City of Bentonville, Arkansas
Bentonville WRRF Improvements

B&V Project 417296
B&V File 80.0930.01
September 1, 2026

Crossland Heavy Contractors
Attention: Mr. Matt Hardin

Reference is made to your Submittal 15500-04F Makeup Air Units A01-A03 dated August 14, 2026. The following data pertains to Section(s) 15500 of the Specifications.

Identification	Manufacturer	Description	Review Status					
			CODE 1 - NO EXCEPTIONS NOTED	CODE 2 - COMMENTS NOTED	CODE 3 - COMMENTS NOTED/CONFIRM	CODE 4 - COMMENTS NOTED/RESUBMIT	CODE 5 - REJECTED/RESUBMIT	CODE 6 - RECEIPT ACKNOWLEDGED
Data	Bessamair	Influent Structure and Influent Electrical Building (MAU-A01, MAU-A02, and MAU-A03) Makeup Air Units REV E						X

Engineer's review of drawings and data submitted by Contractor covers only general conformity to the Drawings and Specifications, external connections and dimensions which affect the layout. Engineer's review does not indicate a thorough review of all dimensions, quantities, and details of the material equipment, devices, or item shown. Engineer's review shall not relieve Contractor of Contractor's responsibility for errors, omissions, or deviations in the drawings and data, nor of the Contractor's sole responsibility for compliance with the Contract Documents.

Remarks:

1. Acknowledged.

BLACK & VEATCH CORPORATION

Bridget Moore
Engineering Manager

By: Michele Roth,

24A03SP - Bentonville WRRF Improvements

1901 N.E. A Street
Bentonville, Arkansas 72712
United States

Crossland Heavy Contractors, Inc.
1800 S 52nd St, Ste 410
Rogers, Arkansas 72758
United States
(479) 464-7077

Title
15500 - Heating, Ventilating, and Air Conditioning : Product Information : Make-Up Air Unit 03 - 05

Submittal Manager
Adrian Ensaldo

Spec Section
15500 - Heating, Ventilating, and Air Conditioning

Type
Product Information

Number
15500-4

Rev
F

Description
A. Drawings and Data 1. Complete assembly and installation drawings, and wiring and schematic diagrams, together with detailed specifications and data covering materials, parts, devices, and accessories forming a part of the equipment furnished, shall be submitted in accordance with the Submittals Procedures section. Device tag numbers indicated on the Drawings shall be referenced on the wiring and schematic diagrams where applicable. The data and specifications for each unit shall include, but shall not be limited to, the following: a. Makeup Air Units 1) Name of manufacturer 2) Type and model 3) Construction materials, thickness, and finishes 4) Input and output heating capacities 5) Filter velocities 6) Overall dimensions and required clearances 7) Net weight and load distribution 8) Performance curves with the specified operating point clearly identified for each unit, type, and model, with capacity in cubic feet per minute as the abscissa and brake horsepower, static pressure, and efficiency as the ordinate. The fan curves shall include a family of curves for at least 5 different rotative speeds on a single chart 9) Certified AMCA standard test code sound power output data for the fan outlet and casing when operating at the specified volume flow rate. Sound data shall list dB re 10-12 watts in each octave band, with midrange frequencies starting at 63 Hz and ending at 8,000 Hz 10) Multiline wiring diagrams clearly indicating factory installed and field installed wiring with all terminals identified 11) Electrical requirements including voltage, number of phases, and amperage 12) Where specified, information on equipment manufacturers' representatives b. Fans 1) Name of manufacturer 2) Type and model 3) Construction materials, thickness, and finishes 4) Overall dimensions and required clearances 5) Net weight and load distribution 6) Performance curves with the specified operating point clearly identified for each unit, type, and model, with capacity in cubic feet per minute as the abscissa and brake horsepower, static pressure, and efficiency as the ordinate. The fan curves shall include a family of curves for at least 3 different rotative speeds on a single chart 7) Certified AMCA standard test code sound power output data for the fan outlet and casing when operating at the specified volume flow rate. Sound data shall list dB re 10-12 watts in each octave band, with midrange frequencies starting at 63 Hz and ending at 8,000 Hz 8) Where specified, information on equipment manufacturers' representatives c. Equipment (not specifically listed) 1) Name of manufacturer 2) Type and model 3) Construction materials, thickness, and finishes 4) Manufacturer's performance data 5) Overall dimensions and required clearances 6) Net weight and load distribution 7) Wiring diagrams d. Sheet Metal Ductwork 1) Sheet metal duct fabrication drawings indicating dimensions of individual shop and field fabricated sections, top and/or bottom duct elevations, joint locations, and dimensions of duct from walls or column rows 2) Pressure and seal classifications 3) Reinforcement types and spacing 4) Joint and seam types 5) Hanger and support types, spacing, and attachment methods 6) Access panel and door construction, sizes, and locations 7) Duct sealant, adhesive, gasket, and tape information 8) Coatings 9) Ductwork materials and thicknesses 10) Product data demonstrating compliance with ASHRAE 62.1 e. Temperature Controls 1) Published descriptive data on each item of equipment and accessories, indicating all specific characteristics and options and identified with the designation used herein and on the Drawings. 2) Schematic control diagrams giving specific data on all settings, ranges, actions, adjustments, and normal positions. Although schematic, these diagrams shall, as closely as possible, represent the actual system with all significant equipment and devices identified and located relative to each other. These diagrams shall also show detailed multiline wiring with all terminals accurately identified. The wiring diagrams shall show the internal connections of the temperature control panels and all field wiring to equipment remote from the control panels, including wiring to Ownerfurnished equipment. The wiring

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SUBMITTAL

Bentonville WRRF Improvements

Submittal	
LOCATION	Bentonville, AR
DATE	August 12, 2026
PRODUCTS	Review Letter - Other Air Handling Unit - MAU-A01 - Bessamaire Air Handling Unit - MAU-A02 - Bessamaire Air Handling Unit - MAU-A03 - Bessamaire

BLACK & VEATCH

8/13/2026 resubmittal for record.
MAU-A03 - See added note: VFD cabinet is sealed from process air stream
MAU-A03 - See added note: service clearances

City of Bentonville, Arkansas
Bentonville WRRF Improvements

B&V Project 417296
B&V File 80.0930.01
August 10, 2026

Crossland Heavy Contractors
Attention: Mr. Matt Hardin

Reference is made to your Submittal 15500-04E Makeup Air Units dated July 23, 2026. The following data pertains to Section(s) 15500 of the Specifications.

Identification	Manufacturer	Description	Review Status: CODE 1 - NO EXCEPTIONS NOTED	CODE 2 - COMMENTS NOTED	CODE 3 - COMMENTS NOTED/CONFIRM	CODE 4 - COMMENTS NOTED/RESUBMIT	CODE 5 - REJECTED/RESUBMIT	CODE 6 - RECEIPT ACKNOWLEDGED
Data	~~Greenheck~~ **BESSAMAIR**	Influent Structure and Influent Electrical Building (MAU-A01, MAU-A02, and MAU-A03) Makeup Air Units REV E			X			

Engineer's review of drawings and data submitted by Contractor covers only general conformity to the Drawings and Specifications, external connections and dimensions which affect the layout. Engineer's review does not indicate a thorough review of all dimensions, quantities, and details of the material equipment, devices, or item shown. Engineer's review shall not relieve Contractor of Contractor's responsibility for errors, omissions, or deviations in the drawings and data, nor of the Contractor's sole responsibility for compliance with the Contract Documents.

Remarks:

1. ~~Provide responses to all previous comments and indicate page where the submittal is updated to address the comment.~~
2. ~~Submittal title is incorrect and lists MAU-03-05. Product information for MAU-01/MAU-02/MAU-03 is contained in the submittal.~~ **CORRECT TAGS: MAU-A01, MAU-A02, MAU-A03**
3. HVAC: MAU discharge dimensions are shown in the revised submittal; however, final coordination between roof opening framing, ductwork, and unit dimensions and any modifications remain the contractor's responsibility.
4. HVAC: Disconnects noted. Confirm with Electrical Code and Owner if disconnect needs to be lockable type.
5. HVAC: NEMA 4X VFD enclosures are noted as ventilated. Confirm VFD electronic internals have conformal coating or are isolated from the ventilation air. **See added note: VFD cabinet is sealed from process air stream**
6. HVAC: Confirm Number Plates with the MAU tag number are provided on the unit mounted operator panel and ECP.
7. Structural: MAU-01: Contractor to coordinate total equipment weight and corner loads with bar joist manufacturer/designer. Contractor shall coordinate exact roof opening/penetration dimensions and locations with bar joist manufacturer/designer.
8. Structural: MAU-02: Contractor shall coordinate exact roof slab opening/penetration dimensions and locations prior to rebar installation and concrete placement.
9. Structural: MAU-03: Contractor to coordinate total equipment weight and corner loads with bar joist manufacturer/designer. Contractor shall coordinate exact roof opening/penetration dimensions and locations with bar joist manufacturer/designer.

10. Electrical: Units are noted to include an integral VFD and integral signal available for use to disable the heating sections when the plant is running on generator power.
11. Electrical: The units are noted to have a single power feed from equipment to the heating and blower sections of the MAU.
12. Electrical: kW heating ratings and blower motor HP are noted to closely match the HVAC schedule on Sheet H-3.

BLACK & VEATCH CORPORATION

Bridget Moore
Engineering Manager

By: Michele Roth, Scott McBrayer, Craig Hardin

MAU CLEARANCE REQUIREMENTS NOTES ADDED - SEE MAU-A03 DRAWINGS

PROJECT TEAM

EQUIPMENT



Clayton Murphy

Engineering Sales

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Account Executive

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Submittal

JOB NAME	Bentonville WRRF Improvements
PRODUCT	Review Letter
MANUFACTURER	Other
LOCATION	Bentonville, AR
DATE	July 22, 2026
CONTRACTOR	Crossland Heavy Contractors
SUBMITTED BY	Clayton Murphy

City of Bentonville, Arkansas
Bentonville WRRF Improvements

B&V Project 417296
B&V File 80.0930.01
May 26, 2026

Crossland Heavy Contractors
Attention: Mr. Matt Hardin

Reference is made to your Submittal 15500-04-C Makeup Air Units dated February 23, 2026.
The following data pertains to Section(s) 15500 of the Specifications.

Identification	Manufacturer	Description	Review Status: CODE 1 - NO EXCEPTIONS NOTED	CODE 2 - COMMENTS NOTED	CODE 3 - COMMENTS NOTED/CONFIRM	CODE 4 - COMMENTS NOTED/RESUBMIT	CODE 5 - REJECTED/RESUBMIT	CODE 6 - RECEPT ACKNOWLEDGED
Data	Bessamaire	Makeup Air Units REV C				X		

Engineer's review of drawings and data submitted by Contractor covers only general conformity to the Drawings and Specifications, external connections and dimensions which affect the layout. Engineer's review does not indicate a thorough review of all dimensions, quantities, and details of the material equipment, devices, or item shown. Engineer's review shall not relieve Contractor of Contractor's responsibility for errors, omissions, or deviations in the drawings and data, nor of the Contractor's sole responsibility for compliance with the Contract Documents.

Remarks: Comments Hyperlinked

Building Mechanical Comments:
General Comments:

1. A new manufacturer is submitted; therefore, previous submittal review comments are now obsolete.
2. Please include listing of items, including equipment tag numbers, contained in the submittal on the cover page and bookmarks in the PDF file corresponding to the listing of items per 01300-3.02.G.
3. Equipment Control Panels provided by Bessamaire are considered "ECP" not "TCP". The TCP is under the HVAC controls contractor's scope. Update submittal with ECP tag numbers shown on the Drawings to identify intended use of products in the work. Clarify in the sequence of operations the control functions provided by Bessamaire and alarms to the ECP, TCP, and the plant control system (PCS) in compliance with Drawing H6. Confirm the ECPs by Bessamaire include a relay to disable the heating section upon a signal from the PCS indicating switch to generator power per Drawing H6 paragraph 4.1.#.
4. The equipment manufacturer is required to have a local service center per 15500-2.04.4 or be able to provide service within 24 hrs from a service center with a parts supply per 15500-1.03.B.3. Provide confirmation of compliance and include contact information for service.
5. Confirm control panel circuit boards/sensitive electronics and all wiring connections are provided with protective conformal coating suitable for electronics per 15500-2.04.A.6.a.
6. Include materials of construction for the electric heating elements, confirm corrosion resistant finned tubular type per 15500 2.04.A.10.
7. Contractor to confirm roof curbs are provided for the makeup air units as accessories as required by 15500-2.04.A.13.a. or by others. Include curb product information.

Curb submittals forthcoming

Specific Comments:

1. HVAC: MAU-A01 cabinet dimensions submitted are larger than the basis of design shown on Drawing HA-4. Contractor is responsible for revision of supplemental steel in roof framing, and coordination of clearances to roof access hatches. Include any required MAU clearances in the submittal.

2. HVAC: MAU-A01 discharge opening dimensions do not match Drawing HA-4. Contractor shall verify and coordinate final opening dimensions between roof opening framing, connected ductwork, and unit dimensions.

3. HVAC: MAU-A01 external static pressure required is 2 in. w.g. as indicated on Drawing H-3. The currently submitted external static pressure is 1 in. w.g. Revise and reselect the fan accordingly.

4. HVAC: MAU-A01. TEFC motor shown on page 10 of 175. Revise to TEFC instead of ODPHE on Page 13 of 175 per section 15050-2-12-a.

5. HVAC: MAU-A01 Contractor to note that that the differential pressure switch and damper actuator indicated for this system are in the ductwork as shown on Drawing H7 and HA-3. Include the "CD-A01" and "PDS-A01" tag numbers on the submittal pages to confirm intended use of the submitted products in the work. Confirm these are provided by others if excluded by Bessamaire. They are required to be explosion proof as indicated by the "EP" designation on the Drawings.

6. HVAC: MAU-A01 Provide heater upstream of the fan as indicated by the section order in 15500-2.04.A.6.a to ensure evenly distributed airflow across the coil under very low entering air temperatures and to allow proper placement and function of the freeze stat sensor and discharge air temperature sensor on the leaving-air side of the coil.

7. HVAC: MAU-A01 MAU sound pressure level shall not exceed 85 dB per Section 01170-1.8. The submitted MAU shows sound pressure levels as high as 97 dB. Contractor to revise or provide compliant selection.

8. HVAC: MAU-A01 Main Operator Panel with functions shown on submittal drawing 26-511xx-S6 (page 31 of 175) is intended to be the remote panel tagged as ECP-A01 located in the electrical room. Confirm the remote panel can be provided where shown on Drawing HA-3 and with switches as identified on Drawing H6 paragraph 4.1. Confirm the panel enclosure is NEMA 12 as required by section 15500-2.04.A.12.c.

9. HVAC: MAU-A01 The submitted wiring diagrams indicate that a separate 480v/3ph power connection is required for the electric heating section. Contractor to confirm and coordinate with the electrical power design.

10. HVAC: MAU-A01 Contractor to confirm mounting location of the VFD and that the NEMA rating of the enclosure is appropriate for the AREA TYPE indicated on the electrical drawings.

11. HVAC: MAU-A02 cabinet dimensions submitted are larger than the basis of design shown on Drawing HA-3. Contractor is responsible for revision of supplemental steel in roof framing, and coordination of clearances to roof access hatches. Include any required MAU clearances in the submittal.

12. HVAC: The MAU-A02 discharge opening dimensions do not match Drawing HA-3. Contractor shall verify and coordinate final opening dimensions between roof opening framing, connected ductwork, and unit dimensions.

13. HVAC: MAU-A02. TEFC motor shown on page 67 of 175. Revise to TEFC instead of ODPHE on Page 70 of 175 per section 15050-2-12-a.

14. HVAC: MAU-A02 Contractor to note that that the differential pressure switch and damper actuator indicated for this system are in the ductwork as shown on Drawing H-7. Include the "CD-A02" and "PDS-A08" tag numbers on the submittal pages to confirm intended use of the submitted products in the work. Confirm these are provided by others if excluded by Bessamaire.

15. HVAC: MAU-A02 Provide heater upstream of the fan as indicated by the section order in 15500-2.04.A.6.a to ensure evenly distributed airflow across the coil under very low entering air temperatures and to allow proper placement and function of the freeze stat sensor and discharge air temperature sensor on the leaving-air side of the coil.

16. HVAC: MAU-A02 The submitted wiring diagrams indicate that a separate 480v/3ph power connection is required for the electric heating section. Contractor to confirm and coordinate with the electrical power design.

17. HVAC: MAU-A02 Main Operator Panel with functions shown on submittal drawing 26-511xx-S6 (page 88 of 175) is intended to be the remote panel tagged as ECP-A02 located in the Access Platform Room. Confirm the remote panel can be provided where shown on Drawing HA-2 and with switches as identified on Drawing H6 paragraph 4.1. Confirm panel enclosure is rated NEMA 12 per section 15500 2.04.A.12.c. This is a ventilated space, Contractor to confirm all components are rated for 104 F.

18. HVAC: MAU-A02 Contractor to confirm mounting location of the VFD and that the NEMA rating of the enclosure is appropriate for the AREA TYPE indicated on the electrical drawings.

19. MAU-A03 cabinet dimensions submitted are larger than the basis of design shown on Drawing HA-9. Unit will not fit on the roof with the other equipment and required clearances. Revise and resubmit. Consider centrifugal down discharge blower and intake louvers rather than hood. Contractor is responsible for revision of supplemental steel in roof framing, and coordination of clearances to other equipment. Include any required MAU clearances in the submittal.

20. HVAC: MAU-A03 discharge opening dimensions do not match Drawing HA-9. Contractor shall verify and coordinate final opening dimensions between roof opening framing, connected ductwork, and unit dimensions.

21. HVAC: MAU-A03 TEFC motor shown on page 122 of 175 is not required to be spark resistant in this location. Revise to TEFC instead of ODPHE on Page 125 of 175 per section 15050-2-12-a.

22. HVAC: MAU-A03 MAU sound pressure level shall not exceed 85 dB per Section 01170-1.8. The submitted MAU shows sound pressure levels as high as 94 dB. Contractor to revise or provide compliant selection.

23. MAU-A03 supply fan motor horsepower is higher than indicated on Schedule H-3. Coordinate with the Electrical discipline to confirm that electrical systems are suitable for the revised motor horsepower.

24. HVAC: MAU-A03 Provide heater upstream of the fan as indicated by the section order in 15500-2.04.A.6.a to ensure evenly distributed airflow across the coil under very low entering air temperatures and to allow proper placement and function of the freeze stat sensor and discharge air temperature sensor on the leaving-air side of the coil.

25. HVAC: MAU-A03 The submitted wiring diagrams indicate that a separate 480v/3ph power connection is required for the electric heating section. Contractor to confirm and coordinate with the electrical power design.

26. HVAC: MAU-A03 Main Operator Panel with functions shown on submittal drawing 26-511xx-S6 (page 143 of 175) is intended to be the remote panel tagged as ECP-A03 located in the electrical room. Confirm the remote panel can be provided where shown on Drawing HA-9 and with switches as identified on Drawing H6 paragraph 4.1. Confirm the panel enclosure is NEMA 12 as required by section 15500-2.04.A.12.c.

27. HVAC: MAU-A03 Contractor to note that that there is no differential pressure switch for ventilation failure indicated on the drawings for this unit and damper actuator indicated for this system is in the ductwork as shown on Drawing H7 and HA-9. Include the “CD-A07” tag number on the submittal pages to confirm intended use of the submitted product in the work. Confirm these are provided by others if excluded by Bessamaire as noted on page 121 of 175.

28. HVAC: MAU-A03 Contractor to confirm mounting location of the VFD and that the NEMA rating of the enclosure is appropriate for the AREA TYPE indicated on the electrical drawings.

29. HVAC: MAU-A03 Supplier to confirm fan VFD can turn down to revised airflow requirements of 9200 cfm high speed and 3380 cfm low speed. Confirm electric heater can operate in the range of high 70 kW to low 34 kW. If not feasible, resubmit a different model.

VFD to be intregal to the MAU cabinet

Electrical Comments:

1. MAU-01 is indicated to be supplied with separate VFD in a coordinated location. The electrical design had assumed that the VFD would be integral to the MAU. There is not enough room in the upper floor electrical room to install the VFD for MAU-01. The only other locations outside of the hazardous area of the upper floor would be on the roof, or outside the bar screen area southern wall.

2. MAU-02 is indicated to be supplied with separate VFD in a coordinated location. The electrical design had assumed that the VFD would be integral to the MAU. There is some available wall space in grit pump room area. VFDs for the grit pumps are installed here, along with other electrical panels.

3. MAU-03 is indicated to be supplied with separate VFD in a coordinated location. The electrical design had assumed that the VFD would be integral to the MAU. There is some available space in the center aisle of the electrical room and some available wall space in the compressor room.

BLACK & VEATCH CORPORATION

Bridget Moore
Engineering Manager

By: Soukat Mattigar, Michele Roth, Scott McBrayer

Product 2/4

Submittal

JOB NAME	Bentonville WRRF Improvements
PRODUCT	Air Handling Unit - MAU-A01
MANUFACTURER	Bessamaire
LOCATION	Bentonville, AR
DATE	July 22, 2026
CONTRACTOR	Crossland Heavy Contractors
SUBMITTED BY	Clayton Murphy

SUBMITTAL PACKAGE

FOR

BENTONVILLE WATER RESOURCES

15500-04-C Makeup Air Units

UNIT PERFORMANCE SPECIFICATIONS:

MODEL NUMBER: JHIEF8-30D
UNIT MAU-A01

UNIT DESCRIPTION: Electric Heating and Ventilating Unit; 27,150 Total CFM; 460/3/60 voltage; Outdoor horizontal configuration Down Discharge; 18 ga. G-90 Galvanized steel construction; 11 Ga G-90 Galvanized Steel base, MERV 8 V Bank Filter Section FPM 350. Double Wall Insulated Heating and Blower Sections. Controls are Relay Logic. Interior Walls, Damper, Blower and Blower Motor P-413 Heresite coated. Exterior walls painted with Polyurethane.

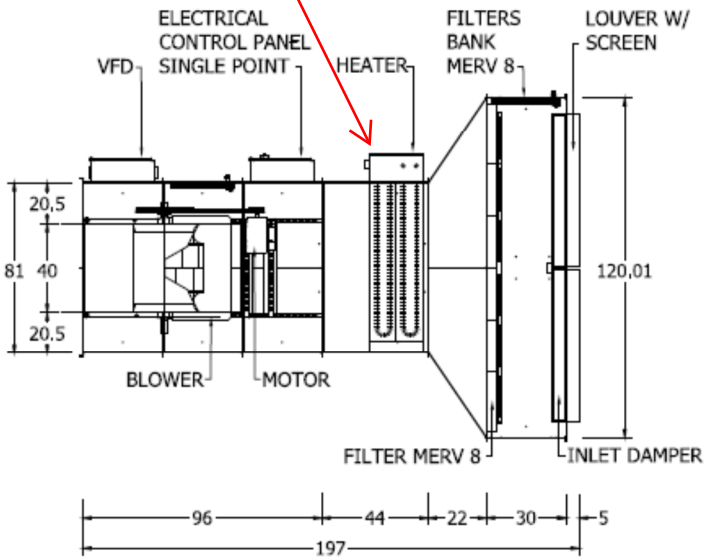
Spec section 15500-2.04.4 -Powers of Arkansas is the local service center and stocking parts department spec section 15500-1.03.b.3 including 24hr service [phone 877-274-7127]

PERFORMANCE DATA INFORMATION:
Volume:27,150 CFM
RPM: 585
TS: 3802
Total Max. External Static Pressure: 2.00" w.g.
Total Static Pressure: 4" w.g.
WEG MOTOR TEFC 30HP
FLA: 35.1
MCA/MOP:43.88/61.43

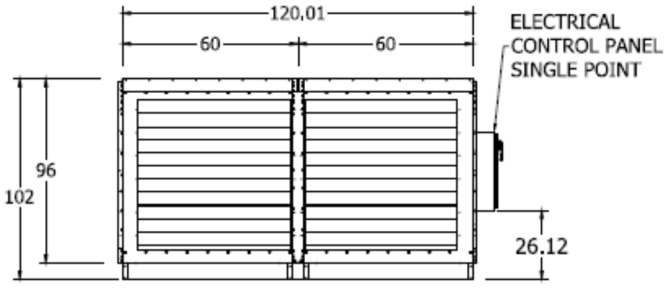
Electric Heater
Air Velocity 931 FPM
KW 275 480-3
AMPS 330.7
Stages 8
Controls 24 V Mod

heater upstream of the fan as indicated by the section order in 15500-2.04.A.6.a

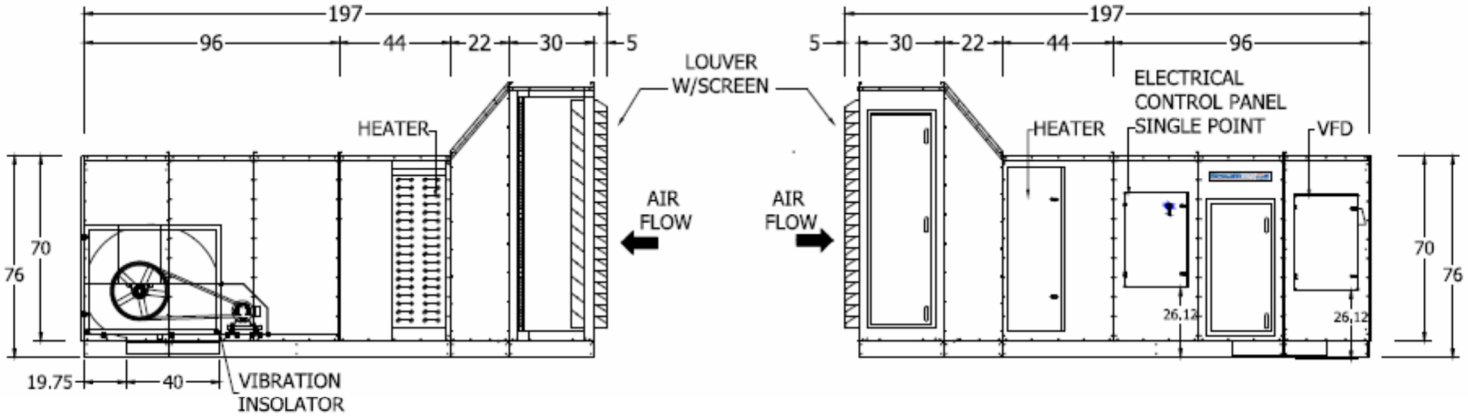
BESSAMAIRE ELECTRICAL HEATING SERIES
SINGLE INLET,DOWN DISCHARGE, 27,150 CFM



PLANT VIEW



FRONT VIEW



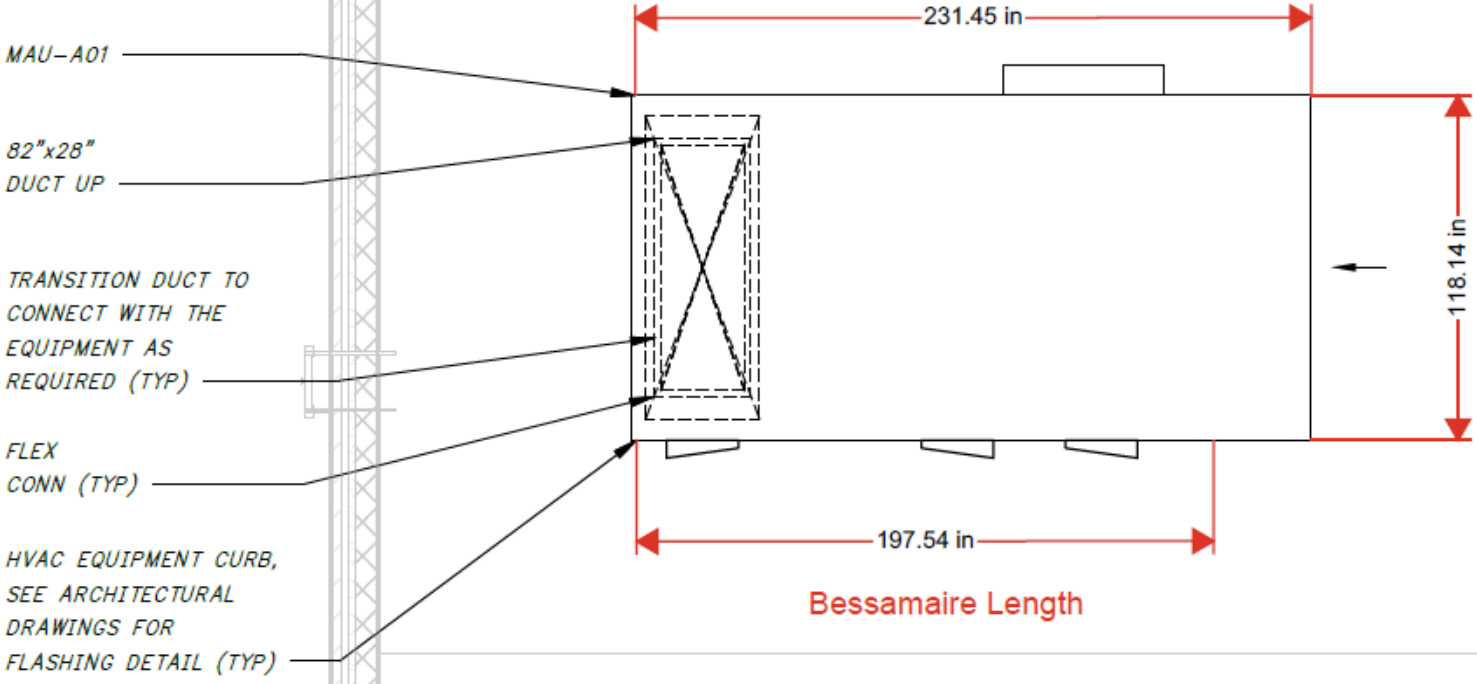
LEFT VIEW

RIGHT VIEW

UNIT	WEIGHT	TOTAL S.P.	HP	OUTLET	PLEATED FILTER	QTY
JHIEF8-30D	7,250 LBS	4.00	30	40" X 40"	20"W x 22"H x 2"D	24

*SUBJECT TO CHANGE WITHOUT NOTICE
*UNIT SHIPPED IN (2) SECTIONS

Drawing Sheet NO. HA-4



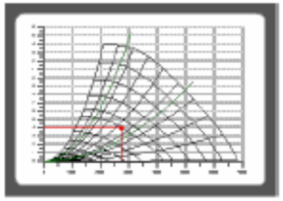
BLOWER / FAN SECTION: DOWN FLOW

Motor Description: 30 HP WEG TEFC Premium Efficient electric motor Spark resistant; 460 volts; 60 hertz;. Blower Description: Comefri ATZAF 32-32 T2 Belt Drive plenum, statically and dynamically balanced to grade Q=6,3 (ISO 1940); per AFMBA. Motor and blower will be mounted on 1" spring isolators reduce db to below 85 and blower outlet will be fitted with a flexible duct connector.

Access Door Description: Flush Style made from G-90 Galvanized Steel construction, 2" thick polyurethane foam insulated, equipped with Allegis Style Stainless Hinges and Roll-Cam Locking and Non-Locking Handles, R6.5 per inch thickness santoprene gasket.

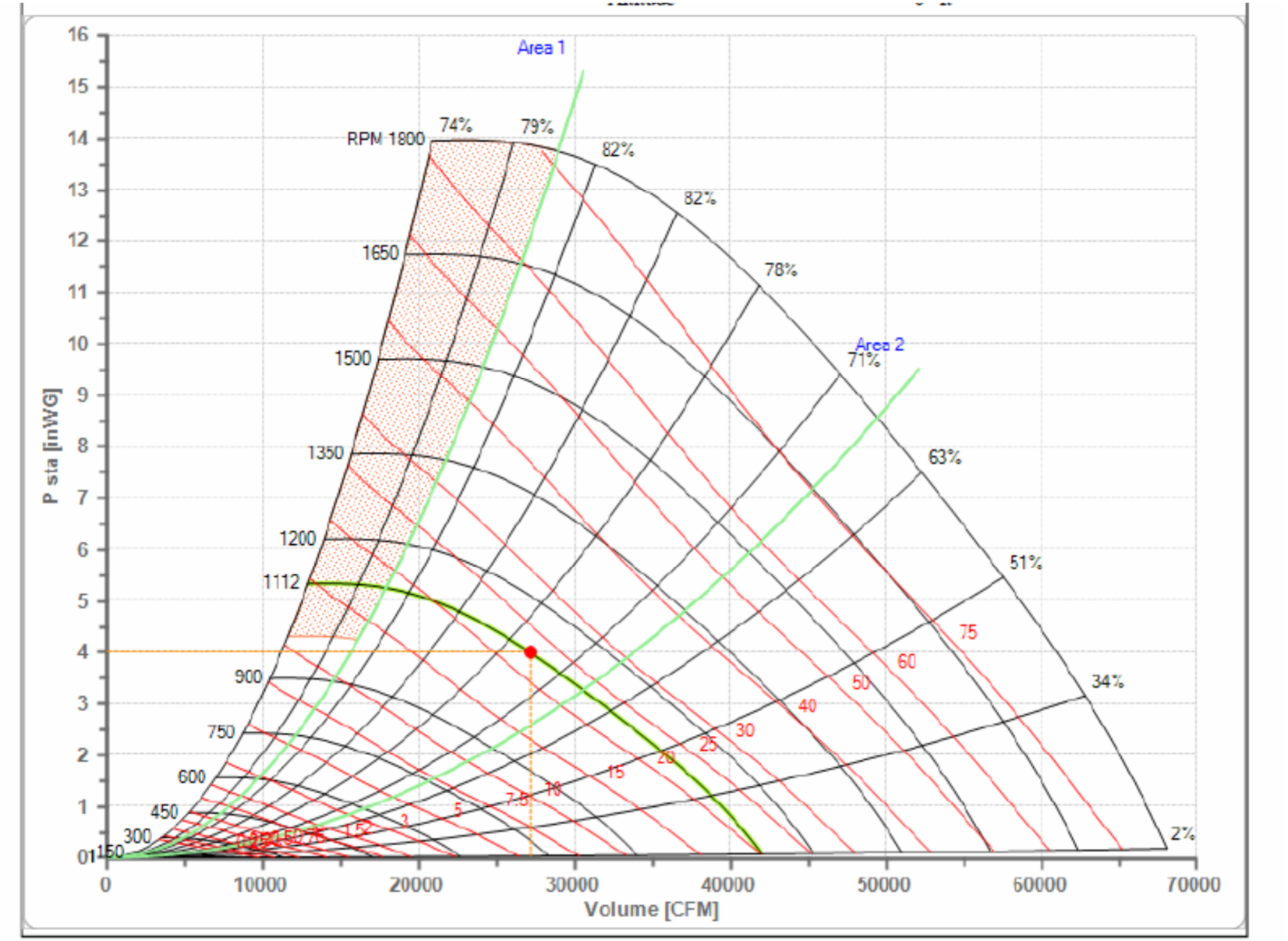
Input data					
Volume	27150 CFM	Temperature	68.0 °F	Density	0.075 lb/cu.ft
Static Pressure	4.00 In.W.G.	Altitude	0 ft	Free Inlet - Ducted Outlet	

	Catalogue data		
Selected Fan **ATZAF 32-32 FF T2**	n Max 1/min	Pw Max BHP	J lb ft²
	1700	66.50	232.00



Fan Information										
c ft/min	p tot In.W.G.	p sta In.W.G.	p dyn In.W.G.	tip speed ft/min	RPM 1/min	eta Tot %	eta Sta %	P fan BHP	Min Mot. BHP	P mot BHP	Shaft diameter in
2489	4.39	4.00	0.39	9172	1112	82.00	74.78	22.84	25.12	30.00	0.00

fm[Hz]		63	125	250	500	1000	2000	4000	8000	Tot.
Lw4 Total Sound Power Level inside the outlet duct - Lwo Outlet Duct Sound Power Level includes the effect of duct end correction										
Level Lw4	dB/dB(A)	92 / 66	90 / 74	92 / 84	88 / 85	85 / 85	78 / 79	75 / 76	68 / 67	97 / 90
Lw6d Total Sound Power Level outside the termination of the outlet duct - Lwno Outlet Sound Power Level (free outlet) do not includes the effect of duct end correction										
Level Lw6d	dB/dB(A)	87 / 61	88 / 72	92 / 84	88 / 85	85 / 85	78 / 79	75 / 76	68 / 67	96 / 90


Area 1
Area 2
RPM 1800
1650
1500
1350
1200
1112
900
750
600
450
300
150
74%
79%
82%
82%
78%
71%
63%
51%
34%
2%
75
60
50
40
30
25
20
15
10
7.5
5
3
2
1.5
1
0.75
P sta [inWG]
Volume [CFM]
0
10000
20000
30000
40000
50000
60000
70000

ELECTRIC HEATING SECTION: Doubled Walled

Air Flow 27,150 CFM
Air Velocity 931 FPM
KW 275 480-3
AMPS 330.7
Stages 8
Controls 24 V Mod

Fabrication Include materials of construction for the electric heating elements, confirm corrosion resistant finned tubular type per spec 15500 2.04.A.10

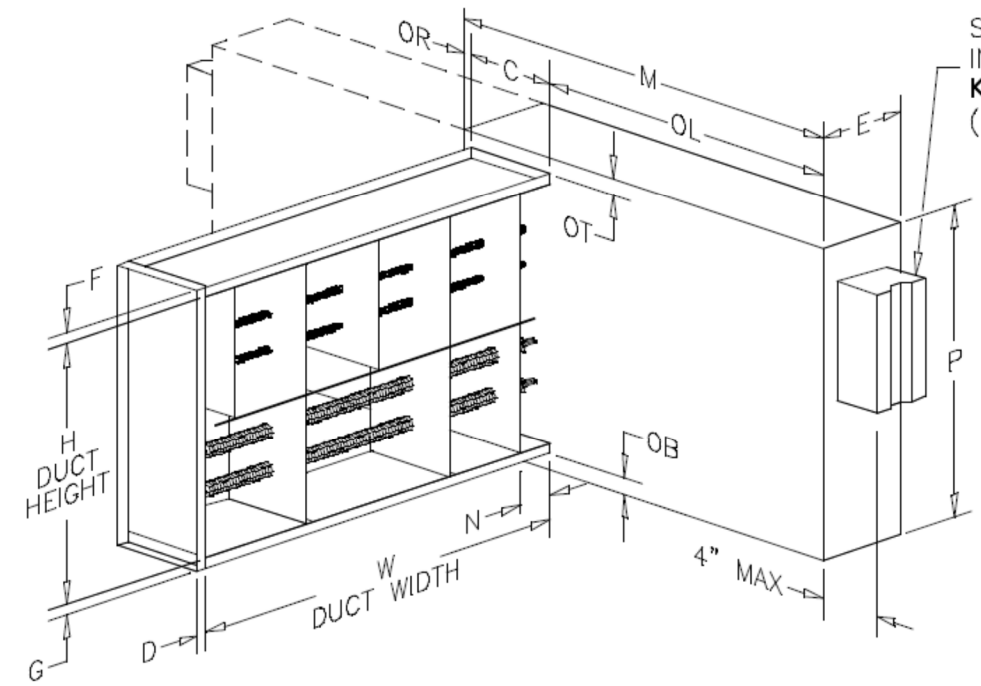
Special Features

B2 Terminal Box Insulated, B9 Enclosure Stainless Steel NEMA 4X, C4 C8 Contactor- Magnetic De-energizing, E36 SCR input-Pulse Thermostat Controlling Master SCR, H3 Stainless Steel Elements 304 SS, L6 Terminal Box Overhang, Q Disconnect Switch Power, Q3 Airflow switch Positive, T2 Control Circuit Transformer, U4 Airflow Direction, Z Automatic Thermal Cutout

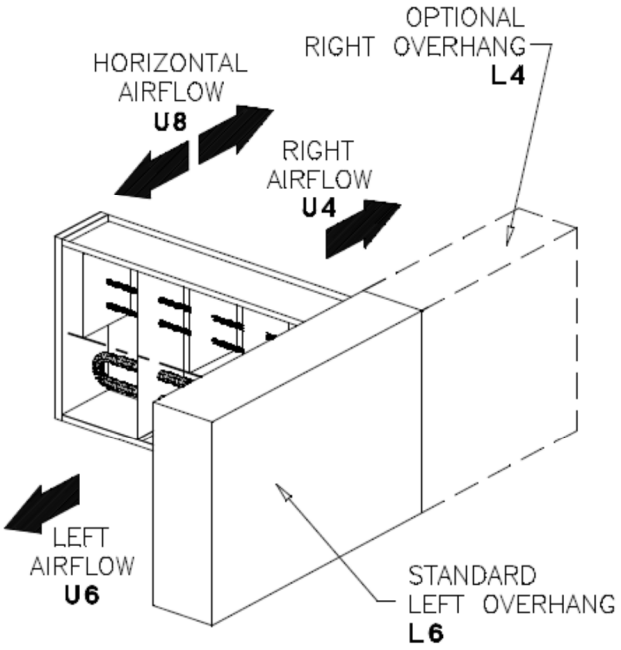
ITEM NO	TAG NO	QTY	HEATER TYPE	KW	INSIDE DUCT DIMENSIONS IN INCHES		SUPPLY LINE VOLTS/ PHASE	STGS	CTRL VOLTS	REFER TO ATTACHED SHEET FOR EXPLANATION					EXTENDED NET PRICE
					WIDTH	HEIGHT				CTRL OPTION	SPECIAL FEATURE CODE	AIR FLOW	OVER HANG	FIG NO	
1		1	TFZ	275.00	70.00	60.00	480/3	1	24	K	B2,B9,C,C4,C8,E33,E22,F,H3 ,L6,M3,Q,Q3,S21,T2,U4,Z,Z2 Pool Construction	U4	L6	4	17422.00

ITEM NO	DIMENSIONS IN INCHES REFER TO INDICATED FIG. ON ATTACHED DRAWING													MIN VEL AIR FPM	WIRING DIAGRAM		MINIMUM INCOMING WIRE		AMPS
	W	H	C	M	OL	OR	P	D	E	F	G	N	FIG NO		NUMBER	CHECK BLOCKS	GA	QTY	
1	70.00	60.00	8.00	36.00	28.00	0.00	63.00	1.50	8.00	1.50	1.50		4	497	931-4-1122-426	09, 11, 20, 21, 23, 90	4/0	2	330.77

FIGURE 4



SCR POWER CONTROLLER
INCLUDED WITH OPTION
K CONTROLS
(MAY BE ON BOTH SIDES)



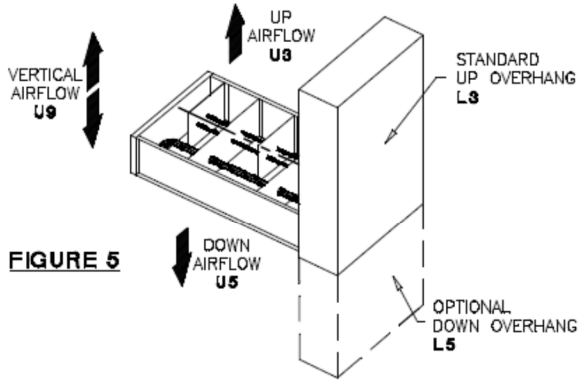


FIGURE 5

ALTERNATE VERTICAL DUCT CONFIGURATION
MUST BE ORDERED WITH CORRECT CONFIGURATION.
HEATERS CANNOT BE FLIPPED/ROTATED IN FIELD.

