



CUSTOM AIR PRODUCTS & SERVICES, INC.

35 Southbelt Industrial Drive • Houston, Texas 77047

(713) 460-9009 • Fax (713) 460-9499

www.customairproducts.com

HERC

40 TON INDUSTRIAL AC UNIT

-

17F-0792

40 TON INDUSTRIAL AC UNIT

NEMA 4

-

-

460V/3PH/60HZ

GENERAL PURPOSE

5/7/2018

INSTALLATION & OPERATION MANUAL

BOOK ASSEMBLED BY: JONATHAN O'MALLEY

DATE: 5/7/2018

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17F-0792**

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SECTION

01

JOB SCOPE



Quote No:	
Quote Date:	10-27-2017
Project Type:	(15) 40 Ton Industrial AC Unit-100% Outside Air-NEMA 4-Non-Classified
Drawing Delivery:	2 weeks after receipt of order
Equipment Delivery:	12-14 weeks After Receipt of Approved Drawings (ARAD)
Freight Terms:	
Payment Terms:	

Item	Qty	Description
1.	15	<p>CAPS Model #: PPKH-40TD-0NN0NN-5E5-P2-S1CEUP Provide the labor and material to manufacture one (1) custom built air condition unit as follows:</p> <ul style="list-style-type: none"> The skid shall be fabricated from 8" x 4" x 3/16" A36 carbon steel rectangular tube. The skid overall length and width is to be designed so that no part of the unit is outside of the lifting/support frame. The fork truck lifting slots are 6" x 12" x 3/16" A36 carbon steel material and are incorporated into the design on 48 1/2" inside to inside fork lift slot walls for a 60" centerline dimension. The skid components are continuously welded at all joints. All tubing ends are capped and continuously welded. All serial numbers are to be Laser cut on 10 gauge 304 stainless steel sheet and attached with powder actuated fasteners on the skid at opposite corner locations. The lifting/support frame material shall be 4" X 4" square steel tubing. This frame is designed for overhead lifting and stacking of the units. All tubing ends are capped and continuously welded. The tubing is cut and fit to the height, width, and length of the unit. All corners have a 45 degree, 3/8" steel plate gusset. The top of the rack has a 3/8" steel plate gusset welded to the horizontal tubing and incorporates a 1/2" eyebolt application. The entire skid/lifting frame assembly shall be hot dipped galvanized before component installation. The condenser housing will be of single wall construction. The housing skin and all dividers will be formed from 14 gauge 304 stainless steel. Condenser coils shall have copper tubes and aluminum fins with 3 rows and 13 fins per inch sized to match evaporator specifications. Condenser coils will be provided with EnergyGuard protective coatings. Four (4) direct drive propeller fans are provided to include 24" non-sparking poly glass fan blades, stainless steel wall housing and 2 HP, 460-3-60 motors.

Item	Qty	Description
		<ul style="list-style-type: none"> • The AHU will be of double wall construction. The exterior skin shall be formed from 18 gauge 304 stainless steel. The inner walls and floor shall be fabricated from 20 gauge 304 stainless steel. All interior blanks shall be 16 gauge 304 stainless steel. • The unit shall be insulated with 1", 3-pound density liner. An adhesive is applied to all metal surfaces to be insulated and the insulation is fitted to match. • The hardware shall be from non-corrosive material to include: Stainless steel TEK-screws and positive acting compression latches. • All access doors/pull panels shall be of double-wall construction using 18 gauge 304 stainless steel for the outer shell and 20 gauge 304 stainless steel for the inner shell. "Close All" 1/4" neoprene gasket is installed on all door frames/openings for air sealing. • The drain pan shall be formed from 16 gauge T-304 stainless steel and continuously welded at all corners and drain connections. Coil hat section supports shall be formed and welded using T-304 stainless steel and designed to allow for easy coil removal. All coil drain lines and P traps shall be fitted from 1-1/2" galvanized steel fittings. • The return air section on the unit shall have a stainless steel inlet panel with four (4) 20" return air duct collars provided with 2"-30% filters in slide racks. The duct connections are provided with hinged covers that can be secured in the closed position using "Jeep Latch" style clamps. Provide four (4) stainless steel friction lock duct clamps on each collar. • Each unit shall have two (2) 20" stainless steel discharge collars that fit to the interior liner and welded to the exterior wall. Supply air duct connections are provided with hinged covers that can be secured in the closed position using "Jeep Latch" style clamps. Provide four (4) stainless steel friction lock duct clamps on each collar. • The fan shall be a belt-drive plenum fan as manufactured by Greenheck (or equal). The fan is sized for 5,600 CFM at 5.5" of total static pressure. The fan bearings are warranted for 80,000 hours of operation. The drive shall be a double-belt system rated for a 1.5 service factor. • The evaporator fan motor shall be a TEFC 7.5 horsepower, 460-3-60. • The evaporator coils shall be sized to condition air at an entering temperature of 95F DB, 80F WB, and a leaving air temperature of 56F DB, 56F WB The coil shall be 6 rows, 12 fins per inch, with aluminum fins and copper tubes. The total capacity of the system shall be rated at 489,200 Btu/hr. with a sensible capacity of 239,300 Btu/hr. The evaporator coils will be provided with EnergyGuard protective coatings. • The compressors shall be scroll type specifically designed for R-410A refrigerant along with all refrigeration specialties and piping as required per industrial standards with hot gas bypass on both circuits for superior capacity control. A total of two (2) compressors will be provided. CAPS will install Vibra-sorbers on the suction and the discharge lines. • System will include a hot gas bypass on both circuits for low ambient conditions. • All refrigerant specialties are to be installed per industry standards. • Main high voltage panel (for all electrical components greater than 50 volts)-disconnects, controls, and all electric panels shall be installed in a

Item	Qty	Description
		<p>NEMA 4 enclosure and suitable for purging at a later time. Power on and phase incorrect pilot lights as well as an Off/On 2 position switch shall be incorporated into the control panel. Four (4) single pole cam style connectors will be provided for power connections.</p> <ul style="list-style-type: none"> • Main low voltage panel (for all electrical components less than 50 volts)- Carel Controller, entering and leaving temperature selector switch contained in this NEMA 4 enclosure. • Siemens Logo controller digital outputs: <ul style="list-style-type: none"> ○ Each compressor to be controlled by output from controller ○ Set point, differential and dead band to be adjustable ○ Adjustable anti-short cycle ○ Ability to lock out either circuit on “2 strikes and out” and provide common digital out trouble contact closure for each circuit <ul style="list-style-type: none"> ▪ Low pressure ▪ High pressure ▪ “2 strikes and out” – automatic warning flag set to monitor a fault (low or high pressure) for a period of 30 minutes from first fault signal. If during normal operation, a high or low pressure condition occurs, the warning flag will be set and the compressor will shut off immediately. After the anti-short cycle delay, the compressor will be allowed to start. If the high or low pressure condition occurs again within this 30 minute period, the controller will lock out that particular circuit and provide a trouble contact closure. Otherwise, if the compressor continues to operate, the warning flag will be reset after 30 minutes of successful run time. • Controller analog inputs <ul style="list-style-type: none"> ○ One (1) supply air temperature sensor ○ One (1) return air temperature sensor ○ One (1) low pressure (suction), pressure transmitter per circuit ○ One (1) high pressure (discharge), pressure transmitter per circuit • Electrical characteristics of the unit will be 460/3/60, 150 Amp circuit breaker. • All control wiring and tubing is to be installed per industry standards. • Unit is primarily constructed of stainless steel and a galvanized skid. There is a requirement for painting compressors, exposed refrigerant piping and some electrical components. All painting of these components to be white. • Unit to be tested and verified for proper operation at Custom Air Products & Services prior to shipment.
		<p><u>EXCLUSIONS</u></p> <ul style="list-style-type: none"> • Installation, Equipment and Start-up Commissioning by others • Sales tax not included • Freight not included • Overtime not included • Proposal valid for 30 days • Any items not listed in the above scope of work to be performed



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SECTION

02

EVAPORATOR COMPONENTS

Customer:	Date:	2/9/2016
Contact:	From:	Larry Novak
Telephone:	Company:	Custom Air Products
Cell:	Return Tel:	(713) 460-9009
Fax:	Return Fax:	
Job: 40 Ton Jetson	Email:	larryn@customairproducts.com
Quote #: 0		

Construction

Item: 40 Ton Evaporator
 Coils Per Bank: 1
 Tube OD IN: 5/8
 Style: EJ
 Fins Per Inch: 12
 Rows: 6
 Fin Surface: C
 Fin Height (IN): 27.00
 Finned Length (IN): 64.00
 Tubing Mat. (IN): 0.020 Copper
 Fin Mat. (IN): 0.0075 Aluminum
 Circuiting: -18
 Face Area (SQ FT): 12.00

Air Side

Air Flow (Sft^3/min) 5600.0
 Altitude FT: 0.00
 Ent. Air DB/WB °F: 95.00 / 80.00
 Lvg. Air DB/WB °F: 0.00 / 0.00
 Total / Sensible MBH: 488.8 / 0.00
 Max Air PD "H2O: 0.00

Refrigerant Side

Refrigerant: 410A
 Super Heat °F: 20.00
 Saturated Suction Temp °F: 45.00
 Liquid Temp °F: 109.8

OUTPUT DATA			OPTIONS	
Model Number:		5EJ1206C	Casing Material:	Galvanized
Air Velocity:	(Sft/min)	466.7	Casing Type:	Flanged
Total Capacity:	MBH	489.2	Hand:	Right
Sens. Capacity:	MBH	239.3	Connection Material:	Copper
Lvg. Air DB:	°F	55.43	ByPass Kit Quantity:	2
Lvg. Air WB:	°F	55.43	ByPass Kit Size:	0
Standard APD	"H2O	1.07	Label Kit:	No
Code 18/19:		8018/20	Coating: None	
Code 18/19_2:		N/A	Mounting Holes:	No
Suction Conn.:	IN	(2) 1.625	Drain Headers:	No
Distributor Conn 1:	IN	(2) 1.125	Boxed Headers:	No
Distributor Conn 2:	IN	N/A		
Refg. PD:	lbf/in^2	2.24		
Refg. Velocity:	ft/min	1392.5		
Internal Volume:	in^3	2303.6		
Weight:	lbm	260.6		
Notes:		CJMU		

Notes:

- C) Coil is NOT certified by AHRI.
- J) Coil Will Be Supplied With Multiple Distributors.
- M) Coil rating valid for Heatcraft coils only.
- U) User-entered circuiting. Check circuiting for dropped tubes or opposite-end connections

Performance	
Quantity	1
Volume (CFM)	5,600
External SP (in. wg)	5.5
Total SP (in. wg)	5.5
Operating Power (hp)	7.34
Start-Up Power (hp)	7.34
Fan RPM	2487
Max Fan RPM	2,964
Oper. Frequency (Hz)	60
Elevation (ft)	105
Start-up Temp.(F)	70
Operating Temp.(F)	70

Fan Configuration	
Size	18
Class	II
Arrangement	3
Rotation	CW
Orientation	Horizontal

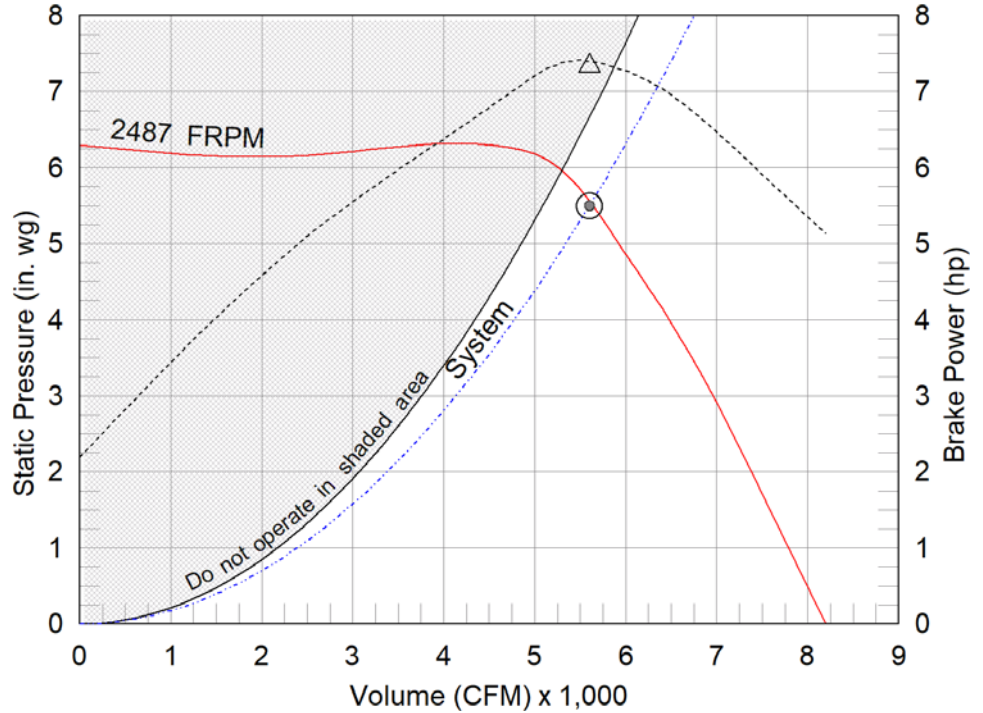
Equipment Weights	
Fan (LMD)(lb)	158
Motor/Drive (lb)	133
Accessories (lb)	19

Misc Fan Data	
FEG	80
Outlet Velocity (ft/min)	2,205
Static Efficiency (%)	69
Tip Speed (ft/min)	11,881
Corner Weight A (lb)	49
Corner Weight B (lb)	102
Corner Weight C (lb)	52
Corner Weight D (lb)	108

Motor and Drives	
Motor	Included
Size (hp)	7 1/2
RPM	1725
Enclosure	TEFC
Voltage	460
Cycle	60
Phase	3
Frame Size	184T
Max Frame Size	184
Location	Right Side
Pulley Type	Constant
Drive Loss (%)	3.7
Drives	Multiple
Drive Service Factor	1.5
NEC FLA* (Amps)	11

Model: 18-APH-3-II-75
Plenum Fan

Operating Performance



- △ Operating Bhp point
- Operating point at Total External SP
- Operating point at External SP
- Fan curve
- - - System curve
- - - Brake horsepower curve



Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	83	82	85	91	82	82	78	73	91	79	30
Outlet	86	88	88	93	89	88	82	77	95	83	38

*FLA - based on tables 150 or 148 of National Electrical Code 2002. Actual motor FLA may vary, for sizing thermal overload, consult factory.

