Model: CGAM080F2H02AXD2A1A1A1AXXA1D1AXXXXXXXB1A3A1DXXXLXX

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
C	G	A	M	0	8	0	F	2	H	0	2	A	X	D	2	A	1	A	1	A	1	A	X	X	A	1	D	1	A	X	X	X	X	X	X	X	B	1	A	3	A	1	D	X	X	X	L	X	X

Product Name: Air-Cooled Chiller, Scroll Compressors
Digit 1-4 = CGAM = Chiller model = CGAM
Digit 5-7 = 080 = Unit nominal tonnage = 80 tons
Digit 8 = F = Unit voltage = 460 volt 3 phases
Digit 12 = 2 = Unit type = High efficiency
Digit 13 = A = Agency listing = UL/CUL
Digit 14 = X = Pressure vessel code = BPHE - exempt from ASME
Digit 15 = D = Unit application = Wide ambient
Digit 16 = 2 = Refrigerant isolation valves = Refr. isolation/discharge valves
Digit 17 = A = Seismically rated unit = None
Digit 18 = 1 = Freeze protection (factory inst) = With freeze protection
Digit 19 = A = Insulation = Insulation
Digit 20 = 1 = Factory charge = Refrigerant charge (HFC-410A)
Digit 21 = A = Evaporator application = Std cooling
Digit 22 = 1 = Water connection (evap) = Grooved pipe
Digit 23 = A = Fin material = Lanced aluminum
Digit 24-25 = XX = Cond heat recovery = None
Digit 26 = A = Starter type = Across the line
Digit 27 = 1 = Incoming power line connection = Single point
Digit 28 = D = Power line connection type = Circuit breaker-high fault rated
Digit 29 = 1 = Enclosure type = UL 1995 rated for outdoor applications
Digit 30 = A = Unit operator interface = English
Digit 31 = X = Remote interface (digital comm) = None
Digit 32 = X = Ext. chilled/hot water&dmd limit setpnt = None
Digit 33 = X = % capacity = Without % capacity
Digit 34 = X = Programmable relays = None
Digit 35 = X = Pump type = None
Digit 36 = X = Pump flow control = None
Digit 37 = X = Buffer tank = No tank
Digit 38 = B = Short circuit = High
Digit 39 = 1 = Installation accessories = Elastomeric isolators
Digit 40 = A = Water strainer = Factory installed
Digit 41 = 3 = Sound attenuator package = Super quiet
Digit 42 = A = Appearance options = Louvers
Digit 43 = 1 = Exterior finish = Standard paint
Digit 44 = D = Literature language = English
Digit 45 = X = Phase reversal protection = None
Digit 46 = X = Shipping package = None
Digit 50 = X = Design special = No Special Requirement

Submittal

Prepared For:
All Bidders

Date: *September 04, 2012*

Sold To:

Trane U.S. Inc. dba Trane is pleased to provide the enclosed submittal for your review and approval.

Product Summary

Qty	Product
1	Air-Cooled Scroll

The attached information describes the equipment we propose to furnish for this project, and is submitted for your approval.

Table Of Contents

Tag Data - Air-Cooled Scroll (Qty: 1)

Item	Tag(s)	Qty	Description	Model Number
A1	CGAM-1	1	Air-Cooled Chiller, Scroll Compressors	CGAM080F2*02AXD2A1A1A1AXXA1D1AXXXXXX XB1A3A1D1X-L-X

Product Data - Air-Cooled Scroll

Item: A1 Qty: 1 Tag(s): CGAM-1

Air-Cooled Scroll Packaged Chiller
80 nominal tons
60 hertz
460 volt 3 phases
High efficiency/performance
Full factory refrigerant charge (HFC-410A)
With freeze protection (External T-STAT control)
Refrigerant isolation valves (discharge valve)
UL listed to US and Canadian safety std
ASHRAE 90.1 all versions compliant
AHRI certified
Flow switch set point 60
Startup allowance
Std cooling (42 to 65F/5.5 to 18C)
Grooved pipe connection
Factory insulation - all cold parts
Performance based on water
Wide ambient (0 to 125F/-18 to 52C)
Lanced aluminum fins
Across the line starter/direct on line
Single point power connection
Circuit breaker-high fault rated control panel
Enclosure type UL 1995 rated for outdoor applications
High A short circuit rating
Elastomeric isolators
With water strainer factory installed
Super quiet
Architectural louvered panels

Performance Data - Air-Cooled Scroll

Tags	CGAM-1
Capacity (tons)	75.80
Unit power input (kW)	93.90
Full load efficiency (EER)	9.7
NPLV (EER)	15.8
IPLV (EER)	15.6
Sound power level (dBA)	92
Sound pressure level (dBA)	65
Refrigerant	R410A
Refrigerant charge circuit 1 (lb)	74.0
Refrigerant charge circuit 2 (lb)	74.0
Oil charge circuit 1 (gal)	3.54
Oil charge circuit 2 (gal)	3.54
Evap entering temp (F)	54.00
Evap leaving temp (F)	44.00
Evap flow rate (gpm)	181.20
Min evap flow rate (gpm)	114.70
Min flow PD evap+strainer (ft H2O)	6.50
Max evap flow rate (gpm)	275.30
Max flow PD evap+strainer (ft H2O)	34.20
Evap fluid freeze point (F)	32.00
Evap press drop (ft H2O)	13.00
Total PD evap+strainer (ft H2O)	15.40
Evap fouling factor (hr-sq ft-deg F/Btu)	0.00010
Saturated evap temp circuit 1 (F)	37.70
Saturated evap temp circuit 2 (F)	37.70
Ambient air temperature (F)	99.00
Elevation (ft)	1280.00
Saturated cond temp circuit 1 (F)	126.50
Saturated cond temp circuit 2 (F)	126.60
Compressor power input (kW)	86.70
RLA - compressor 1A (A)	33.00
LRA - compressor 1A (A)	215.00
RLA - compressor 1B (A)	33.00
LRA - compressor 1B (A)	215.00
RLA - compressor 2A (A)	33.00
LRA - compressor 2A (A)	215.00
RLA - compressor 2B (A)	33.00
LRA - compressor 2B (A)	215.00
Total airflow (cfm)	56844
Number of fans ( )	6
Fan motor power (kW)	6.80
Total fan FLA (A)	20.20
Single point power MCA (A)	162.20
Single point power MOP (A)	175.00
Short circuit current rating (A)	65000.00
Number of compressors ( )	4
Number of circuits ( )	2
Capacity steps ( )	4
Shipping weight (lb)	5607.3
Operating weight (lb)	5692.2
Length (in)	143.100
Width (in)	89.000
Height (in)	92.400

Mechanical Specifications - Air-Cooled Scroll
Item: A1 Qty: 1 Tag(s): CGAM-1

General
Units are constructed of a galvanized steel frame with galvanized steel panels and access doors. Component surfaces are finished with a powder-coated paint. All paint meets the requirement for outdoor equipment of the U.S. Navy and other Federal Government Agencies. This paint finish is durable enough to withstand a 1000-consecutive-hour salt spay application in accordance with standard ASTMB117.

Each unit ships with full operating charges of refrigerant and oil.

Compressor and Motor
The unit is equipped with four hermetic, direct-drive, 3600 rpm 60 Hz suction gas-cooled scroll compressors. The simple design has only three major moving parts and a completely enclosed compression chamber which leads to increased efficiency. Overload protection is internal to the compressors. The compressor includes: centrifugal oil pump, oil level sight glass and oil charging valve. Each compressor will have compressor heaters installed and properly sized to minimize the amount of liquid refrigerant present in the oil sump during off cycles.

Unit-Mounted Starter
The control panel is designed per UL 1995. The starter is in an across-the-line configuration, factory-mounted and fully pre-wired to the compressor motor and control panel. Typically, Trane scroll compressors are up to full speed in one second when started across-the-line.

