Carrier®

62DA,DB,DC,DD07-38 Dedicated Vertical or Horizontal 100% Outdoor Air Unit with Optional Energy Conservation Wheel

Controls and Start-Up

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SAFETY CONSIDERATIONS

Installation and servicing of air-conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair, or service air-conditioning equipment. Untrained personnel can perform the basic maintenance functions of replacing filters. Trained service personnel should perform all other operations.

When working on air-conditioning equipment, observe precautions in the literature, tags and labels attached to the unit, and other safety precautions that may apply. Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloth for unbrazing operations. Have fire extinguishers available for all brazing operations.

⚠ WARNING

Before performing service or maintenance operation on unit turn off and lock off main power switch to unit. Electrical shock can cause personal injury and death. Shut off all power to this equipment during installation and service. The unit may have an internal non-fused disconnect or a field-installed disconnect. **Note that the unit may also be equipped with a convenience outlet, that this outlet is wired to the line side of the unit-mounted disconnect and will remain hot when the disconnect in the unit is off. There is a separate fuse/ disconnect for the convenience outlet.**

⚠ CAUTION

This unit uses a microprocessor-based electronic control system. ***Do not*** use jumpers or other tools to short out components or to bypass or otherwise depart from recommended procedures. Any short-to-ground of the control board or accompanying wiring may destroy the electronic modules or electrical components.

⚠ WARNING

1. Improper installation, adjustment, alteration, service, or maintenance can cause property damage, personal injury, or loss of life. Refer to the User's Information Manual provided with this unit for more details.
2. Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

What to do if you smell gas:

1. DO NOT try to light any appliance.
2. DO NOT touch any electrical switch, or use any phone in your building.
3. IMMEDIATELY call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.

If you cannot reach your gas supplier call the fire department.

GENERAL

This book contains Start-Up, Controls Operation, Troubleshooting and Service information for the 62D dedicated outdoor air units. See Fig. 1. The accessory BACview display may be used for configuration and monitoring of controls.

Use this guide in conjunction with the separate installation instructions packaged with the unit. Refer to the unit wiring diagrams for more detailed wiring information.

The Carrier dedicated outdoor air unit utilizes highly efficient scroll compressors that have been optimally designed for use with Puron® refrigerant (R-410A). Operating efficiency of the unit may be increased by adding the optional energy recovery system. The energy recovery system uses an AHRI (Air Conditioning, Heating, and Refrigeration Institute) listed energy recovery wheel to transfer sensible and latent heat between the incoming air and the exhaust air, reducing energy consumption and improving indoor conditions.

All 62DA and DB units bring in 100% outdoor air through the outdoor air intake hood and do not have a return air connection. The 62DA units have a vertical supply duct opening in the bottom of the unit. The 62DB units have a horizontal supply duct opening in the side of the unit.

All 62DC and DD units bring in 100% outdoor air through the outdoor air intake hood. They may also be equipped with factory-installed power exhaust and/or an energy conservation wheel. The return air is not recirculated or mixed with the incoming outdoor air. The return air may be used to transfer energy to the incoming air with the energy conservation wheel and is then exhausted. The 62DC units have vertical supply and return duct openings in the bottom of the unit. The 62DD units have a horizontal supply duct opening in the side of the unit and a vertical return duct opening in the bottom of the unit.

62 DA A 0 34 – A C 6 2 1 A A CA

62 – Dedicated Outdoor Air Unit

Configuration
- **DA** – 100% OA Vertical Supply / No Return
- **DB** – 100% OA Horizontal Supply / No Return
- **DC** – 100% OA Vertical Supply / Vertical Return
- **DD** – 100% OA Horizontal Supply / Vertical Return

