

INSTALLER'S GUIDE

FIOP-IN-3C 18-HE60D100-3

Note: This document is customer property and must be retained with the unit for maintenance personnel.

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NOTICE

Warnings and Cautions appear at appropriate locations throughout this manual. Read these carefully!

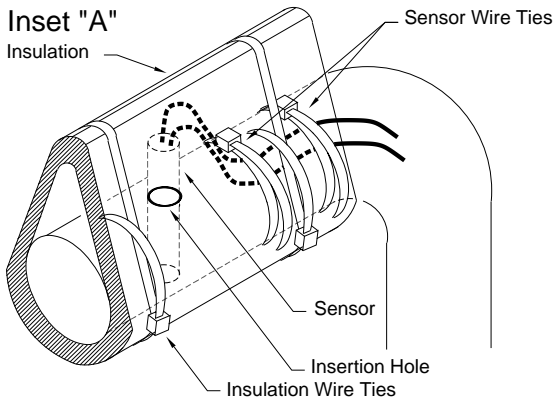
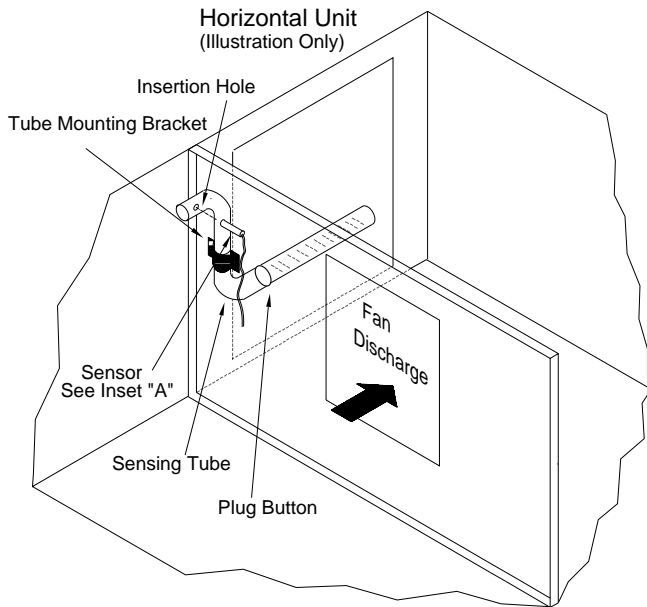
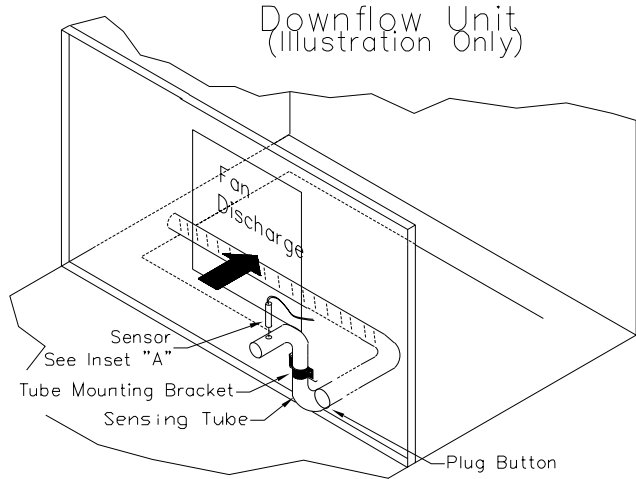
WARNING: Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION: Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices and where property-damage-only accidents could occur.

Since the manufacturer has a policy of continuous product improvement, it reserves the right to change design and specifications without notice.

FIYTUBE008A,009A
Supply Air Sensing Tube
for Heat/Cool Units

The Supply Air Sensing Tube is designed to sense the supply air temperature downstream of the heat exchanger or electric heater.



Note: Pull wire ties tight enough to seal ends around the tube.

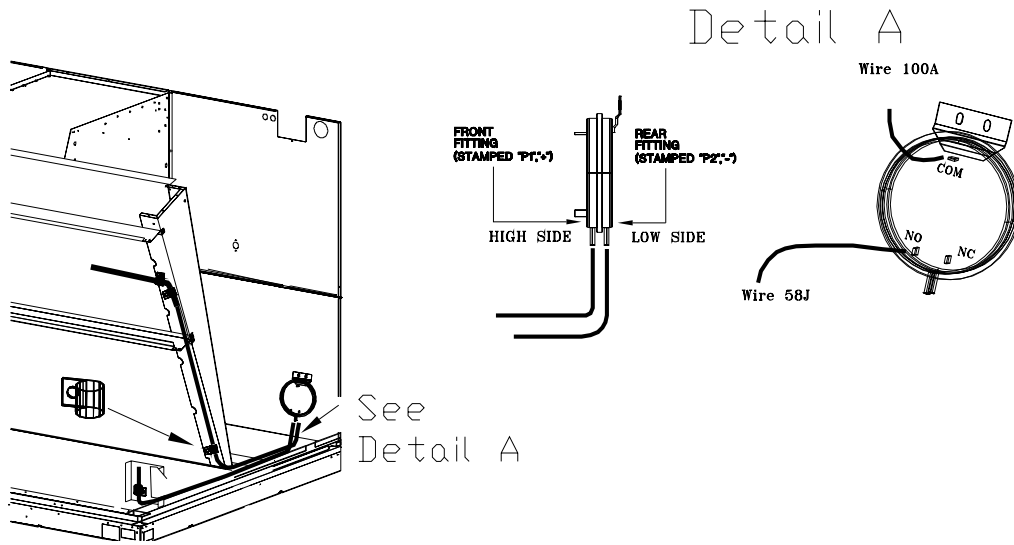
FIYDFPS005A
Clogged Filter Switch

This accessory kit detects static pressure differentials across the filters to indicate a clogged or dirty filter condition. When it detects such a filter problem, it causes the "Service" light LED on the Zone Sensor to glow steady, but not shut down unit operation.

Settings

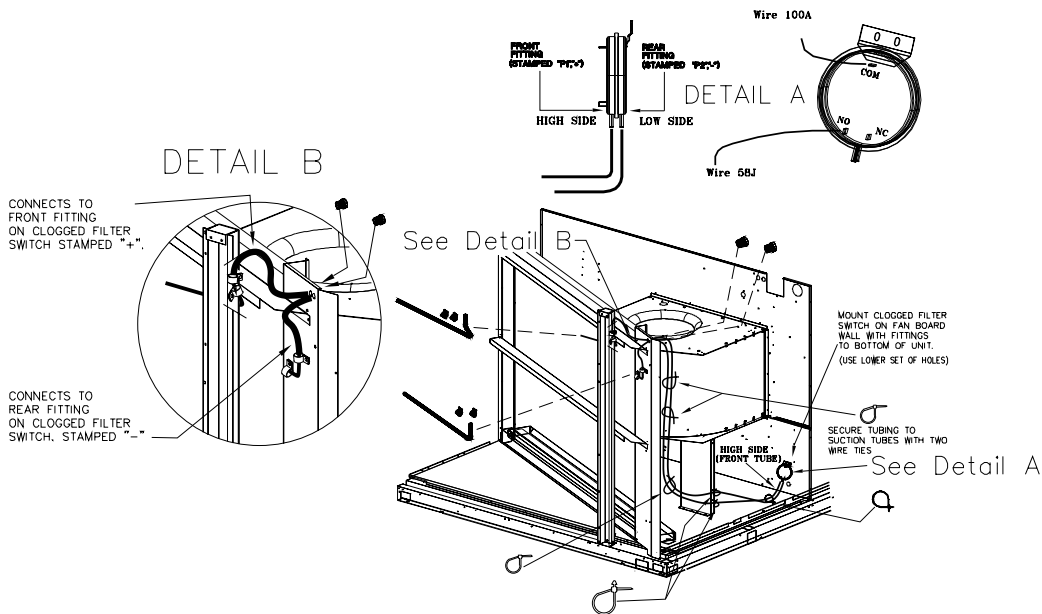
The pressure switch is factory preset at .45" WC. After a failure situation is detected and corrected, reset the Zone Sensor service light. This is done by either setting the mode switch to "OFF" for 5 seconds, then back to the desired mode or by cycling the power "OFF" then "ON" at the unit disconnect switch.

Figure 1
Reference View for TC / WC / YCD 150-301



See
 Detail A

Figure 2
Reference View for TC / WC / YCH 150-301



See Detail B

See Detail A

FIYDFPS006A
Fan Fail Switch

This accessory kit detects static pressure differentials if the indoor fan should fail.