A factory-installed, factory-wired 820 VA control power transformer provides all unit control power (120 Vac secondary) and Trane CH530 module power (24 Vac secondary).

A molded case high interrupting capacity circuit breaker, factory pre-wired with terminal block power connections and equipped with a lockable external operator handle, is available to disconnect the chiller from main power.

Power Connection
Power connections include main three-phase power and one separate 120V, 15 amp customer provided single phase power connection is required to power the heaters (if used for freeze protection).

Short circuit current rating of 65 kA is provided.

Evaporator
Braze plate evaporator is made of stainless steel with copper as the braze material. It is designed to withstand a refrigerant side working pressure of 430 psig (29.6 bars) and a waterside working pressure of 150 psig (10.5 bars). Evaporator is tested at 1.1 times maximum allowable refrigerant side working pressure and 1.5 times maximum allowable water side working pressure. It has one water pass. Immersion heaters protect the evaporator to an ambient of -20°F (-29°C). A water strainer and a flow switch are factory installed.

Condenser
Air-cooled condenser coils have lanced aluminum fins mechanically bonded to internally-finned copper tubing.

The condenser coil has an integral subcooling circuit. The maximum allowable working pressure of the condenser is 650 psig (44.8 bars). Condensers are factory proof and leak tested at 715 psig (49.3 bars).

Direct-drive vertical discharge condenser fans are balanced and individually protected. Three-phase condenser fan motors with permanently lubricated ball bearings and external thermal overload protection are provided.

A variable speed drive on the first fan of each circuit allows the unit to start and operate with ambient temperatures between 0.0 F and 125.0 F.

Refrigerant Circuits
The unit has dual refrigerant circuits. Each refrigerant circuit has Trane scroll compressors piped in parallel with a passive oil management system. A passive oil management system maintains proper oil levels within compressors and has no moving parts. Each refrigerant circuit includes filter drier, electronic expansion valve, liquid line and discharge service valves. Capacity modulation is achieved by turning compressors on and off. The unit has four capacity stages.

Unit Controls
The microprocessor-based control panel is factory-installed and factory-tested. The control system is powered by a pre-wired control power transformer, and will turn on and off compressors to meet the load. Microprocessor-based

chilled water reset based on return water is standard. The unit comes with a factory installed flow switch.

The Trane CH530 microprocessor automatically acts to prevent unit shutdown due to abnormal operating conditions associated with low evaporator refrigerant temperature and high condensing temperature. If an abnormal operating condition continues and the protective limit is reached, the machine will shut down.

The panel includes machine protection for the following conditions: low evaporator refrigerant temperature and pressure, high condenser refrigerant pressure, critical sensor or detection circuit faults, lost communication between modules, phase loss, phase reversal, over temperature protection, external and local emergency stop, and loss of evaporator water flow.

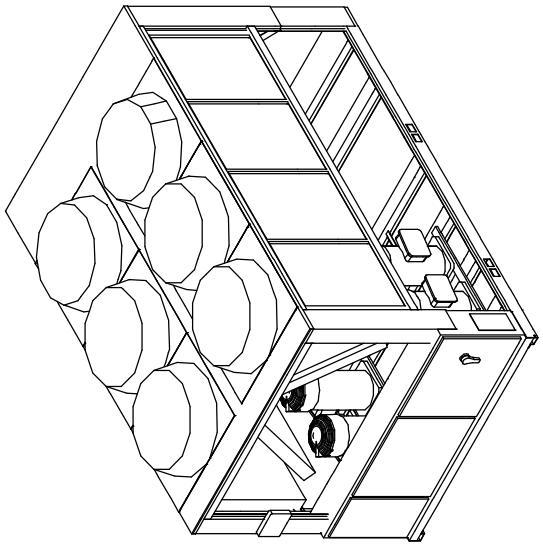
When a fault is detected, the control system conducts more than 100 diagnostic checks and displays results. The display will identify the fault, indicate date, time, and operating mode at time of occurrence, and provide type of reset required and a help message.

Data contained in available reports includes: water and air temperatures, refrigerant pressures and temperatures, flow switch status, EXV position, and compressor starts and run-time. All necessary settings and setpoints are programmed into the microprocessor-based controller via the operator interface. The controller is capable of receiving signals simultaneously from a variety of control sources, in any combination, and priority order of control sources can be programmed.

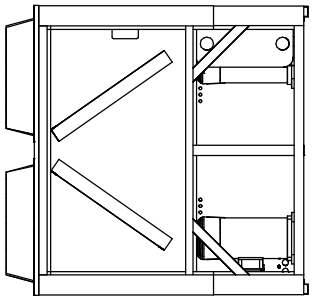
Architectural Louvered Panels
Louvered panels cover the complete condensing coil and service area beneath the condenser.

Isolators
Molded elastomeric isolators, sized to reduce vibration transmission to the supporting structure when the unit is installed, ship with the chiller.

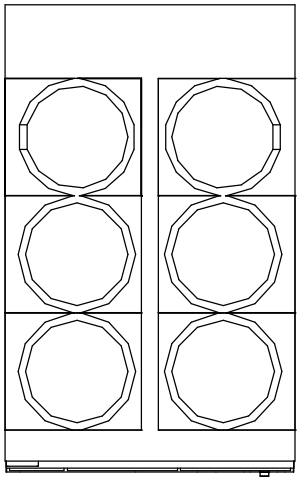
Unit Dimensions - Air-Cooled Scroll
Item: A1 Qty: 1 Tag(s): CGAM-1



