Supply Fan Status Sensor Submittal

Project: San Bernadino County Sherriff Station AHU
Unit Tag: AH 5

Carrier Part Number	39MA51000021
Manufacturer	Automation Components, Inc.
Manufacturer Part Number	A/MCS-A
Cable	21
Channel	UI-6
Terminal/Signal	TB3-11 / Dry Contact DI
Terminal/Signal	TB3-12 / Signal Ground

SFS

Supply Fan Status Sensor

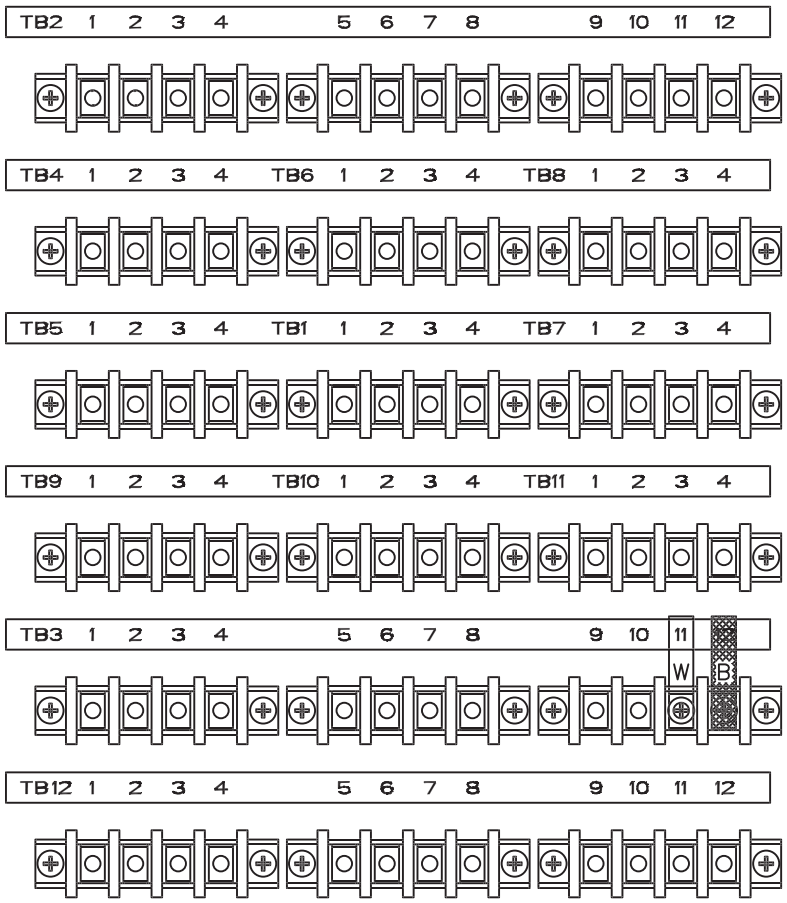
The A/MCS-A is a normally open (N/O) solid state adjustable current switch.

Outputs are non-polarity sensitive, N/O solid-state contacts for switching both AC and DC circuits up to 36 volts.

Unit includes two Status LED indicators, which signal three states:

1. Tripped on
2. Current present but below trip point
3. Current off or below the low end of the adjustable trip point range.

Wire Terminations



Return/Exhaust Fan Status Sensor Submittal

Project: San Bernadino County Sherriff Station AHU
Unit Tag: AH 5

Carrier Part Number	39MA51000021
Manufacturer	Automation Components, Inc.
Manufacturer Part Number	A/MCS-A
Cable	19
Channel	EXIN-1
Terminal/Signal	TB7-1 / Dry Contact DI
Terminal/Signal	TB7-2 / Signal Ground

RFS/EFS

Return/Exhaust Fan Status Sensor

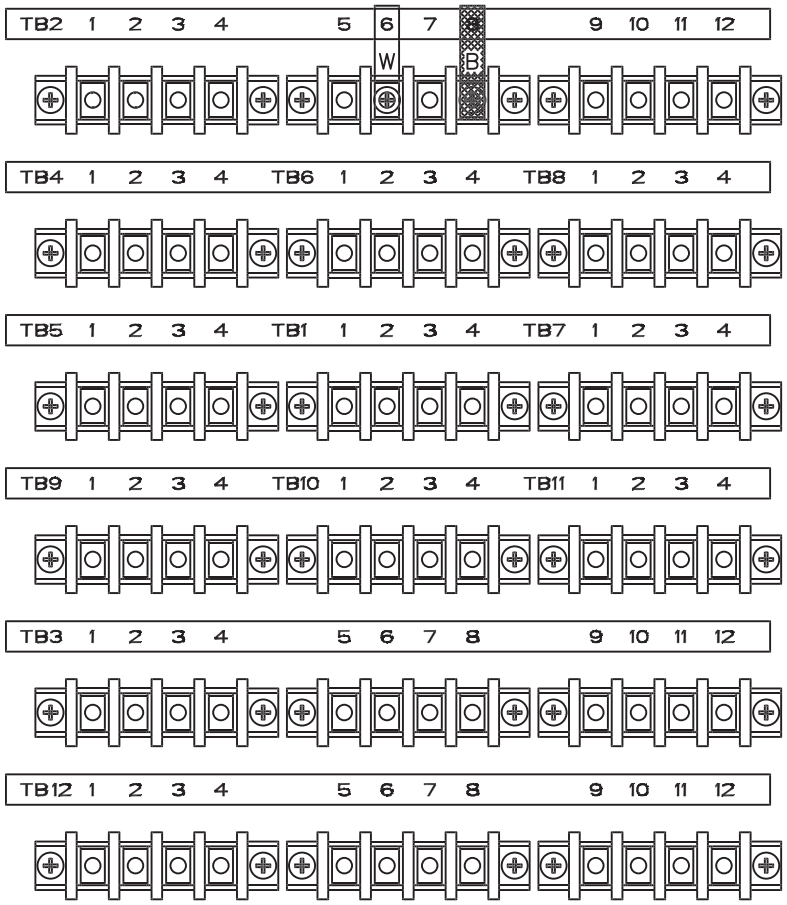
The A/MCS-A is a normally open (N/O) solid state adjustable current switch.

Outputs are non-polarity sensitive, N/O solid-state contacts for switching both AC and DC circuits up to 36 volts.

Unit includes two Status LED indicators, which signal three states:

1. Tripped on
2. Current present but below trip point
3. Current off or below the low end of the adjustable trip point range.

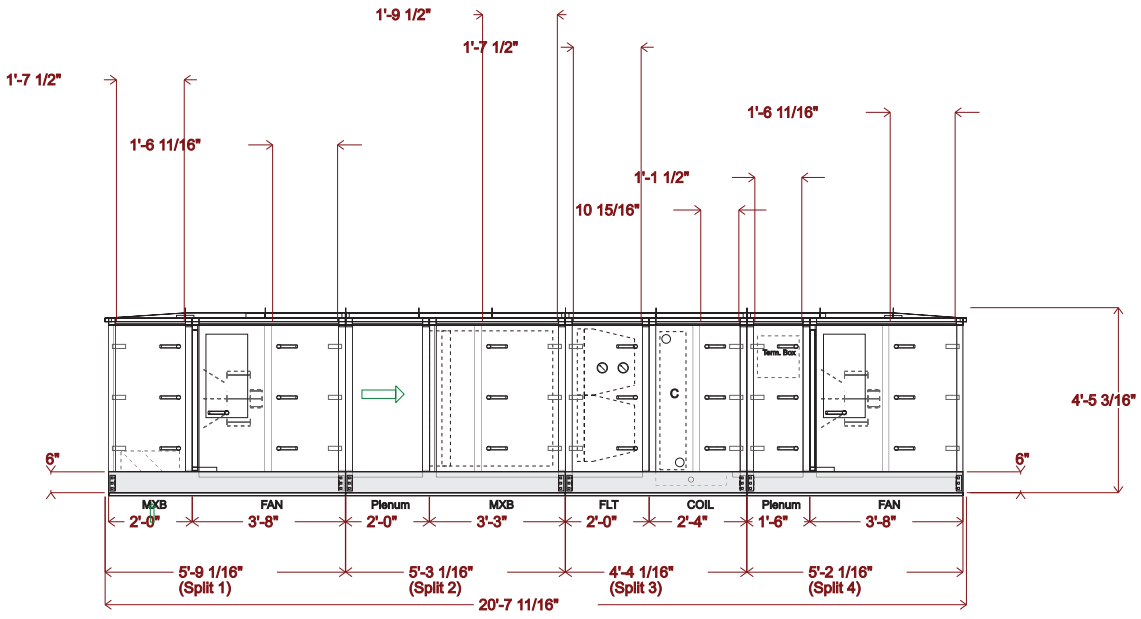
Wire Terminations



Unit width: 6'-9" (plus lifting lugs)
Return Fan
0
Bag/Cartridge Filter 6 - 12 IN. Side Loading
Qty (3) 24in. x 24in.
Qty (3) 12in. x 24in.
Pre Filter : 2In. Flat Filter
Qty (3) 24in. x 24in.

Qty (3) 12in. x 24in.
Chilled Water 6 Row 11 FPI Full Circuit (qty. 1)
Draw-Thru Supply Fan
Operating weight: 4463.0 lbs.
Upstream Corner Weight (each): 1097.0 lbs.
Downstream Corner Weight (each): 1135.0 lbs.

Split	Airway Length	Weight (lbs.)
(Split 1)	5'-9 1/16"	1195
(Split 2)	5'-3 1/16"	907
(Split 3)	4'-4 1/16"	1272
(Split 4)	5'-2 1/16"	1089

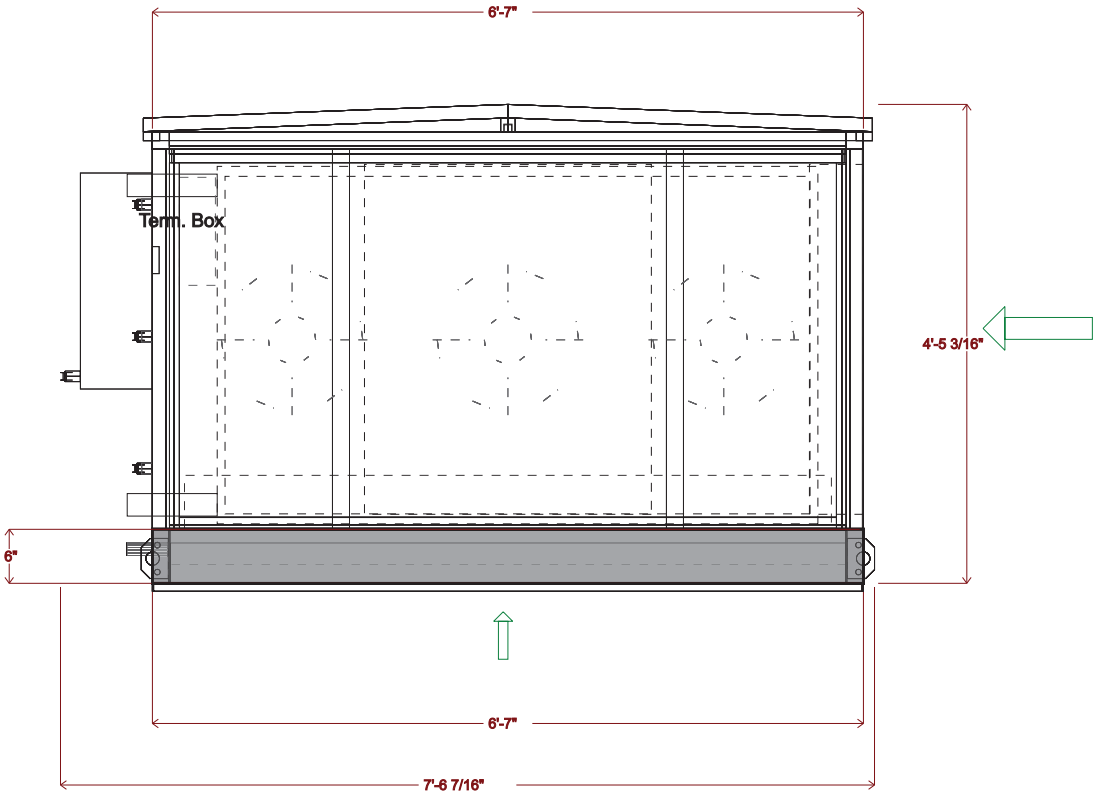


DATE	AHUBuilder	39M Central Station Air-Handler, Size 17W	REVISION
12/30/2024	v7.06	San Bernadino County Sherriff Station AHU: AH 5 Assembly Drawing	Side View

39MW

Unit viewed from right side of side elevation view.
Unit length: 20'-7 11/16"
Return Fan
0
Bag/Cartridge Filter 6 - 12 IN. Side Loading
Qty (3) 24in. x 24in.
Qty (3) 12in. x 24in.
Pre Filter : 2In. Flat Filter

Qty (3) 24in. x 24in.
Qty (3) 12in. x 24in.
Chilled Water 6 Row 11 FPI Full Circuit (qty. 1)
Draw-Thru Supply Fan
Operating weight: 4463.0 lbs.
Upstream Corner Weight (each): 1097.0 lbs.
Downstream Corner Weight (each): 1135.0 lbs.

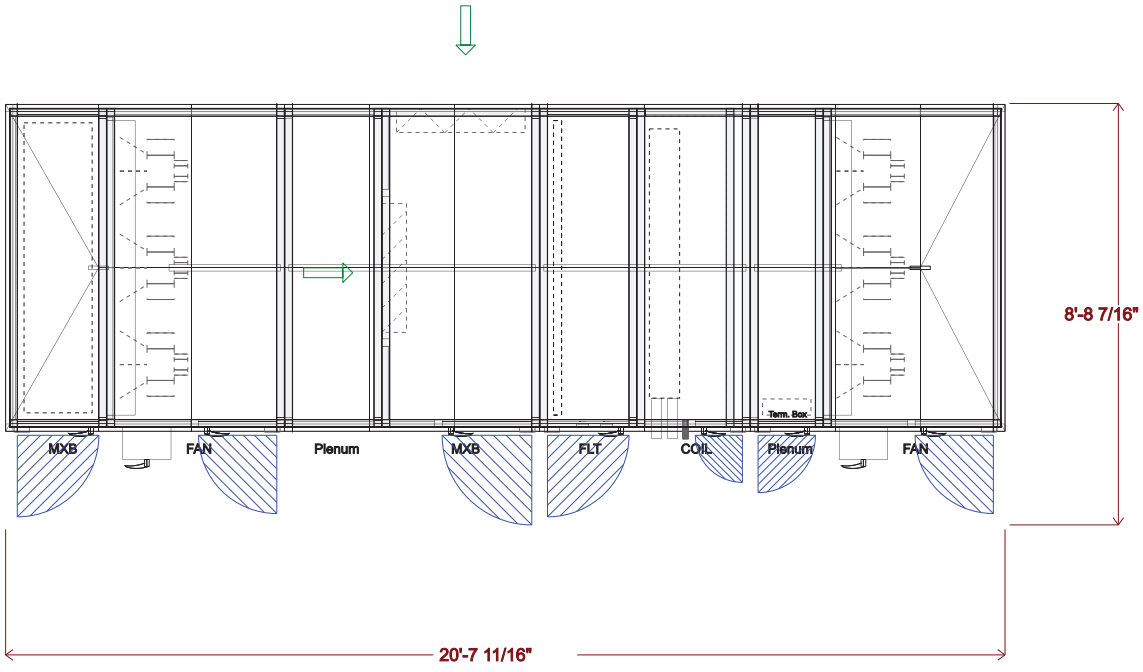


39MW

DATE	AHUBuilder	39M Central Station Air-Handler, Size 17W	REVISION
12/30/2024	v7.06	San Bernadino County Sherriff Station AHU: AH 5 Assembly Drawing	End View

Unit height: 4'-4 11/16"
Return Fan
0
Bag/Cartridge Filter 6 - 12 IN. Side Loading
Qty (3) 24in. x 24in.
Qty (3) 12in. x 24in.
Pre Filter : 2In. Flat Filter
Qty (3) 24in. x 24in.

Qty (3) 12in. x 24in.
Chilled Water 6 Row 11 FPI Full Circuit (qty. 1)
Draw-Thru Supply Fan
Operating weight: 4463.0 lbs.
Upstream Corner Weight (each): 1097.0 lbs.
Downstream Corner Weight (each): 1135.0 lbs.

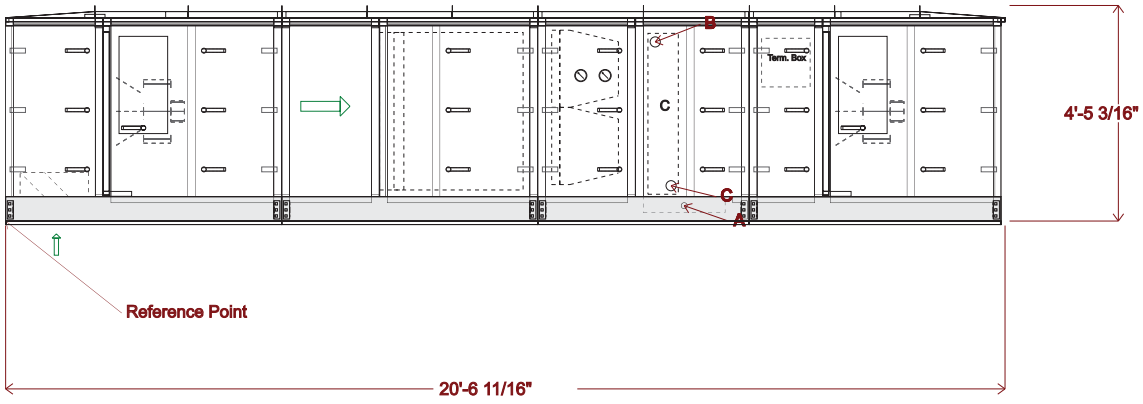


39MW

DATE	AHUBuilder	39M Central Station Air-Handler, Size 17W	REVISION
12/30/2024	v7.06	San Bernadino County Sherriff Station AHU: AH 5 Assembly Drawing	Top View

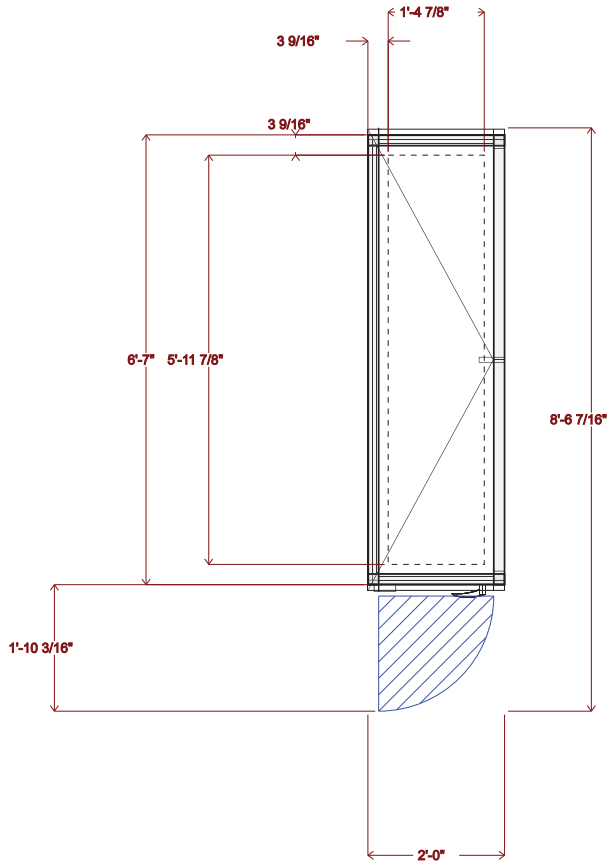
Chilled Water 6 Row 11 FPI Full Circuit (qty. 1)

Pipe	x	y	diameter	Usage
A	13'-11 1/2"	3 13/16"	1 1/2"	DrainPan
B	13'-4 5/16"	3'-8 3/16"	2 1/2"	CW Outlet
C	13'-8 1/4"	8 11/16"	2 1/2"	CW Inlet



39MW

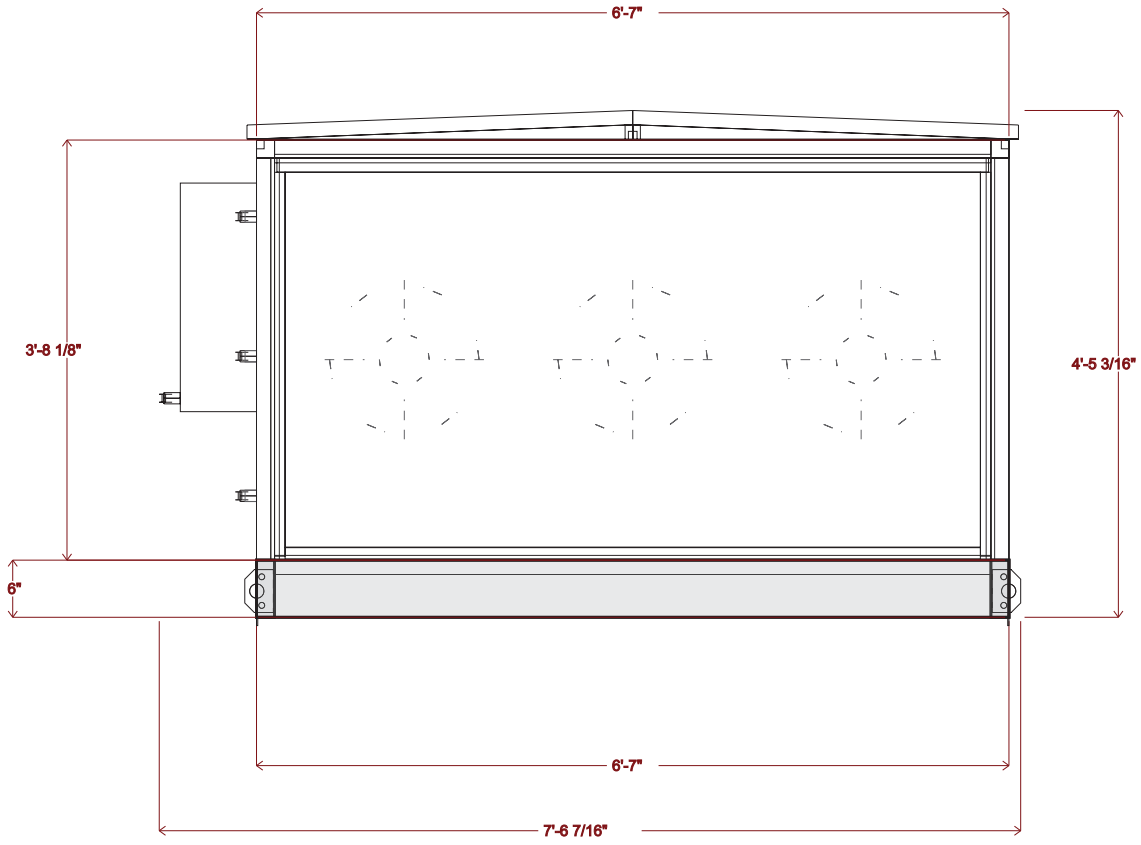
DATE	AHUBuilder	39M Central Station Air-Handler, Size 17W San Bernadino County Sherriff Station AHU: AH 5 Assembly Drawing	REVISION
12/30/2024	v7.06		Side View



DATE	AHUBuilder	39M Central Station Air-Handler, Size 17W San Bernadino County Sherriff Station AHU: AH 5 Mixing Box	REVISION
12/30/2024	v7.06		Top View

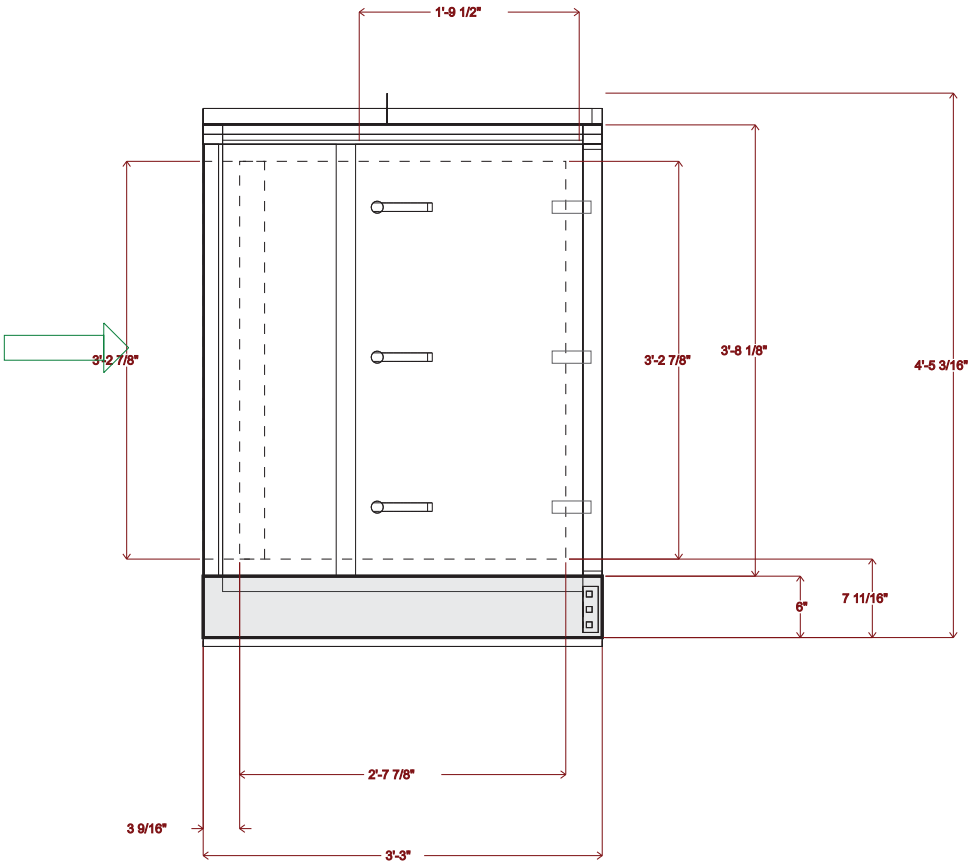
39MW

Unit viewed from right side of side elevation view.
Return Fan
0



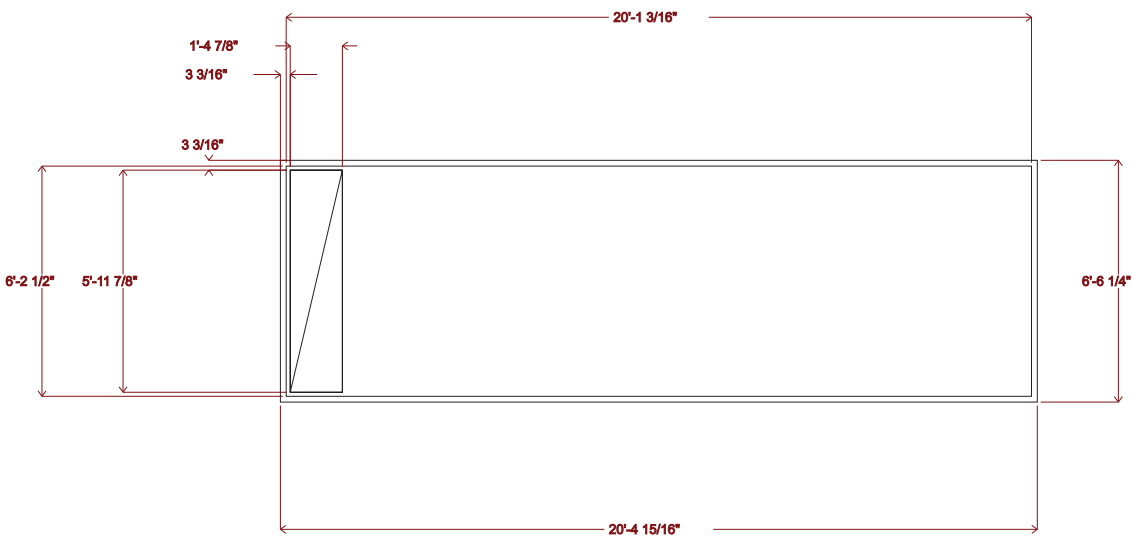
DATE	AHUBuilder	39M Central Station Air-Handler, Size 17W San Bernadino County Sherriff Station AHU: AH 5 Return Fan	REVISION
12/30/2024	v7.06		End View

39MW



DATE	AHUBuilder	39M Central Station Air-Handler, Size 17W	REVISION
12/30/2024	v7.06	San Bernadino County Sherriff Station AHU: AH 5 Mixing Box	Side View

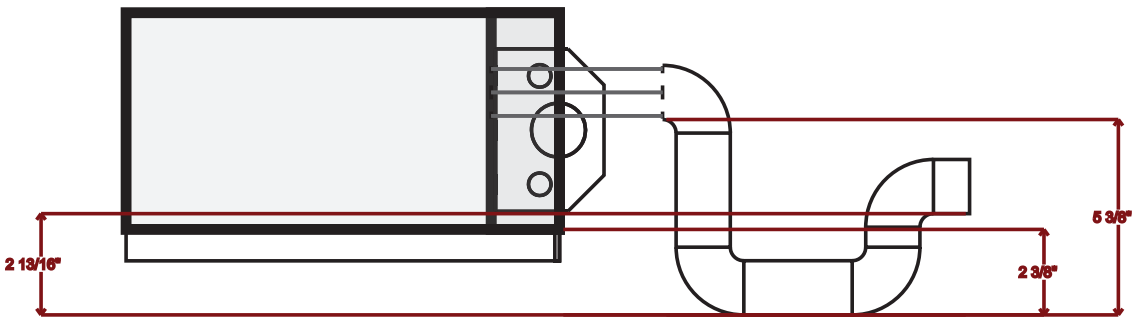
39MW



DATE	AHUBuilder	39M Central Station Air-Handler, Size 17W San Bernadino County Sherriff Station AHU: AH 5 Ahu Curb	REVISION Top View
12/30/2024	v7.06		

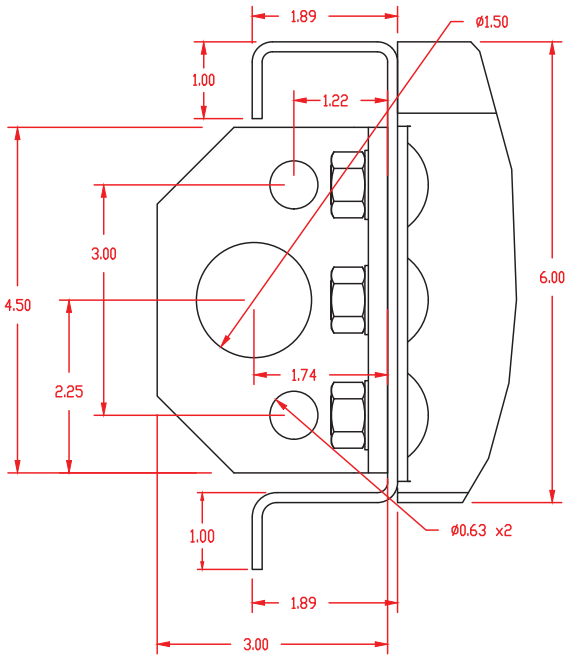
39MW

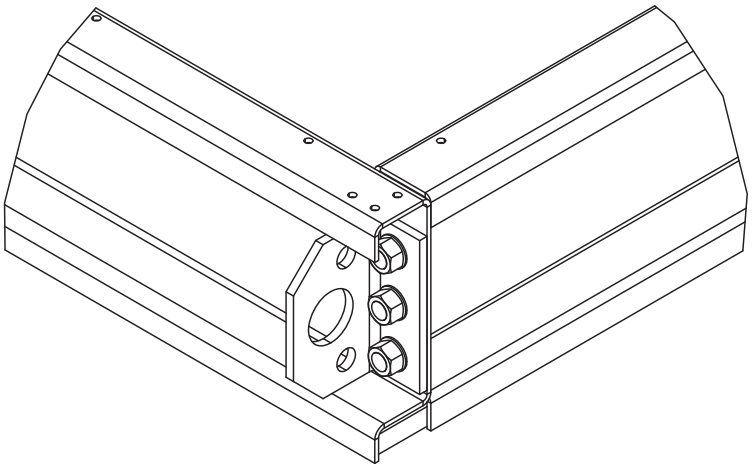
DRAW-THRU



DATE	AHUBuilder	39M Central Station Air-Handler, Size 17W San Bernadino County Sherriff Station AHU: AH 5 Condensate Trap Dimensions	REVISION End View
12/30/2024	v7.06		

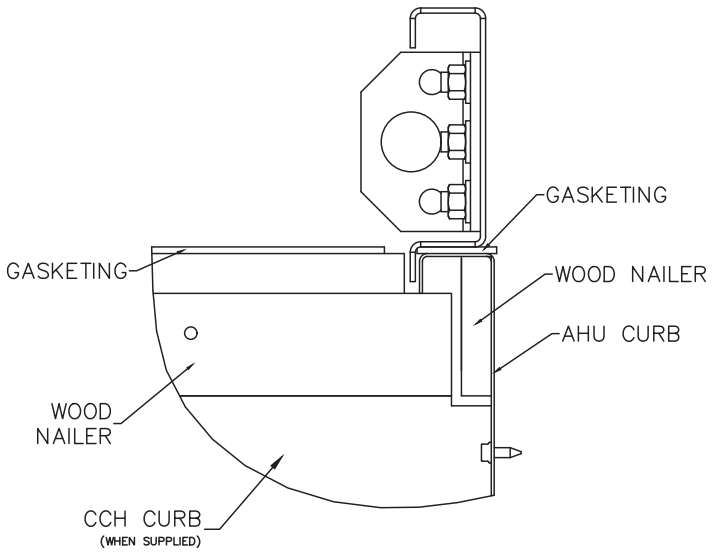
39MW

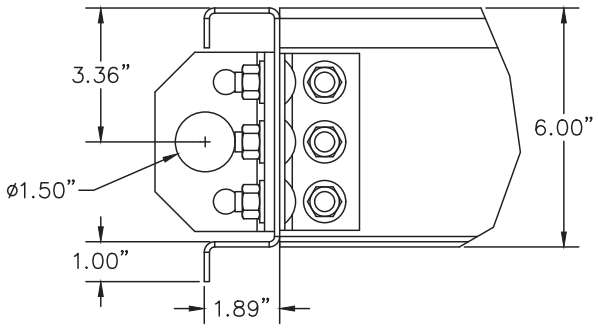


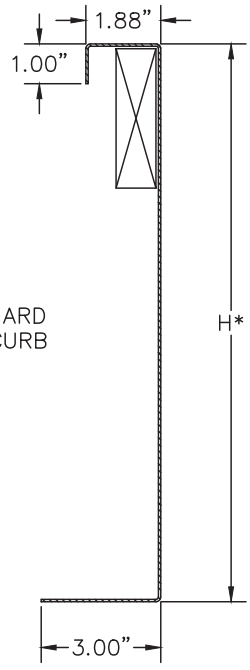


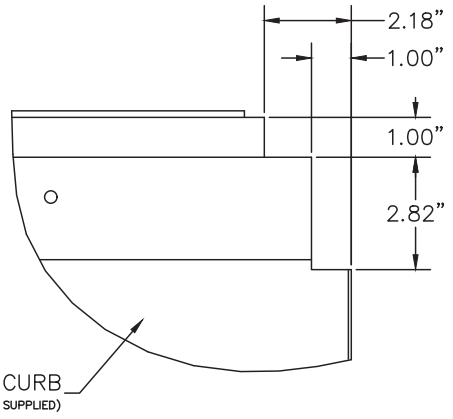
39MW

DATE	AHUBuilder	39M Central Station Air-Handler, Size: 03 - 110	REVISION
2024-12-30	v7.06	6" Baserail and Lifting Lug Detail	







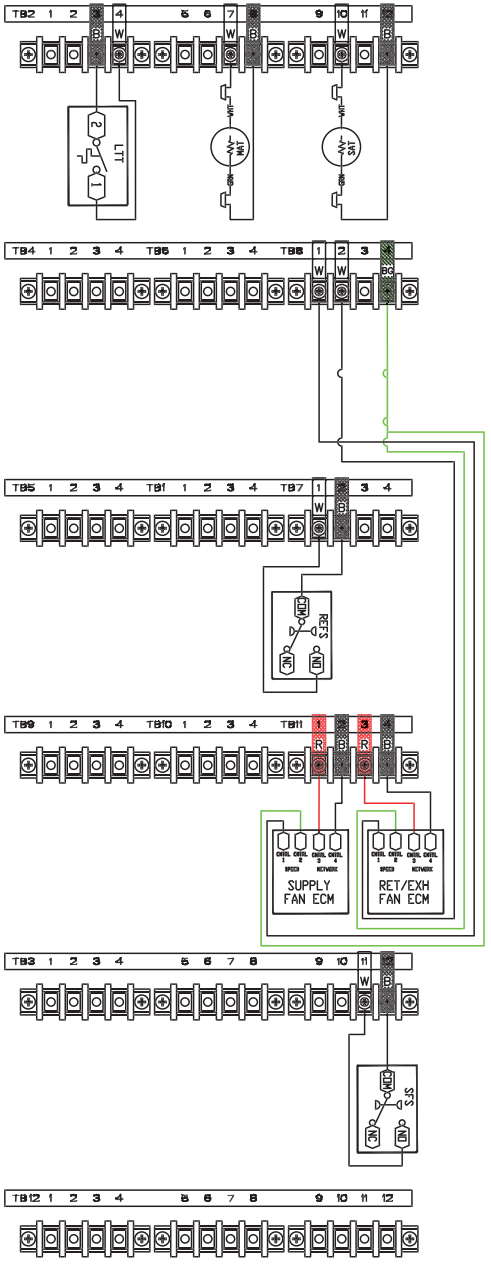


* 14" OR 24" STANDARD HEIGHT FLAT ROOF CURB

39MW

DATE	AHUBuilder	39M Central Station Air–Handler, Size: 03 – 110	REVISION
2024-12-30	v7.06	Curb, Baserail and Lifting Lug Detail	

39M



LEGEND:

⊗	TERMINAL (MARKED)
⊞	TERMINAL BLOCK
⊡	SPLICE FIELD
———	WIRING FACTORY
– – –	WIRING FIELD CONTROL

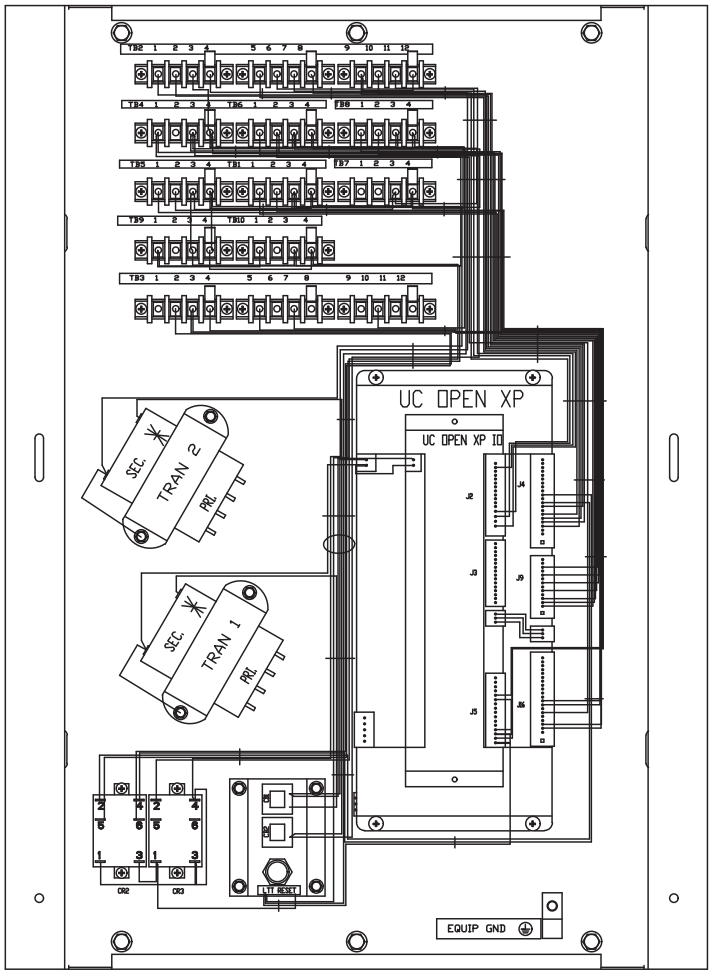
A1/A2	24VAC CONTACTOR COIL
BG	BLACK OR GREEN
CCV	COOLING COIL VALVE*
COM	COMMON
EF	EXHAUST FAN
EHEAT	ELECTRIC HEATER
ERV	ENERGY RECOVERY WHEEL
EXD	EXHAUST AIR DAMPER
FBD	FACE & BYPASS DAMPER
FLTS	FILTER STATUS SWITCH
FLTS2	FILTER STATUS SWITCH 2
HCV	HEATING COIL VALVE*
HDT	HOT DECK TEMPERATURE
HUM	HUMIDIFIER ENABLE
LTT	LOW TEMPERATURE THERMOSTAT (FREEZSTAT)
MAD	MIXED AIR DAMPER
MAT	MIXED AIR TEMPERATURE
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
OAD	OUTDOOR AIR DAMPER
PHEAT	PRE-HEAT
PHV	PRE-HEAT VALVE*
RAD	RETURN AIR DAMPER
REFS	RETURN/EXHAUST FAN STATUS
RF	RETURN FAN
SAT	SUPPLY AIR TEMPERATURE
SCR	SILICON CONTROLLED RECTIFIER
SF	SUPPLY FAN
SFS	SUPPLY FAN STATUS
SI	SIGNAL IN
S/S	START/STOP
TB	TERMINAL BLOCK TERMINAL
VFD	VARIABLE FREQUENCY DRIVE
*	FIELD SUPPLIED

REVISION

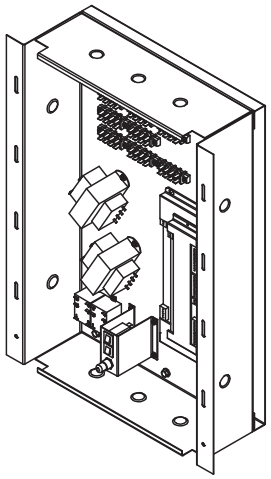
39M Central Station Air Handler, Size: 03 - 110
Factory Wired Controller Wiring Diagram

AHUBuilder
v7.06

DATE
2024-12-30



SIZE 03-06 (SHOWN)

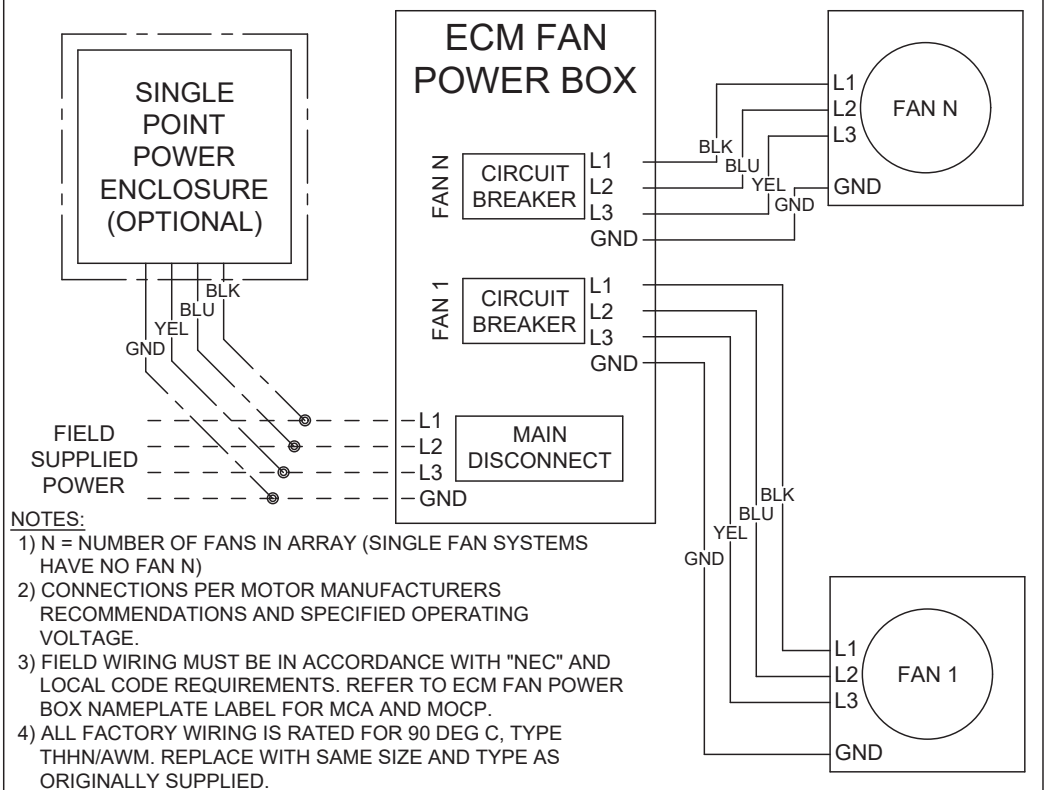


Component wiring for reference only.
When components are factory installed, wiring will be factory installed unless otherwise noted.
When components are provided by the factory for field installation, wiring is not included or installed.

DATE	AHUBuilder	39M Central Station Air-Handler, Size: 03 - 110	REVISION
2024-12-30	v7.06	Factory Wired Controller	

39M

POWER WIRING DIAGRAM
ECM FAN 3 PHASE



NOTES:

1) N = NUMBER OF FANS IN ARRAY (SINGLE FAN SYSTEMS HAVE NO FAN N)
2) CONNECTIONS PER MOTOR MANUFACTURERS RECOMMENDATIONS AND SPECIFIED OPERATING VOLTAGE.
3) FIELD WIRING MUST BE IN ACCORDANCE WITH "NEC" AND LOCAL CODE REQUIREMENTS. REFER TO ECM FAN POWER BOX NAMEPLATE LABEL FOR MCA AND MOCP.
4) ALL FACTORY WIRING IS RATED FOR 90 DEG C, TYPE THHN/AWM. REPLACE WITH SAME SIZE AND TYPE AS ORIGINALLY SUPPLIED.
5) USE COPPER CONDUCTOR SUPPLY WIRES ONLY

———— FACTORY WIRING
– – – – – – FIELD WIRING
——— – ——— OPTIONAL WIRING/EQUIPMENT
GND GREEN, GREEN-YELLOW, OR BARE COPPER

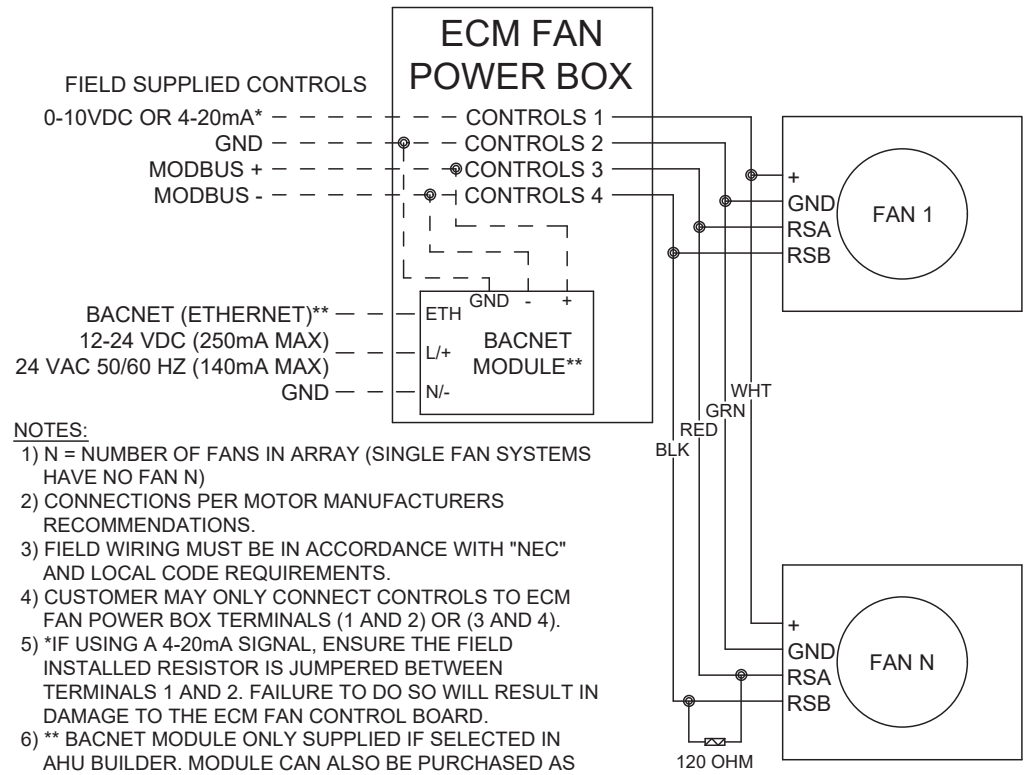
39MA51010016 REV:B

Component wiring for reference only. When components are factory installed, wiring will be factory installed unless otherwise noted. When components are provided by the factory for field installation, wiring is not included or installed.

39M

DATE	AHUBuilder	39M Central Station Air-Handler, Size: 03 - 110	REVISION
2024-12-30	v7.06	ECM Three Phase Wiring Detail	

CONTROLS WIRING DIAGRAM
ECM FAN, EBM-PAPST



NOTES:

1) N = NUMBER OF FANS IN ARRAY (SINGLE FAN SYSTEMS HAVE NO FAN N)
2) CONNECTIONS PER MOTOR MANUFACTURERS RECOMMENDATIONS.
3) FIELD WIRING MUST BE IN ACCORDANCE WITH "NEC" AND LOCAL CODE REQUIREMENTS.
4) CUSTOMER MAY ONLY CONNECT CONTROLS TO ECM FAN POWER BOX TERMINALS (1 AND 2) OR (3 AND 4).
5) *IF USING A 4-20mA SIGNAL, ENSURE THE FIELD INSTALLED RESISTOR IS JUMPERED BETWEEN TERMINALS 1 AND 2. FAILURE TO DO SO WILL RESULT IN DAMAGE TO THE ECM FAN CONTROL BOARD.
6) ** BACNET MODULE ONLY SUPPLIED IF SELECTED IN AHU BUILDER. MODULE CAN ALSO BE PURCHASED AS AN ACCESSORY AND FIELD INSTALLED.

\+ AIN 1 U / IO2, MOTOR SPECIFIC
——— FACTORY WIRING
– – – – – – FIELD WIRING

39MA51010018 REV:C

Component wiring for reference only. When components are factory installed, wiring will be factory installed unless otherwise noted. When components are provided by the factory for field installation, wiring is not included or installed.

39M

DATE	AHUBuilder	39M Central Station Air-Handler, Size: 03 - 110 ECM Controls Wiring Diagram - EBM Pabst	REVISION
2024-12-30	v7.06		

Air Filter Submittal

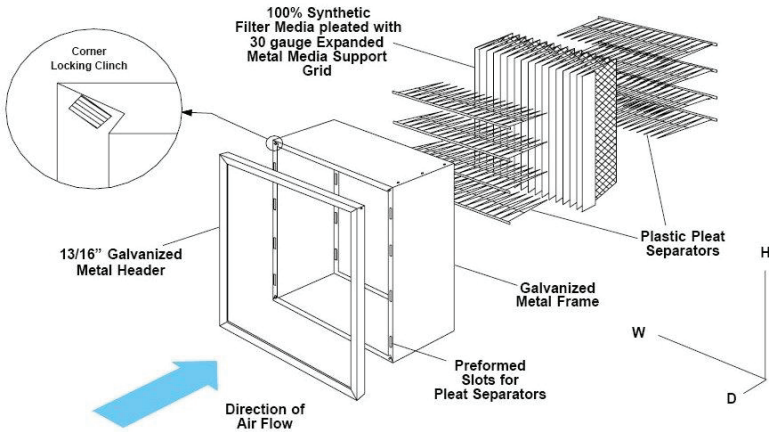
Project: San Bernadino County Sherriff Station AHU
Unit Tag: AH 5

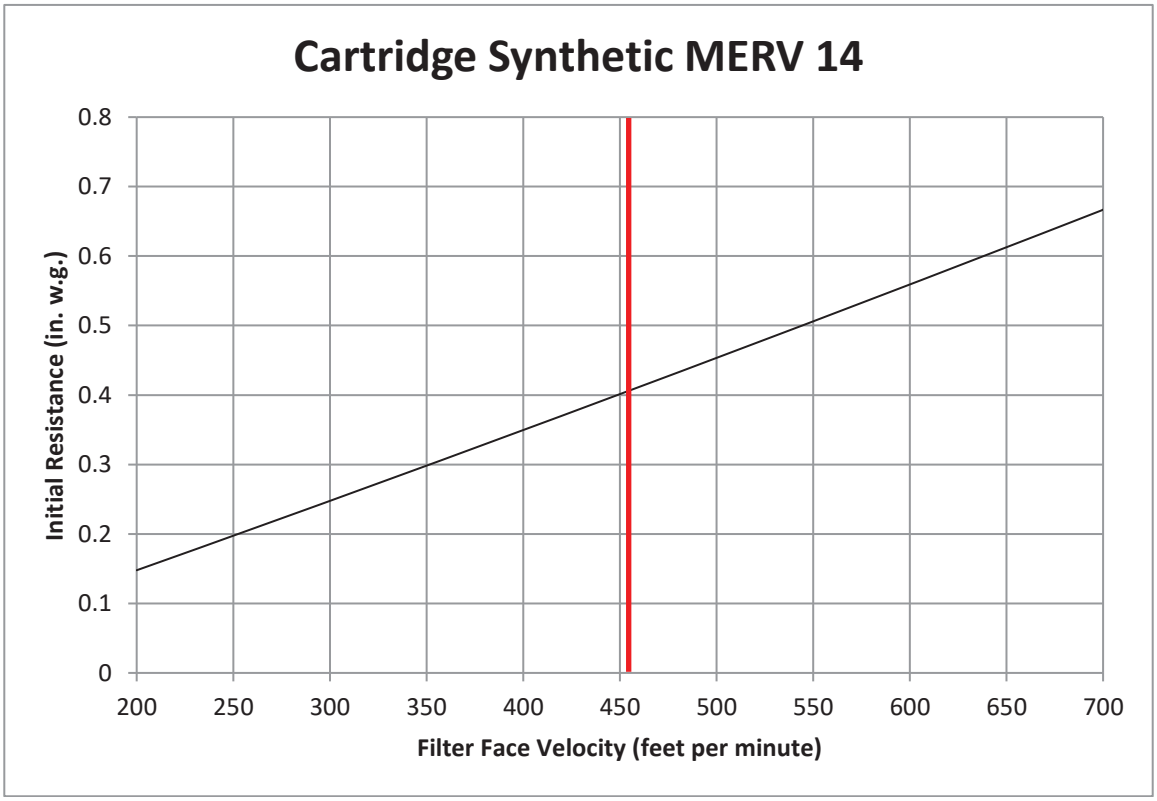
Carrier Part Number	31KB50312240324244
Kit Description	Filter Kit
Unit Airflow, CFM	8200
Filter Velocity, FPM	456
Filter Sizes and Quantities	Qty (3) 24in. x 24in., Qty (3) 12in. x 24in.

DFpro

Synthetic Cartridge Filter

DFpro rigid filters are designed to provide consistent high efficiency filtration in constant and variable air volume systems. Deep pleats are held firmly in place with plastic separators and expanded metal backing. Every edge of the media pack is glued inside the periphery of the frame to prevent air and dust bypass. The media and separators are 100% polypropylene to resist moisture damage, microbial growth, and puncture damage. Heavy gauge galvanized frame resists corrosion and maintains its structural integrity for extended months of service.





Air Filter Submittal

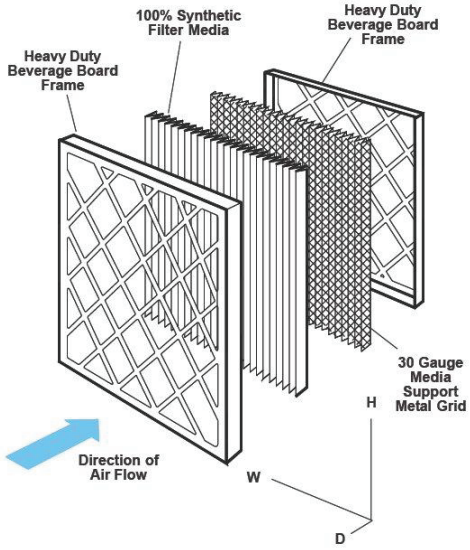
Project: San Bernadino County Sherriff Station AHU
Unit Tag: AH 5

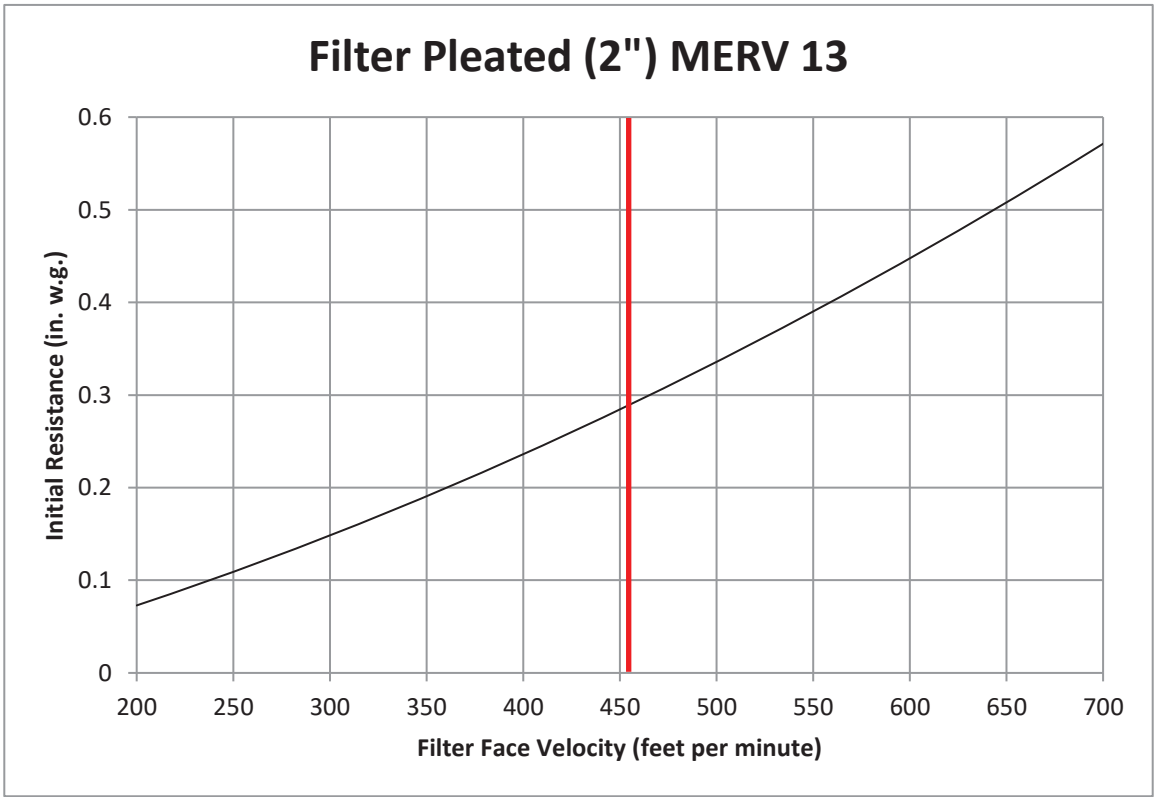
Carrier Part Number	31K2C0312240324244
Kit Description	Filter Kit
Unit Airflow, CFM	8200
Filter Velocity, FPM	456
Filter Sizes and Quantities	Qty (3) 24in. x 24in., Qty (3) 12in. x 24in.

DFpro

MERV 13 Pleated Filter

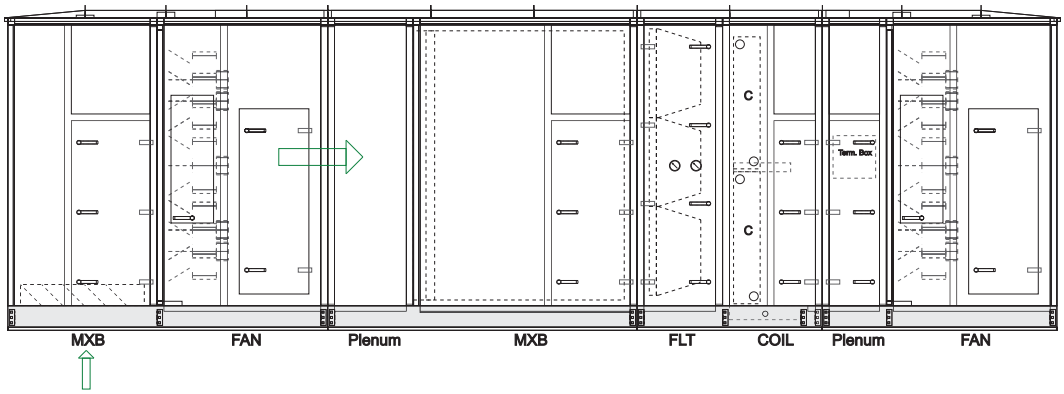
The 100% synthetic graduated density media is continuously bonded to a 30 gauge galvanized, corrosion resistant, expanded metal support grid with an effective open area of 96%. The media is resistant to a wide range of chemicals, does not absorb moisture and will not support microbial growth.
The controlled pleat spacing maximizes surface area and dust holding capacity and is bonded to the enclosure frame to prevent dust bypass. The enclosure frame is constructed of high wet strength moisture resistant beverage board. The diagonal support members of the frame are bonded to the entering and exiting apexes of each pleat to prevent pleat collapse and filter bowing.





Unit Report AH 6

Project: San Bernadino County Sherriff Station AHU
Unit Tag: AH 6



Unit Parameters

- Aero Outdoor Air Handler
- 39MW Size 50W
- Insulation: R-13 Double Wall Sealed Panel
- Exterior Finish: Painted Exterior Panels
- Interior Finish: Galvanized Interior Panels
- Level II Thermal Break
- 6 inch tall Base Rail
- Field Supplied Curb

Mixing Box

- Damper: Bottom Premium Parallel
- Door Right Side

Return Fan

- Shipping Split After
- Rear Inlet
- Fan Sled
  - Plenum Fan B PEBM0105
  - Direct Drive Fans
  - Fan Count 7
  - 2173 fanRPM Class III
  - Full Open Discharge
  - ECM Control Box (Standard)
  - Piezometer and Transducer (1 fan)
  - Voltage Selected - 460/3/60
  - Full Load Amps - 7.7 Each
  - FLA/MCA/MOCP 53.9/55.8/60
- Return/Exhaust Fan Status (DI)
- Door Right Side

Plenum

- Length 24 inches

Mixing Box

- Shipping Split After
- Damper: Left Side Premium Opposed
- Damper: Rear Premium Parallel
- Mixed Air Temperature Sensor (AI)
- Door Right Side

Unit Report AH 6

Project: San Bernadino County Sherriff Station AHU
Unit Tag: AH 6

Bag/Cartridge Filter

Bag/Cartridge Filter 6 - 12 IN. Side Loading
12" Cartridge w/ Header (Synthetic) MERV 14
Qty (3) 12in. x 24in.
Qty (12) 24in. x 24in.
Pre Filter : 2In. Flat Filter
2" Pleated MERV 13 Filter
Qty (3) 12in. x 24in.
Qty (12) 24in. x 24in.
Door Right Side
Minihelic Differential Pressure Gage 0-2" w.c. Right Side
Minihelic Differential Pressure Gage 0-2" w.c. Right Side

Chilled Water Coil and Plenum

Shipping Split After
Low Temperature Thermostat (DI)
304 Stainless Steel Drain Pan Right Side
Chilled Water 50.56 sq.ft 6 Row 11 FPI Double Circuit
Coil Connection Right Side
1/2 in. Tube Diameter
Fin Thickness: 0.0060
AL fins Galv. Casing
Steel Header
No Coating
Door Right Side

Control Plenum

Length 18 inches
Unprogrammed Carrier UC Open XP Controller Located in Control Plenum
Door Right Side

Draw-Thru Supply Fan

Rear Inlet
Fan Sled
Plenum Fan B PEBM0105
Direct Drive Fans
Fan Count 7
3623 fanRPM Class III
Field Supplied Discharge
ECM Control Box (Standard)
Piezometer and Transducer (1 fan)
Voltage Selected - 460/3/60
Full Load Amps - 7.7 Each
FLA/MCA/MOCP 53.9/55.8/60
Supply Fan Status (DI)
Supply Air Temperature Sensor (AI)
Door Right Side

Weights and Dimensions

(LxWxH in ft in) 24' 10" x 9' 11" x 7' 6" **
Operating 9508 LB **

Warranty Part Number(s) (NET PRICING)

39LMR-SU-FIRST Qty 1.0 First 39 Series Start-up

Configuration Notes

An Outdoor Plenum fan may not discharge through the roof of the unit.

If a bottom connection is required, use an Inlet Plenum Section.

An Outdoor Plenum fan may not discharge through the roof of the unit.

Discharge duct(s) must be gasketed and screwed directly to the discharge panel of the unit.

Warranty Part Number(s) (NET PRICING)

QTY 1.0 First 39 Series Start-up

** Weights and Dimensions are approximate. Weights include base unit weight, coils (wet & dry), fans and fan motors, and other components, but does not include filters, drives and skids. Approximate dimensions are provided primarily for shipping purposes, for exact dimensions, refer to submittal drawings. Shipping skids are not included.

All filter media efficiency ratings are for the filter media only.

Chilled Water Coil Performance Summary

Project: San Bernadino County Sherriff Station AHU
Unit Tag: AH 6

Cooling Application's Balance Criteria: Fluid Flow

Coil Model	**28MC**	
Number of Coils	**2**	
Row / FPI / Circ	**6 / 11 / DB**	
Fin Thickness	**.0060**	in
Fin Type	**Sine Wave**	
Face Area Type	**Large**	
Coil Face Area	**50.56**	sqft
Face Velocity	**440.1**	fpm
Fin-Casing Material	**Al-Galv.**	
Tube Diameter	**0.5**	in
Tube spacing: Stf x Str	**1.25 x 0.781**	in
Tube Wall Thickness	**0.016**	in
Actual Airflow	**22250**	CFM
Site Altitude	**0**	ft
Standard Airflow (adj. to std. dry atmosphere)	**21376**	SCFM
Total Cooling Capacity	**823.57**	MBH
Sensible Cooling Capacity	**698.59**	MBH
Fluid Flow Rate	**109.3**	gpm
Fluid Pressure Drop	**3.5**	ft wg
Fluid Velocity	**2.2**	ft/s
Entering Fluid Temperature	**43.00**	F
Leaving Fluid Temperature	**58.07**	F
Fluid Temperature Rise	**15.1**	F
Entering Air Dry Bulb	**83.30**	F
Entering Air Wet Bulb	**65.90**	F
Entering Air Enthalpy	**30.61**	BTU/lb
Leaving Air Dry Bulb	**53.04**	F
Leaving Air Wet Bulb	**53.04**	F
Leaving Air Enthalpy	**22.1**	BTU/lb
Air Friction	**0.65**	in wg
Brine	**FW**	
Brine Concentration	**0**	%
Fouling Factor	**0.0**	(hr-sqft-F)/BTU

NOTE: Certified in accordance with the AHRI Forced-Circulation Air-Cooling and Air-Heating Coils Certification Program which is based on AHRI Standard 410 within the Range of Standard Rating Conditions listed in Table 1 of the Standard. Certified units may be found in the AHRI Directory (www.ahridirectory.org).

LEGEND:
- Stf -- Tube spacing across coil face
- Str -- Tube spacing in direction of airflow

Unit Acoustics Summary

Project: San Bernadino County Sherriff Station AHU
Unit Tag: AH 6

Unit Acoustics Sound Power Level:

	Discharge	Inlet	Casing
63 Hz	**91**	**85**	**83**
125 Hz	**89**	**85**	**83**
250 Hz	**103**	**99**	**97**
500 Hz	**105**	**102**	**99**
1000 Hz	**108**	**99**	**96**
2000 Hz	**104**	**93**	**89**
4000 Hz	**99**	**93**	**89**
8000 Hz	**95**	**87**	**85**

Sound power levels are rated in accordance with AMCA 300.

Unit Acoustics A-weighted Sound Power Level:

	Discharge	Inlet	Casing
63 Hz	**65**	**58**	**57**
125 Hz	**73**	**69**	**67**
250 Hz	**95**	**91**	**88**
500 Hz	**102**	**98**	**96**
1000 Hz	**108**	**99**	**96**
2000 Hz	**105**	**94**	**91**
4000 Hz	**100**	**94**	**90**
8000 Hz	**94**	**86**	**83**

Sound power levels are rated in accordance with AMCA 300.

Sound contributed by Supply and Return Fans
Unit Acoustics PART-LOAD Sound Power Level:

	Discharge	Inlet	Casing
63 Hz	**80**	**77**	**74**
125 Hz	**79**	**77**	**74**
250 Hz	**87**	**87**	**82**
500 Hz	**89**	**85**	**81**
1000 Hz	**91**	**85**	**81**
2000 Hz	**90**	**84**	**79**
4000 Hz	**84**	**85**	**79**
8000 Hz	**81**	**77**	**71**

Sound power levels are rated in accordance with AMCA 300.

Unit Acoustics Summary

Project: San Bernadino County Sherriff Station AHU
Unit Tag: AH 6

Unit Acoustics PART-LOAD A-weighted Sound Power Level:

	Discharge	Inlet	Casing
63 Hz	**53**	**51**	**48**
125 Hz	**63**	**61**	**57**
250 Hz	**78**	**78**	**74**
500 Hz	**85**	**82**	**78**
1000 Hz	**91**	**85**	**81**
2000 Hz	**91**	**86**	**80**
4000 Hz	**85**	**86**	**80**
8000 Hz	**80**	**76**	**70**

Sound power levels are rated in accordance with AMCA 300.

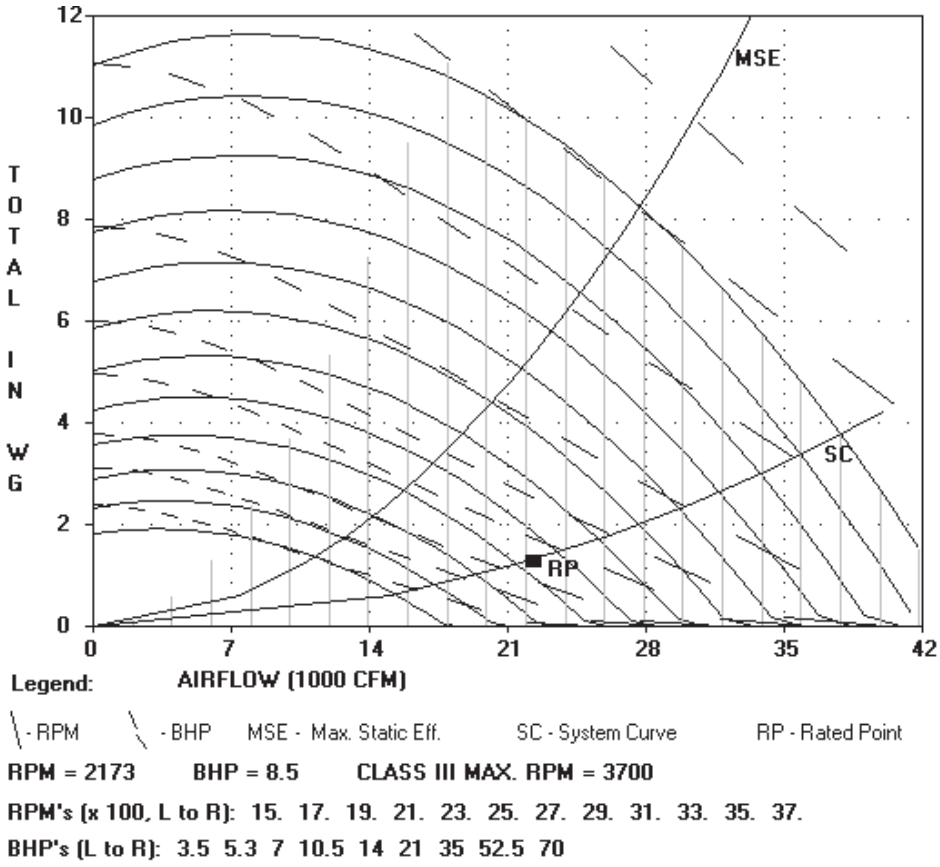
Sound contributed by Supply and Return Fans

Return Fan Performance Summary

Project: San Bernadino County Sherriff Station AHU
Unit Tag: AH 6

Fan Model	**NC-39M5007HPEE**
Unit Size	**50W**
Fan Type **ECM**	
DIRECT DRIVE PLENUM (EBM-05) (Return)	
Fan Wheel Diameter	**15.7**
Fan Class	**III**
Static Efficiency (%)	**53**
Fan Application	**Return Fan**
Orientation	**Horizontal**
Actual Airflow, CFM	**22250**
Site Altitude, , ft	**0**
Total Upstream Static Losses, in wg	**1.30**
Number of Fans	**7**
Fan RPM / Max RPM	**2173/3700**
Each Fan BHP	**1.2**
Fan Total BHP	**8.5**
(n-1) Airflow, CFM	**33712**
(n-1) Redundancy (%)	**152**
Fan Electrical Power, kW	**7.9**
ECM Setting, VDC	**5.9**

Unit is outside of the scope of AHRI Standard 430/431.



Supply Fan Performance Summary

Project: San Bernadino County Sherriff Station AHU
Unit Tag: AH 6

Fan Model	**39M5007HPEE-U**
Unit Size	**50W**
Fan Type	**ECM DIRECT DRIVE PLENUM (EBM-05)**
Fan Wheel Diameter	**15.7**
Fan Class	**III**
Fan Application	**Supply Fan**
Orientation	**Horizontal**
Actual Airflow, CFM	**24500**
Site Altitude, ft	**0**
Upstream Ext. Static, in wg	**0.00**
Downstream Ext. Static, in wg	**5.00**
Cooling Coil Static, in wg	**0.65**
Heating Coil Static, in wg	**0.00**
Total Accessory Static, in wg	**3.08**
Total Static Pressure, in wg	**8.73**
Calculated Fan RPM / Motor RPM	**3623 / 0**
Class III Max. RPM	**3700**
Static Efficiency (%)	**68**
Number of Fans	**7**
Each Fan BHP	**7.1**
Fan Total BHP	**49.6**
(n-1) Airflow, CFM	**23799**
(n-1) Redundancy (%)	**97**
Fan Electrical Power, kW	**41.7**
ECM Setting, VDC	**9.8**

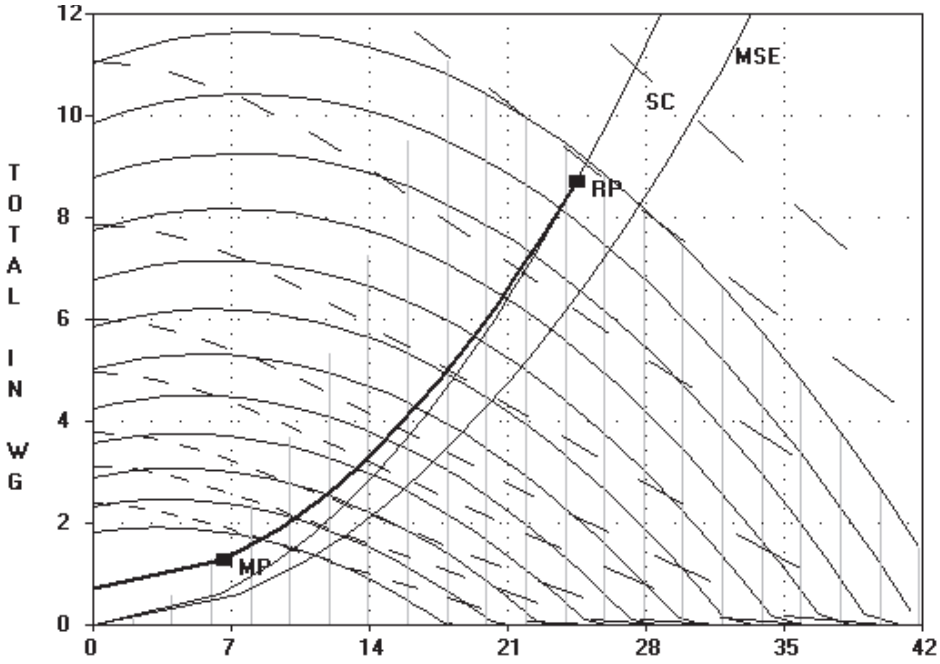
AHRI CERTIFIED®
www.ahridirectory.org
Central Station Air-Handling Unit Supply Fans
AHRI Standard 430/431

Accessories:
(1) Flat Synthetic (2") MERV 13, Dirty [1.50]
(1) CARTRIDGE LONG/SHORT Synthetic MERV 14,Dirty [1.50]
(1) Side Mixing or Exhaust Box [0.08]

NOTE: Certified in accordance with the AHRI Central Station Air-Handling Unit Certification Program, which is based on AHRI Standards 430/431. Certified units may be found in the AHRI Directory at www.ahridirectory.org

Supply Fan Performance Summary

Project: San Bernadino County Sherriff Station AHU
Unit Tag: AH 6



Legend: \ - RPM \ - BHP MSE - Max. Static Eff. SC - System Curve RP - Rated Point

RPM = 3623 BHP = 49.6 CLASS III MAX. RPM = 3700

RPM's (x 100, L to R): 15. 17. 19. 21. 23. 25. 27. 29. 31. 33. 35. 37.

