

## INSTALLATION AND OPERATION INSTRUCTIONS

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# AIRSYS Free Cooling Box

## Models

FREECOOL.OD.PCK.18F1.48

FREECOOL.OD.PCK.36F2.48

FREECOOL.OD.PCK.18F1.48.EXC

FREECOOL.OD.PCK.36F2.48.EXC

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# Chapter 1: Overview

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Thank you for choosing a unit manufactured by AIRSYS REFRIGERATION ENGINEERING TECHNOLOGY (BEIJING) CO., LTD.

The AIRSYS line of wall mounted HVAC systems is optimized for energy efficiency. These systems are specifically designed for the efficient removal of heat generated by electronics from enclosed shelters. The supply air of the AIRSYS system is delivered from the bottom of the machine and the exhaust is at the top, the opposite of a traditional HVAC system. This “bottom throw” is designed to take full advantage of the fact that hotter air rises. With the exhaust located higher within the shelter, every rotation of the fan removes more heat. The cooler air supplied at the bottom accelerates this natural process. This is just one of many design features that makes the AIRSYS HVAC systems among the most energy efficient in the world.

Along with the 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:

- Simple unobstructed access to all key components for PM and servicing
- Selectable alarm relays (NC or NO) to enable the system to adapt to the customer rather than the other way around

Since the FCB is powered directly from the DC plant, it will continue to operate in the event of prime power loss. Even if the outside temperature is higher than the temperature set point, the FCB is programmed to recognize the need for emergency ventilation when the existing HVAC systems are unable to cool the site.

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

## Using this Manual

Before attempting to install or start the unit, you should read this manual carefully. Retain this manual for reference for the entire operational life of the unit. This manual provides information on the following general topics:

- Product overview
- How to install the system, including preparation, installing the wall units, installing the PLD user interface, and verifying the installation
- How to access the functions via the PLD user interface, understand system alarms, and perform advanced troubleshooting
- Preventive maintenance and repair

## Documentation Conventions

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.** Indicate 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 and their meaning 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

## Unit Identification

Each unit is identified by a model number, such as **FREECOOL.OD.PCK36F2.48.XXX**. The elements in the number are explained in Table 2.

**Table 2: Model Number**

Element	Meaning
FREECOOL	Production series name. In this example, FREECOOL-Free Cooling Box is abbreviated FCB.
OD	Installed type. OD: Outdoor mount; ID: Indoor mount.
PCK	Structure type. PCK is Packaged Unit abbreviation; SPL is Split Unit abbreviation.
36	Nominal air volume. In this example, 36 = 3600 m <sup>3</sup> /h.
F2	Fan quantity. F2 means 2 fans assembled; F1 means 1 fan assembled.
48	Voltage. 48 = 48VDC, range: 36VDC~57VDC.
XXX	Special customer requested identification. EXC = Extreme Cold.

## Acronyms and Abbreviations

Table 3 lists acronyms and abbreviations used in this manual.

**Table 3: Acronyms and Abbreviations**

Term	Meaning
AIRSYS	AIRSYS Refrigeration Engineering Technology (Beijing) Co., Ltd
AAST	AIRSYS Authorized Service Technician
Amp	Ampere, unit of electric current, or rate of flow of electricity
AUT/MAN	Automatic or Manual
BMS	Building Monitoring System
CFM	Cubic Feet per Minute
Com	Communication
DC	Direct Current
DG	Diesel Generator
FC	Free Cooling
FCB	Free Cooling Box
HVAC	Heating, Ventilation, and Air Conditioning
Humid	Humidity
I/O	Input/Output
IPU	Indoor Packaged Unit
kW	Kilowatt (1000 Watts)
LED	Light Emitting Diode
NC	Normally Closed
NO	Normally Open
PLD	Programmable LED Display
PWM	Pulse Width Modulation
R	Read (only)
RoHS	Restriction of Hazardous Substances Directive
R/W	Read/Write (may Read or Write)
Temp	Temperature
VAC	Voltage in Alternating Current
VDC	Voltage in Direct Current
WPU	Wall Pack Unit

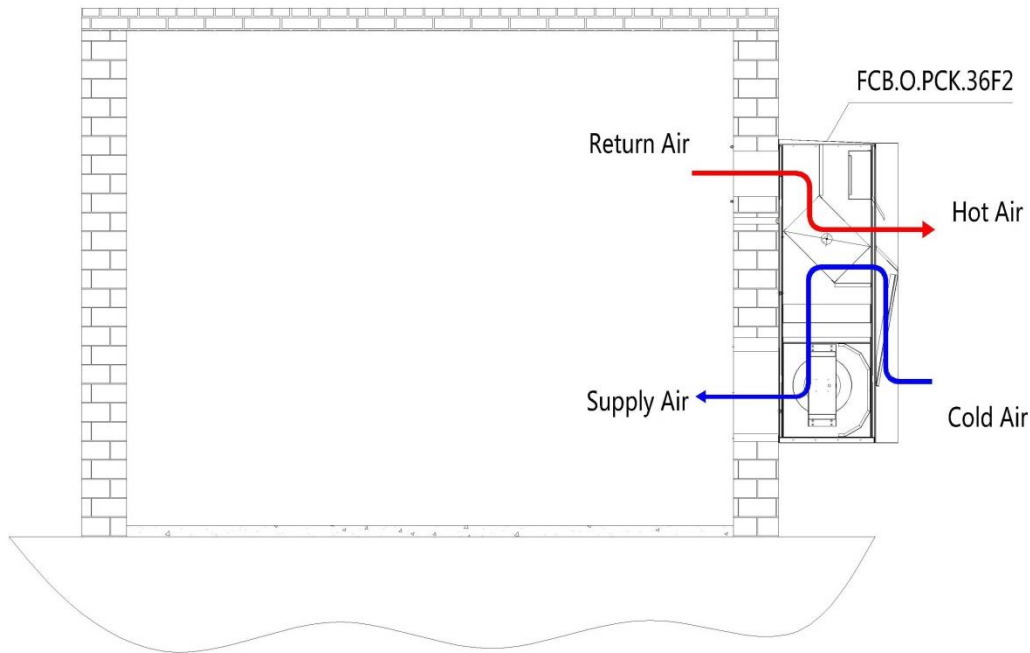
## Product Overview

### Unit Operating Modes

The air conditioning system has three modes of operation:

- I. Free cooling mode (Figure 1).
- II. Mechanical cooling assist mode.
- III. Emergency cooling / ventilation mode.

The control system determines the unit's mode of operation based on the temperature and humidity sensor readings.



**Figure 1: Free Cooling Mode**

#### Free Cooling Mode

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. Existing third-party HVAC units are “off” in this mode.

#### Mechanical Cooling Assist Mode

The lower the  $\Delta T$  (Temp inside – Temp outside), the less cooling capacity the FCB has. When  $\Delta T$  is small enough where the FCB can no longer maintain the inside temp to the designated set-points, the FCB will ask the existing HVAC systems to engage to provide additional cooling capacity to maintain the site temperature.

**NOTE:** When  $\Delta T \geq 3.6^\circ\text{F}$  (adjustable) the FCB will provide cooling benefits and will continue to operate to minimize compressor run time. It is normal for the FCB to be providing this benefit during Mechanical Cooling Assist Mode.

#### Emergency Cooling/Ventilation Mode

If the mechanical cooling assist mode fails to keep the site cool enough whereby the site temp exceeds the upper set point by a few degrees, the FCB will shift into Emergency/Ventilation mode. In this mode the FCB will provide Free Cooling if  $\Delta T > 0^\circ\text{F}$ . This will typically only occur when Mechanical Cooling fails to work when called upon by the

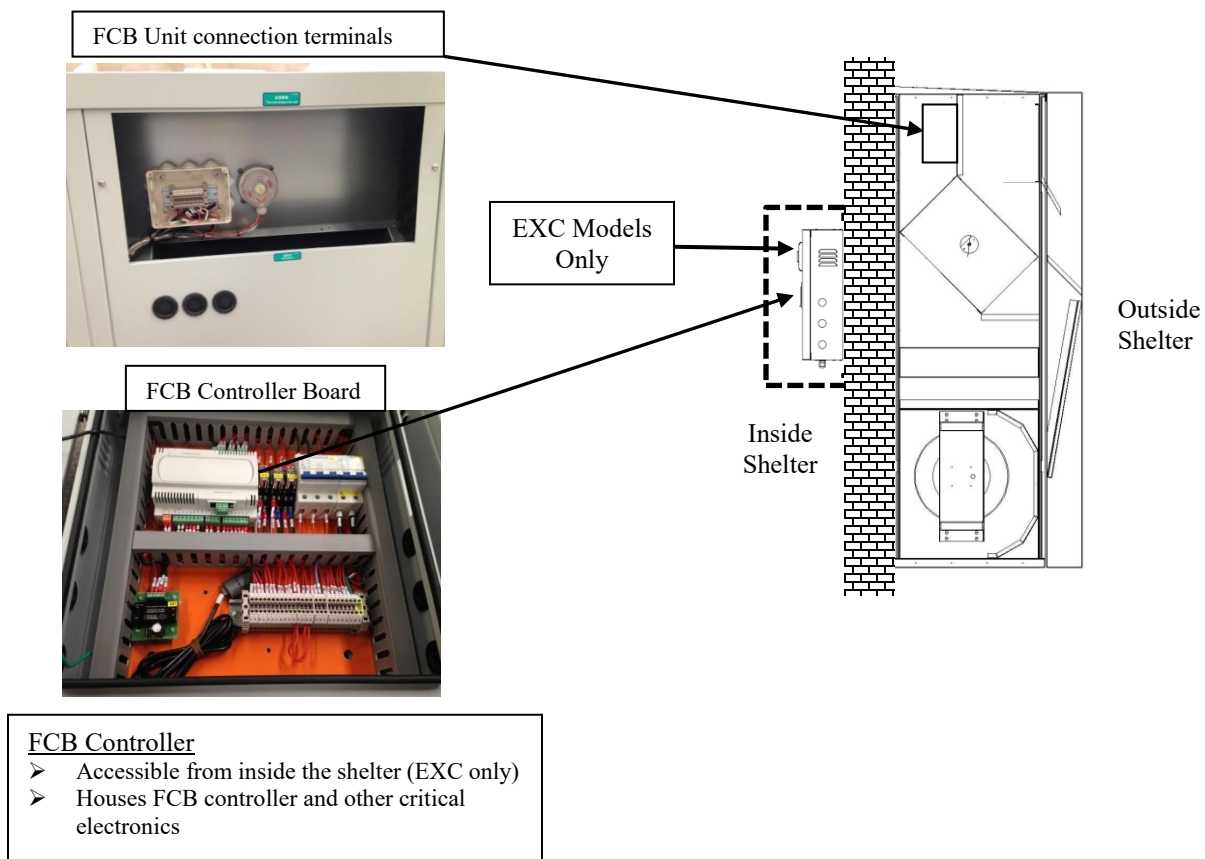
system such as during a loss of prime power or when the HVAC systems fail to cool the site to within a few degrees of the upper set point.

## Ease of Control and Configuration

The FCB controller has a convenient Programmable LED Display (PLD). This is mounted on the unit for standard models and in a separate, indoor mounted box on EXC models. This three-button PLD is the user interface through which an operator can:

- Check the status of the system such as sensor readings and operating mode
- Change factory set points
- Review alarms and alarm history

Many of these same functions can be accessed remotely via an RS485 communication interface built into the controller.





# Chapter 2: Installation

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## Installation Preparation

Unpack the unit carefully. Some parts are packed loosely and will move as the packaging is opened. Before discarding the box, check the packaging carefully for any parts or documents inside. Refer to Table 4 on page 9 for the complete list of material shipped with each unit. Before installation, check that:

- The supply voltage meets the requirements as designated, 36 - 57VDC.
- The shelter to be conditioned is clean on the inside, and free of excess dirt and dust.

A minimum clearance of 61 cm (24") between the supply air and any equipment/rack or other obstruction is recommended since any interference with the airflow will adversely affect the efficiency of the machine. Also verify that all installer provided items, listed in Table 5 on page 10, are present. Installation and startup must be performed by an AIRSYS Authorized Service Technician (AAST).



**Danger.** All the installation work must be done by a skilled professional. 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 incorrect operational use of the units.



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



**Warning.** Outdoor use. Risk of electric shock can cause injury or death: disconnect all remote electric power supplies before servicing

## Delivery

When your 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 order to recover for any damage, please take detailed photographs of all the packaging **before** the external packaging damage, it is very important to annotate *shipping damage* on the Bill of Lading **prior** to signing for the freight. In 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 from losses.

## 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. AIRSYS will furnish replacement parts for any component failures that occur within the warranty period free of charge. The customer is responsible for the cost of shipment of replacement material from US distributor, AIRSYS North America LLC.

**Note:** Warranty assumes that an AAST performed the installation and submitted 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, as date of installation cannot be confirmed. 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.