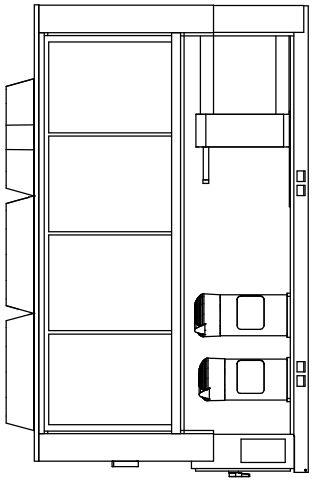
ISOMETRIC VIEW



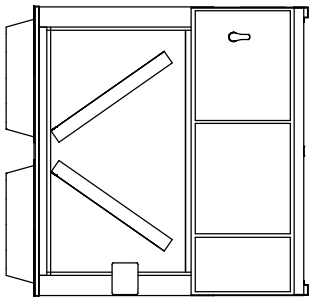
BACK VIEW



TOP VIEW



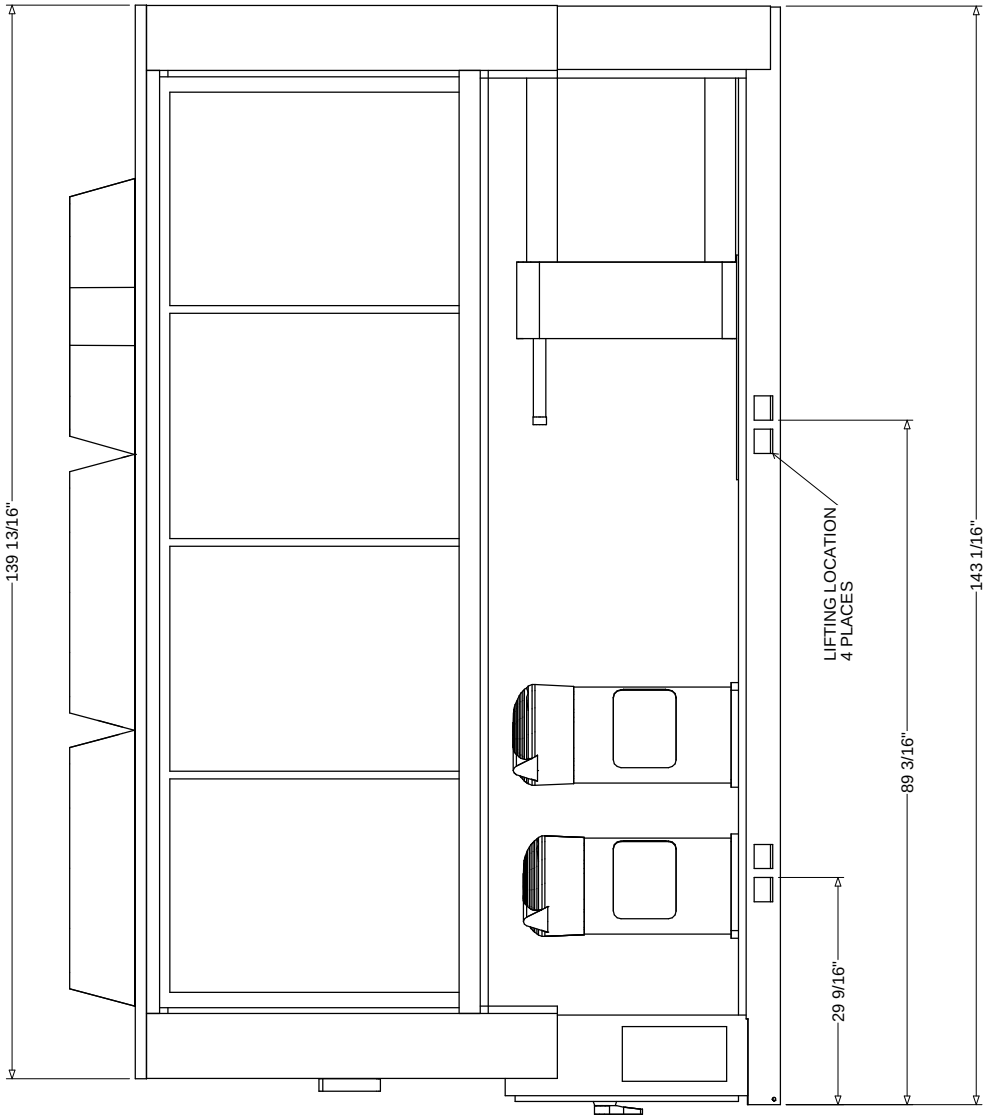
RIGHT SIDE VIEW



FRONT VIEW

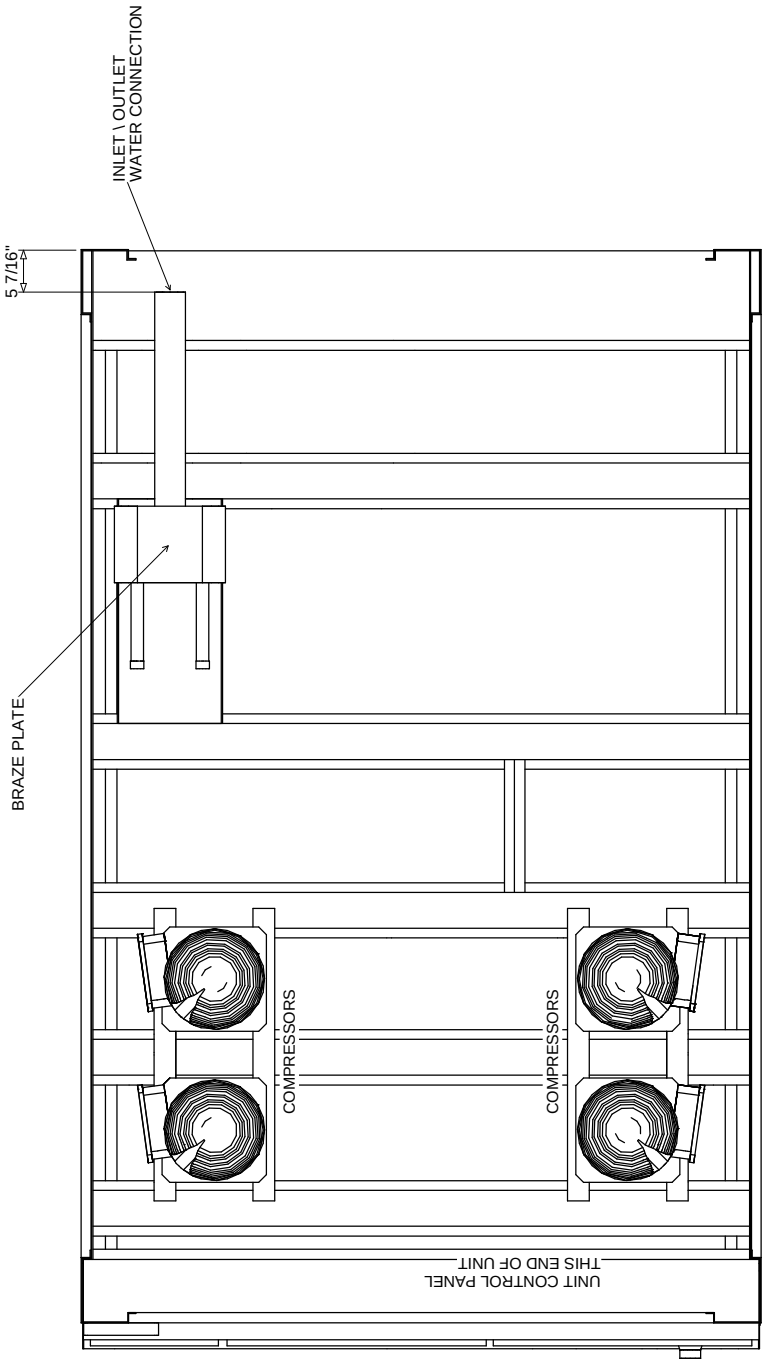
INLET/OUTLET WATER CONNECTION SIZE	4" (100mm)
BRAZE PLATE WATER VOLUME/STORAGE	7.0 GAL (26.5 LITERS)