BHP's (L to R): 3.5 5.3 7 10.5 14 21 35 52.5 70

Sensor and Actuator Points List

Project: San Bernadino County Sherriff Station AHU
Unit Tag: AH 6

Name	AI	AO	DI	DO
Return/Exhaust Fan Status			X	
Mixed Air Temperature Sensor	X			
Low Temperature Thermostat			X	
Supply Fan Status			X	
Supply Air Temperature Sensor	X			

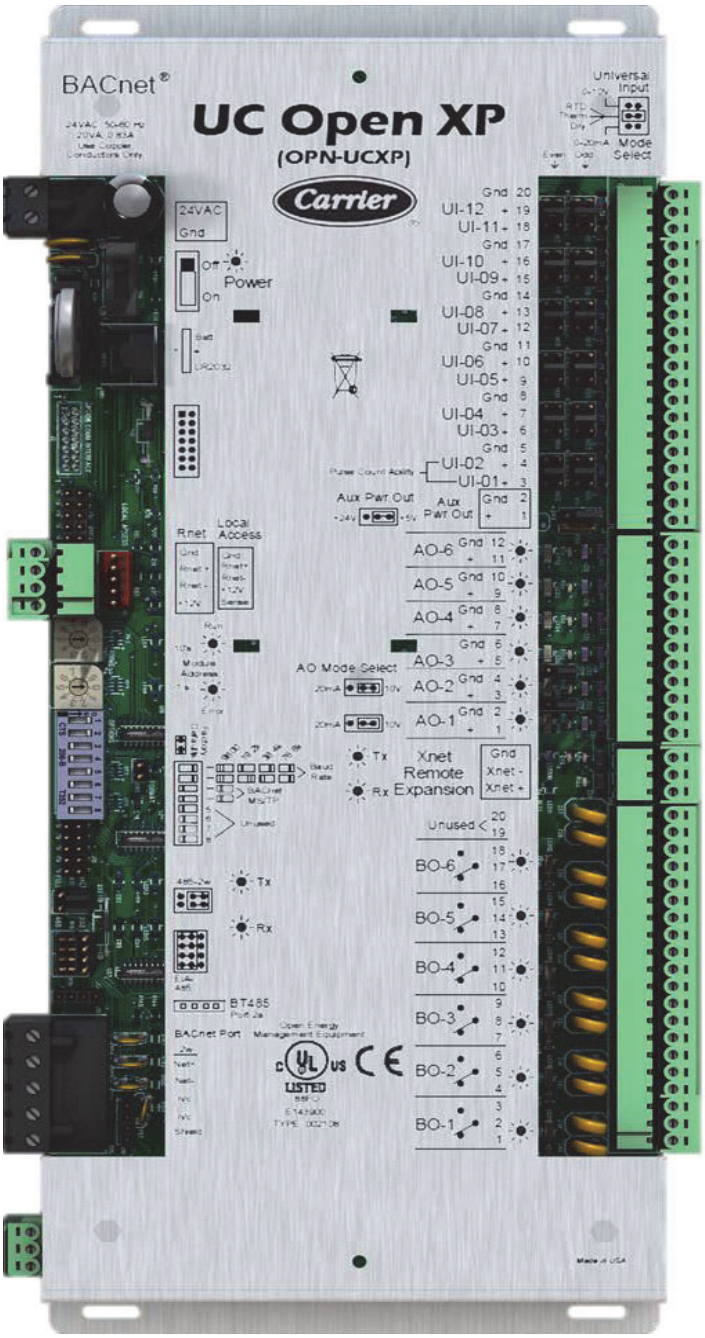
Controller Submittal

Project: San Bernadino County Sherriff Station AHU
Unit Tag: AH 6

Carrier Part Number ..... OPN-UCXP
Manufacturer ..... Carrier

I-VU® UC Open XP

Unit Controller



BACNet Support – Advanced application controller (B-AAC), as defined in BACNet 135-2001 Annex L
BACNet Communication Port – EIA-485 port for BACnet MS/TP communications (baud rate is DIP switch selectable)
Local Access Communication Port – For system start-up and troubleshooting (115.2 kbps)
Rnet Communication Port – For connecting Carrier communicating room sensors and Carrier's touchscreen user interface
Inputs – 12 inputs: Configurable for 0-10V, RTD/Thermistor/Dry contact, or 0-20mA. Inputs 1 and 2 may be used for pulse counting. All analog inputs have 12 bit A/D resolution.
Outputs – 6 binary outputs: Configured as dry contact, normally open or normally closed. All binary outputs must be powered from a Class 2 power source.
6 analog outputs: 1 and 2 are configurable for 0-10V or 0-20mA; 3-6 are 0-10V only. Analog outputs have 8 bit D/A resolution.
Protection – Incoming power and network connections are protected by non-replaceable internal solidstate polyswitches that reset themselves when the condition that causes a fault returns to normal. The power, network, input, and output connections are also protected against voltage transient and surge events.
Real Time Clock – Battery-backed real time clock keeps track of time in event of power failure.
Battery – 10-year Lithium CR2032 battery provides a minimum of 10,000 hours of trend data & time retention during power outages.
Status Indicators – LED status of power, running, and errors. LED indicators for transmit/receive for BACnet port and for each of the 12 outputs.
Controller Addressing – Rotary DIP switches set BACnet MS/TP MAC address of controller.
Listed By – UL-916, FCC Part 15-Subpart B- Class A, CE EN50082-1997
Operating/Storage Range – -24° to 140°F (-30° to 60°C), 10-90% relative humidity, non-condensing
Power Requirements – 24VAC +/- 10%, 50-60Hz
20VA power consumption
Single Class 2 source only, 100VA or less

Controller Expansion Board Submittal

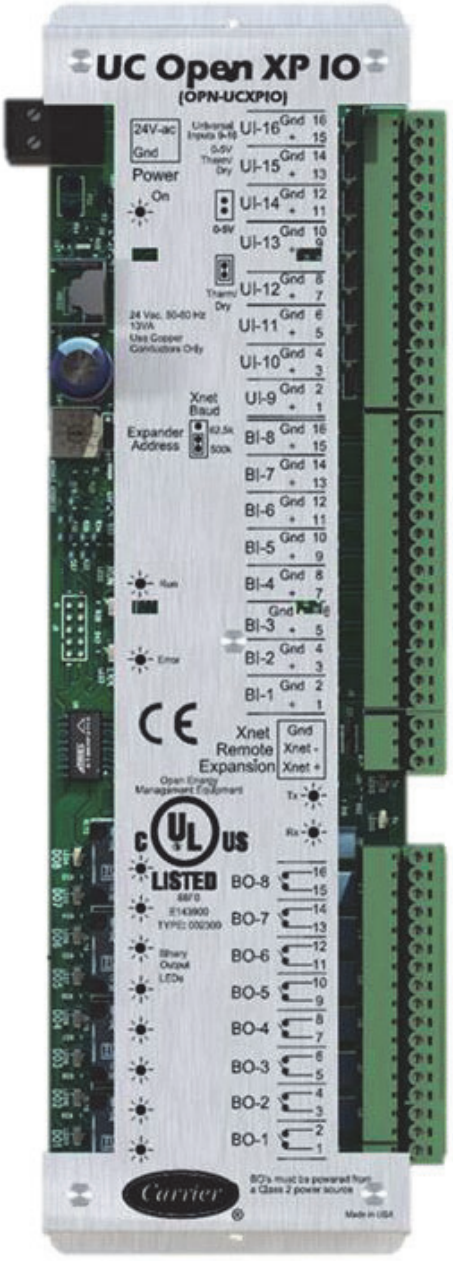
Project: San Bernadino County Sherriff Station AHU
Unit Tag: AH 6

Carrier Part Number ..... OPN-UCXPIO
Manufacturer ..... Carrier

I-VU® UC Open XPIO

Unit Controller Expansion Board

Communication Ports – Xnet Remote Expansion port: For connecting to a UC XP Controller via the Xnet network.
Inputs – 8 binary inputs: Inputs 1-8 are binary only and support pulse counting up to 10 Hz.
8 analog inputs: Inputs 9-16 are universal inputs, jumper selectable between thermistor/dry contact and 0-5VDC. All analog inputs have 10 bit A/D resolution.
Outputs – 8 binary outputs: Configured as dry contact, normally open, and must be powered from a Class 2 power source.
Protection – Incoming power and network connections are protected by non-replaceable internal solidstate polyswitches that reset themselves when the condition that causes a fault returns to normal. The power, network, input, and output connections are also protected.
Status Indicators – LED status of power, outputs, running and errors.
Listed By – UL916 (Canadian Std. C22.2 No. 205-M 1983), CE, FCC Part15-Subpart B - Class A
Operating/Storage Range – -20°F to 140°F (-29° to 60°C), 10-90% relative humidity, non-condensing
Power Requirements – 24VAC +/- 10%, 50-60Hz
13VA power consumption
26VDC (25V min, 30V max)
Single Class 2 source only, 100VA or less



Supply Air Temperature (SAT) Sensor Submittal

Project: San Bernadino County Sherriff Station AHU
Unit Tag: AH 6

Carrier Part Number	33ZCSENSAT
Manufacturer	Automation Components, Inc.
Manufacturer Part Number	ACI/10K-CP-D4
Cable	1
Channel	UI-2
Terminal/Signal	TB2-10 / 10K Thermistor AI
Terminal/Signal	TB2-12 / Signal Ground

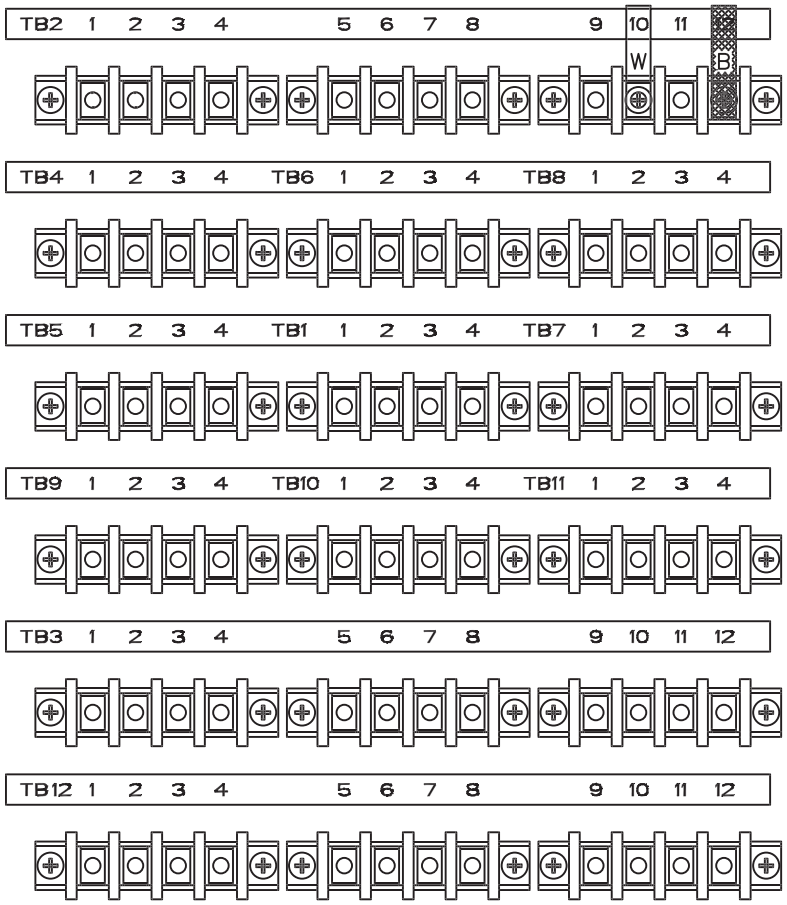
SAT

Supply Air Temperature Sensor

The SAT sensor consists of a thermistor encased within a stainless steel probe.

The thermistor has a temperature range of -245º to 185º F with a nominal resistance of 10,000 ohms at 77º F.

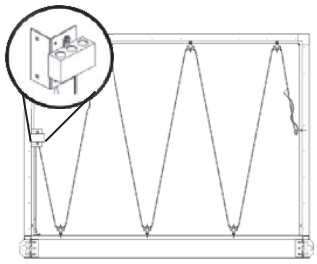
Wire Terminations



Mixed Air Temperature (MAT) Sensor Submittal

Project: San Bernadino County Sherriff Station AHU
Unit Tag: AH 6

Carrier Part Number	HH79NZ041
Manufacturer	Automation Components, Inc.
Manufacturer Part Number	ACI/10K-CP-A24
Cable	4
Channel	UI-3
Terminal/Signal	TB2-7 / 10K Thermistor AI
Terminal/Signal	TB2-8 / Signal Ground



MAT

Mixed Air Temperature Sensor

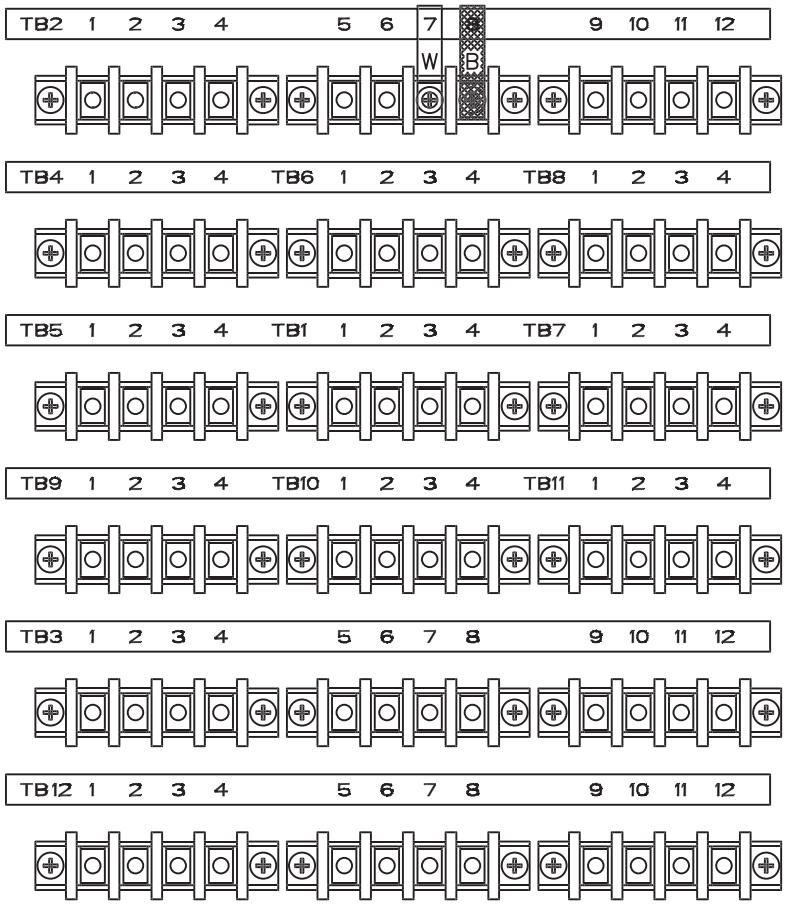
The MAT sensor consists of multiple, evenly spaced thermistors encased within a flexible copper tube.

Mechanical and electrical averaging is used to achieve the temperature measurement over the entire element length.

The MAT sensor has a range of -40º to 185º F with a nominal resistance of 10,000 ohms at 77º F.

The sensor is located in the last mixing box in the airflow.

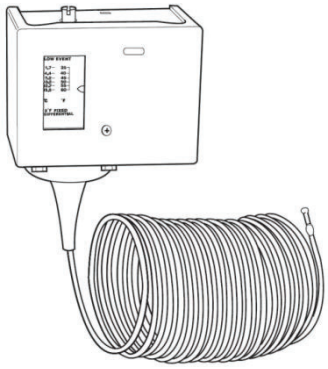
Wire Terminations



Low Temperature Thermostat Submittal

Project: San Bernadino County Sherriff Station AHU
Unit Tag: AH 6

Carrier Part Number	HH22BZ001
Manufacturer	Schneider Electric
Manufacturer Part Number	TC-5231-702
Cable	2
Channel	UI-5
Terminal/Signal	TB2-4 / Dry Contact DI
Terminal/Signal	TB2-3 / Signal Ground



LTT

Low Temperature Thermostat

20 ft. element senses temperature over a large area. Control responds to the coldest one-foot section of the sensor.

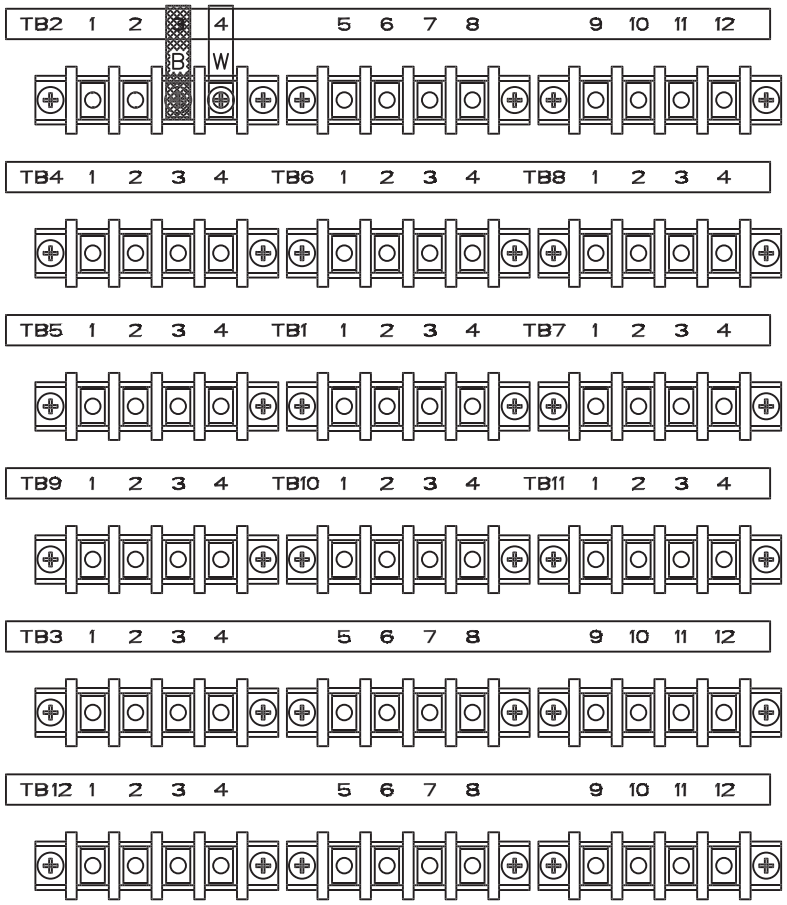
Adjustable setpoint from 35º F to 60º F with 5º F fixed differential.

Rated for use at 17 full load amps (120/208/240 Vac), 24 non-inductive amps (120/208/240 Vac), and 16 non-inductive amps (24 Vac).

Enclosure rating: NEMA Type 1.

Approvals: UL & CSA.

Wire Terminations



Supply Fan Status Sensor Submittal

Project: San Bernadino County Sherriff Station AHU
Unit Tag: AH 6

Carrier Part Number	39MA51000021
Manufacturer	Automation Components, Inc.
Manufacturer Part Number	A/MCS-A
Cable	21
Channel	UI-6
Terminal/Signal	TB3-11 / Dry Contact DI
Terminal/Signal	TB3-12 / Signal Ground

SFS

Supply Fan Status Sensor

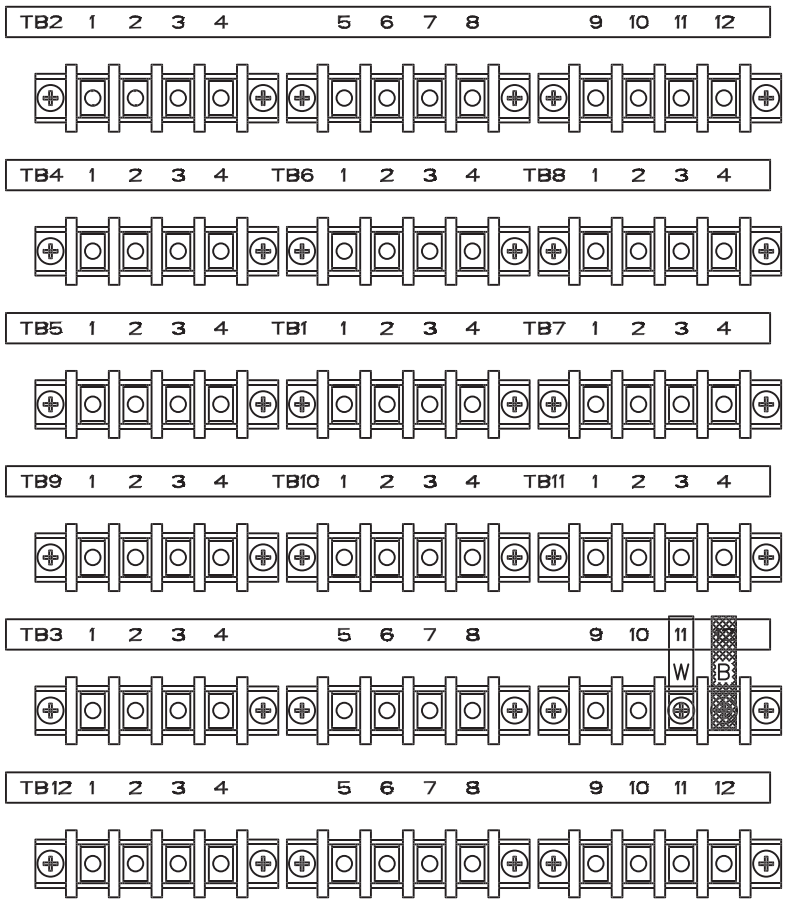
The A/MCS-A is a normally open (N/O) solid state adjustable current switch.

Outputs are non-polarity sensitive, N/O solid-state contacts for switching both AC and DC circuits up to 36 volts.

Unit includes two Status LED indicators, which signal three states:

1. Tripped on
2. Current present but below trip point
3. Current off or below the low end of the adjustable trip point range.

Wire Terminations



Return/Exhaust Fan Status Sensor Submittal

Project: San Bernadino County Sherriff Station AHU
Unit Tag: AH 6

Carrier Part Number	39MA51000021
Manufacturer	Automation Components, Inc.
Manufacturer Part Number	A/MCS-A
Cable	19
Channel	EXIN-1
Terminal/Signal	TB7-1 / Dry Contact DI
Terminal/Signal	TB7-2 / Signal Ground

RFS/EFS

Return/Exhaust Fan Status Sensor

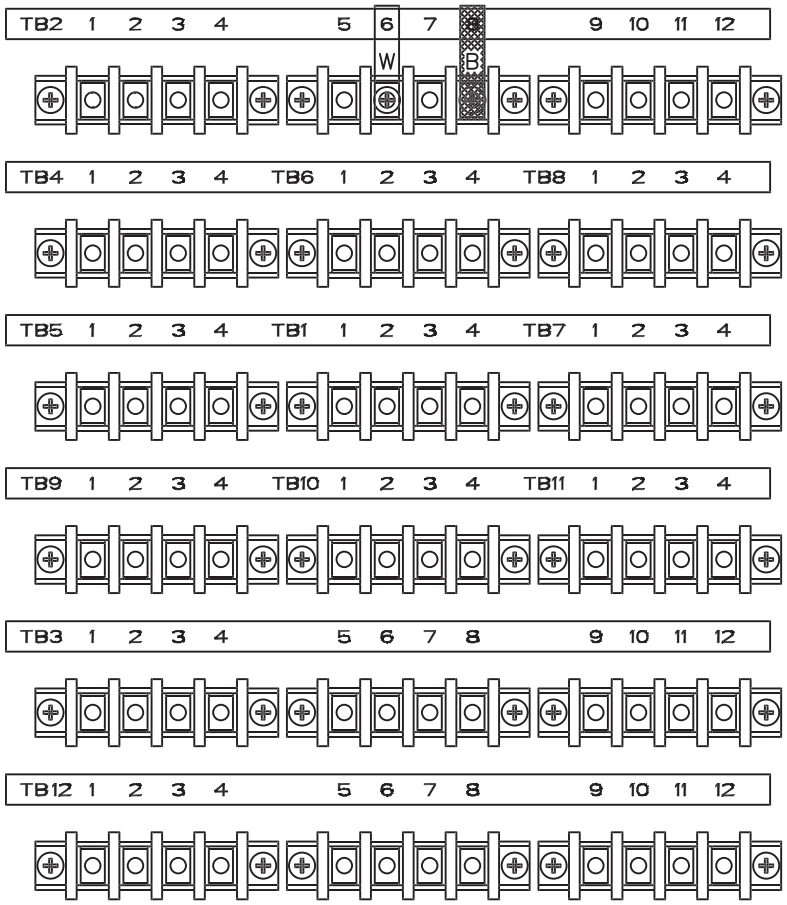
The A/MCS-A is a normally open (N/O) solid state adjustable current switch.

Outputs are non-polarity sensitive, N/O solid-state contacts for switching both AC and DC circuits up to 36 volts.

Unit includes two Status LED indicators, which signal three states:

1. Tripped on
2. Current present but below trip point
3. Current off or below the low end of the adjustable trip point range.

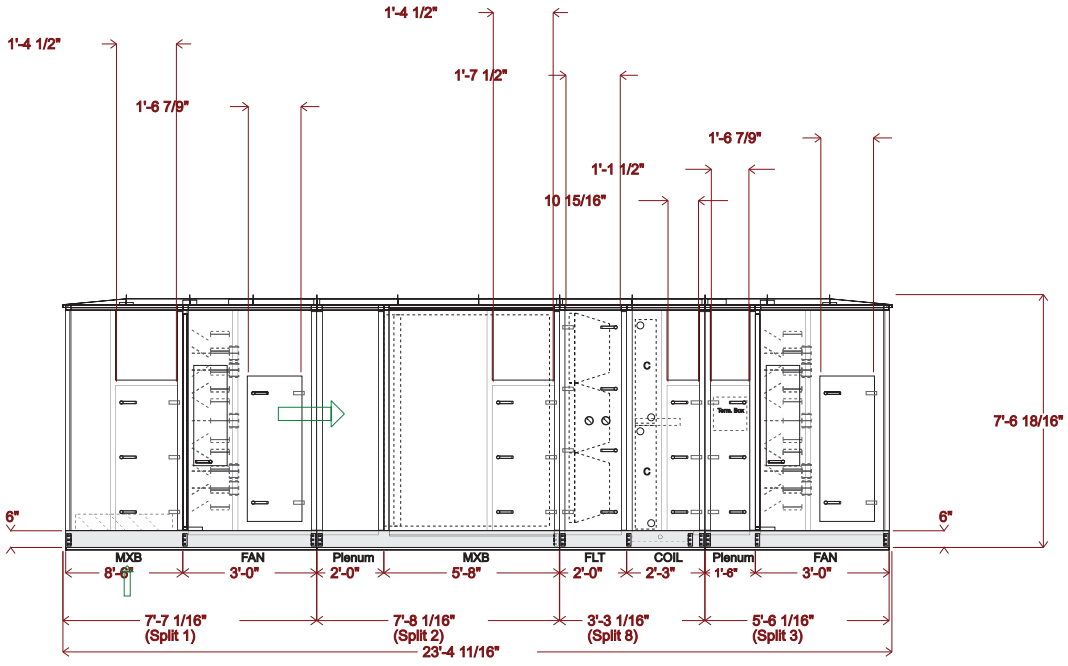
Wire Terminations



Unit width: 4'-11" (plus lifting lugs)
Return Fan
0
Bag/Cartridge Filter 6 - 12 IN. Side Loading
Qty (8) 12in. x 23in.
Qty (12) 23in. x 23in.
Pre Filter : 2In. Flat Filter
Qty (8) 12in. x 23in.

Qty (12) 23in. x 23in.
Chilled Water 6 Row 11 FPI Double Circuit (qty. 2)
Draw-Thru Supply Fan
Operating weight: 4509.0 lbs.
Upstream Corner Weight (each): 2193.0 lbs.
Downstream Corner Weight (each): 2570.0 lbs.

Split	Airway Length	Weight (lbs.)
(Split 1)	7'-7 1/16"	2572
(Split 2)	7'-8 1/16"	1401
(Split 8)	3'-3 1/16"	2936
(Split 3)	5'-6 1/16"	2140

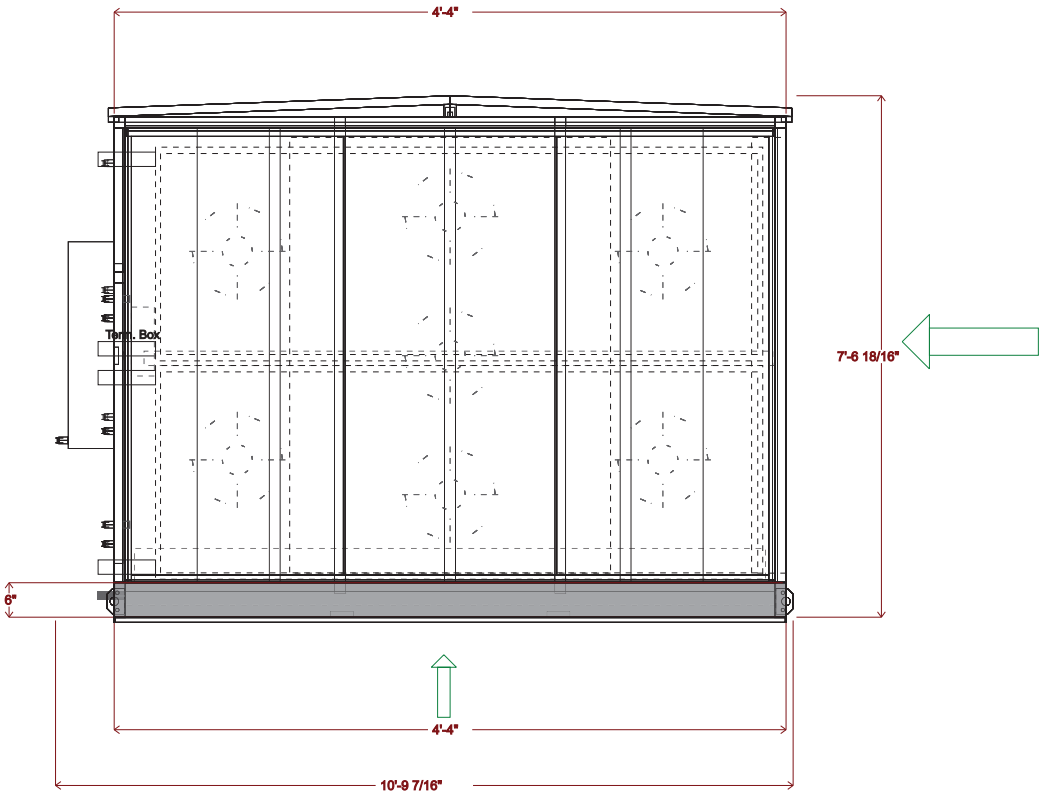


84MW

DATE	AHUBuilder	84M Central Station Air-Handler, Size 50W San Bernadino County Sherriff Station AHU: AH 6 Assembly Drawing	REVISION
12/80/2023	v7.06		Side View

Unit viewed from right side of side elevation view.
Unit length: 23'-4 11/16"
Return Fan
0
Bag/Cartridge Filter 6 - 12 IN. Side Loading
Qty (8) 12in. x 23in.
Qty (12) 23in. x 23in.
Pre Filter : 2in. Flat Filter

Qty (8) 12in. x 23in.
Qty (12) 23in. x 23in.
Chilled Water 6 Row 11 FPI Double Circuit (qty. 2)
Draw-Thru Supply Fan
Operating weight: 4509.0 lbs.
Upstream Corner Weight (each): 2193.0 lbs.
Downstream Corner Weight (each): 2570.0 lbs.

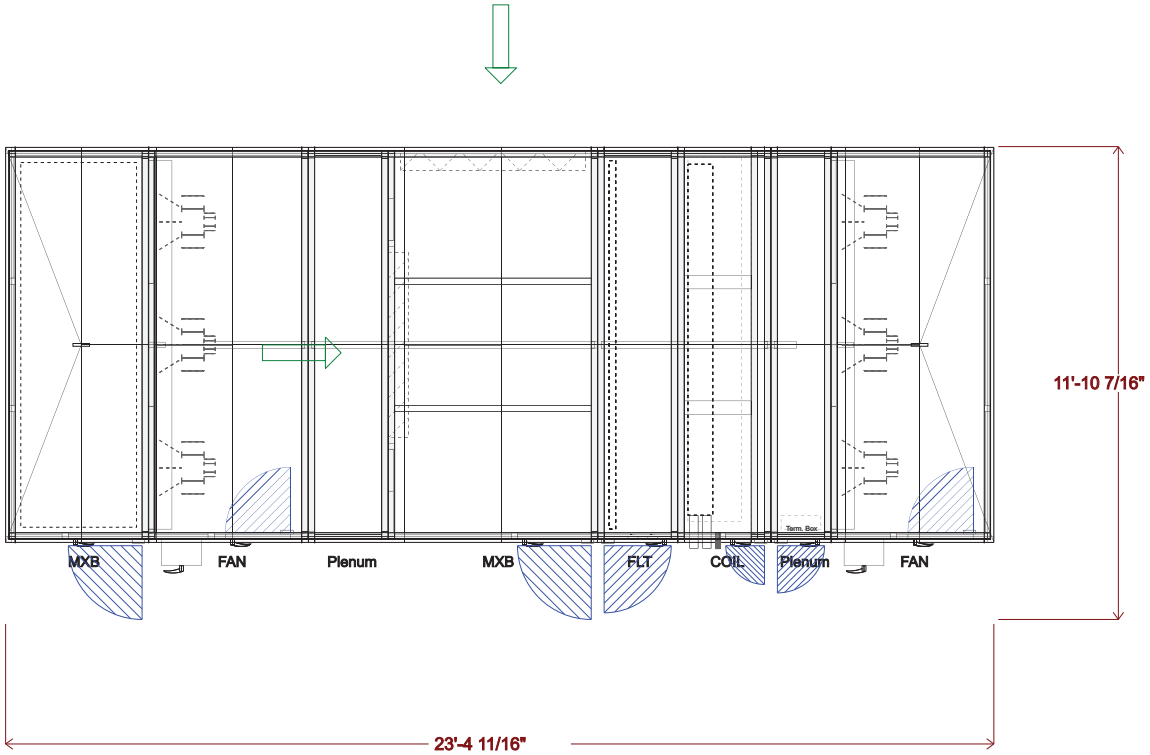


DATE	AHUBuilder	84M Central Station Air-Handler, Size 50W San Bernadino County Sherriff Station AHU: AH 6 Assembly Drawing	REVISION
12/80/2023	v7.06		End View

84MW

Unit height: 7'-6 5/16"
Return Fan
0
Bag/Cartridge Filter 6 - 12 IN. Side Loading
Qty (8) 12in. x 23in.
Qty (12) 23in. x 23in.
Pre Filter : 2In. Flat Filter
Qty (8) 12in. x 23in.

Qty (12) 23in. x 23in.
Chilled Water 6 Row 11 FPI Double Circuit (qty. 2)
Draw-Thru Supply Fan
Operating weight: 4509.0 lbs.
Upstream Corner Weight (each): 2193.0 lbs.
Downstream Corner Weight (each): 2570.0 lbs.

