


Fan Powered Box & Terminal Unit (FPB & TU)

FAN POWERED BOX & TERMINAL UNIT

Control Assembly Label

All Global IFS fan powered terminal units are tagged with a control assembly label as shown on the left. This label identifies the model number, location tag #, controller type, actuator type, thermostat action, application and controller setpoints. Options, accessories and appropriate control diagrams are also identified. If field adjustment of the controller factory setpoints should become necessary, follow the appropriate procedure outlined in the manual.


All factory supplied controllers are tagged with a controller label as shown below. This label identifies the required sensor velocity pressure for both the minimum and maximum controller setpoints.





1290 Barrow Ind. Parkway
Winder, GA 30680-5704
Phone: (678) 425-6640
Fax: (678) 425-6659

VAV SPECIFICATIONS

Price Order No: 1462263
 Branch PO: FDU-1-X
 Customer PO: _____
 Job Name: PRICE RESEARCH CENTER
 Package Tag: _____
 Unit Location: VAV-101


AIR FLOW


INSTALLED


AIR DISTRIBUTION PRODUCTS
 Manufactured by Price


Special Instructions / Instructions Spéciales:
 Configuration = B; Fan Volume = 300 CFM

ITEM	MODEL	SIZE	CTRL TYPE - SEQ #	LINER	MOTOR
1	FDU-1-1	20	FLD / 6000	FG50	ECM 115 Volts
AIR VOLUME (CFM)		RESET SPAN	DAMPER	THERMOSTAT	CONTROL OPTIONS
S 0 L/S 0 CFM					
L 0 L/S 0 CFM					
COIL	COIL OPTIONS		UNIT OPTIONS		
4P-RE, HWC, CWC	LH-HEAT, 1H, LH-COOL, 1C, GALV		DC, SB-E		
CXY CTRL	CXY WIRING	PXY DRAWING	PACKAGING		


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PRICE ORDER NO	ITEM	MODEL	SIZE	UNIT LOCATION
1462263	1	FDU-1-1	20	

PRICE ORDER NO	ITEM	MODEL	SIZE	UNIT LOCATION
1462263	1	FDU-1-1	20	
DAMPER	AIR VOLUME (CFM)		SETTINGS	RESET SPAN
	S	L		
	Min. 0 CFM	Max. 0 CFM		
	Min. 0 L/S	Max. 0 L/S		

FAN POWERED BOX & TERMINAL UNIT

INSTALLATION OVERVIEW

Fan Terminal Installation Instructions

Mounting The Unit

1. Global IFS Fan Powered Terminal Units are designed to be mounted in the direction indicated by the Control Assembly Label found on the protective shroud.
2. Mount the unit directly on the sub-floor, beneath the raised floor. Ensure the area where the unit is to go is clear of cables, wires, etc.
3. Position the unit so that there is no interference with the raised floor support members.
4. Install the unit in a location that allows free access to the unit as well as all control components.
5. Ensure main power to the terminal and electrical coil has been disconnected prior to performing any electrical work or inspection of the circuitry.

WARNING: Do not tamper with control components.

Fan Terminal Duct Connection

1. To prevent excessive air leakage, all cleat joints should be sealed with an approved duct sealer. This applies to all accessory connections as well as the basic fan box.
2. Holes that are drilled in the duct for testing or balancing purposes are to be sealed with duct tape or duct sealer.
3. A minimum of 0.10 inches W.G. downstream static pressure is required to prevent overheating of the fan motor.

Fan Terminal Electrical Connection

1. All field wiring is to be in accordance with the National Electrical Code ANSI/NFPA No. 70 or the Canadian Electrical Code , Part 1, CSA Standard C 22.1 and local codes and standards.
2. Refer to the product identification label on each unit for information to determine the field wire size.

CAUTION: Check voltage requirements prior to power supply connection. Refer to the electrical label located near the electrical control box and also refer to the schematic drawing provided on the underside of the electrical control box cover.

