

**CONTRACT
DESIGN/BUILD CONTRACT**

THIS CONTRACT (Contract) is made and entered into, effective _____, by and between the CITY OF FRESNO, a California municipal corporation (City), and ALLIANCE BUILDING SOLUTIONS, INC, a California Corporation (Design/Builder).

RECITALS

WHEREAS, the City has requested qualifications and the Design/Builder has responded to City's request; and

WHEREAS, the Design/Builder's response is incorporated herein by reference as if truly set forth; and

WHEREAS, the Design/Builder is experienced, well qualified, and a specialist in the field of design/build construction of Energy Retrofit Projects; and

WHEREAS, the City desires to employ the Design/Builder to work on a design/build basis for the Fresno-Clovis Regional Wastewater Reclamation Facility Energy Savings and Sustainability Capital Improvements Project (Project), as set forth herein; and

WHEREAS, the Design/Builder represents it is an entity that lawfully combines the roles of constructor and professional designer, at a minimum, into a single operating unit.

CONTRACT

NOW, THEREFORE, incorporating the foregoing recitals herein, City and Design/Builder mutually agree as follows:

1. **SCOPE OF WORK.** The Work to be performed consists, in general, of the design and construction of an Energy Retrofit Project and Site Work. The Work (subject to earlier termination in accordance with this Contract) from Substantial Completion or Final Completion of the Work, whichever occurs first, constitutes the "Project" herein. The Scope of Work, attached as **Exhibit A**, shall include all items and procedures necessary to properly complete the task in accordance with all of the terms set forth in this Contract, whether specifically included in the scope of Work/services, or not. The scope of Work shall include all items contained in the Design/Builder's response.
2. **CONTRACT DOCUMENTS AND DEFINITIONS.**
 - 2.1. The "Notice Inviting Qualification," "Qualifications," "Scope of Work" and the "Specifications" including "General Conditions", "Special Conditions", "Project Technical Requirements", and "City Standard Specifications" for the following: DESIGN-BUILD OF ENERGY RETROFIT PROJECT
 - 2.2. The scope of work, copies of which are annexed hereto, together with all the drawings, plans, and documents specifically referred to in said annexed documents, including Performance and Payment Bonds, if required, are hereby incorporated into and made a part of this Contract, and shall be known as the Contract Documents.

2.3. Wherever used in this Contract, the words defined in Article 1 of the General Conditions (DIVISION II of the Contract Documents) shall have the meaning therein given, unless the context requires a different meaning.

3. COMPENSATION AND CONTRACT PRICE.

3.1. For the monetary consideration of Twenty Four Million Two Hundred Thirty Four Thousand One Hundred Nine Dollars (\$24,234,109), as set forth in the Proposal, the Design/Builder promises and agrees to perform or cause to be performed, in a good and workmanlike manner, under the direction and to the satisfaction of the City Engineer, and in strict accordance with the Proposal Specifications, all of the work (design, construction) as set forth in the Contract Documents. Of such monetary consideration, the Design/Builder further guarantees that the Work shall be designed and constructed for a Contract Price not to exceed Twenty Four Million Two Hundred Thirty Four Thousand One Hundred Nine Dollars (\$24,234,109) (i.e., "GMP"). This Contract Price (GMP) shall not, under any circumstances, be exceeded without the consent of the City Council for City evidenced by a written Contract amendment approved by the City Council and signed by both Parties to this Contract.

3.2 The compensation set forth in the Contract shall be the maximum compensation which the Design/Builder may receive under this Contract including, but not limited to, all out-of-pocket costs and taxes. If the Design/Builder's actual costs incurred are less than the GMP for design and construction of the Work, then compensation by City will be limited to such lesser amount. The City shall pay nothing above the compensation listed unless otherwise agreed to in writing by the Parties. Unless otherwise required by State law, a 5% retention shall be withheld from payments of the Contract Price to Design/Builder by City. The 5% retention shall be released after the appropriate statutes have expired and all liens and stop payment notices have been released or otherwise cleared to the satisfaction of the City.

3.3. The Design/Builder shall complete the Work (Final Completion) within 540 working days from the date of the Notice to Proceed.

3.4. The City accepts the Design/Builder's Proposal as stated and agrees to pay the consideration stated, at the times, in the amounts, and under the conditions specified in the Contract Documents.

4. **CONTRACTOR DEFINED.** For the purposes of this Contract, "Design/Builder" means a design/build entity as defined in Article 5, Chapter 4 of the Fresno Municipal Code and includes legal entities that are able to provide appropriately licensed contracting, architectural and engineering services as needed for construction of the Work.

5. **PAYMENT PROCEDURE.** The Design/Builder shall be paid for Work (design and construction services) rendered in accordance with the General Conditions.

6. **CONTROL OF SITE.** The care, custody, and control of the Site shall be with the Design/Builder until Substantial Completion or termination of this Contract and shall

pass from the Design/Builder to the City upon Substantial Completion or termination, but subject to the warranties, performance, and any other continuing obligations of the Design/Builder hereunder. From and after Substantial Completion or termination, the City shall assume the risk of physical damage to the Site. The Design/Builder shall be responsible for and obligated to replace, repair, and reconstruct any portion or all of the Work which is lost, damaged, or destroyed prior to the transfer of care, custody, and control of the Work to the City, however such loss or damage or destruction shall have occurred. The City assumes responsibility for such loss, damage, or destruction after Substantial Completion or termination.

7. **SITE CONDITIONS.** The Design/Builder agrees to fully assume all risks, and costs associated with such risks, in performing the Work and meeting the obligations under this Contract, except for costs associated with materially differing Project Site conditions from those reasonably anticipated after completion of design services which are assumed by the City in accordance with the terms set forth herein.
8. **NO WAIVER OF DEFAULT.** The failure of any Party to enforce against another Party any provision of this Contract shall not constitute a waiver of that Party's right to enforce such a provision at a later time, and shall not serve to vary the terms of this Contract.
9. **LICENSES.** The Design/Builder shall, at its sole cost and expense, keep in effect or obtain, and have possession of, at all times during the term of this Contract any and all licenses, permits, approvals and credentials which are legally required for the Design/Builder to practice its profession and design, construct and maintain the Project.
10. **MERGER AND MODIFICATION.** All prior agreements between the Parties are incorporated in this Contract which constitutes the entire agreement. Its terms are intended by the Parties as a final expression of their agreement with respect to such terms as are included herein and may not be contradicted by evidence of any prior agreement or contemporaneous oral agreement. The Parties further intend this Contract constitutes the complete and exclusive statement of its terms and no extrinsic evidence whatsoever may be introduced in any judicial or arbitration proceeding involving this Contract. This Contract may be modified only in a writing approved by the City Council and signed by all the Parties.
11. **COMMUNICATIONS.** All communications between the City and the Design/Builder concerning the Project shall be in writing.
12. **EXHIBITS.** All exhibits and attachments to which reference is made in this Contract are deemed incorporated in this Contract, whether or not actually attached.
13. **COMPLIANCE WITH ALL LAWS.**
 - 13.1. The Design/Builder shall, at the Design/Builder's sole cost, comply with all of the requirements of municipal, state, and federal authorities now in force, or which may hereafter be in force, pertaining to this Contract, and shall faithfully observe in all activities relating to or growing out of this Contract all municipal ordinances and state and federal statutes, rules or regulations, and permitting

requirements now in force or which may hereafter be in force including, without limitation, obtaining a City of Fresno business license where required.

13.2. The Design/Builder, its subcontractors, subconsultants and their employees, in the performance of the Design/Builder's work under this Contract shall be responsible for exercising the degree of skill and care required by customarily accepted good professional practices and procedures used in the Design/Builder's field. Any costs for failure to meet the forgoing standard or to correct otherwise Defective Work that requires re-performance of the Work, as directed by the City shall be borne in total by the Design/Builder and not the City. In the event that the Design/Builder fails to perform in accordance with the above standard, the Design/Builder will re-perform any task which was not performed to the reasonable satisfaction of the City. Any Work re-performed shall be completed within the time limitations originally set forth for the specific task involved. The Design/Builder shall work any overtime required to meet the deadline for the task at no additional cost to the City. If the re-performance of any task is not feasible within the original time limitations, then the Design/Builder shall perform such task within the new schedule for re-performance provided to and accepted by the City. The City shall have the option to direct Design/Builder not to re-perform any task which was not performed to the reasonable satisfaction of the City. In the event the Design/Builder is so directed, the City and the Design/Builder shall negotiate a reasonable settlement for satisfactory Work performed. No previous payment shall be considered a waiver of the City's right to reimbursement. Nothing contained in this clause is intended to limit any of the rights or remedies which the City may have under law.

13.2.1. The City and its designees may make visits to the Project Site, suppliers, subcontractors, and/or demonstration sites, as frequently as necessary to review Project accomplishments and management control systems.

13.2.2. The Design/Builder and its subcontractors and subconsultants shall comply with Title VI of the Civil Rights Act of 1964 (42 United States Codes Section 2000d, et seq.)

13.2.3. During the performance of this Contract, the Design/Builder and its subcontractors and subconsultants shall not unlawfully discriminate, harass or allow harassment, against any employee or applicant for employment because of sex, sexual orientation, race, color, ancestry, religious creed, national origin, disability (including HIV and AIDS), medical condition (cancer), age, marital status, and denial of family care leave. The Design/Builder and its subcontractors and subconsultants shall insure that the evaluation and treatment of their employees and applicants for employment are free of such discrimination and harassment. The Design/Builder and its subcontractors and subconsultants shall comply with the provisions of the Fair Employment and Housing Act (Government Code Sections 12990 et seq.) And the applicable regulations promulgated thereunder

(California Code of Regulations, Title 2, Section 7285.0 et seq.). The applicable regulations of the Fair Employment and Housing Commission implementing Government Code Section 12990(a-f), set forth in Chapter 5 of Division 4 of Title 2 of the California Code of Regulations are incorporated into this Contract by reference and made a part of it as if set forth in full. The Design/Builder and its subcontractors and subconsultants shall give written notice of their obligations under this clause to labor organizations with which they have a collective bargaining or other agreement. The Design/Builder shall include this clause in all subcontracts to perform work under this Contract.

13.2.4. Upon written request of the City, the Design/Builder shall provide detailed documentation of all expenses at any time throughout the Project. In addition, the Design/Builder agrees to allow the City, upon written request, to have reasonable access to and the right of inspection of all records that pertain to the Project during the term of this Contract and for a period of five years thereafter. Further, the Design/Builder agrees to incorporate an audit of this Project within any scheduled audits, when specifically requested by the City. The Design/Builder shall include a similar right to audit clause in any subcontract.

14. INDEPENDENT CONTRACTOR. This Contract calls for the performance of the services of the Design/Builder as an independent contractor. The Design/Builder retains the right to control the manner in which the services described herein are performed and the Design/Builder will supply all equipment, tools, materials and supplies necessary to perform the services set forth in this Contract. In the furnishing of the work provided for herein, the Design/Builder is acting as an independent contractor. Neither the Design/Builder, nor any of its officers, associates, agents, or employees shall be deemed an employee, joint venture, partner or agent of the City for any purpose. However, the City shall retain the right to verify that the Design/Builder is performing its respective obligations in accordance with the terms of the Contract. Because of its status as an independent contractor, the Design/Builder and its officers, agents, and employees shall have absolutely no right to employment rights and benefits available to City employees. The Design/Builder shall be solely liable and responsible for all payroll and tax withholding and for providing to, or on behalf of, its employees all employee benefits including, without limitation, health, welfare and retirement benefits. In addition, together with its other obligations under this Contract, the Design/Builder shall be solely responsible, indemnify, defend, and save the City harmless from all matters relating to employment and tax withholding for and payment of the Design/Builder's employees, including, without limitation, (i) compliance with Social Security and unemployment insurance withholding, payment of workers compensation benefits, and all other laws and regulations governing matters of employee withholding, taxes and payment; and (ii) any claim of right or interest in City employment benefits, entitlements, programs and/or funds offered employees of the City whether arising by reason of any common law, de facto, leased, or co-employee rights or other

theory. It is acknowledged that during the term of this Contract, the Design/Builder may be providing services to others unrelated to City or to this Contract.

15. PAYMENT AND PERFORMANCE BONDS.

15.1. Prior to the City's execution of the Contract, the Design/Builder shall provide two good and sufficient surety bonds as described hereunder from a corporate surety admitted by the California Insurance Commissioner to do business in the State of California.

15.2. The Design/Builder shall provide the following bonds on forms prescribed by the City with the name of the obligee as the City in the amount set forth below as security for the faithful performance and payment of all the Design/Builder's obligations hereunder for completing the Project:

15.2.1. A Payment Bond for 100% of the Contract Price, to satisfy claims of material suppliers and of mechanics and laborers employed on the Work. The bond shall be maintained by Design/Builder in full force and effect until the completed Work is accepted by City and until all claims for materials and labor are paid, and shall otherwise comply with Chapter 7, title XV, Part 4, Division 3 of the Civil Code.

15.2.2. A Performance Bond for 100% of the Contract Price to guarantee faithful performance of the Work, within the time prescribed, in a manner satisfactory to City, and that all materials and workmanship shall be free from original or developed defects. The bond shall be maintained by the Design/Builder in full force and effect until the completed Work is accepted by the City and until all claims for materials and labor are paid.

15.3. Each bond shall be signed by both the Design/Builder and the Surety and the signature of the authorized agent of the Surety shall be notarized.

15.4. Should any bond become insufficient, the Design/Builder shall renew the bond within ten days after receiving notice from the City.

15.5. Changes in the Work or services, or extensions of time, made pursuant to this Contract, shall in no way release the Design/Builder or Surety from their obligations. Notice of such changes or extensions shall be waived by the Surety.

15.6. All bonds shall be sufficient surety bonds in the form prescribed by the City and shall be issued by such Sureties which are admitted insurers (a corporate surety), admitted by the California Insurance Commissioner to do business in the State of California. All bonds shall satisfy the requirements stated in Section 995.660 of the California Code of Civil Procedure, except as provided otherwise by law or regulation. All bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act. Should any Surety at any time fail to meet these requirements notice will be given to the City by the Design/Builder to that effect. The Design/Builder shall require Surety to provide such notice to the Design/Builder and City immediately upon Surety's failure to meet the requirements of a corporate surety in the State of

California. No further payments shall be deemed due or shall be made under the Contract until a new Surety shall qualify and be accepted by the City.

15.7. If the Surety on any bond furnished by the Design/Builder is declared bankrupt or becomes insolvent or its right to do business is terminated in California, the Design/Builder shall within seven days thereafter substitute another bond and Surety, which must be acceptable to the City.

15.8. The Design/Builder shall obtain the City's written acceptance of all such security instruments at the time the bond(s) are provided.

16. INDEMNIFICATION.

16.1. To the furthest extent allowed by law, including California Civil Code section 2782, DESIGN/BUILDER shall indemnify, defend and hold harmless CITY and each of its officers, officials, employees, agents, and volunteers from any and all claims, demands, actions in law or equity, loss, liability, fines, penalties, forfeitures, interest, costs including legal fees, and damages (whether in contract, tort, or strict liability, including but not limited to personal injury, death at any time, property damage, or loss of any type) arising or alleged to have arisen directly or indirectly out of (1) any voluntary or involuntary act or omission, (2) error, omission or negligence, or (3) the performance or non-performance of this Contract. DESIGN/BUILDER'S obligations as set forth in this section shall apply regardless of whether CITY or any of its officers, officials, employees, agents, or volunteers are passively negligent, but shall not apply to any loss, liability, fines, penalties, forfeitures, costs or damages caused by the active or sole negligence, or the willful misconduct, of CITY or any of its officers, officials, employees, agents or volunteers.

16.2. To the fullest extent allowed by law, and in addition to the express duty to indemnify, DESIGN/BUILDER, whenever there is any causal connection between the DESIGN/BUILDER's performance or non-performance of the work or services required under this Contract and any claim or loss, injury or damage of any type, DESIGN/BUILDER expressly agrees to undertake a duty to defend CITY and any of its officers, officials, employees, agents, or volunteers, as a separate duty, independent of and broader than the duty to indemnify. The duty to defend as herein agreed to by DESIGN/BUILDER expressly includes all costs of litigation, attorneys fees, settlement costs and expenses in connection with claims or litigation, whether or not the claims are valid, false or groundless, as long as the claims could be in any manner be causally connected to DESIGN/BUILDER as reasonably determined by CITY.

16.3. Upon the tender by CITY to DESIGN/BUILDER, DESIGN/BUILDER shall be bound and obligated to assume the defense of CITY and any of its officers, officials, employees, agents, or volunteers, including the a duty to settle and otherwise pursue settlement negotiations, and shall pay, liquidate, discharge and satisfy any and all settlements, judgments, awards, or expenses resulting from or arising out of the claims without reimbursement from CITY or any of its officers, officials, employees, agents, or volunteers.

- 16.4.** It is further understood and agreed by DESIGN/BUILDER that if CITY tenders a defense of a claim on behalf of CITY or any of its officers, officials, employees, agents, or volunteers and DESIGN/BUILDER fails, refuses or neglects to assume the defense thereof, CITY and its officers, officials, employees, agents, or volunteers may agree to compromise and settle or defend any such claim or action and DESIGN/BUILDER shall be bound and obligated to reimburse CITY and its officers, officials, employees, agents, or volunteers for the amounts expended by each in defending or settling such claim, or in the amount required to pay any judgment rendered therein.
- 16.5.** The defense and indemnity obligations set forth above shall be direct obligations and shall be separate from and shall not be limited in any manner by any insurance procured in accordance with the insurance requirements set forth in this Contract. In addition, such obligations remain in force regardless of whether CITY provided approval for, or did not review or object to, any insurance DESIGN/BUILDER may have procured in accordance with the insurance requirements set forth in this Contract. The defense and indemnity obligations shall arise at such time that any claim is made, or loss, injury or damage of any type has been incurred by CITY, and the entry of judgment, arbitration, or litigation of any claim shall not be a condition precedent to these obligations.
- 16.6.** The defense and indemnity obligations set forth in this section shall survive termination or expiration of this Contract.
- 16.7.** If DESIGN/BUILDER should subcontract all or any portion of the work to be performed under this Contract, DESIGN/BUILDER shall require each subcontractor to Indemnify, hold harmless and defend CITY and each of its officers, officials, employees, agents and volunteers in accordance with the terms as set forth above
- 17. TERMINATION.** Contract may be terminated as set forth in the General Conditions for this Project. In addition, following Final Completion and during any maintenance period of the Contract, the City may terminate, without liability to the Design/Builder for detrimental reliance or any other basis in law or equity, the Contract (i) with cause upon thirty days' notice to the Design/Builder with opportunity to cure the default during same thirty days and the Design/Builder's failure to cure such default; (ii) without cause and at the end of the then current maintenance period upon providing the Design/Builder sixty days' notice prior to the end of such maintenance period; or (iii) in the sole event of non-appropriation relating to this Contract, the City shall have the right to terminate this Contract at the end of any fiscal year of the City, in the manner and subject to the terms specified in this paragraph as follows: the City shall endeavor to give written notice of such termination not less than sixty days prior to the end of such fiscal year, and shall notify the Design/Builder of any anticipated termination. For purposes of this paragraph, "fiscal year" shall mean the twelve month fiscal period of the City which commences on July 1 in every year and ends on the following June 30. For purposes of this paragraph, "non-appropriation" shall mean the failure of the City or the City's governing body to appropriate money for

any fiscal year of City sufficient for the continued performance of this Contract by the City.

17.1.In the event of termination by the City as set forth above, the Design/Builder shall remain fully liable for any Work not completed, liquidated damages, delays to other contractors, materials, and equipment provided, designs commenced through the date of termination, consequential damages and any remaining warranty period. If it has not already done so, the Design/Builder will immediately deliver to City possession of the Work including all designs, engineering, Project records, cost data, drawings, specifications and contracts, and construction supplies and aids dedicated solely to performing the Work. The Design/Builder shall assign all subcontracts to City, however, City may accept or reject said subcontracts at its sole discretion.

17.2.The City and the Design/Builder agree that should the City's termination for cause be determined by a court of law to be wrongful or without cause, such termination will be treated as a termination for convenience entitling the Design/Builder to an equitable settlement for claims and liabilities outstanding at the date of termination and reasonable compensation for work actually performed to the date of termination. No other compensation shall be due the Design/Builder for termination for convenience.

17.3.In the event of termination by the City following Final Completion as set forth in this section, the Design/Builder shall be paid compensation for maintenance services satisfactorily performed prior to the effective date of the notice of termination. In the event of termination with cause, the City may withhold an amount that would otherwise be payable as an offset to, but not in excess of, the City's damages caused by default of the Design/Builder.

17.4.In the event the City terminates the Contract with cause, the City may exercise any right, remedy (in law or equity), or privilege which may be available to it under applicable laws of the State of California or any other applicable law, or proceed by appropriate court action to enforce the terms of the Contract, or to recover direct, indirect, consequential or incidental damages for the breach of the Contract. No remedy or election hereunder shall be deemed exclusive but shall, wherever possible, be cumulative with all other remedies at law or in equity.

18. STOP NOTICES OR LIENS. The Design/Builder shall not allow any stop notices or liens to be filed on the Project herein, and shall pay all costs and fees to the City, including without limitation attorney's fees, incurred by the City because of the filing of any such stop notice, lien or legal action relating thereto. The Design/Builder agrees the City may withhold from any funds held by the City concerning the Project herein 125% of the amount of the stop notice, lien or legal action and any additional amounts sufficient to cover costs and fees, including without limitation attorney's fees, incurred by the City because of the filing of any stop notice, lien, or legal action relating thereto.

19. **EXECUTION.** This Contract is effective upon execution. All Parties are equally responsible for authorship of this Contract. Section 1654 of the California Civil Code shall not apply to the interpretation of this Contract.
20. **NOTICES.** Any notice required or intended to be given to either party under terms of this Contract shall be in writing and shall be deemed to be duly given if delivered personally or sent by United States registered or certified mail, with postage prepaid, return receipt requested, addressed to the party to which notice is to be given at the party's address set forth on the signature page of the Bid Proposal in the case of the Design/Builder and at the address set forth on the signature page of the Contract in the case of the City, or at such other address as the parties may from time to time designate by written notice. Notices served by United States mail in the manner above described shall be deemed sufficiently served or given at the time of the mailing thereof.
21. **COMPLIANCE WITH LAW.** In providing the services required under this Contract, Design/Builder shall at all times comply with all applicable laws of the United States, the State of California and City, and with all applicable regulations promulgated by federal, state, regional, or local administrative and regulatory agencies, now in force and as they may be enacted, issued, or amended during the term of this Contract.
22. **ASSIGNMENT.** The Contract is personal to the Design/Builder and there shall be no assignment, transfer, sale, or subcontracting by the Design/Builder of its rights or obligations under the Contract without the prior written approval of the City. Any attempted assignment, transfer, sale, or subcontracting by the Design/Builder, its successors or assigns, shall be null and void unless approved in writing by the City.
23. **BINDING EFFECT.** Subject to the foregoing section, the rights and obligations of this Contract shall inure to the benefit of, and be binding upon, the Parties to the Contract and their heirs, administrators, executors, personal representatives, successors and assigns.
24. **TITLE TO DOCUMENTS AND LICENSE TO SOFTWARE.** All documents, plans, and drawings, maps, photographs, and other papers, (including, but not limited to, computer or electronic data) or copies thereof prepared by the Design/Builder pursuant to the terms of this Contract, shall, upon preparation, become the property of the City and may be used by the City for any purpose without further compensation or authorization of Design/Builder. Additionally, the complete right or perpetual license of all system and maintenance software, if any, shall be transferred to the City.
25. **ACCOUNTING RECORDS.** The Design/Builder shall maintain accurate accounting records and other written documentation pertaining to all costs incurred in performance of this Contract. Such records and documentation shall be kept at the Design/Builder's office during the term of this Contract, and for a period of five years from the date of expiration or termination of the Contract or, longer if required by law, and said records shall be made available to City representatives upon request at any time during regular business hours. This section shall survive expiration or termination of this Contract.

26. **SITE INSPECTION.** The City shall be allowed to inspect the Site at any time and the Design/Builder shall make all areas of the Site available to inspection including, without limitation, any construction trailers or offices at the Site and all plans, drawings, schedules, documents, photographs and other documentation relating to the Project.
27. **CORPORATE AUTHORITY.** Each individual signing this Contract on behalf of the Design/Builder represents and warrants that they are, respectively, duly authorized to sign on behalf of the Design/Builder and to bind the Design/Builder fully to each and all of the obligations set forth in this Contract.
28. **NON-INTEREST.** No officer or employee of the City shall hold any interest in this Contract (California Government Code Section 1090).
29. **CUMULATIVE REMEDIES.** All City's remedies provided in this Contract are cumulative; that is, in addition to each and every other remedy herein or otherwise provided by law, and the City shall have any and all equitable and legal remedies which it would have according to law other than damages for failure to complete the Project within the Contract Time, which damages are covered by the liquidated damages provision herein.
30. The City Manager, or designee, is hereby authorized and directed to execute and implement this Agreement. The previous sentence is not intended to delegate any authority to the City Manager to administer the Agreement, any delegation of authority must be expressly included in the Agreement.

[SIGNATURES FOLLOW ON THE NEXT PAGE.]

IN WITNESS WHEREOF, the Parties have executed this Contract on the day and year here below written, of which the date of execution by the City shall be subsequent to that of the Design/Builder's, and this Contract shall be binding and effective upon execution by both Parties.

CITY OF FRESNO,
A California municipal corporation

ALLIANCE BUILDING SOLUTIONS
INCORPORATED,
a California Corporation

By: _____
Brock D. Buche, PE, PLS,
Director of Public Utilities

By: ^{DocuSigned by:} Brad Chapman 12/6/2023
B36B0201B101453...

Name: Brad Chapman
Title: President
(If corporation or LLC., Board Chair,
Pres. or Vice Pres.)

APPROVED AS TO FORM:
ANDREW JANZ
City Attorney

By: ^{DocuSigned by:} Brandon Collet 12/6/2023
1CFC844CAAB61DEC...
Name: Brandon M. Collet Date
Supervising Deputy City Attorney

By: ^{DocuSigned by:} T. B. Gray 12/6/2023
3020DF66B23647F...
Name: Tim Gray
CFO, COO

Title: _____
(If corporation or LLC., CFO, Treasurer,
Secretary or Assistant Secretary)

ATTEST:
TODD STERMER, CMC
City Clerk

By: _____
Deputy Date

Attachments:
Exhibit A - Scope of Work
Exhibit B - Insurance Requirements

**EXHIBIT A
SCOPE OF WORK**

See attached Exhibit A- Scope of Work and Supplementary Attachments

Exhibit A – Scope of Work and Supplementary Attachments

City of Fresno – Phase 3: Wastewater Treatment Plant

Energy Retrofit Project

Attachment A: Scope of Work

Attachment B: Lighting Systems

Attachment C: Mechanical Systems

Attachment D: Electrical Systems

Attachment E: Process Optimization

Attachment F: Measurement and Verification Agreement

Attachment A: Scope of Work

City of Fresno – Phase 3: Wastewater Treatment Plant

Wastewater Treatment Plant

Lighting Systems

-  Replace identified existing interior fluorescent and/or incandescent lighting systems with high efficiency light emitting diode (LED) systems. Installation includes disposal of existing lighting systems and installation of new equipment. Refer to the Lighting Systems Attachment for identified fixtures, specific quantities, and locations.
-  Replace identified existing exterior high intensity discharge (HID) and/or fluorescent lighting systems with high efficiency light emitting diode (LED) systems. Installation includes disposal of existing lighting systems and installation of new equipment. Refer to the Lighting Systems Attachment for identified fixtures, specific quantities, and locations.

Mechanical Systems

-  Replace HVAC units (10 packaged units & 1 split system) with new high efficiency units of similar size, type and capacity. Replacement will include demolition of existing equipment and turn-key installation of new equipment with start-up / testing of the new installation. Refer to the Mechanical Systems Attachment for specific equipment information, locations, and capacities.
-  For the Lab Building the existing modular 93-ton air cooled chiller will be replaced with a new high efficiency 130-ton air cooled chiller. The two variable, primary-only chilled water pumps will be replaced with two new variable, primary-only chilled water pumps that match the increased flow rate. The existing, undersized air handler that serves the Lab in room 24 will be replaced by a new high efficiency air handler with increased cooling capacity to handle the cooling load of the lab. To improve the long-term integrity of the system four automatic air vents will be added along with two air and dirt separators being replaced. Refer to the Mechanical Systems Attachment for specific equipment information, locations, and capacities.
-  For the Administration Building the HVAC system consisting of packaged units, DOAS and some split units will be replaced with new high efficiency multizone VRF split systems, high efficiency packaged units and ductless split systems. The VRF system will consist of three outdoor units and 37 indoor cassette units. There will be eleven new high efficiency package units along with two new ductless split systems. This will optimize the HVAC serving the Administration Building with respect to energy efficiency and improving temperature control throughout the building. Refer to the Mechanical Systems Attachment for specific equipment information, locations, and capacities.

- The odor control exhaust fans and make-up air units located in the Headworks building will be optimized under this measure. The exhaust fans consist of three 125 hp and two 100 hp motors with the make-up air units consisting of one 20 hp and one 50 hp motor. This system will be optimized by adding VFDs to each of the motors in conjunction with sensors to detect levels of H₂S and controls going back to the existing PLC controls for the existing SCADA system. This optimization will allow the speed of the fans to be reduced based upon the levels of H₂S. Refer to the Mechanical Systems Attachment for specific equipment information, locations, and capacities.
- The Train B Return Activated Sludge (RAS) and Waste Activated Sludge (WAS) pumping system will be optimized with respect to energy efficiency. The scope of work includes the replacement of three 75 hp RAS pumps (Pumps 2, 3 & 4) along with the replacement of three 20 hp WAS pumps (Pumps 1, 2 & 3) with associated VFDs added to allow the pumps to modulate with demand. Refer to the Mechanical Systems Attachment for specific equipment information, locations, and capacities.

Electrical Systems

- Replace select existing dry-type electrical transformers with new ultra-efficient K-rated units of similar size and capacity. Replacement will include demolition of existing equipment and turn-key installation of new equipment with start-up and testing of the new installation. Refer to the Electrical Systems Attachment for specific equipment information and sizes.

Process Optimization

- The Aeration Distribution System will be optimized with the comprehensive upgrade of the aeration system. This includes the replacement of the diffusers within the aeration basins for Trains A, B and C. Additionally, the aeration piping, valves and associated electrical and controls components will be replaced as necessary to provide improved energy efficiency and system reliability. Refer to the Process Optimization Attachment for specific equipment information, locations, and capacities.

Scope of Work Exclusions:

1. Includes the recovery and disposal of removed units as per EPA guidelines.
2. Excludes temporary HVAC (cooling or heating) during construction.
3. Excludes air balancing of the existing ductwork.
4. Excludes identification and removal of any hazardous material (such as lead, mold, and asbestos).
5. Excludes any specialty smoke detectors, fire alarm work or testing.
6. Excludes any existing electrical issues of power wiring.
7. Excludes any structural penetrations or reinforcement or engineering.
8. Excludes permit, plan check and utility fees.
9. Excludes concrete work of any kind.
10. Modification and upgrading of existing systems to current codes.
11. LEED Design, evaluation, calculations, or consulting on LEED documentation.
12. Structural engineering, calculations, or modifications of any kind.
13. Assumes everything is up to code.
14. Excludes any unforeseen conditions.

Attachment B: Lighting Systems

City of Fresno – Phase 3: Wastewater Treatment Plant

Energy Retrofit Project



Detailed Lighting Inventory - Fresno-Clovis RWRP

General Information			Existing Fixture Data				Proposed Fixture Data			
#	Building	Room/Area	Fixture Type	Lighting (Pre)	Pre-Watts	Pre # Fixt	Lighting (Post)	Recommended Make: Model #	Post-Watts	Post # Fixt
1	ADM Tanks	ADM Tanks	12' Pole Arm Area	HPS 150W	188	12	LED 50-Watt Pole Area Light	NaturaLED: LED-FXSAL29/50K/DB/3S	50	12
2	Admin	Admin	Wallpack	HPS 70W	95	1	LED 15-Watt Full-Cutoff Wallpack	NaturaLED: LED-FXSWP15/850/BK	15	1
3	Admin	Admin	20' Pole Arm Area	HPS 250W	295	7	LED 75-Watt Pole Area Light	NaturaLED: LED-FXSAL75/50K/DB	75	7
4	Admin	Parking	25' Pole Area	LED 80W	80	2	No Change	No Change: No Change	80	2
5	Admin	Admin	Can Rec. 6"	LED 10W	10	33	No Change	No Change: No Change	10	33
6	Annex	Hallway	Rec. 2'x2'	F17T82L	33	4	(2) LED 9-Watt 2' Tubes & Ballast	ESPEN: L24T8/840/12P-EB, VEL30BN-2C-10V TAA	20	4
7	Annex	Class 106	Rec. 2'x4'	F40T122L	72	12	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	12
8	Annex	Women's RR	SM 1'x4'	F40T122L	72	2	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	2
9	Annex	Men's RR	SM 1'x4'	F32T82L	59	1	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	1
10	Annex	Room 105	Rec. 2'x4'	F40T122L	72	2	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	2
11	Annex	Room 104	Rec. 2'x4'	F40T122L	72	2	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	2
12	Annex	Room 103	Rec. 2'x4'	F40T122L	72	2	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	2
13	Annex	Room 102	Rec. 2'x4'	F40T122L	72	4	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	4
14	Annex	Break Rm	Rec. 2'x4'	F40T124L	144	11	(4) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	48	11
15	Annex	Women's RR (x2)	Surface Mount	INC 60W 1L	60	1	(1) LED 9-Watt A Lamp	NaturaLED: LED9A19/EC/81L/GU24/927	9	1
16	Annex	Men's RR (x2)	Surface Mount	INC 60W 1L	60	1	(1) LED 9-Watt A Lamp	NaturaLED: LED9A19/EC/81L/GU24/927	9	1
17	Annex	Class 106	Can Rec. 6"	INC 75W 1L	75	14	LED 13-Watt 6" Downlight Retrofit	ESPEN: VEKR6D/8T/13W-10V TAA	13	14
18	Annex	Annex	Can Rec. 6"	HPS 70W	95	6	LED 21-Watt 6" Downlight Retrofit	ESPEN: VEKR6D/9T/21W-10V TAA	21	6
19	A-side Finals 1-4	A-side Finals 1-4	10' Pole Top	HPS 150W	188	10	LED 34-Watt Pole Top	NaturaLED: FX15PST34SW/8CCT3/BK	34	10
20	A-side Finals 1-4	A-side Finals 1-4	15' Threaded Knuckle Mount	HPS 150W	188	6	LED 30-Watt Threaded Knuckle Flood	NaturaLED: FXFDL30/76/50K/BZ-KNC	30	6
21	A-Side MCC	Main Area	Pendant Highbay	LED 100W	100	15	No Change	No Change: No Change	100	15
22	A-side RAS pit	A-side RAS pit	10' Pole Top	HPS 70W	95	2	LED 28-Watt Pole Top	NaturaLED: FX15PST34SW/8CCT3/BK	28	2
23	A-side RAS pit	A-side RAS pit	10' Pole Top	HPS 150W	188	5	LED 34-Watt Pole Top	NaturaLED: FX15PST34SW/8CCT3/BK	34	5
24	A-side RAS pit	A-side RAS pit	25' Pole Cobra Head	HPS 250W	295	1	LED 75-Watt Pole Cobra w/ Photocell	Philips: RPS-75W30LED	75	1
25	A-side RAS pit	A-side RAS pit	6' Rooftop Pole Arm Area	HPS 250W	295	3	LED 75-Watt Pole Area Light	NaturaLED: LED-FXSAL75/50K/DB	75	3
26	Blower Bldg #1	Main Rm	Surface Mount	F32T83L	89	19	(3) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	36	19
27	Blower Bldg #1	Elec Rm	Rec. 2'x4'	F32T84L	112	3	(4) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	48	3
28	Blower Bldg #2	Stairwell	Surface Mount	F32T82L	59	1	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	1
29	Blower Bldg #2	Basement	Pendant Highbay	MH 175W	215	18	LED 100-Watt Highbay w/ Ctrls	Aleo: UXB-UX-240/CT-HV G4 ECO (SR)	100	18
30	Blower Bldg #2	Main Rm	Pendant Highbay	HPS 400W	465	12	LED 150-Watt Highbay w/ Ctrls	Aleo: UXB-UX-240/CT-HV G4 ECO (SR)	150	12
31	Blower Bldg #2	Blower Bldg #2	Wall Mount Arm	HPS 150W	188	4	LED 28-Watt Wallpack w/ Photocell	NaturaLED: FXTWP28/50K/BZ-PHO	28	4
32	Blower House	Blower House	Wallpack	HPS 70W	95	11	LED 15-Watt Full-Cutoff Wallpack	NaturaLED: LED-FXSWP15/850/BK	15	11
33	Blower House	Blower House	10' Pole Arm Area	HPS 150W	188	1	LED 50-Watt Pole Area Light	NaturaLED: LED-FXSAL29/50K/DB/3S	50	1
34	Boiler Bldg	Boiler Bldg	Wallpack	HPS 70W	95	5	LED 15-Watt Full-Cutoff Wallpack	NaturaLED: LED-FXSWP15/850/BK	15	5
35	Campus	Campus	20'-25' Pole Cobra Head	HPS 150W	188	13	LED 45-Watt Pole Cobra w/ Photocell	Philips: RPS-45W20LED	45	13
36	Campus	Campus	20'-25' Pole Cobra Head	HPS 250W	295	51	LED 75-Watt Pole Cobra w/ Photocell	Philips: RPS-75W30LED	75	51
37	Campus	Campus	20'-25' Pole Cobra Head	HPS 400W	465	20	LED 110-Watt Pole Cobra w/ Photocell	Philips: RPM-110W60LED	110	20
38	City HVAC & Instrumentation	Shop	Pendant	F32T82L	59	9	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	9



Detailed Lighting Inventory - Fresno-Clovis RWRP

General Information			Existing Fixture Data				Proposed Fixture Data			
#	Building	Room/Area	Fixture Type	Lighting (Pre)	Pre-Watts	Pre # Fixt	Lighting (Post)	Recommended Make: Model #	Post-Watts	Post # Fixt
39	City HVAC & Instrumentation	Instrumentation	Rec. 2'x4'	F32T82L	59	4	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	4
40	City HVAC & Instrumentation	Restroom	Surface Mount	F32T82L	59	2	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	2
41	City HVAC & Instrumentation	S...	Surface Mount	F32T82L	59	2	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	2
42	City HVAC & Instrumentation	City HVAC & Instrumentation	Wallpack	HPS 70W	95	4	LED 15-Watt Full-Cutoff Wallpack	NaturalLED: LED-FXSWP15/850/BK	15	4
43	CMS	1st Flr: Men's RR & Lockers	Strip	F17T82L	33	1	(2) LED 9-Watt 2' Tubes & Ballast	ESPEN: L24T8/840/12P-EB, VEL30BN-2C-10V TAA	20	1
44	CMS	3rd Flr: Lobby	Rec. 2'x4'	F32T82L	59	1	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	1
45	CMS	3rd Flr: Lobby	Surface Mount	F32T82L	59	2	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	2
46	CMS	Class 303	Rec. 2'x4'	F32T82L	59	12	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	12
47	CMS	3rd Flr: Hallway	Rec. 2'x4'	F32T82L	59	5	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	5
48	CMS	3rd Flr: Stairwell	Surface Mount	F32T82L	59	2	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	2
49	CMS	3rd Flr: Men's RR	Surface Mount	F32T82L	59	1	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	1
50	CMS	Room 309	Rec. 2'x4'	F32T82L	59	6	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	6
51	CMS	3rd Flr: Women's RR	Surface Mount	F32T82L	59	1	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	1
52	CMS	Room 306	Rec. 2'x4'	F32T82L	59	4	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	4
53	CMS	2nd Flr: Stair	Rec. 2'x4'	F32T82L	59	8	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	8
54	CMS	208	Rec. 2'x4'	F32T82L	59	2	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	2
55	CMS	209	Rec. 2'x4'	F32T82L	59	2	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	2
56	CMS	304	Surface Mount	F32T82L	59	1	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	1
57	CMS	222	Surface Mount	F32T82L	59	1	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	1
58	CMS	2nd Flr: Hallway	Rec. 2'x4'	F32T82L	59	7	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	7
59	CMS	2nd Flr: Hallway	Surface Mount	F32T82L	59	2	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	2
60	CMS	216	Rec. 2'x4'	F32T82L	59	2	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	2
61	CMS	Office (x4)	Rec. 2'x4'	F32T82L	59	8	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	8
62	CMS	215	Surface Mount	F32T82L	59	1	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	1
63	CMS	2nd Flr: Elevator	Rec. 2'x4'	F32T82L	59	2	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	2
64	CMS	1st Flr: Stairs	Surface Mount	F32T82L	59	2	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	2
65	CMS	1st Flr: Hallway	Rec. 2'x4'	F32T82L	59	11	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	11
66	CMS	1st Flr: Hallway	Surface Mount	F32T82L	59	1	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	1
67	CMS	102	Rec. 2'x4'	F32T82L	59	2	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	2
68	CMS	122	Pendant	F32T82L	59	2	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	2
69	CMS	123	Pendant	F32T82L	59	2	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	2
70	CMS	118	Surface Mount	F32T82L	59	1	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	1
71	CMS	1st Flr: Men's RR & Lockers	Surface Mount	F32T82L	59	8	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	8
72	CMS	1st Flr: Men's RR & Lockers	Strip	F32T82L	59	1	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	1
73	CMS	1st Flr: Equipment Room	Strip	F32T82L	59	2	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	2
74	CMS	113 Closet	Surface Mount	F32T82L	59	1	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	1
75	CMS	117	Surface Mount	F32T82L	59	2	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	2
76	CMS	Women's RR	Surface Mount	F32T82L	59	2	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	2



Detailed Lighting Inventory - Fresno-Clovis RWRP

General Information			Existing Fixture Data				Proposed Fixture Data				
#	Building	Room/Area	Fixture Type	Lighting (Pre)	Pre-Watts	Pre # Fixt	Lighting (Post)	Recommended Make: Model #	Post-Watts	Post # Fixt	
77	CMS	Crane Shop	Surface Mount	F32T84L	112	2	(4) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	48	2	
78	CMS	113	SM 2'x4'	F32T84L	112	6	(4) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	48	6	
79	CMS	1st Floor MRR & Lockers	SM Round	CFL 13W 2L	26	1	(2) LED 5-Watt A Lamp	NaturaLED: LED5A19/45L/950	10	1	
80	CMS	CMS	Mini Wallpack	HPS 70W	95	2	LED 15-Watt Full-Cutoff Wallpack	NaturaLED: LED-FXSWP15/850/BK	15	2	
81	CMS	CMS	Wallpack	HPS 70W	95	7	LED 15-Watt Full-Cutoff Wallpack	NaturaLED: LED-FXSWP15/850/BK	15	7	
82	CMS	2nd Floor Hallway	Rec. 2'x4'	LED 12W 2L	24	1	No Change	No Change: No Change	24	1	
83	Collections	Open	Pendant Strip	F32T82L	59	6	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	6	
84	Collections	Storage	Surface Mount	F32T82L	59	2	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	2	
85	Collections	Storage 2	Surface Mount	F32T82L	59	2	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	2	
86	Collections	Storage 4	Strip	F32T82L	59	12	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	12	
87	Collections	Storage 5	Surface Mount	F32T82L	59	6	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	6	
88	DAFT	MCC Rm	Surface Mount	F32T83L	89	3	(3) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	36	3	
89	DAFT	MCC Rm	Pendant Highbay	MH 100W	128	24	LED 60-Watt Highbay Retrofit Lamp Ballast Bypass	Keystone: KT-LED60HID-V-E26-840-D	60	24	
90	DAFT	DAFT	Wallpack	HPS 70W	95	1	LED 15-Watt Full-Cutoff Wallpack	NaturaLED: LED-FXSWP15/850/BK	15	1	
91	DAFT	DAFT	Pendant Highbay	MH 100W	128	8	LED 60-Watt Highbay Retrofit Lamp Ballast Bypass	Keystone: KT-LED60HID-V-E26-840-D	60	8	
92	DAFT	DAFT	10' Pole Top	HPS 150W	188	2	LED 34-Watt Pole Top	NaturaLED: FX15PST34SW/8CCT3/BK	34	2	
93	DAFT	DAFT	15' Pole Knuckle Area	HPS 150W	188	2	LED 50-Watt Pole Area Light	NaturaLED: LED-FXSAL29/50K/DB/3S	50	2	
94	DAFT	DAFT	15' Pole Arm Area	HPS 250W	295	2	LED 75-Watt Pole Area Light	NaturaLED: LED-FXSAL75/50K/DB	75	2	
95	DECx cogen	DECx cogen	Wallpack	HPS 70W	95	1	LED 15-Watt Full-Cutoff Wallpack	NaturaLED: LED-FXSWP15/850/BK	15	1	
96	DECx cogen	DECx cogen	10' Pole Slip-Fit Explosion Proof Jelly Jar	HPS 100W	138	15	LED 29-Watt Pole Area Light	NaturaLED: LED-FXSAL29/50K/DB/3S	29	15	
97	DECx cogen	DECx cogen	Specialty Mount Wallpack	HPS 250W	295	17	LED 75-Watt Yoke Flood	NaturaLED: LED-FXSAL75/50K	75	17	
98	Dewatering Silo	Dewatering Silo	Wallpack	HPS 70W	95	19	LED 15-Watt Full-Cutoff Wallpack	NaturaLED: LED-FXSWP15/850/BK	15	19	
99	Dewatering Silo	Dewatering Silo	20'-25' Pole Cobra Head	HPS 250W	295	7	LED 75-Watt Pole Cobra w/ Photocell	Philips: RPS-75W30LED	75	7	
100	Dewatering Silo	Pad by Building	15' Pole Arm Area	HPS 250W	295	2	LED 75-Watt Pole Area Light	NaturaLED: LED-FXSAL75/50K/DB	75	2	
101	Dewatering Silo	Dewatering Silo	30'-40' Pole Yoke Flood	MH 1000W	1080	12	LED 400-Watt Pole Athletic Field Flood	NaturaLED: LED-FX15SPL400/44/50K/BK/480	400	12	
102	Dewatering Silo #1	Bldg	Wallpack	MH 150W	190	8	LED 28-Watt Wallpack w/ Photocell	NaturaLED: FXTWP28/50K/BZ-PHO	28	8	
103	Digester #3	Main Rm	Surface Mount	F32T83L	89	2	(3) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	36	2	
104	Digester #3	Digester #3	Jelly Jar Explosion Proof (Unique Mount)	HPS 70W	95	13	LED 29-Watt Pole Area Light	NaturaLED: LED-FXSAL29/50K/DB/3S	29	13	
105	Digester #3	Main Room	Surface Mount	LED 12W 3L	36	2	No Change	No Change: No Change	36	2	
106	Digester #4	Main Room	Surface Mount	F32T82L	59	4	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	4	
107	Digester #4	Main Rm	Pendant Highbay	MH 250W	295	26	LED 100-Watt Highbay w/ Ctrls	Aleo: UXB-UX-240/CT-HV G4 ECO (SR)	100	26	
108	Digester Bldg	Digester Bldg	Wallpack	HPS 70W	95	4	LED 15-Watt Full-Cutoff Wallpack	NaturaLED: LED-FXSWP15/850/BK	15	4	
109	Digester Bldg	Digester Bldg	8' Pole Slip-Fit Explosion Proof Jelly Jar	HPS 100W	138	6	LED 29-Watt Pole Area Light	NaturaLED: LED-FXSAL29/50K/DB/3S	29	6	
110	Field Maintenance	Office	SM 2'x4'	F32T84L	112	3	(4) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	48	3	
111	Field Maintenance	Field Maintenance	Mini Wallpack	HPS 70W	95	3	LED 15-Watt Full-Cutoff Wallpack	NaturaLED: LED-FXSWP15/850/BK	15	3	
112	Field Maintenance	Field Maintenance	Wallpack	HPS 70W	95	1	LED 15-Watt Full-Cutoff Wallpack	NaturaLED: LED-FXSWP15/850/BK	15	1	
113	Field Maintenance	Field Maintenance	30' Pole Arm Area	MH 250W	295	2	LED 75-Watt Pole Area Light	NaturaLED: LED-FXSAL75/50K/DB	75	2	
114	Finals	Finals	10' Pole Top	HPS 150W	188	24	LED 34-Watt Pole Top	NaturaLED: FX15PST34SW/8CCT3/BK	34	24	

Detailed Lighting Inventory - Fresno-Clovis RWRP



General Information			Existing Fixture Data				Proposed Fixture Data			
#	Building	Room/Area	Fixture Type	Lighting (Pre)	Pre-Watts	Pre # Fixt	Lighting (Post)	Recommended Make: Model #	Post-Watts	Post # Fixt
115	Fog Station	Fog Station	Pendant 1'x4'	F32T82L	59	6	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	6
116	Fog Station	Fog Station	Wallpack	HPS 70W	95	2	LED 15-Watt Full-Cutoff Wallpack	NaturalLED: LED-FXSWP15/850/BK	15	2
117	Fog Station	B-side Secondary Clarifier	Slip-Fit Explosion Proof Jelly Jar	HPS 100W	138	1	LED 29-Watt Pole Area Light	NaturalLED: LED-FXSAL29/50K/DB/3S	29	1
118	Fog Station	Polymer A6370 Tank	12' Pole Arm Area	HPS 150W	188	3	LED 50-Watt Pole Area Light	NaturalLED: LED-FXSAL29/50K/DB/3S	50	3
119	Fog Station	B side Splitter	10' Pole Arm Area	HPS 150W	188	2	LED 50-Watt Pole Area Light	NaturalLED: LED-FXSAL29/50K/DB/3S	50	2
120	Fog Station	Primary Clarifier	15' Pole Arm Area	HPS 150W	188	6	LED 50-Watt Pole Area Light	NaturalLED: LED-FXSAL29/50K/DB/3S	50	6
121	Fog Station	Primary Scum Well	12' Pole Arm Area	HPS 150W	188	1	LED 50-Watt Pole Area Light	NaturalLED: LED-FXSAL29/50K/DB/3S	50	1
122	Fog Station	Aeratm Tank	12' Pole Arm Area	HPS 150W	188	38	LED 50-Watt Pole Area Light	NaturalLED: LED-FXSAL29/50K/DB/3S	50	38
123	Fog Station	B-side Secondary Clarifier	12' Pole Arm Area	HPS 150W	188	56	LED 50-Watt Pole Area Light	NaturalLED: LED-FXSAL29/50K/DB/3S	50	56
124	Fog Station	Aeration Tank	12' Pole Arm Area	HPS 150W	188	32	LED 50-Watt Pole Area Light	NaturalLED: LED-FXSAL29/50K/DB/3S	50	32
125	Fog Station	C-side Final Tanks	12' Pole Arm Area	HPS 150W	188	34	LED 50-Watt Pole Area Light	NaturalLED: LED-FXSAL29/50K/DB/3S	50	34
126	Fog Station	Primary Clarifier	15' Square Pole Pole Mount	LED 50W	50	1	No Change	No Change: No Change	50	1
127	Fuel Island	Fuel Island	Explosion Proof Canopy	MH 250W	295	4	LED 53-Watt Canopy 1'x1'	TBD: TBD	53	4
128	Generator Lab	Generator Lab	Can Rec. 6"	LED 10W	10	2	No Change	No Change: No Change	10	2
129	Head Works	Elec Rm	Surface Mount	F32T82L	59	1	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	1
130	Head Works	2nd Flr: Control Rm	Rec. 2'x4'	F40T123L	115	12	(3) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	36	12
131	Head Works	Janitor Closet	Rec. 2'x4'	F32T83L	89	1	(3) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	36	1
132	Head Works	Power Park / Mech. Rm	Surface Mount	F40T123L	115	13	(3) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	36	13
133	Head Works	Men's RR	Can Rec. 6"	CFT 18W 1L	24	2	LED 9.5-Watt 6" Downlight Retrofit	ESPEN: VEKR6D/9T/21W-10V TAA	9.5	2
134	Head Works	Lobby	Can Rec. 6"	CFQ 26W 1L	33	24	LED 9.5-Watt 6" Downlight Retrofit	ESPEN: VEKR6D/9T/21W-10V TAA	9.5	24
135	Head Works	2nd Flr: Lobby	Can Rec. 6"	CFQ 26W 1L	33	36	LED 9.5-Watt 6" Downlight Retrofit	ESPEN: VEKR6D/9T/21W-10V TAA	9.5	36
136	Head Works	Stairwell	Wallpack	HPS 50W	66	30	LED 15-Watt Full-Cutoff Wallpack	NaturalLED: LED-FXSWP15/850/BK	15	30
137	Head Works	Dry Pit	Pendant Highbay	MH 400W	458	10	LED 150-Watt Highbay w/ Ctrls	Aleo: UXB-UX-240/CT-HV G4 ECO (SR)	150	10
138	Head Works	Grit Pump	Linear Fixture	LED 12W 2L	24	18	No Change	No Change: No Change	24	18
139	Heavy Equipment	Heavy Equipment	25' Pole Cobra Head	HPS 250W	295	9	LED 75-Watt Pole Cobra w/ Photocell	Philips: RPS-75W30LED	75	9
140	Heavy Equipment	Heavy Equipment	18' Wall Mount Knuckle Flood	HPS 250W	295	17	LED 75-Watt Yoke Flood	NaturalLED: LED-FXSAL75/50K	75	17
141	Lab	Main Lab	Strip	F32T81L	31	5	(1) LED 12-Watt 4' Tube & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	12	5
142	Maintenance Shop	Janitor Closet	Strip	F32T82L	59	1	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	1
143	One Water Station	Drain Station #2	10' Pole Slip-Fit Explosion Proof Jelly Jar	HPS 100W	138	1	LED 29-Watt Pole Area Light	NaturalLED: LED-FXSAL29/50K/DB/3S	29	1
144	OPS	Break Room	SM 1'x4'	F32T82L	59	11	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	11
145	OPS	Lockers and Restroom	Surface Mount	F32T82L	59	5	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	5
146	OPS	Lockers and Restroom	Strip	F32T82L	59	1	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	1
147	OPS	Lockers and Restroom	Rec. 1'x1' globes	INC 60W 1L	60	4	(1) LED 9-Watt A Lamp	NaturalLED: LED9A19/EC/81L/GU24/927	9	4
148	OPS	Break Room	Mini Wallpack	HPS 70W	95	1	LED 15-Watt Full-Cutoff Wallpack	NaturalLED: LED-FXSWP15/850/BK	15	1
149	Pump House	Area 1	Pendant Highbay	MH 400W	458	12	LED 150-Watt Highbay w/ Ctrls	Aleo: UXB-UX-240/CT-HV G4 ECO (SR)	150	12
150	Pump House	Area 2	Pendant Highbay	MH 400W	458	11	LED 150-Watt Highbay w/ Ctrls	Aleo: UXB-UX-240/CT-HV G4 ECO (SR)	150	11
151	Pump House	Area 1	Wallpack	HPS 70W	95	2	LED 15-Watt Full-Cutoff Wallpack	NaturalLED: LED-FXSWP15/850/BK	15	2
152	Pump House	Area 2	Wallpack	HPS 70W	95	2	LED 15-Watt Full-Cutoff Wallpack	NaturalLED: LED-FXSWP15/850/BK	15	2



Detailed Lighting Inventory - Fresno-Clovis RWRf

General Information			Existing Fixture Data				Proposed Fixture Data				
#	Building	Room/Area	Fixture Type	Lighting (Pre)	Pre-Watts	Pre # Fixt	Lighting (Post)	Recommended Make: Model #	Post-Watts	Post # Fixt	
153	Pump House	Pump House	10' Pole Slip-Fit Explosion Proof Jelly Jar	HPS 100W	138	7	LED 29-Watt Pole Area Light	NaturaLED: LED-FXSAL29/50K/DB/3S	29	7	
154	Pump House	by old cogen	20'-25' Pole Cobra Head	HPS 250W	295	3	LED 75-Watt Pole Cobra w/ Photocell	Philips: RPS-75W30LED	75	3	
155	Ras Was	Basement Ras Was B-side	Surface Mount	F32T82L	59	4	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	4	
156	Ras Was	Basement Ras Was	Surface Mount	F32T83L	89	7	(3) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	36	7	
157	Ras Was	Basement Ras Was B-side	Threaded Knuckle Flood	MH 150W	190	5	LED 50-Watt Threaded Knuckle Flood	NaturaLED: LED-FXFDL50/77/50K/BZ-KNC	50	5	
158	Ras Was	Basement Ras Was C-side	Threaded Knuckle Flood	MH 150W	190	6	LED 50-Watt Threaded Knuckle Flood	NaturaLED: LED-FXFDL50/77/50K/BZ-KNC	50	6	
159	Ras Was	Basement Ras Was C-side	Pendant Highbay	MH 100W	128	37	LED 60-Watt Highbay Retrofit Lamp Ballast Bypass	Keystone: KT-LED60HID-V-E26-840-D	60	37	
160	Ras Was	Basement Ras Was B-side	Pendant Highbay	MH 100W	128	10	LED 60-Watt Highbay Retrofit Lamp Ballast Bypass	Keystone: KT-LED60HID-V-E26-840-D	60	10	
161	Ras Was	Basement Ras Was B-side	Pendant Highbay	MH 250W	295	9	LED 100-Watt Highbay w/ Ctrls	Aleo: UXB-UX-240/CT-HV G4 ECO (SR)	100	9	
162	RAS WAS	West Side	12' Pole Arm Area	HPS 150W	188	8	LED 50-Watt Pole Area Light	NaturaLED: LED-FXSAL29/50K/DB/3S	50	8	
163	Ras Was	Basement Ras Was	Surface Mount	LED 12W 3L	36	5	No Change	No Change: No Change	36	5	
164	Septic	Elec Rm	Rec. 2'x4'	F32T82L	59	5	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	5	
165	Septic	Elec Rm	Strip	F32T82L	59	1	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	1	
166	Septic	Room	Pendant Highbay	MH 250W	295	4	LED 100-Watt Highbay w/ Ctrls	Aleo: UXB-UX-240/CT-HV G4 ECO (SR)	100	4	
167	Septic	Septic	Wallpack	HPS 70W	95	9	LED 15-Watt Full-Cutoff Wallpack	NaturaLED: LED-FXSWP15/850/BK	15	9	
168	Septic	Septic	25' Pole Cobra Head	HPS 250W	295	12	LED 75-Watt Pole Cobra w/ Photocell	Philips: RPS-75W30LED	75	12	
169	Silo 2	Silo 2	Wallpack	HPS 70W	95	5	LED 15-Watt Full-Cutoff Wallpack	NaturaLED: LED-FXSWP15/850/BK	15	5	
170	Switchgear by 2-water	Switchgear by 2-water	Wallpack	HPS 70W	95	1	LED 15-Watt Full-Cutoff Wallpack	NaturaLED: LED-FXSWP15/850/BK	15	1	
171	Switchgear by Cogn	Switchgear by Cogn	Wallpack	HPS 70W	95	4	LED 15-Watt Full-Cutoff Wallpack	NaturaLED: LED-FXSWP15/850/BK	15	4	
172	Switchgear by Cogn	Switchgear by Cogn	10' Pole Slip-Fit Explosion Proof Jelly Jar	HPS 100W	138	12	LED 29-Watt Pole Area Light	NaturaLED: LED-FXSAL29/50K/DB/3S	29	12	
173	Tertiary	Tertiary	Poles	LED 100W	100	0	No Change	No Change: No Change	100	0	
174	Tertiary	Room 2 (1)	Pendant Strip	F32T82L	59	32	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	32	
175	Tertiary	Room 2 (2)	Pendant Strip	F32T82L	59	32	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	32	
176	Tunnels	Tunnel	SM Vapor Proof	F40T122L	72	28	(2) LED 12-Watt 4' Tubes & Ballast	ESPEN: L48T8/850/12P-EB, VEL30BN-2C-10V TAA	24	28	
177	Tunnels	Tunnel	Wallpack	HPS 70W	95	4	LED 15-Watt Full-Cutoff Wallpack	NaturaLED: LED-FXSWP15/850/BK	15	4	
178	Tunnels	Tunnel	SM Jelly Jar	LED 8W	8	87	No Change	No Change: No Change	8	87	



Project	
Notes	
Type	Date
Cat. No.	

LCP™ XE Series

LED Square Canopy Luminaire



DESCRIPTION

The Aleo LCP™ Series, LED Square Canopy Luminaire combines energy-efficiency, low-glare optics, and simple slim profile aesthetics to deliver enhanced performance to a range of surface-mount and recessed lighting applications. Mounting plate allows for quick and easy installation. Weather-proof compartment to withstand challenging environments.

APPLICATIONS

Covered walkways, drive-thrus, semi-covered outdoor aisles, corridors, building canopies, large stairwells. Covers recessed openings for surface mount application. Perfect for school campuses.

Specification Features



LCP Series

10W, 20W, 36W

Construction

Simple, white finish powder-coated housing with advanced thermal management system ensures reliability and durability.

Optical System

Prismatic, square drop lens comes standard. Lens system improves safety and security by delivering high-efficiency illumination with low glare, comfortable illumination.

Certification

ETL Listed. DLC Premium

Warranty

7-year Limited Warranty. See warranty documentation for more information.

Electrical

Luminaire utilizes high-efficacy LED packages maintained at cool temperatures for long life, high efficacy. Reliable driver features universal voltage (120-277V) for convenient installation.

Installation / Mounting

Luminaire comes standard with mounting plate for quick and easy installation. Can be mounted directly to surface junction box or surface mounted via keyhole slots on mounting plate. Covers existing 12" x 12" recessed square opening.

Controls / Dimming

Continuous dimming (0-10V) for 20W and 36W. Suitable for use with dimmers, sensors, daylight harvesting and other control strategies to achieve deeper energy-savings and code compliance.

Rated Life 75,000 hours

Limited Warranty 7-years

Efficacy Over 110 LPW

Quick Ship

LCP-10/50K XE
LCP-20/50K XE
LCP-36/50K XE

Ordering Information

Example: LCP-10/50K XE (PSMK)

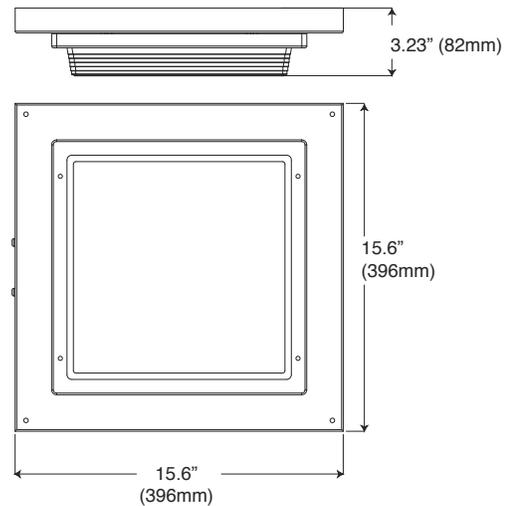
LCP	10	50K	[Blank]	[Options]	[Blank]
Series	Nom. Wattage	Color Temp	Input Voltage	Accessories	Controls
LCP	10 10W	40K 4000K	Blank	PSMK	OSDL/HF
LED Square	20 20W	50K 5000K	120V-277V	Back housing enclosure	Multi-Level High Frequency
Canopy Luminaire	36 36W				Occupancy Sensor
				Emergency Backup	
				EM700 700 lm	
				EM1400 1400 lm	

Specifications and Dimensions subject to change without notice.

Performance Summary

Input Voltage	120V-277V
Input Frequency	50/60 Hz
Rated Wattage	See Performance Table
Delivered Lumens	See Performance Table
Efficacy	> 110 LPW (typ.)
CRI	70+, R9 > 0
Available CCT ¹	4000K, 5000K
Rated Life	50,000 hours
Power Factor	> 0.9
THD	< 20%
Operating Temp.	-20°C to 50°C

Product Dimensions

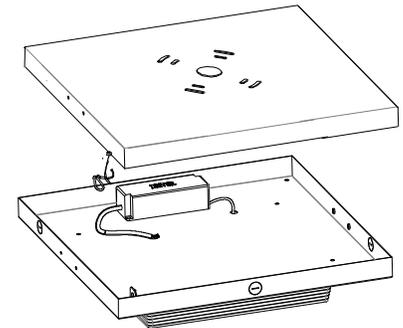


Performance Data

Catalog No.	Rated Wattage (W)	4000K		5000K	
		Delivered Lumens (lm)	Efficacy (lm/W)	Delivered Lumens (lm)	Efficacy (lm/W)
LCP-10/xxK XE	9.7	1135.9	115.74	1186	121.38
LCP-20/xxK XE	18	2205.6	120.79	2360	131.11
LCP-36/xxK XE	36	4144.6	117.26	4442	122.71

LCP-PSMK-Housing

Back Housing Accessory for LCP (10W/20W), for Surface and Pendant Mount, White Finish



DLC QPL Data

QPL Model No.	Product ID	Technical Req.	Classification	Primary Use
LCP-10/40K XE	PLQEJWK1A16D	4.3	Premium	Stairwell and Passageway Luminaires
LCP-10/50K XE	PLNLQ0RGAVGU	4.3	Premium	Stairwell and Passageway Luminaires
LCP-20/40K XE	PLYMMB5N8GGC	4.3	Premium	Stairwell and Passageway Luminaires
LCP-20/50K XE	PLK2XA2JYBQD	4.3	Premium	Stairwell and Passageway Luminaires
LCP-36/40K XE	PL80XZNIYB97	4.4	Premium	Stairwell and Passageway Luminaires
LCP-36/50K XE	PLPCLSD2R917	4.4	Premium	Stairwell and Passageway Luminaires



Specifications and Dimensions subject to change without notice.

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Cerritos, CA 90703
Ph: 877-358-8825



Project	
Notes	
Type	Date
Cat. No.	

UXB™ UX Series

Circular LED High Bay

DESCRIPTION

The Aleo UXB™ Series, Circular High Bay, combines efficiency, robust construction, and utility to deliver a competitive and high-performance high bay solution for single-point mounting applications. The wet location / IP-rated luminaire provides a versatile solution for high mounting facilities. Delivering high output, quality light and low energy consumption, the UXB improves warehouse safety and productivity, lowers maintenance cost, and reduces operating costs

APPLICATIONS

Provides high output illumination for various commercial industrial applications with high ceilings: warehouse, manufacturing, gymnasiums, cold-storage.



Specification Features



UXB UX Series

150
100W/120W/150W
240
180W/200W/240W

Rated Life 100,000 hours
Limited Warranty 7-years
Efficacy Up to 150 LPW
Continuous Dimming

Construction

Rugged, die-cast housing with advanced thermal management system ensures reliability and durability. Integrated, enclosed water-proof driver protects against environmental elements. IP65, Wet Location Rated. White Finish.

Optical System

Polycarbonate (PC) lens provides protection and high efficiency transmission of light.

Certification

UL Listed. Wet location rated. All components have UL certification. UL Class 2. Driver: SCP, OTP, OVP protection, FCC Part 15 Class B, UL8750 Class 2. DLC Premium. NSF/ANSI 2.

Warranty

7-year Limited Warranty. See warranty documentation for more information.

Sensor Ready

Center sensor receptacle for field installable plug and play occupancy sensor with daylight.

Electrical

Luminaire utilizes high-efficacy LED packages maintained at cool temperatures for long life, high efficacy. Reliable driver features continuous dimming. Universal voltage (120-277V) and High Voltage (277-480V) for convenient installation. Comes equipped standard with 6' white SO cord.

Installation / Mounting

Single-point hook mount (hook with screw included).

Controls / Dimming

Continuous dimming (0-10V) comes standard. Suitable for use with dimmers, sensors, daylight harvesting and other control strategies to achieve deeper energy-savings and code compliance.

Field-Adjustable CCT / Wattage

Increased versatility and reduced inventory burden. Wattage and Color Temp. can be adjusted in the field by selecting (3) different wattages and (2) different CCTs via switch inside the housing.



Quick Ship

UXB-UX-150/CT G4 ECO (SR)
UXB-UX-240/CT G4 ECO (SR)
UXB-UX-150/CT-HV G4 ECO (SR)
UXB-UX-240/CT-HV G4 ECO (SR)

Ordering Information

Example: UXB-UX-240/CT-HV G4 ECO (SR)

UXB	UX	240	CT	HV	[Blank]	[Blank]
Series	Lumen Package	Nominal Max Wattage	Color Temp	Input Voltage	Dimming	Controls
UXB Circular High Bay	UX Field Adjustable Wattage	150 100W/120W/150W 240 180W/200W/240W	CT Adjustable CCT 4000K/5000K	Blank 120V-277V HV 277V-480V	Blank 1-10V Continuous Dimming	(SR) Sensor Ready (Plug n' Play)

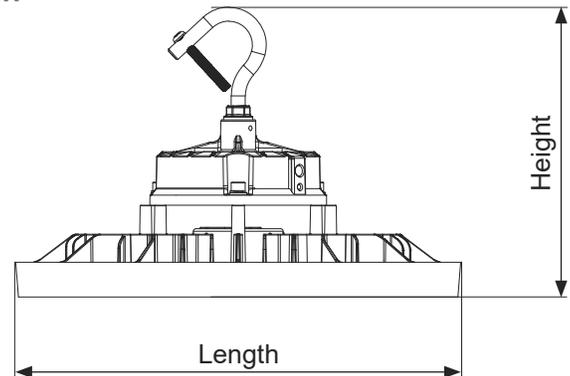
Specifications and Dimensions subject to change without notice.

Performance Summary

Input Voltage	120V-277V, 277V-480V
Input Frequency	50/60 Hz
Rated Wattage	See Performance Table
Delivered Lumens	See Performance Table
Efficacy	> 135 LPW (typ.)
CRI	80+
Available CCT	4000K/5000K
Nominal Beam Angle	90° Deg. (without Reflector)
Rated Life	100,000 hours
L70 ³	100,000 hours
Power Factor	> 0.9
THD	< 20%
Dimming	0-10V Continuous
Operating Temp.	-40°C to 50°C

Product Dimensions

UXB UX



Item No.	Height	Length
UXB-UX-150/CT G4 ECO (SR)	8.23in (209mm)	12.60in (320mm)
UXB-UX-240/CT G4 ECO (SR)	8.54in (217mm)	14.76in (375mm)
UXB-UX-150/CT-HV G4 ECO (SR)	8.23in (209mm)	12.60in (320mm)
UXB-UX-240/CT-HV G4 ECO (SR)	8.54in (217mm)	14.76in (375mm)

Performance Data

Catalog No.	Rated Wattage (W)	Tested Wattage (W)	4000K		5000K	
			Delivered Lumens (lm)	Efficacy (lm/W)	Delivered Lumens (lm)	Efficacy (lm/W)
UXB-UX-150/CT G4 ECO (SR)	150	159.5	23,047.8	144.5	22,170.5	139
UXB-UX-240/CT G4 ECO (SR)	240	240.2	34,420.7	143.3	33,291.7	138.6
UXB-UX-150/CT-HV G4 ECO (SR)	150	156.1	22,259.9	142.6	21,573.0	138.2
UXB-UX-240/CT-HV G4 ECO (SR)	240	230.6	34,751.4	150.7	33,575.4	145.6

DLC QPL Data

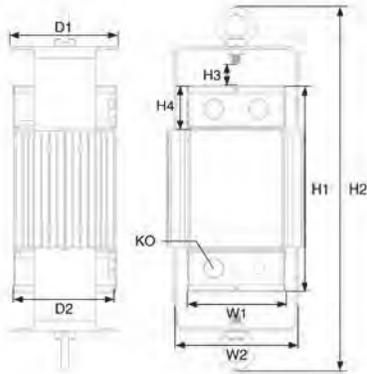
Item No.	Product ID	Technical Req.	Classification	Primary Use
UXB-UX-150/CT G4 ECO (SR)	PL2S28MOJIK1	5.1	Premium	High-Bay Luminaires for Commercial and Industrial Buildings
UXB-UX-240/CT G4 ECO (SR)	PLHC5PS9MM4Q	5.1	Premium	High-Bay Luminaires for Commercial and Industrial Buildings
UXB-UX-150/CT-HV G4 ECO (SR)	PL6TXSEGGICT	5.1	Premium	High-Bay Luminaires for Commercial and Industrial Buildings
UXB-UX-240/CT-HV G4 ECO (SR)	PLRTN0X8YGPQ	5.1	Premium	High-Bay Luminaires for Commercial and Industrial Buildings



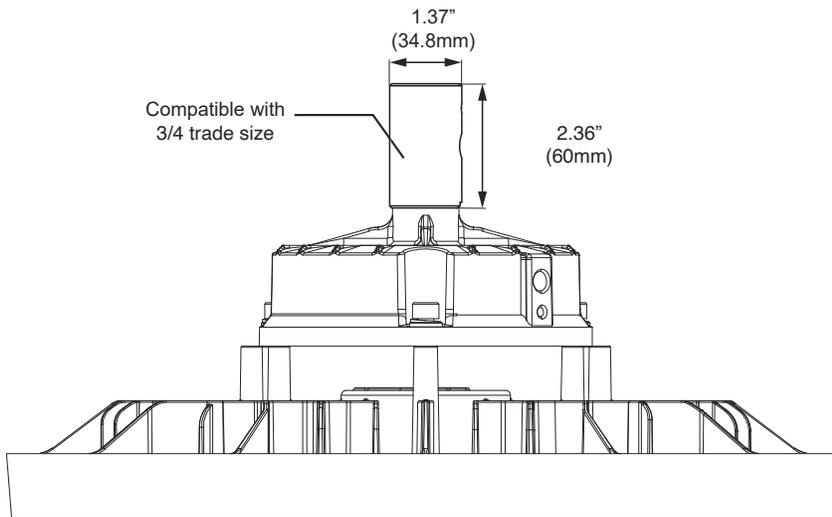
NOTES:

- Quick ship: 4000K/5000K. Other CCTs may require a lead time or be special order
- Typical color consistency. May vary or be changed.
- L70 hours calculated based on LED package manufacturer LM80 report and ISTMT report of LED in luminaire. Stated values are for select catalog numbers. Contact manufacturer for detailed information

Specifications and Dimensions subject to change without notice.

Circular LED High Bay**UXB™ UX Series****Emergency Battery Backup**Item No.: **EM-UFO-V200-UNV-H-FI-30****For Field Install UFO EM LED Driver, 30W max., 120V-277V input, min. 90 min, dual J-Box with eyebolts**

Enclosure (in. ±1)	EM Driver (in.)
Width (W1)	4.21"
Width (W2)	6.10"
Height (H1)	8.54"
Height (H2)	15.94"
Height (H3)	0.98"
Depth (D1)	4.69"
J-Box Size	
Width (W1)	4.21"
Height (H4)	1.55"
Depth (D2)	4.69"
Knock Out (KO)	1/2 Trade Size (0.85")

**Junction Box Accessory**Item No.: **UXB-ADP-3/4NPT****3/4" NPT adapter for UXB ECO High Bay, White Finish****Accessory Options****Plug and Play Sensor Order Codes:****SHF-OSDL/IR-PP2-LV1-10V-B01:** Multi-level High Frequency Occ Sensor w/ Photocell Function, Plug and Play spring-loaded 3-pin port, IR remote setting.**SPIR-OSDL/IR-PP2-LV1-10V-B02:** Multi-level Passive Infrared Occ Sensor w/ Photocell Function, Plug and Play spring-loaded 3-pin port, IR remote setting



Linear T5HE HO

Commercial Grade LED T5 Lamp



Features & Benefits

- No rewiring needed
- Works with fluorescent electronic T5 ballast
- Long life
- High CRI
- Instant on, no delay
- Convenient and quick installation
- Utilizes existing T5 sockets
- Compatible with controls and sensors
- No Mercury, No UV
- Works in cold temperature applications
- Glass tube for superior optical performance
- Full Glass Design
- Super Wide View Angle, 240
- 5 Year Warranty



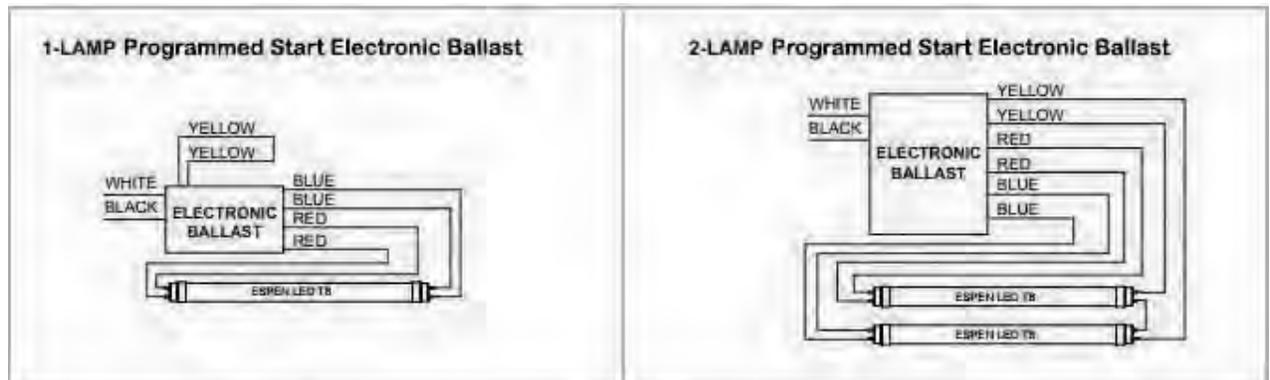
Product Certification

* EMERGENCY BALLAST RESTRICTIONS

Specification

Order Code ¹	Length	Lamp Wattage	System Wattage	CCT	Initial Lumens	CRI	Beam Angle	Lamp Efficacy	System Efficacy	Life	DLC
L48T5HE/830/13G-EB-AC	48 in	13W	16W	3000K	1800	83	240	135	115	50000	Yes
L48T5HE/835/13G-EB-AC	48 in	13W	16W	3500K	1800	83	240	135	115	50000	Yes
L48T5HE/840/13G-EB-AC	48 in	13W	16W	4000K	1800	83	240	135	115	50000	Yes
L48T5HE/850/13G-EB-AC	48 in	13W	16W	5000K	1800	83	240	135	115	50000	Yes

Wiring Diagram



Dlc Information



Order Code	DLC Product ID	DLC Product Model	DLC Version
L48T5HE/830/13G-EB-AC	N/A	N/A	N/A
L48T5HE/835/13G-EB-AC	N/A	N/A	N/A
L48T5HE/840/13G-EB-AC	N/A	N/A	N/A
L48T5HE/850/13G-EB-AC	PLBQK4GCSK84	L48T5HE/850/13G-EB-AC	5

* Please refer to "Ballast Compatibility List" for compatible battery backup and/or emergency ballasts.

* Please refer to "Ballast Compatibility List" on Related Downloads.

Specification data is based on tests performed in a controlled environment and represents relative performance. Actual performance can vary depending on operating conditions. Application and performance data subject to change without notice. All specifications are nominal unless noted otherwise.



Linear T5HE HO

Commercial Grade LED T5 Lamp



Features & Benefits

- No rewiring needed
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- No Mercury, No UV
- Works in cold temperature applications
- Glass tube for superior optical performance
- Full Glass Design
- Super Wide View Angle, 240
- 5 Year Warranty

Product Certification

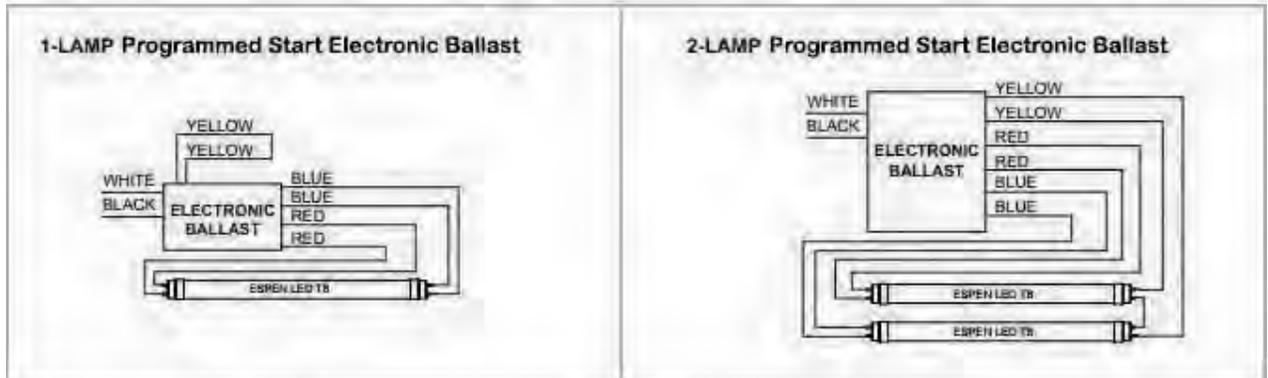
* EMERGENCY BALLAST RESTRICTIONS



Specification

Order Code ¹	Length	Lamp Wattage	System Wattage	CCT	Initial Lumens	CRI	Beam Angle	Lamp Efficacy	System Efficacy	Life	DLC
L48T5HO/830/24G-EB-AC	48 in	24W	27W	3000K	3100	83	240	129	115	50000	Yes
L48T5HO/835/24G-EB-AC	48 in	24W	27W	3500K	3100	83	240	129	115	50000	Yes
L48T5HO/840/24G-EB-AC	48 in	24W	27W	4000K	3200	83	240	133	118	50000	Yes
L48T5HO/850/24G-EB-AC	48 in	24W	27W	5000K	3200	83	240	133	118	50000	Yes

Wiring Diagram



Dlc Information



Order Code	DLC Product ID	DLC Product Model	DLC Version
L48T5HO/830/24G-EB-AC	PL961O49AQPP	L48T5HO/830/24G-EB-AC(-aa)	5
L48T5HO/835/24G-EB-AC	PLDZLUB4M03S	L48T5HO/835/24G-EB-AC(-aa)	5
L48T5HO/840/24G-EB-AC	PL73S2A4V9YD	L48T5HO/840/24G-EB-AC(-aa)	5
L48T5HO/850/24G-EB-AC	PLHC3F4TLDT0	L48T5HO/850/24G-EB-AC(-aa)	5

* Please refer to "Ballast Compatibility List" for compatible battery backup and/or emergency ballasts.

* Please refer to "Ballast Compatibility List" on Related Downloads.

Specification data is based on tests performed in a controlled environment and represents relative performance. Actual performance can vary depending on operating conditions. Application and performance data subject to change without notice. All specifications are nominal unless noted otherwise.



Features & Benefits

- Assembled in USA
- No rewiring needed
- Works with fluorescent electronic ballast (Instant Start, Programmed Start, and Dimming)*
- Long life
- High CRI
- Instant on, no delay
- Convenient and quick installation
- Utilizes existing instant start or rapid start sockets
- Compatible with controls and sensors
- Dimmable
- Works in cold temperature applications
- Super wide view angle
- 5 Year Warranty
- High performance plastic series



* EMERGENCY BALLAST RESTRICTIONS

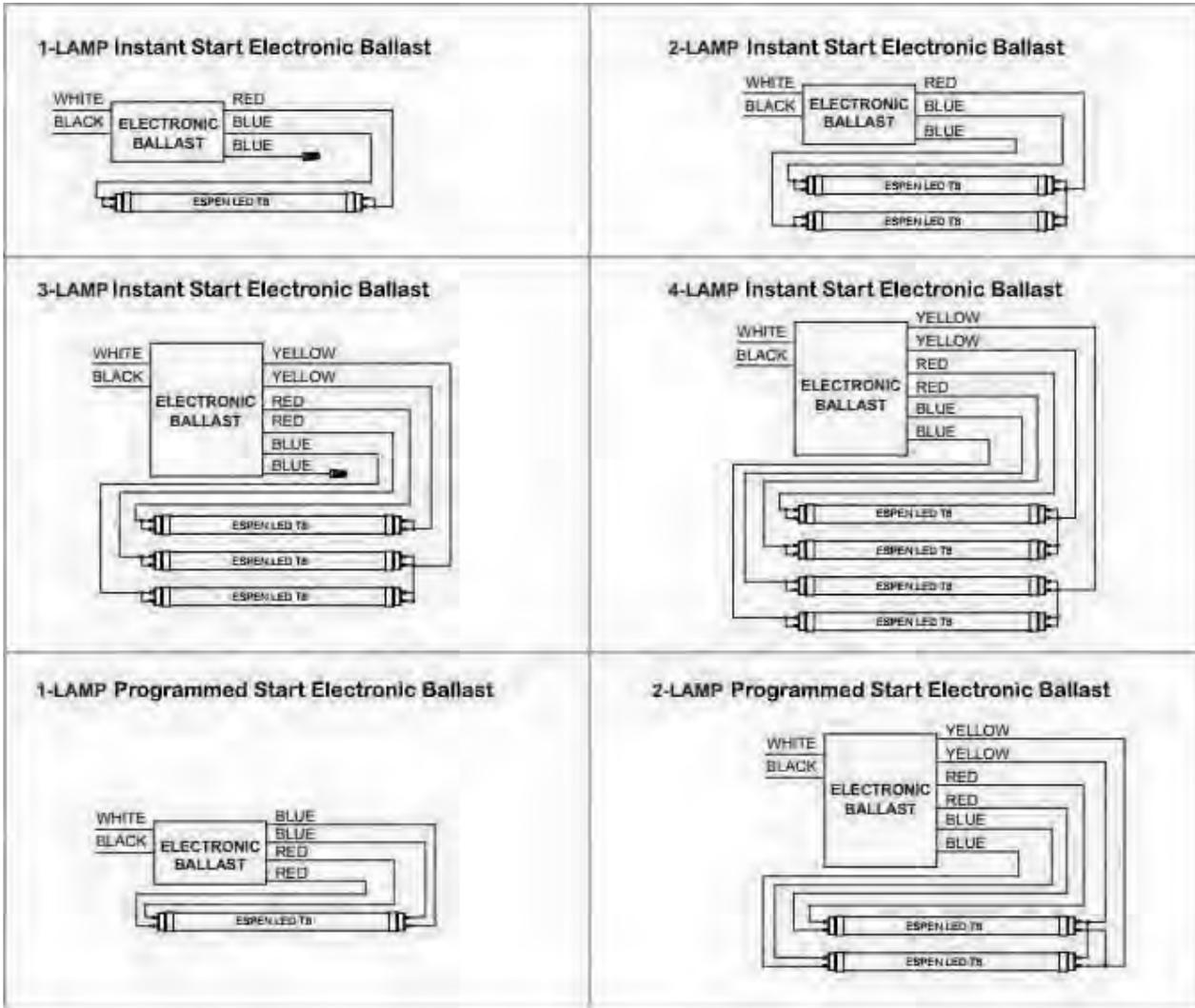


RetroFlex™
LED T8 LAMP • Simplicity.
Commercial Grade LED T8 Lamp

Specification Data

Order Code	Length	Lamp Wattage	System Wattage	CCT	Initial Lumens	CRI	Beam Angle	Lamp Efficacy	System Efficacy	Life	DLC
L48T8/835/12P-EB	48	12	14	3500K	1800	83	325	135	125	50000	Yes
L48T8/840/12P-EB	48	12	14	4000K	1800	83	325	135	125	50000	Yes
L48T8/850/12P-EB	48	12	14	5000K	1800	83	325	135	125	50000	Yes

Wiring diagram



* Not compatible with products equipped with battery backup and/or emergency ballasts.

* Please refer to "Ballast Compatibility List" on Related Downloads.

Specification data is based on tests performed in a controlled environment and represents relative performance. Actual performance can vary depending on operating conditions. Application and performance data subject to change without notice. All specifications are nominal unless noted otherwise.



CRI80

Commercial Grade Recessed Downlight



Product Certification

Features & Benefits

- Commercial Downlight Retrofit or New Construction
- Universal Voltage 120-277V
- UL for Safety, Wet-Location Rateds
- Three Adjustable Lumen Output
- Three Adjustable CCT Options (3000K, 3500K, 4000K)
- Driver Efficiency Greater than 85% at full power
- THD ≤ 20% at full power
- High CRI
- Long Life
- Convenient and quick installation
- 0-10V Dimmable
- 25" Flexible Conduit
- Auto Recovery Short Circuit Protection, Over Load Protection, Over Voltage Protection
- Ambient Operating Temperature: -30 ~ 40°C
- Works in cold temperature applications
- Flicker-Free, Meets IEEE 1789-2015
- 5 Year Warranty

Specification Data

Model No.	Size	IC Rated	Watts	Lumens	CCT	Efficacy	Input Voltage	CRI	Power Factor	Beam Angle (°)	Dimension
VEKR6D/8T/13W-10V	6" Recess	Yes	6.5 / 9 / 13	790 / 1100 / 1560	3000K, 3500K, 4000K selectable	120	120-277	>80	0.9	100	Dia. 8.27" x Height 4.25"

Order Information

EXAMPLE: VEKR4D/8T/10W-10V				
VEKR	4D	8T	10W	10V
Series Retrofit Kit Recessed Light	Size 4" Downlight	CRI>80 T: three CCT adjustable	Wattage 10W Max.	0-10V dimming

Image



User Manual468inDownlightInstallation.pdf



CRI80

Commercial Grade Recessed Downlight



Product Certification

Features & Benefits

- Commercial Downlight Retrofit or New Construction
- Universal Voltage 120-277V
- UL for Safety, Wet-Location Rateds
- Three Adjustable Lumen Output
- Three Adjustable CCT Options (3000K, 3500K, 4000K)
- Driver Efficiency Greater than 85% at full power
- THD ≤ 20% at full power
- High CRI
- Long Life
- Convenient and quick installation
- 0-10V Dimmable
- 25" Flexible Conduit
- Auto Recovery Short Circuit Protection, Over Load Protection, Over Voltage Protection
- Ambient Operating Temperature: -30 ~ 40°C
- Works in cold temperature applications
- Flicker-Free, Meets IEEE 1789-2015
- 5 Year Warranty

Specification Data

Model No.	Size	IC Rated	Watts	Lumens	CCT	Efficacy	Input Voltage	CRI	Power Factor	Beam Angle (°)	Dimension
VEKR8D/8T/17W-10V	8" Recess	Yes	8.5 / 12 / 17	1030 / 1450 / 2040	3000K, 3500K, 4000K selectable	120	120-277	>80	0.9	100	Dia. 10.24" x Height 4.57"

Order Information

EXAMPLE: VEKR4D/8T/10W-10V				
VEKR	4D	8T	10W	10V
Series Retrofit Kit Recessed Light	Size 4" Downlight	CRI>80 T: three CCT adjustable	Wattage 10W Max.	0-10V dimming

Image



User Manual468inDownlightInstallation.pdf



DIRECT DRIVE LED

LINE VOLTAGE T8 TUBES

KT-LED17PLL-22GC-8XX-D /G2

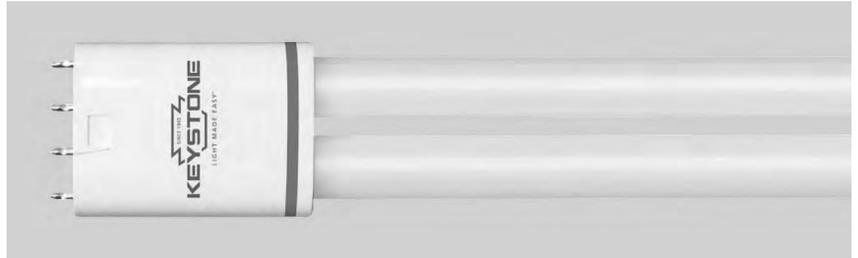
PLL LED LAMP

DESCRIPTION

17W PLL LED | 3000-5000K | >80 CRI | High-Efficiency



LAMP TYPE: PLL
BASE TYPE: 2G11
WATTAGE: 17W
COLOR TEMPERATURE: 3000-5000K
COLOR RENDERING INDEX (CRI): >80
WARRANTY: 5 Years



PRODUCT FEATURES

- Replacement for conventional fluorescent lamp
- UL Classified
- 50,000+ hour lifetime
- Approximately 50% more energy efficient than standard FT40/2G11 lamps
- Environmentally friendly: No mercury used
- Integral driver (isolated) eliminates the need for an external ballast or driver
- Instant startup
- Not dimmable
- Frosted lens eliminates pixelation
- Operating temperature: -20°C/-4°F to 45°C/113°F
- 100+ Lumens per Watt (bare lamp efficacy)
- Suitable for dry and damp locations
- NSF Listed: NSF/ANSI Standard 2 - Food Equipment
- Suitable for enclosed fixture. Minimum lamp compartment dimensions: 61.5cm x 60.5cm x 10.5cm

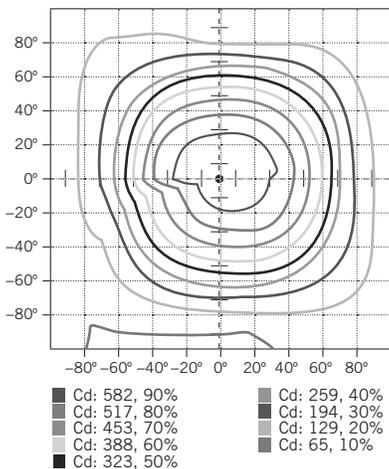
OPERATING SPECIFICATIONS

ELECTRICAL AND PERFORMANCE CHARACTERISTICS

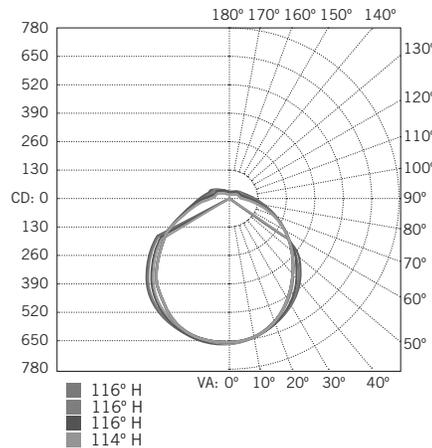
Catalog Number	Input Voltage	CRI	Wattage	Nominal Lumens	Color Temp.	Beam Angle	Efficacy	Power Factor	Max. THD
KT-LED17PLL-22GC-830-D	120-277V	>80	17W	2050	3000K	160°	121 lm/W	>0.9	20%
KT-LED17PLL-22GC-835-D	120-277V	>80	17W	2100	3500K	160°	127 lm/W	>0.9	20%
KT-LED17PLL-22GC-840-D	120-277V	>80	17W	2200	4000K	160°	129 lm/W	>0.9	20%
KT-LED17PLL-22GC-850-D	120-277V	>80	17W	2200	5000K	160°	129 lm/W	>0.9	20%

PHOTOMETRIC SPECIFICATIONS

ISOCANDELA PLOT



POLAR CANDELA DISTRIBUTION



LUX DISTANCE CURVE

Flux Out: 1392 lm

Height	Eavg, Emax	Diameter
1 m	186.9, 642.4 lx	305.48 cm
2 m	46.72, 160.6 lx	610.96 cm
3 m	20.77, 71.37 lx	916.45 cm
4 m	11.68, 40.15 lx	1221.93 cm
5 m	7.476, 25.69 lx	1527.41 cm
6 m	5.192, 17.84 lx	1832.89 cm
7 m	3.814, 13.11 lx	2138.37 cm
8 m	2.920, 10.04 lx	2443.85 cm
9 m	2.307, 7.930 lx	2749.34 cm
10 m	1.868, 6.424 lx	3054.82 cm

Angle: 114°

NOTE: Charts are represented by 5000K

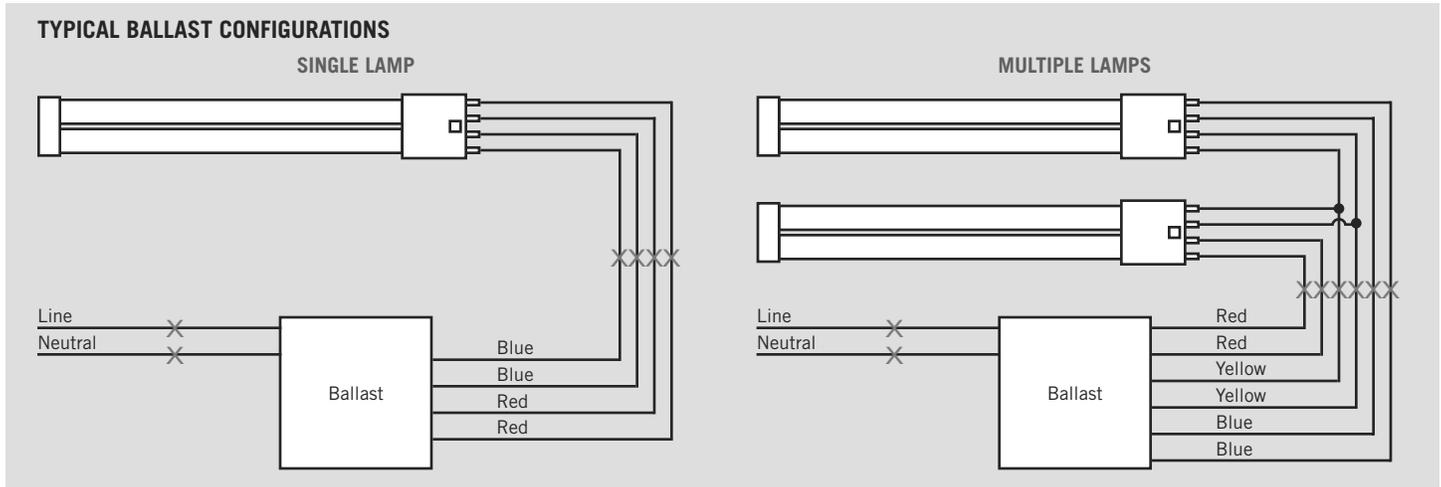


KT-LED17PLL-22GC-8XX-D /G2

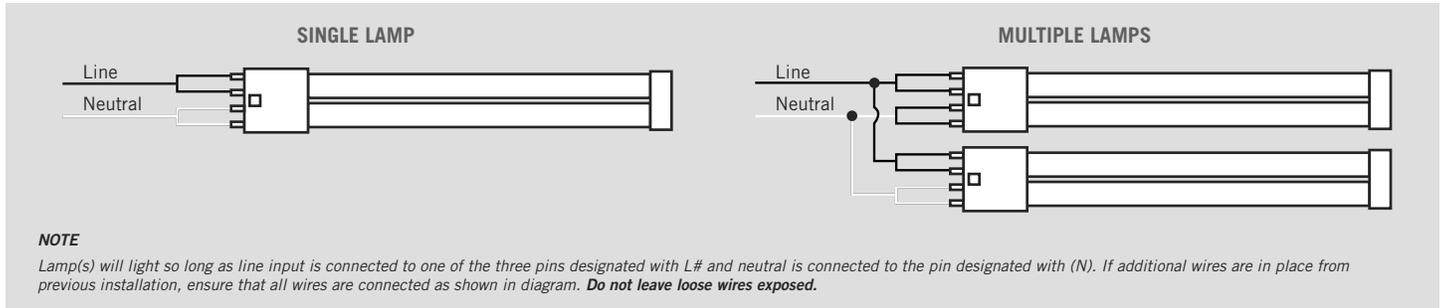
PLL LED LAMP

WIRING DIAGRAMS

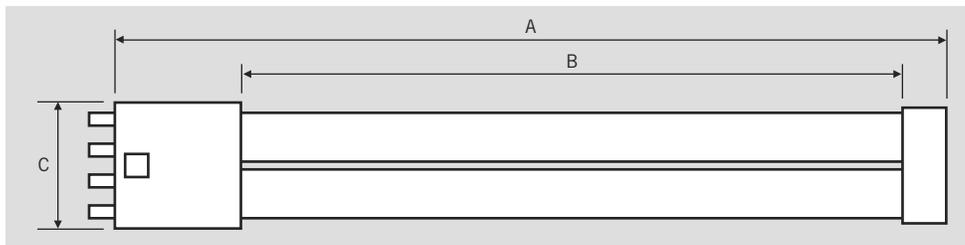
1. Cut all existing connections to ballast as shown below and remove ballast.



2. Re-wire fixture as shown below.



PHYSICAL CHARACTERISTICS



LAMP DIMENSIONS

A (Body Length)	21.8"
B (Illuminated Length)	18.9"
C (Width)	1.7"

BASE TYPE: 2G11



DIRECT DRIVE LED
LINE VOLTAGE T8 TUBES

KT-LED17PLL-22GC-8XX-D /G2

PLL LED LAMP

ORDERING INFORMATION

ORDER CODE	PACK QTY.	EASY CODE	UPC
KT-LED17PLL-22GC-830-D /G2	24	YMX-12	843654131108
KT-LED17PLL-22GC-835-D /G2	24	TWJ-68	843654131115
KT-LED17PLL-22GC-840-D /G2	24	SFM-03	843654131122
KT-LED17PLL-22GC-850-D /G2	24	EGB-03	843654131139

CATALOG NUMBER BREAKDOWN

KT-LED17PLL-22GC-8XX-D /G2

1 2 3 4 5 6 7 8 9 10

- 1 Keystone Technologies
- 2 LED Lamp
- 3 Wattage
- 4 Lamp Type
- 5 Nominal Length (Inches)
- 6 Glass
- 7 800 Series
- 8 Color Temperature
- 9 Direct-Drive Series
- 10 2nd Generation



KT-LED60HID-V-E26-840-D

HID REPLACEMENT LED LAMP

DESCRIPTION

60W HID Replacement LED Lamp | 4000K | >80 CRI | Vertical Light Direction



LAMP TYPE: HID Replacement LED
BASE TYPE: E26 (Medium)
WATTAGE: 60W
COLOR TEMPERATURE: 4000K
METAL HALIDE EQUIVALENT: 200W
COLOR RENDERING INDEX (CRI): >80
WARRANTY: 5 Years



PRODUCT FEATURES

- Replacement for conventional metal halide lamp
- Non-dimmable; Do not dim
- 50,000+ hour lifetime
- Environmentally friendly: No mercury used
- Instant startup
- UL listed
- Delivers approximately 5% uplight
- Suitable for use in fully enclosed fixture
- Integral driver, eliminates the need for external driver or ballast; Includes 4kV surge protection
- Operating temperature range: -29°C/-20°F to 60°C/140°F
- Lamp top has a low-voltage AUX port for lamp level sensor controls

OPERATING SPECIFICATIONS

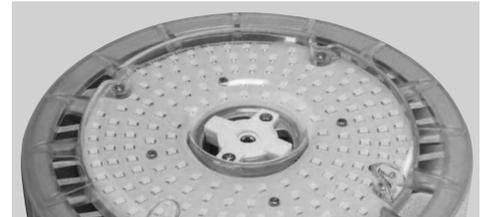
ELECTRICAL CHARACTERISTICS

Input Voltage	Power Consumption	Power Factor	Input Current
120-277Vac	60W	>0.9	0.50A @ 120V 0.22A @ 277V

PHOTOMETRIC CHARACTERISTICS

Color Temperature (CCT)	4000K
Luminous Flux	7850 lm
Color Rendering Index (CRI)	>80
Efficacy	131 lm/W
Visible Light Area	180°

SMART PORT LED COMPATIBLE

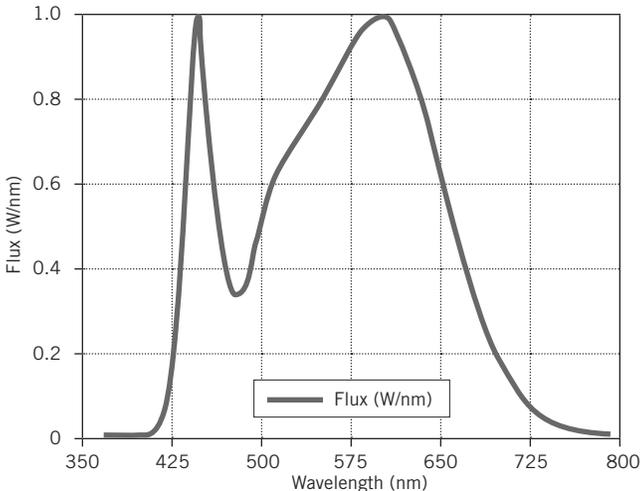


On the top of the lamp is a low-voltage AUX port for Smart Port LED sensors. See *Accessories* for available sensor options.

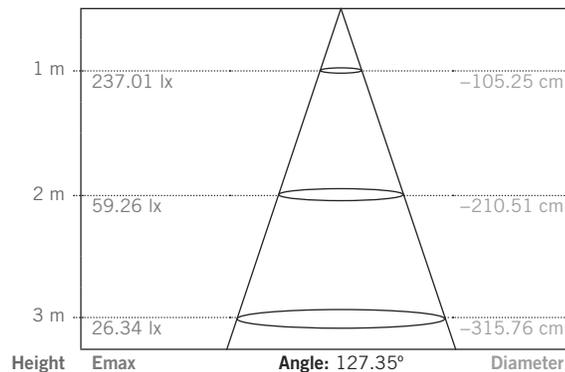
RATED LIFE

L70 (Hours)	50,000
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SPECTRAL DISTRIBUTION



LUX DISTANCE CURVE



Note: The curves indicate the illuminated area and the average illumination when the luminaire is at a different distance.



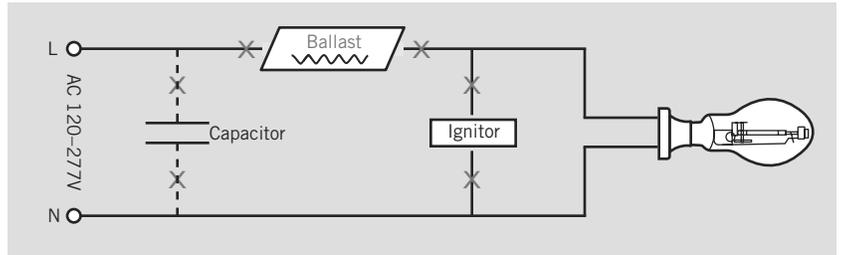
KT-LED60HID-V-E26-840-D

HID REPLACEMENT LED LAMP

WIRING INSTRUCTIONS

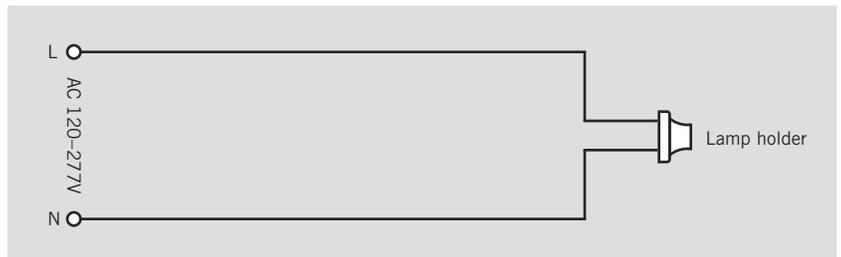
STEP 1

Disconnect power. Disconnect and remove existing ballast, capacitor, and/or ignitor (where applicable) from fixture.



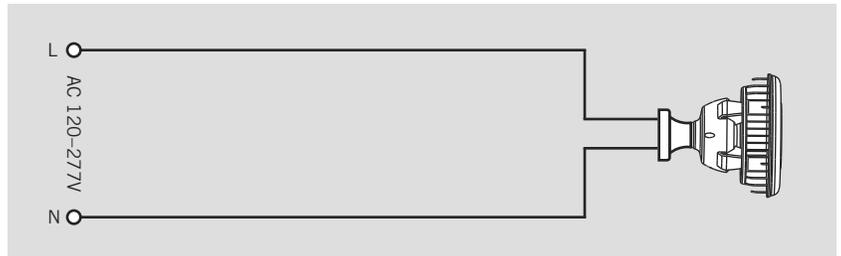
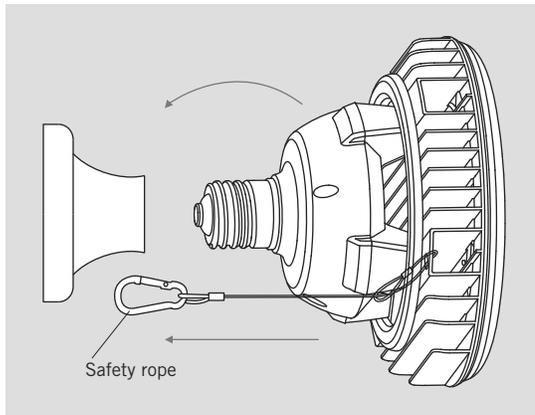
STEP 2

Rewire for line voltage to the lamp socket.



STEP 3

Install new LED replacement lamp. Ensure lamp is operating properly when power is turned on.

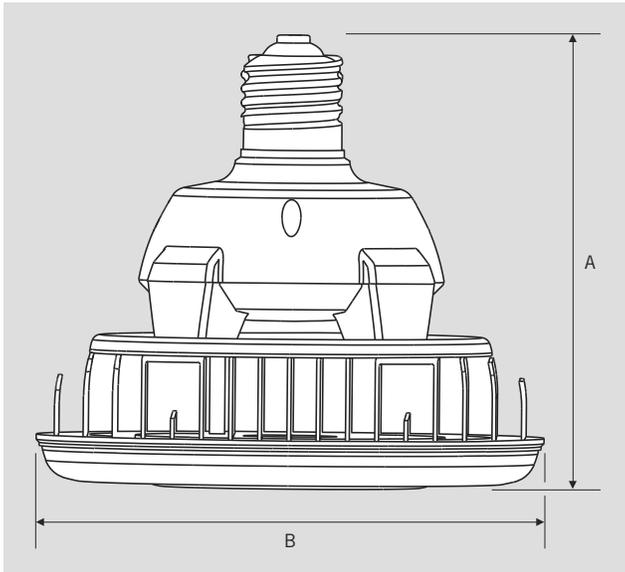




KT-LED60HID-V-E26-840-D

HID REPLACEMENT LED LAMP

PHYSICAL CHARACTERISTICS



LAMP DIMENSIONS

A (Body Length)	6.14"
B (Diameter)	6.88"

BASE TYPE: E26 (Medium)

ACCESSORIES (SOLD SEPARATELY)

Catalog Number	Description
KTS-MW1-12V-AUX	SmartPort LED Microwave Occupancy sensor: On/Off with adjustable standby dimming level; 12V input
KTS-PIR1-12V-AUX	SmartPort LED PIR Occupancy sensor: On/Off with adjustable standby dimming level; 12V input
KTS-PS1-12V-AUX	SmartPort LED Photocell: On/Off with adjustable daylight threshold and timing; 12V input

ORDERING INFORMATION

ORDER CODE	PACKAGING STYLE	PACK QTY.	ITEM STATUS
KT-LED60HID-V-E26-840-D-DP	Distributor Pack (Individual Cartons)	4	Quick Ship

CATALOG NUMBER BREAKDOWN

KT-LED60HID-V-E26-840-D

1 2 3 4 5 6 7 8 9

- | | | |
|-------------------------|------------------------|-----------------------|
| 1 Keystone Technologies | 4 Lamp Type | 7 800 Series |
| 2 LED Lamp | 5 Vertical Orientation | 8 Color Temperature |
| 3 Wattage | 6 Base Type | 9 Direct-Drive Series |



KT-LED62P-0-8XX-D

2-PIN LED LAMP

DESCRIPTION

6W 2-Pin LED Omni-Directional Lamp | ≥ 80 CRI | Line-Voltage Compatible



LAMP TYPE: Compact LED
BULB TYPE: 2-Pin LED
BASE TYPE: GX23
WATTAGE: 6W
COLOR TEMPERATURE: 2700–5000K
CFL EQUIVALENT: 13W
COLOR RENDERING INDEX (CRI): ≥ 80
WARRANTY: 5 Years



PRODUCT FEATURES

- Replacement for 13W CFL lamp
- Ideal for wall-mounted and ceiling applications
- 50,000+ hour lifetime
- Power factor: >0.9
- Environmentally friendly: No mercury used
- Die-cast aluminum heat sink
- Instant startup
- Suitable for dry and damp locations
- Frosted lens eliminates pixelation
- Approximately 50% more energy efficient than traditional CFL lamps
- Ideal for totally enclosed fixtures
- Operating temperature:
 - For enclosed fixture (1 lamp per fixture max), $-20^{\circ}\text{C}/-4^{\circ}\text{F}$ to max $30^{\circ}\text{C}/86^{\circ}\text{F}$
 - For open fixture, $-20^{\circ}\text{C}/-4^{\circ}\text{F}$ to max $40^{\circ}\text{C}/105^{\circ}\text{F}$
- Non-dimmable
- Rotatable 260° beam angle
- UL damp listed

OPERATING SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Input Voltage	Lamp Wattage	Power Factor
120–277Vac	6W	>0.9

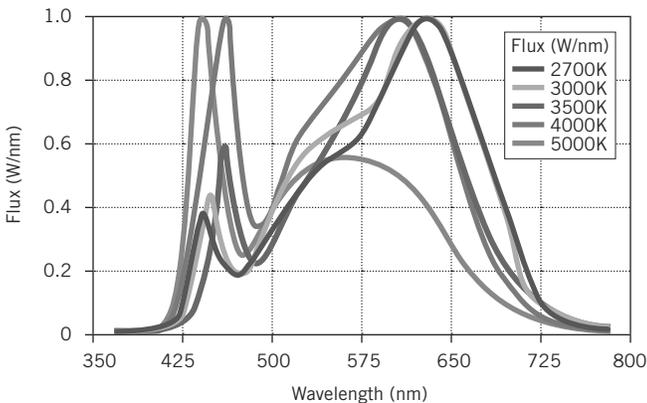
PHOTOMETRIC CHARACTERISTICS

Color Temperature (CCT)	2700K	3000K	3500K	4000K	5000K
Luminous Flux	600 lm				
Color Rendering Index (CRI)	≥ 80				
Efficacy	100 lm/W				
Beam Angle	260°	260°	260°	260°	260°

RATED LIFE

L70 (Hours)	50,000
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SPECTRAL DISTRIBUTION

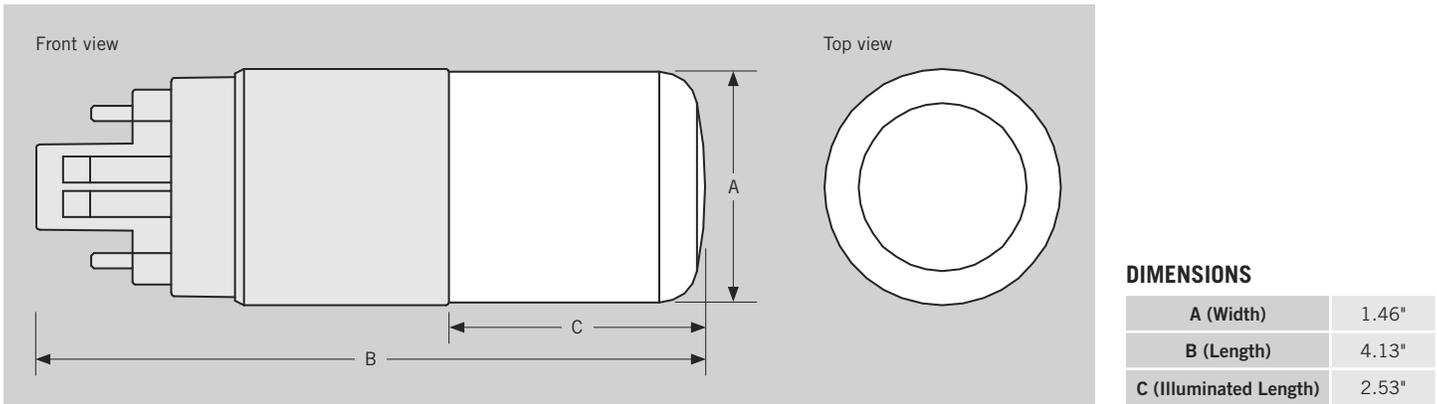




KT-LED62P-0-8XX-D

2-PIN LED LAMP

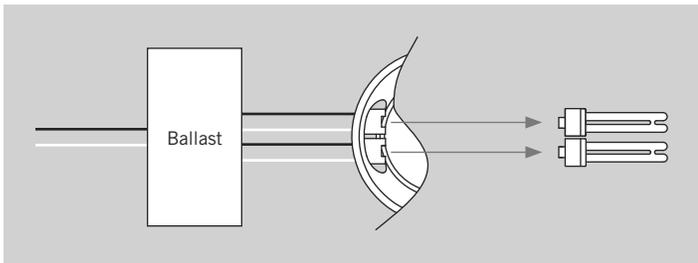
PHYSICAL CHARACTERISTICS



WIRING INSTRUCTIONS

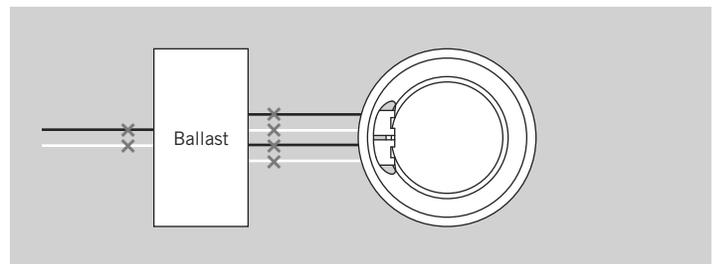
STEP 1

Disconnect power. Remove can cover (if applicable) and remove existing lamps from fixture.



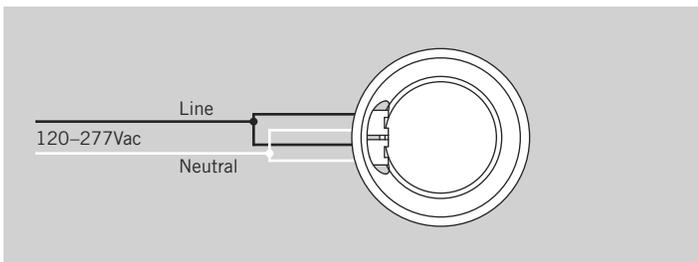
STEP 2

Cut and remove all wires connected to ballast.



