



Air-Cooled Chiller, Scroll Compressors

Job Information			
Name	Job01 (Restored)	Tag	
Address		Quantity	
Sales Team		Model Number	CGAM080F2*02AXD2 A1A1B1AXXA1D1AXX XXXXXBxA3A1D1X- C-X
Comments			

General			
Unit nominal tonnage	80 tons	Capacity	70.40 tons
Unit type	High efficiency	Sound attenuator package	Super quiet
Agency listing	UL/CUL	Refrigerant isolation valves	Refr. isolation valves (discharge valve)
Freeze protection (factory inst. only)	Ext. t-stat control	Water strainer	Factory installed
Appearance options	Louvers	Startup allowance	Unit startup by Trane
TOPSS version number	147	Number of compressors	4
Number of circuits	2	Capacity steps	4
Shipping weight	5607.3 lb	Operating weight	5692.2 lb
Length	143.100 in	Width	89.000 in
Height	92.400 in	Water connections	4.000 in
Refrigerant	R410A	Refrigerant charge circuit 1	74.0 lb
Refrigerant charge circuit 2	74.0 lb	Oil charge circuit 1	3.54 gal
Oil charge circuit 2	3.54 gal	ASHRAE 90.1/CSA compliance	All versions
AHRI certification	Certified	Rated capacity (AHRI)	78.20 tons
Flow switch set point	Flow switch set point 15 cm/sec		

Evaporator			
Evaporator application	Low temp	Evap leaving temp	43.00 F
Evap entering temp	53.00 F	Evap flow rate	184.80 gpm
Evap fluid type	Ethylene glycol	Evap fluid concentration	30.00 %
Evap fouling factor	0.00010 hr-sq ft-deg F/Btu	Evap press drop	15.60 ft H2O
Total PD evap+strainer	18.50 ft H2O	Evap fluid freeze point	5.10 F
Min evap flow rate	114.70 gpm	Min flow PD evap+strainer	7.50 ft H2O
Max evap flow rate	275.30 gpm	Max flow PD evap+strainer	39.60 ft H2O
Saturated evap temp circuit 1	36.20 F	Saturated evap temp circuit 2	36.20 F

Condenser			
Unit application	Wide ambient	Fin material	Lanced aluminum
Ambient air temperature	105.00 F	Elevation	0.00 ft
Total airflow	56958 cfm	Saturated cond temp circuit 1	130.40 F
Saturated cond temp circuit 2	130.40 F		

Electrical			
Unit hertz	60 hertz	Unit voltage	460 volt 3 phases
Starter type	Across the line	Incoming power line connection	Single point
Power line connection	Circuit breaker-high	Enclosure type	UL 1995 rated for



type	fault rated		outdoor applications
Short circuit	High	Unit power	98.30 kW
Total compressor power	90.80 kW	Number of fans	6
Fan motor power	7.10 kW	Total fan FLA	20.20 A
RLA - compressor A	33.00 A	RLA - Compressor B	33.00 A
RLA - Compressor D	33.00 A	RLA - Compressor E	33.00 A
LRA - Compressor A	215.00 A	LRA - Compressor B	215.00 A
LRA - Compressor D	215.00 A	LRA - Compressor E	215.00 A
Single point power MCA	162.20 A	Single point power MOP	175.00 A
Short circuit rating	65000.00 A		

Performance			
Full load efficiency	8.6 EER	IPLV	15.6 EER
NPLV	14.9 EER		

Acoustics			
Sound power level	92 dBA	Sound pressure level	65 dBA

Isolator/Rigging Info			
Mounting weight 1	1434.8 lb	Mounting weight 2	1662.1 lb
Mounting weight 3	774.3 lb	Mounting weight 4	885.5 lb
Mounting weight 5	395.7 lb	Mounting weight 6	448.8 lb
Center of gravity weight 1	1811.3 lb	Center of gravity weight 2	1968.7 lb
Center of gravity weight 3	832.0 lb	Center of gravity weight 4	904.3 lb
Center of gravity length	59.484 in	Center of gravity width	46.610 in
Center of gravity height	37.891 in		

Base unit module	
Factory charge	Refrigerant charge (HFC-410A)

Evaporator module			
Water connection (evap)	Grooved pipe	Insulation	Insulation

Controls module	
Unit operator interface	English

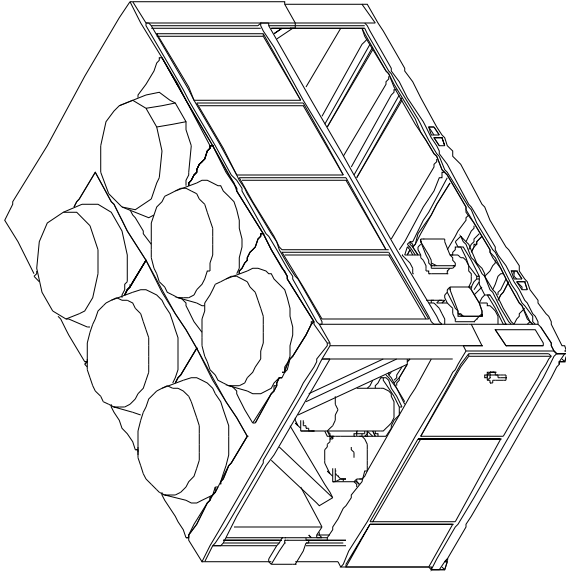


INLET/OUTLET WATER
CONNECTION SIZE

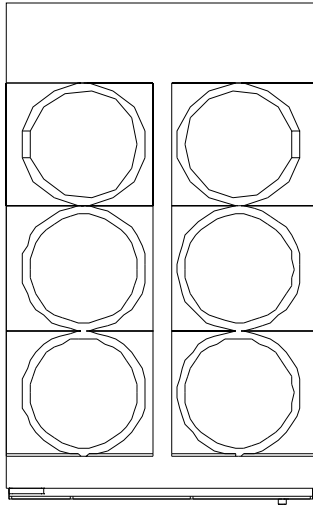
4" (100mm)

BRAZE PLATE
WATER VOLUME/STORAGE

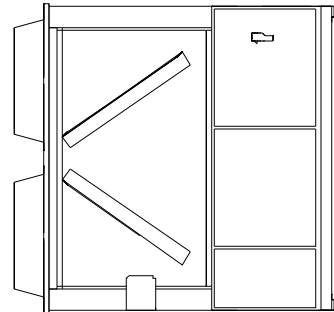
7.0 GAL (26.5 LITERS)



