UNICOOL

Wall Packaged Unit Air Conditioners

Installation and Operation Manual

Unit Models

11V1T3	11V1B3
15V1T4	15V1B4
28V1B5	28V2B5

Controller Model

ASMUC.6

ASMUC.6.AC

ASMUC.6.DC

AIRSYS
Balance the Environment

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AIRSYS North America
https://airsysnorthamerica.com

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Chapter 1: Introduction

Thank you for choosing a unit manufactured by AIRSYS.

The AIRSYS UNICOOL line of wall mounted HVAC systems is optimized for energy efficient removal of heat generated by electronics from enclosed shelters. All units are equipped with variable speed inverter compressors, variable speed EC fans, and an advanced control system that increases system efficiency while reducing wear and tear.

Another feature that promotes energy efficiency is the robustly designed integrated economizer, described as "free cooling". This feature, when conditions are suitable, provides 100% of the rated cooling capacity of the wall pack unit (WPU) while consuming ~ 1kW or less whenever the outdoor temperature is a few degrees lower than a predetermined setpoint. This feature alone can save equipment shelter operators significant utility costs, especially in cooler climates.

In addition to having excellent energy efficiency, these systems are simple to operate, maintain, and service. The AIRSYS design team is committed to listening and responding to the customer community. As a result, these systems have continuously evolved with customer-defined features that have improved the overall quality and the user experience.

Usability features include:

- A functional step test that facilitates complete operational verification in less than 5 minutes
- Unobstructed access to all key components for Preventive Maintenance (PM) and servicing
- A high level of operational reliability via the built in Fail-Safe mode
- Completely selectable alarm relays (NC or NO) to enable the system to adapt to the customer's requirements
- In depth real-time system parameter readings available remotely and on site.
- Real-time power monitoring for individual units

The AIRSYS UNICOOL WPUs are available in cooling capacities from 1.5 - 10 tons; however, the sensible cooling capacity of these machines is as much as 40% higher than a traditional machine. An available ordering guide can help properly match the capacity of the HVAC system to the heat load in the shelter.

With a suite of best in class components from around the globe, AIRSYS UNICOOL WPUs deliver quality and reliability while substantially reducing cost of operation.

Using this Manual

Read this manual carefully before attempting to install or start the unit. Retain this manual for reference for the entire operational life of the unit. This manual provides information on the following topics:

- Product overview
- Instructions for physical, and electrical installation of WPUs and the controller box
- Procedures for commissioning the system
- System operation, including system alarms, program menus, and advanced troubleshooting
- Preventive maintenance

For safety and to achieve the highest levels of performance, always follow the warnings and cautions in this manual when handling and operating the AIRSYS unit.

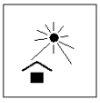
Danger. Emphasizes hazardous conditions that could cause personal injury or death.

Warning. Indicates where the operator must proceed with caution to avoid personal injury or damage to property.

Important. Indicates technical information critical for proper installation or operation.

Table 1 lists symbols that may appear on the external packaging.

Table 1: Packaging Symbols

Symbol	Meaning	Symbol	Meaning
	THIS SIDE UP Shows the orientation of the unit.		NO HOOKS Do not use hooks to lift the packed unit.
	FRAGILE Handle with care.		KEEP AWAY FROM HEAT The unit must be kept away from heat sources.
	PROTECT AGAINST RAIN: The packaged unit must be stored in a dry place.		DO NOT STACK

Model Identification

Each unit is identified by a model number, such as 11V1T3MR410AAC. The elements in the number are explained in Figure 1: Model Number

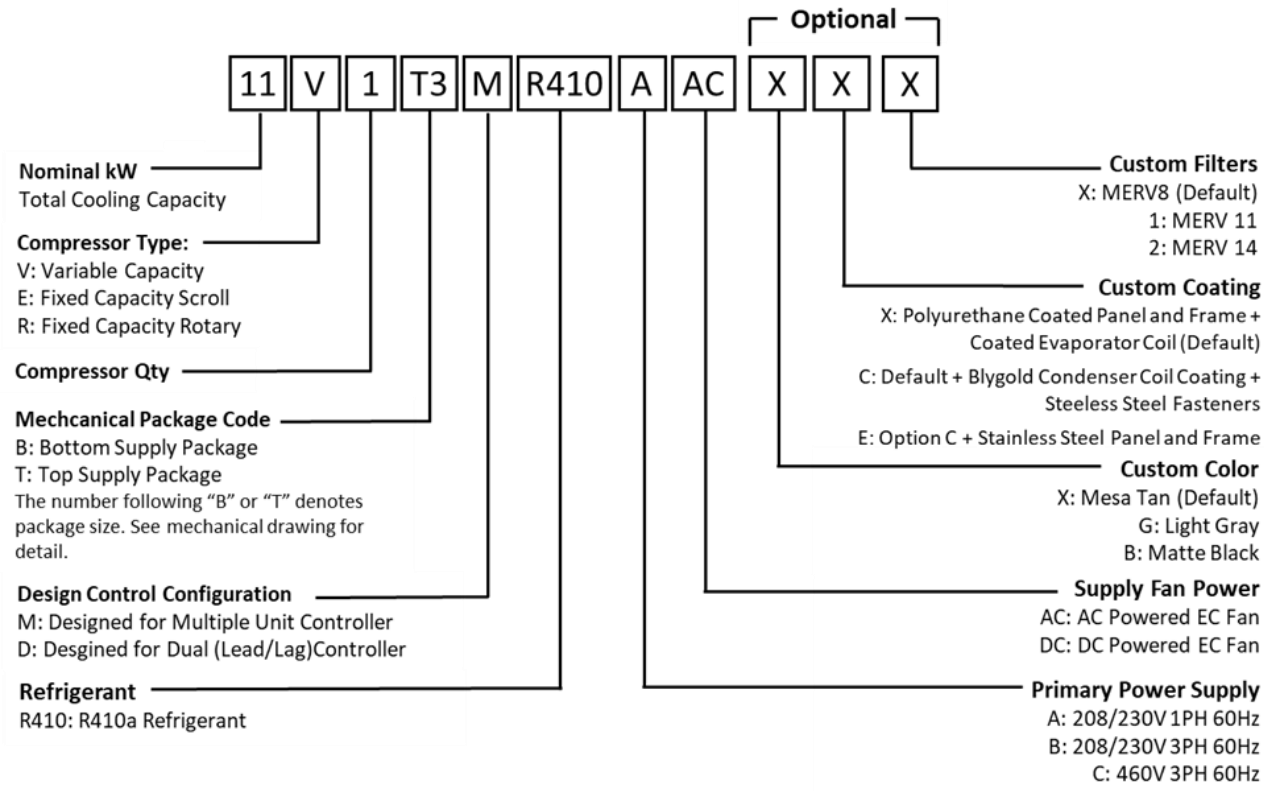


Figure 1: Model Number

Acronyms and Abbreviations

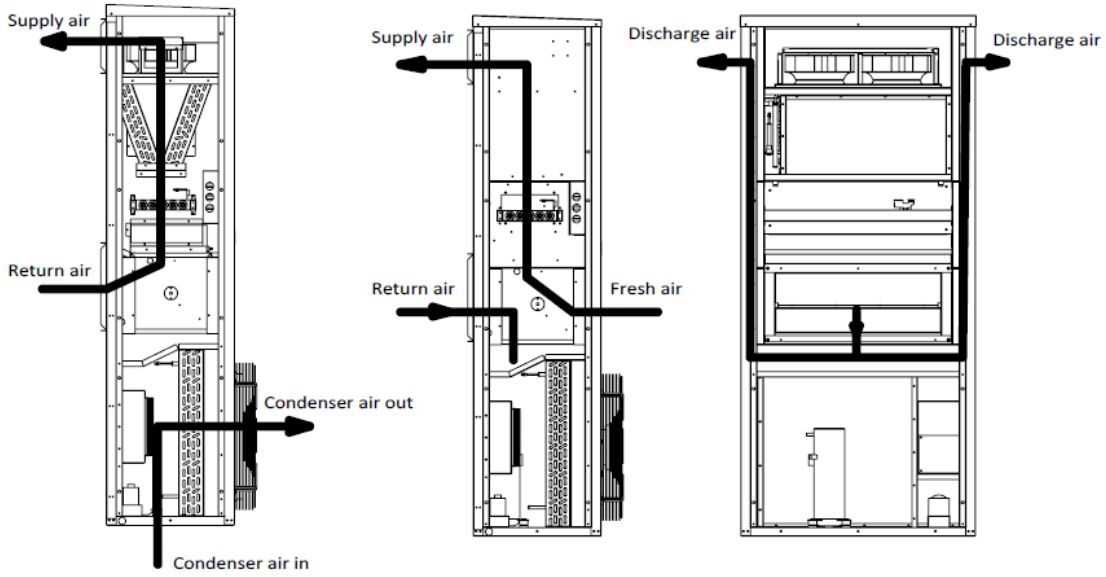
Table 2 lists acronyms and abbreviations used in this manual.

Table 2: Acronyms and Abbreviations

Term	Meaning
A	Ampere, unit of electric current, or rate of flow of electricity
AAST	AIRSYS Authorized Service Technician
AC	Alternating Current
AFPD	Air Filter Protection Device
AUT/MAN	Automatic/Manual
BMS	Building Monitoring System
CFM	Cubic Feet per Minute
Com	Common
Comp	Compressor
Cond	Condenser
DC	Direct Current
Gen Run	Generator Run Signal
EC	Electronically Commutated (Refers to variable speed evaporator/supply fan)
Evap	Evaporator
FC	Free Cooling
HVAC	Heating, Ventilation, and Air Conditioning
I/O	Input/Output
LED	Light Emitting Diode
MC	Mechanical Cooling
N.C.	Normally Closed
N.O.	Normally Open
PSI	Pounds per Square Inch
PWM	Pulse Width Modulation
RoHS	Restriction of Hazardous Substances Directive
R/W	Read/Write
Temp	Temperature
VAC	AC Voltage
VDC	DC Voltage
WPU	Wall Packaged Unit

Chapter 2: Product Overview

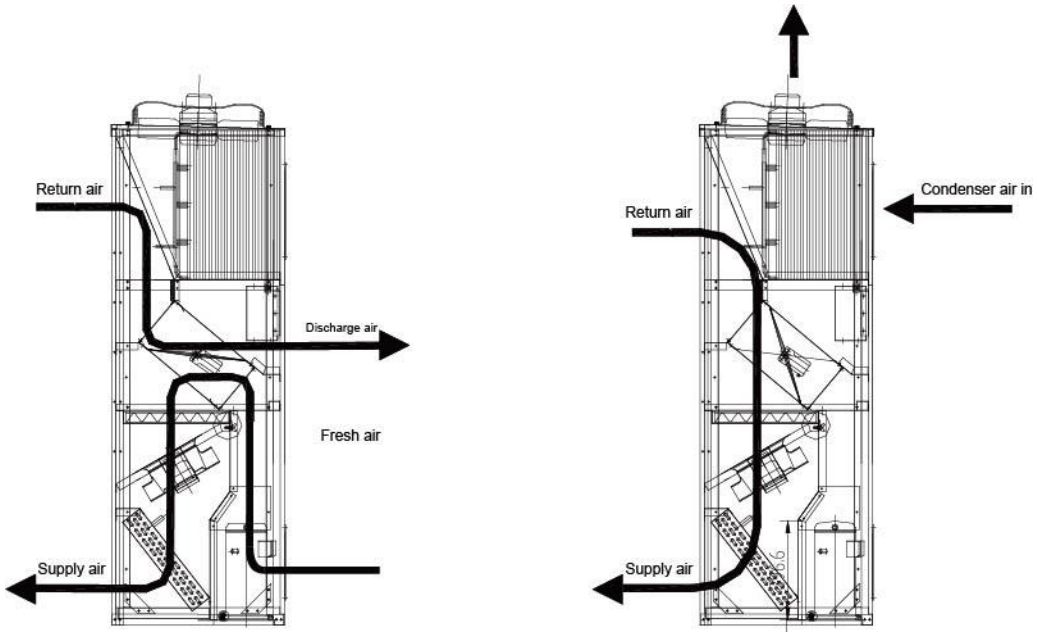
The air conditioning system has three key components: the mechanical cooling system, the free cooling system (economizer), and the control system. The control system determines the unit's mode of operation: free cooling or mechanical cooling, as shown in Figures 2 and 3.



Mechanical Cooling Mode

Free Cooling Mode

Figure 2: Operating Modes (Top Supply)



Free Cooling Mode

Mechanical Cooling Mode

Figure 3: Operating Modes (Bottom Supply)

Free Cooling System

When the operating conditions for free cooling are met, the control system switches the air damper to the free cooling position. Cooler air from outside is delivered to the shelter by the supply air fan. At the same time, hot air in the shelter is discharged to the outdoor environment.

Adaptive Free Cooling

Traditional Wall Packaged Unit control provides a fixed outdoor temperature where free cooling starts based on indoor setpoint. With adaptive free cooling, the system will automatically learn and remember the optimal temperatures where free cooling can take over. Adaptive free cooling will continuously optimize toward free cooling hours with no human adjustment required. This is particularly valuable whenever the site heat load changes as the system will also adapt to find the new optimal free cooling setpoints.

Mechanical Cooling System

When the operating conditions for mechanical cooling are met, the control system switches the air damper to the mechanical cooling position. The compressor compresses the refrigerant gas and sends it to the condenser. The condenser is a heat exchanger, removing heat from the hot compressed gas and allowing it to condense into a liquid. The liquid refrigerant is then routed to the thermal expansion valve, which acts as a restriction device by forcing the refrigerant to go through a small hole. This causes the pressure to drop. Then the liquid refrigerant is routed to the evaporator. The evaporator is also a heat exchanger, absorbing heat from the indoor hot air causing the liquid refrigerant to change back into gas. The refrigerant gas is then routed back to the compressor to complete the cycle. The refrigerant is used repeatedly, absorbing heat from the indoor environment and discharging heat to the outdoor environment.

Soft Start

When mechanical cooling is requested, the compressor will ramp up its capacity and continuously modulate it to match the required site load. This minimizes mechanical stress upon startup, eliminates startup voltage spikes, and reduces unit noise level.

The Control System (ASMUC.6 Controller)

By default, the ASMUC.6 controller can control up to 6 AIRSYS Precision Cooling WPUs (16 with expansion module) organized in up to 4 zones. The setpoint for each zone can be adjusted independently.

The controller box is factory programmed with standard industry setpoints but can be configured on-site or remotely to meet specific needs. Settings are retained in the event of a power loss. In addition, all WPUs have integrated control modules that are the same as those in the controller box. If communication between the units and controller is lost, the units will cool independently using the last given controller settings and information from onboard temperature and humidity sensors.

Ease of Control and Configuration

The controller is controlled through the **P**rogrammable **G**raphical **D**isplay (PGD) interface. The PGD and button actions are explained in more detail starting on Page 45. Using the PGD interface, the user can:

- Check the status of the HVAC system, such as sensor readings and operating mode
- Change factory setpoints
- Place the system temporarily into *comfort mode*
- Review alarms and alarm history

Labeling on the outside of the controller box provides a convenient guide on how to access the most common functions. The same functions can be accessed remotely via an IP communication interface built into the controller. The units are also pre-wired to allow for a PGD to connect directly to the unit, allowing for testing and configuration directly from the unit.

Synchronized Cooling

When mechanical cooling is required to maintain the site temperature, all available units will run at low speed as opposed to one unit taking the full load. This increases overall system efficiency and reduces wear and tear on the compressor. If one of the units is taken offline, the others will adjust their speeds accordingly to maintain the site temperature.

Standalone Mode

The system can operate in fully functional Standalone Mode when communication is lost between HVAC and controller. This includes including free cooling, mechanical cooling, dehumidification, and heating. This eliminates the controller as a potential single point of failure for the HVAC system.

Heat Load Matching

The variable capacity units can adjust the compressor run speed to exactly match the heat load as opposed to cycling on and off to maintain a setpoint. Since most of the component stress occurs during startup and shutdown, heat load matching increases overall system reliability and efficiency.

Turbo Boost

In situations such as extreme outdoor temperature, the heat load of the building may exceed the nominal cooling capacity of the system. In those cases, Turbo Boost can automatically overdrive the units to provide up to 125% of the rated capacity at the cost of some efficiency.

Quiet Mode

Quiet mode reduces noise by 10-14 dBA by limiting the maximum speed that the compressor can run at. In doing so, the maximum cooling capacity will be reduced by ~15% and Turbo Boost will be disabled.

Chapter 3: Installation

Installation Preparation

Unpack the unit carefully. Some parts are packed loosely and may move as the packaging is opened. Before discarding the box, check the packaging carefully for any parts or documents inside. Refer to Table 3 on Page 16 for the complete list of materials shipped with each unit.

Check that:

The supply voltage meets the requirements as designated: 197-252VAC, 36-57VDC.

- The install location is clean on the inside and free of excess dirt and dust.
- Minimum install clearances are met (see "Clearances" on Page 20).
- All installer provided items, listed in Table 4 on Page 18 are accounted for.

Installation and startup must be performed by an AIRSYS Authorized Service Technician (AAST). For more information about the AAST program, please contact:

AIRSYS North America
ASNSupport@air-sys.com
855-874-5380

Danger. All the installation work must be done by professional technicians. Installation that does not comply with the instructions herein can result in the loss of warranty coverage. AIRSYS shall not be held liable for any damage caused to persons or objects due to incorrect installation or operation of the units.

Warning. All wiring must comply with the local safety standards and building codes under all circumstances.

Warning. Risk of electric shock can cause injury or death: disconnect all remote electric power supplies before installation.

When no longer in use, disposal of equipment and materials must be compliant with local laws and standards.

Delivery

When the units are delivered, be sure to inspect them to verify that they have not been damaged during transport. Also verify that all requested accessories listed on the purchase order have been included.

Important. If packages show **any** signs of shipping damage or potential shipping damage, it is very important to annotate *shipping damage* on the Bill of Lading **prior** to signing for the freight. In order to recover for any damage, please take detailed photographs of all the packaging **before** the external packaging is removed. Once detailed photos of the external packaging have been taken, then the external packaging may be removed so the items can be inspected further. Please document with photos

any damage to the equipment that relates directly to the damage observed to the external packaging. ***Without the detailed photos, it will be very difficult to recover equipment loss.***

Warranty

The warranty duration is 12 months from the date of installation. AIRSYS warrants that its products will be free from defects in materials and workmanship for a period of 12 months after installation.

The compressor is to be free from defects in material or workmanship for a period of 60 months from date of installation.

⚠ **Important.** For sites equipped with a generator, when the generator switches to the primary source of power, the instantaneous voltage may become lower. If this is the case, the compressor may run at a lower voltage which can decrease the compressor's working life. Make sure **the Gen-Run signal input is connected** which can protect the compressor. The warranty does not cover damage to the compressor caused by repetitive out of specification supply voltage during compressor operation.

AIRSYS will furnish free of charge replacement parts for any component failures that occur within the warranty period. Customer is responsible for the cost of shipment of replacement material from AIRSYS North America.

Note: Warranty assumes that an AAST performs the installation and submits the warranty registration card that accompanied the units in shipment. If the warranty registration card was not filled out and returned to the supplier, then the warranty will be assumed to expire 12 months from the date of shipment for all components except the compressor, which will be assumed to expire 60 months from date of shipment.

This warranty does not cover damage to the systems caused by misuse or abuse of the systems such as physical damage due to mishandling. The warranty does not cover damage caused by force majeure.

⚠ **Important.** Any mishandling of the equipment or modifications to the equipment, unless agreed upon in writing by AIRSYS, will void the warranty.

Moving the Unit

Forklifts are recommended for moving, loading, unloading, and positioning the WPU for installation. If bands or ropes are used to create a sling, make sure that excessive force is not applied to the upper edges of the machines or the package to avoid cosmetic or material damage. When using spacing bars, protective materials are required around the units to prevent damage. To avoid damage to the units while moving or transporting, ensure the units always remain in the upright position.

Note: The 28V1B5 unit may not be compatible with pallet jacks due to low pallet height. Loading dock facilities or lift gate equipped vehicles are recommended when transporting the unit.

Note: A crane will be required to lift the 28V1B5 unit during installation due to its weight (1370 lb/621 kg).

General Safety Rules

Danger. Do not carry out any operation on the machines if you do not have sufficient knowledge of the operating principles and have not taken all the precautions that permit the system to operate in safe conditions.

Warning. Work on the electric board only after verifying prime power is disconnected. Do not apply power to the machine with the covers removed.

Important. Before carrying out inspections, maintenance operations, and safety checks, follow all accident-prevention standards such as wearing protective goggles and gloves.

Required Materials

AIRSYS Supplied Materials

Table 3: AIRSYS Provided Materials lists all material supplied by AIRSYS. After opening the package, verify that all items are accounted for. If any material is missing, please contact an AIRSYS distribution center using the following information:

AIRSYS North America
Email: ASNSupport@air-sys.com
Phone: 855-874-5380

Table 3: AIRSYS Provided Materials

Wall Pack Unit Assembly

Part #	Item Description	Comments	T3	B3	T4	B4	B5
N/A	Shipping list		1	1	1	1	1
N/A	Installation and Operation Manual		1	1	1	1	1
1110212510	Product Warranty Registration Card		1	1	1	1	1
8551016130	M5*16 screw	Replacement (spare) panel screws	56	56	56	56	65
N/A	Rubber gasket	To be used in conjunction with screws to protect painted finish on units	56	56	56	56	65
7151011110	Weather Stripping		3	3	3	3	4
8552600550	M4.2*13 Self-tapping screw	For supply air and return air grilles	16	16	16	16	24
8255504570	Return air grille		1	-	1	-	-
8255504580	Supply air grille		1	-	1	-	-
1010301360	Bottom support angle		1	-	-	-	-
1060528020	Return air flange		2	-	2	-	-
1060528010	Supply air flange		2	-	2	-	-
8255503240	Return air grille		-	1	-	-	-
8255503230	Supply air grille		-	1	-	-	-
1060519760	Return air flange		-	2	-	-	-
1060519750	Supply air flange		-	2	-	-	-
1010300790	Bottom support angle		-	1	-	-	-

Part #	Item Description	Comments	T3	B3	T4	B4	B5
8255504090	Return air grill		-	-	-	1	-
8255504100	Supply air grill		-	-	-	1	-
1060519820	Return air flange		-	-	-	2	-
1060519810	Supply air flange		-	-	-	2	-
1010300800	Bottom support angle		-	-	1	1	-
8255504820	Return air grill		-	-	-	-	1
8255504830	Supply air grill		-	-	-	-	1
8255504840	Exhaust air grill		-	-	-	-	1
N/A	Support stand		-	-	-	-	1

Multi-Unit Controller

Item	Part #	Qty	Item Description	Comments
1	2040310370	1	Controller box: ASMUC.6	Includes: 2 temperature sensors (Label: ST1, ST3) 1 humidity sensor (Label: SH).
2	N/A	1	Shipping list	
3	1170104800	1	Installation and Operation Manual	
4	8552600560	8	M4.2*25 Self-tapping screw	For controller box installation
5	8551016130	56	M5*16 screw	Replacement screws for WPU access panels For supply air and return air flange installation
6	1110212510	1	Product Warranty Registration Card	Return to AIRSYS North America: ASNSupport@air-sys.com http://airsysnorthamerica.com/support/warranty-registration/
7	1110212560	3	Compressor shipping bracket removal sticker	To ensure the removal of compressor brackets at startup
8	1050500720	2	Temperature sensor bracket	For mounting temperature sensors
9	8458716830	1	Box for outdoor temperature sensor	For mounting outdoor temperature sensor
10	8654009410 1021006350 1021006360	4	Spare breaker panel clip	For locking the breaker panel if necessary

Materials Supplied by Installer

Table 4 lists items required for installation that must be supplied by an AIRSYS Authorized Service Technician (AAST). The wire length and gauge depend on site-specific conditions. However, recommendations are provided.

Table 4: Installer Supplied Materials

No.	Item	Qty	Description	Comments
1	AC power supply cable to WPUs	Same as number of units	1 Wire per Leg of Power (sized per amperage rating)	Refer to Summary Electrical Ratings
2	DC power supply cable to WPUs (DC supply fan models only)	Same as number of units	1 Wire per Leg of Power (sized per amperage rating)	Refer to Summary Electrical Ratings
3	DC power supply cable to controller box	1	2-Wire Conductor for Controller	Max current capacity 0.8A; 18AWG recommended
4	AC Circuit Breaker	Same as number of units	1 Breaker per WPU	Refer to Summary Electrical Ratings
5	DC Circuit Breaker (DC supply fan models only)	Same as number of units	1 Breaker per WPU	Refer to Summary Electrical Ratings
6	DC Circuit Breaker for controller	1	Breaker for the Controller	Max current capacity 0.8A
7	Communication cable from controller box to WPU	Same as number of units	1 Ethernet Cable per WPU	The ethernet (CAT5/5E/6) cable must meet ANSI/TIA-568-B.2 standard
8	Alarm wiring harness (Optional)	Up to 9	2-Wire Conductor (one per alarm)	Alarm connection to controller box, 3 alarm inputs and 6 alarm outputs; all alarm connections are optional
9	Adhesive tape	As needed	Single-Sided Adhesive Tape	Used to line the return and supply air frames
10	Silicone sealant	As needed	Commercial Grade Outdoor Silicone	
11	Nylon zip-tie	As needed	Nylon Zip-Ties	For properly dressing cables and harnesses
12	Supply air frame	As needed	Refer to Appendix A: Air Frame Drawing on Page 96	Built inside wall to facilitate air flow
13	Return air frame	As needed	Refer to Appendix A: Air Frame Drawing on Page 96	Built inside wall to facilitate air flow
14	Mounting hardware	As needed	Hardware for Securing Unit to Wall	Varies based on wall material and thickness
15	Neoprene Gasket	As needed	Provides air tight seal around return/exhaust & supply holes	Should be thick enough to accommodate the rough finish of the shelter exterior
16	IP Address for Controller (Optional)	1 per controller	IP address and gateway for controller	Required for Remote Monitoring. If not supplied at install, a return trip is required to establish communication.
17	IP Address for HVAC (Optional)	1 per unit	IP address and gateway for each HVAC unit	Required for remote software upgrade of individual HVAC units. If not supplied at install, a return trip is required to establish communication.

Electrical Ratings (Wire Sizing)

Table 5: WPU Electrical Ratings

Model	Circuit #1				Circuit #2			
	AC		48VDC		AC		48VDC	
	MCA	MFS	MCA	MFS	MCA	MFS	MCA	MFS
11V1B3MR410AAC	**30**	**40**	--	--	--	--	--	--
11V1T3MR410AAC	**29**	**40**	--	--	--	--	--	--
15V1T4MR410AAC	**34**	**50**	--	--	--	--	--	--
15V1B4MR410AAC	**36**	**50**	--	--	--	--	--	--
28V2B5MR410AAC	**36**	**50**	--	--	**29**	**40**	--	--
28V1B5MR410BAC	**23**	**30**	--	--	**40**	**60**	--	--
28V1B5MR410CAC	**25**	**35**	--	--	--	--	--	--

Table 6: Controller Electrical Ratings

Model	Power Source	Max Power	Max Current
ASMUC.6	48VDC	**50W**	**1.0A**
ASMUC.6.DC	24VDC/48VDC	**30W**	**1.3A/0.6A**
ASMUC.6.AC	120VAC	**90W**	**0.75A**

Physical Installation

To see unit dimensions, please consult Appendix C: Mechanical Drawings

Select the Wall for Installing the Unit

Select the wall where the unit will be installed. Be certain that the wall can support the weight of the unit and that enough space is available for easy operation and installation, both inside and outside the mounting location. Refer to Table 7 below for unit dimensions and weights by model number.

Table 7: Dimensions and Weight by Model Number

Model		11V1T3	11V1B3	15V1T4	15V1B4	28V1B5/28V2B5
Width	in (mm)	44-15/16 (1141)	45-5/8 (1159)	53-3/8 (1355)	53-1/2 (1359)	57-1/2 (1461)
Depth	in (mm)	27-13/16 (706)	27-5/16 (694)	35-7/8 (911)	31-1/4 (794)	42-5/16 (1075)
Height	in (mm)	92-15/16 (2361)	84-9/16 (2148)	92-15/16 (2361)	83-1/16 (2110)	96-3/8 (2448)
Weight	lbs (kg)	645 (293)	645 (293)	858 (390)	840 (380)	1370 (621)

Clearances

The recommended clearances shown below should be adhered to when possible. Units will not be able to operate correctly if minimum clearances are not met.

Note: The 28V1B5 unit requires a larger side clearance than other bottom supply units.

Table 8: Installation Clearances

Clearance	Top Supply Units		Bottom Supply Units		Comments
	Recommended	Minimum	Recommended	Minimum	
Front	80 in (2000 mm)	80 in (2000 mm)	48 in (1200 mm)	48 in (1200 mm)	Clearance between unit and solid obstructions.
Side	28 in (700 mm)	16 in (400 mm)	16 in (400 mm) **28V1 Requires** 24 in (600 mm)	8 in (200 mm) **28V1 Requires** 16 in (400 mm)	Also minimum spacing between units
Above	20 in (500 mm)	12 in (300 mm)	40 in (1000 mm)	40 in (1000 mm)	
Supply Air	36 in (920 mm)	24 in (600 mm)	36 in (920 mm)	24 in (600 mm)	Recommended clearance applies to complete blockages in front of the supply grille, minimum for partial blockages
Bottom	NA	NA	12 in (300 mm)	6 in (150 mm)	Enough space to allow access to evaporator drain tube. NOT needed for 28V1 due to support stand mounting.

⚠ **Important.** The wall selected for the unit must be strong enough to support both the static weight of the unit and the vibration of a unit under operation.

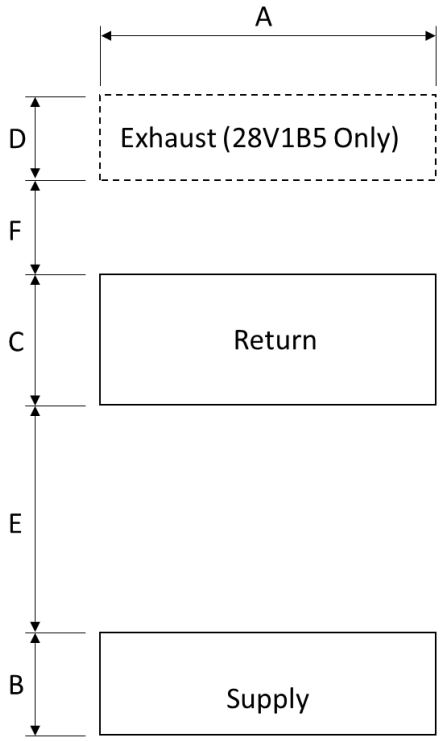
Pouring the Concrete Pad (28V1B5 Only)

Due to the extreme weight of the 28V1B5 unit, a concrete pad may be necessary to support the weight of the unit. The pad should be poured in advance and be able to support the weight of the unit (1370 lbs/621 kg).

Make Openings in the Wall

Make openings for supply and return air and cable and bolt holes in the installation wall as shown in Figures 4-5. Refer to the tables below the drawings for dimensions. All dimensions are accurate to 1/16 in (2 mm).