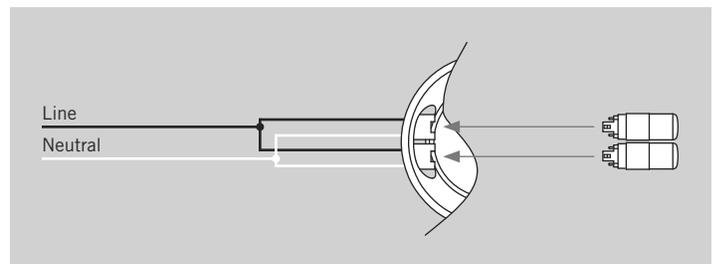
STEP 3

Connect AC input wires to lamp sockets.



STEP 4

Install replacement GX23 LED lamps into sockets. Replace can cover, ensuring that all connecting wires are covered by metal housing. Reconnect power.





KT-LED62P-O-8XX-D

2-PIN LED LAMP

ORDERING INFORMATION

ORDER CODE	PACK QTY.	ITEM STATUS
KT-LED62P-O-8XX-D	50	Quick Ship

CATALOG NUMBER BREAKDOWN

KT-LED62P-O-8XX-D

1 2 3 4 5 6 7 8

- 1 Keystone Technologies
- 2 LED Lamp
- 3 Wattage
- 4 Lamp Type
- 5 Omni-Directional Orientation
- 6 800 Series
- 7 Color Temperature
- 8 Direct Drive Series



KT-LED82P-H-8xx-D

2-PIN LED LAMP

DESCRIPTION

8W 2-Pin LED Lamp | 2700K, 3000K, 3500K, 4000K, 5000K | ≥ 83 CRI



LAMP TYPE: Compact
BULB TYPE: 2-Pin LED
BASE TYPE: G24d
WATTAGE: 8W
COLOR TEMPERATURE: 2700K, 3000K, 3500K, 4000K, 5000K
COLOR RENDERING INDEX (CRI): ≥ 83
WARRANTY: 5 Years



PRODUCT FEATURES

- Replaces 26W/32W/42W G24d & G24q CFL Lamps
- 50,000+ Hour Lifetime
- Approximately 50% More Energy Efficient than Traditional CFL Lamps
- Environmentally Friendly: No Mercury Used
- Instant Startup
- Frosted Lens Eliminates Pixelation
- Integral Driver, Eliminates the Need for External Driver or Ballast
- UL Recognized and UL Classified
- Operating Temperature: -20°C/-4°F to 45°C/113°F
- Up to 5x Longer Life than Traditional CFL Lamps
- Horizontal Orientation

OPERATING SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Input Voltage	Lamp Wattage	Power Factor	System Wattage
120-277V	8W	>0.9	8W

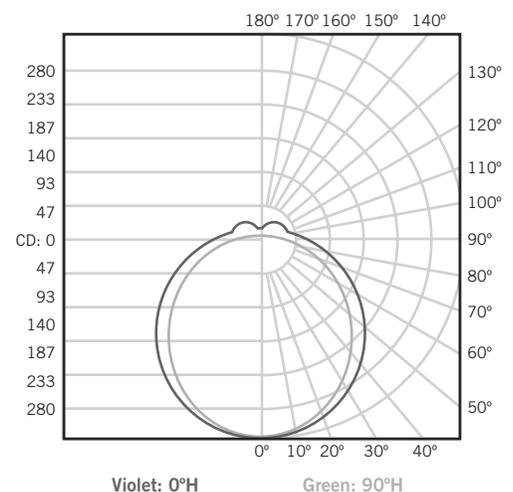
PHOTOMETRIC CHARACTERISTICS

Color Temperature (CCT)	2700K	3000K	3500K	4000K	5000K
Luminous Flux	900 lm	900 lm	900 lm	950 lm	950 lm
Color Rendering Index (CRI)	≥ 83				
Bare Lamp Efficacy	113 lm/W	113 lm/W	113 lm/W	119 lm/W	119 lm/W
Beam Angle	>120°	>120°	>120°	>120°	>120°

RATED LIFE

L70 (Hours)	50,000
--------------------	--------

POLAR CANDELA DISTRIBUTION





KT-LED82P-H-8xx-D

2-PIN LED LAMP

WIRING

BYPASS MAGNETIC BALLAST WITH 1 LAMP

BEFORE

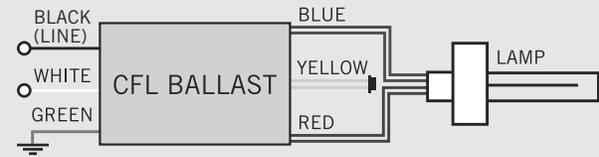


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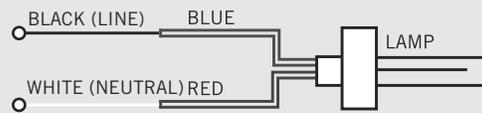


BYPASS ELECTRONIC BALLAST WITH 1 LAMP

BEFORE

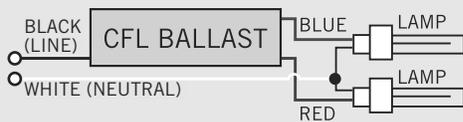


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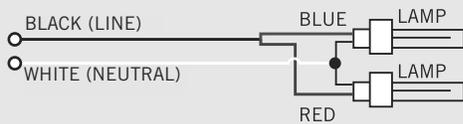


BYPASS MAGNETIC BALLAST WITH 2 LAMPS

BEFORE

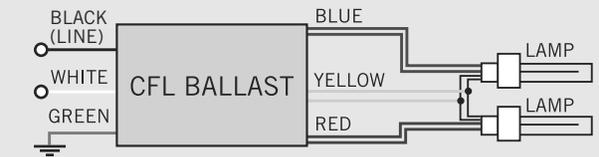


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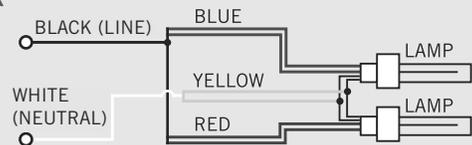


BYPASS ELECTRONIC BALLAST WITH 2 LAMPS

BEFORE

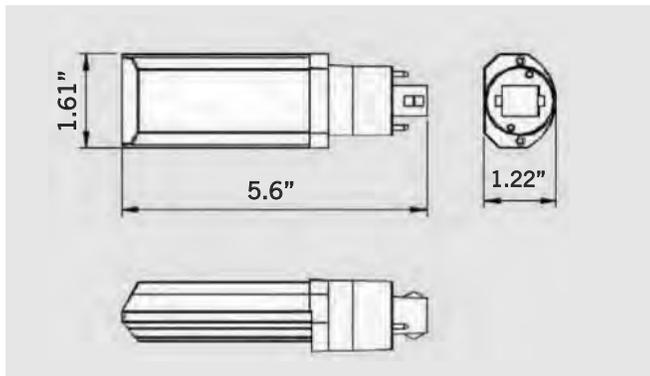


AFTER



PHYSICAL CHARACTERISTICS

LAMP DIMENSIONS





KT-LED82P-H-8xx-D

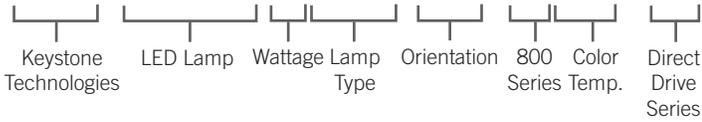
2-PIN LED LAMP

ORDERING INFORMATION

ORDER CODE	PACKAGING STYLE	PACK QTY.	ITEM STATUS
KT-LED82P-H-8xx-D-DP	Distributor Pack	50	Quick Ship

CATALOG NUMBER BREAKDOWN

KT-LED82P-H-8xx-D





SCM SLIM CANOPY 10"x10"

PROJECT: _____

SCHEDULE: _____ **DATE:** _____

PREPARE BY: _____

NOTES: _____

DESCRIPTION

naturaLED® SCM IP65 rated fixtures come in an aesthetically pleasing construction, low-profile design with die-cast aluminum housing and shatter-resistant polycarbonate prismatic lens. In addition, they are dust-proof and include 1/2" threaded conduit entrances on each side. The SCM fixtures are available with or without a microwave occupancy sensor mounted behind the lens. This sensor has multiple settings that can be selected via a dip switch. The settings on the sensor include: step dimming, area sensitivity, standby time and on/off. The SCM supports both pendant mounting and direct surface mounting ceiling or wall. Pendant mounting accepts a 3/4" NPT thread and can be mounted to multiple types of J-boxes.



Rated Life 50,000 Hours
Warranty 5 Years

APPLICATIONS

Warehouses, Parking Garages, Offices, Factories, Hospitals, Hotels

FEATURES

- DLC Premium Qualified
- IP65 Rated
- ETL Listed
- Long life LED chips
- ColorTemp: 4000K, 5000K
- Dimmable: 1-10V
- Input line voltage: 120-277V
- CRI: 80
- Powerfactor >0.9
- Surge Protection: 4KV
- Beam Angle: 160°
- Emergency driver compatible as optional accessories
- Material: aluminum die-cast
- Operating temperature: - 40°F - 122°F
- 5 Year Warranty
- Finish: Black /White

ACCESSORIES

	Emergency Driver
	Motion Sensor
	Beauty Plate
	Drop Lens
	Frosted Lens
	Surge Protector
	Photocell

SAMPLE NUMBER		FX10SCM28/840/BK-SEN				
FAMILY	SIZE	SERIES	WATTAGE	CRI/COLOR TEMP	COLOR	ACCESSORY
FX	10	SCM	28	840	BK	SEN
Fixture	10-inch	Slim Canopy	28 Watt	CRI 80 4000K	Black (WH) White	Motion Sensor none N/A



SLIM CANOPY 10X10

CEILING & AREA LUMINAIRES

ORDERING

*P= Premium DLC / *S = Standard DLC

	Watts (W)	Ordering Code	Description	CCT (K)	Lumens (Lm)	Equiv. Wattage (W)	Dim (V)	Color	Sensor	IP65 Rated	DLC (S/P)
Motion Sensor	28	9432	FX10SCM28/840/BK-SEN	4000K	3,640	150	1-10V	Black	•	•	P
	28	9433	FX10SCM28/850/BK-SEN	5000K	3,640	150	1-10V	Black	•	•	P
	42	9434	FX10SCM42/840/BK-SEN	4000K	5,517	175	1-10V	Black	•	•	P
	42	9435	FX10SCM42/850/BK-SEN	5000K	5,638	175	1-10V	Black	•	•	P
	59	9436	FX10SCM59/840/BK-SEN	4000K	7,695	250	1-10V	Black	•	•	P
	59	9437	FX10SCM59/850/BK-SEN	5000K	7,845	250	1-10V	Black	•	•	P
	28	9414	FX10SCM28/840/BK	4000K	3,640	150	1-10V	Black	-	•	P
	28	9415	FX10SCM28/850/BK	5000K	3,640	150	1-10V	Black	-	•	P
	42	9418	FX10SCM42/840/BK	4000K	5,517	175	1-10V	Black	-	•	P
	42	9419	FX10SCM42/850/BK	5000K	5,638	175	1-10V	Black	-	•	P
	59	9422	FX10SCM59/840/BK	4000K	7,695	250	1-10V	Black	-	•	P
	59	9423	FX10SCM59/850/BK	5000K	7,845	250	1-10V	Black	-	•	P
	28	9416	FX10SCM28/840/WH	4000K	3,640	150	1-10V	White	-	•	P
	28	9417	FX10SCM28/850/WH	5000K	3,640	150	1-10V	White	-	•	P
	42	9420	FX10SCM42/840/WH	4000K	5,517	175	1-10V	White	-	•	P
	42	9421	FX10SCM42/850/WH	5000K	5,638	175	1-10V	White	-	•	P
	59	9424	FX10SCM59/840/WH	4000K	7,695	250	1-10V	White	-	•	P
	59	9425	FX10SCM59/850/WH	5000K	7,845	250	1-10V	White	-	•	P

ACCESSORIES (Ordered Separately)

Motion Sensor



P10234 SEN-MC605V-D
(Microwave Motion Sensor 0-10V)

Frosted Lens



P10125 LENS-SCM/FR9X9
(Frosted Lens for SCM 28W, 42W, 59W)

Emergency Driver



7336 BAEM4-60BC/MV-A
(Emergency Driver for 28W & 42W)

Drop Lens



P10126 LENS-SCM/DR9X9
(Drop Lens for SCM 28W, 42W, 59W)

Photocell



P10036 SEN-PHO-BT-MT/MV
(Button Photocell 120V-277)

Surge Protector



P10389 SPD-L-10KV-277
(Surge Protection 10KV 120-277V)

Beauty Plates



P10195 PLT-SCM/14X14/WH
(14"x14" Beauty Plate used with SCM)

P10196 PLT-SCM/24X24/WH
(24"x24" Beauty Plate used with SCM)



P10390 SPD-L-20KV-277
(Surge Protection 20KV 120-277V)



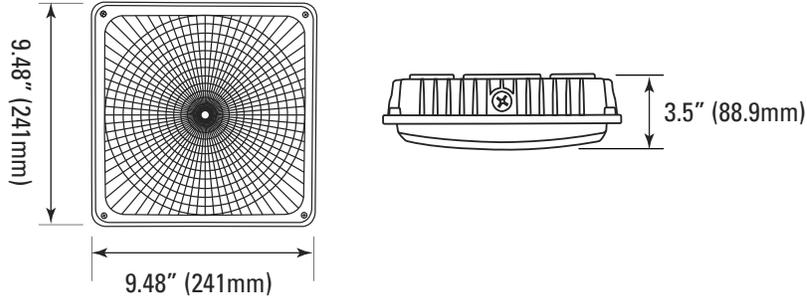
P10391 SPD-L-20KV-480
(Surge Protection 20KV 347-480V)

SLIM CANOPY 10X10

CEILING & AREA LUMINAIRES

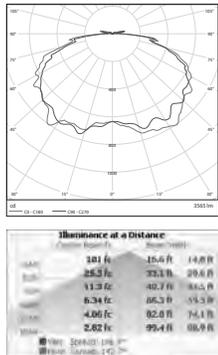
DIMENSIONS

28W **42W** **59W**
 4.50-lbs 5.10-lbs 5.10-lbs

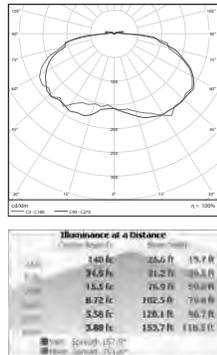


PHOTOMETRICS CHART

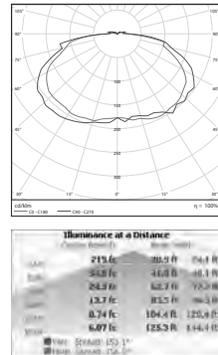
28 Watt
DLC Premium



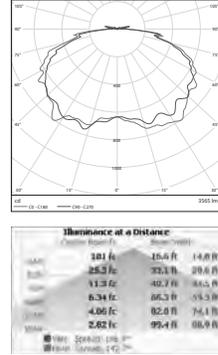
42 Watt
DLC Premium



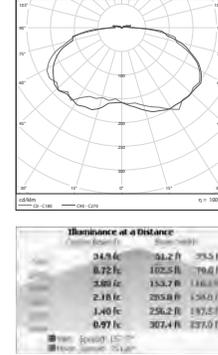
59 Watt
DLC Premium



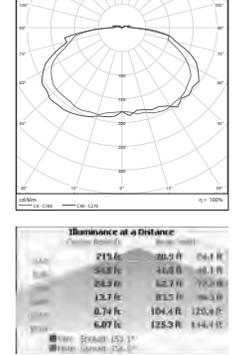
28 Watt with sensor
DLC Premium



42 Watt with sensor
DLC Premium

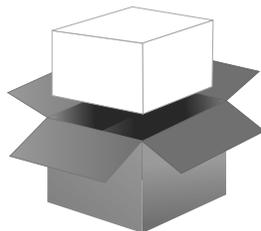


59 Watt with sensor
DLC Premium



PACKAGE

Case Qty 1 pc



Version	2.0	Date	6/14/2021
Prepared By	C.L.		

PRODUCT SPECIFICATION

Category	Compact Area Light
Item Number	9495
Stock Code	FXCAL150/850/BZ/3S
Mounting	PM8 / Slip Fitter / Yoke Mount
Housing Color	Bronze (RAL#8019)

PICTURE

ELECTRICAL CHARACTERISTICS

Rated Wattage (W)	150	Replacement Wattage (W)	400 ~ 575
Tested Wattage (W)	150		
Input Voltage (V)	100 ~ 277	Surge Protect Level	6KV
Voltage Frequency (Hz)	50/60		
Input Current (A)	1.25 (@120V)	Dimmable	1-10V
Power Factor	>0.9	AUX (12V) Line	No
THD	≤ 20%		

PHOTOMETRIC CHARACTERISTICS

Lumen (lm)	21,150	CCT (K)	5000
Efficacy (lm/w)	141	Beam Angle (°)	NEMA Type 3
CRI	>80		

GENERAL CHARACTERISTICS

Operating Temperature (°F)	-40 ~ 113
Storage Temperature (°F)	-40 ~ 158
IP Rating	IP65
IK Rating	IK09
Rated Life	50000 hrs.
Warranty	5 Years

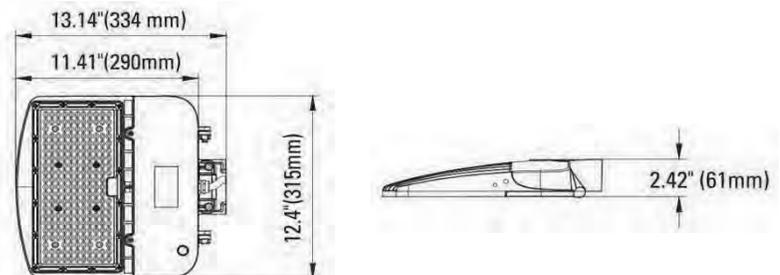
ACCESSORIES

Item #	Stock Code	Description
P10365	MT-CAL/PM8/BZ	8" Pole Mount Arm
P10366	MT-CAL/SF/BZ	Slip Fitter Mount
P10367	MT-CAL/YK13/BZ	Yoke Mount
K379200	MT-CAL/WM/BZ	Wall Mount Kit (P10379 + P10200)

*See Page 2 for more accessories

PRODUCT DIMENSIONS

Width- in (mm)	12.4" (315mm)
Height- in (mm)	2.42" (61.47mm)
Length- in (mm)	13.14" (334mm)
EPA (ft²)	1.357
Weight (lbs)	6.48
Mounting Height (ft)	15 ~ 30
Cable Length (ft)	6


CERTIFICATIONS

UL/ETL	UL/cUL	CEC	
NSF / ETL Sanitation		JAS	
Energy Star		FCC	✓
DLC	V5.1 Premium	RoHs	✓

DOCUMENTS

LM79	✓	IES File	✓
LM80	✓	Dimmer List	



Version	2.0	Date	6/14/2021
Prepared By	C.L.		

PRODUCT SPECIFICATION	
Category	Compact Area Light
Item Number	9497
Stock Code	FXCAL240/850/BZ/3S
Mounting	PM8 / Slip Fitter / Yoke Mount
Housing Color	Bronze (RAL#8019)

PICTURE



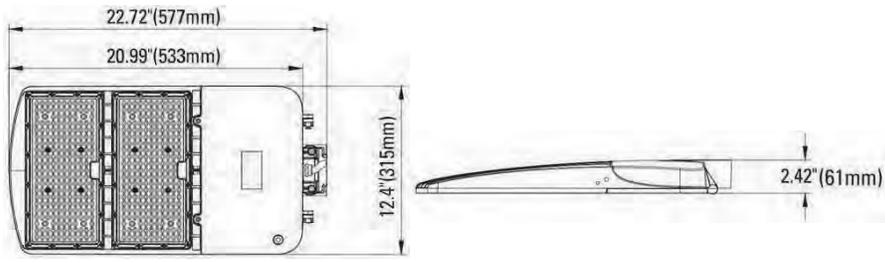
ELECTRICAL CHARACTERISTICS			
Rated Wattage (W)	240	Replacement Wattage (W)	750 ~ 1000
Tested Wattage (W)	240		
Input Voltage (V)	100 ~ 277		
Voltage Frequency (Hz)	50/60	Surge Protect Level	6KV
Input Current (A)	2.0 (@120V)	Dimmable	1-10V
Power Factor	>0.9	AUX (12V) Line	No
THD	≤ 20%		

PHOTOMETRIC CHARACTERISTICS			
Lumen (lm)	33,840	CCT (K)	5000
Efficacy (lm/w)	141	Beam Angle (°)	NEMA Type 3
CRI	>80		

GENERAL CHARACTERISTICS	
Operating Temperature (°F)	-40 ~ 113
Storage Temperature (°F)	-40 ~ 158
IP Rating	IP65
IK Rating	IK09
Rated Life	50000 hrs.
Warranty	5 Years

ACCESSORIES		
Item #	Stock Code	Description
P10365	MT-CAL/PM8/BZ	8" Pole Mount Arm
P10366	MT-CAL/SF/BZ	Slip Fitter Mount
P10367	MT-CAL/YK13/BZ	Yoke Mount
K379200	MT-CAL/WM/BZ	Wall Mount Kit (P10379 + P10200)

*See Page 2 for more accessories

PRODUCT DIMENSIONS		
Width- in (mm)	12.4" (315mm)	
Height- in (mm)	2.42" (61.47mm)	
Length- in (mm)	22.72" (577mm)	
EPA (ft²)	2.346	
Weight (lbs)	10.31	
Mounting Height (ft)	25 ~ 35	
Cable Length (ft)	6	

CERTIFICATIONS			
UL/ETL	UL/cUL	CEC	
NSF / ETL Sanitation		JAS	
Energy Star		FCC	✓
DLC	V5.1 Premium	RoHs	✓

DOCUMENTS			
LM79	✓	IES File	✓
LM80	✓	Dimmer List	



PROJECT: _____

SCHEDULE: _____ DATE: _____

PREPARE BY: _____

NOTES: _____

FDL 1/2" KNUCKLE FLOODLIGHT

DESCRIPTION

naturaLED® floodlights provide a range of sizes and wattages to fit your needs. Our compact flood lights are water resistant rated at IP65 and come with 1/2" NPT knuckle mount. Creating bright, security and spot lighting for a variety of applications such as perimeter, entryway, facades, landscapes, retail and residential complexes and architectural lighting.



Adjustable +/- 90° knuckle

Rated Life 50,000 Hours
Warranty 5 Years

APPLICATIONS

Security, Architectural, Perimeter, Entryway, Pathway, Landscape

FEATURES

- DLC Premium
- IP65 Rated
- UL Listed
- ColorTemp: 4000K, 5000K
- Voltage: 120-277V
- Powerfactor >0.9
- Surge Protection: 15W=2.5KV, 30/50W=1.5KV
- Knuckle can be adjusted +/- 90°
- CRI: 80
- Operating Temperature: - 40°F - 122°F
- Long life LED chips
- 1/2" NPT
- Material: Aluminum Die-Cast Housing
- Color: Bronze
- 5 Year Warranty

SAMPLE NUMBER		FXFDL30/76/40K/BZ-KNC				
FAMILY	SERIES	WATTAGE	BEAM ANGLE	COLOR TEMP	COLOR	ACCESSORY
FX Fixture	FDL Floodlight	30 30 watt	76 76 NEMA 7Hx6V	40K 4000K	BZ Bronze	KNC Knuckle



1/2" KNUCKLE FLOODLIGHT

FLOODLIGHTS & AREA LUMINAIRES

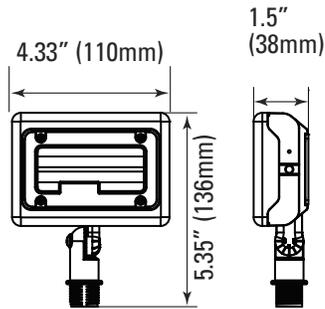
ORDERING

*P= Premium DLC / *S = Standard DLC

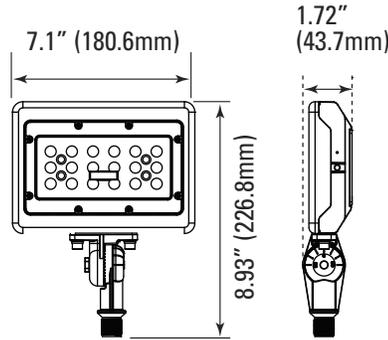
Watts (W)	Ordering Code	Description	CCT (K)	Lumens (Lm)	Equiv. Wattage (W)	Dimmable	IP65 Rated	DLC (S/P)
15	9313	LED-FXFDL15/77/40K/BZ-KNC	4000K	1,603	100	-	•	-
15	9314	LED-FXFDL15/77/50K/BZ-KNC	5000K	1,624	100	-	•	-
50	9317	LED-FXFDL50/77/40K/BZ-KNC	4000K	5,778	250-400	-	•	-
30	9581	FXFDL30/76/40K/BZ-KNC	4000K	4,043	150-200	1-10V	•	P
30	9582	FXFDL30/76/50K/BZ-KNC	5000K	4,214	150-200	1-10V	•	P
50	9583	FXFDL50/76/40K/BZ-KNC	4000K	6,918	250-400	1-10V	•	P
50	9584	FXFDL50/76/50K/BZ-KNC	5000K	7,210	250-400	1-10V	•	P

DIMENSIONS

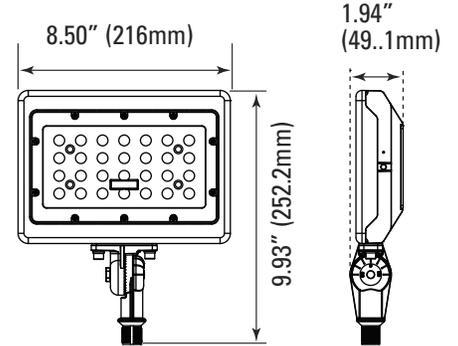
15W
0.88-lbs



30W
2.42-lbs

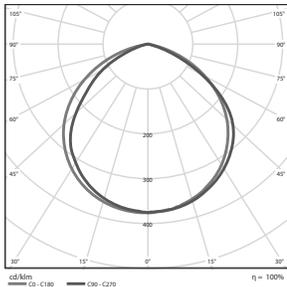


50W
3.52-lbs



PHOTOMETRICS CHART

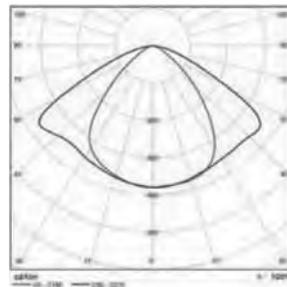
15 Watt



Center Beam fc	Beam Width
2.5ft	95.8 ft
5.0ft	23.9 ft
7.5ft	10.6 ft
10.0ft	7.4 ft
12.5ft	5.99 ft
15.0ft	4.8 ft

Vert. Spread: 113.1°
Horiz. Spread: 106.0°

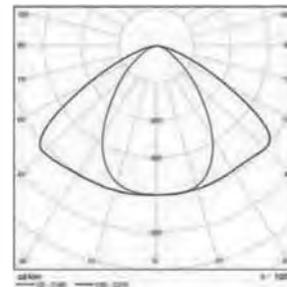
30 Watt
DLC Premium



Center Beam fc	Beam Width
2.5ft	235 ft
5.0ft	58.8 ft
7.5ft	26.1 ft
10.0ft	14.7 ft
12.5ft	9.40 ft
15.0ft	6.53 ft

Vert. Spread: 87.2°
Horiz. Spread: 127.8°

50 Watt
DLC Premium

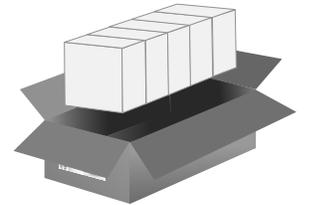


Center Beam fc	Beam Width
2.5ft	424 ft
5.0ft	106 ft
7.5ft	47.1 ft
10.0ft	26.5 ft
12.5ft	17.0 ft
15.0ft	11.8 ft

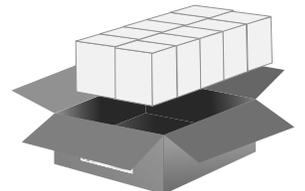
Vert. Spread: 72.7°
Horiz. Spread: 122.1°

PACKAGE

Case Qty for 30W & 50W
5 pcs



Case Qty for 15W
10 pcs





Version	V2.0	Date	8/15/2022
Prepared By	J.C		

PRODUCT SPECIFICATION	
Category	Slim Area Light
Item Number	9647
Stock Code	FXSAL75SW/8CCT3/BZ/T3/480
Mounting	Pole Mount / Slip Fitter / Yoke Mount/ Wall Mount
Housing Color	Bronze (RAL# 8019)



ELECTRICAL CHARACTERISTICS			
Rated Wattage (W)	75/50/25	Replacement Wattage (W)	100W-400W
Tested Wattage (W)	-		
Input Voltage (V)	277~480	Surge Protect Level	10KV
Voltage Frequency (Hz)	50/60HZ		
Input Current (A)	0.3	Dimmable	0 - 10V
Power Factor	>0.9	AUX (12V) Line	Yes
THD	≤ 20%		

PHOTOMETRIC CHARACTERISTICS			
Lumen (lm)	10500/7000/3500	CCT (K)	selectable 3000/4000/5000K
Efficacy (lm/w)	140lm/w	Beam Angle (°)	Type III
CRI	>80		

GENERAL CHARACTERISTICS	
Operating Temperature (°F)	-40 ~ 122
Storage Temperature (°F)	-40~140
IP Rating	IP66
Rated Life	50000 hrs.
Warranty	5 Years

ACCESSORIES		
Item #	Stock Code	Description
P10453	MT-AL/PM6/BZ	Mount - Area Light Pole Mount 6" Bronze
P10455	MT-AL/SF/BZ	Mount - Area Light Slip Fitter Bronze
P10456	MT-SAL/YK12/BZ	Mount - Area Light Yoke mount 12" Bronze
P10473	MT-AL/WM/BZ	Mount - Area Light wall mount Bronze
P10371	SEN-BRI619	Sensor - 0-10V IP66 12-24V IR head
P10467	LENS-SAL-T4-G1	Lens - Type IV lens

PRODUCT DIMENSIONS		
Length- in (mm)	14.2" (360mm)	
Width- in (mm)	12.01" (307mm)	
Height- in (mm)	2.6" (66mm)	
EPA (ft²)	0.212 ft² (@ 0 deg)	
Weight (lbs)	8 lbs	
Mounting Height (ft)	10-15ft	
Cable Length (ft)	1.64ft	

CERTIFICATIONS			
UL/ETL	ETL, cETL	CEC	
NSF/ETL Sanitation		JA8	
Energy Star		FCC	YES
DLC	V5.1 Premium	RoHs	YES

DOCUMENTS			
LM79	YES	IES File	YES
LM80	YES	Dimmer List	

COMMENTS



SAL Slim Area Light (40K,50K, CCT3)

PROJECT: _____

SCHEDULE: _____ **DATE:** _____

PREPARE BY: _____

NOTES: _____

DESCRIPTION

naturaLED® Slim Area Light is constructed with a durable, die-cast aluminum housing and excellent thermal design and is the perfect lighting solution for your parking lot, street, walkway, building flood up/down light and/or as a sign lighter. It provides uniform, consistent color with a wide range of wattage selections to replace from 100W to 1500W HID fixtures. Our fixtures are DLC Premium certified and IP66 rated with four types of mounting options available: Pole Mount, Slip Fitter, Wall Mount, and Yoke Mount. Compatible integrated autonomous and photocell motion sensors are available as options to address your energy savings. Energy savings can be as much as 85% while eliminating maintenance costs in labor and lamp and ballast replacement.



Rated Life 50,000 Hours
Warranty 7 Years*

APPLICATIONS

Area/ Parking, Security, Pathway, Perimeter, Wall Lighting

FEATURES

- DLC Premium
- IP66 Rated
- IK08
- ETL Listed/ cETL Listed
- Low Voltage Output for Sensors
- Contractor Friendly Mounting Options
- Aluminum Die-cast housing
- Finish: Epoxy Powder Coat
- Color Temp: 3CCT (30K/40K/50K), 4000K, 5000K
- Input line voltage: 120-277V, 277-480V
- Power Factor: >0.9
- Built-in Surge Protection: 10KV
- Dimmable: 0-10V
- CRI: 80
- Operating temperature: - 40°F~122°F (- 40°C~50°C)
- 7 Year Warranty
- Finish: Bronze, White, Black
- Optional for Purchase: Type III & Type IV Lens

ACCESSORIES

	Pole Mount Arm		Shorting Cap
	Slip Fitter		Photocell
	Yoke Mount		Lens- Type 3 or 4
	Receptacle		Pole Brackets
	Sensors		Wall Mount
	Surge Protection		

SAMPLE NUMBER FXSAL75SW/8CCT3/BZ/T3

FAMILY	SERIES	WATTAGE	CRI/COLOR TEMP	COLOR	LENS
FX Fixture	SAL Slim Area Light	75SW, 100W 75 Selectable Wattage 100 Watt	8CCT3, 850 CRI 80 Selectable Color Temp (3000, 4000, 5000K) CRI 80 / 5000K	BZ, BK, WH (BZ) Bronze (BK) Black (WH) White	T3 Type III



SLIM AREA LIGHT

WALL & AREA LUMINAIRES

ORDERING

*P= Premium DLC / *S = Standard DLC

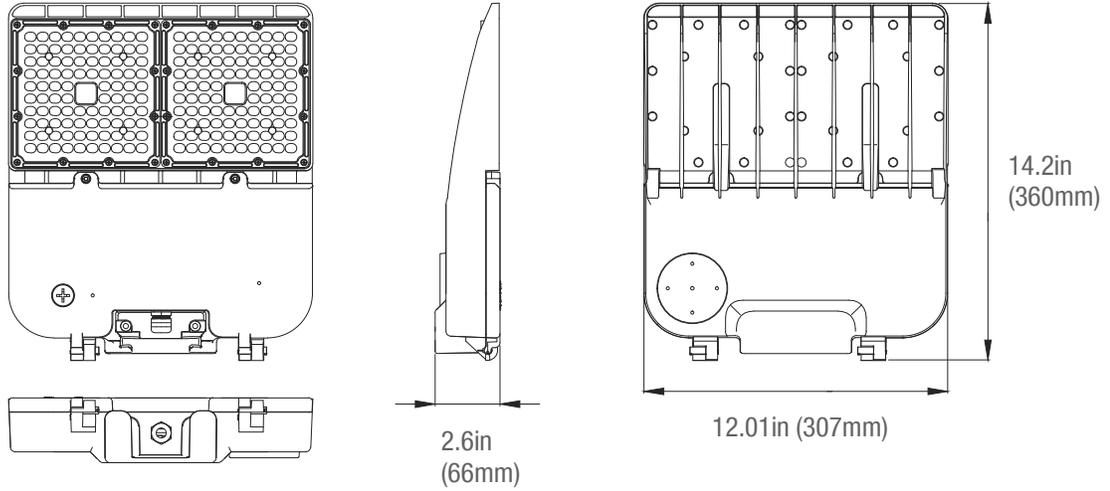
Watts (W)	Ordering Code	Description	CCT (K)	Lumens (Lm)	Equiv. Wattage (W)	Color	IP66 Rated	DLC (S/P)
25	9605	FXSAL75SW/8CCT3/BZ/T3	3CCT (3K/4K/5K)	3,500	100-400	Bronze	•	P
50				7,000				
75				10,500				
100	9606	FXSAL100/840/BZ/T3	4000K	14,000	400	Bronze	•	P
100	9607	FXSAL100/850/BZ/T3	5000K	14,000	400	Bronze	•	P
150	9648	FXSAL150/830/BZ/T3	3000K	19,500	400-575	Bronze	•	P
150	9608	FXSAL150/840/BZ/T3	4000K	21,000	400-575	Bronze	•	P
150	9609	FXSAL150/850/BZ/T3	5000K	21,000	400-575	Bronze	•	P
160	9610	FXSAL240SW/840/BZ/T3	4000K	22,400	400-1000	Bronze	•	P
190				26,600				
240				33,600				
160	9611	FXSAL240SW/850/BZ/T3	5000K	22,400	400-1000	Bronze	•	P
190				26,600				
240				33,600				
320	9612	FXSAL320/840/BZ/T3	4000K	44,800	1000-1500	Bronze	•	P
320	9613	FXSAL320/850/BZ/T3	5000K	44,800	1000-1500	Bronze	•	P
25	9647	FXSAL75SW/8CCT3/BZ/T3/480	3CCT (3K/4K/5K)	3,500	100-400	Bronze	•	P
50				7,000				
75				10,500				
100	9615	FXSAL100/850/BZ/T3/480	5000K	14,000	400	Bronze	•	P
150	9617	FXSAL150/850/BZ/T3/480	5000K	21,000	400-575	Bronze	•	P
160	9619	FXSAL240SW/850/BZ/T3/480	5000K	22,400	400-1000	Bronze	•	P
190				26,600				
240				33,600				
320	9621	FXSAL320/850/BZ/T3/480	5000K	44,800	1000-1500	Bronze	•	P
25	9622	FXSAL75SW/8CCT3/WH/T3	3CCT (3K/4K/5K)	3,500	100-400	White	•	P
50				7,000				
75				10,500				
100	9623	FXSAL100/840/WH/T3	4000K	14,000	400	White	•	P
100	9624	FXSAL100/850/WH/T3	5000K	14,000	400	White	•	P
150	9625	FXSAL150/840/WH/T3	4000K	21,000	400-575	White	•	P
150	9626	FXSAL150/850/WH/T3	5000K	21,000	400-575	White	•	P
160	9627	FXSAL240SW/840/WH/T3	4000K	22,400	400-1000	White	•	P
190				26,600				
240				33,600				
160	9628	FXSAL240SW/850/WH/T3	5000K	22,400	400-1000	White	•	P
190				26,600				
240				33,600				
320	9629	FXSAL320/840/WH/T3	4000K	44,800	1000-1500	White	•	P
320	9630	FXSAL320/850/WH/T3	5000K	44,800	1000-1500	White	•	P
25	9649	FXSAL75SW/8CCT3/BK/T3	3CCT (3K/4K/5K)	3,500	100-400	Black	•	P
50				7,000				
75				10,500				
100	9650	FXSAL100/850/BK/T3	5000K	14,000	400	Black	•	P
150	9651	FXSAL150/850/BK/T3	5000K	21,000	400-575	Black	•	P

SLIM AREA LIGHT

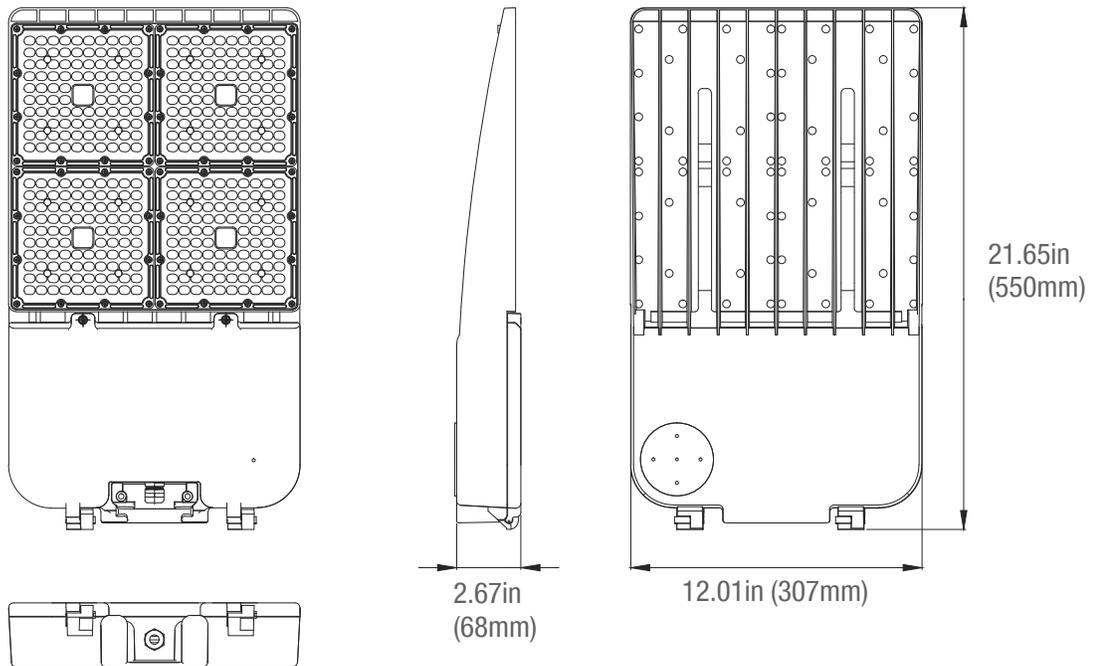
WALL & AREA LUMINAIRES

DIMENSIONS

75/100/150W
8.00-lbs



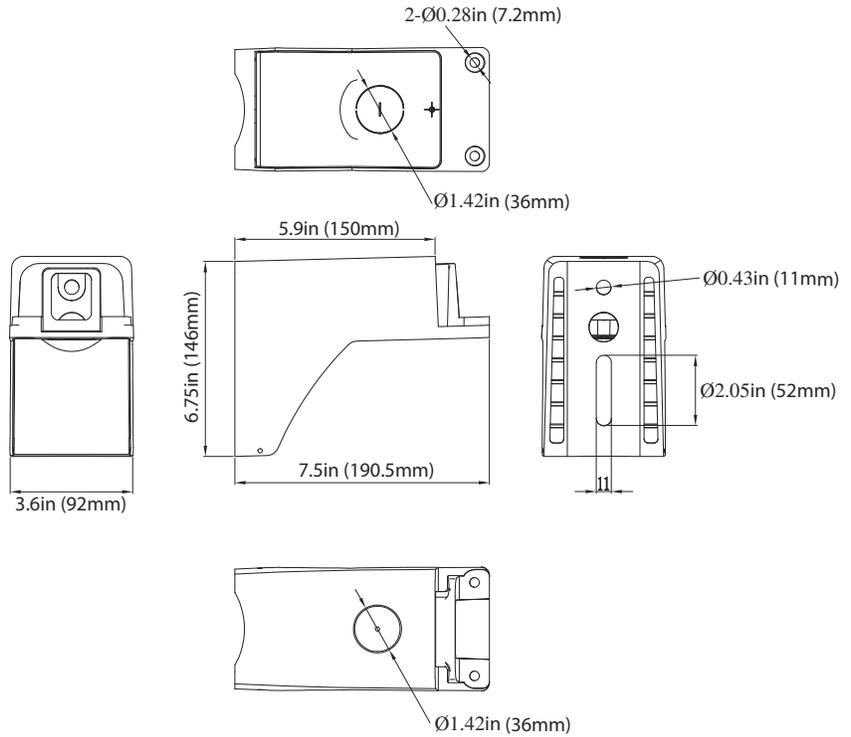
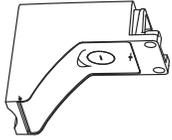
240/320W
15.50-lbs



MOUNTINGS (Ordered Separately)

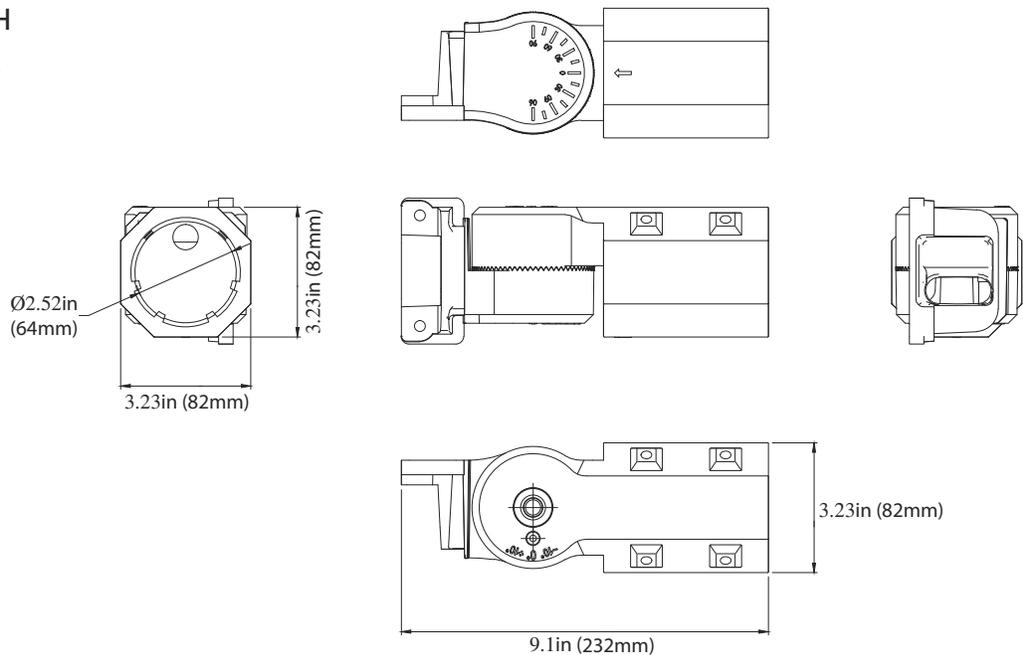
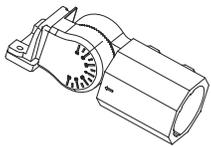
Pole Mount 6"

- P10453 MT-AL/PM6/BZ
- P10458 MT-AL/PM6/WH
- P10468 MT-AL/PM6/BK



Slip Fitter

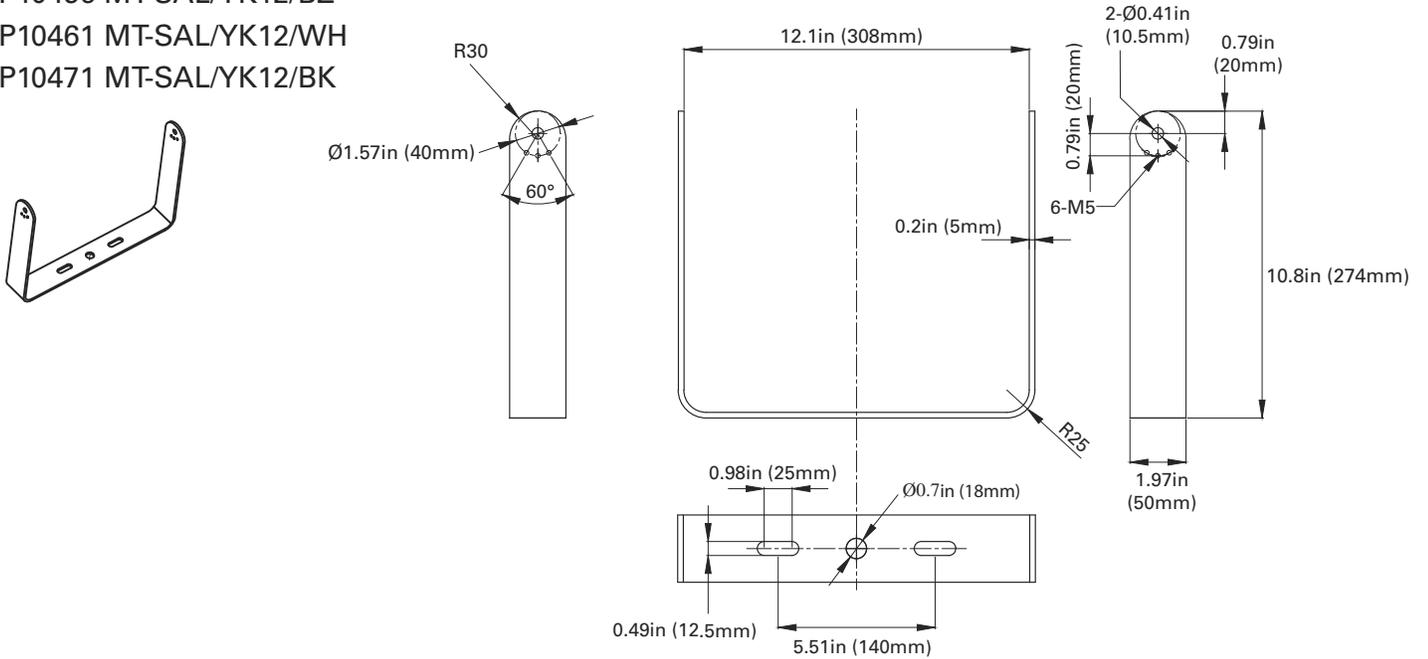
- P10455 MT-AL/SF/BZ
- P10460 MT-AL/SF/WH
- P10470 MT-AL/SF/BK



MOUNTINGS (Ordered Separately)

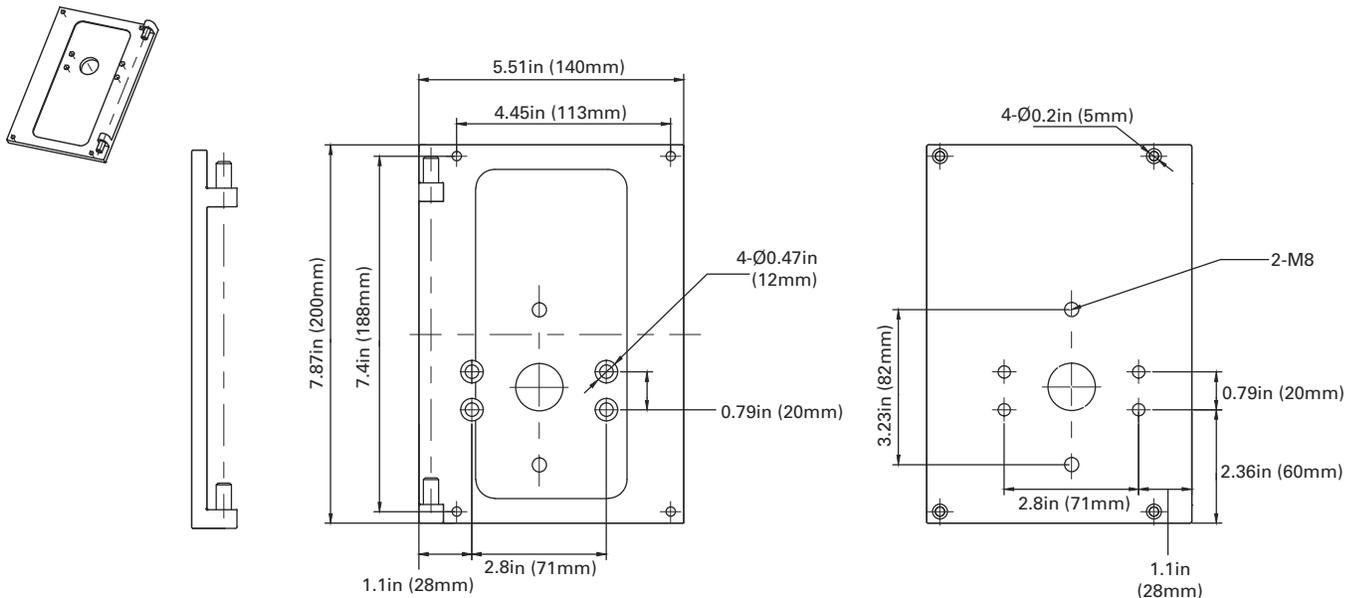
Yoke Mount 12"

- P10456 MT-SAL/YK12/BZ
- P10461 MT-SAL/YK12/WH
- P10471 MT-SAL/YK12/BK



Wall Mount

- P10473 MT-AL/WM/BZ
- P10474 MT-AL/WM/WH
- P10475 MT-AL/WM/BK



SLIM AREA LIGHT

WALL & AREA LUMINAIRES

ACCESSORIES (Ordered Separately)

6" Pole Mount Arm



● P10453 MT-AL/PM6/BZ
(6" Pole Mount Arm Bronze)

○ P10458 MT-AL/PM6/WH
(6" Pole Mount Arm White)

● P10468 MT-AL/PM6/BK
(6" Pole Mount Arm Black)

Twist Lock Receptacle



P10141 REC3PLK
(Twist Lock Photocell & Receptacle
Mount 120-480V 3 Prong)



P10142 REC7PLK
(Twist Lock Photocell & Receptacle
Mount 120-480V 7 Prong)

Type III & IV Lens



P10466 LENS-SAL-T3-G1
(Type III Lens)

P10467 LENS-SAL-T4-G1
(Type IV Lens)

Slip Fitter



● P10455 MT-AL/SF/BZ
(Slip Fitter Mount Bronze)

○ P10460 MT-AL/SF/WH
(Slip Fitter Mount White)

● P10470 MT-AL/SF/BK
(Slip Fitter Mount Black)

Individual Sensors



P10371 SEN-BRI619
(PIR Motion/Photocell 0-10V Bi-Level
Control IP66 12-24V IR Sensor)



P10316 SEN-BRI-RC100
(Remote Programmer for P10371)

Glare Shield

P10481 GSFB-SAL/BZ
(Glare Shield- Bronze)

P10482 GSFB-SAL/WH
(Glare Shield- White)

P10483 GSFB-SAL/BK
(Glare Shield- Black)

Wall Mount



● P10473 MT-AL/WM/BZ
(Wall Mount Bronze)

○ P10474 MT-AL/WM/WH
(Wall Mount White)

● P10475 MT-AL/WM/BK
(Wall Mount Black)

Surge Protection



P10389 SPD-L-10KV-277
(Surge Protection 10KV 120-277V)



P10390 SPD-L-20KV-277
(Surge Protection 20KV 120-277V)



P10391 SPD-L-20KV-480
(Surge Protection 20KV 347-480V)

Yoke Mount



● P10456 MT-SAL/YK12/BZ
(12" Yoke Mount Bronze)

○ P10461 MT-SAL/YK12/WH
(12" Yoke Mount White)

● P10471 MT-SAL/YK12/BK
(12" Yoke Mount Black)

Shorting Cap



P10053 SEN-PHO-LK-MT-SRT
(Twist Lock Photocell Shorting Cap
120-480V 3 Prong)

Dusk to Dawn Photocell



K141030 REC3PLK/PHO
(Twist Lock Photocell & Receptacle
120-277V 3 Prong)

SLIM AREA LIGHT

WALL & AREA LUMINAIRES

POLE BRACKETS (Ordered Separately)



Round Pole Mount Tenon
P10348 MT-3RTV2.5-1/BZ
(3" Round Pole with 2-3/8" Tenon)

P10349 MT-4RTV2.5-1/BZ
(4" Round Pole with 2-3/8" Tenon)

P10350 MT-5RTV2.5-1/BZ
(5" Round Pole with 2-3/8" Tenon)



Spoke Mount Bracket - 90°
P10359 MT-2.5RTBH2.5-290/BZ
(Spoke Mount Bracket with Double 2-3/8" -90°)



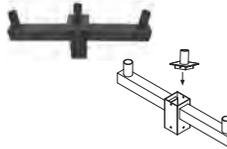
Square Pole Mount with Double - 180°
P10360 MT-4STV2.5-2180/BZ
(4" Square Pole Mount with Double 2-3/8" Tenon)



Square Pole Mount Tenon
P10351 MT-3STV2.5-1/BZ
(3" Square Pole with 2-3/8" Tenon)

P10352 MT-4RTV2.5-1/BZ
(4" Square Pole with 2-3/8" Tenon)

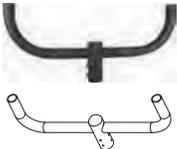
P10353 MT-5RTV2.5-1/BZ
(5" Square Pole with 2-3/8" Tenon)



Square Pole Mount with Triple - 180°
P10361 MT-4STV2.5-3180/BZ
(4" Square Pole Mount with Triple 2-3/8" Tenon)



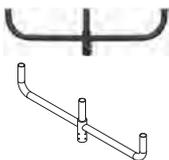
Square Pole Mount with Quad - 90°
P10362 MT-4STV2.5-490/BZ
(4" Square Pole Mount with Quad 2-3/8" Tenon)



Bullhorns with Double - 180°
P10356 MT-2.5RTBV2.5-2180/BZ
(Bullhorn with Double 2-3/8" Tenon-180°)



Wall Mount Bracket
P10363 MT-4WM2.5-1/BZ
(Wall Mount Bracket with 2-3/8" Tenon)



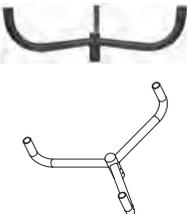
Bullhorns with Triple - 180°
P10357 MT-2.5RTBV2.5-3180/BZ
(Bullhorn with Triple 2-3/8" Tenon-180°)



Angled Mount Bracket - 90°
P10364 MT-4WM2.5-190/BZ
(90° Angled Wall Mount with 2-3/8" Tenon)



Light Pole Cap
P10354 MT-4STC/BK
(4" Square Pole Cap)



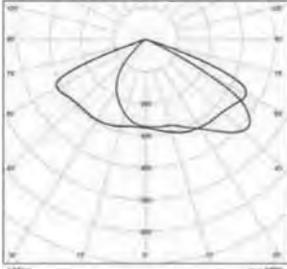
Bullhorns with Triple - 120°
P10358 MT-2.5RTBV2.5-3120/BZ
(Bullhorn with triple 2-3/8" Tenon-120°)

SLIM AREA LIGHT

WALL & AREA LUMINAIRES

PHOTOMETRICS CHART

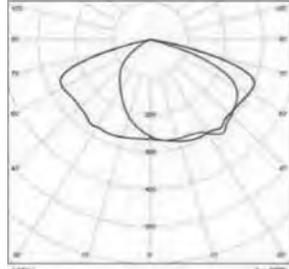
75 Watt - Type 3
DLC Premium



Illuminance at a Distance		
Center Beam Fc	Beam Width	
2.5R	453 fc	4.7 ft 8.0 ft
5.0R	113 fc	9.3 ft 17.6 ft
7.5R	50.4 fc	14.0 ft 26.4 ft
10.0R	28.3 fc	18.7 ft 35.2 ft
12.5R	18.1 fc	23.3 ft 44.0 ft
15.0R	12.6 fc	28.0 ft 52.0 ft

Vert. Spread: 86.0°
Horiz. Spread: 120.8°

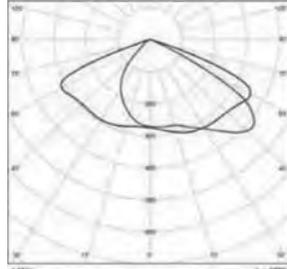
75 Watt - Type 4
DLC Premium



Illuminance at a Distance		
Center Beam Fc	Beam Width	
2.5R	437 fc	6.7 ft 8.0 ft
5.0R	109 fc	13.3 ft 16.5 ft
7.5R	48.6 fc	20.0 ft 24.0 ft
10.0R	27.3 fc	26.7 ft 33.0 ft
12.5R	17.5 fc	33.4 ft 41.3 ft
15.0R	12.1 fc	40.0 ft 49.5 ft

Vert. Spread: 106.3°
Horiz. Spread: 117.6°

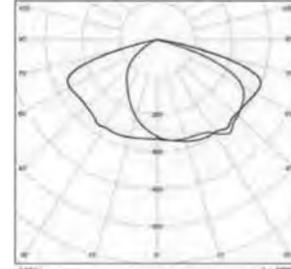
100 Watt - Type 3
DLC Premium



Illuminance at a Distance		
Center Beam Fc	Beam Width	
2.5R	607 fc	4.7 ft 8.0 ft
5.0R	152 fc	9.3 ft 17.6 ft
7.5R	67.4 fc	14.0 ft 26.4 ft
10.0R	37.9 fc	18.7 ft 35.2 ft
12.5R	24.3 fc	23.3 ft 44.0 ft
15.0R	16.9 fc	28.0 ft 52.0 ft

Vert. Spread: 86.0°
Horiz. Spread: 120.8°

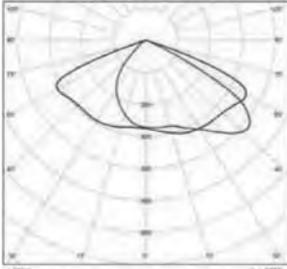
100 Watt - Type 4
DLC Premium



Illuminance at a Distance		
Center Beam Fc	Beam Width	
2.5R	585 fc	6.7 ft 8.0 ft
5.0R	146 fc	13.3 ft 16.5 ft
7.5R	65.0 fc	20.0 ft 24.0 ft
10.0R	36.6 fc	26.7 ft 33.0 ft
12.5R	23.4 fc	33.4 ft 41.3 ft
15.0R	16.3 fc	40.0 ft 49.5 ft

Vert. Spread: 106.3°
Horiz. Spread: 117.6°

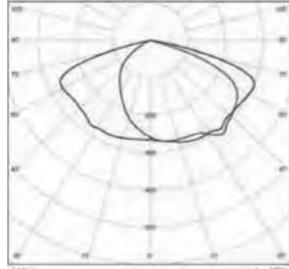
150 Watt - Type 3
DLC Premium



Illuminance at a Distance		
Center Beam Fc	Beam Width	
2.5R	919 fc	4.7 ft 8.0 ft
5.0R	230 fc	9.3 ft 17.6 ft
7.5R	102 fc	14.0 ft 26.4 ft
10.0R	57.4 fc	18.7 ft 35.2 ft
12.5R	36.8 fc	23.3 ft 44.0 ft
15.0R	25.5 fc	28.0 ft 52.0 ft

Vert. Spread: 86.0°
Horiz. Spread: 120.8°

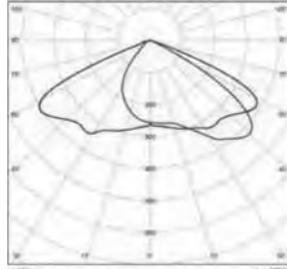
150 Watt - Type 4
DLC Premium



Illuminance at a Distance		
Center Beam Fc	Beam Width	
2.5R	886 fc	6.7 ft 8.0 ft
5.0R	222 fc	13.3 ft 16.5 ft
7.5R	98.4 fc	20.0 ft 24.0 ft
10.0R	55.4 fc	26.7 ft 33.0 ft
12.5R	35.4 fc	33.4 ft 41.3 ft
15.0R	24.6 fc	40.0 ft 49.5 ft

Vert. Spread: 106.3°
Horiz. Spread: 117.6°

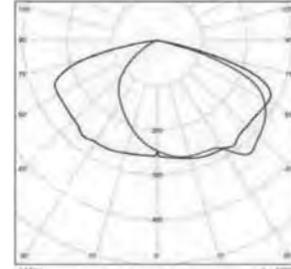
240 Watt - Type 3
DLC Premium



Illuminance at a Distance		
Center Beam Fc	Beam Width	
2.5R	1,407 fc	4.2 ft 8.0 ft
5.0R	352 fc	8.3 ft 16.7 ft
7.5R	156 fc	12.5 ft 25.0 ft
10.0R	87.9 fc	16.6 ft 33.3 ft
12.5R	56.3 fc	20.8 ft 41.7 ft
15.0R	39.1 fc	24.9 ft 50.0 ft

Vert. Spread: 79.4°
Horiz. Spread: 118.1°

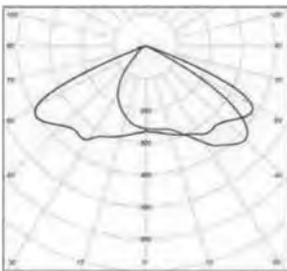
240 Watt - Type 4
DLC Premium



Illuminance at a Distance		
Center Beam Fc	Beam Width	
2.5R	1,340 fc	6.2 ft 8.0 ft
5.0R	335 fc	12.3 ft 17.9 ft
7.5R	149 fc	18.5 ft 26.0 ft
10.0R	83.7 fc	24.7 ft 35.7 ft
12.5R	53.6 fc	30.9 ft 44.6 ft
15.0R	37.2 fc	37.0 ft 53.6 ft

Vert. Spread: 102.0°
Horiz. Spread: 121.5°

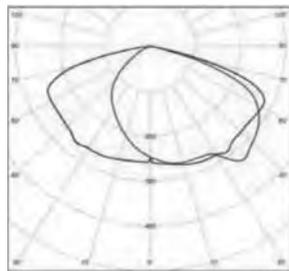
320 Watt - Type 3
DLC Premium



Illuminance at a Distance		
Center Beam Fc	Beam Width	
2.5R	1,864 fc	4.2 ft 8.0 ft
5.0R	466 fc	8.3 ft 16.7 ft
7.5R	207 fc	12.5 ft 25.0 ft
10.0R	116 fc	16.6 ft 33.3 ft
12.5R	74.5 fc	20.8 ft 41.7 ft
15.0R	51.8 fc	24.9 ft 50.0 ft

Vert. Spread: 79.4°
Horiz. Spread: 118.1°

320 Watt - Type 4
DLC Premium

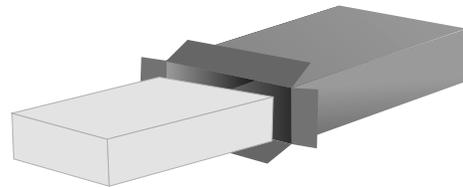


Illuminance at a Distance		
Center Beam Fc	Beam Width	
2.5R	1,775 fc	6.2 ft 8.0 ft
5.0R	444 fc	12.3 ft 17.9 ft
7.5R	197 fc	18.5 ft 26.0 ft
10.0R	111 fc	24.7 ft 35.7 ft
12.5R	71.0 fc	30.9 ft 44.6 ft
15.0R	49.3 fc	37.0 ft 53.6 ft

Vert. Spread: 102.0°
Horiz. Spread: 121.5°

PACKAGE

Case Qty 1 pc



naturaLED®

A19/A21 LAMPS

PROJECT:

SCHEDULE:

DATE:

PREPARE BY:

NOTES:

DESCRIPTION

naturaLED® offers various direct replacement for A- lamps for your decorative lighting, which is free of mercury and lead, JA8 Listed and dimmability functions. Our A19/A21 comes in the choice of 5 watt, 9 watt, 12 watt and 17 watt to replace your existing incandescent up to 100 watt, saving up to 75% of energy. It is a great value energy efficient lamp, using less energy and lasts up to 25,000 hours average life. naturaLED® lamps are ideal lighting solution for track lights, display lights, hotel boutiques, residential, retail, museum lighting and any hospitality applications.



APPLICATIONS

Residential, Decorative, Recessed Downlight, Track , Accent, Retail, Restaurant, Hospitality Lighting



Rated Life Hours 25,000
Warranty 3 Years

FEATURES

- Energy star certified
- UL Damp
- Title20/JA8
- ColorTemp: 2700K, 3000K, 4000K, 5000K
- Instant on / Uniform light distribution and consistent color
- Up to 70% energy savings
- Omni-directional
- Direct Replacement traditional incandescent design
- Contains no mercury or lead
- Input line voltage: 120V
- CRI: 90
- Power Factor: >0.9
- Dimmable
- Operating temperature: - 4°F - 104°F
- 25,000 hrs rated average life

What is CRI 90



CRI180



CRI90

High CRI with LED

Color Rendering Index (CRI) describes how an object appears to the human eye based on ideal or natural light source. The CRI is an index, a measure, that tells something about how colors are represented by light coming from a certain light bulb, compared to how the colors are rendered with the light coming from a reference illuminant.

The CRI reports a unit less value, that can differ between 0 and 100. The value 100 means that there is no difference in color rendition between the light of the observed light bulb and the light of the reference illuminant. Lighting with a CRI of 85 to 90 is typically "excellent" at rendering colors of objects while CRI90 or greater are "superior".

SAMPLE NUMBER LED12A19/110L/927

STYLE	WATTAGE	SERIES	LUMENS	CRI/COLOR TEMP
LED	12	A19	110L	927
LED Lighting	12 Watt	A19 Lamp	1,100 Lumens	CRI 90 2700K



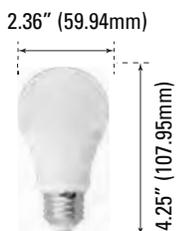
ORDERING

Watts (W)	Ordering Code	Description	CCT (K)	Lumens (Lm)	Base	CRI	Equiv. Wattage (W)	Damp Location	Energy Star
12	4513	LED12A19/110L/927	2700K	1,100	E26	90	75	•	•
12	4528	LED12A19/110L/930	3000K	1,100	E26	90	75	•	•
12	4533	LED12A19/110L/940	4000K	1,100	E26	90	75	•	•
12	4529	LED12A19/110L/950	5000K	1,100	E26	90	75	•	•
17	4514	LED17A21/160L/927	2700K	1,600	E26	90	100	•	•
17	4530	LED17A21/160L/930	3000K	1,600	E26	90	100	•	•
17	4531	LED17A21/160L/950	5000K	1,600	E26	90	100	•	•
15	5962	LED15A21/160L/830	3000K	1,600	E26	80	100	•	•
5	4524	LED5A19/45L/950	5000K	450	E26	90	40	•	•
6	5948	LED6A19/48L/850	5000K	480	E26	80	40	•	•
6.5	4512	LED6.5A19/48L/927	2700K	480	E26	90	40	•	•
9	4525	LED9A19/81L/927	2700K	810	E26	90	60	•	•
9.5	5823	LED9.5A19/88L/50K	5000K	880	E26	80	60	•	-

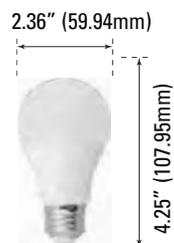
DIMENSIONS

6.5-Watt

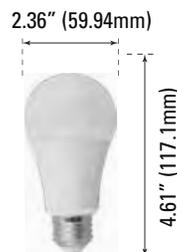
1.91-oz

**9 Watt**

1.97-oz

**12 Watt**

3.20-oz

**17 Watt**

5.62-oz

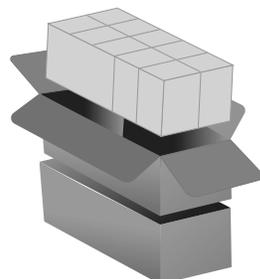
2.82" (71.62mm)



PACKAGE

Case Qty 20 pcs

(10 for inner package)



natural^{led}®

Product Engineering Spec

Product Spec			
Category	LED MR16	PICTURE	
Item Code	4565		
Stock Code	LED6MR16/50L/FL/830		
Mounting	GU5.3		
Housing Color	white		

Electric Characteristics		Photometric Characteristics	
Rated Wattage (W)	6	Lumen (lm)	500
Tested Wattage (W)	6	Efficacy (lm/w)	83
Input Voltage (V)	12	CRI	80
Voltage Frequency (Hz)	60	CCT (K)	3000
Input Current (A)	0.56	Beam Angle (°)	40
Power Factor	>0.7	General Characteristics	
Replacement Wattage (W)	50	Operating Temperature	-4°F~104°F
Surge protect level		Storage Temperature	-4°F~140°F
Dimmable	TRIAC	IP rating	
THD		Rated Life	25000 hrs
		Warranty	3 years

Product Dimensions		Suggested Accessory	
Weight (lbs.)	0.086		
Height (in)	1.96		
Length (in)	1.97		
Width (in)	1.97		
Mounting Height (ft)			
Cable Length (ft)			

Qualifications			
UL/ETL	UL	LM79	√
Energy Star	√	LM80	√
DLC		IES File	
CEC	title 20 compliant	FDA	
JA8		NEMA	
FCC	√	Dimmer List	√
RoHS	√		

Comments:



A19 ENCLOSED FIXTURE LAMP

PROJECT: _____
 SCHEDULE: _____ DATE: _____
 PREPARE BY: _____
 NOTES: _____

DESCRIPTION

naturaLED® offers various direct replacement A-lamps for your decorative lighting, which is free of mercury and lead, with dimmability functions. Our A19 are suitable for enclosed fixtures. It is a great value energy efficient lamp, using less energy and lasts up to 25,000 hours average life. naturaLED® lamps are ideal lighting solution for track lights, display lights, hotel boutiques, residential, retail, museum lighting and any hospitality applications.

APPLICATIONS

Residential, Decorative, Recessed Downlight, Track , Accent, Retail, Restaurant, Hospitality Lighting



Enclosed Fixture
SUITABLE



Rated Life Hours 25,000
Warranty 3 Years

FEATURES

- Energy Star Qualified
- UL Damp & Enclosed fixture rated
- Title24/JA8
- ColorTemp: 2700K, 3000K, 4000K, 5000K
- Instant on / Uniform light distribution and consistent color
- Up to 70% energy savings
- Omni-directional
- Direct Replacement traditional incandescent design
- Contains no mercury or lead
- Input line voltage: 120V
- CRI: 90
- Power Factor: >0.9
- Dimmable
- Operating temperature: -4°F - 104°F
- 25,000 hrs rated average life

SAMPLE NUMBER LED9A19/EC/81L/GU24/927

STYLE	WATTAGE	SERIES	RATED	LUMENS	BASE	CRI/COLOR TEMP
LED	9	A19	EC	81L	GU24	927
LED Lighting	9 Watt	A19 Lamp	Enclosed Rated Fixture	810 Lumens	GU24 Base	CRI 90 2700K



A19 ENCLOSED FIXTURE LAMP

A19 LAMPS

ORDERING

Watts (W)	Ordering Code	Description	CCT (K)	Lumens (Lm)	Base	CRI	Equiv. Wattage (W)	Damp Location	Energy Star
9	4534	LED9A19/EC/81L/927	2700K	810	E26	90	60	•	•
9	4586	LED9A19/EC/81L/930	3000K	810	E26	90	60	•	•
9	4587	LED9A19/EC/81L/940	4000K	810	E26	90	60	•	•
9	4588	LED9A19/EC/81L/950	5000K	810	E26	90	60	•	•
9	4535	LED9A19/EC/81L/GU24/927	2700K	810	GU24	90	60	•	•

What is CRI 90



CRI180



CRI190

High CRI with LED

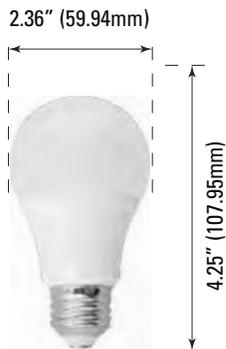
Color Rendering Index (CRI) describes how an object appears to the human eye based on ideal or natural light source. The CRI is an index, a measure, that tells something about how colors are represented by light coming from a certain light bulb, compared to how the colors are rendered with the light coming from a reference illuminant.

The CRI reports a unit less value, that can differ between 0 and 100. The value 100 means that there is no difference in color rendition between the light of the observed light bulb and the light of the reference illuminant. Lighting with a CRI of 85 to 90 is typically "excellent" at rendering colors of objects while CRI90 or greater are "superior".

DIMENSIONS

A19 (E26 Base)

1.67-oz



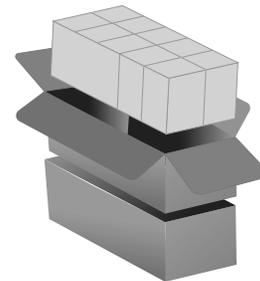
A19 (GU24 Base)

1.80-oz



PACKAGE

Case Qty 20 pcs (10 for inner package)





Product Engineering Spec

Product Spec			
Category	LED Floodlight	PICTURE	
Item Code	9318		
Stock Code	LED-FXFDL50/77/50K/BZ-KNC		
Mounting	Knuckle Mount		
Housing Color	Bronze + Frosted Lens		

Electric Characteristics		Photometric Characteristics	
Rated Wattage (W)	50	Lumen (lm)	5793
Tested Wattage (W)	49.18	Efficacy (lm/w)	118
Input Voltage (V)	100~277	CRI	>80
Voltage Frequency (Hz)	50/60	CCT (K)	5000
Input Current (A)	0.41	Beam Angle (°)	NEMA 7X7
Power Factor	>0.9	General Characteristics	
Replacement Wattage (W)	250	Operating Temperature	-40°F~122°F
Surge protect level	1.5KV	Storage Temperature	-40°F~176°F
Dimmable	No	IP rating	IP65
THD	<20%	Rated Life	50000 hrs
		Warranty	5 years

Product Dimensions		Suggested Accessory	
Weight (lbs.)	3.61		
Height (in)	10.16		
Length (in)	8.5		
Width (in)	2.13		
Mounting Height (ft)			
Cable Length (ft)			

Qualifications			
UL/ETL	UL/cUL	LM79	√
Energy Star		LM80	√
DLC	V5.0 Standard	IES File	√
CEC		FDA	
JA8		NEMA	
FCC	√	Dimmer List	
RoHS	√		

Comments:

natural^{led}

Product Engineering Spec

Product Spec			
Category	Slim Wall Pack	PICTURE	
Item Code	9302		
Stock Code	LED-FXSWP15/850/DB		
Mounting	Wall Mount		
Housing Color	Dark Bronze		

Electric Characteristics		Photometric Characteristics	
Rated Wattage (W)	15	Lumen (lm)	2062
Tested Wattage (W)	15.68	Efficacy (lm/w)	132
Input Voltage (V)	120~277	CRI	>80
Voltage Frequency (Hz)	50/60	CCT (K)	5000
Input Current (A)	0.15	Beam Angle (°)	140
Power Factor	>0.9	General Characteristics	
Replacement Wattage (W)	75W	Operating Temperature	-22°F~122°F
Surge protect level	2KV	Storage Temperature	-40°F~158°F
Dimmable	No	IP rating	IP65
THD	<20%	Rated Life	50000 hrs
		Warranty	5 years

Product Dimensions		Suggested Accessory	
Weight (lbs.)		Photocell	
Height (in)	3.9	Slip Fitter Mount	
Length (in)	8	Knuckle Mount	
Width (in)	6.6		
Mounting Height (ft)			
Cable Length (ft)			

Qualifications			
UL/ETL	ETL	LM79	√
Energy Star		LM80	√
DLC	V4.4 Premium	IES File	√
CEC		FDA	
JA8		NEMA	
FCC	√	Dimmer List	
RoHS	√		

Comments:

Angle Adjustable
 1/2" knockout (4 ways)
 Meets ADA regulation



TWP TRADITIONAL WALL PACK CCT 3

PROJECT: _____

SCHEDULE: _____ **DATE:** _____

PREPARE BY: _____

NOTES: _____

DESCRIPTION

naturaLED® TWP traditional wallpack comes in rugged cast-aluminum housing with excellent thermal design. DLC Premium qualified, our TWP product offers a popular classic appearance for your needs. The traditional shape maintains an aesthetic appearance and will replace any building's wallpack or perimeter lighting. Ideal for outdoor applications such as carports, loading areas, driveways, parking area and pathways. Designed for wall mounting above four feet from ground. New available in Wattage Selectable and Color Temperature Selectable option. *Requires an easy installation using the connectors to activate photocell sensor.



Rated Life 50,000 Hours
Warranty 5 Years

APPLICATIONS

Security, Pathway, Perimeter, Entryway, Area Lighting, and building facades

FEATURES

- DLC Premium Qualified
- IP65 Rated
- ETL Listed
- Built In Photocell Sensor Included (Easy connector to activate the photocell)
- ColorTemp: 4000K, 5000K or CCT3
- Dimmable: 0-10V
- Input line voltage: 120-277V, 120-347V
- Input Current: 28W-0.24A, 38W-0.32A, 60W-0.50A, 80W-0.67A, 100W-0.50A
- Surge Protect Level: 4KV
- Material: Die Cast Aluminum
- Lens: Borosilicate Glass Lens
- Corrosion resistant powder coating
- Operating temperature: -40°F - 122°F
- 5 Year Warranty
- Finish: Bronze
- Optional for Purchase: Motion Sensor, Emergency Driver, Wireguard, Replacement Lens, Shield Cover, Surge Protection

ACCESSORIES

	Motion Sensor
	Emergency Drivers
	Wireguard
	Replacement Lens
	Shield Cover
	Surge Protection

SAMPLE NUMBER FXTWP60SW/CCT3/BZ-PHO

FAMILY	SERIES	WATTAGE	SELECTABLE	COLOR TEMP	FINISH COLOR	ACCESSORY
FX Fixture	TWP Traditional Wall Pack	60 28/38/60W	SW Selectable Wattage	CCT3 3000K 4000K 5000K	BZ Bronze	PHO Photocell Included



TRADITIONAL WALL PACK & CCT 3

WALL & AREA LUMINAIRES

ORDERING

*P= Premium DLC / *S = Standard DLC

	Watts (W)	Ordering Code	Description	CCT (K)	Lumens (Lm)	Equiv. Wattage (W)	Color	IP65 Rated	DLC (S/P)
120-277V	28	9453	FXTWP28/40K/BZ-PHO	4000K	4,200	175	Bronze	•	P
	28	9454	FXTWP28/50K/BZ-PHO	5000K	4,200	175	Bronze	•	P
	38	9447	FXTWP38/40K/BZ-PHO	4000K	5,700	175-250	Bronze	•	P
	38	9448	FXTWP38/50K/BZ-PHO	5000K	5,700	175-250	Bronze	•	P
	60	9449	FXTWP60/40K/BZ-PHO	4000K	9,000	250-400	Bronze	•	P
	60	9450	FXTWP60/50K/BZ-PHO	5000K	9,000	250-400	Bronze	•	P
	80	9451	FXTWP80/40K/BZ-PHO	4000K	12,000	400- 575	Bronze	•	P
	80	9452	FXTWP80/50K/BZ-PHO	5000K	12,000	400-575	Bronze	•	P
	80	9542	FXTWP80/50K/WH-PHO	5000K	12,000	400-575	White	•	P
	120-347V	28	9455	FXTWP60SW/CCT3/BZ-PHO	3CCT	4,404	175-400	Bronze	•
38				(30/40/50K)	6,260	175-400		•	P
60					9,134	175-400		•	P
60		9456	FXTWP100SW/CCT3/BZ-PHO	3CCT	9,065	400-750	Bronze	•	P
80				(30/40/50K)	11,260	400-750		•	P
100					14,500	400-750		•	P
120-347V		38	9534	FXTWP38/40K/BZ/347-PHO	4000K	5,700	175-250	Bronze	•
	38	9535	FXTWP38/50K/BZ/347-PHO	5000K	5,700	175-250	Bronze	•	P
	60	9536	FXTWP60/40K/BZ/347-PHO	4000K	9,000	250-400	Bronze	•	P
	60	9537	FXTWP60/50K/BZ/347-PHO	5000K	9,000	250-400	Bronze	•	P
	28	9532	FXTWP60SW/CCT3/BZ/347-PHO	3CCT	4,060	175-400	Bronze	•	P
	38			(30/40/50K)	5,510	175-400		•	P
	60				8,700	175-400		•	P
	60	9533	FXTWP100SW/CCT3/BZ/347-PHO	3CCT	8,700	400-750	Bronze	•	P
	80			(30/40/50K)	11,600	400-750		•	P
	100				14,500	400-750		•	P

ACCESSORIES (Ordered Separately)**Motion Sensor**

P10234 SEN-MC605V-D
(Microwave Motion Photocell Sensor 0-10V)

Shield

P10402 CVR-TWP-SMALL/BZ
(Shield cover- small 28W Bronze, Size: 9.05"x9.20")



P10403 CVR-TWP-MEDIUM/BZ
(Shield cover- medium 38-100W Bronze, Size: 14.30"x9.20")

Wireguard

P10004 WG-TWP-MEDIUM
(Wireguard for Medium TWP
38W,60W,80W,100W,CCT3, Size: 14.30"x9.20")

Surge Protection

P10389 SPD-L-10KV-277
(Surge Protection 10KV 120-277V)



P10390 SPD-L-20KV-277
(Surge Protection 20KV 120-277V)



P10391 SPD-L-20KV-480
(Surge Protection 20KV 347-480V)

Emergency Driver

7336 BAEM4-60BC/MV-A
(4W CEC Compliant LED Emergency Driver for 28W, 38W)



7334 BAEM15-48BC/MV-A
(15W CEC Compliant LED Emergency Driver
for 38W, 60W, 80W, 60W CCT3)



7337 BAEM25-170BC/347-C
(25W Micro Inverter 120-247V with 12" Conduit 100W CCT3)

Replacement Glass Lens

P10002 LENS-TWP-SMALL
(Glass Lens Gasket for 28W, Size: 9.05"x9.20")



P10000 LENS-TWP-MEDIUM
(Glass Lens Gasket for 38-100W, CCT3, Size: 14.30"x9.20")

Replacement Plastic Lens

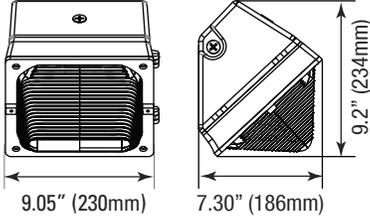
P10003 LENS-TWP-PC-MEDIUM
(Plastic Lens Gasket for 38-100W, CCT3, Size: 14.30"x9.20")

TRADITIONAL WALL PACK & CCT 3

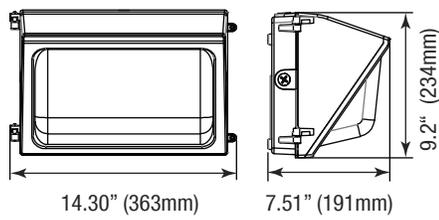
WALL & AREA LUMINAIRES

DIMENSIONS

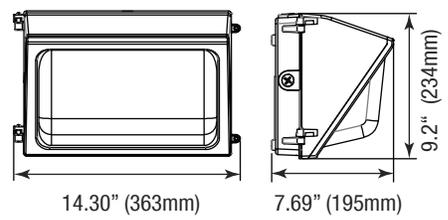
28W
5.51-lbs



38W **60W**
6.79-lbs 6.86-lbs

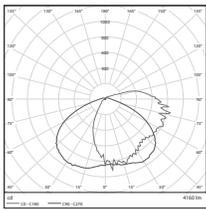


80W **CCT3 100W**
8.07-lbs 9.26-lbs



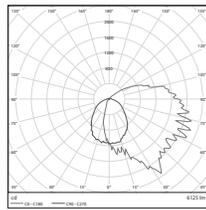
PHOTOMETRICS CHART

28 Watt
DLC Premium



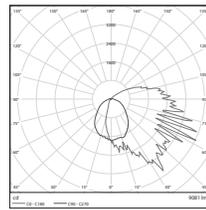
Illuminance at a Distance		
Distance (ft)	Beam Diameter (ft)	Beam Area (sq ft)
10	4.36	14.9
20	8.72	59.6
30	13.08	104.4
40	17.44	153.1
50	21.80	205.8
60	26.16	262.5
70	30.52	323.2
80	34.88	387.9
90	39.24	456.6
100	43.60	529.3

38 Watt
DLC Premium



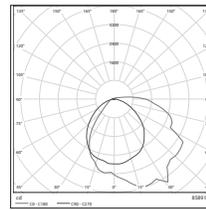
Illuminance at a Distance		
Distance (ft)	Beam Diameter (ft)	Beam Area (sq ft)
10	6.62	21.9
20	13.24	87.6
30	19.86	155.4
40	26.48	226.2
50	33.10	300.0
60	39.72	376.8
70	46.34	456.6
80	52.96	539.4
90	59.58	625.2
100	66.20	714.0

60 Watt
DLC Premium



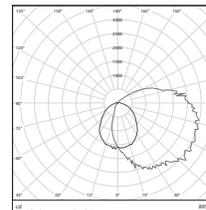
Illuminance at a Distance		
Distance (ft)	Beam Diameter (ft)	Beam Area (sq ft)
10	8.88	39.4
20	17.76	157.6
30	26.64	354.8
40	35.52	621.0
50	44.40	956.2
60	53.28	1361.4
70	62.16	1836.6
80	71.04	2381.8
90	79.92	3007.0
100	88.80	3712.2

80 Watt
DLC Premium



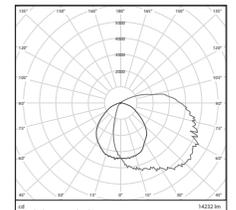
Illuminance at a Distance		
Distance (ft)	Beam Diameter (ft)	Beam Area (sq ft)
10	11.14	61.9
20	22.28	247.6
30	33.42	545.4
40	44.56	976.2
50	55.70	1541.0
60	66.84	2240.8
70	77.98	3075.6
80	89.12	4045.4
90	100.26	5150.2
100	111.40	6390.0

28/38/60 Watt (CCT)
DLC Premium



Illuminance at a Distance		
Distance (ft)	Beam Diameter (ft)	Beam Area (sq ft)
10	7.54	28.3
20	15.08	113.2
30	22.62	203.7
40	30.16	310.0
50	37.70	432.1
60	45.24	570.0
70	52.78	723.7
80	60.32	893.2
90	67.86	1078.5
100	75.40	1279.6

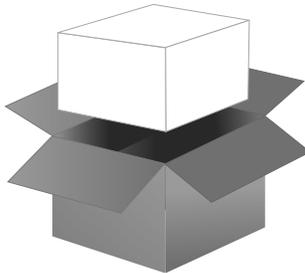
60/80/100 Watt (CCT)
DLC Premium



Illuminance at a Distance		
Distance (ft)	Beam Diameter (ft)	Beam Area (sq ft)
10	11.14	61.9
20	22.28	247.6
30	33.42	545.4
40	44.56	976.2
50	55.70	1541.0
60	66.84	2240.8
70	77.98	3075.6
80	89.12	4045.4
90	100.26	5150.2
100	111.40	6390.0

PACKAGE

Case Qty 1 pc





PST POST TOP AREA LIGHT CCT3

PROJECT: _____

SCHEDULE: _____ **DATE:** _____

PREPARE BY: _____

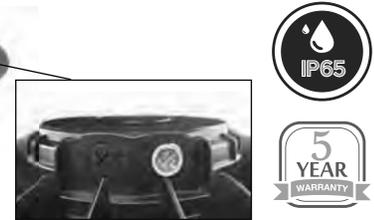
NOTES: _____

DESCRIPTION

naturaLED® has designed a sleek, contemporary post top fixture with three vertical arm that creates a clean look. Easy installation to retrofit on standard 2-3/8" tenons. Saving time and money by upgrading to LED. Our DLC premium open round post top light fixture replaces up to 400 watt metal halide fixtures and produces up to 13,000 lumens.

BENEFITS

Sleek, contemporary design eliminates light trespass to avoid light pollution in the night sky.



Dusk to Dawn Photocell Sensor
Adjustable Wattage and CCT

Rated Life 50,000 Hours
Warranty 5 Years

APPLICATIONS

Corporate Campus, Education, Healthcare, Parking Structure, Parks, Hospitalities, Walkways, Commercial office buildings, Landscape lighting may come into use

FEATURES

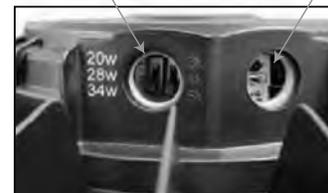
- DLC Premium
- IP65 Rated
- ETL Listed
- Selectable Wattages (3 Wattages)
- Selectable Color Temperature (3000K, 4000K, 5000K)
- Voltage: 120-277V
- Power Factor >0.9
- Surge Protection: 4KV
- Beam Angle: 110°
- Dimmable: 0-10V
- CRI: 80
- Operating temperature: - 40°F - 122°F
- Built-in photocell sensor (turn on and off)
- Mounting: Fits 2-3/8" Tenon
- Recommended Mounting Height: 8-15ft
- Glass Lens
- Color: Black
- 5 Year Warranty
- Optional for Purchase: Surge Protector

ACCESSORIES



PHOTO SENSOR & SELECTABLE

Selectable Wattage & CCT Dusk to Dawn Photocell Sensor On/Off Switch



SAMPLE NUMBER FX15PST100SW/8CCT3/BK

FAMILY	DIAMETER	SERIES	WATTAGE	CRI/COLOR TEMP	COLOR
FX Fixture	15 15-inch	PST Post Top	100SW Selectable Wattage 60W/80W/100W	8CCT3 CRI 80 3000/4000/5000K	BK Black



POST TOP AREA LIGHT CCT3

PARKING & AREA LUMINAIRES

ORDERING

*P= Premium DLC / *S = Standard DLC

Watts (W)	Ordering Code	Description	CCT (K)	Lumens (Lm)	Equip. Wattage (W)	Dim (V)	IP65 Rated	DLC (S/P)
20	9571	FX15PST34SW/8CCT3/BK	3CCT (3/4/5K)	3,004	175	0-10V	•	P
28				4,200				
34				5,262				
60	9572	FX15PST100SW/8CCT3/BK	3CCT (3/4/5K)	8,104	250	0-10V	•	P
80				10,400				
100				13,361				

ACCESSORIES (Ordered Separately)

Surge Protector



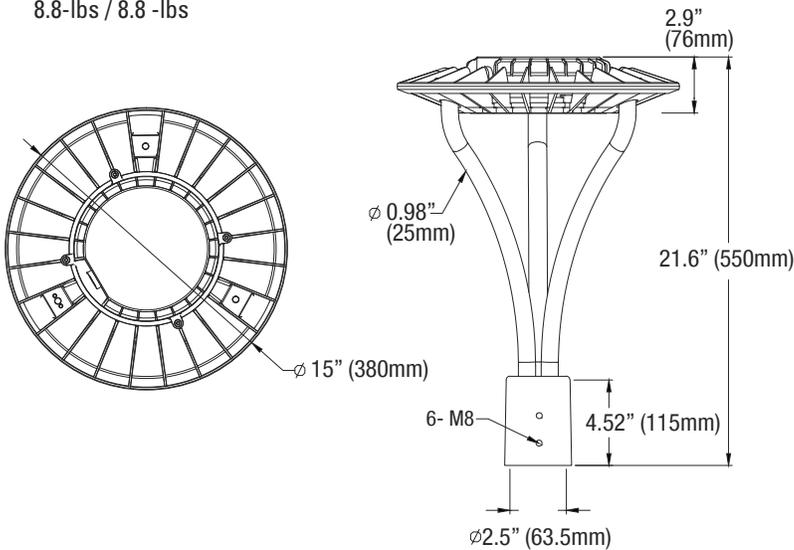
P10389 SPD-L-10KV-277
(10KV Surge protector/ 120-277V)



P10390 SPD-L-20KV-277
(20KV Surge protector/ 120-277V)

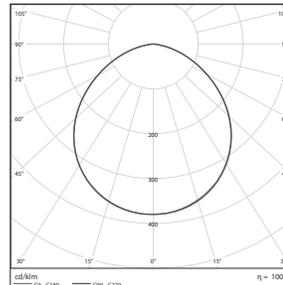
DIMENSIONS

34W / 100W
8.8-lbs / 8.8 -lbs

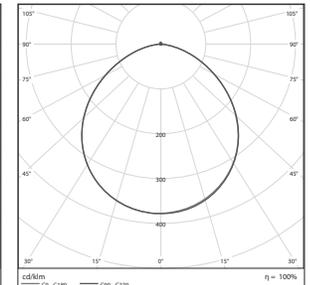


PHOTOMETRICS CHART

20/28/34 Watt
DLC Premium



60/80/100 Watt
DLC Premium



Illuminance at a Distance

Center Beam fc	Beam Width
2.5ft	320 fc
5.0ft	79.9 fc
7.5ft	35.5 fc
10.0ft	20.0 fc
12.5ft	12.8 fc
15.0ft	8.88 fc

■ Vert. Spread: 106.5°
■ Horiz. Spread: 106.5°

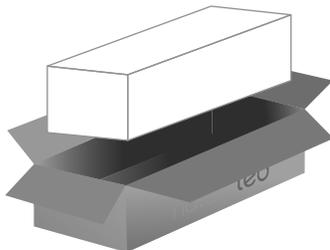
Illuminance at a Distance

Center Beam fc	Beam Width
2.5ft	808 fc
5.0ft	202 fc
7.5ft	89.8 fc
10.0ft	50.5 fc
12.5ft	32.3 fc
15.0ft	22.4 fc

■ Beam Spread: 106.5°

PACKAGE

Case Qty 1 pc





Lumec RoadFocus Plus LED cobra head luminaires feature a unique and patented design with minimalist profile maintaining key cobra head characteristics. Connectable ready, and available in 4 sizes, the RoadFocus Plus family offers multiple lumen packages with industry leading efficacy, a complete array of optical distributions, ensuring the right fit for any type of roadway application. This family also includes Service Tag, which enables data delivery and information sharing, and provides assistance throughout the life of the product.

Project: _____
 Location: _____
 Cat.No: _____
 Type: _____
 Lumens: _____ Qty: _____
 Notes: _____



Ordering guide

example: RPS-35W10LED-740-G1-R2M-UNV-DMG-HSS-PH8-TLRD7-GY3

Series	LED module	CCT	Gen.	Distribution	Voltage	Options		Finish			
						Controls ⁸	Options				
RPS			G1								
RPS RoadFocus Plus small	Standard Performance		G1 Gen 1	Type 2		UNV 120-277V HVVU ² 347-480V	D4I ^{1,8} Zhaga-D4i certified DALI ¹ Digitally addressable lighting interface DMG ¹⁰ 0-10V SRD ¹ Sensor ready driver, standard configuration SRD1 ¹ Sensor ready driver, alternate configuration	2C Two clamps with 4 bolts API Factory installed NEMA label, ANSI C136.15-2020 compliant CSS ^{11,12} Cul-de-Sac Shield FSS ^{11,12} Front Side Shield HSS ^{11,12} House Side Shield LSS ^{11,12} Left Side Shield RSS ^{11,12} Right Side Shield OMS ¹³ Outdoor Multi-Sensor FAWS ² Field adjustable wattage switch JP Job Pack NRC ¹⁴ No receptacle PH8 ^{1,15} Twist-lock photoelectric cell, UNV (120-277VAC) PH8/347 ^{15,16} Twist-lock photoelectric cell (347VAC) PH8/480 ^{15,16} Twist-lock photoelectric cell (480VAC) PHXL ^{1,15} Twist-lock photoelectric cell, extended life, UNV (120-277VAC) PH9 ¹⁵ Shorting cap TLRD7 ^{10,17} Tool less receptacle for twist-lock photocell or shorting cap, 7-pin (standard) SP2 20kV / 10kA Surge protector SP1X Fail-Off 10kV/5kA Surge protector SP2X Fail-Off 20kV/10kA Surge protector TLRSR ^{9,18} SR receptacle BAC ¹⁹ Meets the requirements of the Buy American Act of 1933 (BAA)	BK Black BR Bronze GY3 Gray WH White		
	740 4000K/70CRI	730 3000K/70CRI		727 ⁹ 2700K/70CRI	840 ⁹ 4000K/80CRI					830 ⁹ 3000K/80CRI	827 ⁹ 2700K/80CRI
	10W10LED ^{1,2}	70W20LED		15W10LED ^{1,2}	75W20LED ²					20W10LED ^{1,2}	80W20LED ²
	25W10LED ^{1,2}	85W20LED ²		30W10LED ¹	95W20LED ²					35W10LED	15W30LED ²
	40W10LED	20W30LED ²		45W10LED	25W30LED ²					50W10LED	30W30LED
	55W10LED	35W30LED		15W20LED ^{1,2}	40W30LED					20W20LED ^{1,2}	45W30LED
	25W20LED ^{1,2}	50W30LED		30W20LED	55W30LED					35W20LED	60W30LED
	40W20LED	65W30LED		45W20LED	70W30LED					50W20LED	75W30LED ²
	55W20LED	80W30LED ²		60W20LED	85W30LED ²					65W20LED	95W30LED ²
	High Performance			15W40LED ²	55W40LED					20W40LED ²	60W40LED
	25W40LED ²	65W40LED		30W40LED	70W40LED					35W40LED	75W40LED ²
	40W40LED	80W40LED ²		45W40LED	85W40LED ²					50W40LED	95W40LED ²
				Type 3						Type 4	
				R3M Type III Medium						4 Type IV	
				R3MB ⁶ Type III Medium enhanced back-light						Type 5	
				R3S ⁵ Type III Short						5 Type V	
				R3MHE ⁷ Type II Medium High Efficacy							

¹ Not available with HVU Voltage option.
² Only available with DMG Driver option.
³ Extended lead-time may apply (consult factory).
⁴ Optimized for Type 2 Medium applications but may shows as Type 3 Medium in photometric tools.
⁵ Optimized for Type 2 Short applications but may shows as Type 2 Medium in photometric tools.
⁶ Not available with 10LED versions
⁷ Only available with 40LED 4000K/70CRI versions.
⁸ Select either D4I, DALI or DMG or SRD or SRD1 mandatory option.
⁹ TLRSR must be selected with D4I Driver option.
¹⁰ Please note this integrated feature come standard with RoadFocus.
¹¹ Refer to Accessories section to confirm compatibility of shields with optical distribution.
¹² One shield provided per LED light engine.
¹³ TLRSR Option and D4I Driver option must be selected with OMS.
¹⁴ Not available with PH8, PHXL, PH9, DALI, TLRD7, SRD or SRD1 Driver options.
¹⁵ TLRD7 must be selected for this option.
¹⁶ Not available with UNV Voltage option.
¹⁷ Use of photoelectric cell or shorting cap is required to ensure proper illumination.
¹⁸ Only available with D4I or SRD or SRD1 Driver options.
¹⁹ Failure to properly select the "BAC" suffix could result in you receiving product that is not BAA compliant product with no recourse for an RMA or refund. This BAC designation hereunder does not address (i) the applicability of, or availability of a waiver under, the Trade Agreements Act, or (ii) the "Buy America" domestic content requirements imposed on states, localities, and other non-federal entities as a condition of receiving funds administered by the Department of Transportation or other federal agencies.



RPS RoadFocus Plus

LED Cobra head (small)

Accessories* Must be ordered as separate line items - quickly and easily installed in the field.

Description	Ordering Code	Shield vs Dist. Comp.				Ordering Code	Shield vs Distribution Compatibility									
	10 LED version**	R2M	R3M	4	5	20-30-40 LED versions**	R2M	R2MB	R2MHE	R2S	R3M	R3MB	R3MHE	R3S	4	5
Cul-de-sac shield	ACC-LG66V10LED-CSS	Yes	Yes	No	No	ACC-LG66V40LED-CSS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Front side shield	ACC-LG66V10LED-FSS	Yes	Yes	No	No	ACC-LG66V40LED-FSS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Front side shield (for Type 4 only)	-	-	-	-	-	ACC-LG66V40LED-FSS-4	No	No	No	No	No	No	No	No	Yes	No
House side shield	ACC-LG66V10LED-HSS	Yes	Yes	Yes	No	ACC-LG66V40LED-HSS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
House side shield (for Type 4 only)	ACC-LG66V10LED-HSS-4	No	No	No	No	ACC-LG66V40LED-HSS-4	No	No	No	No	No	No	No	No	Yes	No
Left side shield	ACC-LG66V10LED-LSS	Yes	Yes	No	No	ACC-LG66V40LED-LSS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Right side shield	ACC-LG66V10LED-RSS	Yes	Yes	N/A	N/A	ACC-LG66V40LED-RSS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No

* Consult Signify to confirm whether specific accessories are BAA-compliant.

** Refer to Wattage table to confirm light engine configuration. Example, if configuration is 2x10LED, 2 of the desired shields must be ordered per luminaire.

Predicted Lumen Depreciation Data

Derived from LED manufacturer's data and engineering design estimates, based on IESNA LM-80 methodology. Actual experience may vary due to field application conditions. L70 is the predicted time when LED performance depreciates to 70% of initial lumen output. Calculated per IESNA TM21-21.

Ambient Temperature	L70 per TM-21	Lumen Maintenance % at 77,000 hrs
25°C	>77,000 hrs	See table below



Connected lighting

Interact City connector node provides the plug and play wireless communications technology to connect your street light to the Interact City lighting management system.

Ordering Code	Description
LLC	Interact City cellular technology connector node

Contact the factory for additional support when connected lighting or additional services are desired.

Standard Performance Wattage Values

Ordering Code	Total LEDs	Light Engine Config.	Avg. System Watts (W) ¹	Wattage Label ²	Lumen maintenance at			
					25K hrs	50K hrs	60K hrs	77K hrs
RPS-10W10LED	10	1x10LED	10	10	96.8%	91.8%	89.9%	86.7%
RPS-15W10LED	10	1x10LED	15	10	96.8%	91.8%	89.9%	86.7%
RPS-20W10LED	10	1x10LED	20	20	96.8%	91.8%	89.9%	86.7%
RPS-25W10LED	10	1x10LED	24	20	96.8%	91.8%	89.9%	86.7%
RPS-30W10LED	10	1x10LED	29	30	96.8%	91.8%	89.9%	86.7%
RPS-35W10LED	10	1x10LED	34	30	96.8%	91.8%	89.9%	86.7%
RPS-40W10LED	10	1x10LED	39	40	95.7%	90.0%	87.8%	84.1%
RPS-45W10LED	10	1x10LED	44	40	95.7%	90.0%	87.8%	84.1%
RPS-50W10LED	10	1x10LED	49	50	95.7%	90.0%	87.8%	84.1%
RPS-55W10LED	10	1x10LED	54	50	95.7%	90.0%	87.8%	84.1%
RPS-15W20LED	20	1x20LED	15	10	95.4%	89.3%	87.0%	83.2%
RPS-20W20LED	20	1x20LED	20	20	95.4%	89.3%	87.0%	83.2%
RPS-25W20LED	20	1x20LED	25	20	95.4%	89.3%	87.0%	83.2%
RPS-30W20LED	20	1x20LED	30	30	95.4%	89.3%	87.0%	83.2%
RPS-35W20LED	20	1x20LED	35	30	95.4%	89.3%	87.0%	83.2%
RPS-40W20LED	20	1x20LED	40	40	95.4%	89.3%	87.0%	83.2%
RPS-45W20LED	20	1x20LED	45	40	95.4%	89.3%	87.0%	83.2%
RPS-50W20LED	20	1x20LED	49	50	95.4%	89.3%	87.0%	83.2%
RPS-55W20LED	20	1x20LED	55	50	95.4%	89.3%	87.0%	83.2%
RPS-60W20LED	20	1x20LED	60	60	95.4%	89.3%	87.0%	83.2%

Ordering Code	Total LEDs	Light Engine Config.	Avg. System Watts (W) ¹	Wattage Label ²	Lumen maintenance at			
					25K hrs	50K hrs	60K hrs	77K hrs
RPS-65W20LED	20	1x20LED	64	60	95.4%	89.3%	87.0%	83.2%
RPS-70W20LED	20	1x20LED	69	70	95.4%	89.3%	87.0%	83.2%
RPS-75W20LED	20	1x20LED	74	70	95.4%	89.3%	87.0%	83.2%
RPS-80W20LED	20	1x20LED	79	80	95.4%	89.3%	87.0%	83.2%
RPS-85W20LED	20	1x20LED	84	80	95.4%	89.3%	87.0%	83.2%
RPS-95W20LED	20	1x20LED	94	90	94.8%	88.3%	85.8%	81.7%
RPS-15W30LED	30	1x30LED	15	10	95.4%	89.2%	86.9%	83.1%
RPS-20W30LED	30	1x30LED	20	20	95.4%	89.2%	86.9%	83.1%
RPS-25W30LED	30	1x30LED	25	20	95.4%	89.2%	86.9%	83.1%
RPS-30W30LED	30	1x30LED	30	30	95.4%	89.2%	86.9%	83.1%
RPS-35W30LED	30	1x30LED	34	30	95.4%	89.2%	86.9%	83.1%
RPS-40W30LED	30	1x30LED	39	40	95.4%	89.2%	86.9%	83.1%
RPS-45W30LED	30	1x30LED	44	40	95.4%	89.2%	86.9%	83.1%
RPS-50W30LED	30	1x30LED	50	50	95.4%	89.2%	86.9%	83.1%
RPS-55W30LED	30	1x30LED	55	50	95.4%	89.2%	86.9%	83.1%
RPS-60W30LED	30	1x30LED	60	60	95.4%	89.2%	86.9%	83.1%
RPS-65W30LED	30	1x30LED	64	60	95.4%	89.2%	86.9%	83.1%
RPS-70W30LED	30	1x30LED	69	70	95.4%	89.2%	86.9%	83.1%
RPS-75W30LED	30	1x30LED	74	70	95.4%	89.2%	86.9%	83.1%
RPS-80W30LED	30	1x30LED	79	80	95.4%	89.2%	86.9%	83.1%
RPS-85W30LED	30	1x30LED	84	80	95.4%	89.2%	86.9%	83.1%
RPS-95W30LED	30	1x30LED	94	90	95.4%	89.2%	86.9%	83.1%

High Performance Wattage Values

Ordering Code	Total LEDs	Light Engine Config.	Avg. System Watts (W) ¹	Wattage Label ²	Lumen maintenance at			
					25K hrs	50K hrs	60K hrs	77K hrs
RPS-15W40LED	40	1x40LED	15	10	95.4%	89.2%	86.9%	83.1%
RPS-20W40LED	40	1x40LED	19	20	95.4%	89.2%	86.9%	83.1%
RPS-25W40LED	40	1x40LED	24	20	95.4%	89.2%	86.9%	83.1%
RPS-30W40LED	40	1x40LED	29	30	95.4%	89.2%	86.9%	83.1%
RPS-35W40LED	40	1x40LED	34	30	95.4%	89.2%	86.9%	83.1%
RPS-40W40LED	40	1x40LED	39	40	95.4%	89.2%	86.9%	83.1%
RPS-45W40LED	40	1x40LED	44	40	95.4%	89.2%	86.9%	83.1%

Ordering Code	Total LEDs	Light Engine Config.	Avg. System Watts (W) ¹	Wattage Label ²	Lumen maintenance at			
					25K hrs	50K hrs	60K hrs	77K hrs
RPS-50W40LED	40	1x40LED	50	50	95.4%	89.2%	86.9%	83.1%
RPS-55W40LED	40	1x40LED	55	50	95.4%	89.2%	86.9%	83.1%
RPS-60W40LED	40	1x40LED	59	60	95.4%	89.2%	86.9%	83.1%
RPS-65W40LED	40	1x40LED	64	60	95.4%	89.2%	86.9%	83.1%
RPS-70W40LED	40	1x40LED	68	70	95.4%	89.2%	86.9%	83.1%
RPS-75W40LED	40	1x40LED	74	70	95.4%	89.2%	86.9%	83.1%
RPS-80W40LED	40	1x40LED	79	80	95.4%	89.2%	86.9%	83.1%
RPS-85W40LED	40	1x40LED	84	80	95.4%	89.2%	86.9%	83.1%
RPS-95W40LED	40	1x40LED	94	90	95.4%	89.2%	86.9%	83.1%

1. Typical values, rounded.

2. As per ANSI C136.15-2020. Consult factory for other labelling needs.

RPS RoadFocus Plus

LED Cobra head (small)

Field Adjustable Wattage (FAWS) Multiplier Chart

For all configurations EXCEPT the ones on the right

FAWS Position	Typical Delivered Lumens Multiplier	Typical System wattage
1	0.29	0.30
2	0.50	0.52
3	0.58	0.60
4	0.69	0.70
5	0.74	0.75
6	0.80	0.83
7	0.86	0.86
8	0.91	0.91
9	0.96	0.95
10	1.00	1.00

Note: Typical value accuracy +/- 5%

For these configurations ONLY see data to right

RPS -20LED	RPS -30LED	RPS -40LED
15W20LED	15W30LED	15W40LED
20W20LED	20W30LED	20W40LED
25W20LED	25W30LED	30W40LED
30W20LED	30W30LED	35W40LED
40W20LED	35W30LED	40W40LED
50W20LED	40W30LED	45W40LED
15W30LED	45W30LED	-

FAWS Position	Typical Delivered Lumens Multiplier	Typical System wattage
1	0.16	0.16
2	0.33	0.33
3	0.39	0.39
4	0.47	0.48
5	0.51	0.52
6	0.56	0.56
7	0.61	0.61
8	0.64	0.64
9	0.68	0.68
10	1.00	1.00

Note: Typical value accuracy +/- 5%

4000K/70CRI LED Standard Performance Lumen Values – multiply values by 0.9 for 80CRI

Ordering Code	Type R2M			Type R2S			Type R3M			Type R3S		
	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating
RPS-10W10LED	1691	173	B1-U0-G1	1763	180	B1-U0-G1	1747	178	B1-U0-G1	N/A	N/A	N/A
RPS-15W10LED	2488	170	B1-U0-G1	2594	178	B1-U0-G1	2571	176	B1-U0-G1	N/A	N/A	N/A
RPS-20W10LED	3228	166	B1-U0-G1	3365	173	B1-U0-G1	3336	171	B1-U0-G1	N/A	N/A	N/A
RPS-25W10LED	3930	161	B1-U0-G1	4097	168	B1-U0-G1	4061	167	B1-U0-G1	N/A	N/A	N/A
RPS-30W10LED	4573	156	B1-U0-G1	4767	163	B1-U0-G1	4726	162	B1-U0-G1	N/A	N/A	N/A
RPS-35W10LED	5044	148	B1-U0-G1	5258	154	B2-U0-G2	5212	153	B1-U0-G1	N/A	N/A	N/A
RPS-40W10LED	5642	144	B2-U0-G2	5882	150	B2-U0-G2	5830	148	B2-U0-G1	N/A	N/A	N/A
RPS-45W10LED	6167	140	B2-U0-G2	6429	145	B2-U0-G2	6373	144	B2-U0-G1	N/A	N/A	N/A
RPS-50W10LED	6651	136	B2-U0-G2	6934	141	B2-U0-G2	6873	140	B2-U0-G2	N/A	N/A	N/A
RPS-55W10LED	7107	131	B2-U0-G2	7409	137	B2-U0-G2	7344	136	B2-U0-G2	N/A	N/A	N/A
RPS-15W20LED	2771	188	B1-U0-G1	2717	187	B1-U0-G1	2759	187	B1-U0-G1	2770	188	B1-U0-G1
RPS-20W20LED	3656	186	B1-U0-G1	3604	185	B1-U0-G1	3640	185	B1-U0-G1	3655	186	B1-U0-G1
RPS-25W20LED	4486	183	B1-U0-G1	4427	182	B1-U0-G1	4466	182	B1-U0-G1	4484	183	B1-U0-G1
RPS-30W20LED	5327	180	B1-U0-G1	5098	174	B2-U0-G2	5303	180	B1-U0-G1	5324	180	B1-U0-G1
RPS-35W20LED	6129	177	B2-U0-G2	5876	172	B2-U0-G2	6101	177	B2-U0-G1	6126	177	B1-U0-G1
RPS-40W20LED	6900	175	B2-U0-G2	6684	170	B2-U0-G2	6869	174	B2-U0-G1	6897	175	B2-U0-G2
RPS-45W20LED	7638	171	B2-U0-G2	7394	167	B2-U0-G2	7603	170	B2-U0-G2	7634	171	B2-U0-G2
RPS-50W20LED	7957	161	B2-U0-G2	8085	164	B2-U0-G2	7921	160	B2-U0-G2	7954	161	B2-U0-G2
RPS-55W20LED	8708	159	B2-U0-G2	8740	162	B2-U0-G2	8669	158	B2-U0-G2	8704	159	B2-U0-G2
RPS-60W20LED	9386	158	B2-U0-G2	9520	161	B2-U0-G2	9344	157	B2-U0-G2	9382	157	B2-U0-G2
RPS-65W20LED	9930	154	B2-U0-G2	10104	158	B3-U0-G3	9885	154	B2-U0-G2	9925	154	B2-U0-G2
RPS-70W20LED	10611	153	B2-U0-G2	10639	156	B3-U0-G3	10564	152	B2-U0-G2	10607	153	B2-U0-G2
RPS-75W20LED	11247	151	B3-U0-G3	11300	153	B3-U0-G3	11197	150	B2-U0-G2	11242	151	B2-U0-G2
RPS-80W20LED	11828	149	B3-U0-G3	11798	151	B3-U0-G3	11775	149	B3-U0-G2	11823	149	B2-U0-G2
RPS-85W20LED	12360	147	B3-U0-G3	12386	148	B3-U0-G3	12305	146	B3-U0-G2	12355	147	B2-U0-G2
RPS-95W20LED	13441	143	B3-U0-G3	13300	143	B3-U0-G3	13381	142	B3-U0-G2	13435	143	B2-U0-G2
RPS-15W30LED	2826	192	B1-U0-G1	2920	198	B1-U0-G1	2813	191	B1-U0-G1	2825	191	B1-U0-G1
RPS-20W30LED	3755	191	B1-U0-G1	3880	197	B1-U0-G1	3738	190	B1-U0-G1	3754	191	B1-U0-G1
RPS-25W30LED	4631	189	B1-U0-G1	4784	195	B1-U0-G1	4610	188	B1-U0-G1	4629	189	B1-U0-G1
RPS-30W30LED	5487	186	B2-U0-G2	5669	192	B2-U0-G2	5462	185	B1-U0-G1	5484	186	B1-U0-G1
RPS-35W30LED	6324	183	B2-U0-G2	6534	190	B2-U0-G2	6296	183	B2-U0-G1	6322	183	B1-U0-G1
RPS-40W30LED	7176	182	B2-U0-G2	7414	188	B2-U0-G2	7144	181	B2-U0-G1	7173	182	B2-U0-G2
RPS-45W30LED	7940	179	B2-U0-G2	8203	184	B2-U0-G2	7905	178	B2-U0-G2	7937	178	B2-U0-G2
RPS-50W30LED	8413	170	B2-U0-G2	8692	175	B2-U0-G2	8376	169	B2-U0-G2	8410	170	B2-U0-G2
RPS-55W30LED	9187	168	B2-U0-G2	9492	174	B2-U0-G2	9146	168	B2-U0-G2	9183	168	B2-U0-G2
RPS-60W30LED	9946	167	B2-U0-G2	10276	173	B3-U0-G2	9902	166	B2-U0-G2	9942	167	B2-U0-G2
RPS-65W30LED	10611	165	B2-U0-G2	10963	170	B3-U0-G3	10564	164	B2-U0-G2	10607	165	B2-U0-G2
RPS-70W30LED	11370	164	B3-U0-G3	11747	170	B3-U0-G3	11320	163	B2-U0-G2	11366	164	B2-U0-G2
RPS-75W30LED	12086	162	B3-U0-G3	12487	168	B3-U0-G3	12032	162	B3-U0-G2	12081	162	B2-U0-G2
RPS-80W30LED	12704	160	B3-U0-G3	13125	166	B3-U0-G3	12647	160	B3-U0-G2	12699	160	B2-U0-G2
RPS-85W30LED	13335	159	B3-U0-G3	13777	164	B3-U0-G3	13275	158	B3-U0-G2	13329	159	B2-U0-G2
RPS-95W30LED	14574	155	B3-U0-G3	15057	160	B3-U0-G3	14509	154	B3-U0-G2	14568	155	B3-U0-G2

Actual performance may vary due to installation variables including optics, mounting/ceiling height, dirt depreciation, light loss factor, etc.; highly recommended to confirm performance with a layout - contact Applications at signify.com/outdoorluminaires. Consult DLC QPL to confirm your specific fixture selection is DLC approved. Note: Some data may be scaled based on tests of similar but not identical luminaires.

