LYNWOOD UNIFIED SCHOOL DISTRICT

Bid No. 15MOT26

Lynwood HS Bullis & Mark Twain ES HVAC Replacement Project
Non-DSA

TECHNICAL SPECIFICATIONS

1) LYNWOOD HS BULLIS TECHNICAL SPECIFICATIONS

2) MARK TAWIN ES TECHNICAL SPECIFICATIONS

3) LYNWOOD HS BULLIS CARRIER EQUIPMENT PURCHASED SUBMITTAL

4) MARK TAWIN ES CARRIER EQUIPMENT PURCHASED SUBMITTAL

5) LYNWOOD HS DRAWINGS SET

6) MARK TAWIN ES DRAWINGS SET

Lynwood Unified School District
11321 Bullis Road
Lynwood, CA 90262

SPECIFICATIONS
MANUAL

Non-DSA

LYNWOOD HS, BULLIS & MARK TWAIN ES HVAC REPLACEMENT PROJECT

12124 Bullis Rd, Lynwood, CA 90262.
12315 Thorson Ave, Lynwood, CA 90262

MARCH 19, 2026

1)LYNWOOD HS BULLIS TECHNICAL SPECIFICATIONS

SPECIFICATIONS

LYNWOOD USD DISTRICT WIDE HVAC REPLACEMENT - GROUP LYNWOOD HIGH SCHOOL BULLIS

DIVISION 0 – INTRODUCTORY PAGES

SECTION 00 00 02 - PROJECT DIRECTORY

PART 1 - GENERAL

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-END OF SECTION-

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END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 26 00 - REQUESTS FOR INFORMATION

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of the General and Supplementary Conditions and Division One apply to this section.

B. Section Includes: Procedures for requesting clarification or information about the intent of the contract documents.

1.02 DEFINITIONS

A. Request for information: A request for information, clarification or interpretation is a formal means for the Contractor to verify or clarify the intent of the documents. Requests are presented in writing on a pre-approved form and answered in writing on the same form. Request is prepared by the Contractor, and submitted to the Engineer, to request clarifications or interpretations of the intent of the Contract Documents, or to notify the Engineer of potential conflicts in Contract Documents or between the Contract Documents and field conditions.

1.03 PROCEDURES FOR REQUESTING INFORMATION

A. The Engineer's response is an interpretation or clarification of the Contract Documents. Such request does not authorize changes in the work that impact Contract Sum or Contract Time.

B. When possible, request such clarification either verbally or in writing at the next scheduled Project meeting. When the information request is answered at the project meeting, number the request and enter the response into the meeting minutes. When the urgency or complexity require more timely communication between meetings, prepare and submit a formal written information request to the Engineer, without delay.

C. Submit information requests within 3 days so as not to impede the progress of the work.

1. When an answer to an information request has an effect on cost or time, notify the Engineer in accordance with the Contract Documents. Do not perform such work until a Change Order has been reviewed by the Engineer and approved by the District.

2. When submitting an information request, indicate the time available for the Engineer to respond without causing an impact to the Contract Time.

D. When a request for information involves clarification of coordination issues, lay out Contractors' suggested solutions using scaled sketches, and submit with the request. If the request is such that choices of several logical solutions are apparent to the Contractor, include the logical solutions on the form.

E. Information requests may be returned with a stamp or notation "Not Reviewed", if, in the opinion of the Engineer:

1. The interpretation requested is ambiguous or unclear to the Engineer.

2. The answer is obvious and clear by researching the Contract Documents.

3. The Contractor has not reviewed the request prior to submittal to the Engineer.

4. The Contractor has not offered potential solutions to answer coordination issues or offered logical solutions.

F. Allow a minimum of 4 days for review and response time, after receipt by the Engineer. It is the responsibility of the Contractor to verify receipt by the Engineer. The response time may be increased if:

1. More information is required.

2. The information request is submitted out of sequence.

3. In the opinion of the Engineer, more time is needed to answer the information requests.

G. Do not use information requests for:

1. Submitting substitutions for consideration.

2. Requesting changes or additions of scope to the work.

3. Requesting “value engineering” cost-saving or time-saving changes.

H. If the Contractor believes that a clarification by the Engineer may result in a change, Contractor shall not proceed with the work indicated by the request until a change is approved by the District.

1. If the Contractor believes that a clarification by the Engineer results in additional cost, identify the basis of the Contractor’s bid in the information requests.

2. Answered information requests shall not be construed as an authorization to perform extra work.

I. Form: Submit requests in writing on a form approved by District.

PART 2 – PRODUCTS – NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 32 13 - CONSTRUCTION SCHEDULE - CPM

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of the General and Supplementary Conditions and Division One apply to this section.

B. Section Includes: Construction Schedule procedures, preparation, submittals, reviews, updates, and revisions.

C. Related Sections:

1. Section 01 33 00: Submittals.

2. Section 01 78 39: Project Record Documents.

1.02 SUBMITTALS

A. Approved Schedule: Submit 6 copies and one reproducible of approved Construction Schedule, signed by District and Contractor.

1.03 PROCEDURES

A. Within 15 days after Award of Contract, but not more than 7 days after Notice to Proceed, Contractor shall submit, for review, to the District, a detailed Construction Schedule setting forth requirements for complete execution of work. Construction schedule shall include, but not be limited to specific days, night work, description of work, anticipated completion date(s), phasing, unit building ‘down time’, mechanical system start-up and turnover date.

B. The District will review and return Contractor's Construction Schedule, with summary comments, within 7 days. If revisions are required, Contractor shall resubmit Construction Schedule within 3 days.

C. After approval, changes to Construction Schedule shall not be made unless mutually agreeable to District and Contractor.

D. Include in initial schedule a written summary narrative sufficiently comprehensive to explain basis of Contractor's approach to work.

E. If a Construction Schedule is considered by the District to be in non-compliance with any requirement of the Contract, Contractor will be notified to review and revise Construction Schedule and bring it into compliance. Failure of Contractor to submit a Construction Schedule in full compliance with the Contract may result in a delay in the processing of progress payments, since Construction Schedule will be used in evaluating progress for payment approval.

F. Simultaneously with each submittal of Progress Payment Request, Contractor shall deliver to the District an updated Construction Schedule reflecting work progress as of end of previous reporting period. Each such Construction Schedule shall show actual progress to date in execution of work, together with a projected schedule for completion of work. No changes in logic will be permitted unless agreed upon with District.

G. Scheduled submittals are subject to review and acceptance by the District. The District retains the right to withhold progress payments until Contractor submits a Construction Schedule acceptable to the District.

1.04 PREPARATION GUIDELINES

A. Construction Schedule shall be prepared using Critical Path Method (CPM) of scheduling.

B. Construction Schedule shall be computer-based, in a format acceptable to the District. Level of detail indicated in schedule shall be equal to or greater than the breakdown outlined in Table of Contents of the project manual.

C. Durations and events indicated on schedule shall conform to phasing set forth in the Contract and shall indicate any area or building within a particular phase. Schedule shall indicate Contract "milestone events" and other milestones agreed to by the District; no other milestone dates will be accepted unless approved as a change.

D. Construction Schedule shall represent a practical plan to complete work within time requirements of the Contract.

1. Schedule extending beyond limits of Contract time will not be acceptable.

2. Indicate "float" (plus or minus) in schedule milestone dates.

3. Schedule is subject to approval by the District. Revise and resubmit until approved.

E. Construction schedule shall clearly indicate sequences of construction activities and specifically indicate:

1. Start and completion of all items of work, their major components, and interim milestone completion dates as determined by Contractor and District.

2. Activities for procurement, delivery, installation of equipment, materials and other supplies, including:

a. Time for submittals, resubmittals, and reviews. Include decision dates for selection of finishes.

b. Time for fabrication and delivery of manufactured products for work.

c. Interdependence of procurement and construction activities.

d. Dates for testing and balancing equipment, and final inspection.

F. Schedule shall be in sufficient detail to assure adequate planning and execution of work.

1. Each activity shall range in duration from 1 to 5 workdays, with exception of fabrication and procurement activities, unless directed otherwise by the District. Activity duration shall be total of actual days required to perform and complete that activity and shall not include consideration of weather impact on activity.

2. Schedule shall be cost and resource-loaded with total equal to Contract sum, and shall include all associated interface activities in the Contract including, but not limited to, District's Maintenance Branch activities and Interim Housing schedules, which will be provided by the District.

3. Schedule shall allow monitoring and evaluation of progress in performance of work; it shall be time-scaled in precedence diagramming method (PDM), or arrow diagramming method (ADM).

4. Activities shall include:

   a. Description: what is to be accomplished and where.

   b. Workday duration.

   c. Responsibility code; identifying who performs each individual activity.

5. Network shall show continuous flow from left to right.

6. Identify days per week and shifts per day worked; also, non-work days and holidays.

7. Identify activities which constitute controlling operations, i.e., milestones or critical path.

G. Failure to include any element of work required for performance of this Contract shall not excuse Contractor from completing work required to comply with Contract Documents and Construction Schedule.

H. Submittal of the Construction Schedule shall be interpreted as Contractor's confirmation that schedule meets requirements of the Contract Documents, and that the work will be executed in sequence indicated in schedule.

I. Contractor shall prepare construction only after careful coordination with the District, Probation and the Engineer has been done. Schedule must reflect all suggestions and recommendations by said parties. Construction phasing shall be executed consecutively and without period(s) of intermission. Contractor shall prepare his bid such that no less than ten (10) different phases are included to complete his scope of work indicated in the project documents. Any alteration or changes to phasing and/or execution of work must be approved by Probation and the District prior to start of work.

1.05 REVIEWS, UPDATES, AND REVISIONS

A. The District will review and return Contractor's Construction Schedule, with summary comments, within 10 days. If revisions are required, Contractor shall resubmit the construction schedule within 7 days following receipt of the District's comments.

B. After Contractor and the District agree to a final schedule, it will become the Project Construction Schedule and considered part of the Contract Documents.

C. Construction Schedule Reviews and Updates:

1. Periodically review schedule for:

   a. Actual completion dates for work items completed during report period.

   b. Actual commencement dates for work items started during report period.

   c. Estimated remaining duration for work items in progress are always to be less than original duration, unless modified by change order.

   d. Estimated commencement dates for work items scheduled to start during month following report period.

   e. Changes in duration of work items.

   f. Identification of current and most crucial critical paths to required completion dates.

2. In the case of a schedule change, Contractor shall include a narrative report with the updated progress analysis, which shall include, but not be limited to, a description of problem areas, current and anticipated delaying factors, and any proposed revisions for a recovery plan.

3. Change Orders affecting schedule shall be clearly identified as separate, new activities.

4. Review of Construction Schedule shall not relieve Contractor of the responsibility for accomplishing work in accordance with the Contract Documents.

D. Updates: Contractor shall submit to the District, with each Bi-Weekly payment application, an up-to-date Construction Schedule to include following:

1. Work Item Report: Detailing work items and dependencies as indicated on network diagram, listed in order of ascending work item number.

2. Separate listing of activities completed during reporting period.

3. Separate listing of activities which are currently in progress, indicating their remaining duration and percentages completed.

4. Separate listing of activities which are causing delay in work progress.

5. All reports shall be arranged based on appropriate phasing, areas within a phase, or broken down by building or facility.

6. Narrative report to define problem areas, anticipated delays, and impact on Construction Schedule. Report corrective action taken, or proposed, and its effect, including effect of changes on schedules of individual contractors.

7. Resolution of conflict between actual work progress and schedule logic: when out-of-sequence activities develop in schedule because of actual construction progress, Contractor shall submit a revised schedule to conform to current job sequence and direction.

E. If, according to current updated Construction Schedule, the District determines Contractor is behind the Contract completion date or any interim milestone completion dates and taking into account time extensions to which Contractor is entitled, Contractor shall submit a revised schedule, indicating a workable plan and a narrative description to complete project on time.

1. The District may withhold progress payments until schedule changes are approved.

F. Scheduling of change or extra work orders is responsibility of Contractor.

1. Contractor shall revise Construction Schedule to incorporate all activities involved in completing change orders, or extra work orders, and submit it to the District for review.

G. If the District finds Contractor is entitled to extension of any completion date under provisions of the Contract, the District's determination of total number of days extension will be based upon current analysis of Construction Schedule and upon data relevant to extension.

H. Contractor acknowledges and agrees that delays to non-critical activities (those with "float") will not be considered a basis for a time extension unless activities become critical. Non-critical activities are those activities which, when delayed, do not affect an interim or final Contract completion date.

I. Any claim for extension of time shall be made in writing to the District not more than 24 hours after commencement of delay; otherwise, it shall be deemed finally waived for all purposes. Contractor shall provide an estimate of probable effect of such delay on progress of the work as part of the claim.

1.06 CONTRACTOR'S RESPONSIBILITY

A. Contractor shall provide sufficient skilled labor, materials, and equipment to properly carry out the work in accordance with Construction Schedule.

1.07 SUSPENSION OF PAYMENTS

A. Initial Submittal: The District has the right to withhold progress payments until Construction Schedule is approved.

B. Monthly Submittals: The District has the right to withhold progress payments if Contractor fails to update and submit Construction Schedule and reports as specified.

1.08 RECORD COPY

A. At completion of work items, submit Construction Schedule reflecting actual project critical paths.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 33 00 - SUBMITTALS

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of the General and Supplementary Conditions and Division One apply to this section.

B. Section Includes:

1. Procedures for submitting, to the District, items such as schedules, shop drawings, product data, samples, material lists, manuals, warranties and certificates, required by this section and individual specification sections, finish hardware schedule and segregation of contract costs.

2. Wherever possible, throughout the Contract Documents, the minimum acceptable quality of workmanship and materials has been defined by the name and catalog number of a manufacturer and by reference of recognized industry standards.

3. To ensure that specified products are furnished and installed in accordance with the design intent, procedures have been established for advance submittal of design data and for its review by the District.

C. Related Sections:

1. Section 01 32 13: Construction Schedule.

2. Section 01 78 39: Project Record Documents.

3. Other sections requiring submittals, as indicated in specification sections.

1.02 DEFINITIONS

A. Shop Drawings: Shop drawings are original drawings prepared by Contractor, subcontractor, supplier, or distributor which illustrate some portion of work by showing fabrication, layout, setting, or erection details.

1.03 SUBMITTAL PROCEDURES

A. After award of contract, Contractor will receive the documentation checklist for project completion forms provided by the District. Forms will indicate documentation requested by the District, such as shop drawings, manufacturer's catalogs, samples, warranties, operating and instruction manuals.

B. Upon receipt of checklist, Contractor shall, during course of project, secure and submit the required documentation to the District for review and approval.

C. After the District has date-stamped, signed and reviewed submittals, with corrections noted, if any, the District will transmit submittals to Contractor. Final inspection shall not be held until documentation checklist has been completed.

D. Timing of Submittals:

1. Within 7 days after award of contract, Contractor shall submit to the District shop and diagram drawings, materials lists and other submittals required by the specifications, prior to the establishment of a job start date. (Exception - Finish Hardware Schedule and Segregation of Contract Costs). Contractor shall submit a single, complete submittal package – multiple submittal packages will not be accepted unless otherwise agreed upon by the District and Engineer. Should Contractor submit multiple submittal packages without the approval of the District and Engineer, Contractor may be subject to fee charges for additional review time spent by District and/or Engineer.

2. Provide a schedule of submittals in conformance with construction schedule. Refer to Section 01 32 13: Construction Schedule - CPM.

    a. Submit and review with the District, a schedule for shop drawing submittal dates and date of return required by Contractor in order to maintain construction schedule. Schedule of submittals shall indicate adequate time between submittals in order to allow adequate time for review without impact to construction schedule.

3. Schedule of submittals shall be related to work progress, and shall be organized to allow sufficient time for mailing, reviewing, corrections, resubmission and re-reviewing.

4. Coordinate submittal of related items.

5. Revise, update and submit schedule of submittals to the District, on first of each month, or as required.

6. Allow at least 5 days for the District's review following receipt of submittal. For Divisions 23 and 26 submittals, allow a minimum of 7 days following receipt of submittal.

E. Make submittals in accordance with the construction schedule, and shop drawing submission schedule, in sequence that avoids delaying work and progress of related work.

F. Each submittal shall be accompanied by a letter of transmittal containing an itemized and numbered list of submitted materials. Separate letters of transmittal shall accompany each submittal from different subcontractors.

G. Resubmission: If requested, resubmit submittals within 3 days. Resubmit as specified for initial submittal but identify as such. Indicate changes which have been made other than those requested by the District.

PART 2 - PRODUCTS

2.01 CONSTRUCTION SCHEDULE

A. Provide in accordance with Section 01 32 13 Construction Schedule – CPM.

2.02 SHOP DRAWINGS

A. Draw shop drawings to an accurate scale that is large enough to indicate all pertinent features and methods.

B. Copies Required and Distribution: Unless otherwise indicated in individual specification sections, submit 7 sets of blueline prints of which four sets will be retained by the District, and 2 copies will be returned to Contractor.

C. Contractor MUST prepare shop drawings for all aspects of work, including but not limited to:

a. Chilled and hot water piping – 1/16” (min.) site plan indicating all work

b. Air handling equipment rooms – ¼” (min.) plan indicating new equipment layout, ductwork, hydronic piping and piping appurtenances

c. Building Unit piping – 1/8” (min.) plan indicating pipe routing inside of building and on roof. Indicate building and roof opening locations and sizes.

d. Controls wiring, schematics and sequences

D. All shop drawings must be approved by Engineer prior to the ordering, fabrication, and/or installation or equipment and/or contracted work.

E. See Section 23 30 00, paragraph 1.6 for additional requirements.

2.03 PRODUCT DATA

A. Manufacturer's Standard Schematic Drawings:

1. Delete information that is not applicable to project.

2. Supplement standard drawings to provide additional information applicable to Project.

B. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations, and other standard descriptive data:

1. Clearly mark each copy to identify pertinent materials, products, or models.

2. Indicate dimensions and clearances required.

3. Indicate performance characteristics and capacities.

4. Indicate wiring diagrams and controls.

C. Copies required and Distribution: Submit 6 copies. The District will retain four copies, and 2 will be returned to Contractor.

2.04 SEGREGATION OF CONTRACT COSTS

A. Provide a Segregation of Contract Costs as required by the general condition requirements of the District.

2.05 MANUALS

A. Where manuals are required to be submitted covering items included in work, prepare manuals in durable binders, approximately 8-1/2" by 11" in size, and provide following information:

1. Identification on, or readable through, front cover stating general nature of manual.

2. Neatly typewritten index at front of manual, furnishing immediate information as to location in manual of data or equipment involved.

3. Complete instructions regarding operation and maintenance of equipment involved.

4. Complete nomenclature of replaceable parts, their part numbers, current cost, and name and address of nearest vendor of parts.

5. Copy of all guarantees and warranties issued.

6. Copy of approved shop drawings with data concerning changes made during construction.

B. Extraneous Data: Where contents of manuals include manufacturers' catalog pages, clearly indicate precise items included in this installation and delete, or otherwise clearly indicate, manufacturers' data which is not part of this installation.

C. Number of Copies Required: Deliver 7 copies to the District for review, approval and distribution. The District will return 3 copies to Contractor.

2.06 CERTIFICATES

A. Submit in triplicate, in accordance with requirements of each specification section.

2.07 MATERIAL LIST SUBMITTALS

A. Provide material lists on following:

1. Electrical.

2. Heating, ventilating and air conditioning.

3. Plumbing.

4. Controls.

B. Copies Required: 8 copies; 2 copies will be returned to Contractor.

C. Provide supplementary submittals for materials omitted or not approved.

D. Substitutions proposed by Contractor shall be made in accordance with the General Conditions of the Contract.

PART 3 - EXECUTION

3.01 SUBMITTAL REVIEW BY CONTRACTOR

A. Review submittals prior to submission to the District. Review and stamp submittals prior to review by District.

B. Clearly identify deviations from the Contract drawings and specifications on submittals. Prior approval of deviations by the District or their representative is required. Contractor shall not use the submittal process for substitution requests.

C. Deliver submittals to the District. Identify project name and address, telephone number of Contractor, subcontractor and supplier. Identify, as appropriate, pertinent drawing sheets, detail numbers and specification section numbers. Clearly identify deviations from contract documents.

3.02 SUBMITTAL REVIEW BY DISTRICT

A. District will not review submittals that have not been stamped and reviewed by Contractor. Such submittals will be returned, without review, to Contractor.

B. District will review submittals required, according to the submittal schedule, and make corrections, notes or modifications as appropriate. Submittals will be stamped, to indicate the action required, and returned to Contractor.

1. Submittals not required by the contract documents will be returned without review.

2. District's approval stamp is for design and quality only, and is not an approval for deviations or quantities.

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 40 00 - QUALITY CONTROL

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Interpretation of requirements.

B. Quality assurance and control of installation.

C. Tolerances.

D. Field samples.

E. Mock-up.

F. Manufacturers' field services and reports.

1.2 INTERPRETATION OF REQUIREMENTS

A. If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement.

B. The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation shall comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits.

C. Where codes or specified standards indicate higher standards, more stringent tolerances or more precise workmanship than levels shown or specified, comply with most stringent requirements.

D. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.

1.3 QUALITY ASSURANCE/CONTROL OF INSTALLATION

A. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this project, whose work has resulted in construction with a record of successful in-service performance.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

E. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

F. Comply fully with manufacturers' instructions, including each step in sequence.

G. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

H. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.4 TOLERANCES

A. Monitor tolerance control of installed products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturer's tolerances. Should manufacturer's tolerance conflict with Contract Documents, request clarification from Architect before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.5 FIELD SAMPLES

A. Install field samples at the site as required by individual specifications sections for review.

B. Acceptable samples represent a quality level for the Work.

C. Where field sample is specified in individual sections to be removed, clear area after field sample has been reviewed by Architect.

1.6 MOCK-UP

A. Mock-up will be performed under provisions identified in this section and identified in the respective product specification sections.

B. Assemble and erect specified items, with specified attachment and anchorage devices, flashings, seals and finishes.

C. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

D. Where mock-up is specified in individual Sections to be removed, clear area after mock-up has been reviewed by Architect.

1.7 MANUFACTURERS' FIELD SERVICES AND REPORTS

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment and other field services as applicable, and to initiate instructions when necessary.

B. Individuals to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

C. Submit report in duplicate within 15 days of observation to Architect for review.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 GENERAL INSTALLATION

A. Comply with requirements specified in Section 01 73 00.

3.2 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Verify that utility services are available, of the correct characteristics, and in the correct locations.

3.3 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 42 13 - ABBREVIATIONS, SYMBOLS AND ACRONYMS

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of the General and Supplementary Conditions and Division One apply to this section.

B. Section Includes: List of abbreviations, symbols and acronyms used in these specifications:

1.02 ABBREVIATIONS

ac	Alternating current
amp	ampere
BTU	British thermal unit
cfh	Cubic feet per hour
cfm	Cubic feet per minute
cm	Centimeter
Co.	Company
COP	Coefficient of performance
Corp.	Corporation
d	Penny
db.	Decibel
DB	Dry bulb
dc	Direct current
EER	Energy efficiency ratio
F	Degrees Fahrenheit
fpm	Feet per minute
ft	Foot or feet
gph	Gallons per hour
gpm	Gallons per minute
HP	Horsepower
HVAC	Heating, ventilating and air conditioning
Hz	Hertz
Inc.	Incorporated
KHz	Kilohertz
Kip	thousand pounds
Ksf	Thousand pounds per square foot
Ksi	Thousand pounds per square inch
Kv	Kilovolt
KVA	Kilovolt amperes
KW	Kilowatt
KWH	Kilowatt hour
LF	Linear foot
lb	Pound
LED	Light emitting diode
MBH	1000 BTUs per hour
MHz	Mega hertz

mil	Thousandth of an inch
mm	Millimeter
mph	Miles per hour
oz.	Ounce
PCF	Pounds per cubic foot
pH	Acidity-alkalinity balance
psf	Pounds per square foot
psi	Pounds per square inch
psig	Pounds per square inch, gage
RF	Radio frequency
rpm	Revolutions per minute
SF	Square foot
SY	Square yard
V	Volt
WB	Wet bulb

1.03 SYMBOLS

#	Number or pound
'	Foot or feet
"	Inch(es)
%	Percent

1.04 ACRONYMS

AA	The Aluminum Association, Inc
AABC	Associated Air Balance Council
AAMA	American Architectural Manufacturers Association
AASHTO	American Association of State Highway and Transportation Officials
AATCC	American Association of Textile Chemists and Colorists
ABMA	American Boiler Manufacturers Association
ACI	American Concrete Institute
ADA	Americans for Disability Act
AGA	American Gas Association
AGCIH	American Conference of Governmental Industrial Hygienists
AI	Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Movement and Control Association, Inc.
ANSI	American National Standards Institute
APA	APA – The Engineered Wood Association
ARI	Air-Conditioning and Refrigeration Institute
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials

ATBCB	Architectural & Transportation Barriers Compliance Board
AWI	Architectural Woodwork Institute
AWPA	American Wood Preservers Association
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
BIA	Brick Institute of America
CCR	California Code of Regulations
CFR	Code of Federal Regulations
CISPI	Cast Iron Soil Pipe Institute
CLFMI	Chain Link Fence Manufacturers Institute
CQC	California Quality Control (CMA Standards)
CRA	California Redwood Association
CRI	Carpet and Rug Institute
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standards, U.S. Department of Commerce
CSFM	California State Fire Marshal
CSI	The Construction Specifications Institute
CTIOA	Ceramic Tile Institute of America
CTI	Cooling Tower Institute
DHI	Door and Hardware Institute
DSA	Division of the State Architect, Office of Regulation Services
EPA	Environmental Protection Agency
ETL	ETL Testing Laboratories
FCC	Federal Communication Commission
FM	Factory Mutual
FS	Federal Specifications
GA	Gypsum Association
GANA	Glass Association of North America
HMMA	Hollow Metal Manufacturer’s Association
HPVA	Hardwood Plywood & Veneer Association
IACS	International Annealed Copper Standards
IAMPO	International Association of Plumbing and Mechanical Officials
ICBO	International Conference of Building Officials
ICC	International Code Council
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical & Electronic Engineers, Inc.
IES	Illuminating Engineering Society
IMI	International Masonry Institute
IRI	Industrial Risk Insurers
ISO	International Organization for Standardization

MLSFA	Metal Lath/Steel Framing Association
MSS	Manufacturers Standardization Society of the Valve & Fittings Industry.
NAAMM	National Association of Architectural Metal Manufacturers
NBFU	National Board of Fire Underwriters
NBS	National Bureau of Standards
NCMA	National Concrete Masonry Association
NEMA	National Electrical Manufacturers Association
NEC	National Electrical Code
NFPA	National Fire Protection Association
NFPA	National Forest Products Association
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology
NOFMA	National Oak Flooring Manufacturers Association
NPCA	National Paint and Coatings Association
NPDES	National Pollutant Discharge Elimination System
NRCA	National Roofing Contractors Association
NSF	National Sanitation Foundation
NTMA	National Terrazzo & Mosaic Association
NUSIG	National Uniform Seismic Installation Guidelines
NWMA	National Woodwork Manufacturers Association
PCA	Portland Cement Association
PCI	Precast/Prestressed Concrete Institute
PDI	Plumbing and Drainage Institute
PEI	Porcelain Enamel Institute
PS	Product Standard, U.S. Department of Commerce
RIS	Redwood Inspection Service
RFCI	Resilient Floor Covering Institute
SCAQMD	South Coast Air Quality Management District
SDEI	Steel Deck Institute
SDI	Steel Door Institute
SFM	State Fire Marshal
SFPA	Southern Forest Products Association
SIGMA	Sealed Insulating Glass Manufacturers Association
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SSPC	Steel Structures Painting Council
SWI	Steel Window Institute
TCA	Tile Council of America
UBC	Uniform Building Code
UBPPA	Uni-Bell PVC Pipe Association
UCI	Uniform Construction Index
UFAS	Uniform Federal Accessibility Standards

UL	Underwriters' Laboratories, Inc.
UMC	Uniform Mechanical Code
UPC	Uniform Plumbing Code
WCLIB	West Coast Lumber Inspection Bureau
WDMA	Window and Door Manufacturers Association
WIC	Woodwork Institute of California
WWPA	Western Wood Products Association

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 51 00- CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of the General and Supplementary Conditions and Division One apply to this section.

B. Section Includes Description of temporary utilities and protection of construction facilities that are to be provided and maintained by Contractor.

1.02 TEMPORARY UTILITIES

A. Water:

1. Water used on work will be furnished and paid for by the District. Contractor shall provide necessary temporary piping from distribution point to points on site where water is necessary to carry on work, and upon completion of work shall remove temporary piping.

2. Provide suitable drainage system, subject to approval of the District Inspector, to carry construction wastewater from site to an approved disposal location.

B. Electricity:

1. The District will furnish and pay for electrical power necessary for construction purposes at site. Contractor shall provide necessary temporary wiring and lighting and shall remove all temporary wiring and lighting at the completion of the work. Temporary wiring and lighting shall comply with requirements of the Los Angeles Electrical Code. Contractor shall be responsible for all damage caused by overloading or other causes and the installation shall be satisfactory to the District Inspector.

2. Furnish and install area distribution boxes, so located that individual trades may use 100 feet maximum length extension cords to obtain adequate power and artificial lighting, at points where required for work, for inspection and for safety.

3. Provide electricity needed for construction including connections for construction equipment requiring power.

C. Gas: Contractor shall provide and install gas equipment and piping necessary to perform his work, and shall remove same upon completion of work. Contractor shall pay for the gas used in work.

D. Heating and Ventilation:

1. Provide, maintain, and pay for heat needed for proper installation of work and to protect materials and finishes from damage due to weather.

2. Provide ventilation of enclosed areas to cure materials, to disperse humidity, and to prevent accumulation of dust, fumes, or gases.

E. Temporary Telephone: Contractor shall provide and pay all costs for one cellular telephone or business telephone line at site for his use. Use of District telephones will not be permitted.

F. Temporary FAX: Make necessary arrangements and pay costs for installation and operation of telephone service to Contractor's office at site, suitable for sending and receiving FAX transmissions. Install a plain-paper FAX machine connected to this line and available 24 hours a day during construction operations.

G. Use means necessary to maintain temporary facilities and controls in proper and safe condition throughout progress of work.

H. Make required connections to existing utility systems with minimum disruption to services in existing utility systems. When disruption of existing service is required, do not proceed without the District Inspector's approval and, when required, provide alternate temporary service.

1.03 TEMPORARY HEATING AND COOLING

A. Equipment:

1. Contractor shall provide heating and/or cooling equipment as required to provide heated and/or cooled conditioned air to occupied spaces for which construction has temporarily disabled air conditioning equipment serving that space. All equipment must be sized properly to meet cooling and/or heating load requirements.

2. All temporary equipment must be secured with provisions stated in Section 1.04 of this specification.

3. Contractor shall be responsible for furnishing and installing all equipment and/or items required to properly mount or secure temporary equipment.

4. Upon completion of this project, Contractor shall remove all temporary equipment and appurtenances from the site. All areas and material finishes must be restored to their original state.

1.04 CONTRACTOR'S FACILITIES

A. Storage Units:

1. Provide secure and waterproof storage units where required for the temporary storage of furniture, equipment and other items. Storage unit must be located within the confines of a safety barricade (see below) and shall remain inaccessible to facility occupants.

2. Storage Unit Construction: Walls, roof and doors minimum 16 gage steel; floors 1 inch tongue and groove hardwood or 3/4 inch minimum exterior type plywood, with undercarriage designed to accommodate forklift blades 42 inch to 60 inch long; doors at one end of storage unit, double wide swing out with waterproof gaskets and lockable steel bars.

3. Pay all delivery charges and set the storage unit where directed by the District Inspector.

4. Remove storage unit from the site after removal of all the items that were

B. Contractor's Safety Barricade:

1. Contractor shall erect safety barricade as required by the District Inspector for the protection and safety of staff and the public. New or pre-used material can be utilized.

2. Unless otherwise indicated or specified, barricade shall be constructed of 8 feet high chain link fencing and shall be properly secured to the ground and/or structure. Space posts not to exceed 10 feet on centers.

3. Chain link fencing shall be free from barbs, icicles or other projections resulting from galvanizing process. Fence fabric having such defects will be rejected even though it has been erected.

4. Gates shall be fabricated of steel pipe with welded corners, and bracing as required. Fabric to be attached to frame at 12 inch centers. Provide all gate hardware of a strength and quality to perform satisfactorily until barricade is removed upon completion of work.

5. At completion of work, remove barricade and concrete post footings from site; backfill and compact fence footing holes. Existing surface paving that is cut into or removed shall be patched and sealed to match surrounding areas.

6. The Inspector may allow the use of panelized chain link fence or properly supported orange plastic fence.

7. Edge Protection Guardrails for roof work per OSHA and District Requirements. Cones and caution tape is not acceptable.

C. Other Enclosures:

1. Provide lockable, temporary weather-tight enclosures at openings in exterior walls to facilitate temporary cooling or heating and security.

2. Provide protective barriers around trees, plants and other improvements designated to remain.

D. Storage Yards and Sheds:

1. Contractor shall fence and maintain storage yards in an orderly manner.

2. Storage for materials that cannot be stored outside may be stored within building.

3. District Inspector shall approve exact location, size and access of storage yards.

4. Remove storage yards and sheds as rapidly as progress of work will permit.

E. Contractor's Parking:

Location and number of spaces for Contractor's parking as directed by the District Inspector, temporarily stored and when directed by the District Inspector.

1.05 GENERAL ITEMS

A. Staging areas for delivery of materials and equipment will be at locations designated by the District Inspector.

B. Safety and Security Lighting: Provide 20-foot candles minimum inside building(s) and 5 foot candles outside.

C. Noise Control: Muffle all equipment. All noise levels shall comply with OSHA and CAL/OSHA requirements. Excessive noise tasks such as coring etc. shall be performed after hours or weekends.

D. Dust and Odor Control: Dust and odor barriers shall be in place dividing areas of work and remainder of building to provide a safe and clean environment for building occupants. Provide adequate ventilation if required. Comply with all OSHA and CAL/OSHA requirements.

E. Where temporary noise/duct partitions are required, Contractor shall build a dividing partition, which will extend from finished floor up tight to the underside of existing ceiling. (Upon removing partition,

Contractor shall repair floor and/or ceiling as required to match existing conditions.) Contractor shall construct partition in accordance with local building codes. Under no circumstances shall temporary partition block any means of egress or impede the regular flow of occupant traffic. Contractor shall provide District with a scaled drawing indicating the exact location of the temporary partition relative to its' surroundings. Contractor must have approval from District prior to the erection of such partition.

1.06 TRENCHES

A. Open trenches for installation of utility lines (water, gas, electrical and similar utilities) and open pits outside barricaded working areas shall be cordoned at all times. Barricades, shall be as identified in another part of this section. Walk Plates shall be installed at all pedestrians and vehicle traffic cross-area (see below). Trenches shall be backfilled and patch-paved within 72 hours after approval of installation by the District Inspector.

B. Open trenches deeper than 42 inches, and not located within a parking area or public street access, shall be enclosed within an 8-foot high chain-link fence.

C. Trenches or excavations which cannot be properly back-filled and patched prior to the end of each work day shall be bridged to permit an unobstructed flow of traffic. Trench walls and adjacent soils shall be sufficiently stabilized prior to the use of steel plates for bridging.

   a. Bridging must be secured against displacement by using adjustable cleats, angles, bolts, or other devices to prevent movement by traffic.

   b. The trench must be adequately shored to support the bridging and traffic.

   c. Steel plates used for bridging must extend 1 foot beyond the edges of the trench. Temporary paving materials (premix) should be used to feather the edges of the plate to minimize wheel impact.

D. All excavations in public rights-of-way shall be in compliance with all current Occupational Safety and Health Act (CAL/O.S.H.A.) requirements. Any persons in an excavation not in compliance with CAL/O.S.H.A. regulations will be ordered out of the excavation until it is brought into compliance.

E. All excavations or trenches made in the parking area or sidewalk shall be backfilled and patched in accordance with the current CDOT and/or NCDOT specifications. District inspector shall be notified prior to making an excavation or cutting a trench in any pavement or sidewalk.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of the General and Supplementary Conditions and Division One apply to this section.

B. Section Includes:

1. Quality assurance.

2. Delivery, storage and handling.

3. Installation requirements.

1.02 QUALITY ASSURANCE

A. Standard References: Material or procedure specified by reference to number, symbol, or title of a specific standard, such as a commercial standard, a Federal Specification, a trade association standard, or other similar standard document shall comply with requirements in latest version, revision, amendment or supplement of document in effect on date of executed contract, except as limited to type, class or grade, or modified in such reference.

1.03 DELIVERY, STORAGE AND HANDLING

A. All materials and products for the project shall be delivered in manufacturer's original, undamaged, factory sealed containers, with factory applied labels intact and legible.

B. The labels shall contain the following information as applicable: Manufacturer's name and address; brand name; product designation; type, class or grade; size or weight; batch number; testing lab certification and color.

1.04 EQUIPMENT FURNISHED BY THE DISTRICT

A. Delivery: Within 15 days after the Contract is awarded, Contractor shall notify the District, in writing, of date scheduled for installation of equipment. Upon delivery to site, Contractor shall store equipment inside rooms or protected spaces. The District Inspector will sign receipt, or bill of lading, as required.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 INSTALLATION REQUIREMENTS

A. Install equipment in location and orientation indicated on drawings, or in locations provided by District Inspector.

B. Equipment shall be installed plumb and level, by means of shims or spacers, in a manner that with all mounting bolts fully tightened, no distortion nor undue stresses will be set up within equipment. Furnish other accessories and components necessary to properly install equipment, such as bolts, washers, fittings or blocking.

C. Floor Mounted Equipment:

1. Equipment designed or specified to be attached to substrates such as concrete or steel shall be secured with anchor bolts and tampins, cinch anchors or fastite bolts and shells of size recommended by manufacturer of equipment, or as required for secure mounting.

2. Equipment designed or specified to be attached to wood construction shall be secured with machine bolts or lag screws, of size recommended by manufacturer of equipment, and as directed by the District Inspector.

D. Bench Mounted Equipment: Secure to bench or table by machine bolts.

E. Equipment shall be connected only to outlets with correct electrical characteristics. Contractor shall ascertain that the electrical characteristics of the equipment are for outlets indicated. Report discrepancies immediately to the District Inspector.

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of the General and Supplementary Conditions and Division One apply to this section.

B. Section Includes:

1. Cutting, patching, and alteration procedures:

a. Removals, cutting, alterations and repairs to existing facilities as required to complete work.

b. Relocation and reinstallation of existing construction and finish.

c. Salvage, storage and protection of existing items to be reinstalled.

d. Salvage and delivery to the District of items so designated for removal and salvaged by Contractor.

2. Examination by Contractor.

3. Final inspection.

1.02 SUBMITTALS

A. Shop Drawings: Submit details of cutting and patching, including transition to existing items being patched. Provide details of all piping and ductwork routing, elevations and sizes. Also provide equipment locations and dimensions relative to equipment pads and all equipment support and pad locations.

B. Schedules: Contractor must submit proposed work schedules, including dates and hours proposed. Schedule must be approved by District prior to starting any work. Where special work conditions apply, Contractor must provide a detailed work schedule which must include all duties, work dates and times, completion dates, and an explanation stating means and methods for executing such work.

C. All work executed within the building shall be done on Monday through Friday during the hours of 7:00 a.m. to 6:30 p.m. Any deviations from the said days and/or times must be approved with the District prior to executing such work. Any work to be done before and/or after stated times (except on Saturday or Sunday) shall be scheduled as required and done without additional cost to the District.

1.03 WARRANTIES

A. Existing Warranties: Repair materials and systems that have been cut, modified or damaged as a result of cutting, patching or alteration procedures, using methods and materials that will not void existing warranties. It shall be the responsibility of the Contractor to contact the District and/or Contractor backing an existing warranty – coordinate and consult as required to ensure that all materials are restored to their original condition and warranties are not voided. Any damage to existing systems under warranty shall be repaired by Contractor at no additional cost to the District.

1.04 REMOVAL, ALTERATIONS AND REPAIRS

A. Restore and refinish new and existing construction and improvements that are cut into, damaged, relocated, or reinstalled. Workmanship and materials shall conform to applicable provisions of other sections.

B. Provide new fasteners, connectors, adhesives, and other accessory materials or components as required to complete the work.

C. Perform removals and alterations only to the extent required to complete the work. Carefully remove work to be salvaged or reinstalled. Protect and store for reuse.

1. Walls, Partitions, and Ceilings: Remove by accurately cutting and carefully removing.

2. Concrete: Saw with powered concrete saw, or chip where sawing is not feasible, to prevent spalling of concrete to remain. Cut off reinforcing bars, except where bonded into new concrete or masonry, and paint ends with bituminous paint before enclosing.

3. Woodwork: Cut or remove to a joint or panel line. Undamaged removed material may be reused.

4. Sheet Metal: Remove back to joint, lap, or connection. Secure loose or unfastened ends or edges and make watertight.

5. Glass: Remove broken or damaged glass and clean rebates and stops of setting materials.

6. Plaster: Cut back to sound plaster on straight lines, and back-bevel edges of remaining plaster. Trim existing lath and prepare for new lath.

7. Gypsum Wallboard: Cut back on straight lines to undamaged surfaces, with at least two opposite cut edges centered on supports.

8. Acoustical Ceilings: Remove hanger wires where ceilings are not reinstalled.

9. Tile: Cut back to sound tile and backing on joint lines if portions are to remain.

10. Flooring: Completely remove flooring and clean backing of old cement or adhesive. Carefully remove wood flooring for patching and repairing of existing wood flooring to remain.

11. Miscellaneous Items: Grind items not mentioned but required to be removed in such manner as minimizes damage to Work to remain.

1.05 CUTTING AND PATCHING

A. Cutting, boring, saw cutting or drilling through new or existing structural elements to be done only when so detailed in drawings or accepted by the Structural Engineer, with approval from the District.

B. Patching, Repairing and Finishing:

1. Concrete: Keep the cut edges damp for 24 hours and scrub with a neat portland cement mortar just before new concrete is placed; epoxy adhesive may be used in lieu of cement mortar. Finish new concrete to match existing. Provide 3,000 psi concrete for repairs. At cut concrete edges to remain exposed, apply adhesive and restore with minimum 3/4" thick cement mortar finished to match adjoining surfaces.

2. Metal Items: Grind cut edges to remain exposed smooth and rounded.

3. Woodwork: Trim back to joint lines or splices, re-trim cut surfaces, and patch new matching or undamaged remove materials.

4. Sheet Metal: Restore removed or damaged sheet metal items as required or directed.

5. Glass: Install new matching glass and re-seal existing exterior windows, airtight.

6. Lath and Plaster:

   a. Lath: Lath surfaces to be patched with matching lath as required, secured to supports at 6" centers. Lap new lath 6" over existing and wire-tie new and existing lath edges together at 6" intervals. Restore paper backings as required, shingled into existing.

   b. Plaster: Apply a bonding agent on cut edges of existing plaster. Apply 3-coat plaster patching of type, thickness, finish, color, and texture to match existing plaster.

7. Gypsum Wallboard: Refasten cut edges of existing wallboard. Apply patches with at least two opposite edges centered on supports and secure at 6" centers. Tape and finish joints and fastener heads. Make patching non apparent when painted.

8. Acoustical Ceilings: Conform to requirements specified herein as necessary to match the existing conditions.

9. Resilient Flooring: Completely remove damaged flooring and clean off all old cement as specified. Install new flooring of color, pattern, and type as specified.

10. Painted Surfaces: Prepare patched areas and refinish as specified in Section 09 90 00: Painting.

1.06 PREPARATION OF EXISTING WORK

A. Holes: Drill holes through existing concrete or masonry for new conduit and/or piping, and do not jack-hammer.

B. Sandblasting: Work includes sandblasting of existing surfaces to receive materials secured by cementitious, adhesive, or chemical bond (such as concrete, toppings, elastomeric coatings, plaster, mortar, etc.), and the sandblasting of other surfaces as shown, specified, directed, or required for proper preparation of surfaces. Completely remove existing finishes, stains, oil, grease, bitumen, penetrated mastics and adhesives including primers, and substances deleterious to bond or connection of new materials, and expose clean sound surfaces. Employ wet sandblasting for interior surfaces, and for exterior surfaces where directed or necessary to prevent creation of a dust nuisance or required by Code.

C. Salvage: Existing removed items not indicated or specified to be reused or reinstalled the District intends to retain will be designated by District prior to start of removals in pertaining area. Carefully remove, salvage, box or bundle as approved, and deliver such items to storage at the site as the District Inspector directs.

D. Disposal: Conform to General Conditions. Dispose of removed material off the District's property except existing items to be salvaged or reinstalled. Promptly remove waste and debris and do not allow to accumulate within facilities or on site.

PART 2 - PRODUCTS

2.01 MATERIALS

A. New Materials: Use materials identical in appearance and performance characteristics to existing materials, so that patch or alterations will visually match and blend seamlessly into adjacent existing surfaces.

B. New ceiling tile to replace the obsolete existing tile – Armstrong 741. See specification 09 51 23.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify compatibility and suitability of existing before starting the work. Perform a detailed survey of existing site and building conditions before starting work. Report unsatisfactory conditions to the District Inspector, such as discrepancies or conflicts between Drawings and actual conditions.

3.02 FINAL INSPECTION

A. A final examination shall be made when work is substantially complete, except for minor corrective items, in accordance with District regulations.

B. Before final examination, completed documentation checklist shall have been received and project record documents shall be completed.

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of the General and Supplementary Conditions and Division One apply to this section.

B. Section Includes: Procedures and requirements for preparing project record documents for delivery to District upon completion of the work.

C. Related Sections:

1. General Conditions.

2. Section 01 33 00: Submittals.

3. Section 01 32 13: Construction Schedule-CPM.

1.02 PROCEDURES

A. Project Record Documents: Promptly following award of contract, Contractor shall secure from the District one complete set of Specifications and prints of contract drawings for use on the job site as project record drawings.

B. Timing of Entries: Make entries within 24 hours after receipt of information.

C. Contractor shall be responsible for maintaining and recording changes on project record documents set, by marking them on a daily basis to record the details of construction, including changes and substitutions.

D. Do not use project record documents set for any purpose except entry of new data, and for reference by the Engineer and District. Maintain separate sets for daily reference on job site.

E. Use all means necessary to protect project record documents set from deterioration, loss or damage.

F. Entries on Drawings: Using an erasable color pencil, other than blue, not ink or indelible pencil, clearly describe change by note and by graphic line as required. Date entries. Call attention to entry by a "cloud" around area or areas affected. In event of overlapping changes, different colors may be used for each change.

1. Changes due to approved change orders may be indicated by referencing change order number and scope of change in lieu of revising project record documents, but shall be indicated on the final as-built drawings.

2. Location and depth below finish grade or above ceilings and attic spaces of utilities shall be fully dimensioned and indicated on project record documents. Dimensions shall be taken to building lines or permanent landmarks.

G. District's periodic review of the progress being made on project record documents will be a prerequisite to District's approval of requests for progress or final payments.

1. Progress Approvals: Prior to submitting each request for progress payments, secure the District Inspector's approval of status of project record documents.

2. Prior to submitting request for final payment and final inspection, submit project record (as-built) documents set to the District Inspector, with transmittal letter, in duplicate, for approval and further processing.

3. The Contractor shall certify that the project record documents are complete and accurately reflect all changes or modifications to the original construction documents.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

DIVISION 22 – PLUMBING

SECTION 22 00 00 - PLUMBING

1. PART 1 – GENERAL

1.1 WORK INCLUDED

A. Furnish all labor, materials, services, testing, transportation and equipment necessary for the completion of all plumbing work as indicated on drawings and specified herein. Work materials and equipment not indicated or specified which is necessary for the complete and proper operation of the work of this Section in accordance with the true intent and meaning of the contract documents shall be provided and incorporated at no additional cost to the Owner.

1.2 QUALITY ASSURANCE

A. Code Requirements: All work covered by this Section shall conform to the latest requirements of the following regulations:
   1. C.C.R., Title 24, Part 5 (2025 CPC).
   2. 2025 California Plumbing Code.
   3. SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems.
   4. National Fire Protection Association.
   5. California Division of the State Architect.
   6. California State Division of Industrial Safety.
   7. County Health Department.
   8. Any other legally constituted body-having jurisdiction thereof.

B. Nothing in the specifications or drawings shall be construed to permit deviation from the requirements of governing codes unless approval for said deviation has been obtained from the legally constituted authorities having jurisdiction and from the Owner's representative.

1.3 DRAWINGS

A. Because of the small-scale drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall carefully investigate the conditions surrounding installation of his work, furnishing the necessary piping, fittings, valves, traps, and other devices which may be required to complete the installation.

B. The general arrangement indicated on the drawings shall be followed as closely as possible. Coordinate with the Architectural, Structural, Mechanical and Electrical Drawings and the work of other trades prior to installation of piping fixtures and equipment to verify adequate space available for installation of the work shown. In the event a field condition arises which makes it impossible to install the work as indicated, submit, in writing, the proposed departures to the Architect for his approval. Only when Architect's approval is given, in writing, shall Contractor proceed with installation of the work.

C. Special Note: Should the Contractor make changes in the installation differing from what is indicated on the contract drawings and not necessitated due to field conditions as indicated hereinabove, the Contractor shall be required to re-install the work to comply with what has been indicated on the contract drawings. Should it be impossible to re-install the work and the installation is in accordance with all governing authorities, the architect may permit the installation to remain. However, all costs incurred to revise the contract drawings by the engineer for resubmittal to the building department indicating the as-installed condition shall become the

DIVISION 23 – HEATING, VENTILATING & AIR CONDITIONING

SECTION 23 01 30.51 - HVAC EQUIPMENT & DUCT CLEANING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes commissioning process requirements for HVAC&R systems, assemblies, and equipment.

B. Related Sections:
1. Section 01 33 00 Submittal
2. Section 23 30 00 Heating, Ventilation and Air Conditioning

1.03 GENERAL CONDITIONS

A. General Conditions of the construction contract shall be a part of these specifications, and shall govern the HVAC Systems Rehabilitation Contractor. All work shall be done in accordance with requirements of the Owner and the construction contractor.

1. Contractor's License: The Contractor shall be licensed in the State of California. This License shall be a C-61 Specialty License in the D-64 Duct Cleaning Sub-Division.

2. "National Air Duct Cleaners Association (NADCA): The contractor shall be a Certified Member in good standing with NADCA.

3. Contractor shall visit the site prior to bid and make himself thoroughly familiar with the site and existing conditions. By submitting a bid for HVAC equipment and duct cleaning, Contractor declares that he is familiar with existing conditions and is capable of executing work detailed herein at no additional cost(s) to the Owner.

1.04 QUALLITY ASSURANCE

A. Contractor shall have thorough knowledge and experience in the rehabilitation and cleaning of projects of similar type, size, and degree of difficulty completed within the last two years. Contractor agrees:

1. All work shall be supervised by a foreman having thorough knowledge and experience in the cleaning of air conditioning systems. Experienced, qualified personnel shall perform the work.

2. Contractor shall be fully covered by Workmen's Compensation, Public Liability and Property Damage Insurance, and certificates of these coverage's and limits shall be provided to the Owner upon request.

3. Any mechanical problems discovered during the course of cleaning will be reported in writing within 24 hours to the project coordinator

4. Contractor shall leave area of work in same condition as when work started (on a day-to-day basis and from project start to finish).

5. Contractor shall keep work area free of all surplus material and debris. Upon completion of each shift, all tools, equipment, debris, etc. shall be moved to a designated area selected by the Owner.
6. Contractor shall take all necessary measures to minimize the migration of dust and other air borne particles during the cleaning process. ALL outlets and inlets leading to (or from) occupied spaces must be covered with a leak-proof catch basin. At no time shall dust and/or other air borne particles be blown or dispersed into any space within the building.
7. Contractor shall at all times be in compliance with Cal OSHA and EPA regulations.
8. Unless otherwise noted, Contractor shall be responsible for cleaning all existing supply, return, exhaust, and outside air intake duct to remain as indicated on plans. Any deviations from said section must be approved in writing by the Owner.

B. Photo Documentation: Documentation shall include the use of a digital camera and a fiber optic borescope, where required. Contractor shall take photos of conditions before and after cleaning for inclusion in a project report to be presented to the Owner at the conclusion of the work.

1.05 LABOR AND MATERIALS

A. Contractor shall furnish all labor, materials, supplies, tools, equipment, supervision, transportation and any other services or items necessary to accomplish the work.

B. Safety Procedures and Policy: Contractor shall provide adequate and necessary management personnel to ensure that all safety policies and project requirements are met.

1. Maintain safe and healthy employee working conditions and establish safe operating procedures at each job site.
2. Comply with the safety standards of all federal and state regulatory agencies as a minimum requirement for safety performance at each job site.
3. Comply with all of the safety requirements of the job site and safety requirements mandated by the Owner.
4. Contractor shall provide all necessary safety devices and personal protective equipment for employee use, and shall require their use when needed.
5. The work in progress shall be subject to random unannounced inspections by a representative of Owner.
6. Upon total completion of the project, representatives of Owner will do a quality control inspection. Any area that does not meet the standards of this specification shall be redone at no additional cost.
7. Electrical equipment, sensors and control devices shall be masked, or blocked off where required for protection for water or chemicals.
8. Disinfectant, when used, shall be applied in accordance with the manufacturer instructions, and may be used prior to coating application. System shall be dried after application of disinfectant.
9. HVAC coating shall be applied according to manufacturer instructions. Coating shall be sprayed, brushed, or rolled directly into interior ductwork surface. A continuous film of coating must be achieved. (Provide supplemental ventilation as required.)
10. All ducts too small to allow direct entrance shall have access openings installed approximately every 10-15 feet as required, and at each elbow and vertical riser. Each access opening shall be recovered with a panel made of the same gauge metal, and installed in such a manner as to insure an airtight job. All sheet metal ductwork shall be in accordance with SMACNA Standards, unless otherwise noted.

PART 2 - PRODUCTS

2.01 MATERIALS AND PRODUCTS

A. Material Safety Data sheets for all materials and products used by Contractor shall be provided to Owner prior to start-up of cleaning operations.

B. Degreaser: Maintex 7-11 Armex Baking Soda Blasting Crystals or equal as approved by Owner.

C. Sanitizer Oxine BBJ Microblocide or other EPA registered equal as approved by Owner.

D. Re-Surfacing Treatments: Schuller Superseal Edgecoat Fosters 40-20 Vac-Systems Tough Coat Porta Sept by Porter Paints, containing EPA registered anti-microbial Swamp Cooler Repair condensate drain pan sealant or other EPA registered equal as approved by Owner.

E. Paint: Styletone Series 8 19 Machinery Grey Zynolite Spray Paint.

F. Insulating Lining Material: To match existing or Certainteed Tough Gard Certainteed Ultra-Lite Armaflex Astro-Foil or equal as approved by Owner.

G. Adhesives: Armstrong 520 DPIO/20 Super 77 Spray Adhesive or equal as approved by Owner.

H. Duct Sealant: DP 10/10 Top 12000 Silicone Sealant or equal as approved by Owner

PART 3 – EXECUTION

3.01 METHODOLOGY

A. Cleaning of Ductwork

1. All registers and diffusers shall be removed and cleaned with a mild detergent.

2. All ductwork (not accessible to personnel) shall be cleaned by compressed air, light brush agitation, or vibration agitation, or a combination of any of the above. All duct to be opened so the interior is as visible as possible.

3. Large ductwork shall be cleaned by manual brushing, or vibration agitation. All duct to be opened so as to visually observe the cleaning process.

4. All agitation of contaminants shall be accompanied by negative air pressure created by a negative air machine using a HEPA filter.

5. Access needed for proper cleaning shall be cut into rigid metal ducts at elbows and approximately every 15 feet. Holes shall be sized as appropriate to allow cleaning and visual inspection inside duct.

6. All flexible ducts shall be disconnected at joints and registers for cleaning. Flexible duct lengths of over 15 feet shall be cut at intervals not exceeding 15 feet.

7. Contractor shall provide access in existing ceilings and walls as required. Where openings are made for cleaning purposes, Contractor shall repair such ceilings and walls as required to give a uniform surface. Match existing materials, color and texture.

8. All interior dampers and turning vanes shall be cleaned with a stiff bristle brush and then vacuumed.

9. The surface of all unreplaced liner shall be coated. Any small tears in fiberglass will be repaired with lagging materials and then encapsulated.

10. All access holes made in ducts for cleaning purposes shall be sealed with galvanized sheet panels of the same of heavier gauge metal as the duct. Panels shall be installed with duct sealant and screwed into the duct at four-inch maximum on center, all around as required to maintain an airtight seal. Proof will be required.

11. All flexible ducts disconnected for the purpose of cleaning shall be reattached in the same manner as originally installed.

12. Clean all duct serving remodeled areas, including supply duct and transfer duct. Do not clean main return ductwork at the central air conditioning unit.

B. Hazardous Materials

1. When asbestos or other hazardous materials are encountered, Contractor shall document concern and forward to Owner forthwith.
2. Respiratory protection shall be OSAH/NIOSH approved with HEPA cartridges, or cartridges designed for specific contaminants.
3. No material that is not approved by regulatory authorities shall be introduced to the project as means for accomplishing work outlined herein.

END OF SECTION

responsibility of the Contractor.

D. In case of a difference in the specifications or between the specifications and the drawings, the Contractor shall figure the most expensive alternate and after award of contract, shall secure direction from the Architect.

1.4 PERMITS, INSPECTIONS AND LICENSES

A. All permits, inspections and licenses required by the legally constituted authorities for installation of the work according to the plans and specifications shall be obtained and paid as a part of the work of this section.

1.5 EXAMINATION OF PREMISES

A. Before bidding on this work, Contractors shall make a careful examination of the premises and shall thoroughly familiarize themselves with the requirements of the contract. By the act of submitting a proposal for the work included in this contract, the Contractor shall be deemed to have made such study and examination, and that he is familiar with and accepts all conditions of the site.

1.6 PROTECTION

A. All work, equipment and materials shall be protected at all times. Contractor shall make good all damage caused either directly or indirectly by his own workmen. Contractor shall also protect his own work from damage. He shall close all pipe openings with caps or plugs during installation. He shall protect all his equipment and materials against dirt, water, chemical and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

B. Contractor shall be held responsible for all damage to equipment and materials until he has received written notice from the Architect or Engineer that his work has been accepted.

1.7 LOCATIONS

A. The locations of apparatus, piping and equipment indicated on the drawings are approximate. Piping and equipment shall be installed in such a manner as to avoid all obstruction, preserve headroom, and keep openings and passages clear. The locations of and mounting heights of all fixtures shall be coordinated with the architectural plans and room elevations.

B. Clearances and Openings: Contractor shall cooperate and coordinate his work with all other trades to avoid conflict and permit for a neat and orderly appearance of the entire installation. The Contractor shall, in advance of the work, furnish instructions to the General Contractor as to his requirements for equipment and material installation of any kind, whether or not specifically mentioned on drawings or in the specifications, and shall include recesses, chases in walls, and all required openings in the structure. Should furnishing this information be neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.

C. Contractor shall verify and coordinate pipe routing with location of all electrical rooms, elevator equipment rooms, telecom/data rooms, and other rooms dedicated to the housing of switchgear, panels, or other electrical equipment. In no case shall piping be installed within or above the ceiling of such rooms.

1.8 SUBMITTAL DATA (Also see General Conditions)

A. Submittal Requirements:
1. Furnish, all at one time, prior to any installation, within the time noted below, six (6) copies of valid submittal data on all fixtures, material, equipment and devices. Each submitted item shall be indexed and referenced to these specifications and to identification numbers on fixtures and equipment schedules.

2. Manufacturers' submittal literature and shop drawings are required on all items to ensure the latest and most complete manufacturer's data is available for review. Requirements of the submittals and Engineer's submittal notes are a part of the work of this Division except that Engineer's notes may not

be used as a means of increasing the scope of work of this Division.

3. Submittals will be checked for general conformance with the design concept of the project but the review does not guarantee quantities shown and does not supersede requirements of this Division to properly install work.

4. To be valid, all submittals must:

   (a) Be delivered to the Architect's office within thirty-five (35) days of award of the contract. Contractor shall make time allowance for Engineer's review, return of comments, if any, and resubmittal if required. Corrections or changes in submittals returned as inadequate or incomplete shall be accomplished within this time limit.

   (b) Clearly indicate and label as such any items proposed as substitution for that specified or shown on plans.

   (c) Include all pertinent construction, installation, performance and technical data.

   (d) Have all product data sheets clearly labeled to indicate the individual items being submitted. In addition, all required options and accessories shall be clearly marked.

      (1) Product data sheets corresponding to items indicated on plans shall be clearly labeled with the corresponding fixture or equipment tag number.

      (2) Product data sheets corresponding to items indicated in specifications shall be clearly labeled with the specification section, page and item numbers.

   (e) Include, for every item which differs in size, configuration, connections, service, accessibility or any other significant way, a drawing to the same (or larger) scale as to the pertinent portions of the contract drawings. In this drawing show a complete layout of the system except that which is identical to the contract drawings, unless the unchanged portions must be shown to indicate such things as clearances. This drawing, together with the contract design drawings must show the complete system as revised to accommodate the proposed alternate.

B. Substitution Requirements:

1. Any items included in submittals and proposed by the Contractor as substitution for that specified or shown on plans shall be submitted within thirty five (35) days of award of the contract. After such time, proposed substitutions shall not be accepted for review, and the Contractor shall submit all items as specified or shown on plans.

   (a) For each item proposed as substitution for that specified or shown on plans, copies of product data sheets for the specified item shall be placed side by side with product data sheets for the proposed substitution item within the submittal.

      (1) In addition to the Submittal Requirements for labeling listed above, product data sheets for the specified item shall be clearly labeled "SPECIFIED ITEM, NOT SUBMITTED". Product data sheets for the corresponding proposed substitution item shall be clearly labeled "PROPOSED SUBSTITUTION".

   (b) Provide calculations and other detailed data justifying how any items proposed as substitution were selected for proposal. Data must be complete enough to permit detailed comparison of every significant characteristic for which the specified item was analyzed during design.

2. It shall be the Contractor's responsibility to provide sufficient information to allow the Engineer to analyze any proposed alternate. If inadequate information is provided, the proposal will not be approved and resubmittal will not be allowed.

3. The Contractor shall provide or perform tests required by Engineer for purpose of judging acceptability of proposed substitutions.

4. The Contractor assumes full responsibility that alternate items and procedures will meet the job requirements and is responsible for cost of redesign and of modifications to this and other parts of work caused by alternate items furnished under work in this Section. In view of these responsibilities, it is the purpose of these specifications to establish procedures to ensure that the Contractor has considered all the ramifications of proposed alternates before submitting them for review. Submittals which do not comply with the requirements of these specifications or which indicate proposed alternates that were

selected without proper regard to the requirements of the job will not be approved. No more than one proposed alternate will be considered for each item.

5. Alternate items installed without Engineer's approval will be replaced with specified items at Contractor's expense.

6. The Architect or his authorized representative shall be the sole judge as to the quality and suitability of proposed alternate equipment, fixtures or materials. Decisions of the Architect or that of his representative shall be final and conclusive.

1.9 UNINSPECTED WORK

A. The Contractor shall not allow or cause any of his work to be covered up or closed in until it has been inspected, tested, approved by all authorities have jurisdiction, and until Project Record drawings have been properly annotated.

B. Should any of his work be covered up or closed in before such inspection, he shall, at his own expense, uncover the work to the satisfaction of the inspection party. All related repair work cost shall be borne by the Contractor.

1.10 RECORD DRAWINGS (Also see General Conditions)

A. Contractor shall provide and keep up-to-date a complete "as-built" record set of blueline prints which shall show every change from the original drawings and the exact "as-built" locations and sizes of the work provided under this Section of the specifications. This set shall include locations, dimensions, depth of buried piping, cleanouts, shut-off valves, sewer invert locations, plugged wyes, tees, etc. where applicable. On completion of the work, the Contractor shall incorporate all as-built information on a set of reproducible tracings provided by the Architect and this set of reproducibles shall be delivered to the Architect.

1.11 GUARANTEES (Also see General Conditions)

A. Contractor shall guarantee the entire plumbing and piping systems unconditionally for a period of one (1) year after final acceptance. If, during this period, any materials, equipment, or any part of the systems fail to function properly, the Contractor shall make good the defects promptly and without any expense to the Owner.

B. Contractor shall be responsible for all damage to any part of the premises caused by leaks in pipelines or equipment furnished and installed under this Section for a period of one (1) year after date of acceptance of his work.

C. All equipment and fixtures shall carry manufacturer's warranty against defective parts or poor workmanship for not less than one (1) year. See specific equipment specifications for extended warranty requirements.

2. PART 2 – PRODUCTS

2.1 MATERIALS AND EQUIPMENT (See Schedules on Drawings)

A. General: All materials, as specified or required in the work, shall be new, free from defects and imperfections. All manufactured shall comply with California Assembly Bill 1953.

B.

1. Air Conditioning Condensate Drain Piping.

   (a) Shall be Type "M" copper below roof and indoor.

   (b) Shall be Schedule 80 CPVC on roof.

2. All exposed piping at plumbing fixtures shall be chrome plated yellow brass except exposed pipes in

shop or utility areas.

3. Unions or flanges shall be furnished and installed at each threaded connection to all equipment or valves. The unions or flanges shall be located so that the piping can be easily disconnected for removal of the equipment, tank, or valve, and shall be of the type specified in the following schedule.

   (a) Unions:

      (1) Copper or Brass Tubing: 150 pound cast bronze or copper, ground joint, nonferrous seat with ends, by Walseal, Nibco or Mueller.

   (b) Flanges: Tube Turn or approved equal, raised face 150 pound class forged steel, weld, neck or slip-on type conforming to ASA B16.5 and ASTM A181. For copper piping systems, provide flanges conforming to ANSI B16.24. The faces of the flanges being connected to be alike in all cases. Locate flanges so that the piping can be easily disconnected for removal of the equipment or valve. Gasket material shall be of material suiting the service of the opening system in which installed and which conforms to its respective ANSI Standard (A21.11. B16.21). Provide materials that will not be detrimentally affected by the chemical and thermal conditions of the fluid being carried.

4. All piping on roof shall be supported by pipe supports as manufactured by MAPA Products or Eaton B-Line Dura Blok. Products by Miro Industries and Erico shall be accepted for submittal review.

   (a) Gravity System Piping 2” and Less: MS-1 single post, adjustable height pipe support.

5. All underground non-metallic piping shall have 14 gauge copper "Tracer Wire" continuous for entire length.

C. Roof Flashing:

1. Sanitary vents thru roof and grease vents thru roof: Stoneman No. 1100-5, one (1) piece, seamless, four (4) pound, series with reinforcing steel boot counterflashed with cast iron flashing sleeve and equipped with vandal-proof hood for all vent piping. Seal joint between flashing and pipe with waterproofing compound per flashing manufacturer’s recommendations.

2. Water, gas, condensate drainage and other metallic piping thru roof: Stoneman No. 1100-4, one (1) piece, seamless, four (4) pound, series with reinforcing steel boot counterflashed with cast iron flashing sleeve. Seal joint between flashing and pipe with waterproofing compound per flashing manufacturer’s recommendations

D. Escutcheons: Shall be chrome plated cast brass with setscrew locking device.

E. Dielectric Union Isolators: Connection between incompatible materials above grade and inside building shall be made with two (2) dielectric unions separated by a twelve inch (12") section of red brass pipe. Dielectric union isolator for connection piping or non-compatible materials shall be of standard commercial design with threaded connections.

F. Pipe Supports: Unless otherwise indicated on the drawings, shall be as follows:

1. The Contractor shall furnish and install all miscellaneous iron work including angles, channels, etc., required to appropriately support the various piping systems. Hanger spacing and location shall conform to 2025 California Plumbing Code Table 313.1.

2. All horizontal runs of piping within the building to be supported from the structural framing with steel rods and split ring hangers, B-Line, Grinnell Company, Tolco, or approved equal. Steel rods shall be secured to overhead framing with side beam connectors. Where necessary, install angle iron between framing to accommodate hanger rods. Where several pipes are running together, Unistrut, B-Line or Powerstrut channels with clamps may be used in lieu of individual pipe hangers, and supported from structure as herein specified. Submit test data for type of hanger supports to be provided. For support conditions other than specified herein, the Contractor shall submit method of support for approval prior to any installation.

3. Horizontal Piping Hangers and Supports:

   (a) General: Provide factory fabricated horizontal hangers and supports complying with one of the following MSS types listed to suit horizontal-piping systems, in accordance with MSS SP-69 and

manufacturer's published product information. Select size of hangers and supports to exactly fit pipe size for bare piping, and to exactly fit around piping insulation with saddle or shield for insulated piping. Provide copper-plated hangers and supports for copper-piping systems.

(1) Adjustable Steel Clevis Hangers: (MSS Type 1.) B-Line B 3100

(2) Adjustable Swivel Pipe Rings: (MSS Type 5) B-Line B3690

4. Vertical-Piping Clamps:

(a) General: Provide factory fabricated vertical-piping clamps complying with the following types listed, to suit vertical piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Select size of vertical piping clamps to exactly fit pipe size of bare pipe. Provide copper-plated clamps for copper-piping systems.

(b) Two-Bolt Riser Clamps: (MSS Type 8) B-Line B3373

5. Hanger-Rod Attachments:

(a) General: Provide factory fabricated hanger-rod attachments B-Line, Tolco or approved equal, selected by Installer to suit horizontal-piping hangers and building attachments, in accordance with MSS SP-58 and manufacturer's published product information. Select size of hanger-rod attachment to suit hanger rods. Provide copper-plated hanger-rod attachments for copper-piping systems.

(b) Side beam eye socket, Tolco Fig. #57 for rod sizes 3/8" dia. and Tolco Fig. #25-30-251 for rod sizes 1/2" dia.

6. Building Attachments:

(a) General: Provide factory fabricated building attachments, selected by Installer to suit building structural framing conditions, in accordance with MSS SP-69 and manufacturer's published product information. Select size of building attachments to suit hanger rods. Provide copper-plated building attachments for copper-piping systems.

7. Hanger Rods and Spacing shall conform to the following table:

Pipe Sizes	Spacing	Rods
2 Inch and Smaller	6 Feet	3/8 Inch

8. Hangers and Supports shall be adequate to maintain alignment and prevent sagging and shall be placed within 18 inches of joint. Support shall be provided at each horizontal branch connection.

9. Bracing all piping laterally to structural framing to prevent swaying or lateral movement per bracing detail on plans per seismic note on plumbing sheet P-0.1.

10. Miscellaneous Supports, Wall Brackets, Etc.: Provide where required in accordance with the best standard practices of the trade. Submit shop drawings for all fabricated supports.

11. Isolators. All piping which is not isolated from contact with the building by its insulation shall be installed with a manufactured type isolator. Isolators shall be B-Line vibra clamp and cushion, Super Strut, Stoneman "Trisolator", or approved equal. Piping shall be installed and supported in a manner to provide for expansion without strains. Guides shall be properly installed to ensure this requirement.

12. Shields:

(a) General: Provide shields at piping hangers and supports, factory-fabricated, for all insulated piping as manufactured by Pipe shields Incorporated or approved equal. Size shields for exact fit to mate with pipe insulation.

(b) Protection Shields: MSS Type 40; provide high density insert of same thickness of insulation or equal 100-psi average compressive strength, waterproofed calcium silicate, encased with a sheet metal shield. Insert and shield shall cover entire circumference of the pipe and shall be of length indicated by manufacturer for pipe size and thickness of insulation.

G. Insulation:

1. All condensate drain piping building shall be insulated.

(a) Owens Corning fiberglass SSL 11 with ASJ Max with wrap or equal, composite surface burning characteristics: flame spread 25, smoke developed 50. All condensate drain piping on roof shall have aluminum jacketing.

3. PART 3 – EXECUTION

3.1 INSTALLATION - GENERAL

A. Locations and Accessibility: Install equipment for ease of maintenance and repair. If changes in the indicated locations or arrangements are made by the Contractor, they shall be made without additional charges.

B. Openings: Furnish information to the other trades on size and location of openings which are required in walls, slabs, roof, for piping and equipment at the proper times.

C. Closing-In of Uninspected Work: Do not allow or cause any of the work to be covered up or enclosed until it has been inspected, tested, and approved by the Architect. Any work enclosed or covered prior to such inspection and test shall be uncovered and, after it has been inspected, tested, and approved, make all repairs with such materials as may be necessary to restore all work, including that of other trades, to its original and proper condition.

D. Before laying of any pipe or digging of any trenches, Contractor shall determine by actual excavation and measurement exact locations and depth of existing utility and service lines to which he is going to connect. In event depth of existing sewer main or storm drain is not sufficient to permit installation of piping as detailed on drawings or to make connection in manner indicated, Contractor shall confer with the Architect, Owner's representative and Engineer for Direction.

E. Piping Installation:

1. All piping shall be concealed in finished portion of the building except where otherwise indicated or directed at the time the work is done. All piping shall be installed to clear all framing members and beams, even if drawings do not indicate same. Contractor shall constantly check the work of other trades so as to prevent any interference with the installation of this work.

2. All piping into stem walls and footings shall be double half lap wrapped with 1/8" thick "Armaflex" insulation. The Contractor shall also provide blocked out areas in stem wall and footing as required for the installation of the piping. All piping shall avoid the lower 9" of the footing and the Contractor shall coordinate and provide dropped footings as required for the installation of the underground piping.

3. Unions shall be installed on one side of all screwed shut-off valves, at both sides of screwed automatic valves and on all by-passes, at all equipment connections and elsewhere as indicated or required for ease of installation and dismantling.

4. Connections between copper tubing and equipment shall be with Mueller Brass Company, or approved equal, brass stream line copper to P.P.S. ground joint unions.

5. Cleanouts shall be installed on all condensate drain piping at each aggregate horizontal and vertical change in direction exceeding 135 degrees.

6. All condensate drain piping shall be installed with a minimum slope of 1/8”/FT.

7. All condensate piping on roof shall be painted with UV protection paint.

8. Corrosion Protection:

(a) General.

(1) Corrosion protection shall be provided for all below grade cast iron and copper piping and associated valves and fittings. Such piping shall be protected from corrosion by encasement in a polyethylene protective wrapping, referred to hereafter as polywrap. Although not intended to be a completely air and water tight enclosure, the polywrap shall provide a continuous barrier between the pipe and surrounding bedding and backfill.

(b) Materials.

(1) Cast iron piping encasement.

a) The polywrap shall be minimum 8 mil. in thickness, group 2, linear low density, flat tube, natural (clear) virgin polyethylene film formed into tubes or sheets as required. Material shall meet or exceed the requirements of AWWA C105, ANSI A21.5 and ASTM A674.

b) The polywrap shall be as manufactured by Northtown Company or approved equal.

(2) Copper piping encasement.

a) The polywrap shall be minimum 6 mil. in thickness, group 2, linear low density, flat tube, natural (clear) virgin polyethylene film formed into tubes or sheets as required. Material shall conform to the requirements of ASTM D1248.

b) The polywrap shall be as manufactured by Northtown Company or approved equal.

(3) The minimum Polywrap flat tube width for each pipe diameter shall be as follows:

Pipe Size / Type	Polywrap Flat Tube Width
½" to ¾" copper	2"
1" to 1-½ copper	3"
4" cast iron	16"

(4) The polywrap shall be secured as specified with 2 inch wide pressure sensitive plastic tape not less than 10 mils thick.

a) Tape shall be Scotchwrap No. 50, Polyken No. 900, Tapecoat CT, Johns-Manville No. V-10 Trantex or approved equal.

b) Piping through exterior walls shall be sealed using Link Seal modular seal with nitrile seal elements and stainless steel bolts.

(c) Installation.

(1) The polyethylene tubing shall be cut into lengths approximately 2 feet longer than the pipe sections. Slip the tube around the pipe, centering it to provide a 1-ft overlap on each adjacent pipe section, and bunching it accordion fashion lengthwise until it clears the pipe ends. Lower the pipe into the trench and make up the pipe joint with the preceding section of pipe. . A shallow bell hole must be made at each joint to facilitate installation of the polywrap. The bunched-up polywrap shall be pulled from the preceding length of pipe, slipped over the end of the new length of pipe, and secured in place with one circumferential turn of tape plus enough overlap to assure firm adhesion. The end of the polywrap shall be slipped from the new pipe section over the end of the first wrap until it overlaps the joint at the end of the preceding length of pipe and tape it in place. The loose wrapping on the barrel of the pipe shall be pulled snugly around the barrel of the pipe and excess material folded over the top of the pipe and the folds held in place by means of short strips of adhesive tape, at about 3 foot intervals along the pipe.

(2) Rips, punctures or other damage to the tube shall be repaired with the adhesive tape or pieces of tube material secured with tape. Bends and reducers in the line shall be covered with polyethylene in the same manner as pipe.

(3) Valves, tees, crosses and outlets shall be wrapped with flat sheets of the same material. The sheets shall be passed under valves and brought up around the body to the stem. Edges shall be brought together, folded twice and secured with the adhesive tape.

B. Sleeves: Shall be plastic or galvanized steel where pipes pass through concrete walls or floor slabs.

1. Isolate pipes through ground floor slabs with Kraft paper, plastic tape or similar materials unless conduit is specified or indicated.

2. Sleeves for pipes through exterior walls shall be non-metallic with minimum 2" weep ring as manufactured by Link Seal. Pipe shall be sealed with Link Seal modular seal with EPDM seal elements.

3. Below-grade piping through exterior walls shall be sealed using Link Seal modular seal with nitrile seal elements and stainless steel bolts and sleeves as manufactured by Century Line.

C. Contraction and Expansion: Install all work in such a manner that its contraction and expansion will not do any damage to the pipes, the connected equipment, or the building. Install offsets, swing joints, expansion joints, seismic joints, anchors, etc., as required to prevent excessive strains in the pipe work. All supports shall be installed to permit the materials to contract and expand freely without putting any strain or stress on any part of the system. Provide anchors as necessary.

D. Pipe Joints and Connections:
1. Copper Tubing and Brass Pipe with Threadless Fittings:

(a) Solder joints for copper shall be made with 95/5 lead free solder in accordance with manufacturer's recommendations for the service intended.

(b) Use threaded adapters on copper tubing where threaded connections are required.

E. Each pipe penetration of the roof shall be separated from other piping and any roof equipment by a minimum of 18" to insure a proper pipe flashing installation.

F. Floor, Wall and Ceiling Plates: Where pipes pierce finished surfaces, C.P. brass split flanges with setscrew lock shall be provided.

G. Completion of Installation:
1. Cleaning and Flushing: Clean all equipment and materials thoroughly. Leave surface to be painted smooth and clean, ready for painting.

2. Flush each unit of water supply and distribution system thoroughly with clean water at the highest velocities attainable.

3. Clean all piping, valves, traps, water heaters, fixtures and other devices thoroughly and flush or blow out until free of scale, oil silt, sand, sediment, pipe dope and foreign matter of any kind.

1.2 OPERATION INSTRUCTION

A. Prior to occupancy or prior to the date of final inspection, whichever may occur first, the Contractor shall prepare two (2) sets of typewritten instructions for the operation of all equipment, valves, etc., specified and furnished as a part of the work under this section, and shall assign a competent person, thoroughly familiar with the job, to demonstrate and instruct a representative of the Owner in the operation of the equipment. The time of said demonstration and instructions shall be arranged with the Owner's representative approximately one (1) week in advance. Verbal instructions shall include shut-off location of gas and water. The Contractor shall assemble all operation and maintenance data supplied by the manufacturers of the various pieces of equipment, all keys and special wrenches required to operate and service the equipment (including keys for yard boxes, gas stops and fixture stops), and all equipment warranties and deliver same to the representative of the Owner on date of said instructions.

1.3 PIPE AND EQUIPMENT IDENTIFICATION

A. Each operating and service line shut-off valve shall be identified by a 19 ga. brass tag with stamped, engraved type of service identified and area served, complete with hole and brass chain mounted on valve stem or handle. Tag shall be a minimum of one and one-half inch (1-1/2") in diameter.

B. All piping systems shall be readily identifiable by appropriate labeling with the name of the piping contained. Such labeling shall be by means of metal tags, stenciling, stamping, or with adhesive markers, in a manner that is not readily removable. Labeling shall appear on the piping at intervals of not more than 20 ft and at least once in each room and each story traversed by the piping system.

C. Provide on exterior wall of each building opposite the building's main gas service a sign reading "Gas Shut Off". Sign shall be metal with minimum 1-1/2" high-embossed letters.

D. All equipment shall be provided with name plate indicating all pertinent information on it.

END OF SECTION

DIVISION 23 – HEATING, VENTILATING & AIR CONDITIONING

SECTION 23 05 53 - MECHANICAL IDENTIFICATION

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Provide marking and identification required on all mechanical piping systems, ducts, controls, valves, apparatus, etc., as specified in this Section or any related Sections.

B. Related Sections:

1. Plumbing: Section 22 00 00.

2. Heating, Ventilating, and Air Condition: Section 23 30 00.

1.02 SUBMITTALS

A. Submit in accordance with Section 01 33 00.

B. Submit samples of materials.

1.03 QUALITY ASSURANCE

A. Comply with provisions of Section 01 40 00.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General: All piping systems, controls, valves, apparatus, etc., except those that are installed in inaccessible locations in partitions, walls, and floors, and those buried underground, shall be permanently identified.

2.02 VALVES

A. Use existing chart or diagram for each piping system, indicating thereon by identifying letter or number each valve in the system, its location, and function.

B. Existing color chart is Per District.

C. Bind copies of each chart in Operating Instructions Manual.

D. Provide each valve with brass, aluminum or plastic disc, not less than 1-1/4" diameter bearing engraved numbers corresponding to those indicated on chart. Fasten discs to valve with No. 14 brass wire.

E. Provide an additional tag for all safety valves and other valves that could be hazardous to safety and health of occupants. Distinguish these tags from regular valve tags by color (such as yellow with black letters, and marked "Danger") submit sample tag to the District Inspector.

2.03 INSTRUMENTS AND CONTROLS

A. Identify all panel-mounted instruments and controls with engraved bakelite nameplates permanently affixed to Panel boards.

B. Identify all alarm indicating devices and alarm reset devices by nameplates.

C. Identify all damper motors and automatic valves, flow switches, pressure switches, etc., with embossed aluminum or plastic tape affixed to controller, indicating service and setting.

2.04 EQUIPMENT

A. Identify each major piece of equipment with stenciled designation corresponding to its designation on the Contract Drawings.

2.05 PIPELINES IDENTIFICATION

A. Identify all pipes by means of colored labels with directional arrows as indicated in schedule. (Contractor shall use District colors to distinguish equipment and/or piping use.)

B. Materials: Waterproof plastic cloth, all-temperature, self-adhering, or markers similar to Western "Tel-A-Pipe", Type I, or equal by W.H. Bradley Co.

C. Size: For pipes up to 3" diameter, 2-1/4" x 9" minimum, with 1/2" letters; for pipes over 3" diameter, 2-1/4" x 9" minimum, with 1-1/2" letters.

D. Colors:

1. Backgrounds: As indicated in schedule.

2. Letters: White on red background; black on all other backgrounds.

E. Locations:

1. On all accessible piping, whether insulated or not (including mechanical rooms, attic and ceiling spaces); except that labels shall be omitted from piping where use is obvious due to its connection to fixtures (such as faucets, water closets, etc.).

2. Near each valve and branch connection in such accessible piping.

3. At each pipe passage through wall or floor.

4. At not more than 40'-0" spacing on straight pipe run between bands required in 2 and 3 above.

5. At each change in direction.

F. Application: Apply on clean surfaces free of dust, grease, oil or any material that will prevent proper adhesion. Replace all non-adhering or curling labels with new labels, as approved by the District Inspector.

1. Use spray adhesive on insulated pipes in addition to adhesive on marker.

2. Finish all exposed markers with one coat of lacquer.

G. Schedule:

Content of Pipe	Legend	Color	Note
Domestic cold water	Dom. c.w.	G	*
Non-potable cold water	NP c.w.	G (1)	*
Domestic hot-water 140 F	Dom h.w. 140F	Y	*

Indirect drain	Ind drain	G (1)	*
Sump pump discharge	Pump discharge	G	*
Chilled water supply	Chill water supply	G	*
Chilled water return	Chill water return	G	*
Hot water	Hot Water Supply	Y	*
Hot water	Hot Water Return	Y	*
Condensate	CD		*

**Contractor shall verify all colors and verbiage with District prior to labeling.

H. Notes on Schedule:

1. Symbol * indicates flow arrow required.

2. Symbol (1) indicates 2-1/4" x 1" yellow label with 1/2" letters reading UNSAFE WATER at one end of primary label.

3. Hyphen between words indicates 2 separate stock labels are required, although a single special label with all lettering is equally acceptable.

4. Background colors: Symbol Y indicates yellow background color. Symbol G indicates green background color. Symbol R indicates red background color.

2.06 UNDERGROUND PIPE MARKERS

A. Pipe markers shall be furnished to grade at each horizontal change in direction for all non-metallic underground pipes. Markers shall be concrete plaque inscribed with the appropriate word "gas", "water", "sewer", "air", etc. Cleanouts to grade may serve as direction markers for waste lines. An electrically continuous #14 plastic covered copper tracer wire, Type TW, shall be run in trench along pipe. Wire shall be fastened to pipe at not greater than 20'-0" intervals. Wire shall terminate above ground with a 12" lead taped around each riser. Straight line transitions of metallic to non-metallic pipe shall have lead brought to grade under a marker.

B. Tracer wires for non-metallic pipe shall be color-coded as follows:

1. Gas: Yellow

2. Domestic Water: Blue

3. Fire Sprinkler: Red

4. Irrigation: Green

2.07 IDENTIFICATION OF AIR CONDITIONING EQUIPMENT

Identify location of air conditioning equipment above Tee Bar Ceilings. Install 3/4" to 1" diameter colored self adhesive dots to Tee Bar Ceiling grid showing access. Please note that the following identification shall be included on as built control drawings.

A	Fire Damper		Red
B	Manual Volume Dampers		Blue
	1.	Supply Air	Full Dot
	2.	Return Air	Half Dot.
C	Fan coil unit		Green
D	Filter Location if separate from fan coil		Yellow

PART 3 - EXECUTION

3.01 INSTALLATION

A. Report any conditions detrimental to proper and timely completion of work. Apply markers and identification tags as specified using approved materials and installation procedures recommended by manufacturer.

END OF SECTION

DIVISION 23 – HEATING, VENTILATING & AIR CONDITIONING

SECTION 23 05 93 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Balancing Air Systems:

a. Constant-volume air systems.
b. Multizone systems.
c. Induction-unit systems.

2. Duct leakage tests.

1.3 DEFINITIONS

A. AABC: Associated Air Balance Council.

B. BAS: Building automation systems.

C. NEBB: National Environmental Balancing Bureau.

D. TAB: Testing, adjusting, and balancing.

E. TABB: Testing, Adjusting, and Balancing Bureau.

F. TAB Specialist: An independent entity meeting qualifications to perform TAB work.

G. TDH: Total dynamic head.

1.4 PREINSTALLATION MEETINGS

A. TAB Conference: If requested by the Owner, conduct a TAB conference at Project site. Insert after approval of the TAB strategies and procedures plan to develop a mutual understanding of the details. Provide a minimum of 14 days' advance notice of scheduled meeting time and location.

1. Minimum Agenda Items:

a. The Contract Documents examination report.
b. The TAB plan.
c. Needs for coordination and cooperation of trades and subcontractors.
d. Proposed procedures for documentation and communication flow.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: Within 30 days of Contractor's Notice to Proceed, submit documentation that the TAB specialist and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.

B. Contract Documents Examination Report: Within 30 days of Contractor's Notice to Proceed, submit the Contract Documents review report as specified in Part 3.

C. Strategies and Procedures Plan: Within 30 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.

D. System Readiness Checklists: Within 30 days of Contractor's Notice to Proceed, submit system readiness checklists as specified in "Preparation" Article.

E. Examination Report: Submit a summary report of the examination review required in "Examination" Article.

F. Certified TAB reports.

G. Sample report forms.

H. Instrument calibration reports, to include the following:

1. Instrument type and make.
2. Serial number.
3. Application.
4. Dates of use.
5. Dates of calibration.

1.6 QUALITY ASSURANCE

A. TAB Specialists Qualifications: Certified by AABC.

1. TAB Field Supervisor: Employee of the TAB specialist and certified by AABC.
2. TAB Technician: Employee of the TAB specialist and certified by AABC as a TAB technician.

B. Instrumentation Type, Quantity, Accuracy, and Calibration: Comply with requirements in ASHRAE 111, Section 4, "Instrumentation."

C. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."

D. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.7.2.3 - "System Balancing."

1.7 FIELD CONDITIONS

A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

B. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems designs that may preclude proper TAB of systems and equipment.

B. Examine installed systems for balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are applicable for intended purpose and are accessible.

C. Examine the approved submittals for HVAC systems and equipment.

D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems output, and statements of philosophies and assumptions about HVAC system and equipment controls.

E. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.

F. Examine equipment performance data including fan and pump curves.

1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.

G. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.

H. Examine test reports specified in individual system and equipment Sections.

I. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, filters are clean, and equipment with functioning controls is ready for operation.

J. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.

K. Examine heat-transfer coils for correct piping connections and for clean and straight fins.

L. Examine operating safety interlocks and controls on HVAC equipment.

M. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

A. Prepare a TAB plan that includes the following:

1. Equipment and systems to be tested.
2. Strategies and step-by-step procedures for balancing the systems.
3. Instrumentation to be used.
4. Sample forms with specific identification for all equipment.

B. Perform system-readiness checks of HVAC systems and equipment to verify system readiness for TAB work. Include, at a minimum, the following:

1. Airside:

a. Verify that leakage and pressure tests on air distribution systems have been satisfactorily completed.
b. Duct systems are complete with terminals installed.
c. Volume, smoke, and fire dampers are open and functional.
d. Clean filters are installed.
e. Fans are operating, free of vibration, and rotating in correct direction.
f. Variable-frequency controllers' startup is complete and safeties are verified.
g. Automatic temperature-control systems are operational.
h. Ceilings are installed.
i. Windows and doors are installed.
j. Suitable access to balancing devices and equipment is provided.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance" and in this Section.

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.

1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
2. After testing and balancing, install test ports and duct access doors that comply with requirements in Section 23 30 00.
3. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Section 23 30 00 "Duct Insulation."

C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.

D. Take and report testing and balancing measurements in inch-pound (IP**)** units.

3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Cross-check the summation of required outlet volumes with required fan volumes.

B. Prepare schematic diagrams of systems' "as-built" duct layouts.

C. For variable-air-volume systems, develop a plan to simulate diversity.

D. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

E. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.

F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

G. Verify that motor starters are equipped with properly sized thermal protection.

H. Check dampers for proper position to achieve desired airflow path.

I. Check for airflow blockages.

J. Check condensate drains for proper connections and functioning.

K. Check for proper sealing of air-handling-unit components.

L. Verify that air duct system is sealed as specified in Section 23 30 00 – 2.4 Ductwork and Accessories.

3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure total airflow.

   a. Set outside-air, return-air, and relief-air dampers for proper position that simulates minimum outdoor-air conditions.
   b. Where duct conditions allow, measure airflow by Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses to obtain total airflow.
   c. Where duct conditions are not suitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.
   d. If a reliable Pitot-tube traverse or coil traverse is not possible, measure airflow at terminals and calculate the total airflow.

2. Measure fan static pressures as follows:

   a. Measure static pressure directly at the fan outlet or through the flexible connection.
   b. Measure static pressure directly at the fan inlet or through the flexible connection.
   c. Measure static pressure across each component that makes up the air-handling system.
   d. Report artificial loading of filters at the time static pressures are measured.

3. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
4. Obtain approval from Architect/Engineer of Record for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
5. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload occurs. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows.

1. Measure airflow of submain and branch ducts.

2. Adjust submain and branch duct volume dampers for specified airflow.
3. Re-measure each submain and branch duct after all have been adjusted.

C. Adjust air inlets and outlets for each space to indicated airflows.

1. Set airflow patterns of adjustable outlets for proper distribution without drafts.
2. Measure inlets and outlets airflow.
3. Adjust each inlet and outlet for specified airflow.
4. Re-measure each inlet and outlet after they have been adjusted.

D. Verify final system conditions.

1. Re-measure and confirm that minimum outdoor, return, and relief airflows are within design. Readjust to design if necessary.
2. Re-measure and confirm that total airflow is within design.
3. Re-measure all final fan operating data, rpms, volts, amps, and static profile.
4. Mark all final settings.
5. Test system in economizer mode. Verify proper operation and adjust if necessary.
6. Measure and record all operating data.
7. Record final fan-performance data.

3.6 PROCEDURES FOR MOTORS

A. Motors 1/2 HP and Larger: Test at final balanced conditions and record the following data:

1. Manufacturer's name, model number, and serial number.
2. Motor horsepower rating.
3. Motor rpm.
4. Phase and hertz.
5. Nameplate and measured voltage, each phase.
6. Nameplate and measured amperage, each phase.
7. Starter size and thermal-protection-element rating.
8. Service factor and frame size.

B. Motors Driven by Variable-Frequency Controllers: Test manual bypass of controller to prove proper operation.

3.7 PROCEDURES FOR CONDENSING UNITS

A. Verify proper rotation of fans.

B. Measure entering- and leaving-air temperatures.

C. Record fan and motor operating data.

3.8 PROCEDURES FOR HEAT-TRANSFER COILS

A. Measure, adjust, and record the following data for each refrigerant coil:

1. Dry-bulb temperature of entering and leaving air.
2. Wet-bulb temperature of entering and leaving air.
3. Airflow.

3.9 DUCT LEAKAGE TESTS

A. Witness the duct pressure testing performed by Installer.

B. Verify that proper test methods are used and that leakage rates are within specified tolerances.

C. Report deficiencies observed.

3.10 CONTROLS VERIFICATION

A. In conjunction with system balancing, perform the following:

1. Verify temperature control system is operating within the design limitations.
2. Confirm that the sequences of operation are in compliance with Contract Documents.
3. Verify that controllers are calibrated and function as intended.
4. Verify that controller set points are as indicated.
5. Verify the operation of lockout or interlock systems.
6. Verify the operation of valve and damper actuators.
7. Verify that controlled devices are properly installed and connected to correct controller.
8. Verify that controlled devices travel freely and are in position indicated by controller: open, closed, or modulating.
9. Verify location and installation of sensors to ensure that they sense only intended temperature, humidity, or pressure.

B. Reporting: Include a summary of verifications performed, remaining deficiencies, and variations from indicated conditions.

3.11 TOLERANCES

A. Set HVAC system's airflow rates and water flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10.
2. Air Outlets and Inlets: Plus or minus 10 percent.
3. Contractor to provide the necessary sheaves, pulleys and other accessories needed to meet the tolerance requirements.

B. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.

3.12 PROGRESS REPORTING

A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems balancing devices. Recommend changes and additions to systems balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

B. Status Reports: Prepare monthly progress reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

3.13 FINAL REPORT

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
2. Include a list of instruments used for procedures, along with proof of calibration.
3. Certify validity and accuracy of field data.

B. Final Report Contents: In addition to certified field-report data, include the following:

1. Fan curves.
2. Manufacturers' test data.
3. Field test reports prepared by system and equipment installers.
4. Other information relative to equipment performance; do not include Shop Drawings and Product Data.

C. General Report Data: In addition to form titles and entries, include the following data:

1. Title page.
2. Name and address of the TAB specialist.
3. Project name.
4. Project location.
5. Architect's name and address.
6. Engineer's name and address.
7. Contractor's name and address.
8. Report date.
9. Signature of TAB supervisor who certifies the report.
10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
11. Summary of contents including the following:

    a. Indicated versus final performance.
    b. Notable characteristics of systems.
    c. Description of system operation sequence if it varies from the Contract Documents.

12. Nomenclature sheets for each item of equipment.
13. Data for terminal units, including manufacturer's name, type, size, and fittings.
14. Notes to explain why certain final data in the body of reports vary from indicated values.
15. Test conditions for fans performance forms including the following:

    a. Settings for outdoor-, return-, and exhaust-air dampers.
    b. Conditions of filters.
    c. Cooling coil, wet- and dry-bulb conditions.
    d. Face and bypass damper settings at coils.
    e. Fan drive settings including settings and percentage of maximum pitch diameter.
    f. Inlet vane settings for variable-air-volume systems.
    g. Settings for supply-air, static-pressure controller.
    h. Other system operating conditions that affect performance.

D. System Diagrams: Include schematic layouts of air distribution systems. Present each system with single-line diagram and include the following:

1. Quantities of outdoor, supply, return, and exhaust airflows.
2. Duct, outlet, and inlet sizes.
3. Terminal units.
4. Position of balancing devices.

E. Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:

1. Unit Data:

a. Unit identification.
b. Location.
c. Make and type.
d. Model number and unit size.
e. Manufacturer's serial number.
f. Unit arrangement and class.
g. Discharge arrangement.
h. Sheave make, size in inches (mm), and bore.
i. Center-to-center dimensions of sheave and amount of adjustments in inches (mm).
j. Number, make, and size of belts.
k. Number, type, and size of filters.

2. Motor Data:

a. Motor make, and frame type and size.
b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.
e. Sheave make, size in inches (mm), and bore.
f. Center-to-center dimensions of sheave and amount of adjustments in inches (mm).

3. Test Data (Indicated and Actual Values):

a. Total airflow rate in cfm (L/s).
b. Total system static pressure in inches wg (Pa).
c. Fan rpm.
d. Discharge static pressure in inches wg (Pa).
e. Filter static-pressure differential in inches wg (Pa).
f. Preheat-coil static-pressure differential in inches wg (Pa).
g. Cooling-coil static-pressure differential in inches wg (Pa).
h. Heating-coil static-pressure differential in inches wg (Pa).
i. Outdoor airflow in cfm (L/s).
j. Return airflow in cfm (L/s).
k. Outdoor-air damper position.
l. Return-air damper position.
m. Vortex damper position.

F. Apparatus-Coil Test Reports:

1. Coil Data:

a. System identification.
b. Location.
c. Coil type.
d. Number of rows.
e. Fin spacing in fins per inch (mm) o.c.
f. Make and model number.
g. Face area in sq. ft. (sq. m).
h. Tube size in NPS (DN).
i. Tube and fin materials.
j. Circuiting arrangement.

2. Test Data (Indicated and Actual Values):

a. Airflow rate in cfm (L/s).
b. Average face velocity in fpm (m/s).
c. Air pressure drop in inches wg (Pa).
d. Outdoor-air, wet- and dry-bulb temperatures in deg F (deg C).
e. Return-air, wet- and dry-bulb temperatures in deg F (deg C).
f. Entering-air, wet- and dry-bulb temperatures in deg F (deg C).
g. Leaving-air, wet- and dry-bulb temperatures in deg F (deg C).
h. Water flow rate in gpm (L/s).
i. Water pressure differential in feet of head or psig (kPa).
j. Entering-water temperature in deg F (deg C).
k. Leaving-water temperature in deg F (deg C).
l. Refrigerant expansion valve and refrigerant types.
m. Refrigerant suction pressure in psig (kPa).
n. Refrigerant suction temperature in deg F (deg C).
o. Inlet steam pressure in psig (kPa).

G. Gas- and Oil-Fired Heat Apparatus Test Reports: In addition to manufacturer's factory startup equipment reports, include the following:

1. Unit Data:

a. System identification.
b. Location.
c. Make and type.
d. Model number and unit size.
e. Manufacturer's serial number.
f. Fuel type in input data.
g. Output capacity in Btu/h (kW).
h. Ignition type.
i. Burner-control types.
j. Motor horsepower and rpm.
k. Motor volts, phase, and hertz.
l. Motor full-load amperage and service factor.
m. Sheave make, size in inches (mm), and bore.
n. Center-to-center dimensions of sheave and amount of adjustments in inches (mm).

2. Test Data (Indicated and Actual Values):

a. Total airflow rate in cfm (L/s).
b. Entering-air temperature in deg F (deg C).
c. Leaving-air temperature in deg F (deg C).
d. Air temperature differential in deg F (deg C).
e. Entering-air static pressure in inches wg (Pa).
f. Leaving-air static pressure in inches wg (Pa).
g. Air static-pressure differential in inches wg (Pa).
h. Low-fire fuel input in Btu/h (kW).
i. High-fire fuel input in Btu/h (kW).
j. Manifold pressure in psig (kPa).
k. High-temperature-limit setting in deg F (deg C).
l. Operating set point in Btu/h (kW).
m. Motor voltage at each connection.
n. Motor amperage for each phase.
o. Heating value of fuel in Btu/h (kW).

H. Fan Test Reports: For supply, return, and exhaust fans, include the following:

1. Fan Data:

a. System identification.
b. Location.
c. Make and type.
d. Model number and size.
e. Manufacturer's serial number.
f. Arrangement and class.
g. Sheave make, size in inches (mm), and bore.
h. Center-to-center dimensions of sheave and amount of adjustments in inches (mm).

2. Motor Data:

a. Motor make, and frame type and size.
b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.
e. Sheave make, size in inches (mm), and bore.
f. Center-to-center dimensions of sheave, and amount of adjustments in inches (mm).
g. Number, make, and size of belts.

3. Test Data (Indicated and Actual Values):

a. Total airflow rate in cfm (L/s).
b. Total system static pressure in inches wg (Pa).
c. Fan rpm.
d. Discharge static pressure in inches wg (Pa).
e. Suction static pressure in inches wg (Pa).

I. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:

1. Report Data:

a. System and air-handling-unit number.
b. Location and zone.
c. Traverse air temperature in deg F (deg C).
d. Duct static pressure in inches wg (Pa).
e. Duct size in inches (mm).
f. Duct area in sq. ft. (sq. m).
g. Indicated airflow rate in cfm (L/s).
h. Indicated velocity in fpm (m/s).
i. Actual airflow rate in cfm (L/s).
j. Actual average velocity in fpm (m/s).
k. Barometric pressure in psig (Pa).

J. Air-Terminal-Device Reports:

1. Unit Data:

a. System and air-handling unit identification.
b. Location and zone.
c. Apparatus used for test.
d. Area served.
e. Make.
f. Number from system diagram.
g. Type and model number.
h. Size.
i. Effective area in sq. ft. (sq. m).

2. Test Data (Indicated and Actual Values):

a. Airflow rate in cfm (L/s).
b. Air velocity in fpm (m/s).
c. Preliminary airflow rate as needed in cfm (L/s).
d. Preliminary velocity as needed in fpm (m/s).
e. Final airflow rate in cfm (L/s).
f. Final velocity in fpm (m/s).
g. Space temperature in deg F (deg C).

K. System-Coil Reports: For reheat coils and water coils of terminal units, include the following:

1. Unit Data:

a. System and air-handling-unit identification.
b. Location and zone.
c. Room or riser served.
d. Coil make and size.
e. Flowmeter type.

2. Test Data (Indicated and Actual Values):

a. Airflow rate in cfm (L/s).
b. Entering-water temperature in deg F (deg C).
c. Leaving-water temperature in deg F (deg C).
d. Water pressure drop in feet of head or psig (kPa).
e. Entering-air temperature in deg F (deg C).
f. Leaving-air temperature in deg F (deg C).

L. Instrument Calibration Reports:

1. Report Data:

a. Instrument type and make.
b. Serial number.
c. Application.
d. Dates of use.
e. Dates of calibration.

3.14 VERIFICATION OF TAB REPORT

A. The TAB specialist's test and balance engineer shall conduct the inspection in the presence of Architect.

B. Architect shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.

C. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."

D. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.

E. If TAB work fails, proceed as follows:

1. TAB specialists shall recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
2. If the second final inspection also fails, Owner may contract the services of another TAB specialist to complete TAB work according to the Contract Documents and deduct the cost of the services from the original TAB specialist's final payment.
3. If the second verification also fails, Owner may contact AABC Headquarters regarding the AABC National Performance Guaranty.

F. Prepare test and inspection reports.

3.15 ADDITIONAL TESTS

A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

END OF SECTION 23 05 93

DIVISION 23 – HEATING, VENTILATING & AIR CONDITIONING- REVISION#1

SECTION 23 30 00 - HEATING, VENTILATING AND AIR CONDITIONING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work under this section includes all labor, equipment, material, services, transportation, etc. required for and reasonably incidental to the complete and satisfactory installation of all of the HVAC Systems as indicated on the Drawings or specified herein.

1.2 WORK INCLUDED IN THIS SECTION

A. Package Roof Top Heat Pump Units

B. Test and Balance

C. Submittals and Shop Drawings

D. Record Drawings

E. Operation and Maintenance Manuals

F. Guarantee

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Electrical supply to units. See Electrical Drawings.

B. Cutting and Patching. See Division 1 and 7, and Mechanical Drawings.

C. Equipment Pads and Support. See Structural Drawings.

1.4 GENERAL REQUIREMENTS

A. This section of the specification shall be considered as a part of the entire specification and all applicable portions of General Conditions, Special Conditions, and Division 1 shall apply.

B. Before commencement of work this contractor shall determine the exact location, size, elevation, and availability of all utilities relevant to the mechanical work and immediately notify the District with written notification of any discrepancies. In addition, this Contractor shall contact all involved utility companies, make all necessary arrangements for service, and pay all fees incurred due to connection of services.

C. Erection: The Contractor shall furnish the services of an experienced superintendent, who shall be constantly in charge of the erection of the work, together with all necessary journeymen, helpers, and laborers required to properly unload, erect, connect, adjust, start of operate and test the work involved.

1.5 REFERENCES

A. AABC - National Standards for Field Measurement and Instrumentation, Total System Balance.

B. AMCA 210 - Laboratory Methods of Testing Fans for Rating Purposes.

C. AMCA 300 - Test code for sound rating air-moving devices.

D. ANSI/NFPA 90A - Installation of Air Conditioning and Ventilation System.

E. ARI 270 - Sound rating of Outdoor Unitary Equipment.

F. ASHRAE 52.2-2017 - Method of Testing General Ventilation Air Cleaning Devices for Removal Efficiency By Particle Size

G. ASTM A90 - Weight of Coating on Zinc - Coated (Galvanized) Iron or Steel Articles

H. ASTM A120 - Black and Galvanized Steel Pipe

I. ASTM B88 - Seamless Copper Water Tube

J. ASTM C518 - Steady State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus

K. ASTM C553 - Mineral Fiber Blanket and Felt Insulation

L. ASTM C612 - Mineral Fiber Block and Board Thermal Insulation

M. ASTM E84 - Surface Burning Characteristics of Building Materials

N. ASTM E96 - Water vapor Transmission of Materials

O. NFPA 90B - Installation of Warm Air Heating and Air Conditioning Systems

P. NFPA 255 - Surface Burning Characteristics of Building Materials

Q. SMACNA - Low Pressure Duct Construction Standards

R. UL 181 - Factory Made Air Ducts and Connectors

S. UL 723 - Surface Burning Characteristics of Building Materials

T. California Mechanical Code - 2025 Edition

U. California Building Code - 2025 Edition

V. CEC Title-24 – 2025 Edition

1.6 SUBMITTALS AND SHOP DRAWINGS

A. Contractor agrees that shop drawings submittals processed by the District do not become Contract Documents and are not Change Orders; that the purpose of the shop drawing review is to establish a reporting procedure and is intended for the Contractor's convenience in organizing his work and to permit the District to monitor the Contractor's progress and understanding of the design. The process of review

of the Contractor's submittals is not of testing the District's perception. If deviations, discrepancies or conflicts between shop drawings submittals and the Contract Documents are discovered either prior to or after the shop drawing submittals are processed by the District, the Contractor agrees that the Contract Documents shall control and shall be followed.

B. Prepare and furnish fully coordinated shop drawings showing HVAC equipment on roof and floor plans.
   1. Review and sign these drawings to verify coordination of related equipment.
   2. Conflicts, which occur, shall be brought to the attention of the District Representative prior to issuance of the drawings.

C. Materials and Equipment:
   1. As soon as possible and within 14 days after award of the contract, and before their purchase, the Contractor shall submit to the District electronic format submittals for approval containing a complete list of materials, specialties and equipment he is to furnish for the installation.
   2. Literature shall be standard manufacturer's catalog cuts and items to be installed shall be clearly indicated.
   3. All submittals shall be made at one time.

D. Each item shall be identified by manufacturer, brand and trade name, number, size, rating and whatever other data is necessary to properly identify and check the materials and equipment. The words: "as specified" will not be considered sufficient identification.

E. Accessories, controls, finish, etc., not submitted or identified with the submitted equipment shall be furnished and installed as specified.

F. 1 Sets of complete electronic format shop drawings shall be submitted for approval indicating all equipment and ductwork. These drawings shall indicate sizes, locations and elevations of ductwork, equipment and equipment pads, and controls including transitions, etc.

G. Shop drawings shall be approved only to extent of information indicated. Approval of an item of equipment shall not be construed to mean approval for components for that item for which Contractor has provided no information.

H. Approval of shop drawings shall not relieve Contractor of responsibility for providing all controls, wiring, components, etc. which are shown or specified, or all additional controls, wiring, components, etc. required to provide complete and correctly operating mechanical systems.

I. Submit product data for the following manufactured products, assemblies, personnel and testing agencies required for this project.
   1. Package Roof Top Heat Pump Units
   2. Ductwork and Accessories
   3. Insulation Materials
   4. Filters
   5. Controls

1.7 SUBSTITUTIONS

A. Should the Contractor desire to substitute any material, equipment or other items for those specified, he shall submit a complete list, including detailed equipment layouts and performance characteristics within 14 calendar days after the scheduled Start of Construction. Said data shall be submitted in 1 electronic format set, assembled in individual brochures.

B. The entire cost of all changes of any type due to substitution for materials specified shall be born by the Contractor at no extra cost to the District.

C. Unsolicited and voluntary deducts, on the part of the Contractor for substituting unapproved systems and/or equipment, shall not be considered for the purpose of awarding the Contract.

D. The contractor shall submit the amount of cost credit to the Contract in the event the proposed substitution is accepted.

E. In all cases where substitutions are proposed after bids are received, the Contractor shall bear the cost of evaluation on the basis of 2-1/2 times technical salaries of engineering personnel involved.

1.8 AVAILABILITY OF SPECIFIED EQUIPMENT

A. Verify prior to bidding that all specified equipment is available and can be obtained in time for installation during orderly and timely progress of the work.

B. In the event that specified items will not be so available, notify the District prior to receipt of bids.

C. Costs of delays because of non-availability of specified items, when such delays could have been avoided by proper investigation on the part of the Contractor, will be back-charged as necessary and shall not be born by the District.

1.9 RECORD DRAWINGS

A. The contractor shall arrange and pay for one set of white prints of the HVAC drawings, which he shall alter in red to show all changes made to the original layout. These drawings shall be kept current.

B. The contractor shall deliver these completed to the District when the job is finished and accepted prior to final payment, and provide copies of approved shop drawings in ACAD format to MEOR.

C. Contractor shall provide 1 complete set of electronic format drawings per District standard on BOX.

1.10 OPERATION AND MAINTENANCE DATA

A. Submit one (1) electronic format set prior to final inspection including cover sheet and table of contents. Prepare submittal with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", and title of project. Internally subdivide the section contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

B. Contents: Prepare a Table of Contents with each Product or system description identified.
   1. Part 1:
      a. Directory listing names, addresses, and telephone numbers of District, Contractor, Subcontractors, and major equipment suppliers.
   2. Part 2:
      a. Operation and maintenance instructions, arranged by system.
      b. Identify the following:
         1) Significant design criteria
         2) List of equipment
         3) Parts list for each component
         4) Operating instructions
         5) Maintenance instructions for equipment and systems
         6) Maintenance instructions for special finishes, including recommended cleaning methods and materials and special precautions identifying detrimental agents.

C. Submit one copy of completed volumes in final form 15 days prior to final inspection. This copy will be returned after final inspection, with District comments. Revise content of documents as required prior to final submittal.

D. Submit final volumes (revised) within ten days after final inspection.

1.11 GUARANTEES

A. The Contractor, in accepting this contract, binds himself to replace or repair at his own expense any defect in workmanship or material which may appear within a period of one year from the date of the final acceptance of the building, and to pay for all resulting damage which shall appear within the said period; provided always that the Contractor shall not be liable for anything attributable to acts of the agents of the District, or for ordinary wear. Also, given date of work performed by the Contractor be accepted as complete, he shall agree to correct any deficiencies or omissions in respect to the plans or specifications which may appear in the afore-mentioned twenty-four month period.

B. All refrigerant compressors shall carry a seven-year manufacturer's warranty with additional extended three -year manufacturer's warranty by providing required documents to manufacturer within 90 days from installation date.

1.12 LOCAL CONDITIONS

A. The Contractor and trade submitting tenders on this work shall visit and will be deemed to have visited the site to ensure that they are familiar with all conditions relating to the work. Failure to visit the site will in no way relieve the successful Contractor of the necessity of furnishing any material or performing any work that may be required to complete the work in accordance with the drawings and specifications without additional cost to the District.

1.13 RULES, REGULATIONS AND CODES

A. All work and materials shall be in full accordance with the latest California Mechanical Code, California Plumbing Code, California Building Code and local rules and regulations, State Fire Marshal regulations, the safety orders of the Division of Industrial Safety; the California Electric Code; the standards of the National Fire Protection Association; American Gas Association; Occupation and Safety Act; American National Standards Institute; American Society of Mechanical Engineers; American Society for Testing and Materials; Installation Standards published by the International Association of Plumbing And Mechanical officials (IAPMO) and other applicable laws, codes, or regulations. Nothing in these specifications shall be construed to permit work not conforming to these codes.

B. Electrical Work: Motors, electrical apparatus and wiring specified in this section shall conform to the National Electrical Manufacturer's Standards and the California Electric Code and bear the Underwriter's label of approval.

C. The Contractor shall furnish, without extra charge, any additional material and labor when and where required to comply with these rules and regulations, though the work be not mentioned in these Specifications or shown on the Drawings. When these Specifications or Drawings call for or describe materials or construction of a better quality or larger sizes than required by the above mentioned rules and regulations, the provisions of these specifications and accompanying drawings shall take precedence.

1.14 FEES AND PERMITS

A. The Contractor must obtain and pay all fees for permits, licenses, inspections, etc., which are required by any legally constituted authority. Coordinate exact requirements with the District prior to bid.

1.15 COORDINATION

A. Following the general arrangement indicated on the Drawings as closely as possible, the Contractor shall coordinate with the architectural, structural, plumbing, electrical and all other trades prior to installation of the materials and equipment to verify adequate space available for installation of the work shown. The District shall be immediately notified if an area of conflict occurs between trades.

B. The Contractor shall bear all costs incurred for work that must be relocated due to conflicts between trades.

C. The Mechanical Contractor shall coordinate all requirements for all points of connection with the General Contractor and other trades prior to bid.

1.16 DRAWINGS

A. The work shall be installed as indicated on Drawings, however, changes to accommodate installation of this work with other work, or in order to meet Architectural or structural conditions, shall be made without additional cost to the District.

B. For the purpose of clarity and legibility, the Drawings are essentially diagrammatic to the extent that many offsets, bonds, unions, special fittings and exact locations are not indicated. The Contractor shall make use of all data in all of the Contract Documents, and shall verify this information at the site.

1.17 INSPECTION

A. The Contractor shall not allow or cause any of his work to be covered up or closed in until it has been inspected, tested, approved by all authorities have jurisdiction, and until Project Record drawings have been properly annotated.

B. Should any of his work be covered up or closed in before such inspection, he shall, at his own expense, uncover the work to the satisfaction of the inspection party. All related repair work cost shall be borne by the Contractor.

1.18 DELIVERY, STORAGE AND PROTECTION OF PROPERTY

A. Place orders for all equipment in time to prevent any delay in construction schedule or completion of project. If any materials or equipment are not ordered in time, additional charges made by equipment manufacturers to complete their equipment in time to meet construction schedule, together with any special handling charges, shall be borne by the contractor.

B. Materials shall be delivered in ample quantities from time to time as may be necessary for the uninterrupted progress of the work. They shall be stored as to cause the least obstruction to the premises and distributed so as to prevent overloading to any portion of the structure.

C. The Contractor shall provide temporary storage and shop areas that are required at the site for the safe and proper storage of materials, tools, and other items used in the performance of this work. These areas

shall be constructed only in approved locations and shall not interfere with the work of any other Contractor.

D. All work, equipment and materials shall be protected at all times. The Contractor shall make good all damage caused either directly or indirectly by his own workmen. The Contractor shall also protect his own work from damage. He shall close all pipe and duct openings with caps or plugs during installation. He shall protect all of his equipment and materials against dirt, water, chemical, and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

1.19 DAMAGE BY LEAKS, ETC.

A. The Contractor shall be responsible for all damage to any part of the premises or work of other Contractors, caused by leaks or breaks in the equipment furnished and/or installed under this section, during the construction and guarantee period.

1.20 ACCESS TO EQUIPMENT FOR MAINTENANCE

A. Install all equipment, etc. to permit access for normal maintenance. Maintain easy access to filters, motors, etc. Install all such equipment and accessories to facilitate maintenance. Perform any relocation required to permit access at request of District at no additional cost to District.

B. Furnish and install access doors or panels in walls, floors, and ceilings to permit access to equipment, dampers, and all other items requiring service. Coordinate location of access doors with other trades as required.

C. Size access panels to allow inspection and removal of all items served.

D. Use Milcor style as required for material in which door is installed. Where door is installed in fire rated construction, provide door bearing UL label required for condition.

1.21 QUALITY ASSURANCE

A. Abbreviations:

1. AABC - Associate Air Balance Council
2. ADC - Air Diffusion Council - Test Code
3. AGA - American Gas Association
4. AMCA - Air Moving and Conditioning Association
5. ANSI - American National Standards Institute
6. ARI - Air Conditioning and Refrigeration Institute
7. ASA - American Standards Association
8. ASC - Adhesive and Sealant Council
9. ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers
10. ASME - American Society of Mechanical Engineers
11. ASTN - American Society for Nondestructive Testing
12. ASSE - American Society of Sanitary Engineering
13. ASTM - American Society for Testing and Materials
14. AWS - American Welding Society
15. AWWA - American Water Works Association
16. CAC - California Administration Code
17. 2025 CBC - California Building Code
18. 2025 CEC - California Electrical Code

19. 2025 CMC - California Mechanical Code
20. California Fire Code with California Amendments.
21. MSS - Manufacturers' Standardization Society
22. NBS - National Bureau of Standards
23. NCWB - National Certified Piping Welding Bureau
24. NEMA - National Electrical Manufacturer's Association
25. NFPA - National Fire Protection Association
26. PDI - Plumbing and Drainage Institute
27. SMACNA - Sheet Metal and Air Conditioning Contractor's National Association, Inc.
28. UL - Underwriters Laboratories, Inc.

B. Rulings and interpretations of authorities shall be considered a part of the regulations.

C. Nothing in this document is to be construed to permit Work not conforming to these codes and regulations.

D. Should there be any direct conflict between the above rules, the most stringent shall govern.

E. The Contractor shall recognize that the design is based upon the equipment and material specified by name or construction and accept full responsibility for assuring that the quality, utility and performance of a substitution equals or exceeds that of the specified item.

F. Testing: Provide the services of a qualified testing laboratory/agency to perform the specified field tests. Notify the District Representative 48 hours in advance of performance of Work requiring testing. Provide all materials required for testing.

G. Factory and Field Testing:
1. See each Section for the required testing and their procedures.
2. Test reports shall include description of equipment tested, description of test procedures, test results, and names and signatures of witnesses of tests.

PART 2 - PRODUCTS

2.1 GENERAL

A. All materials and equipment shall be new and of the best of their respective grades, free from all defects and of the make, brand or quality herein specified or as accepted by the District.

B. All materials and equipment shall be identified by manufacturer's name or nameplate data. Unidentified material or equipment shall be removed from the site.

C. Equipment specified by manufacturer's number shall include all accessories, controls, etc., listed in the catalog as standard with the equipment. Optional or additional accessories shall be furnished as specified.

D. Where no specific make of material or equipment is mentioned, any first class product of a reputable manufacturer may be used, provided it conforms to the requirements of the system and meets with the approval of the District.

E. Equipment and materials damaged during transportation, installation and operation shall be considered as "totally damaged" and shall be replaced with new. Any variance from this clause shall be made only with written approval of the District.

2.2 MANUFACTURER

A. Package Roof Top Heat Pump Units:
1. Carrier - coordinate with District for pre-purchased equipment submittals.

2.3 DUCTWORK AND ACCESSORIES

A. General:
1. For any ductwork discovered to be damaged during this project, Contractor shall coordinate with District to provide line item cost for repairs prior to completing any work.
2. Non-combustible or conforming to requirements for Class 1 air duct materials, or UL 181.

B. Steel Ducts:
1. ASTM A653 galvanized steel sheet, lock-forming quality, having zinc coating of 1.25 oz per sq ft for each side in conformance with ASTM A90.
2. Round duct shall be spiral seam construction.

C. Flexible Ducts:
1. Interlocking spiral of galvanized steel or aluminum construction; rated to (2 inches WG positive and 1.5 inches WG negative for low pressure ducts) (and 15 inches WG positive or negative for medium high pressure ducts.)

D. Insulated Flexible Ducts:
1. Flexible duct wrapped with flexible glass fiber insulation, enclosed by Pressure Ductwork: seamless aluminum pigmented plastic vapor barrier jacket; maximum 0.23 K value at 75 degrees F w/metal connectors.

E. Fasteners:
1. Rivets, bolts, or sheet metal screws.

F. Sealant:
1. Non-hardening, water resistant, fire resistive, compatible with mating materials; liquid used alone or with tape, or heavy mastic.

G. Hanger Rod:
1. Steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

H. Low Pressure Ducts:
1. Fabricate and support in accordance with 2025 CMC, SMACNA Low Pressure Duct Construction Standards and ASHRAE handbooks, except as indicated. Gages for galvanized steel ducts for low pressure systems where velocities do not exceed 2000 FPM shall be as follows:
a.

RECTANGULAR DUCT		ROUND DUCT	
Dimension of Largest Side (L) in Inches	Gage	Diameter (D) in Inches	Ga.
$L \leq 12$	26	$D < 9$	26
$12 \leq L \leq 30$	24	$9 \leq D < 14$	24
$30 < L \leq 54$	22	$14 \leq D < 23$	22
$54 < L \leq 84$	20	$23 \leq D < 37$	20
$84 < L$	18	$37 \leq D < 51$	18
		$51 \leq D < 61$	16

RECTANGULAR DUCT		ROUND DUCT	
Dimension of Largest Side (L) in Inches	Gage	Diameter (D) in Inches	Ga.
		61≤D<84	14

b. All joints and seams as indicated in the 2025 CMC are acceptable.

2. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts. No variation of duct configuration or sizes permitted except by written permission.
3. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows are used, provide turning vanes.
4. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible. Divergence upstream of equipment shall not exceed 30 degrees; convergence downstream shall not exceed 45 degrees.
5. Use double nuts and lock washers on threaded rod supports.

I. I. Volume Control Dampers:
1. Fabricate in accordance with SMACNA Low Pressure Duct Construction Standards, and as indicated.
2. Opposed blade dampers shall have factory-fabricated blades, with factory assembled linkages, mounted in frames.
   a. Blades shall have interlocking edges and ends.
   b. Rectangular dampers 6" or more wide shall be the multi-blade type.
   c. Blades on multi-blade type dampers must not be over 6" wide.
   d. Dampers shall be of the opposed blade type.
   e. Dampers shall have bar or channel frames and corner bracing.
   f. All blade and linkage bearings shall be self-lubricating plastic.
   g. Damper assembly leakage not to exceed 1% with 4.0 W.C. static pressure.
3. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
4. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.

J. Duct Test Holes:
1. Cut or drill temporary test holes in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

K. Ceiling Diffusers & Supply Registers and, Return Registers:
1. Fabricate of steel with steel or aluminum frame and baked enamel off-white finish.
2. Provide opposed blade damper and multi-louvered equalizing grid with damper adjustable from diffuser face as indicated on the drawings.
3. Ceiling Diffusers (CD): Titus 300R and Titus MCD or equal, or approved equal.
4. Return grilles shall be Titus 350 RL series or equal perforated.

2.4 INSULATION

A. General:
1. All insulation shall have composite (insulation, jacket or facing, and adhesive used to adhere the facing or jacket to the insulation) fire smoke hazard ratings as tested by procedure ASTM E84, NFPA 255 and UL 723 not exceeding:
   a. Flame Spread: 25
   b. Smoke Developed: 50

2. All products or their shipping cartons shall bear a label indicating that flame and smoke ratings do not exceed above requirements. Any treatment of jackets or facings to impart flame and smoke safety shall meet the above requirements.
3. The Contractor shall certify that all products used have met the above criteria.
4. The insulation values shown are a minimum. If the requirements of Title 24 exceed these values, the amount of and/or type must be increased to meet the Title 24 requirements.

B. Duct Insulation:
1. Fiberglass Duct Wrap:
   a. Insulation: ASTM C553; flexible, noncombustible blanket.
      1) 'K' value: ASTM C518, 0.48 at 75 degrees F.
      2) Maximum service temperature: 250 degrees F.
      3) Density: 0.75 lb/ ft3.
   b. Vapor Barrier Jacket:
      1) Kraft paper reinforced with glass fiber yarn and bonded to aluminized film vinyl.
      2) Moisture vapor transmission: ASTM E96; 0.5 perm.
      3) Secure with pressure sensitive tape.
   c. Vapor Barrier Tape: Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.
   d. Tile Wire: Annealed steel, 16 gage.
2. Glass Fiber Duct Liner, Flexible:
   a. Insulation: ASTM C553; flexible, noncombustible blanket.
      1) 'K' value: ASTM C518, 0.24 at 75 degrees F.
      2) Maximum service temperature: 250 degrees F.
      3) Density: 1.5 to 3.0 lb/ft3.
      4) Maximum Velocity on Coated Air Side: 4,000 ft/min.
   b. Adhesive: Waterproof (fire-retardant) type.
   c. Liner Fasteners: Galvanized steel, self-adhesive pad.
3. Glass Fiber Duct Liner, Rigid:
   a. Insulation: ASTM C612; semi-rigid, noncombustible.
      1) 'K' value: ASTM C518, 0.24 at 75 degrees F.
      2) Maximum service temperature: 250 degrees F.
      3) Density: 1.5 to 3.0 lb/cu ft.
      4) Maximum Velocity on Coated Air Side: 4,000.
4. Adhesive: Waterproof (fire-retardant) type.

2.5 CONTROLS

A. The Mechanical Contractor shall be responsible for the proper coordination of all control work and electrical work in connection therewith. He shall also be responsible for the proper operation of the entire system.

B. The Electrical Contractor shall furnish and install all line voltage control wiring, and in conduit. Wire sizing and length of run shall be coordinated with the manufacturer and Electrical Engineer.

C. Electrical Work: All electric relays, hand off automatic switches and all electrical wiring and all conduits will be provided under the Electrical Section, except as otherwise specified. Furnish and install additional conduit, wiring, relays, hand off automatic switches made necessary by the use of approved substituted equipment under this Section with no additional cost to the Owner.

D. Refer to drawings for control diagrams and additional requirements.

E. Calibration of Controls: The Controls Contractor shall carefully calibrate and adjust all controls as required to maintain comfort conditions and maximum energy conservation.

F. Thermostats and temperature sensors shall be by Venstar or approved equal.

G. Where stand-alone controls are indicated, mechanical contractor shall be responsible for low voltage controls conduit, wiring, and thermostat.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Equipment Installation:
1. All equipment provided under this section of the specifications shall be installed in strict accordance with the manufacturer's recommendations.
2. Should the drawings or specifications indicate the equipment is to be installed in a manner not in accordance with the manufacturer's recommendations; the Contractor shall obtain direction from the Engineer prior to proceeding with the installation. If the Contractor proceeds with the installation without obtaining direction from the Engineer, the Contractor shall be required to make all required corrections to the installation at no additional cost to the contract.
3. Space Consideration:
   a. Certain equipment and ductwork will have to be installed within the limited space available as indicated on the drawings.
   b. Exact field measurements of existing conditions will be the responsibility of this Contractor to assure that the equipment and ductwork to be installed under this Section of the specifications can be installed as indicated.
   c. Contractor shall submit shop drawings for approval prior to installation.
   d. These field verified dimensions shall be made prior to purchase of equipment or fabrication of ductwork.
4. Line all duct as indicated on mechanical sheets. Line ductwork as per General Notes, including but not limited to all ductwork at Bypass Damper connection locations.

B. Roof and Wall Flashings: For any damaged roof or wall flashing, Contractor shall coordinate with District to provide line item cost for repairs prior to completing any work. Contractor shall coordinate and maintain the roof warranty with the current manufacturer’s warranty provider for this building.

C. Openings through Walls and Roof:
1. Framed openings in walls and roof for ductwork to be coordinated in advance of the work with the District. Installer shall furnish shop drawings showing the correct dimensions and locations of the required openings.

D. Ductwork and Accessories:
1. Any modifications to existing ductwork shall be coordinated in advance of the work with the District by Contractor.
2. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.
3. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
4. Install accessories in accordance with manufacturer's instructions and per seismic note on mechanical sheet M-0.1.
5. Provide balancing dampers at points on low-pressure supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Use splitter dampers only where indicated.
6. Provide flexible connections immediately adjacent to equipment in ducts associated with fans and motorized equipment.
7. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, and elsewhere as indicated. Provide minimum 8 x 8 inch size for hand access, 18 x 18 inch size for shoulder access, and as indicated.

8. Provide duct test holes where indicated and required for testing and balancing purposes.
9. Check location of outlets and inlets and make necessary adjustments in position to conform to Architectural features, symmetry, and lighting arrangement.
10. Install diffusers to ductwork with airtight connection.
11. Provide balancing dampers on duct take-off to diffusers and registers, regardless of whether dampers are specified as part of the diffuser, or register assembly.
12. Paint ductwork visible behind air outlets and inlets matte black.
13. Hanger straps to turn under bottom of rectangular ducts and shall attach with sheet metal screws at this point as well as minimum two (2) additional screws into sides of duct for sizes eighteen inches (18") and under three (3) screws for sizes above eighteen inches (18). (Typical for each strap). Ducts in sizes above forty-eight inches (48") shall run continuous under bottom of duct. Straps for round duct shall run completely around underside of duct and shall be secured in place with minimum of two (2) sheet metal screws each side.
    a. Strap Installation: In general, provide in accordance with SMACNA duct installation standards. Contractor may request approval of alternate support methods to type specified. Shop drawings will be required.
    b. Concrete: Secure supports to concrete with concrete inserts. Branch ductwork in sizes eighteen inch (18") and smaller may be secured by power actuated fasteners. Contractor shall submit sizes and maximum loading data.
    c. Bracing all ductwork laterally to structural framing to prevent swaying or lateral movement per bracing details on plans per seismic note on mechanical sheet M-01.
14. Turning Vanes: All elbows having a centerline radius less than the width of the duct shall be square elbows with turning vanes, or proper radius and spacing. These turning vanes shall be multi-vane type and shall be carefully installed in accordance with the manufacturer's instructions. Provide turning vanes for duct widths of 18 inches or greater. Provide single thickness vanes for ducts of less than 18 inches. Contractor may submit for approval shop fabricated vanes conforming to SMACNA Duct Manual Standard. Where required or indicated on drawings, provide acoustic turning vanes constructed of air foil shaped aluminum extrusion with perforated faces and fiberglass fill.
15. Flexible Duct Connections: Shall be provided where indicated as required and shall be "Vent-glass", "Ventbestos", or Duro-Dyne Durolan super metal-fab.
16. Duct Tape and Sealer:
    a. All longitudinal snap lock joints shall be made airtight with high pressure duct sealant TREMCO J.S. 773, GREY A.F., and transverse joints sealed with Hardcast AFG No. 1402 foil grip instant tape sealant for rectangular ducts and round ducts, all U.L. classified. At contractor's option, all round duct transverse joints may be made with MIRACLE D-619 water based, duct sealant U.L. classified 309U as manufactured by MIRACLE ADHESIVES CORP.
    b. Exposed outdoor ductwork shall be sealed as described herein and, in addition, all transverse joints shall be covered with Glenkote "Seal-Flex".

E. Thermostats and over-ride switches:
1. Install at 48" above finished floor unless otherwise stated.
2. Coordinate with other trades.
3. All thermostats and over-ride switches shall be by Ventstar or approved equal.
4. Controls Contractor shall be responsible for verifying, furnishing all controls and wiring for tie-in of thermostats to new building energy management system and shall co-ordinate all requirements with other trades including notifying electrical contractor of necessary conduit and power requirements.
5. All costs for scope of work shall be submitted for final bid.
6. All control conduits shall be by Controls Contractor.

F. Insulation:
1. Duct Insulation:
    a. Unless specifically indicated on the drawings the Contractor may line or wrap ductwork to meet insulation requirements.
    b. Fiberglass duct wrap:

1) Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.
2) Secure insulation without vapor barrier with staples, tape, or wires.
3) Install without sag on underside of ductwork. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift ductwork off trapeze hangers and insert spacers.
4) Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
5) Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

c. Duct (and Plenum) liner Application:
1) Install as indicated (sound lining) on the drawings.
2) Adhere insulation with adhesive for 100 percent coverage. Secure insulation with mechanical liner fasteners. Refer to SMACNA Standards for spacing. Seal and smooth joints. Seal liner surface penetrations with adhesive.
3) Duct dimensions indicated are outside dimensions required for airflow.

3.2 JOB COMPLETION

A. Equipment Identification:
1. All equipment furnished under this section shall be provided with the manufacturer's metal identification labels securely attached and showing all pertinent data, including performance characteristics, size, model, and serial number. Labels shall not be obscured in any manner.
2. Identification name plates shall be provided on all equipment and control components, including room thermostat numbers coded to their respective air conditioning unit. Name plates shall be constructed of black bakelite with white center engraved letters three-sixteenth inch (3/16") high and shall be cemented to equipment with an epoxy resin. The Contractor shall submit to the Architect, a complete list of name plate titles for approval prior to installation.

B. Identification:
1. See Specification Section 23 05 53 for requirements.

C. Final Operation: Upon completion of the installation of the equipment and after all systems have been tested, cleaned, the Contractor shall place a competent person in charge who shall operate the equipment for a period of three eight-hour days. During this period of operation, all safety and operating controls shall be actuated to demonstrate proper operation. During this operating period, the Owner's representative shall be instructed in all details of operation and maintenance. All required instructions from the equipment manufacturer's representative shall be given during the period.

D. Operation Instructions:
1. Prepare a diagram of the entire control system with a full description of the heating, ventilating and air conditioning systems.
2. After approval by the Engineer, the control diagram and complete operating instructions shall be mounted under glass and installed where directed.
3. Prepare two (2) maintenance manuals which shall include all the necessary or pertinent data, such as:
a. Names, addresses and emergency phone numbers of all suppliers and manufacturers.
b. Part numbers of all replaceable items.
c. Oiling and lubrication instructions.
d. Air balance report.
e. Control diagram and operation sequence, together with labeling of controls and instruments to match the diagram.
f. A maintenance schedule which shall list all required maintenance on all equipment furnished under this section of the specifications and the intervals of which the items are to be performed.

E. Clean-Up:

1. After all heating, ventilating and air conditioning work has been tested and approved, the Contractor shall thoroughly clean all parts of the equipment installation. Exposed parts which are to be painted are to be thoroughly cleaned of cement plaster and other materials and all greases and oil spots removed with solvent. Exposed rough metal work to be carefully brushed down with steel brushes to remove rust and other spots and left in proper condition to receive painter's finish.
2. Remove all debris from the job site, all cartons, boxes, packing crates, excess materials not used occasioned by the work and to the satisfaction of the Owner.
3. If the above requirements of clean-up are not to the satisfaction of the Owner, the Owner reserves the right to order the work done and the cost of which shall be borne by the Contractor.
4. The Contractor shall remove on a daily basis all debris from the job site, to the satisfaction of the Owner.
5. If the above requirements of clean-up are not to the satisfaction of the Owner, the Owner reserves the right to order the work done by a third party and the cost of which shall be borne by the Contractor.

- END OF SECTION -

DIVISION 26 – ELECTRICAL

SECTION 26 00 00 - GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SCOPE

A. Work of this section includes everything necessary for or incidental to completing the electrical work, to provide a complete and operable electrical system, except as herein specifically excluded.

1.2 GENERAL REQUIREMENTS

A. Electrical System Characteristics: 480/277V. 3PH, 4W., 208/120V. 3PH, 4W.

B. Guarantee: Furnish a written guarantee for a period of one-year from date of acceptance.

C. Codes and Regulations: Work done under this Section shall comply with the latest edition of the following: California Electrical Code, State of California Title 24, State Building Standards, Occupational Safety and Health Administration (OSHA) requirements, State of California Title 17 and to all local codes having jurisdiction. In the case where the codes have different levels of requirements, the most stringent rule shall apply.

D. Wherever a discrepancy in quantity or size of conduit, wire, equipment, devices, circuit breakers, etc., (all materials), arises on the Drawing and/or Specifications, the Contractor shall be responsible for providing and installing all material and services required by the strictest condition noted on Drawings and/or in Specifications to insure complete and operable systems as required by the Owner and Engineer.

E. The General and Supplementary Conditions, as well as Special Conditions apply in addition to items in the Electrical Section. Special attention is directed to the following sections:

1. Drawings and Specifications at the site.

2. Shop drawings and samples.

3. Record drawings.

4. Cutting and Patching.

5. Cleaning up.

6. Guarantee.

7. Tests.

F. Additional Work: Refer to Mechanical and Plumbing specifications for additional Electrical requirements.

G. Provide minimum of twenty percent (20%) spare fuses of each size specified on plan, bridges, power/switch-packs, and control station of each type for the automatic lighting control system.

H. Testing:

1. Scan:

a. Infrascan test of the existing power distribution system affected by the building addition (i.e. panels, switchboards) and the new branch circuit panels shall be required.
b. Infrascan certified reports shall be submitted on completion to the Owner and Engineer.
c. Scans shall be performed by an independent testing laboratory with total connected loads in operation.

2. Megger:
   a. New branch circuit - phase, neutral and ground conductors.
   b. New insulated bonding conductors.

3. All circuits shall be tested for continuity and circuit integrity. Adjustments shall be made for circuits not complying with testing criteria.

4. Grounding System: Shall be tested by an independent testing laboratory to meet resistance specified in Part 3.1, D.3 of these Specifications. It shall be this Contractor's responsibility to make adjustments, as required, to upgrade non-complying systems to proper and safe operation.

5. All certified testing reports shall be submitted to the Owner at completion of project.

I. All Core Cutting, Drilling, and Patching:

1. For the installation of work under this Section, the aforementioned shall be performed under this Section of the Specifications and the Concrete section of the Specifications.

2. No holes will be allowed in any structural members without the written approval of the Structural Engineer.

3. For penetrations of concrete slabs or concrete footings, the work will be as directed in the Concrete Section of Specifications.

4. The contractor shall be responsible for patching and repairing surfaces where he is required to penetrate for work under this contract.

5. Penetrations shall be sealed to meet the rated integrity of the surface required to be patched and repaired. The patched surface shall be painted or finished to match the existing surface.

J. Verifying Drawings and Job Conditions:

1. This Contractor shall examine all Drawings and Specifications in a manner to be fully cognizant of all work required under this Section.

2. This Contractor shall visit the site and verify existing conditions. Where existing conditions differ from Drawings, adjustment shall be made and allowances included for all necessary equipment to complete all parts of the Drawings and Specifications.

K. Shop Drawings:

1. Drawings shall be submitted in six (6) bound sets accompanied by Letter of Transmittal, which shall give a list of the number and dates of the drawings submitted. Drawings shall be complete in every respect and bound in sets. Drawings shall include floor plans and site plans.

2. The Drawings submitted shall be marked with the name of the project, numbered consecutively and bear the approval of the Contractor as evidence that the Drawings have been checked by the Contractor. Any Drawings submitted without this approval will be returned to the Contractor for resubmission.

3. If the shop drawings show variations from the requirements of the Contract because of standard shop practice or other reasons, the Contractor shall make specific mention of such variations in his

letter of transmittal. If the substitution is accepted, the Contractor shall be responsible for proper adjustment which may be caused by the substitution. Samples shall be submitted when requested.

4. Shop drawings shall be submitted on the following but not limited to:

   a. Pull and Junction boxes.

   b. Wire/Cable.

   c. Conduit and fittings.

   d. Conduit supports.

   e. Safety/Disconnect switches.

L. Drawings of Record: The Contractor shall provide and keep up-to-date, a complete record set of blueprints. These shall be corrected daily and show every change from the original Drawings. This set of prints shall be kept on the job site and shall be used only as a record set. This shall not be construed as authorization for the Contractor to make changes in the layout without definite instruction in each case. Upon completion of the work, a set of reproducible Contract Drawings shall be obtained from the General Contractor and all changes as noted on the record set of prints shall be incorporated thereon with black ink in a neat, legible, understandable and professional manner. Refer to the Supplementary General Conditions for complete requirements.

1.3 WORK IN COOPERATION WITH OTHER TRADES

A. Examine the Drawings and Specifications and determine the work to be performed by the site utilities contractor, electrical, mechanical, plumbing, building contractor and other trades. Provide the type and amount of electrical materials and equipment necessary to place this work in proper operation, completely wired, tested and ready for use. This shall include all conduit, wire, disconnects, relays, and other devices for the required operation sequence of all electrical, mechanical and other systems or equipment.

B. Provide power and control circuits, conduit and wire as indicated on the Mechanical and Plumbing drawings as required for complete and operable systems.

C. The electrical contractor shall be responsible for obtaining back-boxes for all communication/ signal system devices/equipment from the low voltage contractor’s for rough-in. He shall coordinate the delivery of the backboxes to avoid building construction delays. In the event that the backboxes are not delivered as scheduled, the electrical contractor shall be responsible for installing the correct backboxes, patching and refinishing walls disturbed by the installation of the subject backboxes.

1.4 TESTING AND ADJUSTMENT

A. Upon completion of all electrical work, this Contractor shall test all circuits, switches, motors, breakers, motor starter(s) and their auxiliary circuits and any other electrical items to ensure perfect operation of all electrical equipment.

B. Equipment and parts in need of correction and discovered during such testing shall be immediately repaired or replaced with all new equipment and that part of the system shall then be retested. All such replacement or repair shall be done at no additional cost to the Owner.

C. All circuit shall be tested for continuity and circuit integrity. Adjustments hall be made for circuits not complying with testing criteria.

D. All certified testing reports shall be submitted to the Engineer at completion of project.

1.5 IDENTIFICATION

A. Identification nameplates shall be Micarta 1/8" thick and of approved size, with bevelled edges and engraved white letters 1/4" high minimum on black background. Nameplates shall be provided for all circuits in the distribution switchboards, and selector switches. Inscriptions on equipment shall be identical to those indicated in panels and/or motor control centers and other similar devices. Each nameplate shall be provided with drillings and suitable mounting screws corresponding to finish of the nameplate. The inscriptions in each nameplate shall be as indicated on the Drawings.

B. Identification of Air Conditioning Equipment: Equipment to be so identified shall include, but shall not be limited to: Pressure and temperature controllers; switches; equipment motors and boxes or cans housing other control items. Mechanical equipment nameplates shall be mechanically fastened and have letters a minimum of 3/8" high.

1.6 MAINTENANCE, SERVICING, INSTRUCTION MANUALS AND WIRINGDIAGRAMS

A. Prior to final acceptance of the job, the Electrical Contractor shall furnish to the Owner at least four (4) copies of operating and maintenance and servicing instructions, as well as four (4) complete wiring diagrams for the following item(s) or equipment:

1. Circuit breakers.

2. Safety/Disconnect Switches.

B. All wiring diagrams shall specifically cover the system supplied. Typical drawings will not be accepted. Two (2) copies shall be presented to the Electrical Engineer and four (4) copies to the Owner.

1.7 ELECTRICAL CONTRACTOR'S RESPONSIBILITY

A. It shall be the Electrical Contractor's responsibility to obtain a complete set of Drawings and Specifications. He shall check the Drawings of the other trades and shall carefully read the entire Specifications and determine his responsibilities.

B. The contractor shall be responsible for reviewing the plans and specifications to ensure each room, where electrical line or low voltage equipment is to be installed, has sufficient space to accommodate the system cabinets, equipment and terminations while maintaining code mandated clearances about said equipment. The contractor shall identify problem areas prior to bid, include all costs required for corrective measures in his bid and submit alternate equipment and materials suitable for the installation to the Architect/Engineer for acceptance as part of the product submittal process.

1.8 FINAL INSPECTION AND ACCEPTANCE

A. After all requirements of the Specifications and/or the Drawings have been fully completed, representatives of the Owner will inspect the work. Contractor shall provide competent personnel to demonstrate the operation of any item or system to the full satisfaction of each representative.
B. Final acceptance of the work will be made by the Owner after receipt of approval and recommendation of acceptance from each representative.

1.9 RECORD DRAWINGS

A. Contractor shall furnish one set of reproducible record drawings before final payment of retention.

1.10SUBSTITUTIONS

A. Substitution to specified equipment shall be submitted and received by the Engineer fifteen (15) days after the bid date for review and approval.

B. To receive consideration, requests for substitutions must be accompanied by documentary proof of its equality with the specified material. Documentary proof shall be in letter form and identify the specified values/materials alongside proposed equal values/materials. In addition, catalog brochures and

samples must be included in the submittal.

C. In the event that authorization is given for a substitute equal to bid, after award of contract the Contractor shall submit to the Engineer certified quotations from suppliers of both the specified and proposed equal material for price comparison and delivery dates.

D. In the event of cost reduction, the Owner will be credited with 100 percent of the reduction, arranged by Change Order.

E. The Contractor warrants that substitutions proposed for specified items will fully perform the functions required.

F. Substitutions or requests for substitution shall not be accepted and rejected for failure to comply with items A-E above.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials and Equipment: All electrical materials and equipment shall be new and shall be listed by Underwriter's Laboratories and bear their label, or listed and certified by a nationally recognized testing authority where UL does not have an approval. Custom made equipment must have complete test data submitted by the manufacturer attesting to its safety. In addition, the materials and equipment shall comply with the requirements of the following:

1. American Society of Testing Materials (ASTM).

2. Insulated Cable Engineers Association (ICEA).

3. National Electrical Manufacturer's Association (NEMA).

4. National Fire Protection Association (NFPA).

5. American National Standard Institute (ANSI).

B. Conduit:

1. Rigid conduit shall be full weight threaded type aluminum or steel, except where specifically required to be steel. Steel conduit shall be protected by overall zinc coating to inside and outside surfaces, applied by the hot dip, metallizing or sherardizing process.

2. Galvanized Rigid Conduit (GRC), shall be full weight threaded type aluminum or steel, except where specifically required to be steel. Steel conduit shall be protected by overall zinc coating to inside and outside surfaces, applied by the hot dip, metallizing, or sherardizing process.

3. Intermediate Metal Conduit (IMC), shall be hot-dipped galvanized in accordance with UL 1242 and meeting Federal Specification WWC-581 (latest revision).

4. Electrical Metallic Tubing (EMT), shall be zinc-coated steel with baked enamel or plastic finish on inside surfaces.

5. Flexible metal conduit shall be constructed of aluminum or hot-dipped galvanized steel strips wound spirally with interlocking edges to provide greatest flexibility with maximum strength. Interior surfaces shall be smooth and offer minimum drag to pulling in conductors. Used only as directed by the Engineer.

6. Liquid-tight conduit (Seal-Tite) shall be galvanized steel flexible conduit as above except with moisture and oil-proof jacket, pre-cut lengths and factory installed fittings. For outdoor installations and motor connection.

7. Non-Metallic Conduit:

   a. Polyvinyl chloride (PVC) rigid conduit, Schedule 40, Type II for underground installation only.
   b. Conduit and fitting shall be produced by the same manufacturer.

8. MC Cable or Mineral Insulated Cable: Not allowed.

C. Fittings:

1. Condulet type fittings shall be smooth inside and out, taper threaded with integral insulating bushing and of the shapes, sizes and types required to facilitate installation or removal of wires and cables from the conduit and tubing system. These fitting shall be of metal, smooth inside and out, thoroughly galvanized, and sherardized cadmium plated.

2. Metallic condulet covers shall have the same finish as the fitting and shall be provided for the opening of each fitting where conductor do not pass through the cover.

3. Connector, coupling, locknut, bushings and caps used with rigid conduit shall be steel, threaded and thoroughly galvanized. Bushings shall be insulated.

4. EMT fittings, connectors and couplings, shall be steel, zinc or cadmium plated, raintight, threadless, compression or tap-on multiple point, steel locking ring type with insulated throat.

5. Flexible steel conduit connectors shall be or malleable iron clamp or squeeze type or steel twist-in type with insulated throat. The finish shall be zinc or cadmium plating.

6. Die cast, set screw or indenter type fittings are not acceptable.

7. Conduit unions shall be "Erickson" couplings, or approved equal. The use of running threads will not be permitted.

D. 600 Volt Conductors - Wire and Cable:

1. All conductors shall be copper. SimPull type or equal.

2. Type THHN/THWN thermoplastic, 600 volt, UL approved, dry and wet locations, for conductor sizes up to and including #4 AWG.

3. Type XHHW cross-linked synthetic polymer, 600 volt, UL approved, for dry and wet locations, for conductor sizes #2 AWG. and above.

4. Cross-linked synthetic polymer, XHHW, 600 volts, UL approved, for installation underground, in concrete or masonry.

5. Wire and cable shall be new, manufactured not more than six (6) months prior to installation, shall have size, type of insulation, voltage rating and manufacturer's name permanently marked on outer covering at regular intervals.

6. Wire and cable shall be factory color coded by integral pigmentation with a separate color for each phase and neutral. Each system shall be color coded and it shall be maintained throughout.

7. Systems Conductor Color Coding:

   a. Power 208/120V, 3PH, 4W:

      (1) Phase A = Black
      (2) Phase B = Red
      (3) Phase C = Blue

(4) Neutral = White

b. Power 480/277V, 3PH, 4W:

(1) Phase A = Brown
(2) Phase B = Orange
(3) Phase C = Yellow
(4) Neutral = White

c. Ground Conductors:

(1) Green

d. Communication/Signal System:

(1) As recommended by the manufacturer.

8. All color coding for #8 conductor and above shall be as identified above, utilizing phase tape at each termination.

9. No conductors carrying 120 volt or more shall be smaller than #12 AWG.

E. Junction and Pullboxes:

1. For interior dry locations, boxes shall be galvanized one-piece drawn steel, knockout type, with removable, machine screw secured covers.

2. For outside, damp or interior/exterior surface mounted locations, boxes shall be heavy cast aluminum or cast iron with removable, gasketed, non-ferrous machine screw secured covers.

3. All boxes shall be sized for the number and sizes of conductors and conduits entering the box and equipped with plaster rings where required. Each conductor shall be terminated at an insulated, barriered terminal connector and completely identified with an engraved fiber identification marker, Electrovert or Underwriter's Safety Device Company.

F. Outlet Boxes:

1. For fixtures, boxes shall be galvanized, one-piece drawn steel, knockout type equipped with 3/8" fixture studs and plaster rings where required.

2. Unless otherwise noted on plan or specified herein, outlet boxes shall be 4” square x 2 1/8” deep, one-piece drawn steel, knockout type, mounted flush with in wall. Provide with plaster rings and wall plate.

3. For data and combination telephone/data system outlets, outlet boxes shall be 4 11/16” square x 2 1/8” deep, one-piece drawn steel, knockout type, mounted flush with in wall. Provided with plaster rings and leave outlet box ready for installation of Owner furnished wall plate.

4. For all other communication/signal system devices, outlet boxes shall be as recommended by the system manufacturer and provided complete with plaster rings and covers.

5. For locations where standard boxes are not suitable due to number and size of conduit to be terminated, special boxes shall be designed to fit space or meet other requirements and submitted for approval.

6. For surface mounting or exposure to wet or damp locations, outlet boxes shall be heavy cast aluminum or cast iron with threaded hubs; covers shall be watertight with gaskets and non-ferrous screws.

7. Floor boxes shall be cast iron, fully adjustable type, with flange and brass covers suitable for the outlets/connectors specified on plan and in the project manual. Boxes shall be suitable for terminating the conduit specified on plan. Wiremold Omnibox series or approved equal for 1" conduit and smaller. Wiremold Resource RFB series or approved equal for conduits larger than 1".

G. Switches:

1. Standard single pole switches shall be flush tumbler, A.C. rated, quiet type, heavy duty back or side wired with binding screws, standard rocker Hubbell #1221, 20A, 120/277V, or approved equal, color as elected by Architect. Two pole three-way and other switches shall be similar. Refer to Device Plate Section of Specifications for other requirements.

2. Switches located outdoors or in damp or wet locations shall be the same as above provided with steel locking weatherproof lift cover.

3. Switches controlling or disconnecting single phase motor loads in excess of 1/3HP shall be horsepower rated and approved or motor control service. Switches shall be complete with overload device of proper motor nameplate rating, where required.

4. Disconnect (safety) switches shall be fused, heavy duty type meeting NEMA Specifications. Switches shall be provided with rejection type fuse blocks. Provide switches with the number of poles, the voltage, current and horsepower ratings as required. Provide externally operable, quickmake, quick-break type mechanism with cover interlock and padlockable in either the open or closed position. Unless indicated otherwise, provide switches indoors in NEMA Type 1 enclosure and in NEMA Type 3R rain-tight enclosure where indicated to be outdoors or weatherproof. Provide nameplate indicating equipment served. Provide unit as manufactured by Challenger or approved equal Siemens or Westinghouse.

H. Painting:

1. Terminal cabinets, panels, junction boxes, pull boxes, etc., and conduit installed outdoors and in public view shall be painted with colors selected by the Architect to match the subject exterior surface. Refer to painting section of the specifications for additional requirements.

I. Seismic Design and Anchoring of Electrical Equipment:

1. Seismic anchorage of electrical equipment shall conform to C.C.R. Title 24, 2025 CBC with California Amendments. Anchorage details for roof/floor mounted equipment shall be as shown on plans.

PART 3 - EXECUTION

3.1 PREPARATION AND INSTALLATION

A. Installation of Conduit and Outlet Boxes:

1. All conduit exposed or installed in concrete and masonry, shall be galvanized rigid steel conduit (GRC), or intermediate metal conduit (IMC).

2. Rigid conduit may be installed under floor slabs, under concrete sidewalls and as noted on the Drawings. Rigid conduit installed under slabs shall be 1" trade size minimum and shall be wrapped with 20 mil. polyvinyl chloride plastic tape.

3. All conduit except as hereinafter specified, installed in concrete or masonry walls, or damp or hazardous location, or subject to mechanical injury shall be heavy wall, threaded, galvanized rigid steel conduit (GRC), or intermediate metal conduit (IMC).

4. Flexible steel conduit shall only be permitted to be used at light fixture outlets and connections to vibrating electrical equipment. All flexible steel conduit runs shall be less than 6'-0". All outdoor installation shall be made using liquid-tight flex with approved fittings. Use of flexible conduit shall be as approved by the Engineer.

5. Intermediate metal conduit (IMC), is approved for use in all locations as approved for GRC or EMT and in accordance with Article 345 of CEC and UL Information card #DYBY.

6. All conduit installed in the dry walls or ceilings of the building shall be steel tube (EMT), Galvanized Rigid Steel (GRC), or Intermediate Metal Conduit (IMC).

7. MC or mineral insulated cable is not allowed.

8. Conduit shall be run so as not to interfere with other piping fixtures or equipment.

9. The ends of all conduit shall be cut square, carefully reamed out to full size and shall be shouldered in fitting.

10. No running threads will be permitted in locations exposed to the weather, in concrete or underground. Special union fittings shall be used in these locations.

11. Underground conduit shall be, unless otherwise indicated, Schedule 40 PVC (polyvinyl chloride) installed at depth of not less than 24" below grade, concrete encased with a minimum of 3” concrete envelope and 2” minimum between conduits. Conduit separation shall be maintained using plastic spacers located at 10'-0" intervals. Where power and communication/signal conduits are run in a common trench a (12") inch minimum separation shall be maintained between power and communication/signal conduits. The grounding wire in plastic conduit shall be rated in accordance with Article 250 of 2025 CEC. Conduit encasement will not be required for conduits installed under the building slab (building footprint).

12. All underground or imbedded conduit shall be 1" minimum trade size for steel and for PVC.

13. Where underground power feeder conduit runs stub-up, conduit shall transition to GRC underground. The contractor shall use GRC elbows and GRC risers wrapped in 20 mil. PVC tape for stub-ups. Conduit stub-ups for branch circuits and low voltage systems shall be PVC.

14. PVC conduit shall not be run in walls.

15. Where underground conduit runs penetrate floor slab, conduit shall terminate 6” above finished floor with a grounding bushing.

16. Where conductors enter a raceway in a cabinet, pull box, junction box, or auxiliary gutter, the conductors shall be protected by a plastic bushing type fitting providing a smoothly rounded insulating surface.

17. Where conduit extends through roof to equipment on roof area, this Contractor shall provide 24 gauge galvanized sheet metal flashing cones with 4" flanges on roof surface. This flashing shall be delivered to the roofing contractor for installation. The actual location of all such roof penetrations and outlet shall be verified by the Contractor.

18. All conduit underground, in masonry and concrete walls, and where concealed under floor slabs shall have joints painted with thread compound prior to makeup. No conduit shall be installed horizontally in concrete walls or floors.

19. All conduit shall be supported at intervals not less than 6'-0" and within 12" from any outlet and at each side of bends and elbows. Conduit supports shall be galvanized, heavy stamped, two-hole conduit clamp properly secured.

20. Where conduit racks are used the rack shall consist of two piece conduit clamps attached to galvanized steel slotted channels, properly secured via threaded rods attached directly to the building structure.

21. Nail-in conduit supports will not be allowed. One piece set-screw type conduit clamps or perforated iron for supporting conduit will not be permitted.