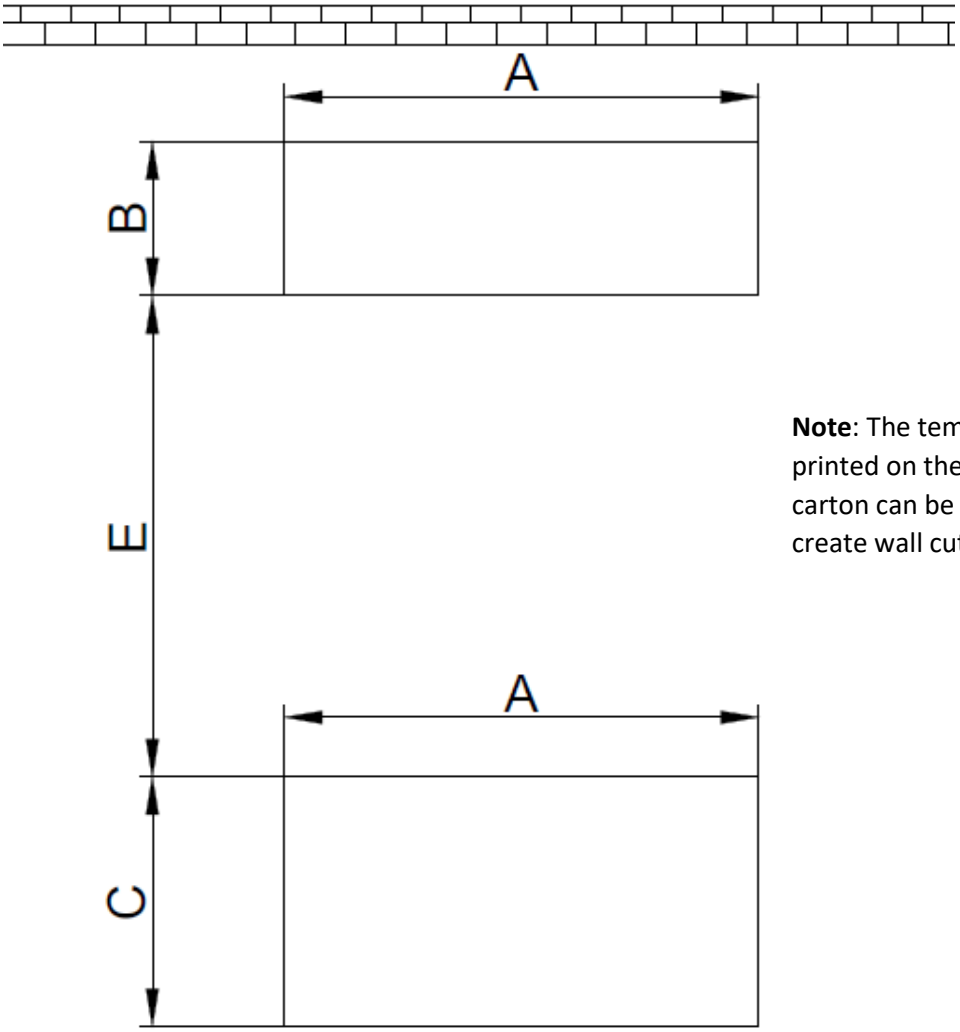
Note: The 28V1B5 unit requires three openings (Figure 4).



Note: The template printed on the shipping carton can be used to create wall cuts.

Figure 4: Openings and Holes in the Wall (Bottom Supply)

Cabinet Size	B3		B4		B5	
	in	mm	in	mm	in	mm
A	30	762	34-5/8	880	39-5/16	998
B	10-9/16	268	10-9/16	268	9-7/16	240
C	14	356	14	356	12-3/16	310
D	-	-	-	-	8-1/4	210
E	43-7/16	1104	43-7/16	1104	34-15/16	887
F	-	-	-	-	11-9/17	293



Note: The template printed on the shipping carton can be used to create wall cuts.

Figure 5: Openings and Holes in the Wall (Top Supply)

Cabinet Size	T3		T4	
	in	mm	in	mm
A	29-3/4	756	29-3/4	756
B	9-11/16	246	9-11/16	246
C	15-11/16	398	15-11/16	398
E	30-1/4	768	30-1/4	768

Install Weather Stripping

Before mounting the unit on the outside wall, fix neoprene weather stripping (installer provided) around the openings of the air supply and the air return to ensure an airtight closure, as shown in Figure 6.

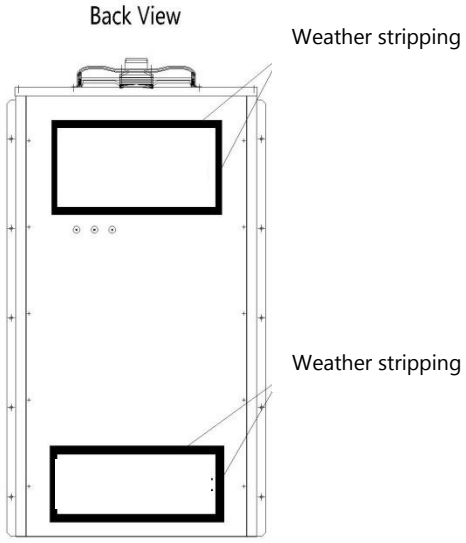


Figure 6: Install Weather Stripping

Position the Unit

Important. The unit is heavy. Exercise caution while putting the unit in place to prevent damage to the WPU or personnel.

The unit must be installed in a level position. An inclination of more than 6-7 mm (± 1°) may cause the condensation tray to overflow (Figure 7).

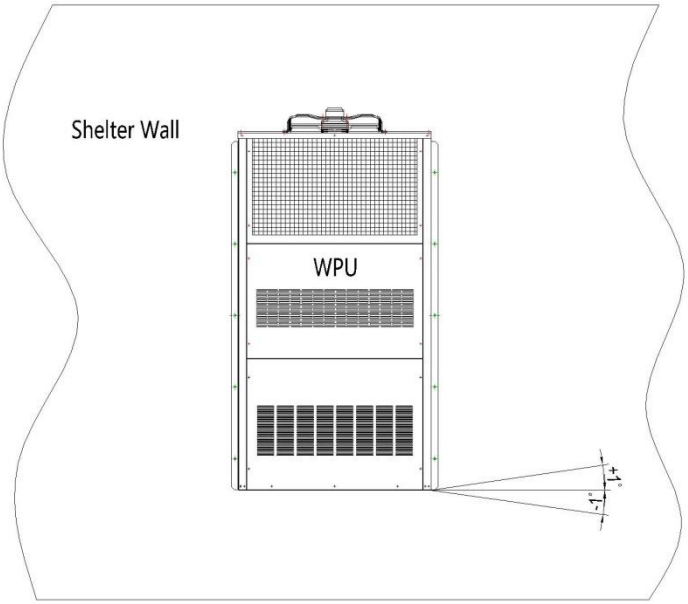


Figure 7: Inclination of Mounted WPU

Lift the unit from below with lifting equipment or tools, and then move the unit to the wall. Use the screws (installer supplied) to affix the unit on the wall. Generally, this is done by following these steps:

1. Position the unit next to the wall.

Note: Lift points are provided on the 28V1B5 for crane lifting. The 28V1B5 requires equipment capable of lifting 1370 lbs (621 kg).

Figure 8: Position the Unit

2. Attach a single mounting screw and adjust to ensure the unit is level.
3. After the unit is level, attach the remaining mounting screws.

Remove Wooden Pallet from WPU

The WPU is bolted to a wooden pallet to facilitate safe lifting and transport of the unit. Four bolts attach the pallet to the unit, as shown in Figure 9. The pallet frame is recessed under the WPU to allow for easy installation while using a forklift. Before completing the mounting of the unit to the wall, remove the pallet by removing the four bolts.

Figure 9: Remove Wooden Pallet

Install the Support Stand (28V1B5 Only)

Support stands should be installed on all 28V1B5 units due to the heavy weight. Place the support stand on the concrete pad, flush against the wall, and extend the legs to the desired length.

Seal the Joints between WPUs and Wall

To prevent moisture from getting in and air leaking out, coat the joint between the rear panel of the unit and the wall with a layer of silicone sealant (installer provided, see Table 4, item 1) as shown in Figure 10.

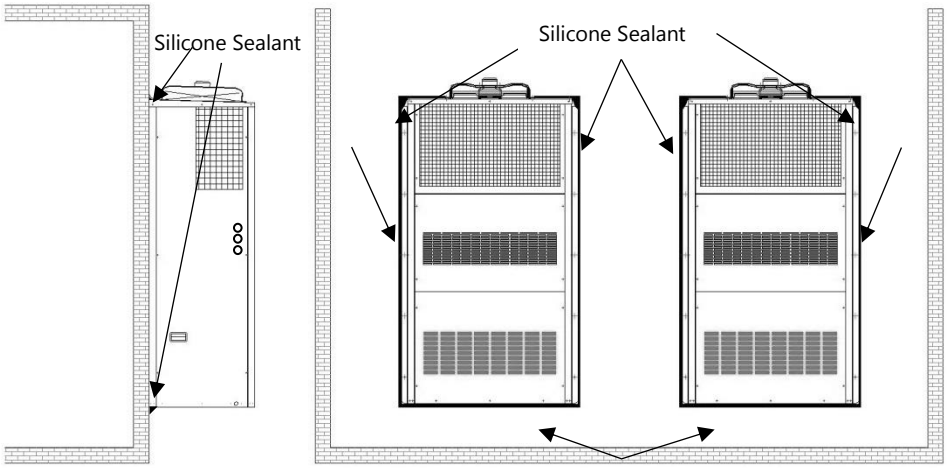


Figure 10: Seal the Joints between WPUs and Wall

Attach the Supply Air Grill and the Return Air Grill to the Wall

The supply and return air grills should be installed at the holes inside the shelter as shown below:

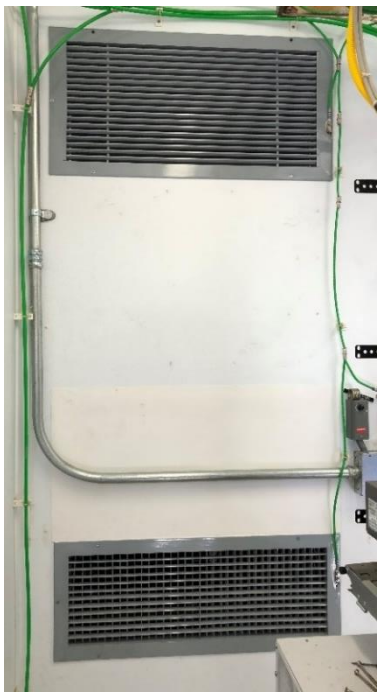


Figure 11: Install the Supply and Return Air Grilles

1. Install the supply and return air frames (and exhaust air frame for 28V1) into their respective cutouts.
2. Use adhesive tape to tape down the edges of the return and supply air frames on the WPU side.

3. After installing the supply air grill, adjust the angle of the fins to direct airflow away from adjacent equipment and prevent the supply air from bouncing back to the unit.

Remove the Compressor Brackets

Open the front, bottom panel on the WPU to locate the compressor. The two brackets at the base of the compressor are required for transport only. Loosen the four bolts, remove the two brackets, and then tighten the four bolts back down to the base of the compressor.

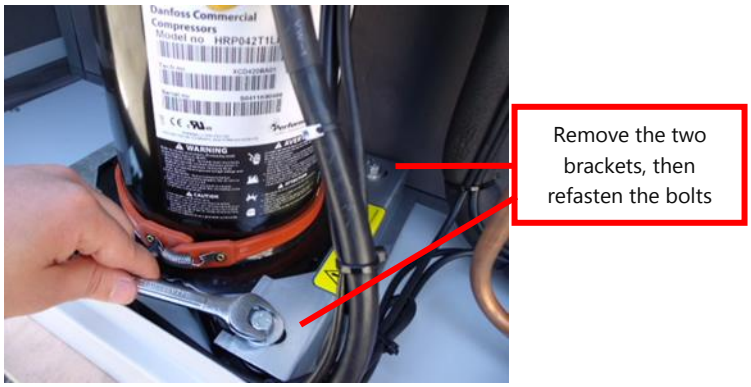


Figure 12: Remove Compressor Brackets

Controller Box Installation

Find a suitable location inside the shelter to mount the controller box. Mount the controller box so that the PGD is near the eye level of the intended operator.

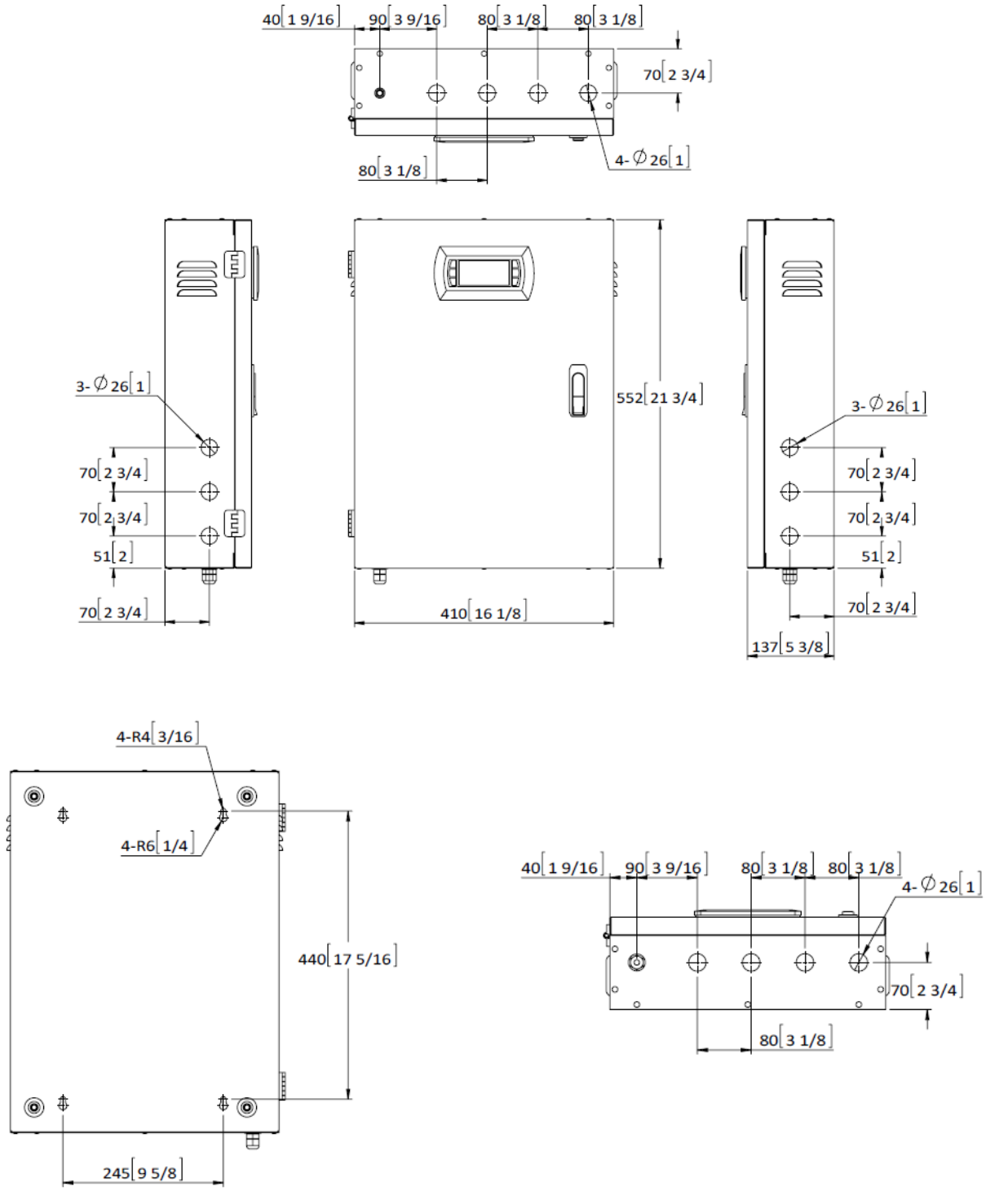


Figure 13: Controller Box Dimensions

Table 9: Key Components in the Controller Box Assembly

Temperature Sensor	PGD Display	Humidity Sensor
Control Module	**Input Breaker**	

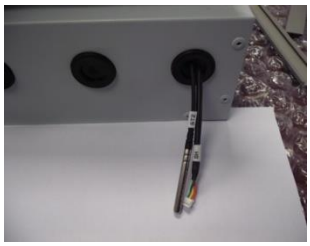
Install Outdoor Temperature Sensor

The outdoor temperature sensor (ST3) that is connected to the controller box must be installed outside the shelter. Use the following steps to complete this task.

1. Select the wall where the WPU is mounted.
2. Drill a 1/2-inch diameter hole for the outdoor temperature sensor (ST3) through the shelter wall.

3. Open the controller box assembly and locate the outdoor temperature sensor (ST3) assembly.

4. Thread the outdoor temperature sensor through a port at the bottom of the controller box.



5. Thread the outdoor temperature sensor from the controller box through the hole in the bottom of the box.
6. Secure the sensor to the bottom of the box with a nylon zip-tie.
7. Secure the box to the outside wall. Snap the sensor box cover in place and use sealant along the seam between the box and the wall.

Note: punching out the holes on the sides and the bottom of the sensor box is critical to allow proper airflow and drainage from rain and dew.

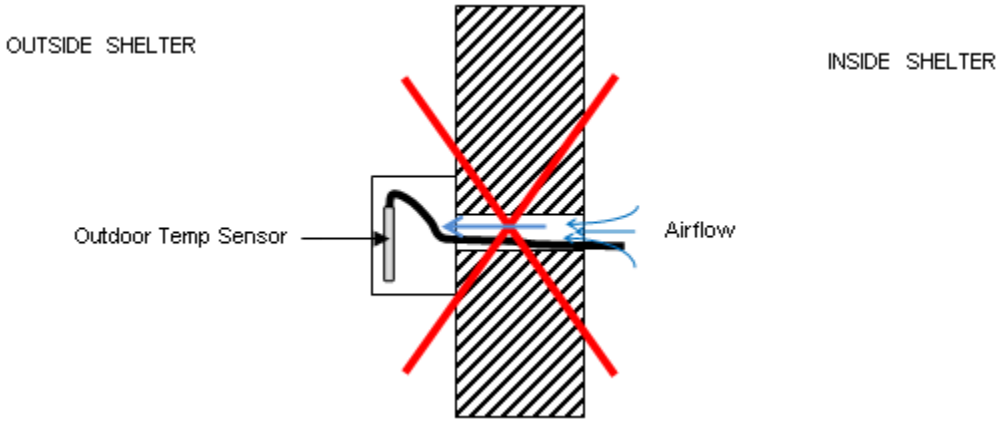


Figure 14: Ensure No Leakage

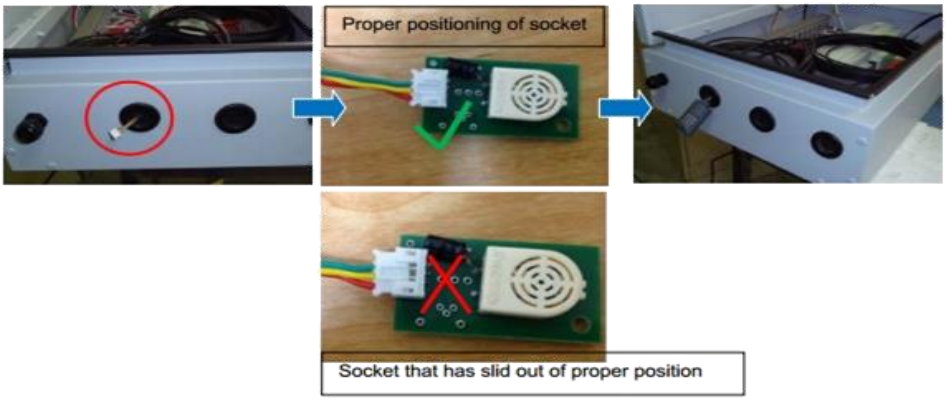
⚠ **Important.** Ensure no air leakage exists from inside the shelter to the box housing the outdoor temperature sensor. Any path whereby air could exit the shelter and arrive in the sensor box will adversely affect the outdoor temperature sensor reading.

Position the Humidity Sensor

Follow these steps to install the humidity sensor that is connected to the controller box:

1. Open the controller box assembly and locate the humidity sensor (SH) assembly.
2. Remove the cover of the humidity sensor, and then unfasten the harness from the sensor.
3. Thread the harness through the hole at the bottom or top of the controller box and reattach the sensor and then the cover.

   Note: If building is not yet in its final, permanent location after mounting the controller, secure the humidity sensor under the controller box with tape to protect the sensor from vibration.



Position the Indoor Temperature Sensor

The indoor temperature sensor (ST1) is located at the bottom of the controller box. The sensor monitors the shelter temperature to control the WPU operation. Slide the sensor through the port on the bottom left side of the controller box. Tighten the port cover to hold the sensor cable in place.

Figure 15: Position the Indoor Temperature Sensor

Complete Electrical Connections

Cautions

Danger. Only an authorized service technician should make the electrical connections to the WPUs and the controller box.

Important. The electrical wiring of the unit must comply with IEC standards or with appropriate national standards.

Danger. The power supply must be disconnected or turned off before working on the unit.

Important. Noncompliance with these instructions may cause damage to the WPU or the controller box. Not following instructions can void the warranty.

Important. No modification to the unit's electric circuit is allowed. If a change is required, it must be authorized by AIRSYS in writing.

Output Alarms

Output alarms are dry contract outputs from the ASMUC to a remote monitoring block/station. Consult the ASMUC wiring diagram in Appendix B for wiring locations.

High/Low Temp Alarm

A high temp alarm will trigger when the indoor temperature has exceeded the high temperature setpoint for at least 1 minute. The default high temp trigger is 18°F above the main setpoint and can be changed under "Alarms" in the HVAC Config menu. A low temp alarm will trigger when the indoor temperature has dropped below the low temperature alarm setpoint (default 32°F below setpoint). The default output setting is Normally Closed (NC), which can be changed to Normally Open (NO) in the "Alarms" menu under the HVAC Config Menu.

HVAC Alarms

An HVAC alarm indicates one or more major alarms that will prevent a unit from Mechanical Cooling. This includes:

- High and low refrigerant pressure (only affects mechanical cooling)
- Power loss
- Fan overload / airflow alarm
- Communication failure
- Failure of both indoor and backup indoor temperature sensors

The ASMUC.6 controller provides three dry contact outputs for HVAC fail alarms. If more connections are needed, multiple HVAC alarms may be wired in series if NC or in parallel if NO.

Note: The negative leads must be landed on the alarm common (Terminal 47).

Dirty Filter Alarm Output

This alarm will trigger when the filter of any unit connected to the controller is dirty and needs replacement. The alarm can be wired as either NO or NC. The default output setting is Normally Closed (NC), which can be changed to Normally Open (NO) in the "Alarms" menu under the Control Config Menu.

Input Alarms

Input Alarms are used to inform the ASMUC of an alarm that is present in the building and make the ASMUC behave accordingly.

Note: all inputs must be dry contact signals.

Smoke/Fire Alarm Input

This alarm input informs the controller that the smoke/fire detector has been triggered. All components will immediately shut down and outside air damper will fully close until alarm condition is removed. The default setting is Normally Closed (NC), which can be changed to Normally Open (NO) in the "Alarms" menu under the Control Config Menu.

This alarm input must be wired to an isolated output or a relay. Piggybacking with other devices may cause a false alarm.

Note: this is an input only and will not work as an output to a remote monitoring station.

Generator Run Input

This alarm input informs the controller that the generator is running. Outside air damper will fully close to prevent diesel fumes from entering the building and only one HVAC will be permitted to run at a time to minimize generator load. The default setting is Normally Open (NO), which can be changed to Normally Closed (NC) in the "Alarms" menu under the Control Config Menu.

*AL*07 (Generator Run) will display if this input is triggered.*

Optional: Enable the multiple compressors during generator run in the "Generator Run" section of the Unit Config menu.

DC Fail-Over Input

This alarm is only applicable when the DC Fail-Over is installed. This alarm input informs the controller that power is only available through the DC inverter, so the controller will only run the supply fan and outdoor air damper.

Hydrogen Alarm Input

This alarm input informs the controller that the hydrogen detector has been triggered. HVAC unit will open outside air damper fully and run fans at high speed to ventilate the room. The default setting is Normally Open (NO), which can be changed to Normally Closed (NC) in the "Alarms" menu under the Control Config Menu.

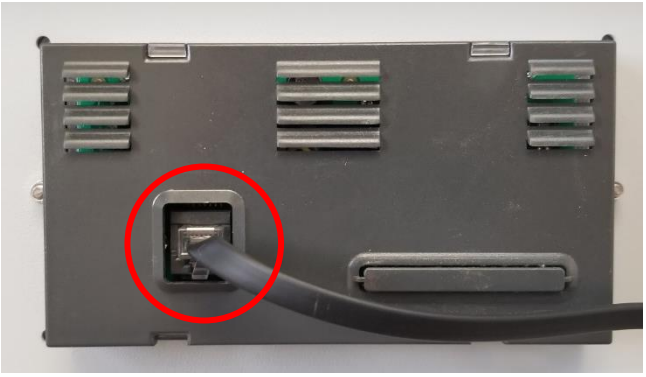
Electrical Connection to Controller Box

Important. The ethernet cable used must be wired according to ANSI/TIA-568-B.2 standard. Communication errors may occur if the cable is not wired correctly.

Follow these steps to complete the connections:

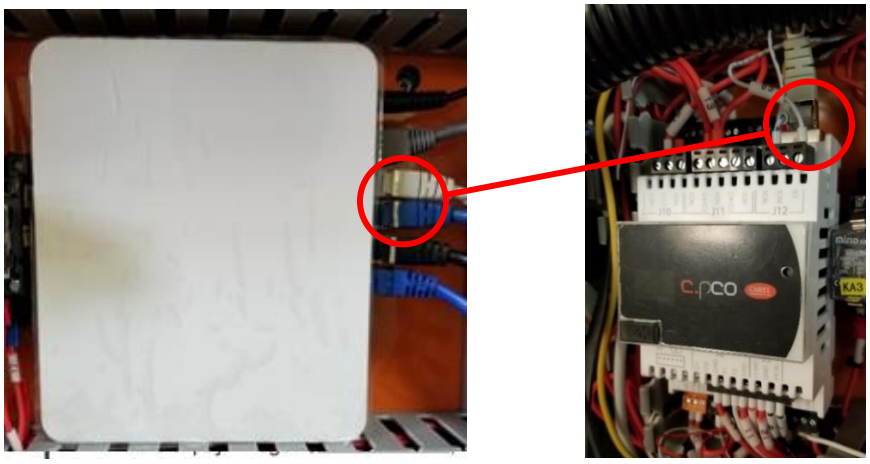
1. Open the controller box.
2. Connect the power cable to the controller breaker (QF1).
3. **(Optional, ASMUC.6.AC Only)** If using 240VAC to power the controller, adjust the U> setting on the voltage monitor to 260V.

4. Ensure the PGD cable is FIRMLY plugged into the user interface terminal located on the inside of the controller box cover.



5. Ensure that terminal J3 (behind J10) is securely plugged in to the control module.
6. Connect one ethernet cable per unit from a port on the network switch to the control module inside the unit (Behind J12).

Important. Do not run the Ethernet cables in the same conduit as prime power or other high voltage AC as this can result in communication errors.



Supplying Power to WPUs

Bring the power cable(s) to the WPU through either the side panel or the back panel.

1. Connect the power cables to each WPU (Refer to nameplate for electrical ratings)

⚠ **Important.** Do not run high voltage cable along same exterior conduit as low voltage/communication wire.

⚠ **Important.** Do not run cables through damper compartment to ensure wire/cables do not interfere with proper operation of the damper.

2. Ground the system using ground lug or ground terminal.

Complete the Installation Checklist

The physical installation should be complete. Prior to starting the system, ensure that no steps have been omitted by completing this installation and wiring checklist.

Date: _____ Unit Factory Number:_____(refer to the unit name plate)	
Verify Physical Installation	✓ **or** ✖
Weather stripping has been attached to the air inlets and outlets of the WPUs between the wall and the unit.	
All machines are securely fastened to the wall.	
All leaks are sealed with silicone.	
The indoor temperature sensor and humidity sensor have been installed and are mounted away from direct or indirect supply or return air stream. Sensors should also be mounted away from equipment or other heat sources.	
The aluminum grills are fastened.	
The brackets at the bottom of the compressor have been removed and the screws refastened.	
The outdoor temperature sensor is inside the sensor box and mounted outside the shelter. Sensor box drain holes are facing downward and the through hole in the shelter wall has been sealed.	
Verify Electrical Installation	
Ethernet connections are secured.	
The main voltage connections between each WPU and the prime power panel are secured.	
The power connections between the controller box and power plant panel are secured.	
Proper clearance is allowed between the cables and air damper in the WPU to avoid interference.	

System Commissioning

A complete system operation verification is vital to ensure all components are operating correctly after installation. A system commissioning checklist is available on Page 45. Follow the instructions in this section to complete the checklist and leave a copy on site.

Note: See Table 10 on Page 52 for PGD button definitions.

Turn on Component Breakers and Primary Power

After completing the installation checklist, turn on all breakers in both the WPUs and controller box. Then reattach all covers and panels before turning on the breakers in the prime power panel.

Verify Proper Phase Rotation (3 Phase Units Only)

Verify that "Normal" LED on the phase monitor (FV) is lit. Correct phase rotation or wiring if necessary.

Figure 16: Phase Monitor

Upgrade System Software

See Chapter 7: System Update for instructions. This is only required if the HVAC units or controller were obtained at different times or if a HVAC unit is being added to an existing install.

Change System Units (Optional)

By default, the system operates using units of °F and psi for temperature and pressure. These can be changed to metric units if desired.

1. Hold the **Esc** button until the main screen is displayed.
2. Press **Up and Down** together to enter the debug menu.
3. Press **Down**, the screen should display "No Conversion".
4. Press **Enter** until the cursor is on the row below "Current UoM"
5. Press **Up** or **Down** until the desired unit conversion is shown and press **Enter**.

Set IP Addresses for Controller (Optional for Remote Monitoring)

This step is needed if user intends to communicate to the device via IP. This step can be skipped and returned to later if user does not immediately intend to communicate to the system remotely.

1. Hold the **Esc** button until the main screen is displayed.
2. Hold **Alarm** and **Enter** for 3 seconds to enter the hardware configuration menu.
3. Press **Down** until the cursor is over "Settings" and press **Enter**.
4. Press **Down** until the cursor is over "TCP/IPv4 Settings" and press **Enter**.

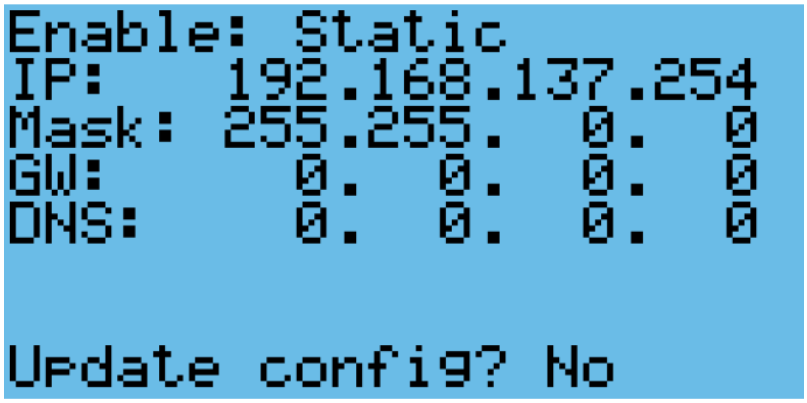


Figure 17: IP Configuration

5. Press **Enter** until the cursor is over the relevant fields of the IP address and Mask. Use the **Up** or **Down** buttons to change them to the desired values.