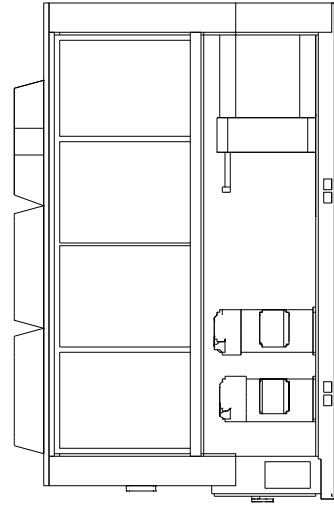
ISOMETRIC VIEW



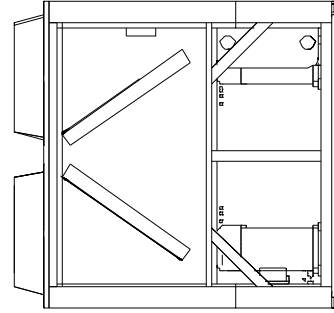
TOP VIEW



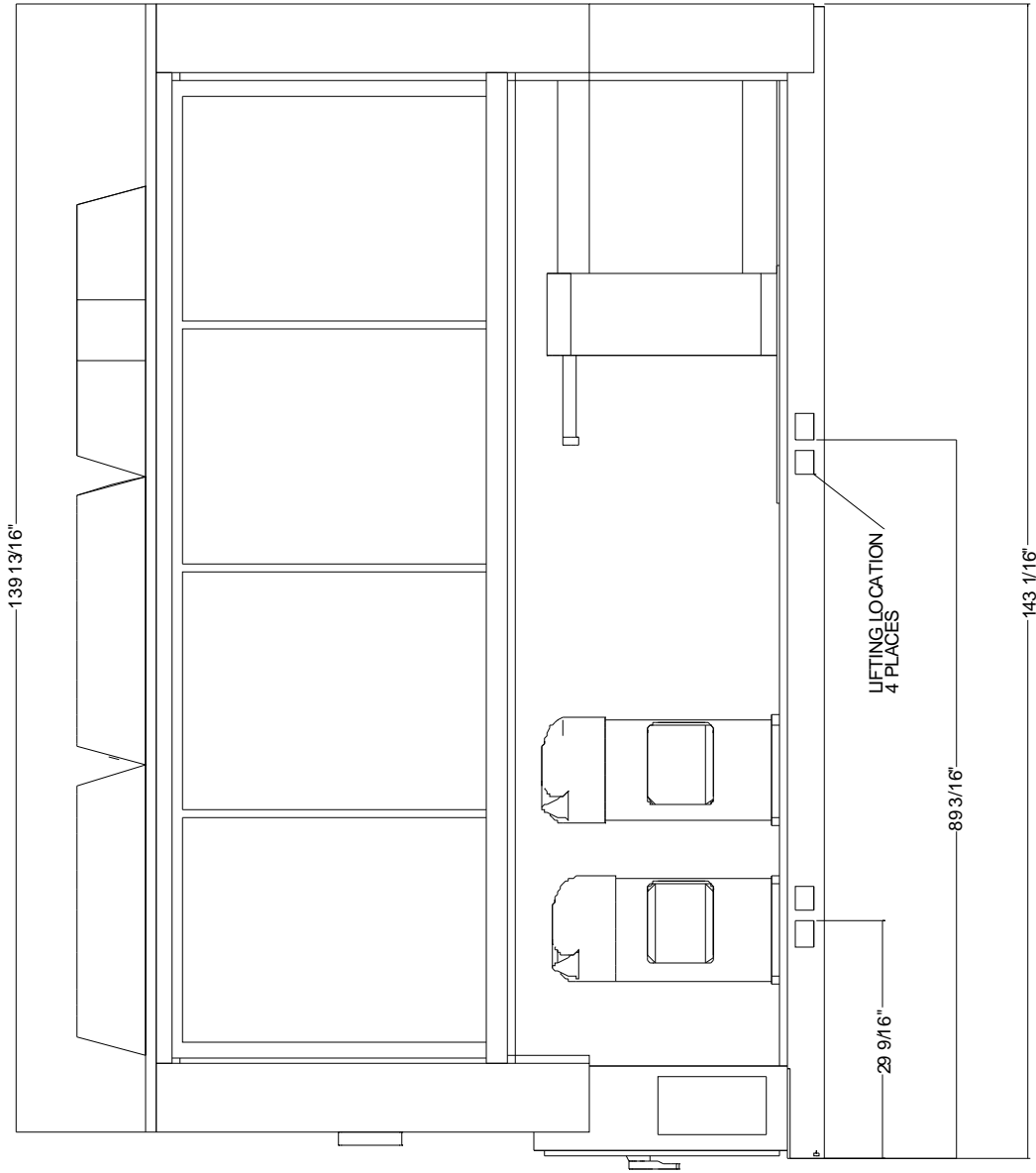
FRONT VIEW



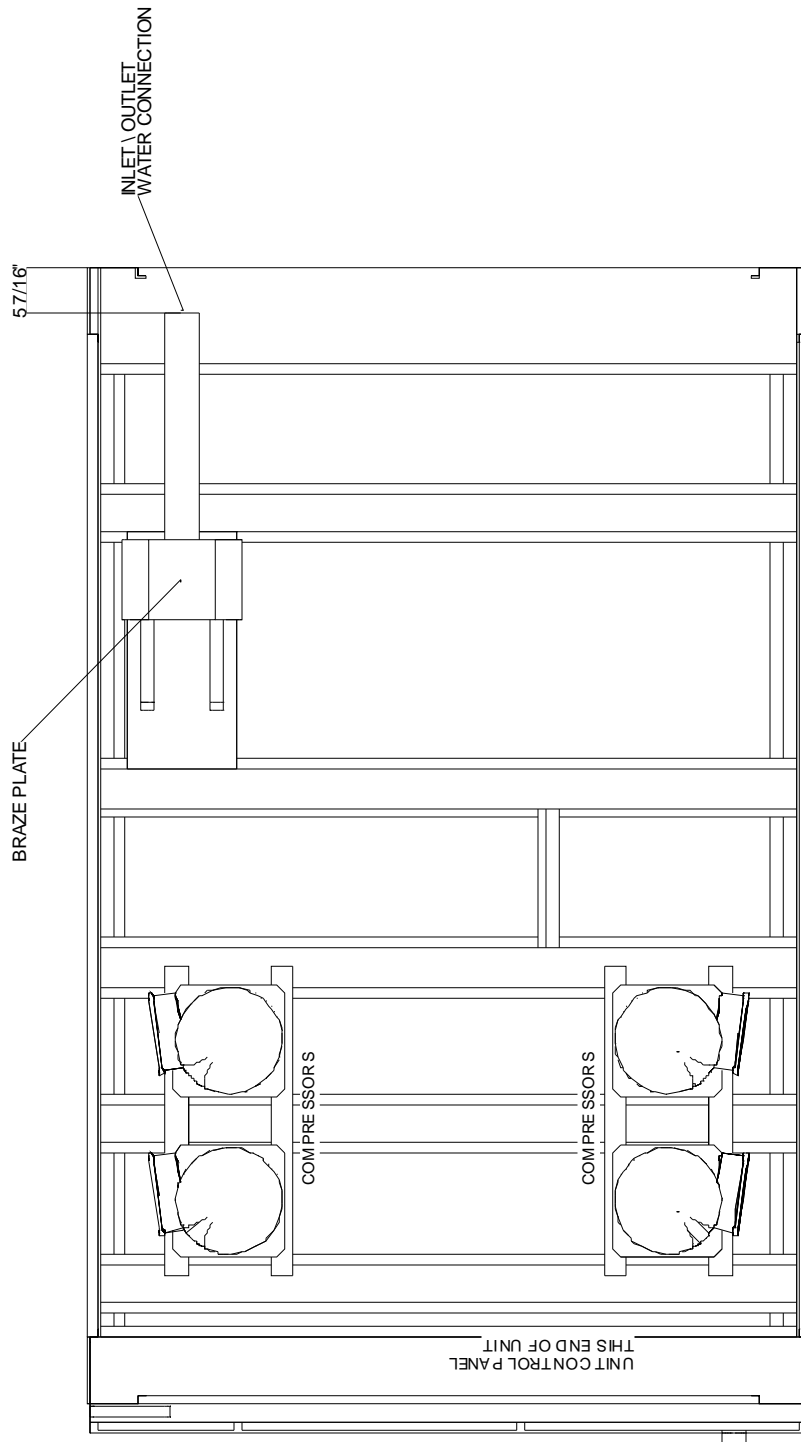
RIGHT SIDE VIEW



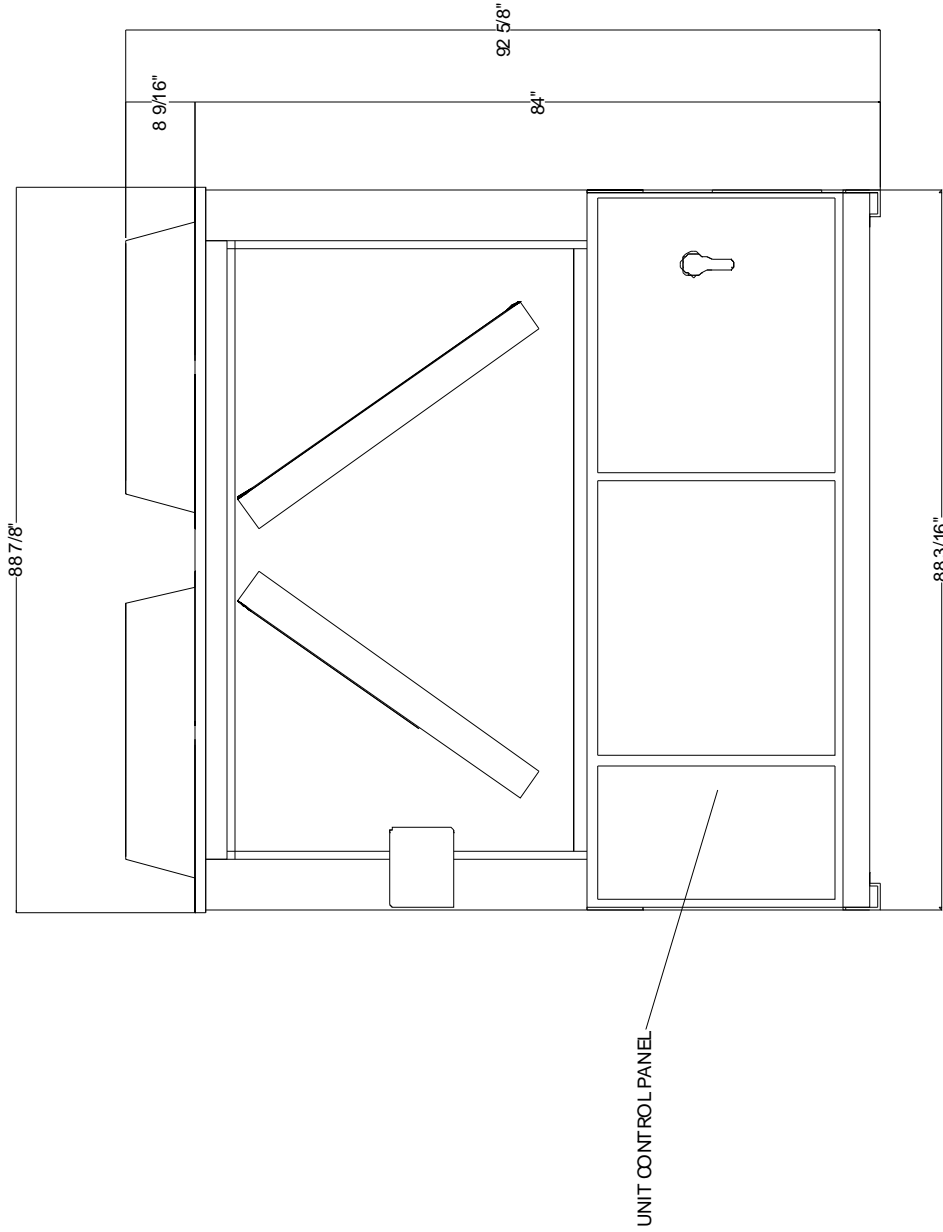
BACK VIEW



RIGHT SIDE VIEW

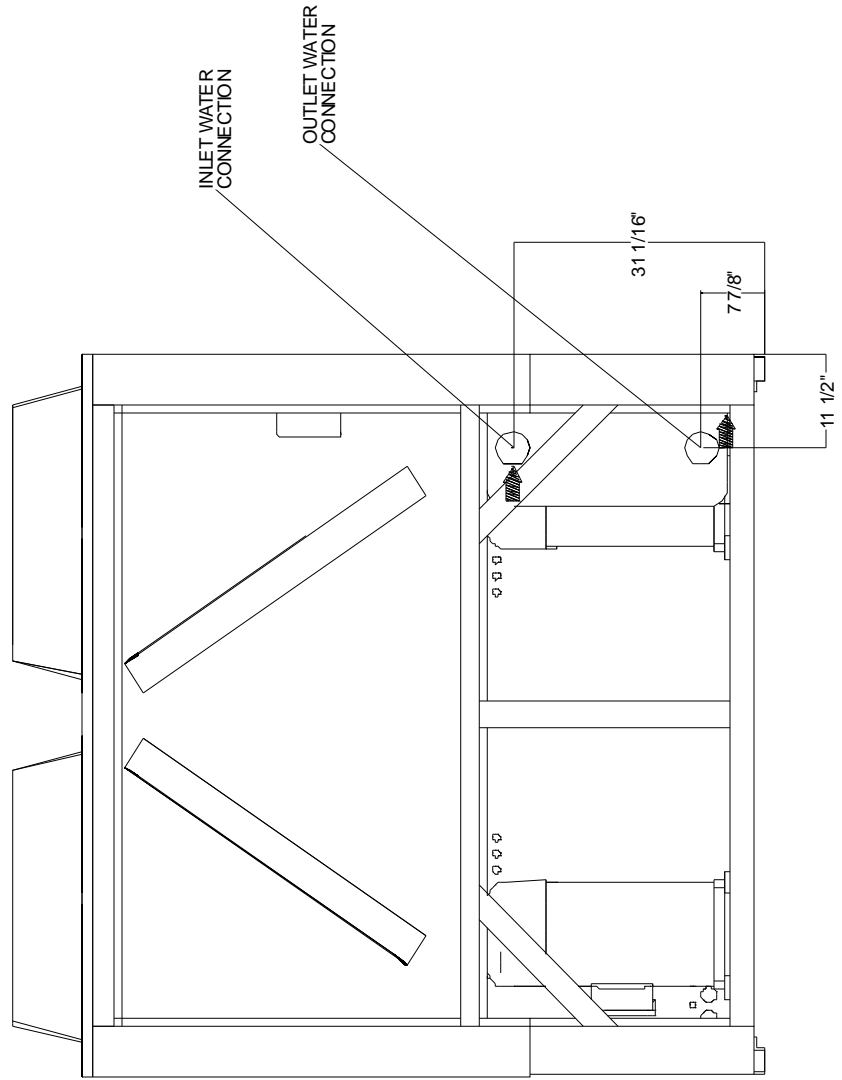


TOP VIEW
CONDENSER, CONTROL PANEL AND
VSD (WHEN ORDERED) REMOVED FOR CLARITY

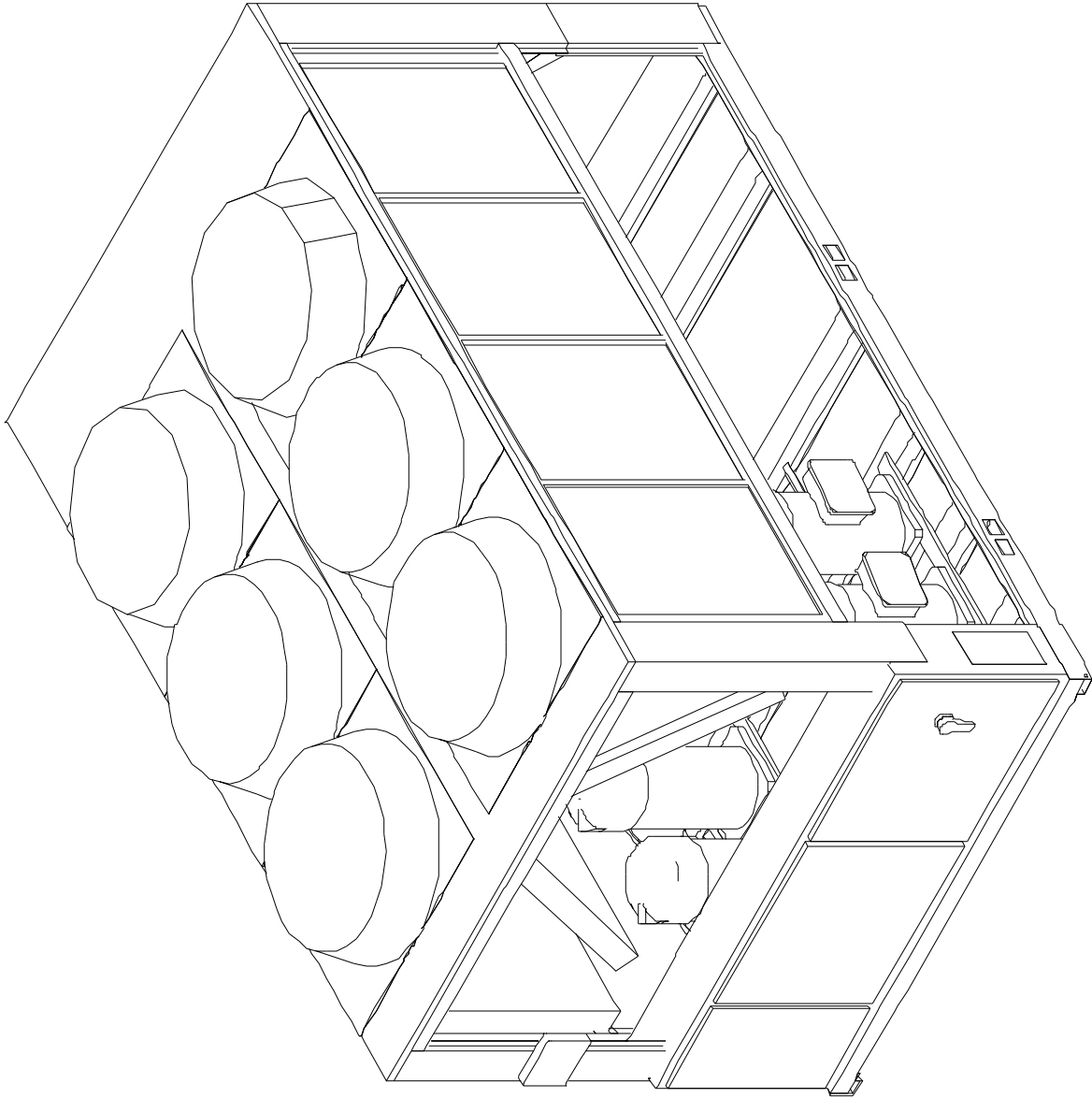


FRONT VIEW

LOUVERED PANELS NOT SHOWN
OVER CONTROL PANEL FOR CLARITY



BACK VIEW

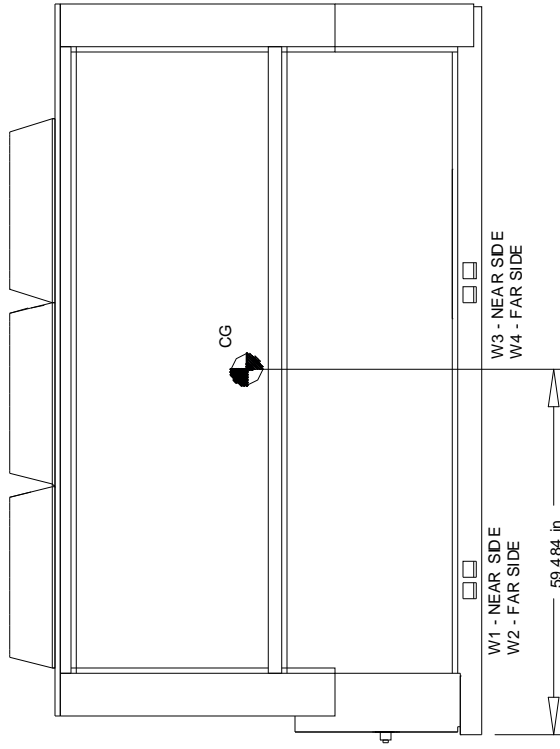
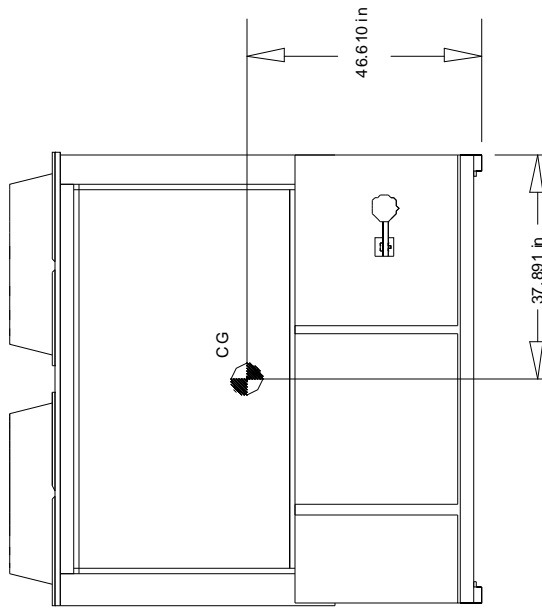


ISOMETRIC VIEW

LOUVERED PANELS NOT SHOWN
OVER CONTROL PANEL FOR CLARITY

UNIT CENTER OF GRAVITY

LIFTING WEIGHTS				
W1	W2	W3	W4	SHIPPING WEIGHT
18 11.3 lb	19 66.7 lb	8 32.0 lb	90 4.3 lb	56 07.3 lb

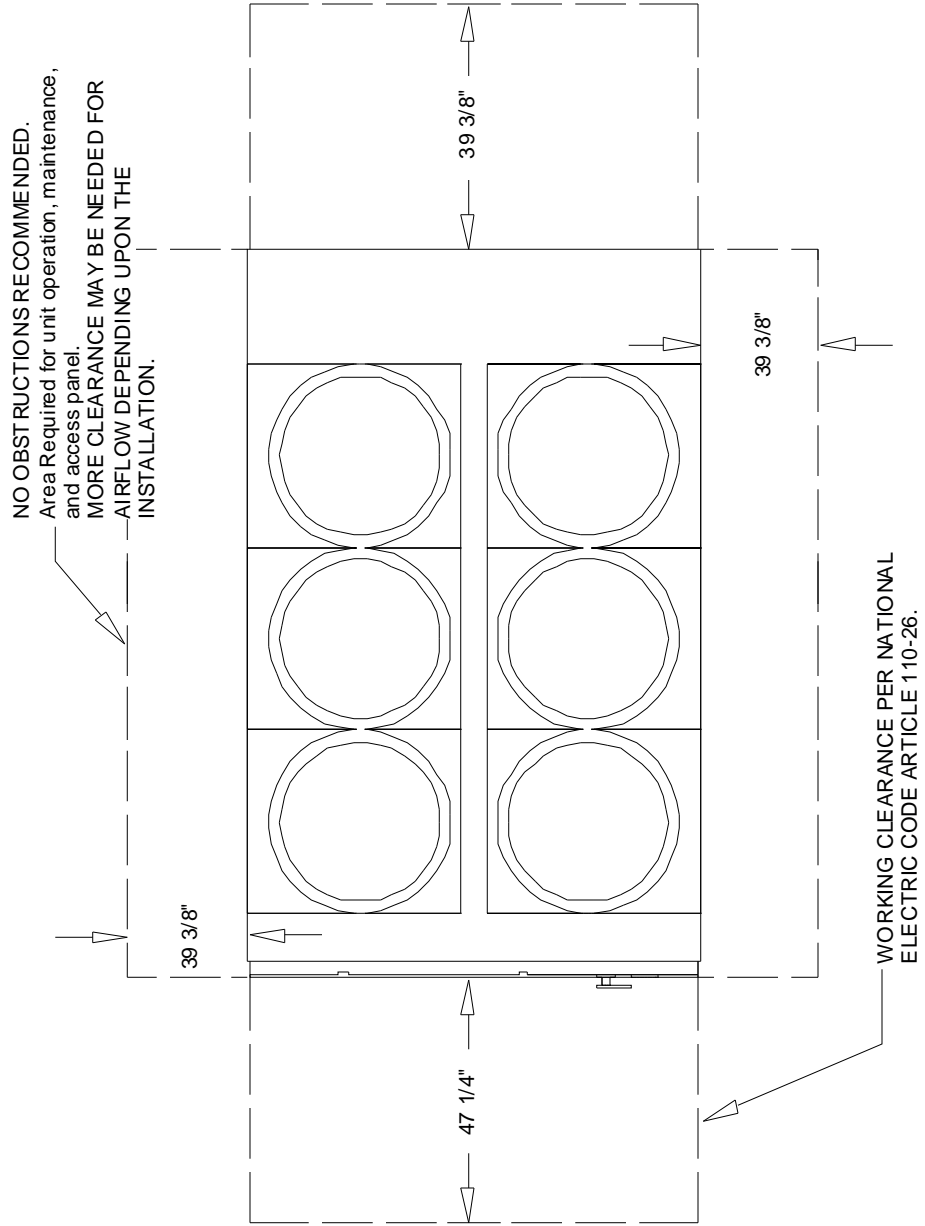


FRONT VIEW
CONTROL PANEL END

SIDE VIEW

UNIT CLEARANCE

NO OBSTRUCTIONS ABOVE THE CONDENSER



FOR OBSTRUCTIONS OR MULTIPLE UNITS,
REFER TO THE CLOSE SPACING BULLETIN.

TOP VIEW

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.

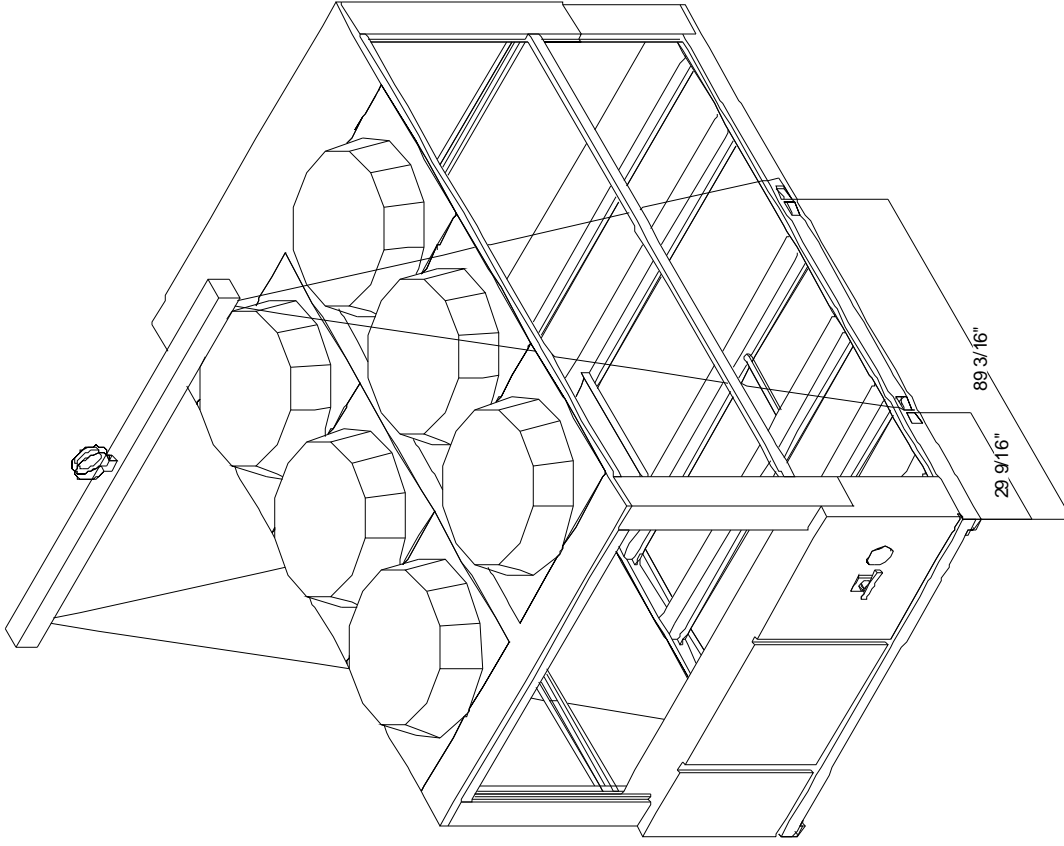


WARNING

IMPROPER LIFTING AND MOVING!