Fan Fail

This condition shuts down operation of the unit and causes the "Service" light LED of the Zone Sensor to flash.

Settings

This device is factory preset at .07" WC. After a failure situation is detected and corrected, reset the Zone Sensor service light. This is done by either setting the mode switch to "OFF" for 5 seconds, then back to the desired mode or by cycling the power "OFF" then "ON" at the unit disconnect switch.

Figure 3
Reference View for TC / WC / YCD 150-301

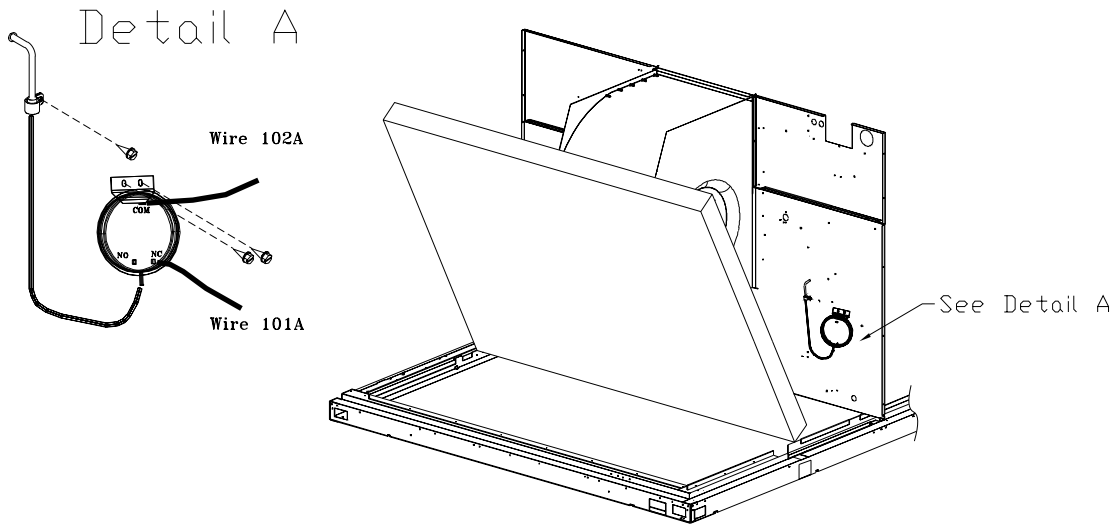
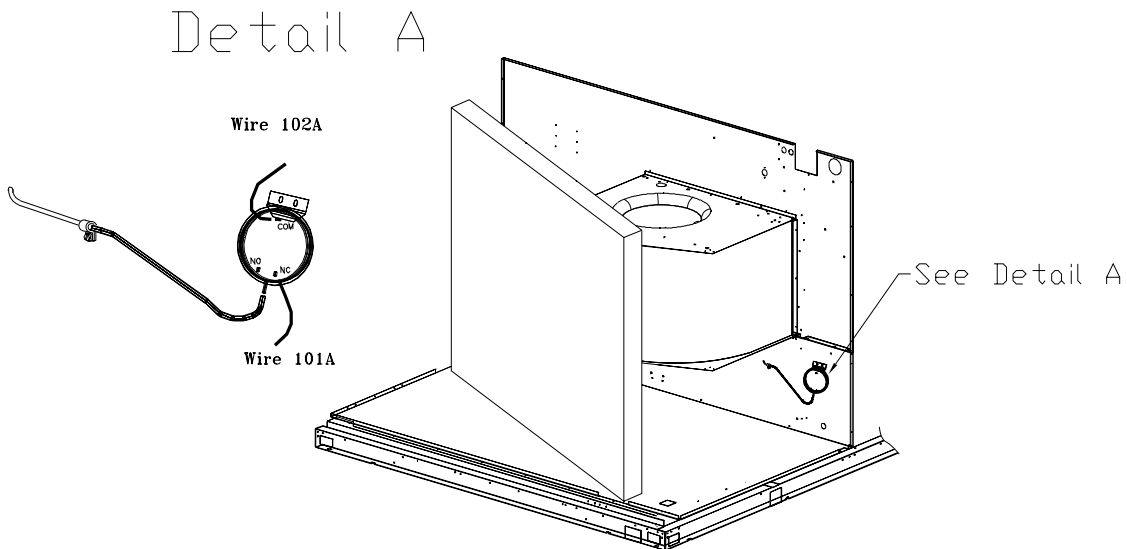


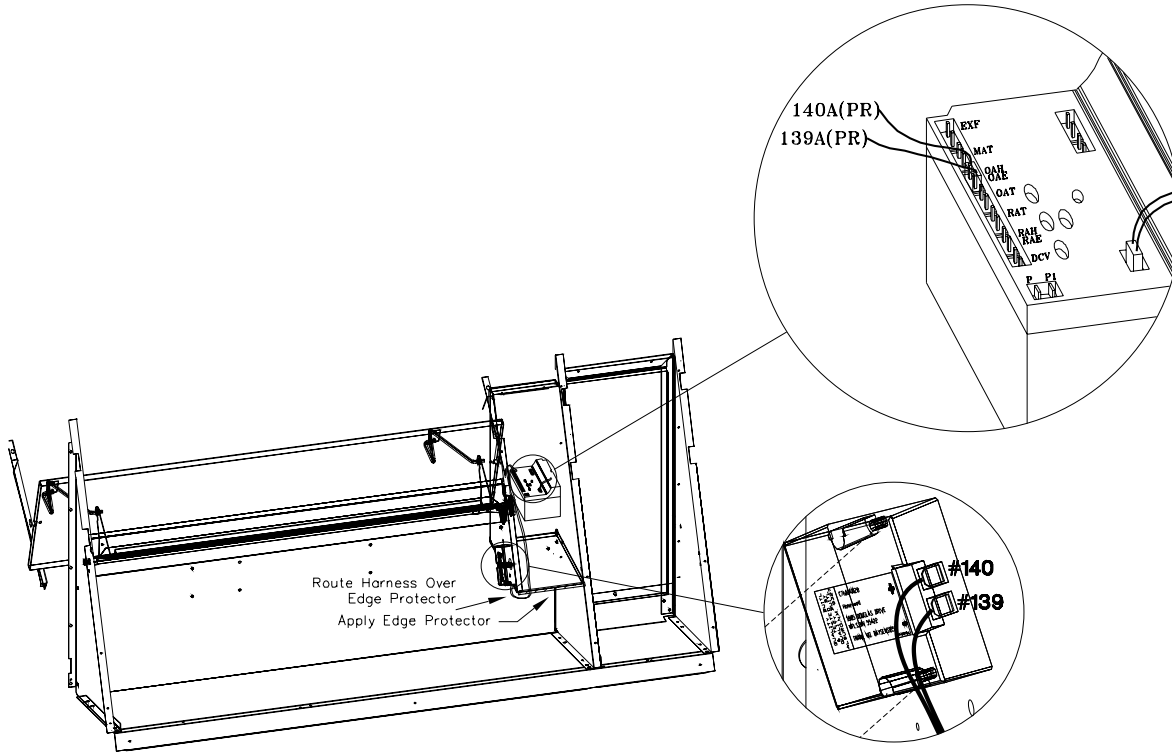
Figure 4
Reference View for TC / WC / YCH 150-301



FIYENTH007A

Reference Enthalpy

An Outdoor Humidity Sensor located in the economizer is used to measure and communicate outdoor humidity. The unit receives and uses this information to provide improved comfort cooling while using the economizer.



FIYENTH008A

Comparative Enthalpy

An Outdoor Humidity Sensor located in the economizer and a Return Humidity Sensor located in the Barometric Hood are used to provide maximum occupant comfort by maximizing the use of the economizer based on the outdoor and the indoor air conditions. By utilizing a humidity sensor and a temperature sensor in both the return air stream and the outdoor air stream, the economizer control actuator (ECA) will be able to establish which conditions are best suited for maintaining the zone temperature, i.e. indoor conditions or outdoor conditions.

Reference Enthalpy Settings

Economizer enthalpy changeover is field selectable to 4 points. See the following table for potentiometer settings. The selection is made on the ECA.