NOTES:
- HORIZONTAL DUCT INSTALLATION ONLY. CONSULT FACTORY FOR VERTICAL DUCT INSTALLATION.
- EXACT AIRFLOW DIRECTION MUST BE USED FOR FINNED TUBULAR HEATERS (RIGHT OR LEFT).

TITLE:	
FLANGED HEATER for **HORIZONTAL AIRFLOW**	**FIGURE 4**

ELECTRIC FINNED TUBULAR DUCT HEATERS

HEATER TYPE

This print covers the following heater types:
TFXU/TFXC Finned Tubular, Custom Slip-In
TFZU/TFZC Finned Tubular, Custom, Flanged
831U/831C Remote Panel

Duct heaters utilize the finest construction principles and techniques. A coil of 80% nickel, 20% chromium resistance wire is precisely centered in a .475\" diameter stainless steel sheath. Magnesium oxide powder, compacted to rock-like density, insulates the coil electrically from the sheath. A 1-1/4\" O.D. spiral wound stainless steel fin makes a minimum of five passes per linear around the outside of the tubular element. The elements are furnished with mounting flanges, making them individually removable from the terminal box. The heater frame is constructed of heavy gauge corrosion resistant steel and is provided with generous flanges for structural rigidity. All heaters are suitable for installation in ducts with up to one inch of interior lining.

All heaters include thermal cutouts (not heat limiters or fusible links) in accordance with requirements of UL and CSA. All controls are factory-wired to clearly marked terminal blocks for field connections. Properly sized knockouts are provided. All heaters are supplied complete with wiring diagrams and installation instructions, and all are given a dielectric test at a minimum of 1200 volts before shipment.

AGI Y APPROVALS AND NATIONAL ELECTRICAL CODE
Duc aters and panels with a “U” in the type designation are Listed by UL under Files E23192 and E53412 and thos th a “C” are Certified under CSA master contract 151727. As such, they are suitable for installation with zero arance to combustible surfaces and for use with heat pumps and central air conditioners. They are also sup with all necessary provisions for installation in full accordance with the National Electric Code (NEC) and Car n Electrical Code (CEC).

INSTALLATION
Slip-in duct heaters are installed by inserting through a rectangular opening cut in the side of the ductwork and are secured to the duct with sheet metal screws. To install flanged duct heaters, flanges must be provided on the duct to match the heater flanges, both on the entering and leaving air sides. The heater is secured to the ductwork by sheet metal screws or bolts through the mating flanges.

When the duct heater is being used in conjunction with an air conditioning or heat pump unit, it must be installed at least 48” from the unit. Sufficient working clearances must be provided on the terminal box side of the heater as detailed in the NEC and/or CEC. Care should be taken to follow all instructions found in the Installation, Operating and Maintenance Instructions sheet supplied with each heater.

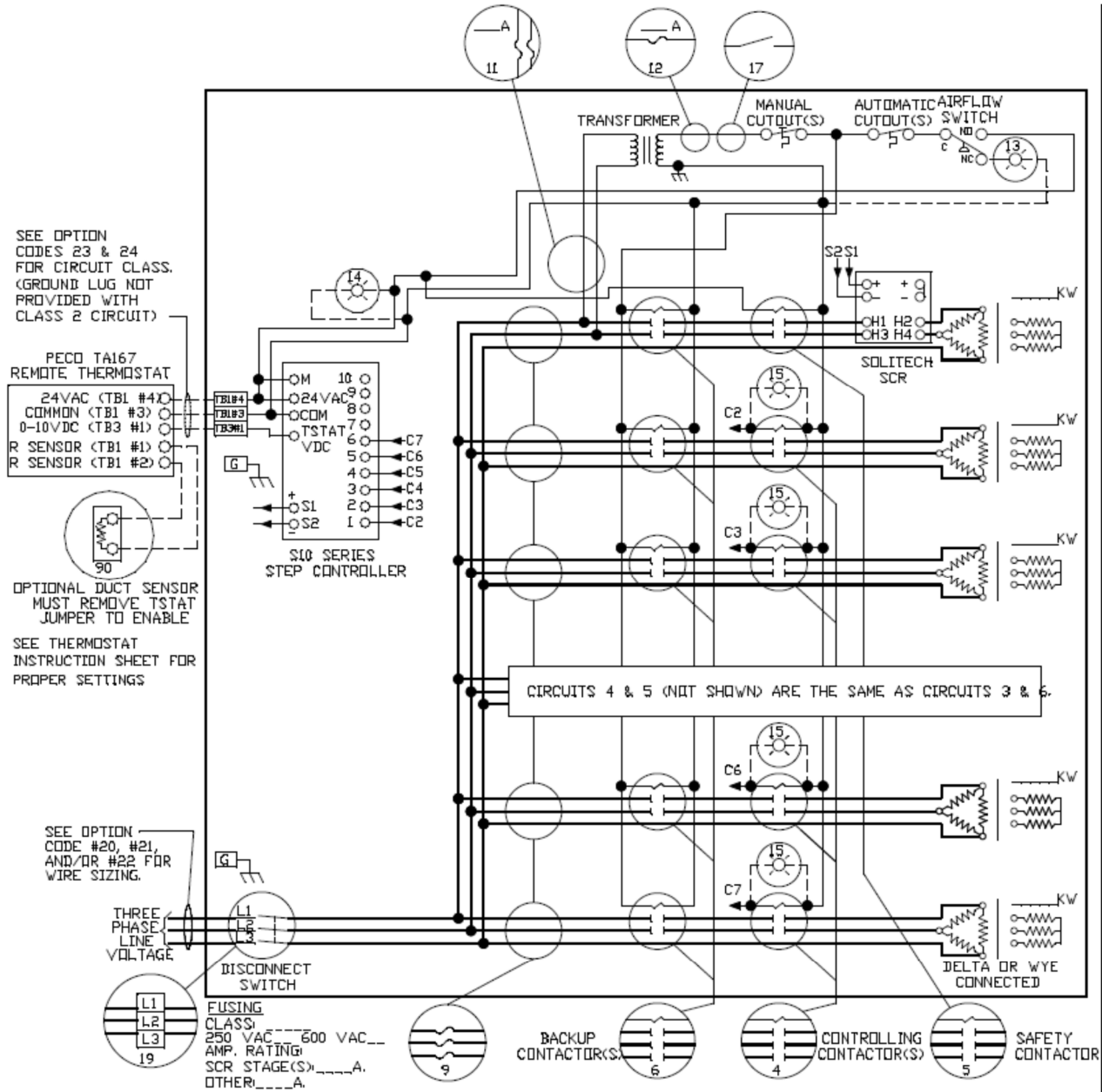
CONTROL OPTIONS
G = Basic
J = Pneumatic
K = Proportional

SPECIAL FEATURES
Heaters are available with a wide variety of special features and constructions. Your quotation or certified print includes a column for special feature codes. The codes in this column, as defined by the table below, describes details of both the standard control options, as well as any special features on the heater in question.";

SPECIAL FEATURE CODE DEFINITIONS

A60, A62	PE Switch-Close on Rise
B	Terminal Box-Bottom
B1	Terminal Box-Side Cover
B2	Terminal Box-Insulated
B3	Enclosure-Weatherproof NEMA 4 Type
B4	Enclosure-Dust-Tight-NEMA 12 Type
B5	Panelboard-Required for Heater Control
B7	Enclosure-Dustproof
B8	Enclosure-Outdoor-3R Type
B9	Enclosure-Stainless Steel Weatherproof Nema 4X Type
C, C4, C8	Contactor-Magnetic De-energizing
C1, C5, C9	Contactor-Magnetic Disconnecting
C2, C6, C10	Contactor-Mercury De-energizing
C3, C7, C11	Contactor-Mercury Disconnecting
D3	Derated Coils-25 Watts per Square Inch
D4	Derated Coils-35 Watts per Square Inch
E20 to E23	SCR Controller
E30	SCR input-2200 Ohms
E31	SCR input-135 Ohms
E32	SCR input-with transducer
E33	SCR input-slave for vernier
E34	SCR input-4-20mA
E35	SCR input-0-10VDC
E36	SCR input-0-10VDC Thermostat Controlling Master SCR
E37	SCR input-Pulse Thermostat Controlling Slave SCR
F	Fuses-Minimum NEC
F1	Fuses-Per Circuit
F3	Circuit Breaker-Minimum NEC
F5	Circuit Breaker-Per Circuit
F6	Time Delay Fusing
G1	Slip-and-Drive Connection
G2	Extended Cold Section
G3	Recessed Terminal Box
GG2	Insulated Duct Construction (extended cold section)
GG3	Insulated Duct Construction (recessed terminal box)
H1	Aluminized Steel Frame & Terminal Box
H2	Stainless Steel Frame & Terminal Box
H3	Stainless Steel Elements (304 Series)
H6	Stainless Steel Elements (316 Series)
L3 to L6	Terminal Box Overhang (See Figs. 10 & 11)
L7	No Overhang, C=M (See Fig. 7)
M to M7	Manual Thermal Cutout
M8	Remote Manual Reset Rod
N(000)	Fan Relay (000 is control voltage)
P1	Pilot Light Each Stage On
P2	Pilot Light Insufficient Air
P3	Pilot Light Heater On
P4	Pilot Light-Overtemperature
Q, Q1	Disconnect Switch-Power
Q2	Pilot Switch-Control Circuit
Q3, Q4	Airflow Switch Positive
Q5, Q6	Airflow Switch Negative
Q8	Disconnect Switch-Control Circuit
Q10	Disc. Switch-Control Circuit Fan Relay
R1	Dry Contact for Remote Heater Enable
S5	2200 Ohm input-Deadband
S16	135 Ohm input-Proportional
S18	4-20mA input-Proportional
S19	with Transducer-Proportional
S20	0-10VDC input-Proportional
S21	Step Controller-0-10VDC Thermostat
T1, T5	Control Circuit Transformer, Fused Primary
T2 to T4	Control Circuit Transformer
U3 to U9	Airflow Direction (See Figs. 10 & 11)
V	Protective Screens-Both Sides
V1	Pressure Plate-Inlet Side
V2	Protective Screens-One Side
Z to Z5	Automatic Thermal Cutout

INDEECO,425 Hanley Industrial Court, St. Louis, MO, 63144
Phone (314) 644-4300, Fax (314) 644-5332,INDEECO.com, email ESales@indeeco.com



ITEMS WITHIN A CIRCLE MAY VARY OR MAY NOT BE SUPPLIED. SEE THE OPTION KEY BELOW WHICH INDICATES BY CHECK MARKS WHICH NUMBERED CIRCLES APPLY.

OPTION KEY –
CHECK MARKS INDICATE WHICH CIRCLES APPLY

	01	CONTROLLING CONTACTOR(S) – 2 POLE
	02	SAFETY CONTACTOR(S) – 2 POLE
	03	BACK-UP CONTACTOR(S) – 2 POLE
	04	CONTROLLING CONTACTOR(S) – 3 POLE
	05	SAFETY CONTACTOR(S) – 3 POLE
	06	BACK-UP CONTACTOR(S) – 3 POLE
	07	SINGLE PHASE LINE FUSING (L1 ONLY)
	08	SINGLE PHASE LINE FUSING (L1 & L2)
	09	THREE PHASE LINE FUSING
	10	PRIMARY TRANSFORMER FUSING – 1 LINE
	11	PRIMARY TRANSFORMER FUSING – 2 LINE
	12	SECONDARY TRANSFORMER FUSING
	13	PILOT LIGHT – LOW AIRFLOW
	14	PILOT LIGHT – HEATER ON
	15	PILOT LIGHT – STAGE(S) ON
	16	PILOT LIGHT – FAN ON
	17	PILOT SWITCH
	18	CONTROL CIRCUIT DISCONNECT SWITCH
	19	NO DISCONNECT SWITCH
	20	IF CHECKED, HEATER MAY BE WIRED WITH_____ AWG MIN. SUPPLY WIRE PER 424.22(d)NEC. IF THE HEATER IS CONTROLLED IN ONE OF THE FOLLOWING 3 WAYS (1)TWO OR MORE THERMOSTAT(S) (2)THERMOSTAT WITH 2 OR MORE STAGES (3)PROPORTIONING TYPE THERMOSTAT(S)
	21	USE _____ AWG MIN. SUPPLY WIRE. _____ WIRE(S) PER PHASE.
	22	UTILISER UN CABLE D'ALIMENTATION D'AU MOINS _____AUG. _____CONDUCTEUR(S) PAR PHASE.
	23	CLASS 1 CIRCUIT
	24	CLASS 2 CIRCUIT
	25	NO MANUALLY RESETTABLE LIMIT CONTROL(S)
	26	INCOMING WIRE TO BE RATED 90 DEG. C. MIN.

LEGEND:
- ——— POWER WIRING
- ——— CONTROL WIRING
- - - - - - - WIRING SUPPLIED ONLY WHEN ASSOCIATED OPTION IS SUPPLIED

REV	DESCRIPTION	DATE	APPROVED

REVISIONS

DWG NO.
931-4-1122-426-A-0

USE COPPER SUPPLY WIRE SUITABLE FOR 75°C. (90°C IN CANADA OR OPTION CODE 26 IS SELECTED). WIRE EXTERNAL CONTROL CIRCUIT PER CLASS 1, ARTICLE 725 OF NEC, AND/OR CLASS 1, SECTION 16 OF CEC, EXCEPT THE CLASS 2 CIRCUIT(S) SHOWN ABOVE.
UTILISEZ DU CONDUIT CAPABLE DE SUPPORTER 75°C. (90°C AU CANADA OU LE CODE D'OPTION 26 EST SÉLECTIONNÉ). CONNECTEZ LE CIRCUIT DE CONTROL EXTERNE EN SUIVANT CLASSE 1, ARTICLE 725 DE LA NEC, OU/ET CLASSE 1, SECTION 16 DE LA CEC SAUF LE(S) CIRCUIT(S) DE CLASSE 2 DEJA MENTIONNÉ(S) AU DESSUS

OUTDOOR RAIN LOUVER MODULE:
Outdoor Rain Louver Configuration designed to prohibit the collection of water and snow.
Rain Louver is designed to function in a way to drain all water and block rain from entering the filter.
Prefilter: Louver and 1" Aluminum Media W/ 304 stainless steel bird-screen.

FILTER MODULE: 350 FPM Air Velocity
V Bank Panel Style Filter housing designed to accommodate 2" thick filters. Filters are approximately 35% efficient @ 1 micrometer. Filters carry an ASHRAE 52.2 MERV 8 Rating.

Access Door Description: Flush Style made from G-90 Galvanized Steel construction; 2" thick polyurethane foam insulated; equipped with Allegis Surface Style Stainless Hinges and Roll-Cam Locking and Non-Locking Handles; R6.5 per inch thickness santoprene gasket.

ECP ELECTRICAL CONTROL PANEL SINGLE POINT

Electrical Control Enclosure contains the following: (Unit Mounted, Conformal coating Factory Installed)

- **3 Phase 60 Hz Main Disconnect with Fuses**
- **460V /120VAC control Transformer**
- **460V /24VAC control Transformer**
- **IEC Motor Circuit Protector for Blower Motor**
- **8-12 Pin Relays and Sockets**
- **GFCI Electrical Outlet**
- **Exhaust Fan Interlock (1 Interlock Provided, N.O. Contact)**
- **Smoke/Fire Emergency Shutoff Alarm (One N.C. Contact)**
- **NEMA 4X Electrical Enclosure**
- **Ventilated NEMA 4X VFD Enclosure**

ECP-A01 - Remote Control Enclosure contains the following: (Field Mounted)

NEMA 12 Enclosure - by spec section 15500-2.04.A.12.c

All wiring connections are provided with protective conformal coating & [1] extra conformal coating in spray can will be supplied with MAU for field connection coating suitable for electronics per 15500-2.04.A.6.a

All wiring connections are provided with protective conformal coating & [1] extra conformal coating in spray can will be supplied with MAU for field connection coating suitable for electronics per 15500-2.04.A.6.a

UR Urethane Conformal Coating

Product# 2104



Product Description

Techspray® offers a variety of coating formulas to match field and engineering requirements. Specifications generally depend on the type of protection needed. E.g. thermal, moisture, and static resistance.

Coatings contain Opti/Scan to allow quality control inspection of coverage and evenness of the coating on a PCB. A coated board can be passed under a standard, low-cost UV (short-wave black) light, and the coated areas glow. The brighter the glow, the thicker the coating.

Features / Benefits

- **Thermal resistance - to 248°F (120°C)**
- **Dielectric strength - 380 volts/mil**
- **Moisture resistant**
- **Chemically resistant**
- **Abrasion resistant**
- **UL94 V-0 – nonflammable final coat**
- **IPC-CC-830B qualified**
- **UV indicator for black light QC inspection**

Specifications

- IPC-CC-830B

Usage Instructions

For industrial use only. Read MSDS carefully prior to use. Before applying Fine-L-Kote™ conformal coatings, clean circuit boards to remove contamination and allow to dry. Cleaning may be performed with Techspray G3, E-LINETM and Precision-V defluxers.

Spray Application: Apply top to bottom, allowing coating to flow evenly around components. Rotate PCB 90º and repeat application. Rotate and apply coating two additional times, then allow board to cure. If additional thickness is desired, apply additional coatings. When using liquid spray with automatic dispensing equipment, adjustments may be required in application rate and viscosity.

Dip Application: Using automatic equipment or hand immersion technique, slowly immerse PCB into the coating and remove slowly. Use an average rate of approximately 1 foot per minute. After allowing the board to cure, process may be repeated to achieve desired thickness.

Brush Application: Evenly apply coating to areas desired at thickness required. Allow time for curing before reapplying to achieve a thick coating. Use WonderMASK to protect components during conformal coating process. After application, cured Fine-L-Kote™ may be removed using Techspray Conformal Coating Removal Pen (2510-N or 2510-P).

Typical Product Data and Physical Properties

Physical state:	Liquid
Flash point:	Closed cup: 81ºF (27.2ºC)
Flammable limits:	Lower 1% Upper 7%
Color:	Colorless
Odor:	Aromatic
Boiling/condensation point:	300.2ºF (149ºC)
Relative density:	0.93
Volatility:	86% (w/w)
Shelf life:	1 year

UR Urethane Conformal Coating
Product# 2104

Performance & Application Data

Cure type	Thermal/air
Tack-free time (min)	15
Accelerated cure time/temp	2 Step: 20 Min. @ 49°C, 30 Min. @ 82°C
Ambient cure time	24 hrs
Viscosity (bulk)	10-20 cps
Operating temperature range	-65° to 125°C
Dielectric strength	380 V/Mil
Insulation resistance (ohms)	1.78×10^{16}
Coverage (1 mil dry film)	1 gal. liquid = 880 ft^2 (81.8M^2)

Packaging and Availability

2104-12S	12 Ounce Liquid
2104-G	1 Gallon Liquid
2104-5G	5 Gallon Liquid

Environmental Policy

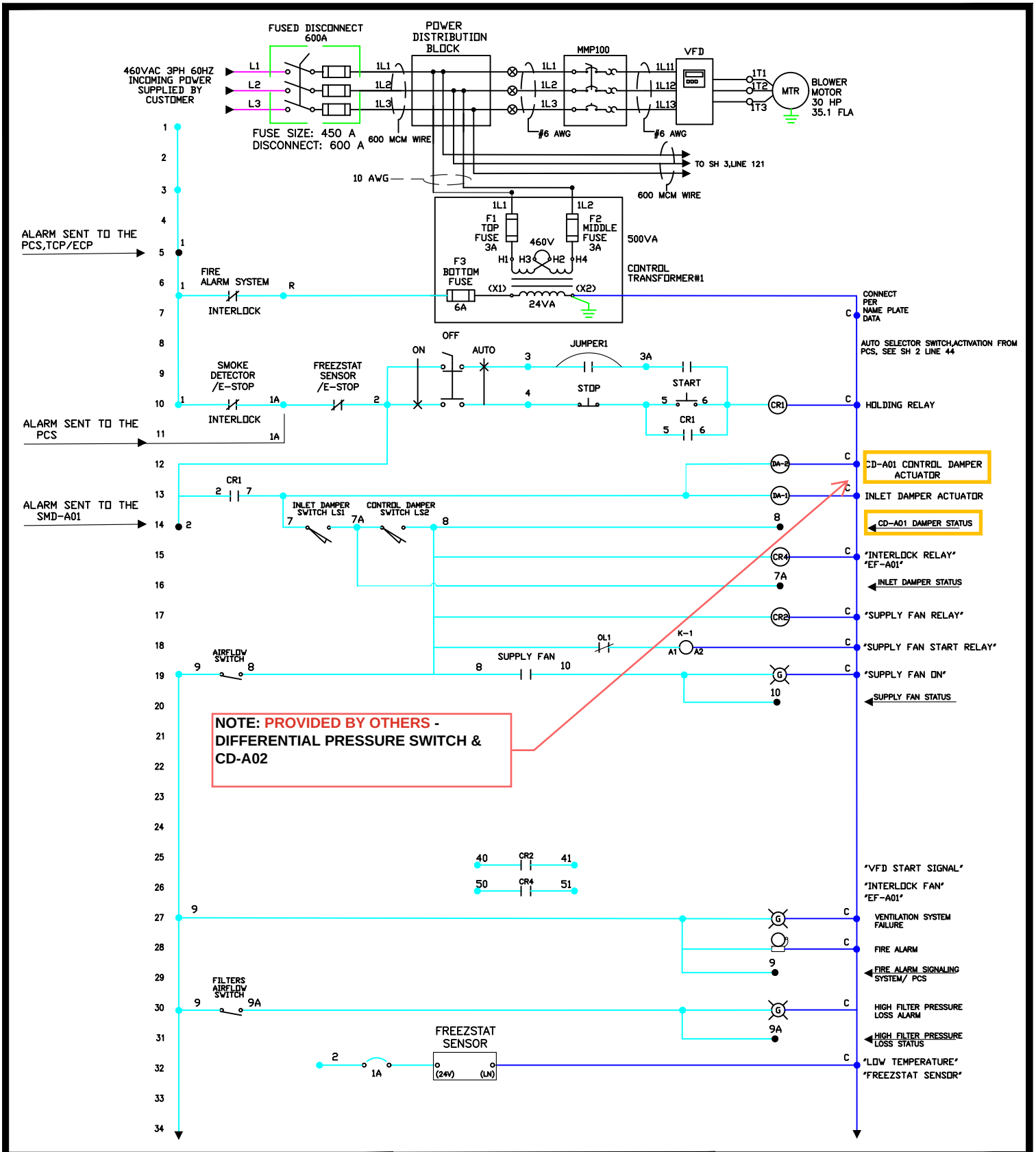
Techspray® is committed to developing products to ensure a safer and cleaner environment. We will continue to meet and sustain the regulations of all federal, state and local government agencies.

Resources

Techspray® products are supported by global sales, technical and customer services resources.

For additional technical information on this product or other Techspray® products in the United States, call the technical sales department at 800-858-4043, email tsales@techspray.com or visit our web site at: www.techspray.com.

Important Notice to Purchaser/User: The information in this publication is based on tests that we believe are reliable. The results may vary due to differences in tests type and conditions. We recommend that each user evaluate the product to determine its suitability for the intended application. Conditions of use are outside our control and vary widely. Techspray's only obligation and your only solution is replacement of product that is shown to be defective when you receive it. In no case will Techspray® be liable for any special, incidental, or consequential damages based on breach of warranty, negligence or any other theory.



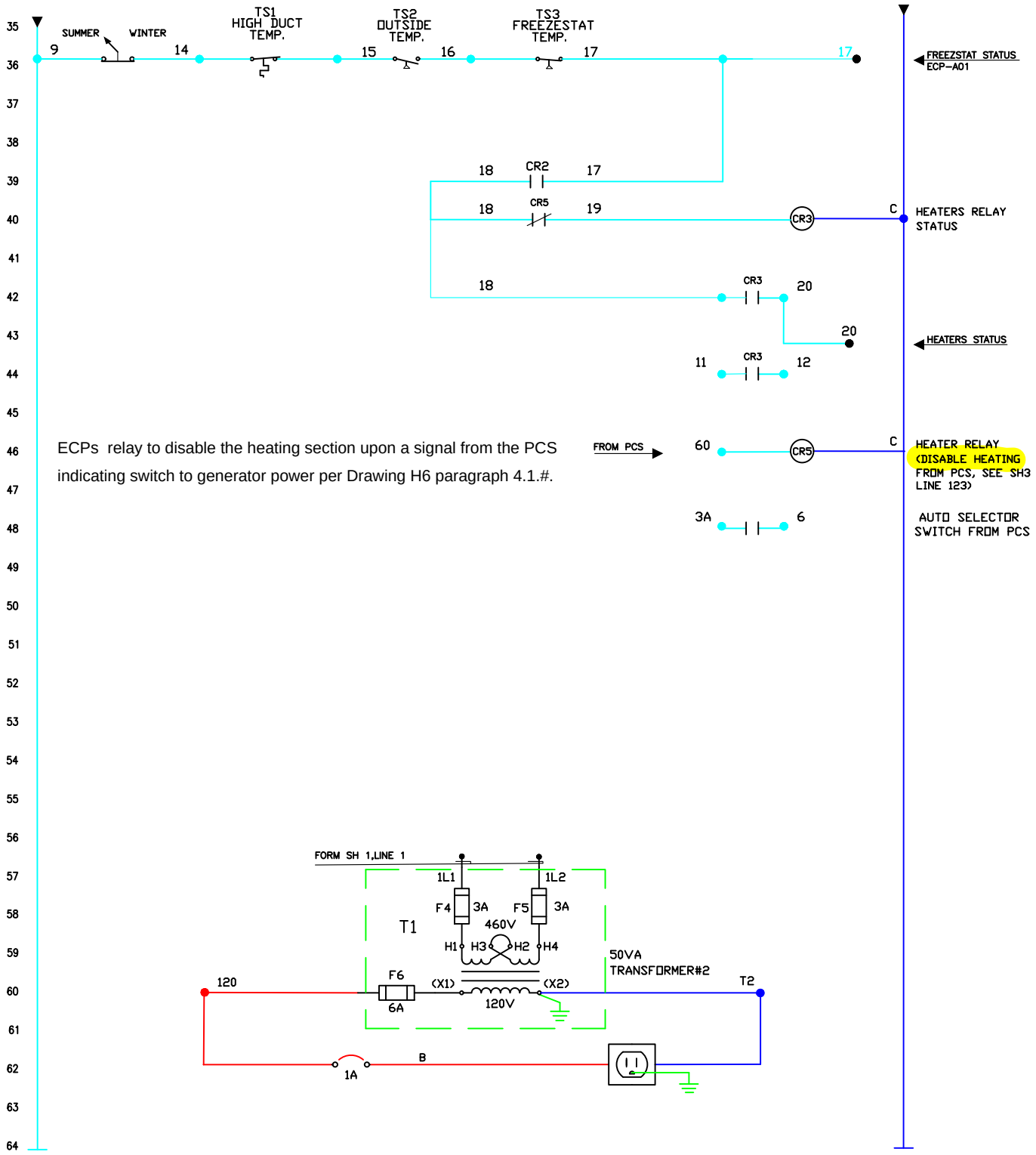
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BLACK - HIGH VOLTAGE
RED - 120 VOLTS
BLUE - 24V DC/AC
GREEN - GROUND
WHITE - NEUTRAL
MAGENTA - FIELD WIRING
BROWN–SIGNAL

WARNING: DO NOT ATTACH WIRES TO THE WALL OF THE UNIT THE SURFACE MAY BE HOT.

WHEN CALLING FOR ASSISTANCE, PLEASE REFER TO THE MODEL & SERIAL NUMBER OF THE UNIT FOR QUICK RESPONSE.

Bessamaire HVEC

MODEL: JHIEF8–30D
CUSTOMER:
Electrical Schematic — SHEET 1 OF 9
REFERENCE NO.: JHIE Series
DRAWING NO.: 26–511XX–S1
DRAWN: RR 7/10/2026
SERIAL NO.: 26–511XX–01
CHECKED: RR 7/10/2026



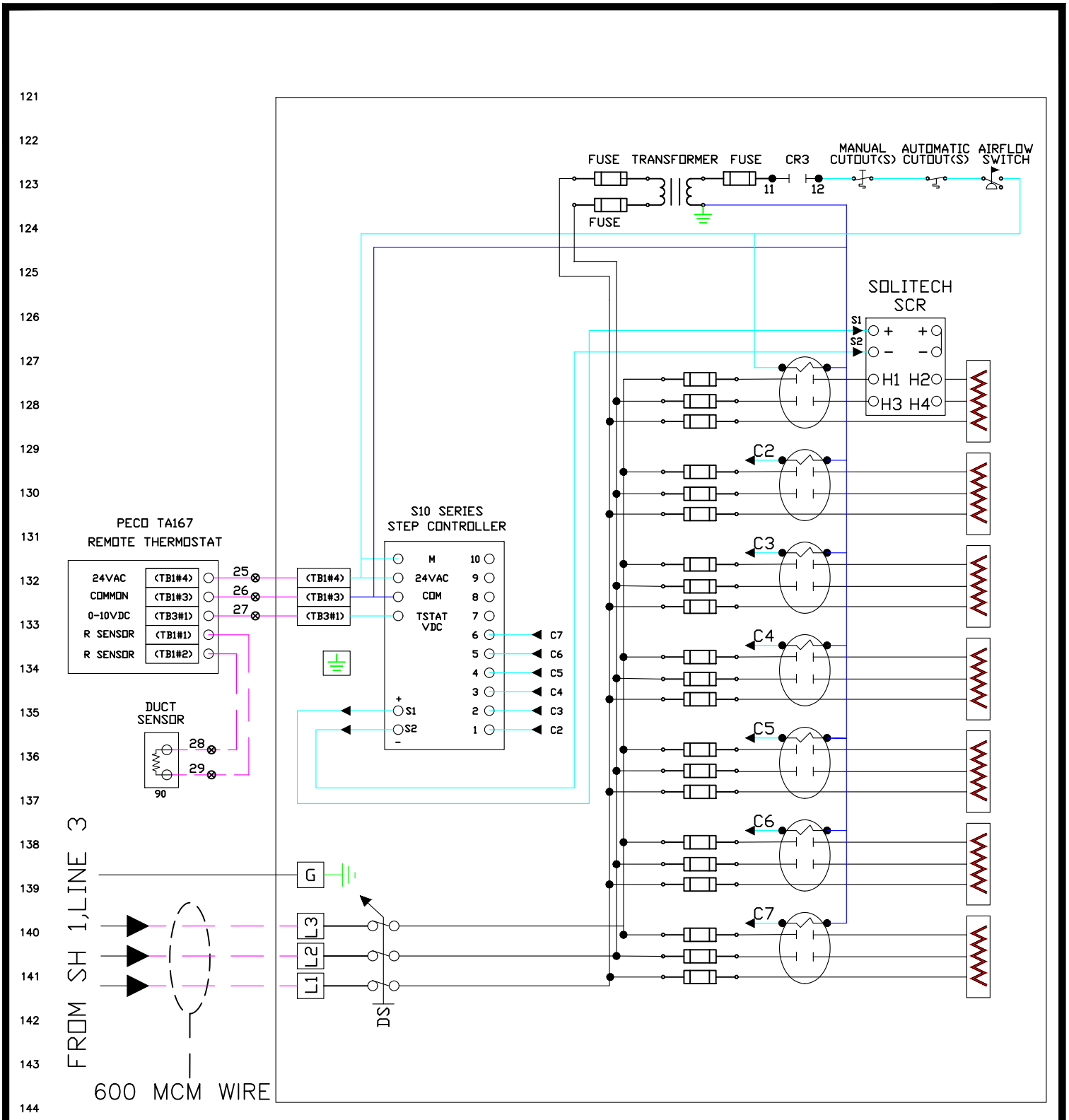
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Bessamaire HVEC

MODEL	JHIEF8–30D
CUSTOMER	
ELECTRICAL SCHEMATIC	SHEET 2 OF 9
REFERENCE NO.	DRAWING NO. 26–511XX–S2
JHIE SERIES	DRAWN RR 7/10/2026
SERIAL NO. 26–511XX–01	CHECKED RR 7/10/2026



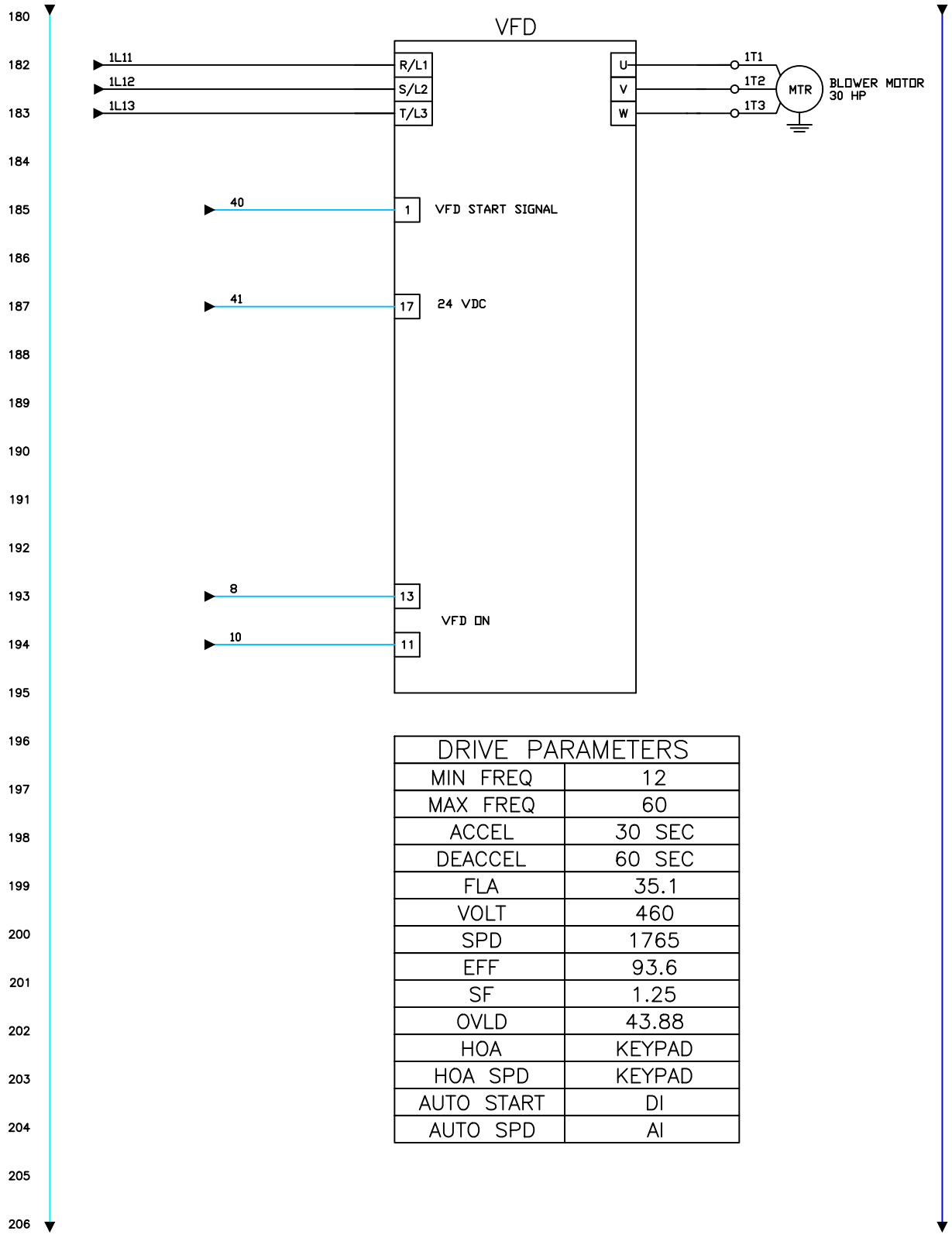
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WHITE - NEUTRAL
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BROWN–SIGNAL

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WHEN CALLING FOR ASSISTANCE, PLEASE REFER TO THE MODEL & SERIAL NUMBER OF THE UNIT FOR QUICK RESPONSE.

Bessamaire HVEC

MODEL: JHIEF8–30D
CUSTOMER:
ELECTRICAL SCHEMATIC — SHEET 3 OF 9
REFERENCE NO.
DRAWING NO.: 26–511XX–S3
JHIE Series
DRAWN: RR 7/10/2026
SERIAL NO.: 26–511XX–01
CHECKED: RR 7/10/2026



DRIVE PARAMETERS	
MIN FREQ	12
MAX FREQ	60
ACCEL	30 SEC
DEACCEL	60 SEC
FLA	35.1
VOLT	460
SPD	1765
EFF	93.6
SF	1.25
OVLD	43.88
HOA	KEYPAD
HOA SPD	KEYPAD
AUTO START	DI
AUTO SPD	AI

WIRE COLOR CODE
BLACK - HIGH VOLTAGE
RED - 120 VOLTS
BLUE - 24V DC/AC
GREEN - GROUND
WHITE - NEUTRAL
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BROWN–SIGNAL

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WHEN CALLING FOR ASSISTANCE, PLEASE REFER TO THE MODEL & SERIAL NUMBER OF THE UNIT FOR QUICK RESPONSE.

Bessamaire HVEC

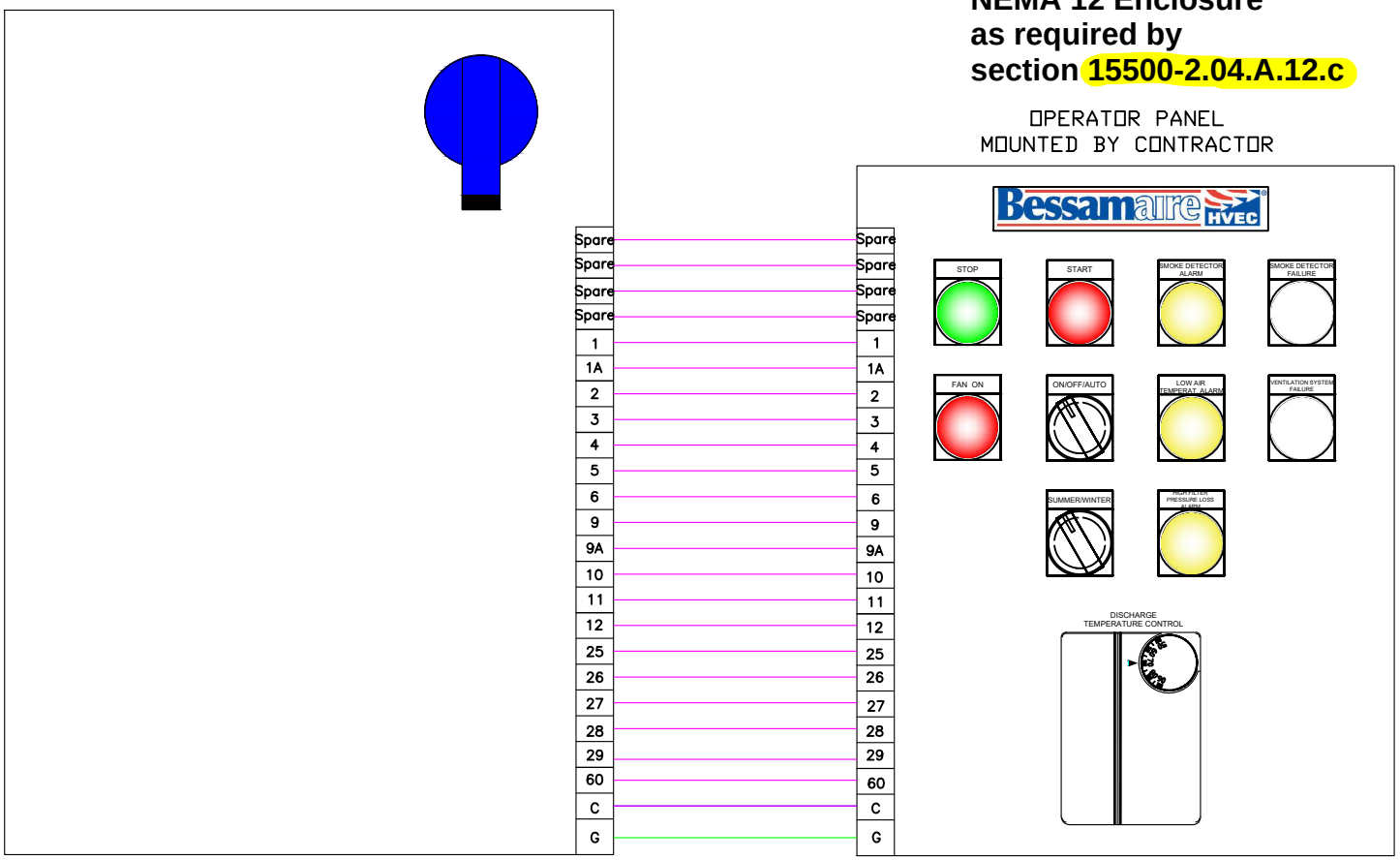
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CUSTOMER:
VFD — SHEET 4 OF 9
REFERENCE NO.: JHIE Series
DRAWING NO.: 26–511XX–S4
DRAWN: RR 7/10/2026
SERIAL NO.: 26–511XX–01
CHECKED: RR 7/10/2026

ECP-A01 [MAU-A01]

NEMA 12 Enclosure as required by section 15500-2.04.A.12.c

MAIN OPERATOR PANEL
MOUNTED ON AHU

OPERATOR PANEL
MOUNTED BY CONTRACTOR



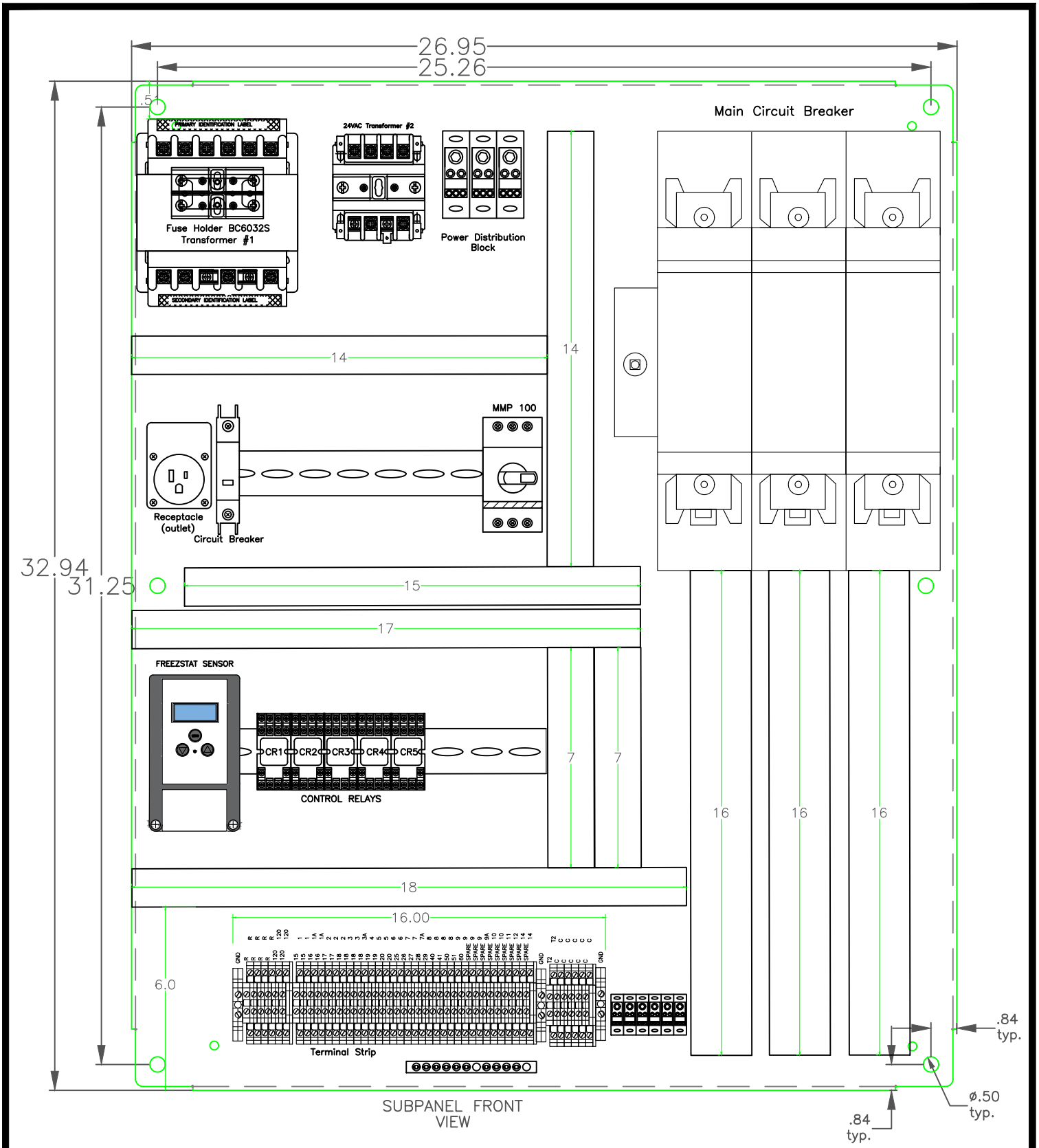
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BLUE - 24V DC/AC
GREEN - GROUND
WHITE - NEUTRAL
MAGENTA - FIELD WIRING
BROWN–SIGNAL

WARNING: DO NOT ATTACH WIRES TO THE WALL OF THE UNIT THE SURFACE MAY BE HOT.