Heat Options*
- **-** – None
- **A** – 75,000 Btuh Gas Heat
- **B** – 100,000 Btuh Gas Heat
- **C** – 150,000 Btuh Gas Heat
- **D** – 200,000 Btuh Gas Heat
- **E** – 250,000 Btuh Gas Heat
- **F** – 300,000 Btuh Gas Heat
- **G** – 400,000 Btuh Gas Heat
- **H** – 500,000 Btuh Gas Heat
- **J** – 600,000 Btuh Gas Heat
- **K** – 75,000 Btuh Gas Heat with Override†
- **L** – 100,000 Btuh Gas Heat with Override†
- **M** – 150,000 Btuh Gas Heat with Override†
- **N** – 200,000 Btuh Gas Heat with Override†
- **P** – 250,000 Btuh Gas Heat with Override†
- **Q** – 300,000 Btuh Gas Heat with Override†
- **R** – 400,000 Btuh Gas Heat with Override†
- **S** – 500,000 Btuh Gas Heat with Override†
- **T** – 600,000 Btuh Gas Heat with Override†
- **W** – Hot Water Heating Coil**
- **Y** – Steam Heating Coil**
- **1** – 7.5 / 10 kW Elect Heat
- **2** – 11.3 / 15 kW Elect Heat
- **3** – 15 / 20 kW Elect Heat
- **4** – 18.8 / 25 kW Elect Heat
- **5** – 22.6 / 30 kW Elect Heat
- **6** – 26.3 / 35 kW Elect Heat
- **7** – 30 / 40 kW Elect Heat
- **8** – 35.7 / 50 kW Elect Heat
- **9** – 45 / 60 kW Elect Heat

Energy Conservation Wheel (ECW) Options ††
- **0** – None
- **A** – ECW (36 in.)
- **B** – ECW (42 in.)
- **C** – ECW (48 in.)
- **D** – ECW (54 in.)
- **E** – ECW (36 in.) with Byp
- **F** – ECW (42 in.) with Byp
- **G** – ECW (48 in.) with Byp
- **H** – ECW (54 in.) with Byp
- **J** – ECW (36 in.) with VFD TD
- **K** – ECW (42 in.) with VFD TD
- **L** – ECW (48 in.) with VFD TD
- **M** – ECW (54 in.) with VFD TD
- **N** – ECW (36 in.) with Byp and VFD TD
- **P** – ECW (42 in.) with Byp and VFD TD
- **Q** – ECW (48 in.) with Byp and VFD TD
- **R** – ECW (54 in.) with Byp and VFD TD

Unit Size – Nominal Tons
- **07** – 6
- **08** – 7
- **09** – 8
- **12** – 10 (9***)
- **14** – 12 (11***)
- **15** – 14 (13***)
- **16** – 15
- **20** – 18
- **22** – 19 (18***)
- **24** – 20
- **30** – 27 (25***)
- **34** – 30
- **38** – 35

SEE NEXT PAGE FOR REMAINDER OF MODEL NUMBER NOMENCLATURE

Supply Fan Motor Options
- **A** – 1/2 HP
- **B** – 3/4 HP
- **C** – 1 HP
- **D** – 1 1/2 HP
- **E** – 2 HP
- **F** – 3 HP
- **G** – 5 HP
- **H** – 7 1/2 HP
- **J** – 10 HP
- **K** – 15 HP
- **L** – 20 HP
- **N** – 1 HP with VFD
- **P** – 1 1/2 HP with VFD
- **Q** – 2 HP with VFD
- **R** – 3 HP with VFD
- **S** – 5 HP with VFD
- **T** – 7 1/2 HP with VFD
- **V** – 10 HP with VFD
- **W** – 15 HP with VFD
- **X** – 20 HP with VFD

Control Options
- **-** – None
- **A** – Filter Status Switch
- **B** – Phase / Voltage Monitor with EM Relay
- **C** – Firestat
- **D** – RA Smoke Detector
- **F** – Filter Status Switch and Phase / Voltage Monitor with EM Relay
- **G** – Filter Status Switch and Firestat
- **H** – Filter Status Switch and RA Smoke Detector
- **K** – Phase / Voltage Monitor with EM Relay and Firestat
- **L** – Phase / Voltage Monitor with EM Relay and RA Smoke Detector
- **N** – Firestat and RA Smoke Detector
- **R** – Filter Status Switch and Phase / Voltage Monitor with EM Relay and Firestat
- **S** – Filter Status Switch and Phase / Voltage Monitor with EM Relay and RA Smoke Detector
- **V** – Filter Status Switch and Firestat and RA Smoke Detector
- **Y** – Phase / Voltage Monitor with EM Relay and Firestat and RA Smoke Detector
- **3** – Filter Status Switch and Phase / Voltage Monitor with EM Relay and Firestat and RA Smoke Detector