Unit Dimensions - Air-Cooled Scroll
Item: A1 Qty: 1 Tag(s): CGAM-1



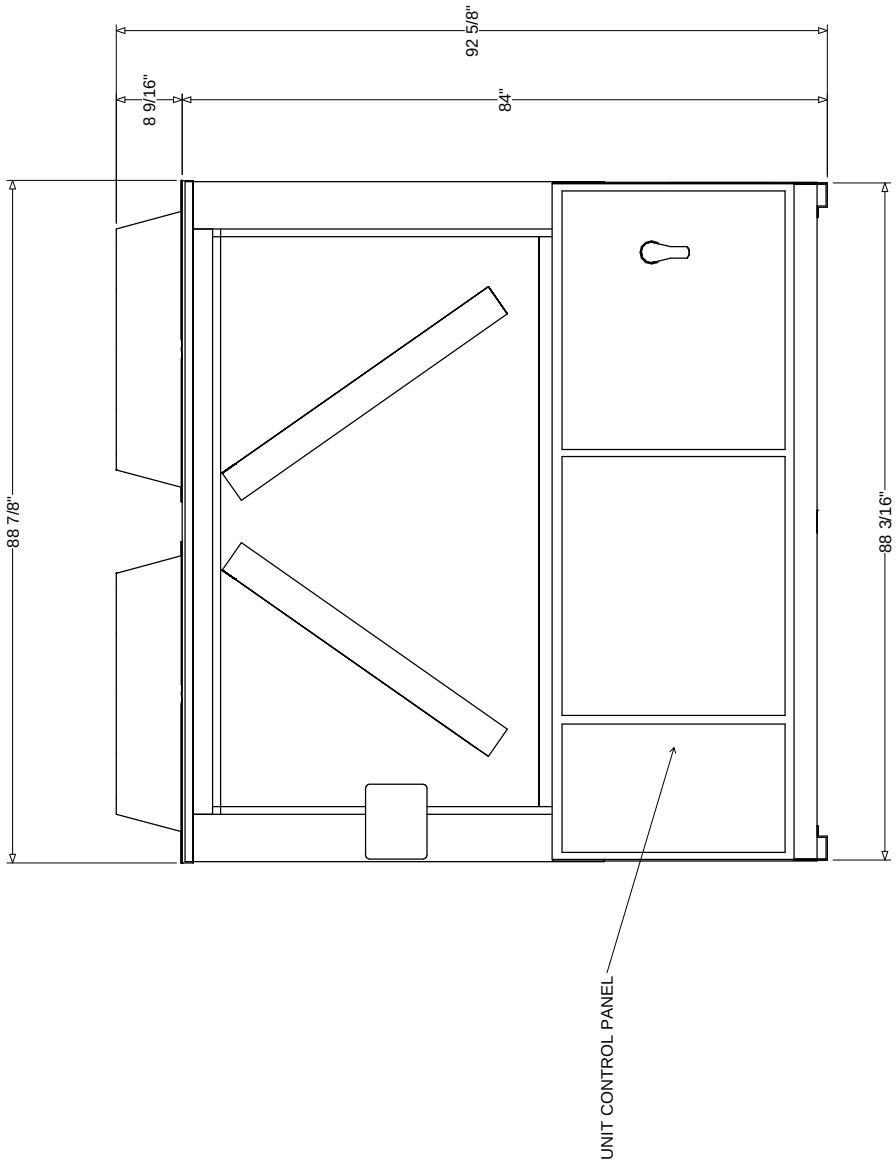
RIGHT SIDE VIEW

Unit Dimensions - Air-Cooled Scroll
Item: A1 Qty: 1 Tag(s): CGAM-1



TOP VIEW
CONDENSER, CONTROL PANEL AND
VSD (WHEN ORDERED) REMOVED FOR CLARITY

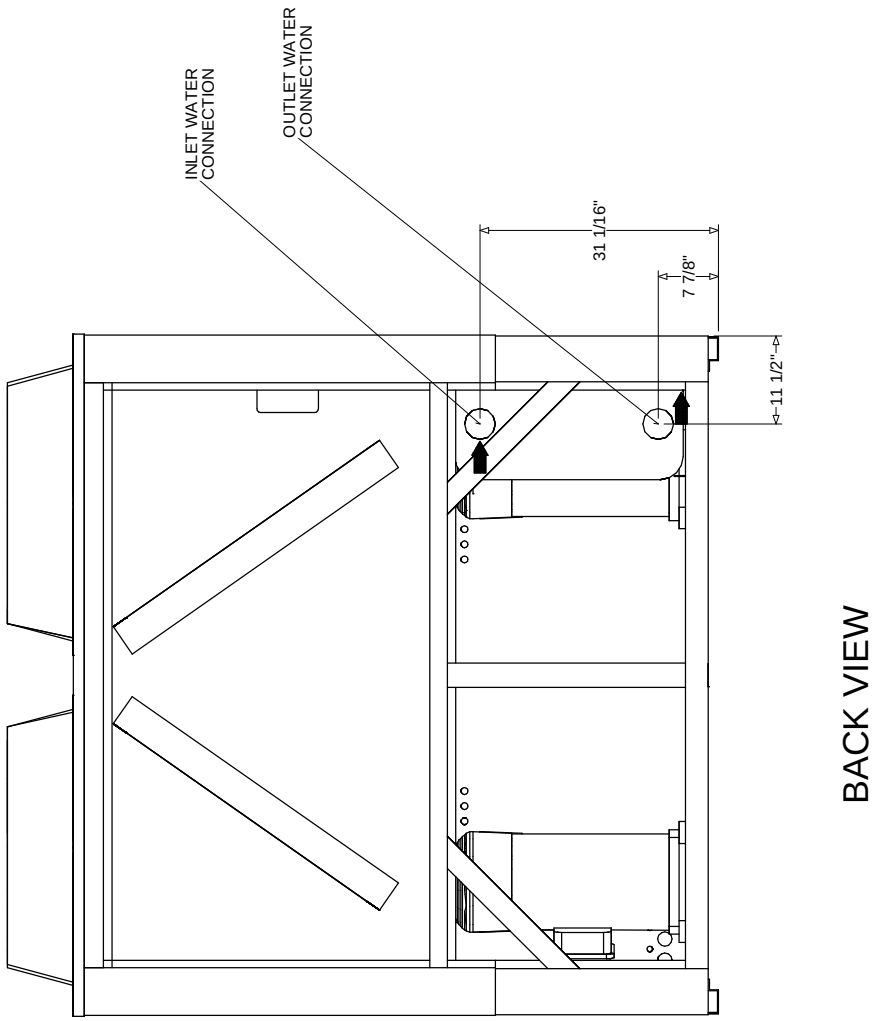
Unit Dimensions - Air-Cooled Scroll
Item: A1 Qty: 1 Tag(s): CGAM-1