Potentiometer Setting	Dry Bulb	Enthalpy
A	73F* (22.8C)	27 Btu/lb (63 kJ/kg)
B	70F (21.1C)	25 Btu/lb (58 kJ/kg)
C	67F (19.4C)	23 Btu/lb (53 kJ/kg)
D	63F (17.2C)	22 Btu/lb (51 kJ/kg)

* Factory Setting

Economizer Control Options

Control Option	Enable Conditions*	Optional Sensors Required**
Dry Bulb (standard)	See Table Above	None
Reference Enthalpy (ReliaTel Only)	See Table Above	Outdoor Humidity (BAYENTH007A)
Comparative Enthalpy (ReliaTel Only)	Outdoor Air Enthalpy 3.0 BTU/lb. less than Return Air Enthalpy	Outdoor Humidity Return Humidity Return Temperature (BAYENTH008A)

* - Economizing is enabled when these conditions are met.

** - Conditions level will be self configured when optional sensors are connected.

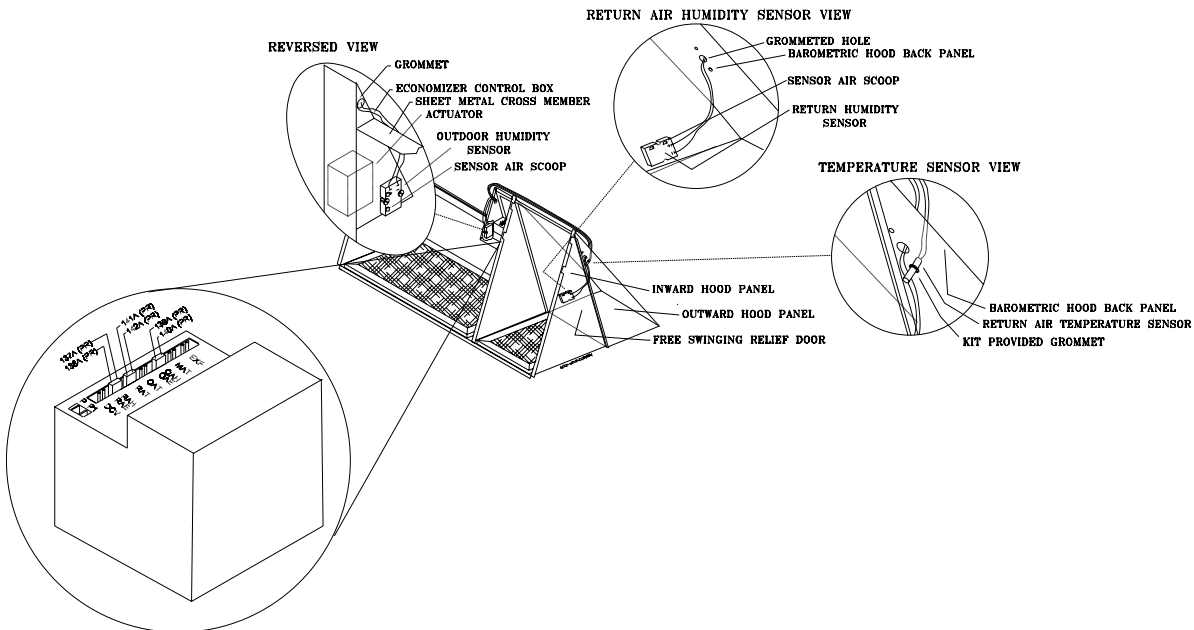
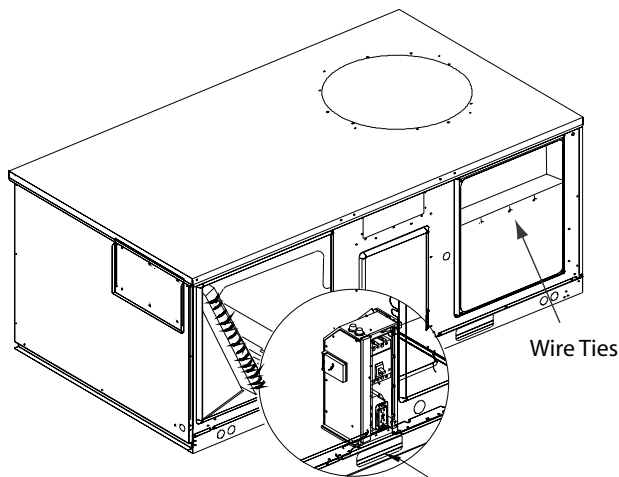


Figure 1

FIYUCB- Factory mounted unit circuit breaker
FIYUDC- Factory mounted unit disconnect



Main power entrance for units with factory mounted disconnect or circuit breaker

Note: All phases of this installation must comply with NATIONAL, STATE & LOCAL CODES. In addition to local codes, the installation must comply with National Electric Code - ANSI/NFPA NO. 70 LATEST REVISION.

Field connections are made by first removing all access panels on the front of the unit. Unscrew the assembly around the outside of the disconnect switch or circuit breaker. This assembly is located between the evaporator and heat section of the unit (See Figure 1).

The hole in the base section in Figure 2 is for both high and low voltage power wiring. The hole is sized for 1 1/4" conduit. If the conduit required for your application is larger, remove the termination plate, and connect to the larger hole using field supplied reducing washers.

Route the power wires and ground conductor through conduit and into the bottom of the factory installed disconnect switch or circuit breaker. Connect the power conductors to the lugs provided. Connect the ground wire to the unit ground lug.

Note: Wire size for the length of run should be determined using the circuit ampacity found on the unit nameplate and the N.E.C.

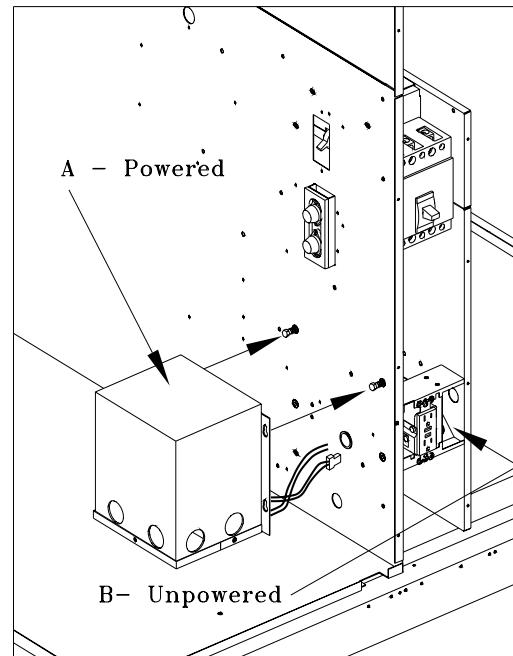
GROUNDING: The unit must be grounded in accordance with all local and national electric codes.

Route low voltage (class II), control wiring through hole in base of unit but not through high voltage conduit. Feed control wiring through bushing provided on side panel and into the flexible conduit provided in the heat section of the unit (Figure 1). Route wires through loose wire ties provided in unit as in Figure 1. Tighten the wire ties. Secure the excess wire bundle under the wire ties in the outdoor section,

do not leave excess wire in the electrical enclosure. Use the unit wiring diagram to make the low voltage connections.

Figure 2

FIYCOPO- Powered Convenience Outlet
Powered Option - Figure 2



When the powered convenience outlet option is installed, the unit will include a dedicated transformer located in the evaporator section of the unit. Additionally, a service receptacle disconnect switch will be provided on the side wall of the evaporator section. The service receptacle switch is shipped in the OFF position. **CAUTION: THE 120V. SERVICE RECEPTACLE CIRCUIT IS ENERGIZED WHEN THE UNIT DISCONNECT SWITCH/CIRCUIT BREAKER IS OPENED.** The powered outlet comes completely wired from the factory except for 208 volt applications. For 208 volt applications, disconnect and tape the blue 230 volt wire and then connect the brown 208 volt wire.

FIYCOUN- Unpowered Convenience Outlet
Unpowered Option - Figure 2

B. When the unpowered convenience outlet option is installed, remove the receptacle. The field wiring should be routed through the hole in the base (see Figure 1), then through holes provided in the "J" box (bottom for EMT and top for flexible conduit), and connect the 3 wires to terminals inside outlet box.