22. Seismic Conduit Support:

    a. All conduit shall be supported in such a manner that it is securely attached to the structure of the building. Attachment is to be capable of supporting the tributary weight of conduit and contents in any direction. Maximum spacing of support and braces are to be as follows:

CONDUIT TYPE	MAXIMUM SPACING
EMT, IMC	10'-0"
GRC (3/4" thru 1 ½")	10'-0"
GRC (2" thru 2½")	16'-0"
GRC (3" and larger)	20'-0"

23. All conduit runs shall be installed parallel or perpendicular to walls, structural members, or intersection of vertical planes and ceilings. Field made bends and offset shall be avoided where possible. Crushed or deformed raceway shall not be installed.

24. Open knockouts in outlet boxes only where required for inserting conduit.
25. Outlet boxes on metal studs shall be attached to metal hangers, tack welded or bolted to studs; on wood studs attachment shall be with wood screws, nails not acceptable.

26. Recessed panels shall be provided with (4) ¾" spare conduit stub-ups into accessible ceiling space. Surface mounted panels secured to stud walls shall be secured to wall using 1/2" x 3" screws into steel backing plate provided by the Contractor.

27. All boxes shall be covered with outlet box protector, Appleton SB-CK. Keep dirt from entering box or panels. If dirt does get in, it shall be removed prior to pulling wires.

28. All boxes installed outdoors shall be suitable for outdoor installations, gasketed, screw cover and painted as directed by the Architect with weatherproof paint to match building.

29. All conduit entries to outdoor mounted panels, cabinets, boxes, etc., shall be made using Myers "SCRU-TITE" hubs Series ST.

30. All conduit shall have a 200 lb test poly-propylene pull line left in place for future use in all runs tagged with a plastic tag at terminating end indicating the location of the opposite end of the conduit.

31. All rotating electrical equipment shall be supplied with flexible, liquid-tight conduit with appropriate slack and shall not exceed thirty-six (36) inches.

32. All multiple conduit runs within suspended ceilings shall be suspended from building structure by means of unistrut hangers/rack, see note 20. Refer to note 19 for support of single conduit runs within suspended ceilings. Conduit shall not be allowed to lay on ceiling or be supported from ceiling suspension wires or other suspension system.

33. Provide complete conduit system for all line and low voltage systems.

34. All raceways shall be installed concealed in walls, under floors or ceilings. Exposed raceways will not be permitted unless specifically approved in writing by the Architect/Engineer. When approved by the Architect/Engineer exposed raceways shall be Wiremold type or equal, color as selected by the Architect.

35. Provide minimum 18” square ceiling access panels for devices, outlets, junction/pull boxes installed over inaccessible ceilings.

36. Provide conduit only for routing of HVAC control wiring. Refer to Mechanical drawings for conduit requirements.

B. Installation of 600 Volt Conductors:

1. All line and low voltage wire shall be installed in conduit.

2. All line voltage circuits and feeder wires shall be continuous from the service point to terminal or farthest outlet. No joints shall be made except in pull, junction or outlet boxes, or in panel or switchboard gutters.

3. All low voltage wire/cables shall be continuous from the service point to terminal or farthest outlet. No joints will be allowed.

4. Thoroughly clean all conduit and wire-ways and see that all parts are perfectly dry before pulling any wires. No joint shall be made except in pull, junction or outlet boxes, or in panel or switchboard gutters.

5. Provide conduit only for routing of HVAC control wiring. Refer to Mechanical drawings for conduit requirements.

6. Install UL approved, fixture wire from all lighting fixture lamp sockets into fixture outlet or junction box.

C. Joints in 600 Volt Conductors:

1. Joints in 600 volt conductors smaller than No. 4 AWG shall be made with Scotchlok spring type connectors. Wires No 4 AWG and larger shall be joined together with approved type of pressure connector and taped with #33 3M tape, three (3) layers minimum to provide insulation not less than that of conductor. Connections to switch or busbar shall be made with one-piece copper lugs. Splicing of all 600 volt or less in-line connections #2 AWG through 350 MCM shall be made with 3M brand PST connector.

2. Joints/splices shall be done in junction or pull boxes.

3. Splices of communications wire/cable will not be permitted. Communications wire/cable shall run continuously from its point of origin to its destination point.

D. Grounding:

1. Provide grounding for entire electric installation as shown on plans and as required by applicable codes. Included as requiring grounding are:
   a. Conduit.
   b. Neutral or identified conductors of interior wiring system.
   c. Non-current carrying metal parts of fixed equipment.

2. Grounding and bonding conductors shall be sized per the latest edition of the California Code of Regulations, Title 24, State of California and CEC.

3. Provide and install an equipment grounding conductor in all feeder and branch circuit conduits.

4. Building grounding system resistance to ground shall not exceed 25 Ohm.

E. Prefabricated Equipment: Installation of all prefabricated items and equipment shall conform to the requirements of the manufacturer's specifications and installation instruction pamphlets. Where code

requirements affect installation of materials and equipment, the more stringent requirements, code or manufacturer's instructions and/or specifications, shall govern the work.

END OF SECTION

2) MARK TAWIN ES TECHNICAL SPECIFICATIONS

SPECIFICATIONS

LYNWOOD USD DISTRICT WIDE HVAC REPLACEMENT - GROUP B - MARK TWAIN ELEMENTARY SCHOOL

DIVISION 0 – INTRODUCTORY PAGES

SECTION 00 00 02 - PROJECT DIRECTORY

PART 1 - GENERAL

Owner:
714-999-3511 PHONE
emorales@mylusd.org

Lynwood Unified School District
11321 Bullis Road
Lynwood, CA 90262
Director of Facilities: Eric Morales

Mechanical Engineering:
714-693-2277 PHONE
None FAX
abanerjee@oed-inc.com

Optimum Energy Design
5200 E. La Palma
Anaheim, CA 92807
Principal-in-Charge: *Abby Banerjee*

-END OF SECTION-

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END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 26 00 - REQUESTS FOR INFORMATION

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of the General and Supplementary Conditions and Division One apply to this section.

B. Section Includes: Procedures for requesting clarification or information about the intent of the contract documents.

1.02 DEFINITIONS

A. Request for information: A request for information, clarification or interpretation is a formal means for the Contractor to verify or clarify the intent of the documents. Requests are presented in writing on a pre-approved form and answered in writing on the same form. Request is prepared by the Contractor, and submitted to the Engineer, to request clarifications or interpretations of the intent of the Contract Documents, or to notify the Engineer of potential conflicts in Contract Documents or between the Contract Documents and field conditions.

1.03 PROCEDURES FOR REQUESTING INFORMATION

A. The Engineer's response is an interpretation or clarification of the Contract Documents. Such request does not authorize changes in the work that impact Contract Sum or Contract Time.

B. When possible, request such clarification either verbally or in writing at the next scheduled Project meeting. When the information request is answered at the project meeting, number the request and enter the response into the meeting minutes. When the urgency or complexity require more timely communication between meetings, prepare and submit a formal written information request to the Engineer, without delay.

C. Submit information requests within 3 days so as not to impede the progress of the work.

1. When an answer to an information request has an effect on cost or time, notify the Engineer in accordance with the Contract Documents. Do not perform such work until a Change Order has been reviewed by the Engineer and approved by the District.

2. When submitting an information request, indicate the time available for the Engineer to respond without causing an impact to the Contract Time.

D. When a request for information involves clarification of coordination issues, lay out Contractors' suggested solutions using scaled sketches, and submit with the request. If the request is such that choices of several logical solutions are apparent to the Contractor, include the logical solutions on the form.

E. Information requests may be returned with a stamp or notation "Not Reviewed", if, in the opinion of the Engineer:

1. The interpretation requested is ambiguous or unclear to the Engineer.

2. The answer is obvious and clear by researching the Contract Documents.

3. The Contractor has not reviewed the request prior to submittal to the Engineer.

4. The Contractor has not offered potential solutions to answer coordination issues or offered logical solutions.

F. Allow a minimum of 4 days for review and response time, after receipt by the Engineer. It is the responsibility of the Contractor to verify receipt by the Engineer. The response time may be increased if:

1. More information is required.

2. The information request is submitted out of sequence.

3. In the opinion of the Engineer, more time is needed to answer the information requests.

G. Do not use information requests for:

1. Submitting substitutions for consideration.

2. Requesting changes or additions of scope to the work.

3. Requesting “value engineering” cost-saving or time-saving changes.

H. If the Contractor believes that a clarification by the Engineer may result in a change, Contractor shall not proceed with the work indicated by the request until a change is approved by the District.

1. If the Contractor believes that a clarification by the Engineer results in additional cost, identify the basis of the Contractor’s bid in the information requests.

2. Answered information requests shall not be construed as an authorization to perform extra work.

I. Form: Submit requests in writing on a form approved by District.

PART 2 – PRODUCTS – NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 32 13 - CONSTRUCTION SCHEDULE - CPM

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of the General and Supplementary Conditions and Division One apply to this section.

B. Section Includes: Construction Schedule procedures, preparation, submittals, reviews, updates, and revisions.

C. Related Sections:

1. Section 01 33 00: Submittals.

2. Section 01 78 39: Project Record Documents.

1.02 SUBMITTALS

A. Approved Schedule: Submit 6 copies and one reproducible of approved Construction Schedule, signed by District and Contractor.

1.03 PROCEDURES

A. Within 15 days after Award of Contract, but not more than 7 days after Notice to Proceed, Contractor shall submit, for review, to the District, a detailed Construction Schedule setting forth requirements for complete execution of work. Construction schedule shall include, but not be limited to specific days, night work, description of work, anticipated completion date(s), phasing, unit building ‘down time’, mechanical system start-up and turnover date.

B. The District will review and return Contractor's Construction Schedule, with summary comments, within 7 days. If revisions are required, Contractor shall resubmit Construction Schedule within 3 days.

C. After approval, changes to Construction Schedule shall not be made unless mutually agreeable to District and Contractor.

D. Include in initial schedule a written summary narrative sufficiently comprehensive to explain basis of Contractor's approach to work.

E. If a Construction Schedule is considered by the District to be in non-compliance with any requirement of the Contract, Contractor will be notified to review and revise Construction Schedule and bring it into compliance. Failure of Contractor to submit a Construction Schedule in full compliance with the Contract may result in a delay in the processing of progress payments, since Construction Schedule will be used in evaluating progress for payment approval.

F. Simultaneously with each submittal of Progress Payment Request, Contractor shall deliver to the District an updated Construction Schedule reflecting work progress as of end of previous reporting period. Each such Construction Schedule shall show actual progress to date in execution of work, together with a projected schedule for completion of work. No changes in logic will be permitted unless agreed upon with District.

G. Scheduled submittals are subject to review and acceptance by the District. The District retains the right to withhold progress payments until Contractor submits a Construction Schedule acceptable to the District.

1.04 PREPARATION GUIDELINES

A. Construction Schedule shall be prepared using Critical Path Method (CPM) of scheduling.

B. Construction Schedule shall be computer-based, in a format acceptable to the District. Level of detail indicated in schedule shall be equal to or greater than the breakdown outlined in Table of Contents of the project manual.

C. Durations and events indicated on schedule shall conform to phasing set forth in the Contract and shall indicate any area or building within a particular phase. Schedule shall indicate Contract "milestone events" and other milestones agreed to by the District; no other milestone dates will be accepted unless approved as a change.

D. Construction Schedule shall represent a practical plan to complete work within time requirements of the Contract.

1. Schedule extending beyond limits of Contract time will not be acceptable.

2. Indicate "float" (plus or minus) in schedule milestone dates.

3. Schedule is subject to approval by the District. Revise and resubmit until approved.

E. Construction schedule shall clearly indicate sequences of construction activities and specifically indicate:

1. Start and completion of all items of work, their major components, and interim milestone completion dates as determined by Contractor and District.

2. Activities for procurement, delivery, installation of equipment, materials and other supplies, including:

a. Time for submittals, resubmittals, and reviews. Include decision dates for selection of finishes.

b. Time for fabrication and delivery of manufactured products for work.

c. Interdependence of procurement and construction activities.

d. Dates for testing and balancing equipment, and final inspection.

F. Schedule shall be in sufficient detail to assure adequate planning and execution of work.

1. Each activity shall range in duration from 1 to 5 workdays, with exception of fabrication and procurement activities, unless directed otherwise by the District. Activity duration shall be total of actual days required to perform and complete that activity and shall not include consideration of weather impact on activity.

2. Schedule shall be cost and resource-loaded with total equal to Contract sum, and shall include all associated interface activities in the Contract including, but not limited to, District's Maintenance Branch activities and Interim Housing schedules, which will be provided by the District.

3. Schedule shall allow monitoring and evaluation of progress in performance of work; it shall be time-scaled in precedence diagramming method (PDM), or arrow diagramming method (ADM).

4. Activities shall include:

   a. Description: what is to be accomplished and where.

   b. Workday duration.

   c. Responsibility code; identifying who performs each individual activity.

5. Network shall show continuous flow from left to right.

6. Identify days per week and shifts per day worked; also, non-work days and holidays.

7. Identify activities which constitute controlling operations, i.e., milestones or critical path.

G. Failure to include any element of work required for performance of this Contract shall not excuse Contractor from completing work required to comply with Contract Documents and Construction Schedule.

H. Submittal of the Construction Schedule shall be interpreted as Contractor's confirmation that schedule meets requirements of the Contract Documents, and that the work will be executed in sequence indicated in schedule.

I. Contractor shall prepare construction only after careful coordination with the District, Probation and the Engineer has been done. Schedule must reflect all suggestions and recommendations by said parties. Construction phasing shall be executed consecutively and without period(s) of intermission. Contractor shall prepare his bid such that no less than ten (10) different phases are included to complete his scope of work indicated in the project documents. Any alteration or changes to phasing and/or execution of work must be approved by Probation and the District prior to start of work.

1.05 REVIEWS, UPDATES, AND REVISIONS

A. The District will review and return Contractor's Construction Schedule, with summary comments, within 10 days. If revisions are required, Contractor shall resubmit the construction schedule within 7 days following receipt of the District's comments.

B. After Contractor and the District agree to a final schedule, it will become the Project Construction Schedule and considered part of the Contract Documents.

C. Construction Schedule Reviews and Updates:

1. Periodically review schedule for:

   a. Actual completion dates for work items completed during report period.

   b. Actual commencement dates for work items started during report period.

   c. Estimated remaining duration for work items in progress are always to be less than original duration, unless modified by change order.

   d. Estimated commencement dates for work items scheduled to start during month following report period.

   e. Changes in duration of work items.

   f. Identification of current and most crucial critical paths to required completion dates.

2. In the case of a schedule change, Contractor shall include a narrative report with the updated progress analysis, which shall include, but not be limited to, a description of problem areas, current and anticipated delaying factors, and any proposed revisions for a recovery plan.

3. Change Orders affecting schedule shall be clearly identified as separate, new activities.

4. Review of Construction Schedule shall not relieve Contractor of the responsibility for accomplishing work in accordance with the Contract Documents.

D. Updates: Contractor shall submit to the District, with each Bi-Weekly payment application, an up-to-date Construction Schedule to include following:

1. Work Item Report: Detailing work items and dependencies as indicated on network diagram, listed in order of ascending work item number.

2. Separate listing of activities completed during reporting period.

3. Separate listing of activities which are currently in progress, indicating their remaining duration and percentages completed.

4. Separate listing of activities which are causing delay in work progress.

5. All reports shall be arranged based on appropriate phasing, areas within a phase, or broken down by building or facility.

6. Narrative report to define problem areas, anticipated delays, and impact on Construction Schedule. Report corrective action taken, or proposed, and its effect, including effect of changes on schedules of individual contractors.

7. Resolution of conflict between actual work progress and schedule logic: when out-of-sequence activities develop in schedule because of actual construction progress, Contractor shall submit a revised schedule to conform to current job sequence and direction.

E. If, according to current updated Construction Schedule, the District determines Contractor is behind the Contract completion date or any interim milestone completion dates and taking into account time extensions to which Contractor is entitled, Contractor shall submit a revised schedule, indicating a workable plan and a narrative description to complete project on time.

1. The District may withhold progress payments until schedule changes are approved.

F. Scheduling of change or extra work orders is responsibility of Contractor.

1. Contractor shall revise Construction Schedule to incorporate all activities involved in completing change orders, or extra work orders, and submit it to the District for review.

G. If the District finds Contractor is entitled to extension of any completion date under provisions of the Contract, the District's determination of total number of days extension will be based upon current analysis of Construction Schedule and upon data relevant to extension.

H. Contractor acknowledges and agrees that delays to non-critical activities (those with "float") will not be considered a basis for a time extension unless activities become critical. Non-critical activities are those activities which, when delayed, do not affect an interim or final Contract completion date.

I. Any claim for extension of time shall be made in writing to the District not more than 24 hours after commencement of delay; otherwise, it shall be deemed finally waived for all purposes. Contractor shall provide an estimate of probable effect of such delay on progress of the work as part of the claim.

1.06 CONTRACTOR'S RESPONSIBILITY

A. Contractor shall provide sufficient skilled labor, materials, and equipment to properly carry out the work in accordance with Construction Schedule.

1.07 SUSPENSION OF PAYMENTS

A. Initial Submittal: The District has the right to withhold progress payments until Construction Schedule is approved.

B. Monthly Submittals: The District has the right to withhold progress payments if Contractor fails to update and submit Construction Schedule and reports as specified.

1.08 RECORD COPY

A. At completion of work items, submit Construction Schedule reflecting actual project critical paths.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 33 00 - SUBMITTALS

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of the General and Supplementary Conditions and Division One apply to this section.

B. Section Includes:

1. Procedures for submitting, to the District, items such as schedules, shop drawings, product data, samples, material lists, manuals, warranties and certificates, required by this section and individual specification sections, finish hardware schedule and segregation of contract costs.

2. Wherever possible, throughout the Contract Documents, the minimum acceptable quality of workmanship and materials has been defined by the name and catalog number of a manufacturer and by reference of recognized industry standards.

3. To ensure that specified products are furnished and installed in accordance with the design intent, procedures have been established for advance submittal of design data and for its review by the District.

C. Related Sections:

1. Section 01 32 13: Construction Schedule.

2. Section 01 78 39: Project Record Documents.

3. Other sections requiring submittals, as indicated in specification sections.

1.02 DEFINITIONS

A. Shop Drawings: Shop drawings are original drawings prepared by Contractor, subcontractor, supplier, or distributor which illustrate some portion of work by showing fabrication, layout, setting, or erection details.

1.03 SUBMITTAL PROCEDURES

A. After award of contract, Contractor will receive the documentation checklist for project completion forms provided by the District. Forms will indicate documentation requested by the District, such as shop drawings, manufacturer's catalogs, samples, warranties, operating and instruction manuals.

B. Upon receipt of checklist, Contractor shall, during course of project, secure and submit the required documentation to the District for review and approval.

C. After the District has date-stamped, signed and reviewed submittals, with corrections noted, if any, the District will transmit submittals to Contractor. Final inspection shall not be held until documentation checklist has been completed.

D. Timing of Submittals:

1. Within 7 days after award of contract, Contractor shall submit to the District shop and diagram drawings, materials lists and other submittals required by the specifications, prior to the establishment of a job start date. (Exception - Finish Hardware Schedule and Segregation of Contract Costs). Contractor shall submit a single, complete submittal package – multiple submittal packages will not be accepted unless otherwise agreed upon by the District and Engineer. Should Contractor submit multiple submittal packages without the approval of the District and Engineer, Contractor may be subject to fee charges for additional review time spent by District and/or Engineer.

2. Provide a schedule of submittals in conformance with construction schedule. Refer to Section 01 32 13: Construction Schedule - CPM.

    a. Submit and review with the District, a schedule for shop drawing submittal dates and date of return required by Contractor in order to maintain construction schedule. Schedule of submittals shall indicate adequate time between submittals in order to allow adequate time for review without impact to construction schedule.

3. Schedule of submittals shall be related to work progress, and shall be organized to allow sufficient time for mailing, reviewing, corrections, resubmission and re-reviewing.

4. Coordinate submittal of related items.

5. Revise, update and submit schedule of submittals to the District, on first of each month, or as required.

6. Allow at least 5 days for the District's review following receipt of submittal. For Divisions 23 and 26 submittals, allow a minimum of 7 days following receipt of submittal.

E. Make submittals in accordance with the construction schedule, and shop drawing submission schedule, in sequence that avoids delaying work and progress of related work.

F. Each submittal shall be accompanied by a letter of transmittal containing an itemized and numbered list of submitted materials. Separate letters of transmittal shall accompany each submittal from different subcontractors.

G. Resubmission: If requested, resubmit submittals within 3 days. Resubmit as specified for initial submittal but identify as such. Indicate changes which have been made other than those requested by the District.

PART 2 - PRODUCTS

2.01 CONSTRUCTION SCHEDULE

A. Provide in accordance with Section 01 32 13 Construction Schedule – CPM.

2.02 SHOP DRAWINGS

A. Draw shop drawings to an accurate scale that is large enough to indicate all pertinent features and methods.

B. Copies Required and Distribution: Unless otherwise indicated in individual specification sections, submit 7 sets of blueline prints of which four sets will be retained by the District, and 2 copies will be returned to Contractor.

C. Contractor MUST prepare shop drawings for all aspects of work, including but not limited to:

a. Chilled and hot water piping – 1/16” (min.) site plan indicating all work

b. Air handling equipment rooms – ¼” (min.) plan indicating new equipment layout, ductwork, hydronic piping and piping appurtenances

c. Building Unit piping – 1/8” (min.) plan indicating pipe routing inside of building and on roof. Indicate building and roof opening locations and sizes.

d. Controls wiring, schematics and sequences

D. All shop drawings must be approved by Engineer prior to the ordering, fabrication, and/or installation or equipment and/or contracted work.

E. See Section 23 30 00, paragraph 1.6 for additional requirements.

2.03 PRODUCT DATA

A. Manufacturer's Standard Schematic Drawings:

1. Delete information that is not applicable to project.

2. Supplement standard drawings to provide additional information applicable to Project.

B. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations, and other standard descriptive data:

1. Clearly mark each copy to identify pertinent materials, products, or models.

2. Indicate dimensions and clearances required.

3. Indicate performance characteristics and capacities.

4. Indicate wiring diagrams and controls.

C. Copies required and Distribution: Submit 6 copies. The District will retain four copies, and 2 will be returned to Contractor.

2.04 SEGREGATION OF CONTRACT COSTS

A. Provide a Segregation of Contract Costs as required by the general condition requirements of the District.

2.05 MANUALS

A. Where manuals are required to be submitted covering items included in work, prepare manuals in durable binders, approximately 8-1/2" by 11" in size, and provide following information:

1. Identification on, or readable through, front cover stating general nature of manual.

2. Neatly typewritten index at front of manual, furnishing immediate information as to location in manual of data or equipment involved.

3. Complete instructions regarding operation and maintenance of equipment involved.

4. Complete nomenclature of replaceable parts, their part numbers, current cost, and name and address of nearest vendor of parts.

5. Copy of all guarantees and warranties issued.

6. Copy of approved shop drawings with data concerning changes made during construction.

B. Extraneous Data: Where contents of manuals include manufacturers' catalog pages, clearly indicate precise items included in this installation and delete, or otherwise clearly indicate, manufacturers' data which is not part of this installation.

C. Number of Copies Required: Deliver 7 copies to the District for review, approval and distribution. The District will return 3 copies to Contractor.

2.06 CERTIFICATES

A. Submit in triplicate, in accordance with requirements of each specification section.

2.07 MATERIAL LIST SUBMITTALS

A. Provide material lists on following:

1. Electrical.

2. Heating, ventilating and air conditioning.

3. Plumbing.

4. Controls.

B. Copies Required: 8 copies; 2 copies will be returned to Contractor.

C. Provide supplementary submittals for materials omitted or not approved.

D. Substitutions proposed by Contractor shall be made in accordance with the General Conditions of the Contract.

PART 3 - EXECUTION

3.01 SUBMITTAL REVIEW BY CONTRACTOR

A. Review submittals prior to submission to the District. Review and stamp submittals prior to review by District.

B. Clearly identify deviations from the Contract drawings and specifications on submittals. Prior approval of deviations by the District or their representative is required. Contractor shall not use the submittal process for substitution requests.

C. Deliver submittals to the District. Identify project name and address, telephone number of Contractor, subcontractor and supplier. Identify, as appropriate, pertinent drawing sheets, detail numbers and specification section numbers. Clearly identify deviations from contract documents.

3.02 SUBMITTAL REVIEW BY DISTRICT

A. District will not review submittals that have not been stamped and reviewed by Contractor. Such submittals will be returned, without review, to Contractor.

B. District will review submittals required, according to the submittal schedule, and make corrections, notes or modifications as appropriate. Submittals will be stamped, to indicate the action required, and returned to Contractor.

1. Submittals not required by the contract documents will be returned without review.

2. District's approval stamp is for design and quality only, and is not an approval for deviations or quantities.

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 40 00 - QUALITY CONTROL

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Interpretation of requirements.

B. Quality assurance and control of installation.

C. Tolerances.

D. Field samples.

E. Mock-up.

F. Manufacturers' field services and reports.

1.2 INTERPRETATION OF REQUIREMENTS

A. If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement.

B. The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation shall comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits.

C. Where codes or specified standards indicate higher standards, more stringent tolerances or more precise workmanship than levels shown or specified, comply with most stringent requirements.

D. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.

1.3 QUALITY ASSURANCE/CONTROL OF INSTALLATION

A. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this project, whose work has resulted in construction with a record of successful in-service performance.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

E. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

F. Comply fully with manufacturers' instructions, including each step in sequence.

G. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

H. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.4 TOLERANCES

A. Monitor tolerance control of installed products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturer's tolerances. Should manufacturer's tolerance conflict with Contract Documents, request clarification from Architect before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.5 FIELD SAMPLES

A. Install field samples at the site as required by individual specifications sections for review.

B. Acceptable samples represent a quality level for the Work.

C. Where field sample is specified in individual sections to be removed, clear area after field sample has been reviewed by Architect.

1.6 MOCK-UP

A. Mock-up will be performed under provisions identified in this section and identified in the respective product specification sections.

B. Assemble and erect specified items, with specified attachment and anchorage devices, flashings, seals and finishes.

C. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

D. Where mock-up is specified in individual Sections to be removed, clear area after mock-up has been reviewed by Architect.

1.7 MANUFACTURERS' FIELD SERVICES AND REPORTS

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment and other field services as applicable, and to initiate instructions when necessary.

B. Individuals to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

C. Submit report in duplicate within 15 days of observation to Architect for review.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 GENERAL INSTALLATION

A. Comply with requirements specified in Section 01 73 00.

3.2 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Verify that utility services are available, of the correct characteristics, and in the correct locations.

3.3 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 42 13 - ABBREVIATIONS, SYMBOLS AND ACRONYMS

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of the General and Supplementary Conditions and Division One apply to this section.

B. Section Includes: List of abbreviations, symbols and acronyms used in these specifications:

1.02 ABBREVIATIONS

ac	Alternating current
amp	ampere
BTU	British thermal unit
cfh	Cubic feet per hour
cfm	Cubic feet per minute
cm	Centimeter
Co.	Company
COP	Coefficient of performance
Corp.	Corporation
d	Penny
db.	Decibel
DB	Dry bulb
dc	Direct current
EER	Energy efficiency ratio
F	Degrees Fahrenheit
fpm	Feet per minute
ft	Foot or feet
gph	Gallons per hour
gpm	Gallons per minute
HP	Horsepower
HVAC	Heating, ventilating and air conditioning
Hz	Hertz
Inc.	Incorporated
KHz	Kilohertz
Kip	thousand pounds
Ksf	Thousand pounds per square foot
Ksi	Thousand pounds per square inch
Kv	Kilovolt
KVA	Kilovolt amperes
KW	Kilowatt
KWH	Kilowatt hour
LF	Linear foot
lb	Pound
LED	Light emitting diode
MBH	1000 BTUs per hour
MHz	Mega hertz

mil	Thousandth of an inch
mm	Millimeter
mph	Miles per hour
oz.	Ounce
PCF	Pounds per cubic foot
pH	Acidity-alkalinity balance
psf	Pounds per square foot
psi	Pounds per square inch
psig	Pounds per square inch, gage
RF	Radio frequency
rpm	Revolutions per minute
SF	Square foot
SY	Square yard
V	Volt
WB	Wet bulb

1.03 SYMBOLS

#	Number or pound
'	Foot or feet
"	Inch(es)
%	Percent

1.04 ACRONYMS

AA	The Aluminum Association, Inc
AABC	Associated Air Balance Council
AAMA	American Architectural Manufacturers Association
AASHTO	American Association of State Highway and Transportation Officials
AATCC	American Association of Textile Chemists and Colorists
ABMA	American Boiler Manufacturers Association
ACI	American Concrete Institute
ADA	Americans for Disability Act
AGA	American Gas Association
AGCIH	American Conference of Governmental Industrial Hygienists
AI	Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Movement and Control Association, Inc.
ANSI	American National Standards Institute
APA	APA – The Engineered Wood Association
ARI	Air-Conditioning and Refrigeration Institute
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials

ATBCB	Architectural & Transportation Barriers Compliance Board
AWI	Architectural Woodwork Institute
AWPA	American Wood Preservers Association
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
BIA	Brick Institute of America
CCR	California Code of Regulations
CFR	Code of Federal Regulations
CISPI	Cast Iron Soil Pipe Institute
CLFMI	Chain Link Fence Manufacturers Institute
CQC	California Quality Control (CMA Standards)
CRA	California Redwood Association
CRI	Carpet and Rug Institute
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standards, U.S. Department of Commerce
CSFM	California State Fire Marshal
CSI	The Construction Specifications Institute
CTIOA	Ceramic Tile Institute of America
CTI	Cooling Tower Institute
DHI	Door and Hardware Institute
DSA	Division of the State Architect, Office of Regulation Services
EPA	Environmental Protection Agency
ETL	ETL Testing Laboratories
FCC	Federal Communication Commission
FM	Factory Mutual
FS	Federal Specifications
GA	Gypsum Association
GANA	Glass Association of North America
HMMA	Hollow Metal Manufacturer’s Association
HPVA	Hardwood Plywood & Veneer Association
IACS	International Annealed Copper Standards
IAMPO	International Association of Plumbing and Mechanical Officials
ICBO	International Conference of Building Officials
ICC	International Code Council
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical & Electronic Engineers, Inc.
IES	Illuminating Engineering Society
IMI	International Masonry Institute
IRI	Industrial Risk Insurers
ISO	International Organization for Standardization

MLSFA	Metal Lath/Steel Framing Association
MSS	Manufacturers Standardization Society of the Valve & Fittings Industry.
NAAMM	National Association of Architectural Metal Manufacturers
NBFU	National Board of Fire Underwriters
NBS	National Bureau of Standards
NCMA	National Concrete Masonry Association
NEMA	National Electrical Manufacturers Association
NEC	National Electrical Code
NFPA	National Fire Protection Association
NFPA	National Forest Products Association
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology
NOFMA	National Oak Flooring Manufacturers Association
NPCA	National Paint and Coatings Association
NPDES	National Pollutant Discharge Elimination System
NRCA	National Roofing Contractors Association
NSF	National Sanitation Foundation
NTMA	National Terrazzo & Mosaic Association
NUSIG	National Uniform Seismic Installation Guidelines
NWMA	National Woodwork Manufacturers Association
PCA	Portland Cement Association
PCI	Precast/Prestressed Concrete Institute
PDI	Plumbing and Drainage Institute
PEI	Porcelain Enamel Institute
PS	Product Standard, U.S. Department of Commerce
RIS	Redwood Inspection Service
RFCI	Resilient Floor Covering Institute
SCAQMD	South Coast Air Quality Management District
SDEI	Steel Deck Institute
SDI	Steel Door Institute
SFM	State Fire Marshal
SFPA	Southern Forest Products Association
SIGMA	Sealed Insulating Glass Manufacturers Association
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SSPC	Steel Structures Painting Council
SWI	Steel Window Institute
TCA	Tile Council of America
UBC	Uniform Building Code
UBPPA	Uni-Bell PVC Pipe Association
UCI	Uniform Construction Index
UFAS	Uniform Federal Accessibility Standards

UL	Underwriters' Laboratories, Inc.
UMC	Uniform Mechanical Code
UPC	Uniform Plumbing Code
WCLIB	West Coast Lumber Inspection Bureau
WDMA	Window and Door Manufacturers Association
WIC	Woodwork Institute of California
WWPA	Western Wood Products Association

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 51 00- CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of the General and Supplementary Conditions and Division One apply to this section.

B. Section Includes Description of temporary utilities and protection of construction facilities that are to be provided and maintained by Contractor.

1.02 TEMPORARY UTILITIES

A. Water:

1. Water used on work will be furnished and paid for by the District. Contractor shall provide necessary temporary piping from distribution point to points on site where water is necessary to carry on work, and upon completion of work shall remove temporary piping.

2. Provide suitable drainage system, subject to approval of the District Inspector, to carry construction wastewater from site to an approved disposal location.

B. Electricity:

1. The District will furnish and pay for electrical power necessary for construction purposes at site. Contractor shall provide necessary temporary wiring and lighting and shall remove all temporary wiring and lighting at the completion of the work. Temporary wiring and lighting shall comply with requirements of the Los Angeles Electrical Code. Contractor shall be responsible for all damage caused by overloading or other causes and the installation shall be satisfactory to the District Inspector.

2. Furnish and install area distribution boxes, so located that individual trades may use 100 feet maximum length extension cords to obtain adequate power and artificial lighting, at points where required for work, for inspection and for safety.

3. Provide electricity needed for construction including connections for construction equipment requiring power.

C. Gas: Contractor shall provide and install gas equipment and piping necessary to perform his work, and shall remove same upon completion of work. Contractor shall pay for the gas used in work.

D. Heating and Ventilation:

1. Provide, maintain, and pay for heat needed for proper installation of work and to protect materials and finishes from damage due to weather.

2. Provide ventilation of enclosed areas to cure materials, to disperse humidity, and to prevent accumulation of dust, fumes, or gases.

E. Temporary Telephone: Contractor shall provide and pay all costs for one cellular telephone or business telephone line at site for his use. Use of District telephones will not be permitted.

F. Temporary FAX: Make necessary arrangements and pay costs for installation and operation of telephone service to Contractor's office at site, suitable for sending and receiving FAX transmissions. Install a plain-paper FAX machine connected to this line and available 24 hours a day during construction operations.

G. Use means necessary to maintain temporary facilities and controls in proper and safe condition throughout progress of work.

H. Make required connections to existing utility systems with minimum disruption to services in existing utility systems. When disruption of existing service is required, do not proceed without the District Inspector's approval and, when required, provide alternate temporary service.

1.03 TEMPORARY HEATING AND COOLING

A. Equipment:

1. Contractor shall provide heating and/or cooling equipment as required to provide heated and/or cooled conditioned air to occupied spaces for which construction has temporarily disabled air conditioning equipment serving that space. All equipment must be sized properly to meet cooling and/or heating load requirements.

2. All temporary equipment must be secured with provisions stated in Section 1.04 of this specification.

3. Contractor shall be responsible for furnishing and installing all equipment and/or items required to properly mount or secure temporary equipment.

4. Upon completion of this project, Contractor shall remove all temporary equipment and appurtenances from the site. All areas and material finishes must be restored to their original state.

1.04 CONTRACTOR'S FACILITIES

A. Storage Units:

1. Provide secure and waterproof storage units where required for the temporary storage of furniture, equipment and other items. Storage unit must be located within the confines of a safety barricade (see below) and shall remain inaccessible to facility occupants.

2. Storage Unit Construction: Walls, roof and doors minimum 16 gage steel; floors 1 inch tongue and groove hardwood or 3/4 inch minimum exterior type plywood, with undercarriage designed to accommodate forklift blades 42 inch to 60 inch long; doors at one end of storage unit, double wide swing out with waterproof gaskets and lockable steel bars.

3. Pay all delivery charges and set the storage unit where directed by the District Inspector.

4. Remove storage unit from the site after removal of all the items that were

B. Contractor's Safety Barricade:

1. Contractor shall erect safety barricade as required by the District Inspector for the protection and safety of staff and the public. New or pre-used material can be utilized.

2. Unless otherwise indicated or specified, barricade shall be constructed of 8 feet high chain link fencing and shall be properly secured to the ground and/or structure. Space posts not to exceed 10 feet on centers.

3. Chain link fencing shall be free from barbs, icicles or other projections resulting from galvanizing process. Fence fabric having such defects will be rejected even though it has been erected.

4. Gates shall be fabricated of steel pipe with welded corners, and bracing as required. Fabric to be attached to frame at 12 inch centers. Provide all gate hardware of a strength and quality to perform satisfactorily until barricade is removed upon completion of work.

5. At completion of work, remove barricade and concrete post footings from site; backfill and compact fence footing holes. Existing surface paving that is cut into or removed shall be patched and sealed to match surrounding areas.

6. The Inspector may allow the use of panelized chain link fence or properly supported orange plastic fence.

7. Edge Protection Guardrails for roof work per OSHA and District Requirements. Cones and caution tape is not acceptable.

C. Other Enclosures:

1. Provide lockable, temporary weather-tight enclosures at openings in exterior walls to facilitate temporary cooling or heating and security.

2. Provide protective barriers around trees, plants and other improvements designated to remain.

D. Storage Yards and Sheds:

1. Contractor shall fence and maintain storage yards in an orderly manner.

2. Storage for materials that cannot be stored outside may be stored within building.

3. District Inspector shall approve exact location, size and access of storage yards.

4. Remove storage yards and sheds as rapidly as progress of work will permit.

E. Contractor's Parking:

Location and number of spaces for Contractor's parking as directed by the District Inspector, temporarily stored and when directed by the District Inspector.

1.05 GENERAL ITEMS

A. Staging areas for delivery of materials and equipment will be at locations designated by the District Inspector.

B. Safety and Security Lighting: Provide 20-foot candles minimum inside building(s) and 5 foot candles outside.

C. Noise Control: Muffle all equipment. All noise levels shall comply with OSHA and CAL/OSHA requirements. Excessive noise tasks such as coring etc. shall be performed after hours or weekends.

D. Dust and Odor Control: Dust and odor barriers shall be in place dividing areas of work and remainder of building to provide a safe and clean environment for building occupants. Provide adequate ventilation if required. Comply with all OSHA and CAL/OSHA requirements.

E. Where temporary noise/duct partitions are required, Contractor shall build a dividing partition, which will extend from finished floor up tight to the underside of existing ceiling. (Upon removing partition,

Contractor shall repair floor and/or ceiling as required to match existing conditions.) Contractor shall construct partition in accordance with local building codes. Under no circumstances shall temporary partition block any means of egress or impede the regular flow of occupant traffic. Contractor shall provide District with a scaled drawing indicating the exact location of the temporary partition relative to its' surroundings. Contractor must have approval from District prior to the erection of such partition.

1.06 TRENCHES

A. Open trenches for installation of utility lines (water, gas, electrical and similar utilities) and open pits outside barricaded working areas shall be cordoned at all times. Barricades, shall be as identified in another part of this section. Walk Plates shall be installed at all pedestrians and vehicle traffic cross-area (see below). Trenches shall be backfilled and patch-paved within 72 hours after approval of installation by the District Inspector.

B. Open trenches deeper than 42 inches, and not located within a parking area or public street access, shall be enclosed within an 8-foot high chain-link fence.

C. Trenches or excavations which cannot be properly back-filled and patched prior to the end of each work day shall be bridged to permit an unobstructed flow of traffic. Trench walls and adjacent soils shall be sufficiently stabilized prior to the use of steel plates for bridging.

   a. Bridging must be secured against displacement by using adjustable cleats, angles, bolts, or other devices to prevent movement by traffic.

   b. The trench must be adequately shored to support the bridging and traffic.

   c. Steel plates used for bridging must extend 1 foot beyond the edges of the trench. Temporary paving materials (premix) should be used to feather the edges of the plate to minimize wheel impact.

D. All excavations in public rights-of-way shall be in compliance with all current Occupational Safety and Health Act (CAL/O.S.H.A.) requirements. Any persons in an excavation not in compliance with CAL/O.S.H.A. regulations will be ordered out of the excavation until it is brought into compliance.

E. All excavations or trenches made in the parking area or sidewalk shall be backfilled and patched in accordance with the current CDOT and/or NCDOT specifications. District inspector shall be notified prior to making an excavation or cutting a trench in any pavement or sidewalk.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of the General and Supplementary Conditions and Division One apply to this section.

B. Section Includes:

1. Quality assurance.

2. Delivery, storage and handling.

3. Installation requirements.

1.02 QUALITY ASSURANCE

A. Standard References: Material or procedure specified by reference to number, symbol, or title of a specific standard, such as a commercial standard, a Federal Specification, a trade association standard, or other similar standard document shall comply with requirements in latest version, revision, amendment or supplement of document in effect on date of executed contract, except as limited to type, class or grade, or modified in such reference.

1.03 DELIVERY, STORAGE AND HANDLING

A. All materials and products for the project shall be delivered in manufacturer's original, undamaged, factory sealed containers, with factory applied labels intact and legible.

B. The labels shall contain the following information as applicable: Manufacturer's name and address; brand name; product designation; type, class or grade; size or weight; batch number; testing lab certification and color.

1.04 EQUIPMENT FURNISHED BY THE DISTRICT

A. Delivery: Within 15 days after the Contract is awarded, Contractor shall notify the District, in writing, of date scheduled for installation of equipment. Upon delivery to site, Contractor shall store equipment inside rooms or protected spaces. The District Inspector will sign receipt, or bill of lading, as required.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 INSTALLATION REQUIREMENTS

A. Install equipment in location and orientation indicated on drawings, or in locations provided by District Inspector.

B. Equipment shall be installed plumb and level, by means of shims or spacers, in a manner that with all mounting bolts fully tightened, no distortion nor undue stresses will be set up within equipment. Furnish other accessories and components necessary to properly install equipment, such as bolts, washers, fittings or blocking.

C. Floor Mounted Equipment:

1. Equipment designed or specified to be attached to substrates such as concrete or steel shall be secured with anchor bolts and tampins, cinch anchors or fastite bolts and shells of size recommended by manufacturer of equipment, or as required for secure mounting.

2. Equipment designed or specified to be attached to wood construction shall be secured with machine bolts or lag screws, of size recommended by manufacturer of equipment, and as directed by the District Inspector.

D. Bench Mounted Equipment: Secure to bench or table by machine bolts.

E. Equipment shall be connected only to outlets with correct electrical characteristics. Contractor shall ascertain that the electrical characteristics of the equipment are for outlets indicated. Report discrepancies immediately to the District Inspector.

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of the General and Supplementary Conditions and Division One apply to this section.

B. Section Includes:

1. Cutting, patching, and alteration procedures:

a. Removals, cutting, alterations and repairs to existing facilities as required to complete work.

b. Relocation and reinstallation of existing construction and finish.

c. Salvage, storage and protection of existing items to be reinstalled.

d. Salvage and delivery to the District of items so designated for removal and salvaged by Contractor.

2. Examination by Contractor.

3. Final inspection.

1.02 SUBMITTALS

A. Shop Drawings: Submit details of cutting and patching, including transition to existing items being patched. Provide details of all piping and ductwork routing, elevations and sizes. Also provide equipment locations and dimensions relative to equipment pads and all equipment support and pad locations.

B. Schedules: Contractor must submit proposed work schedules, including dates and hours proposed. Schedule must be approved by District prior to starting any work. Where special work conditions apply, Contractor must provide a detailed work schedule which must include all duties, work dates and times, completion dates, and an explanation stating means and methods for executing such work.

C. All work executed within the building shall be done on Monday through Friday during the hours of 7:00 a.m. to 6:30 p.m. Any deviations from the said days and/or times must be approved with the District prior to executing such work. Any work to be done before and/or after stated times (except on Saturday or Sunday) shall be scheduled as required and done without additional cost to the District.

1.03 WARRANTIES

A. Existing Warranties: Repair materials and systems that have been cut, modified or damaged as a result of cutting, patching or alteration procedures, using methods and materials that will not void existing warranties. It shall be the responsibility of the Contractor to contact the District and/or Contractor backing an existing warranty – coordinate and consult as required to ensure that all materials are restored to their original condition and warranties are not voided. Any damage to existing systems under warranty shall be repaired by Contractor at no additional cost to the District.

1.04 REMOVAL, ALTERATIONS AND REPAIRS

A. Restore and refinish new and existing construction and improvements that are cut into, damaged, relocated, or reinstalled. Workmanship and materials shall conform to applicable provisions of other sections.

B. Provide new fasteners, connectors, adhesives, and other accessory materials or components as required to complete the work.

C. Perform removals and alterations only to the extent required to complete the work. Carefully remove work to be salvaged or reinstalled. Protect and store for reuse.

1. Walls, Partitions, and Ceilings: Remove by accurately cutting and carefully removing.

2. Concrete: Saw with powered concrete saw, or chip where sawing is not feasible, to prevent spalling of concrete to remain. Cut off reinforcing bars, except where bonded into new concrete or masonry, and paint ends with bituminous paint before enclosing.

3. Woodwork: Cut or remove to a joint or panel line. Undamaged removed material may be reused.

4. Sheet Metal: Remove back to joint, lap, or connection. Secure loose or unfastened ends or edges and make watertight.

5. Glass: Remove broken or damaged glass and clean rebates and stops of setting materials.

6. Plaster: Cut back to sound plaster on straight lines, and back-bevel edges of remaining plaster. Trim existing lath and prepare for new lath.

7. Gypsum Wallboard: Cut back on straight lines to undamaged surfaces, with at least two opposite cut edges centered on supports.

8. Acoustical Ceilings: Remove hanger wires where ceilings are not reinstalled.

9. Tile: Cut back to sound tile and backing on joint lines if portions are to remain.

10. Flooring: Completely remove flooring and clean backing of old cement or adhesive. Carefully remove wood flooring for patching and repairing of existing wood flooring to remain.

11. Miscellaneous Items: Grind items not mentioned but required to be removed in such manner as minimizes damage to Work to remain.

1.05 CUTTING AND PATCHING

A. Cutting, boring, saw cutting or drilling through new or existing structural elements to be done only when so detailed in drawings or accepted by the Structural Engineer, with approval from the District.

B. Patching, Repairing and Finishing:

1. Concrete: Keep the cut edges damp for 24 hours and scrub with a neat portland cement mortar just before new concrete is placed; epoxy adhesive may be used in lieu of cement mortar. Finish new concrete to match existing. Provide 3,000 psi concrete for repairs. At cut concrete edges to remain exposed, apply adhesive and restore with minimum 3/4" thick cement mortar finished to match adjoining surfaces.

2. Metal Items: Grind cut edges to remain exposed smooth and rounded.

3. Woodwork: Trim back to joint lines or splices, re-trim cut surfaces, and patch new matching or undamaged remove materials.

4. Sheet Metal: Restore removed or damaged sheet metal items as required or directed.

5. Glass: Install new matching glass and re-seal existing exterior windows, airtight.

6. Lath and Plaster:

   a. Lath: Lath surfaces to be patched with matching lath as required, secured to supports at 6" centers. Lap new lath 6" over existing and wire-tie new and existing lath edges together at 6" intervals. Restore paper backings as required, shingled into existing.

   b. Plaster: Apply a bonding agent on cut edges of existing plaster. Apply 3-coat plaster patching of type, thickness, finish, color, and texture to match existing plaster.

7. Gypsum Wallboard: Refasten cut edges of existing wallboard. Apply patches with at least two opposite edges centered on supports and secure at 6" centers. Tape and finish joints and fastener heads. Make patching non apparent when painted.

8. Acoustical Ceilings: Conform to requirements specified herein as necessary to match the existing conditions.

9. Resilient Flooring: Completely remove damaged flooring and clean off all old cement as specified. Install new flooring of color, pattern, and type as specified.

10. Painted Surfaces: Prepare patched areas and refinish as specified in Section 09 90 00: Painting.

1.06 PREPARATION OF EXISTING WORK

A. Holes: Drill holes through existing concrete or masonry for new conduit and/or piping, and do not jack-hammer.

B. Sandblasting: Work includes sandblasting of existing surfaces to receive materials secured by cementitious, adhesive, or chemical bond (such as concrete, toppings, elastomeric coatings, plaster, mortar, etc.), and the sandblasting of other surfaces as shown, specified, directed, or required for proper preparation of surfaces. Completely remove existing finishes, stains, oil, grease, bitumen, penetrated mastics and adhesives including primers, and substances deleterious to bond or connection of new materials, and expose clean sound surfaces. Employ wet sandblasting for interior surfaces, and for exterior surfaces where directed or necessary to prevent creation of a dust nuisance or required by Code.

C. Salvage: Existing removed items not indicated or specified to be reused or reinstalled the District intends to retain will be designated by District prior to start of removals in pertaining area. Carefully remove, salvage, box or bundle as approved, and deliver such items to storage at the site as the District Inspector directs.

D. Disposal: Conform to General Conditions. Dispose of removed material off the District's property except existing items to be salvaged or reinstalled. Promptly remove waste and debris and do not allow to accumulate within facilities or on site.

PART 2 - PRODUCTS

2.01 MATERIALS

A. New Materials: Use materials identical in appearance and performance characteristics to existing materials, so that patch or alterations will visually match and blend seamlessly into adjacent existing surfaces.

B. New ceiling tile to replace the obsolete existing tile – Armstrong 741. See specification 09 51 23.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify compatibility and suitability of existing before starting the work. Perform a detailed survey of existing site and building conditions before starting work. Report unsatisfactory conditions to the District Inspector, such as discrepancies or conflicts between Drawings and actual conditions.

3.02 FINAL INSPECTION

A. A final examination shall be made when work is substantially complete, except for minor corrective items, in accordance with District regulations.

B. Before final examination, completed documentation checklist shall have been received and project record documents shall be completed.

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of the General and Supplementary Conditions and Division One apply to this section.

B. Section Includes: Procedures and requirements for preparing project record documents for delivery to District upon completion of the work.

C. Related Sections:

1. General Conditions.

2. Section 01 33 00: Submittals.

3. Section 01 32 13: Construction Schedule-CPM.

1.02 PROCEDURES

A. Project Record Documents: Promptly following award of contract, Contractor shall secure from the District one complete set of Specifications and prints of contract drawings for use on the job site as project record drawings.

B. Timing of Entries: Make entries within 24 hours after receipt of information.

C. Contractor shall be responsible for maintaining and recording changes on project record documents set, by marking them on a daily basis to record the details of construction, including changes and substitutions.

D. Do not use project record documents set for any purpose except entry of new data, and for reference by the Engineer and District. Maintain separate sets for daily reference on job site.

E. Use all means necessary to protect project record documents set from deterioration, loss or damage.

F. Entries on Drawings: Using an erasable color pencil, other than blue, not ink or indelible pencil, clearly describe change by note and by graphic line as required. Date entries. Call attention to entry by a "cloud" around area or areas affected. In event of overlapping changes, different colors may be used for each change.

1. Changes due to approved change orders may be indicated by referencing change order number and scope of change in lieu of revising project record documents, but shall be indicated on the final as-built drawings.

2. Location and depth below finish grade or above ceilings and attic spaces of utilities shall be fully dimensioned and indicated on project record documents. Dimensions shall be taken to building lines or permanent landmarks.

G. District's periodic review of the progress being made on project record documents will be a prerequisite to District's approval of requests for progress or final payments.

1. Progress Approvals: Prior to submitting each request for progress payments, secure the District Inspector's approval of status of project record documents.

2. Prior to submitting request for final payment and final inspection, submit project record (as-built) documents set to the District Inspector, with transmittal letter, in duplicate, for approval and further processing.

3. The Contractor shall certify that the project record documents are complete and accurately reflect all changes or modifications to the original construction documents.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

DIVISION 22 – PLUMBING

SECTION 22 00 00 - PLUMBING

1. PART 1 – GENERAL

1.1 WORK INCLUDED

A. Furnish all labor, materials, services, testing, transportation and equipment necessary for the completion of all plumbing work as indicated on drawings and specified herein. Work materials and equipment not indicated or specified which is necessary for the complete and proper operation of the work of this Section in accordance with the true intent and meaning of the contract documents shall be provided and incorporated at no additional cost to the Owner.

1.2 QUALITY ASSURANCE

A. Code Requirements: All work covered by this Section shall conform to the latest requirements of the following regulations:
   1. C.C.R., Title 24, Part 5 (2025 CPC).
   2. 2025 California Plumbing Code.
   3. SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems.
   4. National Fire Protection Association.
   5. California Division of the State Architect.
   6. California State Division of Industrial Safety.
   7. County Health Department.
   8. Any other legally constituted body-having jurisdiction thereof.

B. Nothing in the specifications or drawings shall be construed to permit deviation from the requirements of governing codes unless approval for said deviation has been obtained from the legally constituted authorities having jurisdiction and from the Owner's representative.

1.3 DRAWINGS

A. Because of the small-scale drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall carefully investigate the conditions surrounding installation of his work, furnishing the necessary piping, fittings, valves, traps, and other devices which may be required to complete the installation.

B. The general arrangement indicated on the drawings shall be followed as closely as possible. Coordinate with the Architectural, Structural, Mechanical and Electrical Drawings and the work of other trades prior to installation of piping fixtures and equipment to verify adequate space available for installation of the work shown. In the event a field condition arises which makes it impossible to install the work as indicated, submit, in writing, the proposed departures to the Architect for his approval. Only when Architect's approval is given, in writing, shall Contractor proceed with installation of the work.

C. Special Note: Should the Contractor make changes in the installation differing from what is indicated on the contract drawings and not necessitated due to field conditions as indicated hereinabove, the Contractor shall be required to re-install the work to comply with what has been indicated on the contract drawings. Should it be impossible to re-install the work and the installation is in accordance with all governing authorities, the architect may permit the installation to remain. However, all costs incurred to revise the contract drawings by the engineer for resubmittal to the building department indicating the as-installed condition shall become the

responsibility of the Contractor.

D. In case of a difference in the specifications or between the specifications and the drawings, the Contractor shall figure the most expensive alternate and after award of contract, shall secure direction from the Architect.

1.4 PERMITS, INSPECTIONS AND LICENSES

A. All permits, inspections and licenses required by the legally constituted authorities for installation of the work according to the plans and specifications shall be obtained and paid as a part of the work of this section.

1.5 EXAMINATION OF PREMISES

A. Before bidding on this work, Contractors shall make a careful examination of the premises and shall thoroughly familiarize themselves with the requirements of the contract. By the act of submitting a proposal for the work included in this contract, the Contractor shall be deemed to have made such study and examination, and that he is familiar with and accepts all conditions of the site.

1.6 PROTECTION

A. All work, equipment and materials shall be protected at all times. Contractor shall make good all damage caused either directly or indirectly by his own workmen. Contractor shall also protect his own work from damage. He shall close all pipe openings with caps or plugs during installation. He shall protect all his equipment and materials against dirt, water, chemical and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

B. Contractor shall be held responsible for all damage to equipment and materials until he has received written notice from the Architect or Engineer that his work has been accepted.

1.7 LOCATIONS

A. The locations of apparatus, piping and equipment indicated on the drawings are approximate. Piping and equipment shall be installed in such a manner as to avoid all obstruction, preserve headroom, and keep openings and passages clear. The locations of and mounting heights of all fixtures shall be coordinated with the architectural plans and room elevations.

B. Clearances and Openings: Contractor shall cooperate and coordinate his work with all other trades to avoid conflict and permit for a neat and orderly appearance of the entire installation. The Contractor shall, in advance of the work, furnish instructions to the General Contractor as to his requirements for equipment and material installation of any kind, whether or not specifically mentioned on drawings or in the specifications, and shall include recesses, chases in walls, and all required openings in the structure. Should furnishing this information be neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.

C. Contractor shall verify and coordinate pipe routing with location of all electrical rooms, elevator equipment rooms, telecom/data rooms, and other rooms dedicated to the housing of switchgear, panels, or other electrical equipment. In no case shall piping be installed within or above the ceiling of such rooms.

1.8 SUBMITTAL DATA (Also see General Conditions)

A. Submittal Requirements:
1. Furnish, all at one time, prior to any installation, within the time noted below, six (6) copies of valid submittal data on all fixtures, material, equipment and devices. Each submitted item shall be indexed and referenced to these specifications and to identification numbers on fixtures and equipment schedules.

2. Manufacturers' submittal literature and shop drawings are required on all items to ensure the latest and most complete manufacturer's data is available for review. Requirements of the submittals and Engineer's submittal notes are a part of the work of this Division except that Engineer's notes may not

be used as a means of increasing the scope of work of this Division.

3. Submittals will be checked for general conformance with the design concept of the project but the review does not guarantee quantities shown and does not supersede requirements of this Division to properly install work.

4. To be valid, all submittals must:

   (a) Be delivered to the Architect's office within thirty-five (35) days of award of the contract. Contractor shall make time allowance for Engineer's review, return of comments, if any, and resubmittal if required. Corrections or changes in submittals returned as inadequate or incomplete shall be accomplished within this time limit.

   (b) Clearly indicate and label as such any items proposed as substitution for that specified or shown on plans.

   (c) Include all pertinent construction, installation, performance and technical data.

   (d) Have all product data sheets clearly labeled to indicate the individual items being submitted. In addition, all required options and accessories shall be clearly marked.

      (1) Product data sheets corresponding to items indicated on plans shall be clearly labeled with the corresponding fixture or equipment tag number.

      (2) Product data sheets corresponding to items indicated in specifications shall be clearly labeled with the specification section, page and item numbers.

   (e) Include, for every item which differs in size, configuration, connections, service, accessibility or any other significant way, a drawing to the same (or larger) scale as to the pertinent portions of the contract drawings. In this drawing show a complete layout of the system except that which is identical to the contract drawings, unless the unchanged portions must be shown to indicate such things as clearances. This drawing, together with the contract design drawings must show the complete system as revised to accommodate the proposed alternate.

B. Substitution Requirements:

1. Any items included in submittals and proposed by the Contractor as substitution for that specified or shown on plans shall be submitted within thirty five (35) days of award of the contract. After such time, proposed substitutions shall not be accepted for review, and the Contractor shall submit all items as specified or shown on plans.

   (a) For each item proposed as substitution for that specified or shown on plans, copies of product data sheets for the specified item shall be placed side by side with product data sheets for the proposed substitution item within the submittal.

      (1) In addition to the Submittal Requirements for labeling listed above, product data sheets for the specified item shall be clearly labeled "SPECIFIED ITEM, NOT SUBMITTED". Product data sheets for the corresponding proposed substitution item shall be clearly labeled "PROPOSED SUBSTITUTION".

   (b) Provide calculations and other detailed data justifying how any items proposed as substitution were selected for proposal. Data must be complete enough to permit detailed comparison of every significant characteristic for which the specified item was analyzed during design.

2. It shall be the Contractor's responsibility to provide sufficient information to allow the Engineer to analyze any proposed alternate. If inadequate information is provided, the proposal will not be approved and resubmittal will not be allowed.

3. The Contractor shall provide or perform tests required by Engineer for purpose of judging acceptability of proposed substitutions.

4. The Contractor assumes full responsibility that alternate items and procedures will meet the job requirements and is responsible for cost of redesign and of modifications to this and other parts of work caused by alternate items furnished under work in this Section. In view of these responsibilities, it is the purpose of these specifications to establish procedures to ensure that the Contractor has considered all the ramifications of proposed alternates before submitting them for review. Submittals which do not comply with the requirements of these specifications or which indicate proposed alternates that were

selected without proper regard to the requirements of the job will not be approved. No more than one proposed alternate will be considered for each item.

5. Alternate items installed without Engineer's approval will be replaced with specified items at Contractor's expense.

6. The Architect or his authorized representative shall be the sole judge as to the quality and suitability of proposed alternate equipment, fixtures or materials. Decisions of the Architect or that of his representative shall be final and conclusive.

1.9 UNINSPECTED WORK

A. The Contractor shall not allow or cause any of his work to be covered up or closed in until it has been inspected, tested, approved by all authorities have jurisdiction, and until Project Record drawings have been properly annotated.

B. Should any of his work be covered up or closed in before such inspection, he shall, at his own expense, uncover the work to the satisfaction of the inspection party. All related repair work cost shall be borne by the Contractor.

1.10 RECORD DRAWINGS (Also see General Conditions)

A. Contractor shall provide and keep up-to-date a complete "as-built" record set of blueline prints which shall show every change from the original drawings and the exact "as-built" locations and sizes of the work provided under this Section of the specifications. This set shall include locations, dimensions, depth of buried piping, cleanouts, shut-off valves, sewer invert locations, plugged wyes, tees, etc. where applicable. On completion of the work, the Contractor shall incorporate all as-built information on a set of reproducible tracings provided by the Architect and this set of reproducibles shall be delivered to the Architect.

1.11 GUARANTEES (Also see General Conditions)

A. Contractor shall guarantee the entire plumbing and piping systems unconditionally for a period of one (1) year after final acceptance. If, during this period, any materials, equipment, or any part of the systems fail to function properly, the Contractor shall make good the defects promptly and without any expense to the Owner.

B. Contractor shall be responsible for all damage to any part of the premises caused by leaks in pipelines or equipment furnished and installed under this Section for a period of one (1) year after date of acceptance of his work.

C. All equipment and fixtures shall carry manufacturer's warranty against defective parts or poor workmanship for not less than one (1) year. See specific equipment specifications for extended warranty requirements.

2. PART 2 – PRODUCTS

2.1 MATERIALS AND EQUIPMENT (See Schedules on Drawings)

A. General: All materials, as specified or required in the work, shall be new, free from defects and imperfections. All manufactured shall comply with California Assembly Bill 1953.

B.

1. Air Conditioning Condensate Drain Piping.

   (a) Shall be Type "M" copper below roof and indoor.

   (b) Shall be Schedule 80 CPVC on roof.

2. All exposed piping at plumbing fixtures shall be chrome plated yellow brass except exposed pipes in

shop or utility areas.

3. Unions or flanges shall be furnished and installed at each threaded connection to all equipment or valves. The unions or flanges shall be located so that the piping can be easily disconnected for removal of the equipment, tank, or valve, and shall be of the type specified in the following schedule.

   (a) Unions:

      (1) Copper or Brass Tubing: 150 pound cast bronze or copper, ground joint, nonferrous seat with ends, by Walseal, Nibco or Mueller.

   (b) Flanges: Tube Turn or approved equal, raised face 150 pound class forged steel, weld, neck or slip-on type conforming to ASA B16.5 and ASTM A181. For copper piping systems, provide flanges conforming to ANSI B16.24. The faces of the flanges being connected to be alike in all cases. Locate flanges so that the piping can be easily disconnected for removal of the equipment or valve. Gasket material shall be of material suiting the service of the opening system in which installed and which conforms to its respective ANSI Standard (A21.11. B16.21). Provide materials that will not be detrimentally affected by the chemical and thermal conditions of the fluid being carried.

4. All piping on roof shall be supported by pipe supports as manufactured by MAPA Products or Eaton B-Line Dura Blok. Products by Miro Industries and Erico shall be accepted for submittal review.

   (a) Gravity System Piping 2” and Less: MS-1 single post, adjustable height pipe support.

5. All underground non-metallic piping shall have 14 gauge copper "Tracer Wire" continuous for entire length.

C. Roof Flashing:

1. Sanitary vents thru roof and grease vents thru roof: Stoneman No. 1100-5, one (1) piece, seamless, four (4) pound, series with reinforcing steel boot counterflashed with cast iron flashing sleeve and equipped with vandal-proof hood for all vent piping. Seal joint between flashing and pipe with waterproofing compound per flashing manufacturer’s recommendations.

2. Water, gas, condensate drainage and other metallic piping thru roof: Stoneman No. 1100-4, one (1) piece, seamless, four (4) pound, series with reinforcing steel boot counterflashed with cast iron flashing sleeve. Seal joint between flashing and pipe with waterproofing compound per flashing manufacturer’s recommendations

D. Escutcheons: Shall be chrome plated cast brass with setscrew locking device.

E. Dielectric Union Isolators: Connection between incompatible materials above grade and inside building shall be made with two (2) dielectric unions separated by a twelve inch (12") section of red brass pipe. Dielectric union isolator for connection piping or non-compatible materials shall be of standard commercial design with threaded connections.

F. Pipe Supports: Unless otherwise indicated on the drawings, shall be as follows:

1. The Contractor shall furnish and install all miscellaneous iron work including angles, channels, etc., required to appropriately support the various piping systems. Hanger spacing and location shall conform to 2025 California Plumbing Code Table 313.1.

2. All horizontal runs of piping within the building to be supported from the structural framing with steel rods and split ring hangers, B-Line, Grinnell Company, Tolco, or approved equal. Steel rods shall be secured to overhead framing with side beam connectors. Where necessary, install angle iron between framing to accommodate hanger rods. Where several pipes are running together, Unistrut, B-Line or Powerstrut channels with clamps may be used in lieu of individual pipe hangers, and supported from structure as herein specified. Submit test data for type of hanger supports to be provided. For support conditions other than specified herein, the Contractor shall submit method of support for approval prior to any installation.

3. Horizontal Piping Hangers and Supports:

   (a) General: Provide factory fabricated horizontal hangers and supports complying with one of the following MSS types listed to suit horizontal-piping systems, in accordance with MSS SP-69 and

manufacturer's published product information. Select size of hangers and supports to exactly fit pipe size for bare piping, and to exactly fit around piping insulation with saddle or shield for insulated piping. Provide copper-plated hangers and supports for copper-piping systems.

(1) Adjustable Steel Clevis Hangers: (MSS Type 1.) B-Line B 3100

(2) Adjustable Swivel Pipe Rings: (MSS Type 5) B-Line B3690

4. Vertical-Piping Clamps:

(a) General: Provide factory fabricated vertical-piping clamps complying with the following types listed, to suit vertical piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Select size of vertical piping clamps to exactly fit pipe size of bare pipe. Provide copper-plated clamps for copper-piping systems.

(b) Two-Bolt Riser Clamps: (MSS Type 8) B-Line B3373

5. Hanger-Rod Attachments:

(a) General: Provide factory fabricated hanger-rod attachments B-Line, Tolco or approved equal, selected by Installer to suit horizontal-piping hangers and building attachments, in accordance with MSS SP-58 and manufacturer's published product information. Select size of hanger-rod attachment to suit hanger rods. Provide copper-plated hanger-rod attachments for copper-piping systems.

(b) Side beam eye socket, Tolco Fig. #57 for rod sizes 3/8" dia. and Tolco Fig. #25-30-251 for rod sizes 1/2" dia.

6. Building Attachments:

(a) General: Provide factory fabricated building attachments, selected by Installer to suit building structural framing conditions, in accordance with MSS SP-69 and manufacturer's published product information. Select size of building attachments to suit hanger rods. Provide copper-plated building attachments for copper-piping systems.

7. Hanger Rods and Spacing shall conform to the following table:

Pipe Sizes	Spacing	Rods
2 Inch and Smaller	6 Feet	3/8 Inch

8. Hangers and Supports shall be adequate to maintain alignment and prevent sagging and shall be placed within 18 inches of joint. Support shall be provided at each horizontal branch connection.

9. Bracing all piping laterally to structural framing to prevent swaying or lateral movement per bracing detail on plans per seismic note on plumbing sheet P-0.1.

10. Miscellaneous Supports, Wall Brackets, Etc.: Provide where required in accordance with the best standard practices of the trade. Submit shop drawings for all fabricated supports.

11. Isolators. All piping which is not isolated from contact with the building by its insulation shall be installed with a manufactured type isolator. Isolators shall be B-Line vibra clamp and cushion, Super Strut, Stoneman "Trisolator", or approved equal. Piping shall be installed and supported in a manner to provide for expansion without strains. Guides shall be properly installed to ensure this requirement.

12. Shields:

(a) General: Provide shields at piping hangers and supports, factory-fabricated, for all insulated piping as manufactured by Pipe shields Incorporated or approved equal. Size shields for exact fit to mate with pipe insulation.

(b) Protection Shields: MSS Type 40; provide high density insert of same thickness of insulation or equal 100-psi average compressive strength, waterproofed calcium silicate, encased with a sheet metal shield. Insert and shield shall cover entire circumference of the pipe and shall be of length indicated by manufacturer for pipe size and thickness of insulation.

G. Insulation:

1. All condensate drain piping building shall be insulated.

(a) Owens Corning fiberglass SSL 11 with ASJ Max with wrap or equal, composite surface burning characteristics: flame spread 25, smoke developed 50. All condensate drain piping on roof shall have aluminum jacketing.

3. PART 3 – EXECUTION

3.1 INSTALLATION - GENERAL

A. Locations and Accessibility: Install equipment for ease of maintenance and repair. If changes in the indicated locations or arrangements are made by the Contractor, they shall be made without additional charges.

B. Openings: Furnish information to the other trades on size and location of openings which are required in walls, slabs, roof, for piping and equipment at the proper times.

C. Closing-In of Uninspected Work: Do not allow or cause any of the work to be covered up or enclosed until it has been inspected, tested, and approved by the Architect. Any work enclosed or covered prior to such inspection and test shall be uncovered and, after it has been inspected, tested, and approved, make all repairs with such materials as may be necessary to restore all work, including that of other trades, to its original and proper condition.

D. Before laying of any pipe or digging of any trenches, Contractor shall determine by actual excavation and measurement exact locations and depth of existing utility and service lines to which he is going to connect. In event depth of existing sewer main or storm drain is not sufficient to permit installation of piping as detailed on drawings or to make connection in manner indicated, Contractor shall confer with the Architect, Owner's representative and Engineer for Direction.

E. Piping Installation:

1. All piping shall be concealed in finished portion of the building except where otherwise indicated or directed at the time the work is done. All piping shall be installed to clear all framing members and beams, even if drawings do not indicate same. Contractor shall constantly check the work of other trades so as to prevent any interference with the installation of this work.

2. All piping into stem walls and footings shall be double half lap wrapped with 1/8" thick "Armaflex" insulation. The Contractor shall also provide blocked out areas in stem wall and footing as required for the installation of the piping. All piping shall avoid the lower 9" of the footing and the Contractor shall coordinate and provide dropped footings as required for the installation of the underground piping.

3. Unions shall be installed on one side of all screwed shut-off valves, at both sides of screwed automatic valves and on all by-passes, at all equipment connections and elsewhere as indicated or required for ease of installation and dismantling.

4. Connections between copper tubing and equipment shall be with Mueller Brass Company, or approved equal, brass stream line copper to P.P.S. ground joint unions.

5. Cleanouts shall be installed on all condensate drain piping at each aggregate horizontal and vertical change in direction exceeding 135 degrees.

6. All condensate drain piping shall be installed with a minimum slope of 1/8”/FT.

7. All condensate piping on roof shall be painted with UV protection paint.

8. Corrosion Protection:

(a) General.

(1) Corrosion protection shall be provided for all below grade cast iron and copper piping and associated valves and fittings. Such piping shall be protected from corrosion by encasement in a polyethylene protective wrapping, referred to hereafter as polywrap. Although not intended to be a completely air and water tight enclosure, the polywrap shall provide a continuous barrier between the pipe and surrounding bedding and backfill.

(b) Materials.

(1) Cast iron piping encasement.

a) The polywrap shall be minimum 8 mil. in thickness, group 2, linear low density, flat tube, natural (clear) virgin polyethylene film formed into tubes or sheets as required. Material shall meet or exceed the requirements of AWWA C105, ANSI A21.5 and ASTM A674.

b) The polywrap shall be as manufactured by Northtown Company or approved equal.

(2) Copper piping encasement.

a) The polywrap shall be minimum 6 mil. in thickness, group 2, linear low density, flat tube, natural (clear) virgin polyethylene film formed into tubes or sheets as required. Material shall conform to the requirements of ASTM D1248.

b) The polywrap shall be as manufactured by Northtown Company or approved equal.

(3) The minimum Polywrap flat tube width for each pipe diameter shall be as follows:

Pipe Size / Type	Polywrap Flat Tube Width
½" to ¾" copper	2"
1" to 1-½ copper	3"
4" cast iron	16"

(4) The polywrap shall be secured as specified with 2 inch wide pressure sensitive plastic tape not less than 10 mils thick.

a) Tape shall be Scotchwrap No. 50, Polyken No. 900, Tapecoat CT, Johns-Manville No. V-10 Trantex or approved equal.

b) Piping through exterior walls shall be sealed using Link Seal modular seal with nitrile seal elements and stainless steel bolts.

(c) Installation.

(1) The polyethylene tubing shall be cut into lengths approximately 2 feet longer than the pipe sections. Slip the tube around the pipe, centering it to provide a 1-ft overlap on each adjacent pipe section, and bunching it accordion fashion lengthwise until it clears the pipe ends. Lower the pipe into the trench and make up the pipe joint with the preceding section of pipe. . A shallow bell hole must be made at each joint to facilitate installation of the polywrap. The bunched-up polywrap shall be pulled from the preceding length of pipe, slipped over the end of the new length of pipe, and secured in place with one circumferential turn of tape plus enough overlap to assure firm adhesion. The end of the polywrap shall be slipped from the new pipe section over the end of the first wrap until it overlaps the joint at the end of the preceding length of pipe and tape it in place. The loose wrapping on the barrel of the pipe shall be pulled snugly around the barrel of the pipe and excess material folded over the top of the pipe and the folds held in place by means of short strips of adhesive tape, at about 3 foot intervals along the pipe.

(2) Rips, punctures or other damage to the tube shall be repaired with the adhesive tape or pieces of tube material secured with tape. Bends and reducers in the line shall be covered with polyethylene in the same manner as pipe.

(3) Valves, tees, crosses and outlets shall be wrapped with flat sheets of the same material. The sheets shall be passed under valves and brought up around the body to the stem. Edges shall be brought together, folded twice and secured with the adhesive tape.

B. Sleeves: Shall be plastic or galvanized steel where pipes pass through concrete walls or floor slabs.

1. Isolate pipes through ground floor slabs with Kraft paper, plastic tape or similar materials unless conduit is specified or indicated.

2. Sleeves for pipes through exterior walls shall be non-metallic with minimum 2" weep ring as manufactured by Link Seal. Pipe shall be sealed with Link Seal modular seal with EPDM seal elements.

3. Below-grade piping through exterior walls shall be sealed using Link Seal modular seal with nitrile seal elements and stainless steel bolts and sleeves as manufactured by Century Line.

C. Contraction and Expansion: Install all work in such a manner that its contraction and expansion will not do any damage to the pipes, the connected equipment, or the building. Install offsets, swing joints, expansion joints, seismic joints, anchors, etc., as required to prevent excessive strains in the pipe work. All supports shall be installed to permit the materials to contract and expand freely without putting any strain or stress on any part of the system. Provide anchors as necessary.

D. Pipe Joints and Connections:
1. Copper Tubing and Brass Pipe with Threadless Fittings:

(a) Solder joints for copper shall be made with 95/5 lead free solder in accordance with manufacturer's recommendations for the service intended.

(b) Use threaded adapters on copper tubing where threaded connections are required.

E. Each pipe penetration of the roof shall be separated from other piping and any roof equipment by a minimum of 18" to insure a proper pipe flashing installation.

F. Floor, Wall and Ceiling Plates: Where pipes pierce finished surfaces, C.P. brass split flanges with setscrew lock shall be provided.

G. Completion of Installation:
1. Cleaning and Flushing: Clean all equipment and materials thoroughly. Leave surface to be painted smooth and clean, ready for painting.

2. Flush each unit of water supply and distribution system thoroughly with clean water at the highest velocities attainable.

3. Clean all piping, valves, traps, water heaters, fixtures and other devices thoroughly and flush or blow out until free of scale, oil silt, sand, sediment, pipe dope and foreign matter of any kind.

1.2 OPERATION INSTRUCTION

A. Prior to occupancy or prior to the date of final inspection, whichever may occur first, the Contractor shall prepare two (2) sets of typewritten instructions for the operation of all equipment, valves, etc., specified and furnished as a part of the work under this section, and shall assign a competent person, thoroughly familiar with the job, to demonstrate and instruct a representative of the Owner in the operation of the equipment. The time of said demonstration and instructions shall be arranged with the Owner's representative approximately one (1) week in advance. Verbal instructions shall include shut-off location of gas and water. The Contractor shall assemble all operation and maintenance data supplied by the manufacturers of the various pieces of equipment, all keys and special wrenches required to operate and service the equipment (including keys for yard boxes, gas stops and fixture stops), and all equipment warranties and deliver same to the representative of the Owner on date of said instructions.

1.3 PIPE AND EQUIPMENT IDENTIFICATION

A. Each operating and service line shut-off valve shall be identified by a 19 ga. brass tag with stamped, engraved type of service identified and area served, complete with hole and brass chain mounted on valve stem or handle. Tag shall be a minimum of one and one-half inch (1-1/2") in diameter.

B. All piping systems shall be readily identifiable by appropriate labeling with the name of the piping contained. Such labeling shall be by means of metal tags, stenciling, stamping, or with adhesive markers, in a manner that is not readily removable. Labeling shall appear on the piping at intervals of not more than 20 ft and at least once in each room and each story traversed by the piping system.

C. Provide on exterior wall of each building opposite the building's main gas service a sign reading "Gas Shut Off". Sign shall be metal with minimum 1-1/2" high-embossed letters.

D. All equipment shall be provided with name plate indicating all pertinent information on it.

END OF SECTION

DIVISION 23 – HEATING, VENTILATING & AIR CONDITIONING

SECTION 23 01 30.51 - HVAC EQUIPMENT & DUCT CLEANING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes commissioning process requirements for HVAC&R systems, assemblies, and equipment.

B. Related Sections:
1. Section 01 33 00 Submittal
2. Section 23 30 00 Heating, Ventilation and Air Conditioning

1.03 GENERAL CONDITIONS

A. General Conditions of the construction contract shall be a part of these specifications, and shall govern the HVAC Systems Rehabilitation Contractor. All work shall be done in accordance with requirements of the Owner and the construction contractor.

1. Contractor's License: The Contractor shall be licensed in the State of California. This License shall be a C-61 Specialty License in the D-64 Duct Cleaning Sub-Division.

2. "National Air Duct Cleaners Association (NADCA): The contractor shall be a Certified Member in good standing with NADCA.

3. Contractor shall visit the site prior to bid and make himself thoroughly familiar with the site and existing conditions. By submitting a bid for HVAC equipment and duct cleaning, Contractor declares that he is familiar with existing conditions and is capable of executing work detailed herein at no additional cost(s) to the Owner.

1.04 QUALLITY ASSURANCE

A. Contractor shall have thorough knowledge and experience in the rehabilitation and cleaning of projects of similar type, size, and degree of difficulty completed within the last two years. Contractor agrees:

1. All work shall be supervised by a foreman having thorough knowledge and experience in the cleaning of air conditioning systems. Experienced, qualified personnel shall perform the work.

2. Contractor shall be fully covered by Workmen's Compensation, Public Liability and Property Damage Insurance, and certificates of these coverage's and limits shall be provided to the Owner upon request.

3. Any mechanical problems discovered during the course of cleaning will be reported in writing within 24 hours to the project coordinator

4. Contractor shall leave area of work in same condition as when work started (on a day-to-day basis and from project start to finish).

5. Contractor shall keep work area free of all surplus material and debris. Upon completion of each shift, all tools, equipment, debris, etc. shall be moved to a designated area selected by the Owner.

6. Contractor shall take all necessary measures to minimize the migration of dust and other air borne particles during the cleaning process. ALL outlets and inlets leading to (or from) occupied spaces must be covered with a leak-proof catch basin. At no time shall dust and/or other air borne particles be blown or dispersed into any space within the building.

7. Contractor shall at all times be in compliance with Cal OSHA and EPA regulations.

8. Unless otherwise noted, Contractor shall be responsible for cleaning all existing supply, return, exhaust, and outside air intake duct to remain as indicated on plans. Any deviations from said section must be approved in writing by the Owner.

B. Photo Documentation: Documentation shall include the use of a digital camera and a fiber optic borescope, where required. Contractor shall take photos of conditions before and after cleaning for inclusion in a project report to be presented to the Owner at the conclusion of the work.

1.05 LABOR AND MATERIALS

A. Contractor shall furnish all labor, materials, supplies, tools, equipment, supervision, transportation and any other services or items necessary to accomplish the work.

B. Safety Procedures and Policy: Contractor shall provide adequate and necessary management personnel to ensure that all safety policies and project requirements are met.

1. Maintain safe and healthy employee working conditions and establish safe operating procedures at each job site.

2. Comply with the safety standards of all federal and state regulatory agencies as a minimum requirement for safety performance at each job site.

3. Comply with all of the safety requirements of the job site and safety requirements mandated by the Owner.

4. Contractor shall provide all necessary safety devices and personal protective equipment for employee use, and shall require their use when needed.

5. The work in progress shall be subject to random unannounced inspections by a representative of Owner.

6. Upon total completion of the project, representatives of Owner will do a quality control inspection. Any area that does not meet the standards of this specification shall be redone at no additional cost.

7. Electrical equipment, sensors and control devices shall be masked, or blocked off where required for protection for water or chemicals.

8. Disinfectant, when used, shall be applied in accordance with the manufacturer instructions, and may be used prior to coating application. System shall be dried after application of disinfectant.

9. HVAC coating shall be applied according to manufacturer instructions. Coating shall be sprayed, brushed, or rolled directly into interior ductwork surface. A continuous film of coating must be achieved. (Provide supplemental ventilation as required.)

10. All ducts too small to allow direct entrance shall have access openings installed approximately every 10-15 feet as required, and at each elbow and vertical riser. Each access opening shall be recovered with a panel made of the same gauge metal, and installed in such a manner as to insure an airtight job. All sheet metal ductwork shall be in accordance with SMACNA Standards, unless otherwise noted.

PART 2 - PRODUCTS

2.01 MATERIALS AND PRODUCTS

A. Material Safety Data sheets for all materials and products used by Contractor shall be provided to Owner prior to start-up of cleaning operations.

B. Degreaser: Maintex 7-11 Armex Baking Soda Blasting Crystals or equal as approved by Owner.

C. Sanitizer Oxine BBJ Microblocide or other EPA registered equal as approved by Owner.

D. Re-Surfacing Treatments: Schuller Superseal Edgecoat Fosters 40-20 Vac-Systems Tough Coat Porta Sept by Porter Paints, containing EPA registered anti-microbial Swamp Cooler Repair condensate drain pan sealant or other EPA registered equal as approved by Owner.

E. Paint: Styletone Series 8 19 Machinery Grey Zynolite Spray Paint.

F. Insulating Lining Material: To match existing or Certainteed Tough Gard Certainteed Ultra-Lite Armaflex Astro-Foil or equal as approved by Owner.

G. Adhesives: Armstrong 520 DPIO/20 Super 77 Spray Adhesive or equal as approved by Owner.

H. Duct Sealant: DP 10/10 Top 12000 Silicone Sealant or equal as approved by Owner

PART 3 – EXECUTION

3.01 METHODOLOGY

A. Cleaning of Ductwork

1. All registers and diffusers shall be removed and cleaned with a mild detergent.

2. All ductwork (not accessible to personnel) shall be cleaned by compressed air, light brush agitation, or vibration agitation, or a combination of any of the above. All duct to be opened so the interior is as visible as possible.

3. Large ductwork shall be cleaned by manual brushing, or vibration agitation. All duct to be opened so as to visually observe the cleaning process.

4. All agitation of contaminants shall be accompanied by negative air pressure created by a negative air machine using a HEPA filter.

5. Access needed for proper cleaning shall be cut into rigid metal ducts at elbows and approximately every 15 feet. Holes shall be sized as appropriate to allow cleaning and visual inspection inside duct.

6. All flexible ducts shall be disconnected at joints and registers for cleaning. Flexible duct lengths of over 15 feet shall be cut at intervals not exceeding 15 feet.

7. Contractor shall provide access in existing ceilings and walls as required. Where openings are made for cleaning purposes, Contractor shall repair such ceilings and walls as required to give a uniform surface. Match existing materials, color and texture.

8. All interior dampers and turning vanes shall be cleaned with a stiff bristle brush and then vacuumed.

9. The surface of all unreplaced liner shall be coated. Any small tears in fiberglass will be repaired with lagging materials and then encapsulated.

10. All access holes made in ducts for cleaning purposes shall be sealed with galvanized sheet panels of the same of heavier gauge metal as the duct. Panels shall be installed with duct sealant and screwed into the duct at four-inch maximum on center, all around as required to maintain an airtight seal. Proof will be required.

11. All flexible ducts disconnected for the purpose of cleaning shall be reattached in the same manner as originally installed.

12. Clean all duct serving remodeled areas, including supply duct and transfer duct. Do not clean main return ductwork at the central air conditioning unit.

B. Hazardous Materials

1. When asbestos or other hazardous materials are encountered, Contractor shall document concern and forward to Owner forthwith.
2. Respiratory protection shall be OSAH/NIOSH approved with HEPA cartridges, or cartridges designed for specific contaminants.
3. No material that is not approved by regulatory authorities shall be introduced to the project as means for accomplishing work outlined herein.

END OF SECTION

DIVISION 23 – HEATING, VENTILATING & AIR CONDITIONING

SECTION 23 05 53 - MECHANICAL IDENTIFICATION

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Provide marking and identification required on all mechanical piping systems, ducts, controls, valves, apparatus, etc., as specified in this Section or any related Sections.

B. Related Sections:

1. Plumbing: Section 22 00 00.

2. Heating, Ventilating, and Air Condition: Section 23 30 00.

1.02 SUBMITTALS

A. Submit in accordance with Section 01 33 00.

B. Submit samples of materials.

1.03 QUALITY ASSURANCE

A. Comply with provisions of Section 01 40 00.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General: All piping systems, controls, valves, apparatus, etc., except those that are installed in inaccessible locations in partitions, walls, and floors, and those buried underground, shall be permanently identified.

2.02 VALVES

A. Use existing chart or diagram for each piping system, indicating thereon by identifying letter or number each valve in the system, its location, and function.

B. Existing color chart is Per District.

C. Bind copies of each chart in Operating Instructions Manual.

D. Provide each valve with brass, aluminum or plastic disc, not less than 1-1/4" diameter bearing engraved numbers corresponding to those indicated on chart. Fasten discs to valve with No. 14 brass wire.

E. Provide an additional tag for all safety valves and other valves that could be hazardous to safety and health of occupants. Distinguish these tags from regular valve tags by color (such as yellow with black letters, and marked "Danger") submit sample tag to the District Inspector.

2.03 INSTRUMENTS AND CONTROLS

A. Identify all panel-mounted instruments and controls with engraved bakelite nameplates permanently affixed to Panel boards.

B. Identify all alarm indicating devices and alarm reset devices by nameplates.

C. Identify all damper motors and automatic valves, flow switches, pressure switches, etc., with embossed aluminum or plastic tape affixed to controller, indicating service and setting.

2.04 EQUIPMENT

A. Identify each major piece of equipment with stenciled designation corresponding to its designation on the Contract Drawings.

2.05 PIPELINES IDENTIFICATION

A. Identify all pipes by means of colored labels with directional arrows as indicated in schedule. (Contractor shall use District colors to distinguish equipment and/or piping use.)

B. Materials: Waterproof plastic cloth, all-temperature, self-adhering, or markers similar to Western "Tel-A-Pipe", Type I, or equal by W.H. Bradley Co.

C. Size: For pipes up to 3" diameter, 2-1/4" x 9" minimum, with 1/2" letters; for pipes over 3" diameter, 2-1/4" x 9" minimum, with 1-1/2" letters.

D. Colors:

1. Backgrounds: As indicated in schedule.

2. Letters: White on red background; black on all other backgrounds.

E. Locations:

1. On all accessible piping, whether insulated or not (including mechanical rooms, attic and ceiling spaces); except that labels shall be omitted from piping where use is obvious due to its connection to fixtures (such as faucets, water closets, etc.).

2. Near each valve and branch connection in such accessible piping.

3. At each pipe passage through wall or floor.

4. At not more than 40'-0" spacing on straight pipe run between bands required in 2 and 3 above.

5. At each change in direction.

F. Application: Apply on clean surfaces free of dust, grease, oil or any material that will prevent proper adhesion. Replace all non-adhering or curling labels with new labels, as approved by the District Inspector.

1. Use spray adhesive on insulated pipes in addition to adhesive on marker.

2. Finish all exposed markers with one coat of lacquer.

G. Schedule:

Content of Pipe	Legend	Color	Note
Domestic cold water	Dom. c.w.	G	*
Non-potable cold water	NP c.w.	G (1)	*
Domestic hot-water 140 F	Dom h.w. 140F	Y	*

Indirect drain	Ind drain	G (1)	*
Sump pump discharge	Pump discharge	G	*
Chilled water supply	Chill water supply	G	*
Chilled water return	Chill water return	G	*
Hot water	Hot Water Supply	Y	*
Hot water	Hot Water Return	Y	*
Condensate	CD		*

**Contractor shall verify all colors and verbiage with District prior to labeling.

H. Notes on Schedule:

1. Symbol * indicates flow arrow required.

2. Symbol (1) indicates 2-1/4" x 1" yellow label with 1/2" letters reading UNSAFE WATER at one end of primary label.

3. Hyphen between words indicates 2 separate stock labels are required, although a single special label with all lettering is equally acceptable.

4. Background colors: Symbol Y indicates yellow background color. Symbol G indicates green background color. Symbol R indicates red background color.

2.06 UNDERGROUND PIPE MARKERS

A. Pipe markers shall be furnished to grade at each horizontal change in direction for all non-metallic underground pipes. Markers shall be concrete plaque inscribed with the appropriate word "gas", "water", "sewer", "air", etc. Cleanouts to grade may serve as direction markers for waste lines. An electrically continuous #14 plastic covered copper tracer wire, Type TW, shall be run in trench along pipe. Wire shall be fastened to pipe at not greater than 20'-0" intervals. Wire shall terminate above ground with a 12" lead taped around each riser. Straight line transitions of metallic to non-metallic pipe shall have lead brought to grade under a marker.

B. Tracer wires for non-metallic pipe shall be color-coded as follows:

1. Gas: Yellow

2. Domestic Water: Blue

3. Fire Sprinkler: Red

4. Irrigation: Green

2.07 IDENTIFICATION OF AIR CONDITIONING EQUIPMENT

Identify location of air conditioning equipment above Tee Bar Ceilings. Install 3/4" to 1" diameter colored self adhesive dots to Tee Bar Ceiling grid showing access. Please note that the following identification shall be included on as built control drawings.

A	Fire Damper	Red
B	Manual Volume Dampers	Blue
	1. Supply Air	Full Dot
	2. Return Air	Half Dot.
C	Fan coil unit	Green
D	Filter Location if separate from fan coil	Yellow

PART 3 - EXECUTION

3.01 INSTALLATION

A. Report any conditions detrimental to proper and timely completion of work. Apply markers and identification tags as specified using approved materials and installation procedures recommended by manufacturer.

END OF SECTION

DIVISION 23 – HEATING, VENTILATING & AIR CONDITIONING

SECTION 23 05 93 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Balancing Air Systems:

a. Constant-volume air systems.
b. Multizone systems.
c. Induction-unit systems.

2. Duct leakage tests.

1.3 DEFINITIONS

A. AABC: Associated Air Balance Council.

B. BAS: Building automation systems.

C. NEBB: National Environmental Balancing Bureau.

D. TAB: Testing, adjusting, and balancing.

E. TABB: Testing, Adjusting, and Balancing Bureau.

F. TAB Specialist: An independent entity meeting qualifications to perform TAB work.

G. TDH: Total dynamic head.

1.4 PREINSTALLATION MEETINGS

A. TAB Conference: If requested by the Owner, conduct a TAB conference at Project site. Insert after approval of the TAB strategies and procedures plan to develop a mutual understanding of the details. Provide a minimum of 14 days' advance notice of scheduled meeting time and location.

1. Minimum Agenda Items:

a. The Contract Documents examination report.
b. The TAB plan.
c. Needs for coordination and cooperation of trades and subcontractors.
d. Proposed procedures for documentation and communication flow.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: Within 30 days of Contractor's Notice to Proceed, submit documentation that the TAB specialist and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.

B. Contract Documents Examination Report: Within 30 days of Contractor's Notice to Proceed, submit the Contract Documents review report as specified in Part 3.

C. Strategies and Procedures Plan: Within 30 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.

D. System Readiness Checklists: Within 30 days of Contractor's Notice to Proceed, submit system readiness checklists as specified in "Preparation" Article.

E. Examination Report: Submit a summary report of the examination review required in "Examination" Article.

F. Certified TAB reports.

G. Sample report forms.

H. Instrument calibration reports, to include the following:

1. Instrument type and make.
2. Serial number.
3. Application.
4. Dates of use.
5. Dates of calibration.

1.6 QUALITY ASSURANCE

A. TAB Specialists Qualifications: Certified by AABC.

1. TAB Field Supervisor: Employee of the TAB specialist and certified by AABC.
2. TAB Technician: Employee of the TAB specialist and certified by AABC as a TAB technician.

B. Instrumentation Type, Quantity, Accuracy, and Calibration: Comply with requirements in ASHRAE 111, Section 4, "Instrumentation."

C. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."

D. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.7.2.3 - "System Balancing."

1.7 FIELD CONDITIONS

A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

B. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems designs that may preclude proper TAB of systems and equipment.

B. Examine installed systems for balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are applicable for intended purpose and are accessible.

C. Examine the approved submittals for HVAC systems and equipment.

D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems output, and statements of philosophies and assumptions about HVAC system and equipment controls.

E. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.

F. Examine equipment performance data including fan and pump curves.

1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.

G. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.

H. Examine test reports specified in individual system and equipment Sections.

I. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, filters are clean, and equipment with functioning controls is ready for operation.

J. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.

K. Examine heat-transfer coils for correct piping connections and for clean and straight fins.

L. Examine operating safety interlocks and controls on HVAC equipment.

M. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

A. Prepare a TAB plan that includes the following:

1. Equipment and systems to be tested.
2. Strategies and step-by-step procedures for balancing the systems.
3. Instrumentation to be used.
4. Sample forms with specific identification for all equipment.

B. Perform system-readiness checks of HVAC systems and equipment to verify system readiness for TAB work. Include, at a minimum, the following:

1. Airside:

a. Verify that leakage and pressure tests on air distribution systems have been satisfactorily completed.
b. Duct systems are complete with terminals installed.
c. Volume, smoke, and fire dampers are open and functional.
d. Clean filters are installed.
e. Fans are operating, free of vibration, and rotating in correct direction.
f. Variable-frequency controllers' startup is complete and safeties are verified.
g. Automatic temperature-control systems are operational.
h. Ceilings are installed.
i. Windows and doors are installed.
j. Suitable access to balancing devices and equipment is provided.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance" and in this Section.

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.

1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
2. After testing and balancing, install test ports and duct access doors that comply with requirements in Section 23 30 00.
3. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Section 23 30 00 "Duct Insulation."

C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.

D. Take and report testing and balancing measurements in inch-pound (IP**)** units.

3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Cross-check the summation of required outlet volumes with required fan volumes.

B. Prepare schematic diagrams of systems' "as-built" duct layouts.

C. For variable-air-volume systems, develop a plan to simulate diversity.

D. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

E. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.

F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

G. Verify that motor starters are equipped with properly sized thermal protection.

H. Check dampers for proper position to achieve desired airflow path.

I. Check for airflow blockages.

J. Check condensate drains for proper connections and functioning.

K. Check for proper sealing of air-handling-unit components.

L. Verify that air duct system is sealed as specified in Section 23 30 00 – 2.4 Ductwork and Accessories.

3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure total airflow.

   a. Set outside-air, return-air, and relief-air dampers for proper position that simulates minimum outdoor-air conditions.
   b. Where duct conditions allow, measure airflow by Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses to obtain total airflow.
   c. Where duct conditions are not suitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.
   d. If a reliable Pitot-tube traverse or coil traverse is not possible, measure airflow at terminals and calculate the total airflow.

2. Measure fan static pressures as follows:

   a. Measure static pressure directly at the fan outlet or through the flexible connection.
   b. Measure static pressure directly at the fan inlet or through the flexible connection.
   c. Measure static pressure across each component that makes up the air-handling system.
   d. Report artificial loading of filters at the time static pressures are measured.

3. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
4. Obtain approval from Architect/Engineer of Record for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
5. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload occurs. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows.

1. Measure airflow of submain and branch ducts.

2. Adjust submain and branch duct volume dampers for specified airflow.
3. Re-measure each submain and branch duct after all have been adjusted.

C. Adjust air inlets and outlets for each space to indicated airflows.

1. Set airflow patterns of adjustable outlets for proper distribution without drafts.
2. Measure inlets and outlets airflow.
3. Adjust each inlet and outlet for specified airflow.
4. Re-measure each inlet and outlet after they have been adjusted.

D. Verify final system conditions.

1. Re-measure and confirm that minimum outdoor, return, and relief airflows are within design. Readjust to design if necessary.
2. Re-measure and confirm that total airflow is within design.
3. Re-measure all final fan operating data, rpms, volts, amps, and static profile.
4. Mark all final settings.
5. Test system in economizer mode. Verify proper operation and adjust if necessary.
6. Measure and record all operating data.
7. Record final fan-performance data.

3.6 PROCEDURES FOR MOTORS

A. Motors 1/2 HP and Larger: Test at final balanced conditions and record the following data:

1. Manufacturer's name, model number, and serial number.
2. Motor horsepower rating.
3. Motor rpm.
4. Phase and hertz.
5. Nameplate and measured voltage, each phase.
6. Nameplate and measured amperage, each phase.
7. Starter size and thermal-protection-element rating.
8. Service factor and frame size.

B. Motors Driven by Variable-Frequency Controllers: Test manual bypass of controller to prove proper operation.

3.7 PROCEDURES FOR CONDENSING UNITS

A. Verify proper rotation of fans.

B. Measure entering- and leaving-air temperatures.

C. Record fan and motor operating data.

3.8 PROCEDURES FOR HEAT-TRANSFER COILS

A. Measure, adjust, and record the following data for each refrigerant coil:

1. Dry-bulb temperature of entering and leaving air.
2. Wet-bulb temperature of entering and leaving air.
3. Airflow.

3.9 DUCT LEAKAGE TESTS

A. Witness the duct pressure testing performed by Installer.

B. Verify that proper test methods are used and that leakage rates are within specified tolerances.

C. Report deficiencies observed.

3.10 CONTROLS VERIFICATION

A. In conjunction with system balancing, perform the following:

1. Verify temperature control system is operating within the design limitations.
2. Confirm that the sequences of operation are in compliance with Contract Documents.
3. Verify that controllers are calibrated and function as intended.
4. Verify that controller set points are as indicated.
5. Verify the operation of lockout or interlock systems.
6. Verify the operation of valve and damper actuators.
7. Verify that controlled devices are properly installed and connected to correct controller.
8. Verify that controlled devices travel freely and are in position indicated by controller: open, closed, or modulating.
9. Verify location and installation of sensors to ensure that they sense only intended temperature, humidity, or pressure.

B. Reporting: Include a summary of verifications performed, remaining deficiencies, and variations from indicated conditions.

3.11 TOLERANCES

A. Set HVAC system's airflow rates and water flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10.
2. Air Outlets and Inlets: Plus or minus 10 percent.
3. Contractor to provide the necessary sheaves, pulleys and other accessories needed to meet the tolerance requirements.

B. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.

3.12 PROGRESS REPORTING

A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems balancing devices. Recommend changes and additions to systems balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

B. Status Reports: Prepare monthly progress reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

3.13 FINAL REPORT

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
2. Include a list of instruments used for procedures, along with proof of calibration.
3. Certify validity and accuracy of field data.

B. Final Report Contents: In addition to certified field-report data, include the following:

1. Fan curves.
2. Manufacturers' test data.
3. Field test reports prepared by system and equipment installers.
4. Other information relative to equipment performance; do not include Shop Drawings and Product Data.

C. General Report Data: In addition to form titles and entries, include the following data:

1. Title page.
2. Name and address of the TAB specialist.
3. Project name.
4. Project location.
5. Architect's name and address.
6. Engineer's name and address.
7. Contractor's name and address.
8. Report date.
9. Signature of TAB supervisor who certifies the report.
10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
11. Summary of contents including the following:

    a. Indicated versus final performance.
    b. Notable characteristics of systems.
    c. Description of system operation sequence if it varies from the Contract Documents.

12. Nomenclature sheets for each item of equipment.
13. Data for terminal units, including manufacturer's name, type, size, and fittings.
14. Notes to explain why certain final data in the body of reports vary from indicated values.
15. Test conditions for fans performance forms including the following:

    a. Settings for outdoor-, return-, and exhaust-air dampers.
    b. Conditions of filters.
    c. Cooling coil, wet- and dry-bulb conditions.
    d. Face and bypass damper settings at coils.
    e. Fan drive settings including settings and percentage of maximum pitch diameter.
    f. Inlet vane settings for variable-air-volume systems.
    g. Settings for supply-air, static-pressure controller.
    h. Other system operating conditions that affect performance.

D. System Diagrams: Include schematic layouts of air distribution systems. Present each system with single-line diagram and include the following:

1. Quantities of outdoor, supply, return, and exhaust airflows.
2. Duct, outlet, and inlet sizes.
3. Terminal units.
4. Position of balancing devices.

E. Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:

1. Unit Data:

a. Unit identification.
b. Location.
c. Make and type.
d. Model number and unit size.
e. Manufacturer's serial number.
f. Unit arrangement and class.
g. Discharge arrangement.
h. Sheave make, size in inches (mm), and bore.
i. Center-to-center dimensions of sheave and amount of adjustments in inches (mm).
j. Number, make, and size of belts.
k. Number, type, and size of filters.

2. Motor Data:

a. Motor make, and frame type and size.
b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.
e. Sheave make, size in inches (mm), and bore.
f. Center-to-center dimensions of sheave and amount of adjustments in inches (mm).

3. Test Data (Indicated and Actual Values):

a. Total airflow rate in cfm (L/s).
b. Total system static pressure in inches wg (Pa).
c. Fan rpm.
d. Discharge static pressure in inches wg (Pa).
e. Filter static-pressure differential in inches wg (Pa).
f. Preheat-coil static-pressure differential in inches wg (Pa).
g. Cooling-coil static-pressure differential in inches wg (Pa).
h. Heating-coil static-pressure differential in inches wg (Pa).
i. Outdoor airflow in cfm (L/s).
j. Return airflow in cfm (L/s).
k. Outdoor-air damper position.
l. Return-air damper position.
m. Vortex damper position.

F. Apparatus-Coil Test Reports:

1. Coil Data:

a. System identification.
b. Location.
c. Coil type.
d. Number of rows.
e. Fin spacing in fins per inch (mm) o.c.
f. Make and model number.
g. Face area in sq. ft. (sq. m).
h. Tube size in NPS (DN).
i. Tube and fin materials.
j. Circuiting arrangement.

2. Test Data (Indicated and Actual Values):

a. Airflow rate in cfm (L/s).
b. Average face velocity in fpm (m/s).
c. Air pressure drop in inches wg (Pa).
d. Outdoor-air, wet- and dry-bulb temperatures in deg F (deg C).
e. Return-air, wet- and dry-bulb temperatures in deg F (deg C).
f. Entering-air, wet- and dry-bulb temperatures in deg F (deg C).
g. Leaving-air, wet- and dry-bulb temperatures in deg F (deg C).
h. Water flow rate in gpm (L/s).
i. Water pressure differential in feet of head or psig (kPa).
j. Entering-water temperature in deg F (deg C).
k. Leaving-water temperature in deg F (deg C).
l. Refrigerant expansion valve and refrigerant types.
m. Refrigerant suction pressure in psig (kPa).
n. Refrigerant suction temperature in deg F (deg C).
o. Inlet steam pressure in psig (kPa).

G. Gas- and Oil-Fired Heat Apparatus Test Reports: In addition to manufacturer's factory startup equipment reports, include the following:

1. Unit Data:

a. System identification.
b. Location.
c. Make and type.
d. Model number and unit size.
e. Manufacturer's serial number.
f. Fuel type in input data.
g. Output capacity in Btu/h (kW).
h. Ignition type.
i. Burner-control types.
j. Motor horsepower and rpm.
k. Motor volts, phase, and hertz.
l. Motor full-load amperage and service factor.
m. Sheave make, size in inches (mm), and bore.
n. Center-to-center dimensions of sheave and amount of adjustments in inches (mm).

2. Test Data (Indicated and Actual Values):

a. Total airflow rate in cfm (L/s).
b. Entering-air temperature in deg F (deg C).
c. Leaving-air temperature in deg F (deg C).
d. Air temperature differential in deg F (deg C).
e. Entering-air static pressure in inches wg (Pa).
f. Leaving-air static pressure in inches wg (Pa).
g. Air static-pressure differential in inches wg (Pa).
h. Low-fire fuel input in Btu/h (kW).
i. High-fire fuel input in Btu/h (kW).
j. Manifold pressure in psig (kPa).
k. High-temperature-limit setting in deg F (deg C).
l. Operating set point in Btu/h (kW).
m. Motor voltage at each connection.
n. Motor amperage for each phase.
o. Heating value of fuel in Btu/h (kW).

H. Fan Test Reports: For supply, return, and exhaust fans, include the following:

1. Fan Data:

a. System identification.
b. Location.
c. Make and type.
d. Model number and size.
e. Manufacturer's serial number.
f. Arrangement and class.
g. Sheave make, size in inches (mm), and bore.
h. Center-to-center dimensions of sheave and amount of adjustments in inches (mm).

2. Motor Data:

a. Motor make, and frame type and size.
b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.
e. Sheave make, size in inches (mm), and bore.
f. Center-to-center dimensions of sheave, and amount of adjustments in inches (mm).
g. Number, make, and size of belts.

3. Test Data (Indicated and Actual Values):

a. Total airflow rate in cfm (L/s).
b. Total system static pressure in inches wg (Pa).
c. Fan rpm.
d. Discharge static pressure in inches wg (Pa).
e. Suction static pressure in inches wg (Pa).

I. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:

1. Report Data:

a. System and air-handling-unit number.
b. Location and zone.
c. Traverse air temperature in deg F (deg C).
d. Duct static pressure in inches wg (Pa).
e. Duct size in inches (mm).
f. Duct area in sq. ft. (sq. m).
g. Indicated airflow rate in cfm (L/s).
h. Indicated velocity in fpm (m/s).
i. Actual airflow rate in cfm (L/s).
j. Actual average velocity in fpm (m/s).
k. Barometric pressure in psig (Pa).

J. Air-Terminal-Device Reports:

1. Unit Data:

a. System and air-handling unit identification.
b. Location and zone.
c. Apparatus used for test.
d. Area served.
e. Make.
f. Number from system diagram.
g. Type and model number.
h. Size.
i. Effective area in sq. ft. (sq. m).

2. Test Data (Indicated and Actual Values):

a. Airflow rate in cfm (L/s).
b. Air velocity in fpm (m/s).
c. Preliminary airflow rate as needed in cfm (L/s).
d. Preliminary velocity as needed in fpm (m/s).
e. Final airflow rate in cfm (L/s).
f. Final velocity in fpm (m/s).
g. Space temperature in deg F (deg C).

K. System-Coil Reports: For reheat coils and water coils of terminal units, include the following:

1. Unit Data:

a. System and air-handling-unit identification.
b. Location and zone.
c. Room or riser served.
d. Coil make and size.
e. Flowmeter type.

2. Test Data (Indicated and Actual Values):

a. Airflow rate in cfm (L/s).
b. Entering-water temperature in deg F (deg C).
c. Leaving-water temperature in deg F (deg C).
d. Water pressure drop in feet of head or psig (kPa).
e. Entering-air temperature in deg F (deg C).
f. Leaving-air temperature in deg F (deg C).

L. Instrument Calibration Reports:

1. Report Data:

a. Instrument type and make.
b. Serial number.
c. Application.
d. Dates of use.
e. Dates of calibration.

3.14 VERIFICATION OF TAB REPORT

A. The TAB specialist's test and balance engineer shall conduct the inspection in the presence of Architect.

B. Architect shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.

C. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."

D. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.

E. If TAB work fails, proceed as follows:

1. TAB specialists shall recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
2. If the second final inspection also fails, Owner may contract the services of another TAB specialist to complete TAB work according to the Contract Documents and deduct the cost of the services from the original TAB specialist's final payment.
3. If the second verification also fails, Owner may contact AABC Headquarters regarding the AABC National Performance Guaranty.

F. Prepare test and inspection reports.

3.15 ADDITIONAL TESTS

A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

END OF SECTION 23 05 93

DIVISION 23 – HEATING, VENTILATING & AIR CONDITIONING- REVISION#1

SECTION 23 30 00 - HEATING, VENTILATING AND AIR CONDITIONING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work under this section includes all labor, equipment, material, services, transportation, etc. required for and reasonably incidental to the complete and satisfactory installation of all of the HVAC Systems as indicated on the Drawings or specified herein.

1.2 WORK INCLUDED IN THIS SECTION

A. Package Roof Top Heat Pump Units

B. Test and Balance

C. Submittals and Shop Drawings

D. Record Drawings

E. Operation and Maintenance Manuals

F. Guarantee

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Electrical supply to units. See Electrical Drawings.

B. Cutting and Patching. See Division 1 and 7, and Mechanical Drawings.

C. Equipment Pads and Support. See Structural Drawings.

1.4 GENERAL REQUIREMENTS

A. This section of the specification shall be considered as a part of the entire specification and all applicable portions of General Conditions, Special Conditions, and Division 1 shall apply.

B. Before commencement of work this contractor shall determine the exact location, size, elevation, and availability of all utilities relevant to the mechanical work and immediately notify the District with written notification of any discrepancies. In addition, this Contractor shall contact all involved utility companies, make all necessary arrangements for service, and pay all fees incurred due to connection of services.

C. Erection: The Contractor shall furnish the services of an experienced superintendent, who shall be constantly in charge of the erection of the work, together with all necessary journeymen, helpers, and laborers required to properly unload, erect, connect, adjust, start of operate and test the work involved.

1.5 REFERENCES

A. AABC - National Standards for Field Measurement and Instrumentation, Total System Balance.

B. AMCA 210 - Laboratory Methods of Testing Fans for Rating Purposes.

C. AMCA 300 - Test code for sound rating air-moving devices.

D. ANSI/NFPA 90A - Installation of Air Conditioning and Ventilation System.

E. ARI 270 - Sound rating of Outdoor Unitary Equipment.

F. ASHRAE 52.2-2017 - Method of Testing General Ventilation Air Cleaning Devices for Removal Efficiency By Particle Size

G. ASTM A90 - Weight of Coating on Zinc - Coated (Galvanized) Iron or Steel Articles

H. ASTM A120 - Black and Galvanized Steel Pipe

I. ASTM B88 - Seamless Copper Water Tube

J. ASTM C518 - Steady State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus

K. ASTM C553 - Mineral Fiber Blanket and Felt Insulation

L. ASTM C612 - Mineral Fiber Block and Board Thermal Insulation

M. ASTM E84 - Surface Burning Characteristics of Building Materials

N. ASTM E96 - Water vapor Transmission of Materials

O. NFPA 90B - Installation of Warm Air Heating and Air Conditioning Systems

P. NFPA 255 - Surface Burning Characteristics of Building Materials

Q. SMACNA - Low Pressure Duct Construction Standards

R. UL 181 - Factory Made Air Ducts and Connectors

S. UL 723 - Surface Burning Characteristics of Building Materials

T. California Mechanical Code - 2025 Edition

U. California Building Code - 2025 Edition

V. CEC Title-24 – 2025 Edition

1.6 SUBMITTALS AND SHOP DRAWINGS

A. Contractor agrees that shop drawings submittals processed by the District do not become Contract Documents and are not Change Orders; that the purpose of the shop drawing review is to establish a reporting procedure and is intended for the Contractor's convenience in organizing his work and to permit the District to monitor the Contractor's progress and understanding of the design. The process of review

of the Contractor's submittals is not of testing the District's perception. If deviations, discrepancies or conflicts between shop drawings submittals and the Contract Documents are discovered either prior to or after the shop drawing submittals are processed by the District, the Contractor agrees that the Contract Documents shall control and shall be followed.

B. Prepare and furnish fully coordinated shop drawings showing HVAC equipment on roof and floor plans.
   1. Review and sign these drawings to verify coordination of related equipment.
   2. Conflicts, which occur, shall be brought to the attention of the District Representative prior to issuance of the drawings.

C. Materials and Equipment:
   1. As soon as possible and within 14 days after award of the contract, and before their purchase, the Contractor shall submit to the District electronic format submittals for approval containing a complete list of materials, specialties and equipment he is to furnish for the installation.
   2. Literature shall be standard manufacturer's catalog cuts and items to be installed shall be clearly indicated.
   3. All submittals shall be made at one time.

D. Each item shall be identified by manufacturer, brand and trade name, number, size, rating and whatever other data is necessary to properly identify and check the materials and equipment. The words: "as specified" will not be considered sufficient identification.

E. Accessories, controls, finish, etc., not submitted or identified with the submitted equipment shall be furnished and installed as specified.

F. 1 Sets of complete electronic format shop drawings shall be submitted for approval indicating all equipment and ductwork. These drawings shall indicate sizes, locations and elevations of ductwork, equipment and equipment pads, and controls including transitions, etc.

G. Shop drawings shall be approved only to extent of information indicated. Approval of an item of equipment shall not be construed to mean approval for components for that item for which Contractor has provided no information.

H. Approval of shop drawings shall not relieve Contractor of responsibility for providing all controls, wiring, components, etc. which are shown or specified, or all additional controls, wiring, components, etc. required to provide complete and correctly operating mechanical systems.

I. Submit product data for the following manufactured products, assemblies, personnel and testing agencies required for this project.
   1. Package Roof Top Heat Pump Units
   2. Ductwork and Accessories
   3. Insulation Materials
   4. Filters
   5. Controls

1.7 SUBSTITUTIONS

A. Should the Contractor desire to substitute any material, equipment or other items for those specified, he shall submit a complete list, including detailed equipment layouts and performance characteristics within 14 calendar days after the scheduled Start of Construction. Said data shall be submitted in 1 electronic format set, assembled in individual brochures.

B. The entire cost of all changes of any type due to substitution for materials specified shall be born by the Contractor at no extra cost to the District.

C. Unsolicited and voluntary deducts, on the part of the Contractor for substituting unapproved systems and/or equipment, shall not be considered for the purpose of awarding the Contract.

D. The contractor shall submit the amount of cost credit to the Contract in the event the proposed substitution is accepted.

E. In all cases where substitutions are proposed after bids are received, the Contractor shall bear the cost of evaluation on the basis of 2-1/2 times technical salaries of engineering personnel involved.

1.8 AVAILABILITY OF SPECIFIED EQUIPMENT

A. Verify prior to bidding that all specified equipment is available and can be obtained in time for installation during orderly and timely progress of the work.

B. In the event that specified items will not be so available, notify the District prior to receipt of bids.

C. Costs of delays because of non-availability of specified items, when such delays could have been avoided by proper investigation on the part of the Contractor, will be back-charged as necessary and shall not be born by the District.

1.9 RECORD DRAWINGS

A. The contractor shall arrange and pay for one set of white prints of the HVAC drawings, which he shall alter in red to show all changes made to the original layout. These drawings shall be kept current.

B. The contractor shall deliver these completed to the District when the job is finished and accepted prior to final payment, and provide copies of approved shop drawings in ACAD format to MEOR.

C. Contractor shall provide 1 complete set of electronic format drawings per District standard on BOX.

1.10 OPERATION AND MAINTENANCE DATA

A. Submit one (1) electronic format set prior to final inspection including cover sheet and table of contents. Prepare submittal with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", and title of project. Internally subdivide the section contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

B. Contents: Prepare a Table of Contents with each Product or system description identified.
   1. Part 1:
      a. Directory listing names, addresses, and telephone numbers of District, Contractor, Subcontractors, and major equipment suppliers.
   2. Part 2:
      a. Operation and maintenance instructions, arranged by system.
      b. Identify the following:
         1) Significant design criteria
         2) List of equipment
         3) Parts list for each component
         4) Operating instructions
         5) Maintenance instructions for equipment and systems
         6) Maintenance instructions for special finishes, including recommended cleaning methods and materials and special precautions identifying detrimental agents.

C. Submit one copy of completed volumes in final form 15 days prior to final inspection. This copy will be returned after final inspection, with District comments. Revise content of documents as required prior to final submittal.

D. Submit final volumes (revised) within ten days after final inspection.

1.11 GUARANTEES

A. The Contractor, in accepting this contract, binds himself to replace or repair at his own expense any defect in workmanship or material which may appear within a period of one year from the date of the final acceptance of the building, and to pay for all resulting damage which shall appear within the said period; provided always that the Contractor shall not be liable for anything attributable to acts of the agents of the District, or for ordinary wear. Also, given date of work performed by the Contractor be accepted as complete, he shall agree to correct any deficiencies or omissions in respect to the plans or specifications which may appear in the afore-mentioned twenty-four month period.

B. All refrigerant compressors shall carry a seven-year manufacturer's warranty with additional extended three -year manufacturer's warranty by providing required documents to manufacturer within 90 days from installation date.

1.12 LOCAL CONDITIONS

A. The Contractor and trade submitting tenders on this work shall visit and will be deemed to have visited the site to ensure that they are familiar with all conditions relating to the work. Failure to visit the site will in no way relieve the successful Contractor of the necessity of furnishing any material or performing any work that may be required to complete the work in accordance with the drawings and specifications without additional cost to the District.

1.13 RULES, REGULATIONS AND CODES

A. All work and materials shall be in full accordance with the latest California Mechanical Code, California Plumbing Code, California Building Code and local rules and regulations, State Fire Marshal regulations, the safety orders of the Division of Industrial Safety; the California Electric Code; the standards of the National Fire Protection Association; American Gas Association; Occupation and Safety Act; American National Standards Institute; American Society of Mechanical Engineers; American Society for Testing and Materials; Installation Standards published by the International Association of Plumbing And Mechanical officials (IAPMO) and other applicable laws, codes, or regulations. Nothing in these specifications shall be construed to permit work not conforming to these codes.

B. Electrical Work: Motors, electrical apparatus and wiring specified in this section shall conform to the National Electrical Manufacturer's Standards and the California Electric Code and bear the Underwriter's label of approval.

C. The Contractor shall furnish, without extra charge, any additional material and labor when and where required to comply with these rules and regulations, though the work be not mentioned in these Specifications or shown on the Drawings. When these Specifications or Drawings call for or describe materials or construction of a better quality or larger sizes than required by the above mentioned rules and regulations, the provisions of these specifications and accompanying drawings shall take precedence.

1.14 FEES AND PERMITS

A. The Contractor must obtain and pay all fees for permits, licenses, inspections, etc., which are required by any legally constituted authority. Coordinate exact requirements with the District prior to bid.

1.15 COORDINATION

A. Following the general arrangement indicated on the Drawings as closely as possible, the Contractor shall coordinate with the architectural, structural, plumbing, electrical and all other trades prior to installation of the materials and equipment to verify adequate space available for installation of the work shown. The District shall be immediately notified if an area of conflict occurs between trades.

B. The Contractor shall bear all costs incurred for work that must be relocated due to conflicts between trades.

C. The Mechanical Contractor shall coordinate all requirements for all points of connection with the General Contractor and other trades prior to bid.

1.16 DRAWINGS

A. The work shall be installed as indicated on Drawings, however, changes to accommodate installation of this work with other work, or in order to meet Architectural or structural conditions, shall be made without additional cost to the District.

B. For the purpose of clarity and legibility, the Drawings are essentially diagrammatic to the extent that many offsets, bonds, unions, special fittings and exact locations are not indicated. The Contractor shall make use of all data in all of the Contract Documents, and shall verify this information at the site.

1.17 INSPECTION

A. The Contractor shall not allow or cause any of his work to be covered up or closed in until it has been inspected, tested, approved by all authorities have jurisdiction, and until Project Record drawings have been properly annotated.

B. Should any of his work be covered up or closed in before such inspection, he shall, at his own expense, uncover the work to the satisfaction of the inspection party. All related repair work cost shall be borne by the Contractor.

1.18 DELIVERY, STORAGE AND PROTECTION OF PROPERTY

A. Place orders for all equipment in time to prevent any delay in construction schedule or completion of project. If any materials or equipment are not ordered in time, additional charges made by equipment manufacturers to complete their equipment in time to meet construction schedule, together with any special handling charges, shall be borne by the contractor.

B. Materials shall be delivered in ample quantities from time to time as may be necessary for the uninterrupted progress of the work. They shall be stored as to cause the least obstruction to the premises and distributed so as to prevent overloading to any portion of the structure.

C. The Contractor shall provide temporary storage and shop areas that are required at the site for the safe and proper storage of materials, tools, and other items used in the performance of this work. These areas

shall be constructed only in approved locations and shall not interfere with the work of any other Contractor.

D. All work, equipment and materials shall be protected at all times. The Contractor shall make good all damage caused either directly or indirectly by his own workmen. The Contractor shall also protect his own work from damage. He shall close all pipe and duct openings with caps or plugs during installation. He shall protect all of his equipment and materials against dirt, water, chemical, and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

1.19 DAMAGE BY LEAKS, ETC.

A. The Contractor shall be responsible for all damage to any part of the premises or work of other Contractors, caused by leaks or breaks in the equipment furnished and/or installed under this section, during the construction and guarantee period.

1.20 ACCESS TO EQUIPMENT FOR MAINTENANCE

A. Install all equipment, etc. to permit access for normal maintenance. Maintain easy access to filters, motors, etc. Install all such equipment and accessories to facilitate maintenance. Perform any relocation required to permit access at request of District at no additional cost to District.

B. Furnish and install access doors or panels in walls, floors, and ceilings to permit access to equipment, dampers, and all other items requiring service. Coordinate location of access doors with other trades as required.

C. Size access panels to allow inspection and removal of all items served.

D. Use Milcor style as required for material in which door is installed. Where door is installed in fire rated construction, provide door bearing UL label required for condition.

1.21 QUALITY ASSURANCE

A. Abbreviations:

1. AABC - Associate Air Balance Council
2. ADC - Air Diffusion Council - Test Code
3. AGA - American Gas Association
4. AMCA - Air Moving and Conditioning Association
5. ANSI - American National Standards Institute
6. ARI - Air Conditioning and Refrigeration Institute
7. ASA - American Standards Association
8. ASC - Adhesive and Sealant Council
9. ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers
10. ASME - American Society of Mechanical Engineers
11. ASTN - American Society for Nondestructive Testing
12. ASSE - American Society of Sanitary Engineering
13. ASTM - American Society for Testing and Materials
14. AWS - American Welding Society
15. AWWA - American Water Works Association
16. CAC - California Administration Code
17. 2025 CBC - California Building Code
18. 2025 CEC - California Electrical Code

19. 2025 CMC - California Mechanical Code
20. California Fire Code with California Amendments.
21. MSS - Manufacturers' Standardization Society
22. NBS - National Bureau of Standards
23. NCWB - National Certified Piping Welding Bureau
24. NEMA - National Electrical Manufacturer's Association
25. NFPA - National Fire Protection Association
26. PDI - Plumbing and Drainage Institute
27. SMACNA - Sheet Metal and Air Conditioning Contractor's National Association, Inc.
28. UL - Underwriters Laboratories, Inc.

B. Rulings and interpretations of authorities shall be considered a part of the regulations.

C. Nothing in this document is to be construed to permit Work not conforming to these codes and regulations.

D. Should there be any direct conflict between the above rules, the most stringent shall govern.

E. The Contractor shall recognize that the design is based upon the equipment and material specified by name or construction and accept full responsibility for assuring that the quality, utility and performance of a substitution equals or exceeds that of the specified item.

F. Testing: Provide the services of a qualified testing laboratory/agency to perform the specified field tests. Notify the District Representative 48 hours in advance of performance of Work requiring testing. Provide all materials required for testing.

G. Factory and Field Testing:
1. See each Section for the required testing and their procedures.
2. Test reports shall include description of equipment tested, description of test procedures, test results, and names and signatures of witnesses of tests.

PART 2 - PRODUCTS

2.1 GENERAL

A. All materials and equipment shall be new and of the best of their respective grades, free from all defects and of the make, brand or quality herein specified or as accepted by the District.

B. All materials and equipment shall be identified by manufacturer's name or nameplate data. Unidentified material or equipment shall be removed from the site.

C. Equipment specified by manufacturer's number shall include all accessories, controls, etc., listed in the catalog as standard with the equipment. Optional or additional accessories shall be furnished as specified.

D. Where no specific make of material or equipment is mentioned, any first class product of a reputable manufacturer may be used, provided it conforms to the requirements of the system and meets with the approval of the District.

E. Equipment and materials damaged during transportation, installation and operation shall be considered as "totally damaged" and shall be replaced with new. Any variance from this clause shall be made only with written approval of the District.

2.2 MANUFACTURER

A. Package Roof Top Heat Pump Units:
1. Carrier - coordinate with District for pre-purchased equipment submittals.

2.3 DUCTWORK AND ACCESSORIES

A. General:
1. For any ductwork discovered to be damaged during this project, Contractor shall coordinate with District to provide line item cost for repairs prior to completing any work.
2. Non-combustible or conforming to requirements for Class 1 air duct materials, or UL 181.

B. Steel Ducts:
1. ASTM A653 galvanized steel sheet, lock-forming quality, having zinc coating of 1.25 oz per sq ft for each side in conformance with ASTM A90.
2. Round duct shall be spiral seam construction.

C. Flexible Ducts:
1. Interlocking spiral of galvanized steel or aluminum construction; rated to (2 inches WG positive and 1.5 inches WG negative for low pressure ducts) (and 15 inches WG positive or negative for medium high pressure ducts.)

D. Insulated Flexible Ducts:
1. Flexible duct wrapped with flexible glass fiber insulation, enclosed by Pressure Ductwork: seamless aluminum pigmented plastic vapor barrier jacket; maximum 0.23 K value at 75 degrees F w/metal connectors.

E. Fasteners:
1. Rivets, bolts, or sheet metal screws.

F. Sealant:
1. Non-hardening, water resistant, fire resistive, compatible with mating materials; liquid used alone or with tape, or heavy mastic.

G. Hanger Rod:
1. Steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

H. Low Pressure Ducts:
1. Fabricate and support in accordance with 2025 CMC, SMACNA Low Pressure Duct Construction Standards and ASHRAE handbooks, except as indicated. Gages for galvanized steel ducts for low pressure systems where velocities do not exceed 2000 FPM shall be as follows:
a.

RECTANGULAR DUCT		ROUND DUCT	
Dimension of Largest Side (L) in Inches	Gage	Diameter (D) in Inches	Ga.
$L \leq 12$	26	$D < 9$	26
$12 \leq L \leq 30$	24	$9 \leq D < 14$	24
$30 < L \leq 54$	22	$14 \leq D < 23$	22
$54 < L \leq 84$	20	$23 \leq D < 37$	20
$84 < L$	18	$37 \leq D < 51$	18
		$51 \leq D < 61$	16

RECTANGULAR DUCT		ROUND DUCT	
Dimension of Largest Side (L) in Inches	Gage	Diameter (D) in Inches	Ga.
		61≤D<84	14

b. All joints and seams as indicated in the 2025 CMC are acceptable.

2. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts. No variation of duct configuration or sizes permitted except by written permission.
3. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows are used, provide turning vanes.
4. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible. Divergence upstream of equipment shall not exceed 30 degrees; convergence downstream shall not exceed 45 degrees.
5. Use double nuts and lock washers on threaded rod supports.

I. I. Volume Control Dampers:
1. Fabricate in accordance with SMACNA Low Pressure Duct Construction Standards, and as indicated.
2. Opposed blade dampers shall have factory-fabricated blades, with factory assembled linkages, mounted in frames.
   a. Blades shall have interlocking edges and ends.
   b. Rectangular dampers 6" or more wide shall be the multi-blade type.
   c. Blades on multi-blade type dampers must not be over 6" wide.
   d. Dampers shall be of the opposed blade type.
   e. Dampers shall have bar or channel frames and corner bracing.
   f. All blade and linkage bearings shall be self-lubricating plastic.
   g. Damper assembly leakage not to exceed 1% with 4.0 W.C. static pressure.
3. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
4. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.

J. Duct Test Holes:
1. Cut or drill temporary test holes in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

K. Ceiling Diffusers & Supply Registers and, Return Registers:
1. Fabricate of steel with steel or aluminum frame and baked enamel off-white finish.
2. Provide opposed blade damper and multi-louvered equalizing grid with damper adjustable from diffuser face as indicated on the drawings.
3. Ceiling Diffusers (CD): Titus 300R and Titus MCD or equal, or approved equal.
4. Return grilles shall be Titus 350 RL series or equal perforated.

2.4 INSULATION

A. General:
1. All insulation shall have composite (insulation, jacket or facing, and adhesive used to adhere the facing or jacket to the insulation) fire smoke hazard ratings as tested by procedure ASTM E84, NFPA 255 and UL 723 not exceeding:
   a. Flame Spread: 25
   b. Smoke Developed: 50

2. All products or their shipping cartons shall bear a label indicating that flame and smoke ratings do not exceed above requirements. Any treatment of jackets or facings to impart flame and smoke safety shall meet the above requirements.
3. The Contractor shall certify that all products used have met the above criteria.
4. The insulation values shown are a minimum. If the requirements of Title 24 exceed these values, the amount of and/or type must be increased to meet the Title 24 requirements.

B. Duct Insulation:
1. Fiberglass Duct Wrap:
   a. Insulation: ASTM C553; flexible, noncombustible blanket.
      1) 'K' value: ASTM C518, 0.48 at 75 degrees F.
      2) Maximum service temperature: 250 degrees F.
      3) Density: 0.75 lb/ ft3.
   b. Vapor Barrier Jacket:
      1) Kraft paper reinforced with glass fiber yarn and bonded to aluminized film vinyl.
      2) Moisture vapor transmission: ASTM E96; 0.5 perm.
      3) Secure with pressure sensitive tape.
   c. Vapor Barrier Tape: Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.
   d. Tile Wire: Annealed steel, 16 gage.
2. Glass Fiber Duct Liner, Flexible:
   a. Insulation: ASTM C553; flexible, noncombustible blanket.
      1) 'K' value: ASTM C518, 0.24 at 75 degrees F.
      2) Maximum service temperature: 250 degrees F.
      3) Density: 1.5 to 3.0 lb/ft3.
      4) Maximum Velocity on Coated Air Side: 4,000 ft/min.
   b. Adhesive: Waterproof (fire-retardant) type.
   c. Liner Fasteners: Galvanized steel, self-adhesive pad.
3. Glass Fiber Duct Liner, Rigid:
   a. Insulation: ASTM C612; semi-rigid, noncombustible.
      1) 'K' value: ASTM C518, 0.24 at 75 degrees F.
      2) Maximum service temperature: 250 degrees F.
      3) Density: 1.5 to 3.0 lb/cu ft.
      4) Maximum Velocity on Coated Air Side: 4,000.
4. Adhesive: Waterproof (fire-retardant) type.

2.5 CONTROLS

A. The Mechanical Contractor shall be responsible for the proper coordination of all control work and electrical work in connection therewith. He shall also be responsible for the proper operation of the entire system.

B. The Electrical Contractor shall furnish and install all line voltage control wiring, and in conduit. Wire sizing and length of run shall be coordinated with the manufacturer and Electrical Engineer.

C. Electrical Work: All electric relays, hand off automatic switches and all electrical wiring and all conduits will be provided under the Electrical Section, except as otherwise specified. Furnish and install additional conduit, wiring, relays, hand off automatic switches made necessary by the use of approved substituted equipment under this Section with no additional cost to the Owner.

D. Refer to drawings for control diagrams and additional requirements.

E. Calibration of Controls: The Controls Contractor shall carefully calibrate and adjust all controls as required to maintain comfort conditions and maximum energy conservation.

F. Thermostats and temperature sensors shall be by Venstar or approved equal.

G. Where stand-alone controls are indicated, mechanical contractor shall be responsible for low voltage controls conduit, wiring, and thermostat.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Equipment Installation:
1. All equipment provided under this section of the specifications shall be installed in strict accordance with the manufacturer's recommendations.
2. Should the drawings or specifications indicate the equipment is to be installed in a manner not in accordance with the manufacturer's recommendations; the Contractor shall obtain direction from the Engineer prior to proceeding with the installation. If the Contractor proceeds with the installation without obtaining direction from the Engineer, the Contractor shall be required to make all required corrections to the installation at no additional cost to the contract.
3. Space Consideration:
   a. Certain equipment and ductwork will have to be installed within the limited space available as indicated on the drawings.
   b. Exact field measurements of existing conditions will be the responsibility of this Contractor to assure that the equipment and ductwork to be installed under this Section of the specifications can be installed as indicated.
   c. Contractor shall submit shop drawings for approval prior to installation.
   d. These field verified dimensions shall be made prior to purchase of equipment or fabrication of ductwork.
4. Line all duct as indicated on mechanical sheets. Line ductwork as per General Notes, including but not limited to all ductwork at Bypass Damper connection locations.

B. Roof and Wall Flashings: For any damaged roof or wall flashing, Contractor shall coordinate with District to provide line item cost for repairs prior to completing any work. Contractor shall coordinate and maintain the roof warranty with the current manufacturer’s warranty provider for this building.

C. Openings through Walls and Roof:
1. Framed openings in walls and roof for ductwork to be coordinated in advance of the work with the District. Installer shall furnish shop drawings showing the correct dimensions and locations of the required openings.

D. Ductwork and Accessories:
1. Any modifications to existing ductwork shall be coordinated in advance of the work with the District by Contractor.
2. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.
3. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
4. Install accessories in accordance with manufacturer's instructions and per seismic note on mechanical sheet M-0.1.
5. Provide balancing dampers at points on low-pressure supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Use splitter dampers only where indicated.
6. Provide flexible connections immediately adjacent to equipment in ducts associated with fans and motorized equipment.
7. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, and elsewhere as indicated. Provide minimum 8 x 8 inch size for hand access, 18 x 18 inch size for shoulder access, and as indicated.

8. Provide duct test holes where indicated and required for testing and balancing purposes.
9. Check location of outlets and inlets and make necessary adjustments in position to conform to Architectural features, symmetry, and lighting arrangement.
10. Install diffusers to ductwork with airtight connection.
11. Provide balancing dampers on duct take-off to diffusers and registers, regardless of whether dampers are specified as part of the diffuser, or register assembly.
12. Paint ductwork visible behind air outlets and inlets matte black.
13. Hanger straps to turn under bottom of rectangular ducts and shall attach with sheet metal screws at this point as well as minimum two (2) additional screws into sides of duct for sizes eighteen inches (18") and under three (3) screws for sizes above eighteen inches (18). (Typical for each strap). Ducts in sizes above forty-eight inches (48") shall run continuous under bottom of duct. Straps for round duct shall run completely around underside of duct and shall be secured in place with minimum of two (2) sheet metal screws each side.
    a. Strap Installation: In general, provide in accordance with SMACNA duct installation standards. Contractor may request approval of alternate support methods to type specified. Shop drawings will be required.
    b. Concrete: Secure supports to concrete with concrete inserts. Branch ductwork in sizes eighteen inch (18") and smaller may be secured by power actuated fasteners. Contractor shall submit sizes and maximum loading data.
    c. Bracing all ductwork laterally to structural framing to prevent swaying or lateral movement per bracing details on plans per seismic note on mechanical sheet M-01.
14. Turning Vanes: All elbows having a centerline radius less than the width of the duct shall be square elbows with turning vanes, or proper radius and spacing. These turning vanes shall be multi-vane type and shall be carefully installed in accordance with the manufacturer's instructions. Provide turning vanes for duct widths of 18 inches or greater. Provide single thickness vanes for ducts of less than 18 inches. Contractor may submit for approval shop fabricated vanes conforming to SMACNA Duct Manual Standard. Where required or indicated on drawings, provide acoustic turning vanes constructed of air foil shaped aluminum extrusion with perforated faces and fiberglass fill.
15. Flexible Duct Connections: Shall be provided where indicated as required and shall be "Vent-glass", "Ventbestos", or Duro-Dyne Durolan super metal-fab.
16. Duct Tape and Sealer:
    a. All longitudinal snap lock joints shall be made airtight with high pressure duct sealant TREMCO J.S. 773, GREY A.F., and transverse joints sealed with Hardcast AFG No. 1402 foil grip instant tape sealant for rectangular ducts and round ducts, all U.L. classified. At contractor's option, all round duct transverse joints may be made with MIRACLE D-619 water based, duct sealant U.L. classified 309U as manufactured by MIRACLE ADHESIVES CORP.
    b. Exposed outdoor ductwork shall be sealed as described herein and, in addition, all transverse joints shall be covered with Glenkote "Seal-Flex".

E. Thermostats and over-ride switches:
1. Install at 48" above finished floor unless otherwise stated.
2. Coordinate with other trades.
3. All thermostats and over-ride switches shall be by Ventstar or approved equal.
4. Controls Contractor shall be responsible for verifying, furnishing all controls and wiring for tie-in of thermostats to new building energy management system and shall co-ordinate all requirements with other trades including notifying electrical contractor of necessary conduit and power requirements.
5. All costs for scope of work shall be submitted for final bid.
6. All control conduits shall be by Controls Contractor.

F. Insulation:
1. Duct Insulation:
    a. Unless specifically indicated on the drawings the Contractor may line or wrap ductwork to meet insulation requirements.
    b. Fiberglass duct wrap:

1) Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.
2) Secure insulation without vapor barrier with staples, tape, or wires.
3) Install without sag on underside of ductwork. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift ductwork off trapeze hangers and insert spacers.
4) Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
5) Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

c. Duct (and Plenum) liner Application:
1) Install as indicated (sound lining) on the drawings.
2) Adhere insulation with adhesive for 100 percent coverage. Secure insulation with mechanical liner fasteners. Refer to SMACNA Standards for spacing. Seal and smooth joints. Seal liner surface penetrations with adhesive.
3) Duct dimensions indicated are outside dimensions required for airflow.

3.2 JOB COMPLETION

A. Equipment Identification:
1. All equipment furnished under this section shall be provided with the manufacturer's metal identification labels securely attached and showing all pertinent data, including performance characteristics, size, model, and serial number. Labels shall not be obscured in any manner.
2. Identification name plates shall be provided on all equipment and control components, including room thermostat numbers coded to their respective air conditioning unit. Name plates shall be constructed of black bakelite with white center engraved letters three-sixteenth inch (3/16") high and shall be cemented to equipment with an epoxy resin. The Contractor shall submit to the Architect, a complete list of name plate titles for approval prior to installation.

B. Identification:
1. See Specification Section 23 05 53 for requirements.

C. Final Operation: Upon completion of the installation of the equipment and after all systems have been tested, cleaned, the Contractor shall place a competent person in charge who shall operate the equipment for a period of three eight-hour days. During this period of operation, all safety and operating controls shall be actuated to demonstrate proper operation. During this operating period, the Owner's representative shall be instructed in all details of operation and maintenance. All required instructions from the equipment manufacturer's representative shall be given during the period.

D. Operation Instructions:
1. Prepare a diagram of the entire control system with a full description of the heating, ventilating and air conditioning systems.
2. After approval by the Engineer, the control diagram and complete operating instructions shall be mounted under glass and installed where directed.
3. Prepare two (2) maintenance manuals which shall include all the necessary or pertinent data, such as:
a. Names, addresses and emergency phone numbers of all suppliers and manufacturers.
b. Part numbers of all replaceable items.
c. Oiling and lubrication instructions.
d. Air balance report.
e. Control diagram and operation sequence, together with labeling of controls and instruments to match the diagram.
f. A maintenance schedule which shall list all required maintenance on all equipment furnished under this section of the specifications and the intervals of which the items are to be performed.

E. Clean-Up:

1. After all heating, ventilating and air conditioning work has been tested and approved, the Contractor shall thoroughly clean all parts of the equipment installation. Exposed parts which are to be painted are to be thoroughly cleaned of cement plaster and other materials and all greases and oil spots removed with solvent. Exposed rough metal work to be carefully brushed down with steel brushes to remove rust and other spots and left in proper condition to receive painter's finish.
2. Remove all debris from the job site, all cartons, boxes, packing crates, excess materials not used occasioned by the work and to the satisfaction of the Owner.
3. If the above requirements of clean-up are not to the satisfaction of the Owner, the Owner reserves the right to order the work done and the cost of which shall be borne by the Contractor.
4. The Contractor shall remove on a daily basis all debris from the job site, to the satisfaction of the Owner.
5. If the above requirements of clean-up are not to the satisfaction of the Owner, the Owner reserves the right to order the work done by a third party and the cost of which shall be borne by the Contractor.

- END OF SECTION -

DIVISION 26 – ELECTRICAL

SECTION 26 00 00 - GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SCOPE

A. Work of this section includes everything necessary for or incidental to completing the electrical work, to provide a complete and operable electrical system, except as herein specifically excluded.

1.2 GENERAL REQUIREMENTS

A. Electrical System Characteristics: 480/277V. 3PH, 4W., 208/120V. 3PH, 4W.

B. Guarantee: Furnish a written guarantee for a period of one-year from date of acceptance.

C. Codes and Regulations: Work done under this Section shall comply with the latest edition of the following: California Electrical Code, State of California Title 24, State Building Standards, Occupational Safety and Health Administration (OSHA) requirements, State of California Title 17 and to all local codes having jurisdiction. In the case where the codes have different levels of requirements, the most stringent rule shall apply.

D. Wherever a discrepancy in quantity or size of conduit, wire, equipment, devices, circuit breakers, etc., (all materials), arises on the Drawing and/or Specifications, the Contractor shall be responsible for providing and installing all material and services required by the strictest condition noted on Drawings and/or in Specifications to insure complete and operable systems as required by the Owner and Engineer.

E. The General and Supplementary Conditions, as well as Special Conditions apply in addition to items in the Electrical Section. Special attention is directed to the following sections:

1. Drawings and Specifications at the site.

2. Shop drawings and samples.

3. Record drawings.

4. Cutting and Patching.

5. Cleaning up.

6. Guarantee.

7. Tests.

F. Additional Work: Refer to Mechanical and Plumbing specifications for additional Electrical requirements.

G. Provide minimum of twenty percent (20%) spare fuses of each size specified on plan, bridges, power/switch-packs, and control station of each type for the automatic lighting control system.

H. Testing:

1. Scan:

a. Infrascan test of the existing power distribution system affected by the building addition (i.e. panels, switchboards) and the new branch circuit panels shall be required.
b. Infrascan certified reports shall be submitted on completion to the Owner and Engineer.
c. Scans shall be performed by an independent testing laboratory with total connected loads in operation.

2. Megger:
a. New branch circuit - phase, neutral and ground conductors.
b. New insulated bonding conductors.

3. All circuits shall be tested for continuity and circuit integrity. Adjustments shall be made for circuits not complying with testing criteria.

4. Grounding System: Shall be tested by an independent testing laboratory to meet resistance specified in Part 3.1, D.3 of these Specifications. It shall be this Contractor's responsibility to make adjustments, as required, to upgrade non-complying systems to proper and safe operation.

5. All certified testing reports shall be submitted to the Owner at completion of project.

I. All Core Cutting, Drilling, and Patching:

1. For the installation of work under this Section, the aforementioned shall be performed under this Section of the Specifications and the Concrete section of the Specifications.

2. No holes will be allowed in any structural members without the written approval of the Structural Engineer.

3. For penetrations of concrete slabs or concrete footings, the work will be as directed in the Concrete Section of Specifications.

4. The contractor shall be responsible for patching and repairing surfaces where he is required to penetrate for work under this contract.

5. Penetrations shall be sealed to meet the rated integrity of the surface required to be patched and repaired. The patched surface shall be painted or finished to match the existing surface.

J. Verifying Drawings and Job Conditions:

1. This Contractor shall examine all Drawings and Specifications in a manner to be fully cognizant of all work required under this Section.

2. This Contractor shall visit the site and verify existing conditions. Where existing conditions differ from Drawings, adjustment shall be made and allowances included for all necessary equipment to complete all parts of the Drawings and Specifications.

K. Shop Drawings:

1. Drawings shall be submitted in six (6) bound sets accompanied by Letter of Transmittal, which shall give a list of the number and dates of the drawings submitted. Drawings shall be complete in every respect and bound in sets. Drawings shall include floor plans and site plans.

2. The Drawings submitted shall be marked with the name of the project, numbered consecutively and bear the approval of the Contractor as evidence that the Drawings have been checked by the Contractor. Any Drawings submitted without this approval will be returned to the Contractor for resubmission.

3. If the shop drawings show variations from the requirements of the Contract because of standard shop practice or other reasons, the Contractor shall make specific mention of such variations in his

letter of transmittal. If the substitution is accepted, the Contractor shall be responsible for proper adjustment which may be caused by the substitution. Samples shall be submitted when requested.

4. Shop drawings shall be submitted on the following but not limited to:

   a. Pull and Junction boxes.

   b. Wire/Cable.

   c. Conduit and fittings.

   d. Conduit supports.

   e. Safety/Disconnect switches.

L. Drawings of Record: The Contractor shall provide and keep up-to-date, a complete record set of blueprints. These shall be corrected daily and show every change from the original Drawings. This set of prints shall be kept on the job site and shall be used only as a record set. This shall not be construed as authorization for the Contractor to make changes in the layout without definite instruction in each case. Upon completion of the work, a set of reproducible Contract Drawings shall be obtained from the General Contractor and all changes as noted on the record set of prints shall be incorporated thereon with black ink in a neat, legible, understandable and professional manner. Refer to the Supplementary General Conditions for complete requirements.

1.3 WORK IN COOPERATION WITH OTHER TRADES

A. Examine the Drawings and Specifications and determine the work to be performed by the site utilities contractor, electrical, mechanical, plumbing, building contractor and other trades. Provide the type and amount of electrical materials and equipment necessary to place this work in proper operation, completely wired, tested and ready for use. This shall include all conduit, wire, disconnects, relays, and other devices for the required operation sequence of all electrical, mechanical and other systems or equipment.

B. Provide power and control circuits, conduit and wire as indicated on the Mechanical and Plumbing drawings as required for complete and operable systems.

C. The electrical contractor shall be responsible for obtaining back-boxes for all communication/ signal system devices/equipment from the low voltage contractor’s for rough-in. He shall coordinate the delivery of the backboxes to avoid building construction delays. In the event that the backboxes are not delivered as scheduled, the electrical contractor shall be responsible for installing the correct backboxes, patching and refinishing walls disturbed by the installation of the subject backboxes.

1.4 TESTING AND ADJUSTMENT

A. Upon completion of all electrical work, this Contractor shall test all circuits, switches, motors, breakers, motor starter(s) and their auxiliary circuits and any other electrical items to ensure perfect operation of all electrical equipment.

B. Equipment and parts in need of correction and discovered during such testing shall be immediately repaired or replaced with all new equipment and that part of the system shall then be retested. All such replacement or repair shall be done at no additional cost to the Owner.

C. All circuit shall be tested for continuity and circuit integrity. Adjustments hall be made for circuits not complying with testing criteria.

D. All certified testing reports shall be submitted to the Engineer at completion of project.

1.5 IDENTIFICATION

A. Identification nameplates shall be Micarta 1/8" thick and of approved size, with bevelled edges and engraved white letters 1/4" high minimum on black background. Nameplates shall be provided for all circuits in the distribution switchboards, and selector switches. Inscriptions on equipment shall be identical to those indicated in panels and/or motor control centers and other similar devices. Each nameplate shall be provided with drillings and suitable mounting screws corresponding to finish of the nameplate. The inscriptions in each nameplate shall be as indicated on the Drawings.

B. Identification of Air Conditioning Equipment: Equipment to be so identified shall include, but shall not be limited to: Pressure and temperature controllers; switches; equipment motors and boxes or cans housing other control items. Mechanical equipment nameplates shall be mechanically fastened and have letters a minimum of 3/8" high.

1.6 MAINTENANCE, SERVICING, INSTRUCTION MANUALS AND WIRINGDIAGRAMS

A. Prior to final acceptance of the job, the Electrical Contractor shall furnish to the Owner at least four (4) copies of operating and maintenance and servicing instructions, as well as four (4) complete wiring diagrams for the following item(s) or equipment:

1. Circuit breakers.

2. Safety/Disconnect Switches.

B. All wiring diagrams shall specifically cover the system supplied. Typical drawings will not be accepted. Two (2) copies shall be presented to the Electrical Engineer and four (4) copies to the Owner.

1.7 ELECTRICAL CONTRACTOR'S RESPONSIBILITY

A. It shall be the Electrical Contractor's responsibility to obtain a complete set of Drawings and Specifications. He shall check the Drawings of the other trades and shall carefully read the entire Specifications and determine his responsibilities.

B. The contractor shall be responsible for reviewing the plans and specifications to ensure each room, where electrical line or low voltage equipment is to be installed, has sufficient space to accommodate the system cabinets, equipment and terminations while maintaining code mandated clearances about said equipment. The contractor shall identify problem areas prior to bid, include all costs required for corrective measures in his bid and submit alternate equipment and materials suitable for the installation to the Architect/Engineer for acceptance as part of the product submittal process.

1.8 FINAL INSPECTION AND ACCEPTANCE

A. After all requirements of the Specifications and/or the Drawings have been fully completed, representatives of the Owner will inspect the work. Contractor shall provide competent personnel to demonstrate the operation of any item or system to the full satisfaction of each representative.
B. Final acceptance of the work will be made by the Owner after receipt of approval and recommendation of acceptance from each representative.

1.9 RECORD DRAWINGS

A. Contractor shall furnish one set of reproducible record drawings before final payment of retention.

1.10SUBSTITUTIONS

A. Substitution to specified equipment shall be submitted and received by the Engineer fifteen (15) days after the bid date for review and approval.

B. To receive consideration, requests for substitutions must be accompanied by documentary proof of its equality with the specified material. Documentary proof shall be in letter form and identify the specified values/materials alongside proposed equal values/materials. In addition, catalog brochures and

samples must be included in the submittal.

C. In the event that authorization is given for a substitute equal to bid, after award of contract the Contractor shall submit to the Engineer certified quotations from suppliers of both the specified and proposed equal material for price comparison and delivery dates.

D. In the event of cost reduction, the Owner will be credited with 100 percent of the reduction, arranged by Change Order.

E. The Contractor warrants that substitutions proposed for specified items will fully perform the functions required.

F. Substitutions or requests for substitution shall not be accepted and rejected for failure to comply with items A-E above.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials and Equipment: All electrical materials and equipment shall be new and shall be listed by Underwriter's Laboratories and bear their label, or listed and certified by a nationally recognized testing authority where UL does not have an approval. Custom made equipment must have complete test data submitted by the manufacturer attesting to its safety. In addition, the materials and equipment shall comply with the requirements of the following:

1. American Society of Testing Materials (ASTM).

2. Insulated Cable Engineers Association (ICEA).

3. National Electrical Manufacturer's Association (NEMA).

4. National Fire Protection Association (NFPA).

5. American National Standard Institute (ANSI).

B. Conduit:

1. Rigid conduit shall be full weight threaded type aluminum or steel, except where specifically required to be steel. Steel conduit shall be protected by overall zinc coating to inside and outside surfaces, applied by the hot dip, metallizing or sherardizing process.

2. Galvanized Rigid Conduit (GRC), shall be full weight threaded type aluminum or steel, except where specifically required to be steel. Steel conduit shall be protected by overall zinc coating to inside and outside surfaces, applied by the hot dip, metallizing, or sherardizing process.

3. Intermediate Metal Conduit (IMC), shall be hot-dipped galvanized in accordance with UL 1242 and meeting Federal Specification WWC-581 (latest revision).

4. Electrical Metallic Tubing (EMT), shall be zinc-coated steel with baked enamel or plastic finish on inside surfaces.

5. Flexible metal conduit shall be constructed of aluminum or hot-dipped galvanized steel strips wound spirally with interlocking edges to provide greatest flexibility with maximum strength. Interior surfaces shall be smooth and offer minimum drag to pulling in conductors. Used only as directed by the Engineer.

6. Liquid-tight conduit (Seal-Tite) shall be galvanized steel flexible conduit as above except with moisture and oil-proof jacket, pre-cut lengths and factory installed fittings. For outdoor installations and motor connection.

7. Non-Metallic Conduit:

   a. Polyvinyl chloride (PVC) rigid conduit, Schedule 40, Type II for underground installation only.
   b. Conduit and fitting shall be produced by the same manufacturer.

8. MC Cable or Mineral Insulated Cable: Not allowed.

C. Fittings:

1. Condulet type fittings shall be smooth inside and out, taper threaded with integral insulating bushing and of the shapes, sizes and types required to facilitate installation or removal of wires and cables from the conduit and tubing system. These fitting shall be of metal, smooth inside and out, thoroughly galvanized, and sherardized cadmium plated.

2. Metallic condulet covers shall have the same finish as the fitting and shall be provided for the opening of each fitting where conductor do not pass through the cover.

3. Connector, coupling, locknut, bushings and caps used with rigid conduit shall be steel, threaded and thoroughly galvanized. Bushings shall be insulated.

4. EMT fittings, connectors and couplings, shall be steel, zinc or cadmium plated, raintight, threadless, compression or tap-on multiple point, steel locking ring type with insulated throat.

5. Flexible steel conduit connectors shall be or malleable iron clamp or squeeze type or steel twist-in type with insulated throat. The finish shall be zinc or cadmium plating.

6. Die cast, set screw or indenter type fittings are not acceptable.

7. Conduit unions shall be "Erickson" couplings, or approved equal. The use of running threads will not be permitted.

D. 600 Volt Conductors - Wire and Cable:

1. All conductors shall be copper. SimPull type or equal.

2. Type THHN/THWN thermoplastic, 600 volt, UL approved, dry and wet locations, for conductor sizes up to and including #4 AWG.

3. Type XHHW cross-linked synthetic polymer, 600 volt, UL approved, for dry and wet locations, for conductor sizes #2 AWG. and above.

4. Cross-linked synthetic polymer, XHHW, 600 volts, UL approved, for installation underground, in concrete or masonry.

5. Wire and cable shall be new, manufactured not more than six (6) months prior to installation, shall have size, type of insulation, voltage rating and manufacturer's name permanently marked on outer covering at regular intervals.

6. Wire and cable shall be factory color coded by integral pigmentation with a separate color for each phase and neutral. Each system shall be color coded and it shall be maintained throughout.

7. Systems Conductor Color Coding:

   a. Power 208/120V, 3PH, 4W:

      (1) Phase A = Black
      (2) Phase B = Red
      (3) Phase C = Blue

(4) Neutral = White

b. Power 480/277V, 3PH, 4W:

(1) Phase A = Brown
(2) Phase B = Orange
(3) Phase C = Yellow
(4) Neutral = White

c. Ground Conductors:

(1) Green

d. Communication/Signal System:

(1) As recommended by the manufacturer.

8. All color coding for #8 conductor and above shall be as identified above, utilizing phase tape at each termination.

9. No conductors carrying 120 volt or more shall be smaller than #12 AWG.

E. Junction and Pullboxes:

1. For interior dry locations, boxes shall be galvanized one-piece drawn steel, knockout type, with removable, machine screw secured covers.

2. For outside, damp or interior/exterior surface mounted locations, boxes shall be heavy cast aluminum or cast iron with removable, gasketed, non-ferrous machine screw secured covers.

3. All boxes shall be sized for the number and sizes of conductors and conduits entering the box and equipped with plaster rings where required. Each conductor shall be terminated at an insulated, barriered terminal connector and completely identified with an engraved fiber identification marker, Electrovert or Underwriter's Safety Device Company.

F. Outlet Boxes:

1. For fixtures, boxes shall be galvanized, one-piece drawn steel, knockout type equipped with 3/8" fixture studs and plaster rings where required.

2. Unless otherwise noted on plan or specified herein, outlet boxes shall be 4” square x 2 1/8” deep, one-piece drawn steel, knockout type, mounted flush with in wall. Provide with plaster rings and wall plate.

3. For data and combination telephone/data system outlets, outlet boxes shall be 4 11/16” square x 2 1/8” deep, one-piece drawn steel, knockout type, mounted flush with in wall. Provided with plaster rings and leave outlet box ready for installation of Owner furnished wall plate.

4. For all other communication/signal system devices, outlet boxes shall be as recommended by the system manufacturer and provided complete with plaster rings and covers.

5. For locations where standard boxes are not suitable due to number and size of conduit to be terminated, special boxes shall be designed to fit space or meet other requirements and submitted for approval.

6. For surface mounting or exposure to wet or damp locations, outlet boxes shall be heavy cast aluminum or cast iron with threaded hubs; covers shall be watertight with gaskets and non-ferrous screws.

7. Floor boxes shall be cast iron, fully adjustable type, with flange and brass covers suitable for the outlets/connectors specified on plan and in the project manual. Boxes shall be suitable for terminating the conduit specified on plan. Wiremold Omnibox series or approved equal for 1" conduit and smaller. Wiremold Resource RFB series or approved equal for conduits larger than 1".

G. Switches:

1. Standard single pole switches shall be flush tumbler, A.C. rated, quiet type, heavy duty back or side wired with binding screws, standard rocker Hubbell #1221, 20A, 120/277V, or approved equal, color as elected by Architect. Two pole three-way and other switches shall be similar. Refer to Device Plate Section of Specifications for other requirements.

2. Switches located outdoors or in damp or wet locations shall be the same as above provided with steel locking weatherproof lift cover.

3. Switches controlling or disconnecting single phase motor loads in excess of 1/3HP shall be horsepower rated and approved or motor control service. Switches shall be complete with overload device of proper motor nameplate rating, where required.

4. Disconnect (safety) switches shall be fused, heavy duty type meeting NEMA Specifications. Switches shall be provided with rejection type fuse blocks. Provide switches with the number of poles, the voltage, current and horsepower ratings as required. Provide externally operable, quickmake, quick-break type mechanism with cover interlock and padlockable in either the open or closed position. Unless indicated otherwise, provide switches indoors in NEMA Type 1 enclosure and in NEMA Type 3R rain-tight enclosure where indicated to be outdoors or weatherproof. Provide nameplate indicating equipment served. Provide unit as manufactured by Challenger or approved equal Siemens or Westinghouse.

H. Painting:

1. Terminal cabinets, panels, junction boxes, pull boxes, etc., and conduit installed outdoors and in public view shall be painted with colors selected by the Architect to match the subject exterior surface. Refer to painting section of the specifications for additional requirements.

I. Seismic Design and Anchoring of Electrical Equipment:

1. Seismic anchorage of electrical equipment shall conform to C.C.R. Title 24, 2025 CBC with California Amendments. Anchorage details for roof/floor mounted equipment shall be as shown on plans.