## 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 goggles, wearing gloves, and wearing appropriate uniform.

## Required Materials

### AIRSYS Supplied Materials

Table 4 lists all the material supplied by AIRSYS. After opening the package, verify that all items are accounted for. If any material is missing, please contact AIRSYS Support using the following information:

Email: [ASNsupport@air-sys.com](mailto:ASNsupport@air-sys.com)

Phone: (855)-874-5380

**Table 4: Material Supplied by AIRSYS**



Item	Model # or Part #	Qty	Item Description	Comments
1a	FREECOOL.OD.PCK.(xxx)	1	Free Cooling Box (FCB) Standard	xxx = 18F1 or 36F2
1b	FREECOOL.OD.PCK.(xxx).EXC	1	Free Cooling Box (FCB) Extreme Cold	xxx = 18F1 or 36F2
2		1	Controller box for Extreme Cold FCB	xxx = 18F1 or 36F2
3	2030100280	1	Supply air grill	
4	2030100270	1	Return air grill	
5	8553703300	24	Self-tapping screw ST4.2*25	For the air grill installations
6	8554504600	6	Pan head screw with washer M5*16	For PLD installation
7	2040303110	1	Controller Module	Assembled in electric box
8	8452001058	1	Indoor temp. sensor (ST1)	Installed in controller box
9	8452001058	1	Outdoor temp. sensor (ST2)	Installed in controller box

Item	Model # or Part #	Qty	Item Description	Comments
10	8452001040	1	Supply air temp. sensor (ST3)	Installed in FCB unit
11	8454020720	1	Humidity sensor (SH)	Installed in FCB unit
12	1170103020	1	Installation and Operation Manual	

## Installer Supplied Material

Table 5 lists items required for installation that must be supplied by an AIRSYS Authorized Service Technician (AAST). The wire length and gauge depends on site-specific conditions. However, recommendations are provided.

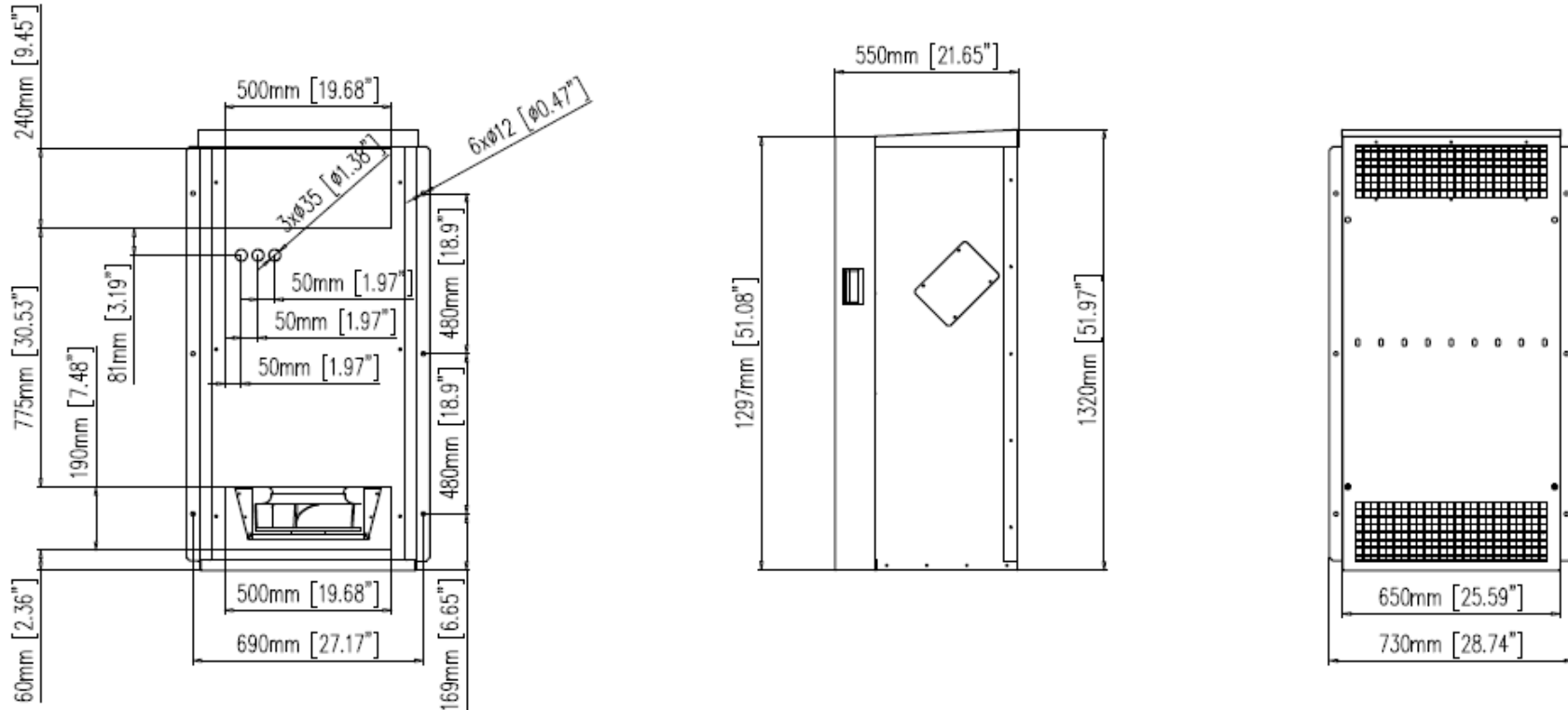
**Table 5: Materials Supplied by the Installer**

No.	Item	Qty	Description	Comments
1	WPU comm. cable	A/R	2-wire, $\geq$ 24 AWG.	From WPU to FCB "G" & "Y"
2	48VDC power plant cable to FCB	A/R	3-wire DC power cable. To electric box terminals 1+, 2- & PE.	Max Current Ampacity: 18F1 = 6A, 36F2 = 11A
3	Alarm input/output wire pairs	A/R	6 cond. max, $\Rightarrow$ 24 AWG. Length & conductor count as needed. Connects between alarm panel and FCB controller.	Input signals: Smoke/Fire, Hydrogen sensor & Generator run. Output signals: Dirty air Filter, FCB alarm, High/Low temp.
4	Supply air frame	1	See addendum DWG.	Installed thru wall to facilitate air flow
5	Return air frame	2	See addendum DWG.	Installed thru wall to facilitate air flow
6	Duct tape	A/R	With single-sided adhesive.	Used to line the return and supply air frame edges.
7	Silicone sealant	A/R	Commercial grade outdoor silicone sealant.	
9	Weather stripping	A/R	Commercial grade neoprene weather stripping or equivalent. Recommend a minimum of 25 mm (~1") wide and 20 mm (~0.8") thick	Used to frame the FCB outlet and inlet to create a weather tight seal
8	Terminals	A/R		Optional, for ease of terminal block wire installation.
9	Terminal crimping pliers	A/R		
10	Nylon zip-tie	A/R	Small nylon zip tie	For securing field wires
<b>Optional connections</b>				
11	RS485 comm. cable	1	Twisted pair or shielded, $\geq$ 24 gauge.	From controller box to customer defined location.
12	24 VDC power plant cable to inverter	1	1 cable with 3 wires.	Max current capacity 22 Amps. Recommended 8AWG.

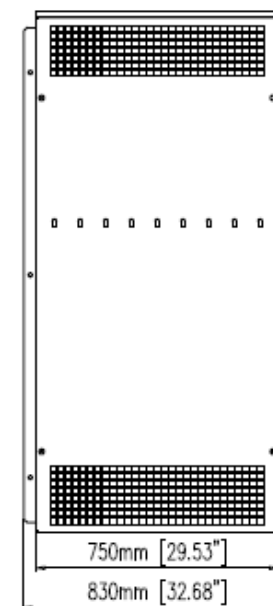
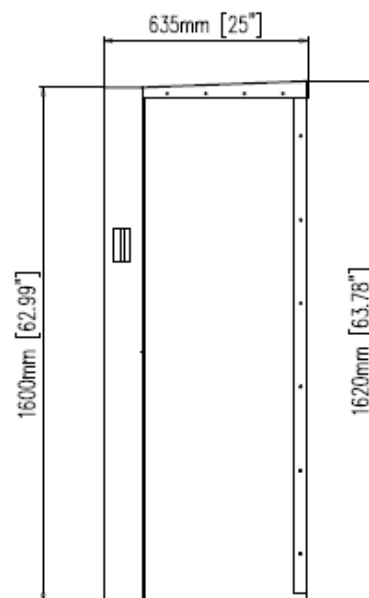
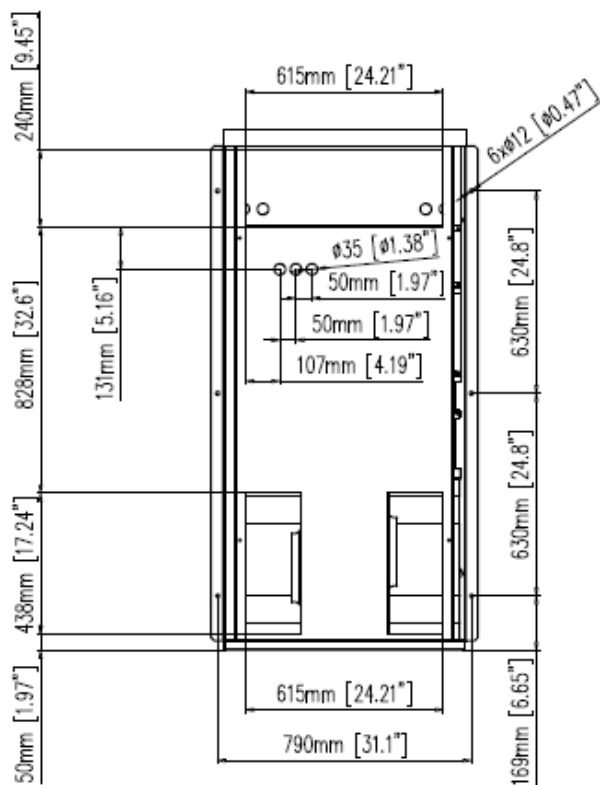
## FCB Dimensions

To assist in the installation process, the following figure and table provide the dimensions of the units to a dimensional tolerance of  $\pm 1/16''$  (2 mm).

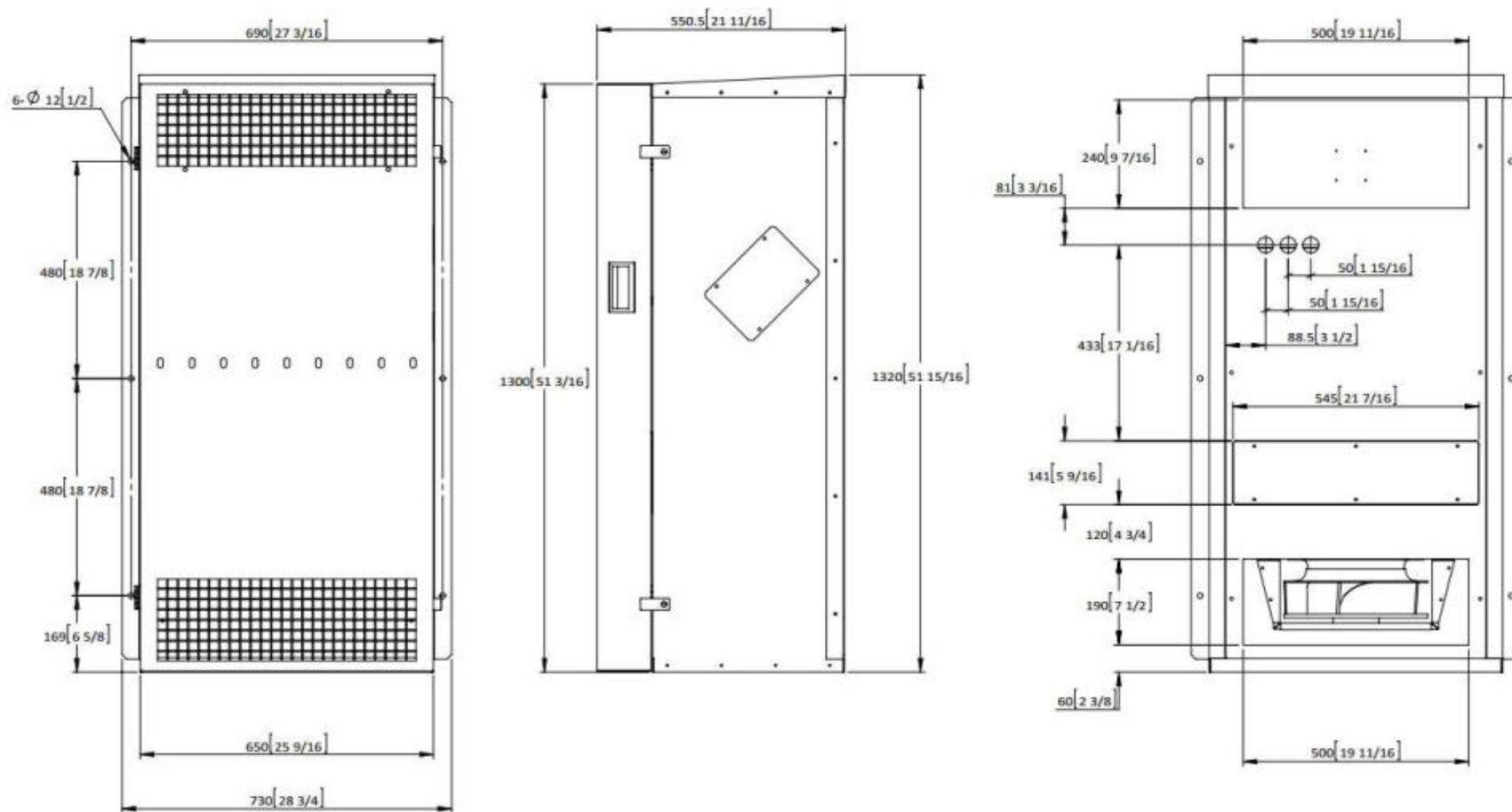
## FREECOOL.OD.PCK.18F1 EXTERNAL DIMENSIONS