Figure 3
Through the Base Openings

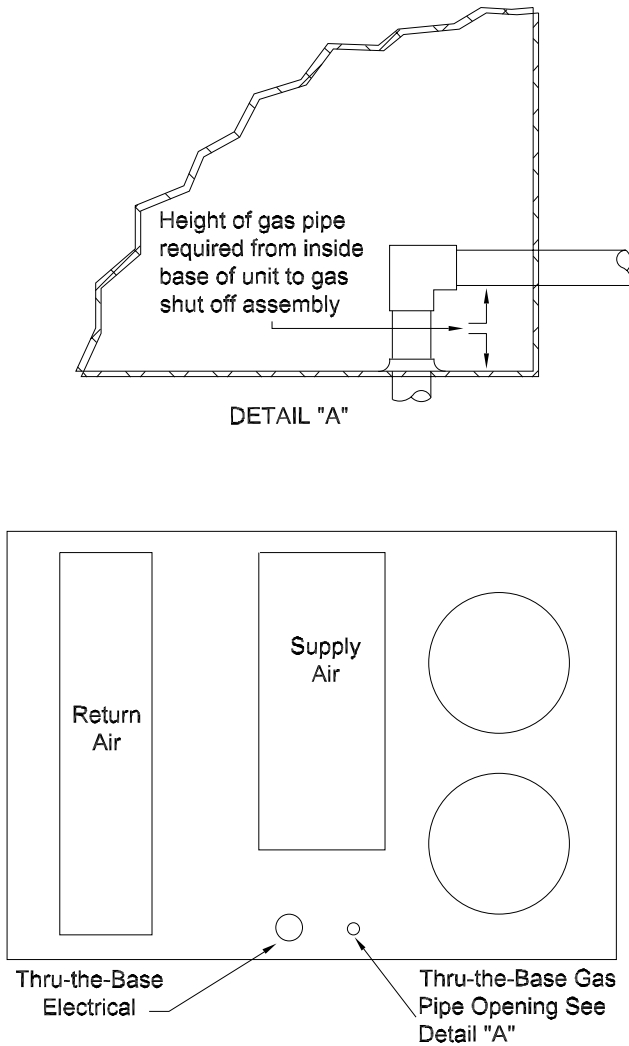
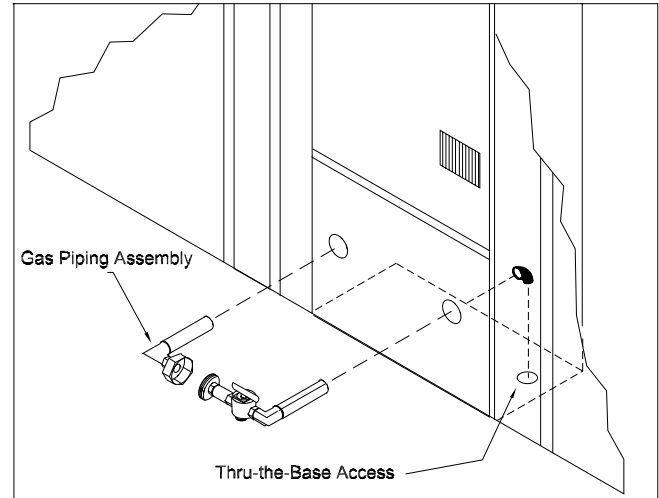


Figure 4
Gas Piping Diagram

FIYTBUG101AA
Through the Base Gas Utility Option



This section contains the instructions for making field connections to the Through the Base Gas Utility Option. For gas piping, supply and manifold pressure information see the unit Installation Operation and Maintenance Guide.

Field Installed Connections

Note: All phases of this installation must comply with NATIONAL, STATE & LOCAL CODES. In absence of local codes, the installation must conform with American National Standard-Z223.1a-National Fuel Gas Code Latest Revision.

Field connections are made by first removing the access panel for the heat section on the front of the unit, See Figure 4. The gas piping assembly ships inside this section and includes the shut-off valve, a pressure tap for testing, and the necessary unions for field connection. For through the base access, remove the factory provided cap from the base pan opening, See Figure 3. Route field piping through this hole to the dimension shown in Table 1. Place the assembly through the cabinet opening as shown in Figure 4 and make the union connection to the field piping and to the Gas Train. Refer to the unit IOM for Checkout Procedures.

IMPORTANT NOTE: THIS UNIT USES A NEGATIVE PRESSURE GAS VALVE. AT START-UP, THE OUTLET PRESSURE SHOULD BE CHECKED AND ADJUSTED IF REQUIRED TO A NEGATIVE -0.2 INCHES OF WATER COLUMN. NEVER ADJUST THE REGULATOR TO A POSITIVE PRESSURE.

Table 1

Model	Dimension
YC*150 - 301	1 3/16"

Factory Installed Economizer Set-Up 12 1/2 through 25 ton units

Each economizer ships inside the unit and requires partial assembling and setup. The following steps are illustrated throughout this section. Refer to the illustrations as the steps are performed.

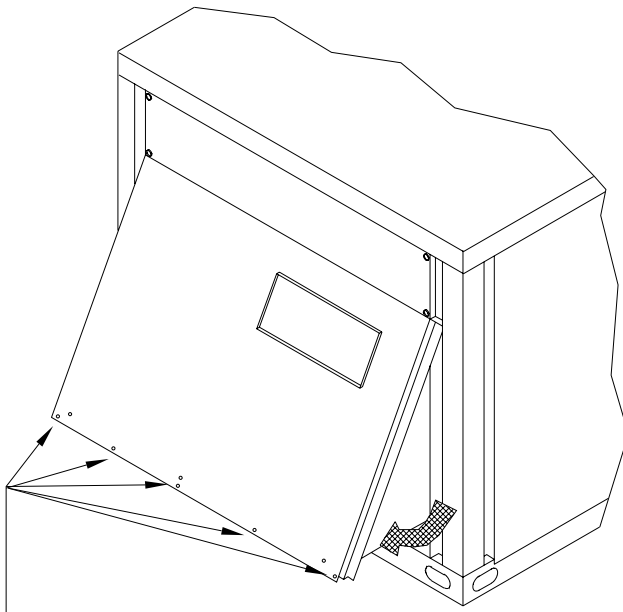
⚠ WARNING: *Open and lock the unit disconnect switch before performing the following procedures. Failure to do so could result in severe injury or death due to electrical shock or contact with moving parts.*

1. Remove the filter/fan compartment access panel.
2. Remove the five (5) lower screws in the end panel, as illustrated in Figure 5.

Note: *Do not remove the three (3) screws in the upper row of the end panel.*

3. Grasp the bottom of the end panel and pull the economizer assembly outward into the operating position, as illustrated with the arrow in Figure 5.
4. Remove approximately 3" of gasket material from the bottom of each corner post to expose the holes used to attach the economizer assembly to the unit, as illustrated in Figure 6

Figure 5



5 Lower Screws securing the end panel to the unit base

5. With the screws provided, secure both sides of the economizer assembly by inserting the screws, through the clearance holes in the bottom of the corner post, into the engagement holes in the economizer assembly. Refer to Figure 6.

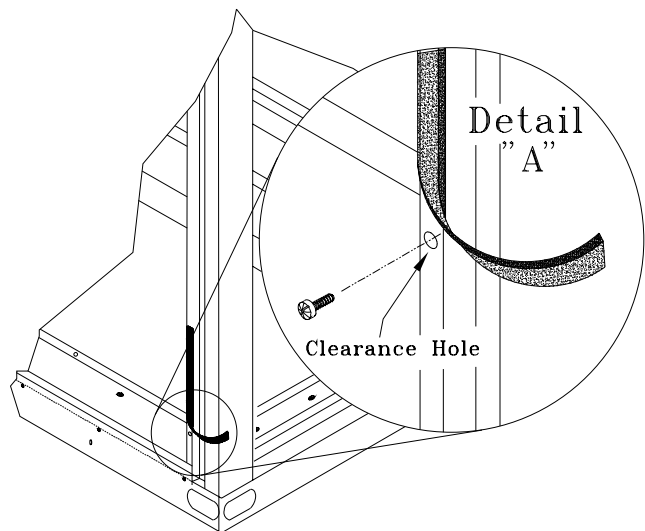
6. From inside the evaporator fan compartment, remove the following parts;

- a. block-off angle (located underneath the evaporator fan assembly)
- b. plastic bag containing;
 1. one tube of sealant
 2. screws
- c. barometric relief hood

7. The barometric relief hood ships in two (2) sections and is secured with brackets. Discard the brackets after removing the hood and install it, as follows;

Note: *If barometric relief is desired, remove the shipping screw from the barometric relief damper and ensure that it swings freely, before attaching the barometric hood.*

Figure 6

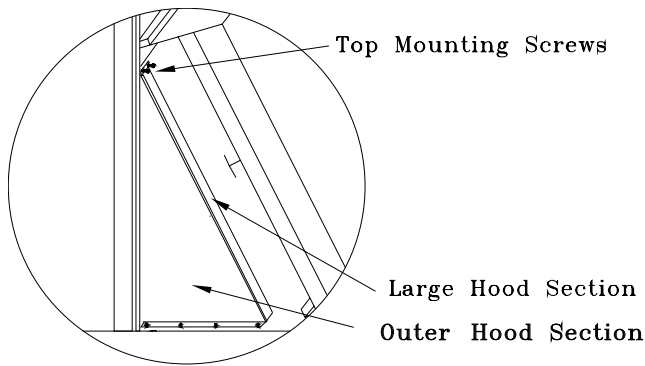


- a. Attach the larger section of the barometric relief hood to the back of the economizer assembly, using 2 screws at the top, as illustrated in Figure 7.
- b. Attach the outer section of the hood to the larger section, previously installed.
- c. With both sections assembled together, secure the completed hood at the top with two (2) screws provided, as illustrated in Figure 7.