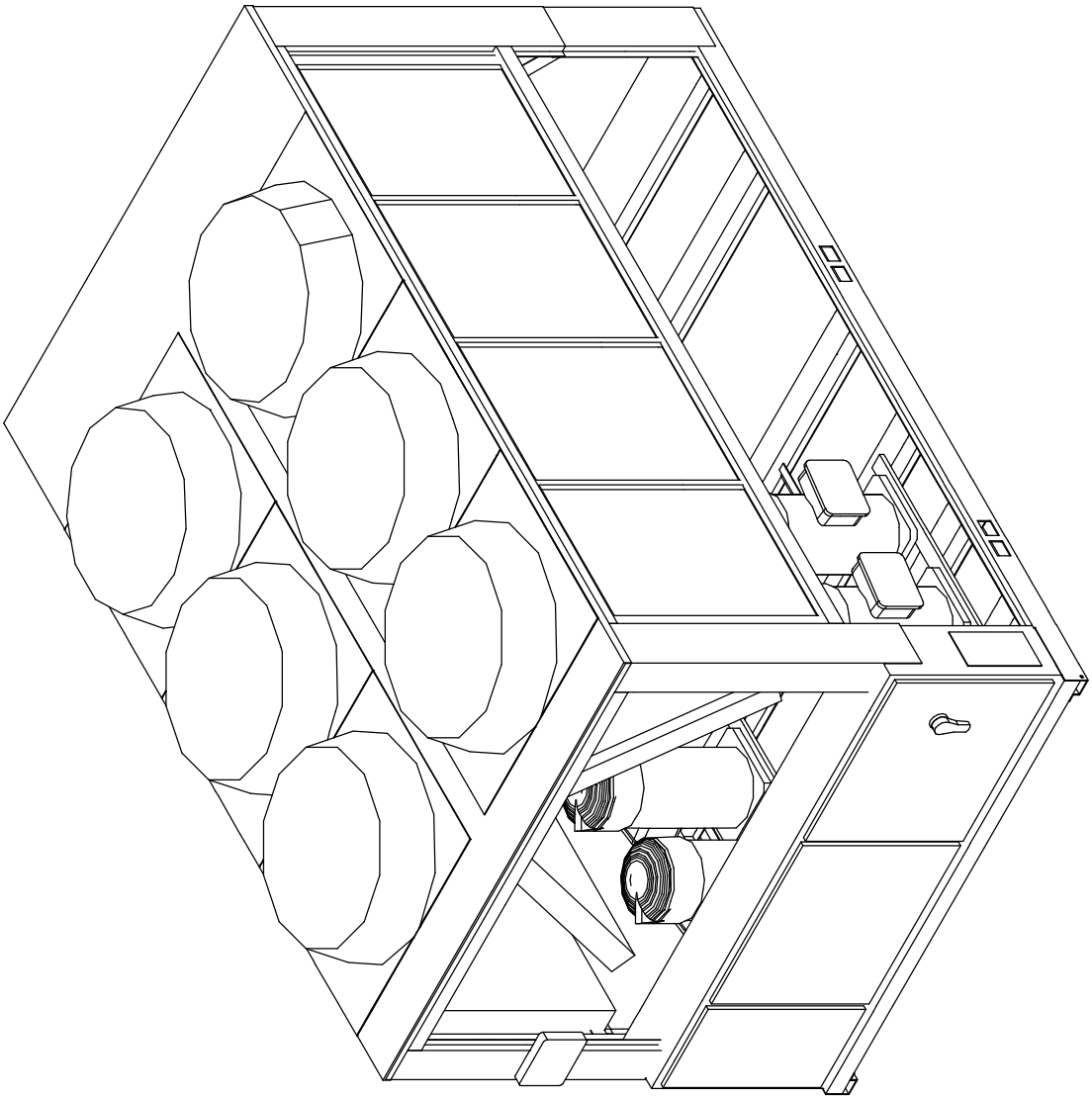
FRONT VIEW

LOUVERED PANELS NOT SHOWN
OVER CONTROL PANEL FOR CLARITY

Unit Dimensions - Air-Cooled Scroll
Item: A1 Qty: 1 Tag(s): CGAM-1



Unit Dimensions - Air-Cooled Scroll
Item: A1 Qty: 1 Tag(s): CGAM-1



ISOMETRIC VIEW

LOUVERED PANELS NOT SHOWN
OVER CONTROL PANEL FOR CLARITY

Weight, Clearance & Rigging Diagram - Air-Cooled Scroll
Item: A1 Qty: 1 Tag(s): CGAM-1

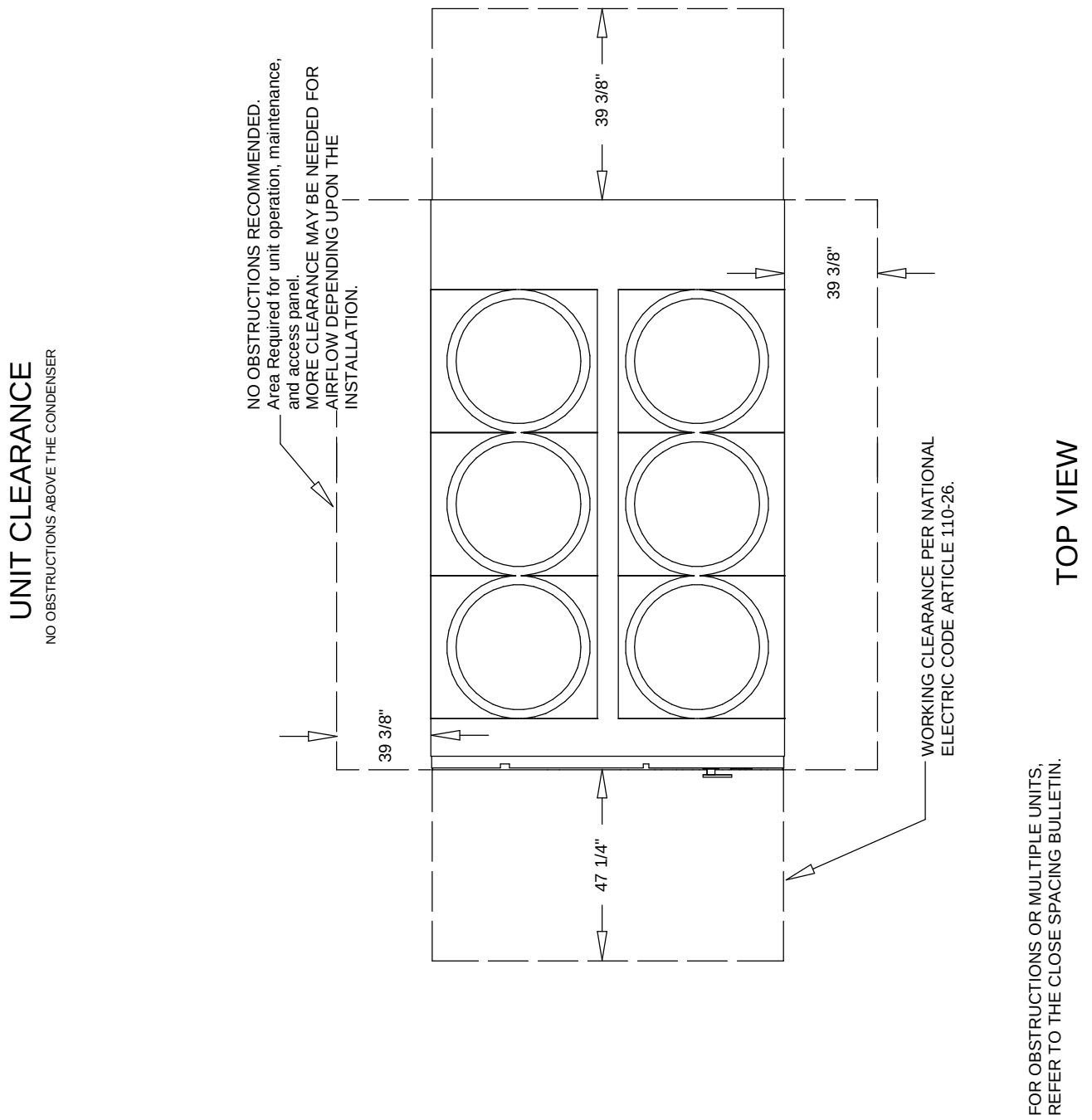
UNIT CENTER OF GRAVITY

LIFTING WEIGHTS				
W1	W2	W3	W4	SHIPPING WEIGHT
1811.3 lb	1968.7 lb	832.0 lb	904.3 lb	5607.3 lb

SIDE VIEW

FRONT VIEW
CONTROL PANEL END

Weight, Clearance & Rigging Diagram - Air-Cooled Scroll
Item: A1 Qty: 1 Tag(s): CGAM-1



Weight, Clearance & Rigging Diagram - Air-Cooled Scroll
Item: A1 Qty: 1 Tag(s): CGAM-1

UNIT RIGGING

LIFTING A UNIT WITH EQUAL LENGTH STRAPS WILL NOT PRODUCE A LEVEL UNIT DURING THE LIFT BECAUSE THE CG WILL NOT BE AT THE MIDPOINT BETWEEN THE BASE LIFTING HOLES. THE FOLLOWING ADJUSTMENTS MUST BE MADE TO PRODUCE A LEVEL LIFT:

- SINGLE SPREADER BAR LIFTING METHOD
IF THE UNIT CG IS CLOSER TO THE CONTROL PANEL, THE STRAPS ON THE CONTROL PANEL SIDE OF THE SPREADER BAR MUST BE ADJUSTED TO BE SHORTER THAN THOSE ON THE OPPOSITE SIDE OF THE SPREADER BAR, ALLOWING THE SPREADER BAR TO MOVE TOWARD THE CONTROL PANEL AND OVER THE UNIT CG. SEVERAL ADJUSTMENTS OF THE STRAP LENGTH MAY BE REQUIRED TO PRODUCE A LEVEL UNIT DURING LIFT.

- H-TYPE SPREADER BAR LIFTING METHOD
IF THE STRAPS FROM THE H BAR TO THE UNIT BASE ARE THE SAME LENGTH, THE CRANE LIFTING POINT ON THE CENTER WEB OF THE H BAR MUST BE ADJUSTED TO PRODUCE A LEVEL UNIT LIFT.

⚠ WARNING

IMPROPER LIFTING AND MOVING!

USE SPREADER BAR AS SHOWN IN DIAGRAM. REFER TO INSTALLATION MANUAL OR NAMEPLATE FOR UNIT WEIGHT. REFER TO INSTALLATION INSTRUCTIONS LOCATED INSIDE CONTROL PANEL FOR FURTHER RIGGING INFORMATION.