   IP: Use the IP given by end user for remote monitoring
   Mask: Always use 255.255.0.0
   Gateway and DNS: Use values specified by end user or leave at 0.0.0.0

6. Press **Enter** until the cursor is over "Update Config" and press **Up** to change "No" to "Yes".
7. Press **Enter**.

Remove the PGD from the Controller (If External Display Not Available)

To set the IP addresses for each unit, a PGD display must be connected to each unit. If an external PGD is not available, the one attached to the controller can be removed.

1. Open the controller box and disconnect the plug on the rear of the display.
2. Using a flathead screwdriver or similar tool, remove the PGD frame.

3. Remove the screws securing the PGD to the controller door.

Set the Unit IP Addresses

The IP address of each unit needs to be set prior to integration into the control network.

1. Connect a PGD to the control module inside the unit using the preinstalled connector.
2. Hold the **Esc** button until the main screen is displayed.
3. Hold **Alarm** and **Enter** for 3 seconds to enter the hardware configuration menu.

4. Press **Down** until the cursor is over "Settings" and press **Enter**.
5. Press **Down** until the cursor is over "TCP/IPv4 Settings" and press **Enter**.
6. Press **Enter** until the cursor is over the relevant fields of the IP address and Mask. Use the **Up** or **Down** buttons to change them to the desired values.

   IP Settings:

   - If the previous section on changing IP for the controller was skipped, set the IP Address to 172.168.11.X where X is the unit number. For example, for Unit #3, set the IP Address to 172.168.11.3
   - If the customer provides IP settings for each HVAC, change the values on the units accordingly.
   - If the controller IP was changed for remote monitoring, set the IP Address to Y.Z.11.X where Y and Z are the same as that of the controller and X is the unit number. For example, if the controller IP is set to 192.168.20.45, set Unit #1 to 192.168.11.1 and Unit #2 to 192.168.11.2.
   - Mask: Always use 255.255.0.0
   - Leave other fields blank.

7. Press **Enter** until the cursor is over "Update Config" and press **Up** to change "No" to "Yes".
8. Press **Enter**.
9. Repeat steps 1-8 for all units to be installed.

Verify the Unit Model Number

1. Hold the **Esc** button until the main screen is displayed.
2. From the Main Screen, press **Prg** and enter the password (0004).
3. Press **Down** until the cursor is over "HVAC Config" and press **Enter**. The cursor should be over "Unit Model". Press **Enter**.
4. Verify that the displayed model number is consistent with the nameplate. Use the **Up** and **Down** buttons to change the model until it is correct. Press **Enter** to confirm.

Optional: Set the Unit Serial Number

1. Hold the **Esc** button until the main screen is displayed.
2. From the Main Screen, press **Prg** and enter the password (0004).
3. Press **Down** until the cursor is over "HVAC Config" and press **Enter**. The cursor should be over "Unit Model". Press **Enter**.
4. Press **Down** until the cursor is over "Serial Number", the press **Enter**.
5. Use the **Up** and **Down** buttons to change each digit of the serial number and press **Enter** to move to the next number.

Set the Number of Units and Zones

Note: If the PGD was removed from the controller to configure the unit IP addresses and the model and serial numbers, it must be reconnected before proceeding with the following steps.

1. On the main controller hold the **Esc** button until the main screen is displayed.
2. From the Main Screen, press **Prg** and enter the password (0004).
3. Press **Down** until the cursor is over "Control Config" and press **Enter**.
4. The cursor should be over "Network". Press **Enter**.
5. Press **Enter** until the cursor is by "Total HVACs". Use the **Up** and **Down** buttons to change the value until it matches the total number of HVACs connected to the controller. Press **Enter** to confirm.
6. Press **Enter** until the cursor is by "Total Zones". Use the **Up** and **Down** buttons to change the number of temperature zones. Press **Enter** to confirm.

Zone Configuration (Optional)

The ASMUC.6 controller can control up to 6 units organized in up to 4 zones. A different temperature setpoint can be set for each zone. Each zone can have between 1 and 6 units and any unit can be assigned to any zone. To do so, perform the following steps from the controller:

1. Hold the **Esc** button until the main screen is displayed.
2. Press the **Prg** button and enter the password (0004).
3. Press **Down** until "Control Config" is selected and press **Enter**.
4. The cursor should be over "Network". Press **Enter**.
5. Press **Down** until the screen below is displayed and press **Enter**.

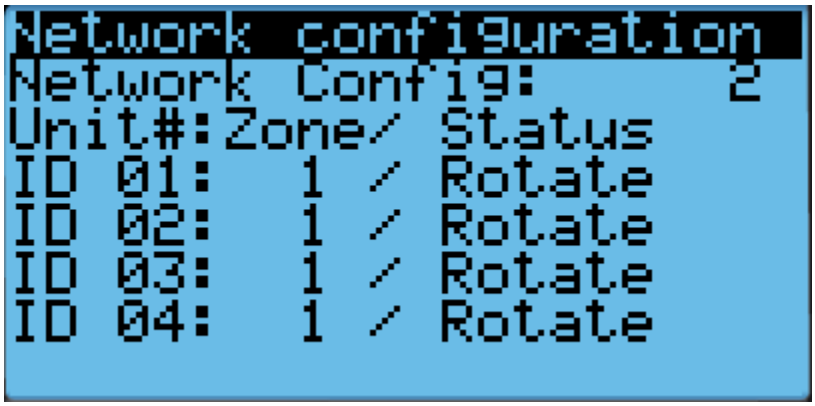


Figure 18: Zone Configuration Screen

6. Press **Enter** until the cursor is next to the desired unit and in the "Zone" column.
7. Press **Up** or **Down** until the desired zone is selected and press **Enter** to confirm.
8. Press **Enter** until the cursor is in the right most column.
9. Press **Up** or **Down** to scroll through the unit setting. The settings should generally stay as "rotate", even for single unit zones. If the unit is set to standalone, it will stay on unless turned off from the unit itself.
10. Repeat steps 6-9 for all units.

11. If more than four units need to be configured, press **Enter** until the cursor is blinking in the upper left corner and press **Down** to access additional units. Repeat steps 6-9 for all units that need to be configured.

Match Unit ID with IP Address

Note: This step can be skipped if the address of the unit was not changed from the default 172.168.11.X where X is the unit #.

The IP address of each unit must be matched to a unit ID. When this step is done, each unit will have a corresponding IP address.

1. Hold the **Esc** button until the main screen is displayed.
2. From the Main Screen, press **Prg** and enter the password (0004).
3. Press **Down** until the cursor is over "Control Config" and press **Enter**.
4. The cursor should be over "Network". Press **Enter**.
5. Press **Down** until the cursor is next to "Network configuration"
6. Press **Enter** until the cursor is next to "Unit ID".
7. Use the **Up** and **Down** buttons to select a Unit ID and press **Enter** to confirm.
8. Press **Enter** until the cursor is over the IP address.
9. Use the **Up** and **Down** buttons to change the value of each part of the IP address. When finished, press **Enter** to move to the next part of the IP address.
10. Once done, repeat steps 5-8 until each Unit ID in the control network has been assigned an IP address.

Turn the HVAC System On

1. Press **Esc** until the main screen is displayed.
2. Press **Down** until a power icon is displayed in the lower right corner of the display.
3. Press **Enter**.
4. Press **Up** until **ON** is displayed and then press **Enter**.

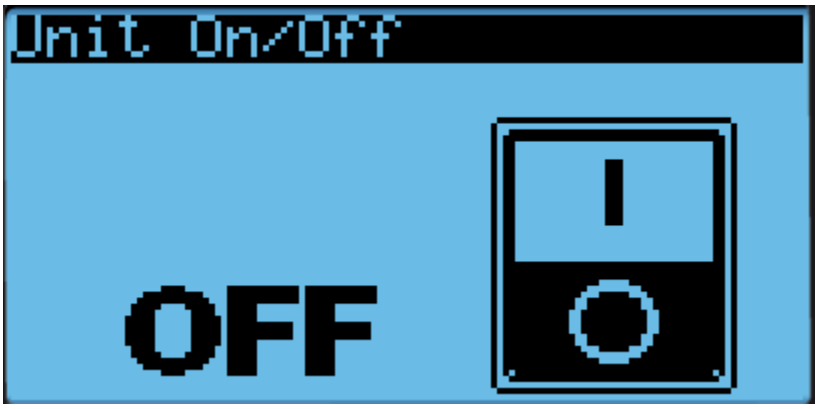


Figure 19: On/Off Screen

Warning. Never leave the site with the HVAC system in the off state. The site will have no cooling, which likely will result in a high temperature alarm requiring an urgent site visit to correct. When the HVAC system is on, the status in the bottom left corner of the main screen should read "ON".

Execute the Step-Test

The step test systematically verifies that key components of the system are operating as expected. Note the following considerations:

- The stages in the step test can be executed in any order; they do not need to be sequential.
- The step test takes the system out of automatic mode.

To perform the step test, follow these steps:

1. Hold **Esc** until the main screen is displayed.
2. From the Main Screen, press **Prg** and enter the password (0004).
3. Press **Enter**, the cursor should be over "Step Test".
4. Press **Enter** to access the menu.
5. Press **Enter**, the cursor should be next to "Select HVAC ID".
6. Press **Up** or **Down** until the unit to be tested is selected, then press **Enter**.
7. Press **Down**, then press **Enter.** The cursor should be next to **STOP**.
8. Use the **Up** and **Down** buttons to select the desired test and press **Enter** to confirm.
9. Repeat Step 8 for all 5 tests. Verify that all components are operating properly. The 5 tests are supply fan, heater, condenser fan, compressor, and damper.
10. After testing is complete, switch the test to **STOP** and press **Enter**.
11. When the step test is complete, return to the main menu by holding **Esc**.

Table 14: Step Test

Name	Action	Notes
Supply Fan	Turns on supply fan	
Heater	Turns on electric heater	Supply fan will run at full speed
Condenser Fan	Turns on condenser fan	
Compressor	Turns on compressor	Supply fan will run at full speed, condenser fan speed will adjust according to the pressure. Compressor will run at medium speed for 3 minutes before changing to the desired speed
Damper	Cycles damper between open and closed	

Optional: When running the supply fan, condenser fan, and compressor step tests, the speed of the component can be changed to test variable speed operation.

1. Repeat steps 1-8 in the above section until the desired step test is selected.
2. Press **Down**, the screen should display "Test settings".
3. Press **Enter** until the desired component is selected.
4. Press **Up** or **Down** to adjust the speed and press **Enter**.

Note: Changing the speed of a component will change its speed only when testing that component. For example, changing the supply fan speed will not affect its run speed during the compressor step test.

Note: The unit will stay under manual control until step "**STOP**" is selected. Make sure that "**STOP**" is selected and the unit is on before leaving the site to avoid potential high temperature alarms. To verify, the system status on the main screen should be "ON".

Warning. Once the compressor has been turned on, it must be allowed to run for at least three minutes before the next step to prevent compressor damage.

Set the System Clock

1. Press **Esc** until the main screen is displayed.
2. Press **Prg** and enter the password (0004). Press the **Enter** key.
3. Press **Down** until the "System" is selected, and press **Enter**. The cursor should be over "Date and Time". Press **Enter**.
4. Press **Enter** to access each individual date and time field.
5. Press **Up** or **Down** to change the value of each number and press **Enter** to verify and move on to the next value. Note: the system operates on 24hr time.
6. Press **Enter** when all fields have been verified. The cursor should be in the upper left corner.

Verify Sensor Readings

All the sensors are factory calibrated before shipping; however, it is essential to verify that all sensors connected to the controller box are properly installed.

1. Press **Esc** until the main screen is displayed.
2. Press **Down** until the "**i**" icon is showing in the bottom right of the display and press **Enter**.
3. Press **Down** until a "Controller Info" is displayed.
4. View the readings shown on the display and verify that they are correct.
5. Wrap a hand around the temperature sensors and verify that the readings change.
6. "Huff" into the humidity sensor with moist warm breath and verify that the humidity reading changes.

If the temperature sensor readings do not change when a hand is wrapped around the corresponding sensor, verify that they have been placed in the correct locations. If the humidity reading does not change, remove the cover and verify that the plug is seated correctly.

Verify Indoor Setpoint

1. Press **Esc** until the main menu is displayed.
2. Press **Down** until **Set** is displayed in the bottom right of the display and press **Enter**.
3. Press **Enter** until "Main Set" is selected.
4. Press **Up** or **Down** to change the setpoint and press **Enter** to confirm.
5. If multiple zones have been established, press **Enter** until the cursor is in the upper left corner and press **Down** to access the settings for each zone.
6. Repeat steps 3-5 until the settings for each zone have been entered.

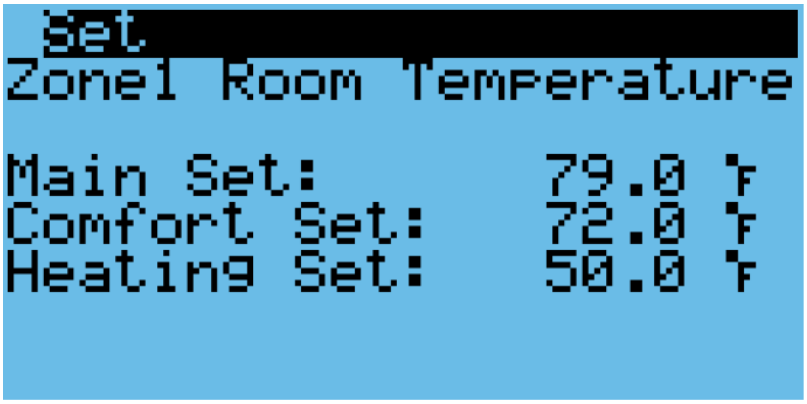


Figure 20: Verify the Main Setpoint

Verify Input and Output Alarms

1. Verify Generator Signal

Note: If the alarm input logic is set incorrectly (NC/NO), no more than one unit will be permitted to run at any time.

   a. Place a jumper between wires 5 and 42 on the controller box terminal block.
   b. Press the **Alarm** button. The generator run alarm should be displayed in the alarm screen.
   c. Remove the jumper.

2. Verify Smoke/Fire Alarm Signal

   a. Press the test button on the smoke/fire detector. The system should completely shut down (Fans and compressors off, damper closed, the Smoke/fire alarm will be displayed on the alarm screen).

   b. The Smoke/Fire Alarm is connected to 41 and 5 on the controller terminal block. If the smoke/fire detector does not have a test button, remove one of the wires from terminals 41 and 5; the system should shut down. It may take the compressor 30 seconds to stop.

3. Verify HVAC Alarms

   a. Verify that the negative leads are landed on the alarm common (terminal 47).

   b. HVAC1: Turn off the HVAC 1 prime power breaker at panel or unit. Verify alarm signal between terminals 46 and 47.

   a. HVAC2: Turn off the HVAC 2 prime power breaker at panel or unit. Verify alarm signal between terminals 47 and 48.

   b. HVAC3: Turn off the HVAC 3 prime power breaker at panel or unit. Verify alarm signal between terminals 47 and 49.

Clear the Alarm History

At significant points such as during preventative maintenance and after commissioning, it may be desired to clear the alarm history.

Warning. Alarm history is collected because it can be very helpful in identifying a problem with the system. The alarm history should never be arbitrarily cleared by an operator. Only AAST should clear the alarm history after all the alarms stored in history have been recorded.

To clear the alarm history, perform the following steps:

1. Hold the **Esc** button until the main screen is displayed.
2. Press **Prg** and enter the password (0004). Press **Enter**.
3. Press **Down** until the cursor is over "System" and press **Enter**.
4. Press **Down** until the cursor is over "Initialization" and press **Enter**.
5. Press **Down** until the cursor is over "Delete Alarm Logs" and press **Enter**.
6. Press **Up** or **Down** until the "no" becomes "yes" and press **Enter**.

Enable SNMP (Optional)

SNMP is available on the ASMUC as an optional extra. To enable it, perform the following steps:

1. Hold the **Esc** button until the main screen is displayed.
2. Press **Prg** and enter the password (0004). Press **Enter**.
3. Press **Down** until the cursor is over "System" and press **Enter**.
4. Press **Down** until the cursor is over "Serial Ports" and press **Enter**.
5. Press **Down** until "SNMP Recipients Config" is displayed across the top.
6. Press **Enter** until the cursor is next to "SNMP" and use the **Up** or **Down** buttons to change "No" to "YES".
7. Press **Enter** to confirm.
8. Press **Enter** until the cursor is over the IP address fields.
9. Use the **Up** and **Down** buttons to change the value of each part of the IP address. When finished, press **Enter** to move to the next part of the IP address.
10. To add additional recipients, press **Enter** until the cursor is in the upper left corner and press Down to access the IP settings for the other recipients.
11. Repeat steps 7-10 as needed. Up to 5 recipients can be added.

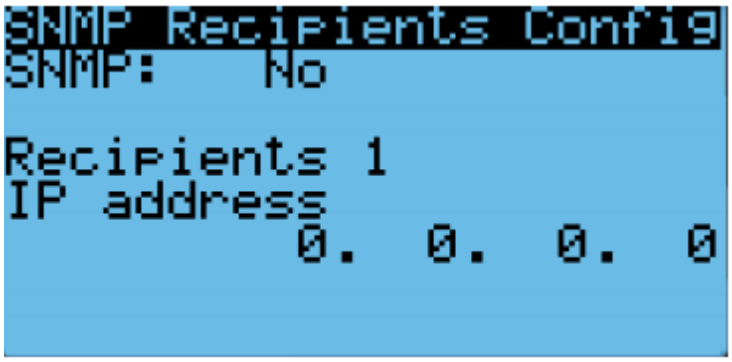
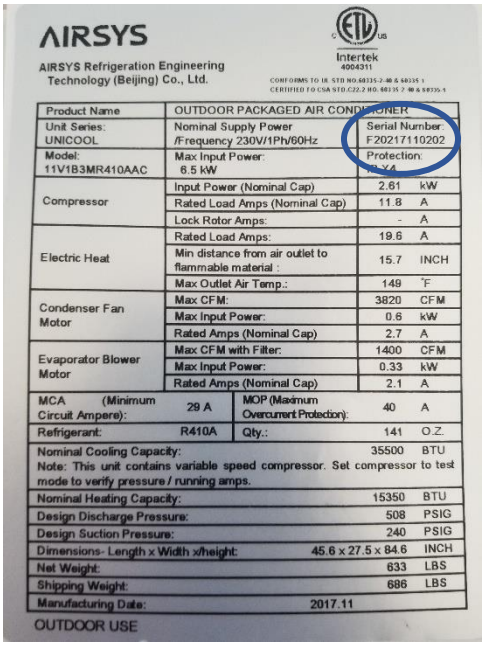
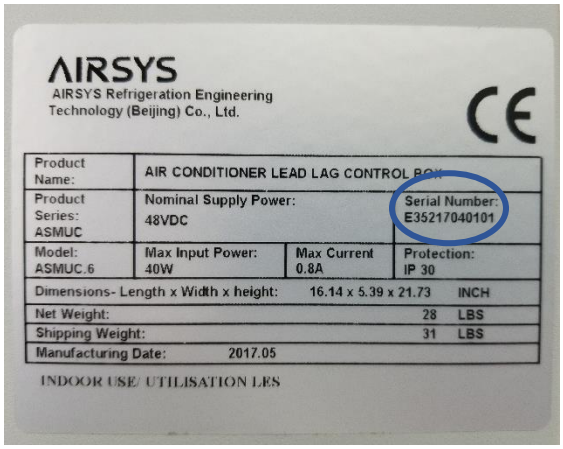


Figure 21: Enable SNMP

Complete the Registration Card

The information on the registration card is critical for establishing the warranty start point.
The following pictures show serial number locations for the WPU and control box. The nameplates can be found on the outside of the WPU and on the front of the controller box. These must be recorded on the AIRSYS Product Warranty Registration Card. The registration card can also be submitted online at https://airsysnorthamerica.com/support/warranty-registration/.





Site name or building serial #: _____

ASMUC.6 Serial #: _____

Date Tested: _____

Name of Tester: _____

Title/Position: _____ Contact information: e. _____

Ph. _____

1. **Change System Units (Optional)** ☐
2. **Set the Unit Model** ☐
3. **Set the Unit Numbers** ☐
4. **Turn ON the HVAC System** ☐
5. **Execute Step Test (verifies all functions of each WPU)**

    5.1. HVAC Supply Fans ☐☐☐☐☐☐
    5.2. HVAC Heaters ☐☐☐☐☐☐
    5.3. HVAC Condenser Fans ☐☐☐☐☐☐
    5.4. HVAC Mechanical Cooling ☐☐☐☐☐☐
    5.5. HVAC Outside Air Damper ☐☐☐☐☐☐

6. **Set the System Clock** ☐
7. **Verify Temp and Humidity sensor readings and Setpoint**

    7.1. Primary Indoor Temp sensor ☐
    7.2. Humidity sensor ☐
    7.3. External (outside) Temp sensor ☐
    7.4. Confirm indoor temperature setpoint ☐

8. **Verify Signal from Generator** ☐
9. **Verify Smoke/Fire Alarm** ☐
10. **Verify HVAC Alarms** ☐
11. **Verify DC-Failover *(if installed)*** ☐
12. **Clear Alarm History *(Optional)*** ☐
13. **Fill out Warranty Card and send to AIRSYS North America** ☐

AIRSYS PRODUCT WARRANTY REGISTRATION CARD

PRODUCT INFORMATION

Controller	Model #:_____	Serial #:_____
HVAC #1	Model #:_____	Serial #:_____
HVAC #2	Model #:_____	Serial #:_____
HVAC #3	Model #:_____	Serial #:_____
HVAC #4	Model #:_____	Serial #:_____
HVAC #5	Model #:_____	Serial #:_____
HVAC #6	Model #:_____	Serial #:_____

INSTALLATION INFORMATION

Site #:_____ Site Name:_____

Street address:_____ City:_____ State:_____ Zip:_____

Date Install Completed:____/____/_____ Installation Company:_____

Installer Name:_____ Phone #:_____ Email:_____

OWNERSHIP INFORMATION

Company:_____

Site Supervisor Name:_____ Phone #:_____ Email:_____

REGISTRATION ONLINE: airsysnorthamerica.com/support/warranty-registration

BY EMAIL: Scan and send to: ASNSupport@air-sys.com

Chapter 4: System Operation

This chapter describes how to use the PGD interface (Figure 22) to execute the functions needed during standard operation. This information may be useful during troubleshooting and in conversations with technical support. For a list of changeable parameters, see Chapter 5: System Parameters and Default Values.

The following topics are covered:

- Using the Main Menu to execute basic functions
- Understanding alarms that may occur and clearing alarm history
- Additional system diagnostic information

Figure 22: PGD User Interface

User Interface Introduction

The units are controlled using the PGD interface, which has 6 buttons (Table 10). A PGD is preinstalled in the ASMUC controller which can be used to control all connected WPUs. In addition, a separate PGD can be connected to a preinstalled display cable on the unit for detailed diagnostics. The preinstalled cable leads from the J3 connector on the controller module and terminates in the display connector. All settings from the controller will override settings inputted at the unit unless the unit has been set for standalone operation.

For this section, "controller" will refer to the ASMUC.6 controller box and "system" will refer to the controller AND all connected units.

Table 10: PGD Button Actions

Button	Function	Description
	Alarm	• Displays current alarms. Indicates active alarm when the LED is on.
	Program	• Enter the menu selection page.
	Esc	• Go up one level in any menu.
	Up	• Scroll up through menu screens and options • Increase the value of selected parameter
	Enter	• Select a parameter to be changed. • Confirm a changed parameter.
	Down	• Scrolls down through menu screens and options • Decrease the value of selected parameter.

Navigating Menus

The user interface is broken down into main menus and program menus. Main menus are accessed through the main screen, while program menus are accessed through the program menu selection screen. Please note the following when navigating the menus:

The current position in the menu is marked by a blinking cursor.

- When the cursor is in the top left corner of the screen, press **Up** or **Down** to navigate to different menu screens.
- To enter a menu screen, press **Enter**.
- When inside the menu screen, press **Enter** to scroll through the different parameters.
- After the desired parameter is selected, press **Up** or **Down** until the desired setting is selected and press **Enter** to confirm.
- To exit a menu screen, press **Enter** until the cursor is in the top left corner. The **Up** and **Down** buttons can then be used to navigate to different menu screens.

Main Screen

The Main Screen is displayed by default upon system startup. It can also be accessed from any point by holding the **Esc** button.

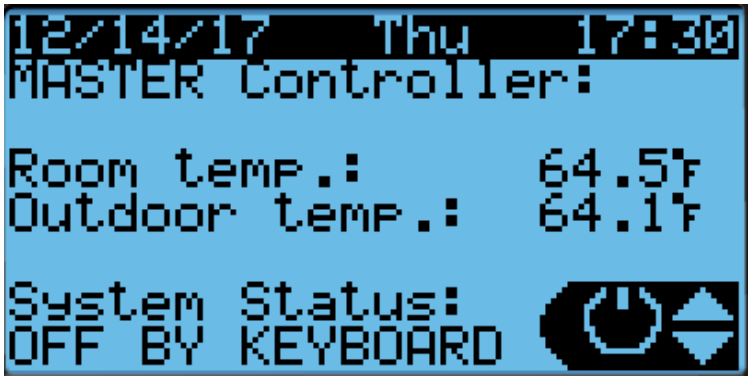


Figure 23: Main Screen

The system status is shown in the bottom left corner. There are 5 possible statuses, which are shown in Table 11.

Table 11: System Statuses

System Status	Status Description	Notes
On	Unit is on	
Off By Alarm	Unit operation is stopped due to alarms	
Off By BMS	Unit has been turned off by the BMS	Displayed on HVAC when the master controller is "Off by Keyboard"
Off By Keyboard	Unit has been turned off locally	
In Manual Mode	Unit is operating in manual mode (step test)	Can be engaged at the unit or controller

The four main menus can be accessed from the main screen. The menus are selected by pressing the **Up** or **Down** buttons. The icon in the bottom right corner will change accordingly. Press **Enter** to access the menu.

- When the power icon is displayed, press **Enter** to access the power menu. The system can be switched on and off from here.
- When the **i** icon is displayed, press **Enter** to access the information menu. This menu contains information regarding the system status, sensor readings, equipment runtime, and system data. If viewing from the controller, information for each connected unit can be viewed from this menu.
- When **Set** is displayed, press **Enter** to access the setpoint menu. The main temperature and comfort mode setpoints for each zone can be assigned. In addition, the free cooling humidity limit can also be set.
- When ***Cft*** is displayed, press **Enter** to access the comfort mode menu. The system can be toggled between normal and comfort mode.

Turning the System On and Off

1. Hold the **Esc** button until the main screen is displayed.
2. Press **Up** or **Down** until the power icon is displayed in the bottom right of the screen and press **Enter**.
3. Press **Up** or **Down** to switch between On and Off, press **Enter** to confirm.

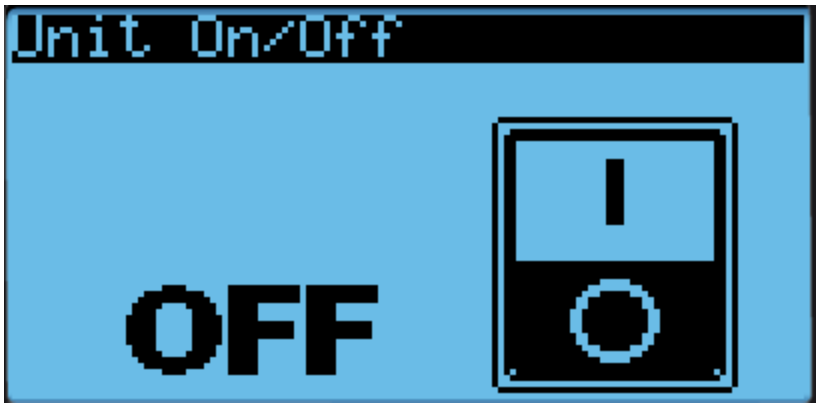


Figure 24: On/Off Screen

Warning. Never leave the site with the HVAC system in the off state. The site will have no temperature control, which likely will result in an urgent site visit to correct.

Changing the Setpoint and Free Cooling Humidity Limit

The cooling, heating, and comfort mode setpoints for each zone can be independently adjusted from the controller. In addition, the free cooling humidity limit can be adjusted, but will apply for the whole network.

1. Hold the **Esc** button until the main screen is displayed.
2. Press **Up** or **Down** until the **Set** is displayed in the bottom right of the screen and press **Enter**.
3. Press **Down** until the desired zone is selected. The screen should display "ZoneX Room Temperature". Press **Enter**.
4. Press **Enter** until the cursor is next to the desired setpoint.
5. Press **Up** or **Down** to change the setpoint and press **Enter** to confirm.
6. If setpoints for more than one zone need to be configured, press **Enter** until the cursor is in the upper left corner and repeat steps 3-5.

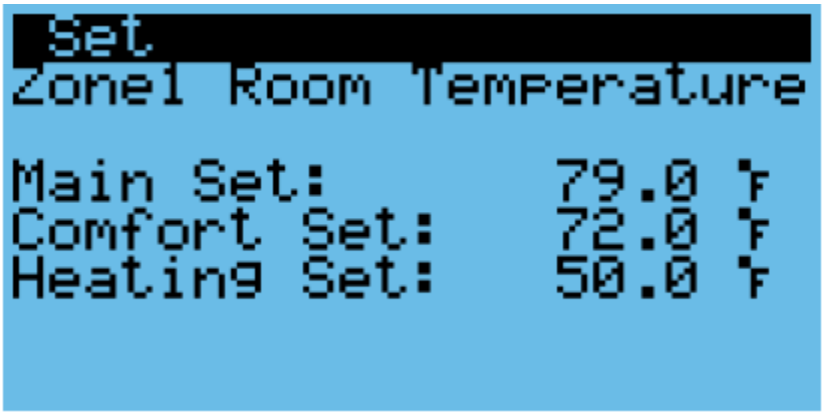


Figure 25: Setpoint Screen

To change the free cooling humidity limit, repeat steps 1-3, but scroll to the screen that reads "Outdoor Humidity" Then press **Enter** and use the **Up** and **Down** keys to adjust the humidity limit. Press **Enter** to confirm.

Using Comfort Mode

The settings on the HVAC system are optimized for operating efficiency and not for human comfort. When working inside the shelter for extended durations, the site temperature can be temporarily adjusted using the comfort mode setting.

1. Hold the **Esc** button until the main screen is displayed.
2. Press **Up** or **Down** until the ***Cft*** is displayed in the bottom right of the screen and press **Enter**.
3. Press **Up** or **Down** to switch between Comfort and normal mode, press **Enter** to confirm.

To change the comfort mode setpoint, see "Changing the Setpoint and Free Cooling Humidity Limit".