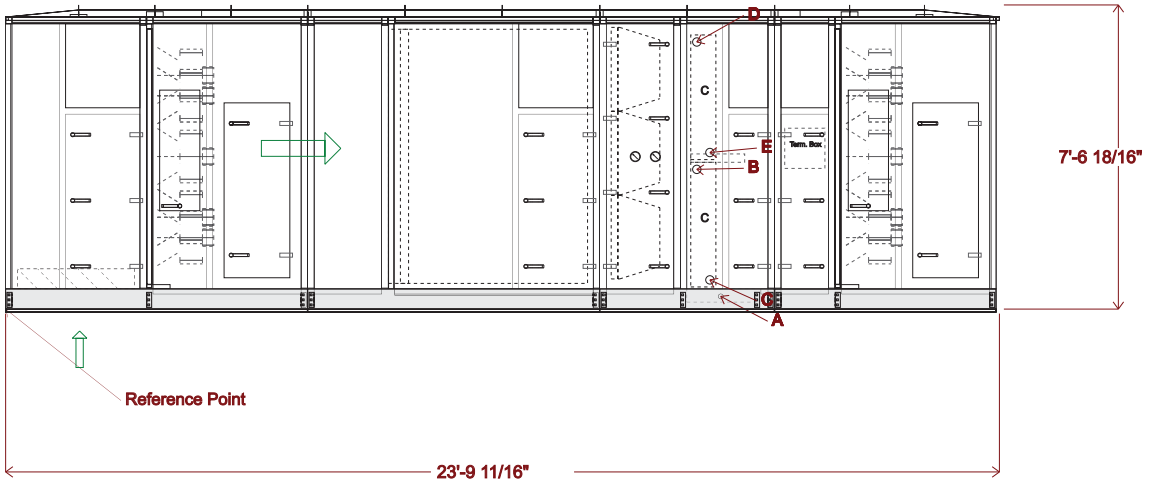


84MW

DATE	AHUBuilder	84M Central Station Air-Handler, Size 50W	REVISION
12/80/2023	v7.06	San Bernadino County Sherriff Station AHU: AH 6 Assembly Drawing	Top View

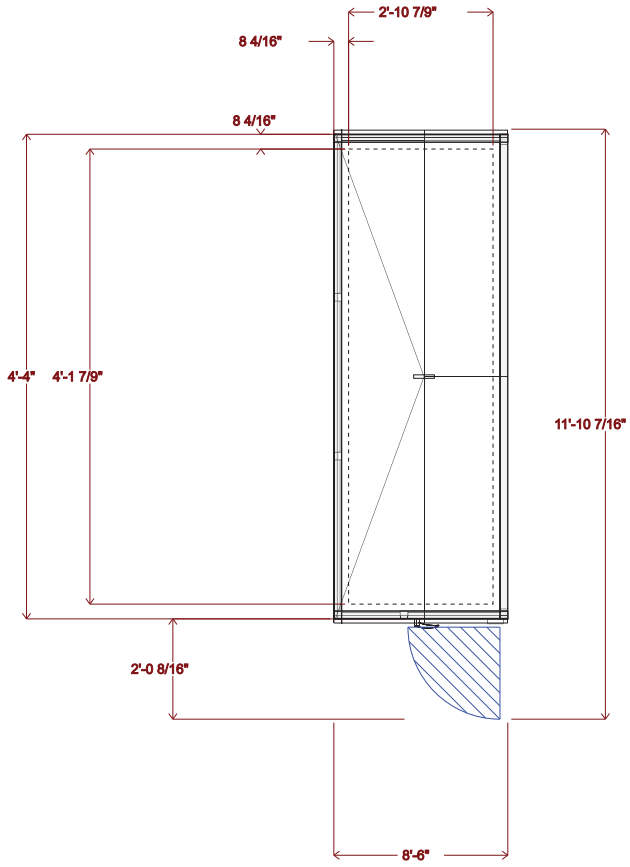
Chilled Water 6 Row 11 FPI Double Circuit (qty. 2)

Pipe	x	y	diameter	Usage
A	17'-4 1/2"	8 18/16"	1 1/2"	DrainPan
B	17'-2 5/16"	8'-5 11/16"	2 1/2"	CW Outlet
C	17'-6 1/3"	9 11/16"	2 1/2"	CW Inlet
D	17'-2 5/16"	6'-7 8/3"	2 1/2"	CW Outlet
E	17'-6 1/3"	8'-10 8/3"	2 1/2"	CW Inlet



84MW

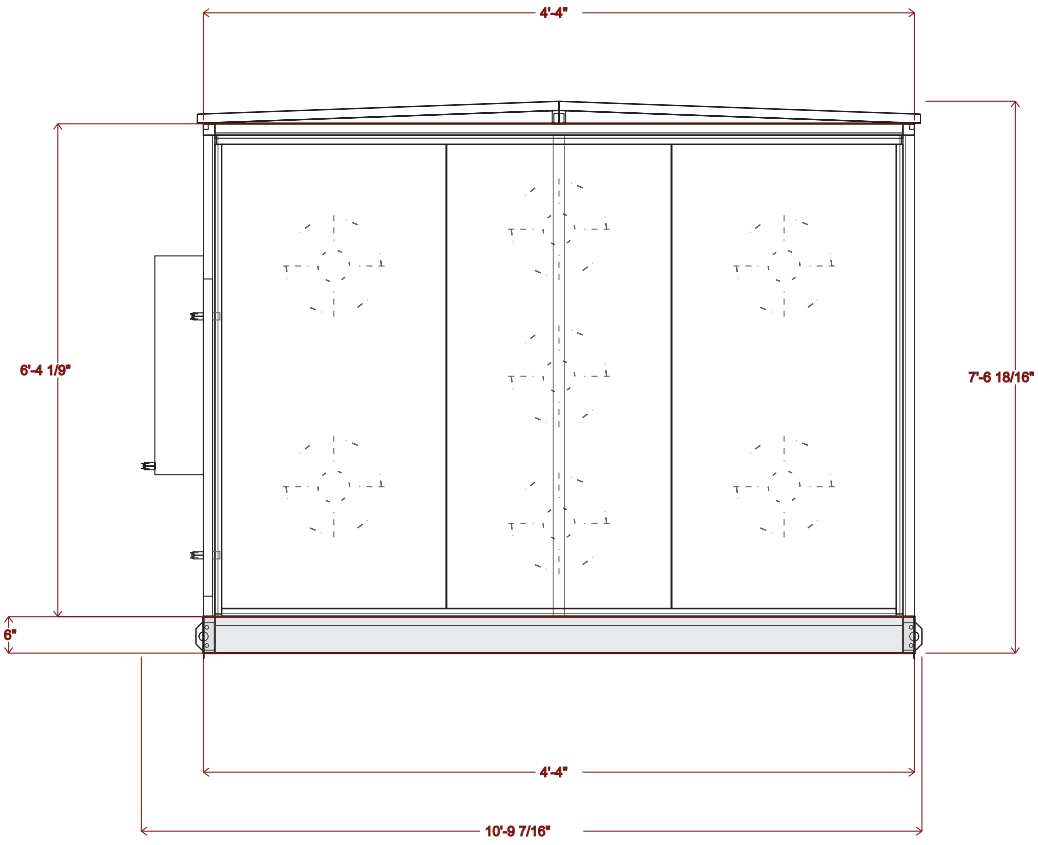
DATE	AHUBuilder	84M Central Station Air-Handler, Size 50W San Bernadino County Sherriff Station AHU: AH 6 Assembly Drawing	REVISION
12/80/2023	v7.06		Side View



DATE	AHUBuilder	84M Central Station Air-Handler, Size 50W San Bernadino County Sherriff Station AHU: AH 6 Mixing Box	REVISION
12/80/2023	v7.06		Top View

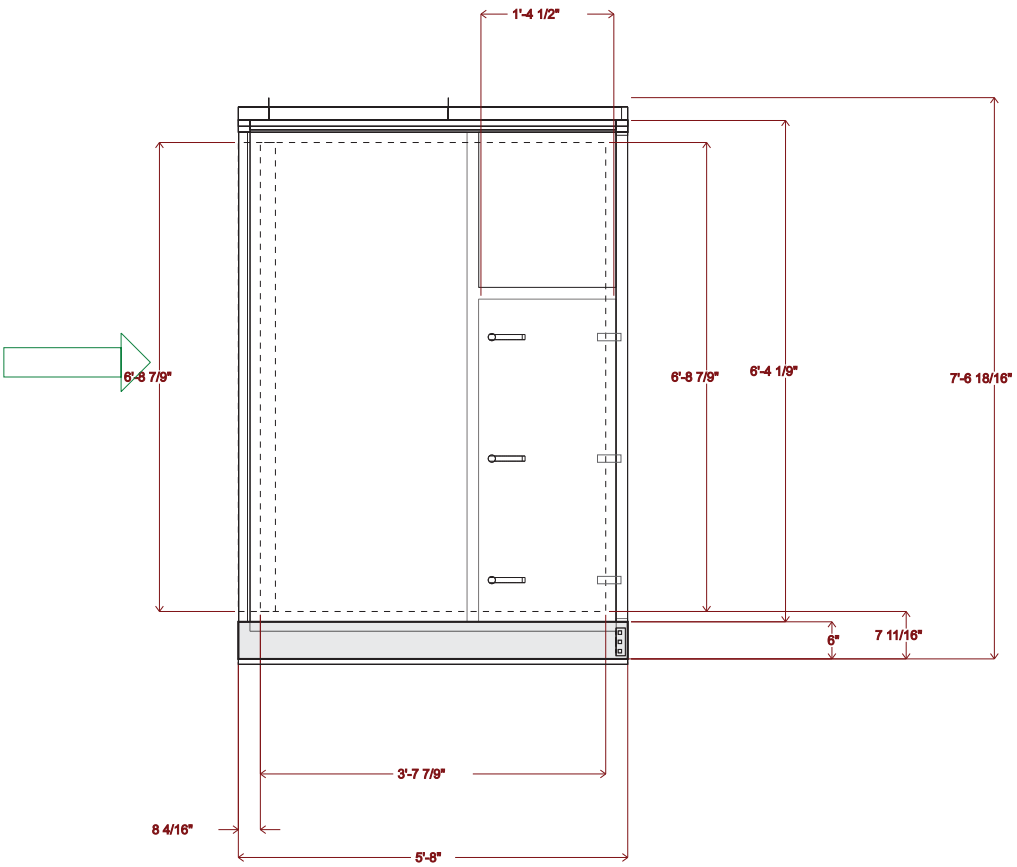
84MW

Unit viewed from right side of side elevation view.
Return Fan
0



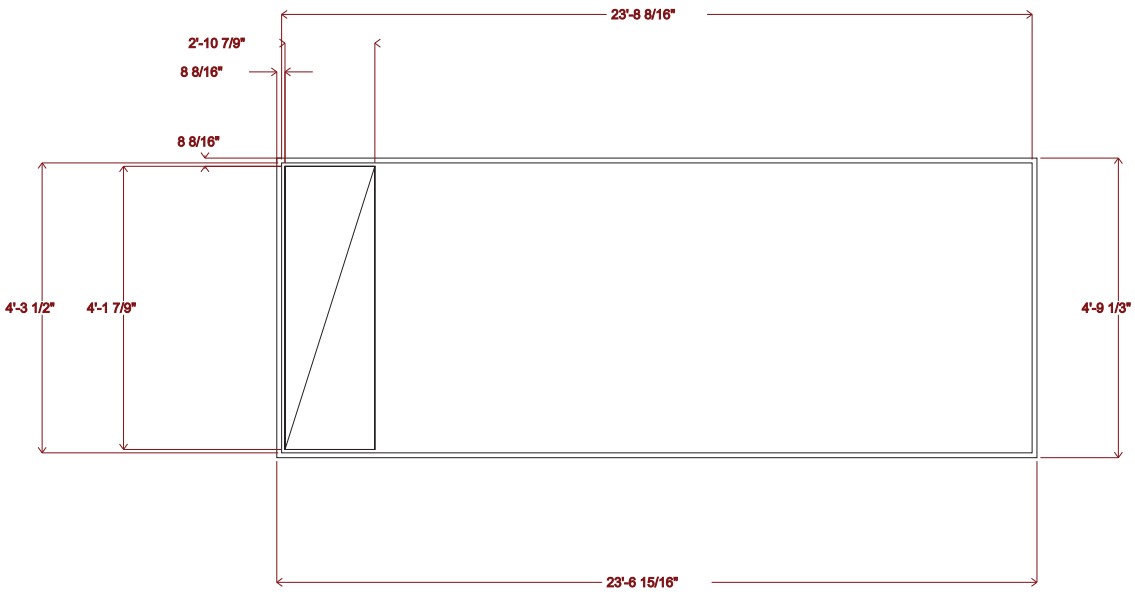
84MW

DATE	AHUBuilder	84M Central Station Air-Handler, Size 50W San Bernadino County Sherriff Station AHU: AH 6 Return Fan	REVISION End View
12/80/2023	v7.06		



DATE	AHUBuilder	84M Central Station Air-Handler, Size 50W	REVISION
12/80/2023	v7.06	San Bernadino County Sherriff Station AHU: AH 6 Mixing Box	Side View

84MW

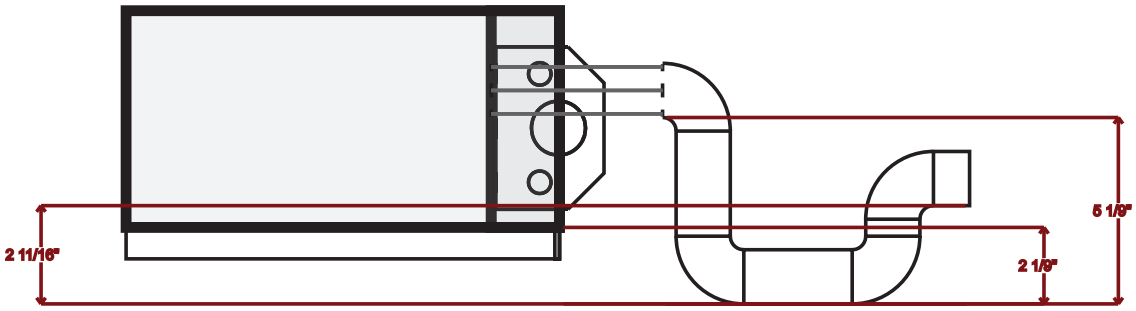


DATE	AHUBuilder	84M Central Station Air-Handler, Size 50W	REVISION
12/80/2023	v7.06	San Bernadino County Sherriff Station AHU: AH 6 Ahu Curb	Top View

Carrier

84MW

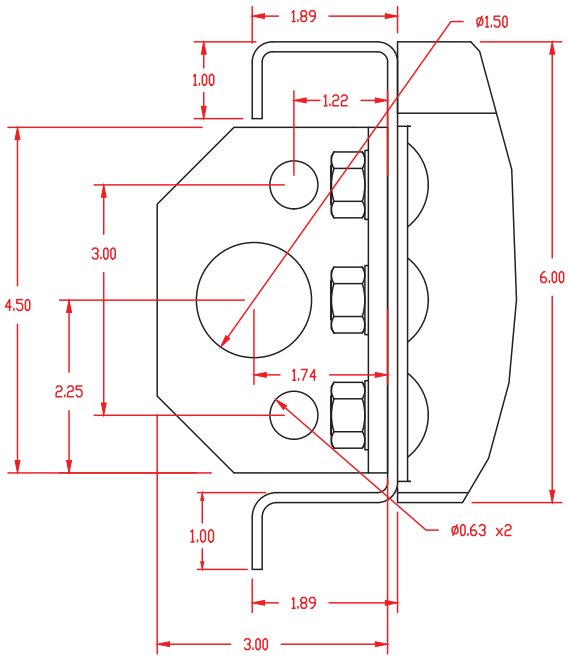
DRAW-THRU

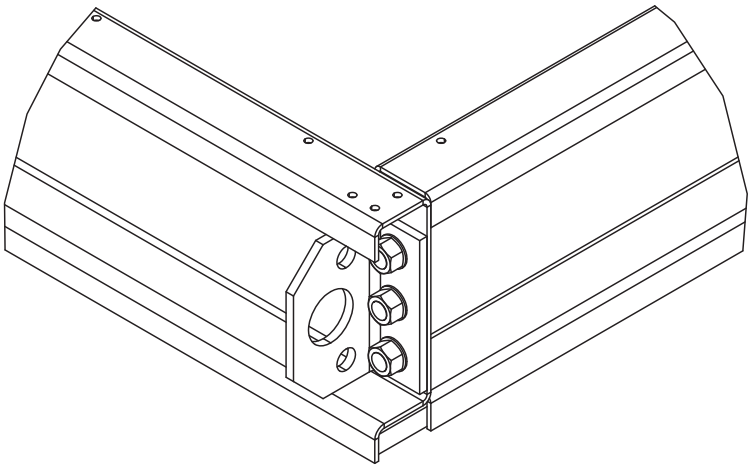


DATE	AHUBuilder	84M Central Station Air-Handler, Size 50W	REVISION
12/80/2023	v7.06	San Bernadino County Sherriff Station AHU: AH 6 Condensate Trap Dimensions	End View

Carrier

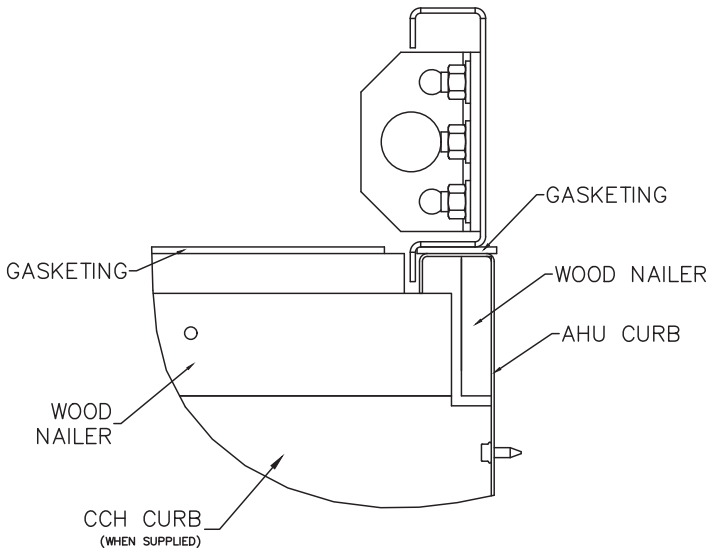
84MW

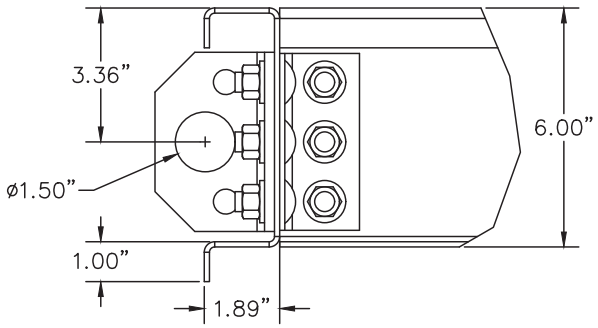


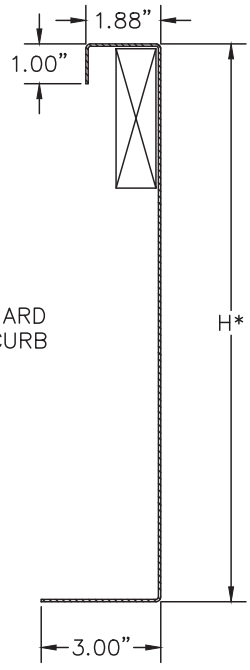


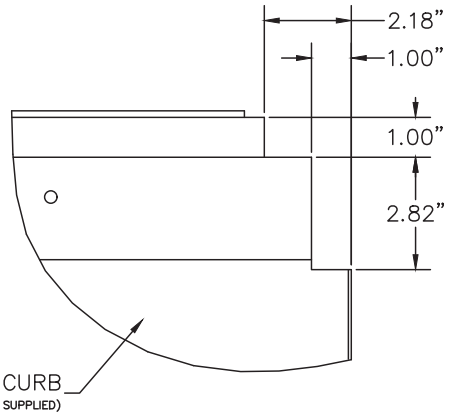
39MW

DATE	AHUBuilder	39M Central Station Air-Handler, Size: 03 - 110	REVISION
2024-12-30	v7.06	6" Baserail and Lifting Lug Detail	







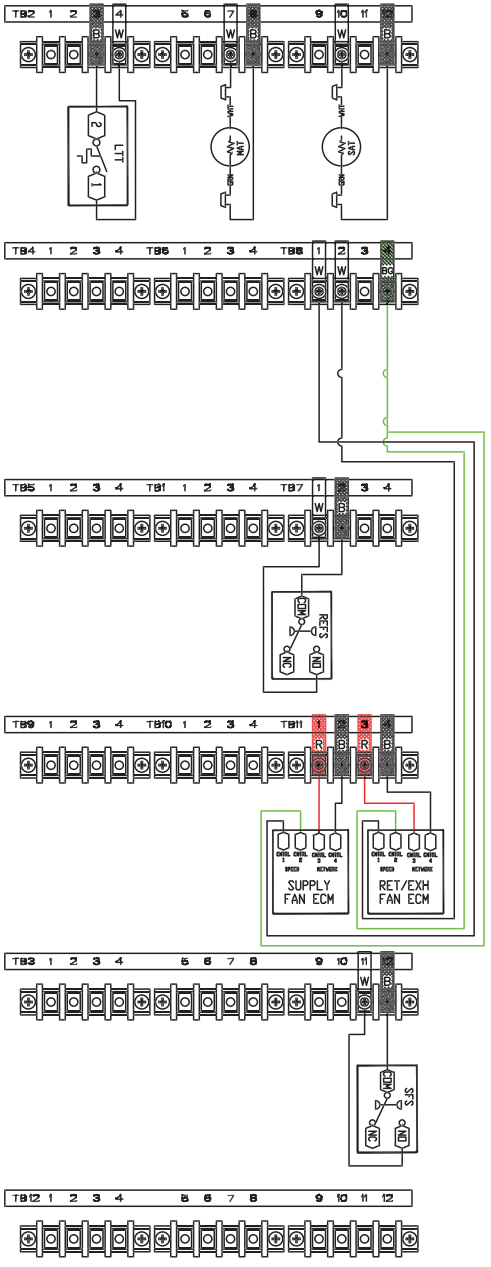


* 14" OR 24" STANDARD HEIGHT FLAT ROOF CURB

39MW

DATE	AHUBuilder	39M Central Station Air–Handler, Size: 03 – 110	REVISION
2024-12-30	v7.06	Curb, Baserail and Lifting Lug Detail	

39M



LEGEND:

⊗	TERMINAL (MARKED)
⊞	TERMINAL BLOCK
⊡	SPLICE FIELD
———	WIRING FACTORY
– – –	WIRING FIELD CONTROL

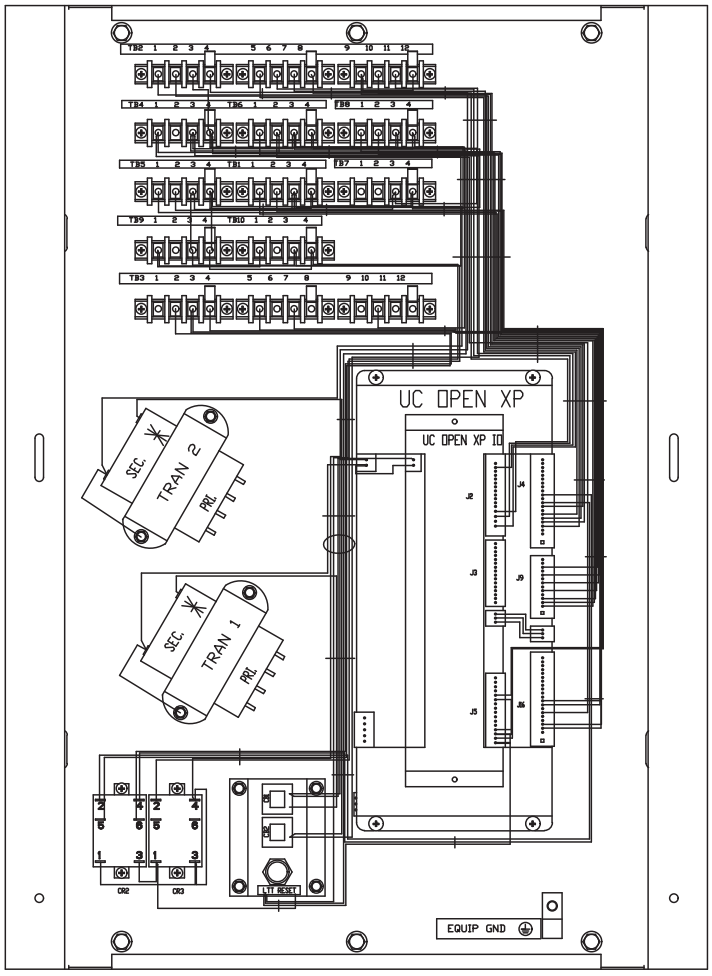
A1/A2	24VAC CONTACTOR COIL
BG	BLACK OR GREEN
CCV	COOLING COIL VALVE*
COM	COMMON
EF	EXHAUST FAN
EHEAT	ELECTRIC HEATER
ERV	ENERGY RECOVERY WHEEL
EXD	EXHAUST AIR DAMPER
FBD	FACE & BYPASS DAMPER
FLTS	FILTER STATUS SWITCH
FLTS2	FILTER STATUS SWITCH 2
HCV	HEATING COIL VALVE*
HDT	HOT DECK TEMPERATURE
HUM	HUMIDIFIER ENABLE
LTT	LOW TEMPERATURE THERMOSTAT (FREEZSTAT)
MAD	MIXED AIR DAMPER
MAT	MIXED AIR TEMPERATURE
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
OAD	OUTDOOR AIR DAMPER
PHEAT	PRE-HEAT
PHV	PRE-HEAT VALVE*
RAD	RETURN AIR DAMPER
REFS	RETURN/EXHAUST FAN STATUS
RF	RETURN FAN
SAT	SUPPLY AIR TEMPERATURE
SCR	SILICON CONTROLLED RECTIFIER
SF	SUPPLY FAN
SFS	SUPPLY FAN STATUS
SI	SIGNAL IN
S/S	START/STOP
TB	TERMINAL BLOCK TERMINAL
VFD	VARIABLE FREQUENCY DRIVE
*	FIELD SUPPLIED

REVISION

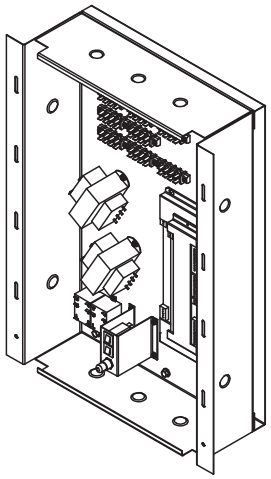
39M Central Station Air Handler, Size: 03 - 110
Factory Wired Controller Wiring Diagram

AHUBuilder
v7.06

DATE
2024-12-30



SIZE 03-06 (SHOWN)

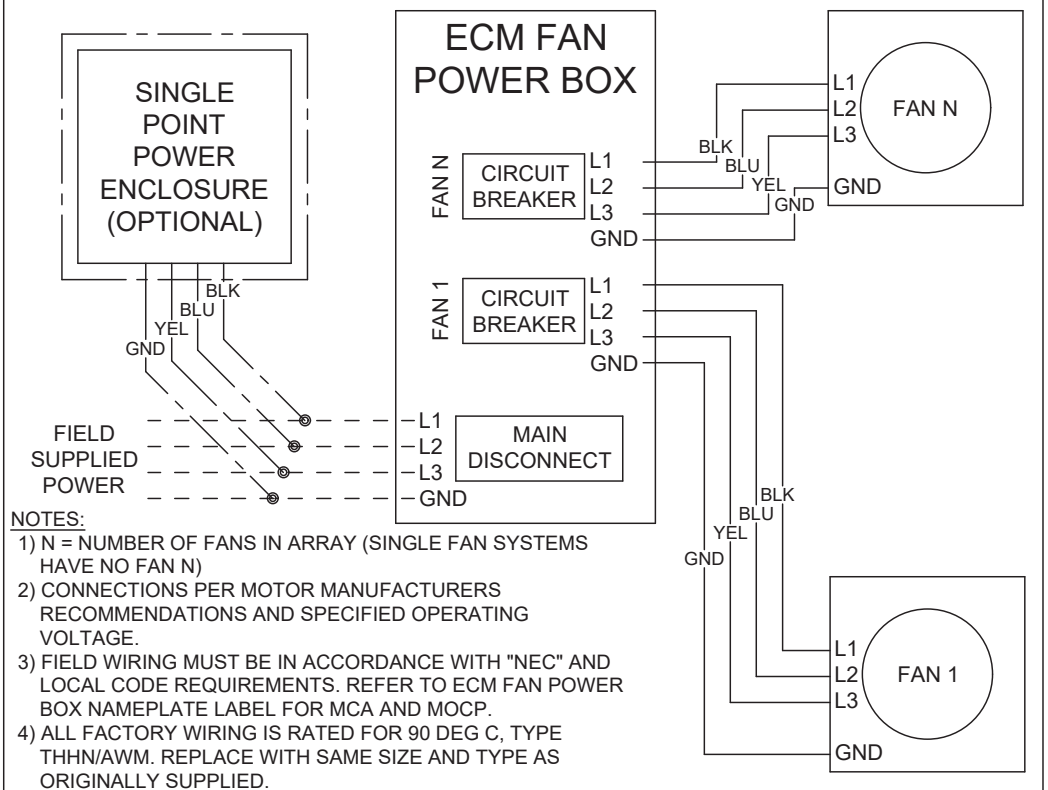


Component wiring for reference only.
When components are factory installed, wiring will be factory installed unless otherwise noted.
When components are provided by the factory for field installation, wiring is not included or installed.

DATE	AHUBuilder	39M Central Station Air-Handler, Size: 03 - 110	REVISION
2024-12-30	v7.06	Factory Wired Controller	

39M

POWER WIRING DIAGRAM
ECM FAN 3 PHASE



NOTES:

1) N = NUMBER OF FANS IN ARRAY (SINGLE FAN SYSTEMS HAVE NO FAN N)
2) CONNECTIONS PER MOTOR MANUFACTURERS RECOMMENDATIONS AND SPECIFIED OPERATING VOLTAGE.
3) FIELD WIRING MUST BE IN ACCORDANCE WITH "NEC" AND LOCAL CODE REQUIREMENTS. REFER TO ECM FAN POWER BOX NAMEPLATE LABEL FOR MCA AND MOCP.
4) ALL FACTORY WIRING IS RATED FOR 90 DEG C, TYPE THHN/AWM. REPLACE WITH SAME SIZE AND TYPE AS ORIGINALLY SUPPLIED.
5) USE COPPER CONDUCTOR SUPPLY WIRES ONLY

———— FACTORY WIRING
– – – – – – FIELD WIRING
——— – ——— OPTIONAL WIRING/EQUIPMENT
GND GREEN, GREEN-YELLOW, OR BARE COPPER

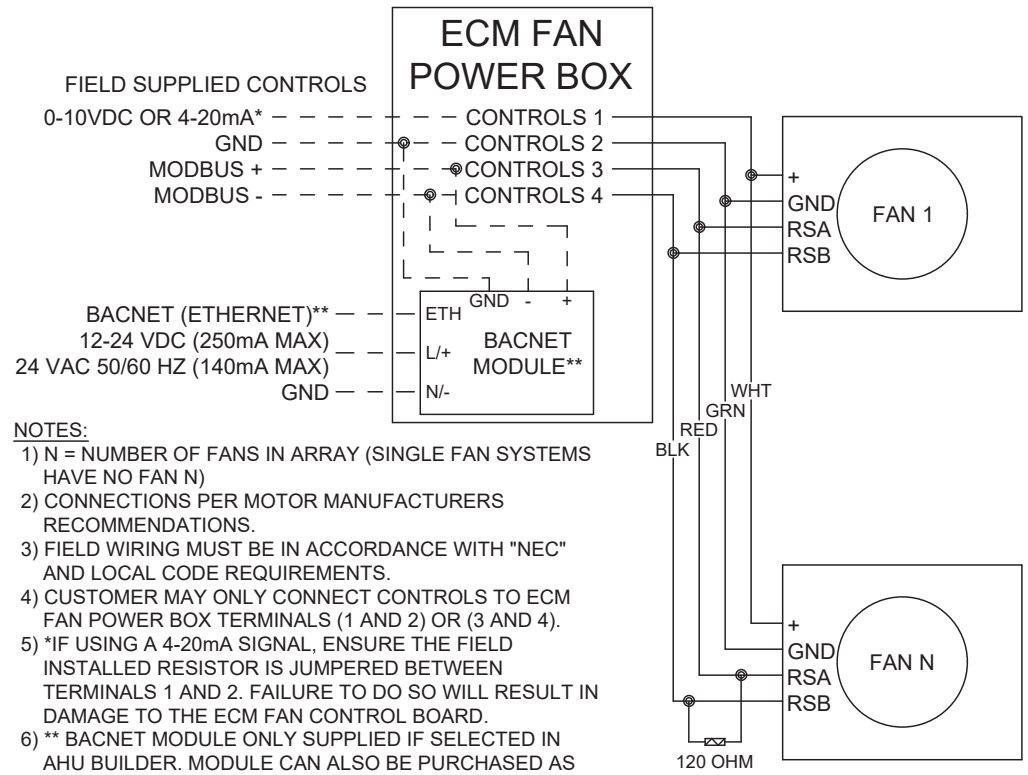
39MA51010016 REV:B

Component wiring for reference only. When components are factory installed, wiring will be factory installed unless otherwise noted. When components are provided by the factory for field installation, wiring is not included or installed.

39M

DATE	AHUBuilder	39M Central Station Air-Handler, Size: 03 - 110	REVISION
2024-12-30	v7.06	ECM Three Phase Wiring Detail	

CONTROLS WIRING DIAGRAM
ECM FAN, EBM-PAPST



NOTES:

1) N = NUMBER OF FANS IN ARRAY (SINGLE FAN SYSTEMS HAVE NO FAN N)
2) CONNECTIONS PER MOTOR MANUFACTURERS RECOMMENDATIONS.
3) FIELD WIRING MUST BE IN ACCORDANCE WITH "NEC" AND LOCAL CODE REQUIREMENTS.
4) CUSTOMER MAY ONLY CONNECT CONTROLS TO ECM FAN POWER BOX TERMINALS (1 AND 2) OR (3 AND 4).
5) *IF USING A 4-20mA SIGNAL, ENSURE THE FIELD INSTALLED RESISTOR IS JUMPERED BETWEEN TERMINALS 1 AND 2. FAILURE TO DO SO WILL RESULT IN DAMAGE TO THE ECM FAN CONTROL BOARD.
6) ** BACNET MODULE ONLY SUPPLIED IF SELECTED IN AHU BUILDER. MODULE CAN ALSO BE PURCHASED AS AN ACCESSORY AND FIELD INSTALLED.

\+ AIN 1 U / IO2, MOTOR SPECIFIC
——— FACTORY WIRING
– – – – – – FIELD WIRING

39MA51010018 REV:C

Component wiring for reference only. When components are factory installed, wiring will be factory installed unless otherwise noted. When components are provided by the factory for field installation, wiring is not included or installed.

39M

DATE	AHUBuilder	39M Central Station Air-Handler, Size: 03 - 110 ECM Controls Wiring Diagram - EBM Pabst	REVISION
2024-12-30	v7.06		

Air Filter Submittal

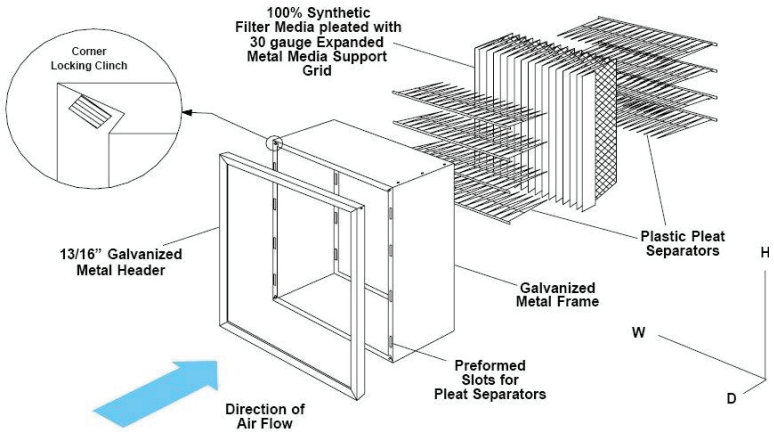
Project: San Bernadino County Sherriff Station AHU
Unit Tag: AH 6

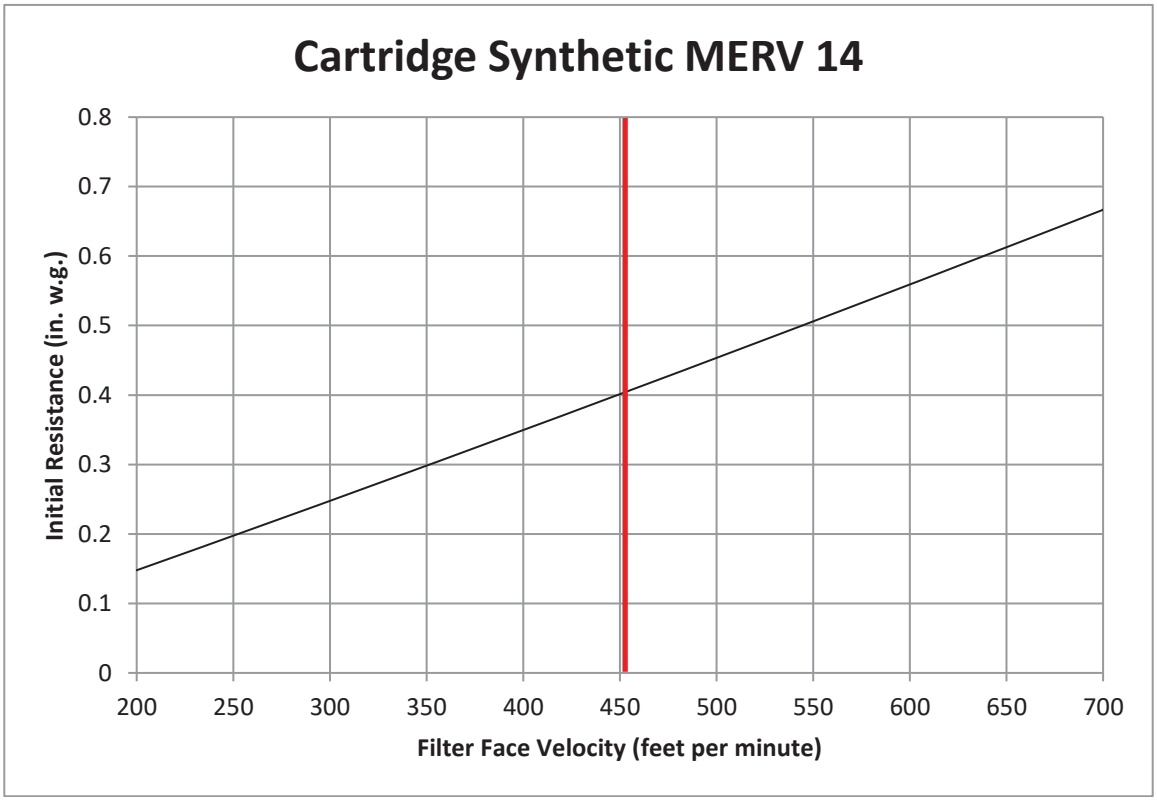
Carrier Part Number	31KB50312241224244
Kit Description	Filter Kit
Unit Airflow, CFM	24500
Filter Velocity, FPM	454
Filter Sizes and Quantities	Qty (3) 12in. x 24in., Qty (12) 24in. x 24in.

DFpro

Synthetic Cartridge Filter

DFpro rigid filters are designed to provide consistent high efficiency filtration in constant and variable air volume systems. Deep pleats are held firmly in place with plastic separators and expanded metal backing. Every edge of the media pack is glued inside the periphery of the frame to prevent air and dust bypass. The media and separators are 100% polypropylene to resist moisture damage, microbial growth, and puncture damage. Heavy gauge galvanized frame resists corrosion and maintains its structural integrity for extended months of service.





Air Filter Submittal

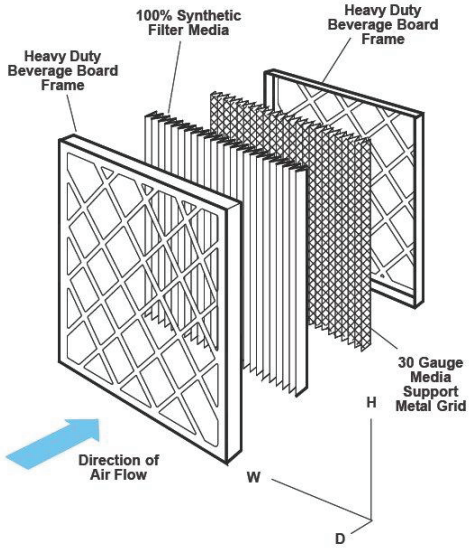
Project: San Bernadino County Sherriff Station AHU
Unit Tag: AH 6

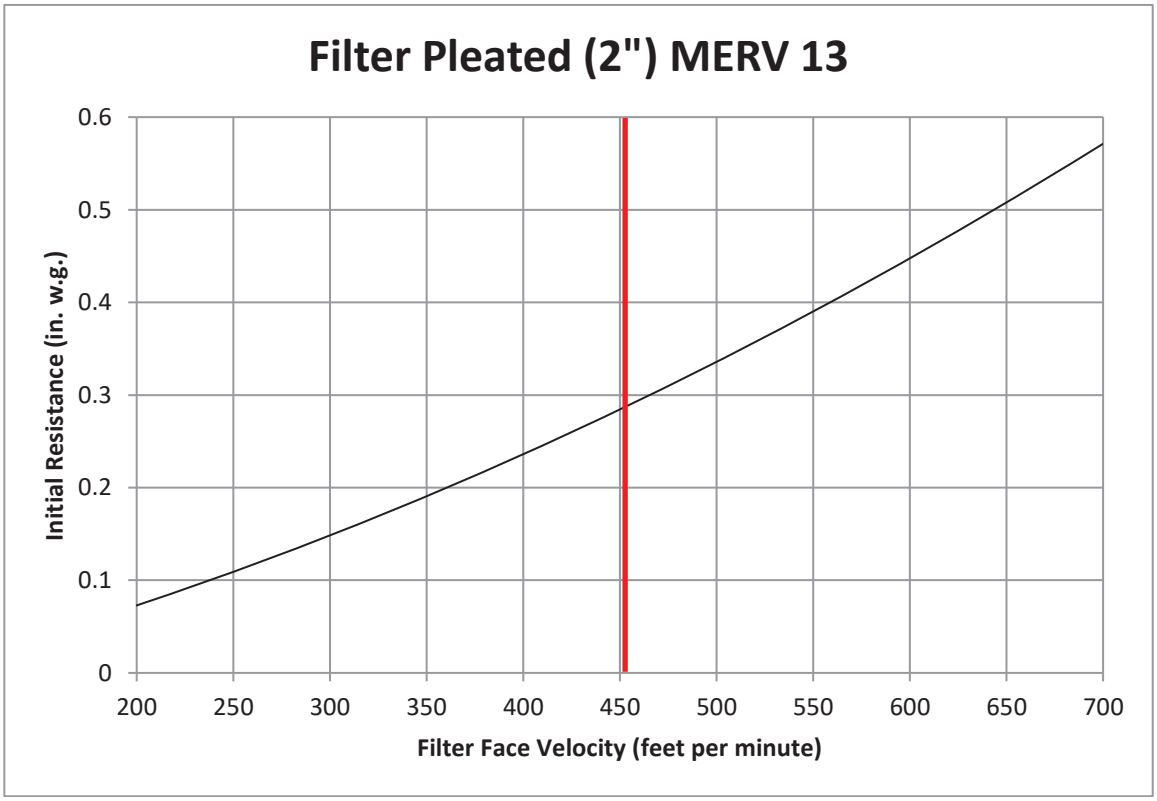
Carrier Part Number	31K2C0312241224244
Kit Description	Filter Kit
Unit Airflow, CFM	24500
Filter Velocity, FPM	454
Filter Sizes and Quantities	Qty (3) 12in. x 24in., Qty (12) 24in. x 24in.