WHEN CALLING FOR ASSISTANCE, PLEASE REFER TO THE MODEL & SERIAL NUMBER OF THE UNIT FOR QUICK RESPONSE.

Bessamaire HVEC

MODEL	JHIEF8–30D
CUSTOMER	
Interconnentions	SHEET 5 OF 9
REFERENCE NO.	DRAWING NO. 26–511xx–S5
JHIE Series	DRAWN RR 7/10/2026
SERIAL NO. 26–511xx–01	CHECKED rr 7/10/2026



WIRE COLOR CODE
BLACK - HIGH VOLTAGE
RED - 120 VOLTS
BLUE - 24V DC/AC
GREEN - GROUND
WHITE - NEUTRAL
MAGENTA - FIELD WIRING
BROWN–SIGNAL

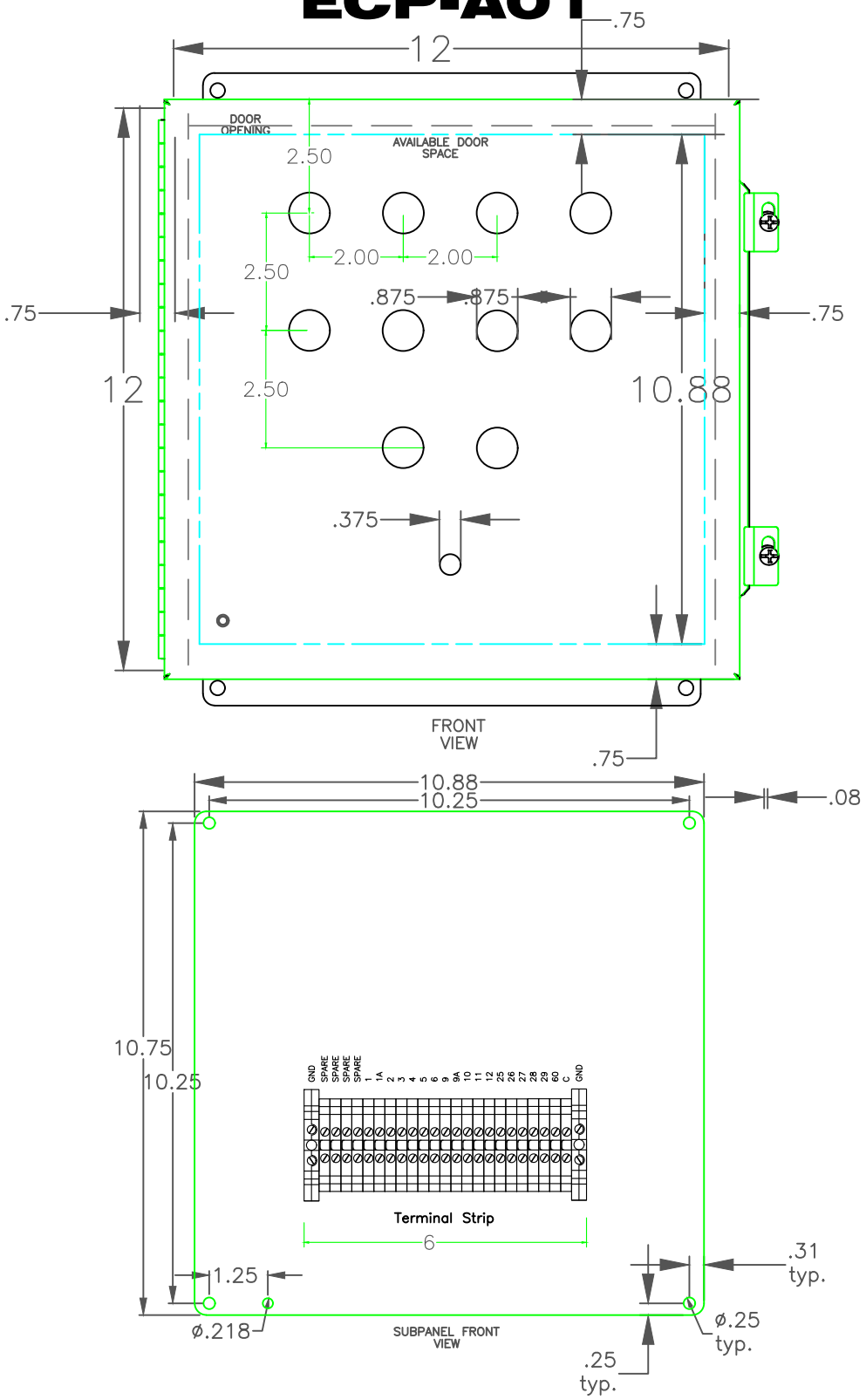
WARNING: DO NOT ATTACH WIRES TO THE WALL OF THE UNIT THE SURFACE MAY BE HOT.

WHEN CALLING FOR ASSISTANCE, PLEASE REFER TO THE MODEL & SERIAL NUMBER OF THE UNIT FOR QUICK RESPONSE.

Bessamaire HVEC

MODEL	JHIEF8–30D
CUSTOMER	
Subpanel Layout	SHEET 6 OF 9
REFERENCE NO.	DRAWING NO. 26–511xx–S6
JHIE Series	DRAWN RR 7/10/2026
SERIAL NO. 26–511xx–01	CHECKED RR 7/10/2026

ECP-AO1



WIRE COLOR CODE
BLACK - HIGH VOLTAGE
RED - 120 VOLTS
BLUE - 24V DC/AC
GREEN - GROUND
WHITE - NEUTRAL
MAGENTA - FIELD WIRING
BROWN–SIGNAL

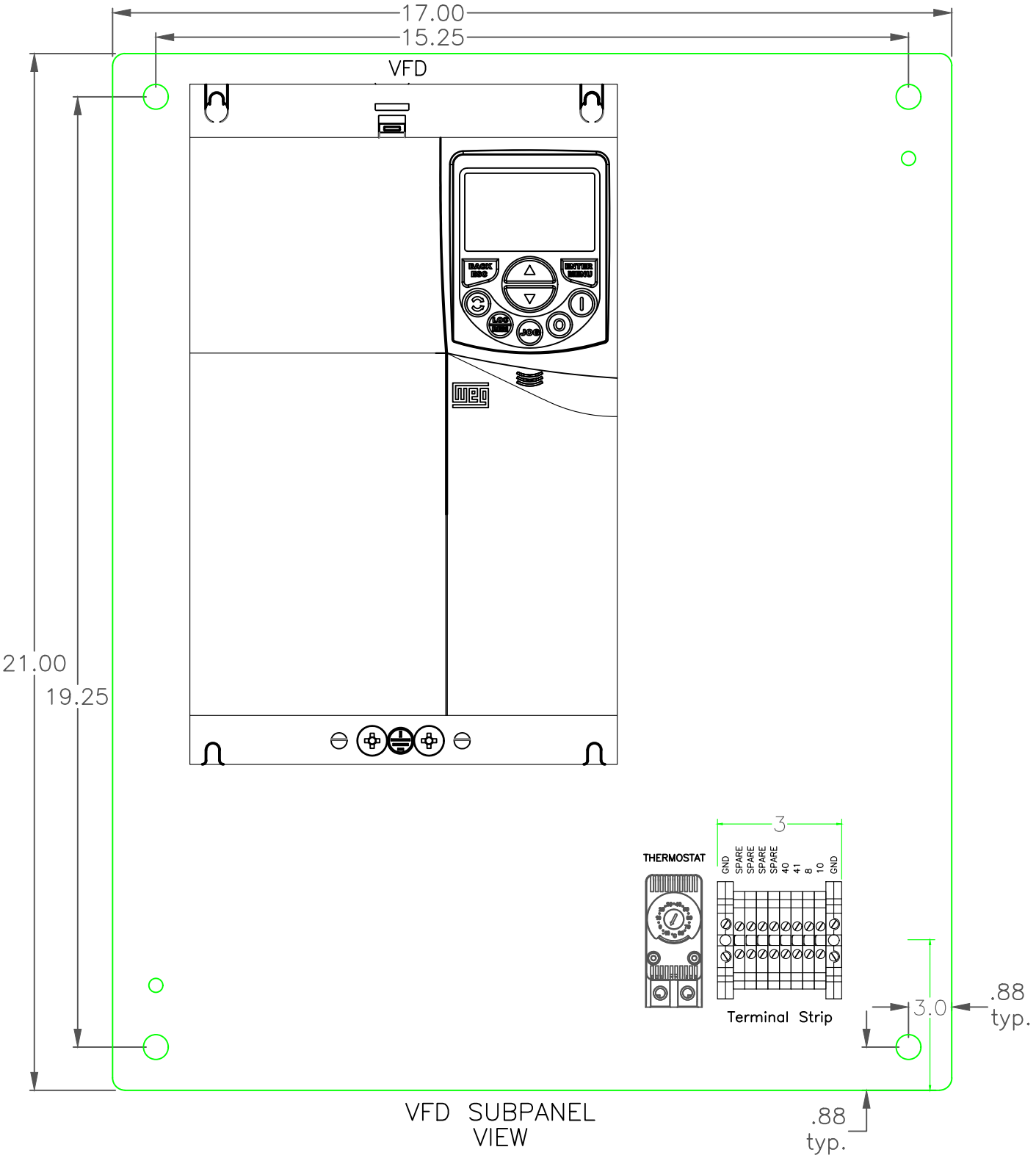
WARNING: DO NOT ATTACH WIRES TO THE WALL OF THE UNIT THE SURFACE MAY BE HOT.

WHEN CALLING FOR ASSISTANCE, PLEASE REFER TO THE MODEL & SERIAL NUMBER OF THE UNIT FOR QUICK RESPONSE.

Bessamaire HVEC

MODEL	JHIEF8–30D
CUSTOMER	
Remote Control Box Layout	SHEET 7 OF 9
REFERENCE NO.	DRAWING NO. 26–511XX–S7
JHIE Series	DRAWN RR 7/10/2026
SERIAL NO. 26–511XX–01	CHECKED RR 7/10/2026

VFD MOUNTED ON AHU



VFD SUBPANEL
VIEW

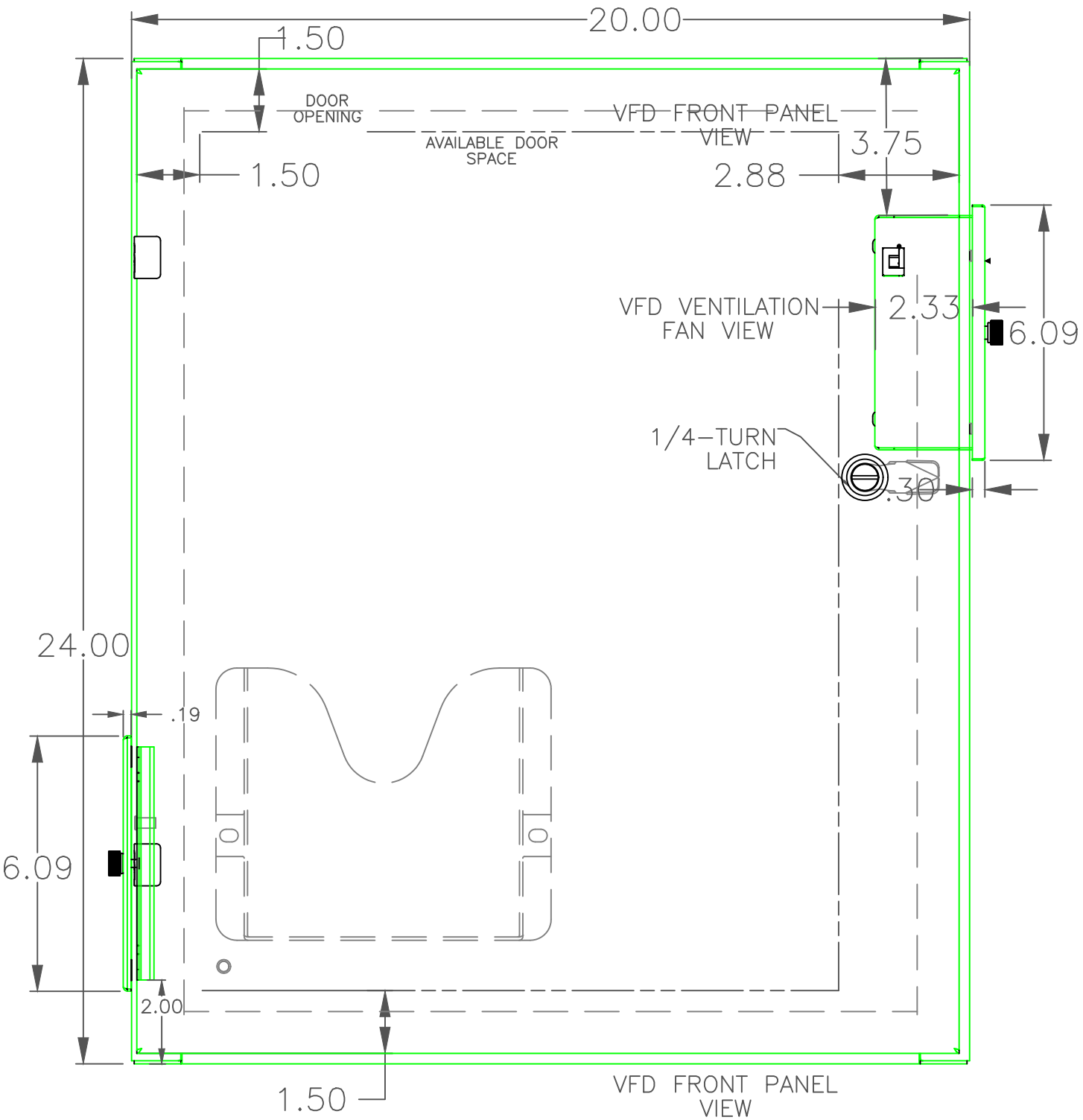
WIRE COLOR CODE
BLACK - HIGH VOLTAGE
RED - 120 VOLTS
BLUE - 24V DC/AC
GREEN - GROUND
WHITE - NEUTRAL
MAGENTA - FIELD WIRING
BROWN–SIGNAL

WARNING: DO NOT ATTACH WIRES TO THE WALL OF THE UNIT THE SURFACE MAY BE HOT.

WHEN CALLING FOR ASSISTANCE, PLEASE REFER TO THE MODEL & SERIAL NUMBER OF THE UNIT FOR QUICK RESPONSE.

Bessamaire HVEC

MODEL	JHIEF8–30D
CUSTOMER	
VFD SUBPANEL	SHEET 8 OF 9
REFERENCE NO.	DRAWING NO. 26–511XX–S8
JHIE Series	DRAWN RR 7/10/2026
SERIAL NO. 26–511XX–01	CHECKED RR 7/10/2026



WIRE COLOR CODE
BLACK - HIGH VOLTAGE
RED - 120 VOLTS
BLUE - 24V DC/AC
GREEN - GROUND
WHITE - NEUTRAL
MAGENTA - FIELD WIRING
BROWN-SIGNAL

WARNING: DO NOT ATTACH WIRES TO THE WALL OF THE UNIT THE SURFACE MAY BE HOT.

WHEN CALLING FOR ASSISTANCE, PLEASE REFER TO THE MODEL & SERIAL NUMBER OF THE UNIT FOR QUICK RESPONSE.

Bessamaire HVEC

MODEL	JHIEF8-30D
CUSTOMER	
VFD LAYOUT VENTILATION FAN	SHEET 9 OF 9
REFERENCE NO.	DRAWING NO. 26-511XX-S9
JHIE Series	DRAWN RR 7/10/2026
SERIAL NO. 26-511XX-01	CHECKED RR 7/10/2026

Heresite P-413

Our 50 years of coating history speaks for itself.

In 1964, Heresite was the first company to apply coatings to aluminum-finned, copper-tubed heat exchangers. The Heresite coating became then, and still remains a standard in the industrial coatings industry. We provide the highest quality protective coatings for air conditioning and refrigeration systems that operate in moderate to severely corrosive environments, including both coastal and/or industrial applications. Our phenolic epoxy has an advantage of dense cross linking and can therefore be applied as a very thin film maintaining stable heat transfer.

We continue our focus on innovation and again have a new story to tell, as we introduce our updated P-413

- A high performance phenolic epoxy coating developed specifically for heat exchangers.
- The flexibility and corrosion resistance of Heresite P-413 appreciably increases the service life of your heat exchange equipment.
- It is specially suited for coating light gauge metals in equipment operating in severe corrosive environments.

P-413 Specifications

The coil will receive a uniform coating on all surfaces, including fin edges, with P-413, a thermoset, modified phenolic coating. Application of P-413 will be through multiple coats by immersion or flow coating to a film thickness of approximately 1.0 mil.

P-413 provides corrosion protection in a 6,000 hour salt spray test in accordance with ASTM B-117 and humidity resistance of >2,000 hours per ASTM D2247. Chemical resistance is demonstrated via 100+ acetone double-rubs per ASTM 5402. P-413 also exhibits superior hardness of 5–6H per ASTM D3363, adhesion of 5B per ASTM B3359 and impact resistance of 160 in/lbs (ASTM D2794). Color shall be brown with gloss of 20–60 — 60 degree. If the coils are to be subjected to direct ultraviolet (UV) exposure, a spray-applied UV-resistant topcoat is an option.

Effective date: 10/09/17

P-413 Typical Properties (@ 1 mil DFT)

Salt Spray: ASTM B-117: 6,000+ hours

SWAAT: ASTM G85-11 Section A.3: Passed 1,000 hours using pressurized coil (see page 2 for results)

Cyclic Weathering: ISO 20340 Offshore Standard: Passed (4,200 hours)

Performance Testing: ISO 12944-6 C5 I/M: Passed C5-M high durability and C5-I high durability

Heat Transfer Reduction: <1% as applied for heat transfer components

Humidity: ASTM D-2247: 2,000+ hours

Simulated Sea Water Resistance: 2,000 hours

Solvent Resistance: ASTM-D5402: 100 acetone double rubs

Cross-hatch Adhesion: ASTM D-3359: 5B

Mandrel: ASTM-D522: >1/4 inch

Impact: ASTM D-2794: 160 lb/inch steel; 40 lb/inch aluminum

pH Range (14 day liquid spot test): 2.4–12.6

Temperature Cycling (4 hours at –75°C; 4 hours at 190°C): 4B–5B adhesion after 5 cycles

Dry Heat Resistance (4 hours at 200°C; 20 minutes at 232°C): 4B–5B adhesion after 5 cycles

Dry Film Thickness: ~1 mils

Hardness: ASTM D3363: 5–6H

Gloss: 20–60 on 60 degree meter (topcoat dependent)

Microchannel Compatible

Abrasion Resistance: 30–40 mg loss per 1,000 cycles

Meets FDA 175.300 for indirect food contact

Meets MIL Spec: MIL-C-18467, MIL-E-480 and MIL-STD-883 Method 1101

Meets Other Specs: Honeywell MC 7200-01 and GE F50T17

Thermal Conductivity: At approximately 2 mils thickness, Thermal Conductivity is less than 1.0 w/mK

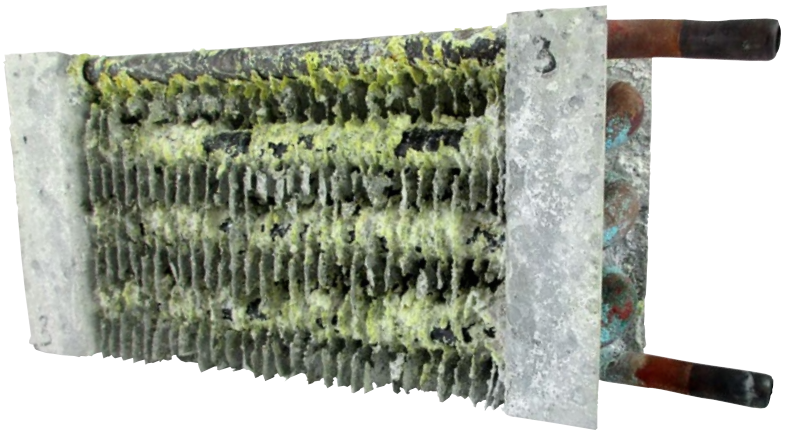
Dielectric Strength [ISO2376:2010(e)]: 286 volts per mil of thickness

NSF Certified – ANSI 51 Certification of Coatings for Food Zone – Non Contact

Heresite Protective Coatings LLC • 822 S. 14th St • Manitowoc, WI 54220
800-558-7747 or 920-684-6646 • sales@heresite.com • www.heresite.com

HERESITE® PROTECTIVE COATINGS, LLC

SWAAT Results

	**Bare 1,000 hour SWAAT**
	**P-413 1,000 hour SWAAT**
	**P-413 + topcoat 1,000 hour SWAAT**

Effective date: 10/09/17

Heresite Protective Coatings LLC • 822 S. 14th St • Manitowoc, WI 54220
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Product Description
Baking cross-linked phenolic epoxy

Recommended Uses
Heresite P-413 is a high performance coating used principally for heat transfer components and parts — especially air conditioning and refrigeration systems that operate in moderate to severely corrosive environments, including both coastal and/or industrial applications. This phenolic epoxy has an advantage of dense cross linking and are therefore highly corrosion resistant even when applied as a very thin film.

Chemical Resistance
P-413 is chemically resistant to a wide range of acids, solvents, and inorganic salts. Please review chemical resistance guide for further information.

Packaging Information
P-413 is available in one gallon, five gallon and 54 gallon drum quantities.

Thinners and Cleanup
Recommended use of Heresite S-275.

Storage Conditions
Coating should not be stored longer than 6 months. Coating should be stored in a clean, dry environment at 50–75°F. Keep out of direct sunlight. Avoid excessive heat and keep from freezing.

Physical Properties
Solids by weight: Approximately 73%

Solids by volume: Approximately 57%

Pot life: NA

Mixing Ratio by Volume: NA 1 component

Shelf life: 6 months

Color: Brown

VOC Content
2.25 lbs/gal (270 g/L) as supplied

Film Thickness
For heat transfer, a 2 coat immersion process will typically yield a dry film thickness of 1.0–2.0 mils (25–50 microns).

For other parts, please contact Heresite.

Coverage
Theoretical coverage is 800 square feet per gallon per dry mil. Coverage rates are estimates and make no allowance for material loss. Actual rates will vary dependent on application method, surfaces, etc.

Surface Preparation
All surfaces must be clean, sound, and free of any oils, dirt, grease, wax and any other contamination that may interfere with coating adhesion.

In general, the surface should be cleaned by solvent or a cleaner at elevated temperature followed by a clean water rinse. Rinse water shall have a conductivity of lower than 500 microsiemens and a neutral pH (7.0–8.0). All surfaces must be dried prior to application of coating.

In cases where there is a large amount of contamination or heat treated steel, a commercial blast is acceptable in accordance with NACE #3 or SSPC-SP-6-63 specifications. Surface profile or anchor pattern shall be 20–25% of the recommended dry film thickness.

Thinning
Reduce P-413 with S-275 solvent to 13–13.5 seconds on ISO Dip 3 mm Cup. This requires approximately a 1:1 dilution by volume.

The amount of thinner required is dependent upon temperature, ventilation, humidity, application type and desired film thickness.

Effective date: 10/09/17

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HERESITE® PROTECTIVE COATINGS, LLC

Application

Application is specific to heat transfer components, for other parts — please contact Heresite.

Immersion Application:

1. Consult SDS prior to use.
2. Do not apply if temperature is less than 5°F above dew point, or if temperature is below 45°F.
3. Consult Heresite for tank and pump recommendations.
4. Ensure as the part is prepared for immersion, one will have a low point for drainage.
5. Immerse the cleaned part for 15 seconds in the reduced P-413.
6. Upon removal of the part from the coating, apply light air pressure (approximately 15 psi) using an Air Knife or similar device to spread the air flow. Using the compressed air, remove excess coating. Minimal brushing should be required.
7. Air dry a minimum of 15 minutes with ventilation prior to introducing heat.
8. Typically, a two coat immersion process is required to achieve 1.0 to 1.5 mil DFT. An intermediate bake is required between coats — see baking schedule.
9. It may be deemed desirable to apply a final aesthetic spray. This can be accomplished immediately after the final immersion is accomplished and prior to final bake.
10. During immersion application, the viscosity must be maintained and monitored. It is recommended that the viscosity be checked every hour to ensure compliance with the specification of 13–13.5 seconds. Additional solvent and coating can be added to adjust viscosity as needed.

Spray Application for Final Aesthetic Spray:

1. Consult SDS prior to use.
2. Do not apply if temperature is less than 5°F above dew point, or if temperature is below 45°F.
3. Use standard production type spray equipment (conventional, HVLP, airless, etc.). A few starting recommendations can be found below:

Guns	Fluid	Air
DeVilbiss JGA-510	E	46MP
Binks #2100	67-SS	46-21MD-2 or 3
Binks #95	66-SS	66-SD
Graco Air Pro HVLP		

4. Spray viscosity will be dependent on type of equipment being used. It has been seen that spraying at immersion viscosity is very effective.
5. Spray equipment: always flush spray equipment with solvent to clean prior to applying coating.
6. Air supply must be uncontaminated. Adjust air pressure to approximately 50 pounds at the gun and provide 15–20 pounds at pressure pot. Adjust spray gun by first opening liquid valve and then adjust air valve to give approximately an 8"–12" fan, holding gun perpendicular to the surface at a distance of 12".
7. Apply a mist bonding pass.
8. Allow to flash off for approximately a minute, but not long enough to allow film to completely dry.
9. Apply 3–4 crisscross multi-passes maintaining a wet appearing film.
10. Air dry a minimum of 15 minutes with ventilation prior to introducing heat.
11. Typically, a one coat process is required to achieve 0.5 to 1.0 mil DFT.

Effective date: 10/09/17

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HERESITE® PROTECTIVE COATINGS, LLC

Spray Application for Higher Film Build — 4–6 mil:

1. Consult SDS prior to use.
2. Do not apply if temperature is less than 5°F above dew point, or if temperature is below 45°F.
3. Use standard production type spray equipment (conventional, HVLP, airless, etc.). A few starting recommendations can be found below:

Guns	Fluid	Air
DeVilbiss JGA-510	E	46MP
Binks #2100	67-SS	46-21MD-2 or 3
Binks #95	66-SS	66-SD
Graco Air Pro HVLP		

4. Spray viscosity will be dependent on type of equipment being used. It has been seen that spraying at immersion viscosity is very effective (13.0–13.5 seconds ISO Dip 3 mm).
5. Spray equipment: always flush spray equipment with solvent to clean prior to applying coating.
6. Air supply must be uncontaminated. Adjust air pressure to approximately 50 pounds at the gun and provide 15–20 pounds at pressure pot. Adjust spray gun by first opening liquid valve and then adjust air valve to give approximately an 8"–12" fan, holding gun perpendicular to the surface at a distance of 12".
7. Apply a mist bonding pass.
8. Allow to flash off for approximately a minute, but not long enough to allow film to completely dry.
9. Apply 3–4 crisscross multi-passes maintaining a wet appearing film. Allow a minimum of 10 minutes to allow the slow solvents to evaporate. Then apply another 2–3 crisscross multi-passes.
10. Air dry a minimum of 15 minutes with ventilation prior to introducing heat.
11. Intermediate bake at 130°C (metal temperature) for a minimum of 10 minutes.
12. Repeat steps 7–10.
13. Final bake per the instructions within the bake schedule.
14. Typically, a two to three coat process is required to achieve 4.0 to 6.0 mil DFT.

Bake Schedule

Intermediate Bake:

1. 90°C (metal temperature) for a minimum of 10 minutes.
   a. To decrease the bake time, a maximum temperature of 130°C may be used.

Final Bake:

1. "Normal" Bake:
   a. 90°C (metal temperature) held for 10 minutes, then increased to 160°C. 160°C (metal temperature) held for 15 minutes, then increased to 190°C. 190°C (metal temperature) held for 45 minutes.
2. "Soft Solder" Bake:
   a. 90°C (metal temperature) held for 10 minutes, then increased to 160°C. 160°C (metal temperature) held for 130 minutes.

These instructions are not intended to show product recommendations for specific service. They are issued as an aid in determining correct surface preparation, mixing instructions and application. It is assumed that the proper product recommendations have been made. These instructions should be followed closely to obtain the maximum service from the materials.

CAUTION: CONTAINS FLAMMABLE SOLVENTS. KEEP AWAY FROM SPARKS AND OPEN FLAMES. IN CONFINED AREAS WORKERS MUST WEAR FRESH AIR LINE RESPIRATORS. PERSONS SHOULD WEAR GLOVES OR USE PROTECTIVE CREAM. ALL ELECTRICAL EQUIPMENT AND INSTALLATIONS SHOULD BE MADE AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE. IN AREAS WHERE EXPLOSION HAZARDS EXIST, WORKMERS SHOULD BE REQUIRED TO USE NONFERROUS TOOLS AND TO WEAR CONDUCTIVE AND NONSPARKING SHOES.

To the best of our knowledge the technical data contained herein are true and accurate at the date of issuance and are subject to change without prior notice. No guarantee of accuracy is given or implied. We guarantee our products to conform to strict quality control. We assume no responsibility for coverage, performance or injuries resulting from use. Liability, if any, is limited to replacement of products. Prices are subject to change without prior notice. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY THE SELLER, EXPRESS OR IMPLIES, STATUTORY, BY OPERATION OF LAW, OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Effective date: 10/09/17

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BASIC SEQUENCE OF OPERATIONS

1.1. TEMPERATURE CONTROL PANEL(S). TEMPERATURE CONTROL PANEL(S) (TCP) AND EQUIPMENT CONTROL PANELS (ECP) IDENTIFIED IN THE SEQUENCE OF OPERATION SHALL BE PROVIDED WITH THE INDICATING LIGHTS, RUNNING LIGHTS, ALARM LIGHTS, AUDIBLE ALARMS, TIMERS, AND SELECTOR SWITCHES FOR CONTROL AND STATUS INDICATION OF THE EQUIPMENT SERVED. WHERE NO CONTROL PANELS ARE PROVIDED FOR EQUIPENT, THE LIGHTS AND SWITCHES SHALL BE AT THE STARTER OR MCC. RUNNING LIGHTS SHALL BE PROVIDED TO INDICATE BOTH ENERGIZED AND DE-ENERGIZED CONDITIONS FOR THE EQUIPMENT AND SHALL POSITIVELY INDICATE EQUIPMENT CONDITIONS FROM THE MOTOR STARTER OR CURRENT SENSOR. SWITCH POSITION SHALL NOT BE USED FOR LIGHT ILLUMINATION. INDICATING AND RUNNING LIGHTS SHALL BE LOCATED DIRECTLY ABOVE EACH RESPECTIVE SELECTOR SWITCH WITH LIGHT COLORS AS FOLLOWS:

RED - ENERGIZED
GREEN - DE-ENERGIZED
AMBER - ALARM
WHITE – STATUS

INDICATING LIGHTS AND SELECTOR SWITCHES SHALL BE LOCATED ON THE FACE OF THE TEMPERATURE CONTROL PANEL SERVING RESPECTIVE EQUIPMENT. IN ADDITION TO THE LIGHTS, TIMERS, AND SELECTOR SWITCHES DESCRIBED IN THE SEQUENCE OF OPERATION FOR THE INDIVIDUAL EQUIPMENT, EACH CONTROL PANEL SHALL BE PROVIDED WITH THE FOLLOWING:

"CONTROL POWER ON" STATUS LIGHT
"INDICATING LIGHT TEST" PUSHBUTTON
"ALARM SILENCE" PUSHBUTTON
"ALARM RESET" PUSHBUTTON (WHERE APPLICABLE)
CONTROL PANELS SPECIFIED TO BE PROVIDED WITH ALARM CONDITION INDICATING LIGHTS SHALL BE PROVIDED WITH AN ELECTRICALLY ISOLATED CONTACT TO PROVIDE A COMMON ALARM TO THE PLANT CONTROL SYSTEM (PCS). EACH CONTROL PANEL SHALL BE PROVIDED WITH A MINIMUM OF ONE COMMON ALARM OUTPUT POINT TO THE PCS AND ADDITIONAL INDIVIDUAL ALARM POINTS AS INDICATED BELOW.
TEMPERATURE CONTROL PANELS SHALL COME WITH PHENOLIC NAMEPLATES FOR EACH CONTROL SWITCH INDICATING SWITCH TYPE, EQUIPMENT CONTROLLED, ROOM OR AREA SERVED, AND SWITCH AUTOMATIC POSITION EQUIPMENT INTERLOCK

1.2. SYSTEM INTERLOCKS AND ALARMS
UNLESS OTHERWISE INDICATED, ALL EQUIPMENT INTERLOCKING DEVICES AS DESCRIBED HEREIN SHALL BE PROVIDED WITHIN THE RESPECTIVE TEMPERATURE/EQUIPMENT CONTROL PANEL (TCP/ECP).

1.2.1. SMOKE DETECTION SYSTEMS

1.2.1.1. SMOKE DETECTION (DUCT MOUNTED DETECTORS). SMOKE DETECTORS SHALL BE LOCATED IN THE DUCT OF EQUIPMENT LISTED BELOW. IN THE EVENT SMOKE IS DETECTED BY A DETECTOR, A SMOKE DETECTED SIGNAL SHALL BE TRANSMITTED TO THE REMOTE TEST STATION AND FIRE ALARM PANEL OR PLANT CONTROL SYSTEM (PCS) AND TCP/ECP WHEN A FIRE ALARM PANEL IS NOT PRESENT. A "SMOKE DETECTED" ALARM LIGHT ON THE RESPECTIVE REMOTE TEST STATION SHALL BE ILLUMINATED. WHERE A TCP/ECP IS PRESENT, THE REMOTE TEST STATION SHALL BE MOUNTED ON OR ADJACENT TO THE TEMPERATURE CONTROL PANEL. THE RESPECTIVE EQUIPMENT AND ANY INTERLOCKED EQUIPMENT SHALL BE DE-ENERGIZED AND OUTSIDE AIR DAMPERS ASSOCIATED WITH THE DE-ENERGIZED EQUIPMENT SHALL CLOSE. IN THE EVENT A SMOKE DETECTOR MALFUNCTIONS, A MALFUNCTION SIGNAL SHALL BE TRANSMITTED TO THE REMOTE TEST STATION OR FIRE ALARM PANEL, ILLUMINATING A “SMOKE DETECTOR MALFUNCTION” INDICATING LIGHT

1.2.2. LOW TEMPERATURE PROTECTION. LOW AIR TEMPERATURE THERMOSTATS/SENSORS SHALL BE LOCATED IN THE SYSTEMS INDICATED BELOW. UPON DETECTION OF LOW AIR TEMPERATURE, THE THERMOSTAT SHALL DE-ENERGIZE THE RESPECTIVE EQUIPMENT AND ALL INTERLOCKED EQUIPMENT, CONTROL DAMPER(S) OF THE RESPECTIVE EQUIPMENT AND INTERLOCKED EQUIPMENT SHALL RETURN TO THE NORMAL POSITION, AND A "LOW AIR TEMPERATURE" ALARM LIGHT ON THE FACE OF THE RESPECTIVE TEMPERATURE/EQUIPMENT CONTROL PANEL SHALL BE ILLUMINATED OR ALARM INDICATION SENT TO THE PLANT CONTROL SYSTEM. AN ADJUSTABLE 0 TO 5 MINUTE TIME DELAY RELAY SHALL BE PROVIDED TO ALLOW FOR STARTING OF THE EQUIPMENT UNDER COLD AMBIENT CONDITIONS. UPON LOW TEMPERATURE SHUTDOWN, THE EQUIPMENT SHALL REQUIRE A MANUAL RESTART.

1.2.4.1. VENTILATION SYSTEM FAILURE (AIRFLOW SWITCHES). VENTILATION SYSTEM FAILURE PRESSURE DIFFERENTIAL SWITCHES SHALL BE LOCATED IN THE SYSTEMS INDICATED BELOW. IN THE EVENT THAT AIRFLOW IS NOT ATTAINED OR LOST AS DETERMINED BY THE PRESSURE DIFFERENTIAL FLOW SWITCH, A "VENTILATION SYSTEM FAILURE" SIGNAL SHALL BE TRANSMITTED TO THE FIRE ALARM SIGNALING SYSTEM. WHERE A FIRE ALARM SIGNALING SYSTEM IS NOT PRESENT, THE "VENTILATION SYSTEM FAILURE" SIGNAL SHALL BE TRANSMITTED TO THE PLANT CONTROL SYSTEM (PCS). WHERE INDICATED ON THE DRAWINGS, A VISUAL ALARM SHALL BE ILLUMINATED AND AUDIBLE ALARM SHALL SOUND AT EACH ROOM ENTRANCE AND WITHIN THE ROOM. THE FIRE ALARM SIGNALING SYSTEMS HAVE A NORMALLY OPEN CONTACT FOR TRANSMITTING A SIGNAL TO THE RESPECTIVE TEMPERATURE/EQUIPMENT CONTROL PANEL ILLUMINATING AN ALARM INDICATING LIGHT FOR THE RESPECTIVE EQUIPMENT.

3.2. "ON-OFF-AUTO" EQUIPMENT CONTROL. EQUIPMENT INDICATED FOR "ON-OFF-AUTO" CONTROL SHALL EACH BE CONTROLLED BY AN INDIVIDUAL "ON-OFF-AUTO" FAN SELECTOR SWITCH. THE SWITCH LOCATION SHALL BE AS INDICATED BELOW. WHEN THE SWITCH IS PLACED IN THE "AUTO" POSITION, THE FAN SHALL BE INTERLOCKED AND CONTROLLED BY THE FAN INTERLOCK. WHEN THE SWITCH IS PLACED IN THE "ON" POSITION, THE FAN SHALL BE ENERGIZED. BEFORE A FAN CAN OPERATE, THE CONTROL DAMPER(S) SHALL BE PROVEN OPEN. WHERE THE FAN IS INTERLOCKED WITH ANOTHER FAN OR EQUIPMENT WITH A FAN, THE FANS SHALL BE ENERGIZED SIMULTANEOUSLY AFTER ALL ASSOCIATED CONTROL DAMPERS ARE PROVEN OPEN. WHEN THE FAN IS DE-ENERGIZED, THE CONTROL DAMPER(S) SHALL RETURN TO THE NORMALLY CLOSED POSITION UNLESS OTHERWISE INDICATED.