RPS RoadFocus Plus

LED Cobra head (small)

4000K/70CRI LED Standard Performance Lumen Values – multiply values by 0.9 for 80CRI (continued)

Ordering Code	Type 4			Type 5			Type R2MB			Type R3MB		
	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating
RPS-10W10LED	1712	175	B0-U0-G1	1713	175	B1-U0-G1	N/A	N/A	N/A	N/A	N/A	N/A
RPS-15W10LED	2519	172	B1-U0-G1	2521	173	B2-U0-G1	N/A	N/A	N/A	N/A	N/A	N/A
RPS-20W10LED	3269	168	B1-U0-G1	3271	168	B2-U0-G1	N/A	N/A	N/A	N/A	N/A	N/A
RPS-25W10LED	3979	163	B1-U0-G1	3982	163	B3-U0-G1	N/A	N/A	N/A	N/A	N/A	N/A
RPS-30W10LED	4630	158	B1-U0-G1	4634	159	B3-U0-G1	N/A	N/A	N/A	N/A	N/A	N/A
RPS-35W10LED	5107	150	B1-U0-G1	5111	150	B3-U0-G1	N/A	N/A	N/A	N/A	N/A	N/A
RPS-40W10LED	5712	145	B1-U0-G2	5717	145	B3-U0-G1	N/A	N/A	N/A	N/A	N/A	N/A
RPS-45W10LED	6244	141	B1-U0-G2	6249	141	B3-U0-G2	N/A	N/A	N/A	N/A	N/A	N/A
RPS-50W10LED	6734	137	B1-U0-G2	6739	137	B3-U0-G2	N/A	N/A	N/A	N/A	N/A	N/A
RPS-55W10LED	7195	133	B1-U0-G2	7201	133	B3-U0-G2	N/A	N/A	N/A	N/A	N/A	N/A
RPS-15W20LED	2743	186	B1-U0-G1	2784	189	B2-U0-G1	2872	195	B1-U0-G1	2789	189	B1-U0-G1
RPS-20W20LED	3620	184	B1-U0-G1	3673	187	B3-U0-G1	3790	193	B1-U0-G1	3680	187	B1-U0-G1
RPS-25W20LED	4441	181	B1-U0-G1	4507	184	B3-U0-G1	4650	190	B2-U0-G2	4515	184	B1-U0-G1
RPS-30W20LED	5274	179	B1-U0-G1	5352	181	B3-U0-G1	5522	187	B2-U0-G2	5362	182	B2-U0-G2
RPS-35W20LED	6067	176	B1-U0-G2	6157	178	B3-U0-G2	6353	184	B2-U0-G2	6169	179	B2-U0-G2
RPS-40W20LED	6831	173	B1-U0-G2	6932	175	B3-U0-G2	7152	181	B2-U0-G2	6945	176	B2-U0-G2
RPS-45W20LED	7561	170	B1-U0-G2	7673	172	B3-U0-G2	7917	178	B2-U0-G2	7688	172	B2-U0-G2
RPS-50W20LED	7878	159	B1-U0-G2	7994	162	B3-U0-G2	8248	167	B2-U0-G2	8009	162	B2-U0-G2
RPS-55W20LED	8621	157	B1-U0-G2	8748	160	B3-U0-G2	9026	165	B3-U0-G3	8765	160	B2-U0-G2
RPS-60W20LED	9292	156	B1-U0-G2	9430	158	B4-U0-G2	9729	163	B3-U0-G3	9448	159	B2-U0-G2
RPS-65W20LED	9830	153	B2-U0-G2	9976	155	B4-U0-G2	10293	160	B3-U0-G3	9995	155	B3-U0-G3
RPS-70W20LED	10505	152	B2-U0-G2	10661	154	B4-U0-G2	10999	159	B3-U0-G3	10681	154	B3-U0-G3
RPS-75W20LED	11134	150	B2-U0-G2	11299	152	B4-U0-G2	11658	157	B3-U0-G3	11321	152	B3-U0-G3
RPS-80W20LED	11710	148	B2-U0-G2	11883	150	B4-U0-G2	12260	155	B3-U0-G3	11906	150	B3-U0-G3
RPS-85W20LED	12237	145	B2-U0-G2	12418	148	B4-U0-G2	12812	152	B3-U0-G3	12442	148	B3-U0-G3
RPS-95W20LED	13307	141	B2-U0-G2	13504	144	B4-U0-G3	13932	148	B3-U0-G3	13530	144	B3-U0-G3
RPS-15W30LED	2798	190	B1-U0-G1	2839	192	B2-U0-G1	2929	198	B1-U0-G1	2845	193	B1-U0-G1
RPS-20W30LED	3718	189	B1-U0-G1	3773	192	B3-U0-G1	3893	198	B1-U0-G1	3780	192	B1-U0-G1
RPS-25W30LED	4585	187	B1-U0-G1	4652	190	B3-U0-G1	4800	196	B2-U0-G2	4661	190	B1-U0-G1
RPS-30W30LED	5432	184	B1-U0-G1	5512	187	B3-U0-G1	5687	193	B2-U0-G2	5523	187	B2-U0-G2
RPS-35W30LED	6261	182	B1-U0-G2	6354	184	B3-U0-G2	6556	190	B2-U0-G2	6366	185	B2-U0-G2
RPS-40W30LED	7104	180	B1-U0-G2	7209	183	B3-U0-G2	7438	189	B2-U0-G2	7223	183	B2-U0-G2
RPS-45W30LED	7861	177	B1-U0-G2	7977	179	B3-U0-G2	8231	185	B2-U0-G2	7992	180	B2-U0-G2
RPS-50W30LED	8329	168	B1-U0-G2	8452	171	B3-U0-G2	8721	176	B2-U0-G2	8469	171	B2-U0-G2
RPS-55W30LED	9095	167	B1-U0-G2	9230	169	B4-U0-G2	9523	175	B3-U0-G3	9248	170	B2-U0-G2
RPS-60W30LED	9847	165	B2-U0-G2	9993	168	B4-U0-G2	10310	173	B3-U0-G3	10012	168	B3-U0-G3
RPS-65W30LED	10505	163	B2-U0-G2	10661	166	B4-U0-G2	10999	171	B3-U0-G3	10681	166	B3-U0-G3
RPS-70W30LED	11257	162	B2-U0-G2	11424	165	B4-U0-G2	11786	170	B3-U0-G3	11445	165	B3-U0-G3
RPS-75W30LED	11965	161	B2-U0-G2	12142	163	B4-U0-G2	12528	168	B3-U0-G3	12166	164	B3-U0-G3
RPS-80W30LED	12577	159	B2-U0-G2	12763	161	B4-U0-G2	13169	166	B3-U0-G3	12788	162	B3-U0-G3
RPS-85W30LED	13202	157	B2-U0-G2	13397	159	B4-U0-G3	13822	164	B3-U0-G3	13423	160	B3-U0-G3
RPS-95W30LED	14428	154	B2-U0-G2	14642	156	B4-U0-G3	15107	161	B3-U0-G3	14670	156	B3-U0-G3

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Note: Some data may be scaled based on tests of similar but not identical luminaires.

RPS RoadFocus Plus

LED Cobra head (small)

3000K/70CRI LED Standard Performance Lumen Values – multiply values by 0.9 for 80CRI

Ordering Code	Type R2M			Type R2S			Type R3M			Type R3S		
	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating
RPS-10W10LED	1619	165	B1-U0-G1	1688	172	B1-U0-G1	1673	171	B1-U0-G1	N/A	N/A	N/A
RPS-15W10LED	2382	163	B1-U0-G1	2483	170	B1-U0-G1	2462	169	B1-U0-G1	N/A	N/A	N/A
RPS-20W10LED	3091	159	B1-U0-G1	3222	165	B1-U0-G1	3194	164	B1-U0-G1	N/A	N/A	N/A
RPS-25W10LED	3763	155	B1-U0-G1	3923	161	B1-U0-G1	3888	160	B1-U0-G1	N/A	N/A	N/A
RPS-30W10LED	4379	150	B1-U0-G1	4565	156	B1-U0-G1	4525	155	B1-U0-G1	N/A	N/A	N/A
RPS-35W10LED	4829	141	B1-U0-G1	5034	147	B2-U0-G2	4991	146	B1-U0-G1	N/A	N/A	N/A
RPS-40W10LED	5402	137	B1-U0-G1	5631	143	B2-U0-G2	5582	142	B1-U0-G1	N/A	N/A	N/A
RPS-45W10LED	5905	134	B2-U0-G2	6156	139	B2-U0-G2	6102	138	B2-U0-G1	N/A	N/A	N/A
RPS-50W10LED	6369	130	B2-U0-G2	6640	135	B2-U0-G2	6581	134	B2-U0-G1	N/A	N/A	N/A
RPS-55W10LED	6805	126	B2-U0-G2	7094	131	B2-U0-G2	7032	130	B2-U0-G2	N/A	N/A	N/A
RPS-15W20LED	2657	180	B1-U0-G1	2601	179	B1-U0-G1	2645	179	B1-U0-G1	2656	180	B1-U0-G1
RPS-20W20LED	3506	178	B1-U0-G1	3451	177	B1-U0-G1	3491	178	B1-U0-G1	3505	178	B1-U0-G1
RPS-25W20LED	4302	175	B1-U0-G1	4240	175	B1-U0-G1	4282	175	B1-U0-G1	4300	175	B1-U0-G1
RPS-30W20LED	5108	173	B1-U0-G1	4881	167	B1-U0-G1	5086	172	B1-U0-G1	5106	173	B1-U0-G1
RPS-35W20LED	5877	170	B2-U0-G2	5626	165	B2-U0-G2	5851	169	B2-U0-G1	5875	170	B1-U0-G1
RPS-40W20LED	6617	168	B2-U0-G2	6400	162	B2-U0-G2	6587	167	B2-U0-G1	6614	167	B2-U0-G1
RPS-45W20LED	7324	164	B2-U0-G2	7079	160	B2-U0-G2	7292	164	B2-U0-G1	7321	164	B2-U0-G2
RPS-50W20LED	7631	154	B2-U0-G2	7741	157	B2-U0-G2	7597	154	B2-U0-G2	7628	154	B2-U0-G2
RPS-55W20LED	8351	152	B2-U0-G2	8369	155	B2-U0-G2	8313	152	B2-U0-G2	8347	152	B2-U0-G2
RPS-60W20LED	9001	151	B2-U0-G2	9115	154	B2-U0-G2	8961	150	B2-U0-G2	8998	151	B2-U0-G2
RPS-65W20LED	9521	148	B2-U0-G2	9674	152	B2-U0-G2	9479	147	B2-U0-G2	9517	148	B2-U0-G2
RPS-70W20LED	10174	147	B2-U0-G2	10188	149	B3-U0-G3	10129	146	B2-U0-G2	10170	147	B2-U0-G2
RPS-75W20LED	10786	145	B3-U0-G3	10821	147	B3-U0-G3	10737	144	B2-U0-G2	10781	145	B2-U0-G2
RPS-80W20LED	11341	143	B3-U0-G3	11296	145	B3-U0-G3	11291	143	B2-U0-G2	11336	143	B2-U0-G2
RPS-85W20LED	11854	141	B3-U0-G3	11859	142	B3-U0-G3	11801	140	B3-U0-G2	11849	141	B2-U0-G2
RPS-95W20LED	12890	137	B3-U0-G3	12735	137	B3-U0-G3	12832	136	B3-U0-G2	12884	137	B2-U0-G2
RPS-15W30LED	2710	184	B1-U0-G1	2800	190	B1-U0-G1	2698	183	B1-U0-G1	2709	184	B1-U0-G1
RPS-20W30LED	3601	183	B1-U0-G1	3721	189	B1-U0-G1	3585	182	B1-U0-G1	3600	183	B1-U0-G1
RPS-25W30LED	4441	181	B1-U0-G1	4588	187	B1-U0-G1	4421	180	B1-U0-G1	4439	181	B1-U0-G1
RPS-30W30LED	5262	178	B1-U0-G1	5436	184	B2-U0-G2	5238	177	B1-U0-G1	5260	178	B1-U0-G1
RPS-35W30LED	6065	176	B2-U0-G2	6266	182	B2-U0-G2	6038	175	B2-U0-G1	6062	176	B1-U0-G1
RPS-40W30LED	6881	174	B2-U0-G2	7110	180	B2-U0-G2	6851	174	B2-U0-G1	6878	174	B2-U0-G2
RPS-45W30LED	7615	171	B2-U0-G2	7867	177	B2-U0-G2	7581	170	B2-U0-G2	7611	171	B2-U0-G2
RPS-50W30LED	8068	163	B2-U0-G2	8336	168	B2-U0-G2	8032	162	B2-U0-G2	8065	163	B2-U0-G2
RPS-55W30LED	8811	162	B2-U0-G2	9103	167	B2-U0-G2	8771	161	B2-U0-G2	8807	161	B2-U0-G2
RPS-60W30LED	9538	160	B2-U0-G2	9855	166	B2-U0-G2	9496	160	B2-U0-G2	9534	160	B2-U0-G2
RPS-65W30LED	10174	158	B2-U0-G2	10512	163	B3-U0-G2	10129	157	B2-U0-G2	10170	158	B2-U0-G2
RPS-70W30LED	10903	157	B3-U0-G3	11264	163	B3-U0-G3	10854	157	B2-U0-G2	10898	157	B2-U0-G2
RPS-75W30LED	11590	156	B3-U0-G3	11975	161	B3-U0-G3	11539	155	B2-U0-G2	11585	156	B2-U0-G2
RPS-80W30LED	12181	154	B3-U0-G3	12585	159	B3-U0-G3	12127	153	B3-U0-G2	12176	154	B2-U0-G2
RPS-85W30LED	12788	152	B3-U0-G3	13212	157	B3-U0-G3	12731	152	B3-U0-G2	12783	152	B2-U0-G2
RPS-95W30LED	13977	149	B3-U0-G3	14440	154	B3-U0-G3	13914	148	B3-U0-G2	13971	149	B3-U0-G2

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Note: Some data may be scaled based on tests of similar but not identical luminaires.

RPS RoadFocus Plus

LED Cobra head (small)

3000K/70CRI LED Standard Performance Lumen Values – multiply values by 0.9 for 80CRI (continued)

Ordering Code	Type 4			Type 5			Type R2MB			Type R3MB		
	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating
RPS-10W10LED	1639	167	B0-U0-G1	1640	168	B1-U0-G1	N/A	N/A	N/A	N/A	N/A	N/A
RPS-15W10LED	2412	165	B1-U0-G1	2414	165	B2-U0-G1	N/A	N/A	N/A	N/A	N/A	N/A
RPS-20W10LED	3130	161	B1-U0-G1	3132	161	B2-U0-G1	N/A	N/A	N/A	N/A	N/A	N/A
RPS-25W10LED	3810	156	B1-U0-G1	3813	157	B3-U0-G1	N/A	N/A	N/A	N/A	N/A	N/A
RPS-30W10LED	4434	152	B1-U0-G1	4437	152	B3-U0-G1	N/A	N/A	N/A	N/A	N/A	N/A
RPS-35W10LED	4890	143	B1-U0-G1	4893	143	B3-U0-G1	N/A	N/A	N/A	N/A	N/A	N/A
RPS-40W10LED	5469	139	B1-U0-G2	5474	139	B3-U0-G1	N/A	N/A	N/A	N/A	N/A	N/A
RPS-45W10LED	5979	135	B1-U0-G2	5984	135	B3-U0-G1	N/A	N/A	N/A	N/A	N/A	N/A
RPS-50W10LED	6448	131	B1-U0-G2	6453	132	B3-U0-G2	N/A	N/A	N/A	N/A	N/A	N/A
RPS-55W10LED	6890	127	B1-U0-G2	6895	128	B3-U0-G2	N/A	N/A	N/A	N/A	N/A	N/A
RPS-15W20LED	2631	179	B1-U0-G1	2670	181	B2-U0-G1	2754	187	B1-U0-G1	2675	182	B1-U0-G1
RPS-20W20LED	3471	177	B1-U0-G1	3523	179	B2-U0-G1	3635	185	B1-U0-G1	3530	180	B1-U0-G1
RPS-25W20LED	4259	174	B1-U0-G1	4322	176	B3-U0-G1	4459	182	B1-U0-G1	4330	177	B1-U0-G1
RPS-30W20LED	5057	171	B1-U0-G1	5132	174	B3-U0-G1	5295	179	B2-U0-G2	5142	174	B2-U0-G2
RPS-35W20LED	5819	168	B1-U0-G2	5905	171	B3-U0-G2	6092	176	B2-U0-G2	5916	171	B2-U0-G2
RPS-40W20LED	6551	166	B1-U0-G2	6648	168	B3-U0-G2	6859	174	B2-U0-G2	6660	169	B2-U0-G2
RPS-45W20LED	7251	163	B1-U0-G2	7359	165	B3-U0-G2	7592	170	B2-U0-G2	7373	165	B2-U0-G2
RPS-50W20LED	7555	153	B1-U0-G2	7666	155	B3-U0-G2	7910	160	B2-U0-G2	7681	155	B2-U0-G2
RPS-55W20LED	8267	151	B1-U0-G2	8390	153	B3-U0-G2	8656	158	B2-U0-G2	8406	153	B2-U0-G2
RPS-60W20LED	8911	150	B1-U0-G2	9043	152	B3-U0-G2	9330	157	B3-U0-G3	9061	152	B2-U0-G2
RPS-65W20LED	9426	146	B2-U0-G2	9566	149	B3-U0-G2	9869	153	B3-U0-G3	9584	149	B3-U0-G3
RPS-70W20LED	10073	145	B2-U0-G2	10222	148	B3-U0-G2	10547	152	B3-U0-G3	10242	148	B3-U0-G3
RPS-75W20LED	10678	143	B2-U0-G2	10836	146	B4-U0-G2	11180	150	B3-U0-G3	10857	146	B3-U0-G3
RPS-80W20LED	11228	142	B2-U0-G2	11394	144	B4-U0-G2	11756	148	B3-U0-G3	11416	144	B3-U0-G3
RPS-85W20LED	11735	139	B2-U0-G2	11909	141	B4-U0-G2	12287	146	B3-U0-G3	11932	142	B3-U0-G3
RPS-95W20LED	12761	136	B2-U0-G2	12950	138	B4-U0-G2	13361	142	B3-U0-G3	12975	138	B3-U0-G3
RPS-15W30LED	2683	182	B1-U0-G1	2723	185	B2-U0-G1	2809	190	B1-U0-G1	2728	185	B1-U0-G1
RPS-20W30LED	3565	181	B1-U0-G1	3618	184	B2-U0-G1	3733	190	B1-U0-G1	3625	184	B1-U0-G1
RPS-25W30LED	4397	179	B1-U0-G1	4462	182	B3-U0-G1	4603	188	B2-U0-G2	4470	182	B1-U0-G1
RPS-30W30LED	5209	176	B1-U0-G1	5286	179	B3-U0-G1	5454	185	B2-U0-G2	5297	179	B2-U0-G2
RPS-35W30LED	6004	174	B1-U0-G2	6093	177	B3-U0-G2	6287	182	B2-U0-G2	6105	177	B2-U0-G2
RPS-40W30LED	6813	173	B1-U0-G2	6914	175	B3-U0-G2	7133	181	B2-U0-G2	6927	176	B2-U0-G2
RPS-45W30LED	7539	170	B1-U0-G2	7650	172	B3-U0-G2	7893	178	B2-U0-G2	7665	172	B2-U0-G2
RPS-50W30LED	7988	161	B1-U0-G2	8106	164	B3-U0-G2	8363	169	B2-U0-G2	8121	164	B2-U0-G2
RPS-55W30LED	8723	160	B1-U0-G2	8852	162	B3-U0-G2	9133	167	B3-U0-G3	8869	163	B2-U0-G2
RPS-60W30LED	9443	159	B2-U0-G2	9583	161	B4-U0-G2	9887	166	B3-U0-G3	9601	161	B3-U0-G3
RPS-65W30LED	10073	157	B2-U0-G2	10222	159	B4-U0-G2	10547	164	B3-U0-G3	10242	159	B3-U0-G3
RPS-70W30LED	10794	156	B2-U0-G2	10954	158	B4-U0-G2	11301	163	B3-U0-G3	10974	158	B3-U0-G3
RPS-75W30LED	11475	154	B2-U0-G2	11645	157	B4-U0-G2	12014	162	B3-U0-G3	11667	157	B3-U0-G3
RPS-80W30LED	12060	152	B2-U0-G2	12238	155	B4-U0-G2	12627	159	B3-U0-G3	12262	155	B3-U0-G3
RPS-85W30LED	12660	151	B2-U0-G2	12848	153	B4-U0-G2	13256	158	B3-U0-G3	12872	153	B3-U0-G3
RPS-95W30LED	13837	147	B2-U0-G2	14042	150	B4-U0-G3	14488	154	B3-U0-G3	14069	150	B3-U0-G3

Actual performance may vary due to installation variables including optics, mounting/ceiling height, dirt depreciation, light loss factor, etc.; highly recommended to confirm performance with a layout – contact Applications at signify.com/outdoorluminaires. Consult DLC QPL to confirm your specific fixture selection is DLC approved.
Note: Some data may be scaled based on tests of similar but not identical luminaires.

RPS RoadFocus Plus

LED Cobra head (small)

2700K/70CRI LED Standard Performance Lumen Values - multiply values by 0.9 for 80CRI

Ordering Code	Type R2M			Type R2S			Type R3M			Type R3S		
	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating
RPS-10W10LED	1497	153	B1-U0-G1	1561	159	B1-U0-G1	1547	158	B1-U0-G1	N/A	N/A	N/A
RPS-15W10LED	2203	151	B1-U0-G1	2297	157	B1-U0-G1	2276	156	B1-U0-G1	N/A	N/A	N/A
RPS-20W10LED	2858	147	B1-U0-G1	2979	153	B1-U0-G1	2954	151	B1-U0-G1	N/A	N/A	N/A
RPS-25W10LED	3479	143	B1-U0-G1	3627	149	B1-U0-G1	3595	148	B1-U0-G1	N/A	N/A	N/A
RPS-30W10LED	4049	138	B1-U0-G1	4221	144	B1-U0-G1	4184	143	B1-U0-G1	N/A	N/A	N/A
RPS-35W10LED	4465	131	B1-U0-G1	4655	136	B1-U0-G1	4614	135	B1-U0-G1	N/A	N/A	N/A
RPS-40W10LED	4995	127	B1-U0-G1	5207	132	B2-U0-G2	5162	131	B1-U0-G1	N/A	N/A	N/A
RPS-45W10LED	5460	124	B1-U0-G1	5692	129	B2-U0-G2	5642	128	B1-U0-G1	N/A	N/A	N/A
RPS-50W10LED	5889	120	B2-U0-G2	6139	125	B2-U0-G2	6085	124	B2-U0-G1	N/A	N/A	N/A
RPS-55W10LED	6292	116	B2-U0-G2	6559	121	B2-U0-G2	6502	120	B2-U0-G1	N/A	N/A	N/A
RPS-15W20LED	2394	162	B1-U0-G1	2405	165	B1-U0-G1	2383	162	B1-U0-G1	2393	162	B1-U0-G1
RPS-20W20LED	3159	161	B1-U0-G1	3191	164	B1-U0-G1	3145	160	B1-U0-G1	3158	161	B1-U0-G1
RPS-25W20LED	3876	158	B1-U0-G1	3920	162	B1-U0-G1	3858	157	B1-U0-G1	3874	158	B1-U0-G1
RPS-30W20LED	4602	156	B1-U0-G1	4513	154	B1-U0-G1	4582	155	B1-U0-G1	4600	156	B1-U0-G1
RPS-35W20LED	5295	153	B1-U0-G1	5203	153	B2-U0-G2	5271	153	B1-U0-G1	5293	153	B1-U0-G1
RPS-40W20LED	5961	151	B2-U0-G2	5918	150	B2-U0-G2	5935	150	B2-U0-G1	5959	151	B1-U0-G1
RPS-45W20LED	6599	148	B2-U0-G2	6546	148	B2-U0-G2	6569	147	B2-U0-G1	6596	148	B1-U0-G1
RPS-50W20LED	6875	139	B2-U0-G2	7159	146	B2-U0-G2	6844	138	B2-U0-G1	6872	139	B2-U0-G2
RPS-55W20LED	7523	137	B2-U0-G2	7738	143	B2-U0-G2	7490	137	B2-U0-G2	7520	137	B2-U0-G2
RPS-60W20LED	8110	136	B2-U0-G2	8428	142	B2-U0-G2	8073	136	B2-U0-G2	8106	136	B2-U0-G2
RPS-65W20LED	8579	133	B2-U0-G2	8945	140	B2-U0-G2	8540	133	B2-U0-G2	8575	133	B2-U0-G2
RPS-70W20LED	9167	132	B2-U0-G2	9420	138	B2-U0-G2	9126	132	B2-U0-G2	9163	132	B2-U0-G2
RPS-75W20LED	9717	131	B2-U0-G2	10005	136	B3-U0-G3	9674	130	B2-U0-G2	9713	131	B2-U0-G2
RPS-80W20LED	10219	129	B2-U0-G2	10445	134	B3-U0-G3	10173	128	B2-U0-G2	10214	129	B2-U0-G2
RPS-85W20LED	10679	127	B2-U0-G2	10965	131	B3-U0-G3	10632	126	B2-U0-G2	10675	127	B2-U0-G2
RPS-95W20LED	11613	123	B3-U0-G3	11775	127	B3-U0-G3	11561	123	B2-U0-G2	11608	123	B2-U0-G2
RPS-15W30LED	2442	165	B1-U0-G1	2523	171	B1-U0-G1	2431	165	B1-U0-G1	2441	165	B1-U0-G1
RPS-20W30LED	3245	165	B1-U0-G1	3352	170	B1-U0-G1	3230	164	B1-U0-G1	3243	165	B1-U0-G1
RPS-25W30LED	4001	163	B1-U0-G1	4134	169	B1-U0-G1	3983	162	B1-U0-G1	3999	163	B1-U0-G1
RPS-30W30LED	4741	160	B1-U0-G1	4898	166	B1-U0-G1	4719	160	B1-U0-G1	4739	160	B1-U0-G1
RPS-35W30LED	5464	159	B2-U0-G2	5645	164	B2-U0-G2	5440	158	B1-U0-G1	5462	158	B1-U0-G1
RPS-40W30LED	6200	157	B2-U0-G2	6405	162	B2-U0-G2	6172	156	B2-U0-G1	6197	157	B1-U0-G1
RPS-45W30LED	6860	154	B2-U0-G2	7088	159	B2-U0-G2	6830	154	B2-U0-G1	6857	154	B2-U0-G1
RPS-50W30LED	7269	147	B2-U0-G2	7510	152	B2-U0-G2	7236	146	B2-U0-G1	7266	147	B2-U0-G2
RPS-55W30LED	7938	146	B2-U0-G2	8201	150	B2-U0-G2	7902	145	B2-U0-G2	7934	145	B2-U0-G2
RPS-60W30LED	8593	144	B2-U0-G2	8878	149	B2-U0-G2	8555	144	B2-U0-G2	8590	144	B2-U0-G2
RPS-65W30LED	9167	143	B2-U0-G2	9471	147	B2-U0-G2	9126	142	B2-U0-G2	9163	142	B2-U0-G2
RPS-70W30LED	9823	142	B2-U0-G2	10149	147	B2-U0-G2	9780	141	B2-U0-G2	9819	142	B2-U0-G2
RPS-75W30LED	10442	140	B2-U0-G2	10788	145	B3-U0-G3	10396	140	B2-U0-G2	10438	140	B2-U0-G2
RPS-80W30LED	10976	139	B3-U0-G3	11340	143	B3-U0-G3	10927	138	B2-U0-G2	10971	139	B2-U0-G2
RPS-85W30LED	11521	137	B3-U0-G3	11903	142	B3-U0-G3	11470	137	B2-U0-G2	11516	137	B2-U0-G2
RPS-95W30LED	12592	134	B3-U0-G3	13010	139	B3-U0-G3	12536	133	B3-U0-G2	12587	134	B2-U0-G2

Actual performance may vary due to installation variables including optics, mounting/ceiling height, dirt depreciation, light loss factor, etc.; highly recommended to confirm performance with a layout - contact Applications at signify.com/outdoorluminaires. Consult DLC QPL to confirm your specific fixture selection is DLC approved.
Note: Some data may be scaled based on tests of similar but not identical luminaires.

RPS RoadFocus Plus

LED Cobra head (small)

2700K/70CRI LED Standard Performance Lumen Values - multiply values by 0.9 for 80CRI (continued)

Ordering Code	Type 4			Type 5			Type R2MB			Type R3MB		
	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating
RPS-10W10LED	1515	155	B0-U0-G1	1517	155	B1-U0-G1	N/A	N/A	N/A	N/A	N/A	N/A
RPS-15W10LED	2230	153	B0-U0-G1	2232	153	B2-U0-G1	N/A	N/A	N/A	N/A	N/A	N/A
RPS-20W10LED	2894	148	B1-U0-G1	2896	149	B2-U0-G1	N/A	N/A	N/A	N/A	N/A	N/A
RPS-25W10LED	3523	145	B1-U0-G1	3525	145	B3-U0-G1	N/A	N/A	N/A	N/A	N/A	N/A
RPS-30W10LED	4100	140	B1-U0-G1	4103	140	B3-U0-G1	N/A	N/A	N/A	N/A	N/A	N/A
RPS-35W10LED	4521	132	B1-U0-G1	4525	133	B3-U0-G1	N/A	N/A	N/A	N/A	N/A	N/A
RPS-40W10LED	5057	129	B1-U0-G1	5061	129	B3-U0-G1	N/A	N/A	N/A	N/A	N/A	N/A
RPS-45W10LED	5528	125	B1-U0-G2	5533	125	B3-U0-G1	N/A	N/A	N/A	N/A	N/A	N/A
RPS-50W10LED	5962	122	B1-U0-G2	5967	122	B3-U0-G1	N/A	N/A	N/A	N/A	N/A	N/A
RPS-55W10LED	6370	118	B1-U0-G2	6376	118	B3-U0-G2	N/A	N/A	N/A	N/A	N/A	N/A
RPS-15W20LED	2370	161	B1-U0-G1	2405	163	B2-U0-G1	2482	168	B1-U0-G1	2410	164	B1-U0-G1
RPS-20W20LED	3128	159	B1-U0-G1	3174	161	B2-U0-G1	3275	167	B1-U0-G1	3180	162	B1-U0-G1
RPS-25W20LED	3837	157	B1-U0-G1	3894	159	B3-U0-G1	4017	164	B1-U0-G1	3901	159	B1-U0-G1
RPS-30W20LED	4556	154	B1-U0-G1	4624	157	B3-U0-G1	4771	162	B2-U0-G2	4633	157	B1-U0-G1
RPS-35W20LED	5242	152	B1-U0-G1	5320	154	B3-U0-G1	5489	159	B2-U0-G2	5330	154	B2-U0-G2
RPS-40W20LED	5902	149	B1-U0-G2	5989	152	B3-U0-G2	6179	156	B2-U0-G2	6001	152	B2-U0-G2
RPS-45W20LED	6533	146	B1-U0-G2	6630	149	B3-U0-G2	6840	153	B2-U0-G2	6642	149	B2-U0-G2
RPS-50W20LED	6806	138	B1-U0-G2	6907	140	B3-U0-G2	7126	144	B2-U0-G2	6920	140	B2-U0-G2
RPS-55W20LED	7448	136	B1-U0-G2	7559	138	B3-U0-G2	7798	142	B2-U0-G2	7573	138	B2-U0-G2
RPS-60W20LED	8029	135	B1-U0-G2	8148	137	B3-U0-G2	8406	141	B2-U0-G2	8163	137	B2-U0-G2
RPS-65W20LED	8493	132	B1-U0-G2	8619	134	B3-U0-G2	8892	138	B2-U0-G2	8635	134	B2-U0-G2
RPS-70W20LED	9076	131	B1-U0-G2	9210	133	B4-U0-G2	9503	137	B3-U0-G3	9228	133	B2-U0-G2
RPS-75W20LED	9620	129	B2-U0-G2	9763	131	B4-U0-G2	10072	135	B3-U0-G3	9781	131	B3-U0-G3
RPS-80W20LED	10117	128	B2-U0-G2	10266	130	B4-U0-G2	10592	134	B3-U0-G3	10286	130	B3-U0-G3
RPS-85W20LED	10573	126	B2-U0-G2	10729	127	B4-U0-G2	11070	132	B3-U0-G3	10750	128	B3-U0-G3
RPS-95W20LED	11497	122	B2-U0-G2	11667	124	B4-U0-G2	12038	128	B3-U0-G3	11690	124	B3-U0-G3
RPS-15W30LED	2417	164	B1-U0-G1	2453	166	B2-U0-G1	2531	172	B1-U0-G1	2458	167	B1-U0-G1
RPS-20W30LED	3212	163	B1-U0-G1	3260	166	B2-U0-G1	3363	171	B1-U0-G1	3266	166	B1-U0-G1
RPS-25W30LED	3961	162	B1-U0-G1	4020	164	B3-U0-G1	4147	169	B1-U0-G1	4027	164	B1-U0-G1
RPS-30W30LED	4693	159	B1-U0-G1	4763	161	B3-U0-G1	4914	166	B2-U0-G2	4772	162	B2-U0-G2
RPS-35W30LED	5410	157	B1-U0-G1	5490	159	B3-U0-G1	5664	164	B2-U0-G2	5500	160	B2-U0-G2
RPS-40W30LED	6138	156	B1-U0-G2	6229	158	B3-U0-G2	6426	163	B2-U0-G2	6241	158	B2-U0-G2
RPS-45W30LED	6792	153	B1-U0-G2	6892	155	B3-U0-G2	7111	160	B2-U0-G2	6906	155	B2-U0-G2
RPS-50W30LED	7196	145	B1-U0-G2	7303	147	B3-U0-G2	7535	152	B2-U0-G2	7317	148	B2-U0-G2
RPS-55W30LED	7858	144	B1-U0-G2	7975	146	B3-U0-G2	8228	151	B2-U0-G2	7990	147	B2-U0-G2
RPS-60W30LED	8508	143	B1-U0-G2	8634	145	B3-U0-G2	8908	150	B2-U0-G2	8650	145	B2-U0-G2
RPS-65W30LED	9076	141	B1-U0-G2	9210	143	B4-U0-G2	9503	148	B3-U0-G3	9228	143	B2-U0-G2
RPS-70W30LED	9725	140	B2-U0-G2	9869	142	B4-U0-G2	10183	147	B3-U0-G3	9888	143	B3-U0-G3
RPS-75W30LED	10338	139	B2-U0-G2	10491	141	B4-U0-G2	10824	146	B3-U0-G3	10511	141	B3-U0-G3
RPS-80W30LED	10866	137	B2-U0-G2	11027	139	B4-U0-G2	11377	144	B3-U0-G3	11048	140	B3-U0-G3
RPS-85W30LED	11406	136	B2-U0-G2	11575	138	B4-U0-G2	11943	142	B3-U0-G3	11597	138	B3-U0-G3
RPS-95W30LED	12466	133	B2-U0-G2	12651	135	B4-U0-G2	13052	139	B3-U0-G3	12675	135	B3-U0-G3

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Note: Some data may be scaled based on tests of similar but not identical luminaires.

RPS RoadFocus Plus

LED Cobra head (small)

4000K/70CRI LED High Performance Lumen Values - multiply values by 0.9 for 80CRI (continued)

Ordering Code	Type R2M			Type R2S			Type R3M			Type R3S			R2MHE		
	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating
RPS-15W40LED	2844	193	B1-U0-G1	2938	200	B1-U0-G1	2831	192	B1-U0-G1	2843	193	B1-U0-G1	2960	201	B1-U0-G1
RPS-20W40LED	3748	193	B1-U0-G1	3872	199	B1-U0-G1	3731	192	B1-U0-G1	3746	192	B1-U0-G1	3901	200	B1-U0-G1
RPS-25W40LED	4704	192	B1-U0-G1	4860	199	B1-U0-G1	4683	192	B1-U0-G1	4702	192	B1-U0-G1	4896	200	B1-U0-G1
RPS-30W40LED	5605	190	B2-U0-G2	5791	197	B2-U0-G2	5580	189	B1-U0-G1	5602	190	B1-U0-G1	5834	198	B2-U0-G2
RPS-35W40LED	6501	189	B2-U0-G2	6716	195	B2-U0-G2	6472	188	B2-U0-G1	6498	189	B1-U0-G1	6766	197	B2-U0-G2
RPS-40W40LED	7454	189	B2-U0-G2	7701	195	B2-U0-G2	7420	188	B2-U0-G2	7450	189	B2-U0-G2	7758	197	B2-U0-G2
RPS-45W40LED	8079	182	B2-U0-G2	8347	188	B2-U0-G2	8043	181	B2-U0-G2	8075	182	B2-U0-G2	8408	189	B2-U0-G2
RPS-50W40LED	8666	175	B2-U0-G2	8953	181	B2-U0-G2	8627	174	B2-U0-G2	8662	175	B2-U0-G2	9019	182	B2-U0-G2
RPS-55W40LED	9523	174	B2-U0-G2	9839	180	B2-U0-G2	9480	173	B2-U0-G2	9519	174	B2-U0-G2	9911	181	B3-U0-G3
RPS-60W40LED	10272	173	B2-U0-G2	10613	179	B3-U0-G2	10226	173	B2-U0-G2	10268	173	B2-U0-G2	10692	180	B3-U0-G3
RPS-65W40LED	11073	172	B3-U0-G3	11441	178	B3-U0-G3	11024	171	B2-U0-G2	11069	172	B2-U0-G2	11525	179	B3-U0-G3
RPS-70W40LED	11828	171	B3-U0-G3	12220	176	B3-U0-G3	11775	170	B3-U0-G2	11823	171	B2-U0-G2	12311	182	B3-U0-G3
RPS-75W40LED	12602	170	B3-U0-G3	13020	176	B3-U0-G3	12546	169	B3-U0-G2	12596	170	B2-U0-G2	13116	177	B3-U0-G3
RPS-80W40LED	13317	168	B3-U0-G3	13759	174	B3-U0-G3	13258	167	B3-U0-G2	13312	168	B2-U0-G2	13861	175	B3-U0-G3
RPS-85W40LED	14013	167	B3-U0-G3	14478	172	B3-U0-G3	13951	166	B3-U0-G2	14007	167	B3-U0-G2	14585	174	B3-U0-G3
RPS-95W40LED	15316	164	B3-U0-G3	15824	169	B3-U0-G3	15248	163	B3-U0-G3	15309	164	B3-U0-G2	15941	170	B3-U0-G3

Ordering Code	Type 4			Type 5			Type R2MB			Type R3MB			R3MHE		
	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating
RPS-15W40LED	2816	191	B1-U0-G1	2857	194	B2-U0-G1	2948	200	B1-U0-G1	2863	194	B1-U0-G1	2928	199	B1-U0-G1
RPS-20W40LED	3711	191	B1-U0-G1	3766	193	B3-U0-G1	3885	200	B1-U0-G1	3773	194	B1-U0-G1	3859	198	B1-U0-G1
RPS-25W40LED	4657	190	B1-U0-G1	4726	193	B3-U0-G1	4876	199	B2-U0-G2	4735	194	B1-U0-G1	4843	198	B1-U0-G1
RPS-30W40LED	5549	188	B1-U0-G1	5631	191	B3-U0-G1	5810	197	B2-U0-G2	5642	191	B2-U0-G2	5770	196	B2-U0-G2
RPS-35W40LED	6436	187	B1-U0-G2	6531	190	B3-U0-G2	6738	196	B2-U0-G2	6544	190	B2-U0-G2	6693	195	B2-U0-G2
RPS-40W40LED	7379	187	B1-U0-G2	7488	190	B3-U0-G2	7726	196	B2-U0-G2	7503	190	B2-U0-G2	7674	195	B2-U0-G2
RPS-45W40LED	7998	180	B1-U0-G2	8116	183	B3-U0-G2	8374	188	B2-U0-G2	8132	183	B2-U0-G2	8317	187	B2-U0-G2
RPS-50W40LED	8579	173	B1-U0-G2	8706	176	B3-U0-G2	8982	181	B3-U0-G3	8723	176	B2-U0-G2	8922	180	B2-U0-G2
RPS-55W40LED	9428	173	B2-U0-G2	9567	175	B4-U0-G2	9871	181	B3-U0-G3	9586	175	B3-U0-G3	9804	179	B3-U0-G3
RPS-60W40LED	10170	172	B2-U0-G2	10320	174	B4-U0-G2	10648	180	B3-U0-G3	10340	174	B3-U0-G3	10576	178	B3-U0-G3
RPS-65W40LED	10963	170	B2-U0-G2	11125	173	B4-U0-G2	11478	178	B3-U0-G3	11146	173	B3-U0-G3	11401	177	B3-U0-G3
RPS-70W40LED	11710	169	B2-U0-G2	11883	172	B4-U0-G2	12260	177	B3-U0-G3	11906	172	B3-U0-G3	12177	180	B3-U0-G3
RPS-75W40LED	12476	168	B2-U0-G2	12661	171	B4-U0-G2	13063	176	B3-U0-G3	12685	171	B3-U0-G3	12974	175	B3-U0-G3
RPS-80W40LED	13184	167	B2-U0-G2	13380	169	B4-U0-G3	13804	174	B3-U0-G3	13405	169	B3-U0-G3	13711	173	B3-U0-G3
RPS-85W40LED	13873	165	B2-U0-G2	14079	168	B4-U0-G3	14526	173	B3-U0-G3	14106	168	B3-U0-G3	14427	172	B3-U0-G3
RPS-95W40LED	15163	162	B2-U0-G2	15388	164	B4-U0-G3	15876	170	B3-U0-G3	15417	165	B3-U0-G3	15768	168	B3-U0-G3

Actual performance may vary due to installation variables including optics, mounting/ceiling height, dirt depreciation, light loss factor, etc.; highly recommended to confirm performance with a layout - contact Applications at signify.com/outdoorluminaires. Consult DLC QPL to confirm your specific fixture selection is DLC approved.
Note: Some data may be scaled based on tests of similar but not identical luminaires.

RPS RoadFocus Plus

LED Cobra head (small)

3000K/70CRI LED High Performance Lumen Values - multiply values by 0.9 for 80CRI (continued)

Ordering Code	Type R2M			Type R2S			Type R3M			Type R3S			R2MHE		
	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating
RPS-15W40LED	2727	185	B1-U0-G1	2818	191	B1-U0-G1	2715	184	B1-U0-G1	2726	185	B1-U0-G1	N/A	N/A	N/A
RPS-20W40LED	3594	185	B1-U0-G1	3714	191	B1-U0-G1	3578	184	B1-U0-G1	3593	185	B1-U0-G1	N/A	N/A	N/A
RPS-25W40LED	4511	184	B1-U0-G1	4661	191	B1-U0-G1	4491	184	B1-U0-G1	4509	184	B1-U0-G1	N/A	N/A	N/A
RPS-30W40LED	5375	182	B1-U0-G1	5553	188	B2-U0-G2	5351	182	B1-U0-G1	5373	182	B1-U0-G1	N/A	N/A	N/A
RPS-35W40LED	6234	181	B2-U0-G2	6441	187	B2-U0-G2	6206	180	B2-U0-G1	6232	181	B1-U0-G1	N/A	N/A	N/A
RPS-40W40LED	7148	181	B2-U0-G2	7385	187	B2-U0-G2	7116	180	B2-U0-G1	7145	181	B2-U0-G2	N/A	N/A	N/A
RPS-45W40LED	7747	174	B2-U0-G2	8004	180	B2-U0-G2	7713	174	B2-U0-G2	7744	174	B2-U0-G2	N/A	N/A	N/A
RPS-50W40LED	8310	168	B2-U0-G2	8586	173	B2-U0-G2	8273	167	B2-U0-G2	8307	168	B2-U0-G2	N/A	N/A	N/A
RPS-55W40LED	9132	167	B2-U0-G2	9435	173	B2-U0-G2	9092	166	B2-U0-G2	9128	167	B2-U0-G2	N/A	N/A	N/A
RPS-60W40LED	9851	166	B2-U0-G2	10178	172	B2-U0-G2	9807	165	B2-U0-G2	9847	166	B2-U0-G2	N/A	N/A	N/A
RPS-65W40LED	10618	165	B2-U0-G2	10970	170	B3-U0-G3	10570	164	B2-U0-G2	10613	165	B2-U0-G2	N/A	N/A	N/A
RPS-70W40LED	11341	164	B3-U0-G3	11717	169	B3-U0-G3	11291	163	B2-U0-G2	11336	164	B2-U0-G2	N/A	N/A	N/A
RPS-75W40LED	12085	163	B3-U0-G3	12486	169	B3-U0-G3	12031	162	B3-U0-G2	12080	163	B2-U0-G2	N/A	N/A	N/A
RPS-80W40LED	12769	161	B3-U0-G3	13193	167	B3-U0-G3	12712	161	B3-U0-G2	12764	161	B2-U0-G2	N/A	N/A	N/A
RPS-85W40LED	13439	160	B3-U0-G3	13885	165	B3-U0-G3	13379	159	B3-U0-G2	13433	160	B2-U0-G2	N/A	N/A	N/A
RPS-95W40LED	14688	157	B3-U0-G3	15175	162	B3-U0-G3	14622	156	B3-U0-G2	14682	157	B3-U0-G2	N/A	N/A	N/A

Ordering Code	Type 4			Type 5			Type R2MB			Type R3MB			R3MHE		
	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating
RPS-15W40LED	2700	183	B1-U0-G1	2740	186	B2-U0-G1	2827	192	B1-U0-G1	2745	186	B1-U0-G1	N/A	N/A	N/A
RPS-20W40LED	3558	183	B1-U0-G1	3611	186	B2-U0-G1	3726	191	B1-U0-G1	3618	186	B1-U0-G1	N/A	N/A	N/A
RPS-25W40LED	4466	183	B1-U0-G1	4532	185	B3-U0-G1	4676	191	B2-U0-G2	4541	186	B1-U0-G1	N/A	N/A	N/A
RPS-30W40LED	5321	181	B1-U0-G1	5400	183	B3-U0-G1	5572	189	B2-U0-G2	5410	184	B2-U0-G2	N/A	N/A	N/A
RPS-35W40LED	6172	179	B1-U0-G2	6263	182	B3-U0-G2	6462	188	B2-U0-G2	6275	182	B2-U0-G2	N/A	N/A	N/A
RPS-40W40LED	7077	179	B1-U0-G2	7181	182	B3-U0-G2	7409	188	B2-U0-G2	7195	182	B2-U0-G2	N/A	N/A	N/A
RPS-45W40LED	7670	173	B1-U0-G2	7784	175	B3-U0-G2	8031	181	B2-U0-G2	7799	176	B2-U0-G2	N/A	N/A	N/A
RPS-50W40LED	8227	166	B1-U0-G2	8349	168	B3-U0-G2	8614	174	B2-U0-G2	8365	169	B2-U0-G2	N/A	N/A	N/A
RPS-55W40LED	9041	165	B1-U0-G2	9175	168	B4-U0-G2	9466	173	B3-U0-G3	9193	168	B2-U0-G2	N/A	N/A	N/A
RPS-60W40LED	9753	165	B2-U0-G2	9897	167	B4-U0-G2	10211	172	B3-U0-G3	9916	167	B3-U0-G3	N/A	N/A	N/A
RPS-65W40LED	10512	163	B2-U0-G2	10668	166	B4-U0-G2	11006	171	B3-U0-G3	10688	166	B3-U0-G3	N/A	N/A	N/A
RPS-70W40LED	11228	162	B2-U0-G2	11394	164	B4-U0-G2	11756	170	B3-U0-G3	11416	165	B3-U0-G3	N/A	N/A	N/A
RPS-75W40LED	11964	161	B2-U0-G2	12142	164	B4-U0-G2	12527	169	B3-U0-G3	12165	164	B3-U0-G3	N/A	N/A	N/A
RPS-80W40LED	12642	160	B2-U0-G2	12829	162	B4-U0-G2	13236	167	B3-U0-G3	12854	162	B3-U0-G3	N/A	N/A	N/A
RPS-85W40LED	13305	158	B2-U0-G2	13502	161	B4-U0-G3	13930	166	B3-U0-G3	13527	161	B3-U0-G3	N/A	N/A	N/A
RPS-95W40LED	14541	155	B2-U0-G2	14757	158	B4-U0-G3	15225	163	B3-U0-G3	14785	158	B3-U0-G3	N/A	N/A	N/A

Actual performance may vary due to installation variables including optics, mounting/ceiling height, dirt depreciation, light loss factor, etc.; highly recommended to confirm performance with a layout - contact Applications at signify.com/outdoorluminaire. Consult DLC QPL to confirm your specific fixture selection is DLC approved.
 Note: Some data may be scaled based on tests of similar but not identical luminaires.

RPS RoadFocus Plus

LED Cobra head (small)

2700K/70CRI LED High Performance Lumen Values – multiply values by 0.9 for 80CRI (continued)

Ordering Code	Type R2M			Type R2S			Type R3M			Type R3S			R2MHE		
	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating
RPS-15W40LED	2457	167	B1-U0-G1	2539	172	B1-U0-G1	2446	166	B1-U0-G1	2456	167	B1-U0-G1	N/A	N/A	N/A
RPS-20W40LED	3238	166	B1-U0-G1	3346	172	B1-U0-G1	3224	166	B1-U0-G1	3237	166	B1-U0-G1	N/A	N/A	N/A
RPS-25W40LED	4064	166	B1-U0-G1	4199	172	B1-U0-G1	4046	165	B1-U0-G1	4063	166	B1-U0-G1	N/A	N/A	N/A
RPS-30W40LED	4843	164	B1-U0-G1	5003	170	B1-U0-G1	4821	164	B1-U0-G1	4841	164	B1-U0-G1	N/A	N/A	N/A
RPS-35W40LED	5617	163	B2-U0-G2	5803	169	B2-U0-G2	5592	163	B1-U0-G1	5614	163	B1-U0-G1	N/A	N/A	N/A
RPS-40W40LED	6440	163	B2-U0-G2	6653	169	B2-U0-G2	6411	163	B2-U0-G1	6437	163	B1-U0-G1	N/A	N/A	N/A
RPS-45W40LED	6980	157	B2-U0-G2	7211	162	B2-U0-G2	6949	156	B2-U0-G1	6977	157	B2-U0-G2	N/A	N/A	N/A
RPS-50W40LED	7487	151	B2-U0-G2	7735	156	B2-U0-G2	7454	150	B2-U0-G2	7484	151	B2-U0-G2	N/A	N/A	N/A
RPS-55W40LED	8228	151	B2-U0-G2	8501	156	B2-U0-G2	8191	150	B2-U0-G2	8224	150	B2-U0-G2	N/A	N/A	N/A
RPS-60W40LED	8875	150	B2-U0-G2	9170	155	B2-U0-G2	8836	149	B2-U0-G2	8871	150	B2-U0-G2	N/A	N/A	N/A
RPS-65W40LED	9567	149	B2-U0-G2	9884	154	B2-U0-G2	9524	148	B2-U0-G2	9563	149	B2-U0-G2	N/A	N/A	N/A
RPS-70W40LED	10219	148	B2-U0-G2	10558	152	B3-U0-G2	10173	147	B2-U0-G2	10214	147	B2-U0-G2	N/A	N/A	N/A
RPS-75W40LED	10888	147	B3-U0-G3	11249	152	B3-U0-G3	10839	146	B2-U0-G2	10883	147	B2-U0-G2	N/A	N/A	N/A
RPS-80W40LED	11505	145	B3-U0-G3	11887	150	B3-U0-G3	11454	145	B2-U0-G2	11501	145	B2-U0-G2	N/A	N/A	N/A
RPS-85W40LED	12108	144	B3-U0-G3	12509	149	B3-U0-G3	12054	143	B3-U0-G2	12102	144	B2-U0-G2	N/A	N/A	N/A
RPS-95W40LED	13233	141	B3-U0-G3	13672	146	B3-U0-G3	13174	141	B3-U0-G2	13227	141	B2-U0-G2	N/A	N/A	N/A

Ordering Code	Type 4			Type 5			Type R2MB			Type R3MB			R3MHE		
	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating
RPS-15W40LED	2433	165	B1-U0-G1	2469	168	B2-U0-G1	2547	173	B1-U0-G1	2473	168	B1-U0-G1	N/A	N/A	N/A
RPS-20W40LED	3206	165	B1-U0-G1	3253	167	B2-U0-G1	3357	172	B1-U0-G1	3260	167	B1-U0-G1	N/A	N/A	N/A
RPS-25W40LED	4024	165	B1-U0-G1	4083	167	B3-U0-G1	4213	172	B1-U0-G1	4091	167	B1-U0-G1	N/A	N/A	N/A
RPS-30W40LED	4794	163	B1-U0-G1	4865	165	B3-U0-G1	5020	170	B2-U0-G2	4875	165	B2-U0-G2	N/A	N/A	N/A
RPS-35W40LED	5561	162	B1-U0-G1	5643	164	B3-U0-G1	5822	169	B2-U0-G2	5654	164	B2-U0-G2	N/A	N/A	N/A
RPS-40W40LED	6376	162	B1-U0-G2	6470	164	B3-U0-G2	6675	169	B2-U0-G2	6482	164	B2-U0-G2	N/A	N/A	N/A
RPS-45W40LED	6910	156	B1-U0-G2	7013	158	B3-U0-G2	7235	163	B2-U0-G2	7026	158	B2-U0-G2	N/A	N/A	N/A
RPS-50W40LED	7412	150	B1-U0-G2	7522	152	B3-U0-G2	7761	157	B2-U0-G2	7536	152	B2-U0-G2	N/A	N/A	N/A
RPS-55W40LED	8145	149	B1-U0-G2	8266	151	B3-U0-G2	8529	156	B2-U0-G2	8282	152	B2-U0-G2	N/A	N/A	N/A
RPS-60W40LED	8787	148	B1-U0-G2	8917	150	B3-U0-G2	9200	155	B3-U0-G3	8934	151	B2-U0-G2	N/A	N/A	N/A
RPS-65W40LED	9471	147	B2-U0-G2	9612	149	B4-U0-G2	9917	154	B3-U0-G3	9630	150	B3-U0-G3	N/A	N/A	N/A
RPS-70W40LED	10117	146	B2-U0-G2	10266	148	B4-U0-G2	10592	153	B3-U0-G3	10286	148	B3-U0-G3	N/A	N/A	N/A
RPS-75W40LED	10779	145	B2-U0-G2	10939	148	B4-U0-G2	11286	152	B3-U0-G3	10960	148	B3-U0-G3	N/A	N/A	N/A
RPS-80W40LED	11391	144	B2-U0-G2	11559	146	B4-U0-G2	11926	151	B3-U0-G3	11581	146	B3-U0-G3	N/A	N/A	N/A
RPS-85W40LED	11987	143	B2-U0-G2	12164	145	B4-U0-G2	12550	149	B3-U0-G3	12187	145	B3-U0-G3	N/A	N/A	N/A
RPS-95W40LED	13101	140	B2-U0-G2	13295	142	B4-U0-G3	13717	147	B3-U0-G3	13320	142	B3-U0-G3	N/A	N/A	N/A

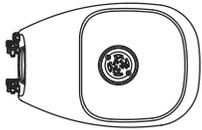
Actual performance may vary due to installation variables including optics, mounting/ceiling height, dirt depreciation, light loss factor, etc.; highly recommended to confirm performance with a layout – contact Applications at signify.com/outdoorluminaires. Consult DLC QPL to confirm your specific fixture selection is DLC approved.
 Note: Some data may be scaled based on tests of similar but not identical luminaires.

RPS RoadFocus Plus

LED Cobra head (small)

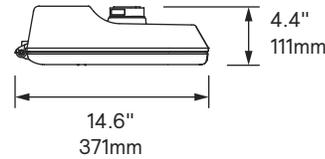
Dimensions

Top View

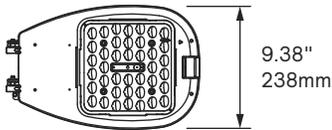


Weight: 8.8 lbs
EPA: 0.17 sq. feet

Side View

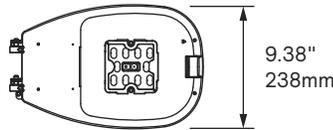


Bottom View (20-30-40 LEDs)



9.38"
238mm

Bottom View (10 LEDs)



9.38"
238mm

Specifications

Housing

Made of a low copper die cast Aluminum alloy (A360), 0.100" (2.5mm) minimum thickness. Fits on a 1.66" (42mm) O.D. (1.25" NPS), 1.9" (48mm) O.D. (1.5" NPS) or 2 3/8" (60mm) O.D. (2" NPS) by 5 1/2" (140mm) minimum long tenon. Comes with a zinc plated clamp fixed by 2 zinc plated hexagonal bolts 3/8 16 UNC for ease of installation. Provides an easy step adjustment of +/- 5° tilt in 2.5° increments. Includes integral bubble level standard (always included). A quick release, tool less entry, single latch, hinged, removable door opens downward to provide access to electronic components and to a terminal block. Door is secured to prevent accidental dropping or disengagement. A clearance of 13" (330mm) at the rear is required in order to remove the door. Complete with a bird guard protecting against birds and similar intruders and an ANSI label as per C136.15-2020 to identify wattage and source (both included in box). Housing (including electrical compartment) rated IP54 per ANSI C136.37.

Light Engine

Composed of 4 main components: LED Module / Optical System / Heat Sink / Driver.

Electrical components are RoHS compliant, IP66 sealed light engine equipped LEDs tested by ISO 17025-2005 accredited lab in accordance with IESNA LM-80 guidelines in compliance with EPA ENERGY STAR, extrapolations in accordance with IESNA TM-21. Metal core board ensures greater heat transfer and longer lifespan.

LED Module: Composed of high-performance white LEDs. Color temperature as per ANSI/ NEMA bin 2700 Kelvin nominal (2725 ±145K), 3000 Kelvin nominal (3045K +/- 175K) or 4000 Kelvin nominal (3985K +/- 275K), CRI 70 Min. 75 Typical. Other CCT/CRI also available, consult factory.

Optical System: Composed of high performance UV stabilized optical grade polymer refractor lenses to achieve desired distribution optimized to get maximum spacing, target lumens and a superior lighting uniformity. System is rated IP66. Performance shall be tested per LM-63, LM-79 and TM-15 (IESNA) certifying its photometric performance. 0% uplight and U0 per IESNA TM-15.

Heat Sink: Built in the housing and door, designed to ensure high efficacy and superior cooling by natural vertical convection air flow pattern always close to LEDs and driver optimizing their efficiency and life.

Product does not use any cooling device with moving parts (only passive cooling). Wide openings enable natural cleaning and removal of dirt and debris. Entire luminaire is rated for operation in ambient temperature of -40°C / -40°F up to +50°C / +122°F.

Driver: High power factor of 90% min. Electronic driver, operating range 50/60 Hz. Auto adjusting universal voltage input from 120 to 277 VAC rated for both application line to line or line to neutral, Class I or 2, THD of 20% max.

DMG: Dimming compatible 0-10 volts. The current supplying the LEDs will be reduced by the driver if the driver experiences internal overheating as a protection to the LEDs and the electrical components. Output is protected from short circuits, voltage overload and current overload. Automatic recovery after correction. Standard built-in driver surge protection of 2.5kV (min).

Integrated Features

DMG: Dimmable driver 0-10V.

TLRD7: Tool less orientable receptacle with 7 pins enabling dimming and additional functionality (to be determined), can be used with a twist lock Interact City node or photoelectric cell or a shorting cap. Use of photoelectric cell or shorting cap is required to ensure proper illumination.

Please note: Additional hardware will be required to utilize the additional 2 pins on this receptacle.

SP1: Fail-On Surge protection device tested in accordance with ANSI/IEEE C62.45 per ANSI/IEEE C62.41.2 Scenario I Category C High Exposure 10kV/10kA waveforms for Line-Ground, Line-Neutral and Neutral-Ground, and in accordance with DOE MSSLC Model Specification for LED Roadway Luminaires Appendix D Electrical Immunity High test level 10kV/10kA.

Please note: These integrated features always come with RoadFocus luminaire.

Driver and Luminaire Options

D41*: Zhaga-D4i certified fixture

DALI*: Pre-set driver compatible with the DALI control system.

SRD*: Sensor Ready Driver including SR communication (used for dimming and other functionalities), 24V auxiliary supply and a logical

signal input (LSI) connected to the top NEMA twist lock receptacle and bottom TLRSR receptacle, if this option included/chosen. This configuration is compatible with Interact City controllers.

SRD1*: Sensor Ready Driver including SR communication (used for dimming and other functionalities) but with 24V auxiliary supply and a logical signal input (LSI) not connected to the top NEMA twist lock. If TLRSR receptacle option included, standard SR communication, 24V auxiliary supply and LSI are connected to the TLRSR receptacle.

JP: Job pack bulk packaging

2C: Two zinc plated clamps fixed by 4 zinc plated hexagonal bolts 3/8 16 UNC for ease of installation.

OMS: Outdoor Multi Sensor

NRC: No Receptacle. Fixture is shipped with a cap instead of a receptacle.

SP2: Fail-On 20kV / 10kA surge protection device that provides extra protection beyond the SP1 10kV/10kA level.

SP1X: Fail-Off Surge protection device tested in accordance with ANSI/IEEE C62.45 per ANSI/ IEEE C62.41.2 Scenario I Category C High Exposure 10kV/5kA waveforms for Line-Ground, Line-Neutral and Neutral-Ground, and in accordance with DOE MSSLC Model Specification for LED Roadway Luminaires Appendix D Electrical Immunity High test level 10kV/5kA.

SP2X: Fail-Off 20kV / 10kA surge protection device that provides extra protection beyond the SP1X 10kV/5kA level.

FAWS: Field Adjustable Wattage Selector, pre-set to the highest position, can be easily switched in the field to the required position. This reduces total luminaire wattage consumption and reduces the light level- see the FAWS multiplier chart for more details.

TLRSR: SR Sensor connector, installed in fixture door. Shipped with protective cover.

PH8: Twist-lock photoelectric cell, UNV (120-277VAC).

PHXL: Twist-lock photoelectric cell, extended life, UNV (120-277VAC).

PH9: Shorting cap (use of photoelectric cell or shorting cap is required to ensure proper illumination).

API: Factory Installed NEMA label, ANSI C136.15-2020 compliant. Consult factory for other labeling needs.

RPS RoadFocus Plus

LED Cobra head (small)

Specifications (continued)

Connected Lighting

Interact City connector node provides the plug and play wireless communications technology to connect your street light to the Interact City lighting management system. With Interact you can remotely manage, monitor and control all city lighting, from roads and streets, to parks and plazas, and bridges from one single system. Connected lighting enables capabilities including, accurate on/off switching, dimming control, fault reporting and integration with other systems to enable condition-based lighting. Interact provides you with a robust and scalable infrastructure to further reduce energy consumption, improve operations, and turn lighting into a connected network for your smart city journey.

For more details visit: interact-lighting.com/en-us/what-is-possible/interact-city

Factory Installed Shield Options (one per Light Engine)

CSS: Cul-de-Sac Shield. Shields light output on the left and right side of fixture.

FSS: Front Side Shield. Shields light output on the front side of fixture.

HSS: House Side Shield. Shields light output to the back side of fixture.

LSS: Left Side Shield. Shields light output on the left side of fixture.

RSS: Right Side Shield. Shields light output on the right side of fixture.

Luminaire Useful Life

Refer to IES files for energy consumption and delivered lumens for each option. Based on ISTMT in situ thermal testing in accordance with UL1598 and UL8750, System Reliability Tool, Advance data and LED manufacturer LM-80/TM-21 data, expected to reach 100,000 + hours with >L70 lumen maintenance @ 25°C. Luminaire Useful Life accounts for LED lumen maintenance AND all of these additional factors including: LED life, driver life, PCB substrate, solder joints, on/off cycles, burning hours and corrosion.

Wiring

The connection of the luminaire is done using a terminal block connector 600V, 85A for use with #2 14 AWG. wires from the primary circuit, located inside the housing. Due to the inrush current that occurs with electronic drivers, recommend using a 10Amp time-delay fuse to avoid unwanted fuse blowing (false tripping) that can occur with normal or fast acting fuses.

Hardware

All exposed screws shall be complete with Ceramic primer seal to reduce seizing of the parts, also offers a high resistance to corrosion. All seals and sealing devices are made and/or lined with EPDM and/or silicone and/or rubber.

Finish

Color in accordance with the AAMA 2603 standard. Application of polyester powder coat paint (4 mils/100 microns) with ± 1 mils/24 microns of tolerance. The Thermosetting resins provides a discoloration resistant finish in accordance with the ASTM D2244 standard, as well as luster retention in keeping with the ASTM D523 standard and humidity proof in accordance with the ASTM D2247 standard.

The surface treatment achieves a minimum of 5000 hours for salt spray resistant finish in accordance with testing performed and per ASTM B117 standard.

LED products manufacturing standard

The electronic components sensitive to electrostatic discharge (ESD) such as light emitting diodes (LEDs) are assembled in compliance with IEC61340-5-1 and ANSI/ESD S20.20 standards so as to eliminate ESD events that could decrease the useful life of the product.

Vibration Resistance

The RPS meets the ANSI C136.31-2018, American National Standard for Roadway Luminaire Vibration specifications for Bridge/overpass applications. (Tested for 3G over 100,000 cycles by independent lab)

Certifications and Compliance

cULus Listed for Canada and USA. Luminaire meets DOE and MSSLC Model Specification for LED Roadway Luminaires. Most versions of RoadFocus LED Cobrahead luminaires are DesignLights Consortium qualified, consult DLC QPL to confirm your specific fixture selection is approved. CCTs 3000K and warmer are IDA Dark Sky Approved. Luminaire complies with or exceeds the following ANSI C136 standards: .2, .3, .10, .14, .15, .22, .25, .31, .37, .41.

Service Tag

Each individual luminaire is uniquely identifiable, thanks to the Service tag application. With a simple scan of a QR code, placed on the inside of the mast door, you gain instant access to the luminaire configuration, making installation and maintenance operations faster and easier, no matter what stage of the luminaire's lifetime. Just download the APP and register your product.

For more details visit: signify.com/servicetag

Limited Warranty

10-year limited warranty. See signify.com/warranties for details and restrictions.

Brackets/Arms

For brackets / arms available with this luminaire, see Lumec 3D for details.





Fluorescent Ballasts



Electronic Ballasts

Product Info

VE2P32MVHIPE

Family	Elite
Ballast Type	Electronic
Lamp Operation	Parallel
Input Voltage	120/277V
Starting Method	Instant Start

Product Specification



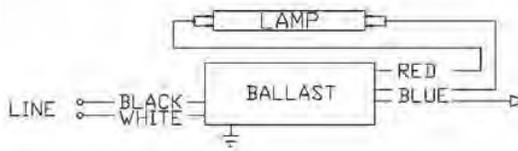
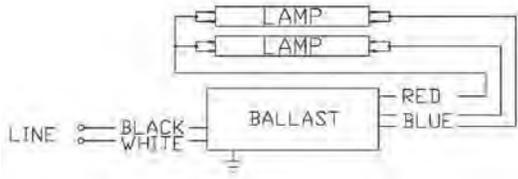
Lamp Type	No. of Lamps	Input Voltage (V)	Input Current (A)	Input Power (W)	Power Factor	MAX THD (%)	Ballast Factor	Min. Starting Temp.(F/C)	Lamp Current Crest Factor	B.E.F.
F32T8/ES 28W	2	120/277	0.17/0.08	51	0.98	10/15	1.05	0	1.7	1.59/1.60
F17T8 17W	2	120/277	0.37/0.16	30	0.98	10	0.89	0	1.7	
F25T8 25W	2	120/277	0.43/0.19	55/54	0.98	10	1.06	0	1.7	1.82/1.70
F32T8/ES 30W	1	120/277	0.26/0.11	28	0.98	10	0.88	0	1.7	
F17T8 17W	2	120/277	0.46/0.20	49/47	0.98	10	0.89	0	1.7	
F32T8 32W	1	120/277	0.23/0.10	19	0.98	10	0.9	0	1.7	1.74/1.70
F25T8 25W	2	120/277	0.41/0.18	43	0.98	10	0.89	0	1.7	
F40T8 40W	1	120/277	0.35/0.15	33	0.98	10	1.01	0	1.7	
F32T8 32W	1	120/277	0.30/0.13	41	0.98	10	1.05	0	1.7	
F32T8/ES 25W	1	120/277	0.23/0.10	35	0.98	10	1.05	0	1.7	
F32T8/ES 25W	1	120/277	0.39/0.17	27	0.98	10	0.89	0	1.7	
F32T8/ES 28W	1	120/277	0.26/0.11	44	0.98	10	1.05	0	1.7	
F32T8/ES 30W	2	120/277	0.28/0.12	31	0.98	10	1.05	0	1.7	

Physical Parameters

Enclosure	(in)	Lead Length	in.(+/-1.0)
Length	9.5	Black	
Width	1.3	White	
Height	1	Red	
Mounting	8.91	Blue	
		Yellow	



Wiring Diagram





Fluorescent Ballasts



Electronic Ballasts

Product Info

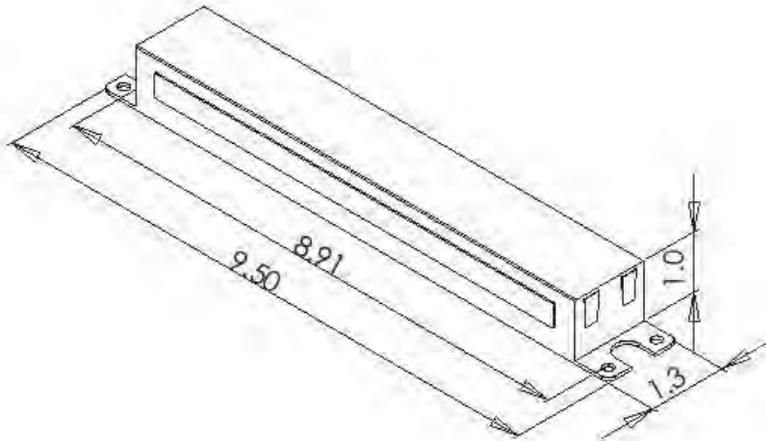
VE228MVHRP

Family	Elite
Ballast Type	Electronic
Lamp Operation	Series
Input Voltage	120/277V
Starting Method	Program Start

Product Specification

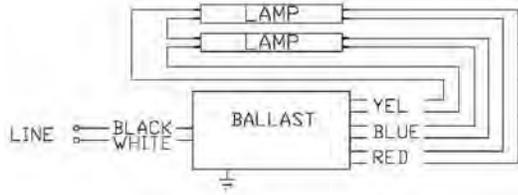
Lamp Type	No. of Lamps	Input Voltage (V)	Input Current (A)	Input Power (W)	Power Factor	MAX THD (%)	Ballast Factor	Min. Starting Temp. (F/C)	Lamp Current Crest Factor	B.E.F.
F28T5/ES-25W	2	120/277	0.29/0.12	58/57	0.98	10	1.06	0	1.7	2.08
F28T5	1	120/277	0.50/0.23	17	0.98	10	1.00	0	1.7	4.24
F28T5	2	120/277	0.28/0.13	49	0.98	10	1.05	0	1.7	3.03/3.33
F14T5	1	120/277	0.34/0.15	25	0.98	10	1.00	32	1.7	3.39
F35T5	2	120/277	0.49/0.21	33/30	0.98	10	1.04	0	1.7	1.61/1.64
F28T5/ES-25W	1	120/277	0.14/0.07	31	0.98	10	1.01	0	1.7	3.15
F14T5	1	120/277	0.39/0.17	62/61	0.98	10	1.00	0	1.7	2.53
F21T5	1	120/277	0.22/0.10	33	0.98	10	1.07	32	1.7	1.72/1.75
F21T5	2	120/277	0.29/0.11	40	0.98	10	1.02	0	1.7	6.29

Physical Parameters



Enclosure	(in)	Lead Length	in.(+/-1.0)
Length	9.5	Black	25
Width	1.3	White	25
Height	1.0	Red	31
Mounting	8.91	Blue	31
		Yellow	46

Wiring Diagram





Fluorescent Ballasts



Electronic Ballasts

Product Info

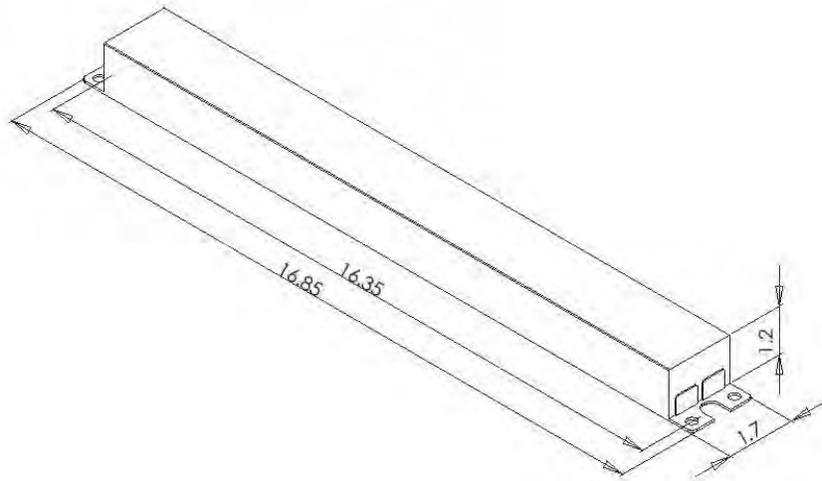
VE454MVHRP

Family	Elite
Ballast Type	Electronic
Lamp Operation	Parallel-Serial
Input Voltage	120/277V
Starting Method	Program Start

Product Specification

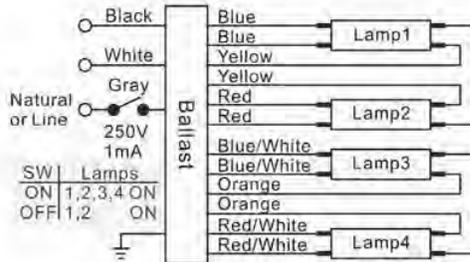
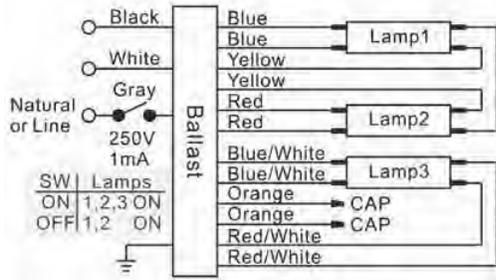
Lamp Type	No. of Lamps	Input Voltage (V)	Input Current (A)	Input Power (W)	Power Factor	MAX THD (%)	Ballast Factor	Min. Starting Temp.(F/C)	Lamp Current Crest Factor	B.E.F.
F54T5HO 54W	4	120/277	2.00/0.86	240/234	0.98	10	1.00	-20	1.7	
F54T5HO 54W	3	120/277	1.52/0.66	182/179	0.98	10	1.03	-20	1.7	

Physical Parameters



Enclosure	(in)	Lead Length	in.(+/-1.0)
Length	16.85	Black	
Width	1.7	White	
Height	1.2	Red	
Mounting	16.35	Blue	
		Yellow	

Wiring Diagram



Attachment C: Mechanical Systems
City of Fresno – Phase 3: Wastewater Treatment Plant
Energy Retrofit Project

Administration Building Proposed HVAC Equipment to be Replaced - Fresno-Clovis RWRP



General Information			Existing Equipment Data						Proposed Equipment Data						
#	Building	Unit Location	Old Zone ID Tag	Existing Area Served	Existing System Type	Make: Model	Size Tons (pre)	IEER / SEER (pre)	New ID Tag	Proposed Area Served	Proposed Description	Proposed System Type	Proposed Make: Model	Size Tons (post)	IEER / SEER (post)
1	Admin	Indoor	AC-14A	Offices 104-106, Lab Office 107 & Office 108	Packaged G/E	Carrier: 48HJD007	6	11	VRF IDU-B-11	Office 104	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY024EM140B		
2	Admin	Indoor							VRF IDU-B-9	Office 105	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015EM140B		
3	Admin	Indoor							VRF IDU-B-8	Office 106	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015EM140B		
4	Admin	Indoor							VRF IDU-B-7	Lab Office 107	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015EM140B		
5	Admin	Indoor							VRF IDU-B-6	Office 108	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015EM140B		
6	Admin	Roof	AC-13A	Offices 102-103, Open Office 109 & Hall 170	Packaged G/E	Carrier: 48HID008	7.5	10.4	HC-1	Open Office 109 & Hall 170	New High Efficiency Package Unit	Package G/E	Carrier: 48FCDM08C2D6-0A0A0	7.5	15
7	Admin	Indoor							VRF IDU-B-13	Office 102	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015EM140B		
8	Admin	Indoor							VRF IDU-B-12	Office 103	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015EM140B		
9	Admin	Roof	AC-12A	Main Entry Lobby 100, Conference Rm 101 & Conference Rm 160	Packaged G/E	Carrier: 48FCDM07A2	6	14	HC-7	Main Entry Lobby 100	New High Efficiency Package Unit	Package G/E	Carrier: 48FCGA04C2D6-0A0A0	3	14
10	Admin	Indoor							VRF IDU-C-7	Conf Rm 101	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY018EM141B		
11	Admin	Indoor							VRF IDU-C-6	Conf Rm 160	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY018EM141B		
12	Admin	Indoor	AC-11A	Offices 154-156, 158, 159	Packaged G/E	Carrier: 48FCDM07A2	6	14	VRF IDU-C-1	Office 154	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY018EM141B		
13	Admin	Indoor							VRF IDU-C-2	Office 155	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015EM140B		
14	Admin	Indoor							VRF IDU-C-3	Office 156	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015EM140B		
15	Admin	Indoor							VRF IDU-C-4	Office 158	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015EM140B		
16	Admin	Indoor							VRF IDU-C-5	Office 159	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015EM140B		
17	Admin	Roof	AC-10A	Foyer 144, RR 145, Office 148, Hall 149, Library 153, Open Office 157, RR 161 & RR 165	Packaged G/E	Carrier: 48HJD009	8.5	9.81	HC-5	Foyer 144, RR 145, Hall 149, Open Office 157, RR 161 & RR 165	New High Efficiency Package Unit	Package G/E	Carrier: 48FCDM08C2D6-0A0A0	7.5	15
18	Admin	Indoor							VRF IDU-C-9	Library 153	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015EM140B		
19	Admin	Indoor							VRF IDU-C-8	Office 148	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015EM140B		
20	Admin	Roof	AC-7A	Conference Rm 146	Packaged G/E	Carrier: 48HJG005	4	11.7	HC-8	Conf Rm 146	New High Efficiency Package Unit	Package G/E	Carrier: 48FCGA05C2D6-0A0A0	4	14
21	Admin	Roof			Ductless Split	Fujitsu: AOU18RLFC	1.5	18	Ductless Split	Phone Rm	New High Efficiency Ductless Split	Ductless Split	Mitsubishi:	2	18
22	Admin	Roof	ODU-1		Precision Cool	Liebert: est 3-ton	3	10	Ductless Split	Server Rm 152	New High Efficiency Ductless Split	Ductless Split	Mitsubishi:	3	18
23	Admin	Roof	AC-9A	Server Rm 152	Packaged G/E	Payne: PY4GNAB24040NATP	2	14	HC-9	Server Rm 152	New High Efficiency Package Unit	Package G/E	Carrier: 48FCGA04C2D6-0A0A0	3	14

Administration Building Proposed HVAC Equipment to be Replaced - Fresno-Clovis RWRP



General Information			Existing Equipment Data						Proposed Equipment Data						
#	Building	Unit Location	Old Zone ID Tag	Existing Area Served	Existing System Type	Make: Model	Size Tons (pre)	IEER / SEER (pre)	New ID Tag	Proposed Area Served	Proposed Description	Proposed System Type	Proposed Make: Model	Size Tons (post)	IEER / SEER (post)
24	Admin	Roof	AC-8A	Hall 150, Storage 162, Open Office 163, Wk Rm 164, File Rm 166, Parts Stor 167, File Rm 168, Hall 169 & Workshop 171	Packaged G/E	Carrier: 48HJD007	6	11.7	HC-6	Hall 150, Storage 162, Open Office 163, File Rm 166, File Rm 168, Hall 169	New High Efficiency Package Unit	Package G/E	Carrier: 48FCDM07C2D6-0A0A0	6	15
25	Admin	Indoor							VRF IDU-C-10	Wk Rm 164	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015EM140B		
26	Admin	Indoor							VRF IDU-C-11	New Off 167	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY008FM140A		
27	Admin	Indoor							VRF IDU-C-12	Workshop 171	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015EM140B		
28	Admin	Roof	AC-6A	Dining Rm 143	Packaged G/E	Carrier: 48HJD014	12.5	8.82	HC-4	Dining Rm 143	New High Efficiency Package Unit	Package G/E	Carrier: 48FCDM09C2D6-0A0A0	8.5	15
29	Admin	Roof	AC-16A	RR 140-141 & Women's Locker Rm/Shower 142	DOAS (DX/Gas)	Aaon: RM006-3-0-DB81	6	12	DOAS-2	RR 140-141 & Women's Locker Rm/Shower 142	New High Efficiency Package Unit	Package G/E	Carrier: 48FCGA05C2D6-0A0A0	4	14
30	Admin	Roof	AC-15A	Vestibule 132, Men's Locker Rm 135, RR 136 & Shower 137	DOAS (DX/Gas)	Aaon: RM020-3-0-DB82	20	12	DOAS-1	Vestibule 132, Men's Locker Rm 135, RR 136 & Shower 137	New High Efficiency Package Unit	Package G/E	Carrier: 48FCDM12C2D6-0A0A0	10	15
31	Admin	Indoor	AC-1A	Hallway 125, Offices 126 - 130, Meeting/Library 131	Packaged G/E	Carrier: 48HJD012	10	8.73	VRF IDU-A-6	Office 126	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015BM140F		
32	Admin	Indoor							VRF IDU-A-5	Office 127	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015EM140B		
33	Admin	Indoor							VRF IDU-A-4	Office 128	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015EM140B		
34	Admin	Indoor							VRF IDU-A-3	Office 129	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015EM140B		
35	Admin	Indoor							VRF IDU-A-11	Hall 125	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015EM140B		
36	Admin	Indoor							VRF IDU-A-2	Office 130	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015EM140B		
37	Admin	Indoor							VRF IDU-A-1	Meet/Library 131	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015FM140A		
38	Admin	Indoor	AC-2A	Offices 121-123, Conference Rm 124, Hallway 125	Packaged G/E	Bryant: S80JE07A072A2	6	14	VRF IDU-A-10	Office 121	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015EM140B		
39	Admin	Indoor							VRF IDU-A-9	Office 122	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015EM140B		
40	Admin	Indoor							VRF IDU-A-12	Hall 125	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015EM140B		
41	Admin	Indoor							VRF IDU-A-8	Office 123	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015EM140B		
42	Admin	Indoor							VRF IDU-A-7	Conf. Rm 124	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015BM140F		
43	Admin	Roof	AC-3A	Control Room 120	Packaged G/E	Carrier: 48HJH004	3	11.7	HC-3	Control Room 120	New High Efficiency Package Unit	Package G/E	Carrier: 48FCGA05C2D6-0A0A0	4	14
44	Admin	Roof	AC-5A	Storage 113 & Process Lab 117	Packaged G/E	Carrier: 48HJH004	3	11.7	VRF IDU-B-3	New Office 113	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015EM140B		
45	Admin	Roof							VRF IDU-B-4	Process Lab 117	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY024EM140B		

Administration Building Proposed HVAC Equipment to be Replaced - Fresno-Clovis RWRF



General Information			Existing Equipment Data						Proposed Equipment Data						
#	Building	Unit Location	Old Zone ID Tag	Existing Area Served	Existing System Type	Make: Model	Size Tons (pre)	IEER / SEER (pre)	New ID Tag	Proposed Area Served	Proposed Description	Proposed System Type	Proposed Make: Model	Size Tons (post)	IEER / SEER (post)
46	Admin	Roof	AC-4A	Storage 110, Janitor 111, Hall 112, Wk Rm 114, Hall 115, Library 116, Offices 118-119	Packaged G/E	Carrier: 48HJG006	5	11.7	HC-2	Storage 110, Janitor 111, Hall 112, Hall 115	New High Efficiency Package Unit	Package G/E	Carrier: 48FCGA04C2D6-0A0A0	3	14
47	Admin	Indoor							VRF IDU-B-5	Wk Rm 114	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY008FM140A		
48	Admin	Indoor							VRF IDU-B-1	Library 116	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015EM140B		
49	Admin	Indoor							VRF IDU-B-10	Office 118	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY015EM140B		
50	Admin	Indoor							VRF IDU-B-2	Office 119	New VRF Indoor Unit	Cassette	Mitsubishi: TPLFY008FM140A		
51	Admin	Roof						VRF Cond. Unit	System A (12 x IDU)	New High Efficiency VRF Condenser	VRF Condenser	Carrier: 48FCGA05C2D6-0A0A0	10	25	
52	Admin	Roof						VRF Cond. Unit	System B (13 x IDU)	New High Efficiency VRF Condenser	VRF Condenser	Carrier: 48FCGA05C2D6-0A0A0	12	24	
53	Admin	Roof						VRF Cond. Unit	System C (12 x IDU)	New High Efficiency VRF Condenser	VRF Condenser	Carrier: 48FCGA05C2D6-0A0A0	12	24	



Proposed HVAC Units to be Replaced - Fresno-Clovis RWRF

General Information				Existing Equipment Data								Proposed Equipment Data			
#	ID Tag	Building	Unit Location	System Type	Make: Model	Mfg. Year	Size Tons (pre)	SEER (pre)	Unit Condition	Replace Unit? (Y/N)	Add Controls ? (Y/N)	Proposed System Type	Proposed Make: Model	Size Tons (post)	SEER (post)
1	No ID Tag	Boiler Bldg	Rooftop	Package Heat Pump	American Standard: WCC036F4008H	2005	3	12	Poor	Y	N	New High Efficiency HVAC Unit	Carrier: 50GCGM04C2D6-0A0A0	3	16.2
2	No ID Tag	DAFT Bldg	DAFT Bldg	Package Heat Pump	Carrier: 50HJQ6076	2008	5	12	Poor	Y	N	New High Efficiency HVAC Unit	Carrier: 50FCQM07C2D6-0A0A0	5	16
3	No ID Tag	Old Training Center Annex	Rooftop	Gas Package	Rheem: RRNL-B024JK06X	2013	2	10	Poor	Y	N	New High Efficiency HVAC Unit	Carrier: 48VGUE240403-TP	2	15
4	No ID Tag	Old Training Center Annex	Rooftop	Gas Package	BDP: 585APW36100A	1979	3	10	Poor	Y	N	New High Efficiency HVAC Unit	Carrier: 48VGUE360605-TP	3	16
5	No ID Tag	Old Training Center Annex	Rooftop	Gas Package	Bryant: 583APW048090NBAF	2005	4	10	Poor	Y	N	New High Efficiency HVAC Unit	Carrier: 48VGUE480905-TP	4	16
6	No ID Tag	Old Training Center Annex	Rooftop	Gas Package	BDP: 586A048125YADX	1978	4	10	Poor	Y	N	New High Efficiency HVAC Unit	Carrier: 48VGUE480905-TP	4	16
7	No ID Tag	Field Maintenance	Rooftop	Gas Package	Carrier: 48HJE004	2008	3	11.7	Poor	Y	N	New High Efficiency HVAC Unit	Carrier: 48GCGM04C2D6-0A0A0	3	16.1
8	No ID Tag	Field Maintenance	Rooftop	Split Heat Pump	Bryant: est 4-ton	2006	4	11.7	Poor	Y	N	New High Efficiency HVAC Unit	Carrier: 25HHA448A006	4	14
9	No ID Tag	Maintenance Shop	Downshot W. Side	Gas Package	Carrier: 48GXM02404	2005	2	11.7	Poor	Y	N	New High Efficiency HVAC Unit	Carrier: 48VGUE240403-TP	2	15
10	No ID Tag	A-Side MCC	South	Package Heat Pump	York: 83CH120A25B	1999	10	10.8	Poor	Y	N	New High Efficiency HVAC Unit	Carrier: 50FCQM12C2D5-0A0A0	10	15
11	No ID Tag	Digester Bldg	Digester Bldg	Package Heat Pump	Carrier: 50HJQ008GM	2008	7.5	10.44	Poor	Y	N	New High Efficiency HVAC Unit	Carrier: 50FCQM08C2D6-0A0A0	7.5	15

Main Laboratory Building Proposed HVAC Equipment to be Replaced - Fresno-Clovis RWRP



General Information					Existing Equipment Data						Proposed Equipment Data				
#	ID Tag	Building	Unit Location	Series	System Type	Make: Model	Size Tons (pre)	SEER (pre)	Unit Condition	Replace Unit? (Y/N)	Proposed Description	Proposed System Type	Proposed Make: Model	Size Tons (post)	SEER (post)
1	CH-1	Main Lab Bldg	Mech. Pad	Bldgs Cooling	Air-Cooled Chiller	Arctic Chill: PACUMU0250D4-3K	93	12	Poor	Y	Replace the modular air-cooled chiller with a Carrier AquaSnap series 130 ton (six compressors & two circuits) unit with dual 10 HP pump package and (1) rooftop air handling unit for added capacity and reliability. The new chiller and existing boiler will be integrated into the DDC system. Add (4) automatic air vents and replace (2) air and dirt separators.	New High Efficiency Air-Cooled Chiller	Carrier: 30RAP130	130	15.8
2	Pump-1	Main Lab Bldg	Mech. Pad	Bldgs Cooling	Variable Primary CHW Pump	Variable Primary CHW Pump	n/a	n/a	Poor	Y		New High Efficiency Variable Primary CHW Pump	New High Eff. Variable Primary CHWP	n/a	n/a
3	Pump-2	Main Lab Bldg	Mech. Pad	Bldgs Cooling	Variable Primary CHW Pump	Variable Primary CHW Pump	n/a	n/a	Poor	Y		New High Efficiency Variable Primary CHW Pump	New High Eff. Variable Primary CHWP	n/a	n/a
4	AH-3	Main Lab Bldg	Rooftop	Room 24	Air Handling Unit	McQuay: OAH008GDAC	0	0	Poor	Y		New High Efficiency Air Handling Unit	New High Capacity High Eff. AHU	0	16

Headworks Building Proposed HVAC Equipment Optimization - Fresno-Clovis RWRf



General Information				Existing Equipment Data					Proposed Equipment Data	
#	ID Tag	Building	Series	System Type	Make	Model	Make: Model	Motor p	Proposed Description	Proposed Equipment
1	MAU-001	Headworks Bldg.	Headworks Bldg.	Constant Speed Make-Up Air Unit	McQuay	RBS-806B	McQuay: RBS-806B	20	Optimize Operation of the Make-Up Air Units and Odor Control Fans. Add variable frequency drives with toxic gas transmitters & receivers, an outside air sensor and modifications to the PLC controls for the existing SCADA system.	Add VFD to Make-Up Air Unit
2	MAU-003	Headworks Bldg.	Headworks Bldg.	Constant Speed Make-Up Air Unit	McQuay	CAH092GDDM	McQuay: CAH092GDDM	50		Add VFD to Make-Up Air Unit
3	OCF-1001	Headworks Bldg.	Headworks Bldg.	Constant Speed Odor Control Fan	Hartzell	A41-1-493FA-66	Hartzell: A41-1-493FA-66	125		Add VFD to Odor Control Fan
4	OCF-1002	Headworks Bldg.	Headworks Bldg.	Constant Speed Odor Control Fan	Hartzell	A41-1-493FA-66	Hartzell: A41-1-493FA-66	125		Add VFD to Odor Control Fan
5	OCF-1003	Headworks Bldg.	Headworks Bldg.	Constant Speed Odor Control Fan	Hartzell	A41-1-493FA-66	Hartzell: A41-1-493FA-66	125		Add VFD to Odor Control Fan
6	OCF-2001	Headworks Bldg.	Headworks Bldg.	Constant Speed Odor Control Fan	Hartzell	A41-1-603FA-33	Hartzell: A41-1-603FA-33	100		Add VFD to Odor Control Fan
7	OCF-2002	Headworks Bldg.	Headworks Bldg.	Constant Speed Odor Control Fan	Hartzell	A41-1-603FA-33	Hartzell: A41-1-603FA-33	100		Add VFD to Odor Control Fan

General Information			Existing Equipment Data							Proposed Equipment Data	
#	ID TAG #	Unit Location	Manuf.	Make	GPM	Mfg. Year	Hp	Motor	Replace (Y/N)	Description (Post)	Proposed Make: Model
1	RAS-2	Train B	Fairbanks Morse Pump Corp.	B5721	8500	≈ 1997	75	Titan 677368	Y	Hi Efficiency Pump & Motor	Gorman-Rupp Co: 6510C-B
2	RAS-3	Train B	Fairbanks Morse Pump Corp.	B5721	8500	≈ 1997	75	Titan 677368	Y	Hi Efficiency Pump & Motor	Gorman-Rupp Co: 6510C-B
3	RAS-4	Train B	Fairbanks Morse Pump Corp.	B5721	8500	≈ 1997	75	Titan 677368	Y	Hi Efficiency Pump & Motor	Gorman-Rupp Co: 6510C-B
4	WAS-1	Train B	Fairbanks Morse Pump Corp.	K4B1	2500	≈ 1997	20	USEM H14905	Y	Hi Efficiency Pump & Motor	Gorman-Rupp Co: 6514B-B
5	WAS-2	Train B	Fairbanks Morse Pump Corp.	K4B1	2500	≈ 1997	20	USEM H14905	Y	Hi Efficiency Pump & Motor	Gorman-Rupp Co: 6514B-B
6	WAS-3	Train B	Fairbanks Morse Pump Corp.	K4B1	2500	≈ 1997	20	USEM H14905	Y	Hi Efficiency Pump & Motor	Gorman-Rupp Co: 6514B-B

Unit Report For 3 Ton HP

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Unit Parameters

Unit Model:.....**50GCQM04C2D6-0A0A0**
 Unit Size:.....**04 (3 Tons)**
 Volts-Phase-Hertz:.....**460-3-60**
 Heating Type:.....**Heat Pump**
 Duct Cfg:.....**Vertical Supply / Vertical Return**
 Two 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:.....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. This filter is not MERV Rated.

Unit Configuration

SA Smoke Detector
 Direct Drive - EcoBlue - Medium Static
 E-coat Al/Cu - E-coat Al/Cu
 Base controls set up for field installed air management device
 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.

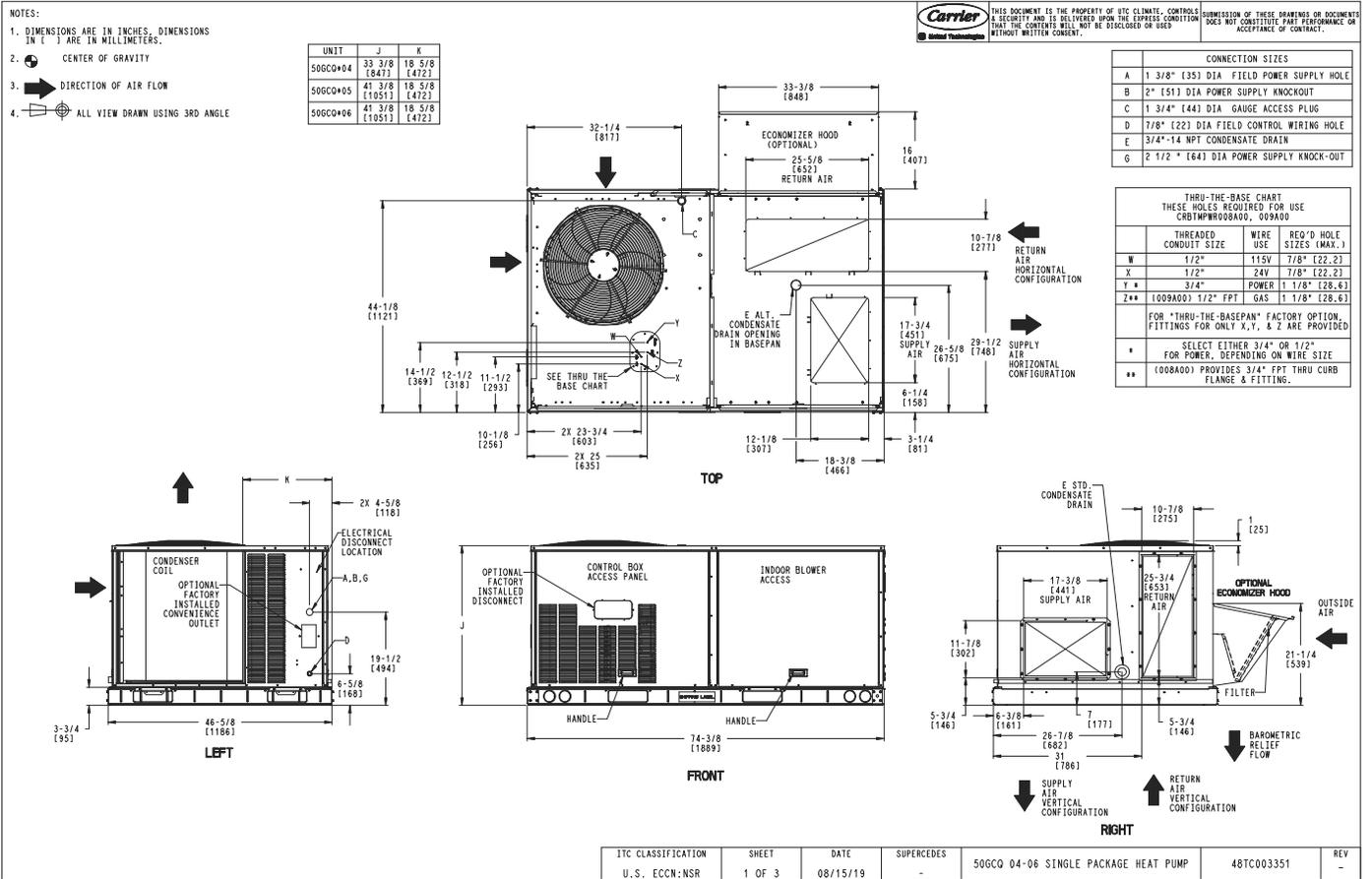
Ordering Information

Part Number	Description	Quantity
50GCQM04C2D6-0A0A0	Rooftop Unit	1

Certified Drawing for 3 Ton HP

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM



Certified Drawing for 3 Ton HP

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

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	
50GCO#04	475	215	128	58	120	54	110	50	117	53	36 [914]	22 3/8 [568]	16 1/8 [410]	
50GCO#05	590	268	162	73	147	67	134	61	148	67	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]	
50GCO#06	596	270	163	74	148	67	125	61	149	68	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.

TOP

FRONT

NOTE:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

SURFACE	CLEARANCE		OPERATING CLEARANCE
	SERVICE WITH CONDUCTIVE BARRIER	SERVICE WITH NONCONDUCTIVE BARRIER	
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]

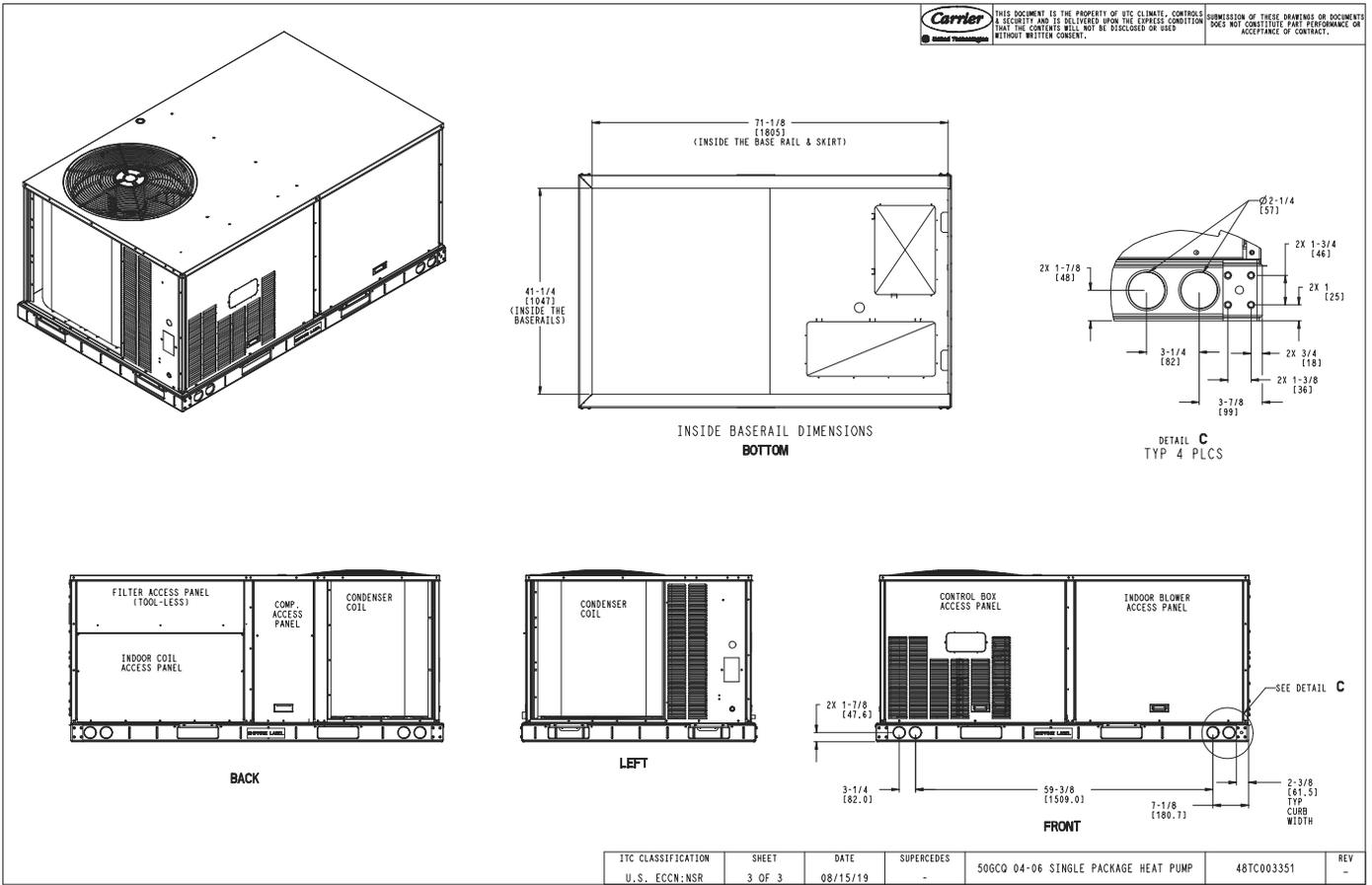
ITC CLASSIFICATION	SHEET	DATE
U.S. ECCN: NSR	2 OF 3	08/15/19

SUPERCEDES	50GCO 04-06 SINGLE PACKAGE HEAT PUMP	REV
-		-

Certified Drawing for 3 Ton HP

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM



ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	50GCO 04-06 SINGLE PACKAGE HEAT PUMP	48TC003351	REV
U.S. ECCN: NSR	3 OF 3	08/15/19	-			-

Performance Summary For 3 Ton HP

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Part Number:50GCQM04C2D6-0A0A0

ARI SEER:.....16.20

Base Unit Dimensions

Unit Length:.....74.4 in
Unit Width:.....46.6 in
Unit Height:.....33.4 in

Operating Weight

Base Unit Weight:.....475 lb
SA Smoke Detector:.....7 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:.....58.9 F
Evaporator Leaving Air WB:.....57.6 F
Evaporator Leaving Air Enthalpy:.....24.79 BTU/lb
Gross Cooling Capacity:.....35.89 MBH
Gross Sensible Capacity:.....27.31 MBH
Compressor Power Input:.....2.46 kW
Coil Bypass Factor:.....0.070

Heating Performance

Outdoor Ambient Temperature:.....47.0 F
Entering Air Indoor Coil DB:.....70.0 F
Leaving Air Indoor Coil DB:.....96.5 F
Total Heating Capacity:.....34.30 MBH
Integrated Heating Capacity:.....34.30 MBH
Heating Power Input:.....2.34 kW
High Temperature COP:.....3.80
Low Temperature COP:.....2.40
HSPF:.....8.3

Supply Fan

External Static Pressure:.....0.50 in wg
Fan RPM:.....1520
Fan Power:.....0.25 BHP
NOTE:.....Selected IFM RPM Range: 1058 - 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 FLA:.....1.2
Power Supply MCA:.....10

Performance Summary For 3 Ton HP

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

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

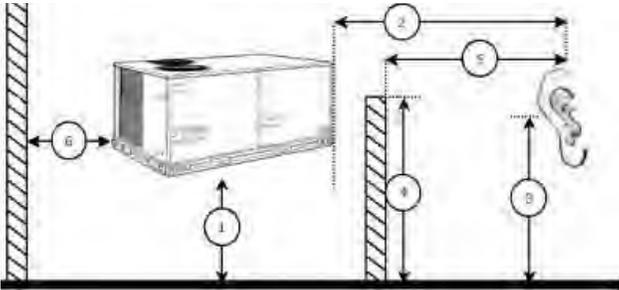
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	86.1	80.7	81.8
125 Hz	78.7	72.2	81.8
250 Hz	70.9	64.2	77.0
500 Hz	62.7	55.9	72.6
1000 Hz	59.6	57.8	69.9
2000 Hz	56.4	49.0	64.6
4000 Hz	53.1	42.9	59.3
8000 Hz	54.6	39.5	55.6
A-Weighted	68.7	63.0	75.4

Advanced Acoustics



Advanced Acoustics 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

A Sound Power Levels at Unit's Acoustic Center, Lw
 B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA

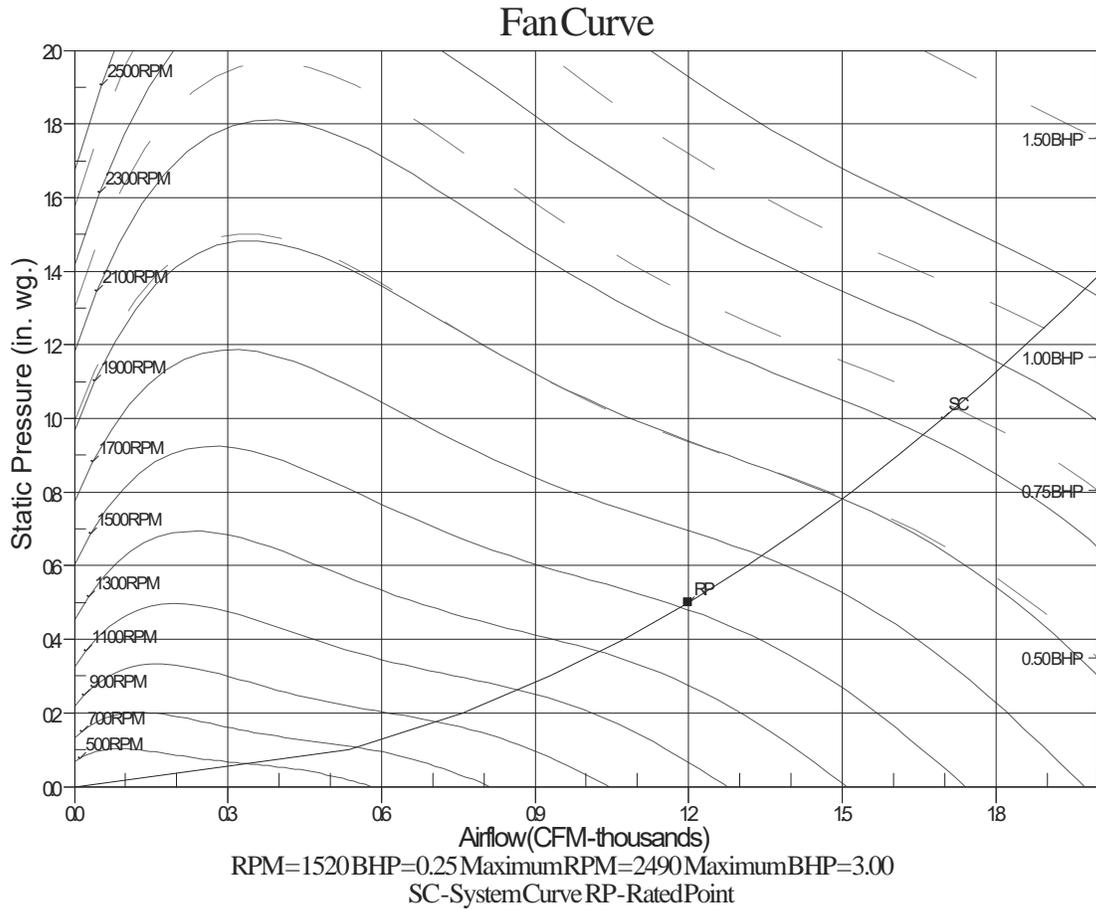
Performance Summary For 3 Ton HP

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

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.



Unit Report For 6 Ton HP

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Unit Parameters

Unit Model:.....**50FCQM07C2D6-0A0A0**
 Unit Size:.....**07 (6 Tons)**
 Volts-Phase-Hertz:.....**460-3-60**
 Heating Type:.....**Heat Pump**
 Duct Cfg:.....**Vertical Supply / Vertical Return**
 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:.....596 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. This filter is not MERV Rated.

Unit Configuration

SA Smoke Detector
 Direct Drive - EcoBlue - Medium Static
 E-coat Al/Cu - E-coat Al/Cu
 Base Electro-mechanical 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.

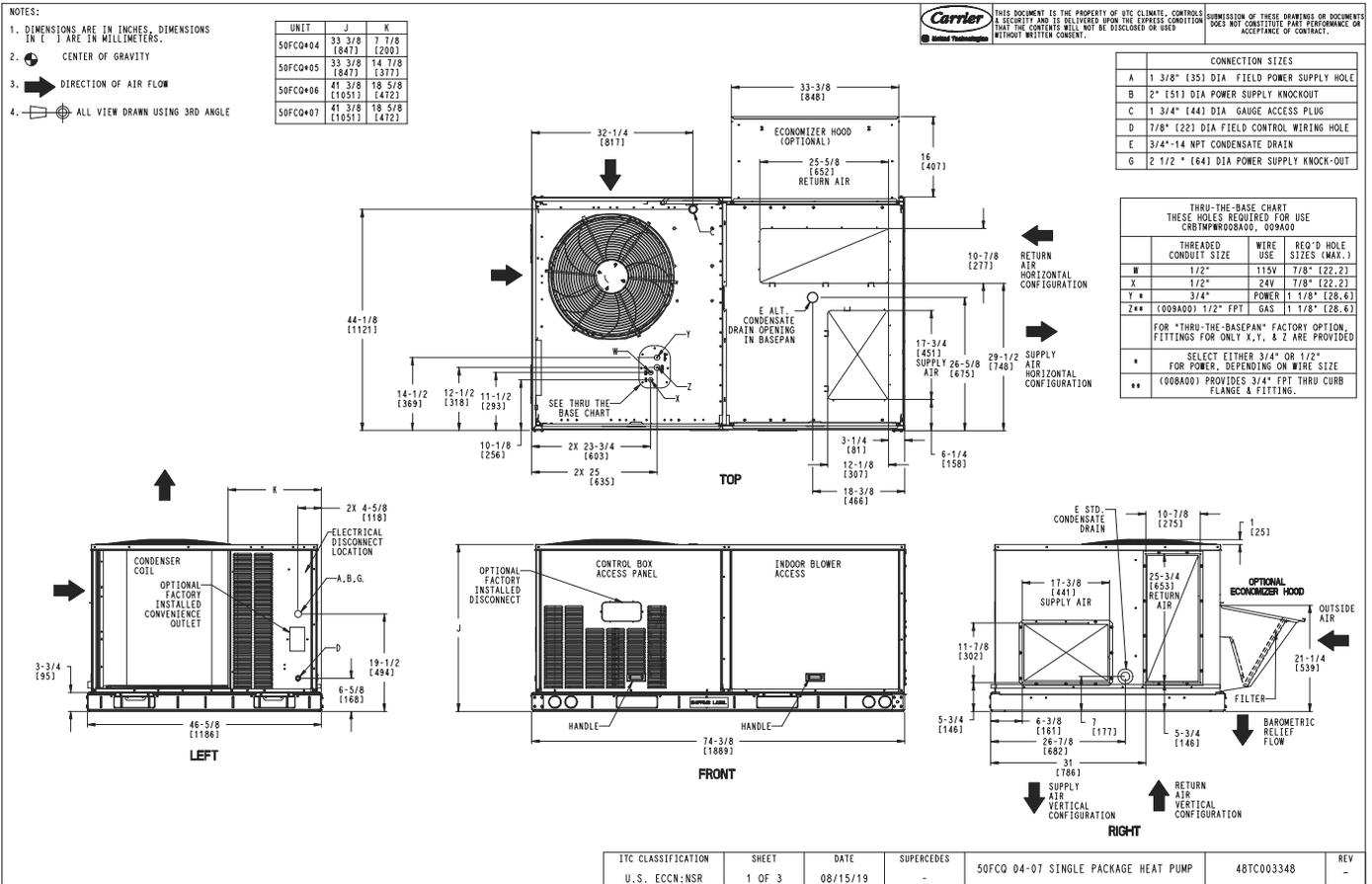
Ordering Information

Part Number	Description	Quantity
50FCQM07C2D6-0A0A0	Rooftop Unit	1

Certified Drawing for 6 Ton HP

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM



Certified Drawing for 6 Ton HP

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

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.	X	Y	Z	
50FCQ04	467	212	126	57	118	53	108	49	115	52	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ05	473	215	127	58	119	54	110	50	117	53	36 [914]	22 3/8 [568]	16 1/8 [410]
50FCQ06	584	265	160	72	145	66	133	60	148	66	35 3/8 [898]	22 5/16 [557]	16 1/2 [419]
50FCQ07	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.

