DOCKETED	
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Project Title:	SJ2
TN #:	234057
Document Title:	Applicants Substantive Responses to CURE Data Request, Set 1
Description:	N/A
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Organization:	Jacobs
Submitter Role:	Applicant Consultant
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Docketed Date:	7/29/2020

STATE OF CALIFORNIA

Energy Resources Conservation and Development Commission

In the Matter of: Application for Small Power Plant Exemption for the: San José City Data Center	Docket No. 19-SPPE-04

APPLICANT MICROSOFT CORPORATION'S RESPONSE TO DATA REQUESTS FROM CALIFORNIA UNIONS FOR RELIABLE ENERGY

July 29, 2020

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Attorneys for Microsoft Corporation

MICROSOFT CORPORATION'S RESPONSES TO DATA REQUESTS FROM CALIFORNIA UNIONS FOR RELIABLE ENERGY, SET 1

Pursuant to section 1716 of Title 20 of the California Code of Regulations (Section 1716), Microsoft Corporation (Applicant) hereby files the following Responses to the Data Requests, Set 1, filed by California Unions for Reliable Energy (CURE) regarding the San José City Data Center (SJC02) Small Power Plant Exemption (SPPE).

CURE filed a Motion for Leave to File Data Requests on May 28, 2020. On June 29, 2020, Commissioner and Presiding Member Karen Douglas granted the motion. On July 20, 2020, Applicant filed Objections to CURE's Data Requests on the basis that several of the requests do not meet the standard under Section 1716 that the information be "reasonably available to the Applicant" and "relevant to the notice or application proceedings or reasonably necessary to make any decision on the . . . application." (20 Cal. Code Regs., § 1716(b).) Applicant now submits substantive responses to those data requests for which Applicant did not state an objection. The responses are included in **Exhibit A** attached hereto.

Respectfully submitted,

Dated: July 29, 2020

MILLER STARR REGALIA

Nadia L. Costa

_____

Nadia Costa, Esq.
Arielle O. Harris, Esq.

Attorneys for Applicant, Microsoft Corporation

EXHIBIT A

MICROSOFT CORPORATION'S RESPONSES
TO CURE DATA REQUESTS, SET ONE

San José City Data Center
(19-SPPE-04)

Responses to CURE Data Requests Set 1
(Data Requests 1 - 26)

Submitted to
California Energy Commission

Prepared by
Microsoft Corporation

with technical assistance from

JACOBS

July 2020

Contents

Attachments

Introduction

Microsoft Corporation (Microsoft or the Applicant) hereby submits responses to the California Unions for Reliable Energy (CURE) Data Request, Set 1 regarding the San José City Data Center (SJC02) (19-SPPE-04) Small Power Plant Exemption (SPPE).

The responses are grouped by individual discipline or topic area. Within each discipline area, the responses are presented in the same order as CURE presented them and are keyed to the Data Request numbers.

Additional tables, figures, or documents submitted in response to a data request (for example, supporting data, stand-alone documents such as plans, folding graphics, etc.) are found at the end of each discipline-specific section and are not sequentially page-numbered consistently with the remainder of the document, though they may have their own internal page numbering system.

Electricity Demand (Requests 1-2)

1) *Please provide the vendor specification for all of the electrical equipment that would support the project, e.g., IT equipment, ancillary electrical/telecommunication equipment, electrical switchgear, lights, heating etc.*

   Response: An objection to the data request was issued on July 20, 2020.

2) *Please provide calculations that support the estimated electricity usage of 803,730 MWh/yr.*

   Response: An objection to the data request was issued on July 20, 2020. As noted in several places in the Small Power Plant Exemption application, the maximum project electrical use will be limited to 99 megawatts (MW) and the expected electrical use was approximately 92 MWs. The expected electrical demand of 803,730 is calculated as follows - 91.75 MW * 24 hours/day * 365 days/year.

Water Use (Requests 3-9)

3) *Will serve letter from water purveyor*

   Response: An objection to the data request was issued on July 20, 2020.

4) *Water quality data for the reclaimed and potable supplies that will be used by the Project.*

   Response: The Applicant obtained recycled and potable water quality data for the Project from the San José Water Company, as the anticipated local water purveyor that would serve the Project; this data is readily available online. Links to the data used are provided below.

   https://www.sanjoseca.gov/home/showdocument?id=38886

   https://www.sjwater.com/sites/default/files/2019-04/CCR-2018.pdf

5) *Sources of potable water, including imported surface water and groundwater well locations.*

   Response: The Applicant would procure water for the Project from the local water purveyor, the San José Water Company (SJWC). SJWC records indicate that water for the relevant North San José and Alviso areas are a blend of Hetch Hetchy water and treated water from the San Francisco Public Utilities Commission (SFPUC). Groundwater from local deep-water wells in North San José may also be utilized (as was relied upon by SJWC as an additional source in 2019) to supplement the SFPUC supply, resulting in a blend of groundwater and SFPUC water.[1]

6) *Vendor specifications for the adiabatic cooling system.*

   Response: Final equipment selection, which would include, among other things, vendor specifications, would occur during final Project design, and therefore the requested information is not currently available. However, preliminary information about vendor specifications, which is based on currently available information, is presented in Attachment CURE DR-6.

7) *Calculations that support the estimated water consumption of 29.1 AF/yr. of which 9 AF/yr. is potable.*

   Response: The estimated annual average water consumption of 29.1 acre-feet per year is based on an annual average water use of 18.04 gallons per minute (GPM). The primary water use at the facility would be for heat rejection from the adiabatic coolers, which are expected to use water when the ambient temperature exceeds 75 degrees Fahrenheit (F). The estimated 29.1 acre-feet per year of water use is calculated using the following equation:

[1] https://www.sanjoseca.gov/home/showdocument?id=38886

18.04 GPM * 60 min/hour * 8760 hours/year * 3.0688832459704E-6 acre-feet/gal = 29.1 acre-feet/year.

The estimated potable water use of 9 acre-feet per year is based on the expected sanitary and maintenance demands, as well as irrigation of the proposed landscaping to facilitate establishment and maintenance of the plants, trees, and bushes that would be installed as part of the Project pursuant to applicable City requirements.

8) *Chemical composition of recycled water used in the adiabatic cooling system, including HAPs.*

Response: Available information regarding the recycled water quality data is presented in the response to CURE Data Request # 4 above.

9) *An estimate of electricity to convey and treat the Project's water demand.*

Response: An objection to the data request was issued on July 20, 2020.

Diesel Generator Pollutions Controls (Requests 10-19)

10) *Documents cited in response to DR-40, which references "engine manufacturer information on SCR."*

Response: Attachment CURE DR-10 presents the preliminary vendor information for the three proposed sizes of emergency generators based on currently available information.

11) *Vendor specification sheets for the backup diesel generators.*

Response: See the response to CURE Data Request # 10.

12) *All vendor correspondence on SCR and diesel particulate traps for the diesel generators, including specifically vendor support for the NO2/NOx ratio as a function of engine load and the citation to "engine manufacturer information on SCR" cited in response to Staff DR-40.*

Response: See the response to CURE Data Request # 10 and Attachment DR-45 of the Applicant's response to Data Request Set #2 (Transaction Number 232027) for a copy of the vendor supporting information for the NO2/NOx ratio.

13) *Vendor specifications for SCR including type of catalyst, catalyst changeout frequency, catalyst disposal or recycle, ammonia slip limit, and form of ammonia (anhydrous or aqueous).*

Response: See the response to CURE Data Request # 10 for the vendor specification on the Selective Catalytic Reduction (SCR) system and Attachment CURE DR-13 for the urea usage rates.

14) *Assumptions about transformation of ammonia slip in the atmosphere used in air quality modeling.*

Response: Ammonia is not considered a criteria air pollutant, although it is recognized that it contributes to secondary particulate matter formation. When performing the ambient air quality analysis for the Project, the Applicant's technical consultant assumed that for testing and maintenance operations, the generators were not operated for duration time to allow for the SCR systems to achieve the minimum required operating temperature (resulting in higher oxides of nitrogen emissions making the air dispersion modeling analysis more conservative). Therefore, ammonia emissions from the emergency generator operation were not incorporated into the ambient air quality analysis air dispersion modeling when analyzing the Project's operational air quality impacts.

However, the ammonia emissions were included in the operational health risk assessment. For this assessment, the Applicant's technical consultant assumed 5 parts per million by volume ammonia slip level for each size generator (see the SPPE Application Appendix 2 – Transaction Number

230763, Appendix 3.3-B, Table 3, Appendix 3.3-B, Table 4, and Appendix 3.3-B, Table 5) past best available control technology analyses for ammonia slip.

15) *Please provide the following information so the public can fully assess the impacts of the Project: Ammonia supply route(s) for delivery to site.*

Response: An objection to the data request was issued on July 20, 2020.

16) *Vendor guarantees for PM2.5 and PM10 for the diesel particulate traps.*

Response: Attachment CURE DR-13 presents the vendor warranties for the diesel particulate matter filters.

17) *Vendor guarantees, including for all pollutants, as a function of load, for the diesel generators. If no guarantees are currently available, all correspondence relating to performance of the SCRs and diesel particulate traps.*

Response: See the response to CURE Data Request #10 for the vendor warranties and guarantees for the emission control equipment.

18) *Vendor guarantees for compiled NOx emissions in Table DR43-1*

Response: See the response to CURE Data Request #10 for the vendor warranties and guarantees for the emission control equipment.

19) *All correspondence between diesel generator vendor and applicant regarding emissions of any pollutant*

Response: The vendor information provided in the response to CURE Data Request #'s 10 and 12 represent the correspondence related to air emissions between the vendor and the Applicant's engineering contractor.

Health Risk Assessment (Request 20)

20) *Please provide all HARP2 and any other risk assessment modeling files in native electronic format.*

Response: A copy of the air dispersion modeling files, unlocked emission workbooks, and CalEEMod input/output files will be uploaded to a document sharing site. Please contact Mr. Jerry Salamy (jerry.salamy@jacobs.com) to arrange for access to the files.

Air Quality (Requests 21-26)

21) All BAAQMD correspondence and other files per Staff DR 32.

Response: Attachment CURE DR-21 represents the correspondence between the Applicant's consultant and the Bay Area Air Quality Management District received to date in connection with the Project.

22) Unlocked Excel spreadsheets supporting all emission calculations.

Response: See the response to CURE Data Request #20.

23) Unlocked CalEEMod files, showing all inputs and outputs.

Response: See the response to CURE Data Request #20.

24) All estimates of emissions associated with electricity consumption.

Response: An objection to the data request was issued on July 20, 2020.

25) Vendor support for diesel generator source parameters used in modelling including stack height and diameter, exhaust temperature, and exit velocity.

Response: CURE Attachment DR-10 provides the vendors' supporting documentation for the generators exhaust parameters (velocity, temperature, and diameter), based on currently available information. The exhaust stack height was defined by the Applicant's design engineers.

26) Air quality modeling files including all AERMOD input and output files in native electronic format, including supporting pre-processing (BPIP-PRIME, AERMAP) files; all met files in native electronic format, and all plot files in native electronic format

Response: See the response to CURE Data Request #20.

Attachment CURE DR-6 Equipment Specifications

Transmittal No. 000594

Microsoft MWH03 SFF and Sitework
1500 Port Industrial Way,
Quincy, WA 98848

DPR Construction, A General Partnership
Project #: D7-A18006-00
Tel: Fax:

Date:11/26/2018

Transmitted To:	Transmitted By:
Baltimore Aircoil Company 7600 Dorsey Run Road Jessup MD 20794 Paige Lavery Tel: 410-799-6200 Fax:	DPR Construction, A General Partnership Jordan Barroso Tel: 206-276-4242 Fax:

Transmitted For

Delivered Via

Email

Reference	Status	Due Date
23.26-Factory Fabricated Induced Draft Fluid Cooler	Submitted	

#	Qty	Item	Date	Ref	Cycle	Description	Comments	Status
1		Submittal	11/26/18	01085	1	Factory Fabricated Induced Draft Fluid Cooler_Performance Data, Product Data, and Rigging Manual		Waived - Do not Submit

Cc: Company Name	Contact Name

Remarks

Submittal Package Approval Sheet

Microsoft MWH03 SFF and Sitework
1500 Port Industrial Way
Quincy, WA 98848

DPR Construction, A General Partnership
Project #: D7-A18006-00
Tel: Fax:

DPR Construction, A General Partnership

1500 Port Industrial Way
Quincy, WA 98848
Phone:
Fax:

Reviewed for general conformance to the contract documents. This review does not relieve the subcontractor of the responsibility of making the work conform to the contract requirements. The subcontractor is responsible for all dimensions, correct fabrication, and accurate fit with the work of other trades.

Submittal No: 23.26

DPR Project No: D7-A18006-00

Reviewed By: Jordan Barroso

Date: 11-19-2018

Prepared: Apollo Mechanical Contractors

Architect

Consultant

SHOP DRAWING REVIEW

This review is for general conformance with the design concept the contractor remains responsible for:

a. Compliance with the contract documents.
b. Confirming and correlating quantities and dimensions.
c. Selecting fabrication process and techniques of construction.
d. Coordination of the work with the other trades.
e. Performing this work in a safe and satisfactory manner.
f. Compliance with the construction methods.

It is understood that the engineer's notation on the submittal is not to be construed as authorization for additional work or additional cost.

- ☐ NO EXCEPTION
- ☐ EXCEPTION AS NOTED
- ☐ RESUBMIT
- ☐ NOT SUBJECT TO REVIEW
- ☑ NO ACTION REQUIRED
- ☐ REJECTED/RESUBMIT (See Remarks)

Environmental Systems Design, Inc.
BY: STumber **DATE:** 11/21/2018

Record submittal

Consultant

Submittal Transmittal

PROJECT:	Microsoft - MWH03 Data Center 52780-52781	DATE SENT:	11/21/2018
SUBJECT:	MWH03 - 236500-01-(01085) Factory Fabricated Induced Draft Fluid Cooler-Performance Data, Product Data, and Rigging Manual	SUBMITTAL ID:	00367
TYPE:	Submittal	TRANSMITTAL ID:	01583
PURPOSE:	No Action Required	VIA:	Info Exchange
SPEC SECTION:			

FROM

NAME	COMPANY	EMAIL	PHONE
Submittals		Submittals@esdglobal.com	

TO

NAME	COMPANY	EMAIL	PHONE
Adam Akins	DPR Construction	AdamA@dpr.com	
Chad Mendell	Environmental Systems Design, Inc. - IL HQ	cmendell@esdglobal.com	312-456-2387
Craig Anderson	Environmental Systems Design, Inc. - IL HQ	CAnderson@esdglobal.com	312-372-1200
DPR Document Control-MWH03 RFIs	DPR Construction	MWH03_DocControl@dpr.com	
Jack Sturm	Environmental Systems Design, Inc. - IL HQ	JSTURM@esdglobal.com	312-551-8686
Jacob Hammon	DPR Construction	JacobH@dpr.com	
Jordan Barroso	DPR Construction	JordanB@dpr.com	
Larry Brown	DPR Construction	larry.brown@dpr.com	
Michael Salvador	Environmental Systems Design, Inc. - IL HQ	MSalvador@esdglobal.com	312-372-1200
Payne Brannon	DPR Construction	PayneB@dpr.com	
Ron Wood		ronw@dpr.com	650-474-1450
Scott Hays	Environmental Systems Design, Inc. - IL HQ	SHays@esdglobal.com	312-372-1200
Todd Grimes	Environmental	TGrimes@esdglobal.co	312-372-1200

Submittal Transmittal

DATE: 11/21/2018
ID: 01583

NAME	COMPANY	EMAIL	PHONE
	Systems Design, Inc. - IL HQ	m	
Vanir	Vanir	VanirQA.MWH@vanir.com	
Vishwa Priyatham Nethigunta	DPR Construction	VishwaN@dpr.com	

REMARKS: No Action Required

CONTENTS

QUANTITY: 1 DATED: 11/20/2018 NUMBER:

DESCRIPTION:
MWH03 Submittal 236500_01_(01085)_Factory Fabricated Induced Draft Fluid Cooler_Performance Data, Product Data, and Rigging Manual.pdf

ACTION:
REMARKS:

BALTIMORE AIRCOIL COMPANY

Submittal Data Form

10-24-2018

Sold To : **MWH03**

Project: MWH03
Engineer: EDS - Chicago
BAC Order # U1872469

All Information is per Unit

Quantity: Fourteen (14) Model: Two Cell HXV-1012C-24T-L-2 CLOSED CIRCUIT COOLING TOWER UNITS

Certified Wet Capacity:
600.00 USGPM of Water from 98.00°F to 82.00°F at 74.00°F entering air wet bulb and 6.4 PSIG fluid pressure drop.

Certified Dry Capacity:
600.00 USGPM of Water from 98.00°F to 82.00°F at 46.00°F entering air dry bulb and 6.4 PSIG fluid pressure drop.
500.00 USGPM of Water from 98.00°F to 82.00°F at 55.00°F entering air dry bulb and 4.6 PSIG fluid pressure drop.
450.00 USGPM of Water from 98.00°F to 82.00°F at 58.00°F entering air dry bulb and 3.8 PSIG fluid pressure drop.

Fan Motor(s): Four (4) 7.5 HP fan motor(s) per unit: Totally Enclosed, Air Over (TEAO),
1 Speed/1 Winding - Premium Efficiency (Inverter Duty), suitable for 460 volt, 3 phase,
60 hertz electrical service and Space Heater.
NEMA Standard Mg.1 -- Part 31

Spray Pump(s): Two (2) 7.5 HP pump motor(s): 1,300 GPM per unit,
1 Speed/1 Winding - Energy Efficient, suitable for 460 volt, 3 phase, 60 hertz.

Submittal Information		Equipment Summary (All information is per cell)
Mechanical Specifications		Welded Type 304 Stainless Steel Construction in Cold Water Basin, Galvanized Steel Elsewhere
Spare Parts List		Unit Structure designed in accordance with the 2015 IBC
Sound Data		BALTIDRIVE® Power Train Independent Fan Drive
Submittal Drawings/Diagrams		Combined Inlet Shield Hail Guard
UP-U1872469X	Unit Print	PVC Fill & Drift Eliminators
DC-U1872469X	Dry Coil Connections	Galvanized Steel, Full Circuit Wet Coil
SS-U1872469X	Unit Support	Copper Full Circuit Dry Coil with Aluminum Finning
BA-U1872469X	Basin Accessories	Integral Pumps with End Make-Up (one per two-cell unit), Drain and Overflow Connections
VL-U1872469X	VCOS Location	One (1) Brass Mechanical Float Valve Assembly per two-cell unit
VW-U1872469X	VCOS Wiring	High & Low Water Level Float Switches
EA-U1872469X	External Access	12 Kw Electric Immersion Heaters Sized to Maintain +40°F water at a -17°F Ambient with Electrical Requirements Matching Fan Motor(s)
IA-U1872469X	Internal Access	Copper Heater Elements
BAC-16894	Combined Enclosure Wiring	Low Water Level Cutout and Thermostat
BAC-16895	Enclosure Diagram	Electronic Vibration Cutout Switch
		Extended Bearing Lubrication Lines
		Motor Removal System
Please see High & Low Water Level Float Switch Data Sheets for wiring instructions.		External Platform with Safety Gate and Ladder with Safety Cage Located on Louver Face(s) of Unit
		8' Ladder and Cage Extension for each Ladder
		Internal Walkway, Ladder with Safety Gate, Service Platform and grating with Galvanized Steel Supports
		BAC Controls with Single Point Connection
		Each cell will ship in three sections
		Warranty Per Master Purchase Agreement

THANK YOU FOR YOUR BUSINESS!