4.1. MAKEUP AIR UNITS (100% OUTSIDE AIR). MAKEUP AIR UNITS SHALL EACH BE CONTROLLED BY AN INDIVIDUAL “SUMMER-OFF-WINTER” SYSTEM SELECTOR SWITCH. THE SWITCH LOCATION SHALL BE AS INDICATED BELOW. WHEN THE SWITCH IS PLACED IN THE “WINTER” POSITION, THE FAN SHALL OPERATE AND THE SUPPLY AIR SENSOR/THERMOSTAT SHALL MODULATE THE HEATING OUTPUT OF THE UNIT TO MAINTAIN THE DESIRED SUPPLY AIR TEMPERATURE. BEFORE THE FAN CAN OPERATE, THE CONTROL DAMPERS SHALL BE PROVEN OPEN. WHEN THE OUTSIDE AIR TEMPERATURE IS GREATER THAN THE HEATING CHANGEOVER TEMPERATURE SETPOINT AS DETECTED BY THE OUTDOOR AIR SENSOR/THERMOSTAT, THE HEATING SHALL BE LOCKED OUT. WHEN THE SWITCH IS PLACED IN THE “SUMMER” POSITION, THE FAN SHALL OPERATE AND THE HEATING SHALL BE LOCKED OUT. WHEN THE UNIT IS DE-ENERGIZED, THE CONTROL DAMPER(S) SHALL CLOSE.

Design Package Approval Form

By signing this Design Package Approval Form, you approve the design specifications and drawings (the "Design Package") as dated for Bessamaire unit(s)

This Approval Form must be signed and returned to Bessamaire, along with all down payment obligations, before the final engineering processes and production begins.

If you cannot approve this Design Package, please identify any necessary revisions below and we will submit a revised Design Package that incorporates those changes.

If there are any Design Package changes after you have signed and returned this Design Package Approval Form to Bessamaire, Bessamaire will notify you immediately.

There will be a 14-week delivery period from the date Bessamaire receives this Design Package Approval Form and you have submitted all down payment obligations.

Bessamaire's Standard Terms and Conditions are specifically incorporated herein and accepted by you pursuant to this Design Package Approval Form.

X_____
Approved signature

P-413 Typical Properties (@ 1 mil DFT)

Salt Spray: ASTM B-117: 6,000+ hours

SWAAT: ASTM G85-11 Section A.3: Passed 1,000 hours using pressurized coil (see page 2 for results)

Cyclic Weathering: ISO 20340 Offshore Standard: Passed (4,200 hours)

Performance Testing: ISO 12944-6 C5 I/M: Passed C5-M high durability and C5-I high durability

Heat Transfer Reduction: <1% as applied for heat transfer components

Humidity: ASTM D-2247: 2,000+ hours

Simulated Sea Water Resistance: 2,000 hours

Solvent Resistance: ASTM-D5402: 100 acetone double rubs

Cross-hatch Adhesion: ASTM D-3359: 5B

Mandrel: ASTM-D522: >1/4 inch

Impact: ASTM D-2794: 160 lb/inch steel; 40 lb/inch aluminum

pH Range (14 day liquid spot test): 2.4–12.6

Temperature Cycling (4 hours at –75°C; 4 hours at 190°C): 4B–5B adhesion after 5 cycles

Dry Heat Resistance (4 hours at 200°C; 20 minutes at 232°C): 4B–5B adhesion after 5 cycles

Dry Film Thickness: ~1 mils

Hardness: ASTM D3363: 5–6H

Gloss: 20–60 on 60 degree meter (topcoat dependent)

Microchannel Compatible

Abrasion Resistance: 30–40 mg loss per 1,000 cycles

Meets FDA 175.300 for indirect food contact

Meets MIL Spec: MIL-C-18467, MIL-E-480 and MIL-STD-883 Method 1101

Meets Other Specs: Honeywell MC 7200-01 and GE F50T17

Thermal Conductivity: At approximately 2 mils thickness, Thermal Conductivity is less than 1.0 w/mK

Dielectric Strength [ISO2376:2010(e)]: 286 volts per mil of thickness

Submittal

JOB NAME	Bentonville WRRF Improvements
PRODUCT	Air Handling Unit - MAU-A02
MANUFACTURER	Bessamaire
LOCATION	Bentonville, AR
DATE	July 22, 2026
CONTRACTOR	Crossland Heavy Contractors
SUBMITTED BY	Clayton Murphy



SUBMITTAL PACKAGE

FOR

BENTONVILLE WATER RESOURCES

15500-04-C Makeup Air Units

UNIT PERFORMANCE SPECIFICATIONS:

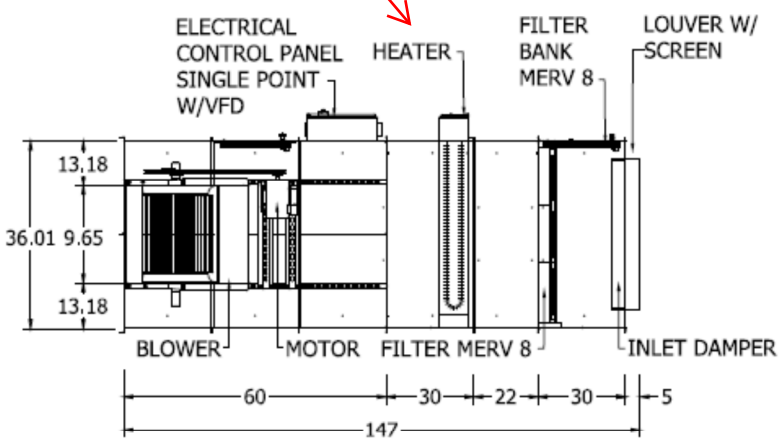
MODEL NUMBER: JHIEF8-2D
UNIT MAU-A02

UNIT DESCRIPTION: Electric Heating and Ventilating Unit; 1,600 Total CFM; 460/3/60 voltage; Outdoor horizontal configuration Down Discharge; 18 ga. G-90 Galvanized steel construction; 11 Ga G-90 Galvanized Steel base, MERV 8 V Bank Filter Section FPM 350. Double Wall Insulated Heating and Blower Sections. Controls are Relay Logic. Interior Walls, Damper, Blower and Blower Motor P-413 Heresite coated. Exterior walls painted with Polyurethane.

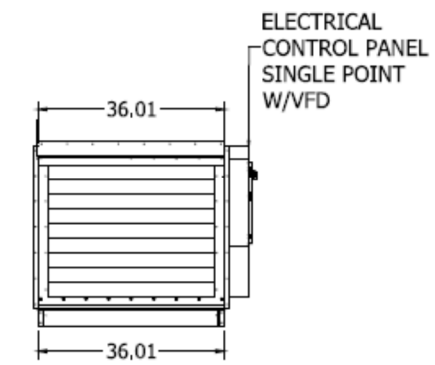
Spec section 15500-2.04.4 -Powers of Arkansas is the local service center and stocking parts department spec section 15500-1.03.b.3 including 24hr service [phone 877-274-7127]

PERFORMANCE DATA INFORMATION:
Volume: 1,600 CFM
RPM: 585
TS: 3802
Total Max. External Static Pressure: 1.00" w.g.
Total Static Pressure: 2.75" w.g.
WEG MOTOR TEFC 1.5 HP -per spec section 15050-2-12-a.
FLA: 2.03
MCA/MOP:2.55/3.55
Electric Heater
Air Velocity 400 FPM
KW 17 480-3
AMPS 20.45
Stages 1
Controls 24 V Mod

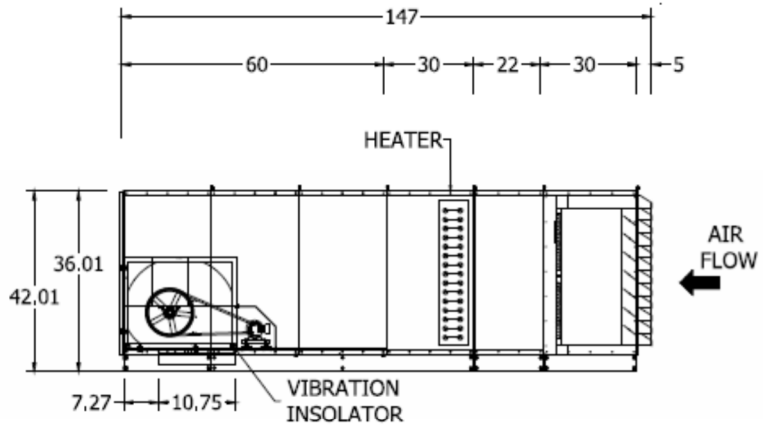
heater upstream of the fan as indicated by the section order in 15500-2.04.A.6.a



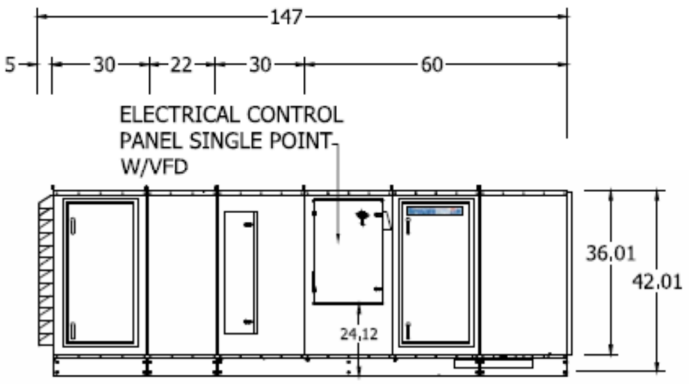
PLANT VIEW



FRONT VIEW



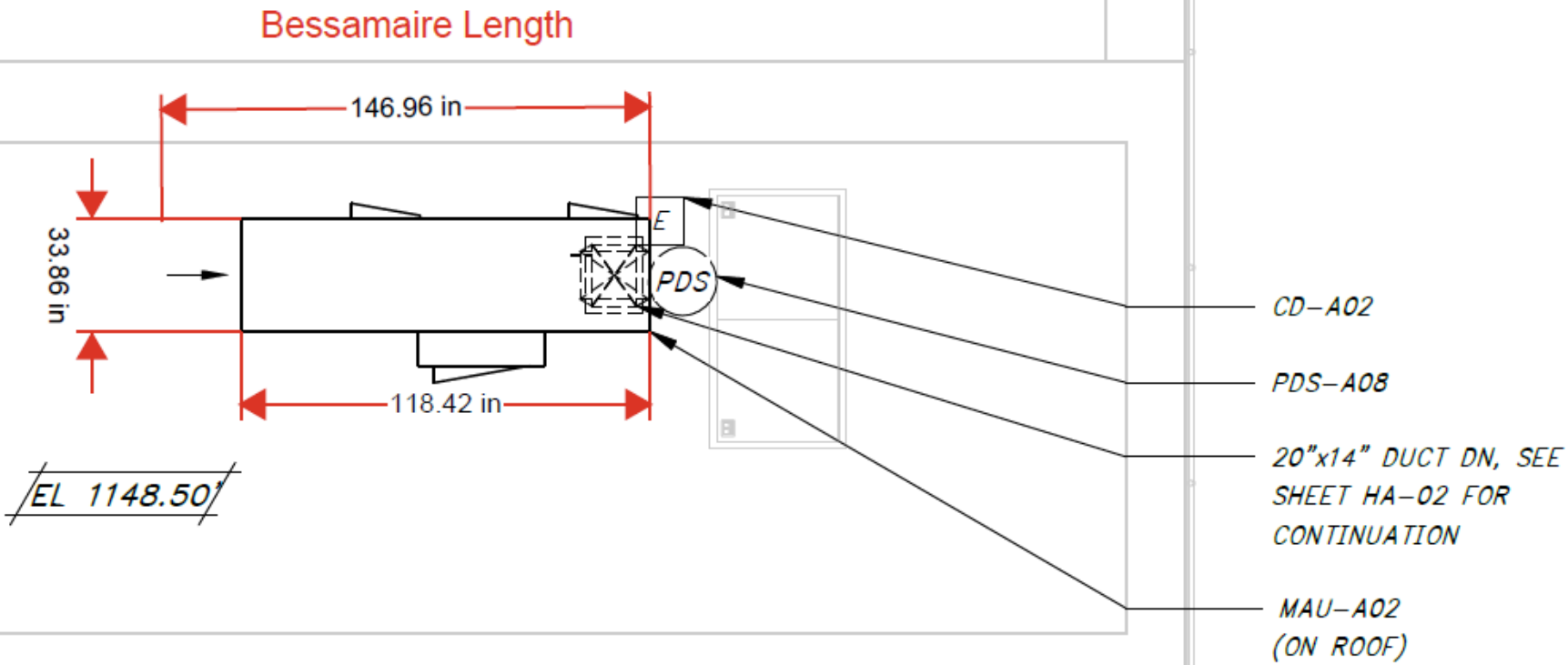
LEFT VIEW



RIGHT VIEW

UNIT	WEIGHT	TOTAL S.P.	HP	OUTLET	PLEATED FILTER	QTY
JHIEF8-1.6D	1,295 LBS	2.75	1.5	9.65" X 10.75"	16"W x 24"H x 2"D	4

*SUBJECT TO CHANGE WITHOUT NOTICE
*UNIT SHIPPED IN (1) SECTIONS



INFLUENT STRUCTURE UPPER LEVEL

DETAIL C

3/16" = 1'-0"

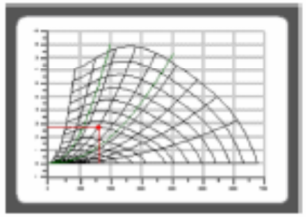
BLOWER / FAN SECTION: DOWN FLOW

Motor Description: 1.5 HP WEG TEFC Premium Efficient electric motor Spark resistant; 460 volts; 60 hertz; Blower Description: Comefri ALTI 9-7 12 T2, Forward Curve statically and dynamically balanced to grade Q=6,3 (ISO 1940); high safety factor, Motor and blower will be mounted on 1" spring isolators and blower outlet will be fitted with a flexible duct connector. Motor and Plenum Heresite Coated. Spring isolators reduce Db 5-7

Access Door Description: Flush Style made from G-90 Galvanized Steel construction, 2" thick polyurethane foam insulated, equipped with Allegis Style Stainless Hinges and Roll-Cam Locking and Non-Locking Handles, R6.5 per inch thickness santoprene gasket.

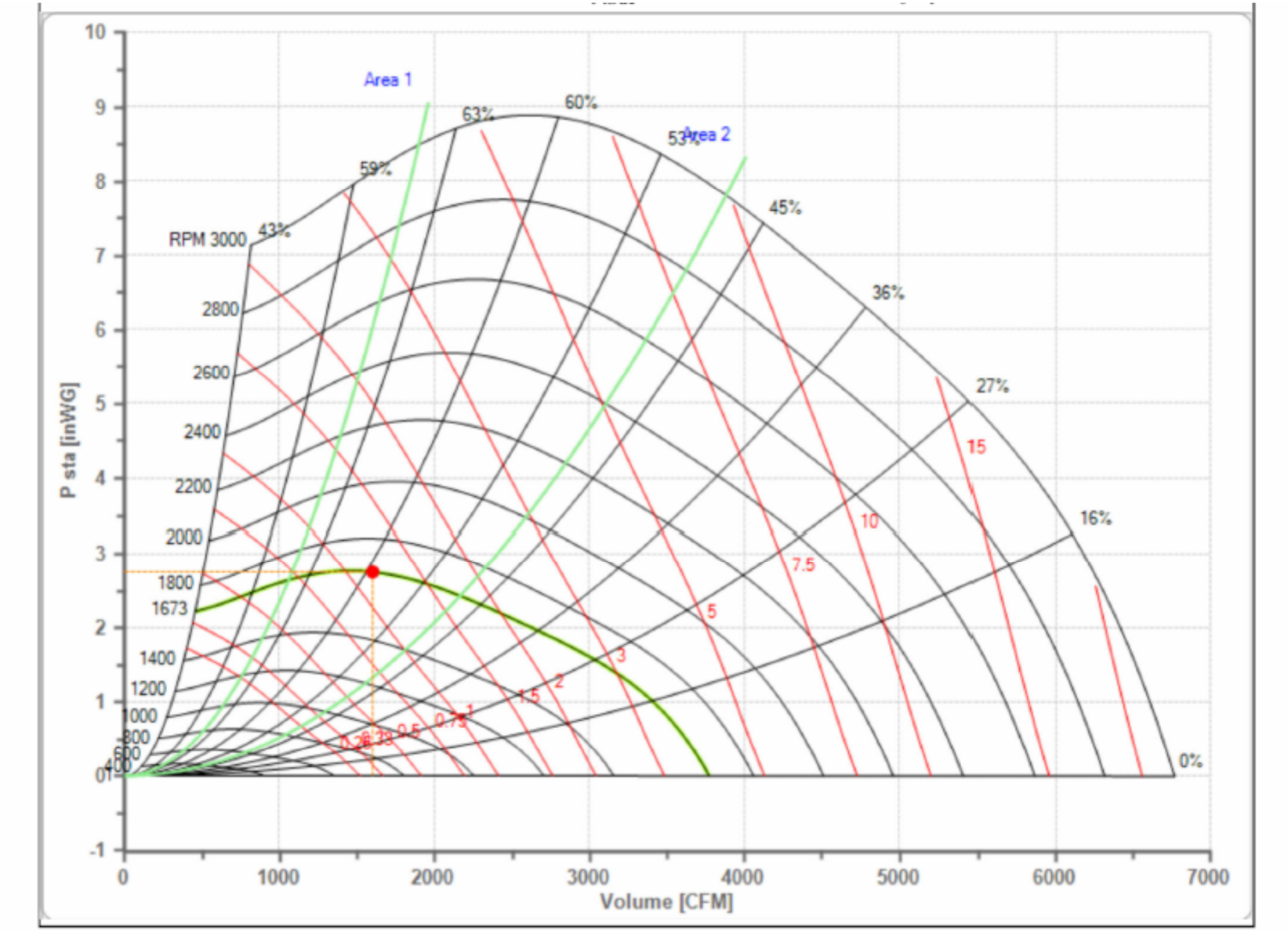
Input data					
Volume	1600 CFM	**Temperature**	68.0 °F	**Density**	0.075 lb/cu.ft
Static Pressure	2.75 In.W.G.	**Altitude**	0 ft	**Free Inlet - Ducted Outlet**	

	Catalogue data		
Selected Fan **ATLI 9 - 7 T2**	n Max 1/min	Pw Max BHP	J lb ft²
	2900	5.00	0.78



Fan Information											
c ft/min	p tot In.W.G.	p sta In.W.G.	p dyn In.W.G.	tip speed ft/min	RPM 1/min	eta Tot %	eta Sta %	P fan BHP	Min Mot. BHP	P mot BHP	Shaft diameter in
2447	3.12	2.75	0.37	4313	1673	67.74	59.64	1.16	1.39	1.50	0.00

fm[Hz]		**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**Tot.**
Lw4 Total Sound Power Level inside the outlet duct - Lwo Outlet Duct Sound Power Level includes the effect of duct end correction										
Level Lw4	**dB/dB(A)**	79 / 53	79 / 63	78 / 70	74 / 71	77 / 77	75 / 76	71 / 72	64 / 63	**86 / 81**
Lw6d Total Sound Power Level outside the termination of the outlet duct - Lwmo Outlet Sound Power Level (free outlet) do not includes the effect of duct end correction										
Level Lw6d	**dB/dB(A)**	66 / 40	71 / 55	74 / 66	73 / 70	77 / 77	75 / 76	71 / 72	64 / 63	**82 / 81**


Area 1
Area 2
63%
60%
59%
53%
45%
43%
36%
27%
16%
0%
RPM 3000
2800
2600
2400
2200
2000
1800
1673
1400
1200
1000
800
600
400
15
10
7.5
5
3
2
1.5
1
0.75
0.5
P sta [inWG]
Volume [CFM]
10
9
8
7
6
5
4
3
2
1
0
-1
0
1000
2000
3000
4000
5000
6000
7000

ELECTRIC HEATING SECTION: Doubled Walled Interior Coated with Heresite P-413

Air Flow 1,600 CFM
Air Velocity 400 FPM
KW 17 480-3
AMPS 20.45
Stages 1
Controls 24 V Mod

Fabrication Include materials of construction for the electric heating elements, confirm corrosion resistant finned tubular type per spec 15500 2.04.A.10

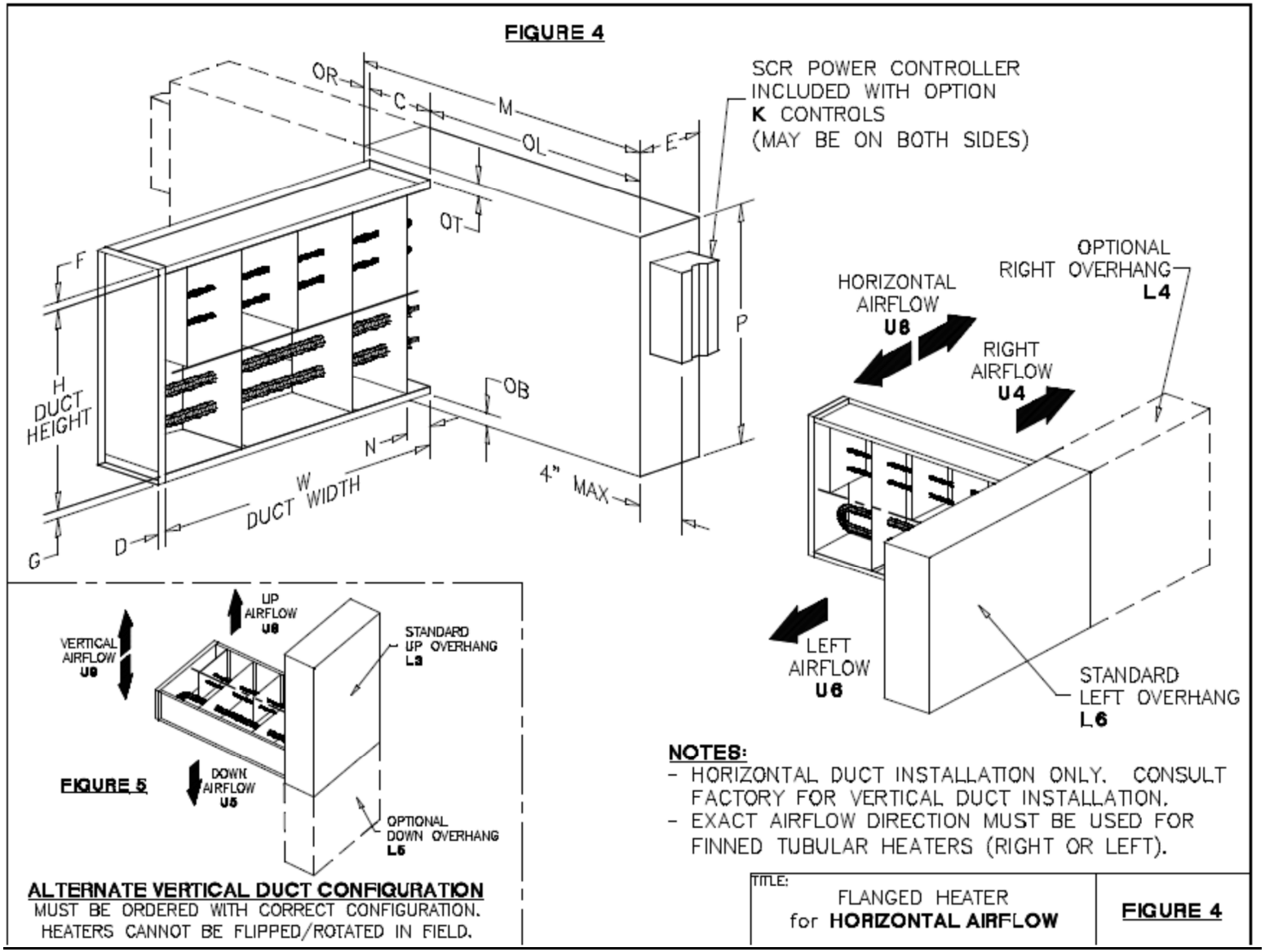
Special Features

B2 Terminal Box Insulated, B9 Enclosure Stainless Steel NEMA 4X, C4 C8 Contactor- Magnetic De-energizing, E36 SCR input-Pulse Thermostat Controlling Master SCR, H3 Stainless Steel Elements 304 SS, L6 Terminal Box Overhang, Q Disconnect Switch Power, Q3 Airflow switch Positive, T2 Control Circuit Transformer, U4 Airflow Direction, Z Automatic Thermal Cutout

ITEM NO	TAG NO	QTY	HEATER TYPE	KW	INSIDE DUCT DIMENSIONS IN INCHES WIDTH	INSIDE DUCT DIMENSIONS IN INCHES HEIGHT	SUPPLY LINE VOLTS/ PHASE	STGS	CTRL VOLTS	REFER TO ATTACHED SHEET FOR EXPLANATION CTRL OPTION	REFER TO ATTACHED SHEET FOR EXPLANATION SPECIAL FEATURE CODE	AIR FLOW	OVER HANG	FIG NO
1		1	TFZ	17.00	24.00	24.00	480/3	1	24	K	B2,B9,C4,C8,E36,E22,H3 ,L6,M3,Q,Q3,T2,U4,Z,Z2 Pool Construction	U4	L6	4
	TOTAL	1												

INDEECO THERMOSTAT(S)	QTY	Item NO(s)
Peco Electronic Duct T'stat, 1031404 & 1031407 (Sensor)	1	1

ITEM NO	DIMENSIONS IN INCHES REFER TO INDICATED FIG. ON ATTACHED DRAWING W	H	C	M	OL	OR	P	D	E	F	G	N	FIG NO	MIN VEL AIR FPM	WIRING DIAGRAM NUMBER	WIRING DIAGRAM CHECK BLOCKS	MINIMUM INCOMING WIRE GA	MINIMUM INCOMING WIRE QTY	AMPS
1	24.00	24.00	6.00	15.00	9.00	0.00	28.00	1.00	6.00	1.00	1.00		4	311	931-4-1122-269	21, 90	10	1	20.45


FIGURE 4
OR
C
M
OL
E
OT
F
H
DUCT HEIGHT
G
D
DUCT W WIDTH
N
OB
4" MAX
P
SCR POWER CONTROLLER
INCLUDED WITH OPTION
K CONTROLS
(MAY BE ON BOTH SIDES)
OPTIONAL
RIGHT OVERHANG
L4
HORIZONTAL
AIRFLOW
U8
RIGHT
AIRFLOW
U4
LEFT
AIRFLOW
U6
STANDARD
LEFT OVERHANG
L6
UP
AIRFLOW
U8
VERTICAL
AIRFLOW
U8
STANDARD
UP OVERHANG
L3
DOWN
AIRFLOW
U5
OPTIONAL
DOWN OVERHANG
L5
FIGURE 5
ALTERNATE VERTICAL DUCT CONFIGURATION
MUST BE ORDERED WITH CORRECT CONFIGURATION.
HEATERS CANNOT BE FLIPPED/ROTATED IN FIELD.
NOTES:
- HORIZONTAL DUCT INSTALLATION ONLY. CONSULT FACTORY FOR VERTICAL DUCT INSTALLATION.
- EXACT AIRFLOW DIRECTION MUST BE USED FOR FINNED TUBULAR HEATERS (RIGHT OR LEFT).
TITLE:
FLANGED HEATER
for HORIZONTAL AIRFLOW
FIGURE 4

ELECTRIC FINNED TUBULAR DUCT HEATERS

HEATER TYPE

This print covers the following heater types:
TFXU/TFXC Finned Tubular, Custom Slip-In
TFZU/TFZC Finned Tubular, Custom, Flanged
831U/831C Remote Panel

Duct heaters utilize the finest construction principles and techniques. A coil of 80% nickel, 20% chromium resistance wire is precisely centered in a .475\" diameter stainless steel sheath. Magnesium oxide powder, compacted to rock-like density, insulates the coil electrically from the sheath. A 1-1/4\" O.D. spiral wound stainless steel fin makes a minimum of five passes per linear around the outside of the tubular element. The elements are furnished with mounting flanges, making them individually removable from the terminal box. The heater frame is constructed of heavy gauge corrosion resistant steel and is provided with generous flanges for structural rigidity. All heaters are suitable for installation in ducts with up to one inch of interior lining.

All heaters include thermal cutouts (not heat limiters or fusible links) in accordance with requirements of UL and CSA. All controls are factory-wired to clearly marked terminal blocks for field connections. Properly sized knockouts are provided. All heaters are supplied complete with wiring diagrams and installation instructions, and all are given a dielectric test at a minimum of 1200 volts before shipment.

AG Y APPROVALS AND NATIONAL ELECTRICAL CODE
Duc aters and panels with a “U” in the type designation are Listed by UL under Files E23192 and E53412 and thos th a “C” are Certified under CSA master contract 151727. As such, they are suitable for installation with zero arance to combustible surfaces and for use with heat pumps and central air conditioners. They are also sup with all necessary provisions for installation in full accordance with the National Electric Code (NEC) and Car n Electrical Code (CEC).

INSTALLATION
Slip-in duct heaters are installed by inserting through a rectangular opening cut in the side of the ductwork and are secured to the duct with sheet metal screws. To install flanged duct heaters, flanges must be provided on the duct to match the heater flanges, both on the entering and leaving air sides. The heater is secured to the ductwork by sheet metal screws or bolts through the mating flanges.

When the duct heater is being used in conjunction with an air conditioning or heat pump unit, it must be installed at least 48” from the unit. Sufficient working clearances must be provided on the terminal box side of the heater as detailed in the NEC and/or CEC. Care should be taken to follow all instructions found in the Installation, Operating and Maintenance Instructions sheet supplied with each heater.

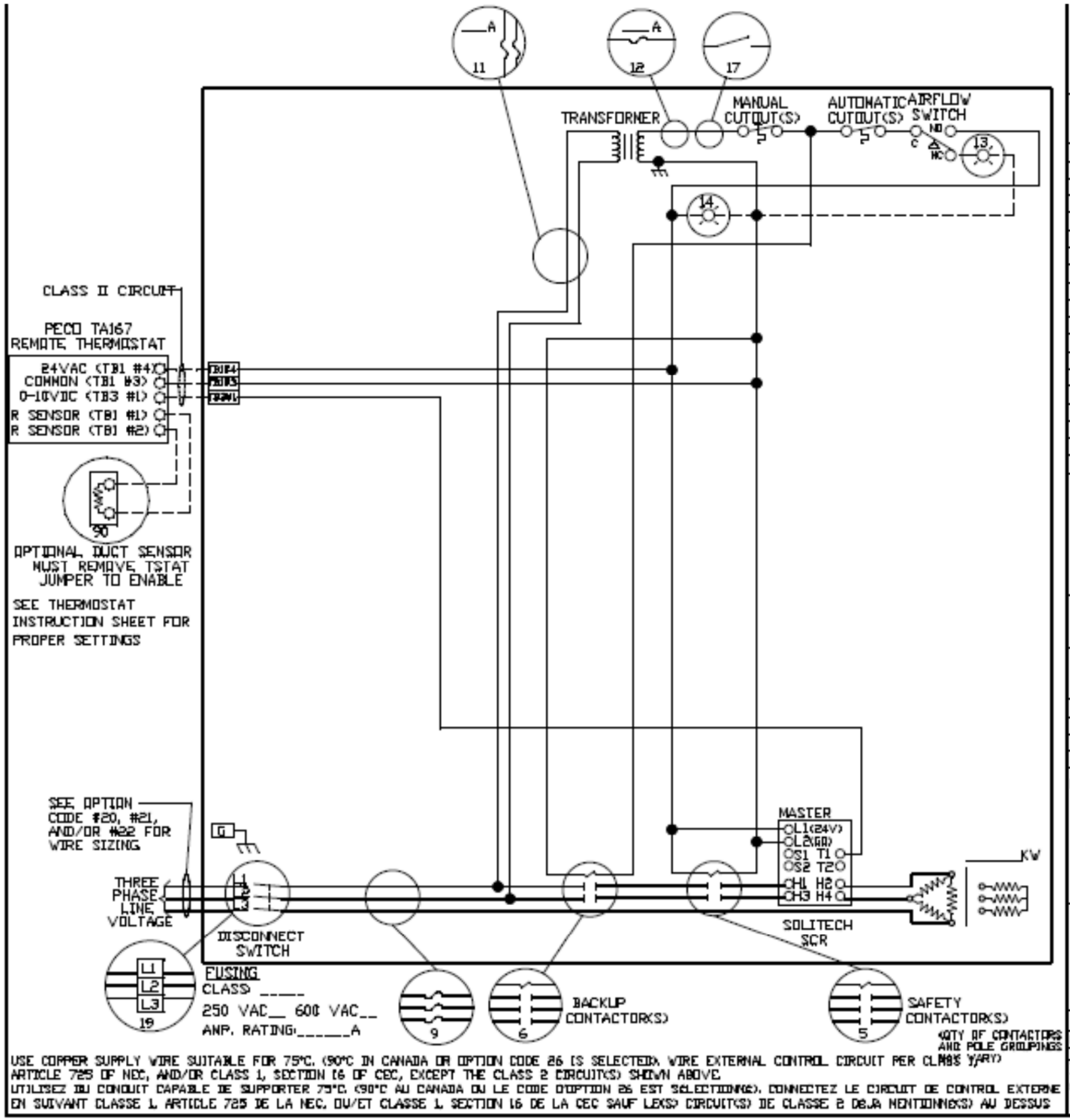
CONTROL OPTIONS
G = Basic
J = Pneumatic
K = Proportional

SPECIAL FEATURES
Heaters are available with a wide variety of special features and constructions. Your quotation or certified print includes a column for special feature codes. The codes in this column, as defined by the table below, describes details of both the standard control options, as well as any special features on the heater in question.";

SPECIAL FEATURE CODE DEFINITIONS

A60, A62	PE Switch-Close on Rise
B	Terminal Box-Bottom
B1	Terminal Box-Side Cover
B2	Terminal Box-Insulated
B3	Enclosure-Weatherproof NEMA 4 Type
B4	Enclosure-Dust-Tight-NEMA 12 Type
B5	Panelboard-Required for Heater Control
B7	Enclosure-Dustproof
B8	Enclosure-Outdoor-3R Type
B9	Enclosure-Stainless Steel Weatherproof Nema 4X Type
C, C4, C8	Contactor-Magnetic De-energizing
C1, C5, C9	Contactor-Magnetic Disconnecting
C2, C6, C10	Contactor-Mercury De-energizing
C3, C7, C11	Contactor-Mercury Disconnecting
D3	Derated Coils-25 Watts per Square Inch
D4	Derated Coils-35 Watts per Square Inch
E20 to E23	SCR Controller
E30	SCR input-2200 Ohms
E31	SCR input-135 Ohms
E32	SCR input-with transducer
E33	SCR input-slave for vernier
E34	SCR input-4-20mA
E35	SCR input-0-10VDC
E36	SCR input-0-10VDC Thermostat Controlling Master SCR
E37	SCR input-Pulse Thermostat Controlling Slave SCR
F	Fuses-Minimum NEC
F1	Fuses-Per Circuit
F3	Circuit Breaker-Minimum NEC
F5	Circuit Breaker-Per Circuit
F6	Time Delay Fusing
G1	Slip-and-Drive Connection
G2	Extended Cold Section
G3	Recessed Terminal Box
GG2	Insulated Duct Construction (extended cold section)
GG3	Insulated Duct Construction (recessed terminal box)
H1	Aluminized Steel Frame & Terminal Box
H2	Stainless Steel Frame & Terminal Box
H3	Stainless Steel Elements (304 Series)
H6	Stainless Steel Elements (316 Series)
L3 to L6	Terminal Box Overhang (See Figs. 10 & 11)
L7	No Overhang, C=M (See Fig. 7)
M to M7	Manual Thermal Cutout
M8	Remote Manual Reset Rod
N(000)	Fan Relay (000 is control voltage)
P1	Pilot Light Each Stage On
P2	Pilot Light Insufficient Air
P3	Pilot Light Heater On
P4	Pilot Light-Overtemperature
Q, Q1	Disconnect Switch-Power
Q2	Pilot Switch-Control Circuit
Q3, Q4	Airflow Switch Positive
Q5, Q6	Airflow Switch Negative
Q8	Disconnect Switch-Control Circuit
Q10	Disc. Switch-Control Circuit Fan Relay
R1	Dry Contact for Remote Heater Enable
S5	2200 Ohm input-Deadband
S16	135 Ohm input-Proportional
S18	4-20mA input-Proportional
S19	with Transducer-Proportional
S20	0-10VDC input-Proportional
S21	Step Controller-0-10VDC Thermostat
T1, T5	Control Circuit Transformer, Fused Primary
T2 to T4	Control Circuit Transformer
U3 to U9	Airflow Direction (See Figs. 10 & 11)
V	Protective Screens-Both Sides
V1	Pressure Plate-Inlet Side
V2	Protective Screens-One Side
Z to Z5	Automatic Thermal Cutout

INDEECO,425 Hanley Industrial Court, St. Louis, MO, 63144
Phone (314) 644-4300, Fax (314) 644-5332,INDEECO.com, email ESales@indeeco.com



ITEMS WITHIN A CIRCLE MAY VARY OR MAY NOT BE SUPPLIED. SEE THE OPTION KEY BELOW WHICH INDICATES BY CHECK MARKS WHICH NUMBERED CIRCLES APPLY.

OPTION KEY –
CHECK MARKS INDICATE WHICH CIRCLES APPLY

	01	CONTROLLING CONTACTOR(S) – 2 POLE
	02	SAFETY CONTACTOR(S) – 2 POLE
	03	BACK-UP CONTACTOR(S) – 2 POLE
	04	CONTROLLING CONTACTOR(S) – 3 POLE
	05	SAFETY CONTACTOR(S) – 3 POLE
	06	BACK-UP CONTACTOR(S) – 3 POLE
	07	SINGLE PHASE LINE FUSING (L1 ONLY)
	08	SINGLE PHASE LINE FUSING (L1 & L2)
	09	THREE PHASE LINE FUSING
	10	PRIMARY TRANSFORMER FUSING – 1 LINE
	11	PRIMARY TRANSFORMER FUSING – 2 LINE
	12	SECONDARY TRANSFORMER FUSING
	13	PILOT LIGHT – LOW AIRFLOW
	14	PILOT LIGHT – HEATER ON
	15	PILOT LIGHT – STAGE(S) ON
	16	PILOT LIGHT – FAN ON
	17	PILOT SWITCH
	18	CONTROL CIRCUIT DISCONNECT SWITCH
	19	NO DISCONNECT SWITCH
	20	IF CHECKED, HEATER MAY BE WIRED WITH ____ AWG MIN. SUPPLY WIRE PER 424-22(d) NEC. IF THE HEATER IS CONTROLLED IN ONE OF THE FOLLOWING 3 WAYS (1)TWO OR MORE THERMOSTAT(S) (2)THERMOSTAT WITH 2 OR MORE STAGES (3)PROPORTIONING TYPE THERMOSTAT(S)
	21	USE _____ AWG MIN. SUPPLY WIRE, ____ WIRE(S) PER PHASE.
	22	UTILISER UN CABLE D'ALIMENTATION D'AU MOINS ___ AUG. ___ CONDUCTEUR(S) PAR PHASE.
	23	CLASS 1 CIRCUIT
	24	CLASS 2 CIRCUIT
	25	NO MANUALLY RESETTABLE LIMIT CONTROL(S)
	26	INCOMING WIRE TO BE RATED 90 DEG. C. MIN.

LEGEND:
- ——— POWER WIRING
- ——— CONTROL WIRING
- - - - - - WIRING SUPPLIED ONLY WHEN ASSOCIATED OPTION IS SUPPLIED

REV	DESCRIPTION	DATE	APPROVED
A	WAS C1025 TSTAT	11/6/17	C.DAY

REVISIONS

DWG NO.
931-4-1122-269-A-A

OUTDOOR RAIN LOUVER MODULE:

Outdoor Rain Louver Configuration designed to prohibit the collection of water and snow with Inlet Louver
Rain Louver is designed to function in a way to drain all water and block rain from entering the filter.
Prefilter: Louver and 1" Aluminum Media W/ 304 stainless steel bird-screen.

FILTER MODULE: 350 FPM Air Velocity

V Bank Panel Style Filter housing designed to accommodate 2" thick filters. Filters are approximately 35% efficient @ 1 micrometer. Filters carry an ASHRAE 52.2 MERV 8 Rating.

Access Door Description: Flush Style made from G-90 Galvanized Steel construction; 2" thick polyurethane foam insulated; equipped with Allegis Surface Style Stainless Hinges and Roll-Cam Locking and Non-Locking Handles; R6.5 per inch thickness santoprene gasket.

ECP ELECTRICAL CONTROL PANEL SINGLE POINT

Electrical Control Enclosure contains the following: (Unit Mounted, Conformal coating Factory Installed)

- **3 Phase 60 Hz Main Disconnect with Fuses**
- **460V /120VAC control Transformer**
- **460V /24VAC control Transformer**
- **IEC Motor Circuit Protector for Blower Motor**
- **8-12 Pin Relays and Sockets**
- **GFCI Electrical Outlet**
- **Exhaust Fan Interlock (1 Interlock Provided, N.O. Contact)**
- **Smoke/Fire Emergency Shutoff Alarm (One N.C. Contact)**
- **NEMA 4X Electrical Enclosure**
- **Ventilated NEMA 4X VFD Enclosure**

ECP-A02 - Remote Control Enclosure contains the following: (Field Mounted)

- **NEMA 12 Enclosure - By spec section 15500-2.04.A.12.c**

Unit Mounted Devices:

- **Discharge Temperature Sensor**
- **Dirty Filter Sensor**

All wiring connections are provided with protective conformal coating & [1] extra conformal coating in spray can will be supplied with MAU for field connection coating suitable for electronics per 15500-2.04.A.6.a

All wiring connections are provided with protective conformal coating & [1] extra conformal coating in spray can will be supplied with MAU for field connection coating suitable for electronics per 15500-2.04.A.6.a

UR Urethane Conformal Coating

Product# 2104



Product Description

Techspray® offers a variety of coating formulas to match field and engineering requirements. Specifications generally depend on the type of protection needed. E.g. thermal, moisture, and static resistance.

Coatings contain Opti/Scan to allow quality control inspection of coverage and evenness of the coating on a PCB. A coated board can be passed under a standard, low-cost UV (short-wave black) light, and the coated areas glow. The brighter the glow, the thicker the coating.