TOP

FRONT

BACK

NOTE:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

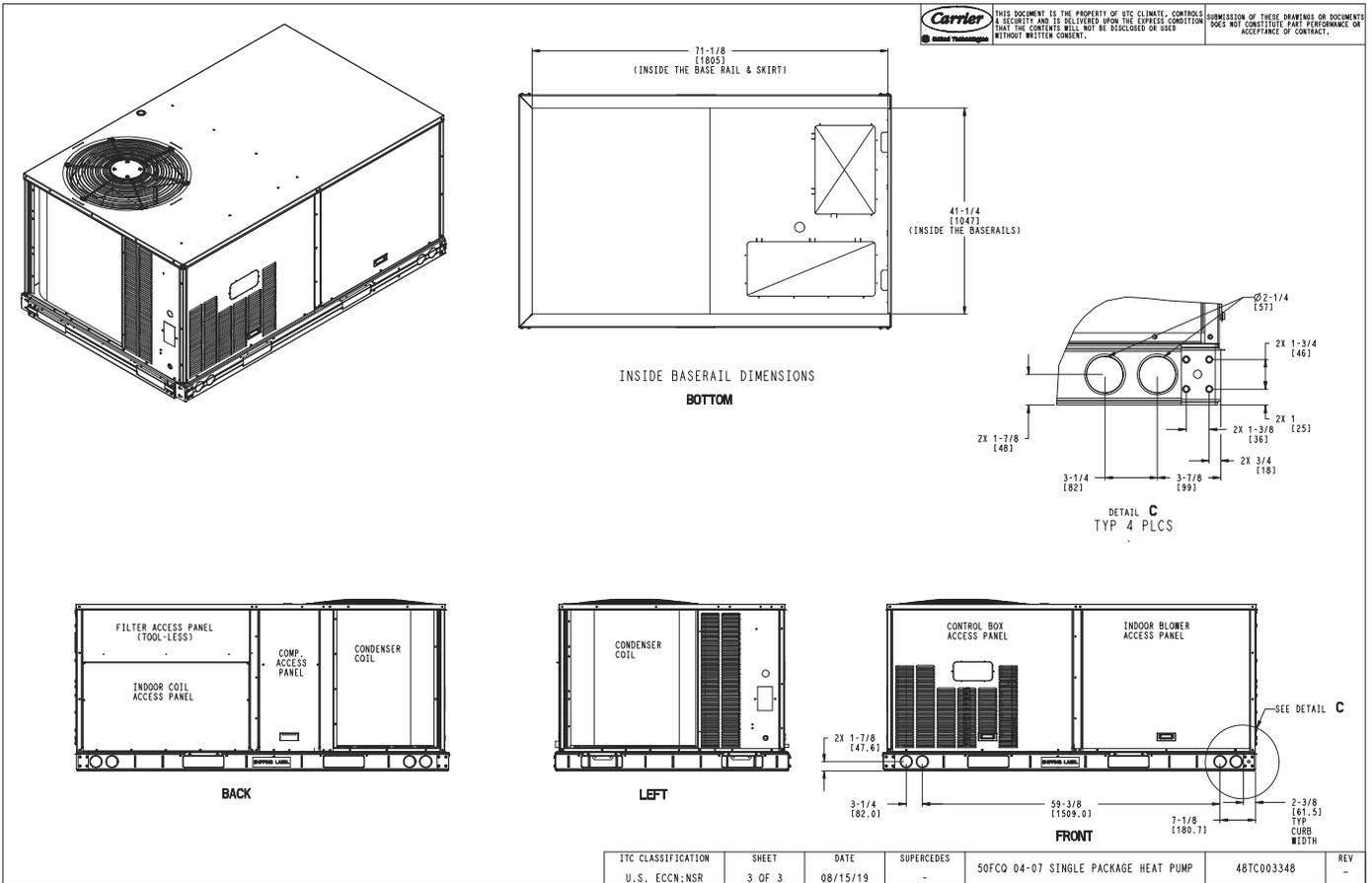
SURFACE	CLEARANCE		OPERATING CLEARANCE
	SERVICE WITH CONDUCTIVE BARRIER	SERVICE WITH NONCONDUCTIVE BARRIER	
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/ECON	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	50FCQ 04-07 SINGLE PACKAGE HEAT PUMP	48TC003348	REV
U.S. ECCN: NSR	2 OF 3	08/15/19	-			-

Certified Drawing for 6 Ton HP

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM



Performance Summary For 6 Ton HP

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Part Number:50FCQM07C2D6-0A0A0

ARI EER:.....11.20
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:.....589 lb
SA Smoke Detector:.....7 lb

Total Operating Weight:.....596 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:.....55.6 F
Evaporator Leaving Air WB:.....55.6 F
Evaporator Leaving Air Enthalpy:.....23.55 BTU/lb
Gross Cooling Capacity:.....73.45 MBH
Gross Sensible Capacity:.....55.30 MBH
Compressor Power Input:.....5.29 kW
Coil Bypass Factor:.....0.022

Heating Performance

Outdoor Ambient Temperature:.....47.0 F
Entering Air Indoor Coil DB:.....70.0 F
Leaving Air Indoor Coil DB:.....98.0 F
Total Heating Capacity:.....63.55 MBH
Integrated Heating Capacity:.....63.55 MBH
Heating Power Input:.....5.15 kW
High Temperature COP:.....3.60
Low Temperature COP:.....2.40
HSPF:.....0.0

Supply Fan

External Static Pressure:.....0.50 in wg
Fan RPM:.....1780
Fan Power:.....0.59 BHP
NOTE:.....Selected IFM RPM Range: 253 - 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:.....8.5
Compressor #1 LRA:......66
Indoor Fan Motor Type:.....MED
Indoor Fan Motor FLA:.....2.2

Performance Summary For 6 Ton HP

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

Power Supply MCA:.....	14
Power Supply MOCP (Fuse or HACR):.....	20
Disconnect Size FLA:.....	13
Disconnect Size LRA:.....	71
Electrical Convenience Outlet:.....	None
Outdoor Fan [Qty / FLA (ea)]:.....	1 / 0.8

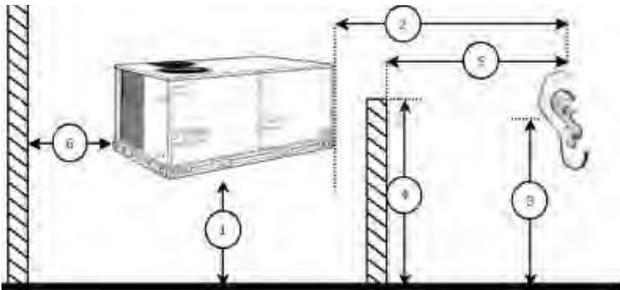
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	87.7	85.7	85.6
125 Hz	78.2	74.8	84.7
250 Hz	72.3	69.3	80.5
500 Hz	70.5	61.2	76.0
1000 Hz	66.2	64.5	72.4
2000 Hz	64.2	55.7	68.0
4000 Hz	60.8	48.7	62.8
8000 Hz	58.0	43.8	59.3
A-Weighted	73.1	68.3	79.0

Advanced Acoustics



Advanced Acoustics 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

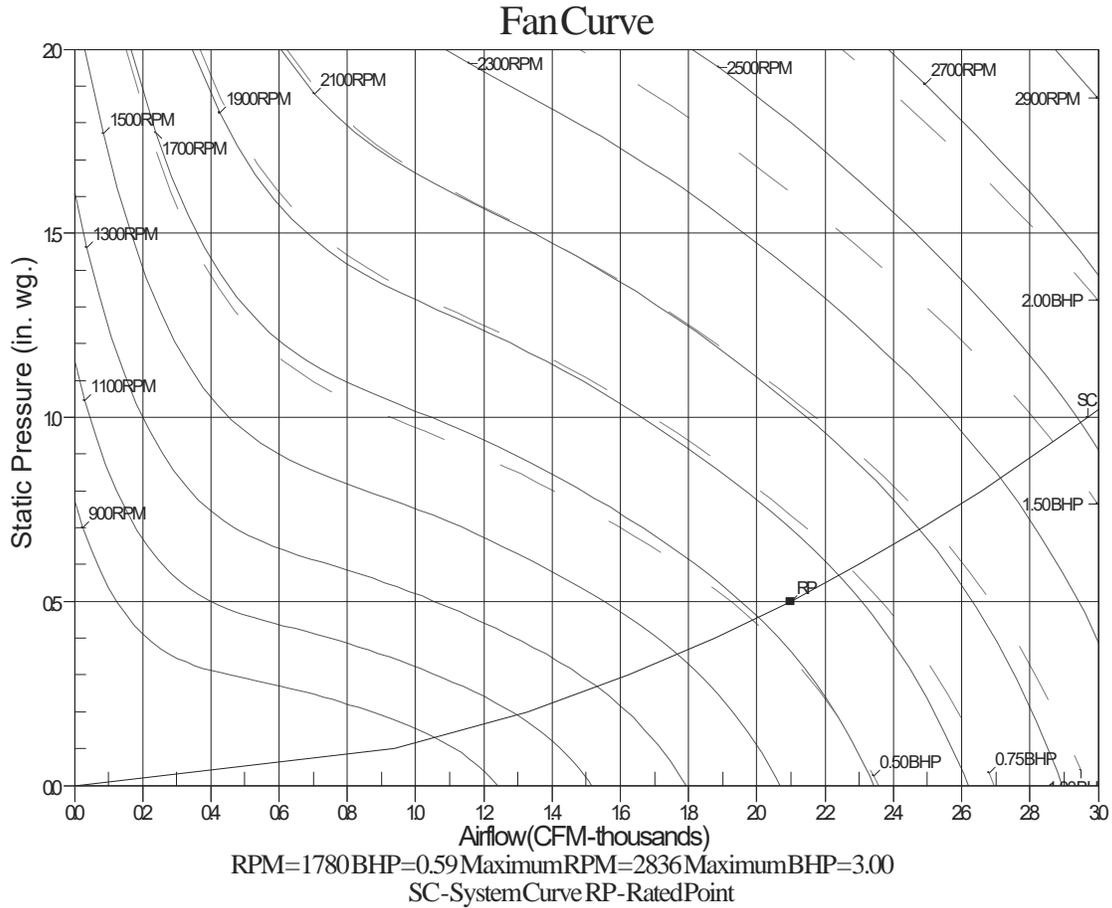
Performance Summary For 6 Ton HP

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

- 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.



Unit Report For 2 Ton

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Unit Parameters

Unit Model:.....**48VGUE240403-TP**
 Unit Size:.....**24 (2.0 Tons)**
 Volts-Phase-Hertz:.....**208-1-60**
 Heating Type:.....**Gas**
 Duct Cfg:.....**Vertical Supply / Vertical Return**
 40,000 Btuh
 Ultra Low NOx Unit

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length:.....**4' 0.1875"**
 Unit Width:.....**2' 8.625"**
 Unit Height:.....**3' 8.125"**

*** 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):

344.....lb

Unit Configuration

Tin-Plated Indoor Coil Hairpins

Warranty Information

1 year warranty on parts
 5 year warranty on compressor
 5 year warranty on heat exchanger

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
48VGUE240403-TP	Rooftop Unit	1

Certified Drawing for 2 Ton

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

There is no Certified Drawing available for this tag

Performance Summary For 2 Ton

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Part Number:48VGUE240403-TP

ARI SEER:.....15.00

Base Unit Dimensions

Unit Length:.....48.2 in
Unit Width:.....32.6 in
Unit Height:.....44.1 in

Base Unit Weight (Does not include any accessories):.....344 lb

Unit

Unit Voltage-Phase-Hertz:.....208-1-60
Air Discharge:.....Vertical
Fan Drive Type:.....Direct
Actual Airflow:.....721 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:.....24.44 BTU/lb
Net Cooling Capacity:.....22.69 MBH
Net Sensible Capacity:.....16.73 MBH
Total Unit Power Input:.....1.90 kW
Coil Bypass Factor:.....0.000

Heating Performance

Heating Airflow:.....721 CFM
Entering Air Temp:.....70.0 F
Leaving Air Temp:.....117.5 F
Gas Heating Input Capacity:.....45.0 MBH
Gas Heating Output Capacity:.....37.0 MBH
Temperature Rise:.....47.5 F
AFUE (%):.....81.0

Supply Fan

External Static Pressure:.....0.30 in wg
Options / Accessories Static Pressure
Wet Coil:.....0.04 in wg
Total Application Static (ESP + Unit Opts/Acc.):.....0.34 in wg
Fan RPM:.....1050
Fan Power:.....0.15 BHP
Fan Motor Size, hp:.....1/2
NOTE:.....Med-High 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:.....11.7
Compressor LRA:.....58.3
Outdoor Fan FLA (ea):.....0.7
Indoor Fan Motor FLA:.....4.1
Power Supply MCA:.....19.4
Power Supply MOCP (Fuse or HACR):.....30

Performance Summary For 2 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

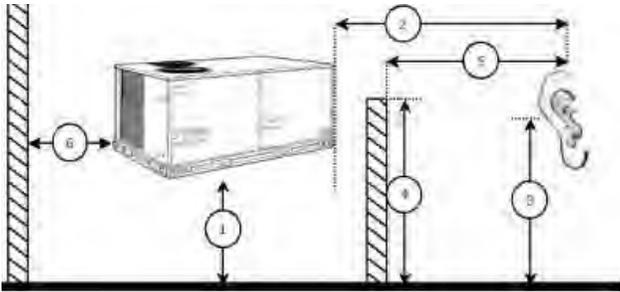
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Rating:.....**73.0** 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	62.5
500 Hz	NA	NA	68.5
1000 Hz	NA	NA	68.5
2000 Hz	NA	NA	64.0
4000 Hz	NA	NA	60.0
8000 Hz	NA	NA	53.0

Advanced Acoustics



Advanced Acoustics 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	62.5	68.5	68.5	64.0	60.0	53.0	73.1 Lw
B	-	43.9	53.9	65.3	68.5	65.2	61.0	51.9	71.9 LwA
C	0.0	27.6	30.1	36.1	36.1	31.6	27.6	20.6	40.7 Lp
D	-	11.5	21.5	32.9	36.1	32.8	28.6	19.5	39.5 LpA
	26.2								

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 2 Ton

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

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.

Unit Report For 3 Ton

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Unit Parameters

Unit Model:.....**48VGUE360605**
 Unit Size:.....**36 (3.0 Tons)**
 Volts-Phase-Hertz:.....**208-3-60**
 Heating Type:.....**Gas**
 Duct Cfg:.....**Vertical Supply / Vertical Return**
 60,000 Btuh
 Ultra Low NOx Unit

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length:.....**4' 0.1875"**
 Unit Width:.....**3' 8.125"**
 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):

447.....lb

Warranty Information

1 year warranty on parts
 5 year warranty on compressor
 5 year warranty on heat exchanger

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
48VGUE360605	Rooftop Unit	1

Certified Drawing for 3 Ton

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

There is no Certified Drawing available for this tag

Performance Summary For 3 Ton

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Part Number:48VGUE360605

ARI SEER:.....16.00

Base Unit Dimensions

Unit Length:.....48.2 in
Unit Width:.....44.1 in
Unit Height:.....44.8 in

Base Unit Weight (Does not include any accessories):.....447 lb

Unit

Unit Voltage-Phase-Hertz:.....208-3-60
Air Discharge:.....Vertical
Fan Drive Type:.....Direct
Actual Airflow:.....1308 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:.....58.5 F
Evaporator Leaving Air Enthalpy:.....25.37 BTU/lb
Net Cooling Capacity:.....35.74 MBH
Net Sensible Capacity:.....28.18 MBH
Total Unit Power Input:.....2.85 kW
Coil Bypass Factor:.....0.000

Heating Performance

Heating Airflow:.....1308 CFM
Entering Air Temp:.....70.0 F
Leaving Air Temp:.....104.7 F
Gas Heating Input Capacity:.....60.0 MBH
Gas Heating Output Capacity:.....49.0 MBH
Temperature Rise:.....34.7 F
AFUE (%):.....81.0

Supply Fan

External Static Pressure:.....0.40 in wg
Options / Accessories Static Pressure
Wet Coil:.....0.10 in wg
Total Application Static (ESP + Unit Opts/Acc.):.....0.50 in wg
Fan RPM:.....1000
Fan Power:.....0.35 BHP
Fan Motor Size, hp:.....3/4
NOTE:.....High 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:.....11.6
Compressor LRA:.....73
Outdoor Fan FLA (ea):.....1.2
Indoor Fan Motor FLA:.....6
Power Supply MCA:.....21.7
Power Supply MOCP (Fuse or HACR):.....30

Performance Summary For 3 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

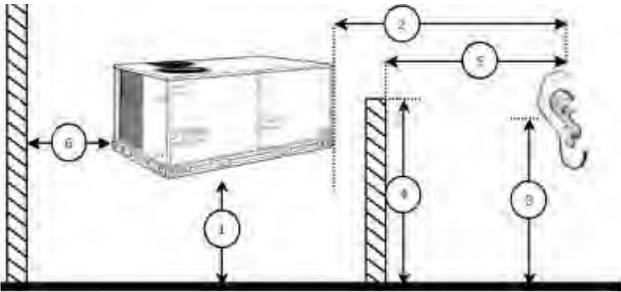
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Rating:.....**73.0** db
 Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	NA	NA	NA
125 Hz	NA	NA	62.5
250 Hz	NA	NA	65.5
500 Hz	NA	NA	67.5
1000 Hz	NA	NA	68.0
2000 Hz	NA	NA	65.5
4000 Hz	NA	NA	60.0
8000 Hz	NA	NA	52.5

Advanced Acoustics



Advanced Acoustics 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	62.5	65.5	67.5	68.0	65.5	60.0	52.5	73.4 Lw
B	- 26.2	46.4	56.9	64.3	68.0	66.7	61.0	51.4	71.9 LwA
C	0.0	30.1	33.1	35.1	35.6	33.1	27.6	20.1	41.0 Lp
D	- 26.2	14.0	24.5	31.9	35.6	34.3	28.6	19.0	39.5 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 3 Ton

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

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.

Unit Report For 4 Ton

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Unit Parameters

Unit Model:.....**48VGUE480905**
 Unit Size:.....**48 (4 Tons)**
 Volts-Phase-Hertz:.....**208-3-60**
 Heating Type:.....**Gas**
 Duct Cfg:.....**Vertical Supply / Vertical Return**
 90,000 Btuh
 Ultra Low NOx Unit

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length:.....**4' 0.1875"**
 Unit Width:.....**3' 8.125"**
 Unit Height:.....**4' 2.75"**

*** 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):
492.....lb

Warranty Information

1 year warranty on parts
 5 year warranty on compressor
 5 year warranty on heat exchanger

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
48VGUE480905	Rooftop Unit	2

Certified Drawing for 4 Ton

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

There is no Certified Drawing available for this tag

Performance Summary For 4 Ton

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Part Number:48VGUE480905

ARI SEER:.....16.00

Base Unit Dimensions

Unit Length:.....48.2 in
Unit Width:.....44.1 in
Unit Height:.....50.8 in

Base Unit Weight (Does not include any accessories):.....492 lb

Unit

Unit Voltage-Phase-Hertz:.....208-3-60
Air Discharge:.....Vertical
Fan Drive Type:.....Direct
Actual Airflow:.....1696 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:.....59.8 F
Evaporator Leaving Air WB:.....58.2 F
Evaporator Leaving Air Enthalpy:.....25.18 BTU/lb
Net Cooling Capacity:.....47.79 MBH
Net Sensible Capacity:.....37.03 MBH
Total Unit Power Input:.....3.89 kW
Coil Bypass Factor:.....0.000

Heating Performance

Heating Airflow:.....1696 CFM
Entering Air Temp:.....70.0 F
Leaving Air Temp:.....109.9 F
Gas Heating Input Capacity:.....89.0 MBH
Gas Heating Output Capacity:.....73.0 MBH
Temperature Rise:.....39.9 F
AFUE (%):.....81.0

Supply Fan

External Static Pressure:.....0.50 in wg
Options / Accessories Static Pressure
Wet Coil:.....0.11 in wg
Total Application Static (ESP + Unit Opts/Acc.):.....0.61 in wg
Fan RPM:.....1075
Fan Power:.....0.63 BHP
Fan Motor Size, hp:.....1
NOTE:.....High 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:.....14
Compressor LRA:.....83.1
Outdoor Fan FLA (ea):.....1.2
Indoor Fan Motor FLA:.....7.6
Power Supply MCA:.....26.3
Power Supply MOCP (Fuse or HACR):.....40

Performance Summary For 4 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

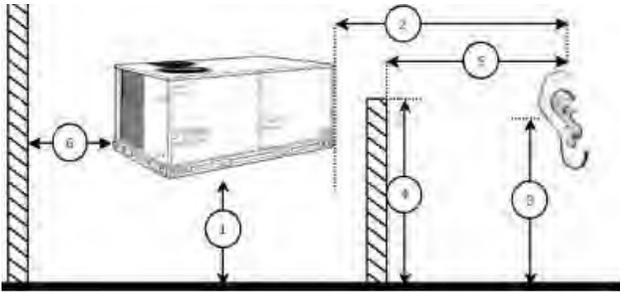
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Rating:.....**72.0** 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	63.5
500 Hz	NA	NA	66.0
1000 Hz	NA	NA	67.0
2000 Hz	NA	NA	63.5
4000 Hz	NA	NA	58.5
8000 Hz	NA	NA	49.5

Advanced Acoustics



Advanced Acoustics 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	63.5	66.0	67.0	63.5	58.5	49.5	71.8 Lw
B	-	43.9	54.9	62.8	67.0	64.7	59.5	48.4	70.5 LwA
	26.2								
C	0.0	27.6	31.1	33.6	34.6	31.1	26.1	17.1	39.4 Lp
D	-	11.5	22.5	30.4	34.6	32.3	27.1	16.0	38.1 LpA
	26.2								

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 4 Ton

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

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.

Unit Report For 3 Ton GC

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Unit Parameters

Unit Model:.....**48GCGM04C2D6-0A0A0**
 Unit Size:.....**04 (3 Tons)**
 Volts-Phase-Hertz:.....**460-3-60**
 Heating Type:.....**Gas**
 Duct Cfg:.....**Vertical Supply / Vertical Return**
 Ultra Low Nox, Low Heat
 Two 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:.....550 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. This filter is not MERV Rated.

Unit Configuration

SA Smoke Detector
 Direct Drive - EcoBlue - Medium Static
 E-coat Al/Cu - E-coat Al/Cu
 Base controls set up for field installed air management devices
 Standard Packaging

Warranty Information

1-Year parts(std.)
 5-Year compressor parts(std.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

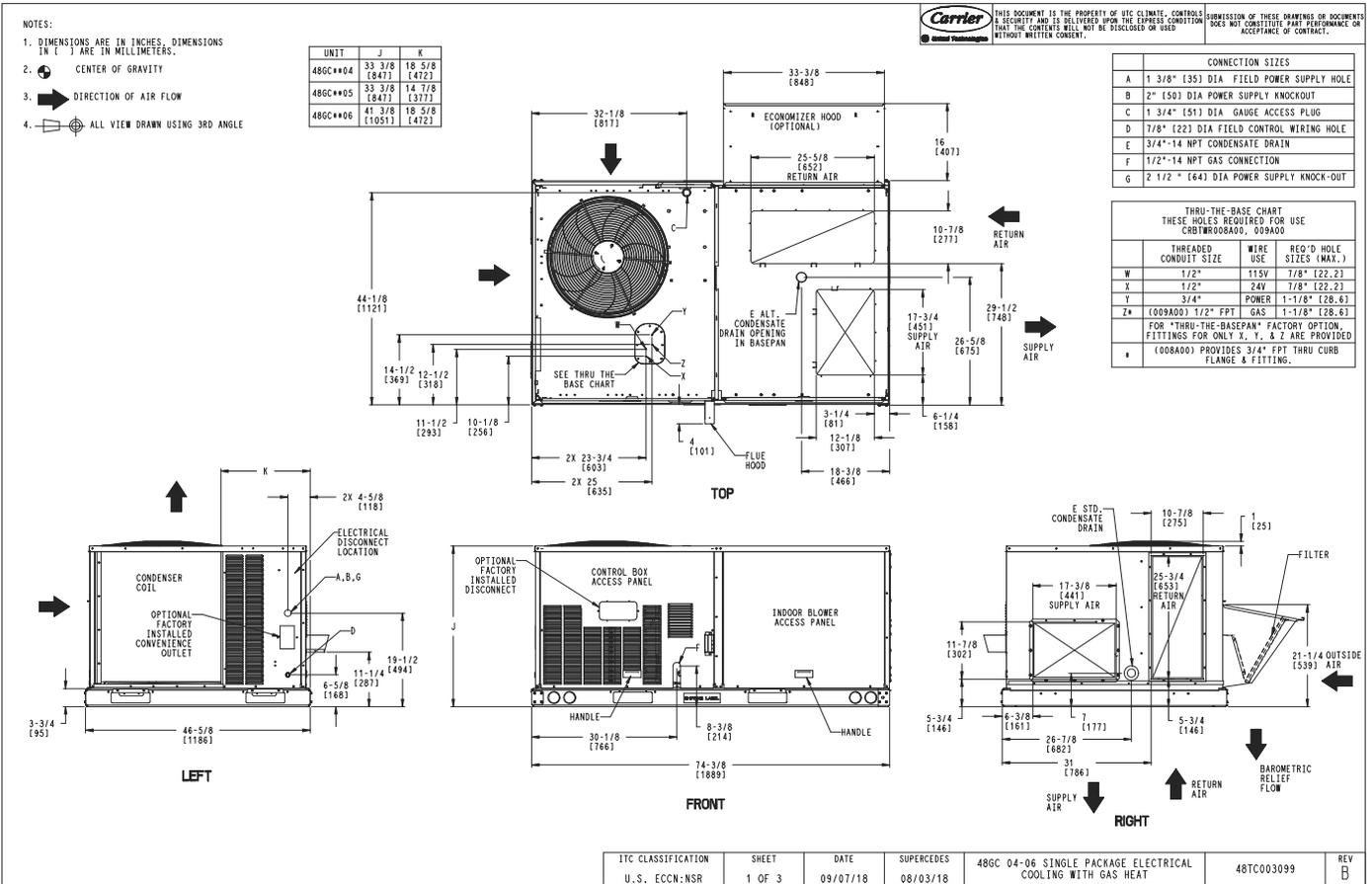
Ordering Information

Part Number	Description	Quantity
48GCGM04C2D6-0A0A0	Rooftop Unit	1

Certified Drawing for 3 Ton GC

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM



Certified Drawing for 3 Ton GC

Project: Alliance - Fresno WWTP
 Prepared By:

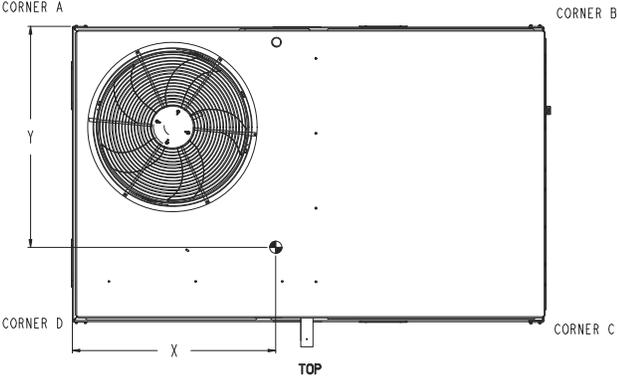
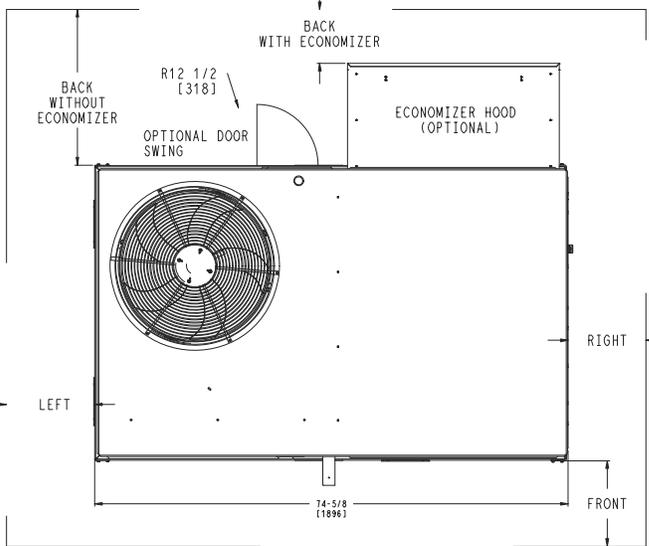
09/26/2022
 02:46PM

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	
48GC**04	513	233	131	59	127	58	125	57	130	59	36 1/2 (927)	23 1/4 (591)	18 1/4 (464)	
48GC**05	555	252	142	64	137	62	135	61	141	64	36 1/2 (927)	23 1/4 (591)	18 (457)	
48GC**06	600	272	161	73	151	68	140	64	149	68	36 (914)	22 1/2 (572)	19 3/8 (492)	

* - STANDARD UNIT WEIGHT IS WITH LOW GAS HEAT AND WITHOUT PACKAGING. FOR OTHER OPTINS AND ACCESSORIES REFER TO THE PRODUCT DATA CATALOG.



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NOTES:
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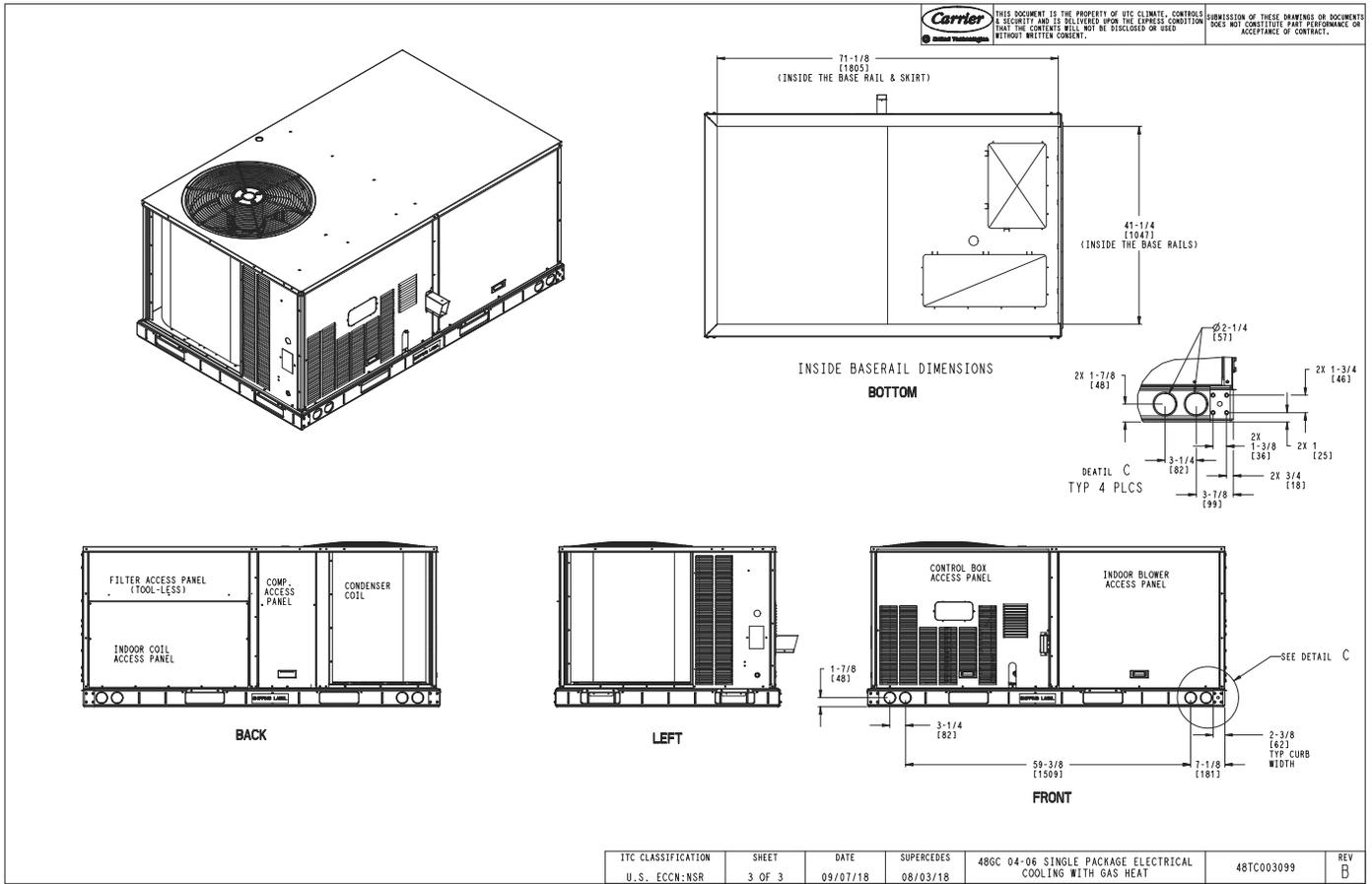
SURFACE	CLEARANCE		OPERATING CLEARANCE
	SERVICE WITH CONDUCTIVE BARRIER	SERVICE WITH NONCONDUCTIVE BARRIER	
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/HOOD	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	48GC 04-06 SINGLE PACKAGE ELECTRICAL COOLING WITH GAS HEAT	REV
U.S. ECCN:NSR	2 OF 3	09/07/18	08/03/18		B

Certified Drawing for 3 Ton GC

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM



ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	48GC 04-06 SINGLE PACKAGE ELECTRICAL COOLING WITH GAS HEAT	48TC003099	REV
U.S. ECCN:NSR	3 OF 3	09/07/18	08/03/18			B

Performance Summary For 3 Ton GC

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Part Number: 48GCGM04C2D6-0A0A0

ARI SEER: 16.10

Base Unit Dimensions

Unit Length: 74.4 in
Unit Width: 46.6 in
Unit Height: 33.4 in

Operating Weight

Base Unit Weight: 543 lb
SA Smoke Detector: 7 lb

Total Operating Weight: 550 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: 60.3 F
Evaporator Leaving Air WB: 57.8 F
Evaporator Leaving Air Enthalpy: 24.93 BTU/lb
Gross Cooling Capacity: 35.14 MBH
Gross Sensible Capacity: 25.59 MBH
Compressor Power Input: 2.47 kW
Coil Bypass Factor: 0.123

Heating Performance

Heating Airflow: 1200 CFM
Entering Air Temp: 70.0 F
Leaving Air Temp: 107.8 F
Gas Heating Input Capacity: 60.0 MBH
Gas Heating Output Capacity: 49.0 MBH
Temperature Rise: 37.8 F
Thermal Efficiency (%): 81.0

Supply Fan

External Static Pressure: 0.50 in wg
Fan RPM: 1592
Fan Power: 0.29 BHP
NOTE: Selected IFM RPM Range: 1129 - 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: 5.7
Compressor #1 LRA: 38
Indoor Fan Motor Type: MED
Indoor Fan Motor FLA: 1.2
Combustion Fan Motor FLA (ea): 0.25
Power Supply MCA: 10
Power Supply MOCP (Fuse or HACR): 15

Performance Summary For 3 Ton GC

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

Disconnect Size FLA:.....**9**
 Disconnect Size LRA:.....**42**
 Electrical Convenience Outlet:.....**None**
 Outdoor Fan [Qty / FLA (ea)]:.....**1 / 0.8**

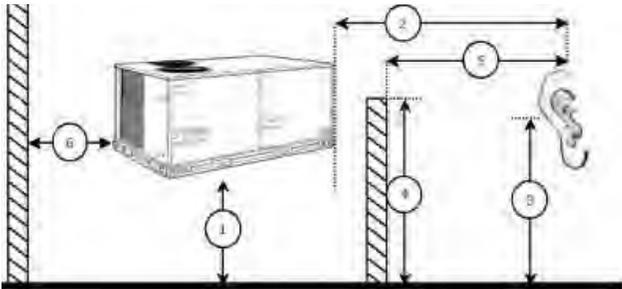
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	87.1	81.6	85.6
125 Hz	79.5	73.4	84.7
250 Hz	72.1	65.1	80.5
500 Hz	63.8	57.1	76.0
1000 Hz	60.9	59.0	72.4
2000 Hz	57.7	50.3	68.0
4000 Hz	54.2	44.1	62.8
8000 Hz	55.0	40.2	59.3
A-Weighted	69.7	64.1	79.0

Advanced Acoustics



Advanced Acoustics 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

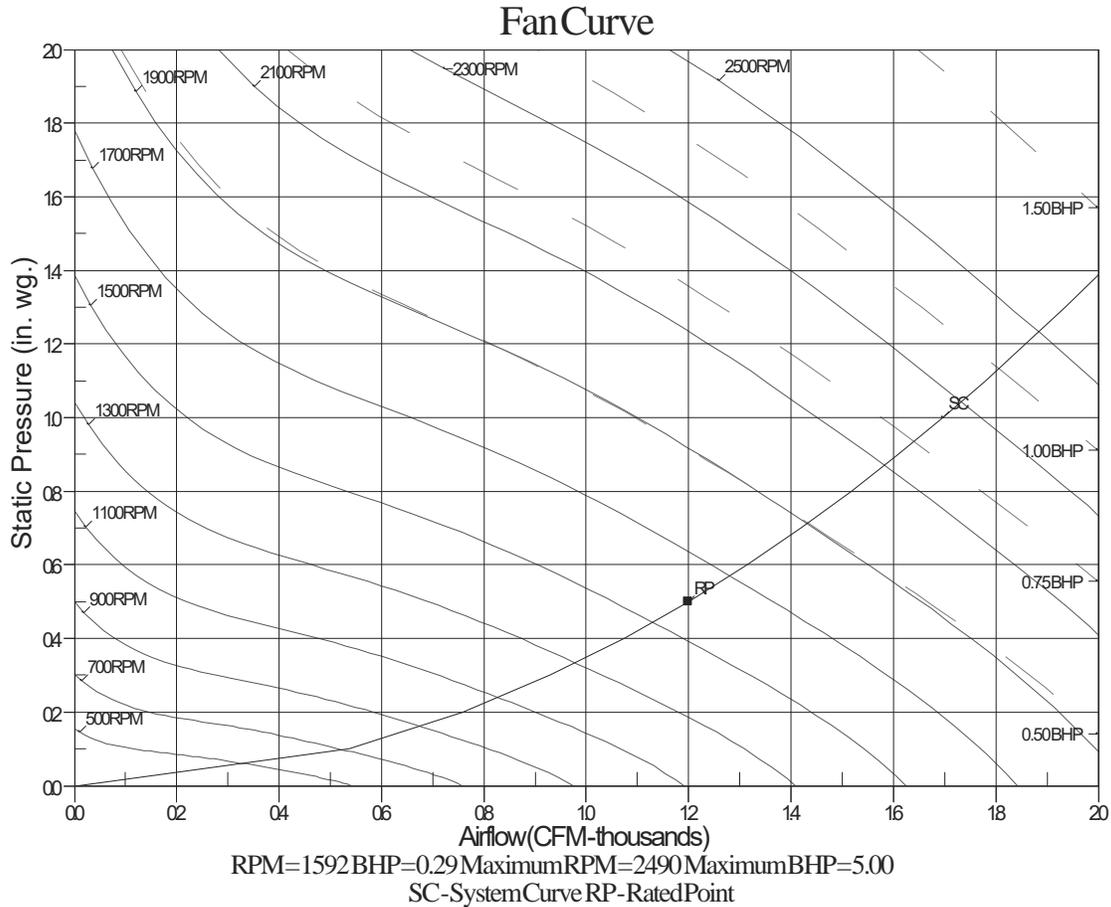
Performance Summary For 3 Ton GC

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

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.



Unit Report For 10 Ton HP

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Unit Parameters

Unit Model:.....**50FCQM12C2D5-0A0A0**
 Unit Size:.....**12 (10 Tons)**
 Volts-Phase-Hertz:.....**208-3-60**
 Heating Type:.....**Heat Pump**
 Duct Cfg:.....**Vertical Supply / Vertical Return**
 Two-Stage Cooling / One Circuit

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. This filter is not MERV Rated.

Unit Configuration

SA Smoke Detector
 Standard/Medium Static (EcoBlue)
 E-coat Al/Cu - E-coat Al/Cu
 Base Electromechanical Controls
 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
50FCQM12C2D5-0A0A0	Rooftop Unit	1

Certified Drawing for 10 Ton HP

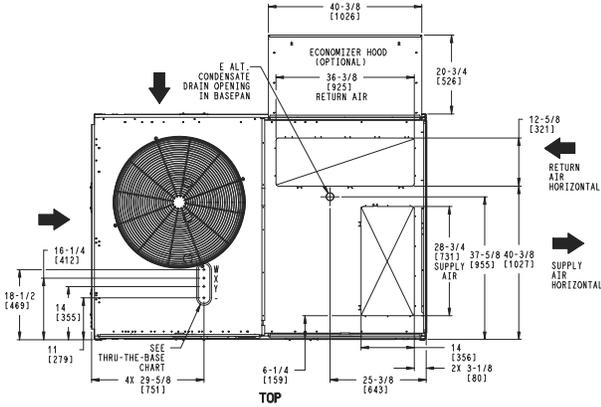
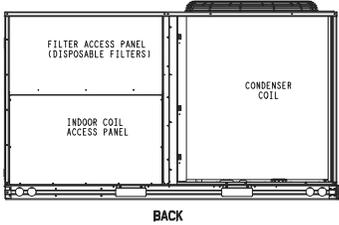
Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

- 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
50FCO-12	RTPF	15 7/8 (403)

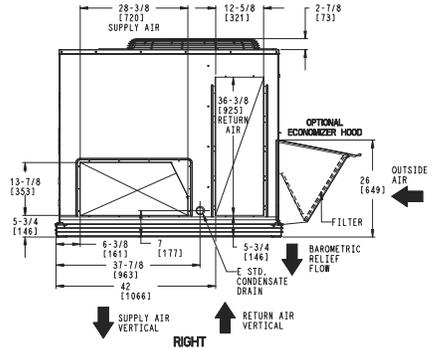
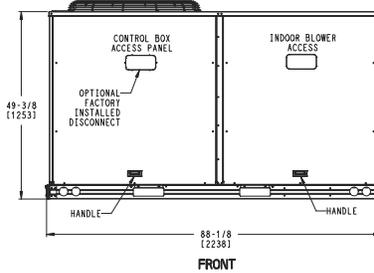
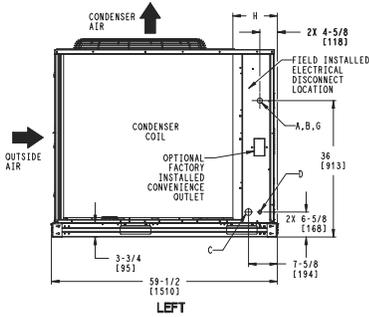
RTPF - ROUND TUBE, PLATE FIN (COPPER/ALUM)



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 CROSS REFERENCE TO			
	THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
W	1/2"	ACC.	7/8" (22, 23)
X	1/2"	24V	7/8" (22, 23)
Y	1 1/4" (002)	POWER	1 3/4" (44, 45)

FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X & Y ARE PROVIDED.



I/C CLASSIFICATION	SHEET	DATE	SUPERCEDES	50FCO 12 SINGLE ZONE ELECTRICAL HEAT PUMP	48TM009024	REV
U.S. ECCN: NSR	1 OF 3	04/01/22	-			-

Certified Drawing for 10 Ton HP

Project: Alliance - Fresno WWTP
 Prepared By:

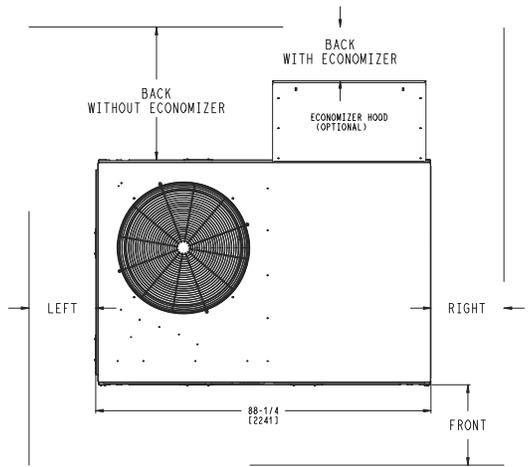
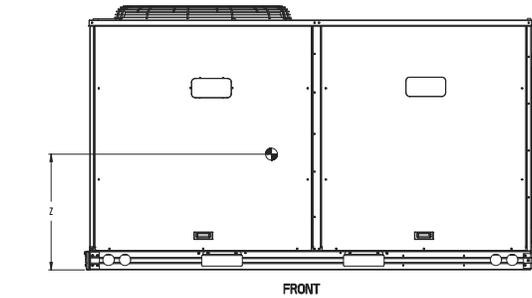
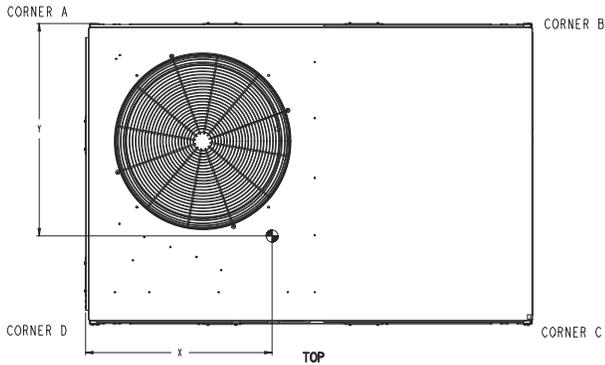
09/26/2022
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UNIT	OUTDOOR COIL TYPE	STD. UNIT WEIGHT***		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.					
		LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z			
50FCO-12	RTPF	955	433	190	86	243	110	293	133	229	104	49 1/2	[1257]	32 1/2	[826]	19 1/8	[486]

RTPF - ROUND TUBE, PLATE FIN (COPPER/ALUM)

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*** 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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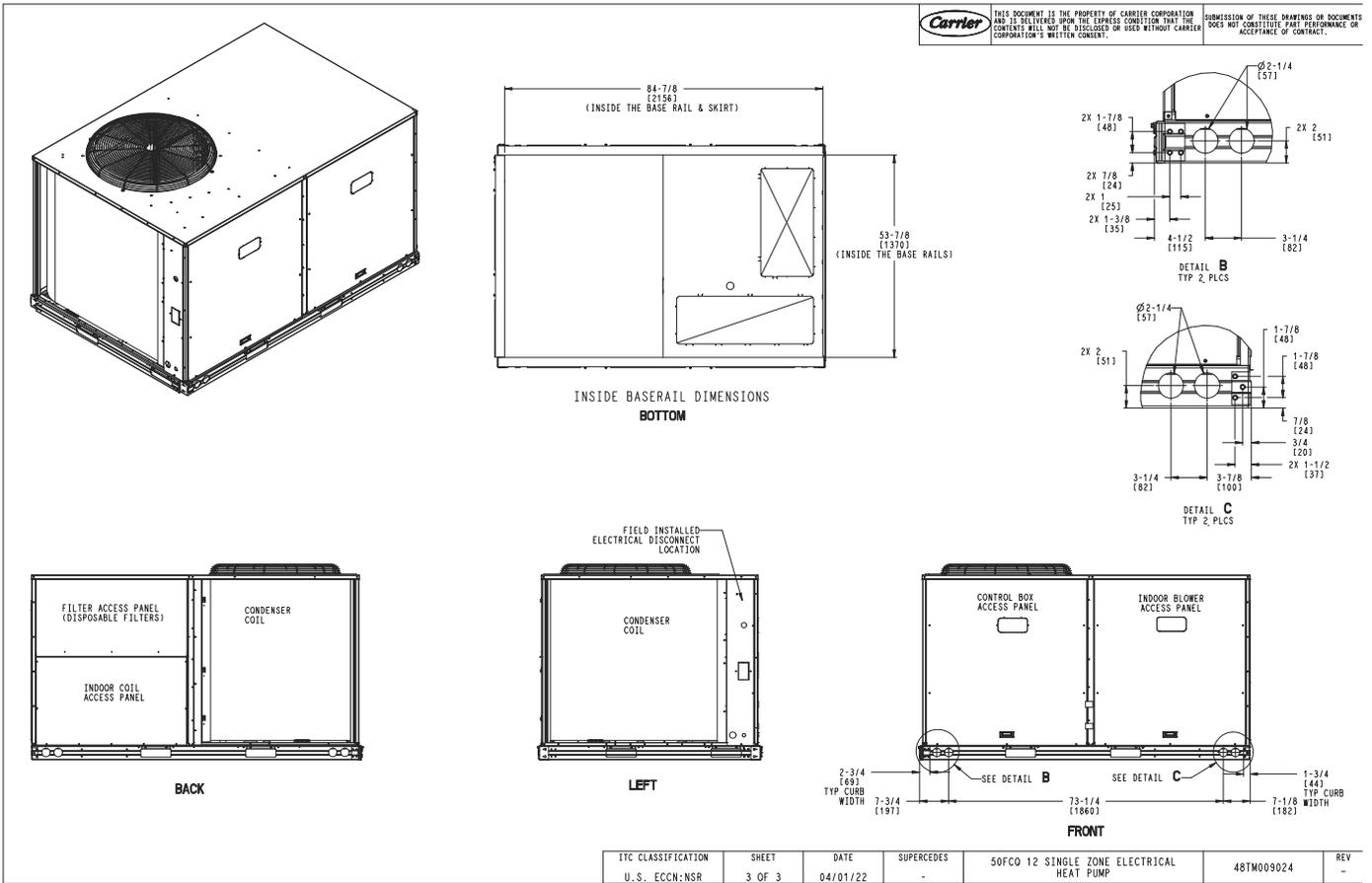
SURFACE	CLEARANCE	
	SERVICE WITH CONDUCTIVE BARRIER	SERVICE WITH NONCONDUCTIVE BARRIER
FRONT	48 [1219mm]	36 [914mm]
LEFT	48 [1219mm]	42 [1067mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]
BACK W/ECON	36 [914mm]	36 [914mm]
RIGHT	36 [914mm]	36 [914mm]
TOP	72 [1829mm]	72 [1829mm]

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	50FCO 12 SINGLE ZONE ELECTRICAL HEAT PUMP	48TM009024	REV
U.S. ECCN:NSR	2 OF 3	04/01/22	-			-

Certified Drawing for 10 Ton HP

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM



ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	50FCO 12 SINGLE ZONE ELECTRICAL HEAT PUMP	48TM009024	REV
U.S. ECCN:NSR	3 OF 3	04/01/22	-			-

Performance Summary For 10 Ton HP

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Part Number:50FCQM12C2D5-0A0A0

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:.....208-3-60
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
HSPF:.....0.0

Supply Fan

External Static Pressure:.....0.50 in wg
Fan RPM:.....1634
Fan Power:.....1.46 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:.....187 - 253
Compressor #1 RLA:.....15.6
Compressor #1 LRA:.....110
Compressor #2 RLA:.....15.6
Compressor #2 LRA:.....110
Indoor Fan Motor Type:.....MED
Indoor Fan Motor FLA:.....6.4
Power Supply MCA:.....49
Power Supply MOCP (Fuse or HACR):.....60

Performance Summary For 10 Ton HP

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

Disconnect Size FLA:..... **52**
 Disconnect Size LRA:..... **236**
 Electrical Convenience Outlet:..... **None**
 Outdoor Fan [Qty / FLA (ea)]:..... **1 / 7.4**

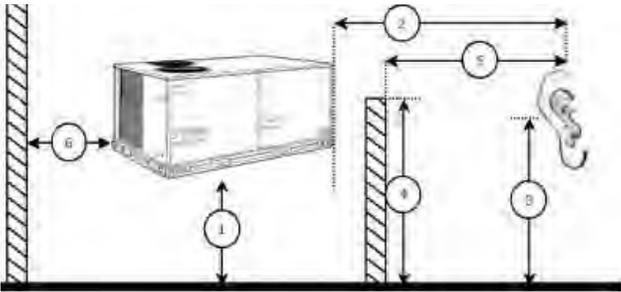
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	90.2	86.0	88.1
125 Hz	85.2	78.2	90.0
250 Hz	70.4	65.2	85.9
500 Hz	70.8	65.4	83.0
1000 Hz	68.6	63.4	81.6
2000 Hz	65.8	57.8	78.5
4000 Hz	66.4	54.8	76.4
8000 Hz	61.2	48.7	75.5
A-Weighted	75.6	69.1	87.0

Advanced Acoustics



Advanced Acoustics 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

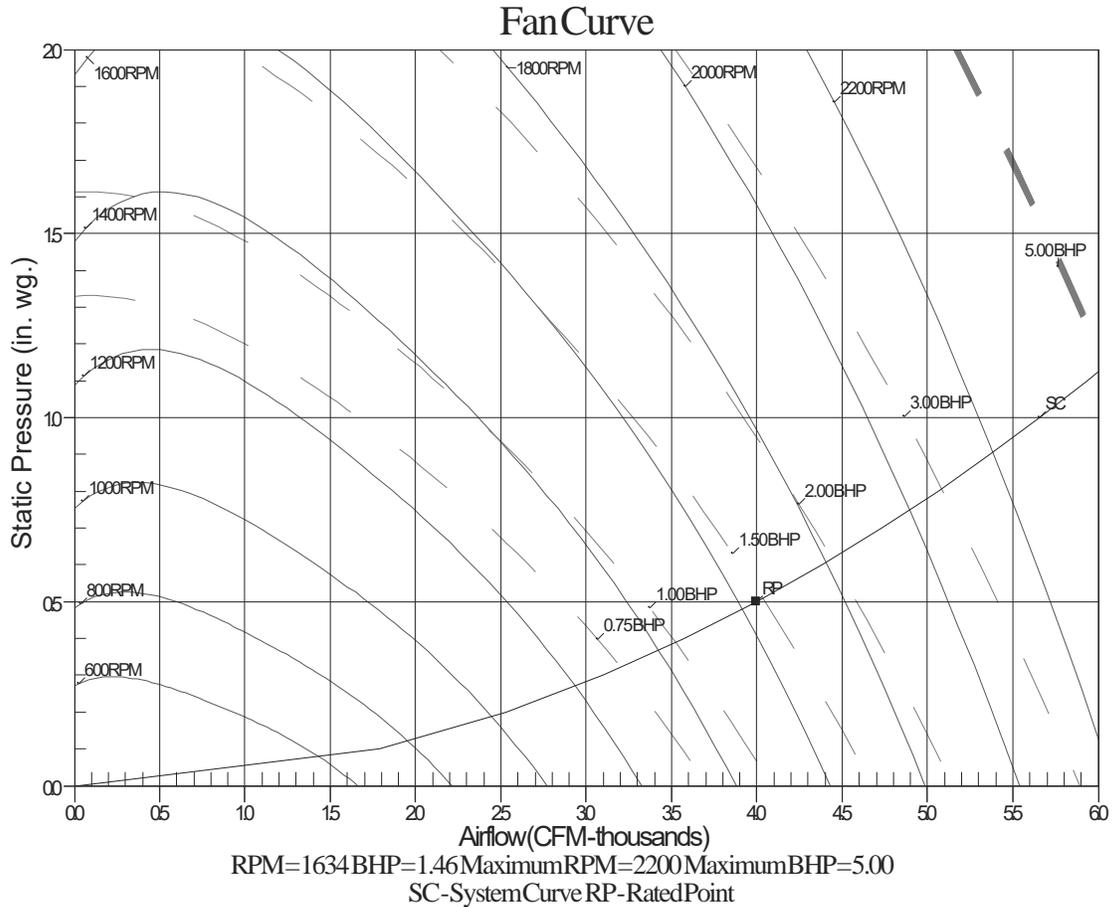
Performance Summary For 10 Ton HP

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

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.



10 Ton HP

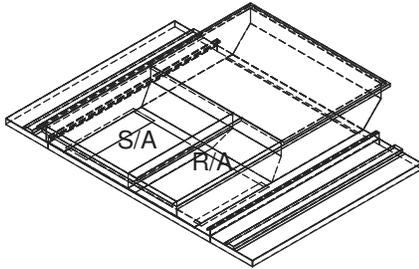
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EXISTING UNIT:			NEW UNIT:	

CURB ADAPTER INFORMATION:

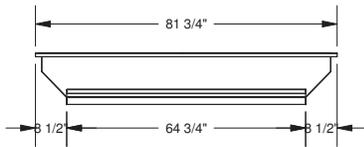
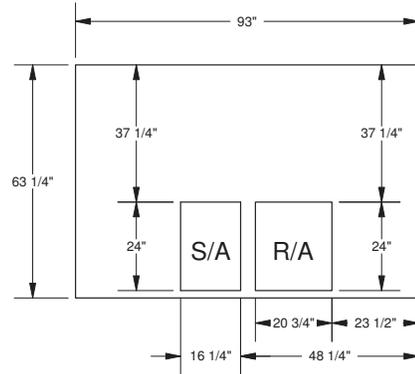
- BEFORE ORDERING CURB ADAPTER, CONTRACTOR MUST CONFIRM THE DIMENSIONS OF THE EXISTING CURB ON THIS DRAWING
- BEFORE NEW HVAC UNIT IS SET IN PLACE, INSPECT STRUCTURAL STABILITY OF EXISTING CURB AND BUILDING'S ROOF LOAD CAPABILITY. REINFORCE IF REQUIRED.
- ALL CURB ADAPTERS WILL INCREASE THE SYSTEMS EXTERNAL STATIC PRESSURE AND MUST BE INCLUDED WHEN CALCULATING UNIT REQUIREMENTS

APPROXIMATE STATIC PRESSURE LOSS AT CFM RANGE				
CFM	2,800	3,500	4,200	4,900
STATIC LOSS	0.343	0.550	0.768	1.073
NOTE:	STATIC PRESSURE LOSS DATA IS BASED ON SIMULATED ANALYSIS WHICH INCLUDES BOTH SUPPLY AND RETURN			

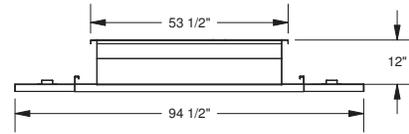
- FEATURES:**
- FULLY WELDED HEAVY GAUGE CONSTRUCTION
 - TRANSITIONS INCLUDED
 - FULL INTERNAL INSULATION
 - GASKET PACKAGE INCLUDED



EXISTING CURB TOP VIEW



ADAPTER END VIEW



ADAPTER SIDE VIEW

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MICROMETL CORP * 3035 N. SHADELAND AVE., STE 300 * INDIANAPOLIS, IN 46226 * 1-800-662-4822 *** MICROMETL * 905 SOUTHERN WAY * SPARKS, NV * 1-800-884-4662 *** MICROMETL * 201 KODAK BLVD * LONGVIEW, TX 75602 * 1-903-248-4800

Unit Report For 10 Ton

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Unit Parameters

Unit Model:.....**48FCDM12C2D6-0A0A0**
 Unit Size:.....**12 (10.0 Tons)**
 Volts-Phase-Hertz:.....**460-3-60**
 Heating Type:.....**Gas**
 Duct Cfg:.....**Vertical Supply / Vertical Return**
 Low Heat
 Single Circuit, Two Stage Cooling

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length:.....**7' 4.125"**
 Unit Width:.....**4' 11.5"**
 Unit Height:.....**4' 1.375"**
 *** **Total Operating Weight:.....822 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:.....**3/4**
 Condensate Drain Line Size:.....**3/4**
 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. This filter is not MERV Rated.

Unit Configuration

SA Smoke Detector
 Standard/Medium Static (EcoBlue)
 E-coat Al/Cu - E-coat Al/Cu
 Base Electromechanical Controls
 Standard Packaging

Warranty Information

1-Year parts(std.)
 5-Year compressor parts(std.)
 10-Year heat exchanger - Aluminized(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
48FCDM12C2D6-0A0A0	Rooftop Unit	1

Certified Drawing for 10 Ton

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

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

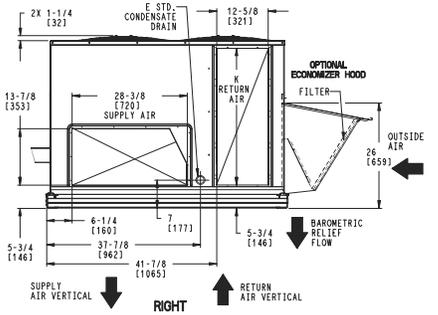
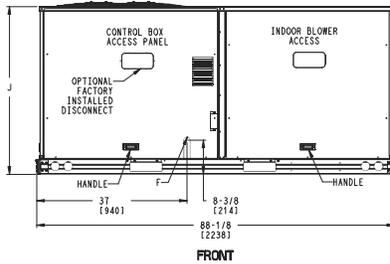
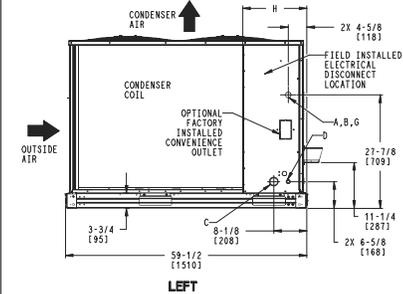
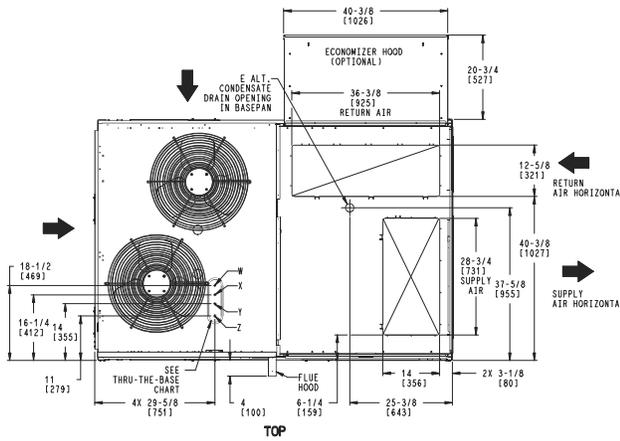
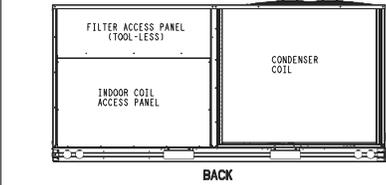
UNIT	OUTDOOR COIL TYPE	J	K	H
48FC-W08	RTFF	41 1/4 (1043)	33 3/4 (857)	15 7/8 (403)
48FC-W09	RTFF	49 3/8 (1252)	36 3/8 (925)	15 7/8 (403)
48FC-W12	RTFF	49 3/8 (1252)	36 3/8 (925)	15 7/8 (403)

RTFF - 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 GANSE 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	3/4" - 14 NPT GAS CONNECTION
G	2" (51) DIA POWER SUPPLY KNOCK-OUT

THRU-THE-BASE CHART (FIELD INST)			
THESE HOLES REQUIRED FOR USE WITH ACCY KITS: CRBTMPW002A01: GAS THRU CURB CRBTMPW004A01: GAS THRU BASEPAN			
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" (002,004)	POWER	1 3/4" (44.4)
Z	(004) 3/4" FPT	GAS	1 3/4" (44.4)
*	(002)	PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.	HOLE SIZES: 2" (50.8)

THRU-THE-BASE CHART (FOP)	
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X, Y, & Z ARE PROVIDED. **	
FOR BELOW LISTED MODELS, A FIELD SUPPLIED 1/2" ADAPTER IS REQUIRED BETWEEN BASE PAN FITTING AND GAS VALVE: 48FC, S408, 09	

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	48FC 08-12 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	48TM006295	REV
U.S. ECCN: NSR	1 OF 3	03/12/21	-			-

Certified Drawing for 10 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

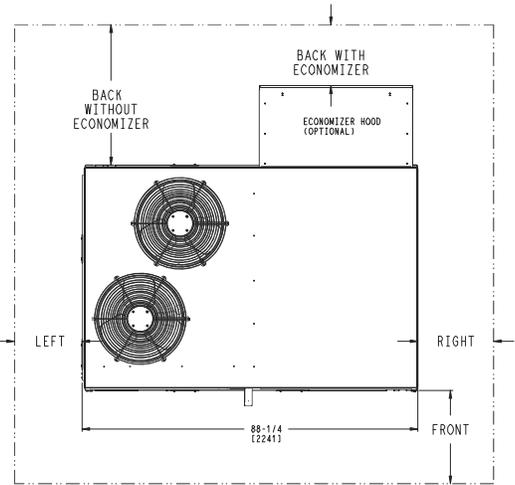
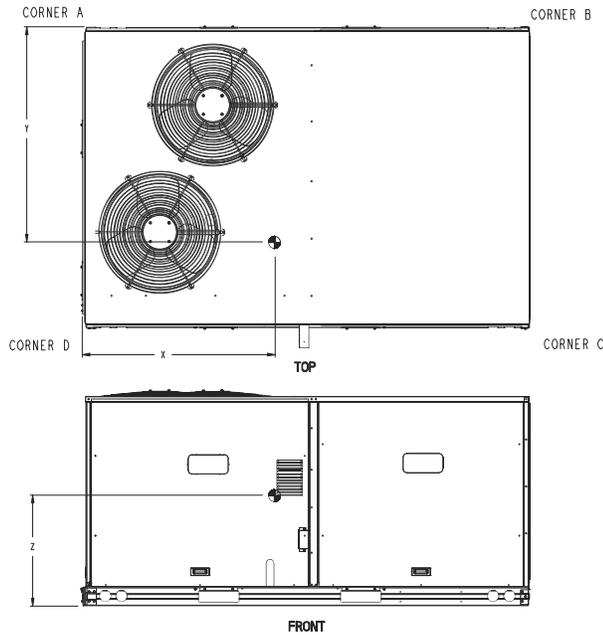
UNIT	OUTDOOR COIL TYPE	STD. UNIT WEIGHT ***		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C. G.			
		LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z	
48FC-M08	RTPF	787	357	181	82	150	68	207	94	249	113	40	110 1/2	34 1/2	19 3/8
48FC-M09	RTPF	868	394	197	89	160	73	229	104	282	128	39 1/2	110 3/4	35	18 5/8
48FC-M12	RTPF	878	398	213	97	175	80	221	100	268	121	39 7/8	110 1/2	33 1/4	18 1/2

RTPF - ROUND TUBE, PLATE FIN (COPPER/ALUM)



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*** STANDARD UNIT WEIGHT IS WITH LOW GAS 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.

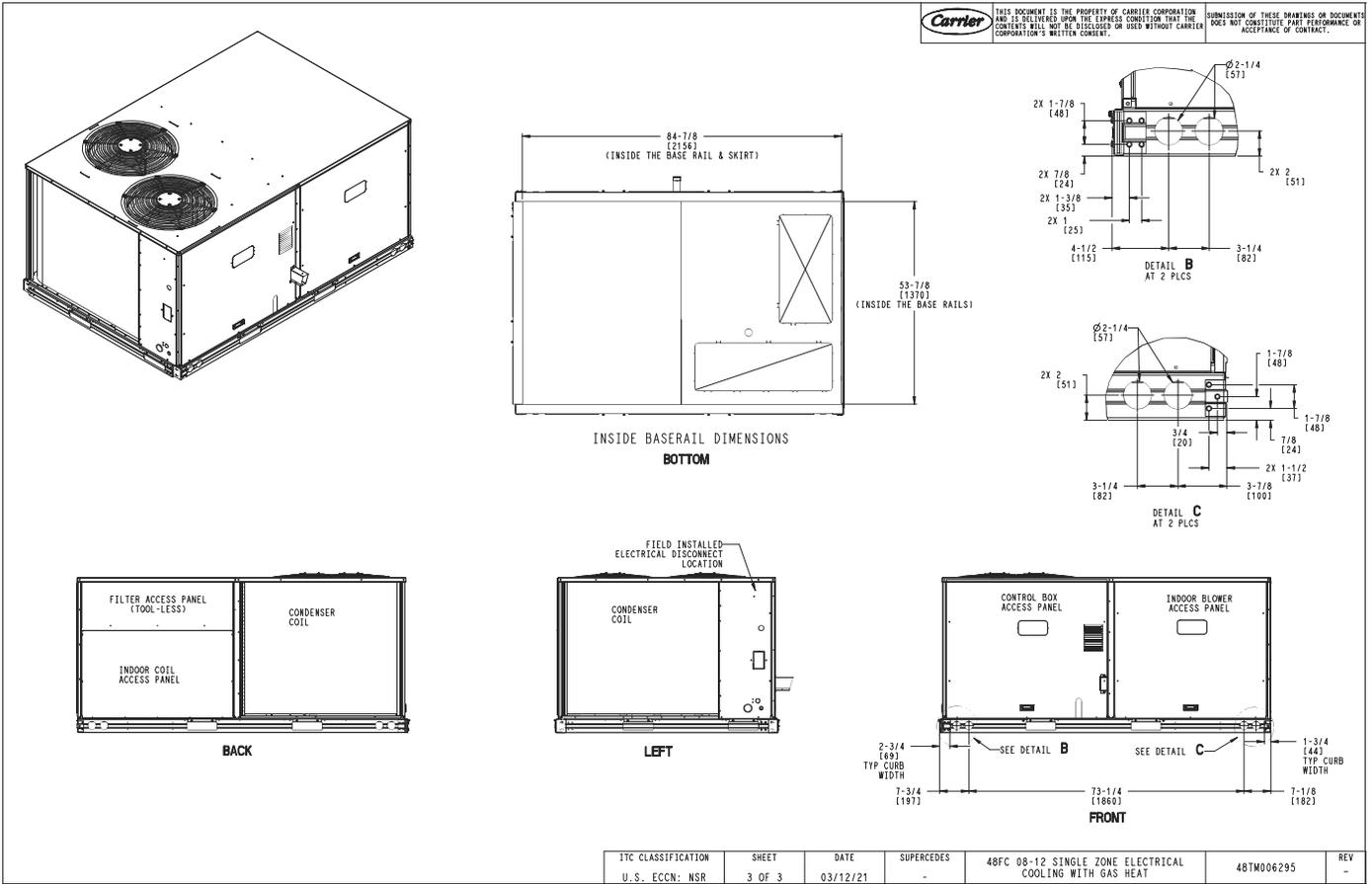
SURFACE	CLEARANCE		OPERATING CLEARANCE
	SERVICE WITH CONDUCTIVE BARRIER	SERVICE WITH NONCONDUCTIVE BARRIER	
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/ECON	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	48FC 08-12 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	48TM006295	REV
U.S. ECCN: NSR	2 OF 3	03/12/21	-			-

Certified Drawing for 10 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM



Performance Summary For 10 Ton

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Part Number:48FCDM12C2D6-0A0A0

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

Operating Weight

Base Unit Weight:.....815 lb
SA Smoke Detector:.....7 lb

Total Operating Weight:.....822 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:.....57.7 F
Evaporator Leaving Air WB:.....57.1 F
Evaporator Leaving Air Enthalpy:.....24.45 BTU/lb
Gross Cooling Capacity:.....125.75 MBH
Gross Sensible Capacity:.....96.22 MBH
Compressor Power Input:.....9.17 kW
Coil Bypass Factor:.....0.052

Heating Performance

Heating Airflow:.....4000 CFM
Entering Air Temp:.....70.0 F
Leaving Air Temp:.....104.3 F
Gas Heating Input Capacity:.....120.0 / 180.0 MBH
Gas Heating Output Capacity:.....98.0 / 148.0 MBH
Temperature Rise:.....34.3 F

Supply Fan

External Static Pressure:.....0.50 in wg
Fan RPM:.....1727
Fan Power:.....1.76 BHP
NOTE:.....Selected IFM RPM Range: 1279 - 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:.....60
Compressor #2 RLA:.....7.7
Compressor #2 LRA:.....60
Indoor Fan Motor Type:.....MED
Indoor Fan Motor FLA:.....3
Combustion Fan Motor FLA (ea):.....0.25

Performance Summary For 10 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

Power Supply MCA:.....	22
Power Supply MOCP (Fuse or HACR):.....	25
Disconnect Size FLA:.....	23
Disconnect Size LRA:.....	128
Electrical Convenience Outlet:.....	None
Outdoor Fan [Qty / FLA (ea)]:.....	2 / 0.8

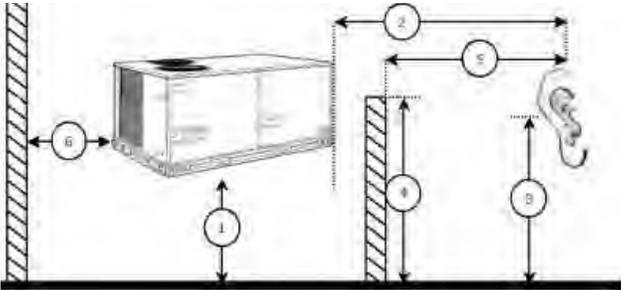
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	96.9	93.6	85.6
125 Hz	93.1	85.5	84.7
250 Hz	78.7	68.7	80.5
500 Hz	73.1	65.9	76.0
1000 Hz	68.3	63.2	72.4
2000 Hz	65.4	58.9	68.0
4000 Hz	69.0	58.7	62.8
8000 Hz	69.1	57.5	59.3
A-Weighted	80.4	73.4	79.0

Advanced Acoustics



Advanced Acoustics 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

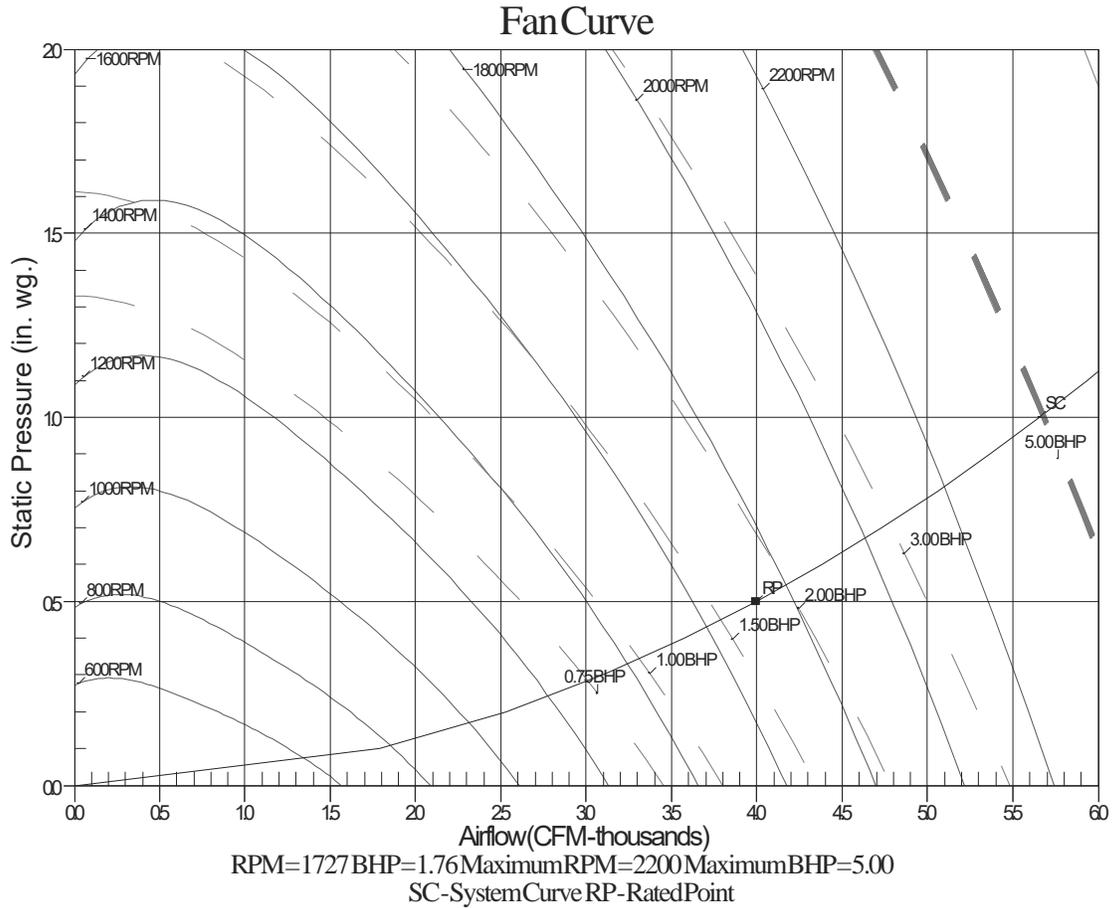
Performance Summary For 10 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

- 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.



Unit Report For 6 Ton

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Unit Parameters

Unit Model:.....**48FCDM07C2D6-0A0A0**
 Unit Size:.....**07 (6 Tons)**
 Volts-Phase-Hertz:.....**460-3-60**
 Heating Type:.....**Gas**
 Duct Cfg:.....**Vertical Supply / Vertical Return**
 Low Heat
 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:.....614 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. This filter is not MERV Rated.

Unit Configuration

SA Smoke Detector
 Direct Drive - EcoBlue - Medium Static
 E-coat Al/Cu - E-coat Al/Cu
 Base Electromechanical Controls
 Standard Packaging

Warranty Information

1-Year parts(std.)
 5-Year compressor parts(std.)
 10-Year heat exchanger - Aluminized(std.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

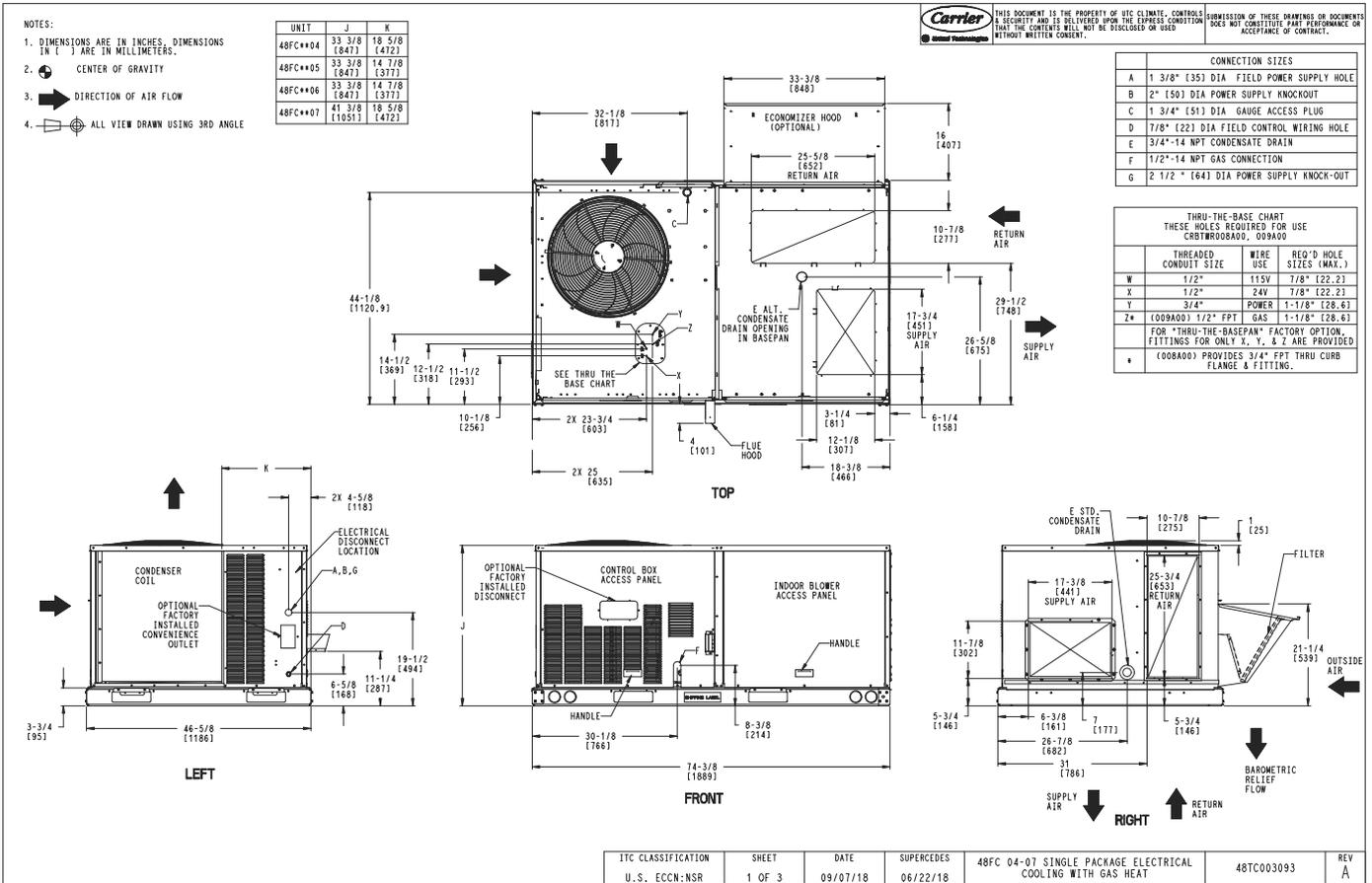
Ordering Information

Part Number	Description	Quantity
48FCDM07C2D6-0A0A0	Rooftop Unit	3

Certified Drawing for 6 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM



Certified Drawing for 6 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

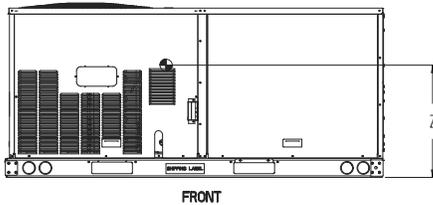
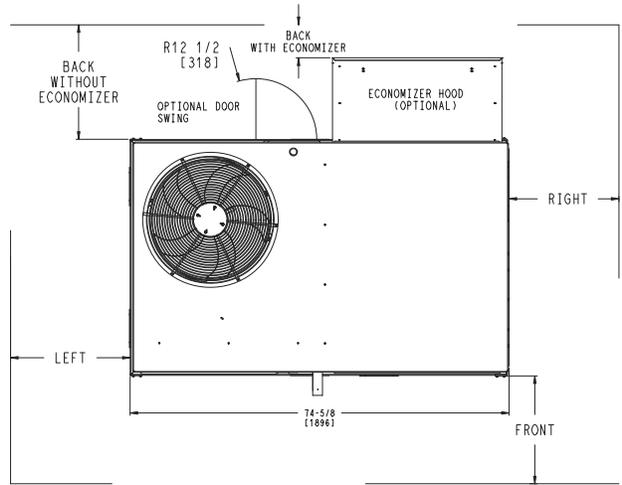
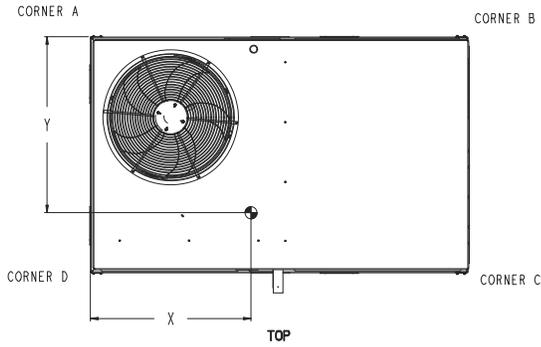
09/26/2022
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UNIT	STD. UNIT WEIGHT *		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.			HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z	
48FC**04	482	219	113	51	116	53	128	58	125	57	37 5/8 (956)	24 9/16 (624)	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.



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NOTES:

- FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

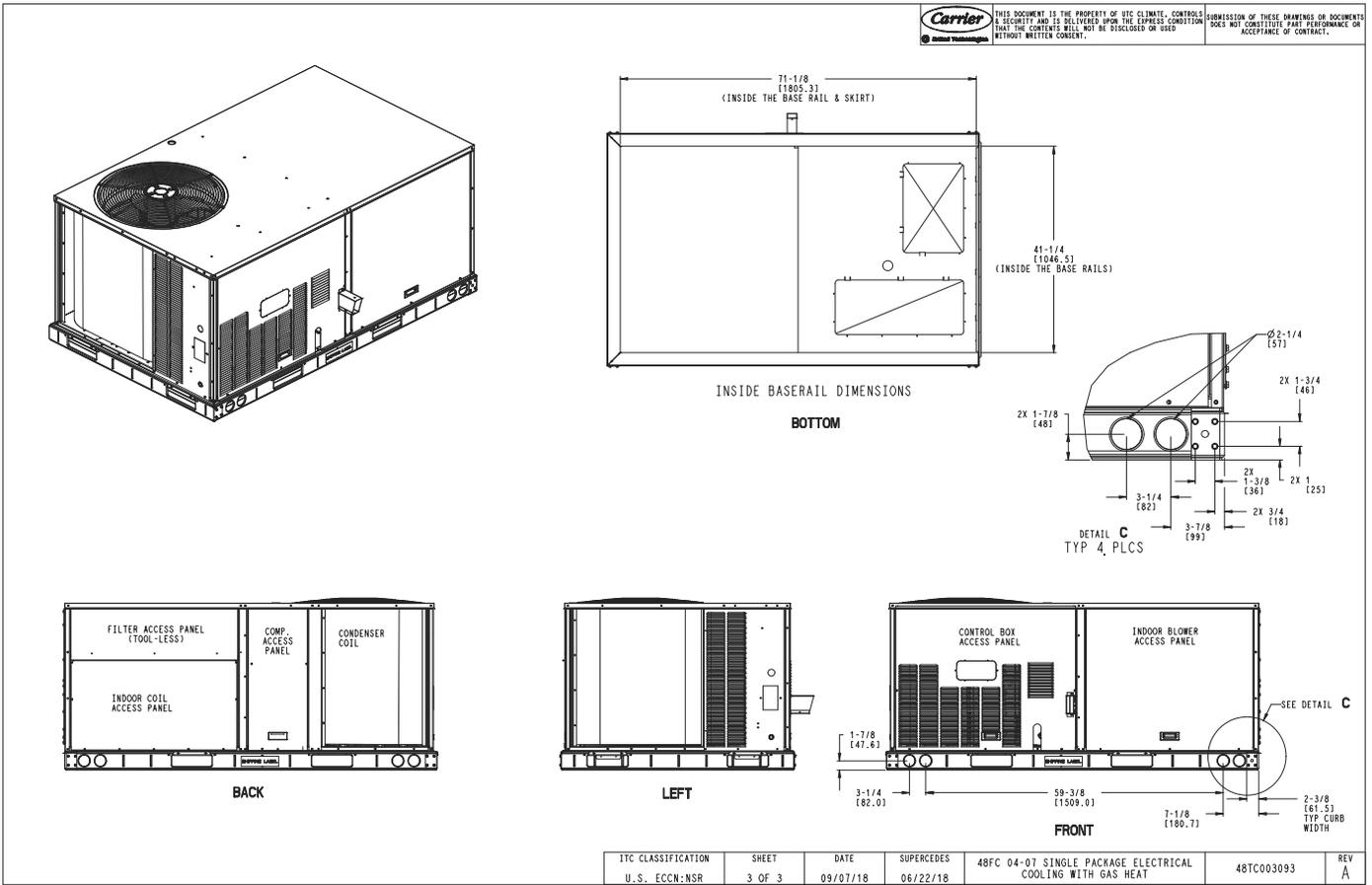
SURFACE	CLEARANCE		OPERATING CLEARANCE
	SERVICE WITH CONDUCTIVE BARRIER	SERVICE WITH NONCONDUCTIVE BARRIER	
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/HOOD	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	48FC 04-07 SINGLE PACKAGE ELECTRICAL COOLING WITH GAS HEAT	48TC003093	REV
U.S. ECCN:NSR	2 OF 3	09/07/18	06/22/18			A

Certified Drawing for 6 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM



Performance Summary For 6 Ton

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Part Number:48FCDM07C2D6-0A0A0

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
SA Smoke Detector:.....7 lb

Total Operating Weight:.....614 lb

Unit

Unit Voltage-Phase-Hertz:.....460-3-60
Air Discharge:.....Vertical
Fan Drive Type:.....Vane Axial
Actual Airflow:.....2400 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:.....57.5 F
Evaporator Leaving Air Enthalpy:.....24.73 BTU/lb
Gross Cooling Capacity:.....72.42 MBH
Gross Sensible Capacity:.....55.62 MBH
Compressor Power Input:.....5.29 kW
Coil Bypass Factor:.....0.096

Heating Performance

Heating Airflow:.....2400 CFM
Entering Air Temp:.....70.0 F
Leaving Air Temp:.....90.8 F
Gas Heating Input Capacity:.....67.0 MBH
Gas Heating Output Capacity:.....54.0 MBH
Temperature Rise:.....20.8 F
Thermal Efficiency (%):.....81.0

Supply Fan

External Static Pressure:.....0.50 in wg
Fan RPM:.....2213
Fan Power:.....1.14 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:.....2.2
Combustion Fan Motor FLA (ea):.....0.25
Power Supply MCA:.....14

Performance Summary For 6 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

Power Supply MOCP (Fuse or HACR):.....	20
Disconnect Size FLA:.....	13
Disconnect Size LRA:.....	71
Electrical Convenience Outlet:.....	None
Outdoor Fan [Qty / FLA (ea)]:.....	1 / 0.8

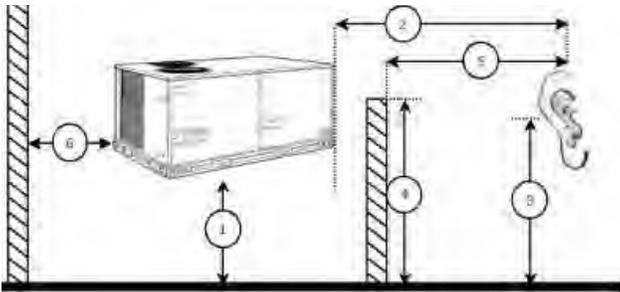
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	91.9	89.2	85.6
125 Hz	83.4	80.2	84.7
250 Hz	77.7	72.1	80.5
500 Hz	75.5	67.4	76.0
1000 Hz	72.3	69.5	72.4
2000 Hz	70.2	61.0	68.0
4000 Hz	65.5	53.8	62.8
8000 Hz	61.0	48.3	59.3
A-Weighted	78.5	73.1	79.0

Advanced Acoustics



Advanced Acoustics 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

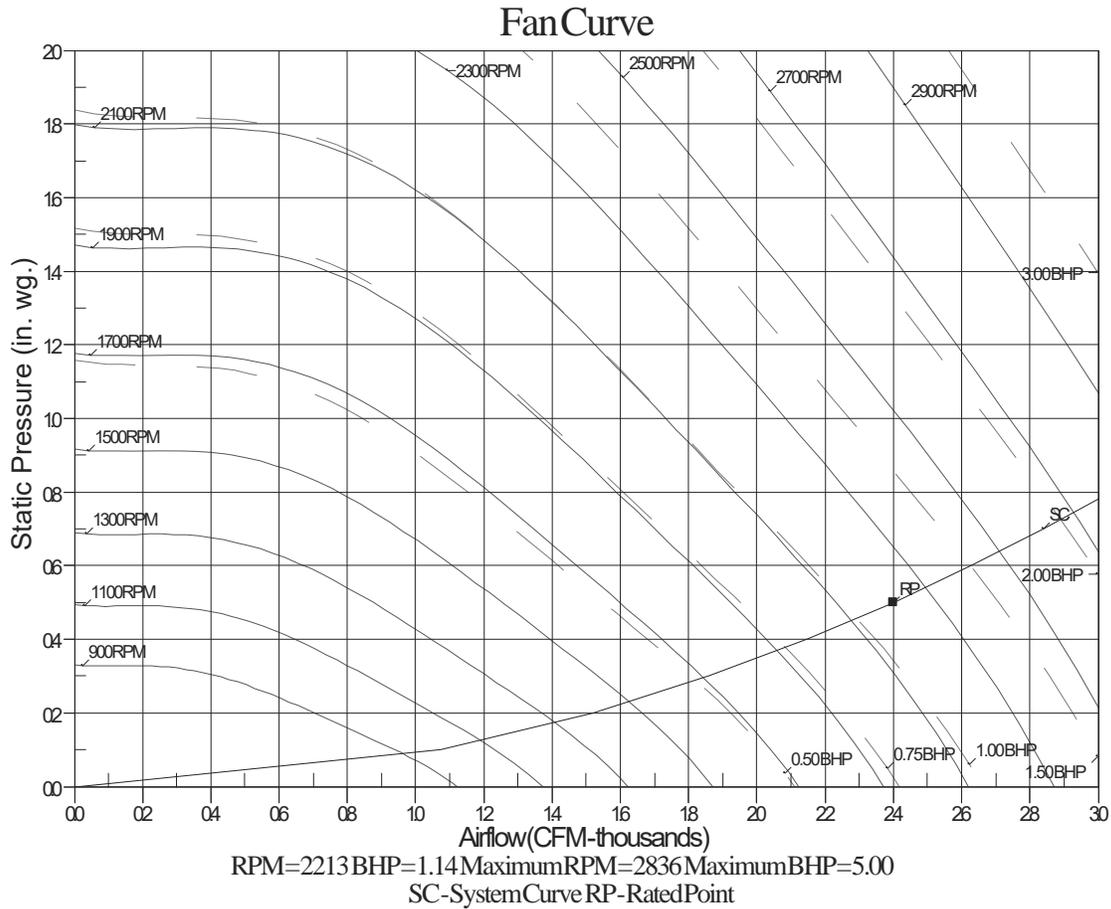
Performance Summary For 6 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

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.



Unit Report For 3 Ton FC

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Unit Parameters

Unit Model:.....**48FCGA04C2D6-0A0A0**
 Unit Size:.....**04 (3 Tons)**
 Volts-Phase-Hertz:.....**460-3-60**
 Heating Type:.....**Gas**
 Duct Cfg:.....**Vertical Supply / Vertical Return**
 Ultra Low Nox, Low Heat
 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:.....519 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. This filter is not MERV Rated.

Unit Configuration

SA Smoke Detector
 Direct Drive - EcoBlue - Medium Static
 E-coat Al/Cu - E-coat Al/Cu
 Base Electromechanical Controls
 Standard Packaging

Warranty Information

1-Year parts(std.)
 5-Year compressor parts(std.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

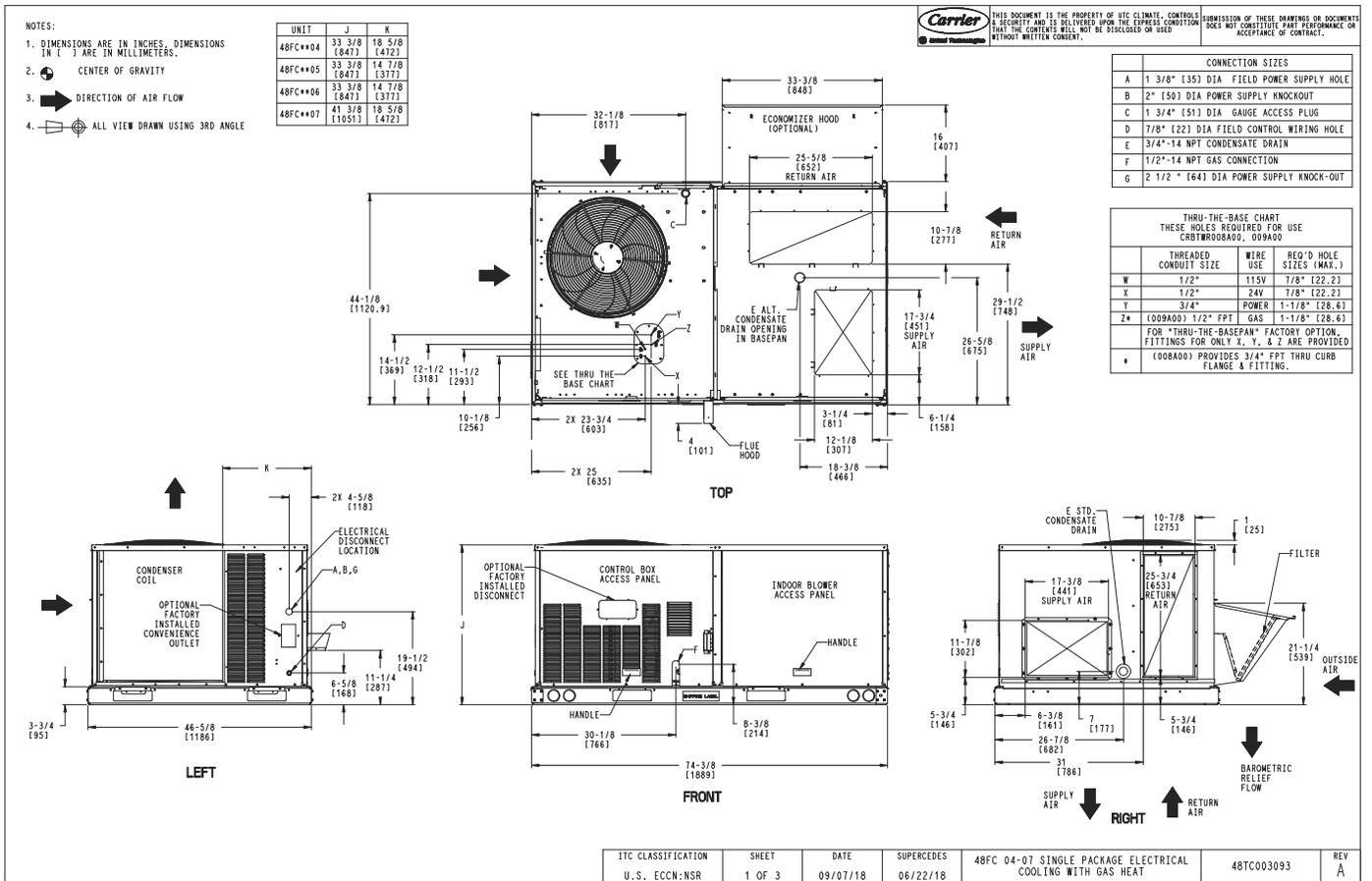
Ordering Information

Part Number	Description	Quantity
48FCGA04C2D6-0A0A0	Rooftop Unit	2

Certified Drawing for 3 Ton FC

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM



Certified Drawing for 3 Ton FC

Project: Alliance - Fresno WWTP
 Prepared By:

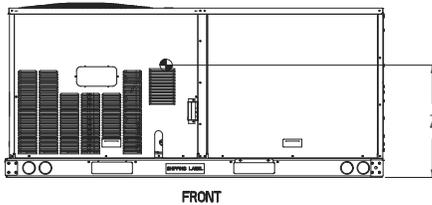
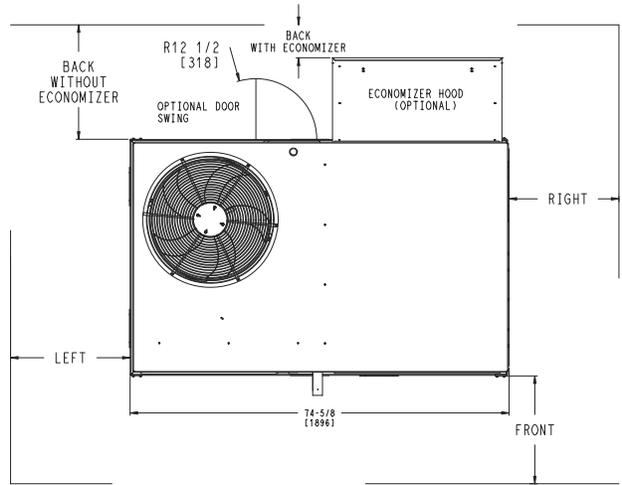
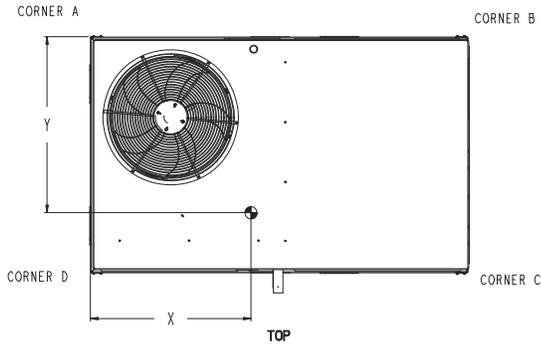
09/26/2022
 02:46PM

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.



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NOTES:
 1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

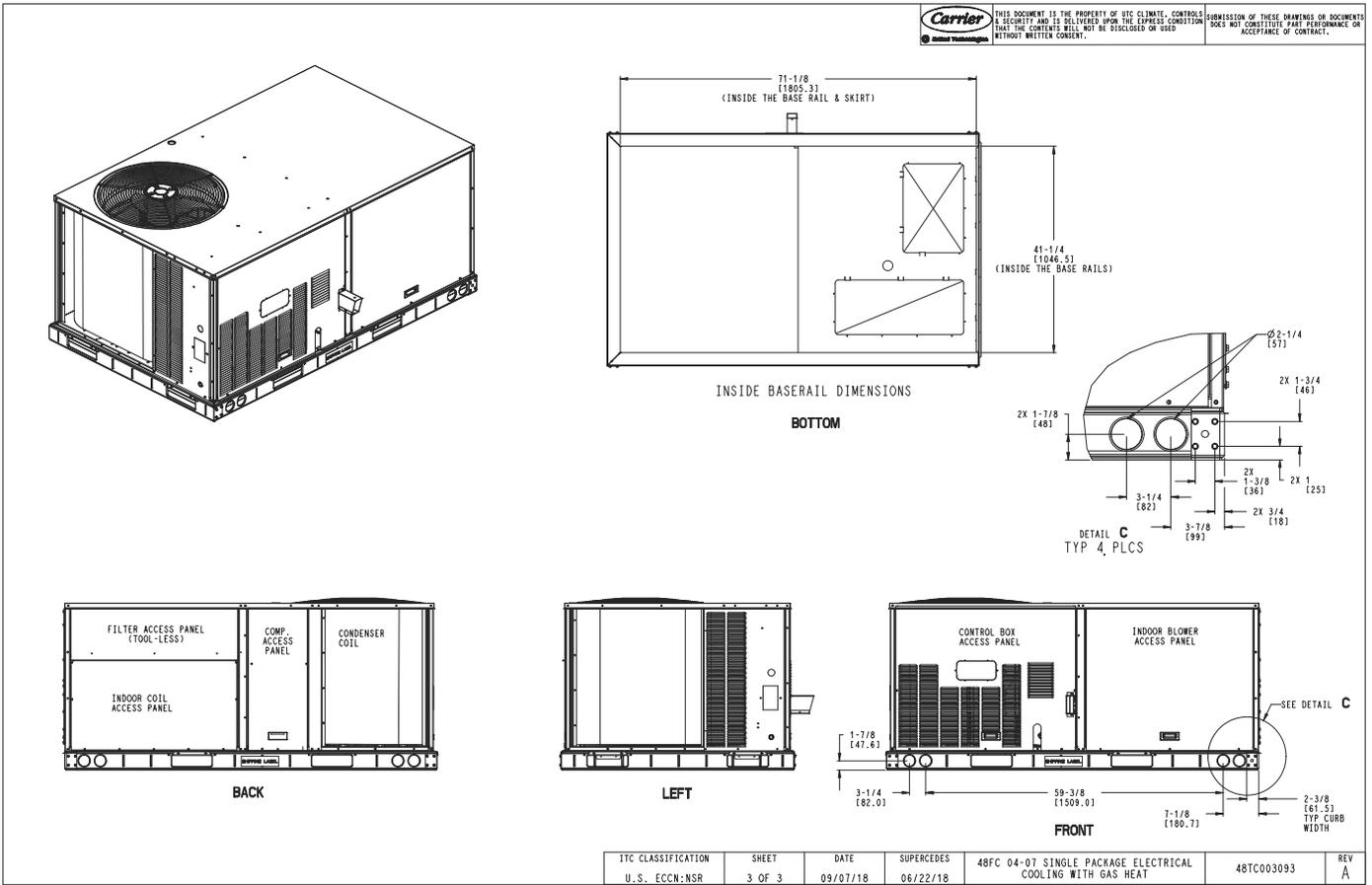
SURFACE	CLEARANCE		OPERATING CLEARANCE
	SERVICE WITH CONDUCTIVE BARRIER	SERVICE WITH NONCONDUCTIVE BARRIER	
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/HOOD	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	48FC 04-07 SINGLE PACKAGE ELECTRICAL COOLING WITH GAS HEAT	48TC003093	REV
U.S. ECCN:NSR	2 OF 3	09/07/18	06/22/18			A

Certified Drawing for 3 Ton FC

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM



Performance Summary For 3 Ton FC

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Part Number: 48FCGA04C2D6-0A0A0

ARI SEER: 14.00

Base Unit Dimensions

Unit Length: 74.4 in
Unit Width: 46.6 in
Unit Height: 33.4 in

Operating Weight

Base Unit Weight: 512 lb
SA Smoke Detector: 7 lb

Total Operating Weight: 519 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: 60.4 F
Evaporator Leaving Air WB: 57.9 F
Evaporator Leaving Air Enthalpy: 24.93 BTU/lb
Gross Cooling Capacity: 35.13 MBH
Gross Sensible Capacity: 25.39 MBH
Compressor Power Input: 2.50 kW
Coil Bypass Factor: 0.180

Heating Performance

Heating Airflow: 1200 CFM
Entering Air Temp: 70.0 F
Leaving Air Temp: 107.8 F
Gas Heating Input Capacity: 60.0 MBH
Gas Heating Output Capacity: 49.0 MBH
Temperature Rise: 37.8 F
Thermal Efficiency (%): 81.0

Supply Fan

External Static Pressure: 0.50 in wg
Fan RPM: 1592
Fan Power: 0.29 BHP
NOTE: Selected IFM RPM Range: 1112 - 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 FLA: 1.2
Combustion Fan Motor FLA (ea): 0.25
Power Supply MCA: 10
Power Supply MOCP (Fuse or HACR): 15

Performance Summary For 3 Ton FC

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

Disconnect Size FLA:.....**9**
 Disconnect Size LRA:.....**42**
 Electrical Convenience Outlet:.....**None**
 Outdoor Fan [Qty / FLA (ea)]:.....**1 / 0.8**

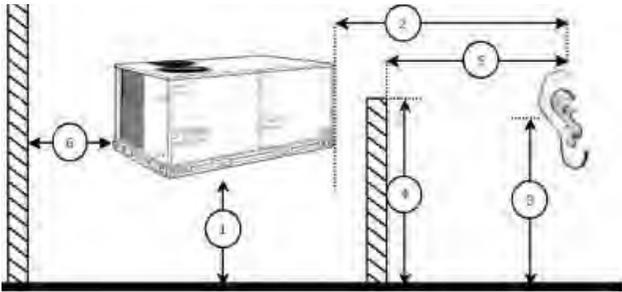
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	87.1	81.6	85.6
125 Hz	79.5	73.4	84.7
250 Hz	72.1	65.1	80.5
500 Hz	63.8	57.1	76.0
1000 Hz	60.8	59.0	72.4
2000 Hz	57.7	50.3	68.0
4000 Hz	54.2	44.1	62.8
8000 Hz	55.0	40.2	59.3
A-Weighted	69.7	64.1	79.0

Advanced Acoustics



Advanced Acoustics 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

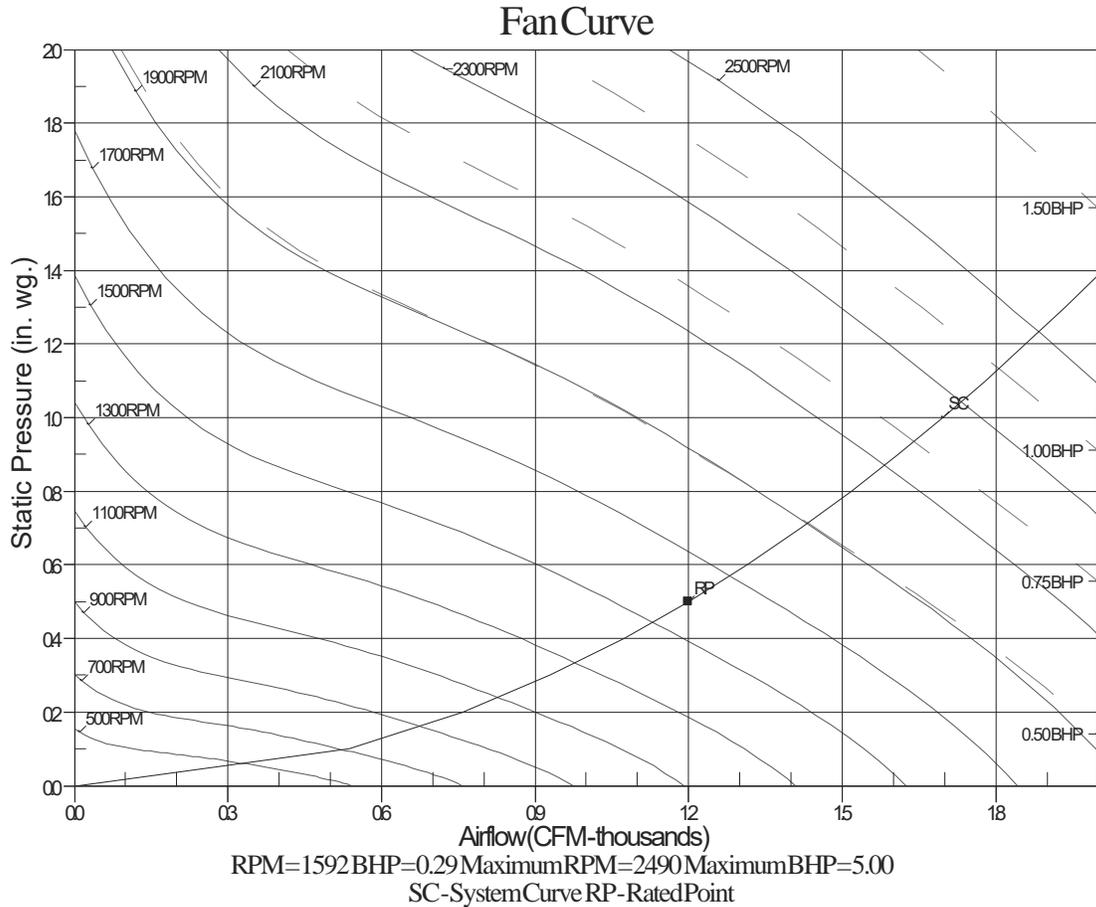
Performance Summary For 3 Ton FC

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

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.



Unit Report For 5 Ton

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Unit Parameters

Unit Model:.....**48FCGA06C2D6-0A0A0**
 Unit Size:.....**06 (5 Tons)**
 Volts-Phase-Hertz:.....**460-3-60**
 Heating Type:.....**Gas**
 Duct Cfg:.....**Vertical Supply / Vertical Return**
 Ultra Low Nox, Low Heat
 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:.....593 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. This filter is not MERV Rated.

Unit Configuration

SA Smoke Detector
 Direct Drive - EcoBlue - Medium Static
 E-coat Al/Cu - E-coat Al/Cu
 Base Electromechanical Controls
 Standard Packaging

Warranty Information

1-Year parts(std.)
 5-Year compressor parts(std.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

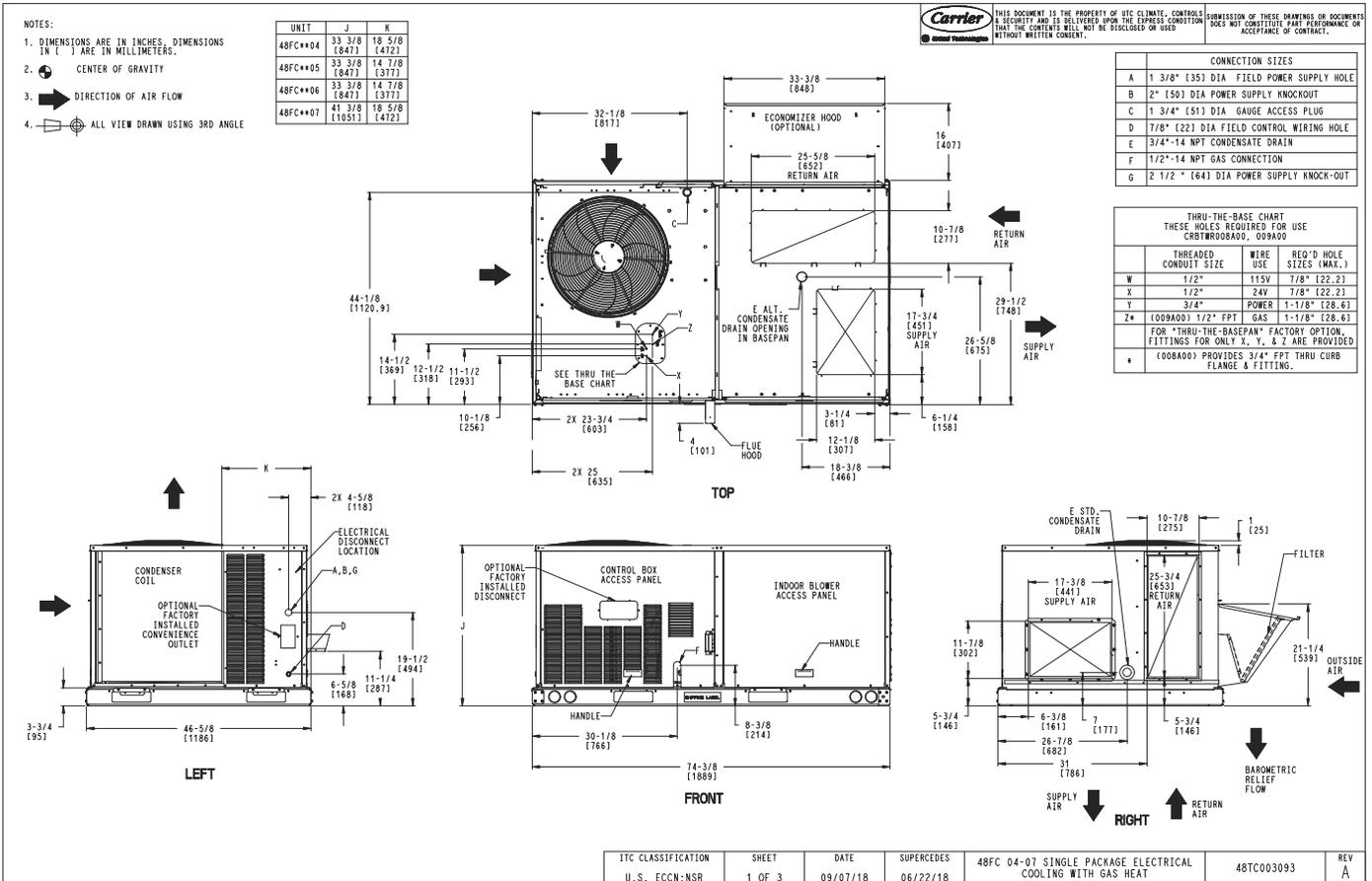
Ordering Information

Part Number	Description	Quantity
48FCGA06C2D6-0A0A0	Rooftop Unit	1

Certified Drawing for 5 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM



Certified Drawing for 5 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

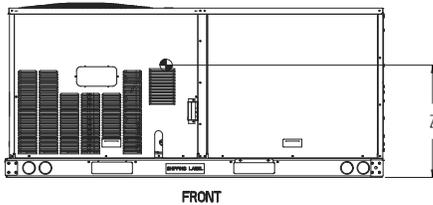
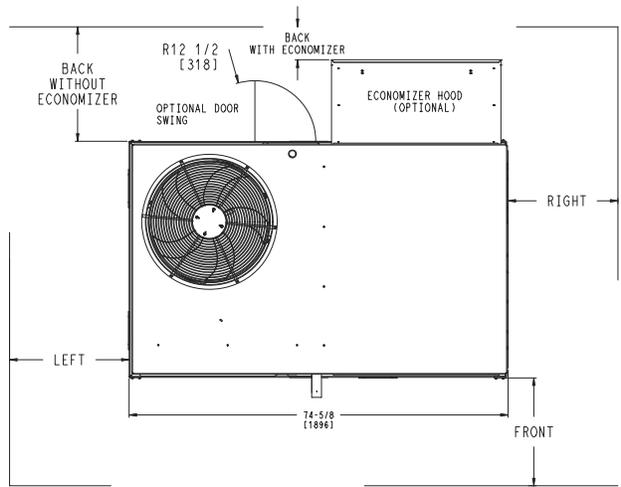
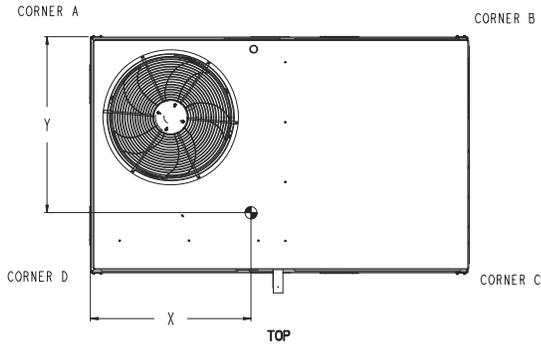
09/26/2022
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UNIT	STD. UNIT WEIGHT *		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C. G.			HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z	
48FC**04	482	219	113	51	116	53	128	58	125	57	37 5/8 (956)	24 9/16 (624)	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.



