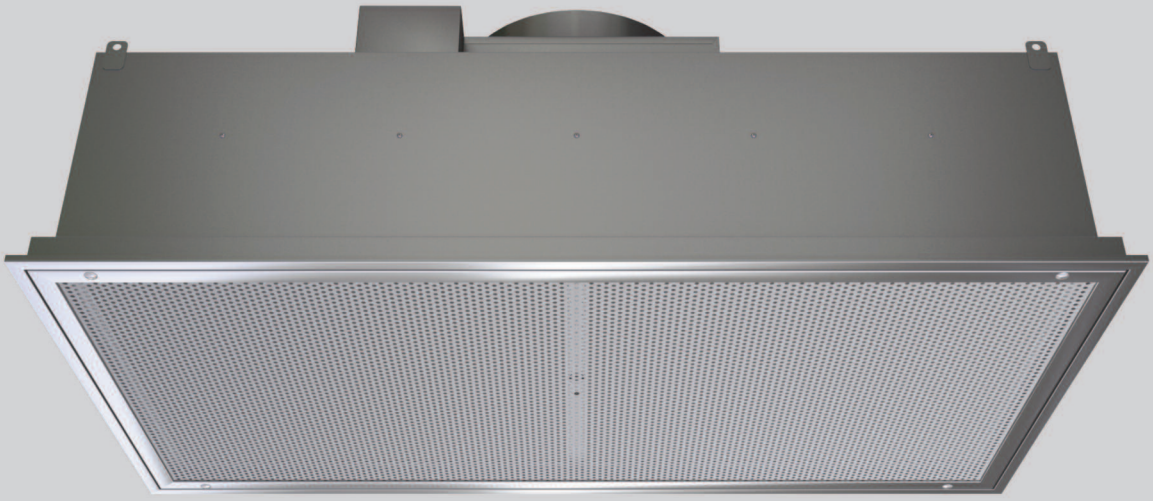
INSTALLATION, OPERATION & MAINTENANCE

MANUAL

Fan Filter Diffuser

Models 92FFD & 92FFD-SS



Read completely and save these instructions for future reference.

Nailor® Industries Inc.

CRITICAL OPERATION CONDITIONS OF THE FAN FILTER DIFFUSER

- **DO NOT TOUCH** the HEPA filter media. Damage to filter media may void the filter warranty. The screen is to protect against accidental contact with the filter. Never place objects on the filter. Always transport or lift the filter by its frame.
- Prior to powering the unit, verify that it is wired to the correct power supply. The rating plate label located on the electrical box cover shows the electrical data.
- For replacement parts refer to the model number and serial number on the rating plate label located on the electrical box.

REPLACEMENT PART NUMBERS

FPH-RP11	FPH 48" x 24" (1219 x 610) HEPA Filter
FPH-RP12	FPH 16" x 16" x 3/8" (406 x 406 x 10) expanded aluminum Pre-filter
FPH-RP13	FPH 24" x 24" (610 x 610) HEPA Filter
FPH-RP14	FPH 14" x 14" x 3/8" (356 x 356 x 10) expanded aluminum Pre-filter
FPH-RP16	FPH 36" x 24" (914 x 610) HEPA filter
FPH-RP21	FPH Programmable Variable Speed Motor (120, 208/240 VAC)
FPH-RP22	FPH Programmable Variable Speed Motor (277 VAC)
FPH-RP31	FPH Control Circuit Board
FPH-RP32	FPH 0 – 10 VDC Control Circuit Board
FPH-RP33	FPH Network Control Circuit Board
FPH-RP34	FPH Fan Verification Kit
FPH-RP35	FPH LED Filter Indicator Kit
FPH-RP36	FPH 120/24 VAC Transformer
FPH-RP37	FPH 208/240/24 VAC Transformer
FPH-RP38	FPH 277/24 VAC Transformer
FPH-RP39	FPH Network Power Control Circuit Board
FPH-RP40	FPH Face Mounted Airflow Display Board
FPH-RP41	FPH Multi-input Control Board

WARNING – TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK OR INJURY TO PERSONS; ALLOW ONLY QUALIFIED TECHNICIANS TO INSTALL AND SERVICE THE UNIT. ALL PERSONS SHOULD OBSERVE THE FOLLOWING:

a) **Use this unit only in a manner intended by the manufacturer. If you have questions; contact the manufacturer.**

b) **Before servicing or cleaning unit, disconnect and lock-out power at the service panel to prevent electric shock or injury if the power is accidently turned on. When the service disconnecting means cannot be locked, securely fasten a prominent warning device, such as a tag, to the service panel.**

- **Installation work and electrical wiring must be completed by qualified persons in accordance with all applicable codes and standards, to include fire rated constructions.**
- **When cutting or drilling into walls and ceilings, be careful not to damage electrical wiring and other hidden utilities.**
- **If this unit is to be installed within close proximity to water, mark the unit in accordance with applicable codes and standards.**
- **This unit is to be used only as intended by the manufacturer. If you have any questions regarding the use, installation or operation of this unit; contact the manufacturer:**

Nailor Industries of Texas, Inc.
4714 Winfield Road
Houston, TX
U.S.A. 77039

Tel.: 281-590-1172
www.nailor.com

Dimensions are in inches (mm).

Nailor Industries Inc. reserves the right to change any information concerning product or specification without notice or obligation.

92FFD AND 92FFD-SS INSTALLATION INSTRUCTIONS CHECKLIST

This is to provide a general overview of what steps should be taken to achieve a successful installation of the fan filter unit. These steps should be performed in the order listed. For more detail see applicable section in this instruction manual. Read the entire manual before beginning installation.

CHECKLIST

- ❑ Unbox and inspect the fan filter unit.
- ❑ If the unit is to be ducted, set upstream air device to produce 0.0" w.c. static pressure at the fan unit inlet. Use dampers if necessary when installing multiple fan units on the same duct line. (See page 5 for details).
- ❑ Install the fan unit into the ceiling. Support its weight from structure above.
- ❑ Connect ductwork to fan unit (if applicable).
- ❑ Seal the fan filter unit to the ceiling using gasketing and caulking (if required).
- ❑ Connect main power wiring.
- ❑ Connect control wiring (if applicable).
- ❑ Run the unit and/or upstream air device to flush out construction debris.
- ❑ Install the pre-filter (if applicable).
- ❑ Install the HEPA/ULPA filter.
- ❑ Turn unit on and adjust airflow to design cfm.
- ❑ Turn on the upstream airflow device.
- ❑ Leak test the fan unit and filter per local codes and building procedures (if required).
- ❑ Install the perforated face screen.
- ❑ Verify airflow with a flow hood (or by approved means).

Nailor Industries Inc. reserves the right to change any information concerning product or specification without notice or obligation.

Nailor® Industries Inc.

IOM Manual
Fan Filter Diffuser
Models: 92FFD and 92FFD-SS

Contents

	Page No.
Fan Filter Diffuser Models: 92FFD and 92FFD-SS	1
Critical Operation Conditions of the Fan Filter Diffuser	2
Warning	2
Installation Checklist	3
FFD Installation	5
Cleaning the FPH Pre-filter	5
Removal and Replacement of the Gel Seal HEPA Filter	6
Removal and Replacement of the EC Motor	7
Access to Electrical Components	8
On / Off Switch – Airflow Adjustment	10
Resettable Fuse / Main Power Switch	11
Digital Airflow Control	11
PAO Challenge System	12
Controls (MODBUS, BACnet)	13
BACnet Gateway	14
Networking	16
Wiring (Pressure Transducer)	21
Testing	23
Trouble Shooting	23
Wiring Diagrams	23
Warranty	24

Nailor Industries Inc. reserves the right to change any information concerning product or specification without notice or obligation.

INSTALLATION

The Fan Filter Diffuser is fully assembled from the factory with the exception of the HEPA filter and lamps (if applicable) which are shipped separately.

Step 1 Carefully remove the unit from the shipping carton and inspect for damage that may have occurred during shipping. If shipping damage is found, do not install. Call the manufacturer to report damage.

Step 2 Wipe down the unit to remove shipping dust and debris.

Step 3 Raise unit into ceiling and lower onto gasketed opening. Gasket should be a closed-cell material approved for the environmental conditions. It is recommended to further support the unit from above using the tabs welded to the plenum.

Step 4 A qualified technician should wire the unit to the appropriate power supply per applicable codes and standards. Refer to the wiring diagram (Figure 4) on page 23 of these instructions.

92FFD, 92FFD-SS – V18 120 VAC Supply
92FFD, 92FFD-SS – V19 208 VAC Supply
92FFD, 92FFD-SS – V20 240 VAC Supply
92FFD, 92FFD-SS – V21 277 VAC Supply

Step 5 Blow out/clean entire duct system leading to the unit to remove construction debris. This is especially important for motor accessible units as they do not have a pre-filter. Wash pre-filter (if applicable), per "Cleaning the Fan Filter Unit Pre-filter" below.

Step 6 Install the HEPA filter per the "Removal and Replacement of the HEPA Filter with Gel Seal" section on page 6.

CLEANING THE FAN FILTER DIFFUSER PRE-FILTER

WARNING! Disconnect the unit from the electrical power source before attempting to service the unit.

Note: For maximum performance, wash pre-filter every three to six months at minimum.

Step 1 Turn off the unit with the rocker switch located on the unit.

Step 2 Disconnect the unit at the power source or at the service panel.

Step 3 Using a driver, remove the screw holding the hinged door. This allows access to the pre-filter. Slide the pre-filter out of the motor enclosure.

Step 4 Wash the filter with hot water and a mild detergent and rinse thoroughly. Do not use a caustic solution to clean the filter. Blow dry or let air dry and slide the filter back into the motor enclosure. **Filter should be completely dry before reinstalling into unit.**

Step 5 Using a driver, re-secure the cover with the screw.