Corporate Headquarters: 7600 Dorsey Run Road, Jessup, MD 20794 – Tele: (410) 799-6200 / Fax: (410) 799-6416

BALTIMORE AIRCOIL COMPANY

Mechanical Specifications

10-24-2018

Project: **MWH03**
Engineer: ESD – Chicago
BAC Order # U1872469

All Information is per unit

Quantity: Fourteen (14) Model: Two Cell HXV-1012C-24T-L-2 CLOSED CIRCUIT COOLING TOWER UNITS

Materials of Construction:

Structural steel components are constructed from G-235 hot-dip galvanized steel. The edges of the hot-dip galvanized steel components are given a protective coat of zinc-rich compound. The basin is constructed of heavy gauge, weldable Type 304 stainless steel. All factory seams between panels inside the basin are welded water-tight. The basin includes a depressed section with drain/clean-out connection and area under the fill sections is sloped toward the depressed section for easy cleaning. All components that are in contact with the water in the basin and structural supports that extend into the basin will be constructed of Type 304 Stainless Steel. The basin is provided with a five (5) year leak proof guarantee. The casing is constructed entirely from heavy gauge, G-235 hot-dip galvanized steel panels. Hinged access doors are provided on each side wall of the tower for access to eliminators and fan plenum section for all cells. The door(s) is made of a steel frame matching the unit construction. The air inlet louvers are constructed of PVC honeycomb shape louver which also act as an air inlet screen and block sunlight to the basin and the front of the fill.

Unit Structure:

The structure of this product has been designed and analyzed in accordance with the wind load requirements of the 2015 IBC for a basic wind speed of 115 mph in exposure C.

Fan Drive:

Fan(s) are driven by a one-piece multi-groove, neoprene/polyester belt designed specifically for evaporative cooling equipment service. Motor is mounted on an adjustable motor base. Fan and motor sheaves are non-corrosive cast aluminum. The BALTIDRIVE® Power Train independent fan drive system, including fan motors, is warranted against defects in materials and workmanship for five (5) years from date of shipment. Fan(s) and steel fan shaft(s) are supported by heavy-duty, self-aligning, grease-packed, relubricatable ball bearings with special seals for protection against dust and moisture. All bearings are designed for minimum L10 life of 300,000 hours.

CIS Hail Guard:

Corrosion and UV Resistant PVC combined inlet shield hail guards are provided to protect the dry coil from hail damage.

Fill:

The BACross® Fill and integral drift eliminators are formed from self-extinguishing (per ASTM D-568) polyvinyl chloride (PVC), having a flame spread rating of 5 per ASTM Standard E84-77a, and are impervious to rot, decay, and fungus or biological attack. The fill is elevated above the cold water basin floor to facilitate cleaning. This fill is suitable for a maximum entering water temperature of 130°F. The eliminators are designed to limit drift loss to no greater than 0.0005% of the recirculating spray water flow rate and effectively strip entrained moisture from the leaving airstream with a minimum of air resistance.

Wet Coil Type:

The coil is suitable for cooling fluids compatible with carbon steel in a closed system. The coil(s) will be constructed with continuous 1.05" O.D. all prime surface steel tubes continuously formed and bent in a serpentine shape, encased in steel framework. The entire assembly is hot-dip galvanized after fabrication. Coil will be designed for free liquid drainage. Coil has a maximum allowable working pressure of 300 psig and is tested at 375 psig air pressure under water. The system should have a vent placed at the highest point in the installation to facilitate filling and drainage (provided and installed by installing contractor). Interconnecting coil piping to be designed, provided, and supported by others.

Dry Coil Type:

The coil(s) will be constructed with continuous 0.615” full circuit copper tubing with aluminum finning. Coil will have extended surface fins at 13 fins per inch fin density. This extended surface coil is designed to enhance dry operation. Coil has a maximum allowable working pressure of 250 psig and is tested at 320 psig air pressure under water. The system should have a vent placed at the highest point in the installation to facilitate filling and drainage (provided and installed by others). The coils will have a UV coating provided to maximize longevity. Interconnecting coil piping to be designed, provided, and supported by others.

Spray Water Pump Assembly:

Each cold water basin has an integral pump with large area, lift out, stainless steel strainer screens including perforated openings sized smaller than the water distribution nozzle orifices. Strainers include anti-vortexing baffles to prevent air entrainment. A close-coupled, bronze-fitted pump with a mechanical seal is mounted on the basin. The pump motors are energy efficient, totally enclosed, fan cooled (TEFC). Electrical requirements match the fan motor.

Basin Water Level Control:

The unit is supplied with a brass make-up valve with unsinkable polystyrene filled plastic float arranged for easy adjustment. The make-up valve is suitable for water supply pressures between 15 psig and 50 psig.

High & Low Water Level Float Switches:

Single-Pole, Double-Throw (SPDT) Liquid Level Float Switches provided in the cold water basin of the unit. When the level in the basin rises above or falls below the required level, the switch will close one circuit and open a second circuit. Field wiring by installing contractor.

Basin Heater(s):

A minimum number of high-watt-density electric immersion heater elements, sized to maintain +40°F basin water at -17°F ambient with a 10 mph wind speed, is provided. Electrical requirements match fan motor. Field wiring by installing contractor.

Heater Element Material of Construction:

The unit is supplied with copper heater elements.

Vibration Cutout Switch:

Fan system is provided with an appropriate number of Metrix Model 440 vibration cutout switches to shut down the unit in the event of excessive vibration. The vibration switch(es) is solid state with a frequency range of 2 to 1,000 Hz (120 to 60,000 RPM), a velocity set point of 0.1 to 1.5 In./Sec., and a time delay adjustable from 2 to 15 seconds. Input power required is 110 V, 50/60 Hz. 3 Watts. Shutdown switch is rated at 5 Amperes, 110 VAC TRIAC. Field wiring is by others.

Extended Lubrication Lines:

Bearing lubrication lines are extended to grease fittings located inside the unit and are accessible from the access door.

Motor Removal System:

Custom internal motor removal system including lifting point with removable grating sections to facilitate lowering of the motor to the internal walkway. Lifting device by to be provided by others.

External Platform at Louver Face:

The unit will be configured with a 36” wide platform (with FRP grating) with galvanized supports, ladder with safety cage and safety railing on the louver face. The safety rails will be constructed of galvanized steel square tube. A spring loaded safety gate is provided. These access options meet OSHA standards. These components ship loose and are to be assembled and are installed in the field by others.

Ladder and Safety Cage Extension(s):

8' ladder and cage extensions are provided for each ladder.

Internal Access Option:

The unit has access doors on both unit ends, a center stainless steel walkway, and FRP grating between the walkway and the blank off panel of the cold water basin with a cutout for the mechanical make up. Internal walkway will be provided with safety railing on the air inlet side. An internal aluminum ladder and full service platform with galvanized steel supports is supplied to facilitate access to the mechanical equipment. Additional safety is provided by the spring loaded self-closing safety gates. Square tube grab handles will be provided on both sides of the pump end access door. All components meet pertinent OSHA standards.

BAC Controls (per cell) :

NEMA 4X enclosure
480V 60Hz 3 Phase input power
Panel rating for SCCR of 65kA
Enclosure to include the following components:
(1) 12kW basin heater starter
Spray pump to be interlocked with basin heater to prevent heater from starting while pump is running
(1) 7.5HP pump starter
(2) 7.5HP fan motor ABB ACH-550 VFDs with 3% line reactor
Provide provisions for the connection of (2) Metrix 440 vibration cutout switches
Provide provisions for the connection and control of (2) fan motor space heaters
Enclosure shall be suitable for operation in ambient temperatures of -20°F to 110°F
Enclosure shall be shipped with all pertinent wiring diagrams
Enclosure shall be UL listed
Field wiring of the controls by installing contractor
FLA: 51.69A
MCA: 64.61A
MOP: 70A

BALTIMORE AIRCOIL COMPANY

Equipment Tag List

10-24-2018

Sold To : **MWH03**

Project: MWH03
Engineer: EDS - Chicago
BAC Order # U1872469

MWH-03	Make	Model	Client Tag ID
MWH03.COLO1.CELLA.FC1	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO1.CELLA.FC1 RIGHT HAND CELL
	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO1.CELLA.FC1 LEFT HAND CELL
MWH03.COLO1.CELLA.FC2	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO1.CELLA.FC2 RIGHT HAND CELL
	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO1.CELLA.FC2 LEFT HAND CELL
MWH03.COLO1.CELLB.FC1	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO1.CELLB.FC1 RIGHT HAND CELL
	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO1.CELLB.FC1 LEFT HAND CELL
MWH03.COLO1.CELLB.FC2	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO1.CELLB.FC2 RIGHT HAND CELL
	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO1.CELLB.FC2 LEFT HAND CELL
MWH03.COLO1.CELLC.FC1	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO1.CELLC.FC1 RIGHT HAND CELL
	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO1.CELLC.FC1 LEFT HAND CELL
MWH03.COLO1.CELLC.FC2	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO1.CELLC.FC2 RIGHT HAND CELL
	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO1.CELLC.FC2 LEFT HAND CELL
MWH03.COLO1.CELLD.FC1	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO1.CELLD.FC1 RIGHT HAND CELL
	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO1.CELLD.FC1 LEFT HAND CELL
MWH03.COLO1.CELLD.FC2	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO1.CELLD.FC2 RIGHT HAND CELL
	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO1.CELLD.FC2 LEFT HAND CELL
MWH03.COLO2.CELLA.FC1	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO2.CELLA.FC1 RIGHT HAND CELL
	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO2.CELLA.FC1 LEFT HAND CELL
MWH03.COLO2.CELLA.FC2	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO2.CELLA.FC2 RIGHT HAND CELL
	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO2.CELLA.FC2 LEFT HAND CELL
MWH03.COLO2.CELLC.FC1	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO2.CELLC.FC1 RIGHT HAND CELL
	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO2.CELLC.FC1 LEFT HAND CELL
MWH03.COLO2.CELLC.FC2	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO2.CELLC.FC2 RIGHT HAND CELL
	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO2.CELLC.FC2 LEFT HAND CELL
MWH03.COLO2.CELLD.FC1	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO2.CELLD.FC1 RIGHT HAND CELL
	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO2.CELLD.FC1 LEFT HAND CELL
MWH03.COLO2.CELLD.FC2	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO2.CELLD.FC2 RIGHT HAND CELL
	BAC – Fluid Cooler	HXV-1012C-24T-L	MWH03.COLO2.CELLD.FC2 LEFT HAND CELL

Corporate Headquarters: 7600 Dorsey Run Road, Jessup, MD 20794 – Tele: (410) 799-6200 / Fax: (410) 799-6416

BALTIMORE AIRCOIL COMPANY

Control Point Verification

10-24-2018

Sold To : **MWH03**

Project: MWH03
Engineer: EDS - Chicago
BAC Order # U1872469

All Information is per Control Panel

Point	Description	Clarification
AO-04 – AO-11	Fluid Cooler X Fan AFD Speed Signal	Available through Modbus. Programming and integration into BMS provided by Siemens.
BI-09 – BI-12	Fluid Cooler X Basin Heater Status	BAC to supply basin heater starter. BAC recommended Siemens to provide current switch. Siemens to provide status.
BI-14 – BI-17	Fluid Cooler X Spray Pump Status	BAC to supply the spray pump starter. BAC recommended Siemens to provide current switch. Siemens to provide status.
BI-18 – BI-21	Fluid Cooler X High Level Alarm	BAC is providing a dry contact in Penn switch. Wiring and programming by Siemens.
BI-22 – BI-25	Fluid Cooler X Low Level Alarm	BAC is providing a dry contact in Penn switch. Wiring and programming by Siemens.
BI-26 – BI-33	Fluid Cooler X Fan AFD Fault	BAC providing dry contact within VFD. Programming, wiring and integration provided by Siemens.
BI-34 – BI-41	Fluid Cooler X Fan AFD Status	BAC providing VFD. Points are available through Modbus communications. Programming and integration provided by Siemens.
BO-06 – BO-09	Fluid Cooler X Spray Pump Start/Stop	BAC providing the spray pump starter. Programming, wiring and integration provided by Siemens.
BO-10 – BO-17	Fluid Cooler X Fan AFD Start/Stop	BAC providing remote enable. Wiring and logic provided by Siemens.
BO-18 – BO-25	Fluid Cooler X Fan AFD Reverse	BAC will provide a terminal at the drive to enable reverse operation, the terminal number will be determined at the field during start up, all logic and integration is by Siemens.

Corporate Headquarters: 7600 Dorsey Run Road, Jessup, MD 20794 – Tele: (410) 799-6200 / Fax: (410) 799-6416

BALTIMORE AIRCOIL COMPANY

Spare Parts List

10-24-2018

Sold To : **MWH03**

Project: MWH03
Engineer: EDS - Chicago
BAC Order # U1872469

Fluid Cooler Spare Parts List	
Part Number	**Description**
290273P2	Nozzles
302840	Pump
280448	Makeup Valve
280046	Float Ball
311492	Vibration Cutout Switch
22FJDEBBFB	Motor A - W8 conduit
22FJDEBBEB	Motor B - W5 conduit
232790	Belts
230422MA	Driver Sheave
232593MA	Driven Sheave
251273	Fan
6C2058	Fan Shaft
230380	Fan Bushing
310572	Heater
5G0108M3	Strainer Screens
5C4845M3	Removeable Strainer Hood
310620	Float Switch
310382	Thermostat
N0G04JP1	Fill Bundle
281930P1	Drift Eliminators
6CB315M2	Prime Surface Coil (Wet Coil)
381029MB	Finned Coil (Dry Coil)
282426P1	Hail Guards
260432P1	Tank Fittings

Corporate Headquarters: 7600 Dorsey Run Road, Jessup, MD 20794 – Tele: (410) 799-6200 / Fax: (410) 799-6416

Control Panel Spare Parts List		
Part Number	**Description**	**Device Tag**
DRC 002160	Relay, 120 VAC, 7.5A, 4PDT, No Light, UL	CR3
DRC 002166	Relay Socket 4 Pole Finger Safe	CR3
DRC 001077	Relay, 120 VAC, 10A, DPDT	CR4
DRC 001078	Relay Socket, DIN Rail, Screw Terminal, 2 Pole	CR4
DRC 001077	Relay, 120 VAC, 10A, DPDT	CR5
DRC 001078	Relay Socket, DIN Rail, Screw Terminal, 2 Pole	CR5
DRC 001077	Relay, 120 VAC, 10A, DPDT	CR6
DRC 001078	Relay Socket, DIN Rail, Screw Terminal, 2 Pole	CR6
DRC 005956	Relay, Control , SPDT, 24VAC, Contact Rating: 10A	CR8
DRC 002162	Relay Socket, DIN Rail, Screw Terminal, 1 Pole	CR8
DRC 005956	Relay, Control , SPDT, 24VAC, Contact Rating: 10A	CR9
DRC 002162	Relay Socket, DIN Rail, Screw Terminal, 1 Pole	CR9
DRC 012832	Current Sensor 0.25-200A Solid Core Fixed Trip Pt.	CS-1
HARDWARE	Screw, #10-24, 1/2", Trilob, Thread Rolling Screw, Zinc Plated, Hex Head	CS-1
DRC 012832	Current Sensor 0.25-200A Solid Core Fixed Trip Pt.	CS-2
HARDWARE	Screw, #10-24, 1/2", Trilob, Thread Rolling Screw, Zinc Plated, Hex Head	CS-2
DRC 028463	CT Ground Fault Toroid 2-8	CT-GF1
DRC 013743	CS Disconnect Switch 100A Fusible J	DS1
DRC 014533	CS Terminal Shroud OS100G Fusible Disconnect Long	DS1
DRC 003138	Disconnect, Shaft, 6mm x 6mm, 16.9in, Type P	DS1
DRC 014534	CS Disconnect Pistol Handle Nema 4 ABB	DS1
HARDWARE	Screw, #10-16, 1/2", Type B, Sheet Metal Screw, Zinc Plated, Phillips Pan Head	DS1
DRC 003254	Terminal Lug Kit ABB 100A Fusible Disconnect	DS1
DRC 002808	Fuse, Class J, Time Delay, 600VAC, 70A, 200K AIC	DS1
DRC 013113	Label Fuse Replacement 600V 70A Class J	DS1
DRC 003164	Disconnect Handle Funnel Guide ABB Fits all Pistol Grip	DS1
DRC 003176	Heater, 120W, 120VAC, Without Thermostat, Strip Heater	EH1
DRC 000548	Fuse, Class CC, Time Delay, 600VAC, 4.0A, 200K AIC	F1A
DRC 000548	Fuse, Class CC, Time Delay, 600VAC, 4.0A, 200K AIC	F1B
DRC 000510	Fuse, Midget, Time Delay, 500VAC, 10A, 10K AIC	F1C
DRC 005839	Fan NEMA 4X 150 CFM 120VAC 1.9A Stainless Steel	FAN1
DRC 003763	Fuse Holder, Class J, 3 Pole, 30A, Open Clip	FB1
DRC 013104	Label Fuse Replacement 600V 15A Class J	FB1
DRC 005813	Fuse Block Accessories, Fuse Cover, J, 30A	FB1
DRC 009356	Fuse Class J 15 A Fast 600 VAC	FB1
DRC 003763	Fuse Holder, Class J, 3 Pole, 30A, Open Clip	FB2
DRC 013104	Label Fuse Replacement 600V 15A Class J	FB2
DRC 005813	Fuse Block Accessories, Fuse Cover, J, 30A	FB2
DRC 009356	Fuse Class J 15 A Fast 600 VAC	FB2
DRC 000553	Fuse, Class CC, Time Delay, 600VAC, 5.0A, 200K AIC	FU2
DRC 032333	FUSEHOLDER; CLASS CC 600V 1 POLE	FU2
DRC 013067	Label Fuse Replacement 600V 5A Class CC	FU2
DRC 000553	Fuse, Class CC, Time Delay, 600VAC, 5.0A, 200K AIC	FU3
DRC 032333	FUSEHOLDER; CLASS CC 600V 1 POLE	FU3
DRC 013067	Label Fuse Replacement 600V 5A Class CC	FU3
DRC 008969	Relay GE Ground Fault Panel Mount	GF1
DRC 003011	Ground Lug, 1 Position, Max 2/0AWG Copper Wire	GLG1
DRC 006732	Ground Bar, 9 Position, Max 4AWG Copper Wire	GND1
DRC 000597	Reactor, Line, 460-480VAC, 7.5HP, 11.0A, 3%	LR1
HARDWARE	Bolt, 1/4"-20, 1/2", Grade 5, Zinc Plated, 7/16" Hex Head	LR1
DRC 000597	Reactor, Line, 460-480VAC, 7.5HP, 11.0A, 3%	LR2