LwA - A weighted sound power level, based on ANSI S1.4

dBA - A weighted sound pressure level, based on 11.5 dB attenuation per octave band at 5 ft- dBA levels are not licensed by AMCA International

Sones - calculated using AMCA 301 at 5 ft

Model: 18-APH-3-II-75

Plenum Fan

Standard Construction Features:

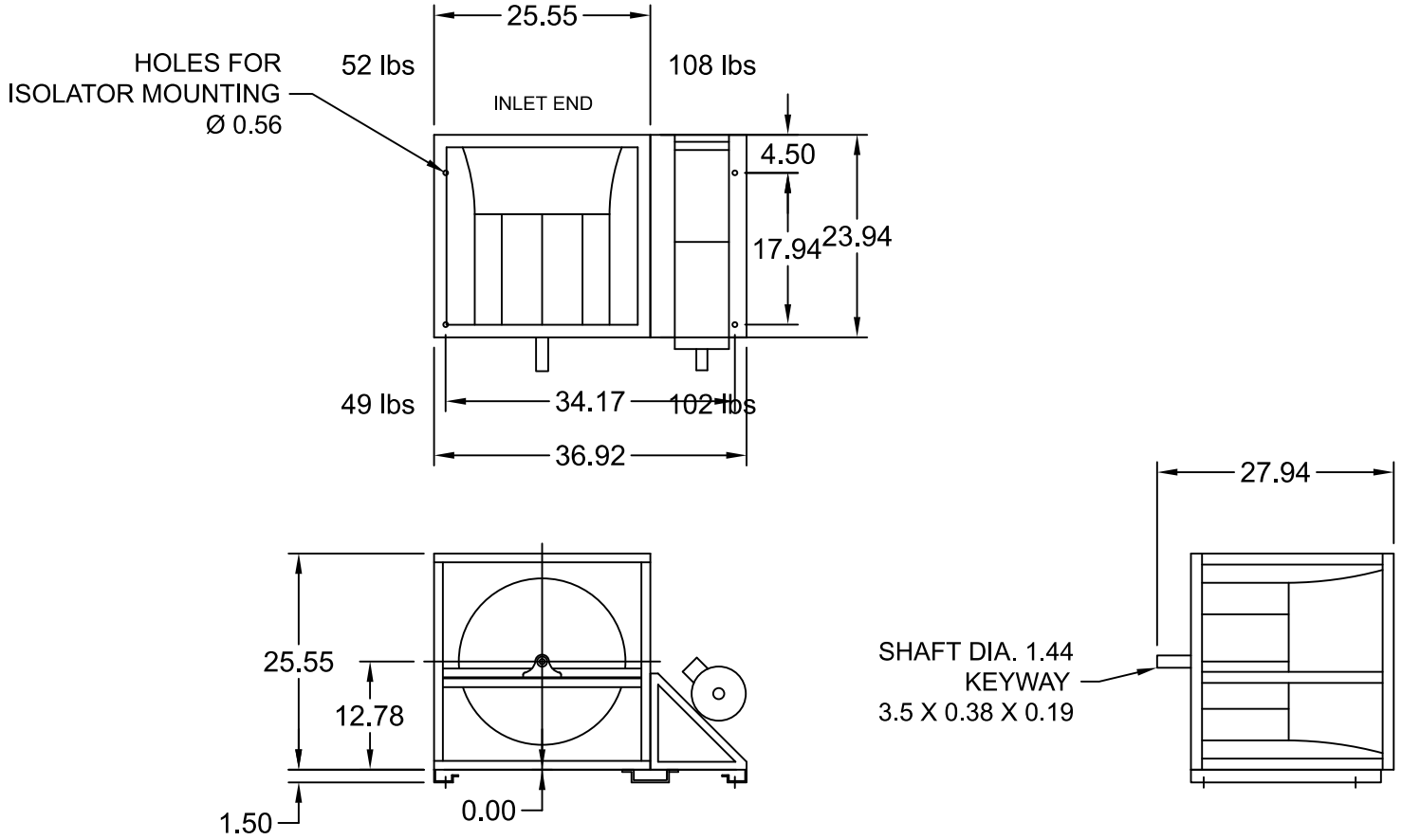
HOUSING: Heavy gauge, welded steel mounting frame with die formed flanges - Inlet panel is heavy gauge steel with die formed flanges with welded corners - Steel components are phosphatized and coated - Corrosion resistant fasteners BEARINGS, SHAFT, AND WHEEL: Heavy duty, concentric locking, self-aligning ball or roller pillow block bearings - Polished, solid steel shafts - Welded, aluminum centrifugal wheel - 12 bladed construction- Airfoil blade profile

Selected Options & Accessories:

NEMA Premium Efficient Motor - meets NEMA Table 12-12
Motor VFD Rated without Shaft Grounding Protection
Motor with Minimum 40 Degree C Ambient Temperature
Motor with Class B or Greater Insulation
Fan Class - II
Motor Position - RightSide
Bearings - L(10) Life of 80,000 Hours, L(50) avg. life 400,000 Hours
Coating - Permatecor, Concrete Gray-RAL 7023, Fan and Attached Accessories, Mill Finish on Aluminum Wheel
Fan Orientation - Horizontal
Inlet Guard
Protective Cage - Totally Enclosed, coated w/Safety yellow finish
Factory Vibration Test, 0.15 in/sec, peak, filter-in as measured at the fan RPM
Motor Slide Base
7.5HP TEFC 460/60/3 1725RPM (T1600048)
HORIZONTAL ARR. 3 MOUNT MOTOR RIGHT SIDE (C1600036)
Unit Warranty: 1 Yr (Standard)

Model: 18-APH-3-II-75

Plenum Fan



Notes: All dimensions shown are in units of in.
Drawings are not to scale. Drawings are of standard unit and do not include dimensions for accessories or design modifications.



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SECTION

03

CONDENSER COMPONENTS

Customer:		Date:	2/9/2016
Contact:		From:	Larry Novak
Telephone:		Company:	Custom Air Products
Cell:		Return Tel:	(713) 460-9009
Fax:		Return Fax:	
Job:	40 Ton Jetson	Email:	larryn@customairproducts.com
Quote #:	0		

Construction

Item : 40 Ton Condenser
 Coils Per Bank : 1
 Duty : Condenser
 Style : CF
 Condensing Sections : 2
 Tube OD IN: 1/2
 Fins Per Inch: 13
 Rows : 3
 Fin Surface : B
 Circuiting : 16
 Fin Height IN: 67.50
 Finned Length IN: 112.00
 Tubing Material: 0.016 Copper
 Fin Material: 0.0075 Aluminum
 Face Area (SQ FT): 52.50

Air Side

Air Flow -S ft³/min: 32,000.00
 Altitude FT: 0
 Ent. Air DB °F: 95.00
 Lvg. Air DB °F: 0.00
 ✓ Total Capacity MBH: 622.90
 Max Air PD "H2O: 0.00

Refrigerant Side

Refrigerant Type: 410A
 Condensing Temp. °F: 125.00
 Vapor Temp. °F: 191.00
 Subcooling Temp. °F: 15.00
 % Condensing Load:

OUTPUT DATA		Most Economical			Specified Coil		
		Coil 1	Coil 2	Coil 3	Coil 4 ✓	Coil 5	Coil 6
Model Number					4CF1303B		
Air Velocity -S	ft/min				609.52		
Total Capacity	MBH				623.76		
Leaving Air DB	°F				112.97		
Standard APD	"H2O				0.34		
Refrigerant PD	lbf/in ²				5.01		
Refg. Mass Flow	lbm/hr				6874.83		
Leaving Refg.	°F						
Circuits					16.00		
Subcooling Temp.	°F				15.42		
Fixed Subcool	MBH				0.00		
Liquid Conn. Size	IN				(2) 0.88		
Vapor Conn. Size	IN				(2) 1.13		
Tubes of Liquid					10.43		
Internal Volume					3807.51		
Weight	lbm				476.80		
Notes					M		

Notes:

M) Coil rating valid for Heatcraft coils only.



Fan specification:

Fan article number	FP00001M77100	
Customer article numer	CND63	
Voltage	265/460	V
Frequency	60	Hz
Fan speed	1745	RPM
Minimum ambient temperature	-25 (-13)	°C (°F)
Maximum ambient temperature	55 (131)	°C (°F)
Frequency control	YES	
Insulation class	CL.F	
IP Class Fan	IP55	

Motor specification:

Motor article number	FM0457M7G0100	
Approvals	cURUs	
Shaft power	1.5	kW
Shaft power	2.0	HP
Voltage	265/460	V
Frequency	60	Hz
Minimum ambient temperature	-25 (-13)	°C (°F)
Maximum ambient temperature	55 (131)	°C (°F)
Frequency control	YES	
Insulation class	CL.F	
IP Class Fan	IP55	

Impeller specification:

Impeller type number	624/4-4/P4ZL/37,5/PACAS	
Diameter	624 (24.6)	mm (inch)
No. of blades	4	
Hub size	4	
Blade profile	P4Z	
Rotation direction	L	
Pitch angle	37.5	°
Blade material	PACAS	
Shaft diameter	19 (0.75)	mm (inch)
Key width	6 (0.24)	mm (inch)
Hub length	42 (1.65)	mm (inch)
Assembly form	A	

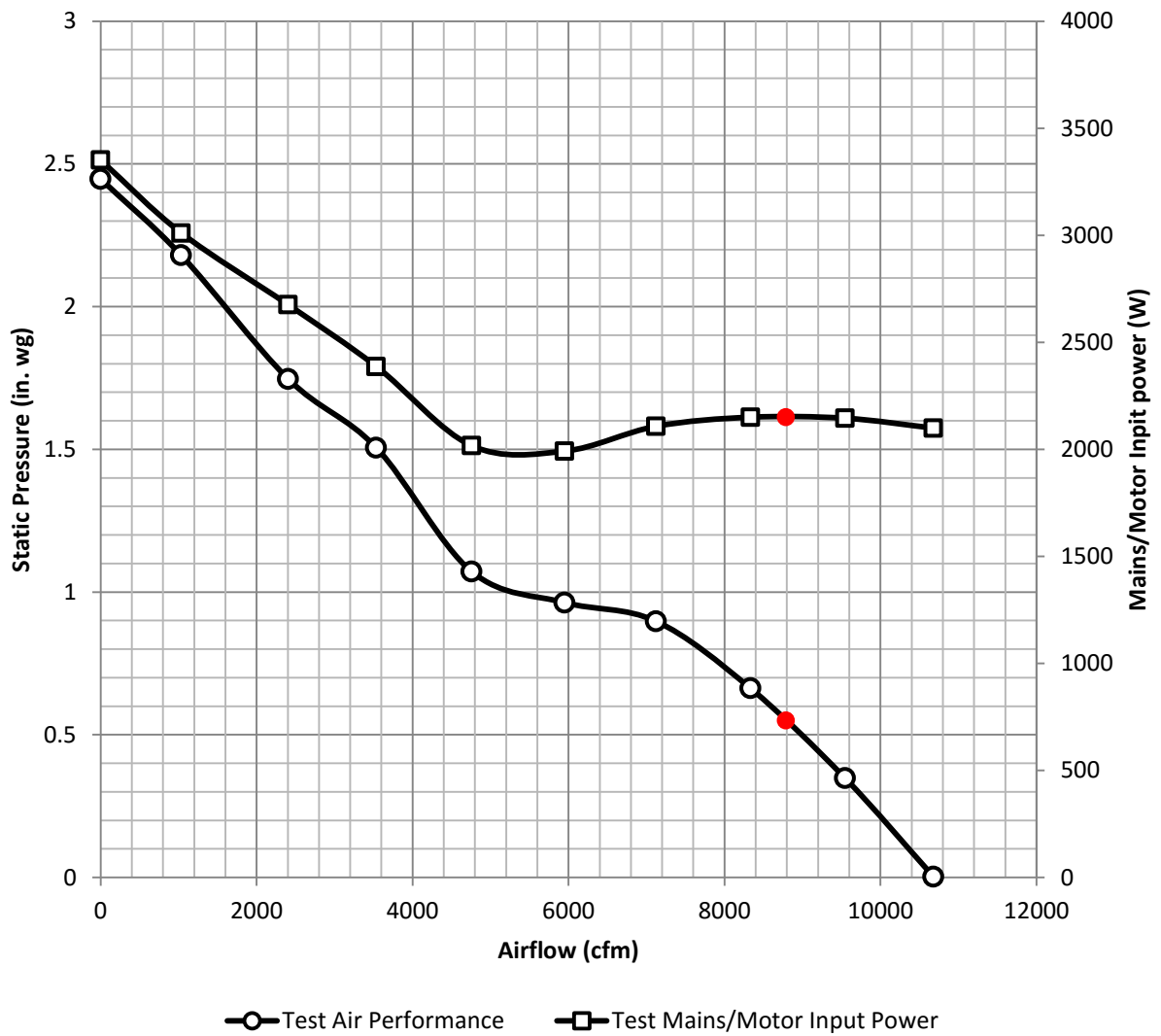


Fan performance:

Test institute	AMCA	
Test method	ANSI / AMCA 210-16	
Installation Type	A	
Test number	34743-A1	
Test date	09/13/2017	

Results at Standard Air:

Det. No.	Pt (in. wg)	Pv (in. wg)	Ps (in. wg)	Q (cfm)	W (W)
1	0.616	0.613	0.003	10679	2099
2	0.837	0.489	0.348	9546	2145
3	1.036	0.372	0.663	8332	2150
4	1.170	0.272	0.898	7120	2107
5	1.153	0.190	0.963	5951	1992
6	1.193	0.121	1.072	4756	2017
7	1.573	0.067	1.506	3534	2387
8	1.778	0.031	1.747	2403	2676
9	2.185	0.006	2.18	1033	3011
10	2.447	0.000	2.447	0	3351

Results at Standard Air:

Specific design point:

Det. No.	Pt	Pv	Ps	Q	W
	(in. wg)	(in. wg)	(in. wg)	(cfm)	(W)
-	-	-	0.55	8790	2150



Fan performance:

Test institute	AMCA	
Test method	ANSI / AMCA 300-14	
Installation Type	A	
Test number	34743-S1	
Test date	09/13/2017	

Test conditions:

Det. No.	Pt (in. wg)	Pv (in. wg)	Ps (in. wg)	Q (cfm)	W (W)
3	-	-	0.549	8808	-

Full Octave Band Analysis:

Sound Power Level Lw in dB per Octave Band:

	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4kHz	8 kHz	
Lw	82.5	93.7	93.7	86.9	87.4	85.7	84.5	82.5	dB

Total Sound Power Level Lw in dB:

Lw	98.3	dB
-----------	------	-----------

Sound Power Level LwA with A-weighting in dB(A) per Octave Band:

	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4kHz	8 kHz	
LwA	56.3	77.6	85.1	83.7	87.4	86.9	85.5	81.0	dB(A)

Total Sound Power Level LwA with A-weighting in dB(A):

LwA	93.3	dB(A)
------------	------	--------------

Calculated Sound Pressure Level LpA at 3 meters with A-weighting in dB(A) per Octave Band:

	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4kHz	8 kHz	
LpA	38.8	60.1	67.6	66.2	69.9	69.4	68.0	63.9	dB(A)

Total calculated Sound Pressure Level LpA at 3 meters with A-weighting in dB(A):

LpA	75.8	dB(A)
------------	------	--------------

Note: Sound Pressure Level LpA at 3 meters was calculated using an ideal hemisphere under free field conditions, therefore LpA levels cannot be guaranteed in actual applications.

Article number: FP00001M77100

Panel fans

Technical data

Voltage	U	265/460	V
Phase		3	~
Frequency		60	Hz
Speed		1745	RPM
Power consumption	P _e	2100	W
Nominal current	I	5.6/3.2	A
Maximum current	I	5.7/3.3	A
Capacitor		-	μF
Ambient temperature	T _{amb min/max}	-13...131	°F
Insulation Class		CL.F	
IP Class Fan		IP55	

Fan details

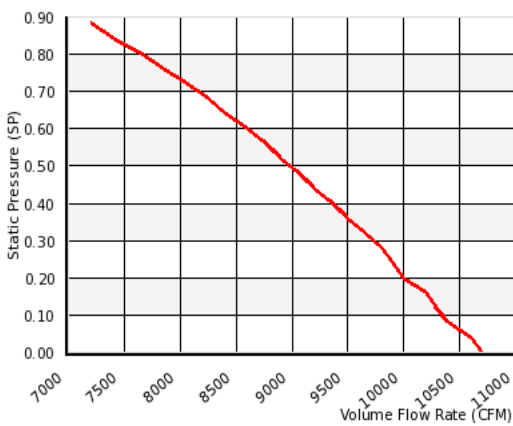
Impeller blades	4
Impeller type	P4
Impeller system	Z
Impeller material	PC

Control options

Triac controller	No
Transformer	No
Frequency drive	Yes
Intelligent Fan Drive	No

Characteristics

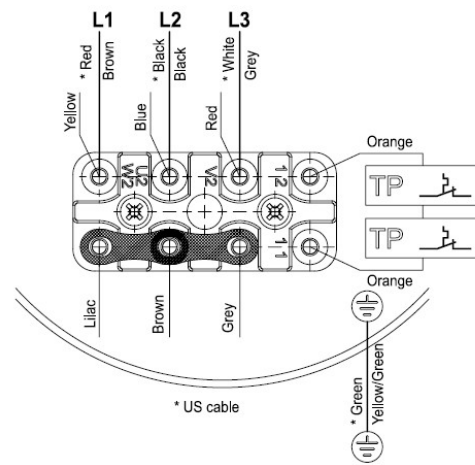
0.00 in. wg 10700 CFM
0.60 in. wg 8600 CFM



Please note: Picture may deviate from original product

Wiring diagram - Fan

AC01 - CCW



Technical data

Voltage	U	265/460	V
Current	I	5.1/3.0	A
Capacitor		0/0	μF/V
Cos phi		0.74	
P ₂		1.50	kW
P ₂ (Horsepower)		2.00	Hp
Phase		3	~
Poles		4	
Frequency		60	Hz
Speed		1760	RPM
Ambient temperature	T _{amb} min/max	-25...55	°C
Insulation Class		CL.F	
IP Class		IP55	
Weight		10.0	kg
Efficientie class		IE2	



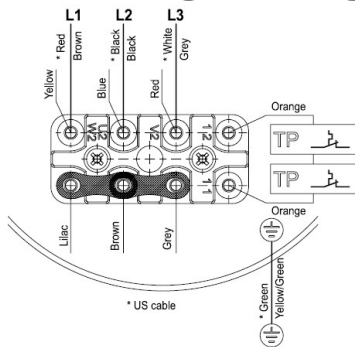
Efficiency IE2

100% Load	85.7%
80% Load	85.1%
50% Load	82.0%

Control options

Triac controller	No
Transformer	No
Frequency drive	Yes

Wiring diagram



CND50 and CND63 Condenser Fans

**FOLLOW INSTALLATION INSTRUCTIONS CAREFULLY.
DO NOT TAKE ANY SHORTCUTS!**

CHECKLIST UPON RECEIPT OF GOODS

1. Inspect for any damage that may have occurred in transit. Report any damage within 48 hours.
2. Check all bolts, screws, set screws etc. for looseness, and re-tighten if necessary.
3. Before installation, rotate the blade to make sure it moves freely. Adjust if necessary.
4. Before installation, please read the entire information sheet carefully.

GENERAL SAFETY INFORMATION

WARNING!

TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONNEL, OBSERVE THE FOLLOWING:

1. Use this unit only in the manner intended by the manufacturer. If you have any questions, contact the manufacturer.
2. Before servicing or cleaning the unit, switch the power off at the service panel. Lock the service panel to prevent the power from being accidentally switched on. If the service panel cannot be locked, securely fasten a prominent warning device, such as a tag, to the service panel.
3. Installation work and electrical wiring must be done by qualified persons in accordance with all applicable codes and standards, including standards on fire-resistant construction.
4. Sufficient air is needed for proper combustion and exhausting of gases through the flue (chimney) of fuel burning equipment to prevent back drafting. Follow the heating equipment manufacturer's guideline and safety standards such as those published by the National Fire Protection Association (NFPA), and the American Society for Heating, Refrigeration and Air Conditioning Engineers (ASHRAE), and the local code authorities.
5. When cutting or drilling into a wall or ceiling, do not damage electrical wiring and other hidden utilities.
6. Ducted fans must always be vented to the outdoors.

CAUTION - For general ventilation use only. Do not use to exhaust hazardous or explosive materials or vapors.

LIMITED WARRANTY

Vostermans Ventilation Inc. warrants the Multifan and MF Flex motors, to the original user, against defects in workmanship on materials, under normal use and service (rental use excluded) for the indicated period of guarantee after date of purchase. Any part which is determined to be defective in material or workmanship should be returned to the dealer from whom it was purchased. All shipping cost will be paid by the customer unless arranged differently prior to return. Parts will be repaired or replaced at the dealer's discretion.

DISCLAIMER

The warranties contained herein are made expressly in view of any and all other warranties expressed or implied. The liability of the seller is limited to the repair or replacement of any product which does not conform to the warranties expressly provided herein.

GUIDELINES FOR INSTALLATION

1. All moving parts should be guarded.
2. The unit should be securely installed in a rigid framework. **Caution:** *allowing the fan frame to bend or move will result in unwanted vibrations and possible premature motor or blade failure.*
3. Connect the power to the motor using an approved wiring method.
4. Before activating the fan, double check to ensure that there are no obstructions (framing, packaging, debris, cord, etc.) that can interfere with proper fan operation.
5. Ensure proper installation/removal of drain plug, see diagram.
6. Use liquid tight fittings and conduits.
7. If fan is used to inflate advertising tubes make sure that placement will not interfere with traffic flow, hinder visibility or makes contact with overhead power lines.
8. Do not use a three-phase fan with any solid-state speed control devices!
9. Three-phase fans require field-provided motor overload protection. The overload protection device shall be rated or selected in compliance with the applicable installation code as specified by the authority having jurisdiction.
10. Vostermans advises the use of a motor protection switch (MPS) with single-phase fans. **ALWAYS use an MPS with three-phase fans!**
11. Motor must be securely and adequately grounded.

USE LIMITATIONS

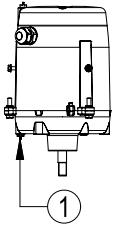
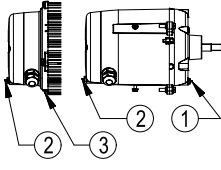
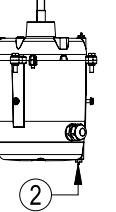
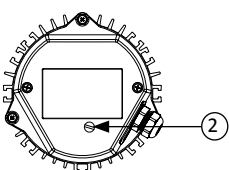
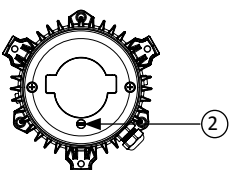
1. Verify that fan/motor is capable of variable speed operation before attaching speed control devices.
2. Installation instructions for fan and controller must be followed carefully. All warranty rights and conditions are rendered null and void if a low quality controller is used.
3. Assure sufficient air supply over the motor under all circumstances. Limits of operating ambient temperatures are -13 to 131 degrees F (-25 to 55° C).

NOTE: DRAIN HOLES:

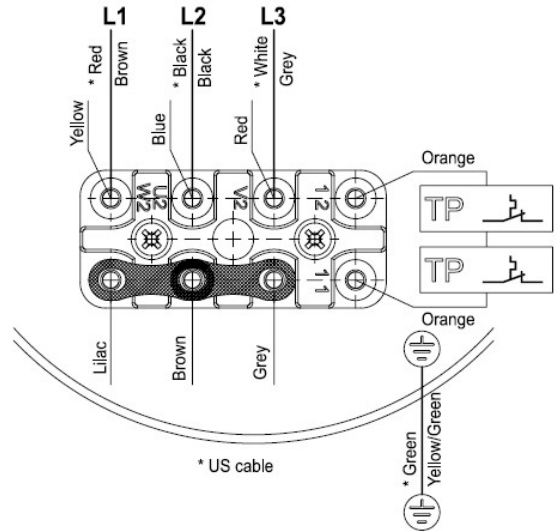
Each Vostermans motor has 2, 3 or 4 drain holes:

- 1 or 2 on the back cover.
- 1 or 2 on the front shield.

Depending on the installation angle, the drain hole at the **lowest point** needs to be open, the others plugged.