Fig. 1 — Model Number Information

62 DA A 0 34 – A C 6 2 1 A A CA

SEE PREVIOUS PAGE FOR REMAINDER OF MODEL NUMBER NOMENCLATURE

Coil Options
- **C** – Al/Cu Cond, Al/Cu 4-Row Evap, no HGBP, no HGRH, with Vari-Speed Cond Fan
- **D** – Al/Cu Cond, Al/Cu 4-Row Evap, with HGBP, no HGRH, with Cycling Cond Fan
- **E** – Al/Cu Cond, Al/Cu 4-Row Evap, with HGBP, no HGRH, with Vari-Speed Cond Fan
- **H** – Al/Cu Cond, Al/Cu 4-Row Evap, with HGBP, Cycling HGRH on Lead Circuit with Vari-Speed Cond Fan
- **J** – Al/Cu Cond, Al/Cu 4-Row Evap, with HGBP, Cycling HGRH on Both Circuits, with Vari-Speed Cond Fan
- **M** – Al/Cu Cond, Al/Cu 4-Row Evap, with HGBP, Modulating HGRH on Lead Circuits, with Vari-Speed Cond Fan
- **N** – Al/Cu Cond, Al/Cu 4-Row Evap, with HGBP, Modulating HGRH on Both Circuits, with Vari-Speed Cond Fan
- **S** – Al/Cu Cond, Al/Cu 6-Row Evap, no HGBP, no HGRH, with Vari-Speed Cond Fan
- **T** – Al/Cu Cond, Al/Cu 6-Row, with Lead Circuit HGBP, no HGRH, with Cycling Cond Fan
- **V** – Al/Cu Cond, Al/Cu 6-Row Evap, with Lead Circuit HGBP, no HGRH, with Vari-Speed Cond Fan
- **Y** – Al/Cu Cond, Al/Cu 6-Row Evap, with Lead Circuit HGBP, Cycling HGRH on Lead Circuit with Vari-Speed Cond Fan
- **Z** – Al/Cu Cond, Al/Cu 6-Row Evap, with Lead Circuit HGBP, Cycling HGRH on Both Circuits with Vari-Speed Cond Fan
- **3** – Al/Cu Cond, Al/Cu 6-Row Evap, with Lead Circuit HGBP, Modulating HGRH on Lead Circuit with Vari-Speed Cond Fan
- **4** – Al/Cu Cond, Al/Cu 6-Row Evap, with Lead circuit HGBP, Modulating HGRH on Both Circuits, with Vari-Speed Cond Fan
- **7** – Al/Cu Cond, Al/Cu 6-Row Evap, with Lead Circuit HGBP, Cycling HGRH on Both Circuits, with Vari-Speed Cond Fan, with Sub Cooling on All Circuits
- **8** – Al/Cu Cond, Al/Cu 6-Row Evap, with Lead Circuit HGBP, Modulating HGRH on Both Circuits, with Vari-Speed Cond Fan, with Sub Cooling on All Circuits

Voltage Options
- **1** – 575-3-60 with Std Compressor
- **4** – 208-3-60 with Std Compressor
- **5** – 230-3-60 with Std Compressor
- **6** – 460-3-60 with Std Compressor
- **A** – 575-3-60 with Digital Compressor
- **B** – 208-3-60 with Digital Compressor
- **C** – 230-3-60 with Digital Compressor
- **D** – 460-3-60 with Digital Compressor
- **E** – 575-3-60 with Std Compressor and LonWorks
- **F** – 208-3-60 with Std Compressor and LonWorks
- **G** – 230-3-60 with Std Compressor and LonWorks
- **H** – 460-3-60 with Std Compressor and LonWorks
- **J** – 575-3-60 with Digital Compressor and LonWorks
- **K** – 208-3-60 with Digital Compressor and LonWorks
- **L** – 230-3-60 with Digital Compressor and LonWorks
- **M** – 460-3-60 with Digital Compressor and LonWorks