HARDWARE	Bolt, 1/4"-20, 1/2", Grade 5, Zinc Plated, 7/16" Hex Head	LR2
DRC 016362	CS System Fault Light 22MM Red	LT1
DRC 016362	CS System Fault Light 22MM Red	LT2
DRC 016362	CS System Fault Light 22MM Red	LT3
DRC 016362	CS System Fault Light 22MM Red	LT4
DRC 016362	CS System Fault Light 22MM Red	LT5
DRC 016362	CS System Fault Light 22MM Red	LT6
DRC 013587	CS Contactor IEC 12A 120VAC Coil Spring Terminals	M4
DRC 014686	CS Contactor Auxiliary Contact 1NO 1NC Size S00 Sp	M4
DRC 013592	CS Contactor IEC 32A 120VAC Coil Spring Terminals	M6
DRC 014695	CS Contactor Auxiliary Contact 1NO 1NC Size S0 Spr	M6
DRC 007603	Enclosure Rittal Nema 04X 48x36x16 Wall Mount	MBX
DRC 030084	SS Hinged Access Door ANSI-61 NEMA 4X	MBX
DRC 028518	PALLET BAC SMALL	MBX
DRC 007002	Label UL NITW NITW7 508A Enclosed	MBX
DRC 028641	"10"" BAC Logo Label"	MBX
DRC 029424	"LABEL GENERIC 1"" X 4"" 2 LINES"	MBX
DRC 029965	Lifting Label Baltimore Air Coil	MBX
LABEL	Label, Main, NON-HVAC, ENCLOSED	MBX
DRC 014482	Label 480Y/277	MBX
LABEL	Label Danger Electric Shock	MBX
LABEL	Label Warning Replacement Parts	MBX
DRC 013178	Label Nameplate Torque	MBX
LABEL	Label Tighten Screws Important	MBX
LABEL	Label Copper Supply Wires	MBX
LABEL	Label, CPT Fuse Replacement	MBX
LABEL	Label Phase L1, L2, L3	MBX
DRC 013630	CS MMP Class 10 Size S00 11 to 16A Screw Terminals	MMP6
DRC 013654	CS MMP Aux Contact, Sizes S00, S0, S2 (Innovations), 2NO, Front Mount	MMP6
DRC 013656	CS MMP Type E Phase Barrier Sizes S00 and S0	MMP6
DRC 013657	CS MMP to Contactor Link Module Screw Terminal S00	MMP6
DRC 013637	CS MMP Class 10 Size S0 20 to 25A Screw Terminals	MMP9
DRC 013656	CS MMP Type E Phase Barrier Sizes S00 and S0	MMP9
DRC 013658	CS MMP to Contactor Link Module Screw Terminal MMP S0	MMP9
DRC 001042	Power Block, 600V, 175A, 3 Pole, 1 x 6, Line: 2/0-14, Load: 4-14	PDB1
DRC 014433	Micron Transformer 460/230V Pri 120V Sec 750VA Fu	T1
DRC 014092	Fuse Cover kit for Micron Transformers	T1
DRC 021364	Terminal Cover Micron, 6 Terminals, 500VA or Greater	T1
DRC 000783	Transformer, Class II, 10VA, 120V, 24V	T2
DRC 003836	Terminal Block, 690VAC, 4 Poles, Spring Clamp, Passthrough (Through-Type)	TB1
DRC 003838	Terminal Block Accessory, End Plate / Cover, 2.5mm², 4 Clamping Points	TB1
DRC 003839	Terminal Block Accessory, End Stop	TB1
DRC 003843	Terminal Block Accessory, Jumper, 5 Poles	TB1
DRC 003840	Terminal Block Accessory, Jumper, 2 Poles	TB1
DRC 003841	Terminal Block Accessory, Jumper, 3 Poles	TB1
DRC 003837	Terminal Block, 690VAC, 4 Poles, Spring Clamp, Grounding	TB1
DRC 003836	Terminal Block, 690VAC, 4 Poles, Spring Clamp, Passthrough (Through-Type)	TB2
DRC 003838	Terminal Block Accessory, End Plate / Cover, 2.5mm², 4 Clamping Points	TB2
DRC 003839	Terminal Block Accessory, End Stop	TB2
DRC 003837	Terminal Block, 690VAC, 4 Poles, Spring Clamp, Grounding	TB2
DRC 003836	Terminal Block, 690VAC, 4 Poles, Spring Clamp, Passthrough (Through-Type)	TB3
DRC 003838	Terminal Block Accessory, End Plate / Cover, 2.5mm², 4 Clamping Points	TB3
DRC 003839	Terminal Block Accessory, End Stop	TB3

DRC 003836	Terminal Block, 690VAC, 4 Poles, Spring Clamp, Passthrough (Through-Type)	TB4
DRC 003838	Terminal Block Accessory, End Plate / Cover, 2.5mm², 4 Clamping Points	TB4
DRC 003839	Terminal Block Accessory, End Stop	TB4
DRC 003840	Terminal Block Accessory, Jumper, 2 Poles	TB4
DRC 002571	Thermostat, Adj. NO 32-140°F close on rise	TS1
DRC 010965	Thermostat Disc 120/240 VAC NC	TS2
DRC 004039	Drive, 380-480V, 7.5HP, 11.9A, Three Phase Input, Three Phase Output	VFD1
DRC 028994	MODIFIED PLASTIC EYELET	VFD1
DRC 021455	VFD Accessory Relay Expansion 3 Relays	VFD1-AUX
DRC 004039	Drive, 380-480V, 7.5HP, 11.9A, Three Phase Input, Three Phase Output	VFD2
DRC 028994	MODIFIED PLASTIC EYELET	VFD2
DRC 021455	VFD Accessory Relay Expansion 3 Relays	VFD2-AUX

Baltimore Aircoil Company

Modified Sound Rating Program
HXV Hybrid Closed Circuit Cooling Tower

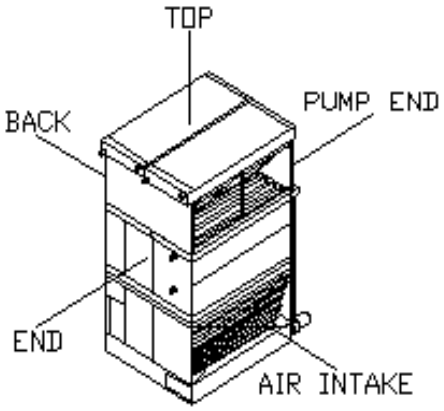
Model: HXV-1012C-24T-L
No. of Fans: (2) 5 ft. Diameter Fan per Cell
Fan Type: Standard
Motor HP: 15 HP total, 7.5 HP per fan
Fan Speed & Fan Power Used: 100% of full speed, 15 BHP Total
Accessories: None

Top
Sound Pressure Level (dB)

Octave Band	Distance 5 ft	Distance 50 ft
1	86	71
2	86	71
3	84	70
4	82	70
5	77	69
6	76	69
7	73	63
8	67	58
A-wgt	84	74

Back
Sound Pressure Level (dB)

Octave Band	Distance 5 ft	Distance 50 ft
1	72	66
2	65	59
3	68	65
4	64	55
5	57	52
6	55	47
7	52	46
8	39	26
A-wgt	65	60



End
Sound Pressure Level (dB)

Octave Band	Distance 5 ft	Distance 50 ft
1	74	65
2	74	62
3	71	62
4	63	57
5	59	54
6	59	45
7	54	41
8	49	30
A-wgt	67	59

End
Sound Pressure Level (dB)

Octave Band	Distance 5 ft	Distance 50 ft
1	72	65
2	74	62
3	70	62
4	61	57
5	59	54
6	56	45
7	52	41
8	46	30
A-wgt	66	59

Air Inlet
Sound Pressure Level (dB)

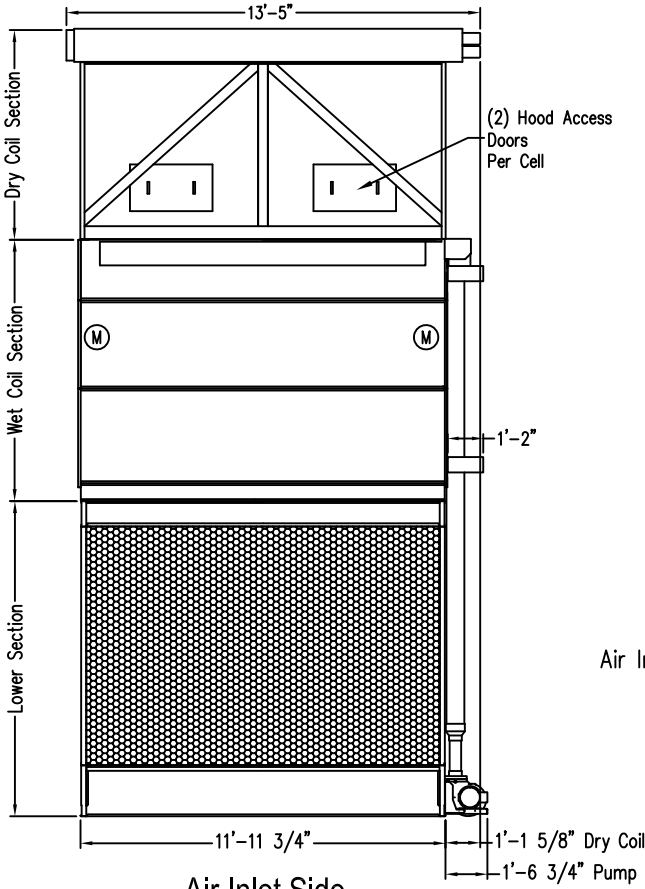
Octave Band	Distance 5 ft	Distance 50 ft
1	84	74
2	81	71
3	86	76
4	80	71
5	69	64
6	65	60
7	59	56
8	59	56
A-wgt	81	72

Sound Power Level (dB)	
Octave Band	Lw
1	102
2	100
3	102
4	99
5	95
6	95
7	89
8	85
A-wgt	102

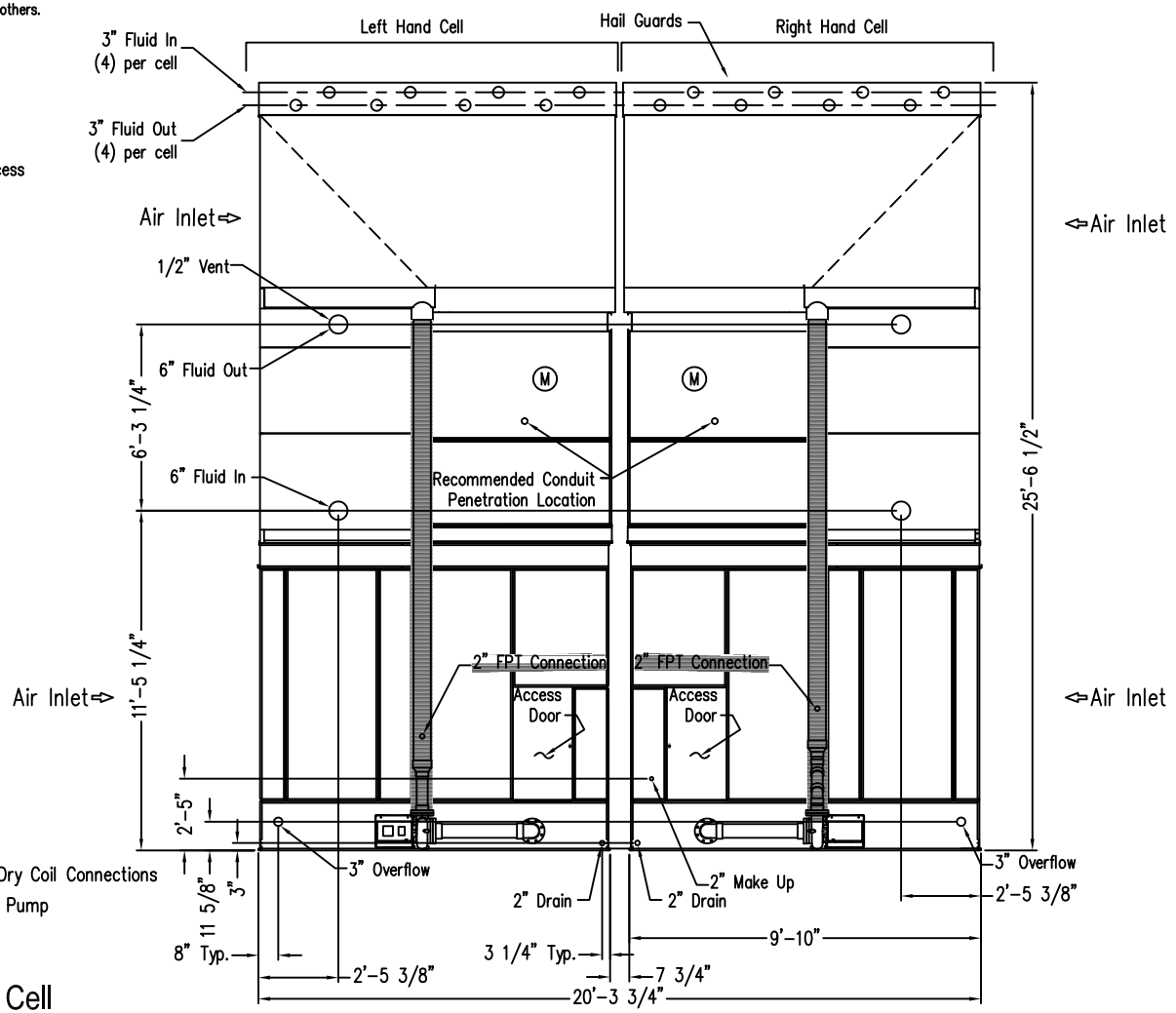
Octave band and A-weighted Sound Pressure Levels (SPL) in dB RE 0.0002 Microbar.
Note: Sound data are free field data valid for unit installation without elevation, not taking into account any reflections. Octave band values are shown for indicative purposes only. Values are obtained according to CTI ATC-128 (Test Code for Measurement of Sound From Water-Cooling Towers) for small towers with a 2 dB(A) tolerance. The use of frequency inverters (variable frequency drives) can increase sound levels.

Data Version 1.08
DWG Version 1.5

Notes
1) All dimensions are in feet and inches. Weights are in pounds.
2) Dimensions showing location of coil connections are approximate and should not be used for prefabrication of connecting piping.
3) The area above the discharge of the fan must be unobstructed.
4) For weight loading and support requirements refer to the unit support drawing.
5) Do not support piping from unit connections. All necessary piping supports to be supplied by others.
6) Weights include all the options and accessories.
7) All unit piping connections 3" and smaller are MPT unless otherwise noted.
8) Wet coil is provided with a 1/2" threaded vent located on the upper outlet pipe stub.
9) All coil connections are capped and charged with nitrogen.
10) Dry coils are provided with a 1/2" vent and 1/2" drain connection.
11) Drawing is not to scale.
12) All connections, except make-up, are typical for each cell.
13) Weights shown are for the combined weight of both cells.
14) Conduit penetration location is a recommendation only, final conduit penetration location and size to be determined by others.
15) Interconnecting coil piping to be designed, provided, and supported by others.
16) See DC drawing for dry coil connection details.