3. If upon energizing the electric motor(s), excessive noise is apparent, shut down the unit. Determine the cause by checking for packing materials, etc. and re-energize after corrective action has been taken.
4. If an Electric Reheat Coil has been supplied, refer to the electrical schematic which is permanently affixed to the topside of the electrical control cabinet cover, prior to hook-up.

CAUTION: Check the voltage requirements to ensure proper voltage supply is used

FAN POWERED BOX & TERMINAL UNIT

START UP & OPERATION

Air System Balancing

Overview

All ductwork must be complete and connected, and all grilles, filters, access doors and panels must be properly installed to establish actual system operating conditions BEFORE beginning air balancing operations. Each individual unit and attached ductwork is a unique system with its own operating characteristics. For this reason, air balancing is normally done by balance specialists who are familiar with all procedures required to properly establish air distribution and fan system operating conditions.

These procedures should not be attempted by unqualified personnel.

After the proper system operation is established, the actual unit air delivery and the actual fan motor amperage draw for each unit should be recorded in a convenient place for future reference such as the inspection, installation, & start-up check sheet, a copy of which is provided on the back of this manual. Contact the sales representative or the factory for additional copies of this sheet.

The manufacturer assumes no responsibility for undesirable system operation due to improper design, equipment or component selection, and/or installation of ductwork, grilles, and other field supplied components.

Air Balancing Procedure

Before Air Balancing the terminal unit, the following general items should be verified.

1. The primary fan system is operating at the specified volume, static pressure, RPM and current.
 2. Return filters (if supplied) are clean.
 3. All balancing dampers are adjusted and locked. Dampers downstream of the terminal unit should be proportionally balanced.
 4. Thermostats are calibrated and operational.
 5. All duct work and connections are free from leaks.
 6. Sufficient duct static pressure is available at the terminal primary air inlet.
 7. All diffusers are installed and adjusted for the proper air pattern.
- NOTE:** Since fan powered terminals are typically operating within a pressurized plenum, all flooring tiles must be replaced prior to verifying outlet flows.
8. A fan powered terminal unit should never be operated if the downstream duct work has not been installed. A minimum downstream static pressure resistance of 0.1 in. w.g. is recommended.
 9. If field adjustment of the primary air valve should be necessary, follow the appropriate calibration procedures for the controller type supplied with the unit. If DDC controls are supplied, refer to the control contractor's documentation for calibration instructions.
 10. Set the thermostat to full cooling. The fan should be on and the primary air valve (if present) at maximum air flow. Verify the air flow with the sensor tube or pitot tube traverse. Adjust if necessary.
 11. The fan volume must be field adjusted with the fan speed controller. Fan curves (available at priceindustries.com) indicate the volume range of each size unit. Adjust the speed control until the desired air flow is measured at the outlet.
 12. Set the thermostat to full heating. The fan should be on and the primary air valve (if present) at minimum flow. Verify the primary air volume with sensor taps or pitot tube traverse. Adjust if necessary.
 13. Always set the fan volume at full cooling.

FAN POWERED BOX & TERMINAL UNIT

START UP & OPERATION

Electronically Commutated Motor (ECM) Information

Do not switch 120/208/240/277 VAC power to turn ECM motor on and off. Instead control the 24VAC signal or BAS signal to turn the ECM motor on and off. The ECM motor has large capacitors that charge quickly on mains power up. Switching on several motors frequently could reduce building power quality and is not recommended.

Standard ECM Speed Controller

The Global IFS standard speed controller allows manual adjustment of the fan flow using the adjustment dial on the control board and a voltmeter. Remote control of the fan speed is also possible with the BAS input. The following chart describes the controller response to a 0-10 VDC input.