PART 3 - EXECUTION

3.1 PREPARATION AND INSTALLATION

A. Installation of Conduit and Outlet Boxes:

1. All conduit exposed or installed in concrete and masonry, shall be galvanized rigid steel conduit (GRC), or intermediate metal conduit (IMC).

2. Rigid conduit may be installed under floor slabs, under concrete sidewalls and as noted on the Drawings. Rigid conduit installed under slabs shall be 1" trade size minimum and shall be wrapped with 20 mil. polyvinyl chloride plastic tape.

3. All conduit except as hereinafter specified, installed in concrete or masonry walls, or damp or hazardous location, or subject to mechanical injury shall be heavy wall, threaded, galvanized rigid steel conduit (GRC), or intermediate metal conduit (IMC).

4. Flexible steel conduit shall only be permitted to be used at light fixture outlets and connections to vibrating electrical equipment. All flexible steel conduit runs shall be less than 6'-0". All outdoor installation shall be made using liquid-tight flex with approved fittings. Use of flexible conduit shall be as approved by the Engineer.

5. Intermediate metal conduit (IMC), is approved for use in all locations as approved for GRC or EMT and in accordance with Article 345 of CEC and UL Information card #DYBY.

6. All conduit installed in the dry walls or ceilings of the building shall be steel tube (EMT), Galvanized Rigid Steel (GRC), or Intermediate Metal Conduit (IMC).

7. MC or mineral insulated cable is not allowed.

8. Conduit shall be run so as not to interfere with other piping fixtures or equipment.

9. The ends of all conduit shall be cut square, carefully reamed out to full size and shall be shouldered in fitting.

10. No running threads will be permitted in locations exposed to the weather, in concrete or underground. Special union fittings shall be used in these locations.

11. Underground conduit shall be, unless otherwise indicated, Schedule 40 PVC (polyvinyl chloride) installed at depth of not less than 24" below grade, concrete encased with a minimum of 3” concrete envelope and 2” minimum between conduits. Conduit separation shall be maintained using plastic spacers located at 10'-0" intervals. Where power and communication/signal conduits are run in a common trench a (12") inch minimum separation shall be maintained between power and communication/signal conduits. The grounding wire in plastic conduit shall be rated in accordance with Article 250 of 2025 CEC. Conduit encasement will not be required for conduits installed under the building slab (building footprint).

12. All underground or imbedded conduit shall be 1" minimum trade size for steel and for PVC.

13. Where underground power feeder conduit runs stub-up, conduit shall transition to GRC underground. The contractor shall use GRC elbows and GRC risers wrapped in 20 mil. PVC tape for stub-ups. Conduit stub-ups for branch circuits and low voltage systems shall be PVC.

14. PVC conduit shall not be run in walls.

15. Where underground conduit runs penetrate floor slab, conduit shall terminate 6” above finished floor with a grounding bushing.

16. Where conductors enter a raceway in a cabinet, pull box, junction box, or auxiliary gutter, the conductors shall be protected by a plastic bushing type fitting providing a smoothly rounded insulating surface.

17. Where conduit extends through roof to equipment on roof area, this Contractor shall provide 24 gauge galvanized sheet metal flashing cones with 4" flanges on roof surface. This flashing shall be delivered to the roofing contractor for installation. The actual location of all such roof penetrations and outlet shall be verified by the Contractor.

18. All conduit underground, in masonry and concrete walls, and where concealed under floor slabs shall have joints painted with thread compound prior to makeup. No conduit shall be installed horizontally in concrete walls or floors.

19. All conduit shall be supported at intervals not less than 6'-0" and within 12" from any outlet and at each side of bends and elbows. Conduit supports shall be galvanized, heavy stamped, two-hole conduit clamp properly secured.

20. Where conduit racks are used the rack shall consist of two piece conduit clamps attached to galvanized steel slotted channels, properly secured via threaded rods attached directly to the building structure.

21. Nail-in conduit supports will not be allowed. One piece set-screw type conduit clamps or perforated iron for supporting conduit will not be permitted.

22. Seismic Conduit Support:

    a. All conduit shall be supported in such a manner that it is securely attached to the structure of the building. Attachment is to be capable of supporting the tributary weight of conduit and contents in any direction. Maximum spacing of support and braces are to be as follows:

CONDUIT TYPE	MAXIMUM SPACING
EMT, IMC	10'-0"
GRC (3/4" thru 1 ½")	10'-0"
GRC (2" thru 2½")	16'-0"
GRC (3" and larger)	20'-0"

23. All conduit runs shall be installed parallel or perpendicular to walls, structural members, or intersection of vertical planes and ceilings. Field made bends and offset shall be avoided where possible. Crushed or deformed raceway shall not be installed.

24. Open knockouts in outlet boxes only where required for inserting conduit.
25. Outlet boxes on metal studs shall be attached to metal hangers, tack welded or bolted to studs; on wood studs attachment shall be with wood screws, nails not acceptable.

26. Recessed panels shall be provided with (4) ¾" spare conduit stub-ups into accessible ceiling space. Surface mounted panels secured to stud walls shall be secured to wall using 1/2" x 3" screws into steel backing plate provided by the Contractor.

27. All boxes shall be covered with outlet box protector, Appleton SB-CK. Keep dirt from entering box or panels. If dirt does get in, it shall be removed prior to pulling wires.

28. All boxes installed outdoors shall be suitable for outdoor installations, gasketed, screw cover and painted as directed by the Architect with weatherproof paint to match building.

29. All conduit entries to outdoor mounted panels, cabinets, boxes, etc., shall be made using Myers "SCRU-TITE" hubs Series ST.

30. All conduit shall have a 200 lb test poly-propylene pull line left in place for future use in all runs tagged with a plastic tag at terminating end indicating the location of the opposite end of the conduit.

31. All rotating electrical equipment shall be supplied with flexible, liquid-tight conduit with appropriate slack and shall not exceed thirty-six (36) inches.

32. All multiple conduit runs within suspended ceilings shall be suspended from building structure by means of unistrut hangers/rack, see note 20. Refer to note 19 for support of single conduit runs within suspended ceilings. Conduit shall not be allowed to lay on ceiling or be supported from ceiling suspension wires or other suspension system.

33. Provide complete conduit system for all line and low voltage systems.

34. All raceways shall be installed concealed in walls, under floors or ceilings. Exposed raceways will not be permitted unless specifically approved in writing by the Architect/Engineer. When approved by the Architect/Engineer exposed raceways shall be Wiremold type or equal, color as selected by the Architect.

35. Provide minimum 18” square ceiling access panels for devices, outlets, junction/pull boxes installed over inaccessible ceilings.

36. Provide conduit only for routing of HVAC control wiring. Refer to Mechanical drawings for conduit requirements.

B. Installation of 600 Volt Conductors:

1. All line and low voltage wire shall be installed in conduit.

2. All line voltage circuits and feeder wires shall be continuous from the service point to terminal or farthest outlet. No joints shall be made except in pull, junction or outlet boxes, or in panel or switchboard gutters.

3. All low voltage wire/cables shall be continuous from the service point to terminal or farthest outlet. No joints will be allowed.

4. Thoroughly clean all conduit and wire-ways and see that all parts are perfectly dry before pulling any wires. No joint shall be made except in pull, junction or outlet boxes, or in panel or switchboard gutters.

5. Provide conduit only for routing of HVAC control wiring. Refer to Mechanical drawings for conduit requirements.

6. Install UL approved, fixture wire from all lighting fixture lamp sockets into fixture outlet or junction box.

C. Joints in 600 Volt Conductors:

1. Joints in 600 volt conductors smaller than No. 4 AWG shall be made with Scotchlok spring type connectors. Wires No 4 AWG and larger shall be joined together with approved type of pressure connector and taped with #33 3M tape, three (3) layers minimum to provide insulation not less than that of conductor. Connections to switch or busbar shall be made with one-piece copper lugs. Splicing of all 600 volt or less in-line connections #2 AWG through 350 MCM shall be made with 3M brand PST connector.

2. Joints/splices shall be done in junction or pull boxes.

3. Splices of communications wire/cable will not be permitted. Communications wire/cable shall run continuously from its point of origin to its destination point.

D. Grounding:

1. Provide grounding for entire electric installation as shown on plans and as required by applicable codes. Included as requiring grounding are:
   a. Conduit.
   b. Neutral or identified conductors of interior wiring system.
   c. Non-current carrying metal parts of fixed equipment.

2. Grounding and bonding conductors shall be sized per the latest edition of the California Code of Regulations, Title 24, State of California and CEC.

3. Provide and install an equipment grounding conductor in all feeder and branch circuit conduits.

4. Building grounding system resistance to ground shall not exceed 25 Ohm.

E. Prefabricated Equipment: Installation of all prefabricated items and equipment shall conform to the requirements of the manufacturer's specifications and installation instruction pamphlets. Where code

requirements affect installation of materials and equipment, the more stringent requirements, code or manufacturer's instructions and/or specifications, shall govern the work.

END OF SECTION

3) LYNWOOD HS BULLIS CARRIER EQUIPMENT PURCHASED SUBMITTAL

Sigler

COMMERCIAL HVAC DIVISION

S U B M I T T A L

Owner: Lynwood USD

Job Name: Lynwood High School

Engineer:

Date: 12/01/2023

Mark For	Qty	Model Number	Description
All Units Include Sigler Pass Services			
Bldg C			
C 1-4	*4*	*50FCQA05A2M6-3A0A0*	***Nominal 4 Ton HP RTU, 460/3/60*** • *One stage cooling* • *Standard Packaging* • *Dir Drive-EcoBlue-Med Static* • *Al/Cu – Al/Cu – Louvered Hg* • *SystemVu Controller* • ***Direct Fit – No Curb Adapter Required***
	4	*ECD-SRT12CB-D0DB-4*	***Field Installed:*** *Vertical Economizer, Belimo*

CONTENTS OF SUBMITTAL:

- PRODUCT DESCRIPTION, PERFORMANCE DATA, DIMENSIONAL DATA, AND ACCESSORY DATA.

NOTES:

- ONE APPROVED COPY OF SUBMITTAL MUST BE RETURNED MARKED “APPROVED” OR “APPROVED AS NOTED” FOR EQUIPMENT TO BE RELEASED FOR FABRICATION TO THE FACTORY.
- CURB ADAPTERS MUST BE REVIEWED AND SIGNED PRIOR TO ORDER. UPON APPROVAL, CONTRACTOR MUST PROVIDE SIGNATURE OF APPROVAL FOR ORDER ON THE CURB ADAPTER CUT SHEET. IF THE CURB ADAPTER DIMENSIONS DO NOT MATCH THE CURB DIMENSIONS OF THE EXISTING IN FIELD, CONTRACTOR TO NOTE EXISTING DIMENSIONS ON CURB ADAPTER CUT SHEET PROVIDED
- **BLDG U UNITS WERE UPSIZE FROM 3.5 TONS TO 4 TONS.**

SUBMITTALS RETURNED REQUIRING ADDITIONAL, OR MODIFIED, DATA WILL BE RE-SUBMITTED BY SIGLER. RELEASE FOR FABRICATION WILL COMMENCE WHEN AN “APPROVED” SUBMITTAL IS RETURNED TO OUR OFFICES.

REVISION: ORIGINAL

SUBMITTED BY: DAVID ROSS

PREPARED BY: BRANDON HERNANDEZ

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SECTION II. ROOFTOP UNIT ACCESSORIES

SECTION I. ROOFTOP UNITS

SUBMITTAL

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Lynwood USD - Lynwood High School Bullis RD

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Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Bldg A - AC 7,9

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

Unit Parameters

Unit Model: **50FCQA06A2M6-3A0A0**
Unit Size: **06 (5 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Single Stage Compressor Models**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **3' 5.375"**
Total Operating Weight: **599** lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **4**
Return Air Filter Size: **16 x 16 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

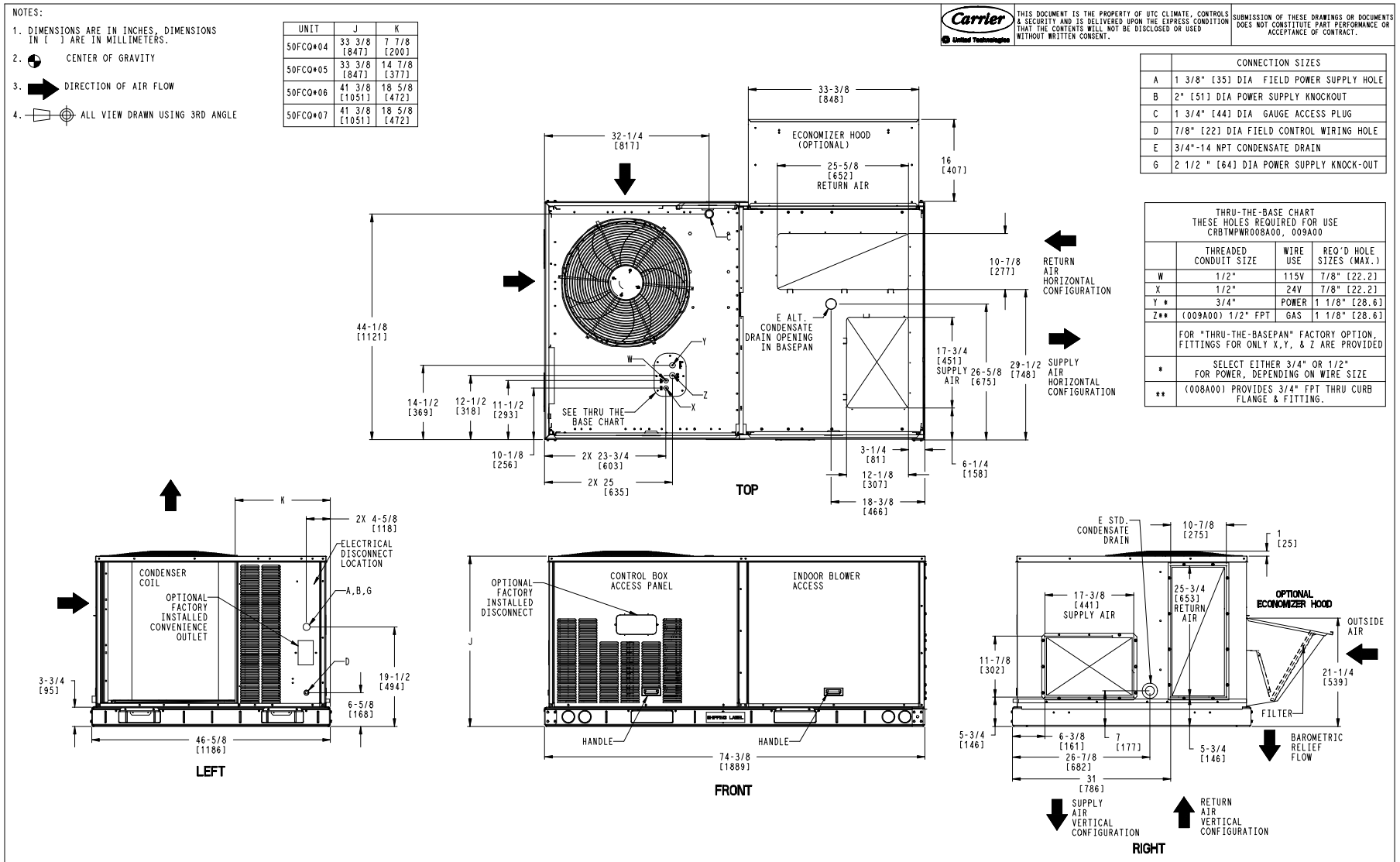
5-Year compressor parts (STD.)
1-Year parts (STD.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
50FCQA06A2M6-3A0A0	Rooftop Unit	2


NOTES:
1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE
UNIT J K
50FCQ*04 33 3/8 [847] 7 7/8 [200]
50FCQ*05 33 3/8 [847] 14 7/8 [377]
50FCQ*06 41 3/8 [1051] 18 5/8 [472]
50FCQ*07 41 3/8 [1051] 18 5/8 [472]
Carrier
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SUBMISSION OF THESE DRAWINGS OR DOCUMENTS DOES NOT CONSTITUTE PART PERFORMANCE OR ACCEPTANCE OF CONTRACT.
CONNECTION SIZES
A 1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B 2" [51] DIA POWER SUPPLY KNOCKOUT
C 1 3/4" [44] DIA GAUGE ACCESS PLUG
D 7/8" [22] DIA FIELD CONTROL WIRING HOLE
E 3/4"-14 NPT CONDENSATE DRAIN
G 2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT
THRU-THE-BASE CHART
THESE HOLES REQUIRED FOR USE CRBTMPWR008A00, 009A00
THREADED CONDUIT SIZE / WIRE USE / REQ'D HOLE SIZES (MAX.)
W 1/2" 115V 7/8" [22.2]
X 1/2" 24V 7/8" [22.2]
Y * 3/4" POWER 1 1/8" [28.6]
Z** (009A00) 1/2" FPT GAS 1 1/8" [28.6]
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X,Y, & Z ARE PROVIDED
* SELECT EITHER 3/4" OR 1/2" FOR POWER, DEPENDING ON WIRE SIZE
** (008A00) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.
33-3/8 [848]
32-1/4 [817]
ECONOMIZER HOOD (OPTIONAL)
25-5/8 [652] RETURN AIR
16 [407]
10-7/8 [277]
RETURN AIR HORIZONTAL CONFIGURATION
SUPPLY AIR HORIZONTAL CONFIGURATION
44-1/8 [1121]
E ALT. CONDENSATE DRAIN OPENING IN BASEPAN
17-3/4 [451] SUPPLY AIR
26-5/8 [675]
29-1/2 [748]
14-1/2 [369]
12-1/2 [318]
11-1/2 [293]
SEE THRU THE BASE CHART
10-1/8 [256]
2X 23-3/4 [603]
2X 25 [635]
3-1/4 [81]
12-1/8 [307]
18-3/8 [466]
6-1/4 [158]
TOP
K
2X 4-5/8 [118]
ELECTRICAL DISCONNECT LOCATION
A,B,G
CONDENSER COIL
OPTIONAL FACTORY INSTALLED CONVENIENCE OUTLET
D
3-3/4 [95]
19-1/2 [494]
6-5/8 [168]
46-5/8 [1186]
LEFT
OPTIONAL FACTORY INSTALLED DISCONNECT
CONTROL BOX ACCESS PANEL
INDOOR BLOWER ACCESS
J
HANDLE
HANDLE
74-3/8 [1889]
FRONT
E STD. CONDENSATE DRAIN
10-7/8 [275]
1 [25]
17-3/8 [441] SUPPLY AIR
25-3/4 [653] RETURN AIR
OPTIONAL ECONOMIZER HOOD
OUTSIDE AIR
11-7/8 [302]
21-1/4 [539]
FILTER
5-3/4 [146]
6-3/8 [161]
7 [177]
5-3/4 [146]
26-7/8 [682]
31 [786]
BAROMETRIC RELIEF FLOW
SUPPLY AIR VERTICAL CONFIGURATION
RETURN AIR VERTICAL CONFIGURATION
RIGHT
ITC CLASSIFICATION U.S. ECCN:NSR
SHEET 1 OF 3
DATE 08/15/19
SUPERCEDES -
50FCQ 04-07 SINGLE PACKAGE HEAT PUMP
48TC003348
REV -

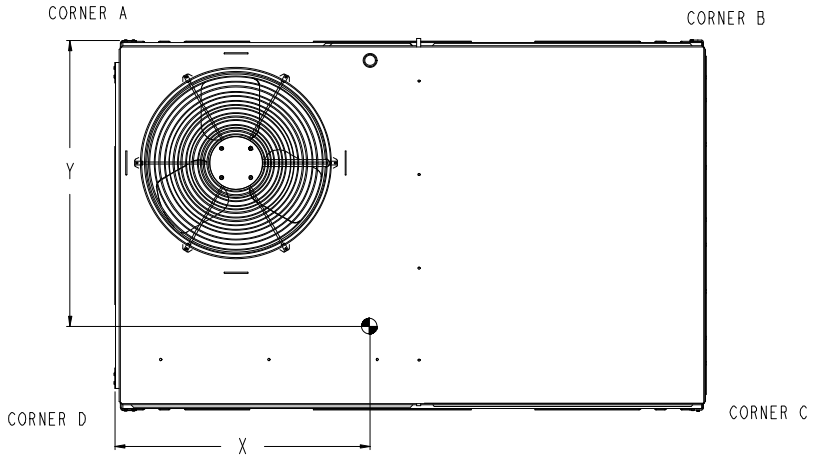
UNIT	STD. UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ*04	467	212	126	57	118	53	108	49	115	52	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*05	473	215	127	58	119	54	110	50	117	53	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*06	584	265	160	72	145	66	133	60	146	66	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]
50FCQ*07	589	267	161	73	146	66	134	61	147	67	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]

* STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.

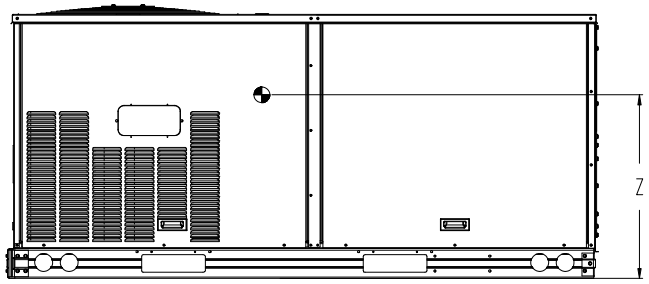
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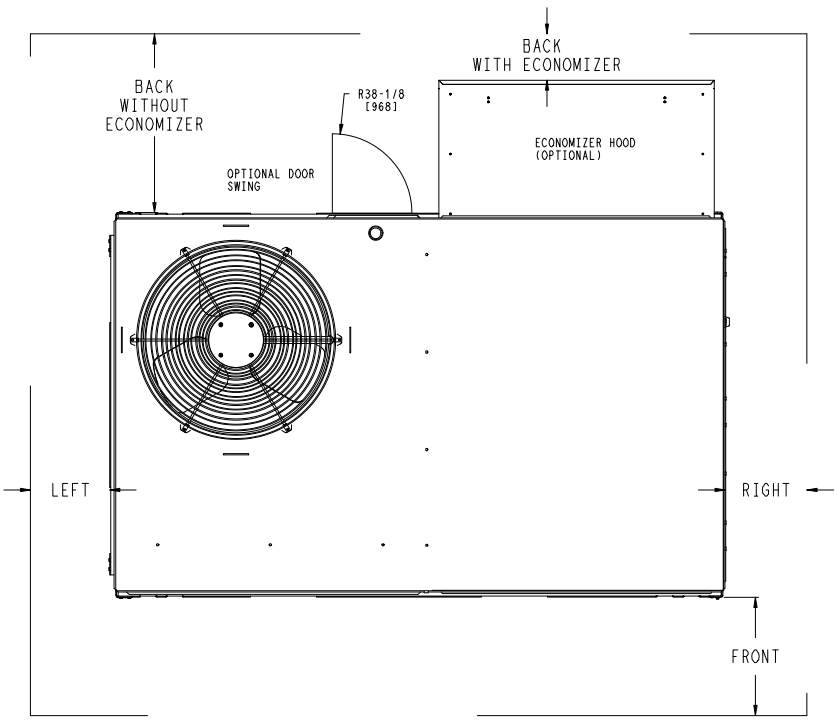
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TOP



FRONT



NOTE:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

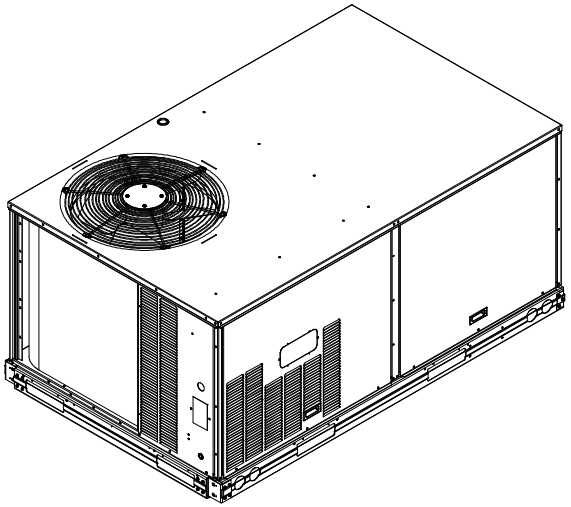
CLEARANCE			
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/ECON	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

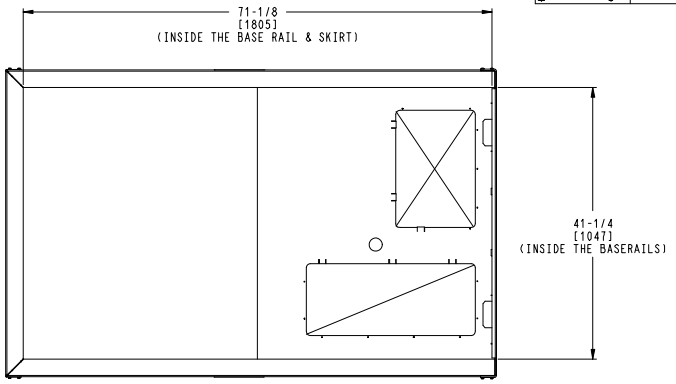
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

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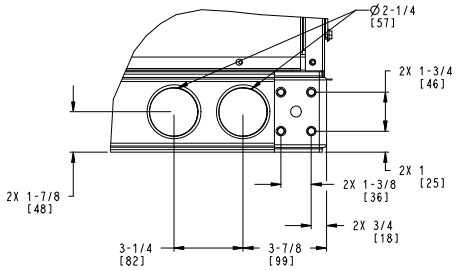
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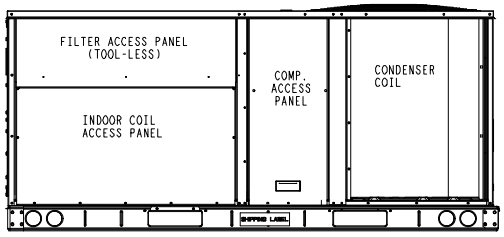


INSIDE BASERAIL DIMENSIONS

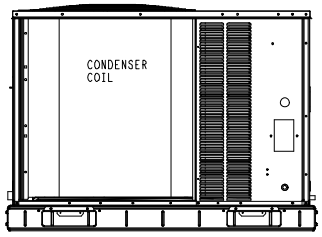
BOTTOM



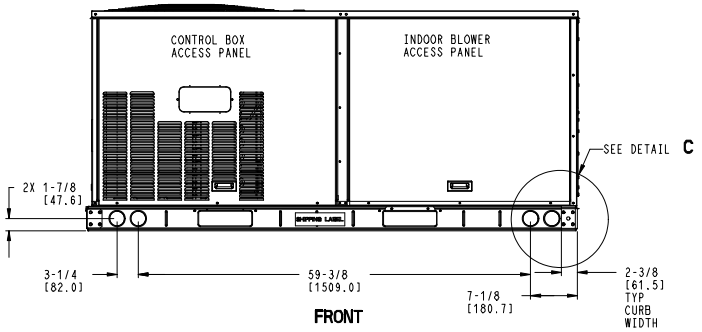
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

Part Number:50FCQA06A2M6-3A0A0

ARI SEER:	**14.30**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**41.4**	in

Operating Weight

Base Unit Weight:	**584**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**13**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**599**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**2000**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**57.3**	F
Evaporator Leaving Air WB:	**57.3**	F
Evaporator Leaving Air Enthalpy:	**24.56**	BTU/lb
Gross Cooling Capacity:	**61.90**	MBH
Gross Sensible Capacity:	**48.96**	MBH
Compressor Power Input:	**4.19**	kW
Coil Bypass Factor:	**0.027**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.3**	F
Total Heating Capacity:	**56.80**	MBH
Integrated Heating Capacity:	**56.80**	MBH
Heating Power Input:	**3.77**	kW
High Temperature COP:	**3.80**	
Low Temperature COP:	**2.30**	
HSPF:	**8.2**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**2036**	
Fan Power:	**0.90**	BHP
NOTE:	**Selected IFM RPM Range: 239 - 2390**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**	
Compressor #1 RLA:	**7.8**	
Compressor #1 LRA:	**52**	
Indoor Fan Motor Type:	**MED**	
Indoor Fan Motor Eff.:	**Null**	

Indoor Fan Motor FLA (Total): **2.1**
Power Supply MCA: **13**
Power Supply MOCP (Fuse or HACR): **20**
Disconnect Size FLA: **12**
Disconnect Size LRA: **57**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

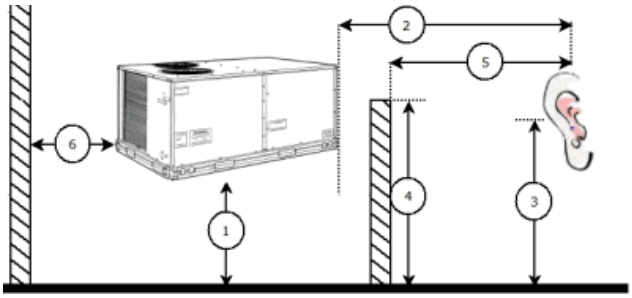
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	92.3	90.8	85.6
125 Hz	83.5	79.7	84.7
250 Hz	77.6	72.4	80.5
500 Hz	73.9	66.4	76.0
1000 Hz	70.7	68.5	72.4
2000 Hz	67.7	59.3	68.0
4000 Hz	64.3	53.1	62.8
8000 Hz	60.4	46.8	59.3
A-Weighted	77.2	72.6	79.0

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	85.6	84.7	80.5	76.0	72.4	68.0	62.8	59.3	89.2 Lw
B	59.4	68.6	71.9	72.8	72.4	69.2	63.8	58.2	78.5 LwA
C	53.2	52.3	48.1	43.6	40.0	35.6	30.4	26.9	56.8 Lp
D	27.0	36.2	39.5	40.4	40.0	36.8	31.4	25.8	46.1 LpA

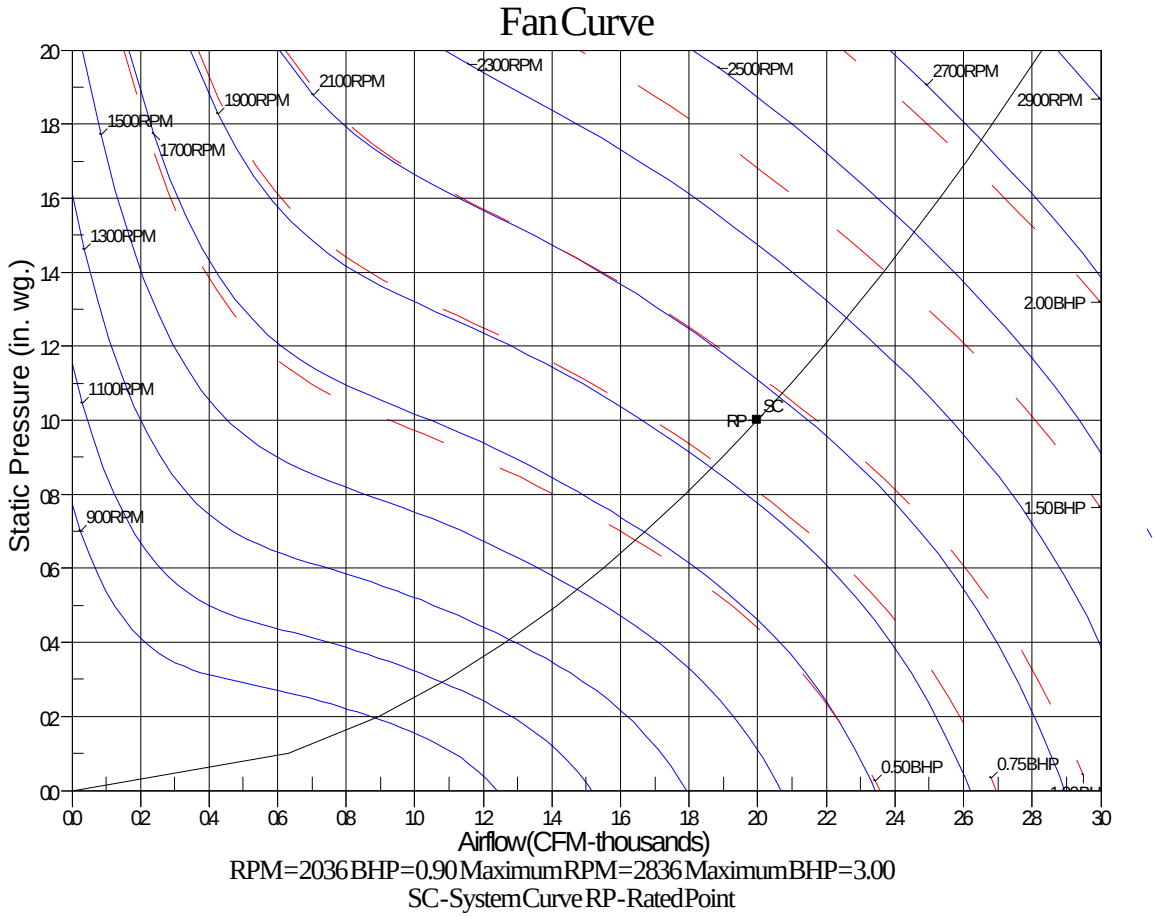
Legend

Performance Summary For Bldg A - AC 7,9

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



Bldg A - AC 1,2,3,4,5

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Bldg A - AC 1,2,3,4,5

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

Unit Parameters

Unit Model: **50FCQA04A2M6-3A0A0**
Unit Size: **04 (3 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Single Stage Compressor Models**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **2' 9.375"**
Total Operating Weight: 482 lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **2**
Return Air Filter Size: **16 x 25 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

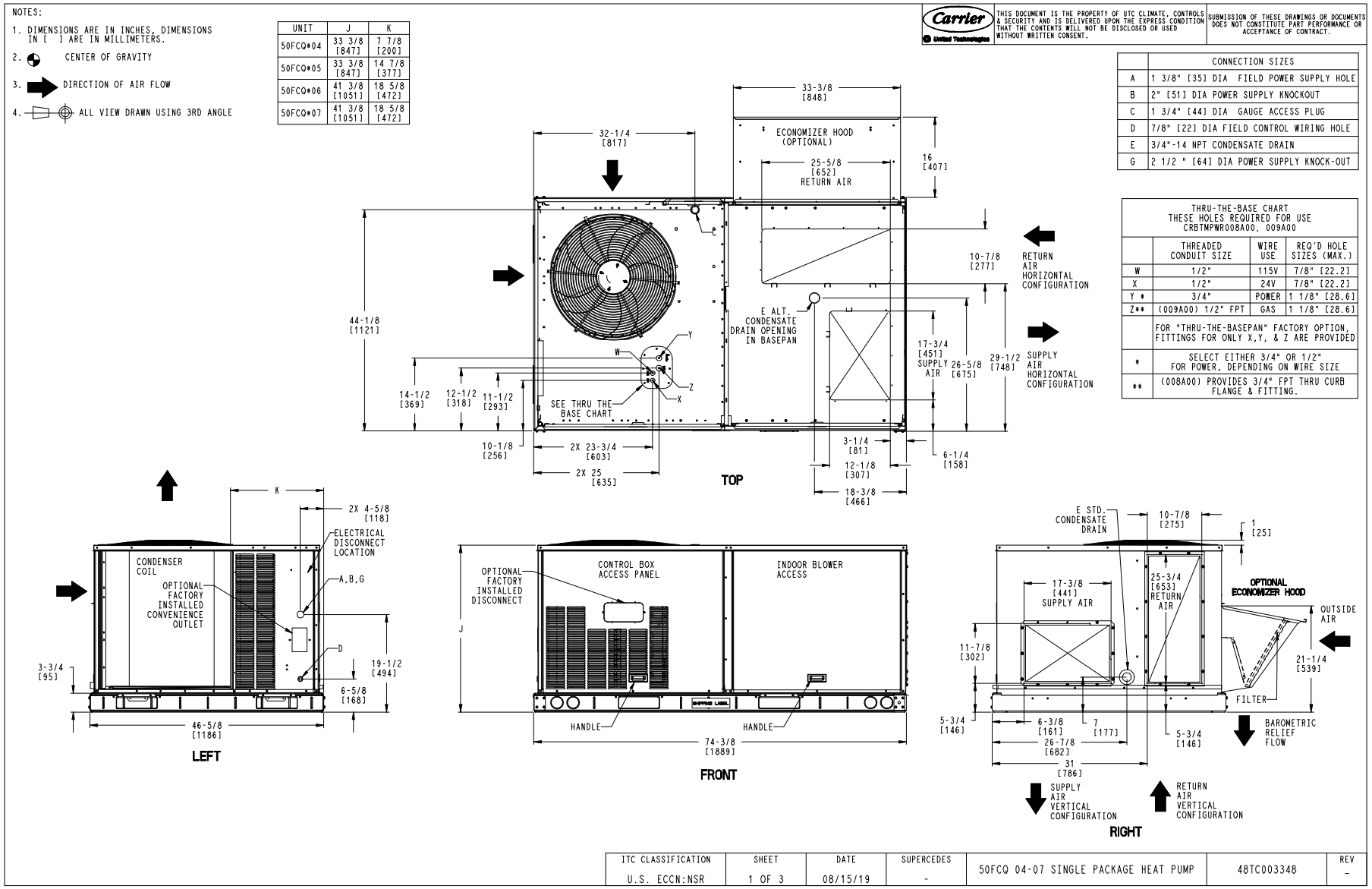
5-Year compressor parts (STD.)
1-Year parts (STD.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
50FCQA04A2M6-3A0A0	Rooftop Unit	5


NOTES:
1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE
UNIT J K
50FCQ*04 33 3/8 [847] 7 7/8 [200]
50FCQ*05 33 3/8 [847] 14 7/8 [377]
50FCQ*06 41 3/8 [1051] 18 5/8 [472]
50FCQ*07 41 3/8 [1051] 18 5/8 [472]
Carrier
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SUBMISSION OF THESE DRAWINGS OR DOCUMENTS DOES NOT CONSTITUTE PART PERFORMANCE OR ACCEPTANCE OF CONTRACT.
CONNECTION SIZES
A 1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B 2" [51] DIA POWER SUPPLY KNOCKOUT
C 1 3/4" [44] DIA GAUGE ACCESS PLUG
D 7/8" [22] DIA FIELD CONTROL WIRING HOLE
E 3/4"-14 NPT CONDENSATE DRAIN
G 2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT
THRU-THE-BASE CHART
THESE HOLES REQUIRED FOR USE CRBTMPWR008A00, 009A00
THREADED CONDUIT SIZE / WIRE USE / REQ'D HOLE SIZES (MAX.)
W 1/2" 115V 7/8" [22.2]
X 1/2" 24V 7/8" [22.2]
Y * 3/4" POWER 1 1/8" [28.6]
Z** (009A00) 1/2" FPT GAS 1 1/8" [28.6]
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X,Y, & Z ARE PROVIDED
* SELECT EITHER 3/4" OR 1/2" FOR POWER, DEPENDING ON WIRE SIZE
** (008A00) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.
33-3/8 [848]
ECONOMIZER HOOD (OPTIONAL)
32-1/4 [817]
25-5/8 [652] RETURN AIR
16 [407]
10-7/8 [277]
RETURN AIR HORIZONTAL CONFIGURATION
44-1/8 [1121]
E ALT. CONDENSATE DRAIN OPENING IN BASEPAN
17-3/4 [451] SUPPLY AIR
26-5/8 [675]
29-1/2 [748]
SUPPLY AIR HORIZONTAL CONFIGURATION
14-1/2 [369]
12-1/2 [318]
11-1/2 [293]
SEE THRU THE BASE CHART
10-1/8 [256]
2X 23-3/4 [603]
2X 25 [635]
3-1/4 [81]
12-1/8 [307]
18-3/8 [466]
6-1/4 [158]
TOP
K
2X 4-5/8 [118]
ELECTRICAL DISCONNECT LOCATION
CONDENSER COIL
OPTIONAL FACTORY INSTALLED CONVENIENCE OUTLET
A,B,G
D
3-3/4 [95]
19-1/2 [494]
6-5/8 [168]
46-5/8 [1186]
LEFT
OPTIONAL FACTORY INSTALLED DISCONNECT
CONTROL BOX ACCESS PANEL
INDOOR BLOWER ACCESS
J
HANDLE
HANDLE
74-3/8 [1889]
FRONT
E STD. CONDENSATE DRAIN
10-7/8 [275]
1 [25]
17-3/8 [441] SUPPLY AIR
25-3/4 [653] RETURN AIR
OPTIONAL ECONOMIZER HOOD
OUTSIDE AIR
11-7/8 [302]
21-1/4 [539]
FILTER
5-3/4 [146]
6-3/8 [161]
7 [177]
26-7/8 [682]
31 [786]
5-3/4 [146]
BAROMETRIC RELIEF FLOW
SUPPLY AIR VERTICAL CONFIGURATION
RETURN AIR VERTICAL CONFIGURATION
RIGHT
ITC CLASSIFICATION U.S. ECCN:NSR
SHEET 1 OF 3
DATE 08/15/19
SUPERCEDES -
50FCQ 04-07 SINGLE PACKAGE HEAT PUMP
48TC003348
REV -

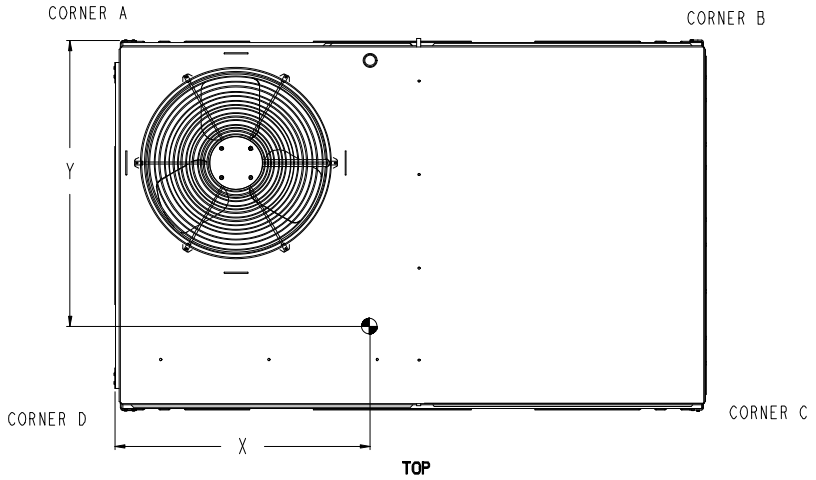
UNIT	STD. UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ*04	467	212	126	57	118	53	108	49	115	52	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*05	473	215	127	58	119	54	110	50	117	53	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*06	584	265	160	72	145	66	133	60	146	66	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]
50FCQ*07	589	267	161	73	146	66	134	61	147	67	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]

* STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.

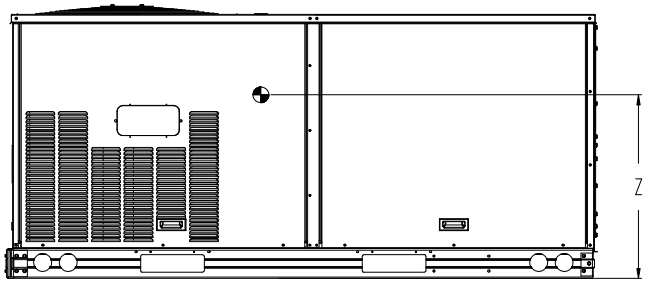
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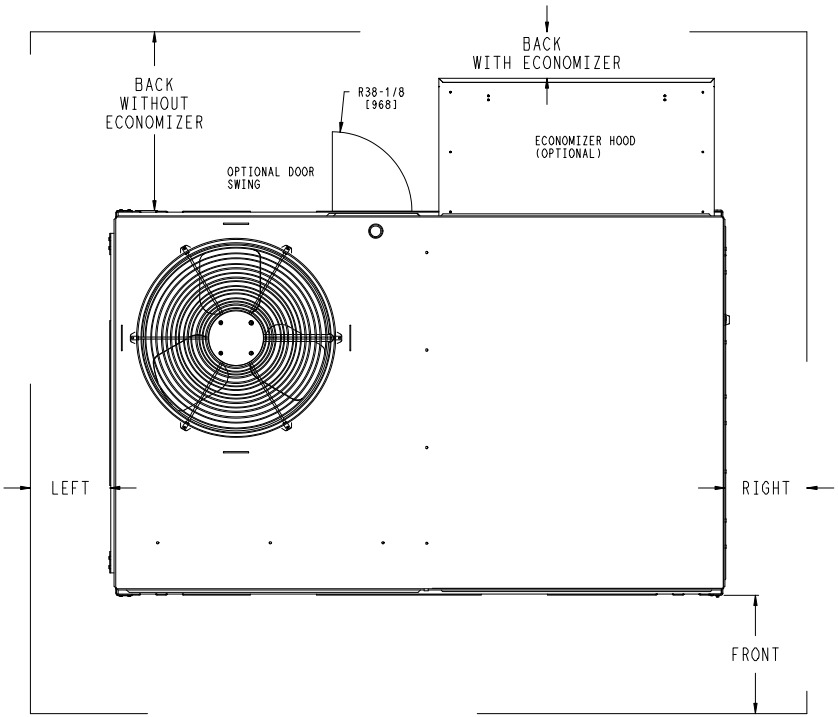
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TOP



FRONT



NOTE:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

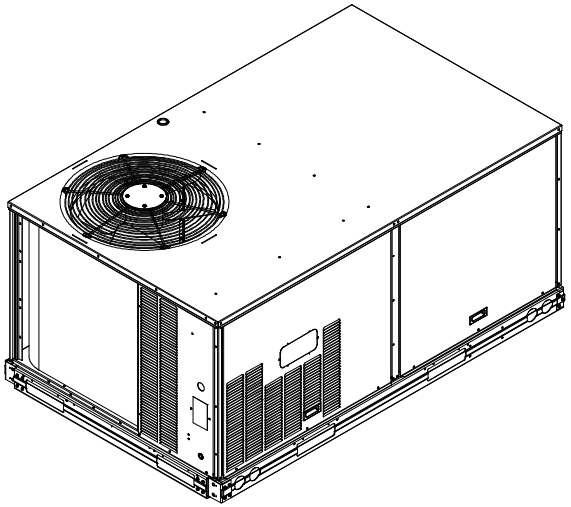
CLEARANCE			
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/ECON	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

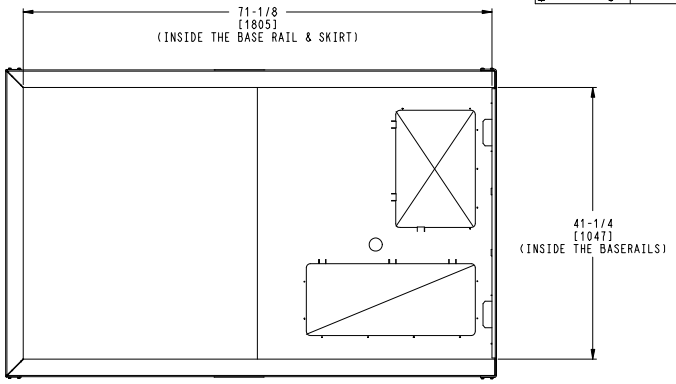
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

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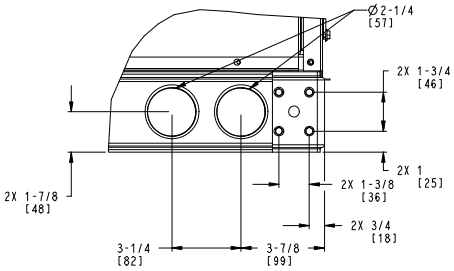
SUBMISSION OF THESE DRAWINGS OR DOCUMENTS DOES NOT CONSTITUTE PART PERFORMANCE OR ACCEPTANCE OF CONTRACT.



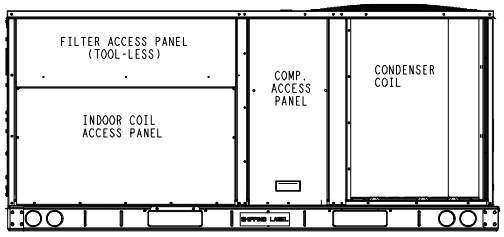


INSIDE BASERAIL DIMENSIONS

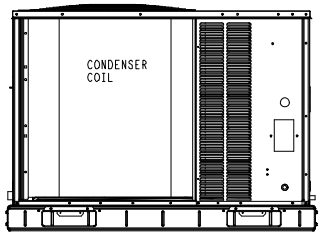
BOTTOM



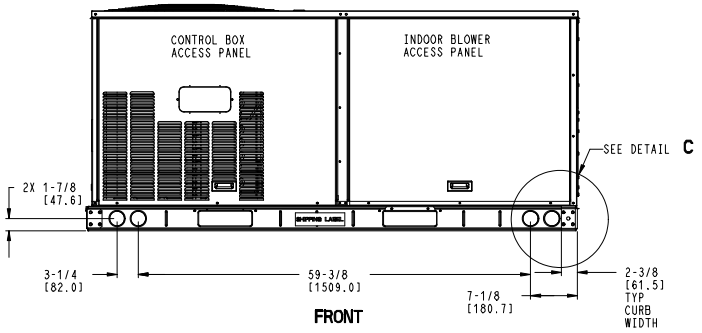
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

Part Number:50FCQA04A2M6-3A0A0

ARI SEER:	**14.30**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**33.4**	in

Operating Weight

Base Unit Weight:	**467**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**13**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**482**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**1200**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**58.4**	F
Evaporator Leaving Air WB:	**57.3**	F
Evaporator Leaving Air Enthalpy:	**24.59**	BTU/lb
Gross Cooling Capacity:	**36.98**	MBH
Gross Sensible Capacity:	**27.93**	MBH
Compressor Power Input:	**2.41**	kW
Coil Bypass Factor:	**0.101**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.3**	F
Total Heating Capacity:	**34.10**	MBH
Integrated Heating Capacity:	**34.10**	MBH
Heating Power Input:	**2.46**	kW
High Temperature COP:	**3.70**	
Low Temperature COP:	**2.25**	
HSPF:	**8.2**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**1946**	
Fan Power:	**0.54**	BHP
NOTE:	**Selected IFM RPM Range: 219 - 2190**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**	
Compressor #1 RLA:	**5.8**	
Compressor #1 LRA:	**38**	
Indoor Fan Motor Type:	**MED**	
Indoor Fan Motor Eff.:	**Null**	

Indoor Fan Motor FLA (Total): **1.2**
Power Supply MCA: **10**
Power Supply MOCP (Fuse or HACR): **15**
Disconnect Size FLA: **9**
Disconnect Size LRA: **42**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

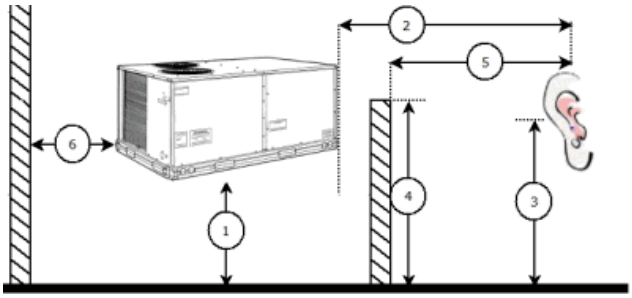
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	92.4	86.1	81.8
125 Hz	83.6	79.2	81.8
250 Hz	76.5	70.0	77.0
500 Hz	69.1	62.8	72.6
1000 Hz	66.5	64.1	69.9
2000 Hz	63.5	55.8	64.6
4000 Hz	59.4	50.0	59.3
8000 Hz	57.1	43.3	55.6
A-Weighted	74.6	69.3	75.4

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	81.8	81.8	77.0	72.6	69.9	64.6	59.3	55.6	85.9 Lw
B	55.6	65.7	68.4	69.4	69.9	65.8	60.3	54.5	75.4 LwA
C	49.4	49.4	44.6	40.2	37.5	32.2	26.9	23.2	53.5 Lp
D	23.2	33.3	36.0	37.0	37.5	33.4	27.9	22.1	43.0 LpA

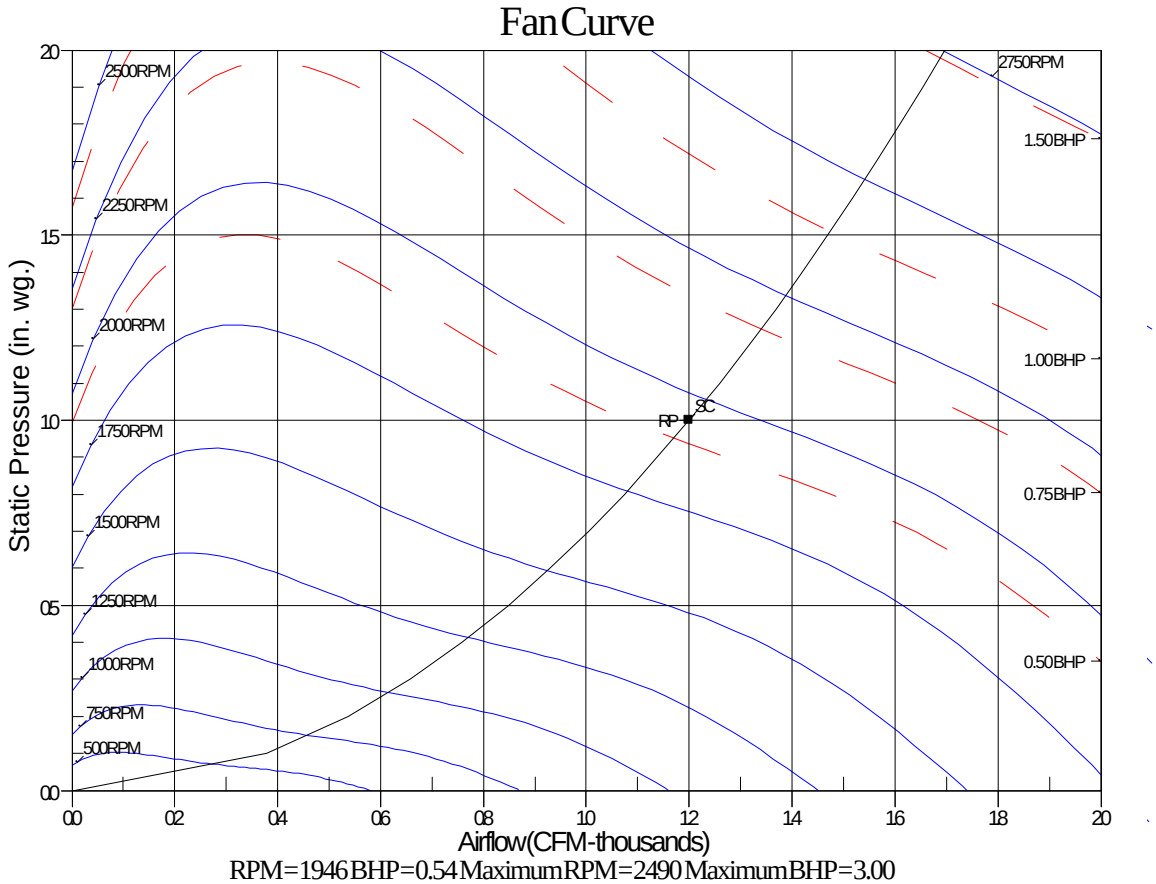
Legend

Performance Summary For Bldg A - AC 1,2,3,4,5

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



RPM=1946 BHP=0.54 Maximum RPM=2490 Maximum BHP=3.00
SC-System Curve RP-Rated Point

Bldg A - AC 6,8

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Bldg A - AC 6,8

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

Unit Parameters

Unit Model: **50FCQA05A2M6-3A0A0**
Unit Size: **05 (4 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Single Stage Compressor Models**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **2' 9.375"**
Total Operating Weight: **488** lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **2**
Return Air Filter Size: **16 x 25 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

5-Year compressor parts (STD.)
1-Year parts (STD.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
50FCQA05A2M6-3A0A0	Rooftop Unit	2

NOTES:

1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE

UNIT	J	K
50FCQ*04	33 3/8 [847]	7 7/8 [200]
50FCQ*05	33 3/8 [847]	14 7/8 [377]
50FCQ*06	41 3/8 [1051]	18 5/8 [472]
50FCQ*07	41 3/8 [1051]	18 5/8 [472]

Carrier United Technologies

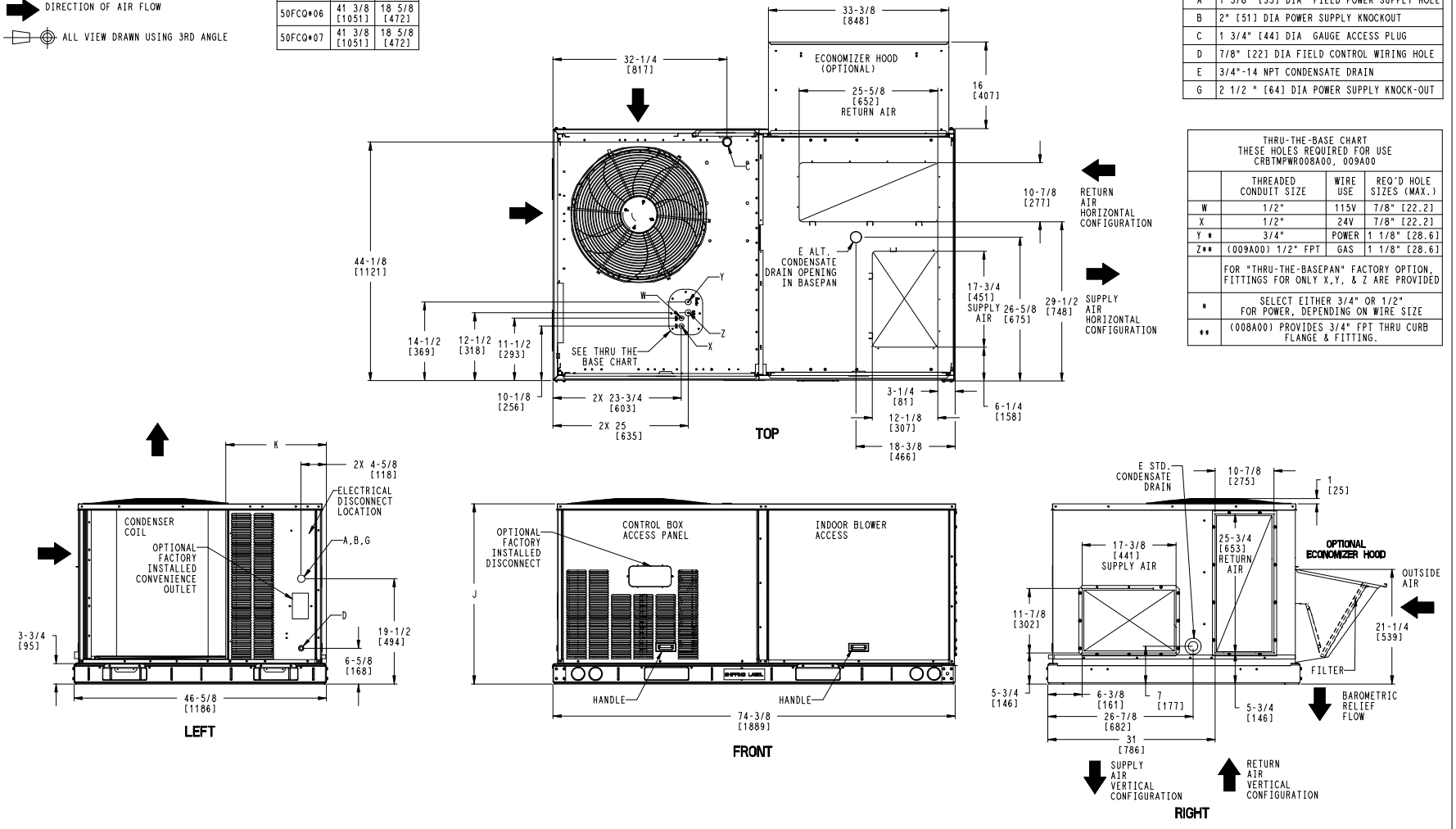
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	CONNECTION SIZES
A	1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B	2" [51] DIA POWER SUPPLY KNOCKOUT
C	1 3/4" [44] DIA GAUGE ACCESS PLUG
D	7/8" [22] DIA FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN
G	2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT

THRU-THE-BASE CHART
THESE HOLES REQUIRED FOR USE
CRBTMPWR008A00, 009A00

	THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
W	1/2"	115V	7/8" [22.2]
X	1/2"	24V	7/8" [22.2]
Y *	3/4"	POWER	1 1/8" [28.6]
Z**	(009A00) 1/2" FPT	GAS	1 1/8" [28.6]
	FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X,Y, & Z ARE PROVIDED		
*	SELECT EITHER 3/4" OR 1/2" FOR POWER, DEPENDING ON WIRE SIZE		
**	(008A00) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.		



ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	1 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

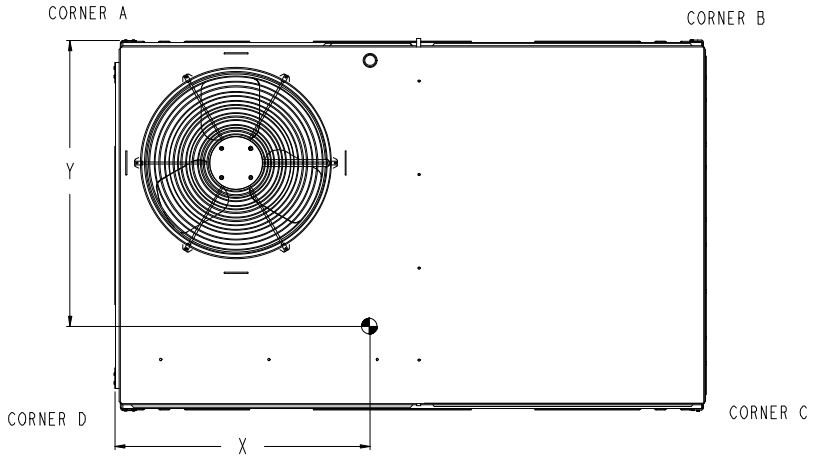
UNIT	STD. UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ*04	467	212	126	57	118	53	108	49	115	52	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*05	473	215	127	58	119	54	110	50	117	53	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*06	584	265	160	72	145	66	133	60	146	66	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]
50FCQ*07	589	267	161	73	146	66	134	61	147	67	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]

* STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.

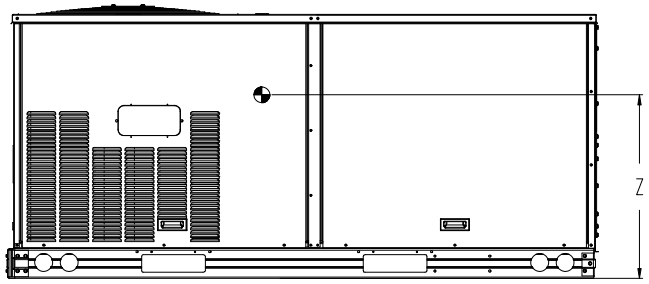
Carrier United Technologies

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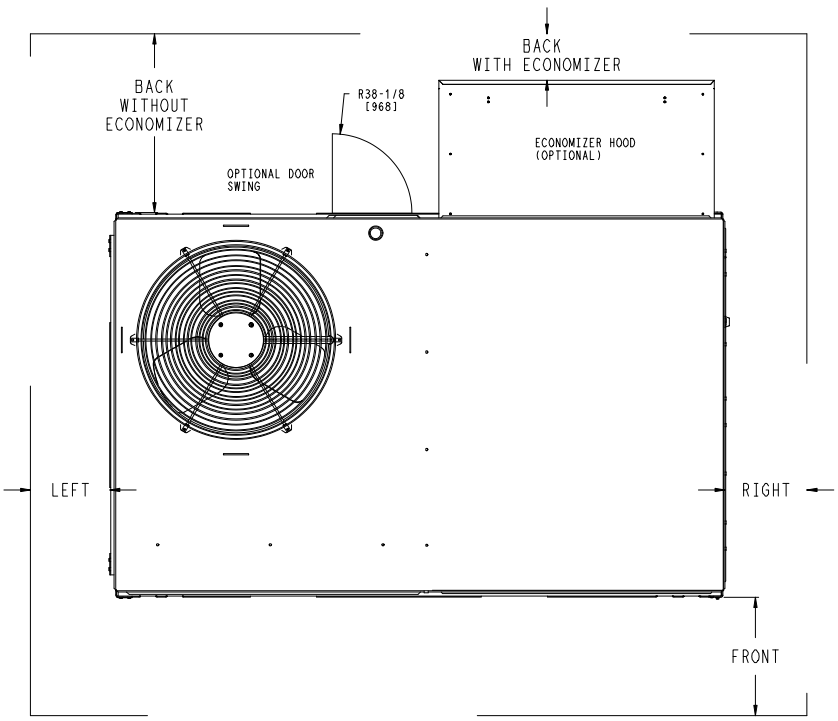
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TOP



FRONT



NOTE:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

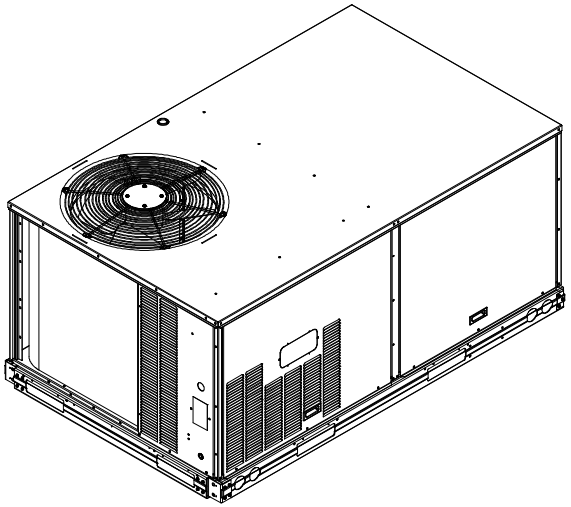
CLEARANCE			
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/ECON	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

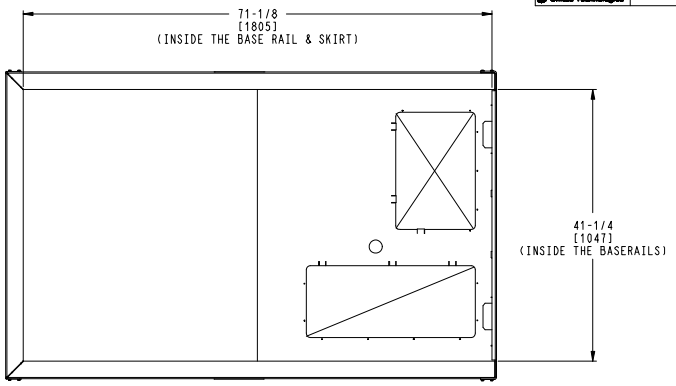
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

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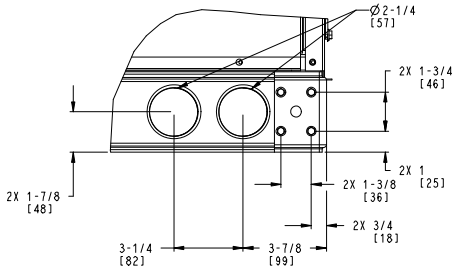
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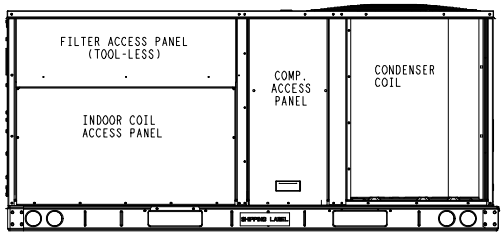


INSIDE BASERAIL DIMENSIONS

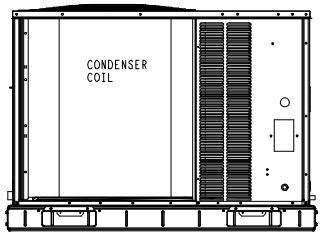
BOTTOM



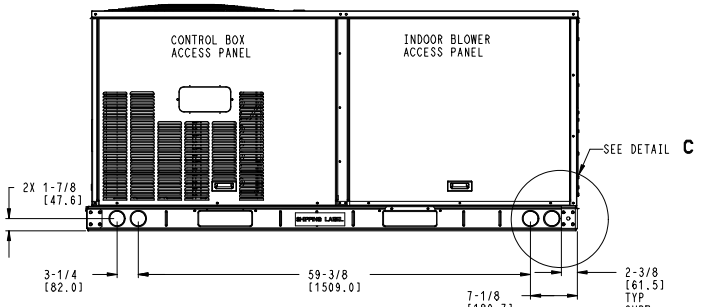
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

Part Number:50FCQA05A2M6-3A0A0

ARI SEER:	**14.30**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**33.4**	in

Operating Weight

Base Unit Weight:	**473**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**13**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**488**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**1600**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**58.1**	F
Evaporator Leaving Air WB:	**57.2**	F
Evaporator Leaving Air Enthalpy:	**24.50**	BTU/lb
Gross Cooling Capacity:	**49.92**	MBH
Gross Sensible Capacity:	**37.82**	MBH
Compressor Power Input:	**3.53**	kW
Coil Bypass Factor:	**0.109**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.7**	F
Total Heating Capacity:	**46.10**	MBH
Integrated Heating Capacity:	**46.10**	MBH
Heating Power Input:	**3.08**	kW
High Temperature COP:	**3.70**	
Low Temperature COP:	**2.28**	
HSPF:	**8.2**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**1958**	
Fan Power:	**0.81**	BHP
NOTE:	**Selected IFM RPM Range: 217 - 2170**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**	
Compressor #1 RLA:	**6.2**	
Compressor #1 LRA:	**41**	
Indoor Fan Motor Type:	**MED**	
Indoor Fan Motor Eff.:	**Null**	

Indoor Fan Motor FLA (Total): **1.7**
Power Supply MCA: **11**
Power Supply MOCP (Fuse or HACR): **15**
Disconnect Size FLA: **10**
Disconnect Size LRA: **45**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

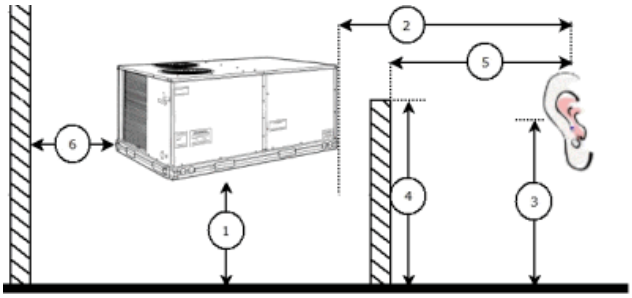
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	93.7	91.1	85.6
125 Hz	84.7	79.8	84.7
250 Hz	78.5	72.9	80.5
500 Hz	73.0	66.0	76.0
1000 Hz	69.8	67.8	72.4
2000 Hz	66.5	58.7	68.0
4000 Hz	63.5	52.9	62.8
8000 Hz	60.1	46.2	59.3
A-Weighted	77.1	72.4	79.0

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	85.6	84.7	80.5	76.0	72.4	68.0	62.8	59.3	89.2 Lw
B	59.4	68.6	71.9	72.8	72.4	69.2	63.8	58.2	78.5 LwA
C	53.2	52.3	48.1	43.6	40.0	35.6	30.4	26.9	56.8 Lp
D	27.0	36.2	39.5	40.4	40.0	36.8	31.4	25.8	46.1 LpA

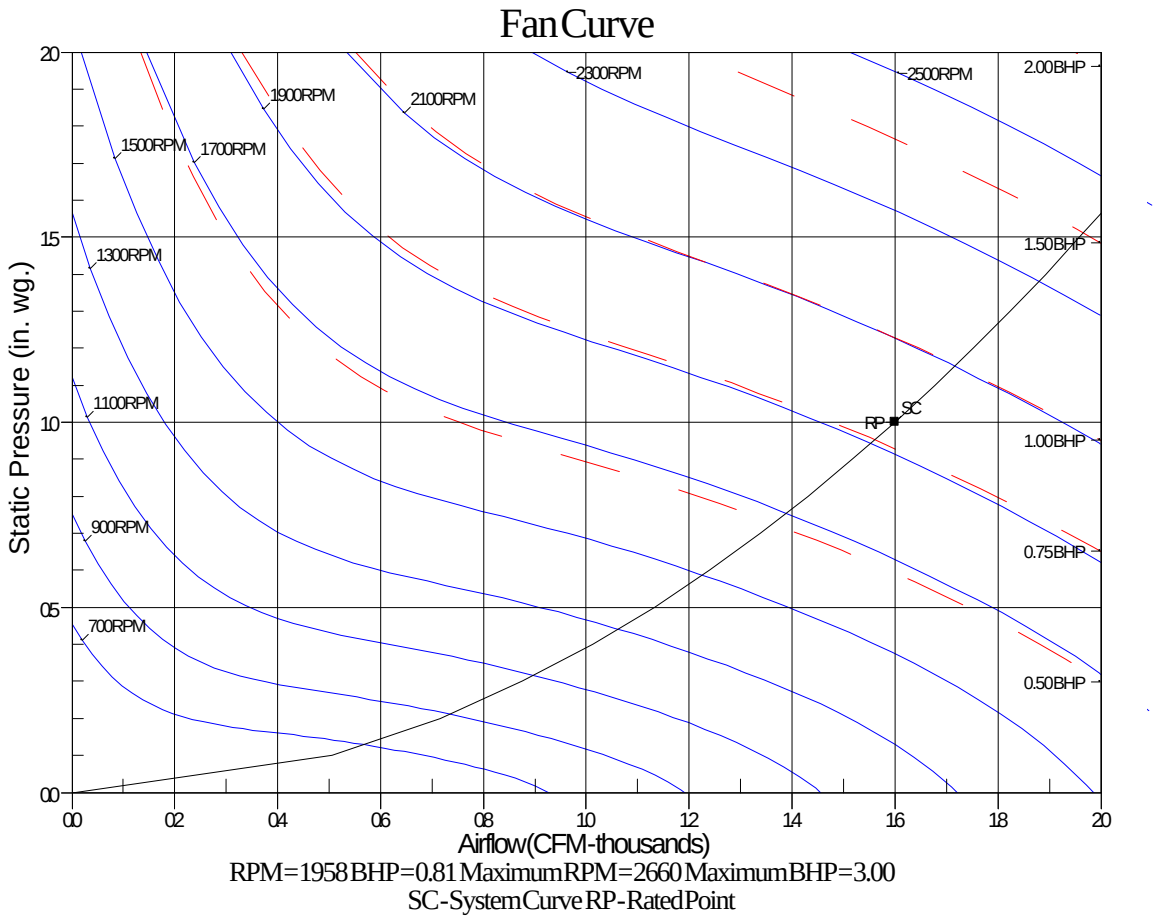
Legend

Performance Summary For Bldg A - AC 6,8

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



RPM=1958 BHP=0.81 Maximum RPM=2660 Maximum BHP=3.00
SC-System Curve RP-Rated Point

Bldg C - C1,2,3,4

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Parameters

Unit Model: **50FCQA05A2M6-3A0A0**
Unit Size: **05 (4 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Single Stage Compressor Models**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **2' 9.375"**
Total Operating Weight: **488** lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **2**
Return Air Filter Size: **16 x 25 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

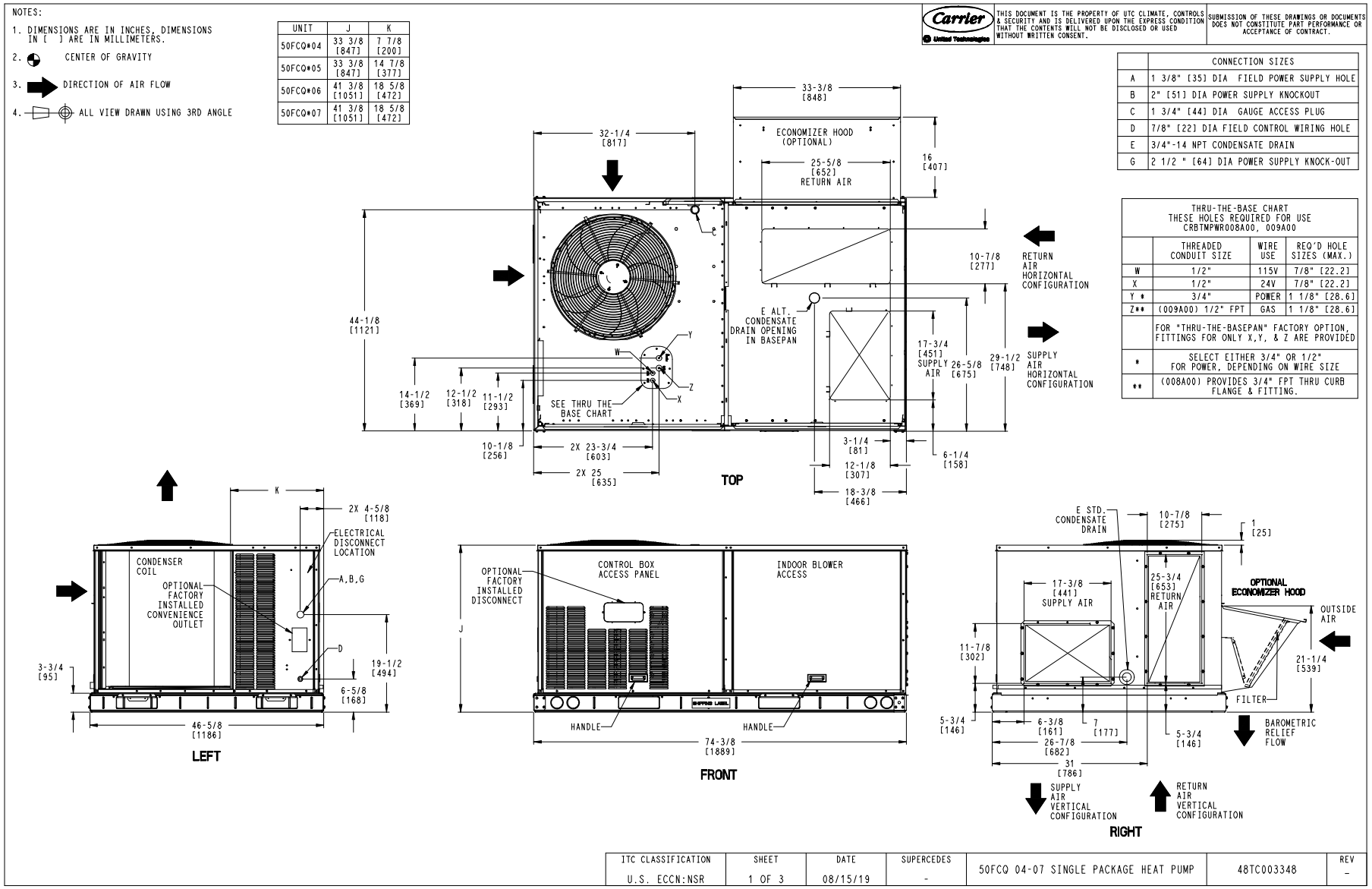
5-Year compressor parts (STD.)
1-Year parts (STD.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
50FCQA05A2M6-3A0A0	Rooftop Unit	4


NOTES:
1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE
UNIT J K
50FCQ*04 33 3/8 [847] 7 7/8 [200]
50FCQ*05 33 3/8 [847] 14 7/8 [377]
50FCQ*06 41 3/8 [1051] 18 5/8 [472]
50FCQ*07 41 3/8 [1051] 18 5/8 [472]
Carrier
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CONNECTION SIZES
A 1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B 2" [51] DIA POWER SUPPLY KNOCKOUT
C 1 3/4" [44] DIA GAUGE ACCESS PLUG
D 7/8" [22] DIA FIELD CONTROL WIRING HOLE
E 3/4"-14 NPT CONDENSATE DRAIN
G 2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT
THRU-THE-BASE CHART
THESE HOLES REQUIRED FOR USE CRBTMPWR008A00, 009A00
THREADED CONDUIT SIZE / WIRE USE / REQ'D HOLE SIZES (MAX.)
W 1/2" 115V 7/8" [22.2]
X 1/2" 24V 7/8" [22.2]
Y * 3/4" POWER 1 1/8" [28.6]
Z** (009A00) 1/2" FPT GAS 1 1/8" [28.6]
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X,Y, & Z ARE PROVIDED
* SELECT EITHER 3/4" OR 1/2" FOR POWER, DEPENDING ON WIRE SIZE
** (008A00) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.
33-3/8 [848]
ECONOMIZER HOOD (OPTIONAL)
32-1/4 [817]
25-5/8 [652] RETURN AIR
16 [407]
10-7/8 [277]
RETURN AIR HORIZONTAL CONFIGURATION
44-1/8 [1121]
E ALT. CONDENSATE DRAIN OPENING IN BASEPAN
17-3/4 [451] SUPPLY AIR
26-5/8 [675]
29-1/2 [748]
SUPPLY AIR HORIZONTAL CONFIGURATION
14-1/2 [369]
12-1/2 [318]
11-1/2 [293]
SEE THRU THE BASE CHART
10-1/8 [256]
2X 23-3/4 [603]
2X 25 [635]
3-1/4 [81]
12-1/8 [307]
18-3/8 [466]
6-1/4 [158]
TOP
K
2X 4-5/8 [118]
ELECTRICAL DISCONNECT LOCATION
CONDENSER COIL
OPTIONAL FACTORY INSTALLED CONVENIENCE OUTLET
A,B,G
D
3-3/4 [95]
19-1/2 [494]
6-5/8 [168]
46-5/8 [1186]
LEFT
OPTIONAL FACTORY INSTALLED DISCONNECT
CONTROL BOX ACCESS PANEL
INDOOR BLOWER ACCESS
J
HANDLE
HANDLE
74-3/8 [1889]
FRONT
E STD. CONDENSATE DRAIN
10-7/8 [275]
1 [25]
17-3/8 [441] SUPPLY AIR
25-3/4 [653] RETURN AIR
OPTIONAL ECONOMIZER HOOD
OUTSIDE AIR
11-7/8 [302]
21-1/4 [539]
FILTER
5-3/4 [146]
6-3/8 [161]
7 [177]
26-7/8 [682]
31 [786]
5-3/4 [146]
BAROMETRIC RELIEF FLOW
SUPPLY AIR VERTICAL CONFIGURATION
RETURN AIR VERTICAL CONFIGURATION
RIGHT
ITC CLASSIFICATION U.S. ECCN:NSR
SHEET 1 OF 3
DATE 08/15/19
SUPERCEDES -
50FCQ 04-07 SINGLE PACKAGE HEAT PUMP
48TC003348
REV -

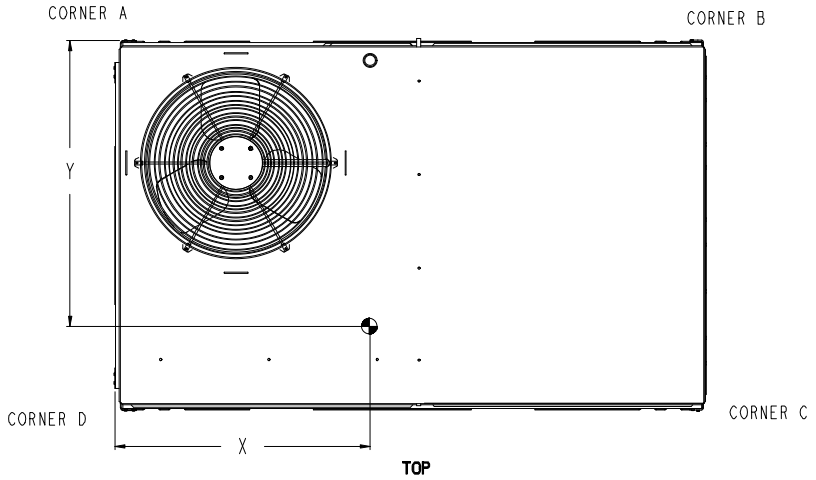
UNIT	STD. UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ*04	467	212	126	57	118	53	108	49	115	52	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*05	473	215	127	58	119	54	110	50	117	53	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*06	584	265	160	72	145	66	133	60	146	66	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]
50FCQ*07	589	267	161	73	146	66	134	61	147	67	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]

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FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.

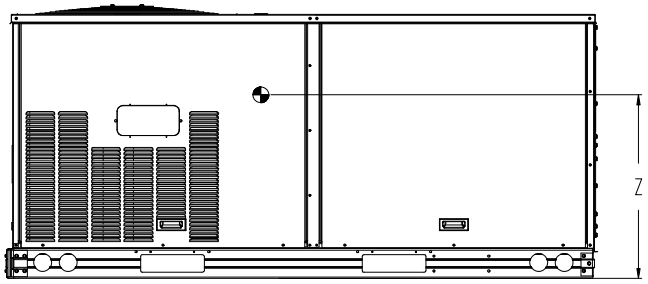
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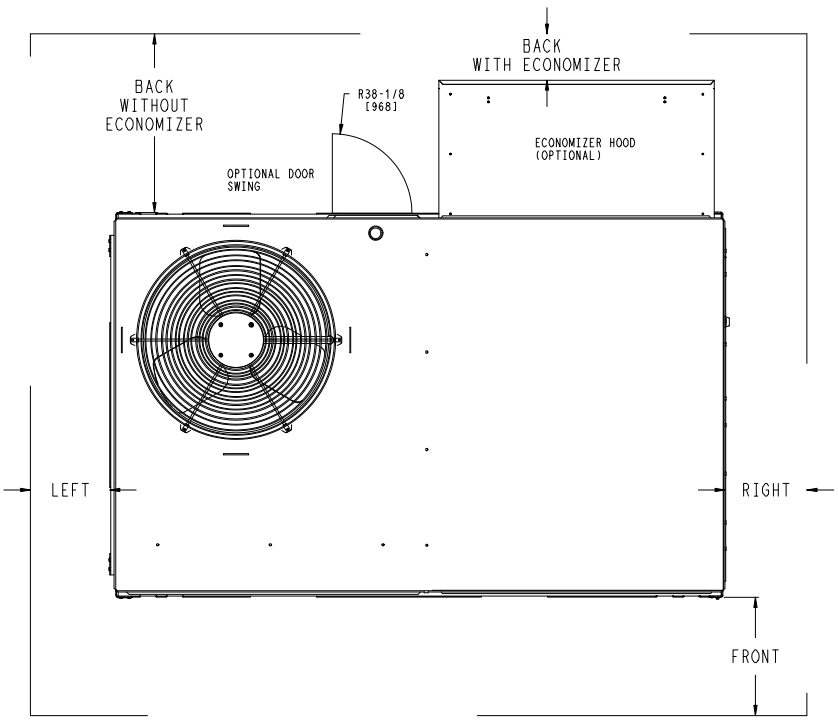
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TOP



FRONT



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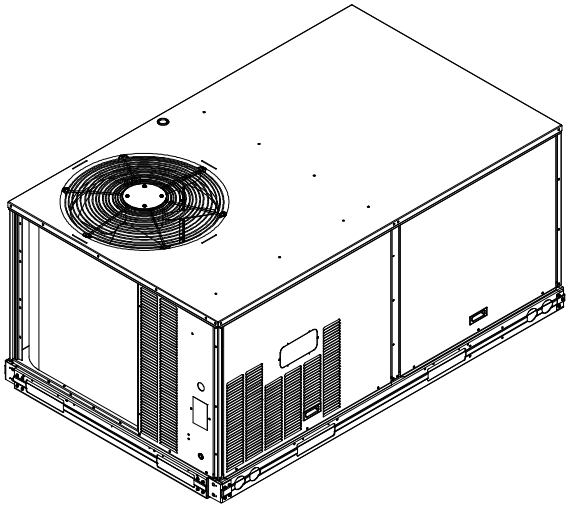
CLEARANCE			
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/ECON	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

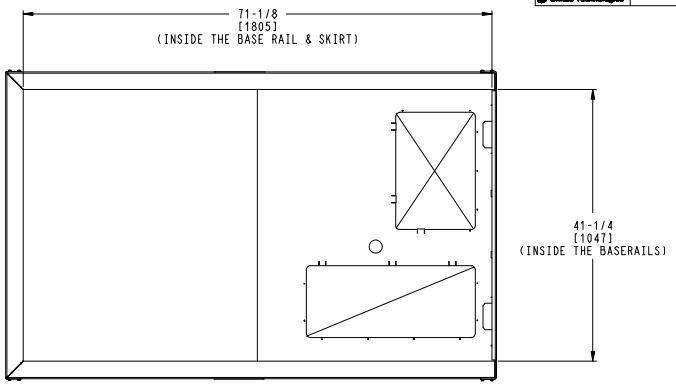
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

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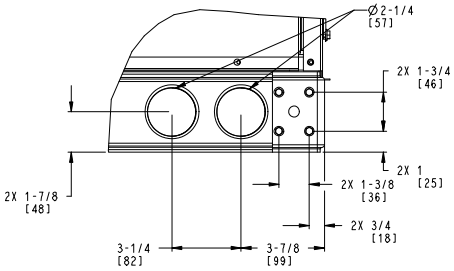
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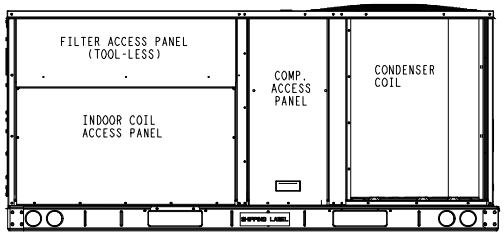


INSIDE BASERAIL DIMENSIONS

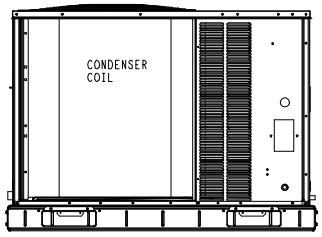
BOTTOM



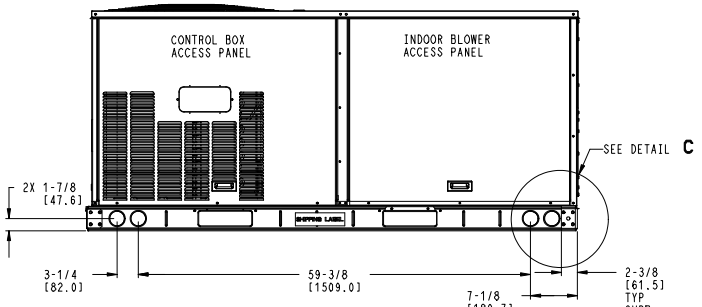
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

Part Number:50FCQA05A2M6-3A0A0

ARI SEER:	**14.30**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**33.4**	in

Operating Weight

Base Unit Weight:	**473**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**13**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**488**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**1600**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**58.1**	F
Evaporator Leaving Air WB:	**57.2**	F
Evaporator Leaving Air Enthalpy:	**24.50**	BTU/lb
Gross Cooling Capacity:	**49.92**	MBH
Gross Sensible Capacity:	**37.82**	MBH
Compressor Power Input:	**3.53**	kW
Coil Bypass Factor:	**0.109**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.7**	F
Total Heating Capacity:	**46.10**	MBH
Integrated Heating Capacity:	**46.10**	MBH
Heating Power Input:	**3.08**	kW
High Temperature COP:	**3.70**	
Low Temperature COP:	**2.28**	
HSPF:	**8.2**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**1958**	
Fan Power:	**0.81**	BHP
NOTE:	**Selected IFM RPM Range: 217 - 2170**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**	
Compressor #1 RLA:	**6.2**	
Compressor #1 LRA:	**41**	
Indoor Fan Motor Type:	**MED**	
Indoor Fan Motor Eff.:	**Null**	

Indoor Fan Motor FLA (Total): **1.7**
Power Supply MCA: **11**
Power Supply MOCP (Fuse or HACR): **15**
Disconnect Size FLA: **10**
Disconnect Size LRA: **45**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

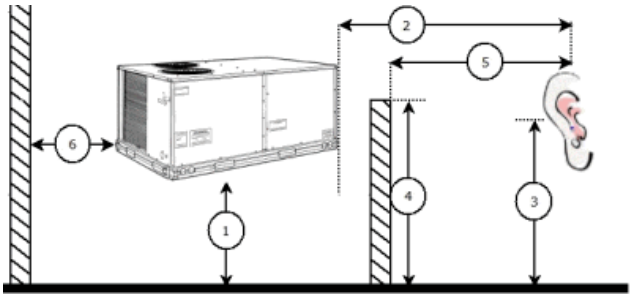
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	93.7	91.1	85.6
125 Hz	84.7	79.8	84.7
250 Hz	78.5	72.9	80.5
500 Hz	73.0	66.0	76.0
1000 Hz	69.8	67.8	72.4
2000 Hz	66.5	58.7	68.0
4000 Hz	63.5	52.9	62.8
8000 Hz	60.1	46.2	59.3
A-Weighted	77.1	72.4	79.0

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	85.6	84.7	80.5	76.0	72.4	68.0	62.8	59.3	89.2 Lw
B	59.4	68.6	71.9	72.8	72.4	69.2	63.8	58.2	78.5 LwA
C	53.2	52.3	48.1	43.6	40.0	35.6	30.4	26.9	56.8 Lp
D	27.0	36.2	39.5	40.4	40.0	36.8	31.4	25.8	46.1 LpA

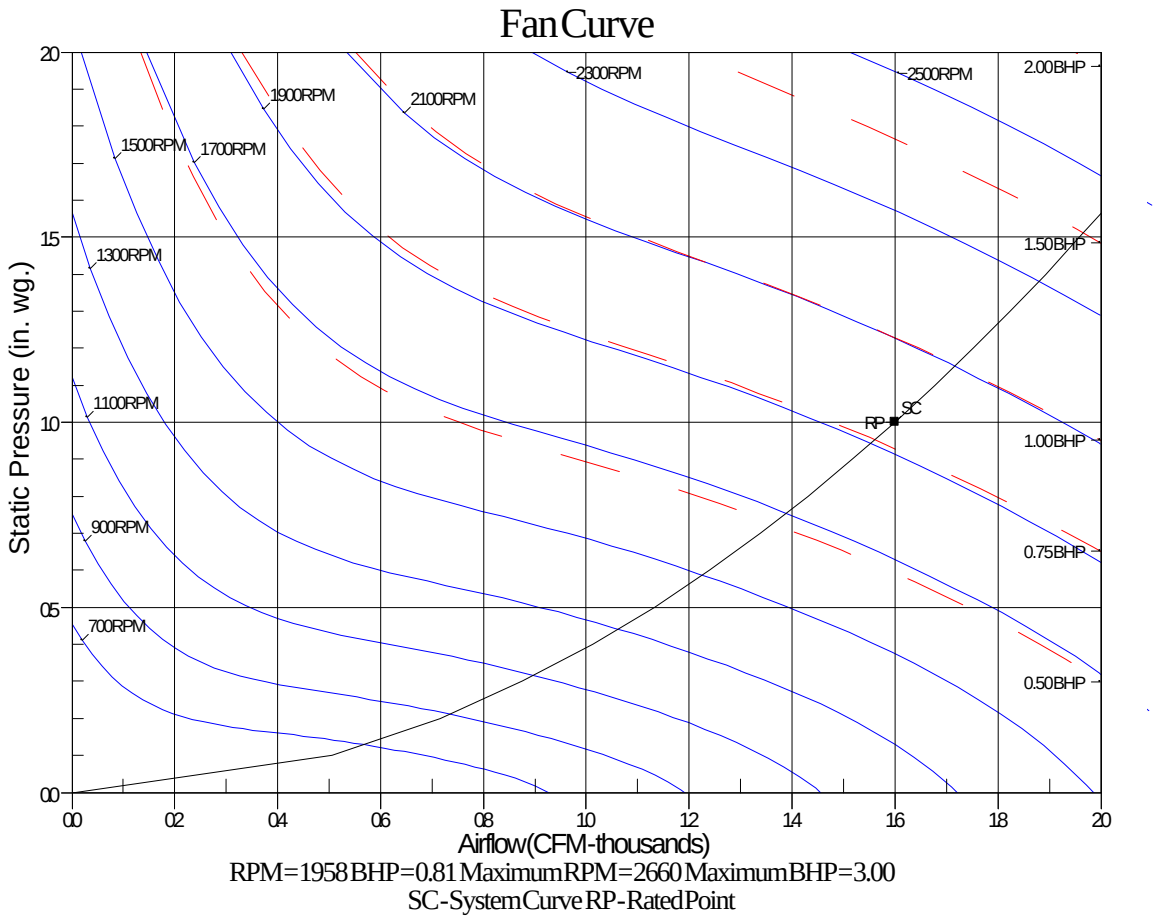
Legend

Performance Summary For Bldg C - C1,2,3,4

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



RPM=1958 BHP=0.81 Maximum RPM=2660 Maximum BHP=3.00
SC-System Curve RP-Rated Point

Bldg F - F3,5

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Bldg F - F3,5

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

Unit Parameters

Unit Model: **50FCQA06A2M6-3A0A0**
Unit Size: **06 (5 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Single Stage Compressor Models**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **3' 5.375"**
Total Operating Weight: 599 lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **4**
Return Air Filter Size: **16 x 16 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

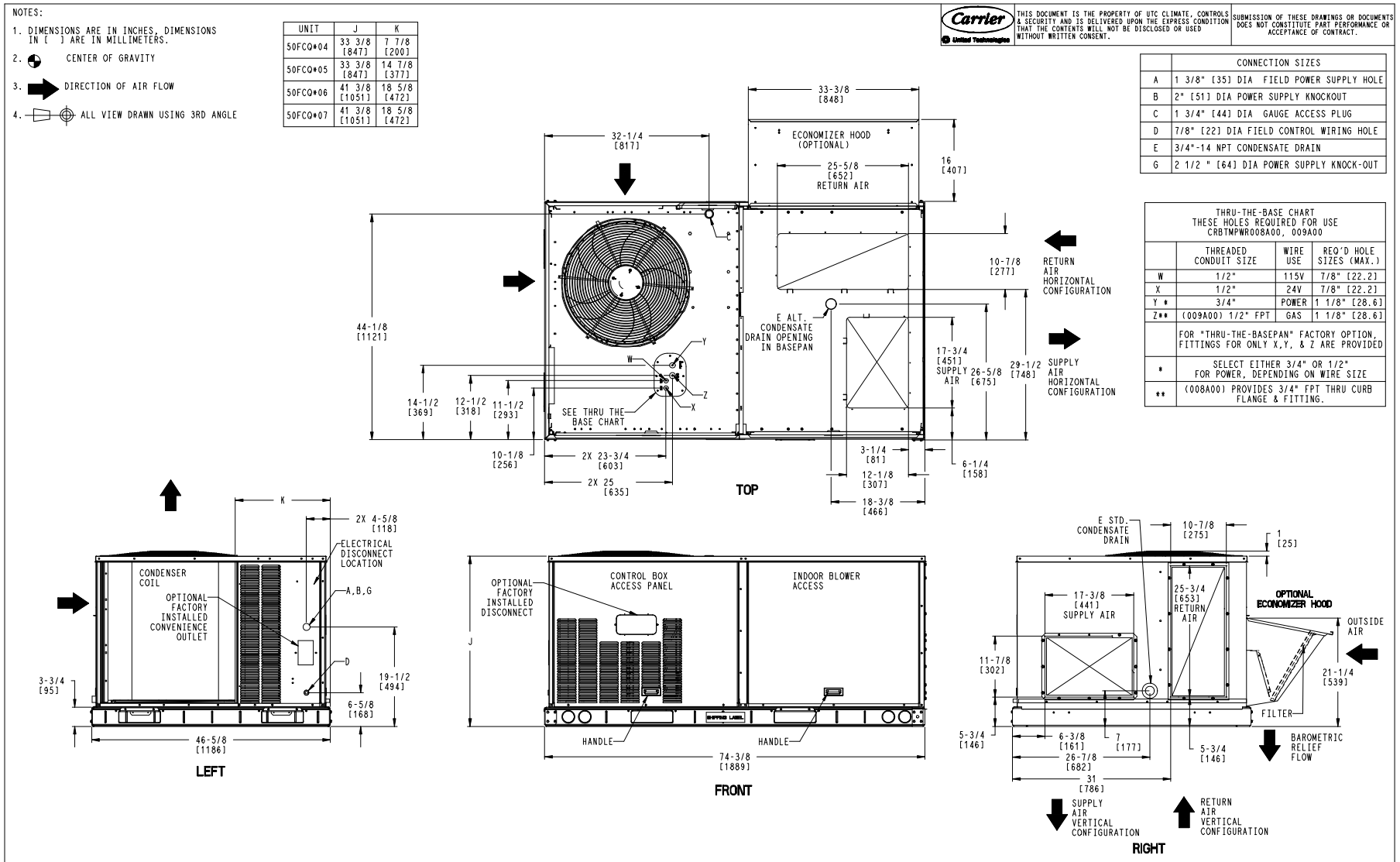
5-Year compressor parts (STD.)
1-Year parts (STD.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
50FCQA06A2M6-3A0A0	Rooftop Unit	2


NOTES:
1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE
UNIT | J | K
50FCQ*04 | 33 3/8 [847] | 7 7/8 [200]
50FCQ*05 | 33 3/8 [847] | 14 7/8 [377]
50FCQ*06 | 41 3/8 [1051] | 18 5/8 [472]
50FCQ*07 | 41 3/8 [1051] | 18 5/8 [472]
Carrier
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SUBMISSION OF THESE DRAWINGS OR DOCUMENTS DOES NOT CONSTITUTE PART PERFORMANCE OR ACCEPTANCE OF CONTRACT.
CONNECTION SIZES
A | 1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B | 2" [51] DIA POWER SUPPLY KNOCKOUT
C | 1 3/4" [44] DIA GAUGE ACCESS PLUG
D | 7/8" [22] DIA FIELD CONTROL WIRING HOLE
E | 3/4"-14 NPT CONDENSATE DRAIN
G | 2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT
THRU-THE-BASE CHART
THESE HOLES REQUIRED FOR USE CRBTMPWR008A00, 009A00
THREADED CONDUIT SIZE | WIRE USE | REQ'D HOLE SIZES (MAX.)
W | 1/2" | 115V | 7/8" [22.2]
X | 1/2" | 24V | 7/8" [22.2]
Y * | 3/4" | POWER | 1 1/8" [28.6]
Z** | (009A00) 1/2" FPT | GAS | 1 1/8" [28.6]
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X,Y, & Z ARE PROVIDED
* SELECT EITHER 3/4" OR 1/2" FOR POWER, DEPENDING ON WIRE SIZE
** (008A00) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.
33-3/8 [848]
32-1/4 [817]
ECONOMIZER HOOD (OPTIONAL)
25-5/8 [652] RETURN AIR
16 [407]
10-7/8 [277]
RETURN AIR HORIZONTAL CONFIGURATION
44-1/8 [1121]
E ALT. CONDENSATE DRAIN OPENING IN BASEPAN
17-3/4 [451] SUPPLY AIR
26-5/8 [675]
29-1/2 [748]
SUPPLY AIR HORIZONTAL CONFIGURATION
14-1/2 [369]
12-1/2 [318]
11-1/2 [293]
SEE THRU THE BASE CHART
10-1/8 [256]
2X 23-3/4 [603]
2X 25 [635]
3-1/4 [81]
12-1/8 [307]
18-3/8 [466]
6-1/4 [158]
TOP
K
2X 4-5/8 [118]
ELECTRICAL DISCONNECT LOCATION
CONDENSER COIL
OPTIONAL FACTORY INSTALLED CONVENIENCE OUTLET
A,B,G
D
3-3/4 [95]
19-1/2 [494]
6-5/8 [168]
46-5/8 [1186]
LEFT
OPTIONAL FACTORY INSTALLED DISCONNECT
CONTROL BOX ACCESS PANEL
INDOOR BLOWER ACCESS
J
HANDLE
HANDLE
74-3/8 [1889]
FRONT
E STD. CONDENSATE DRAIN
10-7/8 [275]
1 [25]
17-3/8 [441] SUPPLY AIR
25-3/4 [653] RETURN AIR
OPTIONAL ECONOMIZER HOOD
OUTSIDE AIR
11-7/8 [302]
21-1/4 [539]
FILTER
5-3/4 [146]
6-3/8 [161]
7 [177]
26-7/8 [682]
31 [786]
5-3/4 [146]
BAROMETRIC RELIEF FLOW
SUPPLY AIR VERTICAL CONFIGURATION
RETURN AIR VERTICAL CONFIGURATION
RIGHT
ITC CLASSIFICATION: U.S. ECCN:NSR
SHEET: 1 OF 3
DATE: 08/15/19
SUPERCEDES: -
50FCQ 04-07 SINGLE PACKAGE HEAT PUMP
48TC003348
REV: -

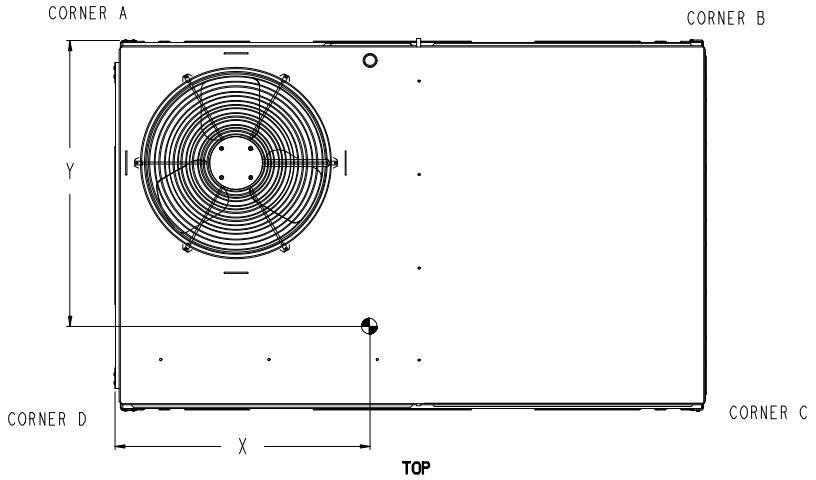
UNIT	STD. UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ*04	467	212	126	57	118	53	108	49	115	52	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*05	473	215	127	58	119	54	110	50	117	53	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*06	584	265	160	72	145	66	133	60	146	66	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]
50FCQ*07	589	267	161	73	146	66	134	61	147	67	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]

* STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.

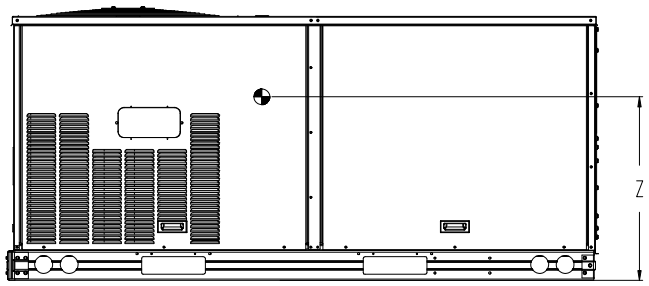
Carrier
United Technologies

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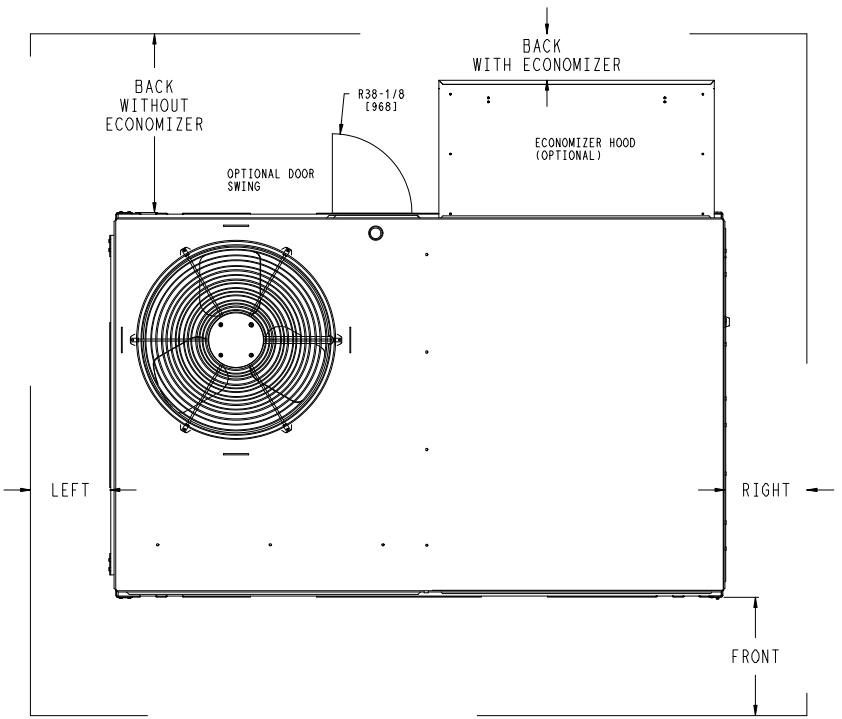
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TOP



FRONT



NOTE:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

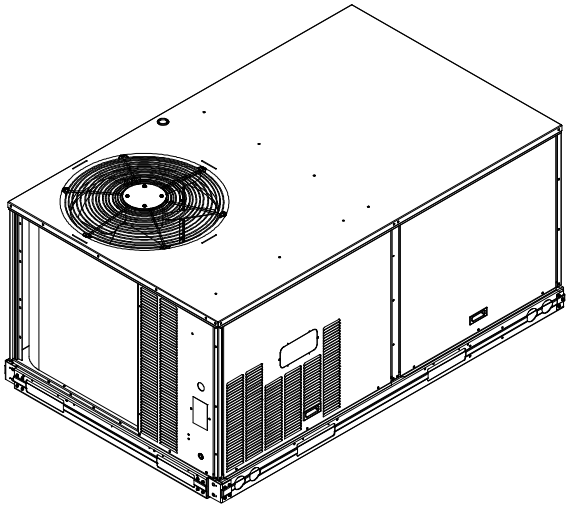
CLEARANCE			
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/ECON	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

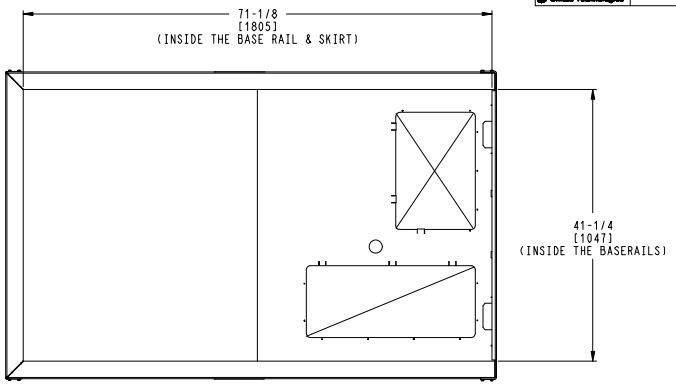
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

Carrier
United Technologies

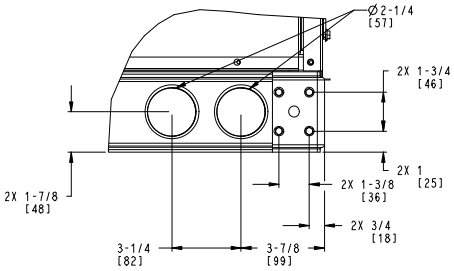
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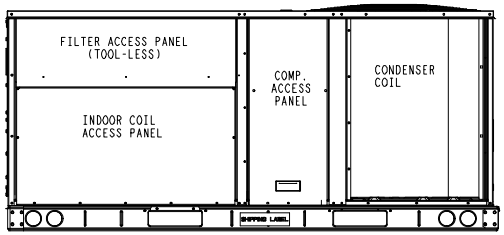




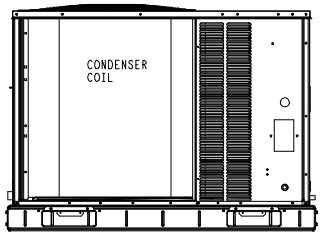
INSIDE BASERAIL DIMENSIONS
BOTTOM



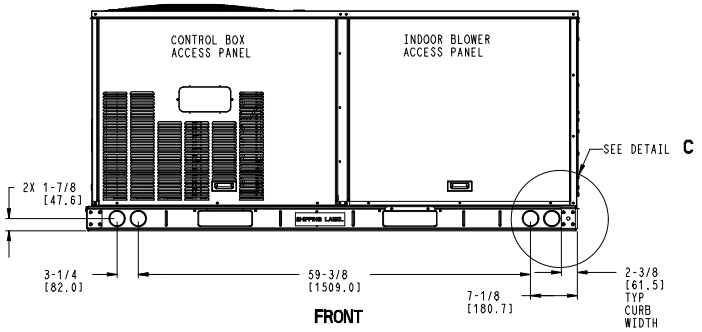
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

Part Number:50FCQA06A2M6-3A0A0

ARI SEER:	**14.30**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**41.4**	in

Operating Weight

Base Unit Weight:	**584**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**13**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**599**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**2000**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**57.3**	F
Evaporator Leaving Air WB:	**57.3**	F
Evaporator Leaving Air Enthalpy:	**24.56**	BTU/lb
Gross Cooling Capacity:	**61.90**	MBH
Gross Sensible Capacity:	**48.96**	MBH
Compressor Power Input:	**4.19**	kW
Coil Bypass Factor:	**0.027**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.3**	F
Total Heating Capacity:	**56.80**	MBH
Integrated Heating Capacity:	**56.80**	MBH
Heating Power Input:	**3.77**	kW
High Temperature COP:	**3.80**	
Low Temperature COP:	**2.30**	
HSPF:	**8.2**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**2036**	
Fan Power:	**0.90**	BHP
NOTE:	**Selected IFM RPM Range: 239 - 2390**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**	
Compressor #1 RLA:	**7.8**	
Compressor #1 LRA:	**52**	
Indoor Fan Motor Type:	**MED**	
Indoor Fan Motor Eff.:	**Null**	

Indoor Fan Motor FLA (Total): **2.1**
Power Supply MCA: **13**
Power Supply MOCP (Fuse or HACR): **20**
Disconnect Size FLA: **12**
Disconnect Size LRA: **57**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

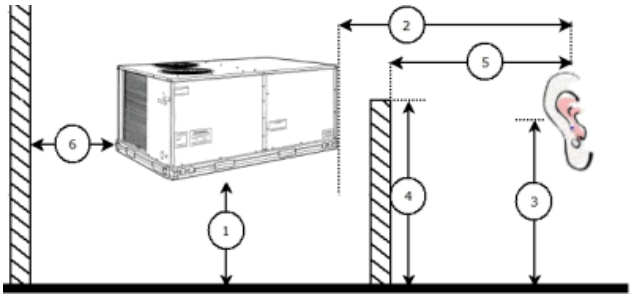
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	92.3	90.8	85.6
125 Hz	83.5	79.7	84.7
250 Hz	77.6	72.4	80.5
500 Hz	73.9	66.4	76.0
1000 Hz	70.7	68.5	72.4
2000 Hz	67.7	59.3	68.0
4000 Hz	64.3	53.1	62.8
8000 Hz	60.4	46.8	59.3
A-Weighted	77.2	72.6	79.0

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

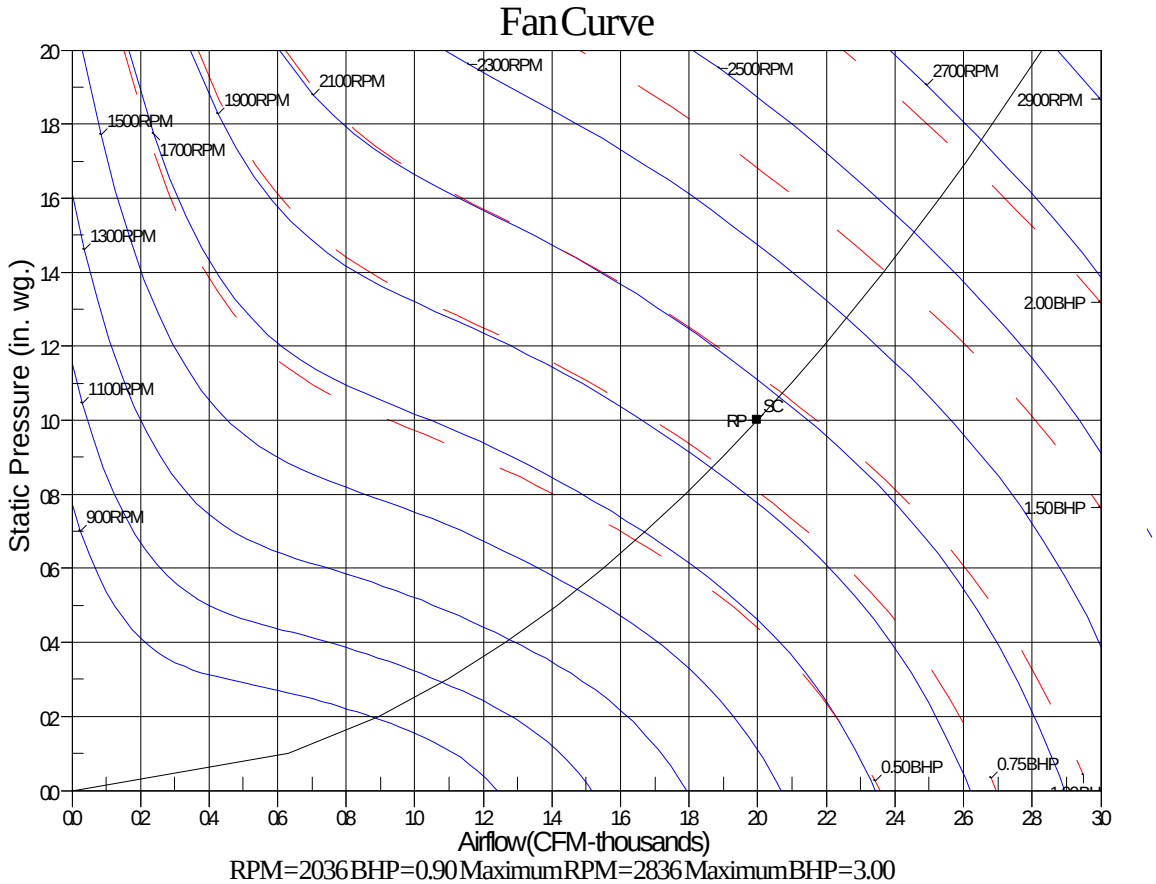
Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	85.6	84.7	80.5	76.0	72.4	68.0	62.8	59.3	89.2 Lw
B	59.4	68.6	71.9	72.8	72.4	69.2	63.8	58.2	78.5 LwA
C	53.2	52.3	48.1	43.6	40.0	35.6	30.4	26.9	56.8 Lp
D	27.0	36.2	39.5	40.4	40.0	36.8	31.4	25.8	46.1 LpA

Legend

A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



RPM=2036 BHP=0.90 Maximum RPM=2836 Maximum BHP=3.00
SC-System Curve RP-Rated Point

Bldg F - F-4

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Bldg F - F-4

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

Unit Parameters

Unit Model: **50FCQM08A2M6-3A0A0**
Unit Size: **08 (7.5 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Two-Stage Cooling / One Circuitl**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **7' 4.125"**
Unit Width: **4' 11.5"**
Unit Height: **4' 1.375"**

*** Weights and Dimensions are approximate. Weight does not include roof curbs, unit packaging, field installed accessories or factory installed options. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Base Unit Weight (Does not include any accessories):
805 lb

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **4**
Return Air Filter Size: **20 x 20 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Standard/Medium Static (EcoBlue)
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controller
Standard Packaging

Warranty Information

1-Year parts (STD.)
5-Year Compressor (std.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
50FCQM08A2M6-3A0A0	Rooftop Unit	1

NOTES:

1. DIMENSIONS ARE IN INCHES. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE

UNIT	OUTDOOR COIL TYPE	J	K	H
50FCQ-08	RTPF	49 3/8 [1253]	36 3/8 [925]	15 7/8 [403]
50FCQ-09	RTPF	49 3/8 [1253]	36 3/8 [925]	15 7/8 [403]

RTPF - ROUND TUBE, PLATE FIN (COPPER/ALUM)

Carrier

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	CONNECTION SIZES
A	1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B	2 1/2" [64] DIA POWER SUPPLY KNOCKOUT
C	1 3/4" [51] DIA GAUGE ACCESS PLUG
D	7/8" [22] DIA FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN
G	2 " [51] DIA POWER SUPPLY KNOCK-OUT

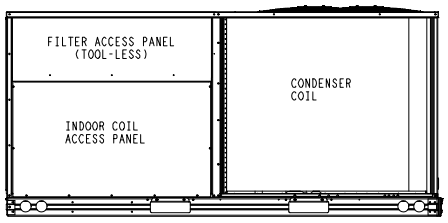
THRU-THE-BASE CHART (FIELD INST)

THESE HOLES REQUIRED FOR USE WITH ACCY KITS: CRBTMPWR002A01

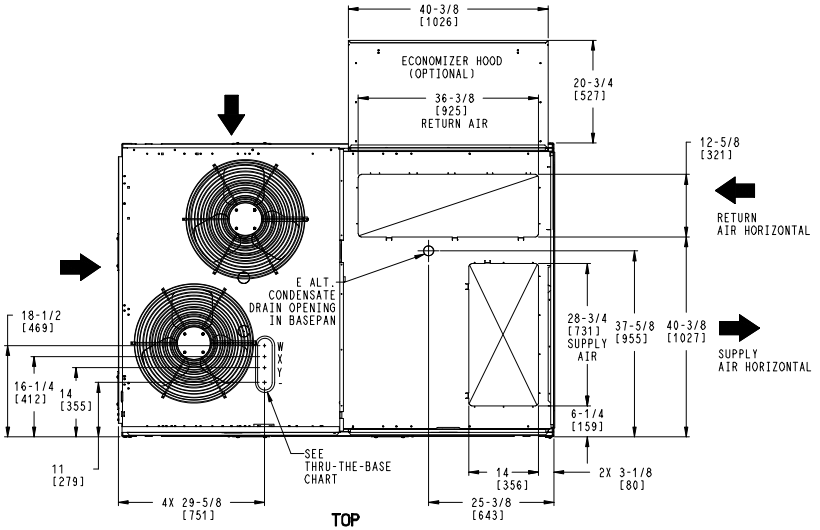
	THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
W	1/2"	ACC.	7/8" [22.2]
X	1/2"	24V	7/8" [22.2]
Y	1 1/4" (002)	POWER	1 3/4" [44.4]

THRU-THE-BASE CHART (FIOP)

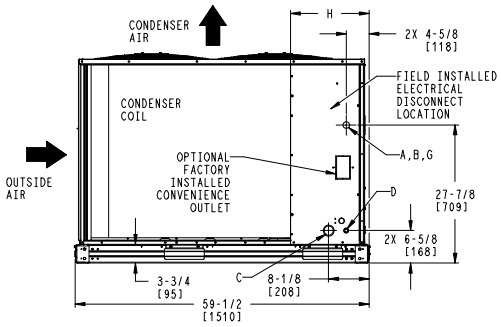
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X & Y ARE PROVIDED: (1) 1/2" & (1) 1 1/4" ELECTRICAL FITTINGS.



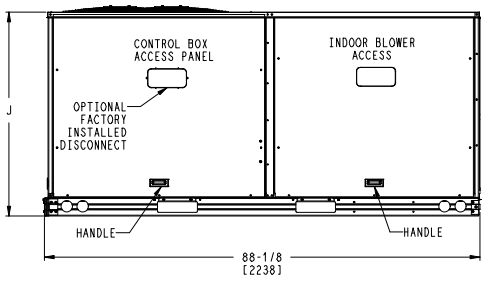
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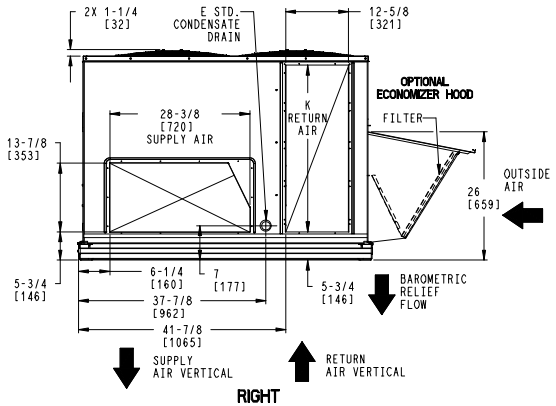
TOP



LEFT



FRONT

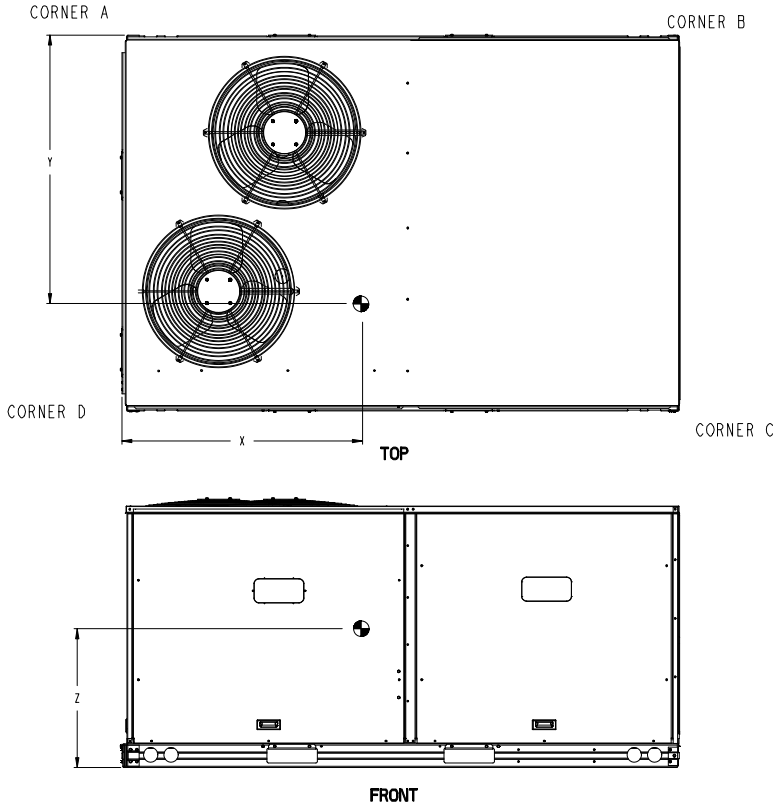


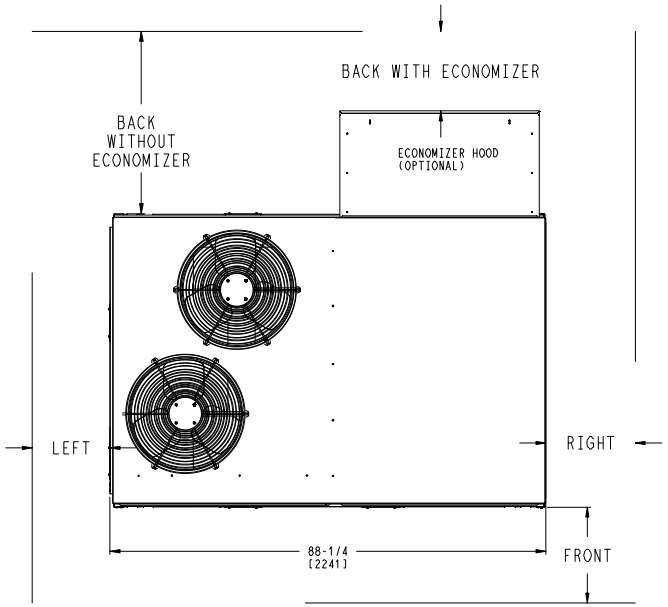
RIGHT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES		REV
U.S. ECCN:NSR	1 OF 3	04/01/22	-	50FCQ 08,09 SINGLE ZONE ELECTRICAL HEAT PUMP	48TM009023	-

UNIT	OUTDOOR COIL TYPE	STD. UNIT WEIGHT ***		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		
		LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ-08	RTPF	805	365	163	74	209	95	243	110	190	86	49 1/2 [1257]	32 [813]	19 1/8 [486]
50FCQ-09	RTPF	812	368	164	75	211	96	245	111	191	87	49 1/2 [1257]	32 [813]	19 1/8 [486]
RTPF - ROUND TUBE, PLATE FIN (COPPER/ALUM)														

*** STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.





NOTE:

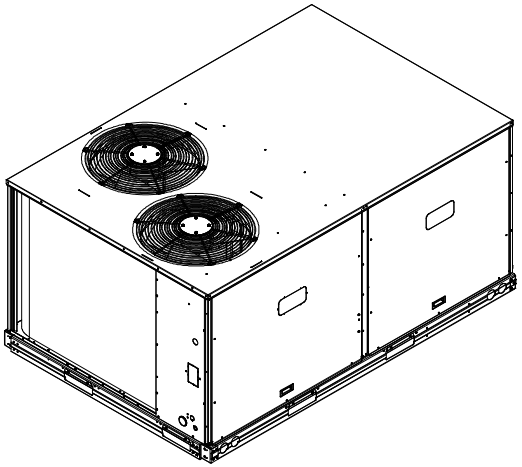
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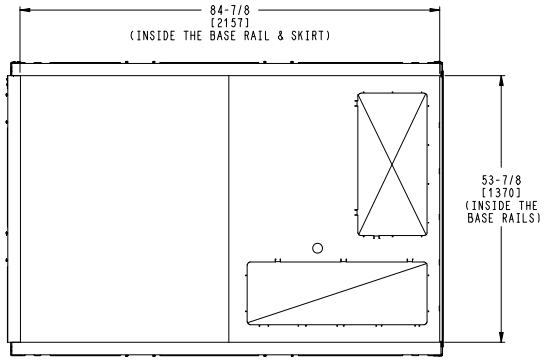
CLEARANCE		
	SERVICE WITH:	SERVICE WITH:
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER
FRONT	48 [1219mm]	36 [914mm]
LEFT	48 [1219mm]	42 [1067mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]
BACK W/ECON	36 [914mm]	36 [914mm]
RIGHT	36 [914mm]	36 [914mm]
TOP	72 [1829mm]	72 [1829mm]

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ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
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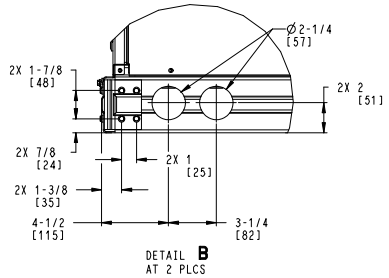
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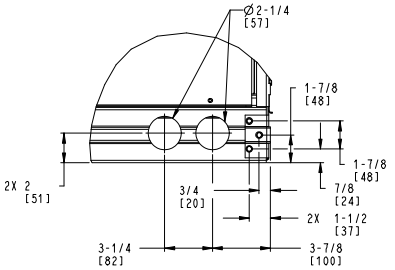


INSIDE BASERAIL DIMENSIONS

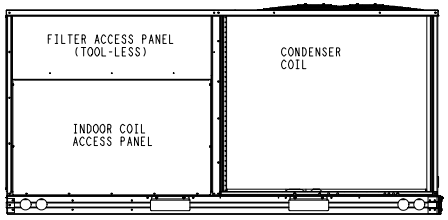
BOTTOM



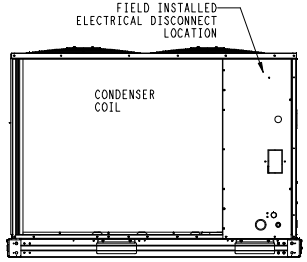
DETAIL **B**
AT 2 PLCS



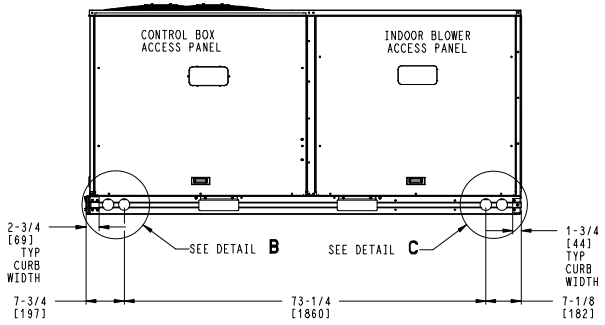
DETAIL **C**
AT 2 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	04/01/22	-	50FCQ 08,09 SINGLE ZONE ELECTRICAL HEAT PUMP	48TM009023	-

Part Number:50FCQM08A2M6-3A0A0

ARI EER:	**11.20**	
IEER:	**15.0**	

Base Unit Dimensions

Unit Length:	**88.1**	in
Unit Width:	**59.5**	in
Unit Height:	**49.4**	in
Base Unit Weight (Does not include any accessories):	**805**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**3000**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**59.4**	F
Evaporator Leaving Air WB:	**57.7**	F
Evaporator Leaving Air Enthalpy:	**24.81**	BTU/lb
Gross Cooling Capacity:	**89.50**	MBH
Gross Sensible Capacity:	**66.85**	MBH
Compressor Power Input:	**6.44**	kW
Coil Bypass Factor:	**0.065**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.4**	F
Total Heating Capacity:	**85.60**	MBH
Integrated Heating Capacity:	**85.60**	MBH
Heating Power Input:	**6.77**	kW
High Temperature COP:	**3.40**	
Low Temperature COP:	**2.30**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**1528**	
Fan Power:	**1.28**	BHP
NOTE:	**Selected IFM RPM Range: 920 - 2000**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**
Compressor #1 RLA:	**6.1**
Compressor #1 LRA:	**41**
Compressor #2 RLA:	**6.1**
Compressor #2 LRA:	**41**
Indoor Fan Motor Type:	**MED**
Indoor Fan Motor FLA (Total):	**3**
Power Supply MCA:	**19**
Power Supply MOCP (Fuse or HACR):	**20**
Disconnect Size FLA:	**19**

Disconnect Size LRA: **90**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **2 / 0.8**

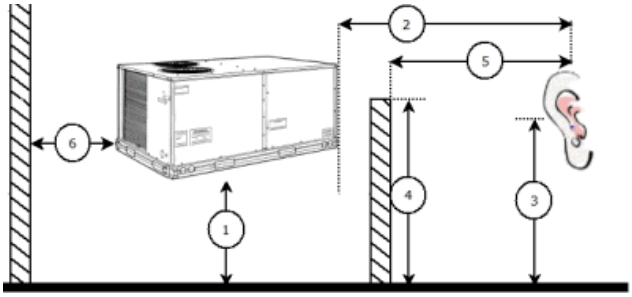
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	87.2	83.1	89.7
125 Hz	82.9	76.8	81.5
250 Hz	75.6	70.5	80.5
500 Hz	72.7	65.1	79.2
1000 Hz	73.7	65.3	77.1
2000 Hz	69.4	59.0	73.2
4000 Hz	64.8	52.2	70.2
8000 Hz	55.8	47.0	67.4
A-Weighted	77.7	69.7	82.0

Advanced Acoustics



Advanced Accoustics Parameters

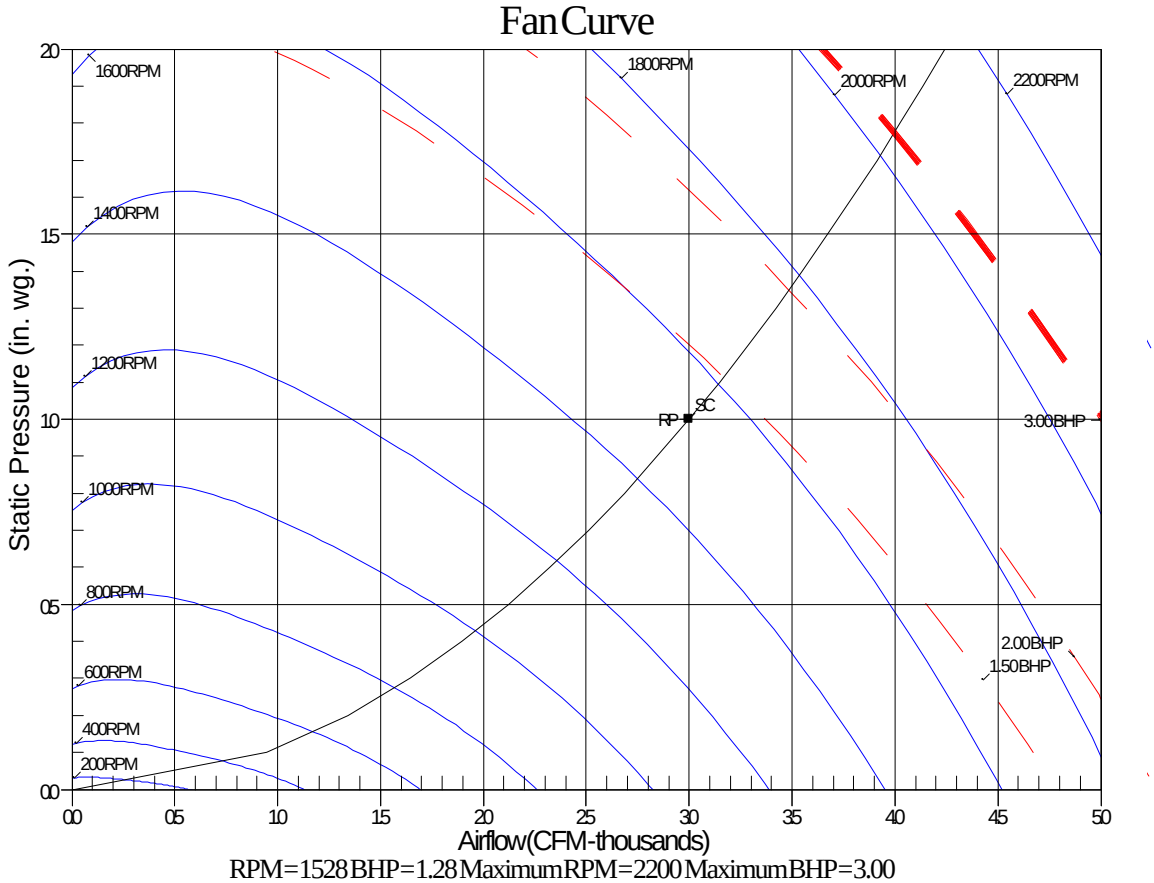
1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	89.7	81.5	80.5	79.2	77.1	73.2	70.2	67.4	91.3 Lw
B	63.5	65.4	71.9	76.0	77.1	74.4	71.2	66.3	82.0 LwA
C	57.3	49.1	48.1	46.8	44.7	40.8	37.8	35.0	58.9 Lp
D	31.1	33.0	39.5	43.6	44.7	42.0	38.8	33.9	49.6 LpA

Legend
A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



RPM=1528 BHP=1.28 Maximum RPM=2200 Maximum BHP=3.00
SC-System Curve RP-Rated Point

Bldg F - F1,2

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Parameters

Unit Model: **50FCQM12A2M6-3A0A0**
Unit Size: **12 (10 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Two-Stage Cooling / One Circuitl**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **7' 4.125"**
Unit Width: **4' 11.5"**
Unit Height: **4' 1.375"**

*** Weights and Dimensions are approximate. Weight does not include roof curbs, unit packaging, field installed accessories or factory installed options. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Base Unit Weight (Does not include any accessories):
955 lb

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **4**
Return Air Filter Size: **20 x 20 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Standard/Medium Static (EcoBlue)
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controller
Standard Packaging

Warranty Information

1-Year parts (STD.)
5-Year Compressor (std.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
50FCQM12A2M6-3A0A0	Rooftop Unit	2

NOTES:

1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE

UNIT	OUTDOOR COIL TYPE	H
50FCQ-12	RTPF	15 7/8 [403]
RTPF - ROUND TUBE, PLATE FIN (COPPER/ALUM)		

Carrier

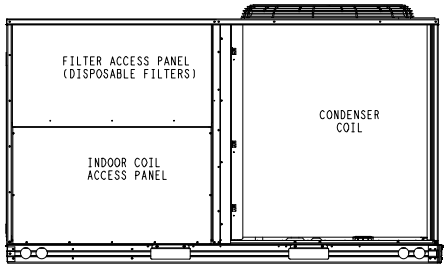
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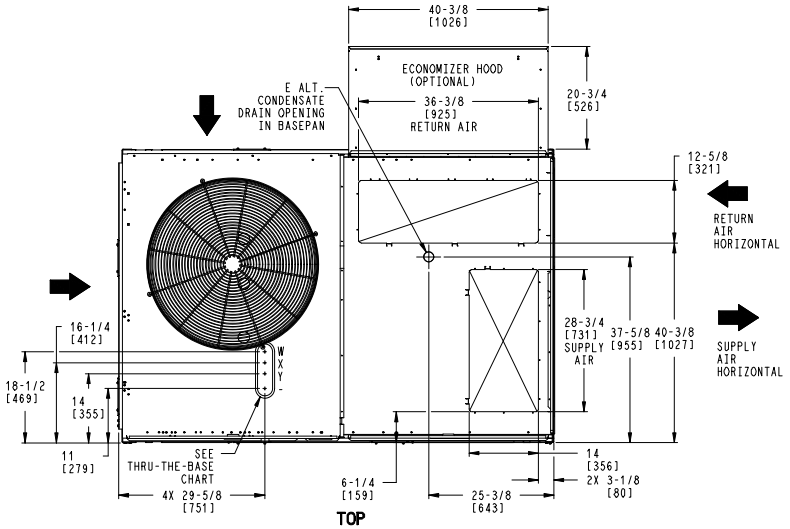
	CONNECTION SIZES
A	1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B	2 1/2" [64] DIA POWER SUPPLY KNOCKOUT
C	1 3/4" [51] DIA GAUGE ACCESS PLUG
D	7/8" [22] DIA FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN
G	2" [51] DIA POWER SUPPLY KNOCK-OUT

THRU-THE-BASE CHART
THESE HOLES REQUIRED FOR USE CRBTMPWR002A01

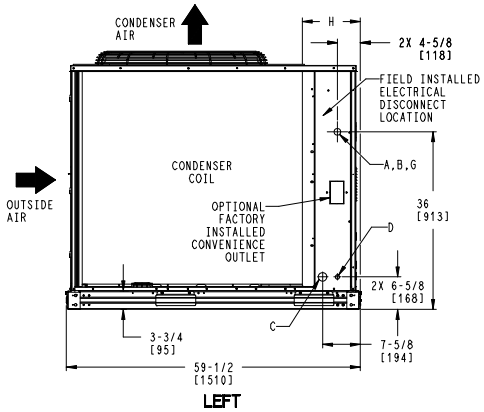
	THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
W	1/2"	ACC.	7/8" [22.2]
X	1/2"	24V	7/8" [22.2]
Y	1 1/4" (002)	POWER	1 3/4" [44.4]
	FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X & Y ARE PROVIDED		



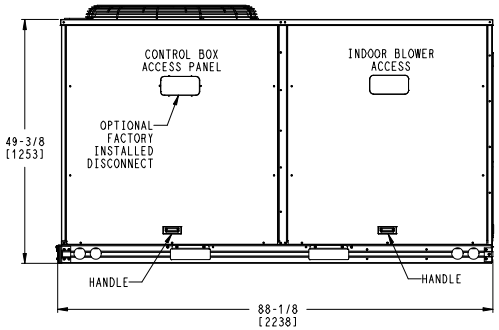
BACK



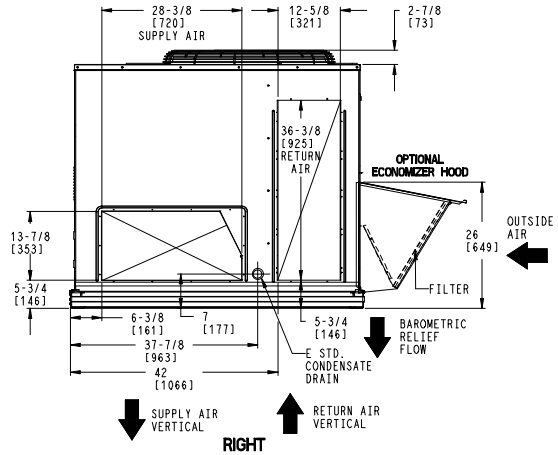
TOP



LEFT



FRONT

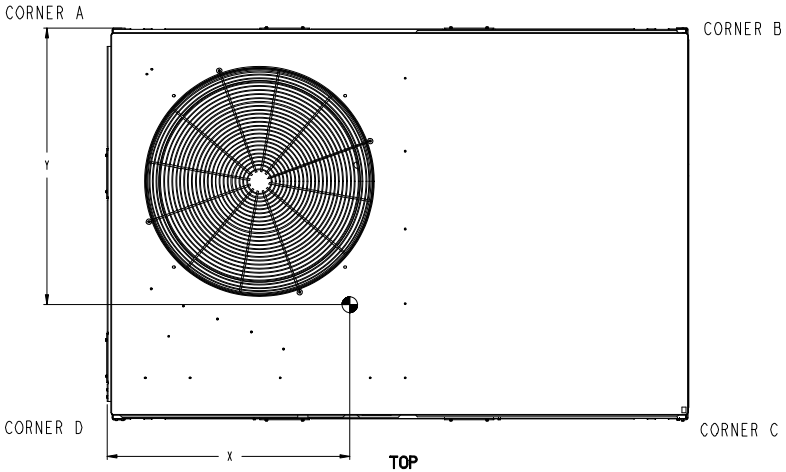


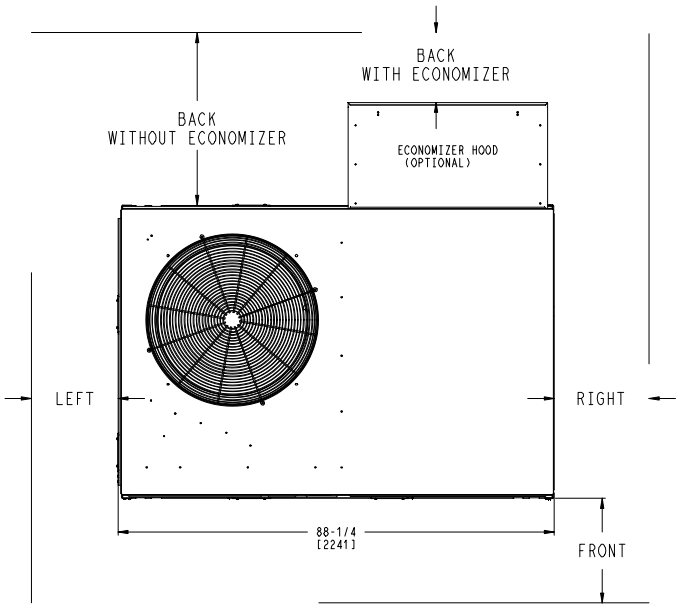
RIGHT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	1 OF 3	04/01/22	-	50FCQ 12 SINGLE ZONE ELECTRICAL HEAT PUMP	48TM009024	-

UNIT	OUTDOOR COIL TYPE	STD. UNIT WEIGHT***		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		
		LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ-12	RTPF	955	433	190	86	243	110	293	133	229	104	49 1/2 [1257]	32 1/2 [826]	19 1/8 [486]
RTPF - ROUND TUBE, PLATE FIN (COPPER/ALUM)														

*** STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.





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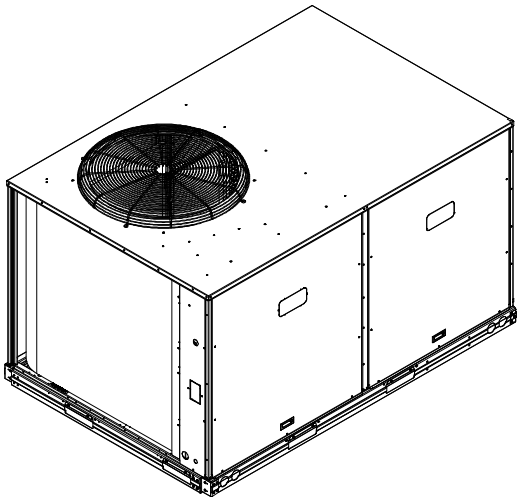
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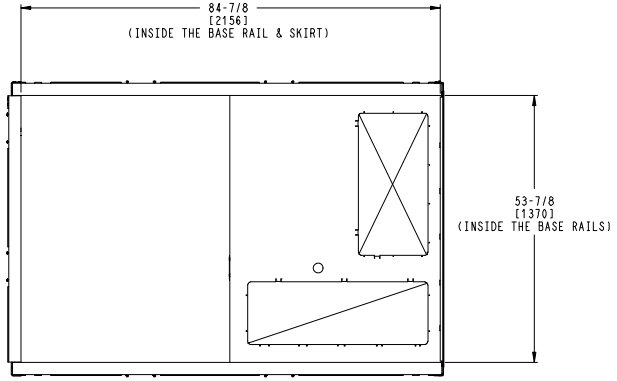
NOTE:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

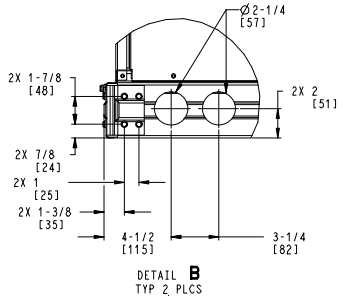
CLEARANCE		
	SERVICE WITH:	SERVICE WITH:
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER
FRONT	48 [1219mm]	36 [914mm]
LEFT	48 [1219mm]	42 [1067mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]
BACK W/ECON	36 [914mm]	36 [914mm]
RIGHT	36 [914mm]	36 [914mm]
TOP	72 [1829mm]	72 [1829mm]

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	04/01/22	-	50FCQ 12 SINGLE ZONE ELECTRICAL HEAT PUMP	48TM009024	-

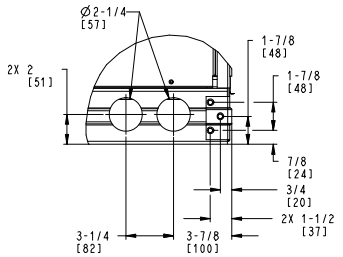




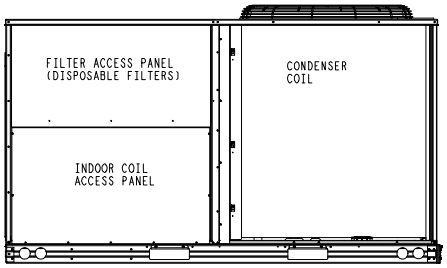
INSIDE BASERAIL DIMENSIONS
BOTTOM



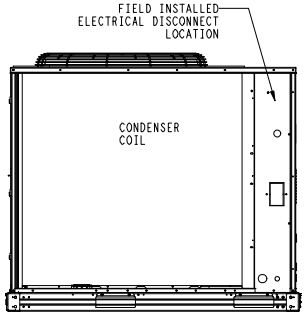
DETAIL **B**
TYP 2 PLCS



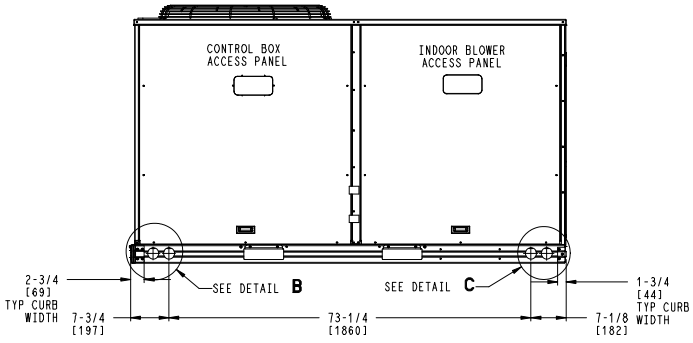
DETAIL **C**
TYP 2 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	04/01/22	-	50FCQ 12 SINGLE ZONE ELECTRICAL HEAT PUMP	48TM009024	-

Part Number:50FCQM12A2M6-3A0A0

ARI EER:	**11.00**	
IEER:	**15.0**	

Base Unit Dimensions

Unit Length:	**88.1**	in
Unit Width:	**59.5**	in
Unit Height:	**49.4**	in
Base Unit Weight (Does not include any accessories):	**955**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**4000**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**58.4**	F
Evaporator Leaving Air WB:	**57.1**	F
Evaporator Leaving Air Enthalpy:	**24.48**	BTU/lb
Gross Cooling Capacity:	**125.29**	MBH
Gross Sensible Capacity:	**93.44**	MBH
Compressor Power Input:	**8.85**	kW
Coil Bypass Factor:	**0.045**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.9**	F
Total Heating Capacity:	**116.40**	MBH
Integrated Heating Capacity:	**116.40**	MBH
Heating Power Input:	**9.44**	kW
High Temperature COP:	**3.40**	
Low Temperature COP:	**2.25**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**1812**	
Fan Power:	**2.07**	BHP
NOTE:	**Selected IFM RPM Range: 990 - 2000**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**
Compressor #1 RLA:	**7.7**
Compressor #1 LRA:	**52**
Compressor #2 RLA:	**7.7**
Compressor #2 LRA:	**52**
Indoor Fan Motor Type:	**MED**
Indoor Fan Motor FLA (Total):	**3**
Power Supply MCA:	**28**
Power Supply MOCP (Fuse or HACR):	**30**
Disconnect Size FLA:	**30**

Disconnect Size LRA: **115**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 7.4**

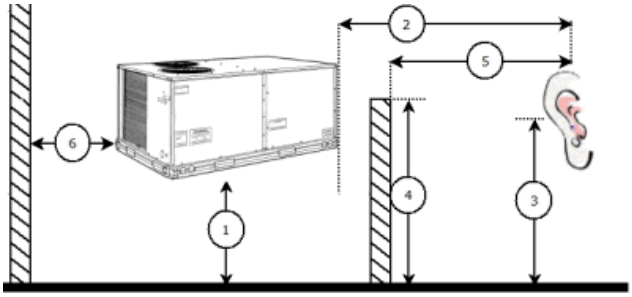
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	94.0	56.6	88.1
125 Hz	88.5	83.1	90.0
250 Hz	83.5	76.6	85.9
500 Hz	81.3	73.4	83.0
1000 Hz	82.4	72.4	81.6
2000 Hz	79.4	67.8	78.5
4000 Hz	73.8	57.9	76.4
8000 Hz	65.4	50.0	75.5
A-Weighted	86.4	76.8	87.0

Advanced Acoustics



Advanced Accoustics Parameters

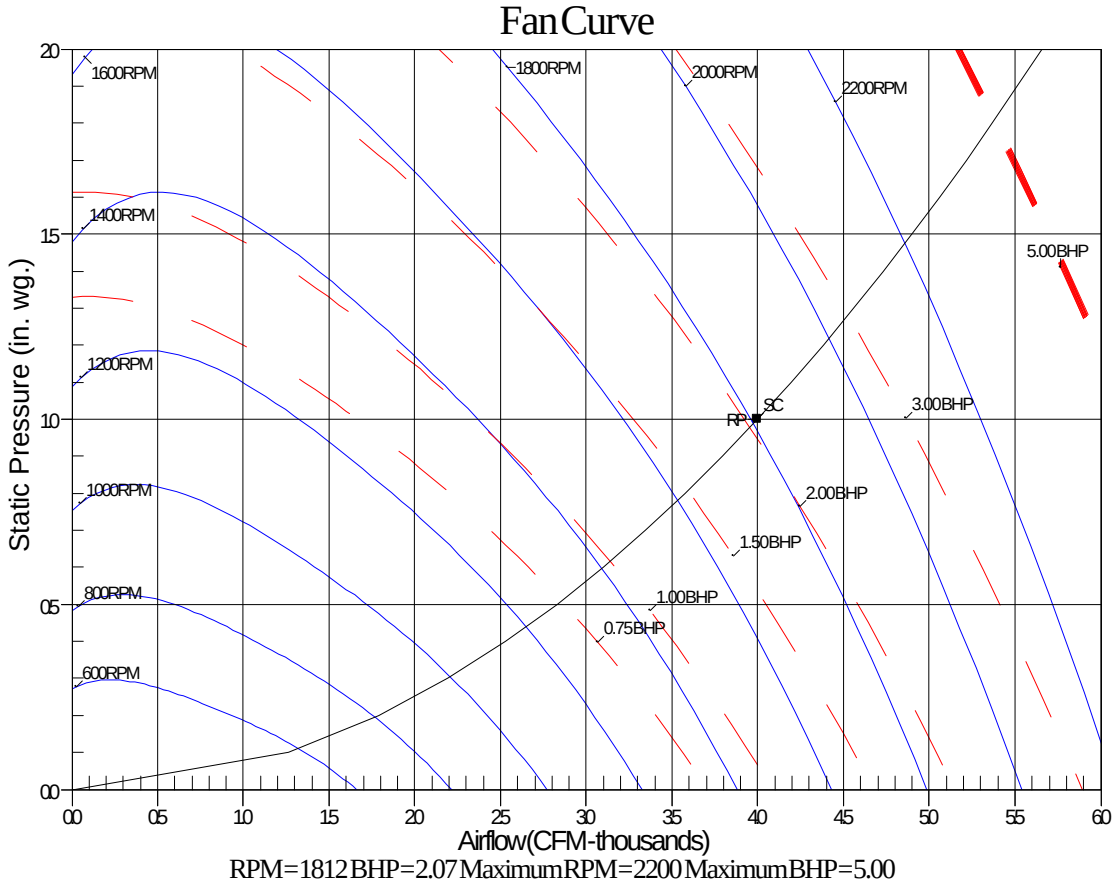
1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	88.1	90.0	85.9	83.0	81.6	78.5	76.4	75.5	94.0 Lw
B	61.9	73.9	77.3	79.8	81.6	79.7	77.4	74.4	87.0 LwA
C	55.7	57.6	53.5	50.6	49.2	46.1	44.0	43.1	61.6 Lp
D	29.5	41.5	44.9	47.4	49.2	47.3	45.0	42.0	54.6 LpA

Legend
A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



RPM=1812 BHP=2.07 Maximum RPM=2200 Maximum BHP=5.00
SC-System Curve RP-Rated Point

Bldg G - G1,2,3

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Bldg G - G1,2,3

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

Unit Parameters

Unit Model: **50FCQA04A2M6-3A0A0**
Unit Size: **04 (3 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Single Stage Compressor Models**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **2' 9.375"**
Total Operating Weight: **482** lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **2**
Return Air Filter Size: **16 x 25 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

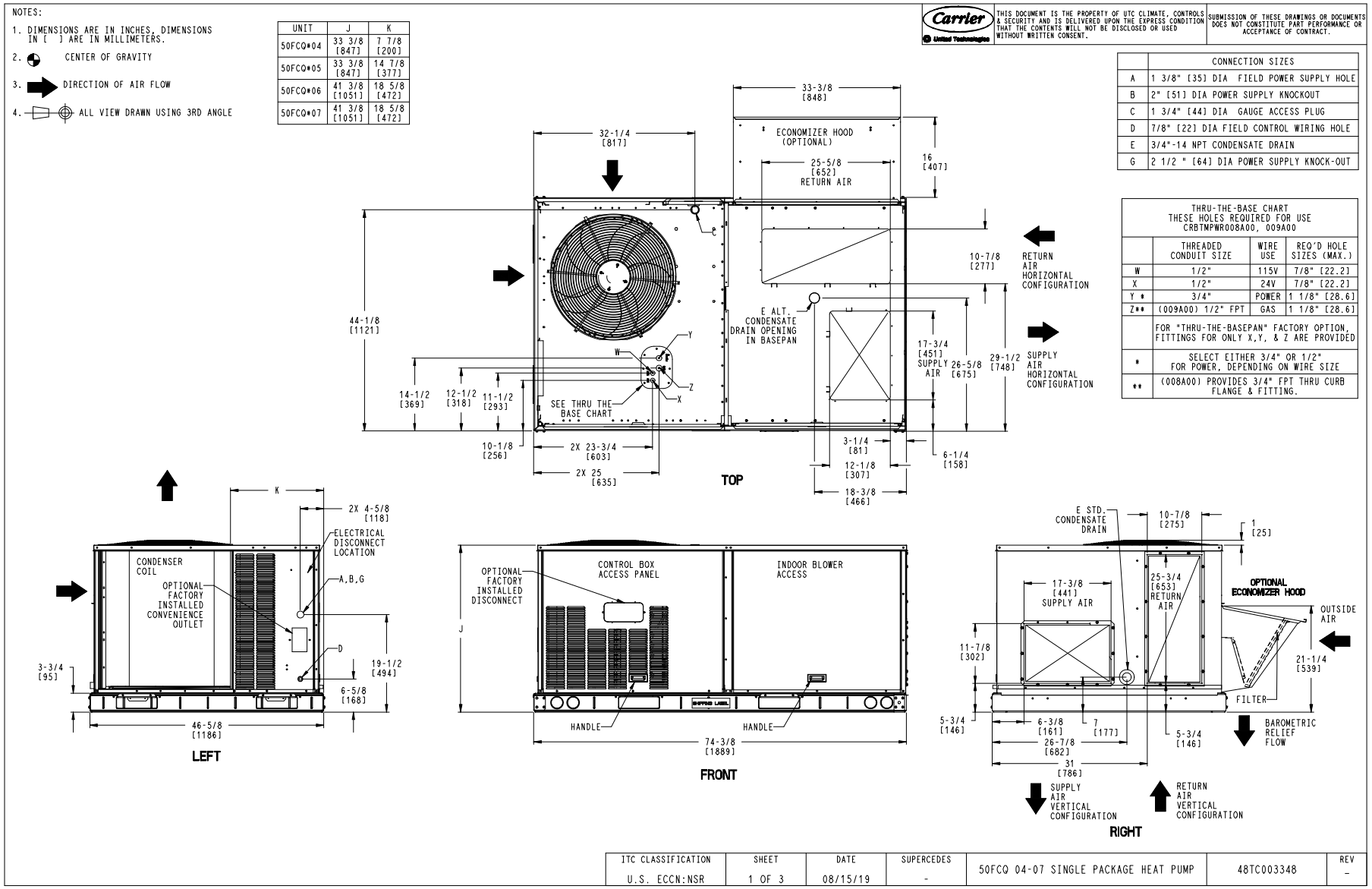
5-Year compressor parts (STD.)
1-Year parts (STD.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
50FCQA04A2M6-3A0A0	Rooftop Unit	3


NOTES:
1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE
UNIT J K
50FCQ*04 33 3/8 [847] 7 7/8 [200]
50FCQ*05 33 3/8 [847] 14 7/8 [377]
50FCQ*06 41 3/8 [1051] 18 5/8 [472]
50FCQ*07 41 3/8 [1051] 18 5/8 [472]
Carrier
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CONNECTION SIZES
A 1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B 2" [51] DIA POWER SUPPLY KNOCKOUT
C 1 3/4" [44] DIA GAUGE ACCESS PLUG
D 7/8" [22] DIA FIELD CONTROL WIRING HOLE
E 3/4"-14 NPT CONDENSATE DRAIN
G 2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT
THRU-THE-BASE CHART
THESE HOLES REQUIRED FOR USE CRBTMPWR008A00, 009A00
THREADED CONDUIT SIZE / WIRE USE / REQ'D HOLE SIZES (MAX.)
W 1/2" 115V 7/8" [22.2]
X 1/2" 24V 7/8" [22.2]
Y * 3/4" POWER 1 1/8" [28.6]
Z** (009A00) 1/2" FPT GAS 1 1/8" [28.6]
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X,Y, & Z ARE PROVIDED
* SELECT EITHER 3/4" OR 1/2" FOR POWER, DEPENDING ON WIRE SIZE
** (008A00) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.
33-3/8 [848]
ECONOMIZER HOOD (OPTIONAL)
32-1/4 [817]
25-5/8 [652] RETURN AIR
16 [407]
10-7/8 [277]
RETURN AIR HORIZONTAL CONFIGURATION
44-1/8 [1121]
E ALT. CONDENSATE DRAIN OPENING IN BASEPAN
17-3/4 [451] SUPPLY AIR
26-5/8 [675]
29-1/2 [748]
SUPPLY AIR HORIZONTAL CONFIGURATION
14-1/2 [369]
12-1/2 [318]
11-1/2 [293]
SEE THRU THE BASE CHART
10-1/8 [256]
2X 23-3/4 [603]
2X 25 [635]
3-1/4 [81]
12-1/8 [307]
18-3/8 [466]
6-1/4 [158]
TOP
K
2X 4-5/8 [118]
ELECTRICAL DISCONNECT LOCATION
CONDENSER COIL
OPTIONAL FACTORY INSTALLED CONVENIENCE OUTLET
A,B,G
D
3-3/4 [95]
19-1/2 [494]
6-5/8 [168]
46-5/8 [1186]
LEFT
OPTIONAL FACTORY INSTALLED DISCONNECT
CONTROL BOX ACCESS PANEL
INDOOR BLOWER ACCESS
J
HANDLE
HANDLE
74-3/8 [1889]
FRONT
E STD. CONDENSATE DRAIN
10-7/8 [275]
1 [25]
17-3/8 [441] SUPPLY AIR
25-3/4 [653] RETURN AIR
OPTIONAL ECONOMIZER HOOD
OUTSIDE AIR
11-7/8 [302]
21-1/4 [539]
FILTER
5-3/4 [146]
6-3/8 [161]
7 [177]
5-3/4 [146]
26-7/8 [682]
31 [786]
BAROMETRIC RELIEF FLOW
SUPPLY AIR VERTICAL CONFIGURATION
RETURN AIR VERTICAL CONFIGURATION
RIGHT
ITC CLASSIFICATION U.S. ECCN:NSR
SHEET 1 OF 3
DATE 08/15/19
SUPERCEDES -
50FCQ 04-07 SINGLE PACKAGE HEAT PUMP
48TC003348
REV -

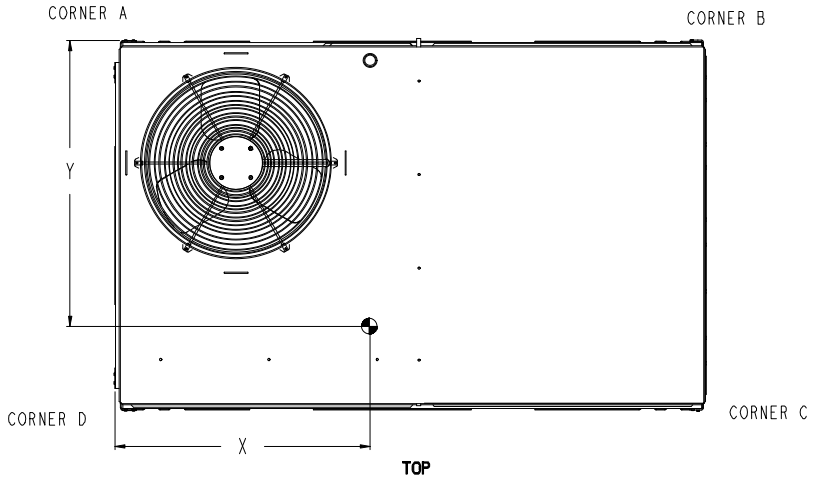
UNIT	STD. UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ*04	467	212	126	57	118	53	108	49	115	52	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*05	473	215	127	58	119	54	110	50	117	53	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*06	584	265	160	72	145	66	133	60	146	66	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]
50FCQ*07	589	267	161	73	146	66	134	61	147	67	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]

* STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.