Factory Installed Options
Refer to price pages for available option codes

Fan Size
- **A** – Standard FC Supply Fan
- **B** – Standard BC Supply Fan
- **C** – Standard AF Supply Fan
- **D** – Oversize AF Supply Fan
- **E** – Standard BI Supply Fan
- **F** – Oversize BI Supply Fan
- **G** – Standard FC Supply Fan and Standard FC Exhaust Fan
- **H** – Standard FC Supply Fan and Oversize FC Exhaust Fan
- **J** – Standard FC Supply Fan and Standard BC Supply Fan
- **K** – Standard FC Supply Fan and Standard AF Exhaust Fan
- **L** – Standard BC Supply Fan and Standard FC Exhaust Fan
- **M** – Standard BC Supply Fan and Oversize FC Exhaust Fan
- **N** – Standard BC Supply Fan and Standard BC Exhaust Fan
- **P** – Standard BC Supply Fan and Standard AF Exhaust Fan
- **Q** – Standard AF Supply Fan and Standard FC Exhaust Fan
- **R** – Standard AF Supply Fan and Oversize FC Exhaust Fan
- **S** – Standard AF Supply Fan and Standard BC Exhaust Fan
- **T** – Standard AF Supply Fan and Standard AF Exhaust Fan
- **V** – Standard AF Supply Fan and Oversize AF Exhaust Fan
- **W** – Oversize AF Supply Fan and Standard BC Exhaust Fan
- **X** – Oversize AF Supply Fan and Standard AF Exhaust Fan
- **Y** – Oversize AF Supply Fan and Oversize AF Exhaust Fan
- **Z** – Standard BI Supply Fan and Standard FC Exhaust Fan
- **1** – Standard BI Supply Fan and Oversize FC Exhaust Fan
- **2** – Standard BI Supply Fan and Standard BC Exhaust Fan
- **3** – Standard BI Supply Fan and Standard AF Exhaust Fan
- **4** – Standard BI Supply Fan and Oversize AF Exhaust Fan
- **5** – Oversize BI Supply Fan and Standard Exhaust Fan
- **6** – Oversize BI Supply Fan and Oversize FC Exhaust Fan
- **7** – Oversize BI Supply Fan and Standard BC Exhaust Fan
- **8** – Oversize BI Supply Fan and Standard AF Exhaust Fan
- **9** – Oversize BI Supply Fan and Oversize AF Exhaust Fan

Exhaust Fan Motor Options
- **-** – None
- **A** – 1/2 HP
- **B** – 3/4 HP
- **C** – 1 HP
- **D** – 1 1/2 HP
- **E** – 2 HP
- **F** – 3 HP
- **G** – 5 HP
- **H** – 7 1/2 HP
- **J** – 10 HP
- **K** – 15 HP
- **L** – 20 HP
- **N** – 1 HP with VFD
- **P** – 1 1/2 HP with VFD
- **Q** – 2 HP with VFD
- **R** – 3 HP with VFD
- **S** – 5 HP with VFD
- **T** – 7 1/2 HP with VFD
- **V** – 10 HP with VFD
- **W** – 15 HP with VFD
- **X** – 20 HP with VFD

Packaging / Filter Options
- **1** – Domestic / 2" MERV 8 Filter
- **A** – Domestic / 2" Metal Mesh Filter
- **B** – Domestic / 4" MERV 8 Filter
- **C** – Domestic / 4" MERV 11 Filter
- **D** – Domestic / 4" MERV 15 Filter
- **E** – Domestic / 2" MERV 8 Filter and 2" MERV 8 ECW Filter
- **F** – Domestic / 2" Metal Mesh Filter and 2" MERV 8 ECW Filter
- **G** – Domestic / 4" MERV 8 Filter and 4" MERV 8 ECW Filter
- **H** – Domestic / 4" MERV 11 Filter and 4" MERV 8 ECW Filter
- **J** – Domestic / 4" MERV 14 Filter and 4" MERV 8 ECW Filter