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

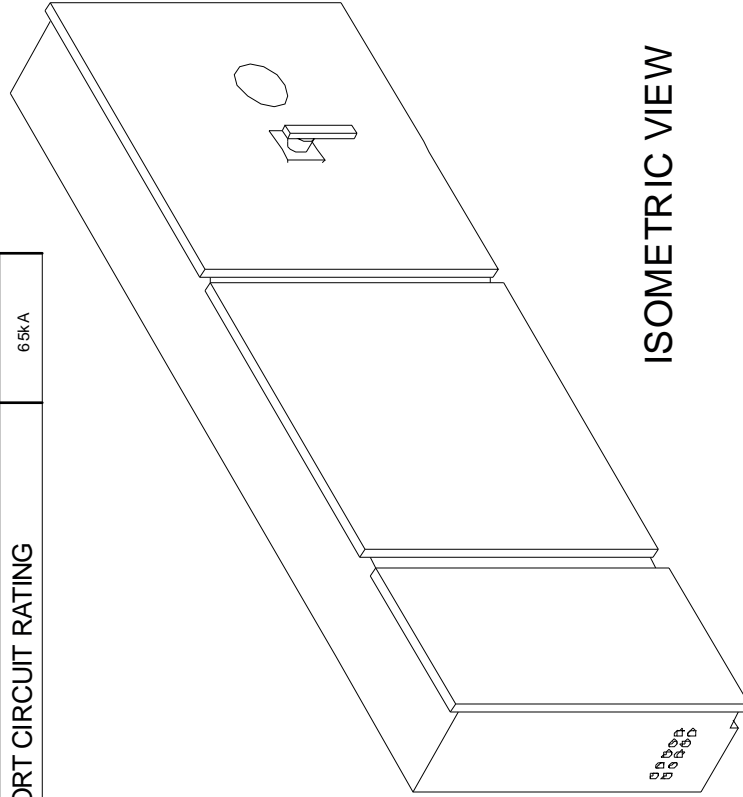
OTHER LIFTING ARRANGEMENTS COULD RESULT IN DEATH, SERIOUS INJURY OR EQUIPMENT DAMAGE.



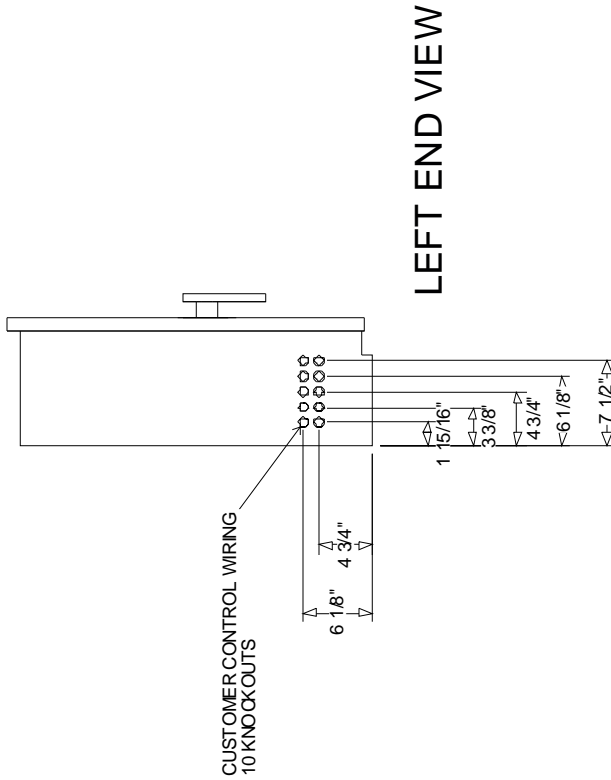
ISOMETRIC VIEW

SHORT CIRCUIT RATING 65KA

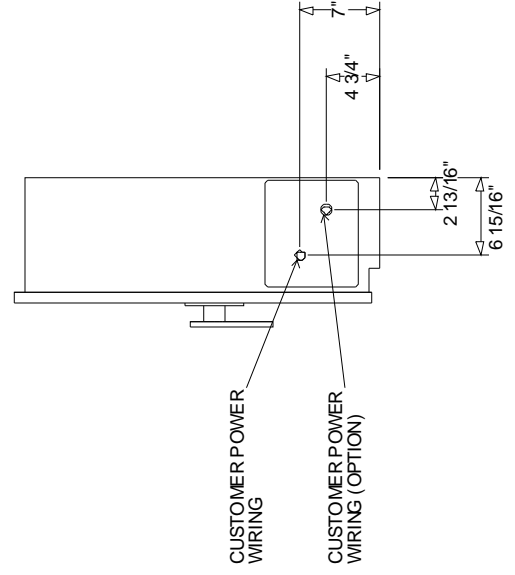
CUSTOMER WIRE SELECTION TABLE			
POWER WIRE CONNECTION TO CIRCUIT BREAKER (1Q1)			
UNIT SIZE	UNIT EFF	VOLTAGE	CR 1 & 2 (SINGLE POINT POWER) LUG WIRE SIZE RANGE (PER PHASE) (1 MAX Conductor per phase) 3/0-350 MCM
080	HIGH	480	



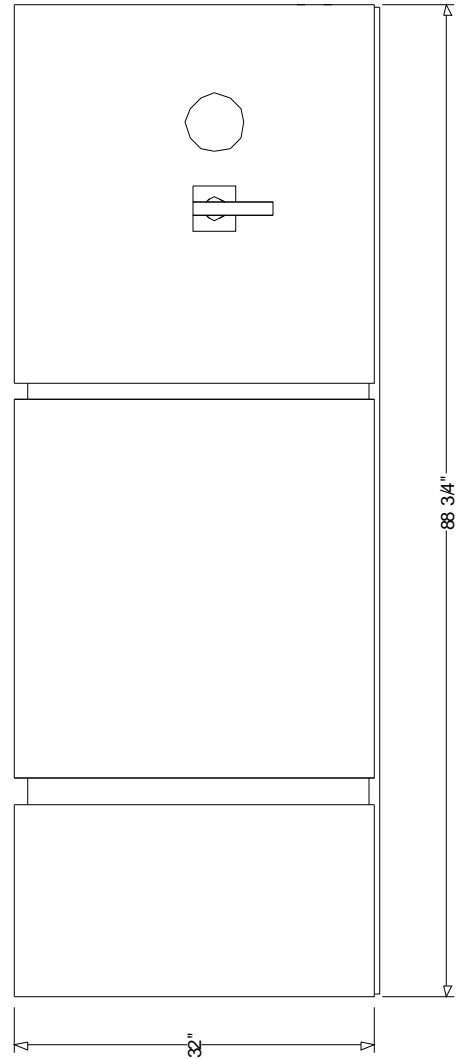
ISOMETRIC VIEW



LEFT END VIEW



RIGHT END VIEW



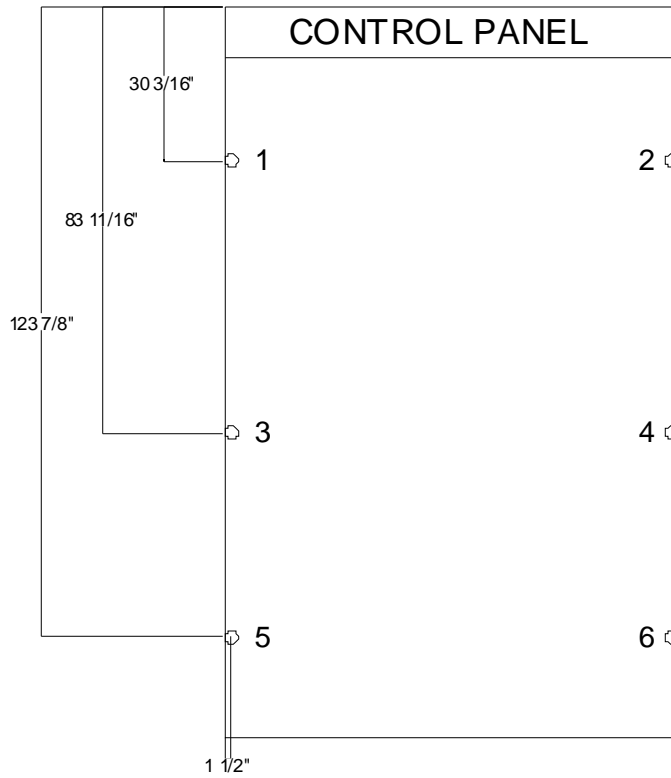
FRONT VIEW



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

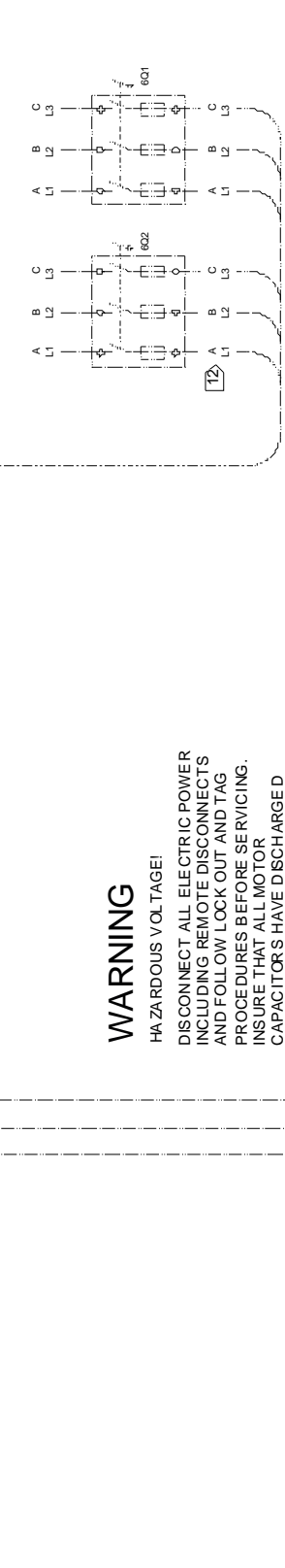
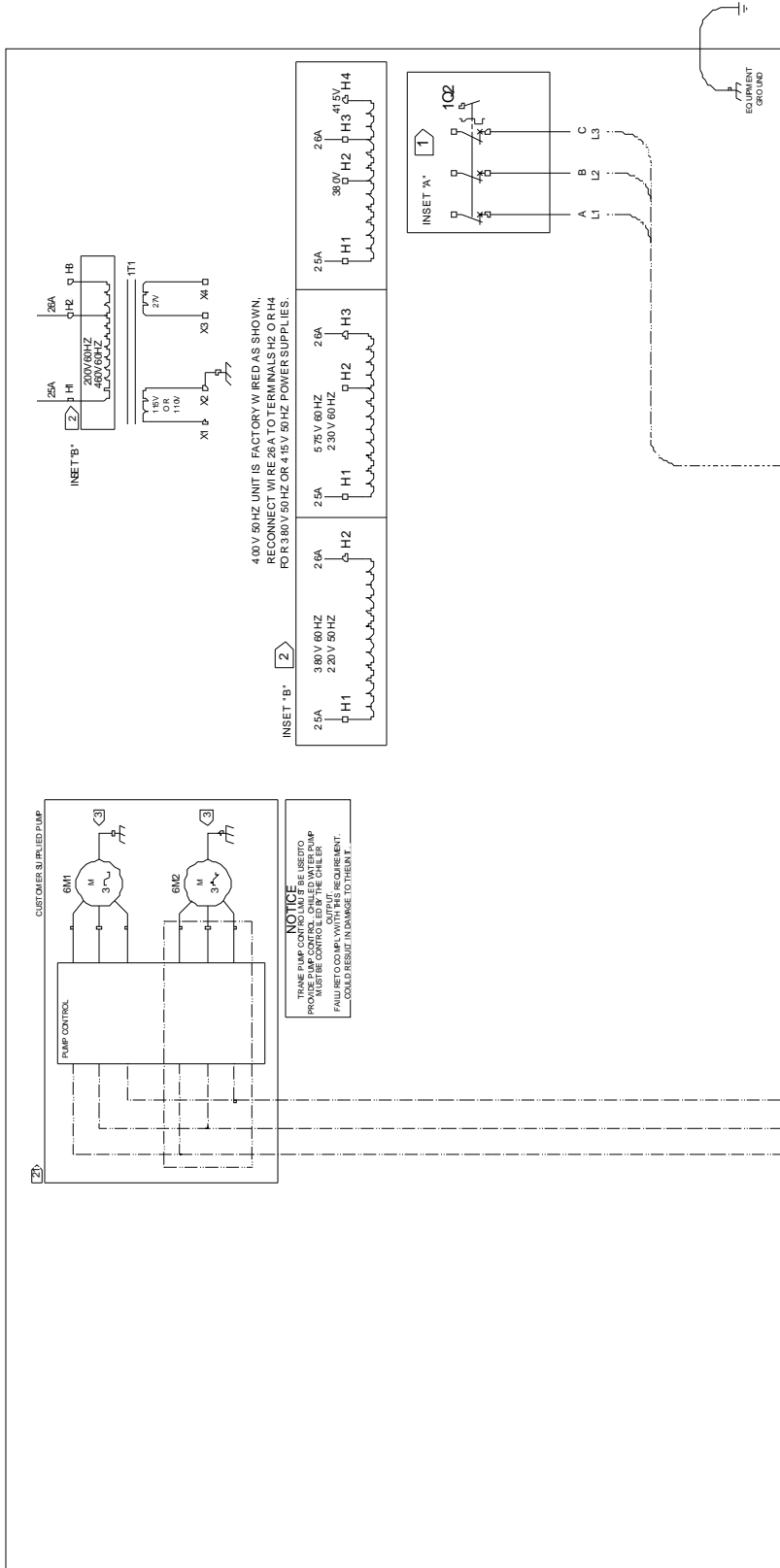
DIMENSIONS ARE REFERENCED FROM THE END AND SIDE OF THE UNIT BASE



TOP VIEW

CONTROL PANEL

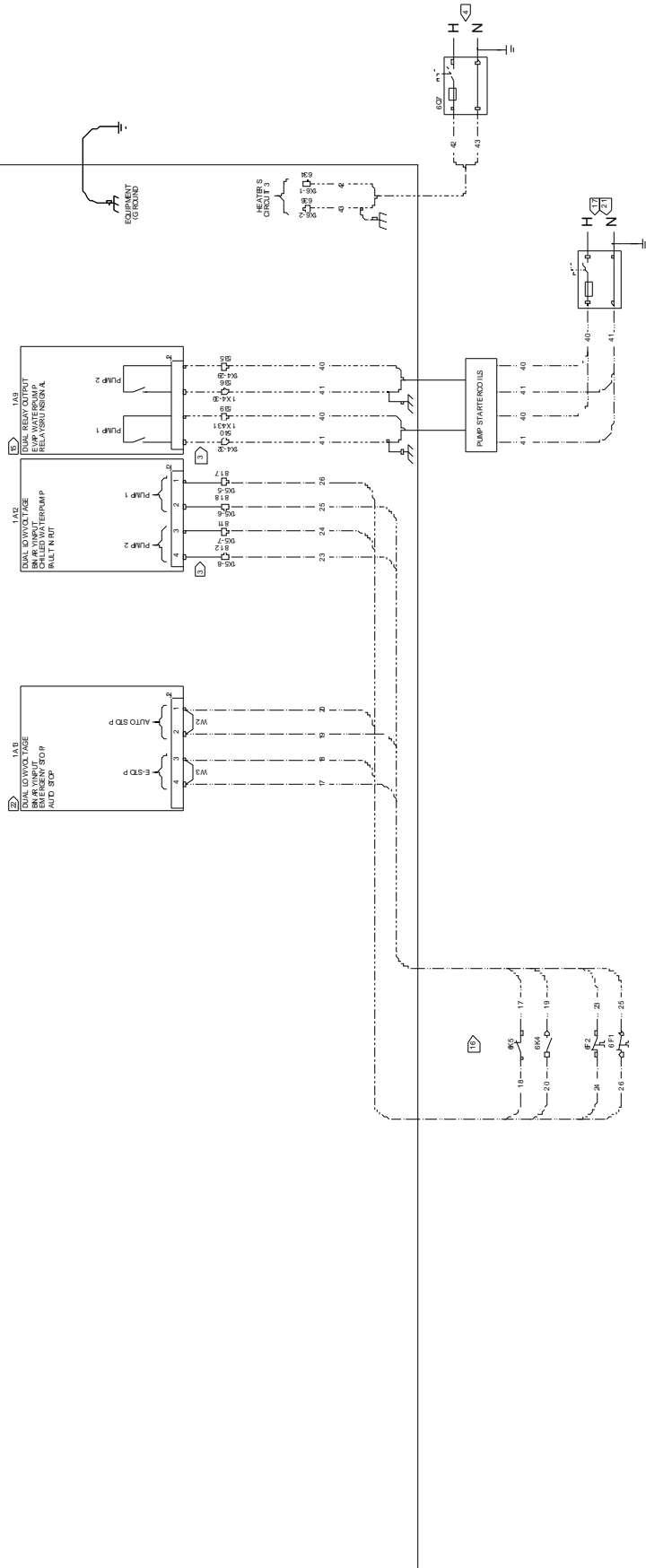
PAGE 1 OF 2



WARNING

HAZARDOUS VOLTAGE!
 DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS AND FOLLOW LOCK OUT AND TAG PROCEDURES BEFORE SERVICING. INSURE THAT ALL MOTOR CAPACITORS HAVE DISCHARGED STORED VOLTAGE. UNITS WITH VARIABLE SPEED DRIVE, REFER TO DRIVE INSTRUCTIONS FOR CAPACITOR DISCHARGE.
 FAILURE TO DO THE ABOVE COULD RESULT IN DEATH OR SERIOUS INJURY.