8. Install the block-off underneath the economizer, as illustrated in Figure 8. The block-off is designed to close the opening created, between the economizer and the base, when the economizer assembly is in its operating position.

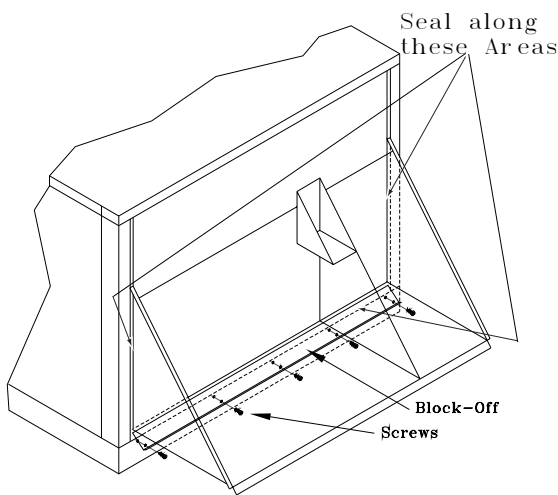
- a. Holding the block-off with the holes at the bottom and the bottom angle outward, tilt the top forward and insert it into the opening between the economizer and the unit base.
- b. Press the bottom of the block-off against the unit and line up the holes. Using the provided screws, secure it into place.

Figure 7



9. Using the sealant that shipped with the economizer, seal along each side, bottom, and any other areas that could be a potential air leak, as illustrated in Figure 8.

Figure 8



Economizer is shown with the end panel removed for illustration purposes. It is not necessary to remove this panel in the field.

10. Replace the filter/fan access panel.

11. Complete the setup and checkout procedures in the "Final Economizer Setup" section.

Economizer Setup

Minimum Position Setting

To adjust the minimum position setting and check out the economizer, the power must be connected.

Close the unit disconnect and place the zone sensor fan selector in the fan "ON" position and the heat/cool selector in the "OFF" position. This will place the damper in the minimum ventilation position.

To adjust the minimum position setting for the required ventilation air, turn the potentiometer (on the ECA) clockwise to "open" (to increase the amount of ventilation) or counter-clockwise to "close" (to decrease the amount of ventilation). The damper will open to this setting each time the blower circuit is energized.

When adjusting minimum position, the damper may move to the new setting in several small steps. Once the damper has remained in position for 10 - 15 seconds without movement, it can be assumed it is at the new position.

Replace the filter access panel.

The damper will close when the blower circuit is de-energized.

Dry Bulb Settings

Standard economizer dry bulb changeover is field selectable to 4 outdoor temperatures. See the following table for potentiometer settings. The selection is made on the ECA.

Reference Enthalpy Settings

Economizer enthalpy changeover is field selectable to 4 points. See the following table for potentiometer settings. The selection is made on the ECA.

Potentiometer Setting	Dry Bulb	Enthalpy
A	73F* (22.8C)	27 Btu/lb (63 kJ/kg)
B	70F (21.1C)	25 Btu/lb (58 kJ/kg)
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* Factory Setting

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Control Option	Enable Conditions*	Optional Sensors Required**
Dry Bulb (standard)	See Table Above	None
Reference Enthalpy (ReliaTel Only)	See Table Above	Outdoor Humidity (BAYENTH007A)
Comparative Enthalpy (ReliaTel Only)	Outdoor Air Enthalpy 3.0 BTU/lb. less than Return Air Enthalpy	Outdoor Humidity Return Humidity Return Temperature (BAYENTH008A)

* - Economizing is enabled when these conditions are met.

** - Conditions level will be self configured when optional sensors are connected.

FIYSMDT* - TCD/YCD150D, 151C, 180C, 181C, 210C, 211C, 240B, 241C, 300B, 301C, WCD150B, WCD180B, WCD240B

Return Air Smoke Detector

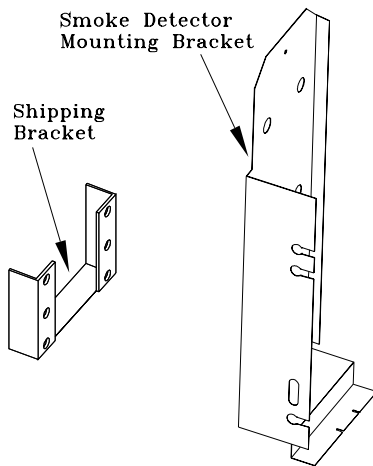
When a unit is ordered with a downflow economizer and a return air smoke detector as factory installed options, the return air smoke detector cannot be completely installed because the economizer, when it is in the shipping position, is occupying the space where the return air smoke detector is to be installed. The partial assembly and set-up required for each factory installed economizer must be completed up to the point where the barometric relief hood is to be installed into the unit. Prior to this operation, go to step #8 of [this](#) instruction and perform the operations described there. After this is completed, the economizer installation is to be completed in its entirety as outlined in the Installer's Guide.

Note: The shipping screw that holds the barometric relief damper must be removed before proceeding with the smoke detector installation.

After completion of the economizer installation as outlined above, proceed with the installation of the return air smoke detector as follows:

1. Remove the smoke detector assembly from its shipping position in the indoor fan compartment. This assembly is attached with three screws to the indoor fan board near the top of the unit.
2. Remove and discard the shipping bracket from the smoke detector assembly. This is the angled piece of sheet metal that secured the smoke detector assembly to the interior parts of the unit during shipment.

Figure 1



3. Remove the plastic cover from the smoke detector by loosening the four captive screws which secure the cover to the housing.
4. Place the end of the smoke detector 16 inch metal exhaust tube provided into the hole at the bottom of the smoke detector. Line up two of the slots on the exhaust tube flange with the two holes in the smoke detector housing and secure the exhaust tube in place with two #6-32 x 1/2" machine screws provided. See Figure 2

5. Place one of the foam air filters provided over the outside of the smoke detector inlet tube located midway up the smoke detector housing and another in the same manner on the exhaust tube. These filters are to be installed onto the tube openings that are on the cover side of the smoke detector.
6. Replace the smoke detector plastic cover. Be sure that the cover properly aligns with the red and green LED indicators and the edges of the smoke detector housing before tightening the screws.
7. Slide one two inch piece of the vinyl tubing provided onto the short smoke detector inlet tube which protrudes out of the back side of the smoke detector. Push this piece of vinyl tubing onto the inlet tube until it contacts the end of the plastic extension on the backside of the smoke detector (See Figure 2).
8. Slide the Long piece of vinyl tubing provided onto one leg of the plastic barbed elbow provided. Slide the other end of this piece of vinyl tubing with the elbow attached approximately 1" onto the end of the copper sampling tube installed in the unit's return air opening. Position the leg of elbow without the vinyl tubing such that it points towards the front side of the unit (directly out of the unit toward the filter access panel). See Figure 2
9. Mount the smoke detector assembly into the unit. Align the smoke detector (exhaust tube down) with the holes in the outer panel of the barometric relief hood and position the smoke detector flush on the panel.

Note: On all units there is a hole with a plastic snap bushing located on the inner vertical side of the barometric relief hood that the long exhaust tube must pass through. Be sure that the exhaust tube is aligned with this hole before positioning the smoke detector flush on the outer panel of the barometric relief hood.

Secure the smoke detector to the hood with two #10-16 x 3/4" sheet metal screws provided.

Note: In order to perform the last part of this operation, it will be necessary to remove the barometric relief filter, open the barometric relief damper, and reach inside through the barometric relief outlet to access and connect the copper exhaust elbow to the smoke detector exhaust tube.