Motor Position	Action
	Remove Plug 1
	Remove Plug 1, 2 and 3
	Remove Plug 2
	An example of an old motor type with a different drain plug position. Remove Plug 2
	An example of an old motor type with a different drain plug position. Remove Plug 2

3~ Motor Wiring Diagram



NOTE:

ALL VOSTERMANS THREE-PHASE FANS ARE WIRED TO 460V. SEE WIRING DIAGRAMS FOR INSTRUCTIONS TO CHANGE THIS TO 240V.

*Please check the motor label for the wiring diagram number (ex. WD: AA01) or contact Vostermans Ventilation Inc. for assistance.

TO REVERSE MOTOR ROTATION:

For 1~ motors, switch the red and brown wires.
 For 3~ motors, switch any two-line wires.

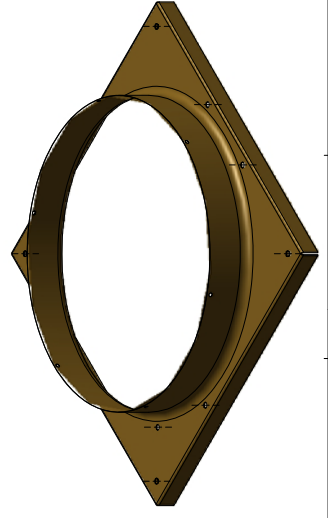
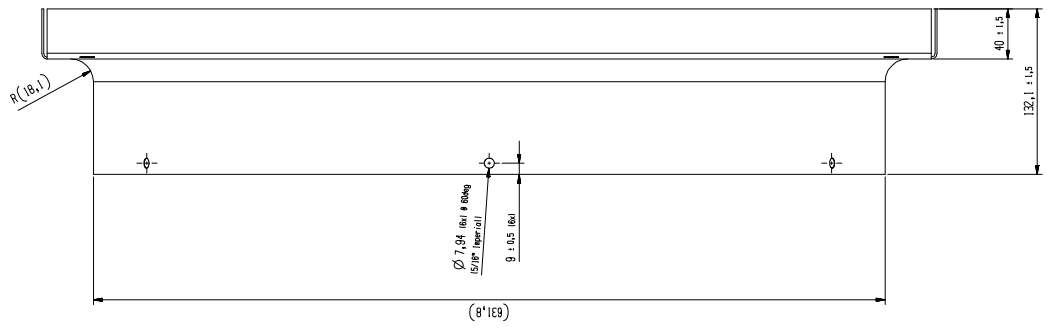
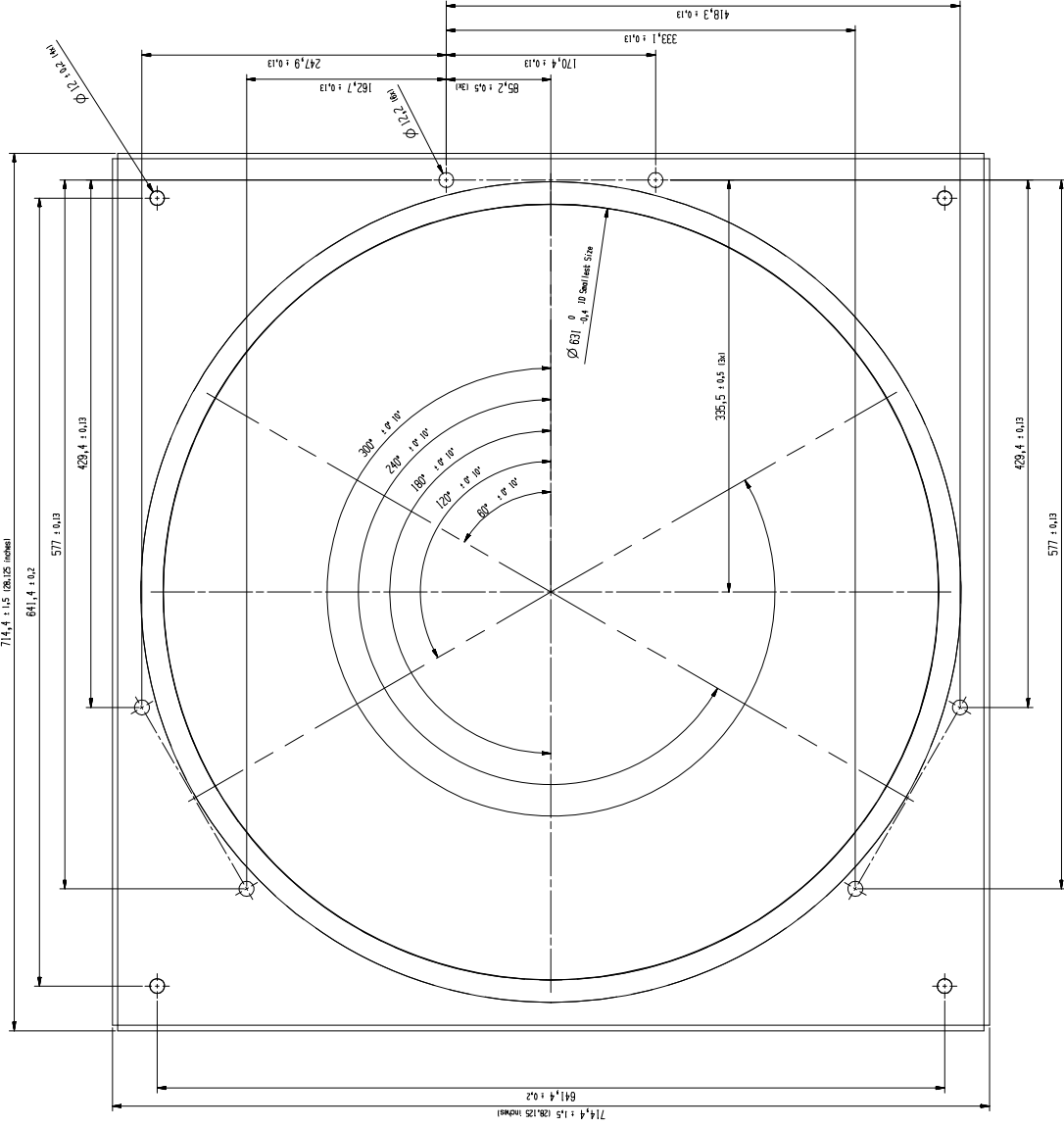
MAINTENANCE

1. Disconnect all sources of power before servicing.
2. When cleaning the motor, the drain holes have to be closed with a drain plug.
3. After wash down, it is recommended to run all motors for 2 hours to dry.
4. Periodically clean the wire guard for better efficiency and correct air movement.
5. Periodically clean the blades and motor to remove any excessive accumulation of dirt.
6. In all Multifan or MF FLEX motors, the bearings are sealed and do not require greasing.
7. The only field-serviceable parts in the motor are the capacitor(s) and the bearings, see www.vostermansusa.com.



Vostermans Ventilation Inc.
 2439 S.Main St. – USA
 Bloomington, IL 61704
 Tel. +1 309 827 - 9798
 Toll Free 800-458-5532
 Fax +1 309 829 - 1993
ventilation@vostermansusa.com
www.vostermansusa.com





Q	1/27/2017	LM	Water treated hollow steel for 875 water
F	11/06/2017	LM	Initial Rev. for 28.125"
M.C. no.	Rev.	Date	Int.
Drawn	Checked	Approved	Remarks
U. Wilson	9/16/18		
Veasna Industries Steel Panel for Condenser Fans <small>Veasna Industries Inc. 28.125" Dia. 304L SS Panel - 875 Water</small>			
Material	Surface treatment	Units	Projection
304 SS	none	mm	mm
18ga		1:1	
152.2768#			
Description		Size	Rev.
24in 304L SS Panel CAPS		A1	F
		Drawing no.	VR1603
		Sheet 1 of 1 sheets	



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SECTION

04

COMPRESSOR SELECTION



BITZER Output data

Created on : 06.11.2017 18:17:48



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Project survey.....	3
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Information: Scroll-Compressor.....	6



Project survey

Selected compressors

Scroll-Compressor

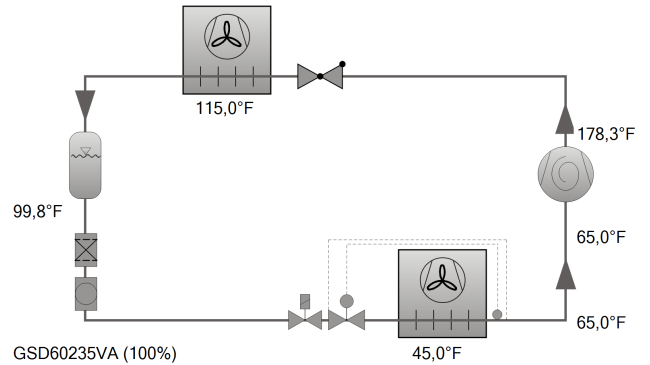
1x GSD60235VA



Selection: Scroll-Compressor

Input Values

Compressor model	GSD60235VA
Refrigerant	R410A
Reference temperature	Dew point temp.
Evaporating SST	45,0 °F
Condensing SDT	115,0 °F
Liq. subc. (in condenser)	15,00 °F
Suct. gas superheat	20,00 °F
Power supply	460V-3-60Hz UL
Useful superheat	100%

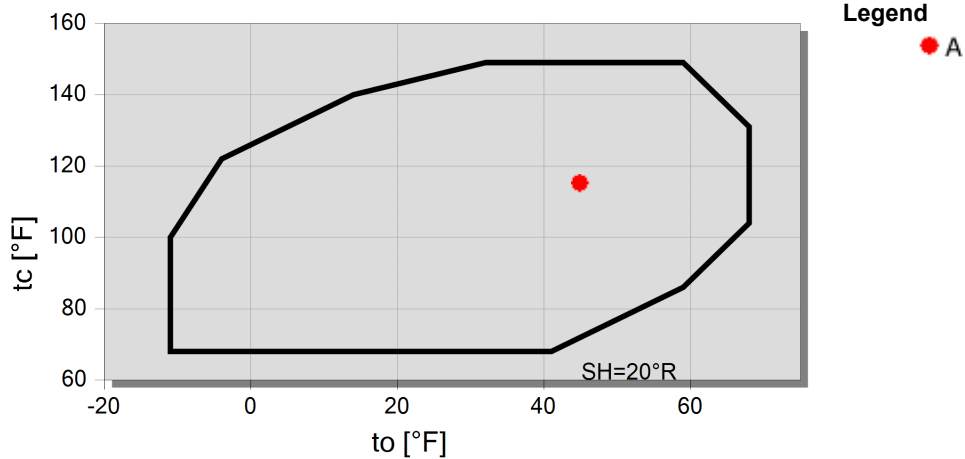


Result

Compressor	GSD60235VA_4
Capacity steps	100%
Cooling capacity	261 kBtu/h
Cooling capacity *	261 kBtu/h
Evaporator capacity	261 kBtu/h
Power input	17,81 kW
Current (460V)	25,0 A
Voltage range	460V
Condenser Capacity	321 kBtu/h
COP/EER	14,63
COP/EER *	14,63
Mass flow	3491 lb/h
Discharge gas temp. w/o cooling	178,3 °F

Tentative Data.
according to ARI540 (20°F suction gas superheat, 15°F liquid subcooling)

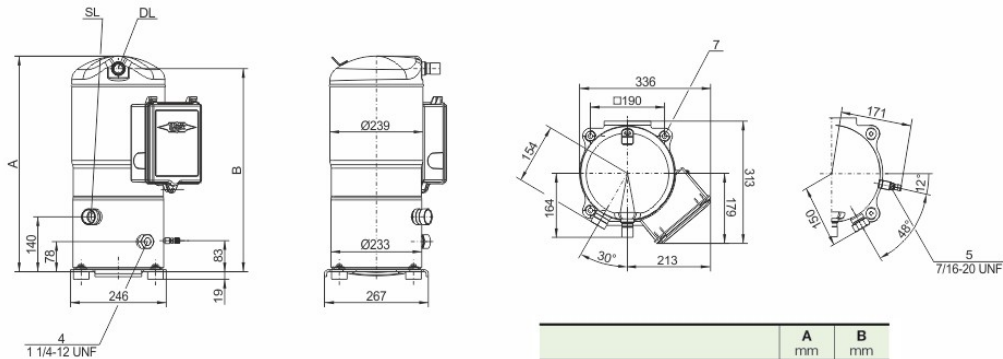
Application Limits





Technical Data: GSD60235VA

Dimensions and Connections



	A mm	B mm
GSD60120VAB..GSD60182VAB	552	520
GSD60235VAB	558	526

Technical Data

Technical Data

Displacement (2900 RPM 50 Hz)	22,1 CFM
Displacement (3500 RPM 60 Hz)	26,7 CFM
Weight	198 lb
Max. pressure (LP/HP)	480 / 650 psi
Connection suction line	
Direct brazing connection	1 3/8 (Standard)
Connection discharge line	
Direct brazing connection	7/8 (Standard "B" version)
Oil type R410A	BVC32 (Standard)

Motor data

Motor voltage (more on request)	460V -60Hz UL
Max operating current	40.7 A
Starting current (Rotor locked)	211.0 A
MCC	50.0 A
RLA (MCC/1.40)	35.7 A
RLA (MCC/1.56)	32.1 A
Max. Power input	28.2 kW

Extent of delivery (Standard)

Oil charge	95 fl oz
Motor protection	SE-B3
Enclosure class	IP54

Available Options

Oil heater	90 W
Discharge gas temperature sensor	Option
Motor protection	SE-E1
Vibration dampers	Option

Sound measurement



Scroll-Compressor

Legend of connection positions according to "Dimensions":

ESH/ELH/ELA:

- 1 High pressure measurement connection (HP) - Schrader
 - 2 High pressure connection (HP) alternatively: connection for discharge gas temperature sensor
 - 3 Low pressure connection (LP)
 - 4 Sight glass
 - 5 Oil maintenance connection
 - 6 Connection for oil and gas equalization (parallel operation)
 - SL Suction line
 - DL Discharge line
- Dimensions can show tolerances according to EN ISO 13920-B.