Air Inlet Side



Two Cell Back to Back

Connection End

Model Number	Shipping Weight	Operating Weight	Heaviest Section (Wet Coil Section)
HXV-1012C-24T-L-2	36932	55602	9586

ORDER NO: **U1872469**

DATE: **10/24/2018**

BALTIMORE AIRCOIL COMPANY

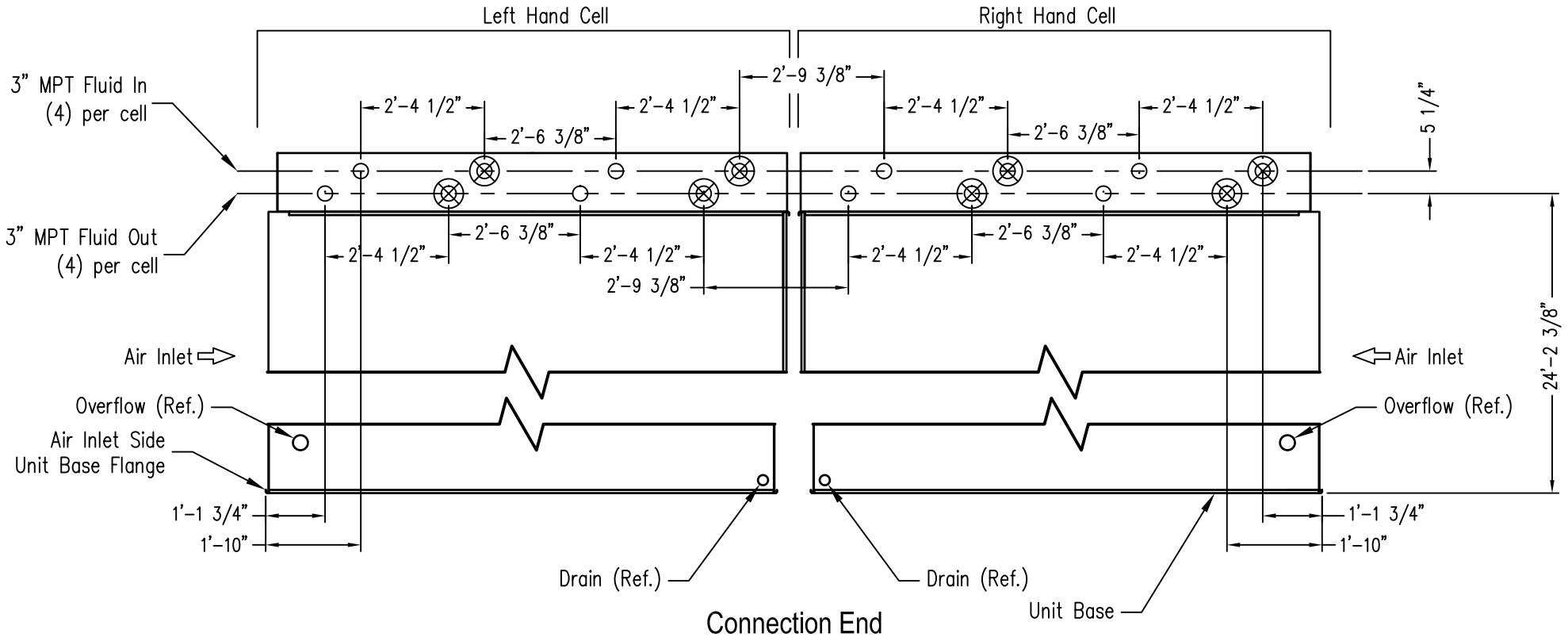
10 X 12 Unit Print
Two Cells Back to Back

DRAWING NUMBER:
UP-U1872469X

Data Version 1.08
DWG Version 1.02

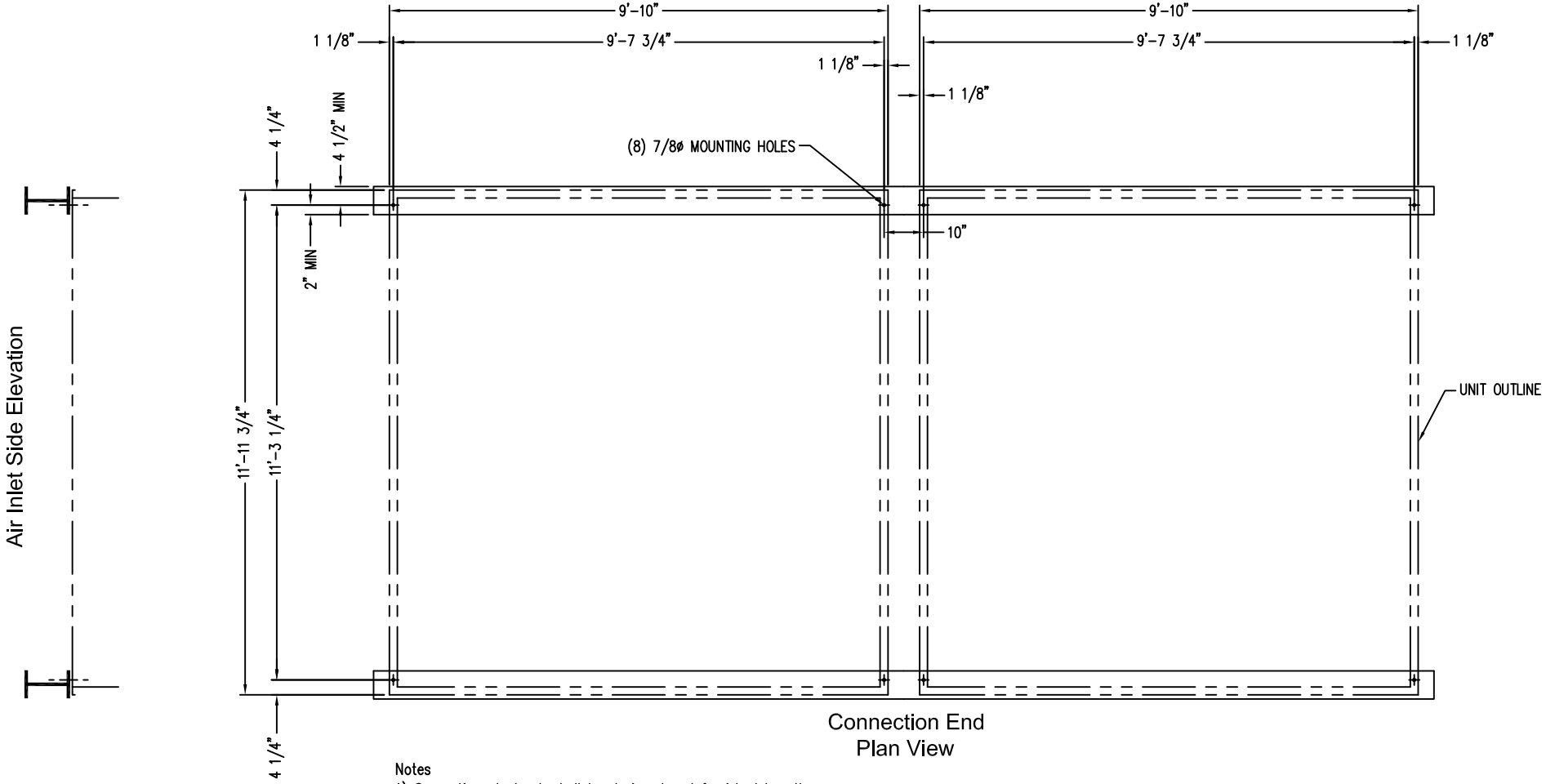
Notes:
1) All dimensions are in feet and inches.
2) All dry coil connection dimensions have a tolerance of ±1/4".
3) All outside dimensions are from the outside face of the unit base flange on the air inlet side of each cell.
4) Drawing is not to scale.
5) Dry coils ship capped and charged with nitrogen.

⊗ = Connection to be field capped (by others).



ORDER NO: **U1872469**	BALTIMORE AIRCOIL COMPANY	**Two Cell Dry Coil** **Dry Coil Connection Locations**
DATE: **10/24/2018**		DRAWING NUMBER: **DC-U1872469X**

Data Version 1.08
DWG Version 1.02



Notes
1) Supporting steelwork shall be designed and furnished by others.
2) Anchor bolts shall be designed and furnished by others. Bolt size shall be 3/4". Grade shall be SAE J429 Grade 5 or equivalent strength. Consult your BAC Representatives for other anchoring methods.
3) All supporting steel must be level at top.
4) Beams should be selected in accordance with accepted structural practice with sufficient stiffness to ensure the supporting steel is level, and differential deflection of supporting steel anywhere directly under the operating unit shall be no more than 1/2 inch.
5) Supporting steel shall be greater than or equal to the total unit length.
6) Each beam should be designed, as a minimum, for 65% of the total unit operating weight applied as a uniformly distributed load.
7) All Dimensions are in feet and inches. All weights are in pounds.
8) Weights include all of the options and accessories.
9) Weights shown are for the combined weight of both cells.
10) Drawing is not to scale.

PLAN "B" STEEL

Model Number	Shipping Weight	Operating Weight
HXV-1012C-24T-L-2	36932	55602

ORDER NO: **U1872469**

DATE: **05/16/2018**

BALTIMORE AIRCOIL COMPANY

Two Cell Unit Support Back to Back

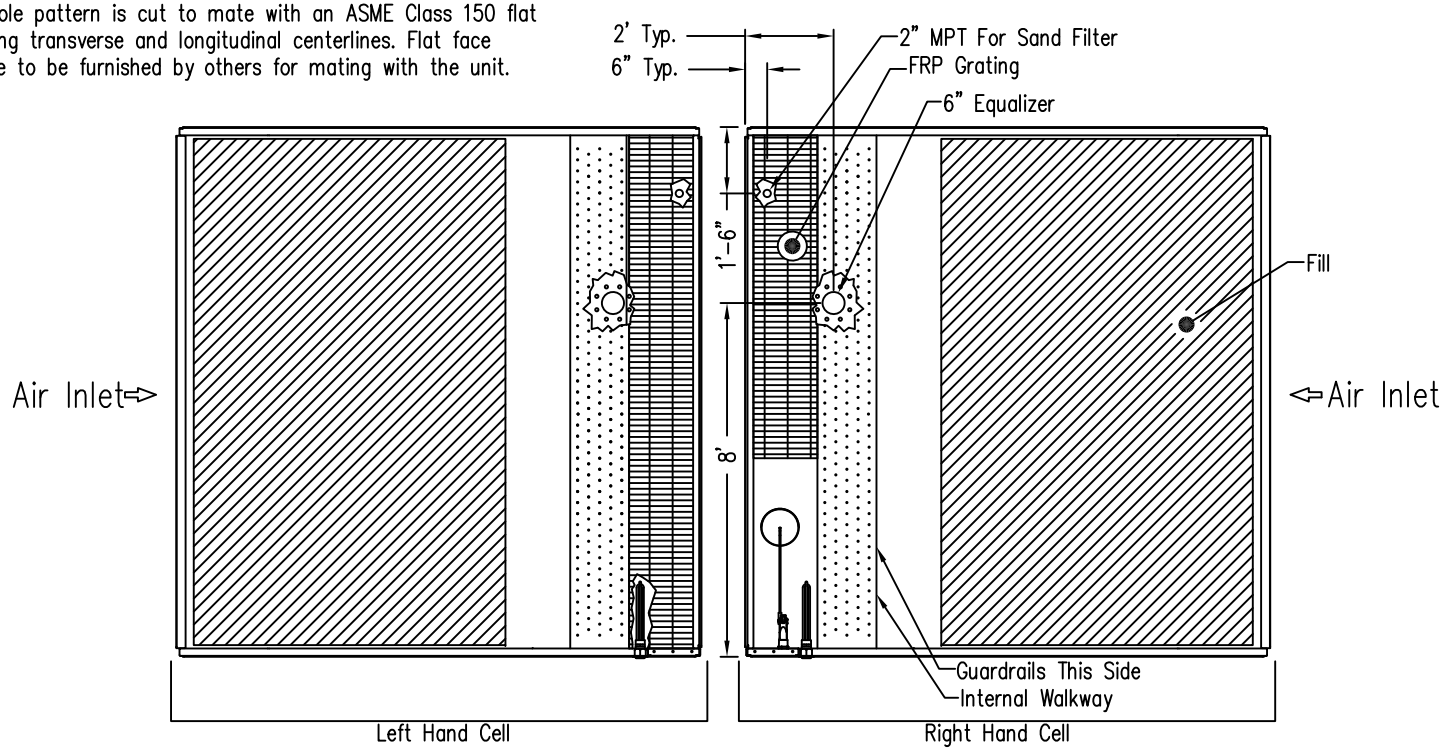
DRAWING NUMBER:
SS-U1872469X

Data Version 0.00
DWG Version 1.1

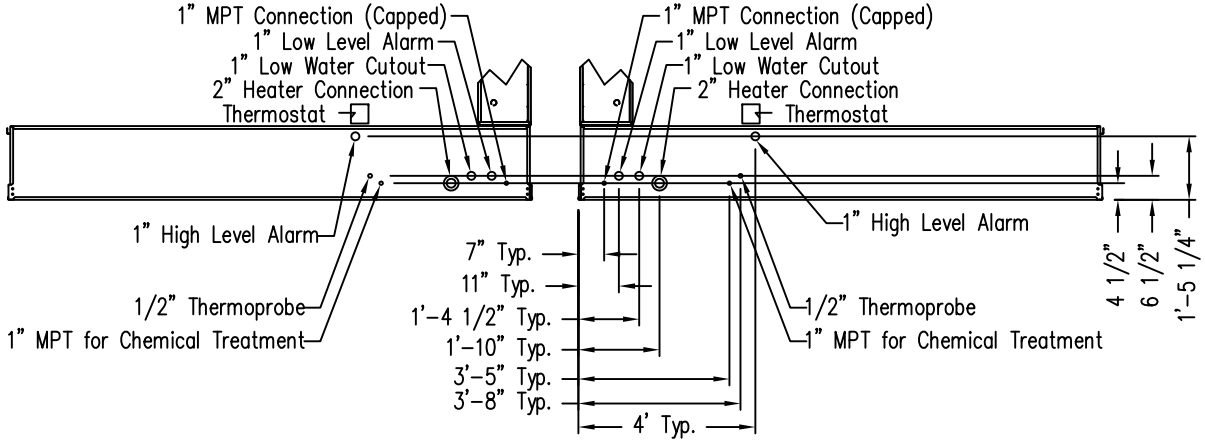
Notes:

1) Drawing is not to scale.

2) Equalizer connection bolt hole pattern is cut to mate with an ASME Class 150 flat face flange with holes straddling transverse and longitudinal centerlines. Flat face flange and full face gasket are to be furnished by others for mating with the unit.



Plan View - Cold Water Basins



Connection End

ORDER NO: **U1872469**

DATE: **10/04/2018**

BALTIMORE AIRCOIL COMPANY

10 X 12 Basin Accessories

DRAWING NUMBER:
BA-U1872469X

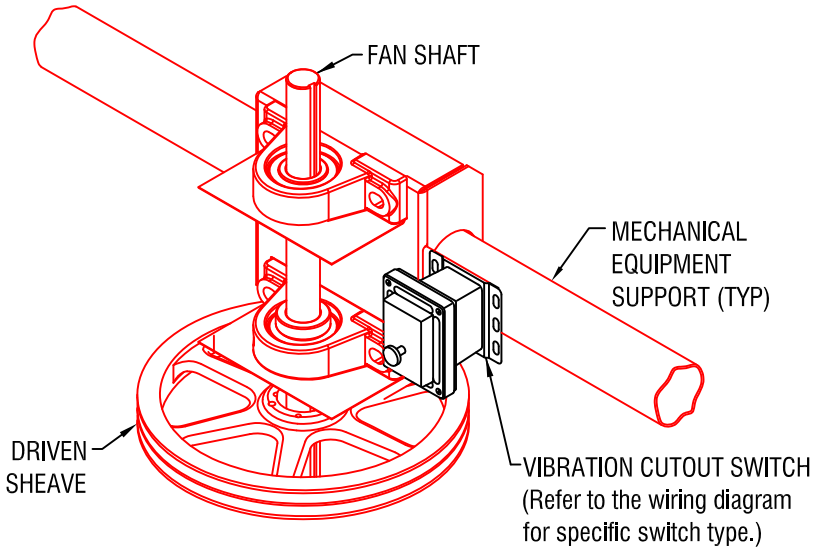
Data Version 0.00
DWG Version 1.0

OPERATING INSTRUCTIONS:
Refer to the Product Operation and Maintenance manual for detailed instructions about vibration cutout switch operation. Direct any questions to your local BAC Representative.

NOTE:
Moisture inside the switch can lead to switch failure. Care must be taken when replacing the cover on the vibration switch to ensure that the proper watertight seal is obtained.

DANGER:
Rotating equipment will cause severe personal injury or death to persons who come in contact. Do not perform any service, maintenance or inspection on or near the fans, motors, and drives, or inside the unit without first ensuring that the fan and pump motors are disconnected, locked out, and tagged out.

SWITCH LOCATION



ORDER NO: **U1872469**

DATE: **02/16/2018**

BALTIMORE AIRCOIL COMPANY

VCOS LOCATION

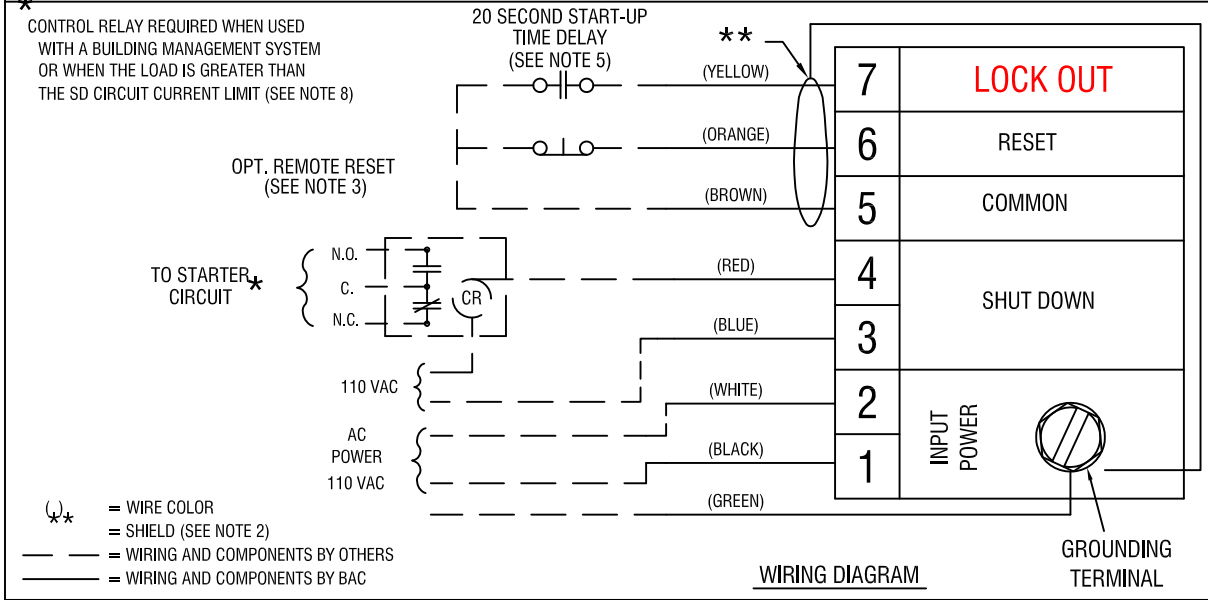
DRAWING NUMBER:
VL-U1872469X

NOTES:

1. THE VIBRATION CUTOUT SWITCH TIME DELAY AND VIBRATION LEVELS HAVE BEEN FACTORY SET AT TYPICAL VALUES FOR EVAPORATIVE COOLING EQUIPMENT. SHOULD ADJUSTMENT FROM THESE SETTINGS BE NECESSARY, PLEASE REFER TO THE OPERATING INSTRUCTIONS. (DRAWINGS BAC-10876, BAC-10877, BAC-10878, OR BAC-11489).
2. THE VIBRATION SWITCH IS SHIPPED FROM THE FACTORY WITH SHIELDED POWER CABLE PRE-WIRED INSIDE THE SWITCH FOR CONNECTION TO WIRING IN A JUNCTION BOX (BY OTHERS) OUTSIDE THE UNIT. THE WIRES FROM TERMINALS 5, 6, AND 7 ARE ENCLOSED IN A SHIELD. IF EXTERNAL WIRING FOR START-UP DELAY OR REMOTE RESET IS USED (BY OTHERS), IT MUST BE SHIELDED AND THE SHIELD CONNECTED TO THE BAC SUPPLIED SHIELD. THIS SHIELD WIRE SHOULD NOT BE GROUNDED AT THE JUNCTION BOX.
3. IF A REMOTE RESET (R/R) IS DESIRED, A MOMENTARY NORMALLY CLOSED (N/C) CONTACT MUST BE PROVIDED BY OTHERS. THE REMOTE RESET IS ACTIVATED BY MOMENTARILY OPENING THE CONTACT BETWEEN TERMINALS 5 AND 6. AS SUPPLIED FROM THE FACTORY, TERMINALS 5 AND 6 ARE CONNECTED BY A WIRE NUT FOR LOCAL RESET.
4. THE SHUTDOWN (SD) RELAY IS FACTORY SET IN THE N/C POSITION. THE SD RELAY CAN BE FIELD ADJUSTED TO NORMALLY OPEN (N/O) BY MEANS OF A SLIDE SWITCH LOCATED UNDER THE TERMINAL STRIP INSIDE SWITCH ENCLOSURE. (SEE SHUTDOWN CIRCUIT CURRENT LIMIT NOTE).
5. THE VIBRATION SWITCH HAS A FIXED 20 SECOND START-UP TIME DELAY CAPABILITY. WHEN THE SWITCH IS WIRED SUCH THAT AC POWER IS ALWAYS APPLIED TO THE SWITCH, THE 20 SECOND TIME DELAY CAN BE ACTIVATED BY MEANS OF A MOMENTARY CONTACT CLOSURE BETWEEN TERMINALS 5 AND 7. THIS CONTACT CAN BE ACHIEVED BY A ONE SHOT RELAY(BY OTHERS) WIRED WITH THE STARTER CIRCUIT AS SHOWN. ALTERNATELY, WHEN THE VIBRATION SWITCH IS WIRED IN SUCH A WAY THAT THE SWITCH IS ONLY POWERED WHEN THE STARTER CIRCUIT IS POWERED, THE 20 SECOND TIME DELAY IS AUTOMATICALLY ACTIVATED WHEN THE POWER IS APPLIED TO THE SWITCH.
6. THE RUNNING TIME DELAY IS FACTORY SET AT 3 SECONDS AND CAN BE FIELD ADJUSTED FROM 1 TO 7 SECONDS. FOR FURTHER DETAILS SEE TIME DELAY SECTION OF THE OPERATING INSTRUCTIONS. 7. THE LIGHT-EMITTING DIODE (LED) IS ILLUMINATED WHEN THE VIBRATION LEVEL IS ABOVE THE TRIP SETTING. THE LED WILL REMAIN ILLUMINATED UNTIL THE UNIT VIBRATION LEVEL DROPS BELOW THE TRIP POINT.
8. A CONTROL RELAY IS REQUIRED IF THE SWITCH IS USED AS INPUT TO A BUILDING MANAGEMENT SYSTEM (N/O TRIAC CURRENT LEAKAGE IS 1 mA). THE RELAY COIL CURRENT MUST BE GREATER THAN 50 mA CONTINUOUS. A CONTROL RELAY IS ALSO REQUIRED FOR STARTER LOADS GREATER THAN 5 AMPS CONTINUOUS, 50 AMPS PEAK FOR 16 mS.
9. IF DESIRED, A SINGLE POLE, DOUBLE THROW CLASS C RELAY (1 POLE N/O, 1 POLE N/C) CAN BE USED IN THE SHUTDOWN CIRCUIT TO POWER AN ALARM (BY OTHERS) TO PROVIDE AN AUDIBLE OR VISUAL INDICATION OF VIBRATION TRIP AS WELL AS SHUTTING DOWN THE MOTOR.

WIRING OF VIBRATION CUTOUT SWITCHES ON UNITS WITH MULTIPLE MOTORS OR CUTOUT SWITCHES:

VIBRATION CUTOUT SWITCHES SHOULD BE WIRED TO SHUT OFF ALL MOTORS ON THE ASSOCIATED FAN DRIVE SYSTEM. THIS MAY REQUIRE WIRING MULTIPLE CUTOUT SWITCHES TO SHUT OFF A SINGLE MOTOR OR WIRING A SINGLE CUTOUT SWITCH TO SHUT OFF MULTIPLE MOTORS. CONTACT YOUR CONTROLS INTEGRATOR FOR DETAILS ON HOW TO WIRE MULTIPLE SWITCHES.

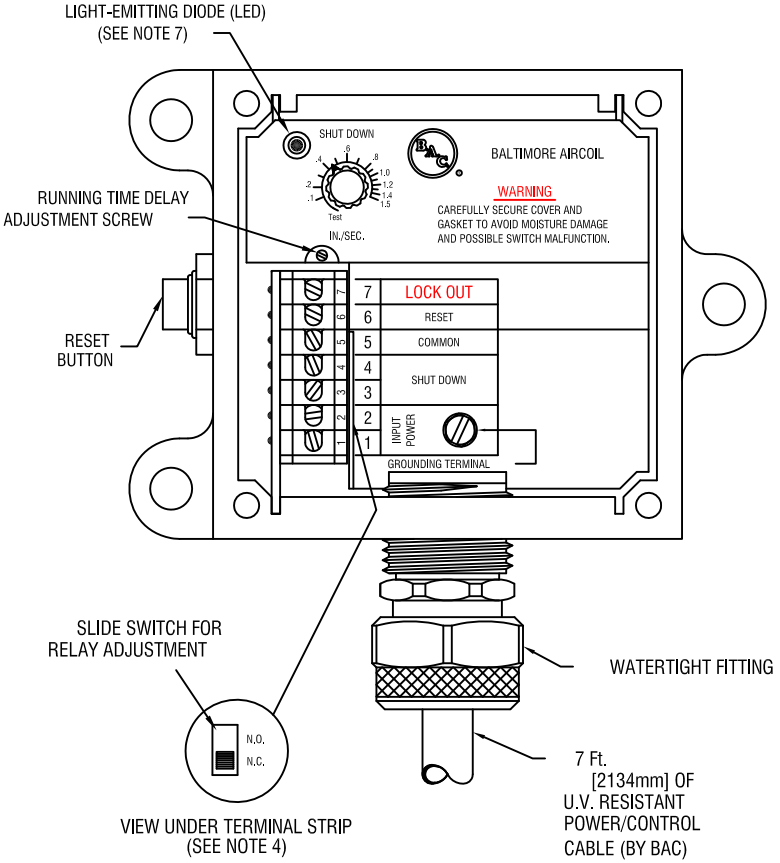


WIRING DIAGRAM

ELECTRONIC VIBRATION CUTOUT SWITCH

(W/WEATHER-PROOF COVER REMOVED)

(INTERNAL FACTORY PRE-WIRING NOT SHOWN FOR CLARITY)



SHUT DOWN CIRCUIT CURRENT LIMIT

THE SHUTDOWN RELAY IS RATED AT 5 AMPS CONTINUOUS, 50 AMPS PEAK FOR 16ms AT 110 VAC .

BEFORE PERFORMING ANY MAINTENANCE, ADJUSTMENT OR INSPECTION OF THE SWITCH, MAKE CERTAIN THAT ALL POWER HAS BEEN DISCONNECTED AND LOCKED IN THE OFF POSITION.

ORDER NO: **U1872469**

DATE: **2/16/2018**

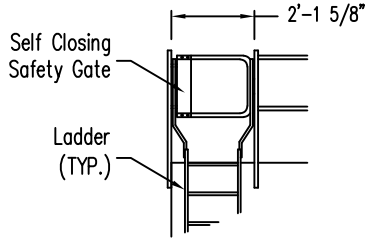
BALTIMORE AIRCOIL COMPANY

Electronic VCOS Wiring
Shut Off with Remote/Local Reset & Delay (110 VAC)

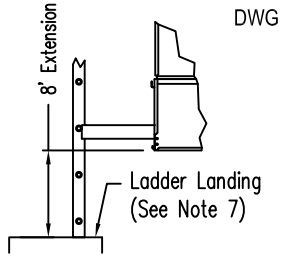
DRAWING NUMBER:
VW-U1872469X

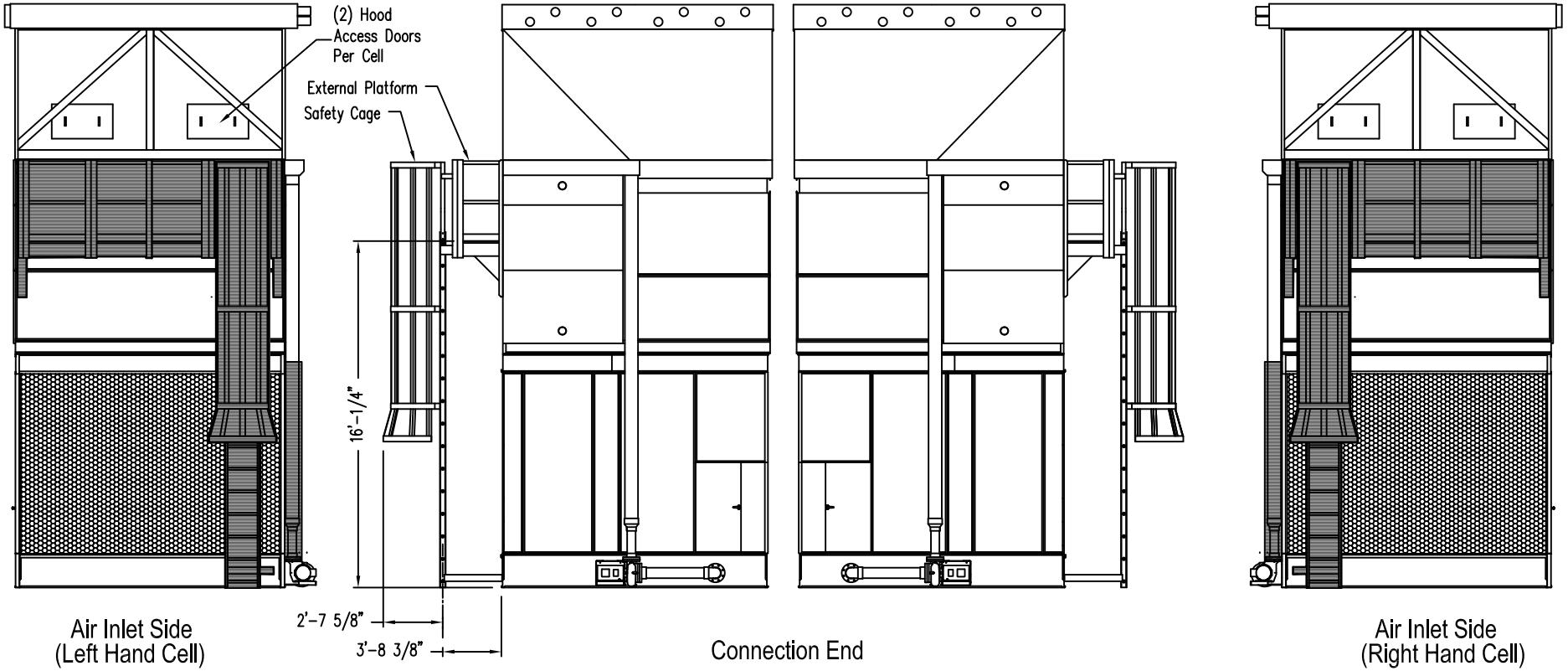
Data Version 0.00
DWG Version 1.0

Notes
1) All Dimensions are in feet and inches. All weights are in pounds.
2) External service platform and ladder ship loose for field assembly.
3) External unit access accessories ship loose for field assembly.
4) Field piping must be kept clear and supported independently of all unit access accessories.
5) Self closing, OSHA-compliant, safety gates are provided for all platform packages. Refer to OSHA and local occupational safety regulations to determine if safety gates are required.
6) Drawing is not to scale.
7) Ladder must be field cut to terrain elevation (by others) and fastened to landing (by others).



Safety Gate Detail





Air Inlet Side
(Left Hand Cell)

Connection End

Air Inlet Side
(Right Hand Cell)

ORDER NO: **U1872469**

DATE: **10/04/2018**

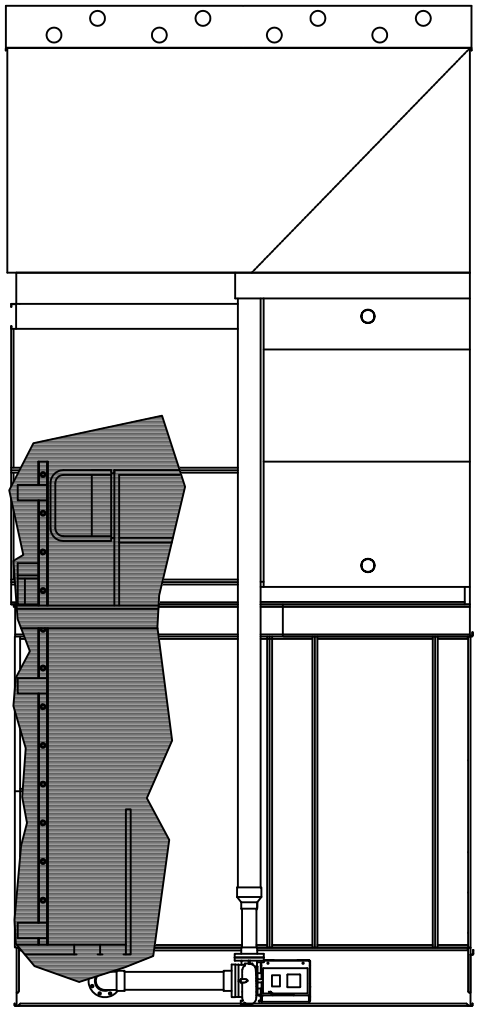
BALTIMORE AIRCOIL COMPANY

10 X 12 External Access

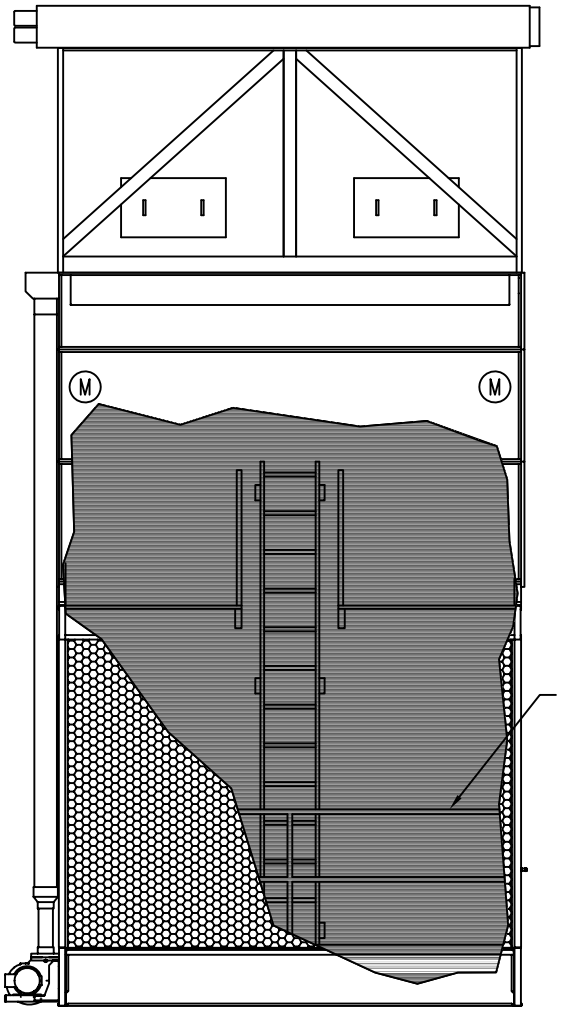
DRAWING NUMBER:
EA-U1872469X

Data Version 0.00
DWG Version 1.0

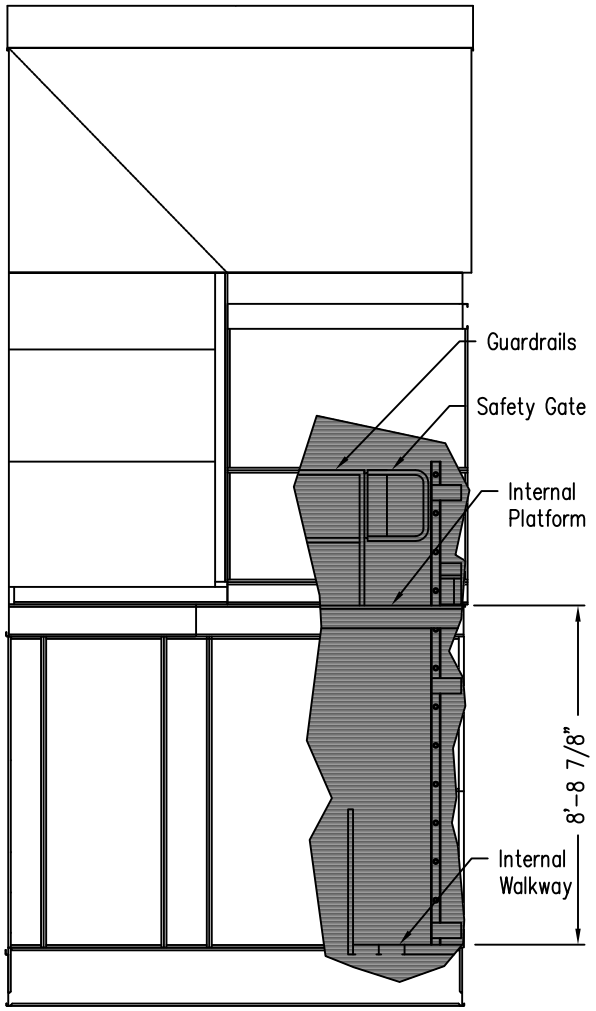
Notes
1) All Dimensions are in feet and inches.
2) Internal Ladder ships loose for field assembly.
3) A fully grated plenum is provided with an opening for a ladder, and removable grating sections to facilitate motor removal.
4) Safety gates are provided at guardrail openings.
5) Right hand unit shown, left hand is mirror image.
6) Drawing is not to scale.