10. Connect the leg of the plastic elbow without the vinyl tubing attached that was installed in step #8 above to the smoke detector inlet tube pushing it onto the piece of vinyl tubing attached to the inlet tube.
11. Refer to Figure 3 for wire connections of return air smoke detector to the unit wiring harness.
12. This completes the installation of the return air smoke detector. If the unit's air filter(s) and/or barometric relief filter were removed to ease installation of the smoke detector, they need to be replaced at this time.
13. Refer to the instructions provided below regarding unit airflow to assure that the return air smoke detector will function properly.

Note: The return air smoke detector is designed to shut off the unit if smoke is sensed in the return air stream. This function is performed by sampling the airflow entering the unit at the return air opening. Follow the instructions provided below to assure that the airflow through the unit is sufficient for adequate sampling. Failure to follow these instructions will prevent the smoke detector from performing its design function.

In order for the return air smoke detector to properly sense smoke in the return air stream, the air velocity entering the unit must be between 500 and 4000 feet per minute. Most models of equipment covered by this instruction will develop an airflow velocity that falls within these limits over the entire airflow range specified in the evaporator fan performance tables.

Certain models however, if operated at low airflow, will not develop an air velocity that falls within the required 500 to 4000 feet per minute range. For these models, the design airflow shall be greater than or equal to the minimum specified in the table provided below.

Unit Model Number	Minimum Allowable Airflow with Return Air Smoke Detector
TCD/YCD181	5300 CFM

Note: Airflow through the unit is affected by the amount of dirt and debris accumulated on the indoor coil and filters. To insure that airflow through the unit is adequate for proper sampling by the return air smoke detector, complete adherence to

the maintenance procedures, including recommended intervals between filter changes, and coil cleaning is required.

Note: Periodic checks and maintenance procedures must be performed on the smoke detector to insure that it will function properly. For detailed instructions concerning these checks and procedures, refer to the appropriate section(s) of the smoke detector Installation and Maintenance Instructions provided with the literature package for this unit.

16. Refer to the service literature provided for testing and other information about the smoke detector or if problems are encountered.

Figure 2

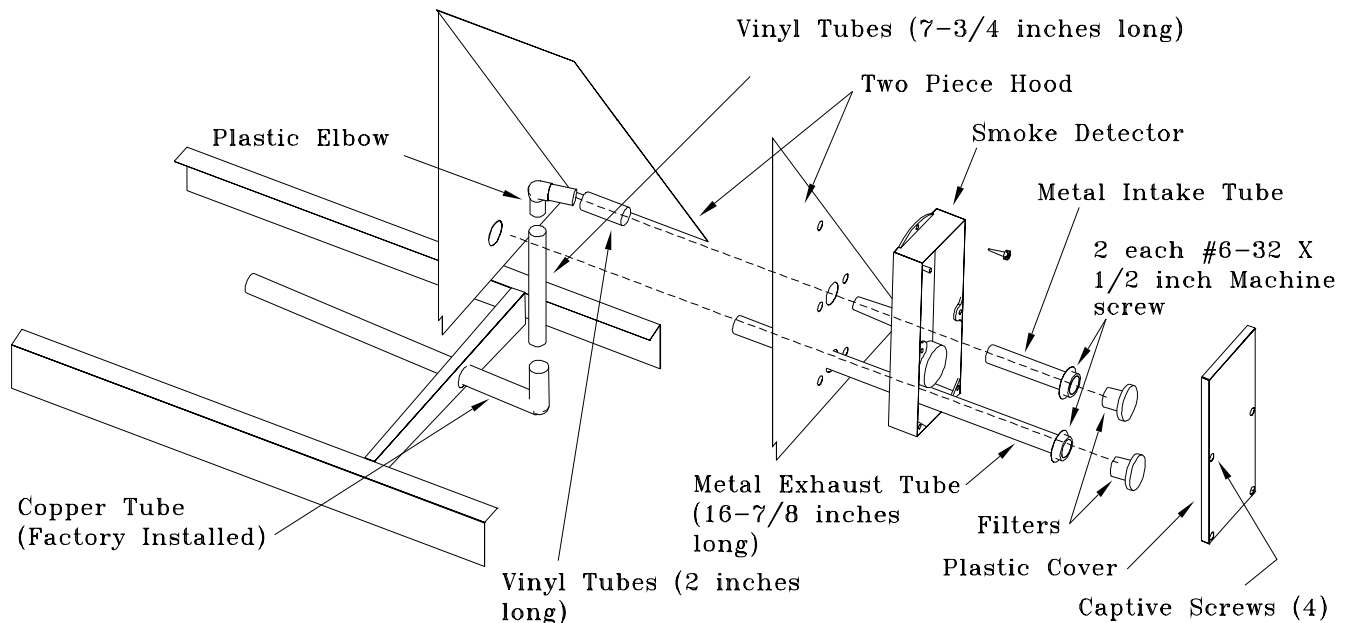
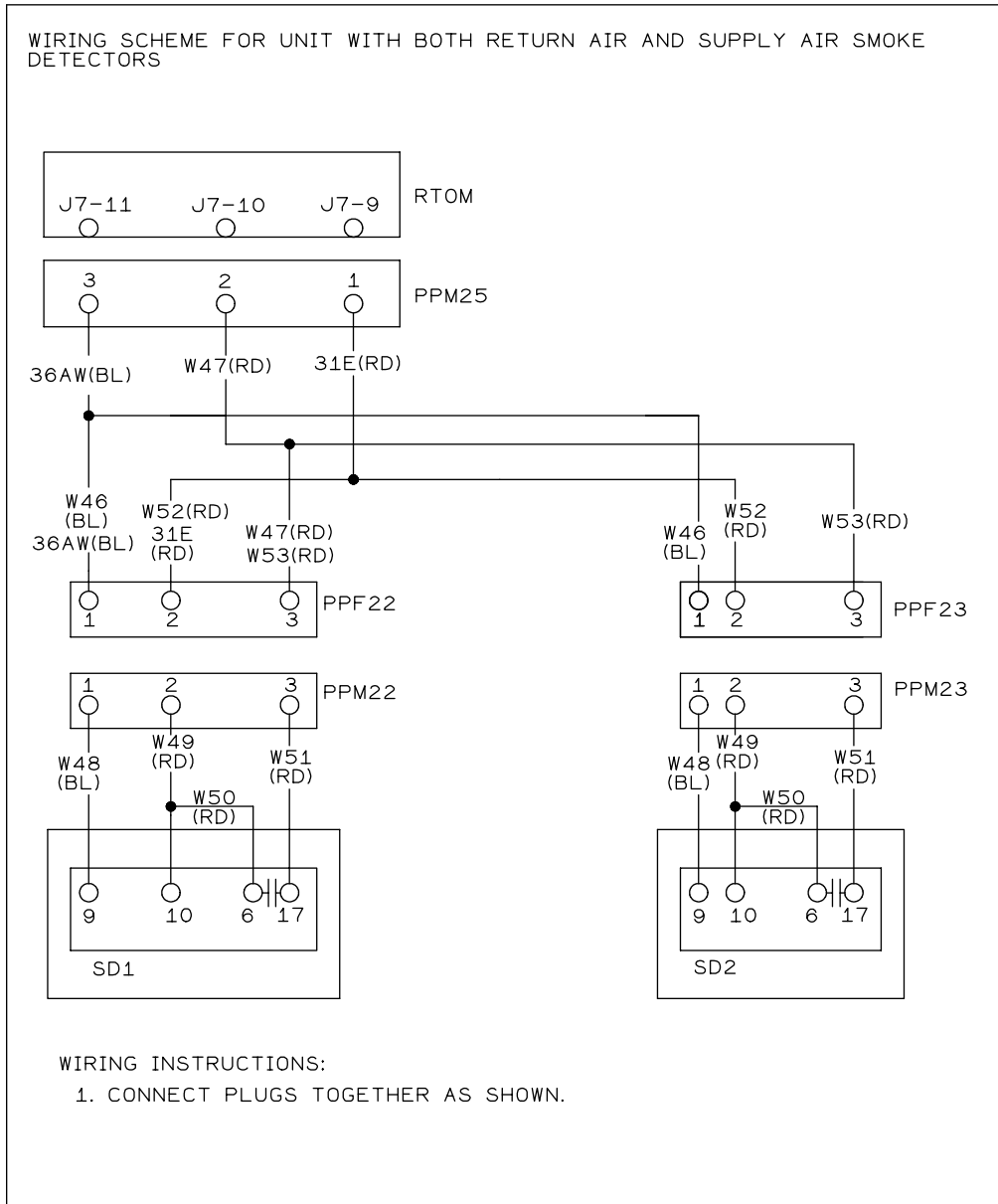


Figure 3

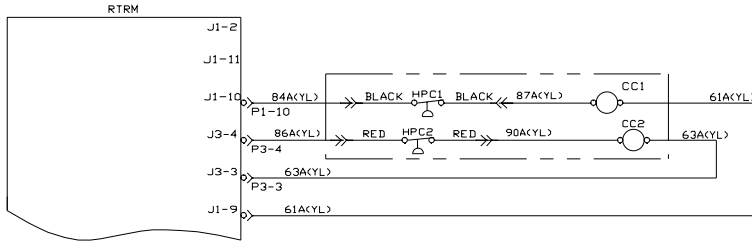


NOTES: 1. REFER TO THIS DRAWING FOR SMOKE DETECTOR INTERFACE TO UNIT. SEE UNIT DIAGRAMS FOR BALANCE OF WIRING.