GSD:

- 1 -
 - 2 High pressure connection (HP) alternatively: connection for discharge gas temperature sensor
 - 3 -
 - 4 Sight glass
 - 5 Oil maintenance connection
 - 6 Connection for oil and gas equalization (parallel operation)
 - 7 Mounting position for vibration dampers
 - 8 Mounting position for Tandem and Trio fixing rails
 - SL Suction gas line
 - DL Discharge gas line
- Dimensions can show tolerances according to EN ISO 13920-B.

GSD Rotalock:

- 1 High pressure measurement connection (HP) - Schrader
 - 2 High pressure connection (HP) alternatively: connection for discharge gas temperature sensor
 - 3 Low pressure connection (LP)
 - 4 Sight glass
 - 5 Oil maintenance connection
 - 6 Connection for oil and gas equalization (parallel operation)
 - 7 Mounting position for vibration dampers
 - 8 Mounting position for Tandem and Trio fixing rails
 - SL Suction gas line
 - DL Discharge gas line
- Dimensions can show tolerances according to EN ISO 13920-B.



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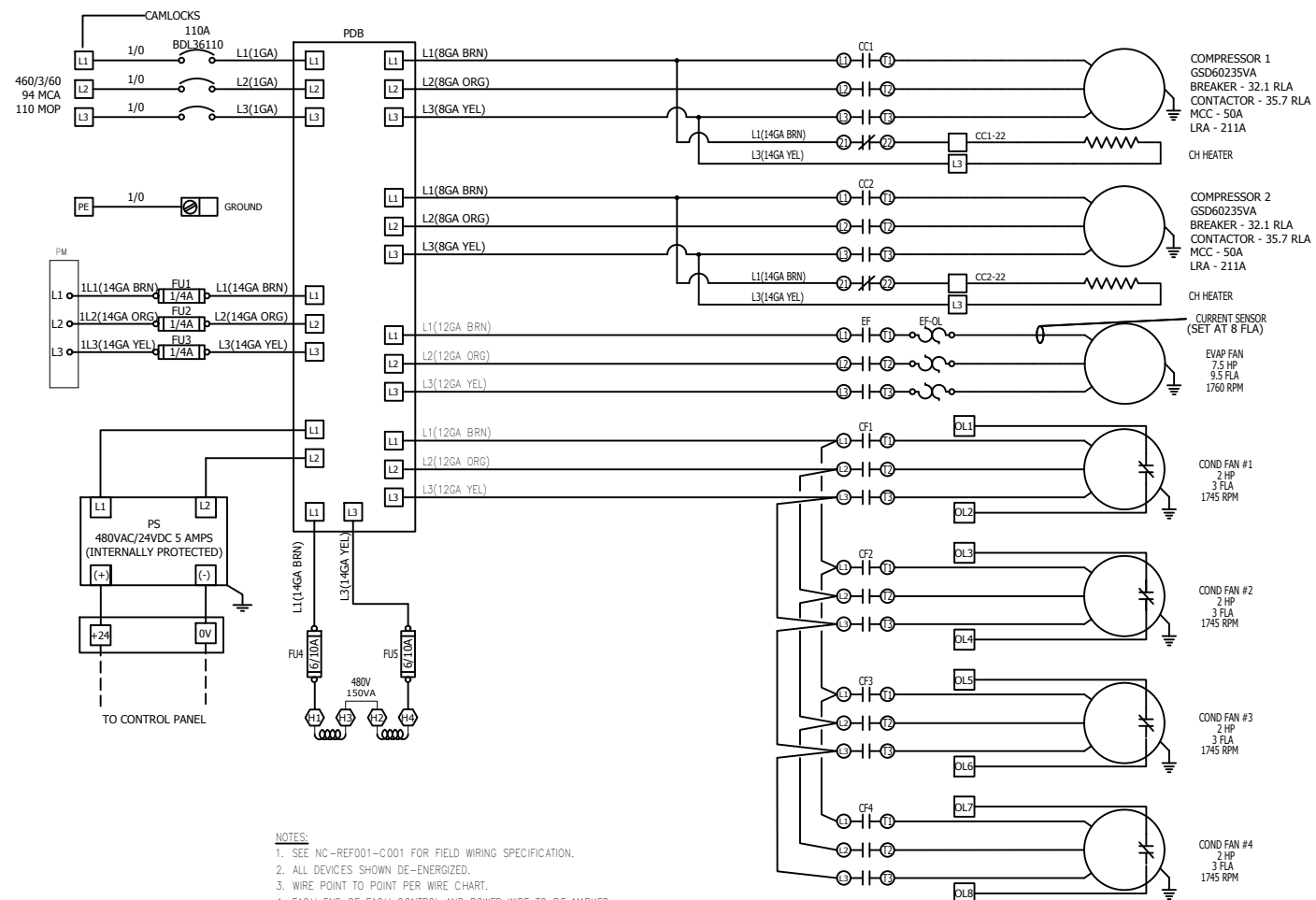
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SECTION

05

ELECTRICAL DRAWINGS



- NOTES:**
- SEE NC-REF001-C001 FOR FIELD WIRING SPECIFICATION.
 - ALL DEVICES SHOWN DE-ENERGIZED.
 - WIRE POINT TO POINT PER WIRE CHART.
 - EACH END OF EACH CONTROL AND POWER WIRE TO BE MARKED WITH HEAT SHRINK MARKERS.
 - USE FERRULES FOR ALL 10GA WIRE AND SMALLER CONNECTIONS.

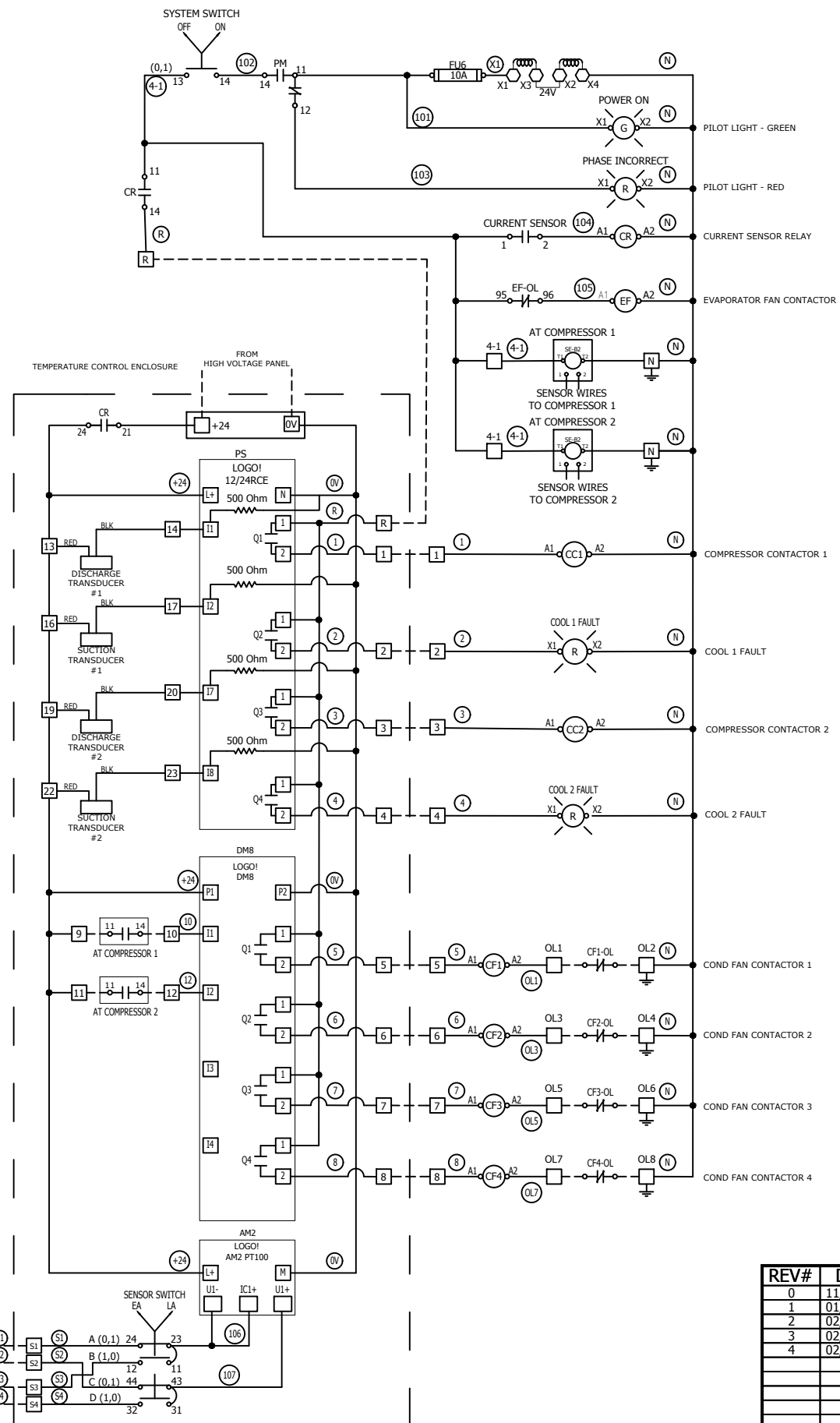
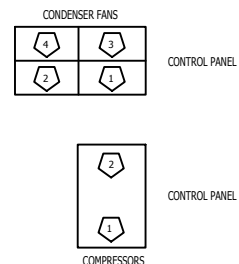
LEGEND	
A	- AMBER LIGHT
CC	- COMPRESSOR CONTACTOR
CF	- CONDENSER FAN CONTACTOR
CH	- CRANKCASE HEATER
DB	- DISTRIBUTION BLOCK
EF	- EVAPORATOR FAN CONTACTOR
FU	- FUSE
G	- GREEN LIGHT
MPM	- COMPRESSOR PROTECTION MODULE
OL	- OVERLOAD
pCO3	- CAREL BOARD
PDB	- POWER DISTRIBUTION BLOCK
PM	- PHASE MONITOR
R	- RED LIGHT
XFRM	- TRANSFORMER
①	- WIRE NUMBER
1	- POWER TERMINAL
1	- MOTOR NUMBER AND LOCATION

WIRING NOTES

208/120VAC	480/277VAC	24VDC
PHASE A - BLACK	PHASE A - BROWN	POSITIVE - DARK BLUE
PHASE B - RED	PHASE B - ORANGE	NEGATIVE - GRAY
PHASE C - BLUE	PHASE C - YELLOW	
NEUTRAL - WHITE	NEUTRAL - GRAY	24VAC
GROUND - GREEN	GROUND - GREEN	PHASE A - RED
		NEUTRAL - BROWN

INTRINSICALLY SAFE WIRING 18AWG LIGHT BLUE AND MUST BE SEPARATED FROM OTHER WIRING BY MINIMUM OF 2". IF CABLE USED IT MUST BE SHIELDED.