A NOTE ABOUT VAV BOXES AND DUCTED APPLICATIONS

In applications where the Fan Filter Diffuser unit will be installed downstream of variable airflow devices such as VAV boxes, air valves, or variable air handlers, proper care in unit set-up needs to be taken.

The unit should not be programmed to run as constant airflow in this application. Two variable controllers trying to reach their respective set point will continuously adjust. This will cause issues such as surging, starving and eventual shut down of the fan filter unit. The units should be ordered with a constant torque program. This will remove the dirty filter ramp-up feature and the cfm display will no longer be accurate. However, this is still preferable to a PSC system due to the energy efficiency of an EC versus a PSC motor.

Ducted applications While the fan filter unit can handle some positive or negative static pressure, optimal performance and reliability will be achieved with an inlet static pressure of 0.0 w.c. or slightly negative.

To reach an accurate 0.0 w.c. inlet static, it is recommended that the primary air balancing of the duct system be done before installing the fan filter unit. When the duct is at optimal static, install the unit per these instructions and adjust the airflow to the design setting. Verify the airflow with an airflow hood.

It is recommended that all fan filter units in the system be energized before any upstream devices to prevent the FFD blower wheel from spinning backwards. While the motor can generally overcome this, if the airflow needed to overcome high static is too great, it may not. This will cause the motor to shut down. Continual running of the motor backward may result in reduced reliability of the EC motor.

Nailor Industries Inc. reserves the right to change any information concerning product or specification without notice or obligation.

REMOVAL AND REPLACEMENT OF THE HEPA FILTER WITH GEL SEAL

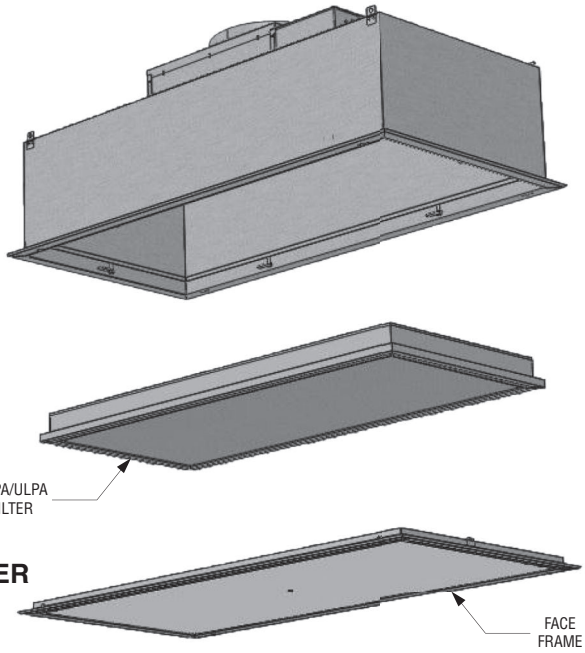
WARNING!
Disconnect the unit from the electrical power source before attempting to service the unit.

WARNING!
The HEPA filter may be protected by an expanded metal screen. This is to prevent accidental touching of the filter media. It is not meant to allow handling of the filter in these areas. Handle the filter ONLY by the frame.

Tools required: Flat screw driver; 7/16" (11) nut driver

Note: The manufacturer recommends two people to remove and install the HEPA filter in the unit.

Step 1 Turn off the unit with the rocker switch located on the unit.
Step 2 Disconnect the unit at the power source or at the service panel.
Step 3 Using a flat screwdriver, release the face frame by rotating the four (4) fasteners a quarter-turn counter clock-wise. Unhook the safety cables from the filter clips. Set the frame aside.
Step 4 Using a 7/16" (11) nut driver, evenly loosen the nuts holding the filter retaining clips by working your way around the unit loosening the nuts a little at a time. To make installing the new filter easier, loosen the nuts until flush with the end of the threaded stud. USE TWO PEOPLE TO SUPPORT THE FILTER and rotate the filter clips toward the offset hole until clip is clear of the filter.
Step 5 Allow gravity to pull the filter away from the unit. If installing a new filter; discard the filter in an appropriate manner.
Step 6 Unpack the new filter and inspect for shipping damage. If damage is found, do not install in unit; call the manufacturer for replacement arrangements.
Step 7 Using two people, raise the filter into place assuring the seal edge is approximately in the center of the gel channel. The threaded posts will help align the filter.
Step 8 While supporting the filter by its frame, rotate the filter clips so that the clips are supporting the frame and are at 90° to the frame. Evenly tighten the nuts by working your way around the unit tightening the nuts a little at a time. Stop tightening when the aluminum filter frame contacts the stainless steel housing frame. DO NOT OVER TIGHTEN. Wait at least 30 minutes before performing any challenge testing to allow the gel to fully adhere to the unit.
Step 9 Raise the face frame back into place, reattach the safety chains and secure quarter-turn fasteners.
Step 10 Inspect all gaskets and seals for integrity. Reconnect power and turn unit power on.



REPLACEMENT OF HEPA FILTER WITH GEL SEAL FIGURE 1

Dimensions are in inches (mm).

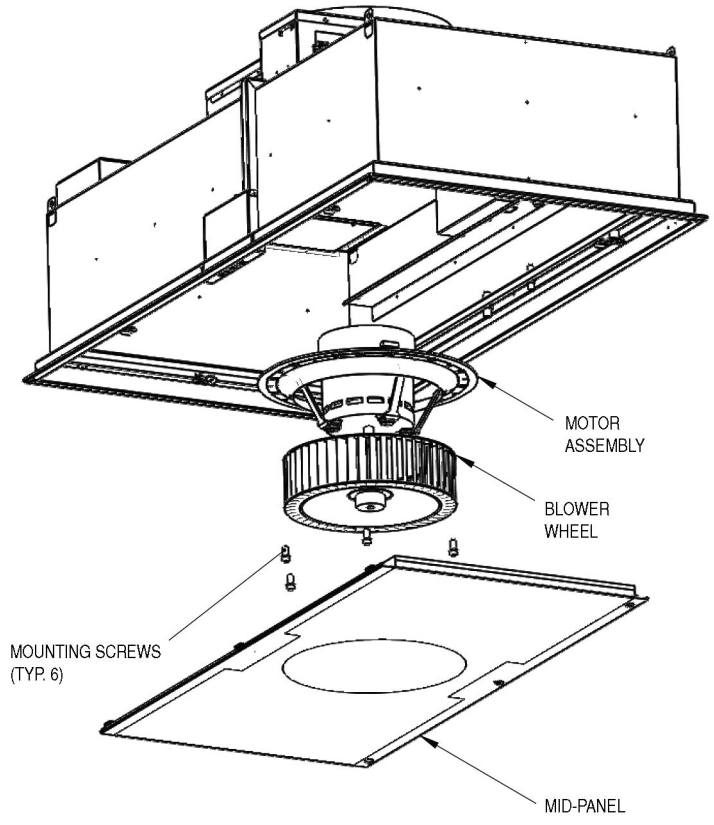
Nailor Industries Inc. reserves the right to change any information concerning product or specification without notice or obligation.

REMOVAL AND REPLACEMENT OF THE EC MOTOR

WARNING!
Disconnect the unit from the electrical power source before attempting to service the unit.

Tools required: Flat screw driver; 7/16" (11) nut driver; drill with 1/8" (3) drill bit; 5/32" (4) hex head driver

Step 1 Turn off the unit with the rocker switch located on the unit.
Step 2 Disconnect the unit at the power source or at the service panel.
Step 3 Remove the HEPA filter and the pre-filter and set aside. See Sections 2 and 3 for instructions.
Step 4 Using a 1/8" (3) drill bit and drill to remove the six (6) rivets located around the motor housing cover. Set cover aside. Clean out metal shavings and rivet parts from the unit. NOTE: If duct is attached to cover, be careful not to damage duct. Disconnect duct if necessary.
Step 5 Disconnect the 6-pin power cable and the 4-pin data cable from the motor.
Step 6 Using the 7/16 (11) nut driver, remove the six nuts holding the motor.
Step 7 Lift the motor/fan/ring assembly out of the unit.
Step 8 Use a 5/32 (4) hex driver to loosen set screw and slide fan off the motor shaft.
Step 9 Use a flat screw driver to loosen the motor mount harness and slide off motor.
Step 10 Reverse above steps to reassemble the motor/fan/ring assembly into the unit. Motor mount should be against control housing of motor and fan collar should be even with the end of the motor shaft. Either rivets or sheet metal screws can be used to secure the motor housing cover.



REMOVAL OF THE EC MOTOR
FIGURE 2

Nailor Industries Inc. reserves the right to change any information concerning product or specification without notice or obligation.

ACCESS TO ELECTRICAL COMPONENTS

WARNING!

Disconnect the unit from the electrical power source before attempting to service the unit.

Step 1 Turn off the unit with the switch located on the electrical box.

Step 2 Disconnect the unit at the power source or at the service panel in accordance with OSHA (LOTO) practices and procedures.

Step 3 Use a 5/16" (10) hex driver to remove screws holding electrical access panel. Swing panel up to release from the tabs.

Step 4 To remove transformer:

Step 4a Disconnect all wires from terminals. See wiring diagram for replacing wires.

Step 4b Using a 1/8" (3) drill bit, drill out the two rivets. Clean debris.

Step 4c Use new 1/8" (3) rivets or # 6 screws to install replacement transformer.