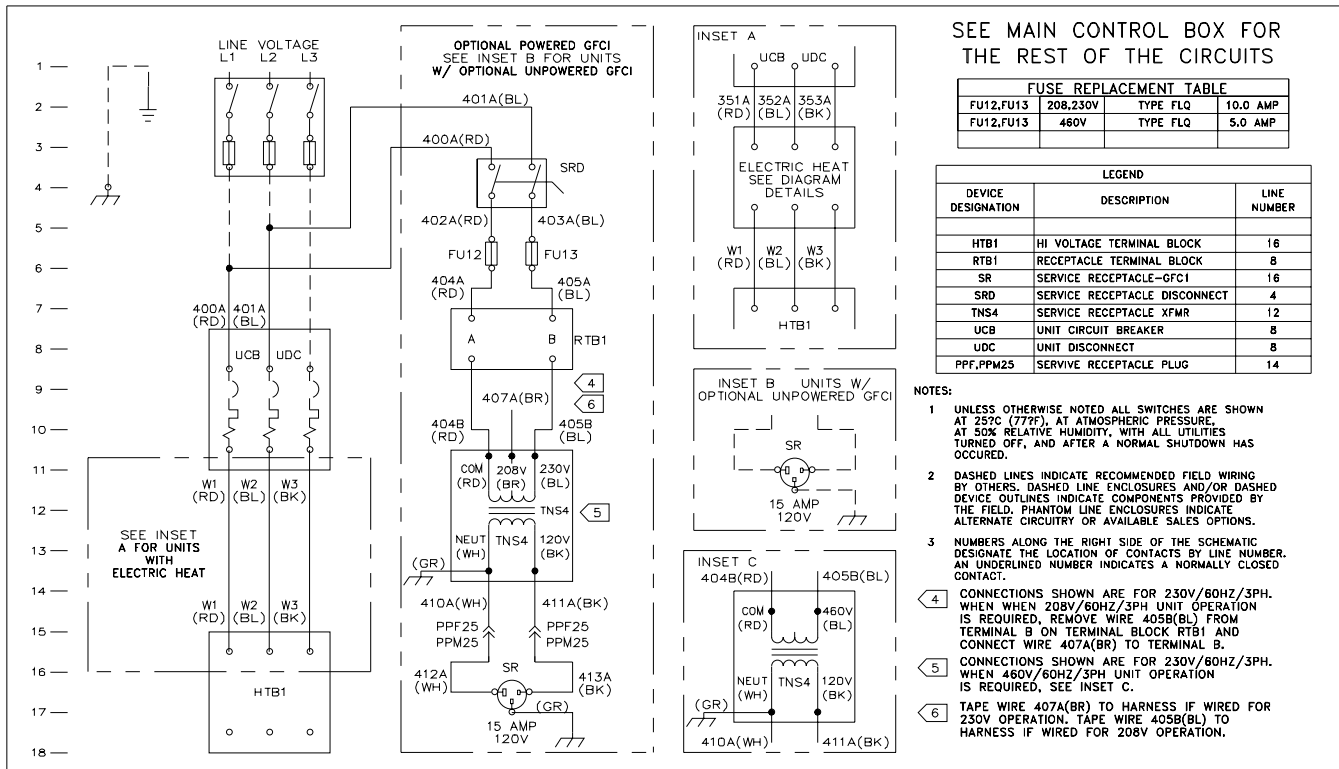
LEGEND:

- PPF22,PPM22.....RETURN AIR SMOKE DETECTOR PLUG
- PPF23,PPM23..... SUPPLY AIR SMOKE DETECTOR PLUG
- SD1.....RETURN AIR SMOKE DETECTOR
- SD2..... SUPPLY AIR SMOKE DETECTOR
- RTOM.....RELIA TEL OPTIONS MODULE
- PPM25..... SMOKE DETECTOR TO RTOM BOARD

FIYHGPC003A High Pressure Cutout Wiring

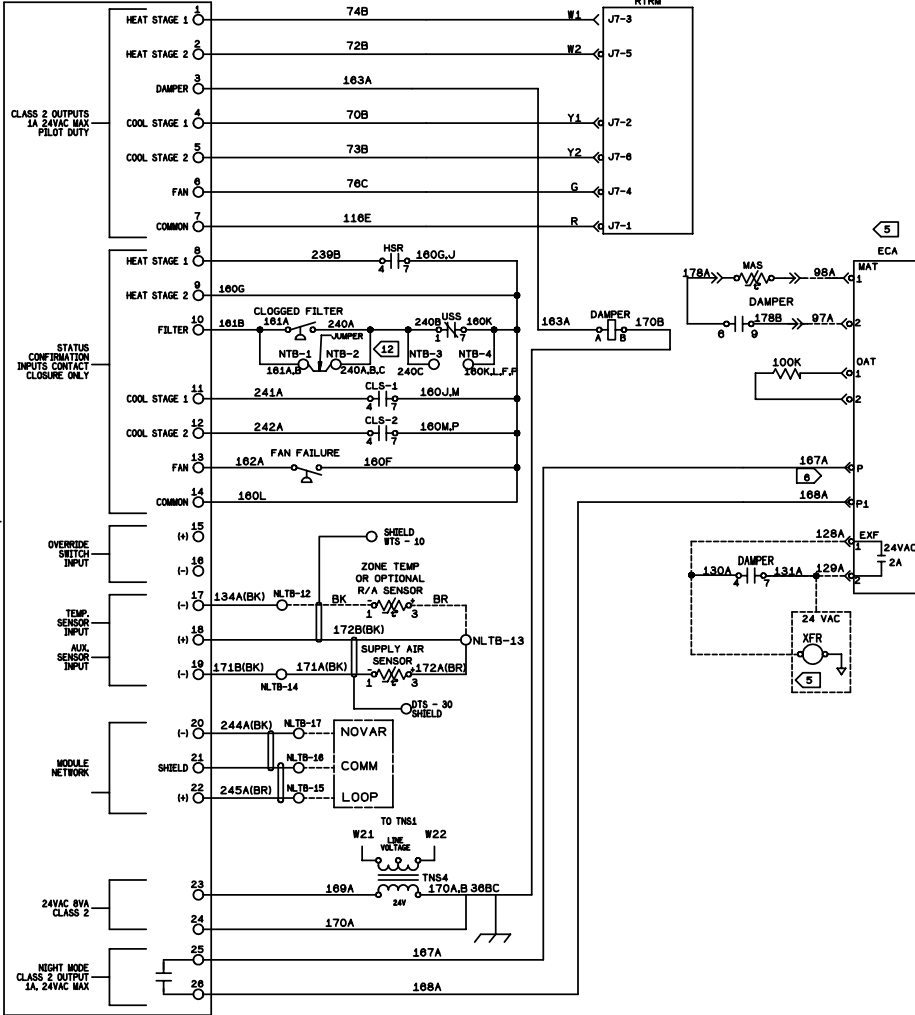


Wiring Schematics Voyager 12 1/2 ton through 25 ton Options Wiring Schematics



**Novar Interface 2024-ETM Schematics for the following units only:
TC*/YC*150, 151, 180, 210, 240, 300, 301**

NOVAR-ETM 2024

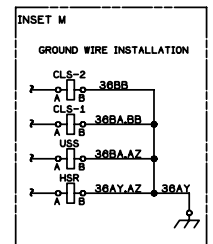
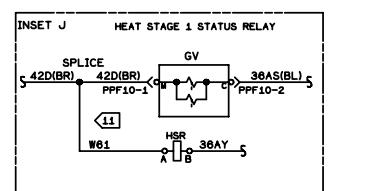
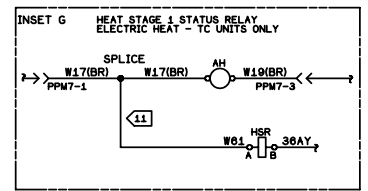
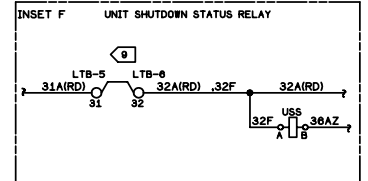
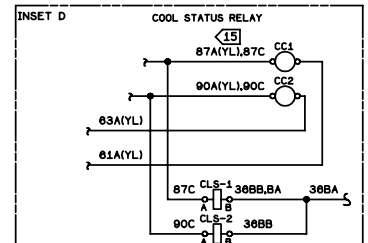