Design Series
- **2** – Revision 2

LEGEND

AF	— Airfoil	**FC**	— Forward Curve
Al	— Aluminum	**HGBP**	— Hot Gas Bypass
BC	— Backward Curve	**HGRH**	— Hot Gas Reheat
BI	— Backward Inclined	**OA**	— Outdoor Air
Byp	— Bypass	**RA**	— Return Air
Cu	— Copper	**TD**	— Temperature Defrost
EM	— Energy Management	**VFD**	— Variable Frequency Drive

* Horizontal units with heat require a BI fan.
† Use with modulating gas heat only.
** Control valves must be field supplied.
†† Energy Conservation Wheel (ECW) options are not available on DA and DB models.
*** Recirculating unit.

Fig. 1 — Model Number Information (cont)

BASIC CONTROL USAGE

Controller — The 62D units are equipped with a stand-alone microprocessor-based controller that provides complete system control of unit operation. See Fig. 2 for typical controller components. The controller monitors all system sensors and makes operating decisions based upon the user's configuration inputs. See Fig. 3.

A scheduling function, programmed by the user, controls the occupied/unoccupied schedule. Up to 4 daily schedules, 12 holiday schedules, and 2 override schedules may be programmed.

Local access to the microprocessor control may be accomplished via the BACview handheld keypad/display unit (BV6H). See Fig. 4. Recommended application is one BACview display per jobsite.

The microprocessor control is capable of operating in a stand-alone control mode and also supports communications with BACnet*, Modbus†, and optionally LonWorks** building automation protocols.

In addition, the microprocessor control has the following features:

- simple access to set points, time schedules, status values, and unit configuration parameters
- alarm conditions are indicated via an alarm LED (light emitting diode) and/or an audible signal
- password protection
- compressor minimum off time (5 minutes) feature
- service diagnostic mode
- field-installed room temperature sensor (RS)
- an on/off switch that may be used to cycle the controller
- a battery to maintain time and date in the event of a power outage (do not remove the battery when power is off)
- DIP switches to configure communication baud rate and protocol

The IO Flex 6126 controller has 6 binary outputs, 12 universal inputs and 6 analog outputs. The binary outputs have n/o and n/c contacts used to turn components on or off. The universal inputs are used to monitor input from various sensors. These universal inputs can be set for one of three different sensor input types:

1. Voltage,
2. Temperature (RTD or thermistor) or discrete contact, or
3. Current.

There are 2 rows of jumpers below the universal input plugs, see Fig. 3. The jumpers are used to configure the input to the desired type, i.e., voltage, temperature, etc. Note at the top of the rows of jumpers, they are marked even and odd. They are also marked on the control module board next to the jumper. The left row of jumpers are for the even numbered universal inputs, UI-12 thru UI-2 (top to bottom). The right row of jumpers are for the odd numbered universal inputs, UI-11 thru UI-1 (top to bottom). When the jumper is in the center position (default setting) the universal input is configured for temperature and discrete contact (digital input), such as "fan on" proof (status). When the jumper is in the top position, the input is configured for a voltage input, for example, a humidity sensor. The bottom jumper position is used for milliamp input. The 62D unit typically does not use a milliamp (current) inputs.

The jumpers are configured at the factory for the specific option package of each 62D unit. The 62D 100% outdoor air unit will have jumpers UI-2, UI-4, and UI-6 set on the top position. All other jumpers will be on the center position. The jumpers do not need to be changed in the field unless the unit is altered.