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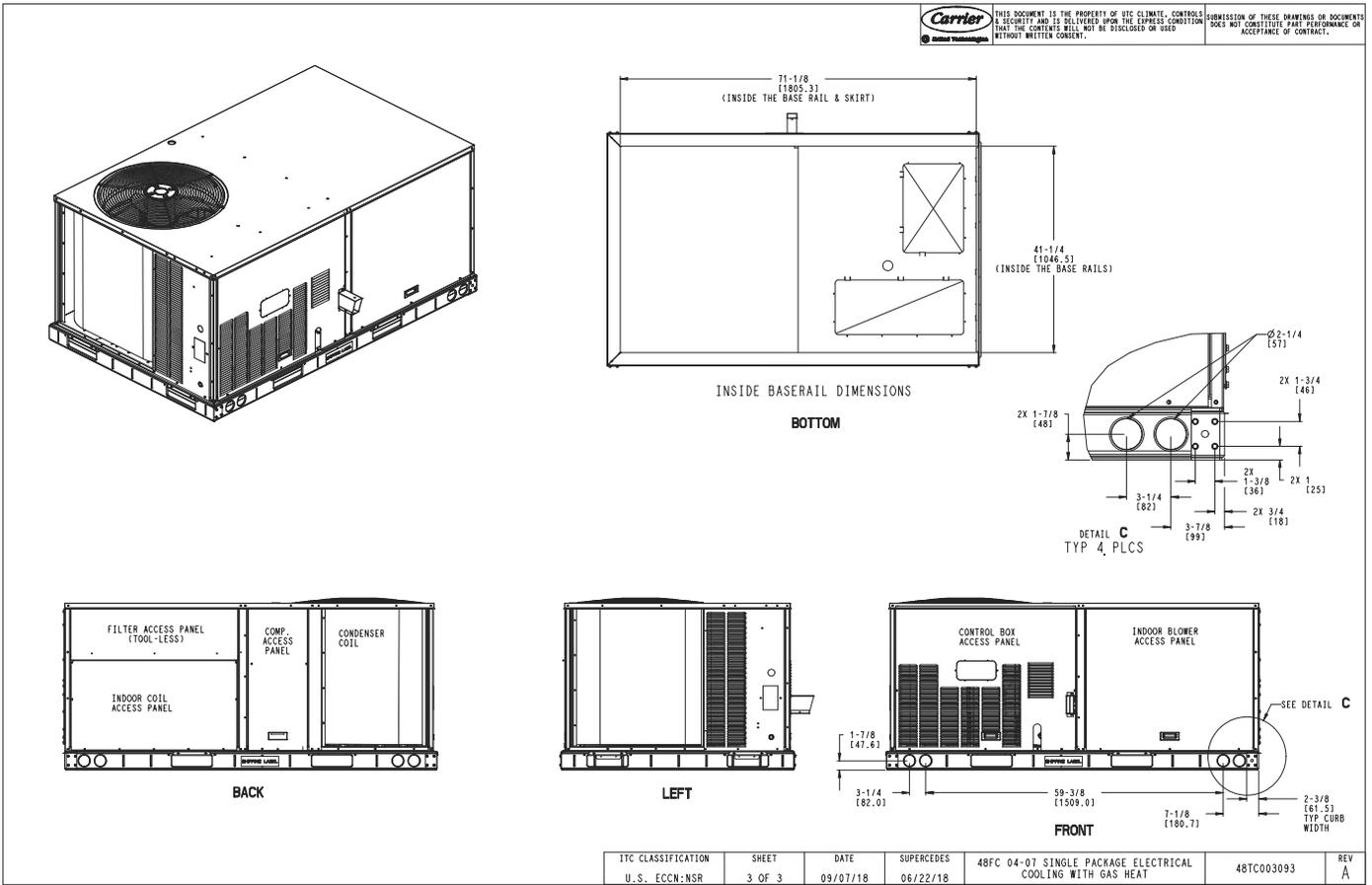
SURFACE	CLEARANCE		OPERATING CLEARANCE
	SERVICE WITH CONDUCTIVE BARRIER	SERVICE WITH NONCONDUCTIVE BARRIER	
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/HOOD	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	48FC 04-07 SINGLE PACKAGE ELECTRICAL COOLING WITH GAS HEAT	48TC003093	REV
U.S. ECCN:NSR	2 OF 3	09/07/18	06/22/18			A

Certified Drawing for 5 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM



Performance Summary For 5 Ton

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Part Number:48FCGA06C2D6-0A0A0

ARI SEER:.....14.00

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
SA Smoke Detector:.....7 lb

Total Operating Weight:.....593 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:.....0.50 in wg
Fan RPM:.....2067
Fan Power:.....0.94 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:.....1.9
Combustion Fan Motor FLA (ea):.....0.25
Power Supply MCA:.....13
Power Supply MOCP (Fuse or HACR):.....20

Performance Summary For 5 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

Disconnect Size FLA:.....**12**
 Disconnect Size LRA:.....**57**
 Electrical Convenience Outlet:.....**None**
 Outdoor Fan [Qty / FLA (ea)]:.....**1 / 0.8**

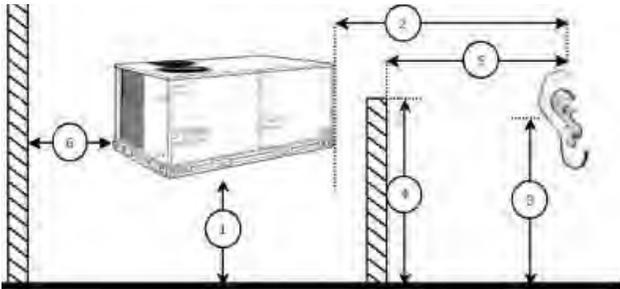
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	92.1	89.2	85.6
125 Hz	83.3	79.2	84.7
250 Hz	77.3	71.8	80.5
500 Hz	73.9	65.9	76.0
1000 Hz	70.6	68.1	72.4
2000 Hz	68.0	59.5	68.0
4000 Hz	64.1	52.7	62.8
8000 Hz	60.2	46.9	59.3
A-Weighted	77.2	72.0	79.0

Advanced Acoustics



Advanced Acoustics 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

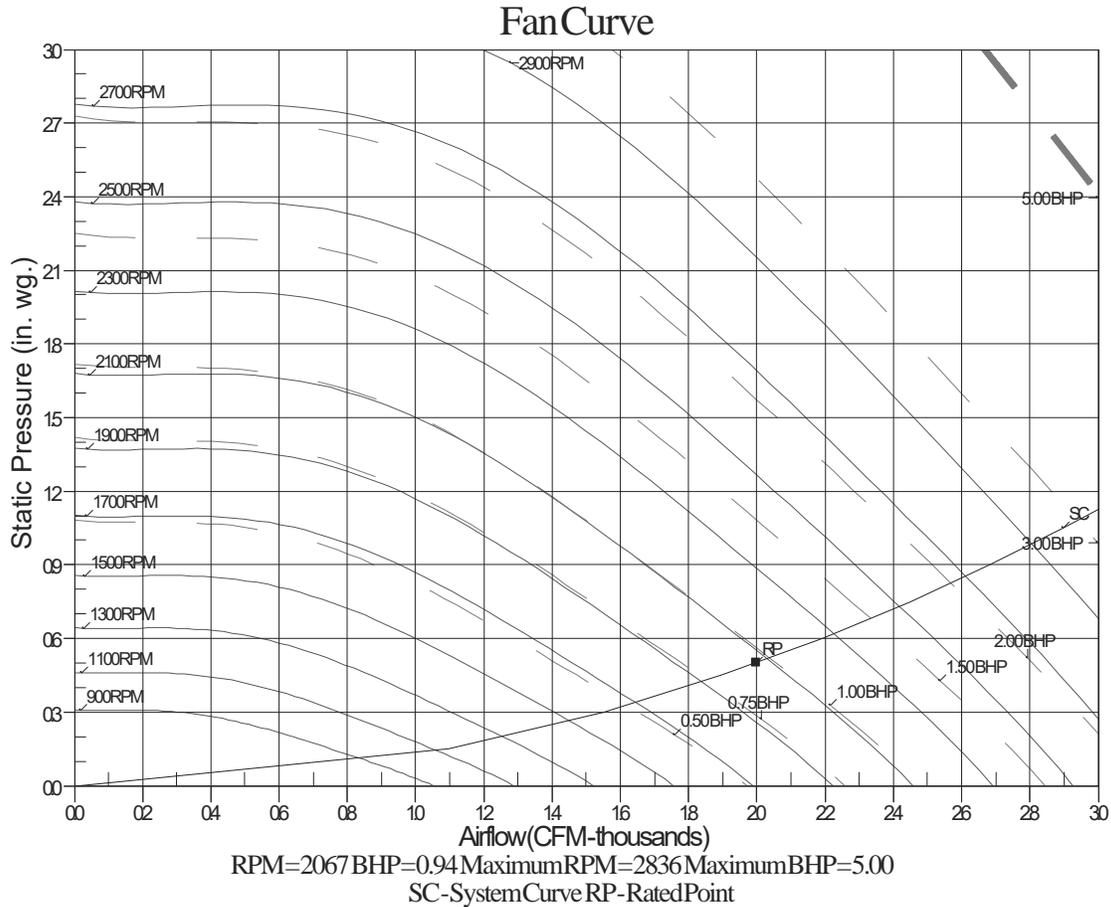
Performance Summary For 5 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

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.



Unit Report For 4 Ton FC

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Unit Parameters

Unit Model:.....**48FCGA05C2D6-0A0A0**
 Unit Size:.....**05 (4 Tons)**
 Volts-Phase-Hertz:.....**460-3-60**
 Heating Type:.....**Gas**
 Duct Cfg:.....**Vertical Supply / Vertical Return**
 Ultra Low Nox, Low Heat
 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:.....580 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. This filter is not MERV Rated.

Unit Configuration

SA Smoke Detector
 Direct Drive - EcoBlue - Medium Static
 E-coat Al/Cu - E-coat Al/Cu
 Base Electromechanical Controls
 Standard Packaging

Warranty Information

1-Year parts(std.)
 5-Year compressor 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
48FCGA05C2D6-0A0A0	Rooftop Unit	1

Certified Drawing for 4 Ton FC

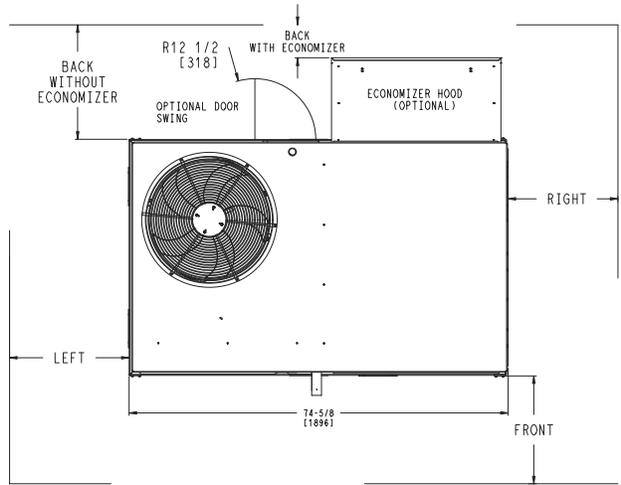
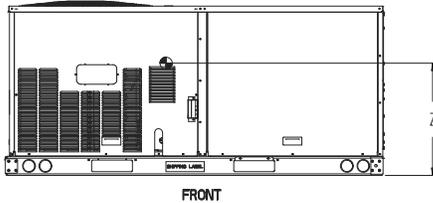
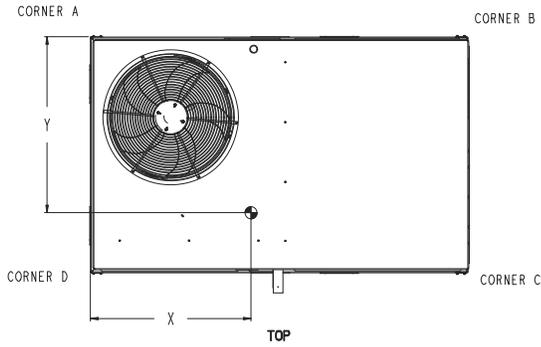
Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

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.

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NOTES:
 1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

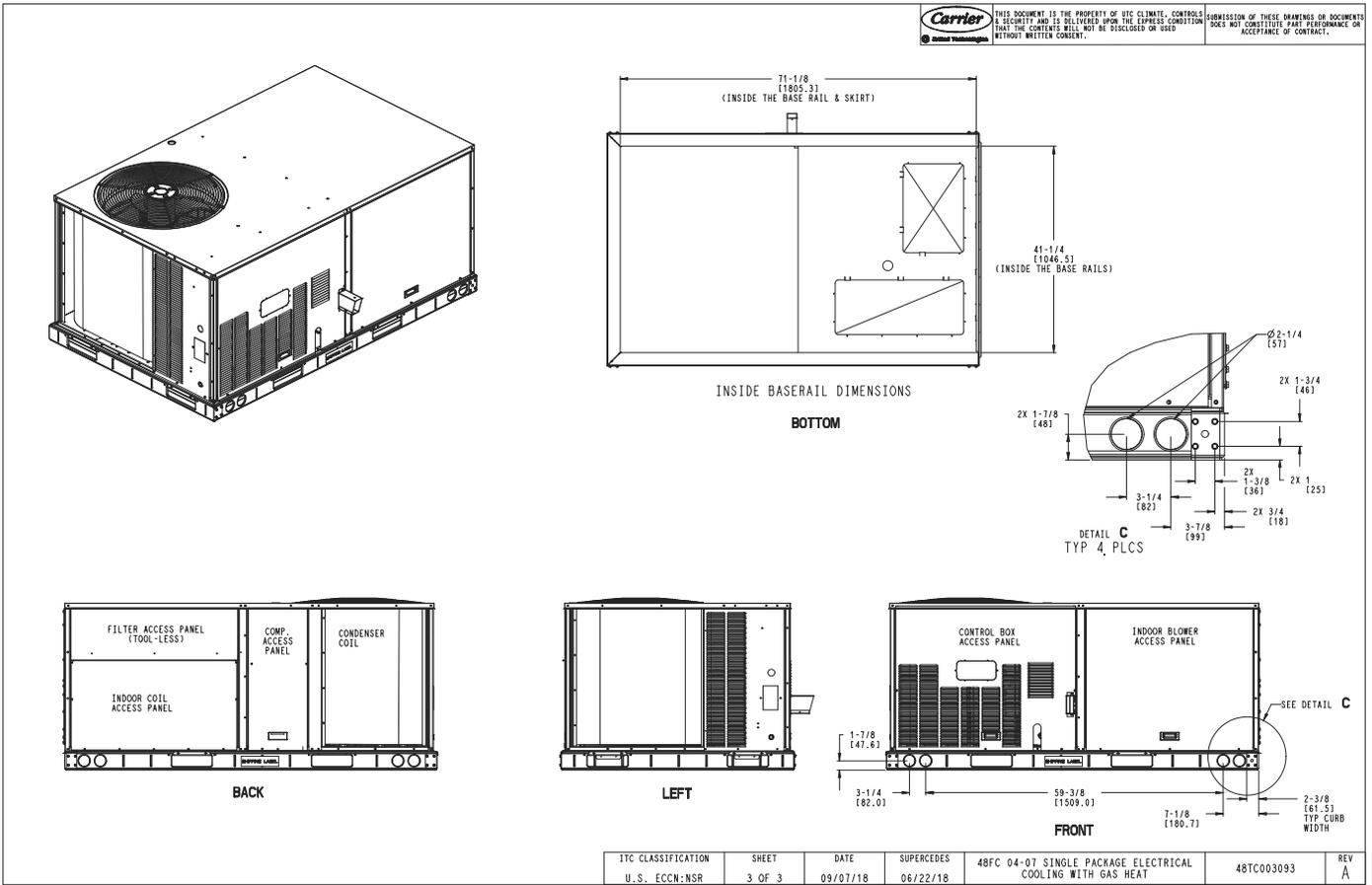
SURFACE	CLEARANCE		OPERATING CLEARANCE
	SERVICE WITH CONDUCTIVE BARRIER	SERVICE WITH NONCONDUCTIVE BARRIER	
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/HOOD	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	48FC 04-07 SINGLE PACKAGE ELECTRICAL COOLING WITH GAS HEAT	48TC003093	REV
U.S. ECCN:NSR	2 OF 3	09/07/18	06/22/18			A

Certified Drawing for 4 Ton FC

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM



Performance Summary For 4 Ton FC

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Part Number: 48FCGA05C2D6-0A0A0

ARI SEER: 14.00

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
SA Smoke Detector: 7 lb

Total Operating Weight: 580 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: 0.50 in wg
Fan RPM: 1792
Fan Power: 0.62 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: 1.5
Combustion Fan Motor FLA (ea): 0.25
Power Supply MCA: 11
Power Supply MOCP (Fuse or HACR): 15

Performance Summary For 4 Ton FC

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

Disconnect Size FLA:.....**10**
 Disconnect Size LRA:.....**45**
 Electrical Convenience Outlet:.....**None**
 Outdoor Fan [Qty / FLA (ea)]:.....**1 / 0.8**

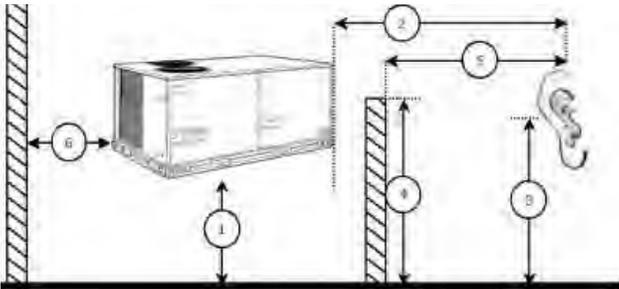
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	90.7	88.0	85.6
125 Hz	81.4	76.4	84.7
250 Hz	75.1	70.6	80.5
500 Hz	70.6	62.3	76.0
1000 Hz	66.8	65.0	72.4
2000 Hz	63.8	56.1	68.0
4000 Hz	61.1	49.9	62.8
8000 Hz	58.3	44.0	59.3
A-Weighted	74.2	69.4	79.0

Advanced Acoustics



Advanced Acoustics 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

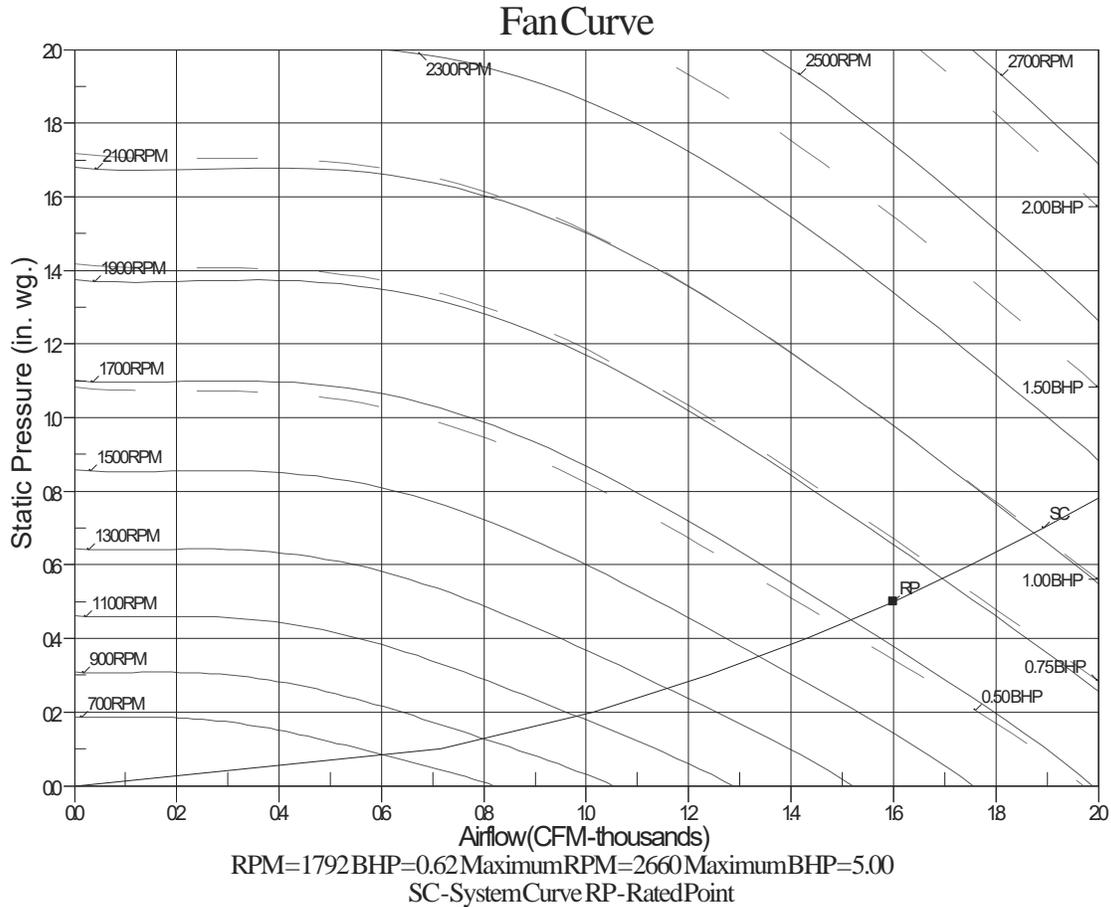
Performance Summary For 4 Ton FC

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

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.



Unit Report For 8.5 Ton

Project: Alliance - Fresno WWTP
Prepared By:

Unit Parameters

Unit Model:.....**48FCDM09C2D6-0A0A0**
 Unit Size:.....**09 (8.5 Tons)**
 Volts-Phase-Hertz:.....**460-3-60**
 Heating Type:.....**Gas**
 Duct Cfg:.....**Vertical Supply / Vertical Return**
 Low Heat
 Single Circuit, Two Stage Cooling

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length:.....**7' 4.125"**
 Unit Width:.....**4' 11.5"**
 Unit Height:.....**4' 1.375"**
 *** **Total Operating Weight:.....822 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:.....**20 x 20 x 2**

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Unit Configuration

SA Smoke Detector
 Standard/Medium Static (EcoBlue)
 E-coat Al/Cu - E-coat Al/Cu
 Base Electromechanical Controls
 Standard Packaging

Warranty Information

1-Year parts(std.)
 5-Year compressor parts(std.)
 10-Year heat exchanger - Aluminized(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
48FCDM09C2D6-0A0A0	Rooftop Unit	1

Certified Drawing for 8.5 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

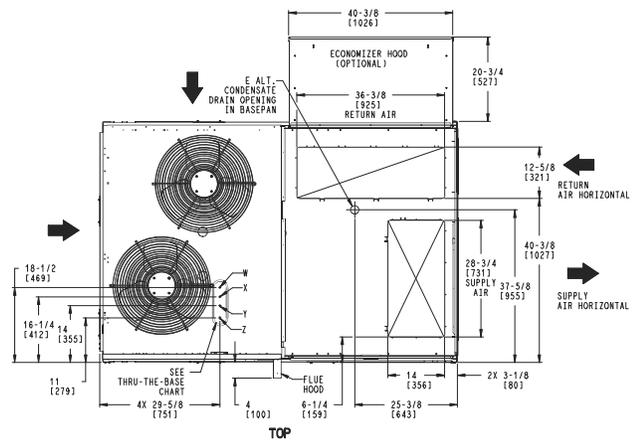
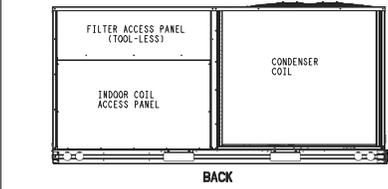
09/26/2022
 02:46PM

- 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
48FC-W08	RTFF	41 1/4 (1043)	33 3/4 (857)	15 7/8 (403)
48FC-W09	RTFF	49 3/8 (1252)	36 3/8 (925)	15 7/8 (403)
48FC-W12	RTFF	49 3/8 (1252)	36 3/8 (925)	15 7/8 (403)

RTFF - ROUND TUBE, PLATE FIN (COPPER/ALUM)

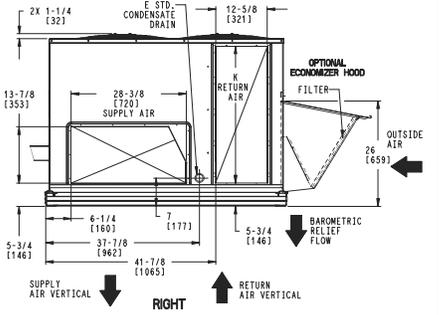
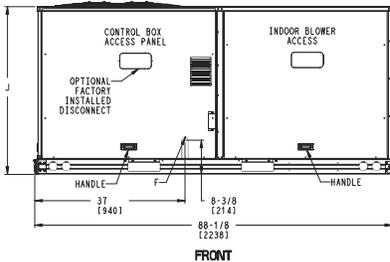
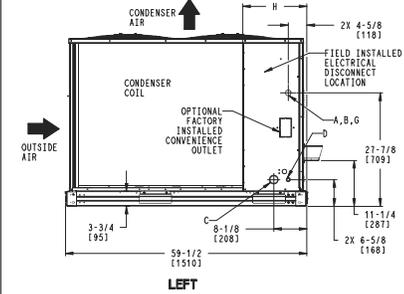
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CONNECTION SIZES	
A	1 3/8" (35) DIA FIELD POWER SUPPLY HOLE
B	2 1/2" (64) DIA POWER SUPPLY KNOCKOUT
C	1 3/4" (51) DIA GAUGE ACCESS PLUG
D	7/8" (22) DIA FIELD CONTROL WIRING HOLE
E	3/4" - 1/4 NPT CONDENSATE DRAIN
F	1/2" - 1/4 NPT GAS CONNECTION
G	2" (51) DIA POWER SUPPLY KNOCK-OUT

THRU-THE-BASE CHART (FIELD INST)			
THESE HOLES REQUIRED FOR USE WITH ACCY KITS: CRBTMPW002A01: GAS THRU CURB CRBTMPW004A01: GAS THRU BASEPAN			
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" (002,004)	POWER	1 3/4" (44.4)
Z	(004) 3/4" FPT	GAS	1 3/4" (44.4)
*	(002)	PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.	HOLE SIZE: 2" (50.8)

THRU-THE-BASE CHART (FIOP)
 FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X, Y, & Z ARE PROVIDED. **
 FOR BELOW LISTED MODELS, A FIELD SUPPLIED 1/2" ADAPTER IS REQUIRED BETWEEN BASE PAN FITTING AND GAS VALVE:
 48FC, S408, 09



ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	48FC 08-12 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	48TM006295	REV
U.S. ECCN: NSR	1 OF 3	03/12/21	-			-

Certified Drawing for 8.5 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

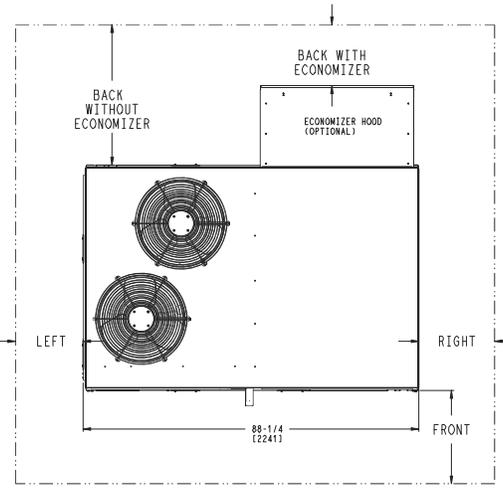
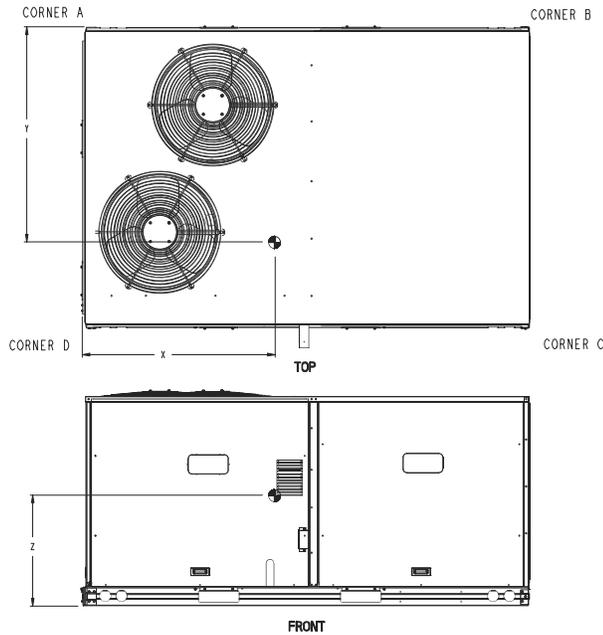
UNIT	OUTDOOR COIL TYPE	STD. UNIT WEIGHT ***		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C. G.					
		LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z			
48FC-M08	RTPF	787	357	181	82	150	68	207	94	249	113	40	[1016]	34 1/2	[876]	19 3/8	[492]
48FC-M09	RTPF	868	394	197	89	160	73	229	104	282	128	39 1/2	[1003]	35	[889]	18 5/8	[473]
48FC-M12	RTPF	878	398	213	97	175	80	221	100	268	121	39 7/8	[1013]	33 1/4	[841]	18 1/2	[470]

RTPF - ROUND TUBE, PLATE FIN (COPPER/ALUM)



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NOTE:
 1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

SURFACE	CLEARANCE		OPERATING CLEARANCE
	SERVICE WITH CONDUCTIVE BARRIER	SERVICE WITH NONCONDUCTIVE BARRIER	
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]

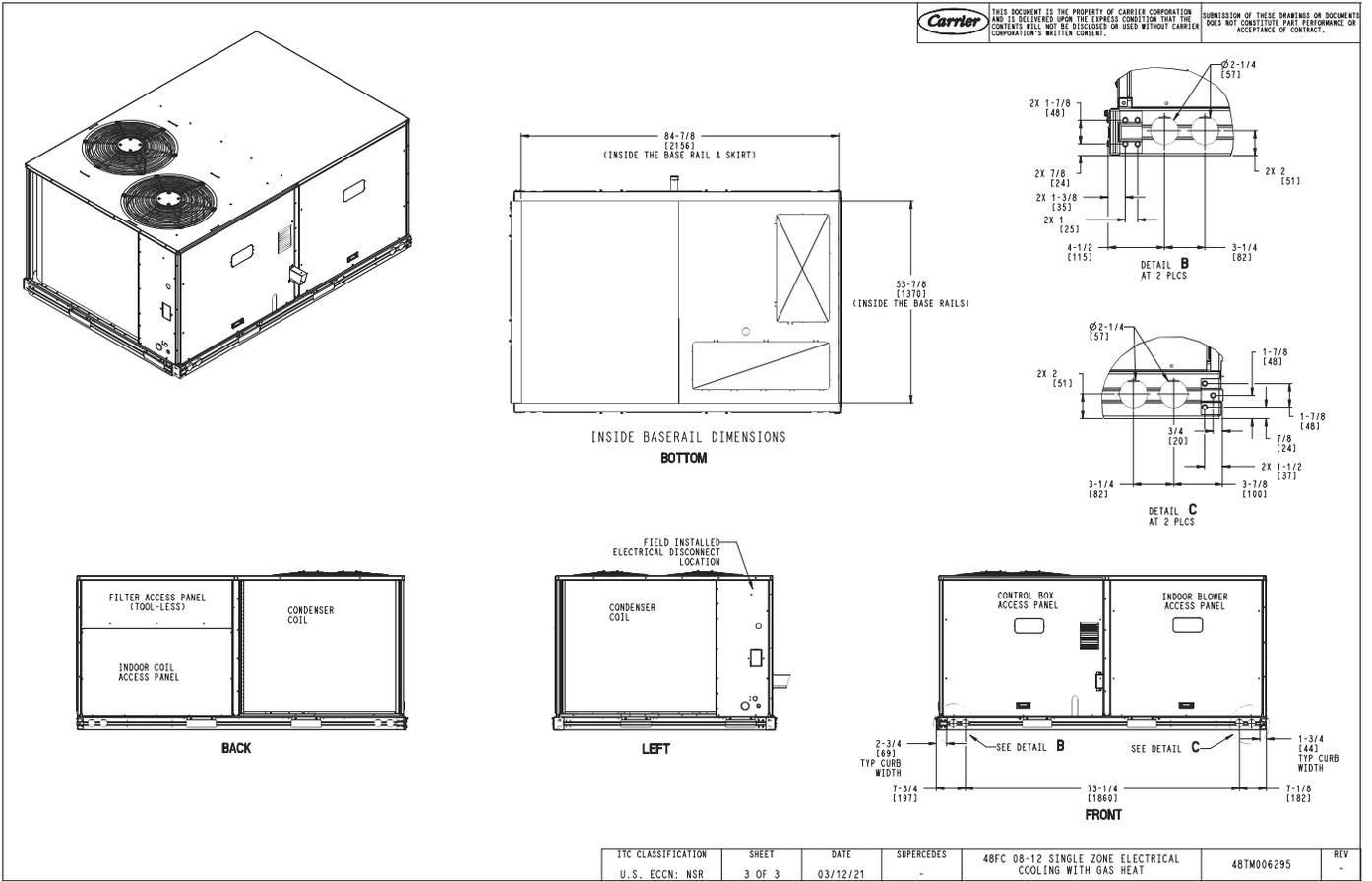
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	48FC 08-12 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	48TM006295	REV
U.S. ECCN: NSR	2 OF 3	03/12/21	-			-

Certified Drawing for 8.5 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

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ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	48FC 08-12 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	48TM006295	REV
U.S. ECCN: NSR	3 OF 3	03/12/21	-			-

Performance Summary For 8.5 Ton

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Part Number: 48FCDM09C2D6-0A0A0

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

Operating Weight

Base Unit Weight: 815 lb
SA Smoke Detector: 7 lb

Total Operating Weight: 822 lb

Unit

Unit Voltage-Phase-Hertz: 460-3-60
Air Discharge: Vertical
Fan Drive Type: Vane Axial
Actual Airflow: 3400 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: 57.6 F
Evaporator Leaving Air Enthalpy: 24.78 BTU/lb
Gross Cooling Capacity: 101.80 MBH
Gross Sensible Capacity: 78.96 MBH
Compressor Power Input: 6.95 kW
Coil Bypass Factor: 0.087

Heating Performance

Heating Airflow: 3400 CFM
Entering Air Temp: 70.0 F
Leaving Air Temp: 98.1 F
Gas Heating Input Capacity: 125.0 MBH
Gas Heating Output Capacity: 103.0 MBH
Temperature Rise: 28.1 F

Supply Fan

External Static Pressure: 0.50 in wg
Fan RPM: 1496
Fan Power: 1.15 BHP
NOTE: Selected IFM RPM Range: 1083 - 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: 6.2
Compressor #1 LRA: 60
Compressor #2 RLA: 6.2
Compressor #2 LRA: 60
Indoor Fan Motor Type: MED
Indoor Fan Motor FLA: 3
Combustion Fan Motor FLA (ea): 0.25

Performance Summary For 8.5 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

Power Supply MCA:.....	19
Power Supply MOCP (Fuse or HACR):.....	25
Disconnect Size FLA:.....	20
Disconnect Size LRA:.....	128
Electrical Convenience Outlet:.....	None
Outdoor Fan [Qty / FLA (ea)]:.....	2 / 0.8

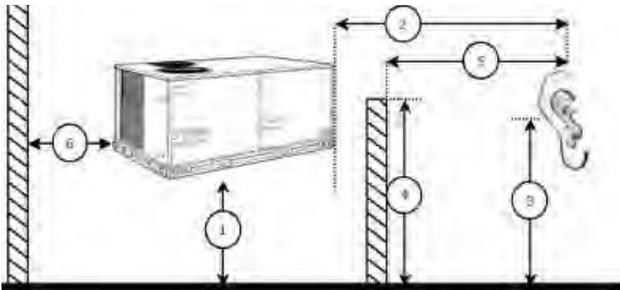
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	95.9	93.1	85.6
125 Hz	91.3	83.6	84.7
250 Hz	75.2	65.7	80.5
500 Hz	69.7	63.6	76.0
1000 Hz	64.3	61.0	72.4
2000 Hz	61.7	56.3	68.0
4000 Hz	65.3	55.6	62.8
8000 Hz	64.6	54.8	59.3
A-Weighted	78.0	71.6	79.0

Advanced Acoustics



Advanced Acoustics 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

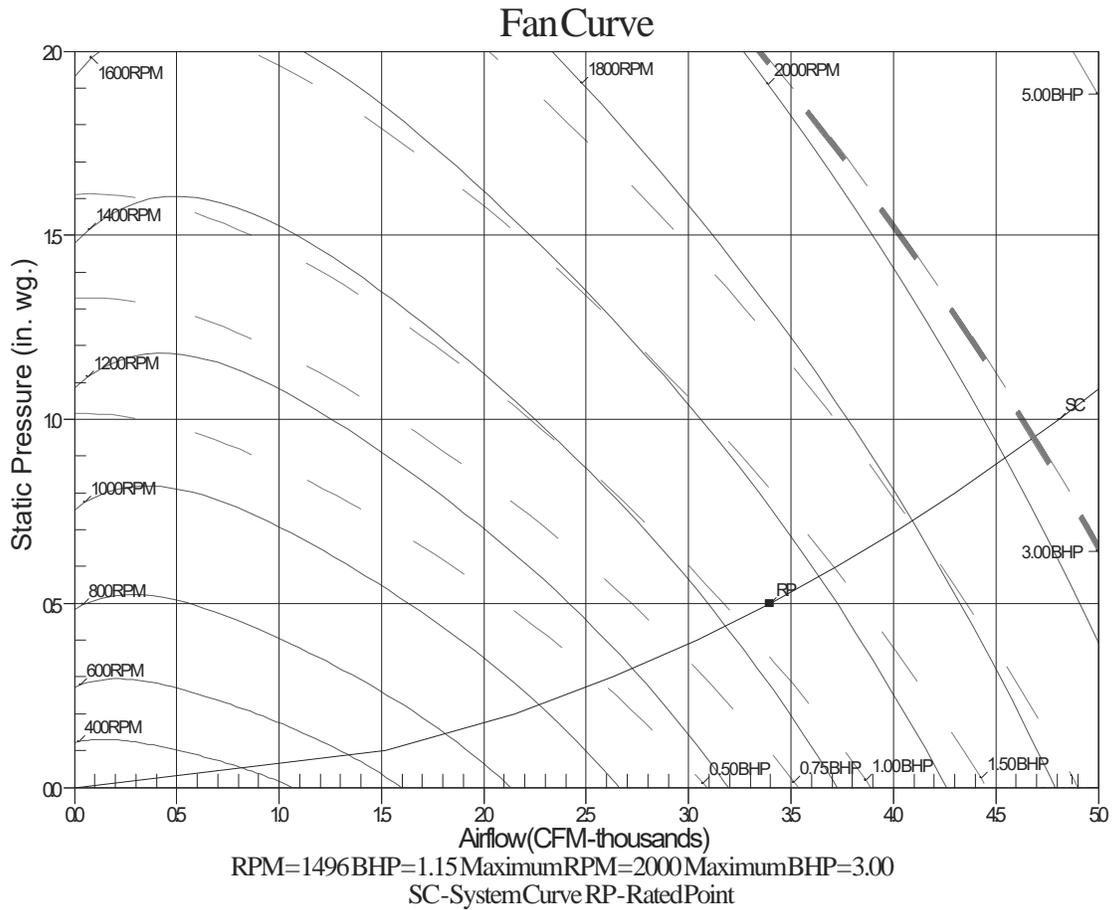
Performance Summary For 8.5 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

- 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.



Unit Report For 7.5 Ton

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Unit Parameters

Unit Model:.....**48FCDM08C2D6-0A0A0**
 Unit Size:.....**08 (7.5 Tons)**
 Volts-Phase-Hertz:.....**460-3-60**
 Heating Type:.....**Gas**
 Duct Cfg:.....**Vertical Supply / Vertical Return**
 Low Heat
 Single Circuit, Two Stage Cooling

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length:.....**7' 4.125"**
 Unit Width:.....**4' 11.5"**
 Unit Height:.....**3' 5.25"**
 *** **Total Operating Weight:.....750 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 20 x 2**

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Unit Configuration

SA Smoke Detector
 Standard/Medium Static (EcoBlue)
 E-coat Al/Cu - E-coat Al/Cu
 Base Electromechanical Controls
 Standard Packaging

Warranty Information

1-Year parts(std.)
 5-Year compressor parts(std.)
 10-Year heat exchanger - Aluminized(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
48FCDM08C2D6-0A0A0	Rooftop Unit	1

Certified Drawing for 7.5 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

- 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

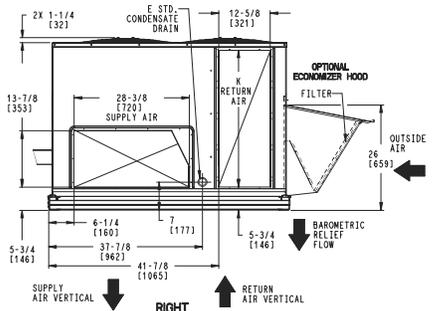
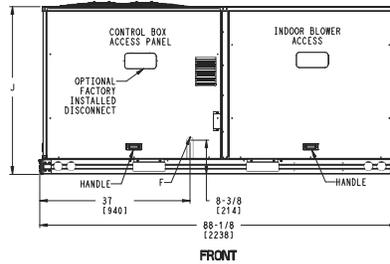
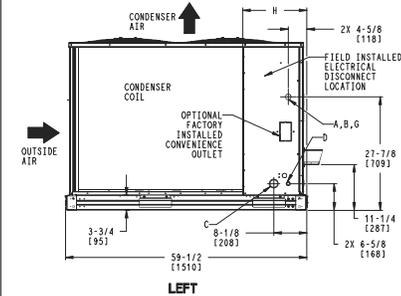
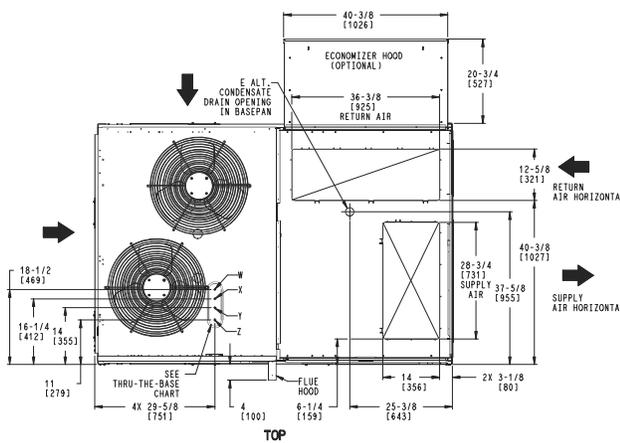
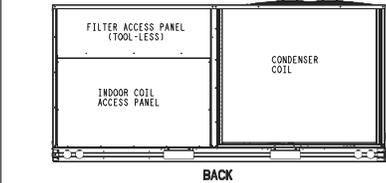
UNIT	OUTDOOR COIL TYPE	J	K	H
48FC-W08	RTFF	41 1/4 (1043)	33 3/4 (857)	15 7/8 (403)
48FC-W09	RTFF	49 3/8 (1253)	36 3/8 (925)	15 7/8 (403)
48FC-W12	RTFF	49 3/8 (1253)	36 3/8 (925)	15 7/8 (403)

RTFF - 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 GANSE 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	3/4"-14 NPT GAS CONNECTION
G	2" (51) DIA POWER SUPPLY KNOCK-OUT

THRU-THE-BASE CHART (FIELD INST)			
THESE HOLES REQUIRED FOR USE WITH ACCY KITS: CRBTMWR002A01: GAS THRU CURB CRBTMWR004A01: GAS THRU BASEPAN			
	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" (002,004)	POWER	1 3/4" (44.4)
Z	** (004)	3/4" FPT GAS	1 3/4" (44.4)
*	(002)	PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING. HOLE SIZE: 2" (50.8)	

THRU-THE-BASE CHART (FIOP)	
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X, Y, & Z ARE PROVIDED. **	
FOR BELOW LISTED MODELS, A FIELD SUPPLIED 1/2" ADAPTER IS REQUIRED BETWEEN BASE PAN FITTING AND GAS VALVE: 48FC, S408, 09	

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	48FC 08-12 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	48TM06295	REV
U.S. ECCN: NSR	1 OF 3	03/12/21	-			-

Certified Drawing for 7.5 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

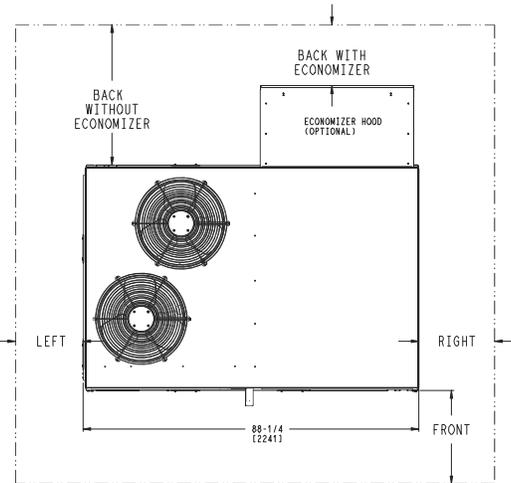
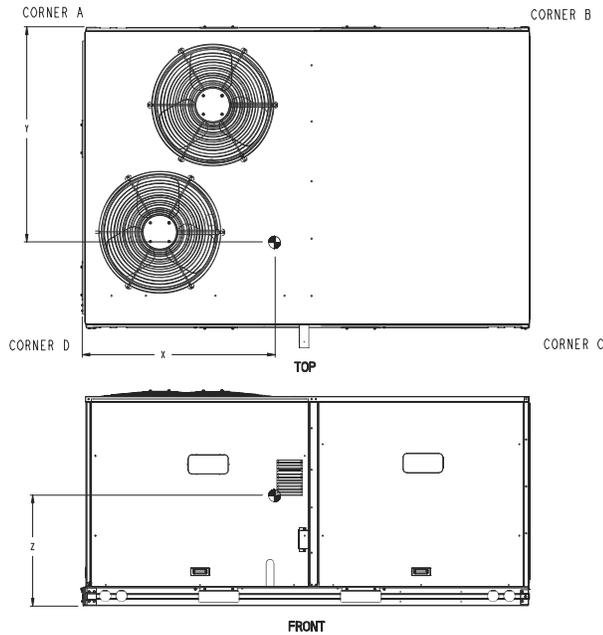
UNIT	OUTDOOR COIL TYPE	STD. UNIT WEIGHT ***		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C. G.			
		LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z	
48FC-M08	RTPF	787	357	181	82	150	68	207	94	249	113	40	[1016]	34 1/2 [876]	19 3/8 [492]
48FC-M09	RTPF	868	394	197	89	160	73	229	104	282	128	39 1/2 [1003]	35 [889]	18 5/8 [473]	
48FC-M12	RTPF	878	398	213	97	175	80	221	100	268	121	39 7/8 [1013]	33 1/4 [841]	18 1/2 [470]	

RTPF - ROUND TUBE, PLATE FIN (COPPER/ALUM)



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*** STANDARD UNIT WEIGHT IS WITH LOW GAS 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.

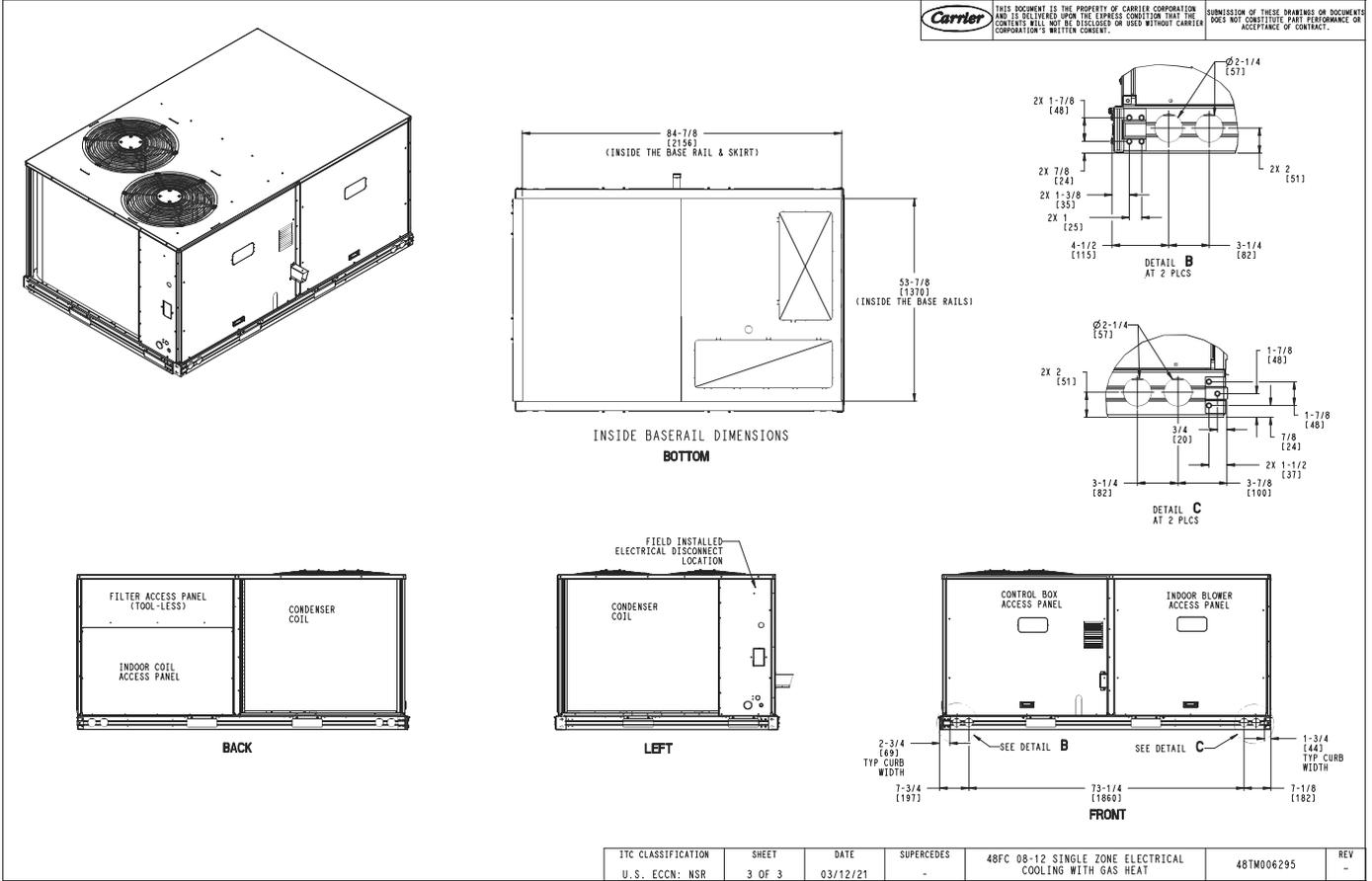
SURFACE	CLEARANCE		OPERATING CLEARANCE
	SERVICE WITH CONDUCTIVE BARRIER	SERVICE WITH NONCONDUCTIVE BARRIER	
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/O ECON	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/ECON	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	48FC 08-12 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	48TM006295	REV
U.S. ECCN: NSR	2 OF 3	03/12/21	-			-

Certified Drawing for 7.5 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM



Performance Summary For 7.5 Ton

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Part Number: 48FCDM08C2D6-0A0A0

ARI EER: 11.20
IEER: 15.0

Base Unit Dimensions

Unit Length: 88.1 in
Unit Width: 59.5 in
Unit Height: 41.3 in

Operating Weight

Base Unit Weight: 743 lb
SA Smoke Detector: 7 lb

Total Operating Weight: 750 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: 59.6 F
Evaporator Leaving Air WB: 57.5 F
Evaporator Leaving Air Enthalpy: 24.74 BTU/lb
Gross Cooling Capacity: 90.47 MBH
Gross Sensible Capacity: 66.02 MBH
Compressor Power Input: 6.30 kW
Coil Bypass Factor: 0.147

Heating Performance

Heating Airflow: 3000 CFM
Entering Air Temp: 70.0 F
Leaving Air Temp: 101.8 F
Gas Heating Input Capacity: 125.0 MBH
Gas Heating Output Capacity: 103.0 MBH
Temperature Rise: 31.8 F

Supply Fan

External Static Pressure: 0.50 in wg
Fan RPM: 1449
Fan Power: 1.11 BHP
NOTE: Selected IFM RPM Range: 1040 - 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: 60
Compressor #2 RLA: 6.1
Compressor #2 LRA: 60
Indoor Fan Motor Type: MED
Indoor Fan Motor FLA: 3
Combustion Fan Motor FLA (ea): 0.25

Performance Summary For 7.5 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

Power Supply MCA:.....	19
Power Supply MOCP (Fuse or HACR):.....	20
Disconnect Size FLA:.....	19
Disconnect Size LRA:.....	128
Electrical Convenience Outlet:.....	None
Outdoor Fan [Qty / FLA (ea)]:.....	2 / 0.8

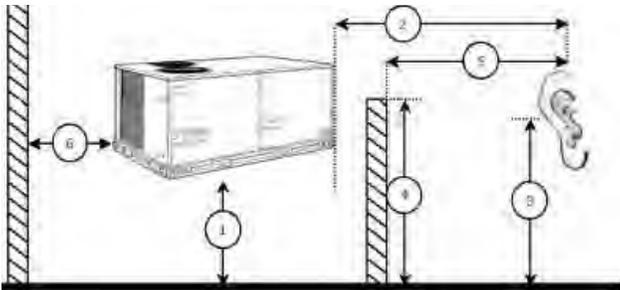
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	96.5	93.7	85.6
125 Hz	90.5	83.8	84.7
250 Hz	75.0	67.6	80.5
500 Hz	68.7	63.8	76.0
1000 Hz	63.8	61.0	72.4
2000 Hz	61.9	56.1	68.0
4000 Hz	64.5	55.2	62.8
8000 Hz	64.7	54.8	59.3
A-Weighted	77.5	72.0	79.0

Advanced Acoustics



Advanced Acoustics 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

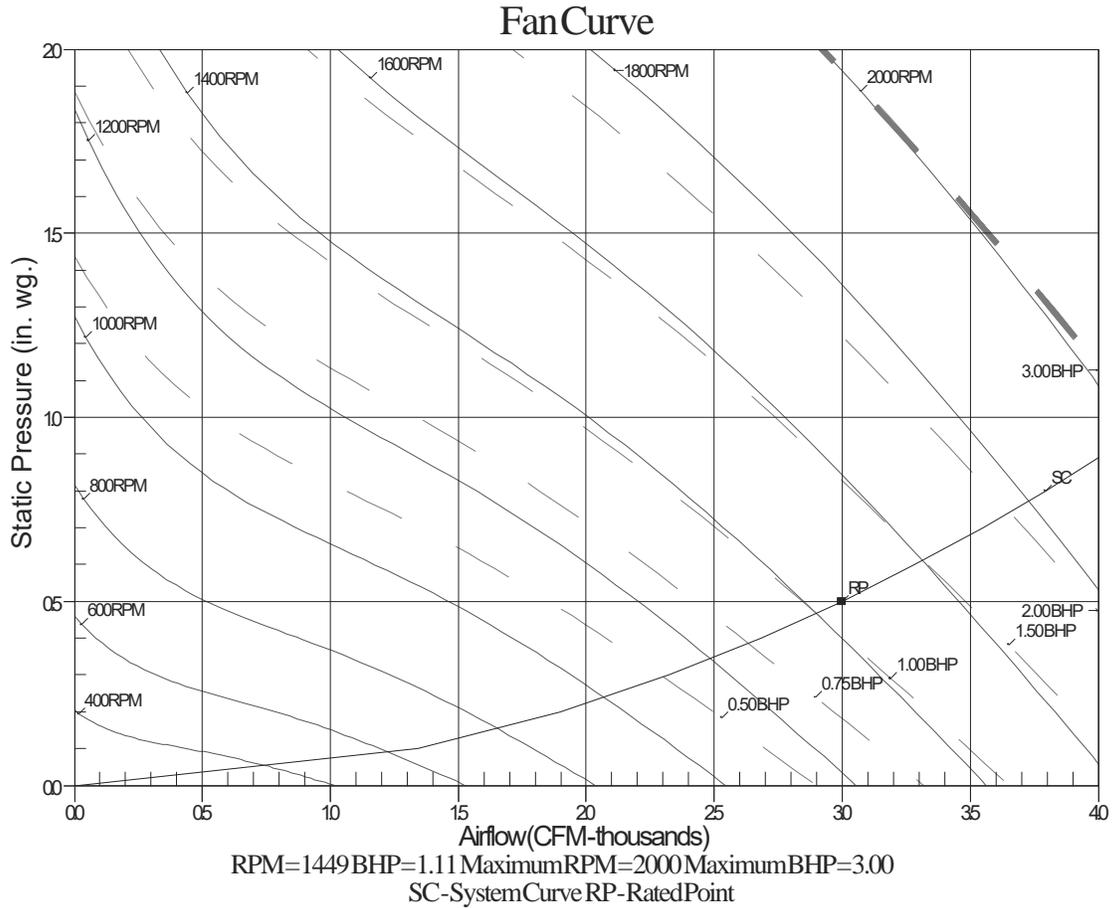
Performance Summary For 7.5 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

- 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.



Unit Report For 15 Ton

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Unit Parameters

Unit Model:.....**48FCDM16C2D6-0A0A0**
 Unit Size:.....**16 (15 Tons)**
 Volts-Phase-Hertz:.....**460-3-60**
 Heating Type:.....**Gas**
 Duct Cfg:.....**Vertical Supply / Vertical Return**
 Low Heat
 Single Circuit, Two Stage Cooling

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length:.....**9' 7.875"**
 Unit Width:.....**5' 6.375"**
 Unit Height:.....**4' 9.375"**
 *** **Total Operating Weight:.....1332 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:.....**3/4**
 Condensate Drain Line Size:.....**3/4**
 Return Air Filter Type:.....**Throwaway**
 Return Air Filter Quantity:.....**6**
 Return Air Filter Size:.....**18 x 24 x 2**

Selection includes construction throwaway filter into the base fan curve. This filter is not MERV Rated.

Unit Configuration

SA Smoke Detector
 Standard/Medium Static (EcoBlue)
 E-coat Al/Cu - E-coat Al/Cu
 Base Electromechanical Controls
 Standard Packaging

Warranty Information

1-Year parts(std.)
 5-Year compressor parts(std.)
 10-Year heat exchanger - Aluminized(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
48FCDM16C2D6-0A0A0	Rooftop Unit	1

Certified Drawing for 15 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

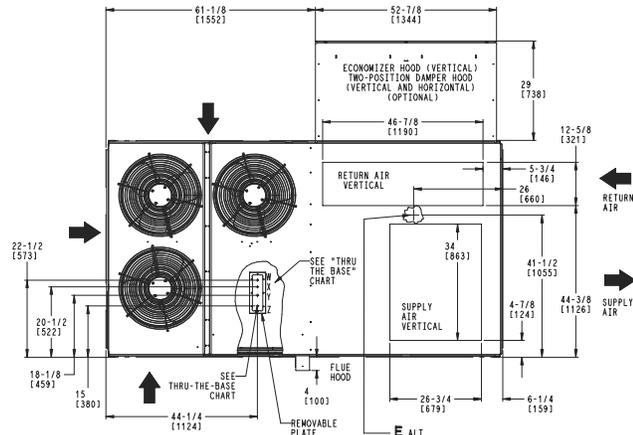
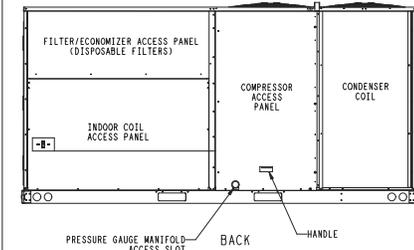
NOTES:

1. DIMENSIONS ARE IN INCHES. DIMENSIONS IN () ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW



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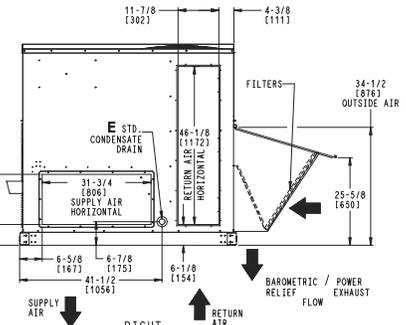
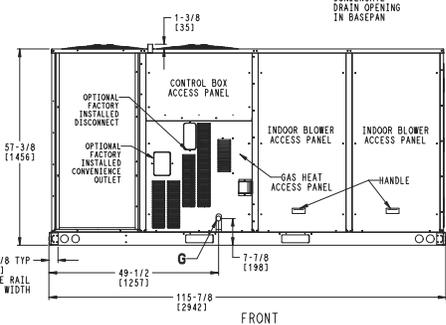
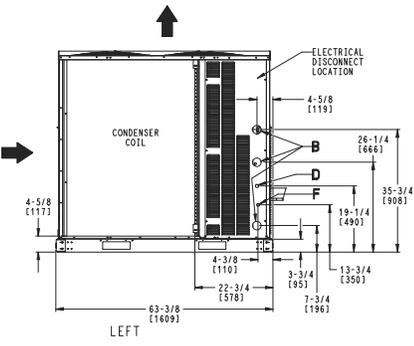
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CONNECTION SIZES	
B	2 1/2" (64) DIA POWER SUPPLY HOLE
D	7/8" (22) DIA FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN
F	7/8" (22) DIA FIELD CONVENIENCE OUTLET HOLE
G	3/4"-14 NPT GAS CONNECTION

THRU-THE-BASE CHART THESE HOLES REQUIRED FOR USE CRBTMPR005A00,006A00,007A00				
ACCESSORY NO.	THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)	
005	W	1/2"	ACC.	7/8" (22.2)
	X	1/2"	24V	7/8" (22.2)
	Y	1 1/4"	POWER	1 1/2" (38.1)
006	Z	3/4" PIPE	GAS	1 3/4" (44.5)
	W	1/2"	ACC.	7/8" (22.2)
	Y	1 1/2"	POWER	2" (50.8)
007	Z	3/4" PIPE	GAS	1 3/4" (44.5)
	W	1/2"	ACC.	7/8" (22.2)
	X	1/2"	24V	7/8" (22.2)
	Y	2"	POWER	2 1/2" (63.5)
	Z	3/4" PIPE	GAS	1 3/4" (44.5)

FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR X & Y ARE PROVIDED AS SPECIFIED ON "006".



I/C CLASSIFICATION	SHEET	DATE	SUPERCEDES	48FC 16 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	50TM002025	REV
U.S. ECCN: NSR	1 OF 2	06/10/21	-			-

Certified Drawing for 15 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

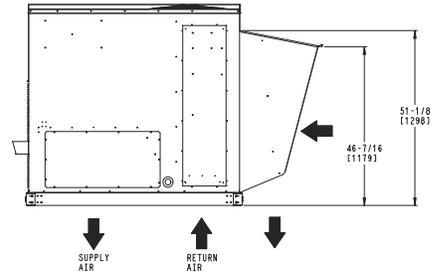
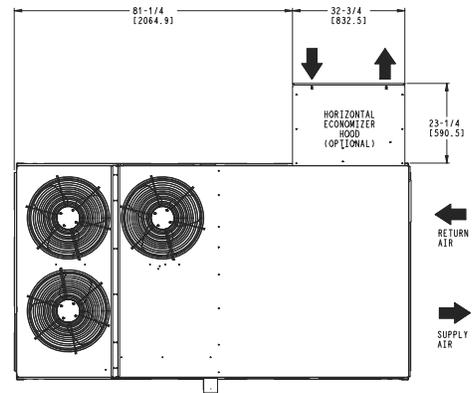
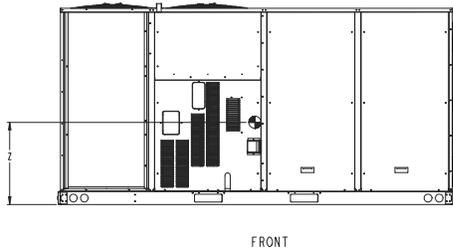
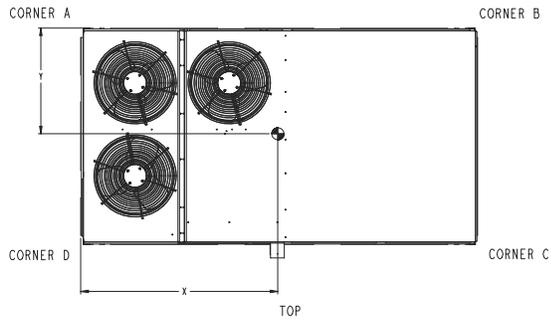
UNIT	STD UNIT WEIGHT	CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.			
		LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z	
48FC-M16	1480	639	373	169	341	155	332	150	362	164	55 3/8 [1407]	31 1/4 [794]	21 1/8 [537]

STANDARD UNIT WEIGHT IS WITH LOW HEAT & WITHOUT PACKAGING.
 FOR OPTIONS & ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.



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HORIZONTAL ECONOMIZER

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	DESCRIPTION	MODEL	REV
U.S. ECCN: NSR	2 OF 2	06/10/21	-	48FC 16 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	50TM002025	-

Performance Summary For 15 Ton

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Part Number:48FCDM16C2D6-0A0A0

ARI EER:.....**10.80**
IEER:.....**14.5**

Base Unit Dimensions

Unit Length:.....**115.9** in
Unit Width:.....**66.4** in
Unit Height:.....**57.4** in

Operating Weight

Base Unit Weight:.....**1325** lb
SA Smoke Detector:.....**7** lb

Total Operating Weight:.....**1332** lb

Unit

Unit Voltage-Phase-Hertz:.....**460-3-60**
Air Discharge:.....**Vertical**
Fan Drive Type:.....**Vane Axial**
Actual Airflow:.....**6000** 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:.....**59.0** F
Evaporator Leaving Air WB:.....**57.4** F
Evaporator Leaving Air Enthalpy:.....**24.66** BTU/lb
Gross Cooling Capacity:.....**183.06** MBH
Gross Sensible Capacity:.....**136.09** MBH
Compressor Power Input:.....**13.50** kW
Coil Bypass Factor:.....**0.093**

Heating Performance

Heating Airflow:.....**6000** CFM
Entering Air Temp:.....**70.0** F
Leaving Air Temp:.....**92.5** F
Gas Heating Input Capacity:.....**144.0 / 180.0** MBH
Gas Heating Output Capacity:.....**118.0 / 146.0** MBH
Temperature Rise:.....**22.5** F

Supply Fan

External Static Pressure:.....**0.50** in wg
Fan RPM:.....**1642**
Fan Power:.....**2.15** BHP
NOTE:.....**Selected IFM RPM Range: 250 - 2200**

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:.....**14.7**
Compressor #1 LRA:.....**130**
Compressor #2 RLA:.....**8.2**
Compressor #2 LRA:.....**66**
Indoor Fan Motor Type:.....**MED**
Indoor Fan Motor FLA:.....**3.5**
Combustion Fan Motor FLA (ea):.....**0.25**

Performance Summary For 15 Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

Power Supply MCA:.....	33
Power Supply MOCP (Fuse or HACR):.....	45
Disconnect Size FLA:.....	33
Disconnect Size LRA:.....	209
Electrical Convenience Outlet:.....	None
Outdoor Fan [Qty / FLA (ea)]:.....	3 / 0.8

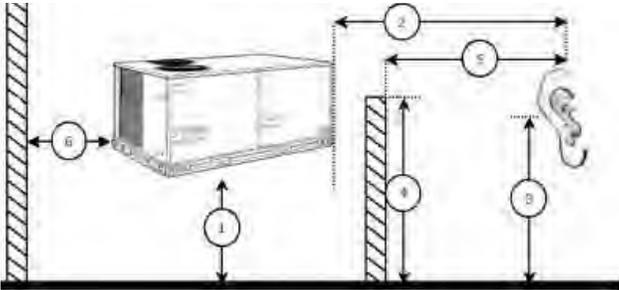
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	95.2	92.1	87.0
125 Hz	95.8	85.3	85.2
250 Hz	80.1	63.4	84.6
500 Hz	76.9	65.6	84.9
1000 Hz	70.6	63.4	82.2
2000 Hz	65.6	60.2	78.4
4000 Hz	72.3	60.7	75.3
8000 Hz	69.7	58.2	72.9
A-Weighted	82.6	73.0	87.0

Advanced Acoustics



Advanced Acoustics 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	87.0	85.2	84.6	84.9	82.2	78.4	75.3	72.9	92.4 Lw
B	60.8	69.1	76.0	81.7	82.2	79.6	76.3	71.8	87.1 LwA
C	54.6	52.8	52.2	52.5	49.8	46.0	42.9	40.5	60.0 Lp
D	28.4	36.7	43.6	49.3	49.8	47.2	43.9	39.4	54.7 LpA

Legend

A Sound Power Levels at Unit's Acoustic Center, Lw

Performance Summary For 15 Ton

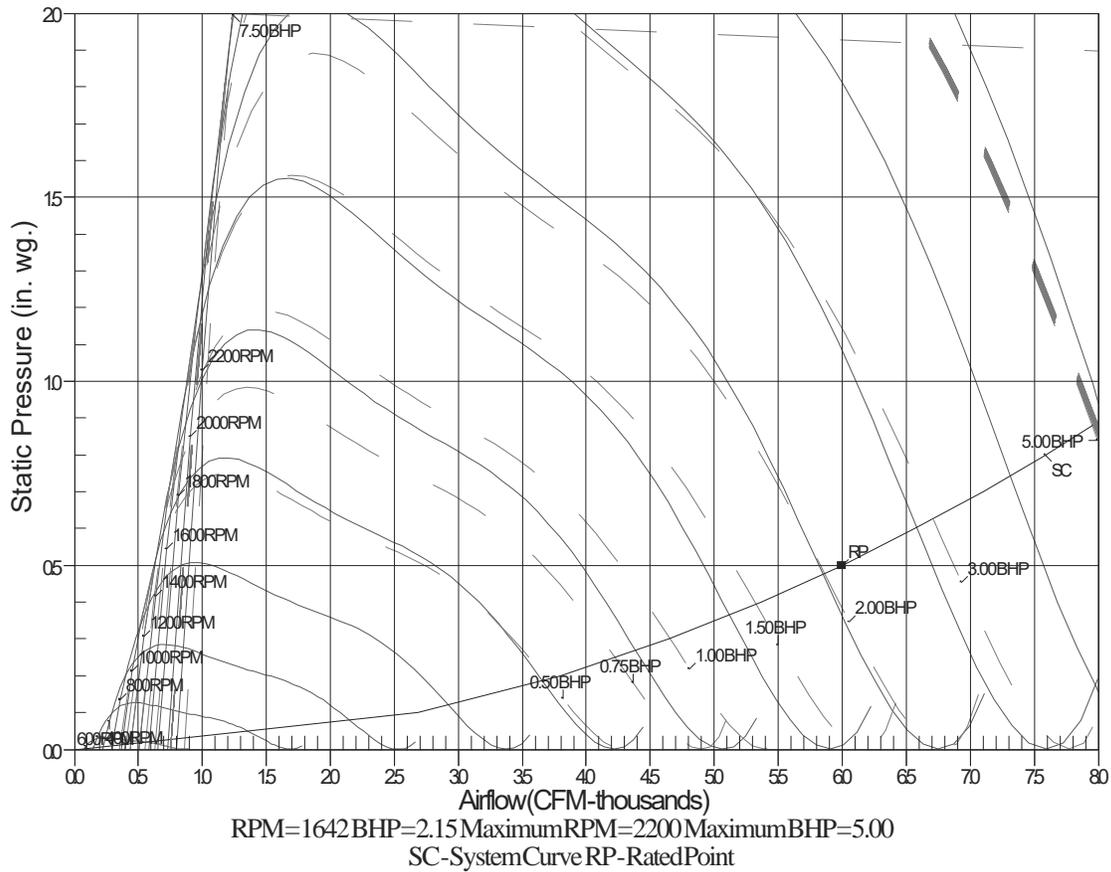
Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

- 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.

Fan Curve



Unit Report For 7.5 Ton HP

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Unit Parameters

Unit Model:.....**50FCQM08C2D6-0A0A0**
Unit Size:.....**08 (7.5 Tons)**
Volts-Phase-Hertz:.....**460-3-60**
Heating Type:.....**Heat Pump**
Duct Cfg:.....**Vertical Supply / Vertical Return**
Two-Stage Cooling / One Circuit

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. This filter is not MERV Rated.

Unit Configuration

SA Smoke Detector
Standard/Medium Static (EcoBlue)
E-coat Al/Cu - E-coat Al/Cu
Base Electromechanical Controls
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
50FCQM08C2D6-0A0A0	Rooftop Unit	1

Certified Drawing for 7.5 Ton HP

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

- 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

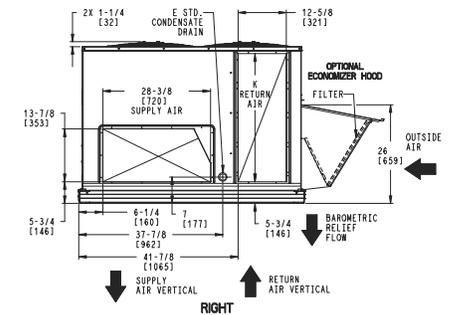
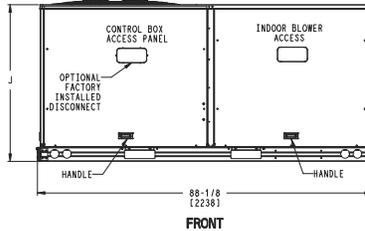
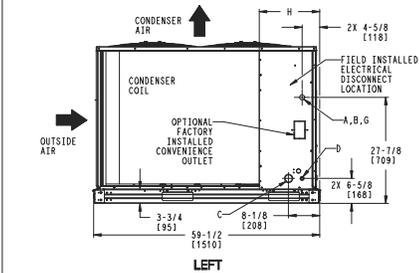
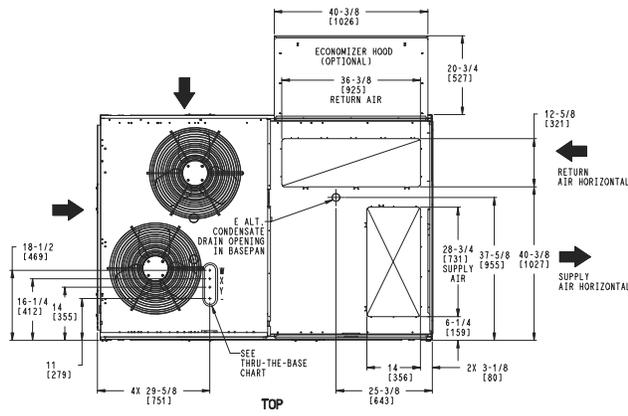
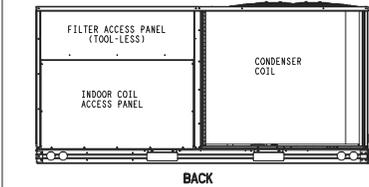
UNIT	OUTDOOR COIL TYPE	J	K	H
50FCO-08	RTPF	49 3/8 [1253]	36 3/8 [925]	15 7/8 [403]
50FCO-09	RTPF	49 3/8 [1253]	36 3/8 [925]	15 7/8 [403]

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: CRBTMPW002AD1			
	THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
M	1/2"	ACC.	7/8" [22.2]
X	1/2"	24V	7/8" [22.2]
Y	1 1/4" [102]	POWER	1 3/4" [44.4]

THRU-THE-BASE CHART (FIOIP)			
FOR "THRU-THE-BASEPAN" FACTORY OPTION.			
FITTINGS FOR ONLY X & Y ARE PROVIDED:			
(1) 1/2" & (1) 1 1/4" ELECTRICAL FITTINGS.			

I/C CLASSIFICATION	SHEET	DATE	SUPERCEDES	50FCO 08, 09 SINGLE ZONE ELECTRICAL	48TM009023	REV
U.S. ECCN:NSR	1 OF 3	04/01/22	-	HEAT PUMP		-

Certified Drawing for 7.5 Ton HP

Project: Alliance - Fresno WWTP
Prepared By:

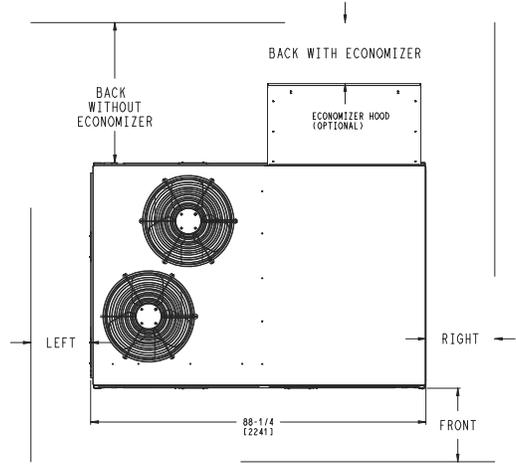
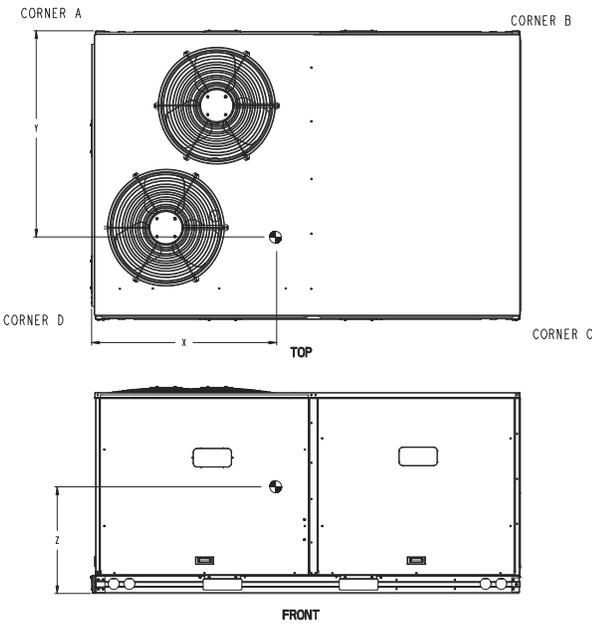
09/26/2022
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UNIT	OUTDOOR COIL TYPE	STD. UNIT WEIGHT ***		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.					
		LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z			
50FCO-08	RTPF	805	365	163	74	209	95	243	110	190	86	49 1/2	(1257)	32	(813)	19 1/8	(486)
50FCO-09	RTPF	812	368	164	75	211	96	245	111	191	87	49 1/2	(1257)	32	(813)	19 1/8	(486)



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*** 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.

SURFACE	CLEARANCE SERVICE WITH:	
	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]

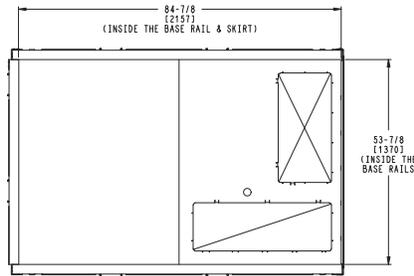
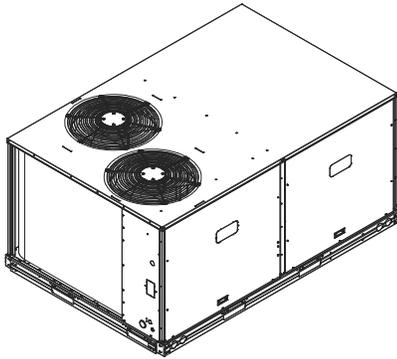
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	50FCO 08,09 SINGLE ZONE ELECTRICAL HEAT PUMP	48TM009023	REV
U.S. ECCN:NSR	2 OF 3	04/01/22	-			-

Certified Drawing for 7.5 Ton HP

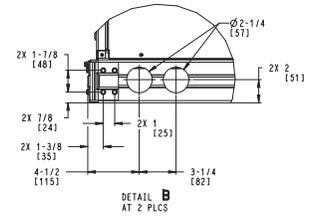
Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

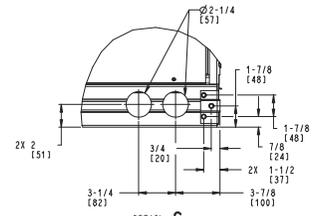
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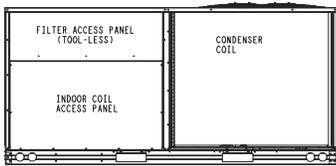
INSIDE BASERAIL DIMENSIONS
BOTTOM



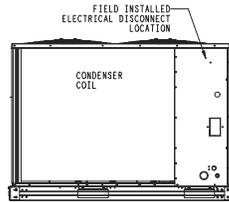
DETAIL B
 AT 2 PLCS



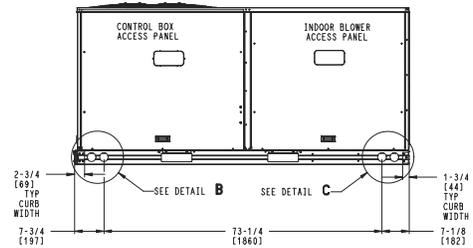
DETAIL C
 AT 2 PLCS



BACK



LEFT



FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	50FCO 08.09 SINGLE ZONE ELECTRICAL HEAT PUMP	48TM009023	REV
U.S. ECCN:NSR	3 OF 3	04/01/22	-			-

Performance Summary For 7.5 Ton HP

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Part Number:50FCQM08C2D6-0A0A0

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
HSPF:.....0.0

Supply Fan

External Static Pressure:.....0.50 in wg
Fan RPM:.....1310
Fan Power:.....0.77 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:.....3
Power Supply MCA:.....19
Power Supply MOCP (Fuse or HACR):.....20

Performance Summary For 7.5 Ton HP

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

Disconnect Size FLA:.....**19**
 Disconnect Size LRA:.....**90**
 Electrical Convenience Outlet:.....**None**
 Outdoor Fan [Qty / FLA (ea)]:.....**2 / 0.8**

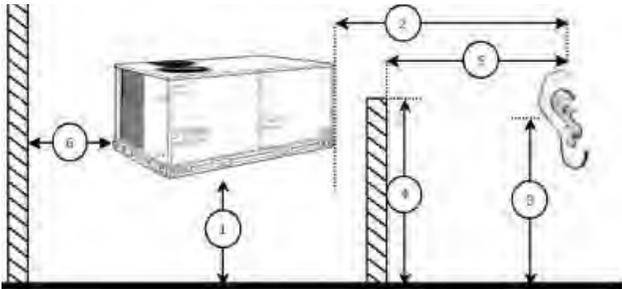
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	89.2	85.1	89.7
125 Hz	82.4	75.7	81.5
250 Hz	65.8	62.8	80.5
500 Hz	65.2	62.3	79.2
1000 Hz	62.0	59.8	77.1
2000 Hz	59.7	54.3	73.2
4000 Hz	59.9	51.4	70.2
8000 Hz	53.9	46.0	67.4
A-Weighted	71.0	66.3	82.0

Advanced Acoustics



Advanced Acoustics 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

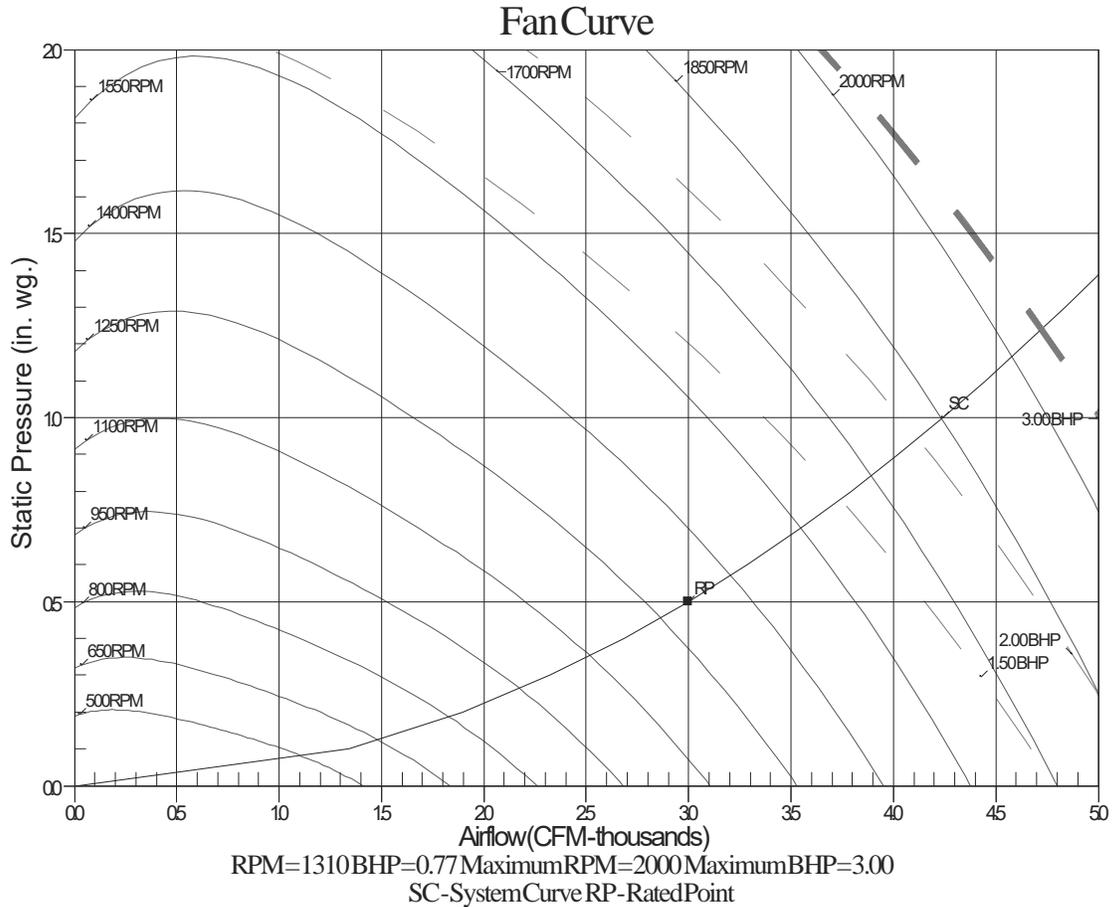
Performance Summary For 7.5 Ton HP

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 02:46PM

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.



Unit Report For 4 Ton Split

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022



Outdoor Unit Parameters

Unit Model:.....**25HPB**
Unit Size:.....**4 Tons**
Voltage:.....**208/230-1-60** V-Ph-Hz

Indoor Coil Parameters

Unit Model:.....**FX4D**
Unit Size:.....**48,000 Btuh (Size 049)**
Cabinet Insulation:**Single-piece cabinet with 1-in. super thick insulation**
Voltage:.....**208-1-60** V-Ph-Hz
Refrigerant Type:.....**Puron**
Heating Size:.....**No Heat**

Outdoor Unit Dimensions and Weight

Unit Length:.....**35** in
Unit Width:.....**35** in
Unit Height:.....**32.0625** in
Unit Shipping Weight:.....**296.** lb

Indoor Coil Dimensions and Weight

Unit Length:.....**22.0625** in
Unit Width:.....**24.6875** in
Unit Height:.....**53.4375** in
Unit Shipping Weight:.....**185.** lb

RESIDENTIAL APPLICATIONS

This warranty is to the original purchasing owner and subsequent owners only to the extent and as stated in the Warranty Conditions and below. The limited warranty period in years, depending on the part and the claimant, is as shown in the table below.

Limited Warranty (Years)		
Item	Original Owner	Subsequent Owner
Parts	10* (or 5)	5
Compressor	10* (or 5)	5

*If properly registered within 90 days of original installation, otherwise 5 years (except in California and Quebec and other jurisdictions that prohibit warranty benefits conditioned on registration). See Warranty Conditions below.

OTHER APPLICATIONS

The warranty period is five (5) years on the compressor, and one (1) year on all other parts. The warranty is the original owner only and is not available for subsequent owners.

Ordering Information

Part Number	Description	Quantity
Outdoor Unit		
25HPB648A003	25HPB Carrier Comfort Heat Pump with Puron 4 Tons Cooling 16 SEER @ ARI Conditions	1
Indoor Coil		
FX4DNF049L00	FX4D Comfort Series Fan Coil with Puron 48000 BTU Cooling 208/230-1-60 Single-piece cabinet with 1-in. super thick insulation Aluminum	1

The Product and Ratings Data in this program is subject to change at any time and without notice. Please refer to the latest product literature and the AHRI directory at www.ahridirectory.org for the most up-to-date information.

Unit Report For 4 Ton Split

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022

Performance Summary For 4 Ton Split

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022

System Performance

System:	25HPB/FX4D	Actual Clg Airflow:.....	1600.0	CFM
System Quantity:.....	1	Standard Clg Airflow:.....	1600.0	CFM
Altitude:.....	0.0 ft	Total Net Clg Capacity:.....	48.73	MBH
Linear Pipe Length:.....	0.0 ft	Net Sensible Clg Capacity:.....	40.13	MBH
COP @ 47 F:.....	3.70	Htg HP Capacity:.....	46.40	MBH
COP @ 17 F:.....	2.64	Htg HP Integrated Capacity:.....	46.40	MBH
SEER @ ARI Conditions:.....	15.5	Heating HP Compressor Power:.....	3.61	kW
EER @ ARI Conditions:.....	12.5	Total System Power:.....	3.88	kW
HSPF @ ARI Conditions:.....	8.5			

System Parameters

Outdoor Unit Parameters

Unit Model:.....	25HPB648A003	
Unit Size (Nominal):.....	4 Tons	
Voltage:.....	208/230-1-60	V-Ph-Hz
Clg Ent Air DB Ambient:.....	95.0	°F
Htg Ent Air DB Ambient:.....	47.0	°F

Indoor Coil Parameters

Unit Model:.....	FX4DNF049L00	
Unit Size (Nominal):.....	48,000 Btuh (Size 049)	
Voltage:.....	208-1-60	V-Ph-Hz
Ent Air DB:.....	80.00	°F
Ent Air WB:.....	67.00	°F
Ent Enthalpy:.....	31.44	BTU/lb
Lvg Air DB:.....	56.78	°F
Lvg Air WB:.....	56.78	°F
Lvg Enthalpy:.....	24.67	BTU/lb
Htg Ent Air DB:.....	70.0	°F
Htg Lvg Air DB:.....	96.9	°F
Heating Size (Nominal):.....	No Heat	
Total External Static Pressure:.....	0.50	in wg

Electrical Data

Outdoor Electrical Data

Unit Voltage:.....	208/230-1-60	V-Ph-Hz
Fan Motor FLA:.....	1.30	Amps
MCA:.....	31.8	Amps
Max Fuse:.....	45	Amps
Operating Range Min:.....	197	V
Operating Range Max:.....	253	V
Compressor RLA:.....	24.4	Amps
Compressor LRA:.....	130.0	Amps

Indoor Electrical Data:

(For units with no factory installed electric heaters)	
Unit Voltage:.....	208-1-60 V-Ph-Hz
Unit FLA:.....	6.0 Amps
Unit MCA:.....	7.5 Amps
Unit MOCP:.....	15.0 Amps
Unit Min Wire Size:.....	14.0
Motor HP:.....	3/4 HP
Notice: Indoor Elect. data is for 208-1-60 voltage	

The Product and Ratings Data in this program is subject to change at any time and without notice. Please refer to the latest product literature and the AHRI directory at www.ahridirectory.org for the most up-to-date information.

Acoustic Summary For 4 Ton Split

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022

Outdoor Unit Parameters:

Unit Model: **25HPB**
 Unit Size: **4 Tons**
 Variations: **Standard**

Octave Band Center Frequency, Hz	125	250	500	1k	2k	4k	8k	dB(A)
Sound Power, dB	68.4	67.7	69.7	67.6	59.4	56.4	50.0	
A-Weighted Sound Power, dBA								71.0

Indoor Coil Parameters:

Unit Model: **FX4D**
 Unit Size: **48,000 Btuh (Size 049)**
 Cabinet Insulation: **Single-piece cabinet with 1-in. super thick insulation**

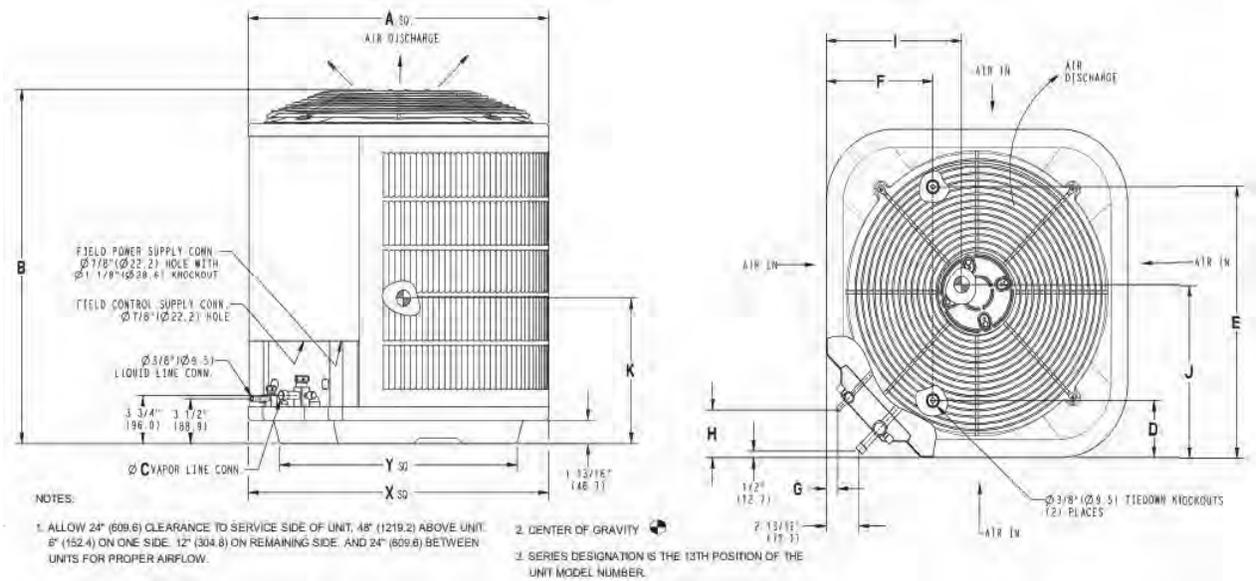
Octave Band Center Frequency, Hz	63	125	250	500	1k	2k	4k
Sound Power, dB	69.0	65.0	61.0	58.0	56.0	54.0	50.0

The Product and Ratings Data in this program is subject to change at any time and without notice. Please refer to the latest product literature and the AHRI directory at www.ahridirectory.org for the most up-to-date information.

Certified Drawing For 4 Ton Split

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022



Outdoor Model

Unit Model:.....**25HPB**
 Unit Size:.....**4 Tons**
 Voltage:.....**208/230-1-60** V-Ph-Hz
 SEER:.....**16**
 PartNumber:.....**25HPB648A003**

Shipping Dimensions and Weights		Outdoor Unit
Height		36.63 in
Width		37.13 in
Length		37.13 in
Operating Weight		258. lb
Shipping Weight		296. lb

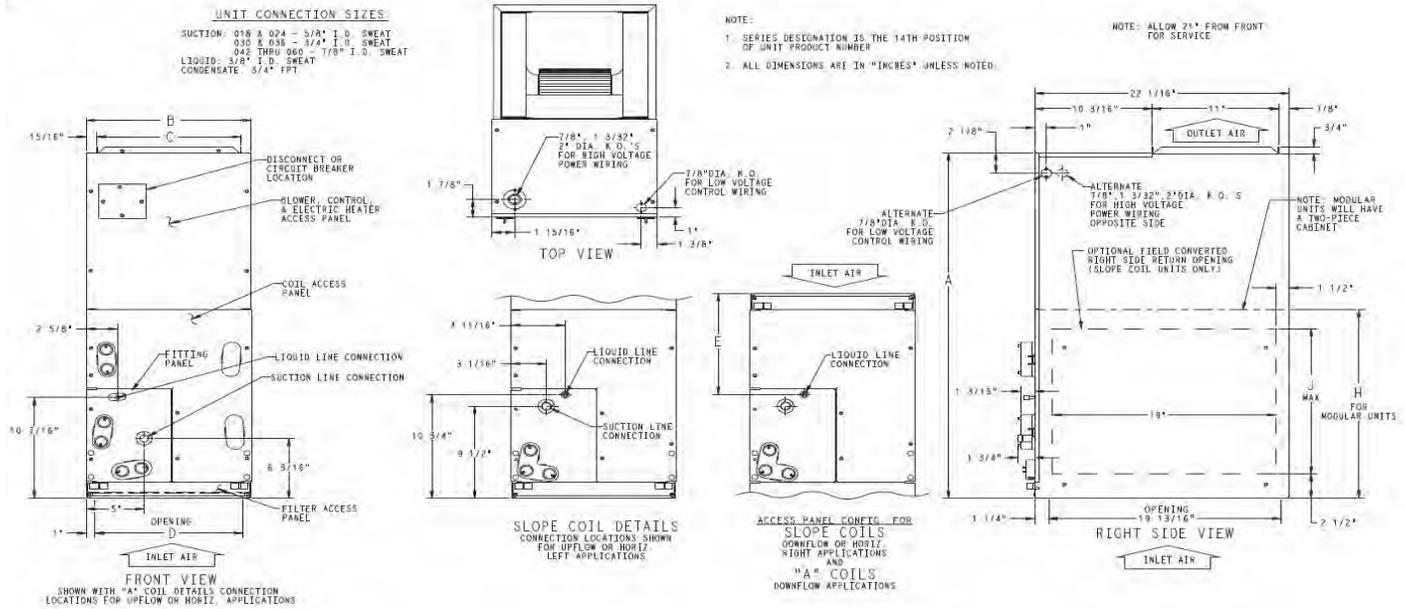
Dimensions										
A	B	C	D	E	F	G	H	I	J	K
35.00 in	32.06 in	0.88 in	6.56 in	28.44 in	9.13 in	1.13 in	3.81 in	16.13 in	18.00 in	14.88 in

The Product and Ratings Data in this program is subject to change at any time and without notice. Please refer to the latest product literature and the AHRI directory at www.ahridirectory.org for the most up-to-date information.

Certified Drawing For 4 Ton Split

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022



Indoor Coil

Unit Model:.....**FX4D**
 Unit Size:.....**48,000 Btuh (Size 049)**
 Voltage:.....**208-1-60 V-Ph-Hz**
 Cabinet Insulation:**Single-piece cabinet with 1-in. super thick insulation**
 PartNumber:.....**FX4DNF049L00**

Dimensions and Weights	Indoor Coil
Height	53.44 in
Width	24.69 in
Length	22.06 in
Shipping Weight	185. lb

Dimensions									
A	B	C	D	E	F	G	H	J	
53.44 in	24.69 in	22.75 in	22.69 in	19.50 in	27.25 in	26.31 in	28.31 in	--	

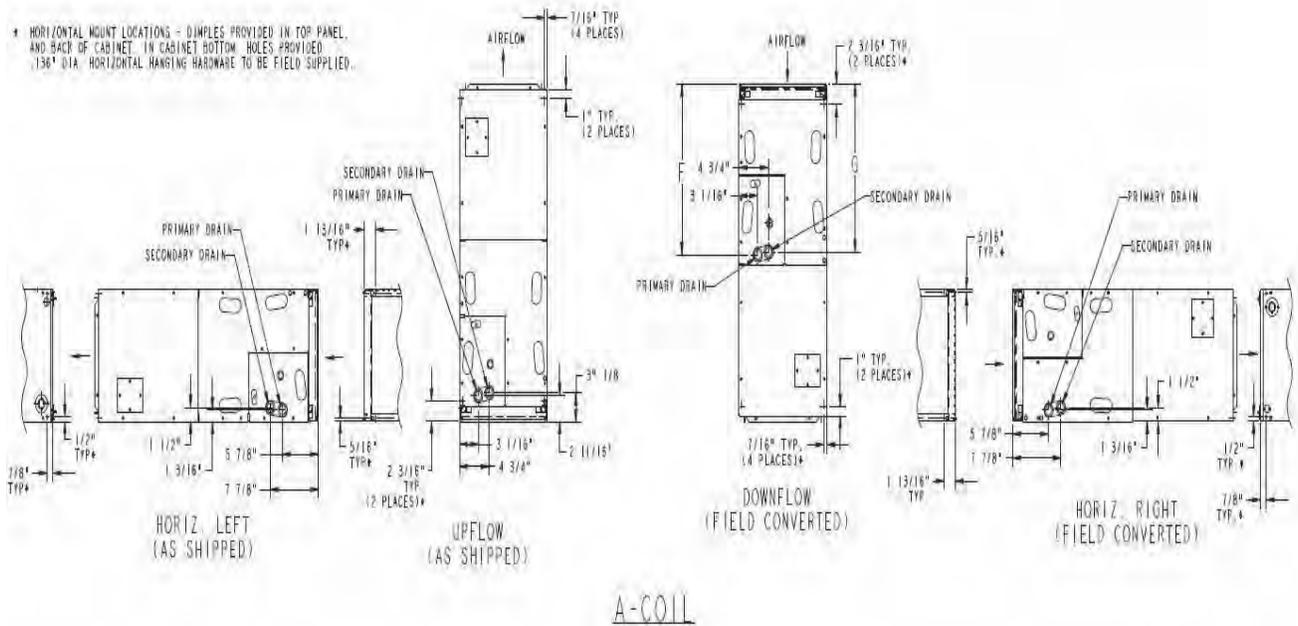
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Certified Drawing For 4 Ton Split

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022

* HORIZONTAL MOUNT LOCATIONS - DIMPLES PROVIDED IN TOP PANEL AND BACK OF CABINET. IN CABINET BOTTOM HOLES PROVIDED 1/32" DIA. HORIZONTAL HANGING HARDWARE TO BE FIELD SUPPLIED.



Indoor Coil

Unit Model:.....**FX4D**
 Unit Size:.....**48,000 Btuh (Size 049)**
 Voltage:.....**208-1-60** V-Ph-Hz
 PartNumber:.....**FX4DNF049L00**

The Product and Ratings Data in this program is subject to change at any time and without notice. Please refer to the latest product literature and the AHRI directory at www.ahridirectory.org for the most up-to-date information.

Unit Report For 130 Nominal Ton

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
02:46PM

Unit Information

Tag Name:.....**130 Nominal Ton**
 Model Number:.....**30RAP130**
 Condenser Type:.....**Air Cooled**
 Compressor Type:.....**Scroll**
 Nameplate Voltage:.....**460-3-60** V-Ph-Hz
 Quantity:.....**1**
 Manufacturing Source:.....**Charlotte, NC USA**
 Refrigerant:.....**R410A**
 Independent Refrigerant Circuits:.....**2**
 Capacity Control Steps:.....**6**
 Minimum Capacity:.....**15.0** %
 Shipping Weight:.....**6335** lb
 Operating Weight:.....**6451** lb
 Unit Length:.....**231** in
 Unit Width:.....**88** in
 Unit Height:.....**78** in

Accessories and Installed Options

Evaporator Heater
 Micro Channel, E-Coat
 Low Sound - Aero Acoustic Fans
 Dual Pump, 10 HP w/ VFD
 EMM and BACnet Communication
 Single Point
 Fixed Speed Condenser Fan

Chiller Warranty Information (Note: for US & Canada only)

First Year - Parts Only (Standard)
 Start-up, First Unit

Ordering Information

Part Number	Description	Quantity
30RAP1306F-M0160	Packaged Chiller	1
	Base Unit	
	Evaporator Heater	
	Micro Channel, E-Coat	
	Low Sound - Aero Acoustic Fans	
	Dual Pump, 10 HP w/ VFD	
	EMM and BACnet Communication	
	Single Point	
	Fixed Speed Condenser Fan	

Summary Performance Report For 130 Nominal Ton

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
03:06PM



AquaSnap™ Air-Cooled Scroll Chiller



Unit Information

Tag Name:.....**130 Nominal Ton**
 Model Number:.....**30RAP130**
 Quantity:.....**1**
 Manufacturing Source:.....**Charlotte, NC USA**
 ASHRAE 90.1:.....**2013/2016, 2010, 2007**
 Refrigerant:.....**R-410A**
 Independent Refrigerant Circuits:.....**2**
 Shipping Weight:.....**6335** lb
 Operating Weight:.....**6451** lb
 Refrigerant Weight (Circuit A):.....**51** lb
 Refrigerant Weight (Circuit B):.....**59** lb
 Unit Length:.....**231** in
 Unit Width:.....**88** in
 Unit Height:.....**78** in
 Chiller Pressure Drop*:.....**27.9** ft H2O
 *Use Chiller Pressure Drop for sizing pumps. This value includes losses due to chiller piping, fittings, 40 mesh factory supplied strainer and BPHX.

Evaporator Information

Fluid Type:.....**Fresh Water**
 Fouling Factor:.....**0.000100** (hr-sqft-F)/BTU
 Leaving Temperature:.....**44.00** °F
 Entering Temperature:.....**54.00** °F
 Fluid Flow:.....**305.6** gpm
 Evaporator Pressure Drop*:.....**13.1** ft H2O
 *Refer to Chiller Pressure Drop for sizing pumps.

Condenser Information

Altitude:.....**0.000** ft
 Number of Fans:.....**9**
 Total Condenser Fan Air Flow:.....**87,300** CFM
 Entering Air Temperature:.....**95.0** °F

Integrated Pump Information

Dynamic Head At Pump:.....**79.2** ft
 Max Dynamic Head At Pumps:.....**79.2** ft
 Max Dynamic Head External To Chiller:**51.4** ft
 Dynamic Head External To Chiller:.....**51.4** ft

Performance Information

Cooling Capacity:.....**127.8** Tons
 Total Compressor Power:.....**141.4** kW
 Total Fan Motor Power:.....**11.52** kW
 Pump Power:.....**6.191** kW
 Total Unit Power (without pump):.....**152.9** kW
 Total Unit Power (with pump):.....**159.1** kW
 Efficiency (without pump) (EER):.....**10.03** BTU/Wh
 IPLV: IP:.....**15.86** BTU/Wh

Accessories and Installed Options

Evaporator Heater
 Micro Channel, E-Coat
 Low Sound - Aero Acoustic Fans
 Dual Pump, 10 HP w/ VFD
 EMM and BACnet Communication
 Single Point
 Fixed Speed Condenser Fan

Electrical Information

Unit Voltage:.....**460-3-60** V-Ph-Hz
 Connection Type:.....**Single Point**
 SCCR:.....**5** kA

Amps	Electrical Circuit 1	Electrical Circuit 2
MCA	270.9	---
MOCP	300.0	---
ICF	478.9	---
Rec Fuse Size	300.0	---

All performance efficiency data are without pump.
 Sound power measured in accordance with ANSI/AHRI Standard 370-2015.

Summary Performance Report For 130 Nominal Ton

Project: Alliance - Fresno WWTP
Prepared By:

09/26/2022
03:06PM



Certified in accordance with the AHRI Air-Cooled Water-Chilling Packages Certification Program, which is based on AHRI Standard 550/590 (I-P) and AHRI Standard 551/591 (SI). Certified units may be found in the AHRI Directory at www.ahridirectory.org.

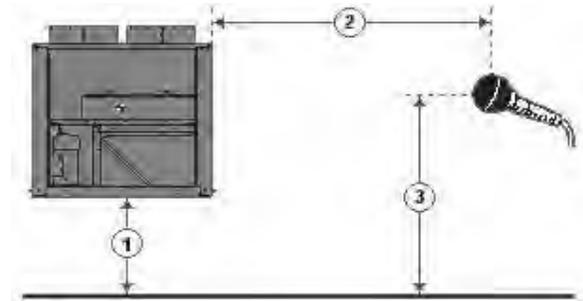
Summary Performance Report For 130 Nominal Ton

Project: Alliance - Fresno WWTP
 Prepared By:

09/26/2022
 03:06PM

Unit Parameters

Tag Name:..... **130 Nominal Ton**
 Model Number:..... **30RAP130**
 Condenser Type:..... **Air Cooled**
 Compressor Type:..... **Scroll**
 Chiller Nameplate Voltage:..... **460-3-60** V-Ph-Hz
 Quantity:..... **1**
 Manufacturing Source:..... **Charlotte, NC USA**
 Refrigerant:..... **R-410A**
 Shipping Weight:..... **6335** lb
 Operating Weight:..... **6451** lb
 Refrigerant Weight (Circuit A):..... **51** lb
 Refrigerant Weight (Circuit B):..... **59** lb
 Unit Length:..... **231** in
 Unit Width:..... **88** in
 Unit Height:..... **78** in



1 - Chiller Height Above Ground
 2 - Horizontal Distance From Chiller to Receiver
 3 - Receiver Height Above Ground
 (See Note 3)

Accessories and Installed Options

Evaporator Heater
 Micro Channel, E-Coat
 Low Sound - Aero Acoustic Fans
 Dual Pump, 10 HP w/ VFD

EMM and BACnet Communication
 Single Point
 Fixed Speed Condenser Fan

Acoustic Information

Table 1. A-Weighted Sound Power Levels (dB re 1 picowatt). See note #1.

Octave Band Center Frequency, Hz	31	63	125	250	500	1k	2k	4k	8k	Overall
100% Load	---	62	77	84	94	91	87	82	81	97
75% Load	---	62	77	84	94	91	87	82	81	97
50% Load	---	62	76	83	93	91	86	82	80	96
25% Load	---	61	76	83	92	90	86	81	79	95

Table 2. A-Weighted Sound Pressure Levels (dB re 20 micropascals) calculated based upon user defined input for dimensions 1, 2 and 3 as shown in above diagram. See note #2 and #3.

Octave Band Center Frequency, Hz	31	63	125	250	500	1k	2k	4k	8k	Overall
100% Load	---	34	49	56	66	63	59	54	53	69
75% Load	---	34	49	56	66	63	59	54	53	69
50% Load	---	34	48	55	65	62	58	54	52	68
25% Load	---	33	48	55	64	62	58	53	51	67

- Notes: (1) Measurements performed in accordance with AHRI Standard 370-2015 for air cooled Chillers.
 (2) Chiller is assumed to be a point source on a reflecting plane.
 (3) Without user defined input, the default dimensions used to construct Table 2 are as follows:
 1 - Chiller Height Above Ground = 0.0 ft
 2 - Horizontal Distance From Chiller to Receiver = 30.0 ft
 3 - Receiver Height Above Ground = 3.0 ft

Certified Drawing for 130 Nominal Ton

Project: Alliance - Fresno WWTP
Prepared By:

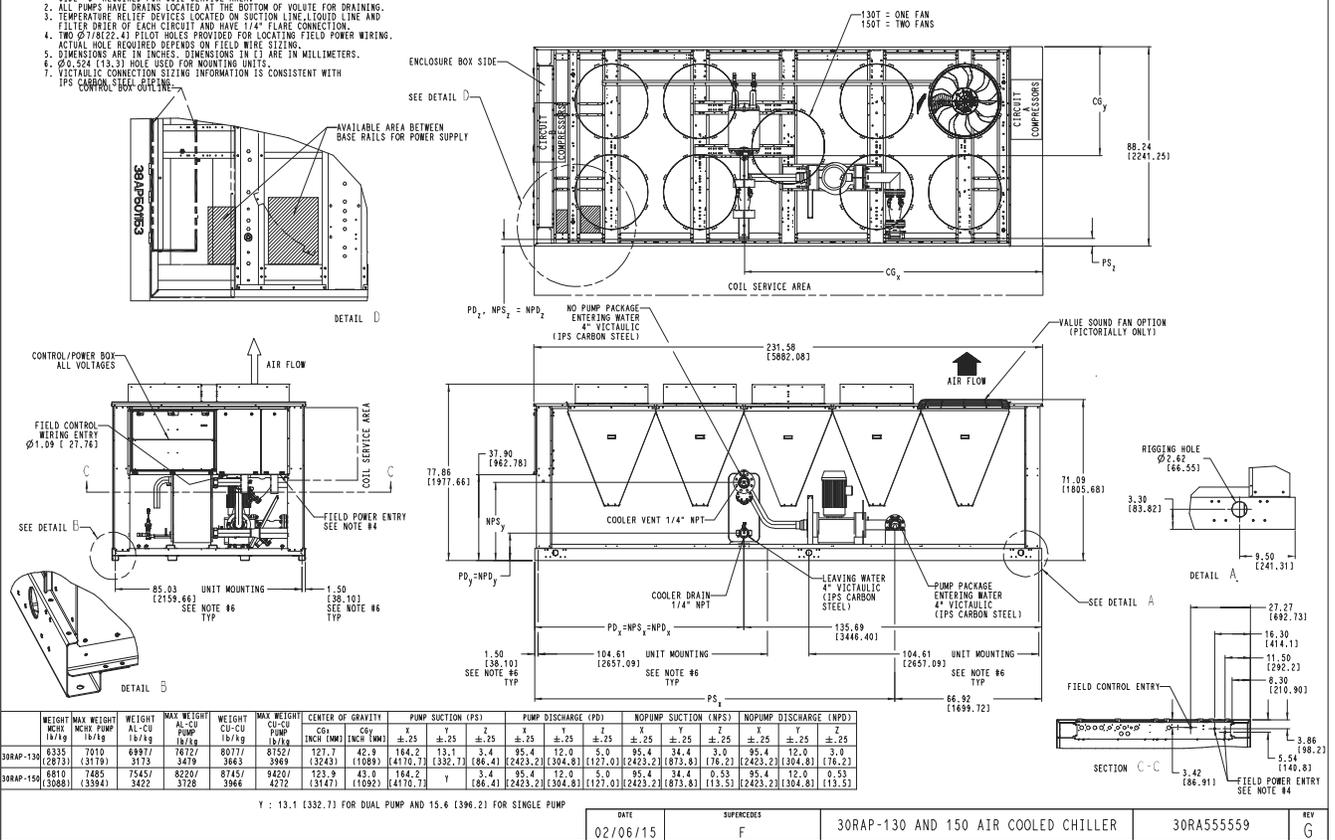
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- NOTES:**
1. UNIT MUST HAVE CLEARANCES AS FOLLOWS:
TOP - DO NOT RESTRICT SIDES AND END - 6" FROM SOLID SURFACE, FOR AIRFLOW SIDE - 8" REQUIRED FOR COIL SERVICE AREA.
 2. ALL PUMPS HAVE DRAINS LOCATED AT THE BOTTOM OF VOLUTE FOR DRAINING.
 3. TEMPERATURE RELIEF DEVICES LOCATED ON SUCTION LINE, LIQUID LINE AND FILTER DRIER OF EACH CIRCUIT AND HAVE 1/4" FLARE CONNECTION.
 4. TWO (2) PIPES: (3) PIPING HOLES PROVIDED FOR LOCATING FIELD POWER WIRING. ACTUAL HOLE REQUIRED DEPENDS ON FIELD WIRE SIZING.
 5. DIMENSIONS ARE IN INCHES. DIMENSIONS IN () ARE IN MILLIMETERS.
 6. Ø1/2" (12.7) HOLE USED FOR MOUNTING UNITS.
 7. VICTAULIC CONNECTION SIZING INFORMATION IS CONSISTENT WITH FPS CARBON STEEL.



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TPLA0A0241EA70B & TRUZA0241HA70(N/B)A
24,000 BTU/H 3' X 3' CEILING CASSETTE
24,000 BTU/H HEAT PUMP UNIVERSAL OUTDOOR



Job Name:

System Reference: **Telephone Room**

Date:



Indoor Unit.....TPLA0A0241EA70B

Outdoor Unit

Standard Model.....TRUZA0241HA70NA

Seacoast Model.....TRUZA0241HA70BA

INDOOR UNIT FEATURES

- Space-efficient ductless installation
- Equipped with 3D i-see Sensor® for enhanced comfort and energy efficiency
- Airflow settings for high and low ceiling applications
- Individual vane settings for direct/indirect airflow control or variable airflow patterns
- Knockouts for outside-air intake and branch-duct run
- Filter indicator signal
- Easy-to-clean, washable filter (optional high-efficiency filter available - requires multi-function casement)
- Built-in condensate lift mechanism
- Ideal for retail shops, classrooms, office spaces, conference centers, building lobbies, and more
- Multiple control options available:
 - kumo cloud® smart device app for remote access
 - Third-party interface options
 - Wired or wireless controllers

OUTDOOR UNIT FEATURES

- Variable speed INVERTER-driven compressor
- Power receiver pre-charged with refrigerant volume for piping length up to 70 ft
- Low ambient cooling down to 0°F providing 100% capacity
- 24-hour continuous operation (cooling mode)
- High pressure protection
- Fast restart
- Superior energy and operational efficiency

SPECIFICATIONS: TPLA0A0241EA70B & TRUZA0241HA70(N/B)A

Cooling at 95°F ¹	Maximum Capacity	BTU/H	24,000
	Rated Capacity	BTU/H	24,000
	Minimum Capacity	BTU/H	10,000
	Maximum Power Input	W	1,670
	Rated Power Input	W	1,670
	Moisture Removal	Pints/h	3.0
	Sensible Heat Factor		0.86
Heating at 47°F ²	Power Factor [208V / 230V]	%	94.3 / 94.3
	Maximum Capacity	BTU/H	29,000
	Rated Capacity	BTU/H	26,000
	Minimum Capacity	BTU/H	9,000
	Maximum Power Input	W	2,070
	Rated Power Input	W	1,750
Heating at 17°F ³	Power Factor [208V / 230V]	%	95.1 / 95.1
	Maximum Capacity	BTU/H	17,400
	Rated Capacity	BTU/H	14,900
	Maximum Power Input	W	1,670
Heating at 5°F ⁴	Rated Power Input	W	1,600
	Maximum Capacity	BTU/H	13,000
Maximum Power Input		W	1,400
	Efficiency	SEER	
EER ¹			14.3
HSPF [IV]			11.2
COP at 47°F ²			4.35
COP at 17°F at Maximum Capacity ³			3.06
COP at 5°F at Maximum Capacity ⁴			2.72
Electrical	ENERGY STAR® Certified		Yes
	Voltage, Phase, Frequency		208/230, 1, 60
	Guaranteed Voltage Range	V AC	198 - 253
	Voltage: Indoor - Outdoor, S1-S2	V AC	208/230
	Voltage: Indoor - Outdoor, S2-S3	V DC	24
	Short-circuit Current Rating [SCCR]	kA	5
	Recommended Fuse/Breaker Size (Outdoor)	A	25
	Recommended Wire Size [Indoor - Outdoor]	AWG	14
	Power Supply		Indoor unit is powered by the outdoor unit
	Indoor Unit	MCA	A
Fan Motor Full Load Amperage		A	0.49
Fan Motor Type			DC Motor
Airflow Rate at Cooling, Dry		CFM	530-640-710-810
Airflow Rate at Cooling, Wet		CFM	490-600-670-770
Airflow Rate at Heating, Dry		CFM	530-640-710-810
Sound Pressure Level [Cooling]		dB[A]	28-30-33-36
Sound Pressure Level [Heating]		dB[A]	28-30-33-36
Drain Pipe Size		In. [mm]	1-1/4 [32]
Condensate Lift Mechanism, Maximum Distance		In. [mm]	33-7/16 [849]
Coating on Heat Exchanger			—
External Finish Color			White Munsell 6.4Y 8.9/0.4
Unit Dimensions		W x D x H: In. [mm]	33-1/16 // 37-13/32 x 33-1/16 // 37-13/32 x 11-3/4 // 1-9/16 [840 // 950 x 840 // 950 x 298 // 40]
Package Dimensions		W x D x H: In. [mm]	35-9/16 // 39-6/16 x 34-5/16 // 38-3/16 x 16-9/16 // 4-12/16 [903 // 1,000 x 871 // 970 x 421 // 121]
Unit Weight	Lbs. [kg]	56 // 11 [25 // 5]	
Package Weight	Lbs. [kg]	68 [31]	
Indoor Unit Operating Temperature Range	Cooling Intake Air Temp [Maximum / Minimum]*	°F	90 DB, 72 WB / 66 DB, 61 WB
	Heating Intake Air Temp [Maximum / Minimum]	°F	77 DB / 59 DB

NOTES:

AHRI Rated Conditions

(Rated data is determined at a fixed compressor speed)

¹Cooling (Indoor // Outdoor)

°F 80 DB, 67 WB // 95 DB, 75 WB

²Heating at 47°F (Indoor // Outdoor)

°F 70 DB, 60 WB // 47 DB, 43 WB

³Heating at 17°F (Indoor // Outdoor)

°F 70 DB, 60 WB // 17 DB, 15 WB

*Indoor/Outdoor Unit Operating Temperature Range (Cooling Air Temp [Maximum / Minimum]):

- Applications should be restricted to comfort cooling only; equipment cooling applications are not recommended for low ambient temperature conditions.

- » Wind baffles required to operate below 23°F DB in cooling mode.

- » Heat pump system with wind baffle: 0°F - 115°F.

- » Refer to wind baffle documentation for further information.

**Outdoor Unit Operating Temperature Range (Cooling Thermal Lock-out / Re-start Temperatures; Heating Thermal Lock-out / Re-start Temperatures):

- System cuts out in heating mode to avoid thermistor error and automatically restarts at these temperatures.