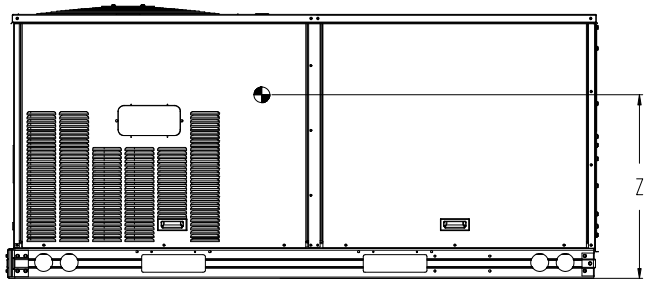
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United Technologies

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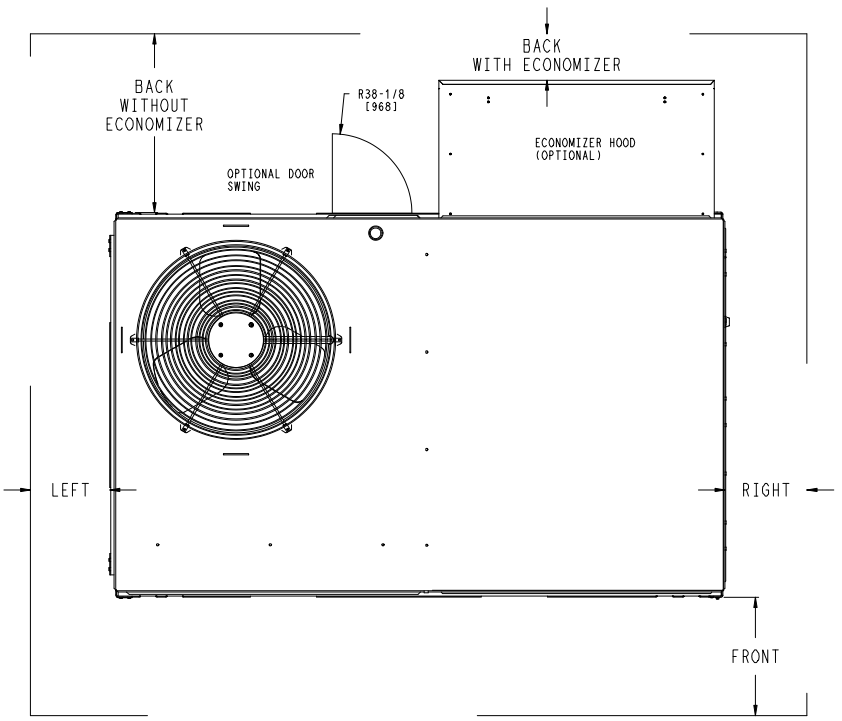
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TOP



FRONT



NOTE:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

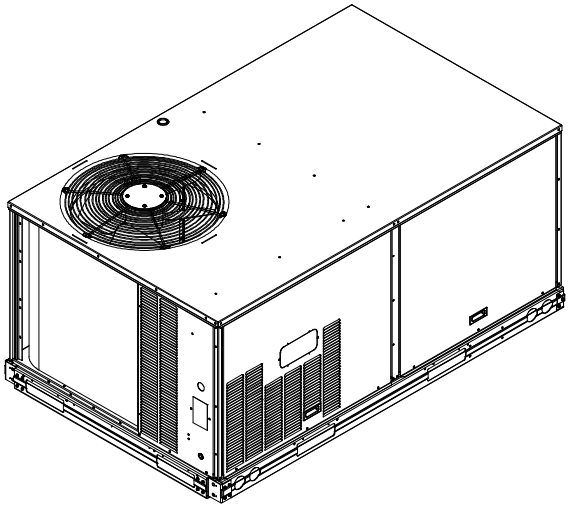
	CLEARANCE		
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/ECON	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

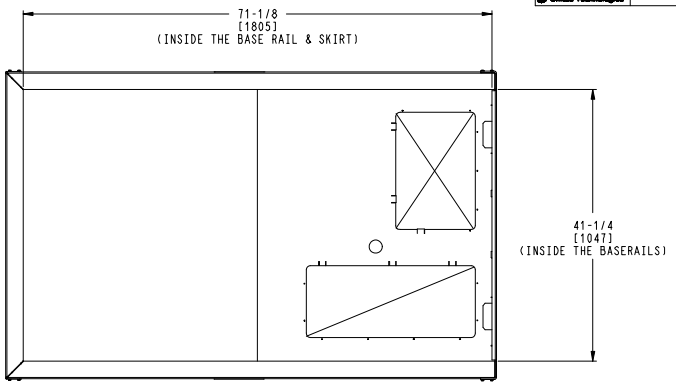
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

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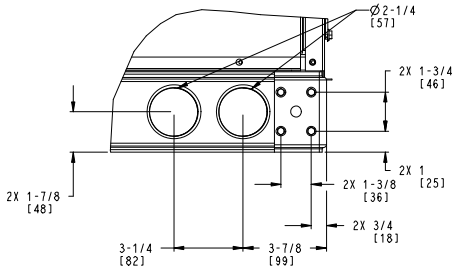
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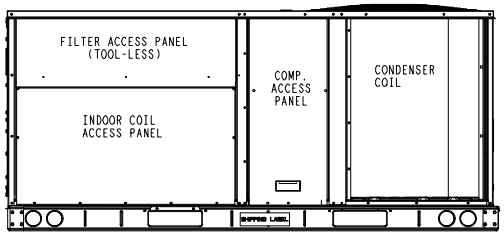




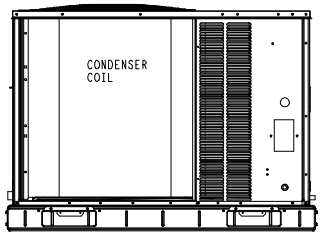
INSIDE BASERAIL DIMENSIONS
BOTTOM



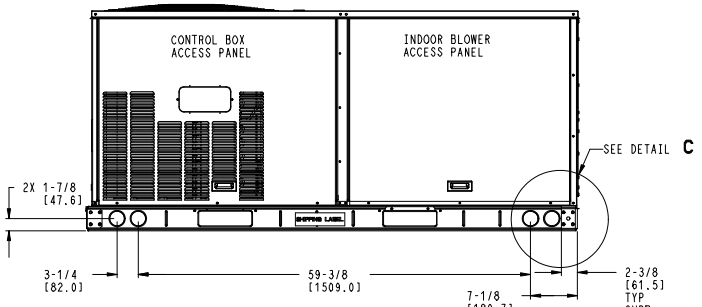
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

Part Number:50FCQA04A2M6-3A0A0

ARI SEER:	**14.30**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**33.4**	in

Operating Weight

Base Unit Weight:	**467**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**13**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**482**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**1200**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**58.4**	F
Evaporator Leaving Air WB:	**57.3**	F
Evaporator Leaving Air Enthalpy:	**24.59**	BTU/lb
Gross Cooling Capacity:	**36.98**	MBH
Gross Sensible Capacity:	**27.93**	MBH
Compressor Power Input:	**2.41**	kW
Coil Bypass Factor:	**0.101**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.3**	F
Total Heating Capacity:	**34.10**	MBH
Integrated Heating Capacity:	**34.10**	MBH
Heating Power Input:	**2.46**	kW
High Temperature COP:	**3.70**	
Low Temperature COP:	**2.25**	
HSPF:	**8.2**	

Supply Fan

External Static Pressure:	**0.50**	in wg
Fan RPM:	**1520**	
Fan Power:	**0.25**	BHP
NOTE:	**Selected IFM RPM Range: 219 - 2190**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**	
Compressor #1 RLA:	**5.8**	
Compressor #1 LRA:	**38**	
Indoor Fan Motor Type:	**MED**	
Indoor Fan Motor Eff.:	**Null**	

Indoor Fan Motor FLA (Total): **1.2**
Power Supply MCA: **10**
Power Supply MOCP (Fuse or HACR): **15**
Disconnect Size FLA: **9**
Disconnect Size LRA: **42**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

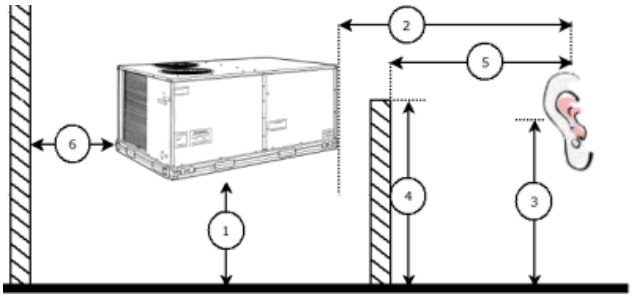
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	86.5	81.1	81.8
125 Hz	79.1	72.8	81.8
250 Hz	70.5	64.8	77.0
500 Hz	63.0	56.4	72.6
1000 Hz	60.0	57.7	69.9
2000 Hz	56.4	49.1	64.6
4000 Hz	53.5	43.2	59.3
8000 Hz	55.0	39.6	55.6
A-Weighted	68.9	63.3	75.4

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	81.8	81.8	77.0	72.6	69.9	64.6	59.3	55.6	85.9 Lw
B	55.6	65.7	68.4	69.4	69.9	65.8	60.3	54.5	75.4 LwA
C	49.4	49.4	44.6	40.2	37.5	32.2	26.9	23.2	53.5 Lp
D	23.2	33.3	36.0	37.0	37.5	33.4	27.9	22.1	43.0 LpA

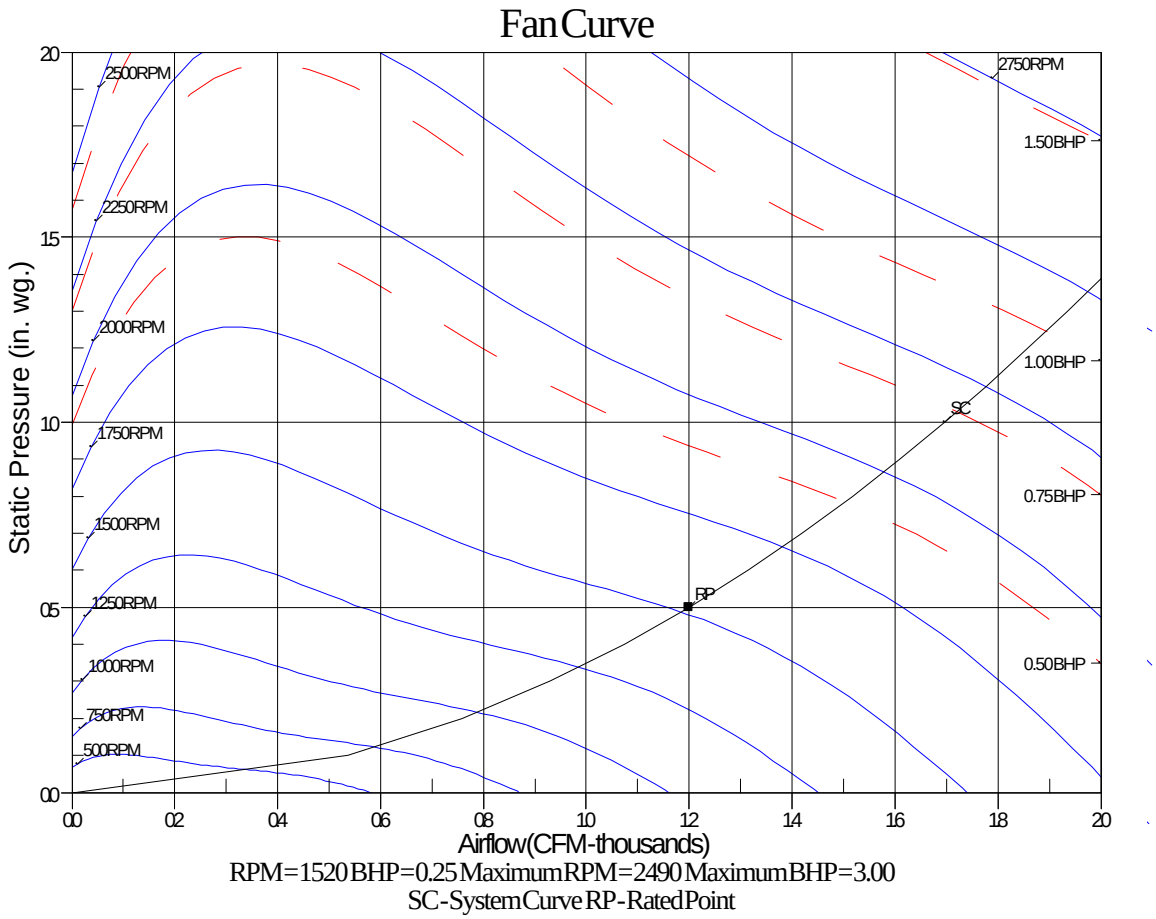
Legend

Performance Summary For Bldg G - G1,2,3

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



RPM=1520 BHP=0.25 Maximum RPM=2490 Maximum BHP=3.00
SC-System Curve RP-Rated Point

Bldg N - N1,N3,N4,N5

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Parameters

Unit Model: **50FCQA05A2M6-3A0A0**
Unit Size: **05 (4 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Single Stage Compressor Models**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **2' 9.375"**
Total Operating Weight: **488** lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **2**
Return Air Filter Size: **16 x 25 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

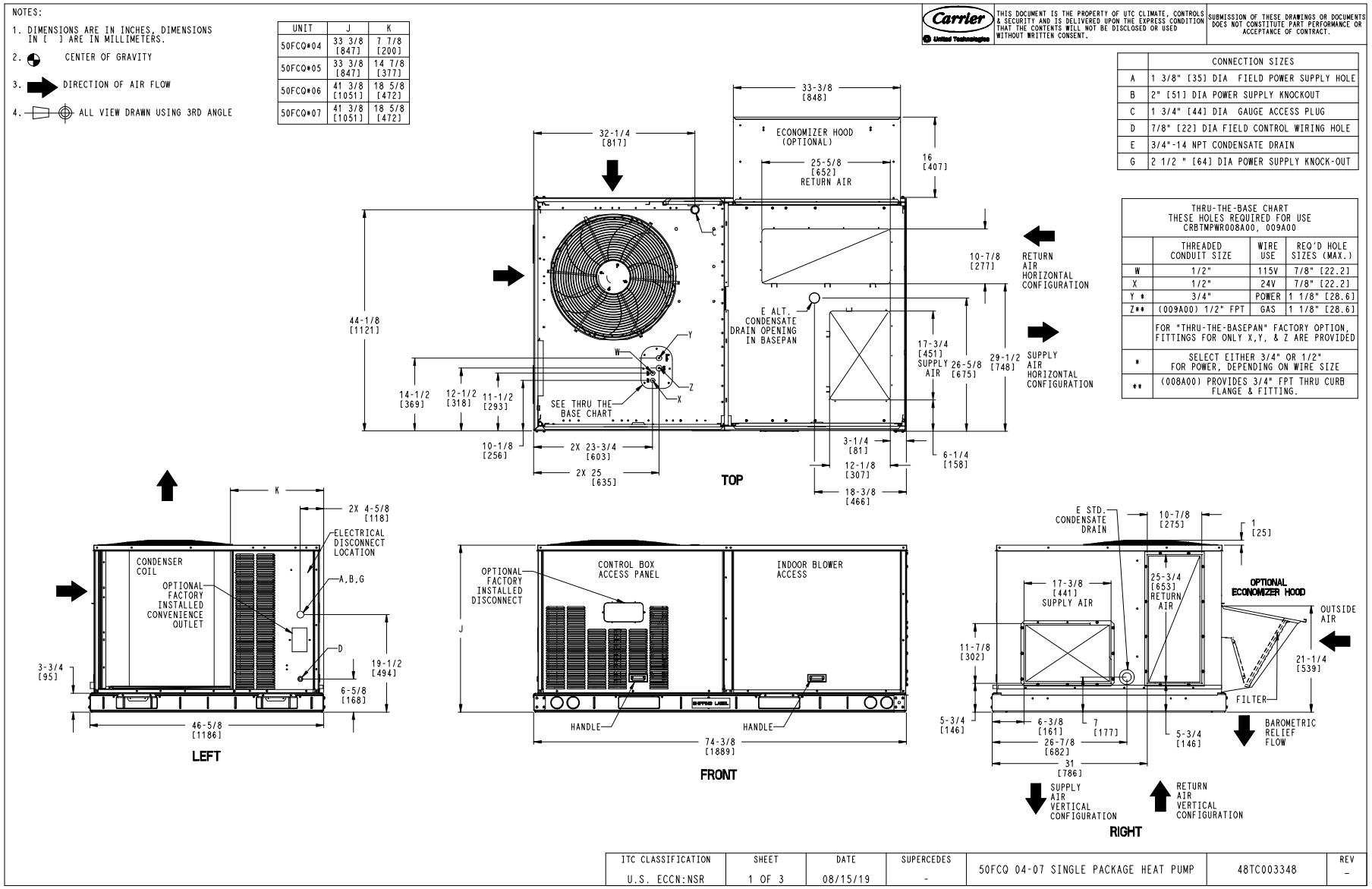
5-Year compressor parts (STD.)
1-Year parts (STD.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
50FCQA05A2M6-3A0A0	Rooftop Unit	4


NOTES:
1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE
UNIT J K
50FCQ*04 33 3/8 [847] 7 7/8 [200]
50FCQ*05 33 3/8 [847] 14 7/8 [377]
50FCQ*06 41 3/8 [1051] 18 5/8 [472]
50FCQ*07 41 3/8 [1051] 18 5/8 [472]
Carrier
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SUBMISSION OF THESE DRAWINGS OR DOCUMENTS DOES NOT CONSTITUTE PART PERFORMANCE OR ACCEPTANCE OF CONTRACT.
CONNECTION SIZES
A 1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B 2" [51] DIA POWER SUPPLY KNOCKOUT
C 1 3/4" [44] DIA GAUGE ACCESS PLUG
D 7/8" [22] DIA FIELD CONTROL WIRING HOLE
E 3/4"-14 NPT CONDENSATE DRAIN
G 2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT
THRU-THE-BASE CHART
THESE HOLES REQUIRED FOR USE CRBTMPWR008A00, 009A00
THREADED CONDUIT SIZE / WIRE USE / REQ'D HOLE SIZES (MAX.)
W 1/2" 115V 7/8" [22.2]
X 1/2" 24V 7/8" [22.2]
Y * 3/4" POWER 1 1/8" [28.6]
Z** (009A00) 1/2" FPT GAS 1 1/8" [28.6]
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X,Y, & Z ARE PROVIDED
* SELECT EITHER 3/4" OR 1/2" FOR POWER, DEPENDING ON WIRE SIZE
** (008A00) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.
33-3/8 [848]
ECONOMIZER HOOD (OPTIONAL)
32-1/4 [817]
25-5/8 [652] RETURN AIR
16 [407]
10-7/8 [277]
RETURN AIR HORIZONTAL CONFIGURATION
44-1/8 [1121]
E ALT. CONDENSATE DRAIN OPENING IN BASEPAN
17-3/4 [451] SUPPLY AIR
26-5/8 [675]
29-1/2 [748]
SUPPLY AIR HORIZONTAL CONFIGURATION
14-1/2 [369]
12-1/2 [318]
11-1/2 [293]
SEE THRU THE BASE CHART
10-1/8 [256]
2X 23-3/4 [603]
2X 25 [635]
3-1/4 [81]
12-1/8 [307]
18-3/8 [466]
6-1/4 [158]
TOP
K
2X 4-5/8 [118]
ELECTRICAL DISCONNECT LOCATION
CONDENSER COIL
OPTIONAL FACTORY INSTALLED CONVENIENCE OUTLET
A,B,G
D
3-3/4 [95]
19-1/2 [494]
6-5/8 [168]
46-5/8 [1186]
LEFT
OPTIONAL FACTORY INSTALLED DISCONNECT
CONTROL BOX ACCESS PANEL
INDOOR BLOWER ACCESS
J
HANDLE
HANDLE
74-3/8 [1889]
FRONT
E STD. CONDENSATE DRAIN
10-7/8 [275]
1 [25]
17-3/8 [441] SUPPLY AIR
25-3/4 [653] RETURN AIR
OPTIONAL ECONOMIZER HOOD
OUTSIDE AIR
11-7/8 [302]
21-1/4 [539]
FILTER
5-3/4 [146]
6-3/8 [161]
7 [177]
26-7/8 [682]
31 [786]
5-3/4 [146]
BAROMETRIC RELIEF FLOW
SUPPLY AIR VERTICAL CONFIGURATION
RETURN AIR VERTICAL CONFIGURATION
RIGHT
ITC CLASSIFICATION U.S. ECCN:NSR
SHEET 1 OF 3
DATE 08/15/19
SUPERCEDES -
50FCQ 04-07 SINGLE PACKAGE HEAT PUMP
48TC003348
REV -

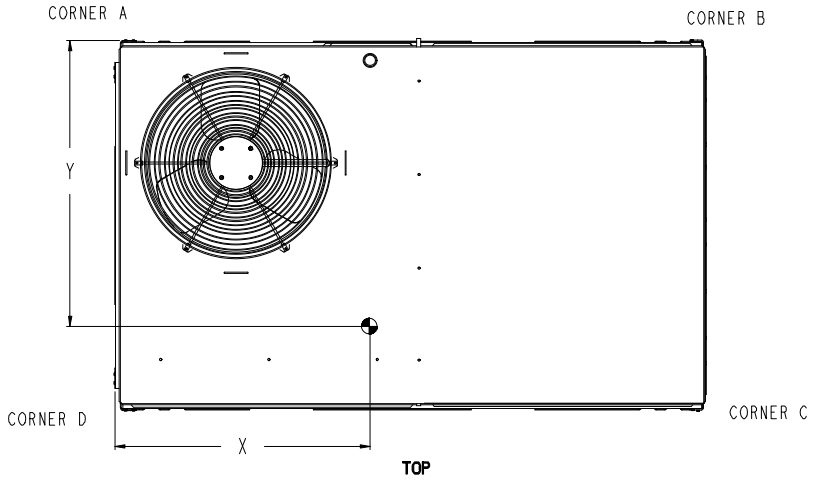
UNIT	STD. UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ*04	467	212	126	57	118	53	108	49	115	52	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*05	473	215	127	58	119	54	110	50	117	53	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*06	584	265	160	72	145	66	133	60	146	66	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]
50FCQ*07	589	267	161	73	146	66	134	61	147	67	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]

* STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.

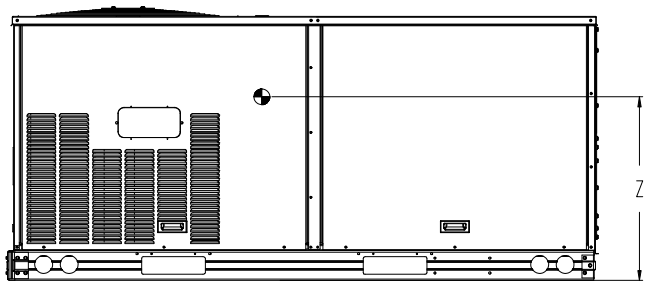
Carrier United Technologies

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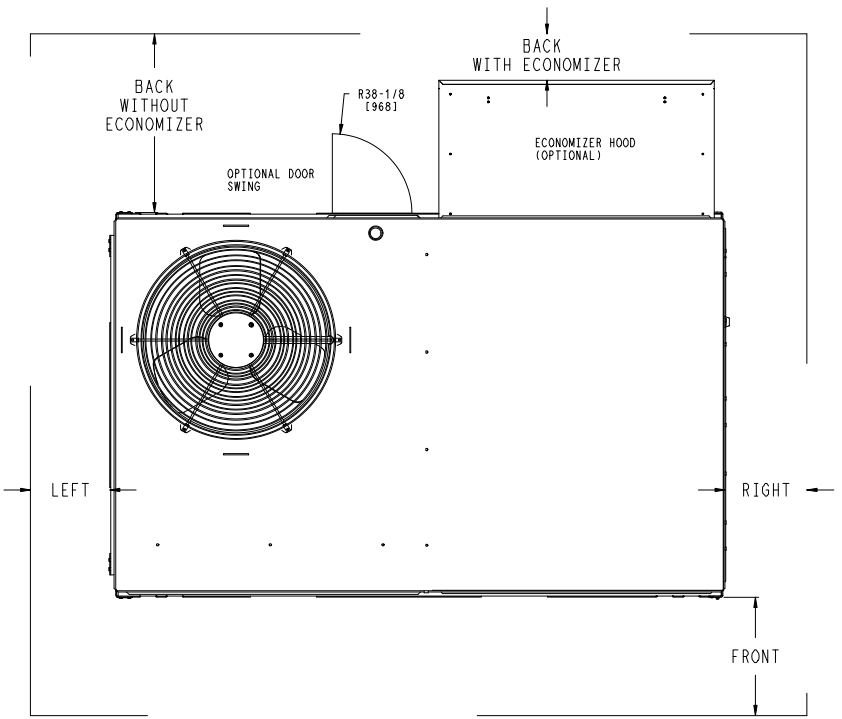
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TOP



FRONT



NOTE:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

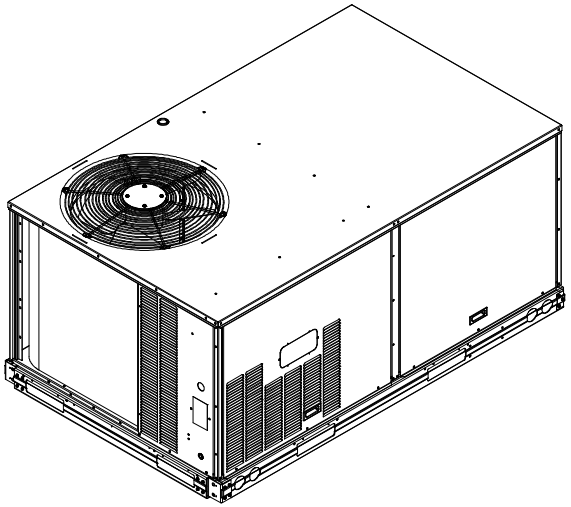
CLEARANCE			
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/ECON	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

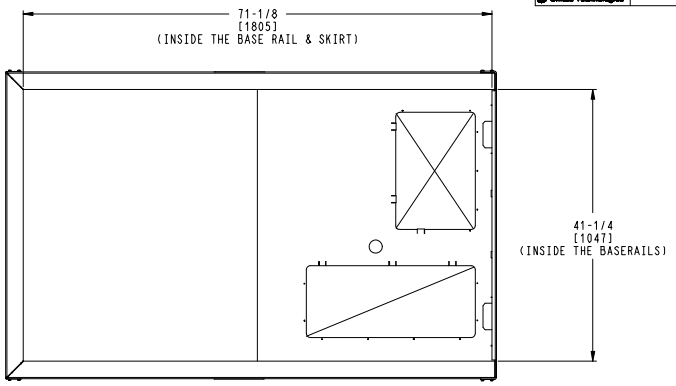
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

Carrier — United Technologies

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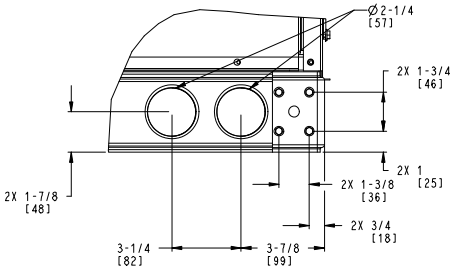
SUBMISSION OF THESE DRAWINGS OR DOCUMENTS DOES NOT CONSTITUTE PART PERFORMANCE OR ACCEPTANCE OF CONTRACT.



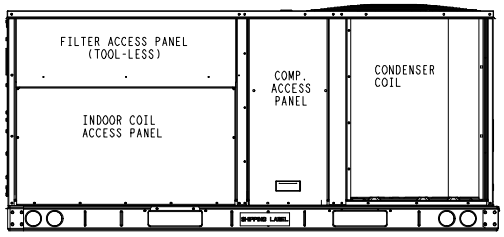


INSIDE BASERAIL DIMENSIONS

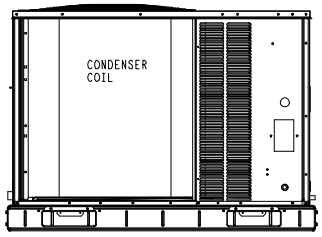
BOTTOM



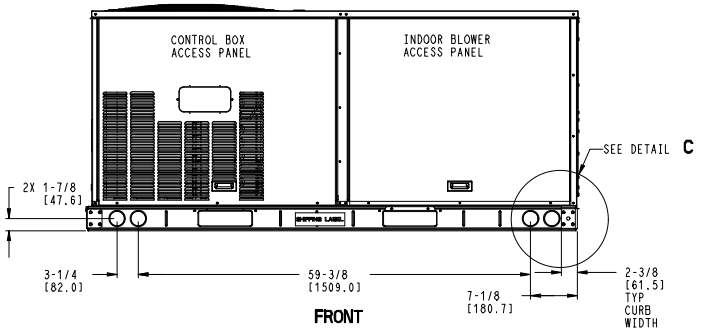
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

Part Number:50FCQA05A2M6-3A0A0

ARI SEER:	**14.30**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**33.4**	in

Operating Weight

Base Unit Weight:	**473**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**13**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**488**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**1600**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**58.1**	F
Evaporator Leaving Air WB:	**57.2**	F
Evaporator Leaving Air Enthalpy:	**24.50**	BTU/lb
Gross Cooling Capacity:	**49.92**	MBH
Gross Sensible Capacity:	**37.82**	MBH
Compressor Power Input:	**3.53**	kW
Coil Bypass Factor:	**0.109**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.7**	F
Total Heating Capacity:	**46.10**	MBH
Integrated Heating Capacity:	**46.10**	MBH
Heating Power Input:	**3.08**	kW
High Temperature COP:	**3.70**	
Low Temperature COP:	**2.28**	
HSPF:	**8.2**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**1958**	
Fan Power:	**0.81**	BHP
NOTE:	**Selected IFM RPM Range: 217 - 2170**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**
Compressor #1 RLA:	**6.2**
Compressor #1 LRA:	**41**
Indoor Fan Motor Type:	**MED**
Indoor Fan Motor Eff.:	**Null**

Indoor Fan Motor FLA (Total): **1.7**
Power Supply MCA: **11**
Power Supply MOCP (Fuse or HACR): **15**
Disconnect Size FLA: **10**
Disconnect Size LRA: **45**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

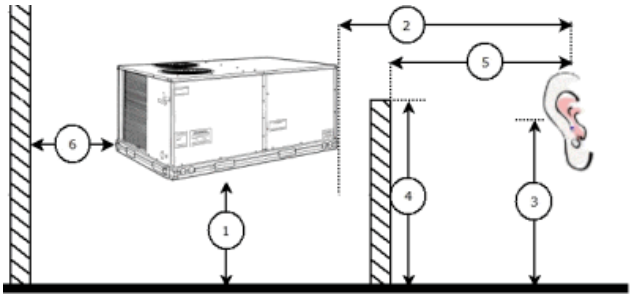
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	93.7	91.1	85.6
125 Hz	84.7	79.8	84.7
250 Hz	78.5	72.9	80.5
500 Hz	73.0	66.0	76.0
1000 Hz	69.8	67.8	72.4
2000 Hz	66.5	58.7	68.0
4000 Hz	63.5	52.9	62.8
8000 Hz	60.1	46.2	59.3
A-Weighted	77.1	72.4	79.0

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	85.6	84.7	80.5	76.0	72.4	68.0	62.8	59.3	89.2 Lw
B	59.4	68.6	71.9	72.8	72.4	69.2	63.8	58.2	78.5 LwA
C	53.2	52.3	48.1	43.6	40.0	35.6	30.4	26.9	56.8 Lp
D	27.0	36.2	39.5	40.4	40.0	36.8	31.4	25.8	46.1 LpA

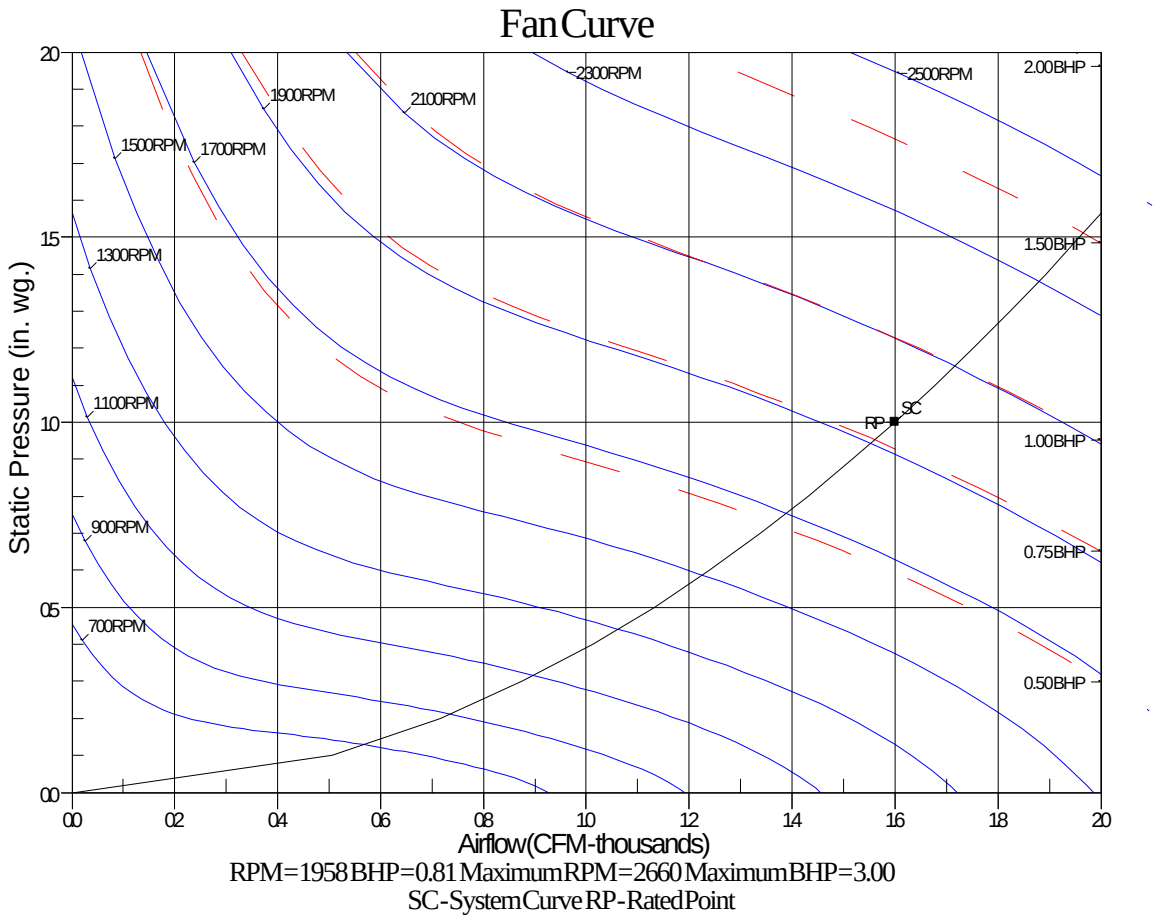
Legend

Performance Summary For Bldg N - N1,N3,N4,N5

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



RPM=1958 BHP=0.81 Maximum RPM=2660 Maximum BHP=3.00
SC-System Curve RP-Rated Point

Bldg N - N2,N6

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Bldg N - N2,N6

Project: Lynwood USD - Lynwood High School Bullis RD
Prepared By:

Unit Parameters

Unit Model: **50VT-K24---3**
Unit Size: **24 (2 Tons)**
Volts-Phase-Hertz: **208-1-60**
Heating Type: **Heat Pump**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **4' 0.1875"**
Unit Width: **2' 8.625"**
Unit Height: **4' 3.75"**

*** Weights and Dimensions are approximate. Weight does not include roof curbs, unit packaging, field installed accessories or factory installed options. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Base Unit Weight (Does not include any accessories):
332 lb

Warranty Information

1 year warranty on parts
5 yearwarranty on compressor

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

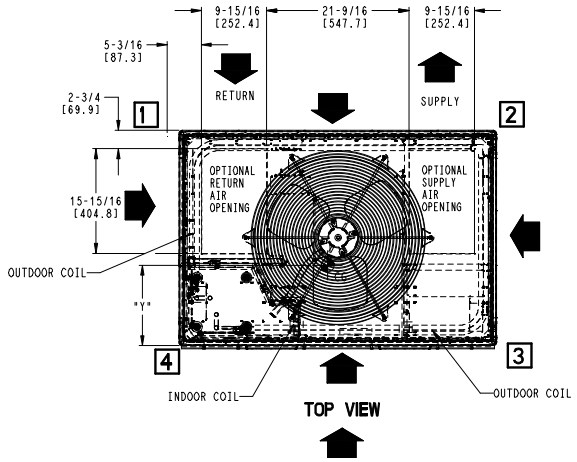
Ordering Information

Part Number	Description	Quantity
50VT-K24---3	Rooftop Unit	2

CARRIER / BRYANT HP (SMALL CHASSIS)

COOLING CAPACITY	UNIT WT.		UNIT HEIGHT IN/MM		CENTER OF GRAVITY IN/MM					
	LB	KG	"A"		X		Y		Z	
24	332	150.6	51-3/4	1315	20-1/2	520.7	15-1/2	394	16-5/8	422.3
30	365	165.6	51-3/4	1315	20-1/2	520.7	15-1/2	394	16-5/8	422.3

UNIT	CORNER WEIGHT LB/KG							
	"1"		"2"		"3"		"4"	
24	84.8	38.5	74.9	34.0	81.2	36.8	91.1	41.3
30	93.3	42.3	82.1	37.3	89.2	40.5	100.4	45.5



TOP VIEW

REQUIRED CLEARANCES TO COMBUSTIBLE MATL.

	INCHES [MM]
TOP OF UNIT	14 [355.6]
DUCT SIDE OF UNIT	2 [50.8]
SIDE OPPOSITE DUCTS	14 [355.6]
BOTTOM OF UNIT	0 [0.0]
ELECTRICAL PANEL	36 [914.4]

NEC. REQUIRED CLEARANCES.

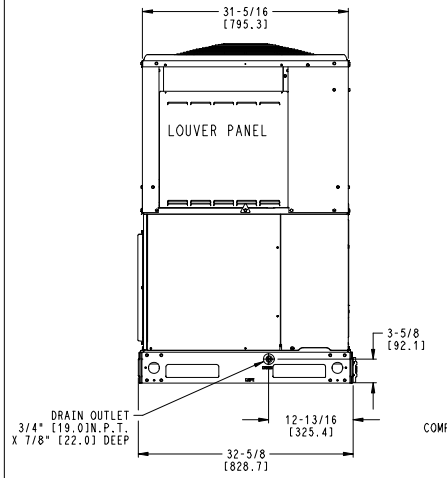
	INCHES [MM]
BETWEEN UNITS, POWER ENTRY SIDE	42 [1066.8]
UNIT AND UNGROUNDED SURFACES, POWER ENTRY SIDE	36 [914.0]
UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, POWER ENTRY SIDE	42 [1066.8]

REQUIRED CLEARANCE FOR OPERATION AND SERVICING

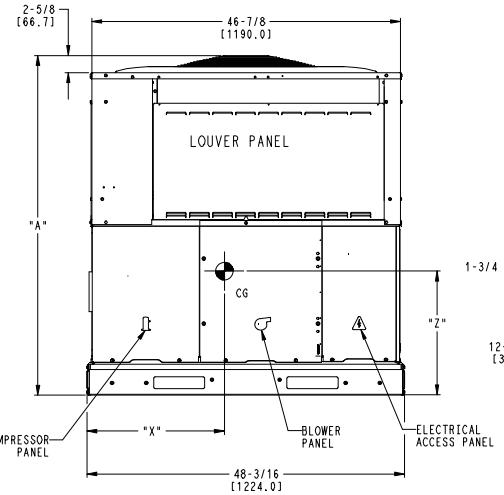
	INCHES [MM]
EVAP. COIL ACCESS SIDE	36 [914.0]
POWER ENTRY SIDE (EXCEPT FOR NEC REQUIREMENTS)	42 [1066.8]
UNIT TOP	48 [1219.2]
SIDE OPPOSITE DUCTS	36 [914.0]
DUCT PANEL	12 [304.8]*

*MINIMUM DISTANCES: IF UNIT IS PLACED LESS THAN 12 [304.8] FROM WALL SYSTEM, THEN SYSTEM PERFORMANCE MAYBE COMPROMISED.

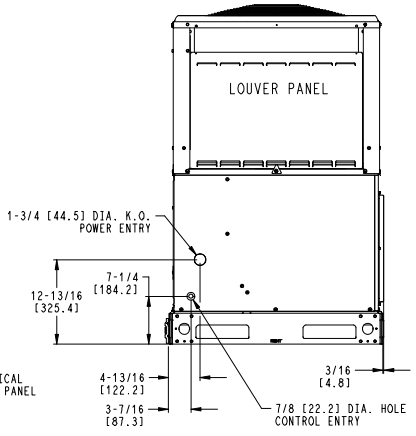
DIMENSIONS IN [] ARE IN MILLIMETERS



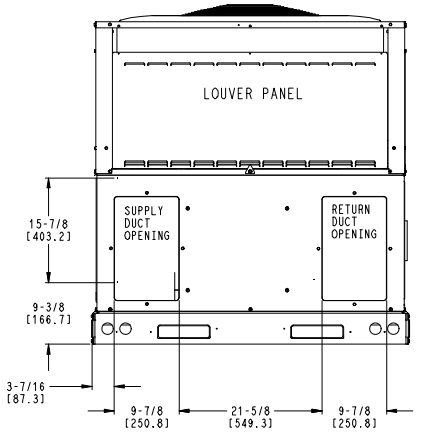
LEFT SIDE VIEW



FRONT VIEW



RIGHT SIDE VIEW



REAR VIEW

10/19/22	UPDATED TABLE DIMS.	SINGLE ZONE ELECTRIC COOLING & HEAT(SM)	SD5770-4	A

Part Number:50VT-K24---3

ARI SEER2:	**13.40**	

Base Unit Dimensions

Unit Length:	**48.2**	in
Unit Width:	**32.6**	in
Unit Height:	**51.8**	in
Base Unit Weight (Does not include any accessories):	**332**	lb

Unit

Unit Voltage-Phase-Hertz:	**208-1-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Direct**	
Actual Airflow:	**825**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**59.7**	F
Evaporator Leaving Air WB:	**58.2**	F
Evaporator Leaving Air Enthalpy:	**25.15**	BTU/lb
Net Cooling Capacity:	**23.36**	MBH
Net Sensible Capacity:	**18.09**	MBH
Total Unit Power Input:	**1.97**	kW
Coil Bypass Factor:	**0.000**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**97.0**	F
Total Heating Capacity:	**24.08**	MBH
Integrated Heating Capacity:	**24.07**	MBH
Heating Power Input:	**1.93**	kW
High Temperature COP:	**3.70**	
Low Temperature COP:	**2.20**	
HSPF2:	**6.7**	

Supply Fan

External Static Pressure:	**0.50**	in wg
Options / Accessories Static Pressure		
Wet Coil:	**0.04**	in wg
Application External Static (ESP + Unit Opts/Acc.):	**0.54**	in wg
Fan Power:	**0.22**	BHP
Fan Motor Size, hp:	**1/2**	
NOTE:	**Medium Motor Speed, Vert**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Minimum Voltage:	**197**
Maximum Voltage:	**253**
Compressor RLA:	**11.1**
Compressor LRA:	**59.5**
Outdoor Fan FLA (ea):	**0.7**
Indoor Fan Motor FLA (Total):	**3.5**
Power Supply MCA:	**18.1**

Power Supply MOCP (Fuse or HACR): **25**

Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

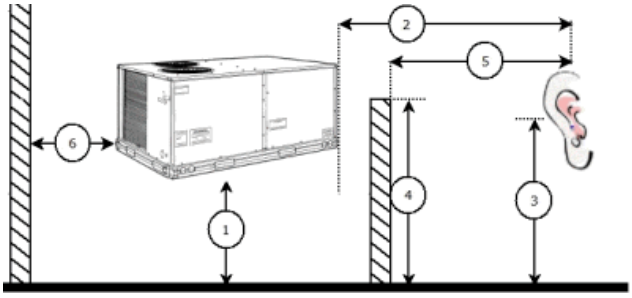
Acoustics

Sound Rating: **69.9** db

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	NA	NA	NA
125 Hz	NA	NA	59.0
250 Hz	NA	NA	56.6
500 Hz	NA	NA	57.9
1000 Hz	NA	NA	60.9
2000 Hz	NA	NA	55.3
4000 Hz	NA	NA	51.7
8000 Hz	NA	NA	44.0

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	0.0	59.0	56.6	57.9	60.9	55.3	51.7	44.0	65.6 Lw
B	-26.2	42.9	48.0	54.7	60.9	56.5	52.7	42.9	63.5 LwA
C	0.0	26.6	24.2	25.5	28.5	22.9	19.3	11.6	33.2 Lp
D	-26.2	10.5	15.6	22.3	28.5	24.1	20.3	10.5	31.1 LpA

Legend
A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.

Bldg N - N7

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Bldg N - N7

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

Unit Parameters

Unit Model: **50FCQA06A2M6-3A0A0**
Unit Size: **06 (5 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Single Stage Compressor Models**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **3' 5.375"**
Total Operating Weight: **599** lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **4**
Return Air Filter Size: **16 x 16 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

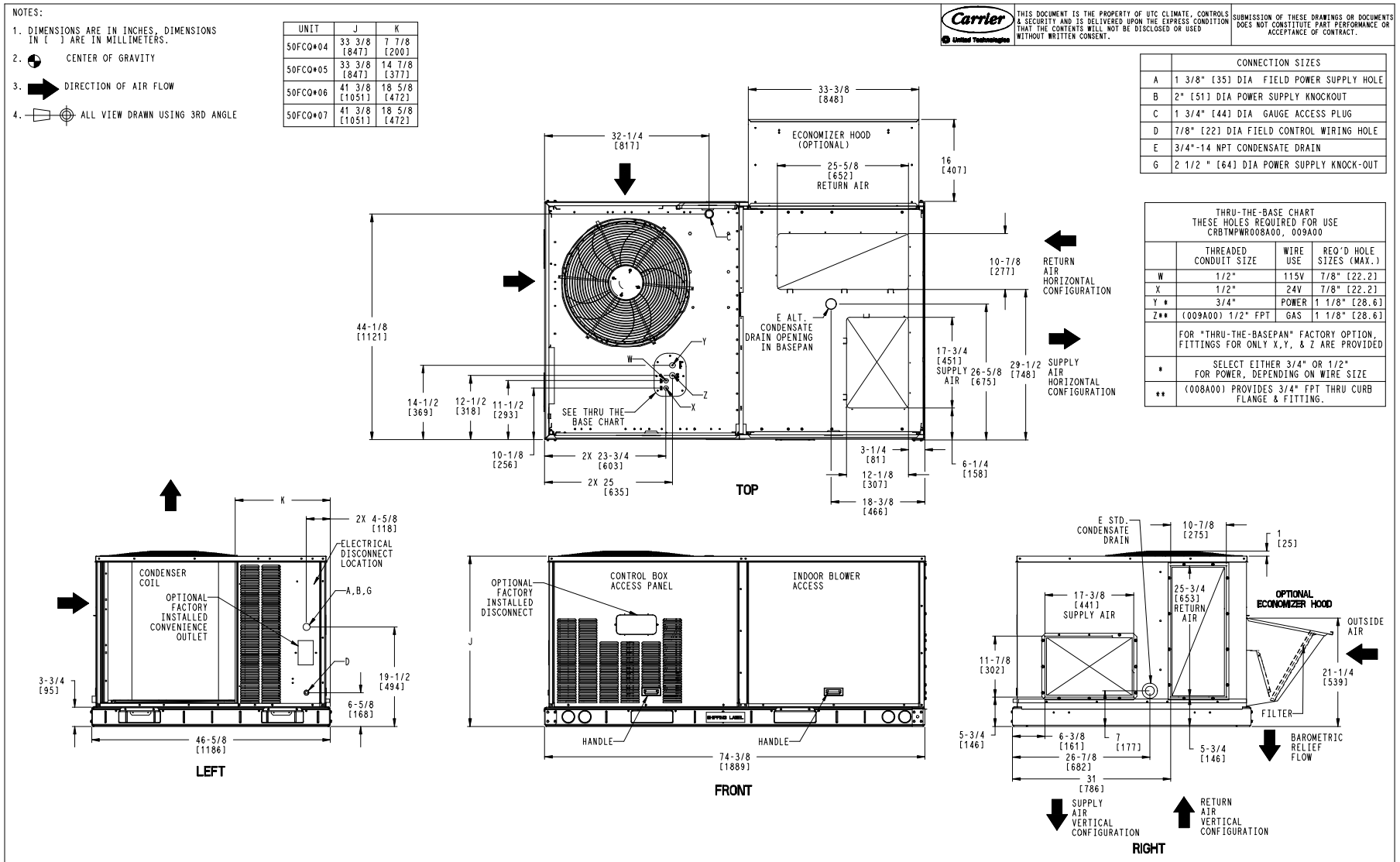
5-Year compressor parts (STD.)
1-Year parts (STD.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
50FCQA06A2M6-3A0A0	Rooftop Unit	1


NOTES:
1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE
UNIT | J | K
50FCQ*04 | 33 3/8 [847] | 7 7/8 [200]
50FCQ*05 | 33 3/8 [847] | 14 7/8 [377]
50FCQ*06 | 41 3/8 [1051] | 18 5/8 [472]
50FCQ*07 | 41 3/8 [1051] | 18 5/8 [472]
Carrier
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SUBMISSION OF THESE DRAWINGS OR DOCUMENTS DOES NOT CONSTITUTE PART PERFORMANCE OR ACCEPTANCE OF CONTRACT.
CONNECTION SIZES
A | 1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B | 2" [51] DIA POWER SUPPLY KNOCKOUT
C | 1 3/4" [44] DIA GAUGE ACCESS PLUG
D | 7/8" [22] DIA FIELD CONTROL WIRING HOLE
E | 3/4"-14 NPT CONDENSATE DRAIN
G | 2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT
THRU-THE-BASE CHART
THESE HOLES REQUIRED FOR USE CRBTMPWR008A00, 009A00
THREADED CONDUIT SIZE | WIRE USE | REQ'D HOLE SIZES (MAX.)
W | 1/2" | 115V | 7/8" [22.2]
X | 1/2" | 24V | 7/8" [22.2]
Y * | 3/4" | POWER | 1 1/8" [28.6]
Z** | (009A00) 1/2" FPT | GAS | 1 1/8" [28.6]
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X,Y, & Z ARE PROVIDED
* SELECT EITHER 3/4" OR 1/2" FOR POWER, DEPENDING ON WIRE SIZE
** (008A00) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.
33-3/8 [848]
32-1/4 [817]
ECONOMIZER HOOD (OPTIONAL)
25-5/8 [652] RETURN AIR
16 [407]
10-7/8 [277]
RETURN AIR HORIZONTAL CONFIGURATION
44-1/8 [1121]
E ALT. CONDENSATE DRAIN OPENING IN BASEPAN
17-3/4 [451] SUPPLY AIR
26-5/8 [675]
29-1/2 [748]
SUPPLY AIR HORIZONTAL CONFIGURATION
14-1/2 [369]
12-1/2 [318]
11-1/2 [293]
SEE THRU THE BASE CHART
10-1/8 [256]
2X 23-3/4 [603]
2X 25 [635]
3-1/4 [81]
12-1/8 [307]
18-3/8 [466]
6-1/4 [158]
TOP
K
2X 4-5/8 [118]
ELECTRICAL DISCONNECT LOCATION
CONDENSER COIL
OPTIONAL FACTORY INSTALLED CONVENIENCE OUTLET
A,B,G
D
3-3/4 [95]
19-1/2 [494]
6-5/8 [168]
46-5/8 [1186]
LEFT
OPTIONAL FACTORY INSTALLED DISCONNECT
CONTROL BOX ACCESS PANEL
INDOOR BLOWER ACCESS
J
HANDLE
HANDLE
74-3/8 [1889]
FRONT
E STD. CONDENSATE DRAIN
10-7/8 [275]
1 [25]
17-3/8 [441] SUPPLY AIR
25-3/4 [653] RETURN AIR
OPTIONAL ECONOMIZER HOOD
OUTSIDE AIR
11-7/8 [302]
21-1/4 [539]
FILTER
5-3/4 [146]
6-3/8 [161]
7 [177]
26-7/8 [682]
31 [786]
5-3/4 [146]
BAROMETRIC RELIEF FLOW
SUPPLY AIR VERTICAL CONFIGURATION
RETURN AIR VERTICAL CONFIGURATION
RIGHT
ITC CLASSIFICATION U.S. ECCN:NSR
SHEET 1 OF 3
DATE 08/15/19
SUPERCEDES -
50FCQ 04-07 SINGLE PACKAGE HEAT PUMP
48TC003348
REV -

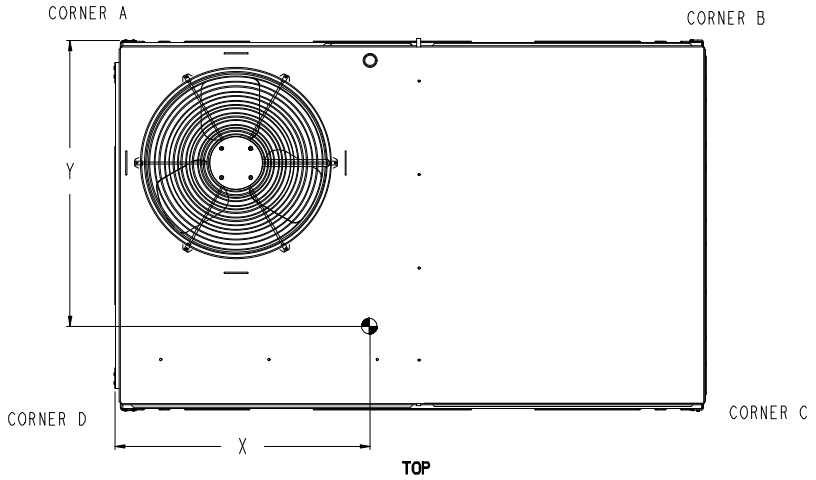
UNIT	STD. UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ*04	467	212	126	57	118	53	108	49	115	52	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*05	473	215	127	58	119	54	110	50	117	53	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*06	584	265	160	72	145	66	133	60	146	66	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]
50FCQ*07	589	267	161	73	146	66	134	61	147	67	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]

* STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.

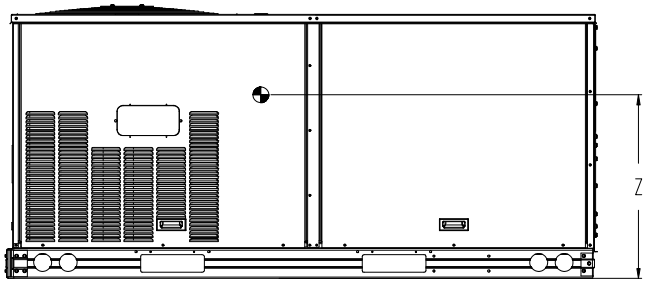
Carrier United Technologies

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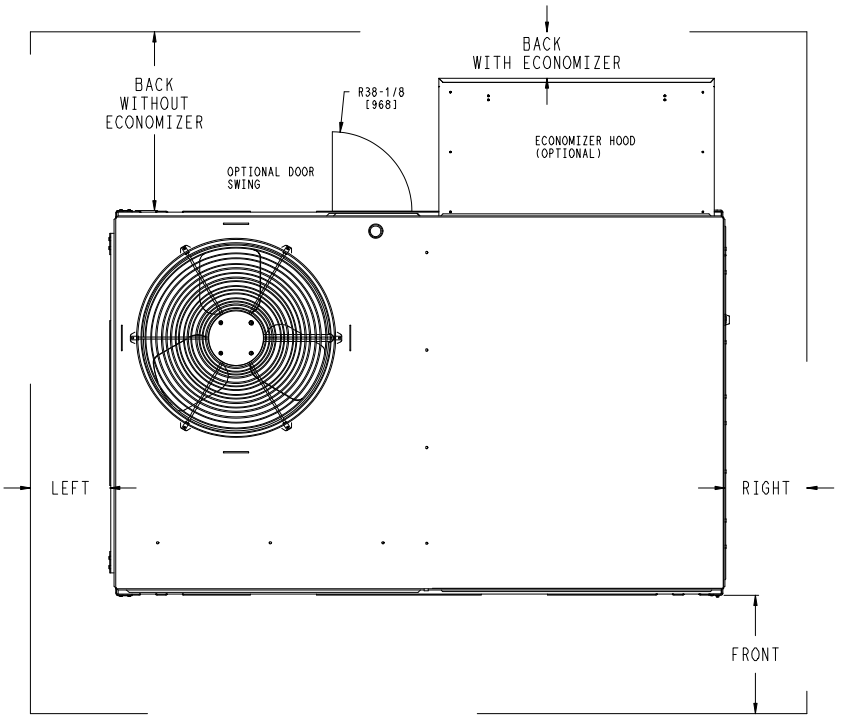
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TOP



FRONT



NOTE:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

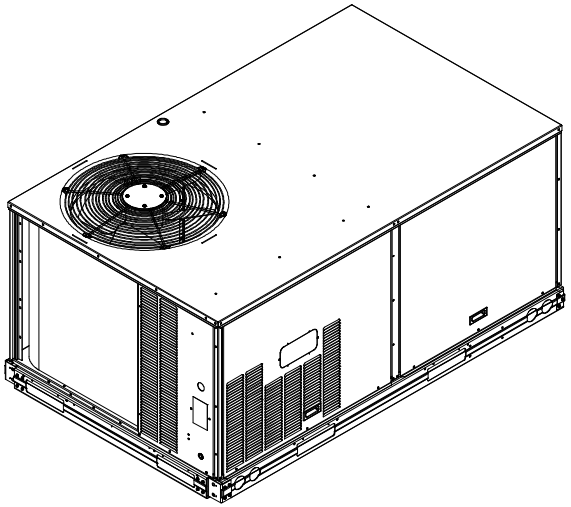
	CLEARANCE		
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/ECON	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

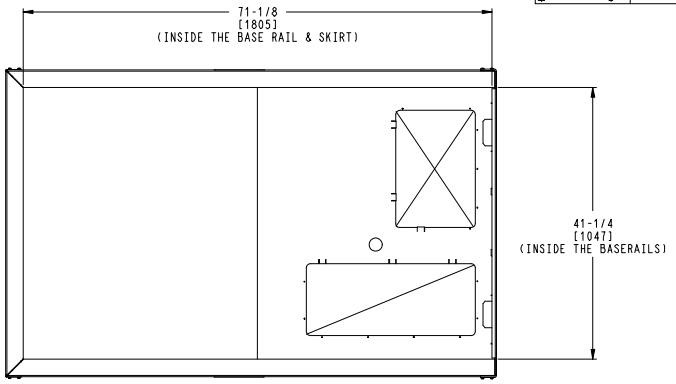
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

Carrier — A United Technologies

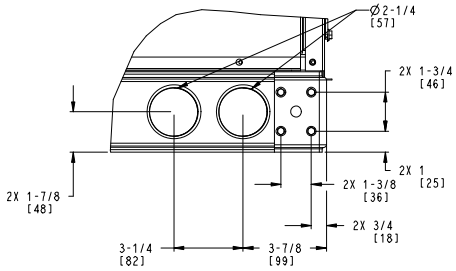
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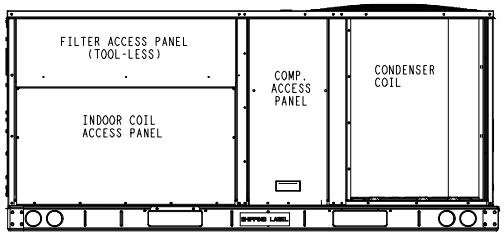




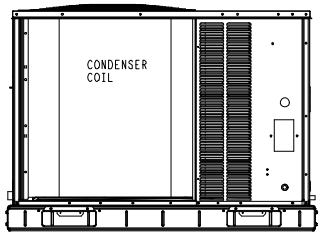
INSIDE BASERAIL DIMENSIONS
BOTTOM



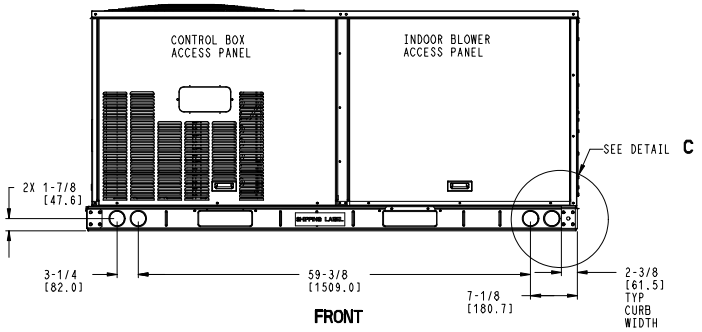
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

Part Number:50FCQA06A2M6-3A0A0

ARI SEER:	**14.30**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**41.4**	in

Operating Weight

Base Unit Weight:	**584**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**13**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**599**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**2000**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**57.3**	F
Evaporator Leaving Air WB:	**57.3**	F
Evaporator Leaving Air Enthalpy:	**24.56**	BTU/lb
Gross Cooling Capacity:	**61.90**	MBH
Gross Sensible Capacity:	**48.96**	MBH
Compressor Power Input:	**4.19**	kW
Coil Bypass Factor:	**0.027**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.3**	F
Total Heating Capacity:	**56.80**	MBH
Integrated Heating Capacity:	**56.80**	MBH
Heating Power Input:	**3.77**	kW
High Temperature COP:	**3.80**	
Low Temperature COP:	**2.30**	
HSPF:	**8.2**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**2036**	
Fan Power:	**0.90**	BHP
NOTE:	**Selected IFM RPM Range: 239 - 2390**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**	
Compressor #1 RLA:	**7.8**	
Compressor #1 LRA:	**52**	
Indoor Fan Motor Type:	**MED**	
Indoor Fan Motor Eff.:	**Null**	

Indoor Fan Motor FLA (Total): **2.1**
Power Supply MCA: **13**
Power Supply MOCP (Fuse or HACR): **20**
Disconnect Size FLA: **12**
Disconnect Size LRA: **57**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

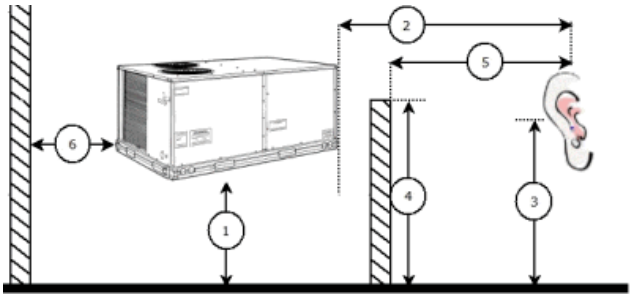
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	92.3	90.8	85.6
125 Hz	83.5	79.7	84.7
250 Hz	77.6	72.4	80.5
500 Hz	73.9	66.4	76.0
1000 Hz	70.7	68.5	72.4
2000 Hz	67.7	59.3	68.0
4000 Hz	64.3	53.1	62.8
8000 Hz	60.4	46.8	59.3
A-Weighted	77.2	72.6	79.0

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	85.6	84.7	80.5	76.0	72.4	68.0	62.8	59.3	89.2 Lw
B	59.4	68.6	71.9	72.8	72.4	69.2	63.8	58.2	78.5 LwA
C	53.2	52.3	48.1	43.6	40.0	35.6	30.4	26.9	56.8 Lp
D	27.0	36.2	39.5	40.4	40.0	36.8	31.4	25.8	46.1 LpA

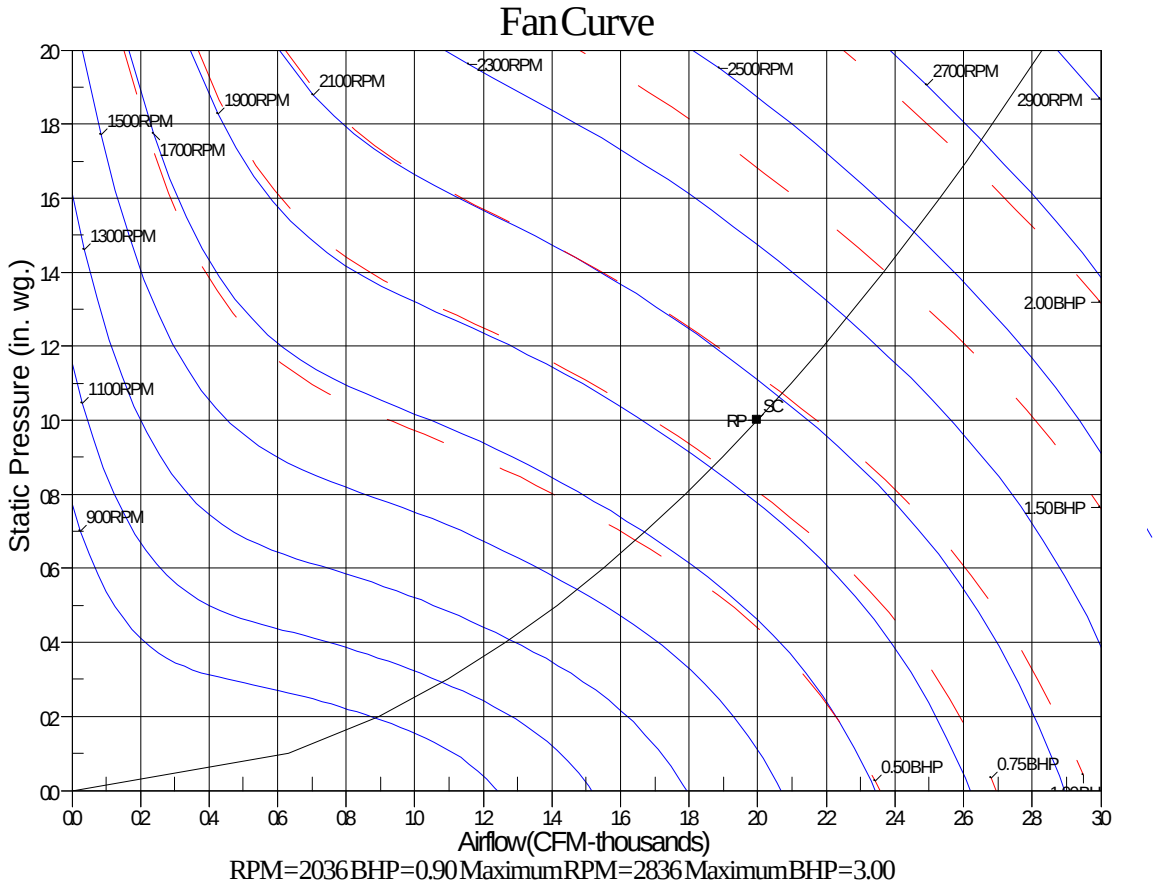
Legend

Performance Summary For Bldg N - N7

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



RPM=2036 BHP=0.90 Maximum RPM=2836 Maximum BHP=3.00
SC-System Curve RP-Rated Point

Bldg P - P5

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Bldg P - P5

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

Unit Parameters

Unit Model: **50FCQM12A2M6-3A0A0**
Unit Size: **12 (10 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Two-Stage Cooling / One Circuitl**
Duct Cfg: **Horizontal Supply / Horizontal Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **7' 4.125"**
Unit Width: **4' 11.5"**
Unit Height: **4' 1.375"**

*** Weights and Dimensions are approximate. Weight does not include roof curbs, unit packaging, field installed accessories or factory installed options. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Base Unit Weight (Does not include any accessories):
955 lb

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **4**
Return Air Filter Size: **20 x 20 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Standard/Medium Static (EcoBlue)
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controller
Standard Packaging

Warranty Information

1-Year parts (STD.)
5-Year Compressor (std.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
50FCQM12A2M6-3A0A0	Rooftop Unit	1

NOTES:

1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE

UNIT	OUTDOOR COIL TYPE	H
50FCQ-12	RTPF	15 7/8 [403]
RTPF - ROUND TUBE, PLATE FIN (COPPER/ALUM)		

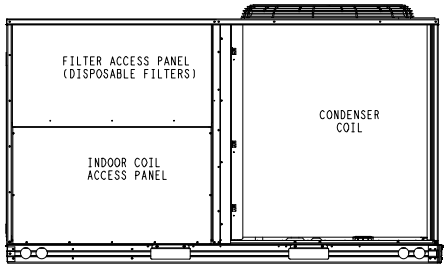
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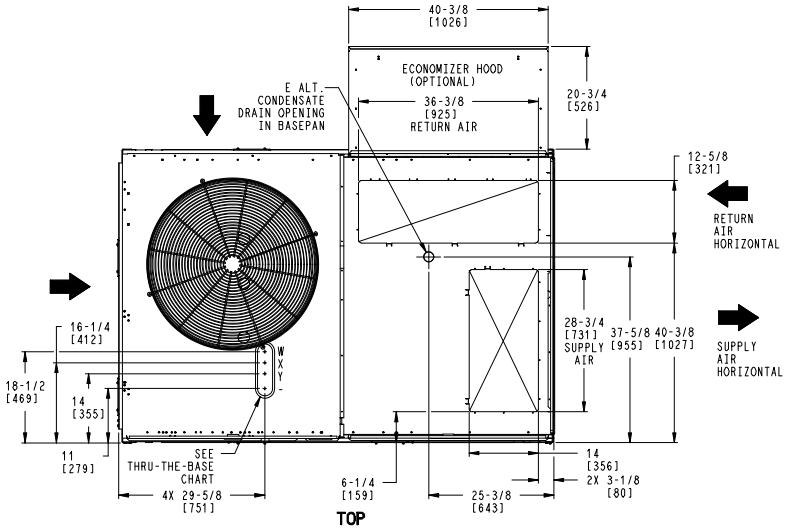
SUBMISSION OF THESE DRAWINGS OR DOCUMENTS DOES NOT CONSTITUTE PART PERFORMANCE OR ACCEPTANCE OF CONTRACT.

	CONNECTION SIZES
A	1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B	2 1/2" [64] DIA POWER SUPPLY KNOCKOUT
C	1 3/4" [51] DIA GAUGE ACCESS PLUG
D	7/8" [22] DIA FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN
G	2" [51] DIA POWER SUPPLY KNOCK-OUT

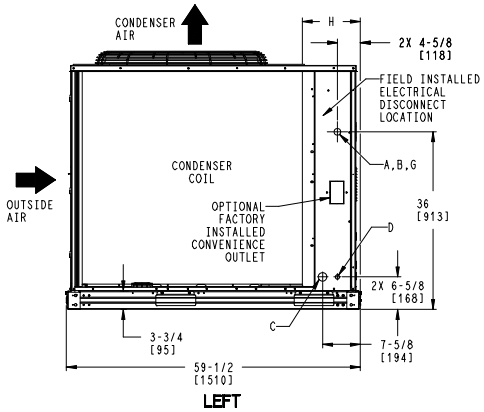
THRU-THE-BASE CHART THESE HOLES REQUIRED FOR USE CRBTMPWR002A01			
	THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
W	1/2"	ACC.	7/8" [22.2]
X	1/2"	24V	7/8" [22.2]
Y	1 1/4" (002)	POWER	1 3/4" [44.4]
	FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X & Y ARE PROVIDED		



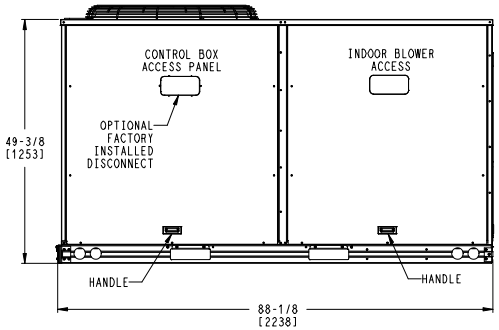
BACK



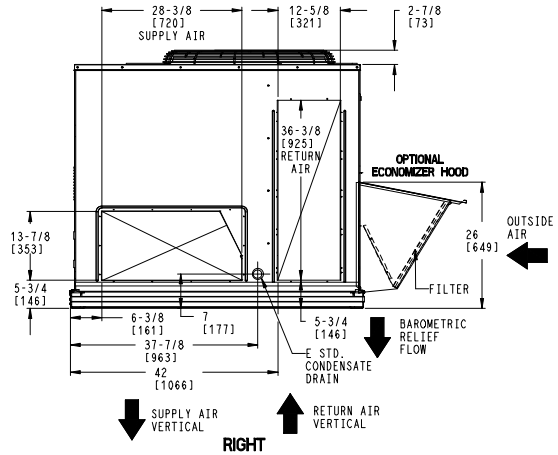
TOP



LEFT



FRONT

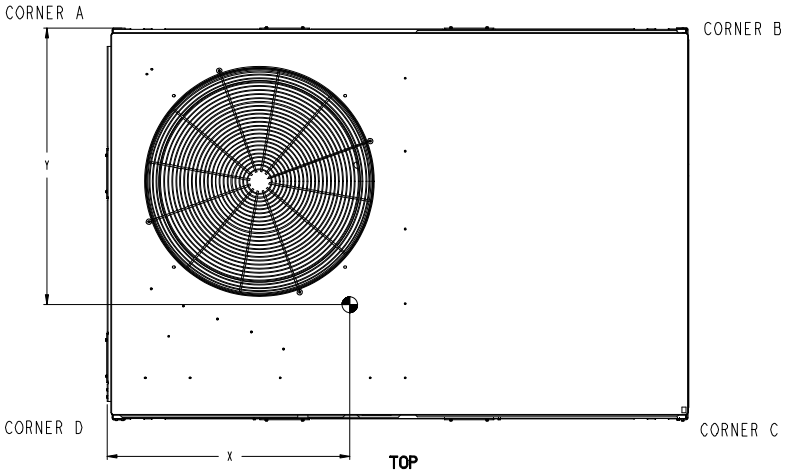


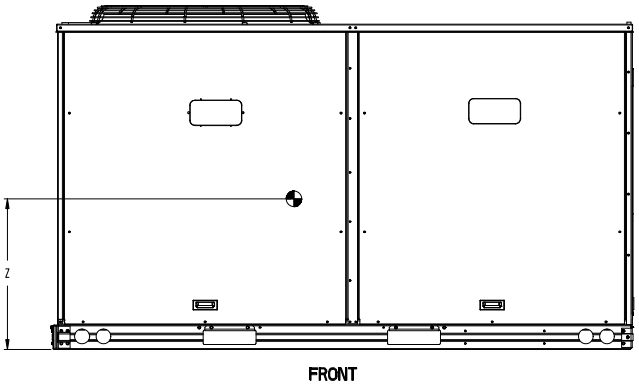
RIGHT

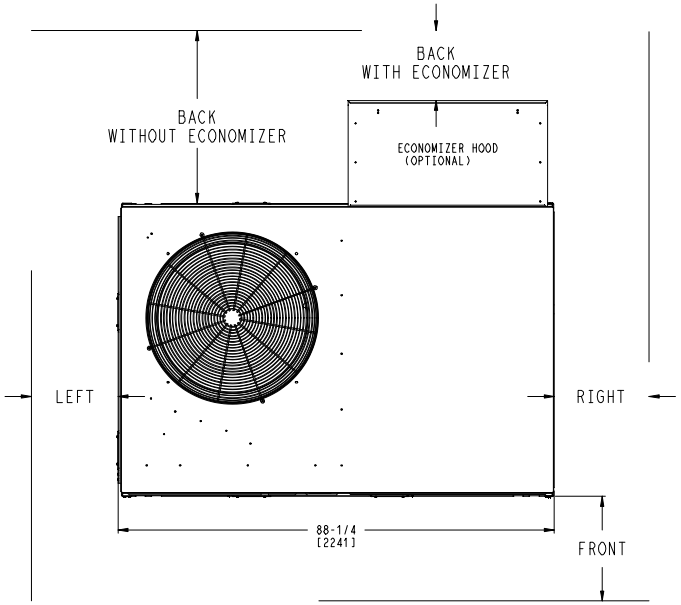
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	1 OF 3	04/01/22	-	50FCQ 12 SINGLE ZONE ELECTRICAL HEAT PUMP	48TM009024	-

UNIT	OUTDOOR COIL TYPE	STD. UNIT WEIGHT***		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		
		LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ-12	RTPF	955	433	190	86	243	110	293	133	229	104	49 1/2 [1257]	32 1/2 [826]	19 1/8 [486]
RTPF - ROUND TUBE, PLATE FIN (COPPER/ALUM)														

*** STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.







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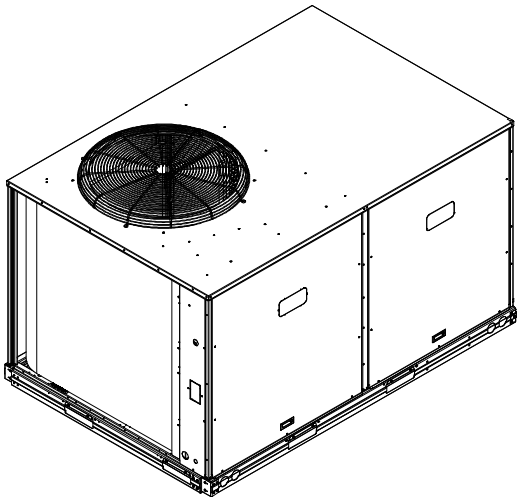
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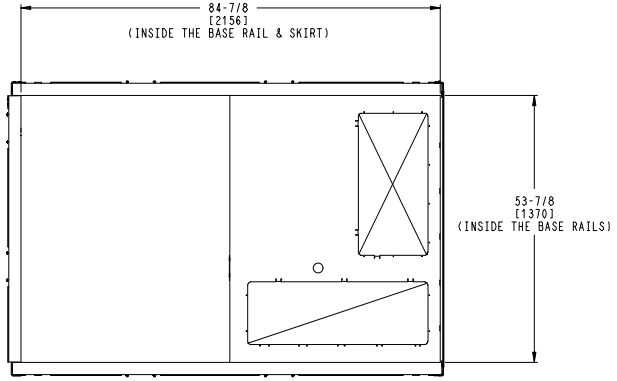
1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

CLEARANCE		
	SERVICE WITH:	SERVICE WITH:
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER
FRONT	48 [1219mm]	36 [914mm]
LEFT	48 [1219mm]	42 [1067mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]
BACK W/ECON	36 [914mm]	36 [914mm]
RIGHT	36 [914mm]	36 [914mm]
TOP	72 [1829mm]	72 [1829mm]

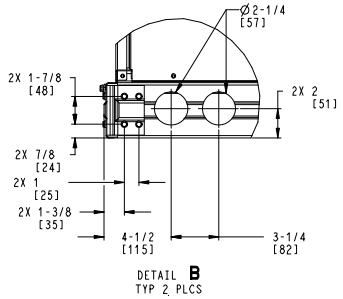
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	04/01/22	-	50FCQ 12 SINGLE ZONE ELECTRICAL HEAT PUMP	48TM009024	-

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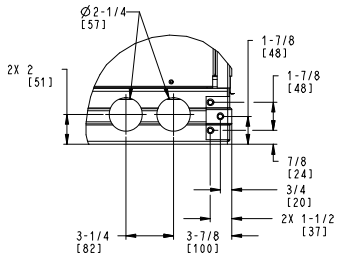




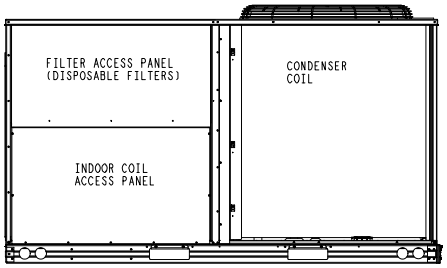
INSIDE BASERAIL DIMENSIONS
BOTTOM



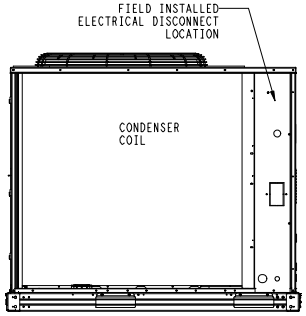
DETAIL **B**
TYP 2 PLCS



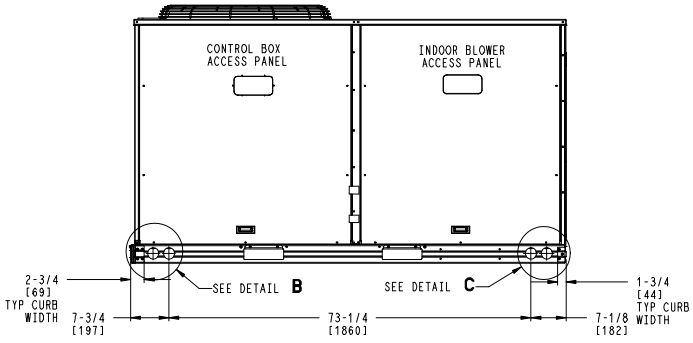
DETAIL **C**
TYP 2 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	04/01/22	-	50FCQ 12 SINGLE ZONE ELECTRICAL HEAT PUMP	48TM009024	-

Part Number:50FCQM12A2M6-3A0A0

ARI EER:	**11.00**	
IEER:	**15.0**	

Base Unit Dimensions

Unit Length:	**88.1**	in
Unit Width:	**59.5**	in
Unit Height:	**49.4**	in
Base Unit Weight (Does not include any accessories):	**955**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**4000**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**58.4**	F
Evaporator Leaving Air WB:	**57.1**	F
Evaporator Leaving Air Enthalpy:	**24.48**	BTU/lb
Gross Cooling Capacity:	**125.29**	MBH
Gross Sensible Capacity:	**93.44**	MBH
Compressor Power Input:	**8.85**	kW
Coil Bypass Factor:	**0.045**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.9**	F
Total Heating Capacity:	**116.40**	MBH
Integrated Heating Capacity:	**116.40**	MBH
Heating Power Input:	**9.44**	kW
High Temperature COP:	**3.40**	
Low Temperature COP:	**2.25**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**1716**	
Fan Power:	**1.72**	BHP
NOTE:	**Selected IFM RPM Range: 990 - 2000**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**
Compressor #1 RLA:	**7.7**
Compressor #1 LRA:	**52**
Compressor #2 RLA:	**7.7**
Compressor #2 LRA:	**52**
Indoor Fan Motor Type:	**MED**
Indoor Fan Motor FLA (Total):	**3**
Power Supply MCA:	**28**
Power Supply MOCP (Fuse or HACR):	**30**
Disconnect Size FLA:	**30**

Disconnect Size LRA: **115**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 7.4**

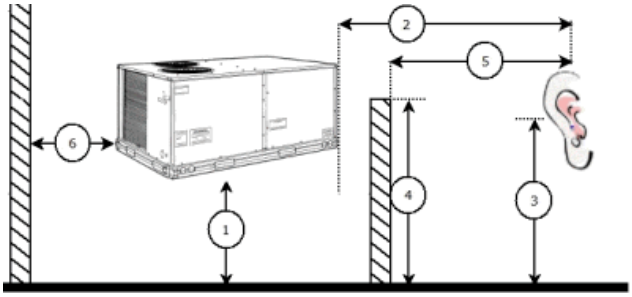
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	91.6	53.3	88.1
125 Hz	86.7	81.0	90.0
250 Hz	82.0	75.5	85.9
500 Hz	79.7	72.0	83.0
1000 Hz	80.8	71.1	81.6
2000 Hz	77.4	65.8	78.5
4000 Hz	71.7	56.3	76.4
8000 Hz	63.6	49.1	75.5
A-Weighted	84.7	75.3	87.0

Advanced Acoustics



Advanced Accoustics Parameters

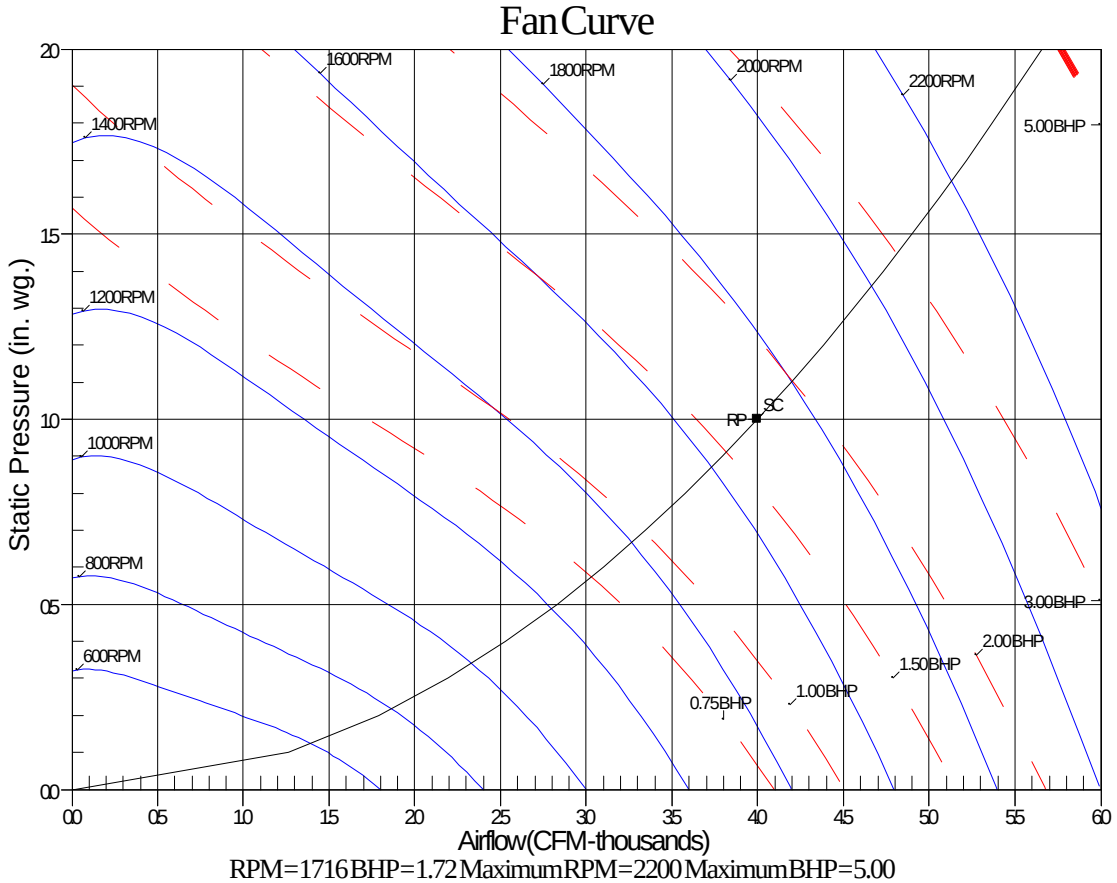
1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	88.1	90.0	85.9	83.0	81.6	78.5	76.4	75.5	94.0 Lw
B	61.9	73.9	77.3	79.8	81.6	79.7	77.4	74.4	87.0 LwA
C	55.7	57.6	53.5	50.6	49.2	46.1	44.0	43.1	61.6 Lp
D	29.5	41.5	44.9	47.4	49.2	47.3	45.0	42.0	54.6 LpA

Legend
A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



RPM=1716 BHP=1.72 Maximum RPM=2200 Maximum BHP=5.00
SC-System Curve RP-Rated Point

Bldg P - P2,4

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Bldg P - P2,4

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

Unit Parameters

Unit Model: **50FCQA05A2M6-3A0A0**
Unit Size: **05 (4 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Single Stage Compressor Models**
Duct Cfg: **Horizontal Supply / Horizontal Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **2' 9.375"**
Total Operating Weight: **488** lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **2**
Return Air Filter Size: **16 x 25 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

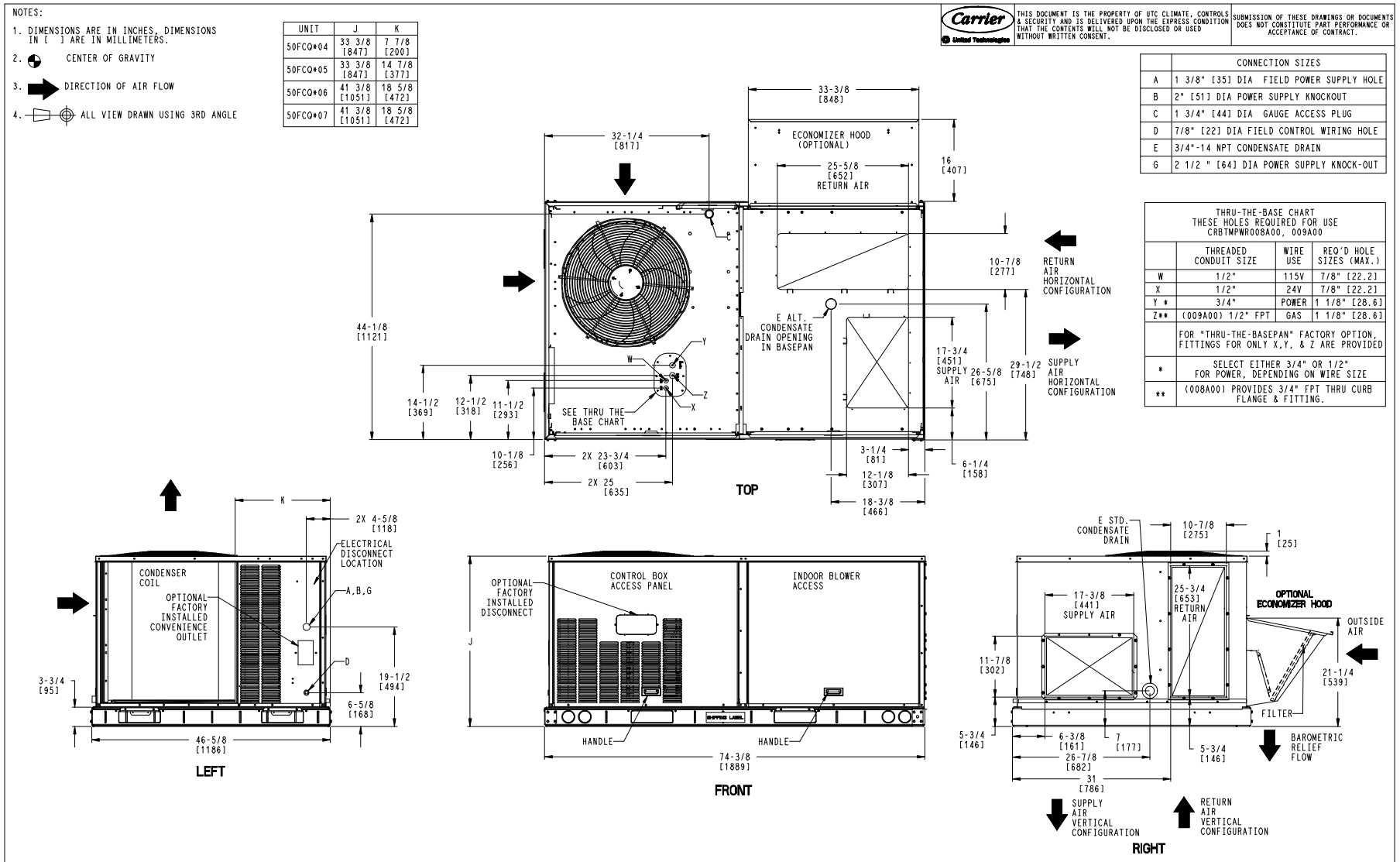
5-Year compressor parts (STD.)
1-Year parts (STD.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
50FCQA05A2M6-3A0A0	Rooftop Unit	2


NOTES:
1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE
UNIT | J | K
50FCQ*04 | 33 3/8 [847] | 7 7/8 [200]
50FCQ*05 | 33 3/8 [847] | 14 7/8 [377]
50FCQ*06 | 41 3/8 [1051] | 18 5/8 [472]
50FCQ*07 | 41 3/8 [1051] | 18 5/8 [472]
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CONNECTION SIZES
A | 1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B | 2" [51] DIA POWER SUPPLY KNOCKOUT
C | 1 3/4" [44] DIA GAUGE ACCESS PLUG
D | 7/8" [22] DIA FIELD CONTROL WIRING HOLE
E | 3/4"-14 NPT CONDENSATE DRAIN
G | 2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT
THRU-THE-BASE CHART
THESE HOLES REQUIRED FOR USE CRBTMPWR008A00, 009A00
THREADED CONDUIT SIZE | WIRE USE | REQ'D HOLE SIZES (MAX.)
W | 1/2" | 115V | 7/8" [22.2]
X | 1/2" | 24V | 7/8" [22.2]
Y * | 3/4" | POWER | 1 1/8" [28.6]
Z** | (009A00) 1/2" FPT | GAS | 1 1/8" [28.6]
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X,Y, & Z ARE PROVIDED
* SELECT EITHER 3/4" OR 1/2" FOR POWER, DEPENDING ON WIRE SIZE
** (008A00) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.
33-3/8 [848]
32-1/4 [817]
ECONOMIZER HOOD (OPTIONAL)
25-5/8 [652] RETURN AIR
16 [407]
10-7/8 [277]
RETURN AIR HORIZONTAL CONFIGURATION
44-1/8 [1121]
E ALT. CONDENSATE DRAIN OPENING IN BASEPAN
17-3/4 [451] SUPPLY AIR
26-5/8 [675]
29-1/2 [748]
SUPPLY AIR HORIZONTAL CONFIGURATION
14-1/2 [369]
12-1/2 [318]
11-1/2 [293]
SEE THRU THE BASE CHART
10-1/8 [256]
2X 23-3/4 [603]
2X 25 [635]
3-1/4 [81]
12-1/8 [307]
18-3/8 [466]
6-1/4 [158]
TOP
K
2X 4-5/8 [118]
ELECTRICAL DISCONNECT LOCATION
CONDENSER COIL
OPTIONAL FACTORY INSTALLED CONVENIENCE OUTLET
A,B,G
D
3-3/4 [95]
19-1/2 [494]
6-5/8 [168]
46-5/8 [1186]
LEFT
OPTIONAL FACTORY INSTALLED DISCONNECT
CONTROL BOX ACCESS PANEL
INDOOR BLOWER ACCESS
J
HANDLE
HANDLE
74-3/8 [1889]
FRONT
E STD. CONDENSATE DRAIN
10-7/8 [275]
1 [25]
17-3/8 [441] SUPPLY AIR
25-3/4 [653] RETURN AIR
OPTIONAL ECONOMIZER HOOD
OUTSIDE AIR
11-7/8 [302]
21-1/4 [539]
FILTER
5-3/4 [146]
6-3/8 [161]
7 [177]
5-3/4 [146]
26-7/8 [682]
31 [786]
BAROMETRIC RELIEF FLOW
SUPPLY AIR VERTICAL CONFIGURATION
RETURN AIR VERTICAL CONFIGURATION
RIGHT
ITC CLASSIFICATION U.S. ECCN:NSR
SHEET 1 OF 3
DATE 08/15/19
SUPERCEDES -
50FCQ 04-07 SINGLE PACKAGE HEAT PUMP
48TC003348
REV -

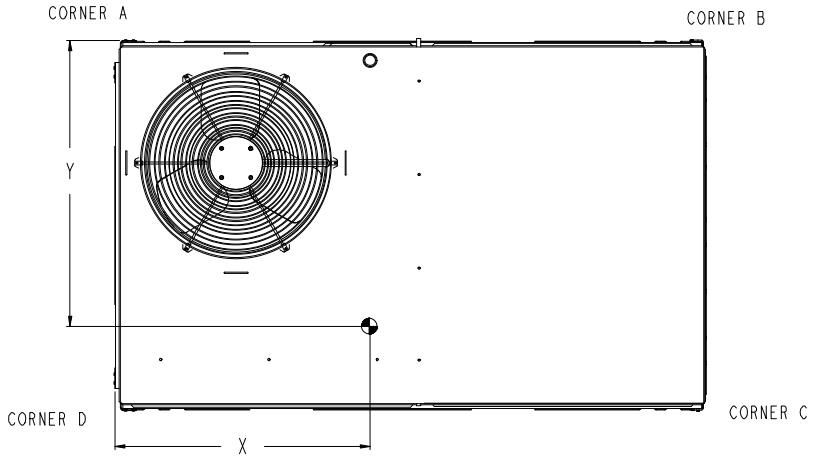
UNIT	STD. UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ*04	467	212	126	57	118	53	108	49	115	52	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*05	473	215	127	58	119	54	110	50	117	53	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*06	584	265	160	72	145	66	133	60	146	66	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]
50FCQ*07	589	267	161	73	146	66	134	61	147	67	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]

* STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.

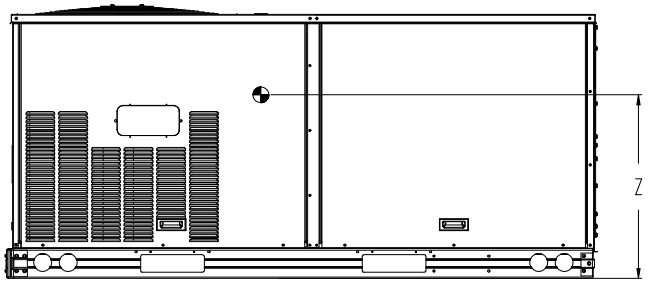
Carrier United Technologies

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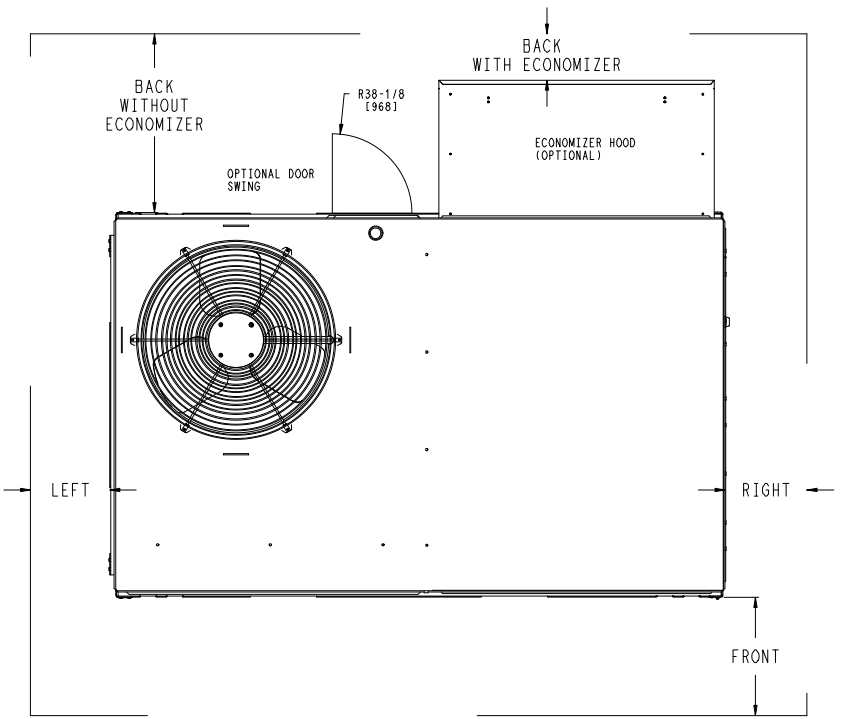
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TOP



FRONT



NOTE:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

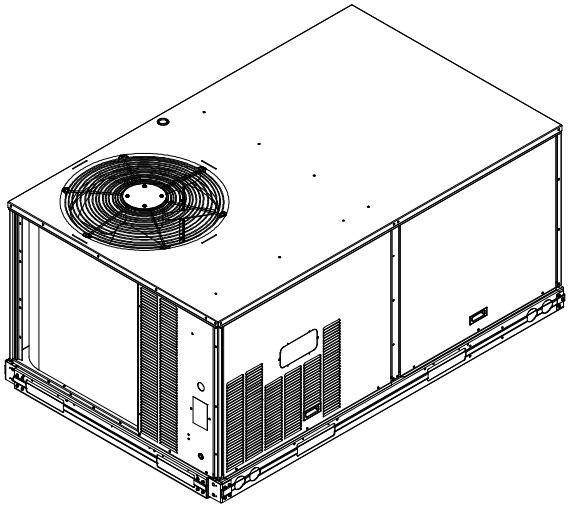
	CLEARANCE		
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/ECON	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

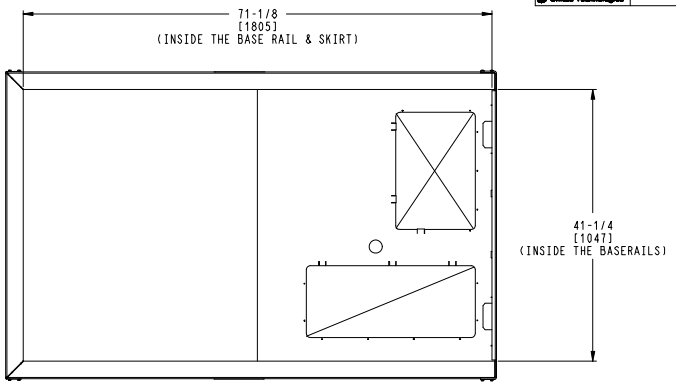
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

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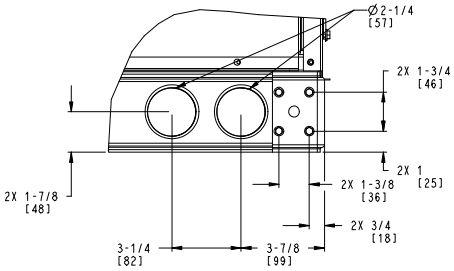
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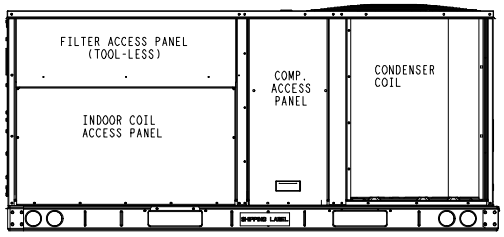


INSIDE BASERAIL DIMENSIONS

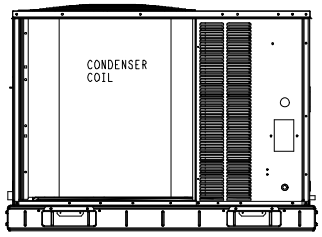
BOTTOM



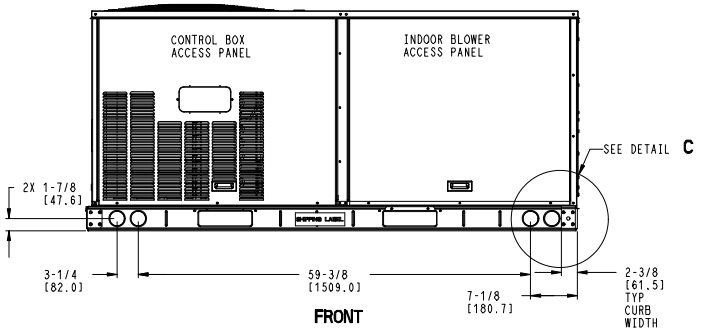
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

Part Number:50FCQA05A2M6-3A0A0

ARI SEER:	**14.30**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**33.4**	in

Operating Weight

Base Unit Weight:	**473**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**13**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**488**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**1600**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**58.1**	F
Evaporator Leaving Air WB:	**57.2**	F
Evaporator Leaving Air Enthalpy:	**24.50**	BTU/lb
Gross Cooling Capacity:	**49.92**	MBH
Gross Sensible Capacity:	**37.82**	MBH
Compressor Power Input:	**3.53**	kW
Coil Bypass Factor:	**0.109**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.7**	F
Total Heating Capacity:	**46.10**	MBH
Integrated Heating Capacity:	**46.10**	MBH
Heating Power Input:	**3.08**	kW
High Temperature COP:	**3.70**	
Low Temperature COP:	**2.28**	
HSPF:	**8.2**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**1944**	
Fan Power:	**0.79**	BHP
NOTE:	**Selected IFM RPM Range: 217 - 2170**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**	
Compressor #1 RLA:	**6.2**	
Compressor #1 LRA:	**41**	
Indoor Fan Motor Type:	**MED**	
Indoor Fan Motor Eff.:	**Null**	

Indoor Fan Motor FLA (Total): **1.7**
Power Supply MCA: **11**
Power Supply MOCP (Fuse or HACR): **15**
Disconnect Size FLA: **10**
Disconnect Size LRA: **45**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

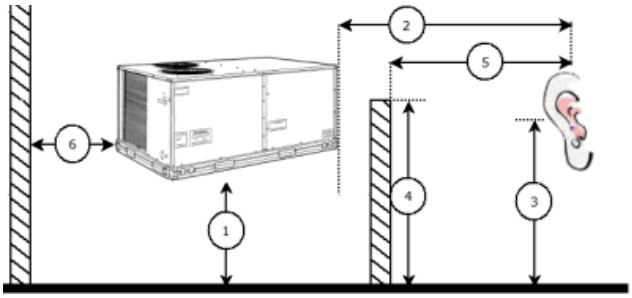
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	93.5	91.0	85.6
125 Hz	84.5	79.5	84.7
250 Hz	78.2	72.7	80.5
500 Hz	72.8	65.8	76.0
1000 Hz	69.5	67.6	72.4
2000 Hz	66.3	58.5	68.0
4000 Hz	63.4	52.7	62.8
8000 Hz	60.0	46.0	59.3
A-Weighted	76.9	72.2	79.0

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	85.6	84.7	80.5	76.0	72.4	68.0	62.8	59.3	89.2 Lw
B	59.4	68.6	71.9	72.8	72.4	69.2	63.8	58.2	78.5 LwA
C	53.2	52.3	48.1	43.6	40.0	35.6	30.4	26.9	56.8 Lp
D	27.0	36.2	39.5	40.4	40.0	36.8	31.4	25.8	46.1 LpA

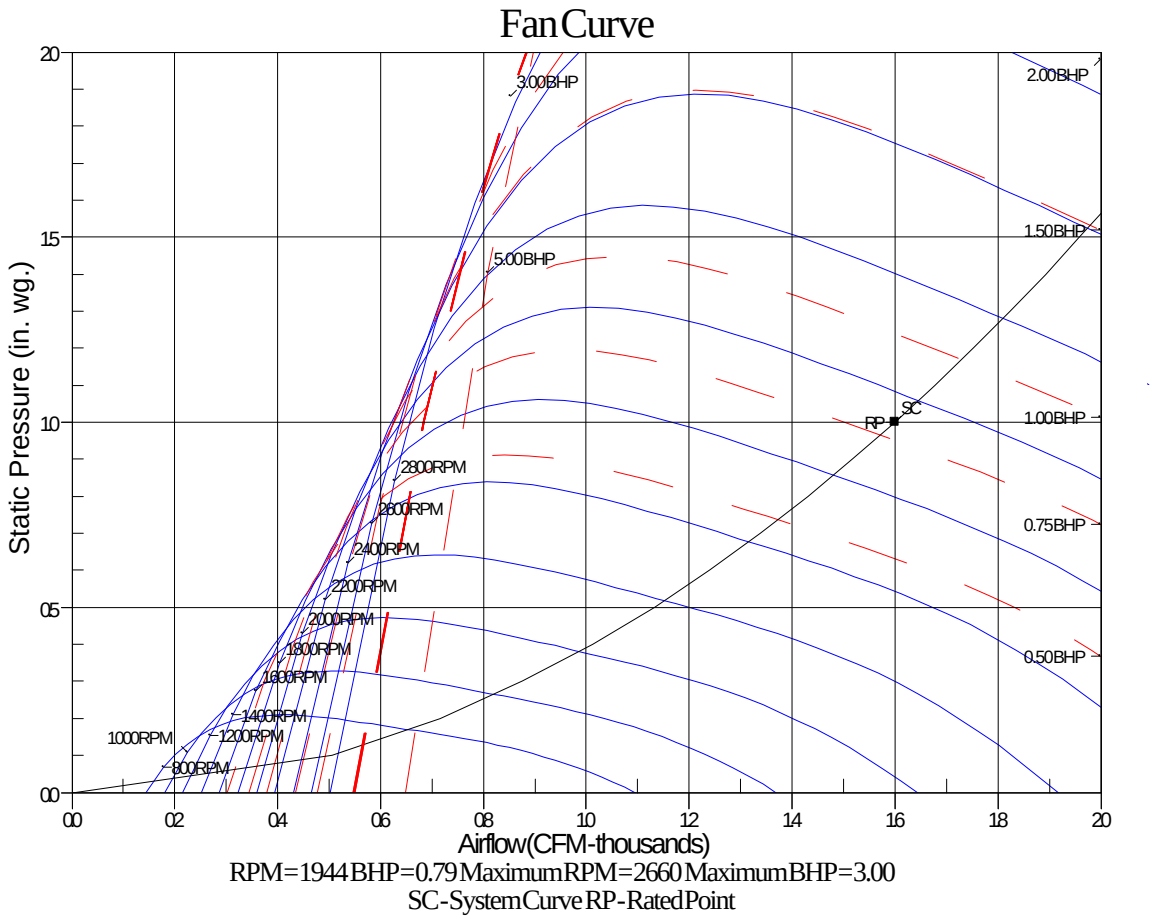
Legend

Performance Summary For Bldg P - P2,4

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



Bldg P - P1,3

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Bldg P - P1,3

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

Unit Parameters

Unit Model: **50FCQA06A2M6-3A0A0**
Unit Size: **06 (5 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Single Stage Compressor Models**
Duct Cfg: **Horizontal Supply / Horizontal Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **3' 5.375"**
Total Operating Weight: 599 lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **4**
Return Air Filter Size: **16 x 16 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

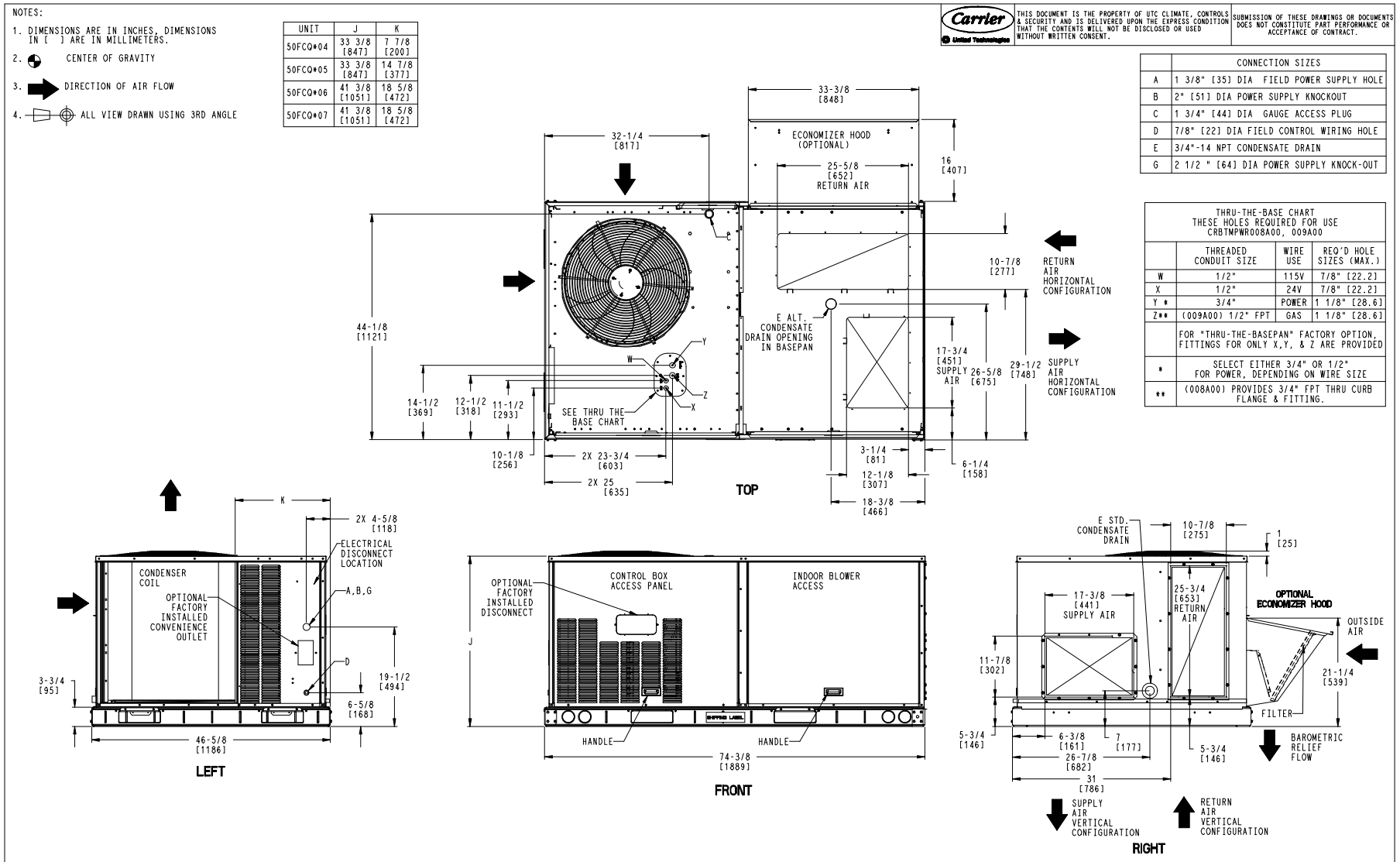
5-Year compressor parts (STD.)
1-Year parts (STD.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
50FCQA06A2M6-3A0A0	Rooftop Unit	2


NOTES:
1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE
UNIT | J | K
50FCQ*04 | 33 3/8 [847] | 7 7/8 [200]
50FCQ*05 | 33 3/8 [847] | 14 7/8 [377]
50FCQ*06 | 41 3/8 [1051] | 18 5/8 [472]
50FCQ*07 | 41 3/8 [1051] | 18 5/8 [472]
Carrier
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CONNECTION SIZES
A | 1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B | 2" [51] DIA POWER SUPPLY KNOCKOUT
C | 1 3/4" [44] DIA GAUGE ACCESS PLUG
D | 7/8" [22] DIA FIELD CONTROL WIRING HOLE
E | 3/4"-14 NPT CONDENSATE DRAIN
G | 2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT
THRU-THE-BASE CHART
THESE HOLES REQUIRED FOR USE CRBTMPWR008A00, 009A00
THREADED CONDUIT SIZE | WIRE USE | REQ'D HOLE SIZES (MAX.)
W | 1/2" | 115V | 7/8" [22.2]
X | 1/2" | 24V | 7/8" [22.2]
Y * | 3/4" | POWER | 1 1/8" [28.6]
Z** | (009A00) 1/2" FPT | GAS | 1 1/8" [28.6]
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X,Y, & Z ARE PROVIDED
* SELECT EITHER 3/4" OR 1/2" FOR POWER, DEPENDING ON WIRE SIZE
** (008A00) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.
33-3/8 [848]
ECONOMIZER HOOD (OPTIONAL)
32-1/4 [817]
25-5/8 [652] RETURN AIR
16 [407]
10-7/8 [277]
RETURN AIR HORIZONTAL CONFIGURATION
44-1/8 [1121]
E ALT. CONDENSATE DRAIN OPENING IN BASEPAN
17-3/4 [451] SUPPLY AIR
26-5/8 [675]
29-1/2 [748]
SUPPLY AIR HORIZONTAL CONFIGURATION
14-1/2 [369]
12-1/2 [318]
11-1/2 [293]
SEE THRU THE BASE CHART
10-1/8 [256]
2X 23-3/4 [603]
2X 25 [635]
3-1/4 [81]
12-1/8 [307]
18-3/8 [466]
6-1/4 [158]
TOP
K
2X 4-5/8 [118]
ELECTRICAL DISCONNECT LOCATION
CONDENSER COIL
OPTIONAL FACTORY INSTALLED CONVENIENCE OUTLET
A,B,G
D
3-3/4 [95]
19-1/2 [494]
6-5/8 [168]
46-5/8 [1186]
LEFT
OPTIONAL FACTORY INSTALLED DISCONNECT
CONTROL BOX ACCESS PANEL
INDOOR BLOWER ACCESS
J
HANDLE
HANDLE
74-3/8 [1889]
FRONT
E STD. CONDENSATE DRAIN
10-7/8 [275]
1 [25]
17-3/8 [441] SUPPLY AIR
25-3/4 [653] RETURN AIR
OPTIONAL ECONOMIZER HOOD
OUTSIDE AIR
11-7/8 [302]
21-1/4 [539]
FILTER
5-3/4 [146]
6-3/8 [161]
7 [177]
5-3/4 [146]
26-7/8 [682]
31 [786]
BAROMETRIC RELIEF FLOW
SUPPLY AIR VERTICAL CONFIGURATION
RETURN AIR VERTICAL CONFIGURATION
RIGHT
ITC CLASSIFICATION U.S. ECCN:NSR
SHEET 1 OF 3
DATE 08/15/19
SUPERCEDES -
50FCQ 04-07 SINGLE PACKAGE HEAT PUMP
48TC003348
REV -

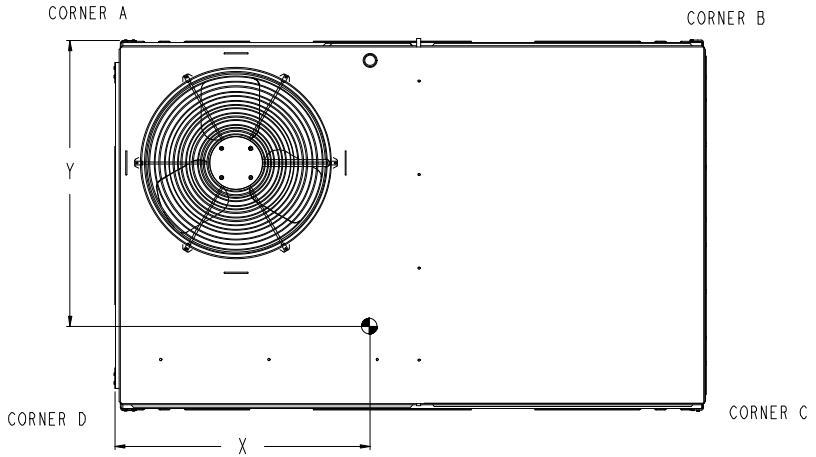
UNIT	STD. UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ*04	467	212	126	57	118	53	108	49	115	52	36 [914]	22 3/8 [568]	16 1/8 [410]
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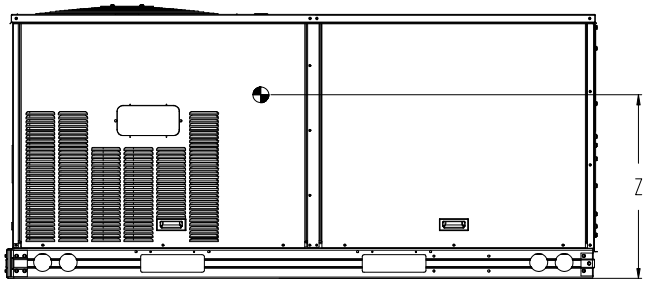
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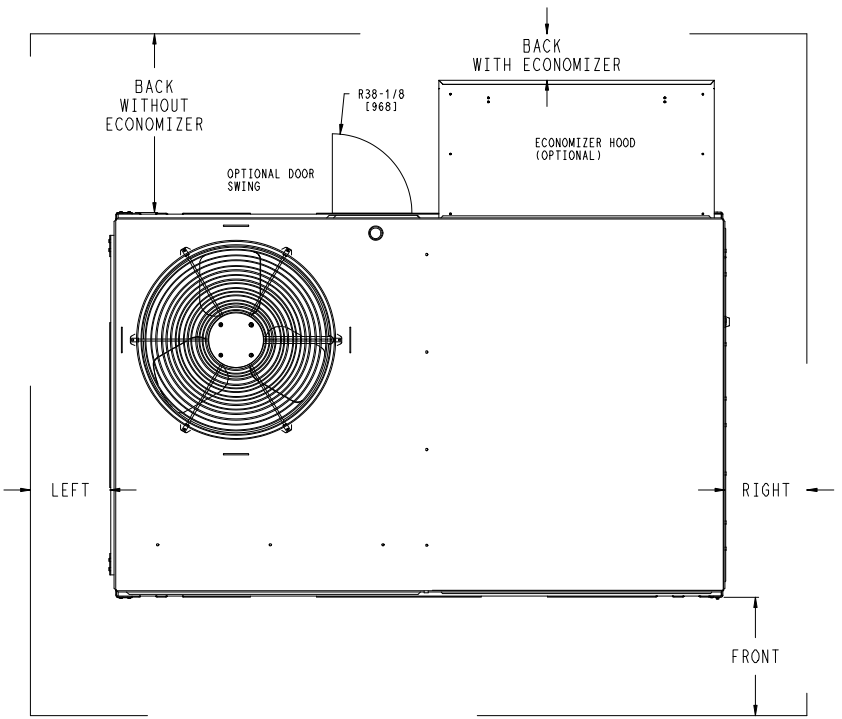
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TOP



FRONT



NOTE:

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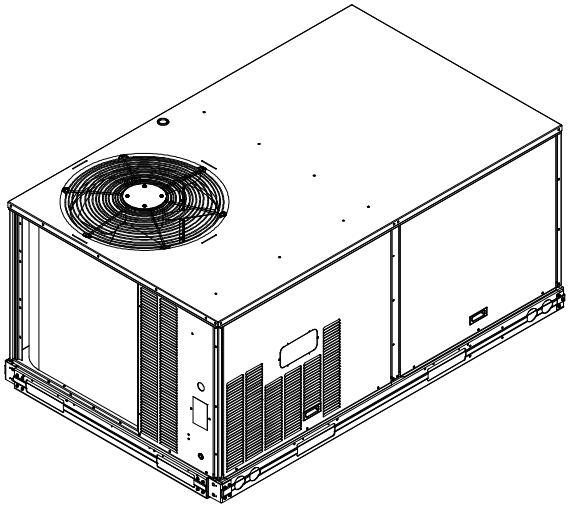
CLEARANCE			
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
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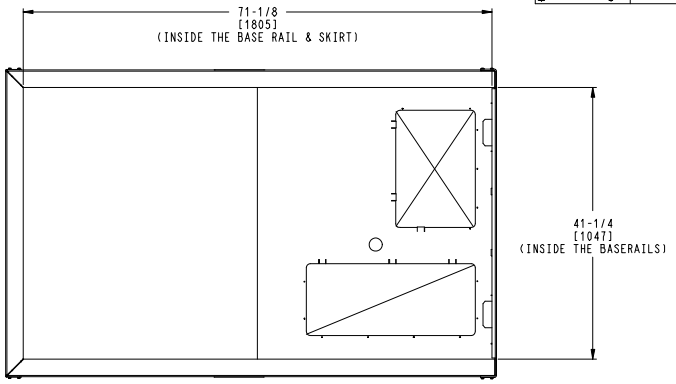
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

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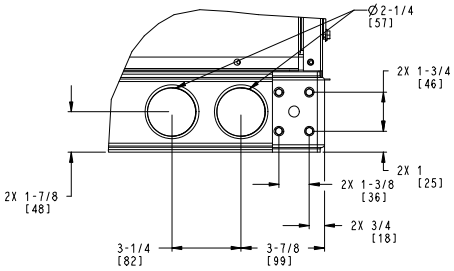
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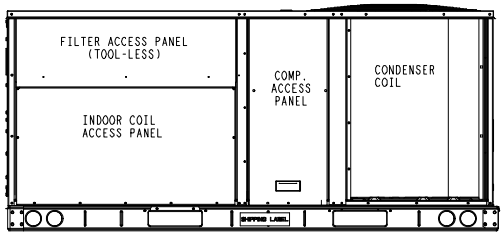


INSIDE BASERAIL DIMENSIONS

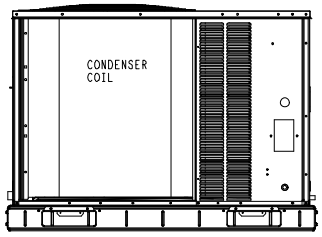
BOTTOM



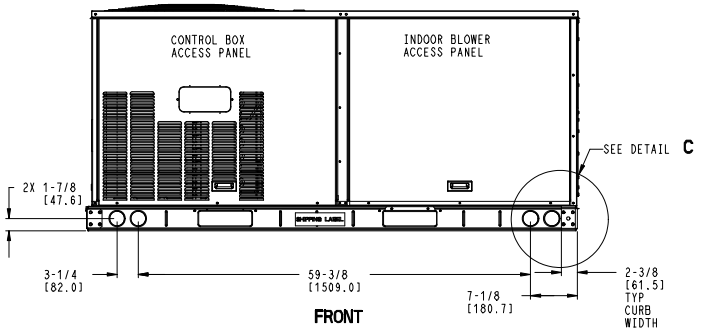
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

Part Number:50FCQA06A2M6-3A0A0

ARI SEER:	**14.30**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**41.4**	in

Operating Weight

Base Unit Weight:	**584**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**13**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**599**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**2000**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**57.3**	F
Evaporator Leaving Air WB:	**57.3**	F
Evaporator Leaving Air Enthalpy:	**24.56**	BTU/lb
Gross Cooling Capacity:	**61.90**	MBH
Gross Sensible Capacity:	**48.96**	MBH
Compressor Power Input:	**4.19**	kW
Coil Bypass Factor:	**0.027**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.3**	F
Total Heating Capacity:	**56.80**	MBH
Integrated Heating Capacity:	**56.80**	MBH
Heating Power Input:	**3.77**	kW
High Temperature COP:	**3.80**	
Low Temperature COP:	**2.30**	
HSPF:	**8.2**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**1995**	
Fan Power:	**0.85**	BHP
NOTE:	**Selected IFM RPM Range: 239 - 2390**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**	
Compressor #1 RLA:	**7.8**	
Compressor #1 LRA:	**52**	
Indoor Fan Motor Type:	**MED**	
Indoor Fan Motor Eff.:	**Null**	

Indoor Fan Motor FLA (Total): **2.1**
Power Supply MCA: **13**
Power Supply MOCP (Fuse or HACR): **20**
Disconnect Size FLA: **12**
Disconnect Size LRA: **57**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

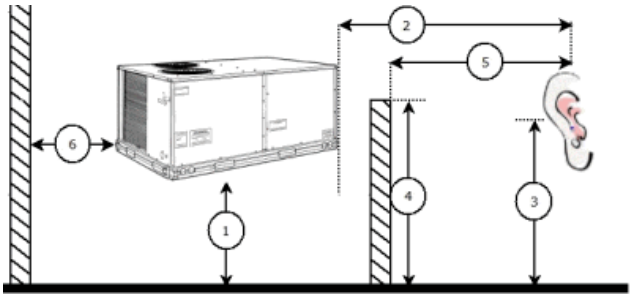
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	91.7	90.2	85.6
125 Hz	82.8	79.0	84.7
250 Hz	76.9	72.0	80.5
500 Hz	73.4	65.7	76.0
1000 Hz	70.0	67.9	72.4
2000 Hz	67.1	58.7	68.0
4000 Hz	63.8	52.5	62.8
8000 Hz	60.1	46.3	59.3
A-Weighted	76.6	72.0	79.0

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	85.6	84.7	80.5	76.0	72.4	68.0	62.8	59.3	89.2 Lw
B	59.4	68.6	71.9	72.8	72.4	69.2	63.8	58.2	78.5 LwA
C	53.2	52.3	48.1	43.6	40.0	35.6	30.4	26.9	56.8 Lp
D	27.0	36.2	39.5	40.4	40.0	36.8	31.4	25.8	46.1 LpA

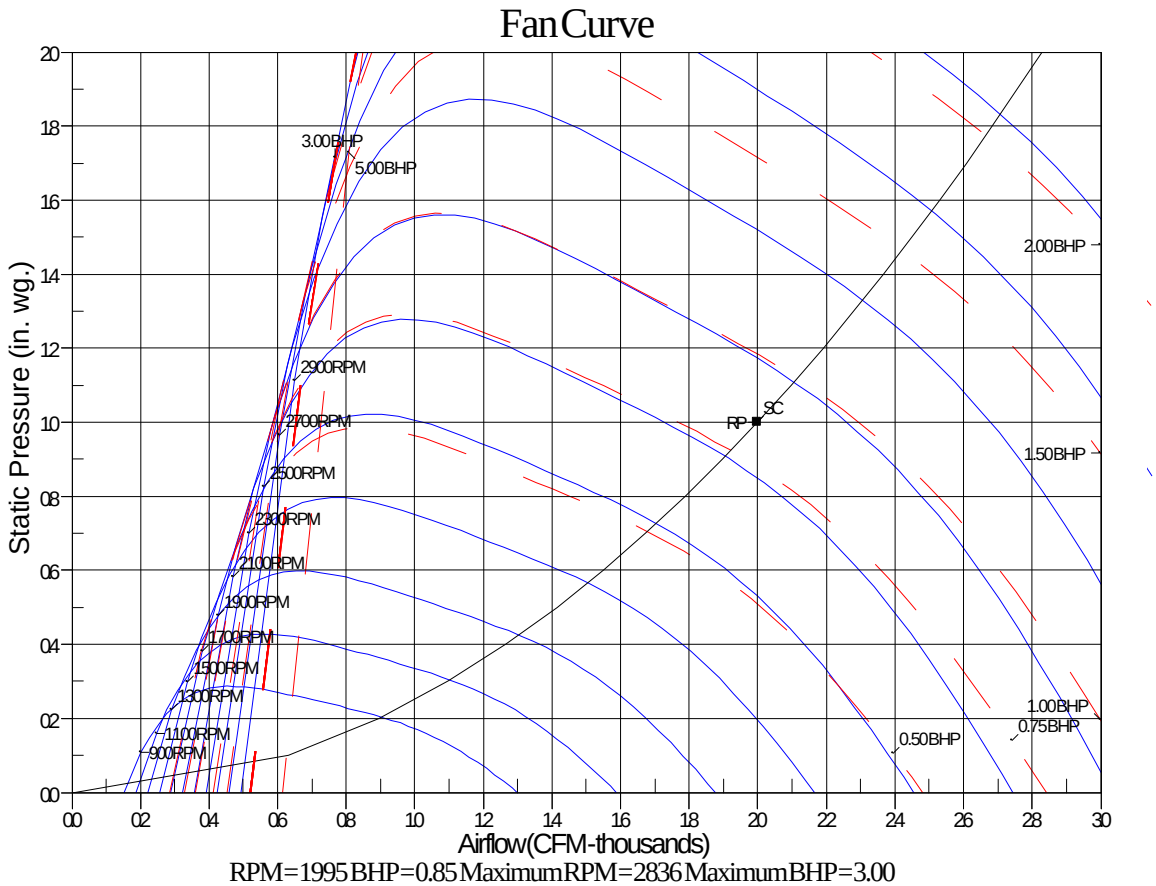
Legend

Performance Summary For Bldg P - P1,3

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



Bldg Q - AC 1,2

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Bldg Q - AC 1,2

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

Unit Parameters

Unit Model: **50FCQA05A2M6-3A0A0**
Unit Size: **05 (4 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Single Stage Compressor Models**
Duct Cfg: **Horizontal Supply / Horizontal Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **2' 9.375"**
Total Operating Weight: **488** lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **2**
Return Air Filter Size: **16 x 25 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

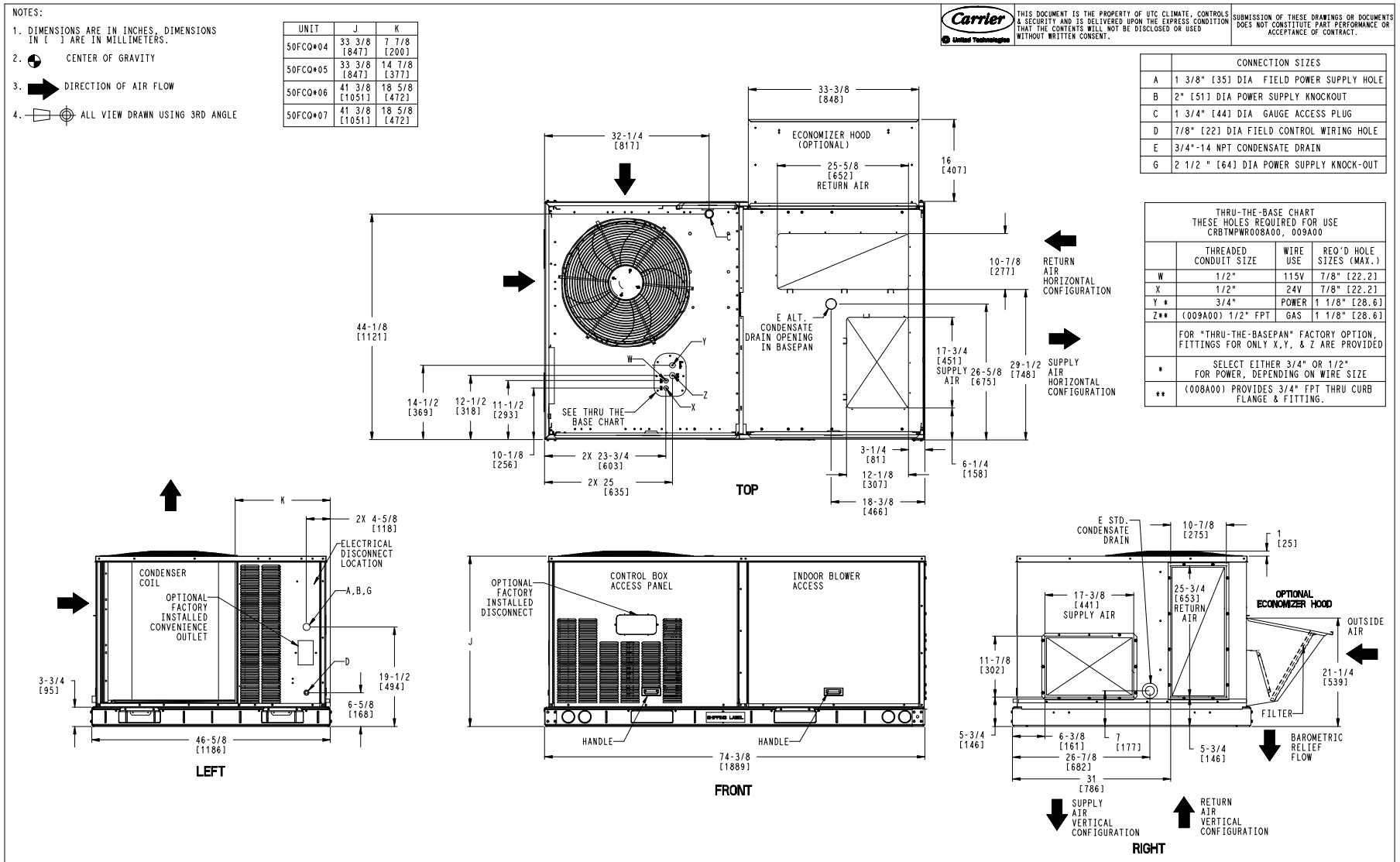
5-Year compressor parts (STD.)
1-Year parts (STD.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
50FCQA05A2M6-3A0A0	Rooftop Unit	2


NOTES:
1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE
UNIT | J | K
50FCQ*04 | 33 3/8 [847] | 7 7/8 [200]
50FCQ*05 | 33 3/8 [847] | 14 7/8 [377]
50FCQ*06 | 41 3/8 [1051] | 18 5/8 [472]
50FCQ*07 | 41 3/8 [1051] | 18 5/8 [472]
Carrier
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SUBMISSION OF THESE DRAWINGS OR DOCUMENTS DOES NOT CONSTITUTE PART PERFORMANCE OR ACCEPTANCE OF CONTRACT.
CONNECTION SIZES
A | 1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B | 2" [51] DIA POWER SUPPLY KNOCKOUT
C | 1 3/4" [44] DIA GAUGE ACCESS PLUG
D | 7/8" [22] DIA FIELD CONTROL WIRING HOLE
E | 3/4"-14 NPT CONDENSATE DRAIN
G | 2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT
THRU-THE-BASE CHART
THESE HOLES REQUIRED FOR USE CRBTMPWR008A00, 009A00
THREADED CONDUIT SIZE | WIRE USE | REQ'D HOLE SIZES (MAX.)
W | 1/2" | 115V | 7/8" [22.2]
X | 1/2" | 24V | 7/8" [22.2]
Y * | 3/4" | POWER | 1 1/8" [28.6]
Z** | (009A00) 1/2" FPT | GAS | 1 1/8" [28.6]
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X,Y, & Z ARE PROVIDED
* SELECT EITHER 3/4" OR 1/2" FOR POWER, DEPENDING ON WIRE SIZE
** (008A00) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.
33-3/8 [848]
32-1/4 [817]
ECONOMIZER HOOD (OPTIONAL)
25-5/8 [652] RETURN AIR
16 [407]
10-7/8 [277]
RETURN AIR HORIZONTAL CONFIGURATION
44-1/8 [1121]
E ALT. CONDENSATE DRAIN OPENING IN BASEPAN
17-3/4 [451] SUPPLY AIR
26-5/8 [675]
29-1/2 [748]
SUPPLY AIR HORIZONTAL CONFIGURATION
14-1/2 [369]
12-1/2 [318]
11-1/2 [293]
SEE THRU THE BASE CHART
10-1/8 [256]
2X 23-3/4 [603]
2X 25 [635]
3-1/4 [81]
12-1/8 [307]
18-3/8 [466]
6-1/4 [158]
TOP
K
2X 4-5/8 [118]
ELECTRICAL DISCONNECT LOCATION
CONDENSER COIL
OPTIONAL FACTORY INSTALLED CONVENIENCE OUTLET
A,B,G
D
3-3/4 [95]
19-1/2 [494]
6-5/8 [168]
46-5/8 [1186]
LEFT
OPTIONAL FACTORY INSTALLED DISCONNECT
CONTROL BOX ACCESS PANEL
INDOOR BLOWER ACCESS
J
HANDLE
HANDLE
74-3/8 [1889]
FRONT
E STD. CONDENSATE DRAIN
10-7/8 [275]
1 [25]
17-3/8 [441] SUPPLY AIR
25-3/4 [653] RETURN AIR
OPTIONAL ECONOMIZER HOOD
OUTSIDE AIR
11-7/8 [302]
21-1/4 [539]
FILTER
5-3/4 [146]
6-3/8 [161]
7 [177]
5-3/4 [146]
26-7/8 [682]
31 [786]
BAROMETRIC RELIEF FLOW
SUPPLY AIR VERTICAL CONFIGURATION
RETURN AIR VERTICAL CONFIGURATION
RIGHT
ITC CLASSIFICATION: U.S. ECCN:NSR
SHEET: 1 OF 3
DATE: 08/15/19
SUPERCEDES: -
50FCQ 04-07 SINGLE PACKAGE HEAT PUMP
48TC003348
REV: -

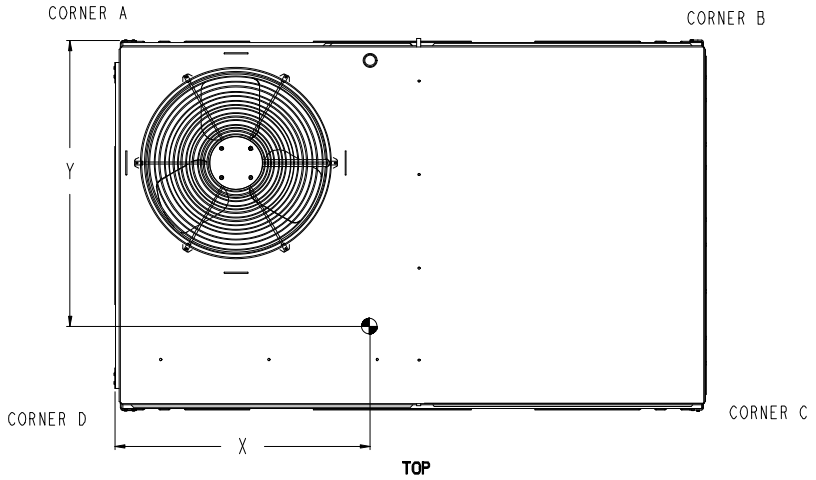
UNIT	STD. UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ*04	467	212	126	57	118	53	108	49	115	52	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*05	473	215	127	58	119	54	110	50	117	53	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*06	584	265	160	72	145	66	133	60	146	66	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]
50FCQ*07	589	267	161	73	146	66	134	61	147	67	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]

* STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.