Features / Benefits

- **Thermal resistance - to 248°F (120°C)**
- **Dielectric strength - 380 volts/mil**
- **Moisture resistant**
- **Chemically resistant**
- **Abrasion resistant**
- **UL94 V-0 – nonflammable final coat**
- **IPC-CC-830B qualified**
- **UV indicator for black light QC inspection**

Specifications

- IPC-CC-830B

Usage Instructions

For industrial use only. Read MSDS carefully prior to use. Before applying Fine-L-Kote™ conformal coatings, clean circuit boards to remove contamination and allow to dry. Cleaning may be performed with Techspray G3, E-LINETM and Precision-V defluxers.

Spray Application: Apply top to bottom, allowing coating to flow evenly around components. Rotate PCB 90º and repeat application. Rotate and apply coating two additional times, then allow board to cure. If additional thickness is desired, apply additional coatings. When using liquid spray with automatic dispensing equipment, adjustments may be required in application rate and viscosity.

Dip Application: Using automatic equipment or hand immersion technique, slowly immerse PCB into the coating and remove slowly. Use an average rate of approximately 1 foot per minute. After allowing the board to cure, process may be repeated to achieve desired thickness.

Brush Application: Evenly apply coating to areas desired at thickness required. Allow time for curing before reapplying to achieve a thick coating. Use WonderMASK to protect components during conformal coating process. After application, cured Fine-L-Kote™ may be removed using Techspray Conformal Coating Removal Pen (2510-N or 2510-P).

Typical Product Data and Physical Properties

Physical state:	Liquid
Flash point:	Closed cup: 81ºF (27.2ºC)
Flammable limits:	Lower 1% Upper 7%
Color:	Colorless
Odor:	Aromatic
Boiling/condensation point:	300.2ºF (149ºC)
Relative density:	0.93
Volatility:	86% (w/w)
Shelf life:	1 year

UR Urethane Conformal Coating
Product# 2104

Performance & Application Data

Cure type	Thermal/air
Tack-free time (min)	15
Accelerated cure time/temp	2 Step: 20 Min. @ 49°C, 30 Min. @ 82°C
Ambient cure time	24 hrs
Viscosity (bulk)	10-20 cps
Operating temperature range	-65° to 125°C
Dielectric strength	380 V/Mil
Insulation resistance (ohms)	1.78×10^{16}
Coverage (1 mil dry film)	1 gal. liquid = 880 ft^2 (81.8M^2)

Packaging and Availability

2104-12S	12 Ounce Liquid
2104-G	1 Gallon Liquid
2104-5G	5 Gallon Liquid

Environmental Policy

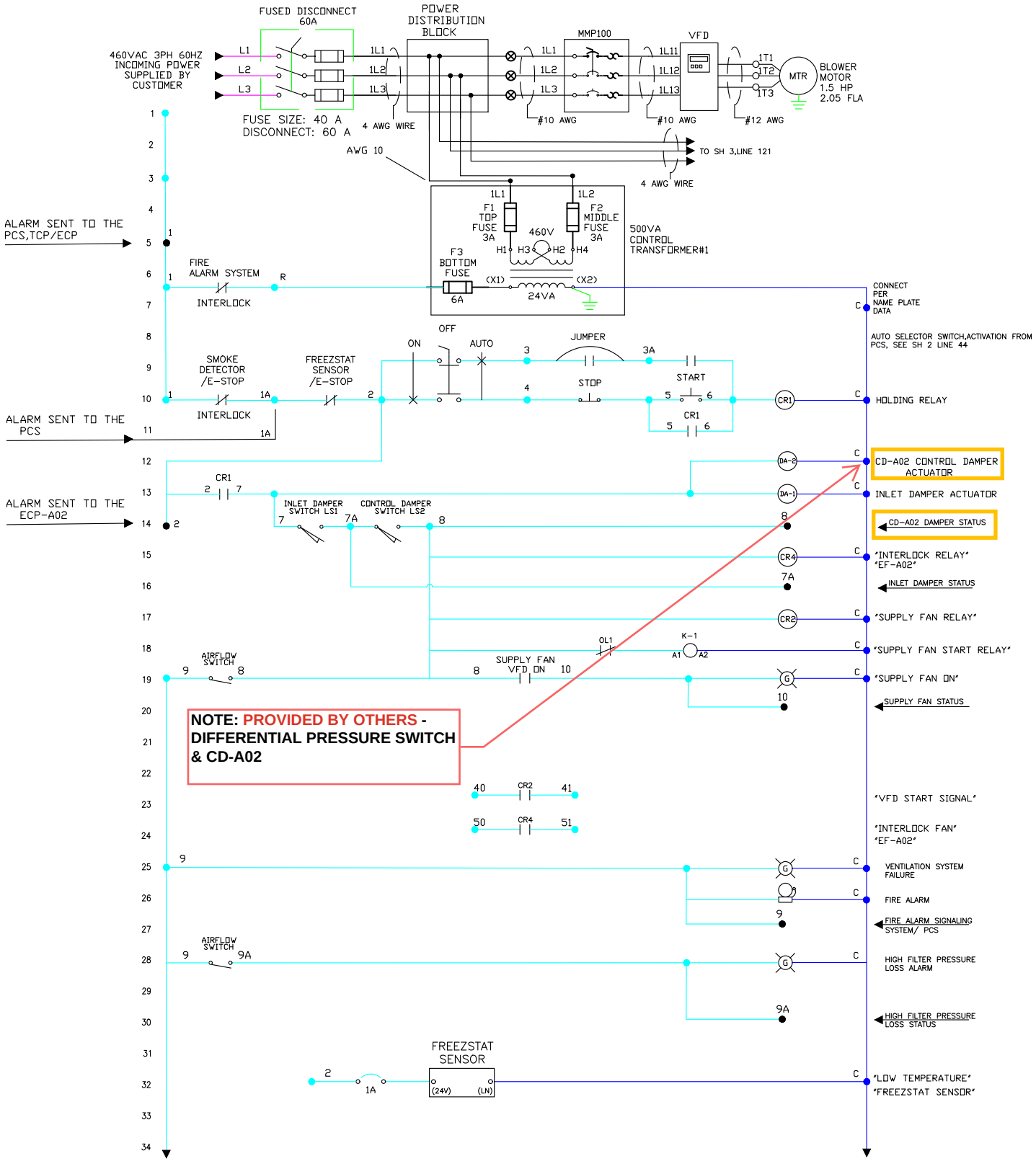
Techspray® is committed to developing products to ensure a safer and cleaner environment. We will continue to meet and sustain the regulations of all federal, state and local government agencies.

Resources

Techspray® products are supported by global sales, technical and customer services resources.

For additional technical information on this product or other Techspray® products in the United States, call the technical sales department at 800-858-4043, email tsales@techspray.com or visit our web site at: www.techspray.com.

Important Notice to Purchaser/User: The information in this publication is based on tests that we believe are reliable. The results may vary due to differences in tests type and conditions. We recommend that each user evaluate the product to determine its suitability for the intended application. Conditions of use are outside our control and vary widely. Techspray's only obligation and your only solution is replacement of product that is shown to be defective when you receive it. In no case will Techspray® be liable for any special, incidental, or consequential damages based on breach of warranty, negligence or any other theory.



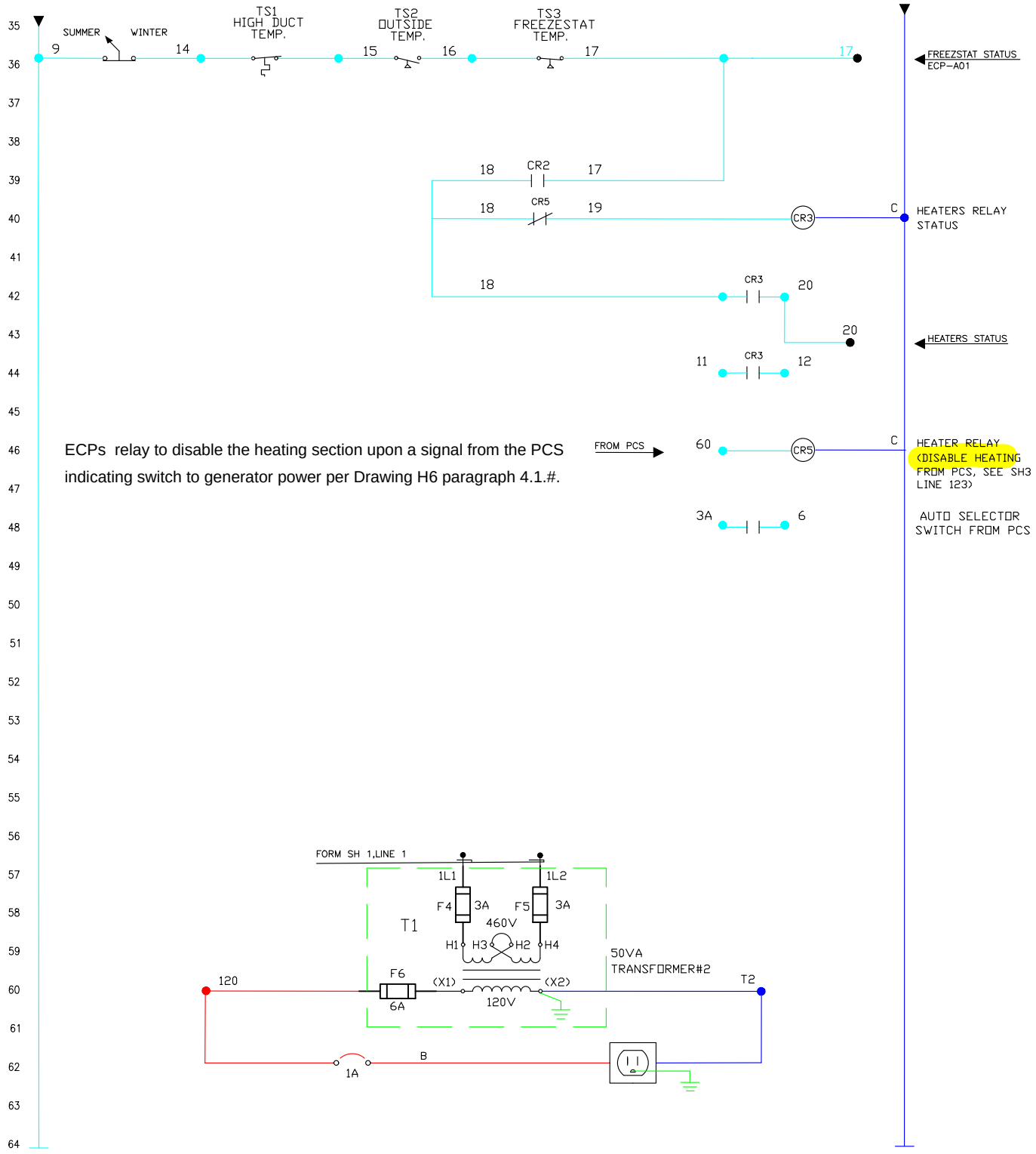
WIRE COLOR CODE
BLACK - HIGH VOLTAGE
RED - 120 VOLTS
BLUE - 24V DC/AC
GREEN - GROUND
WHITE - NEUTRAL
MAGENTA - FIELD WIRING
BROWN–SIGNAL

WARNING: DO NOT ATTACH WIRES TO THE WALL OF THE UNIT THE SURFACE MAY BE HOT.

WHEN CALLING FOR ASSISTANCE, PLEASE REFER TO THE MODEL & SERIAL NUMBER OF THE UNIT FOR QUICK RESPONSE.

Bessamaire HVEC

MODEL: JHIEF8–1.6D
CUSTOMER:
Electrical Schematic — SHEET 1 OF 7
REFERENCE NO.: JHIE Series
DRAWING NO.: 16–511XX–S1
DRAWN: RR 7/10/2026
SERIAL NO.: 26–511XX–01
CHECKED: RR 7/10/2026



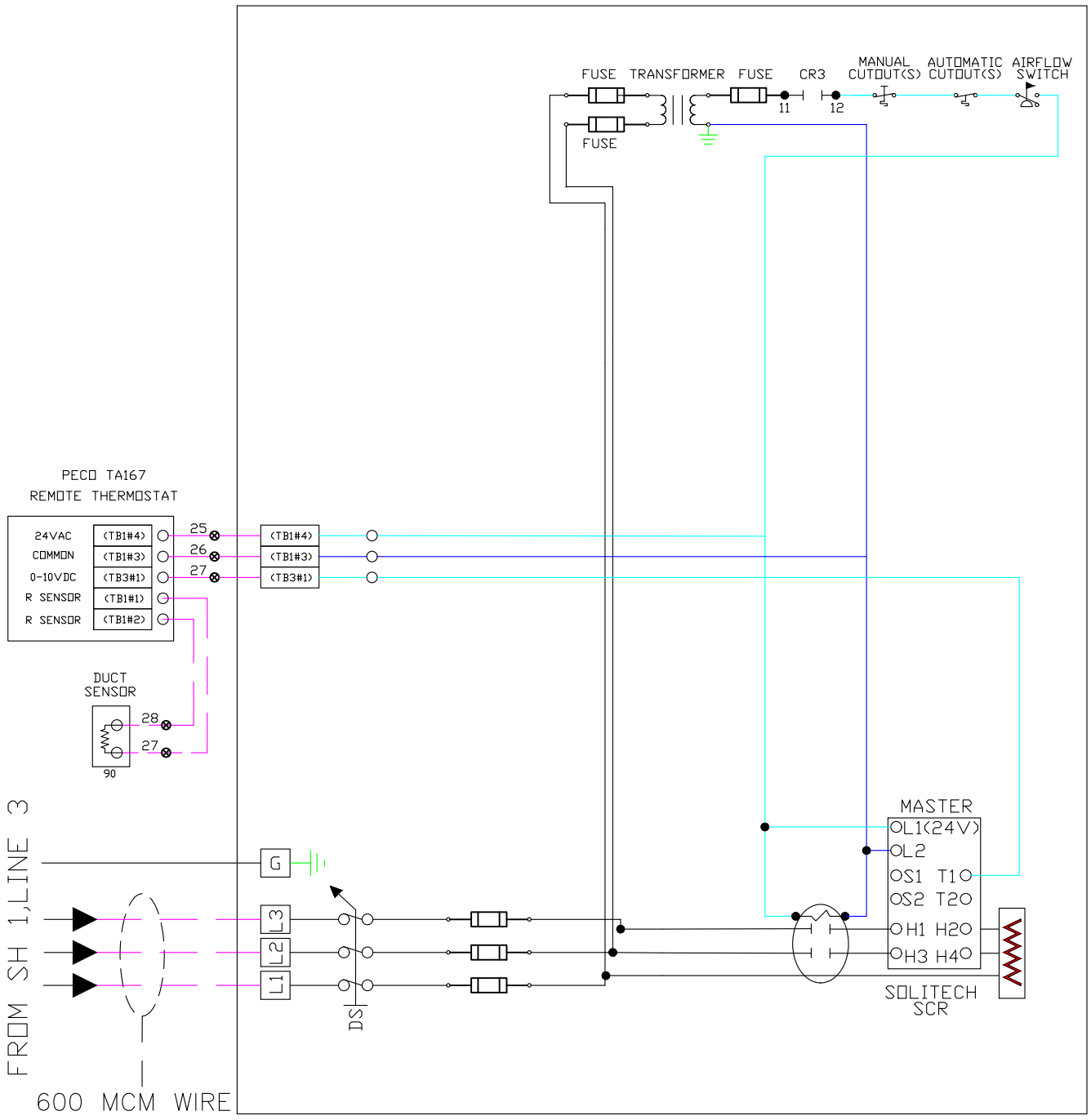
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Bessamaire HVEC

MODEL: JHIEF8-1.6D
CUSTOMER:
ELECTRICAL SCHEMATIC — SHEET 2 OF 87
REFERENCE NO.
DRAWING NO. 26-511XX-S2
JHIE SERIES
DRAWN RR 7/10/2026
SERIAL NO. 26-511XX-01
CHECKED RR 7/10/2026



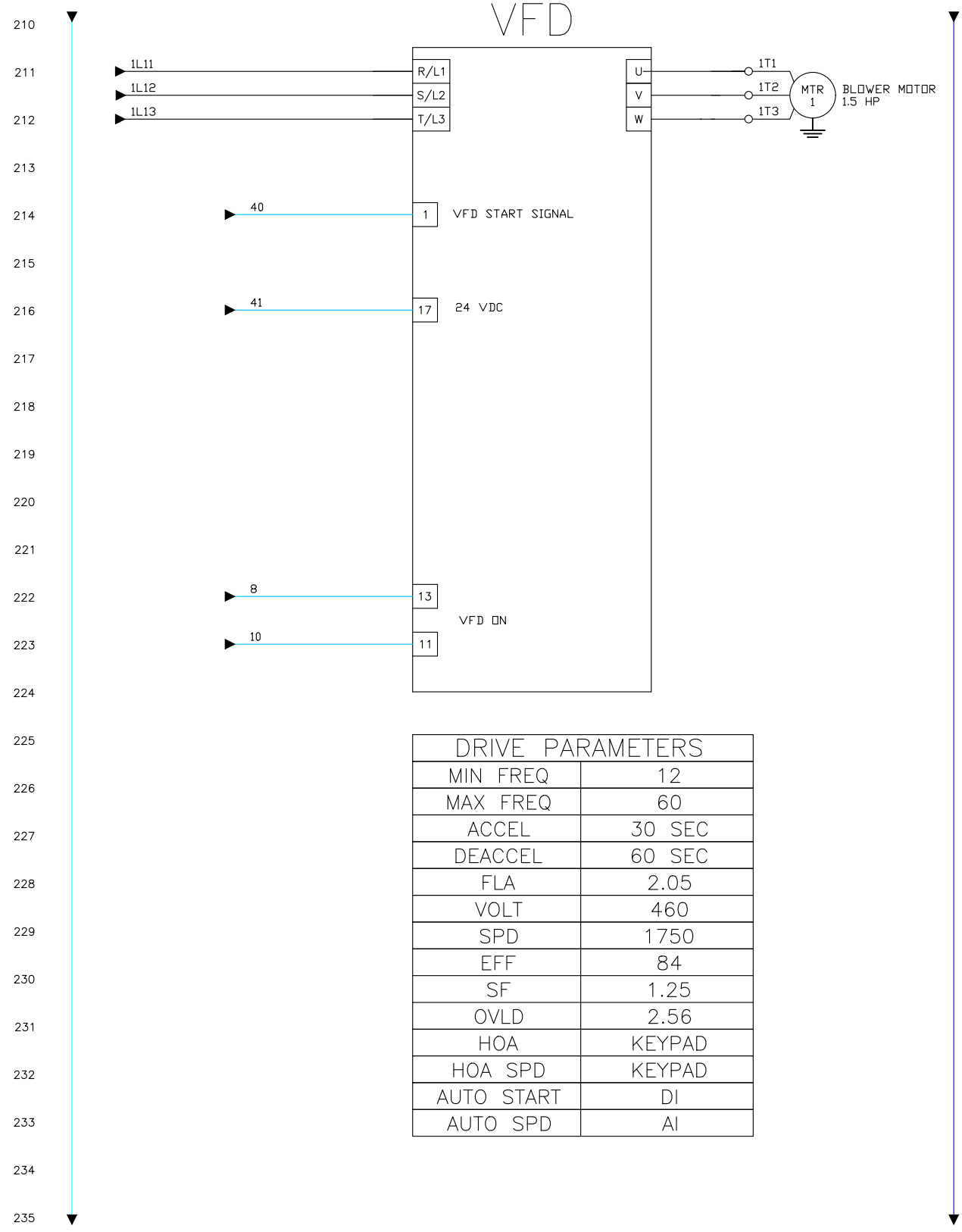
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BLACK - HIGH VOLTAGE
RED - 120 VOLTS
BLUE - 24V DC/AC
GREEN - GROUND
WHITE - NEUTRAL
MAGENTA - FIELD WIRING
BROWN–SIGNAL

WARNING: DO NOT ATTACH WIRES TO THE WALL OF THE UNIT THE SURFACE MAY BE HOT.

WHEN CALLING FOR ASSISTANCE, PLEASE REFER TO THE MODEL & SERIAL NUMBER OF THE UNIT FOR QUICK RESPONSE.

Bessamaire HVEC

MODEL: JHIEF8–1.6D
CUSTOMER:
ELECTRICAL SCHEMATIC — SHEET 3 OF 7
REFERENCE NO.: JHIE Series
DRAWING NO.: 26–511XX–S3
DRAWN: RR 7/10/2026
SERIAL NO.: 26–511XX–01
CHECKED: RR 7/10/2026



DRIVE PARAMETERS	
MIN FREQ	12
MAX FREQ	60
ACCEL	30 SEC
DEACCEL	60 SEC
FLA	2.05
VOLT	460
SPD	1750
EFF	84
SF	1.25
OVLD	2.56
HOA	KEYPAD
HOA SPD	KEYPAD
AUTO START	DI
AUTO SPD	AI

WIRE COLOR CODE
BLACK - HIGH VOLTAGE
RED - 120 VOLTS
BLUE - 24V DC/AC
GREEN - GROUND
WHITE - NEUTRAL
MAGENTA - FIELD WIRING
BROWN–SIGNAL

WARNING: DO NOT ATTACH WIRES TO THE WALL OF THE UNIT THE SURFACE MAY BE HOT.

WHEN CALLING FOR ASSISTANCE, PLEASE REFER TO THE MODEL & SERIAL NUMBER OF THE UNIT FOR QUICK RESPONSE.

Bessamaire HVEC

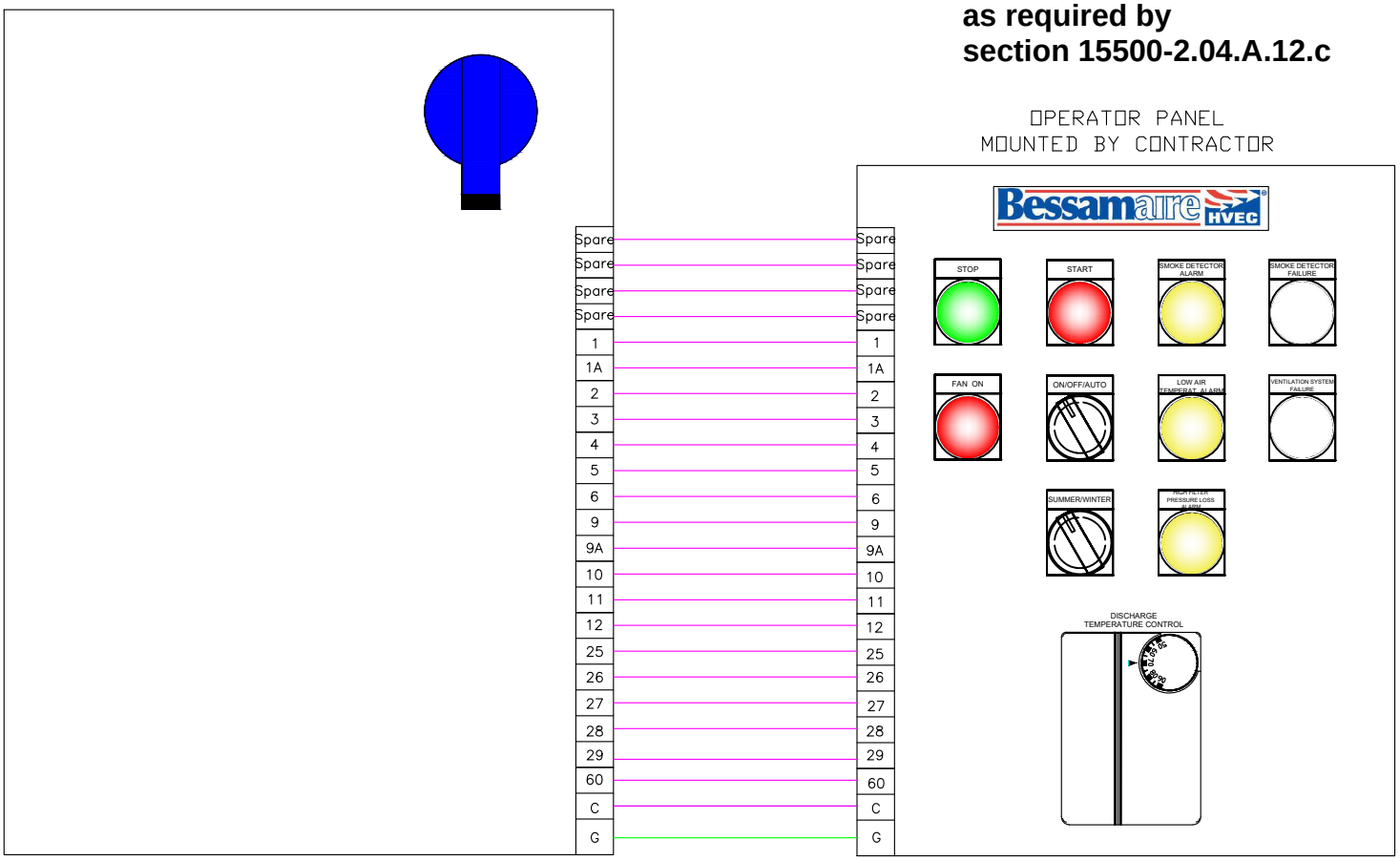
MODEL: JHIEF8–1.6D
CUSTOMER:
VFD — SHEET 4 OF 7
REFERENCE NO.: JHIE Series
DRAWING NO.: 26–511XX–S4
DRAWN: RR 7/10/2026
SERIAL NO.: 26–511XX–01
CHECKED: RR 7/10/2026

ECP-A02 [MAU-A02]

NEMA 12 Enclosure as required by section 15500-2.04.A.12.c

MAIN OPERATOR PANEL
MOUNTED ON AHU

OPERATOR PANEL
MOUNTED BY CONTRACTOR



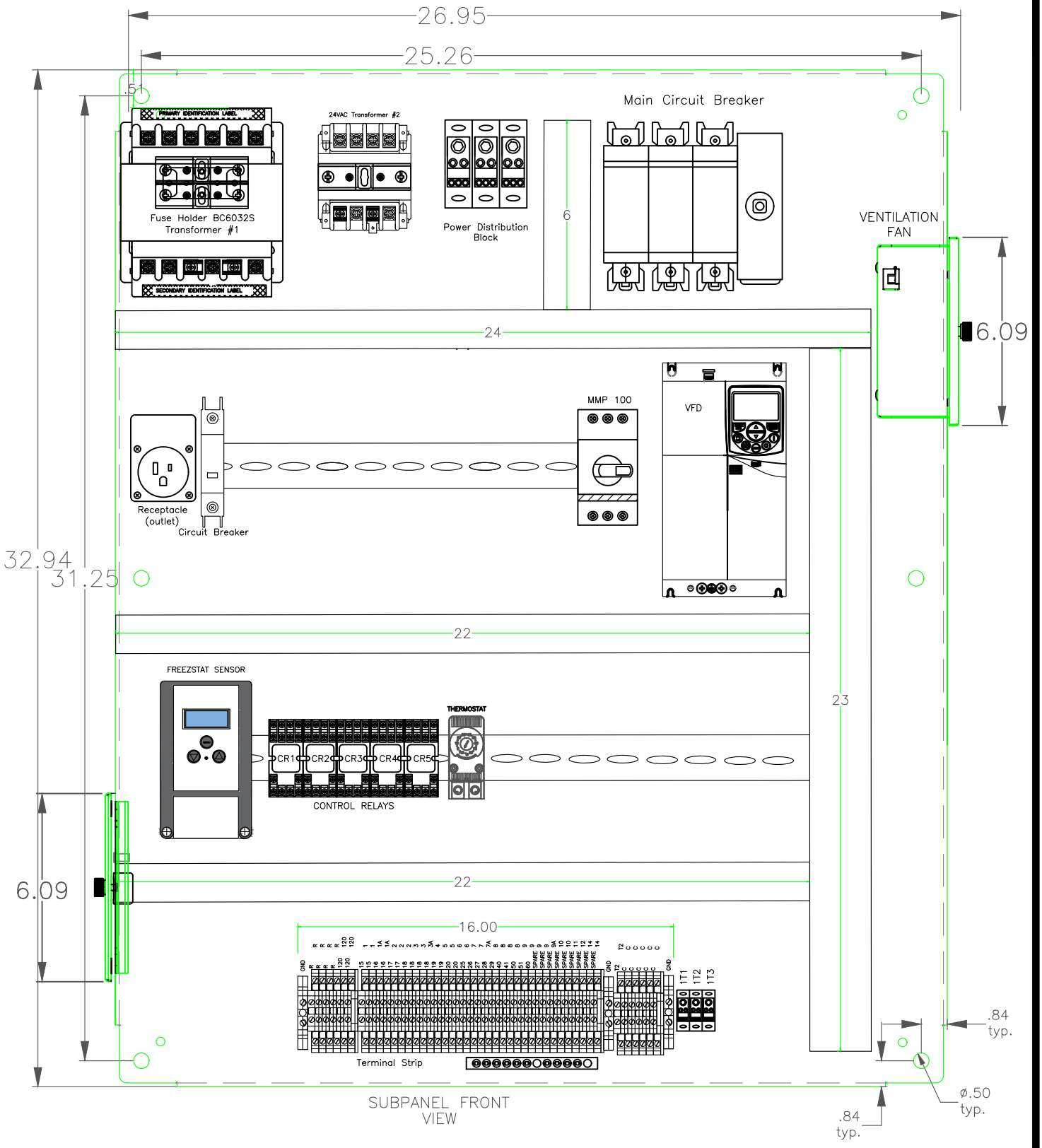
WIRE COLOR CODE
BLACK - HIGH VOLTAGE
RED - 120 VOLTS
BLUE - 24V DC/AC
GREEN - GROUND
WHITE - NEUTRAL
MAGENTA - FIELD WIRING
BROWN–SIGNAL

WARNING: DO NOT ATTACH WIRES TO THE WALL OF THE UNIT THE SURFACE MAY BE HOT.

WHEN CALLING FOR ASSISTANCE, PLEASE REFER TO THE MODEL & SERIAL NUMBER OF THE UNIT FOR QUICK RESPONSE.

Bessamaire HVEC

MODEL: JHIEF8–1.6D
CUSTOMER
Interconnentions
SHEET 5 OF 7
REFERENCE NO.
DRAWING NO. 26–511xx–S5
JHIE Series
DRAWN RR 7/10/2026
SERIAL NO. 26–511xx–01
CHECKED RR 7/10/2026



WIRE COLOR CODE
BLACK - HIGH VOLTAGE
RED - 120 VOLTS
BLUE - 24V DC/AC
GREEN - GROUND
WHITE - NEUTRAL
MAGENTA - FIELD WIRING
BROWN–SIGNAL

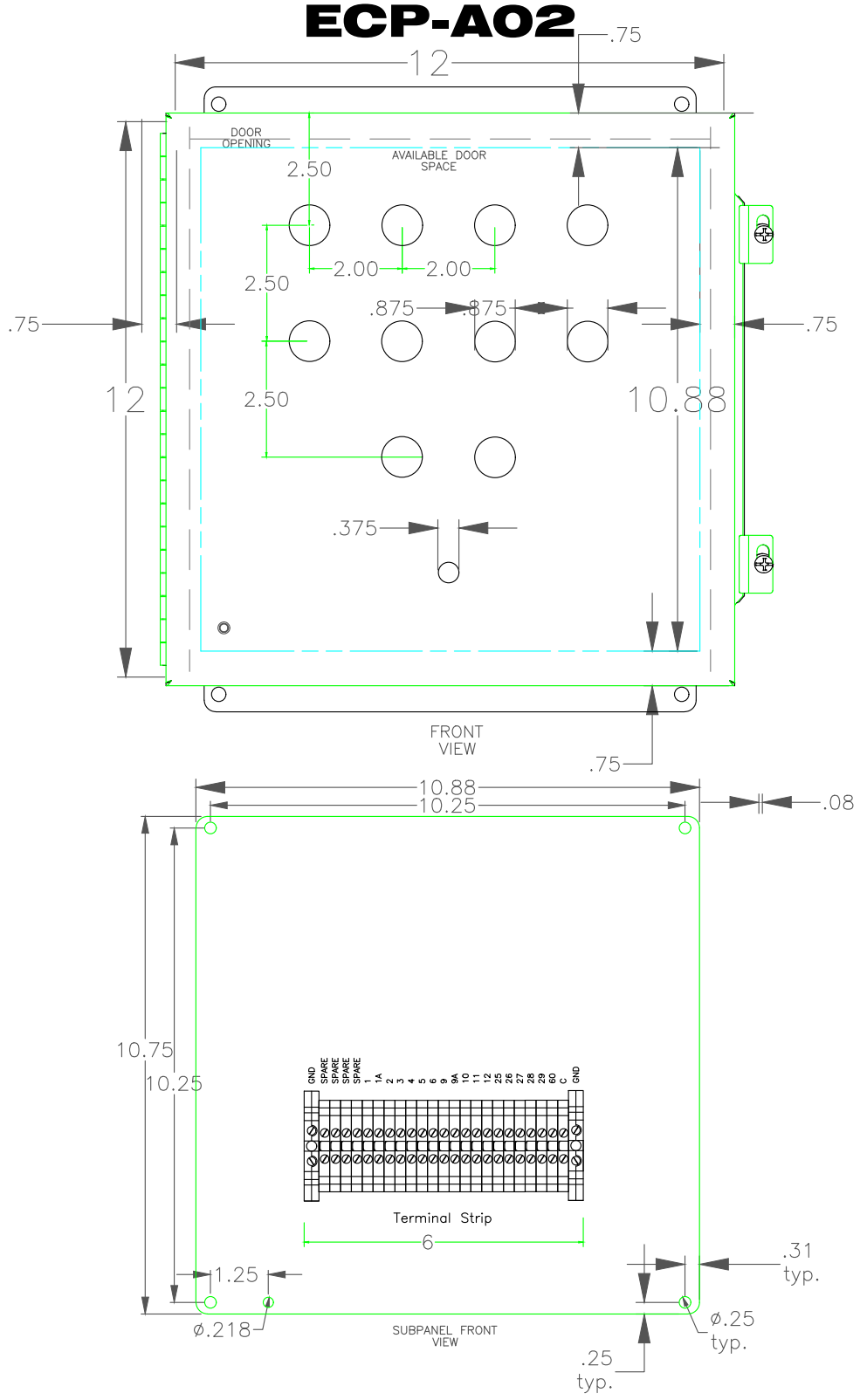
WARNING: DO NOT ATTACH WIRES TO THE WALL OF THE UNIT THE SURFACE MAY BE HOT.

WHEN CALLING FOR ASSISTANCE, PLEASE REFER TO THE MODEL & SERIAL NUMBER OF THE UNIT FOR QUICK RESPONSE.

Bessamaire HVEC

MODEL	JHIEF8–1.6D
CUSTOMER	
Subpanel Layout	SHEET 6 OF 7
REFERENCE NO.	DRAWING NO. 26–511xx–S6
JHIE Series	DRAWN RR 7/10/2026
SERIAL NO. 26–511xx–01	CHECKED RR 7/10/2026

ECP-A02



WIRE COLOR CODE
BLACK - HIGH VOLTAGE
RED - 120 VOLTS
BLUE - 24V DC/AC
GREEN - GROUND
WHITE - NEUTRAL
MAGENTA - FIELD WIRING
BROWN–SIGNAL

WARNING: DO NOT ATTACH WIRES TO THE WALL OF THE UNIT THE SURFACE MAY BE HOT.

WHEN CALLING FOR ASSISTANCE, PLEASE REFER TO THE MODEL & SERIAL NUMBER OF THE UNIT FOR QUICK RESPONSE.

Bessamaire HVEC

MODEL	JHIEF8–1.6D
CUSTOMER	
Remote Control Box Layout	SHEET 7 OF 7
REFERENCE NO.	DRAWING NO. 26–511XX–S7
JHIE Series	DRAWN RR 7/10/2026
SERIAL NO. 26–511XX–01	CHECKED RR 7/10/2026

Heresite P-413

Our 50 years of coating history speaks for itself.

In 1964, Heresite was the first company to apply coatings to aluminum-finned, copper-tubed heat exchangers. The Heresite coating became then, and still remains a standard in the industrial coatings industry. We provide the highest quality protective coatings for air conditioning and refrigeration systems that operate in moderate to severely corrosive environments, including both coastal and/or industrial applications. Our phenolic epoxy has an advantage of dense cross linking and can therefore be applied as a very thin film maintaining stable heat transfer.

We continue our focus on innovation and again have a new story to tell, as we introduce our updated P-413

- A high performance phenolic epoxy coating developed specifically for heat exchangers.
- The flexibility and corrosion resistance of Heresite P-413 appreciably increases the service life of your heat exchange equipment.
- It is specially suited for coating light gauge metals in equipment operating in severe corrosive environments.

P-413 Specifications

The coil will receive a uniform coating on all surfaces, including fin edges, with P-413, a thermoset, modified phenolic coating. Application of P-413 will be through multiple coats by immersion or flow coating to a film thickness of approximately 1.0 mil.

P-413 provides corrosion protection in a 6,000 hour salt spray test in accordance with ASTM B-117 and humidity resistance of >2,000 hours per ASTM D2247. Chemical resistance is demonstrated via 100+ acetone double-rubs per ASTM 5402. P-413 also exhibits superior hardness of 5–6H per ASTM D3363, adhesion of 5B per ASTM B3359 and impact resistance of 160 in/lbs (ASTM D2794). Color shall be brown with gloss of 20–60 — 60 degree. If the coils are to be subjected to direct ultraviolet (UV) exposure, a spray-applied UV-resistant topcoat is an option.

P-413 Typical Properties (@ 1 mil DFT)

Salt Spray: ASTM B-117: 6,000+ hours

SWAAT: ASTM G85-11 Section A.3: Passed 1,000 hours using pressurized coil (see page 2 for results)

Cyclic Weathering: ISO 20340 Offshore Standard: Passed (4,200 hours)

Performance Testing: ISO 12944-6 C5 I/M: Passed C5-M high durability and C5-I high durability

Heat Transfer Reduction: <1% as applied for heat transfer components

Humidity: ASTM D-2247: 2,000+ hours

Simulated Sea Water Resistance: 2,000 hours

Solvent Resistance: ASTM-D5402: 100 acetone double rubs

Cross-hatch Adhesion: ASTM D-3359: 5B

Mandrel: ASTM-D522: >1/4 inch

Impact: ASTM D-2794: 160 lb/inch steel; 40 lb/inch aluminum

pH Range (14 day liquid spot test): 2.4–12.6

Temperature Cycling (4 hours at –75°C; 4 hours at 190°C): 4B–5B adhesion after 5 cycles

Dry Heat Resistance (4 hours at 200°C; 20 minutes at 232°C): 4B–5B adhesion after 5 cycles

Dry Film Thickness: ~1 mils

Hardness: ASTM D3363: 5–6H

Gloss: 20–60 on 60 degree meter (topcoat dependent)

Microchannel Compatible

Abrasion Resistance: 30–40 mg loss per 1,000 cycles

Meets FDA 175.300 for indirect food contact

Meets MIL Spec: MIL-C-18467, MIL-E-480 and MIL-STD-883 Method 1101

Meets Other Specs: Honeywell MC 7200-01 and GE F50T17

Thermal Conductivity: At approximately 2 mils thickness, Thermal Conductivity is less than 1.0 w/mK

Dielectric Strength [ISO2376:2010(e)]: 286 volts per mil of thickness

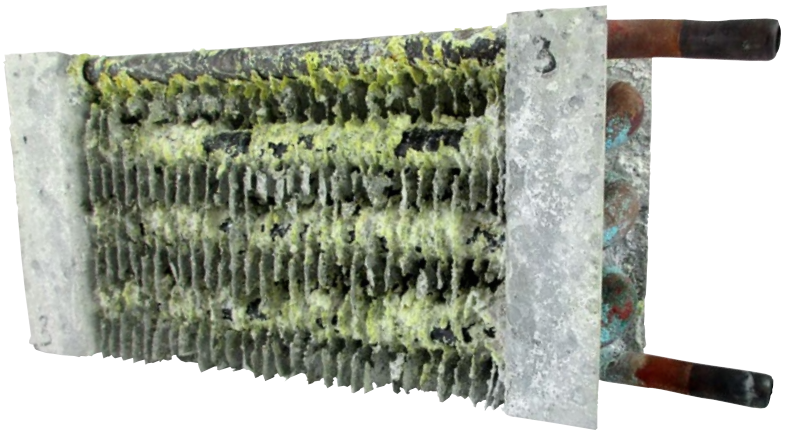
NSF Certified – ANSI 51 Certification of Coatings for Food Zone – Non Contact

Effective date: 10/09/17

Heresite Protective Coatings LLC • 822 S. 14th St • Manitowoc, WI 54220
800-558-7747 or 920-684-6646 • sales@heresite.com • www.heresite.com

HERESITE® PROTECTIVE COATINGS, LLC

SWAAT Results

	**Bare 1,000 hour SWAAT**
	**P-413 1,000 hour SWAAT**
	**P-413 + topcoat 1,000 hour SWAAT**

Effective date: 10/09/17

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Product Description
Baking cross-linked phenolic epoxy

Recommended Uses
Heresite P-413 is a high performance coating used principally for heat transfer components and parts — especially air conditioning and refrigeration systems that operate in moderate to severely corrosive environments, including both coastal and/or industrial applications. This phenolic epoxy has an advantage of dense cross linking and are therefore highly corrosion resistant even when applied as a very thin film.

Chemical Resistance
P-413 is chemically resistant to a wide range of acids, solvents, and inorganic salts. Please review chemical resistance guide for further information.

Packaging Information
P-413 is available in one gallon, five gallon and 54 gallon drum quantities.

Thinners and Cleanup
Recommended use of Heresite S-275.

Storage Conditions
Coating should not be stored longer than 6 months. Coating should be stored in a clean, dry environment at 50–75°F. Keep out of direct sunlight. Avoid excessive heat and keep from freezing.

Physical Properties
Solids by weight: Approximately 73%

Solids by volume: Approximately 57%

Pot life: NA

Mixing Ratio by Volume: NA 1 component

Shelf life: 6 months

Color: Brown

VOC Content
2.25 lbs/gal (270 g/L) as supplied

Film Thickness
For heat transfer, a 2 coat immersion process will typically yield a dry film thickness of 1.0–2.0 mils (25–50 microns).

For other parts, please contact Heresite.

Coverage
Theoretical coverage is 800 square feet per gallon per dry mil. Coverage rates are estimates and make no allowance for material loss. Actual rates will vary dependent on application method, surfaces, etc.

Surface Preparation
All surfaces must be clean, sound, and free of any oils, dirt, grease, wax and any other contamination that may interfere with coating adhesion.