SEACOAST PROTECTION (TRU*A0*****BA MODELS)

- External Outer Panel: Phosphate coating + Acrylic-Enamel coating

- Fan Motor Support: Epoxy resin coating (at edge face)

- Separator Assembly Valve Bed: Epoxy resin coating (at edge face)

- Blue Fin treatment is an anti-corrosion treatment that is applied to the condenser coil to protect it against airborne contaminants.

SPECIFICATIONS: TPLA0A0241EA70B & TRUZA0241HA70(N/B)A

Outdoor Unit	MCA	A	19.0
	MOCP	A	26
	Fan Motor Full Load Amperage	A	0.4
	Airflow Rate [Cooling / Heating]	CFM	1940 / 1940
	Refrigerant Control		LEV
	Defrost Method		Reverse Cycle
	Coating on Heat Exchanger		Blue Fin Coating (BS Model only)
	Sound Pressure Level, Cooling ¹	dB(A)	47
	Sound Pressure Level, Heating ²	dB(A)	48
	Compressor Type		INVERTER-driven twin rotary
	Compressor Model		SNB172FWHM1
	Compressor Rated Load Amps	A	7
	Compressor Locked Rotor Amps	A	11.0
	Compressor Oil [Type // Charge]	oz.	FV50S // 23
	External Finish Color		Ivory Munsell 3Y 7.8/1.1
	Base Pan Heater		N/A
	Unit Dimensions	W x D x H: In. [mm]	37-13/32 x 13 (+1-3/16) x 37-1/8 [950 x 330 (+30) x 943]
	Package Dimensions	W x D x H: In. [mm]	40-15/16 x 17-11/16 x 40-11/16 [1040 x 450 x 1033]
	Unit Weight	Lbs. [kg]	153 [69]
	Package Weight	Lbs. [kg]	179 [81]
Outdoor Unit Operating Temperature Range	Cooling Air Temp [Maximum / Minimum]*	°F	115 DB / 0 DB
	Heating Air Temp [Maximum / Minimum]	°F	70 DB, 59 WB / -4 DB, -4 WB
	Heating Thermal Lock-out / Re-start Temperatures**	°F	-8 / -4
Refrigerant	Maximum Charge Quantity	Lbs, oz	7.0, 11.0
	Initial Charge Quantity	Ft. [m]	70.0 [20.0]
	Additional Refrigerant Charge Per Additional Piping Length	oz./Ft. [g/m]	0.7 [50]
Piping	Gas Pipe Size O.D. [Flared]	In.[mm]	5/8 [15.88]
	Liquid Pipe Size O.D. [Flared]	In.[mm]	3/8 [9.52]
	Maximum Piping Length	Ft. [m]	165 [50]
	Maximum Height Difference	Ft. [m]	100 [30]
	Maximum Number of Bends		15

NOTES:

AHRI Rated Conditions

(Rated data is determined at a fixed compressor speed)

¹Cooling (Indoor // Outdoor)

°F 80 DB, 67 WB // 95 DB, 75 WB

²Heating at 47°F (Indoor // Outdoor)

°F 70 DB, 60 WB // 47 DB, 43 WB

³Heating at 17°F (Indoor // Outdoor)

°F 70 DB, 60 WB // 17 DB, 15 WB

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- Applications should be restricted to comfort cooling only; equipment cooling applications are not recommended for low ambient temperature conditions.
 - » Wind baffles required to operate below 23°F DB in cooling mode.
 - » Heat pump system with wind baffle: 0°F - 115°F.
 - » Refer to wind baffle documentation for further information.

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- System cuts out in heating mode to avoid thermistor error and automatically restarts at these temperatures.

SEACOAST PROTECTION (TRU*A0*****BA MODELS)

- External Outer Panel: Phosphate coating + Acrylic-Enamel coating
- Fan Motor Support: Epoxy resin coating (at edge face)
- Separator Assembly Valve Bed: Epoxy resin coating (at edge face)
- Blue Fin treatment is an anti-corrosion treatment that is applied to the condenser coil to protect it against airborne contaminants.

INDOOR UNIT ACCESSORIES: TPLA0A0241EA70B

Control Interface	3-Pin Connector	<input type="checkbox"/> PAC-715AD
	BACnet® and Modbus® Interface	<input type="checkbox"/> PAC-UKPRC001-CN-1
	CN24 Relay Kit	<input type="checkbox"/> CN24RELAY-KIT-CM3
	IT Extender	<input type="checkbox"/> PAC-WHS01IE-E
	kumo station® for kumo cloud®	<input type="checkbox"/> TAC-WHS01HC-E
	Lockdown bracket for remote controller	<input type="checkbox"/> RCMKP1CB
	Remote Operation Adapter†	<input type="checkbox"/> PAC-SF40RM-E
	Thermostat Interface	<input type="checkbox"/> PAC-US444CN-1
	Thermostat Interface	<input type="checkbox"/> PAC-US445CN-1
	USNAP Adapter	<input type="checkbox"/> PAC-WHS01UP-E
	Wireless Interface for kumo cloud®	<input type="checkbox"/> PAC-USWHS002-WF-2
Remote Sensor	Flush Mount Remote Temperature Sensor	<input type="checkbox"/> PAC-USSEN002-FM-1
	Flush Mount Temperature Sensor	<input type="checkbox"/> PAC-USSEN001-FM-1
	Remote Temperature Sensor	<input type="checkbox"/> PAC-SE41TS-E
	Wireless temperature and humidity sensor for kumo cloud®	<input type="checkbox"/> PAC-USWHS003-TH-1
Wired Remote Controller	Airzone ZBS Wired Blueface Principal Controller White	<input type="checkbox"/> AZZBSBLUEFACECB
	Airzone ZBS Wired Lite Controller White	<input type="checkbox"/> AZZBSLITECB
	Airzone ZBS Wired Think Controller White	<input type="checkbox"/> AZZBSTHINKCB
	Airzone ZBS Wireless Lite Controller White	<input type="checkbox"/> AZZBSLITERB
	Airzone ZBS Wireless Think Controller White	<input type="checkbox"/> AZZBSTHINKRB
	Deluxe Wired MA Remote Controller†	<input type="checkbox"/> TAR-40MAAU
	Simple MA Remote Controller†	<input type="checkbox"/> TAC-YT53CRAU-J
	Touch MA Controller†	<input type="checkbox"/> TAR-CT01MAU-SB
Wireless Remote Controller	kumo touch™ RedLINK™ Wireless Controller	<input type="checkbox"/> MHK2
	Wireless MA Receiver	<input type="checkbox"/> PAR-SR32MA-E
	Wireless MA Remote Controller	<input type="checkbox"/> TAR-FL32MA-E
	Wireless Remote Controller	<input type="checkbox"/> PAR-SL101A-E
	Wireless Signal Receiver	<input type="checkbox"/> PAR-SA9FA-E
	Wireless Signal Receiver Panel	<input type="checkbox"/> PAR-SR4LU-E
Casement	Multi-function Casement	<input type="checkbox"/> PAC-SJ41TM-E
Condensate	Blue Diamond (Advanced) Mini Condensate Pump w/ Reservoir & Sensor (208/230V) [recommended]	<input type="checkbox"/> X87-721
	Blue Diamond (MegaBlue Advanced) Condensate Pump w/ Reservoir & Sensor	<input type="checkbox"/> X87-835
	Blue Diamond Sensor Extension Cable — 15 Ft.	<input type="checkbox"/> C13-103
	Refoco Condensate Pump (100-240 VAC) up to 120,000 BTU/H	<input type="checkbox"/> COMBI
Disconnect Switch	(30A/600V/UL) [fits 2" X 4" utility box] - Black	<input type="checkbox"/> TAZ-MS303
	(30A/600V/UL) [fits 2" X 4" utility box] - White	<input type="checkbox"/> TAZ-MS303W
Filter	High Efficiency Filter Element**	<input type="checkbox"/> PAC-SH59KF-E
i-see Sensor® Panel	Grille with 3D i-see Sensor® (required)	<input checked="" type="checkbox"/> TLP-41EAEU
Lineset	10' x 3/8" x 10' x 5/8" Lineset (Twin-Tube Insulation)††	<input type="checkbox"/> MPLS385812T-10
	100' x 3/8" x 100' x 5/8" Lineset (Twin-Tube Insulation)††	<input type="checkbox"/> MPLS385812T-100
	15' x 3/8" x 15' x 5/8" Lineset (Twin-Tube Insulation)††	<input type="checkbox"/> MPLS385812T-15
	30' x 3/8" x 30' x 5/8" Lineset (Twin-Tube Insulation)††	<input type="checkbox"/> MPLS385812T-30
	50' x 3/8" x 50' x 5/8" Lineset (Twin-Tube Insulation)††	<input type="checkbox"/> MPLS385812T-50
	65' x 3/8" x 65' x 5/8" Lineset (Twin-Tube Insulation)††	<input type="checkbox"/> MPLS385812T-65
Shutter Plate	Shutter Plate	<input type="checkbox"/> PAC-SJ37SP-E
Space Panel	Space Panel	<input type="checkbox"/> PAC-SJ38AS-E

NOTES:

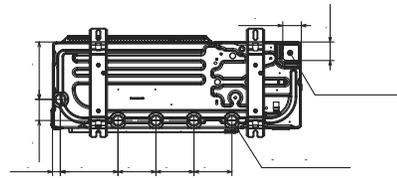
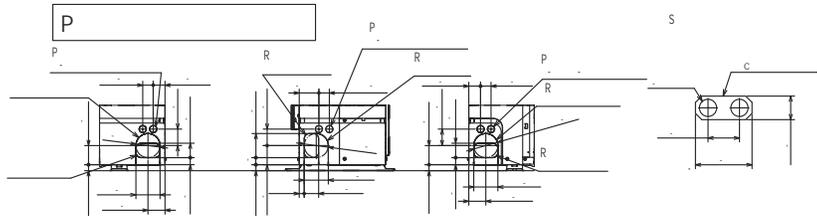
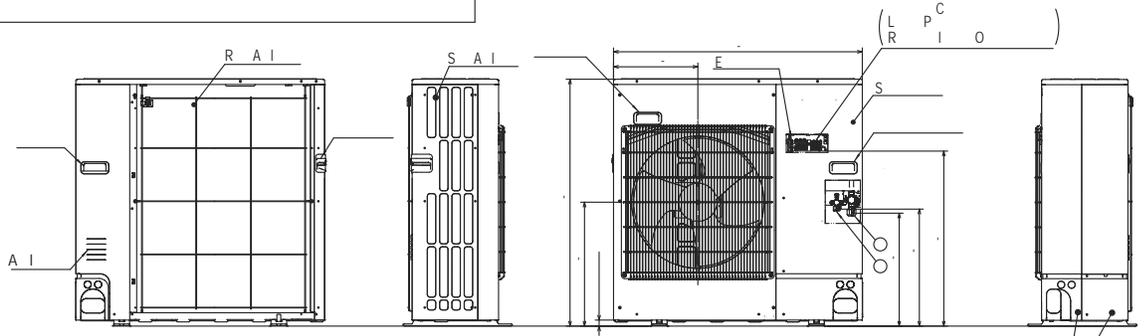
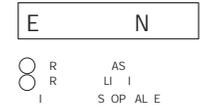
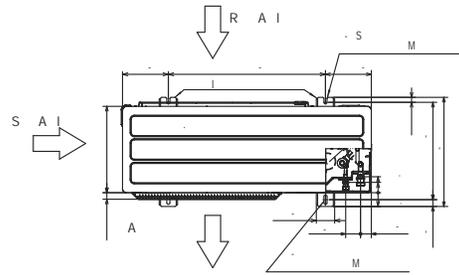
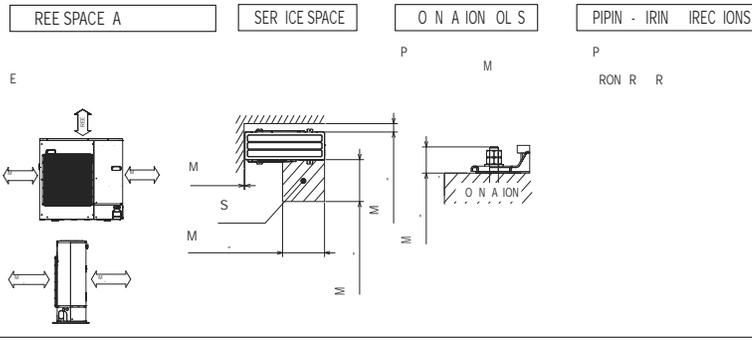
†PAC-SF40RM-E (Unable to use with wireless remote controller)

OUTDOOR UNIT ACCESSORIES: TRUZA0241HA70(N/B)A

Air Outlet Guide	Air Outlet Guide (1 Piece)	<input type="checkbox"/> PAC-SG59SG-E
Centralized Drain Pan	Centralized Drain Pan	<input type="checkbox"/> PAC-SG63DP-E
	Drain Pan	<input type="checkbox"/> PAC-SG64DP-E
Control/Service Tool	Control/Service Tool	<input type="checkbox"/> PAC-SK52ST
	M- & P-Series Maintenance Tool Cable Set	<input type="checkbox"/> M21EC0397
	USB/UART Conversion Cable (Required for all laptop connection)	<input type="checkbox"/> M21EC1397
Distribution pipe	Twinning Distribution Pipe (50:50) ^{††}	<input type="checkbox"/> MSDD-50TR-E
Drain Socket	Drain Socket	<input type="checkbox"/> PAC-SG61DS-E
Hail Guards	Hail Guard	<input type="checkbox"/> HG-A6
M-NET Converter	M-NET Converter	<input type="checkbox"/> PAC-SJ85MA-E
	M-NET Converter	<input type="checkbox"/> PAC-SJ95MA-E
Mini-Split Wire	14 Gauge, 4 wire MiniSplit Cable—250 ft. roll	<input type="checkbox"/> S144-250
	14 Gauge, 4 wire MiniSplit Cable—50 ft. roll	<input type="checkbox"/> S144-50
	16 Gauge, 4 wire MiniSplit Cable—250 ft. roll	<input type="checkbox"/> S164-250
	16 Gauge, 4 wire MiniSplit Cable—50 ft. roll	<input type="checkbox"/> S164-50
Mounting Pad	Condensing Unit Mounting Pad: 24" x 42" x 3"	<input type="checkbox"/> ULTRILITE2
Stand	18" Single Fan Stand	<input type="checkbox"/> QSMS1801M
	24" Single Fan Stand	<input type="checkbox"/> QSMS2401M
	Condenser Wall Bracket	<input type="checkbox"/> QSWB2000M-1
	Condenser Wall Bracket - Stainless Steel Finish	<input type="checkbox"/> QSWBSS
	Outdoor Unit Stand — 12" High	<input type="checkbox"/> QSMS1201M
Wind Baffle	Front Wind Baffle	<input type="checkbox"/> WB-PA5
	Rear Wind Baffle	<input type="checkbox"/> WB-RE5
	Side Advanced Wind Baffle	<input type="checkbox"/> WB-SD5

OUTDOOR UNIT DIMENSIONS: TRUZA0241HA70(N/B)A

Unit: mm<in>



TPLA0A0361EA70B & TRUZA0361KA70(N/B)A
36,000 BTU/H 3' X 3' CEILING CASSETTE
36,000 BTU/H HEAT PUMP UNIVERSAL OUTDOOR



Job Name:

System Reference: **Data Room**

Date:



Indoor Unit.....TPLA0A0361EA70B

Outdoor Unit

Standard Model.....TRUZA0361KA70NA

Seacoast Model.....TRUZA0361KA70BA

INDOOR UNIT FEATURES

- Space-efficient ductless installation
- Equipped with 3D i-see Sensor® for enhanced comfort and energy efficiency
- Airflow settings for high and low ceiling applications
- Individual vane settings for direct/indirect airflow control or variable airflow patterns
- Knockouts for outside-air intake and branch-duct run
- Filter indicator signal
- Easy-to-clean, washable filter (optional high-efficiency filter available - requires multi-function casement)
- Built-in condensate lift mechanism
- Ideal for retail shops, classrooms, office spaces, conference centers, building lobbies, and more
- Multiple control options available:
 - kumo cloud® smart device app for remote access
 - Third-party interface options
 - Wired or wireless controllers

OUTDOOR UNIT FEATURES

- Variable speed INVERTER-driven compressor
- Power receiver pre-charged with refrigerant volume for piping length up to 100 ft
- Low ambient cooling down to 0°F providing 100% capacity
- 24-hour continuous operation (cooling mode)
- High pressure protection
- Fast restart
- Superior energy and operational efficiency

SPECIFICATIONS: TPLA0A0361EA70B & TRUZA0361KA70(N/B)A

Cooling at 95°F ¹	Maximum Capacity	BTU/H	36,000
	Rated Capacity	BTU/H	36,000
	Minimum Capacity	BTU/H	16,000
	Maximum Power Input	W	2,780
	Rated Power Input	W	2,780
	Moisture Removal	Pints/h	4.5
	Sensible Heat Factor		0.86
Heating at 47°F ²	Power Factor [208V / 230V]	%	93.7 / 93.7
	Maximum Capacity	BTU/H	42,000
	Rated Capacity	BTU/H	38,000
	Minimum Capacity	BTU/H	18,000
	Maximum Power Input	W	3,020
	Rated Power Input	W	2,540
Heating at 17°F ³	Power Factor [208V / 230V]	%	93.6 / 93.6
	Maximum Capacity	BTU/H	25,500
	Rated Capacity	BTU/H	22,000
	Maximum Power Input	W	2,550
Heating at 5°F ⁴	Rated Power Input	W	2,490
	Maximum Capacity	BTU/H	21,600
Maximum Power Input		W	2,600
	SEER		21.8
Efficiency	EER ¹		12.9
	HSPF [IV]		10.4
	COP at 47°F ²		4.38
	COP at 17°F at Maximum Capacity ³		2.94
	COP at 5°F at Maximum Capacity ⁴		2.43
ENERGY STAR® Certified		Yes	
Electrical	Voltage, Phase, Frequency		208/230, 1, 60
	Guaranteed Voltage Range	V AC	198 - 253
	Voltage: Indoor - Outdoor, S1-S2	V AC	208/230
	Voltage: Indoor - Outdoor, S2-S3	V DC	24
	Short-circuit Current Rating [SCCR]	kA	5
	Recommended Fuse/Breaker Size (Outdoor)	A	30
	Recommended Wire Size [Indoor - Outdoor]	AWG	14
	Power Supply		Indoor unit is powered by the outdoor unit
Indoor Unit	MCA	A	2.0
	Fan Motor Full Load Amperage	A	0.95
	Fan Motor Type		DC Motor
	Airflow Rate at Cooling, Dry	CFM	670-850-1,020-1,200
	Airflow Rate at Cooling, Wet	CFM	630-810-980-1,160
	Airflow Rate at Heating, Dry	CFM	670-850-1,020-1,200
	Sound Pressure Level [Cooling]	dB[A]	32-37-41-44
	Sound Pressure Level [Heating]	dB[A]	32-37-41-44
	Drain Pipe Size	In. [mm]	1-1/4 [32]
	Condensate Lift Mechanism, Maximum Distance	In. [mm]	33-7/16 [849]
	Coating on Heat Exchanger		—
	External Finish Color		White Munsell 6.4Y 8.9/0.4
	Unit Dimensions	W x D x H: In. [mm]	33-1/16 // 37-13/32 x 33-1/16 // 37-13/32 x 11-3/4 // 1-9/16 [840 // 950 x 840 // 950 x 298 // 40]
	Package Dimensions	W x D x H: In. [mm]	35-9/16 // 39-6/16 x 34-5/16 // 38-3/16 x 16-9/16 // 4-12/16 [903 // 1,000 x 871 // 970 x 421 // 121]
Unit Weight	Lbs. [kg]	56 // 11 [25 // 5]	
Package Weight	Lbs. [kg]	77 [35]	
Indoor Unit Operating Temperature Range	Cooling Intake Air Temp [Maximum / Minimum]*	°F	90 DB, 72 WB / 66 DB, 61 WB
	Heating Intake Air Temp [Maximum / Minimum]	°F	77 DB / 59 DB

NOTES:

AHRI Rated Conditions

(Rated data is determined at a fixed compressor speed)

¹Cooling (Indoor // Outdoor)

°F 80 DB, 67 WB // 95 DB, 75 WB

²Heating at 47°F (Indoor // Outdoor)

°F 70 DB, 60 WB // 47 DB, 43 WB

³Heating at 17°F (Indoor // Outdoor)

°F 70 DB, 60 WB // 17 DB, 15 WB

*Indoor/Outdoor Unit Operating Temperature Range (Cooling Air Temp [Maximum / Minimum]):

- Applications should be restricted to comfort cooling only; equipment cooling applications are not recommended for low ambient temperature conditions.

- » Wind baffles required to operate below 23°F DB in cooling mode.

- » Heat pump system with wind baffle: 0°F - 115°F.

- » Refer to wind baffle documentation for further information.

**Outdoor Unit Operating Temperature Range (Cooling Thermal Lock-out / Re-start Temperatures; Heating Thermal Lock-out / Re-start Temperatures):

- System cuts out in heating mode to avoid thermistor error and automatically restarts at these temperatures.

SEACOAST PROTECTION (TRU*A0*****BA MODELS)

- External Outer Panel: Phosphate coating + Acrylic-Enamel coating

- Fan Motor Support: Epoxy resin coating (at edge face)

- Separator Assembly Valve Bed: Epoxy resin coating (at edge face)

- Blue Fin treatment is an anti-corrosion treatment that is applied to the condenser coil to protect it against airborne contaminants.

SPECIFICATIONS: TPLA0A0361EA70B & TRUZA0361KA70(N/B)A

Outdoor Unit	MCA	A	25.0	
	MOCP	A	31	
	Fan Motor Full Load Amperage	A	0.5 + 0.5	
	Airflow Rate [Cooling / Heating]	CFM	3880 / 3880	
	Refrigerant Control		LEV	
	Defrost Method		Reverse Cycle	
	Coating on Heat Exchanger		Blue Fin Coating (BS Model only)	
	Sound Pressure Level, Cooling ¹	dB(A)	52	
	Sound Pressure Level, Heating ²	dB(A)	53	
	Compressor Type		INVERTER-driven twin rotary	
	Compressor Model		MNB33FBRC-L	
	Compressor Rated Load Amps	A	8	
	Compressor Locked Rotor Amps	A	13.0	
	Compressor Oil [Type // Charge]	oz.	FV50S // 45	
	External Finish Color		Ivory Munsell 3Y 7.8/1.1	
	Base Pan Heater		N/A	
	Unit Dimensions	W x D x H: In. [mm]	41-5/16 x 13 (+1-3/16) x 52-11/16 [1050 x 330 (+30) x 1338]	
	Package Dimensions	W x D x H: In. [mm]	42-15/16 x 17-11/16 x 56-4/16 [1091 x 450 x 1429]	
	Unit Weight	Lbs. [kg]	214 [97]	
	Package Weight	Lbs. [kg]	245 [111]	
	Outdoor Unit Operating Temperature Range	Cooling Air Temp [Maximum / Minimum]*	°F	115 DB / 0 DB
		Heating Air Temp [Maximum / Minimum]	°F	70 DB, 59 WB / -4 DB, -4 WB
		Heating Thermal Lock-out / Re-start Temperatures**	°F	-8 / -4
Refrigerant	Maximum Charge Quantity	Lbs, oz	10.0, 6.0	
	Initial Charge Quantity	Ft. [m]	100.0 [30.0]	
	Additional Refrigerant Charge Per Additional Piping Length	oz./Ft. [g/m]	0.7 [50]	
Piping	Gas Pipe Size O.D. [Flared]	In.[mm]	5/8 [15.88]	
	Liquid Pipe Size O.D. [Flared]	In.[mm]	3/8 [9.52]	
	Maximum Piping Length	Ft. [m]	165 [50]	
	Maximum Height Difference	Ft. [m]	100 [30]	
	Maximum Number of Bends		15	

NOTES:

AHRI Rated Conditions

(Rated data is determined at a fixed compressor speed)

¹Cooling (Indoor // Outdoor)

°F 80 DB, 67 WB // 95 DB, 75 WB

²Heating at 47°F (Indoor // Outdoor)

°F 70 DB, 60 WB // 47 DB, 43 WB

³Heating at 17°F (Indoor // Outdoor)

°F 70 DB, 60 WB // 17 DB, 15 WB

*Indoor/Outdoor Unit Operating Temperature Range (Cooling Air Temp [Maximum / Minimum]):

- Applications should be restricted to comfort cooling only; equipment cooling applications are not recommended for low ambient temperature conditions.
 - » Wind baffles required to operate below 23°F DB in cooling mode.
 - » Heat pump system with wind baffle: 0°F - 115°F.
 - » Refer to wind baffle documentation for further information.

**Outdoor Unit Operating Temperature Range (Cooling Thermal Lock-out / Re-start Temperatures; Heating Thermal Lock-out / Re-start Temperatures):

- System cuts out in heating mode to avoid thermistor error and automatically restarts at these temperatures.

SEACOAST PROTECTION (TRU*A0*****BA MODELS)

- External Outer Panel: Phosphate coating + Acrylic-Enamel coating
- Fan Motor Support: Epoxy resin coating (at edge face)
- Separator Assembly Valve Bed: Epoxy resin coating (at edge face)
- Blue Fin treatment is an anti-corrosion treatment that is applied to the condenser coil to protect it against airborne contaminants.

INDOOR UNIT ACCESSORIES: TPLA0A0361EA70B

Control Interface	3-Pin Connector	<input type="checkbox"/> PAC-715AD
	BACnet® and Modbus® Interface	<input type="checkbox"/> PAC-UKPRC001-CN-1
	CN24 Relay Kit	<input type="checkbox"/> CN24RELAY-KIT-CM3
	IT Extender	<input type="checkbox"/> PAC-WHS01IE-E
	kumo station® for kumo cloud®	<input type="checkbox"/> TAC-WHS01HC-E
	Lockdown bracket for remote controller	<input type="checkbox"/> RCMKP1CB
	Remote Operation Adapter†	<input type="checkbox"/> PAC-SF40RM-E
	Thermostat Interface	<input type="checkbox"/> PAC-US444CN-1
	Thermostat Interface	<input type="checkbox"/> PAC-US445CN-1
	USNAP Adapter	<input type="checkbox"/> PAC-WHS01UP-E
	Wireless Interface for kumo cloud®	<input type="checkbox"/> PAC-USWHS002-WF-2
Remote Sensor	Flush Mount Remote Temperature Sensor	<input type="checkbox"/> PAC-USSEN002-FM-1
	Flush Mount Temperature Sensor	<input type="checkbox"/> PAC-USSEN001-FM-1
	Remote Temperature Sensor	<input type="checkbox"/> PAC-SE41TS-E
	Wireless temperature and humidity sensor for kumo cloud®	<input type="checkbox"/> PAC-USWHS003-TH-1
Wired Remote Controller	Airzone ZBS Wired Blueface Principal Controller White	<input type="checkbox"/> AZZBSBLUEFACECB
	Airzone ZBS Wired Lite Controller White	<input type="checkbox"/> AZZBSLITECB
	Airzone ZBS Wired Think Controller White	<input type="checkbox"/> AZZBSTHINKCB
	Airzone ZBS Wireless Lite Controller White	<input type="checkbox"/> AZZBSLITERB
	Airzone ZBS Wireless Think Controller White	<input type="checkbox"/> AZZBSTHINKRB
	Deluxe Wired MA Remote Controller†	<input type="checkbox"/> TAR-40MAAU
	Simple MA Remote Controller†	<input type="checkbox"/> TAC-YT53CRAU-J
	Touch MA Controller†	<input type="checkbox"/> TAR-CT01MAU-SB
Wireless Remote Controller	kumo touch™ RedLINK™ Wireless Controller	<input type="checkbox"/> MHK2
	Wireless MA Receiver	<input type="checkbox"/> PAR-SR32MA-E
	Wireless MA Remote Controller	<input type="checkbox"/> TAR-FL32MA-E
	Wireless Remote Controller	<input type="checkbox"/> PAR-SL101A-E
	Wireless Signal Receiver	<input type="checkbox"/> PAR-SA9FA-E
	Wireless Signal Receiver Panel	<input type="checkbox"/> PAR-SR4LU-E
Casement	Multi-function Casement	<input type="checkbox"/> PAC-SJ41TM-E
Condensate	Blue Diamond (Advanced) Mini Condensate Pump w/ Reservoir & Sensor (208/230V) [recommended]	<input type="checkbox"/> X87-721
	Blue Diamond (MegaBlue Advanced) Condensate Pump w/ Reservoir & Sensor	<input type="checkbox"/> X87-835
	Blue Diamond Sensor Extension Cable — 15 Ft.	<input type="checkbox"/> C13-103
	Refoco Condensate Pump (100-240 VAC) up to 120,000 BTU/H	<input type="checkbox"/> COMBI
Disconnect Switch	(30A/600V/UL) [fits 2" X 4" utility box] - Black	<input type="checkbox"/> TAZ-MS303
	(30A/600V/UL) [fits 2" X 4" utility box] - White	<input type="checkbox"/> TAZ-MS303W
Filter	High Efficiency Filter Element**	<input type="checkbox"/> PAC-SH59KF-E
i-see Sensor® Panel	Grille with 3D i-see Sensor® (required)	<input checked="" type="checkbox"/> TLP-41EAEU
Lineset	10' x 3/8" x 10' x 5/8" Lineset (Twin-Tube Insulation)††	<input type="checkbox"/> MPLS385812T-10
	100' x 3/8" x 100' x 5/8" Lineset (Twin-Tube Insulation)††	<input type="checkbox"/> MPLS385812T-100
	15' x 3/8" x 15' x 5/8" Lineset (Twin-Tube Insulation)††	<input type="checkbox"/> MPLS385812T-15
	30' x 3/8" x 30' x 5/8" Lineset (Twin-Tube Insulation)††	<input type="checkbox"/> MPLS385812T-30
	50' x 3/8" x 50' x 5/8" Lineset (Twin-Tube Insulation)††	<input type="checkbox"/> MPLS385812T-50
	65' x 3/8" x 65' x 5/8" Lineset (Twin-Tube Insulation)††	<input type="checkbox"/> MPLS385812T-65
Shutter Plate	Shutter Plate	<input type="checkbox"/> PAC-SJ37SP-E
Space Panel	Space Panel	<input type="checkbox"/> PAC-SJ38AS-E

NOTES:

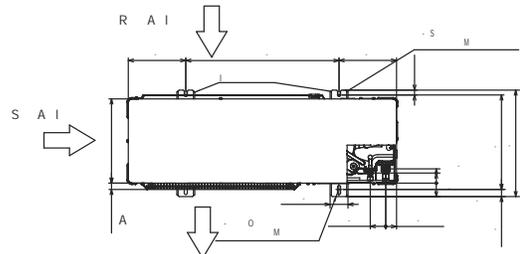
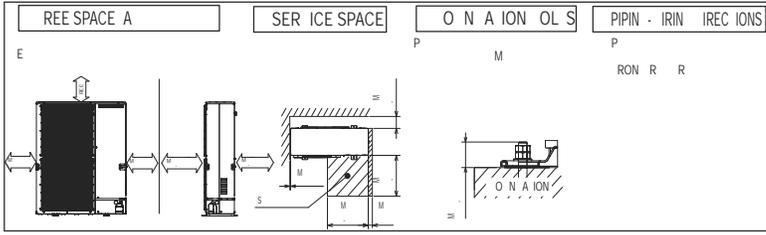
†PAC-SF40RM-E (Unable to use with wireless remote controller)

OUTDOOR UNIT ACCESSORIES: TRUZA0361KA70(N/B)A

Air Outlet Guide	Air Outlet Guide (1 Piece)	<input type="checkbox"/> PAC-SH96SG-E (two pieces are required)
Control/Service Tool	Control/Service Tool	<input type="checkbox"/> PAC-SK52ST
	M- & P-Series Maintenance Tool Cable Set	<input type="checkbox"/> M21EC0397
	USB/UART Conversion Cable (Required for all laptop connection)	<input type="checkbox"/> M21EC1397
Distribution pipe	Twinning Distribution Pipe (50:50) ^{††}	<input type="checkbox"/> MSDD-50TR-E
Drain Socket	Drain Socket	<input type="checkbox"/> PAC-SG61DS-E
M-NET Converter	M-NET Converter	<input type="checkbox"/> PAC-SJ85MA-E
	M-NET Converter	<input type="checkbox"/> PAC-SJ95MA-E
Mini-Split Wire	14 Gauge, 4 wire MiniSplit Cable—250 ft. roll	<input type="checkbox"/> S144-250
	14 Gauge, 4 wire MiniSplit Cable—50 ft. roll	<input type="checkbox"/> S144-50
	16 Gauge, 4 wire MiniSplit Cable—250 ft. roll	<input type="checkbox"/> S164-250
	16 Gauge, 4 wire MiniSplit Cable—50 ft. roll	<input type="checkbox"/> S164-50
Mounting Pad	Condensing Unit Mounting Pad: 24" x 42" x 3"	<input type="checkbox"/> ULTRILITE2
Stand	18" Dual Fan Stand	<input type="checkbox"/> QSMS1802M
	24" Dual Fan Stand	<input type="checkbox"/> QSMS2402M
	Condenser Wall Bracket	<input type="checkbox"/> QSWB2000M-1
	Condenser Wall Bracket - Stainless Steel Finish	<input type="checkbox"/> QSWBSS
	Outdoor Unit Stand — 12" High	<input type="checkbox"/> QSMS1202M
Wind Baffle	Front Wind Baffle	<input type="checkbox"/> WB-PA3 (two pieces are required)
	Rear Wind Baffle	<input type="checkbox"/> WB-RE6
	Side Advanced Wind Baffle	<input type="checkbox"/> WB-SD6

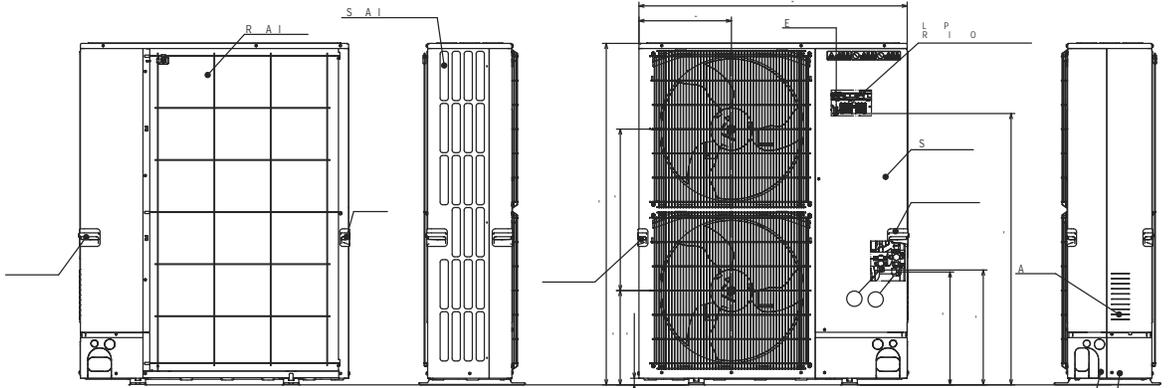
OUTDOOR UNIT DIMENSIONS: TRUZA0361KA70(N/B)A

Unit: mm<in>

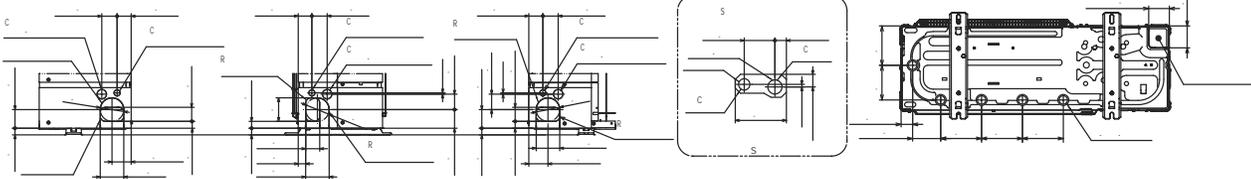


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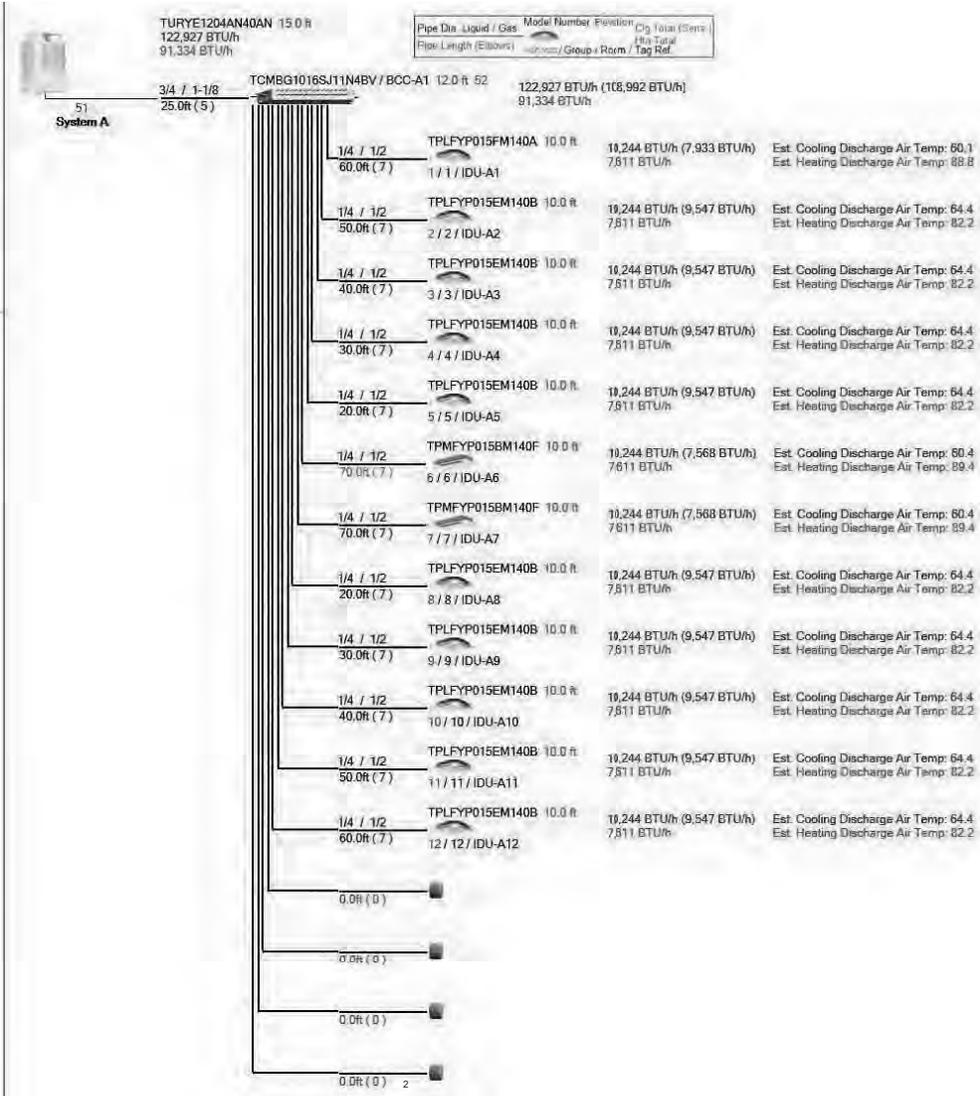
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Design View Piping Diagrams

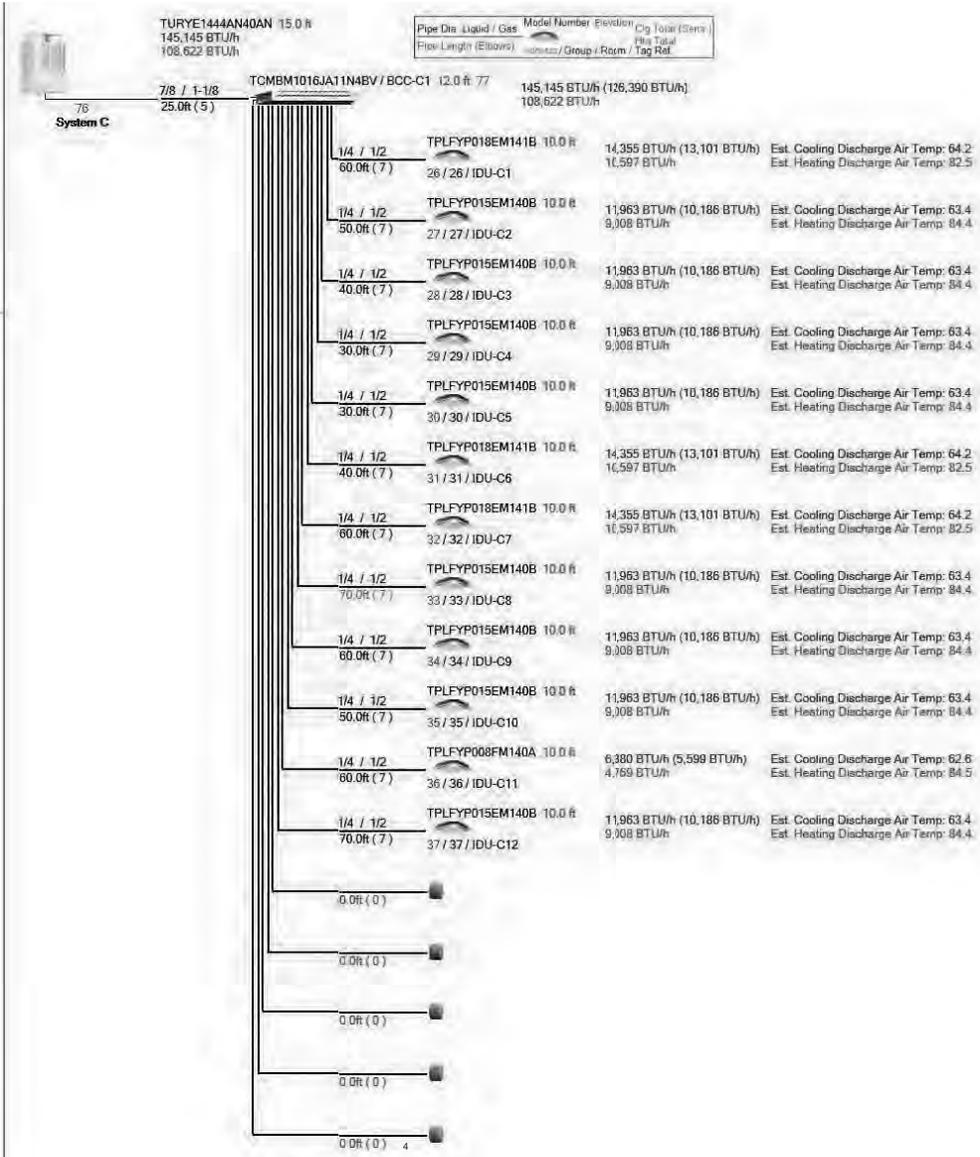
Indoor Units:	12 / 1 to 30
Capacity:	180 / 60 to 180 (150.0%)
* Connectable capacity is not actual capacity.	
Total Pipe Length:	711.0 / 1968.5 feet
Furthest Actual:	95.0 / 541.0 feet
Furthest Equiv.:	114.7 / 623.0 feet
Furthest IU from BC Actual:	70.0 / 194.3 feet
Furthest IU from BC Equiv.:	81.5 / 194.3 feet
Furthest IU from BC Thru Sub BC Actual:	0.0 / 0.0 feet
Furthest IU from BC Thru Sub BC Equiv.:	0.0 / 0.0 feet
Correction Factors	
Outdoor Unit Capacity:	1.11 1.01
Temperature:	1.00 0.72
Piping Length:	0.93 0.98
Defrosting:	- 0.95
User Derate:	1.00 1.00
Total Derate:	1.02 0.68
Additional Refrigerant:	31.35 lb
Total Refrigerant Amount:	48.98 lb

Conditions (°F)			
Cooling			
Indoor DB	80.0	Humidity 51.8%	Indoor WB 67.0
Outdoor DB	96.0		
Heating			
Indoor DB	70.0		
Outdoor DB	18.0	Humidity 72.8%	Outdoor WB 16.4



Indoor Units:	12 / 1 to 36
Capacity:	182 / 72 to 216 (126.4%)
* Connectable capacity is not actual capacity.	
Total Pipe Length:	791.0 / 1968.5 feet
Furthest Actual:	95.0 / 541.0 feet
Furthest Equiv.:	114.7 / 623.0 feet
Furthest IU from BC Actual:	70.0 / 194.3 feet
Furthest IU from BC Equiv.:	81.5 / 194.3 feet
Furthest IU from BC Thru Sub BC Actual:	0.0 / 0.0 feet
Furthest IU from BC Thru Sub BC Equiv.:	0.0 / 0.0 feet
Correction Factors	
Outdoor Unit Capacity:	1.06 1.01
Temperature:	1.00 0.73
Piping Length:	0.96 0.98
Defrosting:	- 0.95
User Derate:	1.00 1.00
Total Derate:	1.01 0.68
Additional Refrigerant:	37.19 lb
Total Refrigerant Amount:	61.00 lb

Conditions (°F)			
Cooling			
Indoor DB	80.0	Humidity	51.8%
Indoor WB	67.0		
Outdoor DB	96.0		
Heating			
Indoor DB	70.0		
Outdoor DB	18.0	Humidity	72.8%
Outdoor WB	16.4		



Submittal Documents

CITYMULTI®

10 TON TUR E1 0 AN 0A(N/B)



Job Name:

System Reference:

Date:

460V OUTDOOR VRF HEAT RECOVERY SYSTEM



UNIT OPTION

- Standard Model.....TURYE1204AN40AN
- Seacoast (BS) Model.....TURYE1204AN40AB

ACCESSORIES

- BC Controller (Required).....for details see BC Controller Submittals
- Joint Kit.....for details see Pipe Accessories Submittal
- Panel Heater Kit.....for details see Panel Heater Kit Submittal
- Snow/Hail Guards Kit.....for details see Snow/Hail Guards Kit Submittal

Specifications		System	
Unit Type		TURYE1204AN40A(N/B)	
Cooling Capacity (Nominal)		BTU/H	120,000
Heating Capacity (Nominal)		BTU/H	135,000
Guaranteed Operating Range	Cooling	°F [°C]	23~126 [-5.0~52.0]
	Heating	°F [°C]	-13~60 [-25.0~15.5]
Extended Operating Range	Heating	°F [°C]	-27.4~60 [-33.0~15.5]
External Dimensions (H x W x D)		In. [mm]	71-5/8 x 48-7/8 x 29-3/16 [1,818 x 1,240 x 740]
Net Weight		Lbs. [kg]	657 [298]
External Finish			Pre-coated galvanized steel sheet (+powder coating for -BS type) [MUNSELL 5Y 8/1]
Electrical Power Requirements	Voltage, Phase, Hertz, Power Tolerance		460V, 3-phase, 60 Hz, ±10%
Minimum Circuit Ampacity		A	19.0
Maximum Overcurrent Protection		A	30
Recommended Fuse Size		A	30
Recommended Minimum Wire Size		AWG [mm]	10 [5.3]
SCCR		kA	5
Refrigerant Piping Diameter	Liquid (High Pressure)	In. [mm]	3/4 [19.05] Brazed
	Gas (Low Pressure)	In. [mm]	1-1/8 [28.58] Brazed
Max. Total Refrigerant Line Length		Ft.	1,968
Max. Refrigerant Line Length (Between ODU & IDU)		Ft.	541
Max. Control Wiring Length		Ft.	1,640
Indoor Unit Connectable	Total Capacity		50.0~150.0% of outdoor unit capacity
	Model/Quantity		P04~P96/1.0~30.0
Sound Pressure Levels		dB(A)	60.0/62.0
Sound Power Levels		dB(A)	80.0/80.5
FAN*	Type x Quantity		Propeller fan x 2
	Fan Motor Output	kW	0.46+0.46
	Airflow Rate	CFM	8,300
	External Static Pressure	In. WG	Selectable; 0.00, 0.12, 0.24, 0.32, In. WG; factory set to 0 In. WG
Compressor Operating Range			15.0% to 100.0%
Compressor	Type x Quantity		Inverter scroll hermetic compressor x 1
Refrigerant	Type x Original Charge		R410A x 17 lbs + 10.0 oz [8.0 kg]
Protection Devices	High Pressure Protection		High pressure sensor, High pressure switch at 4.15 MPa (601 psi)
	Inverter Circuit (Comp./Fan)		Over-current protection
AHRI Ratings (Ducted/Non-ducted)	EER		12.6/13.8
	IEER		25.0/30.1
	COP		3.71/4.04
	SCHE		25.3/29.1

NOTES:
 Nominal cooling conditions (Test conditions are based on AHRI 1230)
 Indoor: 80°F DB, 67°F WB, (26.7°C DB, 19.4°C WB), Outdoor: 95°F DB, (35°C DB)
 Nominal heating conditions (Test conditions are based on AHRI 1230)
 Indoor: 70°F DB, (21.1°C DB), Outdoor: 47°F DB, 43°F WB, (8.3°C DB, 6.1°C WB)

¹Harsh weather environments may demand performance enhancing equipment. Ask your Mitsubishi Electric representative for more details about your region
²For details on extended cooling operation range down to -10° F DB, see Low Ambient Kit Submittal
³When applying product below -4°F, consult your design engineer for cold climate application best practices, including the use of a backup source for heating
⁴Unit will continue to operate in extended operating range, but capacity is not guaranteed

CITYMULTI®

1 TON TUR E1 AN 0A(N/B)



Job Name:

System Reference:

Date:

460V OUTDOOR VRF HEAT RECOVERY SYSTEM



UNIT OPTION

- Standard Model.....TURYE1444AN40AN
- Seacoast (BS) Model.....TURYE1444AN40AB

ACCESSORIES

- BC Controller (Required).....for details see BC Controller Submittals
- Joint Kit.....for details see Pipe Accessories Submittal
- Panel Heater Kit.....for details see Panel Heater Kit Submittal
- Snow/Hail Guards Kit.....for details see Snow/Hail Guards Kit Submittal

Specifications		System	
Unit Type		TURYE1444AN40A(N/B)	
Cooling Capacity (Nominal)		BTU/H	144,000
Heating Capacity (Nominal)		BTU/H	160,000
Guaranteed Operating Range	Cooling	°F [°C]	23~126 [-5.0~52.0]
	Heating	°F [°C]	-13~60 [-25.0~15.5]
Extended Operating Range	Heating	°F [°C]	-27.4~60 [-33.0~15.5]
External Dimensions (H x W x D)		In. [mm]	71-5/8 x 48-7/8 x 29-3/16 [1,818 x 1,240 x 740]
Net Weight		Lbs. [kg]	715 [324]
External Finish			Pre-coated galvanized steel sheet (+powder coating for -BS type) [MUNSELL 5Y 8/1]
Electrical Power Requirements	Voltage, Phase, Hertz, Power Tolerance		460V, 3-phase, 60 Hz, ±10%
Minimum Circuit Ampacity		A	22.0
Maximum Overcurrent Protection		A	35
Recommended Fuse Size		A	35
Recommended Minimum Wire Size		AWG [mm]	8 [8.4]
SCCR		kA	5
Refrigerant Piping Diameter	Liquid (High Pressure)	In. [mm]	7/8 [22.2] Brazed
	Gas (Low Pressure)	In. [mm]	1-1/8 [28.58] Brazed
Max. Total Refrigerant Line Length		Ft.	1,968
Max. Refrigerant Line Length (Between ODU & IDU)		Ft.	541
Max. Control Wiring Length		Ft.	1,640
Indoor Unit Connectable	Total Capacity		50.0~150.0% of outdoor unit capacity
	Model/Quantity		P04~P96/1.0~36.0
Sound Pressure Levels		dB(A)	65.0/65.5
Sound Power Levels		dB(A)	85.5/85.5
FAN ⁴	Type x Quantity		Propeller fan x 2
	Fan Motor Output	kW	0.46+0.46
	Airflow Rate	CFM	9,550
	External Static Pressure	In. WG	Selectable; 0.00, 0.12, 0.24, 0.32, In. WG; factory set to 0 In. WG
Compressor Operating Range			15.0% to 100.0%
Compressor	Type x Quantity		Inverter scroll hermetic compressor x 1
Refrigerant	Type x Original Charge		R410A x 23 lbs + 12.0 oz [10.8 kg]
Protection Devices	High Pressure Protection		High pressure sensor, High pressure switch at 4.15 MPa (601 psi)
	Inverter Circuit (Comp./Fan)		Over-current protection
AHRI Ratings (Ducted/Non-ducted)	EER		11.7/12.9
	IEER		24.1/29.7
	COP		3.49/3.86
	SCHE		24.8/27.7

NOTES:
 Nominal cooling conditions (Test conditions are based on AHRI 1230)
 Indoor: 80°F DB./67°F WB. (26.7°C DB./19.4°C WB.), Outdoor: 95°F DB. (35°C DB.)
 Nominal heating conditions (Test conditions are based on AHRI 1230)
 Indoor: 70°F DB. (21.1°C DB.), Outdoor: 47°F DB./43°F WB. (8.3°C DB./6.1°C WB.)

¹Harsh weather environments may demand performance enhancing equipment. Ask your Mitsubishi Electric representative for more details about your region
²For details on extended cooling operation range down to -10° F DB, see Low Ambient Kit Submittal
³When applying product below -4°F, consult your design engineer for cold climate application best practices, including the use of a backup source for heating
⁴Unit will continue to operate in extended operating range, but capacity is not guaranteed

CITYMULTI®

TCMBG1016S 11N
16 BRANCH (SINGLE BC)

Job Name:

System Reference:

Date:



Specifications		System	
Unit Type		TCMBG1016SJ11N4	
Indoor Unit Capacity Connectable to 1 Branch		BTU/H	54,000
Number Of Branches			16
Electrical Power Requirements			208/230V, 1-phase, 60 Hz
Minimum Circuit Ampacity (MCA)		A	1.5/1.7
Maximum Overcurrent Protection (MOCP)		A	20
Power Input (208 / 230V)	Cooling	kW	1.17 / 1.37
Power Input (208/230V)	Heating	kW	0.59 / 0.69/
Current Input (208/230V)	Cooling	A	0.243 / 0.314/
	Heating	A	0.122 / 0.157
External Dimensions		In. [mm]	9-7/8 x 44-11/16 x 21-1/2 [250 x 1,135 x 545]
Net Weight		Lbs. [kg]	131 [59]
External finish			Galvanized steel plate (Lower part drain pan: Pre-coated galvanized sheets + powder coating) ()
Connectable Outdoor / Heat Source Unit Capacity			72,000 to 120,000
Field drain pipe size		In. [mm]	3/4 NPT
Refrigerant			R410A
Sound power level (measured in anechoic room)	Defrost	dB(A)	40
	Rated operation	dB(A)	59.0
Sound pressure level (measured in anechoic room)	Defrost	dB(A)	71

NOTES:

1. The equipment is for use with R410A refrigerant only.
2. When possible, avoid installing the BC controller within 15 Ft. of sound sensitive areas.
3. Rated operation sound data is based on cooling mode. Sound data may vary depending on outdoor unit capacity and operation mode.
4. Sound pressure/power levels obtained via testing in an anechoic chamber. Actual sound pressure levels may be greater due to ambient noise and/or deflection
5. Sound pressure values were obtained at a test location approximately 5 Ft. from the unit
6. The solenoid valve switching sound pressure value is 56 dB(A) for all units
7. The unit is intended for installation in an indoor environment only
8. For details regarding installation specifics, please refer to the product's Installation Manual.

INDOOR UNIT ACCESSORIES: TCMBG1016S 11N

Ball Valve	Ball Valve (3/8" SAE Brazed)	<input type="checkbox"/> BV38BBSI
	Ball Valve (5/8" SAE Brazed)	<input type="checkbox"/> BV58BBSI
Condensate	Blue Diamond (Advanced) Mini Condensate Pump w/ Reservoir & Sensor (208/230V) [recommended]	<input type="checkbox"/> X87-721
	Blue Diamond (MicroBlue) Mini Condensate Pump (110/208/230V) up to 18,000 BTU/H	<input type="checkbox"/> X86-003
	Saueremann Condensate Pump	<input type="checkbox"/> SI30-230
Control Wire	M-Net Control Wire, 1,000' Roll (16-AWG, Standard, Twisted Pair, Shielded, Jacketed- Plenum rated)	<input type="checkbox"/> CW162S-1000
	M-Net Control Wire, 250' Roll (16-AWG, Standard, Twisted Pair, Shielded, Jacketed- Plenum rated)	<input type="checkbox"/> CW162S-250
Port Adapter	Joint Pipe Adapter	<input type="checkbox"/> CMY-R160-J1
Valves Adaptors & Headers	Branch Joint (Downstream capacity 127,000-216,000 BTU/H)	<input type="checkbox"/> CMY-R202S-G
	Branch Joint (Downstream capacity 217,000-234,000 BTU/H)	<input type="checkbox"/> CMY-R203S-G
	Branch Joint (Downstream capacity 235,000-360,000 BTU/H)	<input type="checkbox"/> CMY-R204S-G
	Branch Joint (Downstream capacity 73,000-96,000 BTU/H)	<input type="checkbox"/> CMY-Y102LS-G2
	Branch Joint (Downstream capacity ≤126,000 BTU/H)	<input type="checkbox"/> CMY-R201S-G
	Branch Joint (Downstream capacity ≤126,000 BTU/H)	<input type="checkbox"/> CMY-Y202S-G2
	Branch Joint (Downstream capacity ≤72,000 BTU/H)	<input type="checkbox"/> CMY-Y102SS-G2
	Branch Joint (Downstream capacity ≥316,000 BTU/H)	<input type="checkbox"/> CMY-R205S-G
	Reducer (Between Main and Sub BC)	<input type="checkbox"/> CMY-R303S-G1
	Reducer (Between ODU and BC)	<input type="checkbox"/> CMY-R302S-G1

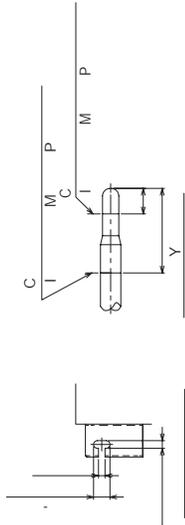
INDOOR UNIT DIMENSIONS: TCMBG1016S 11N

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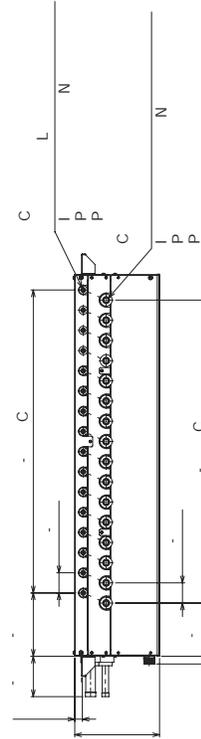
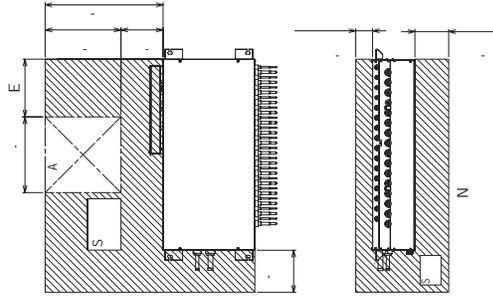
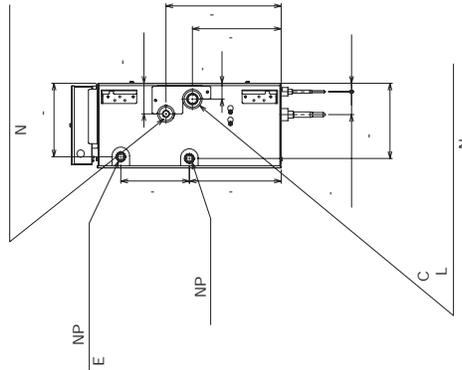
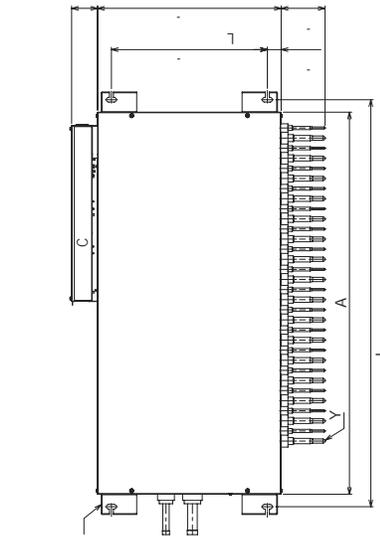
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CITYMULTI®

TPLF P01 FM1 0A
1,000 BTU/H X A CEILING CASSETTE



Job Name:

System Reference:

Date:



GENERAL FEATURES

- Square edge, sleek design
- 3D i-see Sensor™ available as an option
- Improved installation features*
- Occupancy detection*
- Energy saving features*
- Improved occupant comfort
- Four fan speed settings including auto-fan
- Individual vane settings
- 2' x 2' size matches size of many ceiling tiles
- Corner-pocket design for simplified installation
- Built-in condensate lift mechanism designed to provide up to 33" of lift
- Ventilation air intake supported

*Requires a PAR-33MAA-J controller

Specifications		System	
Unit Type		TPLFY015FM140A	
Cooling capacity (Nominal) ¹		BTU/H	15,000
Heating capacity (Nominal) ¹		BTU/H	17,000
Power source		Voltage, Phase, Hertz	208/230V, 1-phase, 60 Hz
Power Consumption	Cooling	kW	0.03
	Heating	kW	0.03
Current	Cooling	A	0.28
	Heating	A	0.23
MCA		A	0.4
Maximum Overcurrent Protection (MOCP)		A	15
External finish			Galvanized steel sheet
External Dimensions		In. [mm]	22-7/16 x 22-7/16 x 8-3/16 [570 x 570 x 208]
Net weight		Lbs [kg]	31.3 [14.2]
Heat exchanger			Cross fin (Aluminum fin and copper tube)
Fan	Type x quantity		Turbo fan x 1
	Airflow rate	CFM	230–280–315
	Motor type		DC motor
	Motor Output	kW	0.05
	Motor FLA	A	0.22
Air filter			PP honeycomb fabric (long life type)
Refrigerant	Type		R410A
Diameter of refrigerant pipe (O.D.)	Liquid (High Pressure)	In. [mm]	1/4 [6.35] Flare
	Gas (Low Pressure)	In. [mm]	1/2 [12.7] Flare
Diameter of drain pipe		In. [mm]	O.D. 1-1/4 [32]

NOTES:

¹Cooling / Heating capacity indicated at the maximum value at operation under the following conditions:

Cooling | Indoor: 80° F (26.7° C) DB / 67° F (19.4° C) WB; Outdoor 95° F (35° C) DB

Heating | Indoor: 70° F (21.1° C) DB; Outdoor 47° F (8.3° C) DB / 43° F (6.1° C) WB

INDOOR UNIT ACCESSORIES: TPLF P01 FM1 0A

Control Interface	BACnet® and Modbus® Interface	<input type="checkbox"/> PAC-UKPRC001-CN-1
	Connector cable for remote display	<input type="checkbox"/> PAC-SA88HA-EP
	IT Extender	<input type="checkbox"/> PAC-WHS01IE-E
	kumo station® for kumo cloud®	<input type="checkbox"/> TAC-WHS01HC-E
	Thermostat Interface	<input type="checkbox"/> PAC-US444CN-1
	Thermostat Interface	<input type="checkbox"/> PAC-US445CN-1
Remote Sensor	Remote Temperature Sensor	<input type="checkbox"/> PAC-SE41TS-E
Terminal Signal Adapter	Terminal Signal Adapter	<input type="checkbox"/> PAC-IT51AD-E
	Terminal Signal Adapter	<input type="checkbox"/> PAC-IT52AD-E
Wired Remote Controller	Deluxe Wired MA Remote Controller†	<input type="checkbox"/> TAR-40MAAU
	Simple MA Remote Controller†	<input type="checkbox"/> TAC-YT53CRAU-J
	Smart ME Remote Controller - Backlit touchscreen	<input type="checkbox"/> TAR-U01MEDU-K
	Touch MA Controller†	<input type="checkbox"/> TAR-CT01MAU-SB
Wireless Remote Controller	kumo touch™ RedLINK™ Wireless Controller	<input type="checkbox"/> MHK2
	Wireless MA Receiver	<input type="checkbox"/> PAR-SR32MA-E
	Wireless MA Remote Controller	<input type="checkbox"/> TAR-FL32MA-E
	Wireless Receiver	<input type="checkbox"/> PAR-WSC009FA-E
	Wireless Remote Controller	<input type="checkbox"/> PAR-SL101A-E
	Wireless Signal Receiver Panel	<input type="checkbox"/> PAR-SR4LU-E
Condensate	Blue Diamond (Advanced) Mini Condensate Pump w/ Reservoir & Sensor (208/230V) [recommended]	<input type="checkbox"/> X87-721
	Blue Diamond (MicroBlue) Mini Condensate Pump (110/208/230V) up to 18,000 BTU/H	<input type="checkbox"/> X86-003
	Refco Condensate Pump (100-240 VAC) up to 120,000 BTU/H	<input type="checkbox"/> COMBI
Control Interface	CN24 Relay Kit	<input type="checkbox"/> CN24RELAY-KIT-CM3
	Remote Operation Adapter†	<input type="checkbox"/> PAC-SF40RM-E
i-see Sensor® Panel	3D i-see Sensor® Corner Panel	<input type="checkbox"/> PAC-SF1ME-E
	Grille with 3D i-see Sensor®	<input type="checkbox"/> TLP-18FAEU

NOTES:

†PAC-SF40RM-E (Unable to use with wireless remote controller)

CITYMULTI®

TPLF P01 EM1 0B
1,000 BTU/H 33 X 33
A CEILING CASSETTE



Job Name:

System Reference:

Date:



GENERAL FEATURES

- Square edge, sleek design
- 3D turbo fan enabling increased airflow
- Built-in 3D i-see Sensor®*
- Improved installation features*
- Occupancy detection*
- Energy saving features*
- Improved occupant comfort
- Four fan speed settings including auto-fan
- Corner pocket design for simplified installation
- Built-in condensate lift mechanism designed to provide up to 33-7/16" of lift
- Ventilation air intake supported

**3D i-See sensor® settings requires either TAR-40MAA controller

Specifications		System	
Unit Type		TPLFYP015EM140B	
Cooling capacity (Nominal) ¹		BTU/H	15,000
Heating capacity (Nominal) ¹		BTU/H	17,000
Power source		Voltage, Phase, Hertz	208/230V, 1-phase, 60 Hz
Power Consumption	Cooling	kW	0.03
	Heating	kW	0.02
Current	Cooling	A	0.3
	Heating	A	0.3
MCA		A	0.4
Maximum Overcurrent Protection (MOCP)		A	15
External finish		Galvanized steel sheet	
External Dimensions		In. [mm]	33-3/32 x 33-3/32 x 10-3/16 [840 x 840 x 258]
Net weight		Lbs [kg]	46 [21]
Heat exchanger		Cross fin (Aluminum fin and copper tube)	
Fan	Type x quantity	Turbo fan x 1	
	Airflow rate	CFM	530-547-565-600
	Motor type	DC motor	
	Motor Output	kW	0.05
	Motor FLA	A	0.31
Sound pressure level (Measured in anechoic room)		dB(A)	28-29-30-31
Air filter		PP honeycomb (long life filter, anti-bacterial type)	
Refrigerant	Type	R410A	
Diameter of refrigerant pipe (O.D.)	Liquid (High Pressure)	In. [mm]	1/4 [6.35] Flare
	Gas (Low Pressure)	In. [mm]	1/2 [12.7] Flare
Diameter of drain pipe		In. [mm]	O.D. 1-1/4 [32]

NOTES:

¹Cooling / Heating capacity indicated at the maximum value at operation under the following conditions:

Cooling | Indoor: 80° F (26.7° C) DB / 67° F (19.4° C) WB; Outdoor 95° F (35° C) DB

Heating | Indoor: 70° F (21.1° C) DB; Outdoor 47° F (8.3° C) DB / 43° F (6.1° C) WB

INDOOR UNIT ACCESSORIES: TPLF P01 EM1 0B

Control Interface	BACnet® and Modbus® Interface	<input type="checkbox"/> PAC-UKPRC001-CN-1
	CN24 Relay Kit	<input type="checkbox"/> CN24RELAY-KIT-CM3
	IT Extender	<input type="checkbox"/> PAC-WHS01IE-E
	kumo station® for kumo cloud®	<input type="checkbox"/> TAC-WHS01HC-E
	Thermostat Interface	<input type="checkbox"/> PAC-US444CN-1
	Thermostat Interface	<input type="checkbox"/> PAC-US445CN-1
Remote Sensor	Flush Mount Remote Temperature Sensor	<input type="checkbox"/> PAC-USSEN002-FM-1
	Flush Mount Temperature Sensor	<input type="checkbox"/> PAC-USSEN001-FM-1
Terminal Signal Adapter	Terminal Signal Adapter	<input type="checkbox"/> PAC-IT51AD-E
	Terminal Signal Adapter	<input type="checkbox"/> PAC-IT52AD-E
Wired Remote Controller	Deluxe Wired MA Remote Controller†	<input type="checkbox"/> TAR-40MAAU
	Simple MA Remote Controller†	<input type="checkbox"/> TAC-YT53CRAU-J
	Smart ME Remote Controller - Backlit touchscreen	<input type="checkbox"/> TAR-U01MEDU-K
	Touch MA Controller†	<input type="checkbox"/> TAR-CT01MAU-SB
Wireless Remote Controller	kumo touch™ RedLINK™ Wireless Controller	<input type="checkbox"/> MHK2
	Wireless MA Receiver	<input type="checkbox"/> PAR-SR32MA-E
	Wireless MA Remote Controller	<input type="checkbox"/> TAR-FL32MA-E
	Wireless Remote Controller	<input type="checkbox"/> PAR-SL101A-E
Casement	Wireless Signal Receiver Panel	<input type="checkbox"/> PAR-SR4LU-E
	Multi-function Casement	<input type="checkbox"/> PAC-SJ41TM-E
Condensate	Blue Diamond (Advanced) Mini Condensate Pump w/ Reservoir & Sensor (208/230V) [recommended]	<input type="checkbox"/> X87-721
	Blue Diamond (MicroBlue) Mini Condensate Pump (110/208/230V) up to 18,000 BTU/H	<input type="checkbox"/> X86-003
	Blue Diamond MultiTank — collection tank for use with multiple pumps	<input type="checkbox"/> C21-014
	Blue Diamond Sensor Extension Cable — 15 Ft.	<input type="checkbox"/> C13-103
	Refco Condensate Pump (100-240 VAC) up to 120,000 BTU/H	<input type="checkbox"/> COMBI
	Sauermann Condensate Pump	<input type="checkbox"/> SI30-230
Filter	High Efficiency Filter Element**	<input type="checkbox"/> PAC-SH59KF-E
Shutter Plate	Shutter Plate	<input type="checkbox"/> PAC-SJ37SP-E

NOTES:

**High efficiency filter requires use of multi-function casement: PAC-SJ41TM-E

CITYMULTI®

Model: TPMFYP015BM140F



Job Name:

System Reference:

Date:



GENERAL FEATURES

- Dual set point functionality
- Lightweight and compact design
- Four-speed fan settings
- Built-in condensate lift mechanism
- Ventilation air intake supported

OPTIONS

- CN24 Relay Kit.....CN24RELAY-KIT-CM3

* Cooling / Heating capacity indicated at the maximum value at operation under the following conditions:

Cooling | Indoor: 80° F (27° C) DB / 67° F (19° C) WB

Cooling | Outdoor: 95° F (35° C) DB

Heating | Indoor: 70° F (21° C) DB

Heating | Outdoor: 47° F (8° C) DB / 43° F (6° C) WB

SPECIFICATIONS

Capacity*

Cooling	15,000 Btu/h
Heating	17,000 Btu/h

Power

Power Source208 / 230V, 1 phase, 60Hz
--------------------	----------------------------

Power Consumption

Cooling	0.05 kW
Heating	0.05 kW

Current

Cooling	0.26 A
Heating	0.26 A
Minimum Circuit Ampacity (MCA)	0.33 A
Maximum Overcurrent Protection (MOCP)	15 A

External FinishGrille: 6.4Y 8.9/0.4

Dimensions

Inches9-1/16" h x 31-31/32" w x 15-9/16" d
mm230 h x 812 w x 395 d
Grille	
Inches	1-3/16" h x 39-3/8" w x 18-17/32" d
mm30 h x 1000 w x 470 d

Net Weight

Unit31 lb / 14 kg
Grille7 lb / 3 kg

Coil TypeCross fin

Fan

Type x Quantity	Line flow fan x 1
Airflow Rate (Low-Mid1-Mid2-High) ..	272 -307 -343 -378 CFM
Motor Type	DC brushless motor

Air FilterPP honeycomb

Refrigerant Pipe Dimensions

Liquid	1/4" / 6.35 mm flare
Gas	1/2" / 12.7 mm flare

Drainpipe DimensionO.D. 1" / 26 mm

Sound Level (Low-Mid1-Mid2-High) 33 -35 -37 -39 dB (A)

CITYMULTI®

TCMBM1016JA11N4
16 BRANCH (MAIN BC)

Job Name:

System Reference:

Date:



Specifications Unit Type		System TCMBM1016JA11N4	
Indoor Unit Capacity Connectable to 1 Branch		BTU/H	54,000
Number Of Branches			16
Electrical Power Requirements			208/230V, 1-phase, 60 Hz
Minimum Circuit Ampacity (MCA)		A	1.6/1.8
Maximum Overcurrent Protection (MOCP)		A	20
Power Input (208 / 230V)	Cooling	kW	1.25 / 1.45
Power Input (208/230V)	Heating	kW	0.66 / 0.77/
Current Input (208/230V)	Cooling	A	0.258 / 0.333/
	Heating	A	0.137 / 0.176
External Dimensions		In. [mm]	9-7/8 x 44-11/16 x 21-1/2 [250 x 1,135 x 545]
Net Weight		Lbs. [kg]	150 [68]
External finish			Galvanized steel plate (Lower part drain pan: Pre-coated galvanized sheets + powder coating) ()
Connectable Outdoor / Heat Source Unit Capacity			72,000 to 336,000
Field drain pipe size		In. [mm]	3/4 NPT
Refrigerant			R410A
Sound power level (measured in anechoic room)	Defrost	dB(A)	50
	Rated operation	dB(A)	68.0
Sound pressure level (measured in anechoic room)	Defrost	dB(A)	74

NOTES:

1. The equipment is for use with R410A refrigerant only.
2. When possible, avoid installing the BC controller within 15 Ft. of sound sensitive areas.
3. Rated operation sound data is based on cooling mode. Sound data may vary depending on outdoor unit capacity and operation mode.
4. Sound pressure/power levels obtained via testing in an anechoic chamber. Actual sound pressure levels may be greater due to ambient noise and/or deflection
5. Sound pressure values were obtained at a test location approximately 5 Ft. from the unit
6. The solenoid valve switching sound pressure value is 56 dB(A) for all units
7. The unit is intended for installation in an indoor environment only
8. For details regarding installation specifics, please refer to the product's Installation Manual.

INDOOR UNIT ACCESSORIES: TCMBM1016JA11N4

Ball Valve	Ball Valve (3/8" SAE Brazed)	<input type="checkbox"/> BV38BBSI
	Ball Valve (5/8" SAE Brazed)	<input type="checkbox"/> BV58BBSI
Condensate	Blue Diamond (Advanced) Mini Condensate Pump w/ Reservoir & Sensor (208/230V) [recommended]	<input type="checkbox"/> X87-721
	Blue Diamond (MicroBlue) Mini Condensate Pump (110/208/230V) up to 18,000 BTU/H	<input type="checkbox"/> X86-003
	Saueremann Condensate Pump	<input type="checkbox"/> SI30-230
Control Wire	M-Net Control Wire, 1,000' Roll (16-AWG, Standard, Twisted Pair, Shielded, Jacketed- Plenum rated)	<input type="checkbox"/> CW162S-1000
	M-Net Control Wire, 250' Roll (16-AWG, Standard, Twisted Pair, Shielded, Jacketed- Plenum rated)	<input type="checkbox"/> CW162S-250
Port Adapter	Joint Pipe Adapter	<input type="checkbox"/> CMY-R160-J1
Valves Adaptors & Headers	Branch Joint (Downstream capacity 127,000-216,000 BTU/H)	<input type="checkbox"/> CMY-R202S-G
	Branch Joint (Downstream capacity 217,000-234,000 BTU/H)	<input type="checkbox"/> CMY-R203S-G
	Branch Joint (Downstream capacity 235,000-360,000 BTU/H)	<input type="checkbox"/> CMY-R204S-G
	Branch Joint (Downstream capacity 73,000-96,000 BTU/H)	<input type="checkbox"/> CMY-Y102LS-G2
	Branch Joint (Downstream capacity ≤126,000 BTU/H)	<input type="checkbox"/> CMY-R201S-G
	Branch Joint (Downstream capacity ≤126,000 BTU/H)	<input type="checkbox"/> CMY-Y202S-G2
	Branch Joint (Downstream capacity ≤72,000 BTU/H)	<input type="checkbox"/> CMY-Y102SS-G2
	Branch Joint (Downstream capacity ≥316,000 BTU/H)	<input type="checkbox"/> CMY-R205S-G
	Reducer (Between Main and Sub BC)	<input type="checkbox"/> CMY-R303S-G1
	Reducer (Between ODU and BC)	<input type="checkbox"/> CMY-R302S-G1

CITYMULTI®

T
000 BTU H00 M140A
4 A CEI IN CASSETTE

Job Name:

System Reference:

Date:



GENERAL FEATURES

- Square edge, sleek design
- 3D i-see Sensor™ available as an option
- Improved installation features*
- Occupancy detection*
- Energy saving features*
- Improved occupant comfort
- Four fan speed settings including auto-fan
- Individual vane settings
- 2' x 2' size matches size of many ceiling tiles
- Corner-pocket design for simplified installation
- Built-in condensate lift mechanism designed to provide up to 33" of lift
- Ventilation air intake supported

*Requires a PAR-33MAA-J controller

Specifications		System	
Unit Type		TPLFY008FM140A	
Cooling capacity (Nominal) ¹		BTU/H	8,000
Heating capacity (Nominal) ¹		BTU/H	9,000
Power source		Voltage, Phase, Hertz	208/230V, 1-phase, 60 Hz
Power Consumption	Cooling	kW	0.02
	Heating	kW	0.02
Current	Cooling	A	.22
	Heating	A	0.17
MCA		A	0.3
Maximum Overcurrent Protection (MOCP)		A	15
External finish			Galvanized steel sheet
External Dimensions		In. [mm]	22-7/16 x 22-7/16 x 8-3/16 [570 x 570 x 208]
Net weight		Lbs [kg]	28.9 [13.1]
Heat exchanger			Cross fin (Aluminum fin and copper tube)
Fan	Type x quantity		Turbo fan x 1
	Airflow rate	CFM	265–315–390
	Motor type		DC motor
	Motor Output	kW	0.05
	Motor FLA	A	0.28
Air filter			PP honeycomb fabric (long life type)
Refrigerant	Type		R410A
Diameter of refrigerant pipe (O.D.)	Liquid (High Pressure)	In. [mm]	1/4 [6.35] Flare
	Gas (Low Pressure)	In. [mm]	1/2 [12.7] Flare
Diameter of drain pipe		In. [mm]	O.D. 1-1/4 [32]

NOTES:

¹Cooling / Heating capacity indicated at the maximum value at operation under the following conditions:

Cooling | Indoor: 80° F (26.7° C) DB / 67° F (19.4° C) WB; Outdoor 95° F (35° C) DB

Heating | Indoor: 70° F (21.1° C) DB; Outdoor 47° F (8.3° C) DB / 43° F (6.1° C) WB

INDOOR UNIT ACCESSORIES: T 00 M140A

Control Interface	BACnet® and Modbus® Interface	<input type="checkbox"/> PAC-UKPRC001-CN-1
	Connector cable for remote display	<input type="checkbox"/> PAC-SA88HA-EP
	IT Extender	<input type="checkbox"/> PAC-WHS01IE-E
	kumo station® for kumo cloud®	<input type="checkbox"/> TAC-WHS01HC-E
	Thermostat Interface	<input type="checkbox"/> PAC-US444CN-1
	Thermostat Interface	<input type="checkbox"/> PAC-US445CN-1
Remote Sensor	Flush Mount Remote Temperature Sensor	<input type="checkbox"/> PAC-USSEN002-FM-1
	Flush Mount Temperature Sensor	<input type="checkbox"/> PAC-USSEN001-FM-1
	Remote Temperature Sensor	<input type="checkbox"/> PAC-SE41TS-E
Terminal Signal Adapter	Terminal Signal Adapter	<input type="checkbox"/> PAC-IT51AD-E
	Terminal Signal Adapter	<input type="checkbox"/> PAC-IT52AD-E
Wired Remote Controller	Deluxe Wired MA Remote Controller†	<input type="checkbox"/> TAR-40MAAU
	Simple MA Remote Controller†	<input type="checkbox"/> TAC-YT53CRAU-J
	Smart ME Remote Controller - Backlit touchscreen	<input type="checkbox"/> TAR-U01MEDU-K
	Touch MA Controller†	<input type="checkbox"/> TAR-CT01MAU-SB
Wireless Remote Controller	kumo touch™ RedLINK™ Wireless Controller	<input type="checkbox"/> MHK2
	Wireless MA Receiver	<input type="checkbox"/> PAR-SR32MA-E
	Wireless MA Remote Controller	<input type="checkbox"/> TAR-FL32MA-E
	Wireless Receiver	<input type="checkbox"/> PAR-WSC009FA-E
	Wireless Remote Controller	<input type="checkbox"/> PAR-SL101A-E
	Wireless Signal Receiver Panel	<input type="checkbox"/> PAR-SR4LU-E
Condensate	Blue Diamond (Advanced) Mini Condensate Pump w/ Reservoir & Sensor (208/230V) [recommended]	<input type="checkbox"/> X87-721
	Blue Diamond (MicroBlue) Mini Condensate Pump (110/208/230V) up to 18,000 BTU/H	<input type="checkbox"/> X86-003
	Refco Condensate Pump (100-240 VAC) up to 120,000 BTU/H	<input type="checkbox"/> COMBI
Control Interface	CN24 Relay Kit	<input type="checkbox"/> CN24RELAY-KIT-CM3
	Remote Operation Adapter‡	<input type="checkbox"/> PAC-SF40RM-E
i-see Sensor® Panel	3D i-see Sensor® Corner Panel	<input type="checkbox"/> PAC-SF1ME-E
	Grille with 3D i-see Sensor®	<input type="checkbox"/> TLP-18FAEU

NOTES:

†PAC-SF40RM-E (Unable to use with wireless remote controller)

CITYMULTI®

T
4 000 BTU H0 4EM140B
4 A CEI IN CASSETTE

Job Name:

System Reference:

Date:



GENERAL FEATURES

- Square edge, sleek design
- 3D turbo fan enabling increased airflow
- Built-in 3D i-see Sensor®*
- Improved installation features*
- Occupancy detection*
- Energy saving features*
- Improved occupant comfort
- Four fan speed settings including auto-fan
- Corner pocket design for simplified installation
- Built-in condensate lift mechanism designed to provide up to 33-7/16" of lift
- Ventilation air intake supported

**3D i-See sensor® settings requires either TAR-40MAA controller

Specifications Unit Type		System TPLFY024EM140B	
Cooling capacity (Nominal) ¹		BTU/H	24,000
Heating capacity (Nominal) ¹		BTU/H	27,000
Power source		Voltage, Phase, Hertz	208/230V, 1-phase, 60 Hz
Power Consumption	Cooling	kW	0.04
	Heating	kW	0.04
Current	Cooling	A	0.4
	Heating	A	0.4
MCA		A	0.5
Maximum Overcurrent Protection (MOCP)		A	15
External finish		Galvanized steel sheet	
External Dimensions		In. [mm]	33-3/32 x 33-3/32 x 11-3/4 [840 x 840 x 298]
Net weight		Lbs [kg]	55 [25]
Heat exchanger		Cross fin (Aluminum fin and copper tube)	
Fan	Type x quantity	Turbo fan x 1	
	Airflow rate	CFM	636-671-742-812
	Motor type	DC motor	
	Motor Output	kW	0.12
	Motor FLA	A	0.43
Sound pressure level (Measured in anechoic room)		dB(A)	28-30-32-34
Air filter		PP honeycomb (long life filter, anti-bacterial type)	
Refrigerant	Type	R410A	
Diameter of refrigerant pipe (O.D.)	Liquid (High Pressure)	In. [mm]	3/8 [9.52] Flare
	Gas (Low Pressure)	In. [mm]	5/8 [15.88] Flare
Diameter of drain pipe		In. [mm]	O.D. 1-1/4 [32]

NOTES:

¹Cooling / Heating capacity indicated at the maximum value at operation under the following conditions:

Cooling | Indoor: 80° F (26.7° C) DB / 67° F (19.4° C) WB; Outdoor 95° F (35° C) DB

Heating | Indoor: 70° F (21.1° C) DB; Outdoor 47° F (8.3° C) DB / 43° F (6.1° C) WB

INDOOR UNIT ACCESSORIES: T 0 4EM140B

Control Interface	BACnet® and Modbus® Interface	<input type="checkbox"/> PAC-UKPRC001-CN-1
	CN24 Relay Kit	<input type="checkbox"/> CN24RELAY-KIT-CM3
	IT Extender	<input type="checkbox"/> PAC-WHS01IE-E
	kumo station® for kumo cloud®	<input type="checkbox"/> TAC-WHS01HC-E
	Thermostat Interface	<input type="checkbox"/> PAC-US444CN-1
	Thermostat Interface	<input type="checkbox"/> PAC-US445CN-1
Remote Sensor	Flush Mount Remote Temperature Sensor	<input type="checkbox"/> PAC-USSEN002-FM-1
	Flush Mount Temperature Sensor	<input type="checkbox"/> PAC-USSEN001-FM-1
Terminal Signal Adapter	Terminal Signal Adapter	<input type="checkbox"/> PAC-IT51AD-E
	Terminal Signal Adapter	<input type="checkbox"/> PAC-IT52AD-E
Wired Remote Controller	Deluxe Wired MA Remote Controller†	<input type="checkbox"/> TAR-40MAAU
	Simple MA Remote Controller†	<input type="checkbox"/> TAC-YT53CRAU-J
	Smart ME Remote Controller - Backlit touchscreen	<input type="checkbox"/> TAR-U01MEDU-K
	Touch MA Controller†	<input type="checkbox"/> TAR-CT01MAU-SB
Wireless Remote Controller	kumo touch™ RedLINK™ Wireless Controller	<input type="checkbox"/> MHK2
	Wireless MA Receiver	<input type="checkbox"/> PAR-SR32MA-E
	Wireless MA Remote Controller	<input type="checkbox"/> TAR-FL32MA-E
	Wireless Remote Controller	<input type="checkbox"/> PAR-SL101A-E
Casement	Wireless Signal Receiver Panel	<input type="checkbox"/> PAR-SR4LU-E
	Multi-function Casement	<input type="checkbox"/> PAC-SJ41TM-E
Condensate	Blue Diamond (Advanced) Mini Condensate Pump w/ Reservoir & Sensor (208/230V) [recommended]	<input type="checkbox"/> X87-721
	Blue Diamond (MegaBlue Advanced) Condensate Pump w/ Reservoir & Sensor	<input type="checkbox"/> X87-835
	Blue Diamond MultiTank — collection tank for use with multiple pumps	<input type="checkbox"/> C21-014
	Blue Diamond Sensor Extension Cable — 15 Ft.	<input type="checkbox"/> C13-103
	Refco Condensate Pump (100-240 VAC) up to 120,000 BTU/H	<input type="checkbox"/> COMBI
	Sauermann Condensate Pump	<input type="checkbox"/> SI30-230
Filter	High Efficiency Filter Element**	<input type="checkbox"/> PAC-SH59KF-E
Shutter Plate	Shutter Plate	<input type="checkbox"/> PAC-SJ37SP-E

NOTES:

**High efficiency filter requires use of multi-function casement: PAC-SJ41TM-E

CITYMULTI®

TCMBS0104 B11N4
4 BRANCH (SUB BC)

Job Name:

System Reference:

Date:



Specifications		System	
Unit Type		TCMBS0104KB11N4	
Indoor Unit Capacity Connectable to 1 Branch	BTU/H	54,000	
Number Of Branches		4	
Electrical Power Requirements		208/230V, 1-phase, 60 Hz	
Minimum Circuit Ampacity (MCA)	A	0.4/0.4	
Maximum Overcurrent Protection (MOCP)	A	20	
Power Input (208 / 230V)	Cooling	kW	0.30 / 0.35
Power Input (208/230V)	Heating	kW	0.15 / 0.18/
Current Input (208/230V)	Cooling	A	0.061 / 0.078/
	Heating	A	0.030 / 0.039
External Dimensions	In. [mm]	9-7/8 x 23-1/2 x 15-11/16 [250 x 596 x 398]	
Net Weight	Lbs. [kg]	51 [23]	
External finish		Galvanized steel plate (Lower part drain pan: Pre-coated galvanized sheets + powder coating) ()	
Connectable Outdoor / Heat Source Unit Capacity		126,000 to	
Field drain pipe size	In. [mm]	3/4 NPT	
Refrigerant		R410A	
Sound power level (measured in anechoic room)	Defrost	dB(A)	40
	Rated operation	dB(A)	59.0
Sound pressure level (measured in anechoic room)	Defrost	dB(A)	71

NOTES:

1. The equipment is for use with R410A refrigerant only.
2. When possible, avoid installing the BC controller within 15 Ft. of sound sensitive areas.
3. Rated operation sound data is based on cooling mode. Sound data may vary depending on outdoor unit capacity and operation mode.
4. Sound pressure/power levels obtained via testing in an anechoic chamber. Actual sound pressure levels may be greater due to ambient noise and/or deflection
5. Sound pressure values were obtained at a test location approximately 5 Ft. from the unit
6. The solenoid valve switching sound pressure value is 56 dB(A) for all units
7. The unit is intended for installation in an indoor environment only
8. For details regarding installation specifics, please refer to the product's Installation Manual.

INDOOR UNIT ACCESSORIES: TCMBS0104 B11N4

Ball Valve	Ball Valve (3/8" SAE Brazed)	<input type="checkbox"/> BV38BBSI
	Ball Valve (5/8" SAE Brazed)	<input type="checkbox"/> BV58BBSI
Condensate	Blue Diamond (Advanced) Mini Condensate Pump w/ Reservoir & Sensor (208/230V) [recommended]	<input type="checkbox"/> X87-721
	Blue Diamond (MicroBlue) Mini Condensate Pump (110/208/230V) up to 18,000 BTU/H	<input type="checkbox"/> X86-003
	Saueremann Condensate Pump	<input type="checkbox"/> SI30-230
Control Wire	M-Net Control Wire, 1,000' Roll (16-AWG, Standard, Twisted Pair, Shielded, Jacketed- Plenum rated)	<input type="checkbox"/> CW162S-1000
	M-Net Control Wire, 250' Roll (16-AWG, Standard, Twisted Pair, Shielded, Jacketed- Plenum rated)	<input type="checkbox"/> CW162S-250
Port Adapter	Joint Pipe Adapter	<input type="checkbox"/> CMY-R160-J1
Valves Adaptors & Headers	Branch Joint (Downstream capacity 127,000-216,000 BTU/H)	<input type="checkbox"/> CMY-R202S-G
	Branch Joint (Downstream capacity 217,000-234,000 BTU/H)	<input type="checkbox"/> CMY-R203S-G
	Branch Joint (Downstream capacity 235,000-360,000 BTU/H)	<input type="checkbox"/> CMY-R204S-G
	Branch Joint (Downstream capacity 73,000-96,000 BTU/H)	<input type="checkbox"/> CMY-Y102LS-G2
	Branch Joint (Downstream capacity ≤126,000 BTU/H)	<input type="checkbox"/> CMY-R201S-G
	Branch Joint (Downstream capacity ≤126,000 BTU/H)	<input type="checkbox"/> CMY-Y202S-G2
	Branch Joint (Downstream capacity ≤72,000 BTU/H)	<input type="checkbox"/> CMY-Y102SS-G2
	Branch Joint (Downstream capacity ≥316,000 BTU/H)	<input type="checkbox"/> CMY-R205S-G
	Reducer (Between Main and Sub BC)	<input type="checkbox"/> CMY-R303S-G1
	Reducer (Between ODU and BC)	<input type="checkbox"/> CMY-R302S-G1

INDOOR UNIT DIMENSIONS: TCMB0104 B11N4

TCMB0104, 0108KB

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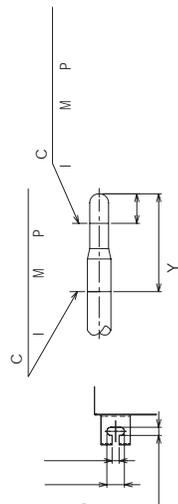
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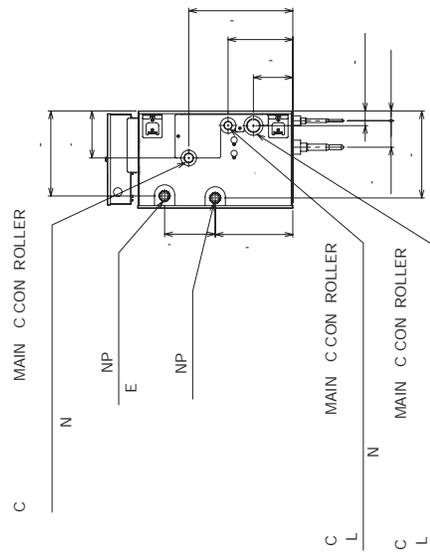
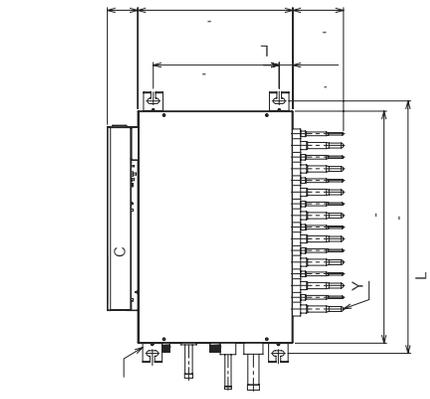
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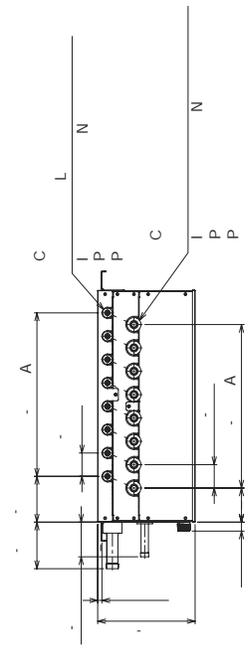
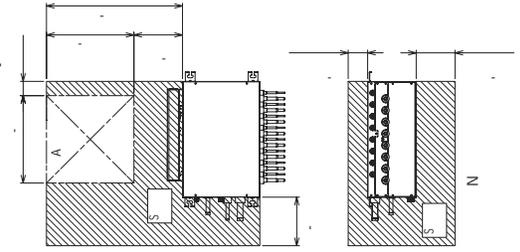
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CM - P	N -



CITYMULTI®

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1 000 BTU H01 EM141B
4 A CEI IN CASSETTE

Job Name:

System Reference:

Date:



GENERAL FEATURES

- Square edge, sleek design
- 3D turbo fan enabling increased airflow
- Built-in 3D i-see Sensor®*
- Improved installation features*
- Occupancy detection*
- Energy saving features*
- Improved occupant comfort
- Four fan speed settings including auto-fan
- Corner pocket design for simplified installation
- Built-in condensate lift mechanism designed to provide up to 33-7/16" of lift
- Ventilation air intake supported

**3D i-See sensor® settings requires either TAR-40MAA controller

Specifications Unit Type		System TPLFYP018EM141B	
Cooling capacity (Nominal) ¹		BTU/H	18,000
Heating capacity (Nominal) ¹		BTU/H	20,000
Power source		Voltage, Phase, Hertz	208/230V, 1-phase, 60 Hz
Power Consumption	Cooling	kW	0.04
	Heating	kW	0.04
Current	Cooling	A	0.4
	Heating	A	0.4
MCA		A	0.5
Maximum Overcurrent Protection (MOCP)		A	15
External finish		Galvanized steel sheet	
External Dimensions		In. [mm]	33-3/32 x 33-3/32 x 11-3/4 [840 x 840 x 258]
Net weight		Lbs [kg]	55 [25]
Heat exchanger		Cross fin (Aluminum fin and copper tube)	
Fan	Type x quantity	Turbo fan x 1	
	Airflow rate	CFM	636-671-742-812
	Motor type	DC motor	
	Motor Output	kW	0.12
	Motor FLA	A	0.43
Sound pressure level (Measured in anechoic room)		dB(A)	28-30-32-34
Air filter		PP honeycomb (long life filter, anti-bacterial type)	
Refrigerant	Type	R410A	
Diameter of refrigerant pipe (O.D.)	Liquid (High Pressure)	In. [mm]	1/4 [6.35] Flare
	Gas (Low Pressure)	In. [mm]	1/2 [12.7] Flare
Diameter of drain pipe		In. [mm]	O.D. 1-1/4 [32]

NOTES:

¹Cooling / Heating capacity indicated at the maximum value at operation under the following conditions:

Cooling | Indoor: 80° F (26.7° C) DB / 67° F (19.4° C) WB; Outdoor 95° F (35° C) DB

Heating | Indoor: 70° F (21.1° C) DB; Outdoor 47° F (8.3° C) DB / 43° F (6.1° C) WB

INDOOR UNIT ACCESSORIES: T 01 EM141B

Control Interface	BACnet® and Modbus® Interface	<input type="checkbox"/> PAC-UKPRC001-CN-1
	CN24 Relay Kit	<input type="checkbox"/> CN24RELAY-KIT-CM3
	IT Extender	<input type="checkbox"/> PAC-WHS01IE-E
	kumo station® for kumo cloud®	<input type="checkbox"/> TAC-WHS01HC-E
	Thermostat Interface	<input type="checkbox"/> PAC-US444CN-1
	Thermostat Interface	<input type="checkbox"/> PAC-US445CN-1
Remote Sensor	Flush Mount Remote Temperature Sensor	<input type="checkbox"/> PAC-USSEN002-FM-1
	Flush Mount Temperature Sensor	<input type="checkbox"/> PAC-USSEN001-FM-1
Terminal Signal Adapter	Terminal Signal Adapter	<input type="checkbox"/> PAC-IT51AD-E
	Terminal Signal Adapter	<input type="checkbox"/> PAC-IT52AD-E
Wired Remote Controller	Deluxe Wired MA Remote Controller†	<input type="checkbox"/> TAR-40MAAU
	Simple MA Remote Controller†	<input type="checkbox"/> TAC-YT53CRAU-J
	Smart ME Remote Controller - Backlit touchscreen	<input type="checkbox"/> TAR-U01MEDU-K
	Touch MA Controller†	<input type="checkbox"/> TAR-CT01MAU-SB
Wireless Remote Controller	kumo touch™ RedLINK™ Wireless Controller	<input type="checkbox"/> MHK2
	Wireless MA Receiver	<input type="checkbox"/> PAR-SR32MA-E
	Wireless MA Remote Controller	<input type="checkbox"/> TAR-FL32MA-E
	Wireless Remote Controller	<input type="checkbox"/> PAR-SL101A-E
Casement	Wireless Signal Receiver Panel	<input type="checkbox"/> PAR-SR4LU-E
	Multi-function Casement	<input type="checkbox"/> PAC-SJ41TM-E
Condensate	Blue Diamond (Advanced) Mini Condensate Pump w/ Reservoir & Sensor (208/230V) [recommended]	<input type="checkbox"/> X87-721
	Blue Diamond (MicroBlue) Mini Condensate Pump (110/208/230V) up to 18,000 BTU/H	<input type="checkbox"/> X86-003
	Blue Diamond MultiTank — collection tank for use with multiple pumps	<input type="checkbox"/> C21-014
	Blue Diamond Sensor Extension Cable — 15 Ft.	<input type="checkbox"/> C13-103
	Refco Condensate Pump (100-240 VAC) up to 120,000 BTU/H	<input type="checkbox"/> COMBI
	Sauermann Condensate Pump	<input type="checkbox"/> SI30-230
Filter	High Efficiency Filter Element**	<input type="checkbox"/> PAC-SH59KF-E
Shutter Plate	Shutter Plate	<input type="checkbox"/> PAC-SJ37SP-E

NOTES:

**High efficiency filter requires use of multi-function casement: PAC-SJ41TM-E

CITYMULTI®

MODEL: TE-200A



Job Name:

System Reference:

Date:



TE-200A

- TE-200A is the Master Controller
- Master Controller can operate and monitor up to 50 indoor units
- Expansion Controllers can expand an TE-200A to operate and monitor up to 50 additional indoor units through the touchscreen or web browser
- Network up to three TE-50A or TW-50A to one TE-200A to allow the TE-200A to manage up to 200 indoor units

OPTIONAL LICENSES

- LIC-BACnet Master: BACnet Function
 - Connected air conditioning units can be monitored and operated not only from the existing web browser or the TE-200/TE-50's LCD, but also from the building management system using the BACnet® communication protocol. See LIC-BACnet Data Sheet for more information.
- LIC-Charge Master: Energy Allocation
 - The apportioned electricity billing function is an electric energy apportionment system that apportions electric energy using input from electricity meters with a pulse generator function. The respective amounts of electric energy can be apportioned based on the operating status and capacity of each tenant. See LIC-Charge Data Sheet for more information.
- LIC-PWeb Master: Online Personal Browser
 - Allows tenant managers and general users to control their respective zone conditions via a networked PC, tablet, or mobile phone with or without local remote controllers installed in the space. See LIC-PWeb Data Sheet for more information.

SPECIFICATIONS

- Supports dual set point functionality (connected equipment dependent)
- Displays:
 - CITY MULTI® compressor speed and hi/low pressure
 - AdvancedHVAC Controller (DC-A2IO) input/output status
 - Indoor unit free contact input/output status
 - Space temperature and humidity (from Smart ME or AI controller)
 - Error code (Can be emailed automatically to specified recipients)
 - Unoccupied setback up temperature range
- Functions
 - Hold function (temporarily disables schedules indoor unit model dependent)
 - Initial setting
 - Operation data back-up
- Permits or prohibits remote controller functions:
 - On/Off
 - Change Operation Mode
 - Change Set Point Temperature
 - Filter Status
 - Change Fan Speed
 - Change Air Direction
- External input/output signals can be used for batch operations such as Start/Stop and Emergency Stop (requires PAC-YG10HA)
- Pulse signal input can obtain watt-hour meter, billing data and energy management data based on the cumulative number of pulse signal pulse signals directly input from a metering device
- Temperature set point range limits can be set for local remote controllers
- User defined indoor unit functions:
 - On/Off
 - Monitoring and Operation
 - Operation mode:
 - Auto* (Dual or Single set point)
 - Heat
 - Fan
 - Drying
 - Setback*
- Note: *R2 Series only (connected equipment dependent)
- Temperature Setting
- Fan Speed
- Airflow Direction
- Monitoring and Control:
 - CITY MULTI® indoor units
 - Nv- & P-Series units (requires M-Net adapter)
 - Lossnay® units
 - TPWFY hydronic heat pump units
 - DIDO controllers
 - CITY MULTI® DOAS
 - Interlock setting enables integration of general equipment inputs/outputs and indoor units
- Scheduling
 - Daily
 - Annually
 - Five pattern of weekly seasonal schedule
- Twenty four scheduled events per day, indoor unit model dependent:
 - ON/OFF
 - Mode
 - Temperature Setting
 - Vane Direction
 - Fan
 - Speed
 - Operation Prohibits
- Trend data:
 - Fan operation time
 - Thermo-on time
 - Set temperature
 - Room temperature
 - AI Controller temperature and humidity (requires PAC-YG63-MCA, 2 inputs total for each controller)
- Memory back up via USB (universal serial bus)
- Memory back up via LAN (local area network) port

TE-200A - SPECIFICATIONS, CONT.

TE A CENTRAL I E D C N T R L L E R

Item	Specifications		
Power Supply	Rated input	100–240 VAC ± 10%; 0.3–0.2 A 50/60 Hz Single-phase	
	Fuse	250 VAC 6.3 A Time-Lag type (IEC 60127-2S.S.5)	
M-NET power feeding capability	No specifications**Only an MN converter can be connected.		
Ambient conditions	Temperature	Operating Range	0° C to +40° C (+32° F to +104° F)
		Non-operating Range	-20° C to +60° C (-4° F to +140° F)
	Humidity	30% to 90% RH (no condensation)	
Weight	2.3 kg (5-5/64 lbs)		
Dimensions (W x H x D)	11-5/32 x 7-55/64 x 2-17/32 in. (284 x 200 x 65 mm)		
Installation conditions	Indoor only **To be used in a business office or similar environment		

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Item	Requirements	
PC	CPU	1 GHz or faster (2 GHz or faster recommended)
	Memory	2 GB or more
	Screen Resolution	1024 x 768 or higher recommended
	OS/Java® execution environment	<ul style="list-style-type: none"> • Microsoft® Windows® 8.1 • Microsoft® Windows® 10 • Mac OS® X10.11 or later (Only CSV File Download Tool is not guaranteed to work.) * Java® execution environment (Oracle® Java or AdoptOpenJDK) is required. Verified to work properly on Oracle® Java8 (https://www.java.com/download/) and AdoptOpenJDK11 HotSpot (https://adoptopenjdk.net/). * The version of the Oracle® Java can be verified by clicking [Java] in the Control Panel. * Install the Java® execution environment that is appropriate for your Air Conditioner Control Tool. When using a 64-bit Air-conditioner Control Tool, install 64-bit Oracle® Java or AdoptOpenJDK
	Browser	<ul style="list-style-type: none"> • Microsoft® Internet Explorer® 11 • Microsoft® Edge® • Google Chrome™ Ver. 83 • Safari® 13
	Microsoft® Excel®	• Microsoft® Excel® 2010 or later

	Item	Requirements
Smartphone	Safari® 12	<ul style="list-style-type: none"> • iPhone 6s (Plus) (iOS 10.1.1 or later) • iPhone 7 (Plus) (iOS 10.1.1 or later) • iPhone SE (iOS 10.1.1 or later) • iPhone XR (iOS 12.1.1 or later)
	Google Chrome™ Ver. 83	<ul style="list-style-type: none"> • Galaxy SC-04J (Android™ 8.0.0) • HUAWEI P9 (Android™ 6.0 or later) • Xperia Z5 (Android™ 6.0 or later)
Tablet	Safari® 13	<ul style="list-style-type: none"> • iPad Air 2 (iOS 12.2.2 or later) • 9.7-inch iPad Pro (iOS 10.1.1 or later)
	Google Chrome™ Ver. 83	• MediaPad T2 7.0 Pro (Android™ 5.1.1)

Note: Registered trademarks

- Android is a registered trademark of Google LLC. in the U.S. and other countries.
- Apple is a trademark of Apple Inc., registered in the U.S. and other countries.
- Google is a registered trademark of Google LLC.
- Google Chrome is a registered trademark of Google LLC. in the U.S. and other countries.
- Edge is a trademark or registered trademark of Microsoft Corporation in the U.S. and other countries.
- Internet Explorer is a trademark or registered trademark of Microsoft Corporation in the U.S. and other countries.
- The official name of Internet Explorer is "Microsoft® Internet Explorer Internet browser".
- iOS is a trademark or registered trademark of Cisco in the U.S. and other countries and is used under license.
- iPad is a trademark of Apple Inc., registered in the U.S. and other countries.
- Mac OS is a trademark of Apple Inc., registered in the U.S. and other countries.
- Microsoft Office Excel is a product name of Microsoft Corporation in the U.S.
- Windows is a trademark or registered trademark of Microsoft Corporation in the U.S. and other countries.
- The official name of Windows is "Microsoft® Windows® Operating System".
- Safari is a trademark or registered trademark of Apple Inc. in the U.S.
- Nexus is a registered trademark of Google LLC. in the U.S. and other countries.
- Galaxy is a trademark or registered trademark of Samsung Co., Ltd.

Note: Company name or product name that is described in this manual may be a trademark or a registered trademark of each company

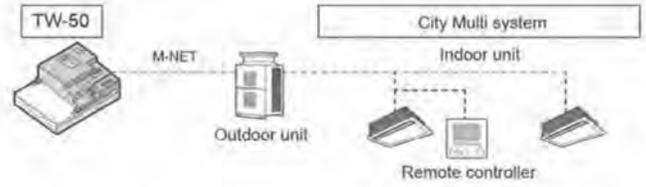
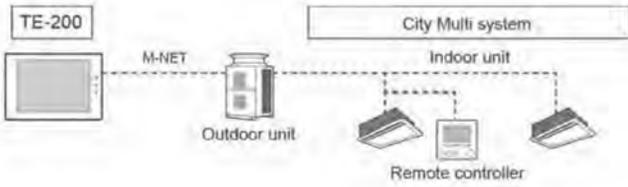
MODEL: TE-200A - SYSTEM CONFIGURATION

C NTR LLIN R E ER UNITS E UIPMENT

*TE-200A is indicated as TE-200
*TE-50A is indicated as TE-50

1. TE-200

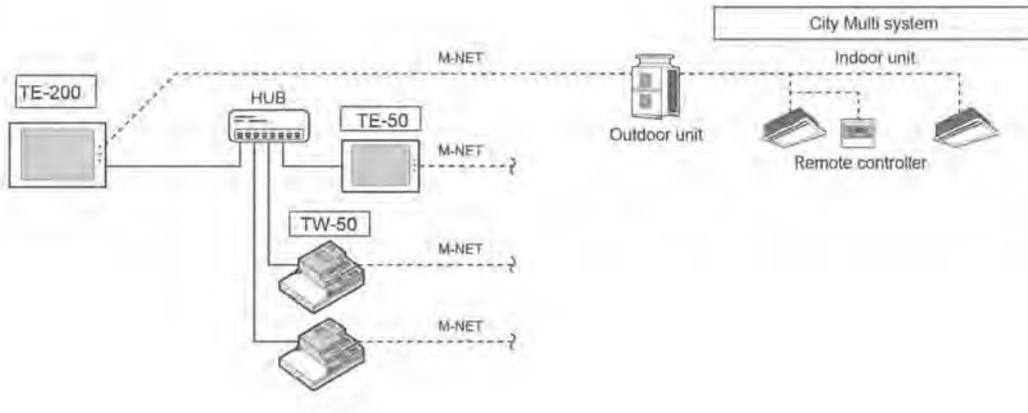
2. TW-50



CONTROLLING MORE THAN 50 UNITS OF EQUIPMENT (WITH CONNECTION TO A TE-200 CONTROLLER)

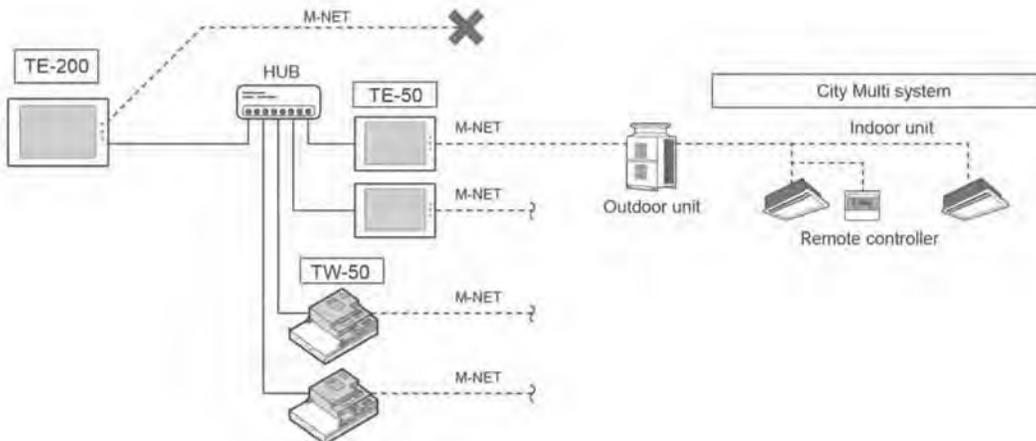
Note

TE-200 is required when using TE-50



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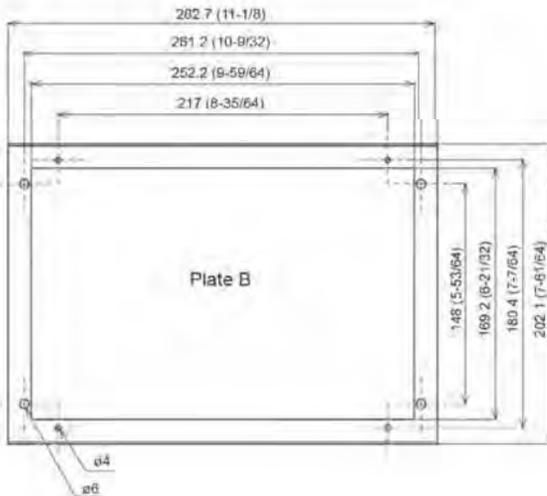
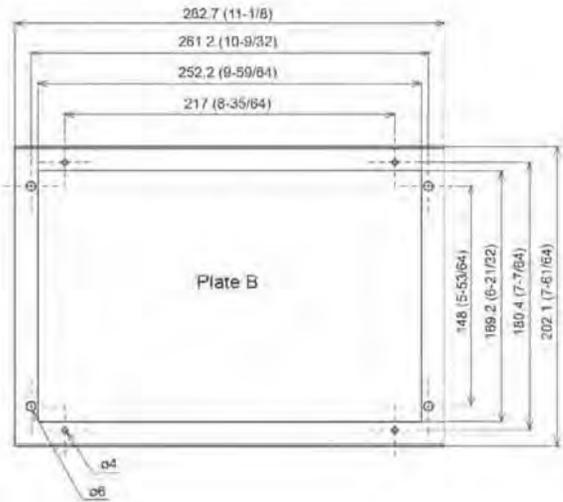
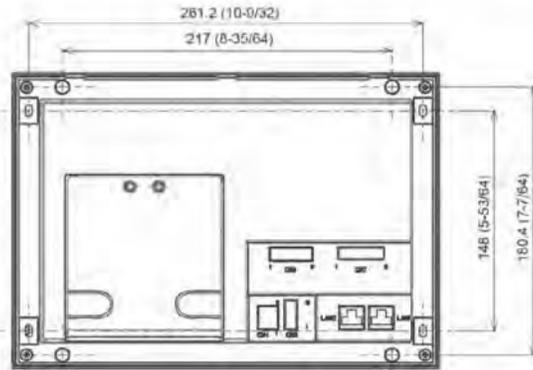
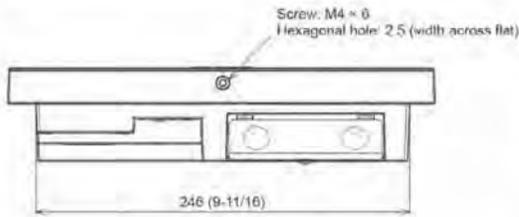
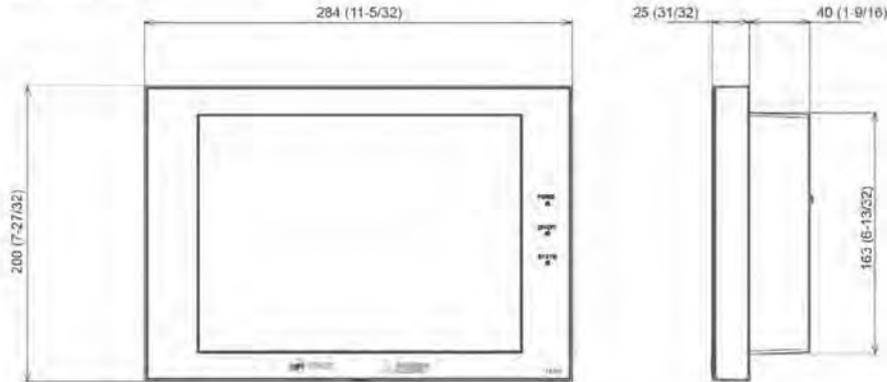
Notes
TE-200 is required to use a billing function.
TE-200 M-NET cannot be used when a billing function is used
"Charge" license is required to use a billing function.



TE-200A - DIMENSIONS

Unit: mm (inch)

*TE-200A is indicated as TE-200
 *TE-50A is indicated as TE-50



MODE : TAC T CRAU J



Job Name:

System Reference:

Date:

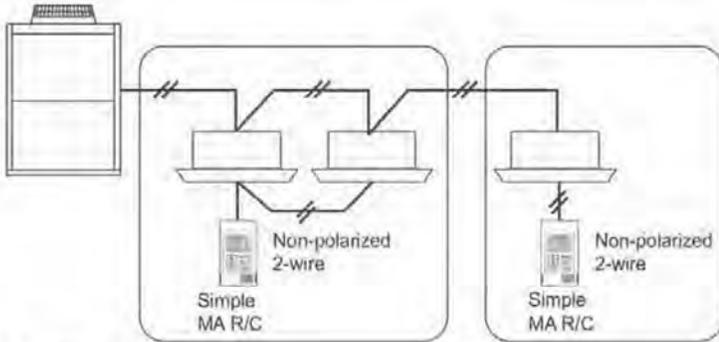


SIMPLE MA REMOTE CONTROLLER (TAC-YT53CRAU-J) SPECIFICATIONS

- Controls group operation for up to 16 indoor units in a single group
- Supports both Fahrenheit and Celsius
- User defined functions:
 - ON/OFF
 - Operation mode: AUTO (R2-Series only), COOL, HEAT, FAN, DRY, SETBACK, or ADD
 - Set temperature
 - Fan speed setting
 - Air flow direction
 - Set temperature range: depending on operation mode and indoor unit connected.
- Set temperature range limit: Simple MA allowable set temperature range can be reduced for cool and heat modes.
- LOSSNAY®: Simple MA for interlocked system can set high/low/Stop on LOSSNAY.
- Room temperature can be sensed either at the indoor unit (default) or at the remote controller.
- Diagnostics: Displays four-digit error code and error unit address.
- Grouping: Same group use only with other TAC-YT53CRAU-J Simple MA Controllers with up to two remote controllers per group.
- Addressing: No addressing required.
- Wiring: Uses two-wire, stranded, non-polar control wire for connecting TB15 connection terminal on the indoor unit.
- Requires crossover wiring for grouping across indoor units.
- Dimensions: 2-3/4 x 9/16 x 4-3/4" (70 x 14.5 x 120mm).