Input Voltage	Mode of Operation
0-1 VDC	Manual Control
1-2 VDC	Fan Off (1.5V Recommended)
2-10 VDC	Remote Control 0 - 100%

Note: Refer to "Fan Curves" performance data documents for fan

curves. **Pressure Independent Flow (PIF) Motor Program Voltage**

Equations Box Configuration:

Size	115V	208/240V	277V
10	CFM = (175.57 X VDC) - 159.00	CFM = (173.93 X VDC) - 153.79	CFM = (171.07 X VDC) - 145.50
20	CFM = (272.79 X VDC) - 228.79	CFM = (272.57 X VDC) - 224.57	CFM = (271.36 X VDC) - 220.21
30	CFM = (347.14 X VDC) - 305.86	CFM = (347.21 X VDC) - 306.21	CFM = (346.29 X VDC) - 300.14
40	CFM = (521.93 X VDC) - 447.93	CFM = (522.86 X VDC) - 445.71	CFM = (526.5 X VDC) - 471.07
50	CFM = (640.00 X VDC) - 378.86	CFM = (636.79 X VDC) - 373.50	CFM = (615.07 X VDC) - 331.93
60	CFM = (1018.14 X VDC) - 885.71	CFM = (1029.07 X VDC) - 893.50	CFM = (1015.93 X VDC) - 897.93

Terminal Configuration:

Size	115V	208/240V	277V
10	CFM = (155.50 X VDC) - 50.79	CFM = (152.86 X VDC) - 45.29	CFM = (178.57 X VDC) - 167.29
20	CFM = (249.79 X VDC) - 207.64	CFM = (253.36 X VDC) - 211.50	CFM = (246.36 X VDC) - 197.64
30	CFM = (298.00 X VDC) - 216.86	CFM = (297.29 X VDC) - 214.43	CFM = (314.79 X VDC) - 277.79
40	CFM = (478.36 X VDC) - 347.50	CFM = (474.71 X VDC) - 341.00	CFM = (475.86 X VDC) - 350.00

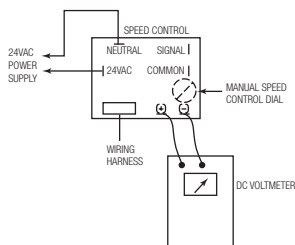
FAN POWERED BOX & TERMINAL UNIT

ECM Adjustment

1. Remove the electrical control cover and connect the leads from a DC voltmeter to the terminals indicated.
2. Determine test point voltage from the formula based on the desired airflow.
3. Adjust the manual speed control dial on the outside of the box with a screwdriver until the test point voltage is achieved.
4. Wait a few seconds for the motor to adjust its speed and then verify fan flow with measurements at the supply outlets.
5. If necessary, fine tune the speed control in accordance with the measured outlet flow.

POT Voltage	Motor
0 - 1 VDC	Off
1 - 4.5 VDC	0-100% Control
4.5 - 5 VDC	100%

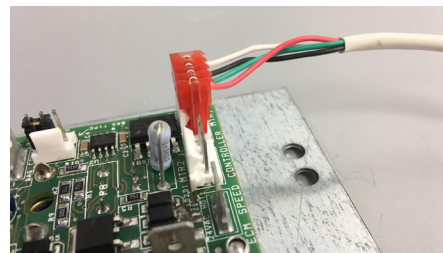
CONTROL ASSEMBLY LABEL ▼



ECM SPEED CONTROLLER ▼



ECM CABLE CONNECTION ▼



ECM Deluxe Speed Controller Adjustment

The Global IFS Deluxe ECM speed controller works with a high efficiency ECM motor. This low voltage (24 VAC) speed control allows full manual (push button adjust) or BAS (2-10 VDC signal) control of the ECM motor. The deluxe speed controller also has a digital screen and BAS RPM feedback (2-10 VDC) which is proportional to motor RPM.

NOTE: 24 VAC COM, BAS COM, ANALOG OUTPUT COM are all connected together. Please observe 24 VAC polarity

NOTE: Local setpoints are stored to EEPROM and will remain set after power failures.

Local control:

To change modes press both up and down buttons at the same time until L.SET appears on display

Use up and down to adjust fan speed.