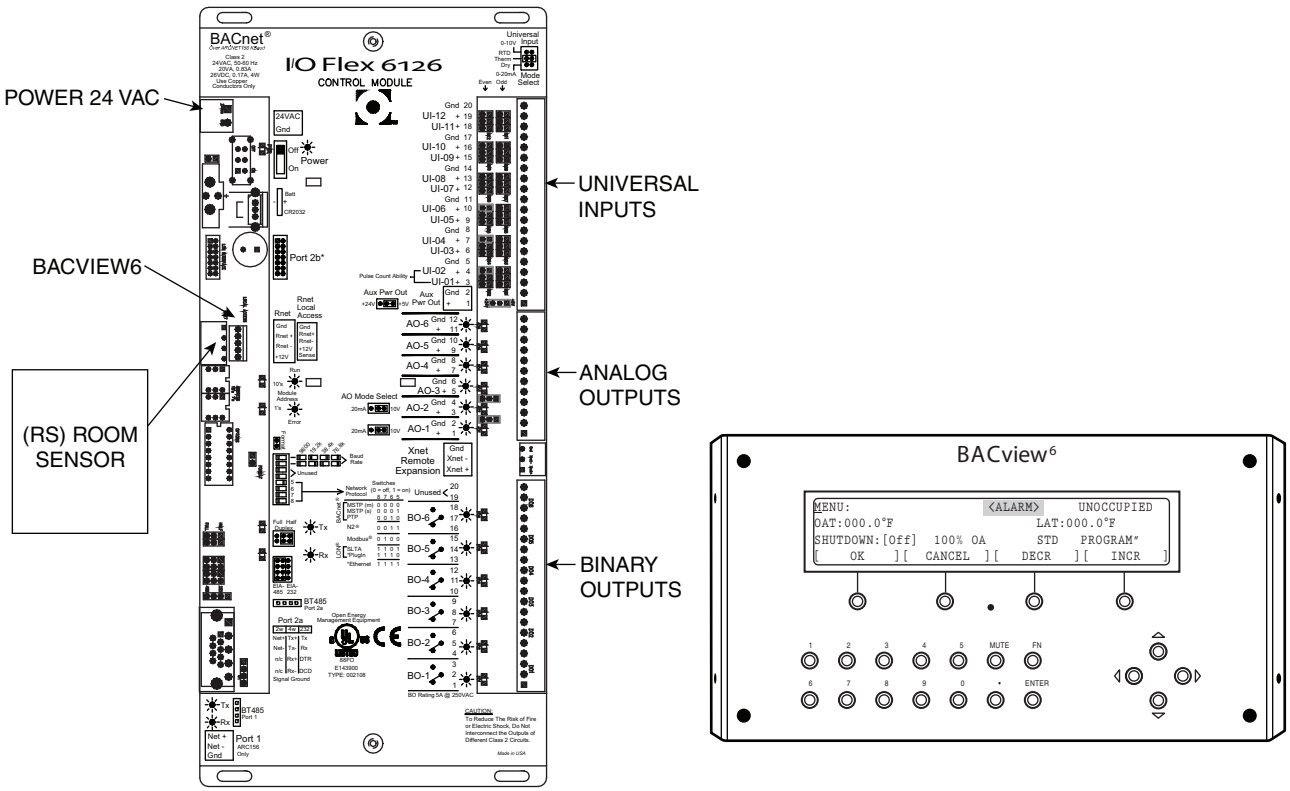


Fig. 2 — Typical Controller Components

* Sponsored by ASHRAE (American Socity of Heating, Refrigerating and Air Conditioning.

† Registered trademark of Schneider Electric.
** Registered trademark of Echelon Corporation.