NOTE: A MAC-334IF-E may be needed in order to connect to the indoor unit. Please see the compatibility charts for more information.

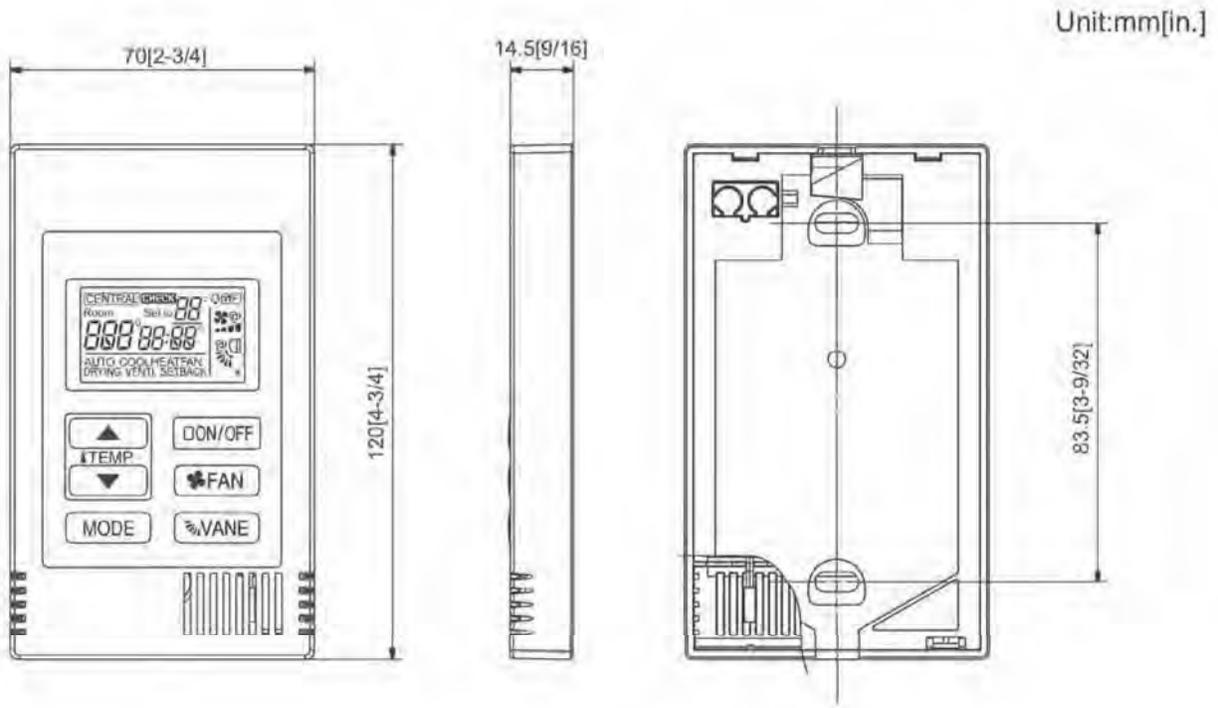
SAMPLE SYSTEM



System example

NOTES:

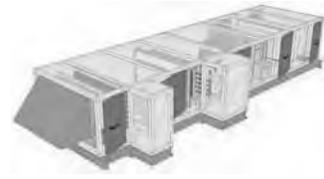
DIMENSIONS: TAC T CRAU J



AH-3

Technical Data Sheet

Job Information		Technical Data Sheet	
Job Name	Fresno WWTP-Lab Building		
Date	October 26 2022		
Submitted By	KF		
Software Version	13.01		
Unit Tag	AH-3		



Unit Overview						
Model Number	Air Volume cfm	Static Pressure		External Dimensions		
		External inWc	Total inWc	Height in	Width in	Length in
		OAH008GDAM	3000	2.00	4.70	34*

**Not including base rails, coil connectors, drain connectors, vestibule sections, control boxes and hoods.*

Unit			
Model Number:	OAH008GDAM		
Approval:	ETL Listed / ETL Listed to Canadian Safety Standards (ETL Label / ETLc Label)		
Outer Panel:	Painted 24 gauge G60 Galvanized Steel		
Liner:	24 gauge Galvanized Steel (unless noted per section)		
Insulation:	R-13 Injected Foam		
Unit Configuration:	Inline horizontal	Drive (Handling) Location:	Right
Base:	Curb ready	Wall Thickness:	2 in
Roof Curb Kit:	0 in	Shipping Stretch Wrap:	Yes
Altitude:	0 ft	Parts Warranty:	Standard One Year

Mixing Box		Component: 1		Length: 20 in		Shipping Section: 1	
Filter Data							
Type	Efficiency	Face Velocity	Face Area	Air Volume	Filter Loading		
Pre Pleat	MERV 13	341 ft/min	8.8 ft ²	3000 cfm	Side		
Air Pressure Drop				Number of Filters	Height	Width	Depth
Clean Air	Mean Air	Dirty Air	User Spec	1	24 in	24 in	2 in
0.21 inWc	0.60 inWc	1.00 inWc	N/A				
				1	24 in	20 in	2 in
				1	24 in	12 in	2 in
Custom Dampers							
Custom Damper	Damper Type	Location	Size (Width x Height)		Material	Blade Action	Rainhood w/Screen
			Overall	Opening			
1	UltraSeal Low Leak	End	46 in x 22 in	36 in x 18 in	Galv. Steel	Parallel	Provided - Factory Installed
2	UltraSeal Low Leak	Bottom	50 in x 12 in	40 in x 8 in	Galv. Steel	Parallel	None
Door							
Location			Width		Opening		
Drive side			16 in		Outward		
Special Options							
Sound Baffle (As casing details)				Filter Gauge Magnehelic 0-1"			

AH-3

Technical Data Sheet

Hot Water Coil		Component: 2		Length: 16 in		Shipping Section: 1	
Coil Model	Total Capacity	Number of Coils	Number of Rows	Fins per Inch	Tube Diameter	Tube Spacing (Face x Row)	
5WQ1301C	94339 Btu/hr	1	1	13	0.625 in	1.50 in x 1.299 in	
Air Volume	Air Temperature		Coil Air Pressure Drop	Finned Height	Finned Length	Face Area	Face Velocity
	Entering	Leaving					
	Dry Bulb	Dry Bulb					
3000 cfm	58.3 °F	87.1 °F	0.15 inWc	24 in	42 in	7.00 ft ²	429 ft/min
Water		Flow Rate	Pressure Drop	Velocity	Volume	Weight	Piping Vestibule
Entering	Leaving						
140.0 °F	120.4 °F	9.70 gpm	2.90 ftHd	2.70 ft/s	2.0 gal	18.00 lb	18 in
Connection [Data Per Coil]				Min. Fin Surface Temp.	Min. Tube Wall Surface Temp.	Fouling Factor	
Type	Size	Location	Material				
Threaded	1.50 in	Drive side	Carbon steel	120.4 °F	120.4 °F	0.000	
Material							
Fin	Tube		Header		Case		
Aluminum .0075 in	Copper .025 in		Copper		Galv. steel		
AHRI 410 Certification							
	Certified in accordance with the AHRI Forced-Circulation Air-Cooling and Air-Heating Coils Certification Program which is based on AHRI Standard 410 within the Range of Standard Rating Conditions listed in Table 1 of the Standard. Certified units may be found in the AHRI Directory at www.ahridirectory.org						

Access Section		Component: 3		Length: 30 in		Shipping Section: 1	
Drip Pan		Drip Side		Air Pressure Drop			
Stainless steel drip pan		Drive side		0.00 inWc			
Door							
Location		Width		Opening			
Drive side		26 in		Outward			

Internal Face and Bypass		Component: 4		Length: 12 in		Shipping Section: 1	
Face Air Pressure Drop		Bypass Air Pressure Drop		Opening Location		Type	
0.03 inWc		0.34 inWc		Internal		Opposed blade - low leak	

Note: Cabinet height for bypass extended 0.00 inches above 'External cabinet height' referenced above.

AH-3

Technical Data Sheet

Chilled Water Coil		Component: 5			Length: 24 in		Shipping Section: 1		
Coil Model	Total Capacity	Sensible Capacity	Number of Coils		Number of Rows	Fins per Inch		Tube Diameter	Tube Spacing (Face x Row)
5WH0806B	86141 Btu/hr	77665 Btu/hr	1		6	8		0.625 in	1.50 in x 1.299 in
Air Volume	Air Temperature				Coil Air Pressure Drop	Finned Height	Finned Length	Face Area	Face Velocity
	Entering		Leaving						
	Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb					
3000 cfm	79.7 °F	63.8 °F	56.0 °F	54.1 °F	0.63 inWc	18 in	45 in	5.62 ft ²	533 ft/min
Water		Flow Rate	Pressure Drop	Velocity	Volume	Weight	Piping Vestibule		
Entering	Leaving	16.00 gpm	6.60 ftHd	3.00 ft/s	4.0 gal	41.00 lb	18 in		
45.0 °F	55.8 °F								
Connection [Data Per Coil]					Min. Fin Surface Temp.	Min. Tube Wall Surface Temp.	Fouling Factor		
Type	Size	Location	Material		45.0 °F	45.0 °F	0.000		
Threaded	1.50 in	Drive side	Carbon steel						
Material					Drain Pan		Drain Side		
Fin	Tube	Header	Case		Stainless steel		Opp drive side		
Aluminum .0075 in	Copper .025 in	Copper	Galv. steel						
AHRI 410 Certification									
 Certified in accordance with the AHRI Forced-Circulation Air-Cooling and Air-Heating Coils Certification Program which is based on AHRI Standard 410 within the Range of Standard Rating Conditions listed in Table 1 of the Standard. Certified units may be found in the AHRI Directory at www.ahridirectory.org									

Supply Fan		Component: 6			Length: 40 in		Shipping Section: 2			
Fan Performance										
Air Volume	Static Pressure			Fan Energy Index(FEI)	Total Input Power	Fan Shaft Power	Speed		Outlet Velocity	
	External	Total	Cabinet				Operating	Maximum		
3000 cfm	2.00 inWc	4.70 inWc	0.00 inWc	1.02	3.8 kW	3.96 BHP	1867 rpm	2091 rpm	2041 ft/min	
Fan Data										
Fan Type	Blade Type / Class	Quantity of Fans	Wheel Diameter	Number of Blades	Discharge	Motor Location				
Centrifugal DWDI	Forward Curved / 2	1	12.62 in	N/A	Top horizontal	To Side of Fan				
Motor Data										
Power	Electrical Supply	Speed	Efficiency	Enclosure	Frame Size	Supplier	Number of Poles	Lock Rotor Current	Full Load Current	
5.0 HP	460/60/3 V/Hz/Phase	1750 rpm	Premium	ODP	184 T frame	Generic	4	47.04 A	6.60 A	
Fan Options										
Seismic Restraint:		With snubbers			Isolator Type:		Spring			
Drive Package Data*										
Fan Sheave	Motor Sheave	Belt	Number of Belts	Actual Drive S.F.	Bearing Type					
AK56H	AK61H	A37	1	1.11	Standard - L50 (200K)					
*Daikin Applied reserves the right to provide a different but equivalent drive package										
VFD/Starter/Disconnect Data										
Selection Type:	VFD	Vendor:				Danfoss (FC101)				
Voltage:	460 V	Height x Width x Depth:				13.32 in x 6.30 in x 8.85 in				
Mounting:	Door Side	Enclosure:				NEMA 3R				
VFD Quantity:	1									
Door										
Location			Width			Opening				
Drive side			22 in			Outward				

AH-3

Technical Data Sheet

Diffuser		Component: 7	Length: 12 in	Shipping Section: 2
Type		Air Pressure Drop		
Perforated plate		0.15 inWc		
Panel				
Location		Width		Opening
Removable panels		- in		Outward

Access Section		Component: 8	Length: 24 in	Shipping Section: 2
Air Pressure Drop				
0.00 inWc				
Door				
Location		Drive Side Door Width	Opp. Drv. Side Door Width	Opening
Both sides		20 in	20 in	Outward
Special Options				
Tread Plate Floor Liner			Sound Baffle	
Tread plate installed			(As casing details)	

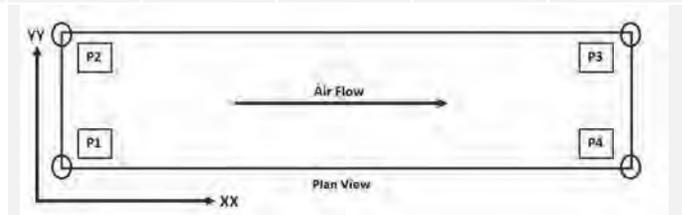
Combination Filter		Component: 9	Length: 20 in	Shipping Section: 2						
Access		Face Velocity		Face Area						
Front		375 ft/min		8.0 ft ²						
Air Volume		3000 cfm								
Portion	Type	Efficiency	Air Pressure Drop				Number of Filters	Height	Width	Depth
			Clean Air	Mean Air	Dirty Air	User Spec				
Pre-Filter	Pre Pleat	MERV 13	0.24 inWc	0.62 inWc	1.00 inWc	N/A	2	24 in	24 in	2 in
Filter	HEPA	MERV 17 (99.97%)	1.00 inWc	1.90 inWc	2.80 inWc	N/A	2	24 in	24 in	12 in
Special Options										
Sound Baffle					Filter Gauge					
(As casing details)					Magnehelic 0-3"					

Plenum Section		Component: 10	Length: 20 in	Shipping Section: 2
Air Pressure Drop				
0.02 inWc				
Custom Openings				
Custom Opening		Location		Width
1		Bottom		54 in
				Height
				16 in
				Rainhood w/Screen
				None
Door				
Location		Drive Side Door Width	Opp. Drv. Side Door Width	Opening
Both sides		16 in	16 in	Outward

Unit Sound Power (dB)								
Type	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Radiated:	77	82	69	63	67	57	46	51
Unit Discharge:	78	84	76	72	76	70	61	59
Unit Return:	77	82	72	70	74	70	62	59

Shipping Section Details

Section	Length in	Weight lb	Corner Weights (lb)				Center of Gravity (in)		
			P1	P2	P3	P4	XX	YY	ZZ
1	102	1842	505	347	416	574	55	24	19
2	116	1426	436	383	277	330	49	27	18
Entire Unit	218	3268	1012	802	622	832	97	25	19



NOTE: Piping vestibule shipping section length(s) not included in the total shipping section length.

NOTE: Piping vestibule(s) are shipped attached to the coil section(s).

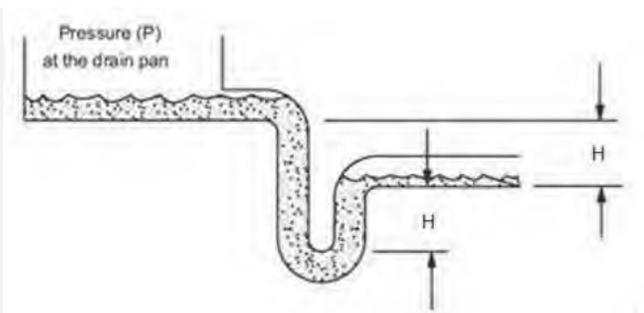
NOTE: Special components aren't included in the corner weights and center of gravity data.

Supply Static Pressure Drop

Component	Option	Static Pressure Drop
Mixing Box	Filter	0.21 insWg
Mixing Box	Mixing Box	0.28 insWg
Hot Water Coil	Hot Water Coil	0.15 insWg
Access Section	Access Section	
Face and Bypass	Face and Bypass	0.03 insWg
Chilled Water coil	Chilled Water coil	0.63 insWg
Supply Fan	Cabinet	
Diffuser	Diffuser	0.15 insWg
Access Section	Access Section	
Panel and Bag Filter	Panel and Bag Filter	1.24 insWg
Plenum Section	Plenum Section	0.02 insWg
External Static	External Static	2.00 insWg
Total Supply Fan Static		4.70 insWg

Minimum Recommended Drain Pan Trap Dimensions

Shipping Section	Component	H
1	Access Section	1.78
1	Chilled Water coil	3.10



Dimensions provided as a courtesy and are recommended minimums only. Daikin is not responsible for supplying or designing drain pan traps and is not responsible for any damage caused by incorrect trap heights. The dimensions listed above should be reviewed and approved by a licensed plumbing professional.

AHRI Certification

Certified in accordance with the AHRI Central Station Air-Handling Unit Certification Program, which is based on AHRI Standards 430/431. Certified units may be found in the AHRI Directory at www.ahridirectory.org.

Notes**Standard**

1. As a standalone component, unit meets or exceeds requirements of ASHRAE 90.1 - 2007. The approving authority is responsible for compliance of multi - component building systems.

Rosemount™ 936

Open Path Toxic Gas Detectors



The Rosemount 936 Open Path Gas Detector providing continuous monitoring for toxic hydrogen sulfide (H₂S) or ammonia (NH₃) gases utilizing UV flash technology in harsh environments where dust, fog, rain, snow, or vibration can cause a high reduction of signal.

Typical applications

Note

Typically used in perimeter monitoring and fence control

- Offshore platforms and floating production storage and offloading (FPSOs)
- Petrochemical plants
- Chemical processing plants
- Gas filling and distribution terminals
- Gas transport and pipelines
- Agriculture
- Food and beverage
- Waste management
- Water treatment
- Pharmaceutical

Contents

Typical applications.....	2
Features and benefits.....	3
Ordering information.....	4
Specifications.....	7
Accessories.....	11
Product certification.....	12
Dimensional drawings.....	14

Features and benefits

- Accurate and reliable high-speed response in under 10 seconds
- Utilizes ultraviolet flash technology
- High immunity to false alarms
- Solar blind and immune to industrial environments
- Strengthened reliability and durability with a massive three-year warranty
- Easy installation and maintenance
- Heated window for superb performance in harsh weather conditions (snow, ice, or condensation)
- Detection of a cloud of gas at very low concentrations, up to 95 percent obscuration
- User programmable via HART® 7 or RS-485 Modbus® protocols compatible with modern user interface for ease of use
- Certified performance/Hazardous Area approved (ATEX/IECEX/CSA and more) for location in zone 1 areas
- Safety Integrity Level SIL2 (TÜV)
- High reliability - MTBF - minimum 100,000 hours

Ordering information

You can order the Rosemount 936 as separate parts: source (PN 936TXT00XXXX), detector (PN 936RT12XXXXX), and accessories.



- Accurate and reliable high-speed response in under three seconds
- Utilizes ultraviolet technology
- High immunity to false alarms
- Easy installation and maintenance

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Model codes

Model codes contain the details related to each product.

Exact model codes will vary; an example of a typical model code is shown in Source (Transmitter) and Detector (Receiver).

Source (Transmitter)

936T1T00F002SA1

Detector (Receiver)

936R1T262SA1

Specifications and options

See Specification for more details on each configuration.

Specification and selection of product materials, options, or components must be made by the purchaser of the equipment.

Source (Transmitter)

Required model components

Model

Code	Description
936	Toxic Open Path Gas Detector Source (Transmitter)

July 2022

Rosemount 936

Transmitter range

Code	Description
T1	Transmitter - Range of 17 ft (5 m) to 52 ft (16 m)
T2	Transmitter - Range of 46 ft (14 m) to 132 ft (40 m)
T3	Transmitter - Range of 115 ft (35 m) to 200 ft (60 m)

Gas calibration

Code	Description
T00	Transmitter

Housing style / conduit

Code	Material	Measurement
2S	Stainless steel	¾-in NPT
4S	Stainless steel	M25

Product certifications

Code	Description
A1	ATEX and IECEx
A3	CSA
E2	INMETRO
EM	CU TR (EAC)

Detector (Receiver)**Required model components****Model**

Code	Description
936	Toxic Open Path Gas Detector (Receiver)

Receiver selection

Code	Description
R1	Receiver

Rosemount 936

July 2022

Gas calibration

Code	Description
T26	Hydrogen sulfide (receiver)
T27	Ammonia (receiver)

Housing style / conduit

Code	Material	Measurement
2S	Stainless steel	¾-in NPT
4S	Stainless steel	M25

Product certifications

Code	Description
A1	ATEX and IECEx
A3	CSA
E2	INMETRO
EM	CU TR (EAC)

Specifications

General specifications

Detected gases

- Hydrogen sulfide (H₂S)
- Ammonia (NH₃)

Table 1: Detection Distance Range

Detector	Source	Minimum installation distance	Maximum installation distance
H₂S			
RT126XXXX	T1T00XXXX	17 ft (5 m)	52 ft (16 m)
RT126XXXX	T2T00XXXX	46 ft (14 m)	132 ft (40 m)
RT126XXXX	T3T00XXXX	115 ft (35 m)	200 ft (60 m)
NH₃			
R1T127XXXX	T1T00XXXX	17 ft (5 m)	52 ft (16 m)
R1T127XXXX	T2T00XXXX	46 ft (14 m)	132 ft (40 m)
R1T127XXXX	T3T00XXXX	115 ft (35 m)	200 ft (60 m)

Response time

< 3 sec

Spectral response

200 to 300 nm

Sensitivity range

Full scale	Warning	Alarm
500 ppm/m	100 ppm/m	300 ppm/m

Field of view

Line of sight

Alignment tolerance

±1 degree

Minimum detectable gas volume

50 ppm/m

Temperature range

-67 °F (-55 °C) to 149 °F (65 °C)

Immunity to false alarm

Does not produce a false alarm and is not influenced by solar radiation, hydrocarbon flames, or other external infrared radiation sources.

Electrical specifications

Operating voltage

18-32 Vdc

Power consumption

Table 2: Detector and source maximum power consumption

	Without heated optics (maximum)	With heated optics (maximum)
Detector	150 mA	300 mA
Source	200 mA	300 mA

Electrical input protection

The input circuit is protected against voltage-reversed polarity, voltage transients, surges, and spikes, according to EN50270.

Electrical outputs

- 0-20 mA current output: The 0-20 mA is an isolated sink option. You can also configure this output as source. The maximum permitted load resistance is 500 Ω .
- Communication network: The detector is equipped with an RS-485 communication link that can be used in installations with computerized controllers. Communication is compatible with the Modbus[®] protocol.
 - This protocol is standard and widely used.
 - It enables continuous communication between a single standard Modbus controller (master device) and a serial network of up to 247 detectors.
 - It enables connection between different types of Rosemount detectors or other Modbus devices to the same network.
- HART[®] 7 protocol: A digital communication protocol used to communicate between intelligent field instruments and the host system. Through the HART 7 protocol, the detector can:
 - Display setup.
 - Reconfigure setup.
 - Display and determine the detector status.
 - Perform detector diagnostics.
 - Troubleshoot.

Mechanical specifications

Enclosure

The detector, source, and tilt mount are stainless steel, 316 electro chemical, and passivized coating.

Explosion proof

ATEX, IECEx, and UK CA

Ex II 2(2) G D

Ex db eb ib [ib Gb] IIB+H2 T4 Gb

Ex tb [ib Db] IIIC T135 °C Db

Water and dust tight

IP66 and IP68

IP68 is rated for 7 ft (2 m) depth for 45 minutes.

NEMA® 250 Type 6p

Electrical modules

Conformal coated

Electrical connection

Two options, specified at time of order:

- 2 x M25 for International Organization on Standardization (ISO)
- 2 x ¼-in-14 NPT conduits

Dimensions

- Detector: 10.5 in (267 mm) x 5.1 in (130 mm) x 5.1 in (130 mm)
- Source: 10.5 in (267 mm) x 5.1 in (130 mm) x 5.1 in (130 mm)
- Tilt mount: 4.7 in (119 mm) x 4.7 in (119 mm) x 5.5 in (140 mm)

Weight

Detector: 11 lb (5 kg)

Source: 11 lb (5 kg)

Tilt mount: 4.2 lb (1.9 kg)

Environmental specifications

The Rosemount 936 system is designed to withstand harsh environmental conditions.

The source and detector units compensate for adverse conditions while maintaining accuracy.

High temperature

The Rosemount 936 is designed to meet DNVGL-CG-0039, class D.

Operating temperature 149 °F (65 °C)

Storage temperature 149 °F (65 °C)

Low temperature

The Rosemount 936 is designed to meet DNVGL-CG-0039, Class D.

Operating temperature -67 °F (-55 °C)

Storage temperature -67 °F (-55 °C)

Humidity

The Rosemount 936 is designed to meet DNVGL-CG-0339, class B.

Enclosure

The Rosemount 936 is designed to meet DNVGL-CG-0339, class C.

Water and dust

- IP68 per EN60529
- IP66 per EN60529

Dust Completely protected against dust.

Liquids Protected against immersion between 5.9 in. (15 cm) and 3.3 ft. (1 m) in depth. Protected against water jets from all directions.

Vibration

The Rosemount 936 is designed to meet DNVGL-CG-0339, class B.

Electromagnetic compatibility (EMC)

This product is in conformance with EMC per EN50270.

Radiated emission	EN55022
Conducted emission	EN55022
Radiated immunity	EN61000-4-3
Conducted immunity	EN61000-4-6
Electrostatic discharge (ESD)	EN61000-4-2
Burst	EN61000-4-4
Surge	EN61000-4-5
Magnetic field	EN61000-4-8

To fully comply with EMC directive 2014/30/EU and protect against interference caused by radio frequency interference (RFI) and electromagnetic interference (EMI), the cable to the detector must be shielded, and the detector must be grounded. Ground the shield at the detector end.

Accessories

Part number	Description
888270	Spare tilt mount The tilt mounting brackets allow accurate alignment of the detector and source for proper open path operation. The brackets give crude alignment of $\pm 60^\circ$ and fine alignment of $\pm 10^\circ$.
799225	U-bolt/pole mount: 4 to 5 in. (101.6 to 127 mm) The U-bolt mount is available to facilitate a 5-in. (127 mm) pipe opening.
888140	U-bolt/pole mount: 2 to 3 in. (50.8 to 76.2 mm)
8888847-1	Hydrogen sulfide (H ₂ S) commissioning kit The commissioning/alignment kit is required for commissioning and future maintenance checks. Only one kit is required per site. The kit includes an alignment tool and a magnetic mode selector. Two different functional check filters are in each set for system installation and periodic functional testing, along with socket keys for access to detectors.
8888847-2	Ammonia sulfide (NH ₃) commissioning kit The commissioning/alignment kit is required for commissioning and future maintenance checks. Only one kit is required per site. The kit includes an alignment tool and a magnetic mode selector. Two different functional check filters are in each set for system installation and periodic functional testing, along with socket keys for access to detectors.
888931	Air Shield
888815	HART [®] 7 hand-held harness kit With external communication cable. This is a quick plug connection with a harness, which is connected on one side to a standard HART 7 Field Communicator and includes Rosemount host software that can be uploaded to an existing Field Communicator. It does not include the Field Communicator.
888816	Personal computer (PC) harness kit with external communication cable
888263	Sunshade The sunshade is designed to protect the detector from the sun's heat.
888355-1	Open path gas detector (OPGD) duct mount - QT/QR

Rosemount 936

Product certification

ATEX and IECEx

The Rosemount 936 is approved per:

Ex II 2(2) G D

Ex db eb ib [ib Gb] IIB+H₂ T4 Gb

Ex tb [ib Db] IIIC T135 °C Db

T_a = -55 °C to +65 °C

SIL-2

The Rosemount 936 is TUV approved for SIL-2 requirements per IEC61508.

The alert condition according to SIL-2 can be implemented by alert signal via 0-20 mA current loop.

TR CU

The Rosemount 936 is in compliance with the standard TR CU 012/2011 per:

1Ex db eb ib [ib Gb] IIB + H₂ T4 Gb X

Ex tb IIIC T135 °C Db X

-55 °C ≤ T_a ≤ +65 °C

For more details, see TR CU Certificate number *TC RU C-US.M ю 62.B.05535*.

INMETRO

The Rosemount 936 is in compliance with the standards ABNT NBR IEC 60079-0, ABNT NBR IEC 60079-1, ABNT NBR IEC 60079-7, ABNT NBR IEC 60079-11, ABNT NBR IEC 60079-28, ABNT NBR IEC 60079-31, and INMETRO decree No. 179 as of May 18th, 2010.

Further details may be found on the Certificate of Compliance Number UL-BR 19.0726X.

CSA C/US

The Rosemount 936 is approved per CSA C/US for hazardous and ordinary locations:

Canada

Ex db eb ib [ib Gb] IIB+H₂ T4 Gb

Ex tb [ib Db] IIIC T135 °C Db

T_a = -55 °C to +65 °C

USA

Class I Zone 1 AEx db eb ib [ib Gb] IIB+H₂ T4 Gb

Zone 21 AEx tb [ib Db] IIIC T135 °C Db

T_a = -55 °C to +65 °C

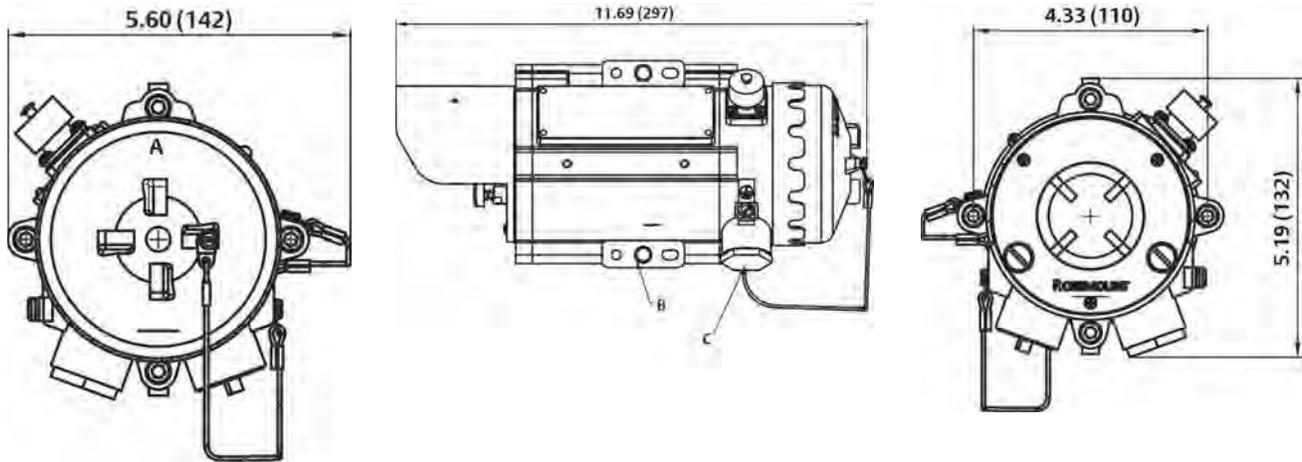


The Rosemount 936 is a "Class 1 Laser Product" per IEC 60825-1: 2014 ed. 05.

Dimensional drawings

Figure 1: Gas Detector Assembly

Dimensions are in inches [millimeters].



- A. Do not open while energized
- B. M10x1.5
- C. Two conduit entry locations, M25x1.5 mm ISO or ¾-in. NPT.

Material
Stainless steel - 316L

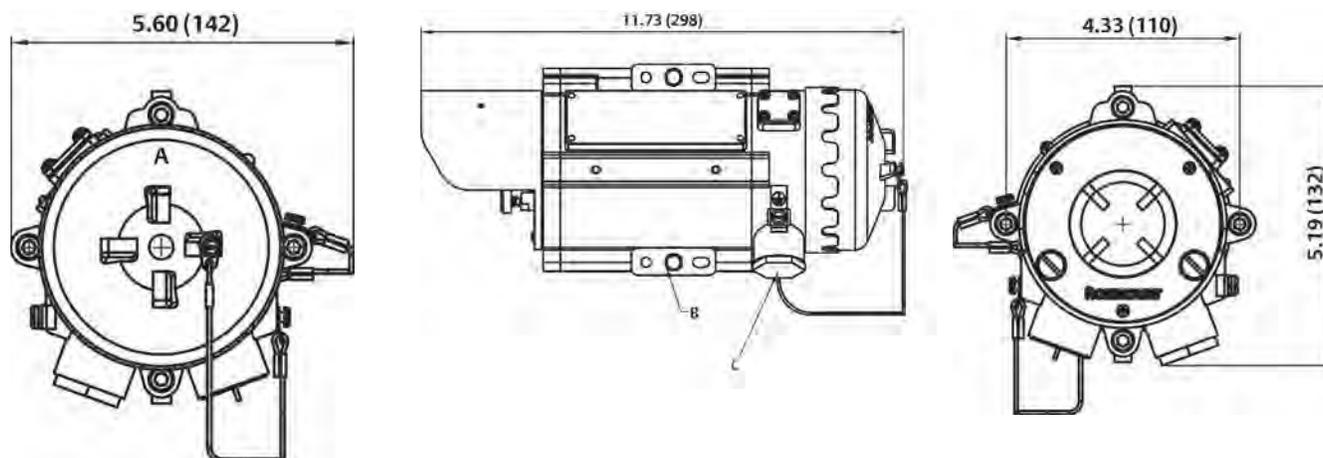
Weight
11 lb. (5 kg) approximately

July 2022

Rosemount 936

Figure 2: Gas UV Source Assembly

Dimensions are in inches [millimeters].



A. Do not open while energized

B. M10x1.5

C. Two conduit entry locations, M25x1.5 mm ISO or 3/4-in. NPT.

Material

Stainless steel - 316L

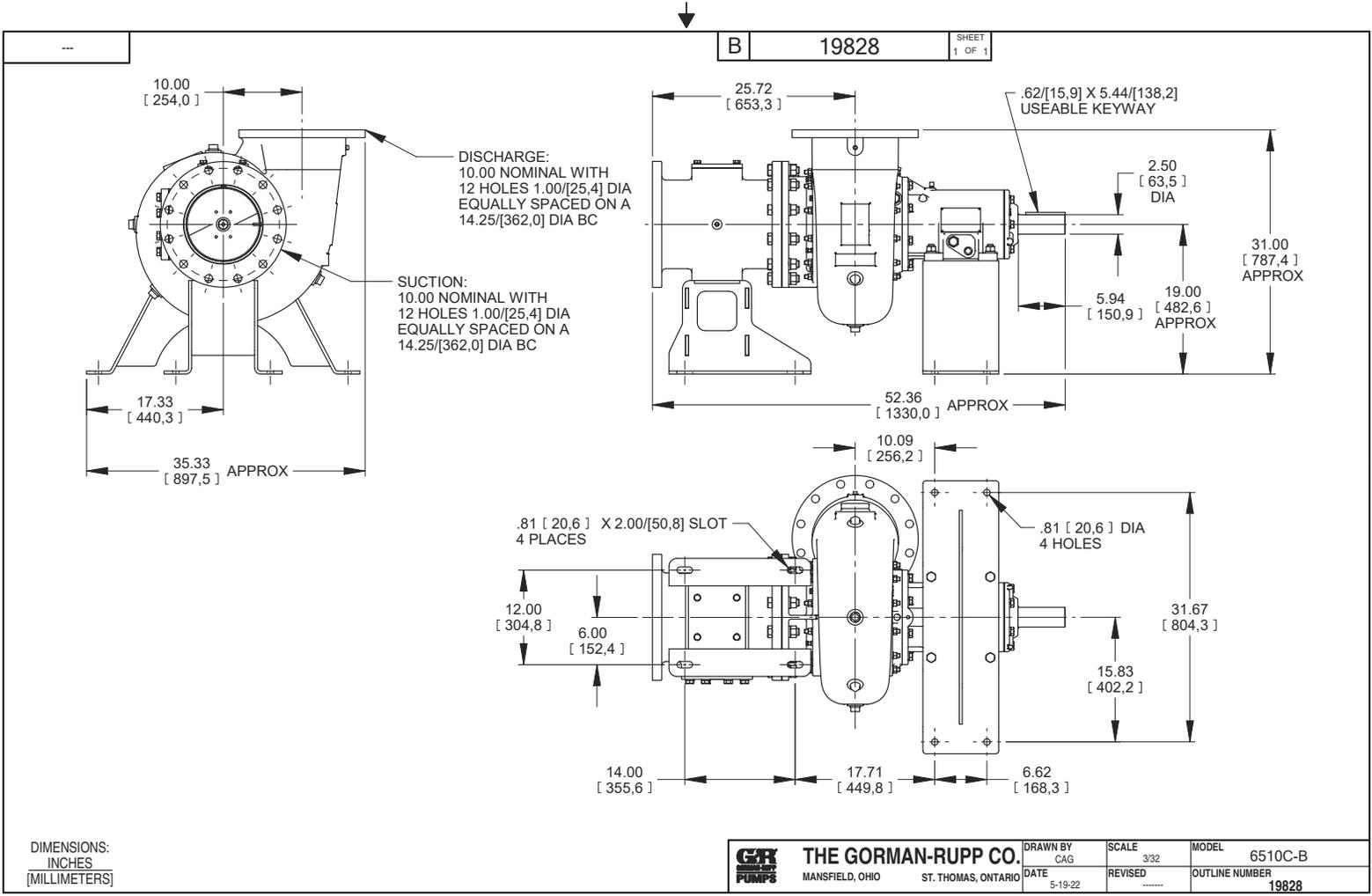
Weight

11 lb. (5 kg) approximately

For more information: **Emerson.com**

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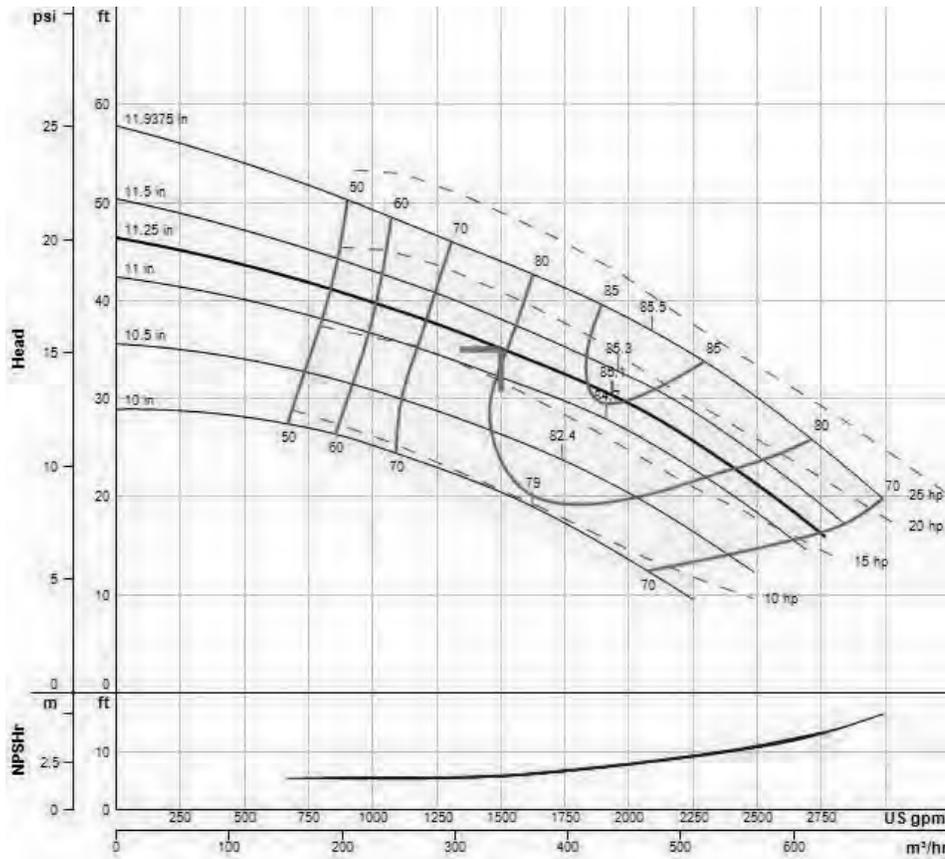
Emerson Terms and Conditions of Sale are available upon request. The Emerson logo is a trademark and service mark of Emerson Electric Co. Rosemount is a mark of one of the Emerson family of companies. All other marks are the property of their respective owners.





6510C60-B Standard Centrifugal

Suction	10" (250 mm)
Discharge	10" (250 mm)
Solids Handling	3.25" (83 mm)
Casing	Ductile Iron
Impeller/Rotor	Ductile Iron
Seal Material	Silicon Carbide
Flange	ANSI
Drive Type	Basic
Unit Weight	N/A



Curve Info

Type	6500-SERIES	
Curve	6510C-B-4	
Impeller	38615-091	
Speed	1200 rpm	
Diameter	11.25 in	

Data Point

Flow	1502	US gpm
Head	35.1	ft
NPSHr	5.83	ft
Efficiency	79	%
Power	16.8	hp

This curve is provided for preliminary selection only. Please consult factory before making final pump or motor selections. Not NSF certified.

Basic Pedestal

Standard Centrifugal Pump

Model 6510C60-B

Size 10" x 10"



PUMP SPECIFICATIONS

Size: 10" x 10" (254 mm x 254 mm) Flanged.

Casing: Gray Iron 30.

Maximum Operating Pressure 103 psi (710 kPa).*

Open Type, Two Vane Impeller: Ductile Iron 65-45-12.

Handles 3.25" (88,6 mm) Diameter Spherical Solids.

Suction Head: Gray Iron 30.

Suction Spool: Gray Iron 30.

Impeller Shaft: Alloy Steel 4150.

Replaceable Wear Ring: Ductile Iron 80-55-06.

Pedestal: Gray Iron 30.

Seal Plate: Gray Iron 30.

Radial Bearing: Open Roller.

Thrust Bearing: Open Double Ball.

Bearing and Seal Cavity Lubrication: SAE 30 Non-Detergent Oil.

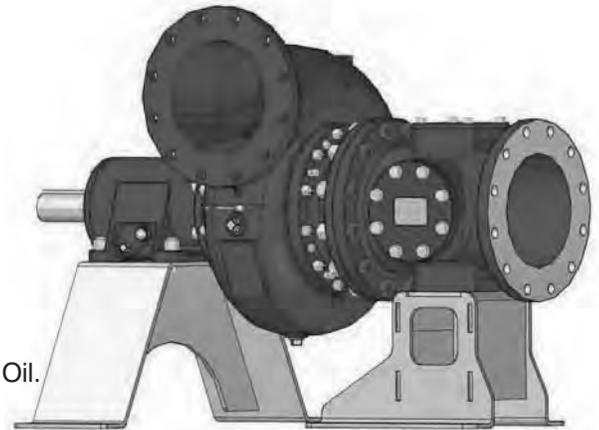
Gaskets: Vegetable Fiber, Red Rubber and Buna-N.

O-Rings: Buna-N.

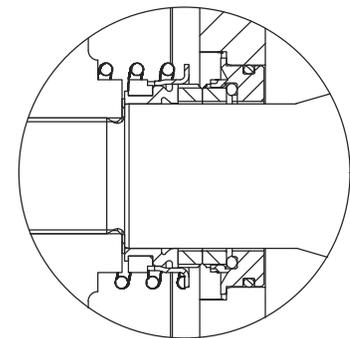
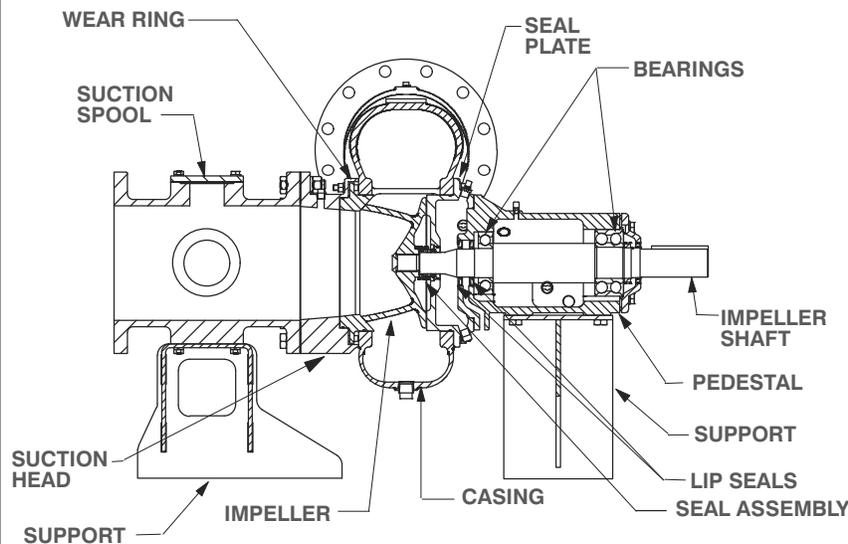
Hardware: Standard Plated Steel.

Bearing and Seal Cavity Oil Level Sight Gauges.

*Consult Factory for Applications Exceeding Maximum Pressure and/or Temperature Indicated.

**WARNING!**

Do not use in explosive atmosphere or for pumping volatile flammable liquids.

**SEAL DETAIL**

Mechanical, Oil-Lubricated. Silicon Carbide Rotating Face and Stationary Seat. Fluorocarbon Elastomers (DuPont Viton® or Equivalent). Stainless Steel 316 Cage and Stainless Steel 18-8 Spring. Maximum Temperature of Liquid Pumped 160°F (71°C).*



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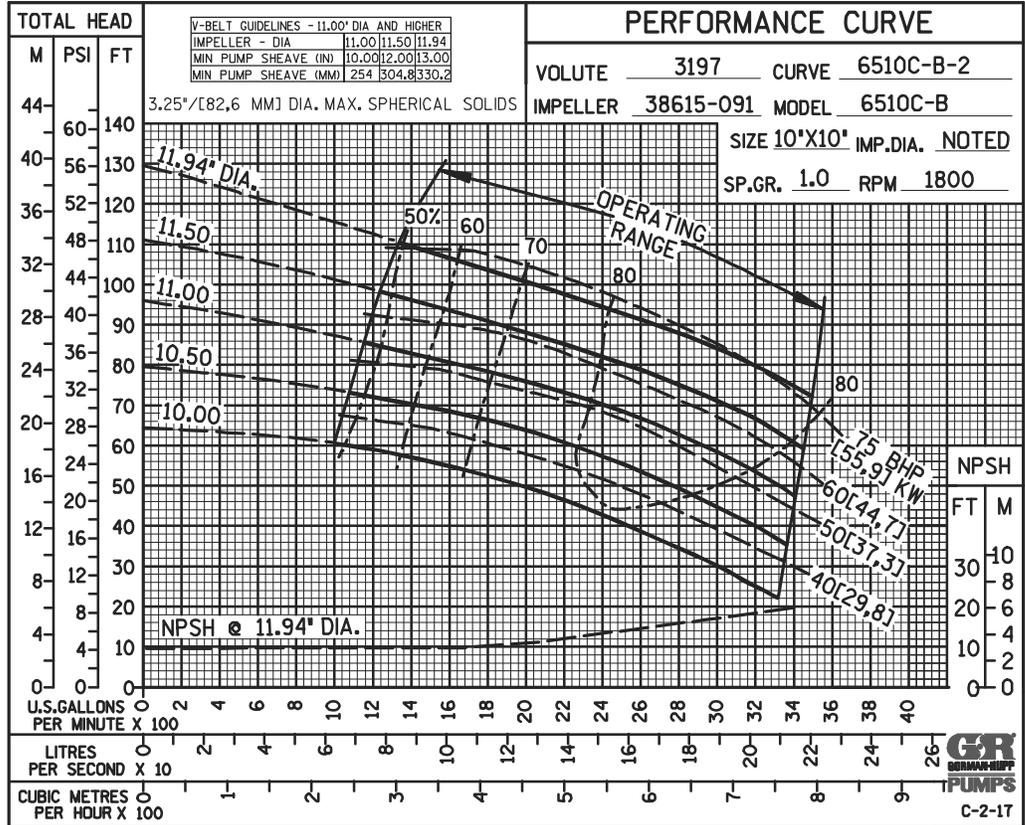
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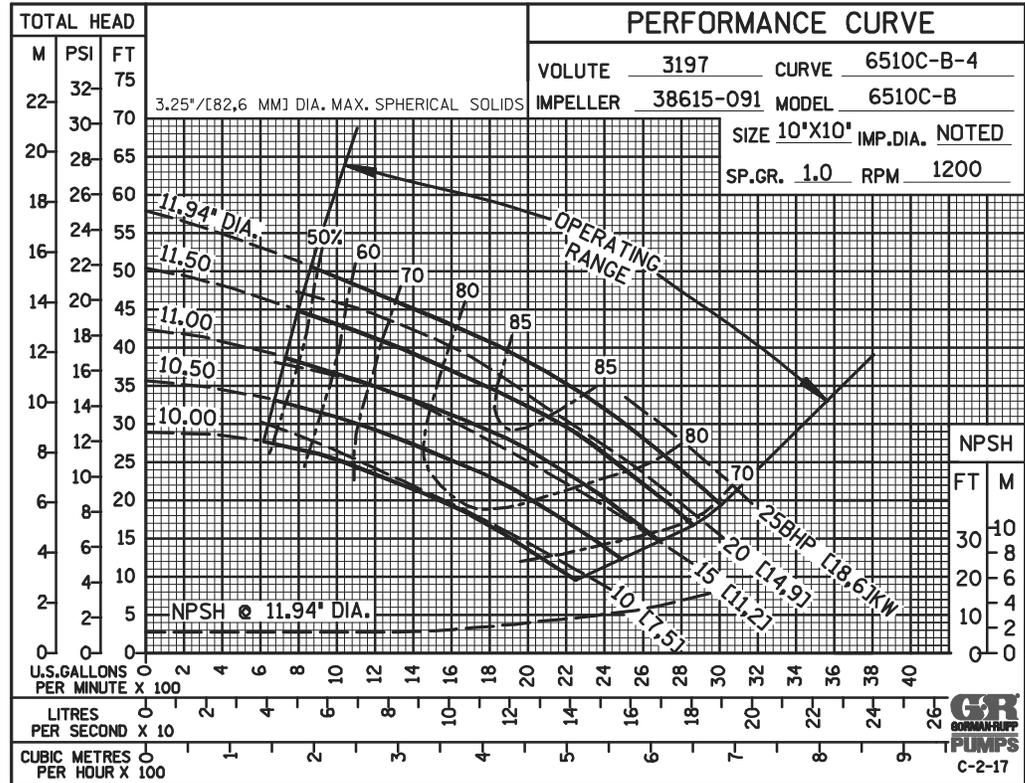
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60 HERTZ
PERFORMANCE
BASED ON
WATER
TRIMMED
IMPELLER



60 HERTZ
PERFORMANCE
BASED ON
WATER
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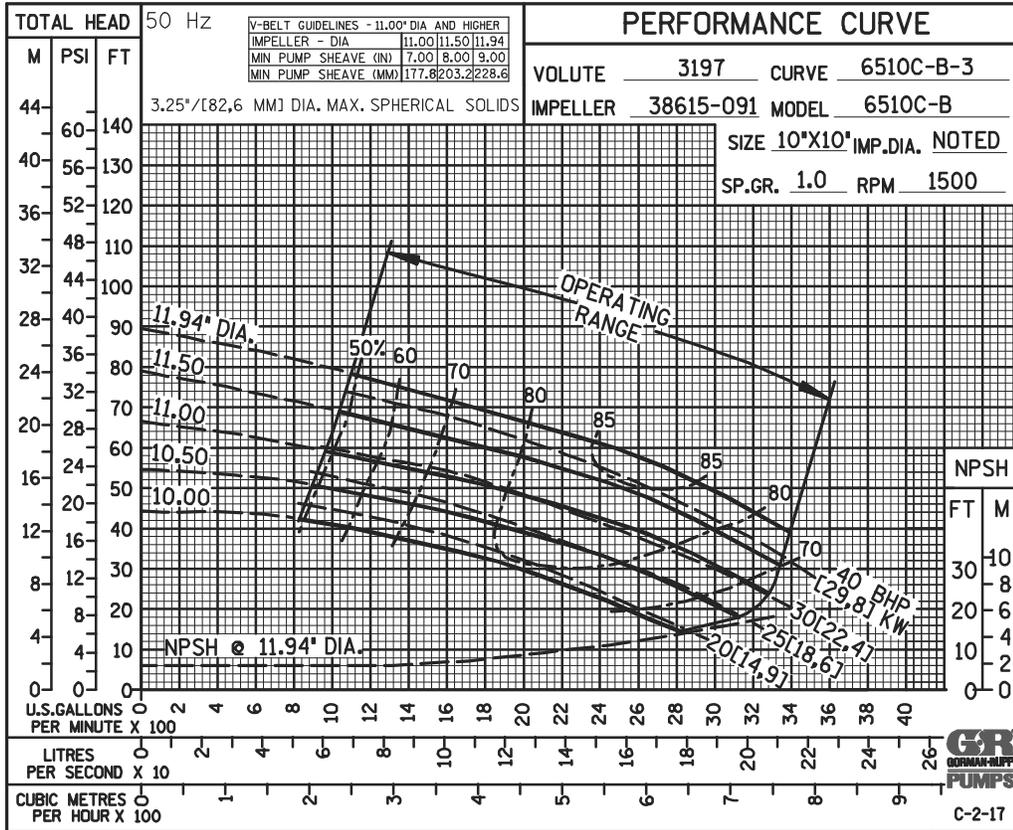
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OCTOBER 2017



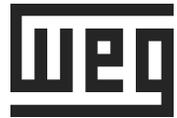
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DATA SHEET



Three Phase Induction Motor - Squirrel Cage

Customer	:					
Product line	:	W22				
Product code	:	11441772				
Catalog #	:	02012ET3E286T-W22				
Frame	:	284/6T				
Output	:	20 HP (15 kW)				
Poles	:	6				
Frequency	:	60 Hz				
Rated voltage	:	230/460 V				
Rated current	:	48.4/24.2 A				
L. R. Amperes	:	300/150 A				
LRC	:	6.2x(Code G)				
No load current	:	19.0/9.50 A				
Rated speed	:	1175 rpm				
Slip	:	2.08 %				
Rated torque	:	89.4 ft.lb				
Locked rotor torque	:	229 %				
Breakdown torque	:	260 %				
Insulation class	:	F				
Service factor	:	1.25				
Moment of inertia (J)	:	9.16 sq.ft.lb				
Design	:	B				
Locked rotor time	:	28s (cold) 16s (hot)				
Temperature rise	:	80 K				
Duty cycle	:	Cont.(S1)				
Ambient temperature	:	-20°C to +40°C				
Altitude	:	1000 m.a.s.l.				
Protection degree	:	IP55				
Cooling method	:	IC411 - TEFC				
Mounting	:	F-1				
Rotation ¹	:	Both (CW and CCW)				
Noise level ²	:	59.0 dB(A)				
Starting method	:	Direct On Line				
Approx. weight ³	:	438 lb				
Output	25%	50%	75%	100%	Foundation loads	
Efficiency (%)	90.8	91.0	91.7	91.7	Max. traction	: 908 lb
Power Factor	0.44	0.70	0.80	0.85	Max. compression	: 1347 lb

	Drive end	Non drive end
Bearing type	: 6311 C3	6211 C3
Sealing	: V'Ring	V'Ring
Lubrication interval	: 20000 h	20000 h
Lubricant amount	: 18 g	11 g
Lubricant type	: Mobil Polyrex EM	

Notes
USABLE @208V 53.5A SF 1.15 SFA 61.5A

This revision replaces and cancel the previous one, which must be eliminated.

- (1) Looking the motor from the shaft end.
- (2) Measured at 1m and with tolerance of +3dB(A).
- (3) Approximate weight subject to changes after manufacturing process.
- (4) At 100% of full load.

These are average values based on tests with sinusoidal power supply, subject to the tolerances stipulated in NEMA MG-1.

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Checked by			Page	Revision
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TORQUE AND CURRENT VS SPEED CURVE



Three Phase Induction Motor - Squirrel Cage

Customer :

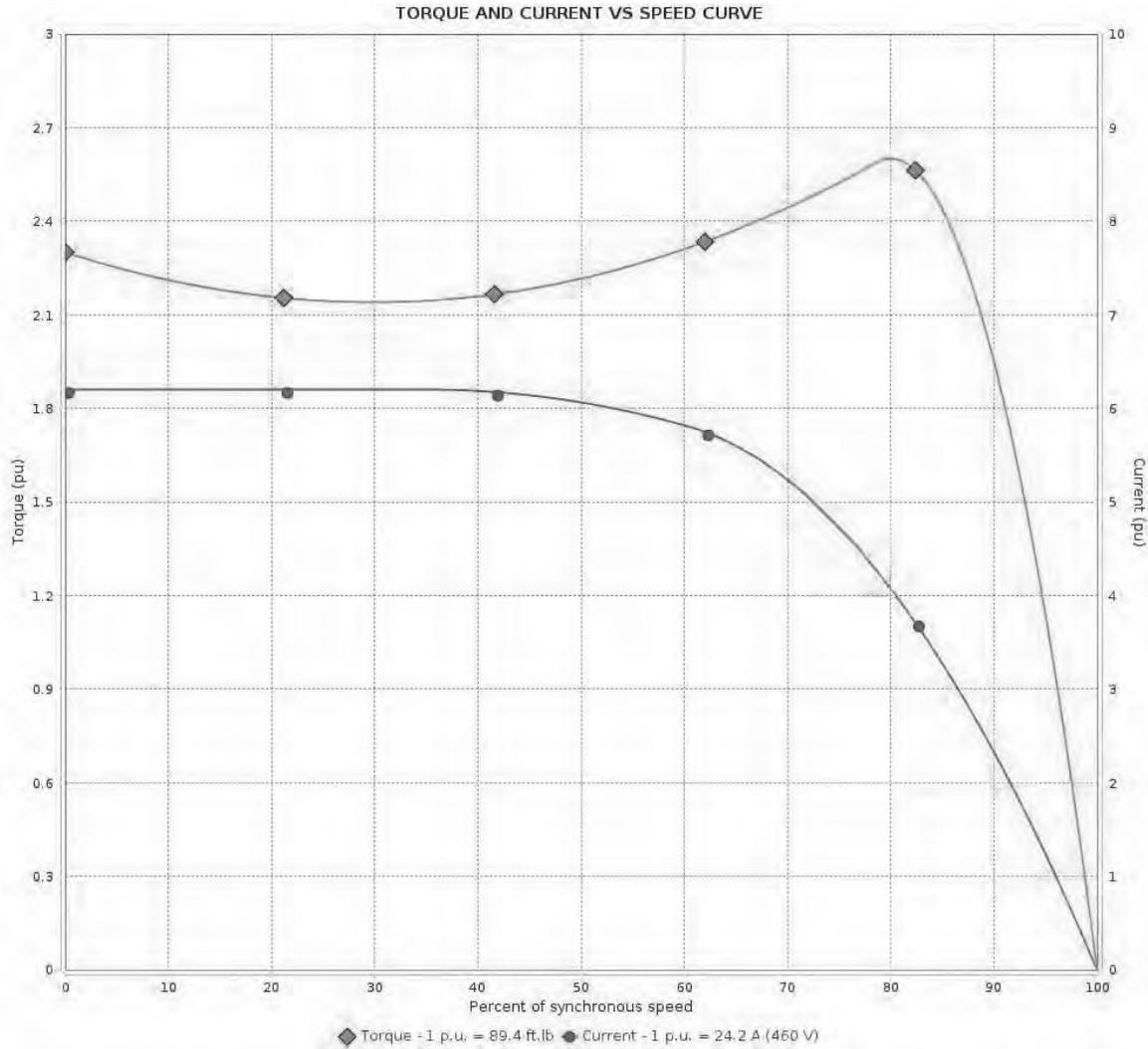
Product line : W22

Product code :

11441772

Catalog # :

02012ET3E286T-W22



Performance : 230/460 V 60 Hz 6P

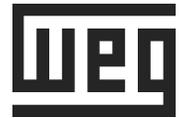
Rated current : 48.4/24.2 A
 LRC : 6.2
 Rated torque : 89.4 ft.lb
 Locked rotor torque : 229 %
 Breakdown torque : 260 %
 Rated speed : 1175 rpm

Moment of inertia (J) : 9.16 sq.ft.lb
 Duty cycle : Cont.(S1)
 Insulation class : F
 Service factor : 1.25
 Temperature rise : 80 K
 Design : B

Locked rotor time : 28s (cold) 16s (hot)

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LOAD PERFORMANCE CURVE



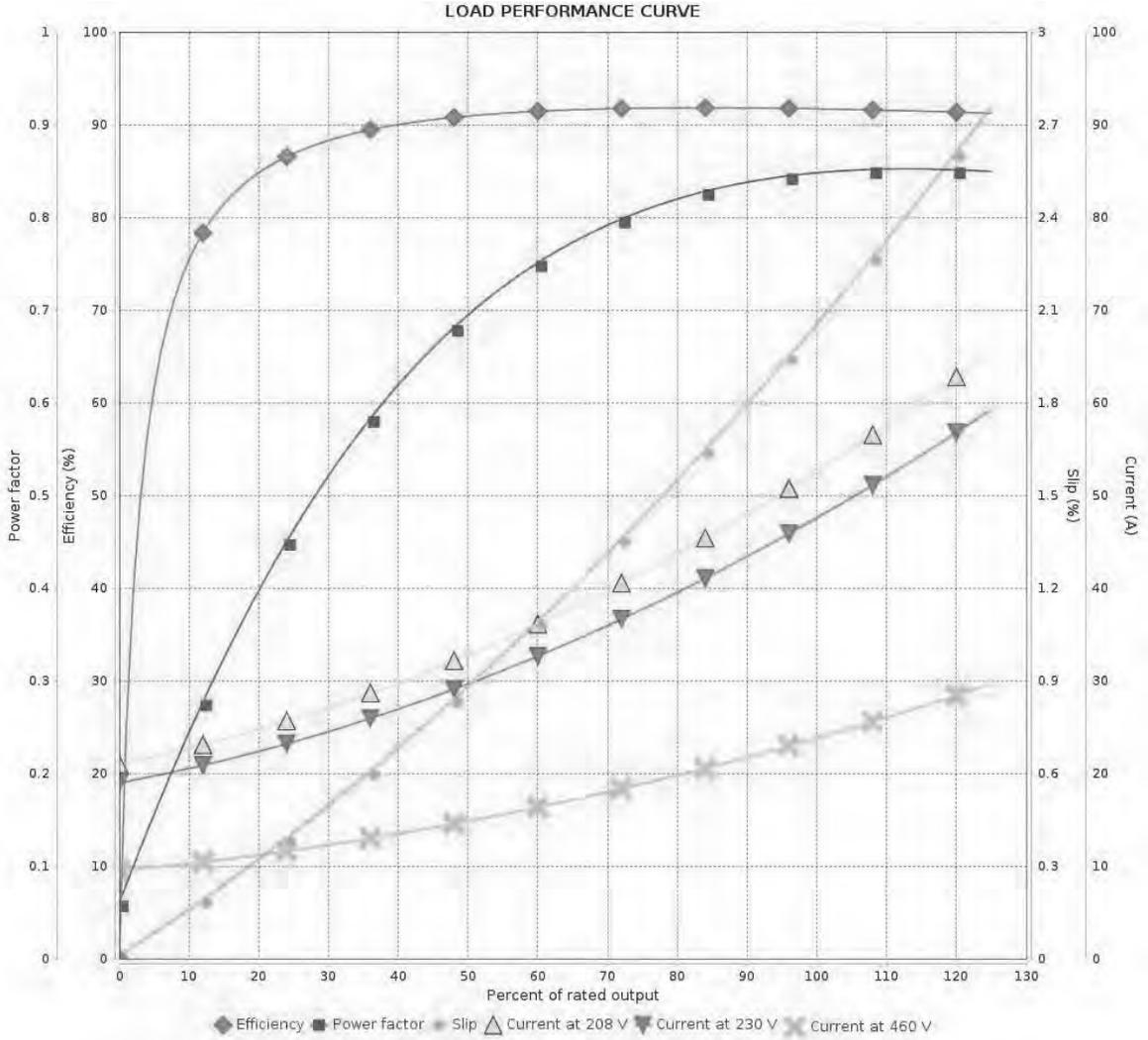
Three Phase Induction Motor - Squirrel Cage

Customer : _____

Product line : W22

Product code : 11441772

Catalog # : 02012ET3E286T-W22



Performance : 230/460 V 60 Hz 6P

Rated current	: 48.4/24.2 A	Moment of inertia (J)	: 9.16 sq.ft.lb
LRC	: 6.2	Duty cycle	: Cont.(S1)
Rated torque	: 89.4 ft.lb	Insulation class	: F
Locked rotor torque	: 229 %	Service factor	: 1.25
Breakdown torque	: 260 %	Temperature rise	: 80 K
Rated speed	: 1175 rpm	Design	: B

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THERMAL LIMIT CURVE

Three Phase Induction Motor - Squirrel Cage

Customer :

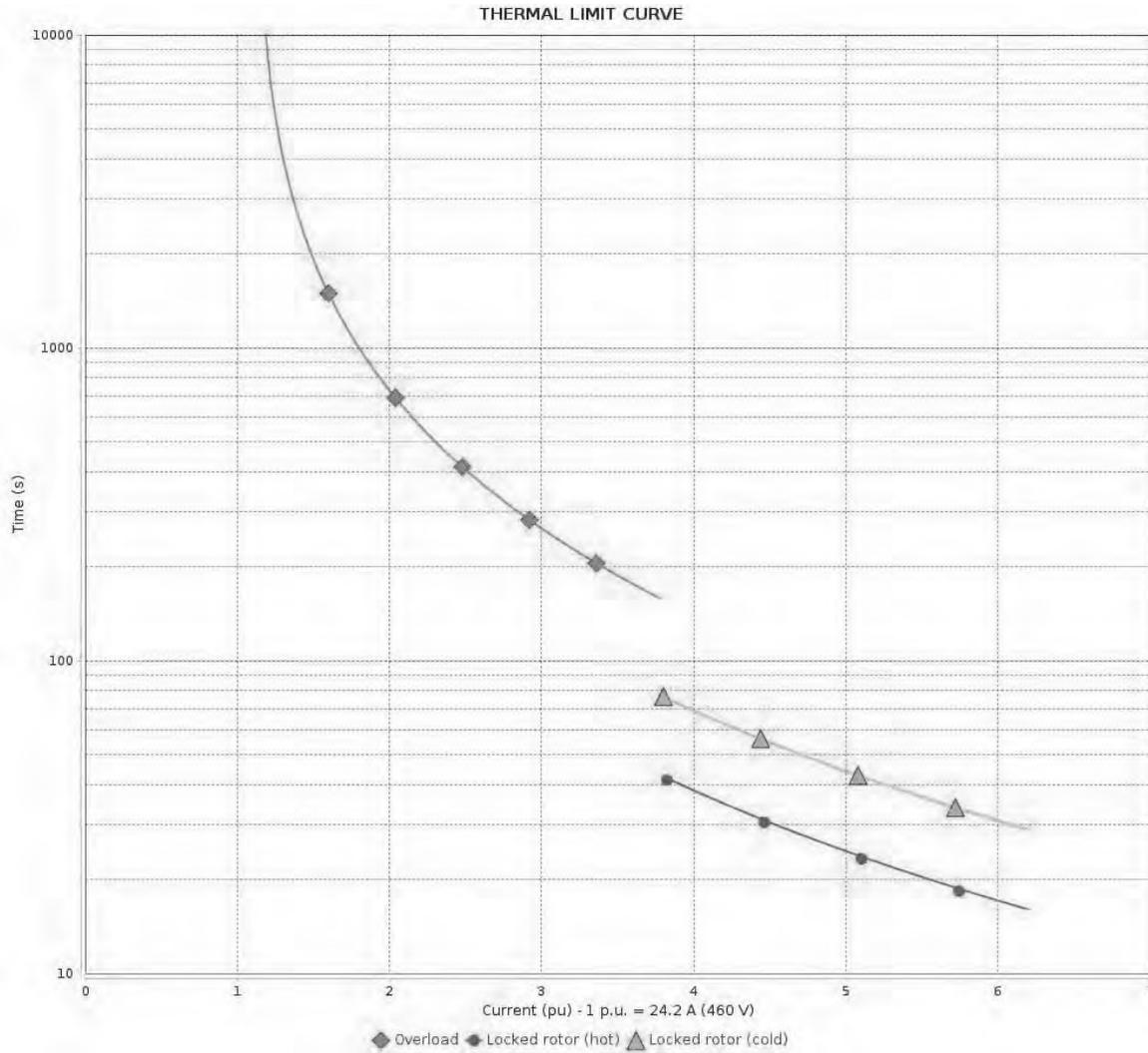
Product line : W22

Product code :

11441772

Catalog # :

02012ET3E286T-W22



Performance : 230/460 V 60 Hz 6P

Rated current : 48.4/24.2 A
 LRC : 6.2
 Rated torque : 89.4 ft.lb
 Locked rotor torque : 229 %
 Breakdown torque : 260 %
 Rated speed : 1175 rpm

Moment of inertia (J) : 9.16 sq.ft.lb
 Duty cycle : Cont.(S1)
 Insulation class : F
 Service factor : 1.25
 Temperature rise : 80 K
 Design : B

Heating constant

Cooling constant

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VFD OPERATION CURVE

Three Phase Induction Motor - Squirrel Cage

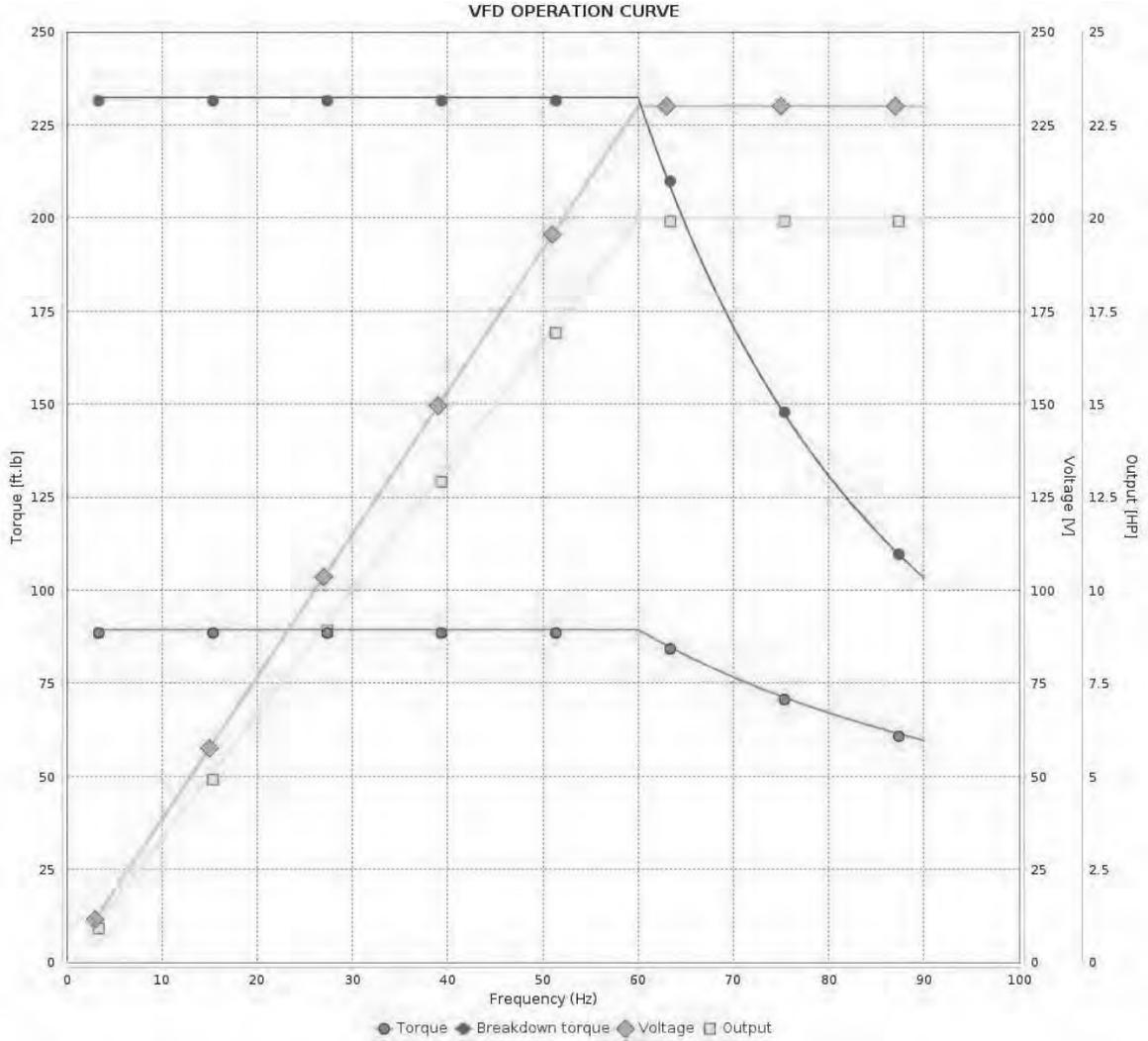


Customer : _____

Product line : W22

Product code : 11441772

Catalog # : 02012ET3E286T-W22



Performance : 230/460 V 60 Hz 6P

Rated current : 48.4/24.2 A
 LRC : 6.2
 Rated torque : 89.4 ft.lb
 Locked rotor torque : 229 %
 Breakdown torque : 260 %
 Rated speed : 1175 rpm

Moment of inertia (J) : 9.16 sq.ft.lb
 Duty cycle : Cont.(S1)
 Insulation class : F
 Service factor : 1.25
 Temperature rise : 80 K
 Design : B

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MODEL 02012ET3E286T-W22

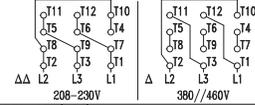


For use on 60Hz
 Class I, Div 2, Gr A, B, C and D - T3
 Class I, Zone 2, IIC - T3
 Class II, Div 2, Gr F and G - T4
 For use on PWM: Gr. A, B, C, D and F,
 VT 1000-1, CT 20-1, 1.00SF - T3A

MADE IN BRAZIL
 11441772

Inverter Duty Motor
 Severe Duty

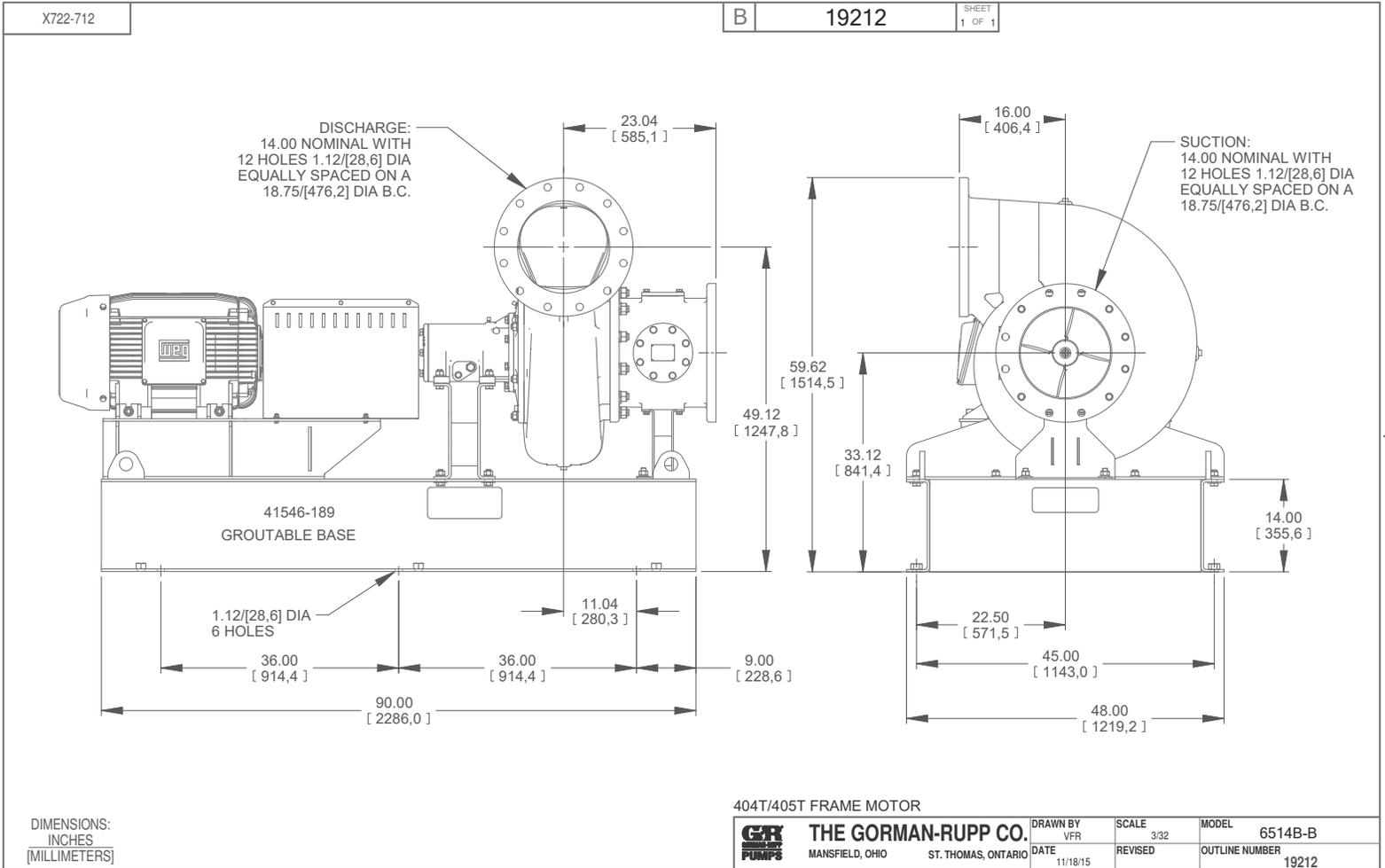
PH3 60Hz Fr. 284/6T 1000m.a.s.l. IP55 TEFC 438lb
 V 230/460 A 48.4/24.2
 HP 20 kW 15
 SF 1.25 SFA 60.5/30.3
 RPM 1175 PF 0.85
 AMB 40°C INS cl. F DT80K NEMA NOM RPP 91.7%
 DUTY CONT. DES B Code G
 USABLE @208V 53.5A SF 1.15 SFA 61.5
 20HP 15kW 50Hz 380V 29.9A 965RPM SF 1.00 EFF 88.5% (IE1)



→ 6311-C3 (18g)

→ 6211-C3 (11g)

MOBIL POLYREX EM (20000h)

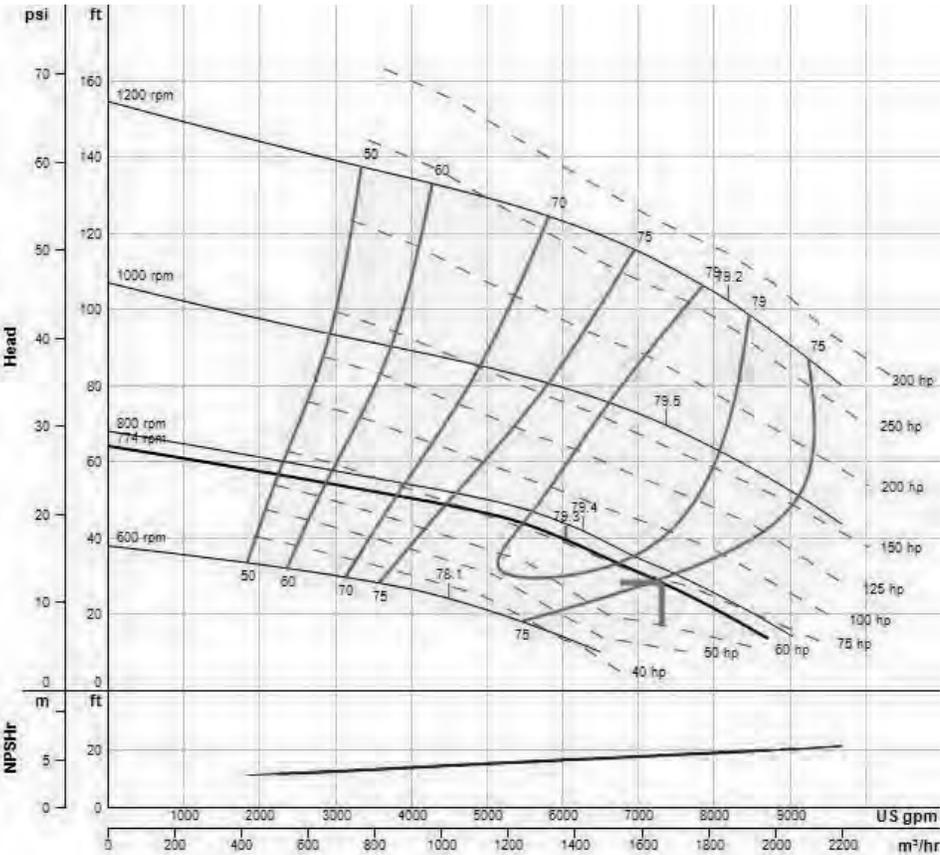




651C- 60B Standard i entrfgul ac



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Wpæ	6500B9A/9S	
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Basic Pedestal

Standard Centrifugal Pump

Model 6514B60-B

Size 14" x 14"



PUMP SPECIFICATIONS

Size: 14" x 14" (356 mm x 356 mm) Flanged.

Casing: Ductile Iron 65-45-12.

Maximum Casing Pressure 100 psi (690 kPa).*

Enclosed Type, Four Vane Impeller: Ductile Iron 80-55-06.

Handles 3-1/2" (88,9 mm) Diameter Spherical Solids.

Suction Spool: Gray Iron 30.

Impeller Shaft: Alloy Steel 4150.

Replaceable Wear Ring: Ductile Iron 65-45-12.

Pedestal: Gray Iron 30.

Seal Plate: Ductile Iron 65-45-12.

Shaft Sleeve: Stainless Steel 303/304.

Radial Bearing: Open Roller.

Thrust Bearing: Open Double Ball.

Bearing and Seal Cavity Lubrication: SAE 30 Non-Detergent Oil.

Gaskets: Vegetable Fiber, Red Rubber and Buna-N.

O-Rings: Buna-N.

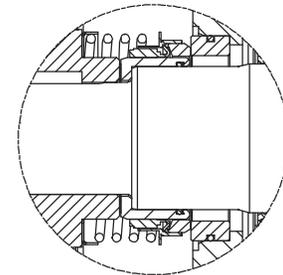
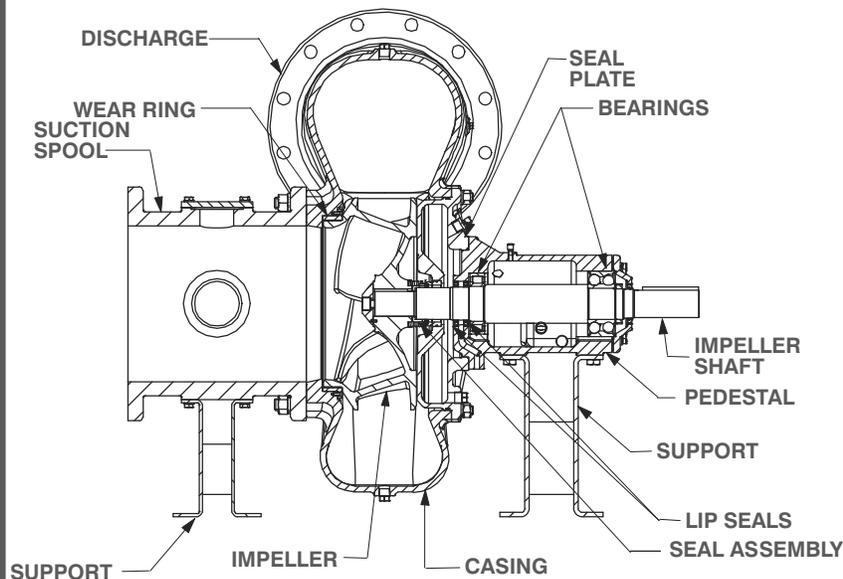
Hardware: Standard Plated Steel.

Bearing and Seal Cavity Oil Level Sight Gauges.

*Consult Factory for Applications Exceeding Maximum Pressure and/or Temperature Indicated.

**WARNING!**

Do not use in explosive atmosphere or for pumping volatile flammable liquids.

**SEAL DETAIL**

Open Double Mechanical, Oil-Lubricated. Silicon Carbide Rotating Face and Stationary Seat. Fluorocarbon Elastomers (DuPont Viton® or Equivalent). Stainless Steel 316 Cage and Stainless Steel 18-8 Spring. Maximum Temperature of Liquid Pumped 160°F (71°C).*



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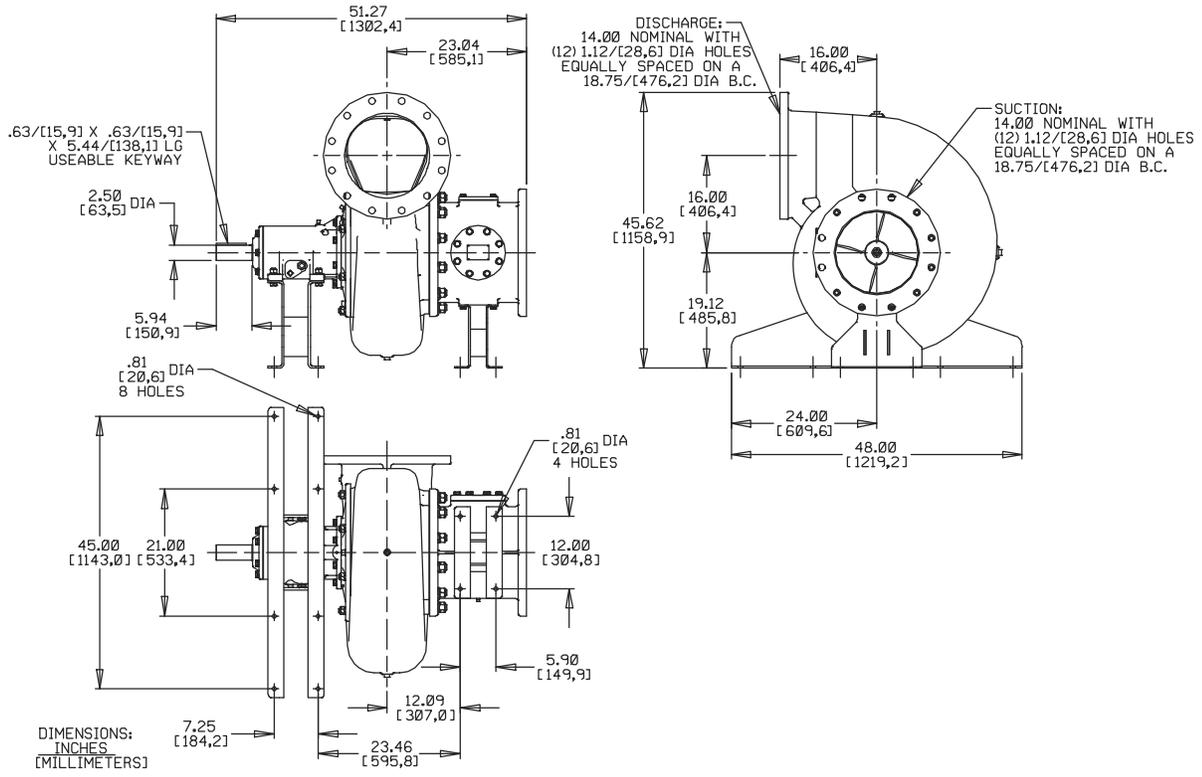
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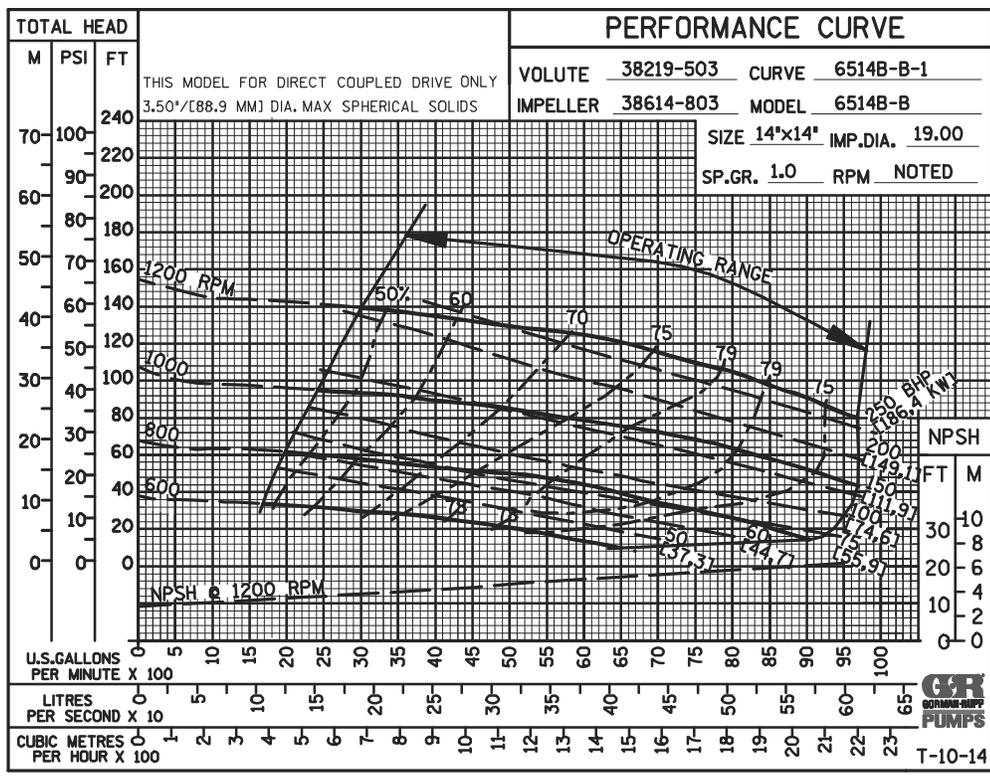
SECTION 65, PAGE 700

APPROXIMATE
DIMENSIONS and WEIGHTS

NET WEIGHT: 1483 LBS. (672,7 KG.)
SHIPPING WEIGHT: 1683 LBS. (763,4 KG.)
EXPORT CRATE: 92.4 CU. FT. (2,6 CU. M.)



**MULTI-SPEED
CURVE
PERFORMANCE
BASED ON
WATER**



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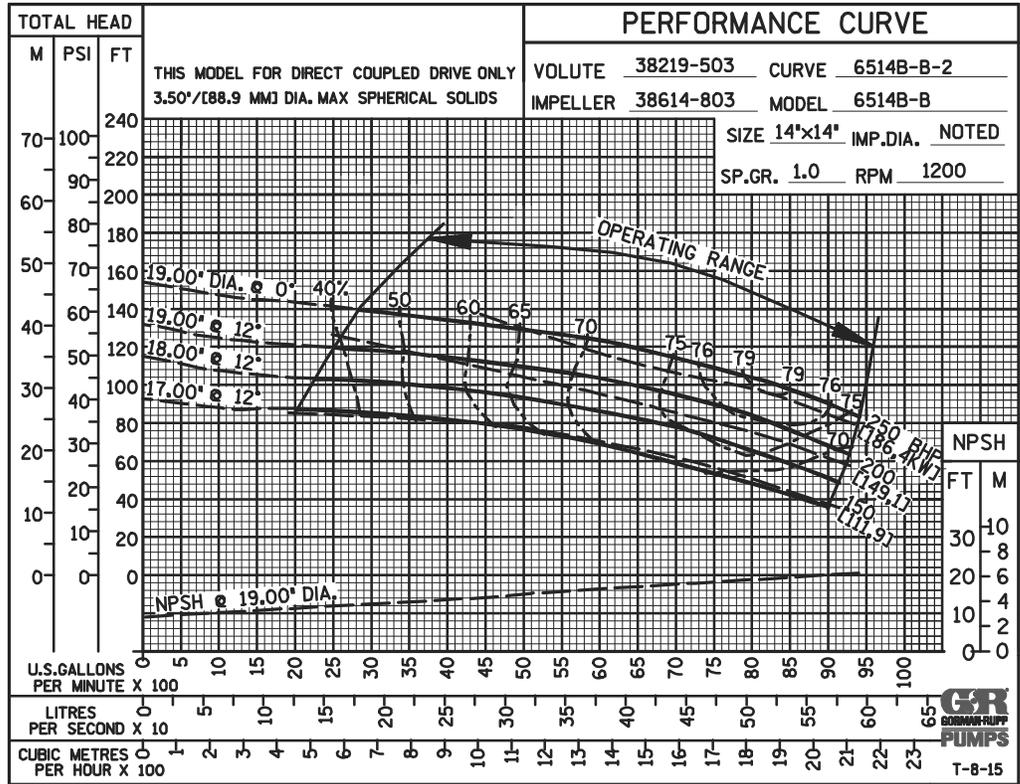
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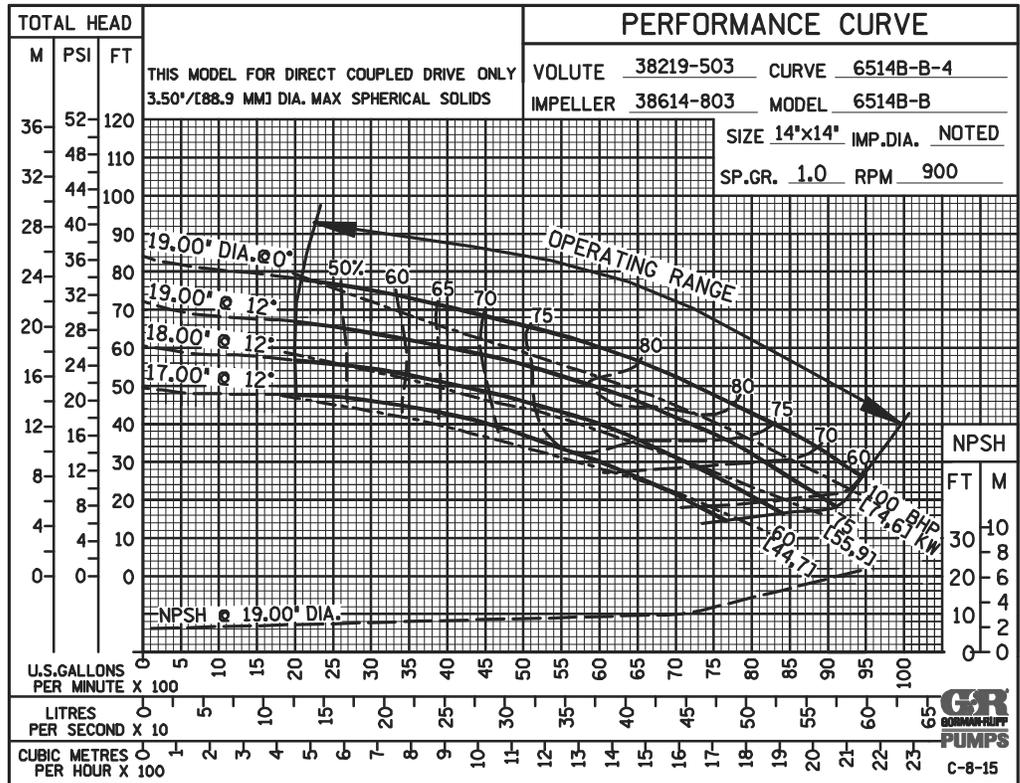
Sec. 65

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SEPTEMBER 2015

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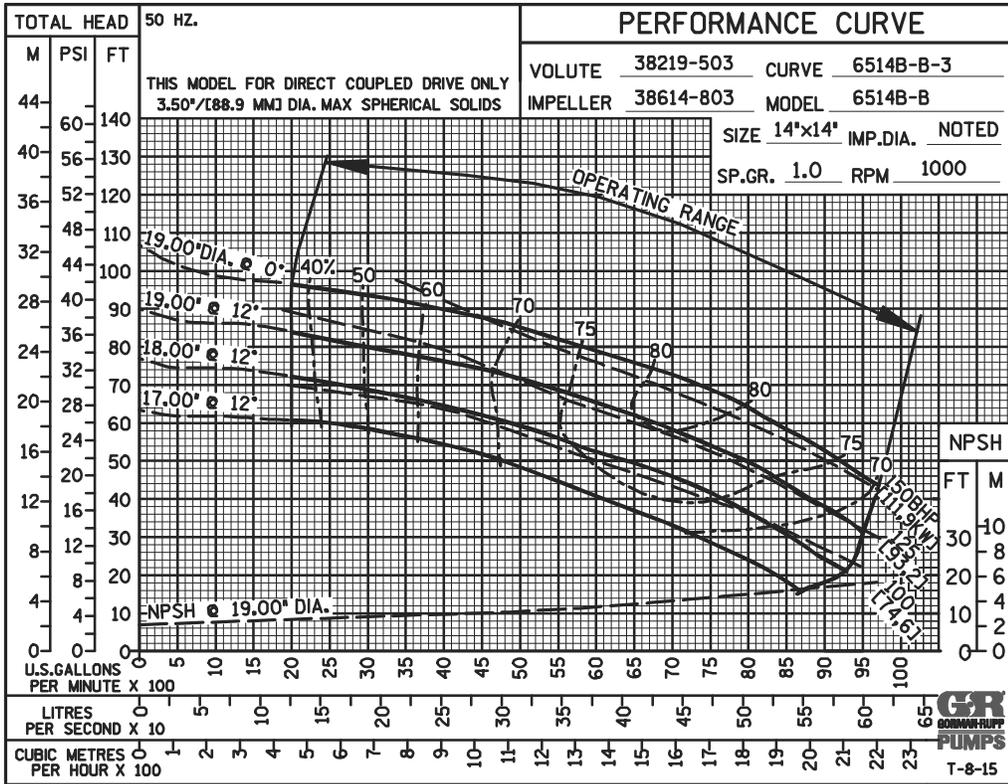
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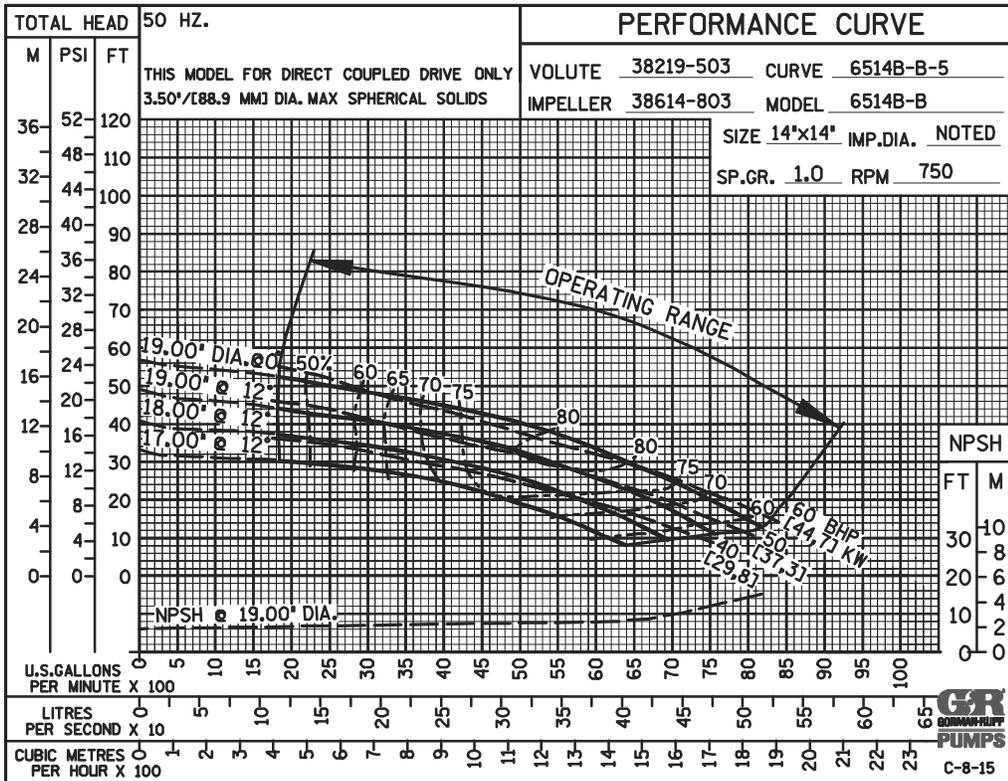
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SEPTEMBER 2015

50 HERTZ
PERFORMANCE
BASED ON
WATER
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50 HERTZ
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DATA SHEET



Three Phase Induction Motor - Squirrel Cage

Customer :

Product line : W22 Product code : 11568627
Catalog # : 07509ET3E444T-W22

Frame	: 444/5T	Locked rotor time	: 32s (cold) 18s (hot)
Output	: 75 HP (55 kW)	Temperature rise	: 80 K
Poles	: 8	Duty cycle	: Cont.(S1)
Frequency	: 60 Hz	Ambient temperature	: -20°C to +40°C
Rated voltage	: 230/460 V	Altitude	: 1000 m.a.s.l.
Rated current	: 187/93.4 A	Protection degree	: IP55
L. R. Amperes	: 1196/598 A	Cooling method	: IC411 - TEFC
LRC	: 6.4x(Code H)	Mounting	: F-1
No load current	: 80.0/40.0 A	Rotation ¹	: Both (CW and CCW)
Rated speed	: 890 rpm	Noise level ²	: 63.0 dB(A)
Slip	: 1.11 %	Starting method	: Direct On Line
Rated torque	: 443 ft.lb	Approx. weight ³	: 1489 lb
Locked rotor torque	: 170 %		
Breakdown torque	: 200 %		
Insulation class	: F		
Service factor	: 1.25		
Moment of inertia (J)	: 73.6 sq.ft.lb		
Design	: B		

Output	50%	75%	100%	Foundation loads	
Efficiency (%)	93.0	93.6	93.6	Max. traction	: 2235 lb
Power Factor	0.64	0.74	0.79	Max. compression	: 3724 lb

	<u>Drive end</u>	<u>Non drive end</u>
Bearing type	: 6319 C3	6316 C3
Sealing	: WSeal	WSeal
Lubrication interval	: 17000 h	20000 h
Lubricant amount	: 45 g	34 g
Lubricant type	: Mobil Polyrex EM	

Notes
USABLE @208V 206A SF 1.10 SFA 226A

This revision replaces and cancel the previous one, which must be eliminated.
(1) Looking the motor from the shaft end.
(2) Measured at 1m and with tolerance of +3dB(A).
(3) Approximate weight subject to changes after manufacturing process.
(4) At 100% of full load.

These are average values based on tests with sinusoidal power supply, subject to the tolerances stipulated in NEMA MG-1.

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TORQUE AND CURRENT VS SPEED CURVE



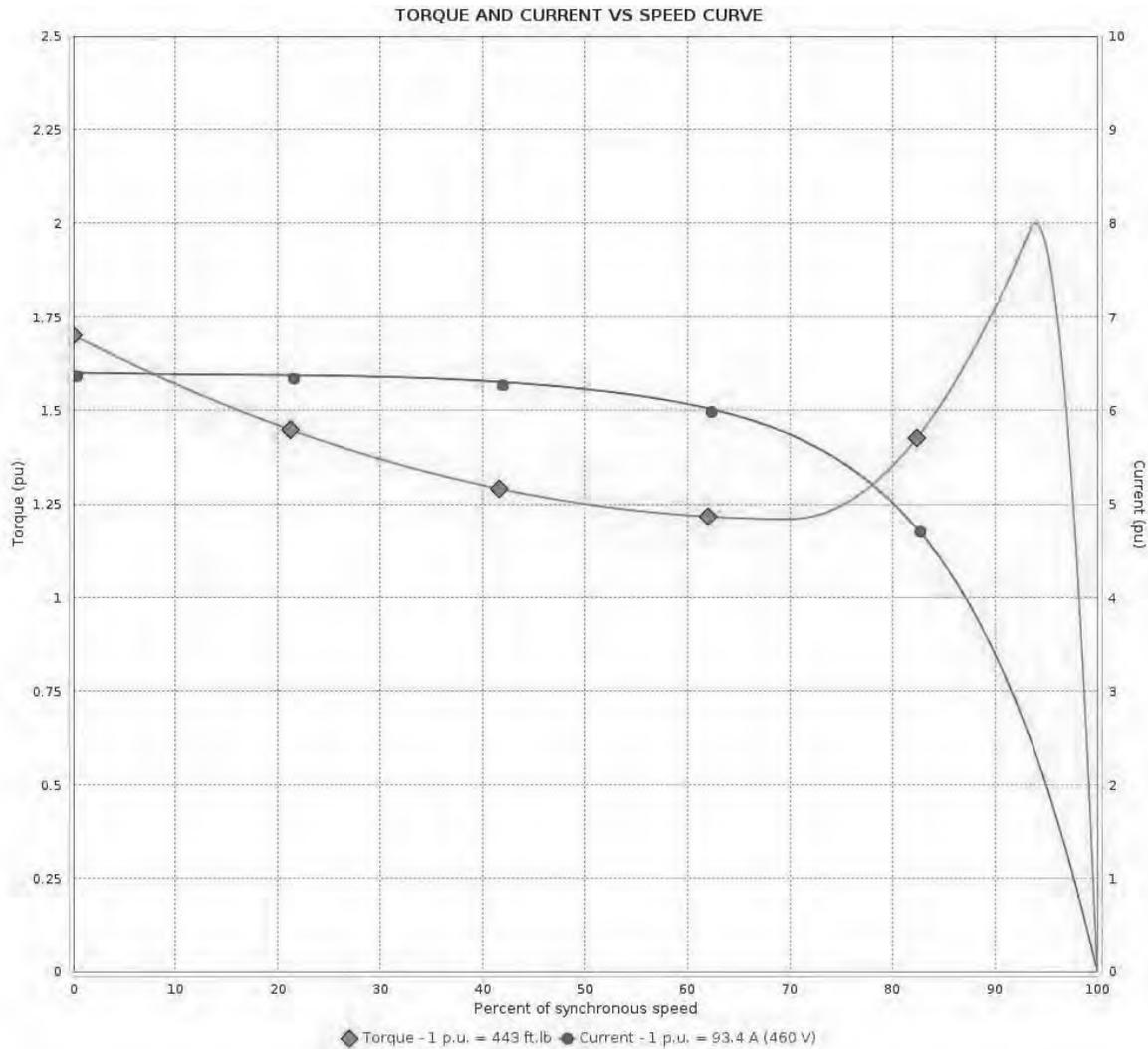
Three Phase Induction Motor - Squirrel Cage

Customer :

Product line : W22

Product code : 11568627

Catalog # : 07509ET3E444T-W22



Performance : 230/460 V 60 Hz 8P

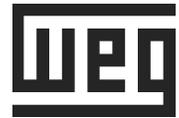
Rated current : 187/93.4 A
 LRC : 6.4
 Rated torque : 443 ft.lb
 Locked rotor torque : 170 %
 Breakdown torque : 200 %
 Rated speed : 890 rpm

Moment of inertia (J) : 73.6 sq.ft.lb
 Duty cycle : Cont.(S1)
 Insulation class : F
 Service factor : 1.25
 Temperature rise : 80 K
 Design : B

Locked rotor time : 32s (cold) 18s (hot)

Rev.	Changes Summary	Performed	Checked	Date
Performed by			Page	Revision
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Date	23/02/2023			
		2 / 5		

LOAD PERFORMANCE CURVE



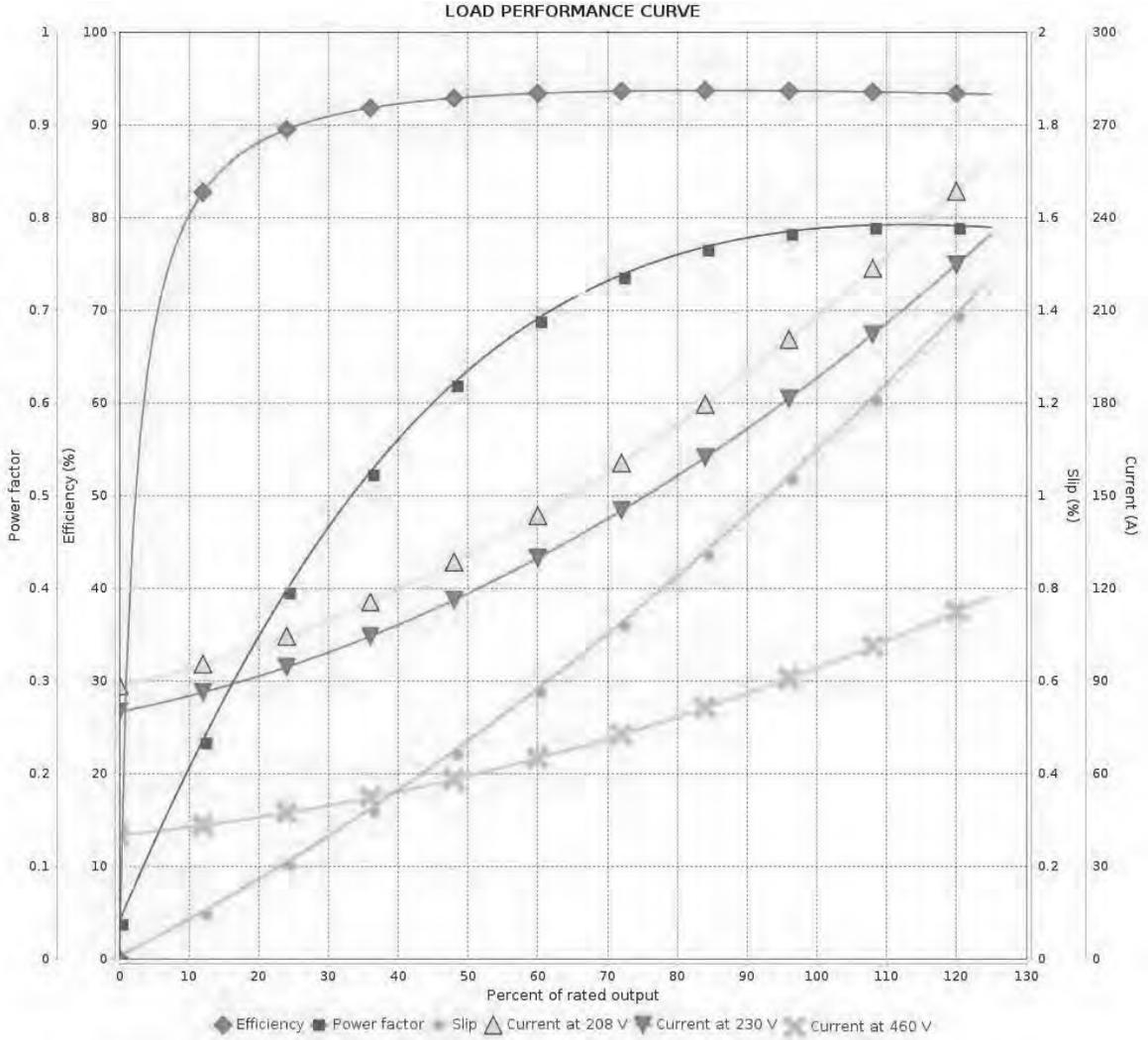
Three Phase Induction Motor - Squirrel Cage

Customer : _____

Product line : W22

Product code : 11568627

Catalog # : 07509ET3E444T-W22



Performance : 230/460 V 60 Hz 8P

Rated current	: 187/93.4 A	Moment of inertia (J)	: 73.6 sq.ft.lb
LRC	: 6.4	Duty cycle	: Cont.(S1)
Rated torque	: 443 ft.lb	Insulation class	: F
Locked rotor torque	: 170 %	Service factor	: 1.25
Breakdown torque	: 200 %	Temperature rise	: 80 K
Rated speed	: 890 rpm	Design	: B

Rev.	Changes Summary	Performed	Checked	Date
Performed by			Page	Revision
Checked by			3 / 5	
Date	23/02/2023			



THERMAL LIMIT CURVE

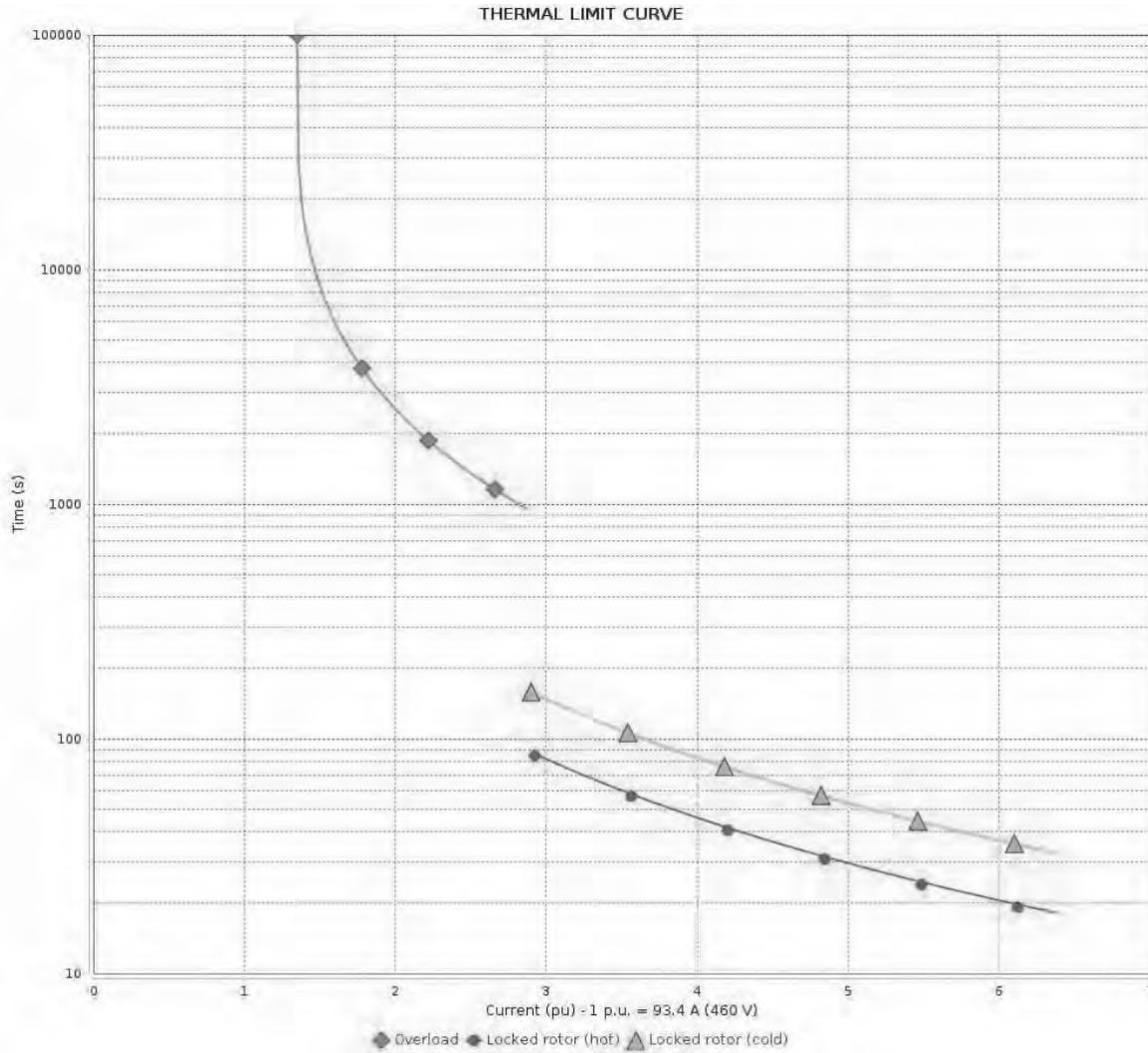
Three Phase Induction Motor - Squirrel Cage

Customer :

Product line : W22

Product code : 11568627

Catalog # : 07509ET3E444T-W22



Performance : 230/460 V 60 Hz 8P

Rated current : 187/93.4 A
 LRC : 6.4
 Rated torque : 443 ft.lb
 Locked rotor torque : 170 %
 Breakdown torque : 200 %
 Rated speed : 890 rpm

Moment of inertia (J) : 73.6 sq.ft.lb
 Duty cycle : Cont.(S1)
 Insulation class : F
 Service factor : 1.25
 Temperature rise : 80 K
 Design : B

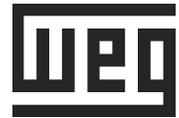
Heating constant

Cooling constant

Rev.	Changes Summary	Performed	Checked	Date
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Date		23/02/2023		

VFD OPERATION CURVE

Three Phase Induction Motor - Squirrel Cage

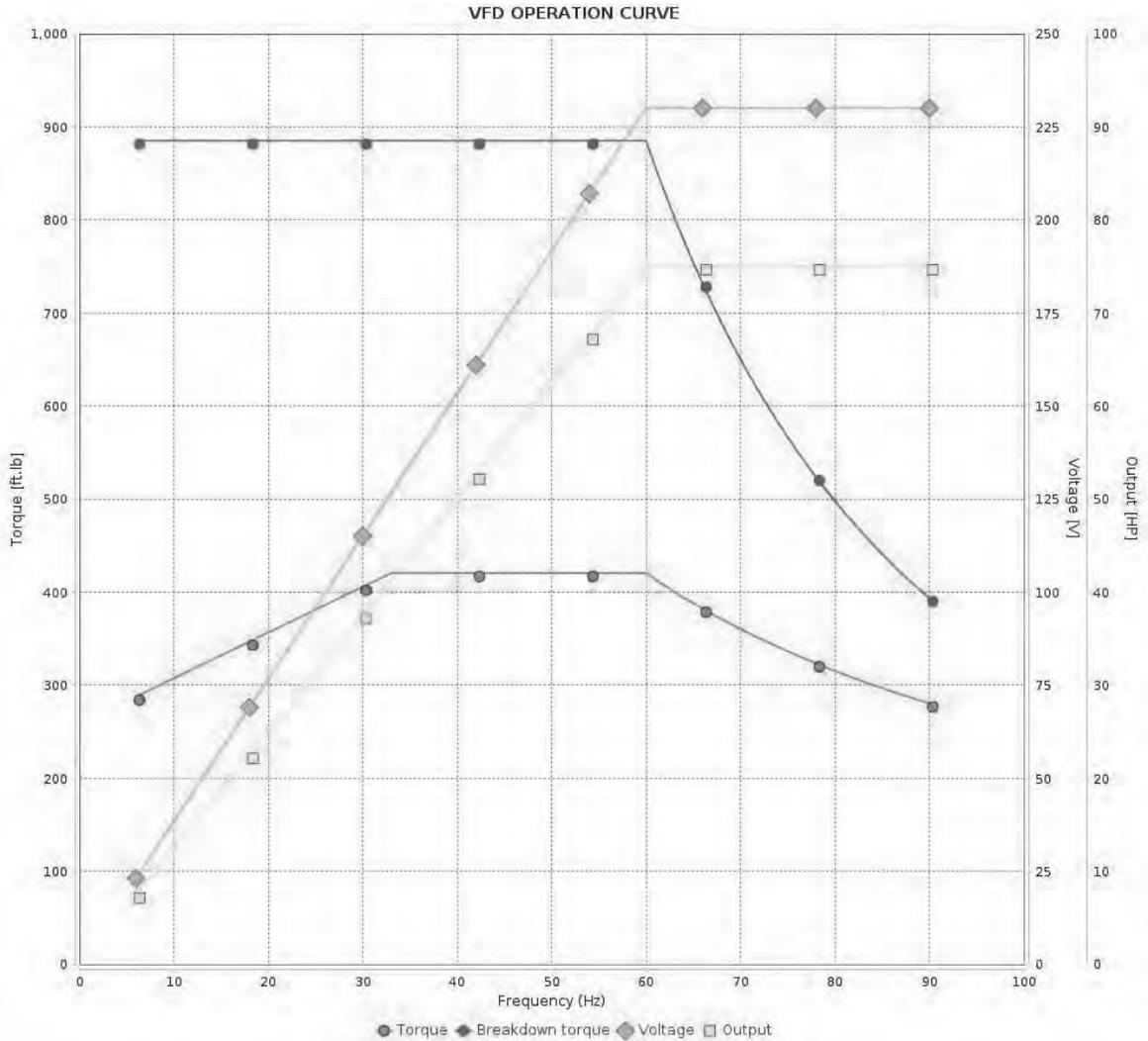


Customer : _____

Product line : W22

Product code : 11568627

Catalog # : 07509ET3E444T-W22



Performance : 230/460 V 60 Hz 8P

Rated current : 187/93.4 A
 LRC : 6.4
 Rated torque : 443 ft.lb
 Locked rotor torque : 170 %
 Breakdown torque : 200 %
 Rated speed : 890 rpm

Moment of inertia (J) : 73.6 sq.ft.lb
 Duty cycle : Cont.(S1)
 Insulation class : F
 Service factor : 1.25
 Temperature rise : 80 K
 Design : B

Rev.	Changes Summary	Performed	Checked	Date
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Date	23/02/2023	5 / 5		



MODEL 07509ET3E444T-W22

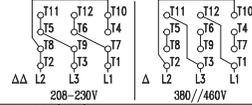


For use on 60Hz
 Class I, Div 2, Gr A, B, C and D - T3
 Class I, Zone 2, IIC - T3
 Class II, Div 2, Gr F and G - T3C
 For use on PWM: Gr. A, B, C, D and F,
 VT 1000-1, CT 20-1, 1.00SF - T3A

MADE IN BRAZIL
 111568627

Inverter Duty Motor
 Severe Duty

PH3 60Hz Fr. 444/5T 1000m.a.s.l. IP55 TEFC 1488lb
 V 230/460 A 187/93.4
 HP 75 kW 55
 SF 1.25 SFA 234/117
 RPM 890 PF 0.79
 AMB 40°C INS cl. F DT80K NEMA NOM EFF 93.6%
 DUTY CONT. DES B Code H
 USABLE @208V 206A SF 1.10 SFA 227
 75HP 55kW 50Hz 380V 114A 735RPM SF 1.00 EFF 91.7% (IE2)



→ 6319-C3 (45g)
 → 6316-C3 (34g)

MOBIL POLYREX EM (17000h)

Attachment D: Electrical Systems

City of Fresno – Phase 3: Wastewater Treatment Plant

Energy Retrofit Project

Proposed Transformers to be Replaced - Fresno-Clovis RWRP



General Information				Existing Equipment Data					Proposed Equipment Data	
#	ID TA #	Building	Unit Location	Transformer Type	Make	k A	E Star Rated (Y/N)	Replace (Y/N)	Description (Post)	Proposed Make: Model
1	No ID Tag	Annex	North Outside	Transformers	Square D	112.5	N	Y	New High Efficiency Transformer	E-Saver-80R
2	49-XFMR-001	Field Maintenance	Ground Mt.	Transformers	Square D	37.5	N	Y	New High Efficiency Transformer	E-Saver-80R
3	No ID Tag	Digester #1	Electrical Rm	Transformers	Magnetics	37.5	N	Y	New High Efficiency Transformer	E-Saver-80R
4	5A	Ras Was	Equipment Rm	Transformers	Westinghouse	45	N	Y	New High Efficiency Transformer	E-Saver-80R
5	5D	Ras Was	Equipment Rm	Transformers	Westinghouse	30	N	Y	New High Efficiency Transformer	E-Saver-80R
6	5C	Ras Was	Equipment Rm	Transformers	Cutler-Hammer	50	N	Y	New High Efficiency Transformer	E-Saver-80R
7	Lighting T-1	Head Works	Electrical Rm	Transformers	Westinghouse	45	N	Y	New High Efficiency Transformer	E-Saver-80R
8	Lighting T-2	Head Works	Electrical Rm	Transformers	Cutler-Hammer	45	N	Y	New High Efficiency Transformer	E-Saver-80R
9	No ID Tag	Head Works	Electrical Rm Wall Mount 10'	Transformers	Westinghouse	30	N	Y	New High Efficiency Transformer	E-Saver-80R
10	No ID Tag	Head Works	Electrical Rm Wall Mount 10'	Transformers	Westinghouse	30	N	Y	New High Efficiency Transformer	E-Saver-80R
11	P4	Blower Bldg #1	Electrical Rm	Transformers	Square D	45	N	Y	New High Efficiency Transformer	E-Saver-80R
12	3A	Blower Bldg #1	Electrical Rm	Transformers	Cutler-Hammer	50	N	Y	New High Efficiency Transformer	E-Saver-80R
13	No ID Tag	Blower Bldg #2	Electrical Rm	Transformers	Square D	45	N	Y	New High Efficiency Transformer	E-Saver-80R
14	No ID Tag	Annex	N.E. Ground Mount	Transformers	Square D	300	N	Y	New High Efficiency Transformer	E-Saver-80R
15	No ID Tag	Annex	N.E. Ground Mount	Transformers	Square D	300	N	Y	New High Efficiency Transformer	E-Saver-80R
16	No ID Tag	Wet Weather	Ground Mount Outside	Transformers	MGM	50	N	Y	New High Efficiency Transformer	E-Saver-80R
17	TFR-8A	Pump House	Ground Mt. Primary Clarifier 9&10	Transformers	Square D	37.5	N	Y	New High Efficiency Transformer	E-Saver-80R
18	1A	Head Works	Ground Mt. Outside	Transformers	Federal Pacific	37.5	N	Y	New High Efficiency Transformer	E-Saver-80R
19	7A	MCC Bldg	Dewatering West	Transformers	Westinghouse	45	N	Y	New High Efficiency Transformer	E-Saver-80R
20	C3-207	MCC Bldg	Dewatering West	Transformers	Westinghouse	30	N	Y	New High Efficiency Transformer	E-Saver-80R

Proposed Transformers to be Replaced - Fresno-Clovis RWRP



Headworks: Lighting Transformer T-1 and T-2



E-SAVER OPAL-R™ Series

OPAL-R TRANSFORMERS ARE OPTIMIZED FOR RETROFIT PROJECTS DELIVERING AN AVERAGE OF 80% LESS LOSSES WHEN REPLACING OLDER UNITS

APPLICATION

The OPAL-R Series (E-Saver-80R & E-Saver-81R) are ultra-efficient dry-type isolation transformers optimized to maximize energy savings and provide the fastest payback in retrofit applications.