USE COPPER CONDUCTORS ONLY!
 UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.
 FAILURE TO DO THE ABOVE COULD RESULT IN EQUIPMENT DAMAGE.



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- 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 ANNUNCIATOR.
- 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 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).



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 spray application in accordance with standard ASTM B117.

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. A water strainer and a flow switch are factory installed.

Immersion heaters protect the evaporator to an ambient of -20°F (-29°C).

An additional temperature sensor, at the compressor discharge, enables leaving evaporator water temperature below 42°F (5.5°C).

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, high compressor discharge temperature, 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.



CGAM80 HIGH Tag: CGAM-1

Part Load Performance

NPLV = 14.9

%Load	Cap.	LWT evap	EWT evap	Flow evap	WPD evap	Ambient	Kw	Eff
100	70.4	43.0	53.0	184.8	18.5	105.0	98.3	8.6
75	52.8	43.0	50.5	184.8	18.5	86.0	50.5	12.5
50	35.2	43.0	48.0	184.8	18.5	67.0	25.7	16.4
25	17.6	43.0	45.5	184.8	18.5	55.0	11.5	18.3

Note: 1. $NPLV = 0.01A + 0.42B + 0.45C + 0.12D$

Where: A = EER at 100% at user defined ambient temperature with 1% weighting

B = EER at 75% at user defined ambient temperature with 42% weighting

C = EER at 50% at user defined ambient temperature with 45% weighting

D = EER at 25% at user defined ambient temperature with 12% weighting

2. NPLV is defined using the input design conditions, outside of AHRI conditions at 100% full load.

3. NPLV and/or NPLV may not be reflective of local climate conditions. The Customized Part Load Value Calculation may provide a more accurate measure of part load efficiency.

Version: 147.0

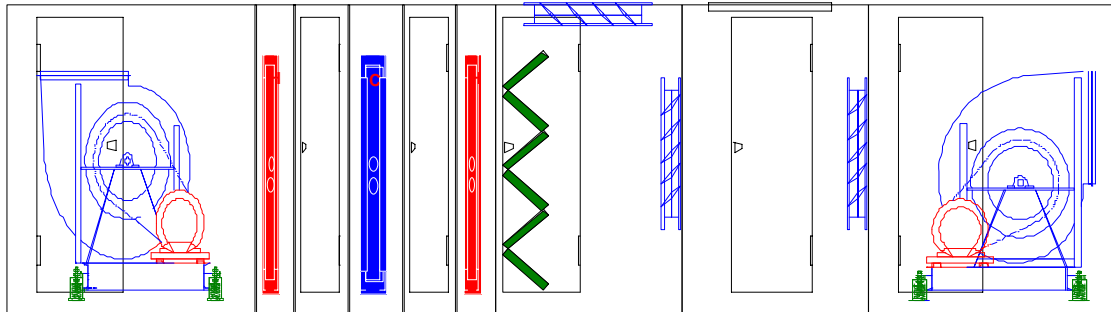
March 25, 2013

TRANE Air-Cooled Series R(TM) Chiller



Performance Climate Changer

Job Information			
Name	Job01 (Restored)	Tag	CSAA-1
Address		Quantity	1
Sales Team		Model Number	CSAA035UA
Comments			



Unit level options			
Fuse size circuit 2	45.00 A	Fuse size circuit 1	90.00 A
Available Sds (based on IBC 2006 & 2009)	No	Number of marine LED lights	0 Lights
Comp #1 circuit number	1	MOP circuit 2	47.25 A
MOP circuit 1	90.00 A	Single or front discharge - 1K Hz	88 dB
Single or front discharge - 500 Hz	91 dB	Single or front discharge - 250 Hz	89 dB
Single or front discharge - 125 Hz	95 dB	Single or front discharge - 63 Hz	98 dB
Circuit number 2	Exhaust fan motor(s)	Circuit number 1	Supply fan motor(s)
Single or front discharge - 8K Hz	77 dB	Single or front discharge - 4K Hz	81 dB
Single or front discharge - 2K Hz	85 dB	Component #2	Exhaust fan motor(s)
Component #1	Supply fan motor(s)	Casing - 250 Hz	80 dB
Casing - 125 Hz	86 dB	Casing - 63 Hz	99 dB
Integral base frame	2.5in. integral base frame	Ducted inlet - 8K Hz	67 dB
Ducted inlet - 4K Hz	71 dB	Ducted inlet - 2K Hz	73 dB
Ducted inlet - 1K Hz	74 dB	Ducted inlet - 500 Hz	76 dB
Ducted inlet - 250 Hz	74 dB	Ducted inlet - 125 Hz	78 dB
Ducted inlet - 63 Hz	94 dB	Casing - 8K Hz	56 dB
Casing - 4K Hz	49 dB	Casing - 2K Hz	67 dB
Casing - 1K Hz	88 dB	Casing - 500 Hz	93 dB
Comp #2	460/3/60	Comp #1	460/3/60
voltage/phase/hertz		voltage/phase/hertz	
Roof curb weight	0.0 lb	Comp #2 FLA	21.00 A
Comp #1 FLA	40.00 A	Comp #2 circuit number	2
MCA circuit 1	50.00 A	Rigging weight	7601.6 lb
Width	100.000 in	Length	285.875 in
MCA circuit 2	26.25 A	Installed weight	7922.2 lb
FLA (CV) circuit 2	21.00 A	FLA (CV) circuit 1	40.00 A

Controls and VFD/starter			
Factory controls package	No factory mount	Controller mounting	No mount
LCD screen and keypad	No LCD	Controller type	No controller
Prepackaged solution option used	MP common configuration not used		



Fan section			
Inlet and casing - 63 Hz	97 dB	Inlet and casing - 8K Hz	77 dB
Inlet and casing - 4K Hz	79 dB	Inlet and casing - 2K Hz	81 dB
Inlet and casing - 1K Hz	81 dB	Inlet and casing - 500 Hz	83 dB
Inlet and casing - 250 Hz	80 dB	Inlet and casing - 125 Hz	87 dB
Motor class	NEMA premium compliant ODP	Ducted inlet - 63 Hz	93 dB
Casing - 8K Hz	54 dB	Casing - 4K Hz	47 dB
Casing - 2K Hz	64 dB	Casing - 1K Hz	84 dB
Casing - 500 Hz	87 dB	Casing - 250 Hz	74 dB
Casing - 125 Hz	82 dB	Casing - 63 Hz	94 dB
Elevation	0.00 ft	Ducted inlet - 8K Hz	67 dB
Ducted inlet - 4K Hz	71 dB	Ducted inlet - 2K Hz	73 dB
Ducted inlet - 1K Hz	74 dB	Ducted inlet - 500 Hz	76 dB
Ducted inlet - 250 Hz	73 dB	Ducted inlet - 125 Hz	77 dB
Unit static efficiency	18.19 %	Total brake horsepower at min temp	15.588 hp
Total brake horsepower	14.705 hp	Speed	784 rpm
Design temperature	70.00 F	Fan discharge loss pressure drop	0.000 in H2O
Fan outlet velocity	3879 ft/min	Fan module pressure drop	1.000 in H2O
Total static pressure	1.000 in H2O	Outlet area	4.38 sq ft
NEMA nominal motor efficiency	93.00 %	Motor hertz	60.00 Hz
Fan size and type	20in. diameter FC, class 1	Starter/VFD - factory mounted & wired	None
Section weight	1931.0 lb	Section height	67.250 in
Section width	100.000 in	Section length	63.750 in
Fan airflow	17000 cfm	Motor voltage	460/3
Motor horsepower per fan	15 hp	Motor RPM	1800
Single or front discharge - 8K Hz	81 dB	Single or front discharge - 4K Hz	86 dB
Single or front discharge - 2K Hz	88 dB	Single or front discharge - 1K Hz	89 dB
Single or front discharge - 500 Hz	91 dB	Single or front discharge - 250 Hz	90 dB
Single or front discharge - 125 Hz	95 dB	Single or front discharge - 63 Hz	101 dB

Air mixing section			
Opening 1 top - airflow	17000 cfm	Opening 1 front - airflow	17000 cfm
Opening 1 back - airflow	17000 cfm	Opening 1 back - pressure drop	0.252 in H2O
Opening 1 top - face velocity	1159 ft/min	Opening 1 back - face velocity	1187 ft/min
Opening 1 top - area	14.66 sq ft	Opening 1 front - area	40.50 sq ft
Opening 1 back - area	14.32 sq ft	Opening 1 top - pressure drop	0.000 in H2O
Opening 1 top total pressure drop	0.000 in H2O	Opening 1 back total pressure drop	0.252 in H2O
Greatest entry PD	0.252 in H2O	Total mixing section pressure drop	0.252 in H2O

Air mixing section			
Opening 1 top - airflow	17000 cfm	Opening 1 front - airflow	17000 cfm
Opening 1 back - airflow	17000 cfm	Opening 1 back - pressure drop	0.252 in H2O
Opening 1 top - face velocity	1187 ft/min	Opening 1 back - face velocity	1187 ft/min



velocity		velocity	
Opening 1 top - area	14.32 sq ft	Opening 1 front - area	40.50 sq ft
Opening 1 back - area	14.32 sq ft	Opening 1 top - pressure drop	0.115 in H2O
Opening 1 top total pressure drop	0.115 in H2O	Opening 1 back total pressure drop	0.252 in H2O
Filter pressure drop	0.709 in H2O	Filter face velocity	268 ft/min
Filter area	63.33 sq ft	Filter airflow	17000 cfm
Greatest entry PD	0.252 in H2O	Total mixing section pressure drop	0.960 in H2O

Coil section			
Corrosion resistant coating	None	Tube diameter	5/8in. tube diameter (15.875 mm)
Tube matl/wall thickness	.020" (0.508mm) copper tubes	Coil height	Unit coil height
Coil face velocity	521 ft/min	Coil face area	32.63 sq ft
Unit airflow	17000 cfm	Coil performance airflow	17000 cfm
Coil installed weight	171.2 lb	Coil rigging weight	128.5 lb
Coil section pressure drop	0.083 in H2O	Air pressure drop	0.083 in H2O
Section weight	398.2 lb	Section height	67.250 in
Section width	100.000 in	Section length	10.000 in
Rows	1 row	Coil type	5W
System type	Hot water	Entering dry bulb	45.00 F
Leaving dry bulb	78.00 F	Nominal height coil # 1	54 in. (1372 mm)
Fin type	Prima flo H (Hi efficient)	Fin material	Aluminum fins
Fin spacing	89 Per Foot	J trap dimension	2.018 in
H trap dimension	4.035 in	Fluid pressure drop	7.30 ft H2O
Standard fluid flow rate	60.76 gpm	Fluid temperature drop	20.00 F
Leaving fluid temperature	160.00 F	Entering fluid temperature	180.00 F
Coil fluid percentage	100.00 %	Fluid type	Water
Total cap coil #1	608.40 MBh	Total capacity	608.40 MBh
Coil fouling factor	0.00050 hr-sq ft-deg F/Btu	Fluid volume	5.12 gal
Fluid velocity	3.73 ft/s		

Access section			
Section width	100.000 in	Section length	14.000 in
Section weight	242.0 lb	Section height	67.250 in

Coil section			
Corrosion resistant coating	None	Tube diameter	1/2in. tube diameter (12.7 mm)
Tube matl/wall thickness	.016" (0.406mm) copper tubes	Coil height	Unit coil height
Coil face velocity	487 ft/min	Coil face area	34.94 sq ft
Unit airflow	17000 cfm	Coil performance airflow	17000 cfm
Coil installed weight	644.6 lb	Coil rigging weight	456.9 lb
Coil section pressure drop	0.637 in H2O	Air pressure drop	0.637 in H2O
Section weight	883.6 lb	Section height	67.250 in
Section width	100.000 in	Section length	14.000 in
Rows	6 rows	Coil type	UW
System type	Chilled water	Entering dry bulb	80.00 F
Leaving wet bulb	54.36 F	Leaving dry bulb	55.00 F
Nominal height coil # 1	57 in. (1448 mm)	Fin type	Delta flo H (Hi efficient)
Fin material	Aluminum fins	Fin spacing	92 Per Foot
J trap dimension	2.336 in	H trap dimension	4.672 in
Fluid pressure drop	18.65 ft H2O	Standard fluid flow rate	132.24 gpm
Fluid temperature rise	10.00 F	Leaving fluid	55.00 F



Entering fluid temperature	45.00 F	temperature	
Fluid type	Water	Coil fluid percentage	100.00 %
Total capacity	663.51 MBh	Entering wet bulb	67.00 F
Coil fouling factor	0.00000 hr-sq ft-deg F/Btu	Sensible capacity	468.49 MBh
Fluid velocity	5.04 ft/s	Fluid volume	22.44 gal

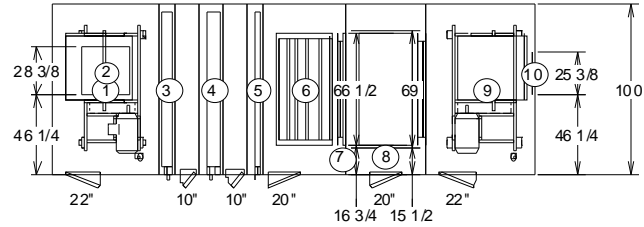
Access section			
Section width	100.000 in	Section length	14.000 in
Section weight	242.0 lb	Section height	67.250 in

Coil section			
Corrosion resistant coating	None	Tube diameter	5/8in. tube diameter (15.875 mm)
Tube matl/wall thickness	.020" (0.508mm) copper tubes	Coil height	Unit coil height
Coil face velocity	521 ft/min	Coil face area	32.63 sq ft
Unit airflow	17000 cfm	Coil performance airflow	17000 cfm
Coil installed weight	335.4 lb	Coil rigging weight	245.1 lb
Coil section pressure drop	0.139 in H2O	Air pressure drop	0.139 in H2O
Section weight	562.4 lb	Section height	67.250 in
Section width	100.000 in	Section length	10.000 in
Rows	2 rows	Coil type	5W
System type	Hot water	Entering dry bulb	55.00 F
Leaving dry bulb	104.00 F	Nominal height coil # 1	54 in. (1372 mm)
Fin type	Prima flo E (energy efficient)	Fin material	Aluminum fins
Fin spacing	90 Per Foot	J trap dimension	2.405 in
H trap dimension	4.811 in	Fluid pressure drop	3.23 ft H2O
Standard fluid flow rate	90.22 gpm	Fluid temperature drop	20.00 F
Leaving fluid temperature	160.00 F	Entering fluid temperature	180.00 F
Coil fluid percentage	100.00 %	Fluid type	Water
Total cap coil #1	903.39 MBh	Total capacity	903.39 MBh
Coil fouling factor	0.00050 hr-sq ft-deg F/Btu	Fluid volume	10.85 gal
Fluid velocity	2.77 ft/s		

Fan section			
Inlet and casing - 63 Hz	98 dB	Inlet and casing - 8K Hz	65 dB
Inlet and casing - 4K Hz	65 dB	Inlet and casing - 2K Hz	72 dB
Inlet and casing - 1K Hz	75 dB	Inlet and casing - 500 Hz	83 dB
Inlet and casing - 250 Hz	81 dB	Inlet and casing - 125 Hz	88 dB
Motor class	NEMA premium compliant ODP	Ducted inlet - 63 Hz	89 dB
Casing - 8K Hz	53 dB	Casing - 4K Hz	46 dB
Casing - 2K Hz	64 dB	Casing - 1K Hz	87 dB
Casing - 500 Hz	92 dB	Casing - 250 Hz	79 dB
Casing - 125 Hz	85 dB	Casing - 63 Hz	98 dB
Elevation	0.00 ft	Ducted inlet - 8K Hz	46 dB
Ducted inlet - 4K Hz	55 dB	Ducted inlet - 2K Hz	63 dB
Ducted inlet - 1K Hz	66 dB	Ducted inlet - 500 Hz	69 dB
Ducted inlet - 250 Hz	69 dB	Ducted inlet - 125 Hz	74 dB
Unit static efficiency	50.61 %	Total brake horsepower at min temp	27.000 hp
Total brake horsepower	25.470 hp	Speed	1045 rpm
Design temperature	70.00 F	Fan discharge loss pressure drop	0.000 in H2O

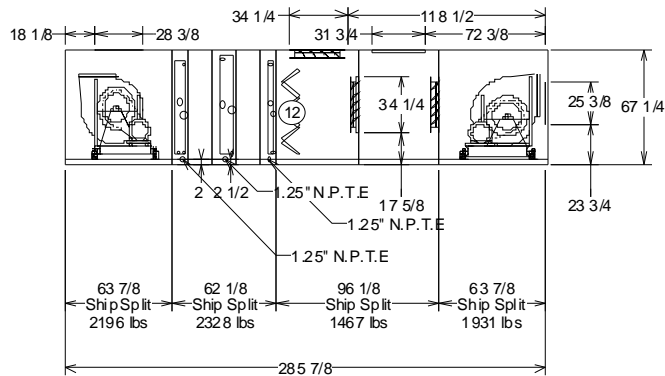


Fan outlet velocity	3067 ft/min	Fan module pressure drop	3.000 in H2O
Total static pressure	4.819 in H2O	Outlet area	5.54 sq ft
NEMA nominal motor efficiency	94.10 %	Motor hertz	60.00 Hz
Fan size and type	22in. diameter FC, class 2	Starter/VFD - factory mounted & wired	None
Section weight	2196.0 lb	Section height	67.250 in
Section width	100.000 in	Section length	63.750 in
Fan airflow	17000 cfm	Motor voltage	460/3
Motor horsepower per fan	30 hp	Motor RPM	1800
Single or front discharge - 8K Hz	77 dB	Single or front discharge - 4K Hz	81 dB
Single or front discharge - 2K Hz	85 dB	Single or front discharge - 1K Hz	88 dB
Single or front discharge - 500 Hz	91 dB	Single or front discharge - 250 Hz	89 dB
Single or front discharge - 125 Hz	95 dB	Single or front discharge - 63 Hz	98 dB