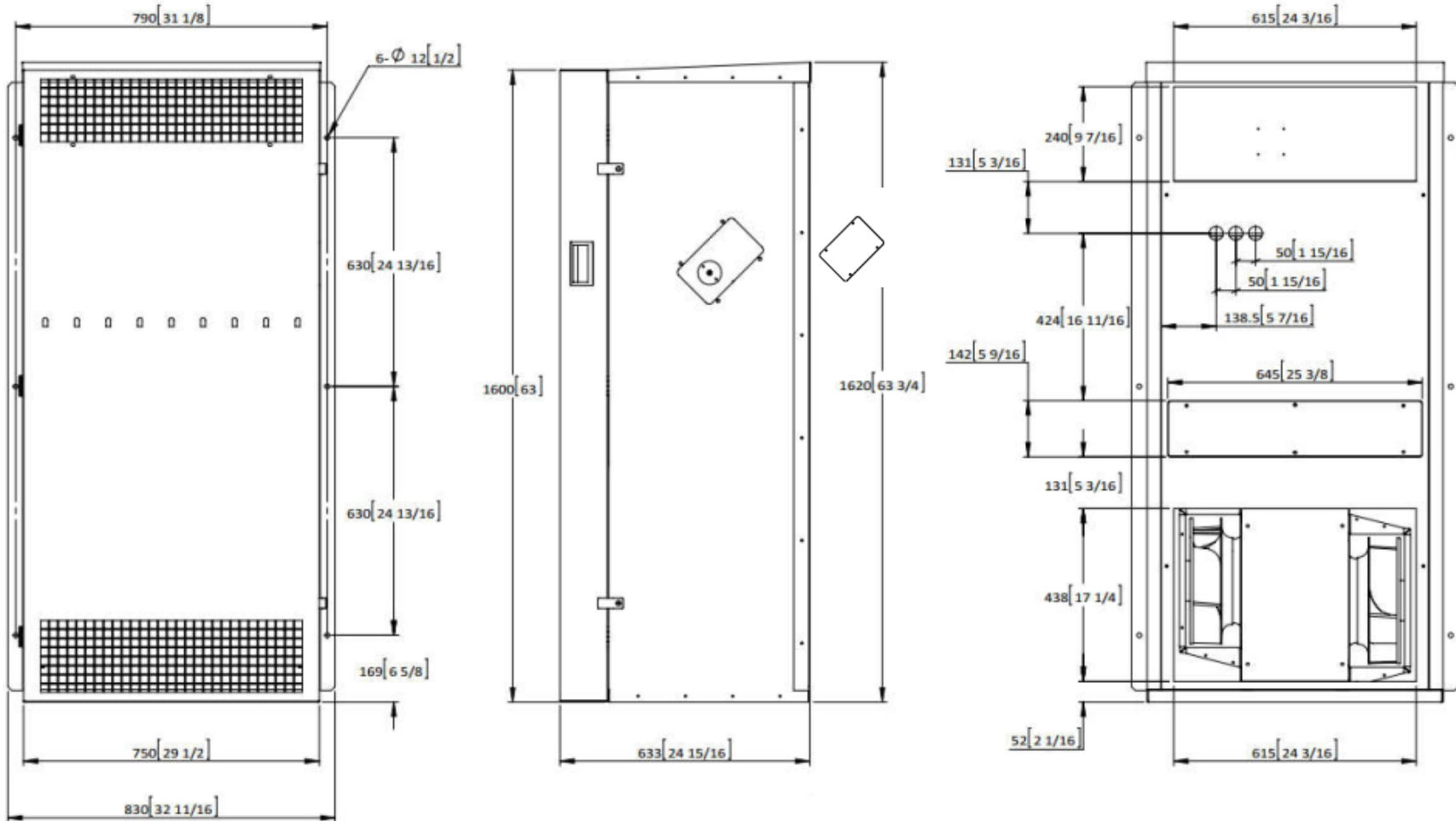
## FREECOOL.OD.PCK.36F2 EXTERNAL DIMENSIONS



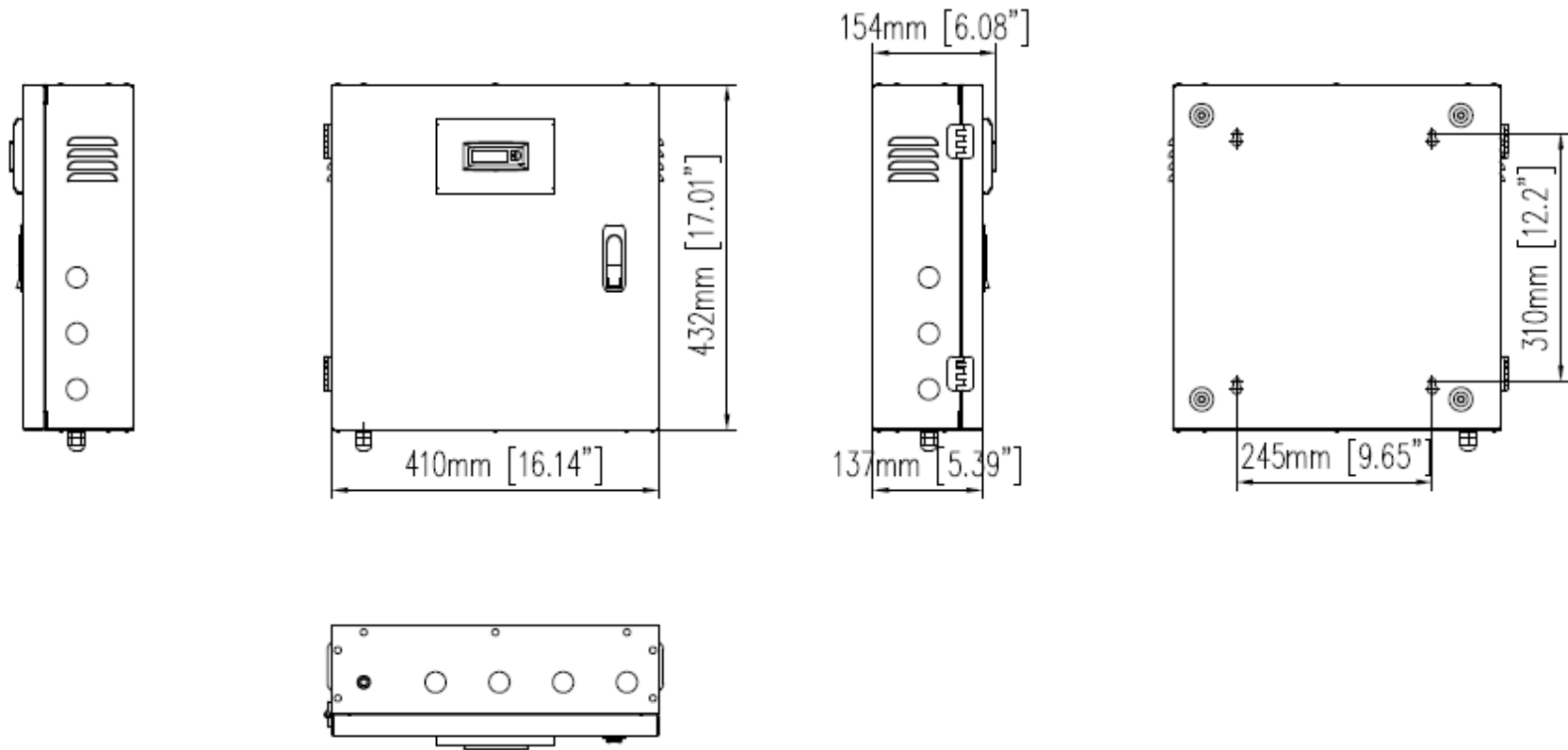
## FREECOOL.OD.PCK.18F1.EXC EXTERNAL DIMENSIONS



# FREECOOL.OD.PCK.36F2.EXC EXTERNAL DIMENSIONS



### FCB Controller Box Dimensions (EXC Models Only)

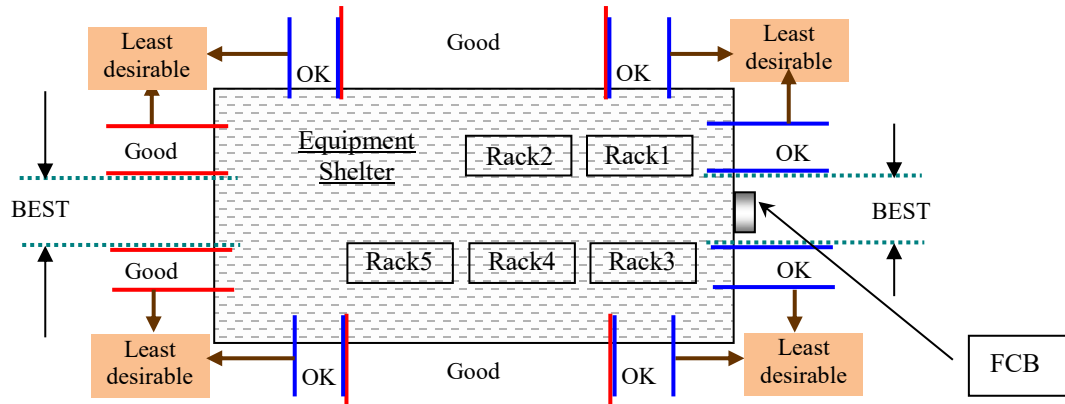




## Physical Location of the FCB

The FCB will perform best if placed according to the following guidelines:

- Mounted on short side of the shelter so there is maximum airflow
- Centered on the wall to facilitate good air flow
- Minimum 24" clearance between supply vent and any partial or complete blockage
- Do not place directly behind complete supply blockage such as a battery bank.



## 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 sufficient space is available for easy operation and installation, both inside and outside the mounting location.

Leave at least:

- 1200 mm (47.24") free space in front of the unit;
- 500 mm (19.68") free space at the bottom of the unit;

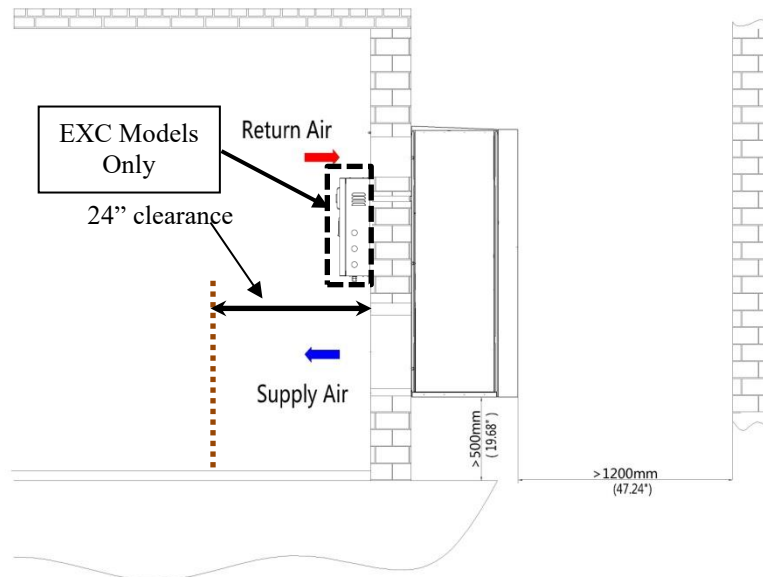


Figure 2: Recommended Clearances



**Important.** The wall selected for the unit must be strong enough to support both the static weight of the unit and the vibration of an operating unit.

## Make Openings and Holes

Make openings for supply and return air and cable and bolt holes in the installation wall as shown in Figure 3 **Error! Reference source not found.** and Figure 4 **Error! Reference source not found.**; refer to FCB Dimensions on pages 11 and 12 for more details.