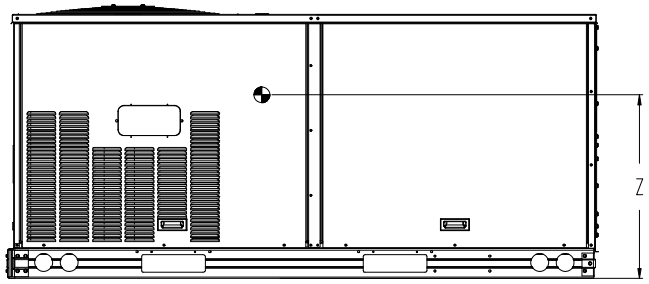
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United Technologies

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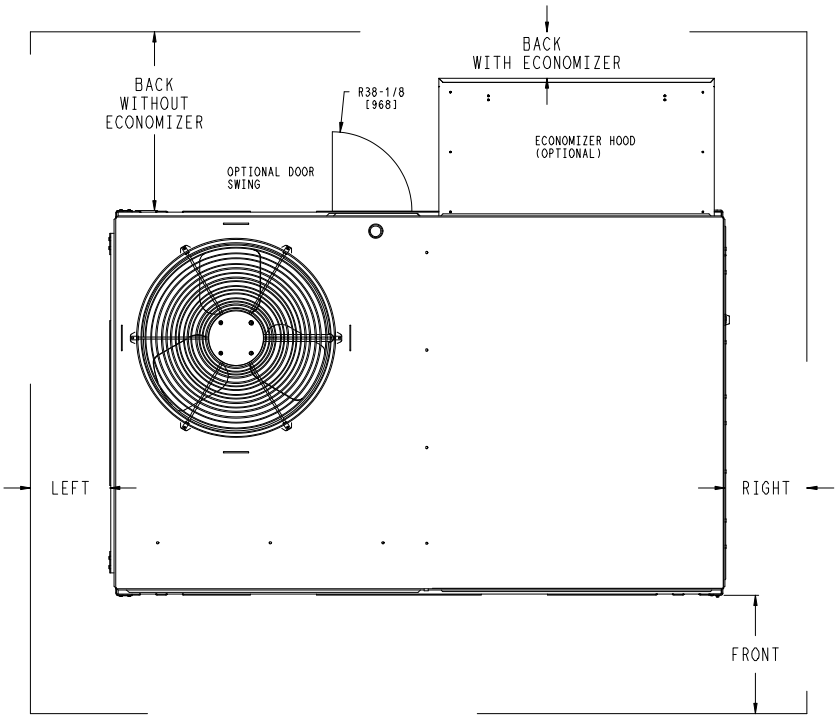
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TOP



FRONT



NOTE:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

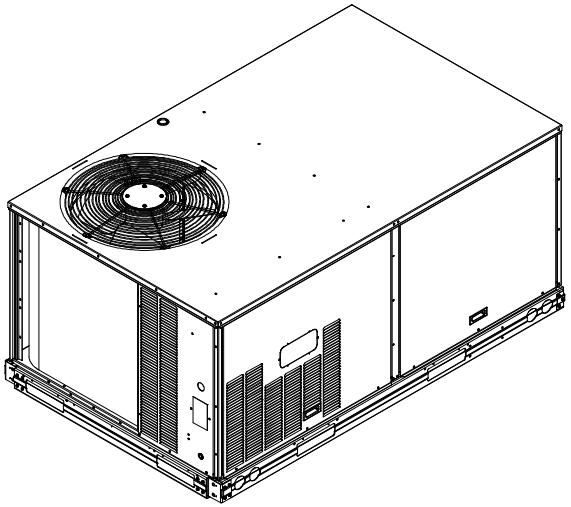
CLEARANCE			
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/ECON	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

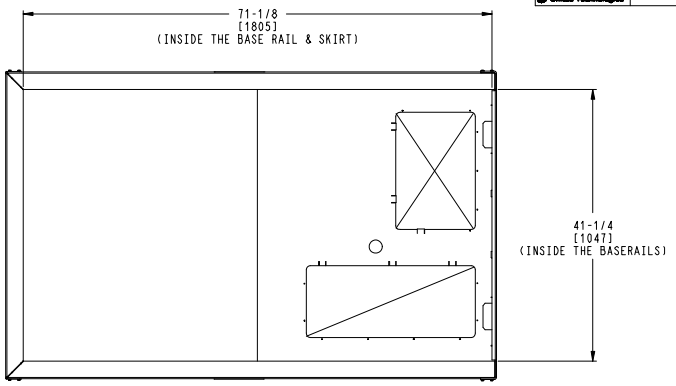
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

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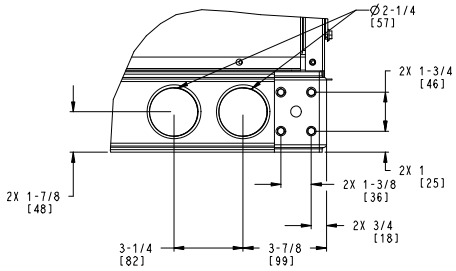
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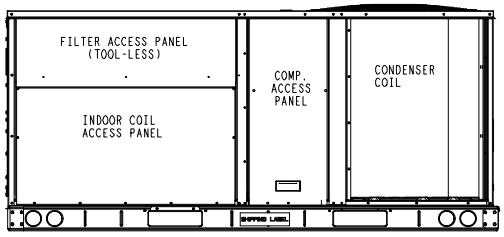


INSIDE BASERAIL DIMENSIONS

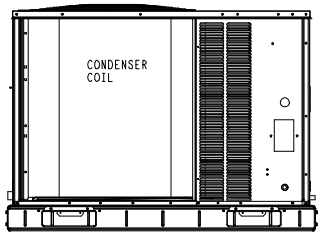
BOTTOM



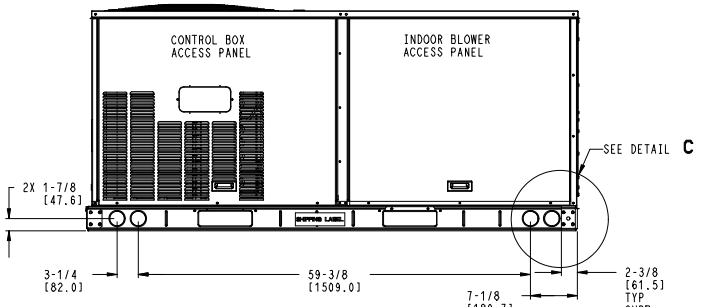
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

Part Number:50FCQA05A2M6-3A0A0

ARI SEER:	**14.30**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**33.4**	in

Operating Weight

Base Unit Weight:	**473**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**13**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**488**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**1600**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**58.1**	F
Evaporator Leaving Air WB:	**57.2**	F
Evaporator Leaving Air Enthalpy:	**24.50**	BTU/lb
Gross Cooling Capacity:	**49.92**	MBH
Gross Sensible Capacity:	**37.82**	MBH
Compressor Power Input:	**3.53**	kW
Coil Bypass Factor:	**0.109**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.7**	F
Total Heating Capacity:	**46.10**	MBH
Integrated Heating Capacity:	**46.10**	MBH
Heating Power Input:	**3.08**	kW
High Temperature COP:	**3.70**	
Low Temperature COP:	**2.28**	
HSPF:	**8.2**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**1944**	
Fan Power:	**0.79**	BHP
NOTE:	**Selected IFM RPM Range: 217 - 2170**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**	
Compressor #1 RLA:	**6.2**	
Compressor #1 LRA:	**41**	
Indoor Fan Motor Type:	**MED**	
Indoor Fan Motor Eff.:	**Null**	

Indoor Fan Motor FLA (Total): **1.7**
Power Supply MCA: **11**
Power Supply MOCP (Fuse or HACR): **15**
Disconnect Size FLA: **10**
Disconnect Size LRA: **45**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

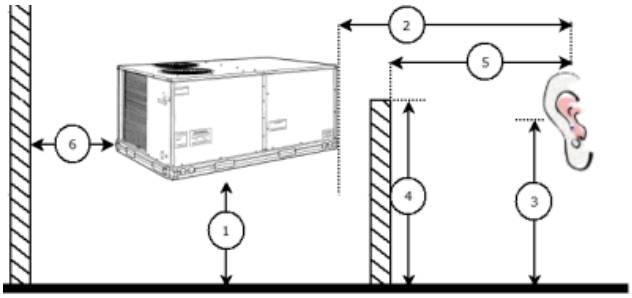
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	93.5	91.0	85.6
125 Hz	84.5	79.5	84.7
250 Hz	78.2	72.7	80.5
500 Hz	72.8	65.8	76.0
1000 Hz	69.5	67.6	72.4
2000 Hz	66.3	58.5	68.0
4000 Hz	63.4	52.7	62.8
8000 Hz	60.0	46.0	59.3
A-Weighted	76.9	72.2	79.0

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	85.6	84.7	80.5	76.0	72.4	68.0	62.8	59.3	89.2 Lw
B	59.4	68.6	71.9	72.8	72.4	69.2	63.8	58.2	78.5 LwA
C	53.2	52.3	48.1	43.6	40.0	35.6	30.4	26.9	56.8 Lp
D	27.0	36.2	39.5	40.4	40.0	36.8	31.4	25.8	46.1 LpA

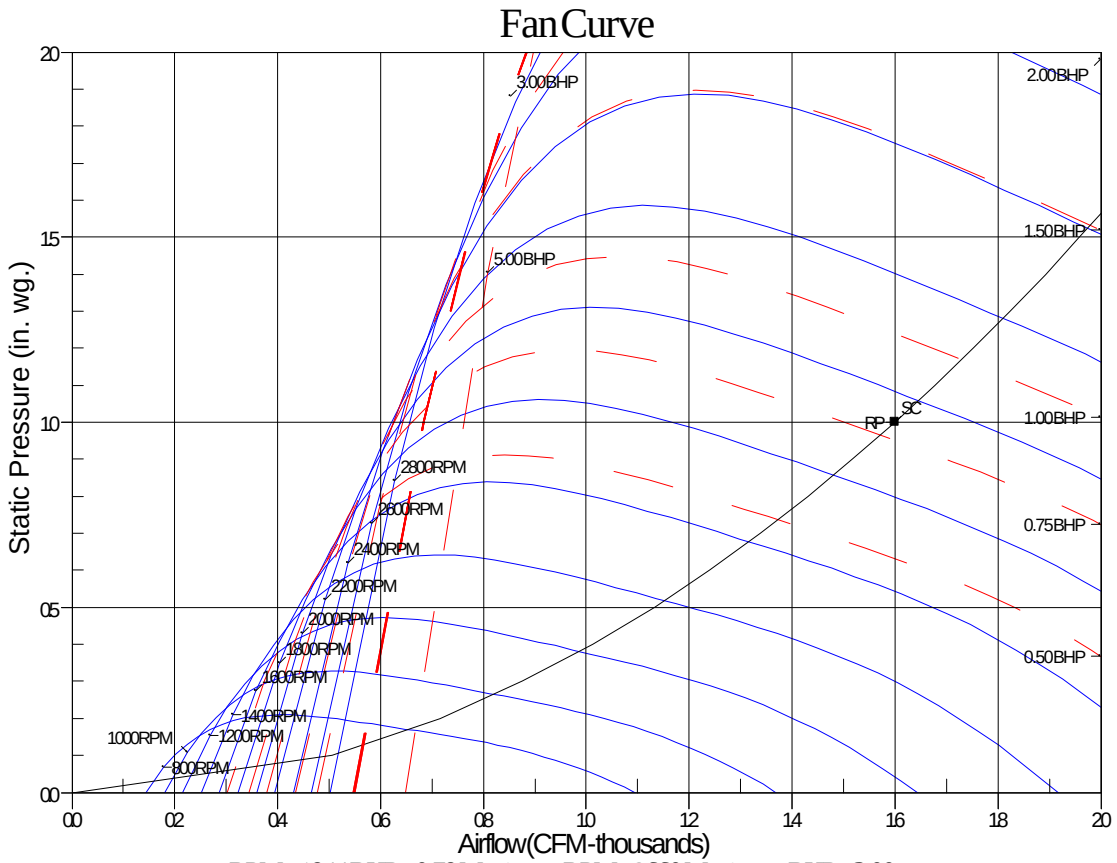
Legend

Performance Summary For Bldg Q - AC 1,2

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



Bldg S - AC 1

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Bldg S - AC 1

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

Unit Parameters

Unit Model: **50FCQM08A2M6-3A0A0**
Unit Size: **08 (7.5 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Two-Stage Cooling / One Circuitl**
Duct Cfg: **Horizontal Supply / Horizontal Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **7' 4.125"**
Unit Width: **4' 11.5"**
Unit Height: **4' 1.375"**

*** Weights and Dimensions are approximate. Weight does not include roof curbs, unit packaging, field installed accessories or factory installed options. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Base Unit Weight (Does not include any accessories):
805 lb

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **4**
Return Air Filter Size: **20 x 20 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Standard/Medium Static (EcoBlue)
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controller
Standard Packaging

Warranty Information

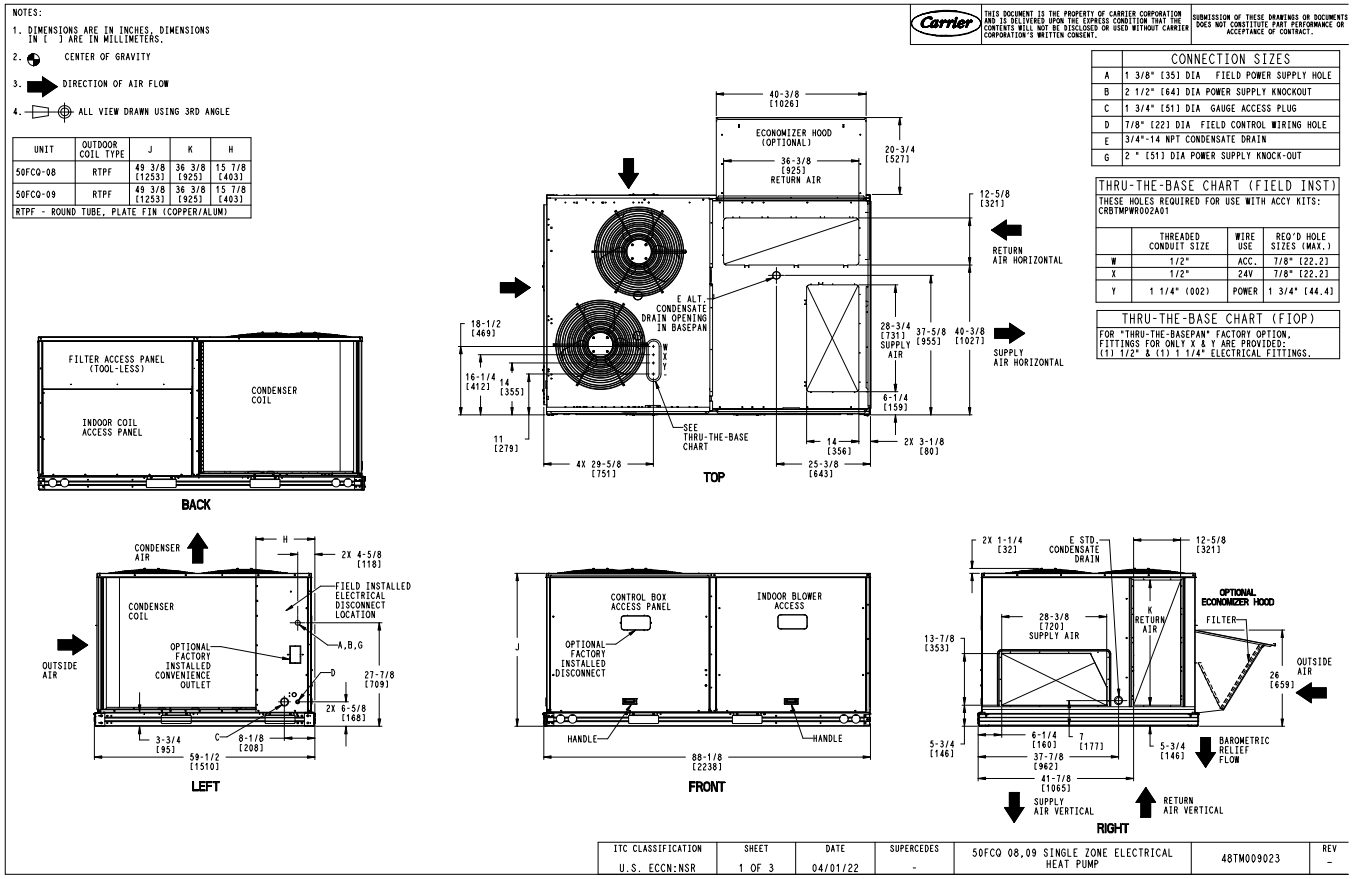
1-Year parts (STD.)
5-Year Compressor (std.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

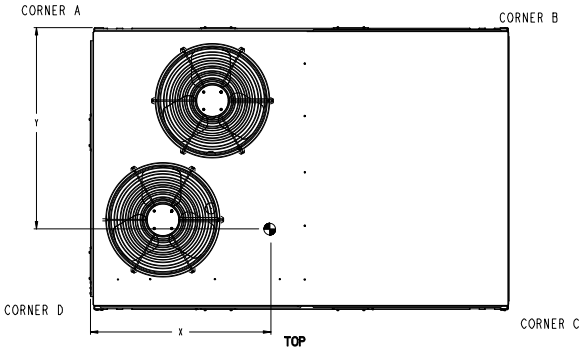
Part Number	Description	Quantity
50FCQM08A2M6-3A0A0	Rooftop Unit	1

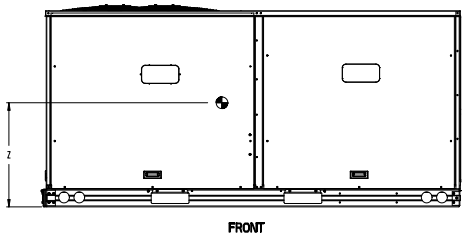

NOTES:
1. DIMENSIONS ARE IN INCHES. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE
UNIT | OUTDOOR COIL TYPE | J | K | H
50FCQ-08 | RTPF | 49 3/8 [1253] | 36 3/8 [925] | 15 7/8 [403]
50FCQ-09 | RTPF | 49 3/8 [1253] | 36 3/8 [925] | 15 7/8 [403]
RTPF - ROUND TUBE, PLATE FIN (COPPER/ALUM)
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CONNECTION SIZES
A 1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B 2 1/2" [64] DIA POWER SUPPLY KNOCKOUT
C 1 3/4" [51] DIA GAUGE ACCESS PLUG
D 7/8" [22] DIA FIELD CONTROL WIRING HOLE
E 3/4"-14 NPT CONDENSATE DRAIN
G 2 " [51] DIA POWER SUPPLY KNOCK-OUT
THRU-THE-BASE CHART (FIELD INST)
THESE HOLES REQUIRED FOR USE WITH ACCY KITS: CRBTMPWR002A01
THREADED CONDUIT SIZE | WIRE USE | REQ'D HOLE SIZES (MAX.)
W 1/2" ACC. 7/8" [22.2]
X 1/2" 24V 7/8" [22.2]
Y 1 1/4" (002) POWER 1 3/4" [44.4]
THRU-THE-BASE CHART (FIOP)
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X & Y ARE PROVIDED: (1) 1/2" & (1) 1 1/4" ELECTRICAL FITTINGS.
FILTER ACCESS PANEL (TOOL-LESS)
INDOOR COIL ACCESS PANEL
CONDENSER COIL
BACK
40-3/8 [1026]
ECONOMIZER HOOD (OPTIONAL)
36-3/8 [925] RETURN AIR
20-3/4 [527]
12-5/8 [321]
RETURN AIR HORIZONTAL
SUPPLY AIR HORIZONTAL
E ALT. CONDENSATE DRAIN OPENING IN BASEPAN
18-1/2 [469]
16-1/4 [412]
14 [355]
11 [279]
4X 29-5/8 [751]
SEE THRU-THE-BASE CHART
28-3/4 [731] SUPPLY AIR
37-5/8 [955]
40-3/8 [1027]
6-1/4 [159]
14 [356]
2X 3-1/8 [80]
25-3/8 [643]
TOP
CONDENSER AIR
H
2X 4-5/8 [118]
FIELD INSTALLED ELECTRICAL DISCONNECT LOCATION
CONDENSER COIL
OPTIONAL FACTORY INSTALLED CONVENIENCE OUTLET
A,B,G
D
C
OUTSIDE AIR
27-7/8 [709]
2X 6-5/8 [168]
3-3/4 [95]
8-1/8 [208]
59-1/2 [1510]
LEFT
CONTROL BOX ACCESS PANEL
INDOOR BLOWER ACCESS
OPTIONAL FACTORY INSTALLED DISCONNECT
J
HANDLE
HANDLE
88-1/8 [2238]
FRONT
2X 1-1/4 [32]
E STD. CONDENSATE DRAIN
12-5/8 [321]
OPTIONAL ECONOMIZER HOOD
FILTER
28-3/8 [720] SUPPLY AIR
K RETURN AIR
13-7/8 [353]
OUTSIDE AIR
26 [659]
6-1/4 [160]
7 [177]
5-3/4 [146]
5-3/4 [146]
BAROMETRIC RELIEF FLOW
37-7/8 [962]
41-7/8 [1065]
SUPPLY AIR VERTICAL
RETURN AIR VERTICAL
RIGHT
ITC CLASSIFICATION U.S. ECCN:NSR
SHEET 1 OF 3
DATE 04/01/22
SUPERCEDES -
50FCQ 08,09 SINGLE ZONE ELECTRICAL HEAT PUMP
48TM009023
REV -

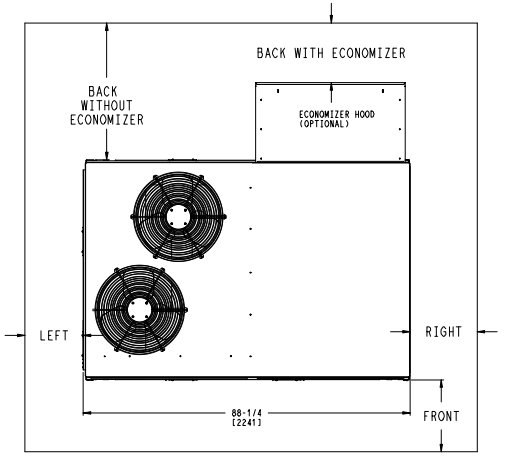
UNIT	OUTDOOR COIL TYPE	STD. UNIT WEIGHT ***		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		
		LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ-08	RTPF	805	365	163	74	209	95	243	110	190	86	49 1/2 [1257]	32 [813]	19 1/8 [486]
50FCQ-09	RTPF	812	368	164	75	211	96	245	111	191	87	49 1/2 [1257]	32 [813]	19 1/8 [486]

RTPF - ROUND TUBE, PLATE FIN (COPPER/ALUM)

*** STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.





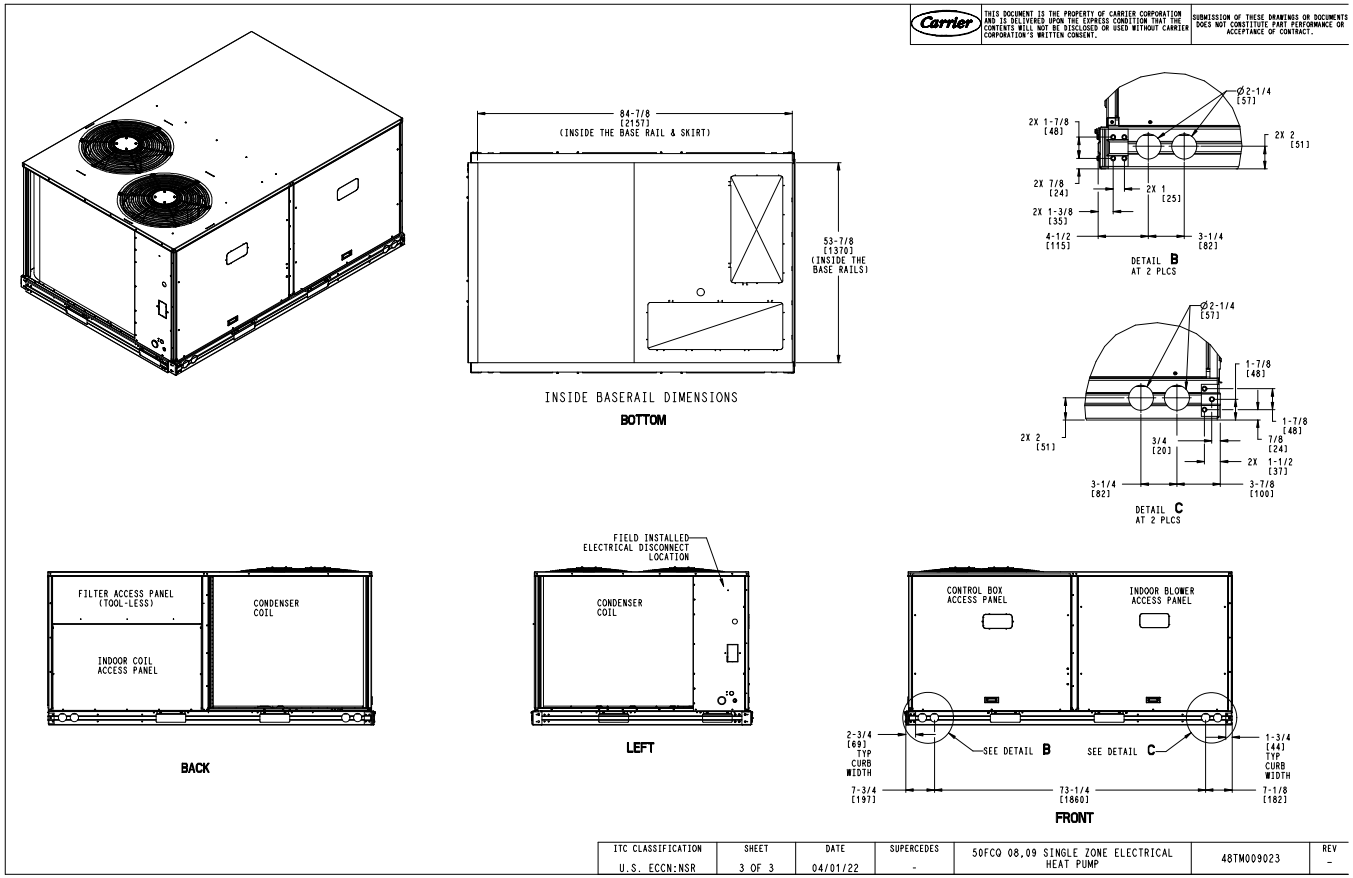


NOTE:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

	CLEARANCE	
	SERVICE WITH:	SERVICE WITH:
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER
FRONT	48 [1219mm]	36 [914mm]
LEFT	48 [1219mm]	42 [1067mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]
BACK W/ECON	36 [914mm]	36 [914mm]
RIGHT	36 [914mm]	36 [914mm]
TOP	72 [1829mm]	72 [1829mm]

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	04/01/22	-	50FCQ 08,09 SINGLE ZONE ELECTRICAL HEAT PUMP	48TM009023	-


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84-7/8 [2157] (INSIDE THE BASE RAIL & SKIRT)
53-7/8 [1370] (INSIDE THE BASE RAILS)
INSIDE BASERAIL DIMENSIONS
BOTTOM
Ø2-1/4 [57]
2X 1-7/8 [48]
2X 2 [51]
2X 7/8 [24]
2X 1 [25]
2X 1-3/8 [35]
4-1/2 [115]
3-1/4 [82]
DETAIL B AT 2 PLCS
1-7/8 [48]
3/4 [20]
7/8 [24]
2X 1-1/2 [37]
3-1/4 [82]
3-7/8 [100]
DETAIL C AT 2 PLCS
FILTER ACCESS PANEL (TOOL-LESS)
CONDENSER COIL
INDOOR COIL ACCESS PANEL
BACK
FIELD INSTALLED ELECTRICAL DISCONNECT LOCATION
CONDENSER COIL
LEFT
CONTROL BOX ACCESS PANEL
INDOOR BLOWER ACCESS PANEL
2-3/4 [69] TYP CURB WIDTH
SEE DETAIL B
SEE DETAIL C
1-3/4 [44] TYP CURB WIDTH
7-3/4 [197]
73-1/4 [1860]
7-1/8 [182]
FRONT
ITC CLASSIFICATION U.S. ECCN:NSR
SHEET 3 OF 3
DATE 04/01/22
SUPERCEDES -
50FCQ 08,09 SINGLE ZONE ELECTRICAL HEAT PUMP
48TM009023
REV -

Part Number:50FCQM08A2M6-3A0A0

ARI EER:	**11.20**	
IEER:	**15.0**	

Base Unit Dimensions

Unit Length:	**88.1**	in
Unit Width:	**59.5**	in
Unit Height:	**49.4**	in
Base Unit Weight (Does not include any accessories):	**805**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**3000**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**59.4**	F
Evaporator Leaving Air WB:	**57.7**	F
Evaporator Leaving Air Enthalpy:	**24.81**	BTU/lb
Gross Cooling Capacity:	**89.50**	MBH
Gross Sensible Capacity:	**66.85**	MBH
Compressor Power Input:	**6.44**	kW
Coil Bypass Factor:	**0.065**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.4**	F
Total Heating Capacity:	**85.60**	MBH
Integrated Heating Capacity:	**85.60**	MBH
Heating Power Input:	**6.77**	kW
High Temperature COP:	**3.40**	
Low Temperature COP:	**2.30**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**1470**	
Fan Power:	**1.13**	BHP
NOTE:	**Selected IFM RPM Range: 920 - 2000**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**
Compressor #1 RLA:	**6.1**
Compressor #1 LRA:	**41**
Compressor #2 RLA:	**6.1**
Compressor #2 LRA:	**41**
Indoor Fan Motor Type:	**MED**
Indoor Fan Motor FLA (Total):	**3**
Power Supply MCA:	**19**
Power Supply MOCP (Fuse or HACR):	**20**
Disconnect Size FLA:	**19**

Disconnect Size LRA: **90**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **2 / 0.8**

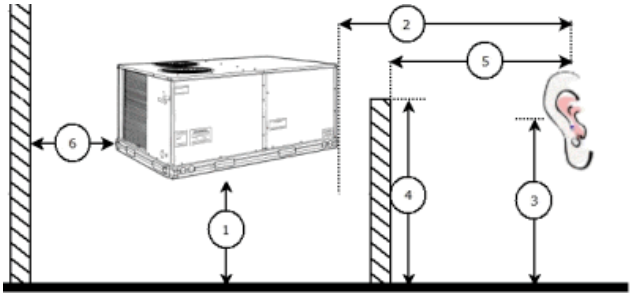
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	86.0	81.7	89.7
125 Hz	81.5	75.8	81.5
250 Hz	74.5	69.2	80.5
500 Hz	71.6	64.1	79.2
1000 Hz	72.6	64.2	77.1
2000 Hz	68.3	57.9	73.2
4000 Hz	63.5	51.1	70.2
8000 Hz	54.5	46.3	67.4
A-Weighted	76.6	68.7	82.0

Advanced Acoustics



Advanced Accoustics Parameters

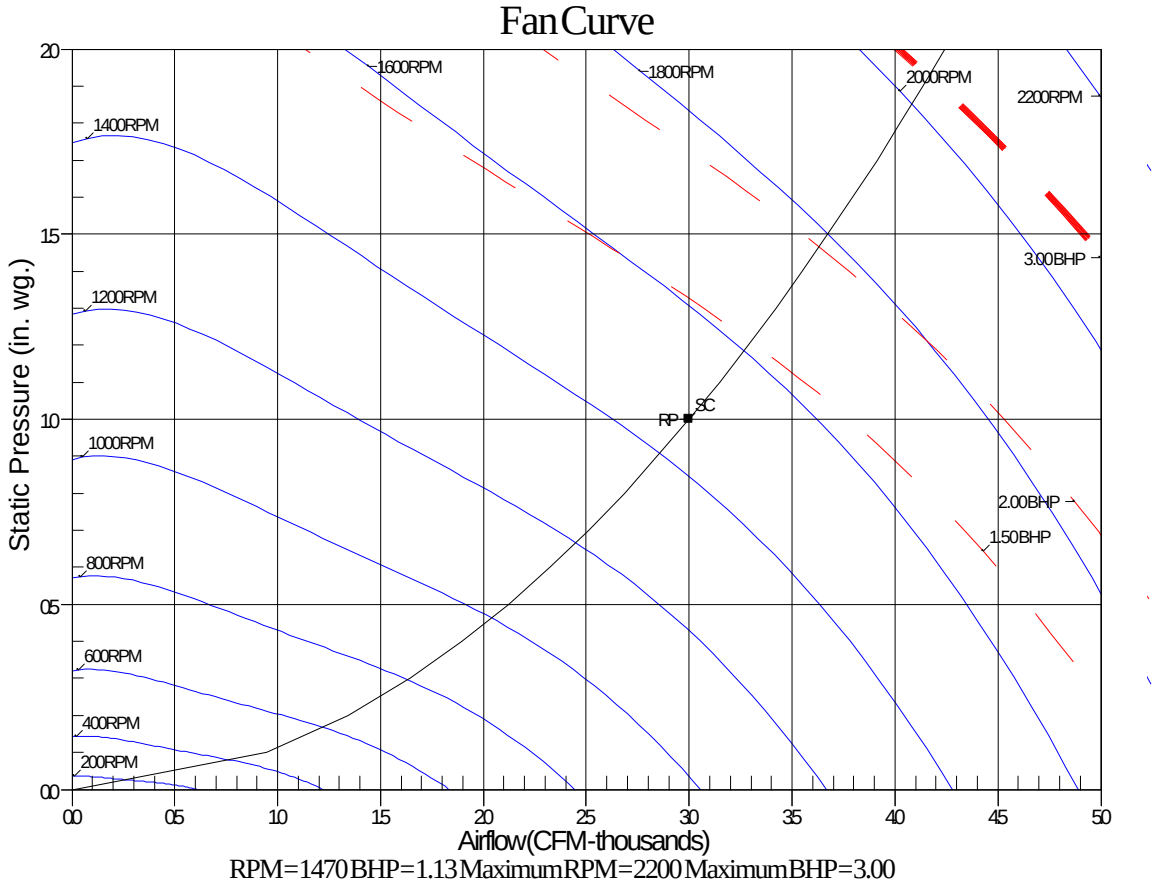
1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	89.7	81.5	80.5	79.2	77.1	73.2	70.2	67.4	91.3 Lw
B	63.5	65.4	71.9	76.0	77.1	74.4	71.2	66.3	82.0 LwA
C	57.3	49.1	48.1	46.8	44.7	40.8	37.8	35.0	58.9 Lp
D	31.1	33.0	39.5	43.6	44.7	42.0	38.8	33.9	49.6 LpA

Legend
A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



RPM=1470 BHP=1.13 Maximum RPM=2200 Maximum BHP=3.00
SC-System Curve RP-Rated Point

Bldg S - AC 2,3

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Bldg S - AC 2,3

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

Unit Parameters

Unit Model: **50FCQA04A2M6-3A0A0**
Unit Size: **04 (3 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Single Stage Compressor Models**
Duct Cfg: **Horizontal Supply / Horizontal Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **2' 9.375"**
Total Operating Weight: 482 lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **2**
Return Air Filter Size: **16 x 25 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

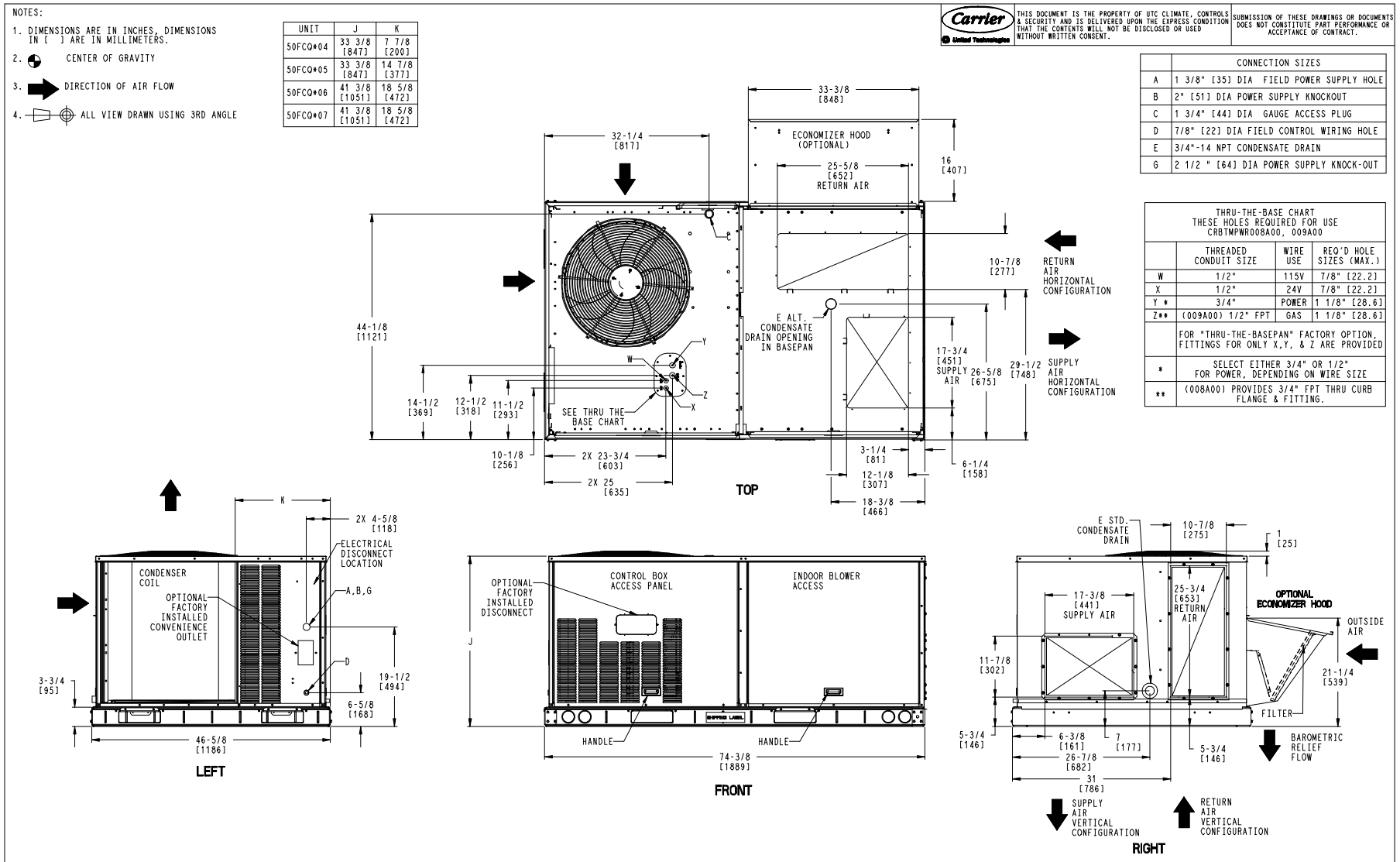
5-Year compressor parts (STD.)
1-Year parts (STD.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
50FCQA04A2M6-3A0A0	Rooftop Unit	2


NOTES:
1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE
UNIT J K
50FCQ*04 33 3/8 [847] 7 7/8 [200]
50FCQ*05 33 3/8 [847] 14 7/8 [377]
50FCQ*06 41 3/8 [1051] 18 5/8 [472]
50FCQ*07 41 3/8 [1051] 18 5/8 [472]
Carrier
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CONNECTION SIZES
A 1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B 2" [51] DIA POWER SUPPLY KNOCKOUT
C 1 3/4" [44] DIA GAUGE ACCESS PLUG
D 7/8" [22] DIA FIELD CONTROL WIRING HOLE
E 3/4"-14 NPT CONDENSATE DRAIN
G 2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT
THRU-THE-BASE CHART
THESE HOLES REQUIRED FOR USE CRBTMPWR008A00, 009A00
THREADED CONDUIT SIZE / WIRE USE / REQ'D HOLE SIZES (MAX.)
W 1/2" 115V 7/8" [22.2]
X 1/2" 24V 7/8" [22.2]
Y * 3/4" POWER 1 1/8" [28.6]
Z** (009A00) 1/2" FPT GAS 1 1/8" [28.6]
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X,Y, & Z ARE PROVIDED
* SELECT EITHER 3/4" OR 1/2" FOR POWER, DEPENDING ON WIRE SIZE
** (008A00) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.
33-3/8 [848]
ECONOMIZER HOOD (OPTIONAL)
32-1/4 [817]
25-5/8 [652] RETURN AIR
16 [407]
10-7/8 [277]
RETURN AIR HORIZONTAL CONFIGURATION
44-1/8 [1121]
E ALT. CONDENSATE DRAIN OPENING IN BASEPAN
17-3/4 [451] SUPPLY AIR
26-5/8 [675]
29-1/2 [748]
SUPPLY AIR HORIZONTAL CONFIGURATION
14-1/2 [369]
12-1/2 [318]
11-1/2 [293]
SEE THRU THE BASE CHART
10-1/8 [256]
2X 23-3/4 [603]
2X 25 [635]
3-1/4 [81]
12-1/8 [307]
18-3/8 [466]
6-1/4 [158]
TOP
K
2X 4-5/8 [118]
ELECTRICAL DISCONNECT LOCATION
CONDENSER COIL
OPTIONAL FACTORY INSTALLED CONVENIENCE OUTLET
A,B,G
D
3-3/4 [95]
19-1/2 [494]
6-5/8 [168]
46-5/8 [1186]
LEFT
OPTIONAL FACTORY INSTALLED DISCONNECT
CONTROL BOX ACCESS PANEL
INDOOR BLOWER ACCESS
J
HANDLE
HANDLE
74-3/8 [1889]
FRONT
E STD. CONDENSATE DRAIN
10-7/8 [275]
1 [25]
17-3/8 [441] SUPPLY AIR
25-3/4 [653] RETURN AIR
OPTIONAL ECONOMIZER HOOD
OUTSIDE AIR
11-7/8 [302]
21-1/4 [539]
FILTER
5-3/4 [146]
6-3/8 [161]
7 [177]
26-7/8 [682]
31 [786]
5-3/4 [146]
BAROMETRIC RELIEF FLOW
SUPPLY AIR VERTICAL CONFIGURATION
RETURN AIR VERTICAL CONFIGURATION
RIGHT
ITC CLASSIFICATION U.S. ECCN:NSR
SHEET 1 OF 3
DATE 08/15/19
SUPERCEDES -
50FCQ 04-07 SINGLE PACKAGE HEAT PUMP
48TC003348
REV -

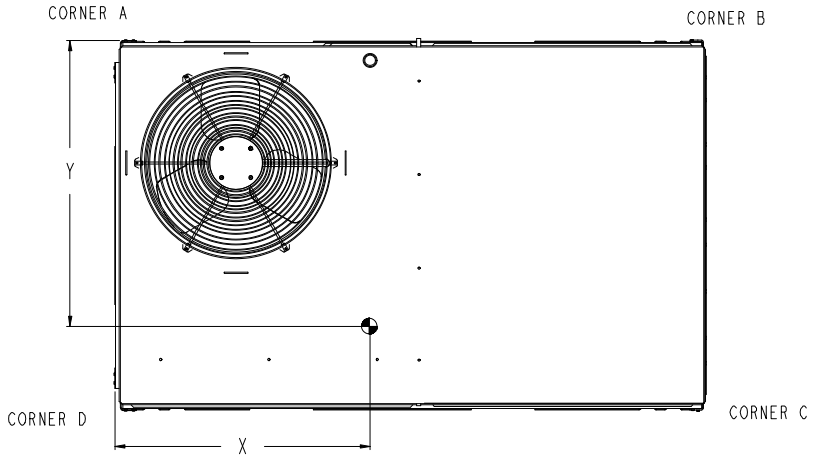
UNIT	STD. UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ*04	467	212	126	57	118	53	108	49	115	52	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*05	473	215	127	58	119	54	110	50	117	53	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*06	584	265	160	72	145	66	133	60	146	66	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]
50FCQ*07	589	267	161	73	146	66	134	61	147	67	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]

* STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.

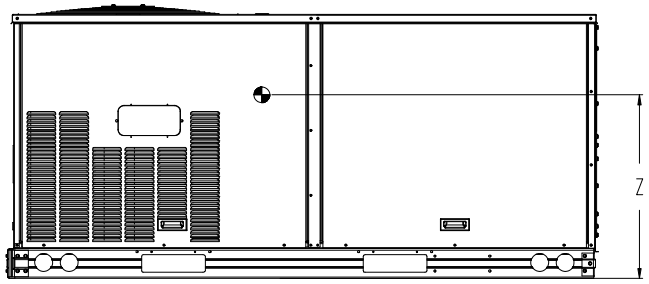
Carrier — United Technologies

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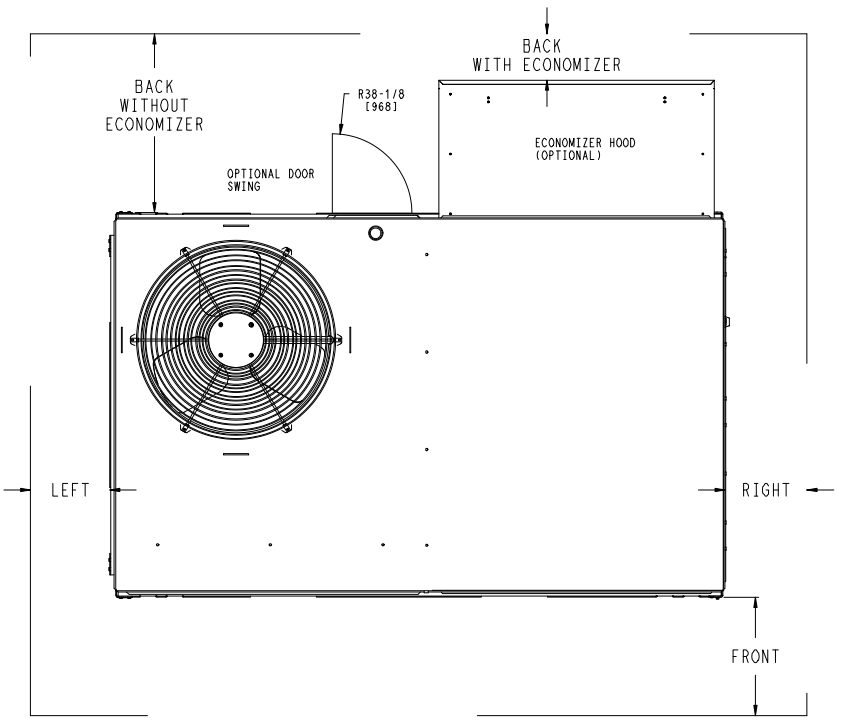
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TOP



FRONT



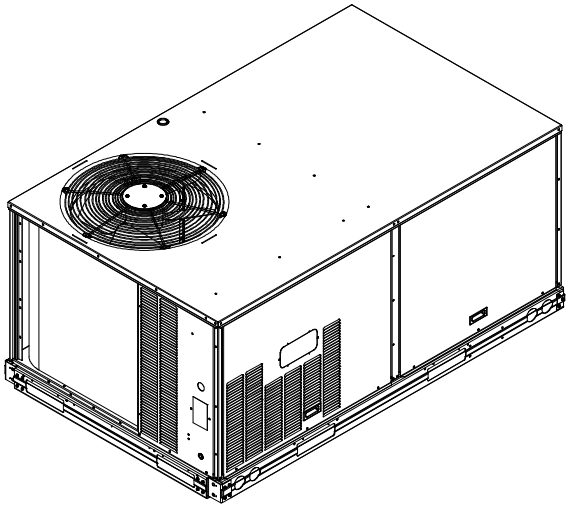
NOTE:

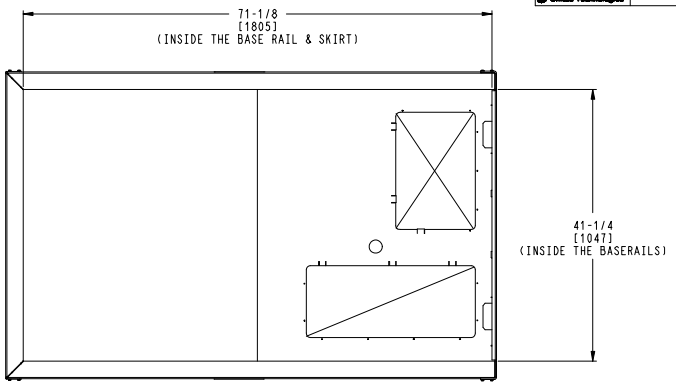
1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

	CLEARANCE		
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/ECON	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

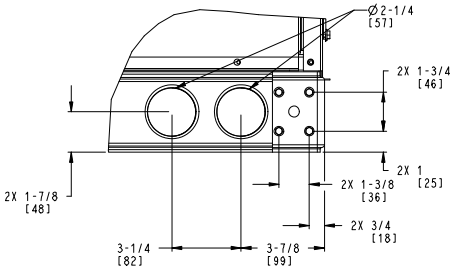
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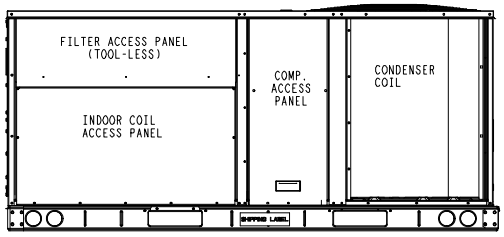


INSIDE BASERAIL DIMENSIONS

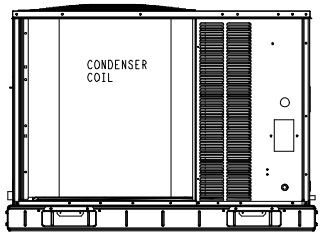
BOTTOM



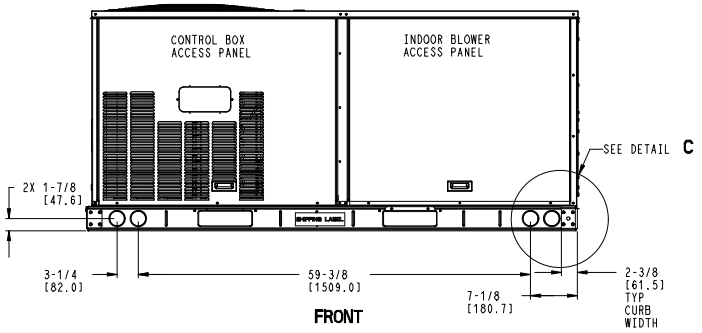
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

Part Number:50FCQA04A2M6-3A0A0

ARI SEER:	**14.30**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**33.4**	in

Operating Weight

Base Unit Weight:	**467**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**13**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**482**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**1200**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**58.4**	F
Evaporator Leaving Air WB:	**57.3**	F
Evaporator Leaving Air Enthalpy:	**24.59**	BTU/lb
Gross Cooling Capacity:	**36.98**	MBH
Gross Sensible Capacity:	**27.93**	MBH
Compressor Power Input:	**2.41**	kW
Coil Bypass Factor:	**0.101**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.3**	F
Total Heating Capacity:	**34.10**	MBH
Integrated Heating Capacity:	**34.10**	MBH
Heating Power Input:	**2.46**	kW
High Temperature COP:	**3.70**	
Low Temperature COP:	**2.25**	
HSPF:	**8.2**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**1916**	
Fan Power:	**0.51**	BHP
NOTE:	**Selected IFM RPM Range: 219 - 2190**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**	
Compressor #1 RLA:	**5.8**	
Compressor #1 LRA:	**38**	
Indoor Fan Motor Type:	**MED**	
Indoor Fan Motor Eff.:	**Null**	

Indoor Fan Motor FLA (Total): **1.2**
Power Supply MCA: **10**
Power Supply MOCP (Fuse or HACR): **15**
Disconnect Size FLA: **9**
Disconnect Size LRA: **42**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

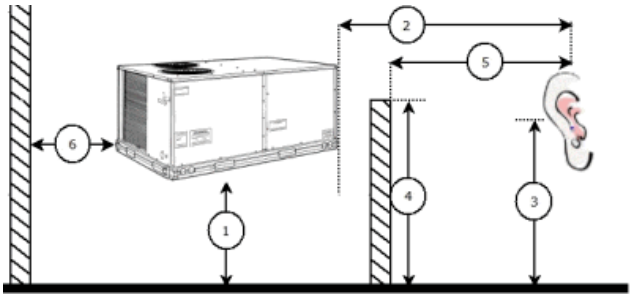
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	92.0	85.8	81.8
125 Hz	83.3	78.7	81.8
250 Hz	76.1	69.6	77.0
500 Hz	68.7	62.3	72.6
1000 Hz	66.1	63.7	69.9
2000 Hz	63.0	55.4	64.6
4000 Hz	59.0	49.6	59.3
8000 Hz	56.9	43.0	55.6
A-Weighted	74.2	68.9	75.4

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	81.8	81.8	77.0	72.6	69.9	64.6	59.3	55.6	85.9 Lw
B	55.6	65.7	68.4	69.4	69.9	65.8	60.3	54.5	75.4 LwA
C	49.4	49.4	44.6	40.2	37.5	32.2	26.9	23.2	53.5 Lp
D	23.2	33.3	36.0	37.0	37.5	33.4	27.9	22.1	43.0 LpA

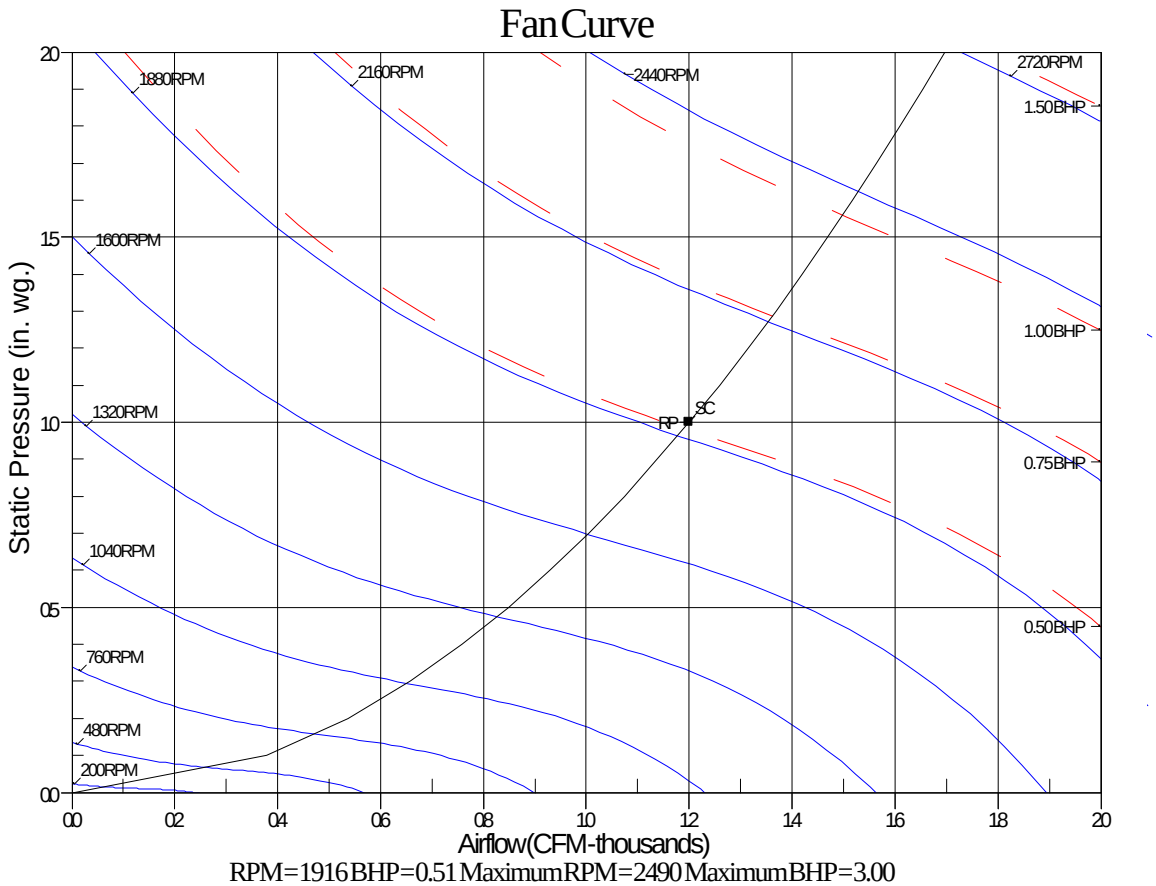
Legend

Performance Summary For Bldg S - AC 2,3

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



RPM=1916 BHP=0.51 Maximum RPM=2490 Maximum BHP=3.00
SC-System Curve RP-Rated Point

Bldg U - U1,2,3,4

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Bldg U - U1,2,3,4

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

Unit Parameters

Unit Model: **50VT-K48---3**
Unit Size: **48 (4 Tons)**
Volts-Phase-Hertz: **208-1-60**
Heating Type: **Heat Pump**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **4' 0.25"**
Unit Width: **3' 8.1875"**
Unit Height: **3' 8.75"**

*** Weights and Dimensions are approximate. Weight does not include roof curbs, unit packaging, field installed accessories or factory installed options. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Base Unit Weight (Does not include any accessories):
426 lb

Warranty Information

1 year warranty on parts
5 yearwarranty on compressor

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
50VT-K48---3	Rooftop Unit	4

Certified Drawing for Bldg U - U1,2,3,4

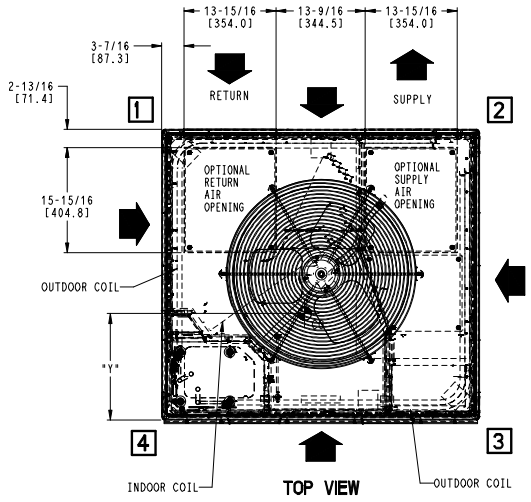
Project: Lynwood USD - Lynwood High School Bullis RD
Prepared By:

12/01/2023
08:50AM

CARRIER / BRYANT HP (LARGE CHASSIS)

COOLING CAPACITY	UNIT WT.		UNIT HEIGHT IN/MM		CENTER OF GRAVITY IN/MM					
	LB	KG	"A"		X		Y		Z	
36	406	184.2	54-3/4	1391	20-1/2	521	17-1/2	445	17-3/8	441
42	426	193.3	54-3/4	1391	20-1/2	521	17-1/2	445	17-3/8	448
48	426	193.3	44-3/4	1137	20-1/2	521	17-1/2	445	17-3/8	448
60	496	225.0	48-3/4	1238	20-1/2	521	17-1/2	445	18	457

UNIT	CORNER WEIGHT LB/KG							
	"1"		"2"		"3"		"4"	
36	88.6	40.2	78.4	35.6	78.4	51.1	112.6	57.4
42	92.9	42.2	82.4	37.4	82.4	53.7	118.3	60.0
48	92.6	42.0	82.5	37.4	82.5	53.5	117.9	60.4
60	107.5	48.8	95.5	43.3	95.5	62.5	137.8	70.4



TOP VIEW

REQUIRED CLEARANCES TO COMBUSTIBLE MATL.

	INCHES [MM]
TOP OF UNIT	14 [355.6]
DUCT SIDE OF UNIT	2 [50.8]
SIDE OPPOSITE DUCTS	14 [355.6]
BOTTOM OF UNIT	0 [0.0]
ELECTRICAL PANEL	36 [914.4]

NEC. REQUIRED CLEARANCES.

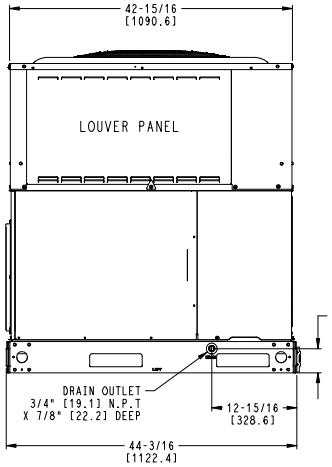
	INCHES [MM]
BETWEEN UNITS, POWER ENTRY SIDE	42 [1066.8]
UNIT AND UNGROUNDED SURFACES, POWER ENTRY SIDE	36 [914.0]
UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, POWER ENTRY SIDE	42 [1066.8]

REQUIRED CLEARANCE FOR OPERATION AND SERVICING

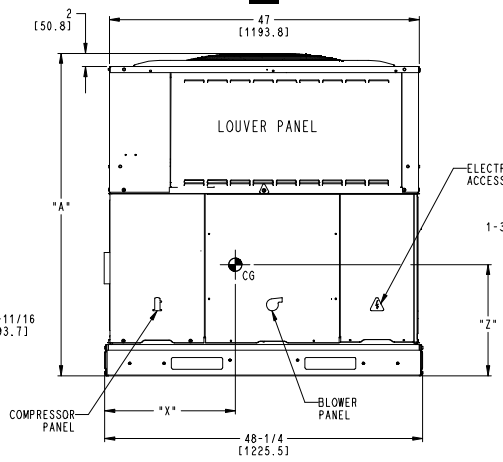
	INCHES [MM]
EVAP. COIL ACCESS SIDE	36 [914.0]
POWER ENTRY SIDE	42 [1066.8]
(EXCEPT FOR NEC REQUIREMENTS)	
UNIT TOP	48 [1219.2]
SIDE OPPOSITE DUCTS	36 [914.0]
DUCT PANEL	12 [304.8]*

*MINIMUM DISTANCES:IF UNIT IS PLACED LESS THAN 12 [304.8] FROM WALL SYSTEM,THEN SYSTEM PERFORMANCE MAYBE COMPROMISED.

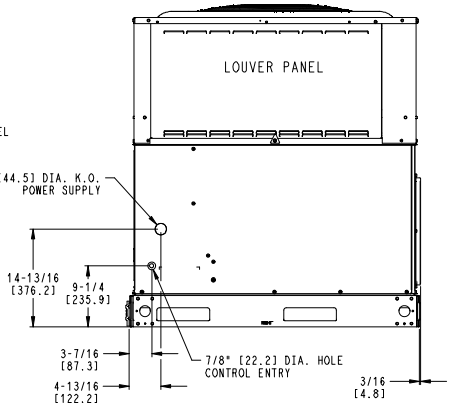
DIMENSIONS IN [] ARE IN MILLIMETERS



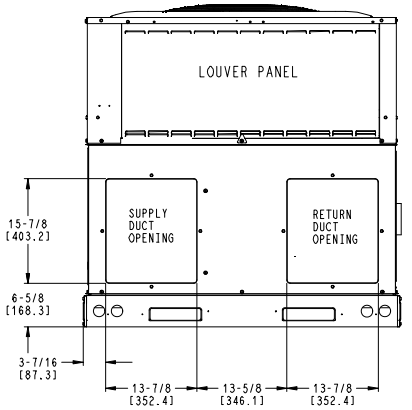
LEFT SIDE VIEW



FRONT VIEW



RIGHT SIDE VIEW



REAR VIEW

10/19/22	UPDATED TABLE DIMS.	SINGLE ZONE ELECTRIC COOLING & HEAT(LG)	SD5770-4	A

Part Number:50VT-K48---3

ARI SEER2:	**13.40**	

Base Unit Dimensions

Unit Length:	**48.3**	in
Unit Width:	**44.2**	in
Unit Height:	**44.8**	in
Base Unit Weight (Does not include any accessories):	**426**	lb

Unit

Unit Voltage-Phase-Hertz:	**208-1-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Direct**	
Actual Airflow:	**1590**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**58.8**	F
Evaporator Leaving Air WB:	**57.8**	F
Evaporator Leaving Air Enthalpy:	**24.87**	BTU/lb
Net Cooling Capacity:	**46.97**	MBH
Net Sensible Capacity:	**36.33**	MBH
Total Unit Power Input:	**4.09**	kW
Coil Bypass Factor:	**0.000**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.7**	F
Total Heating Capacity:	**45.86**	MBH
Integrated Heating Capacity:	**45.86**	MBH
Heating Power Input:	**3.64**	kW
High Temperature COP:	**3.70**	
Low Temperature COP:	**2.30**	
HSPF2:	**6.7**	

Supply Fan

External Static Pressure:	**0.50**	in wg
Options / Accessories Static Pressure		
Wet Coil:	**0.11**	in wg
Application External Static (ESP + Unit Opts/Acc.):	**0.61**	in wg
Fan Power:	**0.57**	BHP
Fan Motor Size, hp:	**1**	
NOTE:	**Medium Motor Speed, Vert**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Minimum Voltage:	**197**
Maximum Voltage:	**253**
Compressor RLA:	**19.7**
Compressor LRA:	**130**
Outdoor Fan FLA (ea):	**1.2**
Indoor Fan Motor FLA (Total):	**6.9**
Power Supply MCA:	**32.7**

Power Supply MOCP (Fuse or HACR): **50**

Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

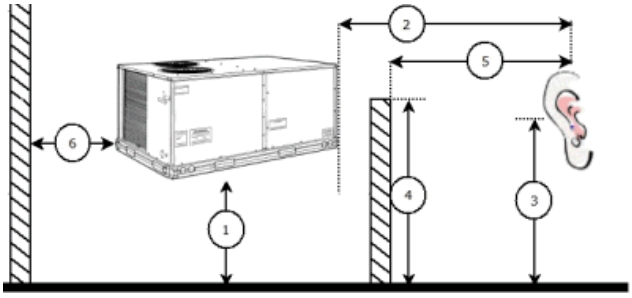
Acoustics

Sound Rating: **74.0** db

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	NA	NA	NA
125 Hz	NA	NA	56.9
250 Hz	NA	NA	59.3
500 Hz	NA	NA	63.9
1000 Hz	NA	NA	64.5
2000 Hz	NA	NA	61.7
4000 Hz	NA	NA	55.4
8000 Hz	NA	NA	47.4

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	0.0	56.9	59.3	63.9	64.5	61.7	55.4	47.4	69.3 Lw
B	-26.2	40.8	50.7	60.7	64.5	62.9	56.4	46.3	68.2 LwA
C	0.0	24.5	26.9	31.5	32.1	29.3	23.0	15.0	36.9 Lp
D	-26.2	8.4	18.3	28.3	32.1	30.5	24.0	13.9	35.8 LpA

Legend
A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.

Locker RM - 3,4,5

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Locker RM - 3,4,5

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

Unit Parameters

Unit Model: **50FCQM08A2M6-3A0A0**
Unit Size: **08 (7.5 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Two-Stage Cooling / One Circuitl**
Duct Cfg: **Horizontal Supply / Horizontal Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **7' 4.125"**
Unit Width: **4' 11.5"**
Unit Height: **4' 1.375"**

*** Weights and Dimensions are approximate. Weight does not include roof curbs, unit packaging, field installed accessories or factory installed options. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Base Unit Weight (Does not include any accessories):
805 lb

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **4**
Return Air Filter Size: **20 x 20 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Standard/Medium Static (EcoBlue)
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controller
Standard Packaging

Warranty Information

1-Year parts (STD.)
5-Year Compressor (std.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
50FCQM08A2M6-3A0A0	Rooftop Unit	3

NOTES:

1. DIMENSIONS ARE IN INCHES. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE

UNIT	OUTDOOR COIL TYPE	J	K	H
50FCQ-08	RTPF	49 3/8 [1253]	36 3/8 [925]	15 7/8 [403]
50FCQ-09	RTPF	49 3/8 [1253]	36 3/8 [925]	15 7/8 [403]

RTPF - ROUND TUBE, PLATE FIN (COPPER/ALUM)

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	CONNECTION SIZES
A	1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B	2 1/2" [64] DIA POWER SUPPLY KNOCKOUT
C	1 3/4" [51] DIA GAUGE ACCESS PLUG
D	7/8" [22] DIA FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN
G	2 " [51] DIA POWER SUPPLY KNOCK-OUT

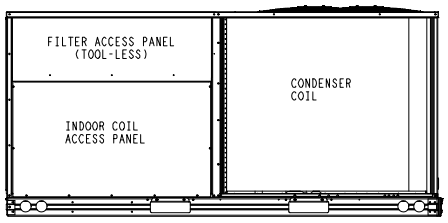
THRU-THE-BASE CHART (FIELD INST)

THESE HOLES REQUIRED FOR USE WITH ACCY KITS: CRBTMPWR002A01

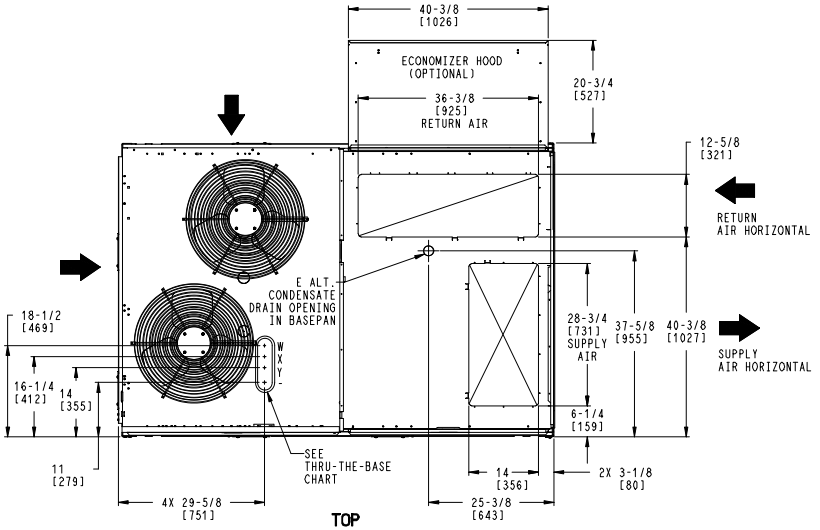
	THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
W	1/2"	ACC.	7/8" [22.2]
X	1/2"	24V	7/8" [22.2]
Y	1 1/4" (002)	POWER	1 3/4" [44.4]

THRU-THE-BASE CHART (FIOP)

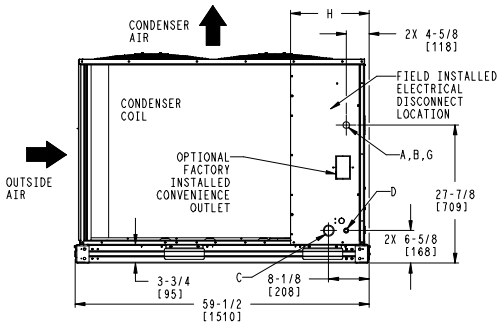
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X & Y ARE PROVIDED: (1) 1/2" & (1) 1 1/4" ELECTRICAL FITTINGS.



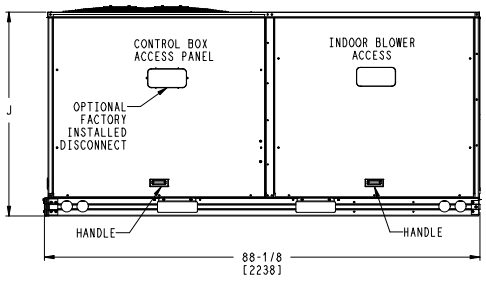
BACK



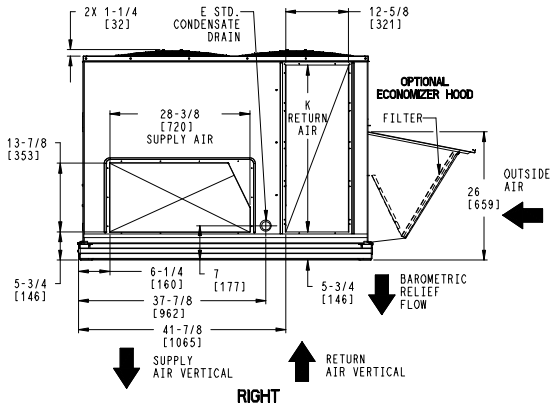
TOP



LEFT



FRONT

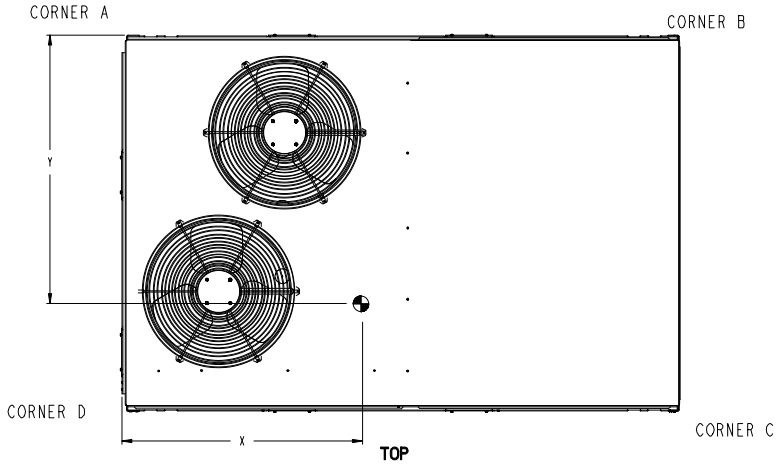


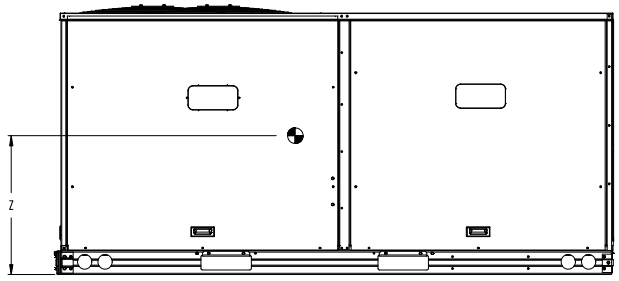
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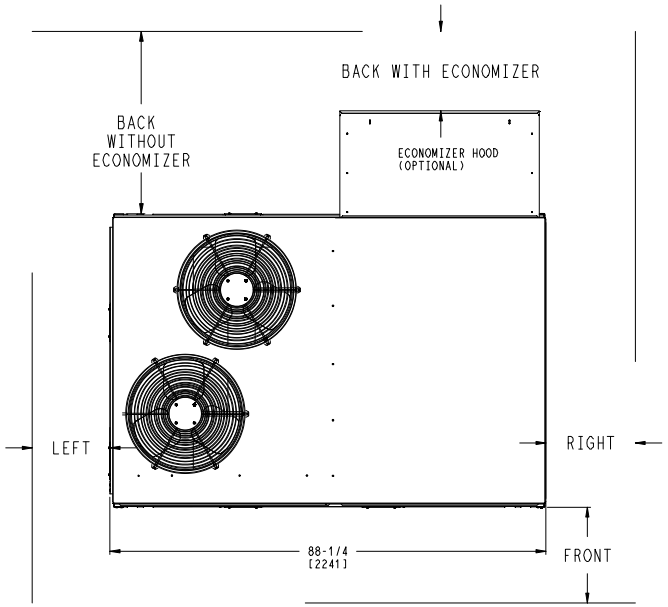
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	1 OF 3	04/01/22	-	50FCQ 08,09 SINGLE ZONE ELECTRICAL HEAT PUMP	48TM009023	-

UNIT	OUTDOOR COIL TYPE	STD. UNIT WEIGHT ***		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		
		LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ-08	RTPF	805	365	163	74	209	95	243	110	190	86	49 1/2 [1257]	32 [813]	19 1/8 [486]
50FCQ-09	RTPF	812	368	164	75	211	96	245	111	191	87	49 1/2 [1257]	32 [813]	19 1/8 [486]
RTPF - ROUND TUBE, PLATE FIN (COPPER/ALUM)														

*** STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.







NOTE:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

	CLEARANCE	
	SERVICE WITH:	SERVICE WITH:
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER
FRONT	48 [1219mm]	36 [914mm]
LEFT	48 [1219mm]	42 [1067mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]
BACK W/ECON	36 [914mm]	36 [914mm]
RIGHT	36 [914mm]	36 [914mm]
TOP	72 [1829mm]	72 [1829mm]

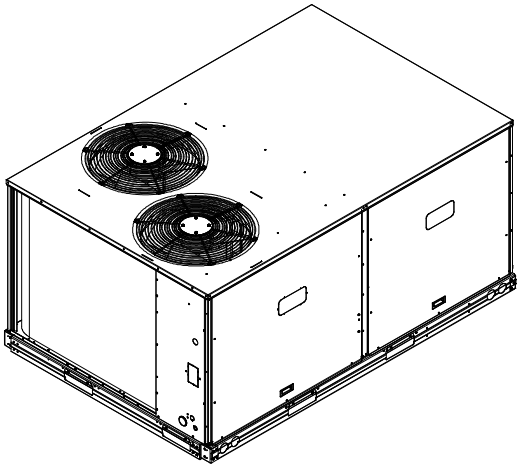
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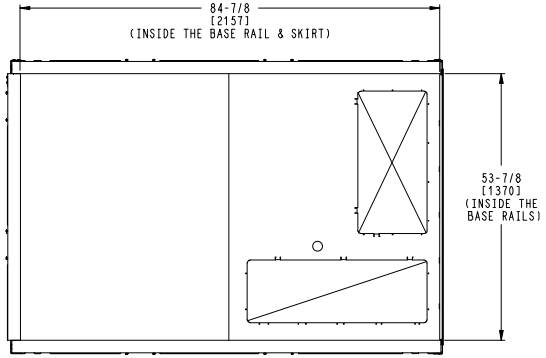
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	04/01/22	-	50FCQ 08,09 SINGLE ZONE ELECTRICAL HEAT PUMP	48TM009023	-

Certified Drawing for Locker RM - 3,4,5

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

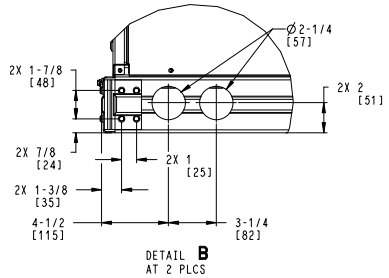
Carrier | THIS DOCUMENT IS THE PROPERTY OF CARRIER CORPORATION AND IS DELIVERED UPON THE EXPRESS CONDITION THAT THE CONTENTS WILL NOT BE DISCLOSED OR USED WITHOUT CARRIER CORPORATION'S WRITTEN CONSENT. | SUBMISSION OF THESE DRAWINGS OR DOCUMENTS DOES NOT CONSTITUTE PART PERFORMANCE OR ACCEPTANCE OF CONTRACT.



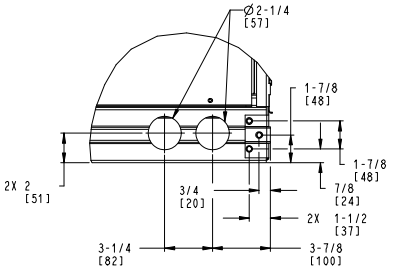


INSIDE BASERAIL DIMENSIONS

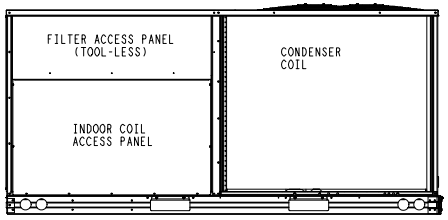
BOTTOM



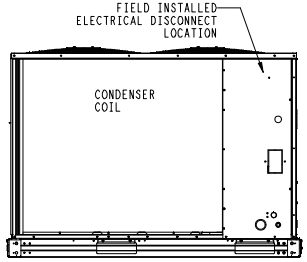
DETAIL **B**
AT 2 PLCS



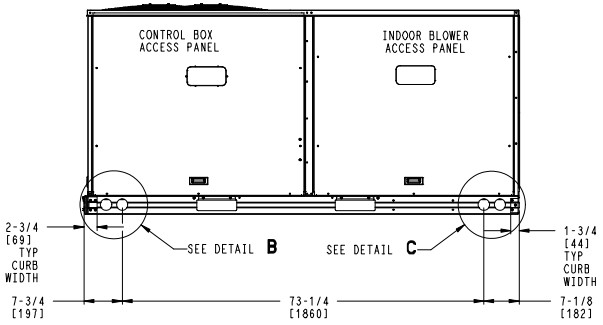
DETAIL **C**
AT 2 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	04/01/22	-	50FCQ 08,09 SINGLE ZONE ELECTRICAL HEAT PUMP	48TM009023	-

Performance Summary For Locker RM - 3,4,5

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

Part Number:50FCQM08A2M6-3A0A0

ARI EER:	**11.20**	
IEER:	**15.0**	

Base Unit Dimensions

Unit Length:	**88.1**	in
Unit Width:	**59.5**	in
Unit Height:	**49.4**	in
Base Unit Weight (Does not include any accessories):	**805**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**3000**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**59.4**	F
Evaporator Leaving Air WB:	**57.7**	F
Evaporator Leaving Air Enthalpy:	**24.81**	BTU/lb
Gross Cooling Capacity:	**89.50**	MBH
Gross Sensible Capacity:	**66.85**	MBH
Compressor Power Input:	**6.44**	kW
Coil Bypass Factor:	**0.065**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.4**	F
Total Heating Capacity:	**85.60**	MBH
Integrated Heating Capacity:	**85.60**	MBH
Heating Power Input:	**6.77**	kW
High Temperature COP:	**3.40**	
Low Temperature COP:	**2.30**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**1470**	
Fan Power:	**1.13**	BHP
NOTE:	**Selected IFM RPM Range: 920 - 2000**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**
Compressor #1 RLA:	**6.1**
Compressor #1 LRA:	**41**
Compressor #2 RLA:	**6.1**
Compressor #2 LRA:	**41**
Indoor Fan Motor Type:	**MED**
Indoor Fan Motor FLA (Total):	**3**
Power Supply MCA:	**19**
Power Supply MOCP (Fuse or HACR):	**20**
Disconnect Size FLA:	**19**

Disconnect Size LRA: **90**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **2 / 0.8**

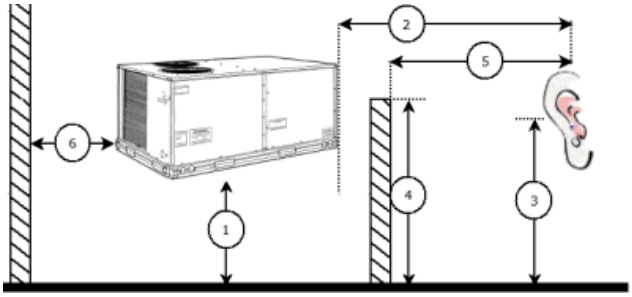
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	86.0	81.7	89.7
125 Hz	81.5	75.8	81.5
250 Hz	74.5	69.2	80.5
500 Hz	71.6	64.1	79.2
1000 Hz	72.6	64.2	77.1
2000 Hz	68.3	57.9	73.2
4000 Hz	63.5	51.1	70.2
8000 Hz	54.5	46.3	67.4
A-Weighted	76.6	68.7	82.0

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

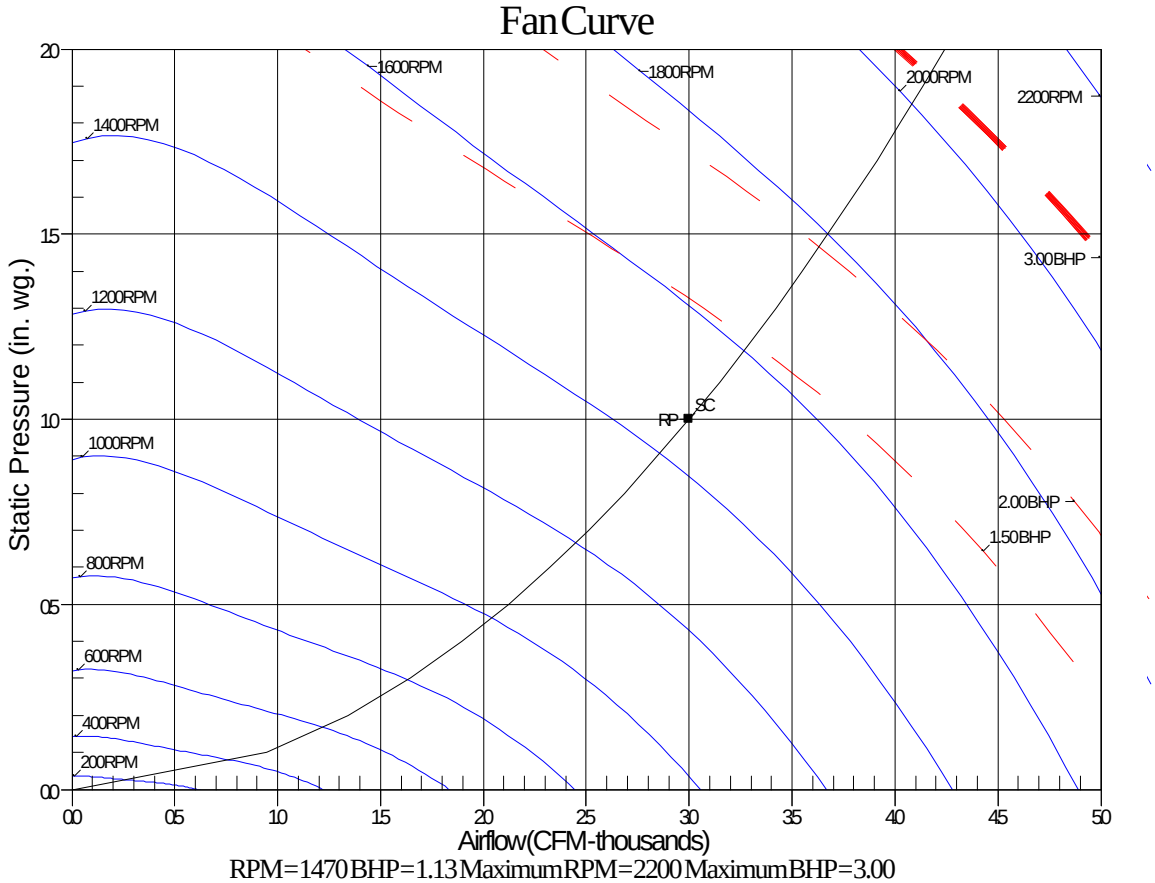
Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	89.7	81.5	80.5	79.2	77.1	73.2	70.2	67.4	91.3 Lw
B	63.5	65.4	71.9	76.0	77.1	74.4	71.2	66.3	82.0 LwA
C	57.3	49.1	48.1	46.8	44.7	40.8	37.8	35.0	58.9 Lp
D	31.1	33.0	39.5	43.6	44.7	42.0	38.8	33.9	49.6 LpA

Legend
A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Performance Summary For Locker RM - 3,4,5

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



RPM=1470 BHP=1.13 Maximum RPM=2200 Maximum BHP=3.00
SC-System Curve RP-Rated Point

Locker RM - AC 1,2

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Locker RM - AC 1,2

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

Unit Parameters

Unit Model: **50FCQA04A2M6-3A0A0**
Unit Size: **04 (3 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Single Stage Compressor Models**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **2' 9.375"**
Total Operating Weight: **482** lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **2**
Return Air Filter Size: **16 x 25 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

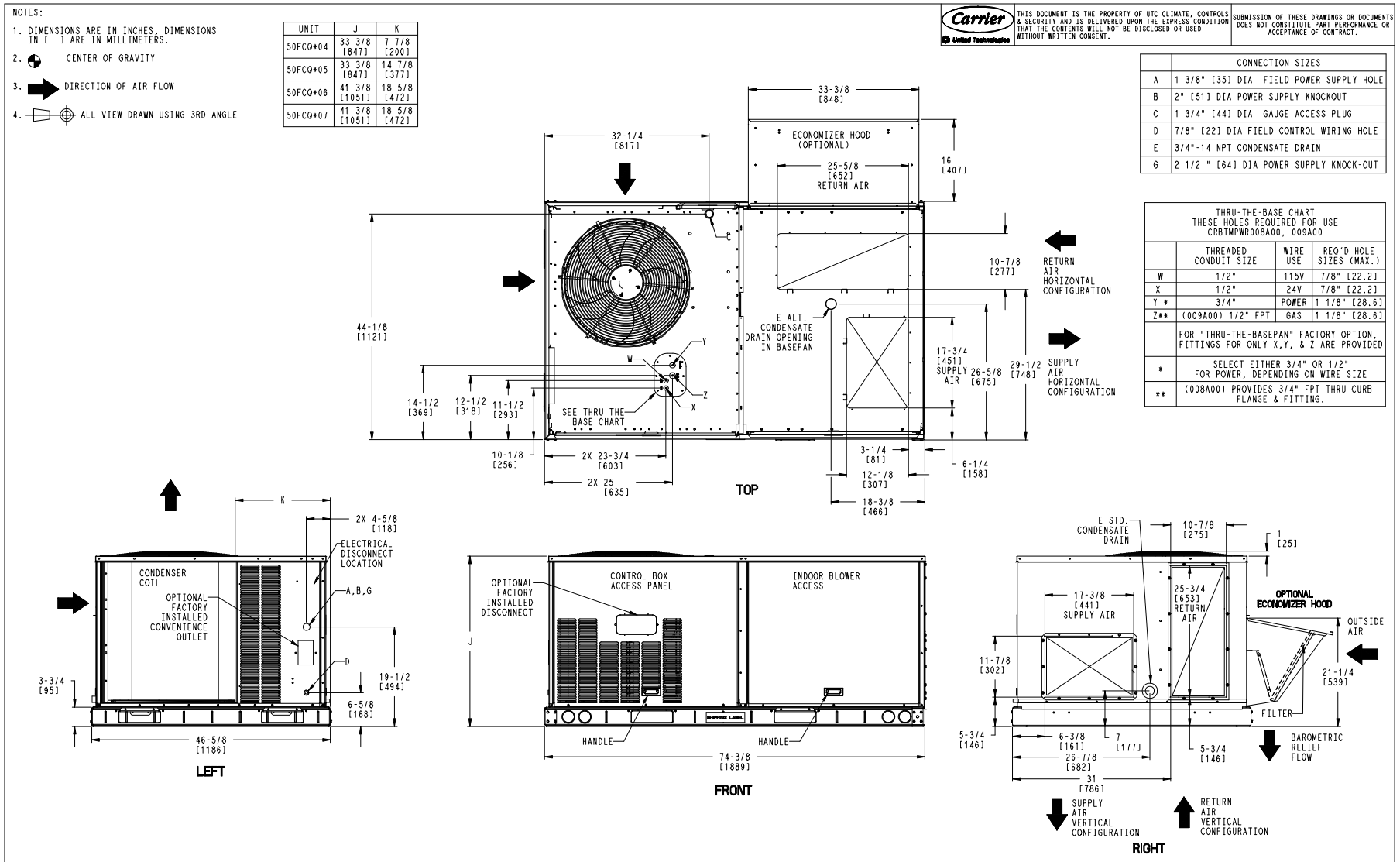
5-Year compressor parts (STD.)
1-Year parts (STD.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
50FCQA04A2M6-3A0A0	Rooftop Unit	2


NOTES:
1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE
UNIT | J | K
50FCQ*04 | 33 3/8 [847] | 7 7/8 [200]
50FCQ*05 | 33 3/8 [847] | 14 7/8 [377]
50FCQ*06 | 41 3/8 [1051] | 18 5/8 [472]
50FCQ*07 | 41 3/8 [1051] | 18 5/8 [472]
Carrier
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CONNECTION SIZES
A | 1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B | 2" [51] DIA POWER SUPPLY KNOCKOUT
C | 1 3/4" [44] DIA GAUGE ACCESS PLUG
D | 7/8" [22] DIA FIELD CONTROL WIRING HOLE
E | 3/4"-14 NPT CONDENSATE DRAIN
G | 2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT
THRU-THE-BASE CHART
THESE HOLES REQUIRED FOR USE CRBTMPWR008A00, 009A00
THREADED CONDUIT SIZE | WIRE USE | REQ'D HOLE SIZES (MAX.)
W | 1/2" | 115V | 7/8" [22.2]
X | 1/2" | 24V | 7/8" [22.2]
Y * | 3/4" | POWER | 1 1/8" [28.6]
Z** | (009A00) 1/2" FPT | GAS | 1 1/8" [28.6]
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X,Y, & Z ARE PROVIDED
* SELECT EITHER 3/4" OR 1/2" FOR POWER, DEPENDING ON WIRE SIZE
** (008A00) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.
33-3/8 [848]
32-1/4 [817]
ECONOMIZER HOOD (OPTIONAL)
25-5/8 [652] RETURN AIR
16 [407]
10-7/8 [277]
RETURN AIR HORIZONTAL CONFIGURATION
44-1/8 [1121]
E ALT. CONDENSATE DRAIN OPENING IN BASEPAN
17-3/4 [451] SUPPLY AIR
26-5/8 [675]
29-1/2 [748]
SUPPLY AIR HORIZONTAL CONFIGURATION
14-1/2 [369]
12-1/2 [318]
11-1/2 [293]
SEE THRU THE BASE CHART
10-1/8 [256]
2X 23-3/4 [603]
2X 25 [635]
3-1/4 [81]
12-1/8 [307]
18-3/8 [466]
6-1/4 [158]
TOP
K
2X 4-5/8 [118]
ELECTRICAL DISCONNECT LOCATION
CONDENSER COIL
OPTIONAL FACTORY INSTALLED CONVENIENCE OUTLET
A,B,G
D
3-3/4 [95]
19-1/2 [494]
6-5/8 [168]
46-5/8 [1186]
LEFT
OPTIONAL FACTORY INSTALLED DISCONNECT
CONTROL BOX ACCESS PANEL
INDOOR BLOWER ACCESS
J
HANDLE
HANDLE
74-3/8 [1889]
FRONT
E STD. CONDENSATE DRAIN
10-7/8 [275]
1 [25]
17-3/8 [441] SUPPLY AIR
25-3/4 [653] RETURN AIR
OPTIONAL ECONOMIZER HOOD
OUTSIDE AIR
11-7/8 [302]
21-1/4 [539]
FILTER
5-3/4 [146]
6-3/8 [161]
7 [177]
5-3/4 [146]
26-7/8 [682]
31 [786]
BAROMETRIC RELIEF FLOW
SUPPLY AIR VERTICAL CONFIGURATION
RETURN AIR VERTICAL CONFIGURATION
RIGHT
ITC CLASSIFICATION: U.S. ECCN:NSR
SHEET: 1 OF 3
DATE: 08/15/19
SUPERCEDES: -
50FCQ 04-07 SINGLE PACKAGE HEAT PUMP
48TC003348
REV: -

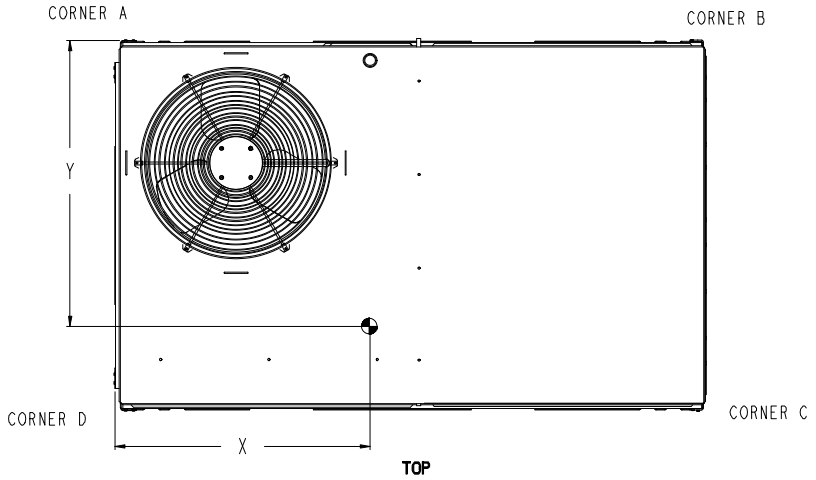
UNIT	STD. UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ*04	467	212	126	57	118	53	108	49	115	52	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*05	473	215	127	58	119	54	110	50	117	53	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*06	584	265	160	72	145	66	133	60	146	66	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]
50FCQ*07	589	267	161	73	146	66	134	61	147	67	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]

* STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.

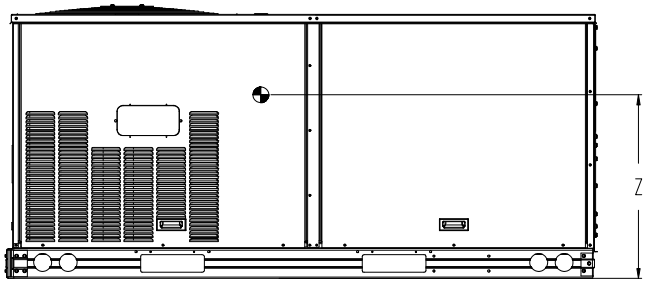
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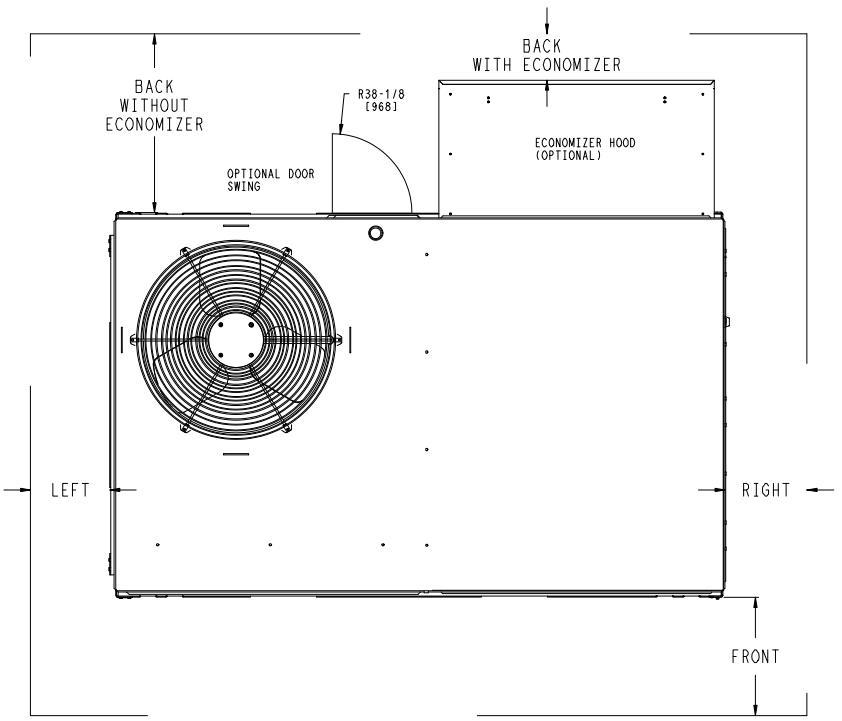
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TOP



FRONT



NOTE:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

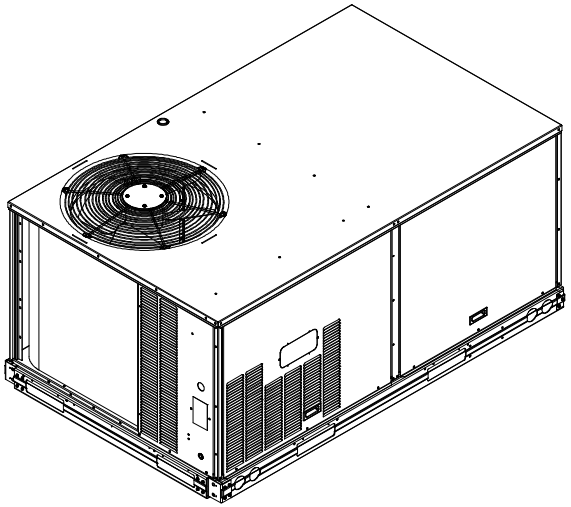
	CLEARANCE		
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/ECON	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

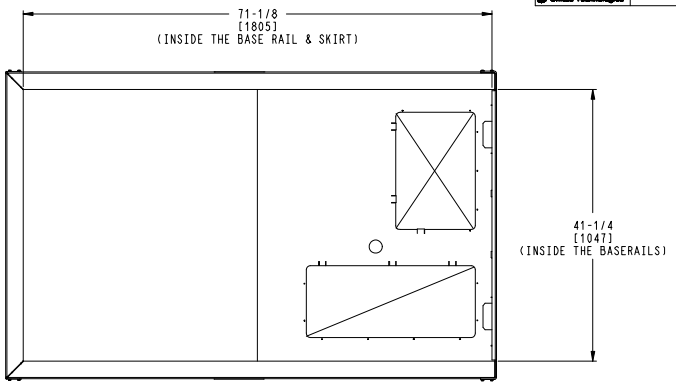
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

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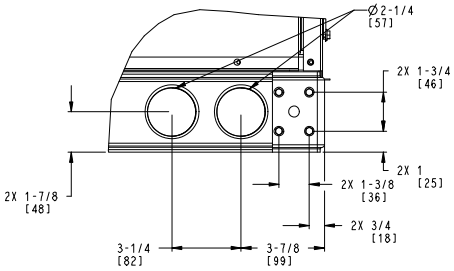
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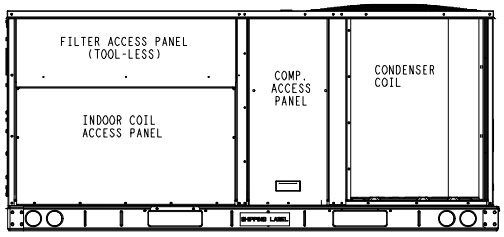


INSIDE BASERAIL DIMENSIONS

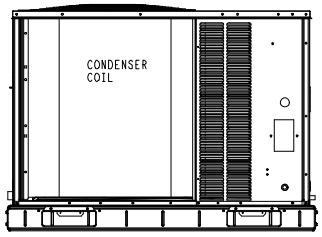
BOTTOM



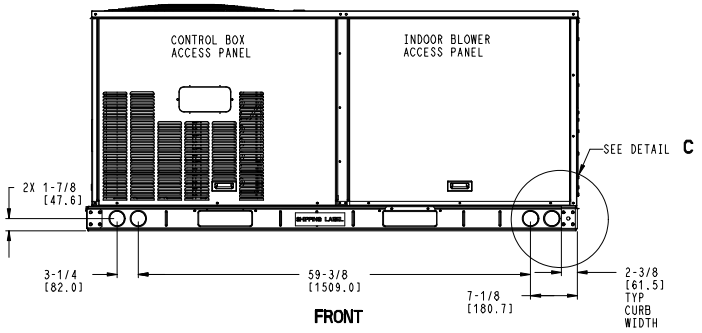
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

Part Number:50FCQA04A2M6-3A0A0

ARI SEER:	**14.30**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**33.4**	in

Operating Weight

Base Unit Weight:	**467**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**13**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**482**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**1200**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**58.4**	F
Evaporator Leaving Air WB:	**57.3**	F
Evaporator Leaving Air Enthalpy:	**24.59**	BTU/lb
Gross Cooling Capacity:	**36.98**	MBH
Gross Sensible Capacity:	**27.93**	MBH
Compressor Power Input:	**2.41**	kW
Coil Bypass Factor:	**0.101**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.3**	F
Total Heating Capacity:	**34.10**	MBH
Integrated Heating Capacity:	**34.10**	MBH
Heating Power Input:	**2.46**	kW
High Temperature COP:	**3.70**	
Low Temperature COP:	**2.25**	
HSPF:	**8.2**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**1946**	
Fan Power:	**0.54**	BHP
NOTE:	**Selected IFM RPM Range: 219 - 2190**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**	
Compressor #1 RLA:	**5.8**	
Compressor #1 LRA:	**38**	
Indoor Fan Motor Type:	**MED**	
Indoor Fan Motor Eff.:	**Null**	

Indoor Fan Motor FLA (Total): **1.2**
Power Supply MCA: **10**
Power Supply MOCP (Fuse or HACR): **15**
Disconnect Size FLA: **9**
Disconnect Size LRA: **42**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

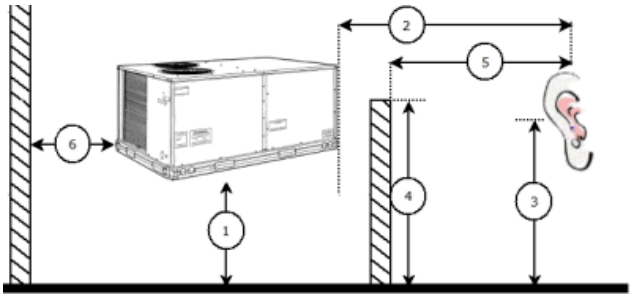
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	92.4	86.1	81.8
125 Hz	83.6	79.2	81.8
250 Hz	76.5	70.0	77.0
500 Hz	69.1	62.8	72.6
1000 Hz	66.5	64.1	69.9
2000 Hz	63.5	55.8	64.6
4000 Hz	59.4	50.0	59.3
8000 Hz	57.1	43.3	55.6
A-Weighted	74.6	69.3	75.4

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	81.8	81.8	77.0	72.6	69.9	64.6	59.3	55.6	85.9 Lw
B	55.6	65.7	68.4	69.4	69.9	65.8	60.3	54.5	75.4 LwA
C	49.4	49.4	44.6	40.2	37.5	32.2	26.9	23.2	53.5 Lp
D	23.2	33.3	36.0	37.0	37.5	33.4	27.9	22.1	43.0 LpA

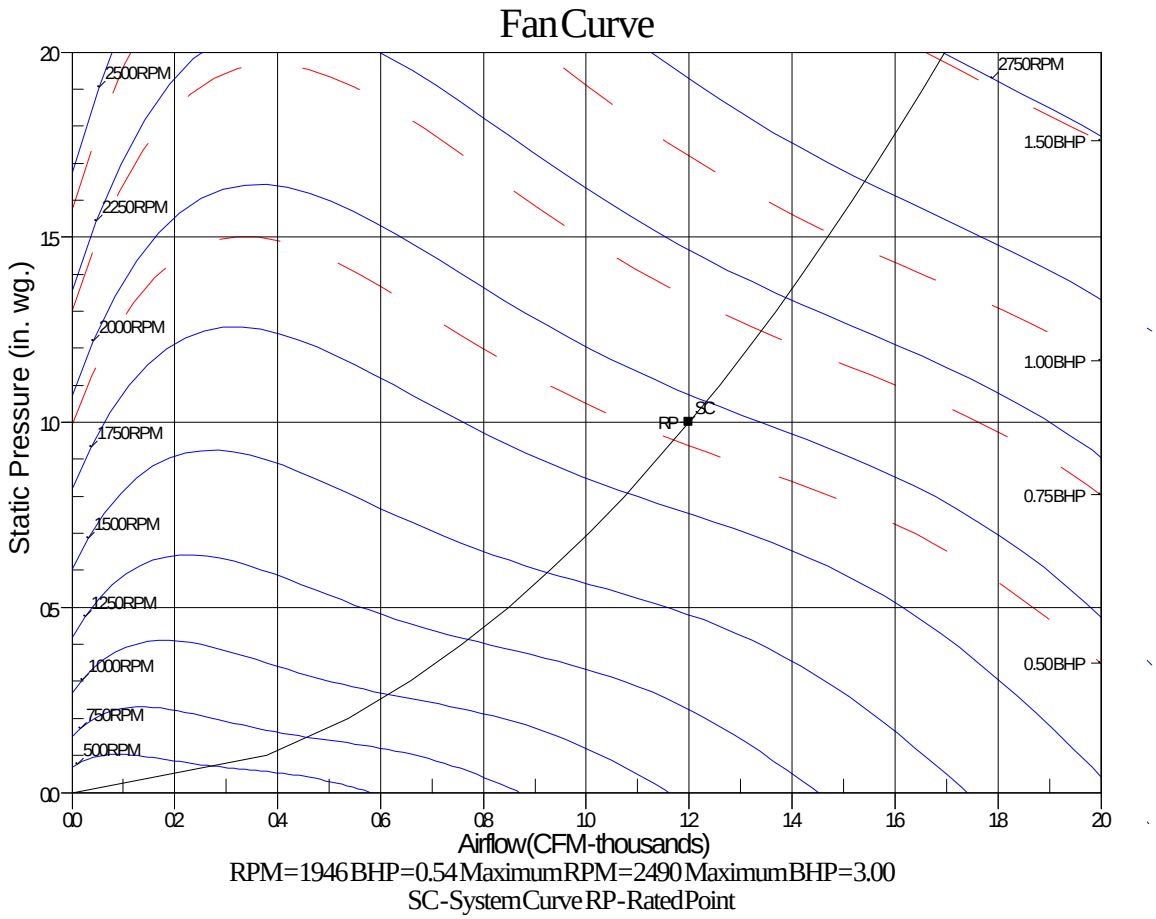
Legend

Performance Summary For Locker RM - AC 1,2

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



RPM=1946 BHP=0.54 Maximum RPM=2490 Maximum BHP=3.00
SC-System Curve RP-Rated Point

GYM - 1,2,3,4,5,6

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For GYM - 1,2,3,4,5,6

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

Unit Parameters

Unit Model: **50FCQM08A2M6-3A0A0**
Unit Size: **08 (7.5 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Two-Stage Cooling / One Circuitl**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **7' 4.125"**
Unit Width: **4' 11.5"**
Unit Height: **4' 1.375"**

*** Weights and Dimensions are approximate. Weight does not include roof curbs, unit packaging, field installed accessories or factory installed options. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Base Unit Weight (Does not include any accessories):
805 lb

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **4**
Return Air Filter Size: **20 x 20 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Standard/Medium Static (EcoBlue)
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controller
Standard Packaging

Warranty Information

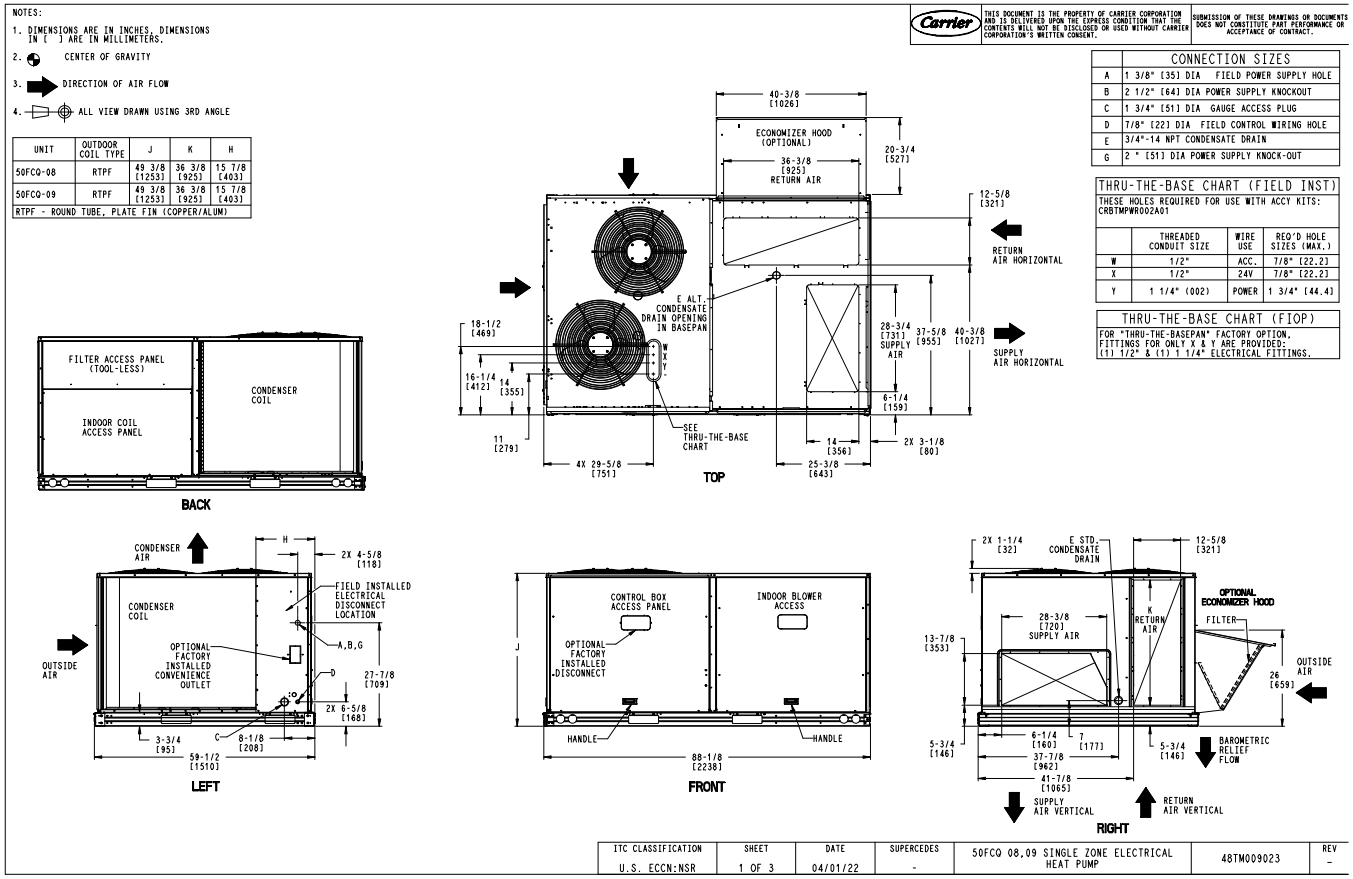
1-Year parts (STD.)
5-Year Compressor (std.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

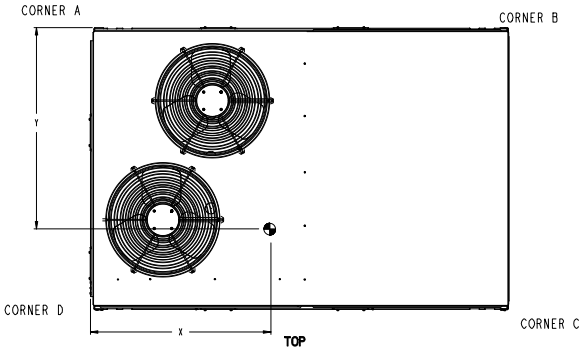
Part Number	Description	Quantity
50FCQM08A2M6-3A0A0	Rooftop Unit	6

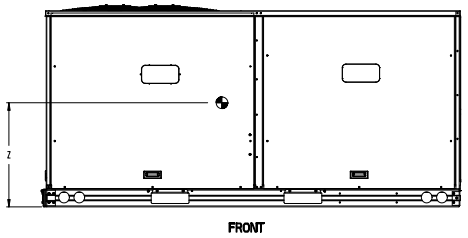

NOTES:
1. DIMENSIONS ARE IN INCHES. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE
UNIT | OUTDOOR COIL TYPE | J | K | H
50FCQ-08 | RTPF | 49 3/8 [1253] | 36 3/8 [925] | 15 7/8 [403]
50FCQ-09 | RTPF | 49 3/8 [1253] | 36 3/8 [925] | 15 7/8 [403]
RTPF - ROUND TUBE, PLATE FIN (COPPER/ALUM)
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CONNECTION SIZES
A 1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B 2 1/2" [64] DIA POWER SUPPLY KNOCKOUT
C 1 3/4" [51] DIA GAUGE ACCESS PLUG
D 7/8" [22] DIA FIELD CONTROL WIRING HOLE
E 3/4"-14 NPT CONDENSATE DRAIN
G 2 " [51] DIA POWER SUPPLY KNOCK-OUT
THRU-THE-BASE CHART (FIELD INST)
THESE HOLES REQUIRED FOR USE WITH ACCY KITS: CRBTMPWR002A01
THREADED CONDUIT SIZE | WIRE USE | REQ'D HOLE SIZES (MAX.)
W 1/2" ACC. 7/8" [22.2]
X 1/2" 24V 7/8" [22.2]
Y 1 1/4" (002) POWER 1 3/4" [44.4]
THRU-THE-BASE CHART (FIOP)
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X & Y ARE PROVIDED: (1) 1/2" & (1) 1 1/4" ELECTRICAL FITTINGS.
FILTER ACCESS PANEL (TOOL-LESS)
INDOOR COIL ACCESS PANEL
CONDENSER COIL
BACK
40-3/8 [1026]
ECONOMIZER HOOD (OPTIONAL)
36-3/8 [925] RETURN AIR
20-3/4 [527]
12-5/8 [321]
RETURN AIR HORIZONTAL
SUPPLY AIR HORIZONTAL
E ALT. CONDENSATE DRAIN OPENING IN BASEPAN
18-1/2 [469]
16-1/4 [412]
14 [355]
11 [279]
4X 29-5/8 [751]
SEE THRU-THE-BASE CHART
28-3/4 [731] SUPPLY AIR
37-5/8 [955]
40-3/8 [1027]
6-1/4 [159]
14 [356]
2X 3-1/8 [80]
25-3/8 [643]
TOP
CONDENSER AIR
H
2X 4-5/8 [118]
FIELD INSTALLED ELECTRICAL DISCONNECT LOCATION
CONDENSER COIL
OPTIONAL FACTORY INSTALLED CONVENIENCE OUTLET
A,B,G
D
27-7/8 [709]
2X 6-5/8 [168]
OUTSIDE AIR
3-3/4 [95]
C
8-1/8 [208]
59-1/2 [1510]
LEFT
CONTROL BOX ACCESS PANEL
INDOOR BLOWER ACCESS
OPTIONAL FACTORY INSTALLED DISCONNECT
J
HANDLE
HANDLE
88-1/8 [2238]
FRONT
2X 1-1/4 [32]
E STD. CONDENSATE DRAIN
12-5/8 [321]
OPTIONAL ECONOMIZER HOOD
FILTER
28-3/8 [720] SUPPLY AIR
K RETURN AIR
13-7/8 [353]
OUTSIDE AIR
26 [659]
6-1/4 [160]
7 [177]
5-3/4 [146]
5-3/4 [146]
BAROMETRIC RELIEF FLOW
37-7/8 [962]
41-7/8 [1065]
SUPPLY AIR VERTICAL
RETURN AIR VERTICAL
RIGHT
ITC CLASSIFICATION U.S. ECCN:NSR
SHEET 1 OF 3
DATE 04/01/22
SUPERCEDES -
50FCQ 08,09 SINGLE ZONE ELECTRICAL HEAT PUMP
48TM009023
REV -

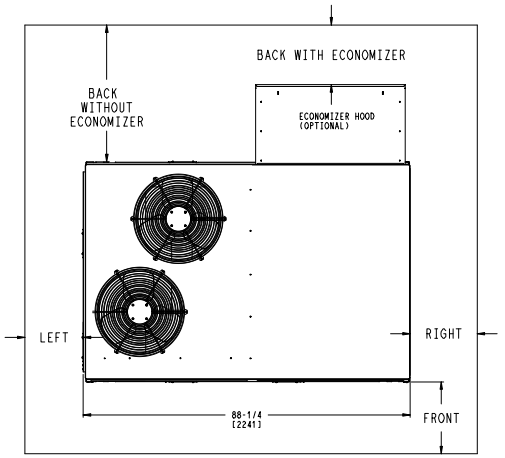
UNIT	OUTDOOR COIL TYPE	STD. UNIT WEIGHT ***		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		
		LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ-08	RTPF	805	365	163	74	209	95	243	110	190	86	49 1/2 [1257]	32 [813]	19 1/8 [486]
50FCQ-09	RTPF	812	368	164	75	211	96	245	111	191	87	49 1/2 [1257]	32 [813]	19 1/8 [486]

RTPF - ROUND TUBE, PLATE FIN (COPPER/ALUM)

*** STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.





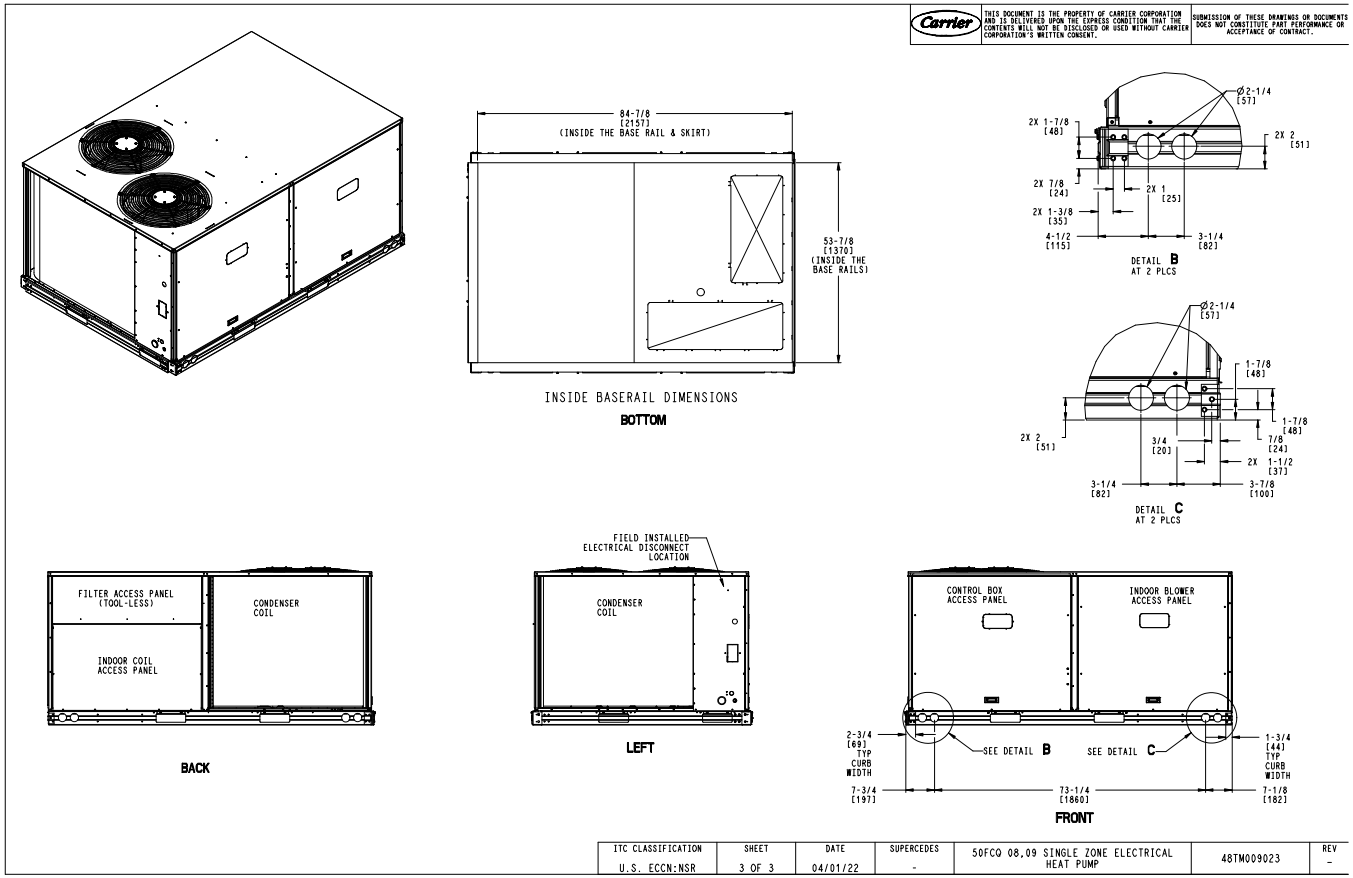


NOTE:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

	CLEARANCE	
	SERVICE WITH:	SERVICE WITH:
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER
FRONT	48 [1219mm]	36 [914mm]
LEFT	48 [1219mm]	42 [1067mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]
BACK W/ECON	36 [914mm]	36 [914mm]
RIGHT	36 [914mm]	36 [914mm]
TOP	72 [1829mm]	72 [1829mm]

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	04/01/22	-	50FCQ 08,09 SINGLE ZONE ELECTRICAL HEAT PUMP	48TM009023	-


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84-7/8 [2157] (INSIDE THE BASE RAIL & SKIRT)
53-7/8 [1370] (INSIDE THE BASE RAILS)
INSIDE BASERAIL DIMENSIONS
BOTTOM
Ø2-1/4 [57]
2X 1-7/8 [48]
2X 2 [51]
2X 7/8 [24]
2X 1 [25]
2X 1-3/8 [35]
4-1/2 [115]
3-1/4 [82]
DETAIL B AT 2 PLCS
1-7/8 [48]
3/4 [20]
2X 1-1/2 [37]
3-7/8 [100]
DETAIL C AT 2 PLCS
FILTER ACCESS PANEL (TOOL-LESS)
INDOOR COIL ACCESS PANEL
CONDENSER COIL
BACK
FIELD INSTALLED ELECTRICAL DISCONNECT LOCATION
LEFT
CONTROL BOX ACCESS PANEL
INDOOR BLOWER ACCESS PANEL
2-3/4 [69] TYP CURB WIDTH
1-3/4 [44] TYP CURB WIDTH
SEE DETAIL B
SEE DETAIL C
7-3/4 [197]
73-1/4 [1860]
7-1/8 [182]
FRONT
ITC CLASSIFICATION U.S. ECCN:NSR
SHEET 3 OF 3
DATE 04/01/22
SUPERCEDES -
50FCQ 08,09 SINGLE ZONE ELECTRICAL HEAT PUMP
48TM009023
REV -

Performance Summary For GYM - 1,2,3,4,5,6

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

Part Number:50FCQM08A2M6-3A0A0

ARI EER:	**11.20**	
IEER:	**15.0**	

Base Unit Dimensions

Unit Length:	**88.1**	in
Unit Width:	**59.5**	in
Unit Height:	**49.4**	in
Base Unit Weight (Does not include any accessories):	**805**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**3000**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**59.4**	F
Evaporator Leaving Air WB:	**57.7**	F
Evaporator Leaving Air Enthalpy:	**24.81**	BTU/lb
Gross Cooling Capacity:	**89.50**	MBH
Gross Sensible Capacity:	**66.85**	MBH
Compressor Power Input:	**6.44**	kW
Coil Bypass Factor:	**0.065**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.4**	F
Total Heating Capacity:	**85.60**	MBH
Integrated Heating Capacity:	**85.60**	MBH
Heating Power Input:	**6.77**	kW
High Temperature COP:	**3.40**	
Low Temperature COP:	**2.30**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**1528**	
Fan Power:	**1.28**	BHP
NOTE:	**Selected IFM RPM Range: 920 - 2000**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**
Compressor #1 RLA:	**6.1**
Compressor #1 LRA:	**41**
Compressor #2 RLA:	**6.1**
Compressor #2 LRA:	**41**
Indoor Fan Motor Type:	**MED**
Indoor Fan Motor FLA (Total):	**3**
Power Supply MCA:	**19**
Power Supply MOCP (Fuse or HACR):	**20**
Disconnect Size FLA:	**19**

Disconnect Size LRA: **90**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **2 / 0.8**

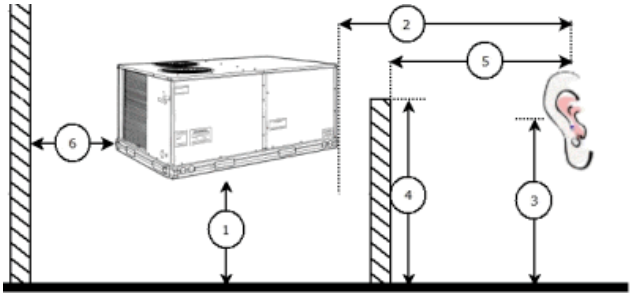
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	87.2	83.1	89.7
125 Hz	82.9	76.8	81.5
250 Hz	75.6	70.5	80.5
500 Hz	72.7	65.1	79.2
1000 Hz	73.7	65.3	77.1
2000 Hz	69.4	59.0	73.2
4000 Hz	64.8	52.2	70.2
8000 Hz	55.8	47.0	67.4
A-Weighted	77.7	69.7	82.0

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

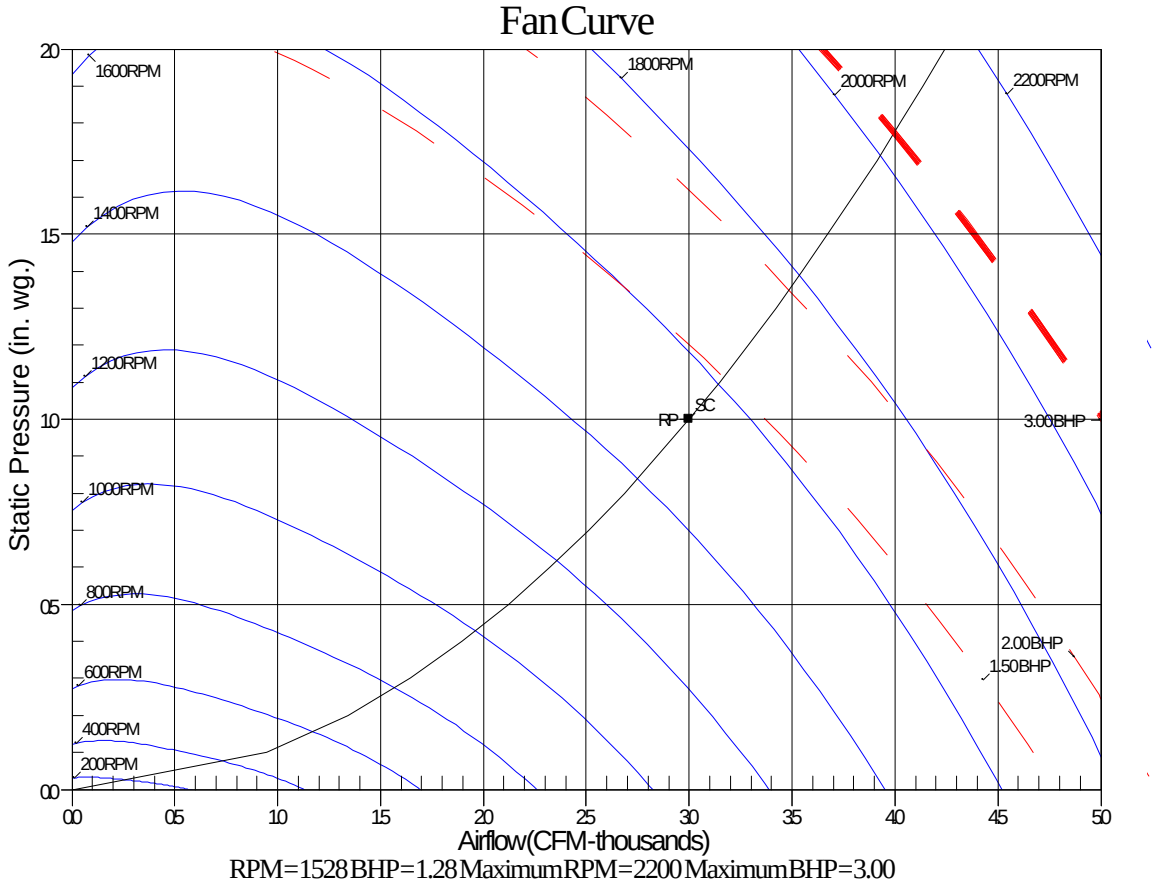
Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	89.7	81.5	80.5	79.2	77.1	73.2	70.2	67.4	91.3 Lw
B	63.5	65.4	71.9	76.0	77.1	74.4	71.2	66.3	82.0 LwA
C	57.3	49.1	48.1	46.8	44.7	40.8	37.8	35.0	58.9 Lp
D	31.1	33.0	39.5	43.6	44.7	42.0	38.8	33.9	49.6 LpA

Legend
A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Performance Summary For GYM - 1,2,3,4,5,6

Project: Lynwood USD - Lynwood High School Bullis RD 12/01/2023
Prepared By: 08:50AM

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



RPM=1528 BHP=1.28 Maximum RPM=2200 Maximum BHP=3.00
SC-System Curve RP-Rated Point

SECTION II. ROOFTOP UNIT ACCESSORIES

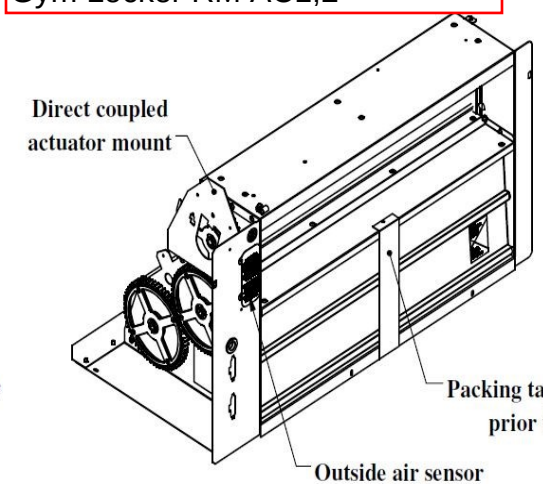
MicroMetl	Date:	Weight: 45lbs (US) 20.41kg (Metric)	Part Number: ECD-SRT12CB-D0DB-4
	RTU:		
Submitted to:		Approved by:	Notes:

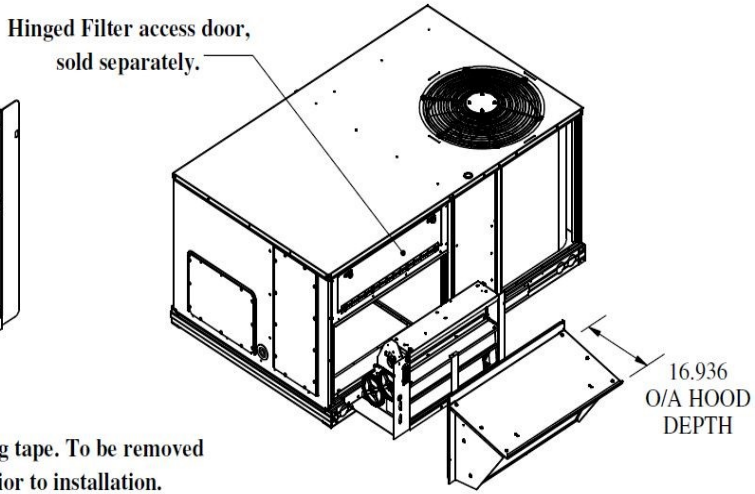
Economizer - Economizer - Genesis Ultra Low Leak Economizer, Vertical Orientation, RTU Open - Premier Link - System VU - No Controller, Adjustable Dry Bulb Sensor, Belimo Actuator. Painted Rain Hood With Aluminum Filter, Barometric Relief, All Necessary Panels And Hardware Included.

For: Bldg A: AC-7,9,1-5,6,8;
Bldg C: C-1-4; Bldg F: F-3,5;
Bldg G: G-1-3;
Bldg N: N-1,3,4,5,7;
Gym Locker RM AC1,2

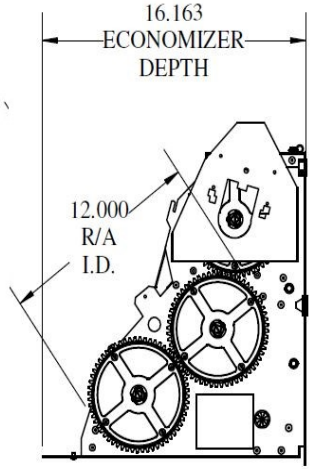
FEATURES:

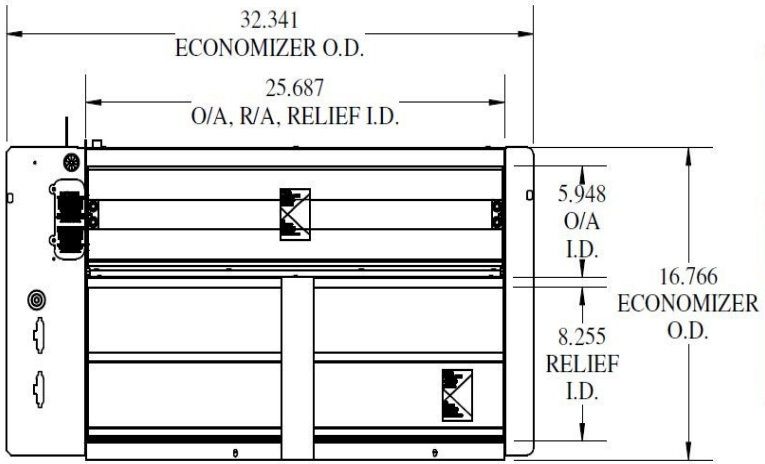
- External gear driven dampers with roll formed blades.
- Designed for vertical applications only.
- Factory assembled rain hood, with aluminum water entrainment filters.
- Filter access door supplied with RTU.
- Hinged filter access door is ordered separately.
  - MMC P/# for Chassis 1 - ECD-SRT1CA-HDOOR
  - MMC P/# for Chassis 2 - ECD-SRT2CA-HDOOR
- Rain hood is sloped for water run off.
- All harnesses and plugs needed are supplied.
- Economizer is class 1A & AMCA rated.
- Relief blades are AMCA rated.
- Uses filter rack with unit.
- Motorized relief available, add -M to end of part number
  - Ex: ECD-SRT12CB-D00H-M
- Economizer with smoke detector available, add -S to end of part number
  - Ex: ECD-SRT12CB-D00H-S





-Control Types	
-D0DB-4	RTU Open - Premier Link - System VU, No controller, Adjustable dry bulb, Belimo actuator
-D0DB-X	Comfortlink - No controller, Adjustable dry bulb, Belimo MFT actuator with 500 ohm resistor
-D00H-H	Communicating Honeywell actuator only
-D00H	Non-communicating Honeywell actuator only
-D00B	Belimo actuator with feedback and end switch
-D00S	Siemens actuator with feedback





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Master Revision 0001A

Page Revision 0001A

MicroMetl	Date:	Weight: 45lbs (US) 20.41kg (Metric)	Part Number: ECD-SRT12CB-D0DB-4
	RTU:		
Submitted to:		Approved by:	Notes:

Economizer - Economizer - Genesis Ultra Low Leak Economizer, Vertical Orientation, RTU Open - Premier Link - System VU - No Controller, Adjustable Dry Bulb Sensor, Belimo Actuator. Painted Rain Hood With Aluminum Filter, Barometric Relief, All Necessary Panels And Hardware Included.

Compliant Economizer:

1. **Title 24:** Economizers meet California Energy Commission Title 24-2013 / 2016 prescriptive section 140.4 (damper leakage etc.), and when used with Carrier Comfortlink, RTU Open, System Vu, or I/O Flex 6126 control systems, meet mandatory section 120.2.i for Fault Detection and Diagnostic requirements. 5 Year Warranty for parts and components only.
2. **ASHRAE 90.1:** Economizers meet ASHRAE 90.1-2013/2016 damper leakage requirements, and meet 2016 Fault Detection and Diagnosis requirements when used with Carrier Comfortlink, RTU Open, System Vu, or I/O Flex 6126 control systems.
3. **IECC:** Economizers meet IECC 2012, IECC 2015, and IECC 2018 for outside air, return air, and relief damper (when provided) leakage requirements, and when used with Carrier Comfortlink, RTU Open, System Vu, or I/O Flex control systems meet IECC 2015 and IECC 2018 for Fault Detection and Diagnostic requirements. Note: IECC 2015 and IECC 2018 requires differential return air sensor, which must be ordered separately.
4. **AMCA:** Outside air and return air (volume) dampers are AMCA Class 1A rated at 1" w.g. Refer to MicroMetl NS2 catalog sheet on web site for details. Relief air dampers (when provided) are also AMCA rated. Refer to GR1 series catalog sheet on web site for details.

Features:

- For single or 2 speed indoor fan units. Other control options available.
- Gear driven design for trouble-free operation, eliminating slippage and binding associated with standard linkage.
- Includes assembled rainhood with aluminum water entrainment filters in the outside air section.
- Rainhood is sloped for water run-off.
- Built-in barometric relief damper provided. Power exhaust options available.
- All harnesses and plugs needed are provided.
- Uses standard factory filter access door shipped with HVAC unit.
- If factory hinged access door option is installed on unit, an additional kit is required to seal hinged door properly.
  - OEM part no. CRPECONV003A00 or MicroMetl part number 0640-0100-HDANGL

Notes:

1. Control systems include DDC actuator, and some models include 500 OHM resistor and outside air temperature sensor.
2. Differential return air sensor if required can be ordered from OEM unit factory, and is field installed in return duct.
3. ASHRAE, IECC, and Title 24 require the economizer controller be capable of reporting faults to a fault management application accessible by day-to-day operating or service personnel, or annunciated locally on zone thermostats or in some codes other devices are acceptable. Refer to applicable code requirements and to DDC controller for options.



MicroMetl Corporation certifies that the models GR1 and NS2 shown herein are licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with requirements of the AMCA Certified Ratings Programs. The AMCA Certified Ratings Seal applies to Air Leakage and Air Performance ratings.

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Master Revision 0001A

Page Revision 0001A

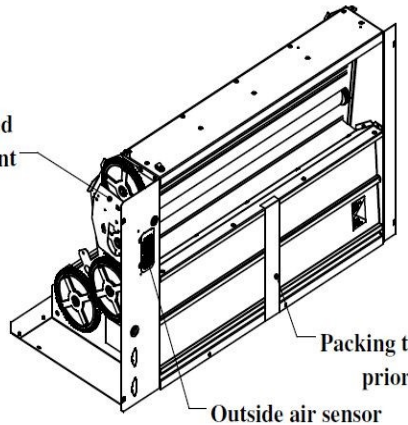
MicroMetl	Date:	Weight: 68lbs (US) 30.84kg (Metric)	Part Number: ECD-SRT34CB-D0DB-4
	RTU:		
Submitted to:		Approved by:	Notes:

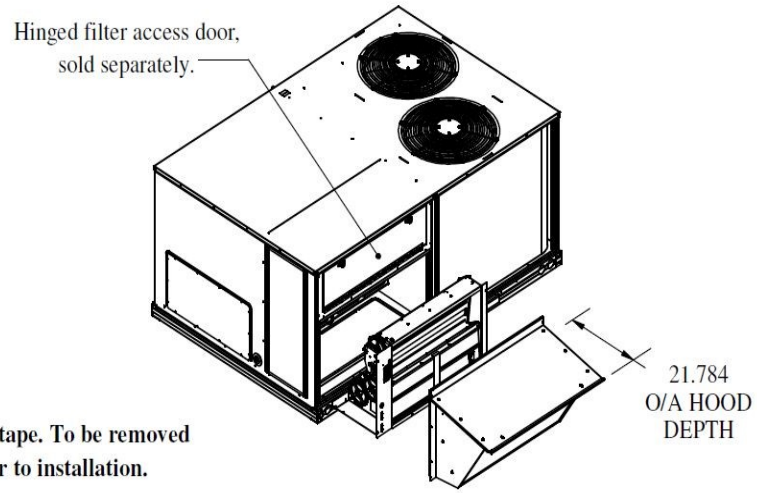
Economizer - Economizer - Genesis Ultra Low Leak Economizer, Vertical Orientation, RTU Open - Premier Link - System VU - No Controller, Adjustable Dry Bulb Sensor, Belimo Actuator. Painted Rain Hood With Aluminum Filter, Barometric Relief, All Necessary Panels And Hardware Included.

For: Bldg F: F-4,1,2;
Gym: AC-1-6

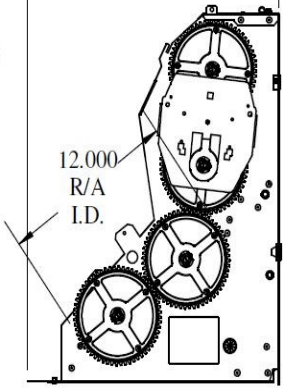
FEATURES:

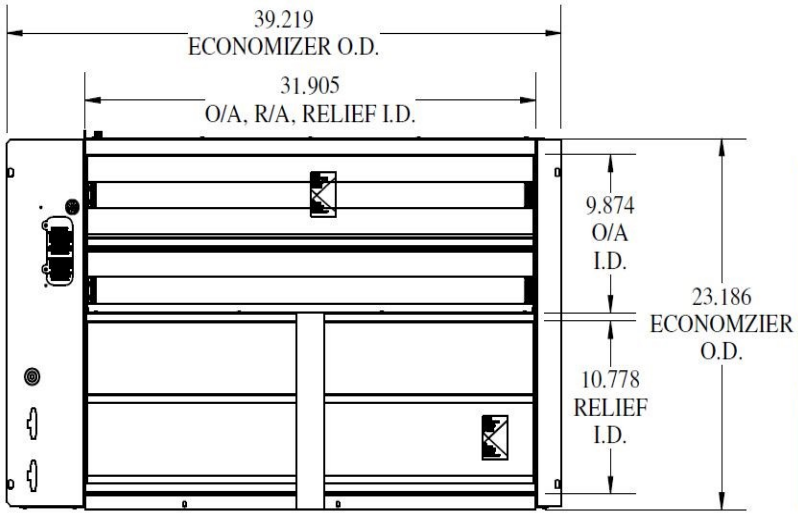
- External gear driven dampers with roll formed blades.
- Designed for vertical applications only.
- Factory assembled rain hood, with aluminum water entrainment filters.
- Filter access door supplied with RTU.
- Hinged filter access door is ordered separately.
  - MMC P/# for Chassis 3 - ECD-SRT3CA-HDOOR
  - MMC P/# for Chassis 4 - ECD-SRT4CA-HDOOR
- Rain hood is sloped for water run off.
- All harnesses and plugs needed are supplied.
- Economizer is class 1A & AMCA rated.
- Relief blades are AMCA rated.
- Uses filter rack with unit.
- Motorized relief available, add -M to end of part number
  - Ex: ECD-SRT34CB-D00H-M
- Economizer with smoke detector available, add -S to end of part number
  - Ex: ECD-SRT34CB-D00H-S





-Control Types	
-D0DB-4	RTU Open - Premier Link - System VU, No controller, Adjustable dry bulb, Belimo actuator
-D0DB-X	Comfortlink - No controller, Adjustable dry bulb, Belimo MFT actuator with 500 ohm resistor
-D00H-H	Communicating Honeywell actuator only
-D00H	Non-communicating Honeywell actuator only
-D00B	Belimo actuator with feedback and end switch
-D00S	Siemens actuator with feedback





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Master Revision	0001A
Page Revision	0001A

MicroMetl	Date:	Weight: 68lbs (US) 30.84kg (Metric)	Part Number: ECD-SRT34CB-D0DB-4
	RTU:		
Submitted to:		Approved by:	Notes:

Economizer - Economizer - Genesis Ultra Low Leak Economizer, Vertical Orientation, RTU Open - Premier Link - System VU - No Controller, Adjustable Dry Bulb Sensor, Belimo Actuator. Painted Rain Hood With Aluminum Filter, Barometric Relief, All Necessary Panels And Hardware Included.

Compliant Economizer:

1. **Title 24:** Economizers meet California Energy Commission Title 24-2013 / 2016 prescriptive section 140.4 (damper leakage etc.), and when used with Carrier Comfortlink, RTU Open, System Vu, or I/O Flex 6126 control systems, meet mandatory section 120.2.i for Fault Detection and Diagnostic requirements. 5 Year Warranty for parts and components only.
2. **ASHRAE 90.1:** Economizers meet ASHRAE 90.1-2013/2016 damper leakage requirements, and meet 2016 Fault Detection and Diagnosis requirements when used with Carrier Comfortlink, RTU Open, System Vu, or I/O Flex 6126 control systems.
3. **IECC:** Economizers meet IECC 2012, IECC 2015, and IECC 2018 for outside air, return air, and relief damper (when provided) leakage requirements, and when used with Carrier Comfortlink, RTU Open, System Vu, or I/O Flex control systems meet IECC 2015 and IECC 2018 for Fault Detection and Diagnostic requirements. Note: IECC 2015 and IECC 2018 requires differential return air sensor, which must be ordered separately.
4. **AMCA:** Outside air and return air (volume) dampers are AMCA Class 1A rated at 1" w.g. Refer to MicroMetl NS2 catalog sheet on web site for details. Relief air dampers (when provided) are also AMCA rated. Refer to GR1 series catalog sheet on web site for details.

Features:

- For single or 2 speed indoor fan units. Other control options available.
- Gear driven design for trouble-free operation, eliminating slippage and binding associated with standard linkage.
- Includes assembled rainhood with aluminum water entrainment filters in the outside air section.
- Rainhood is sloped for water run-off.
- Built-in barometric relief damper provided. Power exhaust options available.
- All harnesses and plugs needed are provided.
- Uses standard factory filter access door shipped with HVAC unit.
- If factory hinged access door option is installed on unit, an additional kit is required to seal hinged door properly.
  - OEM part no. CRPECONV004A00 or MicroMetl part number 0640-0200-HDANGL

Notes:

1. Control systems include DDC actuator, and some models include 500 OHM resistor and outside air temperature sensor.
2. Differential return air sensor if required can be ordered from OEM unit factory, and is field installed in return duct.
3. ASHRAE, IECC, and Title 24 require the economizer controller be capable of reporting faults to a fault management application accessible by day-to-day operating or service personnel, or annunciated locally on zone thermostats or in some codes other devices are acceptable. Refer to applicable code requirements and to DDC controller for options.

amca WORLDWIDE CERTIFIED RATINGS AIR LEAKAGE AIR PERFORMANCE AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC. www.amca.org

MicroMetl Corporation certifies that the models GR1 and NS2 shown herein are licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with requirements of the AMCA Certified Ratings Programs. The AMCA Certified Ratings Seal applies to Air Leakage and Air Performance ratings.

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Indianapolis_3035 N. Shadeland Ave., Indianapolis, IN 46226_800.MMC.HVAC •• Sparks_905 Southern Way, Sparks, NV 89431_800.884.4MMC •• Longview_201 Kodak Blvd., Longview, TX 75602_903.248.4800

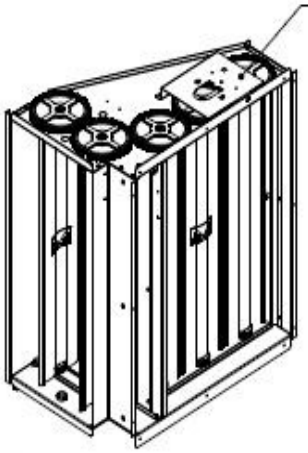
MicroMetl	Date:	Weight: 111lbs (US) 50.35kg (Metric)	Part Number: ECH-SRT34CB-D0DB-4
	RTU:		
Submitted to:		Approved by:	Notes:

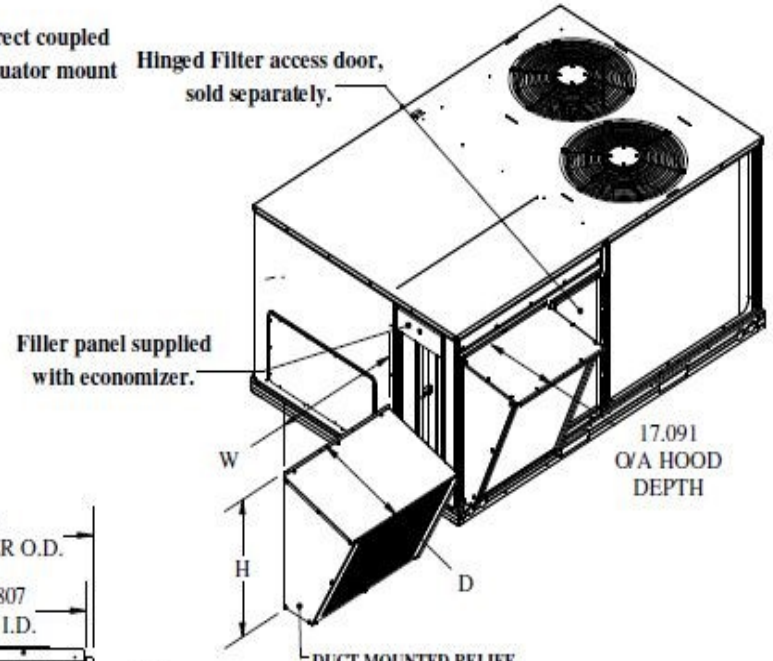
Economizer - Economizer - Genesis Ultra Low Leak Economizer, Horizontal Orientation, RTU Open - Premier Link - System VU - No Controller, Adjustable Dry Bulb Sensor, Belimo Actuator. Painted Rain Hood With Aluminum Filter, Barometric Relief, All Necessary Panels And Hardware Included.

For: Bldg P: P-5; Bldg S: AC1;
Gym: Locker RM-AC-3-5

FEATURES:

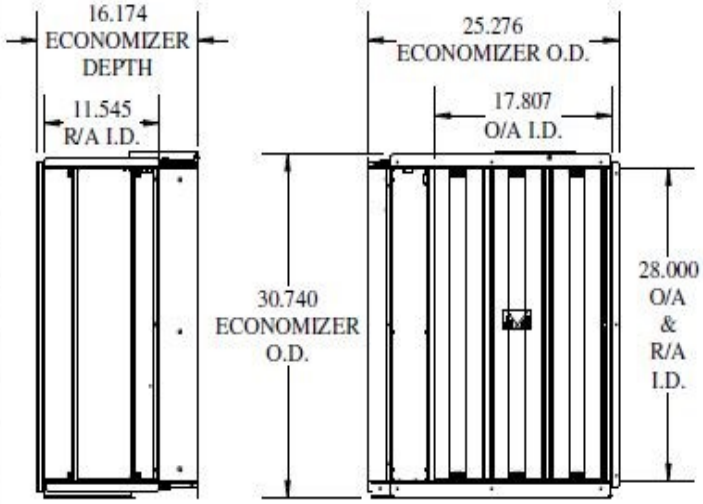
- External gear driven dampers with roll formed blades.
- Designed for horizontal applications only.
- Factory assembled rain hood, with aluminum water entrainment filters.
- Filter access door supplied with economizer
- Hinged filter access door is available - ordered separately.
  - MMC P/# - ECH-SRT34CA-HDOOR
- Rain hood is sloped for water run off.
- All harnesses and plugs needed are supplied.
- Economizer is class 1A & AMCA rated.
- Relief blades are AMCA rated.
- Uses filter rack with unit.
- Motorized relief available, add -M to end of part number
  - ECH-SRT34CB-D00H-m
- Economizer with smoke detector available, add -S to end of part number
  - ECH-SRT34CB-D00H-S





DUCT MOUNTED RELIEF
HOOD DIMENSIONS
W" x H" x D"
30.00" x 30.00" x 20.00"

-Control Types	
-D0DB-4	RTU Open - Premier Link - System VU, No controller, Adjustable dry bulb, Belimo actuator
-D0DB-X	Comfortlink - No controller, Adjustable dry bulb, Belimo MFT actuator with 500 ohm resistor
-D00H-H	Communicating Honeywell actuator only
-D00H	Non-communicating Honeywell actuator only
-D00B	Belimo actuator with feedback and end switch
-D00S	Siemens actuator with feedback



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Master Revision 0001A

Page Revision 0001A

MicroMetl	Date:	Weight: 111lbs (US) 50.35kg (Metric)	Part Number: ECH-SRT34CB-D0DB-4
	RTU:		
Submitted to:		Approved by:	Notes:

Economizer - Economizer - Genesis Ultra Low Leak Economizer, Horizontal Orientation, RTU Open - Premier Link - System VU - No Controller, Adjustable Dry Bulb Sensor, Belimo Actuator. Painted Rain Hood With Aluminum Filter, Barometric Relief, All Necessary Panels And Hardware Included.

Compliant Economizer:

1. **Title 24:** Economizers meet California Energy Commission Title 24-2013 / 2016 prescriptive section 140.4 (damper leakage etc.), and mandatory section 120.2.i for Fault Detection and Diagnostic controls. 5 Year Warranty for parts and components only.
2. **ASHRAE 90.1:** Economizers meet ASHRAE 90.1-2013 / 2016 damper leakage requirements as stated in Table 6.4.3.4.3., and meet 2016 Fault Detection and Diagnosis requirements in section 6.4.3.12.
3. **IECC:** Economizers meet IECC 2012 section C402.4.5.2 and, IECC 2015 sections C403.2.4.3 and C403.3.3.5 for outside air, return air, and relief damper (when provided) leakage requirements, and IECC 2015 section c403.2.4.7 for Fault Detection and Diagnostic requirements, Note: IECC 2015 section C403.2.4.7.1 requires differential return air sensor, which is included in some models (i.e. -DYXB) and must be ordered separately on others (i.e. -DYDB, -DYEB).
4. **AMCA:** Outside air and return air (volume) dampers are AMCA Class 1A rated 1" w.g. Refer to MicroMetl NS2 catalog sheet on web site for details. Relief air dampers (when provided) are also AMCA rated. Refer to GR1 series catalog sheet on web site for details.

Approximate static pressure drop through R/A damper in inches w.g.				
CFM	3500	4000	4500	5000
Pressure Drop	0.15	0.24	0.29	0.38



MicroMetl Corporation certifies that the models GR1 and NS2 shown herein are licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with requirements of the AMCA Certified Ratings Programs. The AMCA Certified Ratings Seal applies to Air Leakage and Air Performance ratings.

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Master Revision 0001A

Page Revision 0001A

MicroMetl	Date:	Weight: 74lbs (US) 33.57kg (Metric)	Part Number: ECH-SRT12CB-D0DB-4
	RTU:		
Submitted to:		Approved by:	Notes:

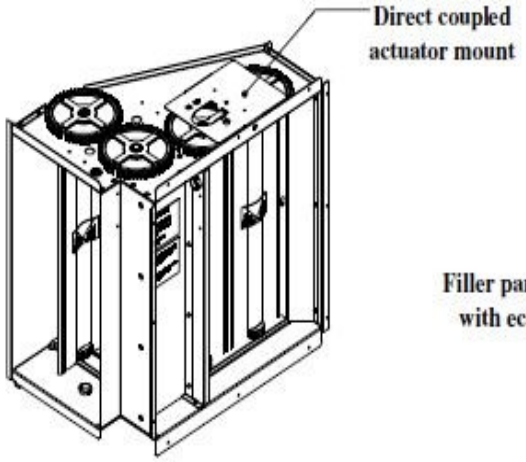
Economizer - Economizer - Genesis Ultra Low Leak Economizer, Horizontal Orientation, RTU Open - Premier Link - System VU - No Controller, Adjustable Dry Bulb Sensor, Belimo Actuator. Painted Rain Hood With Aluminum Filter, Barometric Relief, All Necessary Panels And Hardware Included.

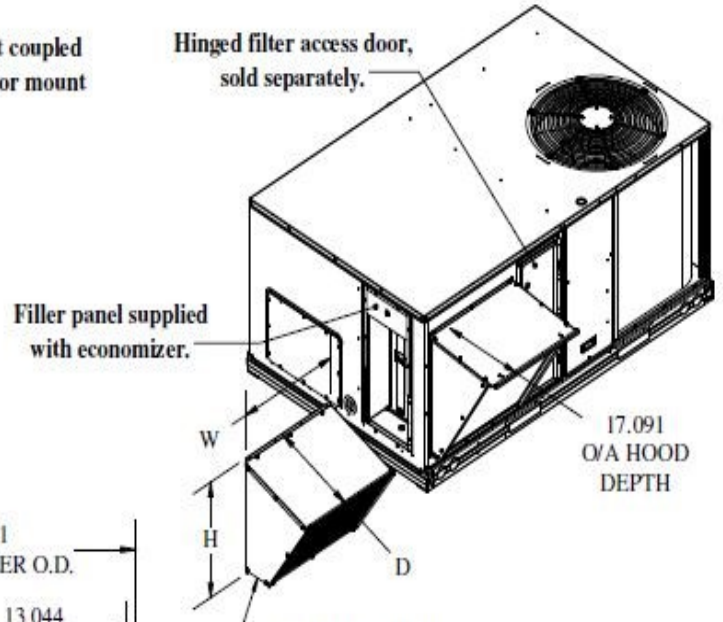
For: Bldg P: P-1,3;
Bldg Q: AC-1,2;
Bldg S: AC-2,3;

FEATURES:

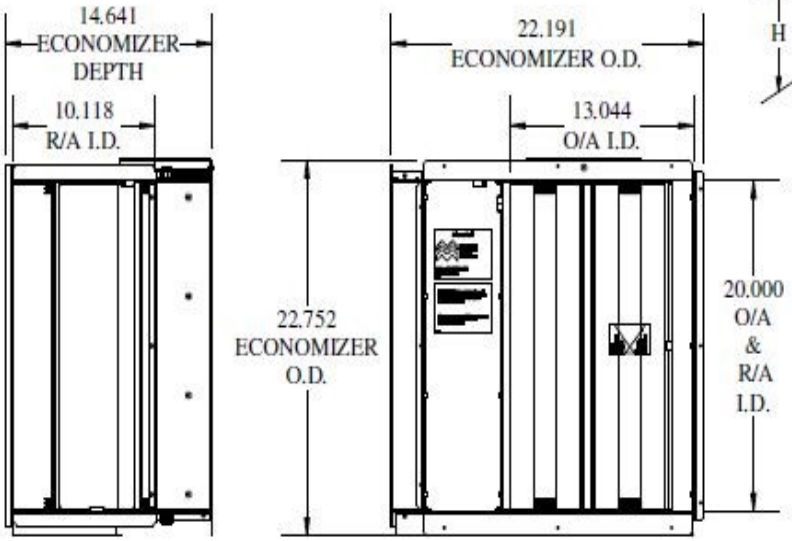
- External gear driven dampers with roll formed blades.
- Designed for horizontal applications only.
- Factory assembled rain hood, with aluminum water entrainment filters.
- Filter access door supplied with economizer
- Hinged filter access door is available - ordered separately
  - MMC P/# - ECH-SRT12CA-HDOOR.
- Rain hood is sloped for water run off.
- All harnesses and plugs needed are supplied.
- Economizer is class 1A & AMCA rated.
- Relief blades are AMCA rated.
- Uses filter rack with unit.
- Motorized relief available, add -M to end of part number
  - Ex: ECH-SRT12CB-D00H-M
- Economizer with smoke detector available, add -S to end of part number
  - Ex: ECH-SRT12CB-D00H-S

-Control Types	
-D0DB-4	RTU Open - Premier Link - System VU, No controller, Adjustable dry bulb, Belimo actuator
-D0DB-X	Comfortlink - No controller, Adjustable dry bulb, Belimo MFT actuator with 500 ohm resistor
-D00H-H	Communicating Honeywell actuator only
-D00H	Non-communicating Honeywell actuator only
-D00B	Belimo actuator with feedback and end switch
-D00S	Siemens actuator with feedback





DUCT MOUNTED RELIEF
HOOD DIMENSIONS
W" x H" x D"
22.00" x 22.00" x 16.00"



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Master Revision 0001A

Page Revision 0001A

MicroMetl	Date:	Weight: 74lbs (US) 33.57kg (Metric)	Part Number: ECH-SRT12CB-D0DB-4
	RTU:		
Submitted to:		Approved by:	Notes:

Economizer - Economizer - Genesis Ultra Low Leak Economizer, Horizontal Orientation, RTU Open - Premier Link - System VU - No Controller, Adjustable Dry Bulb Sensor, Belimo Actuator. Painted Rain Hood With Aluminum Filter, Barometric Relief, All Necessary Panels And Hardware Included.

Compliant Economizer:

1. **Title 24:** Economizers meet California Energy Commission Title 24-2013 / 2016 prescriptive section 140.4 (damper leakage etc.), and mandatory section 120.2.i for Fault Detection and Diagnostic controls. 5 Year Warranty for parts and components only.
2. **ASHRAE 90.1:** Economizers meet ASHRAE 90.1-2013 / 2016 damper leakage requirements as stated in Table 6.4.3.4.3., and meet 2016 Fault Detection and Diagnosis requirements in section 6.4.3.12.
3. **IECC:** Economizers meet IECC 2012 section C402.4.5.2 and, IECC 2015 sections C403.2.4.3 and C403.3.3.5 for outside air, return air, and relief damper (when provided) leakage requirements, and IECC 2015 section c403.2.4.7 for Fault Detection and Diagnostic requirements, Note: IECC 2015 section C403.2.4.7.1 requires differential return air sensor, which is included in some models (i.e. -DYXB) and must be ordered separately on others (i.e. -DYDB, -DYEB).
4. **AMCA:** Outside air and return air (volume) dampers are AMCA Class 1A rated 1" w.g. Refer to MicroMetl NS2 catalog sheet on web site for details. Relief air dampers (when provided) are also AMCA rated. Refer to GR1 series catalog sheet on web site for details.

Approximate static pressure drop through R/A damper in inches w.g.						
CFM	750	1400	1630	1850	2000	2400
Pressure Drop	0.03	0.12	0.17	0.23	0.27	0.38



MicroMetl Corporation certifies that the models GR1 and NS2 shown herein are licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with requirements of the AMCA Certified Ratings Programs. The AMCA Certified Ratings Seal applies to Air Leakage and Air Performance ratings.

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Page Revision 0001A

CANNON FABRICATION INC
182 GRANITE STREET, SUITE 101, CORONA, CA 92879
PHONE: (951)278-1830 FAX: (951)278-8444 www.canfab.com canfab@canfab.com

CARRIER 2 - 3 TON
48/50 ES, EZ, 48/50VL-A 24-36, 48/50 VT-A, VG, 48/50VR, XL, XT-A 24-30

PART NO: SEE BELOW

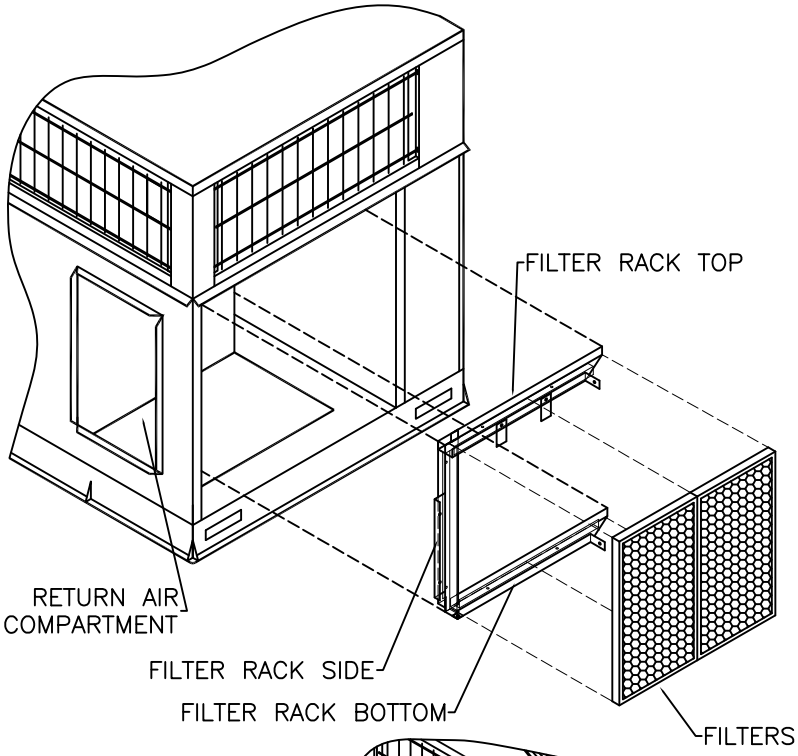
1259-0A OUTSIDE AIR INTAKE HOOD

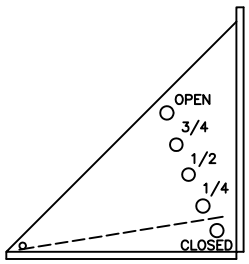
PART NUMBER	SHIPPING WEIGHT	APPROXIMATE AIR VOLUME
1259-OA	10 LBS.	25%

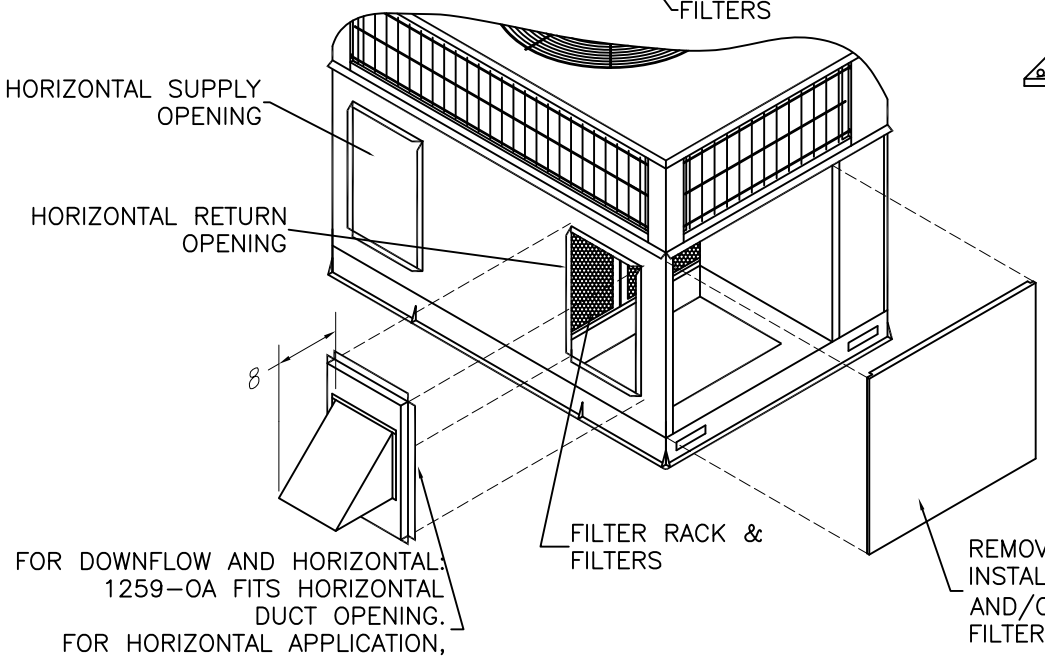
FEATURES

- OUTSIDE AIR INTAKE HOOD WITH BAROMETRIC BACKDRAFT DAMPER.
- HEAVY GAUGE GALVANIZED STEEL CONSTRUCTION.
- FILTER RACK SIZED FOR 1" OR 2" FILTERS [(2) 20x10x1 (NOMINAL) FILTERS PROVIDED].
- COLOR COORDINATED PAINT FINISH.
- FILTER RACK SHIPPED KNOCKED DOWN.