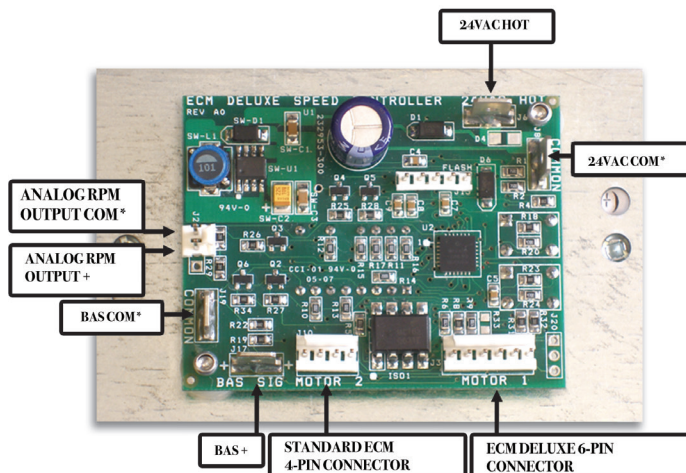
BAS control:

To change modes press both up and down buttons at the same time until bAS.r appears on display

The BAS input voltage is a 2-10 VDC scale, and therefore VDC calculated for a given CFM using the equation must be doubled to achieve that CFM using the BAS input. See standard speed controller BAS section for an example of calculating the voltage required for a specific CFM. Example found in the BAS Input Signal section below.

NOTE: For further troubleshooting information on ECM motors, ECM Speed Controllers, and ECM Deluxe Speed Controllers, please refer to the ECM motor manual.