DFpro

MERV 13 Pleated Filter

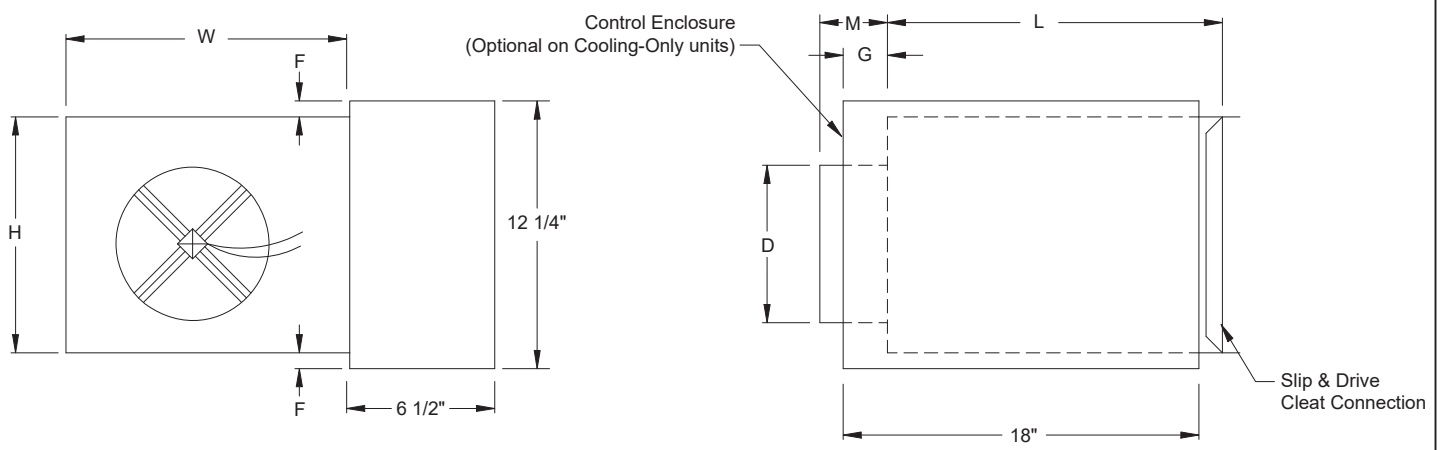
The 100% synthetic graduated density media is continuously bonded to a 30 gauge galvanized, corrosion resistant, expanded metal support grid with an effective open area of 96%. The media is resistant to a wide range of chemicals, does not absorb moisture and will not support microbial growth.
The controlled pleat spacing maximizes surface area and dust holding capacity and is bonded to the enclosure frame to prevent dust bypass. The enclosure frame is constructed of high wet strength moisture resistant beverage board. The diagonal support members of the frame are bonded to the entering and exiting apexes of each pleat to prevent pleat collapse and filter bowing.





DESV

Single Duct Terminal Unit
Direct Digital Control, Pressure Independent



Right hand unit shown. All dimensions are in inches.

Inlet Size	CFM Range	D	F	G	H	L	M	W
4	0-225	3 7/8	2 1/8	7 3/8	8	15 1/2	5 3/8	12
5	0-350	4 7/8	2 1/8	7 3/8	8	15 1/2	5 3/8	12
6	0-500	5 7/8	2 1/8	7 3/8	8	15 1/2	3 3/8	12
7	0-650	6 7/8	1 1/8	7 3/8	10	15 1/2	3 3/8	12
8	0-900	7 7/8	1 1/8	7 3/8	10	15 1/2	3 3/8	12
9	0-1050	8 7/8	-	5 3/8	12 1/2	15 1/2	3 3/8	14
10	0-1400	9 7/8	-	5 3/8	12 1/2	15 1/2	3 3/8	14
12	0-2000	11 7/8	-	5 3/8	15	15 1/2	3 3/8	16
14	0-3000	13 7/8	-	3 3/8	17 1/2	15 1/2	3 3/8	20
16	0-4000	15 7/8	-	3 3/8	18	15 1/2	3 3/8	24
24 x 16	0-8000	23 7/8 x 15 7/8	1 1/8	5 3/8	18	15	3 3/8	38

Accessories (Optional)

Check ☑ if provided.

- ☐ 24 V Control Transformer
- ☐ Dust Tight Enclosure Seal
- ☐ Fibre Free Liner
- ☐ ½" EcoShield Liner
- ☐ ½" Fibre Free Liner
- ☐ 1" Fiberglass Liner
- ☐ 1" EcoShield Liner
- ☐ 1" Fibre Free Liner
- ☐ Low Leakage Seal/Test/Certify
- ☐ SteriLoc Liner
- ☐ UltraLoc Liner
- ☐ ½" EcoShield Liner (Foil Face)
- ☐ 1" EcoShield Liner (Foil Face)
- ☐ Disconnect Switch
- ☐ Hanger Brackets
- ☐ Removable Air Flow Sensor
- ☐ Bottom Access Door
- ☐ OSP & IBC Certification
- ☐ Red List Compliant "Google" Gasketing
- ☐ _____

General Description

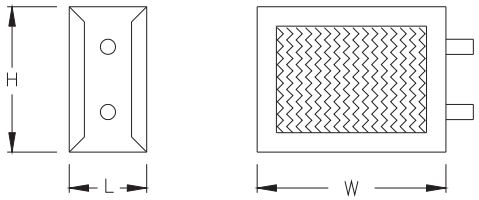
- Heavy gauge steel housing. Mechanically sealed and gasketed, leak resistant construction. Less than 2% of nominal cfm at 1.5" sp wg.
- Dual density internal insulation, treated to resist air erosion. Meets requirements of NFPA 90A and UL 181.
- Rectangular discharge opening is designed for slip and drive cleat duct connection.
- Multipoint center averaging inlet velocity sensor.
- Digital control packages can be factory mounted by Titus.
- Choice of right hand or left hand control location.
- Model DESV can be installed horizontally, vertically, or at any angle. Operation is not affected by position.
- Gauge tees for cfm measurement.
- OSHPD Seismic Certification: OSP-0352-10
- Only Titus Alpha digital controls package approved for seismic installation.

Accessories (Optional)

☐ Hot Water Coil Section

- Aluminum ripple fins, 10 per inch
- Coil pipe connections are male, sweat, type "L" copper. Connection sizes are ½" OD for 1 row coil unit sizes 04-08. All other coils have $^{7}/_{8}$" OD.
- Coil is installed at discharge of unit.
- On units with attenuators, coil are installed at the discharge of attenuator.

☐ 1 Row
☐ 2 Row
☐ 3 Row
☐ 4 Row



☐ Electric Coil Section ☐ Optional SCR Controlled Electric Heater ☐ Optional Lynergy Controlled Electric Heater

Standard Features

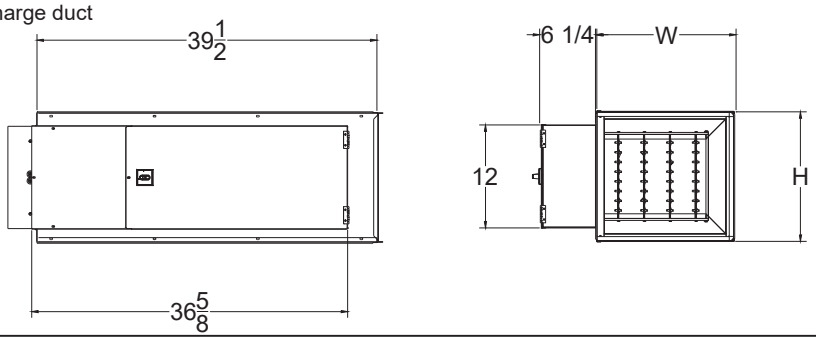
- Single side access to low voltage, high voltage, and electric heater controls.
- Automatic reset thermal cutouts, one per element
- Manual reset secondary protection.
- Positive pressure flow switch
- Magnetic contactor for each step.
- Slip and drive cleat discharge duct connection.

Options

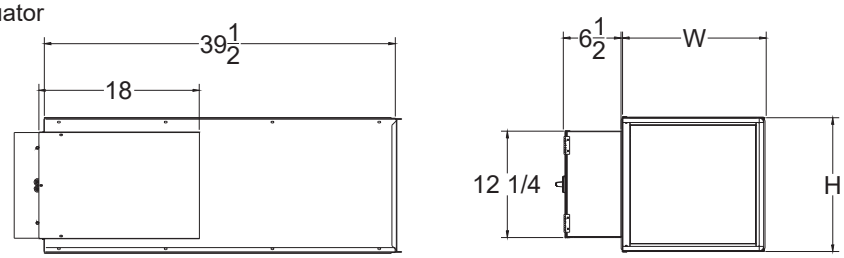
☐ Fuse Block
☐ Disconnect switch, door interlock type
☐ Dust tight construction
☐ Mercury contactors

Supply Voltage

☐ 120V, 1 ph, 60Hz
☐ 208V, 1 ph, 60Hz
☐ 240V, 1 ph, 60Hz
☐ 277V, 1 ph, 60Hz
☐ 208V, 3 ph, 60Hz
☐ 480V, 3 ph, 60Hz (4 wire wye standard)



☐ Integral Sound Attenuator



Inlet Size	H	W	Water Coil	
			L (1-2 Row)	L (3-4 Row)
4	8	12	5	7 1/4
5	8	12	5	7 1/4
6	8	12	5	7 1/4
7	10	12	5	7 1/4
8	10	12	5	7 1/4
9	12 1/2	14	5	7 1/4
10	12 1/2	14	5	7 1/4
12	15	16	5	7 1/4
14	17 1/2	20	7 1/2	9 3/4
16	18	24	7 1/2	9 3/4
24 x 16	18	38	5	7 1/4

The total length of the DESV unit is the summation of the unit length (with or without attenuator) and the length of the optional water coil.

Marvair®
An ACS Brand

WALL MOUNT HEAT PUMP PRODUCT DATA SHEET

1.5 to 5 Ton Vertical Packaged High Efficiency Wall Mount Heat Pumps

MAH1020H-1024H-1030H-1036H-1042H-1048H-1060H (Single Stage Cooling)
MAH2024H-2030H-2036H-2042H-2048H-2060H (2-Stage Cooling)

General Description

The Marvair® MAH family of wall mounted heat pumps are the ideal HVAC system for a wide variety of applications. The exterior mounting means that no valuable interior space is required. Marvair MAH heat pumps are packaged units – the refrigerant piping and internal wiring are factory assembled and thoroughly tested. All components are readily accessible for easy service and maintenance. The energy efficient operation keeps operating costs to a minimum and makes the Marvair heat pumps ideal problem solvers for a wide variety of applications, including offices, classrooms and telecommunication shelters.

➤ **Marvair Heat Pumps Are Available To Meet Any Budget Or Efficiency Requirement:**

- **MAH Single Stage Models**
  Marvair heat pumps meet all federal efficiency requirements with an Energy Efficiency Ratio (EER) of 11. Single stage Marvair MAH heat pumps are available in cooling capacities of 1½, 2, 2½, 3, 3½, 4 & 5 tons (20,000 to 60,000 BTUH).
- **MAH 2-Stage Models**
  These models feature a 2-stage compressor which can reduce energy costs by more precisely matching the cooling capacity to the heat load with first stage cooling approximately 65% of the total cooling capacity. This results in Energy Efficiency Ratios (EER's) of up to 11.00 and an Integrated Part Load Value (IPLV) of up to 15.00. MAH 2-Stage models are available in cooling capacities of 2, 2½, 3, 3½, 4 & 5 tons (24,000 to 60,000 BTUH).

➤ **Outside Air for Ventilation or Free Cooling**

A full range of accessories and options allows Marvair heat pumps to be optimized for each application. For classrooms, a complete range of ventilation options are available to meet the fresh air requirements of the ASHRAE 62 standard, "Ventilation for Acceptable Indoor Air Quality". Where cooling is required during cool or cold weather, e.g., telecommunications shelters, a factory installed economizer should be used. To insure proper operation and optimum performance, all outside air ventilation packages are non-removable, factory installed and factory calibrated.

➤ **Safety Listed and Energy Certified**

All Marvair heat pumps conform to UL/CSA standard 60335-1 and 60335-2-40 and CAN/CSA C22.2, No. 236-11 Ed.4. For energy efficiency and performance, the units are tested and rated in accordance to the ANSI/AHRI (Air-Conditioning Heating and Refrigeration Institute) Standard 390 (Single Package Vertical Units). All units meet or exceed the efficiency requirements of ANSI/ASHRAE/IESNA 90.1.2016. Marvair heat pumps are commercial units and are not intended for use in residential applications.

MAH1036H

AHRI CERTIFIED® www.ahridirectory.org CE c ETL us Intertek Designed, Engineered & Assembled In the USA

Features and Benefits

Meets DOE Efficiency Requirements

- *All Models 11EER*
- *All Models 3.3 COP*

Next Generation R-454B Refrigerant

- *78% Lower GWP than R-410A*
- *Non-Ozone Depleting Refrigerant*
- *Synthetic Lubricant*
- *Reduced Compressor Wear*

High Efficiency and Reliability

- *No Wall Mount Heat Pump is More Efficient*
- *Optional Economizer Reduces Energy Usage*
- *High Efficiency Compressor and Lanced Coil Fins*
- *Liquid Line Temperature Monitoring & Control*
- *Suction Line Temperature Monitoring & Control*

Ease of Installation and Service

- *Single Point Power Entry*
- *Built-In Mounting Flanges and Internal Disconnect*
- *Standard Access Valves and Filters, Status LEDs*

Marvair Heat Pump Features

➤ **High Efficiency**

- Scroll compressors are standard on all units.
- Lanced fins and rifled tubing on the indoor & outdoor coils maximize heat transfer.
- Electronically commutated indoor blower motor on all models

➤ **Engineered Reliability with On Board Configuration Menu and Fault Notification.**

- PC board simplifies wiring, consolidates several of the electrical functions in one device.
- High refrigerant pressure switch with lockout relay protects the compressor in the event of insufficient condenser air flow.
- High pressure switch and low pressure sensor with lockout protects refrigerant circuit.
- Time delay for short cycle protection.

➤ **Ease of Installation**

- Sloped top with flashing eliminates need of rain hood.
- Built-in mounting flanges facilitate installation and minimize chance of water leaks.
- Factory installed phase monitor is standard on all 3Ø units and will turn the air conditioner off if power supply is not phased properly.
- Factory installed disconnect on all units, including 460v. models.
- Outside air hood included with each unit.
- Single Point Power Entry Complies with latest edition of U.L. Standard 60335-2-40.

➤ **Rugged Construction**

- Baked on beige finish over galvaneel steel on exterior sheet metal.
- Copper tube, aluminum fin evaporator and condenser coils.
- Corrosion resistant Dacromet® external fasteners.

➤ **Designed for Operation on Generator Power**

- All Marvair single & three phase air conditioners are designed to operate on Generator Power. See *Summary Electrical Ratings* for your specific model

➤ **Ease of Service**

- Control board on-board display indicates fault conditions.
- Refrigerant access valves are standard
- All major components are readily accessible
- Front control panel allows easy access and complies with NEC clearance codes on side by side units.
- Major components accessible from either side.

Options for Outside Air for Ventilation

ASHRAE standard 62 requires 15 cfm of outside air per occupant of a classroom. To meet this requirement, Marvair offers seven ventilation packages for every budget and requirement.

➤ **Configuration "C": Up to 100% Modulating Economizer**

The economizer reduces the cost of air conditioning by using outside air when acceptable to cool the room (Free Cooling). The factory installed Marvair® economizer has integral pressure relief.

Control Board Logic: Upon a "Call for Cooling", the economizer control board calculates whether the HVAC operates in economizer mode or mechanical cooling mode based on outdoor temperature (dry bulb) or temperature/humidity (enthalpy). When outdoor conditions are favorable for economizer cooling , the damper drives open and modulates to maintain a 55ºF mixed air temperature through the supply grille. When outdoor conditions are not favorable for economizer cooling, the economizer damper remains closed, and the HVAC unit will operate in mechanical cooling mode.

Features Designed for Telecommunication applications:
Hydrogen Fault Input: When 24VAC is applied to the Emergency Ventilation (EV) input, the economizer board forces the damper to open 100% for emergency ventilation. The compressor does not operate during Hydrogen Fault/ Emergency Ventilation.

Forced Mechanical Cooling: When 24VAC is applied to the FC input of the economizer board, the economizer damper is forced closed, and the HVAC will operate in mechanical cooling mode. This is considered as economizer override in the event economizer cooling is not sufficient for the heat load. Thermostat must provide the fan "G" signal to HVAC to activate the indoor blower.

Economizer Status: The economizer board has contacts that when used with the Marvair CommStat 4 Telecom HVAC Controller, change state to provide feedback to the CommStat 4 to indicate when the HVAC is in economizer mode verses mechanical cooling mode. This feedback allows the CommStat 4 to initiate the forced cooling feature to override economizer cooling and force mechanical cooling.

When used with minimum position potentiometer (optional), the Marvair® economizer can meet requirements of ASHRAE Std. 62.

➤ **Configuration "D": Two-Position Motorized Fresh Air Damper w/Pressure Relief Ventilation**

Control Board Logic: The 92589 control board allows the position of the "D" damper to be set for desired outside air intake from fully closed to fully open. Setting 15 of the control board configuration menu allows the user to set the position from 20 (2VDC / Closed) to 100 (10VDC 100% open). The damper position can be adjusted in 1VDC increments to any position from closed to 100% open as required.

Operation: Anytime the indoor blower operates, the damper drives open to the position selected in the control board configuration menu setting 15. When the indoor blower stops operation the motorized damper spring returns to the fully closed position.

Note: This circuit does not interrupt the compressor or heater operation.

➤ **Configuration "E": Two-Position Motorized Fresh Air Damper w/Pressure Relief Ventilation & Independent Control**

Control Board/Factory Installed Relay Logic: The 92589 control board allows the position of the "E" damper to be set for desired outside air intake from fully closed to fully open. Setting 15 of the control board configuration menu allows the user to set the position from 20 (2VDC / Closed) to 100 (10VDC 100% open). The damper position can be adjusted in 1VDC increments to any position from closed to 100% open as required.

Operation: Upon a "Call for Motorized damper" via a 24V signal from an external user-installed device, the motorized damper opens to the position selected in the control board configuration menu setting 15 and the indoor blower operates. A 24VAC signal {sourced from LVTB 24VAC "R" and supplied through a user-provided Normally Open (NO) contact} activates (opens) the Motorized Damper and connected Relief Damper. When the 24VAC signal is removed, the motorized damper spring returns to the fully closed position and the indoor blower stops operation. The motorized damper Does NOT open when there is a call for the indoor fan (G).

Note: This circuit does not interrupt the compressor or heater operation.

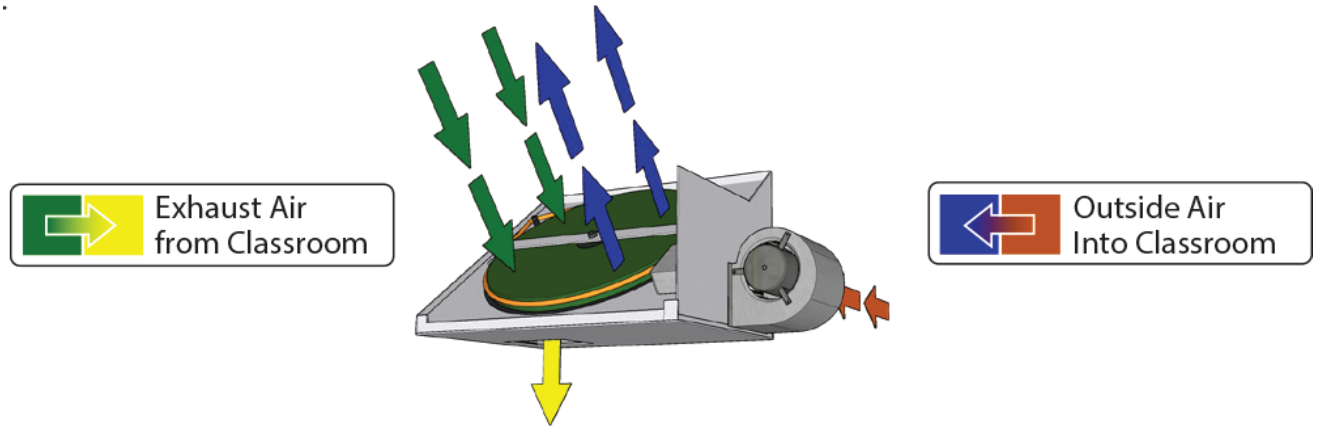
➤ **Configuration "H": GreenWheel® ERV Energy Recovery Ventilator *(Optional only for MAH1030/2030 - MAH1060/2060)***

Allows independent control of the exhaust and intake blowers. When used, the standard speed controller operates the intake blower and the optional second controller, the exhaust blower. Individual blower control allows positive pressurization of the classroom. Field or factory installed.

The Marvair GreenWheel® ERV is a total energy (both sensible and latent) wheel that reduces both construction and operating cost while ventilating the classroom to ASHRAE 62-1999 requirements. The use of the GreenWheel ERV reduces the energy load of the outside air. Exhausting stale, inside air keeps indoor pollutants and harmful gases to a minimum. The Marvair GreenWheel ERV has been tested and certified according to ARI Standard 1060.

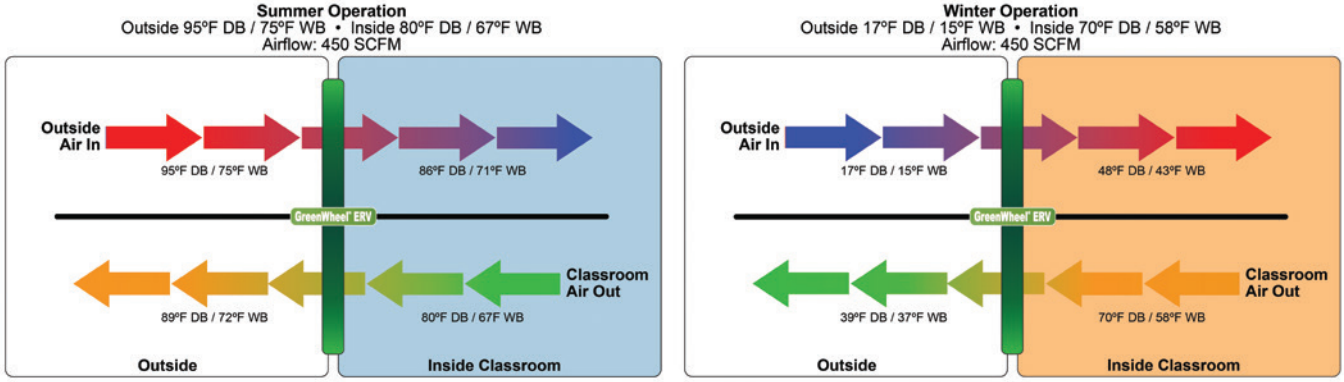
How It Works - During the summer, cool dry air from the classroom is exhausted through the GreenWheel ERV to the outside. As the air passes through the rotating wheel, the desiccant becomes cooler and drier. Simultaneously, hot humid air is being pulled across the rotating wheel. The cool, dry desiccant absorbs moisture and heat from the incoming air. The cooler, drier air is mixed with the return air from the classroom and distributed throughout the room.

In the winter, warm moist air is exhausted through the GreenWheel ERV to the outside. As the air passes through the rotating wheel, the desiccant becomes warmer and absorbs moisture. Simultaneously, cold dry air is being pulled across the rotating wheel. The cold, dry air absorbs heat and moisture from the desiccant. The warmed air is mixed with the return air from the classroom and distributed throughout the room.



Quality Components - The GreenWheel ERV Ventilation package consists of the GreenWheel cassette, an incoming air blower, an exhaust air blower, an air filter for the incoming air and one fan speed controller that controls the speed of both blower motors simultaneously. As an option, a second fan speed controller can be factory installed for independent control of the exhaust air motor and positive pressurization of the classroom. Also, an optional filter on the exhaust air is available on selected models. Please consult your Marvair representative for details. The two

blowers simultaneously pull fresh air from outside and exhaust air from the classroom through the rotating wheel. The air streams are separated by an insulated partition so that the incoming fresh air is not mixed with the exhaust air. Two variable speed blowers ensure that up to 450 CFM of outside air can be brought into the room and the indoor air is properly exhausted. Variable speed blowers permit that the desired quantity of outside air is delivered into the room. Optional independent exhaust air blower control allows positive pressurization of the classroom, i.e., more outside air can be introduced through the GreenWheel ERV than is exhausted.



GreenWheel® Energy Recovery Ventilator Performance

SCFM* of Outside Air	Energy Conserved, BTUH					
	95° DB/73° WB Outside • 80° DB/67° WB Inside			95° DB/80° WB Outside • 80° DB/67° WB Inside		
	Sensible	Latent	Total	Sensible	Latent	Total
225	2,900	1,100	4,000	2,900	6,400	9,300
250	3,100	1,200	4,300	3,100	6,900	10,000
325	3,700	1,400	5,100	3,700	8,100	11,800
400	4,200	1,500	5,700	4,200	9,100	13,300
450	4,500	1,600	6,100	4,500	9,700	14,200

SCFM* of Outside Air	Energy Conserved, BTUH								
	90° DB/74° WB Outside • 75° DB/64° WB Inside			80° DB/70° WB Outside • 75° DB/64° WB Inside			60° DB/54° WB Outside • 70° DB/58° WB Inside		
	Sensible	Latent	Total	Sensible	Latent	Total	Sensible	Latent	Total
225	2800	3600	6400	900	2800	2700	1900	200	2100
250	3000	3800	6800	1000	3000	4000	2000	200	2200
325	3600	4500	8100	1200	3500	4700	2400	200	2600
400	4100	4900	9000	1400	3800	5200	2700	300	3000
450	4300	5200	9500	1400	4000	5400	2900	300	3200

SCFM* of Outside Air	Energy Conserved, BTUH								
	40° DB/36° WB Outside • 70° DB/58° WB Inside			20° DB/18° WB Outside • 70° DB/58° WB Inside			0° DB/7° WB Outside • 70° DB/58° WB Inside		
	Sensible	Latent	Total	Sensible	Latent	Total	Sensible	Latent	Total
225	5600	3300	8900	9300	4900	14200	13000	5700	18700
250	6000	3600	9600	10000	5300	15300	14000	6100	14100
325	7200	4200	11400	12000	6200	18200	16700	7100	23800
400	8100	4600	12700	13500	6800	20300	18900	7900	26800
450	8600	4800	13400	14400	7100	21500	20100	8200	28300

*SCFM = Standard Cubic Feet per Minute
For performance of the GreenWheel® ERV at conditions other than those shown, please contact your Marvair® representative or the factory.

For performance of the GreenWheel ERV at conditions other than those shown, please contact your Marvair representative or the factory.

➤ **Configuration "N": Barometric Fresh Air Damper *(Standard)***
Barometric damper capable of up to 15% of rated airflow of outside air; field adjustable, no pressure relief.

➤ **Configuration "T": Title 24 Compliant Economizer & Controls**
California Title 24 compliant economizer and associated controls.

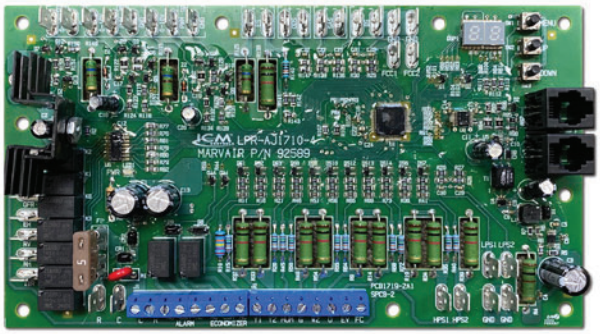
Heat Pump PC Board

➤ **Electronic Control Board**

The exclusive Printed Circuit Board (PCB) in base model Marvair heat pumps sets the standard for the industry in terms of flexibility, reliability, and performance. This UL certified component is engineered to optimize Heating, Cooling and Dehumidification operation while communicating valuable information to the end user.

Special Features Include:

- Improved HVAC System Reliability (Built In Sequence / Timer Functionality And Simplified Wiring)
- On Board Configuration Menu With Adjustments Of Various Functions and Setpoints
- 2-Stage Compressor Operation
- Independent Indoor Blower Speed Adjustments For 1st Stage Cooling, 2nd Stage Cooling, Electric Heat And Dehumidification (Optimize Latent and Sensible Capacity)
- Built-In Remote Communication (Monitor and Control Via MODBUS Qty. 2 RJ11 Ports)
- Alarm Status and Fault Display(Drastically Reduces Troubleshooting Time and System Downtime)
- Sensors To Monitor Refrigerant Temperature Of The Low Pressure Circuit and Liquid Line Circuit
- Economizer Control With Adjustments For Both Enthalpy Or Dry Bulb Sensor
- Economizer Status Output Contacts
- Emergency Ventilation Control (Systems Equipped with Ventilation Package)
- Forced Cooling (Overrides Economizer Operation)
- Dehumidification Control (Systems Equipped With Electric Reheat Or Hot Gas Reheat Dehumidification)
- Lockout Contacts (Normally Open Or Normally Closed)
- Alarms Communicated Via MODBUS



Protection of the Refrigerant Components

➤ **High Refrigerant Pressure Switch**

The high pressure switch is located on the liquid line. It is electrically connected to the PC board and will turn the compressor off if the pressure rises above the set point twice on the same call for cooling or heat-pump heating. This protects the compressor if airflow is significantly reduced or lost through the coil performing the condenser function.

➤ **Low Pressure Sensor**

The loss of charge low pressure sensor is located on the common suction line. It is electrically connected to the PC board and will turn the compressor off if the pressure drops below the set point twice on the same call for cooling or heat-pump heating. This protects the compressor if airflow is significantly reduced or lost through the coil performing the evaporator function or there is a loss of refrigerant.

Marvair MAH Heat Pump Options

Marvair® options can be used to provide optimum performance over a full range of operating conditions.

➤ **Adjustable Outdoor Thermostat**

Will not allow electric resistance heat to be energized unless the outdoor temperature is below the desired set point. Field or factory installed. Available on all MAH units.

➤ **Energy Management System (EMS) Relay Kit**

Relay to control the unit. Available in 24, 120 or 240 VAC. Field or factory installed.

➤ **Electric Reheat**

Control provides simultaneous operation of compressor when in cooling mode and the electric elements to provide dehumidification without over cooling the room. The electric element (kW) must be properly sized for each model for proper operation. Factory installed. Available on all MAH units. Consult factory for details.

➤ **Cabinet Color**

Marvair heat pumps are available in six different cabinet colors. The standard colors are Marvair® beige, white, gray and Carlsbad Canyon (brown). The standard cabinet's sides, top and front panels are constructed of 20 gauge painted steel. Contact your Marvair representative for color chips. Custom colors are also available; contact Marvair for details.

Two stainless steel cabinet constructions are available:

Stainless Steel Exterior (Option "5"): This option replaces all standard exterior painted surfaces with stainless steel. This option also replaces the standard unpainted compressor base of the unit and exterior cabinet screws with stainless steel. No other standard construction surfaces are stainless steel in this option, unless listed in this description. Back panel is not stainless steel with this option. This option is designed to give a more economical alternative to full stainless steel, and still offer an enhanced level of protection. For further corrosion protection, please see our "A" offering at full stainless on all metal components.

Stainless Steel Unit (Option "A"): This option replaces all interior and exterior steel sheet metal parts with stainless steel. All galvanized and painted steel surfaces found in the standard unit are stainless steel with this option. All cabinet screws are stainless steel. No other standard construction surfaces are stainless steel, unless listed in this description. This option is designed to give our most robust protection against steel corrosion.

➤ **Extended Warranty**

A first-year labor (Silver), and a two-year labor (Gold) are available. See www.marvair.com for optional warranty details.

➤ **Compressor Sound Jackets**

Reduces sound of compressor.

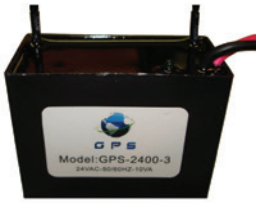
➤ **Anti-Microbial Light**

A germicidal UV light destroys toxic bacteria, viruses and mold on the indoor air coil.

➤ **Cold Plasma Air Purification Device**

Installed inside the Scholar 2.0 unit, this device neutralizes odors, kills mold, bacteria and viruses. It also helps to control allergens*, asthma*, smoke and airborne particles.

*These statements are based on customer testimonials and have not been evaluated by the FDA.



Cold Plasma Air Purifier

Special Application Packages and Coil Coatings

➤ **Protective Coating Packages**

Typically, only non-economizer units are used in corrosive environments, but all Marvair air conditioner are available with corrosion protection. Two corrosion protection packages are offered - one for the condenser section (Coastal Environmental Package) and the other for the entire unit (Coat-All Package).

The Coastal Environmental Package includes:

- Corrosion resistant fasteners
- Sealed or partially sealed condenser fan motor
- Protective coating applied to all exposed internal copper and metal in the condenser section
- Protective coating on the condenser coil (Luvata Insitu®) contains ES2 (embedded stainless steel pigment) technology.

The Coat all Package includes all of the above, plus:

- Protective coating on the evaporator coil (Luvata Insitu®) contains ES2 (embedded stainless steel pigment) technology
- Protective coating on exterior and interior components and sheet metal.
  Note 1: The insulated internal sheet metal and the internal control box are not coated.
  Note 2: The corrosion prevention coating can not be applied to stainless steel.

➤ **Protective Coil Coatings**

The Condenser Coil or the Evaporator Coil or Both can be coated. Coating the Evaporator Coil in not common. For harsh conditions, e.g., power plants, paper mills or sites where the unit will be exposed to salt water, the coils should be protected by a protective coating.

Note: Cooling capacity may be reduced by up to 5% on units with coated coils.

Accessories

➤ **Thermostats for Single Stage and 2-Stage Heat Pumps**

See the *Marvair Thermostats and Controllers Product Data Sheet* for the thermostats for use with Marvair heat pumps.

➤ **Grilles**

Description	Size	Marvair P/N
For the MAH1020H/1024H & MAH2024H		
Double Deflection, Aluminum Supply Grille	20” x 8“ (509mm x 203mm)	80674
Aluminum Return Grille	20” x 12” (509mm x 305mm)	80677
Return Filter Grille	20” x 12” (509mm x 305mm)	80671
For the MAH1030H/1036H & MAH2030H/2036H		
Double Deflection, Aluminum Supply Grille	28” x 8“ (711mm x 203mm)	80675
Aluminum Return Grille	28” x 14” (711mm x 356mm)	80678
Return Filter Grille*	28” x 14” (711mm x 356mm	80672
For the MAH1042H/1048H/1060H & MAH2042H/2048H/2060H		
Double Deflection, Aluminum Supply Grille	30” x 10“ (762mm x 254mm)	80676
Aluminum Return Grille	30” x 16” (762mm x 406mm)	80679
Return Filter Grille	30” x 16” (762mm x 406mm)	80673

Note: Return filter grilles should be used when the 2” (51mm) filter in the MAH unit is not accessible from the exterior of the building. Filter used in the return filter grille is a 1” (25mm) thick filter. The return filter grille is not recommended for use with the MAH heat pumps with economizers.

EER Comparison by Model

Nominal Cooling Capacity (BTUH)	Basic Model	EER
20,000	MAH1020H	11.00
24,000	MAH1024H	11.00
	MAH2024H	11.00
30,000	MAH1030H	11.00
	MAH2030H	11.00
36,000	MAH1036H	11.00
	MAH2036H	11.00

Nominal Cooling Capacity (BTUH)	Basic Model	EER
42,000	MAH1042H	11.00
	MAH2042H	11.00
48,000	MAH1048H	11.00
	MAH2048H	11.00
60,000	MAH1060H	11.00
	MAH2060H	11.00

Air Flow (Cubic Feet per Minute)

Model Number	External Static Pressure (WET COIL)					
	0.10	0.20	0.25	0.30	0.40	0.50
MAH1020H/1024H/2024H	889	831	820	801		
MAH1030H/2030H	1152	1122	1100	1075	1028	
MAH1036H/2036H	1265	1222	1200	1175	1133	
MAH1042H/2042H		1650	1585	1520	1450	1360
MAH1048H/2048H		1693	1650	1619	1591	1529
MAH1060H/2060H		1693	1650	1619	1591	1529

Air flow ratings of 208-230v. Units are at 230v. Air flow ratings of 480 v. units are at 460 volts. Operation of units at a different voltage from the rating point will affect air flow.