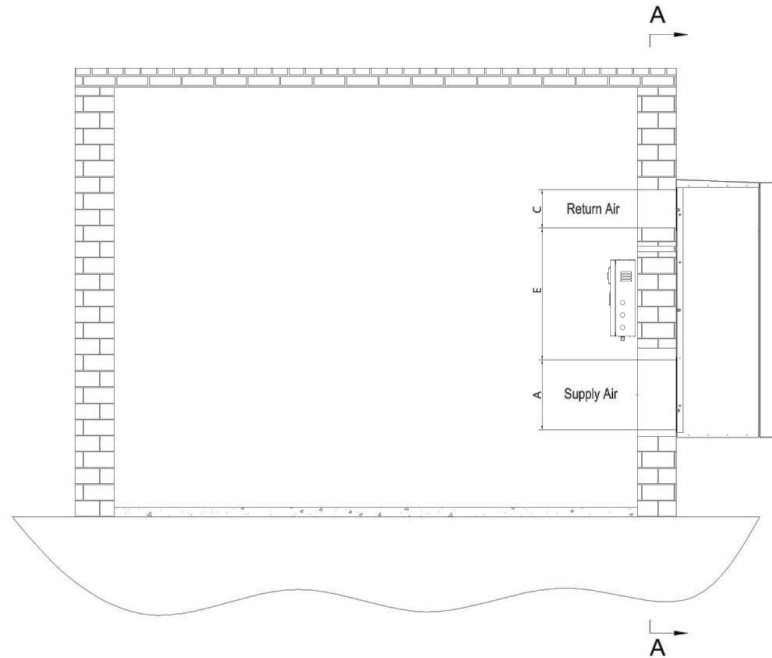


Figure 3: Left Side View

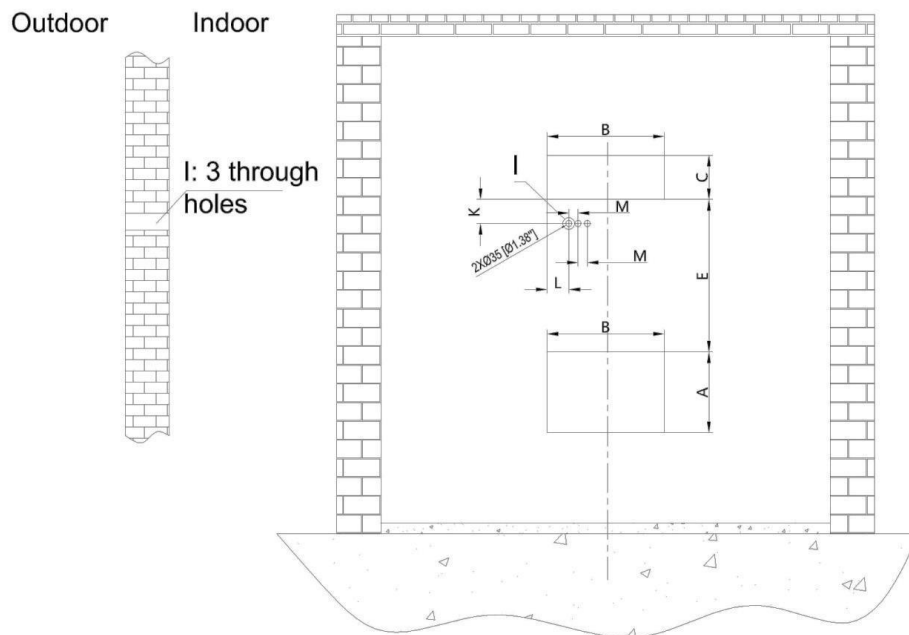
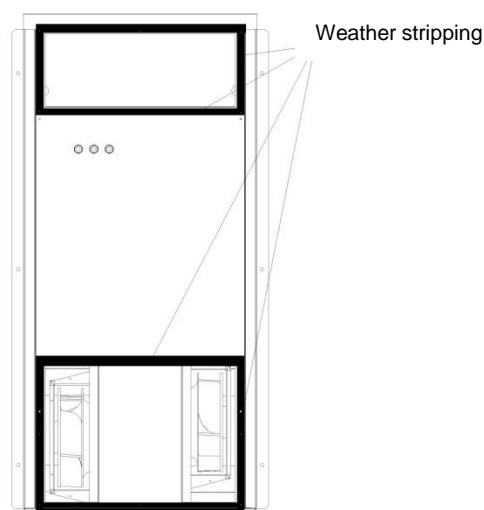


Figure 4: Openings and Holes in the Wall

Dimensions of Basic Unit for Architectural and Installation (Nominal)						NOTE: Dimensional tolerance $\pm 1/16"$ (2 mm)						
MODEL	UNIT	SUPPLY		RETURN								
		A	B	C	B	E	I	J	K	L	M	N
18F1	MM	190	500	240	500	775	480	169	81	50	50	1297
	IN	7.48	19.68	9.45	19.68	30.53	18.9	6.65	3.19	1.97	1.97	51.08
36F2	MM	438	615	240	615	828	630	169	131	107	50	1600
	IN	17.24	24.21	9.45	24.21	32.6	24.8	6.65	5.16	4.23	1.97	62.99
18F1.EXC	MM	455	550	240	550	510	480	169	81	50	50	1297
	IN	17.91	21.65	9.45	21.65	30.53	18.9	6.65	3.19	1.97	1.97	51.08
36F2.EXC	MM	715	650	240	650	551	630	169	131	107	50	1600
	IN	28.14	25.59	9.45	25.59	21.7	24.8	6.65	5.16	4.23	1.97	62.99

## 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 5 **Error! Reference source not found..**



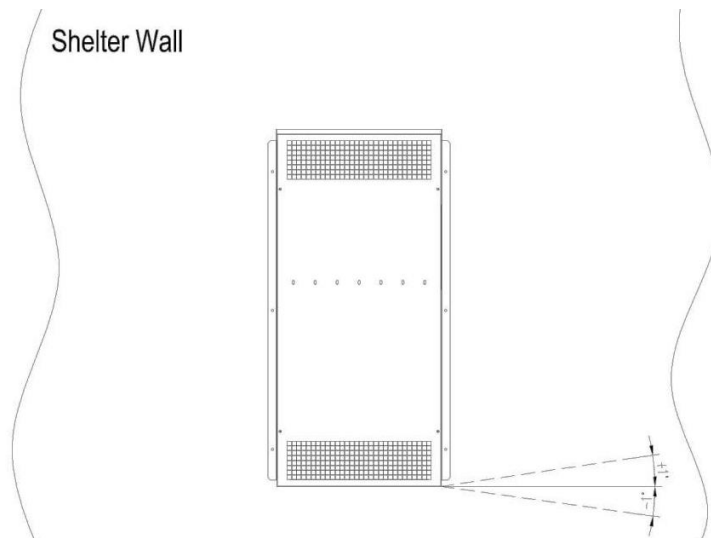
**Figure 5: Install Sealing Strips**

## Position the Unit



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

The unit must be installed in a level position ( $\pm 1$  degree from level). Refer to Figure 6.



**Figure 6: Inclination of Mounted FCB**

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

1. Position the unit next to the wall using a forklift or leveling system.



**Figure 7: Position the Unit**

2. Attach a single mounting screw and adjust to ensure the unit is level.

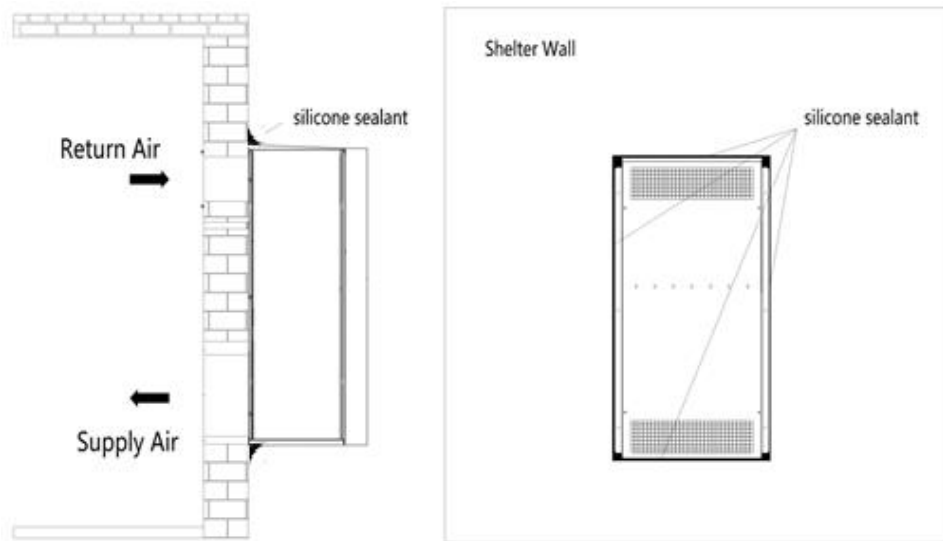


**Figure 8: Verify the Unit is Level**

3. After the unit is level, attach the remaining mounting screws (6 total for one FCB).

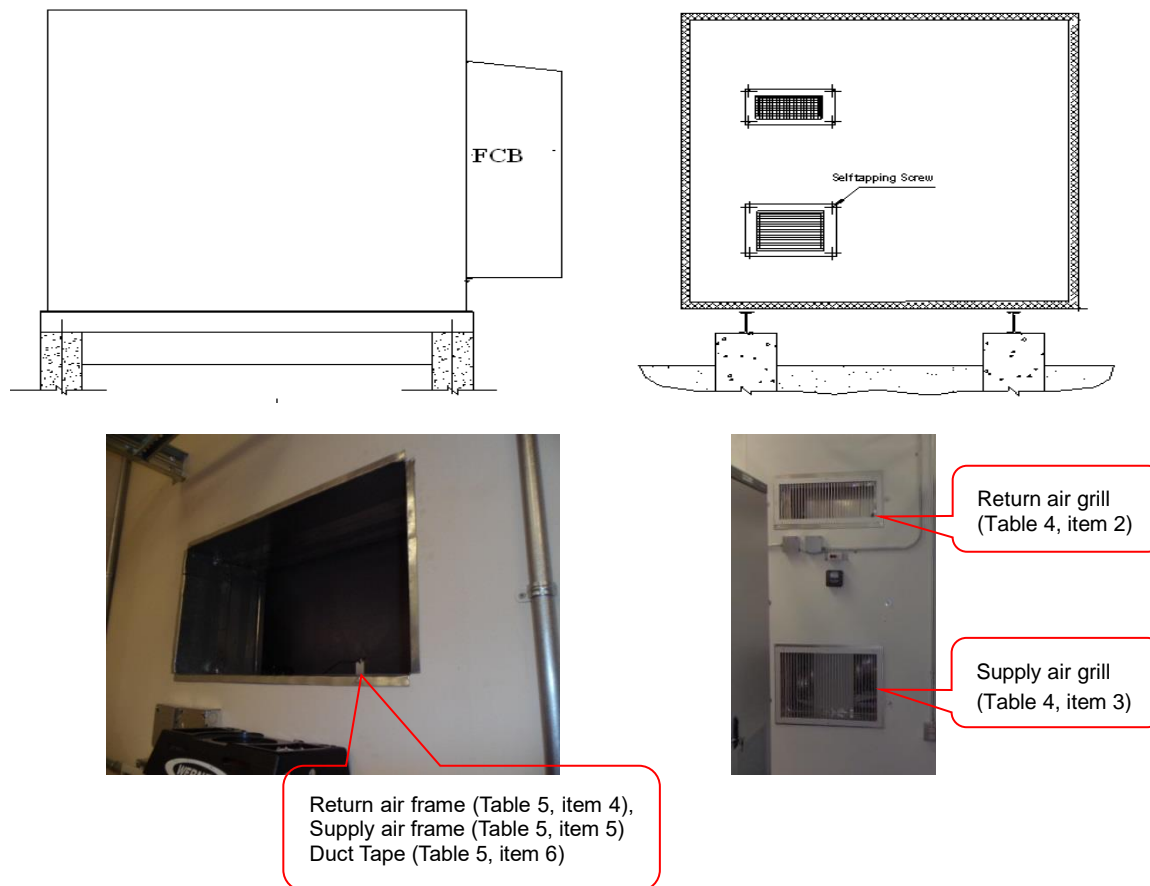
### Seal the Opening between Units and Wall

In order to prevent rain from entering the gap, coat the joint between the rear panel of the unit and the wall with a layer of silicone sealant (installer provided, see Table 5) as shown in Figure 9



**Figure 9: Seal the Opening between Holes and Wall**

## Attach the Supply and the Return Air Grills to the Wall



**Figure 10: Install the Supply and Return Air Grills**

Note the following:

- Install the supply and return air frames into their respective cutouts.
- Use aluminum tape to tape down the edges of the return and supply air frames on the WPU side.
- After installing the supply air grill, adjust the angle of the fins to direct airflow away from adjacent equipment and prevent bounce-back of supply air. Adjust the fins first up and down; then, left and right.
- Refer to Appendix 1 for the dimensions of the supply and return air frames for each model.

## Complete Electrical Connections

### Cautions

**Danger.** Only a certified service technician should make the electrical connections to the existing 3<sup>rd</sup> party HVAC system.