- 1 Housed fan - 22 in. diameter FC, class 2
Supply fan 30 hp 460/3
- 2 TPFT discharge opening
28.400 x 28.400
- 3 Heating coil - 2 rows Coil type 5W
- 4 Cooling coil - 6 rows Coil type UW
- 5 Heating coil - 1 row Coil type 5W
- 6 Damper top-parallel blade
34.250 x 69.000
- 7 Damper back-parallel blade
34.250 x 69.000 (2)
- 8 Opening top
31.750 x 66.500
- 9 Housed fan - 20 in. diameter FC, class 1
Exhaust fan 15 hp 460/3
BKTP discharge opening
25.370 x 25.370
- 10 1.25" N.P.T.E
- 11 1.25" N.P.T.E
- 12 Angled filters -

Doors
 22 width x 61 height
 10 width x 61 height
 20 width x 61 height

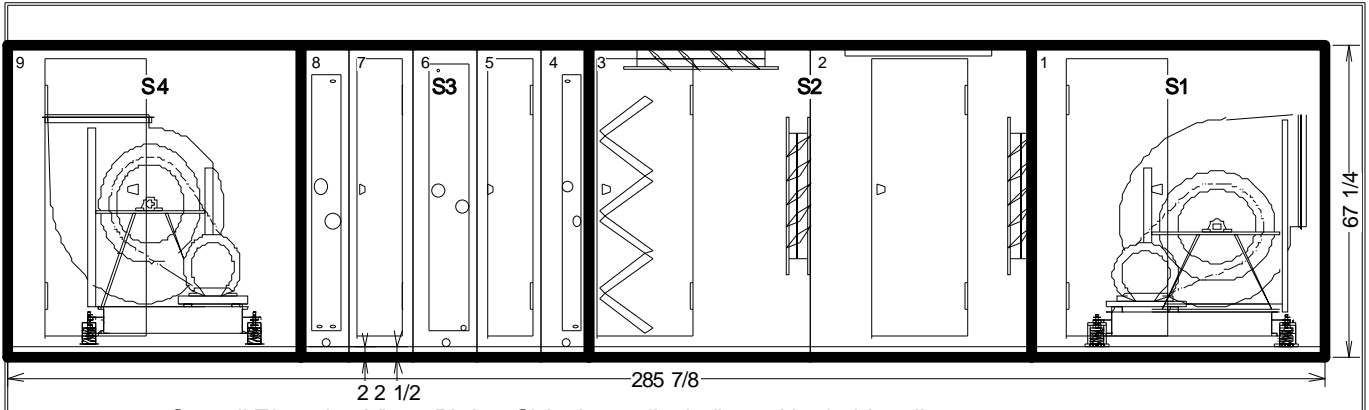


For maneuvering purposes, include 1.125 inches to each ship split length for overlapping panel flange. Flange will not add to overall installed unit length shown.

OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 35	Job Name: Job01 (Restored)	Unit Casing: 2 in Double Wall
Product group: Indoor unit	Actual airflow: 17000 cfm	Proposal Number:
Integral base frame: 2.5 in. integral base frame	Sales Office:	Tags: CSAA-1
Paint: Unpainted/field painted outdoor		Rigging/Installed Weight: 7601.6 lb/ 7922.2 lb

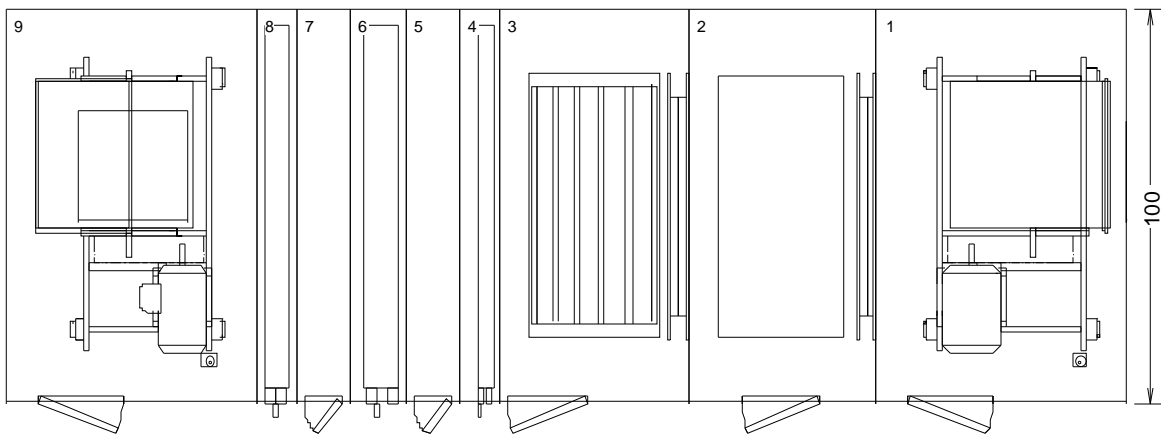




Overall Elevation View: Right - Shipping splits indicated by bold outline. - Measurements in inches

For maneuvering purposes, include 1.125 inches to each ship split length for overlapping panel flange. Flange will not add to overall installed unit length shown.

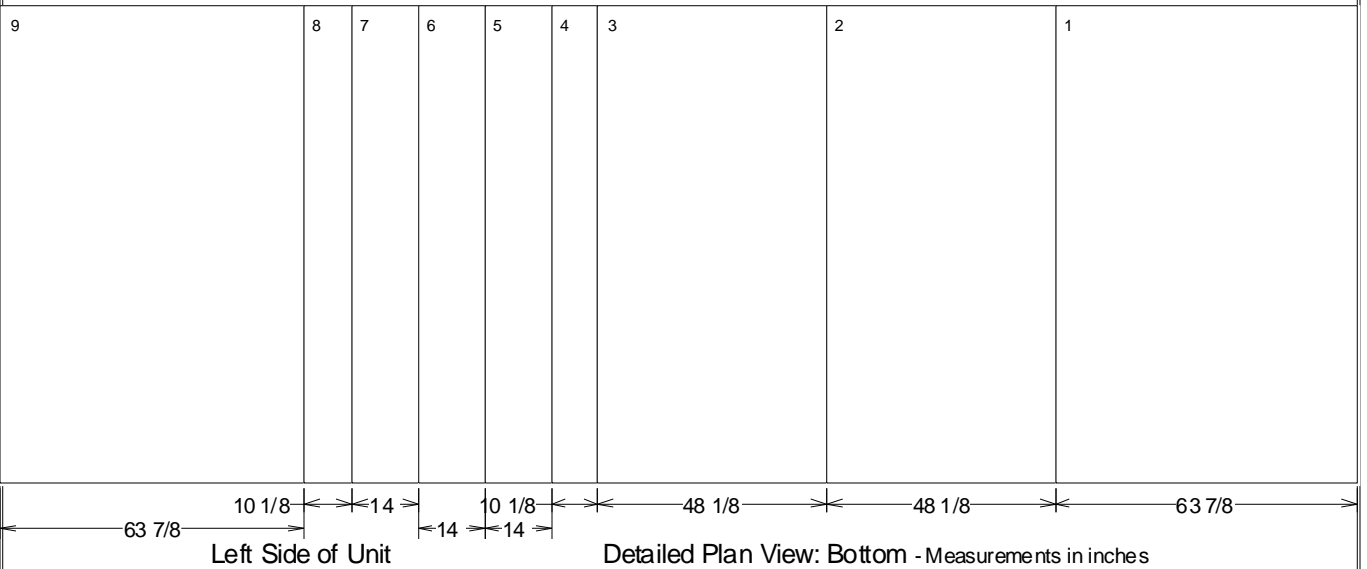
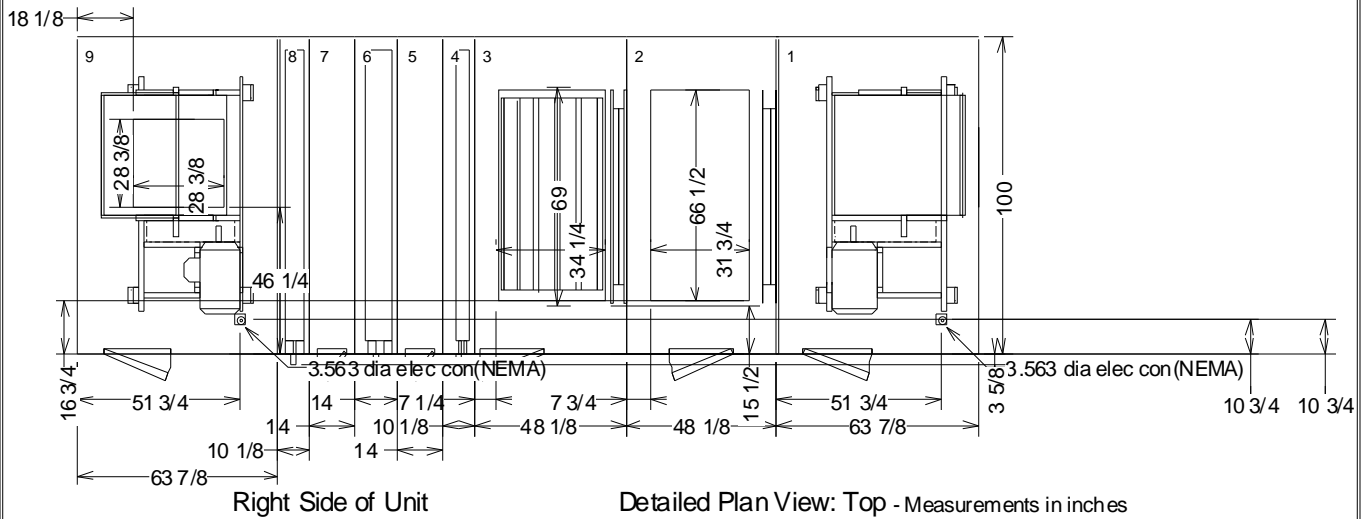
Pos #	Module	Length	Weight
1	Fan section	63 7/8	1931.00
2	Air mixing section	48 1/8	683.00
3	Air mixing section	48 1/8	784.00
4	Coil section	10 1/8	398.19
5	Access section	14	242.00
6	Coil section	14	883.56
7	Access section	14	242.00
8	Coil section	10 1/8	562.44
9	Fan section	63 7/8	2196.00
		Installed Unit Weight 7922.19 lbs	




Basic Overall Plan View: Top - Measurements in inches

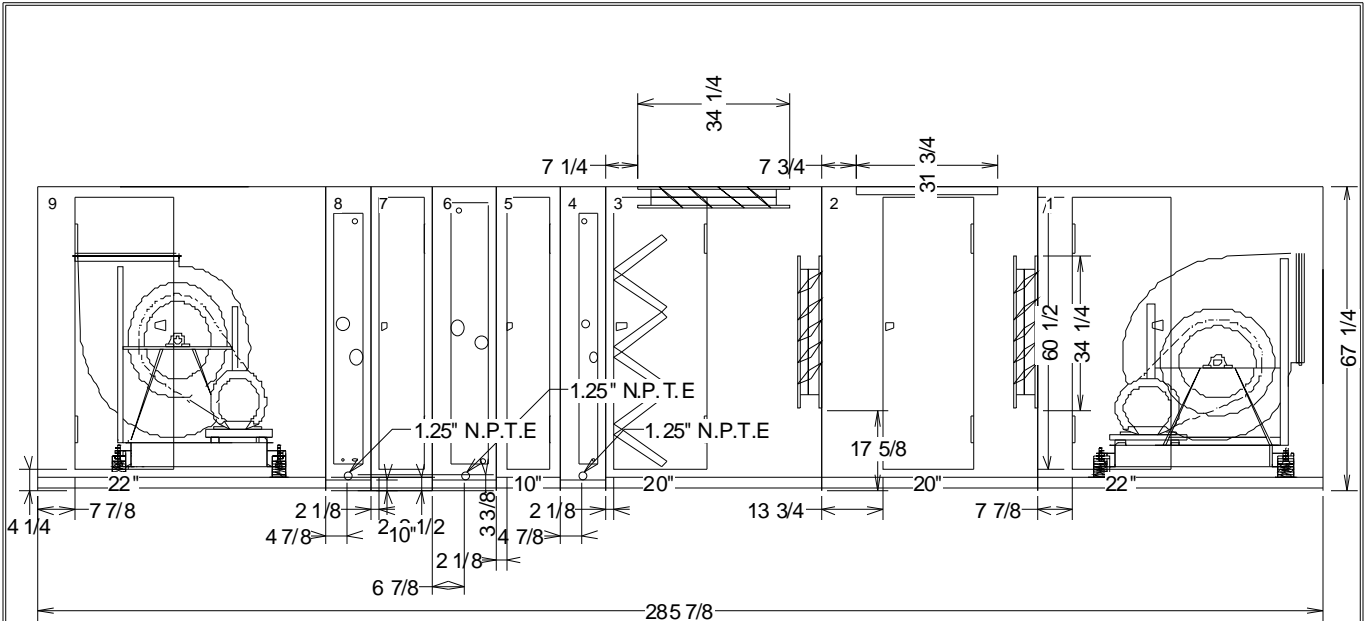
OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 35	Job Name: Job01 (Restored)	Unit Casing: 2in Double Wall	 Performance Climate Changer™ Air Handlers
Product group: Indoor unit	Actual airflow: 17000 cfm	Proposal Number:	
Integral base frame 2.5in. integral base frame	Sales Office:	Tags: C SAA-1	
Paint: Unpainted/field painted outdoor		Rigging/Installed Weight: 7601.6 lb/ 7922.2 lb	

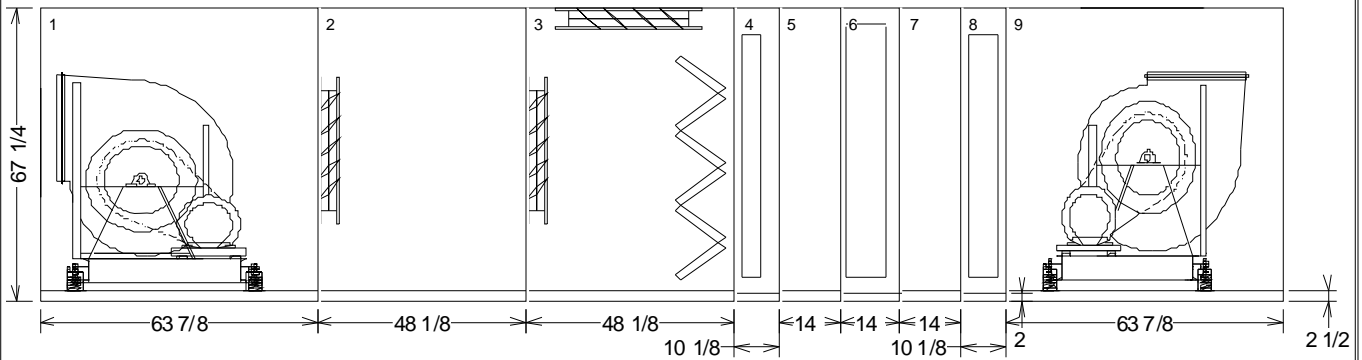


OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 35	Job Name: Job01 (Restored)	Unit Casing: 2in Double Wall	 TRANE Performance Climate Changer™ Air Handlers
Product group: Indoor unit	Actual airflow: 17000 cfm	Proposal Number:	
Integral base frame: 2.5in. integral base frame	Sales Office:	Tags: C SAA-1	
Paint: Unpainted/field painted outdoor		Rigging/Installed Weight: 7601.6 lb/ 7922.2 lb	




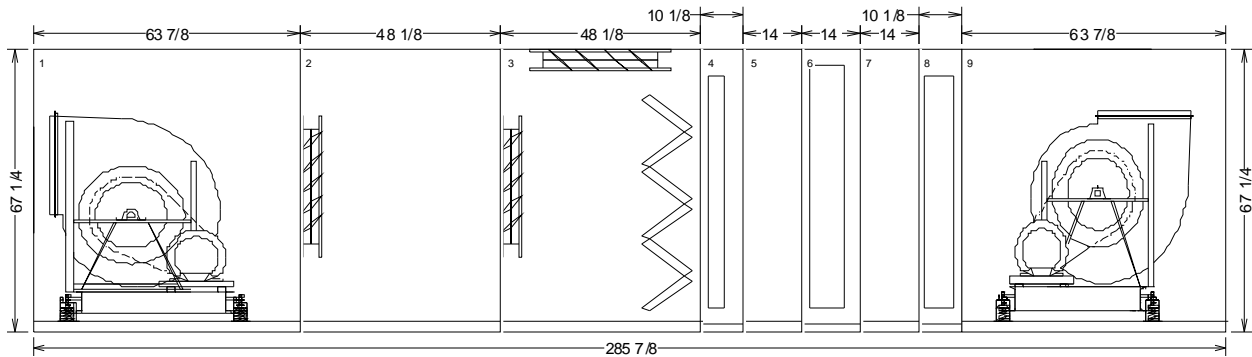
Detailed Elevation View: Right - Measurements in inches