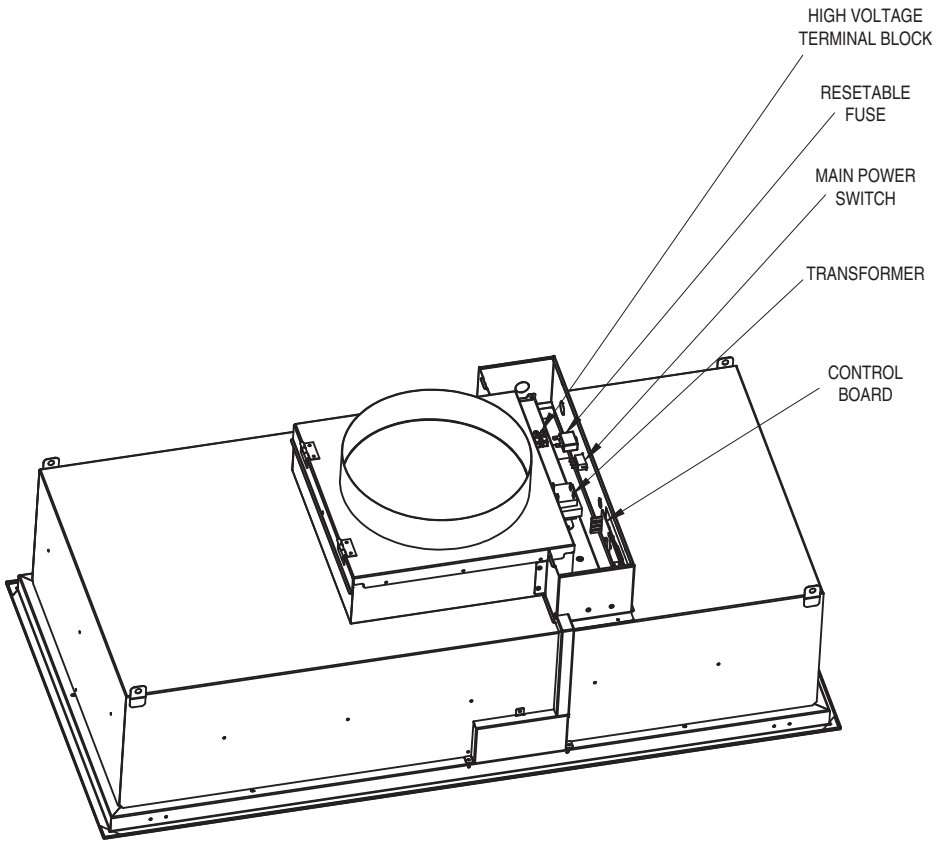
Step 5 To remove control board:

Step 5a Using a 1/8" (3) drill bit, drill out the two rivets holding the control board to the electrical box. Clean debris.

Step 5b Remove the two red plugs and use a small screwdriver to remove power wires.

Step 5c Use new 1/8" (3) rivets or # 6 screws to install replacement board.

Step 6 Reverse above steps to replace electrical components and to replace panel.



Nailor Industries Inc. reserves the right to change any information concerning product or specification without notice or obligation.

ACCESS TO ELECTRICAL COMPONENTS

WARNING!

Disconnect the unit from the electrical power source before attempting to service the unit.

Step 1 Using a flat screwdriver, release the face frame by rotating the four (4) fasteners a 1/4 turn counter clock-wise. Unhook the safety cables from the filter clips. Set the frame aside.

Step 2 Turn off the unit off with the switch located on the frame of the unit.

Step 3 Disconnect the unit at the power source or at the service panel in accordance with OSHA (LOTO) practices and procedures.

Step 4 Remove the HEPA filter and the pre-filter and set aside. See sections 2 and 3 for instructions.

Step 5 Using a flat screwdriver, release the mid panel by rotating the three (3) fasteners a 1/4 turn counter clock-wise. Allow panel to swing down to vertical and remove from unit. Set aside.

Step 6 Use a 5/16" (10) hex driver to remove screws holding electrical access panel (find them in the 1/4 (6) round holes in foam). Slide panel over to release from the slots.

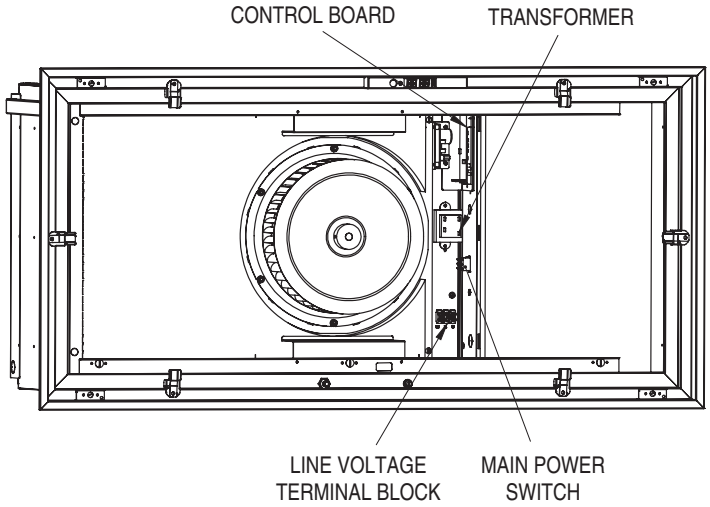
Step 7 To remove transformer:

- **Step 7a** Disconnect all wires from terminals. See wiring diagram for replacing wires.
- **Step 7b** Using a 1/8" (3) drill bit, drill out the two rivets. Clean debris.
- **Step 7c** Use new 1/8" (3) rivets or # 6 screws to install replacement transformer.

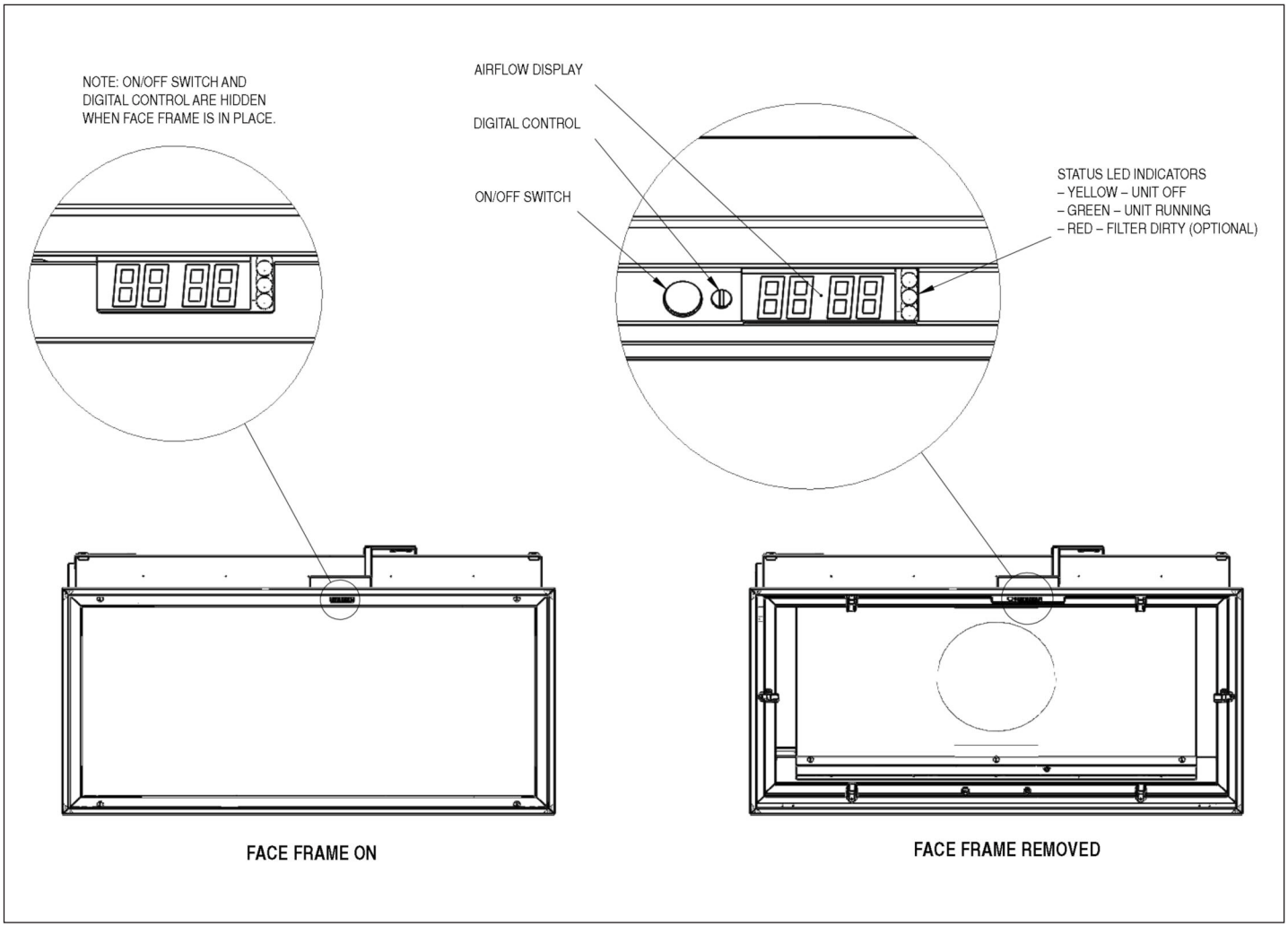
Step 8 To remove control board:

- **Step 8a** Use a 5/16" (10) hex driver to remove screws holding the control board bracket.
- **Step 8b** Remove the two red plugs and use a small screwdriver to remove power wires.
- **Step 8c** Using a 1/8" (3) drill bit, drill out the two rivets holding the control board to the bracket. Clean debris.
- **Step 8d** Use new 1/8" (3) rivets or # 6 screws to install replacement board.

Step 9 Reverse above steps to replace electrical components and to replace panels.



Nailor Industries Inc. reserves the right to change any information concerning product or specification without notice or obligation.