**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 FCB. 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.

### Electrical Connection List (Standard Models Only)

#	Connection	Description
1	*HVAC1 Control	Prevents operation of HVAC 1 when FCB relay KA1 is open (Breaks command for Compressor (Y) and Supply Fan (G))
2	*HVAC2 Control	Prevents operation of HVAC 2 when FCB relay KA2 is open (Breaks command for Compressor (Y) and Supply Fan (G))
3	48 VDC	Supplies operating power to FCB (6 or 11 Amps MAX for 18F1/36F2 respectively)
4	Earth Ground	Should meet local electrical codes
5	Smoke/Fire Alarm	Input Signal → Form C contact relay that can be NO or NC
6	FCB Alarm	(Optional) Output Signal → Indicates FCB has a fault (NO or NC)
7	Generator run	(Optional) Input Signal → Indicates generator is running (NO or NC)

\* This connection is made as an interrupt in the low voltage control line from the HVAC controller to each HVAC. Consult the HVAC controller manual for details on choosing a low voltage line for HVAC 1 and HVAC 2

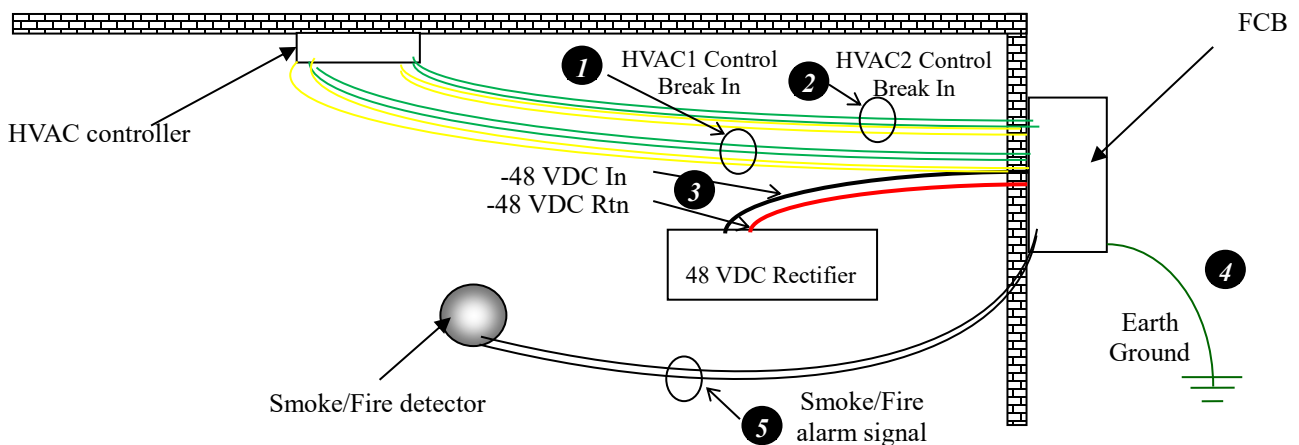


Figure 11a: FCB Wiring Connections (Standard Models Only)

## Electrical Connection List (EXC Models Only)

#	Connection	Description
1	*HVAC1 Control	Prevents operation of HVAC 1 when FCB relay KA1 is open (Breaks command for Compressor (Y) and Supply Fan (G))
2	*HVAC2 Control	Prevents operation of HVAC 2 when FCB relay KA2 is open (Breaks command for Compressor (Y) and Supply Fan (G))
3	48 VDC	Supplies operating power to FCB (6 or 11 Amps MAX for 18F1/36F2 respectively)
4	Field Wire to FCB (EXC Model Only)	Control wire between FCB controller and FCB unit
5	Smoke/Fire Alarm	Input Signal → Form C contact relay that can be NO or NC
6	FCB Alarm	(Optional) Output Signal → Indicates FCB has a fault (NO or NC)
7	Generator run	(Optional) Input Signal → Indicates generator is running (NO or NC)

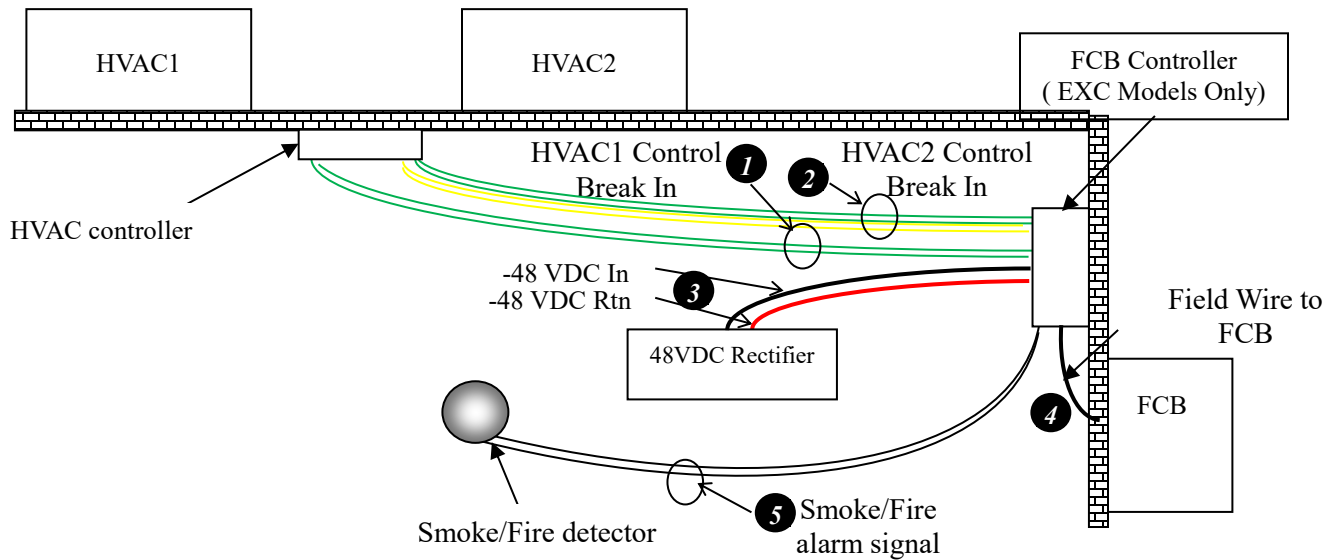
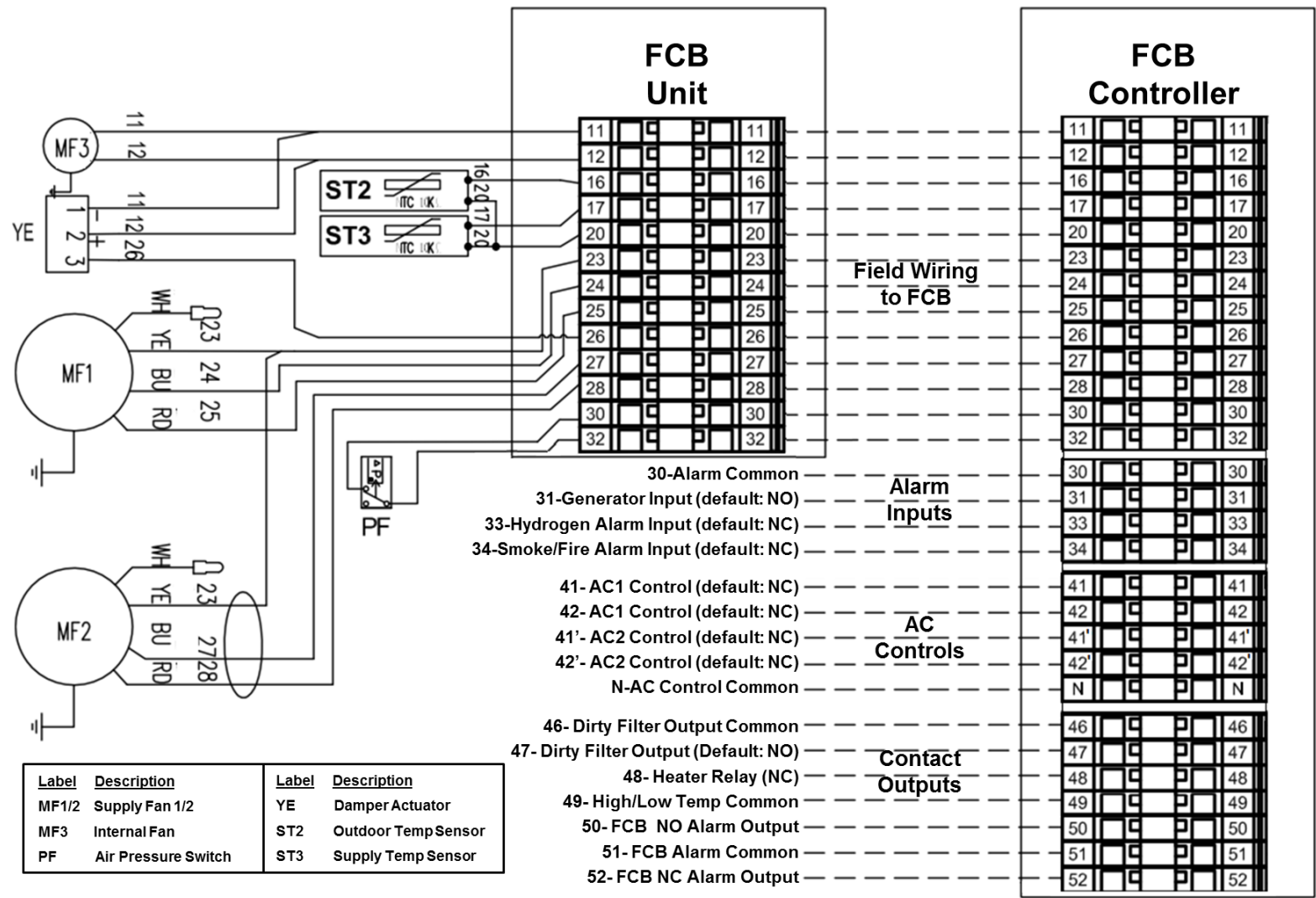


Figure 12b: FCB Wiring Connections (EXC Models Only)



Field Wiring Diagram (EXC Models Only)



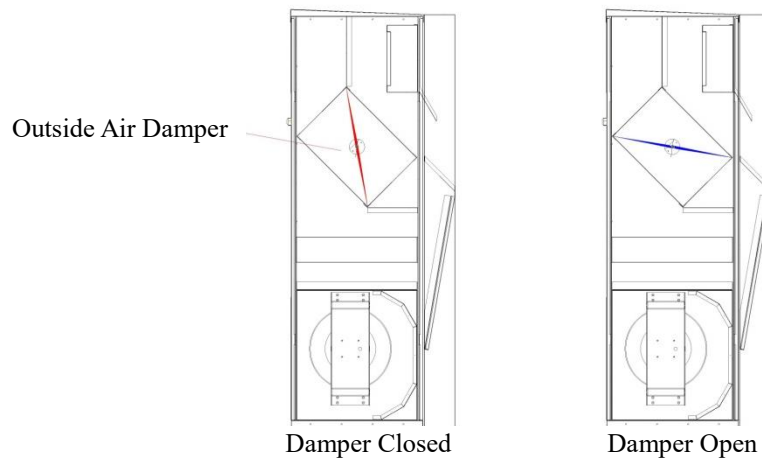
## Electrical Connections (Standard Models Only)

Before wiring to the FCB, manually open the air damper by holding the black button with one hand and opening the air damper with the other hand.



Hold the black button, and open the air damper

Note: When the Air Damper is open, the installer can look upward through the FCB and see the FCB exhaust cut-out in the shelter wall.



**Figure 13: Damper Positions**

Then, complete the connections using the following procedure:

1. Take the cables through the holes which are in the wall and built-in the unit. Connect the 48VDC power plant cable from the DC plant to the FCB electric box.



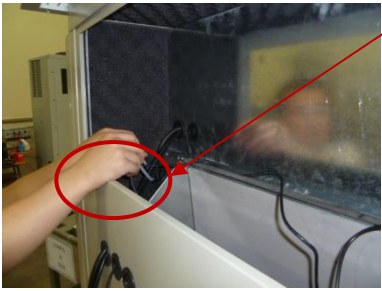
**Danger.** DC power plant breaker must be in the off position.



Take the PLD cable through the holes

2. Connect the communication cable from the PLD to the FCB.

- a. Take the cables through the holes which are in the wall and built-in the unit.



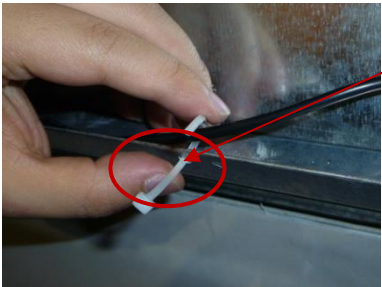
Take the PLD cable  
through the holes

- b. Tie the communication cable and power cables together and tighten using a zip tie.



Tie the PLD cable and  
power cables together

- c. Fasten the cable to the middle of the bar and through the holes on the right side of the FCB.

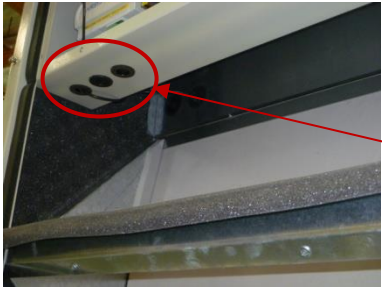


Tie the PLD cable



Put the PLD cable  
through the holes

- d. Put the communication cable through the hole under the electric box and plug the communication cable terminal to terminal J7 on the controller board.



Through the hole



PLD cable to J7 terminal

3. Fix the PLD to the wall
- a. Remove the PLD cover.



Take the cover away

- b. Loosen the screw and yellow block, then tighten the screw, fixing the PLD to the install bar.

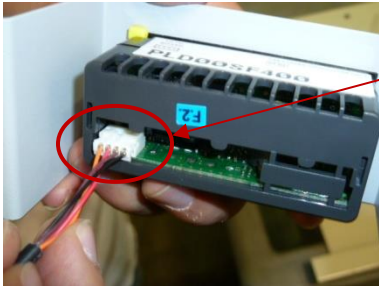


Fix the PLD user terminal on the install bar

- c. After attaching the PLD to the install bar, replace the PLD cover.



- d. Connect the communications cable to the PLD.