IF VAC WIRING GAUGE NOT SPECIFIED USE 18 AWG
IF VDC WIRING GAUGE NOT SPECIFIED USE 18 AWG



REV#	DATE	DESIGNER	DESCRIPTION
0	11/03/2017	TRUNG TRAN	ISSUE FOR CONSTRUCTION
1	01/09/2018	J.O'MALLEY	ADDED NUCO DRAWINGS - ECN#00305
2	02/08/2018	TRUNG TRAN	CHANGE LOGO INPUT PER ECR# 00348
3	02/09/2018	TRUNG TRAN	CHANGE MAIN BREAKER W/MCA & MOP PER ECR# 00353
4	02/23/2018	DN/JO	AS BUILT



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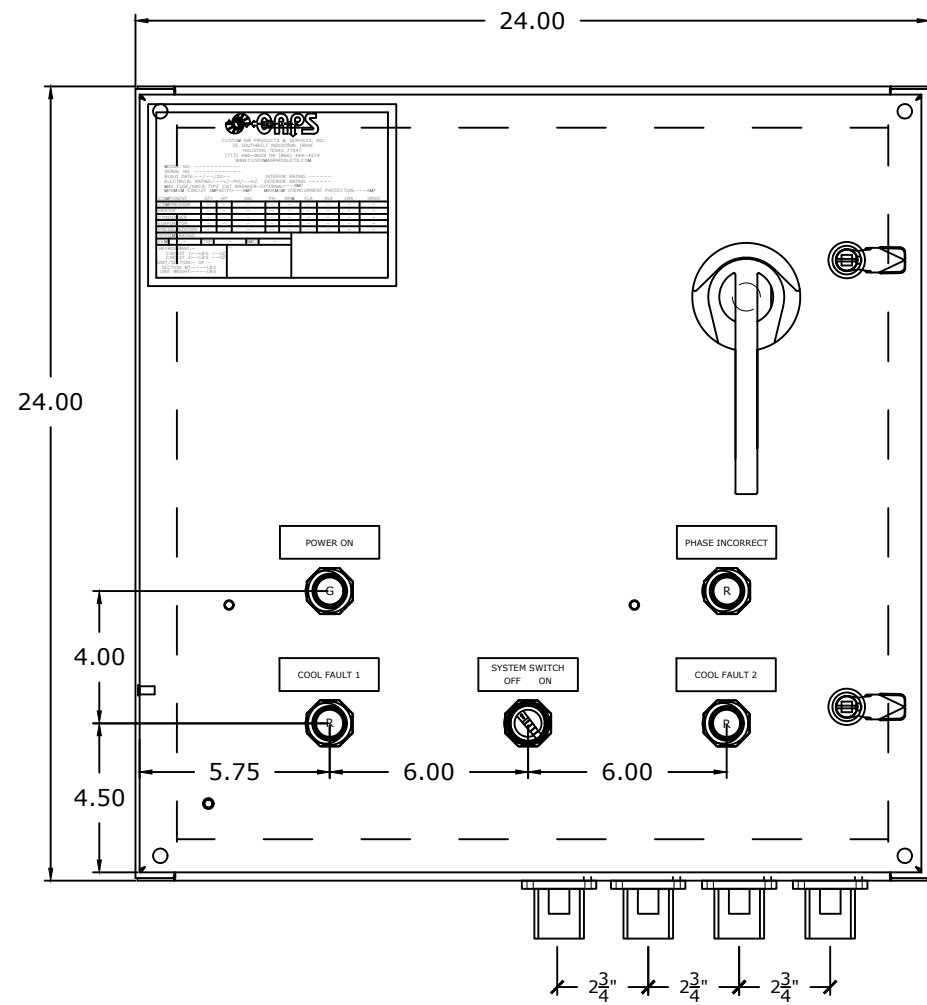
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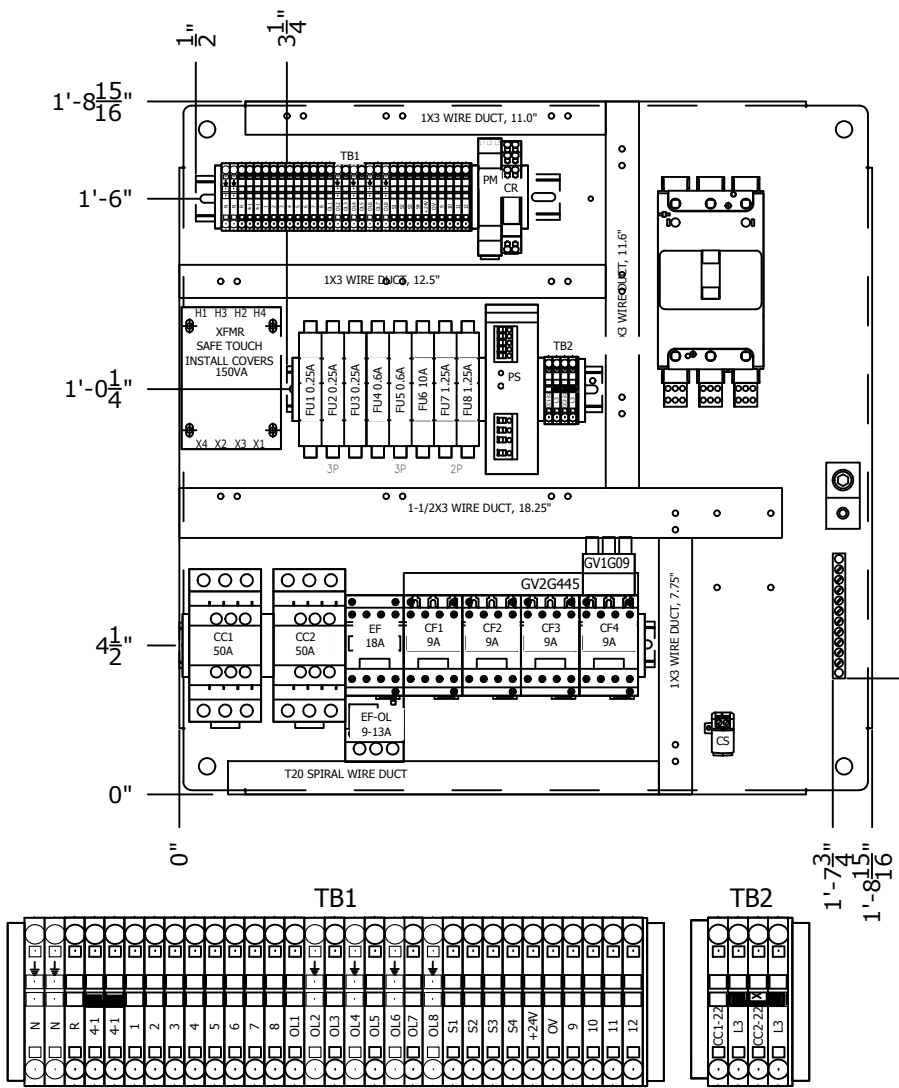
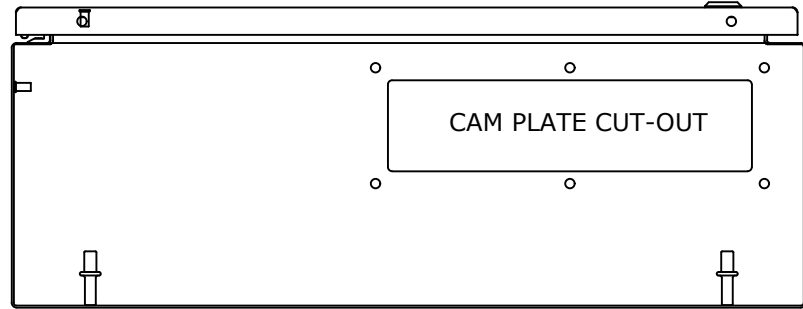
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CUST. PO#:	SHEET:	CHECKED BY:	DATE:
	1 OF 4	DAVID NGUYEN	02/23/2018
SIZE:	REV:	APPROVED BY:	DATE:
B	4	LARRY NOVAK	02/23/2018

CUSTOMER:	HERC
40 TON INDUSTRIAL AC UNIT NEMA 4 GENERAL PURPOSE 460V/3P/60HZ ELECTRICAL DESIGN ELECTRICAL WIRING DIAGRAM	

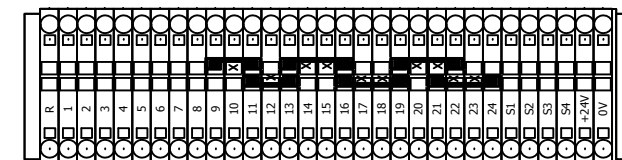
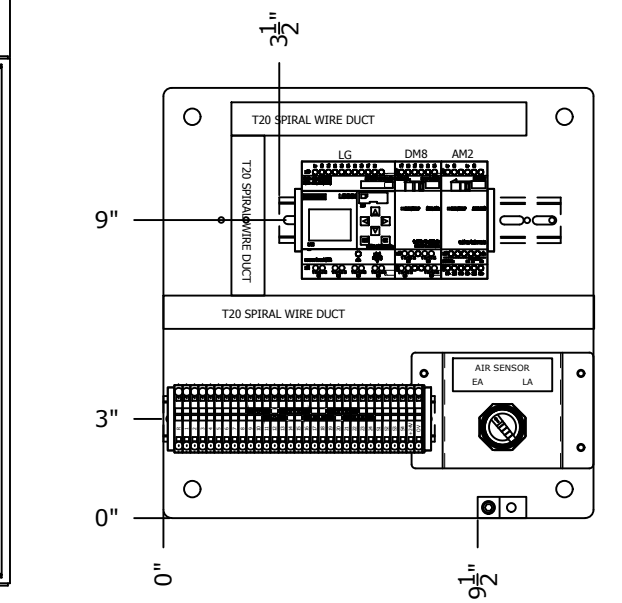
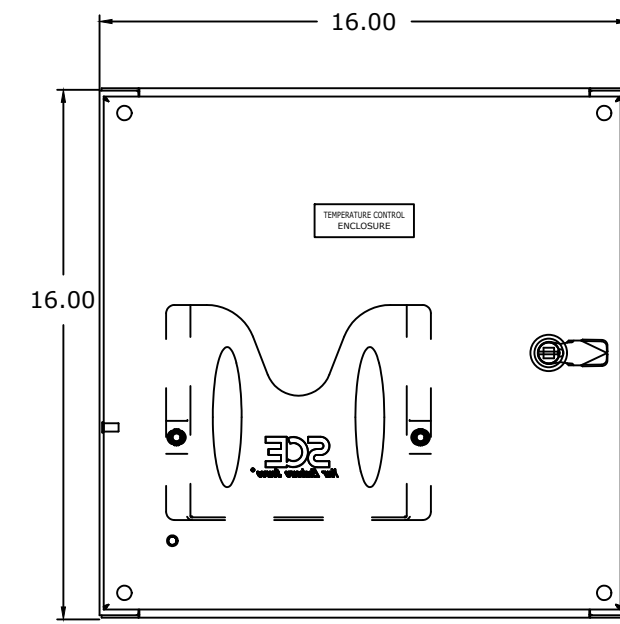


BOTTOM VIEW

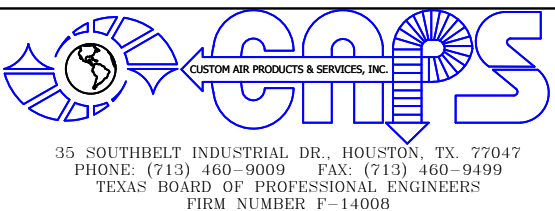


LEGEND

- EF - EVAPORATOR FAN CONTACTOR
- CF - CONDENSOR FAN CONTACTOR
- CC - COMPRESSOR CONTACTOR
- PM - PHASE MONITOR
- PDB - POWER DISTRIBUTION BLOCK



REV#	DATE	DESIGNER	DESCRIPTION
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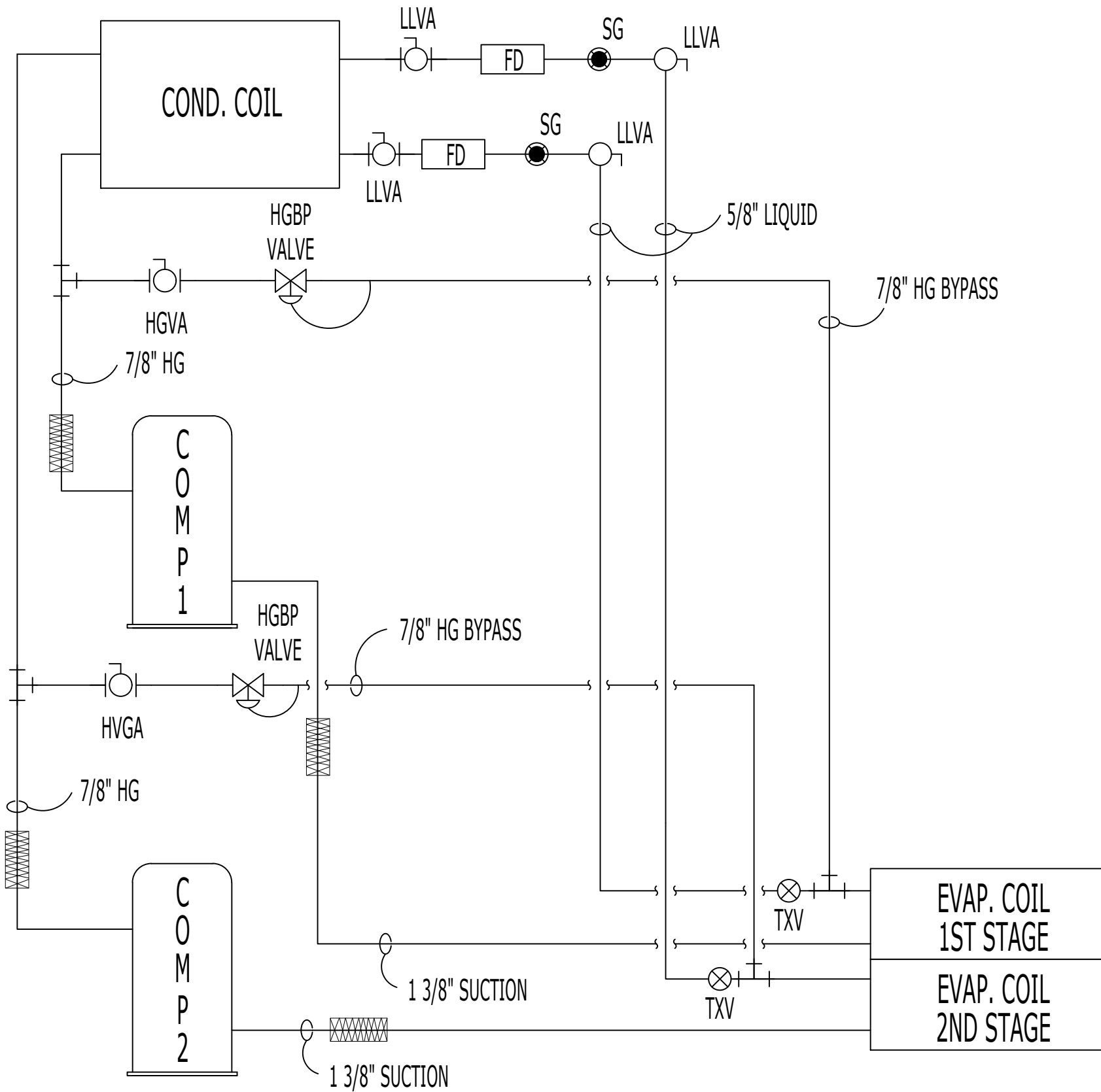
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 APPROVER: _____ DATE: _____