Connection End



Air Inlet Side



ORDER NO: **U1872469**

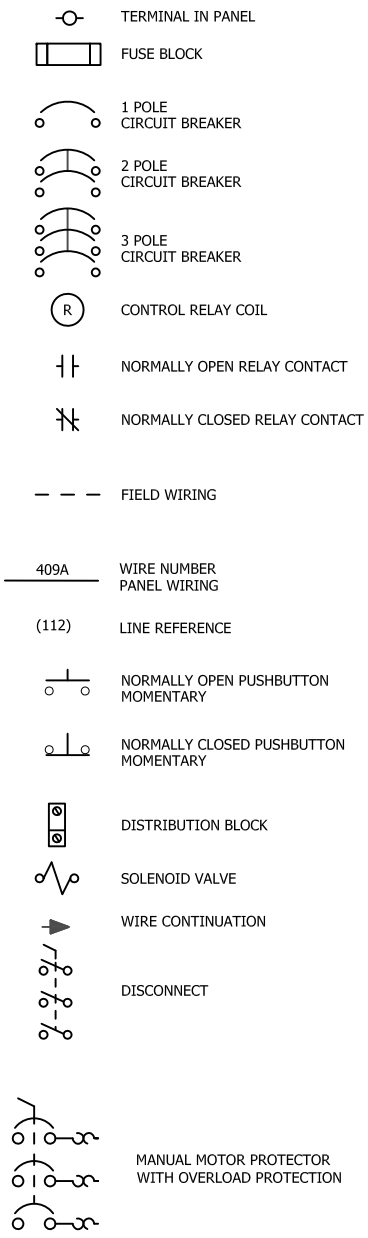
DATE: **02/16/2018**

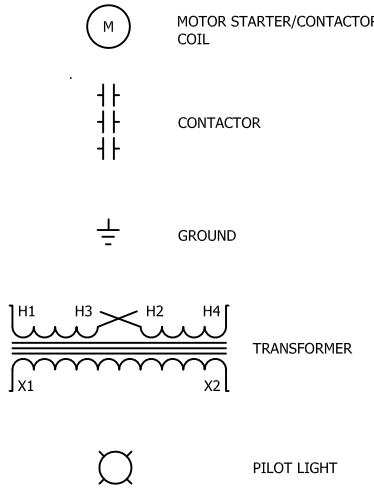
BALTIMORE AIRCOIL COMPANY

10 X 12 Internal Access

DRAWING NUMBER:
IA-U1872469X

Data Version 1.08
DWG Version 1.02





CONTROL PANEL WIRE COLOR CODING

BLACK	ALL UNGROUNDED CONTROL CIRCUIT CONDUCTORS OPERATING AT THE SUPPLY VOLTAGE
RED	UNGROUNDED AC CONTROL CIRCUITS OPERATING AT A VOLTAGE LESS THAN THE SUPPLY VOLTAGE (120V)
BLUE	UNGROUNDED DC CONTROL CIRCUITS
YELLOW	UNGROUNDED AC CONTROL CIRCUITS OPERATING AT A VOLTAGE LESS THAN THE SUPPLY VOLTAGE (24V)
WHITE OR	GROUNDED AC CURRENT-CARRYING CONTROL CIRCUIT CONDUCTOR (120V)
WHITE WITH BLUE STRIPE	GROUNDED DC CURRENT-CARRYING CONTROL CIRCUIT CONDUCTOR
WHITE WITH YELLOW STRIPE	GROUNDED AC CONTROL CIRCUIT CURRENT-CARRYING CONDUCTOR THAT REMAINS ENERGIZED WHEN THE MAIN DISCONNECT IS IN THE "OFF" POSITION
LIGHT BLUE	INTRINSICALLY SAFE WIRING CONTROL CIRCUIT CONDUCTOR

ORDER NO: **U1872469**

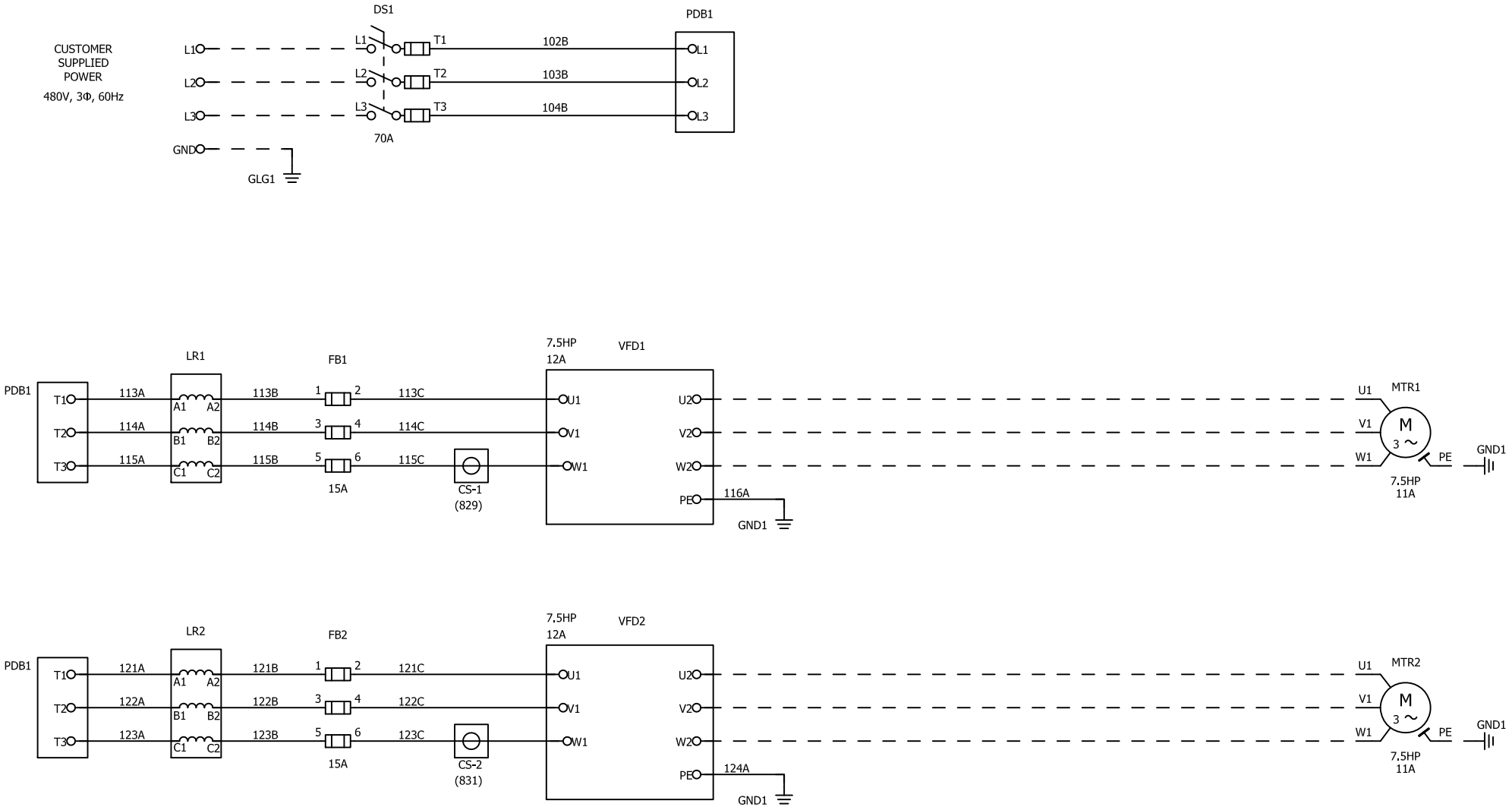
DATE: **03/07/2018**

BALTIMORE AIRCOIL COMPANY

Combined Enclosure Wiring Legend

DRAWING NUMBER:
BAC-16894

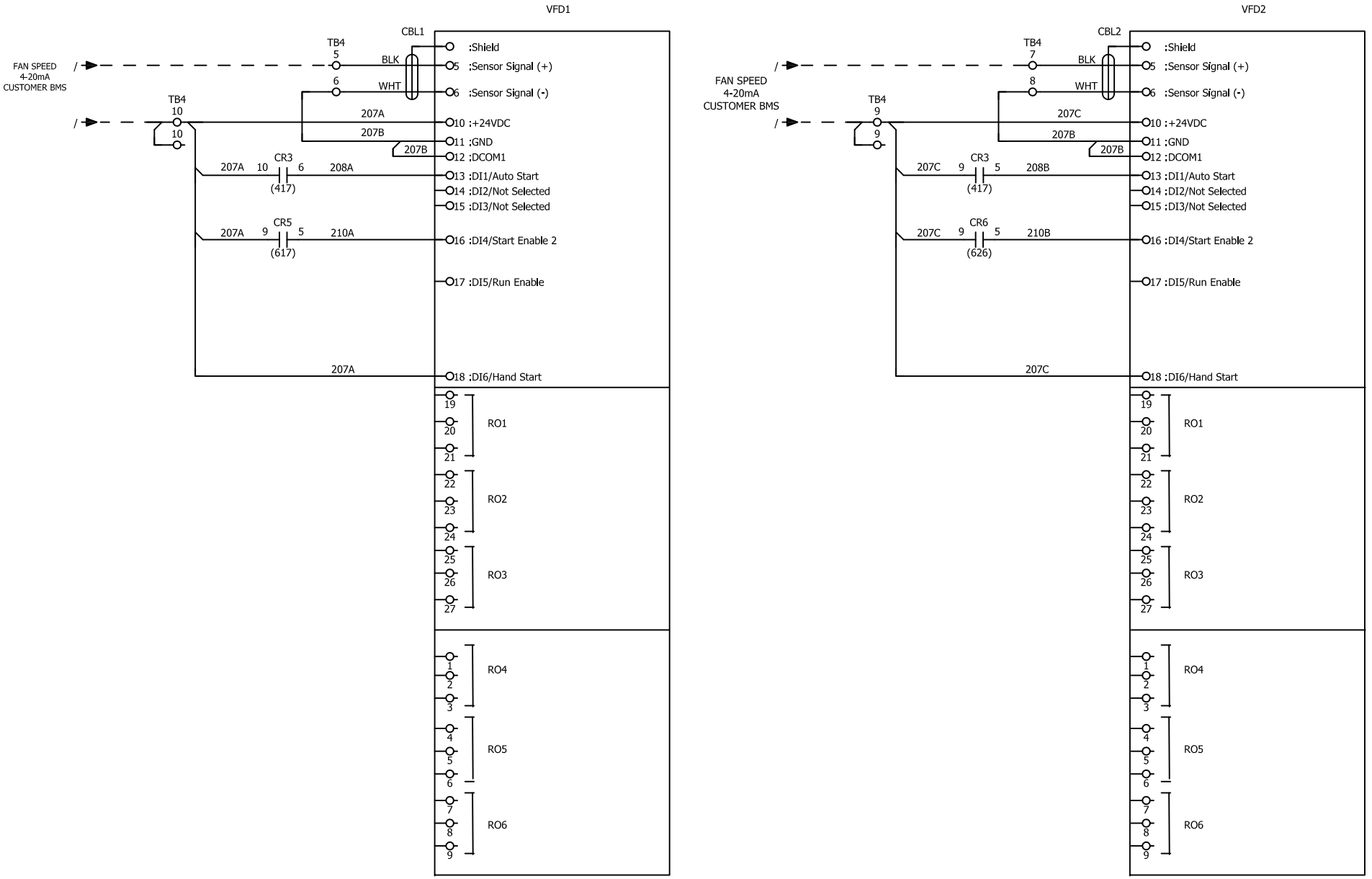
Data Version 1.08
DWG Version 1.02



Notes
1) PDB1 wiring is as follows:
   L1 to T1
   L2 to T2
   L3 to T3
2) PDB1 is wired to both VFD1 and VFD2.

ORDER NO: **U1872469**	**BALTIMORE AIRCOIL COMPANY**	**Combined Enclosure Wiring**
DATE: **05/25/2018**		DRAWING NUMBER: **BAC-16894**

Data Version 1.08
DWG Version 1.02



ORDER NO: **U1872469**

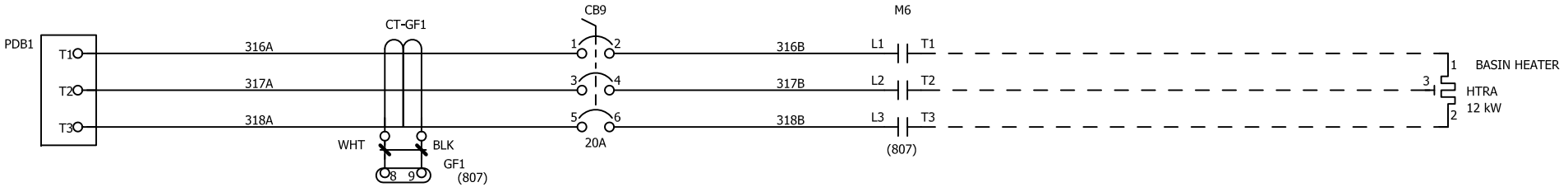
DATE: **02/26/2018**

BALTIMORE AIRCOIL COMPANY

Combined Enclosure Wiring

DRAWING NUMBER:
BAC-16894

Data Version 1.08
DWG Version 1.02



NOTE: SET GF1 TO TRIP RANGE "A"