Detailed Elevation View: Left - Measurements in inches

OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 35	Job Name: Job01 (Restored)	Unit Casing: 2in Double Wall	 TRANE Performance Climate Changer™ Air Handlers
Product group: Indoor unit	Actual airflow: 17000 cfm	Proposal Number:	
Integral base frame: 2.5in. integral base frame	Sales Office:	Tags: C SAA-1	
Paint: Unpainted/field painted outdoor		Rigging/Installed Weight: 7601.6 lb/ 7922.2 lb	

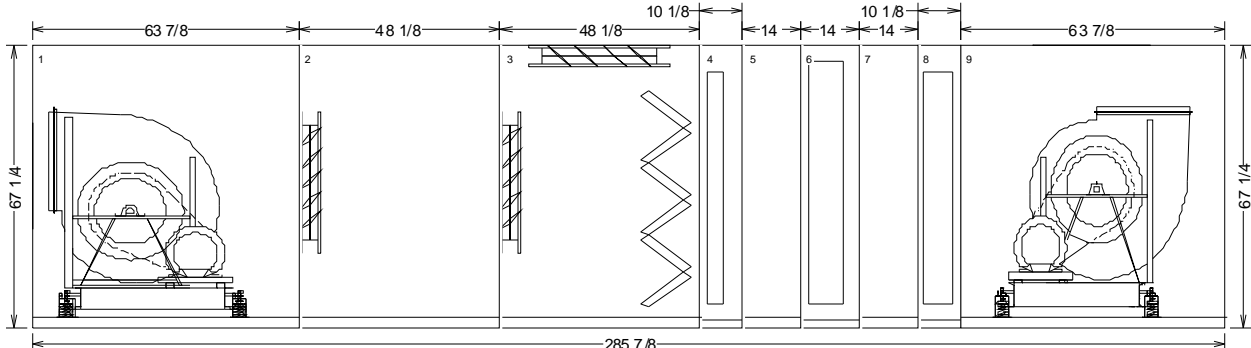


Coil connection view: Left - Measurements in inches

NPTI : National Pipe Thread Internal Connection
 NPTE : National Pipe Thread External Connection

OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 35	Job Name: Job01 (Restored)	Unit Casing: 2 in Double Wall	 TRANE ® Performance Climate Changer™ Air Handlers
Product group: Indoor unit	Actual airflow: 17000 cfm	Proposal Number:	
Integral base frame: 2.5 in. integral base frame	Sales Office:	Tags: CSAA-1	
Paint: Unpainted/field painted outdoor		Rigging/Installed Weight: 7601.6 lb/ 7922.2 lb	

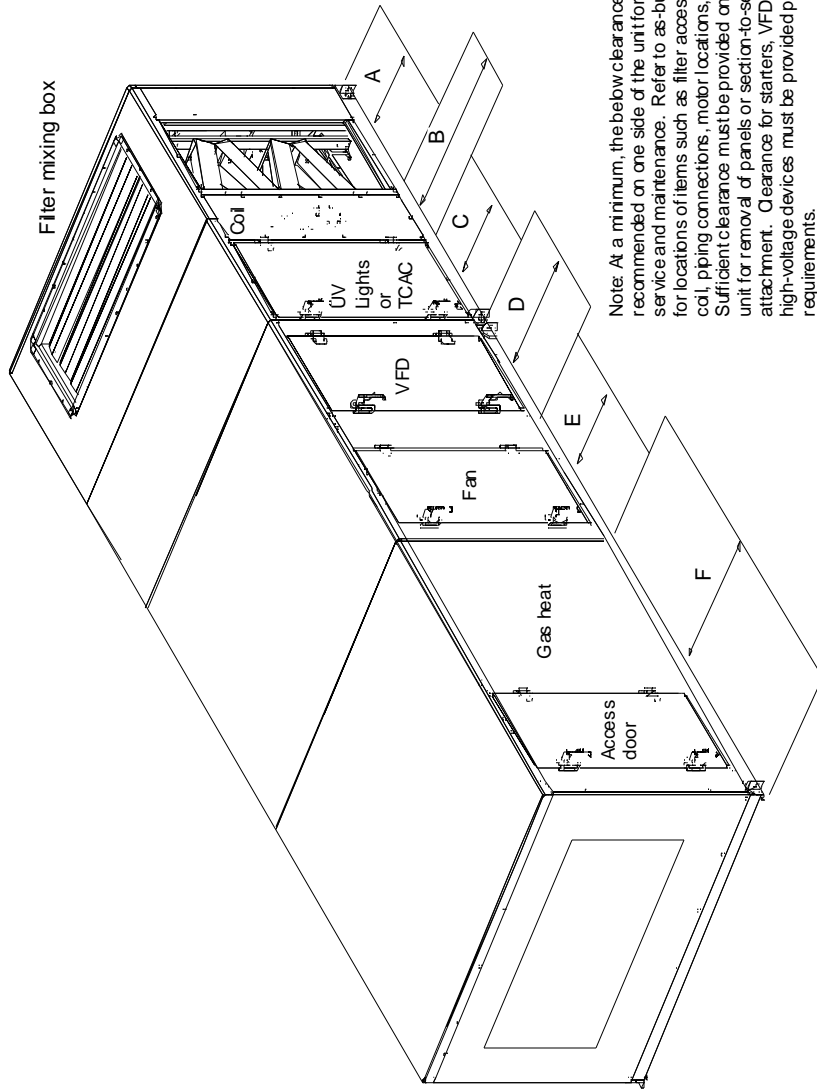


Coil connection view: Left - Measurements in inches

NPTI : National Pipe Thread Internal Connection
 NPTE : National Pipe Thread External Connection

OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

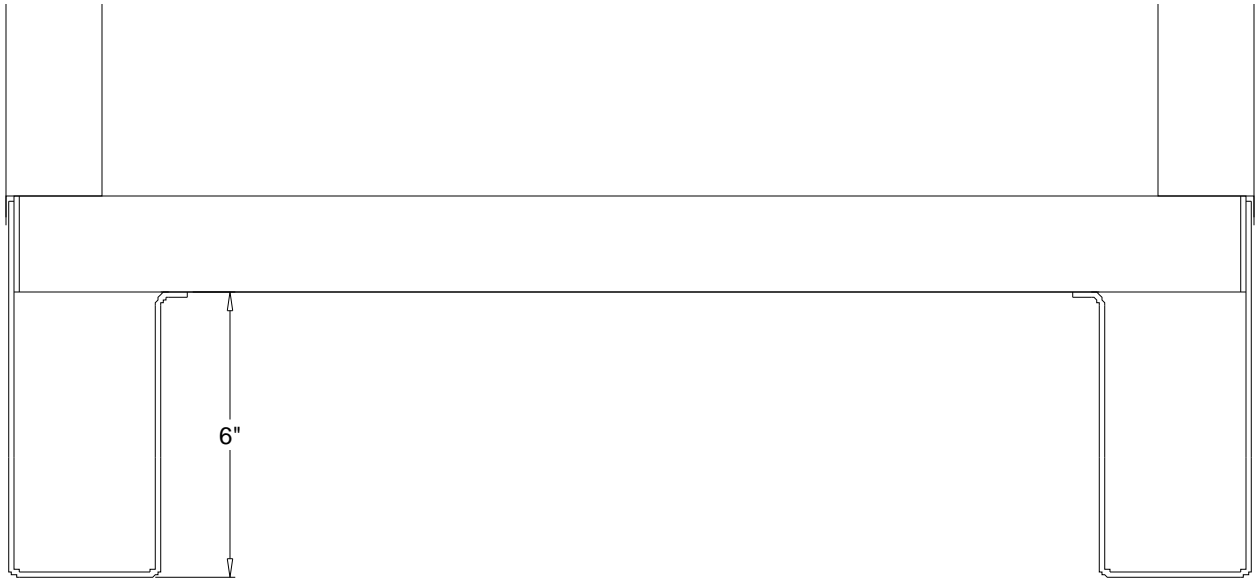
Unit size: 35	Job Name: Job01 (Restored)	Unit Casing: 2 in Double Wall	 Performance Climate Changer* Air Handlers
Product group: Indoor unit	Actual airflow: 17000 cfm	Proposal Number:	
Integral base frame: 2.5 in. integral base frame	Sales Office:	Tags: CSAA-1	
Paint: Unpainted/field painted outdoor		Rigging/Installed Weight: 7601.6 lb/ 7922.2 lb	



Note: At a minimum, the below clearance dimensions are recommended on one side of the unit for regular service and maintenance. Refer to as-built submittal for locations of items such as filter access doors, coil, piping connectors, motor locations, etc. Sufficient clearance must be provided on all sides of unit for removal of panels or section-to-section attachment. Clearance for starters, VFDs, or other high-voltage devices must be provided per NEC requirements.

Clearance items	3	4	6	8	10	12	14	17	21	21 TALL	25 TALL	25 TALL	30 TALL	30 TALL	35 TALL	35 TALL	40 TALL	40 TALL	40 TALL	50 TALL	50 TALL	57 TALL	57 TALL	66	80	100	120
A (filter, gas heat)	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	52	56	58	58
B (coil, humidifier)	48	59	59	66	77	82	87	87	95	77	95	77	109	87	115	96	128	96	141	141	110	141	156	156	170	197	
C (UV Lights)	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	52	56	58	58
C (TCAC)	43	59	59	63	75	81	83	83	58	75	58	75	83	83	75	59	83	83	83	83	83	83	83	83	75	83	
D (External Starter or VFD - shown)	61	61	61	61	61	61	61	61	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64
Starter or VFD)	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
E (fan)	48	48	48	48	51	54	58	61	60	51	66	51	66	58	66	60	70	60	77	66	77	66	93	93	101	101	
F (Gas Heat Ext Vestible)	N/A	N/A	89	90	108	100	100	105	115	N/A	115	N/A	118	N/A	136	N/A	140	N/A	156	N/A	156	N/A	170	179	180	N/A	
F (Gas Heat Int Vestible)	N/A	N/A	56	63	74	79	84	84	92	N/A	92	N/A	106	N/A	112	N/A	125	N/A	138	N/A	138	N/A	153	153	167	194	

Base Detail





GENERAL

Lifting Instructions

The air handling units must be rigged, lifted, and installed in strict accordance with the Installation, Operation, and Maintenance manual (CLCH-SVX07B-EN). The units are also to be installed in strict accordance with the specifications. Units may be shipped fully assembled or disassembled to the minimum functional section size in accordance with shipping and job site requirements.

Indoor units shall be shipped on an integral base frame (variable from the standard 2.5" to 8" height) for the purpose of mounting units to a housekeeping pad and providing additional height to properly trap condensate from the unit. The integral base frame may be used for ceiling suspension, external isolation, or as a housekeeping pad. Indoor sizes 3 to 30 will also be shipped with a shipping skid designed for forklift transport.

Refer to the unit As-Built or Product Data section of the submittal for the base frame height of each unit.

All units will be shipped with an integral base frame designed with the necessary number of lift points for safe installation. All lifting lugs are to be utilized during lift. The lift points will be designed to accept standard rigging devices and be removable after installation. Units shipped in sections will have a minimum of four points of lift.

Per ASHRAE 62.1 recommendation, indoor air handling units will be shipped stretch-wrapped to protect unit from in-transit rain and debris.

Installing contractor is responsible for long term storage in accordance with the Installation, Operation, and Maintenance manual (CLCH-SVX07B-EN).

Unit shall be UL and C-UL Listed.

Air-handling performance data shall be certified in accordance with AHRI Standard 430.

Unit sound performance data shall be provided using AHRI Standard 260 test methods and reported as sound power. Trane, in providing this program and data, does not certify or warrant NC levels. These levels are affected by factors specific to each application and/or installation and therefore unable to be predicted or certified by Trane.

Coil performance shall be certified in accordance with AHRI Standard 410.

Unit Construction

All unit panels shall be 2" solid, double-wall construction to facilitate cleaning of unit interior. Unit panels shall be provided with a mid-span, no-through-metal, internal thermal break. Casing thermal performance shall be such that under 55°F supply air temperature and design conditions on the exterior of the unit of 81°F dry bulb and 73°F wet bulb, condensation shall not form on the casing exterior.

All exterior and interior indoor AHU panels will be made of galvanized steel.

Unit Paint

Unit to ship unpainted from factory. Unit to be painted by 3rd party finisher, or by painting contractor at job site.

Casing Deflection

The casing shall not exceed 0.0042 inch deflection per inch of panel span at 1.5 times design static pressure up to a maximum of +8 inches w.g. in all positive pressure sections and -8 inches w.g. in all negative pressure sections.

The unit floor shall be of sufficient strength to support a 300-lb load during maintenance activities and shall deflect no more than 0.0042 inch per inch of panel span.

Insulation



Panel insulation shall provide a minimum thermal resistance (R) value of 13 ft²·h·°F/Btu throughout the entire unit. Insulation shall completely fill the panel cavities in all directions so that no voids exist and settling of insulation is prevented. Panel insulation shall comply with NFPA 90A.

Drain Pan

All cooling coil sections shall be provided with an insulated, double-wall, galvanized or stainless steel drain pan. To address indoor air quality (IAQ), the drain pan shall be designed in accordance with ASHRAE 62.1 being of sufficient size to collect all condensation produced from the coil and sloped in two planes promoting positive drainage to eliminate stagnant water conditions. The outlet shall be located at the lowest point of the pan and shall be sufficient diameter to preclude drain pan overflow under any normally expected operating condition. All drain pan threaded connections shall be visible external to the unit. Drain connections shall be of the same material as the primary drain pan and shall extend a minimum of 2-1/2" beyond the base to ensure adequate room for field piping of condensate drain traps. Coil support members inside the drain pan shall be of the same material as the drain pan and coil casing.

Refer to Product Data for specific information on which sections are supplied with a drain pan, the drain pan material and connection location.

Access Door Construction

Access doors shall be 2" double-wall construction. Interior and exterior door panels shall be of the same construction as the interior and exterior wall panels, respectively. All doors shall be provided with a thermal break construction of door panel and door frame. Gasketing shall be provided around the full perimeter of the doors to prevent air leakage. Surface-mounted handles shall be provided to allow quick access to the interior of the functional section and to prevent through-cabinet penetrations that could likely weaken the casing leakage and thermal performance. Handle hardware shall be designed to prevent unintended closure. Access doors shall be hinged and removable for quick, easy access. Hinges shall be interchangeable with the door handle hardware to allow for alternating door swing in the field to minimize access interference due to unforeseen job site obstructions. Door handle hardware shall be adjustable and visually indicate locking position of door latch external to the section.

All doors shall be a minimum of 60" high when sufficient height is available, or the maximum height allowed by the unit height.

Door handles shall be provided for each latching point of the door necessary to maintain the specified air leakage integrity of the unit. Optionally for indoor AHUs and as standard on outdoor AHUs, outward swing doors are provided with a single handle linked to multiple latching points. Unit doors may also be provided with an optional shatterproof window for viewing, capable of withstanding unit operating pressures.

Refer to Product Data for specific information on which sections are supplied with an access door, the door location, a single handle, and a window.

MIXING SECTION

A mixing section shall be provided to support the damper assembly for outdoor, return, and/or exhaust air.

Dampers

Dampers shall modulate the volume of outdoor, return, or exhaust air. The dampers shall be of double-skin airfoil design with metal, compressible jamb seals and extruded-vinyl blade-edge seals on all blades. The blades shall rotate on stainless-steel sleeve bearings. The dampers shall be rated for a maximum leakage rate of 4 cfm/ft² at 1 in. w.g. complying with ASHRAE 90.1 maximum damper leakage. All leakage testing and pressure ratings shall be based on AMCA Standard 500-D. Dampers may be arranged in a parallel or opposed-blade configuration.

Dampers

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Filters



Mixing sections shall be provided with a filter rack as indicated in the Product Data and As-Built sections of the submittal.

4-inch high-efficiency filters constructed with a fine fiber media made into closely spaced pleats shall be provided. The filters shall be capable of operating up to 625 fpm face velocity without loss of filter efficiency and holding capacity. The filter media shall be sealed into a frame assembled in a rigid manner. The manufacturer shall supply a side-access filter rack capable of holding 4-inch high-efficiency filters.

COIL SECTION

The coil section shall be provided complete with coil and coil holding frame. The coils shall be installed such that headers and return bends are enclosed by unit casings. If two or more cooling coils are stacked in the unit, an intermediate drain pan shall be installed between each coil and be of the same material as the primary drain pan. Like the primary drain pan, the intermediate drain pan shall be designed being of sufficient size to collect all condensation produced from the coil and sloped to promote positive drainage to eliminate stagnant water conditions. The intermediate pan shall begin at the leading face of the water-producing device and be of sufficient length extending downstream to prevent condensate from passing through the air stream of the lower coil. Intermediate drain pan shall include downspouts to direct condensate to the primary drain pan. The outlet shall be located at the lowest point of the pan and shall be sufficient diameter to preclude drain pan overflow under any normally expected operating condition.

Water Coils (UW, UU, UA, W, 5W, 5A, WD, 5D, D1, D2, P, or TT)

The coils shall have aluminum fins and seamless copper tubes. Copper fins may be applied to coils with 5/8-inch tubes. Fins shall have collars drawn, belled, and firmly bonded to tubes by mechanical expansion of the tubes. The coil casing may be galvanized or stainless steel. Refer to the Product Data section of the submittal for the coil casing material. The coils shall be proof-tested to 300 psig and leak-tested under water to 200 psig. Coil performance data and coils containing water or ethylene glycol shall be certified in accordance with AHRI Standard 410. Propylene glycol and calcium chloride, or mixtures thereof, are outside the scope of AHRI Standard 410 and, therefore, do not require AHRI 410 rating or certification.

Coil header connections are constructed of cast iron with female connections, steel block with female connections or steel pipe with male connections.

Tubes are 1/2" [13mm] OD 0.016" [0.406mm] thick copper.