In general, the surface should be cleaned by solvent or a cleaner at elevated temperature followed by a clean water rinse. Rinse water shall have a conductivity of lower than 500 microsiemens and a neutral pH (7.0–8.0). All surfaces must be dried prior to application of coating.

In cases where there is a large amount of contamination or heat treated steel, a commercial blast is acceptable in accordance with NACE #3 or SSPC-SP-6-63 specifications. Surface profile or anchor pattern shall be 20–25% of the recommended dry film thickness.

Thinning
Reduce P-413 with S-275 solvent to 13–13.5 seconds on ISO Dip 3 mm Cup. This requires approximately a 1:1 dilution by volume.

The amount of thinner required is dependent upon temperature, ventilation, humidity, application type and desired film thickness.

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HERESITE® PROTECTIVE COATINGS, LLC

Application

Application is specific to heat transfer components, for other parts — please contact Heresite.

Immersion Application:

1. Consult SDS prior to use.
2. Do not apply if temperature is less than 5°F above dew point, or if temperature is below 45°F.
3. Consult Heresite for tank and pump recommendations.
4. Ensure as the part is prepared for immersion, one will have a low point for drainage.
5. Immerse the cleaned part for 15 seconds in the reduced P-413.
6. Upon removal of the part from the coating, apply light air pressure (approximately 15 psi) using an Air Knife or similar device to spread the air flow. Using the compressed air, remove excess coating. Minimal brushing should be required.
7. Air dry a minimum of 15 minutes with ventilation prior to introducing heat.
8. Typically, a two coat immersion process is required to achieve 1.0 to 1.5 mil DFT. An intermediate bake is required between coats — see baking schedule.
9. It may be deemed desirable to apply a final aesthetic spray. This can be accomplished immediately after the final immersion is accomplished and prior to final bake.
10. During immersion application, the viscosity must be maintained and monitored. It is recommended that the viscosity be checked every hour to ensure compliance with the specification of 13–13.5 seconds. Additional solvent and coating can be added to adjust viscosity as needed.

Spray Application for Final Aesthetic Spray:

1. Consult SDS prior to use.
2. Do not apply if temperature is less than 5°F above dew point, or if temperature is below 45°F.
3. Use standard production type spray equipment (conventional, HVLP, airless, etc.). A few starting recommendations can be found below:

Guns	Fluid	Air
DeVilbiss JGA-510	E	46MP
Binks #2100	67-SS	46-21MD-2 or 3
Binks #95	66-SS	66-SD
Graco Air Pro HVLP		

4. Spray viscosity will be dependent on type of equipment being used. It has been seen that spraying at immersion viscosity is very effective.
5. Spray equipment: always flush spray equipment with solvent to clean prior to applying coating.
6. Air supply must be uncontaminated. Adjust air pressure to approximately 50 pounds at the gun and provide 15–20 pounds at pressure pot. Adjust spray gun by first opening liquid valve and then adjust air valve to give approximately an 8"–12" fan, holding gun perpendicular to the surface at a distance of 12".
7. Apply a mist bonding pass.
8. Allow to flash off for approximately a minute, but not long enough to allow film to completely dry.
9. Apply 3–4 crisscross multi-passes maintaining a wet appearing film.
10. Air dry a minimum of 15 minutes with ventilation prior to introducing heat.
11. Typically, a one coat process is required to achieve 0.5 to 1.0 mil DFT.

Effective date: 10/09/17

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HERESITE® PROTECTIVE COATINGS, LLC

Spray Application for Higher Film Build — 4–6 mil:

1. Consult SDS prior to use.
2. Do not apply if temperature is less than 5°F above dew point, or if temperature is below 45°F.
3. Use standard production type spray equipment (conventional, HVLP, airless, etc.). A few starting recommendations can be found below:

Guns	Fluid	Air
DeVilbiss JGA-510	E	46MP
Binks #2100	67-SS	46-21MD-2 or 3
Binks #95	66-SS	66-SD
Graco Air Pro HVLP		

4. Spray viscosity will be dependent on type of equipment being used. It has been seen that spraying at immersion viscosity is very effective (13.0–13.5 seconds ISO Dip 3 mm).
5. Spray equipment: always flush spray equipment with solvent to clean prior to applying coating.
6. Air supply must be uncontaminated. Adjust air pressure to approximately 50 pounds at the gun and provide 15–20 pounds at pressure pot. Adjust spray gun by first opening liquid valve and then adjust air valve to give approximately an 8"–12" fan, holding gun perpendicular to the surface at a distance of 12".
7. Apply a mist bonding pass.
8. Allow to flash off for approximately a minute, but not long enough to allow film to completely dry.
9. Apply 3–4 crisscross multi-passes maintaining a wet appearing film. Allow a minimum of 10 minutes to allow the slow solvents to evaporate. Then apply another 2–3 crisscross multi-passes.
10. Air dry a minimum of 15 minutes with ventilation prior to introducing heat.
11. Intermediate bake at 130°C (metal temperature) for a minimum of 10 minutes.
12. Repeat steps 7–10.
13. Final bake per the instructions within the bake schedule.
14. Typically, a two to three coat process is required to achieve 4.0 to 6.0 mil DFT.

Bake Schedule

Intermediate Bake:

1. 90°C (metal temperature) for a minimum of 10 minutes.
   a. To decrease the bake time, a maximum temperature of 130°C may be used.

Final Bake:

1. "Normal" Bake:
   a. 90°C (metal temperature) held for 10 minutes, then increased to 160°C. 160°C (metal temperature) held for 15 minutes, then increased to 190°C. 190°C (metal temperature) held for 45 minutes.
2. "Soft Solder" Bake:
   a. 90°C (metal temperature) held for 10 minutes, then increased to 160°C. 160°C (metal temperature) held for 130 minutes.

These instructions are not intended to show product recommendations for specific service. They are issued as an aid in determining correct surface preparation, mixing instructions and application. It is assumed that the proper product recommendations have been made. These instructions should be followed closely to obtain the maximum service from the materials.

CAUTION: CONTAINS FLAMMABLE SOLVENTS. KEEP AWAY FROM SPARKS AND OPEN FLAMES. IN CONFINED AREAS WORKERS MUST WEAR FRESH AIR LINE RESPIRATORS. PERSONS SHOULD WEAR GLOVES OR USE PROTECTIVE CREAM. ALL ELECTRICAL EQUIPMENT AND INSTALLATIONS SHOULD BE MADE AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE. IN AREAS WHERE EXPLOSION HAZARDS EXIST, WORKMERS SHOULD BE REQUIRED TO USE NONFERROUS TOOLS AND TO WEAR CONDUCTIVE AND NONSPARKING SHOES.

To the best of our knowledge the technical data contained herein are true and accurate at the date of issuance and are subject to change without prior notice. No guarantee of accuracy is given or implied. We guarantee our products to conform to strict quality control. We assume no responsibility for coverage, performance or injuries resulting from use. Liability, if any, is limited to replacement of products. Prices are subject to change without prior notice. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY THE SELLER, EXPRESS OR IMPLIES, STATUTORY, BY OPERATION OF LAW, OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Effective date: 10/09/17

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BASIC SEQUENCE OF OPERATIONS

1.1. TEMPERATURE CONTROL PANEL(S). TEMPERATURE CONTROL PANEL(S) (TCP) AND EQUIPMENT CONTROL PANELS (ECP) IDENTIFIED IN THE SEQUENCE OF OPERATION SHALL BE PROVIDED WITH THE INDICATING LIGHTS, RUNNING LIGHTS, ALARM LIGHTS, AUDIBLE ALARMS, TIMERS, AND SELECTOR SWITCHES FOR CONTROL AND STATUS INDICATION OF THE EQUIPMENT SERVED. WHERE NO CONTROL PANELS ARE PROVIDED FOR EQUIPENT, THE LIGHTS AND SWITCHES SHALL BE AT THE STARTER OR MCC. RUNNING LIGHTS SHALL BE PROVIDED TO INDICATE BOTH ENERGIZED AND DE-ENERGIZED CONDITIONS FOR THE EQUIPMENT AND SHALL POSITIVELY INDICATE EQUIPMENT CONDITIONS FROM THE MOTOR STARTER OR CURRENT SENSOR. SWITCH POSITION SHALL NOT BE USED FOR LIGHT ILLUMINATION. INDICATING AND RUNNING LIGHTS SHALL BE LOCATED DIRECTLY ABOVE EACH RESPECTIVE SELECTOR SWITCH WITH LIGHT COLORS AS FOLLOWS:

RED - ENERGIZED
GREEN - DE-ENERGIZED
AMBER - ALARM
WHITE – STATUS

INDICATING LIGHTS AND SELECTOR SWITCHES SHALL BE LOCATED ON THE FACE OF THE TEMPERATURE CONTROL PANEL SERVING RESPECTIVE EQUIPMENT. IN ADDITION TO THE LIGHTS, TIMERS, AND SELECTOR SWITCHES DESCRIBED IN THE SEQUENCE OF OPERATION FOR THE INDIVIDUAL EQUIPMENT, EACH CONTROL PANEL SHALL BE PROVIDED WITH THE FOLLOWING:

"CONTROL POWER ON" STATUS LIGHT
"INDICATING LIGHT TEST" PUSHBUTTON
"ALARM SILENCE" PUSHBUTTON
"ALARM RESET" PUSHBUTTON (WHERE APPLICABLE)
CONTROL PANELS SPECIFIED TO BE PROVIDED WITH ALARM CONDITION INDICATING LIGHTS SHALL BE PROVIDED WITH AN ELECTRICALLY ISOLATED CONTACT TO PROVIDE A COMMON ALARM TO THE PLANT CONTROL SYSTEM (PCS). EACH CONTROL PANEL SHALL BE PROVIDED WITH A MINIMUM OF ONE COMMON ALARM OUTPUT POINT TO THE PCS AND ADDITIONAL INDIVIDUAL ALARM POINTS AS INDICATED BELOW.
TEMPERATURE CONTROL PANELS SHALL COME WITH PHENOLIC NAMEPLATES FOR EACH CONTROL SWITCH INDICATING SWITCH TYPE, EQUIPMENT CONTROLLED, ROOM OR AREA SERVED, AND SWITCH AUTOMATIC POSITION EQUIPMENT

INTERLOCK

1.2. SYSTEM INTERLOCKS AND ALARMS
UNLESS OTHERWISE INDICATED, ALL EQUIPMENT INTERLOCKING DEVICES AS DESCRIBED HEREIN SHALL BE PROVIDED WITHIN THE RESPECTIVE TEMPERATURE/EQUIPMENT CONTROL PANEL (TCP/ECP).

1.2.1. SMOKE DETECTION SYSTEMS

1.2.1.2. SMOKE DETECTION (AREA SMOKE DETECTION). A SMOKE DETECTED SIGNAL SHALL BE SENT FROM THE FIRE ALARM PANEL TO THE RESPECTIVE TEMPERATURE/EQUIPMENT CONTROL PANEL IN THE EVENT SMOKE IS DETECTED BY THE BUILDING SMOKE DETECTION SYSTEM. THE EQUIPMENT BELOW AND ANY INTERLOCKED EQUIPMENT SHALL BE DEENERGIZED AND OUTSIDE AIR DAMPERS ASSOCIATED WITH THE DE-ENERGIZED EQUIPMENT SHALL CLOSE

1.2.2. LOW TEMPERATURE PROTECTION. LOW AIR TEMPERATURE THERMOSTATS/SENSORS SHALL BE LOCATED IN THE SYSTEMS INDICATED BELOW. UPON DETECTION OF LOW AIR TEMPERATURE, THE THERMOSTAT SHALL DE-ENERGIZE THE RESPECTIVE EQUIPMENT AND ALL INTERLOCKED EQUIPMENT, CONTROL DAMPER(S) OF THE RESPECTIVE EQUIPMENT AND INTERLOCKED EQUIPMENT SHALL RETURN TO THE NORMAL POSITION, AND A "LOW AIR TEMPERATURE" ALARM LIGHT ON THE FACE OF THE RESPECTIVE TEMPERATURE/EQUIPMENT CONTROL PANEL SHALL BE ILLUMINATED OR ALARM INDICATION SENT TO THE PLANT CONTROL SYSTEM. AN ADJUSTABLE 0 TO 5 MINUTE TIME DELAY RELAY SHALL BE PROVIDED TO ALLOW FOR STARTING OF THE EQUIPMENT UNDER COLD AMBIENT CONDITIONS. UPON LOW TEMPERATURE SHUTDOWN, THE EQUIPMENT SHALL REQUIRE A MANUAL RESTART.

1.2.4.1. VENTILATION SYSTEM FAILURE (AIRFLOW SWITCHES). VENTILATION SYSTEM FAILURE PRESSURE DIFFERENTIAL SWITCHES SHALL BE LOCATED IN THE SYSTEMS INDICATED BELOW. IN THE EVENT THAT AIRFLOW IS NOT ATTAINED OR LOST AS DETERMINED BY THE PRESSURE DIFFERENTIAL FLOW SWITCH, A "VENTILATION SYSTEM FAILURE" SIGNAL SHALL BE TRANSMITTED TO THE FIRE ALARM SIGNALING SYSTEM. WHERE A FIRE ALARM SIGNALING SYSTEM IS NOT PRESENT, THE "VENTILATION SYSTEM FAILURE" SIGNAL SHALL BE TRANSMITTED TO THE PLANT CONTROL SYSTEM (PCS). WHERE INDICATED ON THE DRAWINGS, A VISUAL ALARM SHALL BE ILLUMINATED AND AUDIBLE ALARM SHALL SOUND AT EACH ROOM ENTRANCE AND WITHIN THE ROOM. THE FIRE ALARM SIGNALING SYSTEMS HAVE A NORMALLY OPEN CONTACT FOR TRANSMITTING A SIGNAL TO THE RESPECTIVE TEMPERATURE/EQUIPMENT CONTROL PANEL ILLUMINATING AN ALARM INDICATING LIGHT FOR THE RESPECTIVE EQUIPMENT.

3.2. "ON-OFF-AUTO" EQUIPMENT CONTROL. EQUIPMENT INDICATED FOR "ON-OFF-AUTO" CONTROL SHALL EACH BE CONTROLLED BY AN INDIVIDUAL "ON-OFF-AUTO" FAN SELECTOR SWITCH. THE SWITCH LOCATION SHALL BE AS INDICATED BELOW. WHEN THE SWITCH IS PLACED IN THE "AUTO" POSITION, THE FAN SHALL BE INTERLOCKED AND CONTROLLED BY THE FAN INTERLOCK. WHEN THE SWITCH IS PLACED IN THE "ON" POSITION, THE FAN SHALL BE ENERGIZED. BEFORE A FAN CAN OPERATE, THE CONTROL DAMPER(S) SHALL BE PROVEN OPEN. WHERE THE FAN IS INTERLOCKED WITH ANOTHER FAN OR EQUIPMENT WITH A FAN, THE FANS SHALL BE ENERGIZED SIMULTANEOUSLY AFTER ALL ASSOCIATED CONTROL DAMPERS ARE PROVEN OPEN. WHEN THE FAN IS DE-ENERGIZED, THE CONTROL DAMPER(S) SHALL RETURN TO THE NORMALLY CLOSED POSITION UNLESS OTHERWISE INDICATED.

4.1. MAKEUP AIR UNITS (100% OUTSIDE AIR). MAKEUP AIR UNITS SHALL EACH BE CONTROLLED BY AN INDIVIDUAL "SUMMER-OFF-WINTER" SYSTEM SELECTOR SWITCH. THE SWITCH LOCATION SHALL BE AS INDICATED BELOW. WHEN THE SWITCH IS PLACED IN THE "WINTER" POSITION, THE FAN SHALL OPERATE AND THE SUPPLY AIR SENSOR/THERMOSTAT SHALL MODULATE THE HEATING OUTPUT OF THE UNIT TO MAINTAIN THE DESIRED SUPPLY AIR TEMPERATURE. BEFORE THE FAN CAN OPERATE, THE CONTROL DAMPERS SHALL BE PROVEN OPEN. WHEN THE OUTSIDE AIR TEMPERATURE IS GREATER THAN THE HEATING CHANGEOVER TEMPERATURE SETPOINT AS DETECTED BY THE OUTDOOR AIR SENSOR/THERMOSTAT, THE HEATING SHALL BE LOCKED OUT. WHEN THE SWITCH IS PLACED IN THE "SUMMER" POSITION, THE FAN SHALL OPERATE AND THE HEATING SHALL BE LOCKED OUT. WHEN THE UNIT IS DE-ENERGIZED, THE CONTROL DAMPER(S) SHALL CLOSE.

Design Package Approval Form

By signing this Design Package Approval Form, you approve the design specifications and drawings (the "Design Package") as dated for Bessamaire unit(s)

This Approval Form must be signed and returned to Bessamaire, along with all down payment obligations, before the final engineering processes and production begins.

If you cannot approve this Design Package, please identify any necessary revisions below and we will submit a revised Design Package that incorporates those changes.

If there are any Design Package changes after you have signed and returned this Design Package Approval Form to Bessamaire, Bessamaire will notify you immediately.

There will be a 12-week delivery period from the date Bessamaire receives this Design Package Approval Form and you have submitted all down payment obligations.

Bessamaire's Standard Terms and Conditions are specifically incorporated herein and accepted by you pursuant to this Design Package Approval Form.

X_____

Approved signature

Submittal

JOB NAME	Bentonville WRRF Improvements
PRODUCT	Air Handling Unit - MAU-A03
MANUFACTURER	Bessamaire
LOCATION	Bentonville, AR
DATE	~~July 22, 2026~~ **AUGUST 12, 2026**
CONTRACTOR	Crossland Heavy Contractors
SUBMITTED BY	Clayton Murphy

SUBMITTAL PACKAGE

FOR

BENTONVILLE WATER RESOURCES

15500-04-C Makeup Air Units

UNIT PERFORMANCE SPECIFICATIONS:

MODEL NUMBER: JHIEF8-10D
UNIT MAU-A03

UNIT DESCRIPTION: Electric Heating and Ventilating Unit; 9,200 Total CFM; 460/3/60 voltage; Outdoor horizontal configuration Down Discharge; 18 ga. G-90 Galvanized steel construction; 11 Ga G-90 Galvanized Steel base, MERV 8 V Bank Filter Section FPM 350. Double Wall Insulated Heating and Blower Sections. Controls are Relay Logic. Interior Walls, Damper, Blower and Blower Motor P-413 Heresite coated. Exterior walls painted with Polyurethane.

PERFORMANCE DATA INFORMATION:
Volume: MAX 9,200 CFM AND MINIMUM 3,380 CFM [TO BE PROGRAMED WITH VFD]
RPM: 585
TS: 7109
Total Max. External Static Pressure: 1.00" w.g.
Total Static Pressure: 3" w.g.

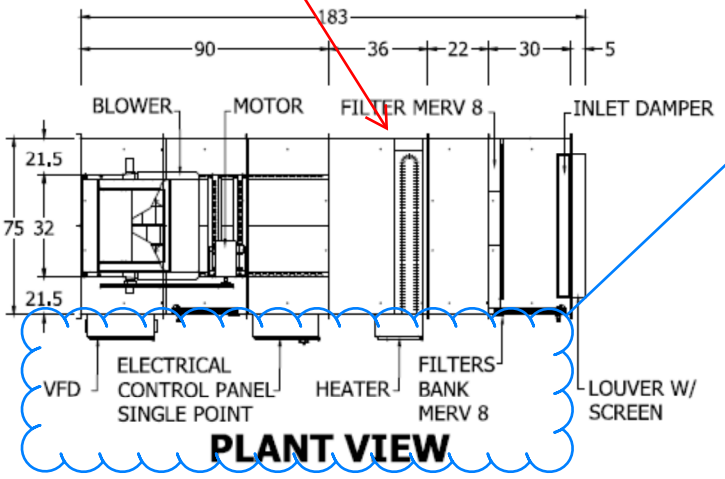
TEFC WEG Motor, 7.5HP - per spec section 15050-2-12-a.
FLA: 9.0
MCA/MOP:11.25/15.75

Spec section 15500-2.04.4 -Powers of Arkansas is the local service center and stocking parts department spec section 15500-1.03.b.3 including 24hr service [phone 877-274-7127]

heater upstream of the fan as indicated by the section order in 15500-2.04.A.6.a

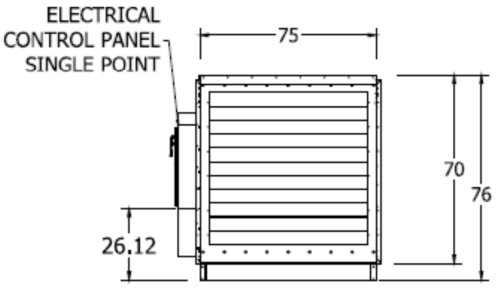
AUGUST 12, 2026

BESSAMAIRE ELECTRICAL HEATING SERIES
SINGLE INLET,DOWN DISCHARGE, 9,200CFM



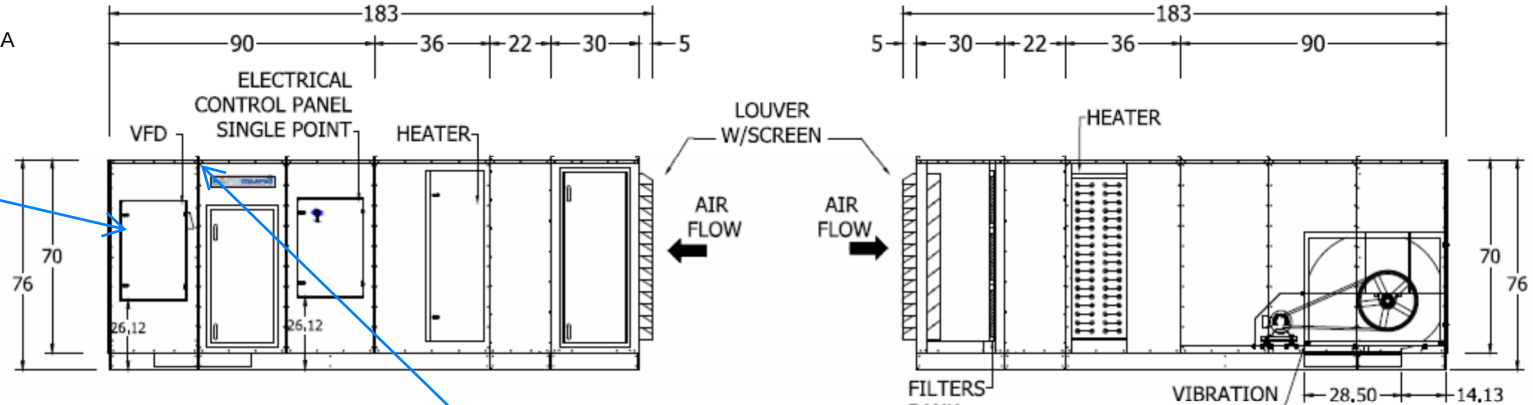
PLANT VIEW

Access Side Service clearance 36"



FRONT VIEW

VFD CABINET IS SEALED FROM THE PROCESS AIR STREAM; VENTILATIED FROM FRESH OSA



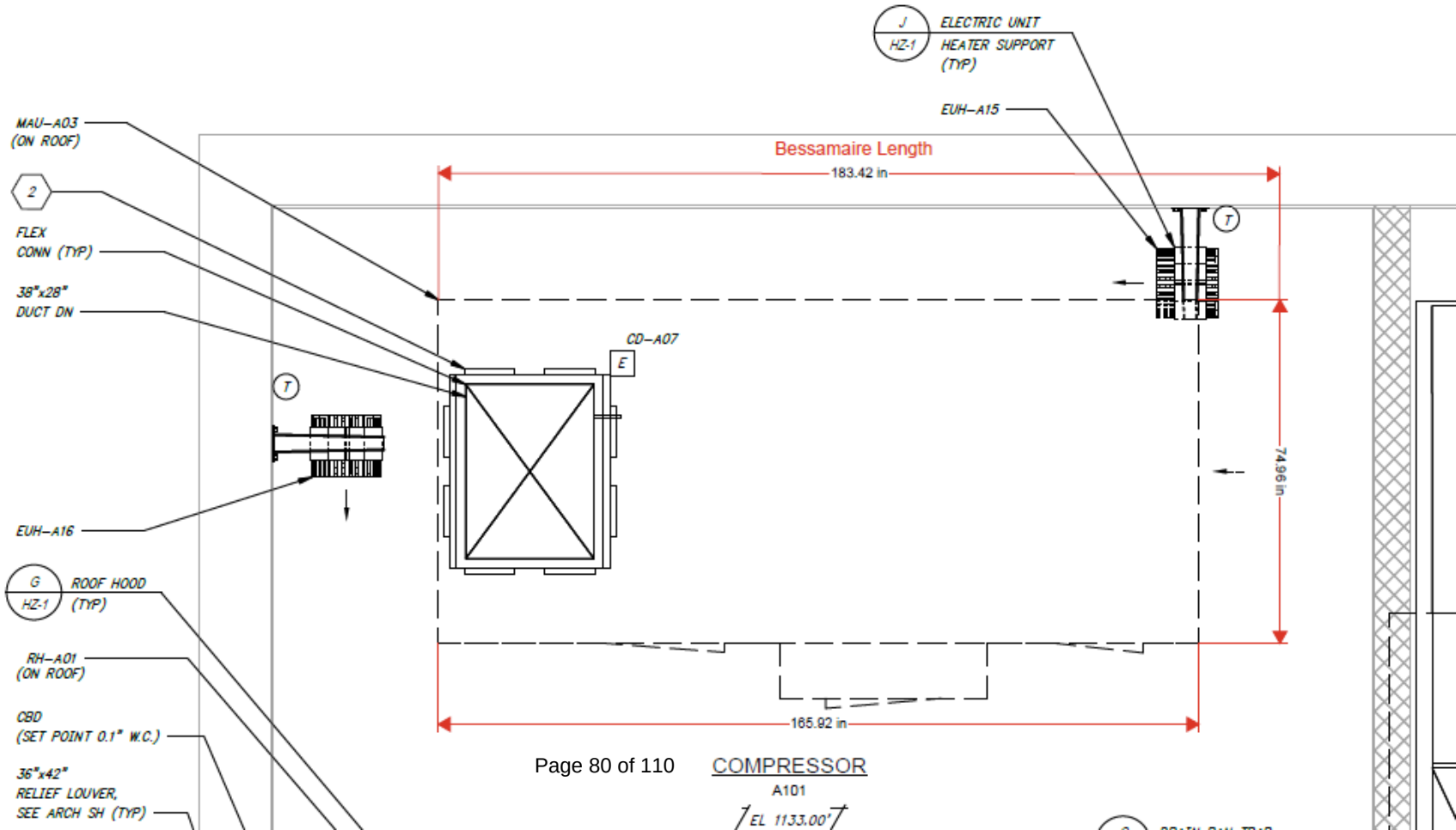
LEFT VIEW

RIGHT VIEW

UNIT	WEIGHT	TOTAL S.P.	HP	OUTLET	PLEATED FILTER	QTY
JHIEF8-9,2D	3,850 LBS	2.75	7.5	28.5" X 28.5"	24"W x 20"H x 2"D	9

*SUBJECT TO CHANGE WITHOUT NOTICE
*UNIT SHIPPED IN (1) SECTIONS

SERVICE ACCESS: blower & heater service access for future change out VIA ROOF PANEL REMOVAL [roof panels are manufactured for removal]


J
HZ-1
ELECTRIC UNIT HEATER SUPPORT (TYP)
EUH–A15
MAU–A03 (ON ROOF)
2
FLEX CONN (TYP)
38"x28" DUCT DN
Bessamaire Length
183.42 in
T
CD–A07
E
T
74.96 in
EUH–A16
G
HZ-1
ROOF HOOD (TYP)
RH–A01 (ON ROOF)
CBD (SET POINT 0.1" W.C.)
36"x42" RELIEF LOUVER, SEE ARCH SH (TYP)
165.92 in
COMPRESSOR
A101
EL 1133.00'

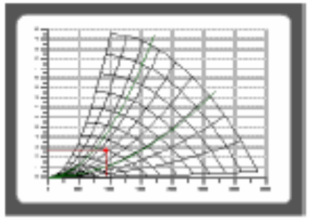
BLOWER / FAN SECTION: DOWN FLOW Doubled Walled

Motor Description: 7.5 HP WEG TEFC Premium Efficient electric motor Spark resistant; 460 volts; 60 hertz;. Blower Description: Comefri ATZAF 22-22 T2 Direct Drive plenum, statically and dynamically balanced to grade Q=6,3 (Motor and blower will be mounted on 1" spring isolators reduce db to below 85 and blower outlet will be fitted with a flexible duct connector. Heresite Coated

Access Door Description: Flush Style made from G-90 Galvanized Steel construction, 2" thick polyurethane foam insulated, equipped with Allegis Style Stainless Hinges and Roll-Cam Locking and Non-Locking Handles, R6.5 per inch thickness santoprene gasket.

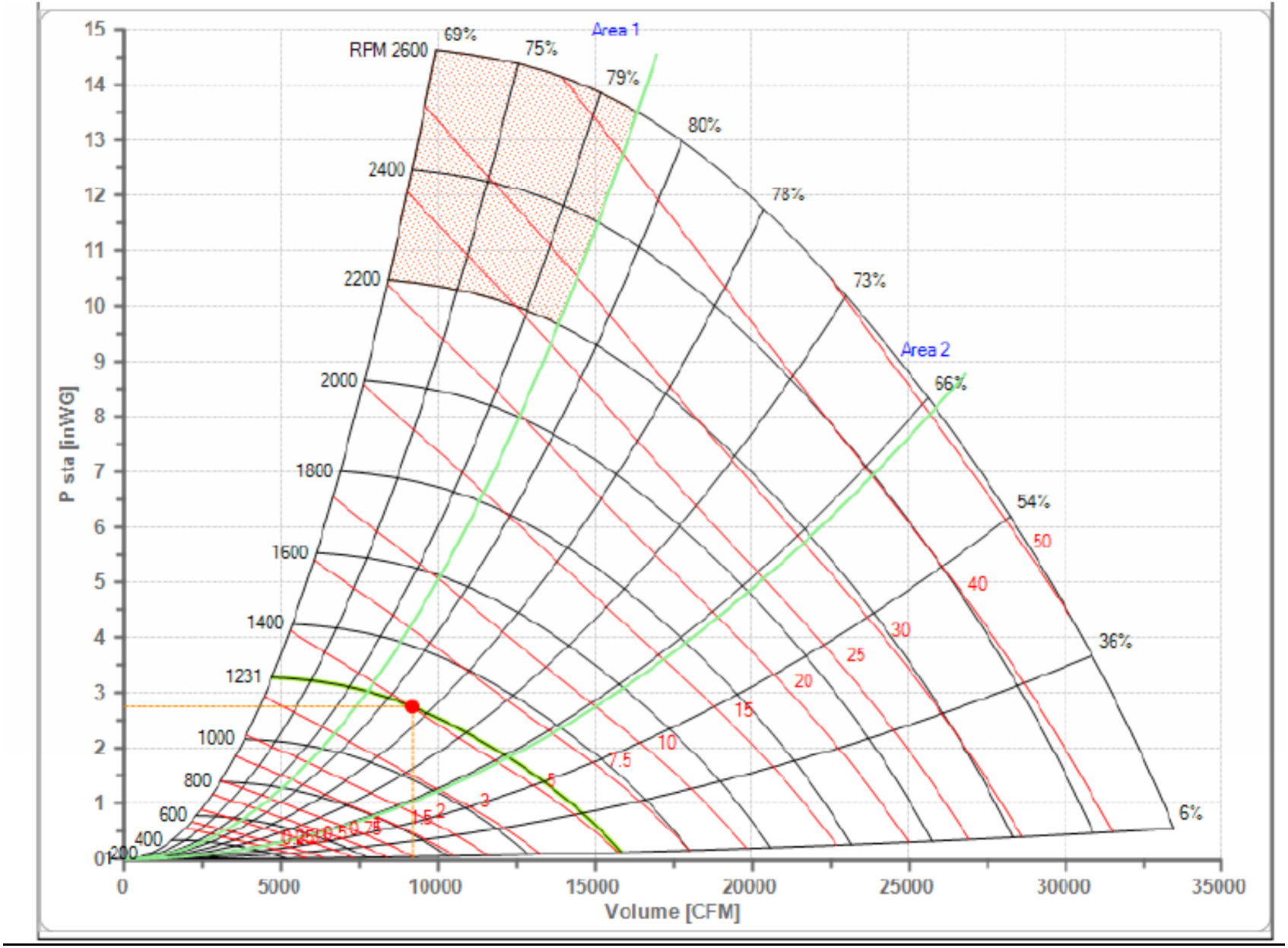
Input data					
Volume	9200 CFM	**Temperature**	68.0 °F	**Density**	0.075 lb/cu.ft
Static Pressure	2.75 In.W.G.	**Altitude**	0 ft	**Free Inlet - Ducted Outlet**	

	Catalogue data		
Selected Fan **ATZAF 22-22 FF T2**	n Max 1/min	Pw Max BHP	J lb ft²
	2500	50.00	49.50



Fan Information											
c ft/min	p tot In.W.G.	p sta In.W.G.	p dyn In.W.G.	tip speed ft/min	RPM 1/min	eta Tot %	eta Sta %	P fan BHP	Min Mot. BHP	P mot BHP	Shaft diameter in
1673	2.92	2.75	0.17	7109	1231	80.54	75.73	5.25	6.04	7.50	0.00

fm[Hz]		63	125	250	500	1000	2000	4000	8000	Tot.
Lw4 Total Sound Power Level inside the outlet duct - Lwo Outlet Duct Sound Power Level includes the effect of duct end correction										
Level Lw4	**dB/dB(A)**	86 / 60	83 / 67	84 / 75	81 / 78	77 / 77	69 / 70	64 / 65	58 / 57	**90 / 81**
Lw6d Total Sound Power Level outside the termination of the outlet duct - Lwmo Outlet Sound Power Level (free outlet) do not includes the effect of duct end correction										
Level Lw6d	**dB/dB(A)**	79 / 53	80 / 64	83 / 74	81 / 78	77 / 77	69 / 70	64 / 65	58 / 57	**87 / 81**


RPM 2600
2400
2200
2000
1800
1600
1400
1231
1000
800
600
400
200
69%
75%
79%
80%
78%
73%
66%
54%
36%
6%
Area 1
Area 2
50
40
30
25
20
15
10
7.5
5
3
2
1.5
P sta [inWG]
Volume [CFM]
0
5000
10000
15000
20000
25000
30000
35000

ELECTRIC HEATING SECTION: Doubled Walled

Air Flow MAX 9,200 CFM & MIN 3,380 CFM
Air Velocity 490-FPM
KW 155 480-3
AMPS 184.4
Stages 5
Controls 24 V Mod

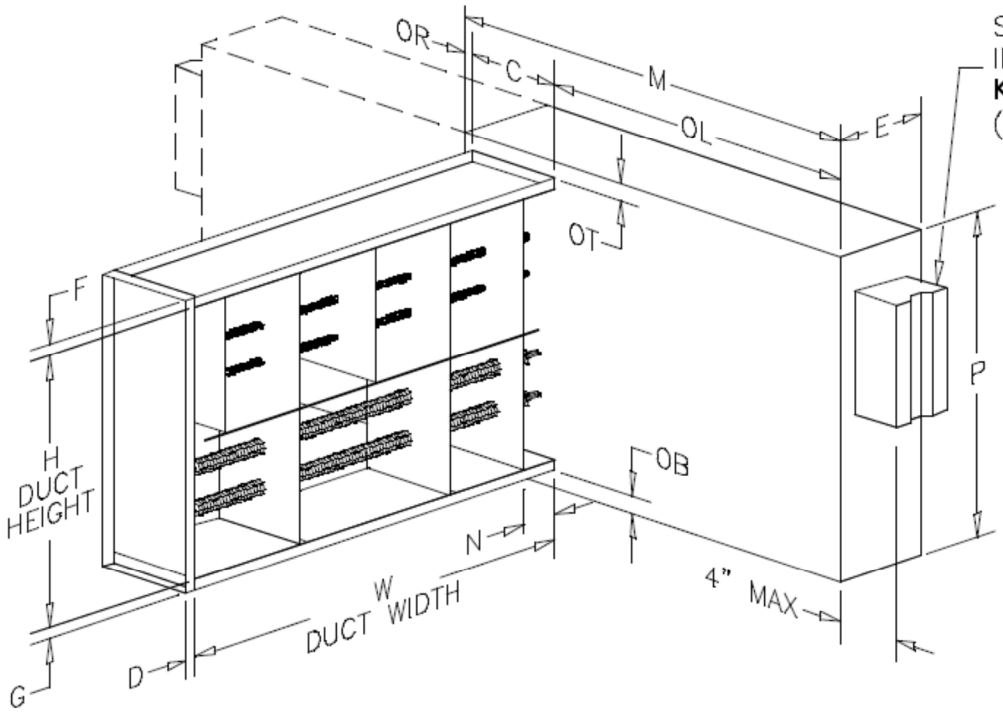
Fabrication Include materials of construction for the electric heating elements, confirm corrosion resistant finned tubular type per spec 15500 2.04.A.10

Special Features
B2 Terminal Box Insulated, B9 Enclosure Stainless Steel NEMA 4X, C4 C8 Contactor- Magnetic De-energizing, E36 SCR input-Pulse Thermostat Controlling Master SCR, H3 Stainless Steel Elements 304 SS, L6 Terminal Box Overhang, Q Disconnect Switch Power, Q3 Airflow switch Positive, T2 Control Circuit Transformer, U4 Airflow Direction, Z Automatic Thermal Cutout

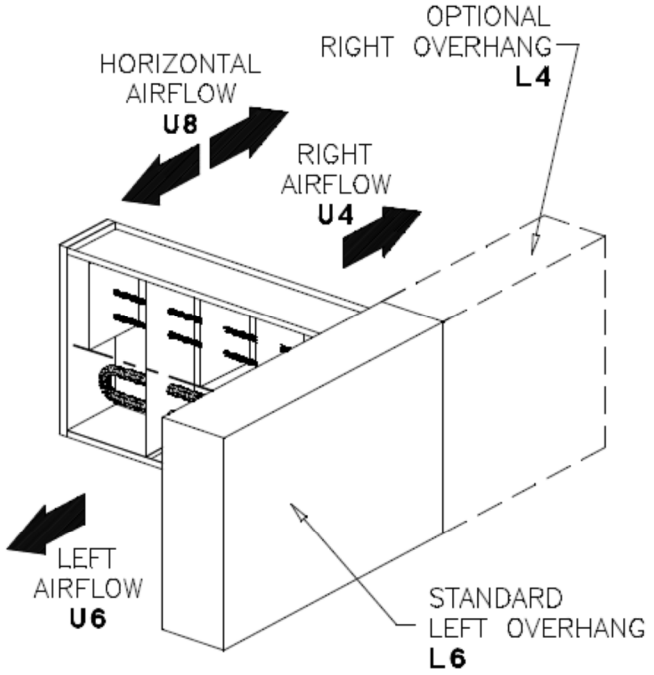
ITEM NO	TAG NO	QTY	HEATER TYPE	KW	INSIDE DUCT DIMENSIONS IN INCHES		SUPPLY LINE VOLTS/ PHASE	STGS	CTRL VOLTS	REFER TO ATTACHED SHEET FOR EXPLANATION				
					WIDTH	HEIGHT				CTRL OPTION	SPECIAL FEATURE CODE	AIR FLOW	OVER HANG	FIG NO
1		1	TFZ	155.00	50.00	44.00	480/3	1	24	K	B2,B9,C,C4,C8,E33,E22,F,H3 ,L6,M3,Q,Q3,S21,T2,U4,Z,Z2 Pool Construction	U4	L6	4
	TOTAL	1												

ITEM NO	DIMENSIONS IN INCHES REFER TO INDICATED FIG. ON ATTACHED DRAWING													MIN VEL AIR FPM	WIRING DIAGRAM		MINIMUM INCOMING WIRE		AMPS
	W	H	C	M	OL	OR	P	D	E	F	G	N	FIG NO		NUMBER	CHECK BLOCKS	GA	QTY	
1	50.00	44.00	8.00	30.00	22.00	0.00	48.00	1.50	6.00	1.50	1.50		4	521	931-4-1122-503	09, 11, 20, 21, 90	250	1	186.44

FIGURE 4



SCR POWER CONTROLLER
INCLUDED WITH OPTION
K CONTROLS
(MAY BE ON BOTH SIDES)



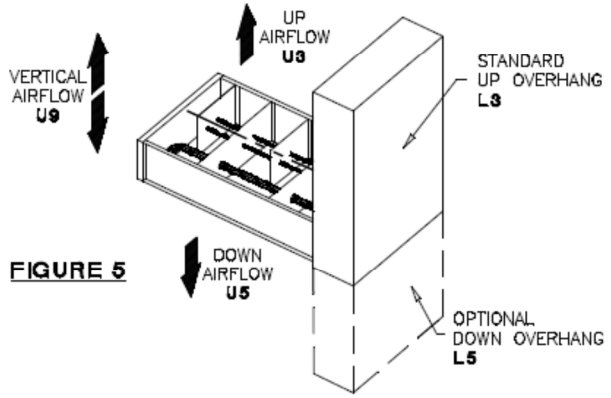


FIGURE 5

ALTERNATE VERTICAL DUCT CONFIGURATION
MUST BE ORDERED WITH CORRECT CONFIGURATION.
HEATERS CANNOT BE FLIPPED/ROTATED IN FIELD.

NOTES:
- HORIZONTAL DUCT INSTALLATION ONLY. CONSULT FACTORY FOR VERTICAL DUCT INSTALLATION.
- EXACT AIRFLOW DIRECTION MUST BE USED FOR FINNED TUBULAR HEATERS (RIGHT OR LEFT).

TITLE:	
FLANGED HEATER for **HORIZONTAL AIRFLOW**	**FIGURE 4**

ELECTRIC FINNED TUBULAR DUCT HEATERS

HEATER TYPE

This print covers the following heater types:
TFXU/TFXC Finned Tubular, Custom Slip-In
TFZU/TFZC Finned Tubular, Custom, Flanged
831U/831C Remote Panel

Duct heaters utilize the finest construction principles and techniques. A coil of 80% nickel, 20% chromium resistance wire is precisely centered in a .475\" diameter stainless steel sheath. Magnesium oxide powder, compacted to rock-like density, insulates the coil electrically from the sheath. A 1-1/4\" O.D. spiral wound stainless steel fin makes a minimum of five passes per linear around the outside of the tubular element. The elements are furnished with mounting flanges, making them individually removable from the terminal box. The heater frame is constructed of heavy gauge corrosion resistant steel and is provided with generous flanges for structural rigidity. All heaters are suitable for installation in ducts with up to one inch of interior lining.