ORDER NO: **U1872469**

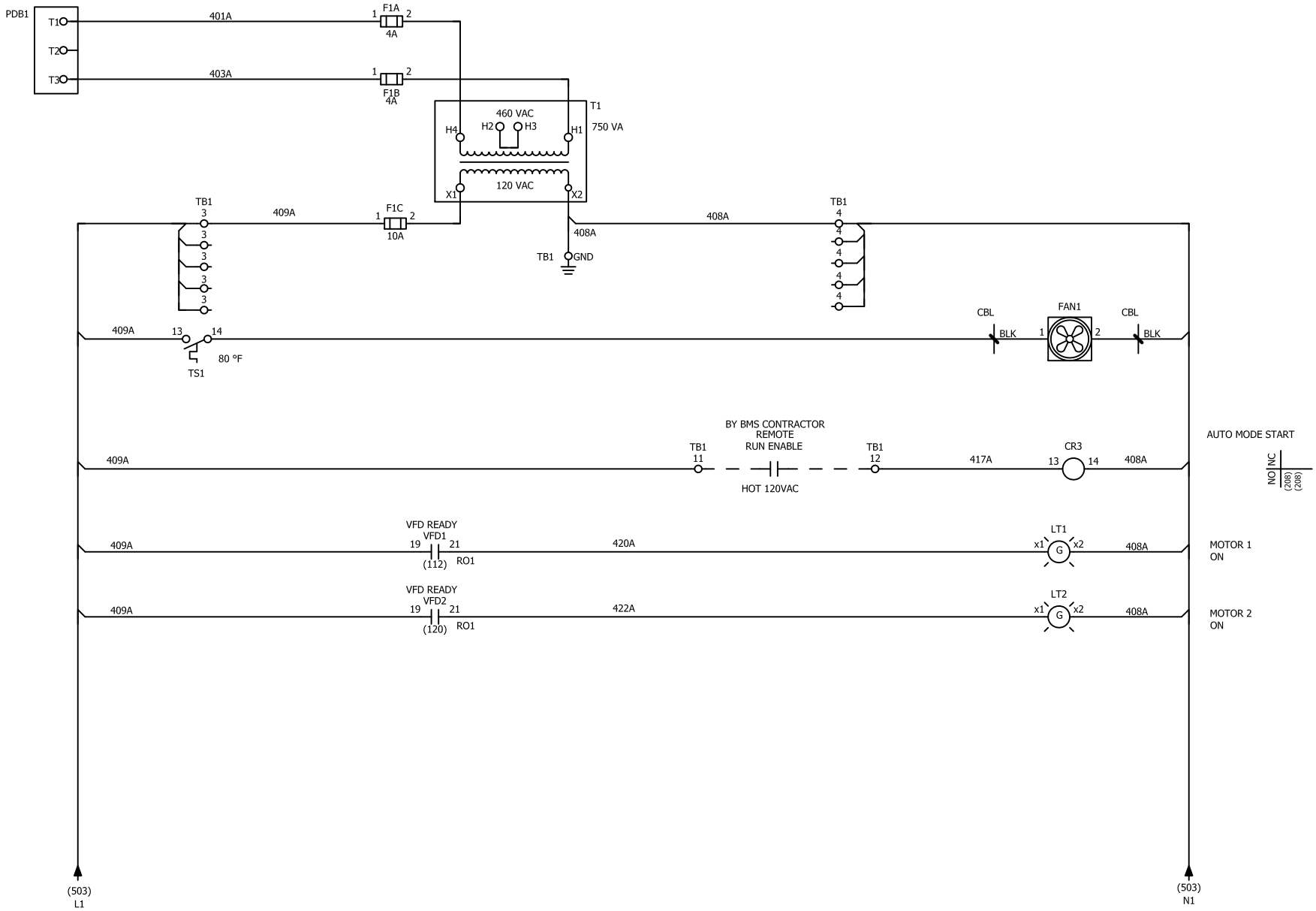
DATE: **02/26/2018**

BALTIMORE AIRCOIL COMPANY

Combined Enclosure Wiring

DRAWING NUMBER:
BAC-16894

Data Version 1.08
DWG Version 1.02



ORDER NO: **U1872469**

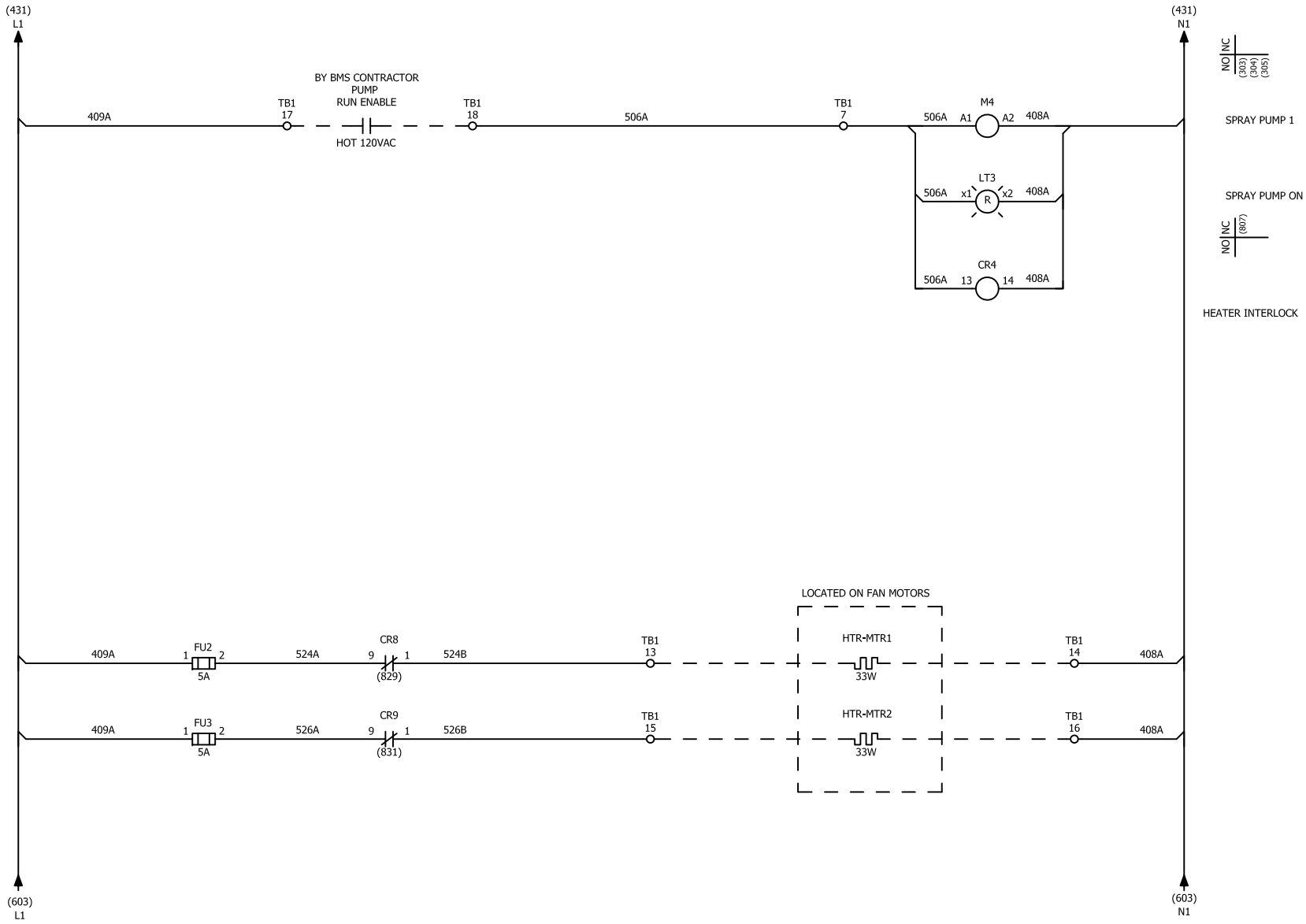
DATE: **05/25/2018**

BALTIMORE AIRCOIL COMPANY

Combined Enclosure Wiring

DRAWING NUMBER:
BAC-16894

Data Version 1.08
DWG Version 1.02



ORDER NO: **U1872469**

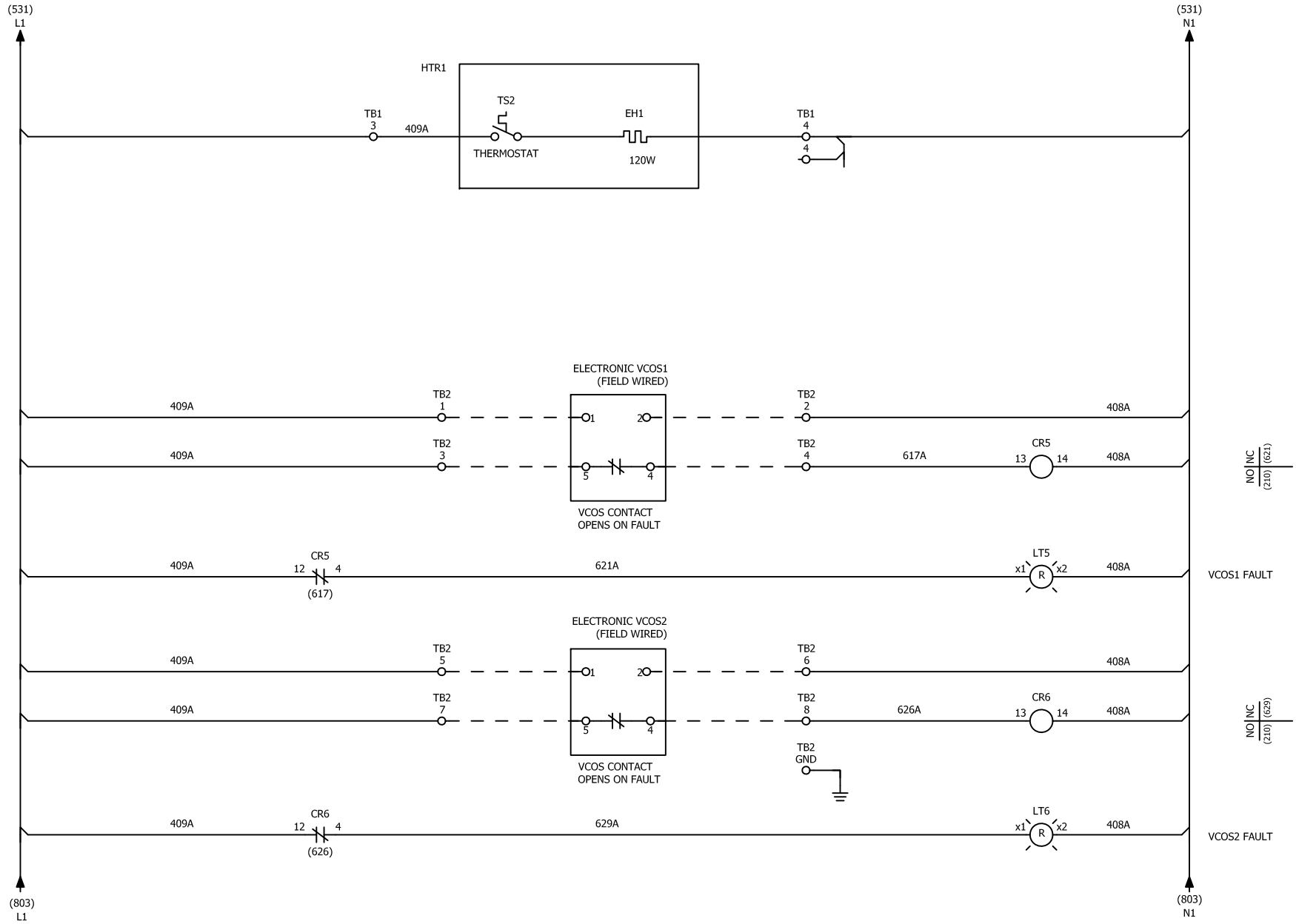
DATE: **05/25/2018**

BALTIMORE AIRCOIL COMPANY

Combined Enclosure Wiring

DRAWING NUMBER:
BAC-16894

Data Version 1.08
DWG Version 1.02



ORDER NO: **U1872469**

DATE: **02/26/2018**

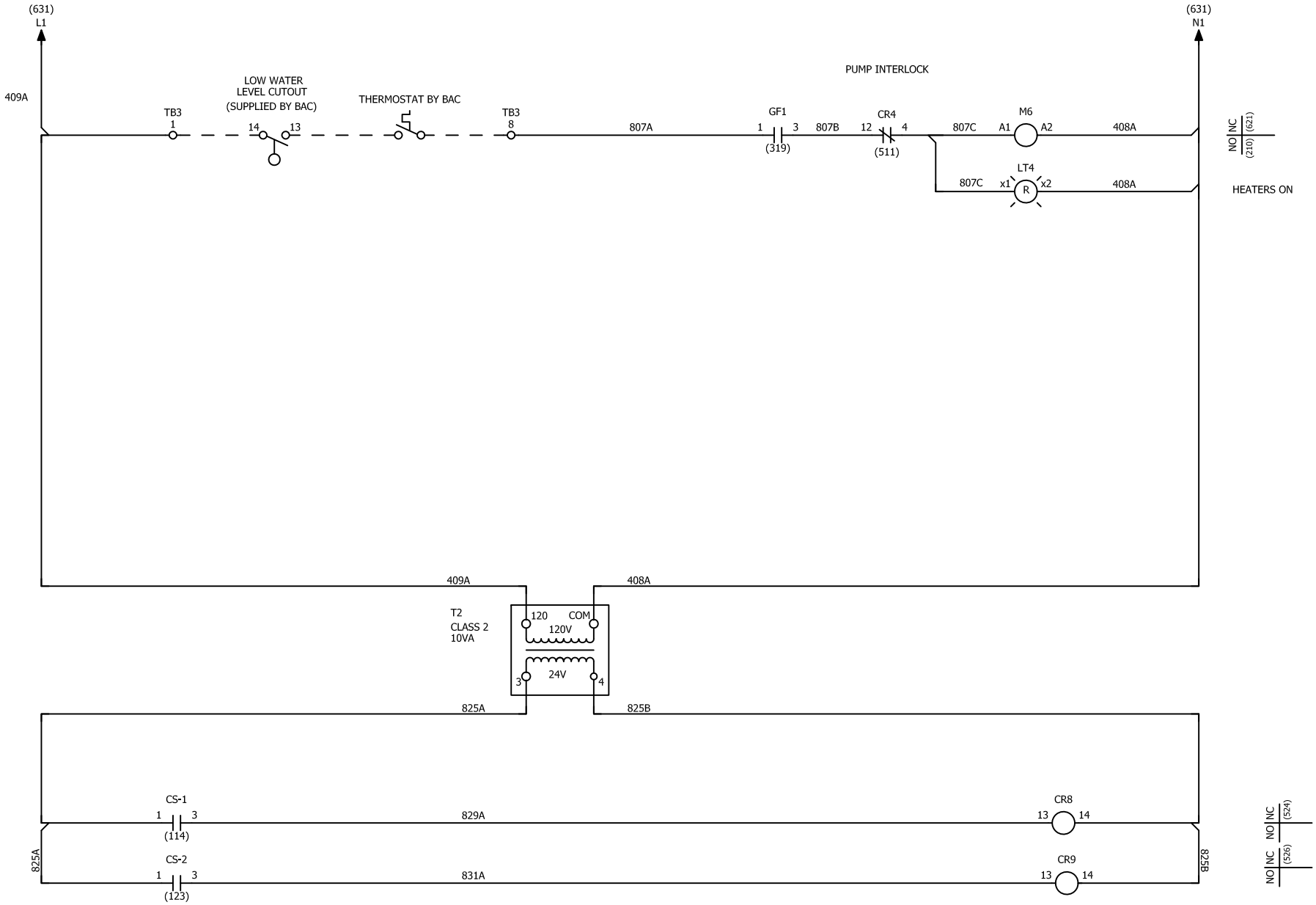
BALTIMORE AIRCOIL COMPANY

Combined Enclosure Wiring

DRAWING NUMBER:
BAC-16894

A

Data Version 1.08
DWG Version 1.02



ORDER NO: **U1872469**

DATE: **02/26/2018**

BALTIMORE AIRCOIL COMPANY

Combined Enclosure Wiring

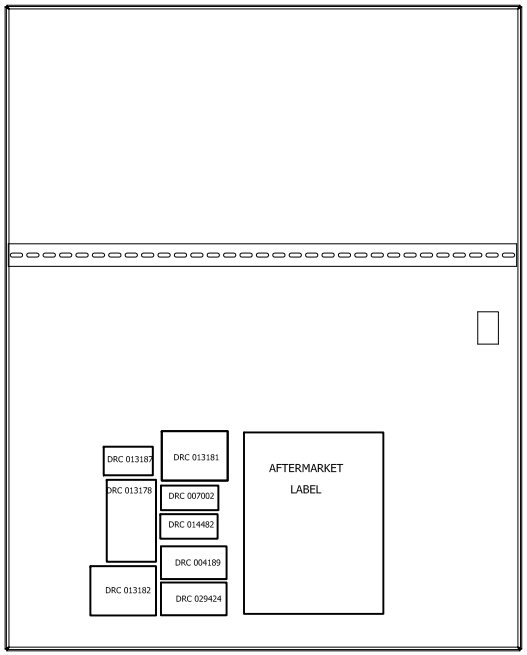
DRAWING NUMBER:
BAC-16894

A

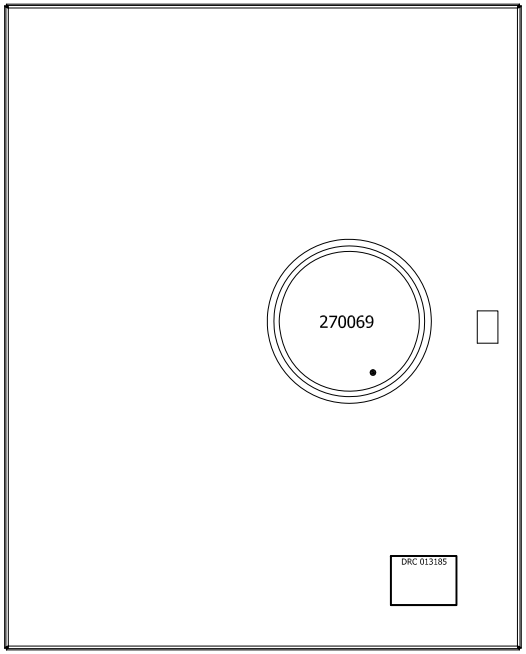
Data Version 1.08
DWG Version 1.02

ENCLOSURE - TOP VIEW

DOOR-INSIDE VIEW



DOOR-OUTSIDE VIEW



NOTE: DO NOT USE WIRE TRACK ON INSIDE OF DOOR

ORDER NO: **U1872469**

DATE: **02/26/2018**

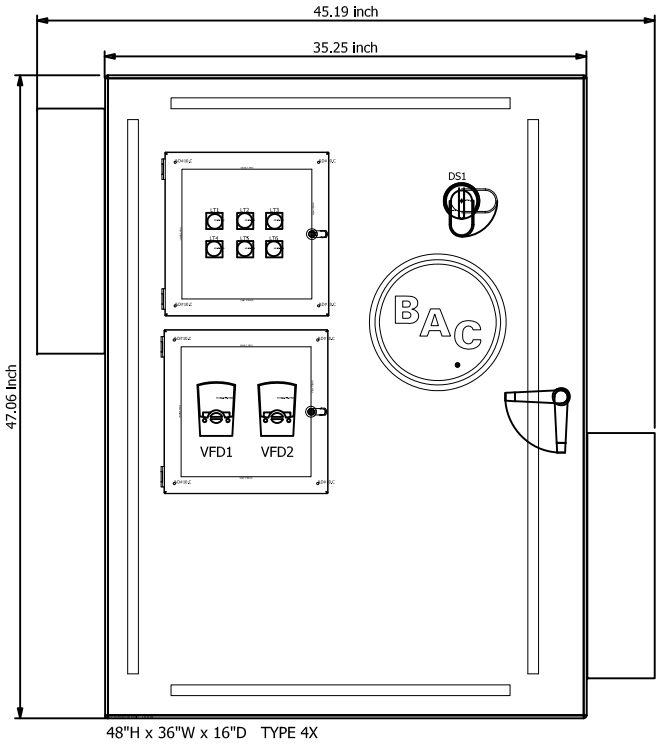
BALTIMORE AIRCOIL COMPANY

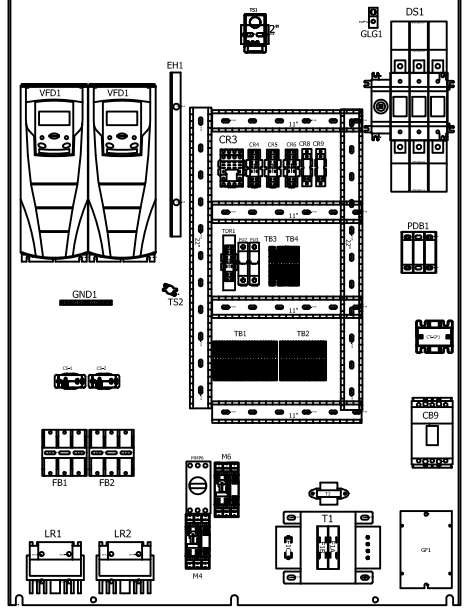
Enclosure Diagram

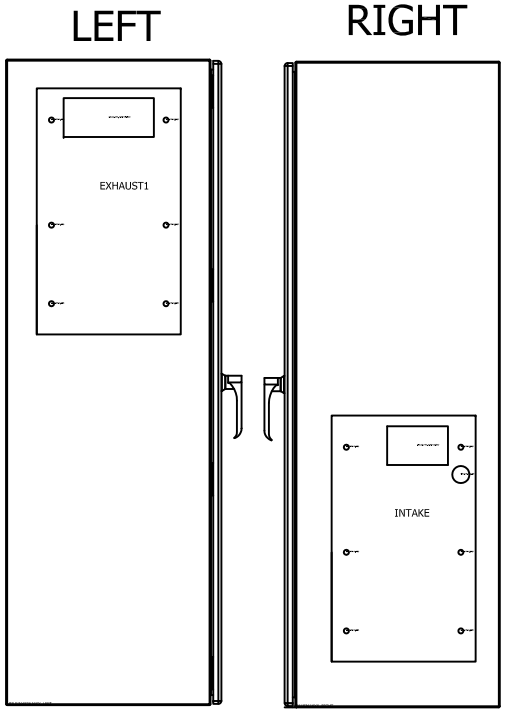
DRAWING NUMBER:
BAC-16895

A

Data Version 1.08
DWG Version 1.02







ORDER NO: **U1872469**

DATE: **02/26/2018**

BALTIMORE AIRCOIL COMPANY

Enclosure Diagram

DRAWING NUMBER:
BAC-16895

BALTIMORE AIRCOIL COMPANY

Data Specification Sheets

10-24-2018

Sold To : **MWH03**

Project:	MWH03
Engineer:	EDS - Chicago
BAC Order #	U1872469

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Corporate Headquarters: 7600 Dorsey Run Road, Jessup, MD 20794 – Tele: (410) 799-6200 / Fax: (410) 799-6416

Attachment CURE DR-10, Vendor Information

Application & Performance Warranty Data

Project Information

GL-19-003835 - NTE Estimates / Offline

Site Location:	CA
Project Name:	Cummins Power Generation SJC02 3 MW
Application:	Standby/Data Centers
Number Of Engines:	40
Operating Hours per Year:	50

Engine Specifications

Engine Manufacturer:	Cummins
Model Number:	QSK95-G5 NR2
Rated Speed:	1800
Type of Fuel:	Ultra-Low Sulfur Diesel (ULSD)
Type of Lube Oil:	1 wt% sulfated ash or less
Lube Oil Consumption:	0.1 % Fuel Consumption
Number of Exhaust Manifolds:	1

Engine Data

Load	Power	Exhaust Flow	Exhaust Temp.	O2	H2O
%	bhp	acfm	F	%	%
100	4,307	23,365	830	10.0	12.5
75	3,256	19,695	714	10.0	12.5
50	2,206	16,018	670	10.0	12.5
25	1,155	10,028	630	10.0	12.5
10	431	7,020	531	10.0	12.5

Emission Data

Load (ekW)	Species	Raw Engine Emissions		Tier 4F Emissions Targets	
		g/bhp-hr	ppmvd	g/bhp-hr	ppmvd
100%	NOx*	6.80	1077	0.50	79
	CO	0.40	104	2.6	676
	NMHC**†	0.12	54	0.14	64
	PM_{10}†	0.10	61	0.022	12
75%	NOx*	5.60	724	-	-
	CO	0.20	42	-	-
	NMHC**†	0.17	63	-	-
	PM_{10}†	0.15	74	-	-
50%	NOx*	4.30	377	-	-
	CO	0.40	58	-	-
	NMHC**†	0.31	78	-	-
	PM_{10}†	0.25	84	-	-
25%	NOx*	4.40	368	-	-
	CO	0.80	110	-	-
	NMHC**†	0.49	117	-	-
	PM_{10}†	0.50	160	-	-
10%	NOx*	6.00	243	-	-
	CO	2.60	173	-	-
	NMHC**†	1.00	116	-	-
	PM_{10}†	0.75	116	-	-

* MW referenced as NO_2

** MW referenced as CH_4. Assumed as 100% unsaturated HCs. Average at steady state per EPA 40CFR60 Method 25A for HC or mutually agreed test method.