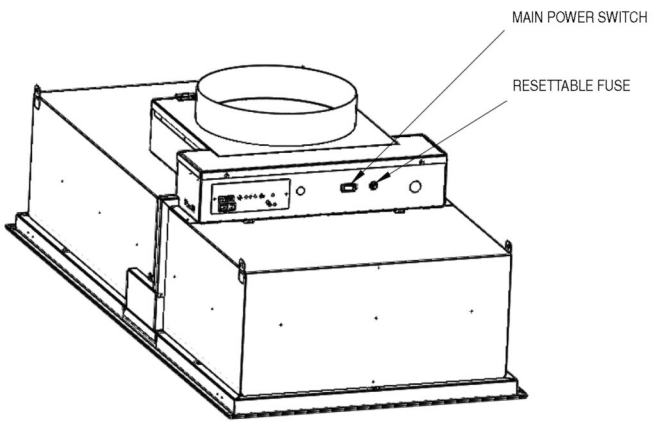
Nailor Industries Inc. reserves the right to change any information concerning product or specification without notice or obligation.

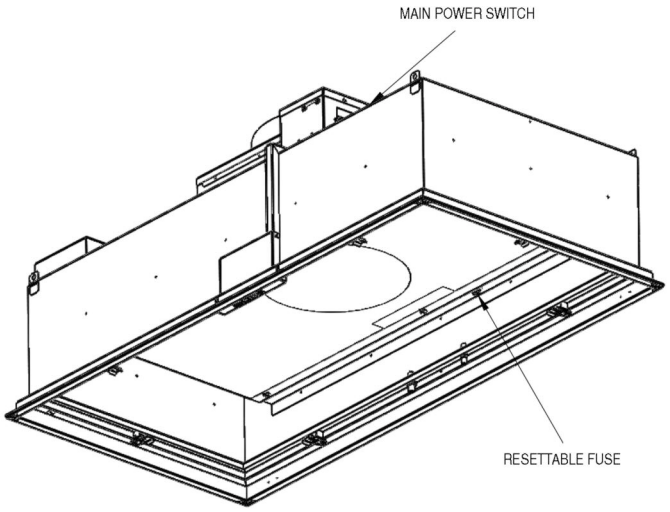
RESETTABLE FUSE/MAIN POWER SWITCH

Each Fan Filter Diffuser is equipped with an 8 amp resettable fuse to protect the unit from electrical spikes. The fuse is located on the electrical box on the back of the unit as standard. On the -RMB and -RMBC units, the fuse is inside the unit along the side.
The main power switch is located on the electrical on the back side of the unit. An additional disconnect can be added by others per local codes and regulations.
NOTE: 277 VAC units do not have the fuse.
NOTE: When a unit from a room-side removable blower, motor and/or controls is installed in an area with no access above the ceiling, the main power switch must be turned on before installing into the ceiling.

DIGITAL AIRFLOW CONTROL

The FPM includes a Digital Airflow Control unit to adjust the airflow in the range of 250 cfm to 700 cfm. The adjustment is made by turning the recessed knob located to the lower left of the display. To increase the airflow, adjust the knob clockwise with a small flat screwdriver. Turning it counter-clockwise lowers the desired airflow. The digital display alternates between the selected flow input (%) and the current airflow (cfm).





Nailor Industries Inc. reserves the right to change any information concerning product or specification without notice or obligation.

PAO CHALLENGE SYSTEM

An optional PAO Challenge Manifold System is available to provide a reliable, convenient method of performing a challenge test of the fan filter unit at the face.

****These instructions are to assist a qualified technician in testing the leakage of the fan filter unit. Filter should be installed for a minimum of 30 minutes before test is performed.**

Step 1 Using a flat screwdriver, release the face frame by rotating the four (4) fasteners a 1/4 turn counter clock-wise. Unhook the safety cables from the filter clips. Set the frame aside.

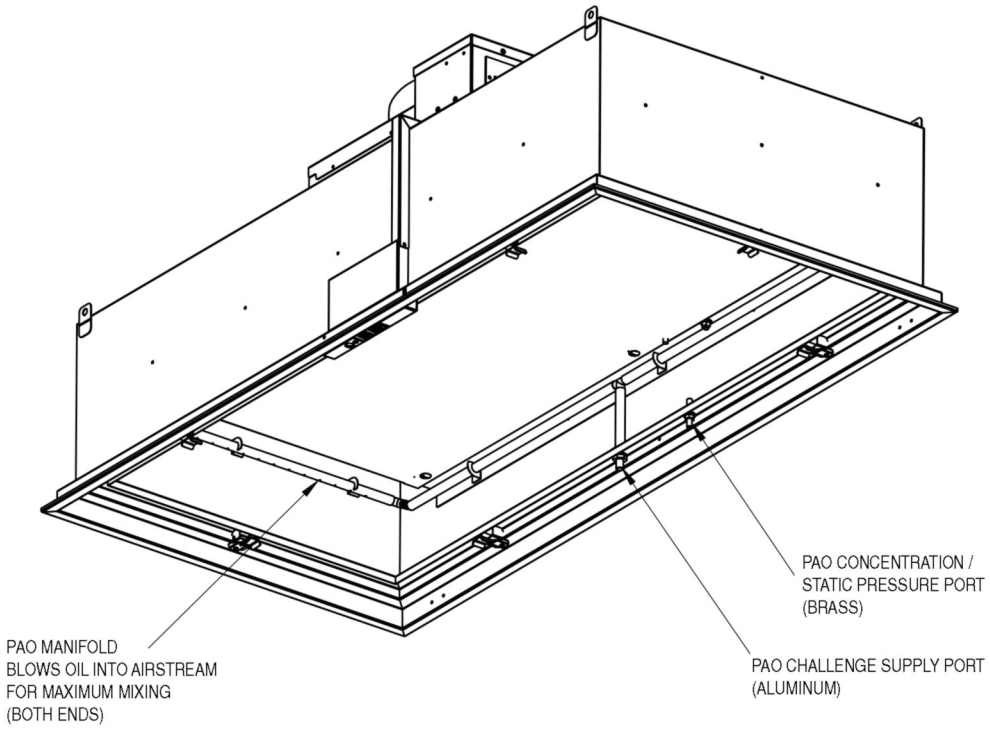
Step 2 Remove cap from PAO concentration port (brass). Attach UPSTREAM hose (1/4" [6] ID) from photometer to PAO concentration port.

Step 3 Remove cap from PAO challenge supply port (aluminum). Attach DOWNSTREAM hose (3/8" [10] ID) from photometer to PAO concentration supply port.

Step 4 Conduct the challenge test per equipment specifications and IEST-RP-CC034.3.

Step 5 Disconnect hoses from ports and securely replace caps.

Step 6 Raise the face frame back into place, reattach the safety chains and secure 1/4 turn fasteners.



Nailor Industries Inc. reserves the right to change any information concerning product or specification without notice or obligation.

CONTROLS

The fan filter unit can be controlled through various inputs.

1. Local potentiometer control.
   – Adjust airflow from the face.
   – Adjust flow from back of unit (disabled if face control present).
2. Individual unit wall mounted control (must be determined before ordering).
3. 0 – 10 V / 0 – 5 V DC Control.
4. 0 – 20 mA / 4 – 20 mA Control.
5. Full range of network controls including connection to BAS / BMS through MODBUS RTU RS 485 control.
   – BAC Net IP, BACNet MS / TP, & LON Works available with additional hardware.

Additionally, monitoring and controls of the fan filter unit can be done through closed loop control from sensors such as pressure transducers, thermostats, partical counters, etc.

This manual will give basic information on how to connect controls and sensors to the unit. For more details refer to the instructions included with the controller or sensors.

Nailor Industries Inc. reserves the right to change any information concerning product or specification without notice or obligation.

INSTALLATION

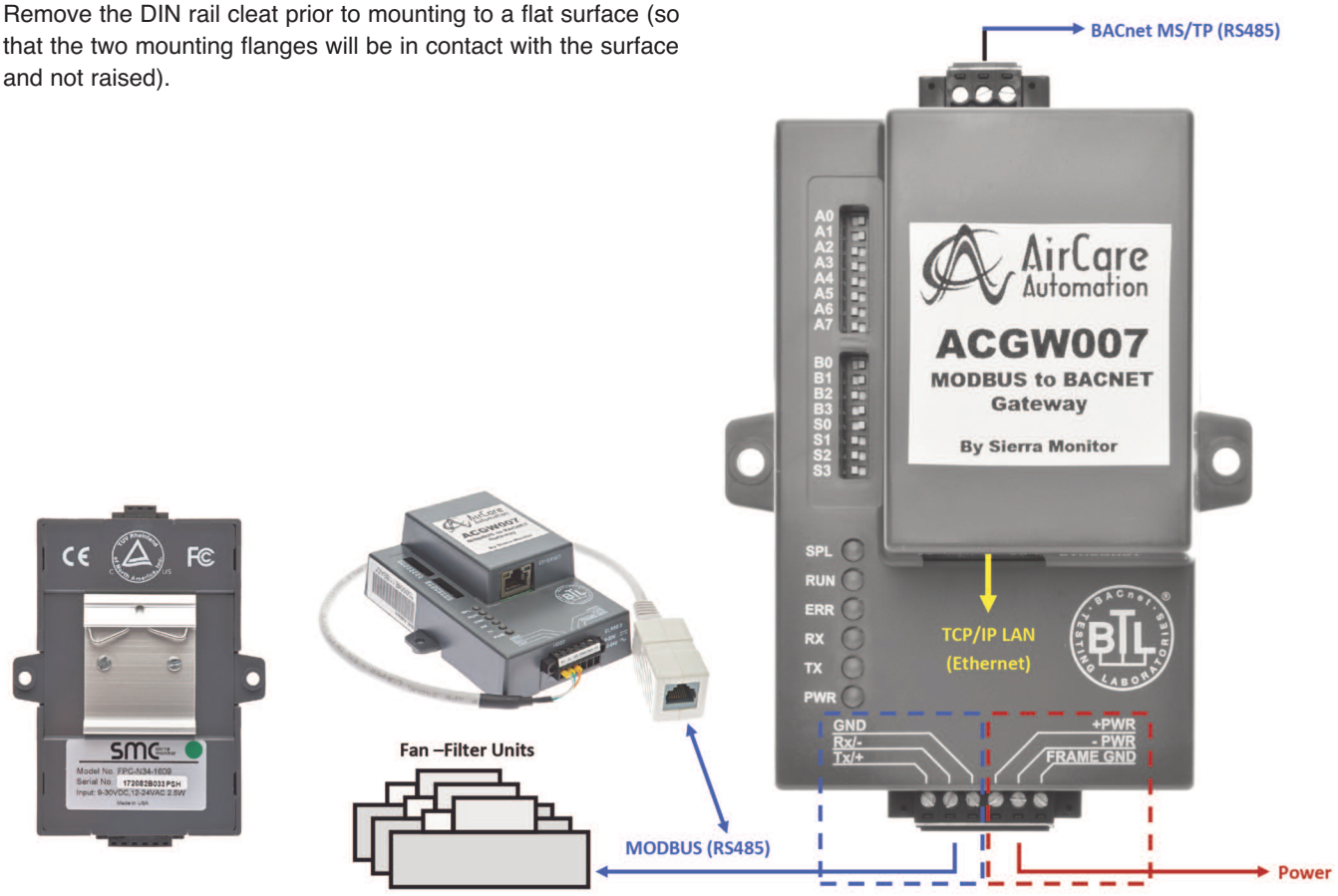
ACGW007 – MODBUS RTU TO BACnet / IP & MS / TP Gateway