Powersmiths has actively measured load profiles and losses for thousands of low-voltage transformers it has retrofitted for applications from K-12 schools to college and hospital campuses, from courthouses to military bases, from general commercial and office buildings to mission critical data centers.

Powersmiths has found that the most common profile is a lightly loaded transformer that feeds predominately electronic equipment.

OPAL-R's E-Saver-80R and -81R models have been optimized specifically for this profile delivering a per project average of an 80% reduction in losses when replacing existing older transformers.

For transformers optimized to feed dedicated equipment like fans, motors, elevators, or heavy harmonic rich loads, see the rest of the OPAL Series™ as well as OPAL T1000™.

OPAL™ - OPTIMIZED DESIGNS FOR RETROFITS

There is more to a transformer retrofit than simply matching the kVA and voltages with a typical transformer from the distributor's warehouse. A transformer has much more impact in an electrical system than just efficiency because of electrical characteristics that affect fault levels, arc flash levels and inrush. Other important considerations for a retrofit should also include site conditions, footprint and internal terminal layout.

Powersmiths has developed a transformer design best practice called OPAL - Optimized Performance for the Application Load to specifically address transformer retrofit considerations.

OPAL considers the system as a whole, including goals like managing impedance, arc flash, fault level, inrush, harmonics, and more. OPAL is possible thanks to the tight feedback loop between design, onsite manufacturing, and extensive real world performance verification.

Our flexible design and manufacturing process enables us to deliver solutions for the wide variety of site conditions and transformer manufacturers including footprint and internal terminal layouts, while the result is the most savings per dollar spent.

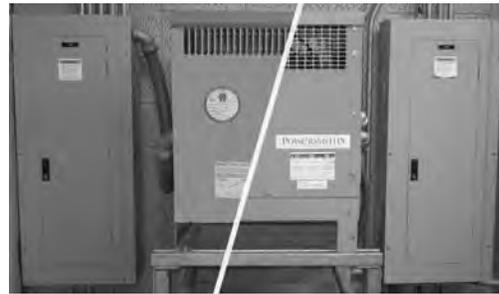
DOE IDENTIFIES BILLIONS IN SAVINGS BEYOND DOE 2016

Most manufacturers design low-voltage transformers to just meet the minimum requirement of U.S. Dept. of Energy law (DOE 2016). DOE 2016 has been set at a single 35% load point, under an ideal sine wave factory test profile, sacrificing performance elsewhere.

By exceeding the minimum efficiency, the DOE has quantified the savings potential to be in billions of dollars and that lifecycle savings can be maximized by optimizing for real-world loading. OPAL enables access to these savings - backed by real-world performance verification.

DEPARTMENT OF DEFENCE UFC COMPLIANCE

The OPAL-R with the T115 option complies with the US Department of Defense's Unified Facilities Criteria (UFC) - Interior Electrical Systems.



E-Saver OPAL-R™ Retrofits deliver maximum energy savings and follow best practices to measure & verify lifecycle savings, and ensure hassle-free transformer replacements.

RETROFITS REQUIRE A BEST PRACTICE

To replace existing transformers cost effectively, Powersmiths' professional engineers use a multi-step best practice for the entire project cycle including: vetted project savings calculations, comprehensive site audits and tagging, individualized product selection, baseline and post installation field measurements of load profiles, losses and efficiency, following IPMVP protocols, performance reports and more.

GUARANTEED PERFORMANCE FOR 32 YEARS

In a world filled with small print disclaimers and limited DOE compliance testing, you can count on Powersmiths performance. We guarantee that every transformer we manufacture meets our published technical data, and furthermore, that this performance is met over the full term of the 32-year pro-rated warranty. Trusting that savings are both real and long-term is part of why organizations choose Powersmiths.

K-RATING IS A MODERN REQUIREMENT

Typically, transformers are purchased and installed with lowest first cost in mind, however, these transformers' are UL listed on the basis of feeding only linear load. Today, most connected loads are electronic with nonlinear profiles, and in order to have a valid UL listing, a low-voltage isolation transformer needs to be appropriately K-rated for most applications

EXPANDED KVA SELECTION ENABLES RIGHT-SIZING

Powersmiths enables right-sizing of electrical infrastructure by offering a much broader selection of transformer kVA sizes. The capital cost, operating cost and footprint reductions can be dramatic - on the order of 30-50%, through smaller transformers, breakers, conductors, and distribution panels.

ENVIRONMENTAL/GREEN BUILDING/LEED®/NET ZERO

By going meaningfully beyond the DOE 2016 baseline efficiency, the E-Saver™ contributes to green building, LEED®, Net Zero and carbon footprint reduction goals. Additional benefits include our ISO14001 certified manufacturing, integrated metering and ability to integrate with the Powersmiths WOW™ - Building Resource Management Platform.

CERTIFICATIONS & TESTING

Powersmiths certifications include ISO9001 (Quality), ISO14001 (Environment) ISO17025 (Efficiency Test Lab), UL and CSA. Powersmiths has a production-integrated nonlinear load test program that enables efficiency verification under real-world conditions, as well as Certified Test Lab Profile Test Reports.

METERING & ARC FLASH OPTIONS

Integrated metering can provide information about capacity utilization, load profiles, power quality and energy use. The lockable hinged door option as well as our patented 360° Rotatable IR Port™ option enable quick and safe access to internal transformer connections, and reduces arc flash risk.

Powersmiths offers also transformers with Integrated Power Distribution, see the Energy Station TX™ brochure.

KEY FEATURES

- Optimized for light, nonlinear loads found in most applications K-rated as required by UL to feed modern electronic equipment
- Retrofit Best Practice ensures a smooth retrofit with verified savings
- Significant savings beyond DOE 2016 legislation
- Electrical system consideration: impedance, inrush, fault & arc flash levels
- Available with a wide range of safety & performance features like integrated hinged doors, 360° Rotatable IR Port™, and Cyberhawk™ Metering and Logging
- Manufactured in a certified ISO 9001, ISO 14001 and ISO 17025 facility for quality, low environmental impact, and transformer efficiency testing

E-SAVER OPAL-R™ Loss Reduction Curves

% Loss Reduction

Percentage Loading

¹ U.S. Dept. of Energy 10 CFR Part 431, [Docket No. EERE-2010-BT-STD-0048] Energy Conservation Program: Energy Conservation Standards for Distribution Transformers, Final Rule April 18, 2013.

TECHNICAL SPECIFICATIONS

The E-Saver™-80R and 81R are ultra-efficient low-voltage dry-type isolation transformers that meaningfully exceed the U.S. Dept. of Energy’s new minimum efficiency law, commonly referred to as DOE 2016. All E-Saver transformers carry a UL Listing and CSA Approval, with application appropriate K-factor. The aluminum wound E-Saver-80R and the copper wound E-Saver-81R are both K-factor listed per UL 1561 and are K-7 rated per C57.110. Both models are compatible with electronic equipment all the way up to full load. The standard temperature rise is 130°C with a 115°C option available. E-Savers have a common-core (3-phase models), 10kV BIL, 200% rated neutral, are 60Hz rated (std), built to NEMA ST-20, UL1561, IEEE C57.110 and other applicable ANSI and IEEE standards. Both primary and secondary terminals and voltage taps (typically six 2.5%) are all front-accessible. E-Savers have a 220°C class insulation system that is NOMEX-based with an Epoxy Co-polymer impregnant with technical performance characteristics that embed lower environmental impact, long term reliability and long life expectancy. E-Savers carry OSHPD and IBC Seismic Certification. The seismic bracing option provides a higher 2.28g certification. All E-Saver models come standard in a Type 2 ventilated drip-proof indoor enclosure made of heavy gauge steel finished with epoxy powder coating for durability and low environmental impact, and are UL Listed for 2” rear clearance – a significant improvement over the typical industry 6” limit. A wide variety of enclosures and options are available.

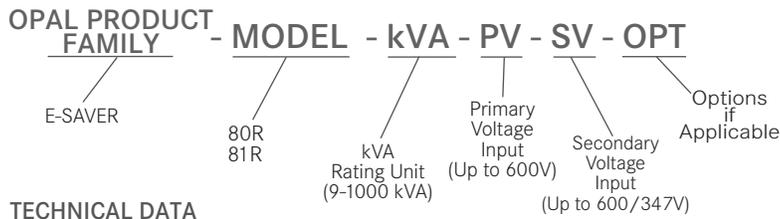
Low Noise: Keeping audible noise at a minimum is key. While the NEMA ST-20 standard sets levels referenced by industry only a type test, not a production test, is required – so transformers on actual projects may be noisy. Powersmiths builds 3dB quieter than NEMA standard values, and furthermore every unit is tested to ensure quiet operation. For very sensitive environments an additional 2dB lower noise option is available.

Management of Impedance, Inrush, Fault Level, Arc Flash: Powersmiths OPAL™ design best practice includes addressing key transformer attributes like impedance, inrush, fault level, arc flash, to ensure smooth integration into an electrical system, avoiding the negative impacts often associated with high efficiency transformers. See individual technical data sheets for comprehensive values for all parameters.

Impedance: For both the E-Saver-80R and E-Saver-81R, impedance is kept at or above 4.0% in order to manage downstream fault current and arc flash levels, and maintain compatibility with equipment interrupting capacity (kAIC) ratings. Higher impedance is available to meet specific project needs.

Inrush: Inrush currents are managed in order to avoid nuisance tripping of the primary breaker and to enable design engineers to use standard 125% rated primary protection, thereby avoiding expensive design changes that otherwise may be needed. Very low inrush designs are available as specific projects may require, for example some datacenter and medical applications.

ORDERING INFORMATION



TECHNICAL DATA

kVA	Audible Noise	80R, 81R Model Weight Range (lbs)	Standard Case Size (in)	Alternate Smaller Case Size (in)*
15	42 dB	230-300	17.5W x 17D x 27.5H	17.5W x 14.5D x 25H
20	42 dB	260-340	25.5W x 18D x 30H	23W x 15.5D x 27.5H
25	42 dB	300-380	25.5W x 18D x 30H	23W x 15.5D x 27.5H
30	42 dB	340-420	25.5W x 18D x 30H	23W x 15.5D x 27.5H
45	42 dB	400-540	25.5W x 18D x 30H	No Alternate
50	42 dB	450-600	31.5W x 21.5D x 40H	No Alternate
63	47 dB	500-650	31.5W x 21.5D x 40H	26.5W x 20D x 33H
75	47 dB	610-700	31.5W x 21.5D x 40H	26.5W x 20D x 33H
100	47 dB	675-900	31.5W x 21.5D x 40H	No Alternate
112.5	47 dB	770-990	31.5W x 21.5D x 40H	No Alternate
125	47 dB	875-1120	37.5W x 26.5D x 48H	33W x 23D x 38H
150	47 dB	1010-1230	37.5W x 26.5D x 48H	33W x 23D x 38H
175	52 dB	1100-1360	37.5W x 26.5D x 48H	34.5W x 26.5D x 42H
200	52 dB	1175-1450	37.5W x 26.5D x 48H	34.5W x 26.5D x 42H
225	52 dB	1295-1600	37.5W x 31.5D x 52H	34.5W x 26.5D x 42H
250	52 dB	1400-1800	37.5W x 31.5D x 52H	37.5W x 26.5D x 48H
300	52 dB	1575-1960	37.5W x 31.5D x 52H	37.5W x 26.5D x 48H
400	57 dB	2025-2450	51.5W x 38D x 61H	43.5W x 33.5D x 55.5H
450	57 dB	2200-2600	51.5W x 38D x 61H	43.5W x 33.5D x 55.5H
500	57 dB	2475-2900	51.5W x 38D x 61H	43.5W x 33.5D x 55.5H
600	59 dB	2725-3600	64W x 47D x 67H	51.5W x 38D x 61H
750	61 dB	3200-4300	64W x 47D x 67H	Contact Factory
850	61 dB	3600-5000	64W x 47D x 67H	Contact Factory
1000	61 dB	4200-6000	64W x 53D x 67H	Contact Factory

AVAILABLE OPTIONS

- Metering:** Express Logger™, SMART™ or Cyberhawk TX™ (see product cut sheets for details)
- CC:** Core & Coils available for OEM Integration
- 3R:** Type 3R, sprinkler proof/outdoor ventilated enclosure
- OSEC:** Enclosure for outdoor public areas
- SS:** Painted stainless steel enclosure
- NVI:** Non-ventilated indoor enclosure
- IRP:** 360° Rotatable IR Port™
- HD:** Hinged Door
- F50:** 50 Hz design
- 1S:** Single electrostatic shield
- 2S:** Dual electrostatic shields
- 3S:** Triple electrostatic shields
- SPD:** (120/208 V OR 277/480V)
 - PRO80:** 80kA, 7 mode, Filter
 - PRO120:** 120kA, 7 mode, Filter
 - PRO160:** 160kA, 7 mode, Filter
 - PROXX:** Where XX is custom ID
- VLI:** Very Low Inrush
- IMP:** Custom Impedance
- COL:** Custom color
- TS:** Thermal sensors at 170°C and 200°C
- RTR:** Routine Test Report
- NLT:** Nonlinear Load Test with Certificate
- 2016TR:** DOE 2016 Test Report
- CTL:** ISO 17025 Certified Test Lab, load profile test
- SE:** Sensitive environment, extra low noise
- SB:** Certified Seismic bracing for 2.28g (for Certificate details contact Powersmiths)
- WM:** Wall-mount kit up to 75kVA is available (sold separately)
- T115:** 115°C Temperature Rise

NOTE: The above data applies to the standard configuration of each kVA. Selection of some options may change enclosure size and/or transformer weight. Some options may be mutually exclusive. Consult factory for detailed product data sheet for these and other configurations. Efficiencies tested according to U.S. Dept. of Energy’s 10 CFR Part 431, a linear load test at 35% of nameplate capacity. Refer to technical data sheet for comprehensive information for each specific model, kVA, and option selected.

As design optimization is continuous, technical data is updated over time. Please check with Powersmiths for latest revision.

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Email: info@powersmiths.com

WWW.POWERSMITHS.COM

Product Warranty

32 YEAR PRO-RATED LIMITED PRODUCT WARRANTY

WARRANTY PERIOD, LIMITATION OF LIABILITY, NOTICE OF CLAIM

This is a limited warranty. Powersmiths International Corp. ("Powersmiths") warrants that its OPAL-R™ Series, E-Saver 80-R and E-Saver 81-R, products meet applicable design specifications, and are free from defects in materials and workmanship. The warranty period is THIRTY-TWO YEARS - PRO- RATED from the date of factory shipment. Pro-rating is based upon the price paid on the original invoice.

Powersmiths' liability is expressly limited to the repair or replacement of defective product at the discretion of Powersmiths. Powersmiths' entire liability shall be limited to at a maximum the purchase price of the product, and in no way shall be liable for any consequential damages whatsoever. Powersmiths shall have no liability for damage resulting from external event, accident, improper application, installation, operation or repair. This limited warranty is in lieu of all other warranties. The Warranty is valid and honored globally. In case of dispute, the laws of Ontario Canada apply.

PERFORMANCE GUARANTEE

SEISMIC: Powersmiths warrants the unit will remain functional after a seismic event up to rated severity.

EFFICIENCY & LOSSES: Powersmiths guarantees that ALL units meet or exceed the performance levels listed in the table for the full duration of the 32-year warranty period.

kVA	DOE 2016 reference efficiency (35% LOADING)	ESAVER-81R Efficiency (35%)	ESAVER-80-R Efficiency (35%)	Maximum Allowable No Load Losses (W)
15	97.89%	98.25%	97.89%	49
30	98.23%	98.55%	98.23%	66
37.5	98.32%	98.62%	98.32%	83
45	98.40%	98.69%	98.40%	92
50	98.43%	98.71%	98.43%	105
75	98.60%	98.80%	98.60%	132
112.5	98.74%	98.93%	98.74%	194
150	98.83%	98.98%	98.83%	232
220	98.94%	99.10%	98.94%	319
225	98.94%	99.11%	98.94%	321
300	99.02%	99.14%	99.02%	388
330	99.04%	99.16%	99.04%	464
500	99.14%	99.24%	99.14%	613
750	99.23%	99.32%	99.23%	879

NOTES: EFFICIENCY AND TEST REFERENCE: U.S. Dept. of Energy 10CFR Part 431, Sub-part K
Efficiencies at other than standard kVAs are interpolated per DOE protocol.
This table applies to 3-phase, low-voltage, dry-type transformers.

POWERSMITHS™

10 Devon Road, Brampton, Ontario, Canada, L6T 5B5

Toll-Free: 1800-747-9627 • Fax: (905) 791-8870

Email: info@powersmiths.com • Website: www.powersmiths.com

Attachment E: Process Optimization

City of Fresno – Phase 3: Wastewater Treatment Plant

Energy Retrofit Project

Aeration System Optimization - Fresno-Clovis RWRf



Train B
o Modification of existing aeration basin air feed lines and valving near aeration header pipe. Replacement of existing line modifications and butterfly valves with new piping and 16” iris valves (8 valves total). See Figure 5 in Attachment A.
o Electrical and controls modifications necessary to provide power and controls capabilities to the new aeration valves. It should be noted that the existing valves are equipped with Rotax actuators, which are understood to be in good condition, and capabilities to control the valves via the plant SCADA system. Therefore, the electrical and controls design will include connecting the new valves to the existing electrical (480V 3-phase power) and controls (analog controls 4-20mA) components. Wiring will be extended up to 20 feet per valve, if necessary, and the existing Rotax actuators will be installed on the new valves. System integration will be limited to commissioning the existing actuators on the new valves and confirming control capabilities through the existing SCADA programing.
o Replacement of air line drop piping from aeration feed lines to diffusers (12” piping to diffusers).
o Replacement of diffusers in all Train B aeration basins (4 total aeration basins each with multiple compartments)

Aeration System Optimization - Fresno-Clovis RWRP



Train C
o Modification of existing aeration basin air feed lines and valving near aeration header pipe. Replacement of existing butterfly valves with 16" iris valves (4 valves total) and necessary piping modifications.
o Electrical and controls modifications necessary to provide power and controls capabilities to the new aeration valves. Electrical and controls related assumptions described for Train B also apply to Train C.
o Replacement of air line drop piping from aeration feed lines to diffusers (12" piping to diffusers).
o Replacement of diffusers in all Train C aeration basins (2 total aeration basins each with multiple compartments)



Date: 09/28/2022
Project Name: RFP WWTF, CA
Prepared for: AESC
Fine Bubble Diffuser Equipment



Fine Bubble Diffusers
Disc Type



Fine Bubble Diffusers
Tube Type



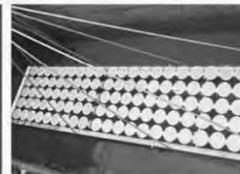
Coarse Bubble Diffusers
Reliability Built In



Telemetry Systems
Real Time Camera Monitoring



Advanced
Membrane Materials
PTFE



Retrievable Systems
Easy to Maintain



Complete Aeration Systems
Designed for You



OEM Replacement
Membranes
Retrofit Existing Systems



SSI Aeration Inc.
 4 Tucker Drive
 Poughkeepsie, N.Y. 12603
 United States America.
 Tel. +1 845-454-8171
 Fax: +1 845-454-8094
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www.ssiaeration.com

DIFFUSED AERATION SYSTEM

Doc #	SD00011750	Revision #	1
Project	RFP WWTF, CA (AESC)	Date	9-23-2022
Process Type	AST	Units	Imperial

Basin #3

Tank Type	Aeration	Tank Shape	Rectangular
Type of Input	SOR	Diffuser Type	ECD215a
	Units		Design
Design Scenario			Standard
SOR	(lbs O ₂ /day)		78,400
SOR	(lbs O ₂ /hr)		3,266.67
Basin #3 Length	(ft)		170
Basin #3 Width	(ft)		170
Diffuser Water Depth	(ft)		15
Total Airflow	(SCFM)		8,645
Airflow Per Diffuser	(SCFM)		0.85
Diffuser Quantity	(pcs)		10,200
Diffuser Density	(%)		9.53
SOTE	(%/ft)		2.41
Total SOTE	(%)		36.2
Blower Pressure	(PSIG)		8.28
Pressure @ Top Of Dropleg	(PSIG)		7.78

Basin #5

Tank Type	Aeration	Tank Shape	Rectangular
Type of Input	SOR	Diffuser Type	ECD215a
	Units		Design
Design Scenario			Standard

SOR	(lbs O ₂ /day)	73,250
SOR	(lbs O ₂ /hr)	3,052.08
Basin #5 Length	(ft)	203
Basin #5 Width	(ft)	103
Diffuser Water Depth	(ft)	16
Total Airflow	(SCFM)	7,559
Airflow Per Diffuser	(SCFM)	0.84
Diffuser Quantity	(pcs)	9,050
Diffuser Density	(%)	11.69
SOTE	(%/ft)	2.42
Total SOTE	(%)	38.67
Blower Pressure	(PSIG)	8.7
Pressure @ Top Of Dropleg	(PSIG)	8.20

Basin #9			
Tank Type	Aeration	Tank Shape	Rectangular
Type of Input	SOR	Diffuser Type	ECD215a
	Units		Design
Design Scenario			Standard
SOR	(lbs O ₂ /day)		73,000
SOR	(lbs O ₂ /hr)		3,041.67
Basin #9 Length	(ft)		203
Basin #9 Width	(ft)		103
Diffuser Water Depth	(ft)		16
Total Airflow	(SCFM)		7,530
Airflow Per Diffuser	(SCFM)		0.83
Diffuser Quantity	(pcs)		9,050
Diffuser Density	(%)		11.69
SOTE	(%/ft)		2.42
Total SOTE	(%)		38.69
Blower Pressure	(PSIG)		8.69
Pressure @ Top Of Dropleg	(PSIG)		8.19

Basin #3		
	Units	Design
SOR	(lbs O ₂ /day)	78,400
SOR	(lbs O ₂ /hr)	3,266.67
Aeration Time	(hrs)	24
Minimum Diffuser Density	(%)	5
Dissolved Oxygen	(mg/l)	2
Basin #3 Length	(ft)	170
Basin #3 Width	(ft)	170
Side Water Depth	(ft)	16
Diffuser Water Depth	(ft)	15
Basin #3 Area	(ft ²)	28,900
Tank Volume	(ft ³)	462,400
Tank Volume	(Million Gallons)	3.46
Required Mixing Energy	(SCFM/ft ²)	0.12
Airflow For Minimum Mixing	(SCFM)	3,468
Minimum Diffuser Quantity	(pcs)	5,352
SP O ₂ Transfer Rate	gr O ₂ /Nm ³ -m	23.77
SAE	(lbs O ₂ /hp-h)	8.68
Blower Efficiency	(%)	70
Blower Power	(hp)	376.37
Estimated cost per kWh	(kWh)	0.11
Annual Operating Cost	(USD)	270,447.53

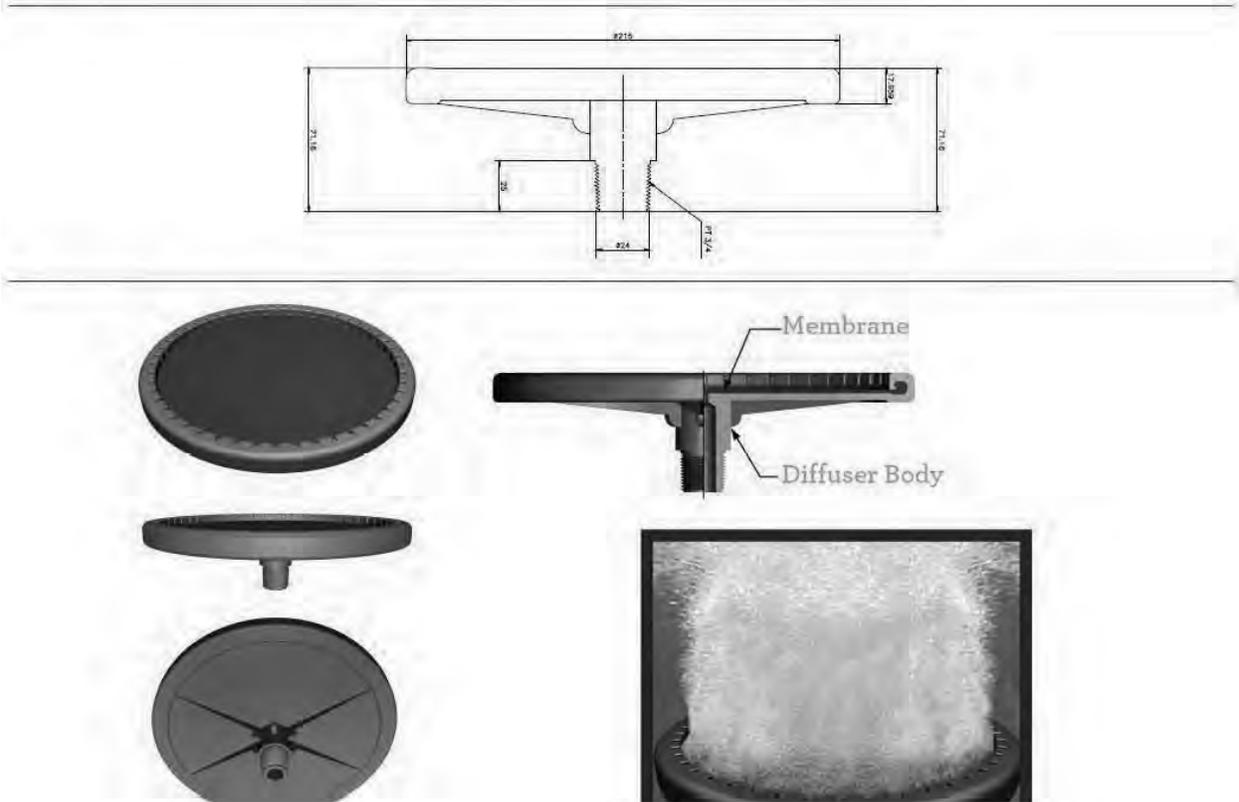
Basin #5		
	Units	Design
SOR	(lbs O ₂ /day)	73,250
SOR	(lbs O ₂ /hr)	3,052.08
Aeration Time	(hrs)	24
Minimum Diffuser Density	(%)	5
Dissolved Oxygen	(mg/l)	2
Basin #5 Length	(ft)	203
Basin #5 Width	(ft)	103
Side Water Depth	(ft)	17
Diffuser Water Depth	(ft)	16
Basin #5 Area	(ft ²)	20,909
Tank Volume	(ft ³)	355,453

Tank Volume	(Million Gallons)	2.66
Required Mixing Energy	(SCFM/ft ²)	0.12
Airflow For Minimum Mixing	(SCFM)	2,509.08
Minimum Diffuser Quantity	(pcs)	3,873
SP O ₂ Transfer Rate	gr O ₂ /Nm ³ -m	23.81
SAE	(lbs O ₂ /hp-h)	8.89
Blower Efficiency	(%)	70
Blower Power	(hp)	343.34
Estimated cost per kWh	(kWh)	0.11
Annual Operating Cost	(USD)	246,713.22

Basin #9

	Units	Design
SOR	(lbs O ₂ /day)	73,000
SOR	(lbs O ₂ /hr)	3,041.67
Aeration Time	(hrs)	24
Minimum Diffuser Density	(%)	5
Dissolved Oxygen	(mg/l)	2
Basin #9 Length	(ft)	203
Basin #9 Width	(ft)	103
Side Water Depth	(ft)	17
Diffuser Water Depth	(ft)	16
Basin #9 Area	(ft ²)	20,909
Tank Volume	(ft ³)	355,453
Tank Volume	(Million Gallons)	2.66
Required Mixing Energy	(SCFM/ft ²)	0.12
Airflow For Minimum Mixing	(SCFM)	2,509.08
Minimum Diffuser Quantity	(pcs)	3,873
SP O ₂ Transfer Rate	gr O ₂ /Nm ³ -m	23.82
SAE	(lbs O ₂ /hp-h)	8.9
Blower Efficiency	(%)	70
Blower Power	(hp)	341.68
Estimated cost per kWh	(kWh)	0.11
Annual Operating Cost	(USD)	245,520.39

SSI ECD215 Disc Diffuser Systems



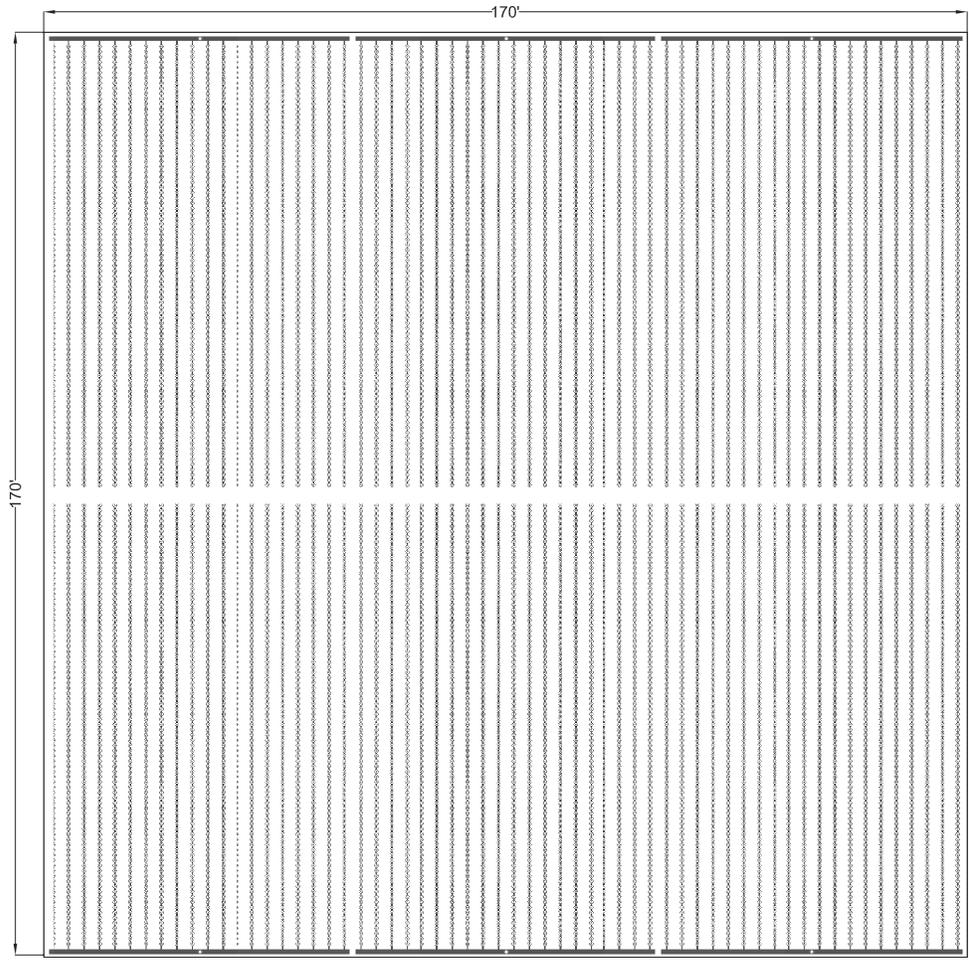
Limitation of Liability: The information contained in this Design is provided as a service exclusively to SSI clients and is intended to use with SSI products for Proposal/Quotation purpose only to be stamped or embossed with the SSI corporate seal for validation/approval. We accept no liability for the accuracy of self-generated designs.

Notes:

-

Thank you very much for your enquiry. This is a computer generated design.

**DRAWING LAYOUT FOR REFERENCE ONLY
NOT TO BE USED FOR FABRICATION OR INSTALLATION**



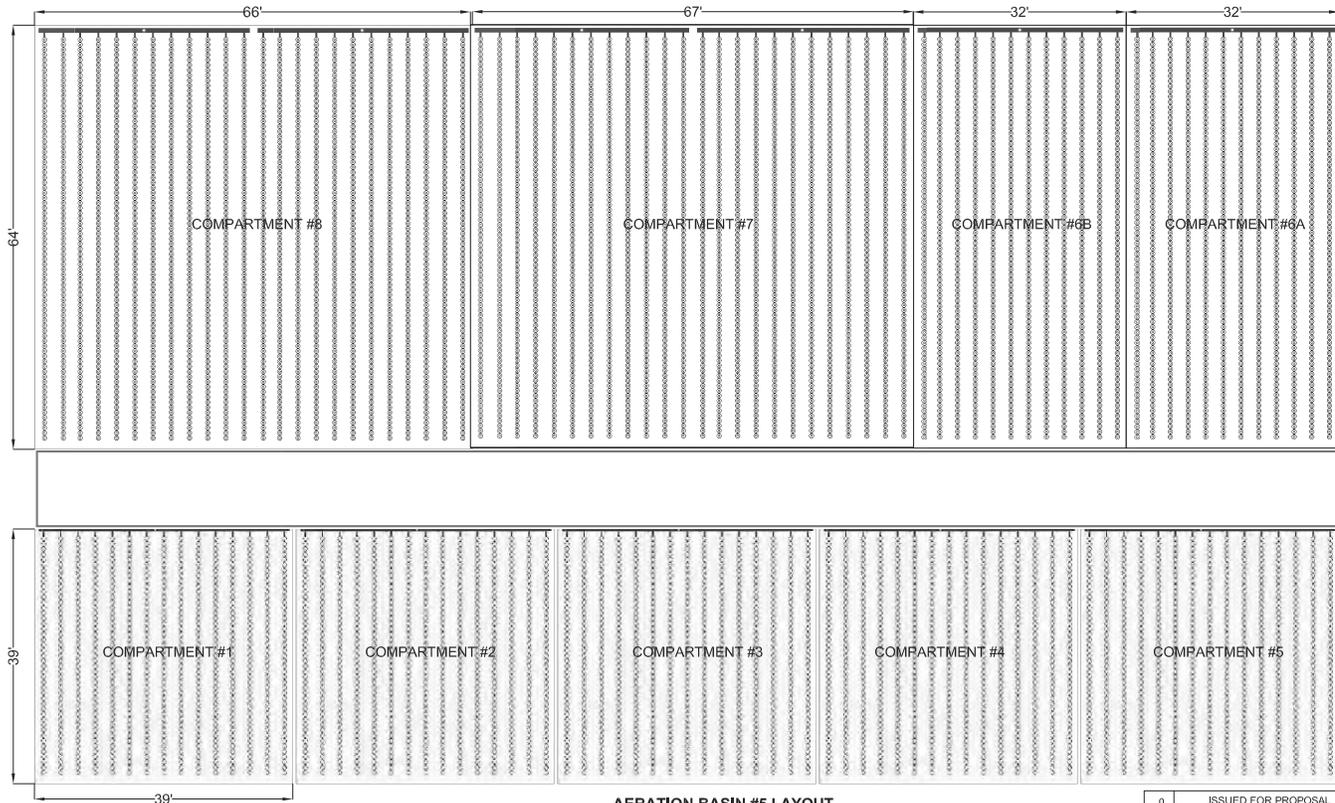
AERATION BASIN #3 LAYOUT
BASIN #3 & #4 ARE IDENTICAL (TOTAL 2)

0	ISSUED FOR PROPOSAL	09/28/2022	NIKHIL
REV	DESCRIPTION	DATE	BY
ECD215-P FINE BUBBLE DISC DIFFUSERS WITH PTFE MEMBRANES			
RFP WWTF, CA (AESC)			
BASIN #3 & #4 - 2 NO'S 170' x 170' x 16' (SWD) LAYOUT			
Stamford Scientific International Inc., ENGINEERING			
SHEET: 1 OF 1	DRAWN:	NIKHIL	
SCALE: NTS	CHECKED:	RAVI	
DATE: SEP, 2022	PROCESS DESIGN:	NIM	
	APPROVED:	KIRAN	
		PROPOSAL ISSUE	

**ALL THE FIELD DIMENSIONS OR ANY SLOPE IN THE
TANK FLOOR TO BE CONFIRMED BEFORE APPROVAL**

DWG.No: RFP WWTF, CA_Aeration basins_ECD215-P_P01

**DRAWING LAYOUT FOR REFERENCE ONLY
NOT TO BE USED FOR FABRICATION OR INSTALLATION**



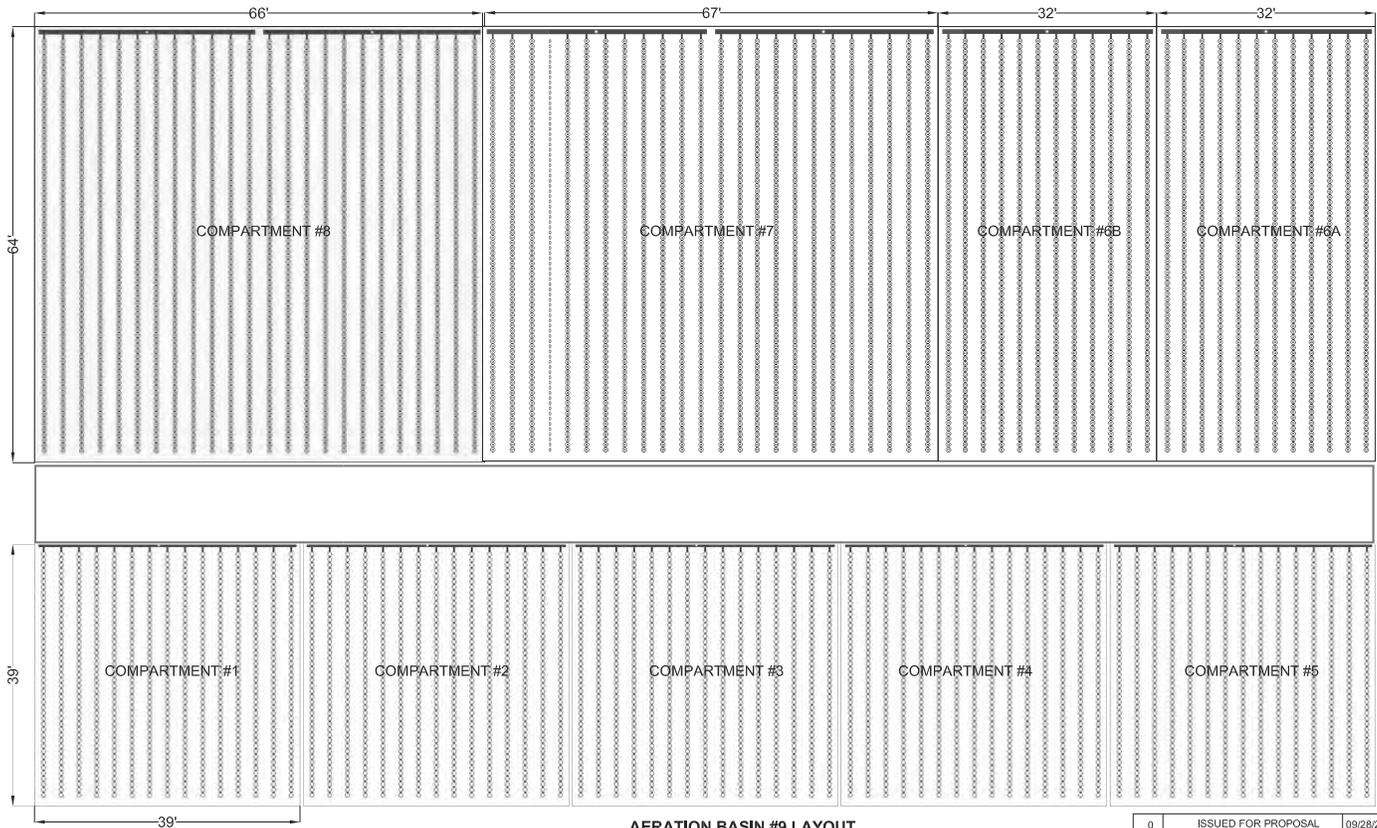
AERATION BASIN #5 LAYOUT
BASINS #5 to #8 ARE IDENTICAL (TOTAL 4)

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REV	DESCRIPTION	DATE	BY
ECD215-P FINE BUBBLE DISC DIFFUSERS WITH PTFE MEMBRANES			
RFP WWTF, CA (AESC)			
BASIN #5 to #8 - 4 NO'S LAYOUT			
Stamford Scientific International Inc., ENGINEERING			
SHEET: 1 OF 1	DRAWN: NIKHIL		
SCALE: NTS	CHECKED: RAVI		
	PROCESS DESIGN: NIM		
DATE: SEP, 2022	APPROVED: KIRAN		
PROPOSAL ISSUE			

**ALL THE FIELD DIMENSIONS OR ANY SLOPE IN THE
TANK FLOOR TO BE CONFIRMED BEFORE APPROVAL**

DWG.No: RFP WWTF, CA_Aeration basins _ECD215-P_P01

**DRAWING LAYOUT FOR REFERENCE ONLY
NOT TO BE USED FOR FABRICATION OR INSTALLATION**



AERATION BASIN #9 LAYOUT
BASINS #9 & #10 ARE IDENTICAL (TOTAL 2)

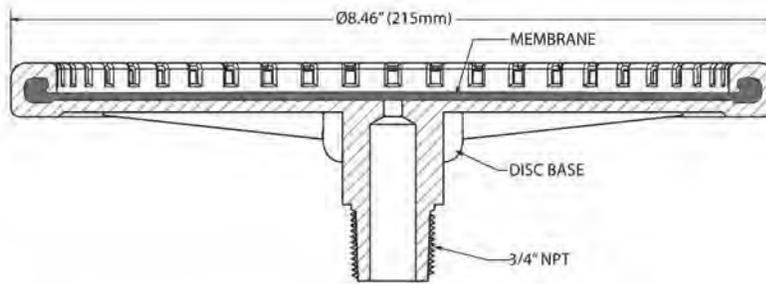
0	ISSUED FOR PROPOSAL	09/28/2022	NIKHIL
REV	DESCRIPTION	DATE	BY
ECD215-P FINE BUBBLE DISC DIFFUSERS WITH PTFE MEMBRANES			
RFP WWTF, CA (AESC)			
BASIN #9 & #10 - 2 NO'S LAYOUT			
Stamford Scientific International Inc., ENGINEERING			
SHEET: 1 OF 1	DRAWN:	NIKHIL	
SCALE: NTS	CHECKED:	RAVI	
DATE: SEP, 2022	PROCESS DESIGN:	NIM	
	APPROVED:	KIRAN	
PROPOSAL ISSUE			

**ALL THE FIELD DIMENSIONS OR ANY SLOPE IN THE
TANK FLOOR TO BE CONFIRMED BEFORE APPROVAL**

DWG.No: RFP WWTF, CA_Aeration basins_ECD215-P_P01

What makes the SSI ECD215 (High Efficiency) Disc Diffuser Systems a Worldwide Choice?

The SSI 7" Disc Diffuser System combines engineering excellence, superior component quality, and a technically advanced product design. Proven highly durable and efficient in thousands of municipal and industrial installations around the world, this advanced system has reliability built into every stage of performance. SSI's ECD diffusers are composed of a single piece molded body integrated with SSI's standard EPDM or PTFE membranes. The single mold body allows SSI to offer a lower price point per diffuser. This results in significant savings in initial upfront costs and significant power savings.



ECD215 (HE) Disc Diffuser

Unique System Strengths

Complete product line – creating the system that fits your needs

SSI manufactures disc diffusers and coarse bubble diffusers, and we mount these products on a wide range of piping materials including PVC, CPVC, PP and Stainless Steel. We have the ability to attach diffusers to pipe using saddles, grommets, or pre-assembled PODS. We can provide retrievable systems or fixed grids, and systems in kit form or mostly factory assembled. We try to understand and anticipate your needs, and fit our recommendations to your situation.

Piping system integrity – thicker wall pipe and double anchors for fewer breakages

Our piping is 38% thicker and has double rod support stands as standard – two anchors for each support location means twice the resistance to hydraulic and thermal loads. Most often supports fail due to temperature and water velocity. SSI locates two anchors where support is needed most, helping to increase product longevity.

Comprehensive design service and after sales support

SSI provides full design services, including biological and mixing calculations, process simulations and hydraulic studies. We maintain a full drafting department with 3D and animation capabilities and we can assist with specifications and CAD drawings. Our service and installation crew can hold your hand during the early stages of the project and our worldwide multilingual staff is dedicated to your complete satisfaction.



SSI provides full design services, including biological and mixing calculations, process simulations and hydraulic studies.

Intelligent Upgrade Options

Patented PTFE membranes prolong efficiency and reduce whole-life costs

SSI's patented PTFE membrane barrier properties not only reduce plasticizer extraction, shrinking, and membrane hardening but also limit dynamic changes that can result from swell, such as creep. Compared with uncoated products that are more susceptible to increases in DWP due to more aggressive fouling and changes in physical properties and weight, the PTFE coated membrane improves consistency of DWP (Headloss) values over the product life. This directly impacts long-term power costs and the ability of the system to distribute air uniformly across the tank floor.

Grommet Connection

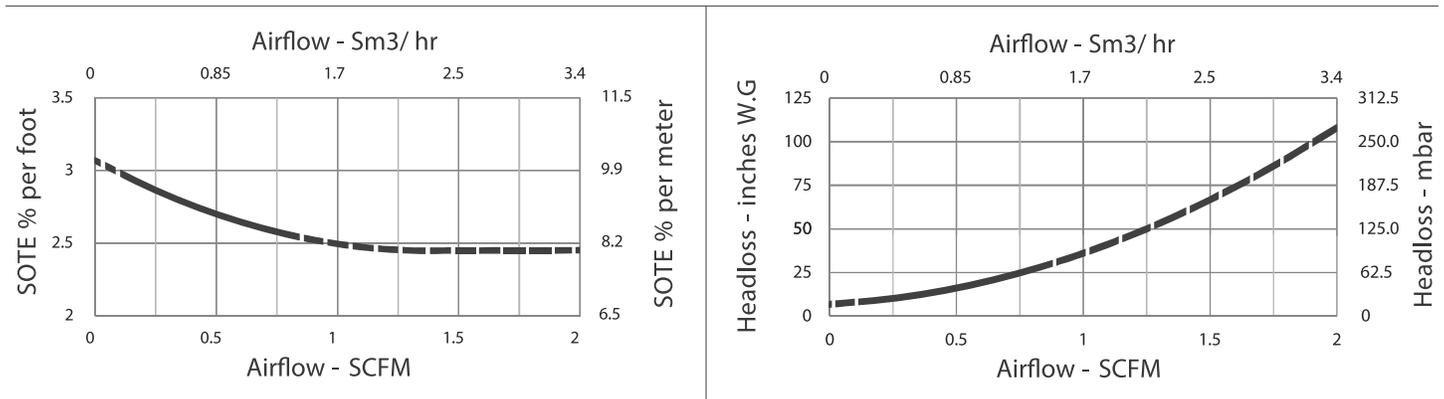
Simple to install on site, compact to ship and move. Affordably priced and time tested over 15 years worldwide.

Quick Threaded Saddle

QTS saddles quickly and easily bolt onto the pipe and allow installation of the diffuser with a few simple turns.

Avg Operating Condition per Diffuser	Peak Air Flow per Diffuser	Orifice Size	Slit Qty	Active Surface Area per Diffuser	Weight per Diffuser ECD215
0.1 - 0.85 SCFM 0.16 - 1.43 Sm ³ /hr	1.6 SCFM 2.7 Sm ³ /hr	0.10" 2.7mm	+/- 4,155	0.30 ft ² 0.02 m ²	0.81 lbs 0.37 kg

Operating diffusers distant to average operating conditions range might leads to poor uniform distribution and subjected to rapid fouling.



Above curves are generated based on ideal condition. Actual curves for specified project/condition to be provided upon request.

SSI™ ACCESSORIES

NPT SADDLES

Quick Connect NPT Saddles mount on nominal US 4" or metric 114.3mm OD pipe. They allow retrofit of 12" to 9" discs without changing the piping system. Quick Connect NPT Saddles are made of polypropylene, and install into a 5/8" (16mm) hole.



EXPANSION JOINT OPTIONS



Rigid Bolted SS

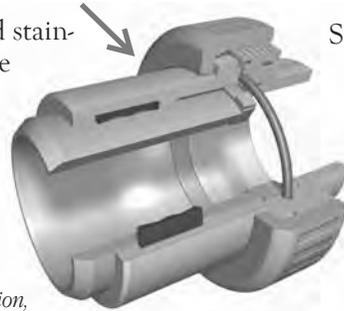
Expansion Joints are available in three types: Flexible PVC with SS Shell, Rigid Bolted SS, and Anti-rotation, Telescoping PVC. The flexible expansion joints are recommended for disc installations and the positive locking type for tube diffuser projects.



Flexible PVC w/SS shell

Slotted band joints with stainless steel shear rings are suitable for disc-type fine bubble and cap-type coarse bubble lateral plastic piping systems, in conjunction with SSI's fixed and guide support stand system to manage thermal expansion and contraction.

Positive locking bolted stainless steel couplings are suitable for drop pipes, stainless joints, and for all tube diffuser piping systems to restrict header pipe rotation.



Anti-rotation, Telescoping PVC

SSI's Sliding Expansion Joint is an anti-rotational telescopic union which absorbs pipe expansion and contraction to up to 1.5" (38mm).

GROMMETS

Grommets are available for round plastic or square stainless steel pipes in US or Metric dimensions. Installation is simple. Multiple sizes are available based on pipe wall thickness. Grommets install into a 1-1/4" (32mm) chamfered hole.

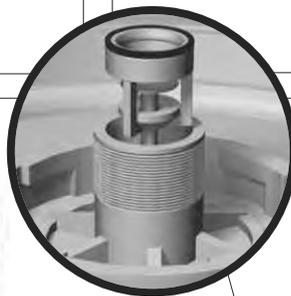


CHECK VALVES

SSI fine and coarse bubble diffusers are available with optional check valves. These are not required for proper operation since most diffusers are self-checking, but they may give peace of mind to the designer or operator.



Tube Diffuser check valves



Disc showing check valve installation



Coarse Band (WBCB) check valves



Snappy Saddle check valves

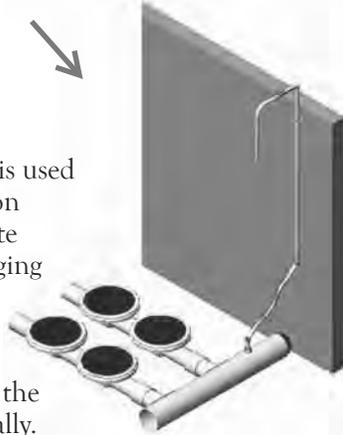


Please see reverse for additional technical data

SSI™ ACCESSORIES *continued*

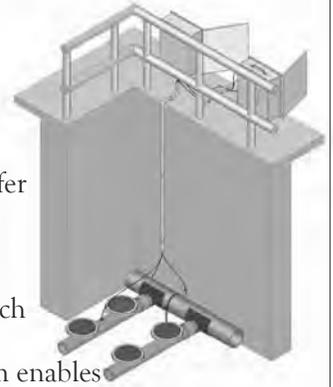
MOISTURE PURGE SYSTEM

An airlift type purge system is used in all SSI fine bubble aeration systems to remove condensate from the piping system. Purging entrained water helps ensure even air distribution to all diffusers in a grid. A ball valve is supplied with the system and is opened manually. Continuous purge systems are available for retrievable-type aeration systems, or where it is not possible to fasten a purge line to a tank wall.



PRESSURE MONITORING SYSTEM

Throughout the life of an aeration system, oxygen transfer efficiency may decline somewhat when diffusers become fouled, but headloss can increase dramatically which in turn increases energy costs. A pressure monitoring system enables the operator to better determine the optimal cleaning frequency of the membranes. The fouling rate can vary by aeration zone, hence it is recommended to install at least one system in each zone.



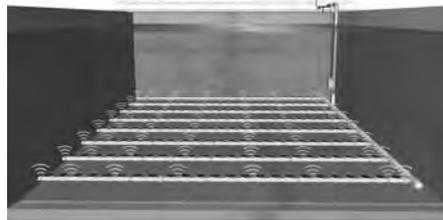
SUPPORT STANDS

Support Stands are available in 304SS, 316SS or in ABS plastic. SSI's standard is 304SS with drop-in anchor bolts. In our aeration piping systems, support stands fulfill the dual role of anchoring pipes to the floor and controlling thermal expansion and contraction. Special support stands for uneven tank floors, for installing into concrete ballast forms, and for tanks with significant channel velocity (with lateral supports) are also available. ABS support stands are primarily used with disc diffusers and plastic pipe, where a low capital cost is the primary objective. *ABS plastic support stand*



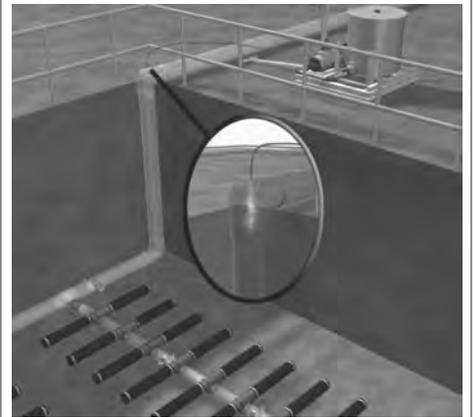
TELEMETRY SYSTEM

Adding a Telemetry System to your aeration system will allow you to remotely monitor factors inside your tank from any PC, tablet or mobile device. Telemetry can be installed in new systems or retrofitted through an end cap into existing systems. Telemetry sensors are available to monitor variables in your system such as temperature, vibration, humidity, water detection, DO, and other environmental factors.



ACID DOSING SYSTEM

In-situ Acid Dosing Systems are available to control calcareous deposits in the perforations which will reduce membrane backpressure.



Attachment F: Measurement and Verification Agreement

City of Fresno – Phase 3: Wastewater Treatment Plant

*MEASUREMENT AND VERIFICATION AGREEMENT
FOR
CITY OF FRESNO – PHASE 3
WASTEWATER TREATMENT PLANT*

SCOPE OF SERVICES

TERMS AND CONDITIONS

ATTACHMENTS:

Attachment 1 – Guaranteed Savings Measurement & Verification

- Savings Guarantee
- Measurement and Verification Methods
- Selected Measurement and Verification Options
- IPMVP Option A M&V Plan
- IPMVP Option C M&V Plan

Attachment 2 – Utility Baseline Summary

Attachment 3 – Energy Project Cashflow

MEASUREMENT & VERIFICATION AGREEMENT

This Measurement and Verification (“M&V”) Agreement (“Agreement”) dated / / (“Effective Date”) is made by and between:

City of Fresno Wastewater Treatment Plant
 (“Purchaser”) with its principal place of business at
 2600 Fresno Street, Fresno, CA 93721

and

Alliance Building Solutions, Inc.
 (“ABS”) with its principal place of business at
 12520 High Bluff Drive, Ste 345, San Diego, CA 92130

SCOPE OF SERVICES

Energy Savings Measurement & Verification Service:

“ABS” will provide measurement and verification services of the energy savings associated with “Purchaser” Energy Retrofit Installation, as described in “Attachment A – Scope of Work”. Energy Savings M&V reports will be provided to the “Purchaser” on an annual basis or upon request up to once a year for the term specified below.

Term:

This Service Agreement shall commence upon the completion and acceptance of the Purchaser energy retrofit installation project and receipt of final payment for the Contract and shall continue for an initial term of (1) year. The “Purchaser” may elect to enter into further extended terms upon written notice provided to ABS not less than thirty (30) days prior to termination of the initial term. If the “Purchaser” fails to provide ABS with a written notice of extension prior to the end of the initial term or any subsequent extensions, the M&V Agreement shall be considered terminated. The “Purchaser” may terminate this service agreement at any time with a (30) day written notice. However, termination of this agreement will void any savings guarantee associated with this project.

Charges:

This Agreement shall be billed once per year is due and payable 30-days after “Purchaser’s” receipt of invoice. The annual Service Agreement charge is \$0 for the first year, \$25,000 for the second year, \$30,000 for the third year, \$35,000 for the fourth year and escalated at 4% annually for every subsequent year thereafter. This rate does not include taxes.

TERMS AND CONDITIONS

I. General Provisions:

- I.1 Unless stated otherwise, the services provided under this Agreement shall be provided during "ABS" normal business hours. Normal business hours are Monday through Friday, 7:00AM to 4:00PM, excluding holidays. "ABS" will coordinate with the "Purchaser" so that any variations in these normal business hours necessitated by "Purchaser" Schedules can be accommodated.
- I.2 The "Purchaser" shall provide reasonable means of access to the equipment being measured or verified. "ABS" shall not be responsible for any removal, replacement, or refinishing of the building structure, if required to gain access to the equipment. "ABS" shall be permitted to start and stop all equipment necessary to perform the services herein described as arranged with the "Purchaser's" representative. "ABS" will obtain agreement from the "Purchaser's" representative prior to any starting or stopping of equipment.
- I.3 This Agreement shall supersede any previous Measurement and Verification Agreements accepted and approved by the "Purchaser" and "ABS."
- I.4 This Agreement, when accepted in writing by the "Purchaser" and approved by an authorized "ABS" representative, shall constitute the entire Agreement between the two (2) parties.

II. Charges:

- II.1 For services not covered by this Agreement but performed by "ABS" upon the "Purchaser's" prior written authorization, the "Purchaser" agrees to pay "ABS"'s invoice(s) 30 days after receipt of invoice. Failure to pay the invoice within 30 days after receipt will result in a 10% late payment penalty and failure to pay within 60 days will result in forfeiture of the entire agreement.
- II.2 If emergency service is requested by the "Purchaser" and inspection does not reveal any defect for which "ABS" is liable under this Agreement, the "Purchaser" will be charged at "ABS"'s current emergency charge rates.

III. Limitations of Liability:

- III.1 Neither party shall be liable for any loss, delay, injury, or damage that may be caused by circumstances beyond its control including, but not restricted to; acts of God, war, civil commotion, acts of government, fire, theft, corrosion, floods, lightning strikes, freezes, strikes, lockouts, differences with workmen, riots, explosions, quarantine restrictions, delays in transportation, shortage of vehicles, fuel, labor or materials, or malicious mischief. IN NO EVENT, SHALL EITHER PARTY BE LIABLE FOR BUSINESS INTERRUPTION, LOSSES, CONSEQUENTIAL, INDIRECT, SPECIAL OR SPECULATIVE DAMAGES.
- III.2 "ABS" shall not be required to make safety tests, install new devices, or make modifications to any equipment to comply with recommendations or directives of insurance companies, governmental bodies, or for other reasons.
- III.3 Section removed
- III.4 "ABS" warrants that for equipment furnished and/or installed but NOT manufactured by "ABS", "ABS" will extend the same warranty and terms and conditions, which "ABS" received from the manufacturer of said equipment.
- III.5 This agreement pre-supposes that all equipment is in satisfactory working order. Should any equipment be in need of repair, "ABS" will have ninety (90) days to make such repair. If the "Purchaser" does not authorize "ABS" to make the repairs or if the "Purchaser" does not have the work performed, the equipment will be eliminated from coverage and the Agreement saving will be adjusted. Maintenance of existing equipment and systems is the responsibility of the "Purchaser". Failure to properly maintain equipment and systems can result in reduced energy efficiency and may necessitate a baseline energy adjustment
- III.6 The amount of any present or future sales, use, occupancy excise, or other tax (federal, state or local) which "ABS" hereafter shall be obligated to pay, either on its own behalf or on the behalf of the "Purchaser" (shall reasonably assist "ABS" in determining the applicable requirements, it shall be "ABS"'s sole responsibility for determining and complying with all applicable laws, regulations and standards.) or otherwise, with respect to the services covered by this Agreement, shall be paid by the "Purchaser".
- III.7 If the equipment or software included under this Agreement is altered, modified, or changed by a party other than "ABS", this Agreement shall be modified to incorporate such changes the Agreement price and/or Savings shall be adjusted accordingly.
- III.8 Following twelve (12) months of service or any time thereafter, if individual item(s) cannot, in "ABS"'s opinion, be properly repaired on-site because of excessive wear, deterioration or an Act of God that is out of "ABS" control. "ABS" may withdraw the item(s) from coverage upon ninety (90) days prior written notice. Energy savings may be adjusted accordingly.
- III.9 This agreement shall be governed by, construed, and enforced in accordance with the laws of the State of California.

IV. Miscellaneous Provisions:

IV.1 The services provided hereunder may occur on active "Purchaser" sites. As such, "ABS" shall ensure that its services on and around the "Purchaser" site comply with all applicable laws, regulations and standards including but not limited to, the fingerprinting requirements and any other legal requirements which may be applicable to "ABS"'s activities on or about the "Purchaser" sites. The "Purchaser" shall reasonably assist "ABS" in determining the applicable laws, regulations and stands. If, at any time prior to completion of the Scope of Services, the "Purchaser" determines that there possibly might be more than limited contact between "ABS" and any minor-aged Purchaser student, the "Purchaser" may, in its sole discretion, require that "ABS" complies with the requirements of Education Code Section 45125.1, regardless of whether such requirements are otherwise applicable. In such event, "ABS" at its sole cost and expense, and without additional compensation from "Purchaser", shall comply with all California Department of Justice guidelines and requirements with respect to fingerprinting of "ABS" officers, employees, agents, or other representatives who will or might be present on or at the "Purchaser" facility.

IV.2 Dispute Resolution:

IV.2.1 Disputes: This section shall apply to any disputes arising under our related to this Agreement (whether arising in contract, tort or otherwise, and whether arising at law or in equity including (a) any dispute regarding the performance, validity or enforceability of any provision of this Agreement and (b) whether any party is in compliance with, or breach or, any provisions of this Agreement and (b) the applicability of this Section to a particular dispute. Any dispute to which this section applies is referred to herein as a "Dispute"

IV.2.2 Negotiation to Resolve Disputes: If a dispute arises, the Parties shall attempt to resolve such dispute through the following procedure.

IV.2.2.1 First, the representatives of each of the Parties shall promptly meet (whether by phone or in person) in a good faith attempt to resolve the Dispute;

IV.2.2.2 Second, if the Dispute is still unresolved after 20 days following the commencement of the negotiations described in Section 4.2.2.1 then a designated executive officer to each party shall meet (whether by phone or in person) in a good faith attempt to resolve the Dispute;

IV.2.2.3 Third, if the Dispute is still unresolved after 10 days following the commencement of the negotiations described in Section 4.2.2.2, then either Party may submit such Dispute to litigation;

IV.2.2.4 The venue for any Dispute arising from or relating to this Agreement that is adjudicated pursuant to this Section 4.2.2.4 shall be arbitrated in Los Angeles, California. Any Dispute arising from or relating to this Agreement that is adjudicated pursuant to this Section 4.2.2.4 shall be arbitrated in Los Angeles, California. The arbitration shall be administered by JAMS in accordance with its Comprehensive Arbitration Rules and Procedures, and judgment on any award maybe entered in any court of competent jurisdiction. If the Parties agree, a mediator may be consulted prior to arbitration;

IV.2.2.5 Pending a final resolution of a Dispute, the Parties shall each proceed diligently and faithfully with performance of their respective obligations under this Agreement.

IV.3 Indemnification:

The Parties hereto agree to defend, indemnify, and hold harmless the other Party, it's employees, agents, officials, officers and directors from any and all liabilities, claims, expenses, losses or damages, including attorney's fees which may arise in connection with the work herein specified and which are caused in whole or in part by the negligent act or omission of the indemnifying Party. To the extent it may lawfully do so, the Parties hereby indemnify, defend (with counsel of it choosing), and holds harmless the other party and its affiliates, directors, representatives, agents, officers, employees and volunteers from and against any and all liability or claim of liability, loss or expense, including defense costs and legal fees and claims for damages of whatsoever character, nature and kind, whether directly or indirectly arising from any third party actions from injury to or death of persons, and damage to or loss of property to the extent caused by or arising out the connected with an act or omission of the indemnifying party, or an agent, invitee, guest, employee, or anyone in, on or about he "Purchaser" sites, including, but not limited to, liability, expense, and claims for: bodily injury, death, personal injury, or property damage caused by negligence, creation or maintenance of a dangerous condition of property, breach of express or implied warranty of product, defectiveness of product, or intentional infliction of harm, including any workers' compensation suites, liability, or expense, arising from or connected with services performed by, or on



behalf of the indemnifying party, by any person pursuant to this Agreement; nonpayment for labor materials, appliances, teams or power, performed on, or furnished or contributed to the "Purchaser" sites. Notwithstanding the above, neither party shall be required to defend, indemnify and hold harmless the other for its own negligent acts and omissions' or willful misconduct. It is the intent of the Parties that were negligence is determined to have been joint or contributory, principles of comparative negligence will be followed, and each Party shall bear the proportionate cost of any loss damage, expense or liability attributable to that Party's negligence.

- V. **Occupational Safety and Health:** The Parties hereto agree to notify each other immediately upon becoming aware of any alleged violations of, the Occupational Safety and Health Act (OSHA) relating in any way to the project or project site.
- VI. **Audits:** In accordance with Government Code Section 8546.7, the State has the right to examine, review, audit and/or copy the Records of the work during the three (3) year period following final payment to the Contractor pursuant to the Contract. In addition, the "Purchaser" hereby has the right to examine, review, audit and/or copy the Records of the work during the three (3) year period following final payment to the Contractor pursuant to the Contract. Therefore, the Contractor shall make the Project Records available at its offices at all reasonable time during the performance of the Work and for three (3) years from the date of final completion or filing of a Notice of Completion for the Project, whichever is later. However, if any audit is commenced within such three (3) year period, the Contractor shall make the Project Records available at all reasonable times until proceedings related to such audit are complete and all statutes of limitations related thereto have expired. In the event the "Purchaser" notifies the Contractor that federal funds have been used in connection with Project, the Contractor shall retain and make available the Project Records for such longer period as may be required by federal law.
- VII. **Entire Agreement:** This Agreement, upon acceptance, shall constitute the entire agreement between the parties and supersedes any prior representations or understandings.
- VIII. **Changes:** No change or modification of any of the terms and conditions stated herein shall be binding upon either Party unless accepted by both Parties in writing.
- IX. **Severability:** if one or more of the provisions of this Agreement are held to be unenforceable under laws, such provisions(s) shall be excluded from these terms and conditions and the remaining terms and conditions shall be interpreted as if such provision were so excluded and shall be enforced in accordance to their terms and conditions.
- X. **Counterparts:** This Agreement may be executed in multiple counterparts, each of which shall be deemed an original and all of which together shall constitute one and the same instrument. A signature on a copy of this agreement received by either party by facsimile or portable document format (PDF) is binding upon the other party as an original. The parties shall treat a photocopy of such facsimile as a duplicate original.
- XI. **Assignment:** "ABS" retains the right to assign its rights and obligations of the Agreement with written consent of "Purchaser".
- XII. **Acknowledgement:** Both "ABS" and the "Purchaser" acknowledge having read this Agreement and all contract documents incorporated herein and have executed this agreement on the date written above.
- XIII. **Approval:** Each Party represents that the person that has executed this Agreement on its' behalf is authorized to do so.

CITY OF FRESNO,
A California municipal corporation

By: _____
Brock D. Buche, PE, PLS,
Director of Public Utilities

APPROVED AS TO FORM:
ANDREW JANZ
City Attorney

By: Brandon Collet 12/6/2023

Brandon M. Collet... Date
Supervising Deputy City Attorney

ATTEST:
TODD STERMER, CMC
City Clerk

By: _____
Deputy Date

ALLIANCE BUILDING SOLUTIONS, INC.,
A California municipal corporation

DocuSigned by:
By: Brad Chapman 12/6/2023

Brad Chapman
Name: _____

Title: President

(If corporation or LLC., Board Chair, Pres. or
Vice Pres.)

DocuSigned by:
By: Tim Gray 12/6/2023

Tim Gray
Name: _____

Title: CFO, COO

(If corporation or LLC., CFO, Treasurer, Secretary or
Assistant Secretary)

Attachment 1

Guaranteed Savings Measurement & Verification

Guaranteed Savings Measurement & Verification

This document contains the Measurement and Verification (M&V) plan for the energy savings related to the Energy Efficiency Measures (EEMs) contained in the Installation Agreement. The following table summarizes the EEMs implemented at the Fresno Waste Water Treatment Plant.

For each EEM, a specific M&V plan is submitted to provide a comprehensive overall plan for the City of Fresno. Energy savings shall be compared to the Utility Baseline Summary, as shown in Attachment 2. Each EEM's M&V Plan provides:

- A description of how the savings shall be verified.
- The selection of the specific protocol of verification of savings.
- The requirements for measurement or other means to establish savings.

ABS is responsible for pre-retrofit measurements, energy savings calculations, equipment installation, and required post retrofit verification as outlined herein. Purchaser agrees to operate and maintain all equipment installed. Proper operation and maintenance of equipment and systems is critical to long-term achievement of energy savings.

Savings Guarantee

ABS warrants that Purchaser shall realize total annual project savings (utility and operational savings) and rebates in excess of the annual lease payments. The effective date will begin on the date of final acceptance of the Installation project and receipt of final payment for the associated Installation Contract. The total project savings will exceed the installation contract amount and M&V payments associated with this agreement during the course of the useful life of the installed equipment. ABS agrees to complete the M&V Report on an annual basis and deliver to the Purchaser within sixty (0) days of the anniversary date of final acceptance and annually thereafter if renewed by the Purchaser. Project savings that are verified during the course of construction will be applied to the 1st year guaranteed project savings.

If the annual M&V Report demonstrates that the project will achieve one hundred percent (100%) or more of the Guaranteed Project Annual Savings, then ABS shall have satisfied its energy performance guarantee obligation and the Purchaser shall accept the Annual M&V Report.

In the event that an annual M&V Report savings value (including any excess savings from previous years) does not meet the Guaranteed Project Savings in accordance with the M&V Plan, then ABS shall repair, replace, or substitute the EEM that is not performing at the required level, as identified in the M&V Report. Following corrective action, ABS shall re-perform the relevant M&V work for the affected EEM(s) and amend or supplement the M&V Report. If the sum of the EEMs indicates that the Guaranteed Project Savings are met or exceeded, then no further remedy shall be required.

If, after the opportunity to make corrections, the M&V Report, as amended, indicates that verified savings are less than the Guaranteed Project Savings as shown in the Savings Summary, then ABS shall pay the Purchaser the shortfall amount. However, under no circumstances will the amount(s) paid for the total of the energy savings shortfalls exceed the total lease payments associated with this contract.

The Purchaser agrees that project savings, which exceed the guaranteed amount in any one (1) year, may be applied to previous or future year's savings to offset an energy savings shortfall. The savings guarantee will remain in effect for the term of this agreement. Cancellation of this agreement will result in the termination of the savings guarantee.

The Utility Baseline Summary, as shown in Attachment 2, may be modified over the course of the Guarantee Period to adjust for changes in utility rates, number of days in utility billing cycle, square footage, energy using equipment, building occupancy and weather. This Guarantee is subject to the Purchaser's adherence to the Control Parameters for Lighting and HVAC systems, as documented in the Installation Agreement Attachments.

Measurement and Verification Methods

Measurement and Verification (M&V) of energy savings is a methodology based on standard industry protocol intended to provide reasonable assurance that energy savings calculated are realized over the term of the contract.

The development of the M&V plan is based on the International Performance Measurement and Verification Protocol (IPMVP): Concepts and Options for Determining Energy and Water Savings, Volume 1. This plan contains methodology that shall provide verification of the estimated program savings through direct utility billing comparisons, engineering calculations and/or field measurements.

M&V methods can differ based on the type, size and complexity of the project, as well as the availability of data, level of assurance of saving, financing constraints, and energy costs. The M&V methods used for this project are detailed herein and were selected to be the most cost effective while still providing a reasonable assurance of the savings calculations.

IPMVP 2012 Volume 1 provides an overview of the IPMVP Options, as illustrated below:

M&V Option	M&V Methodology Description	How Savings Are Calculated
Option A Retrofit Isolation: Key Parameter Measurement	Savings are determined by field measurement of the key performance parameter(s) which define the energy use of the EEM's affected system(s) and/or the success of the project. Measurement frequency ranges from short-term to continuous, depending on the expected variations in the measured parameter, and the length of the reporting period. Parameters not selected for field measurement are estimated. Estimates can be based on historical data, manufacturer's specifications, or engineering judgment. Documentation of the source or justification of the estimated parameter is required. The plausible savings error arising from estimation rather than measurement is evaluated.	Engineering calculation of baseline and reporting period energy from short-term or continuous measurements of key operating parameter(s) and estimated values. Routine and non-routine adjustments as required.
Option B Retrofit Isolation: All Parameter Measurement	Savings are determined by field measurement of the energy use of the EEM-affected system. Measurement frequency ranges from short-term to continuous, depending on the expected variations in the savings and the length of the reporting period.	Short-term or Continuous measurements of baseline and reporting period energy, and/or engineering computations using measurements of proxies of energy use. Routine and non-routine adjustments as required.
Option C Whole Facility	Savings are determined by measuring energy use at the whole facility or sub-facility level. Continuous measurements of the entire facility's energy use are taken throughout the reporting period.	Analysis of whole facility baseline and reporting period (utility) meter data. Routine adjustments as required, using techniques such as simple comparison or regression analysis. Non-routine adjustments as required.
Option D Calibrated Simulation	Savings are determined through simulation of the energy use of the whole facility, or of a sub-facility. Simulation routines are demonstrated to adequately model actual energy performance measured in the facility. This Option usually requires considerable skill in calibrated simulation.	Energy use simulation, calibrated with hourly or monthly utility billing data. (Energy end use metering may be used to help refine input data.)

Selected Measurement and Verification Options

The below table illustrates the selected IPMVP Options for the EEMs covered under this M&V plan:

ECM #	Type	Measure Description	Lighting Upgrades	HVAC Upgrades	Electrical Upgrades	Process Improvements
1	EEM Interior Lighting	Replace Interior Linear Fluorescent Lighting with LED Tubes and Compatible Ballast	Option A & C			
2	EEM Interior Lighting	Replace Select Interior Incandescent and Compact Fluorescent Lighting with LED Lamps	Option A & C			
3	EEM Interior Lighting	Replace Select Interior Incandescent and Compact Fluorescent Lighting with LED Recessed Can Downlight Retrofit	Option A & C			
4	EEM Interior Lighting	Replace Select Interior Metal Halide and High Pressure Sodium Lighting with LED Fixtures	Option A & C			
5	Exterior Lighting	Replace Select Exterior Lighting with LED Fixtures	Option A & C			
6	Electric Distribution	Replace Old, Inefficient Transformers with New High Efficiency Transformers			Option A & C	
7	HVAC	Replace Old, Inefficient HVAC with New High Efficiency HVAC		Option A & C		
8	HVAC	For Lab Bldg. Replace the Older Undersized Chiller & AHU #3 with New High Efficiency Equipment		Option A & C		
9	HVAC	For Admin Bldg. Replace Older HVAC Units with a Combination of High Eff. Pack. Gas/Elect Units, Heat Recovery VRF System & Ductless Splits		Option A & C		
10	Process	Install VFDs on Make-Up Air Units and Odor Control Fans Controlled by H2S Meters Output				Option A & C
11	Process	Optimization of the Aeration Distribution System by Replacing the Diffusers and Iris Valves to a more Efficient Style				Option A & C
12	Process	Optimization of RAS & WAS Pumping Operations				Option A & C

The particular options selected for each EEM were based on a number of related issues including: EEM complexity, EEM cost, EEM savings, cost of M&V and the ability to accurately determine holistic building operations. If more than one option is selected, either option will be considered valid by ABS and the Purchaser. The baseline and the post-installation energy use depend on various system and external factors, such as utilized setpoints, energy demand, operating hours, occupancy, weather conditions, and energy rates. Development of the baseline, post installation consumption, cost avoidances and simple payback for each EEM covered by this M&V plan includes:

- Stipulated Values – These agreed upon values are important in the overall calculations for energy consumption, financial calculations, and operating conditions.
- Developed/Measured Values – These are the values determined by spot or short-term measurement. Values are determined based on a sound engineering approach to variable determination. Both values used for baseline consumption and values to be measured/determined as parts of the post installation are detailed.
- Assumptions – Some values that are assumed in order to calculate energy use are necessary in certain circumstances.
- Calculations – The necessary calculations for baseline energy usage, costing, and annual savings for evaluating the estimated and actual savings of EEMs.
- Pre-Retrofit Measurements – EEMs may have a section detailing the measurements required prior to the retrofit. These measurements are used to establish the baseline or adjustments required to establish an accurate baseline.
- Post Retrofit Measurements – EEMs may have a section that details the measurements required if any after the retrofit is completed. This section is utilized to detail the type of measurements required for verification of the energy savings calculations.
- Adjustments – EEMs may have a section for adjustments. This section includes possible adjustments to the actual Energy Audit Report and energy information, appropriate adjustments to the M&V plan, and adjustments to any savings guarantee. This section is utilized to anticipate changes necessary due to field conditions and provide an appropriate response in the verification of actual energy and cost avoidances.



- Commissioning – EEMs may have a section regarding the commissioning process. This provides the detail for how the savings will be verified upon project completion, and the type of inspection that will be completed, and the billing method for verified savings. This section is utilized to provide a standard approach for each EEM upon project completion.

ABS will follow the agreed-upon M&V protocols for the measurement period and will prepare post installation reports with supporting documentation for the Purchaser.

Measurement and Verification Plan

IPMVP Option A: Retrofit Isolation, Key Parameter Measurement For Lighting System Upgrades

M&V Procedure

This option provides for the measurement of at least one variable pre and post retrofit with other variables allowed for stipulation. For this retrofit, a representative sample of each of the fixture types will be measured. The same sample will be used for both pre and post retrofit calculations. Wattage shall be measured with an appropriate instrument that is properly calibrated.

Stipulated Values

Operating Hours are stipulated for purposes of M&V. Please refer to the Lighting Systems Attachment in the Installation Agreement for a complete list of lighting hours of operation. Stipulated values are agreed to by the Purchaser.

Adjustments

For this EEM, the following adjustments are allowed for purposes of Measurement and Verification:

- Light level requirements may be modified as detailed in this plan.
- Changes in actual construction including the number and/or type of lighting fixtures.
- Utility rates, billing days or degree days.

Savings Calculations

The calculations for the baseline energy consumption and post retrofit savings shall be completed in accordance with the industry guidelines set forth by IPMVP and methods indicated below.

$$kWh\ Savings = [(Existing\ Watts / Fixture) \times (Existing\ Quantity) \times (Existing\ Hours\ of\ Operation) / 1000] - [(Proposed\ Watts / Fixture) \times (Proposed\ Quantity) \times (Proposed\ Hours\ of\ Operation) / 1000]$$

$$Dollar\ Savings = (kWh\ Savings) \times (Average\ Utility\ Baseline\ \$/kWh\ Rate)$$

Operational Savings

The Purchaser will realize maintenance and operational savings resulting from the new system installations, extended warranties, and/or service agreements provided by ABS. The operational savings are based on CEC guidelines and are stipulated and met upon the completed installation of the energy retrofit contract.

Commissioning

Commissioning shall consist of inspections and a final verification report. Inspections shall consist of:

- During construction, ABS shall maintain a detailed record of the types and quantities of fixtures retrofitted and fixtures installed in each facility. A post construction inspection is required by the responsible M&V party.
- After lighting modifications have been completed, the installations shall be inspected to verify counts by fixture code.
- Post-retrofit lighting levels shall be measured to verify compliance with the contract standards.

Measurement and Verification Plan

IPMVP Option A: Retrofit Isolation, Key Parameter Measurement For HVAC System Upgrades

M&V Procedure

This option shall provide for the measurement of at least one variable pre- and post-retrofit with other variables allowed for stipulation. For this retrofit, field data shall be collected which includes, unit counts, unit capacity, nameplate electrical data and efficiency rating for each existing HVAC system.

Stipulated Values

Hours of operation, heating/cooling loads and runtime hours of the existing HVAC systems are stipulated for purposes of M&V. Please refer to the table titled "Fresno WWTP HVAC Controls Operating Parameters" in the below controls section for specific operating hours and runtime hours for each HVAC unit or area. Stipulated values are agreed to by Purchaser.

Adjustments

None required for this EEM.

Savings Calculations

The calculations for the baseline energy consumption and post retrofit savings shall be completed in accordance with the industry guidelines set forth by IPMVP and methods indicated below.

$$kWh\ Savings = [(Capacity\ of\ Existing\ HVAC\ Unit) \times (Existing\ Unit\ Efficiency) \times (Stipulated\ Load\ Factor)] - [(Capacity\ of\ New\ HVAC\ Unit) \times (New\ Unit\ Efficiency) \times (Stipulated\ Load\ Factor)] \times (Annual\ Hours\ of\ Operation)$$

$$Dollar\ Savings = (kWh\ Savings) \times (Average\ Utility\ Baseline\ \$/kWh\ Rate)$$

Operational Savings

The Purchaser will realize maintenance and operational savings resulting from the new system installations, extended warranties, and/or service agreements provided by ABS. The operational savings are based on CEC guidelines and are stipulated and met upon the completed installation of the energy retrofit contract.

Commissioning

Commissioning shall consist of inspections and a final verification report. Inspections shall consist of:

- ABS shall include verification that each new unit is operating as specified in all modes (heat/cool).

Control Operating Parameters

Fresno WWTP HVAC Controls Operating Parameters		
Area	Est. Annual Current Hours	Notes
Administrative Building	4,912	Precision Cooling 24/7
Old Training Center	4,912	
Lab Building	8,760	Central Plant Optimized Sequence of Operation
Field Maint	8,760	
Maintenance	8,760	
Digester Bldg.	8,760	
Head Works	8,760	
Process Areas	8,760	

Measurement and Verification Plan

IPMVP Option A: Retrofit Isolation, Key Parameter Measurement For Transformer Upgrades

M&V Procedure

This option provides for the measurement of at least one variable pre and post retrofit with other variables allowed for stipulation. For this retrofit, a representative sample of each of the transformer types will be measured. The same sample will be used for both pre and post retrofit calculations. Wattage shall be measured with an appropriate instrument that is properly calibrated.

Stipulated Values

Operating Hours are stipulated for purposes of M&V. The hours of operation will match the hours the facilities were operating during the baseline period. The transformers are energized 24/7 year-round for all facilities. Stipulated values are agreed to by the Purchaser. The below table illustrates stipulated existing and proposed transformer losses and percentage loading based on extensive field measurements:

Transformer kVA	# Units	Existing Equipment		Proposed Equipment		Savings	
		Loss (kW)	Annual Loss (kWh)	Loss (kW)	Annual Loss (kWh)	kW Savings	kWh Savings
30	4	0.48	4173	0.07	594	0.41	3579
37.5	4	0.55	4839	0.07	584	0.49	4255
45	6	0.65	5737	0.09	801	0.56	4936
50	3	0.58	5085	0.08	772	0.50	4313
112.5	1	1.22	10720	0.19	1653	1.04	9067
300	2	2.60	22745	0.42	3703	2.18	19042

Adjustments

For this EEM, the following adjustments are allowed for purposes of Measurement and Verification:

- Utility rates, billing days or degree days.

Savings Calculations

The calculations for the baseline energy consumption and post retrofit savings shall be completed in accordance with the industry guidelines set forth by IPMVP and methods indicated below.

$$kWh \text{ Saving} = EXISTING \left[\frac{(No \text{ Load Losses} + (On \% \text{ Loading})^2 * (Full \text{ Load Losses} - No \text{ Load Losses}))}{1000} * (Operation \text{ Hours}) + \frac{(No \text{ Load Losses} + (OFF \% \text{ Loading})^2 * (Full \text{ Load Losses} - No \text{ Load Losses}))}{1000} * (Operation \text{ Hours}) \right] - PROPOSED \left[\frac{(No \text{ Load Losses} + (On \% \text{ Loading})^2 * (Full \text{ Load Losses} - No \text{ Load Losses}))}{1000} * (Operation \text{ Hours}) + \frac{(No \text{ Load Losses} + (OFF \% \text{ Loading})^2 * (Full \text{ Load Losses} - No \text{ Load Losses}))}{1000} * (Operation \text{ Hours}) \right]$$

$$Dollar \text{ Savings} = (kWh \text{ Savings}) * (Average \text{ Utility Baseline } \$ / kWh \text{ Rate})$$

Operational Savings

The Purchaser will realize maintenance and operational savings resulting from the new system installations, extended warranties, and/or service agreements provided by ABS. The operational savings are based on CEC guidelines and are stipulated and met upon the completed installation of the energy retrofit contract.

Commissioning

Commissioning shall consist of inspections and a final verification report. Inspections shall consist of:

- During construction, ABS shall maintain a detailed record of the types and quantities of fixtures retrofitted and fixtures installed in each facility. A post construction inspection is required by the responsible M&V party.

Measurement and Verification Plan

IPMVP Option A: Retrofit Isolation, Key Parameter Measurement For Odor Control Upgrades of MUA and Exhaust Fans

M&V Procedure

This option provides for the measurement of at least one variable pre and post retrofit with other variables allowed for stipulation. For this retrofit, a detailed series of pre-measurements were taken for a representation of baseline performance. These measurements were taken as part of the PG&E incentive program. This sample will be used as the representative of baseline energy consumption. In the post retrofit sampling the electrical parameters such as electrical load (kW) will be measured over a period of time to provide a representative performance of the system(s). This electrical measurement will be able to provide the projected duty cycle and load factor of the individual systems to extrapolate the annual performance of the post retrofit system. The post-retrofit relative to the baseline will provide energy savings for the system. Electrical measurements will be planned to be collected from the existing SCADA control system.

Stipulated Values

Operating Hours are based upon wastewater loads as collected during the baseline period. The hours of operation used for the calculations will match the hours the facilities were operating during the baseline period.

Adjustments

For this EEM, the following adjustments are allowed for purposes of Measurement and Verification:

- Utility rates, changes to operating practices.

Savings Calculations

The calculations for the baseline energy consumption and post retrofit savings shall be completed in accordance with the industry guidelines set forth by IPMVP and methods indicated below.

kWh Saving = EXISTING kWh – PROPOSED kWh

EXISTING = [Avg Motor Load (kW)](Operation Hours) by Motor*
PROPOSED= [Avg Motor Load (kW)](Operation Hours) by Motor*

Dollar Savings = (kWh Savings) x (Average Utility Rate \$/kWh Rate)

Operational Savings

The Purchaser will realize maintenance and operational savings resulting from the new system installations, extended warranties, and/or service agreements provided by ABS. The operational savings are based on CEC guidelines and are stipulated and met upon the completed installation of the energy retrofit contract.

Commissioning

Commissioning shall consist of inspections and a final verification report.

Measurement and Verification Plan

IPMVP Option A: Retrofit Isolation, Key Parameter Measurement

For Optimization of the Aeration Distribution System by Replacing the Diffusers and Iris Valves to a more Efficient Style

M&V Procedure

This option provides for the measurement of at least one variable pre and post retrofit with other variables allowed for stipulation. For this retrofit, a detailed series of pre-measurements were taken for a representation of baseline performance. These measurements were taken as part of the PG&E incentive program. This sample will be used as the representative of baseline energy consumption. In the post retrofit sampling the electrical parameters such as electrical load (kW) will be measured over a period of time to provide a representative performance of the system(s). This electrical measurement will be able to provide the projected duty cycle and load factor of the individual systems to extrapolate the annual performance of the post retrofit system. The post-retrofit relative to the baseline will provide energy savings for the system. Electrical measurements will be planned to be collected from the existing SCADA control system.

Stipulated Values

Operating Hours are based upon wastewater loads as collected during the baseline period. The hours of operation used for the calculations will match the hours the facilities were operating during the baseline period.

Adjustments

For this EEM, the following adjustments are allowed for purposes of Measurement and Verification:

- Utility rates, changes to operating practices.

Savings Calculations

The calculations for the baseline energy consumption and post retrofit savings shall be completed in accordance with the industry guidelines set forth by IPMVP and methods indicated below.

$$kWh \text{ Saving} = \text{EXISTING kWh} - \text{PROPOSED kWh}$$

$$\begin{aligned} \text{EXISTING} &= [\text{Avg Motor Load (kW)}] * (\text{Operation Hours}) \text{ by Motor} \\ \text{PROPOSED} &= [\text{Avg Motor Load (kW)}] * (\text{Operation Hours}) \text{ by Motor} \end{aligned}$$

$$\text{Dollar Savings} = (\text{kWh Savings}) \times (\text{Average Utility Rate } \$/\text{kWh Rate})$$

Operational Savings

The Purchaser will realize maintenance and operational savings resulting from the new system installations, extended warranties, and/or service agreements provided by ABS. The operational savings are based on CEC guidelines and are stipulated and met upon the completed installation of the energy retrofit contract.

Commissioning

Commissioning shall consist of inspections and a final verification report.

Measurement and Verification Plan

IPMVP Option A: Retrofit Isolation, Key Parameter Measurement For Optimization of RAS & WAS Pumping Operations

M&V Procedure

This option provides for the measurement of at least one variable pre and post retrofit with other variables allowed for stipulation. For this retrofit, a detailed series of pre-measurements were taken for a representation of baseline performance. These measurements were taken as part of the PG&E incentive program. This sample will be used as the representative of baseline energy consumption. In the post retrofit sampling the electrical parameters such as electrical load (kW) will be measured over a period of time to provide a representative performance of the system(s). This electrical measurement will be able to provide the projected duty cycle and load factor of the individual systems to extrapolate the annual performance of the post retrofit system. The post-retrofit relative to the baseline will provide energy savings for the system. Electrical measurements will be planned to be collected from the existing SCADA control system.

Stipulated Values

Operating Hours are based upon wastewater loads as collected during the baseline period. The hours of operation used for the calculations will match the hours the facilities were operating during the baseline period.

Adjustments

For this EEM, the following adjustments are allowed for purposes of Measurement and Verification:

- Utility rates, changes to operating practices.

Savings Calculations

The calculations for the baseline energy consumption and post retrofit savings shall be completed in accordance with the industry guidelines set forth by IPMVP and methods indicated below.

kWh Saving = EXISTING kWh – PROPOSED kWh

EXISTING = [Avg Motor Load (kW)](Operation Hours) by Motor*
PROPOSED= [Avg Motor Load (kW)](Operation Hours) by Motor*

Dollar Savings = (kWh Savings) x (Average Utility Rate \$/kWh Rate)

Operational Savings

The Purchaser will realize maintenance and operational savings resulting from the new system installations, extended warranties, and/or service agreements provided by ABS. The operational savings are based on CEC guidelines and are stipulated and met upon the completed installation of the energy retrofit contract.

Commissioning

Commissioning shall consist of inspections and a final verification report.

Measurement and Verification Plan

IPMVP Option C: Whole Facility

M&V Procedure

The Measurement and Verification (M&V) Plan following IPMVP Option C protocol is designed to evaluate the energy performance of the whole facility, not just individual EEMs. The energy performance is assessed through utility meters, whole-facility meters, or sub-meters. The measurement boundary encompasses either the whole facility or a major section of the facility where EEMs were installed. Option C determines the combined savings of all the EEMs installed at the facility and is monitored by the associated energy meter. Savings reported under this Option will include the positive or negative effects of any non-EEM changes made in the facility because whole-facility meters are used.

Adjustments

Adjustments will be computed from identifiable physical facts about the energy governing characteristics of equipment within the measurement boundary. Adjustments are used to express both pieces of measured energy data under the same set of conditions. Two types of adjustments are possible:

- *Routine Adjustments* are used to account for any energy-governing factors, expected to change routinely during the reporting period. Routine Adjustments are completed by developing a mathematical model of each meter's energy-use pattern. Typically, the baseline model includes factors derived from regression analysis, which correlates energy to one or more independent variables such as occupancy, weather, and metering period length. Values of independent variables over the reporting period can be inputted into the baseline model to predict what the baseline energy consumption would have been had if no EEM's were installed.
- *Non-Routine Adjustments* are used to account for those energy-governing factors which are not usually expected to change, such as: the facility size, the design and operation of installed equipment, or the type of occupants. ABS will monitor these static factors for change throughout the reporting period. Adjustments will be based on industry standards and sound engineering principles as they pertain to the specific affected system.

Metering

Whole-facility energy measurements can use the utility's meters. Utility meter data is considered 100% accurate for determining savings because this data defines the payment for energy. The energy supplier's meter(s) may be equipped or modified to provide output that can be recorded by the facility's monitoring equipment. Meter data can be hourly, daily or monthly whole-facility data.

Savings Calculations

The calculations for the baseline energy consumption and post retrofit savings shall be completed in accordance with the industry guidelines set forth by IPMVP and ASHRAE. The baseline period and reporting period should use complete years of continuous data (12, 24, or 36 months). The electrical consumption reduction of the facility (measured in kWh and/or kW) shall be reported as Savings, or Avoided Energy Use, in which the savings are stated under the conditions of the reporting period and determined by the following equation:

$$\text{Energy Savings (Avoided Energy Use)} = (\text{Baseline Energy} \pm \text{Routine Adjustments to reporting-period conditions} \pm \text{Non-Routine Adjustments to reporting-period conditions}) - \text{Reporting-Period Energy}$$

The price schedule of the reporting period will be used to compute the "avoided cost" on a meter-by-meter basis. The price schedule will be obtained from the utility and will include all elements that are affected by metered amounts, such as consumption charges, demand charges, power factor, and demand ratchets. In the event of a significant decrease in energy prices, the price schedule used for savings reporting will be that which prevailed at the time of commitment to the investment. Cost savings are determined by applying the appropriate rate / price schedule in the following equation:

$$\text{Cost Savings (Avoided Cost)} = \text{Cost of Baseline Energy} - \text{Cost of Reporting-Period Energy}$$

Attachment 2

Utility Baseline Summary

Fresno WWTP Combined Electric Utility Data, March 2022 - February 2023													
Month	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Total / Max
Total kWh	4,248,021	3,692,709	4,424,474	4,208,240	4,296,083	4,783,528	4,113,850	4,128,736	3,819,952	3,999,487	4,054,650	3,824,664	49,594,393
Total Cost	\$ 562,404	\$ 503,428	\$ 696,754	\$ 826,119	\$ 826,664	\$ 908,726	\$ 801,226	\$ 616,676	\$ 573,480	\$ 598,761	\$ 645,259	\$ 623,464	\$ 8,182,961
Avg Cost	\$ 0.1324	\$ 0.1363	\$ 0.1575	\$ 0.1963	\$ 0.1924	\$ 0.1900	\$ 0.1948	\$ 0.1494	\$ 0.1501	\$ 0.1497	\$ 0.1591	\$ 0.1630	\$ 0.1650

Meter #1010078429 (Stand-By) Electric Utility Data, March 2022 - February 2023													
Month	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Total / Max
Total kWh	108	97	252,292	40	43	3,978	6,174	5,571	5,773	5,940	3,557	54	283,626
Total Cost	\$ 521	\$ 515	\$ 142,610	\$ 765	\$ 1,023	\$ 1,555	\$ 1,873	\$ 1,458	\$ 1,300	\$ 1,328	\$ 1,016	\$ 534	\$ 154,497
Avg Cost	\$ 4.8207	\$ 5.3012	\$ 0.5653	\$ 19.3083	\$ 23.6729	\$ 0.3909	\$ 0.3034	\$ 0.2616	\$ 0.2252	\$ 0.2236	\$ 0.2857	\$ 9.8980	\$ 0.5447

Meter #28P607 Electric Utility Data, March 2022 - February 2023													
Month	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Total / Max
Total kWh	4,247,913	3,692,612	4,172,182	4,208,200	4,296,040	4,779,550	4,107,676	4,123,165	3,814,179	3,993,547	4,051,093	3,824,610	49,310,767
Total Cost	\$ 561,884	\$ 502,913	\$ 554,144	\$ 825,354	\$ 825,641	\$ 907,171	\$ 799,353	\$ 615,218	\$ 572,180	\$ 597,433	\$ 644,243	\$ 622,930	\$ 8,028,464
Avg Cost	\$ 0.1323	\$ 0.1362	\$ 0.1328	\$ 0.1961	\$ 0.1922	\$ 0.1898	\$ 0.1946	\$ 0.1492	\$ 0.1500	\$ 0.1496	\$ 0.1590	\$ 0.1629	\$ 0.1628

Attachment 3
Energy Project Cashflow



Exhibit B**INSURANCE REQUIREMENTS****Contractor Service Agreement between City of Fresno (City)
and Alliance Building Solutions Incorporated (Design/Builder)****Fresno-Clovis Regional Wastewater Reclamation Facility Energy Savings and
Sustainability Capital Improvements Project**

(a) Throughout the life of this Agreement, DESIGN/BUILDER shall pay for and maintain in full force and effect all insurance as required herein with an insurance company(ies) either (i) admitted by the California Insurance Commissioner to do business in the State of California and rated no less than "A-VII" in the Best's Insurance Rating Guide, or (ii) as may be authorized in writing by CITY'S Risk Manager or his/her designee at any time and in his/her sole discretion. The required policies of insurance as stated herein shall maintain limits of liability of not less than those amounts stated therein. However, the insurance limits available to CITY, its officers, officials, employees, agents and volunteers as additional insureds, shall be the greater of the minimum limits specified therein or the full limit of any insurance proceeds to the named insured.

(b) If at any time during the life of the Agreement or any extension, DESIGN/BUILDER or any of its subcontractors fail to maintain any required insurance in full force and effect, all services and work under this Agreement shall be discontinued immediately, and all payments due or that become due to DESIGN/BUILDER shall be withheld until notice is received by CITY that the required insurance has been restored to full force and effect and that the premiums therefore have been paid for a period satisfactory to CITY. Any failure to maintain the required insurance shall be sufficient cause for CITY to terminate this Agreement. No action taken by CITY pursuant to this section shall in any way relieve DESIGN/BUILDER of its responsibilities under this Agreement. The phrase "fail to maintain any required insurance" shall include, without limitation, notification received by CITY that an insurer has commenced proceedings, or has had proceedings commenced against it, indicating that the insurer is insolvent.

(c) The fact that insurance is obtained by DESIGN/BUILDER shall not be deemed to release or diminish the liability of DESIGN/BUILDER, including, without limitation, liability under the indemnity provisions of this Agreement. The duty to indemnify CITY shall apply to all claims and liability regardless of whether any insurance policies are applicable. The policy limits do not act as a limitation upon the amount of indemnification to be provided by DESIGN/BUILDER. Approval or purchase of any insurance contracts or policies shall in no way relieve from liability nor limit the liability of DESIGN/BUILDER, vendors, suppliers, invitees, contractors, sub-contractors, subcontractors, or anyone employed directly or indirectly by any of them.

Coverage shall be at least as broad as:

1. The most current version of Insurance Services Office (ISO) Commercial General Liability Coverage Form CG 00 01, providing liability coverage arising out of your business operations. The Commercial General Liability policy shall be written on an occurrence form and shall provide coverage for "bodily injury," "property damage" and "personal and advertising injury" with coverage for premises and operations (including the use of owned and non-owned equipment), products and completed operations, and contractual liability (including, without limitation, indemnity obligations under the Agreement) with limits of liability not less than those set forth under "Minimum Limits of Insurance."
2. The most current version of ISO *Commercial Auto Coverage Form CA 00 01, providing liability coverage arising out of the ownership, maintenance or use of automobiles in the course of your business operations. The Automobile Policy shall be written on an occurrence form and shall provide coverage for all owned, hired, and non-owned automobiles or other licensed vehicles (Code 1- Any Auto). If personal automobile

coverage is used, the CITY, its officers, officials, employees, agents and volunteers are to be listed as additional insureds.

3. Workers' Compensation insurance as required by the State of California and Employer's Liability Insurance.
4. Professional Liability (Errors and Omissions) insurance appropriate to DESIGN/BUILDER's profession.

MINIMUM LIMITS OF INSURANCE DESIGN/BUILD DEVELOPER

DESIGN/BUILDER shall procure and maintain for the duration of the contract, and for 5 years thereafter, insurance with limits of liability not less than those set forth below. However, insurance limits available to CITY, its officers, officials, employees, agents and volunteers as additional insureds, shall be the greater of the minimum limits specified herein or the full limit of any insurance proceeds available to the named insured:

1. **COMMERCIAL GENERAL LIABILITY**

- (i) \$2,000,000 per occurrence for bodily injury and property damage;
- (ii) \$2,000,000 per occurrence for personal and advertising injury;
- (iii) \$4,000,000 aggregate for products and completed operations; and,
- (iv) \$4,000,000 general aggregate applying separately to the work performed under the Agreement.

2. **COMMERCIAL AUTOMOBILE LIABILITY**

\$1,000,000 per accident for bodily injury and property damage.

3. **Workers' Compensation Insurance as required by the State of California with statutory limits and EMPLOYER'S LIABILITY with limits of liability not less than:**

- (i) \$1,000,000 each accident for bodily injury;
- (ii) \$1,000,000 disease each employee; and,
- (iii) \$1,000,000 disease policy limit.

4. **PROFESSIONAL LIABILITY** (Errors and Omissions):

- (i) \$1,000,000 per claim/occurrence; and,
- (ii) \$2,000,000 policy aggregate.

5. **BUILDERS RISK** (Course of Construction) insurance in an amount equal to the completed value of the project with no coinsurance penalty provisions. **(Only required if the project includes new construction of a building, or renovation of, or addition to, an existing building.)**

6. **CONTRACTORS POLLUTION LEGAL LIABILITY** with coverage for bodily injury, property damage or pollution clean-up costs that could result from of pollution condition, both sudden and gradual. Including a discharge of pollutants brought to the work site, a release of pre-

existing pollutants at the site, or other pollution conditions with limits of liability of not less than the following:

- (i) \$2,000,000 per occurrence or claim; and,
- (ii) \$4,000,000 general aggregate per annual policy period.

- (a) In the event this Agreement involves the transportation of hazardous material, either the Commercial Automobile policy or other appropriate insurance policy shall be endorsed to include *Transportation Pollution Liability insurance* covering materials to be transported by DESIGN/BUILDER pursuant to the Agreement.

UMBRELLA OR EXCESS INSURANCE

In the event DESIGN/BUILDER purchases an Umbrella or Excess insurance policy(ies) to meet the "Minimum Limits of Insurance," this insurance policy(ies) shall "follow form" and afford no less coverage than the primary insurance policy(ies). In addition, such Umbrella or Excess insurance policy(ies) shall also apply on a primary and non-contributory basis for the benefit of the CITY, its officers, officials, employees, agents and volunteers.

DEDUCTIBLES AND SELF-INSURED RETENTIONS

DESIGN/BUILDER shall be responsible for payment of any deductibles contained in any insurance policy(ies) required herein and DESIGN/BUILDER shall also be responsible for payment of any self-insured retentions. Any deductibles or self-insured retentions must be declared on the Certificate of Insurance, and approved by, the CITY'S Risk Manager or his/her designee. At the option of the CITY'S Risk Manager or his/her designee, either:

- (i) The insurer shall reduce or eliminate such deductibles or self-insured retentions as respects CITY, its officers, officials, employees, agents and volunteers; or
- (ii) DESIGN/BUILDER shall provide a financial guarantee, satisfactory to CITY'S Risk Manager or his/her designee, guaranteeing payment of losses and related investigations, claim administration and defense expenses. At no time shall CITY be responsible for the payment of any deductibles or self-insured retentions.

OTHER INSURANCE PROVISIONS/ENDORSEMENTS

- (i) All policies of insurance required herein shall be endorsed to provide that the coverage shall not be cancelled, non-renewed, reduced in coverage or in limits except after thirty (30) calendar days written notice has been given to CITY, except ten (10) days for nonpayment of premium. DESIGN/BUILDER is also responsible for providing written notice to the CITY under the same terms and conditions. Upon issuance by the insurer, broker, or agent of a notice of cancellation, non-renewal, or reduction in coverage or in limits, DESIGN/BUILDER shall furnish CITY with a new certificate and applicable endorsements for such policy(ies). In the event any policy is due to expire during the work to be performed for CITY, DESIGN/BUILDER shall provide a new certificate, and applicable endorsements, evidencing renewal of such policy not less than fifteen (15) calendar days prior to the expiration date of the expiring policy.
- (ii) The Commercial General and Automobile Liability insurance policies shall be written on an occurrence form. The Contractors Pollution Liability insurance policy shall be written on either an occurrence form, or a claims-made form.

- (iii) The Commercial General, Automobile and Contractors Pollution Liability insurance policies shall be endorsed to name City, its officers, officials, agents, employees and volunteers as an additional insured. DESIGN/BUILDER shall establish additional insured status for the City and for all ongoing and completed operations under both Commercial General and Commercial Pollution Liability policies by use of ISO Forms or an executed manuscript insurance company endorsement providing additional insured status. The Commercial General endorsements must be as broad as that contained in ISO Forms: GC 20 10 11 85 or both CG 20 10 & CG 20 37.
- (iv) All such policies of insurance shall be endorsed so the DESIGN/BUILDERS' insurance shall be primary and no contribution shall be required of City. The coverage shall contain no special limitations on the scope of protection afforded to City, its officers, officials, employees, agents and volunteers. If DESIGN/BUILDER maintains higher limits of liability than the minimums shown above, City requires and shall be entitled to coverage for the higher limits of liability maintained by DESIGN/BUILDER.
- (v) Should any of these policies provide that the defense costs are paid within the Limits of Liability, thereby reducing the available limits by defense costs, then the requirement for the Limits of Liability of these policies will be twice the above stated limits.
- (vi) For any claims related to this Agreement, DESIGN/BUILDER'S insurance coverage shall be primary insurance with respect to the CITY, its officers, officials, agents, employees and volunteers. Any insurance or self-insurance maintained by the CITY, its officers, officials, agents, employees and volunteers shall be excess of the DESIGN/BUILDER'S insurance and shall not contribute with it.
- (vii) The Workers' Compensation insurance policy shall contain, or be endorsed to contain, a waiver of subrogation as to CITY, its officers, officials, agents, employees and volunteers.
- (viii) The Builder's Risk Insurance shall have the policy endorsed to provide the City of Fresno to be named as a Loss Payee.

If the Professional (Errors and Omissions) policy is written on a claims-made form:

1. The retroactive date must be shown, and must be before the effective date of the Agreement or the commencement of work by DESIGN/BUILDER.
2. Insurance must be maintained and evidence of insurance must be provided for at least five (5) years after completion of the Agreement work or termination of the Agreement, whichever occurs first, or, in the alternative, the policy shall be endorsed to provide not less than a five (5) year discovery period.
3. If coverage is canceled or non-renewed, and not replaced with another claims-made policy form with a retroactive date prior to the effective date of the Agreement or the commencement of work by DESIGN/BUILDER, DESIGN/BUILDER must purchase "extended reporting" coverage for a minimum of five (5) years completion of the Agreement work or termination of the Agreement, whichever occurs first.
4. A copy of the claims reporting requirements must be submitted to CITY for review.
5. These requirements shall survive expiration or termination of the Agreement.

PROVIDING OF DOCUMENTS - DESIGN/BUILDER shall furnish CITY with all certificate(s) and applicable endorsements effecting coverage required herein **All certificates and applicable endorsements are to be received and approved by the CITY'S Risk Manager or his/her designee prior to CITY'S execution of the Agreement and before work commences.** All

non-ISO endorsements amending policy coverage shall be executed by a licensed and authorized agent or broker. Upon request of CITY, DESIGN/BUILDER shall immediately furnish CITY with a complete copy of any insurance policy required under this Agreement, including all endorsements, with said copy certified by the underwriter to be a true and correct copy of the original policy. This requirement shall survive expiration or termination of this Agreement. All subcontractors working under the direction of DESIGN/BUILDER shall also be required to provide all documents noted herein.

CLAIMS-MADE POLICIES - If any coverage required is written on a claims-made coverage form:

- (i) The retroactive date must be shown, and must be before the effective date of the Agreement or the commencement of work by DESIGN/BUILDER.
- (ii) Insurance must be maintained and evidence of insurance must be provided for at least five (5) years after completion of the work or termination of the Agreement, whichever first occurs.
- (iii) If coverage is canceled or non-renewed, and not replaced with another claims-made policy form with a retroactive date prior to the effective date of the Agreement, or work commencement date, DESIGN/BUILDER must purchase "extended reporting" period coverage for a minimum of five (5) years after completion of the work or termination of the Agreement, whichever first occurs.
- (iv) A copy of the claims reporting requirements must be submitted to CITY for review.
- (v) These requirements shall survive expiration or termination of the Agreement.

SUBCONTRACTORS -If DESIGN/BUILDER subcontracts any or all of the services to be performed under this Agreement, DESIGN/BUILDER shall require, at the discretion of the CITY Risk Manager or designee, subcontractor (s) to enter into a separate Side Agreement with the City to provide required indemnification and insurance protection. Any required Side Agreement(s) and associated insurance documents for the subcontractors must be reviewed and preapproved by CITY Risk Manager or designee. If no Side Agreement is required, DESIGN/BUILDER shall require and verify that subcontractors maintain insurance meeting all the requirements stated herein and DESIGN/BUILDER shall ensure that CITY, its officers, officials, employees, agents and volunteers are additional insureds. The subcontractors' certificates and endorsements shall be on file with DESIGN/BUILDER, and CITY, prior to commencement of any work by the subcontractors.