Important. If the HVAC system needs to cool aggressively to reach the comfort mode setpoint, multiple WPUs may go into mechanical cooling.

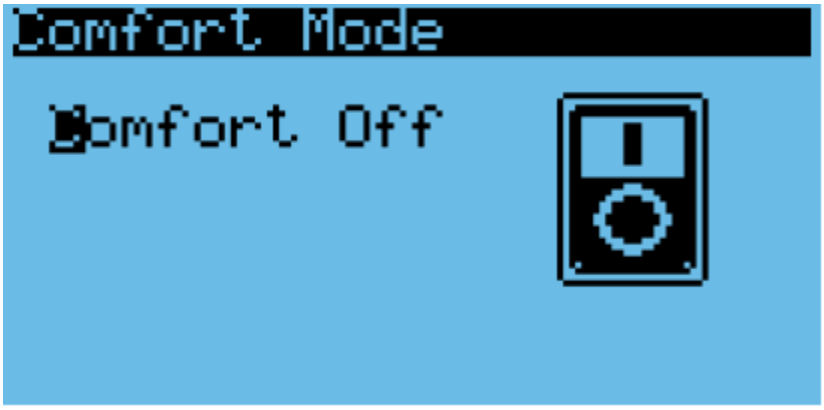


Figure 26: Comfort Mode Screen

Changing System Units

By default, the system operates using units of °F and psi for temperature and pressure. These can be changed to metric units if desired.

1. Hold the **Esc** button until the main screen is displayed.
2. Press **Up and Down** together to enter the debug menu.
3. Press **Down**, the screen should display "No Conversion".
4. Press **Enter** until the cursor is on the row below "Current UoM"
5. Press **Up** or **Down** until the desired unit conversion is shown and press **Enter**.

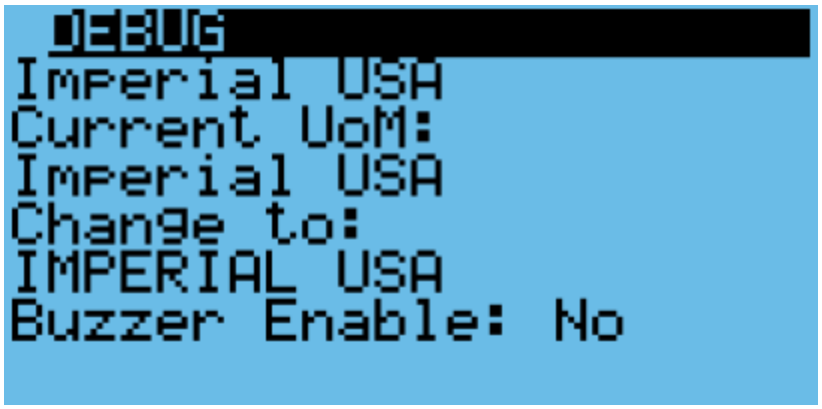


Figure 27: Unit Selection Screen

Viewing Controller Information

System information such as unit status and energy consumption as well as controller status can be viewed from the controller. See

Table **12** for a complete list of information viewable from the controller. All parameters are read-only.

1. Hold the **Esc** button until the main screen is displayed.
2. Press **Up** or **Down** until **i** is displayed in the bottom right of the screen and press **Enter**.
3. Use the **Up** or **Down** buttons to scroll through the menu screens.

Table 12: Controller Info Menu

Menu Screen	Parameter	Description
Network Status	Network Status	View unit status
HVAC Info	ID Fan	Supply fan speed
	Comp	Compressor speed
	OD Fan	Condenser fan speed
	Damper	Damper position
	Heater	Heater Status
	kW	Energy consumption
	Status	Unit status
HVAC FC Status	HVAC FC Status	Free cooling status of each unit
Avg KW	1 Hour	Average energy consumption in the past hour for all units
	30 Days	Average energy consumption in the last 30 days for all units
Sensor Reading	Outdoor temp	Outdoor temperature reading from controller
	Room temp 1	Room temperature reading from controller
	Humidity	Humidity reading from controller
	Room temp 2	Zone 2 room temperature
	Room temp 3	Zone 3 room temperature
	Room temp 4	Zone 4 room temperature
Alarm Inputs	Smoke/fire	Smoke/fire alarm status
	Generator run	Generator run alarm status
	DC failover	DC failover run status

	Hydrogen	Hydrogen alarm status
Alarm Outputs	High temp	High temp alarm status
	HVAC Alarm 1	HVAC 1 alarm status
	HVAC Alarm 2	HVAC 2 alarm status
	HVAC Alarm 3	HVAC 3 alarm status
	Filter	Filter alarm status
Drive Signal	Residual Press. Valve	Residual Pressure Valve Status
HVAC ID Select	Select Unit ID	Select the unit to view
	Goto HVAC Info	Change "NO" to "YES" and press **Enter** to view unit status.
Controller info	SW ver.	Software version
	OS ver.	Operating system version
	BOOT ver.	Bootloader version
PRESS [ENTER] TO VIEW ADVANCED INFO		
System info	Board type	Control board model
	Board size	Control board size
	Board temp	Control board temperature
	Ret mem writes	Memory writes
Run Time	Controller	Controller operating hours
Power Off Info	Current time	Current time
	Power off time	Last time the unit was powered off
	Length last time off	Length of last unit shutdown

Viewing Unit Information

1. Information such as suction and discharge temperatures, system pressures, compressor speed, and energy consumption can be viewed for all units from the controller.

Table 13 contains unit information that can be viewed either at the controller or directly at the unit. All parameters are read-only.

2. Hold the **Esc** button until the main screen is displayed.
3. Press **Up** or **Down** until **i** is displayed in the bottom right of the screen and press **Enter**.
4. Press **Down** until "Select HVAC ID" is displayed on the screen and press **Enter.**
5. Use the **Up** or **Down** buttons to select the unit to be viewed and press **Enter**.
6. Press **Down** until the cursor is over "Goto HVAC Info" and press **Enter**.

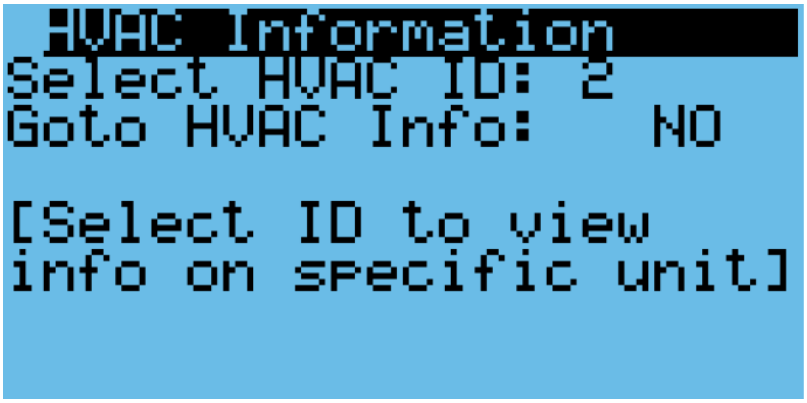


Figure 28: HVAC ID Select Screen

7. Press **Down** until "NO" becomes "YES" and press **Enter**.
8. Press **Down** until a menu titled "Info" is displayed.
9. Press **Up** or **Down** to scroll through the unit information.

Table 13: Unit Info Menu

Menu Screen	Parameter	Description
Capacity Regulation	Unit request.	Compressor speed requested by the unit
	Required cap.	Compressor speed requested by the controller
	Actual cap.	Current compressor speed (%)
	Actual speed	Current compressor speed (rps)
Inverter Info	DC Voltage	DC voltage to inverter
	Current	Current to inverter
	Amb Temp.	Ambient temperature
	Driver temperature	Inverter driver temperature
Refrig. Pressure	Suct. Pressure	Suction pressure
	Disc. Pressure	Discharge pressure
	Press. Diff.	Pressure difference between compressor suction and discharge
	Press. Ratio	Pressure ratio between compressor suction and discharge
Refrig. Temperature	Disc. Temp	Discharge temperature
	Cond. Temp	Condensing temperature
	Cond. Sat. Temp	Condensation saturation pressure
	Suct. Temp	Suction temperature
	Suct. Sat. Temp	Suction saturation temperature
EEV Info	EEV Step	EEV Step
	EEV Status	EEV opening percentage
	Super Cool	Unit Subcooling
	Super Heat	Unit Superheat
Sensor Reading	Supply temp.	Unit supply temperature reading
	Return temp.	Unit return temp reading
	Outdoor temp.	Unit outdoor temperature reading
	Humidity	Unit humidity reading
	Backup temp.	Unit backup temperature sensor reading

Alarm inputs	Smoke/fire	Smoke/fire alarm input status
	Comp. ovld	Compressor overload alarm input status
	HP switch	High pressure alarm input status
	Power failure	Power failure alarm input status
	Filter clogged	Dirty filter alarm input status
	Supply fan ovld.	Supply fan overload alarm input status
	AFPD	AFPD trigger alarm input status
Component Status	Compressor	Compressor status
	Supply fan	Supply fan status
	Heater	Heater status
	EEV	EEV status
	Supply fan	Supply fan speed
	Speed	Supply fan rotation speed (rpm)
	FC damper	Damper opening percentage
Drive Signal	Supply Fan	Supply fan speed
	FC damper	FC damper opening
	Cond. fan	Condenser fan speed
	Cond. Fan. Dirty Rate	Condenser Fan Dirty Rate
Run Time	Unit	Unit operating hours
	Supply fan	Supply fan operating hours
	Compressor	Compressor operation hours
	Heater	Heater operating hours
	Free Cooling	Free cooling operating hours
Start times	Supply fan	Number of supply fan starts
	Compressor	Number of compressor starts
	Heater	Number of heater starts
	Free cooling	Number of free cooling starts
Power Off Info	Current time	Current time
	Power off time	Last time the unit was powered off
	Length last time off	Length of last unit shutdown
HVAC Model	HVAC Model	HVAC model and serial number

Program Menus

Program Menus can be accessed through the program menu selection screen. Changing most system settings require accessing a program menu. From the main screen, press **Prg** to access the program menu selection screen. Accessing a program menu requires a password. There are three password protected access levels: user, service, and manufacturer. Enter the password, using the **Enter** button to move the cursor horizontally and the **Up** and **Down** buttons to change the numbers. Once the password is entered, hold **Enter** until the selection screen is displayed.

The user level gives limited access to system parameters, the service level allows access to critical component settings such as the EEV and compressor, and the manufacturer level allows for modification of all system parameters. The default passwords for the user and service levels are 0003 and 0004. Contact AIRSYS Support for access to manufacturer parameters.

The current access level is shown in the upper left corner of the program menu selection screen. To change access levels, scroll through the program menu selection screen until "Logout" is highlighted and press **Enter** until the main screen is displayed. Then press **Prg** and log in with the appropriate password.

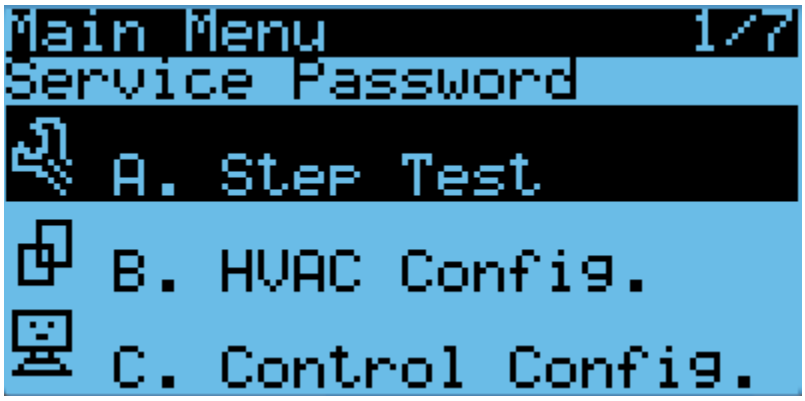


Figure 29: Program Menu Selection Screen

Step Test

The step test systematically verifies that key components of the system are operating as expected. Note the following considerations:

- The stages in the step test can be executed in any order; they do not need to be sequential.
- The Step Test takes the system out of automatic mode.

To perform the step test, follow these steps:

1. Hold **Esc** until the main screen is displayed.
2. From the Main Screen, press **Prg** and enter the password (0004).
3. Press **Enter**, the cursor should be over "Step Test".
4. Press **Enter** to access the menu.
5. Press **Enter**, the cursor should be next to "Select HVAC ID".
6. Press **Up** or **Down** until the unit to be tested is selected, then press **Enter**.
7. Press **Down**, then press **Enter.** The cursor should be next to **STOP**.
8. Use the **Up** and **Down** buttons to select the desired test and press **Enter** to confirm.
9. Repeat Step 8 for all 5 tests. Verify that all components are operating properly. The 5 tests are supply fan, heater, condenser fan, compressor, and damper.
10. After testing is complete, switch the test to **STOP** and press **Enter**.
11. When the step test is complete, return to the main menu by holding **Esc**.

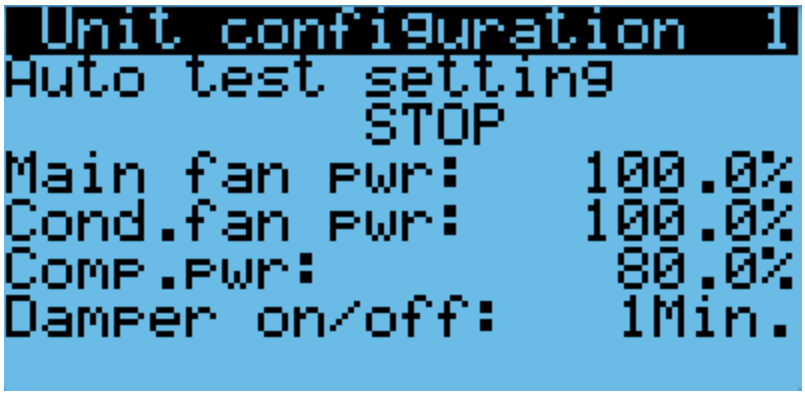


Figure 30: Step Test Selection Screen

Table 14: Step Test

Name	Action	Notes
Supply Fan	Turns on supply fan	
Heater	Turns on electric heater	Supply fan will run at full speed
Condenser Fan	Turns on condenser fan	
Compressor	Turns on compressor	Supply fan will run at full speed, condenser fan speed will adjust according to the pressure. Compressor will run at medium speed for 3 minutes before changing to the desired speed
Damper	Cycles damper between open and closed	

When running the supply fan, condenser fan, and compressor step tests, the speed of the component can be changed to test variable speed operation.

1. Repeat steps 1-8 in the above section until the desired step test is selected.
2. Press **Down**, the screen should display "Test settings".
3. Press **Enter** until the desired component is selected.
4. Press **Up** or **Down** to adjust the speed and press **Enter**.

Note: Changing the speed of a component will change its speed only when testing that component. For example, changing the supply fan speed will not affect its run speed during the compressor step test.

Note: The unit will stay under manual control until step "**STOP**" is selected. Make sure that "**STOP**" is selected and the unit is on before leaving the site to avoid potential high temperature alarms. To verify, the system status on the main screen should be "ON".

Warning. Once the compressor has been turned on, it must be allowed to run for at least three minutes before the next step to prevent compressor damage.

Alarms

When a problem occurs during unit operation, the controller records the related information and the **Alarm** button will be lit. Depending on the severity of the alarm, various components are automatically shut down. The system will automatically restart most components after a defined delay period. However,

manual reset is required when certain alarms occur three times within an hour (configurable). A description of all system alarms is given below.

Table 14: Alarm Descriptions

Code	Description	User/Auto Reset
AL*01	Too Many Internal Memory Writes	User reset
AL*02	Internal Memory Read/Write Error	User reset
AL*03	Outdoor Temperature Sensor Error	Auto reset
AL*04	Indoor Temperature Sensor Error	Auto reset
AL*05	Humidity Sensor Error	Auto reset
AL*06	Smoke/Fire alarm	Auto reset
AL*07	Generator Run	Auto reset
AL*08	DC Failover Active	Auto reset
AL*09	AC Power Failure	Auto reset
AL*10	Low Press Lockout	User reset
AL*11	High Temp Alarm	Auto reset
AL*12	Low Temp Alarm	Auto reset
AL*13	Hydrogen Alarm	Auto reset
AL*14	Dirty Condenser Alarm	User reset
AL*47	High Pressure Sensor Error	Auto reset
AL*48	Discharge Temperature Sensor Error	Auto reset
AL*49	Suction Pressure Sensor Error	Auto reset
AL*50	Suction Temperature Sensor Error	Auto reset
AL*51	Supply Temperature Probe Error	Auto reset
AL*52	Condenser Temperature Probe Error	Auto reset
AL*53	Compressor Overload	Auto reset
AL*54	High Pressure Switch Alarm	Auto reset
AL*55	Supply Fan Overload	Auto reset
AL*56	High Pressure Alarm	Auto reset
AL*57	Low Pressure Alarm	Auto reset
AL*58	Low Pressure Limit Alarm	Auto reset
AL*59	Stuck Filter Alarm	Auto reset
AL*60	AFPD Protection Triggered	Auto reset
AL*61	High Supply Temperature Alarm	Auto reset
AL*62	Damper Alarm	Auto reset
AL*63	Low supply Temperature Alarm	Auto reset
AL*64	Expansion Board Offline	Auto reset
AL*65	Master Controller Offline	Auto reset
AL*68	Low delta pressure	Auto reset
AL*69	High Discharge Temperature Alarm	Auto reset
AL*142	Inverter Offline	Auto reset

AL*143	Low Superheat Alarm	Auto reset
AL*144	Low Evaporator Temperature Alarm	Auto reset
AL*145	High Evaporator Temperature Alarm	Auto reset
AL*146	Low Suction Pressure	Auto reset
AL*147	EEV Alarm	Auto reset
AL*148	Emergency Ventilation Active	Auto reset
AL*149	Out of Envelope	Auto reset
AL*159	Air Filter Pressure Differential Alarm	Auto reset

If the **Alarm** button is illuminated, press it at the main screen to display current active alarms. The code identifying the system alarm will display on the screen of the user terminal. Press **Up** or **Down** to scroll through all active alarms. Press **Esc** to return to the main screen.

Alarm History

The controller stores up to 200 alarms which are individually timestamped and can be viewed in the Alarm History.

To access the alarm history, perform the following steps:

1. Hold the **Esc** button until the main screen is displayed.
2. Press **Prg** and enter the password (0004). Press **Enter**.
3. Press **Down** until the cursor is over "Alarm Logs" and press **Enter.**
4. Press **Up** or **Down** to scroll through the alarm logs.

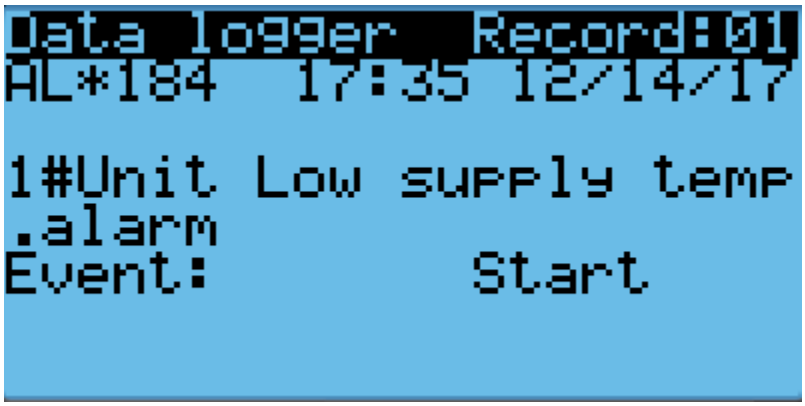


Figure 31: Alarm Logs

Clearing Alarm History

At significant points such as during preventative maintenance, it may be desired to clear the alarm history.

Warning. Alarm history is collected because it can be very helpful in identifying a problem with the system. The alarm history should never be arbitrarily cleared by an operator. Only AAST should clear the alarm history after all the alarms stored in history have been recorded.

To clear the alarm history, perform the following steps:

1. Hold the **Esc** button until the main screen is displayed.
2. Press **Prg** and enter the password (0004). Press **Enter**.
3. Press **Down** until the cursor is over "System" and press **Enter**.
4. Press **Down** until the cursor is over "Initialization" and press **Enter**.
5. Press **Enter** until the cursor is over "Delete Alarm Logs".
6. Press **Up** or **Down** until the "NO" becomes "YES" and press **Enter**.

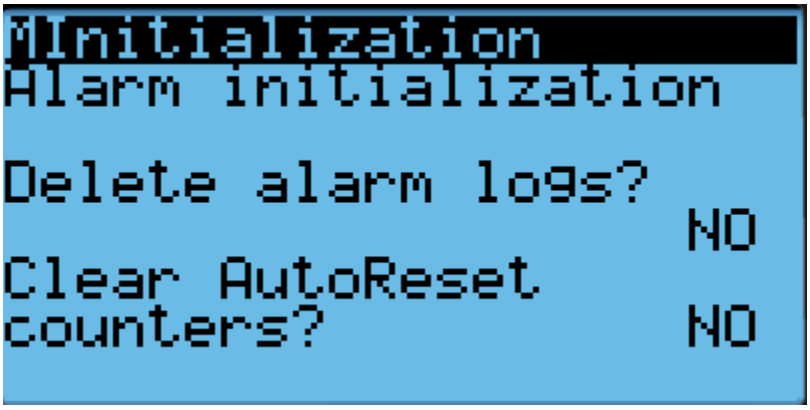


Figure 32: Clear Alarm History

Exporting System History and Alarm Logs

The system logs and alarm history can be downloaded to a personal computer through a USB connection from the controller to the computer.

Exporting System Logs

1. Hold the **Alarm** and **Enter** buttons until the hardware configuration menu is displayed.

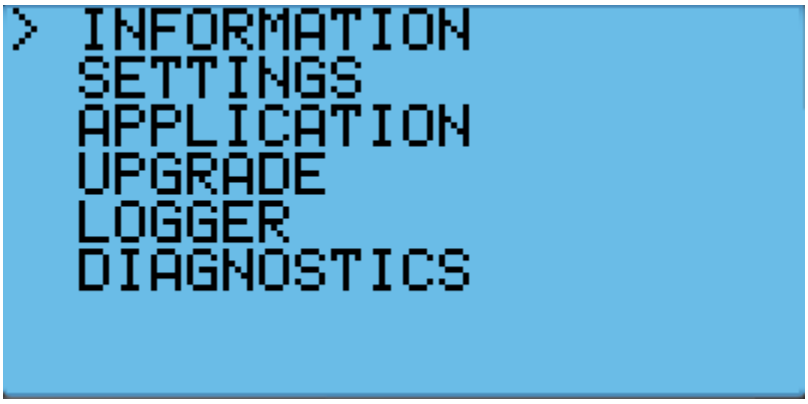


Figure 33: Hardware Configuration Menu

2. Press **Down** until the arrow is next to "Diagnostics" and press **Enter**.
3. The screen should display "System Log". Press **Enter**.

4. Press **Enter** and wait until "Saving successful" is displayed. Press **Esc** until the hardware configuration menu is displayed.
5. Press **Up** or **Down** until the arrow is next to "Logger" and press **Enter**.
6. The arrow should be next to "Export Logs". Press **Enter**.
7. Press **Down** until the arrow is next to "NewLog" and press **Enter**.
8. Wait until "Log operation ok" is displayed and press **Enter**.
9. Connect the controller and a computer using a microUSB to USB cable. The folder containing the logs should appear as a new drive. The logs can then be copied to the computer and viewed.

Exporting Alarm History

1. Hold the **Esc** button until the main screen is displayed.
2. Press **Prg** and enter the password (0004). Press **Enter**.
3. Press **Down** until the cursor is over "Import/Export" and press **Enter**.
4. Press **Down** until the cursor is over "Alarm Export" and press **Enter**.
5. Press **Enter** until the cursor is over "File name" and press the **Up** or **Down** buttons to change the log number. Press **Enter** to confirm.
6. Press **Down** until the "NO" becomes "YES" and press **Enter**.
7. Connect the controller and a computer using a micro USB to USB cable. The folder containing the logs should appear as a new drive. The logs can then be copied to the computer and viewed.

Resetting Factory Defaults

In some cases, it may be necessary to restore the controller to factory defaults. Depending on the option selected, custom setpoints and other system parameters will be changed to factory defaults.

Note: Resetting factory defaults should only be done under the instruction of AIRSYS support.

There are three types of available factory resets:

- Restore factory settings (Wipe retain mem)
- Reset system memory (Wipe NVRAM mem)
- Full factory reset (Wipe both mem)

Restoring factory settings will restore all settings to factory defaults but will not affect stored data such as alarm and system logs. Resetting the system memory will clear all stored data but will not change any system settings. The full factory reset will restore all settings to factory default and wipe the system memory.

Important. The system must be re-commissioned after resetting to factory default. Follow the commissioning steps on Page 36 to re-commission the system.

To perform a factory reset perform the following steps:

1. Hold the **Esc** button until the main screen is displayed.
2. Press **Prg** and enter the password (0004). Press **Enter**.
3. Press **Down** until the cursor is over "System" and press **Enter**.
4. Press **Down** until the cursor is over "Initialization" and press **Enter**.
5. Press **Down** until "Default Installation" is displayed across the top of the screen.

6. Press **Enter** until the desired option is selected.
7. Press **Up** or **Down** until "NO" becomes "Yes" and press **Enter**.
8. Wait for the system to automatically reboot and follow the on-screen instructions if given.

Figure 34: Factory Reset Screen

If performing a factory reset on a unit, cycle the unit breaker after the reset is complete. This is necessary for the unit to receive system setpoints from the controller.

Set the Master

If performing a factory reset on the controller, it must be set to "Master" after the reset is complete. Do so through the following steps:

1. Press the **Up** and **Down** buttons at the same time to enter the Debug Menu.
2. Press **Down** to scroll to Master/HVAC Select and press **Enter**.
3. Press **Down** until "Master" is selected and press **Enter** to confirm.

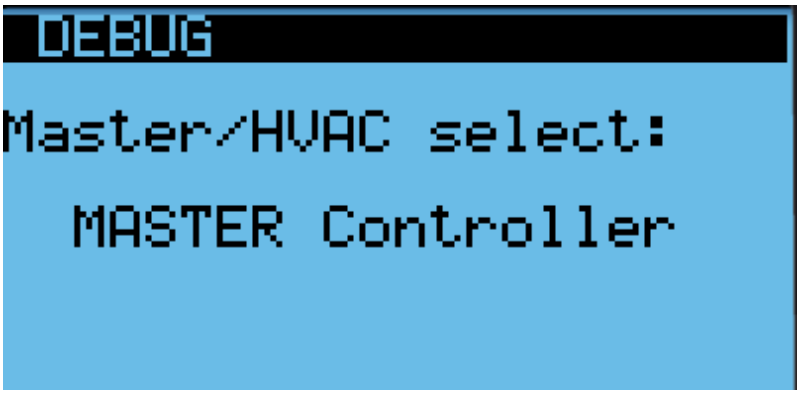


Figure 35: Set the Master

Operational Logic:

Free Cooling (Economizer) Operation

When Free Cooling (FC) is engaged, the damper opens to introduce cooler air from outside to be delivered to the shelter. The damper will open when the difference between the indoor and outdoor temperatures is larger than a predefined minimum (default 3.6°F, configurable under "Free Cooling" in the Control Configuration menu) and the outdoor humidity is below the limit (default 85%).

The supply fan will start at low speed when the damper opening conditions are met and the indoor temperature is above the Free Cooling Setpoint (configurable under "Room Temperature" in the User Configuration menu). As the indoor temperature rises, the fan speed will increase to keep the indoor temperature within 2°F of the main setpoint. If the indoor temperature cannot be maintained below the lead compressor turn on point (configurable under "Setpoints" in the Control Configuration menu), the compressor will start to assist FC.

During cold weather, the outdoor damper modulates to keep the supply air temperature above 51.8°F and will close completely when the supply temperature is below that point (configurable under "Setpoints" in the Control Configuration menu). The damper will also close if the humidity is above the limit (default 85%) or if the AFPD dust sensor triggers a protection event.

If partial free cooling is allowed (default enabled), the damper can remain open when the compressor is engaged, provided that the outdoor temperature is lower than the indoor temperature. Otherwise, the damper will close as soon as the compressor starts. For shelters without a secondary pressure relief (e.g. a barometric louvre), partial free cooling can be disabled (configurable under "Free Cooling" in the Control Configuration menu).

Mechanical Cooling Operation

All AIRSYS Precision Cooling WPUs have variable speed compressors which will adjust their speed to match the heat load inside the shelter. The compressor logic will vary based on whether free cooling is engaged. If free cooling is enabled, the compressor will not start until the indoor temperature has reached a predetermined level above the setpoint (default 2°F). At that point, the compressor will start at full speed and adjust its speed according to the indoor temperature. These settings can be configured under "Setpoints" in the Control Configuration menu.

Heater Operation

The heater will activate when the indoor temperature reaches a predetermined level below the setpoint (default 29°F). The heater will then run until the temperature is a certain level above the on point (default 3°F). These settings can be configured under "Setpoints" in the Control Configuration menu.

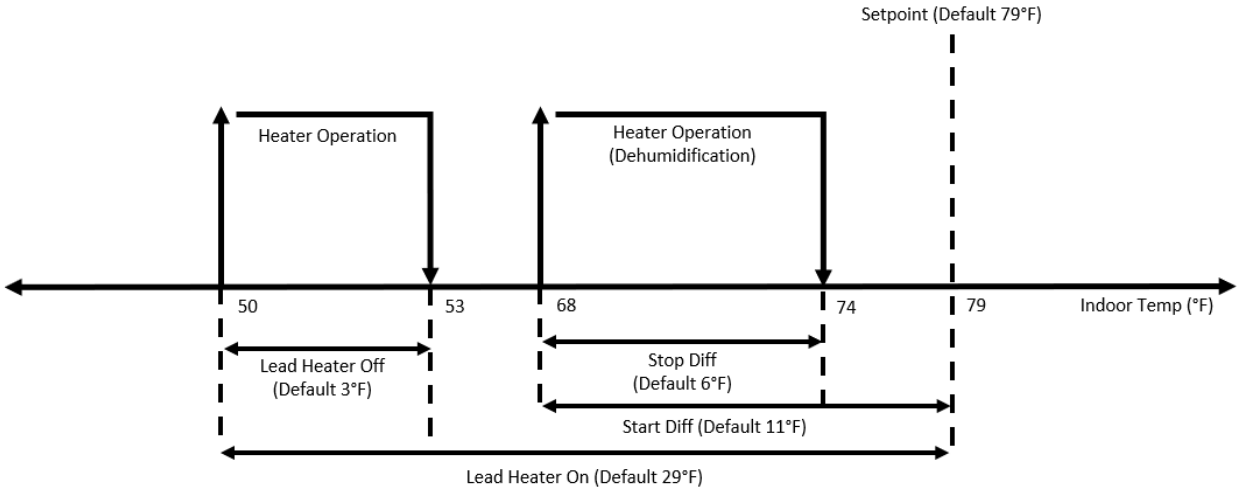


Figure 36 : Heater Operation Logic

Dehumidification

Dehumidification using the compressor or heater is available using the compressor or heater. It can be enabled under "Setpoints" in the Control Configuration menu. When the humidity reading from the controller exceeds a threshold (default 15% above target), dehumidification will activate. The heater will activate if the indoor temperature is below a certain level (default 11°F below setpoint). Otherwise, the compressor will be used to dehumidify. Dehumidification will stay active until the target is reached (default 55%).