For: Bldg N: N-2,6







DOC: 01-01

PROJECT: DATE:

ENGINEER: DISTRIBUTOR:

DRAWING NUMBER:

OPTIONS:
INSULATED PANELS (WHERE REQUIRED)
1" 1-1/2LB DUCT INSULATION (R VALUE 3.85)
GASKET PROVIDED WITH CURB

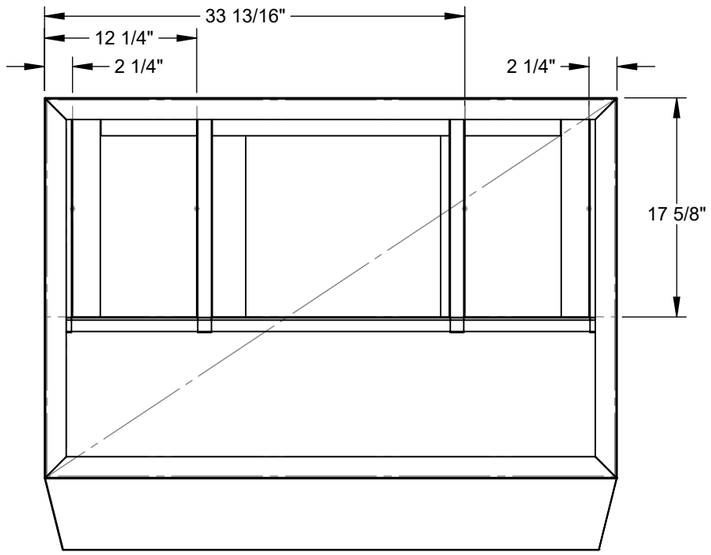
DIMENSIONED AND TOLERENCED PER ANSI Y14.5M-1982

Attn:_____

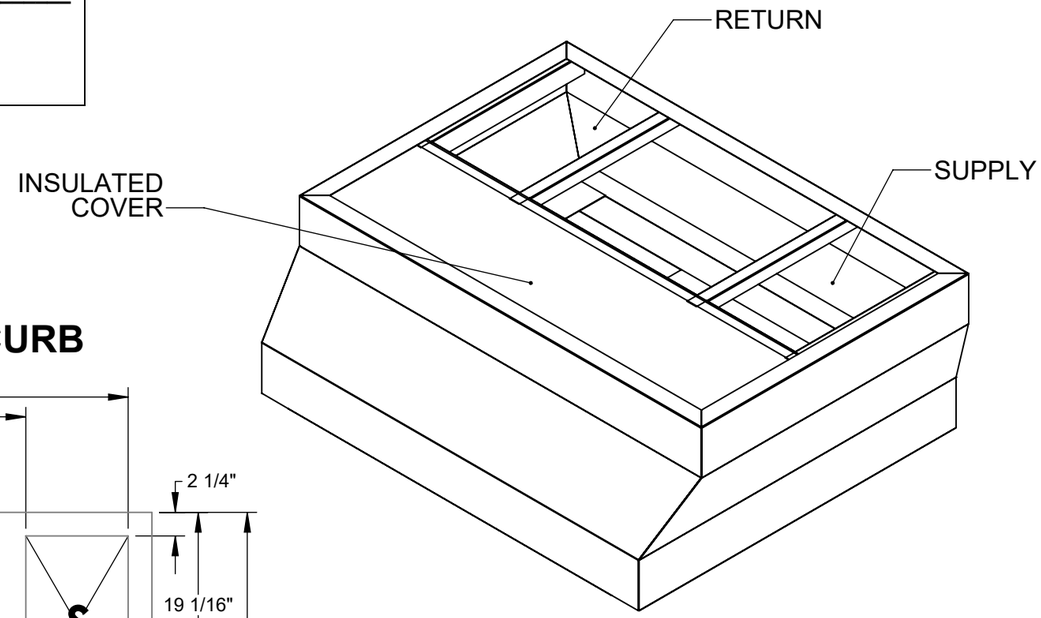
Approval:_____

RTU TAG(S):

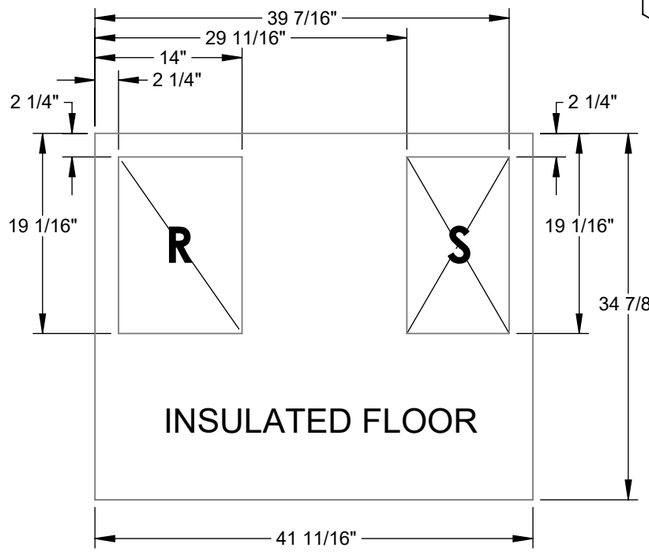
REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
1	INITIAL DRAWING	11-17-2021	IC

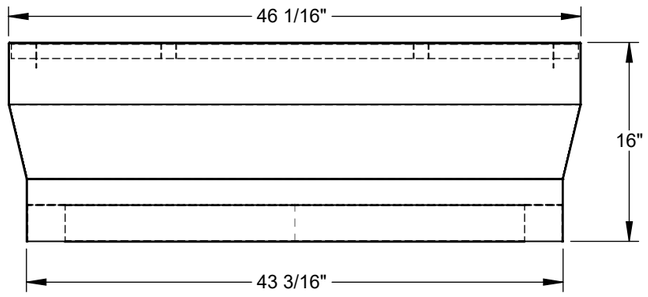


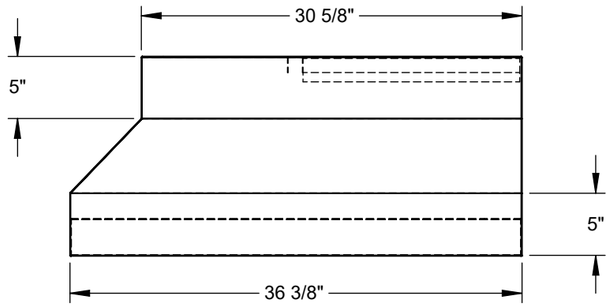
For: Bldg N: N-2,6



EXISTING CURB







Material: 18 ga. G-90 Galv Steel
Existing Curb Oversized by: 1.5 Inches
Operational Height(Raise unit by):13 Inches

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APPROVALS	DATE
DRAWN: ichavez	11/17/2021
CHECKED:	

DIMENSIONS ARE AS FOLLOWS: 1.00 in [25.40 mm]

TITLE/FILE NAME: 1-4026-4021

*VERIFY EXISTING CURB OD
*VERIFY SUPPLY AND RETURN OPENINGS
*NOTE ANY CHANGES
*CALL WITH ANY QUESTIONS
*FAX BACK IF DRAWING IS OK AS IS

3RD ANGLE PROJECTION

CDI
Contact us @ www.cdicurbs.com or 1-888-234-7001

APPROXIMATE CURB WEIGHT (LBS.): 79.89

ECO #:

REV: 1

SCALE: 1:16

SHEET: 1 OF 4

\\crystal.cdicurbs.com\eng\files\CURBS_CURB_ADAPTERS\1-XXXX-XXXX_CURB_ADAPTERS\1-4XXX-XXXX_CARRIER\1-4026-4021

CanFab
CANNON FABRICATION INC
182 GRANITE STREET, SUITE 101, CORONA, CA 92879
PHONE: (951)278-1830 FAX: (951)278-8444 www.canfab.com canfab@canfab.com

CARRIER 3 - 5 TON
48/50 ES, EZ, 48/50VL-A 42-60, 48/50 VT-A, VG, 48/50VR, XL, XT-A 36-60

PART NO: SEE BELOW

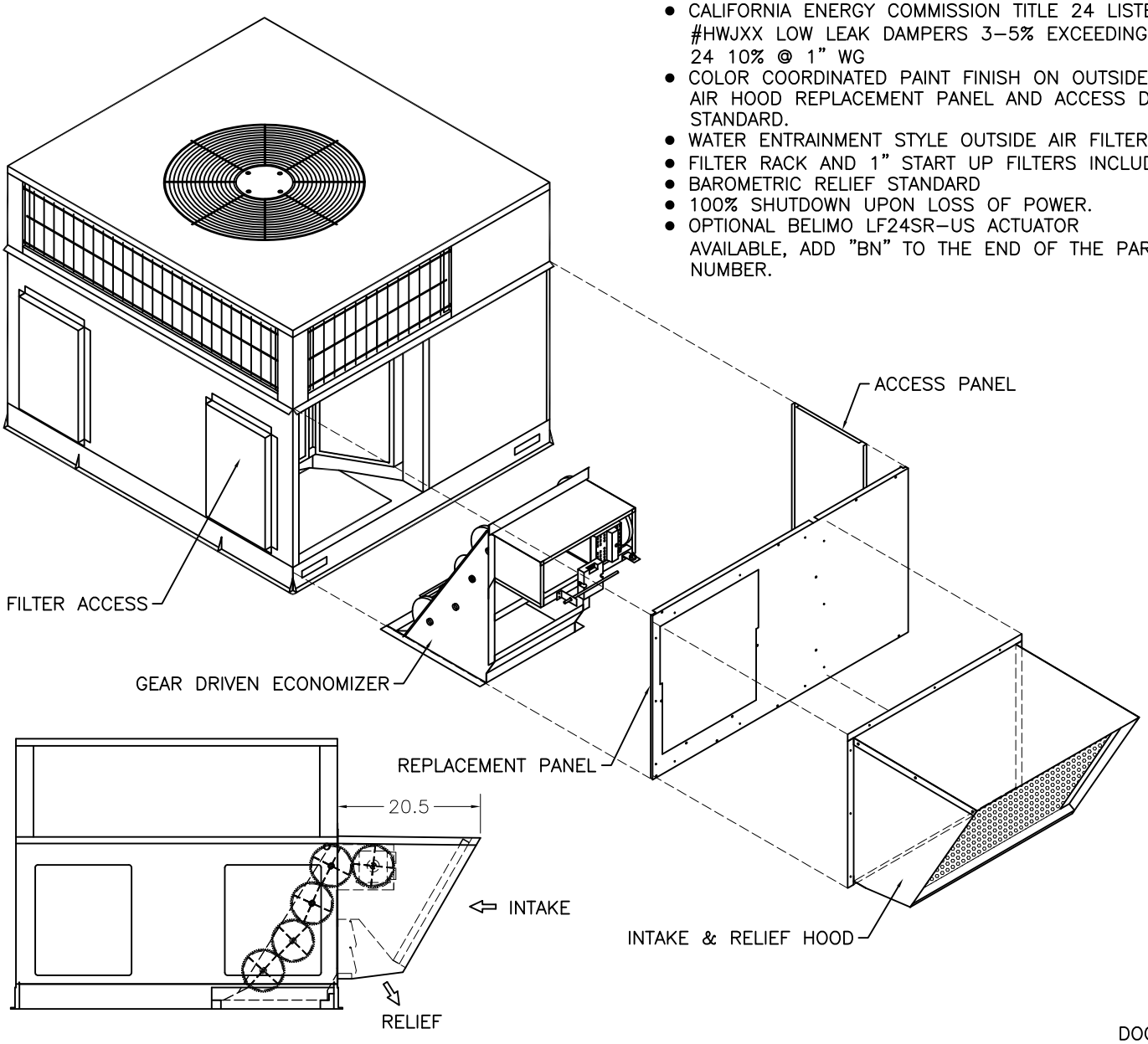
DEDICATED DOWN DISCHARGE ECONOMIZER

REPLACES 1103-EC ECONOMIZER

For: Bldg U: U-1-4

PART NUMBER	SHIPPING WEIGHT
1161-EC	84 LBS.

- GEAR DRIVEN HONEYWELL JADE FDD MODULATING DRYBULB CONTROL SYSTEM. OPTIONS: ENTHALPY " HE"; COMPARATIVE ENTHALPY "-HC"
- CALIFORNIA ENERGY COMMISSION TITLE 24 LISTED #HWJXX LOW LEAK DAMPERS 3-5% EXCEEDING TITLE 24 10% @ 1" WG
- COLOR COORDINATED PAINT FINISH ON OUTSIDE AIR HOOD REPLACEMENT PANEL AND ACCESS DOOR STANDARD.
- WATER ENTRAINMENT STYLE OUTSIDE AIR FILTER.
- FILTER RACK AND 1" START UP FILTERS INCLUDED.
- BAROMETRIC RELIEF STANDARD
- 100% SHUTDOWN UPON LOSS OF POWER.
- OPTIONAL BELIMO LF24SR-US ACTUATOR AVAILABLE, ADD "BN" TO THE END OF THE PART NUMBER.



DOC: 01-01

PROJECT: DATE:

ENGINEER: DISTRIBUTOR:

DRAWING NUMBER:

MicroMetl	DATE: 03/2020	WEIGHT (LBS): 17	DESCRIPTION: ADAPTER KIT FOR 0571 SERIES	PART NUMBER: ADPT-0571-SD-W (Rev A)
SUBMITTED TO:	COMPANY:		JOB NAME:	APPROVED BY: DATE:
EXISTING UNIT:			NEW UNIT:	

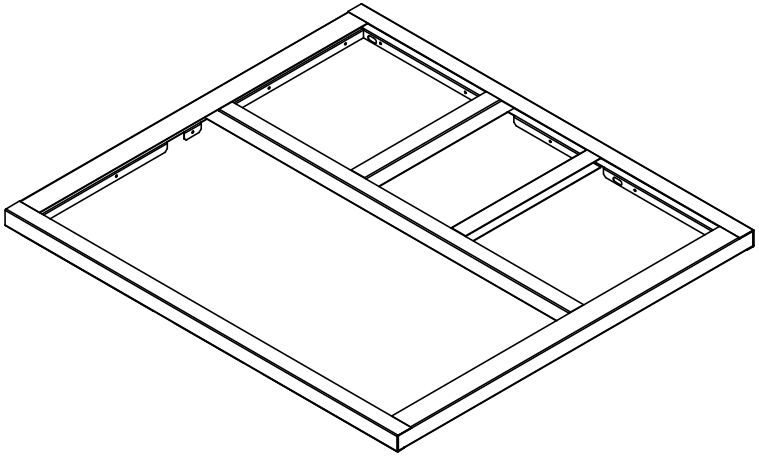
CURB ADAPTER INFORMATION:

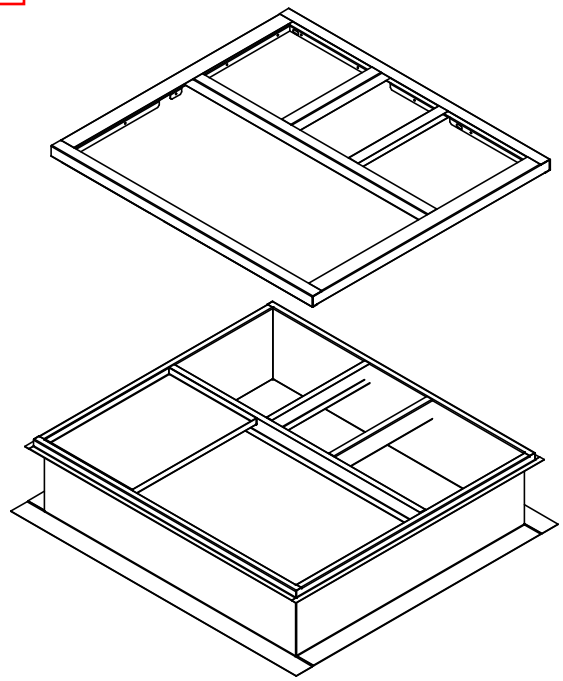
1. BEFORE ORDERING CURB ADAPTER, CONTRACTOR MUST CONFIRM THE DIMENSIONS OF THE EXISTING CURB ON THIS DRAWING

2. BEFORE NEW HVAC UNIT IS SET IN PLACE, INSPECT STRUCTURAL STABILITY OF EXISTING CURB AND BUILDING'S ROOF LOAD CAPABILITY. REINFORCE IF REQUIRED.

3. ALL CURB ADAPTERS WILL INCREASE THE SYSTEM'S EXTERNAL STATIC PRESSURE AND MUST BE INCLUDED WHEN CALCULATING UNIT REQUIREMENTS

For: Bldg U: U-1-4

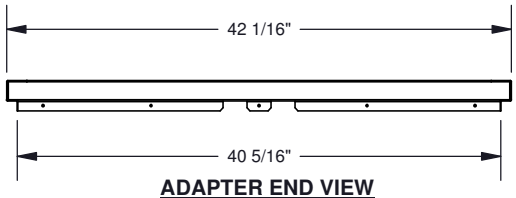




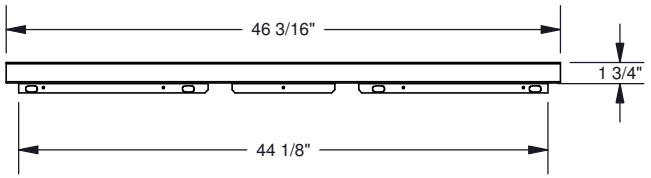
FEATURES:
- FULLY WELDED HEAVY GAUGE CONSTRUCTION
- TRANSITIONS INCLUDED
- FULL INTERNAL INSULATION
- GASKET PACKAGE INCLUDED

ADPT-0571-SD-W

MicroMetl 0571 series curb
or CPRFCURB008A00
or CPRFCURB009A00



ADAPTER END VIEW



ADAPTER SIDE VIEW

NOTES:

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Reference

Lynwood High School						
Building	Mark For	Manufacture	Exisiting unit Model	Orentation	Tonnage	Replacement
GYM	Locker RM AC 1	Carrier	50LJQ004---6	Downshot	3	50FCQA04A2M6-3A0A0
GYM	Locker RM AC 2	Carrier	50LJQ004---641	Downshot	3	50FCQA04A2M6-3A0A0
GYM	Locker RM AC 3	Carrier	50LJQ008---631	Horizontal	7.5	50FCQM08A2M6-3A0A0
GYM	Locker RM AC 4	Carrier	50LJQ008---631	Horizontal	7.5	50FCQM08A2M6-3A0A0
GYM	Locker RM AC 5	Carrier	50LJQ008---631	Horizontal	7.5	50FCQM08A2M6-3A0A0
GYM	AC 1	Carrier	50LJQ008---631	Downshot	7.5	50FCQM08A2M6-3A0A0
GYM	AC 2	Carrier	50LJQ008---631	Downshot	7.5	50FCQM08A2M6-3A0A0
GYM	AC 3	Carrier	50LJQ008---631	Downshot	7.5	50FCQM08A2M6-3A0A0
GYM	AC 4	Carrier	50LJQ008---631	Downshot	7.5	50FCQM08A2M6-3A0A0
GYM	AC 5	Carrier	50LJQ008---631	Downshot	7.5	50FCQM08A2M6-3A0A0
GYM	AC 6	Carrier	50LJQ008---621	Downshot	7.5	50FCQM08A2M6-3A0A0
Bldg S	AC 1	Carrier	50LJQ008---631	Horizontal	7.5	50FCQM08A2M6-3A0A0
Bldg S	AC 2	Carrier	50LJQ004---631	Horizontal	3	50FCQA04A2M6-3A0A0
Bldg S	AC 3	Carrier	50LJQ004---631	Horizontal	3	50FCQA04A2M6-3A0A0
Bldg Q	AC 1	Carrier	50LJQ005---641	Horizontal	4	50FCQA05A2M6-3A0A0
Bldg Q	AC 2	Carrier	50LJQ005---641	Horizontal	4	50FCQA05A2M6-3A0A0
Bldg A	AC 1	Carrier	50LJQ004---641	Downshot	3	50FCQA04A2M6-3A0A0
Bldg A	AC 2	Carrier	50LJQ004---641	Downshot	3	50FCQA04A2M6-3A0A0
Bldg A	AC 3	Carrier	50LJQ004---641	Downshot	3	50FCQA04A2M6-3A0A0
Bldg A	AC 4	Carrier	50LJQ004---641	Downshot	3	50FCQA04A2M6-3A0A0
Bldg A	AC 5	Carrier	50LJQ004---641	Downshot	3	50FCQA04A2M6-3A0A0
Bldg A	AC 6	Carrier	50LJQ005---641	Downshot	4	50FCQA05A2M6-3A0A0
Bldg A	AC 7	Carrier	50LJQ006---641	Downshot	5	50FCQA06A2M6-3A0A0

Bldg A	AC 8	Carrier	50LJQ005---641	Downshot	4	50FCQA05A2M6-3A0A0
Bldg A	AC 9	Carrier	50LJQ006---641	Downshot	5	50FCQA06A2M6-3A0A0
Bldg C	C-1	Carrier	50LJQ005---641	Downshot	4	50FCQA05A2M6-3A0A0
Bldg C	C-2	Carrier	50LJQ005---641	Downshot	4	50FCQA05A2M6-3A0A0
Bldg C	C-3	Carrier	50LJQ005---641	Downshot	4	50FCQA05A2M6-3A0A0
Bldg C	C-4	Carrier	50LJQ005---641	Downshot	4	50FCQA05A2M6-3A0A0
Bldg G	G-1	Carrier	50LJQ004---641	Downshot	3	50FCQA04A2M6-3A0A0
Bldg G	G-2	Carrier	50LJQ004---641	Downshot	3	50FCQA04A2M6-3A0A0
Bldg G	G-3	Carrier	50LJQ004---641	Downshot	3	50FCQA04A2M6-3A0A0
Bldg P	P-1	Carrier	50LJQ006---641	Horizontal	5	50FCQA06A2M6-3A0A0
Bldg P	P-2	Carrier	50LJQ005---641	Horizontal	4	50FCQA05A2M6-3A0A0
Bldg P	P-3	Carrier	50LJQ006---641	Horizontal	5	50FCQA06A2M6-3A0A0
Bldg P	P-4	Carrier	50LJQ005---641	Horizontal	4	50FCQA05A2M6-3A0A0
Bldg P	P-5	Carrier	50LJQ012---631	Horizontal	10	50FCQM12A2M6-3A0A0
Bldg N	N-1	Carrier	50LJQ005---641	Downshot	4	50FCQA05A2M6-3A0A0
Bldg N	N-2	Carrier	50HS-024---301	Downshot	2	50VT-K24---3
Bldg N	N-3	Carrier	50LJQ005---641	Downshot	4	50FCQA05A2M6-3A0A0
Bldg N	N-4	Carrier	50LJQ005---641	Downshot	4	50FCQA05A2M6-3A0A0
Bldg N	N-5	Carrier	50LJQ005---641	Downshot	4	50FCQA05A2M6-3A0A0
Bldg N	N-6	Carrier	50HS-024---301	Downshot	2	50VT-K24---3
Bldg N	N-7	Carrier	50LJQ006---641	Downshot	5	50FCQA06A2M6-3A0A0
Bldg F	F-1	Carrier	50LJQ012---631	Downshot	10	50FCQM12A2M6-3A0A0
Bldg F	F-2	Carrier	50LJQ012---631	Downshot	10	50FCQM12A2M6-3A0A0
Bldg F	F-3	Carrier	50LJQ006---641	Downshot	5	50FCQA06A2M6-3A0A0
Bldg F	F-4	Carrier	50LJQ008---631	Downshot	7.5	50FCQM08A2M6-3A0A0
Bldg F	F-5	Carrier	50LJQ006---641	Downshot	5	50FCQA06A2M6-3A0A0
Bldg U	U-1	Carrier	50SZ-042---301	Downshot	3.5	50VT-K48---3
Bldg U	U-2	Carrier	50SZ-042---301	Downshot	3.5	50VT-K48---3

Bldg U	U-3	Carrier	50SZ-042---301	Downshot	3.5	50VT-K48---3
Bldg U	U-4	Carrier	50SZ-042---301	Downshot	3.5	50VT-K48---3

4) MARK TAWIN ES CARRIER EQUIPMENT PURCHASED SUBMITTAL

Carrier
turn to the experts

Sigler

COMMERCIAL HVAC DIVISION

S U B M I T T A L

Contractor: Lynwood School District
Engineer:
Job Name: Mark Twain Elementary
Date: 10/31/2023

Mark For	Qty	Model Number	Description
			Bldg F
F1,F3,F4	3	50FCQA05A2M6-3A0A0	***Nominal 4 Ton HP RTU, 460/3/60*** • *One stage cooling* • *Standard Packaging* • *Dir Drive-EcoBlue-Med Static* • *Al/Cu - Al/Cu - Louvered Hail Guards* • *Electro-Mechanical Ctl* • *SystemVu Controller*
F2	1	50FCQA04A2M6-3A0A0	***Nominal 3 Ton HP RTU, 460/3/60*** • *One stage cooling* • *Standard Packaging* • *Dir Drive-EcoBlue-Med Static* • *Al/Cu - Al/Cu - Louvered Hail Guards* • *Electro-Mechanical Ctl* • *SystemVu Controller*
	4	1105-EC-BNN	***Field Installed:*** *Vertical Economizer, Belimo Actuator, No controls*

		Bldg G	
G2,G3	*2*	*50FCQA04A2M6-3A0A0*	***Nominal 3 Ton HP RTU, 460/3/60*** • *One stage cooling* • *Standard Packaging* • *Dir Drive-EcoBlue-Med Static* • *Al/Cu - Al/Cu - Louvered Hail Guards* • *Electro-Mechanical Ctl* • *SystemVu Controller*
G1	*1*	*50FCQA05A2M6-3A0A0*	***Nominal 4 Ton HP RTU, 460/3/60*** • *One stage cooling* • *Standard Packaging* • *Dir Drive-EcoBlue-Med Static* • *Al/Cu - Al/Cu - Louvered Hail Guards* • *Electro-Mechanical Ctl* • *SystemVu Controller*
	3	*1105-EC-BNN*	***Field Installed:*** *Vertical Economizer, Belimo Actuator, No controls*
		Main Office [Bldg A]	
M1	*1*	*50FCQA05A2M6-3A0A0*	***Nominal 4 Ton HP RTU, 460/3/60*** • *One stage cooling* • *Standard Packaging* • *Dir Drive-EcoBlue-Med Static* • *Al/Cu - Al/Cu - Louvered Hail Guards* • *Electro-Mechanical Ctl* • *SystemVu Controller*
	1	*1105-EC-BNN*	***Field Installed:*** *Vertical Economizer, Belimo Actuator, No controls*
MS3-CU	*1*	*38MARBQ18AA3*	***Nominal 1.5 Ton Ductless Condenser, 208-230/1/60*** • *Voltage change from existing unit*
MS3-HW	*1*	*40MAHBQ18XA3*	***Nominal 1.5 Ton Ductless High Wall Fan Coil, 208-230/1/60*** • *Voltage change from existing unit*
	1	*TATTOO16-230V*	***Field Installed:*** *Condensate Pump*

CONTENTS OF SUBMITTAL:

- PRODUCT DESCRIPTION, PERFORMANCE DATA, DIMENSIONAL DATA, AND ACCESSORY DATA.

NOTES:

- ONE APPROVED COPY OF SUBMITTAL MUST BE RETURNED MARKED “APPROVED” OR “APPROVED AS NOTED” FOR EQUIPMENT TO BE RELEASED FOR FABRICATION TO THE FACTORY.
- **CURB ADAPTERS MUST BE REVIEWED AND SIGNED PRIOR TO ORDER. UPON APPROVAL, CONTRACTOR MUST PROVIDE SIGNATURE OF APPROVAL FOR ORDER ON THE CURB ADAPTER CUT SHEET. IF THE CURB ADAPTER DIMENSIONS DO NOT MATCH THE CURB DIMENSIONS OF THE EXISTING IN FIELD, CONTRACTOR TO NOTE EXISTING DIMENSIONS ON CURB ADAPTER CUT SHEET PROVIDED**

SUBMITTALS RETURNED REQUIRING ADDITIONAL, OR MODIFIED, DATA WILL BE RE-SUBMITTED BY SIGLER. RELEASE FOR FABRICATION WILL COMMENCE WHEN AN “APPROVED” SUBMITTAL IS RETURNED TO OUR OFFICES.

REVISION: ORIGINAL
SUBMITTED BY: DAVID ROSS
PREPARED BY: BRANDON HERNANDEZ

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SECTION III. DUCTLESS SPLIT SYSTEMS

SECTION IV. DUCTLESS SPLIT SYSTEM ACCESSORIES

SECTION V. AIRSYS PACKAGED WALL MOUNTED HEAT PUMP

SECTION VI. EXISTING UNITS FOR REFERENCE

SECTION I. ROOFTOP UNITS

SUBMITTAL

Project

Lynwood Unified Mark Twain ES

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Prepared By: 10:13AM

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Bldg E - E3

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Bldg E - E3

Project: Lynwood Unified Mark Twain ES 10/31/2023
Prepared By: 10:13AM

Unit Parameters

Unit Model: **50VT-K48---6**
Unit Size: **48 (4 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **4' 0.25"**
Unit Width: **3' 8.1875"**
Unit Height: **3' 8.75"**

***** Weights and Dimensions are approximate. Weight does not include roof curbs, unit packaging, field installed accessories or factory installed options. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Base Unit Weight (Does not include any accessories):
426 lb

Warranty Information

1 year warranty on parts
5 yearwarranty on compressor

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

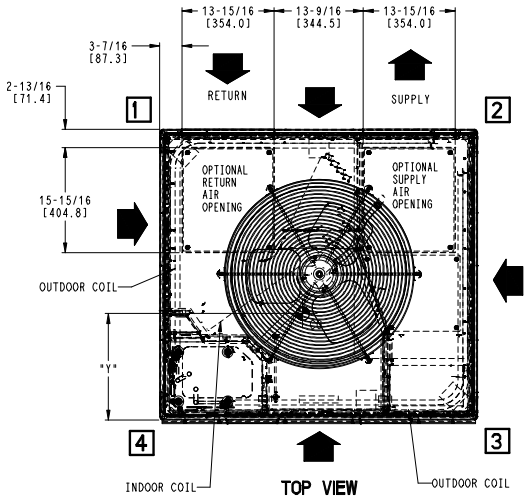
Ordering Information

Part Number	Description	Quantity
50VT-K48---6	Rooftop Unit	1

CARRIER / BRYANT HP (LARGE CHASSIS)

COOLING CAPACITY	UNIT WT.		UNIT HEIGHT IN/MM		CENTER OF GRAVITY IN/MM					
	LB	KG	"A"		X		Y		Z	
36	406	184.2	54-3/4	1391	20-1/2	521	17-1/2	445	17-3/8	441
42	426	193.3	54-3/4	1391	20-1/2	521	17-1/2	445	17-3/8	448
48	426	193.3	44-3/4	1137	20-1/2	521	17-1/2	445	17-3/8	448
60	496	225.0	48-3/4	1238	20-1/2	521	17-1/2	445	18	457

UNIT	CORNER WEIGHT LB/KG							
	"1"		"2"		"3"		"4"	
36	88.6	40.2	78.4	35.6	78.4	51.1	112.6	57.4
42	92.9	42.2	82.4	37.4	82.4	53.7	118.3	60.0
48	92.6	42.0	82.5	37.4	82.5	53.5	117.9	60.4
60	107.5	48.8	95.5	43.3	95.5	62.5	137.8	70.4



TOP VIEW

REQUIRED CLEARANCES TO COMBUSTIBLE MATL.

	INCHES [MM]
TOP OF UNIT	14 [355.6]
DUCT SIDE OF UNIT	2 [50.8]
SIDE OPPOSITE DUCTS	14 [355.6]
BOTTOM OF UNIT	0 [0.0]
ELECTRICAL PANEL	36 [914.4]

NEC. REQUIRED CLEARANCES.

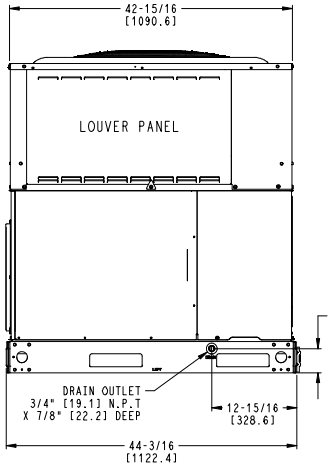
	INCHES [MM]
BETWEEN UNITS, POWER ENTRY SIDE	42 [1066.8]
UNIT AND UNGROUNDED SURFACES, POWER ENTRY SIDE	36 [914.0]
UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, POWER ENTRY SIDE	42 [1066.8]

REQUIRED CLEARANCE FOR OPERATION AND SERVICING

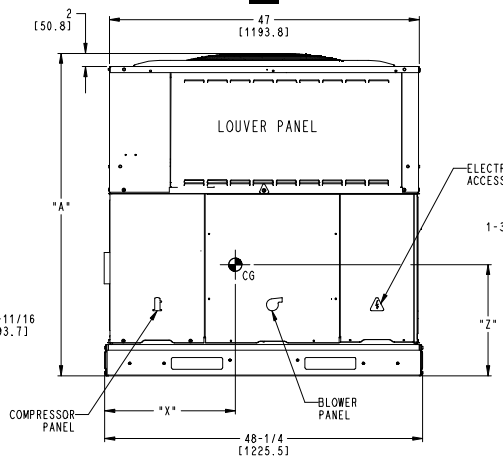
	INCHES [MM]
EVAP. COIL ACCESS SIDE	36 [914.0]
POWER ENTRY SIDE	42 [1066.8]
(EXCEPT FOR NEC REQUIREMENTS)	
UNIT TOP	48 [1219.2]
SIDE OPPOSITE DUCTS	36 [914.0]
DUCT PANEL	12 [304.8]*

*MINIMUM DISTANCES:IF UNIT IS PLACED LESS THAN 12 [304.8] FROM WALL SYSTEM,THEN SYSTEM PERFORMANCE MAYBE COMPROMISED.

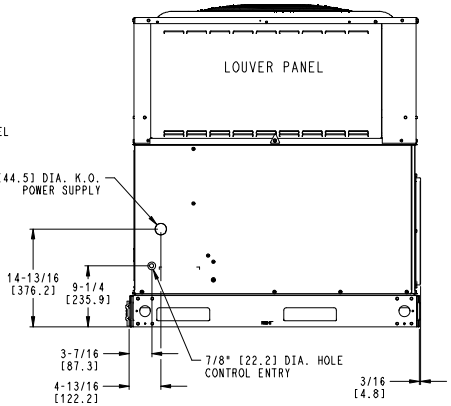
DIMENSIONS IN [] ARE IN MILLIMETERS



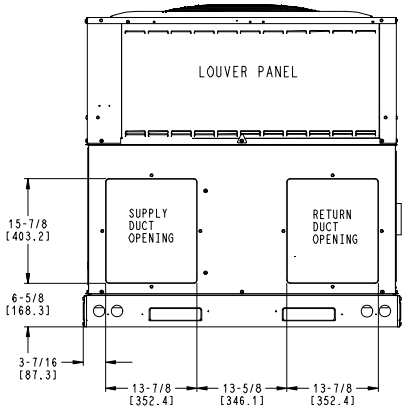
LEFT SIDE VIEW



FRONT VIEW



RIGHT SIDE VIEW



REAR VIEW

10/19/22	UPDATED TABLE DIMS.	SINGLE ZONE ELECTRIC COOLING & HEAT(LG)	SD5770-4	A

Part Number:50VT-K48---6

ARI SEER2:	**13.40**	

Base Unit Dimensions

Unit Length:	**48.3**	in
Unit Width:	**44.2**	in
Unit Height:	**44.8**	in
Base Unit Weight (Does not include any accessories):	**426**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Direct**	
Actual Airflow:	**1590**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**58.8**	F
Evaporator Leaving Air WB:	**57.8**	F
Evaporator Leaving Air Enthalpy:	**24.87**	BTU/lb
Net Cooling Capacity:	**46.97**	MBH
Net Sensible Capacity:	**36.33**	MBH
Total Unit Power Input:	**4.09**	kW
Coil Bypass Factor:	**0.000**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.7**	F
Total Heating Capacity:	**45.86**	MBH
Integrated Heating Capacity:	**45.86**	MBH
Heating Power Input:	**3.64**	kW
High Temperature COP:	**3.70**	
Low Temperature COP:	**2.30**	
HSPF2:	**6.7**	

Supply Fan

External Static Pressure:	**0.50**	in wg
Options / Accessories Static Pressure		
Wet Coil:	**0.11**	in wg
Application External Static (ESP + Unit Opts/Acc.):	**0.61**	in wg
Fan Power:	**0.57**	BHP
Fan Motor Size, hp:	**1**	
NOTE:	**Medium Motor Speed, Vert**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Minimum Voltage:	**414**
Maximum Voltage:	**506**
Compressor RLA:	**6.2**
Compressor LRA:	**41**
Outdoor Fan FLA (ea):	**0.53**
Indoor Fan Motor FLA (Total):	**2.3**
Power Supply MCA:	**10.6**

Power Supply MOCP (Fuse or HACR): **15**

Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

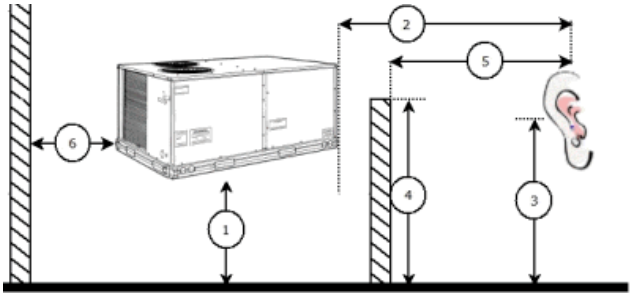
Acoustics

Sound Rating: **74.0** db

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	NA	NA	NA
125 Hz	NA	NA	56.9
250 Hz	NA	NA	59.3
500 Hz	NA	NA	63.9
1000 Hz	NA	NA	64.5
2000 Hz	NA	NA	61.7
4000 Hz	NA	NA	55.4
8000 Hz	NA	NA	47.4

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	0.0	56.9	59.3	63.9	64.5	61.7	55.4	47.4	69.3 Lw
B	-26.2	40.8	50.7	60.7	64.5	62.9	56.4	46.3	68.2 LwA
C	0.0	24.5	26.9	31.5	32.1	29.3	23.0	15.0	36.9 Lp
D	-26.2	8.4	18.3	28.3	32.1	30.5	24.0	13.9	35.8 LpA

Legend
A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.

Bldg E - E1

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Bldg E - E1

Project: Lynwood Unified Mark Twain ES 10/31/2023
Prepared By: 10:13AM

Unit Parameters

Unit Model: **50FCQA05A2M6-3A0A0**
Unit Size: **05 (4 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Single Stage Compressor Models**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **2' 9.375"**
Total Operating Weight: **488** lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **2**
Return Air Filter Size: **16 x 25 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

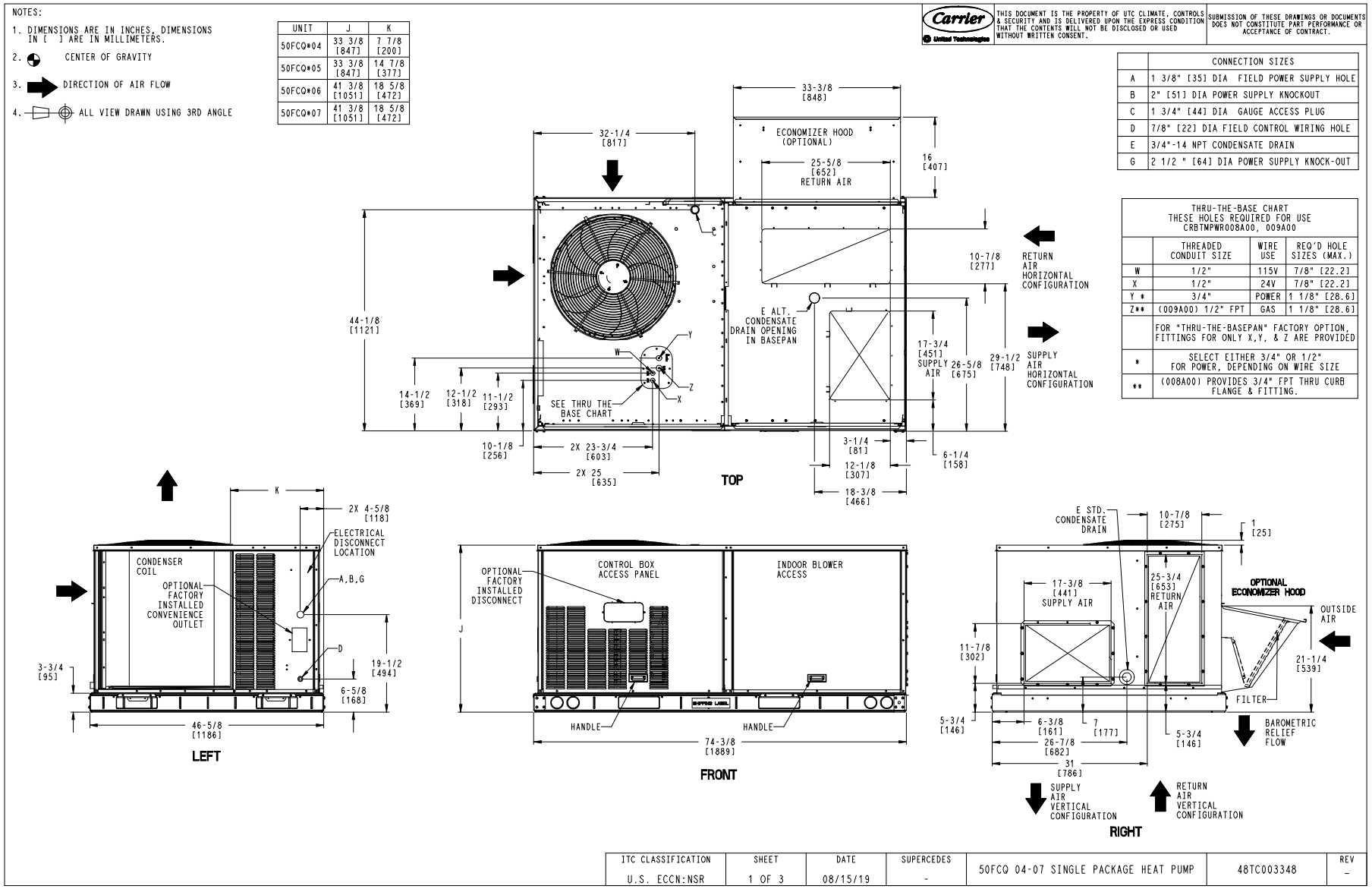
5-Year compressor parts (STD.)
1-Year parts (STD.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
50FCQA05A2M6-3A0A0	Rooftop Unit	1


NOTES:
1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE
UNIT J K
50FCQ*04 33 3/8 [847] 7 7/8 [200]
50FCQ*05 33 3/8 [847] 14 7/8 [377]
50FCQ*06 41 3/8 [1051] 18 5/8 [472]
50FCQ*07 41 3/8 [1051] 18 5/8 [472]
Carrier
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SUBMISSION OF THESE DRAWINGS OR DOCUMENTS DOES NOT CONSTITUTE PART PERFORMANCE OR ACCEPTANCE OF CONTRACT.
CONNECTION SIZES
A 1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B 2" [51] DIA POWER SUPPLY KNOCKOUT
C 1 3/4" [44] DIA GAUGE ACCESS PLUG
D 7/8" [22] DIA FIELD CONTROL WIRING HOLE
E 3/4"-14 NPT CONDENSATE DRAIN
G 2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT
THRU-THE-BASE CHART
THESE HOLES REQUIRED FOR USE CRBTMPWR008A00, 009A00
THREADED CONDUIT SIZE / WIRE USE / REQ'D HOLE SIZES (MAX.)
W 1/2" 115V 7/8" [22.2]
X 1/2" 24V 7/8" [22.2]
Y * 3/4" POWER 1 1/8" [28.6]
Z** (009A00) 1/2" FPT GAS 1 1/8" [28.6]
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X,Y, & Z ARE PROVIDED
* SELECT EITHER 3/4" OR 1/2" FOR POWER, DEPENDING ON WIRE SIZE
** (008A00) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.
33-3/8 [848]
ECONOMIZER HOOD (OPTIONAL)
32-1/4 [817]
25-5/8 [652] RETURN AIR
16 [407]
10-7/8 [277]
RETURN AIR HORIZONTAL CONFIGURATION
44-1/8 [1121]
E ALT. CONDENSATE DRAIN OPENING IN BASEPAN
17-3/4 [451] SUPPLY AIR
26-5/8 [675]
29-1/2 [748]
SUPPLY AIR HORIZONTAL CONFIGURATION
14-1/2 [369]
12-1/2 [318]
11-1/2 [293]
SEE THRU THE BASE CHART
10-1/8 [256]
2X 23-3/4 [603]
2X 25 [635]
3-1/4 [81]
12-1/8 [307]
18-3/8 [466]
6-1/4 [158]
TOP
K
2X 4-5/8 [118]
ELECTRICAL DISCONNECT LOCATION
CONDENSER COIL
OPTIONAL FACTORY INSTALLED CONVENIENCE OUTLET
A,B,G
D
3-3/4 [95]
19-1/2 [494]
6-5/8 [168]
46-5/8 [1186]
LEFT
OPTIONAL FACTORY INSTALLED DISCONNECT
CONTROL BOX ACCESS PANEL
INDOOR BLOWER ACCESS
J
HANDLE
HANDLE
74-3/8 [1889]
FRONT
E STD. CONDENSATE DRAIN
10-7/8 [275]
1 [25]
17-3/8 [441] SUPPLY AIR
25-3/4 [653] RETURN AIR
OPTIONAL ECONOMIZER HOOD
OUTSIDE AIR
11-7/8 [302]
21-1/4 [539]
FILTER
5-3/4 [146]
6-3/8 [161]
7 [177]
26-7/8 [682]
31 [786]
5-3/4 [146]
BAROMETRIC RELIEF FLOW
SUPPLY AIR VERTICAL CONFIGURATION
RETURN AIR VERTICAL CONFIGURATION
RIGHT
ITC CLASSIFICATION U.S. ECCN:NSR
SHEET 1 OF 3
DATE 08/15/19
SUPERCEDES -
50FCQ 04-07 SINGLE PACKAGE HEAT PUMP
48TC003348
REV -

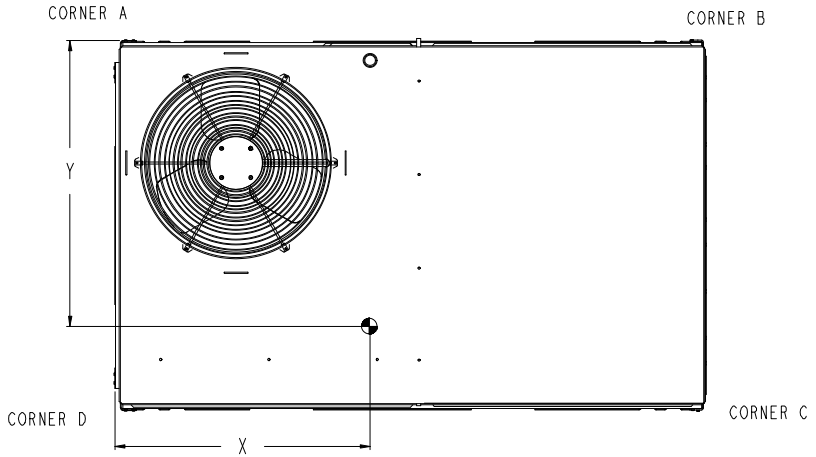
UNIT	STD. UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ*04	467	212	126	57	118	53	108	49	115	52	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*05	473	215	127	58	119	54	110	50	117	53	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*06	584	265	160	72	145	66	133	60	146	66	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]
50FCQ*07	589	267	161	73	146	66	134	61	147	67	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]

* STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.

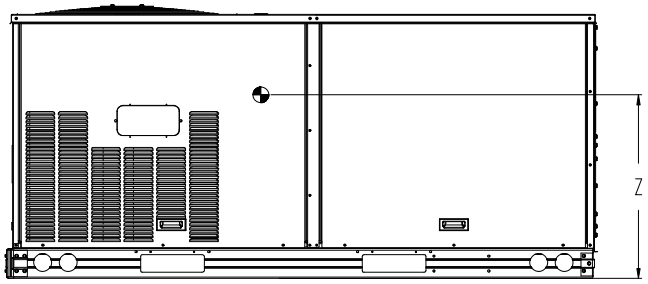
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United Technologies

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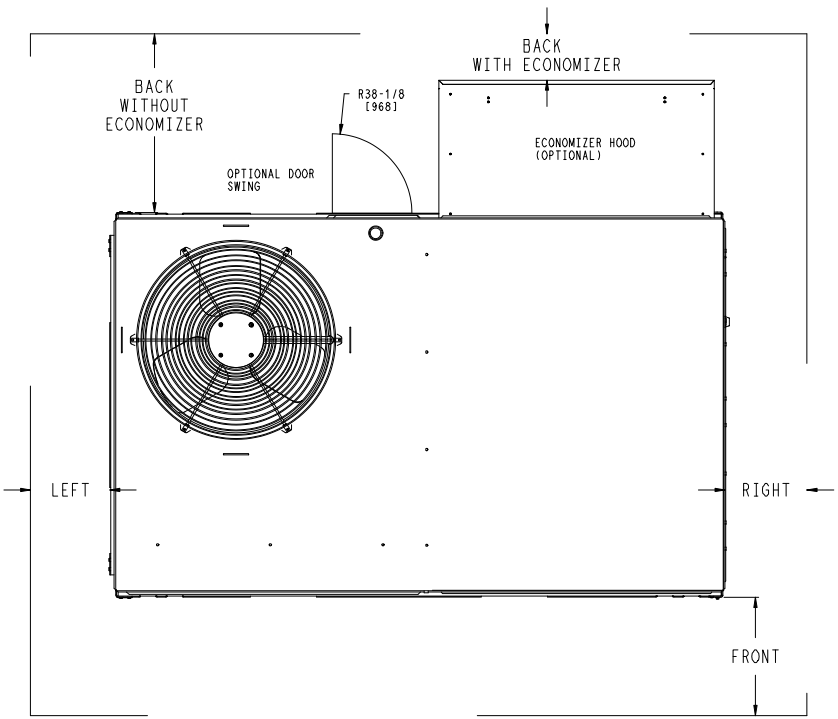
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TOP



FRONT



NOTE:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

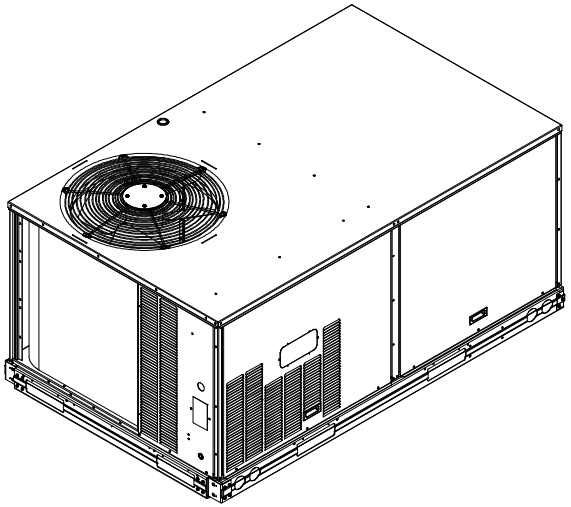
CLEARANCE			
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/ECON	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

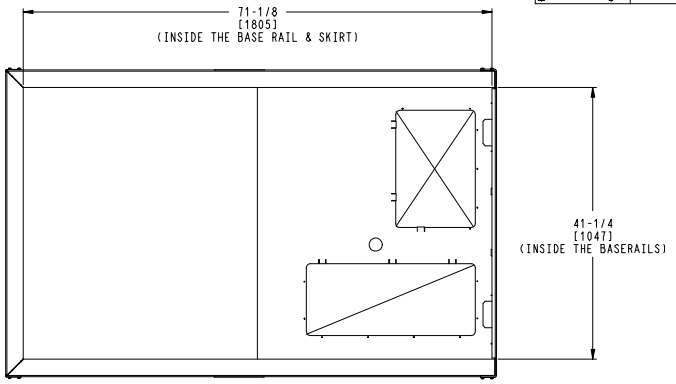
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

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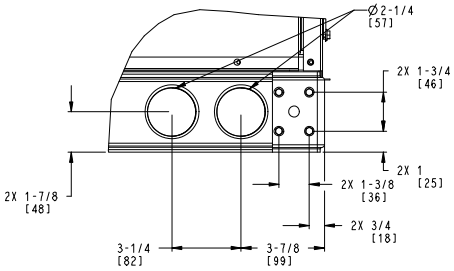
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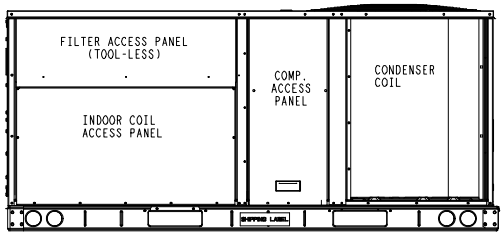


INSIDE BASERAIL DIMENSIONS

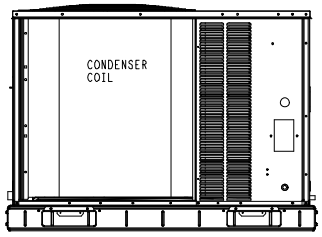
BOTTOM



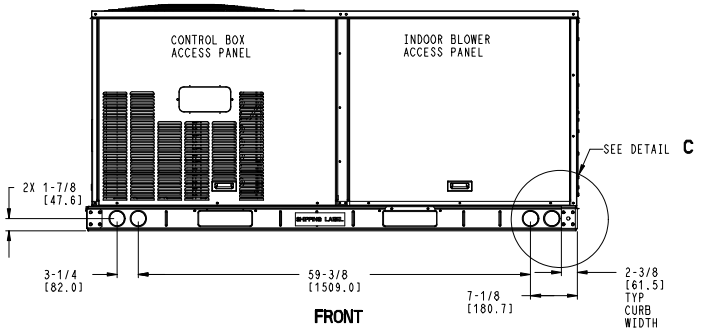
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

Part Number:50FCQA05A2M6-3A0A0

ARI SEER:	**14.30**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**33.4**	in

Operating Weight

Base Unit Weight:	**473**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**13**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**488**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**1600**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**58.1**	F
Evaporator Leaving Air WB:	**57.2**	F
Evaporator Leaving Air Enthalpy:	**24.50**	BTU/lb
Gross Cooling Capacity:	**49.92**	MBH
Gross Sensible Capacity:	**37.82**	MBH
Compressor Power Input:	**3.53**	kW
Coil Bypass Factor:	**0.109**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.7**	F
Total Heating Capacity:	**46.10**	MBH
Integrated Heating Capacity:	**46.10**	MBH
Heating Power Input:	**3.08**	kW
High Temperature COP:	**3.70**	
Low Temperature COP:	**2.28**	
HSPF:	**8.2**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**1958**	
Fan Power:	**0.81**	BHP
NOTE:	**Selected IFM RPM Range: 217 - 2170**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**	
Compressor #1 RLA:	**6.2**	
Compressor #1 LRA:	**41**	
Indoor Fan Motor Type:	**MED**	
Indoor Fan Motor Eff.:	**Null**	

Indoor Fan Motor FLA (Total): **1.7**
Power Supply MCA: **11**
Power Supply MOCP (Fuse or HACR): **15**
Disconnect Size FLA: **10**
Disconnect Size LRA: **45**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

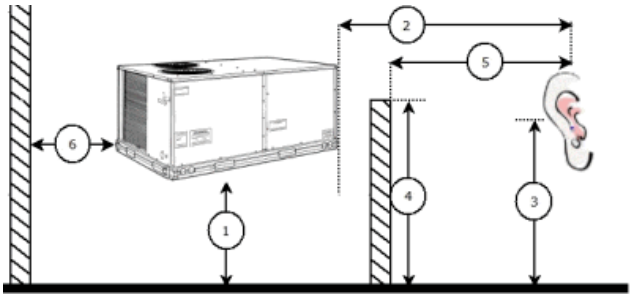
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	93.7	91.1	85.6
125 Hz	84.7	79.8	84.7
250 Hz	78.5	72.9	80.5
500 Hz	73.0	66.0	76.0
1000 Hz	69.8	67.8	72.4
2000 Hz	66.5	58.7	68.0
4000 Hz	63.5	52.9	62.8
8000 Hz	60.1	46.2	59.3
A-Weighted	77.1	72.4	79.0

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	85.6	84.7	80.5	76.0	72.4	68.0	62.8	59.3	89.2 Lw
B	59.4	68.6	71.9	72.8	72.4	69.2	63.8	58.2	78.5 LwA
C	53.2	52.3	48.1	43.6	40.0	35.6	30.4	26.9	56.8 Lp
D	27.0	36.2	39.5	40.4	40.0	36.8	31.4	25.8	46.1 LpA

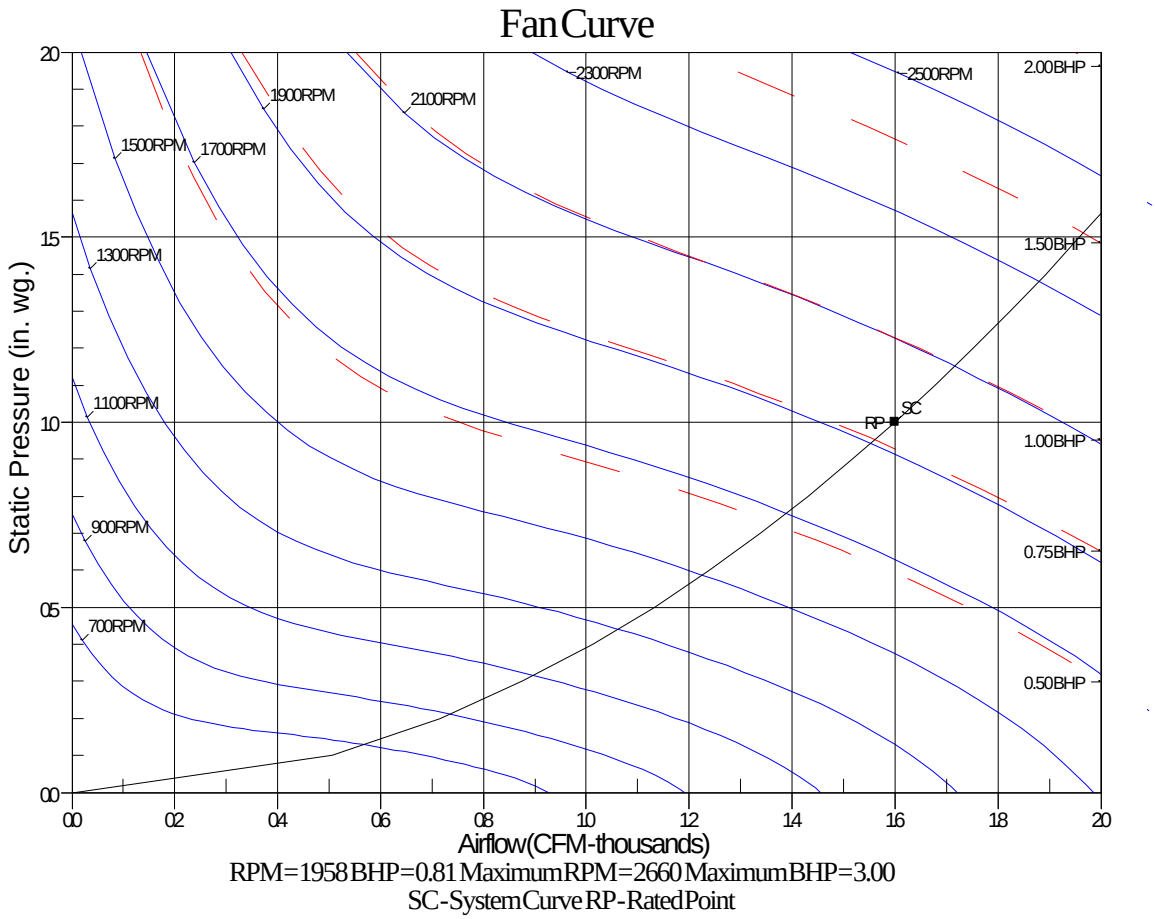
Legend

Performance Summary For Bldg E - E1

Project: Lynwood Unified Mark Twain ES 10/31/2023
Prepared By: 10:13AM

A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



RPM=1958 BHP=0.81 Maximum RPM=2660 Maximum BHP=3.00
SC-System Curve RP-Rated Point

Bldg E - E2,E4,E5

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Bldg E - E2,E4,E5

Project: Lynwood Unified Mark Twain ES 10/31/2023
Prepared By: 10:15AM

Unit Parameters

Unit Model: **50FCQA04A2M6-3A0A0**
Unit Size: **04 (3 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Single Stage Compressor Models**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **2' 9.375"**
Total Operating Weight: 482 lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **2**
Return Air Filter Size: **16 x 25 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

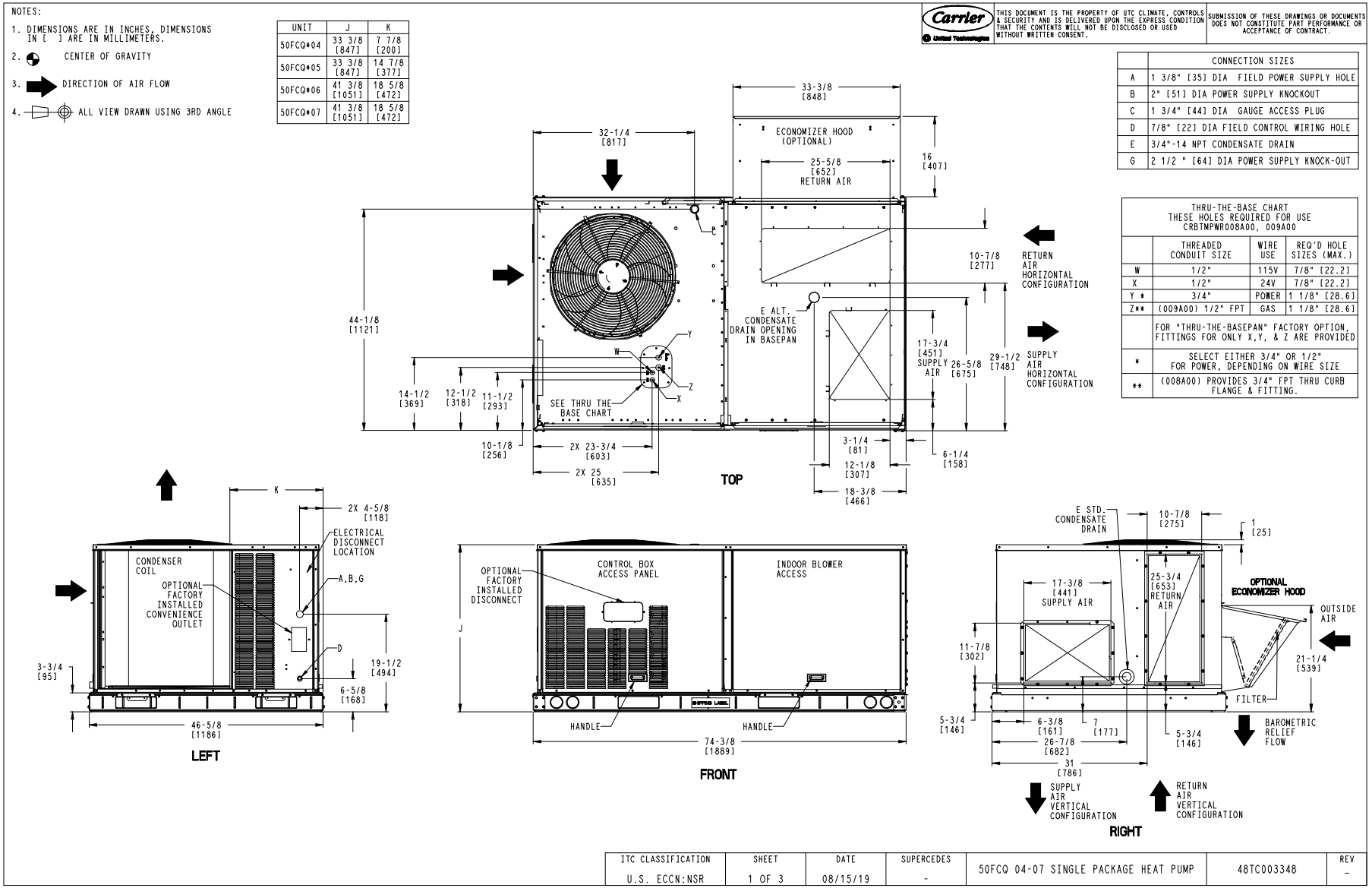
5-Year compressor parts (STD.)
1-Year parts (STD.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
50FCQA04A2M6-3A0A0	Rooftop Unit	3


NOTES:
1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE
UNIT | J | K
50FCQ*04 | 33 3/8 [847] | 7 7/8 [200]
50FCQ*05 | 33 3/8 [847] | 14 7/8 [377]
50FCQ*06 | 41 3/8 [1051] | 18 5/8 [472]
50FCQ*07 | 41 3/8 [1051] | 18 5/8 [472]
Carrier
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SUBMISSION OF THESE DRAWINGS OR DOCUMENTS DOES NOT CONSTITUTE PART PERFORMANCE OR ACCEPTANCE OF CONTRACT.
CONNECTION SIZES
A | 1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B | 2" [51] DIA POWER SUPPLY KNOCKOUT
C | 1 3/4" [44] DIA GAUGE ACCESS PLUG
D | 7/8" [22] DIA FIELD CONTROL WIRING HOLE
E | 3/4"-14 NPT CONDENSATE DRAIN
G | 2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT
THRU-THE-BASE CHART
THESE HOLES REQUIRED FOR USE CRBTMPWR008A00, 009A00
THREADED CONDUIT SIZE | WIRE USE | REQ'D HOLE SIZES (MAX.)
W | 1/2" | 115V | 7/8" [22.2]
X | 1/2" | 24V | 7/8" [22.2]
Y * | 3/4" | POWER | 1 1/8" [28.6]
Z** | (009A00) 1/2" FPT | GAS | 1 1/8" [28.6]
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X,Y, & Z ARE PROVIDED
* SELECT EITHER 3/4" OR 1/2" FOR POWER, DEPENDING ON WIRE SIZE
** (008A00) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.
33-3/8 [848]
32-1/4 [817]
ECONOMIZER HOOD (OPTIONAL)
25-5/8 [652] RETURN AIR
16 [407]
10-7/8 [277]
RETURN AIR HORIZONTAL CONFIGURATION
SUPPLY AIR HORIZONTAL CONFIGURATION
E ALT. CONDENSATE DRAIN OPENING IN BASEPAN
44-1/8 [1121]
14-1/2 [369]
12-1/2 [318]
11-1/2 [293]
SEE THRU THE BASE CHART
10-1/8 [256]
2X 23-3/4 [603]
2X 25 [635]
17-3/4 [451] SUPPLY AIR
26-5/8 [675]
29-1/2 [748]
3-1/4 [81]
12-1/8 [307]
6-1/4 [158]
18-3/8 [466]
TOP
K
2X 4-5/8 [118]
ELECTRICAL DISCONNECT LOCATION
A,B,G
CONDENSER COIL
OPTIONAL FACTORY INSTALLED CONVENIENCE OUTLET
D
3-3/4 [95]
19-1/2 [494]
6-5/8 [168]
46-5/8 [1186]
LEFT
OPTIONAL FACTORY INSTALLED DISCONNECT
CONTROL BOX ACCESS PANEL
INDOOR BLOWER ACCESS
J
HANDLE
HANDLE
74-3/8 [1889]
FRONT
E STD. CONDENSATE DRAIN
10-7/8 [275]
1 [25]
17-3/8 [441] SUPPLY AIR
25-3/4 [653] RETURN AIR
OPTIONAL ECONOMIZER HOOD
OUTSIDE AIR
11-7/8 [302]
21-1/4 [539]
FILTER
5-3/4 [146]
6-3/8 [161]
7 [177]
26-7/8 [682]
31 [786]
5-3/4 [146]
BAROMETRIC RELIEF FLOW
SUPPLY AIR VERTICAL CONFIGURATION
RETURN AIR VERTICAL CONFIGURATION
RIGHT
ITC CLASSIFICATION | SHEET | DATE | SUPERCEDES | 50FCQ 04-07 SINGLE PACKAGE HEAT PUMP | 48TC003348 | REV
U.S. ECCN:NSR | 1 OF 3 | 08/15/19 | - | | | -

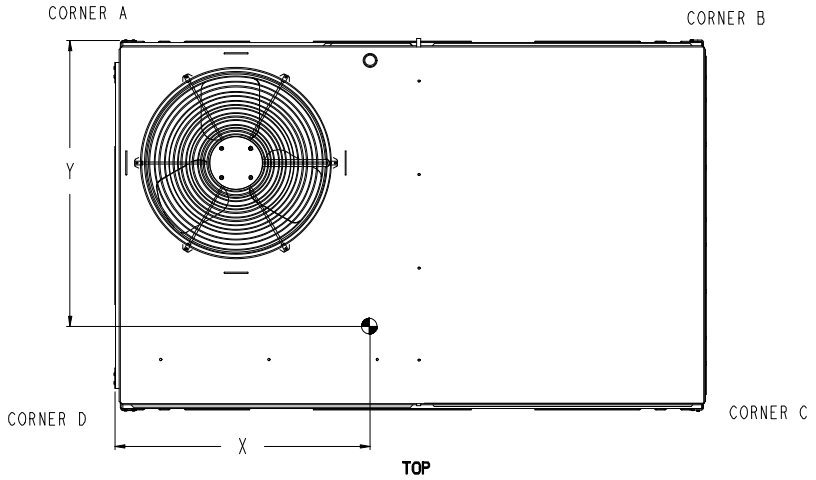
UNIT	STD. UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ*04	467	212	126	57	118	53	108	49	115	52	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*05	473	215	127	58	119	54	110	50	117	53	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*06	584	265	160	72	145	66	133	60	146	66	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]
50FCQ*07	589	267	161	73	146	66	134	61	147	67	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]

* STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.

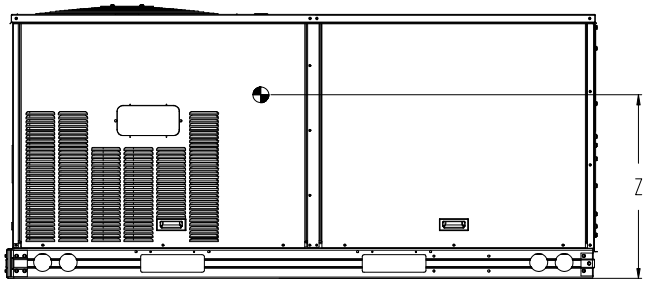
Carrier
United Technologies

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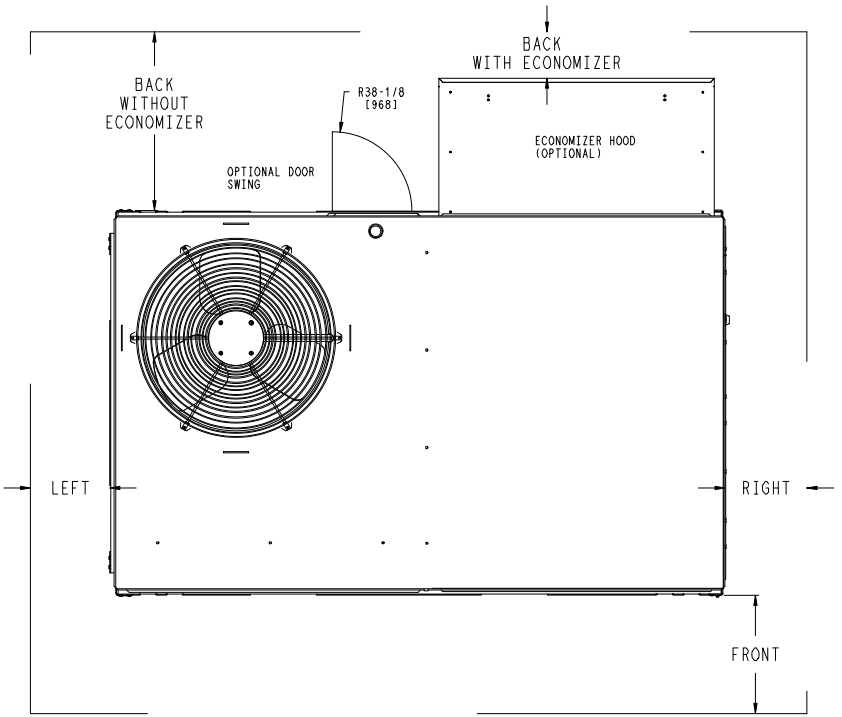
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TOP



FRONT



NOTE:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

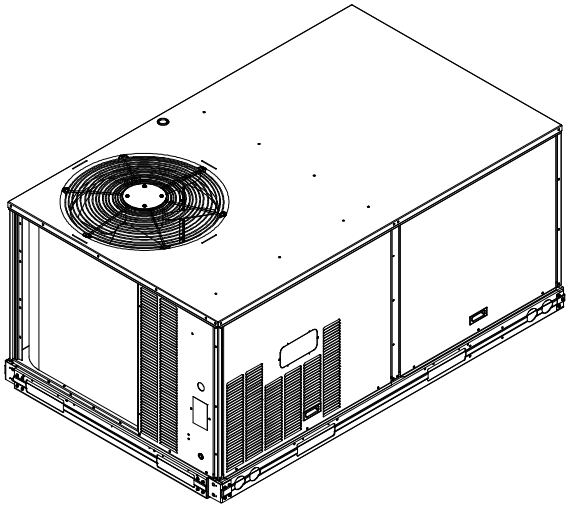
CLEARANCE			
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/ECON	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

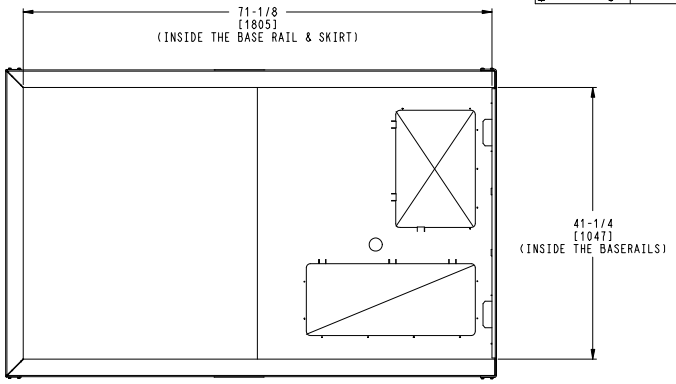
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

Carrier
United Technologies

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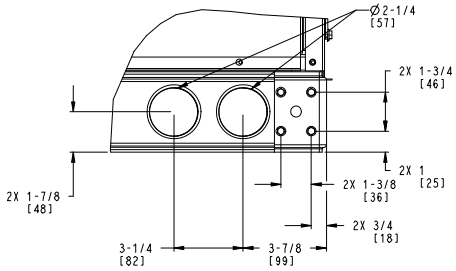
SUBMISSION OF THESE DRAWINGS OR DOCUMENTS DOES NOT CONSTITUTE PART PERFORMANCE OR ACCEPTANCE OF CONTRACT.



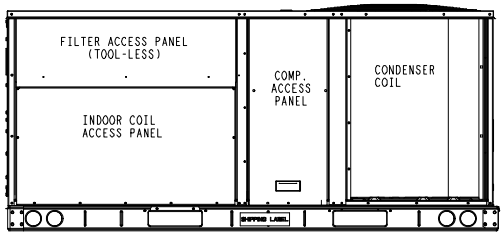


INSIDE BASERAIL DIMENSIONS

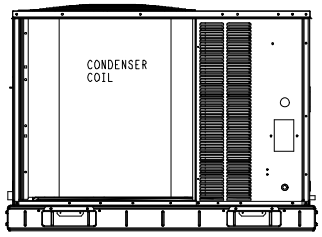
BOTTOM



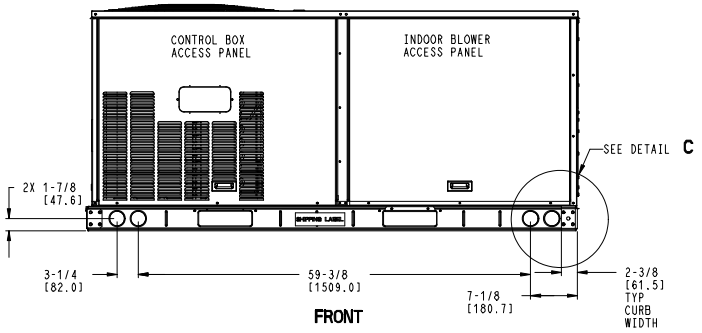
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

Part Number:50FCQA04A2M6-3A0A0

ARI SEER:	**14.30**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**33.4**	in

Operating Weight

Base Unit Weight:	**467**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**13**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**482**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**1200**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**58.4**	F
Evaporator Leaving Air WB:	**57.3**	F
Evaporator Leaving Air Enthalpy:	**24.59**	BTU/lb
Gross Cooling Capacity:	**36.98**	MBH
Gross Sensible Capacity:	**27.93**	MBH
Compressor Power Input:	**2.41**	kW
Coil Bypass Factor:	**0.101**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.3**	F
Total Heating Capacity:	**34.10**	MBH
Integrated Heating Capacity:	**34.10**	MBH
Heating Power Input:	**2.46**	kW
High Temperature COP:	**3.70**	
Low Temperature COP:	**2.25**	
HSPF:	**8.2**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**1946**	
Fan Power:	**0.54**	BHP
NOTE:	**Selected IFM RPM Range: 219 - 2190**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**	
Compressor #1 RLA:	**5.8**	
Compressor #1 LRA:	**38**	
Indoor Fan Motor Type:	**MED**	
Indoor Fan Motor Eff.:	**Null**	

Indoor Fan Motor FLA (Total): **1.2**
Power Supply MCA: **10**
Power Supply MOCP (Fuse or HACR): **15**
Disconnect Size FLA: **9**
Disconnect Size LRA: **42**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

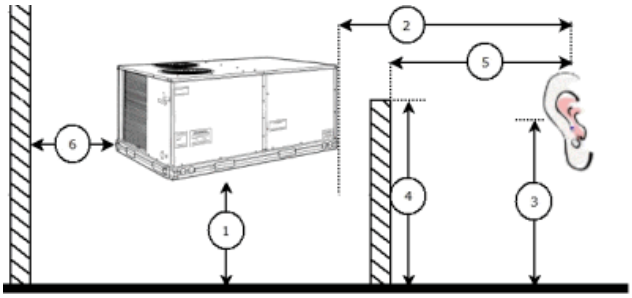
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	92.4	86.1	81.8
125 Hz	83.6	79.2	81.8
250 Hz	76.5	70.0	77.0
500 Hz	69.1	62.8	72.6
1000 Hz	66.5	64.1	69.9
2000 Hz	63.5	55.8	64.6
4000 Hz	59.4	50.0	59.3
8000 Hz	57.1	43.3	55.6
A-Weighted	74.6	69.3	75.4

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	81.8	81.8	77.0	72.6	69.9	64.6	59.3	55.6	85.9 Lw
B	55.6	65.7	68.4	69.4	69.9	65.8	60.3	54.5	75.4 LwA
C	49.4	49.4	44.6	40.2	37.5	32.2	26.9	23.2	53.5 Lp
D	23.2	33.3	36.0	37.0	37.5	33.4	27.9	22.1	43.0 LpA

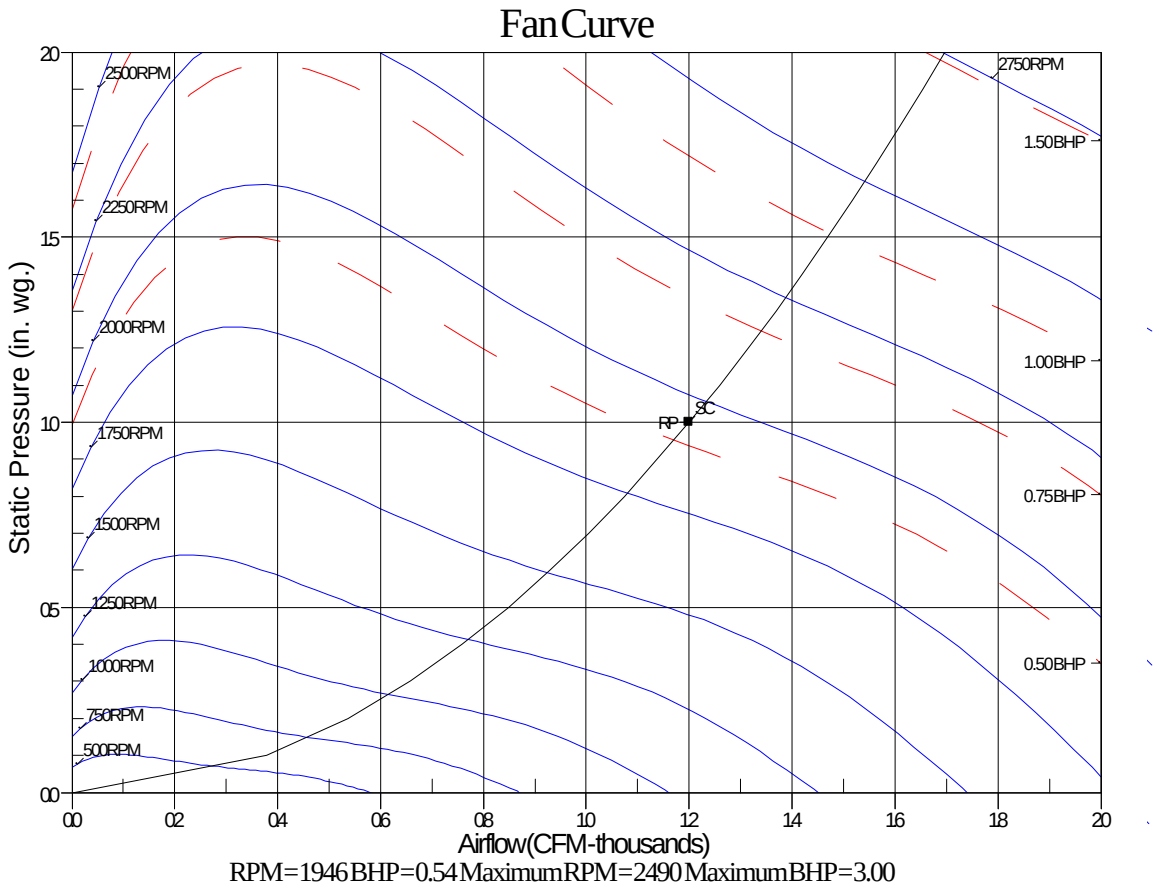
Legend

Performance Summary For Bldg E - E2,E4,E5

Project: Lynwood Unified Mark Twain ES 10/31/2023
Prepared By: 10:15AM

A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



RPM=1946 BHP=0.54 Maximum RPM=2490 Maximum BHP=3.00
SC-System Curve RP-Rated Point

Bldg F - F1,F3,F4

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Bldg F - F1,F3,F4

Project: Lynwood Unified Mark Twain ES 10/31/2023
Prepared By: 10:13AM

Unit Parameters

Unit Model: **50FCQA05A2M6-3A0A0**
Unit Size: **05 (4 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Single Stage Compressor Models**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **2' 9.375"**
Total Operating Weight: **488** lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **2**
Return Air Filter Size: **16 x 25 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

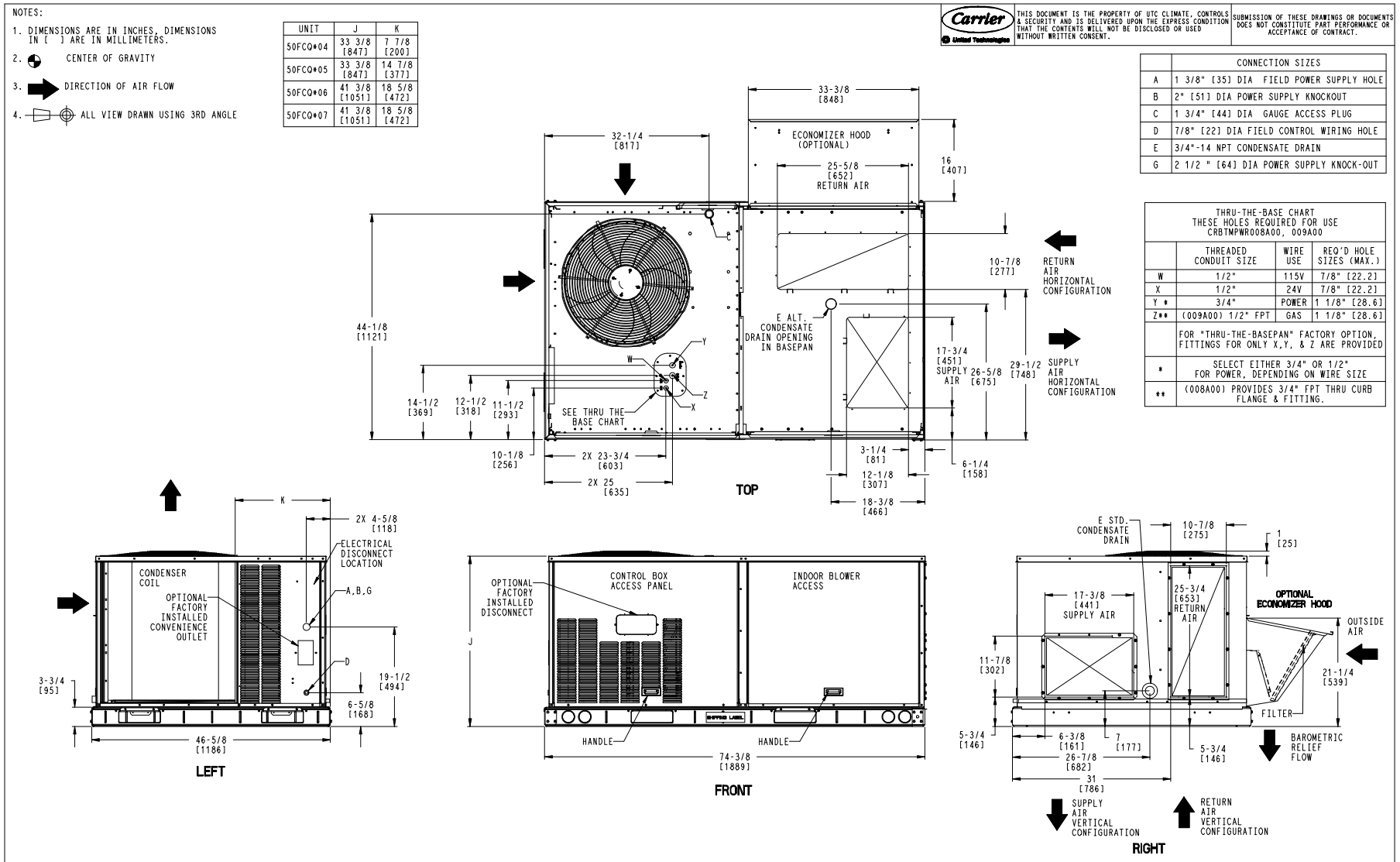
5-Year compressor parts (STD.)
1-Year parts (STD.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
50FCQA05A2M6-3A0A0	Rooftop Unit	3


NOTES:
1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE
UNIT J K
50FCQ*04 33 3/8 [847] 7 7/8 [200]
50FCQ*05 33 3/8 [847] 14 7/8 [377]
50FCQ*06 41 3/8 [1051] 18 5/8 [472]
50FCQ*07 41 3/8 [1051] 18 5/8 [472]
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CONNECTION SIZES
A 1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B 2" [51] DIA POWER SUPPLY KNOCKOUT
C 1 3/4" [44] DIA GAUGE ACCESS PLUG
D 7/8" [22] DIA FIELD CONTROL WIRING HOLE
E 3/4"-14 NPT CONDENSATE DRAIN
G 2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT
THRU-THE-BASE CHART
THESE HOLES REQUIRED FOR USE CRBTMPWR008A00, 009A00
THREADED CONDUIT SIZE / WIRE USE / REQ'D HOLE SIZES (MAX.)
W 1/2" 115V 7/8" [22.2]
X 1/2" 24V 7/8" [22.2]
Y * 3/4" POWER 1 1/8" [28.6]
Z** (009A00) 1/2" FPT GAS 1 1/8" [28.6]
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X,Y, & Z ARE PROVIDED
* SELECT EITHER 3/4" OR 1/2" FOR POWER, DEPENDING ON WIRE SIZE
** (008A00) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.
33-3/8 [848]
ECONOMIZER HOOD (OPTIONAL)
32-1/4 [817]
25-5/8 [652] RETURN AIR
16 [407]
10-7/8 [277]
RETURN AIR HORIZONTAL CONFIGURATION
44-1/8 [1121]
E ALT. CONDENSATE DRAIN OPENING IN BASEPAN
17-3/4 [451] SUPPLY AIR
26-5/8 [675]
29-1/2 [748]
SUPPLY AIR HORIZONTAL CONFIGURATION
14-1/2 [369]
12-1/2 [318]
11-1/2 [293]
SEE THRU THE BASE CHART
10-1/8 [256]
2X 23-3/4 [603]
2X 25 [635]
3-1/4 [81]
12-1/8 [307]
18-3/8 [466]
6-1/4 [158]
TOP
K
2X 4-5/8 [118]
ELECTRICAL DISCONNECT LOCATION
CONDENSER COIL
OPTIONAL FACTORY INSTALLED CONVENIENCE OUTLET
A,B,G
D
3-3/4 [95]
19-1/2 [494]
6-5/8 [168]
46-5/8 [1186]
LEFT
OPTIONAL FACTORY INSTALLED DISCONNECT
CONTROL BOX ACCESS PANEL
INDOOR BLOWER ACCESS
J
HANDLE
HANDLE
74-3/8 [1889]
FRONT
E STD. CONDENSATE DRAIN
10-7/8 [275]
1 [25]
17-3/8 [441] SUPPLY AIR
25-3/4 [653] RETURN AIR
OPTIONAL ECONOMIZER HOOD
OUTSIDE AIR
11-7/8 [302]
21-1/4 [539]
FILTER
5-3/4 [146]
6-3/8 [161]
7 [177]
26-7/8 [682]
31 [786]
5-3/4 [146]
BAROMETRIC RELIEF FLOW
SUPPLY AIR VERTICAL CONFIGURATION
RETURN AIR VERTICAL CONFIGURATION
RIGHT
ITC CLASSIFICATION U.S. ECCN:NSR
SHEET 1 OF 3
DATE 08/15/19
SUPERCEDES -
50FCQ 04-07 SINGLE PACKAGE HEAT PUMP
48TC003348
REV -

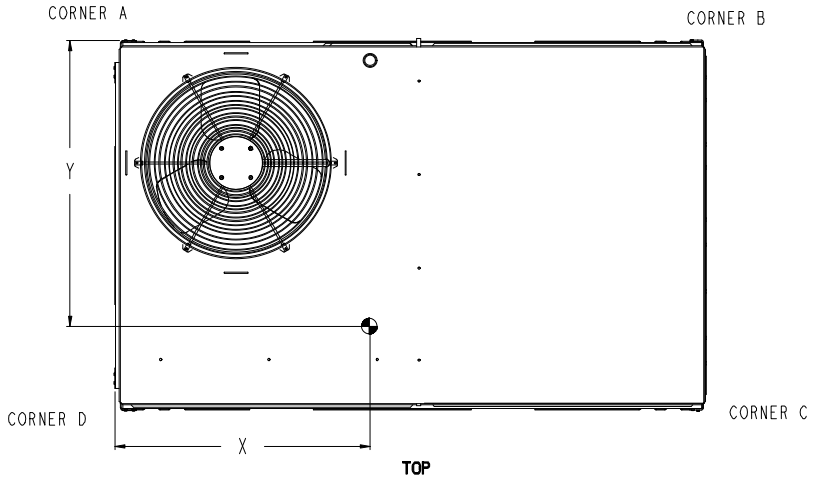
UNIT	STD. UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ*04	467	212	126	57	118	53	108	49	115	52	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*05	473	215	127	58	119	54	110	50	117	53	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*06	584	265	160	72	145	66	133	60	146	66	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]
50FCQ*07	589	267	161	73	146	66	134	61	147	67	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]

* STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.

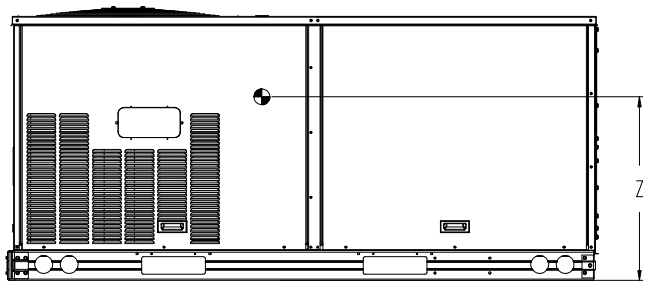
Carrier
United Technologies

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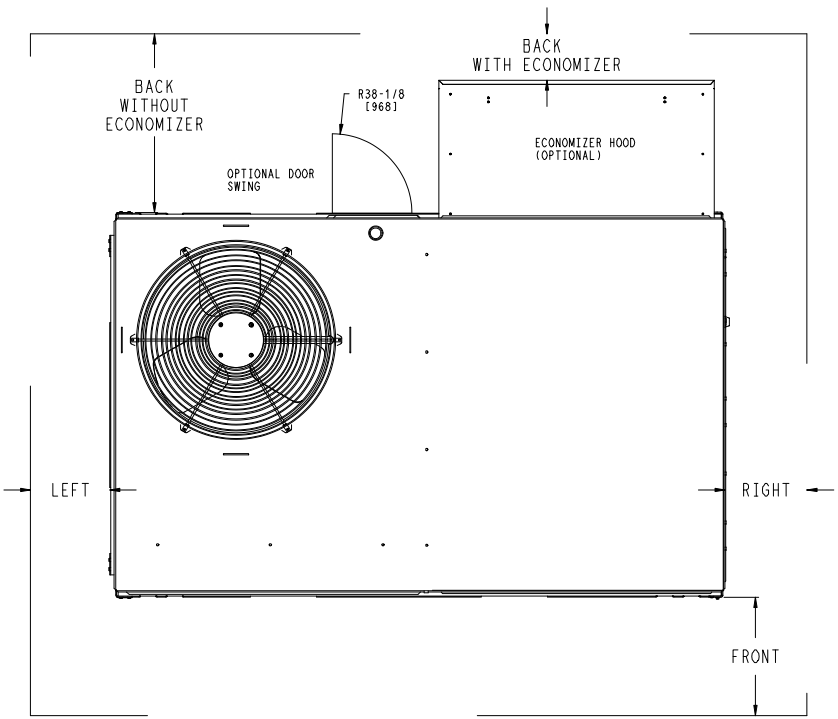
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TOP



FRONT



NOTE:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

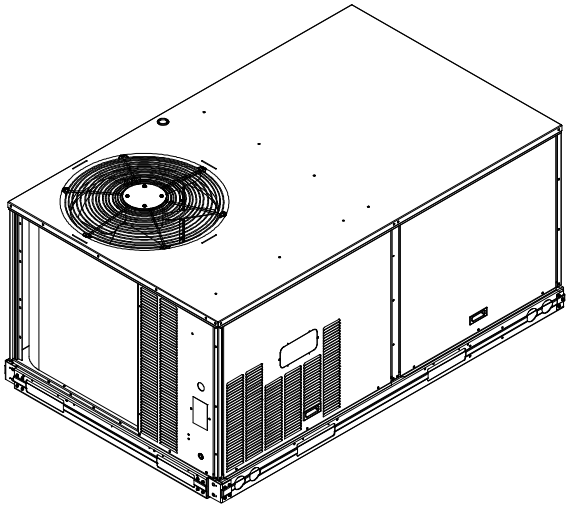
CLEARANCE			
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/ECON	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

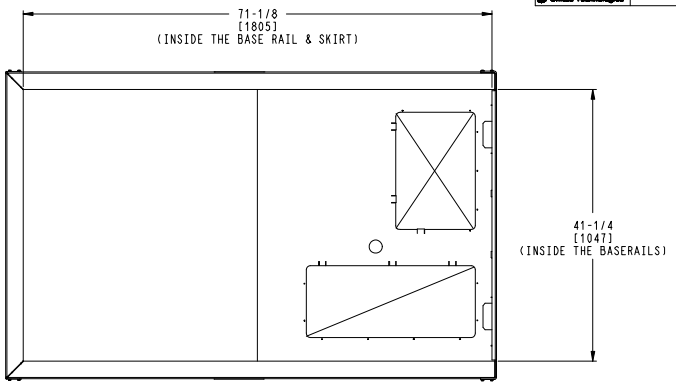
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

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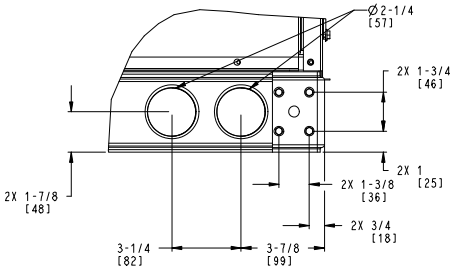
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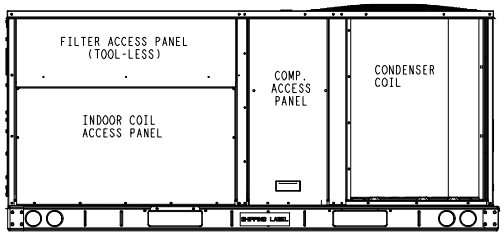


INSIDE BASERAIL DIMENSIONS

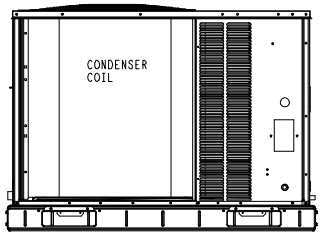
BOTTOM



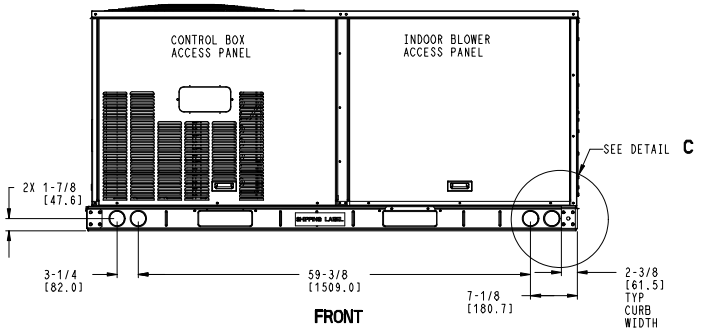
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

Part Number:50FCQA05A2M6-3A0A0

ARI SEER:	**14.30**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**33.4**	in

Operating Weight

Base Unit Weight:	**473**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**13**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**488**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**1600**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**58.1**	F
Evaporator Leaving Air WB:	**57.2**	F
Evaporator Leaving Air Enthalpy:	**24.50**	BTU/lb
Gross Cooling Capacity:	**49.92**	MBH
Gross Sensible Capacity:	**37.82**	MBH
Compressor Power Input:	**3.53**	kW
Coil Bypass Factor:	**0.109**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.7**	F
Total Heating Capacity:	**46.10**	MBH
Integrated Heating Capacity:	**46.10**	MBH
Heating Power Input:	**3.08**	kW
High Temperature COP:	**3.70**	
Low Temperature COP:	**2.28**	
HSPF:	**8.2**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**1958**	
Fan Power:	**0.81**	BHP
NOTE:	**Selected IFM RPM Range: 217 - 2170**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**	
Compressor #1 RLA:	**6.2**	
Compressor #1 LRA:	**41**	
Indoor Fan Motor Type:	**MED**	
Indoor Fan Motor Eff.:	**Null**	

Indoor Fan Motor FLA (Total): **1.7**
Power Supply MCA: **11**
Power Supply MOCP (Fuse or HACR): **15**
Disconnect Size FLA: **10**
Disconnect Size LRA: **45**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

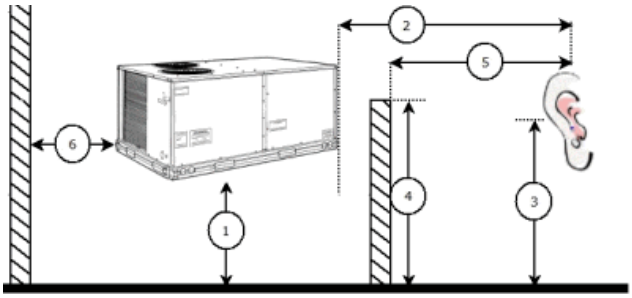
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	93.7	91.1	85.6
125 Hz	84.7	79.8	84.7
250 Hz	78.5	72.9	80.5
500 Hz	73.0	66.0	76.0
1000 Hz	69.8	67.8	72.4
2000 Hz	66.5	58.7	68.0
4000 Hz	63.5	52.9	62.8
8000 Hz	60.1	46.2	59.3
A-Weighted	77.1	72.4	79.0

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	85.6	84.7	80.5	76.0	72.4	68.0	62.8	59.3	89.2 Lw
B	59.4	68.6	71.9	72.8	72.4	69.2	63.8	58.2	78.5 LwA
C	53.2	52.3	48.1	43.6	40.0	35.6	30.4	26.9	56.8 Lp
D	27.0	36.2	39.5	40.4	40.0	36.8	31.4	25.8	46.1 LpA

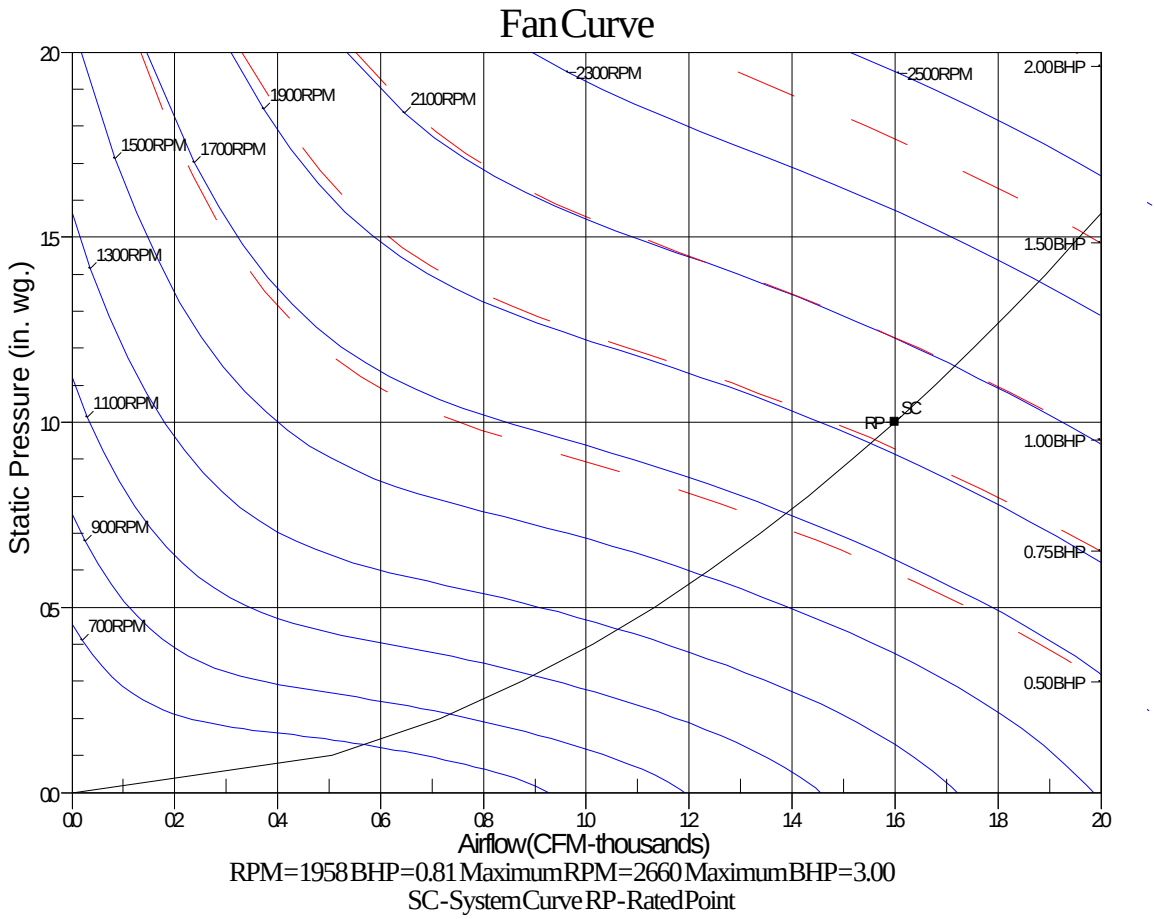
Legend

Performance Summary For Bldg F - F1,F3,F4

Project: Lynwood Unified Mark Twain ES 10/31/2023
Prepared By: 10:13AM

A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



RPM=1958 BHP=0.81 Maximum RPM=2660 Maximum BHP=3.00
SC-System Curve RP-Rated Point

Bldg F - F2

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Bldg F - F2

Project: Lynwood Unified Mark Twain ES 10/31/2023
Prepared By: 10:13AM

Unit Parameters

Unit Model: **50FCQA04A2M6-3A0A0**
Unit Size: **04 (3 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Single Stage Compressor Models**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **2' 9.375"**
Total Operating Weight: 482 lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **2**
Return Air Filter Size: **16 x 25 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

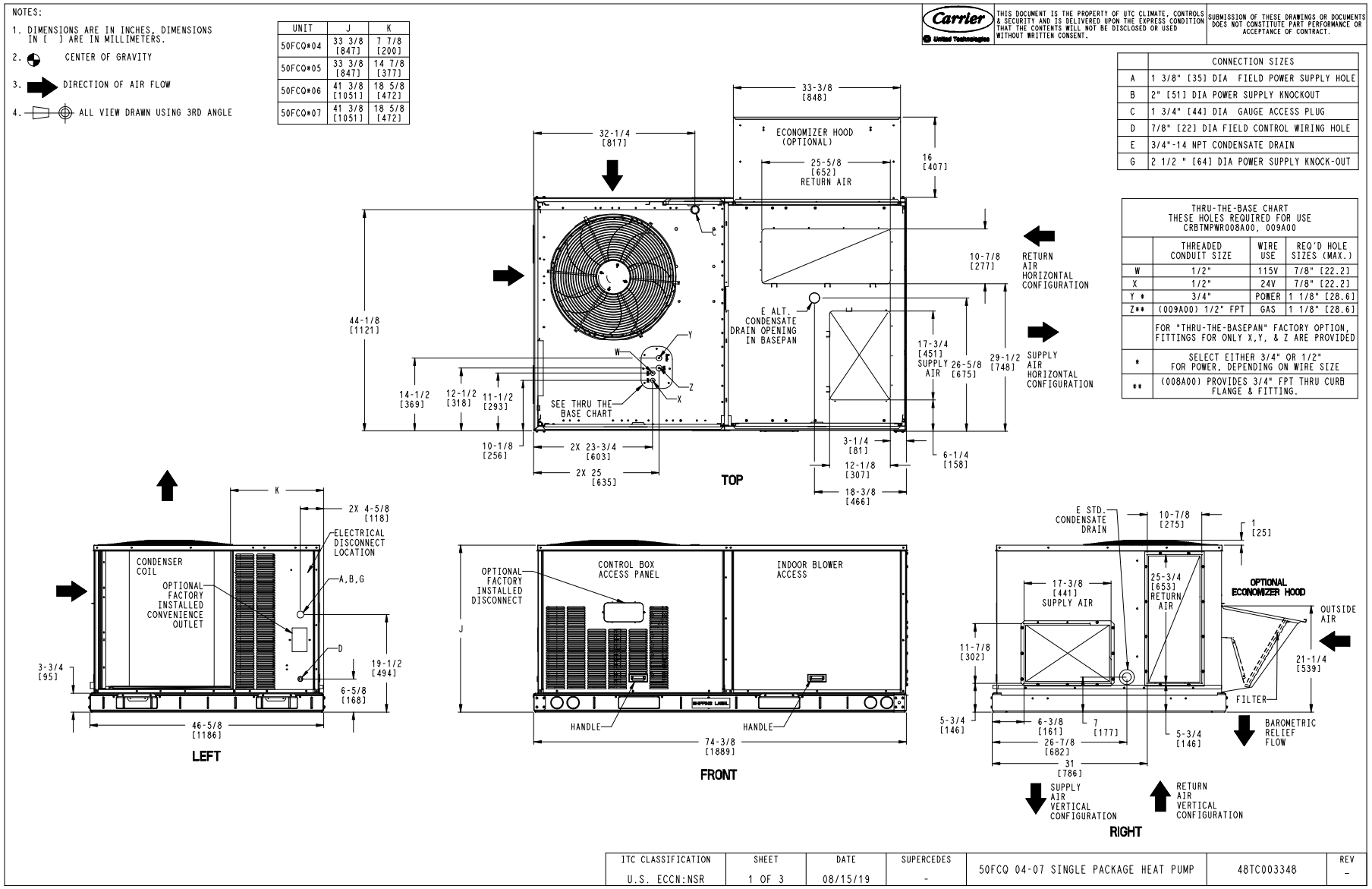
5-Year compressor parts (STD.)
1-Year parts (STD.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
50FCQA04A2M6-3A0A0	Rooftop Unit	1


NOTES:
1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE
UNIT J K
50FCQ*04 33 3/8 [847] 7 7/8 [200]
50FCQ*05 33 3/8 [847] 14 7/8 [377]
50FCQ*06 41 3/8 [1051] 18 5/8 [472]
50FCQ*07 41 3/8 [1051] 18 5/8 [472]
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CONNECTION SIZES
A 1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B 2" [51] DIA POWER SUPPLY KNOCKOUT
C 1 3/4" [44] DIA GAUGE ACCESS PLUG
D 7/8" [22] DIA FIELD CONTROL WIRING HOLE
E 3/4"-14 NPT CONDENSATE DRAIN
G 2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT
THRU-THE-BASE CHART
THESE HOLES REQUIRED FOR USE CRBTMPWR008A00, 009A00
THREADED CONDUIT SIZE / WIRE USE / REQ'D HOLE SIZES (MAX.)
W 1/2" 115V 7/8" [22.2]
X 1/2" 24V 7/8" [22.2]
Y * 3/4" POWER 1 1/8" [28.6]
Z** (009A00) 1/2" FPT GAS 1 1/8" [28.6]
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X,Y, & Z ARE PROVIDED
* SELECT EITHER 3/4" OR 1/2" FOR POWER, DEPENDING ON WIRE SIZE
** (008A00) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.
33-3/8 [848]
ECONOMIZER HOOD (OPTIONAL)
32-1/4 [817]
25-5/8 [652] RETURN AIR
16 [407]
10-7/8 [277]
RETURN AIR HORIZONTAL CONFIGURATION
44-1/8 [1121]
E ALT. CONDENSATE DRAIN OPENING IN BASEPAN
17-3/4 [451] SUPPLY AIR
26-5/8 [675]
29-1/2 [748]
SUPPLY AIR HORIZONTAL CONFIGURATION
14-1/2 [369]
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SEE THRU THE BASE CHART
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2X 25 [635]
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6-1/4 [158]
TOP
K
2X 4-5/8 [118]
ELECTRICAL DISCONNECT LOCATION
CONDENSER COIL
OPTIONAL FACTORY INSTALLED CONVENIENCE OUTLET
A,B,G
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LEFT
OPTIONAL FACTORY INSTALLED DISCONNECT
CONTROL BOX ACCESS PANEL
INDOOR BLOWER ACCESS
J
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HANDLE
74-3/8 [1889]
FRONT
E STD. CONDENSATE DRAIN
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BAROMETRIC RELIEF FLOW
SUPPLY AIR VERTICAL CONFIGURATION
RETURN AIR VERTICAL CONFIGURATION
RIGHT
ITC CLASSIFICATION U.S. ECCN:NSR
SHEET 1 OF 3
DATE 08/15/19
SUPERCEDES -
50FCQ 04-07 SINGLE PACKAGE HEAT PUMP
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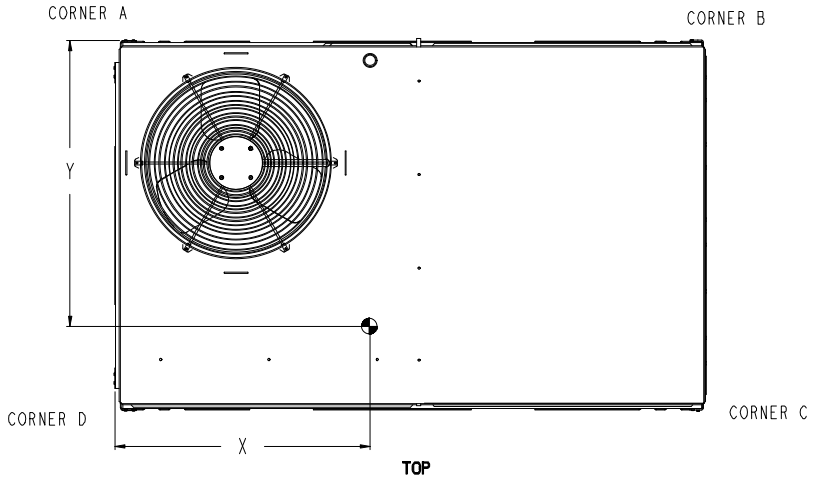
UNIT	STD. UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ*04	467	212	126	57	118	53	108	49	115	52	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*05	473	215	127	58	119	54	110	50	117	53	36 [914]	22 3/8 [568]	16 1/8 [410]
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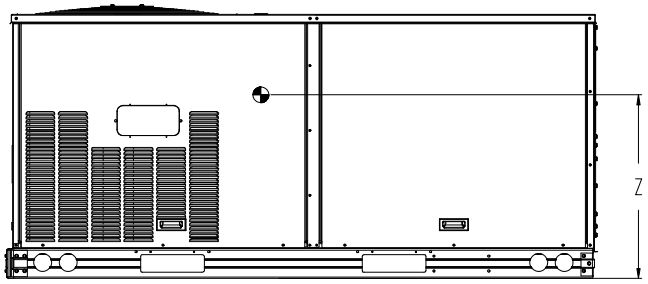
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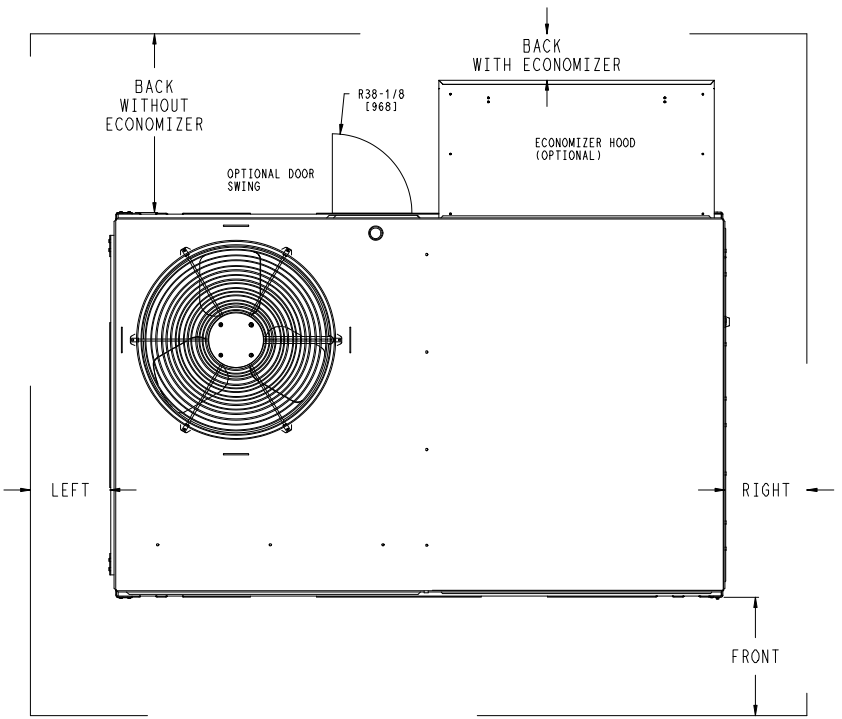
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TOP



FRONT



NOTE:

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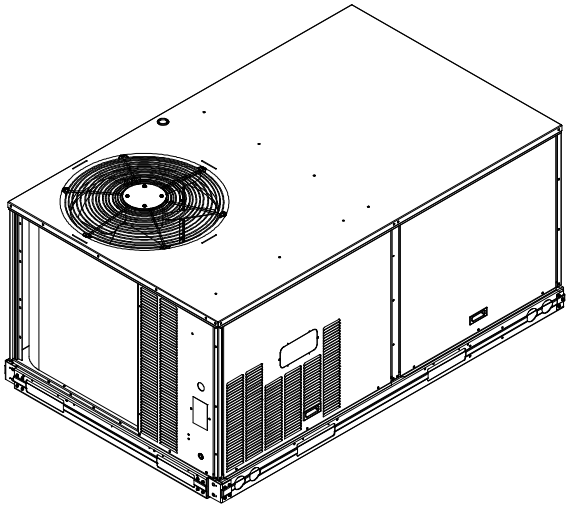
CLEARANCE			
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/ECON	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

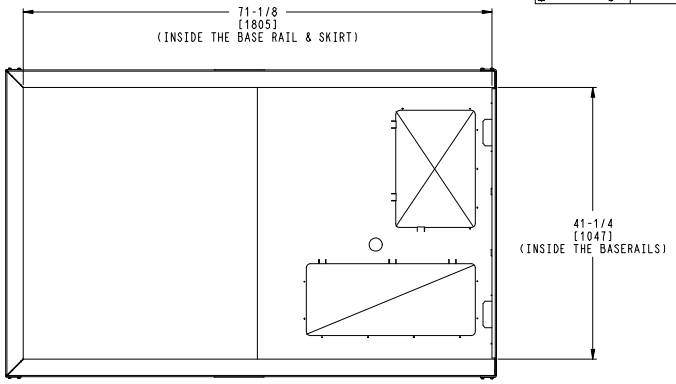
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

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United Technologies

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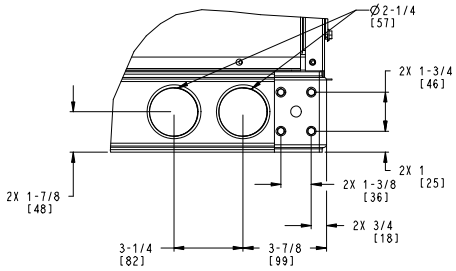
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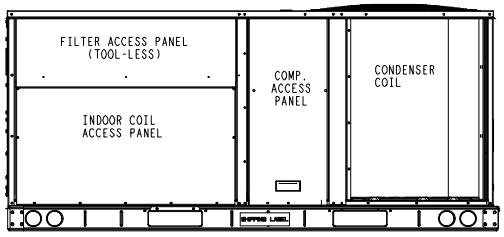


INSIDE BASERAIL DIMENSIONS

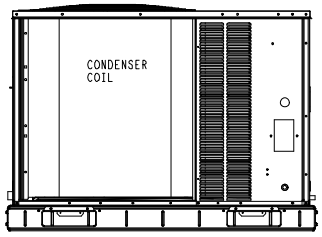
BOTTOM



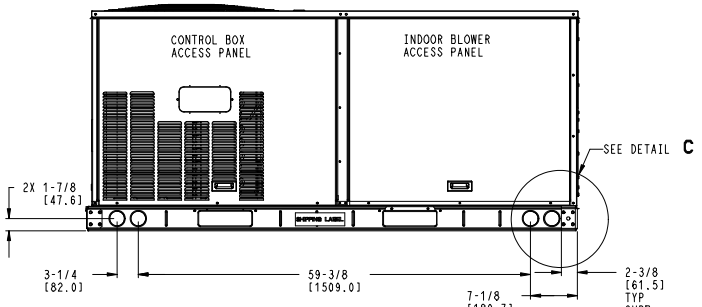
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

Performance Summary For Bldg F - F2

Project: Lynwood Unified Mark Twain ES 10/31/2023
Prepared By: 10:13AM

Part Number:50FCQA04A2M6-3A0A0

ARI SEER:	**14.30**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**33.4**	in

Operating Weight

Base Unit Weight:	**467**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**13**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**482**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**1200**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**58.4**	F
Evaporator Leaving Air WB:	**57.3**	F
Evaporator Leaving Air Enthalpy:	**24.59**	BTU/lb
Gross Cooling Capacity:	**36.98**	MBH
Gross Sensible Capacity:	**27.93**	MBH
Compressor Power Input:	**2.41**	kW
Coil Bypass Factor:	**0.101**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.3**	F
Total Heating Capacity:	**34.10**	MBH
Integrated Heating Capacity:	**34.10**	MBH
Heating Power Input:	**2.46**	kW
High Temperature COP:	**3.70**	
Low Temperature COP:	**2.25**	
HSPF:	**8.2**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**1946**	
Fan Power:	**0.54**	BHP
NOTE:	**Selected IFM RPM Range: 219 - 2190**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**	
Compressor #1 RLA:	**5.8**	
Compressor #1 LRA:	**38**	
Indoor Fan Motor Type:	**MED**	
Indoor Fan Motor Eff.:	**Null**	

Indoor Fan Motor FLA (Total): **1.2**
Power Supply MCA: **10**
Power Supply MOCP (Fuse or HACR): **15**
Disconnect Size FLA: **9**
Disconnect Size LRA: **42**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

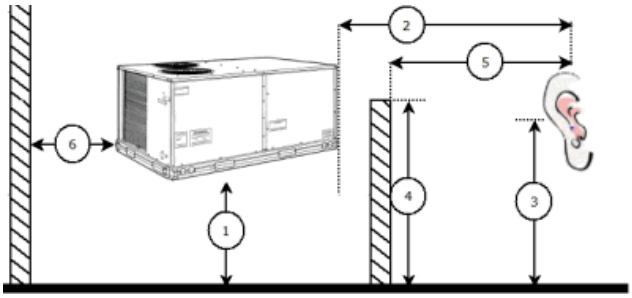
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	92.4	86.1	81.8
125 Hz	83.6	79.2	81.8
250 Hz	76.5	70.0	77.0
500 Hz	69.1	62.8	72.6
1000 Hz	66.5	64.1	69.9
2000 Hz	63.5	55.8	64.6
4000 Hz	59.4	50.0	59.3
8000 Hz	57.1	43.3	55.6
A-Weighted	74.6	69.3	75.4

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	81.8	81.8	77.0	72.6	69.9	64.6	59.3	55.6	85.9 Lw
B	55.6	65.7	68.4	69.4	69.9	65.8	60.3	54.5	75.4 LwA
C	49.4	49.4	44.6	40.2	37.5	32.2	26.9	23.2	53.5 Lp
D	23.2	33.3	36.0	37.0	37.5	33.4	27.9	22.1	43.0 LpA

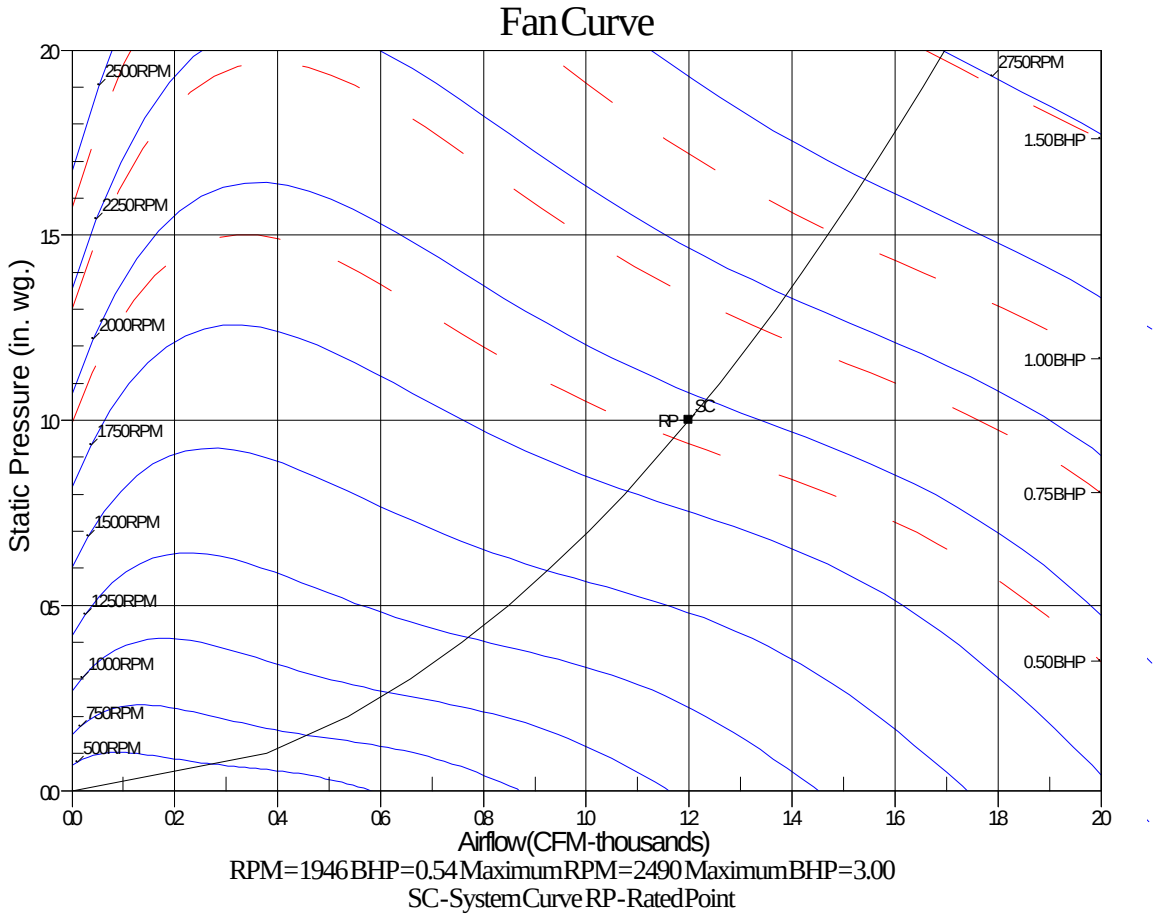
Legend

Performance Summary For Bldg F - F2

Project: Lynwood Unified Mark Twain ES 10/31/2023
Prepared By: 10:13AM

A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



Bldg B - B1

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Bldg B - B1

Project: Lynwood Unified Mark Twain ES 10/31/2023
Prepared By: 10:13AM

Unit Parameters

Unit Model: **50VT-K60---5**
Unit Size: **60 (5 Tons)**
Volts-Phase-Hertz: **208-3-60**
Heating Type: **Heat Pump**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **4' 0.25"**
Unit Width: **3' 8.1875"**
Unit Height: **4' 0.75"**

*** Weights and Dimensions are approximate. Weight does not include roof curbs, unit packaging, field installed accessories or factory installed options. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Base Unit Weight (Does not include any accessories):
496 lb

Warranty Information

1 year warranty on parts
5 yearwarranty on compressor

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

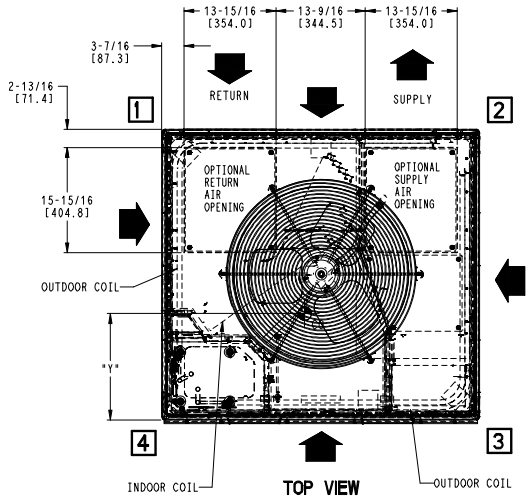
Ordering Information

Part Number	Description	Quantity
50VT-K60---5	Rooftop Unit	1

CARRIER / BRYANT HP (LARGE CHASSIS)

COOLING CAPACITY	UNIT WT.		UNIT HEIGHT IN/MM		CENTER OF GRAVITY IN/MM					
	LB	KG	"A"		X		Y		Z	
36	406	184.2	54-3/4	1391	20-1/2	521	17-1/2	445	17-3/8	441
42	426	193.3	54-3/4	1391	20-1/2	521	17-1/2	445	17-3/8	448
48	426	193.3	44-3/4	1137	20-1/2	521	17-1/2	445	17-3/8	448
60	496	225.0	48-3/4	1238	20-1/2	521	17-1/2	445	18	457

UNIT	CORNER WEIGHT LB/KG							
	"1"		"2"		"3"		"4"	
36	88.6	40.2	78.4	35.6	78.4	51.1	112.6	57.4
42	92.9	42.2	82.4	37.4	82.4	53.7	118.3	60.0
48	92.6	42.0	82.5	37.4	82.5	53.5	117.9	60.4
60	107.5	48.8	95.5	43.3	95.5	62.5	137.8	70.4



TOP VIEW

REQUIRED CLEARANCES TO COMBUSTIBLE MATL.

	INCHES [MM]
TOP OF UNIT	14 [355.6]
DUCT SIDE OF UNIT	2 [50.8]
SIDE OPPOSITE DUCTS	14 [355.6]
BOTTOM OF UNIT	0 [0.0]
ELECTRICAL PANEL	36 [914.4]

NEC. REQUIRED CLEARANCES.

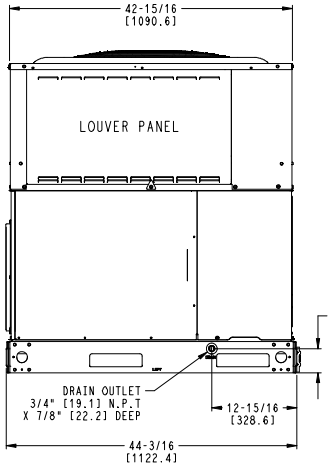
	INCHES [MM]
BETWEEN UNITS, POWER ENTRY SIDE	42 [1066.8]
UNIT AND UNGROUNDED SURFACES, POWER ENTRY SIDE	36 [914.0]
UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, POWER ENTRY SIDE	42 [1066.8]

REQUIRED CLEARANCE FOR OPERATION AND SERVICING

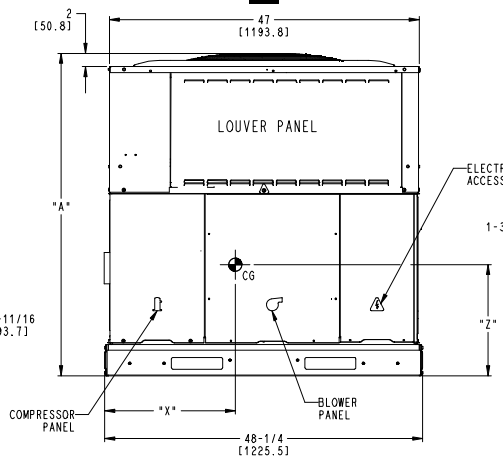
	INCHES [MM]
EVAP. COIL ACCESS SIDE	36 [914.0]
POWER ENTRY SIDE	42 [1066.8]
(EXCEPT FOR NEC REQUIREMENTS)	
UNIT TOP	48 [1219.2]
SIDE OPPOSITE DUCTS	36 [914.0]
DUCT PANEL	12 [304.8]*

*MINIMUM DISTANCES:IF UNIT IS PLACED LESS THAN 12 [304.8] FROM WALL SYSTEM,THEN SYSTEM PERFORMANCE MAYBE COMPROMISED.

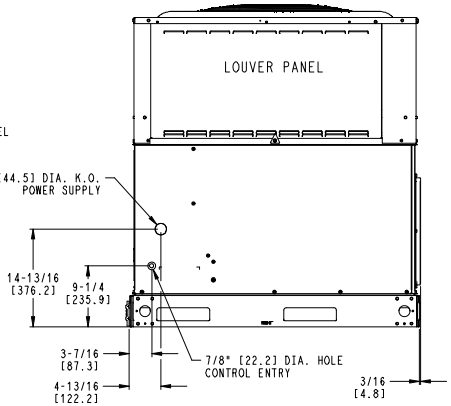
DIMENSIONS IN [] ARE IN MILLIMETERS



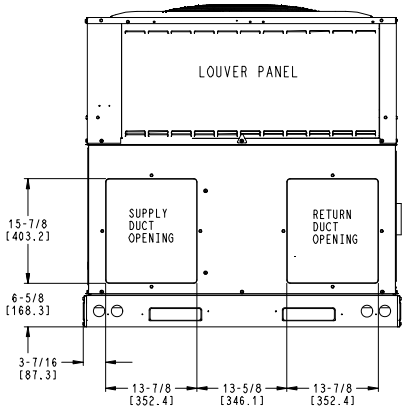
LEFT SIDE VIEW



FRONT VIEW



RIGHT SIDE VIEW



REAR VIEW

10/19/22	UPDATED TABLE DIMS.	SINGLE ZONE ELECTRIC COOLING & HEAT(LG)	SD5770-4	A

Part Number:50VT-K60---5

ARI SEER2:	**13.40**	

Base Unit Dimensions

Unit Length:	**48.3**	in
Unit Width:	**44.2**	in
Unit Height:	**48.8**	in
Base Unit Weight (Does not include any accessories):	**496**	lb

Unit

Unit Voltage-Phase-Hertz:	**208-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Direct**	
Actual Airflow:	**1760**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**58.5**	F
Evaporator Leaving Air WB:	**57.1**	F
Evaporator Leaving Air Enthalpy:	**24.48**	BTU/lb
Net Cooling Capacity:	**55.11**	MBH
Net Sensible Capacity:	**40.93**	MBH
Total Unit Power Input:	**4.92**	kW
Coil Bypass Factor:	**0.000**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**99.7**	F
Total Heating Capacity:	**56.41**	MBH
Integrated Heating Capacity:	**56.43**	MBH
Heating Power Input:	**4.72**	kW
High Temperature COP:	**3.50**	
Low Temperature COP:	**2.42**	
HSPF2:	**6.7**	

Supply Fan

External Static Pressure:	**0.50**	in wg
Options / Accessories Static Pressure		
Wet Coil:	**0.06**	in wg
Application External Static (ESP + Unit Opts/Acc.):	**0.56**	in wg
Fan Power:	**0.69**	BHP
Fan Motor Size, hp:	**1**	
NOTE:	**Medium Motor Speed, Vert**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Minimum Voltage:	**197**
Maximum Voltage:	**253**
Compressor RLA:	**13.2**
Compressor LRA:	**93**
Outdoor Fan FLA (ea):	**1.1**
Indoor Fan Motor FLA (Total):	**6.9**
Power Supply MCA:	**24.5**

Power Supply MOCP (Fuse or HACR): **35**

Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

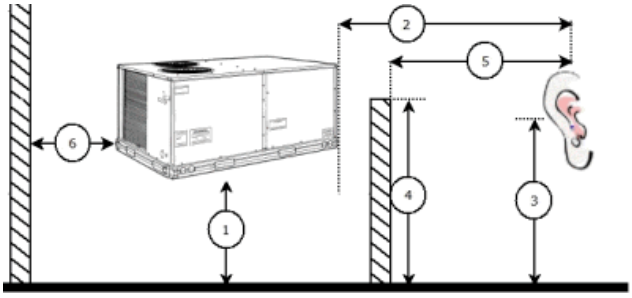
Acoustics

Sound Rating: **74.7** db

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	NA	NA	NA
125 Hz	NA	NA	60.0
250 Hz	NA	NA	61.6
500 Hz	NA	NA	63.8
1000 Hz	NA	NA	63.5
2000 Hz	NA	NA	62.0
4000 Hz	NA	NA	59.3
8000 Hz	NA	NA	50.3

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	0.0	60.0	61.6	63.8	63.5	62.0	59.3	50.3	69.8 Lw
B	-26.2	43.9	53.0	60.6	63.5	63.2	60.3	49.2	68.4 LwA
C	0.0	27.6	29.2	31.4	31.1	29.6	26.9	17.9	37.4 Lp
D	-26.2	11.5	20.6	28.2	31.1	30.8	27.9	16.8	36.0 LpA

Legend
A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.

Bldg G - G2,G3

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Bldg G - G2,G3

Project: Lynwood Unified Mark Twain ES 10/31/2023
Prepared By: 10:13AM

Unit Parameters

Unit Model: **50FCQA04A2M6-3A0A0**
Unit Size: **04 (3 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Single Stage Compressor Models**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **2' 9.375"**
Total Operating Weight: 482 lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **2**
Return Air Filter Size: **16 x 25 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

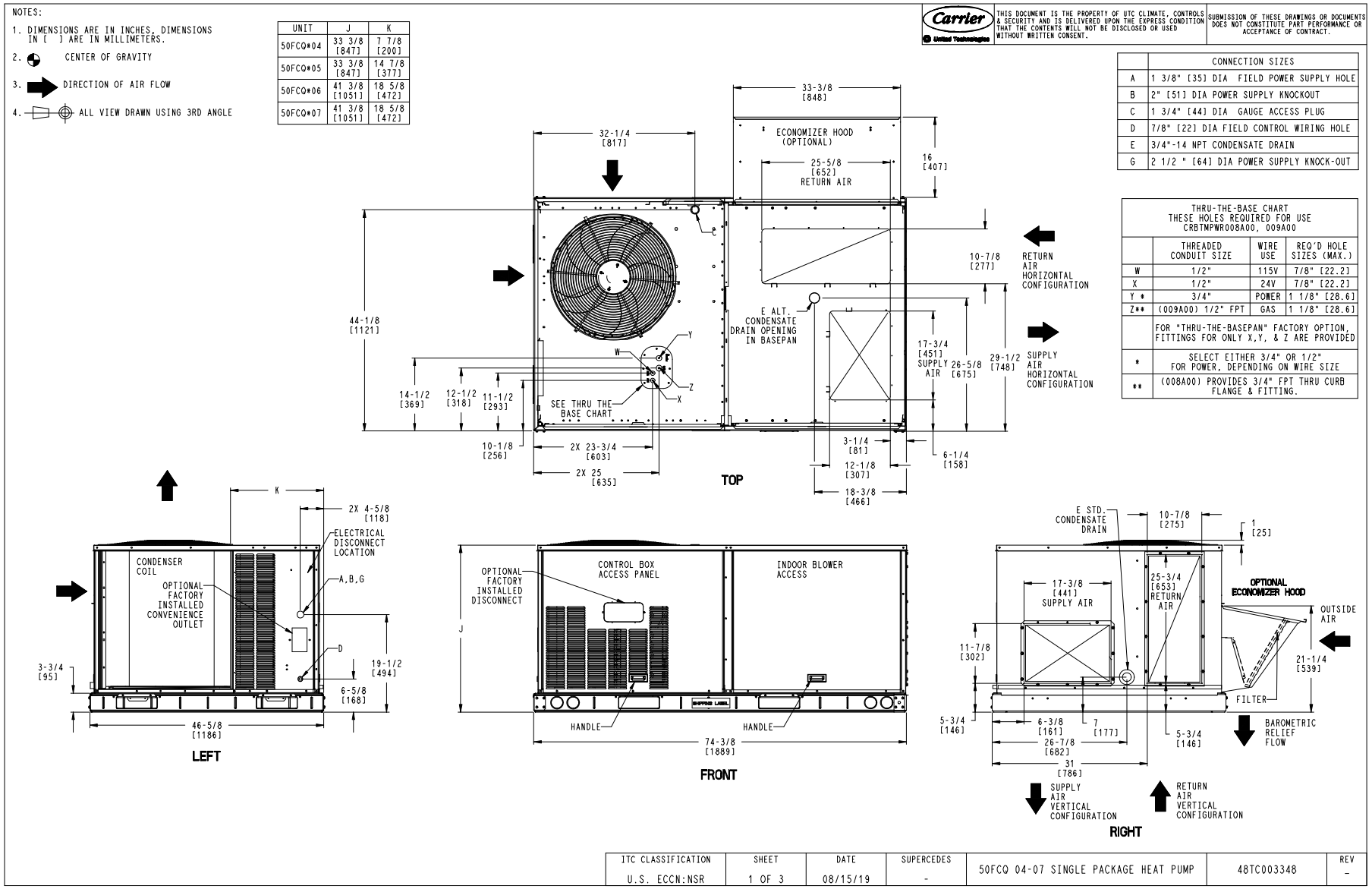
5-Year compressor parts (STD.)
1-Year parts (STD.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
50FCQA04A2M6-3A0A0	Rooftop Unit	2


NOTES:
1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE
UNIT | J | K
50FCQ*04 | 33 3/8 [847] | 7 7/8 [200]
50FCQ*05 | 33 3/8 [847] | 14 7/8 [377]
50FCQ*06 | 41 3/8 [1051] | 18 5/8 [472]
50FCQ*07 | 41 3/8 [1051] | 18 5/8 [472]
Carrier
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CONNECTION SIZES
A | 1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B | 2" [51] DIA POWER SUPPLY KNOCKOUT
C | 1 3/4" [44] DIA GAUGE ACCESS PLUG
D | 7/8" [22] DIA FIELD CONTROL WIRING HOLE
E | 3/4"-14 NPT CONDENSATE DRAIN
G | 2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT
THRU-THE-BASE CHART
THESE HOLES REQUIRED FOR USE CRBTMPWR008A00, 009A00
THREADED CONDUIT SIZE | WIRE USE | REQ'D HOLE SIZES (MAX.)
W | 1/2" | 115V | 7/8" [22.2]
X | 1/2" | 24V | 7/8" [22.2]
Y * | 3/4" | POWER | 1 1/8" [28.6]
Z** | (009A00) 1/2" FPT | GAS | 1 1/8" [28.6]
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X,Y, & Z ARE PROVIDED
* SELECT EITHER 3/4" OR 1/2" FOR POWER, DEPENDING ON WIRE SIZE
** (008A00) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.
33-3/8 [848]
32-1/4 [817]
ECONOMIZER HOOD (OPTIONAL)
25-5/8 [652] RETURN AIR
16 [407]
10-7/8 [277]
RETURN AIR HORIZONTAL CONFIGURATION
44-1/8 [1121]
E ALT. CONDENSATE DRAIN OPENING IN BASEPAN
17-3/4 [451] SUPPLY AIR
26-5/8 [675]
29-1/2 [748]
SUPPLY AIR HORIZONTAL CONFIGURATION
14-1/2 [369]
12-1/2 [318]
11-1/2 [293]
SEE THRU THE BASE CHART
10-1/8 [256]
2X 23-3/4 [603]
2X 25 [635]
3-1/4 [81]
12-1/8 [307]
18-3/8 [466]
6-1/4 [158]
TOP
K
2X 4-5/8 [118]
ELECTRICAL DISCONNECT LOCATION
CONDENSER COIL
OPTIONAL FACTORY INSTALLED CONVENIENCE OUTLET
A,B,G
D
3-3/4 [95]
19-1/2 [494]
6-5/8 [168]
46-5/8 [1186]
LEFT
OPTIONAL FACTORY INSTALLED DISCONNECT
CONTROL BOX ACCESS PANEL
INDOOR BLOWER ACCESS
J
HANDLE
HANDLE
74-3/8 [1889]
FRONT
E STD. CONDENSATE DRAIN
10-7/8 [275]
1 [25]
17-3/8 [441] SUPPLY AIR
25-3/4 [653] RETURN AIR
OPTIONAL ECONOMIZER HOOD
OUTSIDE AIR
11-7/8 [302]
21-1/4 [539]
FILTER
5-3/4 [146]
6-3/8 [161]
7 [177]
5-3/4 [146]
26-7/8 [682]
31 [786]
BAROMETRIC RELIEF FLOW
SUPPLY AIR VERTICAL CONFIGURATION
RETURN AIR VERTICAL CONFIGURATION
RIGHT
ITC CLASSIFICATION: U.S. ECCN:NSR
SHEET: 1 OF 3
DATE: 08/15/19
SUPERCEDES: -
50FCQ 04-07 SINGLE PACKAGE HEAT PUMP
48TC003348
REV: -

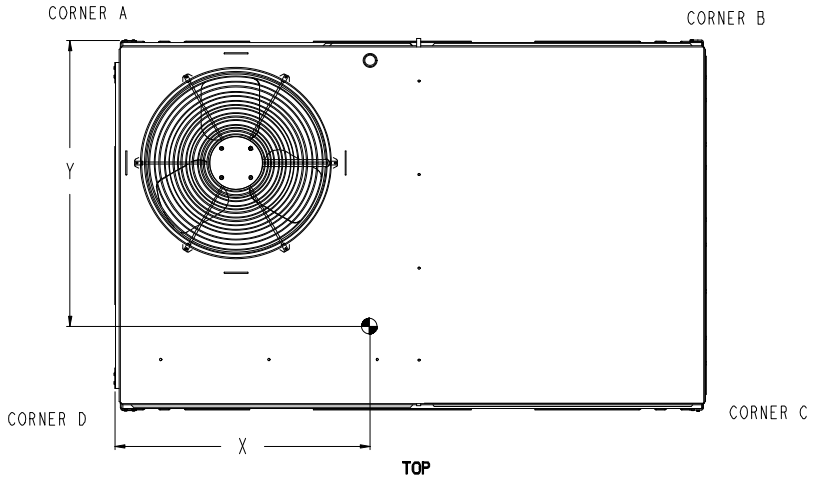
UNIT	STD. UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ*04	467	212	126	57	118	53	108	49	115	52	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*05	473	215	127	58	119	54	110	50	117	53	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*06	584	265	160	72	145	66	133	60	146	66	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]
50FCQ*07	589	267	161	73	146	66	134	61	147	67	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]

* STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.