INSTALLATION OUTLINE

1. Mount unit.
2. Connect to fan filter network using factory provided RJ45 inline coupler and serial cable.
3. Connect 3-pin screw terminals to BACnet MS/TP or BACnet IP network.
4. Verify switch settings (next page).
5. Connect to power (9 – 30 VDC, 12 – 24 VAC, 2.5 W).
6. Verify operation (see ACGW007 User Guide).

MOUNTING

The ACGW007 can be mounted to a flat surface or to a DIN rail. Remove the DIN rail cleat prior to mounting to a flat surface (so that the two mounting flanges will be in contact with the surface and not raised).



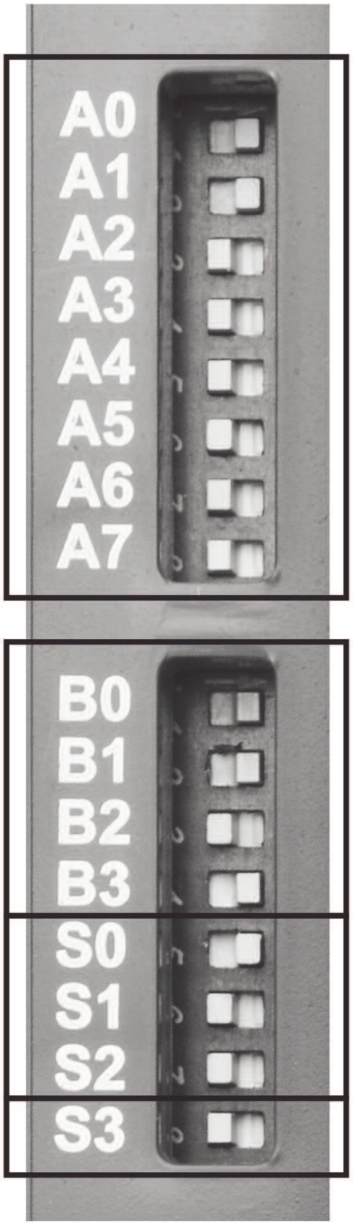
Nailor Industries Inc. reserves the right to change any information concerning product or specification without notice or obligation.

INSTALLATION

ACGW007 – MODBUS RTU to BACnet / IP & MS / TP Gateway

VERIFY SWITCH SETTINGS

Power OFF before changing switch settings. New settings will take effect on power-up.



1) A0 – A7: BACnet MS / TP MAC Address

Switches A0 - A7 select the BACnet MS / TP MAC address.

The BACnet MS / TP MAC address is used by a BMS upstream system to find the ACGW007 via BACnet Auto-Discovery.

The default BACnet address is a value of 3, corresponding to switches A0 and A1 in the ON position as shown.

2) B0 – B3: BMS BACnet MS / TP Baud Rate

Switches B0 - B3 select the BACnet MS / TP Baud Rate.

The Baud Rate should be set to match upstream BMS BACnet MS / TP Baud Rate..

3) S0 – S2: BACnet MS / IP or BACnet MS / TP

Switches S0 - S2 select upstream BACnet protocol. Verify switches S0 – S2 are set in agreement with your system.

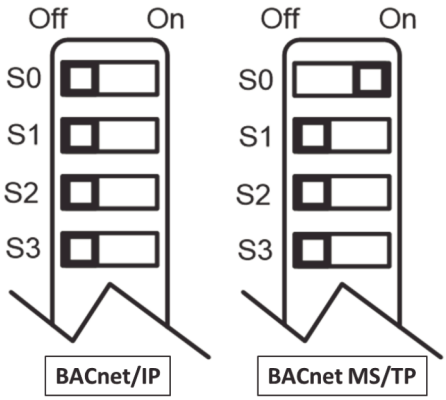
4) S3: AutoDiscovery Switch OFF

Switches S3 enables AutoDiscovery. S3 should be in the OFF position to allow for control of AutoDiscovery using the web browser interface.

Baud	B0	B1	B2	B3
9600	On	On	On	Off
19200	Off	Off	Off	On
38400*	**On**	**On**	**Off**	**On**
57600	Off	Off	On	On
76800	On	Off	On	On

Figure 9: BMS Baud Rate

* Factory default setting = 38400



Nailor Industries Inc. reserves the right to change any information concerning product or specification without notice or obligation.

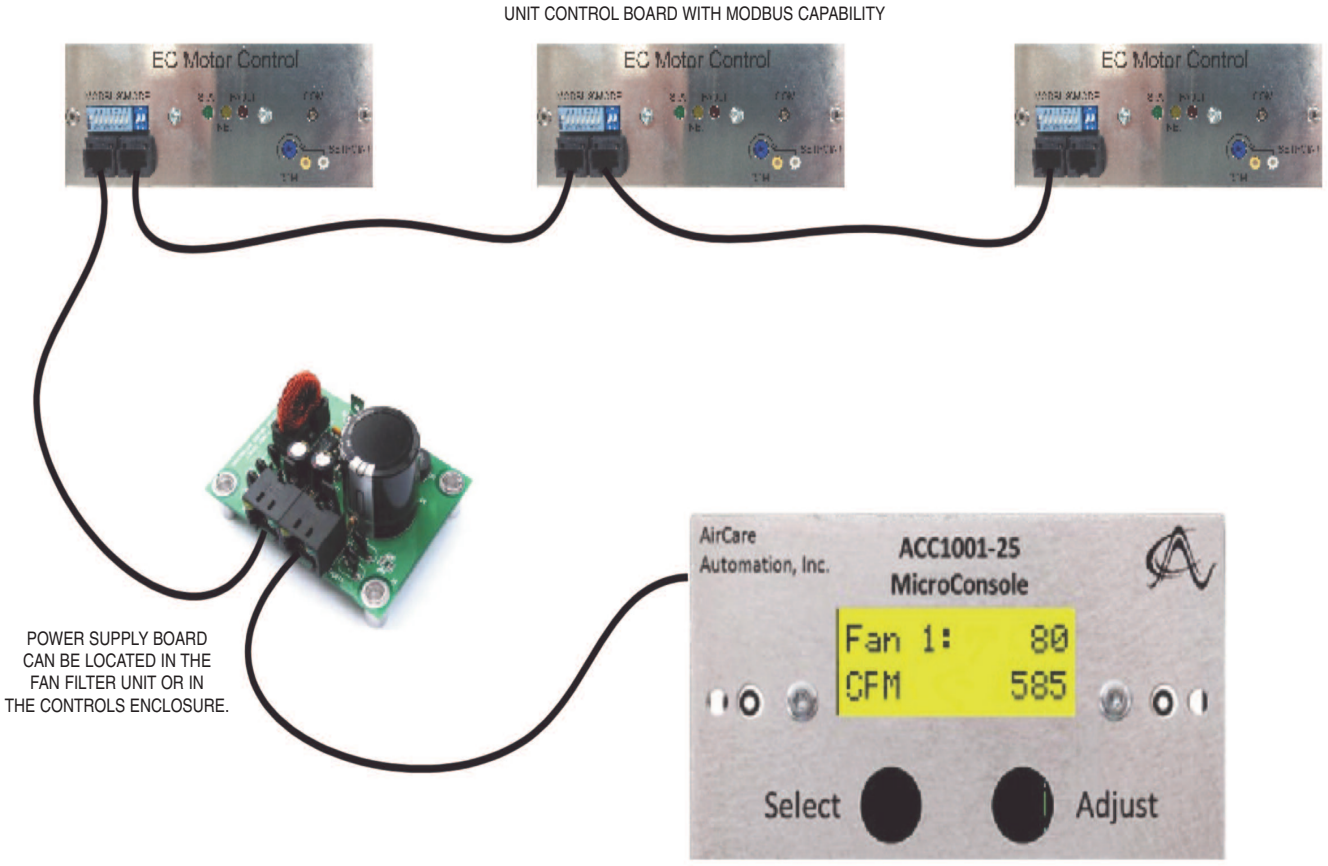
NETWORKING

When networking the fan filter units whether in a local area network (LAN) or connecting to a BAS / BMS system, each unit is connected in a straight-through daisy-chain using Cat5e or Cat6 network cables and the on-board RJ45 connectors.

If field cutting network cables, it is important for each end of the cable to be wired identically. However, assembled network cable are available; field assembled cables are the leading cause of problems in new systems.