Room Size Limitations

	MAH1020H	MAH1024H	MAH1030H	MAH1036H	MAH1042H	MAH1048H	MAH1060H
Minimum Room Size (ft²)	108.0	108.0	109.8	117.8	137.5	157.1	180.6
Minimum Supply Height (ft)	6.9	6.9	6.9	6.9	6.9	6.9	6.9
		MAH2024H	**MAH2030H**	**MAH2036H**	**MAH2042H**	**MAH2048H**	**MAH2060H**
Minimum Room Size (ft²)		117.8	117.8	147.5	137.5	157.1	180.6
Minimum Supply Height (ft)		6.9	6.9	6.9	6.9	6.9	6.9

Marvair Heat Pump Model Identification

Example	**M**	**A**	**H**	**1**	**0**	**3**	**6**	**H**	**A**	**0**	**5**	**0**	**C**	**+**	**+**	**R**	**+**	**1**	**E**	**A**	**+**	**A**	**3**	**1**	**+**	**+**	**+**	**+**	**+**	**+**
Position	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

1	Unit Designation/Family	**M** = Marvair Wall Mount **S** = Stock Unit
2	Energy Efficiency Ratio (EER)	**A** = 11
3	Refrigerant Type	**H** = R-454B
4	Compressor Type/Quantity	**1** = Single Stage Compressor **2** = 2-Stage Compressor
5 **6** **7**	Unit Capacity/Nominal Cooling (BTUH)	**020** = 20,000 | **042** = 42,000 **024** = 24,000 | **048** = 48,000 **030** = 30,000 | **060** = 60,000 **036** = 36,000
8	System Type	**H** = Heat Pump
9	Power Supply (Volts-Hz-Phase)	**A** = 208/230-60-1 | **D** = 460-60-3 **C** = 208/230-60-3
10 **11** **12**	Heat Designation @ Rated Voltage	**000** = No Heat | **090** = 9KW **040** = 4KW | **100** = 10KW **050** = 5KW | **120** = 12KW **060** = 6KW | **150** = 15KW **080** = 8KW
13	Ventilation Configuration	**C** = Economizer **D** = Motorized Damper w/Pressure Relief **E** = Motorized Damper w/Pressure Relief & Independent Motorized Damper Control **H** = GreenWheel® ERV **N** = Barometric Damper w/15% OSA **T** = Title 24 Compliant Economizer & Controls **+** = None **$** = Special
14	Dehumidification	**G** = Hot Gas Reheat **R** = Electric Reheat **T** = Electric Reheat w/Humidity Control **+** = None **$** = Special
15	Controls	**A** = Power Fail Alarm w/Additional Lockouts **C** = 24V EMS Relay Kit **+** = None **$** = Special
16	Operating Condition	**A** = Evaporator Freeze Sensor (EFS) **C** = EFS w/Hot Gas Bypass **D** = Desert Duty **E** = Extreme Duty **F** = Desert Duty w/Hard Start **G** = Desert Duty w/EFS **H** = Desert Duty w/Hard Start & EFS **J** = Extreme Duty w/Hard Start **K** = Extreme Duty w/EFS **M** = Extreme Duty w/Hard Start & EFS **N** = Hard Start **P** = Hard Start w/Low Ambient & CCH **Q** = Hard Start w/Low Ambient & Fan Cycle Control (FCC) **R** = Crank Case Heater (CCH) **T** = Hard Start w/EFS **U** = Hard Start w/Hot Gas Bypass **V** = Hard Start w/Low Ambient & CCH & EFS **W** = Low Ambient w/CCH **X** = Hot Gas Bypass **Y** = Low Ambient w/CCH & FCC **Z** = Low Ambient w/CCH & EFS **1** = Low Ambient w/FCC **2** = Low Ambient w/FCC & EFS **3** = CCH w/Hot Gas Bypass **+** = None **$** = Special
17	Indoor Air Quality Features	**A** = UV Light **D** = Dry Bulb Sensor **E** = Dry Bulb Sensor w/Dirty Filter **G** = Dirty Filter Sensor **K** = Bi-Polar Ionization **M** = Dry Bulb Sensor & CO2 Sensor (Only w/Economizer) **+** = None **$** = Special
18	Air Flow	**1** = Top Supply/Center Return (STD) **$** = Special
19	Compressor Location	**D** = Left Hand - All 3½ to 5 ton units **E** = Right Hand - All 1½ to 3 ton units
20	Filter Option	**A** = 2" Pleated (MERV 8, AC/HP-C) **C** = 2" Charcoal **D** = MERV 11 High Filtration Package **E** = MERV 13 High Filtration Package **F** = Filter Access Through Return Air Grille **W** = Aluminum Washable **+** = None **$** = Special
21	Corrosion Protection	**A** = Condenser Coil Only **C** = Evaporator Coil Only **D** = Both Coils Condenser & Evaporator **E** = All Coils Cond/Evap/Reheat **F** = Coat All **G** = Coastal Package & Evaporator Coil **K** = Coastal Package **+** = None **$** = Special
22 **23**	Engineering Revision Level	**A3** **D3**
24	Cabinet Color	**1** = Marvair Beige (STD) **2** = Gray (STD) **3** = Carlsbad Canyon (STD) **4** = White (STD) **5** = Stainless Steel Exterior **9** = Pebble Gray **A** = Stainless Steel - Unit **$** = Custom Color (Powder Coat)
25	Sound Attenuation	**2** = Compressor Blanket **+** = None
26	Security Option	**A** = Lockable Access Plate/Tamper Proof **C** = Tamper Proof Screws **D** = Lockable Access Plate w/Tamper Proof **+** = None **$** = Special
27	Fastener/Drain Pan Option	**A** = Stainless Steel Fasteners **C** = Stainless Steel Drain Pan **D** = Stainless Steel Fasteners & Drain Pan **+** = None **$** = Special
28	Miscellaneous	**C** = Copeland Compressor **+** = None **$** = Special
29	Unused	**+** = None **$** = Special
30	Special Variation	**+** = None **$** = Special Configuration Not Covered by Model Nomenclature

Note: Not all options are available with all configurations. Contact your Marvair sales representative for configuration details and feature compatibility.

Marvair MAH Single Stage Heat Pump Certified Ratings & Performance

Efficiency and Capacity Ratings at ANSI/AHRI Standard 390 - MAH Heat Pumps

Model Number	MAH1020H	MAH1024H			MAH1030H			MAH1036H			MAH1042H			MAH1048H			MAH1060H		
	A	A	C	D	A	C	D	A	C	D	A	C	D	A	C	D	A	C	D
Cooling BTUH[1]	20,000	24,000			29,000			35,000			42,000			46,000			57,000		
EER[2]	11	11			11			11			11			11			11		
High Temperature Heating[3]	20,000	24,000			27,000			30,000			34,000			42,000			51,000		
High Temperature COP[4]	3.3	3.3			3.3			3.3			3.3			3.3			3.3		
Rated Air Flow (CFM[5])	760	820			1,150			1,200			1,350			1,700			1,800		

[1]Cooling is rated at 95°F (35°C) outdoor and 80°F DB/67°F WB (26.5°C DB/19.5°C WB) return air.
[2]EER = Energy Efficiency Ratio
[3]High Temperature Heating & COP are rated at 47°F DB/43°WB (8.3°C DB/6.1°C WB) outdoor and 70°F (21.1°C) return air.
[4]COP = Coefficient of Performance
[5]CFM = Cubic Feet per Minute

Ratings are with no outside air. Performance will be affected by altitude. Ratings are at 230 volts for 208/230 volt units ("A" & "C" models) and 460 volts for "D" models. Operation of units at a different voltage from that of the rating point will affect performance and air flow.

Sensible Total Heat Ratio @ 95ºF (35ºC) Outside Air DB - MAH Heat Pumps

Model Number	MAH1020H	MAH1024H			MAH1030H			MAH1036H			MAH1042H			MAH1048H			MAH1060H		
	A	A	C	D	A	C	D	A	C	D	A	C	D	A	C	D	A	C	D
Total Capacity	20,000	24,000			29,000			35,000			42,000			46,000			57,000		
Sensible Heat Ratio	0.80	0.80			0.70			0.70			0.70			0.70			0.60		
Sensible Capacity	15,000	18,600			21,500			24,500			27,400			31,000			36,900		
Rated Air Flow (CFM[1])	760	820			1,150			1,200			1,350			1,700			1,800		

[1]CFM=Cubic Feet per Minute
Sensible Heat Ratios based upon ANSI/AHRI std. 390 outdoor conditions of 95°F (35°C) outdoor and 80°F DB/67°F WB (26.5°C DB/19.5°C WB) return air.

Cooling Performance (BTUH) at Various Outdoor Temperatures - MAH Heat Pumps

Model Number	Outdoor Temperature											
	75ºF/24ºC	80ºF/26.5ºC	85ºF/29ºC	90ºF/32ºC	95ºF/35ºC	100ºF/38ºC	105ºF/40.5ºC	110ºF/43.3ºC	115ºF/46ºC	120ºF/49ºC	125ºF/52ºC	130ºF/54ºC
MAH1020H	23,200	22,400	21,600	20,800	20,000	19,200	18,400	17,600	17,200	16,840	16,480	16,120
MAH1024H	27,840	26,880	25,920	24,960	24,000	23,040	22,080	21,120	20,640	20,208	19,776	19,344
MAH1030H	33,640	32,480	31,320	30,160	29,000	27,840	26,680	25,520	24,940	24,418	23,896	23,374
MAH1036H	40,600	39,200	37,800	36,400	35,000	33,600	32,200	30,800	30,100	29,470	28,840	28,210
MAH1042H	48,720	47,040	45,360	43,680	42,000	40,320	38,640	36,960	36,120	35,364	34,608	33,852
MAH1048H	53,360	51,520	49,680	47,840	46,000	44,160	42,320	40,480	39,560	38,732	37,904	37,076
MAH1060H	66,120	63,840	61,560	59,280	57,000	54,720	52,440	50,160	49,020	47,994	46,968	45,942

Based upon ANSI/AHRI std. 390 return air conditions of 80°F DB/67°F WB (26.5°C DB/19.5°C WB). Return air at rated air flow.

Heating Performance (BTUH) at Various Outdoor Temperatures - MAH Heat Pumps

Model Number	Outdoor Temperature								
	10ºF/-12.2ºC	17ºF/-8.3ºC	20ºF/-6.7ºC	30ºF/-1.1ºC	40ºF/4.4ºC	47ºF/8.3ºC	50ºF/10ºC	60ºF/15.6ºC	70ºF/21.1ºC
MAH1020H	10,766	11,333	12,200	15,233	17,833	20,000	20,600	21,500	22,500
MAH1024H	11,560	13,600	14,640	18,280	21,400	24,000	24,720	25,800	27,000
MAH1030H	15,130	17,800	18,720	21,940	24,700	27,000	27,810	29,025	30,375
MAH1036H	15,810	18,600	19,740	23,730	27,150	30,000	30,900	32,250	33,750
MAH1042H	18,700	22,000	23,340	28,030	32,050	35,400	36,462	38,055	39,825
MAH1048H	20,400	24,000	25,800	32,100	37,500	42,000	43,260	45,150	47,250
MAH1060H	22,900	27,000	29,300	37,500	44,600	51,000	51,900	54,300	61,100

Based upon ANSI/AHRI std. 390 return air conditions of 70°F DB (21.1°C DB). Return air at rated air flow.

Electrical Characteristics - Compressor, Fan, Ventilation & Blower Motors
MAH Heat Pumps with Single Stage Compressor

Basic Model	Compressor				Outdoor Fan Motor				Indoor Blower Motor				Ventilation GreenWheel AMPS		
	Type	Volts-Hz-Ph	RLA[1]	LRA[2]	Volts-Hz-PH	RPM[3]	FLA[4]	HP[5]	Volts-Hz-PH	RPM[3]	FLA[4]	HP[5]	OAM[6]	EXM[7]	WD[8]
MAH1020HA	Scroll	208/230-60-1	10.3	60.2	208/230-60-1	1200	3.5	1/3	208/230-60-1	1200	2.8	1/3			
MAH1024HA		208/230-60-1	11.9	67.8	208/230-60-1	1200	3.5	1/3	208/230-60-1	1200	2.8	1/3	1.0	1.0	0.2
MAH1030HA		208/230-60-1	13.5	82.5	208/230-60-1	1200	3.5	1/3	208/230-60-1	1200	4.1	1/2	1.0	1.0	0.2
MAH1036HA		208/230-60-1	14.7	109.0	208/230-60-1	1200	3.5	1/3	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH1042HA		208/230-60-1	18.6	123.0	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH1048HA		208/230-60-1	22.4	126.0	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH1060HA		208/230-60-1	25.6	155.0	208/230-60-1	1200	6.3	3/4	208/230-60-1	1050	6.0	3/4	1.0	1.0	0.2
MAH1024HC	Scroll	208/230-60-3	8.3	67.7	208/230-60-1	1200	3.5	1/3	208/230-60-1	1200	2.8	1/3			
MAH1030HC		208/230-60-3	12.8	97.5	208/230-60-1	1200	3.5	1/3	208/230-60-1	1200	4.1	1/2	1.0	1.0	0.2
MAH1036HC		208/230-60-3	12.2	102.8	208/230-60-1	1200	3.5	1/3	208/230-60-1	1200	4.1	1/2	1.0	1.0	0.2
MAH1042HC		208/230-60-3	12.8	102.8	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH1048HC		208/230-60-3	12.8	120.4	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH1060HC		208/230-60-3	18.6	155.0	208/230-60-1	1200	6.3	3/4	208/230-60-1	1050	6.0	3/4	1.0	1.0	0.2
MAH1024HD	Scroll	460-60-3	5.1	38.1	208/230-60-1	1200	3.5	1/3	208/230-60-1	1200	2.8	1/3			
MAH1030HD		460-60-3	5.1	44.3	208/230-60-1	1200	3.5	1/3	208/230-60-1	1200	4.1	1/2	1.0	1.0	0.2
MAH1036HD		460-60-3	5.8	50.0	208/230-60-1	1200	3.5	1/3	208/230-60-1	1200	4.1	1/2	1.0	1.0	0.2
MAH1042HD		460-60-3	5.8	50.0	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH1048HD		460-60-3	6.0	49.4	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH1060HD		460-60-3	8.3	58.1	208/230-60-1	1200	6.3	3/4	208/230-60-1	1050	6.0	3/4	1.0	1.0	0.2
MAH1024HZ	Scroll	575-60-3	3.8	27.7	208/230-60-1	1200	3.5	1/3	208/230-60-1	1200	2.8	1/3			
MAH1030HZ		575-60-3	4.5	27.1	208/230-60-1	1200	3.5	1/3	208/230-60-1	1200	4.1	1/2	1.0	1.0	0.2
MAH1036HZ		575-60-3	4.5	41.0	208/230-60-1	1200	3.5	1/3	208/230-60-1	1200	4.1	1/2	1.0	1.0	0.2
MAH1042HZ		575-60-3	5.1	41.0	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH1048HZ		575-60-3	5.8	41.0	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH1060HZ		575-60-3	7.7	47.8	208/230-60-1	1200	6.3	3/4	208/230-60-1	1050	6.0	3/4	1.0	1.0	0.2

[1]RLA = Rated Load Amps
[2]LRA = Locked Rotor Amps
[3]RPM = Revolutions per Minute
[4]FLA = Full Load Amps
[5]HP = Horsepower
[6]OAM = Outside Air Mover
[7]EXM = Exhaust Air Mover
[8]WD = Wheel Drive Motor
The 460 volt units have a step down transformer for the 230 volt motors.

MAH Heat Pumps Summary Electrical Ratings (Wire and HACR Circuit Breaker Sizing) - Ventilation Configuration:

C: Economizer, Outside Air with Pressure Relief
D: Motorized 2-Position Damper, up to 450 cfm of Outside Air w/Pressure Relief
E: Motorized Damper w/Pressure Relief & Independent Motorized Damper Control
N: Barometric Damper, up to 15% Outside Air
T: Title 24 Compliant Economizer & Controls

Electric Heat		000 = None		040 = 4 kw		050 = 5 kw		060 = 6 kw		080 = 8 kw		090 = 9 kw		100 = 10 kw		120 = 12 kw		150 = 15 kw	
Basic Model	Volts-Hz-Ph	SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]	
		MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]
MAH1020HA	208/230-60-1	19.2	25	40.0	45	45.2	50	50.4	60	60.8	70			71.3	80				
MAH1024HA	208/230-60-1	21.2	30	42.0	45	47.2	50	52.4	60	62.8	70			73.3	80				
MAH1030HA	208/230-60-1	24.5	35	45.3	50	50.5	60	55.7	60	66.1	70			76.6	80	87.0	90	102.6	110
MAH1036HA	208/230-60-1	26.0	40	46.8	50	52.0	60	57.2	60	67.6	70			78.1	80	88.5	90	104.1	110
MAH1042HA	208/230-60-1	32.7	50	53.5	60	58.7	70							84.7	90	95.2	100	110.8	125
MAH1048HA	208/230-60-1	37.4	50	58.2	70	63.4	80							89.5	100	99.9	100	115.5	125
MAH1060HA	208/230-60-1	44.3	60	65.1	80	70.3	90							96.4	110	106.8	110	122.4	125
MAH1024HC	208/230-60-3	16.7	20					34.7	35			43.7	45			52.8	60	61.8	70
MAH1030HC	208/230-60-3	23.6	35					41.6	50			50.7	60			59.7	60	68.7	70
MAH1036HC	208/230-60-3	22.9	35					40.9	45			49.9	50			58.9	60	68.0	70
MAH1042HC	208/230-60-3	25.4	35					43.4	50			52.5	60			61.5	70	70.5	80
MAH1048HC	208/230-60-3	25.4	35					43.4	50			52.5	60			61.5	70	70.5	80
MAH1060HC	208/230-60-3	35.6	50					53.6	60			62.6	70			71.6	80	80.7	90
MAH1024HD	460-60-3	9.5	15					18.5	20			23.1	25			27.6	30	32.1	35
MAH1030HD	460-60-3	10.2	15					19.2	20			23.7	25			28.2	30	32.7	35
MAH1036HD	460-60-3	11.1	15					20.1	25			24.6	25			29.1	30	33.6	35
MAH1042HD	460-60-3	12.0	15					21.0	25			25.5	30			30.0	30	34.5	35
MAH1048HD	460-60-3	12.2	15					21.2	25			25.7	30			30.2	35	34.8	35
MAH1060HD	460-60-3	16.5	20					25.5	30			30.1	35			34.6	35	39.1	40
MAH1024HZ	575-60-3	7.3	15					14.8	15			18.6	20			22.3	25	26.1	30
MAH1030HZ	575-60-3	8.7	15					16.2	20			20.0	20			23.7	25	27.5	30
MAH1036HZ	575-60-3	8.7	15					16.2	20			20.0	20			23.7	25	27.5	30
MAH1042HZ	575-60-3	10.1	15					17.7	20			21.4	25			25.2	30	29.0	30
MAH1048HZ	575-60-3	11.0	15					18.5	20			22.3	25			26.1	30	29.8	30
MAH1060HZ	575-60-3	14.5	20					22.1	25			25.8	30			29.6	30	33.4	35

S-Circuit - The user can move a pin on the board to control whether the electric heat will operate simultaneously with the compressor (S Circuit – NO) or will not run simultaneously with the compressor (S Circuit – Yes).

[1]MCA = Minimum Circuit Ampacity (Wiring Size Amps) [2]MFS = Maximum Fuse or HACR Breaker Size [3]SPPE = Single Point Power Entry
[4]Top Supply/Center Return [5]Center Supply/Top Return

MCA & MFS are calculated at 240 volts on the “A” & “C” models. The 480 volts “D” models are calculated at 480 volts. This chart should only be used as a guideline for estimating conductor size and overcurrent protection. For the requirements of specific units, always refer to the data label on the unit.

1. MFS (Maximum Fuses Size) value listed is the maximum value as per UL 60335-2-40 calculations for MOCP (branch-circuit conductor sizes in this chart are based on this MOCP). The actual factory installed Overcurrent Protective Device (Circuit Breaker) in the models may be lower than the maximum UL 60335-2-40 allowable MOCP value, but still above the UL 60335-2-40 minimum calculated value or Minimum Circuit Ampacity (MCA) listed.
2. The end user shall size conductors based on the Single Point Power Entry (SPPE) - Minimum Circuit Ampacity. The service circuit breaker shall not be sized less than the minimum circuit ampacity associated to Single Point Power Entry value provided. The service circuit breaker shall also not be sized greater than the Maximum Fuse size associated to the Single Point Power Entry Value Provided.
3. While this electrical data is presented as a guide, it is important to electrically connect properly sized fuses and conductor wires in accordance with the National Electrical Code and all local codes.

MAH Heat Pumps Summary Electrical Ratings (Wire and HACR Circuit Breaker Sizing) - MAH Heat Pumps with the "S" Circuit Enabled and Ventilation Configuration:

C: Economizer, Outside Air with Pressure Relief
D: Motorized 2-Position Damper, up to 450 cfm of Outside Air w/Pressure Relief
E: Motorized Damper w/Pressure Relief & Independent Motorized Damper Control
N: Barometric Damper, up to 15% Outside Air
T: Title 24 Compliant Economizer & Controls

Electric Heat		000 = None		040 = 4 kw		050 = 5 kw		060 = 6 kw		080 = 8 kw		090 = 9 kw		100 = 10 kw		120 = 12 kw		150 = 15 kw	
Basic Model	Volts-Hz-Ph	SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]	
		MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]
MAA1020HA	208/230-60-1	19.2	25	23.6	25	28.8	30	34.1	35	44.5	45			54.9	60				
MAA1024HA	208/230-60-1	21.2	30	23.6	30	28.8	30	34.1	35	44.5	45			54.9	60				
MAA1030HA	208/230-60-1	24.5	35	24.9	35	30.1	35	35.4	40	45.8	50			56.2	60	66.6	70	82.2	90
MAA1036HA	208/230-60-1	26.0	40	26.0	40	30.1	40	35.4	40	45.8	50			56.2	60	66.6	70	82.2	90
MAA1042HA	208/230-60-1	32.7	50	32.7	50	32.7	50							56.2	60	66.6	70	82.2	90
MAA1048HA	208/230-60-1	37.4	50	37.4	50	37.4	50							56.2	60	66.6	70	82.2	90
MAA1060HA	208/230-60-1	44.3	60	44.3	60	44.3	60							58.1	60	68.5	70	84.1	90
MAA1024HC	208/230-60-3	16.7	20					20.8	25			29.9	30			38.9	40	47.9	50
MAA1030HC	208/230-60-3	23.6	35					23.6	35			31.2	35			40.2	45	49.2	50
MAA1036HC	208/230-60-3	22.9	35					22.9	35			31.2	35			40.2	45	49.2	50
MAA1042HC	208/230-60-3	25.4	35					25.4	35			31.2	35			40.2	45	49.2	50
MAA1048HC	208/230-60-3	25.4	35					25.4	35			31.2	35			40.2	45	49.2	50
MAA1060HC	208/230-60-3	35.6	50					35.6	50			35.6	50			42.1	50	51.1	60
MAA1024HD	460-60-3	9.5	15					10.4	15			14.9	15			19.4	20	24.0	25
MAA1030HD	460-60-3	10.2	15					11.1	15			15.6	20			20.1	25	24.6	25
MAA1036HD	460-60-3	11.1	15					11.1	15			15.6	20			20.1	25	24.6	25
MAA1042HD	460-60-3	12.0	15					12.0	15			15.6	20			20.1	25	24.6	25
MAA1048HD	460-60-3	12.2	15					12.2	15			15.6	20			20.1	25	24.6	25
MAA1060HD	460-60-3	16.5	20					16.5	20			16.5	20			21.0	25	25.6	30
MAA1024HZ	575-60-3	7.3	15					8.7	15			12.4	15			16.2	20	19.9	20
MAA1030HZ	575-60-3	8.7	15					9.2	15			12.9	15			16.7	20	20.5	25
MAA1036HZ	575-60-3	8.7	15					9.2	15			12.9	15			16.7	20	20.5	25
MAA1042HZ	575-60-3	10.1	15					10.1	15			12.9	15			16.7	20	20.5	25
MAA1048HZ	575-60-3	11.0	15					11.0	15			12.9	15			16.7	20	20.5	25
MAA1060HZ	575-60-3	14.5	20					14.5	20			14.5	20			17.5	20	21.2	25

S-Circuit - The user can move a pin on the board to control whether the electric heat will operate simultaneously with the compressor (S Circuit – NO) or will not run simultaneously with the compressor (S Circuit – Yes).

[1]MCA = Minimum Circuit Ampacity (Wiring Size Amps) [2]MFS = Maximum Fuse or HACR Breaker Size [3]SPPE = Single Point Power Entry
[4]Top Supply/Center Return [5]Center Supply/Top Return

MCA & MFS are calculated at 240 volts on the "A" & "C" models. The 480 volts "D" models are calculated at 480 volts. This chart should only be used as a guide-line for estimating conductor size and overcurrent protection. For the requirements of specific units, always refer to the data label on the unit.

1. MFS (Maximum Fuses Size) value listed is the maximum value as per UL 60335-2-40 calculations for MOCP (branch-circuit conductor sizes in this chart are based on this MOCP). The actual factory installed Overcurrent Protective Device (Circuit Breaker) in the models may be lower than the maximum UL 60335-2-40 allowable MOCP value, but still above the UL 60335-2-40 minimum calculated value or Minimum Circuit Ampacity (MCA) listed.
2. The end user shall size conductors based on the Single Point Power Entry (SPPE) - Minimum Circuit Ampacity. The service circuit breaker shall not be sized less than the minimum circuit ampacity associated to Single Point Power Entry value provided. The service circuit breaker shall also not be sized greater than the Maximum Fuse size associated to the Single Point Power Entry Value Provided.

While this electrical data is presented as a guide, it is important to electrically connect properly sized fuses and conductor wires in accordance with the National Electrical Code and all local codes.

Unit Load Amps (Heating) - MAH Heat Pumps with Ventilation Configurations:

C: Economizer, Outside Air with Pressure Relief
D: Motorized 2-Position Damper, up to 450 cfm of Outside Air w/Pressure Relief
E: Motorized Damper w/Pressure Relief & Independent Motorized Damper Control
N: Barometric Damper, up to 15% Outside Air
T: Title 24 Compliant Economizer & Controls

Basic Model Number	Volts-Hz-Ph	Current Amps		LOAD OF RESISTIVE HEATING - ELEMENTS ONLY (AMPS) *(1) ALL HEATING ELEMENTS ARE ON A SEPARATE CIRCUIT* *(2) SHADED VALUES (12 & 15 kW) UTILIZE TWO CIRCUITS*								TOTAL MAXIMUM HEATING AMPS *INCLUDES AMPS FROM MOTOR(S) THAT ARE LOCATED ON AN ELECTRICAL CIRCUIT THAT DOES NOT HAVE HEATERS*							
		HP[1]	IBM[2]	4 kW	5 kW	6 kW	8 kW	9 kW	10 kW	12 kW	15 kW	4 kW	5 kW	6 kW	8 kW	9 kW	10 kW	12 kW	15 kW
MAH1020HA	208/230-60-1	16.6	2.8	16.7	20.8	25.0	33.3		41.7			19.5	23.6	27.8	36.1		44.5		
MAH1024HA	208/230-60-1	18.2	2.8	16.7	20.8	25.0	33.3		41.7			19.5	23.6	27.8	36.1		44.5		
MAH1030HA	208/230-60-1	21.1	4.1	16.7	20.8	25.0	33.3		41.7	**50.0**	**62.5**	20.8	24.9	29.1	37.4		45.8	**54.1**	**66.6**
MAH1036HA	208/230-60-1	22.3	4.1	16.7	20.8	25.0	33.3		41.7	**50.0**	**62.5**	20.8	24.9	29.1	37.4		45.8	**54.1**	**66.6**
MAH1042HA	208/230-60-1	28.0	4.1	16.7	20.8	25.0	33.3		41.7	**50.0**	**62.5**	20.8	24.9	29.1	37.4		45.8	**54.1**	**66.6**
MAH1048HA	208/230-60-1	31.8	4.1	16.7	20.8				41.7	**50.0**	**62.5**	20.8	24.9				45.8	**54.1**	**66.6**
MAH1060HA	208/230-60-1	37.9	6.0	16.7	20.8				41.7	**50.0**	**62.5**	22.7	26.8				47.7	**56.0**	**68.5**
MAH1024HC	208/230-60-3	14.6	2.8	9.6	12.0				24.1	28.9	36.1	12.4	14.8				26.9	31.7	38.9
MAH1030HC	208/230-60-3	20.4	4.1			14.4		21.7		28.9	36.1			18.5		25.8		33.0	40.2
MAH1036HC	208/230-60-3	19.8	4.1			14.4		21.7		28.9	36.1			18.5		25.8		33.0	40.2
MAH1042HC	208/230-60-3	22.2	4.1			14.4		21.7		28.9	36.1			18.5		25.8		33.0	40.2
MAH1048HC	208/230-60-3	22.2	4.1			14.4		21.7		28.9	36.1			18.5		25.8		33.0	40.2
MAH1060HC	208/230-60-3	30.9	6.0			14.4		21.7		28.9	36.1			20.4		27.7		34.9	42.1
MAH1024HD	460-60-3	8.3	1.4			7.2		10.8		14.4	18.0			8.6		12.2		15.8	19.4
MAH1030HD	460-60-3	8.9	2.1			7.2		10.8		14.4	18.0			9.3		12.9		16.5	20.1
MAH1036HD	460-60-3	9.6	2.1			7.2		10.8		14.4	18.0			9.3		12.9		16.5	20.1
MAH1042HD	460-60-3	10.5	2.1			7.2		10.8		14.4	18.0			9.3		12.9		16.5	20.1
MAH1048HD	460-60-3	10.7	2.1			7.2		10.8		14.4	18.0			9.3		12.9		16.5	20.1
MAH1060HD	460-60-3	14.5	3.0			7.2		10.8		14.4	18.0			10.2		13.8		17.4	21.0
MAH1024HZ	575-60-3	6.3	1.1			6.0		9.0		12.0	15.1			7.1		10.1		13.1	16.2
MAH1030HZ	575-60-3	7.5	1.6			6.0		9.0		12.0	15.1			7.6		10.6		13.6	16.7
MAH1036HZ	575-60-3	7.5	1.6			6.0		9.0		12.0	15.1			7.6		10.6		13.6	16.7
MAH1042HZ	575-60-3	8.9	1.6			6.0		9.0		12.0	15.1			7.6		10.6		13.6	16.7
MAH1048HZ	575-60-3	9.6	1.6			6.0		9.0		12.0	15.1			7.6		10.6		13.6	16.7
MAH1060HZ	575-60-3	12.6	2.4			6.0		9.0		12.0	15.1			8.4		11.4		14.4	17.5

[1]HP = Heat Pump Unit Amps (includes Indoor Motor amps) [2]IBM = Indoor Blower Motor
Heating kW is rated at 240 volts on the 208-230v. (HPA & HPC) models. Derate heater output by 25% for operation at 208 volts. Heating kW is rated at 480 volts on the HPD models.
Total heating amps for single phase units with two circuits (#1 and #2) includes both circuits. Total heating and cooling amps includes all motors. Three phase models contain single phase motor loads. Values shown are maximum phase loads. Loads are not equally balanced on each phase.

Marvair MAH 2-Stage Heat Pump Certified Ratings & Performance

Efficiency and Capacity Ratings at ANSI/AHRI Standard 390 - MAH Heat Pumps

Model Number	MAH2024H			MAH2030H			MAH2036H			MAH2042H			MAH2048H			MAH2060H		
	A	C	D	A	C	D	A	C	D	A	C	D	A	C	D	A	C	D
Cooling BTUH[1]	20,600			29,000			33,000			40,000			46,000			56,000		
EER[2]	11			11			11			11			11			11		
IPLV[3]	14.3			15.5			14.3			14.3			14			14.8		
High Temperature Heating[4]	21,000			25,000			29,000			35,400			42,000			50,500		
High Temperature COP[5]	3.3			3.3			3.3			3.3			3.3			3.3		
Rated Indoor Air Flow (CFM[6])	950			1,050			1,180			1,350			1,700			1,750		

[1]Cooling is rated at 95°F (35°C) outdoor and 80°F DB/67°F WB (26.5°C DB/19.5°C WB) return air.
[2]EER = Energy Efficiency Ratio
[3]IPLV = Integrated Part Load Value
[4]High Temperature Heating & COP are rated at 47°F DB/43°F WB (8.3°C DB/6.1°C WB) outdoor and 70°F (21.1°C) return air.
[5]COP = Coefficient of Performance
[6]CFM = Cubic Feet per Minute
Ratings are with no outside air. Performance will be affected by altitude. Ratings are at 230 volts for 208/230 volt units ("A" & "C" models) and 460 volts for "D" models. Operation of units at different voltage from that of the rating point will affect performance and air flow.

Sensible Total Heat Ratio @ 95ºF (35ºC) Outside Air DB - MAH Heat Pumps

Model Number	MAH2024H			MAH2030H			MAH2036H			MAH2042H			MAH2048H			MAH2060H		
	A	C	D	A	C	D	A	C	D	A	C	D	A	C	D	A	C	D
Total Capacity	20,600			29,000			33,000			40,000			46,000			56,000		
Sensible Heat Ratio	0.80			0.70			0.70			0.70			0.70			0.70		
Sensible Capacity	16,500			20,300			23,100			27,200			31,000			67,500		
Rated Air Flow (CFM[1])	950			1,050			1,180			1,350			1,700			1,750		

[1]CFM=Cubic Feet per Minute
Sensible Heat Ratios based upon ANSI/AHRI std. 390 outdoor conditions of 95°F (35°C) outdoor and 80°F DB/67°F WB (26.5°C DB/19.5°C WB) return air.

Cooling Performance (BTUH) at Various Outdoor Temperatures - MAH Heat Pumps

Model Number	Outdoor Temperature											
	75ºF/24ºC	80ºF/26.5ºC	85ºF/29ºC	90ºF/32ºC	95ºF/35ºC	100ºF/38ºC	105ºF/40.5ºC	110ºF/43.3ºC	115ºF/46ºC	120ºF/49ºC	125ºF/52ºC	130ºF/54ºC
MAH2024H	23,896	23,072	22,484	21,424	20,600	19,776	18,952	18,128	17,716	16,480	15,656	14,832
MAH2030H	33,640	32,480	31,320	30,160	29,000	27,840	26,680	25,520	24,940	23,200	22,040	20,880
MAH2036H	39,440	38,080	36,720	35,360	34,000	32,640	31,280	29,920	29,240	27,200	25,840	24,480
MAH2042H	46,400	44,800	43,200	41,600	40,000	38,400	36,800	35,200	34,400	32,000	30,400	28,800
MAH2048H	53,360	51,520	49,680	47,840	46,000	44,160	42,320	40,480	39,560	36,800	34,960	33,120
MAH2060H	64,900	62,700	60,500	58,200	56,000	53,700	51,500	49,300	48,100	44,800	42,600	40,300

Based upon ANSI/AHRI std. 390 return air conditions of 80°F DB/67°F WB (26.5°C DB/19.5°C WB). Return air at rated air flow.

Heating Performance (BTUH) at Various Outdoor Temperatures - MAH Heat Pumps

Model Number	Outdoor Temperature								
	10ºF/-12.2ºC	17ºF/-8.3ºC	20ºF/-6.7ºC	30ºF/-1.1ºC	40ºF/4.4ºC	47ºF/8.3ºC	50ºF/10ºC	60ºF/15.6ºC	70ºF/21.1ºC
MAH2024H	11,560	13,600	14,340	16,930	19,150	21,000	21,630	22,575	23,625
MAH2030H	15,130	17,800	18,520	21,040	23,200	25,000	25,750	26,875	28,125
MAH2036H	15,810	18,600	19,740	23,730	27,150	30,000	30,900	32,250	33,750
MAH2042H	18,700	22,000	23,340	28,030	32,050	35,400	36,462	38,055	39,825
MAH2048H	20,400	24,000	25,800	32,100	37,500	42,000	43,260	45,150	47,250
MAH2060H	29,500	34,700	36,300	41,800	46,500	50,500	51,900	54,300	56,800

Based upon ANSI/AHRI std. 390 return air conditions of 70°F DB (21.1°C DB). Return air at rated air flow.

Electrical Characteristics - Compressor, Fan, Ventilation & Blower Motors
MAH Heat Pumps with 2-Stage Compressor

Basic Model	Compressor				Outdoor Fan Motor				Indoor Blower Motor				Ventilation GreenWheel AMPS		
	Type	Volts-Hz-Ph	RLA[1]	LRA[2]	Volts-Hz-PH	RPM[3]	FLA[4]	HP[5]	Volts-Hz-PH	RPM[3]	FLA[4]	HP[5]	OAM[6]	EXM[7]	WD[8]
MAH2024HA	Scroll	208/230-60-1	10.3	62.0	208/230-60-1	1200	3.5	1/3	208/230-60-1	1050	2.8	1/3	1.0	1.0	0.2
MAH2030HA		208/230-60-1	14.6	90.0	208/230-60-1	1200	3.5	1/3	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH2036HA		208/230-60-1	14.6	90.0	208/230-60-1	1200	3.5	1/3	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH2042HA		208/230-60-1	18.2	106.0	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH2048HA		208/230-60-1	18.3	138.0	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH2060HA		208/230-60-1	25.2	147.3	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	6.0	3/4	1.0	1.0	0.2
MAH2024HC	Scroll	208/230-60-3	6.3	56.0	208/230-60-1	1200	3.5	1/3	208/230-60-1	1050	2.8	1/3	1.0	1.0	0.2
MAH2030HC		208/230-60-3	7.9	66.0	208/230-60-1	1200	3.5	1/3	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH2036HC		208/230-60-3	9.9	82.0	208/230-60-1	1200	3.5	1/3	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH2042HC		208/230-60-3	11.5	114.0	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH2048HC		208/230-60-3	11.9	112.0	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH2060HC		208/230-60-3	13.8	150.0	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	6.0	3/4	1.0	1.0	0.2
MAH2024HD	Scroll	460-60-3	3.8	29.0	208/230-60-1	1200	3.5	1/3	208/230-60-1	1050	2.8	1/3	1.0	1.0	0.2
MAH2030HD		460-60-3	4.8	39.0	208/230-60-1	1200	3.5	1/3	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH2036HD		460-60-3	4.8	44.3	208/230-60-1	1200	3.5	1/3	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH2042HD		460-60-3	6.5	56.0	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH2048HD		460-60-3	6.8	61.8	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH2060HD		460-60-3	6.9	58.0	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	6.0	3/4	1.0	1.0	0.2

[1]RLA = Rated Load Amps [2]LRA = Locked Rotor Amps [3]RPM = Revolutions per Minute [4]FLA = Full Load Amps
[5]HP = Horsepower [6]OAM = Outside Air Mover [7]EXM = Exhaust Air Mover [8]WD = Wheel Drive Motor
The 460 volt units have a step down transformer for the 230 volt motors.