LEGEND

CLS-1	COOL STATUS RELAY STAGE 1
CLS-2	COOL STATUS RELAY STAGE 2
ECA	ECONOMIZER ACTUATOR
HSR	HEAT STATUS RELAY
LTB	LOW VOLTAGE TERMINAL BLOCK
MAS	MIXED AIR SENSOR
NTB	NOVAR TERMINAL BLOCK
RTRM	RELIAFEL REFRIGERATION MODULE
USS	UNIT SHUTDOWN STATUS RELAY
XFR	EXHAUST FAN RELAY
ZSM	ZONE SENSOR MODULE

WIRE COLOR CHART

ABBR	COLOR
BL	BLUE
BK	BLACK
PR	PURPLE
RD	RED
BR	BROWN

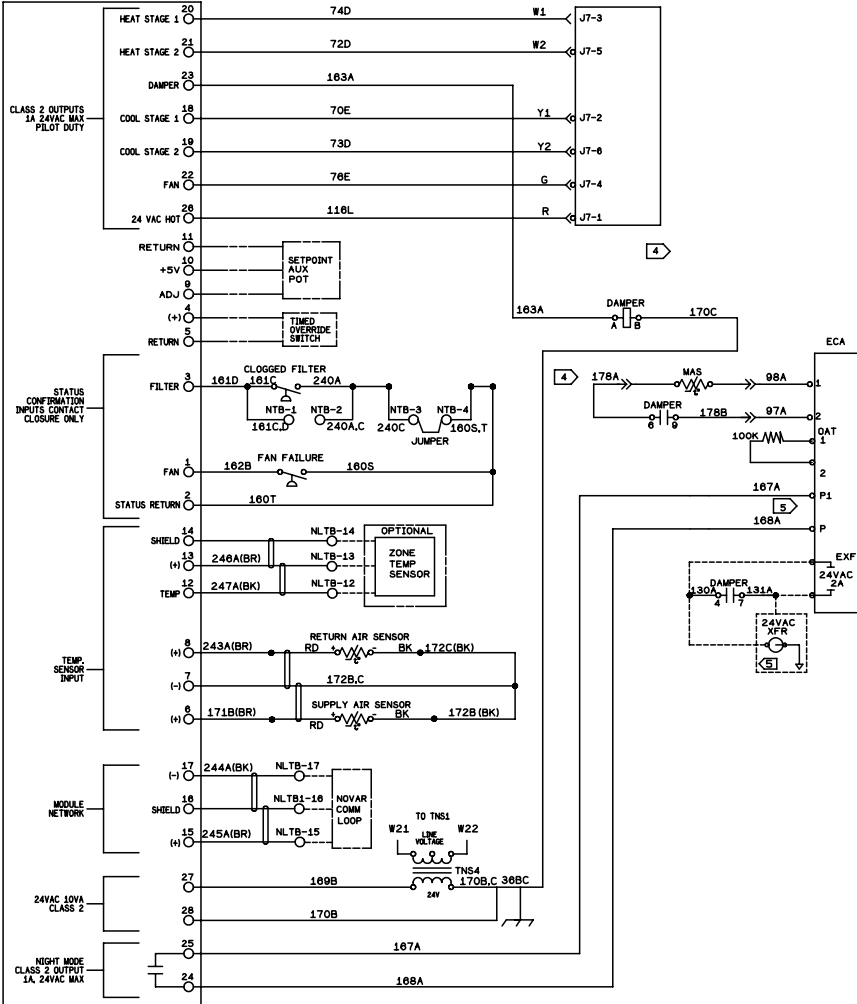


NOTES:

- 1 THIS UNIT HAS FACTORY INSTALLED NOVAR CONTROLS. REFER TO THIS DRAWING FOR NOVAR INTERFACE TO UNIT. SEE UNIT DIAGRAMS FOR BALANCE OF WIRING.
- 3 PLACE WIRING DIAGRAM LABEL ON INSIDE OF ACCESS PANEL.
- 5 ECONOMIZER ACTUATOR DRIVES TO MIN. POS. ON CALL FOR FAN. ACTUATOR WILL MODULATE TO MAINTAIN 50-55°F SUPPLY AIR ON A CALL FOR DAMPER AND OPTIONAL X-FAN WILL RUN FOR FULL OPEN ECONOMIZER REPLACE MAS WITH A JUMPER.
- 6 ECONOMIZER MIN. POS. IS OVERRIDDEN TO FULL CLOSED DURING UNOCCUPIED PERIODS. PLACE JUMPER BETWEEN P AND P1 TO DISABLE THIS FUNCTION.
- 8 TO SHUT DOWN THE UNIT FOR EMERGENCY STOP, REMOVE JUMPER AND WIRE SMOKE DETECTOR BETWEEN THE TERMINALS. RELABEL/REASSIGN NOVAR "FILTER STATUS" INPUT AS "SMOKE DETECTOR STATUS."
- 10. FOR STATUS RELAY GROUND WIRE CONNECTIONS SEE INSET M.
- 11 CONNECT WIRE W61 IN THE HEAT SECTION OF THE UNIT AT THE GAS VALVE OR ELECTRIC HEAT RELAY.
- 12 TO USE NOVAR STATUS INPUT AS CLOGGED FILTER, REMOVE THE JUMPER FROM NTB-1.2 AND INSTALL ON NTB-3.4.
- 15 CONNECT WIRE 87C WITH WIRE 87A(YL) AT CC1 AND WIRE 90C WITH WIRE 90A(YL) AT CC2.

**Novar Interface 3051-ETMSchematics for the following units only:
TC*/YC* 181, 211, 241, 301**

NOVAR ETM-3051



LEGEND	
ECA	ECONOMIZER ACTUATOR
LTB	LOW VOLTAGE TERMINAL BLOCK
MAS	MIXED AIR SENSOR
NTB	NOVAR TERMINAL BLOCK
RTRM	RELIATEL REFRIGERATION MODULE
XFR	EXHAUST FAN RELAY
XFM	EXHAUST FAN MOTOR
ZSM	ZONE SENSOR MODULE
	ZONE TEMP SENSOR
	NOVAR WTS - SOS
	RETURN AIR SENSOR
	NOVAR RTS - UVF
	SUPPLY AIR SENSOR
	NOVAR RTS - UVC

WIRE COLOR CHART	
ABBR	COLOR
BL	BLUE
BK	BLACK
PR	PURPLE
RD	RED
BR	BROWN

NOTES:

- 1 REFER TO THIS DRAWING FOR NOVAR INTERFACE TO UNIT. SEE UNIT DIAGRAMS FOR BALANCE OF WIRING.
- 2 PLACE WIRING DIAGRAM LABEL ON INSIDE OF ACCESS PANEL.
- 3 PLUG PPM6A TO PPF8. ALSO PLUG WIRES 126A(BK) AND 129A(BK) INTO UNIT WIRES WHEN OPTIONAL X-FAN IS INSTALLED.
- 4 ECONOMIZER ACTUATOR DRIVES TO MIN. POS. ON CALL FOR FAN. ACTUATOR WILL MODULATE TO MAINTAIN 30-55°F SUPPLY AIR ON A CALL FOR DAMPER AND OPTIONAL X-FAN WILL RUN FOR FULL OPEN ECONOMIZER REPLACE MAS WITH A JUMPER.
- 5 ECONOMIZER MIN. POS. IS OVERRIDDEN TO FULL CLOSED DURING UNOCCUPIED PERIODS. PLACE JUMPER BETWEEN P AND P1 TO DISABLE THIS FUNCTION.