All heaters include thermal cutouts (not heat limiters or fusible links) in accordance with requirements of UL and CSA. All controls are factory-wired to clearly marked terminal blocks for field connections. Properly sized knockouts are provided. All heaters are supplied complete with wiring diagrams and installation instructions, and all are given a dielectric test at a minimum of 1200 volts before shipment.

AG Y APPROVALS AND NATIONAL ELECTRICAL CODE
Duc aters and panels with a “U” in the type designation are Listed by UL under Files E23192 and E53412 and thos th a “C” are Certified under CSA master contract 151727. As such, they are suitable for installation with zero arance to combustible surfaces and for use with heat pumps and central air conditioners. They are also sup with all necessary provisions for installation in full accordance with the National Electric Code (NEC) and Car n Electrical Code (CEC).

INSTALLATION
Slip-in duct heaters are installed by inserting through a rectangular opening cut in the side of the ductwork and are secured to the duct with sheet metal screws. To install flanged duct heaters, flanges must be provided on the duct to match the heater flanges, both on the entering and leaving air sides. The heater is secured to the ductwork by sheet metal screws or bolts through the mating flanges.

When the duct heater is being used in conjunction with an air conditioning or heat pump unit, it must be installed at least 48” from the unit. Sufficient working clearances must be provided on the terminal box side of the heater as detailed in the NEC and/or CEC. Care should be taken to follow all instructions found in the Installation, Operating and Maintenance Instructions sheet supplied with each heater.

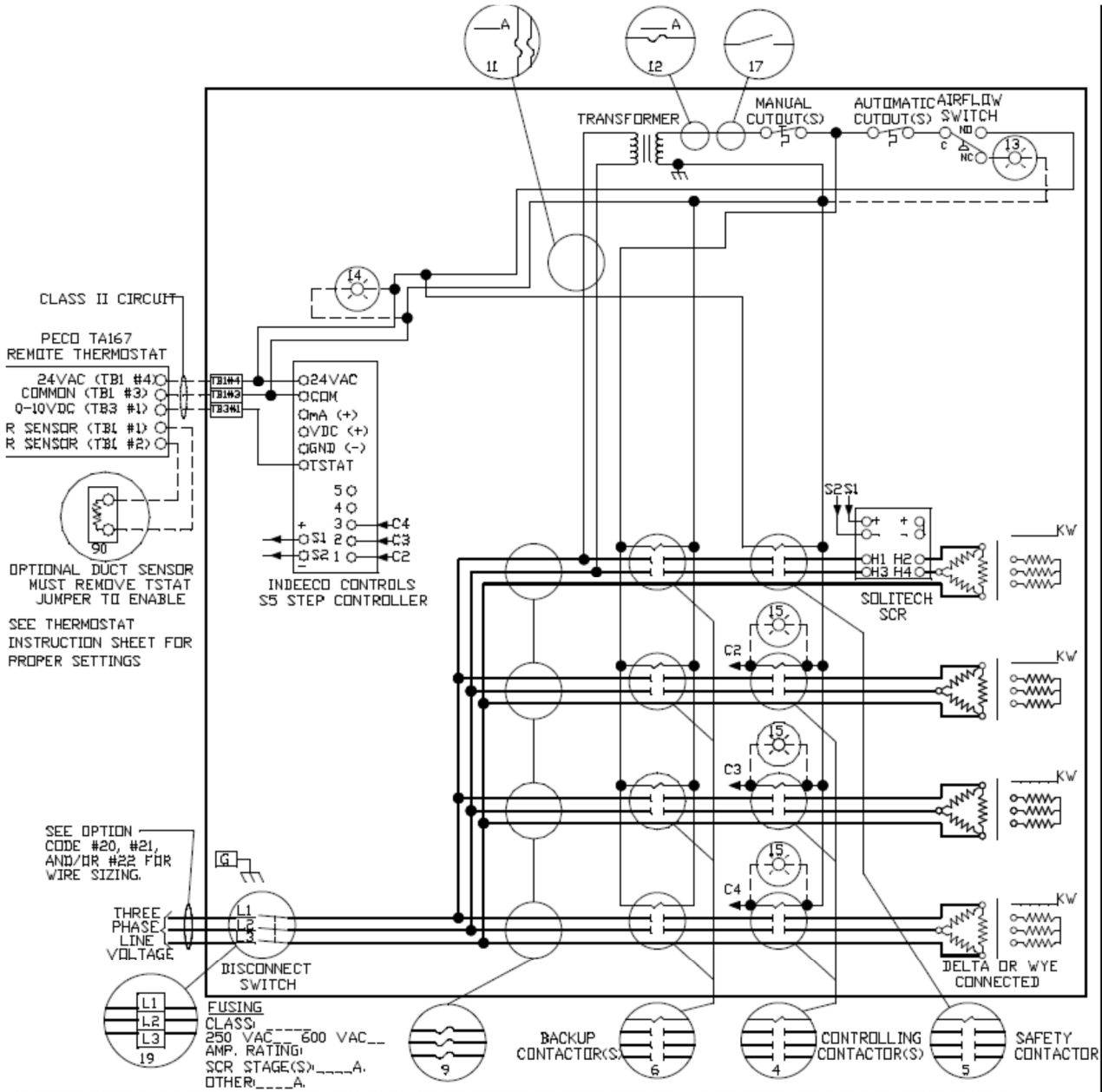
CONTROL OPTIONS
G = Basic
J = Pneumatic
K = Proportional

SPECIAL FEATURES
Heaters are available with a wide variety of special features and constructions. Your quotation or certified print includes a column for special feature codes. The codes in this column, as defined by the table below, describes details of both the standard control options, as well as any special features on the heater in question.";

SPECIAL FEATURE CODE DEFINITIONS

A60, A62	PE Switch-Close on Rise
B	Terminal Box-Bottom
B1	Terminal Box-Side Cover
B2	Terminal Box-Insulated
B3	Enclosure-Weatherproof NEMA 4 Type
B4	Enclosure-Dust-Tight-NEMA 12 Type
B5	Panelboard-Required for Heater Control
B7	Enclosure-Dustproof
B8	Enclosure-Outdoor-3R Type
B9	Enclosure-Stainless Steel Weatherproof Nema 4X Type
C, C4, C8	Contactor-Magnetic De-energizing
C1, C5, C9	Contactor-Magnetic Disconnecting
C2, C6, C10	Contactor-Mercury De-energizing
C3, C7, C11	Contactor-Mercury Disconnecting
D3	Derated Coils-25 Watts per Square Inch
D4	Derated Coils-35 Watts per Square Inch
E20 to E23	SCR Controller
E30	SCR input-2200 Ohms
E31	SCR input-135 Ohms
E32	SCR input-with transducer
E33	SCR input-slave for vernier
E34	SCR input-4-20mA
E35	SCR input-0-10VDC
E36	SCR input-0-10VDC Thermostat Controlling Master SCR
E37	SCR input-Pulse Thermostat Controlling Slave SCR
F	Fuses-Minimum NEC
F1	Fuses-Per Circuit
F3	Circuit Breaker-Minimum NEC
F5	Circuit Breaker-Per Circuit
F6	Time Delay Fusing
G1	Slip-and-Drive Connection
G2	Extended Cold Section
G3	Recessed Terminal Box
GG2	Insulated Duct Construction (extended cold section)
GG3	Insulated Duct Construction (recessed terminal box)
H1	Aluminized Steel Frame & Terminal Box
H2	Stainless Steel Frame & Terminal Box
H3	Stainless Steel Elements (304 Series)
H6	Stainless Steel Elements (316 Series)
L3 to L6	Terminal Box Overhang (See Figs. 10 & 11)
L7	No Overhang, C=M (See Fig. 7)
M to M7	Manual Thermal Cutout
M8	Remote Manual Reset Rod
N(000)	Fan Relay (000 is control voltage)
P1	Pilot Light Each Stage On
P2	Pilot Light Insufficient Air
P3	Pilot Light Heater On
P4	Pilot Light-Overtemperature
Q, Q1	Disconnect Switch-Power
Q2	Pilot Switch-Control Circuit
Q3, Q4	Airflow Switch Positive
Q5, Q6	Airflow Switch Negative
Q8	Disconnect Switch-Control Circuit
Q10	Disc. Switch-Control Circuit Fan Relay
R1	Dry Contact for Remote Heater Enable
S5	2200 Ohm input-Deadband
S16	135 Ohm input-Proportional
S18	4-20mA input-Proportional
S19	with Transducer-Proportional
S20	0-10VDC input-Proportional
S21	Step Controller-0-10VDC Thermostat
T1, T5	Control Circuit Transformer, Fused Primary
T2 to T4	Control Circuit Transformer
U3 to U9	Airflow Direction (See Figs. 10 & 11)
V	Protective Screens-Both Sides
V1	Pressure Plate-Inlet Side
V2	Protective Screens-One Side
Z to Z5	Automatic Thermal Cutout

INDEECO,425 Hanley Industrial Court, St. Louis, MO, 63144
Phone (314) 644-4300, Fax (314) 644-5332,INDEECO.com, email ESales@indeeco.com



ITEMS WITHIN A CIRCLE MAY VARY OR MAY NOT BE SUPPLIED. SEE THE OPTION KEY BELOW WHICH INDICATES BY CHECK MARKS WHICH NUMBERED CIRCLES APPLY.

OPTION KEY -
CHECK MARKS INDICATE WHICH CIRCLES APPLY

	01	CONTROLLING CONTACTOR(S) - 2 POLE
	02	SAFETY CONTACTOR(S) - 2 POLE
	03	BACK-UP CONTACTOR(S) - 2 POLE
	04	CONTROLLING CONTACTOR(S) - 3 POLE
	05	SAFETY CONTACTOR(S) - 3 POLE
	06	BACK-UP CONTACTOR(S) - 3 POLE
	07	SINGLE PHASE LINE FUSING (L1 ONLY)
	08	SINGLE PHASE LINE FUSING (L1 & L2)
	09	THREE PHASE LINE FUSING
	10	PRIMARY TRANSFORMER FUSING - 1 LINE
	11	PRIMARY TRANSFORMER FUSING - 2 LINE
	12	SECONDARY TRANSFORMER FUSING
	13	PILOT LIGHT - LOW AIRFLOW
	14	PILOT LIGHT - HEATER ON
	15	PILOT LIGHT - STAGE(S) ON
	16	PILOT LIGHT - FAN ON
	17	PILOT SWITCH
	18	CONTROL CIRCUIT DISCONNECT SWITCH
	19	NO DISCONNECT SWITCH
	20	IF CHECKED, HEATER MAY BE WIRED WITH_____ AWG MIN. SUPPLY WIRE PER 424.22(a)NEC. IF THE HEATER IS CONTROLLED IN ONE OF THE FOLLOWING 3 WAYS (1)TWO OR MORE THERMOSTAT(S) (2)THERMOSTAT WITH 2 OR MORE STAGES (3)PROPORTIONING TYPE THERMOSTAT(S)
	21	USE _____ AWG MIN. SUPPLY WIRE. _____ WIRE(S) PER PHASE.
	22	UTILISER UN CABLE D'ALIMENTATION D'AU MOINS _____AUG. _____CONDUCTEUR(S) PAR PHASE.
	23	CLASS 1 CIRCUIT
	24	CLASS 2 CIRCUIT
	25	NO MANUALLY RESETTABLE LIMIT CONTROL(S)
	26	INCOMING WIRE TO BE RATED 90 DEG. C. MIN.

LEGEND:
- ——— POWER WIRING
- ——— CONTROL WIRING
- - - - - - - WIRING SUPPLIED ONLY WHEN ASSOCIATED OPTION IS SUPPLIED

REV	DESCRIPTION	DATE	APPROVED
	REVISIONS		

DWG NO.
931-4-1122-503-A-0

USE COPPER SUPPLY WIRE SUITABLE FOR 75°C. (90°C IN CANADA OR OPTION CODE 26 IS SELECTED). WIRE EXTERNAL CONTROL CIRCUIT PER CLASS 1, ARTICLE 725 OF NEC, AND/OR CLASS 1, SECTION 16 OF CEC, EXCEPT THE CLASS 2 CIRCUIT(S) SHOWN ABOVE.
UTILISEZ DU CONDUIT CAPABLE DE SUPPORTER 75°C. (90°C AU CANADA OU LE CODE D'OPTION 26 EST SÉLECTIONNÉ). CONNECTEZ LE CIRCUIT DE CONTROL EXTERNE EN SUIVANT CLASSE 1, ARTICLE 725 DE LA NEC, OU/ET CLASSE 1, SECTION 16 DE LA CEC SAUF LE(S) CIRCUIT(S) DE CLASSE 2 DEJA MENTIONNÉ(S) AU DESSUS

OUTDOOR RAIN LOUVER MODULE:

Outdoor Rain Louver Configuration designed to prohibit the collection of water and snow with inlet Louver.
Rain Lover is designed to function in a way to drain all water and block rain from entering the filter.
Prefilter: Louver and 1" Aluminum Media W/ 304 stainless steel bird-screen.

FILTER MODULE: 350 FPM Air Velocity

V Bank Panel Style Filter housing designed to accommodate 2" thick filters. Filters are approximately 35% efficient @ 1 micrometer. Filters carry an ASHRAE 52.2 MERV 8 Rating.

Access Door Description: Flush Style made from G-90 Galvanized Steel construction; 2" thick polyurethane foam insulated; equipped with Allegis Surface Style Hinges and Roll-Cam Locking and Non-Locking Handles; R6.5 per inch thickness santoprene gasket.

ECP ELECTRICAL CONTROL PANEL SINGLE POINT

Electrical Control Enclosure contains the following: (Unit Mounted, Conformal coating Factory Installed)

- **3 Phase 60 Hz Main Disconnect with Fuses**
- **460V /120VAC control Transformer**
- **460V /24VAC control Transformer**
- **IEC Motor Circuit Protector for Blower Motor**
- **8-12 Pin Relays and Sockets**
- **GFCI Electrical Outlet**
- **Exhaust Fan Interlock (1 Interlock Provided, N.O. Contact)**
- **Smoke/Fire Emergency Shutoff Alarm (One N.C. Contact)**
- **NEMA 4X Electrical Enclosure**
- **Ventilated NEMA 4X Enclosure for VFD**

ECP-A03 - Remote Control Enclosure contains the following: (Field Mounted)

- **NEMA 12 Enclosure - per spec section 15500-2.04.A.12.c**

Unit Mounted Devices:

- **Discharge Temperature Sensor**
- **Dirty Filter Sensor**

All wiring connections are provided with protective conformal coating & [1] extra conformal coating in spray can will be supplied with MAU for field connection coating suitable for electronics per 15500-2.04.A.6.a

All wiring connections are provided with protective conformal coating & [1] extra conformal coating in spray can will be supplied with MAU for field connection coating suitable for electronics per 15500-2.04.A.6.a

UR Urethane Conformal Coating

Product# 2104



Product Description

Techspray® offers a variety of coating formulas to match field and engineering requirements. Specifications generally depend on the type of protection needed. E.g. thermal, moisture, and static resistance.

Coatings contain Opti/Scan to allow quality control inspection of coverage and evenness of the coating on a PCB. A coated board can be passed under a standard, low-cost UV (short-wave black) light, and the coated areas glow. The brighter the glow, the thicker the coating.

Features / Benefits

- **Thermal resistance - to 248°F (120°C)**
- **Dielectric strength - 380 volts/mil**
- **Moisture resistant**
- **Chemically resistant**
- **Abrasion resistant**
- **UL94 V-0 – nonflammable final coat**
- **IPC-CC-830B qualified**
- **UV indicator for black light QC inspection**

Specifications

- IPC-CC-830B

Usage Instructions

For industrial use only. Read MSDS carefully prior to use. Before applying Fine-L-Kote™ conformal coatings, clean circuit boards to remove contamination and allow to dry. Cleaning may be performed with Techspray G3, E-LINETM and Precision-V defluxers.

Spray Application: Apply top to bottom, allowing coating to flow evenly around components. Rotate PCB 90º and repeat application. Rotate and apply coating two additional times, then allow board to cure. If additional thickness is desired, apply additional coatings. When using liquid spray with automatic dispensing equipment, adjustments may be required in application rate and viscosity.

Dip Application: Using automatic equipment or hand immersion technique, slowly immerse PCB into the coating and remove slowly. Use an average rate of approximately 1 foot per minute. After allowing the board to cure, process may be repeated to achieve desired thickness.

Brush Application: Evenly apply coating to areas desired at thickness required. Allow time for curing before reapplying to achieve a thick coating. Use WonderMASK to protect components during conformal coating process. After application, cured Fine-L-Kote™ may be removed using Techspray Conformal Coating Removal Pen (2510-N or 2510-P).

Typical Product Data and Physical Properties

Physical state:	Liquid
Flash point:	Closed cup: 81ºF (27.2ºC)
Flammable limits:	Lower 1% Upper 7%
Color:	Colorless
Odor:	Aromatic
Boiling/condensation point:	300.2ºF (149ºC)
Relative density:	0.93
Volatility:	86% (w/w)
Shelf life:	1 year

UR Urethane Conformal Coating
Product# 2104

Performance & Application Data

Cure type	Thermal/air
Tack-free time (min)	15
Accelerated cure time/temp	2 Step: 20 Min. @ 49°C, 30 Min. @ 82°C
Ambient cure time	24 hrs
Viscosity (bulk)	10-20 cps
Operating temperature range	-65° to 125°C
Dielectric strength	380 V/Mil
Insulation resistance (ohms)	1.78×10^{16}
Coverage (1 mil dry film)	1 gal. liquid = 880 ft^2 (81.8M^2)

Packaging and Availability

2104-12S	12 Ounce Liquid
2104-G	1 Gallon Liquid
2104-5G	5 Gallon Liquid

Environmental Policy

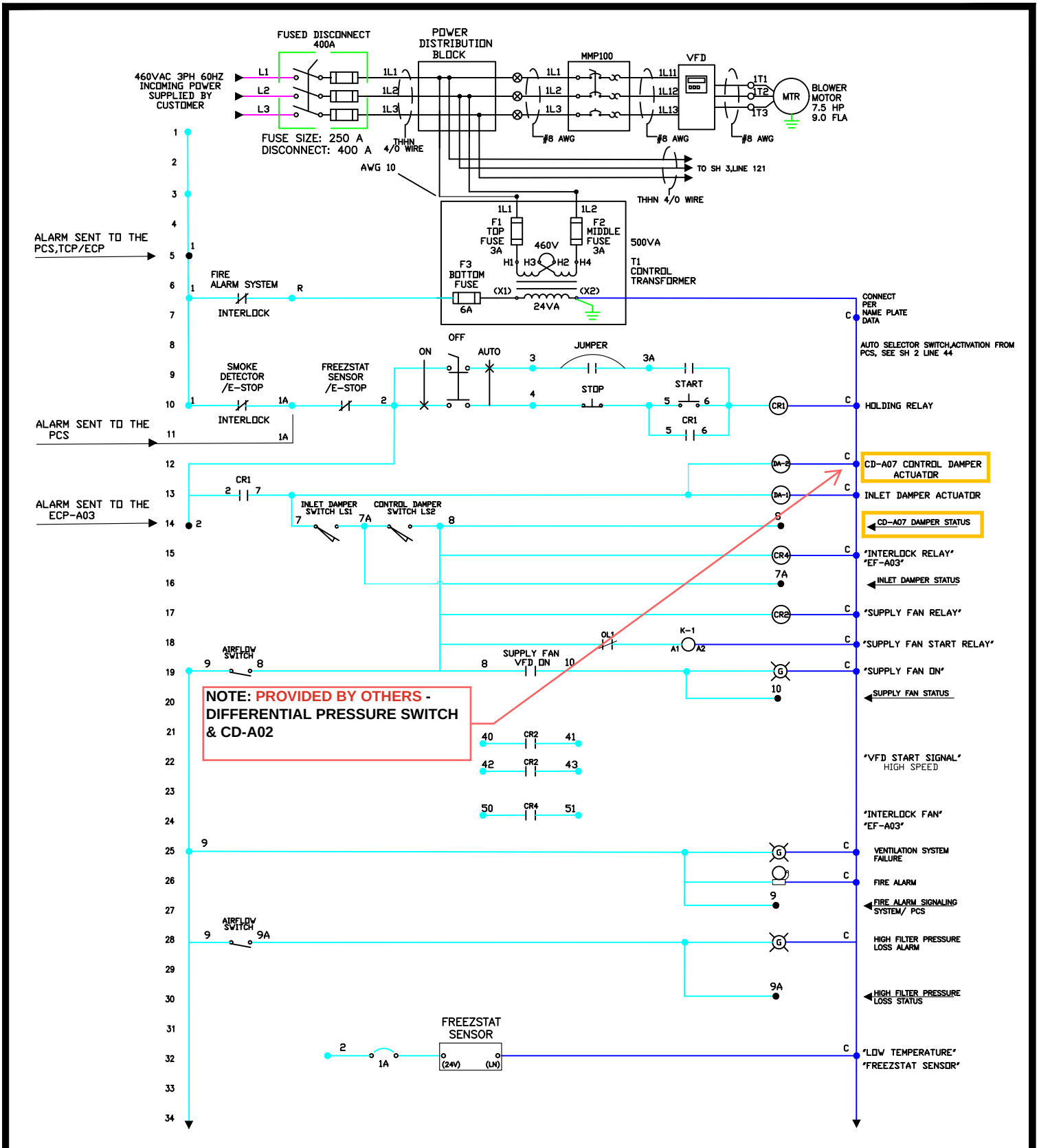
Techspray® is committed to developing products to ensure a safer and cleaner environment. We will continue to meet and sustain the regulations of all federal, state and local government agencies.

Resources

Techspray® products are supported by global sales, technical and customer services resources.

For additional technical information on this product or other Techspray® products in the United States, call the technical sales department at 800-858-4043, email tsales@techspray.com or visit our web site at: www.techspray.com.

Important Notice to Purchaser/User: The information in this publication is based on tests that we believe are reliable. The results may vary due to differences in tests type and conditions. We recommend that each user evaluate the product to determine its suitability for the intended application. Conditions of use are outside our control and vary widely. Techspray's only obligation and your only solution is replacement of product that is shown to be defective when you receive it. In no case will Techspray® be liable for any special, incidental, or consequential damages based on breach of warranty, negligence or any other theory.



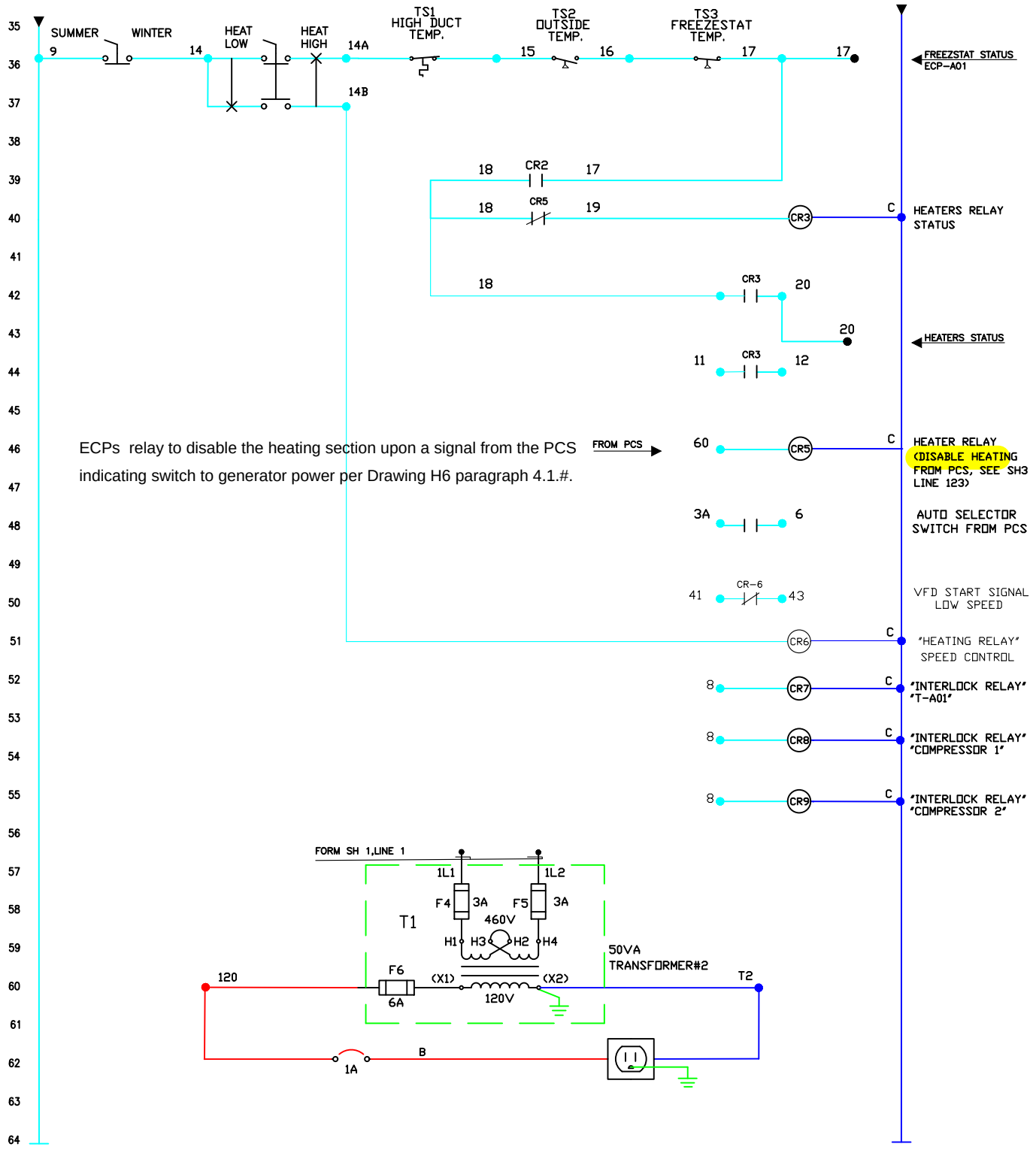
WIRE COLOR CODE
BLACK - HIGH VOLTAGE
RED - 120 VOLTS
BLUE - 24V DC/AC
GREEN - GROUND
WHITE - NEUTRAL
MAGENTA - FIELD WIRING
BROWN–SIGNAL

WARNING: DO NOT ATTACH WIRES TO THE WALL OF THE UNIT THE SURFACE MAY BE HOT.

WHEN CALLING FOR ASSISTANCE, PLEASE REFER TO THE MODEL & SERIAL NUMBER OF THE UNIT FOR QUICK RESPONSE.

Bessamaire HVEC

MODEL	JHIEF8–10D
CUSTOMER	
Electrical Schematic	SHEET 1 OF 9
REFERENCE NO.	DRAWING NO. 16–511XX–S1
JHIE Series	DRAWN RR 7/10/2026
SERIAL NO. 26–511XX–01	CHECKED RR 7/10/2026



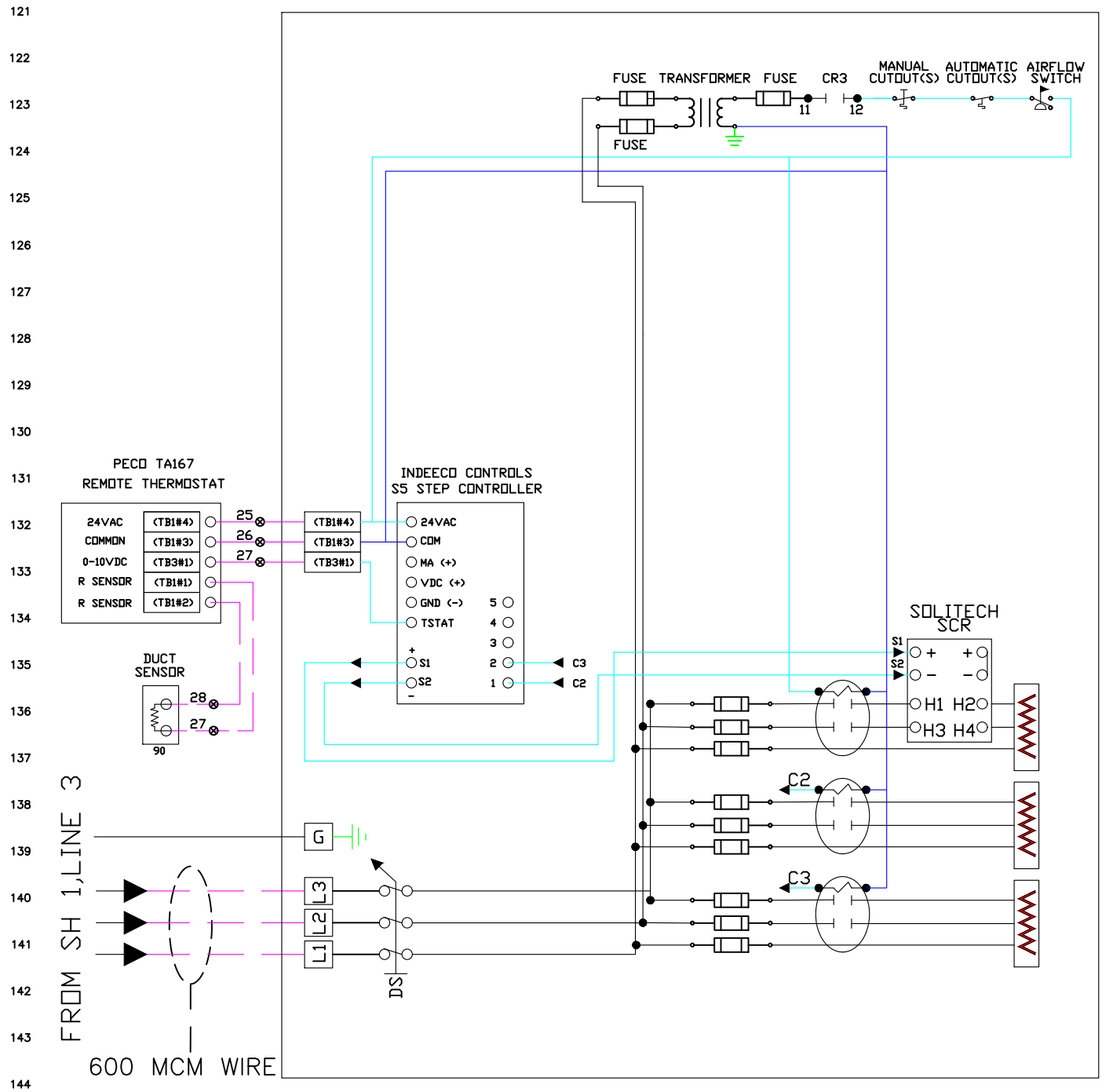
WIRE COLOR CODE
BLACK - HIGH VOLTAGE
RED - 120 VOLTS
BLUE - 24V DC/AC
GREEN - GROUND
WHITE - NEUTRAL
MAGENTA - FIELD WIRING
BROWN-SIGNAL

WARNING: DO NOT ATTACH WIRES TO THE WALL OF THE UNIT THE SURFACE MAY BE HOT.

WHEN CALLING FOR ASSISTANCE, PLEASE REFER TO THE MODEL & SERIAL NUMBER OF THE UNIT FOR QUICK RESPONSE.

Bessamaire HVEC

MODEL	JHIEF8-10D
CUSTOMER	
ELECTRICAL SCHEMATIC	SHEET 2 OF 9
REFERENCE NO.	DRAWING NO. 26-511XX-S2
JHIE SERIES	DRAWN RR 7/10/2026
SERIAL NO. 26-511XX-01	CHECKED RR 7/10/2026



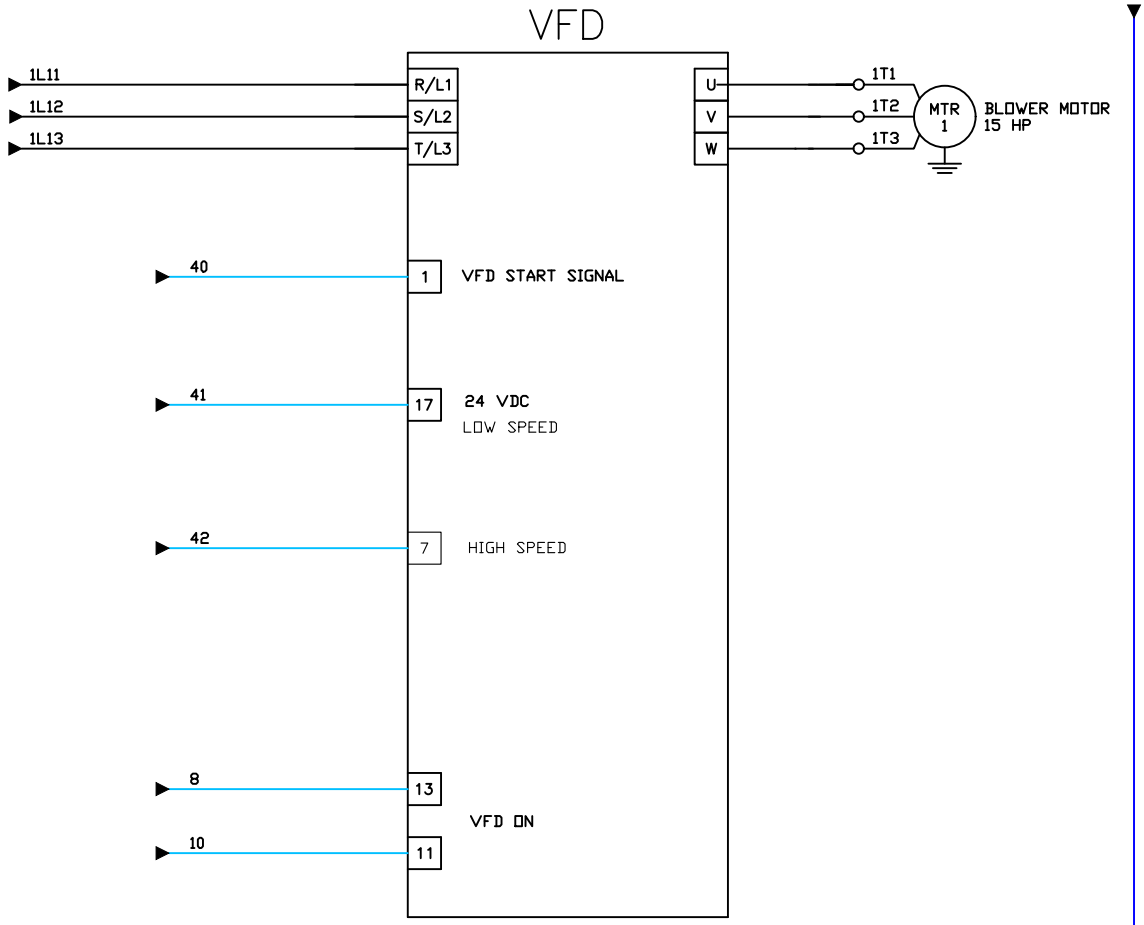
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WHEN CALLING FOR ASSISTANCE, PLEASE REFER TO THE MODEL & SERIAL NUMBER OF THE UNIT FOR QUICK RESPONSE.

Bessamaire HVEC

MODEL: JHIEF8–10D
CUSTOMER:
ELECTRICAL SCHEMATIC — SHEET 3 OF 9
REFERENCE NO.: JHIE Series
DRAWING NO.: 26–511XX–S3
DRAWN: RR 7/10/2026
SERIAL NO.: 26–511XX–01
CHECKED: RR 7/10/2026



DRIVE PARAMETERS	
MIN FREQ	20
MAX FREQ	60
ACCEL	30 SEC
DEACCEL	60 SEC
FLA	9
VOLT	460
SPD	1765
EFF	91.7
SF	1.25
OVLD	11.25
HOA	KEYPAD
HOA SPD	KEYPAD
AUTO START	DI
AUTO SPD	AI

NOTES:

1. HEAT MODE, UNIT AT 9,200 CFM HIGH SPEED, SEE SEQUENCE OF OPERATION.
2. HEAT MODE, UNIT AT 3,380 CFM LOW SPEED, SEE SEQUENCE OF OPERATION.

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BLUE - 24V DC/AC
GREEN - GROUND
WHITE - NEUTRAL
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WHEN CALLING FOR ASSISTANCE, PLEASE REFER TO THE MODEL & SERIAL NUMBER OF THE UNIT FOR QUICK RESPONSE.

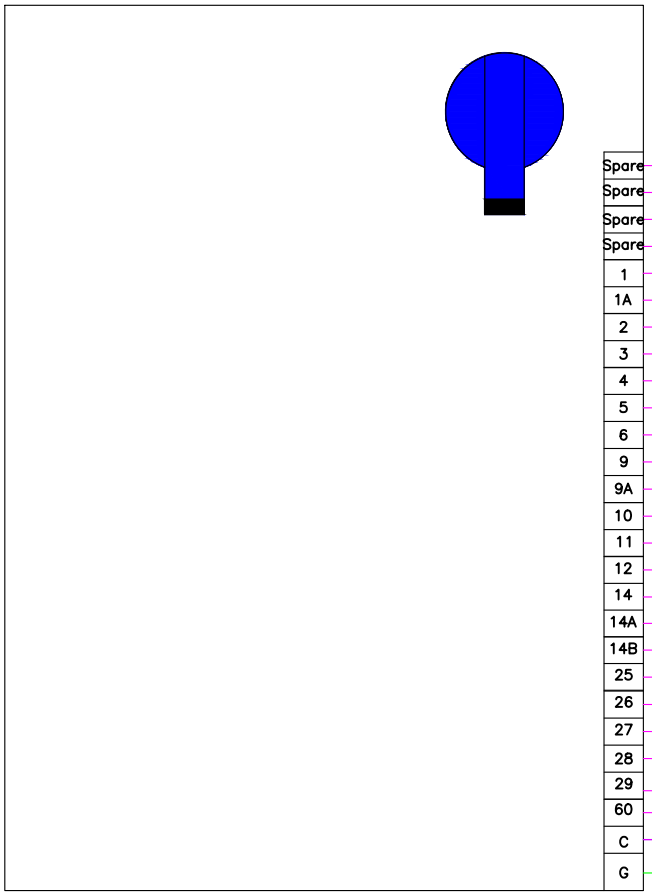
Bessamaire HVEC

MODEL: JHIEF8–10D
CUSTOMER:
VFD — SHEET 4 OF 9
REFERENCE NO.: JHIE Series
DRAWING NO.: 26–511XX–S4
DRAWN: RR 7/10/2026
SERIAL NO.: 26–511XX–01
CHECKED: RR 7/10/2026

ECP-A03 [MAU-A03]

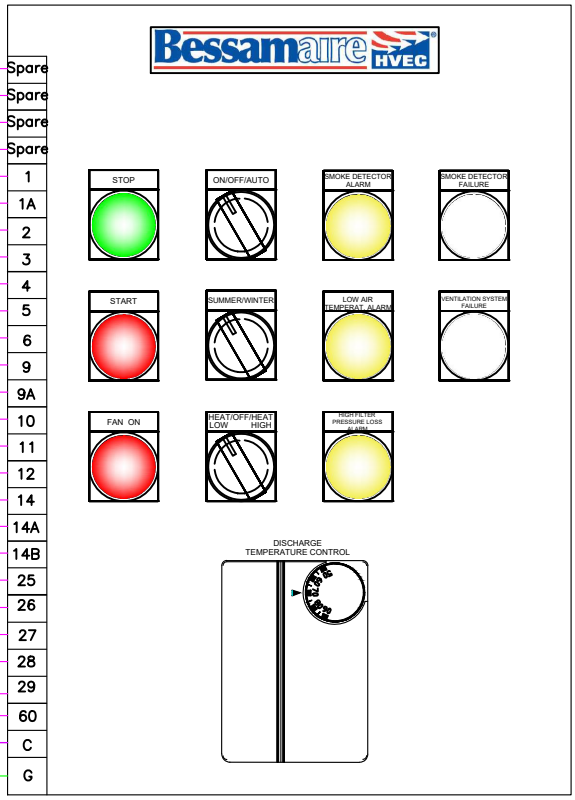
NEMA 12 Enclosure as required by section 15500-2.04.A.12.c

MAIN OPERATOR PANEL
MOUNTED ON AHU



Spare	Spare
Spare	Spare
Spare	Spare
Spare	Spare
1	1
1A	1A
2	2
3	3
4	4
5	5
6	6
9	9
9A	9A
10	10
11	11
12	12
14	14
14A	14A
14B	14B
25	25
26	26
27	27
28	28
29	29
60	60
C	C
G	G

OPERATOR PANEL
MOUNTED BY CONTRACTOR



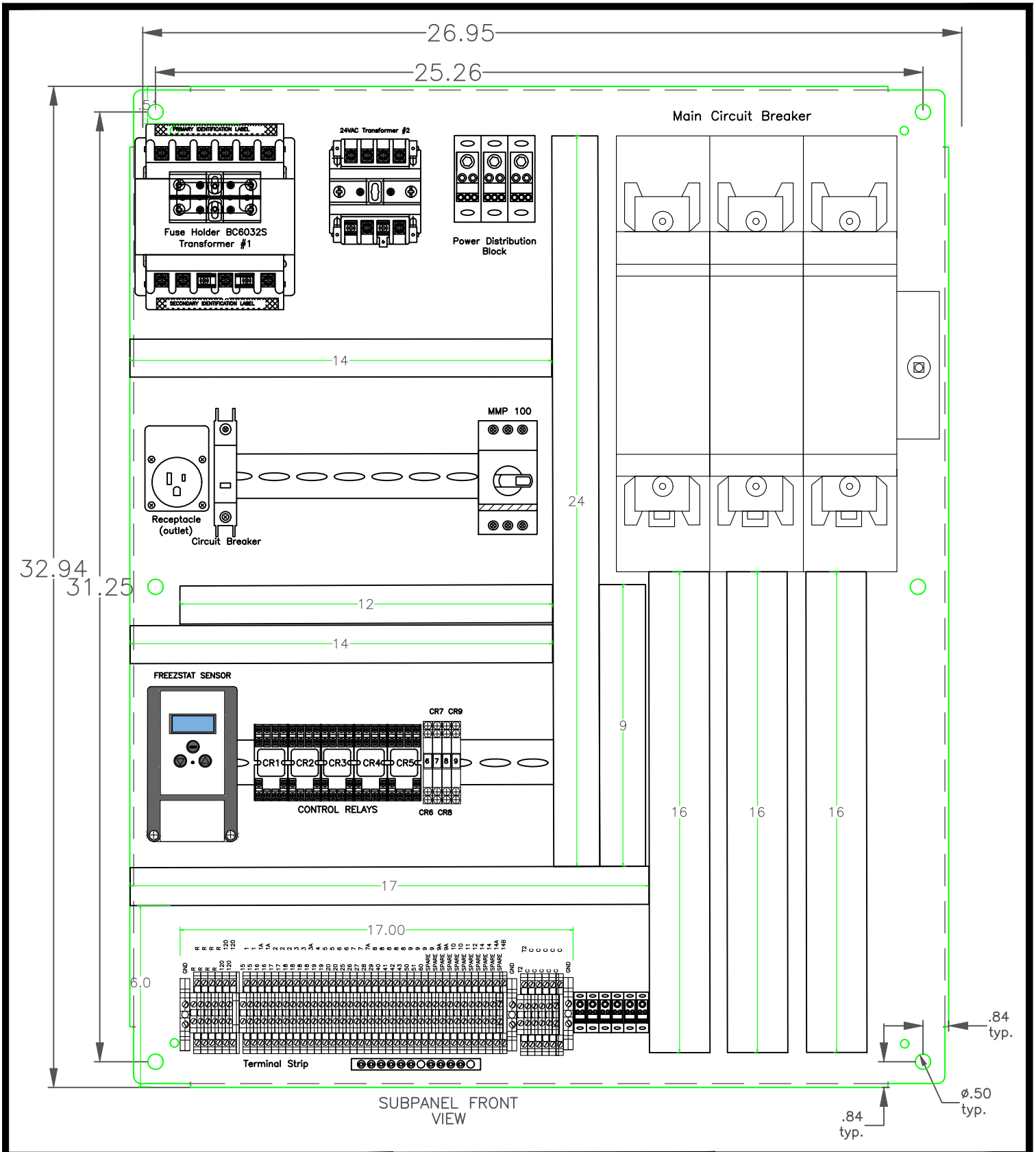
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BLUE - 24V DC/AC
GREEN - GROUND
WHITE - NEUTRAL
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BROWN–SIGNAL

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WHEN CALLING FOR ASSISTANCE, PLEASE REFER TO THE MODEL & SERIAL NUMBER OF THE UNIT FOR QUICK RESPONSE.