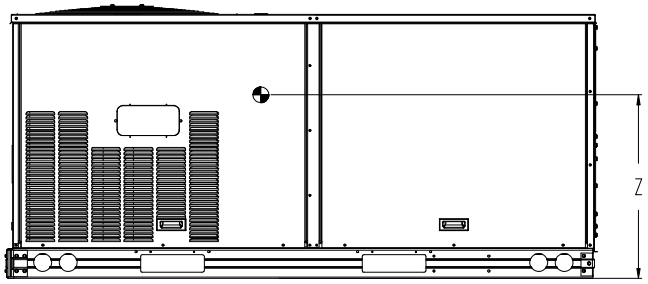
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United Technologies

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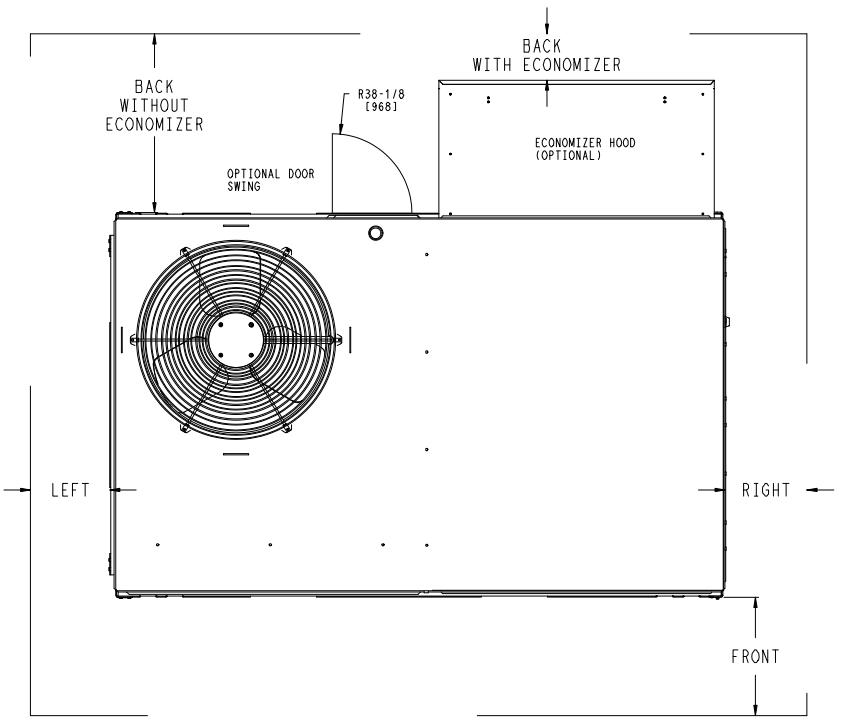
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TOP



FRONT



NOTE:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

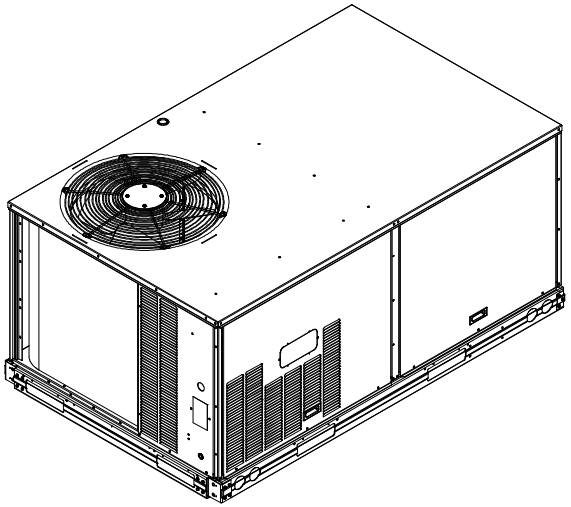
CLEARANCE			
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/ECON	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

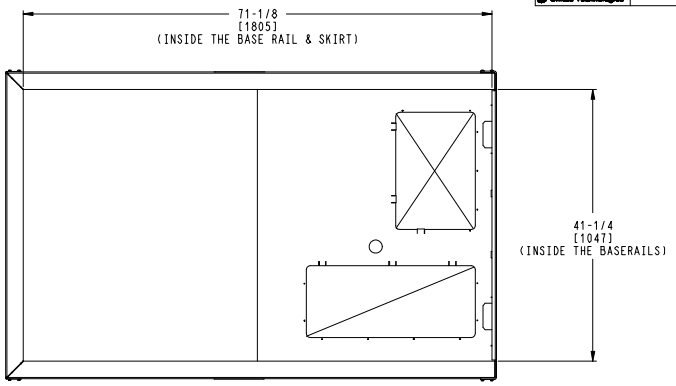
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

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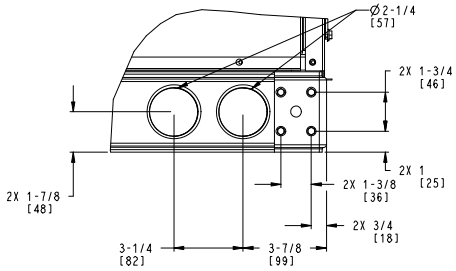
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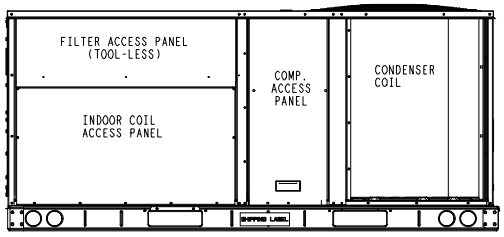


INSIDE BASERAIL DIMENSIONS

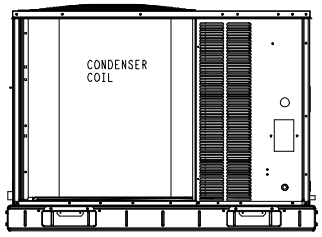
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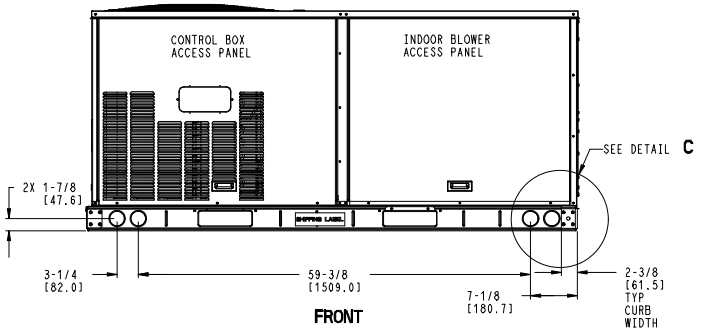
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

Part Number:50FCQA04A2M6-3A0A0

ARI SEER:	**14.30**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**33.4**	in

Operating Weight

Base Unit Weight:	**467**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**13**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**482**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**1200**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**58.4**	F
Evaporator Leaving Air WB:	**57.3**	F
Evaporator Leaving Air Enthalpy:	**24.59**	BTU/lb
Gross Cooling Capacity:	**36.98**	MBH
Gross Sensible Capacity:	**27.93**	MBH
Compressor Power Input:	**2.41**	kW
Coil Bypass Factor:	**0.101**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.3**	F
Total Heating Capacity:	**34.10**	MBH
Integrated Heating Capacity:	**34.10**	MBH
Heating Power Input:	**2.46**	kW
High Temperature COP:	**3.70**	
Low Temperature COP:	**2.25**	
HSPF:	**8.2**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**1946**	
Fan Power:	**0.54**	BHP
NOTE:	**Selected IFM RPM Range: 219 - 2190**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**	
Compressor #1 RLA:	**5.8**	
Compressor #1 LRA:	**38**	
Indoor Fan Motor Type:	**MED**	
Indoor Fan Motor Eff.:	**Null**	

Indoor Fan Motor FLA (Total): **1.2**
Power Supply MCA: **10**
Power Supply MOCP (Fuse or HACR): **15**
Disconnect Size FLA: **9**
Disconnect Size LRA: **42**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

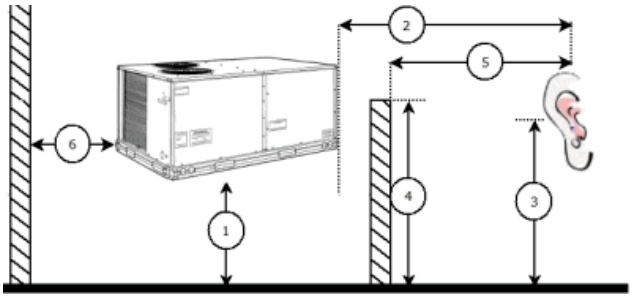
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	92.4	86.1	81.8
125 Hz	83.6	79.2	81.8
250 Hz	76.5	70.0	77.0
500 Hz	69.1	62.8	72.6
1000 Hz	66.5	64.1	69.9
2000 Hz	63.5	55.8	64.6
4000 Hz	59.4	50.0	59.3
8000 Hz	57.1	43.3	55.6
A-Weighted	74.6	69.3	75.4

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	81.8	81.8	77.0	72.6	69.9	64.6	59.3	55.6	85.9 Lw
B	55.6	65.7	68.4	69.4	69.9	65.8	60.3	54.5	75.4 LwA
C	49.4	49.4	44.6	40.2	37.5	32.2	26.9	23.2	53.5 Lp
D	23.2	33.3	36.0	37.0	37.5	33.4	27.9	22.1	43.0 LpA

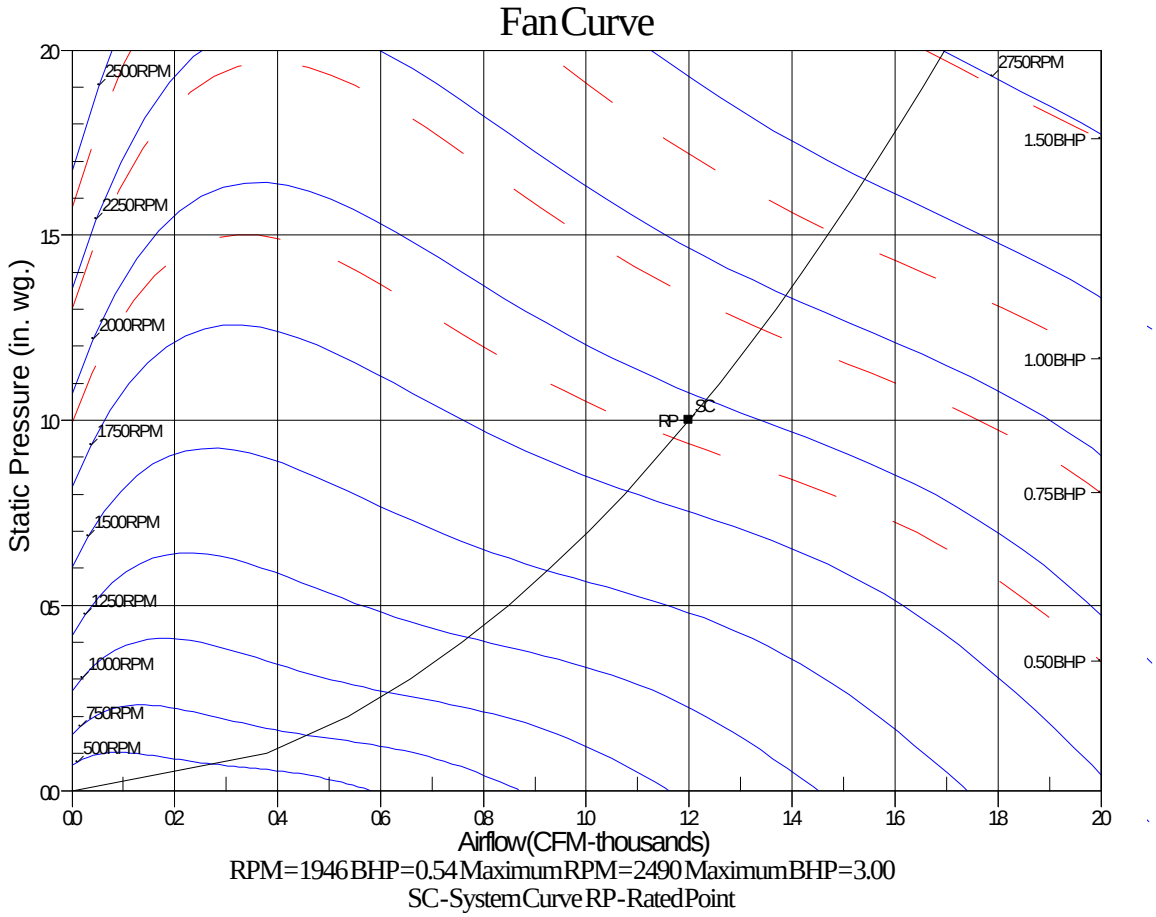
Legend

Performance Summary For Bldg G - G2,G3

Project: Lynwood Unified Mark Twain ES 10/31/2023
Prepared By: 10:13AM

A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



RPM=1946 BHP=0.54 Maximum RPM=2490 Maximum BHP=3.00
SC-System Curve RP-Rated Point

Bldg G - G1

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Bldg G - G1

Project: Lynwood Unified Mark Twain ES 10/31/2023
Prepared By: 10:13AM

Unit Parameters

Unit Model: **50FCQA05A2M6-3A0A0**
Unit Size: **05 (4 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Single Stage Compressor Models**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **2' 9.375"**
Total Operating Weight: **488** lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **2**
Return Air Filter Size: **16 x 25 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

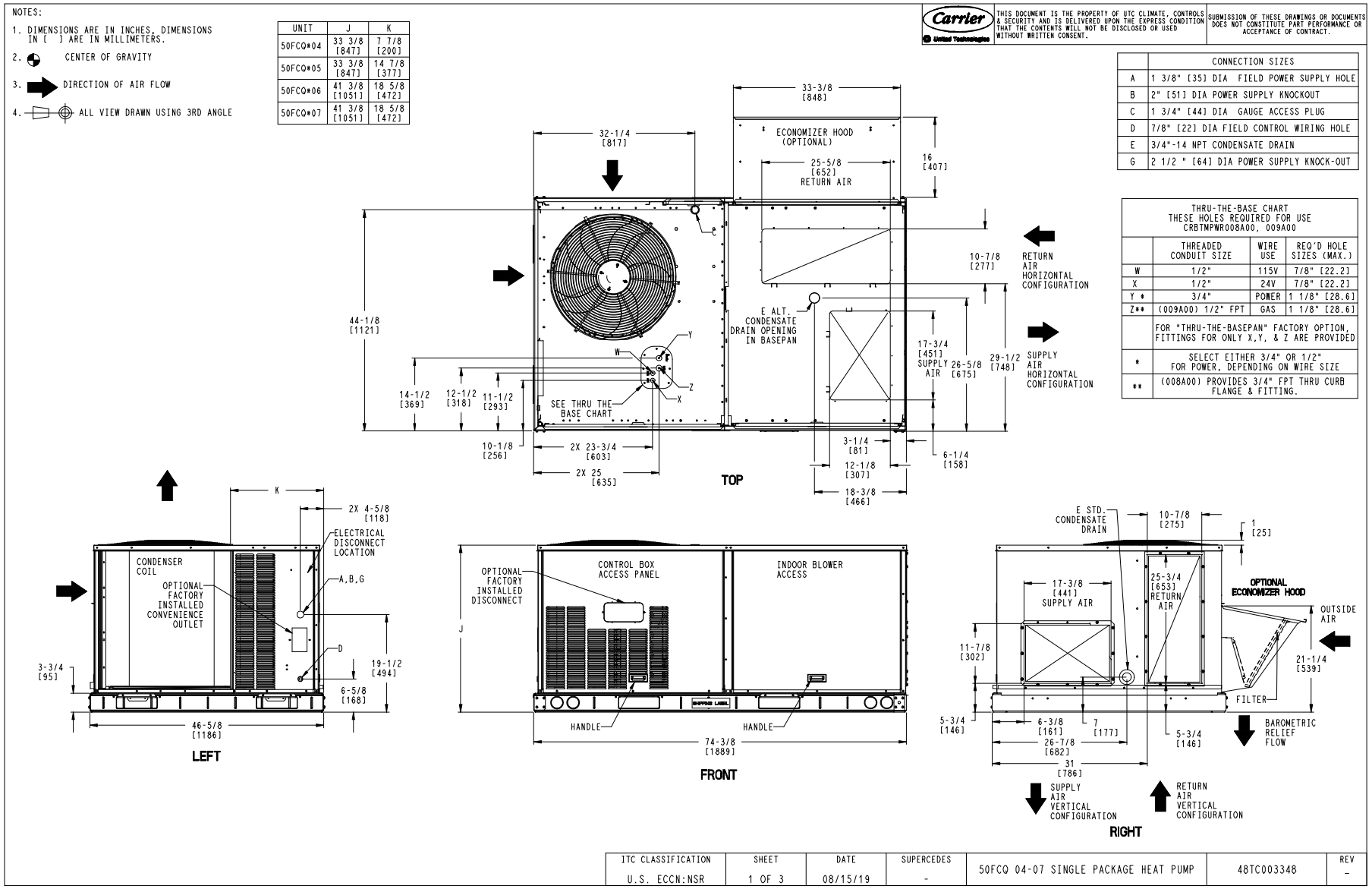
5-Year compressor parts (STD.)
1-Year parts (STD.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
50FCQA05A2M6-3A0A0	Rooftop Unit	1


NOTES:
1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE
UNIT | J | K
50FCQ*04 | 33 3/8 [847] | 7 7/8 [200]
50FCQ*05 | 33 3/8 [847] | 14 7/8 [377]
50FCQ*06 | 41 3/8 [1051] | 18 5/8 [472]
50FCQ*07 | 41 3/8 [1051] | 18 5/8 [472]
Carrier
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CONNECTION SIZES
A | 1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B | 2" [51] DIA POWER SUPPLY KNOCKOUT
C | 1 3/4" [44] DIA GAUGE ACCESS PLUG
D | 7/8" [22] DIA FIELD CONTROL WIRING HOLE
E | 3/4"-14 NPT CONDENSATE DRAIN
G | 2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT
THRU-THE-BASE CHART
THESE HOLES REQUIRED FOR USE CRBTMPWR008A00, 009A00
THREADED CONDUIT SIZE | WIRE USE | REQ'D HOLE SIZES (MAX.)
W | 1/2" | 115V | 7/8" [22.2]
X | 1/2" | 24V | 7/8" [22.2]
Y * | 3/4" | POWER | 1 1/8" [28.6]
Z** | (009A00) 1/2" FPT | GAS | 1 1/8" [28.6]
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X,Y, & Z ARE PROVIDED
* SELECT EITHER 3/4" OR 1/2" FOR POWER, DEPENDING ON WIRE SIZE
** (008A00) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.
33-3/8 [848]
32-1/4 [817]
ECONOMIZER HOOD (OPTIONAL)
25-5/8 [652] RETURN AIR
16 [407]
44-1/8 [1121]
14-1/2 [369]
12-1/2 [318]
11-1/2 [293]
SEE THRU THE BASE CHART
10-1/8 [256]
2X 23-3/4 [603]
2X 25 [635]
E ALT. CONDENSATE DRAIN OPENING IN BASEPAN
10-7/8 [277]
RETURN AIR HORIZONTAL CONFIGURATION
17-3/4 [451] SUPPLY AIR
26-5/8 [675]
29-1/2 [748]
SUPPLY AIR HORIZONTAL CONFIGURATION
3-1/4 [81]
12-1/8 [307]
18-3/8 [466]
6-1/4 [158]
TOP
K
2X 4-5/8 [118]
ELECTRICAL DISCONNECT LOCATION
CONDENSER COIL
OPTIONAL FACTORY INSTALLED CONVENIENCE OUTLET
A,B,G
D
3-3/4 [95]
19-1/2 [494]
6-5/8 [168]
46-5/8 [1186]
LEFT
OPTIONAL FACTORY INSTALLED DISCONNECT
CONTROL BOX ACCESS PANEL
INDOOR BLOWER ACCESS
J
HANDLE
HANDLE
74-3/8 [1889]
FRONT
E STD. CONDENSATE DRAIN
10-7/8 [275]
1 [25]
17-3/8 [441] SUPPLY AIR
25-3/4 [653] RETURN AIR
OPTIONAL ECONOMIZER HOOD
OUTSIDE AIR
11-7/8 [302]
21-1/4 [539]
FILTER
5-3/4 [146]
6-3/8 [161]
7 [177]
26-7/8 [682]
31 [786]
5-3/4 [146]
BAROMETRIC RELIEF FLOW
SUPPLY AIR VERTICAL CONFIGURATION
RETURN AIR VERTICAL CONFIGURATION
RIGHT
ITC CLASSIFICATION: U.S. ECCN:NSR
SHEET: 1 OF 3
DATE: 08/15/19
SUPERCEDES: -
50FCQ 04-07 SINGLE PACKAGE HEAT PUMP
48TC003348
REV: -

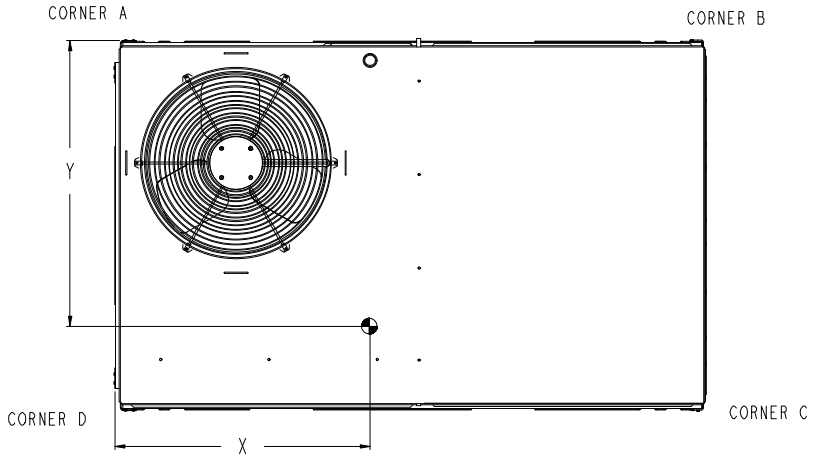
UNIT	STD. UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ*04	467	212	126	57	118	53	108	49	115	52	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*05	473	215	127	58	119	54	110	50	117	53	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*06	584	265	160	72	145	66	133	60	146	66	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]
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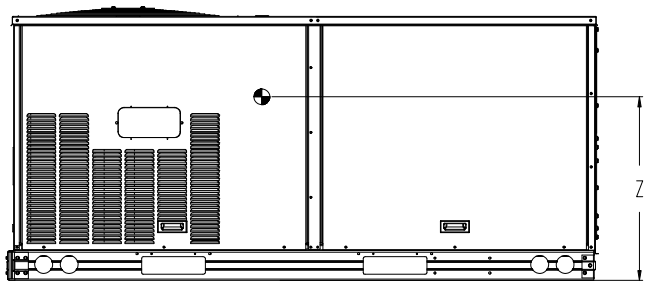
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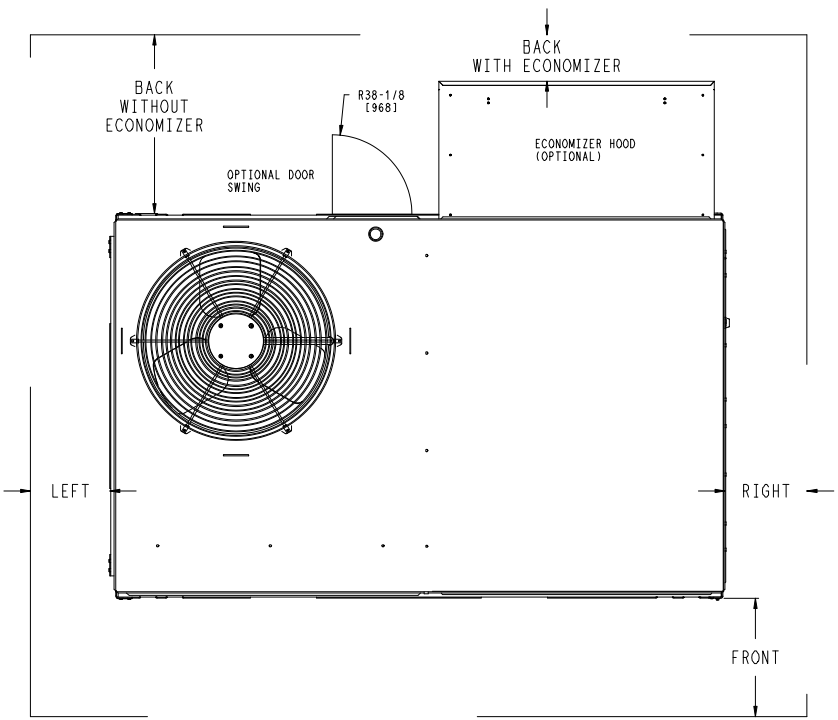
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TOP



FRONT



NOTE:

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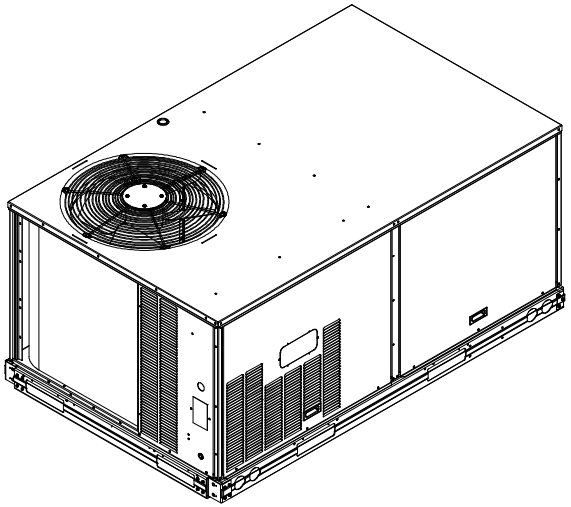
CLEARANCE			
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]	18 [457mm]
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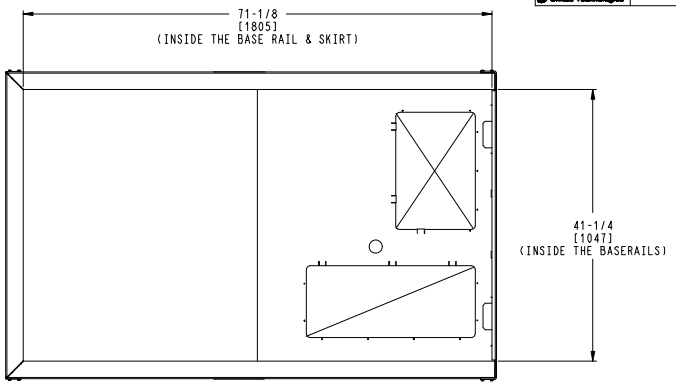
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

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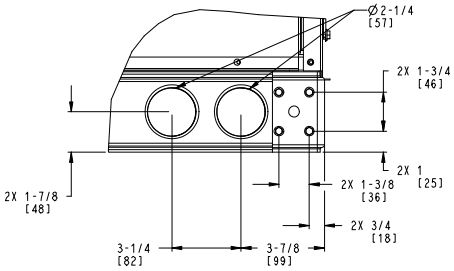
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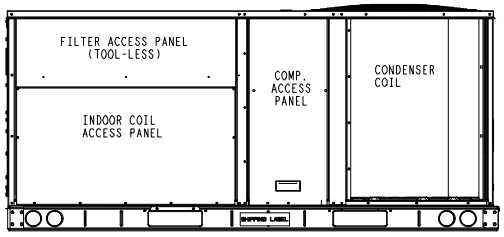


INSIDE BASERAIL DIMENSIONS

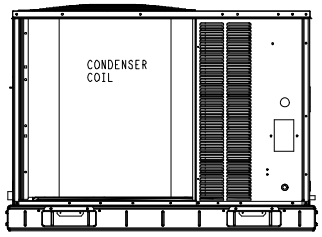
BOTTOM



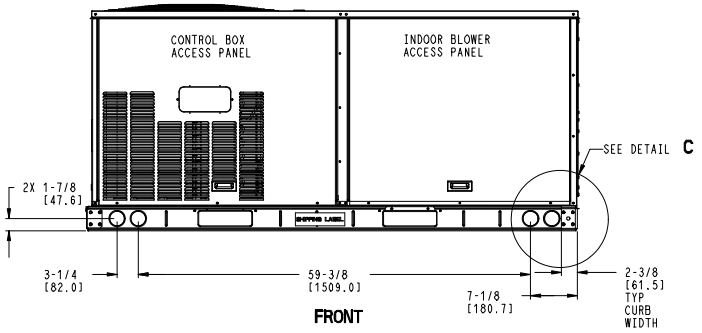
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

Part Number:50FCQA05A2M6-3A0A0

ARI SEER:	**14.30**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**33.4**	in

Operating Weight

Base Unit Weight:	**473**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**13**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**488**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**1600**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**58.1**	F
Evaporator Leaving Air WB:	**57.2**	F
Evaporator Leaving Air Enthalpy:	**24.50**	BTU/lb
Gross Cooling Capacity:	**49.92**	MBH
Gross Sensible Capacity:	**37.82**	MBH
Compressor Power Input:	**3.53**	kW
Coil Bypass Factor:	**0.109**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.7**	F
Total Heating Capacity:	**46.10**	MBH
Integrated Heating Capacity:	**46.10**	MBH
Heating Power Input:	**3.08**	kW
High Temperature COP:	**3.70**	
Low Temperature COP:	**2.28**	
HSPF:	**8.2**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**1958**	
Fan Power:	**0.81**	BHP
NOTE:	**Selected IFM RPM Range: 217 - 2170**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**
Compressor #1 RLA:	**6.2**
Compressor #1 LRA:	**41**
Indoor Fan Motor Type:	**MED**
Indoor Fan Motor Eff.:	**Null**

Indoor Fan Motor FLA (Total): **1.7**
Power Supply MCA: **11**
Power Supply MOCP (Fuse or HACR): **15**
Disconnect Size FLA: **10**
Disconnect Size LRA: **45**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

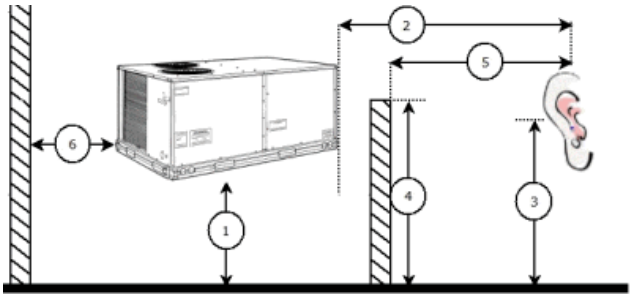
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	93.7	91.1	85.6
125 Hz	84.7	79.8	84.7
250 Hz	78.5	72.9	80.5
500 Hz	73.0	66.0	76.0
1000 Hz	69.8	67.8	72.4
2000 Hz	66.5	58.7	68.0
4000 Hz	63.5	52.9	62.8
8000 Hz	60.1	46.2	59.3
A-Weighted	77.1	72.4	79.0

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	85.6	84.7	80.5	76.0	72.4	68.0	62.8	59.3	89.2 Lw
B	59.4	68.6	71.9	72.8	72.4	69.2	63.8	58.2	78.5 LwA
C	53.2	52.3	48.1	43.6	40.0	35.6	30.4	26.9	56.8 Lp
D	27.0	36.2	39.5	40.4	40.0	36.8	31.4	25.8	46.1 LpA

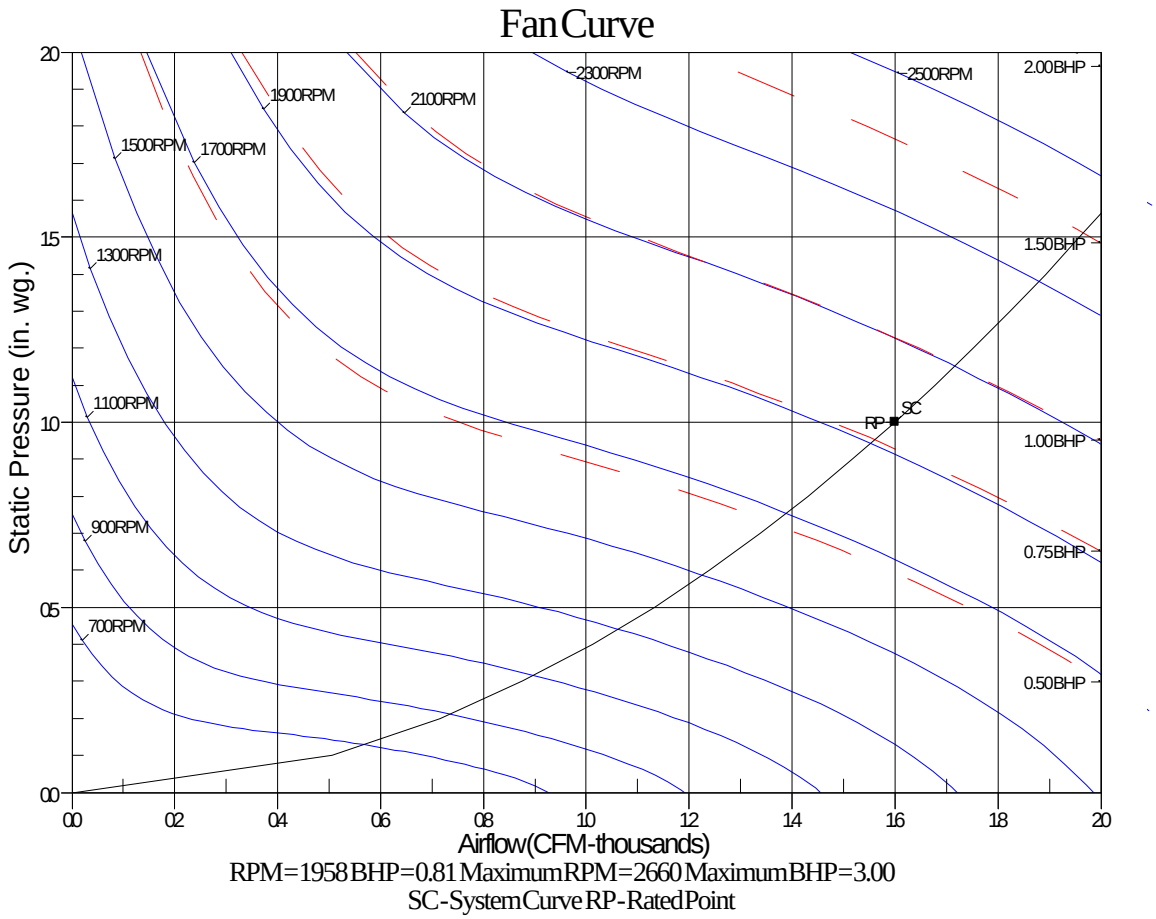
Legend

Performance Summary For Bldg G - G1

Project: Lynwood Unified Mark Twain ES 10/31/2023
Prepared By: 10:13AM

A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



RPM=1958 BHP=0.81 Maximum RPM=2660 Maximum BHP=3.00
SC-System Curve RP-Rated Point

Bldg J - J2,J4,J5

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Bldg J - J2,J4,J5

Project: Lynwood Unified Mark Twain ES 10/31/2023
Prepared By: 10:13AM

Unit Parameters

Unit Model: **50FCQA04A2M6-3A0A0**
Unit Size: **04 (3 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Single Stage Compressor Models**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **2' 9.375"**
Total Operating Weight: 482 lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **2**
Return Air Filter Size: **16 x 25 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

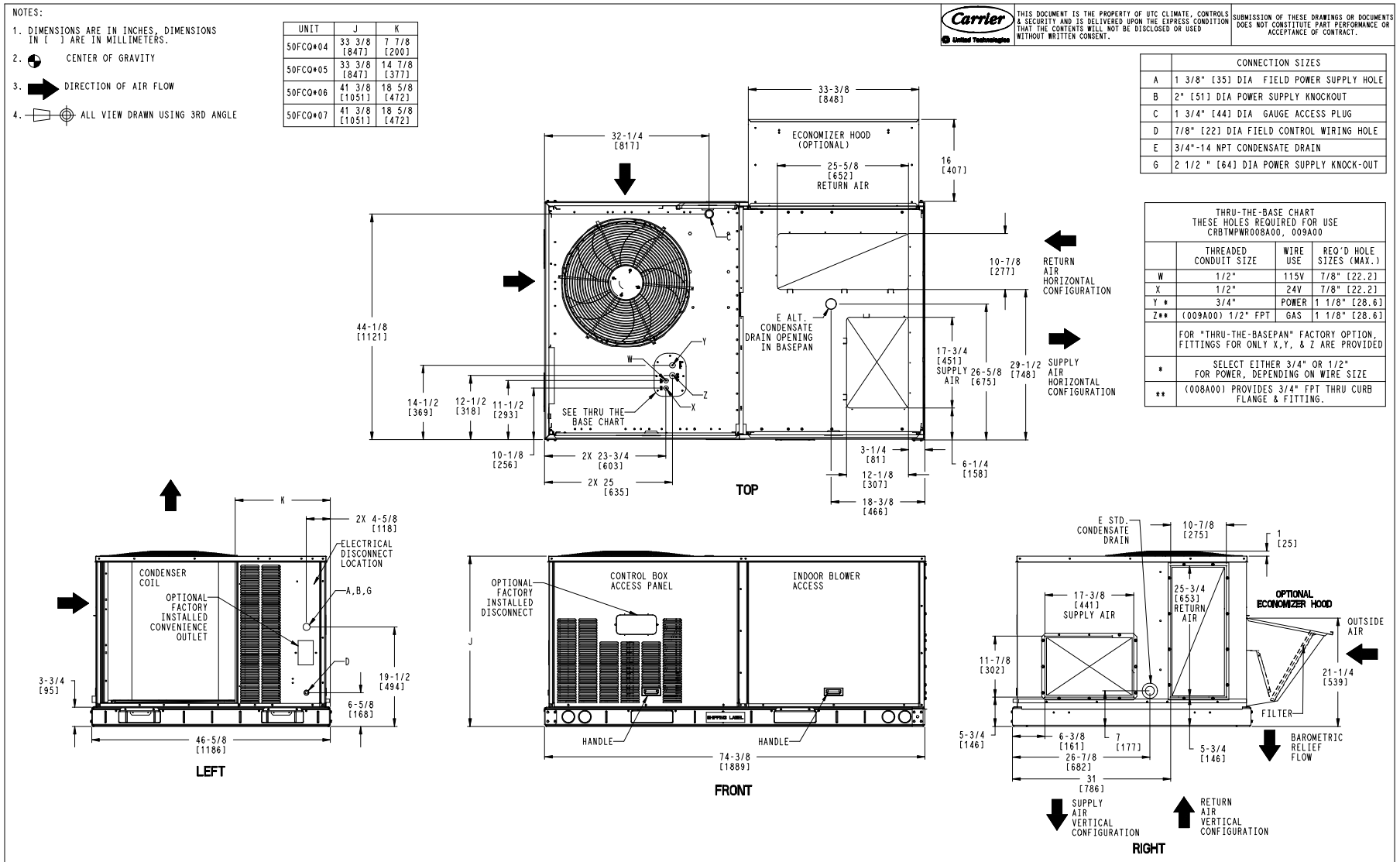
5-Year compressor parts (STD.)
1-Year parts (STD.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
50FCQA04A2M6-3A0A0	Rooftop Unit	3


NOTES:
1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE
UNIT J K
50FCQ*04 33 3/8 [847] 7 7/8 [200]
50FCQ*05 33 3/8 [847] 14 7/8 [377]
50FCQ*06 41 3/8 [1051] 18 5/8 [472]
50FCQ*07 41 3/8 [1051] 18 5/8 [472]
Carrier
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SUBMISSION OF THESE DRAWINGS OR DOCUMENTS DOES NOT CONSTITUTE PART PERFORMANCE OR ACCEPTANCE OF CONTRACT.
CONNECTION SIZES
A 1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B 2" [51] DIA POWER SUPPLY KNOCKOUT
C 1 3/4" [44] DIA GAUGE ACCESS PLUG
D 7/8" [22] DIA FIELD CONTROL WIRING HOLE
E 3/4"-14 NPT CONDENSATE DRAIN
G 2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT
THRU-THE-BASE CHART
THESE HOLES REQUIRED FOR USE CRBTMPWR008A00, 009A00
THREADED CONDUIT SIZE / WIRE USE / REQ'D HOLE SIZES (MAX.)
W 1/2" 115V 7/8" [22.2]
X 1/2" 24V 7/8" [22.2]
Y * 3/4" POWER 1 1/8" [28.6]
Z** (009A00) 1/2" FPT GAS 1 1/8" [28.6]
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X,Y, & Z ARE PROVIDED
* SELECT EITHER 3/4" OR 1/2" FOR POWER, DEPENDING ON WIRE SIZE
** (008A00) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.
33-3/8 [848]
ECONOMIZER HOOD (OPTIONAL)
32-1/4 [817]
25-5/8 [652] RETURN AIR
16 [407]
10-7/8 [277]
RETURN AIR HORIZONTAL CONFIGURATION
44-1/8 [1121]
E ALT. CONDENSATE DRAIN OPENING IN BASEPAN
17-3/4 [451] SUPPLY AIR
26-5/8 [675]
29-1/2 [748]
SUPPLY AIR HORIZONTAL CONFIGURATION
14-1/2 [369]
12-1/2 [318]
11-1/2 [293]
SEE THRU THE BASE CHART
10-1/8 [256]
2X 23-3/4 [603]
2X 25 [635]
3-1/4 [81]
12-1/8 [307]
18-3/8 [466]
6-1/4 [158]
TOP
K
2X 4-5/8 [118]
ELECTRICAL DISCONNECT LOCATION
CONDENSER COIL
OPTIONAL FACTORY INSTALLED CONVENIENCE OUTLET
A,B,G
D
3-3/4 [95]
19-1/2 [494]
6-5/8 [168]
46-5/8 [1186]
LEFT
OPTIONAL FACTORY INSTALLED DISCONNECT
CONTROL BOX ACCESS PANEL
INDOOR BLOWER ACCESS
J
HANDLE
HANDLE
74-3/8 [1889]
FRONT
E STD. CONDENSATE DRAIN
10-7/8 [275]
1 [25]
17-3/8 [441] SUPPLY AIR
25-3/4 [653] RETURN AIR
OPTIONAL ECONOMIZER HOOD
OUTSIDE AIR
11-7/8 [302]
21-1/4 [539]
FILTER
5-3/4 [146]
6-3/8 [161]
7 [177]
26-7/8 [682]
31 [786]
5-3/4 [146]
BAROMETRIC RELIEF FLOW
SUPPLY AIR VERTICAL CONFIGURATION
RETURN AIR VERTICAL CONFIGURATION
RIGHT
ITC CLASSIFICATION U.S. ECCN:NSR
SHEET 1 OF 3
DATE 08/15/19
SUPERCEDES -
50FCQ 04-07 SINGLE PACKAGE HEAT PUMP
48TC003348
REV -

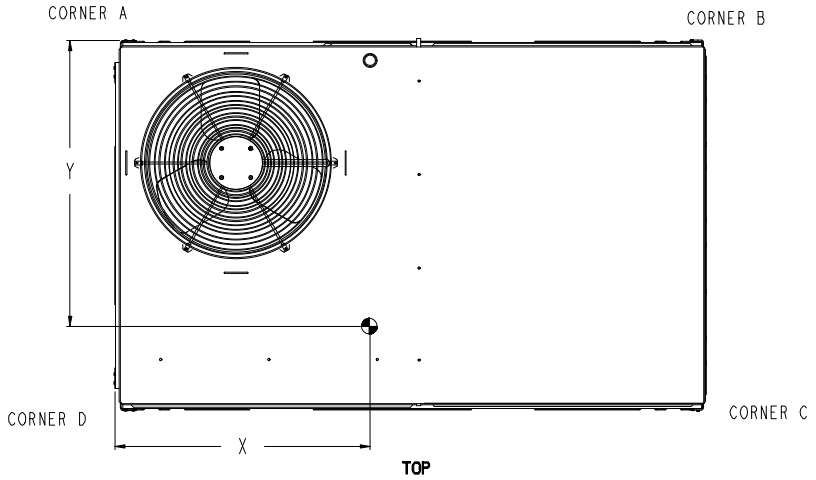
UNIT	STD. UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ*04	467	212	126	57	118	53	108	49	115	52	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*05	473	215	127	58	119	54	110	50	117	53	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*06	584	265	160	72	145	66	133	60	146	66	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]
50FCQ*07	589	267	161	73	146	66	134	61	147	67	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]

* STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.

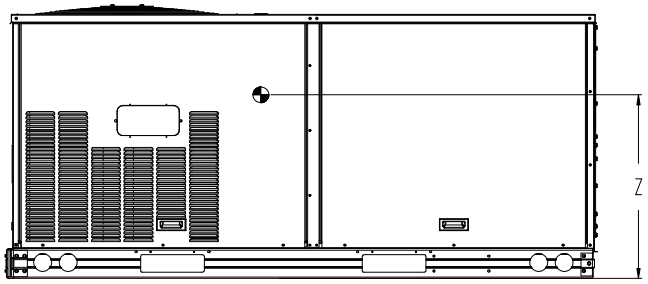
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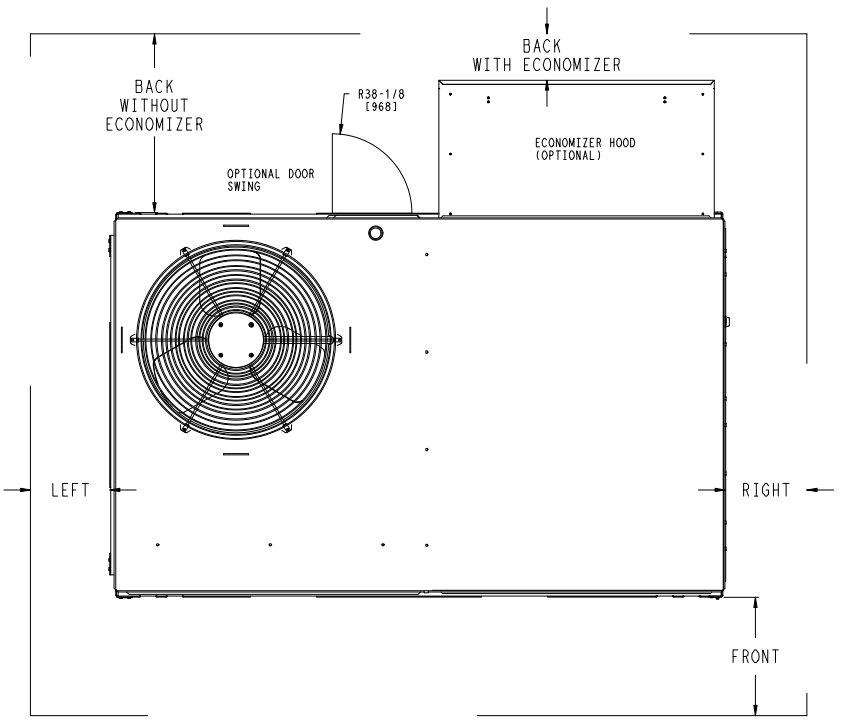
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TOP



FRONT



NOTE:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

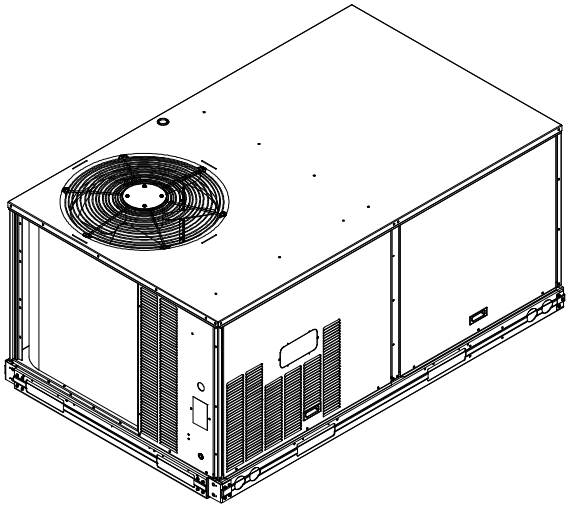
CLEARANCE			
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/ECON	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

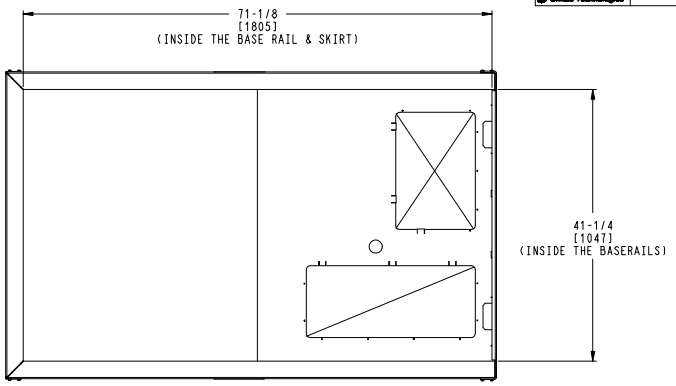
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

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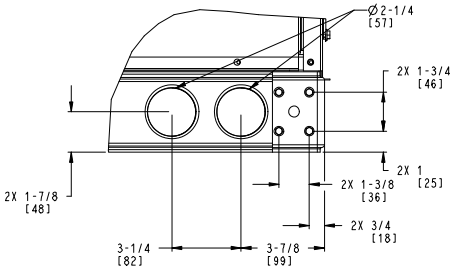
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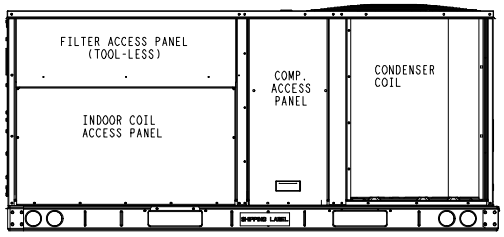


INSIDE BASERAIL DIMENSIONS

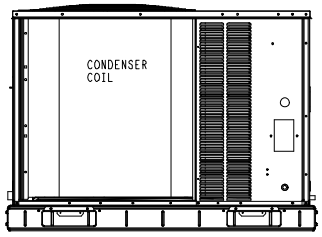
BOTTOM



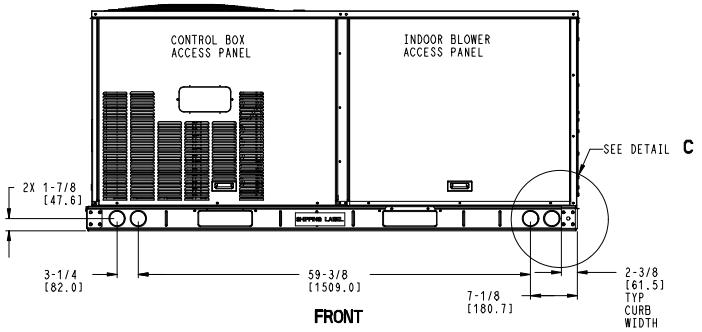
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

Part Number:50FCQA04A2M6-3A0A0

ARI SEER:	**14.30**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**33.4**	in

Operating Weight

Base Unit Weight:	**467**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**13**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**482**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**1200**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**58.4**	F
Evaporator Leaving Air WB:	**57.3**	F
Evaporator Leaving Air Enthalpy:	**24.59**	BTU/lb
Gross Cooling Capacity:	**36.98**	MBH
Gross Sensible Capacity:	**27.93**	MBH
Compressor Power Input:	**2.41**	kW
Coil Bypass Factor:	**0.101**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.3**	F
Total Heating Capacity:	**34.10**	MBH
Integrated Heating Capacity:	**34.10**	MBH
Heating Power Input:	**2.46**	kW
High Temperature COP:	**3.70**	
Low Temperature COP:	**2.25**	
HSPF:	**8.2**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**1946**	
Fan Power:	**0.54**	BHP
NOTE:	**Selected IFM RPM Range: 219 - 2190**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**	
Compressor #1 RLA:	**5.8**	
Compressor #1 LRA:	**38**	
Indoor Fan Motor Type:	**MED**	
Indoor Fan Motor Eff.:	**Null**	

Indoor Fan Motor FLA (Total): **1.2**
Power Supply MCA: **10**
Power Supply MOCP (Fuse or HACR): **15**
Disconnect Size FLA: **9**
Disconnect Size LRA: **42**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

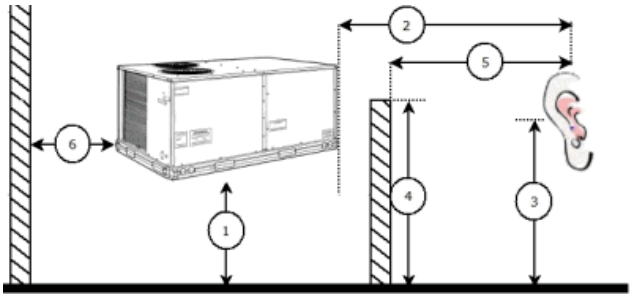
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	92.4	86.1	81.8
125 Hz	83.6	79.2	81.8
250 Hz	76.5	70.0	77.0
500 Hz	69.1	62.8	72.6
1000 Hz	66.5	64.1	69.9
2000 Hz	63.5	55.8	64.6
4000 Hz	59.4	50.0	59.3
8000 Hz	57.1	43.3	55.6
A-Weighted	74.6	69.3	75.4

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	81.8	81.8	77.0	72.6	69.9	64.6	59.3	55.6	85.9 Lw
B	55.6	65.7	68.4	69.4	69.9	65.8	60.3	54.5	75.4 LwA
C	49.4	49.4	44.6	40.2	37.5	32.2	26.9	23.2	53.5 Lp
D	23.2	33.3	36.0	37.0	37.5	33.4	27.9	22.1	43.0 LpA

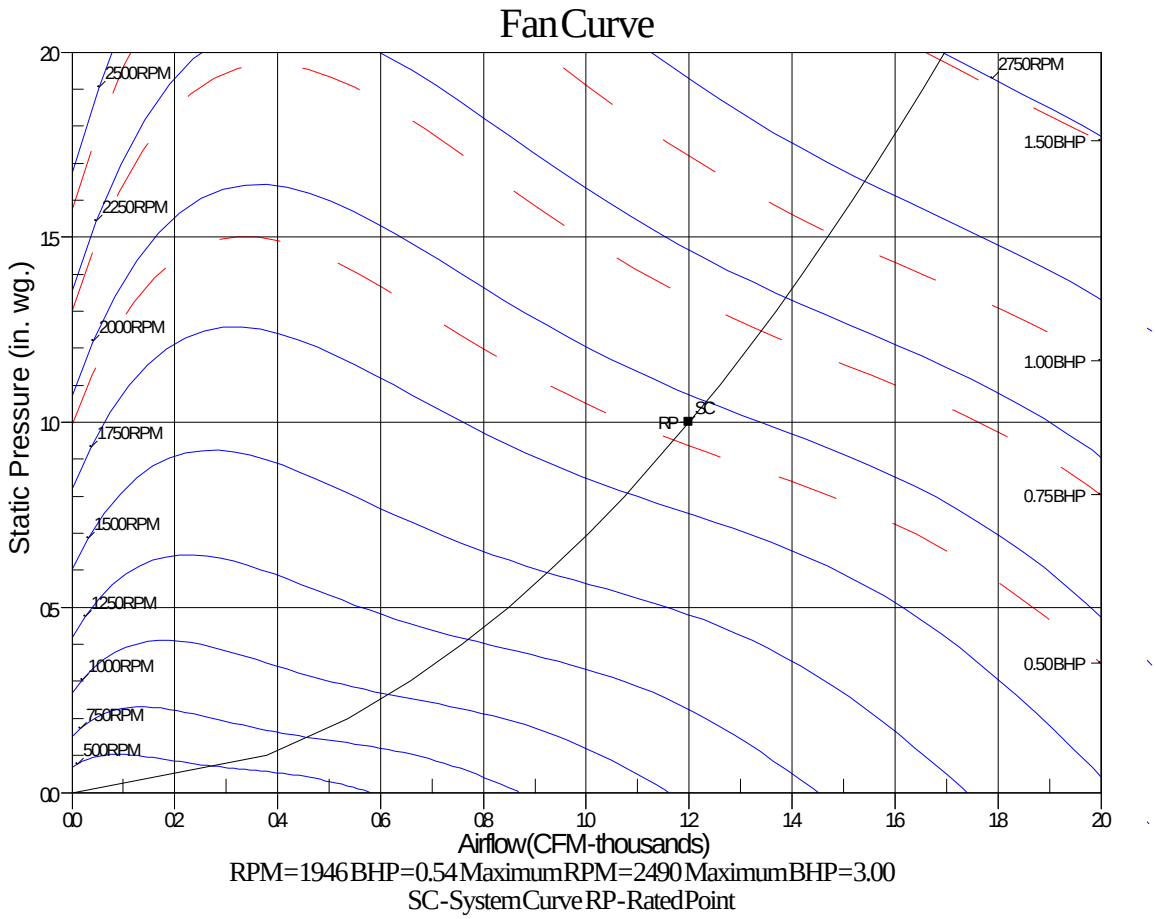
Legend

Performance Summary For Bldg J - J2,J4,J5

Project: Lynwood Unified Mark Twain ES 10/31/2023
Prepared By: 10:13AM

A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



RPM=1946 BHP=0.54 Maximum RPM=2490 Maximum BHP=3.00
SC-System Curve RP-Rated Point

Bldg J - J1,J3

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Bldg J - J1,J3

Project: Lynwood Unified Mark Twain ES 10/31/2023
Prepared By: 10:13AM

Unit Parameters

Unit Model: **50FCQA05A2M6-3A0A0**
Unit Size: **05 (4 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Single Stage Compressor Models**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **2' 9.375"**
Total Operating Weight: **488** lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **2**
Return Air Filter Size: **16 x 25 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

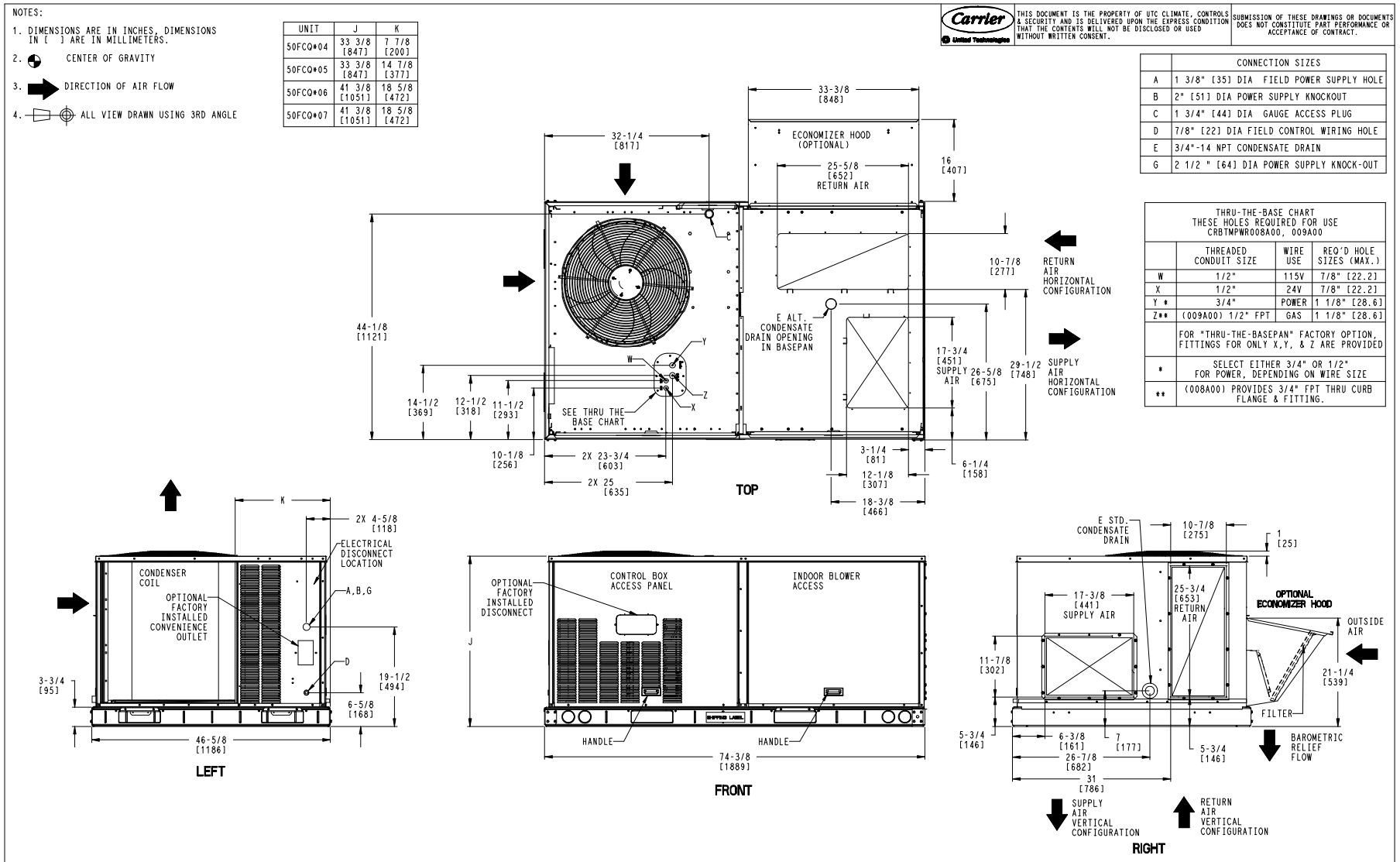
5-Year compressor parts (STD.)
1-Year parts (STD.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
50FCQA05A2M6-3A0A0	Rooftop Unit	2


NOTES:
1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE
UNIT J K
50FCQ*04 33 3/8 [847] 7 7/8 [200]
50FCQ*05 33 3/8 [847] 14 7/8 [377]
50FCQ*06 41 3/8 [1051] 18 5/8 [472]
50FCQ*07 41 3/8 [1051] 18 5/8 [472]
Carrier
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CONNECTION SIZES
A 1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B 2" [51] DIA POWER SUPPLY KNOCKOUT
C 1 3/4" [44] DIA GAUGE ACCESS PLUG
D 7/8" [22] DIA FIELD CONTROL WIRING HOLE
E 3/4"-14 NPT CONDENSATE DRAIN
G 2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT
THRU-THE-BASE CHART
THESE HOLES REQUIRED FOR USE CRBTMPWR008A00, 009A00
THREADED CONDUIT SIZE / WIRE USE / REQ'D HOLE SIZES (MAX.)
W 1/2" 115V 7/8" [22.2]
X 1/2" 24V 7/8" [22.2]
Y * 3/4" POWER 1 1/8" [28.6]
Z** (009A00) 1/2" FPT GAS 1 1/8" [28.6]
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X,Y, & Z ARE PROVIDED
* SELECT EITHER 3/4" OR 1/2" FOR POWER, DEPENDING ON WIRE SIZE
** (008A00) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.
33-3/8 [848]
ECONOMIZER HOOD (OPTIONAL)
32-1/4 [817]
25-5/8 [652] RETURN AIR
16 [407]
10-7/8 [277]
RETURN AIR HORIZONTAL CONFIGURATION
44-1/8 [1121]
E ALT. CONDENSATE DRAIN OPENING IN BASEPAN
17-3/4 [451] SUPPLY AIR
26-5/8 [675]
29-1/2 [748]
SUPPLY AIR HORIZONTAL CONFIGURATION
14-1/2 [369]
12-1/2 [318]
11-1/2 [293]
SEE THRU THE BASE CHART
10-1/8 [256]
2X 23-3/4 [603]
2X 25 [635]
3-1/4 [81]
12-1/8 [307]
18-3/8 [466]
6-1/4 [158]
TOP
K
2X 4-5/8 [118]
ELECTRICAL DISCONNECT LOCATION
CONDENSER COIL
OPTIONAL FACTORY INSTALLED CONVENIENCE OUTLET
A,B,G
D
3-3/4 [95]
19-1/2 [494]
6-5/8 [168]
46-5/8 [1186]
LEFT
OPTIONAL FACTORY INSTALLED DISCONNECT
CONTROL BOX ACCESS PANEL
INDOOR BLOWER ACCESS
J
HANDLE
HANDLE
74-3/8 [1889]
FRONT
E STD. CONDENSATE DRAIN
10-7/8 [275]
1 [25]
17-3/8 [441] SUPPLY AIR
25-3/4 [653] RETURN AIR
OPTIONAL ECONOMIZER HOOD
OUTSIDE AIR
11-7/8 [302]
21-1/4 [539]
FILTER
5-3/4 [146]
6-3/8 [161]
7 [177]
5-3/4 [146]
26-7/8 [682]
31 [786]
BAROMETRIC RELIEF FLOW
SUPPLY AIR VERTICAL CONFIGURATION
RETURN AIR VERTICAL CONFIGURATION
RIGHT
ITC CLASSIFICATION U.S. ECCN:NSR
SHEET 1 OF 3
DATE 08/15/19
SUPERCEDES -
50FCQ 04-07 SINGLE PACKAGE HEAT PUMP
48TC003348
REV -

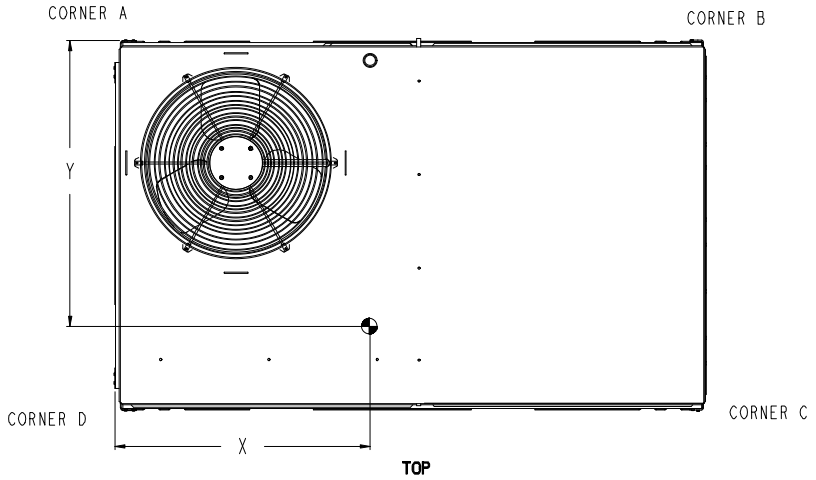
UNIT	STD. UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ*04	467	212	126	57	118	53	108	49	115	52	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*05	473	215	127	58	119	54	110	50	117	53	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*06	584	265	160	72	145	66	133	60	146	66	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]
50FCQ*07	589	267	161	73	146	66	134	61	147	67	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]

* STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.

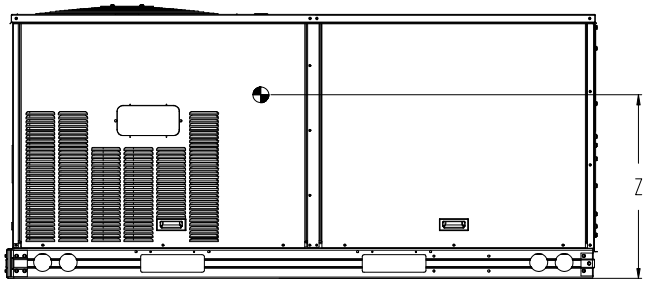
Carrier
United Technologies

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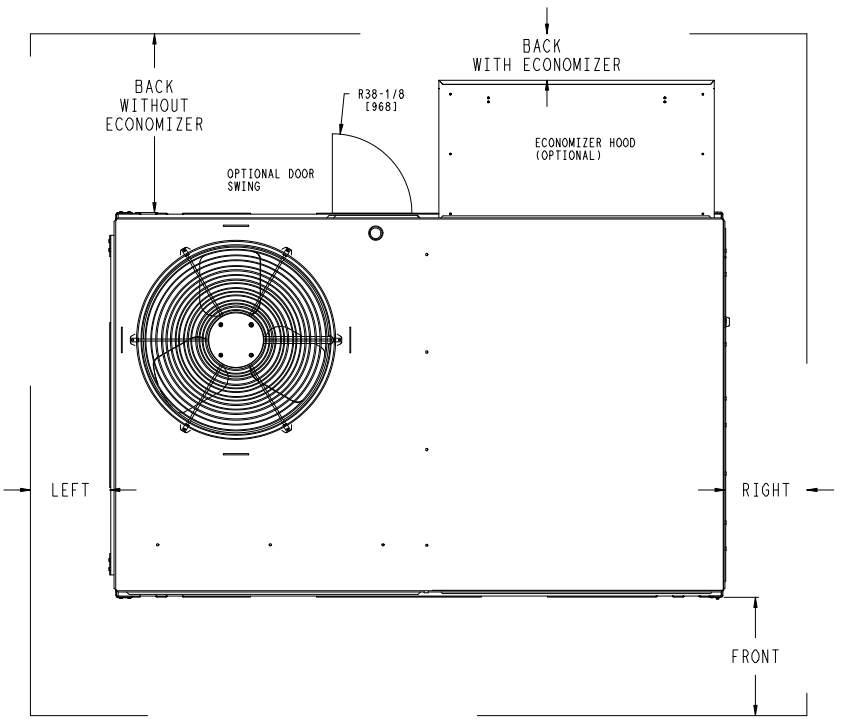
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TOP



FRONT



NOTE:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

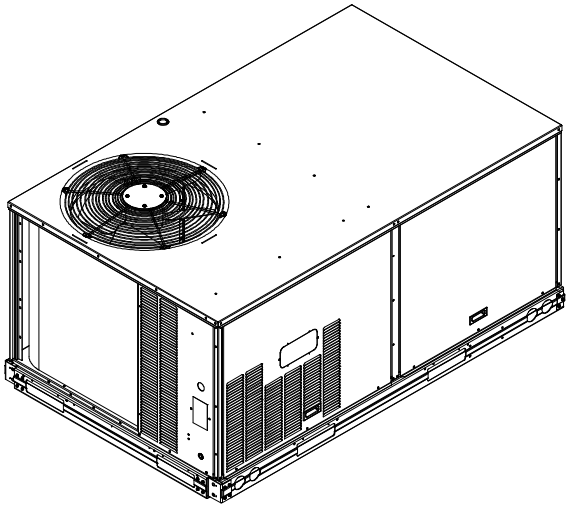
CLEARANCE			
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/ECON	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

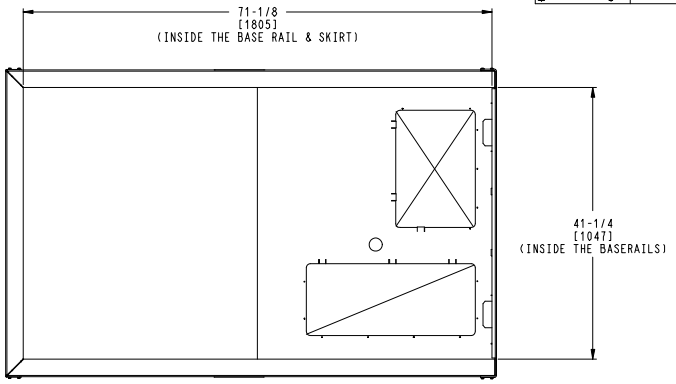
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

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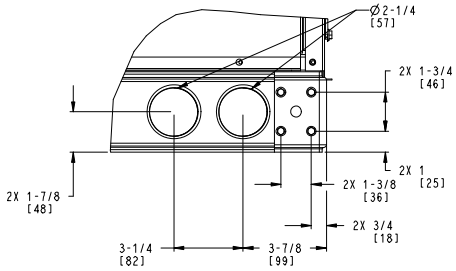
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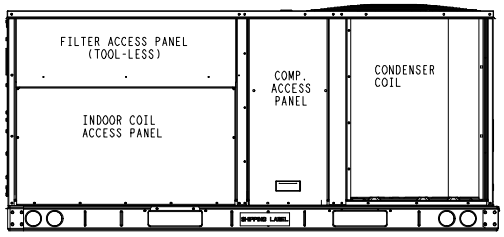


INSIDE BASERAIL DIMENSIONS

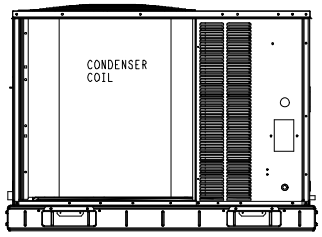
BOTTOM



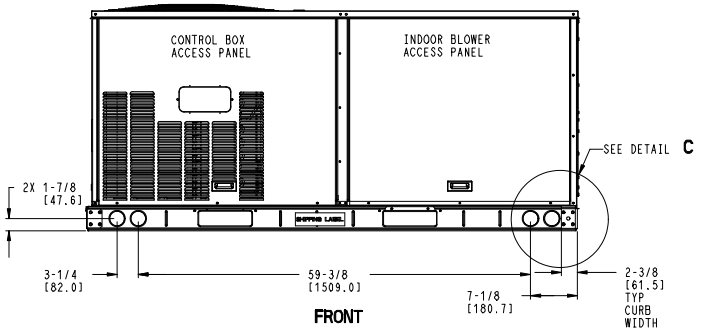
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

Part Number:50FCQA05A2M6-3A0A0

ARI SEER:	**14.30**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**33.4**	in

Operating Weight

Base Unit Weight:	**473**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**13**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**488**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**1600**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**58.1**	F
Evaporator Leaving Air WB:	**57.2**	F
Evaporator Leaving Air Enthalpy:	**24.50**	BTU/lb
Gross Cooling Capacity:	**49.92**	MBH
Gross Sensible Capacity:	**37.82**	MBH
Compressor Power Input:	**3.53**	kW
Coil Bypass Factor:	**0.109**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.7**	F
Total Heating Capacity:	**46.10**	MBH
Integrated Heating Capacity:	**46.10**	MBH
Heating Power Input:	**3.08**	kW
High Temperature COP:	**3.70**	
Low Temperature COP:	**2.28**	
HSPF:	**8.2**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**1958**	
Fan Power:	**0.81**	BHP
NOTE:	**Selected IFM RPM Range: 217 - 2170**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**	
Compressor #1 RLA:	**6.2**	
Compressor #1 LRA:	**41**	
Indoor Fan Motor Type:	**MED**	
Indoor Fan Motor Eff.:	**Null**	

Indoor Fan Motor FLA (Total): **1.7**
Power Supply MCA: **11**
Power Supply MOCP (Fuse or HACR): **15**
Disconnect Size FLA: **10**
Disconnect Size LRA: **45**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

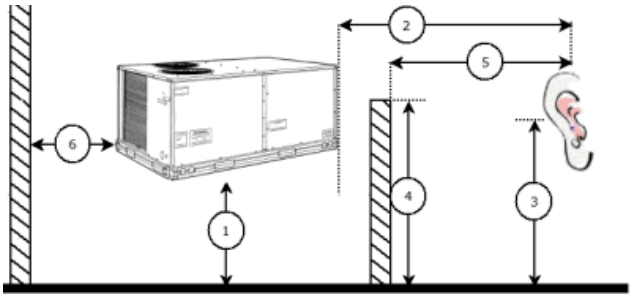
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	93.7	91.1	85.6
125 Hz	84.7	79.8	84.7
250 Hz	78.5	72.9	80.5
500 Hz	73.0	66.0	76.0
1000 Hz	69.8	67.8	72.4
2000 Hz	66.5	58.7	68.0
4000 Hz	63.5	52.9	62.8
8000 Hz	60.1	46.2	59.3
A-Weighted	77.1	72.4	79.0

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	85.6	84.7	80.5	76.0	72.4	68.0	62.8	59.3	89.2 Lw
B	59.4	68.6	71.9	72.8	72.4	69.2	63.8	58.2	78.5 LwA
C	53.2	52.3	48.1	43.6	40.0	35.6	30.4	26.9	56.8 Lp
D	27.0	36.2	39.5	40.4	40.0	36.8	31.4	25.8	46.1 LpA

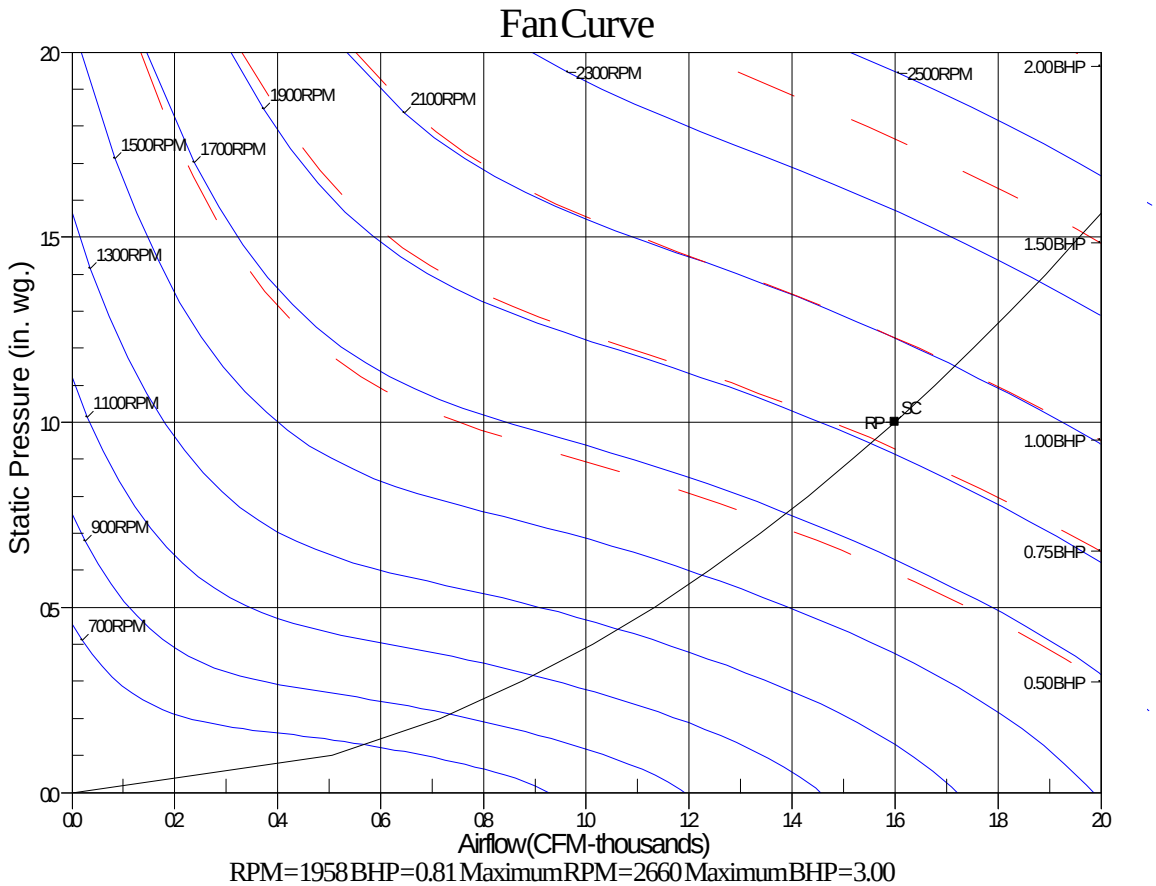
Legend

Performance Summary For Bldg J - J1,J3

Project: Lynwood Unified Mark Twain ES 10/31/2023
Prepared By: 10:13AM

A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



RPM=1958 BHP=0.81 Maximum RPM=2660 Maximum BHP=3.00
SC-System Curve RP-Rated Point

Main Office/Bldg A - M1

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For Main Office/Bldg A - M1

Project: Lynwood Unified Mark Twain ES 10/31/2023
Prepared By: 10:13AM

Unit Parameters

Unit Model: **50FCQA05A2M6-3A0A0**
Unit Size: **05 (4 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Heat Pump**
Heat Control: **Single Stage Compressor Models**
Duct Cfg: **Vertical Supply / Vertical Return**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **2' 9.375"**
Total Operating Weight: 488 lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **2**
Return Air Filter Size: **16 x 25 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

5-Year compressor parts (STD.)
1-Year parts (STD.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

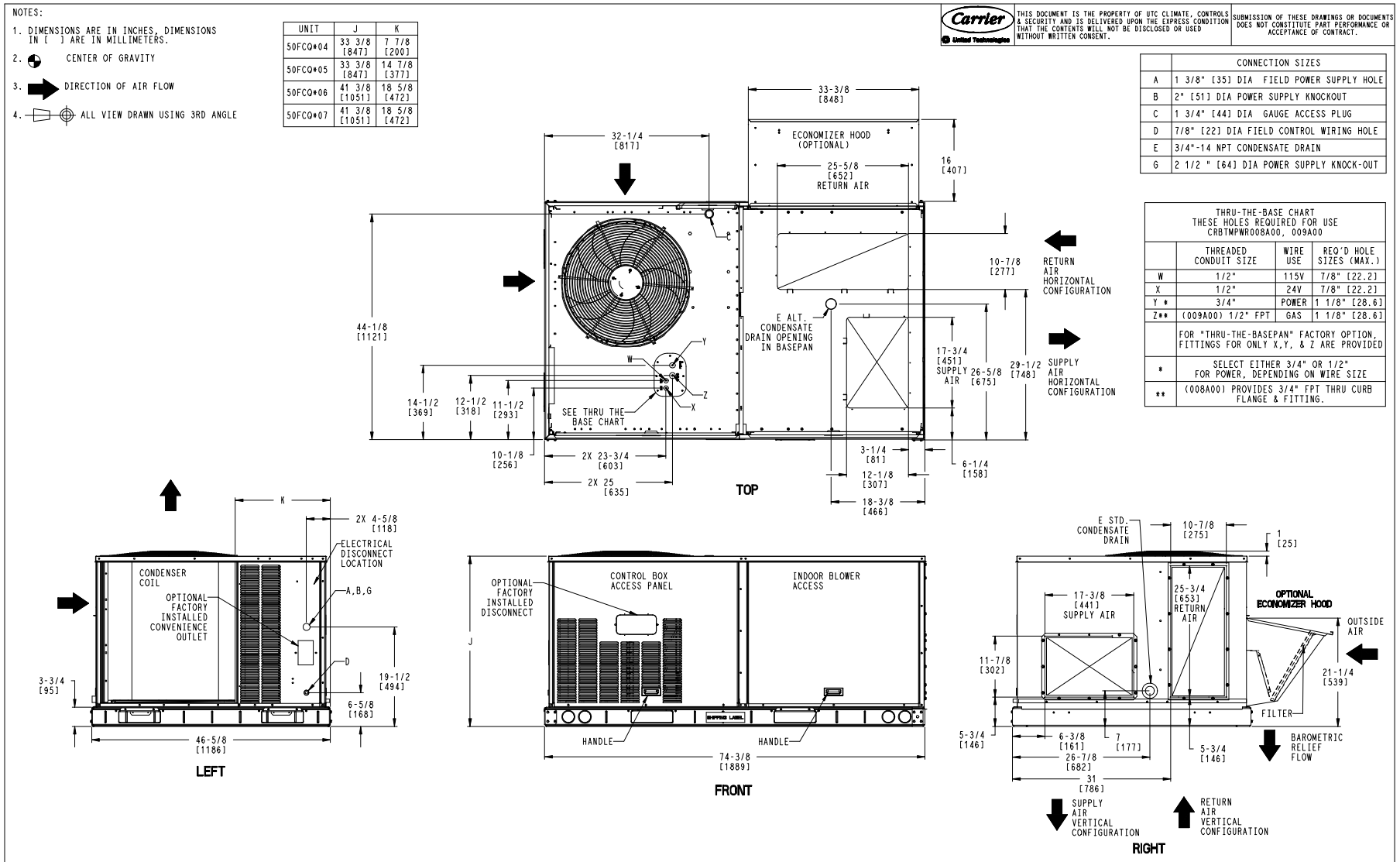
Ordering Information

Part Number	Description	Quantity
50FCQA05A2M6-3A0A0	Rooftop Unit	1

Certified Drawing for Main Office/Bldg A - M1

Project: Lynwood Unified Mark Twain ES
Prepared By:

10/31/2023
10:13AM



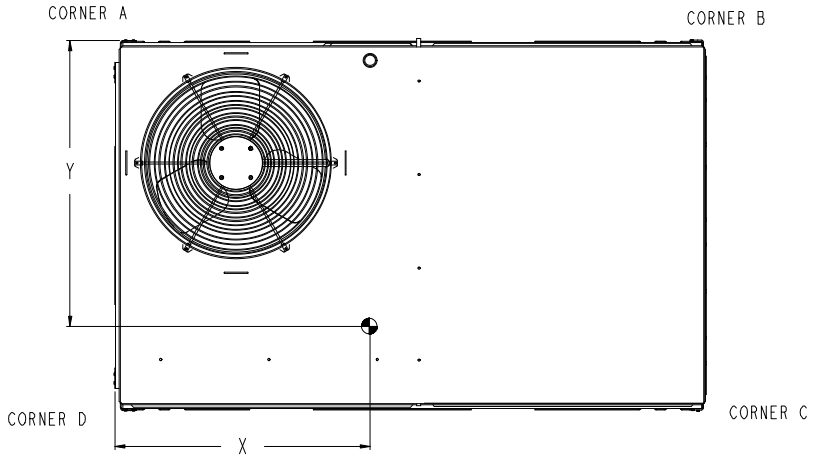
UNIT	STD. UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
50FCQ*04	467	212	126	57	118	53	108	49	115	52	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*05	473	215	127	58	119	54	110	50	117	53	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ*06	584	265	160	72	145	66	133	60	146	66	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]
50FCQ*07	589	267	161	73	146	66	134	61	147	67	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]

* STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.

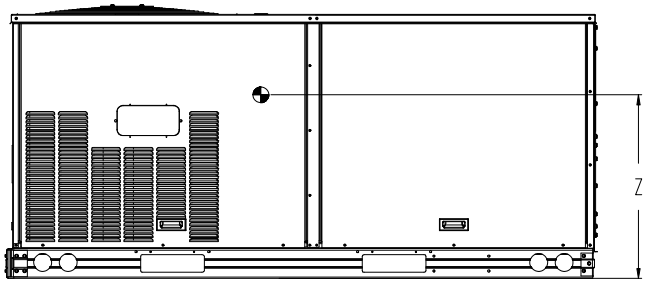
Carrier United Technologies

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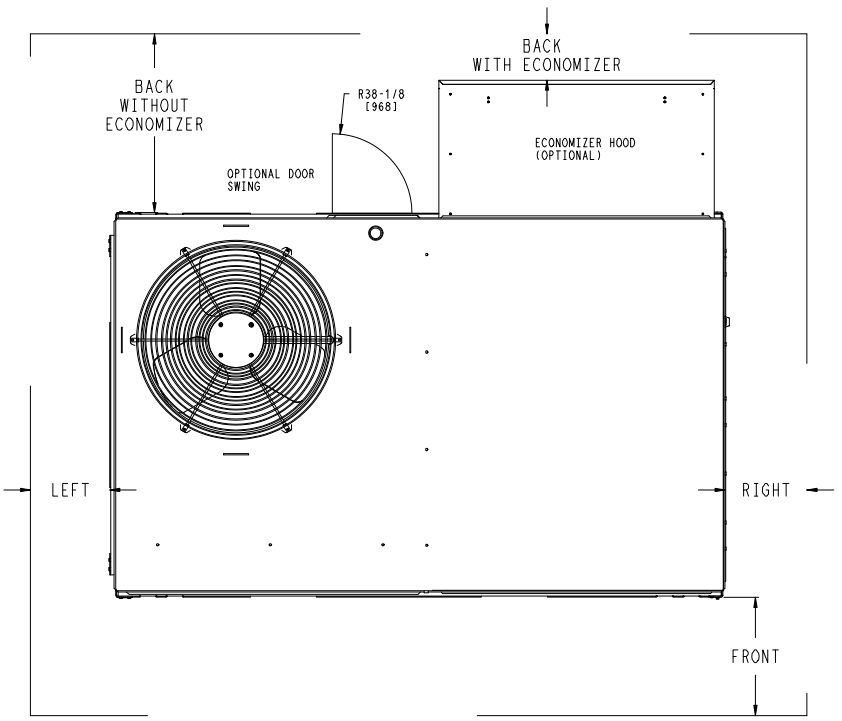
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TOP



FRONT



NOTE:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

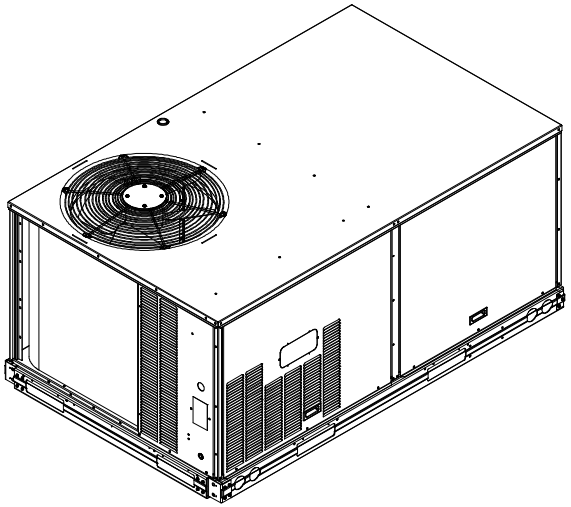
CLEARANCE			
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/ECON	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

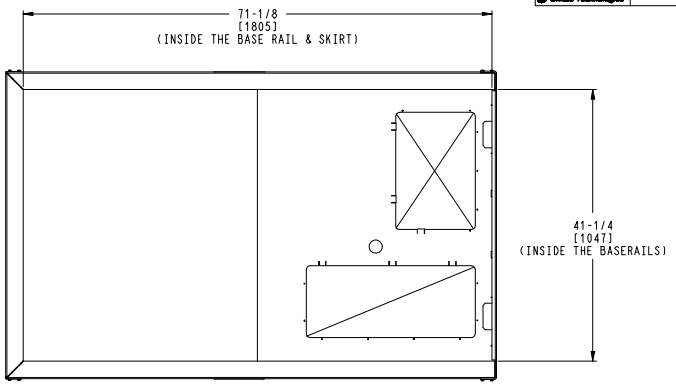
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

Carrier — A United Technologies

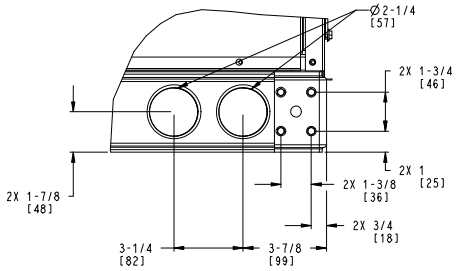
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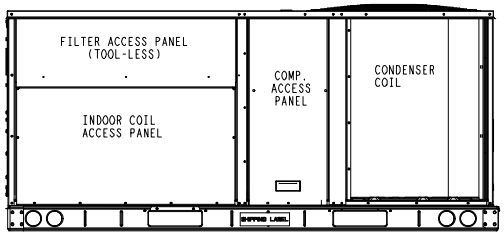




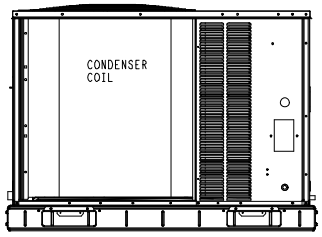
INSIDE BASERAIL DIMENSIONS
BOTTOM



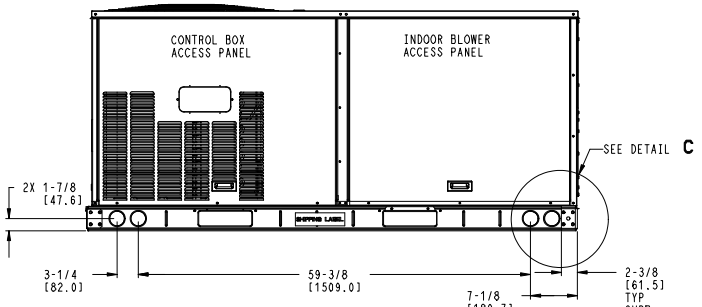
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	08/15/19	-	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	-

Part Number:50FCQA05A2M6-3A0A0

ARI SEER:	**14.30**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**33.4**	in

Operating Weight

Base Unit Weight:	**473**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**13**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**488**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**1600**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**58.1**	F
Evaporator Leaving Air WB:	**57.2**	F
Evaporator Leaving Air Enthalpy:	**24.50**	BTU/lb
Gross Cooling Capacity:	**49.92**	MBH
Gross Sensible Capacity:	**37.82**	MBH
Compressor Power Input:	**3.53**	kW
Coil Bypass Factor:	**0.109**	

Heating Performance

Outdoor Ambient Temperature:	**47.0**	F
Entering Air Indoor Coil DB:	**70.0**	F
Leaving Air Indoor Coil DB:	**96.7**	F
Total Heating Capacity:	**46.10**	MBH
Integrated Heating Capacity:	**46.10**	MBH
Heating Power Input:	**3.08**	kW
High Temperature COP:	**3.70**	
Low Temperature COP:	**2.28**	
HSPF:	**8.2**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**1958**	
Fan Power:	**0.81**	BHP
NOTE:	**Selected IFM RPM Range: 217 - 2170**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**	
Compressor #1 RLA:	**6.2**	
Compressor #1 LRA:	**41**	
Indoor Fan Motor Type:	**MED**	
Indoor Fan Motor Eff.:	**Null**	

Indoor Fan Motor FLA (Total): **1.7**
Power Supply MCA: **11**
Power Supply MOCP (Fuse or HACR): **15**
Disconnect Size FLA: **10**
Disconnect Size LRA: **45**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

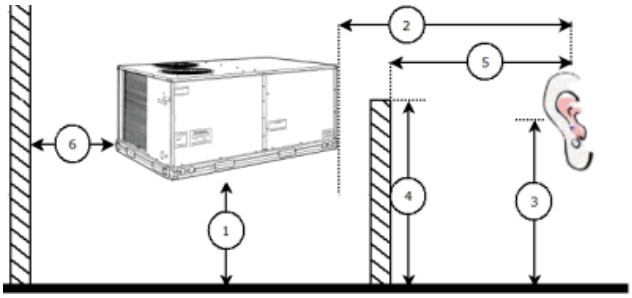
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	93.7	91.1	85.6
125 Hz	84.7	79.8	84.7
250 Hz	78.5	72.9	80.5
500 Hz	73.0	66.0	76.0
1000 Hz	69.8	67.8	72.4
2000 Hz	66.5	58.7	68.0
4000 Hz	63.5	52.9	62.8
8000 Hz	60.1	46.2	59.3
A-Weighted	77.1	72.4	79.0

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	85.6	84.7	80.5	76.0	72.4	68.0	62.8	59.3	89.2 Lw
B	59.4	68.6	71.9	72.8	72.4	69.2	63.8	58.2	78.5 LwA
C	53.2	52.3	48.1	43.6	40.0	35.6	30.4	26.9	56.8 Lp
D	27.0	36.2	39.5	40.4	40.0	36.8	31.4	25.8	46.1 LpA

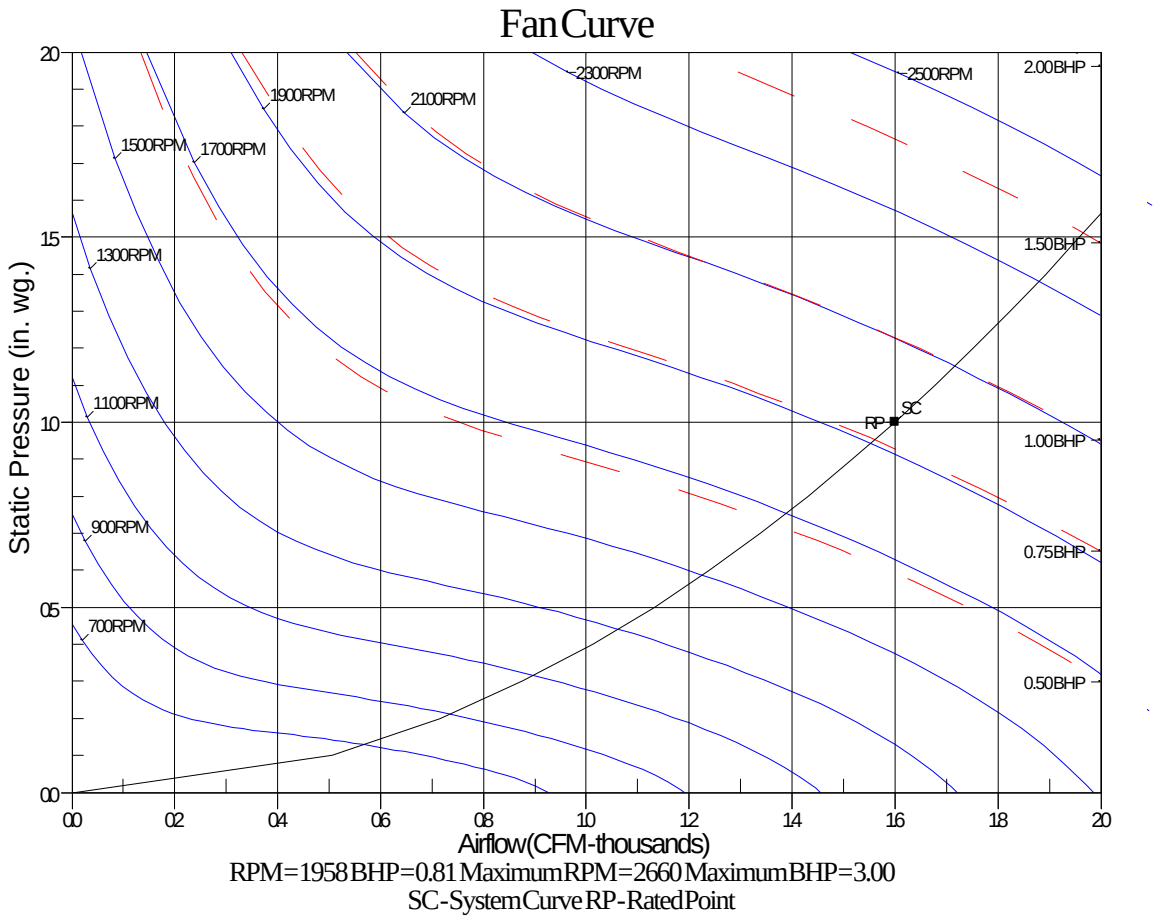
Legend

Performance Summary For Main Office/Bldg A - M1

Project: Lynwood Unified Mark Twain ES 10/31/2023
Prepared By: 10:13AM

A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



RPM=1958 BHP=0.81 Maximum RPM=2660 Maximum BHP=3.00
SC-System Curve RP-Rated Point

North Bldg/Bldg K - 215,9,10,12

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For North Bldg/Bldg K - 215,9,10,12

Project: Lynwood Unified Mark Twain ES 10/31/2023
Prepared By: 10:13AM

Unit Parameters

Unit Model: **48FCGA06A2M6-3A0A0**
Unit Size: **06 (5 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Gas**
Heat Control: **Ultra Low NOx, Low Heat**
Duct Cfg: **Vertical Supply / Vertical Return**
DX Options: **Standard One Stage Cooling Models**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **2' 9.375"**
Total Operating Weight: **601** lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Gas Line Size: **1/2**
Condensate Drain Line Size: **3/4**
Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **2**
Return Air Filter Size: **16 x 25 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

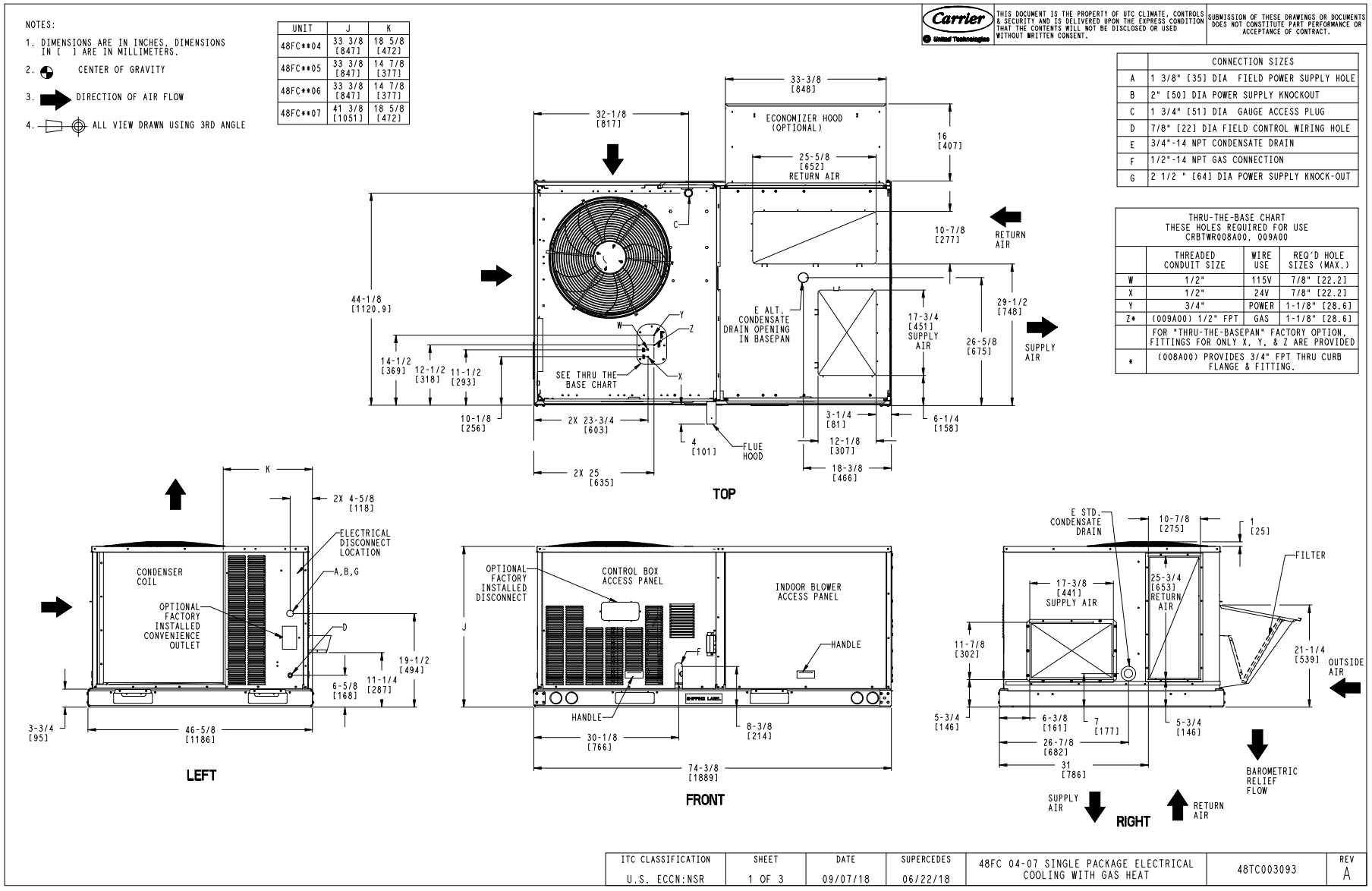
1-Year parts(std.)
5-Year compressor parts(std.)
3-Year SystemVu

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
48FCGA06A2M6-3A0A0	Rooftop Unit	4


NOTES:
1. DIMENSIONS ARE IN INCHES. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE
UNIT J K
48FC**04 33 3/8 [847] 18 5/8 [472]
48FC**05 33 3/8 [847] 14 7/8 [377]
48FC**06 33 3/8 [847] 14 7/8 [377]
48FC**07 41 3/8 [1051] 18 5/8 [472]
Carrier
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CONNECTION SIZES
A 1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B 2" [50] DIA POWER SUPPLY KNOCKOUT
C 1 3/4" [51] DIA GAUGE ACCESS PLUG
D 7/8" [22] DIA FIELD CONTROL WIRING HOLE
E 3/4"-14 NPT CONDENSATE DRAIN
F 1/2"-14 NPT GAS CONNECTION
G 2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT
THRU-THE-BASE CHART
THESE HOLES REQUIRED FOR USE CRBTWR008A00, 009A00
THREADED CONDUIT SIZE
WIRE USE
REQ'D HOLE SIZES (MAX.)
W 1/2" 115V 7/8" [22.2]
X 1/2" 24V 7/8" [22.2]
Y 3/4" POWER 1-1/8" [28.6]
Z* (009A00) 1/2" FPT GAS 1-1/8" [28.6]
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X, Y, & Z ARE PROVIDED
* (008A00) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.
33-3/8 [848]
32-1/8 [817]
ECONOMIZER HOOD (OPTIONAL)
25-5/8 [652] RETURN AIR
16 [407]
10-7/8 [277]
RETURN AIR
44-1/8 [1120.9]
E ALT. CONDENSATE DRAIN OPENING IN BASEPAN
17-3/4 [451] SUPPLY AIR
29-1/2 [748]
26-5/8 [675]
SUPPLY AIR
14-1/2 [369]
12-1/2 [318]
11-1/2 [293]
SEE THRU THE BASE CHART
10-1/8 [256]
2X 23-3/4 [603]
2X 25 [635]
4 [101]
FLUE HOOD
3-1/4 [81]
12-1/8 [307]
18-3/8 [466]
6-1/4 [158]
TOP
K
2X 4-5/8 [118]
ELECTRICAL DISCONNECT LOCATION
A,B,G
CONDENSER COIL
OPTIONAL FACTORY INSTALLED CONVENIENCE OUTLET
D
19-1/2 [494]
11-1/4 [287]
6-5/8 [168]
3-3/4 [95]
46-5/8 [1186]
LEFT
OPTIONAL FACTORY INSTALLED DISCONNECT
CONTROL BOX ACCESS PANEL
INDOOR BLOWER ACCESS PANEL
J
F
HANDLE
HANDLE
30-1/8 [766]
8-3/8 [214]
74-3/8 [1889]
FRONT
E STD. CONDENSATE DRAIN
10-7/8 [275]
1 [25]
FILTER
17-3/8 [441] SUPPLY AIR
25-3/4 [653] RETURN AIR
11-7/8 [302]
21-1/4 [539]
OUTSIDE AIR
5-3/4 [146]
6-3/8 [161]
7 [177]
5-3/4 [146]
26-7/8 [682]
31 [786]
BAROMETRIC RELIEF FLOW
SUPPLY AIR
RETURN AIR
RIGHT
ITC CLASSIFICATION U.S. ECCN:NSR
SHEET 1 OF 3
DATE 09/07/18
SUPERCEDES 06/22/18
48FC 04-07 SINGLE PACKAGE ELECTRICAL COOLING WITH GAS HEAT
48TC003093
REV A

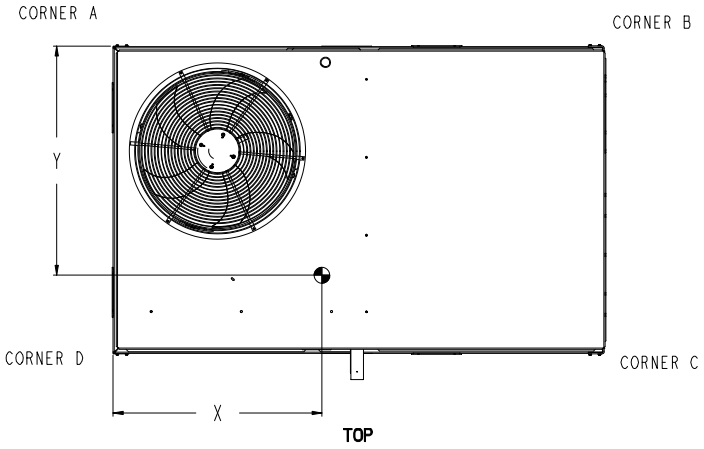
Carrier — United Technologies

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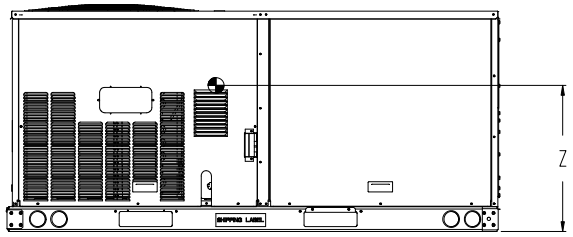
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UNIT	STD. UNIT WEIGHT *		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
48FC**04	482	219	113	51	116	53	128	58	125	57	37 5/8 [956]	24 9/16 [624]	18 1/4 [464]
48FC**05	543	246	138	63	133	60	133	60	138	63	36 1/2 [927]	23 3/8 [594]	18 [457]
48FC**06	556	252	142	64	136	62	136	62	142	64	36 1/2 [927]	23 3/8 [594]	18 [457]
48FC**07	607	275	162	73	152	69	141	64	151	68	36 [914]	22 1/2 [572]	19 3/8 [492]

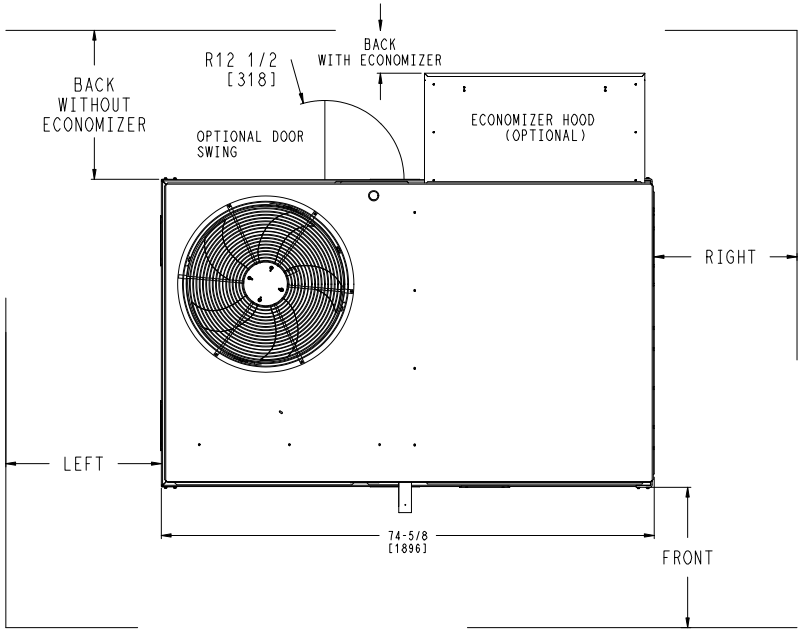
* STANDARD UNIT WEIGHT IS WITH LOW GAS HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.



TOP



FRONT



NOTES:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

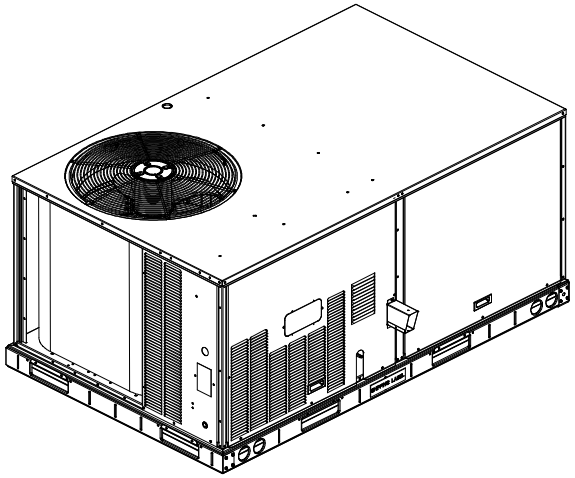
	CLEARANCE		
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/HOOD	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

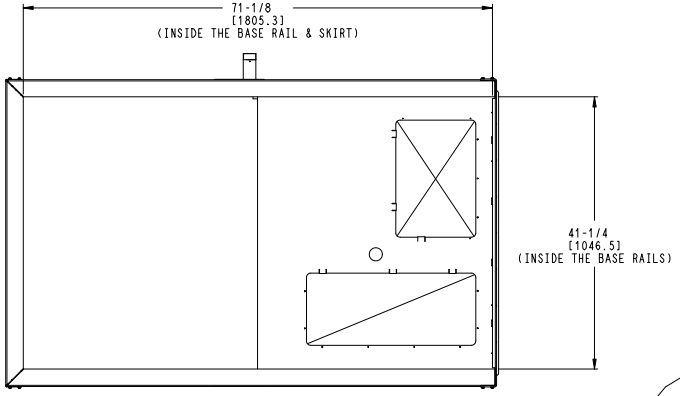
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	09/07/18	06/22/18	48FC 04-07 SINGLE PACKAGE ELECTRICAL COOLING WITH GAS HEAT	48TC003093	A

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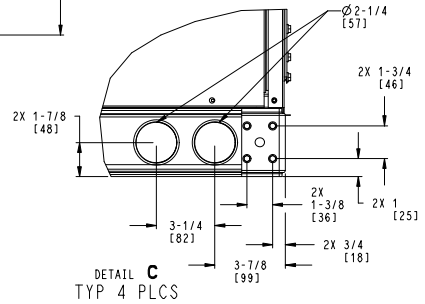
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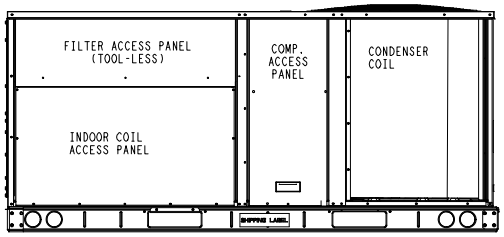


INSIDE BASERAIL DIMENSIONS

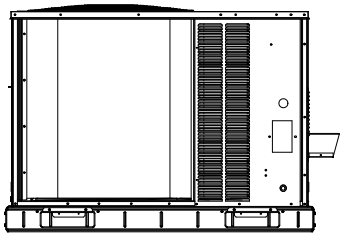
BOTTOM



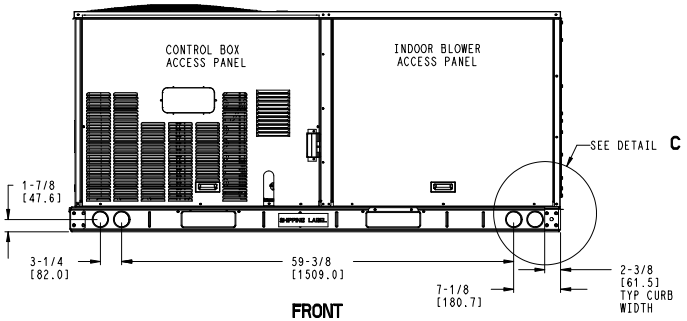
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	09/07/18	06/22/18	48FC 04-07 SINGLE PACKAGE ELECTRICAL COOLING WITH GAS HEAT	48TC003093	A

Part Number:48FCGA06A2M6-3A0A0

ARI SEER:	**14.00**	
ARI SEER2:	**13.40**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**33.4**	in

Operating Weight

Base Unit Weight:	**586**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**13**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**601**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**2000**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**59.3**	F
Evaporator Leaving Air WB:	**57.7**	F
Evaporator Leaving Air Enthalpy:	**24.85**	BTU/lb
Gross Cooling Capacity:	**59.31**	MBH
Gross Sensible Capacity:	**44.73**	MBH
Compressor Power Input:	**4.14**	kW
Coil Bypass Factor:	**0.163**	

Heating Performance

Heating Airflow:	**2000**	CFM
Entering Air Temp:	**70.0**	F
Leaving Air Temp:	**92.7**	F
Gas Heating Input Capacity:	**60.0**	MBH
Gas Heating Output Capacity:	**49.0**	MBH
Temperature Rise:	**22.7**	F
Thermal Efficiency (%):	**81.0**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**2363**	
Fan Power:	**1.42**	BHP
NOTE:	**Selected IFM RPM Range: 1478 - 2390**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**
Compressor #1 RLA:	**7.8**
Compressor #1 LRA:	**52**
Indoor Fan Motor Type:	**MED**
Indoor Fan Motor FLA (Total):	**2.1**
Combustion Fan Motor FLA (ea):	**0.25**

Power Supply MCA: **13**
Power Supply MOCP (Fuse or HACR): **20**
Disconnect Size FLA: **12**
Disconnect Size LRA: **57**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

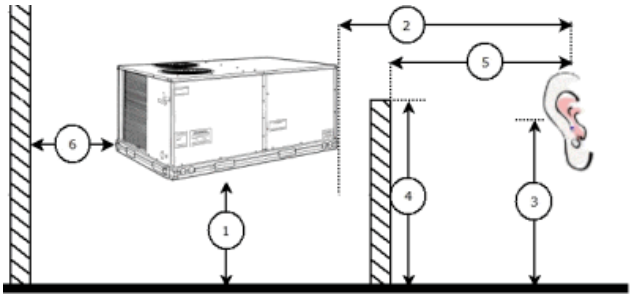
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	96.7	94.7	85.6
125 Hz	88.5	84.6	84.7
250 Hz	82.7	75.5	80.5
500 Hz	77.7	71.8	76.0
1000 Hz	75.3	72.6	72.4
2000 Hz	72.1	63.5	68.0
4000 Hz	67.9	57.6	62.8
8000 Hz	62.9	50.2	59.3
A-Weighted	81.7	76.8	79.0

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

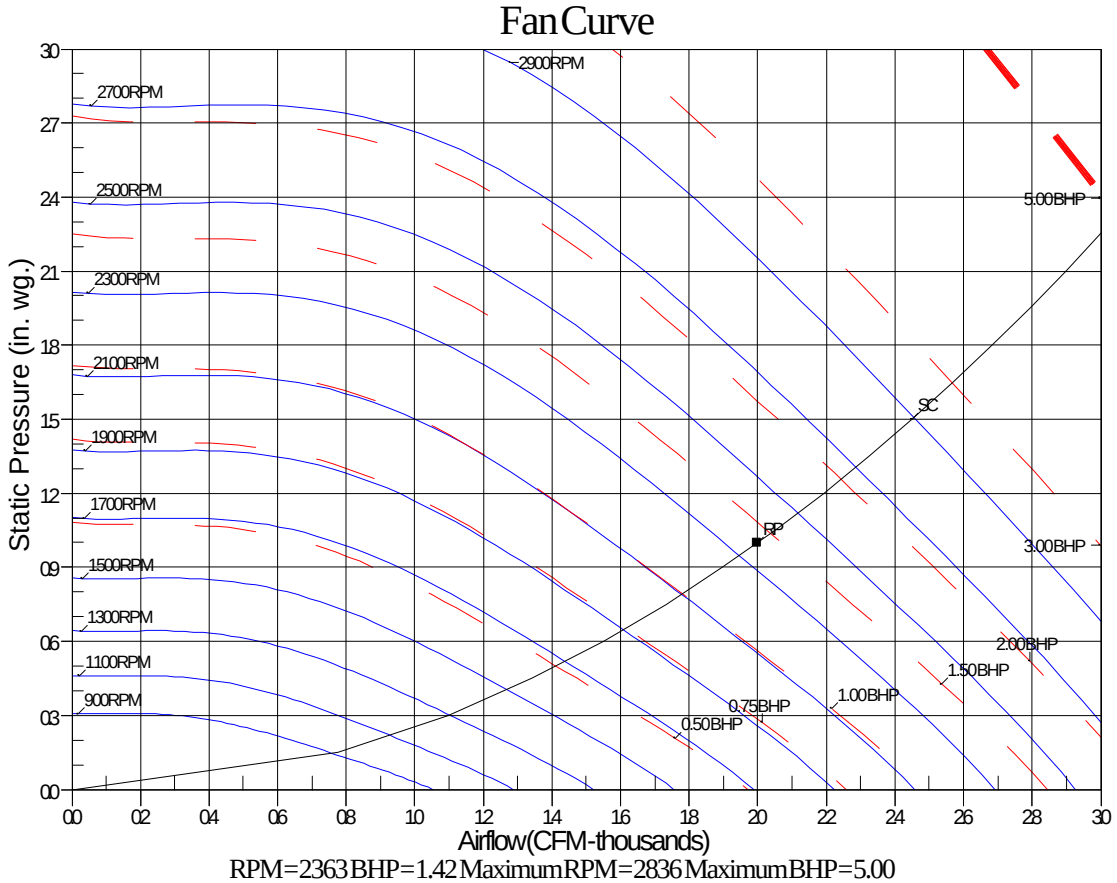
Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	85.6	84.7	80.5	76.0	72.4	68.0	62.8	59.3	89.2 Lw
B	59.4	68.6	71.9	72.8	72.4	69.2	63.8	58.2	78.5 LwA
C	53.2	52.3	48.1	43.6	40.0	35.6	30.4	26.9	56.8 Lp
D	27.0	36.2	39.5	40.4	40.0	36.8	31.4	25.8	46.1 LpA

Legend
A Sound Power Levels at Unit's Acoustic Center, Lw

B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



North Bldg/Bldg K - 112A, 214,Library,107,105,13

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For North Bldg/Bldg K - 112A, 214,Library,107,105,13

Project: Lynwood Unified Mark Twain ES 10/31/2023
Prepared By: 10:13AM

Unit Parameters

Unit Model: **48FCGA06A2M6-3A0A0**
Unit Size: **06 (5 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Gas**
Heat Control: **Ultra Low NOx, Low Heat**
Duct Cfg: **Vertical Supply / Vertical Return**
DX Options: **Standard One Stage Cooling Models**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **2' 9.375"**
Total Operating Weight: 601 lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Gas Line Size: **1/2**
Condensate Drain Line Size: **3/4**
Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **2**
Return Air Filter Size: **16 x 25 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

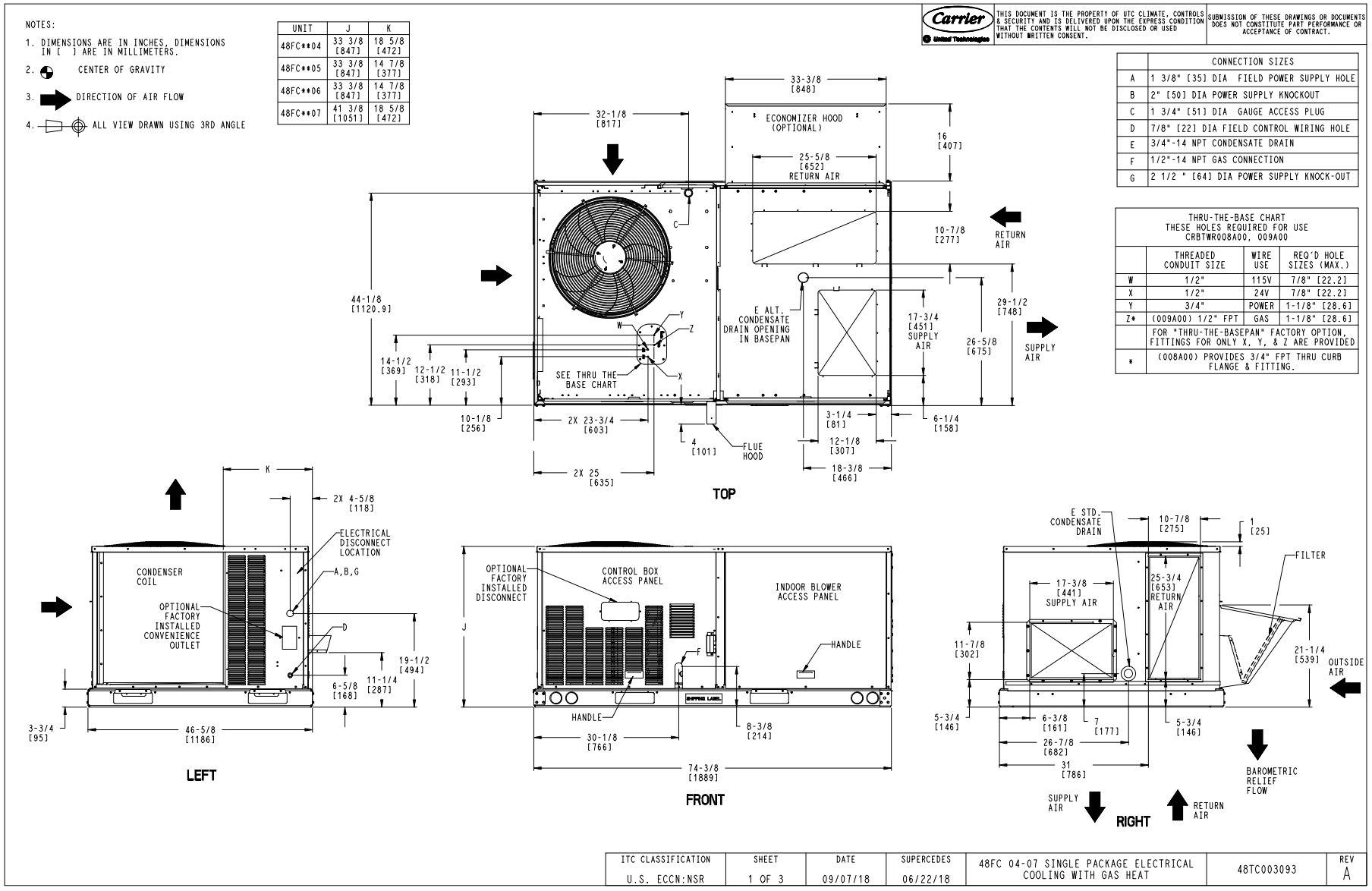
1-Year parts(std.)
5-Year compressor parts(std.)
3-Year SystemVu

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
48FCGA06A2M6-3A0A0	Rooftop Unit	6



UNIT	J	K
48FC**04	33 3/8 [847]	18 5/8 [472]
48FC**05	33 3/8 [847]	14 7/8 [377]
48FC**06	33 3/8 [847]	14 7/8 [377]
48FC**07	41 3/8 [1051]	18 5/8 [472]

	CONNECTION SIZES
A	1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B	2" [50] DIA POWER SUPPLY KNOCKOUT
C	1 3/4" [51] DIA GAUGE ACCESS PLUG
D	7/8" [22] DIA FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN
F	1/2"-14 NPT GAS CONNECTION
G	2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT

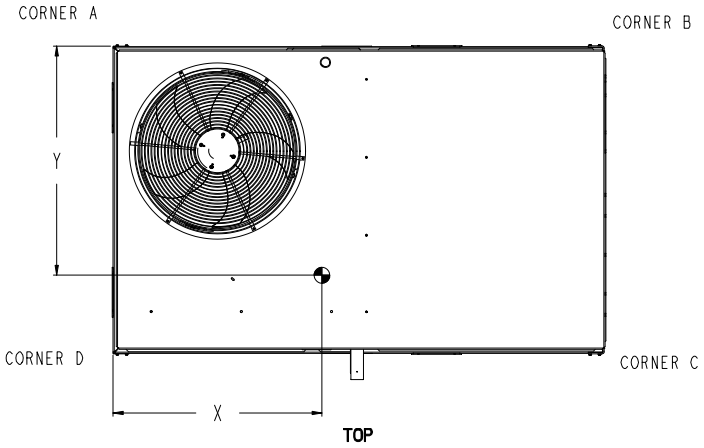
THRU-THE-BASE CHART
THESE HOLES REQUIRED FOR USE CRBTWR008A00, 009A00

	THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
W	1/2"	115V	7/8" [22.2]
X	1/2"	24V	7/8" [22.2]
Y	3/4"	POWER	1-1/8" [28.6]
Z*	(009A00) 1/2" FPT	GAS	1-1/8" [28.6]
	FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X, Y, & Z ARE PROVIDED		
*	(008A00) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.		

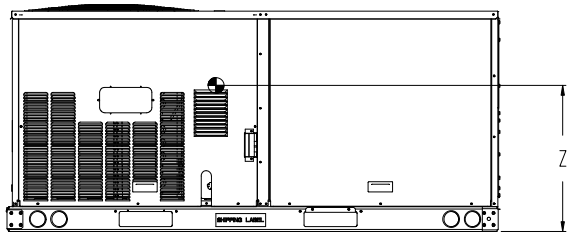
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES		
U.S. ECCN:NSR	1 OF 3	09/07/18	06/22/18	48FC 04-07 SINGLE PACKAGE ELECTRICAL COOLING WITH GAS HEAT	48TC003093	REV A

UNIT	STD. UNIT WEIGHT *		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
48FC**04	482	219	113	51	116	53	128	58	125	57	37 5/8 [956]	24 9/16 [624]	18 1/4 [464]
48FC**05	543	246	138	63	133	60	133	60	138	63	36 1/2 [927]	23 3/8 [594]	18 [457]
48FC**06	556	252	142	64	136	62	136	62	142	64	36 1/2 [927]	23 3/8 [594]	18 [457]
48FC**07	607	275	162	73	152	69	141	64	151	68	36 [914]	22 1/2 [572]	19 3/8 [492]

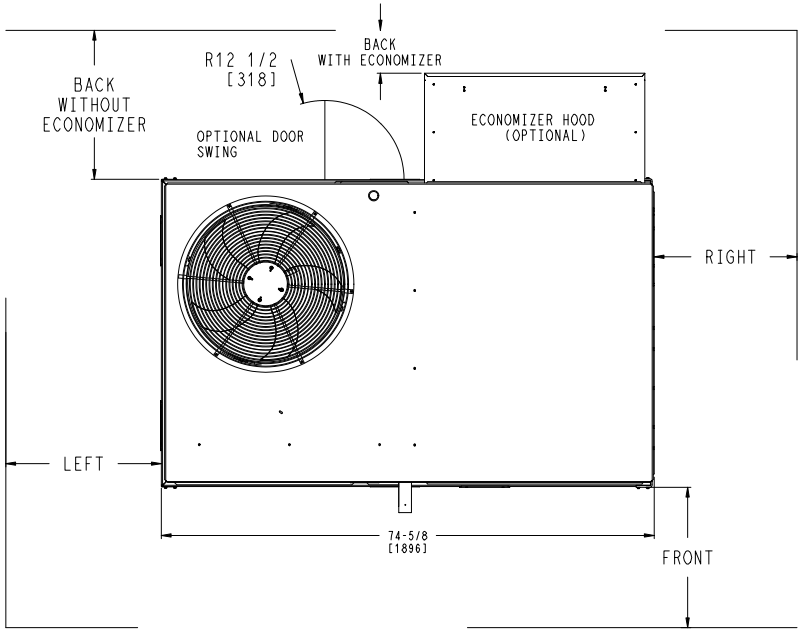
* STANDARD UNIT WEIGHT IS WITH LOW GAS HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.



TOP



FRONT



NOTES:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

	CLEARANCE		
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/HOOD	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

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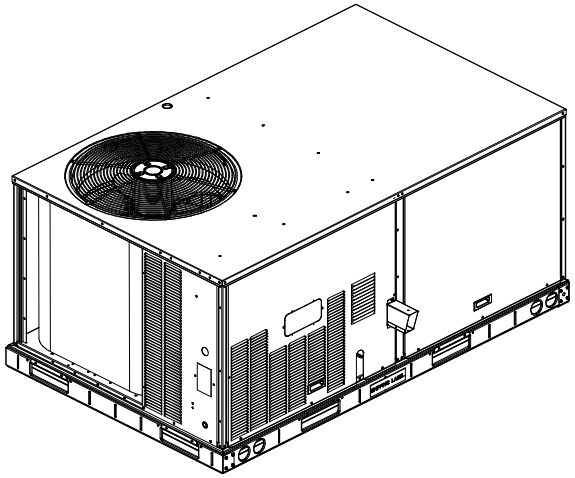
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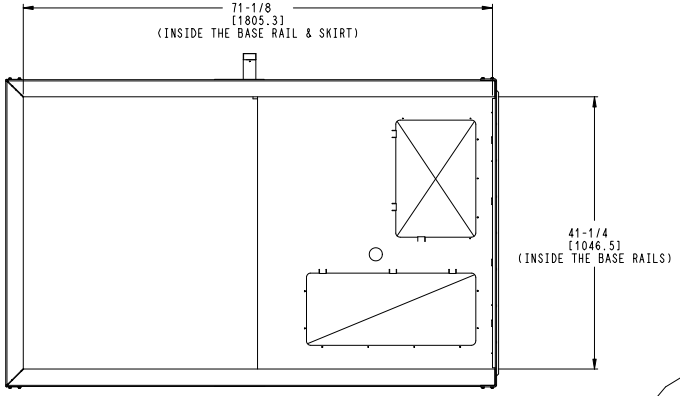
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	09/07/18	06/22/18	48FC 04-07 SINGLE PACKAGE ELECTRICAL COOLING WITH GAS HEAT	48TC003093	A

Carrier — United Technologies

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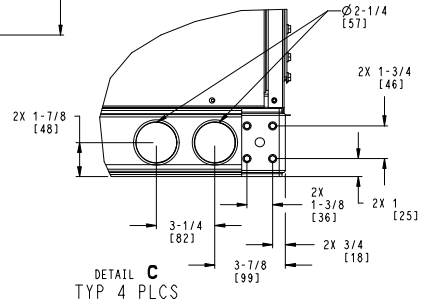
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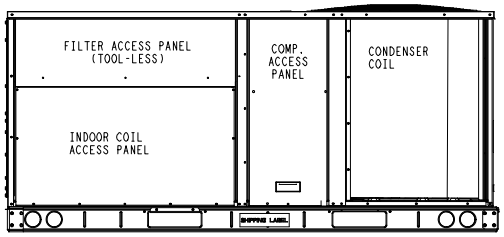


INSIDE BASERAIL DIMENSIONS

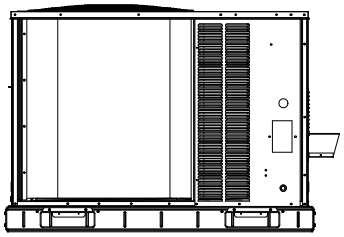
BOTTOM



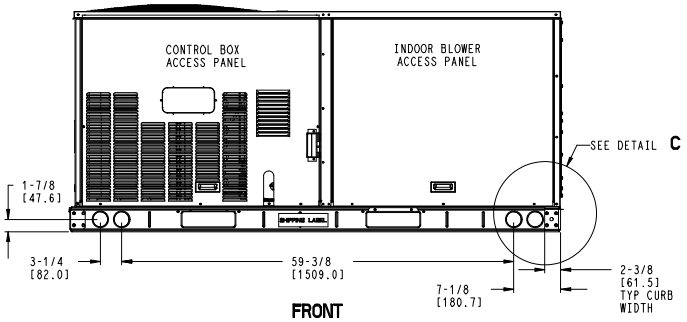
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	09/07/18	06/22/18	48FC 04-07 SINGLE PACKAGE ELECTRICAL COOLING WITH GAS HEAT	48TC003093	A

Part Number:48FCGA06A2M6-3A0A0

ARI SEER:	**14.00**	
ARI SEER2:	**13.40**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**33.4**	in

Operating Weight

Base Unit Weight:	**586**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**13**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**601**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**1600**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**56.0**	F
Evaporator Leaving Air WB:	**55.4**	F
Evaporator Leaving Air Enthalpy:	**23.38**	BTU/lb
Gross Cooling Capacity:	**58.00**	MBH
Gross Sensible Capacity:	**41.54**	MBH
Compressor Power Input:	**4.11**	kW
Coil Bypass Factor:	**0.123**	

Heating Performance

Heating Airflow:	**1600**	CFM
Entering Air Temp:	**70.0**	F
Leaving Air Temp:	**98.4**	F
Gas Heating Input Capacity:	**60.0**	MBH
Gas Heating Output Capacity:	**49.0**	MBH
Temperature Rise:	**28.4**	F
Thermal Efficiency (%):	**81.0**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**2114**	
Fan Power:	**1.02**	BHP
NOTE:	**Selected IFM RPM Range: 1478 - 2390**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**
Compressor #1 RLA:	**7.8**
Compressor #1 LRA:	**52**
Indoor Fan Motor Type:	**MED**
Indoor Fan Motor FLA (Total):	**2.1**
Combustion Fan Motor FLA (ea):	**0.25**

Power Supply MCA: **13**
Power Supply MOCP (Fuse or HACR): **20**
Disconnect Size FLA: **12**
Disconnect Size LRA: **57**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

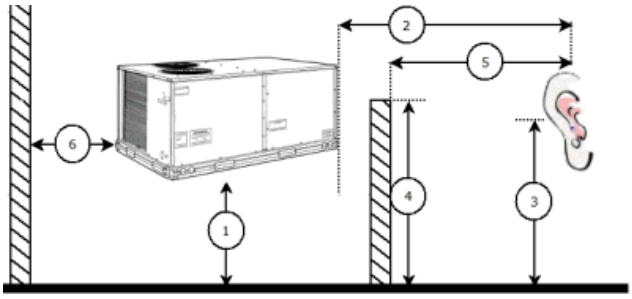
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	95.9	92.9	85.6
125 Hz	87.3	82.3	84.7
250 Hz	81.1	74.5	80.5
500 Hz	74.9	68.8	76.0
1000 Hz	72.1	70.0	72.4
2000 Hz	68.8	61.0	68.0
4000 Hz	65.4	55.2	62.8
8000 Hz	61.4	48.0	59.3
A-Weighted	79.4	74.5	79.0

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

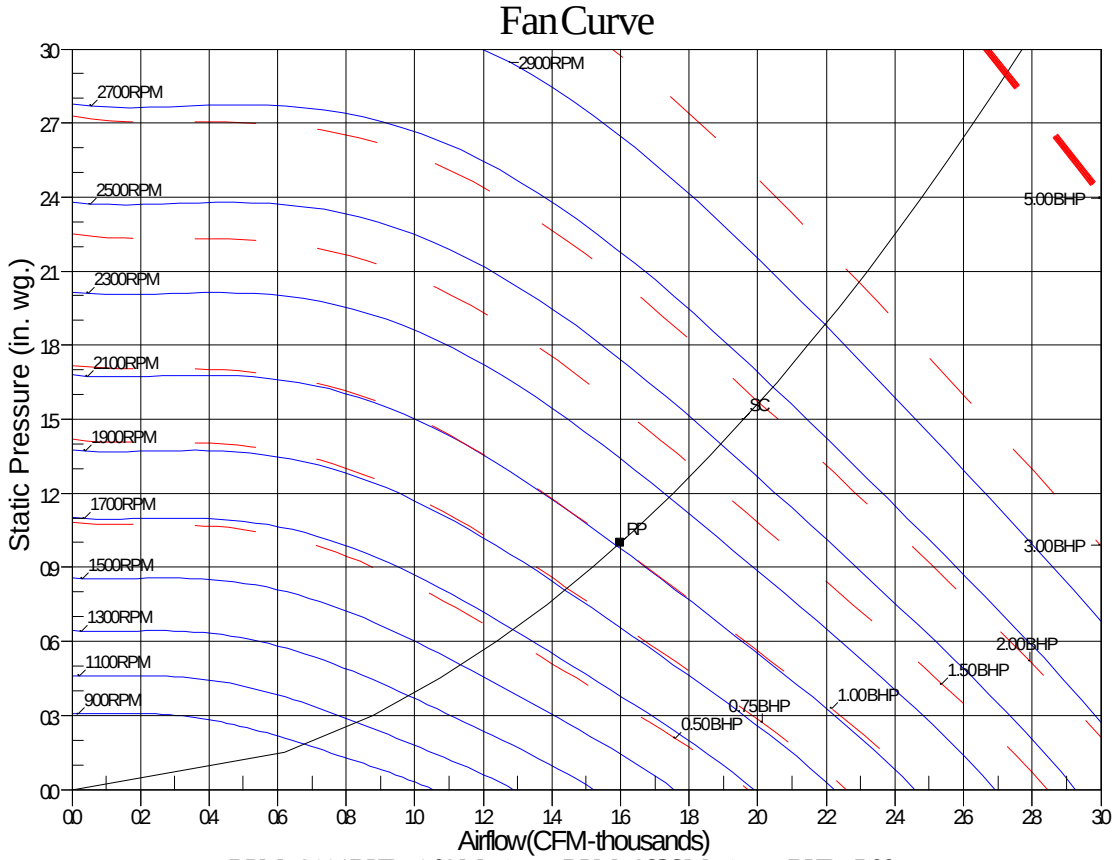
Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	85.6	84.7	80.5	76.0	72.4	68.0	62.8	59.3	89.2 Lw
B	59.4	68.6	71.9	72.8	72.4	69.2	63.8	58.2	78.5 LwA
C	53.2	52.3	48.1	43.6	40.0	35.6	30.4	26.9	56.8 Lp
D	27.0	36.2	39.5	40.4	40.0	36.8	31.4	25.8	46.1 LpA

Legend
A Sound Power Levels at Unit's Acoustic Center, Lw

B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



RPM=2114 BHP=1.02 Maximum RPM=2836 Maximum BHP=5.00
SC-System Curve RP-Rated Point

North Bldg/Bldg K - 112B,8,11

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For North Bldg/Bldg K - 112B,8,11

Project: Lynwood Unified Mark Twain ES 10/31/2023
Prepared By: 10:13AM

Unit Parameters

Unit Model: **48FCDM07A2M6-3A0A0**
Unit Size: **07 (6 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Gas**
Heat Control: **Low Heat**
Duct Cfg: **Vertical Supply / Vertical Return**
DX Options: **Single Circuit, Two Stage Cooling (07 only)**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **3' 5.375"**
Total Operating Weight: **626** lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Gas Line Size: **1/2**
Condensate Drain Line Size: **3/4**
Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **4**
Return Air Filter Size: **16 x 16 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

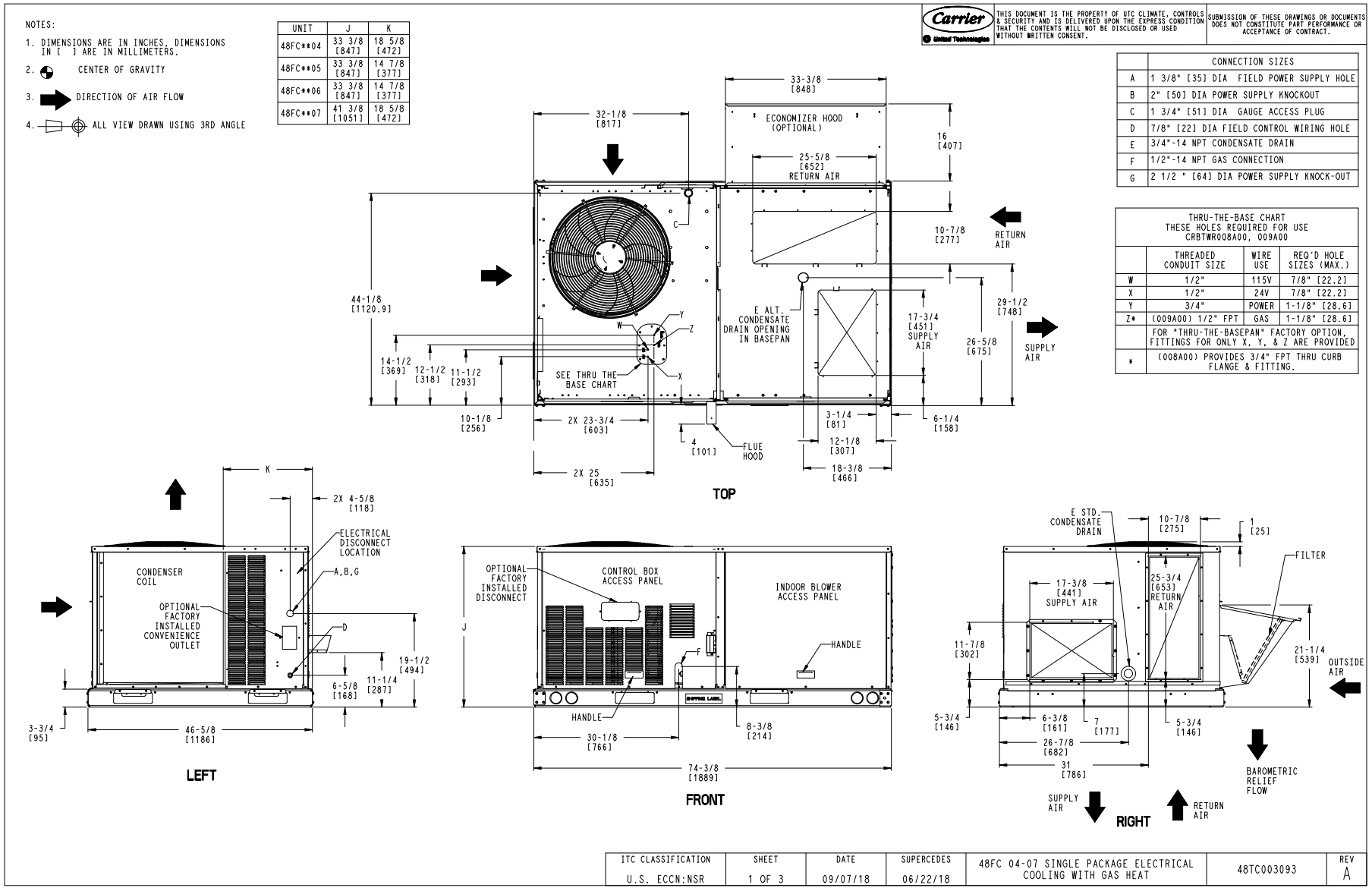
1-Year parts(std.)
5-Year compressor parts(std.)
10-Year heat exchanger - Aluminized(std.)
3-Year SystemVu

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

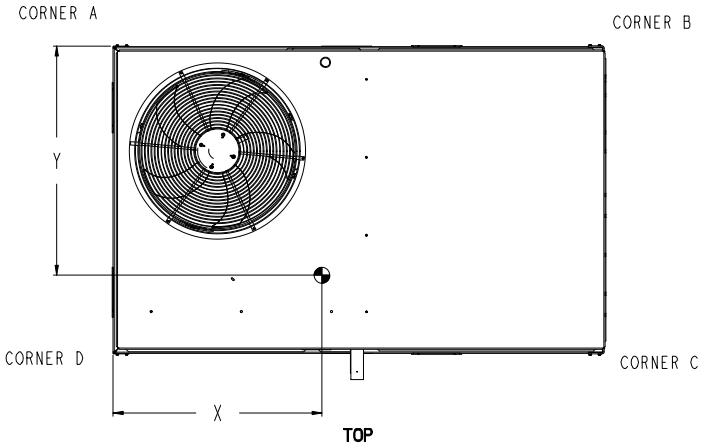
Part Number	Description	Quantity
48FCDM07A2M6-3A0A0	Rooftop Unit	3



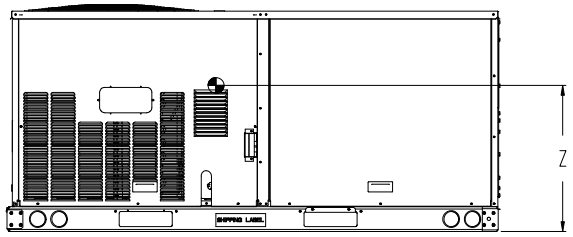
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	1 OF 3	09/07/18	06/22/18	48FC 04-07 SINGLE PACKAGE ELECTRICAL COOLING WITH GAS HEAT	48TC003093	A

UNIT	STD. UNIT WEIGHT *		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
48FC**04	482	219	113	51	116	53	128	58	125	57	37 5/8 [956]	24 9/16 [624]	18 1/4 [464]
48FC**05	543	246	138	63	133	60	133	60	138	63	36 1/2 [927]	23 3/8 [594]	18 [457]
48FC**06	556	252	142	64	136	62	136	62	142	64	36 1/2 [927]	23 3/8 [594]	18 [457]
48FC**07	607	275	162	73	152	69	141	64	151	68	36 [914]	22 1/2 [572]	19 3/8 [492]

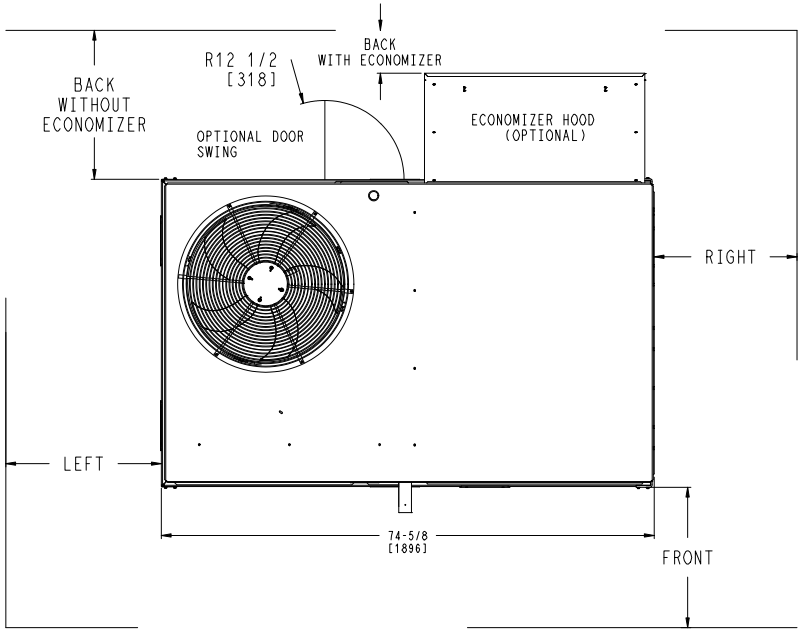
* STANDARD UNIT WEIGHT IS WITH LOW GAS HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.



TOP



FRONT



NOTES:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

	CLEARANCE		
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/HOOD	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

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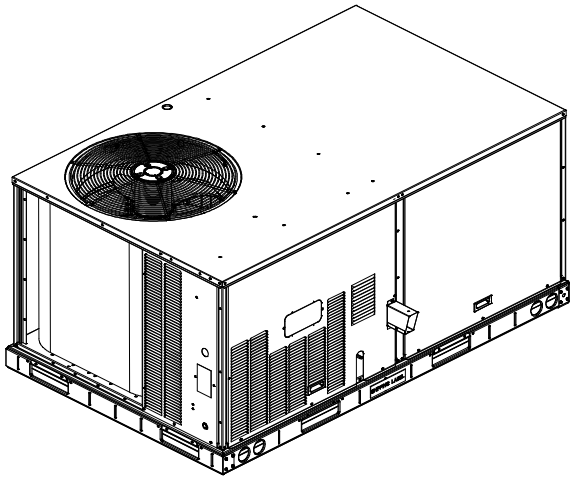
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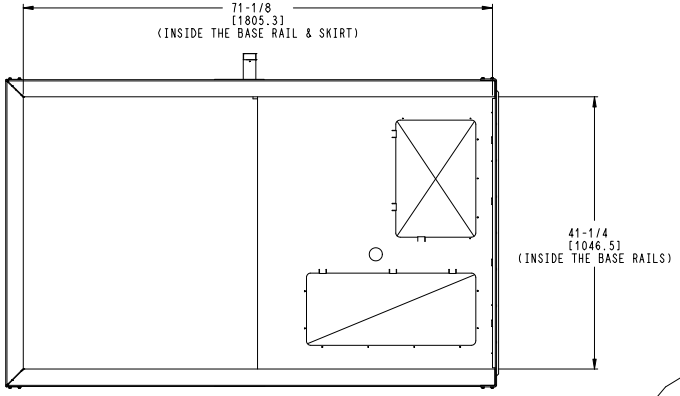
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	09/07/18	06/22/18	48FC 04-07 SINGLE PACKAGE ELECTRICAL COOLING WITH GAS HEAT	48TC003093	A

Carrier
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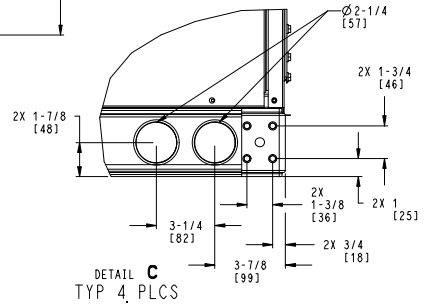
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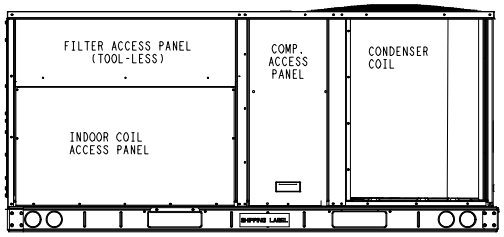


INSIDE BASERAIL DIMENSIONS

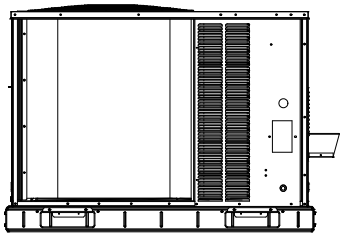
BOTTOM



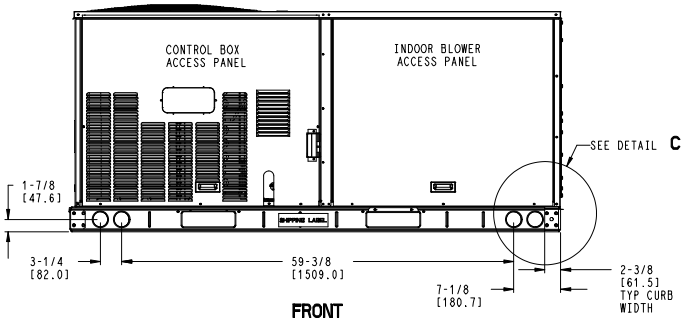
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	09/07/18	06/22/18	48FC 04-07 SINGLE PACKAGE ELECTRICAL COOLING WITH GAS HEAT	48TC003093	A

Part Number:48FCDM07A2M6-3A0A0

ARI EER:	**11.00**	
IEER:	**15.0**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**41.4**	in

Operating Weight

Base Unit Weight:	**607**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**17**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**626**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**2100**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**57.1**	F
Evaporator Leaving Air WB:	**56.2**	F
Evaporator Leaving Air Enthalpy:	**23.91**	BTU/lb
Gross Cooling Capacity:	**71.15**	MBH
Gross Sensible Capacity:	**52.00**	MBH
Compressor Power Input:	**5.27**	kW
Coil Bypass Factor:	**0.083**	

Heating Performance

Heating Airflow:	**2100**	CFM
Entering Air Temp:	**70.0**	F
Leaving Air Temp:	**93.8**	F
Gas Heating Input Capacity:	**67.0**	MBH
Gas Heating Output Capacity:	**54.0**	MBH
Temperature Rise:	**23.8**	F
Thermal Efficiency (%):	**81.0**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**2310**	
Fan Power:	**1.32**	BHP
NOTE:	**Selected IFM RPM Range: 1596 - 2530**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**
Compressor #1 RLA:	**8.4**
Compressor #1 LRA:	**66**
Indoor Fan Motor Type:	**MED**
Indoor Fan Motor FLA (Total):	**2.6**
Combustion Fan Motor FLA (ea):	**0.25**

Power Supply MCA: **14**
Power Supply MOCP (Fuse or HACR): **20**
Disconnect Size FLA: **14**
Disconnect Size LRA: **72**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

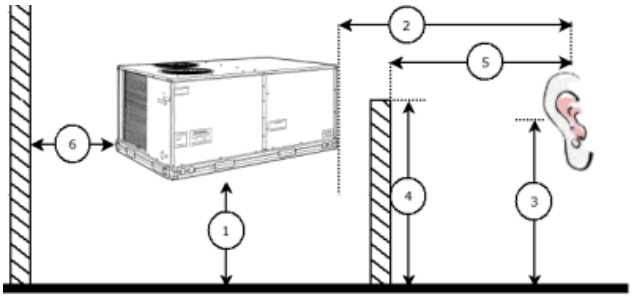
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	95.5	93.8	85.6
125 Hz	87.2	83.5	84.7
250 Hz	81.4	74.8	80.5
500 Hz	77.1	70.8	76.0
1000 Hz	74.5	71.9	72.4
2000 Hz	71.4	62.7	68.0
4000 Hz	67.3	56.7	62.8
8000 Hz	62.5	49.6	59.3
A-Weighted	80.8	76.0	79.0

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

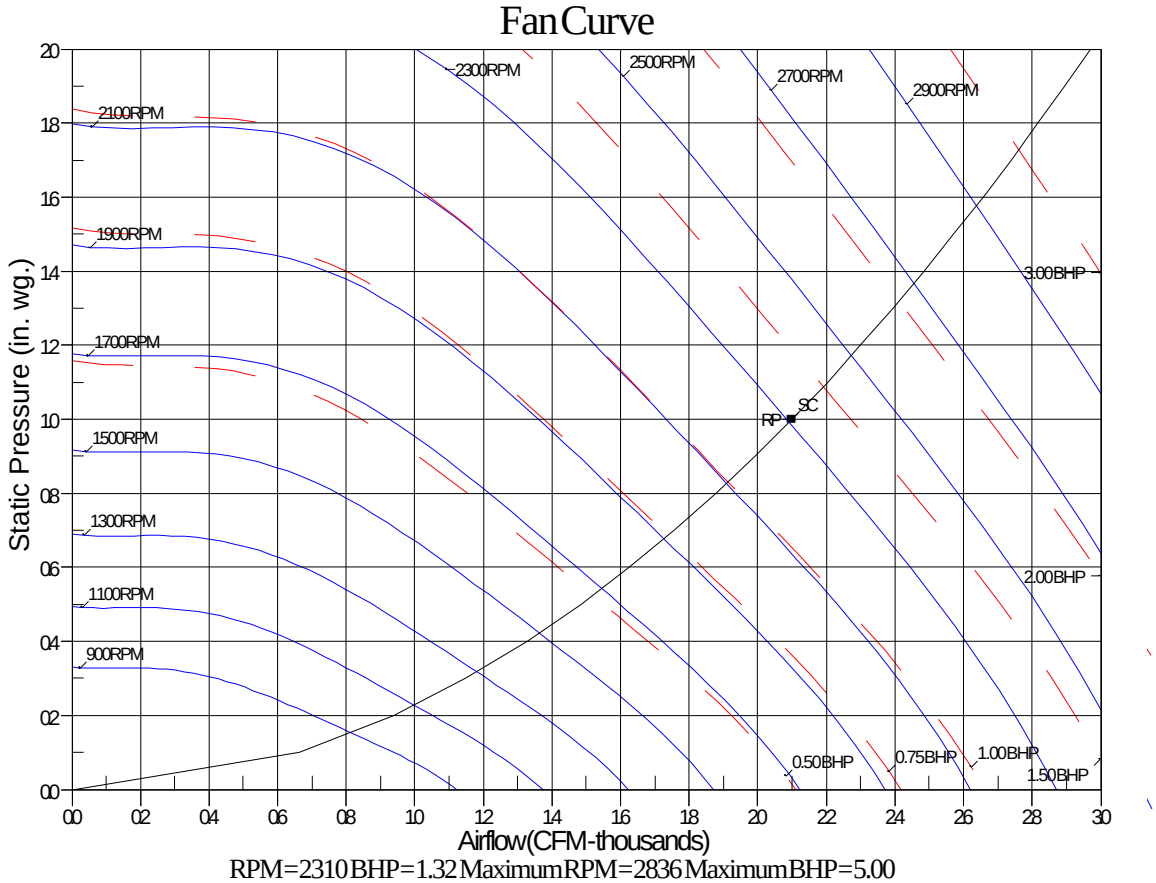
Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	85.6	84.7	80.5	76.0	72.4	68.0	62.8	59.3	89.2 Lw
B	59.4	68.6	71.9	72.8	72.4	69.2	63.8	58.2	78.5 LwA
C	53.2	52.3	48.1	43.6	40.0	35.6	30.4	26.9	56.8 Lp
D	27.0	36.2	39.5	40.4	40.0	36.8	31.4	25.8	46.1 LpA

Legend
A Sound Power Levels at Unit's Acoustic Center, Lw

B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



RPM=2310 BHP=1.32 Maximum RPM=2836 Maximum BHP=5.00
SC-System Curve RP-Rated Point

South Bldg/Bldg L - 1,2,3,4,5,10

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For South Bldg/Bldg L - 1,2,3,4,5,10

Project: Lynwood Unified Mark Twain ES 10/31/2023
Prepared By: 10:13AM

Unit Parameters

Unit Model: **48FCGA06A2M6-3A0A0**
Unit Size: **06 (5 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Gas**
Heat Control: **Ultra Low NOx, Low Heat**
Duct Cfg: **Vertical Supply / Vertical Return**
DX Options: **Standard One Stage Cooling Models**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **2' 9.375"**
Total Operating Weight: 601 lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Gas Line Size: **1/2**
Condensate Drain Line Size: **3/4**
Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **2**
Return Air Filter Size: **16 x 25 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

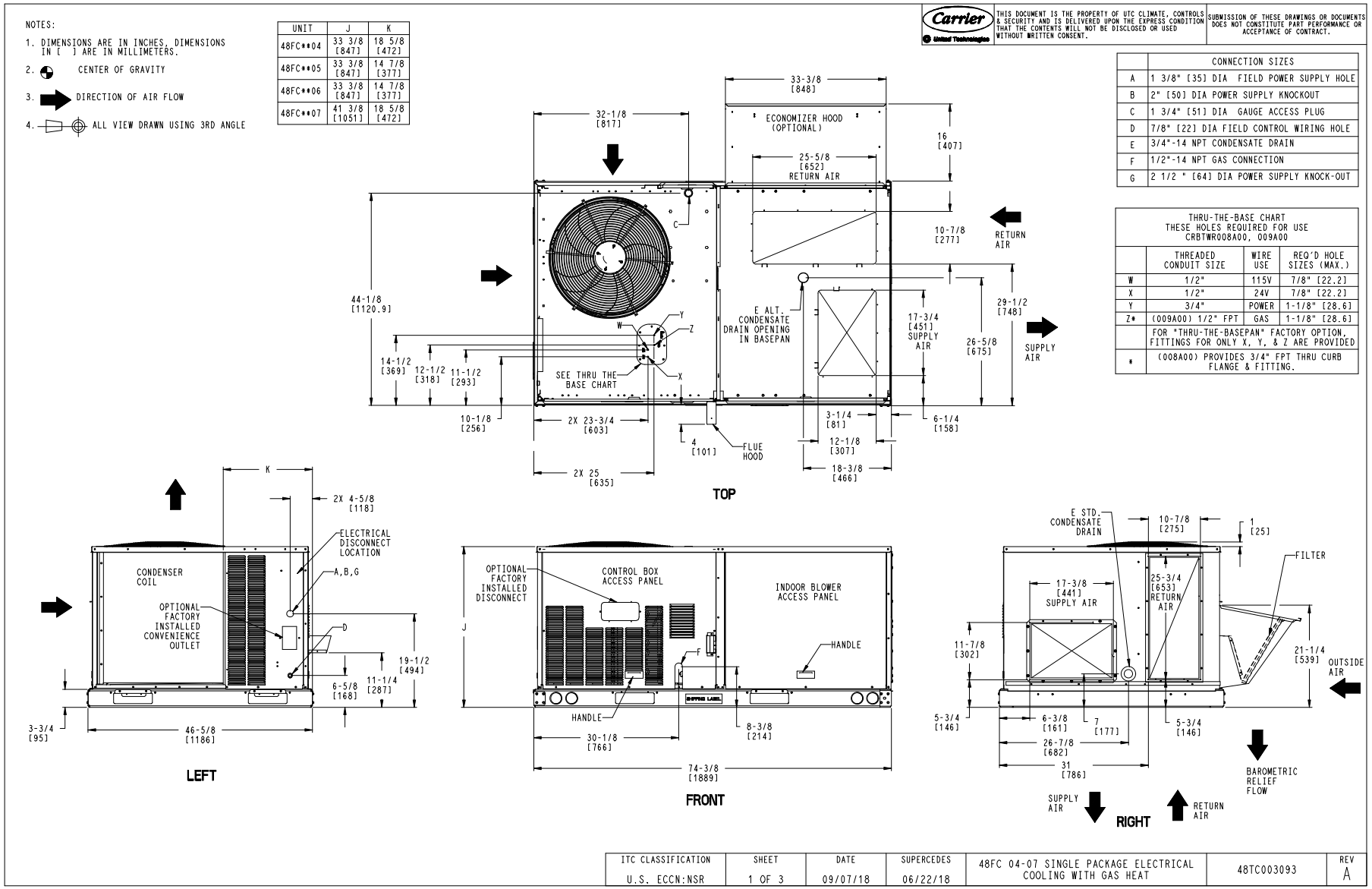
1-Year parts(std.)
5-Year compressor parts(std.)
3-Year SystemVu

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
48FCGA06A2M6-3A0A0	Rooftop Unit	6



UNIT	J	K
48FC**04	33 3/8 [847]	18 5/8 [472]
48FC**05	33 3/8 [847]	14 7/8 [377]
48FC**06	33 3/8 [847]	14 7/8 [377]
48FC**07	41 3/8 [1051]	18 5/8 [472]

	CONNECTION SIZES
A	1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B	2" [50] DIA POWER SUPPLY KNOCKOUT
C	1 3/4" [51] DIA GAUGE ACCESS PLUG
D	7/8" [22] DIA FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN
F	1/2"-14 NPT GAS CONNECTION
G	2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT

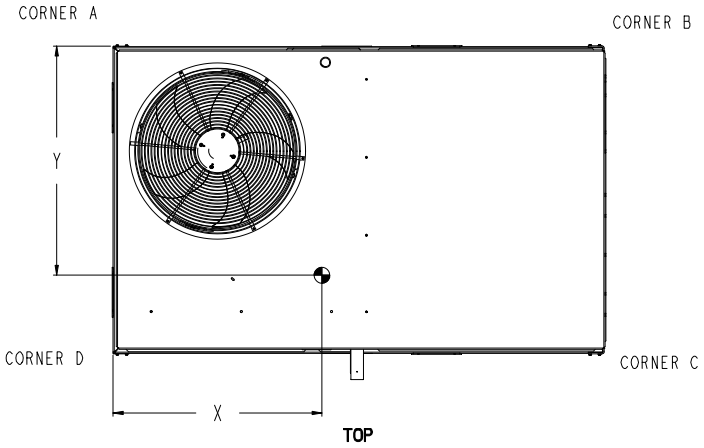
THRU-THE-BASE CHART
THESE HOLES REQUIRED FOR USE CRBTWR008A00, 009A00

	THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
W	1/2"	115V	7/8" [22.2]
X	1/2"	24V	7/8" [22.2]
Y	3/4"	POWER	1-1/8" [28.6]
Z*	(009A00) 1/2" FPT	GAS	1-1/8" [28.6]
	FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X, Y, & Z ARE PROVIDED		
*	(008A00) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.		

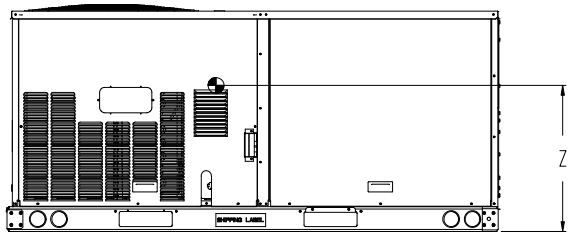
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES		REV
U.S. ECCN:NSR	1 OF 3	09/07/18	06/22/18	48FC 04-07 SINGLE PACKAGE ELECTRICAL COOLING WITH GAS HEAT	48TC003093	A

UNIT	STD. UNIT WEIGHT *		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
48FC**04	482	219	113	51	116	53	128	58	125	57	37 5/8 [956]	24 9/16 [624]	18 1/4 [464]
48FC**05	543	246	138	63	133	60	133	60	138	63	36 1/2 [927]	23 3/8 [594]	18 [457]
48FC**06	556	252	142	64	136	62	136	62	142	64	36 1/2 [927]	23 3/8 [594]	18 [457]
48FC**07	607	275	162	73	152	69	141	64	151	68	36 [914]	22 1/2 [572]	19 3/8 [492]

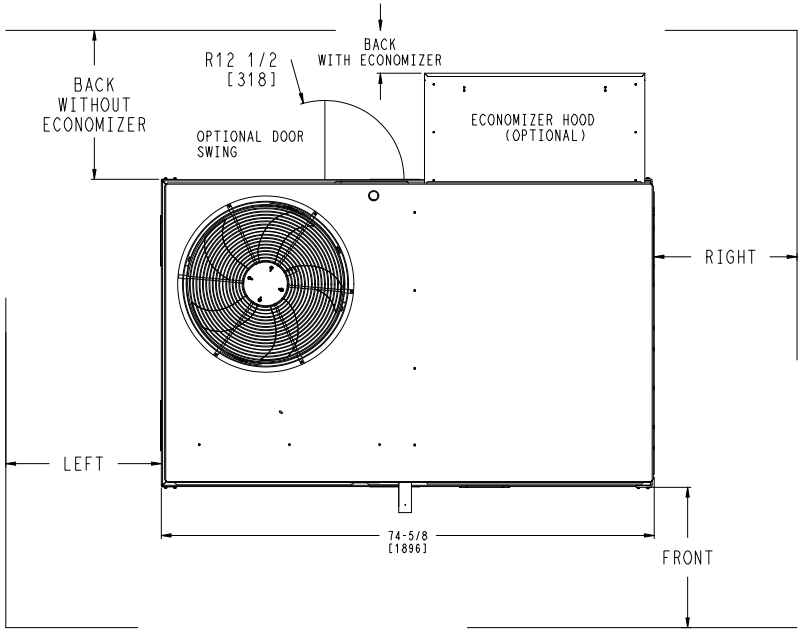
* STANDARD UNIT WEIGHT IS WITH LOW GAS HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.