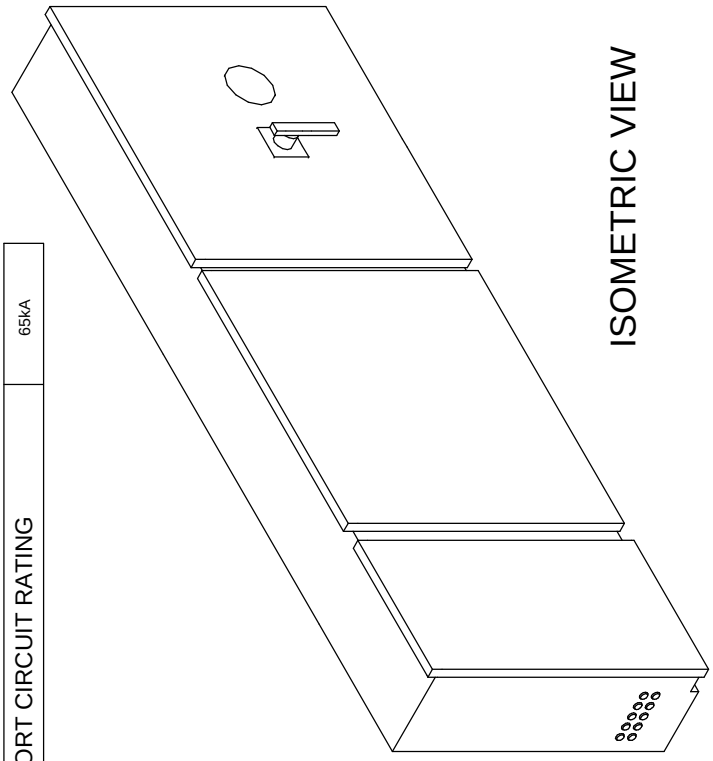
OTHER LIFTING ARRANGEMENTS COULD RESULT IN DEATH, SERIOUS INJURY OR EQUIPMENT DAMAGE.

ISOMETRIC VIEW

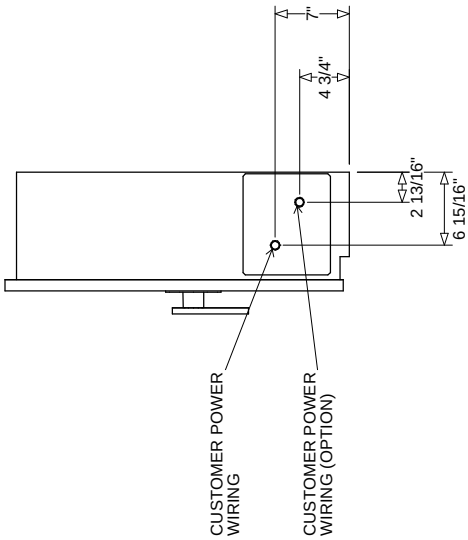
Accessory - Air-Cooled Scroll
Item: A1 Qty: 1 Tag(s): CGAM-1

SHORT CIRCUIT RATING	65kA

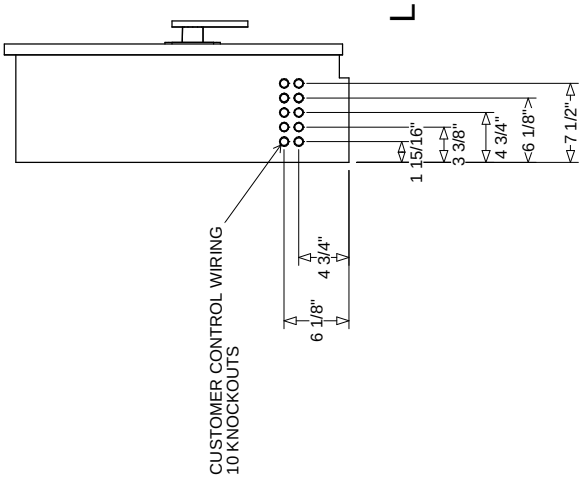
ISOMETRIC VIEW



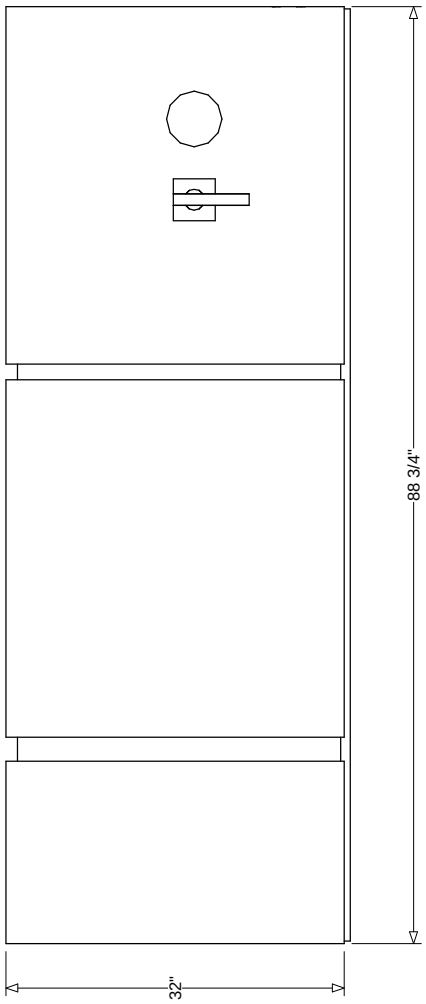
RIGHT END VIEW



LEFT END VIEW



FRONT VIEW



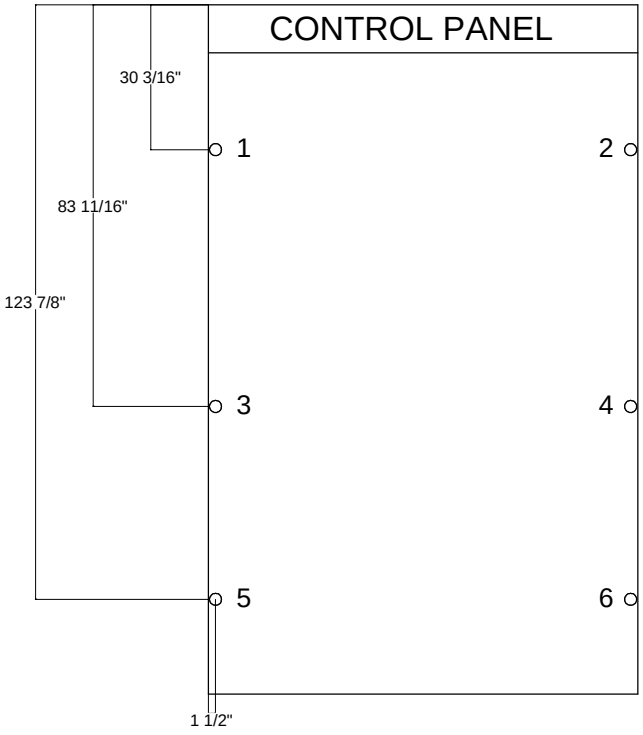
CUSTOMER WIRE SELECTION TABLE			
POWER WIRE CONNECTION TO CIRCUIT BREAKER (1Q1)			
UNIT SIZE	UNIT EFF	VOLTAGE	CIR 1 & 2 (SINGLE POINT POWER) LUG WIRE SIZE RANGE (PER PHASE) (1 MAX Conductor per phase) 3/0-350MCM
080	HIGH	460	

Accessory - Air-Cooled Scroll
Item: A1 Qty: 1 Tag(s): CGAM-1

UNIT SIZE	MOUNTING LOCATIONS & POINT LOAD WEIGHTS								TOTAL OPERATING WEIGHT
	1	2	3	4	5	6	7	8	
080	1434.8 lb	1662.1 lb	774.3 lb	885.5 lb	395.7 lb	448.8 lb	N/A	N/A	5692.2 lb