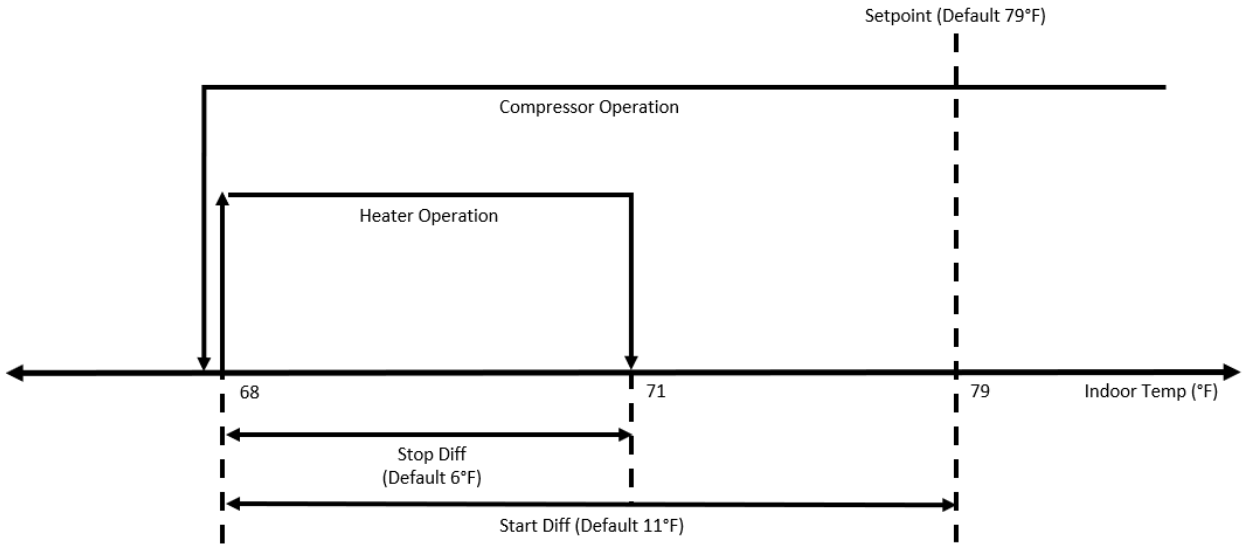


Figure 37: Dehumidification Logic

Generator Run

If a generator run circuit is installed, the system can be set to limit free cooling and compressor speed when the generator is running. When the alarm signal is received, compressor speed will be limited to a default of 80%. This can be changed under "Alarms" in the HVAC Configuration Menu. Free cooling is not limited by default but can be disabled during generator operation to stop diesel fumes from entering the site.

Emergency Ventilation

When the indoor temperature is a much higher than the setpoint (default 14°F), emergency ventilation will start. The compressor will operate at full speed and the damper will open unless it is completely disabled. Emergency ventilation will continue to operate until the temperature is below a cutoff point (default 9°F below activation) at which point the system will return to normal operation.

Seaside Mode

Seaside mode will disable free cooling unless the conditions for emergency ventilation are met.

AFPD

The Air Filter Protection Device (AFPD) will automatically shut the damper when it detects a particulate concentration that is higher than a preset concentration (adjustable between 0.15-0.35 mg/m^3). When a protection event is triggered, the damper will automatically shut. It will remain shut for a minimum of 1 hour and display the AL*60 alarm unless the controller is manually reset.

After the hour, it will sample the particulate concentration at one minute (configurable) intervals and reopen the damper when it is below the opening threshold.

Condenser Monitoring

The heat transfer across the condenser coil is monitored by the system and can be used to schedule preventative maintenance when the efficiency is low. Condenser status can be monitored under "Cond. fan dirty rate" in the "Unit Info Menu" shown on Page 58.

Chapter 5: System Parameters and Default Values

This section provides a listing of all changeable parameters in the PGD user interface. Authorized technicians may use the information in this section to change factory settings. The main menu and associated menu screens are covered in "Main Screen" on Page 52.

Step Test Menu Parameters

The Step Test menu is used to access the step test. See "Step Test" on Page 60 for additional information and instructions for executing the step test.

HVAC Config Menu Parameters

The HVAC Config menu contains configuration options for the following components, each of which has its own menu:

- Supply (Evaporator) Fan
- Condenser Fan
- EEV
- Compressor
- Inverter
- Alarms

Table 15: Parameters in the Supply Fan Menu

Menu Screen	Option	Description	Default
Supply Fan	Min Speed	Minimum allowed fan speed	30%
	Max Speed	Maximum allowed fan speed	100%
	Prime Power Fail	Maximum fan speed when the unit has no AC Power	80%
Supply Fan PID	Kp	Proportional control setting	4.0
	Ki	Integral control setting	30
	Kd	Derivative control setting	0
DX Fan Speed	Fixed DX Max Speed	Supply fan speed when the compressor is on and system is in fixed speed mode	100%
	Variable DX Max Speed	Supply fan speed when the compressor is on and system is in normal speed (variable) mode	93%
	Dehumidification Speed	Supply fan speed during dehumidification	75%
	Variable DX Min Speed:	Minimum fan speed during mechanical cooling	70%

Table 16: Parameters in the Condenser Fan Menu

Menu Screen	Option	Description	Default
Condensing Fan Speed	Min Speed	Minimum allowed fan speed	30%
	Max Speed	Maximum allowed fan speed	100%
Condensing Fan Setting	Setpoint	Condensation pressure setpoint	391.6 psi
	Deadband	Condensation pressure control deadband	21.8 psi
	Cut off difference	Condenser fan shut off pressure difference	43.5 psi
	HP Protect	High pressure protection	Enabled
	Off Delay Time	Condenser fan delay when turning off	20s
Condensing Fan PID	Kp	Proportional control setting	5.0
	Ki	Integral control setting	120
	Kd	Derivative control setting	0
Snow Setting	Wipe Snow	Snow removal functionality	Disabled
	Setpoint	Snow removal temperature setpoint	28.4°F
	Diff	Temp differential for snow removal	4.5°F
	Fan on time	Condensing fan on time during snow removal	3 min
	Fan off time	Condensing fan off time during snow removal	30 min

Table 17: Parameters in the EEV Menu

Menu Screen	Option	Description	Default
EEV	Enable exp. Board	Enable EEV driver	Enabled
	Address	Driver address	3
	New address	New Driver Address	3
	Cmd. Delay	Driver instruction delay time	30ms
	Timeout	Driver instruction timeout	2000ms
	Enable EEV	Enable EEV	Yes

Table 18: EU EEV Configuration Options

Note: This menu is only available when the display is directly connected to the unit.

Menu Screen	Option	Description	Default
Enable Device	Main Refrigerant	Unit refrigerant	R410A
	Enable LOP	Enable LOP control. 0/1 represents Disabled/Enabled	1
	Control Type	EEV control type	Auto
	Start position	EEV start position	50%
	Start Keep T	Start position holding time	60s
	Total Step	Total number of steps	250
	Max Open	Maximum opening percentage	100%
	Manual Open	Manual opening percentage	50%
	MOP Enable	Enable MOP control. 0/1 represents Disabled/Enabled	1
	MOP Set	MOP Setpoint	13.6K
	EEV Kp	Proportional control setting	4

	EEV Ki	Integral control setting	25s
	EEV Kd	Derivative control setting	0s
	SH Set	EEV superheat setting	10.0K

Table 19: Carel EEV Configuration Options

Note: This menu is only available when the display is directly connected to the unit.

Menu Screen	Option	Description	Default
Enable Device	Setup Done	EVD driver setup status. Will display YES when setup is complete.	No
	Default Request	Driver initialization	No
Super parameters	Valve	EEV model	Carel E2Vu
	Main regulation	Compressor type	BLDC
	Auxiliary Regulation	Compressor type	BLDC
System Configuration	Main Refrigerant	Refrigerant type	R410A
	Auxiliary Refrigerant	Refrigerant type	Same as main reg
Regulation	Superheat setpoint	Superheat setpoint	18°F
	Valve open at start up	EEV opening percentage during pre-opening	50%
	Pre-positioning time	EEV pre-opening time	6s
	Stand-by Valve Opened	EEV standby status	Disabled
	Valve position	EEV valve opening percentage during standby	0%
	Prop. gain	Proportional control setting	15
	Integ. Time	Integral control setting	150s
	Deriv. Time	Derivative control setting	15s
Low SH Protection	Threshold	Low superheat threshold	3.6°F
	Integral time	Integral control setting	10s
	Alarm delay	Alarm delay time	300s
LOP Protection	Threshold	Low evaporation temperature threshold	-58°F
	Integral time	Integral control setting	10s
	Alarm delay	Alarm delay time	300s
MOP Protection	Threshold	High evaporation temperature threshold	78°F
	Integral time	Integral control setting	20s
	Alarm delay	Alarm delay time	600s
Manual Positioning	Enable	Enable/Disable manual positioning	Disabled
	Position	Manual valve position	0 Step
Advanced	Power supply mode	Power supply	24 VAC
Alarms configuration	Alarm thresh.	Low suction temperature alarm threshold	-58°F
	Alarm timeout	Alarm timeout	300s

Table 20: Parameters in the Compressor Menu

Menu Screen	Option	Description	Default
Compressor Safety Time	Min. Run Time	Minimum compressor operating time	180s
	Min. Stop Time	Minimum compressor off time	180s
	Min. time btw. start	Minimum time between two compressor starts	360s
Compressor PID	Kp	Proportional control setting	30
	Ki	Integral control setting	100
	Kd	Derivative control setting	3
	Cycle	PID cycle time	20s
Comp speed Setting	Fixed speed	Compressor speed when unit is in fixed speed mode	42.0 rps
	Dehum. speed	Compressor speed during dehumidification	80%
	Gen Run speed	Max compressor speed when generator is running	80%
Discharge Gas Mgmt.	Limit Temp	Discharge gas temperature limit	194°F
	Protect Temp	Discharge gas protection temperature	203°F
	Alarm Temp	Discharge temperature alarm setpoint	248°F
	Diff	Discharge temperature control difference	9°F
	Cycle Time	Discharge temperature control time	210s

Table 21: Parameters in the Inverter Menu

Menu Screen	Option	Description	Default
Comp. & INV	Enable Comp. INV	Enable compressor inverter	Enable
	INV Factory	Inverter driver manufacturer	EU
	Device address	Driver address	1
	New address	New driver address	0
	Cmd. delay	Driver instruction delay time	20ms
	Timeout	Driver instruction timeout	1000ms
Speed Cfg (rps)	Start speed	Compressor starting speed	30 rps

NOTE: Additional configuration options are available depending on the inverter driver manufacturer (EU or Carel).

Table 22: Additional Inverter Settings (EU)

Menu Screen	Option	Description	Default
Inverter Setting	Keep speed	Speed to maintain during starting period	40 rps
	Min. Lim. speed	Minimum speed limit	27 rps
	Max. Lim. speed	Maximum speed limit	64 rps
	Start Keep Time	Time to maintain “Keep speed” after start	195s
Speed Step Cfg (rps/s)	Incre. Step	Acceleration rate	30 rps/s
	Decre. Step	Deceleration rate	30 rps/s
	Decre. Step. Ser	Maximum deceleration	90 rps/s

Inverter Setting [EU]	Start pressure Diff. Lim	Maximum pressure differential during startup	116.0 psi
	Control rate	EEV control rate	1.2

Table 23: Additional Inverter Settings (Carel)

Menu Screen	Option	Description	Default
Start up pressure Differential Control	Max pressure differential	Maximum pressure differential allowed during start up	3 bar
	Equalization mode		EEV Preopening
	Max Equaliz. Time	Maximum equalization time	10s
	EEV Opening	EEV opening percentage during equalization	100%
Start-up failure control	Press difference min. variation	Minimum pressure differential allowed during startup	0 bar
	Control period	Control period	0s
	Restart delay	Restart delay	0s
	Max retry number	Maximum number of restarts	5
Speed management	Start-by forced speed	Starting speed	0 rps
	Max speed	Maximum speed	64 rps
	Min speed	Minimum speed	27 rps
	Deceleration Rate	Deceleration rate	0 rps/s
	Acceleration rate	Acceleration rate	0 rps/s
	Switch-off rate	Deceleration rate when powering off	0 rps/s
Envelope Control	Speed reduction rate	Deceleration rate	0 rps/s
	Min speed admitted	Minimum speed	0 rps
	Out of Envelope Alarm Timeout	Timeout for out of envelope alarm	180s
	Low pressure diff Alarm Timeout	Timeout for low pressure difference	
Low Ratio management	By EEV Closing	Manage low pressure ratio by closing EEV	No
	By Compressor speed up	Manage low pressure ratio by increasing compressor speed	No
Discharge Gas Control	High Discharge Temp limit	High temperature limit for exhaust gas	
	High discharge temp alarm	Alarm temperature for exhaust gas	
Speed Control Due to Discharge Gas	Action distance	Temperature control range	
	Action pause	Control duration	
	Compressor speed reduction	Compressor speed reduction	
Regulation	Mode	Regulation Mode. Suction Superheat/Discharge Superheat	Suction Superheat
	Discharge temp. probe Compensat. Time	Exhaust temperature probe compensation time	
Discharge Superheat Control	Set point	Super heat set point	
	Offset	Super heat offset	

	Hysteresis	Super heat hysteresis	
Discharge Temperature Control	Set point	Discharge temperature setpoint	
	Offset	Discharge Offset	
	Hysteresis	Discharge Hysteresis	
	Actual work model	Suction Superheat/Discharge Superheat	Suction Superheat

Table 24: Parameters in the Alarms Menu

Menu Screen	Option	Description	Default
Alarm Input Logic	Smoke/fire	Smoke/fire alarm logic	N.C
	Generator run	Generator run alarm logic	N.O
	DC failover	DC failover alarm logic	N.O
	Hydrogen	Hydrogen alarm logic	N.O
Alarm Output Logic	HVAC Alarm 1	HVAC 1 alarm output logic	N.O
	HVAC Alarm 2	HVAC 2 alarm output logic	N.O
	HVAC Alarm 3	HVAC 3 alarm output logic	N.O
High Pressure Alarm	Setpoint	High pressure alarm setpoint	594.7 psi
	Diff	Pressure below setpoint at which the alarm turns off	145 psi
Low pressure alarm	Thresh	Low pressure alarm trigger point	72.5 psi
	Start delay	Alarm delay after compressor starts	30s
	Running delay	Delay before alarm triggers	10s
	Low out delay	Delay before alarm triggers again	60s
	Lim. thresh.	Low pressure at which compressor steps	58 psi
	Lim. hyst.	Low pressure alarm hysteresis	29 psi
Supply fan ovld. alarm	Start delay	Alarm delay after supply fan start	20s
	Running delay	Delay before alarm triggers	10s
Dust detect alarm	Delay time	Delay before alarm triggers	60s
	Retry wait time	Time between dust checks	1 min
	Auto reset time	Alarm will reset if no protection events occur in this interval	1 h
High Supply Temp Alarm	Thresh	Temperature above set point at which alarm triggers	5.4°F
	Start delay	Alarm delay after supply fan start	1 min
	Running delay	Delay before alarm triggers	60s
Damper alarm	Comp. off DT	Alarm delay after compressor stop	5 min
	Close diff	Maximum temperature differential between room and supply temperature when damper is closed	16.2°F
	Open diff	Maximum temperature differential between outdoor and supply temperature when damper is open	6.5°F
	Diff. check T	Time differential between temperature checks	5 min
	Retry time	Time allowed for temperature checks. Alarm will trigger if “Retry number” is exceeded in this interval	60 min
	Retry number	Number of checks before alarms	3

	Alarm delay	Delay before alarm triggers	12 min
Low Temp	Low Temp Alarm Diff	Low room temperature alarm trigger point	34°F
	Delay time	Delay before alarm triggers	60s
High Temp	High Temp Alarm Diff	High room temperature alarm trigger point. Alarm will trigger if temperature is this much higher than the setpoint	16°F
	Delay time	Delay before alarm triggers	60s
Low Supply temp	Low supply temp	Low supply temperature alarm trigger point	10.8°F
	Delay time	Delay before alarm triggers	20s
Dirty Condenser	Enable Dirty Condenser	Enable dirty condenser alarm	Yes
	Subcool Setpoint	Maximum allowed supercool before triggering alarm	41°F
	Subcool Diff	Temperature above supercool setpoint at which the alarm will restore	5.8°F
	Threshold Set	Subcool threshold	80%
Generator run	FC limited by Gen.	Disable free cooling during generator run	No
	Comp limited by Gen.	Compressor speed limited by generator run	Yes

Control Configuration Menu Parameters

NOTE: This menu contains options for the network, setpoints, free cooling, sensors, and input/output logic.

Table 25: Parameters in the Network Menu

Menu Screen	Option	Description	Default
Net Config	Total HVACs	Number of HVAC Units	2
	Total Zones	Number of Control Zones	1
	En Zone Temp Sensor	Enable Zone Temp Sensors	No
Network View	Unit ID	Select Unit to View IP Address	1
	View	View Unit IP Address	--
Network Configuration	Unit ID	Select Unit to Change IP Address	1
	New	Change Unit IP Address	--
Network Config	Assign units to each zone and configure operating mode		
HVAC Model Setting	Unit ID	Select model of each HVAC Unit	--

Table 26: Parameters in the Setpoints Menu

Menu Screen	Option	Description	Default
Zone Configuration	Backup Number	Number of Backup Units in Zone	0
	Setpoint	Zone Setpoint	79°F
	Dead Zone	Zone Deadband	1.8°F
	Comfort Set	Zone Comfort Mode Setpoint	72°F
	Dehum Number	Number of Units in Dehumidification	1
Room Temperature	Cool Band	PID controller dead band	1.8°F
	Cool Diff	Allowed temperature range for compressor operation	6°F
	Cool Dead	Temperature range around setpoint for compressor operation	2°F
	Backup Diff	Temperature differential above setpoint at which the backup units will come on	8°F
	Backup Offset	Temperature offset at which the backup units will shut off	4°F
Room Temperature PID	Kp	Proportional control setting	25
	Ti	Integral control setting	120
	Td	Derivative control setting	0
Comfort Temperature	Setpoint	Comfort mode setpoint	72°F
	Keep Time	Comfort mode duration	60 min
Heater	Heater Turn On Diff	Temperature range for heater operation	3°F
	Heater Deadband	Temperature below setpoint at which heater turns on	29°F
Dehumidification	Enable	Enable Dehumidification	Disable
	Setpoint	Humidity setpoint	55%
	Diff	Humidity level above setpoint at which dehumidification starts	15%

	Stop diff	Temperature below the setpoint at which the heater will start to dehumidify	11°F
	Start diff	Temperature above heater start point at which heater will stop dehumidifying	6°F
	Heater on delay	Heater start delay during dehumidification	0s
Supply Temperature	Setpoint	Supply temperature setpoint	51.8°F
	Deadband	Supply temperature PID control dead zone	1.8°F
	Limi. High	Supply temperature high limit. Temperature above setpoint at which damper is 100% open.	2.0°F
	Limi. Low	Supply temperature low limit. Temperature below setpoint at which damper is closed.	2.0°F
Supply Temperature PID	Kp	Proportional control setting	50.0
	Ti	Integral control setting	0
	Td	Derivative control setting	0
Setpoint Config	Average Room Temp	Average Multiple Temperature Sensors	No

Table 27: Parameters in the Free Cooling Menu

Menu Screen	Option	Description	Default
Free-cooling	Humidity limit	Free cooling humidity limit	Disable
	Max Humidity	Maximum humidity for free cooling	85%
	Humidity Deadband	Humidity below the limit at which free cooling will be re-enabled	5%
	Enable Parti. Freecool	Enable Partial Free Cooling	Disable
	Min. temp. diff. for freecool	Damper will open if the indoor-outdoor temperature difference is larger than this value	3.6°F
	Stop diff	Damper will close if the indoor-outdoor temperature difference is smaller than this value	3.6°F
	Delay	Free cooling delay time	10s
	FC Min	Minimum damper opening percentage	0.0%
	Exhaust	Run condenser fans during free cooling (28V1B5 unit only)	Yes
Additional function	Sea-side Mode	Enable free cooling only at high indoor temperatures	Disable
	Dust detect	Enable dust detection	Enable
	Emergency ventilation enable	Enable emergency ventilation	Enable
	Setpoint	Temperature above setpoint at which emergency ventilation will activate	14°F
	Diff	Temperature below emergency ventilation setpoint at which emergency ventilation will deactivate	9°F
	Force Comp. Stop for FC	Force compressor to stop during free cooling	Force Stop

Table 28: Parameters in the Sensors Menu

Note: Parameters in gray can only be accessed by connecting a PGD to the unit or via the html interface.

Menu Screen	Option	Description	Default
Sensor Settings	Humidity Min Value	Minimum allowed humidity value	20%
	Humidity Max Value	Maximum allowed humidity value	150%
Sensor Settings (Unit Only)	HP min. value	Minimum allowed high pressure sensor value	0 psi
	HP max. value	Maximum allowed high pressure sensor value	652.7 psi
	LP min. value	Minimum allowed low pressure sensor value	14.5 psi
	LP max. value	Maximum allowed low pressure sensor value	514.9 psi
Sensor Offset	Outdoor temp	Outdoor temperature sensor offset	0°F
	Room temp	Room temperature sensor offset	0°F
	Outdoor hum	Outdoor humidity sensor offset	0%
Sensor Offset (Unit Only)	Supply temp	Supply temperature offset	0°F
	Room temp	Room temperature sensor offset	0°F
	Outdoor temp	Outdoor temperature sensor offset	0°F
	Dscg temp	Compressor discharge temperature sensor offset	0°F
	Suct. press	Suction pressure sensor offset	0 psi
	Cond. press	Condensing pressure sensor offset	0 psi
	Suct. temp	Suction temperature sensor offset	0°F
	Cond. temp	Condensing temperature sensor offset	0°F
	Filter air pressure	Filter air pressure sensor offset	0 psi

Table 29: Parameters in the I/O Logic Menu

Menu Screen	Option	Description	Default
Component Logic	Exhaust Damper	Exhaust Damper Alarm Logic	N.O
Component Output logic (unit only)	Comp	Compressor alarm output logic	N.O

System Menu Parameters

Table 30: Parameters in the System Menu

Menu Screen	Option	Description
Date/Time	Format	Date Format
	Date	System Date
	Hour	System Time (24 hr clock)
	Day	Day of the week
Serial Ports	Baudrate	Change baud rate
Pwd Change	Change Password	Change system passwords
Initialization	Clear alarm logs	Change "No" to "Yes" to clear logs
	Clear AutoReset Counters	Change "No" to "Yes" to clear counters
	Wipe retain mem	Wipe memory
	Wipe NVRAM	Wipe storage
	Wipe both	Wipe memory and storage
	Reboot System	Change "No" to "Yes" to reboot controller
	Reboot HVAC	Reboots selected HVAC. Change "No" to "Yes" to reboot HVAC unit.

Debug and Hardware Configuration Menu Parameters

The Debug and Hardware Configuration Menus contain configuration options for all controller modules. Settings changed here from the controller box will not carry over to the individual units. No password is required to access these options.

Note: The Debug Menu should not be accessed outside of initial startup or system update. To enter the Debug Menu, press **Up** and **Down** at the same time from the main screen.

Table 31: Debug Menu Options

Menu Screen	Option	Description
Master/HVAC Select	Master/HVAC	Select between Master and HVAC controller operation
Conversion	Unit Conversion	Change between different unit systems
Operation Mode (Unit Only)	Operation Mode	Select between normal and fixed speed operation
Work alone mode	Work alone mode	Set up unit for operation without an ASMUC.6 controller

To enter the Hardware Configuration Menu, hold **Alarm** and **Enter** at the same time until the menu is displayed.

Table 32: Hardware Configuration Menu Options

Menu Screen	Option	Description
Information	PCO Info	Control software information
	I/O Info	HW and SW version information
	Memory Info	System RAM Usage
	pLAN Info	System pLAN address
	Filesystem Info	System Storage Info
	Tasks Info	System Tasks Information
	Application Info	Current system status
	Built In Info	Built In Info
Settings	Password	Change password
	Connections	Allow USB, PC, and pCO disk connections
	pLAN pCO address	Change pCO address
	Clock	Change time or sync to server
	TCP/IP Settings	Change IP address and settings
Application	Application settings	Reboot controller and controller OS options
Upgrade	Upgrade	Upgrade OS
Logger	Logs	Export, wipe, restart system logs
Diagnostics	System Logs	View system logs

Chapter 6: Preventative Maintenance

Table 33 provides preventative maintenance guidelines that should be followed for optimal unit performance. Following these guidelines will help avoid serious damage to components and expensive repairs by skilled personnel.

Table 33: Preventative Maintenance Schedule

Task	Recommended Frequency	Comments
Inspect all wiring for signs of wear	Based on local conditions	More frequently in areas with active rodent or insect populations that can damage wiring
Check general operations	12 months	Perform the Step-Test
Inspect all hardware for "snug" connection	12 months	Make note of any loose hardware so it can be checked again at next scheduled PM
Air filter inspection/cleaning and replacement if needed	Based on local conditions	Depends on the amount and frequency of airborne particulates in the area
Inspect and clean condenser coil	Based on local conditions	More frequently in areas that experience excessive airborne particulates that will collect on the condenser coil
Inspect drain pipes (condenser and evaporator)	12 months	
Physical Inspection of Air Damper	12 months	

Danger. Stop the machine and remove the power supply from the equipment before performing maintenance operations.

Important. *All PM should be performed by an AIRSYS Authorized Service Technician (AAST) to ensure that the manufacturer's warranty is preserved.*

General Operation Check

It is a good idea to compare the operation of the equipment with the results of the previous inspection. Any differences in operating characteristics can then be easily identified.

A detailed and periodic visual inspection of the equipment and a general cleaning are both important to ensure good operation. Before beginning the PM steps, the general system status should be verified by looking at the areas outlined in this section.

Check Main Voltage

Check the following:

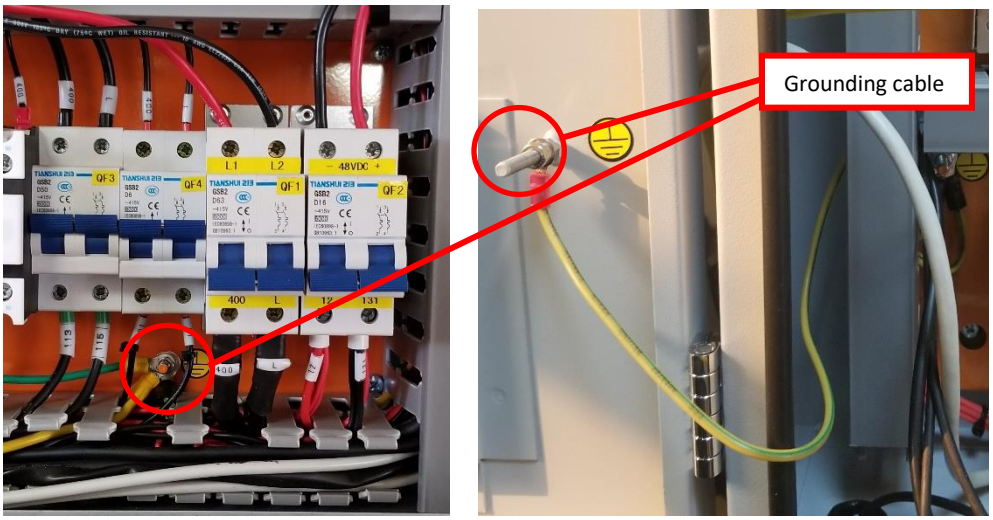
- The main voltage is within ±15% of the rated voltage required by the machine.
- The DC voltage is in normal range, if applicable. (36 -57VDC)

- The main electrical supply cable and the terminals, including the user terminal cable, are correctly connected.
- All cables are secured to the system.

Check Wiring and Components

For wiring and components, perform a preliminary check to verify the system is functional:

- Check that the system has been installed correctly.
- Check that the wiring cable sections meet current capacity. Report any incorrect mounting and setting to the AAST who installed the system so that the necessary modifications can be made.
- Check that the grounding cables have been installed in the controller box and unit as shown in the graphic.



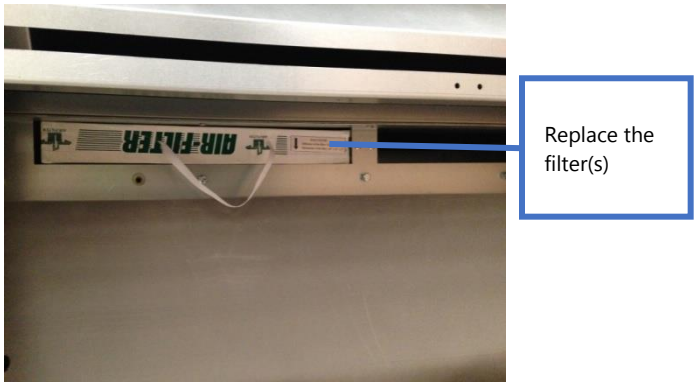
Perform the Step-Test

The purpose of this test is to simulate real operation without damaging components due to incorrect operation or protection failures.

Use the step test to check that the relays, breakers, and components work normally. For details, see “Execute the Step-Test” on Page 63.

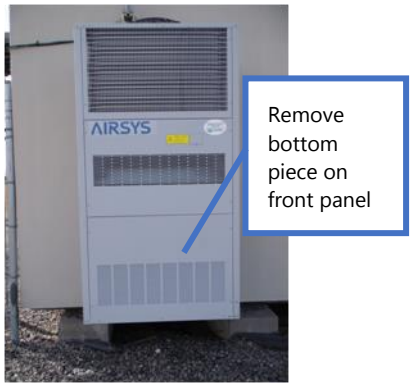
Replace Air Filter

A dirty air filter reduces the air volume and the system capacity. This problem can be avoided by regularly cleaning or replacing filters. The frequency at which filters must be checked depends on the amount of dust in the environment. If the filters are frequently very dirty, the frequency of checks and maintenance should be increased.



Clean the Preliminary Air Filter

The preliminary air filter can become clogged with dust and leaves or other debris after a period of use and should be cleaned with water or compressed air.



Inspect and Clean Condenser Coils

During times of peak usage, the condensing coils must be able to offer maximum thermal exchange. Debris such as paper, dead leaves, and dust can be sucked in around the coils, reducing the thermal exchange rate. Dirty condenser coils may trigger the high-pressure switch and cause the compressor to lock out.

Remove any objects from the coil which may have accumulated and wash the system with water and commercial coil cleaner. The coil should be inspected more frequently if the environment experiences seasons of high dust or falling leaves.

Inspect and Clean the Drain Pipes (Both Evaporator and Condenser Drain Pipes)

To avoid water overflow, ensure that the system has proper drainage discharges. The pipe and outflow should be completely free of any obstructions. If necessary, clean the drain and outflow area.

Physical Inspection of the Damper

The air damper is a critical element in the WPU. If it does not function normally, the free cooling function will fail. This can be avoided by periodically and regularly checking the following:

- Check if the damper can fully open and close via the manual override
- Check if the nuts are properly tightened, as shown in the following images

Operations Checklist

If a problem with the system is experienced, use this checklist to verify the system and determine the root cause. Keep these records for future inspections.