Tubes are 5/8" [16mm] OD 0.020" [0.508mm] thick copper.

ACCESS/INSPECTION / TURNING SECTION

A section shall be provided to allow additional access/inspection of unit components and space for field-installed components as needed. An access door shall be provided for easy access. All access sections shall be complete with a double-wall, removable door downstream for inspection, cleaning, and maintenance. Interior and exterior door panels shall be of the same construction as the interior and exterior wall panels, respectively. All doors downstream of cooling coils shall be provided with a thermal break construction of door panel and door frame.

FC FAN SECTION

The fan type shall be provided as required for stable operation and optimum energy efficiency. The fan shall be a double-width, double-inlet, multiblade-type, forward-curved (FC) fan. The fan shall be equipped with self-aligning, antifriction bearings with an L-50 life of 200,000 hours as calculated per ANSI/AFBMA Standard 9. For any bearing requiring relubrication, the grease line shall be extended to the fan support bracket on the drive side. The fan shall be statically and dynamically balanced at the factory as a complete fan assembly (fan wheel, motor, drive, and belts). The fan shaft shall not exceed 75 percent of its first critical speed at any cataloged speed. Fan wheels shall be keyed to the fan shaft to prevent slipping. The fan shafts shall be solid steel. The fan section shall be provided with an access door on the drive side of the fan. Fan performance shall be certified as complying with AHRI Standard 430.

Motor Frame



The motor shall be mounted integral to the isolated fan assembly and furnished by the unit manufacturer. The motor is mounted inside the unit casing on an adjustable base to permit adjustment of drive belt tension (not applicable for direct drive plenum fans). The motor shall meet or exceed all NEMA Standards Publication MG 1 requirements and comply with NEMA Premium efficiency levels when applicable except for fractional horsepower motors which are not covered by the NEMA classification. The motor shall be T-frame, squirrel cage with size, type, and electrical characteristics as shown on the equipment schedule.

Refer to the Product Data section for selected fan motors within each unit.

Two-Inch Spring Isolators

The fan and motor assembly (on sizes 10 to 120) shall be internally isolated from the unit casing with 2-inch (50.8 mm) deflection spring isolators, furnished and installed by the unit manufacturer. The isolation system shall be designed to resist loads produced by external forces, such as earthquakes, and conform to the current IBC seismic requirements.

Drive Service Factor

The drives shall be constant speed with fixed-pitch sheaves. The drives shall be selected at a minimum 50 percent larger than the motor brake horsepower (1.5 service factor).

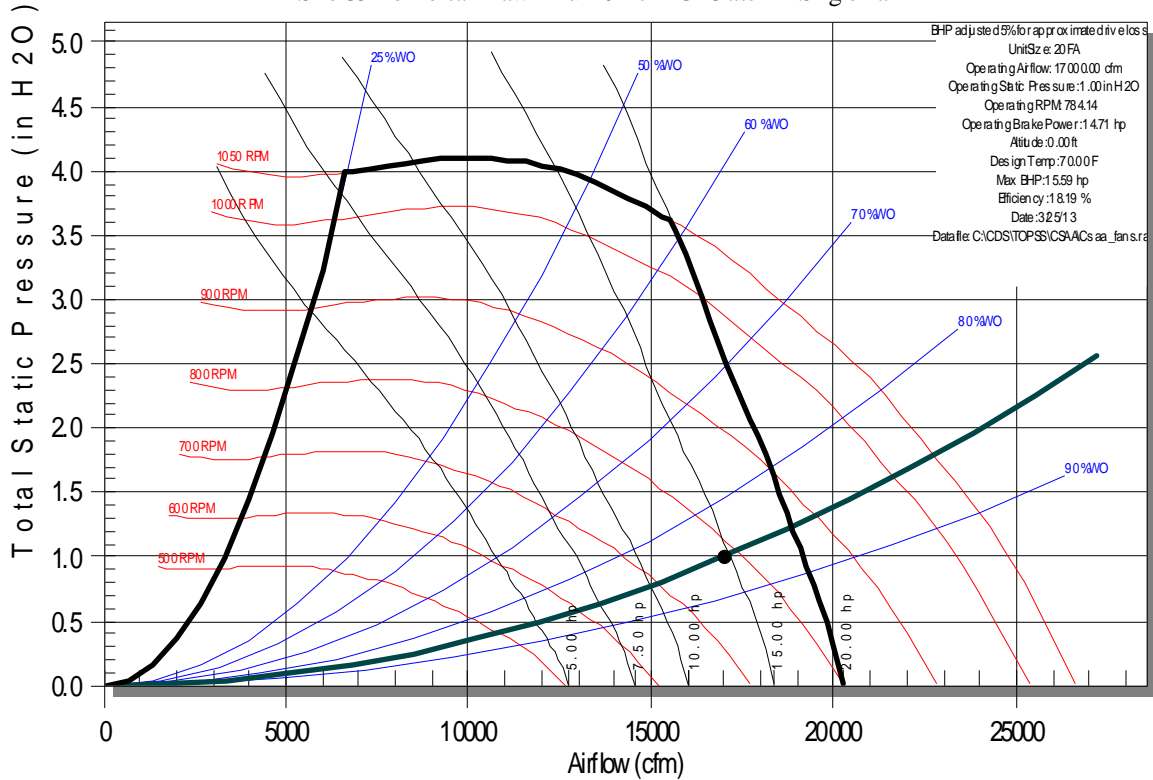


CSAA-1 -
Overall Unit Acoustics

	63Hz	125Hz	250Hz	500Hz	1 kHz	2 kHz	4 kHz	8 kHz
Discharge	98	95	89	91	88	85	81	77
Casing	99	86	80	93	88	67	49	56
Ducted Inlet	94	78	74	76	74	73	71	67



CSAA-1 - Exhaust Fan sec [1]-1 Size 35 Horizontal Draw-Thru 20 inch FC Class 1 - Single Fan

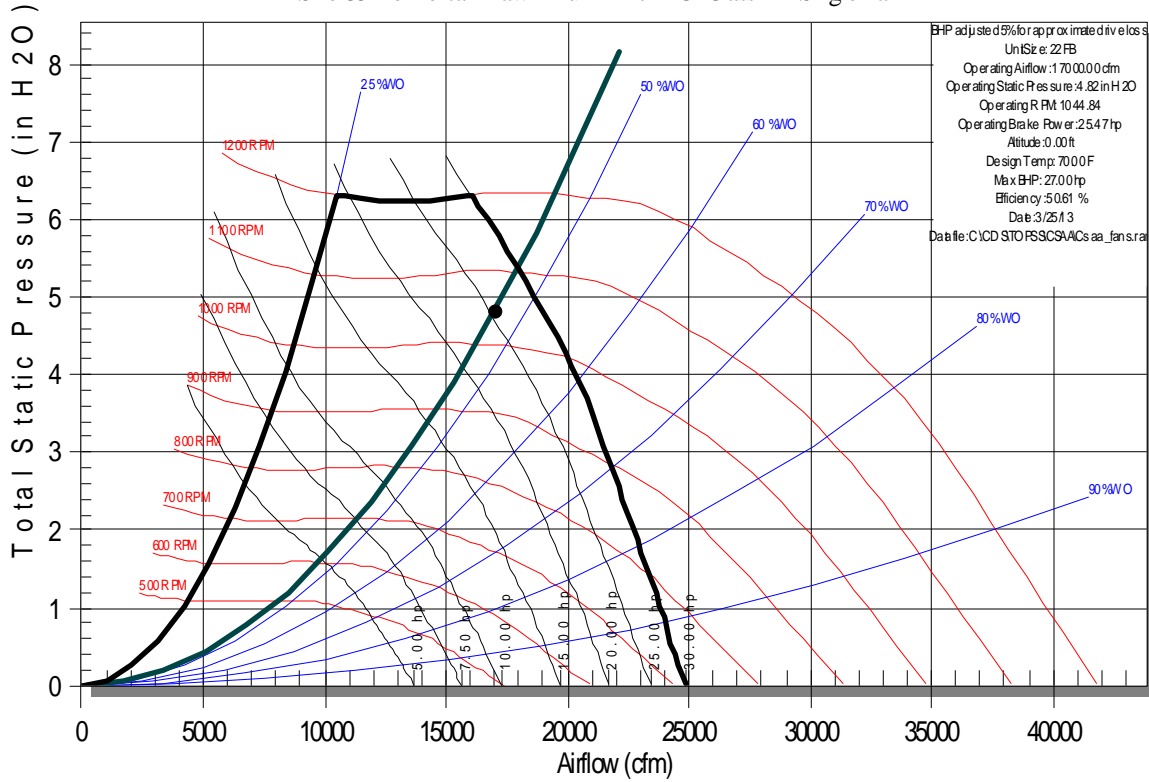


CSAA-1 - Exhaust Fan sec [1]-1 Size 35 Horizontal Draw-Thru 20 inch FC Class 1

	63Hz	125Hz	250Hz	500Hz	1 kHz	2 kHz	4 kHz	8 kHz
Discharge	101	95	90	91	89	88	86	81
Inlet + Casing	97	87	80	83	81	81	79	77
Casing	94	82	74	87	84	64	47	54
Ducted Inlet	93	77	73	76	74	73	71	67



CSAA-1 - Supply Fan sec [9]-1
 Size 35 Horizontal Draw-Thru 22 inch FC Class 2 - Single Fan



CSAA-1 - Supply Fan sec [9]-1
 Size 35 Horizontal Draw-Thru 22 inch FC Class 2

	63Hz	125Hz	250Hz	500Hz	1 kHz	2 kHz	4 kHz	8 kHz
Discharge	98	95	89	91	88	85	81	77
Inlet + Casing	98	88	81	83	75	72	65	65
Casing	98	85	79	92	87	64	46	53
Ducted Inlet	89	74	69	69	66	63	55	46

System Checksums

By HP ENGINEERING

Laboratory Room

Parallel Fan Powered VAV, Htg Coil on Mixing Box Outlet

COOLING COIL PEAK				CLG SPACE PEAK				HEATING COIL PEAK			TEMPERATURES														
Peaked at Time:		Mo/Hr: 7 / 15		Mo/Hr: 7 / 13		Mo/Hr: Heating Design			Cooling	Heating															
Outside Air:		OADB/WB/HR: 98 / 75 / 97		OADB: 96		OADB: 13			SADB	55.9	75.1														
Space Sens. + Lat.	Plenum Sens. + Lat	Net Total	Percent Of Total (%)	Space Sensible	Percent Of Total (%)	Space Peak	Coil Peak	Percent Of Total	Return	77.3	68.8														
Btu/h	Btu/h	Btu/h		Btu/h		Space Sens	Tot Sens		Ret/OA	77.3	68.8														
							Btu/h	Btu/h		Fn MtrTD	0.2	0.0													
										Fn BldTD	0.4	0.1													
										Fn Frict	1.1	0.2													
Envelope Loads				Envelope Loads							AIRFLOWS														
Skylite Solar	0	0	0	0	0	Skylite Solar	0	0.00	Diffuser	Cooling			870	Heating	870										
Skylite Cond	0	0	0	0	0	Skylite Cond	0	0.00	Terminal	870			870												
Roof Cond	0	4,829	4,829	17	0	Roof Cond	0	-2,792	24.05	Main Fan			870	435											
Glass Solar	0	0	0	0	0	Glass Solar	0	0	0.00	Sec Fan			0	435											
Glass/Door Cond	0	0	0	0	0	Glass/Door Cond	0	0	0.00	Nom Vent			93	93											
Wall Cond	1,904	856	2,761	10	2,107	14	Wall Cond	-2,152	-3,168	27.29			AHU Vent	93	93										
Partition/Door	0	0	0	0	0	0	Partition/Door	0	0	0.00			Infil	0	0										
Floor	0	0	0	0	0	0	Floor	0	0	0.00			MinStop/Rh	87	435										
Adjacent Floor	0	0	0	0	0	0	Adjacent Floor	0	0	0			Return	870	435										
Infiltration	0	0	0	0	0	0	Infiltration	0	0	0.00			Exhaust	93	93										
Sub Total ==>	1,904	5,685	7,590	27	2,107	14	Sub Total ==>	-2,152	-5,960	51.34			Rm Exh	0	0										
Internal Loads				Internal Loads									Auxiliary	0	0										
Lights	2,007	502	2,509	9	2,007	13	Lights	0	0	0.00			Leakage Dwn	0	0										
People	4,410	0	4,410	16	2,450	16	People	0	0	0.00			Leakage Ups	0	0										
Misc	7,526	0	7,526	27	7,526	49	Misc	0	0	0.00	ENGINEERING CKS														
Sub Total ==>	13,943	502	14,444	52	11,983	79	Sub Total ==>	0	0	0.00			% OA	Cooling	10.7	Heating	10.7								
Ceiling Load				Ceiling Load									cfm/ft²	1.18	0.59										
Ventilation Load	0	0	4,966	18	0	0	Ventilation Load	0	-5,975	51.48			cfm/ton	372.65											
Adj Air Trans Heat	0	0	0	0	0	0	Adj Air Trans Heat	0	0	0			ft²/ton	314.98											
Dehumid. Ov Sizing	0	0	0	0	0	0	Ov/Undr Sizing	0	0	0.00			Btu/hr-ft²	38.10	-23.12										
Ov/Undr Sizing	0	0	0	0	0	0	Exhaust Heat	0	327	-2.82			No. People	10											
Exhaust Heat	0	-534	-534	-2	0	0	OA Preheat Diff.	0	0	0.00			COOLING COIL SELECTION												
Sup. Fan Heat	0	1,536	1,536	5	0	0	RA Preheat Diff.	0	0	0.00					AREAS										
Ret. Fan Heat	0	0	0	0	0	0	Additional Reheat	0	0	0.00						Gross Total	Glass	HEATING COIL SELECTION							
Duct Heat Pkup	0	0	0	0	0	0	Underflr Sup Ht Pkup	0	0	0.00							ft²			Capacity	Coil Airflow	Ent	Lvg		
Underflr Sup Ht Pkup	0	0	0	0	0	0	Supply Air Leakage	0	0	0.00							(%)			MBh	cfm	°F	°F		
Supply Air Leakage	0	0	0	0	0	0	Grand Total ==>	-2,904	-11,608	100.00						Floor	735				Main Htg	-12.8	870	61.5	75.1
Grand Total ==>	17,075	4,425	28,002	100.00	15,209	100.00	Grand Total ==>	-2,904	-11,608	100.00						Part	0				Aux Htg	0.0	0	0.0	0.0
																Int Door	0				Preheat	-4.2	93	13.0	54.3
											ExFlr	0					Reheat			-8.4	435	54.3	72.0		
											Roof	735				0	0			Humidif	0.0	0	0.0	0.0	
											Wall	672				0	0			Opt Vent	0.0	0	0.0	0.0	
											Ext Door	0				0	0			Total	-17.0				

COOLING COIL SELECTION											AREAS				HEATING COIL SELECTION				
	Total Capacity		Sens Cap.	Coil Airflow	Enter DB/WB/HR			Leave DB/WB/HR			Gross Total	Glass	ft² (%)	Capacity	Coil Airflow	Ent	Lvg		
	ton	MBh			MBh	cfm	°F	°F	gr/lb	°F								°F	gr/lb
Main Clg	2.3	28.0	23.7	864	79.5	63.4	63.9	54.3	52.3	56.7	Floor	735		Main Htg	-12.8	870	61.5	75.1	
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	0		Aux Htg	0.0	0	0.0	0.0	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Int Door	0		Preheat	-4.2	93	13.0	54.3	
											ExFlr	0		Reheat	-8.4	435	54.3	72.0	
Total	2.3	28.0									Roof	735	0	0	Humidif	0.0	0	0.0	0.0
											Wall	672	0	0	Opt Vent	0.0	0	0.0	0.0
											Ext Door	0	0	0	Total	-17.0			