WHAT TO EXPECT:

One unit will be clearly labelled MASTER UNIT. This unit will contain the ACC1001-25 and power supply. The power supply can be left in the master unit control box and control board can be mounted anywhere in the space, including at the master unit.



ACC1001 CONTROL USED AS AN EXAMPLE.
OTHER CONTROLLER OPTIONS ARE AVAILABLE.

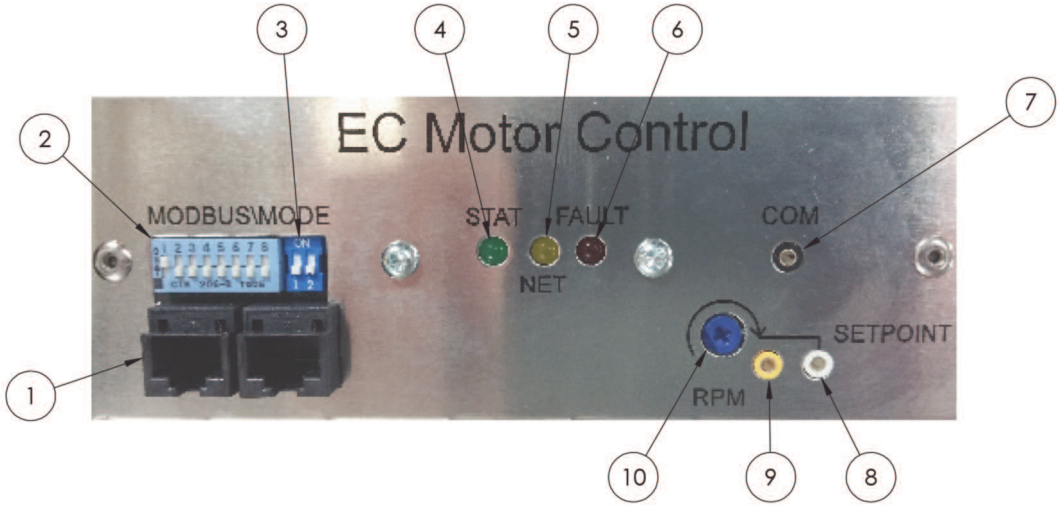
Nailor Industries Inc. reserves the right to change any information concerning product or specification without notice or obligation.

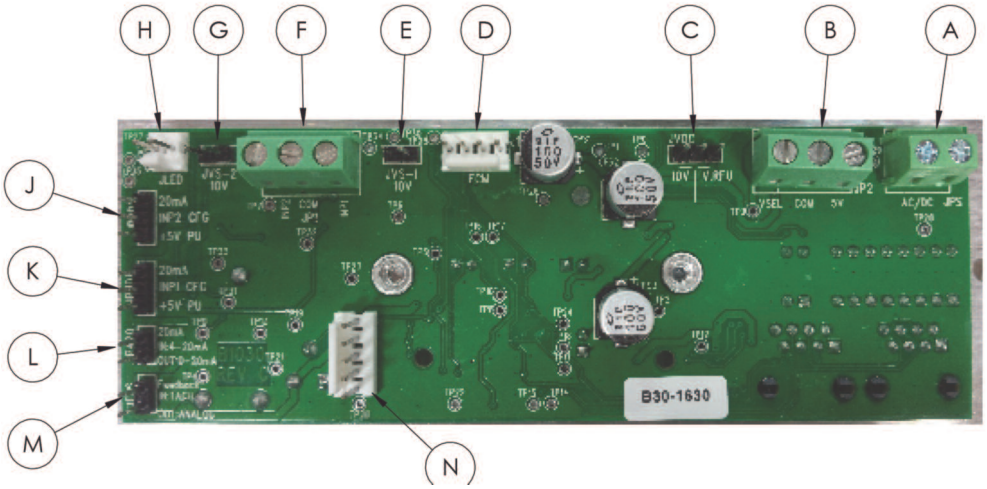
EC MOTOR CONTROL

INSTALLATION OUTLINE

1. RJ45 Dual Jacks
2. MODBUS Address DIP Switches
3. S1-1 and S1-2 Configuration DIP Switches
4. STATUS LED
5. NET LED (network activity)
6. FAULT LED
7. Multimeter Common
8. Multimeter Setpoint as m VDC
9. Multimeter CFM as m VDC
10. Onboard Setpoint Potentiometer

A. JPS: Bias input power, isolated
B. JP2: Accessory output voltages
C. JVDC: Selector for 10 V regulated or unregulated rectified and filtered bus voltage
D. J1: EC Motor Port
E. JVS1: INP1 10 V signal range selector
F. JP1: INP1 and INP2 analog / digital inputs
G. JVS2: INP2 10 V signal range selector
H. JLED: External FAULT output
J. JPUD2: INP2 digital input pull-up or 20 mA signal format selector
K. JPUD1: INP1 digital input pull-up or 20 mA signal format selector
L. JP420: 0 – 20 mA or 4 – 20 mA signal format selector
M. JFBS: TACH or Analog 2 feedback signal selector
N. Auxiliary Board Port





Nailor Industries Inc. reserves the right to change any information concerning product or specification without notice or obligation.

NETWORKING

DIP SWITCH SETTINGS

Each Fan Filter unit in a network must be set to a unique address between 1 and 247. Addresses 248 – 255 are declared reserved per MODBUS protocol. A DIP switch block of eight switches are used for addressing. The control board supports MODBUS Broadcast Address Zero for single and multiple register write commands (MODBUS Function Codes 6 and 16).

Address settings are checked by the board controller only at power-up, so power must be cycled before any changes take effect.

Analog input setpoint modes preserve the ability to monitor and modify register values using a suitable controller console or PLC. Therefore, addressing may be relevant for configuration, monitoring and / or troubleshooting even when units are intended to be used with analog setpoint input.

ADDRESS SELECTION

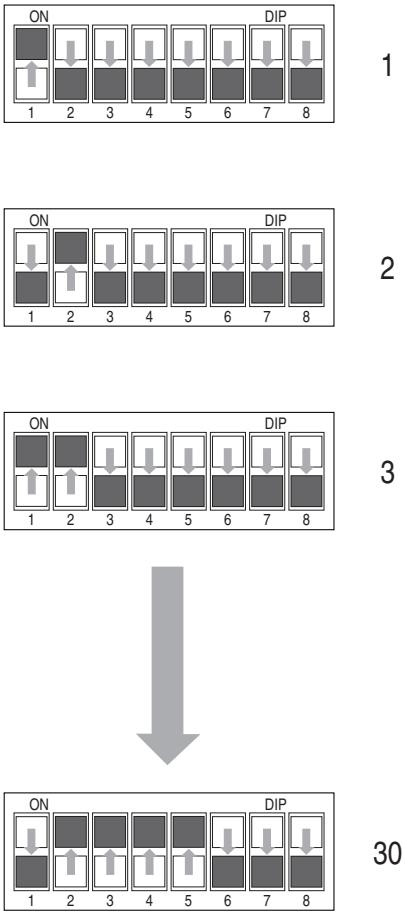
When adjusted to the ON position, each DIP switch pole represents a value as follows:

Calculate the address value of existing switch settings by adding the values of each DIP switch pole in the ON position, per the table below.
Construct switch settings for a desired address value by successively subtracting the largest pole value that is less than the desired address value, repeating with each remainder until the remainder is zero. An example is provided below.

Example: Desired address is 114

114 – 64 = 50 SW1-7 ON
50 – 32 = 18 SW1-6 ON
18 – 16 = 2 SW1-5 ON
2 – 2 = 0 SW1-2 ON

DIP Switch Pole	Value
1	1
2	2
3	4
4	8
5	16
6	32
7	64
8	128



Nailor Industries Inc. reserves the right to change any information concerning product or specification without notice or obligation.

CONFIGURATION DIP SWITCHES S1-1 & S1-2

Switch	S1-1	S1-2
	Control Loop Mode	Setpoint Source
OFF	Open-Loop Control	Analog Setpoint
ON	Closed-Loop Control	Network Setpoint

Open-Loop – Fan filter unit is controlled by a controller, i.e. on-board potentiometer or network controller.
Closed-Loop – A sensor is used to maintain airflow, i.e. room pressure, room temperature or a particle counter.
Analog Setpoint – Unit is controlled with an analog controller, i.e. on-board potentiometer or individual wall mounted controller (must be determined before ordering).
Network Setpoint – Unit is controlled with a networked controller, i.e. ACC1 or ACM7052 touchscreen controller.

SENSOR SHUNT TABLES

Shunt	JP420	JFBS	JVS-1*	JVS-2*
OUT	0 – 20 mA	Analog	0 – 5 VDC	0 – 5 VDC
IN	4 – 20 mA	n/a	0 – 10 VDC	0 – 10 VDC

* Leave shunt out if using a 0 – 20 mA or 4 – 20 mA sensor.

SHUNT TABLE FOR JP1 WIRING BLOCK

Center Pin to...	JPUD1:INP1	JPUD2:INP2
No Connection	Analog 5 V or 10 V	Analog 5 V or 10 V
20 mA	Analog 20 mA	Analog 20 mA
+ 5 PU	Digital 10 kΩ pull-up TO 5 V	Digital 10 kΩ pull-up TO 5 V

SHUNT TABLE FOR JP2 WIRING BLOCK

Center Pin to...	JVDC
No Connection	VSEL = no connection; open
10 V	VSEL = 10 V regulated
V.RFU	VSEL = DC filtered, unregulated, ~33 VDC

NOTES:

- JP1 is for signal input
- JP2 is for output power
  - connect COM / 5 V –> 5 V power supplied
  - connect COM / VSEL with 10 V shunt –> 10 V power supplied
  - connect COM / VSEL with V.RFU shunt –> Full wave rectified power supplied (~ 33 VDC)

- INP1 on JP1 wiring block is for monitoring only
  - 0 – 10 VDC
  - 0 – 5 VDC
  - 0 – 20 mA
  - 4 – 20 mA

- INP2 on JP1 wiring block is for closed-loop feedback monitoring
  - Controller airflow by room pressure or particle counter

Nailor Industries Inc. reserves the right to change any information concerning product or specification without notice or obligation.