Address: _____Site No.: _____ Date: _____ **Unit Factory Number:_____ (refer to the unit name plate)**	
Check Items	**✓ or ✖**
Step-Test or Manual Operation	
Verify WPU supply fan(s) work normally	
Verify WPU heater work normally	
Verify WPU compressor works normally At the same time, check if the WPU condenser fan works normally.	
Verify WPU free cooling is working	
Record these values using pressure gauges, built-in sensors, or multi-meter readings **Outdoor Temperature: _____Indoor Temperature: _____**	
The WPU suction pressure R410a system, normal range: 8-12Bar/116-174PSI	Bar/PSI
The WPU discharge pressure R410a system normal range: 25-30Bar/362.5-435PSI	Bar/PSI
The WPU current of the compressor (refer to nameplate)	Amp
The WPU current of the supply fan (refer to nameplate)	Amp
The WPU input voltage	VAC

Chapter 7: System Update

Both the ASMUC.6 controller and the WPUs can gain additional functions and improvements by updating the control software and operating system. All required software and upgrade packages will be provided by AIRSYS. To request an update package, contact AIRSYS Support at ASNSupport@air-sys.com.

Updates can be performed via the web interface or the USB connection. A microUSB to USB cable is required to perform the update.

Local Software Update:

Required Equipment

1. Upgrade Files. Download the latest software from https://support.airsysnorthamerica.com/. Search for "ASMUC Software Upgrade".
2. Laptop/PC. A computer is required to upload the update files.
3. MicroUSB cable.

Figure 38: microUSB Cable

Step 1: Upgrade HVAC Units

Note: An external display must be connected to the unit being upgraded. If an extra display is unavailable, the one installed in the controller can be detached using the instructions below. Skip a-d if an external display is available.

1. Download and unzip both the upgrade and HTTP files.
2. Open the controller box and disconnect the plug on the rear of the display.
3. Using a flathead screwdriver or similar tool, remove the PGD frame. See Figure 39.
4. Remove the screws securing the PGD to the ASMUC door.
5. Install the display on the HVAC unit. See Figure 40 for cable location.

Figure 39: Detaching Display

6. Connect the computer to the micro USB port on the controller board inside the unit. The controller should become visible as external storage "USB Drive" on the PC.
7. Copy the AP1 file to the "Upgrade" folder.

8. Copy the HTTP folder to the root directory ("USB Drive") and overwrite the existing files.

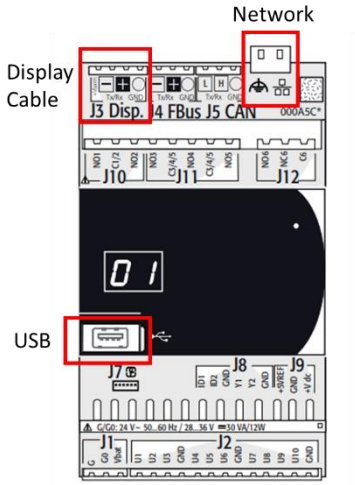


Figure 40: Controller Board

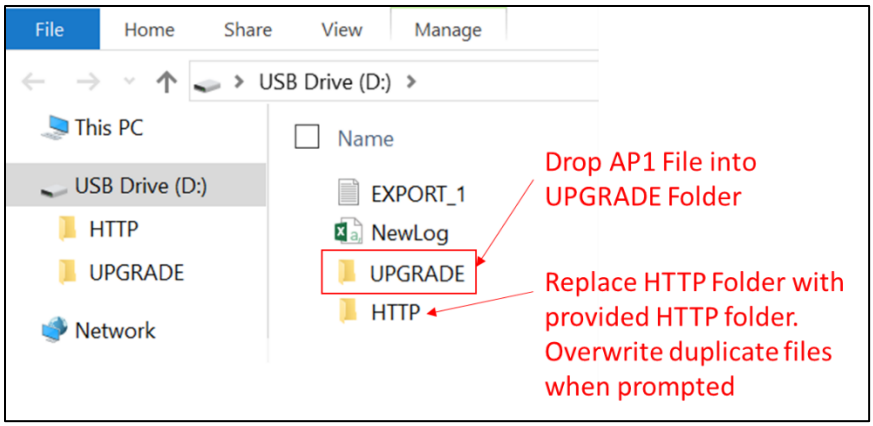


Figure 41: Upgrade Folder

9. Disconnect the USB cable from the controller board inside the unit. The upgrade process will automatically start.
10. Once the upgrade is complete, the screen will display "Upload successful" and return to the main screen. This may take up to 5 minutes.
11. Repeat process d-g for all HVAC units to be upgraded.
12. Reinstall the display on the ASMUC.

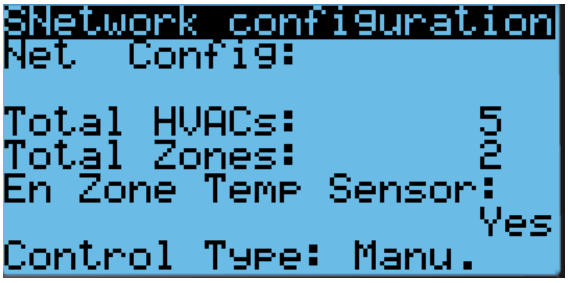
Step 2: Save Controller Settings

The software upgrade procedure will reset all settings to factory defaults. Some settings must be manually reconfigured. Complete the following steps from the ASMUC.

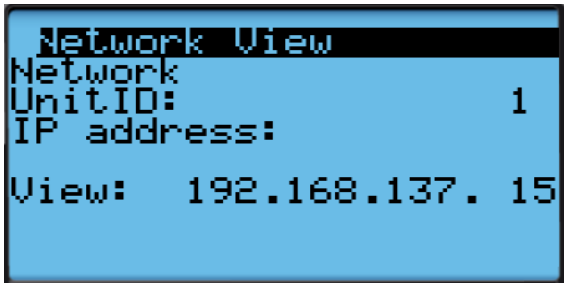
1. Press **Prg** and enter the default password (0004). Press **Enter**.

   Note: If password has been changed from factory default, consult the facility manager for correct password.

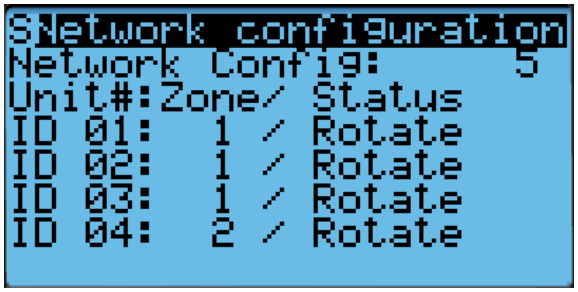
2. Press **Up** or **Down** to reach "Control Config" and press **Enter**.
3. Press **Enter** at "Network"
4. Record all network settings (a-d). Press **Down** to access each individual screen.
   a. Total # of HVAC and Total # of Zones



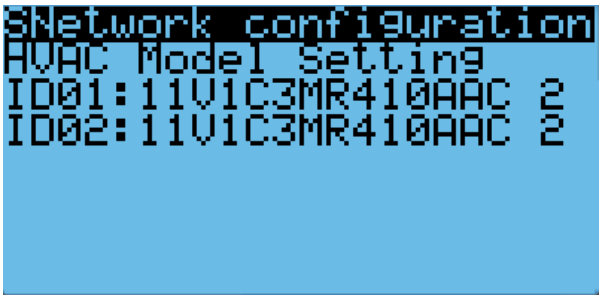
b. IP address of all connected HVAC units (Press **Enter** and use the **Up** and **Down** buttons to cycle through units. Press **Enter** to display the IP of each unit.)



c. Zone assignment (which units are assigned to which zones).



d. Model numbers of connected units.



5. (Optional) Record any other settings, such as temperature setpoint, that are to be maintained.

Step 3: Upgrade Controller (ASMUC)

1. Connect the computer to the micro USB port on the controller board inside the ASMUC. The controller should become visible as external storage "USB Drive" on the PC.
2. Copy the AP1 file to the "Upgrade" folder.
3. Copy the HTTP folder to the root directory and overwrite the existing files.
4. Disconnect the USB cable from the controller. The upgrade process will automatically start.
5. Once the upgrade is complete, the screen will display "Upload successful" and return to the main screen. This may take up to 5 minutes.
6. Power cycle the controller by turning off the breaker and turning back on after a few seconds.

Step 4: Reload Saved Parameters on Controller

1. Pressure **Up** and **Down** together.
2. In the "Master/HVAC select" screen, select "Master Controller" and press **Enter.**
3. Press **Esc**.
4. Press **Prg** and enter the default password (0004). Press **Enter**.
5. Press **Up** or **Down** to reach "Control Config" and press **Enter**.
6. Press **Enter** at "Network"
7. Re-enter the saved information (a-d)
    a. Total # of HVAC and Total # of Zones
    b. IP address of all connected HVAC units
    c. Zone assignment, which units are assigned to which zones.
    d. Model number of connected units
8. Re-enter any other setting that has been manually saved.

Step 5: Restore and Verify Controller Operation

1. Hold **Esc** until the main screen is displayed.
2. Press **Down** until an info icon (i) is displayed in the bottom right corner and press **Enter**.
3. If the controller has re-established communication with the units, **ON** or **OFF** status should be displayed for every unit.

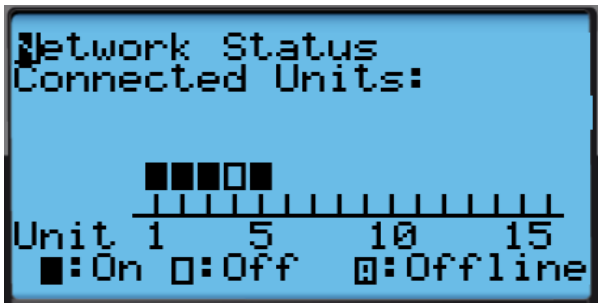


Figure 42: Network Status

Remote Software Upgrade:

Required Equipment

1. Upgrade Files. Download the latest software from https://support.airsysnorthamerica.com/. Search for "ASMUC Software Download".
2. PC/Laptop, needed for remote connection to controller.
3. Remote IP/HTTP connection to all HVAC units and multi-unit controller to be upgraded.
4. If upgrading webpages: FTP software/connection.

Step 1: Upgrade HVAC units

1. Download and unzip both the HTTP and the upgrade files.
2. Navigate to the IP address of the HVAC unit (not the multi-unit controller).
    a. If unsure, navigate to "Controller Interface" tab. Master Controller/HVAC status will be displayed on the main page

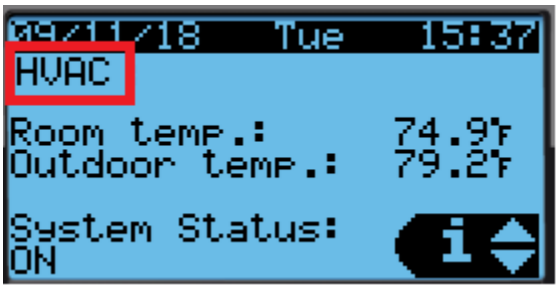


Figure 43: Master/HVAC Status

3. Select "Upgrade" tab on the left.
4. Click "Choose File" under "C.pCO AP1 Upgrade" and select the previously downloaded AP1 file.

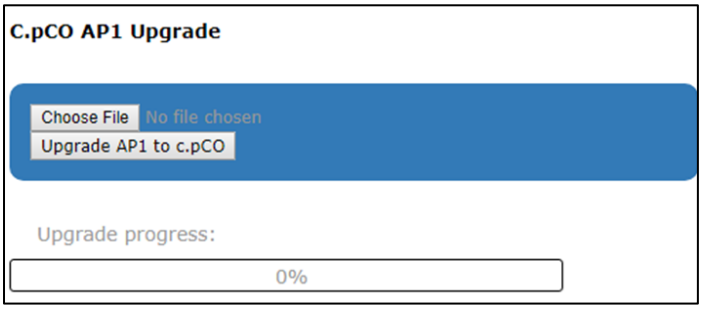


Figure 44: File Selection Screen

5. Click "Upgrade AP1 to c.pCO", the upgrade process will start.
6. Once the upgrade is complete, the status will display "Upload successful". This may take up to 5 minutes.
7. Repeat steps 1-5 for all HVAC units.

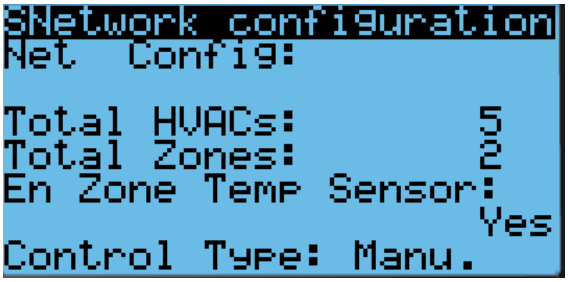
Step 2: Save Controller Settings

The software upgrade procedure will reset all settings to factory defaults. Some settings must be manually reconfigured. Complete the following steps using the ASMUC web interface.

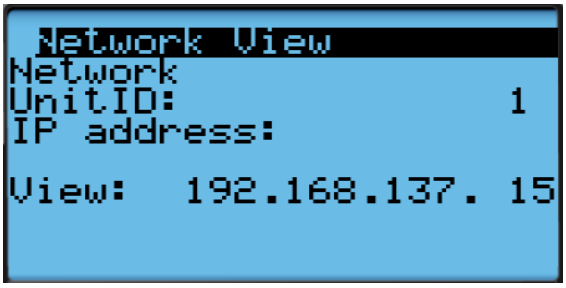
1. Navigate to the IP address of the multi-unit controller.
    a. If unsure, navigate to "Controller Interface" tab. Master Controller/HVAC status will be displayed on the main page.
2. Navigate to the "Controller Interface" tab.
3. Press **Prg** (⊙) and enter the default password (0004). Press **Enter**.
4. Press **Up** or **Down** to reach "Control Config" and press **Enter**.

Press **Enter** at "Network".

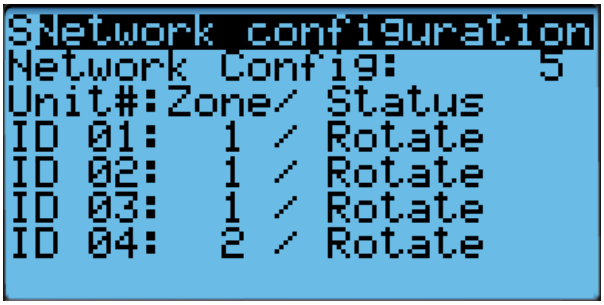
5. Record all network settings (i-iv). Press **Down** to access each individual screen.
    a. Total # of HVAC and Total # of Zones



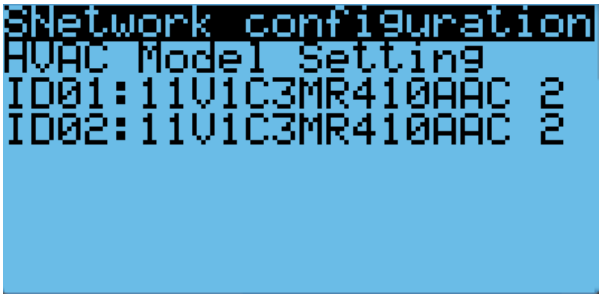
    b. IP address of all connected HVAC units (Press **Enter** and use the **Up** and **Down** buttons to cycle through units. Press **Enter** to display the IP of each unit.)



    c. Zone assignment (which units are assigned to which zones).



    d. Model numbers of connected units.



6. (Optional) Write down any other settings, such as temperature setpoint, that need to be carried over.

Step 3: Upgrade Controller (ASMUC)

1. Select "Upgrade" tab on the left.
2. Click "Choose File" under "C.pCO AP1 Upgrade" and select the previously downloaded AP1 file.

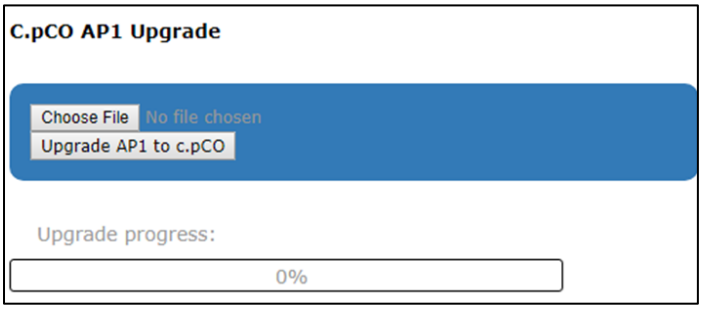


Figure 45: File Selection Screen

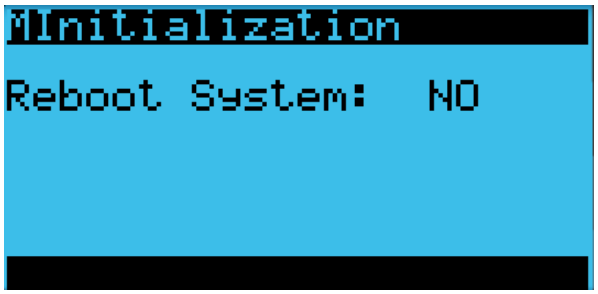
3. Click "Upgrade AP1 to c.pCO", the upgrade process will start.
4. Once the upgrade is complete, the status will display "Upload successful". This may take up to 5 minutes.

Step 4: Reload Saved Parameters on Controller

1. Navigate to the "Controller Interface" tab.
2. Press **Up** and **Down** together.
3. In the "Master/HVAC select" screen, select "Master Controller" and press **Enter.**
4. Press **Prg** and enter the default password (0004). Press **Enter**.
5. Press **Up** or **Down** to reach "Control Config" and press **Enter**.
6. Press **Enter** at "Network".
7. Re-enter the saved information:
    a. Total HVAC and Total Zones.
    b. IP address of all connected HVAC units.
    c. Zone assignment, which units are assigned to which zones.
    d. Model number of connected units.
8. Re-enter any other settings that have been manually saved.

Step 5: Restore and Verify Controller Operation

1. Hold **Esc** until the main screen is displayed.
2. Press **Prg** and enter the password (0004). Press **Enter**
3. Select System and press **Enter**.
4. Press **Down** until the cursor is over "Initialization" and press **Enter.**
5. Press Down until screen shows "Reboot System".



6. Press **Down** until an info. icon (i) is displayed in the bottom right corner and press **Enter**.
7. If the controller has re-established communication with the units, **ON** or **OFF** status should be displayed for every unit.

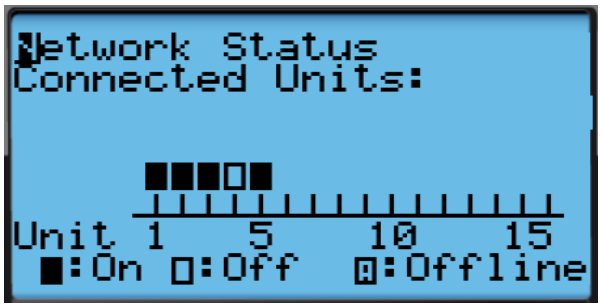


Figure 46: Network Status

Step 6: (Optional) Update HTTP files

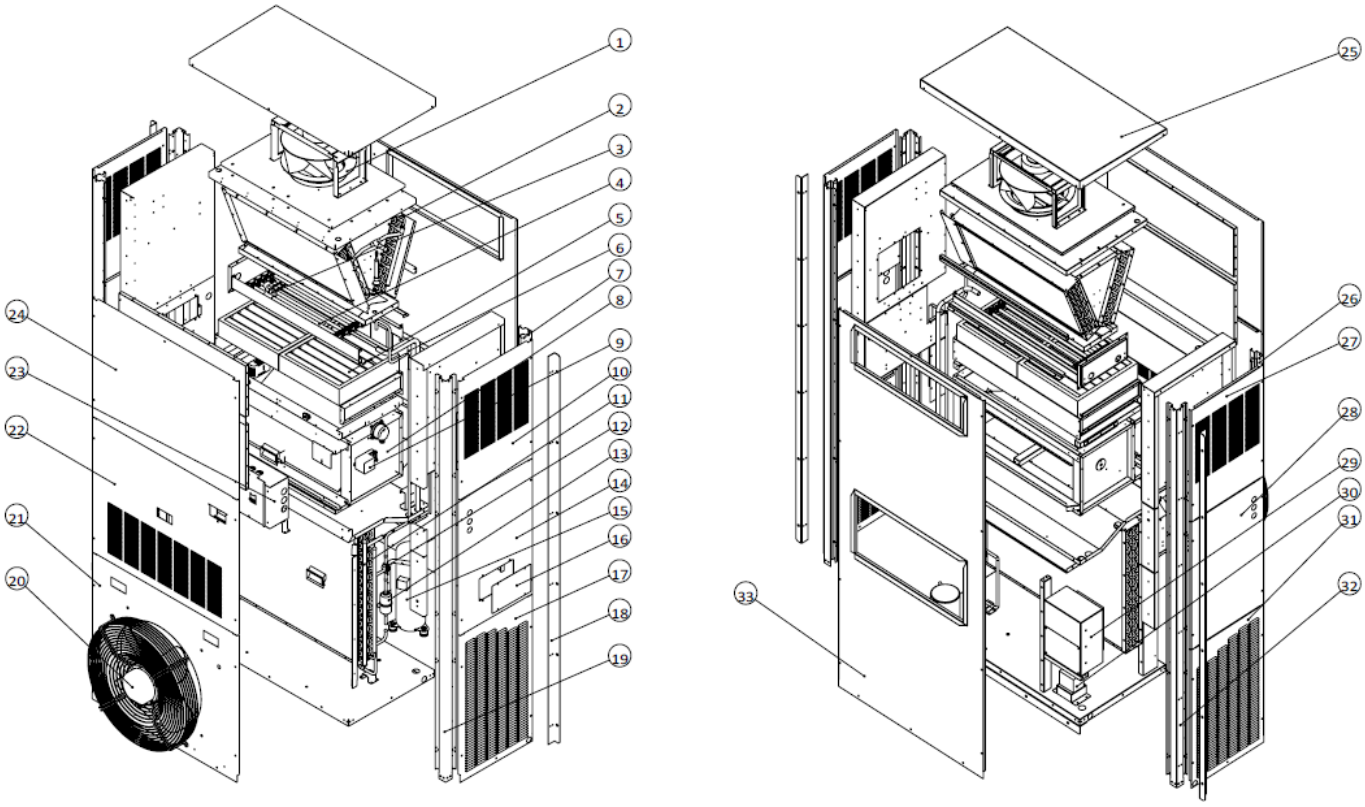
Note: Updated webpages may change the look of the HTML page and may include more information not previously available. Updating will not affect system operation.

1. Use a built-in FTP client or an FTP application such as FileZilla (recommended open source client) to establish connection to the IP of the controller.
    a. Depending on network conditions and how many connection the controller has, the Time Out setting may need to be adjusted to 40 seconds or more. To change timeout in Filezilla, go to Edit->Setting->Connection.
    b. Leave Username and password blank. Use port 21 if prompted.
2. Replace/overwrite HTTP folder under root directory with new HTTP folder included in the update file. The transfer may take up to 10 minutes.
3. Disconnect FTP server. The browser cache may need to be cleared for the webpage to display the correct version.

Chapter 8: Spare Parts

For all part requests, please contact:

AIRSYS North America
Web: http://airsysnorthamerica.com
Email: ASNSupport@air-sys.com
Phone: 855-874-5380

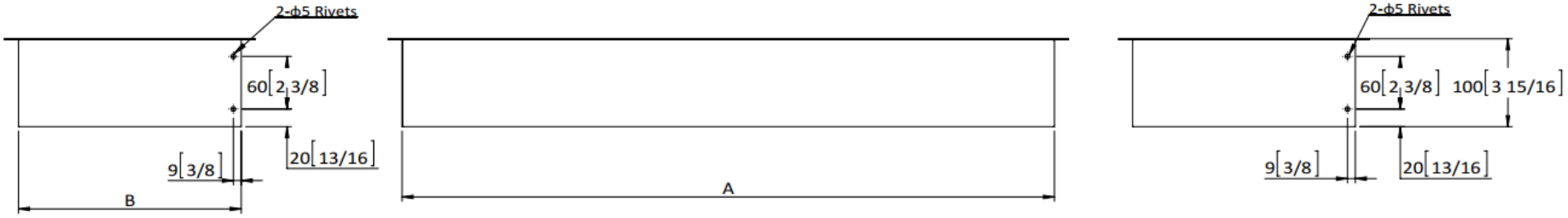


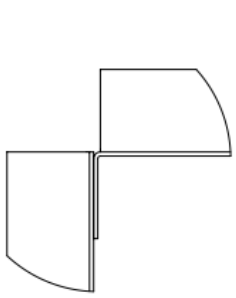
Number	Part Name	Number	Part Name	Number	Part Name
1	Supply Fan	12	Sight Glass	23	Electrical Box
2	Evaporator Coil	13	Dry Filter	24	Panel, Front Upper
3	Thermal Cutoff Switch	14	Panel, Right Middle	25	Panel, Top
4	Electric Heater	15	Compressor	26	Corner Post, Left Front
5	Main Filter	16	Panel, Damper Inspection	27	Panel, Left Upper
6	Electronic Expansion Valve	17	Panel, Right Bottom	28	Panel, Left Middle
7	Corner Post, Right Back	18	Installation Support Bar	29	Inverter
8	Damper Assembly	19	Corner Post, Right Bottom	30	Detuned Reactor
9	Damper Actuator	20	Condenser Fan	31	Panel, Left Bottom
10	Panel, Right Upper	21	Panel, Front Bottom	32	Corner Post, Left Back
11	Condenser Coil	22	Panel, Front Middle	33	Panel, Back

Figure 47: Top Supply WPU Part Identification

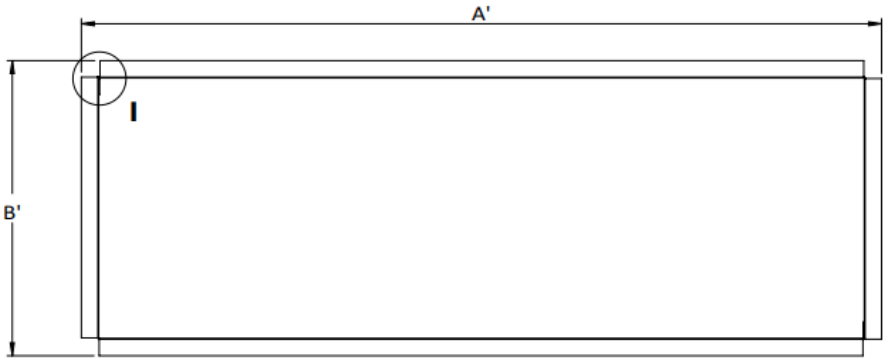
Appendix A: Air Frame Drawing

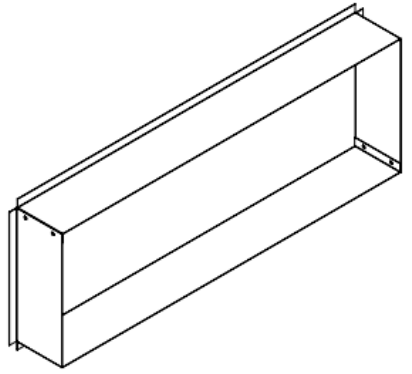
Model	11V1T3MR410AAC				11V1B3MR410AAC				28V1B5MR410BAC					
Frame Type	Supply		Return		Supply		Return		Supply		Return		Discharge	
Unit	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
A	764	30.08	764	30.08	770	30.31	770	30.31	1006	39.61	1006	39.61	1006	39.61
B	254	10.00	406	15.98	276	10.87	364	14.33	248	9.76	318	12.52	218	8.58
A'	796	31.34	796	31.34	802	31.57	802	31.57	1038	40.87	1038	40.87	1038	40.87
B'	286	11.26	438	17.24	308	12.13	396	15.59	280	11.02	350	13.78	250	9.84



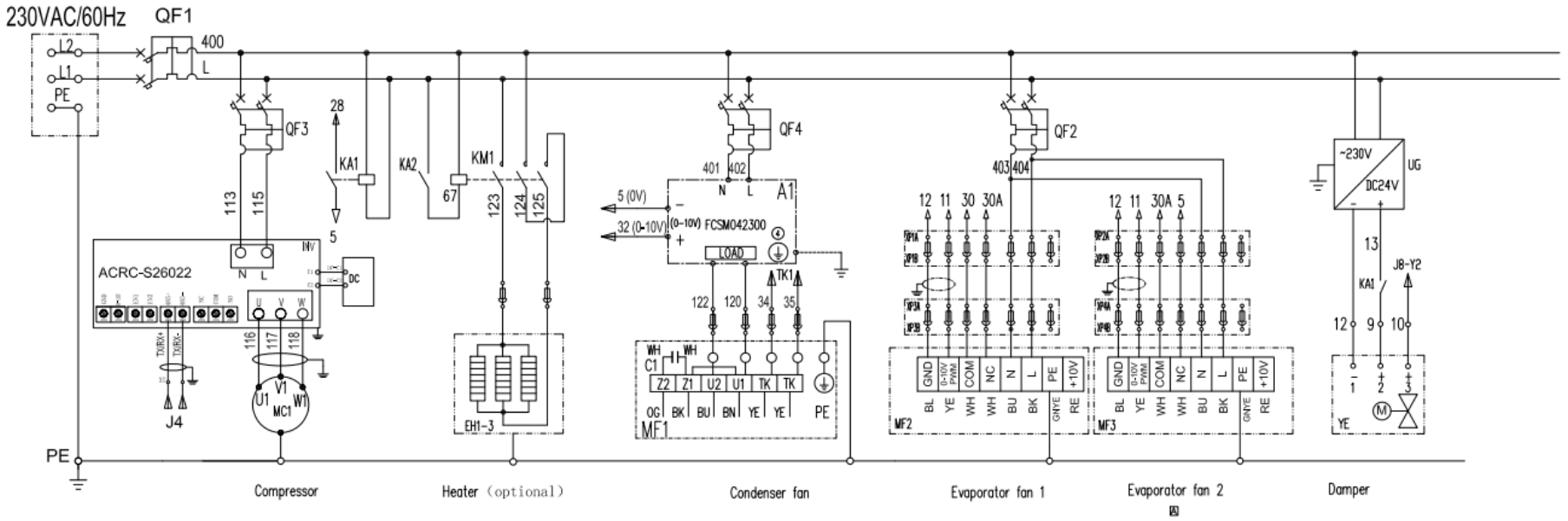


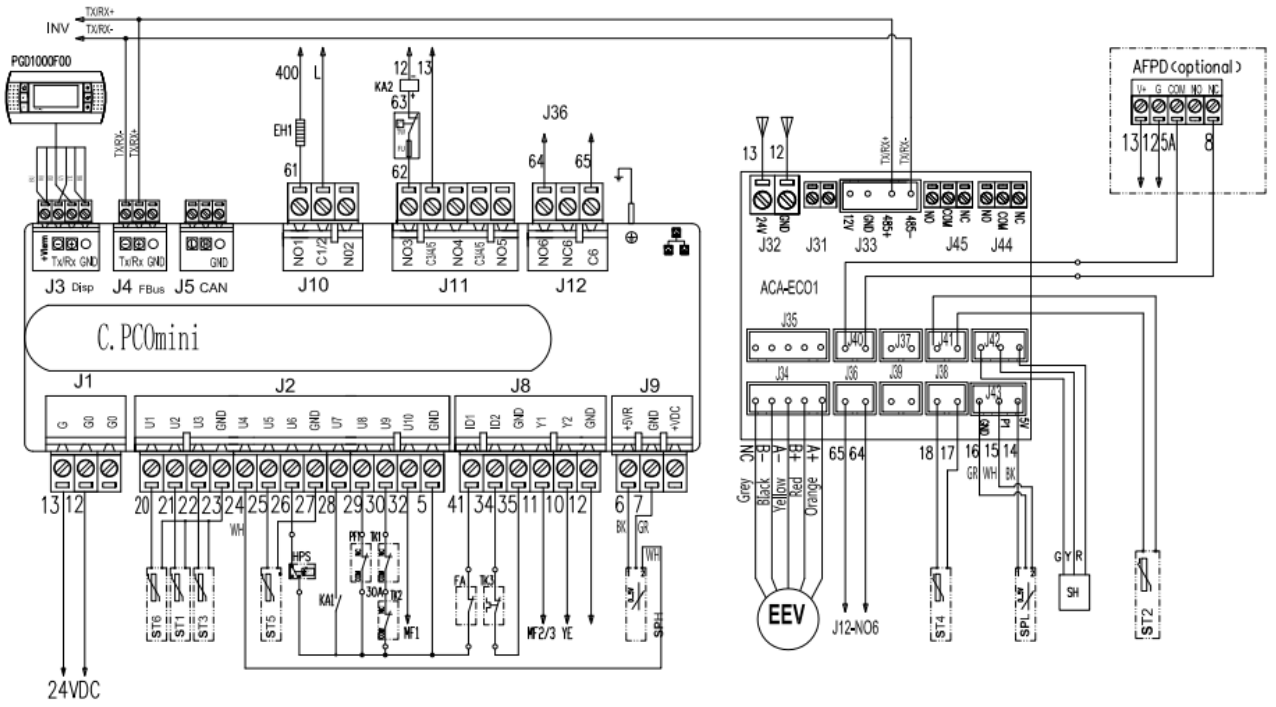
Partial view I
Proportion 1 : 1





Appendix B: Wiring Diagrams





Note:

1: Condenser Fan function selection as the list

Unit Type	11V1B3	11V1T3	15V1B4
MF3	[A]	[A]	[B]

Wiring Diagram

Models

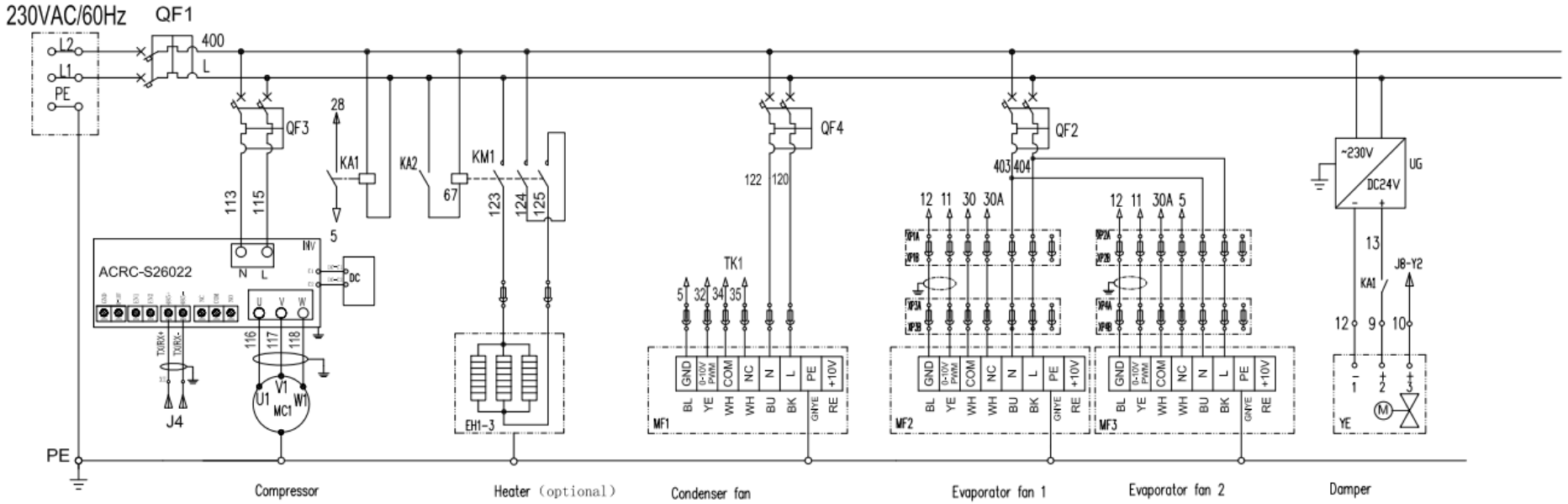
11V1B3MR410AAC

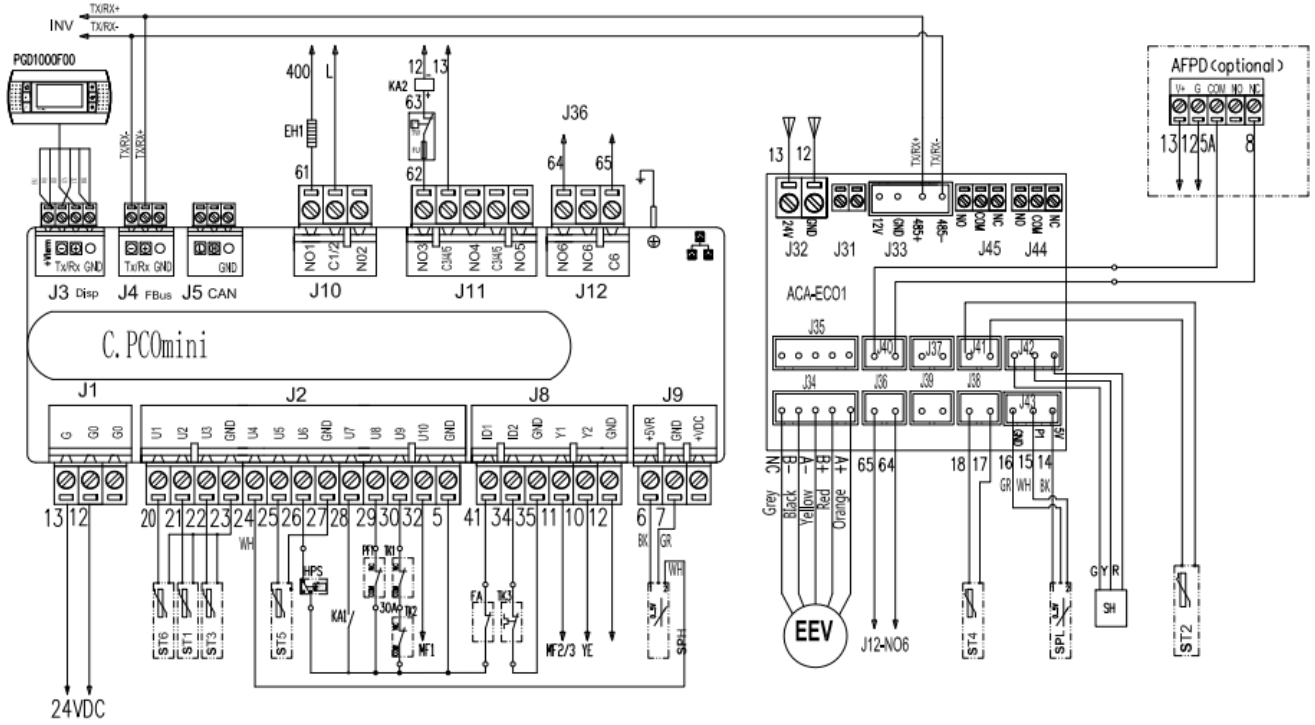
11V1T3MR410AAC

15V1B4MR410AAC

17	EH1-3	Electric heaters (optional)	34	FA	Fire/Smoke Alarm
16	EH	Crankcase heater	33	DC	Reactor
15	FU	Thermal fuse for heating	32	ST6	Condenser temperature
14	TW	Temperature switch for heating	31	ST5	Exhaust temperature
13	YE	Air damper actuator	30	ST4	Suction temperature
12	CPCOMini	Controller	29	ST3	Outdoor temperature
11	AFPD	Dust sensor (optional)	28	ST2	Supply temperature
10	TK1/TK2	Evaporator fan overload	27	ST1	Indoor temperature
9	PF1	Air pressure differential switch	26	NIV	Compressor drive Inverter
8	ACA-ECO1	Electronic expansion valve actuator	25	MC	Compressor
7	EEV	Electronic expansion valve	24	HPS	High pressure switch
6	SH	Outdoor .RH.	23	MF2/MF3	Evaporator fan/Supply fan
5	TC	Transformer	22	MF1	Condenser fan
4	UG	Switch power supply	21	C1	Capacitor for condenser fan
3	KM1	Electric heaters AC contactor	20	TK3	Condenser fan overload
2	KA	Auxiliary relay	19	SPH	High Pressure Transduce
1	QF	Breaker	18	SPL	Low pressure sensor
SN	Sign	Description	Index	Sign	Description

PART#:1170105230



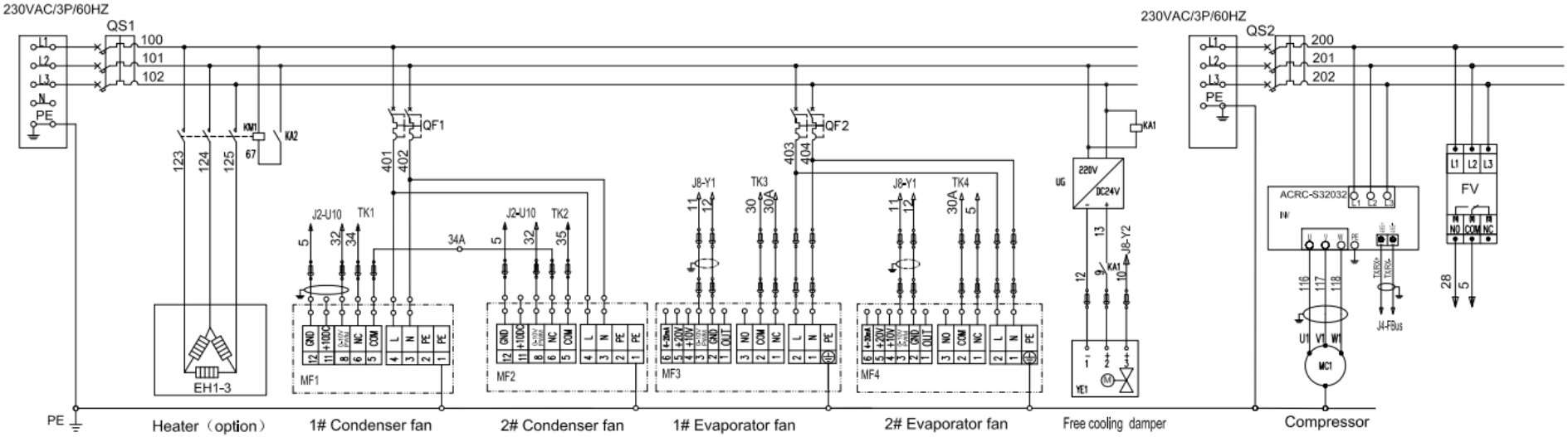


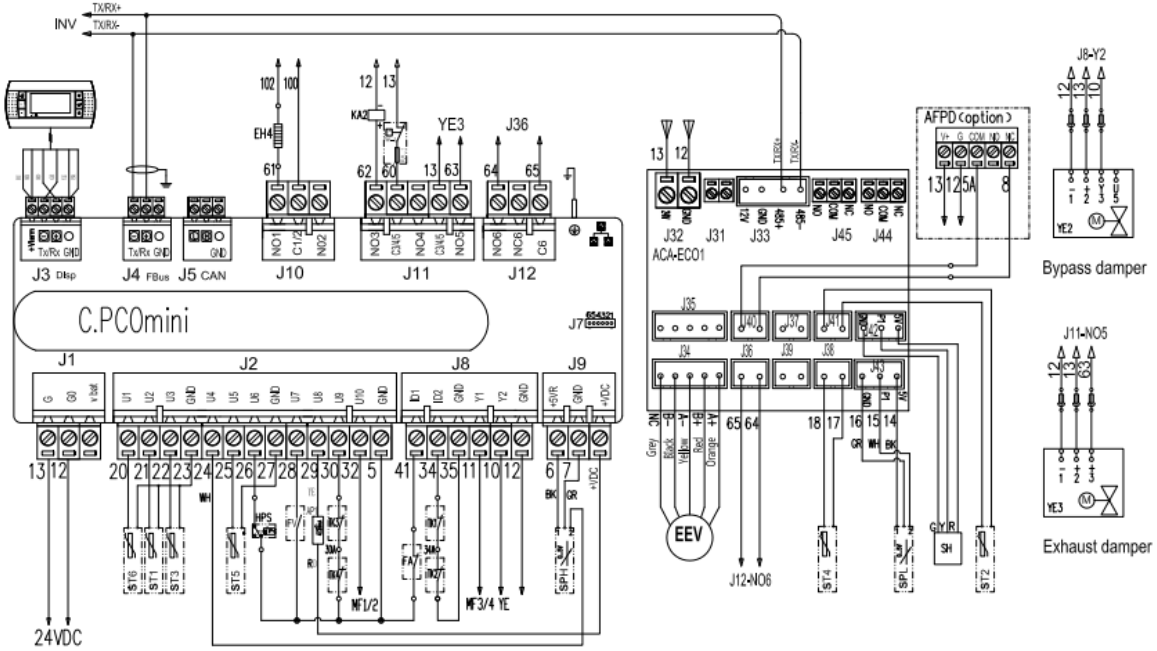
Wiring Diagram

Models
15V1T4MR410AAC

17	EH1-3	Electric heaters (optional)	34	FA	Fire/Smoke Alarm
16	EH	Crankcase heater	33	DC	Reactor
15	FU	Thermal fuse for heating	32	ST6	Condenser temperature
14	TW	Temperature switch for heating	31	ST5	Exhaust temperature
13	YE	Air damper actuator	30	ST4	Suction temperature
12	CPCOmini	Controller	29	ST3	Outdoor temperature
11	AFPD	Dust sensor (optional)	28	ST2	Supply temperature
10	TK1/TK2	Evaporator fan overload	27	ST1	Indoor temperature
9	PF1	Air pressure differential switch	26	NIV	Compressor drive Inverter
8	ACA-ECO1	Electronic expansion valve actuator	25	MC	Compressor
7	EEV	Electronic expansion valve	24	HPS	High pressure switch
6	SH	Outdoor .RH.	23	MF2/MF3	Evaporator fan/Supply fan
5	TC	Transformer	22	MF1	Condenser fan
4	UG	Switch power supply	21	C1	Capacitor for condenser fan
3	KM1	Electric heaters AC contactor	20	TK3	Condenser fan overload
2	KA	Auxiliary relay	19	SPH	High Pressure Transduce
1	QF	Breaker	18	SPL	Low pressure sensor
S/N	Sign	Description	Index	Sign	Description

PART#:1170105440





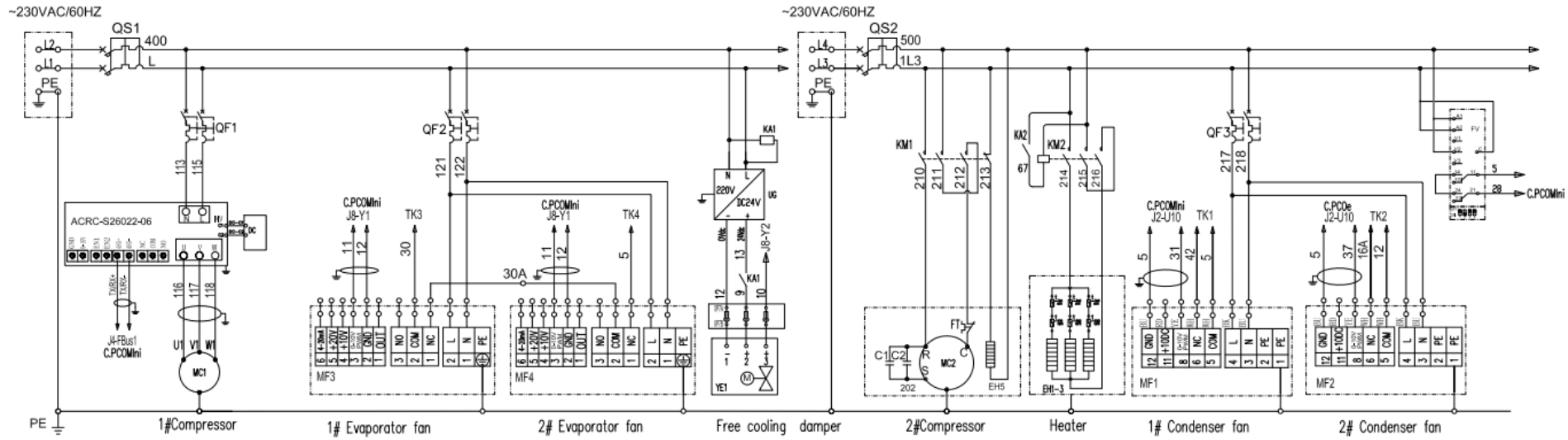
Wiring Diagram

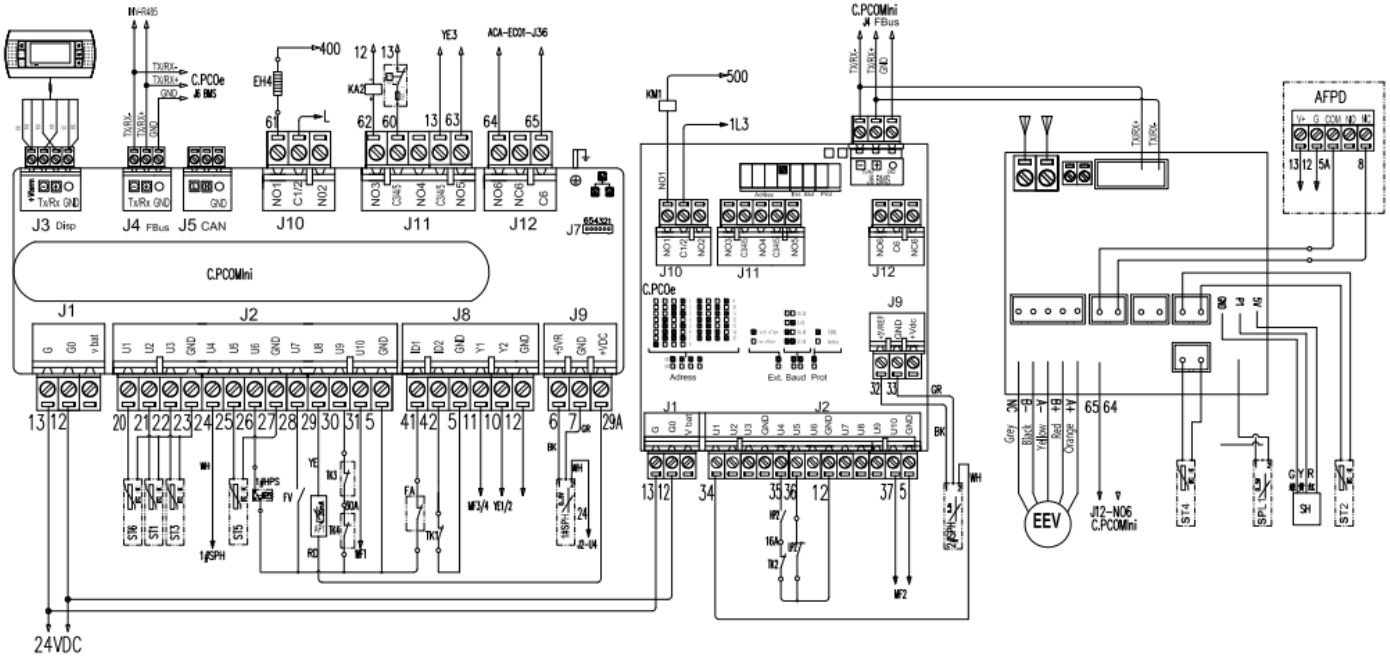
Models

28V1B5MR410BAC

SN	Mark	Name	SN	Mark	Name
01	FV	Power protect	19	AP1	Differential air press for Filter blocked
02	FA	Fire /Smoke alarm	20	FU	Thermal fuse for heating
03	YE3	Exhaust damper	21	TW	Temperature switch for heating
04	YE2	Bypass damper	22	ST6	Condenser temperature
05	YE1	Free cooling damper	23	ST5	Exhaust temperature
06	TK	Fan overload	24	ST4	Suction temperature
07	MF1,MF2	Condenser fan	25	ST3	Outdoor temperature
08	MF3,MF4	Evaporator fan	26	ST2	Supply temperature
09	INV1	Inverter	27	ST1	Indoor temperature
10	MC1	Inverter compressor	28	PGD	PGD1AY000
11	EH4	Oil Heater（option）	29	CPCOMini	Control board
12	EH1-3	Electric heaters（option）	30	ACA-EC01	Controller expansion board
13	HPS	High-pressure switch	31	KM1	Electric heaters Contactor
14	SPH	High pressure Transducer	32	KA	Relay
15	SPL	Low pressure Transducer	33	QF2	Evaporator fan breaker
16	EVD	Electronic expansion valve	34	QF1	Condenser fan breaker
17	XT	Terminal board	35	QS	Isolating switch
18	AFPD	Dust sensor （option）	36	UG	Switch power supply

PART#:1170105240



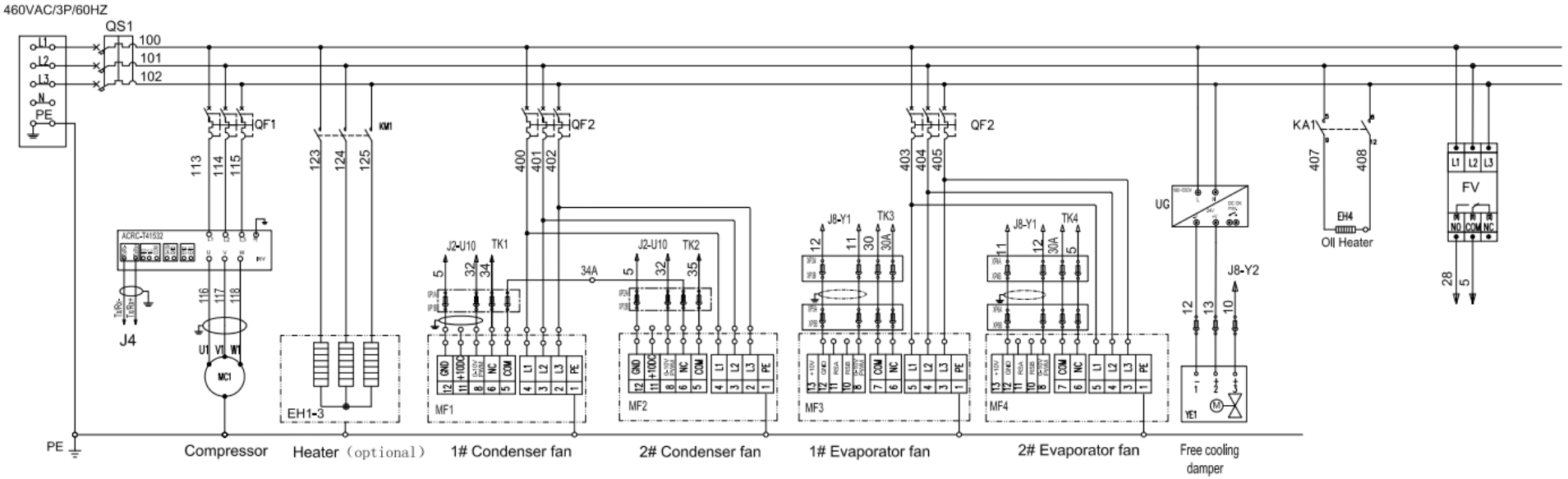


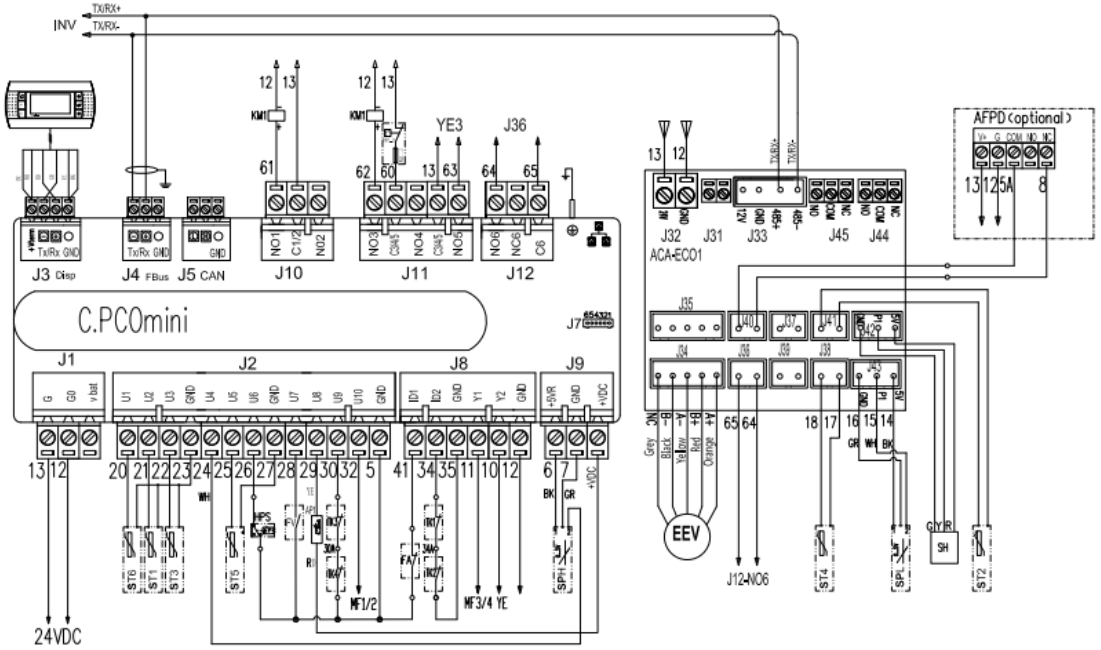
Wiring Diagram

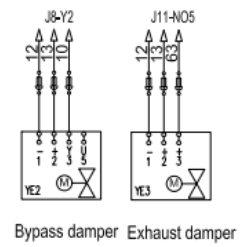
Models

28V2B5MR410AAC

SN	Mark	Name	SN	Mark	Name
01	FV	Power protect	19	AP1	Differential air press for Filter blocked
02	FA	Fire /Smoke alarm	20	FU	Thermal fuse for heating
03	YE3	Exhaust damper	21	TW	Temperature switch for heating
04	YE2	Bypass damper	22	ST6	Condenser temperature
05	YE1	Free cooling damper	23	ST5	Exhaust temperature
06	TK	Fan overload	24	ST4	1# Suction temperature
07	MF1,MF2	Condenser fan	25	ST3	Outdoor temperature
08	MF3,MF4	Evaporator fan	26	ST2	Supply temperature
09	INV1	Inverter	27	ST1	Indoor temperature
10	MC1	Inverter compressor	28	PGD	PGDWK800
11	EH4	Oil Heater	29	C.PCOMini	Control board
12	EH1-3	Electric heaters	30	ACA-EC01	Controller expension board
13	HPS	High-pressure switch	31	KM1	Electric heaters Contactor
14	SPH	High pressure Transducer	32	KA	Relay
15	SPL	1# Low pressure Transducer	33	QF2	Evaporator fan breaker
16	EVD	Electronic expansion valve	34	QF1	Condenser fan breaker
17	XT	Terminal board	35	QS	Isolating switch
18	AFPD	Dust sensor （option）	36	UG	Switch power supply







Wiring Diagram

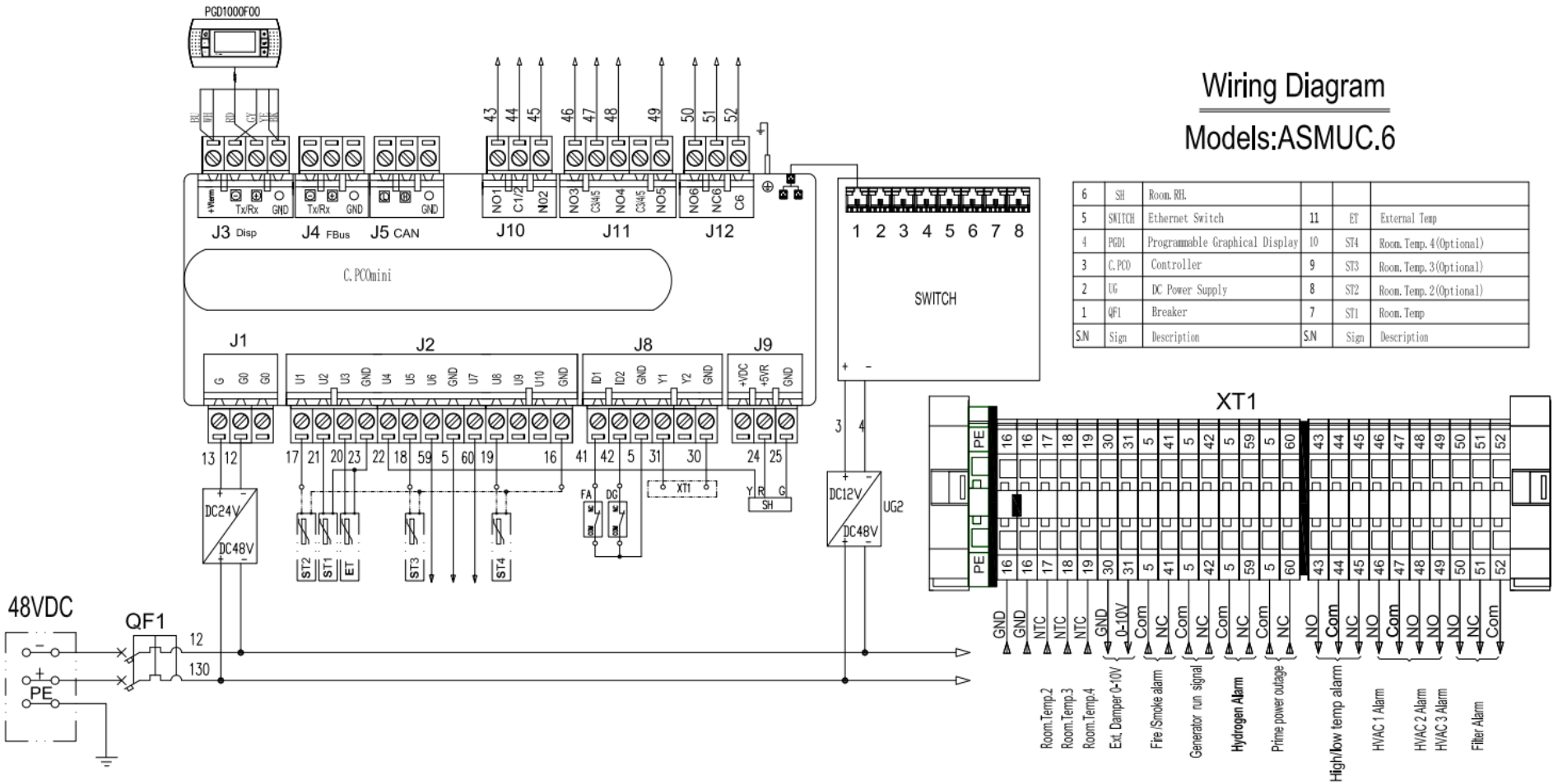
Models
28V1B5MR410CAC

SN	Mark	Name	SN	Mark	Name
01	FV	Power protect	19	AP1	Differential air press for Filter blocked
02	FA	Fire /Smoke alarm	20	FU	Thermal fuse for heating
03	YE3	Exhaust damper	21	TW	Temperature switch for heating
04	YE2	Bypass damper	22	ST6	Condenser temperature
05	YE1	Free cooling damper	23	ST5	Exhaust temperature
06	TK	Fan overload	24	ST4	Suction temperature
07	MF1,MF2	Condenser fan	25	ST3	Outdoor temperature
08	MF3,MF4	Evaporator fan	26	ST2	Supply temperature
09	INV1	Inverter	27	ST1	Indoor temperature
10	MC1	Inverter compressor	28	PGD	PGD1AYU008
11	EH4	Oil Heater (optional)	29	C.PCOMini	Control board
12	EH1-3	Electric heaters (optional)	30	ACA-ECO1	Controller expansion board
13	HPS	High-pressure switch	31	KM1	Electric heaters Contactor
14	SPH	High pressure Transducer	32	KA	Relay
15	SPL	Low pressure Transducer	33	QF2	Evaporator fan breaker
16	EVD	Electronic expansion valve	34	QF1	Condenser fan breaker
17	XT	Terminal board	35	QS	Lsolating switch
18	AFPD	Dust sensor (optional)	36	UG	Switch power supply