System Specifications

Design Exhaust Flow Rate:	
SCR Catalyst Volume:	
System Pressure Loss:	
Sound Target:	
Exhaust Temperature Limits:	572 – 977°F
Minimum Regeneration Temperature[2]:	500°F
Reactant:	Urea
Percent Concentration:	32.5%
System Dosing Capacity:	
Estimated Reactant Consumption:	

Special Notes & Conditions

[1.] Carbon steel housings are suitable for use in all applications where the housing will not be insulated. Carbon steel housings may only be insulated in applications where the exhaust temperature does not exceed 900°F. If your application requires insulation with an engine exhaust temperature exceeding 900°F, a stainless steel housing is required. Customer installed insulation on carbon steel housings in applications where exhaust temperature exceeds 900°F voids any MIRATECH product warranty.

[2.] Diesel Particulate Filters depend on exhaust temperature to keep soot regenerated and the filter back pressure within acceptable levels. If the engine will be operated consistently at low loads/low exhaust temperatures, the customer should make provisions to add load via facility operations or a load bank. Refer to the included Guidelines for Successful Operation of LTR™ DPF.

- Any sound attenuation or emissions reductions listed are based on housing with catalyst elements installed.

- MIRATECH Corporation warrants that the emissions reductions requested for this inquiry will be achieved at the design and test load point as outlined in the proposal. Tier 4 is an engine certificate designation, not an actual tons/yr or g/bhp-hr measurement. MIRATECH will utilize the engine manufacturer's emission data at 100% load to provide our warranty. This is the maximum volume potential point for pollutants to be emitted. Permitting is normally done on a mass flow or tons per year basis, therefore the system will be sized accordingly. The MIRATECH design is to achieve the blended Tier 4 emission targets from the D2 test cycle, measured at 100% engine load conditions.

- Shell Radiated Noise Guarantee requires the purchase and installation of optional external insulation.

[3.] Tier 4 Final emission limits are specified by EPA as a weighted average across a 5-mode cycle. Specific values at various loads are not furnished in the standard

[4.] The terms of the performance warranty are per the MIRATECH General Terms and Conditions of Sale with the following amendments to paragraph 7.2:

Throughout the Warranty Period, Seller warrants that the Product will achieve the emissions levels shown in the table above, subject to the conditions that:

a. the Product is operated and maintained at all times in accordance with MIRATECH's written instructions;
b. the Purchaser's equipment is operated and maintained at all times in accordance with all manufacturer's instructions and guidelines;
c. the Purchaser's equipment, during operation, shall never exceed the Exhaust Emission Data set forth in the Potential Site Emission Variation Values for MSFT SJC02 project submitted to MIRATECH at time of quote
d. the Purchaser's equipment shall be operated within the temperature limits stated in this document after startup;
e. the Purchaser will operate the equipment so the engine emissions & temperature are as stated in the above table and:
    1. the NO_x, CO, VOC/NMNEHC, O_2, and PM_{10} will not fluctuate more than 2% from this value and,
    2. the Exhaust flow rate will not fluctuate more than 2% from this value and,
    3. the Exhaust temperature into the catalyst will not fluctuate more than 10°F from this value.
    4. the Exhaust temperature after the SCR catalyst will be above 572°F

[5.] The SCR NOx reduction portion of the system is expected to be active within 1 hour of engine start, at loads greater than 75%.

Application & Performance Warranty Data

Project Information

GL-19-003837 - NTE Estimates / Offline

Site Location:	CA
Project Name:	Cummins Power Generation SJC02 1250 kW
Application:	Standby/Data Centers
Number Of Engines:	1
Operating Hours per Year:	50

Engine Specifications

Engine Manufacturer:	Cummins
Model Number:	QSK50-G5 NR2
Rated Speed:	1800
Type of Fuel:	Ultra-Low Sulfur Diesel (ULSD)
Type of Lube Oil:	1 wt% sulfated ash or less
Lube Oil Consumption:	0.1 % Fuel Consumption
Number of Exhaust Manifolds:	1

Engine Data

Load	Power	Exhaust Flow	Exhaust Temp.	O2	H2O
%	bhp	acfm	F	%	%
100	1,818	10,417	850	10.0	12.5
75	1,382	9,249	810	10.0	12.5
50	945	7,243	785	10.0	12.5
25	509	4,376	724	10.0	12.5
10	247	2,804	586	10.0	12.5

Emission Data

Load (ekW)	Species	Raw Engine Emissions		Tier 4F Emissions Factors	
		g/bhp-hr	ppmvd	g/bhp-hr	ppmvd
100%	NOx*	6.00	799	0.50	799
	CO	1.60	350	2.6	350
	NMHC**†	0.15	57	0.14	57
	PM_{10}†	0.10	51	0.022	-
75%	NOx*	4.60	509	-	-
	CO	1.60	291	-	-
	NMHC**†	0.29	92	-	-
	PM_{10}†	0.13	55	-	-
50%	NOx*	3.90	369	-	-
	CO	2.00	311	-	-
	NMHC**†	0.48	130	-	-
	PM_{10}†	0.18	65	-	-
25%	NOx*	3.80	305	-	-
	CO	3.20	422	-	-
	NMHC**†	0.78	179	-	-
	PM_{10}†	0.28	86	-	-
10%	NOx*	5.30	285	-	-
	CO	4.40	388	-	-
	NMHC**†	1.33	205	-	-
	PM_{10}†	0.50	103	-	-

* MW referenced as NO_2

** MW referenced as CH_4. Assumed as 100% unsaturated HCs. Average at steady state per EPA 40CFR60 Method 25A for HC or mutually agreed test method.

System Specifications

Design Exhaust Flow Rate:	
SCR Catalyst Volume:	
System Pressure Loss:	
Sound Target:	
Exhaust Temperature Limits:	572 – 977°F
Minimum Regeneration Temperature[2]:	500°F
Reactant:	Urea
Percent Concentration:	32.5%
System Dosing Capacity:	
Estimated Reactant Consumption:	

Special Notes & Conditions

[1.] Carbon steel housings are suitable for use in all applications where the housing will not be insulated. Carbon steel housings may only be insulated in applications where the exhaust temperature does not exceed 900°F. If your application requires insulation with an engine exhaust temperature exceeding 900°F, a stainless steel housing is required. Customer installed insulation on carbon steel housings in applications where exhaust temperature exceeds 900°F voids any MIRATECH product warranty.

[2.] Diesel Particulate Filters depend on exhaust temperature to keep soot regenerated and the filter back pressure within acceptable levels. If the engine will be operated consistently at low loads/low exhaust temperatures, the customer should make provisions to add load via facility operations or a load bank. Refer to the included Guidelines for Successful Operation of LTR™ DPF.

- Any sound attenuation or emissions reductions listed are based on housing with catalyst elements installed.

- MIRATECH Corporation warrants that the emissions reductions requested for this inquiry will be achieved at the design and test load point as outlined in the proposal. Tier 4 is an engine certificate designation, not an actual tons/yr or g/bhp-hr measurement. MIRATECH will utilize the engine manufacturer's emission data at 100% load to provide our warranty. This is the maximum volume potential point for pollutants to be emitted. Permitting is normally done on a mass flow or tons per year basis, therefore the system will be sized accordingly. The MIRATECH design is to achieve the blended Tier 4 emission targets from the D2 test cycle, measured at 100% engine load conditions.

- Shell Radiated Noise Guarantee requires the purchase and installation of optional external insulation.

[3.] Tier 4 Final emission limits are specified by EPA as a weighted average across a 5-mode cycle. Specific values at various loads are not furnished in the standard

[4.] The terms of the performance warranty are per the MIRATECH General Terms and Conditions of Sale with the following amendments to paragraph 7.2:

Throughout the Warranty Period, Seller warrants that the Product will achieve the emissions levels shown in the table above, subject to the conditions that:

a. the Product is operated and maintained at all times in accordance with MIRATECH's written instructions;
b. the Purchaser's equipment is operated and maintained at all times in accordance with all manufacturer's instructions and guidelines;
c. the Purchaser's equipment, during operation, shall never exceed the Exhaust Emission Data set forth in the Potential Site Emission Variation Values for MSFT SJC02 project submitted to MIRATECH at time of quote
d. the Purchaser's equipment shall be operated within the temperature limits stated in this document after startup;
e. the Purchaser will operate the equipment so the engine emissions & temperature are as stated in the above table and:
    1. the NO_x, CO, VOC/NMNEHC, O_2, and PM_{10} will not fluctuate more than 2% from this value and,
    2. the Exhaust flow rate will not fluctuate more than 2% from this value and,
    3. the Exhaust temperature into the catalyst will not fluctuate more than 10°F from this value.
    4. the Exhaust temperature after the SCR catalyst will be above 572°F

[5.] The SCR NOx reduction portion of the system is expected to be active within 1 hour of engine start, at loads greater than 75%.

Application & Performance Warranty Data

Project Information

GL-19-003836 - NTE Estimates / Offline

Site Location:	CA
Project Name:	Cummins Power Generation SJC02 500 kW
Application:	Standby/Data Centers
Number Of Engines:	1
Operating Hours per Year:	50

Engine Specifications

Engine Manufacturer:	Cummins
Model Number:	QSX15-G9
Rated Speed:	1800
Type of Fuel:	Ultra-Low Sulfur Diesel (ULSD)
Type of Lube Oil:	1 wt% sulfated ash or less
Lube Oil Consumption:	0.1 % Fuel Consumption
Number of Exhaust Manifolds:	1

Engine Data

Load	Power	Exhaust Flow	Exhaust Temp.	O2	H2O
%	bhp	acfm	F	%	%
100	731	3,442	894	10.0	12.5
75	554	2,771	852	10.0	12.5
50	378	2,245	828	10.0	12.5
25	201	1,418	719	10.0	12.5
10	96	955	541	10.0	12.5

Emission Data

Load (ekW)	Species	Raw Engine Emissions		Tier 4F Emissions Targets	
		g/bhp-hr	ppmvd	g/bhp-hr	ppmvd
100%	NOx*	6.30	1056	0.50	84
	CO	0.30	83	2.6	716
	NMHC**†	0.10	48	0.14	67
	PM_{10}†	0.05	32	0.022	-
75%	NOx*	6.20	948	-	-
	CO	0.50	126	-	-
	NMHC**†	0.12	53	-	-
	PM_{10}†	0.09	53	-	-
50%	NOx*	4.70	594	-	-
	CO	0.50	104	-	-
	NMHC**†	0.22	80	-	-
	PM_{10}†	0.12	58	-	-
25%	NOx*	4.90	477	-	-
	CO	1.40	224	-	-
	NMHC**†	0.36	101	-	-
	PM_{10}†	0.37	138	-	-
10%	NOx*	6.10	358	-	-
	CO	12.40	1194	-	-
	NMHC**†	1.13	190	-	-
	PM_{10}†	0.28	63	-	-

* MW referenced as NO_2

** MW referenced as CH_4. Assumed as 100% unsaturated HCs. Average at steady state per EPA 40CFR60 Method 25A for HC or mutually agreed test method.

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b. the Purchaser's equipment is operated and maintained at all times in accordance with all manufacturer's instructions and guidelines;

c. the Purchaser's equipment, during operation, shall never exceed the Exhaust Emission Data set forth in the Potential Site Emission Variation Values for MSFT SJC02 project submitted to MIRATECH at time of quote

d. the Purchaser's equipment shall be operated within the temperature limits stated in this document after startup;

e. the Purchaser will operate the equipment so the engine emissions & temperature are as stated in the above table and:

1. the NO_x, CO, VOC/NMNEHC, O_2, and PM_{10} will not fluctuate more than 2% from this value and,
2. the Exhaust flow rate will not fluctuate more than 2% from this value and,
3. the Exhaust temperature into the catalyst will not fluctuate more than 10°F from this value.
4. the Exhaust temperature after the SCR catalyst will be above 572°F

[5.] The SCR NOx reduction portion of the system is expected to be active within 1 hour of engine start, at loads greater than 75%.

Attachment CURE DR-13, Vendor Warranties

From:	Brandon Ewing
To:	Salamy, Jerry/SAC
Cc:	Engel, Elyse/SJC; Frohning, John/SEA; Giles, Blake; Ravi Thapa
Subject:	[EXTERNAL] RE: SJC02: RE: 3MW Cummins Diesel engineer Tier IV - Request for support
Date:	Tuesday, September 10, 2019 10:12:31 AM
Attachments:	image001.png image002.png image003.png

Let me know if you need anything else.

3mW 16.2 gph at full load
1250 6.3 gph at full load
500 2.8 gph at full load

Brandon Ewing
Sr. Strategic Account Manager – Data Centers of NA

Cummins Sales and Service
1680 NE 51 Ave.
Des Moines, IA 50313

Cell 515-240-2009
brandon.ewing@cummins.com _

Celebrating 100 years
1919 - 2019

From: Salamy, Jerry/SAC <Jerry.Salamy@jacobs.com>
Sent: Friday, September 6, 2019 3:40 PM
To: Brandon Ewing <brandon.ewing@cummins.com>
Cc: Engel, Elyse/SJC <Elyse.Engel@jacobs.com>; Frohning, John/SEA <John.Frohning@jacobs.com>; Giles, Blake <Blake.Giles@jacobs.com>
Subject: RE: SJC02: RE: 3MW Cummins Diesel engineer Tier IV - Request for support

External Sender

Hi Brandon,

Can you provide a maximum expected Diesel exhaust fluid usage in gallons/hour for the 3-MW, 500 kW, and 1250 kW engines?

Thanks,

Jerry Salamy
Jacobs
Principal Project Manager | BIAF
+ 916.286.0207 office
+ 916.769.8919 mobile
+ 916.634.3407 fax
jerry.salamy@jacobs.com
www.jacobs.com

From: Brandon Ewing <brandon.ewing@cummins.com>
Sent: Thursday, September 05, 2019 11:23 AM
To: Salamy, Jerry/SAC <Jerry.Salamy@jacobs.com>
Subject: [EXTERNAL] RE: SJC02: RE: 3MW Cummins Diesel engineer Tier IV - Request for support

Sent these in a different email just minutes ago. Let me know if you do not get them.

Brandon Ewing
Sr. Strategic Account Manager – Data Centers of NA

Cummins Sales and Service
1680 NE 51 Ave.
Des Moines, IA 50313

Cell 515-240-2009
brandon.ewing@cummins.com _

Attachment CURE DR-21, Applicant Correspondence with BAAQMD

From: Xuna Cai
To: Salamy, Jerry/SAC
Cc: Engel, Elyse/SJC; Frohning, John/SEA; Madams, Sarah
Subject: [EXTERNAL] RE: Bay Area Air Quality Management District"s Calculating Potential to Emit for Emergency Backup Power Generators Policy
Date: Thursday, January 16, 2020 3:26:54 PM
Attachments: image001.png

Hi Jerry,

To determine the applicability of major facility and PSD, we usually start with calculating the PTE based on all standby engines operated at 100% load and up to 100 hours for emergency and the proposed reliability-testing hours (no more than 50 hours) per year per engine.
If the PTE as calculated above exceeds any major facility or PSD thresholds for any pollutants, the applicant can propose some enforceable permit conditions to limit the PTE. These proposed conditions are subject to the District's review and approval on a case-by-case basis.

For example, if the applicant accepts a permit condition that limits the number of engines that can operate at any one time and this is verified by recordkeeping or other direct engine monitoring, then this would be considered a federally-enforceable limit on the potential to emit for the facility.

If you have any questions, please let me know.

Thanks,

Xuna Cai

From: Salamy, Jerry/SAC <Jerry.Salamy@jacobs.com>
Sent: Thursday, January 16, 2020 9:52 AM
To: Xuna Cai <xcai@baaqmd.gov>
Cc: Engel, Elyse/SJC <Elyse.Engel@jacobs.com>; Frohning, John/SEA <John.Frohning@jacobs.com>; Madams, Sarah <Sarah.Madams@jacobs.com>
Subject: Bay Area Air Quality Management District's Calculating Potential to Emit for Emergency Backup Power Generators Policy

Hi Xuna,

I am working on a project that consists of the following Tier 4 (DPF and SCR) emergency diesel generators to support a data center, consisting of two single story buildings, proposed for operation in San José, CA.

40 – 3 megawatt standby generators to support the IT load
1 – 1.25 megawatt administrative generator to support the administrative load for building 1
1 – 500 kilowatt administrative generator to support the administrative load for building 2

We have submitted a Small Power Plant Exemption Application to the California Energy Commission (see the link below to the CEC's webpage). The project proposes 15 standby generators to support the IT load per building, with 25% surplus capacity installed for a total of 20 standby generators installed per building. The maximum electrical demand for the data center is 92 megawatts (worst case electrical use not expected to be exceeded). We estimated our potential to emit (PTE) consistent with the BAAQMD's "Calculating Potential to Emit for Emergency Backup Power Generators" Policy by assuming a total of 100 hours per year of total power outage at this facility. The calculation assumes 30 standby generators operate at 100% operating rate to support the IT load (30 * 3 MWs * 100% load = 90 MWs) and the two administrative generators (1.25 MWs + 0.5 MWs for a total of 91.75 megawatts) operate at 100% load for 142 hours per year (42 maintenance and testing and 100 emergency hours), with the remaining 10 standby generators operated at 100 percent load for 42 hours per year for maintenance and testing. We assumed the SCR systems were not functional during the emergency operation and conservatively used Tier 2 NOx emission factors to calculate the PTE for the maintenance and testing and emergency operation. I believe the CEC is trying to understand if the District will require the PTE to be calculated based on the maximum expected operation of 92 MWs (using the definition of PTE in 2-2-217) or on the total electrical rating of the engines of 121.75 MWs regardless of where the project can use/accommodate this level of generation. We understand that we could assume all standby generators operated at 75% load, but don't believe that addresses the CEC concern. The CEC has asked that we consult with the BAAQMD to respond to the following question. Can you please provide a response?

44. Please consult with the District and respond with what is the appropriate number of standby engines that should be assumed to operate for 142 hours per year to compute PTE for purposes of determining PSD applicability, as in Tables 3.3-5 and 3.3-16.

https://ww2.energy.ca.gov/sitingcases/sj2/

Jerry Salamy | Jacobs | Project Manager
O:+916.286.0207 | M:+916.769.8919 | jerry.salamy@jacobs.com

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