ECM DELUXE SPEED CONTROLLER ▼



FAN POWERED BOX & TERMINAL UNIT

MAINTENANCE

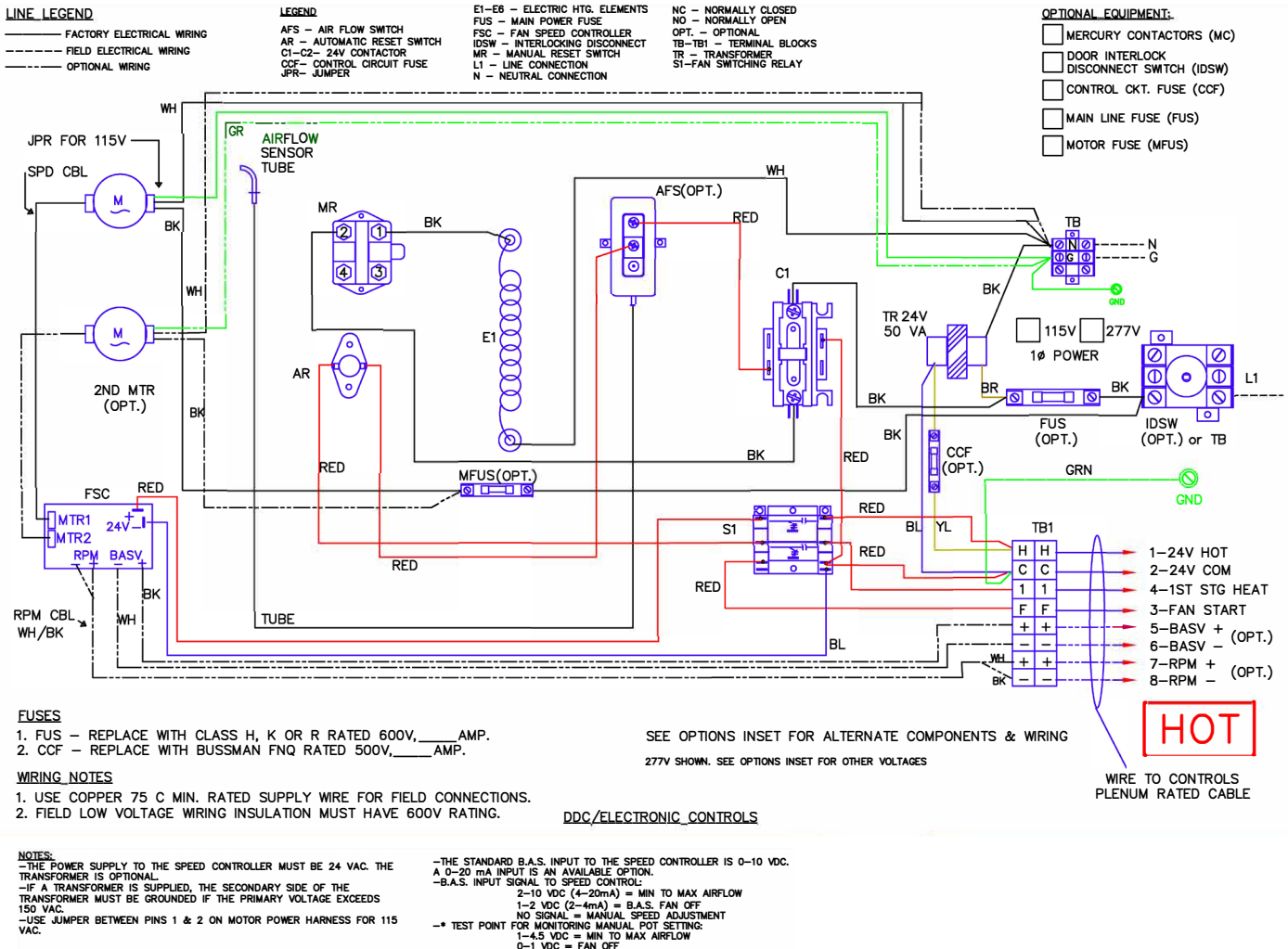
Troubleshooting Guide

- 1. The terminal is louder than expected. What might be causing this?**
 - a. The first thing to look for is any foreign material in the fan or terminal casing, like packing material or small parts shipped with the unit. Ensure the power is off, and spin the fan wheel to make sure it is balanced so it is not making contact with the fan housing.
 - b. Once it's confirmed that the fan and terminal casing are free of foreign material and balanced, ensure the terminal is the correct size. Check the label for the model and size, and match that against the schedule to ensure the correct size was selected and installed. A terminal that is too small for the application will cause high air velocity and excessive noise.
 - c. If an electric coil is present, ensure there is sufficient downstream static pressure of 0.2 inches water gauge to prevent any chatter of the air proving switch.
- 2. The terminal is not providing the specified primary air volume. How do I adjust the primary air volume?**
 - a. First, the airflow may simply need to be balanced correctly to ensure the primary airflow isn't short circuiting into the plenum. See page 6 for air balancing procedures.
 - b. Check the controller. Make sure it is set up according to the wiring diagram. There should be a wiring diagram mounted inside the door of the controls enclosure, or contact airmovement@priceindustries.com for assistance.
 - c. Next, ensure the following items are operating correctly:
 - i. Cycle the thermostat to see if a signal is being sent to the controller and the controller is reacting appropriately.
 - ii. Check the operation of the damper actuator and the linkage.
 - iii. Check the flow sensor and tubing for block
- 3. The fan air volume is too low. How do I adjust the fan air volume?**
 - a. Measure the downstream static pressure. It needs to be at least 0.1 in wg (0.2 in wg for a Size 60 FDC or if an electric coil is present). If the downstream static pressure is too low, the blower motor will overheat, turn off, and restart after it cools, and will continue in this cycle.
 - b. Once the downstream static pressure is confirmed, check the supply voltage is the same as stated on the wiring diagram. The supply voltage must be identical to the wiring diagram.
 - c. For ECM applications, the motor will be furnished with one of two programs:
 - i. High Turndown flow program: This program will maintain constant motor torque to vary the airflow with fluctuations in static pressure.
 - ii. Pressure Independent program: This program will maintain the desired airflow by varying the motor torque to compensate for changes in static pressure. Check the product label to confirm which program was supplied with your motor, and determine if the program matches the behavior of the fan with respect to duct static pressure. If it is not operating as described for the appropriate program, contact airmovement@priceindustries.com for assistance.
 - ci. Next, check the filter for excessive dust build-up, and then check the fan, any coils, and the inside of the terminal casing for particle blockage, or loose insulation. If needed, changed the filter and clear any blockages.
 - cii. Check the fan rotation to ensure it is spinning in the direction marked on the blower casing. If the fan is not energized for morning warm-up, for example, the warm primary air may short-circuit through the return opening to the plenum, inducing the fan to spin in the wrong direction. When the fan is energized, it will continue to spin in the wrong direction, which will sharply decrease fan flow.
 - ciiii. Finally, inspect the ductwork for leaks or obstructions, sharp elbows near the fan inlet, or improperly designed turning vanes. Any of these items can decrease the fan's efficiency.
- 4. The fan will not operate. How do I get it to start?**
 - a. Check the wiring diagram provided with the terminal unit. Make sure that all the wiring inside the electrical enclosure matches the wiring diagram exactly.
 - b. If the fan is cycling on and off, it may be insufficient downstream static pressure causing the motor to overheat and cycle. Ensure the downstream static pressure is a minimum of 0.1 in wg (0.2 in wg for a Size 60 FDC or if an electric heater is installed).
 - c. Cycle the thermostat to full heating and verify the signal output from the thermostat to the controller.
 - d. Check the disconnect switch or breaker.
 - e. Ensure the fan wheel is not touching the blower casing.