DIP SWITCH SETTINGS FOR UP TO 30 FAN FILTER UNITS

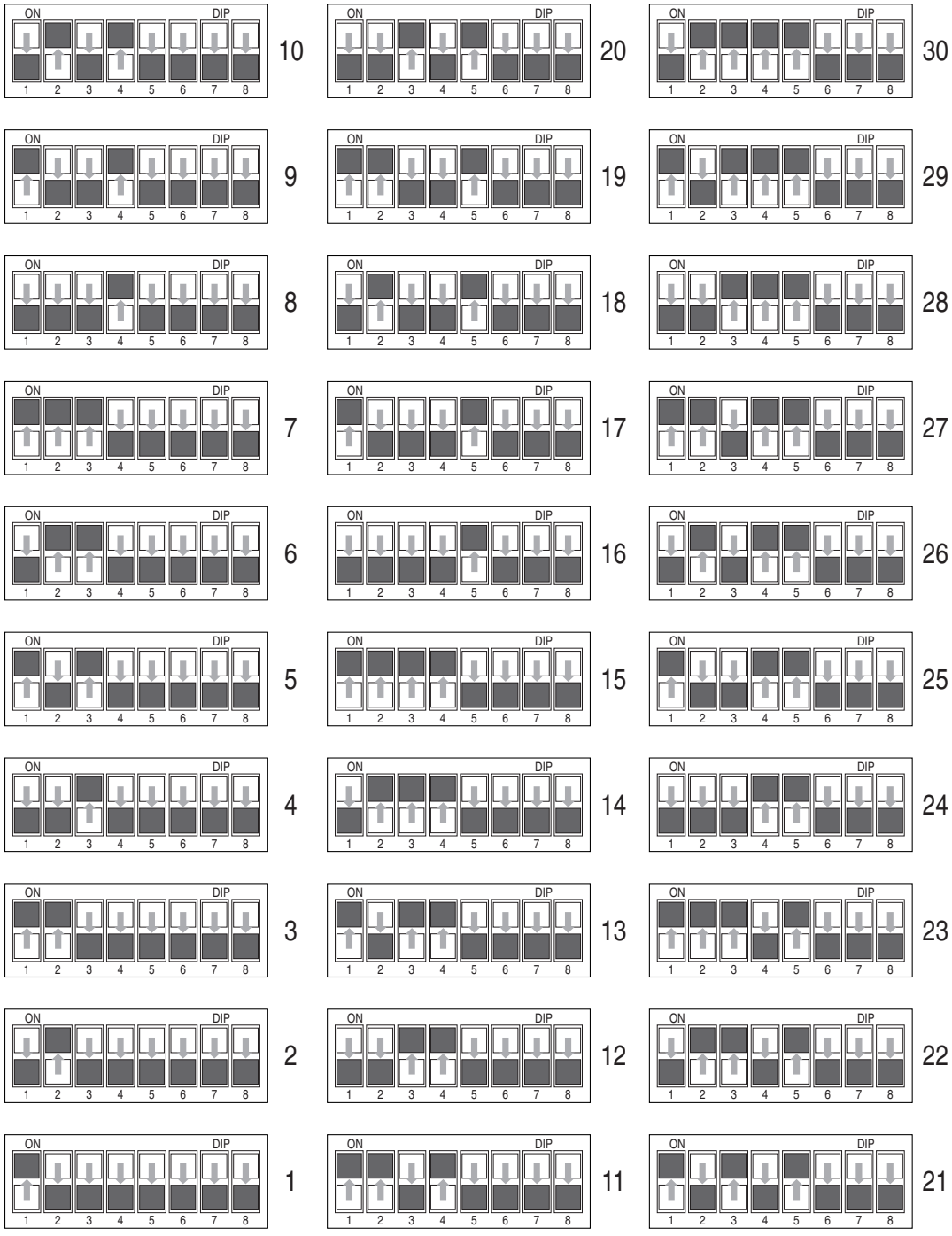
(For more units; see below)

Calculate the address value of existing switch settings by adding the values of each DIP switch pole in the ON position, per the table below.
Construct switch settings for a desired address value by successively subtracting the largest pole value that is less than the desired address value, repeating with each remainder until the remainder is zero. An example is provided below.

Example: Desired address is 114

114 – 64 = 50 SW1-7 ON
50 – 32 = 18 SW1-6 ON
18 – 16 = 2 SW1-5 ON
2 – 2 = 0 SW1-2 ON

DIP Switch Pole	Value
1	1
2	2
3	4
4	8
5	16
6	32
7	64
8	128

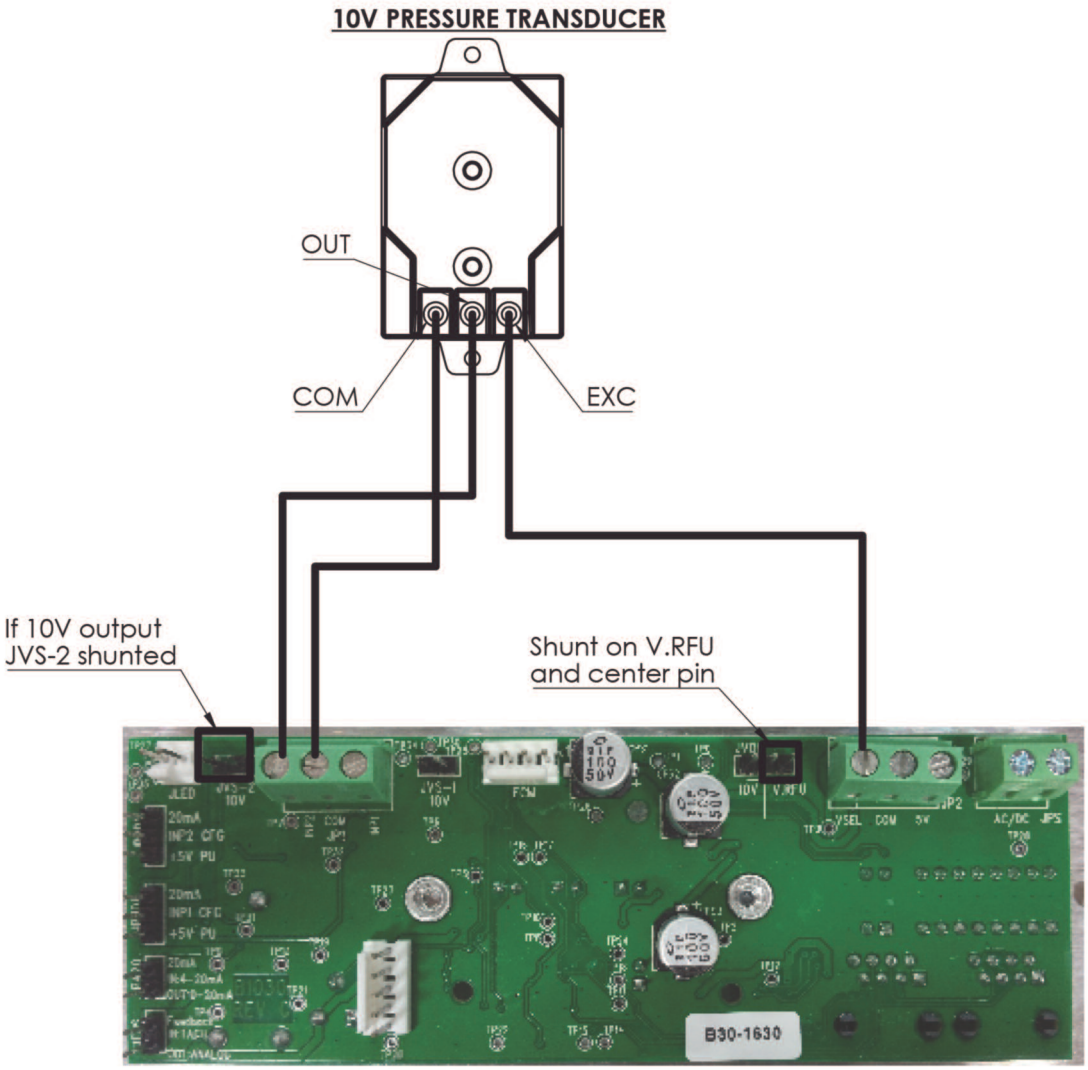


Nailor Industries Inc. reserves the right to change any information concerning product or specification without notice or obligation.