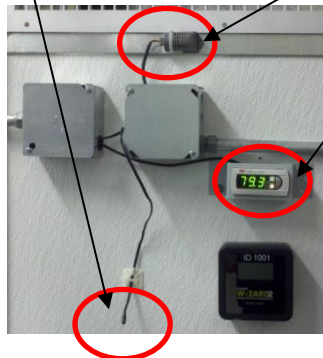


Connect the communications cable to the PLD

- e. Fix the PLD terminal install bar to the wall.



4. Relocate the indoor temperature sensor (ST1) and humidity sensor (RH) near PLD user terminal.



## Complete alarm connections (Standard Models Only)

### Fire/Smoke Alarm Input (Required)

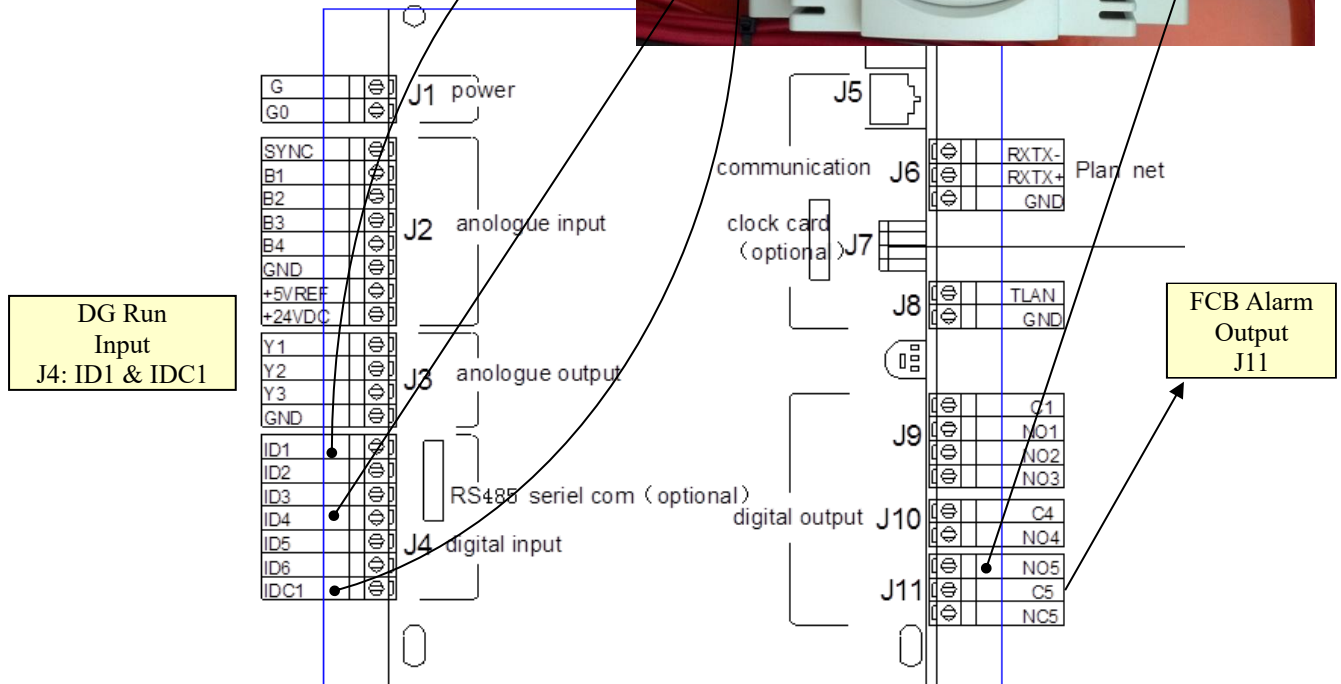
- **CONFIG:** NC or NO via software (NC default)
  - **CONNECT:** J4 ID4 & IDC1
- Shuts down outside Air damper and HVACs

### FCB Alarm Output (Optional)

- **CONFIG:** NC via NC5 or NO via NO5
  - **CONNECT:** J11 C5 and NC5 or NO5
- Provides signal to NOC that maintenance is needed

### DG Run Alarm (Optional)

- **CONFIG:** NC or NO via software (NC default)
  - **CONNECT:** J4 ID1 & IDC1
- Shuts outside Air damper when DG is running





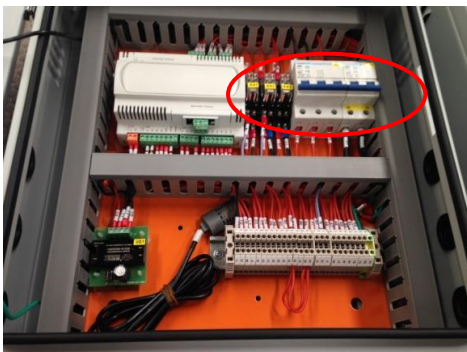
## Complete the Installation Check list

You should now have completed all physical installation steps. Before starting the system, ensure that no steps have been omitted by completing this installation and wiring checklist.

<b>Date:</b> _____ <b>Unit Factory Number:</b> _____ (refer to the FCB name plate)	
<b>INSTALLATION</b>	√ or X
Commercial grade weather stripping is applied around both supply and exhaust holes in FCB	
FCB is securely mounted to the wall.	
Silicone sealant has been applied to seal FCB to wall on ALL sides with NO gaps	
Humidity sensor is mounted near the controller.	
The supply & return air grills are installed and properly secured.	
<b>WIRING</b>	
The connections are tight & secure from FCB to 48VDC power panel.	
The connections are tight & secure from 24 to 48VDC convertor to 24VDC power panel. (if converter used)	
The connections are tight & secure from 24VDC to 48VDC convertor to FCB. (If converter used)	
Earth Ground is tight & secure.	
Smoke/Fire Alarm connections are correct, are tight & secure.	
FCB Alarm connections are correct, are tight & secure.	
Generator run connections are correct, tight & secure.	

## Turn on Component Breakers

After completing the checklist, turn all breakers to the on position. Then reattach all covers and panels.



## Verify the Installation

To verify the installation, you will complete these steps:

- Turn on the switches at the main power supply.
- Execute the test to verify the equipment is functioning correctly.
- Turn the system on.
- Complete warranty registration so the warranty period can be properly established.

Three of these steps require using the PLD interface. Additional details on using the PLD to perform operational functions can be found in Chapter 3 starting on page 32. The steps that require using the PLD in this section are in summary form.

## Turn on 48VDC Power

Turn on the 48VDC input breaker in DC power plant.

The PLD display should light up and after a brief delay should display the inside temperature. If any alarms are registered, use the information in Chapter 3 to diagnose the problem

## Turn the FCB System On or Off

Press the **Up** and **Down** buttons together to enter the main screen.



Press **Up** until the screen display  $\square F F / \square \square$ . Hold the **Sel** button down for three (3) seconds. This will change the state of the FCB from  $\square \square$  to  $\square F F$  or from  $\square F F$  to  $\square \square$ .



**NOTE:** When the system is  $\square \square$  both the **Up** and **Down** LEDs will be lit. When the system is  $\square F F$  both the **Up** and **Down** LEDs will be dark.



## System Test

### I. Verify sensor readings

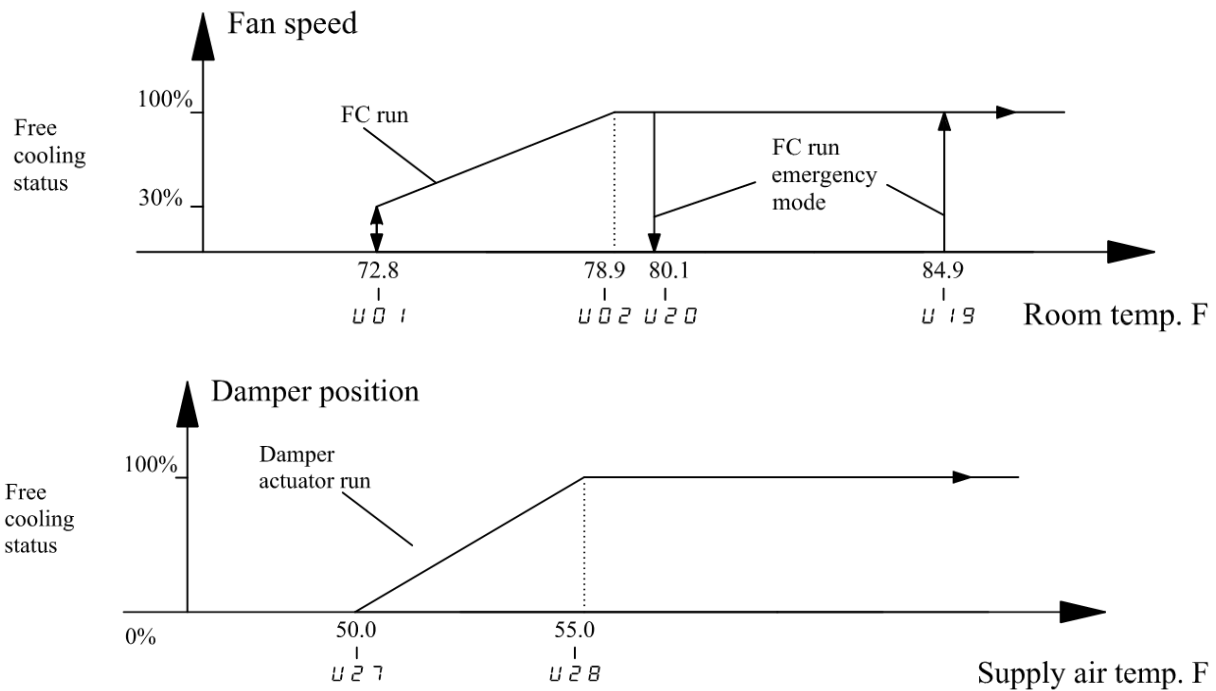
- Room Temp sensor
- Outside Temp Sensor
- Supply Air Temp Sensor
- Humidity sensor

### II. Verify Free Cooling Operation

CONDITIONS: Wrap a hand around the sensor to change the temperature if needed.

- Room temperature – Outside temperature =  $\Delta T > 3.6^{\circ}$
- Indoor Temp  $> 73^{\circ}\text{F}$  & Outdoor Temp  $< 79^{\circ}\text{F}$
- RH  $< 85\%$

The fan speed and damper position should reflect the logic diagrams below



### III. Verify Emergency Mode of Operation

CONDITIONS: Room temperature  $> \text{U19}$  (Factory Default  $84.9^{\circ}\text{F}$ ) AND Room Temp  $> \text{Outside Temp}$

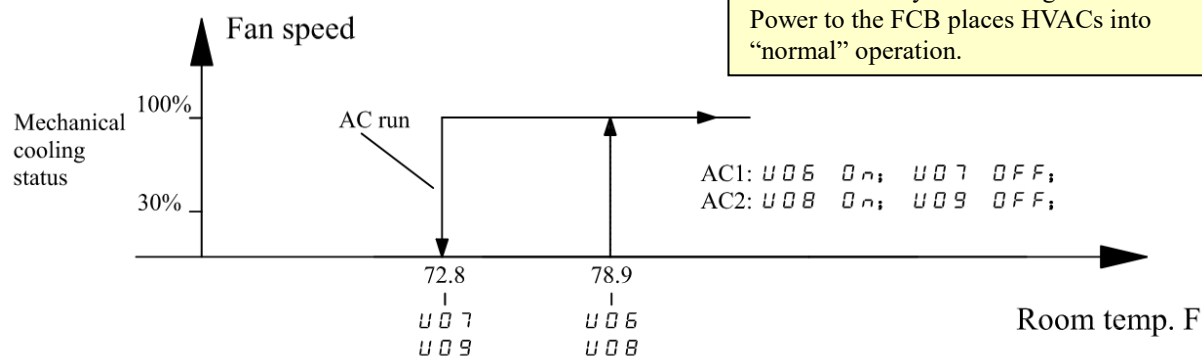
RESULTS: Supply Fan speed at 100%, damper open.

#### IV. Verify Mechanical Cooling Mode of Operation

**CONDITIONS:** Room temperature > U06/U08 (Factory Default 78.9°F)

**RESULTS:** HVACs will be released to operate “normally” under their own controller until Room Temp cools down to U07/U09.

**NOTE:** Verify that turning off DC Power to the FCB places HVACs into “normal” operation.



#### V. Alarm Verification Testing

1. Trigger FIRE/SMOKE alarm:
  - a. FCB Damper should close and fan shuts off.
  - b. HVACs should shut down (Closed to outside air and fans off).
2. Trigger Generator Run Alarm (DG) (optional): FCB Damper should close.
3. Trigger FCB Fail Alarm (optional): If connected, alarm signal should be received by the NO/NC.

#### Complete Product Registration

Registration can be completed at <https://airsysnorthamerica.com/support/warranty-registration/>

# Chapter 3: System Operation

This chapter describes how to use the PLD interface to execute the functions needed during standard operation. In addition, reference information for all factory default settings is shown. This information may be useful during troubleshooting and in conversations with technical support.

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





## User Interface Introduction

The units are controlled using a simple interface with an LED display and three buttons. Button actions are described in Table 6.