MAH Heat Pumps Summary Electrical Ratings (Wire and HACR Circuit Breaker Sizing) - Ventilation Configuration:

C: Economizer, Outside air with Pressure Relief
D: Motorized 2-Position Damper, up to 450 cfm of outside air w/Pressure Relief
E: Motorized Damper w/Pressure Relief & Independent Motorized Damper Control
N: Barometric Damper, up to 15% outside air
T: Title 24 Compliant Economizer & Controls

Electric Heat		000 = None		040 = 4 kw		050 = 5 kw		060 = 6 kw		080 = 8 kw		090 = 9 kw		100 = 10 kw		120 = 12 kw		150 = 15 kw	
Basic Model	Volts-Hz-Ph	SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]	
		MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]
MAH2024HA	208/230-60-1	19.2	25	40.0	45	45.2	50	50.4	60	60.8	70			71.3	80				
MAH2030HA	208/230-60-1	25.9	40	46.7	50	51.9	60	57.1	60	67.5	70			77.9	80				
MAH2036HA	208/230-60-1	25.9	40	46.7	50	51.9	60	57.1	60	67.5	70			77.9	80				
MAH2042HA	208/230-60-1	32.2	50	53.0	60	58.2	70	63.4	70	73.8	80			84.2	90	94.7	100	110.3	125
MAH2048HA	208/230-60-1	32.3	50	53.1	60	58.3	70	63.5	70	73.9	80			84.4	90	94.8	100	110.4	125
MAH2060HA	208/230-60-1	42.8	60	63.6	80	68.8	80	74.1	90	84.5	100			94.9	100	105.3	110	120.9	125
MAH2024HC	208/230-60-3	14.2	20					32.2	35			41.2	45			50.3	60	59.3	60
MAH2030HC	208/230-60-3	17.5	25					35.5	40			44.5	45			53.6	60	62.6	70
MAH2036HC	208/230-60-3	20.0	25					38.0	40			47.0	50			56.1	60	65.1	70
MAH2042HC	208/230-60-3	23.8	35					41.8	45			50.8	60			59.9	60	68.9	70
MAH2048HC	208/230-60-3	24.3	35					42.3	50			51.3	60			60.4	70	69.4	70
MAH2060HC	208/230-60-3	28.6	40					46.6	50			55.6	60			64.6	70	73.7	80
MAH2024HD	460-60-3	7.9	15					16.9	20			21.4	25			25.9	30	30.5	35
MAH2030HD	460-60-3	9.8	15					18.8	20			23.3	25			27.8	30	32.4	35
MAH2036HD	460-60-3	9.8	15					18.8	20			23.3	25			27.8	30	32.4	35
MAH2042HD	460-60-3	12.8	15					21.8	25			26.4	30			30.9	35	35.4	40
MAH2048HD	460-60-3	13.2	15					22.2	25			26.7	30			31.2	35	35.8	40
MAH2060HD	460-60-3	14.3	20					23.3	25			27.8	30			32.3	35	36.8	40

S-Circuit - The user can move a pin on the board to control whether the electric heat will operate simultaneously with the compressor (S Circuit – NO) or will not run simultaneously with the compressor (S Circuit – Yes).

[1]MCA = Minimum Circuit Ampacity (Wiring Size Amps) [2]MFS = Maximum Fuse or HACR Breaker Size [3]SPPE = Single Point Power Entry

[4]Top Supply/Center Return [5]Center Supply/Top Return

MCA & MFS are calculated at 240 volts on the “A” & “C” models. The 480 volts “D” models are calculated at 480 volts. This chart should only be used as a guideline for estimating conductor size and overcurrent protection. For the requirements of specific units, always refer to the data label on the unit.

1. MFS (Maximum Fuses Size) value listed is the maximum value as per UL 60335-2-40 calculations for MOCP (branch-circuit conductor sizes in this chart are based on this MOCP). The actual factory installed Overcurrent Protective Device (Circuit Breaker) in the models may be lower than the maximum UL 60335-2-40 allowable MOCP value, but still above the UL 60335-2-40 minimum calculated value or Minimum Circuit Ampacity (MCA) listed.
2. The end user shall size conductors based on the Single Point Power Entry (SPPE) - Minimum Circuit Ampacity. The service circuit breaker shall not be sized less than the minimum circuit ampacity associated to Single Point Power Entry value provided. The service circuit breaker shall also not be sized greater than the Maximum Fuse size associated to the Single Point Power Entry Value Provided.

While this electrical data is presented as a guide, it is important to electrically connect properly sized fuses and conductor wires in accordance with the National Electrical Code and all local codes.

MAH Heat Pumps Summary Electrical Ratings (Wire and HACR Circuit Breaker Sizing) - MAH Heat Pumps with the "S" Circuit Enabled and Ventilation Configuration:

C: Economizer, Outside Air with Pressure Relief
D: Motorized 2-Position Damper, up to 450 cfm of Outside Air w/Pressure Relief
E: Motorized Damper w/Pressure Relief & Independent Motorized Damper Control
N: Barometric Damper, up to 15% Outside Air
T: Title 24 Compliant Economizer & Controls

Electric Heat		000 = None		040 = 4 kw		050 = 5 kw		060 = 6 kw		080 = 8 kw		090 = 9 kw		100 = 10 kw		120 = 12 kw		150 = 15 kw	
Basic Model	Volts-Hz-Ph	SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]	
		MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]
MAH2024HA	208/230-60-1	19.2	25	23.6	25	28.8	30	34.1	35	44.5	45			54.9	60				
MAH2030HA	208/230-60-1	25.9	40	25.9	40	30.1	40	35.4	40	45.8	50			56.2	60				
MAH2036HA	208/230-60-1	25.9	40	25.9	40	30.1	40	35.4	40	45.8	50			56.2	60				
MAH2042HA	208/230-60-1	32.2	50	32.2	50	32.2	50	35.4	50	45.8	50			56.2	60	66.6	70	82.2	90
MAH2048HA	208/230-60-1	32.3	50	32.3	50	32.3	50	35.4	50	45.8	50			56.2	60	66.6	70	82.2	90
MAH2060HA	208/230-60-1	42.8	60	42.8	60	42.8	60	42.8	60	47.7	60			58.1	60	68.5	70	84.1	90
MAH2024HC	208/230-60-3	14.2	20					20.8	25			29.9	30			38.9	40	47.9	50
MAH2030HC	208/230-60-3	17.5	25					22.1	25			31.2	35			40.2	45	49.2	50
MAH2036HC	208/230-60-3	20.0	25					22.1	25			31.2	35			40.2	45	49.2	50
MAH2042HC	208/230-60-3	23.8	35					23.8	35			31.2	35			40.2	45	49.2	50
MAH2048HC	208/230-60-3	24.3	35					24.3	35			31.2	35			40.2	45	49.2	50
MAH2060HC	208/230-60-3	28.6	40					28.6	40			33.1	40			42.1	45	51.1	60
MAH2024HD	460-60-3	7.9	15					10.4	15			14.9	15			19.4	20	24.0	25
MAH2030HD	460-60-3	9.8	15					11.1	15			15.6	20			20.1	25	24.6	25
MAH2036HD	460-60-3	9.8	15					11.1	15			15.6	20			20.1	25	24.6	25
MAH2042HD	460-60-3	12.8	15					12.8	15			15.6	20			20.1	25	24.6	25
MAH2048HD	460-60-3	13.2	15					13.2	15			15.6	20			20.1	25	24.6	25
MAH2060HD	460-60-3	14.3	20					14.3	20			16.5	20			21.0	25	25.6	30

S-Circuit - The user can move a pin on the board to control whether the electric heat will operate simultaneously with the compressor (S Circuit – NO) or will not run simultaneously with the compressor (S Circuit – Yes).

[1]MCA = Minimum Circuit Ampacity (Wiring Size Amps) [2]MFS = Maximum Fuse or HACR Breaker Size [3]SPPE = Single Point Power Entry

[4]Top Supply/Center Return [5]Center Supply/Top Return

MCA & MFS are calculated at 240 volts on the "A" & "C" models. The 480 volts "D" models are calculated at 480 volts. This chart should only be used as a guide-line for estimating conductor size and overcurrent protection. For the requirements of specific units, always refer to the data label on the unit.

1. MFS (Maximum Fuses Size) value listed is the maximum value as per UL 60335-2-40 calculations for MOCP (branch-circuit conductor sizes in this chart are based on this MOCP). The actual factory installed Overcurrent Protective Device (Circuit Breaker) in the models may be lower than the maximum UL 60335-2-40 allowable MOCP value, but still above the UL 60335-2-40 minimum calculated value or Minimum Circuit Ampacity (MCA) listed.
2. The end user shall size conductors based on the Single Point Power Entry (SPPE) - Minimum Circuit Ampacity. The service circuit breaker shall not be sized less than the minimum circuit ampacity associated to Single Point Power Entry value provided. The service circuit breaker shall also not be sized greater than the Maximum Fuse size associated to the Single Point Power Entry Value Provided.

While this electrical data is presented as a guide, it is important to electrically connect properly sized fuses and conductor wires in accordance with the National Electrical Code and all local codes.

Unit Load Amps (Heating) - MAH Heat Pumps with Ventilation Configurations:

C: Economizer, Outside Air with Pressure Relief
D: Motorized 2-Position Damper, up to 450 cfm of Outside Air w/Pressure Relief
E: Motorized Damper w/Pressure Relief & Independent Motorized Damper Control
N: Barometric Damper, up to 15% Outside Air
T: Title 24 Compliant Economizer & Controls

Basic Model	Volts-Hz-Ph	Current Amps		LOAD OF RESISTIVE HEATING - ELEMENTS ONLY (AMPS *(1) ALL HEATING ELEMENTS ARE ON A SEPARATE CIRCUIT* **(2) SHADED VALUES (12 & 15 kW) UTILIZE TWO CIRCUITS**								TOTAL MAXIMUM HEATING AMPS *INCLUDES AMPS FROM MOTOR(S) THAT ARE LOCATED ON AN ELECTRICAL CIRCUIT THAT DOES NOT HAVE HEATERS*							
		HP[1]	IBM[2]	4 kW	5 kW	6 kW	8 kW	9 kW	10 kW	12 kW	15 kW	4 kW	5 kW	6 kW	8 kW	9 kW	10 kW	12 kW	15 kW
MAH2024HA	208/230-60-1	16.6	2.8	16.7	20.8	25.0	33.3		41.7			19.5	23.6	27.8	36.1		44.5		
MAH2030HA	208/230-60-1	22.2	4.1	16.7	20.8	25.0	33.3		41.7			20.8	24.9	29.1	37.4		45.8		
MAH2036HA	208/230-60-1	22.2	4.1	16.7	20.8	25.0	33.3		41.7			20.8	24.9	29.1	37.4		45.8		
MAH2042HA	208/230-60-1	27.6	4.1	16.7	20.8	25.0	33.3		41.7	50.0	62.5	20.8	24.9	29.1	37.4		45.8	54.1	66.6
MAH2048HA	208/230-60-1	27.7	4.1	16.7	20.8	25.0	33.3		41.7	**50.0**	**62.5**	20.8	24.9	29.1	37.4		45.8	**54.1**	**66.6**
MAH2060HA	208/230-60-1	36.5	6.0	16.7	20.8	25.0	33.3		41.7	**50.0**	**62.5**	22.7	26.8	31.0	39.3		47.7	**56.0**	**68.5**
MAH2024HC	208/230-60-3	12.6	2.8			14.4		21.7		28.9	36.1			17.2		24.5		31.7	38.9
MAH2030HC	208/230-60-3	15.5	4.1			14.4		21.7		28.9	36.1			18.5		25.8		33.0	40.2
MAH2036HC	208/230-60-3	17.5	4.1			14.4		21.7		28.9	36.1			18.5		25.8		33.0	40.2
MAH2042HC	208/230-60-3	20.9	4.1			14.4		21.7		28.9	36.1			18.5		25.8		33.0	40.2
MAH2048HC	208/230-60-3	21.3	4.1			14.4		21.7		28.9	36.1			18.5		25.8		33.0	40.2
MAH2060HC	208/230-60-3	25.1	6.0			14.4		21.7		28.9	36.1			20.4		27.7		34.9	42.1
MAH2024HD	460-60-3	7.0	1.4			7.2		10.8		14.4	18.0			8.6		12.2		15.8	19.4
MAH2030HD	460-60-3	8.6	2.1			7.2		10.8		14.4	18.0			9.3		12.9		16.5	20.1
MAH2036HD	460-60-3	8.6	2.1			7.2		10.8		14.4	18.0			9.3		12.9		16.5	20.1
MAH2042HD	460-60-3	11.2	2.1			7.2		10.8		14.4	18.0			9.3		12.9		16.5	20.1
MAH2048HD	460-60-3	11.5	2.1			7.2		10.8		14.4	18.0			9.3		12.9		16.5	20.1
MAH2060HD	460-60-3	12.6	3.0			7.2		10.8		14.4	18.0			10.2		13.8		17.4	21.0

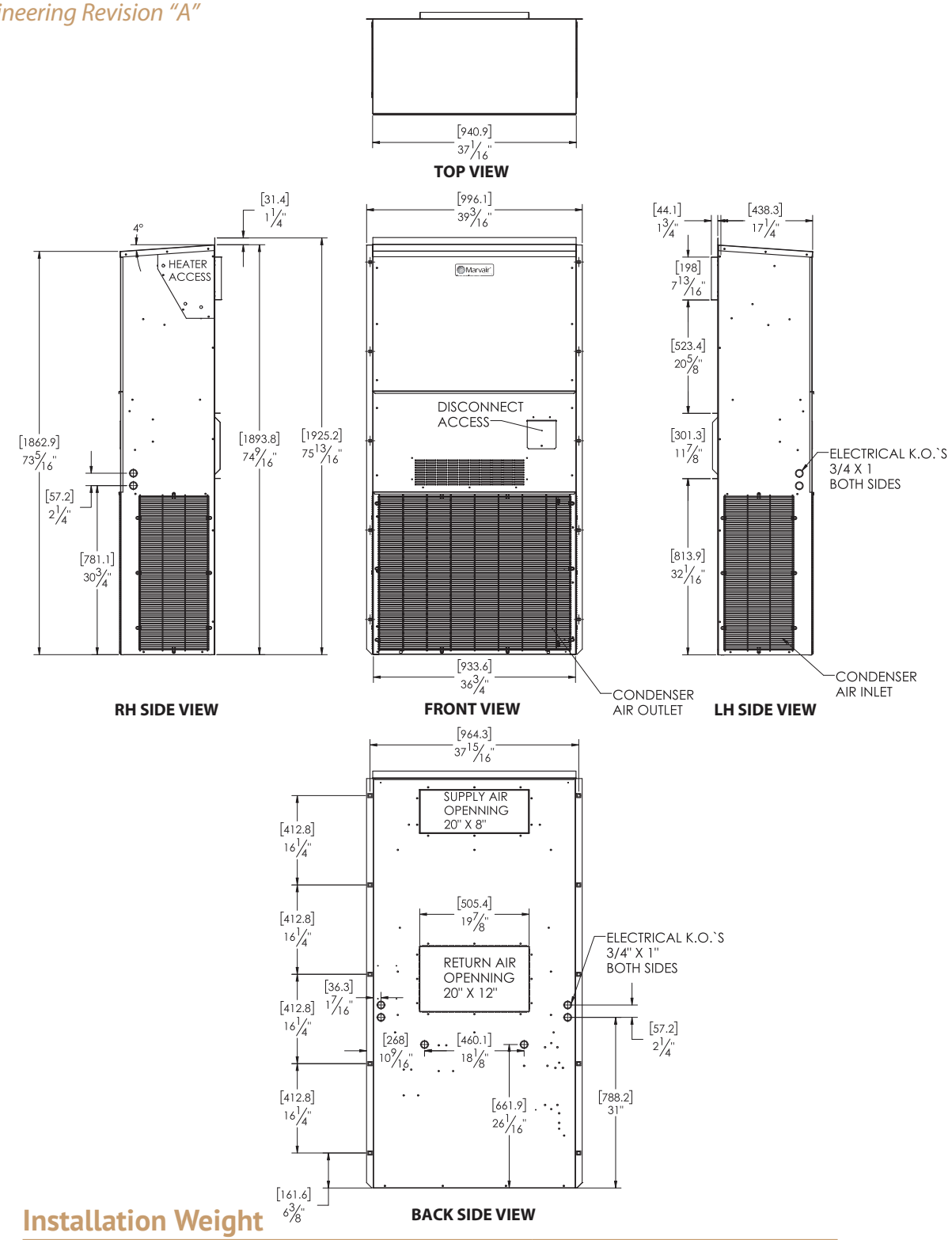
[1]HP = Heat Pump Unit Amps (includes Indoor Motor amps) [2]IBM = Indoor Blower Motor

Heating kW is rated at 240 volts on the 208-230v. (HPA & HPC) models. Derate heater output by 25% for operation at 208 volts. Heating kW is rated at 480 volts on the HPD models.

Total heating amps for single phase units with two circuits (#1 and #2) includes both circuits. Total heating and cooling amps includes all motors. Three phase models contain single phase motor loads. Values shown are maximum phase loads. Loads are not equally balanced on each phase.

Dimensional Data: MAH1020H/1024H & MAH2024H

Engineering Revision "A"



Installation Weight

MAH1020H/1024H & MAH2024H	Base	w/Economizer	w/3 Phase	w/Economizer & 3 Phase
Pounds	337	357	356	376
Kilograms	153	162	161	171

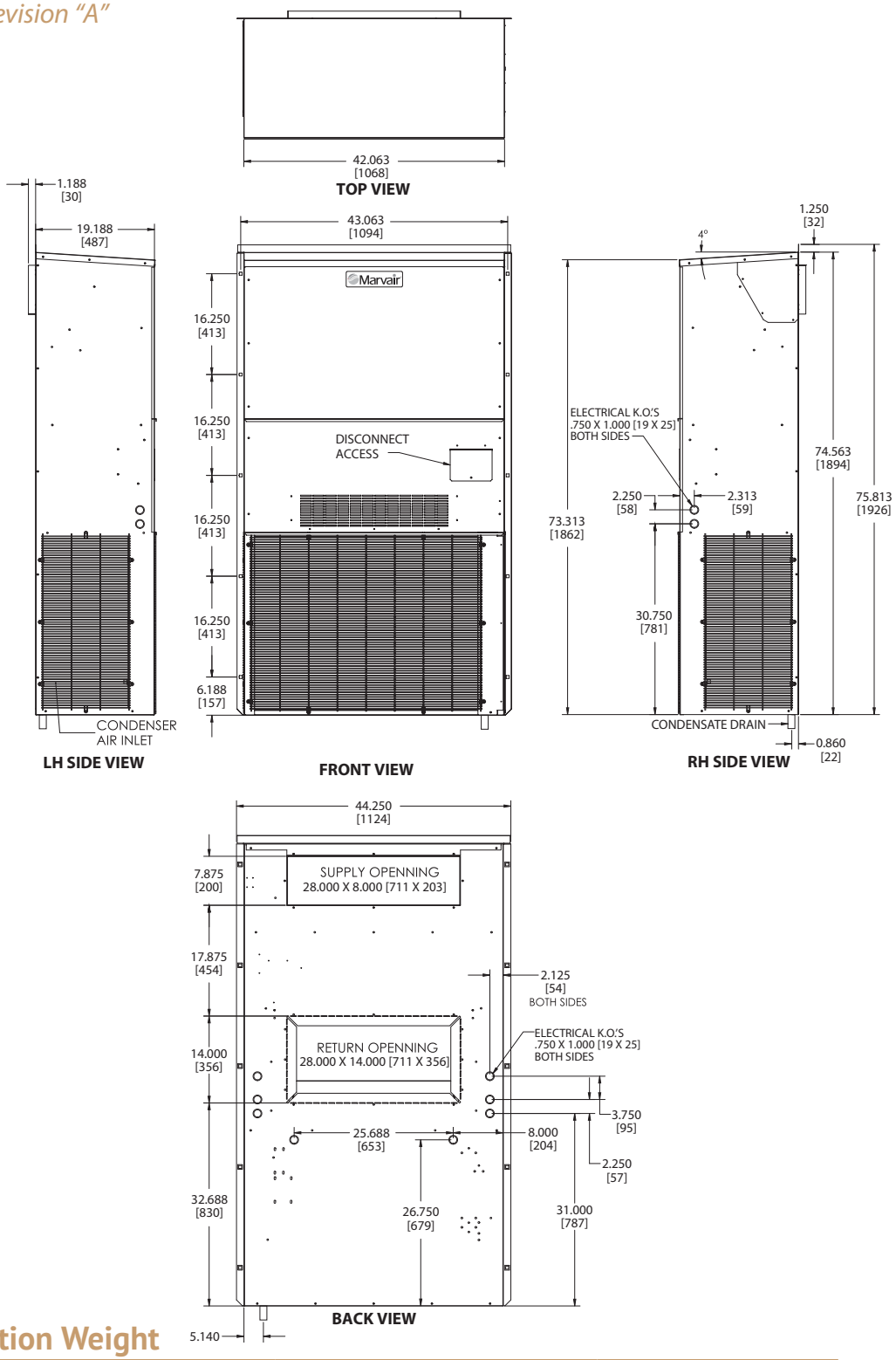
Filter Size

MAH1020H/1024H & MAH2024H	INCHES	MILLIMETERS	PART NUMBER	FILTERS PER UNIT	MERV RATING
RETURN AIR FILTER	16 x 25 x 2	406 x 635 x 51	80137	1	8 (STD)

Note: All overall outside dimensions are given with +/- .250" (6mm) tolerance.

Dimensional Data: MAH1030H/1036H & MAH2030H/2036H

Engineering Revision "A"



Installation Weight

MAH1030H/1036H & MAH2030H/2036H	Base	w/Economizer	w/3 Phase	w/Economizer & 3 Phase
Pounds	397	419	416	438
Kilograms	180	190	189	199

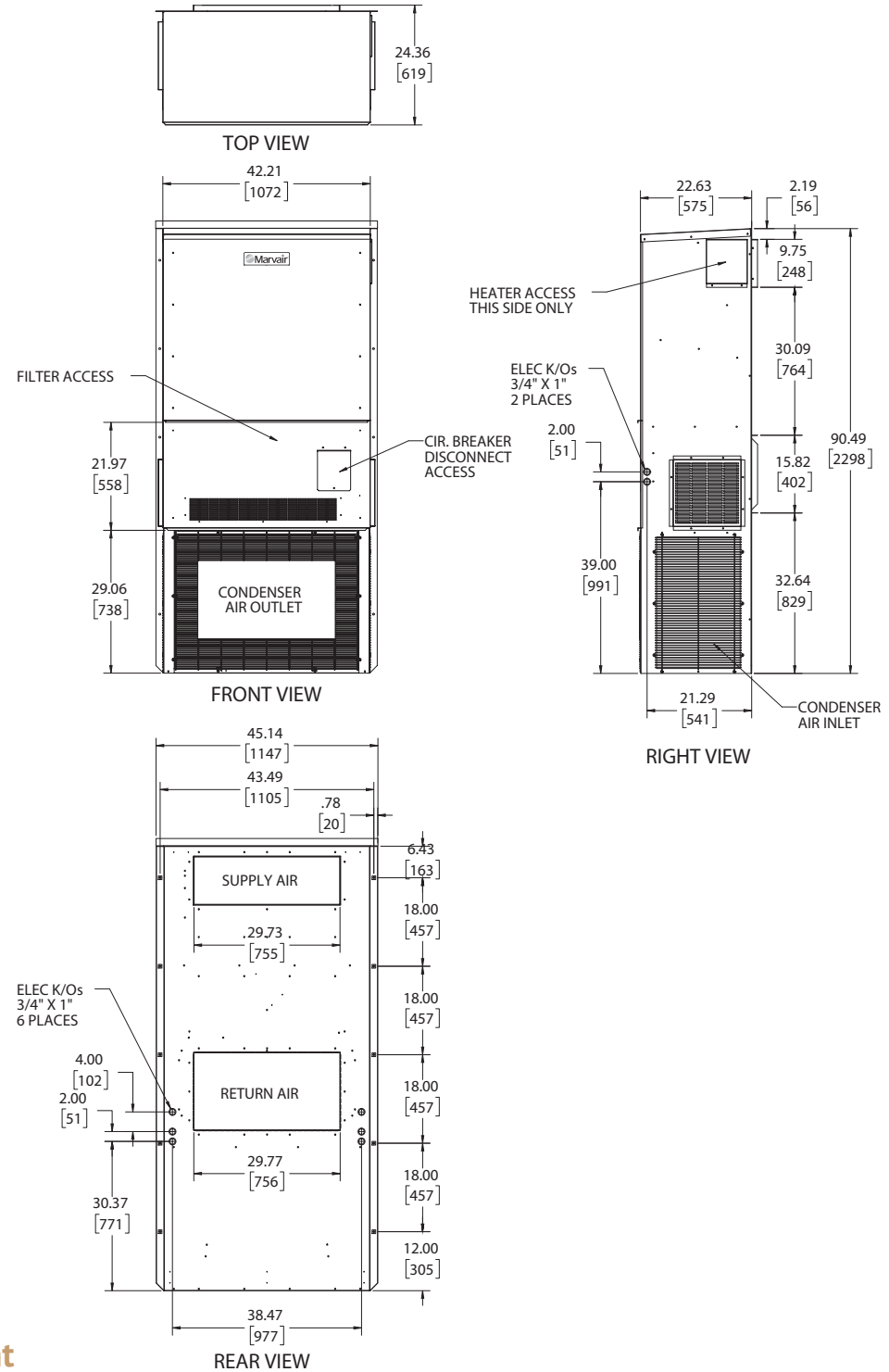
Filter Size

MAH1030H/1036H & MAH2030H/2036H	INCHES	MILLIMETERS	PART NUMBER	FILTERS PER UNIT	MERV RATING
RETURN AIR FILTER	18 x 30 x 2	457 x 762 x 51	93184	1	8 (STD)

Note: All overall outside dimensions are given with +/- .250" (6mm) tolerance.

Dimensional Data: MAH1042H/1048H & MAH2042H/2048H

Engineering Revision "D"



Installation Weight

MAH1042H MAH1048H MAH2042H MAH2048H	Base	w/Economizer	w/3 Phase	w/Economizer & 3 Phase
Pounds	469	492	522	545
Kilograms	213	223	237	247

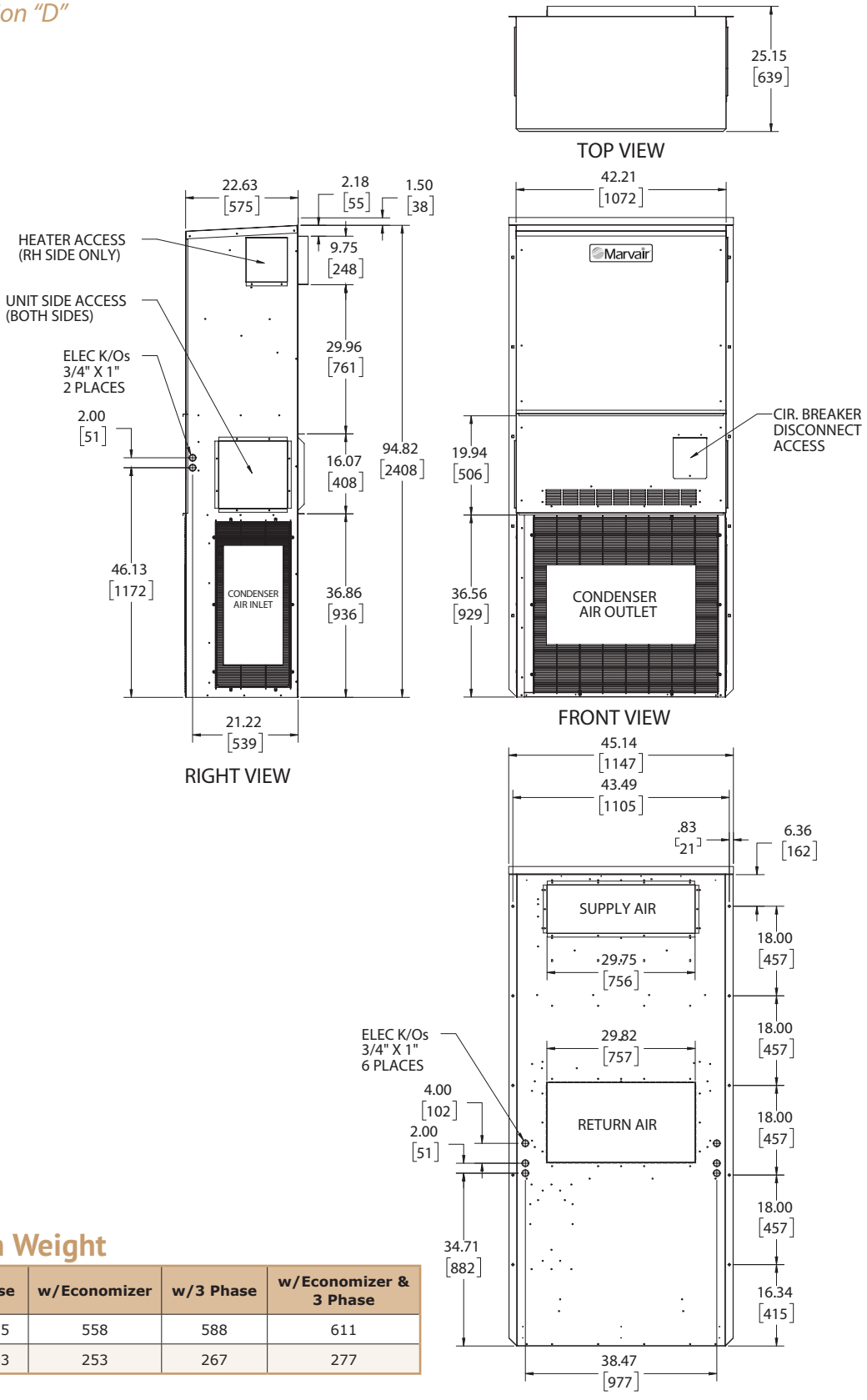
Filter Size

MAH1042H/1048H MAH2042H/2048H	INCHES	MILLIMETERS	PART NUMBER	FILTERS PER UNIT	MERV RATING
RETURN AIR FILTER	36½ x 22 x 2	927 x 559 x 51	80162	1	8 (STD)

Note: All overall outside dimensions are given with +/- .250" (6mm) tolerance.

Dimensional Data: MAH1060H & MAH2060H

Engineering Revision "D"



Installation Weight

MAH1060H MAH2060H	Base	w/Economizer	w/3 Phase	w/Economizer & 3 Phase
Pounds	535	558	588	611
Kilograms	243	253	267	277

Filter Size

MAH1060H MAH2060H	INCHES	MILLIMETERS	PART NUMBER	FILTERS PER UNIT	MERV RATING
RETURN AIR FILTER	36½ x 22 x 2	927 x 559 x 51	80162	1	8 (STD)

Note: All overall outside dimensions are given with +/- .250" (6mm) tolerance.

Notes

Notes

Please consult the Marvair® website at www.marvair.com for the latest product literature. Detailed dimensional data is available upon request. A complete warranty statement can be found in each product's Installation/Operation Manual, on our website or by contacting Marvair at 229-273-3636. As part of the Marvair continuous improvement program, specifications are subject to change without notice.

Marvair®
An ACS Brand
P.O. Box 400 • Cordele, GA 31010
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Designed, Engineered & Assembled In the USA

Attachment D: Control Systems

San Bernardino County

Detailed Replace HVAC Controls Inventory - San Bernardino County

ALLIANCE BUILDING SOLUTIONS

County of San Bernardino: Sheriff Headquarters: Replace Select HVAC Controls

General Information				Existing Equipment Data								Proposed Controls Data			
ID Tag	Location	Building	Unit Location	System Type	Make	Model	Size Tons (pre)	SEER (pre)	Unit Condition	Replace Unit? (Y/N)	Add Controls? (Y/N)	Proposed System Type	Proposed Make: Model	Size Tons (post)	SEER (post)
AHU-4	Sheriff Headquarters	Main	Roof	Air Handling Unit	Pace	P33AF/P40AFX	51.9	0.0	Poor	Y	Y	New HVAC Controls	Siemens: Desigo	51.9	n/a
AHU-1	Sheriff Headquarters	Main	Roof	Air Handling Unit	Pace	P30AFX	41.7	0.0	Poor	Y	Y	New HVAC Controls	Siemens: Desigo	41.7	n/a
AHU-5	Sheriff Headquarters	Main	Roof	Air Handling Unit	Pace	P24AFX	28.0	0.0	Poor	Y	Y	New HVAC Controls	Siemens: Desigo	28.0	n/a
AHU-3	Sheriff Headquarters	Main	Roof	Air Handling Unit	Pace	P36AFX	72.3	0.0	Poor	Y	Y	New HVAC Controls	Siemens: Desigo	72.3	n/a
AHU-2	Sheriff Headquarters	Main	Roof	Air Handling Unit	Pace	P33AF/P40AFX	56.1	0.0	Poor	Y	Y	New HVAC Controls	Siemens: Desigo	56.1	n/a
AHU-6	Sheriff Headquarters	Main	Roof	Air Handling Unit	Pace	P36F/P44AFX	68.6	0.0	Poor	Y	Y	New HVAC Controls	Siemens: Desigo	68.6	n/a
AC-2	Sheriff Headquarters	Main	Roof	Package Unit (cooling only)	Trane	TCH300F4F0AB	25.0	10.4	Fair	Y	Y	New HVAC Controls	Siemens: Desigo	25.0	17
AC-1	Sheriff Headquarters	Main	Roof	Package Unit (cooling only)	Trane	TCH300F4F0AB	25.0	10.4	Fair	Y	Y	New HVAC Controls	Siemens: Desigo	25.0	17
AC-3	Sheriff Headquarters	Main	Roof	Package Unit (cooling only)	Trane	THC063A4B0A	5.0	11.7	Fair	Y	Y	New HVAC Controls	Siemens: Desigo	5.0	17
AC-4	Sheriff Headquarters	Main	Roof	Package Unit (cooling only)	Trane	THC06SA4B0A	5.0	11.7	Fair	Y	Y	New HVAC Controls	Siemens: Desigo	5.0	17
FC-1	Sheriff Headquarters	Main	Interior	Fan Coil Unit	-	-	1.3	0.0	Poor	Y	Y	New HVAC Controls	Siemens: Desigo	1.3	n/a
FC-2	Sheriff Headquarters	Main	Interior	Fan Coil Unit	-	-	1.0	0.0	Poor	Y	Y	New HVAC Controls	Siemens: Desigo	1.0	n/a
FC-3	Sheriff Headquarters	Main	Interior	Fan Coil Unit	-	-	1.0	0.0	Poor	Y	Y	New HVAC Controls	Siemens: Desigo	1.0	n/a

Detailed Replace HVAC Controls Inventory - San Bernardino County

ALLIANCE BUILDING SOLUTIONS

County of San Bernardino: Old Crime Lab: Replace Select HVAC Controls

General Information				Existing Equipment Data								Proposed Controls Data			
ID Tag	Location	Building	Unit Location	System Type	Make	Model	Size Tons (pre)	SEER (pre)	Unit Condition	Replace Unit? (Y/N)	Add Controls? (Y/N)	Proposed System Type	Proposed Make: Model	Size Tons (post)	SEER (post)
AC-14	Old Crime Lab	Main	Roof	Gas Package Unit	ICP	PGD336060	3.0	11.7	Poor	Y	Y	New HVAC Controls	Pelican: -	3	**15**
AC-5	Old Crime Lab	Main	Roof	Gas Package Unit	Trane	YHC036	3.0	11.7	Poor	Y	Y	New HVAC Controls	Pelican: -	3	17
AC-6	Old Crime Lab	Main	Roof	Gas Package Unit	Trane	YHC036	3.0	11.7	Poor	Y	Y	New HVAC Controls	Pelican: -	3	17
AC-4	Old Crime Lab	Main	Roof	Gas Package Unit	Trane	YHC060	5.0	11.7	Poor	Y	Y	New HVAC Controls	Pelican: -	5	17
AC-3	Old Crime Lab	Main	Roof	Gas Package Unit	Trane	YHC048A4RL	4.0	11.7	Poor	Y	Y	New HVAC Controls	Pelican: -	4	17
AC-2	Old Crime Lab	Main	Roof	Gas Package Unit	Trane	YHC072	6.0	11.7	Poor	Y	Y	New HVAC Controls	Pelican: -	6	17
AC-1	Old Crime Lab	Main	Roof	Gas Package Unit	Trane	YHC036	3.0	11.7	Poor	Y	Y	New HVAC Controls	Pelican: -	3	17
n/a	Old Crime Lab	Main	Roof	Gas Package Unit	Armstrong	RPGE13A48100LP-3A	4.0	13.0		N	Y	New HVAC Controls	Pelican: -	4	13
n/a	Old Crime Lab	Main	Roof	Gas Package Unit	Existing HVAC		4.0	#N/A		N	Y	New HVAC Controls	Pelican: -	4	13

Detailed Replace HVAC Controls Inventory - San Bernardino County

ALLIANCE BUILDING SOLUTIONS

County of San Bernardino: County Building: Replace Select HVAC Controls

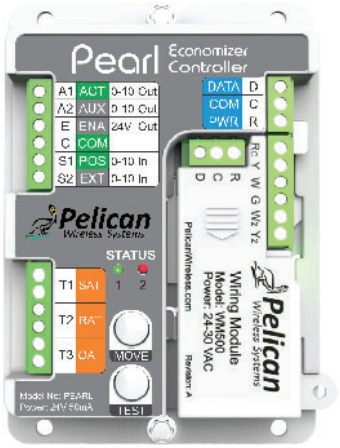
General Information				Existing Equipment Data								Proposed Controls Data			
ID Tag	Location	Building	Unit Location	System Type	Make	Model	Size Tons (pre)	SEER (pre)	Unit Condition	Replace Unit? (Y/N)	Add Controls? (Y/N)	Proposed System Type	Proposed Make: Model	Size Tons (post)	SEER (post)
HP-24	County Building	Main	Roof	Package Heat-Pump	Carrier	50HJQ005	4.0	11.7	Poor	Y	Y	New HVAC Controls	Pelican: -	4	***15.5***
HP-6	County Building	Main	Roof	Package Heat-Pump	Carrier	50HJQ007	6.0	11.7	Poor	Y	Y	New HVAC Controls	Pelican: -	6	***17***
HP-7	County Building	Main	Roof	Package Heat-Pump	Carrier	50HJQ004	3.0	11.8	Poor	Y	Y	New HVAC Controls	Pelican: -	3	***15.5***
HP-8	County Building	Main	Roof	Package Heat-Pump	Carrier	50HJQ005	4.0	11.7	Poor	Y	Y	New HVAC Controls	Pelican: -	4	***15.5***
HP-9	County Building	Main	Roof	Package Heat-Pump	Carrier	50HJQ005	4.0	11.7	Poor	Y	Y	New HVAC Controls	Pelican: -	4	***15.5***
HP-22	County Building	Main	Roof	Package Heat-Pump	Carrier	50HJQ007	6.0	10.5	Poor	Y	Y	New HVAC Controls	Pelican: -	6	***17***
HP-16	County Building	Main	Roof	Package Heat-Pump	Carrier	50HJQ006	5.0	11.7	Poor	Y	Y	New HVAC Controls	Pelican: -	5	***15.5***
HP-13	County Building	Main	Roof	Package Heat-Pump	Carrier	50HJQ005	4.0	11.7	Poor	Y	Y	New HVAC Controls	Pelican: -	4	***15.5***
HP-21	County Building	Main	Roof	Package Heat-Pump	Carrier	50HJQ007	6.0	10.5	Poor	Y	Y	New HVAC Controls	Pelican: -	6	***17***
HP-14	County Building	Main	Roof	Package Heat-Pump	Carrier	50HJQ004	3.0	11.8	Poor	Y	Y	New HVAC Controls	Pelican: -	3	***15.5***
HP-15	County Building	Main	Roof	Package Heat-Pump	Carrier	50HJQ006	5.0	11.7	Poor	Y	Y	New HVAC Controls	Pelican: -	5	***15.5***
HP-2	County Building	Main	Roof	Package Heat-Pump	Carrier	50HJQ006	5.0	11.7	Poor	Y	Y	New HVAC Controls	Pelican: -	5	***15.5***
HP-3	County Building	Main	Roof	Package Heat-Pump	Carrier	50HJQ005	4.0	11.7	Poor	Y	Y	New HVAC Controls	Pelican: -	4	***15.5***
HP-4	County Building	Main	Roof	Package Heat-Pump	Carrier	50HJQ006	5.0	11.7	Poor	Y	Y	New HVAC Controls	Pelican: -	5	***15.5***
HP-1	County Building	Main	Roof	Package Heat-Pump	Carrier	50HJQ007	6.0	10.5	Poor	Y	Y	New HVAC Controls	Pelican: -	6	***17***
HP-5	County Building	Main	Roof	Package Heat-Pump	Carrier	50HJQ007	6.0	10.5	Poor	Y	Y	New HVAC Controls	Pelican: -	6	***17***
HP-23	County Building	Main	Roof	Package Heat-Pump	Carrier	50HJQ004	3.0	11.8	Poor	Y	Y	New HVAC Controls	Pelican: -	3	***15.5***
HP-17	County Building	Main	Roof	Package Heat-Pump	Carrier	50HJQ007	6.0	10.5	Poor	Y	Y	New HVAC Controls	Pelican: -	6	***15.5***
HP-11	County Building	Main	Roof	Package Heat-Pump	Carrier	50HJQ004	3.0	11.8	Poor	Y	Y	New HVAC Controls	Pelican: -	3	***15.5***
HP-18	County Building	Main	Roof	Package Heat-Pump	Carrier	50HJQ007	6.0	10.5	Poor	Y	Y	New HVAC Controls	Pelican: -	6	***17***
HP-19	County Building	Main	Roof	Package Heat-Pump	Carrier	50HJQ007	6.0	10.5	Poor	Y	Y	New HVAC Controls	Pelican: -	6	***17***
HP-20	County Building	Main	Roof	Package Heat-Pump	Carrier	50HJQ004	3.0	11.8	Poor	Y	Y	New HVAC Controls	Pelican: -	3	***15.5***
HP-25	County Building	Main	Roof	Package Heat-Pump	Carrier	50JS-030	2.5	9.0	Poor	Y	Y	New HVAC Controls	Pelican: -	2.5	***15.5***
HP-10	County Building	Main	Roof	Package Heat-Pump	Carrier	50HJQ007	6.0	10.5	Poor	Y	Y	New HVAC Controls	Pelican: -	6	***17***
HP-12	County Building	Main	Roof	Split Condenser	Carrier	24ABR348A520	4.0	11.7	Poor	Y	Y	New HVAC Controls	Pelican: -	4	***16***

Detailed Replace HVAC Controls Inventory - San Bernardino County

ALLIANCE BUILDING SOLUTIONS

County of San Bernardino: Sheriff Training Center: Replace Select HVAC Controls															
General Information				Existing Equipment Data								Proposed Controls Data			
ID Tag	Location	Building	Unit Location	System Type	Make	Model	Size Tons (pre)	SEER (pre)	Unit Condition	Replace Unit? (Y/N)	Add Controls? (Y/N)	Proposed System Type	Proposed Make: Model	Size Tons (post)	SEER (post)
	Sheriff Training Center	Main	Wall & Roof Mount	Combined Unit Types	Combined	Mix	131.5				Y	New HVAC Controls	Pelican: -	131.5	various

PEARL Economizer



ACCESSORY
Outside Air Damper management for a Pelican Thermostat. (Only compatible with Pelican Thermostats: TS200, TS250, TS200H, TS250H).