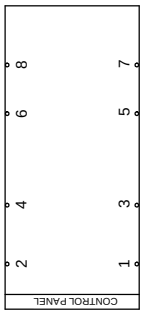
MOUNTING HOLE DIAMETER 19mm

DIMENSIONS ARE REFERENCED FROM
THE END AND SIDE OF THE UNIT BASE



TOP VIEW

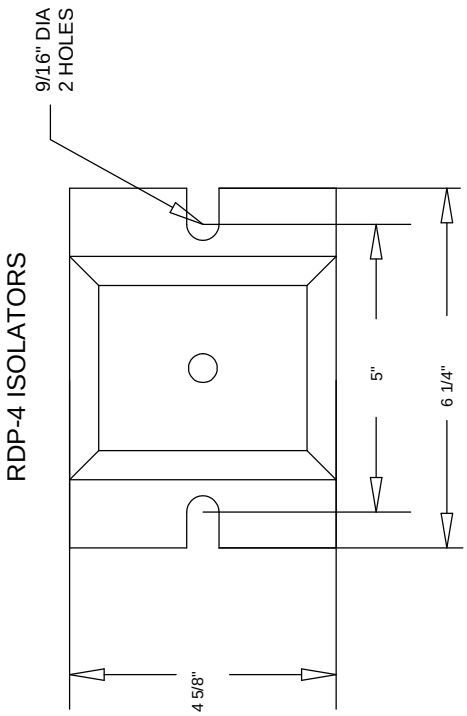
Accessory - Air-Cooled Scroll
Item: A1 Qty: 1 Tag(s): CGAM-1

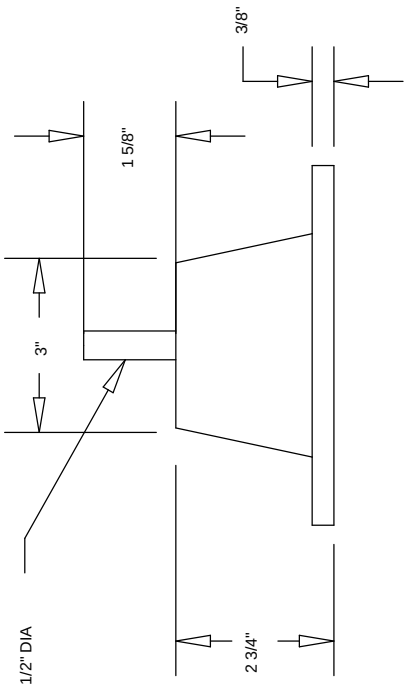


SEE ISOLATOR POINT LOADS FOR DETAILED INFORMATION ON ISOLATOR LOCATIONS.

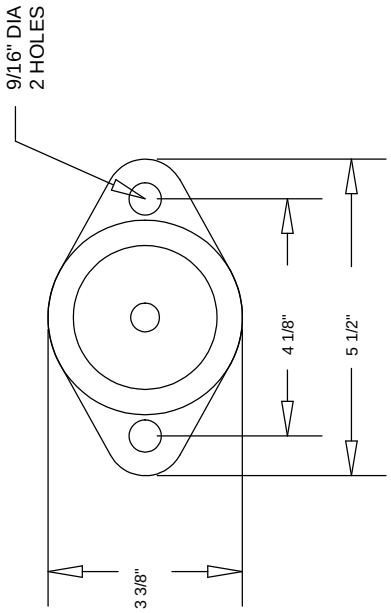
UNIT SIZE	MOUNTING LOCATIONS AND ISOLATOR NUMBER							
	1	2	3	4	5	6	7	8
080	RDP-4 BRICK RED	RDP-4 LIME	RDP-4 BRICK RED	RDP-4 BRICK RED	RDP-3 CHARCOAL	RDP-3 CHARCOAL	N/A	N/A