System Checksums

By HP ENGINEERING

North Zone

Parallel Fan Powered VAV, Htg Coil on Mixing Box Outlet

COOLING COIL PEAK				CLG SPACE PEAK				HEATING COIL PEAK			TEMPERATURES							
Peaked at Time:		Mo/Hr: 7 / 15		Mo/Hr: 7 / 17		Mo/Hr: Heating Design			Cooling			Heating						
Outside Air:		OADB/WB/HR: 98 / 75 / 97		OADB: 96		OADB: 13			SADB			Ra Plenum						
	Space Sens. + Lat.	Plenum Sens. + Lat.	Net Total	Percent Of Total (%)	Space Sensible	Percent Of Total (%)	Space Peak	Coil Peak	Percent Of Total	Return			Ret/OA					
	Btu/h	Btu/h	Btu/h		Btu/h		Space Sens	Tot Sens		Fn MtrTD			Fn BldTD					
							Btu/h	Btu/h		Fn Frict								
Envelope Loads				Envelope Loads							AIRFLOWS							
Skylite Solar	0	0	0	0	0	0	Skylite Solar	0	0.00	Diffuser			Cooling			Heating		
Skylite Cond	0	0	0	0	0	0	Skylite Cond	0	0.00	Terminal			11,847			11,849		
Roof Cond	0	113,657	113,657	25	0	0	Roof Cond	0	31.48	Main Fan			11,847			5,924		
Glass Solar	11,391	0	11,391	3	16,904	8	Glass Solar	0	0.00	Sec Fan			0			5,924		
Glass/Door Cond	3,692	0	3,692	1	3,572	2	Glass/Door Cond	-8,771	4.18	Nom Vent			1,939			1,939		
Wall Cond	8,229	4,060	12,288	3	9,254	4	Wall Cond	-12,141	9.02	AHU Vent			1,939			1,939		
Partition/Door	0	0	0	0	0	0	Partition/Door	0	0.00	Infil			0			0		
Floor	0	0	0	0	0	0	Floor	0	0.00	MinStop/Rh			1,185			5,924		
Adjacent Floor	0	0	0	0	0	0	Adjacent Floor	0	0	Return			11,847			5,924		
Infiltration	0	0	0	0	0	0	Infiltration	0	0.00	Exhaust			1,939			1,939		
Sub Total ==>	23,311	117,716	141,027	31	29,731	14	Sub Total ==>	-20,911	44.68	Rm Exh			0			0		
Internal Loads				Internal Loads							ENGINEERING CKS							
Lights	48,137	12,034	60,171	13	48,137	22	Lights	0	0.00	% OA			Cooling			Heating		
People	79,335	0	79,335	18	44,075	20	People	0	0.00	cfm/ft²			16.4			16.4		
Misc	60,171	0	60,171	13	60,171	28	Misc	0	0.00	cfm/ton			315.99			53.4		
Sub Total ==>	187,643	12,034	199,677	44	152,383	70	Sub Total ==>	0	0.00	ft²/ton			470.24			-15.50		
Ceiling Load	39,601	-39,601	0	0	36,156	17	Ceiling Load	-22,041	0.00	Btu/hr-ft²			25.52			-15.50		
Ventilation Load	0	0	103,375	23	0	0	Ventilation Load	0	59.28	No. People			176					
Adj Air Trans Heat	0	0	0	0	0	0	Adj Air Trans Heat	0	0									
Dehumid. Ov Sizing			0	0			Ov/Undr Sizing	0	0.00									
Ov/Undr Sizing	0	0	0	0	0	0	Exhaust Heat	8,324	-3.96									
Exhaust Heat		-14,955	-14,955	-3			OA Preheat Diff.	0	0.00									
Sup. Fan Heat			20,774	5			RA Preheat Diff.	0	0.00									
Ret. Fan Heat		0	0	0			Additional Reheat	0	0.00									
Duct Heat Pkup		0	0	0			Underflr Sup Ht Pkup	0	0.00									
Underflr Sup Ht Pkup		0	0	0			Supply Air Leakage	0	0.00									
Supply Air Leakage		0	0	0			Grand Total ==>	-42,952	209,953									
Grand Total ==>	250,555	75,194	449,899	100.00	218,270	100.00	Grand Total ==>	-42,952	209,953									

COOLING COIL SELECTION											AREAS				HEATING COIL SELECTION				
	Total Capacity		Sens Cap.	Coil Airflow	Enter DB/WB/HR			Leave DB/WB/HR			Gross Total	Glass	Capacity		Coil Airflow	Ent	Lvg		
	ton	MBh	MBh	cfm	°F	°F	gr/lb	°F	°F	gr/lb		ft² (%)	MBh	cfm	°F	°F			
Main Clg	37.5	449.9	366.1	11,686	82.2	64.8	66.1	53.4	51.7	55.6	Floor	17,630		Main Htg	-188.1	11,849	60.7	75.3	
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	0		Aux Htg	0.0	0	0.0	0.0	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Int Door	0		Preheat	-85.3	1,939	13.0	53.4	
											ExFlr	0		Reheat	-119.7	5,924	53.4	72.0	
Total	37.5	449.9									Roof	17,630	0	Humidif	0.0	0	0.0	0.0	
											Wall	4,548	504	11	Opt Vent	0.0	0	0.0	0.0
											Ext Door	0	0	0	Total	-273.4			

System Checksums

By HP ENGINEERING

South Zone

Parallel Fan Powered VAV, Htg Coil on Mixing Box Outlet

COOLING COIL PEAK				CLG SPACE PEAK				HEATING COIL PEAK			TEMPERATURES			
Peaked at Time:		Mo/Hr: 7 / 15		Mo/Hr: 10 / 14		Mo/Hr: Heating Design			Cooling		Heating	SADB	60.0	74.2
Outside Air:		OADB/WB/HR: 98 / 75 / 97		OADB: 74		OADB: 13			Ra Plenum		69.1	Return	77.6	69.1
Space Sens. + Lat.	Plenum Sens. + Lat	Net Total	Percent Of Total (%)	Space Sensible	Percent Of Total (%)	Space Peak	Coil Peak	Percent Of Total	Ret/OA <th>Fn MtrTD <th>Fn BldTD <th>Fn Frict <td colspan="1">79.7</td> <td colspan="1">58.9</td> </th></th></th>	Fn MtrTD <th>Fn BldTD <th>Fn Frict <td colspan="1">79.7</td> <td colspan="1">58.9</td> </th></th>	Fn BldTD <th>Fn Frict <td colspan="1">79.7</td> <td colspan="1">58.9</td> </th>	Fn Frict <td colspan="1">79.7</td> <td colspan="1">58.9</td>	79.7	58.9
Btu/h	Btu/h	Btu/h		Btu/h		Btu/h	Btu/h						0.2	0.0
Envelope Loads				Envelope Loads							AIRFLOWS			
Skylite Solar	0	0	0	0	0	Skylite Solar	0	0.00	Diffuser		18,357	18,357	Cooling	Heating
Skylite Cond	0	0	0	0	0	Skylite Cond	0	0.00	Terminal		18,357	18,357	18,357	18,357
Roof Cond	0	115,433	26	0	0	Roof Cond	-67,351	33.04	Main Fan		18,357	9,179	18,357	9,179
Glass Solar	31,034	0	7	77,340	32	Glass Solar	0	0.00	Sec Fan		0	9,179	0	9,179
Glass/Door Cond	7,471	0	2	210	0	Glass/Door Cond	-17,750	8.71	Nom Vent		1,674	1,674	1,674	1,674
Wall Cond	8,341	5,592	3	6,474	3	Wall Cond	-9,663	8.14	AHU Vent		1,674	1,674	1,674	1,674
Partition/Door	0	0	0	0	0	Partition/Door	0	0.00	Infil		0	0	0	0
Floor	0	0	0	0	0	Floor	0	0.00	MinStop/Rh		1,836	9,179	1,836	9,179
Adjacent Floor	0	0	0	0	0	Adjacent Floor	0	0	Return		18,357	9,179	18,357	9,179
Infiltration	0	0	0	0	0	Infiltration	0	0.00	Exhaust		1,674	1,674	1,674	1,674
Sub Total ==>	46,846	121,025	37	84,023	35	Sub Total ==>	-27,413	49.88	Rm Exh		0	0	0	0
Internal Loads				Internal Loads							ENGINEERING CKS			
Lights	48,137	12,034	13	48,137	20	Lights	0	0.00	% OA		9.1	9.1	Cooling	Heating
People	55,479	0	12	30,822	13	People	0	0.00	cfm/ft²		1.04	0.52	486.63	486.63
Misc	60,171	0	13	60,171	25	Misc	0	0.00	ft²/ton		467.36	467.36	25.68	-16.53
Sub Total ==>	163,787	12,034	39	139,130	58	Sub Total ==>	0	0.00	Btu/hr-ft²		25.68	-16.53	123	123
Grand Total ==>	241,970	91,505	100.00	239,632	100.00	Grand Total ==>	-43,648	100.00	No. People		123	123		

COOLING COIL SELECTION										
	Total Capacity		Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR			Leave DB/WB/HR		
	ton	MBh			°F	°F	gr/lb	°F	°F	gr/lb
Main Clg	37.7	452.7	385.8	16,647	79.7	63.4	63.4	58.4	54.2	57.5
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	37.7	452.7								

AREAS			
	Gross Total	Glass ft²	(%)
Floor	17,630		
Part	0		
Int Door	0		
ExFlr	0		
Roof	17,630	0	0
Wall	4,548	1,020	22
Ext Door	0	0	0

HEATING COIL SELECTION				
	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-208.8	18,357	63.7	74.2
Aux Htg	0.0	0	0.0	0.0
Preheat	-82.6	1,674	13.0	58.4
Reheat	-136.1	9,179	58.4	72.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-291.4			

System Checksums

By HP ENGINEERING

North Zone

Parallel Fan Powered VAV, Htg Coil on Mixing Box Outlet

COOLING COIL PEAK				CLG SPACE PEAK				HEATING COIL PEAK			TEMPERATURES				
Peaked at Time:		Mo/Hr: 7 / 15		Mo/Hr: 7 / 17		Mo/Hr: Heating Design					Cooling		Heating		
Outside Air:		OADB/WB/HR: 98 / 75 / 97		OADB: 96		OADB: 13					SADB	55.1	75.3		
Space Sens. + Lat.	Plenum Sens. + Lat	Net Total	Percent Of Total (%)	Space Sensible	Percent Of Total (%)	Space Peak	Coil Peak	Percent Of Total	Space Sens	Tot Sens	Percent Of Total	Return	Fn MtrTD	Fn BldTD	Fn Frict
Btu/h	Btu/h	Btu/h	(%)	Btu/h	(%)	Btu/h	Btu/h	(%)	Btu/h	Btu/h	(%)	79.1	0.2	0.4	1.1
Envelope Loads				Envelope Loads											
Skylite Solar	0	0	0	0	0	Skylite Solar	0	0.00	0	0	0.00				
Skylite Cond	0	0	0	0	0	Skylite Cond	0	0.00	0	0	0.00				
Roof Cond	0	113,657	25	0	0	Roof Cond	-66,103	31.48	0	-66,103	31.48				
Glass Solar	11,391	0	3	16,904	8	Glass Solar	0	0.00	0	0	0.00				
Glass/Door Cond	3,692	0	1	3,572	2	Glass/Door Cond	-8,771	4.18	-8,771	-8,771	4.18				
Wall Cond	8,229	4,060	3	9,254	4	Wall Cond	-12,141	9.02	-12,141	-18,935	9.02				
Partition/Door	0	0	0	0	0	Partition/Door	0	0.00	0	0	0.00				
Floor	0	0	0	0	0	Floor	0	0.00	0	0	0.00				
Adjacent Floor	0	0	0	0	0	Adjacent Floor	0	0	0	0	0				
Infiltration	0	0	0	0	0	Infiltration	0	0.00	0	0	0.00				
Sub Total ==>	23,311	117,716	31	29,731	14	Sub Total ==>	-20,911	44.68	-20,911	-93,808	44.68				
Internal Loads				Internal Loads											
Lights	48,137	12,034	13	48,137	22	Lights	0	0.00	0	0	0.00				
People	79,335	0	18	44,075	20	People	0	0.00	0	0	0.00				
Misc	60,171	0	13	60,171	28	Misc	0	0.00	0	0	0.00				
Sub Total ==>	187,643	12,034	44	152,383	70	Sub Total ==>	0	0.00	0	0	0.00				
Ceiling Load	39,601	-39,601	0	36,156	17	Ceiling Load	-22,041	0.00	-22,041	0	0.00				
Ventilation Load	0	0	23	0	0	Ventilation Load	0	59.28	0	-124,469	59.28				
Adj Air Trans Heat	0	0	0	0	0	Adj Air Trans Heat	0	0	0	0	0				
Dehumid. Ov Sizing			0			Ov/Undr Sizing	0	0.00	0	0	0.00				
Ov/Undr Sizing	0	0	0	0	0	Exhaust Heat		-3.96		8,324	-3.96				
Exhaust Heat		-14,955	-3			OA Preheat Diff.		0.00		0	0.00				
Sup. Fan Heat		20,774	5			RA Preheat Diff.		0.00		0	0.00				
Ret. Fan Heat		0	0			Additional Reheat		0.00		0	0.00				
Duct Heat Pkup		0	0			Underflr Sup Ht Pkup		0.00		0	0.00				
Underflr Sup Ht Pkup		0	0			Supply Air Leakage		0.00		0	0.00				
Supply Air Leakage		0	0												
Grand Total ==>	250,555	75,194	100.00	218,270	100.00	Grand Total ==>	-42,952	100.00	-42,952	-209,953	100.00				

AIRFLOWS		
	Cooling	Heating
Diffuser	11,847	11,849
Terminal	11,847	11,849
Main Fan	11,847	5,924
Sec Fan	0	5,924
Nom Vent	1,939	1,939
AHU Vent	1,939	1,939
Infil	0	0
MinStop/Rh	1,185	5,924
Return	11,847	5,924
Exhaust	1,939	1,939
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS		
	Cooling	Heating
% OA	16.4	16.4
cfm/ft²	0.67	0.34
cfm/ton	315.99	
ft²/ton	470.24	
Btu/hr-ft²	25.52	-15.50
No. People	176	

COOLING COIL SELECTION										
	Total Capacity		Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR			Leave DB/WB/HR		
	ton	MBh			°F	°F	gr/lb	°F	°F	gr/lb
Main Clg	37.5	449.9	366.1	11,686	82.2	64.8	66.1	53.4	51.7	55.6
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	37.5	449.9								

AREAS			
	Gross Total	Glass	
		ft²	(%)
Floor	17,630		
Part	0		
Int Door	0		
ExFlr	0		
Roof	17,630	0	0
Wall	4,548	504	11
Ext Door	0	0	0

HEATING COIL SELECTION				
	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Aux Htg	0.0	0	0.0	0.0
Preheat	-85.3	1,939	13.0	53.4
Reheat	-119.7	5,924	53.4	72.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-273.4			

System Checksums

By HP ENGINEERING

South Zone

Parallel Fan Powered VAV, Htg Coil on Mixing Box Outlet

COOLING COIL PEAK				CLG SPACE PEAK				HEATING COIL PEAK			TEMPERATURES			
Peaked at Time:		Mo/Hr: 7 / 15		Mo/Hr: 10 / 14		Mo/Hr: Heating Design			Cooling	Heating		SADB	60.0	74.2
Outside Air:		OADB/WB/HR: 98 / 75 / 97		OADB: 74		OADB: 13			Ra Plenum	77.6	69.1	Return	77.6	69.1
Space Sens. + Lat.	Plenum Sens. + Lat	Net Total	Percent Of Total (%)	Space Sensible	Percent Of Total (%)	Space Peak	Coil Peak	Percent Of Total	Ret/OA	Fn MtrTD	Fn BldTD	Fn Frict	0.2	0.0
Btu/h	Btu/h	Btu/h		Btu/h		Btu/h	Btu/h						0.4	0.1
Envelope Loads				Envelope Loads										
Skylite Solar	0	0	0	0	0	0	0	0.00	SADB	60.0	74.2			
Skylite Cond	0	0	0	0	0	0	0	0.00	Ra Plenum	77.6	69.1			
Roof Cond	0	115,433	115,433	26	0	0	-67,351	33.04	Return	77.6	69.1			
Glass Solar	31,034	0	31,034	7	77,340	32	0	0.00	Ret/OA	79.7	58.9			
Glass/Door Cond	7,471	0	7,471	2	210	0	-17,750	8.71	Fn MtrTD	0.2	0.0			
Wall Cond	8,341	5,592	13,933	3	6,474	3	-9,663	8.14	Fn BldTD	0.4	0.1			
Partition/Door	0	0	0	0	0	0	0	0.00	Fn Frict	1.1	0.2			
Floor	0	0	0	0	0	0	0	0.00						
Adjacent Floor	0	0	0	0	0	0	0	0						
Infiltration	0	0	0	0	0	0	0	0.00						
Sub Total ==>	46,846	121,025	167,871	37	84,023	35	-27,413	49.88						
Internal Loads				Internal Loads							AIRFLOWS			
Lights	48,137	12,034	60,171	13	48,137	20	0	0.00	Diffuser	18,357	18,357			
People	55,479	0	55,479	12	30,822	13	0	0.00	Terminal	18,357	18,357			
Misc	60,171	0	60,171	13	60,171	25	0	0.00	Main Fan	18,357	9,179			
Sub Total ==>	163,787	12,034	175,821	39	139,130	58	0	0.00	Sec Fan	0	9,179			
Ceiling Load	31,337	-31,337	0	0	16,479	7	-16,235	0.00	Nom Vent	1,674	1,674			
Ventilation Load	0	0	89,602	20	0	0	0	52.71	AHU Vent	1,674	1,674			
Adj Air Trans Heat	0	0	0	0	0	0	0	0	Infil	0	0			
Dehumid. Ov Sizing			0	0				0.00	MinStop/Rh	1,836	9,179			
Ov/Undr Sizing	0	0	0	0	0	0	0	0.00	Return	18,357	9,179			
Exhaust Heat		-10,217	-10,217	-2			5,293	-2.60	Exhaust	1,674	1,674			
Sup. Fan Heat			29,595	7			0	0.00	Rm Exh	0	0			
Ret. Fan Heat		0	0	0			0	0.00	Auxiliary	0	0			
Duct Heat Pkup		0	0	0			0	0.00	Leakage Dwn	0	0			
Underflr Sup Ht Pkup		0	0	0			0	0.00	Leakage Ups	0	0			
Supply Air Leakage		0	0	0			0	0.00						
Grand Total ==>	241,970	91,505	452,673	100.00	239,632	100.00	-43,648	100.00						

COOLING COIL SELECTION										
	Total Capacity		Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR			Leave DB/WB/HR		
	ton	MBh			°F	°F	gr/lb	°F	°F	gr/lb
Main Clg	37.7	452.7	385.8	16,647	79.7	63.4	63.4	58.4	54.2	57.5
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	37.7	452.7								

AREAS			
	Gross Total	Glass	
		ft²	(%)
Floor	17,630		
Part	0		
Int Door	0		
ExFlr	0		
Roof	17,630	0	0
Wall	4,548	1,020	22
Ext Door	0	0	0

HEATING COIL SELECTION				
	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Aux Htg	0.0	0	0.0	0.0
Preheat	-82.6	1,674	13.0	58.4
Reheat	-136.1	9,179	58.4	72.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-291.4			