ECONOMIZATION MANAGEMENT
Combining the PEARL with a Pelican TS200 or TS200H delivers complete Internet-enabled economizer control. Pelican uses outside air temperature, supply temperature, space temperature, thermostat set point, and the demand in the space to intelligently decide when to use outside air.

INDOOR AIR QUALITY CONTROL
The PEARL has built-in Internet Enabled fault detection and diagnostic feedback. By monitoring space, supply, and outside temperatures, and the outside damper position, the PEARL is able to send an alarm if the HVAC equipment or the outside air damper fails. Alarms are sent via email, text, and/or displayed on the Pelican Web App.

INSTALLATION AND CONFIGURATION
The PEARL only requires three standard thermostat wires between it and a Pelican thermostat. Compatible with industry standard unshielded thermostat wiring up to 500 feet between devices. Configuration is accomplished through a single one-button calibration process. The PEARL goes through a self testing and adjustment algorithm. Adjustments of default settings are done through the Pelican Web App.

HISTORICAL DATA
All temperatures (outside, supply, return, and conditioned space) and CO2 levels can be viewed in real-time online via the Pelican Web App. Damper position, calls for Heat, Cool, and/or Fan can also be viewed online. Two years of historical tracking of trend data is stored and viewable on online historical graphs.

CERTIFIED
California Energy Commission Certified
California Title 24 Compliant
ASHRAE Compliant

Specifications

POWER		
	Hardwire	24VAC; 50 mA
OUTPUTS		
	(A1)	0-10VDC (Actuator)
	(A2)	0-10VDC (VFD)
	(E)	24VAC (Exhaust Fan)
	(Y, W, G, Y2, W2)	24VAC
INPUTS		
	(S1)	0-10VDC (Actuator)
	(S2)	0-10VDC (Future Use)
	(T1)	10K Type II (Supply Air)
	(T2)	10K Type II (Return Air)
	(T3)	10K Type II (Outside Air)
RANGES		
	Operating Range	-20°F to 160°F
	Operating Humidity (%RH)	5 to 90% RH
	External Temperature Range	-20°F to 180°F
SIZE		
	Inch	H 5.2 x W 3.6 x D 1.1
	mm	H 63.5 x W 63.5 x D 19.05
	Vertical Mounting	

Designed and assembled in the USA
5-Year Limited Warranty

Pelican Wireless Systems | 2655 Collier Canyon Road, Livermore CA 94551
(888) 512-0490 | sales@pelicanwireless.com

RT2-DC Wireless Remote Sensor

A Pelican Remote Wireless Sensor (RT2-DC) allows for easy detection, averaging, and data logging of room temperatures across multiple areas. Each sensor communicates on the wireless to a single primary Pelican thermostat for temperature averaging and/or to the Pelican Connect app for temperature monitoring. If averaging, weighting between the primary thermostat and its remote wireless sensor(s) are customizable through the app.

MULTIPLE LOCATIONS
Up to eight Remote Thermostats can be linked to a single master thermostat. This provides maximum flexibility when managing a large space.

MANAGED WEIGHTING
All weighting is managed through the Pelican Web App. Setting different weights between multiple sensor locations is as easy as moving a slider on a computer screen.

AUTOMATED BALANCING
At times when temperatures become out of balance between different sensing locations, the master Pelican thermostat will automatically operate the fan to recirculate air to balance both conditioned spaces.

GRAPHICAL DISPLAY
Temperatures from each sensor are virtually stored in real-time and can be displayed on a historical graph using the Pelican app. This helps for managing the overall space difference and allows easy identification of areas where balance can be improved for comfort.

BATTERY POWERED
The Remote sensor is available as a battery powered device (Two AA batteries) for installation convenience in locations where wired power is not available. Batteries are designed to last up to a year with app and on-screen replace battery notifications.

TOUCH DISPLAY
The RT2 utilizes the same electronic ink technology as Pelican Touch thermostats providing an intuitive user interface, connection process, and other information directly on the screen.

Designed and assembled in the USA
5-Year Limited Warranty

CONTAINS FCC ID OA3MRF24J40MA

Specifications

POWER
- (2) AA Batteries (included)

COMPATIBILITY
- Temperature Detection Only
- Works with an Pelican primary thermostat
- Up to eight Remote Wireless Sensors can be averaged to a single primary Pelican thermostat

WIRELESS
- Does NOT Repeat Wireless Signals

SYSTEM MANAGEMENT
- Keypad Lockout
- Online Weighted Temperature Averaging
- Set point Limiting
- Set Remote Sensor as 100% of Master Thermostat's Temperature Detection

THERMOSTAT RANGE

Operating Range:	-4°F to 122°F
Differential Temperature:	±0.5°F
Operating Humidity (%RH):	5 to 90% RH; non-condensing
Storage Temperature:	-20°F to 160°F

SIZE

Inch	H 5.2" x W 3.9" x D 0.75"
mm	H 132 x W 99 x D 19

- Vertical Mounting. Mounts on vertical single gang ring.

Pelican Wireless Systems | 2655 Collier Canyon Road, Livermore CA 94551
(888) 512-0490 | sales@pelicanwireless.com

PELICAN

TA1 Temperature and Alarm Sensor

The TA1 is a wired thermostat accessory either used as an external temperature sensor or to provide an input for an external thermistor or a dry contact relay. The TA1 is compatible with the TS200, TS200H, TS250, and TS250H. Connecting the TA1 is simple and provides a wide range of input flexibility. Most common applications for a TA1 include: averaging temperature between it and a thermostat; using it as a thermostat's external temperature probe; mounting one in a coldbox for temperature monitoring; using one as an input for a supply air temperature probe; or using one as a dry-contact input for an occupancy sensor. Only one TA1 can be used per Pelican thermostat.

SPACE TEMPERATURE

Mounting a TA1 in a space and wiring it to a Pelican thermostat allows the TA1 to be set as the thermostat's temperature sensor for temperature control. The TA1 can also be set as an averaging temperature.

DUCT TEMPERATURE

The TA1 has a two-wire input for a 10K Type II external thermistor. Most commonly used to monitor discharge air or outside air.

COLDBOX MONITORING

Mounting a TA1 directly inside a coldbox provides virtual monitoring of the coldbox temperature. Pelican provides settable safe ranges for email/text notifications. For temperatures below -4°F an external thermistor will need to be used down to -20°F.

DRY-CONTACT ALARM

A TA1 can accept a dry contact relay. Pelican can send a uniquely named email or text message alarm if either the dry-contact opens or closes.

OCCUPANCY SENSOR INPUT

A TA1 can accept a dry-contact occupancy sensor. Thermostat will automatically adjust temperature settings based on occupancy.

Designed and assembled in the USA
5-Year Limited Warranty

Specifications

POWER
- Hardwire 24VAC, 60Hz; 50 mA
- Voltage Range: 23 - 30VAC
- Thermistor: 10K Type II

COMMUNICATION WIRING
- Three Wires to a Pelican Thermostat (TS200, TS200H, TS250, TS250H)
- R: 24VAC C: NEUTRAL D: DATA

OPERATING RANGE

Operating Range	-4°F to 160°F (-20°C to 50°C)
Operating Humidity (%RH)	5 to 90% RH; non-condensing
Storage Temperature	-20°F to 160°F

INPUT WIRING

External Probe	Two Wire, max 100 ft
Dry Contact Input	Two Wire, max 150 ft

DRY CONTACT INPUT

Alarming	N/O or N/C
Occupancy Sensor	N/O = Unoccupied N/C = Occupied

TEMPERATURE RANGE DETECTION

Internal Probe	-4°F to 120°F
External Probe	-20°F to 180°F

SIZE

Inch	H 2.5 x W 2.5 x D 0.75
mm	H 63.5 x W 63.5 x D 19

Vertical Mounting (with logo at the bottom)

Pelican Wireless Systems | 2655 Collier Canyon Road, Livermore CA 94551
(888) 512-0490 | sales@pelicanwireless.com

Pelican Wireless Extended Range Gateways - GW400 Series

Plug-and-Play Pelican Internet Connection

Pelican Gateways are simple bridges, which automatically connect all your on-site Pelican devices to your Pelican Web-app. Exceeding commercial secuirty standards, all communication is secure, encrypted, and reliable.

Pelican has two gateway options depending on your networking requirements. The GW400 connects to an existing business Ethernet network using a standard CAT 5 connection. The GW400-LTE is a cellular gateway, which runs on the Pelican AnyWhere 4G/LTE cellular network.

Both gateways can provide Internet connectivity for up to 2000 Pelican devices.

GW400 **GW400-LTE**

- Ideal for commercial customers
- Easy to install and set up
- Automatic Internet connection
- Supports up to 2000 Pelican wireless devices
- Uses Advanced Encryption Standards (AES) from the cloud to end device

ETHERNET CONNECTIVITY

The GW400 gateway is a plug-and-play wired Ethernet device. It plugs into an existing Ethernet switch or router and is designed to the highest enterprise security standards. It uses an outbound only connection, with encrypted end-to-end communication, and the option for DHCP (default) or Static IP addressing. Setup is fast and easy for any installation team.

CELLULAR CONNECTIVITY

The GW400-LTE gateway is an integrated cellular-enabled device, which connects your Pelican devices to the Internet. It can be installed anywhere there is cellular connectivity available, eliminating the need for a direct hardwired Ethernet source. It is designed to meet enterprise level security standards and will only communicate with Pelican products.

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GW400 / GW400-LTE Gateways

Key Features and Specifications

FEATURES

INTERNET ACCESS AND DEVICE CONNECTIVITY

- GW400 uses a standard Ethernet LAN/WAN port for Internet connectivity
- GW400-LTE includes an integrated 4G/LTE modem for cellular Internet connectivity
- Gateways support up to 2000 Pelican wireless device connections
- 2.4 GHz, Wireless 802.15.4
- Complies with Class B Part 15 of FCC rules
- Pelican's wireless network co-exists with other wireless network standards, including WiFi
- Self-creating and self-healing wireless mesh network

SECURITY

- Advanced Encryption Standards (AES) from the cloud direct to end Pelican device (does not de-encyrpt and re-encrypt)
- GW400 uses outbound established connections, no inbound firewall rules required
- GW400 defaults to DHCP or can be configured to a Static IP address
- GW400-LTE communicates on the Pelican AnyWhere cellular network*
- Gateways come factory locked to only allow for communication with other Pelican hardware
- Does not interact with customer's internal network
- Does not use WiFi (802.11) communication and remains separate from the business's enterprise WiFi network

*The Pelican AnyWhere Cellular Network requires you to agree to Pelican's cellular Terms of Service and any associated costs before service can be provided. This cellular service is provided by Pelican Wireless Systems and does not require you to sign any third-party cellular provider agreements.

Specifications

POWER
Hardwire 5 VDC; 200 mA (GW400)
Hardware 5 VDC; 2.0 A (GW400-LTE)

WIRELESS
2.4 GHz, IEEE 802.15.4
Complies with Class B Part 15 of FCC rules

TEMPERATURE
Operating Range -4°F to 122°F
Storage Range -20°F to 160°F

RELATIVE HUMIDITY (non-condensing)
5% to 90% Operating and Storage

CERTIFICATIONS
FCC (GW400 and GW400-LTE)
PTCRB (GW400-LTE)

SIZE
4.5-in x 3.5-in x 1.25-in (114 mm x 89 mm x 32 mm)
Antenna H 7.25-in (184 mm)

MOUNTS
Vertically on flat non-metallic surface

What's in the Box

GW400
Ethernet-enabled Gateway
120 VAC / 5 VAC Power Adapter
10-in CAT5 Ethernet Cable

GW400-LTE
Cellular-enabled Gateway
120 VAC / 5 VAC Power Adapter

Requirements

GW400 requires an active Ethernet port that provides outbound Internet connections (e.g., DSL, Cable, T1)

Web Browser to create a Pelican Site
(minimum of Firefox, Chrome, Safari, Internet Explorer 10, Edge, or any browser that supports HTML5)

PELICAN

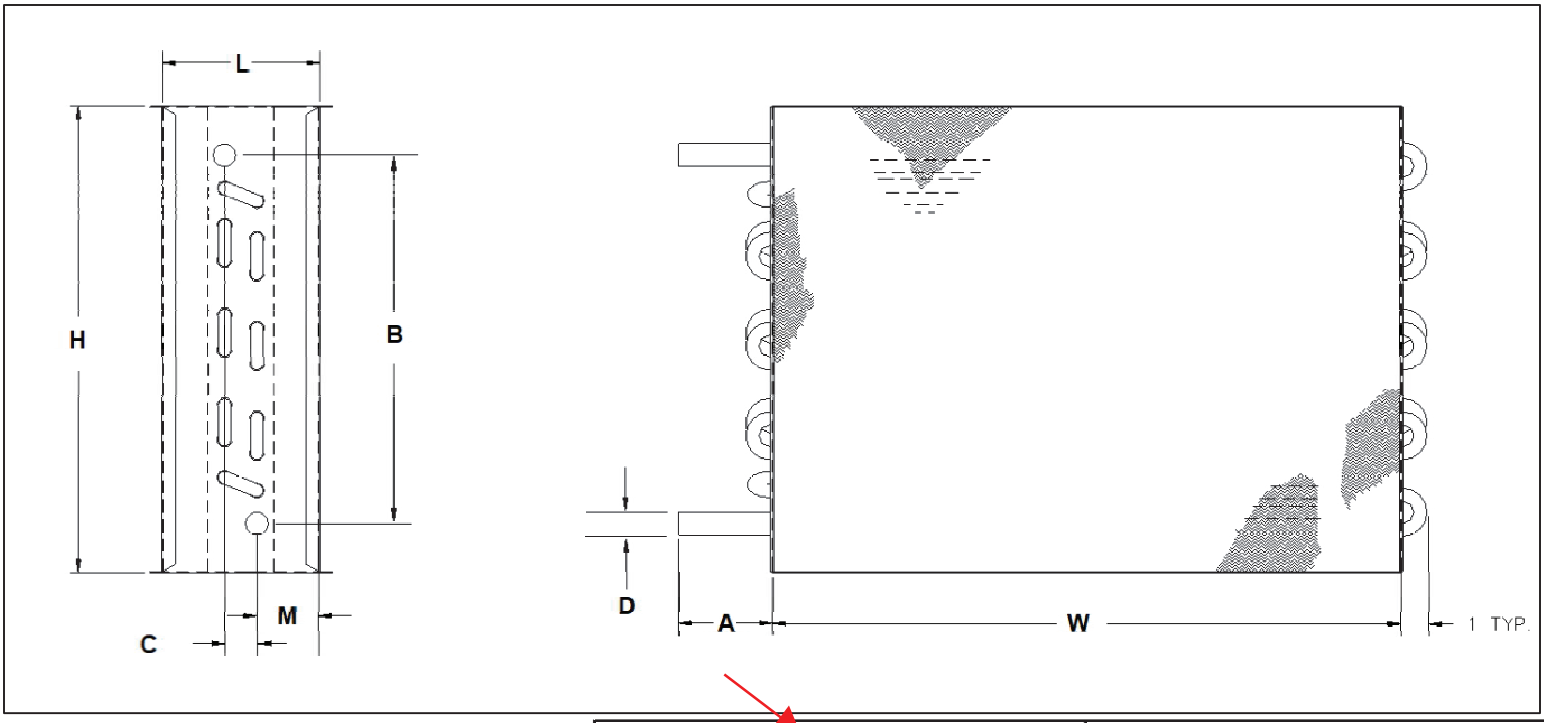
Pelican Wireless Systems | 2655 Collier Canyon Road, Livermore, CA 94551 | (888) 512-0490 | sales@pelicanwireless.com

www.PelicanWireless.com

DS-GW400-2

VAV Terminal Units and Reheat Coils

ESV Hot Water Reheat



					1 Row				2 Row			
Unit Size	H	W	L	M	A	B	C	D	A	B	C	D
4,5,6	7 7/8	12	5	1 3/4	3	6 1/4	0	1/2	3	8 3/4	0	5/8
7,8	10	12	5	1 3/4	3	8 3/4	0	1/2	2 4/7	8 3/4	0	5/8
9,10	12 3/4	14	5	1 3/4	4 1/4	10 7/8	1 1/8	7/8	4 1/4	11 1/2	1 1/16	7/8
12	15 1/4	16	5	1 3/4	4 1/4	13 3/8	1 1/8	7/8	4 1/4	14	1 1/16	7/8
14	17 3/4	20	7 1/2	1 3/4	4 1/4	15 7/8	1 1/8	7/8	4 1/4	16 1/2	1 1/16	7/8
16	17 3/4	24	7 1/2	1 3/4	4 1/4	15 7/8	1 1/8	7/8	4 1/4	16 1/2	1 1/16	7/8
24 x 16	17 3/4	38	5	1 3/4	4 1/4	15 7/8	1 1/8	7/8	4 1/4	16 1/2	1 1/16	7/8

					3 Row				4 Row			
Unit Size	H	W	L	M	A	B	C	D	A	B	C	D
4,5,6	7 7/8	12	7 1/4	1 3/4	4 1/4	5 7/8	2 3/16	7/8	4 1/4	6 1/4	3 1/4	7/8
7,8	10	12	7 1/4	1 3/4	4 1/4	8 3/8	2 3/16	7/8	4 1/4	9	3 1/4	7/8
9,10	12 3/4	14	7 1/4	1 3/4	4 1/4	10 7/8	2 3/16	7/8	4 1/4	11 1/2	3 1/4	7/8
12	15 1/4	16	7 1/4	1 3/4	4 1/4	13 3/8	2 3/16	7/8	4 1/4	14	3 1/4	7/8
14	17 1/2	20	9 3/4	1 3/4	4 1/4	15 7/8	2 3/16	7/8	4 1/4	16 1/2	3 1/4	7/8
16	17 3/4	24	9 3/4	1 3/4	4 1/4	15 7/8	2 3/16	7/8	4 1/4	16 1/2	3 1/4	7/8
24 x 16	17 3/4	38	7 1/4	1 3/4	4 1/4	15 7/8	2 3/16	7/8	4 1/4	16 1/2	3 1/4	7/8

General Description

- Coil tubing is 1/2 inch diameter 0.016" thick copper.
- Coil connection Tubing is 0.032" thick copper. (See dimension D for O.D. connection diameter)
- Aluminum plate fins, 10 per inch.
- Casing is 20 Gauge galvanized steel.
- Copper male solder connections.
- Connection is slip and drive to duct work down stream of terminal.
- Leak tested to 450 PSIG.
- Maximum working pressure, 360 PSIG
- Maximum 200 degree F water

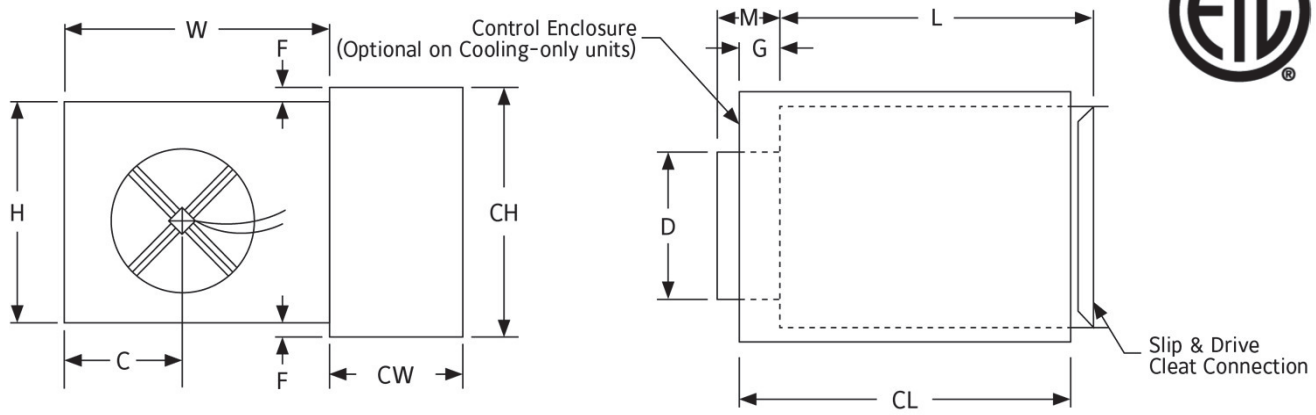
Unit Size	1 Row		2 Row	
	Water Weight (lbs)	Water Volume (gal)	Water Weight (lbs)	Water Volume (gal)
4,5,6	0.59	0.07	1.26	0.15
7,8	0.77	0.09	1.82	0.22
9,10	1.17	0.14	2.32	0.28
12	1.87	0.22	3.45	0.41
14	2.29	0.27	4.08	0.49
16	2.67	0.32	4.75	0.57
24 x 16	4.20	0.50	7.50	0.90

Note: For additional rows, add difference between the 1 and 2 rows coil capacity.
8.34 LBS / gallon of water

ESV

Single Duct Terminal Unit
Digital, Analog or Electric Control, Pressure Independent

☐ Digital Control, DESV ☐ Analog Control, AESV ☐ Electric Control, EESV



Right hand unit shown. All dimensions are in inches.

Size	CFM Range	D (H x W)	C	F	G	H	L	M	W	CH	CL	CW
4	0-225	3 7/8	6 1/2	2 1/8	7 3/8	8	15 1/2	5 3/8	12	12 1/4	18	6 1/2
5	0-350	4 7/8	6 1/2	2 1/8	7 3/8	8	15 1/2	5 3/8	12	12 1/4	18	6 1/2
6	0-500	5 7/8	6 1/2	2 1/8	7 3/8	8	15 1/2	3 3/8	12	12 1/4	18	6 1/2
7	0-650	6 7/8	6	1 1/8	7 3/8	10	15 1/2	3 3/8	12	12 1/4	18	6 1/2
8	0-900	7 7/8	6	1 1/8	7 3/8	10	15 1/2	3 3/8	12	12 1/4	18	6 1/2
9	0-1050	8 7/8	7	-	5 3/8	12 1/2	15 1/2	3 3/8	14	12 1/4	18	6 1/2
10	0-1400	9 7/8	7	-	5 3/8	12 1/2	15 1/2	3 3/8	14	12 1/4	18	6 1/2
12	0-2000	11 7/8	8	-	5 3/8	15	15 1/2	3 3/8	16	12 1/4	18	6 1/2
14	0-3000	13 7/8	10 1/2	-	3 3/8	17 1/2	15 1/2	3 3/8	20	12 1/4	18	6 1/2
16	0-4000	15 7/8	13 1/2	-	3 3/8	18	15 1/2	3 3/8	24	12 1/4	18	6 1/2
20	0-2000	7 1/2 x 12 1/4	8	1/4	3	10	15 1/2	3 3/8	16	10 1/4	15 1/4	6 1/2
30	0-4000	7 1/2 x 23 3/4	13 5/8	1/4	3	10	15 1/2	3 3/8	27 1/4	10 1/4	15 1/4	6 1/2
40	0-8000	15 7/8 x 23 7/8	19	1 1/8	5 3/8	18	15	3 3/8	38	12 1/4	18	6 1/2
5E	0-350	4 7/8	6	2 1/8	7 3/8	10	15 1/2	3 3/8	12	12 1/4	18	6 1/2
6E	0-500	5 7/8	6	2 1/8	7 3/8	10	15 1/2	3 3/8	12	12 1/4	18	6 1/2
7E	0-650	6 7/8	7	1 1/8	5 3/8	12 1/2	15 1/2	3 3/8	14	12 1/4	18	6 1/2
8E	0-900	7 7/8	7	1 1/8	5 3/8	12 1/2	15 1/2	3 3/8	14	12 1/4	18	6 1/2
1E	0-1400	9 7/8	8	-	5 3/8	15	15 1/2	3 3/8	16	12 1/4	18	6 1/2
2E	0-2000	11 7/8	10 1/2	-	3 3/8	17 1/2	15 1/2	3 3/8	20	12 1/4	18	6 1/2
4E	0-3000	13 7/8	13 1/2	-	3 3/8	18	15 1/2	3 3/8	24	12 1/4	18	6 1/2

This submittal is meant to demonstrate general dimensions of this product. The drawings are not meant to detail every aspect of the product. Drawings are not to scale. Titus reserves the right to make changes without written notice.

General Description

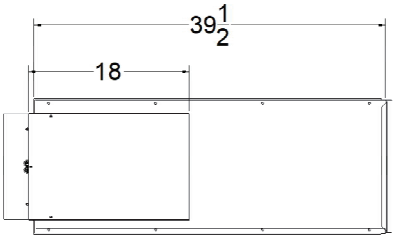
- Heavy gauge steel housing. Mechanically sealed and gasketed, leak resistant construction. Less than 2% of nominal cfm at 1.5" sp wg.
- Dual density internal insulation, treated to resist air erosion. Meets requirements of NFPA 90A and UL 181.
- Units equipped with the Titus II velocity controller can either be direct acting or reverse acting, with the damper either normally open or normally closed. Controller maintains constant span and start point. (Span and start point are adjustable.)
- Rectangular discharge opening is designed for slip and drive cleat duct connection.
- Multipoint center averaging inlet velocity sensor.
- Control packages can be factory mounted by Titus.
- Choice of right hand or left hand control location.
- Units equipped with the Titus I velocity controller are available in both direct acting / normally open and reverse acting / normally closed operating modes.
- Model DESV without coils can be installed horizontally, vertically, or at any angle. Operation is not affected by position. For units with coils, consult technical support.
- Gauge tees for cfm measurement.
- OSHPD Seismic Certification: OSP-0352-10
- Only Titus Alpha digital and pneumatic controls approved for seismic installation.

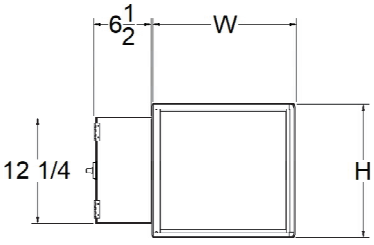
Accessories (Optional)

Check ☑ if provided.

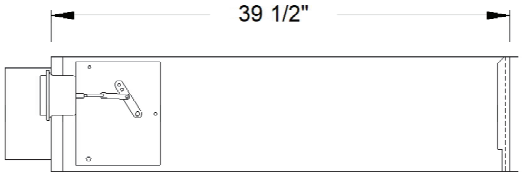
- ☐ 24 V Control Transformer
- ☐ Dust Tight Enclosure Seal
- ☐ Fibre Free Liner
- ☐ ½" EcoShield Liner
- ☐ ½" Fibre Free Liner
- ☐ 1" Fiberglass Liner
- ☐ 1" EcoShield Liner
- ☐ 1" Fibre Free Liner
- ☐ Low Leakage Seal/Test/Certify
- ☐ SteriLoc Liner
- ☐ UltraLoc Liner
- ☐ ½" EcoShield Liner (Foil Face)
- ☐ 1" EcoShield Liner (Foil Face)
- ☐ Disconnect Switch
- ☐ Hanger Brackets
- ☐ Removable Air Flow Sensor
- ☐ Bottom Access Door
- ☐ OSP & IBC -S Seismic Certification
- ☐ Red List Compliant "Google" Gasketing
- ☐ Metal Controls Enclosure

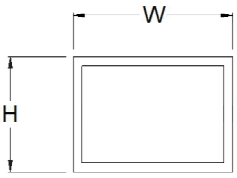
☐ Integral Sound Attenuator





DESV, AESV, EESV





PESV

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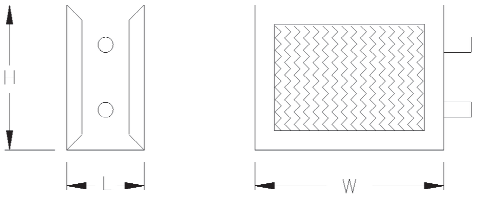
Accessories (Optional)

☐ Hot Water Coil Section

- Aluminum ripple fins, 10 per inch
- Coil pipe connections are male, sweat, type "L" copper. Connection sizes on unit sizes 04-08 are $^{1}/_{2}$" OD for 1 row coil and $^{5}/_{8}$" on 2 row coils. All other coils have $^{7}/_{8}$" OD.
- Coil is installed at discharge of unit.
- On units with attenuators, coil are installed at the discharge of attenuator.
- Coils rated and certified to AHRI Standard 410

☐ 1 Row
☐ 2 Row
☐ 3 Row
☐ 4 Row



☐ Electric Coil Section ☐ Optional SCR Controlled Electric Heater ☐ Optional Lynergy Controlled Electric Heater

Standard Features

- Single side access to low voltage, high voltage, and electric heater controls.
- Automatic reset thermal cutouts, one per element
- Manual reset secondary protection.
- Positive pressure flow switch
- Magnetic contactor for each step.
- Slip and drive cleat discharge duct connection.

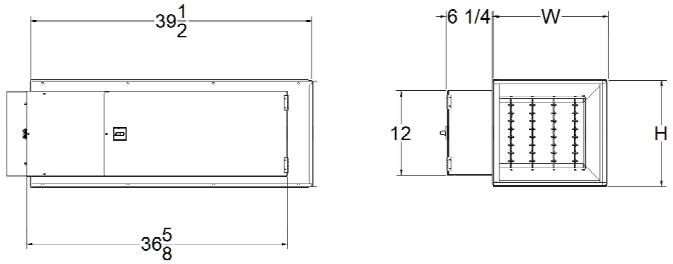
Options

☐ Fuse Block
☐ Disconnect switch, door interlock type
☐ Dust tight construction
☐ Mercury contactors

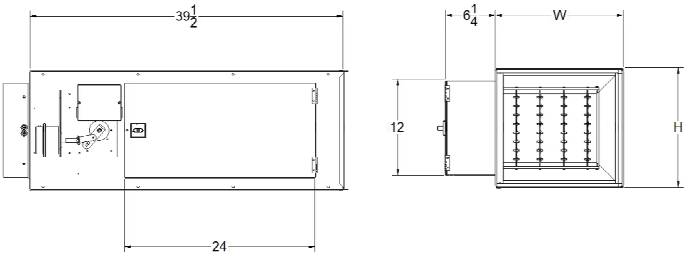
Supply Voltage

☐ 120V, 1 ph, 60Hz
☐ 208V, 1 ph, 60Hz
☐ 240V, 1 ph, 60Hz
☐ 277V, 1 ph, 60Hz
☐ 208V, 3 ph, 60Hz
☐ 480V, 3 ph, 60Hz (4 wire wye standard)

DESV, AESV, EESV



PESV



Size	H	W	Water Coil	
			L (1-2 Row)	L (3-4 Row)
4	8	12	5	7 1/4
5	8	12	5	7 1/4
6	8	12	5	7 1/4
7	10	12	5	7 1/4
8	10	12	5	7 1/4
9	12 1/2	14	5	7 1/4
10	12 1/2	14	5	7 1/4
12	15	16	5	7 1/4
14	17 1/2	20	7 1/2	9 3/4
16	18	24	7 1/2	9 3/4
20	10	16	5	7 1/4
30	10	27 1/4	5	7 1/4
40	18	38	5	7 1/4

The total length of the ESV unit is the summation of the unit length (with or without attenuator) and the length of the optional water coil.

This submittal is meant to demonstrate general dimensions of this product. The drawings are not meant to detail every aspect of the product. Drawings are not to scale. Titus reserves the right to make changes without written notice.

½" EcoShield Insulation

Insulation Characteristics

Material:	Natural Fiber Duct Liner
Thickness:	1/2 inch
R-Value:	2.0 ft^2 °F h/Btu @ 75°F
Density:	3.0 lbs/ft^3
Flame Spread:	less than 25
Smoke Density:	less than 50
Mold Growth:	None

Code Compliances

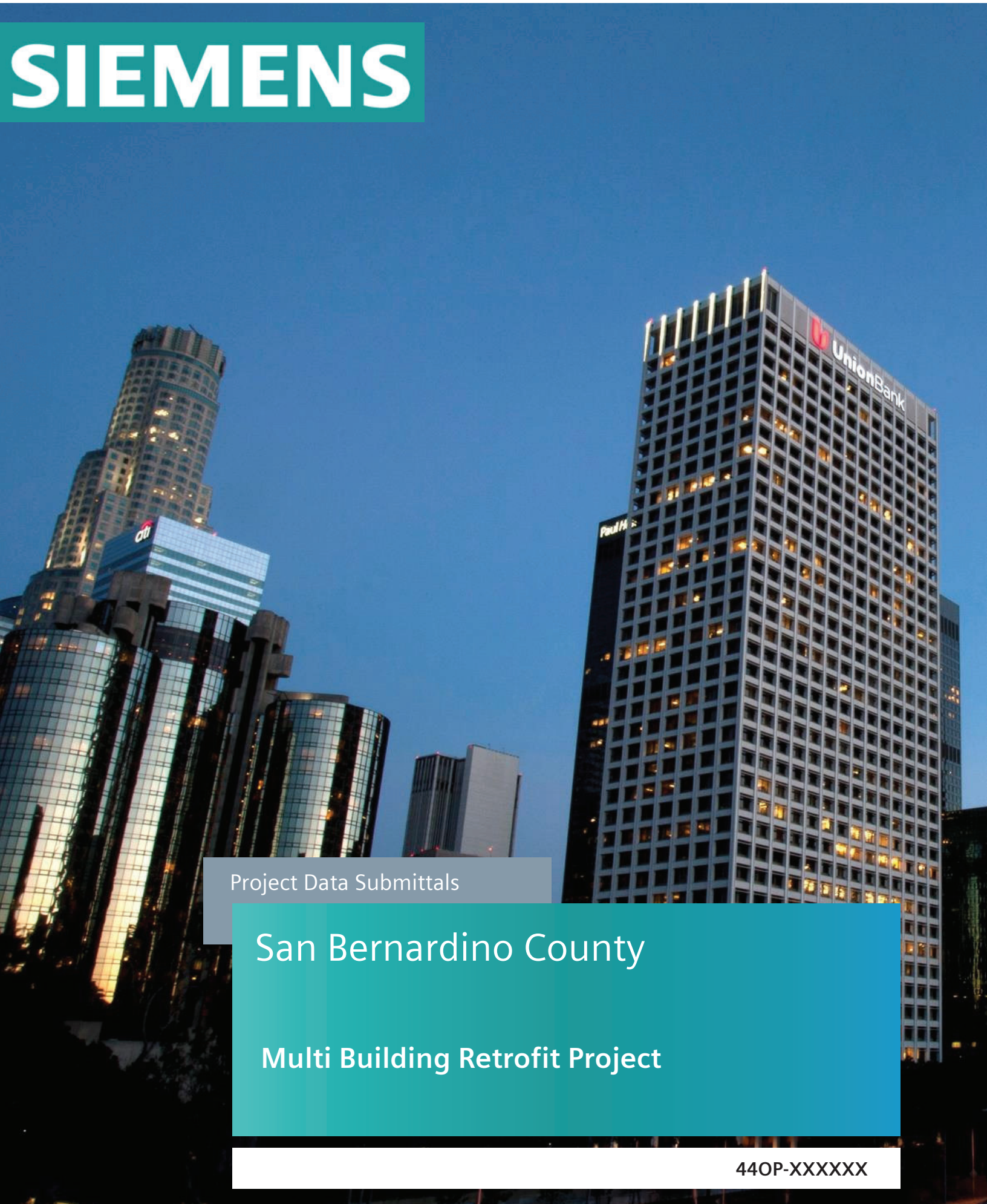
NFPA 90A & 90B	Appliances
NFPA 255	Flame / Smoke Spread (25/50)
UL 723	Flame / Smoke Spread (25/50)
ASTM C 411	Operating Temperature Limits
ASTM E84	Flame / Smoke Spread (25/50)
ASTM C 1071	Maximum Air Velocity
ASTM C 739	Corrosion Resistance
ASTM G 21	Fungi Resistance
ASTM G 22	Bacteria Resistance

Acoustical Performance

No correction factors are required for ½" EcoShield.

Controls

SIEMENS



Project Data Submittals

San Bernardino County

Multi Building Retrofit Project

44OP-XXXXXX

Information

Siemens Building Technologies
www.usa.siemens.com/buildingtechnologies

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Building Technologies Division
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USA

Summary

This submittal was prepared by Siemens for the Project Name project under the Siemens project number 44OP-XXXXXX.

Product Documentation

SIEMENS