TOP



FRONT



NOTES:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

	CLEARANCE		
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/HOOD	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

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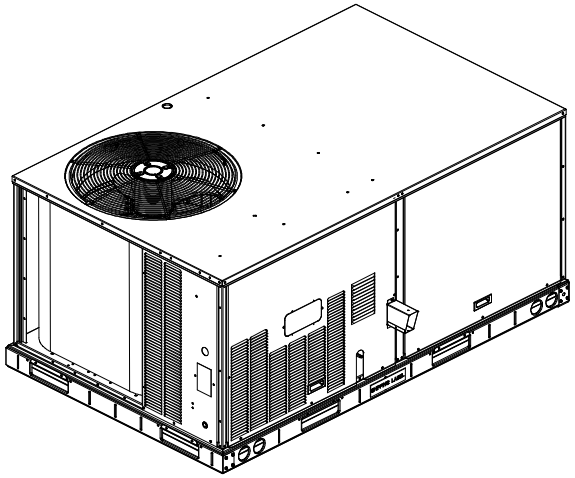
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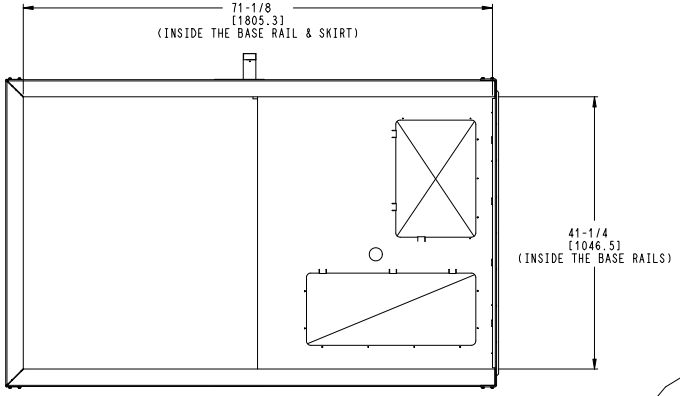
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	09/07/18	06/22/18	48FC 04-07 SINGLE PACKAGE ELECTRICAL COOLING WITH GAS HEAT	48TC003093	A

Carrier — United Technologies

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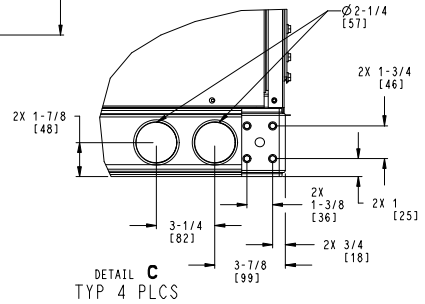
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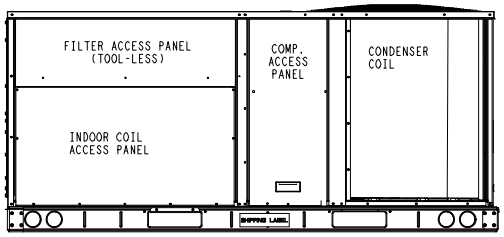


INSIDE BASERAIL DIMENSIONS

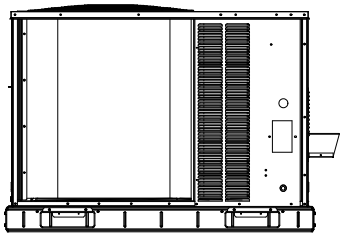
BOTTOM



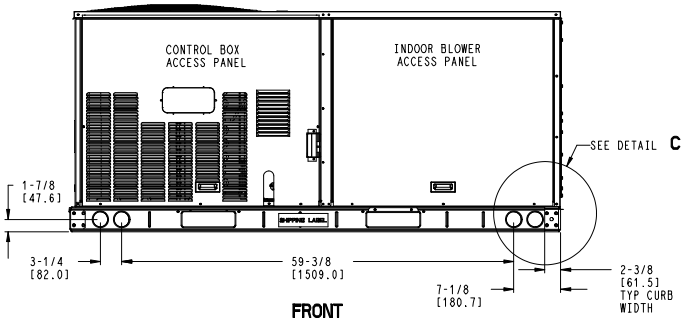
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	09/07/18	06/22/18	48FC 04-07 SINGLE PACKAGE ELECTRICAL COOLING WITH GAS HEAT	48TC003093	A

Part Number:48FCGA06A2M6-3A0A0

ARI SEER:	**14.00**	
ARI SEER2:	**13.40**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**33.4**	in

Operating Weight

Base Unit Weight:	**586**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**13**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**601**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**2000**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**59.3**	F
Evaporator Leaving Air WB:	**57.7**	F
Evaporator Leaving Air Enthalpy:	**24.85**	BTU/lb
Gross Cooling Capacity:	**59.31**	MBH
Gross Sensible Capacity:	**44.73**	MBH
Compressor Power Input:	**4.14**	kW
Coil Bypass Factor:	**0.163**	

Heating Performance

Heating Airflow:	**2000**	CFM
Entering Air Temp:	**70.0**	F
Leaving Air Temp:	**92.7**	F
Gas Heating Input Capacity:	**60.0**	MBH
Gas Heating Output Capacity:	**49.0**	MBH
Temperature Rise:	**22.7**	F
Thermal Efficiency (%):	**81.0**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**2363**	
Fan Power:	**1.42**	BHP
NOTE:	**Selected IFM RPM Range: 1478 - 2390**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**
Compressor #1 RLA:	**7.8**
Compressor #1 LRA:	**52**
Indoor Fan Motor Type:	**MED**
Indoor Fan Motor FLA (Total):	**2.1**
Combustion Fan Motor FLA (ea):	**0.25**

Power Supply MCA: **13**
Power Supply MOCP (Fuse or HACR): **20**
Disconnect Size FLA: **12**
Disconnect Size LRA: **57**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

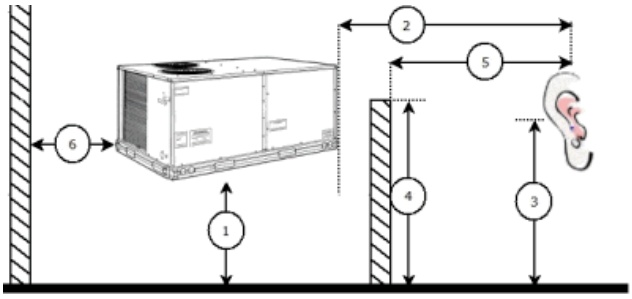
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	96.7	94.7	85.6
125 Hz	88.5	84.6	84.7
250 Hz	82.7	75.5	80.5
500 Hz	77.7	71.8	76.0
1000 Hz	75.3	72.6	72.4
2000 Hz	72.1	63.5	68.0
4000 Hz	67.9	57.6	62.8
8000 Hz	62.9	50.2	59.3
A-Weighted	81.7	76.8	79.0

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

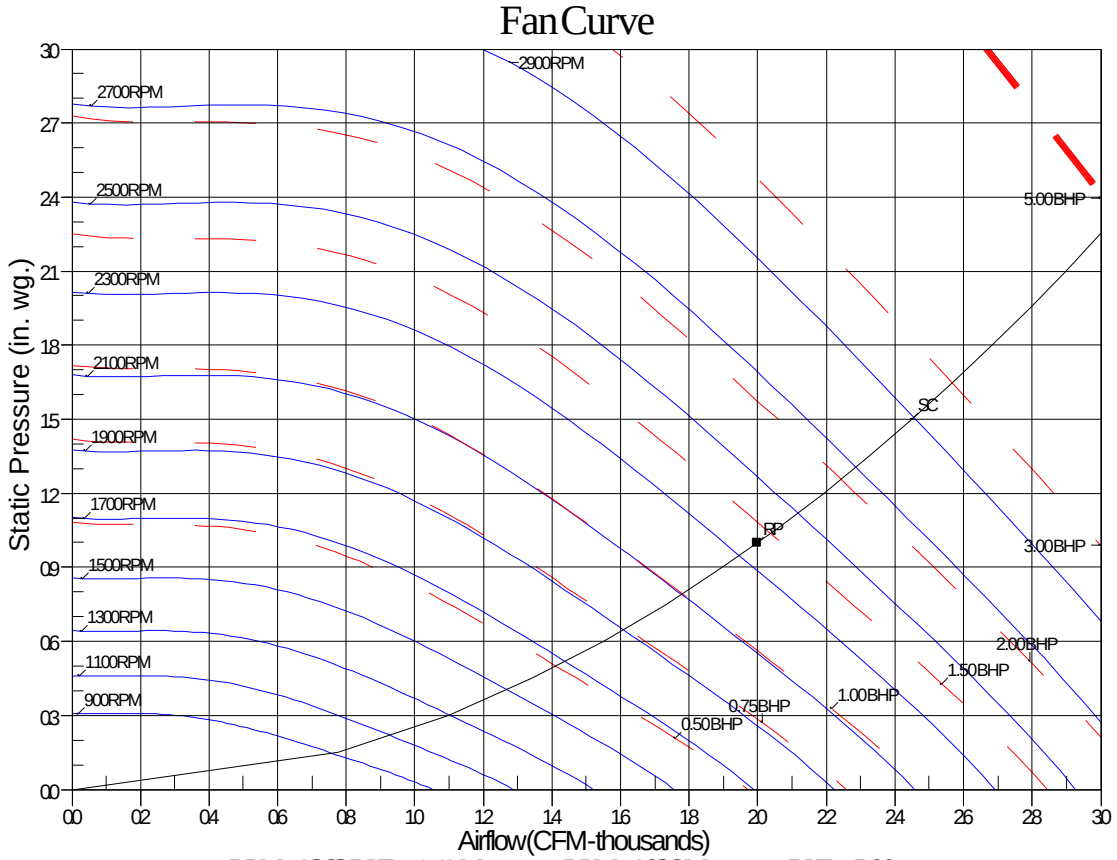
Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	85.6	84.7	80.5	76.0	72.4	68.0	62.8	59.3	89.2 Lw
B	59.4	68.6	71.9	72.8	72.4	69.2	63.8	58.2	78.5 LwA
C	53.2	52.3	48.1	43.6	40.0	35.6	30.4	26.9	56.8 Lp
D	27.0	36.2	39.5	40.4	40.0	36.8	31.4	25.8	46.1 LpA

Legend
A Sound Power Levels at Unit's Acoustic Center, Lw

B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



South Bldg/Bldg L - 7,8,11,12

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For South Bldg/Bldg L - 7,8,11,12

Project: Lynwood Unified Mark Twain ES 10/31/2023
Prepared By: 10:13AM

Unit Parameters

Unit Model: **48FCGA05A2M6-3A0A0**
Unit Size: **05 (4 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Gas**
Heat Control: **Ultra Low NOx, Low Heat**
Duct Cfg: **Vertical Supply / Vertical Return**
DX Options: **Standard One Stage Cooling Models**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **2' 9.375"**
Total Operating Weight: **588** lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Gas Line Size: **1/2**
Condensate Drain Line Size: **3/4**
Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **2**
Return Air Filter Size: **16 x 25 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

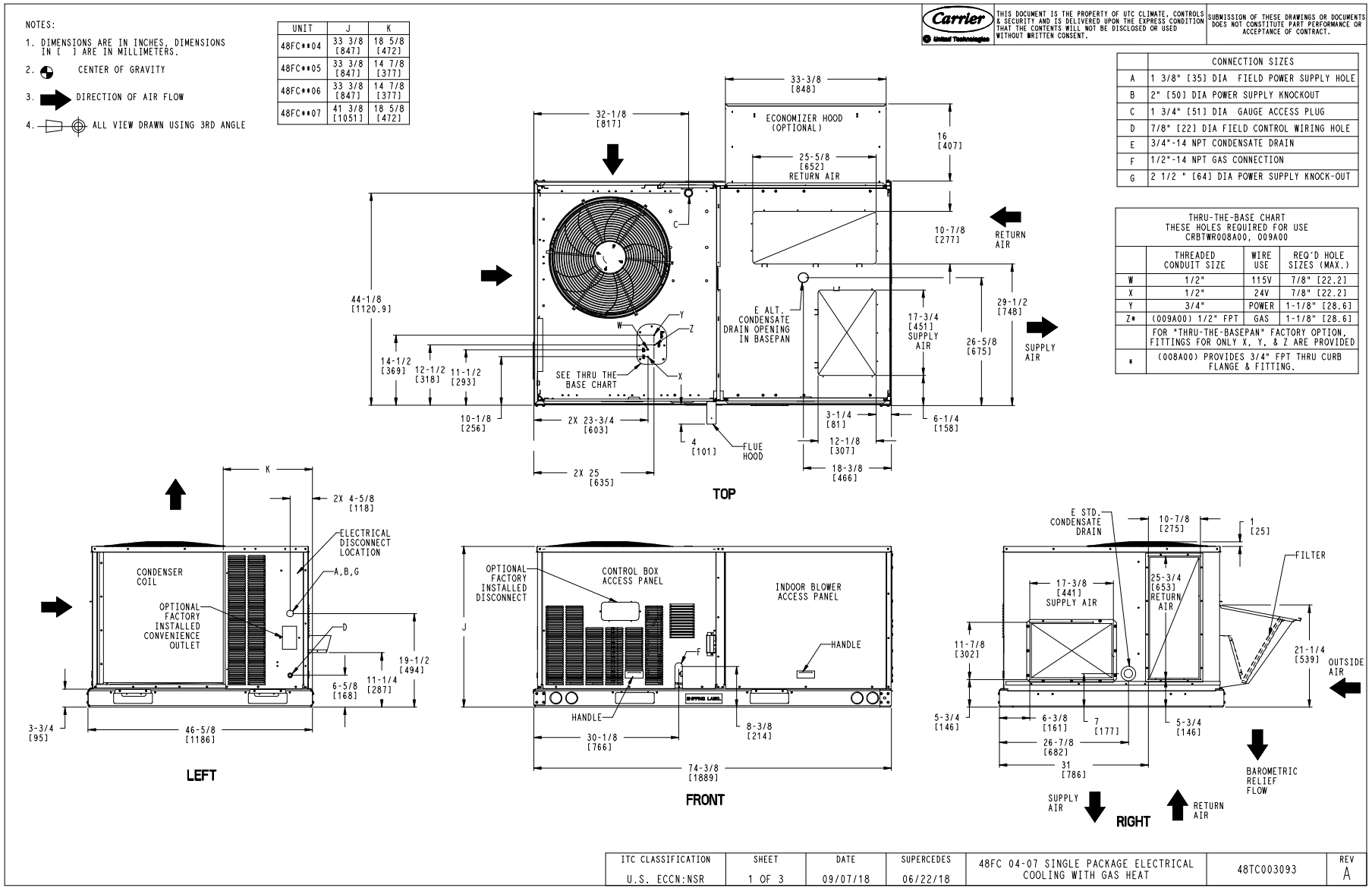
1-Year parts(std.)
5-Year compressor parts(std.)
3-Year SystemVu

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

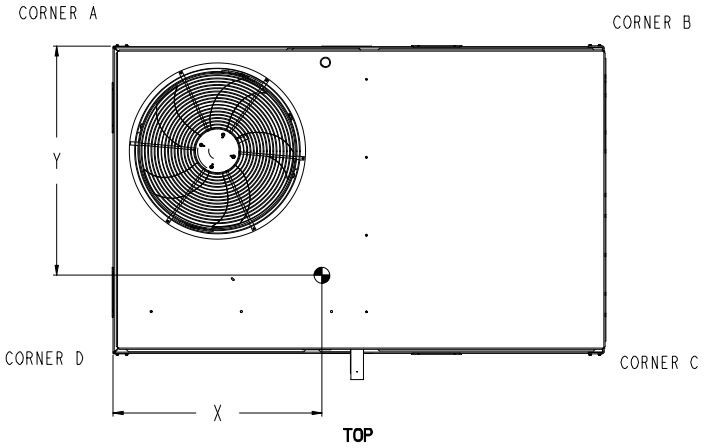
Ordering Information

Part Number	Description	Quantity
48FCGA05A2M6-3A0A0	Rooftop Unit	4

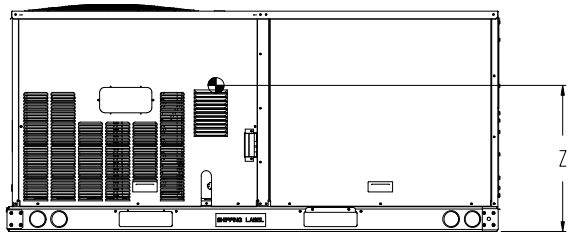

NOTES:
1. DIMENSIONS ARE IN INCHES. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE
UNIT | J | K
48FC**04 | 33 3/8 [847] | 18 5/8 [472]
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Carrier
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CONNECTION SIZES
A 1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B 2" [50] DIA POWER SUPPLY KNOCKOUT
C 1 3/4" [51] DIA GAUGE ACCESS PLUG
D 7/8" [22] DIA FIELD CONTROL WIRING HOLE
E 3/4"-14 NPT CONDENSATE DRAIN
F 1/2"-14 NPT GAS CONNECTION
G 2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT
THRU-THE-BASE CHART
THESE HOLES REQUIRED FOR USE CRBTWR008A00, 009A00
THREADED CONDUIT SIZE | WIRE USE | REQ'D HOLE SIZES (MAX.)
W 1/2" 115V 7/8" [22.2]
X 1/2" 24V 7/8" [22.2]
Y 3/4" POWER 1-1/8" [28.6]
Z* (009A00) 1/2" FPT GAS 1-1/8" [28.6]
FOR *THRU-THE-BASEPAN* FACTORY OPTION, FITTINGS FOR ONLY X, Y, & Z ARE PROVIDED
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33-3/8 [848]
32-1/8 [817]
ECONOMIZER HOOD (OPTIONAL)
25-5/8 [652] RETURN AIR
16 [407]
10-7/8 [277]
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44-1/8 [1120.9]
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ELECTRICAL DISCONNECT LOCATION
A,B,G
CONDENSER COIL
OPTIONAL FACTORY INSTALLED CONVENIENCE OUTLET
D
19-1/2 [494]
11-1/4 [287]
6-5/8 [168]
3-3/4 [95]
46-5/8 [1186]
LEFT
OPTIONAL FACTORY INSTALLED DISCONNECT
CONTROL BOX ACCESS PANEL
INDOOR BLOWER ACCESS PANEL
J
F
HANDLE
HANDLE
30-1/8 [766]
8-3/8 [214]
74-3/8 [1889]
FRONT
E STD. CONDENSATE DRAIN
10-7/8 [275]
1 [25]
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21-1/4 [539]
OUTSIDE AIR
5-3/4 [146]
6-3/8 [161]
7 [177]
5-3/4 [146]
26-7/8 [682]
31 [786]
BAROMETRIC RELIEF FLOW
SUPPLY AIR
RETURN AIR
RIGHT
ITC CLASSIFICATION U.S. ECCN:NSR
SHEET 1 OF 3
DATE 09/07/18
SUPERCEDES 06/22/18
48FC 04-07 SINGLE PACKAGE ELECTRICAL COOLING WITH GAS HEAT
48TC003093
REV A

UNIT	STD. UNIT WEIGHT *		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
48FC**04	482	219	113	51	116	53	128	58	125	57	37 5/8 [956]	24 9/16 [624]	18 1/4 [464]
48FC**05	543	246	138	63	133	60	133	60	138	63	36 1/2 [927]	23 3/8 [594]	18 [457]
48FC**06	556	252	142	64	136	62	136	62	142	64	36 1/2 [927]	23 3/8 [594]	18 [457]
48FC**07	607	275	162	73	152	69	141	64	151	68	36 [914]	22 1/2 [572]	19 3/8 [492]

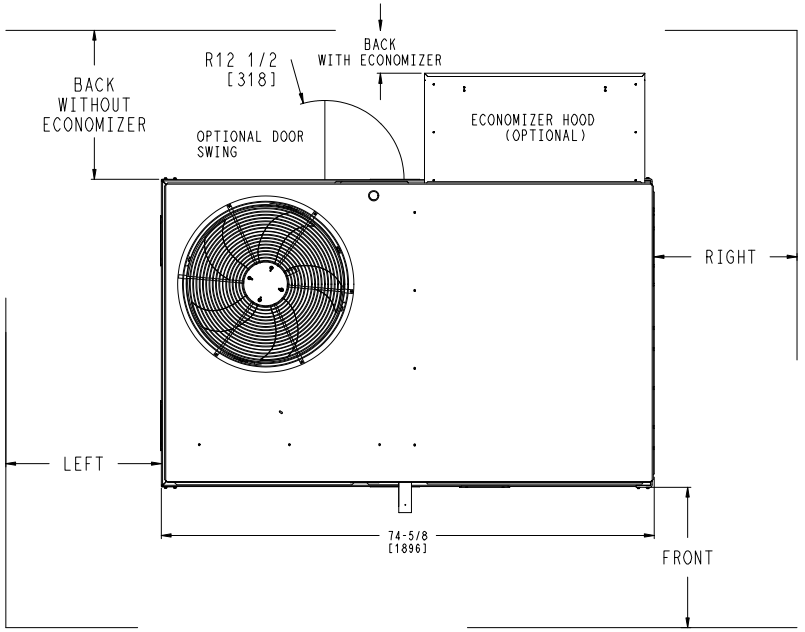
* STANDARD UNIT WEIGHT IS WITH LOW GAS HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.



TOP



FRONT



Carrier — United Technologies

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NOTES:

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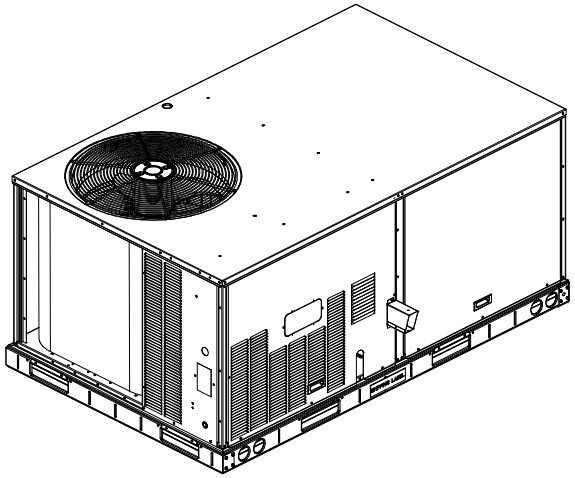
	CLEARANCE		
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/HOOD	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

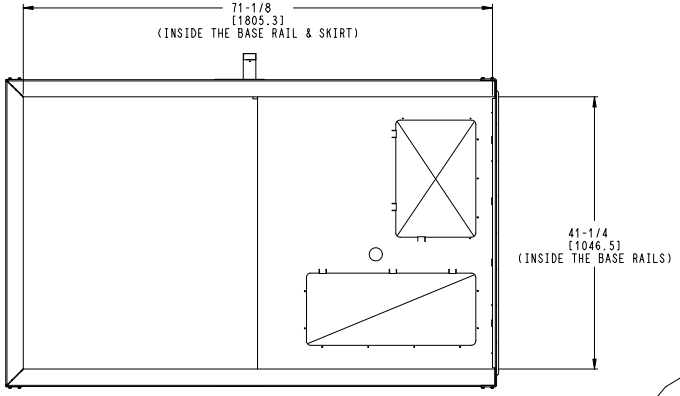
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	09/07/18	06/22/18	48FC 04-07 SINGLE PACKAGE ELECTRICAL COOLING WITH GAS HEAT	48TC003093	A

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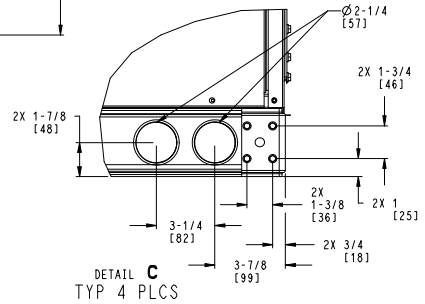
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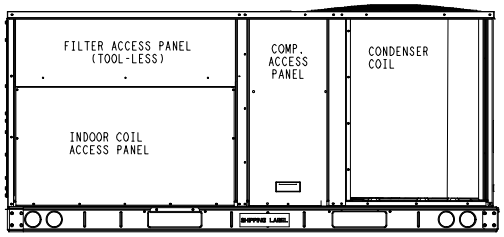


INSIDE BASERAIL DIMENSIONS

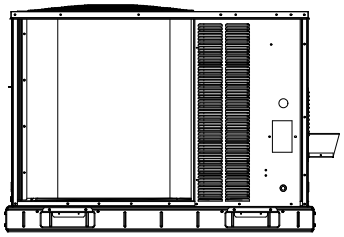
BOTTOM



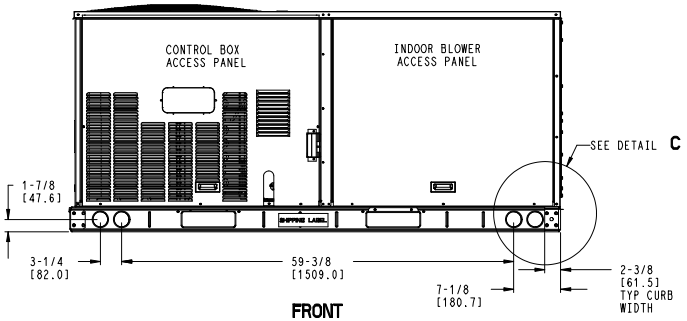
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	09/07/18	06/22/18	48FC 04-07 SINGLE PACKAGE ELECTRICAL COOLING WITH GAS HEAT	48TC003093	A

Part Number:48FCGA05A2M6-3A0A0

ARI SEER:	**14.00**	
ARI SEER2:	**13.40**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**33.4**	in

Operating Weight

Base Unit Weight:	**573**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**13**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**588**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**1600**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**60.1**	F
Evaporator Leaving Air WB:	**57.5**	F
Evaporator Leaving Air Enthalpy:	**24.71**	BTU/lb
Gross Cooling Capacity:	**48.41**	MBH
Gross Sensible Capacity:	**34.31**	MBH
Compressor Power Input:	**3.44**	kW
Coil Bypass Factor:	**0.129**	

Heating Performance

Heating Airflow:	**1600**	CFM
Entering Air Temp:	**70.0**	F
Leaving Air Temp:	**98.4**	F
Gas Heating Input Capacity:	**60.0**	MBH
Gas Heating Output Capacity:	**49.0**	MBH
Temperature Rise:	**28.4**	F
Thermal Efficiency (%):	**81.0**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**2114**	
Fan Power:	**1.02**	BHP
NOTE:	**Selected IFM RPM Range: 1262 - 2170**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**	
Compressor #1 RLA:	**6.2**	
Compressor #1 LRA:	**41**	
Indoor Fan Motor Type:	**MED**	
Indoor Fan Motor FLA (Total):	**1.7**	
Combustion Fan Motor FLA (ea):	**0.25**	

Power Supply MCA: **11**
Power Supply MOCP (Fuse or HACR): **15**
Disconnect Size FLA: **10**
Disconnect Size LRA: **45**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

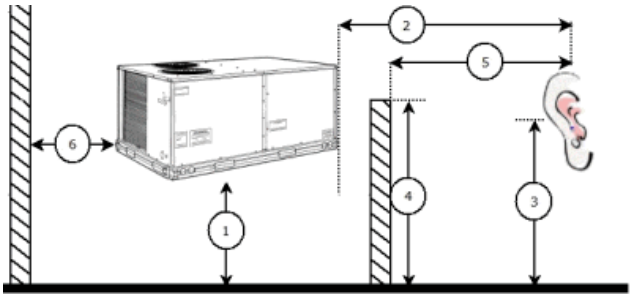
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	95.9	92.9	85.6
125 Hz	87.3	82.3	84.7
250 Hz	81.1	74.5	80.5
500 Hz	74.9	68.8	76.0
1000 Hz	72.1	70.0	72.4
2000 Hz	68.8	61.0	68.0
4000 Hz	65.4	55.2	62.8
8000 Hz	61.4	48.0	59.3
A-Weighted	79.4	74.5	79.0

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

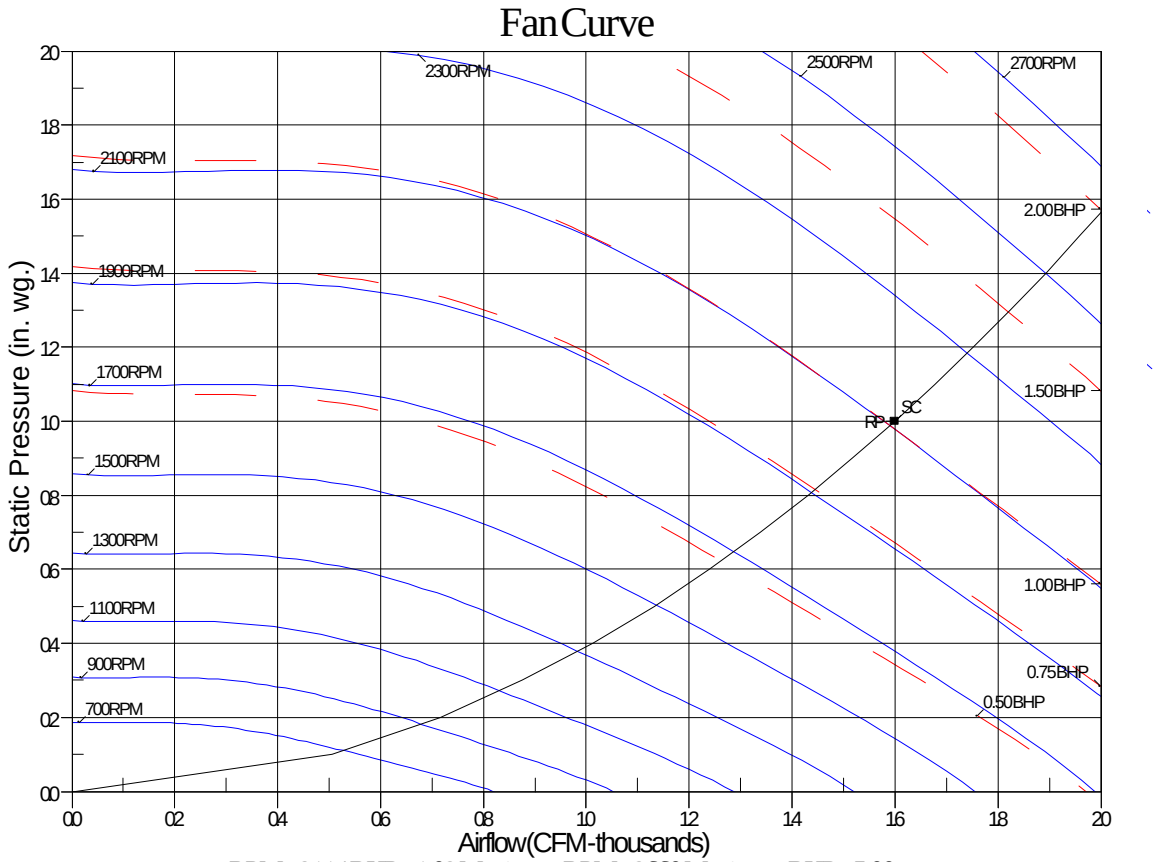
Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	85.6	84.7	80.5	76.0	72.4	68.0	62.8	59.3	89.2 Lw
B	59.4	68.6	71.9	72.8	72.4	69.2	63.8	58.2	78.5 LwA
C	53.2	52.3	48.1	43.6	40.0	35.6	30.4	26.9	56.8 Lp
D	27.0	36.2	39.5	40.4	40.0	36.8	31.4	25.8	46.1 LpA

Legend
A Sound Power Levels at Unit's Acoustic Center, Lw

B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



South Bldg/Bldg L - 6,9

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report

Unit Report For South Bldg/Bldg L - 6,9

Project: Lynwood Unified Mark Twain ES 10/31/2023
Prepared By: 10:13AM

Unit Parameters

Unit Model: **48FCDM07A2M6-3A0A0**
Unit Size: **07 (6 Tons)**
Volts-Phase-Hertz: **460-3-60**
Heating Type: **Gas**
Heat Control: **Low Heat**
Duct Cfg: **Vertical Supply / Vertical Return**
DX Options: **Single Circuit, Two Stage Cooling (07 only)**

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: **6' 2.375"**
Unit Width: **3' 10.625"**
Unit Height: **3' 5.375"**
Total Operating Weight: **626** lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Gas Line Size: **1/2**
Condensate Drain Line Size: **3/4**
Return Air Filter Type: **Throwaway**
Return Air Filter Quantity: **4**
Return Air Filter Size: **16 x 16 x 2**

Selection includes construction throwaway filter into the base fan curve.

Unit Configuration

Direct Drive - EcoBlue - Medium Static
Al/Cu - Al/Cu - Louvered Hail Guards
SystemVu Controls
Standard Packaging

Warranty Information

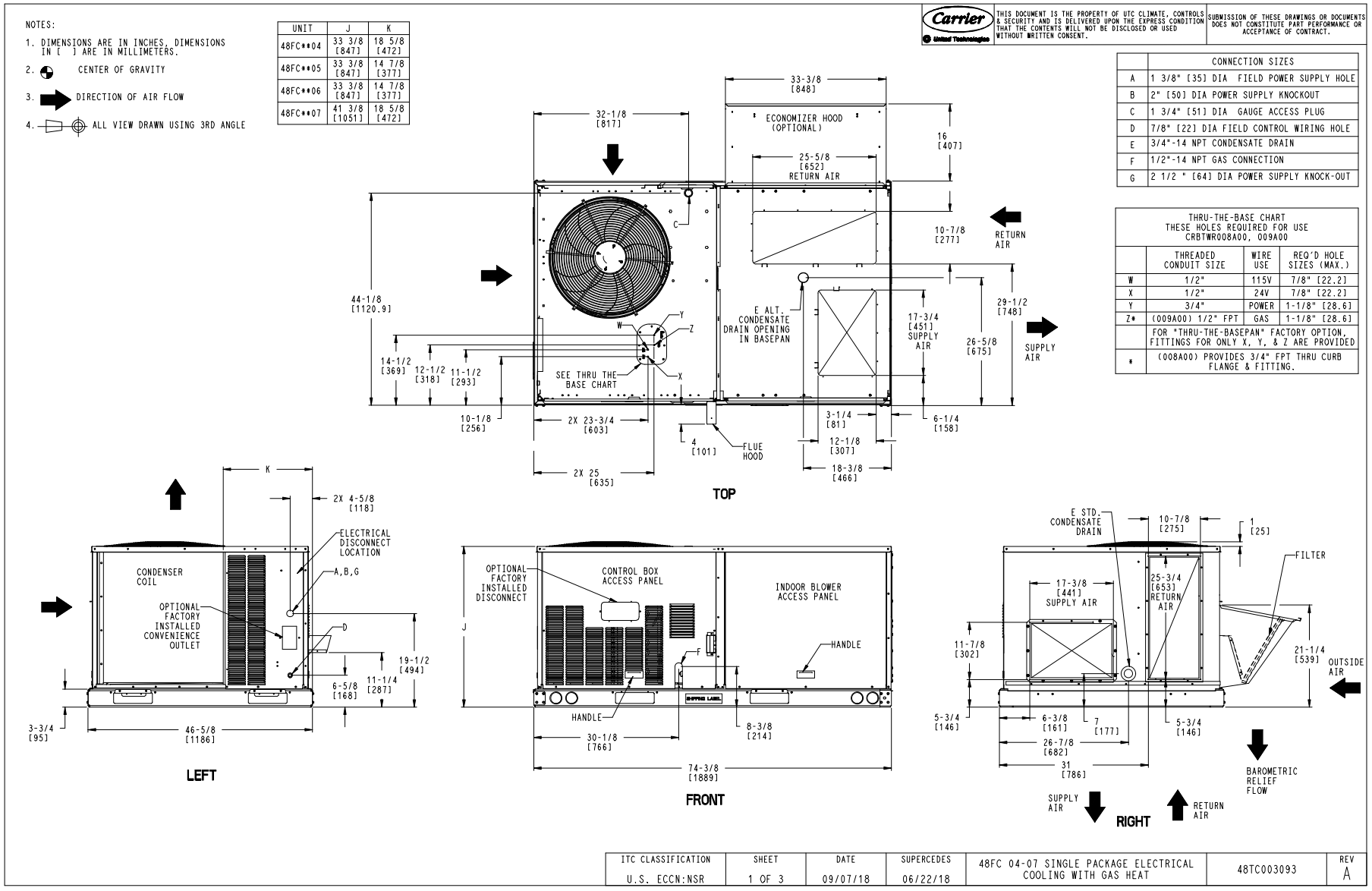
1-Year parts(std.)
5-Year compressor parts(std.)
10-Year heat exchanger - Aluminized(std.)
3-Year SystemVu

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

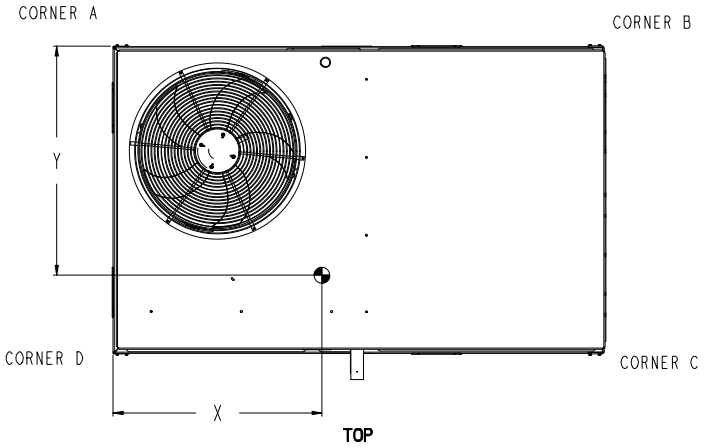
Ordering Information

Part Number	Description	Quantity
48FCDM07A2M6-3A0A0	Rooftop Unit	2

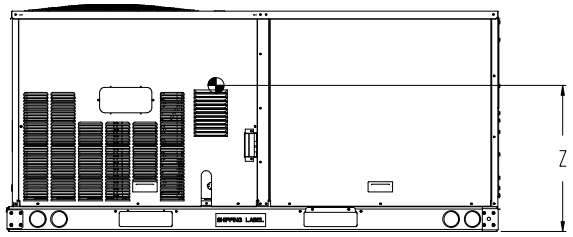

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ITC CLASSIFICATION U.S. ECCN:NSR
SHEET 1 OF 3
DATE 09/07/18
SUPERCEDES 06/22/18
48FC 04-07 SINGLE PACKAGE ELECTRICAL COOLING WITH GAS HEAT
48TC003093
REV A

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48FC**06	556	252	142	64	136	62	136	62	142	64	36 1/2 [927]	23 3/8 [594]	18 [457]
48FC**07	607	275	162	73	152	69	141	64	151	68	36 [914]	22 1/2 [572]	19 3/8 [492]

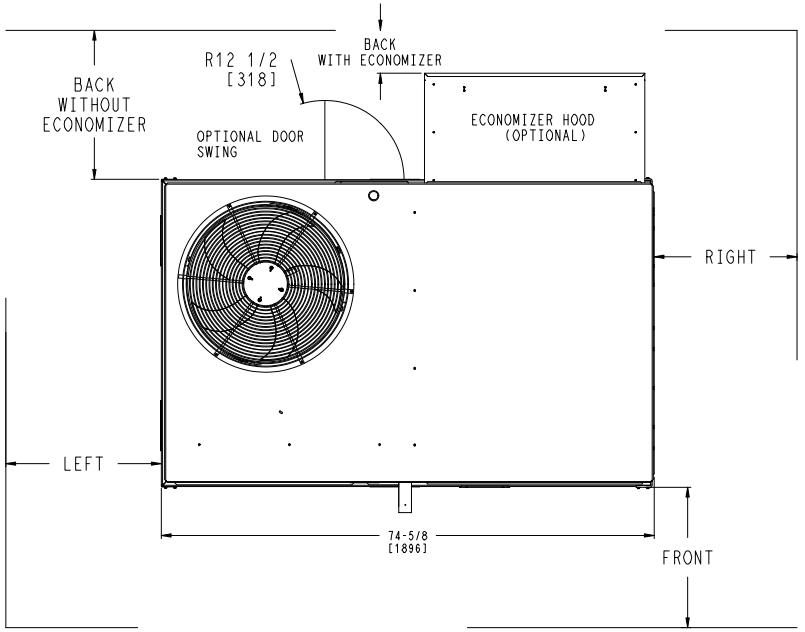
* STANDARD UNIT WEIGHT IS WITH LOW GAS HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.



TOP



FRONT



NOTES:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

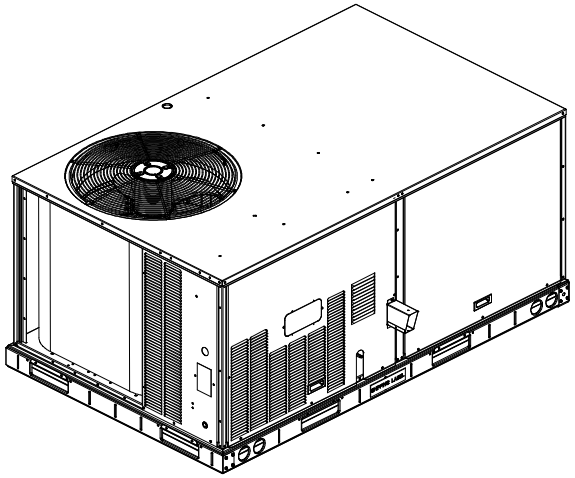
CLEARANCE			
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/HOOD	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

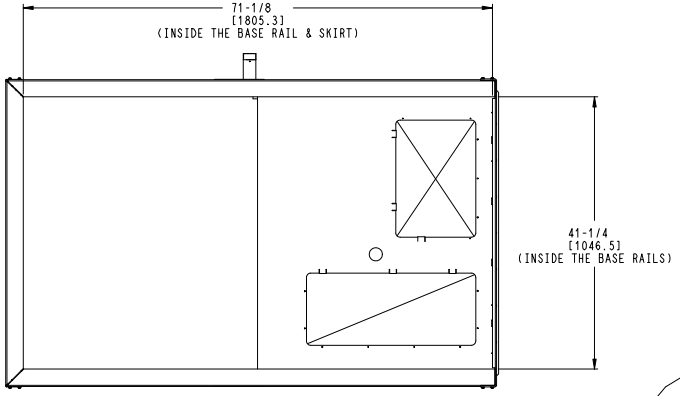
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SUBMISSION OF THESE DRAWINGS OR DOCUMENTS DOES NOT CONSTITUTE PART PERFORMANCE OR ACCEPTANCE OF CONTRACT.

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	09/07/18	06/22/18	48FC 04-07 SINGLE PACKAGE ELECTRICAL COOLING WITH GAS HEAT	48TC003093	A

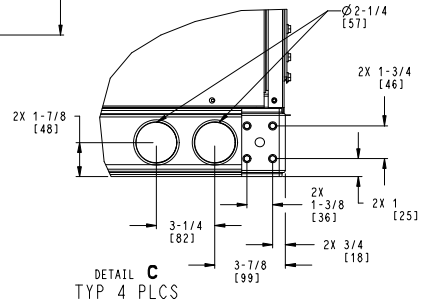
Carrier | THIS DOCUMENT IS THE PROPERTY OF UTC CLIMATE, CONTROLS & SECURITY AND IS DELIVERED UPON THE EXPRESS CONDITION THAT THE CONTENTS WILL NOT BE DISCLOSED OR USED WITHOUT WRITTEN CONSENT. | SUBMISSION OF THESE DRAWINGS OR DOCUMENTS DOES NOT CONSTITUTE PART PERFORMANCE OR ACCEPTANCE OF CONTRACT.



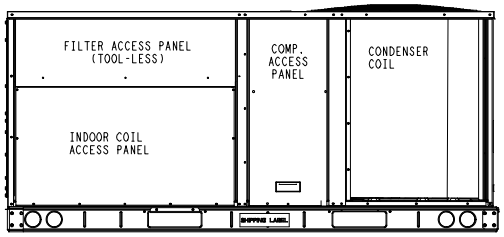


INSIDE BASERAIL DIMENSIONS

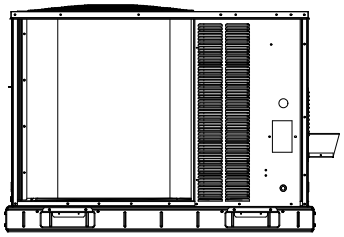
BOTTOM



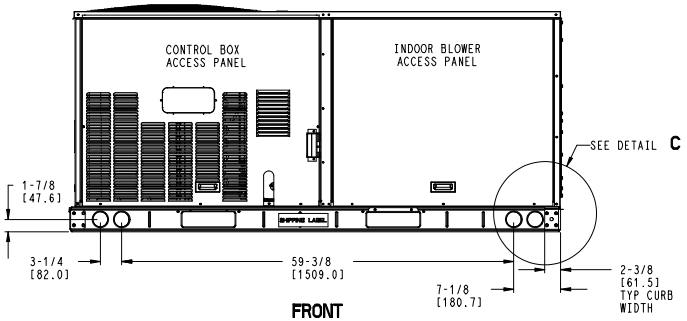
DETAIL **C**
TYP 4 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	09/07/18	06/22/18	48FC 04-07 SINGLE PACKAGE ELECTRICAL COOLING WITH GAS HEAT	48TC003093	A

Part Number:48FCDM07A2M6-3A0A0

ARI EER:	**11.00**	
IEER:	**15.0**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**41.4**	in

Operating Weight

Base Unit Weight:	**607**	lb
Al/Cu - Al/Cu - Louvered Hail Guards:	**17**	lb
SystemVu Controls:	**2**	lb
Total Operating Weight:	**626**	lb

Unit

Unit Voltage-Phase-Hertz:	**460-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Vane Axial**	
Actual Airflow:	**2100**	CFM
Site Altitude:	**0**	ft

Cooling Performance

Condenser Entering Air DB:	**95.0**	F
Evaporator Entering Air DB:	**80.0**	F
Evaporator Entering Air WB:	**67.0**	F
Entering Air Enthalpy:	**31.44**	BTU/lb
Evaporator Leaving Air DB:	**57.1**	F
Evaporator Leaving Air WB:	**56.2**	F
Evaporator Leaving Air Enthalpy:	**23.91**	BTU/lb
Gross Cooling Capacity:	**71.15**	MBH
Gross Sensible Capacity:	**52.00**	MBH
Compressor Power Input:	**5.27**	kW
Coil Bypass Factor:	**0.083**	

Heating Performance

Heating Airflow:	**2100**	CFM
Entering Air Temp:	**70.0**	F
Leaving Air Temp:	**93.8**	F
Gas Heating Input Capacity:	**67.0**	MBH
Gas Heating Output Capacity:	**54.0**	MBH
Temperature Rise:	**23.8**	F
Thermal Efficiency (%):	**81.0**	

Supply Fan

External Static Pressure:	**1.00**	in wg
Fan RPM:	**2310**	
Fan Power:	**1.32**	BHP
NOTE:	**Selected IFM RPM Range: 1596 - 2530**	

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Electrical Data

Voltage Range:	**414 - 506**
Compressor #1 RLA:	**8.4**
Compressor #1 LRA:	**66**
Indoor Fan Motor Type:	**MED**
Indoor Fan Motor FLA (Total):	**2.6**
Combustion Fan Motor FLA (ea):	**0.25**

Power Supply MCA: **14**
Power Supply MOCP (Fuse or HACR): **20**
Disconnect Size FLA: **14**
Disconnect Size LRA: **72**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 0.8**

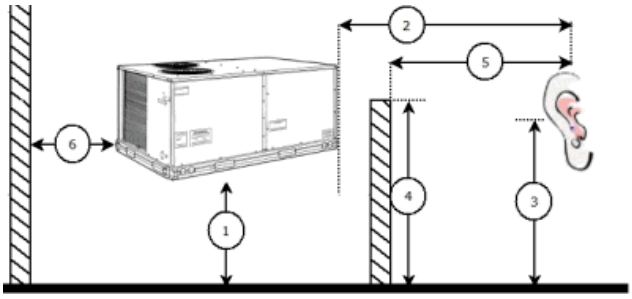
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	95.5	93.8	85.6
125 Hz	87.2	83.5	84.7
250 Hz	81.4	74.8	80.5
500 Hz	77.1	70.8	76.0
1000 Hz	74.5	71.9	72.4
2000 Hz	71.4	62.7	68.0
4000 Hz	67.3	56.7	62.8
8000 Hz	62.5	49.6	59.3
A-Weighted	80.8	76.0	79.0

Advanced Acoustics



Advanced Accoustics Parameters

1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

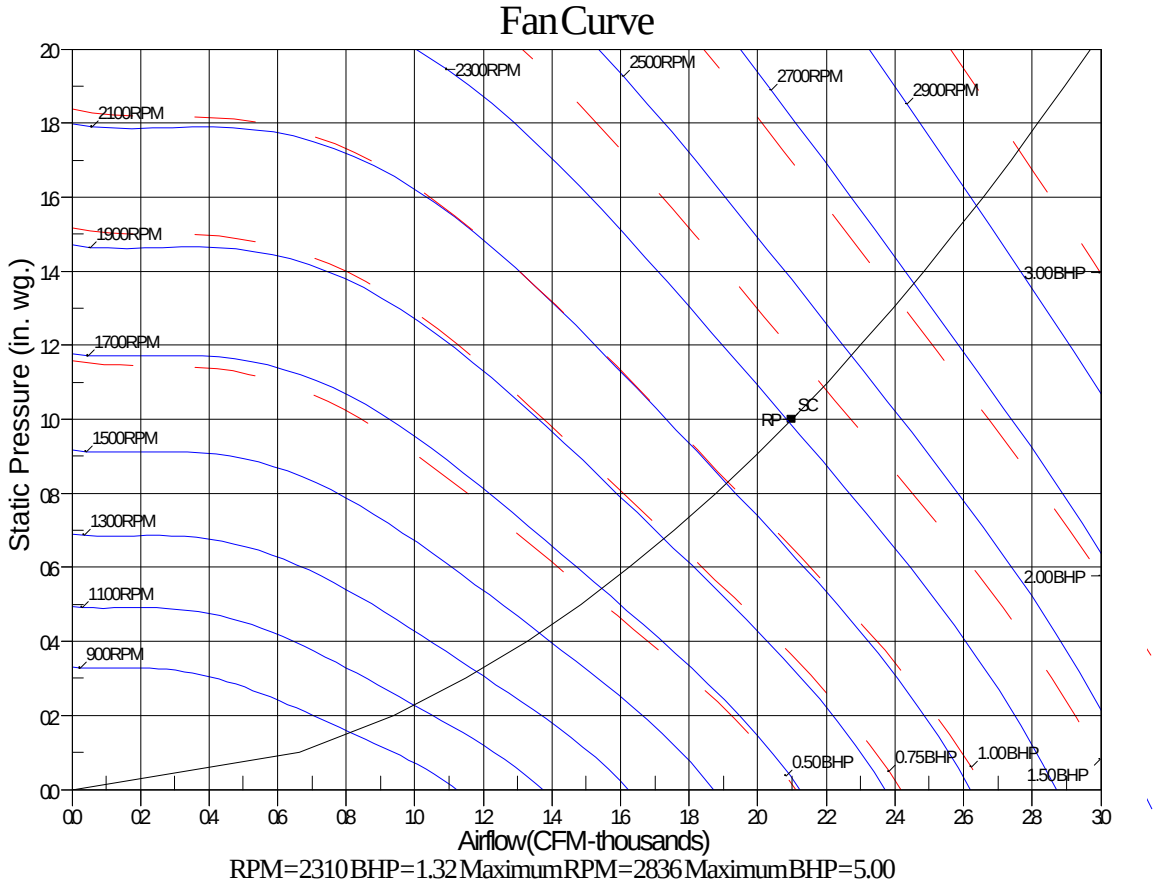
Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	85.6	84.7	80.5	76.0	72.4	68.0	62.8	59.3	89.2 Lw
B	59.4	68.6	71.9	72.8	72.4	69.2	63.8	58.2	78.5 LwA
C	53.2	52.3	48.1	43.6	40.0	35.6	30.4	26.9	56.8 Lp
D	27.0	36.2	39.5	40.4	40.0	36.8	31.4	25.8	46.1 LpA

Legend
A Sound Power Levels at Unit's Acoustic Center, Lw

B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



SECTION II. ROOFTOP UNIT ACCESSORIES

CanFab
CANNON FABRICATION INC
182 GRANITE STREET, SUITE 101, CORONA, CA 92879
PHONE: (951)278-1830 FAX: (951)278-8444 www.canfab.com canfab@canfab.com

CARRIER 3 - 5 TON
48/50 ES, EZ, 48/50VL-A 42-60, 48/50 VT-A, VG, 48/50VR, XL, XT-A 36-60

PART NO: SEE BELOW

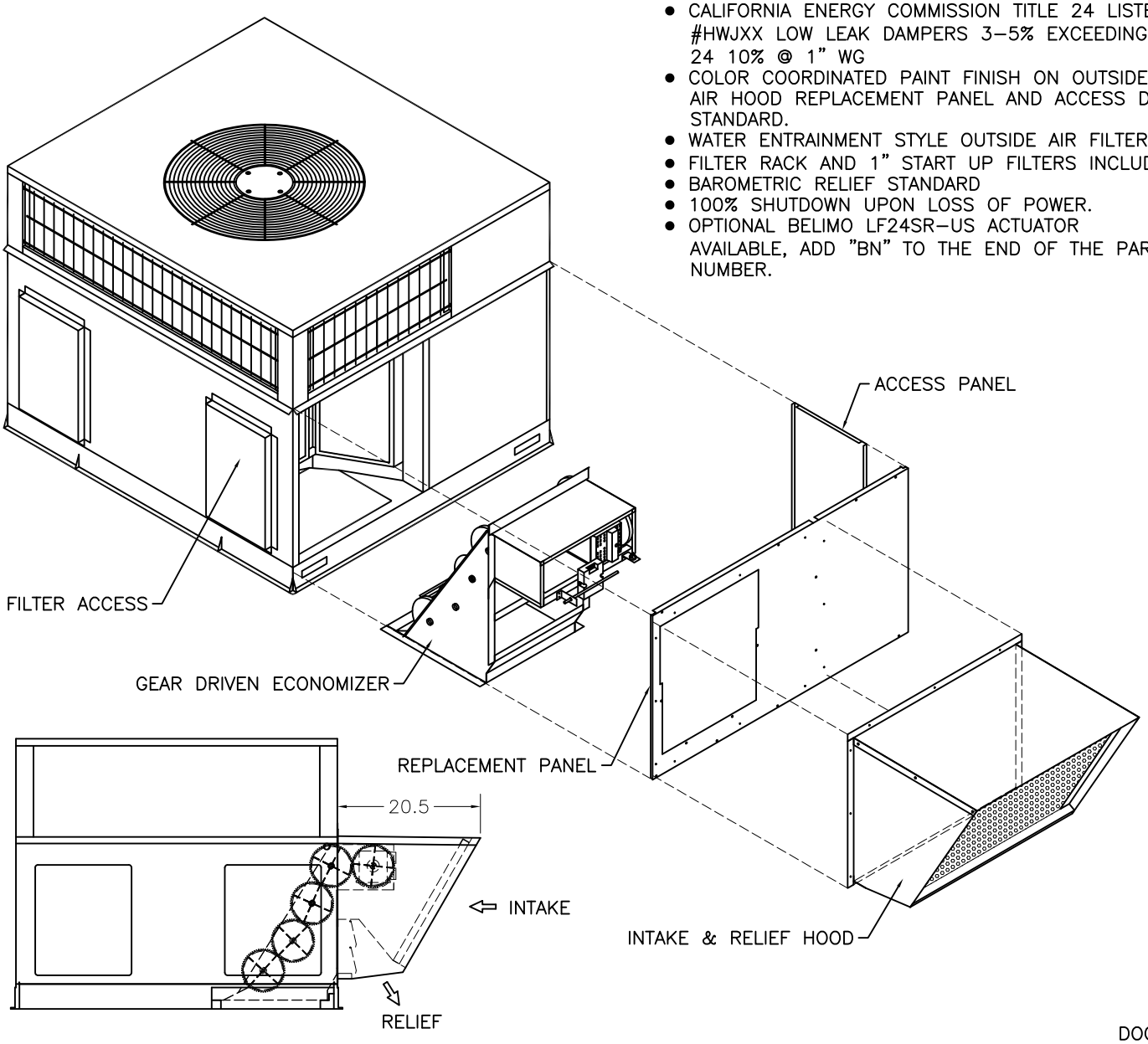
DEDICATED DOWN DISCHARGE ECONOMIZER

REPLACES 1103-EC ECONOMIZER

For: E3, B1

PART NUMBER	SHIPPING WEIGHT
1161-EC	84 LBS.

- GEAR DRIVEN HONEYWELL JADE FDD MODULATING DRYBULB CONTROL SYSTEM. OPTIONS: ENTHALPY " HE"; COMPARATIVE ENTHALPY "-HC"
- CALIFORNIA ENERGY COMMISSION TITLE 24 LISTED #HWJXX LOW LEAK DAMPERS 3-5% EXCEEDING TITLE 24 10% @ 1" WG
- COLOR COORDINATED PAINT FINISH ON OUTSIDE AIR HOOD REPLACEMENT PANEL AND ACCESS DOOR STANDARD.
- WATER ENTRAINMENT STYLE OUTSIDE AIR FILTER.
- FILTER RACK AND 1" START UP FILTERS INCLUDED.
- BAROMETRIC RELIEF STANDARD
- 100% SHUTDOWN UPON LOSS OF POWER.
- OPTIONAL BELIMO LF24SR-US ACTUATOR AVAILABLE, ADD "BN" TO THE END OF THE PART NUMBER.



DOC: 01-01

PROJECT: DATE:

ENGINEER: DISTRIBUTOR:

DRAWING NUMBER:

OPTIONS:
MATERIAL: 18ga. GALV STEEL
INSULATED PANELS (WHERE REQUIRED)
1" 1-1/2LB DUCT INSULATION (R VALUE 3.85)
GASKET PROVIDED WITH CURB
1 1/2" ADDED TO EXISTING CURB O.D.

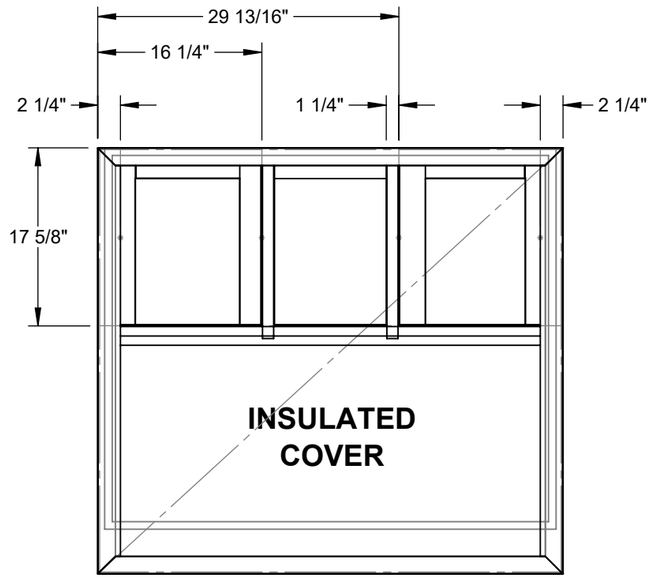
DIMENSIONED AND TOLERENCED PER ANSI Y14.5M-1982

Attn:_____

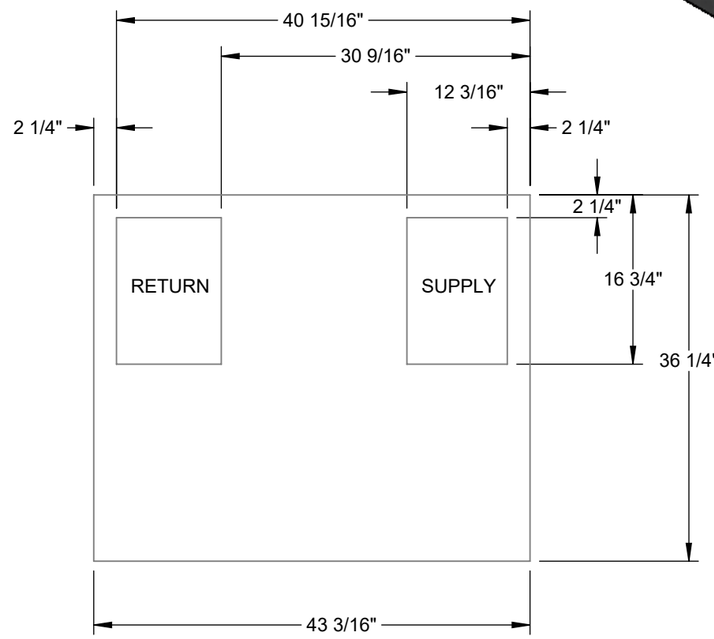
Tag: For: E3

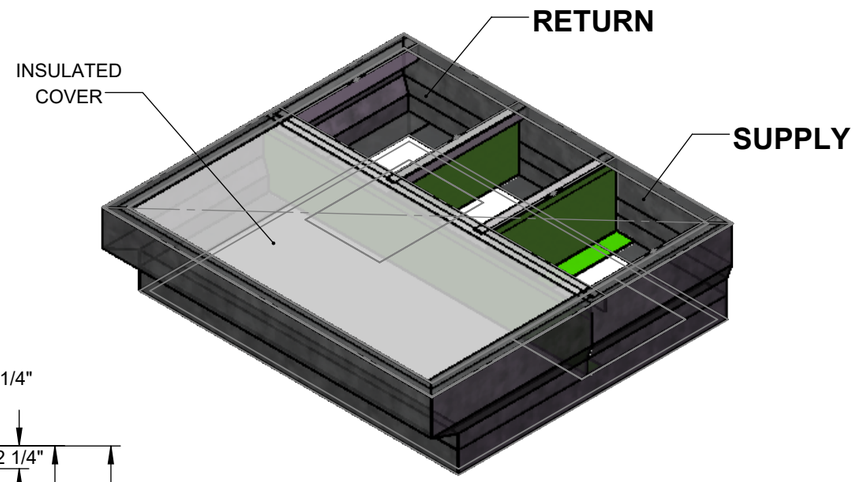
Approval:_____

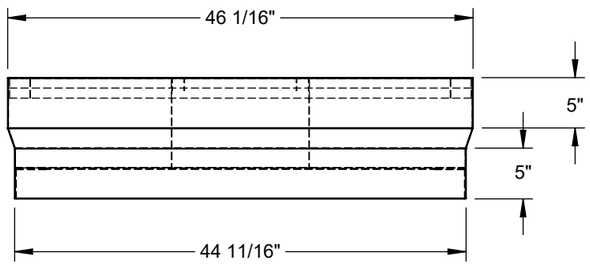
REVISIONS				
REV.	ECO#	DESCRIPTION	DATE	APPROVED
1		INITIAL DRAWING	3/7/11	SRP
2		REMOVE TOP OUTER FLANGE	10/20/2011	GKF
3		CHANGED TO HEM CURB	2/4/21	SRP

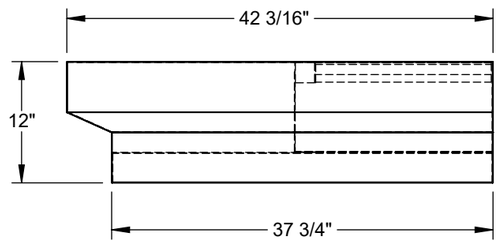


EXISTING CURB LAYOUT









CURB SHOWN IS CDI STANDARD CONFIGURATION CDI RESERVES THE RIGHT TO CHANGE LAYOUT WITHOUT NOTIFICATION. IF CURB IS NEEDED IN A DIFFERENT CONFIGURATION CDI MUST BE NOTIFIED PRIOR TO PLACING AN ORDER.

OPERATIONAL HEIGHT OF CDI ADAPTER IS 3" LESS THAN OVERALL CURB HEIGHT SHOWN.

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APPROVALS	DATE
DRAWN: spickar	2/5/2021
CHECKED:	

DIMENSIONS ARE AS FOLLOWS: 1.00 in [25.40 mm]

TITLE/FILE NAME: 1-4740-4023

*VERIFY EXISTING CURB OD
*VERIFY SUPPLY AND RETURN OPENINGS
*NOTE ANY CHANGES
*CALL WITH ANY QUESTIONS
*FAX BACK IF DRAWING IS OK AS IS

3RD ANGLE PROJECTION

CDI LITHIUM ION BATTERY SOLUTIONS
Contact us @ www.cdicurbs.com or 1-888-234-7001

APPROXIMATE CURB WEIGHT (LBS.): 46.97

ECO #:

REV: 1

SCALE: 1:15

SHEET: 1 OF 10

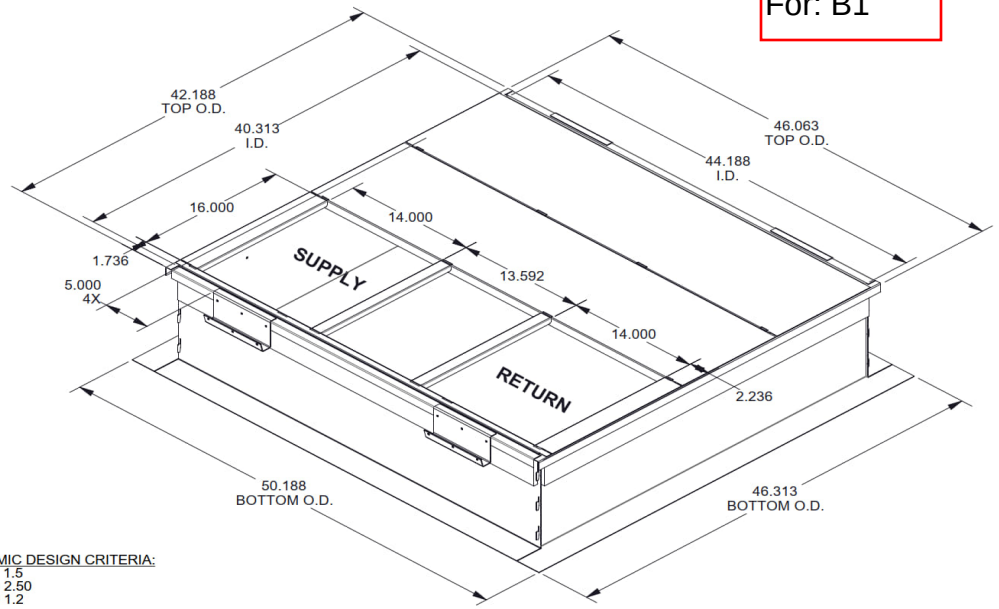
S:\PRODUCTION\TURRET\STOCK_CURBS\1-4740-4023\

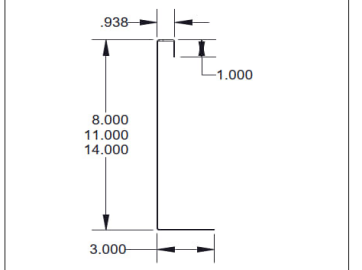
MicroMetl	Date: `	Weight: 65lbs (US) 29.48kg (Metric)	Part Number: CRBK-SPPLGHA-111H
	RTU:		
Submitted to:		Approved by:	Notes:

Knockdown Structurally Calculated Curb - 11 Inches Tall Non Insulated Full Perimeter Knockdown Structurally Calculated Curb, California State Standard, High Seismic Criteria, Includes Hold-Down Brackets. "Structurally" Stamped By A Professional Engineer, Without Pitch, Insulated Deck Pan If Applicable, Includes Wood Nailer & Hold Down Brackets. Meets Seismic Requirements for 2022 CBC & 2021 IBC. Wind Design Criteria: 60 Foot Tall Building Maximum, Exposure C, 155 MPH - 3 Second Gust Speed, Risk Category III & IV.

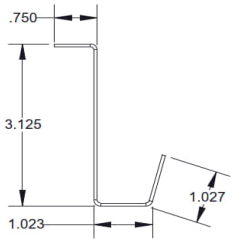
FORM NO.: _____

For: B1



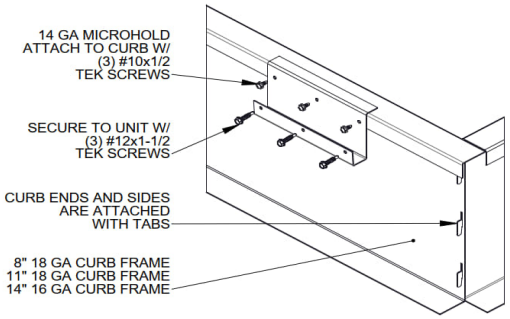


CURB END DETAIL

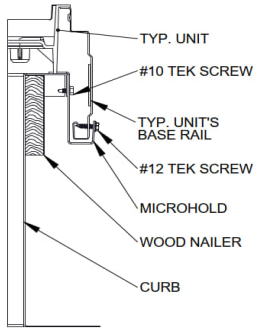


MICROHOLD DETAIL

KNOCK DOWN CURB CORNER DETAIL



UNIT TO CURB ATTACHMENT DETAIL



SEISMIC DESIGN CRITERIA:
- Ip = 1.5
- Ss = 2.50
- Fa = 1.2

WIND DESIGN CRITERIA:
- 60 FT. TALL BUILDING MAX.
- EXPOSURE C
- 155 MPH, 3-SECOND GUST WIND SPEED
- RISK CATEGORY III & IV

CURB MICROHOLD REQUIREMENTS:
- (2) MICROHOLDS PER LONG SIDE
- (0) MICROHOLDS PER SHORT SIDE

THE STANDARD PRODUCT DOES NOT INCLUDE THROUGH THE SIDE SERVICE HOLES

MicroMetl Corporation

CRBK-SPPLGHA-08 Series	08" TALL	57 LBS.
CRBK-SPPLGHA-11 Series	11" TALL	65 LBS.
CRBK-SPPLGHA-14 Series	14" TALL	80 LBS.

STRUCTURALLY CALCULATED KNOCK DOWN CURB

MAX UNIT WEIGHT 791 lbs.

Indianapolis, IN. : (800) 662-4822
Sparks, NV. (800) 884-4662
Longview, TX. (903) 248-4800

DRAWN BY: IR | DATE 08/22/2022

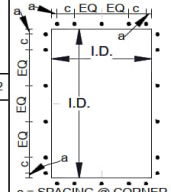
MEETS SEISMIC REQUIREMENTS FOR 2022 CBC & 2021 IBC

MEETS REQUIREMENTS FOR 155 MPH, 60' BUILDING HEIGHT MAX. 3 SEC. GUST, EXP C

ANCHORAGE DETAILS TO ROOF:

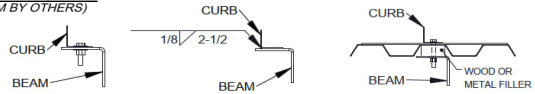
ALL DETAILS ARE CALCULATED USING THE SEISMIC DESIGN CRITERIA INDICATED ABOVE. FOR ANY OTHER TYPE OF ANCHORAGE THE EOR HAS THE OPTION TO CALCULATE THE ANCHORAGE USING SITE SPECIFIC PARAMETERS AND LOADS.

TYPICAL PLAN VIEW



c = SPACING @ CORNER ANCHORS

STEEL ATTACHMENT:
(BEAM BY OTHERS)



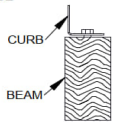
(12) A307 1/2" DIA. BOLTS, W/ WASHER CENTERED ON FLANGE
(1) EACH LONG SIDE
(1) EACH SHORT SIDE
(2) EACH CORNER
a = 2"
c = 6"

WELD OPTION:
(2.5") LONG 1/8" FILLET WELDS ARE PERMITTED TO BE USED IN PLACE OF EACH BOLT INDICATED BY THE STEEL ATTACHMENT DETAIL, EQUALLY SPACED

(12) A307 1/2" DIA. BOLTS, W/ WASHER CENTERED ON FLANGE
(1) EACH LONG SIDE
(1) EACH SHORT SIDE
(2) EACH CORNER
a = 2"
c = 6"

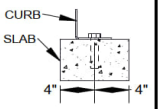
WOOD ATTACHMENT:
(REF: DOUGLAS FIR)

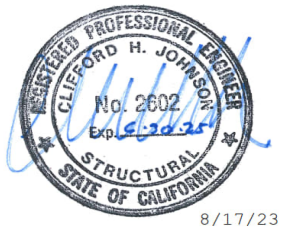
(26) 1/4" x 3" SIMPSON SDS W/ WASHER, CENTERED ON CURB FLANGE
(5) EACH LONG SIDE
(4) EACH SHORT SIDE
(2) EACH CORNER
a = 1"
c = 3"



CONCRETE ATTACHMENT:
(3000 PSI MINIMUM, 6" MINIMUM THICKNESS)
(4" MIN EDGE DISTANCE, 3-3/4" EMBEDDED)

(12) 1/2" SIMPSON TITEN HD CENTERED ON CURB FLANGE, 8" MINIMUM SPACING
(1) EACH LONG SIDE
(1) EACH SHORT SIDE
(2) EACH CORNER
a = 3"
c = 8"





8/17/23

BJG# 20220039

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ENGS03A

Created: 1/6/2011 7:01:04 AM

PRINTED: 8/23/2022

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Master Revision 0001A

Page Revision 0001A

CANNON FABRICATION INC
182 GRANITE STREET, SUITE 101, CORONA, CA 92879
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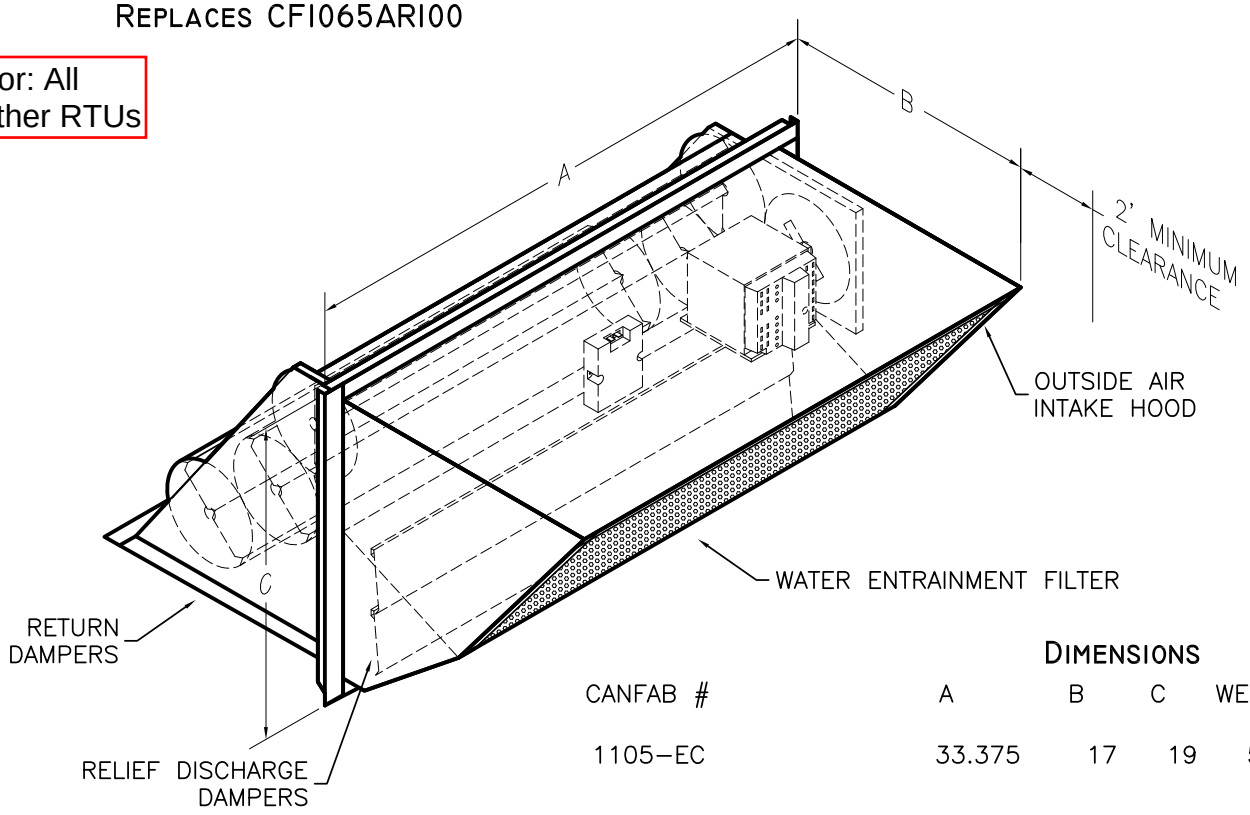
CARRIER 3 - 6-1/2 TONS
48/50HC 04-06, 50HCQ 04-06, 50KCQ 04-06,
48/50LC 04-06, 48/50TC 04-07, 50TCQ 04-07
48/50KC 04-06

PART NO: SEE BELOW

100% BAROMETRIC RELIEF DOWN DISCHARGE ECONOMIZER

REPLACES CFI065ARI00

For: All other RTUs



DIMENSIONS

CANFAB #	A	B	C	WEIGHT
1105-EC	33.375	17	19	59 LBS.

SELECT PRODUCT ☐

DIMENSIONS

CANFAB#	A	B	C	WEIGHT
1105-EC	33.375	17	19	59 LBS.

FEATURES

- HEAVY GAUGE GALVANIZED STEEL CONSTRUCTION.
- AMERICAN STERLING GREY PAINT FINISH.
- ONE PIECE ASSEMBLY.
- GEAR DRIVEN DAMPERS.
- HONEYWELL MODULATING DRYBULB CONTROL SYSTEM FULLY INTEGRATED. OPTIONS: ENTHALPY "-HE"; COMPARATIVE (DIFFERENTIAL) ENTHALPY "-HC", ADD "-HE" OR "-HC" TO THE END OF PART NUMBER.
- OPTIONAL BELIMO LF24SR-US ACTUATOR AVAILABLE, ADD "BN" TO THE END OF THE PART NUMBER (BELIMO ACTUATOR ONLY, NO OTHER CONTROLS PROVIDED).
- USES HVAC UNITS FILTER ACCESS DOOR.
- CAPABLE OF RELIEVING UP TO 100% OF THE OUTSIDE AIR INTAKE.

1105-EC

CFM	SP IN WG
2600	.40
2400	.36
2200	.32
2000	.31
1800	.30
1600	.22
1400	.16
1200	.10
900	.07

DOC: 01

PROJECT: DATE:

ENGINEER: DISTRIBUTOR:

DRAWING NUMBER:

SECTION III. DUCTLESS SPLIT SYSTEM

Outdoor Unit Single Zone Heat Pump Ductless System

Outdoor Model: **38MARBQ18AA3** MS3-CU

Submittal Data

Turn to the experts

Job Data: Location:

Buyer: Buyer P.O. #: Carrier #:

Unit Number: Model Number:

Performance Data Certified By: Date:



STANDARD FEATURES

- Variable Speed (Inverter)
- Factory installed Base Pan Heater
- Factory installed Crankcase Heater
- Low Voltage Controls
- Auto-Restart function
- Condenser High Temp Protection
- Modes: Cool, Heat, Dry, Fan, Auto
- Quiet operation
- Anti-corrosive fin coating

LIMITED WARRANTY*
• 10 year limited to original purchaser on compressor and parts upon timely registration, otherwise 5 years
*For residential applications.
See warranty for full details.

ENERGY STAR

NOTE: Images for illustration purposes only. Actual models may be slightly different.

System	Size		18
	Outdoor Model		38MARBQ18AA3
Electrical	Voltage, Phase, Cycle	V/Ph/Hz	208/230-1-60
	MCA	A.	16
	Recommended Fuse Size	A.	20
	MOCP - Fuse Rating	A.	25
Operating Range	Cooling Outdoor DB Min - Max	°F(°C)	-22~122 (-30~50)
	Heating Outdoor DB Min - Max	°F(°C)	-22~86 (-30~30)
Piping	Total Piping Length	ft (m)	98 (30)
	Piping Lift*	ft (m)	65 (20)
	Pipe Connection Size - Liquid	in (mm)	1/4 (6.35)
	Pipe Connection Size - Suction	in (mm)	1/2 (12.7)
Refrigerant	Refrigerant Type		R410A
	Metering Device		EEV
	Charge	lbs (kg)	4.08 (1.85)

Outdoor Coil	Face Area	Sq. Ft.	5.9
	No. Rows		2
	Fins per inch		20
	Circuits		6
Compressor	Type		Rotary Inverter
	Model		KTM240D43UKT
	Oil Type		VG74
	Oil Charge	Fl. Oz.	21.0
	Rated Current	RLA	14.3
Outdoor	Unit Width	in (mm)	35.04 (890)
	Unit Height	in (mm)	26.50 (673)
	Unit Depth	in (mm)	13.46 (342)
	Net Weight	lbs (kg)	100.97 (45.8)
	Airflow	CFM	1,765
	Sound Pressure	dB(A)	59.0

* Condensing unit above or below indoor unit
See compatibility chart for additional model specific information

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Edition Date: 01/2022

Catalog No: 38MARB-18-3-04SB

Performance

	Indoor Model		FM(C,U)4Z18**AL*
FMC - FMU Fan Coil	Energy Star		NO
	Cooling Rated Capacity	Btu/h	18,500
	Cooling Cap. Range Min - Max	Btu/h	14100~21800
	SEER		19.0
	EER		12.2
	Heating Rated Capacity (47°F)	Btu/h	19,300
	Heating Rated Capacity (17°F)	Btu/h	15,000
	Heating Maximum Capacity (5°F)	Btu/h	13,900
	Heating Cap. Range Min - Max	Btu/h	11700~21000
	HSPF		11.5
	COP (47°F)	W/W	4.00
	COP (17°F)	W/W	3.40
	COP (5°F)	W/W	2.00

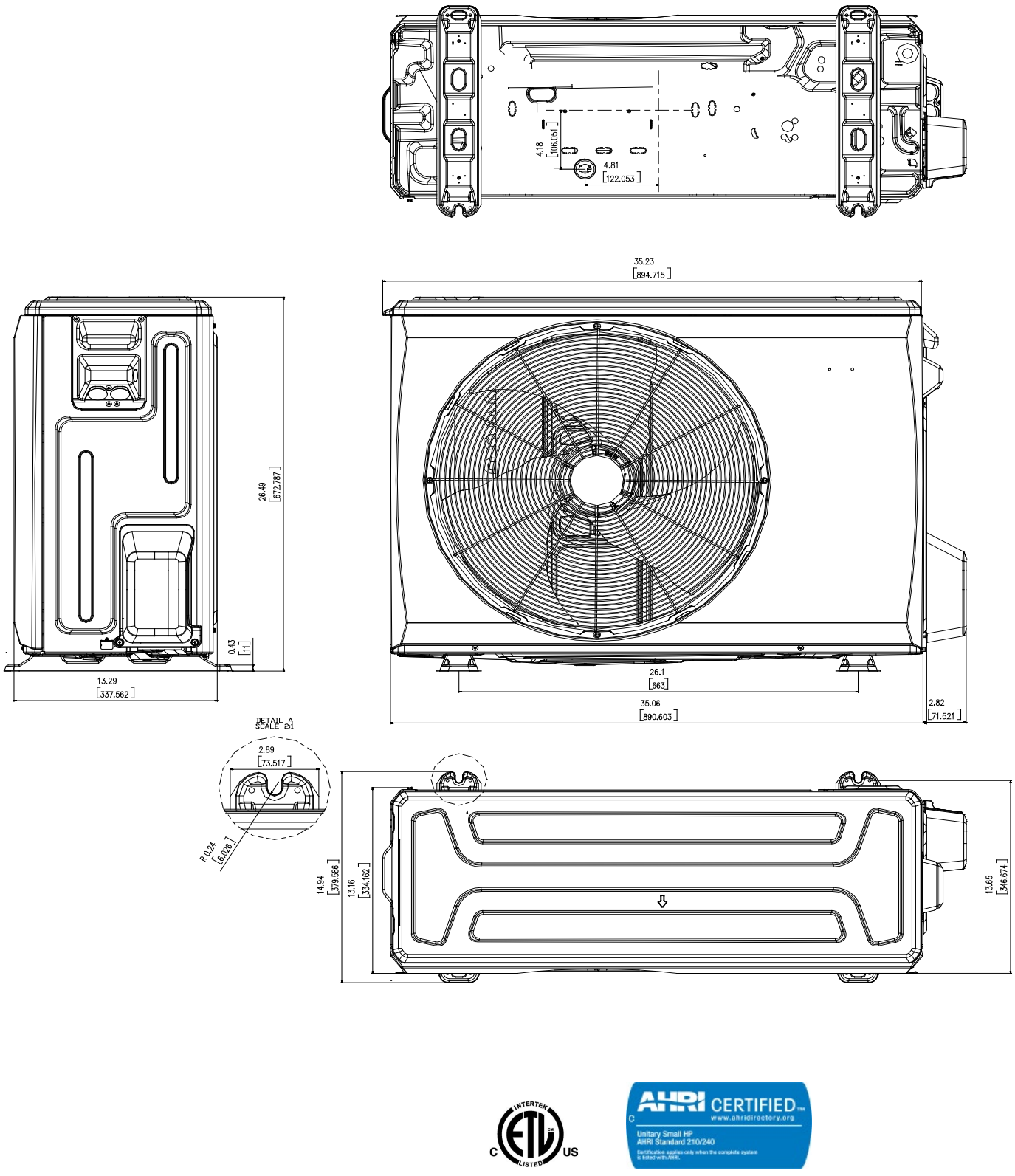
Applications with the FB4CNP, FMA4, FX4D, FV4C, FMC and FMU fan coils require the 24V Interface (2nd Generation) KSAIC0301230 and a Piping Adapter Kit to facilitate piping installation when removing the TXV kit from the indoor unit.

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Edition Date: 01/2022

Catalog No: 38MARB-18-3-04SB

Construction View

Outdoor Model: **38MARBQ18AA3**



High Wall Heat Pump Ductless System

Indoor Model: **40MAHBQ18XA3** MS3-HW

Submittal Data

Job Data: | Location:

Buyer: | Buyer P.O. #: | Carrier #:

Unit Number: | Model Number:

Performance Data Certified By: | Date:





Performance SERIES

STANDARD FEATURES
- Modes: Cool, Heat, Dry, Fan, Auto
- Turbo Mode
- Four fan speeds
- Sleep Mode
- Relative Humidity Sensor
- Intelligent Eye (Occupancy Sensor)
- ECO Mode
- Up-Down Louver control (fixed or swing)
- Follow Me (senses temperature at handheld remote)
- Heating Setback (46° F Heating Mode)
- Quiet indoor operation
- Aluminum Golden Hydrophilic pre-coated fins

CONTROLS:
- Wireless Remote Controller included with indoor unit

LIMITED WARRANTY*
- 10 year limited to original purchaser on compressor and parts upon timely registration, otherwise 5 years

*For residential applications. See warranty for full details.

System	Size		18
	Indoor Model		40MAHBQ18XA3
Electrical	Voltage, Phase, Cycle	V/Ph/Hz	208/230-1-60
	Power Supply	Indoor unit powered by outdoor unit	
	MCA	A.	0.2
Controls	Wireless Remote Controller (°F/°C Convertible)		Standard
	Wired Remote Controller (°F/°C Convertible)		Optional
Operating Range	Cooling Indoor DB Min -Max	°F(°C)	63~90 (17~32)
	Heating Indoor DB Min -Max	°F(°C)	32~86 (0~30)
Piping	Pipe Connection Size - Liquid	in (mm)	1/4 (6.35)
	Pipe Connection Size - Suction	in (mm)	1/2 (12.7)

Indoor Coil	Face Area	Sq. Ft.	2.75
	No. Rows		2
	Fins per inch		20
	Circuits		4
Indoor	Unit Width	in (mm)	37.99 (965)
	Unit Height	in (mm)	12.56 (319)
	Unit Depth	in (mm)	9.41 (239)
	Net Weight	lbs (kg)	27.12 (12.3)
	Number of Fan Speeds		4
	Airflow (lowest to highest)	CFM	306/376/524/635
	Sound Pressure (lowest to highest)	dB(A)	37/40/46/48
	Air throw Data	ft (m)	27.9 (8.5)
	Moisture removal	Pint/h (L/h)	4.583 (2.18)
	Field Drain Pipe Size O.D.	in (mm)	0.625 (16)

Performance may vary based on the outdoor unit matched to. See compatible outdoor units pages for Performance Data.
For Compatibility See Product Data

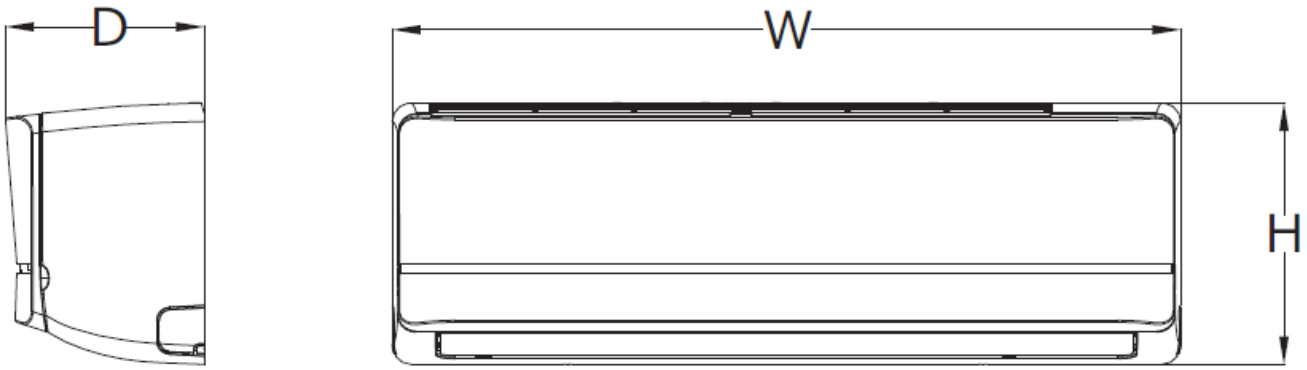
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Edition Date: 02/2021
Catalog No: SUB40MAHB-18-3-02

Accessories

KSACN0801AAA	Wired Remote Control 7 Day Programmable
KSACN0101AAA	Wired Remote Control with Timer Function
KSAIF0601AAA	Wi-Fi™ Kit High Wall Mid-Tier
KSAIC0301230	24V Interface Kit 230V

Construction View

Indoor Model: 40MAHBQ18XA3



Unit Width	in (mm)	37.99 (965)
Unit Height	in (mm)	12.56 (319)
Unit Depth	in (mm)	9.41 (239)
Net Weight	lbs (kg)	27.12 (12.3)

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Edition Date: 02/2021
Catalog No: SUB40MAHB-18-3-02

Outdoor Unit Single Zone Heat Pump Ductless System

Outdoor Model: **38MARBQ09AA3** MS1,2-CU

Submittal Data

Turn to the experts

Job Data: _____ Location: _____

Buyer: _____ Buyer P.O. #: _____ Carrier #: _____

Unit Number: _____ Model Number: _____

Performance Data Certified By: _____ Date: _____



STANDARD FEATURES

- Variable Speed (Inverter)
- Factory installed Base Pan Heater
- Factory installed Crankcase Heater
- Low Voltage Controls
- Auto-Restart function
- Condenser High Temp Protection
- Modes: Cool, Heat, Dry, Fan, Auto
- Quiet operation
- Anti-corrosive fin coating

LIMITED WARRANTY*
• 10 year limited to original purchaser on compressor and parts upon timely registration, otherwise 5 years
*For residential applications.
See warranty for full details.

NOTE: Images for illustration purposes only. Actual models may be slightly different.

System	Size		9
	Outdoor Model		38MARBQ09AA3
Electrical	Voltage, Phase, Cycle	V/Ph/Hz	208/230-1-60
	MCA	A.	15
	Recommended Fuse Size	A.	15
	MOCP - Fuse Rating	A.	15
Operating Range	Cooling Outdoor DB Min - Max	°F(°C)	-22~122 (-30~50)
	Heating Outdoor DB Min - Max	°F(°C)	-22~86 (-30~30)
Piping	Total Piping Length	ft (m)	82 (25)
	Piping Lift*	ft (m)	32 (10)
	Pipe Connection Size - Liquid	in (mm)	1/4 (6.35)
	Pipe Connection Size - Suction	in (mm)	3/8 (9.52)
Refrigerant	Refrigerant Type		R410A
	Metering Device		EEV
	Charge	lbs (kg)	2.6 (1.18)

Outdoor Coil	Face Area	Sq. Ft.	4.7
	No. Rows		2
	Fins per inch		20
	Circuits		4
Compressor	Type		Rotary Inverter
	Model		KTN110D42UFZ
	Oil Type		VG74
	Oil Charge	Fl. Oz.	11.8
	Rated Current	RLA	6.0
Outdoor	Unit Width	in (mm)	31.69 (805)
	Unit Height	in (mm)	21.81 (554)
	Unit Depth	in (mm)	12.99 (330)
	Net Weight	lbs (kg)	74.07 (33.6)
	Airflow	CFM	1,324
	Sound Pressure	dB(A)	54.5

* Condensing unit above or below indoor unit

See compatibility chart for additional model specific information

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Edition Date: 07/2021

Catalog No: 38MARB-09-3-04SB

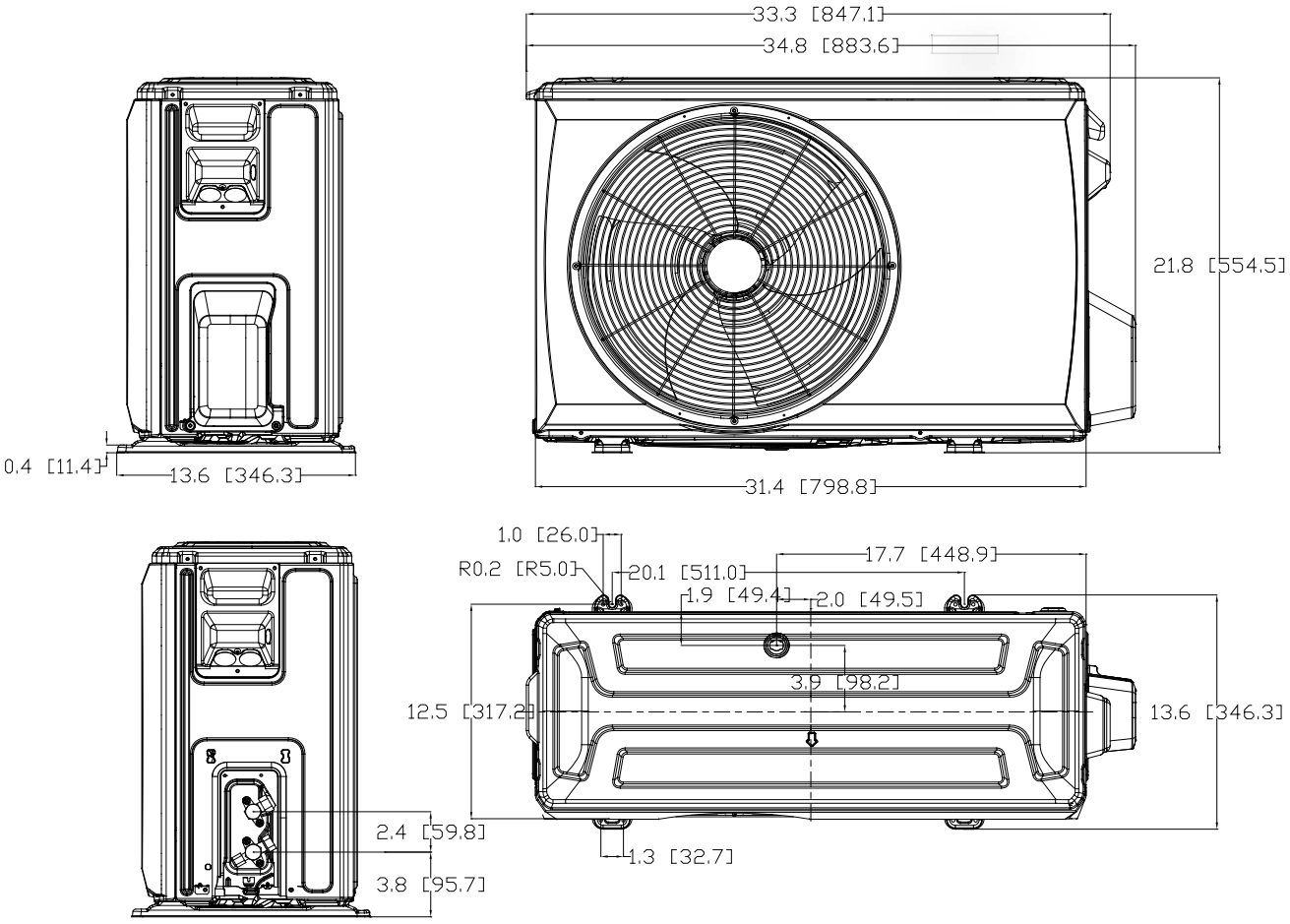
Performance

High Wall	Indoor Model		9K (208/230V)
	Energy Star		YES
	Cooling Rated Capacity	Btu/h	9,000
	Cooling Cap. Range Min - Max	Btu/h	3,300~13,400
	SEER		28.1
	EER		16.2
	Heating Rated Capacity (47°F)	Btu/h	11,800
	Heating Rated Capacity (17°F)	Btu/h	7,500
	Heating Maximum Capacity (17°F)	Btu/h	12,000
	Heating Maximum Capacity (5°F)	Btu/h	10,500
	Heating Cap. Range Min - Max	Btu/h	5,000~15,200
	HSPF		13.0
	COP (47°F)	W/W	3.81
	COP (17°F)	W/W	3.00
	COP (5°F)	W/W	1.80
Cassette	Indoor Model		9K (208/230V)
	Energy Star		YES
	Cooling Rated Capacity	Btu/h	9,000
	Cooling Cap. Range Min - Max	Btu/h	2,850~11,100
	SEER		20.5
	EER		13
	Heating Rated Capacity (47°F)	Btu/h	10,000
	Heating Rated Capacity (17°F)	Btu/h	6,650
	Heating Maximum Capacity (17°F)	Btu/h	11,800
	Heating Maximum Capacity (5°F)	Btu/h	10,200
	Heating Cap. Range Min - Max	Btu/h	1,800~12,500
	HSPF		10.8
	COP (47°F)	W/W	2.93
	COP (17°F)	W/W	1.80
	COP (5°F)	W/W	1.79
Ducted	Indoor Model		9K (208/230V)
	Energy Star		YES
	Cooling Rated Capacity	Btu/h	9,000
	Cooling Cap. Range Min - Max	Btu/h	2,400~12,500
	SEER		23.0
	EER		14
	Heating Rated Capacity (47°F)	Btu/h	10,000
	Heating Rated Capacity (17°F)	Btu/h	6,450
	Heating Maximum Capacity (17°F)	Btu/h	11,600
	Heating Maximum Capacity (5°F)	Btu/h	9,900
	Heating Cap. Range Min - Max	Btu/h	1,700~15,600
	HSPF		12.0
	COP (47°F)	W/W	3.62
	COP (17°F)	W/W	1.90
	COP (5°F)	W/W	1.78

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Edition Date: 07/2021
Catalog No: 38MARB-09-3-04SB

Construction View

Outdoor Model: **38MARBQ09AA3**



High Wall Heat Pump Ductless System

Indoor Model: **40MAHBQ09XA3**

MS-1,2 HW

Submittal Data

Job Data: | Location:

Buyer: | Buyer P.O. #: | Carrier #:

Unit Number: | Model Number:

Performance Data Certified By: | Date:





STANDARD FEATURES
- Modes: Cool, Heat, Dry, Fan, Auto
- Turbo Mode
- Four fan speeds
- Sleep Mode
- Relative Humidity Sensor
- Intelligent Eye (Occupancy Sensor)
- ECO Mode
- Up-Down Louver control (fixed or swing)
- Follow Me (senses temperature at handheld remote)
- Heating Setback (46° F Heating Mode)
- Quiet indoor operation
- Aluminum Golden Hydrophilic pre-coated fins

CONTROLS:
- Wireless Remote Controller included with indoor unit

Performance SERIES

LIMITED WARRANTY*
- 10 year limited to original purchaser on compressor and parts upon timely registration, otherwise 5 years

*For residential applications. See warranty for full details.

System	Size		9
	Indoor Model		40MAHBQ09XA3
Electrical	Voltage, Phase, Cycle	V/Ph/Hz	208/230-1-60
	Power Supply	Indoor unit powered by outdoor unit	
	MCA	A.	0.3125
Controls	Wireless Remote Controller (°F/°C Convertible)		Standard
	Wired Remote Controller (°F/°C Convertible)		Optional
Operating Range	Cooling Indoor DB Min -Max	°F(°C)	63~90 (17~32)
	Heating Indoor DB Min -Max	°F(°C)	32~86 (0~30)
Piping	Pipe Connection Size - Liquid	in (mm)	1/4 (6.35)
	Pipe Connection Size - Suction	in (mm)	3/8 (9.52)

Indoor Coil	Face Area	Sq. Ft.	2.15
	No. Rows		2
	Fins per inch		20
	Circuits		3
Indoor	Unit Width	in (mm)	31.3 (795)
	Unit Height	in (mm)	11.61 (295)
	Unit Depth	in (mm)	8.86 (225)
	Net Weight	lbs (kg)	22.71 (10.3)
	Number of Fan Speeds		4
	Airflow (lowest to highest)	CFM	176/229/335/382
	Sound Pressure (lowest to highest)	dB(A)	32/34/38/47
	Air throw Data	ft (m)	24.9 (7.6)
	Moisture removal	Pint/h (L/h)	0.75 (0.35)
	Field Drain Pipe Size O.D.	in (mm)	0.625 (16)

Performance may vary based on the outdoor unit matched to. See compatible outdoor units pages for Performance Data.

For Compatibility See Product Data

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Edition Date: 02/2021

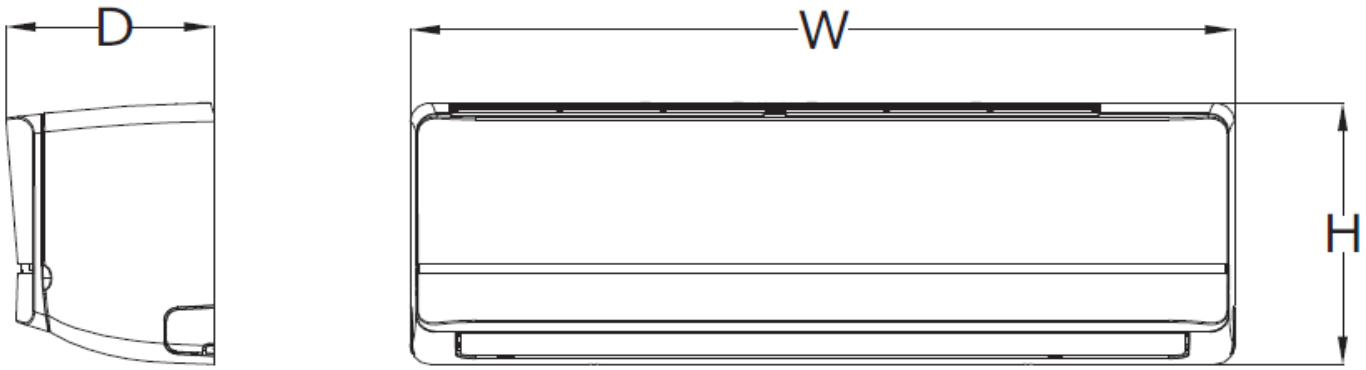
Catalog No: SUB40MAHB-09-3-02

Accessories

KSACN0801AAA	Wired Remote Control 7 Day Programmable
KSACN0101AAA	Wired Remote Control with Timer Function
KSAIF0601AAA	Wi-Fi™ Kit High Wall Mid-Tier
KSAIC0301230	24V Interface Kit 230V

Construction View

Indoor Model: **40MAHBQ09XA3**



Unit Width	in (mm)	31.3 (795)
Unit Height	in (mm)	11.61 (295)
Unit Depth	in (mm)	8.86 (225)
Net Weight	lbs (kg)	22.71 (10.3)

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Edition Date: 02/2021

Catalog No: SUB40MAHB-09-3-02

SECTION IV. DUCTLESS SPLIT SYSTEM ACCESSORIES

HMAX
QUALITY HVAC ACCESSORIES

TATTOO

Condensate Removal System

- The Tattoo series is the **most silent** condensate removal system on the market today.
- Compact size compared to a tank pump
- Built-in check valve
- Thermal security of 230°F (110°C)
- 5ft communication wire
- **Normally Open/Normally Closed alarm 100V to 240V/8A**
- Delivered complete with mounting accessories - **ready to use**



SUITABILITY

- Split, multisplit and VRF/VRV systems
- Tattoo 10 is for air-conditioner systems up to 36,000 BTU 3 tons
- Tattoo 16 is for air-conditioner systems up to 54,000 BTU 5 tons
- High wall split systems, Ducted units, Floor standing, and Chassis units

CONTENTS

- Tattoo pump body (1)
- Mounting bracket for horizontal and vertical positioning (2)
- Plug & Play detection unit with 5ft communication wire (3)
- Connection elbow (4)
- Ventilation tube (5)
- Fixing screws and anchors (6)
- Double sided foam adhesive (7)



E-mail: info@hmax.com
www.hmax.com
Phone: (844) 500-HMAX

HMAX ©2016 12/16

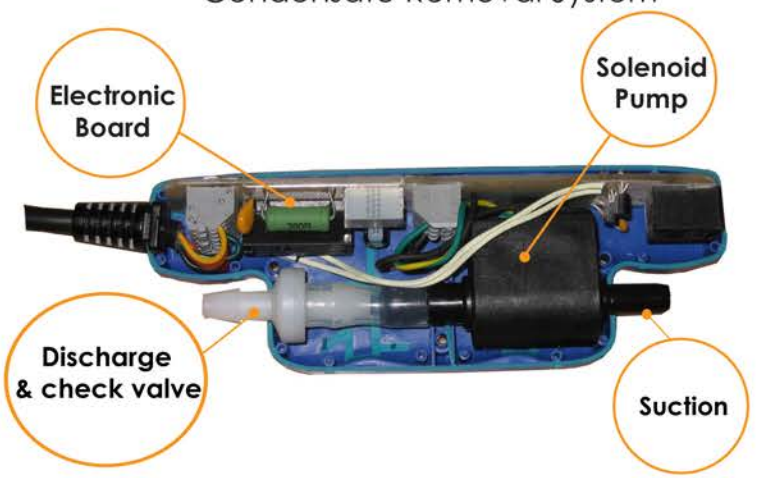
HMAX
QUALITY HVAC ACCESSORIES

CONDENSATE PUMPS

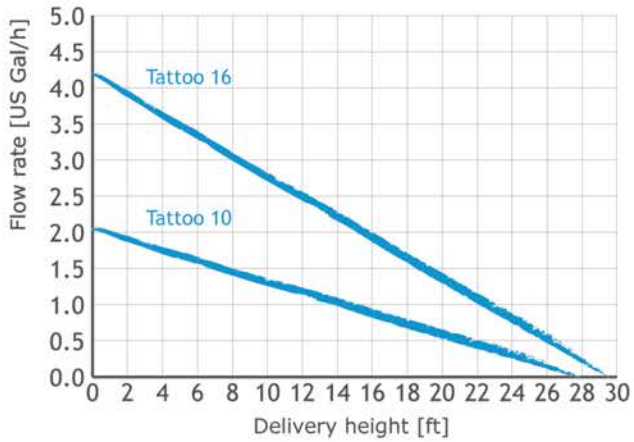
TATTOO

Condensate Removal System

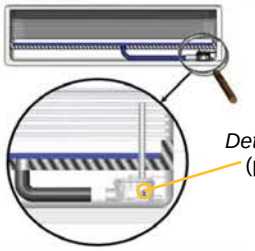
	TATTOO 10	TATTOO 16
Max flow rate	2.1 gal/h	4.3 gal/h
Flow rate at 3 ft	1.9 gal/h	3.8 gal/h
Flow rate at 10 ft	1.4 gal/h	2.8 gal/h
Max dry suction height	3.3 ft	3.3 ft
Max wet suction height	6.6 ft	6.6 ft
Max delivery height	28 ft	29.5 ft
Alarm contact	NO/NC-120v/8A	NO/NC-120v/8A
Pump dimensions	5.9" x 2.2" x 1.1"	5.9" x 2.2" x 1.1"
Sensor unit dimensions	3.2" x 1.6" x 1.6"	3.2" x 1.6" x 1.6"
Weight	15.5 oz	15.5 oz
Power supply	120v or 230v	120v or 230v
Noise level	<19 dBA	22 dBA

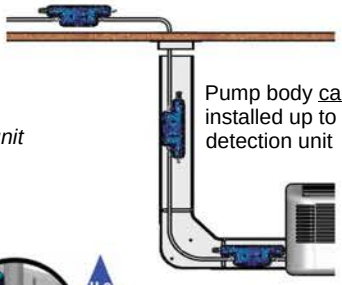


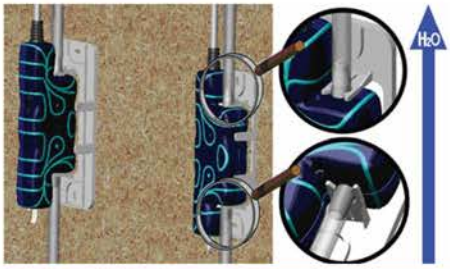
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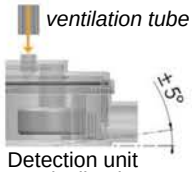


INSTALLATION OPTIONS

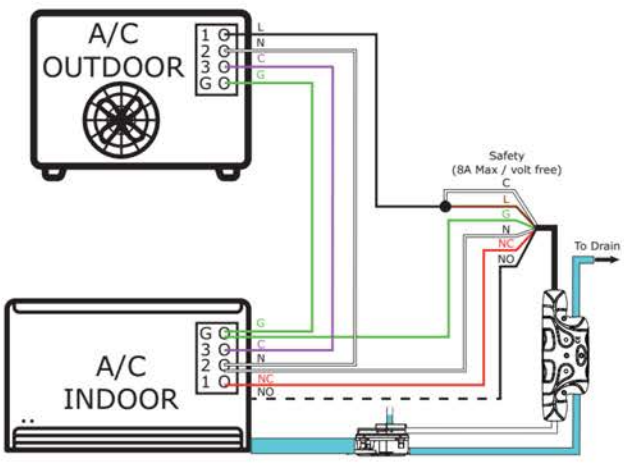




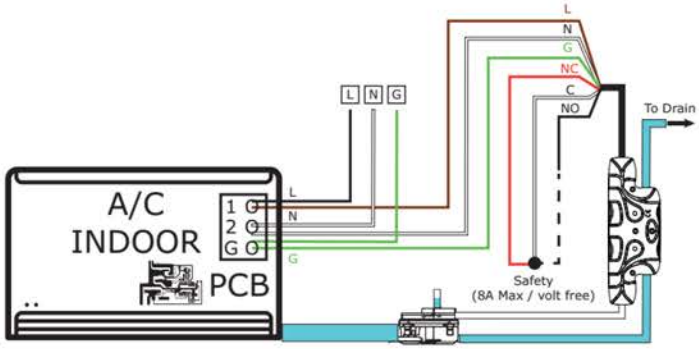




WIRING - RESIDENTIAL



WIRING - COMMERCIAL



E-mail: info@hmax.com
www.hmax.com
Phone: (844) 500-HMAX
373 Nesconset Highway #147
Hauppauge, New York 11788

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SECTION V. AIRSYS PACKAGED WALL MOUNTED HEAT PUMP

School Air Solutions™ - Backpack™

Backpack™ Outdoor System

The School Air Systems™ model named the ***Backpack™*** have been specifically designed for human comfort. The units are variable speed heat pumps that offer superior efficiency and operate at extremely low sound levels. Fan speed and capacity modulation are based on real-time demand for heating or cooling from the space being conditioned and will automatically adjust even small temperature fluctuations creating space temperature differences and causing discomfort in the space.



Front View

- Variable Frequency Drive (VFD) technology offers up to **17 ILPV or better**
- Highest Efficiency Rating in the market for any single packaged vertical systems
- "Soft Start" capability slowly ramps-up compressor speed and eliminates the startling noise distractions when the compressor and fan starts on a call for cooling or heating
- Eliminates in-rush current and voltage spikes, reducing mechanical stress on components with compressor starts on a call for heating /cooling

Precise Heat Load Match

Since the numerous cycles create most of the mechanical stress on a compressor and many related components, the Start/Stop action results in an "In-Rush" of current wears down electronics within the system, and similarly, the action wears down contactors and other electrical components. Despite properly sized and set minimum compressor run/stop timer, loading and unloading reaches over 100 cycles in a day resulting in >30,000 times in a year.

The inability of staged control to match the heat load at all times, results in an inability to precisely follow an accurate temperature path.

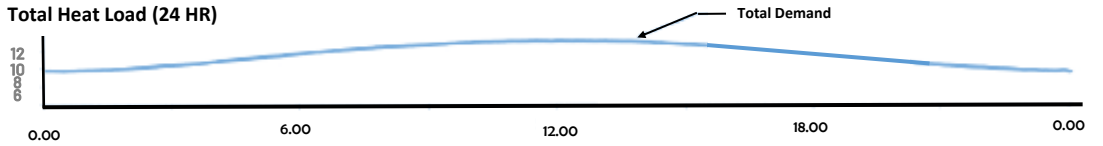
The Backpack™ (Outdoor) is specifically designed for human comfort by providing the advantages of a variable speed Heat Pump that operates at a significantly lower sound level, and virtually eliminates the poor efficiency and energy use common to any staged units.

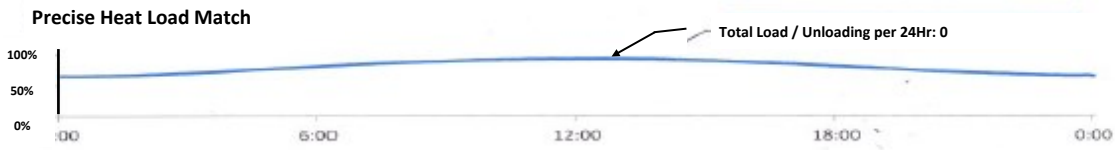
The ability for the Backpack™ (Outdoor) unit to modulate the speed of the compressor with standard invertor technology, matching the unit's air flow accordingly which closely and reliably follows the real-time environment load.



Front & Side View–
Showing the Removable Accessories and Options

An example is shown in the illustration to the above. As you can see, the Total Heat Load (Demand) curve at the top will just about match the Precise Heat Load Match as depicted on the bottom diagram.



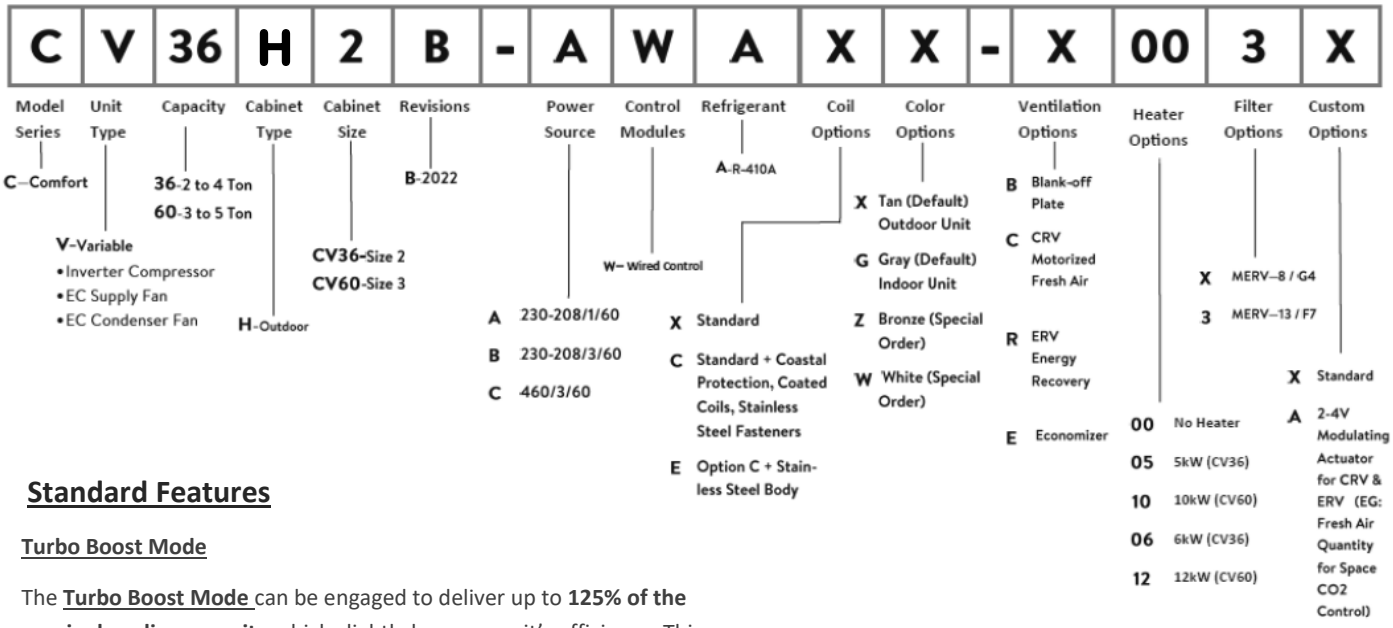


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School Air Solutions™ - Backpack™

Backpack™ Outdoor System

Model Number - Nomenclature



Standard Features

Turbo Boost Mode

The **Turbo Boost Mode** can be engaged to deliver up to **125% of the nominal cooling capacity** which slightly lowers a unit's efficiency. This feature is available when the space served by the unit experiences an increased load due to higher than normal outdoor temperature and the nominal design capacity of the unit is exceeded

Quiet Mode

To further reduce the unit's standard cataloged sound levels up to 5-7 dBA, the **Quiet Mode** can limit the maximum frequency that drives the compressor may be reduced. This reduces the Heat Pump's capacity by as little as 15%, yielding a realistic tradeoff between capacity and noise level (Turbo Boost will not be available).

Soft Start

Beginning with the unit start-up, the Backpack™ units ramp-up the variable compressor and will continually modulate capacity with changes in space load. The **Soft Start** feature eliminates distractions caused by numerous sudden starts by conventional units, and minimizes mechanical stress on a compressor when starting up, eliminates voltage spikes and in-rush current spikes that save demand energy requirements. Additionally, this benefit reduces the noise usually generated by sudden compressor starts.

Auto Defrost

When the Backpack™ Heat Pump is operating in low ambient temperatures, and frost builds up on the outdoor coil, the **Auto Defrost** feature engages and reduce or eliminate the frost and the reduction of the rate of heat transfer for the unit.

Electronic Expansion Valve (EEV)

The **Electronic Expansion Valve** keeps the compressor running in its optimal state throughout its duty cycle. This feature delivers superior energy consumption savings in unlimited ambient / environmental conditions

Low / High Pressure Compressor Protection

High and low pressure sensors, provided on each unit protect the compressor and refrigeration circuit against damage that can be caused by the loss of refrigerant charge, dirty filter (s), restricted outdoor coil, and low air flow. When the internal protection is repeatedly engaged, the unit's controls will lock out mechanical cooling

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School Air Solutions™ - Backpack™

Backpack™ Outdoor System

Certified Performance Data (AHRI 390)

	Nominal Tonnage	Model	Nominal Cooling Capacity (BTUH/kW)	IEER	ILPV	Nominal Heating Capacity (BTUH/kW)	COP
Outdoor	3 Ton Variable	CV36H2B-A	35,200 / 10.3	18+	17.0	34,000 / 10.0	3.3
		CV36H2B-B	34,000 / 10.0	18+	17.0	35,000 / 10.3	3.3
		CV36H2BC	33,500 / 9.8	18+	17.0	35,000 / 10.3	3.3
	5 Ton Variable	CV60H3B-A	57,300 / 16.8	18+	17.0	56,600 / 16.6	3.3
		CV60H3B-B	54,500 / 16.0	18+	16.5	56,000 / 16.4	3.3
		CV60H3B-C	54,000 / 16.0	18+	16.5	56,000 / 16.4	3.3

Airflow Ratings

Model	0.0 in. WC. (0 PA)	0.1in. WC. (25 PA)	0.2 in. WC. (50PA)	0.3 in. WC. (75 PA)
CV36H2	1005/1030	950/980	900/940	845/895
CV60H3	1650/1680	1590/1620	1540//1580	1470/1520
CV36N3	1050/1075	1000/1030	950/990	895/945
CV60N3	1600/1630	1540/1579	1490/1530	1420/1480

Indoor Noise Levels

Model	Low Speed Cooling / Heating	Low Speed with Curb	High Speed Cooling/Heating	High Speed With Curb
CV36H2	37	36	40	39
CV60H3	41	40	43	42
CV36N2	40	N/A	43	N/A
CV36N3	42	N/A	44	N/A

NOTE: Measured 5ft above floor, 10ft from HVAC Unit. Standard Airflow Volume

Filter Sizes

Model	Filter Quantity	Nominal Size (in)	Exact Size (in))
CV36H2	2	20" x 25"	19-1/2 x 24-1/2
CV60H3	2	20" x 25"	19-1/2 x 24-1/2
CV36N3	2	20" x 25"	19-1/2 x 24-1/2
CV60N3	2	20" x 25'	19-1/2 x 24-1/2

Compatible with 1", 2", and 4" filter depths

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School Air Solutions™ - Backpack™

Backpack™ Outdoor System

Technical Details

Model	Compressor	Evaporator Fan		Condenser Fan		Electric Heater				Outdoor Noise (2)	
	Running Current (A)	Current (A)	Air Volume CFM (3)	Current (A)	Air Volume CFM	kW	Current (A) 208/1/60/ 230/1/60	Current (B) 208/230/3/60 LTL / LTN	Current (C) 480/3/ 60 LTL / LTN	Nominal	Low Speed
CV36H2B-A	11.3	0.5	1005	1.1	2820	5/10	24.04 / 48.08 21.74 / 43.48			44	41
CV36H2B-B	6.9	0.5	1150	0.9	2599	5/10		13.88 / 27.78 7.25 / 25.1		44	41
CV36H2B-C	3.4	0.5	1150	0.3	2500	5/10			6.01 / 3.47 12.03 /6.94	44	41
CV60H3B-A	17.4	1.8	1650	2.4	4590	6/12	24.04 / 48.08 21.74 / 43.48			45	42
CV60H3B-B	10.8	1.1	1600	1.7	4200	6/12		13.88 / 27.78 7.25 / 25.1		45	42
CV60H3B-C	5.4	1.1	1600	0.5	4200	6/12			6.01 / 27.78 12.03 / 6.94	45	42

Notes

(1) All electric current values are given at max capacity / speed

(2) Ambient Temperature = 95°F, 6.5FT away form unit in open space

(3) With Standard Pleated Filter

(LTL) Line to Line

(LTN) Line to Neutral

Electrical Ratings (Wire Sizing)

Model	Heater Size	MCA	MOP	Recommended Breaker Size*	MCA	MOP	Recommended Breaker Size*	MCA	MOP	Recommended Breaker Size
CV36H2B-A	0kW	26	40	40	-	-	-	-	-	-
	5kW	50	60	63	26	40	40	27	30	32
	10kW	77	80	90	26	40	40	54	60	63
CV60H3B-A	0kW	38	60	63	-	-	-	-	-	-
	6kW	71	80	80	38	60	63	33	354	40
	12kW	103	110	110	38	60	63	65	70	70
CV36H2B-B	0kW	16	25	32	-	-	-	-	-	-
	5kW	30	35	50	16	25	32	16	20	25
	10kW	45	50	63	16	25	32	31	35	40
CV60H3B-B	0kW	23	36	40	-	-	-	-	-	-
	6kW	42	50	50	23	35	40	19	20	25
	12kW	61	70	63	23	35	40	38	40	50
CV36H2B-C	0kW	8	10	25	-	-	-	-	-	-
	5kW	15	15	32	-	-	-	-	-	-
	10kW	23	25	40	-	-	-	-	-	-
CV60H3B-C	0kW	12	15	32	-	-	-	-	-	-
	6kW	22	25	40	-	-	-	-	-	-
	12kW	31	35	50	-	-	-	-	-	-

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School Air Solutions™ - Backpack™

Backpack™ Outdoor System

Variable Speed Cooling Data - Backpack™ (Outdoor)

Model	Return Air Temp. (DB / WB)	Minimum Total Capacity (BTUH/kW)	Maximum Total Capacity (BTUH/kW)	Minimum Sensible Capacity (BTUH/kW)	Maximum Sensible Capacity (BTUH/kW)
CV36H2B-A	80/67°F	19,800 / 5.8	42,300 / 12.4	15,700 / 4.6	29,300 / 8.6
	86/69°F	21,800 / 6.4	43,700 / 12.8	20,100 / 5.9	31,100 / 9.1
	95/72°F	24,200 / 7.1	45,700 / 13.4	22,500 / 6.6	36,200 / 10.6
CV36H2B-B	80/67°F	17,100 / 5.0	42,000 / 12.3	13,500 / 4.0	29,100 / 8.5
	86/69°F	18,800 / 5.5	43,300 / 12.7	17,400 / 5.1	30,800 / 9.0
	95/72°	20,900 / 6.1	45,400 / 13.3	19,400 / 5.7	35,900 / 10.5
CV36H2B-C	80/67°F	17,100 / 5.0	42,000 / 12.3	13,00 / 4.0	29,100 8.5
	86/69°F	18,800 / 5.5	43,300 / 12.7	17,400 / 5.1	30,800 / 9.0
	95/72°F	20,900 /6.1	45,400 / 13.3	19,400 / 5.7	35,900 / 10.5
CV60H3B-A	80/67°F	29,300 / 8.6	67,600 / 19.8	24,200 / 7.1	46,700 / 13.7
	86/69°F	32.100 / 9.4	69,900 / 20.5	29,000 / 8.5	49,500 / 14.5
	95/72°F	35,100 / 10.3	72,700 / 21.3	32.100 / 9.4	57,300 / 16.8
CV60H3B-B	80/67°	31,000 / 9.1	65,900 / 19.3	24,600 / 7.2	45,700 / 7.2
	86/69°F	34,300 / 10.0	68,000 /19.9	31,600 / 9.3	48,300 / 14.2
	95/72°F	38,000 / 11.1	71,200 / 20.9	35,300 / 10.4	56,300 / 16.5
CV60H3B-C	80/67°F	31,000 / 9.1	65,900 / 19.3	24,600 / 7.2	45,700 / 13.4
	86/69°F	34,300 / 10.0	68,000 / 19.9	31,600 / 9.3	48,300 / 14.2
	95/72°F	38,000 / 11.1	71,200 / 20.9	35,300 / 10.4	56,300 / 16.5

Variable Speed Heat Pump Capacity (KW / BTUH)

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School Air Solutions™ - Backpack™

Backpack™ Outdoor System

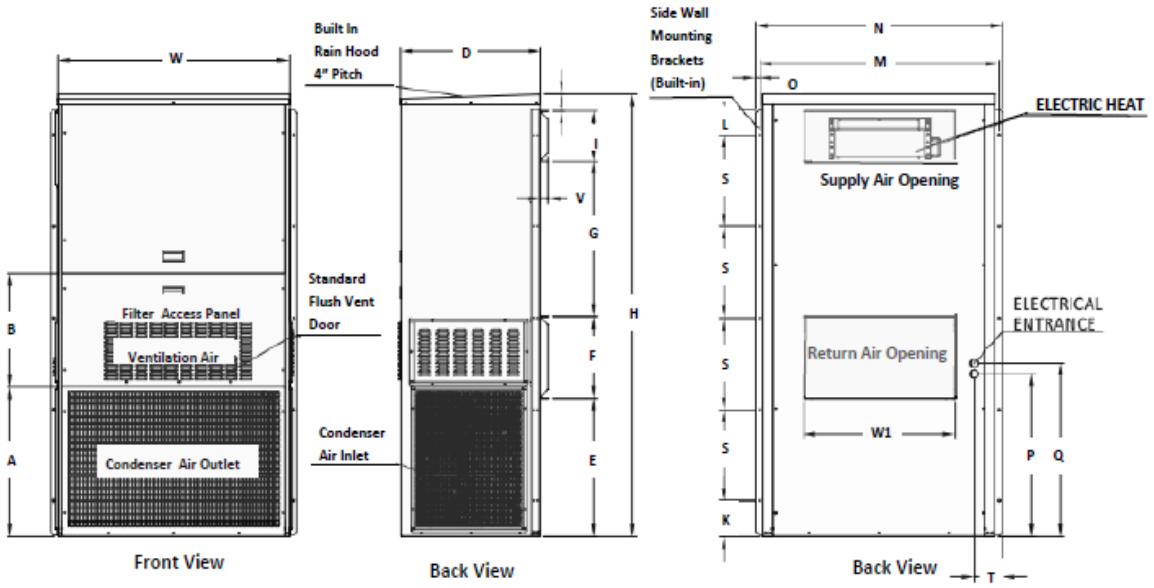
Variable Speed Heating Data - Backpack™ (Outdoor)

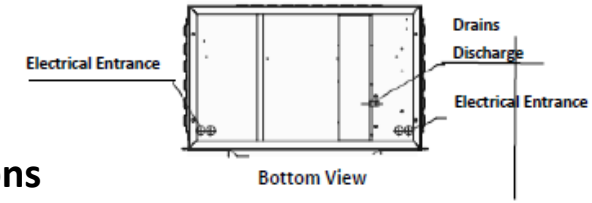
Variable Speed Heat Pump Capacity (KW / BTUH)

Model	Outdoor Temp.	50°F	40°F	30°F	20°F	10°F	0°F
CV36H2B-A	MAX Speed	14 / 47,900	10.8 / 28,400	8.3 / 28,400	6.4 / 21,800	4.9 / 16,600	N/A
	MIN Speed	5.8 / 19,800	4.5 / 15,300	3.5 / 11,800	2.6 / 9,000	2.0 / 6.900	N/A
CV36H2B-A	MAX Speed	14.3 / 48,800	11.7 / 39,900	10.5 / 35,800	9.2 / 31,400	7.8 / 26,600	6.4 / 21,800
	MIN Speed	5.7 / 19,400	4.5 / 15,400	4.1 / 14,000	3.7 / 12,600	3.2 / 10,500	2.6 / 8,900
CV36H2B-C	MAX Speed	14.3 / 48,800	11.7 /39,900	10.5 / 35,800	9.2 / 31,400	7.8 / 26,600	6.4 / 21,800
	MIN Speed	5.7 / 19,400	4.5 / 15,400	4.1 / 14,000	3.7 / 12,600	3.2 / 10,900	2.6 / 8,900
CV60H3B-A	MAX Speed	22.4 / 76,500	17.4 / 59,200	13.3 / 45,400	10.2 / 34,900	7.8 / 26,600	N/A
	MIN Speed	9.3 / 31,600	7.2 / 24,400	5.5 / 18,800	4.2 / 14,400	3.2 / 11,000	N/A
CV60H3B-B	MAX Speed	24.3 / 82,900	19.9 / 67,900	18.1 / 61,800	15.7 / 53,600	13.3 / 45,400	10.9 / 37,200
	MIN Speed	11.6 / 39,600	9.1 / 31,000	8.2 / 28,000	7.3 / 24,900	6.3 / 21,500	5.1 / 17,400
CV60H3B-C	MAX Speed	24.3 / 82,900	19.9 / 67,900	18.1 / 61,800	15.7 / 53,600	13.3 / 45,400	10.9 / 37,200
	MIN Speed	11.6 / 39,600	9.1 / 31,000	8.2 / 28,000	7.3 / 24,900	6.3 / 21,500	5.1 / 1t,400

- All Data Shown at 70°F indoor temperature
- For high altitude installation, de-rate the capacity shown by 1% for every 1000ft, above 1000ft

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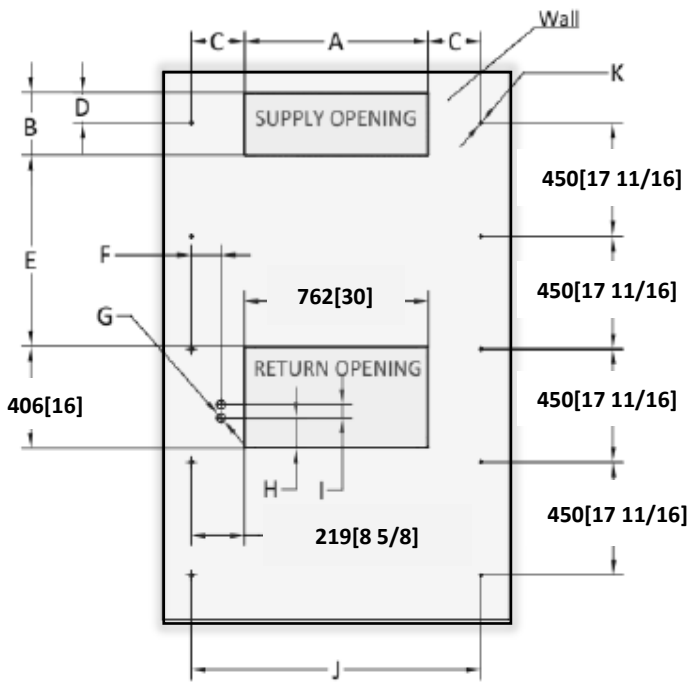


Dimensions

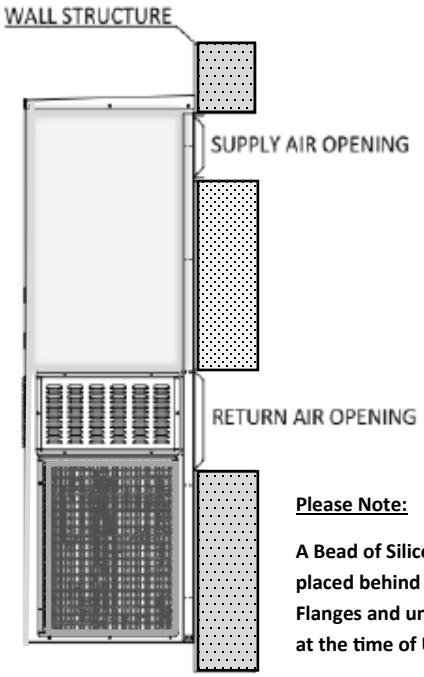
					Supply		Return																
Model	Unit	Width (W)	Depth (D)	Height (H)	I	W1	F	W1	A	B	E	G	V	J	M	N	O	K	S	L	T	P	O
CV36H2B	mm	1160	700	2180	250	760	403	760	738	560	684	762	40	81	1200	1240	20	178	450	130	110	803	855
	inch	45 5/8	27 9/16	85 7/8	9 7/8	29 15/16	15 7/8	29 1/16	29.06	22 1/16	26 15/16	30	19/16	3 3/16	47 1/4	48 13/16	3/4	7	17 3/4	5 1/8	4 5/16	31 5/8	33 5/8
Model	Unit	Width (W)	Depth (D)	Height (H)	I	W1	F	W1	A	B	E	G	V	J	M	N	O	K	S	L	T	P	O
CV60H3B	mm	1160	700	2360	250	760	403	760	956	560	890	762	40	55	1200	1240	20	268	450	220	110	1021	1073
	Inch	45 5/8	27 9/16	92 7/8	9 7/8	29 15/16	15 7/8	29 1/16	37.84	22 1/8	35 1/16	30	19/16	2 3/16	47 1/4	48 13/16	3/4	10 9/16	17 3/4	8 5/8	4 5/16	40 3/16	42 1/4

Note: Dimensions may change without notice

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Wall Opening and Hole Location View



Please Note:

A Bead of Silicon Caulk should be placed behind the side Mounting Flanges and under the Top Flashing at the time of Unit installation

Right Side View

Dimensions

Model	Note	Unit	A	B	C	D	E	F	G	H	I	J	K
CV36H2B	Required Dimensions to maintain 1/4" Minimum Clearance from Combustible Materials	mm	775	267	213	133	756	90	35ϕ	119	52	1200	12ϕ
		inch	30 1/2	10 1/2	8 3/8	5 1/4	29 3/4	3 9/16	1 3/8ϕ	4 11/16	2 1/16	47 1/4	.472ϕ
CV60H3B		mm	775	267	213	249	756	90	35	132	52	1200	12ϕ
		inch	30 1/2	10 1/2	8 3/8	9 3/4	29 3/4	3 9/13	1 3/8ϕ	5 3/16	2 1/16	47 1/4	.472ϕ
CV36H2B	Required Dimensions to maintain 1" Minimum Clearance from Combustible Materials	mm	813	305	194	152	737	90	35ϕ	119	52	1200	12ϕ
		inch	32	12	7 5/8	6	29	3 9/16	1 3/8ϕ	4 11/16	2 11/16	47 1/4	.472ϕ
CV60H3B		mm	813	305	193.59	268	737	90	35ϕ	132	52	1200	12ϕ
		inch	30	12	7 5/8	10 5/8	29	3 9/16	1 3/8ϕ	5 3/16	2 1/16	47 1/4	.472ϕ

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Wiring Information

Wiring Main Power

- Refer to Page 4 for electrical ratings All wiring must conform to all applicable national and local codes.
- The unit rating plate list a maximum fuse size or circuit beaker size to be used with the equipment. The correct size must be used to ensure to ensure proper operation of the units.
- Unit can be wired either single or dual circuit
- **Single Circuit**: Connect Main Power to circuit breaker QS1
- **Dual Circuit Connection**:
  - Disconnect the factory jumper from QS1 to QS2
  - Connect Circuit #1 Power Supply to QS1 (See Figure below for location details)
  - Connect Circuit #2 to Power Supply QS2 (See Figure on Page 33 for location details)

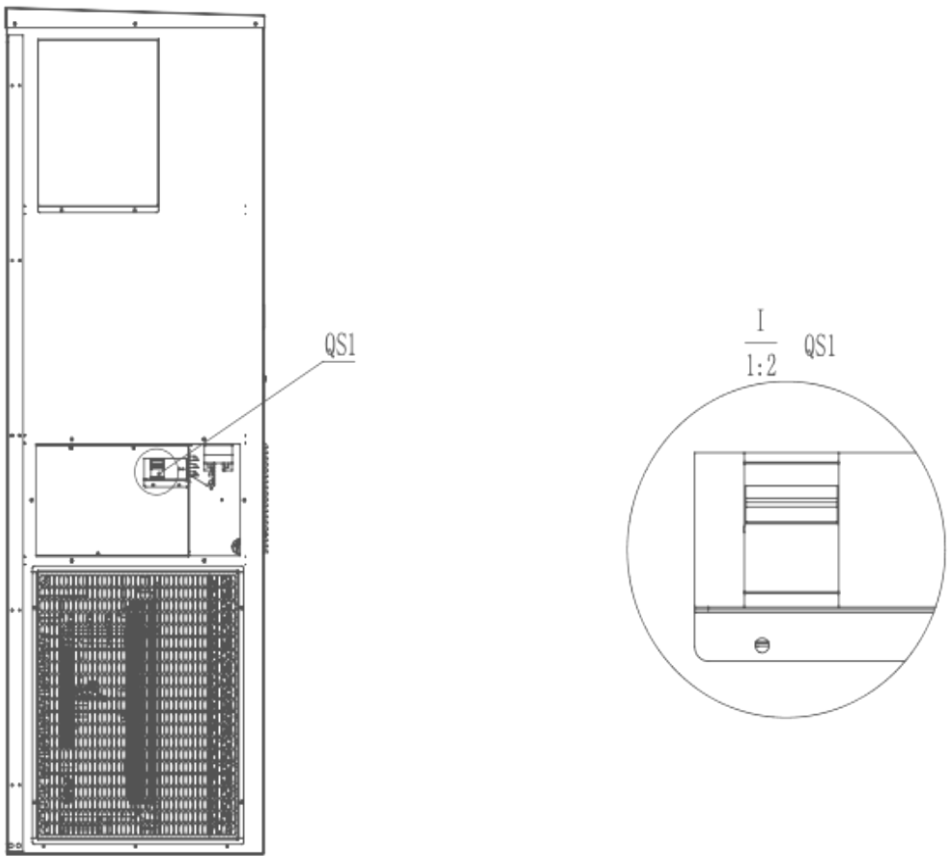
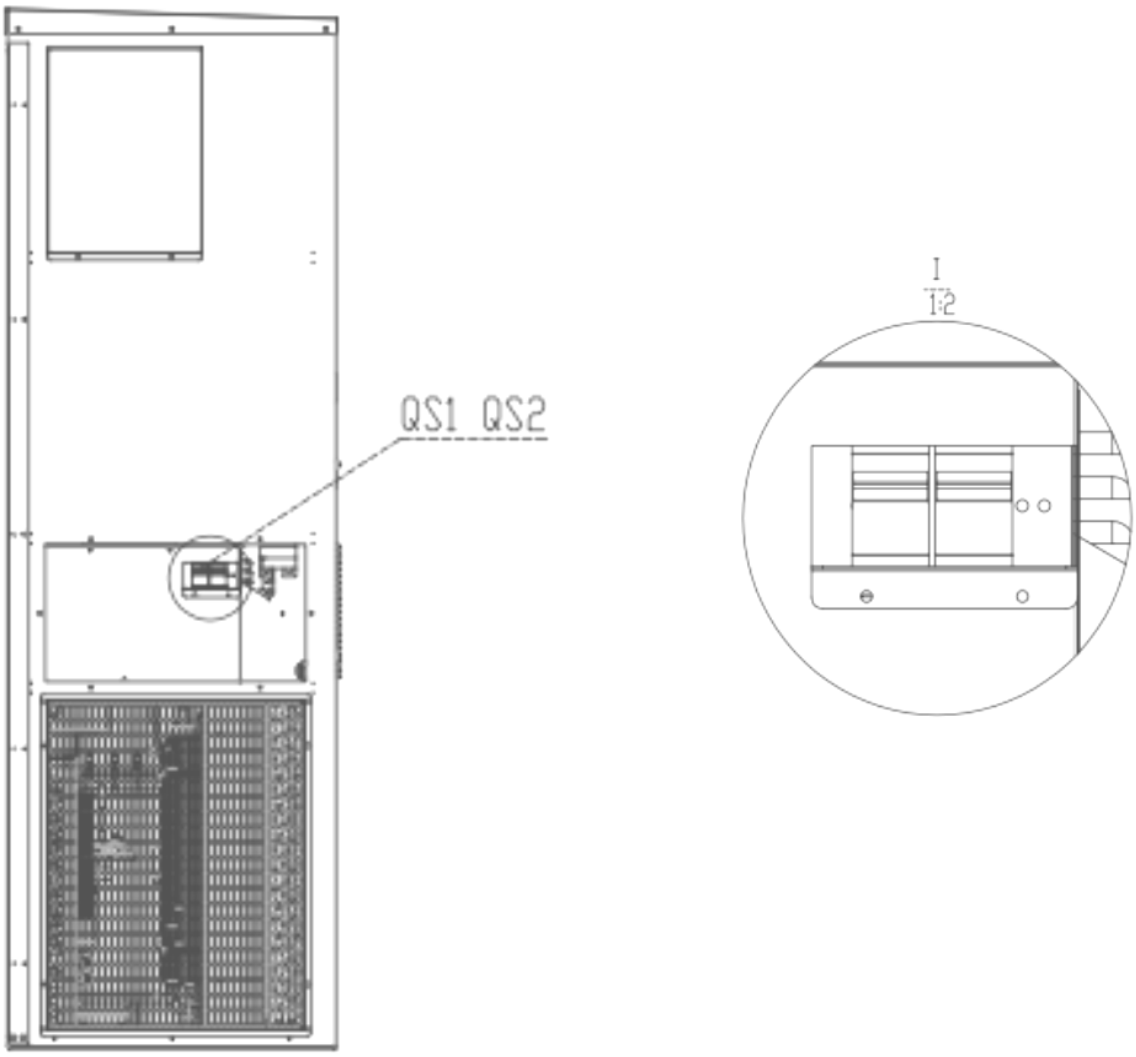


Figure 3-13 Single Circuit QS1 Location

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Wiring Information

Wiring Main Power



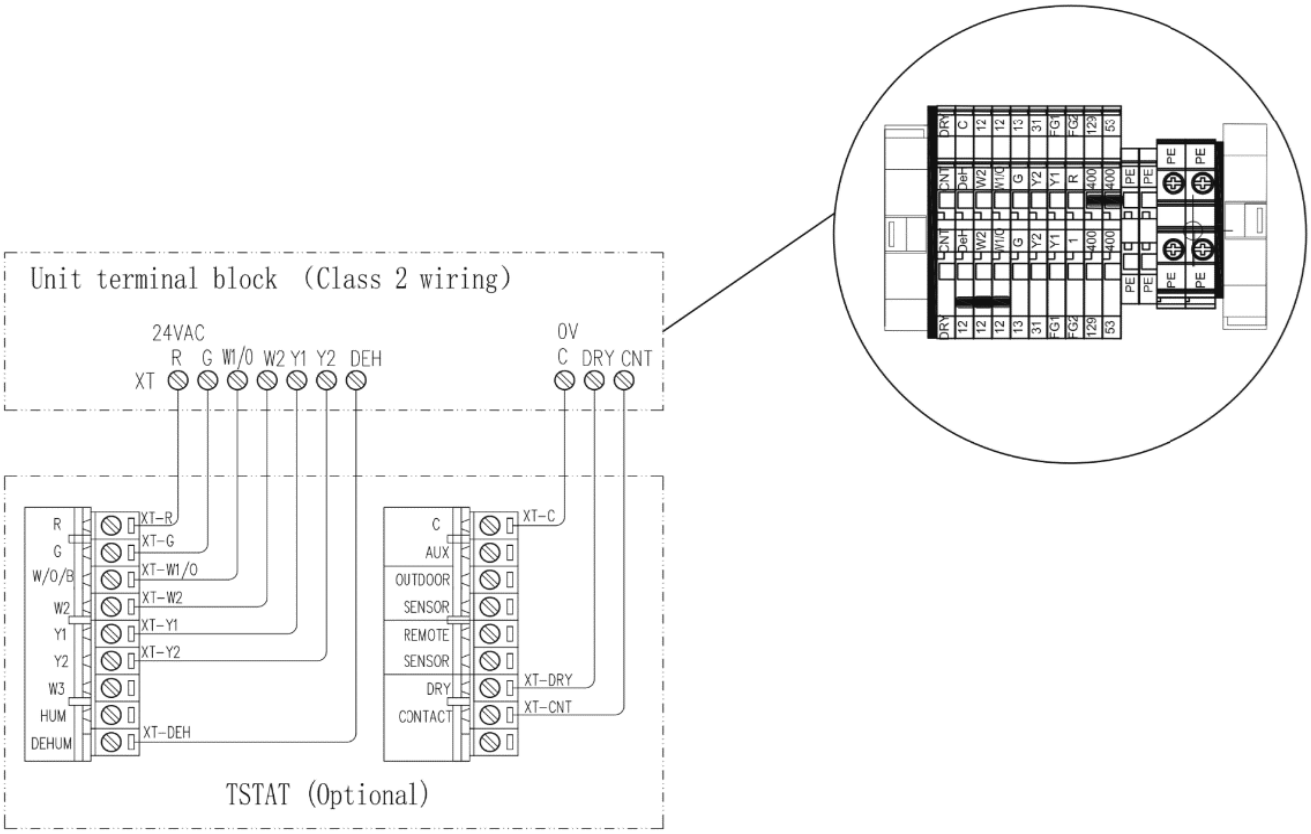
Dual Circuit QS1 & QS2 Locations

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Wiring Information

Wiring— Low Voltage Wiring

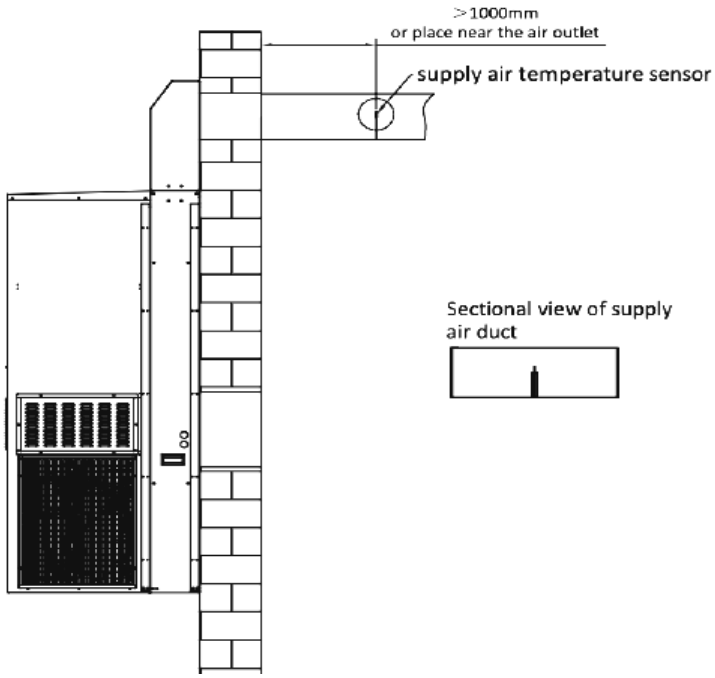
Function	G	O	Y1	Y2	W2	Dehum
Fan Only	X					
Low Speed Cool	X	X	X			
High Speed Cool	X	X	X	X		
Low Speed Heat	X		X			
High Speed Heat	X		X	X		
Electric Heat (Opt.)	X				X	
Dehum. (Opt.)	X	X	X	X		X



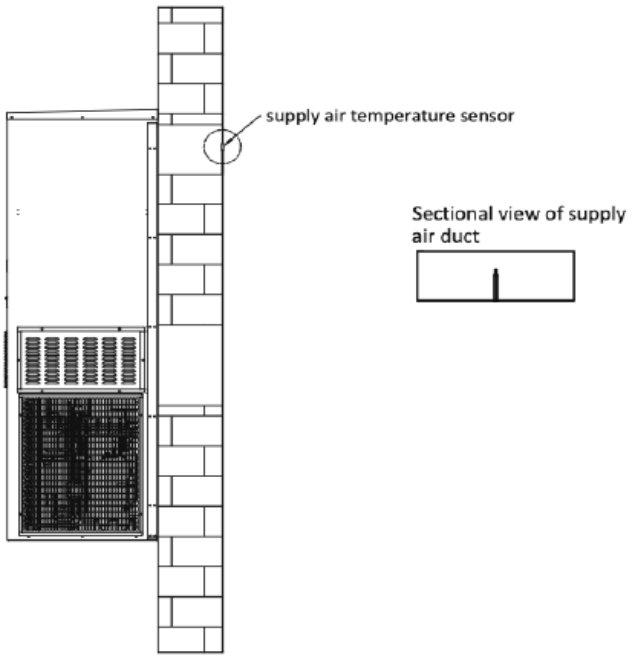
Low Voltage Wiring Detail

Wiring Information

Supply Air Temperature Locations



Supply Air Temperature Installation Location in Ductwork



Supply Air Temperature Installation Location in he Supply Grille

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SECTION VI. EXISTING UNITS FOR REFERENCE

Mark Tawin Elementary					
Building	Mark For	Existing Unit Model	Serial Number	Orientation	Replacement
North Bldg/Bldg K	Room 112A	48HJL006---641	2806G30461	Downshot	48FCGA06A2M6-3A0A0
North Bldg/Bldg K	Room 112B	48HJD007---651	1906G3041	Downshot	48FCDM07A2M6-3A0A0
North Bldg/Bldg K	214	48HJL006---641	2906G10399	Downshot	48FCGA06A2M6-3A0A0
North Bldg/Bldg K	Library	48HJL006---641	290G10402	Downshot	48FCGA06A2M6-3A0A0
North Bldg/Bldg K	215	48HJL005---651	2106G10349	Downshot	48FCGA05A2M6-3A0A0
North Bldg/Bldg K	MS-1	Mitsubishi .75 Split	Unknown	Mitsubishi Split	38MARBQ09AA3
North Bldg/Bldg K	Room 107	48HJL006---641	2806G30452	Downshot	48FCGA06A2M6-3A0A0
North Bldg/Bldg K	8	48HJD007---651	1206G400295	Downshot	48FCDM07A2M6-3A0A0
North Bldg/Bldg K	9	48HJL005---651	1506G40313	Downshot	48FCGA05A2M6-3A0A0
North Bldg/Bldg K	10	48HJL005---651	1506G10359	Downshot	48FCGA05A2M6-3A0A0
North Bldg/Bldg K	11	48HJD007---651	1006G30453	Downshot	48FCDM07A2M6-3A0A0
North Bldg/Bldg K	Room 105	48HJL006---641	2806G30453	Downshot	48FCGA06A2M6-3A0A0
North Bldg/Bldg K	12	48HJL005---651	1506G10356	Downshot	48FCGA05A2M6-3A0A0
North Bldg/Bldg K	13	48HJL006---651	1506G10352	Downshot	48FCGA06A2M6-3A0A0
South Bldg/Bldg L	MS-2	MU-A09WA	Unknown	Mitsubishi Split	38MARBQ09AA3
South Bldg/Bldg L	1	48HJL006---641	2906G10403	Downshot	48FCGA06A2M6-3A0A0
South Bldg/Bldg L	2	48HJL006---641	2906G10400	Downshot	48FCGA06A2M6-3A0A0
South Bldg/Bldg L	3	48HJL006---641	2806G30478	Downshot	48FCGA06A2M6-3A0A0
South Bldg/Bldg L	4	48HJL006---641	2806G30456	Downshot	48FCGA06A2M6-3A0A0
South Bldg/Bldg L	5	48HJL006---641	2906G10397	Downshot	48FCGA06A2M6-3A0A0
South Bldg/Bldg L	6	48HJD007---651	1906G40471	Downshot	48FCDM07A2M6-3A0A0
South Bldg/Bldg L	7	48HJL005---651	1606G40338	Downshot	48FCGA05A2M6-3A0A0
South Bldg/Bldg L	8	48HJL005---651	2106G10348	Downshot	48FCGA05A2M6-3A0A0
South Bldg/Bldg L	9	48HJD007---651	1406G30486	Downshot	48FCDM07A2M6-3A0A0
South Bldg/Bldg L	10	48HJL006---641	2906G10396	Downshot	48FCGA06A2M6-3A0A0
South Bldg/Bldg L	11	48HJL005---651	1506G30358	Downshot	48FCGA05A2M6-3A0A0
South Bldg/Bldg L	12	48HJL005---651	1506G303	Downshot	48FCGA05A2M6-3A0A0
Bldg J	J1	50HJQ005---601	0499G20168	Downshot	50FCQA05A2M6-3A0A0
Bldg J	J2	50HJQ004---601	3499G2022	Downshot	50FCQA04A2M6-3A0A0
Bldg J	J3	50HJQ005---601	1399G21062	Downshot	50FCQA05A2M6-3A0A0
Bldg J	J4	50HJQ004---601	3499G20023	Downshot	50FCQA04A2M6-3A0A0

Bldg J	J5	50HJQ004---601	3199G20182	Downshot	50FCQA04A2M6-3A0A0
Bldg I	I1	Bard 5 Ton RTU	Unknown	Downshot	50VT-K60---3
Bldg I	I2	Bard 5 Ton RTU	Unknown	Downshot	50VT-K60---3
Bldg I	I3	50VT-A60-31	1914C32078	Downshot	50VT-K60---3
Bldg I	I4	Bard 5 Ton RTU	Unknown	Downshot	50VT-K60---3
Bldg H	H1	Bard 5 Wall Mount	Unknown	Wall Mount	CV60H3B-A
Bldg H	H2	Bard 5 Wall Mount	Unknown	Wall Mount	CV60H3B-A
Bldg H	H3	Bard 5 Wall Mount	Unknown	Wall Mount	CV60H3B-A
Bldg Main Office	M1	50HJQ005---601	1199G20198	Downshot	50FCQA05A2M6-3A0A0
Bldg Main Office	MS-3	Mitsubishi 1.5 Ton Spli	Unknown	Mitsubishi Split	38MARBQ18AA3
Bldg G	G-1 (3-8)	50LJQ005---641	0994G01251	Downshot	50FCQA05A2M6-3A0A0
Bldg G	G-2 (3-11)	50LJQ004---641	0994G01296	Downshot	50FCQA04A2M6-3A0A0
Bldg G	G-3 (3-13)	50LJQ004---641	0994G01300	Downshot	50FCQA04A2M6-3A0A0
Bldg B	B1	Bard 5 Ton RTU	Unknown	Downshot	50VT-K60---3
Bldg F	F1 3-6	50LJQ005---641	0994G01244	Downshot	50FCQA05A2M6-3A0A0
Bldg F	F2 3-9	50LJQ004---641	0994G01306	Downshot	50FCQA04A2M6-3A0A0
Bldg F	F3 3-7	50LJQ005---641	0994G01250	Downshot	50FCQA05A2M6-3A0A0
Bldg F	F4 3-4	50LJQ005---641	Unknown	Downshot	50FCQA05A2M6-3A0A0
Bldg E	E1	50HJQ005---641	3101G21714	Downshot	50FCQA05A2M6-3A0A0
Bldg E	E2	50HJQ004---601	1701G24161	Downshot	50FCQA04A2M6-3A0A0
Bldg E	E3	655AEX042000ABBG	0700G40608	Downshot	50VT-K48---6
Bldg E	E4 3-12	50LJQ004---641	0994G1293	Downshot	50FCQA04A2M6-3A0A0
Bldg E	E5 3-10	50LJQ004---641	0994G01303	Downshot	50FCQA04A2M6-3A0A0