CAPS NO.: 17F-0792
 DRAWING: AE2
 DRAWN BY: DAVID NGUYEN
 DATE: 11/09/2017
 SHEET: 2 OF 4
 CHECKED BY: DAVID NGUYEN
 DATE: 02/23/2018
 REV: 4
 APPROVED BY: LARRY NOVAK
 DATE: 02/23/2018

CUSTOMER: HERC
 40 TON INDUSTRIAL AC UNIT NEMA 4
 GENERAL PURPOSE
 460V/3P/60HZ
 ELECTRICAL DESIGN
 PANEL LAYOUT



NOTE:
 INSTALL TXV EQUALIZER LINES TO FACTORY
 1/4" COPPER CONNECTIONS.

REV#	DATE	DESIGNER	DESCRIPTION
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4	02/23/2018	DN/JO	AS BUILT



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CUST. PO#:	SHEET:	CHECKED BY:	DATE:
	3 OF 4	DAVID NGUYEN	02/23/2018
SIZE:	REV:	APPROVED BY:	DATE:
B	4	LARRY NOVAK	02/23/2018

CUSTOMER:	HERC
	40 TON INDUSTRIAL AC UNIT NEMA 4 GENERAL PURPOSE 460V/3P/60HZ ELECTRICAL DESIGN P & ID



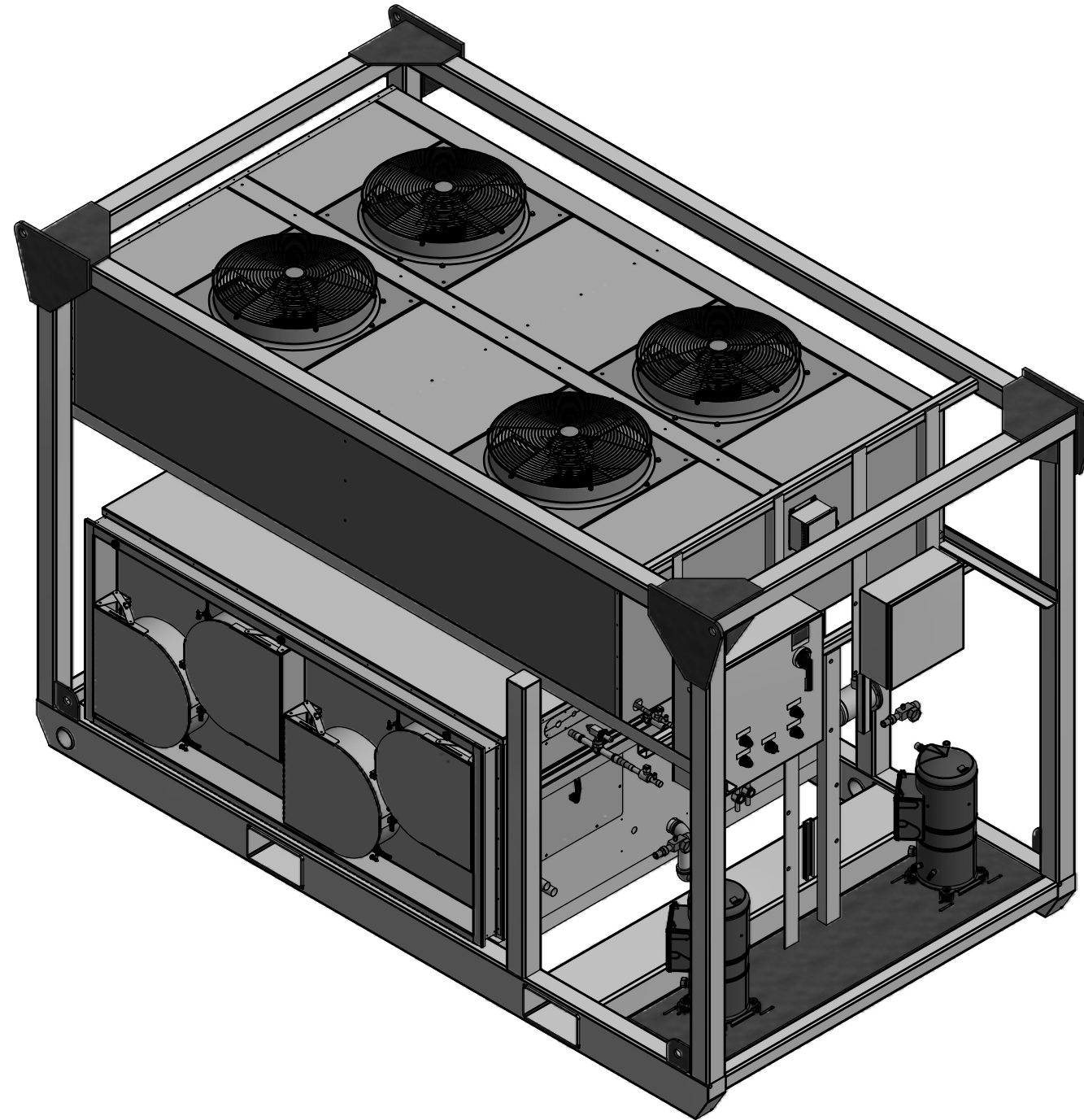
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SECTION

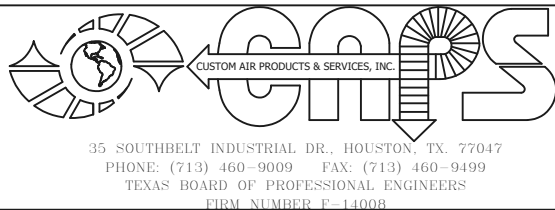
06

MECHANICAL DRAWINGS

CAPS - MERIDIAN
40 TON INDUSTRIAL PACKAGE UNIT
GALV SKID, GALV. CAGE, S.S HOUSINGS
DUCTED RETURN PANEL, NEMA 4 CONSTRUCTION
17F-0792



NEMA4 CONFIGURATION
 SCALE 1 / 24



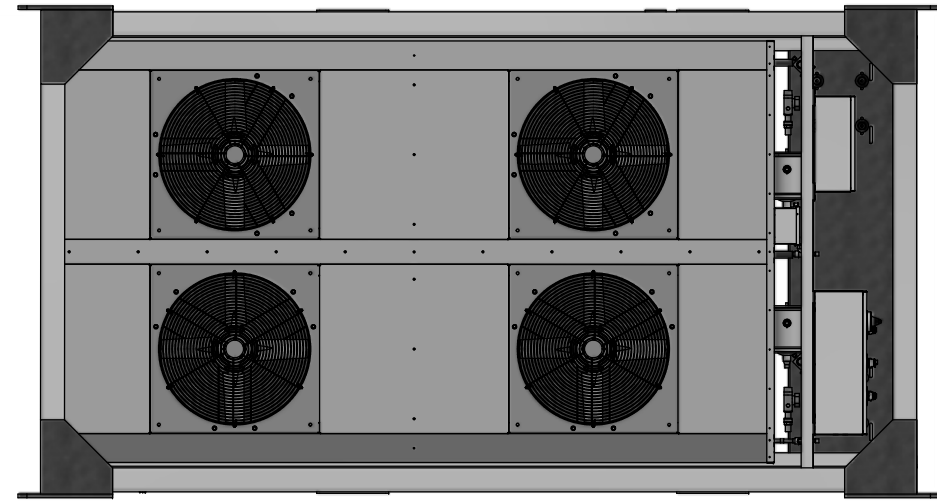
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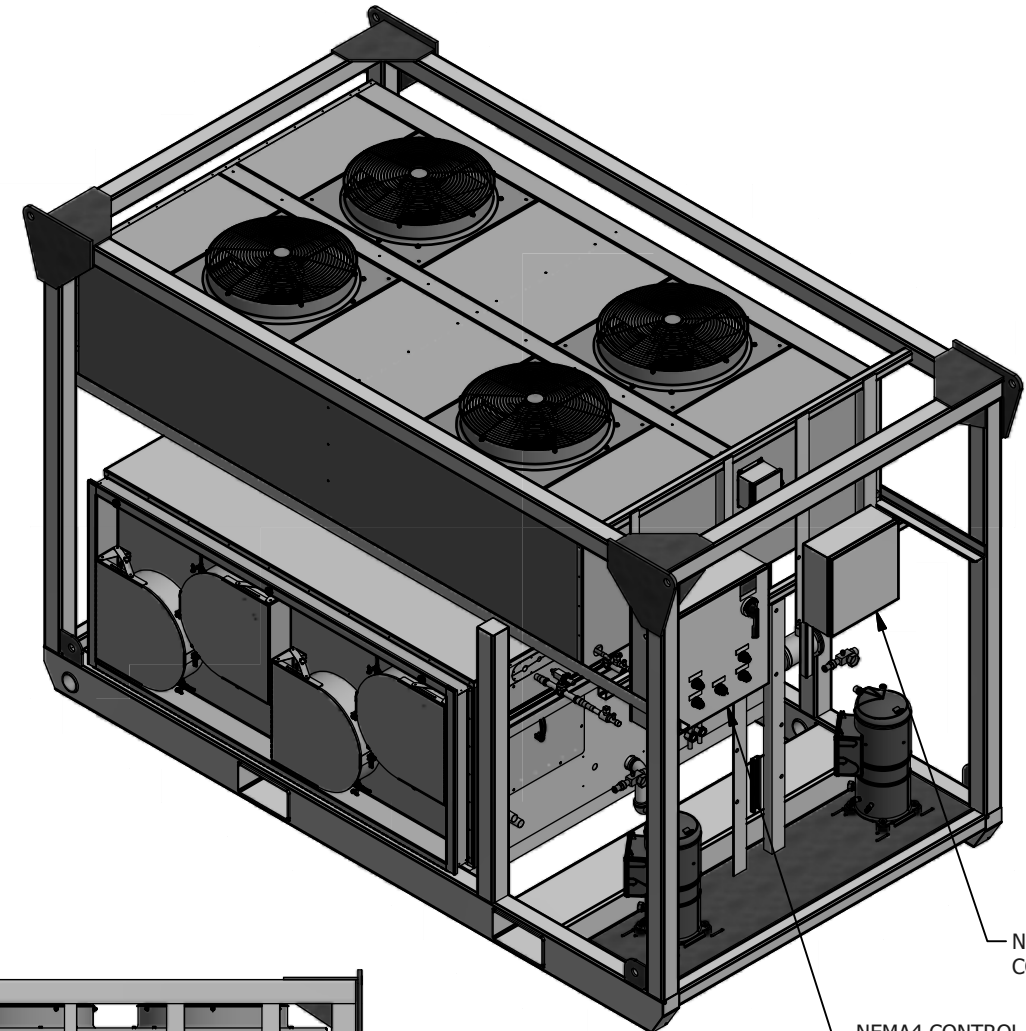
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APPROVER: _____ DATE: _____

CAPS NO.:	DRAWING:	DESIGNER:	DATE:	CUSTOMER:
17F-0792	M1	TIEN NGUYEN	1/27/2011	HERC
CUST. PO#:	SHEET:	CHECKER:	DATE:	40 TON INDUSTRIAL PACKAGE UNIT GALV SKID, GALV. CAGE, S.S HOUSINGS DUCTED RETURN PANEL, NEMA 4 CONSTRUCTION PROJECT INFORMATION COVER SHEET
	1 OF 2	DAVID POTTS	11/6/2017	
SIZE:	REV:	APPROVER:	DATE:	
B	16	JOHN PHAN	11/6/2017	