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MAINTENANCE

Typical Wiring Diagram



NOTE: The ECM motor is turned ON/OFF by switching 24 VAC power to the ECM speed controller. It is not recommended to switch the main (120/240/277 VAC) power on and off. This is because the ECM motor has large capacitors that cause a current surge when turned on. This could cause a significant power spike if many units are turned on at once.

For reference only. For actual wiring specific to the supplied units please refer to the wiring diagram supplied with each unit.

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MAINTENANCE

Replacement Parts

Component	Part#	Description
ECM Fan Motors	019178-006	120V/240V - 1/3 HP (FDU Size 10, 20)
	019179-006	277V - 1/3 HP (FDU Size 10, 20)
	019178-007	120V/240V - 1/2 HP (FDU Size 30, 50)
	019179-007	277V - 1/2 HP (FDU Size 30, 50)
	019178-008	120V/240V - 3/4 HP (FDU Size 40)
	019179-008	277V - 3/4 HP (FDU Size 40)
ECM Speed Controller	232952-100	Standard Fan Speed Controller (All Sizes)
	232952-200	Deluxe Fan Speed Controller (All Sizes)
Blowers	100186-011	FDU Size 10, 20
	100185-002	FDU Size 30, 50
	100185-003	FDU Size 40
Actuators	019917-001	FDU Terminal & Box w/ ID (Sizes 10-40)
Thermostats	Reference UMCB Underfloor Modulating Controller with BACnet Manual5 mfd	
Transformers	019436-001	115V-24V, 50 VA Transformer
	019436-011	208V/240V-24V, 50 VA Transformer
	019439-001	277V-24V, 50 VA Transformer
Disconnect Switch	019903-001	115V/277V Single Pole
	019903-003	240V Two Pole

Drain Pan Part# Reference (506274-XXX)

2 Pipe 1 or 2 Row		2 Pipe 3 or 4 Row		2 Pipe 5 or 6 Row	
Galvanized	Stainless Steel	Galvanized	Stainless Steel	Galvanized	Stainless Steel
001	101	002	102	003	103
4 Pipe 1/2 Cool - 1/2 Heat		4 Pipe 3/4 Cool - 1/2 Heat		4 Pipe 5/6 Cool - 1/2 Heat	
Galvanized	Stainless Steel	Galvanized	Stainless Steel	Galvanized	Stainless Steel
004	104	005	105	006	106

Discharge Attenuator Part# Reference (506271-XXX)

Unit Size	Configuration	XXX
10	STD BOX/EC	001
20	STD BOX/EC	002
30	STD BOX/EC	003
40	STD BOX/EC	004
50	STD BOX/EC/WC	005
10	BOX W/ CWC	101
10/20	BOX W/ HWC(10), CWC/HWC (20)	102
30	BOX W/ WC	103
40	BOX W/ WC	104