PART#:1170105270

Wiring Diagram

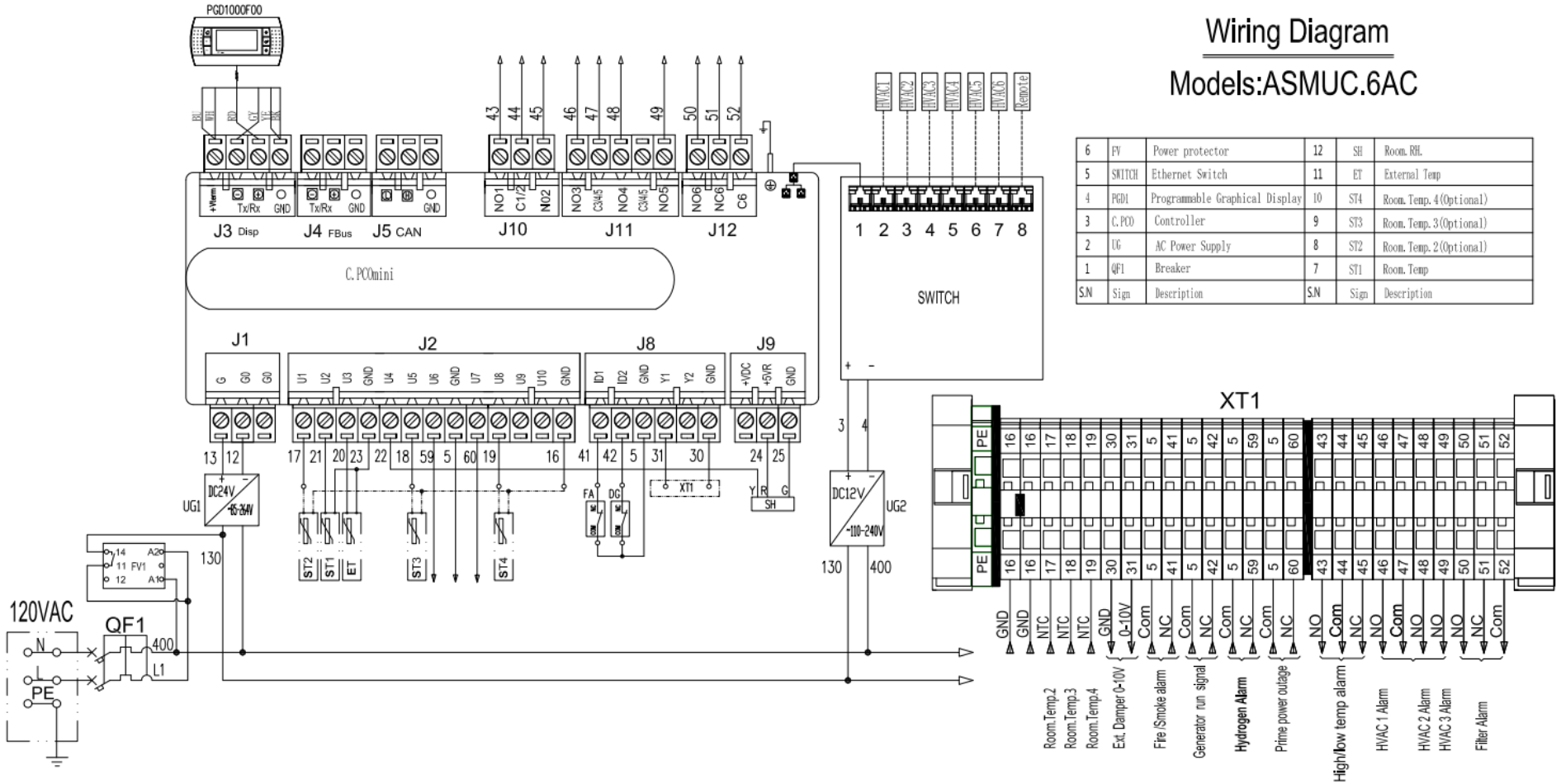
Models:ASMUC.6



6	SH	Room.RH.			
5	SWITCH	Ethernet Switch	11	ET	External Temp
4	PGD1	Programmable Graphical Display	10	ST4	Room.Temp.4(Optional)
3	C.PCO	Controller	9	ST3	Room.Temp.3(Optional)
2	UG	DC Power Supply	8	ST2	Room.Temp.2(Optional)
1	QF1	Breaker	7	ST1	Room.Temp
S.N	Sign	Description	S.N	Sign	Description

Wiring Diagram

Models:ASMUC.6AC

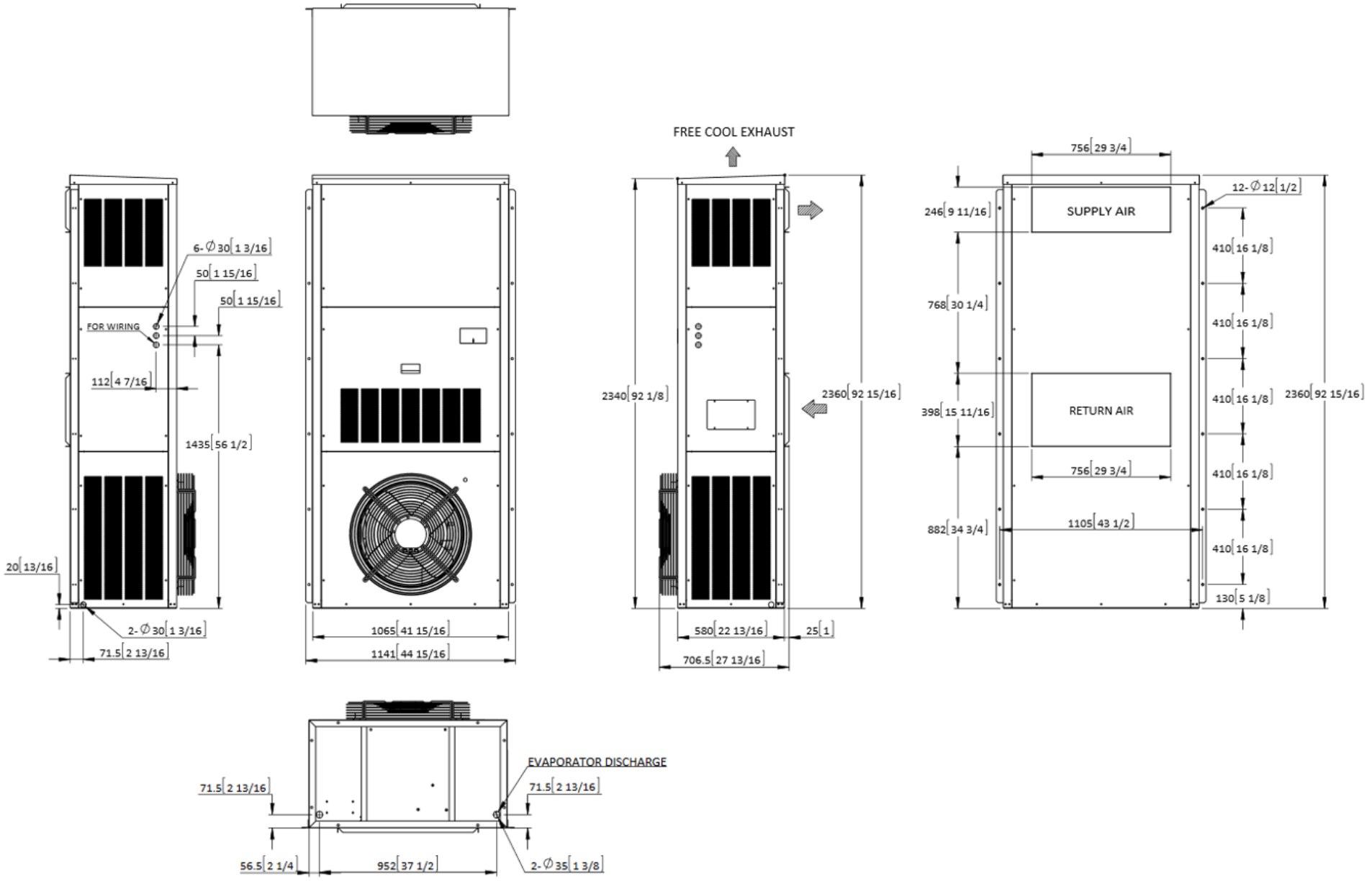


6	FV	Power protector	12	SH	Room.RH.
5	SWITCH	Ethernet Switch	11	ET	External Temp
4	PGD1	Programmable Graphical Display	10	ST4	Room.Temp.4(Optional)
3	C.PCO	Controller	9	ST3	Room.Temp.3(Optional)
2	UG	AC Power Supply	8	ST2	Room.Temp.2(Optional)
1	QF1	Breaker	7	ST1	Room.Temp
S.N	Sign	Description	S.N	Sign	Description

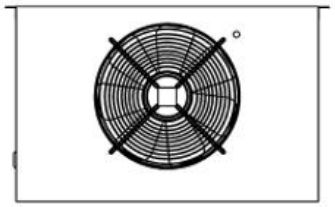
Appendix C: Mechanical Drawings

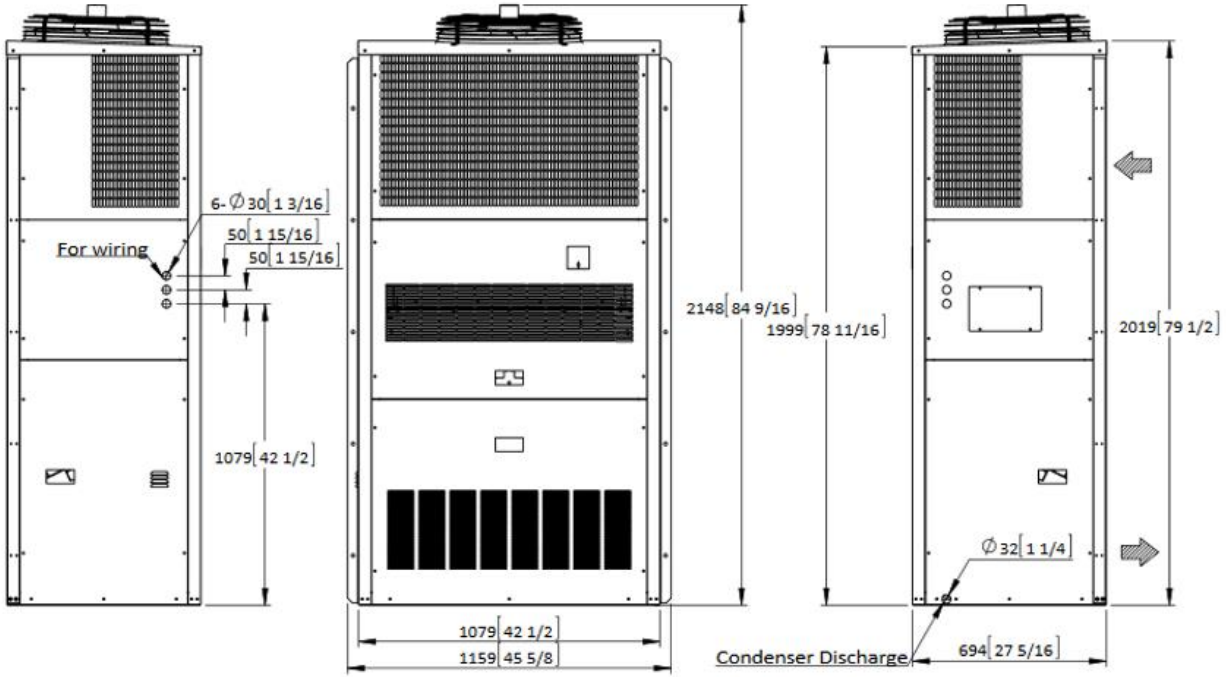
11V1T3

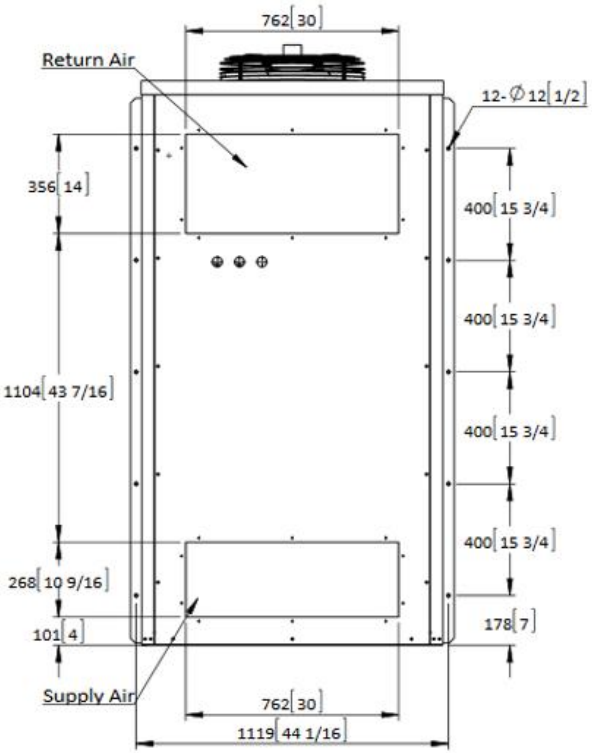
NOTE: To assist in the installation process, the following figures provide the unit dimensions to a tolerance of ± 1/16" (2 mm).

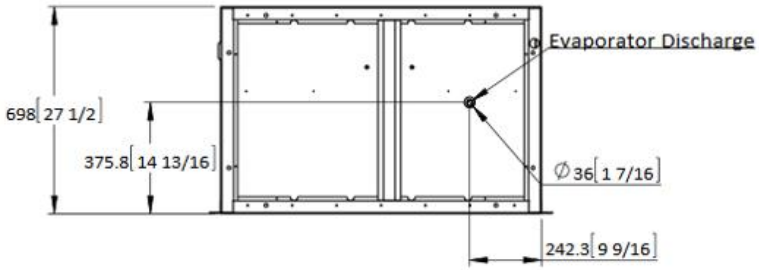


11V1B3

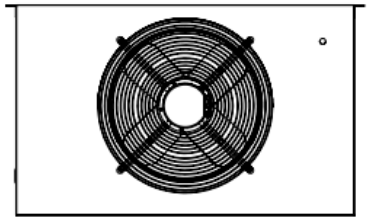


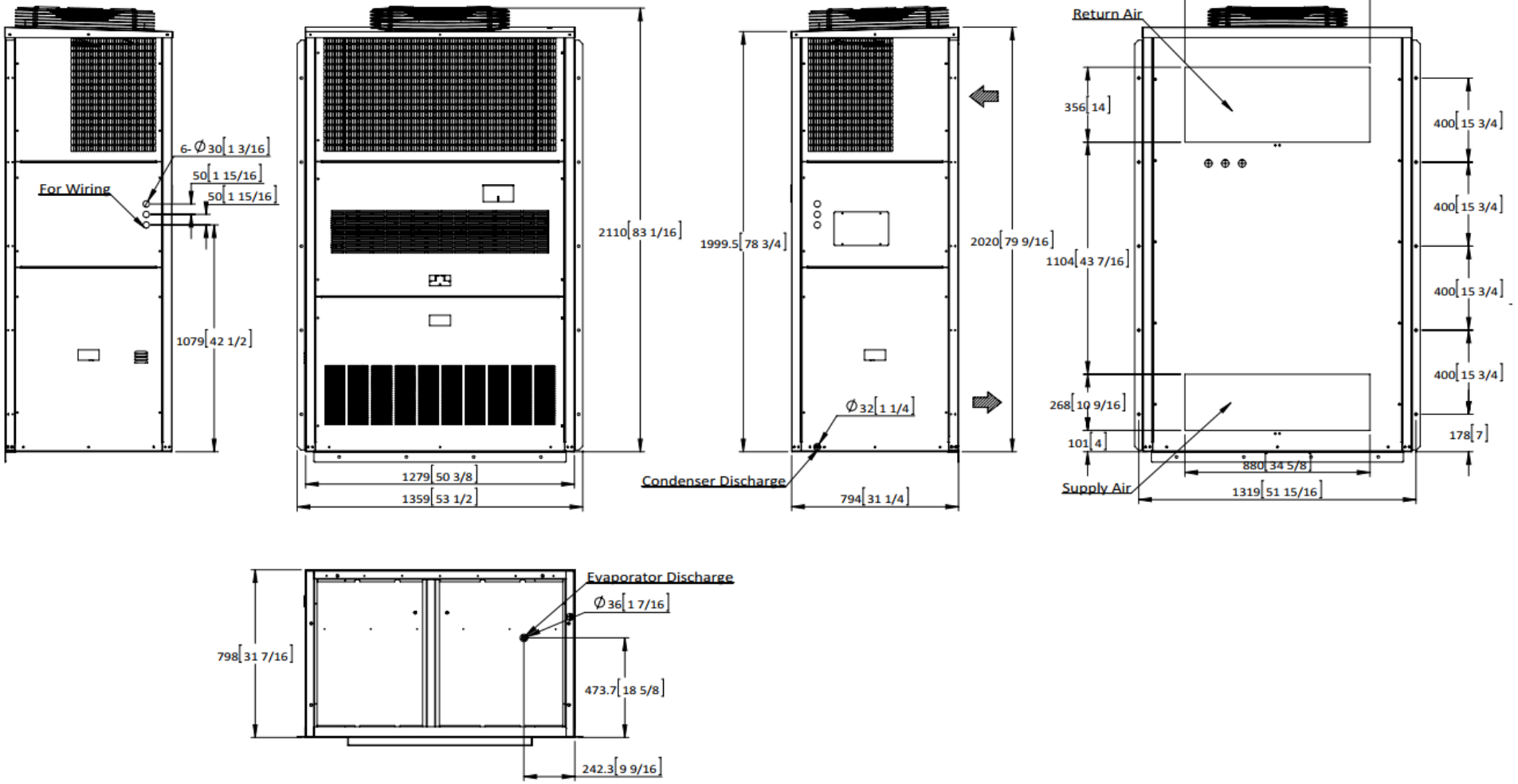

6-Ø30[1 3/16]
50[1 15/16]
50[1 15/16]
For wiring
1079[42 1/2]
2148[84 9/16]
1999[78 11/16]
1079[42 1/2]
1159[45 5/8]
2019[79 1/2]
Ø32[1 1/4]
Condenser Discharge
694[27 5/16]


762[30]
Return Air
12-Ø12[1/2]
356[14]
400[15 3/4]
400[15 3/4]
1104[43 7/16]
400[15 3/4]
400[15 3/4]
268[10 9/16]
178[7]
101[4]
Supply Air
762[30]
1119[44 1/16]


Evaporator Discharge
698[27 1/2]
375.8[14 13/16]
Ø36[1 7/16]
242.3[9 9/16]

15V1B4

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50[1 15/16]
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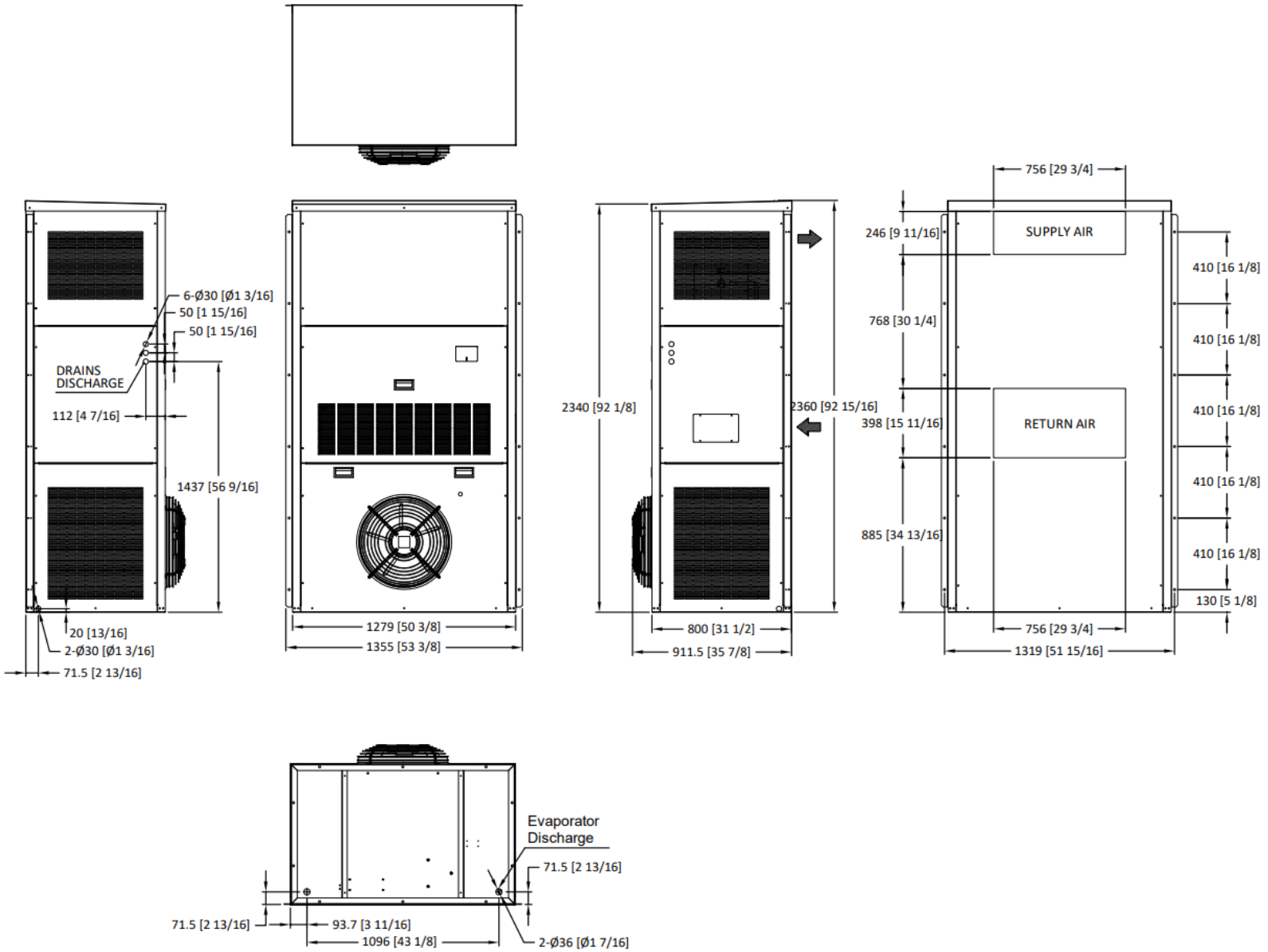
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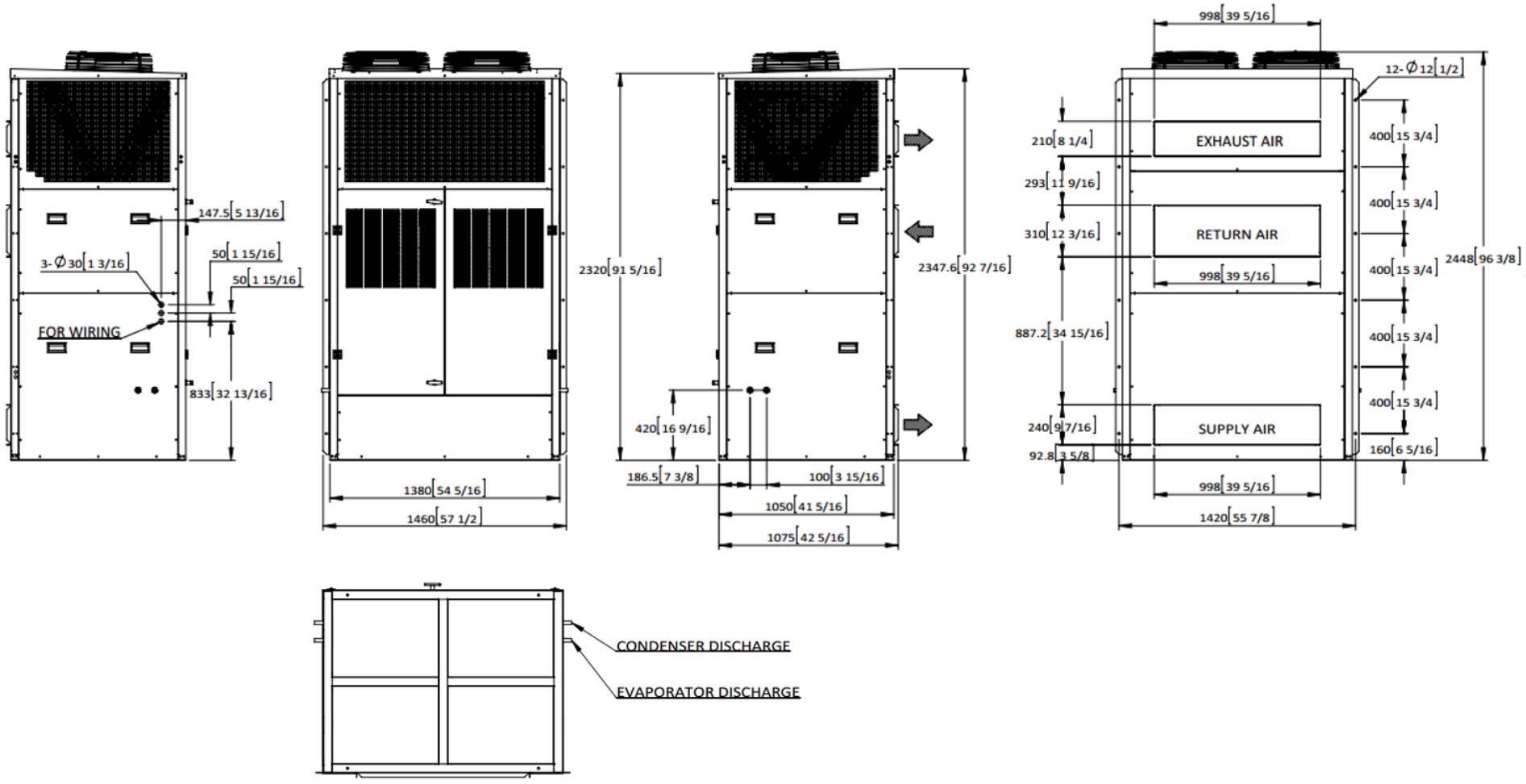
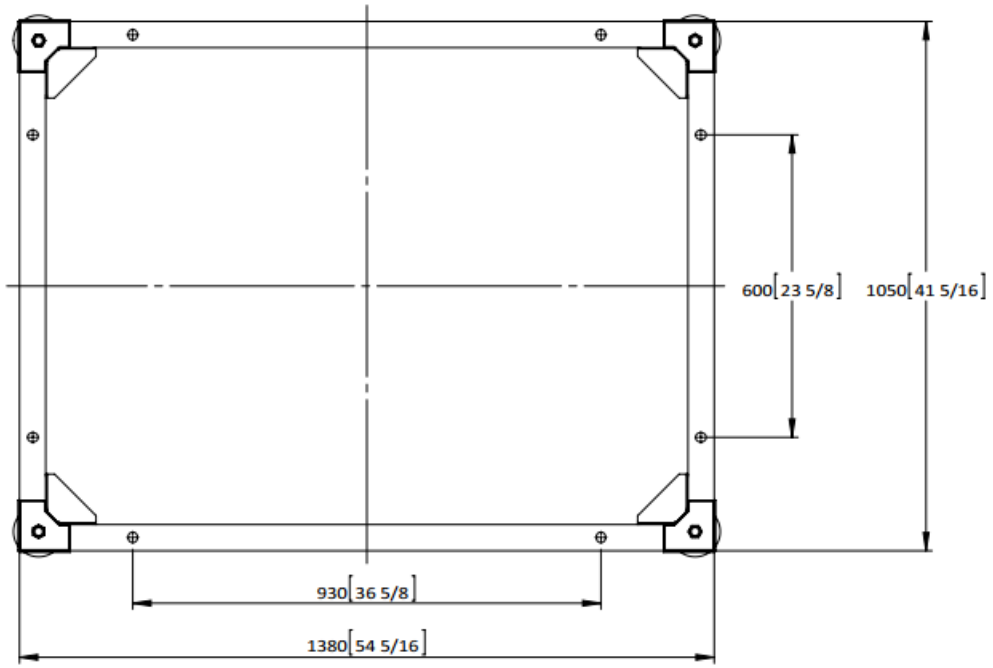
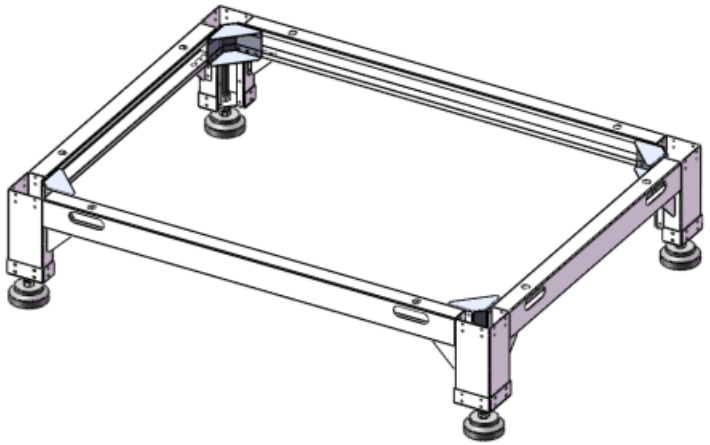


Support Stand for 28V1B5





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