Bessamaire HVEC

MODEL: JHIEF8–10D
CUSTOMER:
Interconnentions — SHEET 5 OF 9
REFERENCE NO.
DRAWING NO.: 26–511xx–S5
JHIE Series
DRAWN: RR 7/10/2026
SERIAL NO.: 26–511xx–01
CHECKED: RR 7/10/2026



WIRE COLOR CODE
BLACK - HIGH VOLTAGE
RED - 120 VOLTS
BLUE - 24V DC/AC
GREEN - GROUND
WHITE - NEUTRAL
MAGENTA - FIELD WIRING
BROWN–SIGNAL

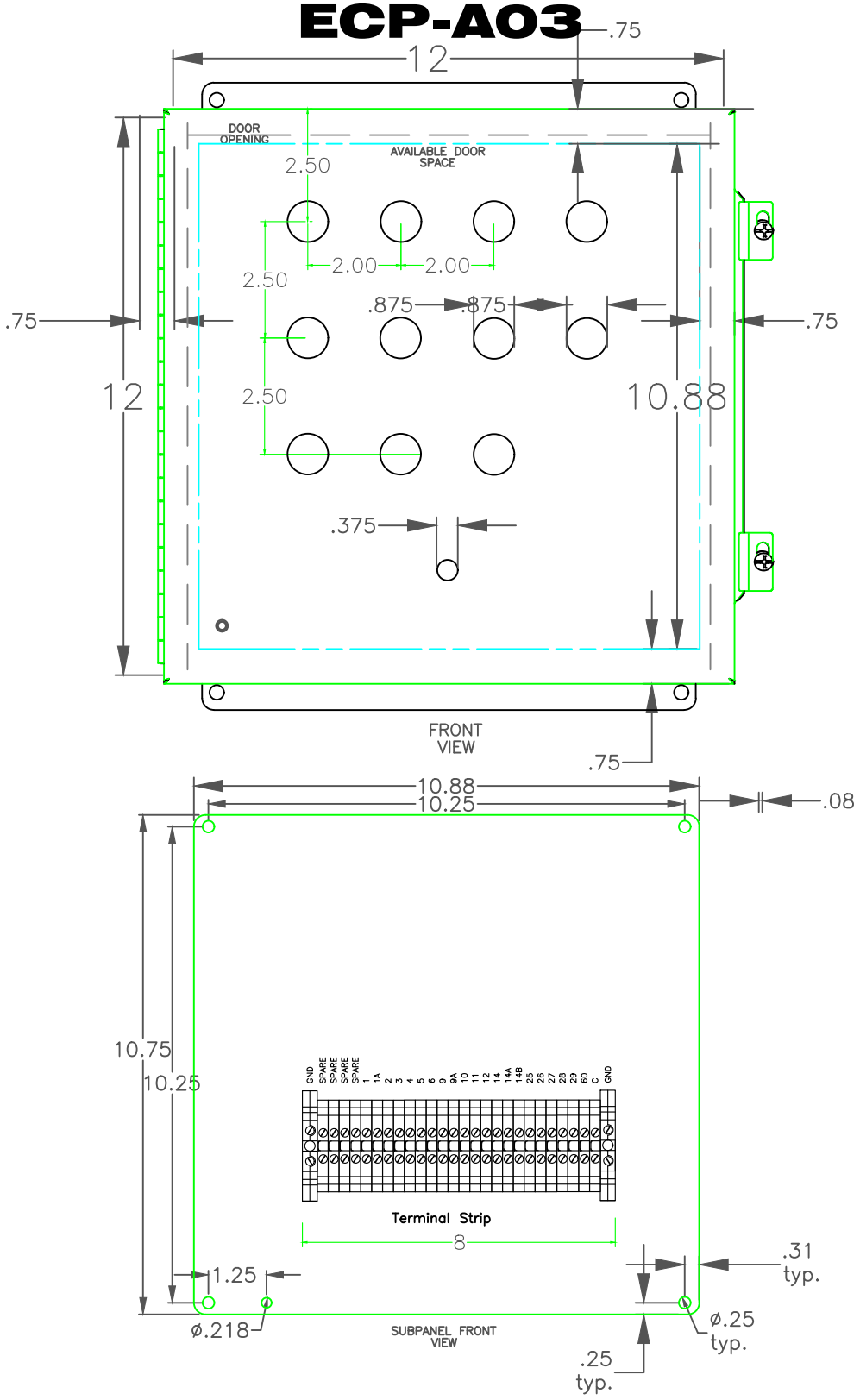
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WHEN CALLING FOR ASSISTANCE, PLEASE REFER TO THE MODEL & SERIAL NUMBER OF THE UNIT FOR QUICK RESPONSE.

Bessamaire HVEC

MODEL	JHIEF8–10D
CUSTOMER	
Subpanel Layout	SHEET 6 OF 9
REFERENCE NO.	DRAWING NO. 26–511xx–S6
JHIE Series	DRAWN RR 7/10/2026
SERIAL NO. 26–511xx–01	CHECKED RR 7/10/2026

ECP-A03



WIRE COLOR CODE
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WHITE - NEUTRAL
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BROWN–SIGNAL

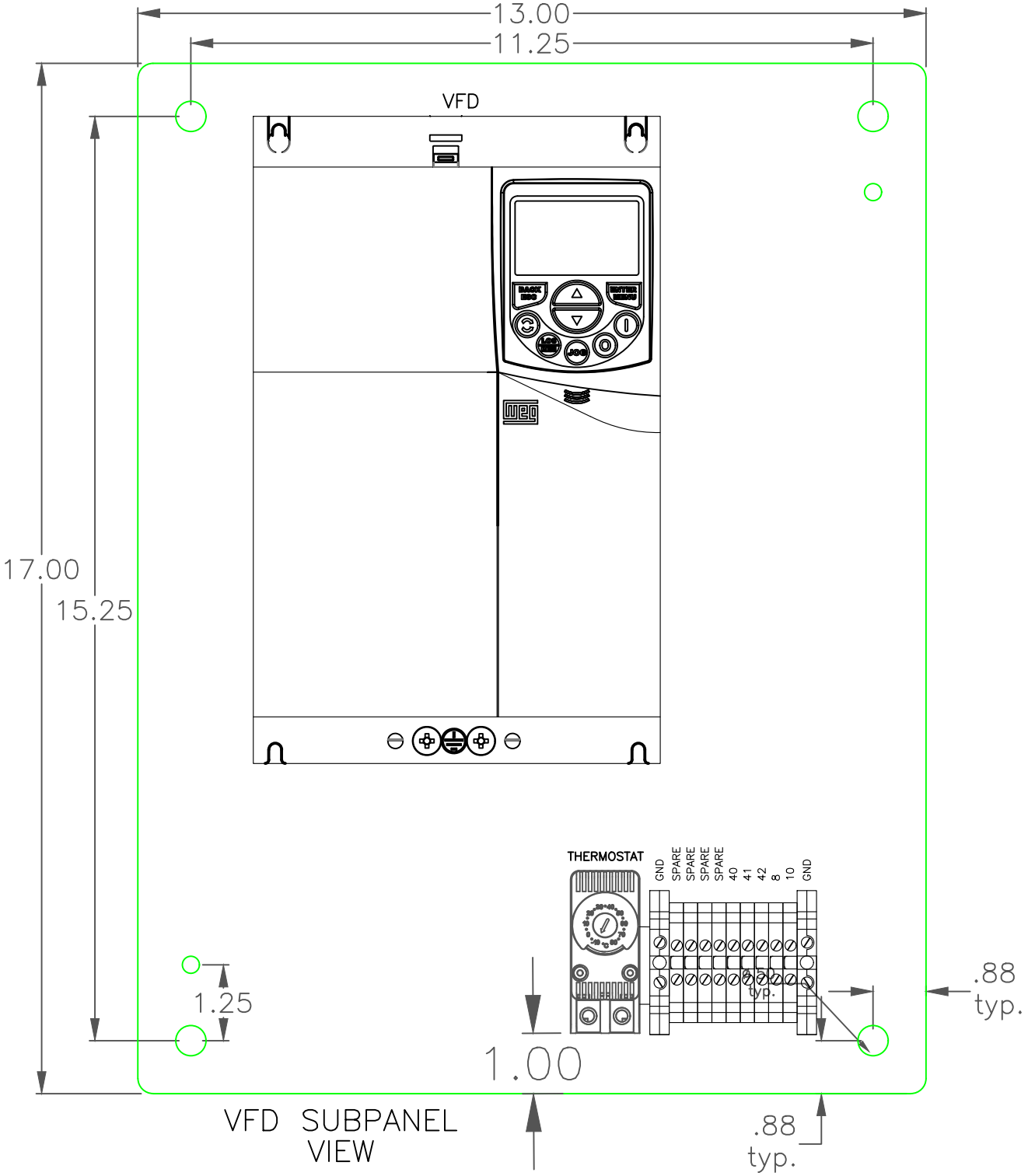
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WHEN CALLING FOR ASSISTANCE, PLEASE REFER TO THE MODEL & SERIAL NUMBER OF THE UNIT FOR QUICK RESPONSE.

Bessamaire HVEC

MODEL	JHIEF8–10D
CUSTOMER	
Remote Control Box Layout	SHEET 7 OF 9
REFERENCE NO.	DRAWING NO. 26–511XX–S7
JHIE Series	DRAWN RR 7/10/2026
SERIAL NO. 26–511XX–01	CHECKED RR 7/10/2026

VFD MOUNTED ON AHU



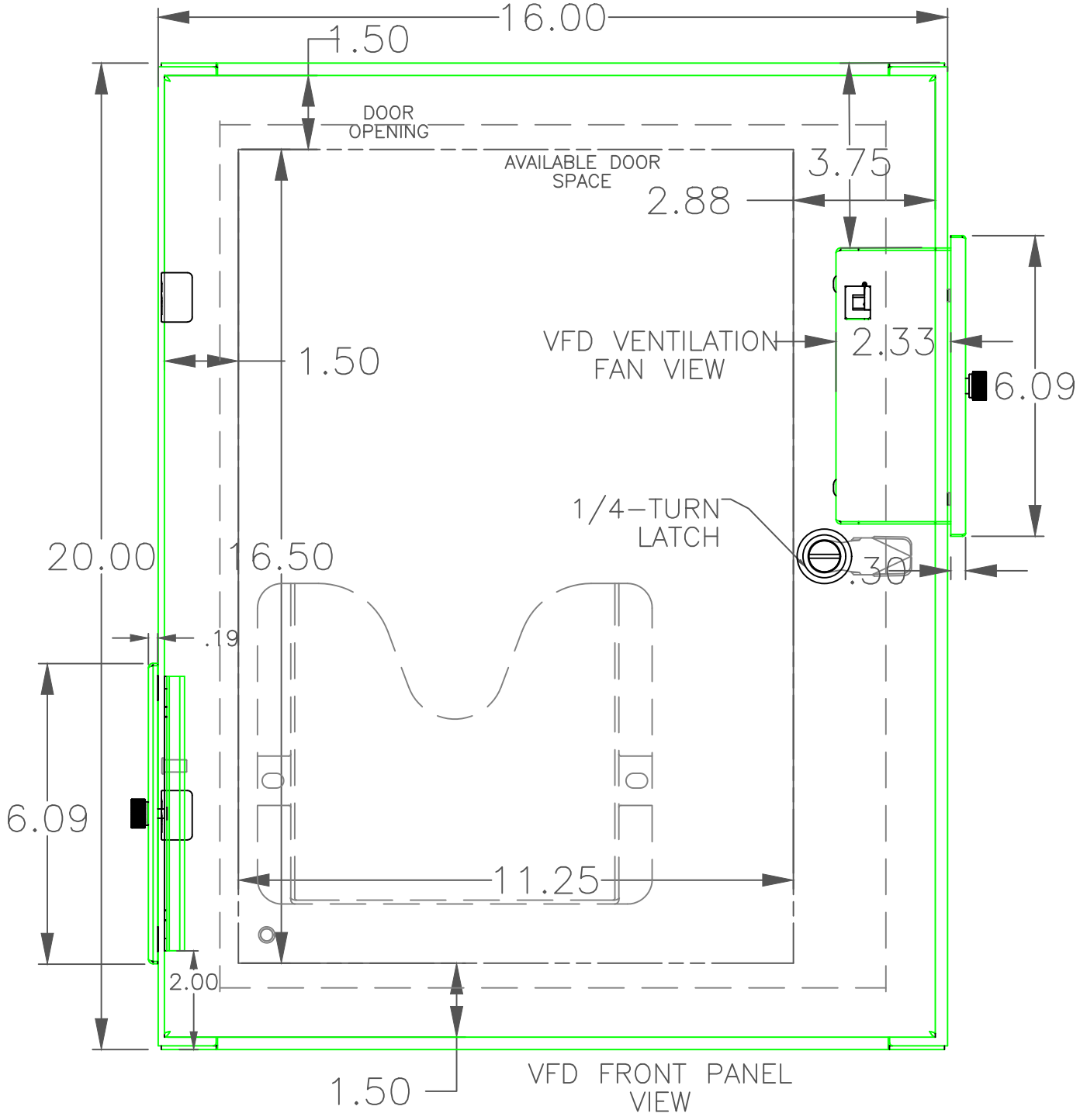
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WARNING: DO NOT ATTACH WIRES TO THE WALL OF THE UNIT THE SURFACE MAY BE HOT.

WHEN CALLING FOR ASSISTANCE, PLEASE REFER TO THE MODEL & SERIAL NUMBER OF THE UNIT FOR QUICK RESPONSE.

Bessamaire HVEC

MODEL	JHIEF8–10D
CUSTOMER	
VFD SUBPANEL	SHEET 8 OF 9
REFERENCE NO.	DRAWING NO. 26–511XX–S8
JHIE Series	DRAWN RR 7/10/2026
SERIAL NO. 26–511XX–01	CHECKED RR 7/10/2026



WIRE COLOR CODE
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BROWN-SIGNAL

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WHEN CALLING FOR ASSISTANCE, PLEASE REFER TO THE MODEL & SERIAL NUMBER OF THE UNIT FOR QUICK RESPONSE.

Bessamaire HVEC

MODEL	JHIEF8-10D
CUSTOMER	
VFD-LAYOUT VENTILATION FAN	SHEET 9 OF 9
REFERENCE NO.	DRAWING NO. 26-511XX-S9
JHIE Series	DRAWN RR 7/10/2026
SERIAL NO. 26-511XX-01	CHECKED RR 7/10/2026

Heresite P-413

Our 50 years of coating history speaks for itself.

In 1964, Heresite was the first company to apply coatings to aluminum-finned, copper-tubed heat exchangers. The Heresite coating became then, and still remains a standard in the industrial coatings industry. We provide the highest quality protective coatings for air conditioning and refrigeration systems that operate in moderate to severely corrosive environments, including both coastal and/or industrial applications. Our phenolic epoxy has an advantage of dense cross linking and can therefore be applied as a very thin film maintaining stable heat transfer.

We continue our focus on innovation and again have a new story to tell, as we introduce our updated P-413

- A high performance phenolic epoxy coating developed specifically for heat exchangers.
- The flexibility and corrosion resistance of Heresite P-413 appreciably increases the service life of your heat exchange equipment.
- It is specially suited for coating light gauge metals in equipment operating in severe corrosive environments.

P-413 Specifications

The coil will receive a uniform coating on all surfaces, including fin edges, with P-413, a thermoset, modified phenolic coating. Application of P-413 will be through multiple coats by immersion or flow coating to a film thickness of approximately 1.0 mil.

P-413 provides corrosion protection in a 6,000 hour salt spray test in accordance with ASTM B-117 and humidity resistance of >2,000 hours per ASTM D2247. Chemical resistance is demonstrated via 100+ acetone double-rubs per ASTM 5402. P-413 also exhibits superior hardness of 5–6H per ASTM D3363, adhesion of 5B per ASTM B3359 and impact resistance of 160 in/lbs (ASTM D2794). Color shall be brown with gloss of 20–60 — 60 degree. If the coils are to be subjected to direct ultraviolet (UV) exposure, a spray-applied UV-resistant topcoat is an option.

Effective date: 10/09/17

P-413 Typical Properties (@ 1 mil DFT)

Salt Spray: ASTM B-117: 6,000+ hours

SWAAT: ASTM G85-11 Section A.3: Passed 1,000 hours using pressurized coil (see page 2 for results)

Cyclic Weathering: ISO 20340 Offshore Standard: Passed (4,200 hours)

Performance Testing: ISO 12944-6 C5 I/M: Passed C5-M high durability and C5-I high durability

Heat Transfer Reduction: <1% as applied for heat transfer components

Humidity: ASTM D-2247: 2,000+ hours

Simulated Sea Water Resistance: 2,000 hours

Solvent Resistance: ASTM-D5402: 100 acetone double rubs

Cross-hatch Adhesion: ASTM D-3359: 5B

Mandrel: ASTM-D522: >1/4 inch

Impact: ASTM D-2794: 160 lb/inch steel; 40 lb/inch aluminum

pH Range (14 day liquid spot test): 2.4–12.6

Temperature Cycling (4 hours at –75°C; 4 hours at 190°C): 4B–5B adhesion after 5 cycles

Dry Heat Resistance (4 hours at 200°C; 20 minutes at 232°C): 4B–5B adhesion after 5 cycles

Dry Film Thickness: ~1 mils

Hardness: ASTM D3363: 5–6H

Gloss: 20–60 on 60 degree meter (topcoat dependent)

Microchannel Compatible

Abrasion Resistance: 30–40 mg loss per 1,000 cycles

Meets FDA 175.300 for indirect food contact

Meets MIL Spec: MIL-C-18467, MIL-E-480 and MIL-STD-883 Method 1101

Meets Other Specs: Honeywell MC 7200-01 and GE F50T17

Thermal Conductivity: At approximately 2 mils thickness, Thermal Conductivity is less than 1.0 w/mK

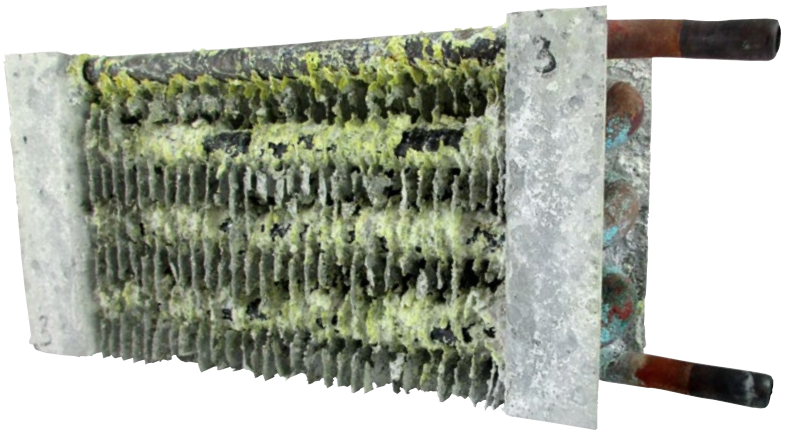
Dielectric Strength [ISO2376:2010(e)]: 286 volts per mil of thickness

NSF Certified – ANSI 51 Certification of Coatings for Food Zone – Non Contact

Heresite Protective Coatings LLC • 822 S. 14th St • Manitowoc, WI 54220
800-558-7747 or 920-684-6646 • sales@heresite.com • www.heresite.com

HERESITE® PROTECTIVE COATINGS, LLC

SWAAT Results

	**Bare 1,000 hour SWAAT**
	**P-413 1,000 hour SWAAT**
	**P-413 + topcoat 1,000 hour SWAAT**

Effective date: 10/09/17

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Product Description
Baking cross-linked phenolic epoxy

Recommended Uses
Heresite P-413 is a high performance coating used principally for heat transfer components and parts — especially air conditioning and refrigeration systems that operate in moderate to severely corrosive environments, including both coastal and/or industrial applications. This phenolic epoxy has an advantage of dense cross linking and are therefore highly corrosion resistant even when applied as a very thin film.

Chemical Resistance
P-413 is chemically resistant to a wide range of acids, solvents, and inorganic salts. Please review chemical resistance guide for further information.

Packaging Information
P-413 is available in one gallon, five gallon and 54 gallon drum quantities.

Thinners and Cleanup
Recommended use of Heresite S-275.

Storage Conditions
Coating should not be stored longer than 6 months. Coating should be stored in a clean, dry environment at 50–75°F. Keep out of direct sunlight. Avoid excessive heat and keep from freezing.

Physical Properties
Solids by weight: Approximately 73%

Solids by volume: Approximately 57%

Pot life: NA

Mixing Ratio by Volume: NA 1 component

Shelf life: 6 months

Color: Brown

VOC Content
2.25 lbs/gal (270 g/L) as supplied

Film Thickness
For heat transfer, a 2 coat immersion process will typically yield a dry film thickness of 1.0–2.0 mils (25–50 microns).

For other parts, please contact Heresite.

Coverage
Theoretical coverage is 800 square feet per gallon per dry mil. Coverage rates are estimates and make no allowance for material loss. Actual rates will vary dependent on application method, surfaces, etc.

Surface Preparation
All surfaces must be clean, sound, and free of any oils, dirt, grease, wax and any other contamination that may interfere with coating adhesion.

In general, the surface should be cleaned by solvent or a cleaner at elevated temperature followed by a clean water rinse. Rinse water shall have a conductivity of lower than 500 microsiemens and a neutral pH (7.0–8.0). All surfaces must be dried prior to application of coating.

In cases where there is a large amount of contamination or heat treated steel, a commercial blast is acceptable in accordance with NACE #3 or SSPC-SP-6-63 specifications. Surface profile or anchor pattern shall be 20–25% of the recommended dry film thickness.

Thinning
Reduce P-413 with S-275 solvent to 13–13.5 seconds on ISO Dip 3 mm Cup. This requires approximately a 1:1 dilution by volume.

The amount of thinner required is dependent upon temperature, ventilation, humidity, application type and desired film thickness.

Effective date: 10/09/17

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HERESITE® PROTECTIVE COATINGS, LLC

Application

Application is specific to heat transfer components, for other parts — please contact Heresite.

Immersion Application:

1. Consult SDS prior to use.
2. Do not apply if temperature is less than 5°F above dew point, or if temperature is below 45°F.
3. Consult Heresite for tank and pump recommendations.
4. Ensure as the part is prepared for immersion, one will have a low point for drainage.
5. Immerse the cleaned part for 15 seconds in the reduced P-413.
6. Upon removal of the part from the coating, apply light air pressure (approximately 15 psi) using an Air Knife or similar device to spread the air flow. Using the compressed air, remove excess coating. Minimal brushing should be required.
7. Air dry a minimum of 15 minutes with ventilation prior to introducing heat.
8. Typically, a two coat immersion process is required to achieve 1.0 to 1.5 mil DFT. An intermediate bake is required between coats — see baking schedule.
9. It may be deemed desirable to apply a final aesthetic spray. This can be accomplished immediately after the final immersion is accomplished and prior to final bake.
10. During immersion application, the viscosity must be maintained and monitored. It is recommended that the viscosity be checked every hour to ensure compliance with the specification of 13–13.5 seconds. Additional solvent and coating can be added to adjust viscosity as needed.

Spray Application for Final Aesthetic Spray:

1. Consult SDS prior to use.
2. Do not apply if temperature is less than 5°F above dew point, or if temperature is below 45°F.
3. Use standard production type spray equipment (conventional, HVLP, airless, etc.). A few starting recommendations can be found below:

Guns	Fluid	Air
DeVilbiss JGA-510	E	46MP
Binks #2100	67-SS	46-21MD-2 or 3
Binks #95	66-SS	66-SD
Graco Air Pro HVLP		

4. Spray viscosity will be dependent on type of equipment being used. It has been seen that spraying at immersion viscosity is very effective.
5. Spray equipment: always flush spray equipment with solvent to clean prior to applying coating.
6. Air supply must be uncontaminated. Adjust air pressure to approximately 50 pounds at the gun and provide 15–20 pounds at pressure pot. Adjust spray gun by first opening liquid valve and then adjust air valve to give approximately an 8"–12" fan, holding gun perpendicular to the surface at a distance of 12".
7. Apply a mist bonding pass.
8. Allow to flash off for approximately a minute, but not long enough to allow film to completely dry.
9. Apply 3–4 crisscross multi-passes maintaining a wet appearing film.
10. Air dry a minimum of 15 minutes with ventilation prior to introducing heat.
11. Typically, a one coat process is required to achieve 0.5 to 1.0 mil DFT.

Effective date: 10/09/17

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HERESITE® PROTECTIVE COATINGS, LLC

Spray Application for Higher Film Build — 4–6 mil:

1. Consult SDS prior to use.
2. Do not apply if temperature is less than 5°F above dew point, or if temperature is below 45°F.
3. Use standard production type spray equipment (conventional, HVLP, airless, etc.). A few starting recommendations can be found below:

Guns	Fluid	Air
DeVilbiss JGA-510	E	46MP
Binks #2100	67-SS	46-21MD-2 or 3
Binks #95	66-SS	66-SD
Graco Air Pro HVLP		

4. Spray viscosity will be dependent on type of equipment being used. It has been seen that spraying at immersion viscosity is very effective (13.0–13.5 seconds ISO Dip 3 mm).
5. Spray equipment: always flush spray equipment with solvent to clean prior to applying coating.
6. Air supply must be uncontaminated. Adjust air pressure to approximately 50 pounds at the gun and provide 15–20 pounds at pressure pot. Adjust spray gun by first opening liquid valve and then adjust air valve to give approximately an 8"–12" fan, holding gun perpendicular to the surface at a distance of 12".
7. Apply a mist bonding pass.
8. Allow to flash off for approximately a minute, but not long enough to allow film to completely dry.
9. Apply 3–4 crisscross multi-passes maintaining a wet appearing film. Allow a minimum of 10 minutes to allow the slow solvents to evaporate. Then apply another 2–3 crisscross multi-passes.
10. Air dry a minimum of 15 minutes with ventilation prior to introducing heat.
11. Intermediate bake at 130°C (metal temperature) for a minimum of 10 minutes.
12. Repeat steps 7–10.
13. Final bake per the instructions within the bake schedule.
14. Typically, a two to three coat process is required to achieve 4.0 to 6.0 mil DFT.

Bake Schedule

Intermediate Bake:

1. 90°C (metal temperature) for a minimum of 10 minutes.
   a. To decrease the bake time, a maximum temperature of 130°C may be used.

Final Bake:

1. "Normal" Bake:
   a. 90°C (metal temperature) held for 10 minutes, then increased to 160°C. 160°C (metal temperature) held for 15 minutes, then increased to 190°C. 190°C (metal temperature) held for 45 minutes.
2. "Soft Solder" Bake:
   a. 90°C (metal temperature) held for 10 minutes, then increased to 160°C. 160°C (metal temperature) held for 130 minutes.

These instructions are not intended to show product recommendations for specific service. They are issued as an aid in determining correct surface preparation, mixing instructions and application. It is assumed that the proper product recommendations have been made. These instructions should be followed closely to obtain the maximum service from the materials.

CAUTION: CONTAINS FLAMMABLE SOLVENTS. KEEP AWAY FROM SPARKS AND OPEN FLAMES. IN CONFINED AREAS WORKERS MUST WEAR FRESH AIR LINE RESPIRATORS. PERSONS SHOULD WEAR GLOVES OR USE PROTECTIVE CREAM. ALL ELECTRICAL EQUIPMENT AND INSTALLATIONS SHOULD BE MADE AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE. IN AREAS WHERE EXPLOSION HAZARDS EXIST, WORKMERS SHOULD BE REQUIRED TO USE NONFERROUS TOOLS AND TO WEAR CONDUCTIVE AND NONSPARKING SHOES.

To the best of our knowledge the technical data contained herein are true and accurate at the date of issuance and are subject to change without prior notice. No guarantee of accuracy is given or implied. We guarantee our products to conform to strict quality control. We assume no responsibility for coverage, performance or injuries resulting from use. Liability, if any, is limited to replacement of products. Prices are subject to change without prior notice. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY THE SELLER, EXPRESS OR IMPLIES, STATUTORY, BY OPERATION OF LAW, OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

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BASIC SEQUENCE OF OPERATIONS

1.1. TEMPERATURE CONTROL PANEL(S). TEMPERATURE CONTROL PANEL(S) (TCP) AND EQUIPMENT CONTROL PANELS (ECP) IDENTIFIED IN THE SEQUENCE OF OPERATION SHALL BE PROVIDED WITH THE INDICATING LIGHTS, RUNNING LIGHTS, ALARM LIGHTS, AUDIBLE ALARMS, TIMERS, AND SELECTOR SWITCHES FOR CONTROL AND STATUS INDICATION OF THE EQUIPMENT SERVED. WHERE NO CONTROL PANELS ARE PROVIDED FOR EQUIPENT, THE LIGHTS AND SWITCHES SHALL BE AT THE STARTER OR MCC. RUNNING LIGHTS SHALL BE PROVIDED TO INDICATE BOTH ENERGIZED AND DE-ENERGIZED CONDITIONS FOR THE EQUIPMENT AND SHALL POSITIVELY INDICATE EQUIPMENT CONDITIONS FROM THE MOTOR STARTER OR CURRENT SENSOR. SWITCH POSITION SHALL NOT BE USED FOR LIGHT ILLUMINATION. INDICATING AND RUNNING LIGHTS SHALL BE LOCATED DIRECTLY ABOVE EACH RESPECTIVE SELECTOR SWITCH WITH LIGHT COLORS AS FOLLOWS:

RED - ENERGIZED
GREEN - DE-ENERGIZED
AMBER - ALARM
WHITE – STATUS

INDICATING LIGHTS AND SELECTOR SWITCHES SHALL BE LOCATED ON THE FACE OF THE TEMPERATURE CONTROL PANEL SERVING RESPECTIVE EQUIPMENT. IN ADDITION TO THE LIGHTS, TIMERS, AND SELECTOR SWITCHES DESCRIBED IN THE SEQUENCE OF OPERATION FOR THE INDIVIDUAL EQUIPMENT, EACH CONTROL PANEL SHALL BE PROVIDED WITH THE FOLLOWING:

"CONTROL POWER ON" STATUS LIGHT
"INDICATING LIGHT TEST" PUSHBUTTON
"ALARM SILENCE" PUSHBUTTON
"ALARM RESET" PUSHBUTTON (WHERE APPLICABLE)
CONTROL PANELS SPECIFIED TO BE PROVIDED WITH ALARM CONDITION INDICATING LIGHTS SHALL BE PROVIDED WITH AN ELECTRICALLY ISOLATED CONTACT TO PROVIDE A COMMON ALARM TO THE PLANT CONTROL SYSTEM (PCS). EACH CONTROL PANEL SHALL BE PROVIDED WITH A MINIMUM OF ONE COMMON ALARM OUTPUT POINT TO THE PCS AND ADDITIONAL INDIVIDUAL ALARM POINTS AS INDICATED BELOW.
TEMPERATURE CONTROL PANELS SHALL COME WITH PHENOLIC NAMEPLATES FOR EACH CONTROL SWITCH INDICATING SWITCH TYPE, EQUIPMENT CONTROLLED, ROOM OR AREA SERVED, AND SWITCH AUTOMATIC POSITION EQUIPMENT

INTERLOCK

1.2. SYSTEM INTERLOCKS AND ALARMS
UNLESS OTHERWISE INDICATED, ALL EQUIPMENT INTERLOCKING DEVICES AS DESCRIBED HEREIN SHALL BE PROVIDED WITHIN THE RESPECTIVE TEMPERATURE/EQUIPMENT CONTROL PANEL (TCP/ECP).

1.2.1. SMOKE DETECTION SYSTEMS

1.2.1.2. SMOKE DETECTION (AREA SMOKE DETECTION). A SMOKE DETECTED SIGNAL SHALL BE SENT FROM THE FIRE ALARM PANEL TO THE RESPECTIVE TEMPERATURE/EQUIPMENT CONTROL PANEL IN THE EVENT SMOKE IS DETECTED BY THE BUILDING SMOKE DETECTION SYSTEM. THE EQUIPMENT BELOW AND ANY INTERLOCKED EQUIPMENT SHALL BE DEENERGIZED AND OUTSIDE AIR DAMPERS ASSOCIATED WITH THE DE-ENERGIZED EQUIPMENT SHALL CLOSE

1.2.2. LOW TEMPERATURE PROTECTION. LOW AIR TEMPERATURE THERMOSTATS/SENSORS SHALL BE LOCATED IN THE SYSTEMS INDICATED BELOW. UPON DETECTION OF LOW AIR TEMPERATURE, THE THERMOSTAT SHALL DE-ENERGIZE THE RESPECTIVE EQUIPMENT AND ALL INTERLOCKED EQUIPMENT, CONTROL DAMPER(S) OF THE RESPECTIVE EQUIPMENT AND INTERLOCKED EQUIPMENT SHALL RETURN TO THE NORMAL POSITION, AND A "LOW AIR TEMPERATURE" ALARM LIGHT ON THE FACE OF THE RESPECTIVE TEMPERATURE/EQUIPMENT CONTROL PANEL SHALL BE ILLUMINATED OR ALARM INDICATION SENT TO THE PLANT CONTROL SYSTEM. AN ADJUSTABLE 0 TO 5 MINUTE TIME DELAY RELAY SHALL BE PROVIDED TO ALLOW FOR STARTING OF THE EQUIPMENT UNDER COLD AMBIENT CONDITIONS. UPON LOW TEMPERATURE SHUTDOWN, THE EQUIPMENT SHALL REQUIRE A MANUAL RESTART.

1.2.4.1. VENTILATION SYSTEM FAILURE (AIRFLOW SWITCHES). VENTILATION SYSTEM FAILURE PRESSURE DIFFERENTIAL SWITCHES SHALL BE LOCATED IN THE SYSTEMS INDICATED BELOW. IN THE EVENT THAT AIRFLOW IS NOT ATTAINED OR LOST AS DETERMINED BY THE PRESSURE DIFFERENTIAL FLOW SWITCH, A "VENTILATION SYSTEM FAILURE" SIGNAL SHALL BE TRANSMITTED TO THE FIRE ALARM SIGNALING SYSTEM. WHERE A FIRE ALARM SIGNALING SYSTEM IS NOT PRESENT, THE "VENTILATION SYSTEM FAILURE" SIGNAL SHALL BE TRANSMITTED TO THE PLANT CONTROL SYSTEM (PCS). WHERE INDICATED ON THE DRAWINGS, A VISUAL ALARM SHALL BE ILLUMINATED AND AUDIBLE ALARM SHALL SOUND AT EACH ROOM ENTRANCE AND WITHIN THE ROOM. THE FIRE ALARM SIGNALING SYSTEMS HAVE A NORMALLY OPEN CONTACT FOR TRANSMITTING A SIGNAL TO THE RESPECTIVE TEMPERATURE/EQUIPMENT CONTROL PANEL ILLUMINATING AN ALARM INDICATING LIGHT FOR THE RESPECTIVE EQUIPMENT.

3.2. "ON-OFF-AUTO" EQUIPMENT CONTROL. EQUIPMENT INDICATED FOR "ON-OFF-AUTO" CONTROL SHALL EACH BE CONTROLLED BY AN INDIVIDUAL "ON-OFF-AUTO" FAN SELECTOR SWITCH. THE SWITCH LOCATION SHALL BE AS INDICATED BELOW. WHEN THE SWITCH IS PLACED IN THE "AUTO" POSITION, THE FAN SHALL BE INTERLOCKED AND CONTROLLED BY THE FAN INTERLOCK. WHEN THE SWITCH IS PLACED IN THE "ON" POSITION, THE FAN SHALL BE ENERGIZED. BEFORE A FAN CAN OPERATE, THE CONTROL DAMPER(S) SHALL BE PROVEN OPEN. WHERE THE FAN IS INTERLOCKED WITH ANOTHER FAN OR EQUIPMENT WITH A FAN, THE FANS SHALL BE ENERGIZED SIMULTANEOUSLY AFTER ALL ASSOCIATED CONTROL DAMPERS ARE PROVEN OPEN. WHEN THE FAN IS DE-ENERGIZED, THE CONTROL DAMPER(S) SHALL RETURN TO THE NORMALLY CLOSED POSITION UNLESS OTHERWISE INDICATED.

4.1. MAKEUP AIR UNITS (100% OUTSIDE AIR). MAKEUP AIR UNITS SHALL EACH BE CONTROLLED BY AN INDIVIDUAL "SUMMER-OFF-WINTER" SYSTEM SELECTOR SWITCH. THE SWITCH LOCATION SHALL BE AS INDICATED BELOW. WHEN THE SWITCH IS PLACED IN THE "WINTER" POSITION, THE FAN SHALL OPERATE AND THE SUPPLY AIR SENSOR/THERMOSTAT SHALL MODULATE THE HEATING OUTPUT OF THE UNIT TO MAINTAIN THE DESIRED SUPPLY AIR TEMPERATURE. BEFORE THE FAN CAN OPERATE, THE CONTROL DAMPERS SHALL BE PROVEN OPEN. WHEN THE OUTSIDE AIR TEMPERATURE IS GREATER THAN THE HEATING CHANGEOVER TEMPERATURE SETPOINT AS DETECTED BY THE OUTDOOR AIR SENSOR/THERMOSTAT, THE HEATING SHALL BE LOCKED OUT. WHEN THE SWITCH IS PLACED IN THE "SUMMER" POSITION, THE FAN SHALL OPERATE AND THE HEATING SHALL BE LOCKED OUT. WHEN THE UNIT IS DE-ENERGIZED, THE CONTROL DAMPER(S) SHALL CLOSE.

Design Package Approval Form

By signing this Design Package Approval Form, you approve the design specifications and drawings (the "Design Package") as dated for Bessamaire unit(s)

This Approval Form must be signed and returned to Bessamaire, along with all down payment obligations, before the final engineering processes and production begins.

If you cannot approve this Design Package, please identify any necessary revisions below and we will submit a revised Design Package that incorporates those changes.

If there are any Design Package changes after you have signed and returned this Design Package Approval Form to Bessamaire, Bessamaire will notify you immediately.

There will be a 12-week delivery period from the date Bessamaire receives this Design Package Approval Form and you have submitted all down payment obligations.

Bessamaire's Standard Terms and Conditions are specifically incorporated herein and accepted by you pursuant to this Design Package Approval Form.

X_____

Approved signature

P-413 Typical Properties (@ 1 mil DFT)

Salt Spray: ASTM B-117: 6,000+ hours

SWAAT: ASTM G85-11 Section A.3: Passed 1,000 hours using pressurized coil (see page 2 for results)

Cyclic Weathering: ISO 20340 Offshore Standard: Passed (4,200 hours)

Performance Testing: ISO 12944-6 C5 I/M: Passed C5-M high durability and C5-I high durability

Heat Transfer Reduction: <1% as applied for heat transfer components

Humidity: ASTM D-2247: 2,000+ hours

Simulated Sea Water Resistance: 2,000 hours

Solvent Resistance: ASTM-D5402: 100 acetone double rubs

Cross-hatch Adhesion: ASTM D-3359: 5B

Mandrel: ASTM-D522: >1/4 inch

Impact: ASTM D-2794: 160 lb/inch steel; 40 lb/inch aluminum

pH Range (14 day liquid spot test): 2.4–12.6

Temperature Cycling (4 hours at –75°C; 4 hours at 190°C):

4B–5B adhesion after 5 cycles

Dry Heat Resistance (4 hours at 200°C; 20 minutes at 232°C): 4B–5B adhesion after 5 cycles

Dry Film Thickness: ~1 mils

Hardness: ASTM D3363: 5–6H

Gloss: 20–60 on 60 degree meter (topcoat dependent)

Microchannel Compatible

Abrasion Resistance: 30–40 mg loss per 1,000 cycles

Meets FDA 175.300 for indirect food contact

Meets MIL Spec: MIL-C-18467, MIL-E-480 and MIL-STD-883 Method 1101

Meets Other Specs: Honeywell MC 7200-01 and GE F50T17

Thermal Conductivity: At approximately 2 mils thickness, Thermal Conductivity is less than 1.0 w/mK

Dielectric Strength [ISO2376:2010(e)]: 286 volts per mil of thickness