Figure 14: PLD User Interface

Table 6: PLD Button Actions


Button and LED	Function Description
 <b>Sel</b>	Confirm or review the value. When the LED is on, indicates that an alarm has been triggered.
 <b>Up</b>	Increase value or go back to previous display.
 <b>Down</b>	Decrease value or go to next display.
 <b>Up + Down</b>	Press together to return to the main menu. When both buttons are lit, the system is on. When both are dark, the system is off.

## Navigating the Main Menu

- Pressing the **Up** and **Down** buttons at the same time returns the PLD to Main Menu and will display the current room temperature. (Think of this as the Escape key).
  - Navigate with the **Up** or **Down** buttons to access all parameters & menus listed in Table 7.
- Press **Sel** to display the chosen parameter in real time such as Humidity, Outdoor temperature & Supply air temperature. Press the **Up** and **Down** buttons at the same time, to return to the Main Menu.
- Other parameters change system functions such as: Turn system On or Off, start comfort mode and setting comfort mode temperature and access other menu levels.

**Note:** Option A-8 (Set) allows access to all preconfigured system parameters. Typically, only a few are ever needed during normal operation. Some are discussed in this section, however all menus are described in detail starting on Page 40, “System Parameters and Default Values”.

**Table 7: Parameters on Main Menu (A)**

Parameter	Displayed	Description
Room temperature	73.6	Current room temperature
Unit Condition	5 E 8	Unit status Description of the displayed number: 0. Unit on. 1. OFF by alarms. 2. OFF by monitor. 3. OFF by time–schedule control. 4. OFF by digital input. 5. OFF by keyboard. 6. Manual operation. 7. Standby status.
Unit type	E P P	Unit type, See section 5. “Unit type definition”. Read-only.
Unit Status	ON (or OFF)	Unit status is On or Off.
Humidity	H U	Humidity measurement.
Outside temp.	E E	External Ambient (outside) temperature measurement.
Supply temp.	S E	Supply Air temperature measurement.
Path to other menus		Enter other menu levels.

### Executing the start test

These test steps verify that the system is operating as expected. Before beginning this process, turn on the FCB (See Page 29, “Turning the FCB System On or Off”).

1. Make sure the indoor temperature is higher than 73°F. (You can hold the indoor temp sensor to trick it)
2. Make sure the Tindoor –Toutdoor > 3.6F.
3. Make sure Indoor Humidity <85%.
4. Check if the supply fan runs normally, if OK, means the FCB installation and wiring are OK.

Note: for a complete system test, please refer to System Test on page 30.

## Alarms

When a problem occurs during operation of the unit, the controller records the related information and outputs an alarm signal. The code identifying the malfunction displays on the screen of the user terminal. Depending on the severity of the alarm, various devices are automatically shut down. The system will restart most of these devices without human intervention after a defined delay period.

When an alarm occurs, press the **Sel** and **Up** buttons to terminate the alarm sound. Press the **Down** button to review details of the latest alarm. The system also lets you review alarm history through a separate menu. Table 8 lists the alarm codes that may display with a brief description. Table 9 on page 35 provides more detail on troubleshooting alarms should they occur during operation of the system.

**Table 8: Summary of System Alarms**

Code	Description	Output Delay	Devices Switched Off
A01	Dirty Air Filter	10s	
A03	Smoke/fire alarm		Free cooling function off
A04	Fan 1 Off		Free cooling function off
A05	Fan 2 Off		Free cooling function off
A06	High temperature alarm	60s	
A07	Low temperature alarm	60s	
A08	Indoor temp sensor defective	60s	Free cooling function off
A09	Humidity sensor defective	60s	Free cooling function off
A10	Outdoor temperature sensor defective	60s	Free cooling function off
A11	Supply air temperature sensor defective	60s	
A16	Air damper alarm	195m	
A18	Generator run signal	5s	Free cooling function off
A19	Hydrogen high density alarm	5s	Full speed ventilation

### Viewing Alarm History

To review the history of alarm codes, follow these steps:

1. From the main menu, press the **Sel** and **Down** buttons at the same time, the screen displays  $L \ 0 \ 1$ . Press **Down** until the screen displays  $L \ 0 \ 5$ .
2. Press the **Sel** button to confirm, the screen displays  $H \ 0 \ 1$ . Press **Sel** to confirm.
3. Press **Up** or **Down** to review the history.

### Clearing Alarm History

To clear the history of alarm codes, follow these steps:

1. From the main menu, press the **Sel** and **Down** buttons at the same time, the screen displays  $L \ 0 \ 1$ . Press **Down** button until the screen displays  $L \ 0 \ 5$ .
2. Press the **Sel** button to confirm, the screen displays  $H \ 0 \ 1$ . Press **Down** button the screen displays  $H \ 0 \ 2$ , press **Sel** to confirm. The screen displays  $n \ 0$ .
3. Press **Up** or **Down** to clear the history.

## Alarm Descriptions

**Table 9: Troubleshooting Alarms**

Code	Signal	Description	Possible cause	Components to check	Recommend actions	Device Actions		
						Fan	Damper	HVAC
A01	Dirty air filter	Alarm sounds. This alarm can reset automatically.	Filter clogging.	Check if the filter is dirty.	Clean filter. Replace filter after cleaning twice.			
			Corresponding input digital (DI2) is disconnected or controller board broken	Check if the DI2 is disconnected or loose, review the DI2 status through L04 replay.	Re-connect the DI2 or replace controller board			
			Air pressure switch setting value is too low	Check the air pressure switch setting value (default:250)	Adjust the alarm value to standard value.			
A03	Smoke/Fire alarm	Free cooling function stops, HVAC stops, alarm sounds. This alarm can reset automatically.	The fire alarm is generated	Check if the fire alarm is generated	Replace fire alarm equipment	Off	Off	Off
			Corresponding input digital (DI4) is disconnected or controller board broken	Check if the DI4 is disconnected or loose, review the DI4 status through L04 replay.	Re-connect the DI4 or replace controller board			
A04	Fan 1 Off	Alarm sounds, it can reset automatically. If A05 starts at the same time, Free cooling stops, HVAC units start to work.	Fan 1 breaker off	Fan breakers in controller	Turn on all breaker in controller			
			Corresponding input digital (DI5) is disconnected or controller board broken	Check if the DI5 is disconnected or loose, review the DI5 status through L04 replay.	Re-connect the DI5 or replace controller board.			
A05	Fan 2 Off	Alarm sounds, it can reset automatically. If A04 starts at the same time, Free cooling stops, HVAC units start to work.	Fan 2 breaker off	Fan breakers in controller	Turn on all breaker in controller			
			Corresponding input digital (DI6) is disconnected or controller board broken	Check if the DI6 is disconnected or loose, review the DI6 status through L04 replay.	Re-connect the DI6 or replace controller board.			
A06	High temp. (HT) alarm	Alarm sounds. This alarm can reset automatically.	FCB broken, if HVAC installed, HVAC broken.	Check if FCB broken or filter clogged; Check if HVAC work broken.	Remedy FCB; Remedy HVAC.			
			The alarm setting value too low	Check the HT alarm value L01-U15	Change the value to a reasonable value.			

Code	Signal	Description	Possible cause	Components to check	Recommend actions	Device Actions		
						Fan	Damper	HVAC
A07	Low temp. (LT) alarm	Alarm sounds. This alarm can reset automatically.	Leak	Check if there are some leaks between wall and FCB	Seal the leaks			
			The alarm setting value too high	Check the HT alarm value L01-U16	Change the value to reasonable value.			
A08	Indoor temperature defective	Free cooling function stop, HVAC start to work. It can reset automatically.	Indoor temp. sensor (B1) broken	Check if the sensor is shorted or broken	Replace the sensor	Off	Off	On
A09	Humidity sensor defective	Free cooling function stop, HVAC start to work. It can reset automatically.	Ambient Humidity. sensor (B2) broken	Check if the sensor is shorted or broken	Replace the sensor	Off	Off	On
A10	Outdoor temperature sensor defective	Free cooling function stop, HVAC start to work. It can reset automatically.	Ambient temp. sensor (B3) broken	Check if the sensor is shorted or broken	Replace the sensor	Off	Off	On
A11	Supply air temperature sensor defective	Alarm sounds, it can reset automatically.	Supply air temp. sensor (B3) broken	Check if the sensor is shorted or broken	Replace the sensor			
A16	Air damper failure alarm	Alarm sounds, it can reset automatically.	Air valve hindered	Check if the valve can work normally	Remove the hindered object			
			Air damper actuator broken	Check if the damper can work normally	Replace the air damper actuator			
A18	Generator run signal	Alarm sounds, it can reset automatically. Free cooling function stop	Generator start working			Off	Off	On
A19	Hydrogen high density alarm	Alarm sounds, it can reset automatically. 100% free cooling.				On	On	

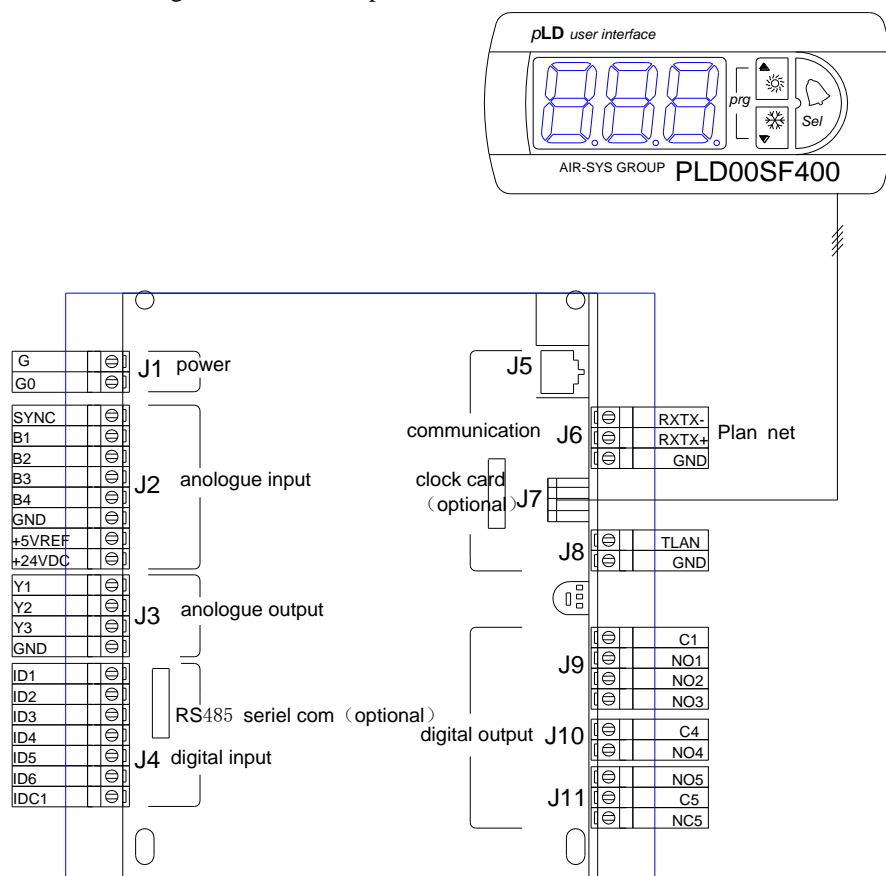
## System Diagnostics

The information provided in this section may be useful during the troubleshooting of issues that arise during operation of the system. Two types of information are provided:

- A description of the input and output ports of the controller.
- A description of all of factory settings and how they can be viewed and possibly modified.

## Port Definitions

Figure 15 is a schematic drawing of the controller ports.



**Figure 15: pCOxs Controller Hardware Structure.**

Table 10 lists the input and output ports of the unit.

**Note:** The supply air temperature is a calculated value; the unit does not have a supply temperature sensor. This temperature is used only when the unit is operating in free cooling mode.

**Table 10: Port Values**

Digital inputs		Analog Inputs		Digital Outputs		Analog Outputs	
ID1	DG Status (Close =Run)	B1	Indoor Temperature	DO1	AC 1 Control	Y1	Fan1/Fan2
ID2	Filter clogged alarm	B2	Indoor Humidity	DO2	AC2 Control	Y2	Air damper
ID3	Hydrogen Alarm (N.C.) Default: L02-F04=14; If F04=15, TYPE=N.O.	B3	Ambient temp	DO3	High/low Temp alarm (close=alarm)	Y3	



ID4	Smoke/fire Alarm (N.C.) Default: L02-F05=9; If F05=10, TYPE=N.O.	B4	Supply Temp	DO4	Filter clogged alarm (close=alarm)		
ID5	Fan2 Off			DO5	FCB Alarm		
ID6	Fan1 Off						

## System Parameters and Default Values

This section describes the menus used for completing operations and displaying information. This section describes the menus that allow authorized technicians access to factory default settings.

**Table 11: Control Menus**

ID	Purpose	Description
A	Main Menu	Review the current indoor temperature, software version and turn on/off FCB.
L01	User Menu	Password protected values that can only be changed by an AIRSYS Certified Service Technician. To change the FCB working settings.
L02	Factory Menu	Password protected values that can only be changed by an AIRSYS Certified Service Technician. FCB factory configuration.
L03	Maintenance Menu	Manual mode and review FCB run time/start count.
L04	I/O menu	Review the current indoor temperature, outdoor temperature, supply air temperature and humidity.
L05	Initialization & Version	Review software version and reset the whole unit.
L06	History alarm menu	Review history alarm and clear the history alarm

To review or modify a parameter, follow these general steps:

- Press the **Up** or **Down** buttons to find the desired code, then press the **Sel** button to review that value.
- If the parameter can be modified, press the **Up** or **Down** buttons to modify that value. Then press **Sel** to confirm the change.
- To review menus L01-L05, press the **Sel** and **Down** buttons together, then press the **Sel** button to review the selected value.