EXAMPLE OF WIRING A PRESSURE TRANSDUCER TO CONTROL BOARD FOR FEEDBACK OR MONITORING THROUGH CONTROLLER

NOTES:

- Pressure transducer provides 0 – 10 VDC output signal
- Powered by ~ 33 VDC supply

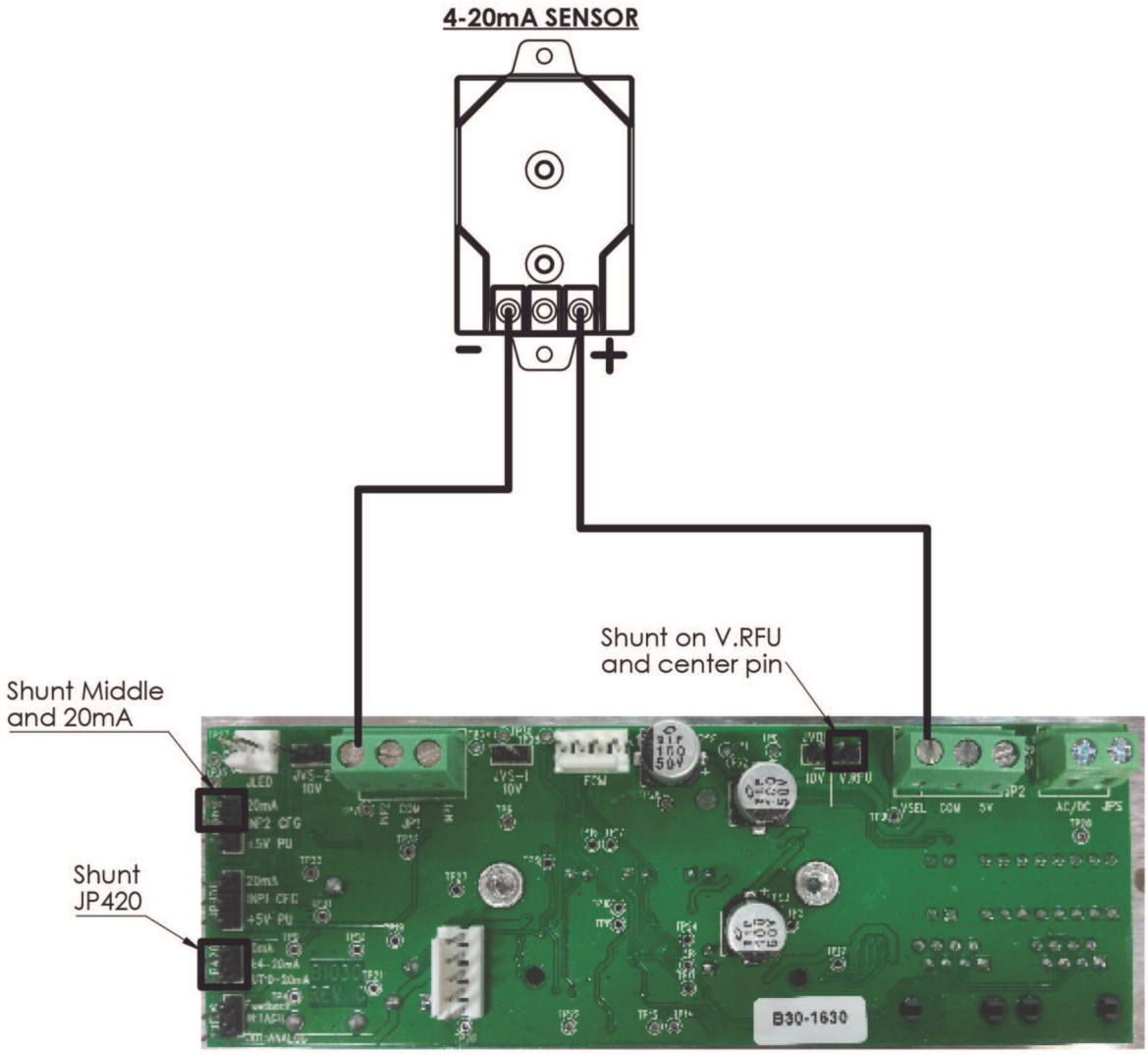


Nailor Industries Inc. reserves the right to change any information concerning product or specification without notice or obligation.

EXAMPLE OF WIRING A SENSOR TO CONTROL BOARD FOR FEEDBACK OR MONITORING THROUGH CONTROLLER

NOTES:

– Pressure transducer provides 4 – 20 mA output signal
– Powered by ~ 33 VDC supply



Nailor Industries Inc. reserves the right to change any information concerning product or specification without notice or obligation.

TESTING

Each Fan Filter Diffuser is thoroughly tested at the factory before shipment. However, many codes and standards require testing for by-pass leakage after installation. Nailor Industries Inc. encourages that the customer contact an independent, certified testing organization with technicians that are trained and experienced in performance evaluation and maintenance of clean air equipment. Nailor Industries Inc. recommends at lease 30 minutes elapse after HEPA/ULPA filter installation before performing any type of challenge leak testing. The unit should be sealed to the ceiling and the room should have a positive pressure held during testing and normal operation.

TROUBLE SHOOTING

Low Airflow

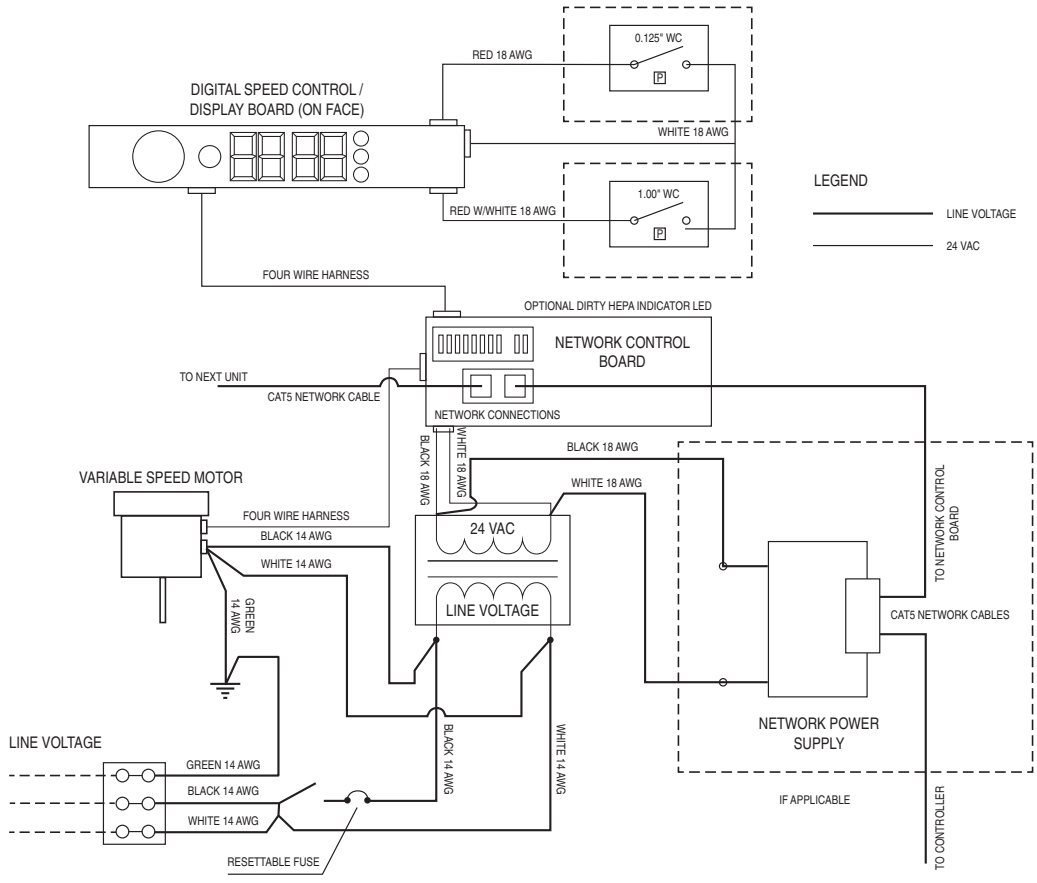
- If optional HEPA red LED light is on, replace the HEPA filter.
- Inspect the pre-filter. Clean or replace as necessary.
- Adjust the digital speed control for higher blower output.
- Check the power supply for proper voltage, amperage and distribution frequency.
- Replace the HEPA filter if airflow remains low.

High Airflow

- Adjust the digital speed control for lower blower output.

Non-Laminar Airflow and/or Excessive Contamination

- Insure that upstream is clear of large obstructions.
- Ensure that no other air moving devices are operating in such a way to disrupt the room's airflow pattern.
- Check airflow and if not desired airflow see above.
- Conduct smoke or photometer test on HEPA filter and gel seal. If test fails seal or replace the HEPA filter as necessary.



Nailor Industries Inc. reserves the right to change any information concerning product or specification without notice or obligation.

WARRANTY

Limited Warranty

Unless otherwise expressly stated elsewhere in Nailor Industries Inc. (Nailor) published literature, Nailor warrants that the Fan Filter Diffusers are free from defects in material and workmanship, except for services which are warranted to be performed in a competent and diligent manner in accordance with any mutually agreed specifications. The foregoing warranty shall apply for twelve (12) months from the date of shipment from the Nailor facility. Provided the Buyer informs Nailor in writing of any breach or warranty prior to the expiration of the applicable warranty period, Nailor shall, as its sole obligation and the Buyer's sole and exclusive remedy for any breach of this warranty, repair or replace/reperform the unit which gave rise to the breach or, at Nailor's option, refund the amounts paid by the Buyer for the unit which gave rise to the breach. Any repair, replacement or reperformance by Nailor hereunder shall not extend the applicable Warranty Period. The parties shall mutually agree on the specifications of any test to determine the presence of a defect. Unless otherwise agreed upon by Nailor in writing, the Buyer shall bear the costs of access, de-installation, re-installation and transportation of the unit to the Nailor facility and back to the Buyer's designated location. These warranties and remedies are conditioned upon (a) the proper storage, installation, operation and maintenance of the unit and conformance with the proper operation instruction manuals provided by Nailor or its suppliers and subcontractors, (b) the Buyer keeping proper records of operation and maintenance during the applicable Warranty Period and providing Nailor with access to these records and (c) modification of repair of the units only as authorized by Nailor. Nailor does not warrant the unit or any repaired or replacement parts against normal wear and tear or damage caused by misuse, accident or use against the instructions of Nailor. Any modification or repair of the unit not authorized by Nailor shall render the warranty null and void. EXCEPT AS EXPRESSLY SET FORTH HEREIN, NAILOR MAKES NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NO LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, NO-INFRINGEMENT OR FITNESS FOR A PARTICULAR PURPOSE WHICH ARE HEREBY DISCLAIMED TO THE EXTENT PERMITTED BY APPLICABLE LAW.