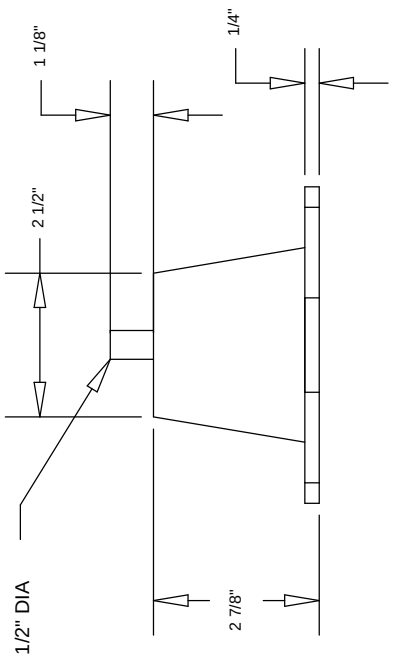
RDP-4 ISOLATORS



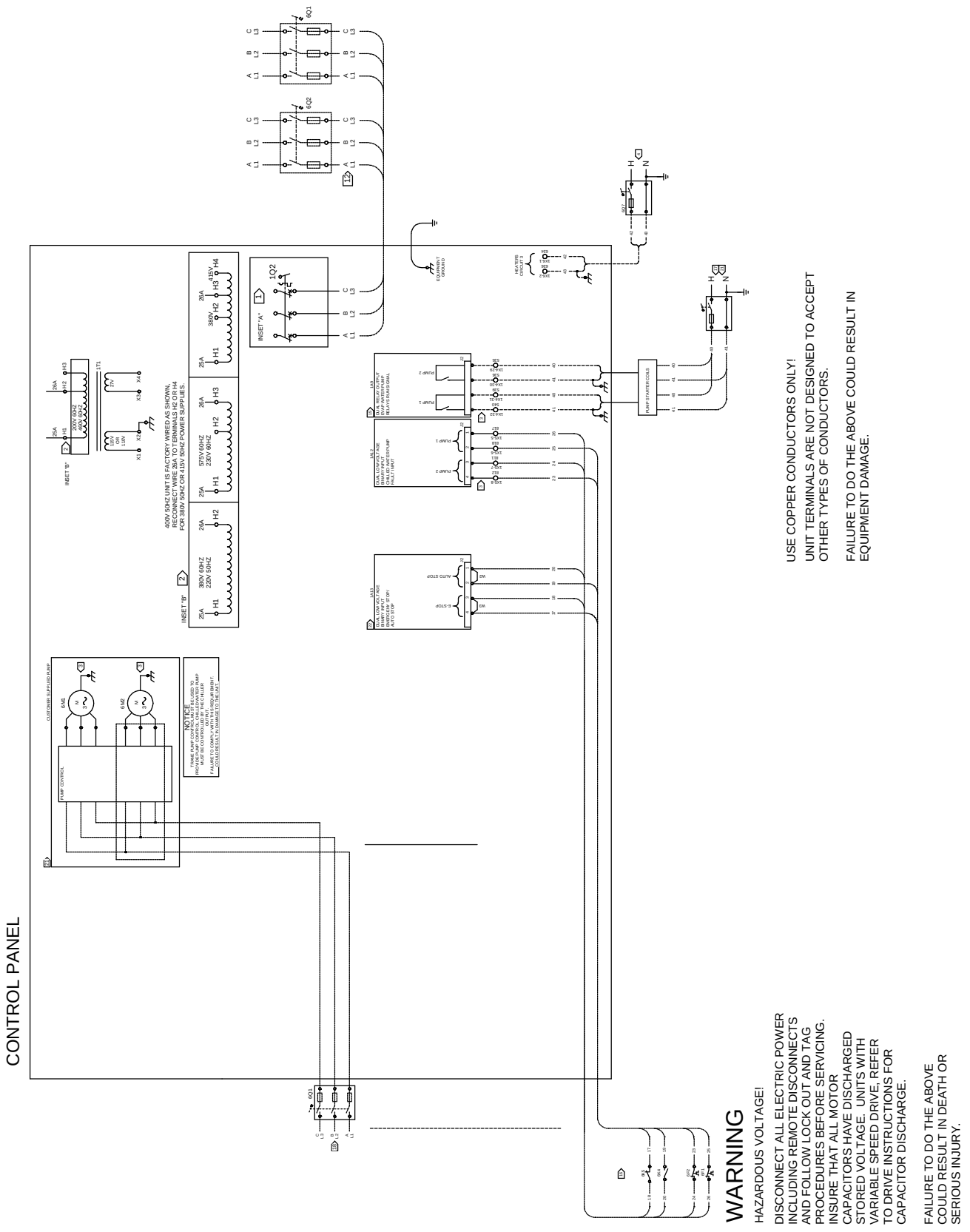


RDP-3 ISOLATORS





Field Wiring - Air-Cooled Scroll
Item: A1 Qty: 1 Tag(s): CGAM-1



Field Wiring - Air-Cooled Scroll
Item: A1 Qty: 1 Tag(s): CGAM-1

1. SINGLE SOURCE POWER IS PROVIDED AS STANDARD ON THESE PRODUCTS, FIELD CONNECTIONS ARE MADE TO 1X1, OR 1Q2.
2. FOR VOLTAGES 200V/60HZ, 220V/50HZ, 380V/60HZ, 460V/60HZ, WIRE 26A SHALL BE CONNECTED TO H2. FOR VOLTAGES 230V/60HZ & 575V/60HZ, WIRE 26A SHALL BE CONNECT TO H3. 400V/50HZ UNIT IS FACTORY WIRED WITH 26A CONNECTED TO H3 - RECONNECT WIRE 26A TO H2 FOR 380V/50HZ, OR H4 FOR 415V/50HZ. H4 IS ONLY AVAILABLE WITH 400V/50HZ PANELS.
3. FIELD CONNECTIONS ARE ONLY MADE IN A CUSTOMER PROVIDED PUMP (PTYP=NONE). THESE CONNECTIONS WILL BE MADE BY THE FACTORY WHEN THE PUMP IS PROVIDED BY THE FACTORY (PTYP=DHHP).
4. CUSTOMER SUPPLIED POWER 115/60/1 OR 220/50/1 TO POWER RELAYS. MAX. FUSE SIZE IS 20 AMPS. GROUND ALL CUSTOMER SUPPLIED POWER SUPPLIES AS REQUIRED BY APPLICABLE CODES. GREEN GROUND SCREWS ARE PROVIDED IN UNIT CONTROL PANEL.
5. WIRED TO NEXT UNIT. 22 AWG SHIELDED COMMUNICATION WIRE EQUIVALENT TO HELIX LF22P0014216 RECOMMENDED. THE SUM TOTAL OF ALL INTERCONNECTED CABLE SEGMENTS NOT TO EXCEED 4500 FEET. CONNECTION TOPOLOGY SHOULD BE DAISY CHAIN. REFER TO BUILDING AUTOMATION SYSTEM (BAS) COMMUNICATION INSTALLATION LITERATURE FOR END OF LINE TERMINATION RESISTOR REQUIREMENTS.
6. WIRED TO TRACER OR OTHER TRANE REMOTE DEVICE. 22 AWG SHIELDED COMMUNICATION WIRE EQUIVALENT TO HELIX LF22P0014216 RECOMMENDED. THE SUM TOTAL OF ALL INTERCONNECTED CABLE SEGMENTS NOT TO EXCEED 4500 FEET. CONNECTION TOPOLOGY SHOULD BE DAISY CHAIN. REFER TO BUILDING AUTOMATION SYSTEM (BAS) COMMUNICATION INSTALLATION LITERATURE FOR END OF LINE TERMINATION RESISTOR REQUIREMENTS.
7. WIRED TO CUSTOMER CHILLED WATER SET POINT 2-10V OR 4-20mA.
8. WIRED TO CUSTOMER EXTERNAL DEMAND LIMIT 2-10V OR 4-20mA.
9. WIRED TO CUSTOMER 2-10V OR 4-20mA % CAPACITY ANNUNICIATOR.
10. WIRED TO TRACER OR OTHER REMOTE DEVICE.
11. REFER TO CGAM ELECTRICAL SCHEMATIC FOR SPECIFIC ELECTRICAL CONNECTION INFORMATION AND NOTES PERTAINING TO WIRING INSTALLATION.
12. ALL UNIT POWER WIRING MUST BE 600 VOLT COPPER CONDUCTORS ONLY AND HAVE A MINIMUM TEMPERATURE INSULATION RATING OF 90 DEGREE C. REFER TO UNIT NAMEPLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION DEVICE. PROVIDE AN EQUIPMENT GROUND IN ACCORDANCE WITH APPLICABLE ELECTRIC CODES. REFER TO WIRE RANGE TABLE FOR LUG SIZES.
13. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH NATIONAL ELECTRIC CODE AND LOCAL REQUIREMENTS.
14. ALL CUSTOMER CONTROL CIRCUIT WIRING MUST BE COPPER CONDUCTORS ONLY AND HAVE A MINIMUM INSULATION RATING OF 300 VOLTS. EXCEPT AS NOTED, ALL CUSTOMER WIRING CONNECTIONS ARE MADE TO CIRCUIT BOARD MOUNTED BOX LUGS WITH A WIRE RANGE OF 14 TO 18 AWG OR DIN RAIL MOUNTED SPRING FORCE TERMINALS.
15. UNIT PROVIDED DRY CONTACTS FOR THE CONDENSER/CHILLED WATER PUMP CONTROL. RELAYS ARE RATED FOR 7.2 AMPS RESISTIVE, 2.88 AMPS PILOT DUTY, OR $\frac{1}{3}$ HP, 7.2 FLA AT 120 VOLTS 60 HZ, CONTACTS ARE RATED FOR 5 AMPS GENERAL PURPOSE DUTY 240 VOLTS.
16. CUSTOMER SUPPLIED CONTACTS FOR ALL LOW VOLTAGE CONNECTIONS MUST BE COMPATABLE WITH DRY CIRCUIT 24 VOLTS DC FOR A 12 mA RESISTIVE LOAD. SILVER OR GOLD PLATED CONTACTS RECOMMENDED.
17. FIELD CONNECTIONS ARE ONLY MADE IN A CUSTOMER PROVIDED PUMP. THESE CONNECTIONS WILL BE MADE BY THE FACTORY WHEN THE PUMP IS PROVIDED BY THE FACTORY. CUSTOMER SUPPLIED POWER 115V, 60Hz, 1PH.
18. CUSTOMER SUPPLIED 3 PHASE POWER.
19. OPTIONAL FIELD ASSIGNED PROGRAMMABLE RELAYS (STAT=PRLY). CLASS 1 FIELD WIRED MODULE, RELAY AT 120V: 7.2A RESISTIVE 2.88A PILOT DUTY, 1/2 HP 7.2FLA; AT 240VAC: 5 AMPS GENERAL PURPOSE.
20. WIRED TO CUSTOMER 0-10 VDC PUMP SPEED SIGNAL.
21. WHEN FACTORY PROVIDED PUMP IS NOT SELECTED. CUSTOMER MUST SUPPLY SUITABLE PUMP SYSTEM. REFER TO PUMP MANUFACTURER FOR WIRING REQUIREMENTS.
22. THE CONTACTS FOR AUTO STOP AND EMERGENCY STOP SWITCHES ARE JUMPERED AT THE FACTORY BY JUMPERS W2 & W3 TO ENABLE UNIT OPERATION. IF REMOTE CONTROL IS DESIRED, REMOVED THE JUMPERS AND CONNECT TO THE DESIRED CONTROL CIRCUIT.
23. 1A15, LCI MODULE USED WHEN (COMM = LCI).
24. 1A41, BACNET INTERFACE MODULE USED WHEN (COMM = BCNT).