The following tables list the parameters found in “L” sub-menus. Fahrenheit is used as the default temperature unit although it can be set to Centigrade.

Parameter	Read/Write	Screen Code	Description	Unit	Range	Default Value
<b>L01 – User menu</b>						
User password	R/W	P 5 1	Input user password		0~999	123
Temp. set point for min. fan speed	R/W	U 0 1		°F	U16~U02	72.8
Temp. set point for max. fan speed	R/W	U 0 2			U01~U15	78.9
Fan starting temp. diff.	R/W	U 0 3	Temp. diff.= Room temperature - Ambient temperature. If outdoor temperature is selected, the screen appears.	°F	-70~99.9	2/3.6
Humidity limited set point	R/W	U 0 4	When F22=YES, Display	%	U05~99.9	90.0

Parameter	Read/Write	Screen Code	Description	Unit	Range	Default Value
No humidity limited set point	R/W	U 0 5		%	0~U04	85.0
A/C1 start set point temp.	R/W	U 0 6	If A/C1 is selected, the screen appears.	°F	U07~U15	78.9
A/C1 stop set point temp.	R/W	U 0 7			U01~U06	74.8
A/C2 start set point temp.	R/W	U 0 8	If A/C2 is selected, the screen appears.	°F	U09~U15	78.9
A/C2 stop set point temp.	R/W	U 0 9			U01~U08	74.8
A/Cs heat start set point temp.	R/W	U 1 3		°F	0~99.9	57
A/Cs heat stop set point temp.	R/W	U 1 4		°F	0~99.9	60
A/C Min running time	R/W	U 1 2	If A/C is selected, the screen appears.	M	0~500	8
High temp. set point temp.	R/W	U 1 5		°F	U06~999	95.0
Low temp. set point temp.	R/W	U 1 6			-70~U13	41.0
High/low temp. delay	R/W	U 1 7		Sec.	0~999	60
Enable emergency mode	R/W	U 1 8	No humidity limit in this mode.		Yes/No	Yes
Emergency mode set point	R/W	U 1 9		°F	0~999	84.9
Emergency mode fallback deviation	R/W	U 2 0			0~99.9	4.8
Enable temperature difference limited	R/W	U 2 1			Yes/No	Yes
Fan running time in emergency mode	R/W	U 2 2	(Judge whether the linkage to A/C default is recovered or not)	M	1~500	15
Temperature difference judgment time in emergency mode	R/W	U 2 3		M	1~500	3
Temperature difference for judgment in emergency mode	R/W	U 2 4		°F	0~99.9	3.6
Temperature difference in emergency mode	R/W	U 2 5		°F	0~99.9	0
Whether humidity limit function is valid or not in emergency mode	R/W	U 2 6			Yes/No	No
Air supply limited	R/W	U 2 7	Temperature of air supply and air fresh valve is necessary.	°F	-70~999	50
Air supply limited dead zone	R/W	U 2 8		°F	0~999	1.8
Cycle time	R/W	U 2 9		S	1~32	5
Alarm of fresh air valve is valid.	R/W	U 3 0	Valve check		Yes/No	Yes
Open Check temp delta	R/W	U 3 1		°F	0~99.9	10.0
Close Check temp delta	R/W	U 3 2		°F	0~99.9	10.0
Check delay	R/W	U 3 3		s	0~999	300
Check stop time	R/W	U 3 4		m	0~540	60
Lock counts	R/W	U 3 5			1~999	3
Lock time	R/W	U 3 6		m	0~540	540

Parameter	Read/Write	Screen Code	Description	Unit	Range	Default Value
Automatic hydrogen exhaust function	R/W	U 3 7			YES/NO	No
Hydrogen exhaust interval	R/W	U 3 8		H	1-999	12
Hydrogen exhaust interval	R/W	U 3 9		M	1-540	5
Hydrogen exhaust low temp bypass	R/W	U 4 0		°F	0-999	55
New user password	R/W	P 5 4				123
L02 – Factory menu						
Factory password	R/W	P 5 2	Input factory password		0~999	123
Unit type	R/W	F 0 1	Port selection		0-10	8
Digital input 1 select	R/W	F 0 2				0
Digital input 2 select	R/W	F 0 3				3
Digital input 3 select	R/W	F 0 4				14
Digital input 4 select	R/W	F 0 5				9
Digital input 5 select	R/W	F 0 6				7
Digital input 6 select	R/W	F 0 7				8
Analog input 1 select	R/W	F 0 8				4
Analog input 2 select	R/W	F 0 9				2
Analog input 3 select	R/W	F 1 0				3
Analog input 4 select	R/W	F 1 1				1
Analog output 1 select	R/W	F 1 2				2
Analog output 2 select	R/W	F 1 3				3
Analog output 3 select (PWM)	R/W	F 1 4				0
Digital output 1 select	R/W	F 1 5				4
Digital output 2 select	R/W	F 1 6				3
Digital output 3 select	R/W	F 1 7				0
Digital output 4 select	R/W	F 1 8				0
Digital output 5 select	R/W	F 1 9				7
Fan min. output voltage	R/W	F 2 0	Select the analog supply fan.	V	0~10	3.0
Fan max. output voltage	R/W	F 2 1		V	0~10	10.0
Enable humidity limit function	R/W	F 2 2	Yes: humidity limit control enabled.		Yes/No	Yes
Enable A/C and fan running at the same time	R/W	F 2 4	If F24=NO, when A/C starts, fan stops.		Yes/No	Yes
Enable clock card	R/W	F 2 5	Need corresponding options.		Yes/No	No

Parameter	Read/Write	Screen Code	Description	Unit	Range	Default Value
PC permit start and stop unit	R/W	F 2 6			Yes/No	No
Enable auto restart	R/W	F 2 7	Yes: auto restart enabled No: auto restart disabled		Yes/No	Yes
Filter alarm delay	R/W	F 2 8	Filter alarm occurs delay times	Sec.	0~999	10
Whether temperature check function is valid or not	R/W	F 3 0	No: disable temperature check when fan idle status Yes: enable temperature check when fan idle status		Yes/No	Yes
Stop time (check supply temp)		F 3 1		M	1-540	120
Fan on time (check supply temp)		F 3 2	Mag U33	S	1-999	320
Communication protocol type	R/W	F 3 3	0: Carel 1: Modbus 2: YDT		CAR/MDB/YDT	MDB
Communication Protocol address	R/W	F 3 4			1~207	1
Communication protocol Speed	R/W	F 3 5	0-1200, 1-2400, 2-4800, 3-9600, 4-19200	Bps	0~4	3
Use British Imperial Units	R/W	F 3 6			Yes/No	Yes
Minimum control voltage of damper.	R/W	F 3 8	0~10v damper valve	V	0~10	0
Maximum control voltage of damper.	R/W	F 3 9	0~10v damper valve	V	0~10	10
One fan overload for alarm, two fans are serious alarm.	R/W	F 4 0	one output controls 2 fans		Yes/No	Yes
Allow AFPD.	R/W	F 4 1			NO/YES	NO
After AFPD allowed, damper will open with a delay time after damper closed.	R/W	F 4 2		M	1-999	120
New factory password	R/W	P 5 F				123
<b>L03 – Maintenance menu</b>						
Room temp. offset.	R/W	n 0 1		°C/°F	-99~999	0
Ambient humidity offset.	R/W	n 0 2		%	-99~999	0
Ambient temp. offset.	R/W	n 0 3		°C/°F	-99~999	0
Supply temp. offset.	R/W	n 0 4		°C/°F	-99~999	0
Enable manual control.	R/W	n 0 5	Manually operate the unit when the system is OFF.	°C/°F	AUT/NAN	AUT
Fan 1 manual voltage output.	R/W	n 0 6	If N05= NAN, the screen appears.	V	0~10	0
Valve manual voltage output.	R/W	n 9 8		V	0~10	0
A/C1 manual control.	R/W	n 1 1			On/Off	Off
A/C2 manual control.	R/W	n 1 2			On/Off	Off
Fan1 run time high value.	R	n 1 5		1000 Hour	0~999	
Fan1 run time low value.	R/W	n 1 6		Hour	0~999	
Fan1 time reset.	R	n 1 7			Yes/No	NO
Fan1 start times.	R	n 1 8				

Parameter	Read/Write	Screen Code	Description	Unit	Range	Default Value
Fan1 start times reset.	R/W	119			No/Yes	NO
A/C1 run time high value.	R	125	A/C1 run time	1000 Hour	0~999	
A/C1 run time low value.	R	126		Hour	0~999	
A/C1 time reset.	R/W	127			Yes/No	NO
A/C1 start times.	R	128				
A/C1 start times reset.	R/W	129			No/Yes	NO
A/C2 run time high value.	R	130	A/C2 run time	1000 Hour	0~999	
A/C2 run time low value.	R	131		Hour	0~999	
A/C2 time reset.	R/W	132			Yes/No	No
A/C2 start times.	R	133				
A/C2 start times reset.	R/W	134			No/Yes	No
Filter1 clogged times.	R/W	145				
Filter1 clogged times reset.	R/W	146			No/Yes	No
<b>L04 – Input and output menu</b>						
Room temperature.	R	101		°C/°F	-99~999	
Ambient Humidity.	R	102		%	-99~999	
Ambient temp.	R	103		°C/°F	-99~999	
Supply temp.	R	104	Need corresponding options.		-99~999	
Digital input 1.	R	105	C: Close, O: Open		C/O	
Digital input 2.	R	106	C: Close, O: Open		C/O	
Digital input 3.	R	107	C: Close, O: Open		C/O	
Digital input 4.	R	108	C: Close, O: Open		C/O	
Digital input 5.	R	109	C: Close, O: Open		C/O	
Digital input 6.	R	110	C: Close, O: Open		C/O	
Digital output 1.	R	001	C: Close, O: Open		C/O	
Digital output 2.	R	002	C: Close, O: Open		C/O	
Digital output 3.	R	003	C: Close, O: Open		C/O	
Digital output 4.	R	004	C: Close, O: Open		C/O	
Digital output 5.	R	005	C: Close, O: Open		C/O	
Analog output 1.	R	μ1		V	0~10	
Analog output 2.	R	μ2		V	0~10	
Analog output 3 (PWM).	R	μ3		PWM	0~10	

Parameter	Read/ Write	Screen Code	Description	Unit	Range	Default Value
<b>L05 – Initialization and version menu</b>						
Version	R	F E . 8				1.4
BIOS	R	8 1 0	430=4.30			
BOOT	R	8 0 0	403=4.03			
Input initialization password	R/W	P 5 3				123
Initialization	R/W	d E F	After unit type is changed, press “Sel.” to initialize.			
Modify initialization password	R/W	P 5 d				123
Software version	R	E 0 2				
<b>L06 – History alarm menu</b>						
History alarm	R	H 0 1				
Reset history alarm	R/W	H 0 2			Yes/No	No

# Chapter 4: Preventive Maintenance



**Important.** AIRSYS FCB units are designed to be among the highest performing in the world for both energy efficiency and reliability. Good preventive maintenance techniques are a crucial part of maintaining high levels of energy efficiency and reliability. It is also important to keep track of findings during each PM event for future reference.

## Preventive Maintenance Schedule

This section provides guidelines for the owner of an AIRSYS unit to ensure that the equipment continues to perform well. Following these guidelines for regular care will help to avoid serious damage to components and expensive repairs by skilled personnel.

**Table 12: Preventive Maintenance Schedule**

Task	Recommended Frequency	Comments
Check general operations	12 months	Perform the start test
Preliminary air filter inspection/cleaning and replace if needed	Based on local conditions	Depends on the amount and frequency of airborne particulates in the area
Inspect the two supply fans	12 months	Working normally
Check air damper	12 months	
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
Inspect all hardware for "snug" connection	12 months	Make note of any loose hardware so it can be checked again at next scheduled PM



**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 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 always important to ensure good operation. Before beginning the PM steps, you should verify the general system status by looking at the areas outlined in this section.

## Wiring and Components

For wiring and components:

- 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 a Functional Test

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

Use the start test to check that the relays, breakers, and components work normally. For details on executing this test, see page 33 “Executing the start test”.

### Replace Air Filter

A dirty air filter reduces the air volume and the system capacity. This problem can be avoided by periodically and regularly cleaning or replacing filters.

The frequency at which filters must be checked depends on the amount of dust in the environment. If during inspection, the filters are frequently very dirty, you should increase the frequency of checks and maintenance.



### Check Air 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 performing the following:

- Check if the damper can open and close normally.
- Check for damage to the damper actuator
- Check for damage to the damper rotor.
- Check if the nuts are properly tightened, as shown in the following figure.



### Spare Parts

Most spare and replacement parts can be provided by AIRSYS. Please contact:

AIRSYS North America

Web: <http://airsysnorthamerica.com>

Email: [ASNSupport@air-sys.com](mailto:ASNSupport@air-sys.com)

Phone: 855-874-5380



# Appendix 1: Wiring Diagrams