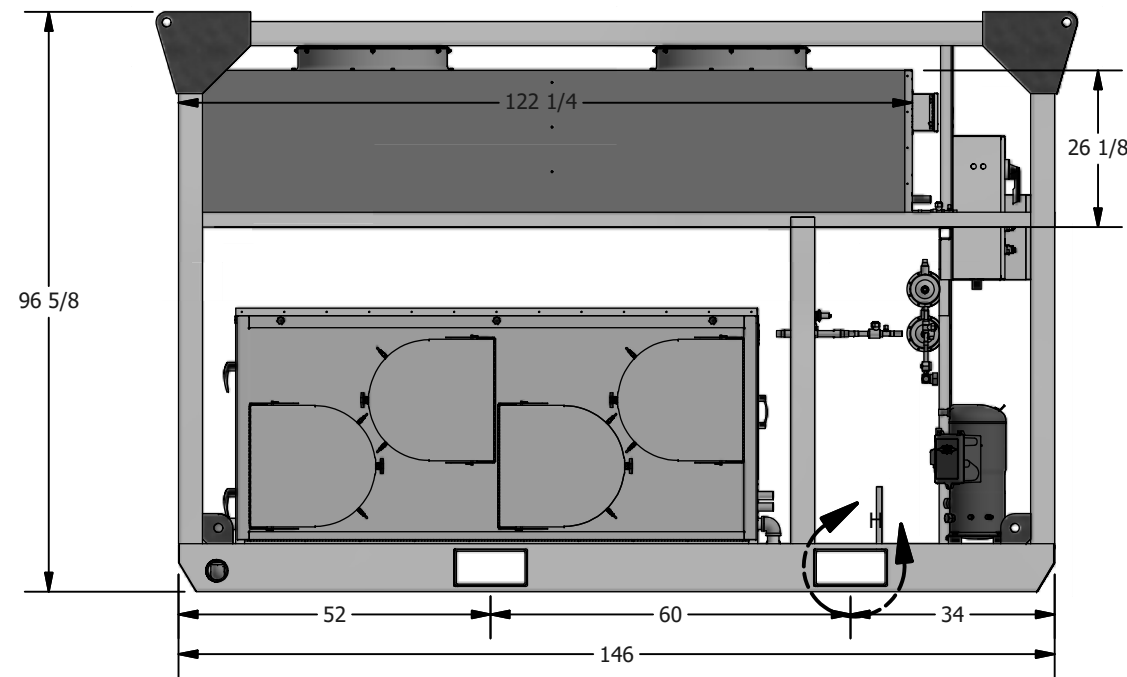


PLAN VIEW
SCALE 1 / 32

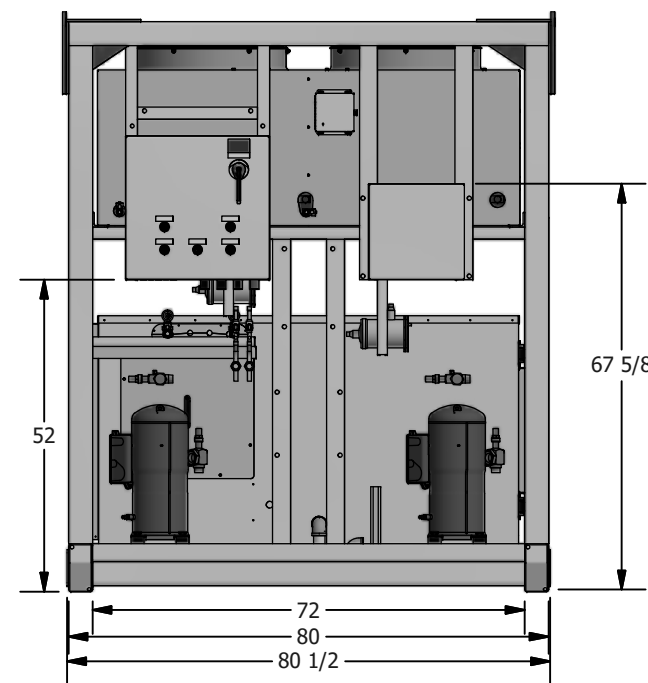


NEMA4 TEMPERATURE
CONTROL ENCLOSURE

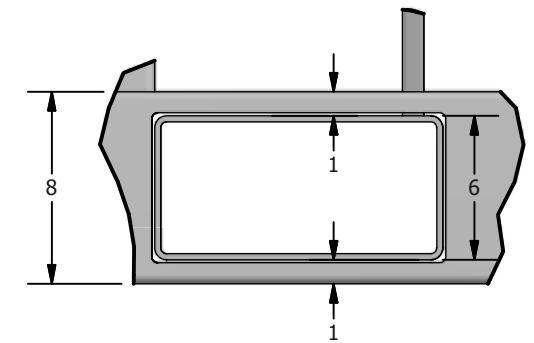
NEMA4 CONTROL
ENCLOSURE



LEFT ELEVATION
SCALE 1 / 32



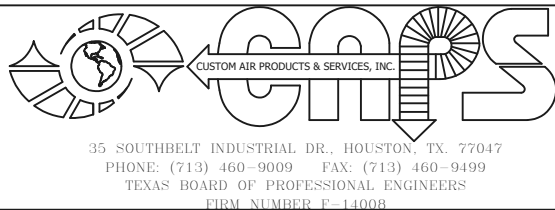
FRONT ELEVATION
SCALE 1 / 32



DETAIL H
SCALE 1 / 8

40 Ton Package System

NEMA4 WITH DUCTED RETURN PANEL



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APPROVER: _____ DATE: _____

CAPS NO.:	DRAWING:	DESIGNER:	DATE:	CUSTOMER:
17F-0792	M1	TIEN NGUYEN	1/27/2011	HERC
CUST. PO#:	SHEET:	CHECKER:	DATE:	
	2 OF 2	DAVID POTTS	11/6/2017	
SIZE:	REV:	APPROVER:	DATE:	
B	16	JOHN PHAN	11/6/2017	

40 TON INDUSTRIAL PACKAGE UNIT
GALV SKID, GALV. CAGE, S.S HOUSINGS
DUCTED RETURN PANEL, NEMA 4 CONSTRUCTION
GENERAL DESIGN
NEMA 4 LAYOUT



CUSTOM AIR PRODUCTS & SERVICES, INC.

35 Southbelt Industrial Drive • Houston, Texas 77047
(713) 460-9009 • Fax (713) 460-9499
www.customairproducts.com

SECTION

07

SPARE PARTS LIST

SUGGESTED SPARE PARTS

JOB #: 17F-0792		REVISION #: 0				
CUSTOMER: HERC						
PROJECT: 40 TON INDUSTRIAL AC UNIT						
ITEM #	DESIGNATION	BRAND	MODEL/PART #	DESCRIPTION	QTY	CAPS#
1	EVAPORATOR COIL	LUVATA HEATCRAFT	5EJ1206C	DWG # 127363400 / 40T INDUSTRIAL PKG / 27FHx64FLx10D-RH, COATED FEEDER TUBE	1	
2	CONDENSER COIL	LUVATA HEATCRAFT	4CF1303B	DWG# 127363500 / 40T INDUSTRIAL PKG / 67.5FHx112LFx6.5D-LH	1	
3	EVAPORATOR FAN	GREENHECK	18-APH-3-II-75	5600 CFM-7.5HP-RPM1725, FAN GUARD	1	
4	CONDENSER FAN	VOSTERMANS	FP00001M77100	2HP, 1800 RPM, 1740 CFM (COMPLETED ASSEMBLY)	1	
5	COMPRESSOR	BITZER	GSD60235VAB422	20 TON COMPRESSOR, SCROLL, GSD6, 460/3/60, NO ROTALOCK	1	
6	CRANKCASE HEATER	BITZER	34325607	90W @ 460V CRANK CASE HEATER	1	
7	MOUNTING KIT	BITZER	370024-03	KIT, MTG, DMPR, GSD6 SCROLL	1	
8	SYSTEM SWITCH	SQUARE D	9001KS11B	2 POSITION SWITCH	1	
9	CONTACT BLOCK	SQUARE D	9001KA2	CONTACT BLOCK (0-1)	1	
10	CONTACT BLOCK	SQUARE D	9001KA3	CONTACT BLOCK (1-0)	1	
11	CC1, CC2	SQUARE D	LC1D40AB7	COMP CONTACTOR (40A, 24V CONTROL)	1	
12	EF	SQUARE D	LC1D18B7	EVAP FAN CONTACTOR (18A, 24V CONTROL)	1	
13	EF-OL	SQUARE D	LRD16	OVERLOAD RELAY (9-13 AMPS)	1	
14	CF1,2,3,4	SQUARE D	LC1D09B7	CONDENSER FAN CONTACTORS (9A, 24V)	1	
15	TRANSFORMER	HPS	SP150QR	TRANSFORMER, 150VA, 240/480 X 12/24V	1	
16	PM	SQ D	RM17TU00	PM, 3P, 208-480VAC	1	
17	FUSE BLOCK	WAGO	811-430	FUSE HOLDER, 3P, 30A, 600V, CLASS CC, CAGE CLAMP	1	
18	FUSE	MERSEN	ATQR1/4	1/4A FUSE	1	
19	FUSE	MERSEN	ATQR6/10	6/10A FUSE	1	
20	FUSE	MERSEN	ATQR10	10A FUSE	1	
21	MAIN CB	SQUARE D	BDL36110	CIRCUIT BREAKER 110A 3P AC 18KA AT 480/440V	1	
22	CB MECHANISM	SQUARE D	9421LB1	DOOR MOUNTED OPERATING MECHANISM STANDARD KIT	1	
23	PL	SQUARE D	9001KP35G31	24V GREEN PILOT LIGHT, POWER ON	1	
24	PL	SQUARE D	9001KP35R31	24V RED PILOT LIGHT	1	
25	POWER SUPPLY	PHOENIX	2866462	PWR SPLY, TRIO-PS/3AC/24DC/5A	1	
26	LOGO!	SIEMENS	6ED1052-1MD00-0BA8	SMART RELAY 12/24RCE, 24VDC, 8 INPUTS, 4 OUTPUTS	1	
27	LOGO! EXP	SIEMENS	6ED1055-1HB00-0BA2	LOGO! EXPANSION MODULE DM8 24R, 4 INPUTS, 4 OUTPUTS, 24V AC/DC	1	
28	LOGO! EXP AM2 PT100	SIEMENS	6ED1055-1MD00-0BA2	LOGO! 8 AM2 RTD EXPAN MODULE PU DC 12/24V, 2AI, -50-+200D, PT100/1000	1	
29	TEMP SENSOR	ACI	A/100-2W-DO-4"-6" CL2P	SENSOR 100 OHM @ 32F (0 DEGREE C)	1	
30	TRANSDUCER	JOHNSON CONTROLS	P499ACP-107C	750PSI, 4-20mA TRANSDUCER	1	
31	TRANSDUCER CABLE	JOHNSON CONTROLS	WHA-PKD3-600C	19-5/8" TRANSDUCER CABLE	1	
32	CURRENT SENSOR RELAY	WAGO	788-512	RELAY, 24VAC, DPDT, W/SOCKET & LATCH, 8A, 250V, PUSH IN CAGE CLAMP	1	
33	CURRENT SENSOR	SENAVA	C-1220	CURRENT SWITCH, N.O., .75-50A RANGE	1	
34	CF1, CF2, CF3, CF4	SQ D	GV1G09	TERM BLOCK FOR BUSBAR	1	
35	CF1, CF2, CF3, CF4	SQ D	GV2G445	BUSBAR, 3P, 4 TAPS	1	
36	XFMR COVER	HPS	SPFG1	XFMR FINGER GUARD, SPARTAN	1	
37	CAM PLATE	NUCO	NC-EMC012-P005	ALUM CAM PLATE	1	
38	SENSOR SWITCH	NUCO	NC-EMC303-P010	SELECTOR SWITCH MOUNTING BRACKET	1	
39	TERMINAL BLOCK JUMPER	WAGO	2004-433	TERM BLK, TJS, 3-WAY JUMPER, POS 1&3	1	
40	TERMINAL BLOCK	WAGO	2004-1207	TERM BLK, TJS, PE, 2-COND,30A,600V, GRN/YEL (50)	1	
41	TERMINAL BLOCK END	WAGO	2004-1291	TERM BLK, TJS, END/INTERMEDIATE PLATE, GRY (25)	1	
42	HGBV	SPORLAN	HGBE-8	HOT GAS BYPASS VALVE, 7/8" ODF	1	
43	FD	SPORLAN	C-489-G	FILTER DRIER, 1 1/8" ODF	1	
44	FC	SPORLAN	RCW-48	HIGH CAPACITY CORE	1	
45	SG	SPORLAN	SA-15S	SIGHT GLASS, 5/8" ODF	1	
46	LLVA	SPORLAN	EBVT-1050	BALL VALVE, 5/8" ODF	1	
47	HGVA	SPORLAN	EBVT-1070	BALL VALVE, 7/8" ODF	1	
48	VIBRASORBER	PACKLESS	VAFS-10	SIZE, 1 3/8	1	
49	VIBRASORBER	PACKLESS	VAFS-8	SIZE, 7/8	1	
50	FILTERS	GLASFLOSS	16" x 20" x 2"	30% PLEATED	1	