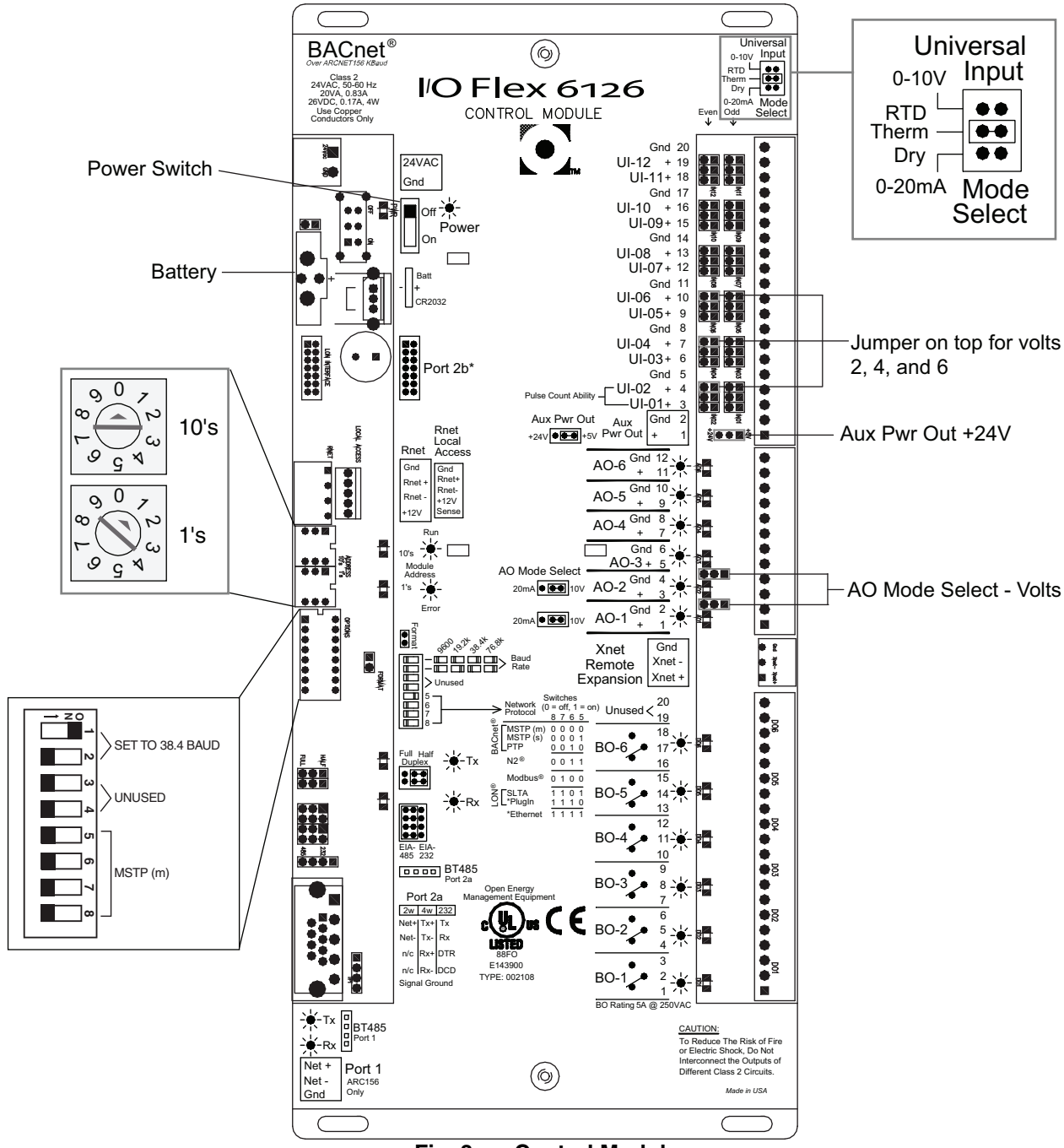


Fig. 3 — Control Module

Factory values:

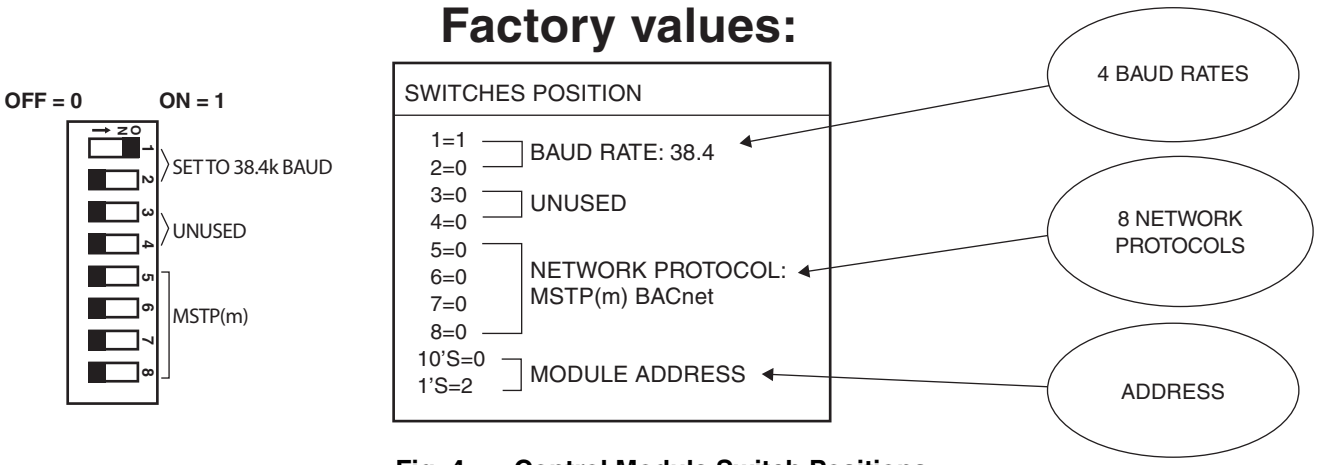


Fig. 4 — Control Module Switch Positions

In addition, the following settings are made at the factory, see Fig. 4:

1. Auxiliary Power Output (Aux Pwr Out) jumper should be set on 24V to power the 0 - 10 VDC sensors
2. Analog outputs (AO) labeled AO-1 and AO-2 should be set on Volts
3. The module address (MAC) rotary switches are set for '02' from the factory. The MAC may be reconfigured in the field if required.

   NOTE: To download software to the I/O Flex 6126, the MAC setting must be on '02'.

   Example: If the control module's address is 01, point the arrow on the tens (10's) switch to 0 and the arrow on the ones (1's) switch to 1. See Fig. 5.

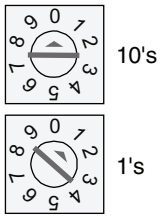


Fig. 5 — Module Address Rotary Switches

   NOTE: The I/O Flex 6126 recognizes its address only after power has been cycled.

4. The communication rate is factory configured for 38.4 baud rate.

BACview Display — The BACview handheld keypad/display features a numeric keypad, direction keys, four programmable function keys, and a backlit LCD (liquid crystal diode) display. See Fig. 6. For specifications on BACview display see Table 1. The display is a large 4-line by 40-character display that is easy to read, even in low light conditions. The handheld keypad/display has a padded backing and plugs directly into the controller using attached cable. See Fig. 6. The display may also be plugged into the bottom of the Room Sensor (RS). See Typical Controller Components Fig 2. To adjust the contrast of the display, turn the contrast screw on top of the BACview clockwise to lighten the display or counterclockwise to darken it. See Fig. 6.

The BACview screen goes dim after 10 minutes of inactivity. Press any key except MUTE or FN to activate the screen. The user can change the length of inactivity on the KEYPAD screen.

Table 1 — BACview Specifications

FEATURE	SPECIFICATION
Power	Supplied by the Rnet port througt the cable (+12 vdc at 250 mA)
Display	4-line by 40-character backlit LCD display, alarm LED and audible horn for alarm conditions
Protection	15 KV ESD protection to the enclosure.
Physical	Rugged aluminum enclosure and heavy duty-rubber backing for protection
Environmental Operating Range	32-120 F (0-48.9 C) 10-90% RH non-condensing
Overall Dimensions	Width: 9 5/8 in. (24.5 cm) Height: 4 15/16 in. (12.5 cm) Weight 1.5 lb (0.68 kg)
Listings	UL-916 (PAZX), CE (1997), FCC Part 15-Subpart B-Class A

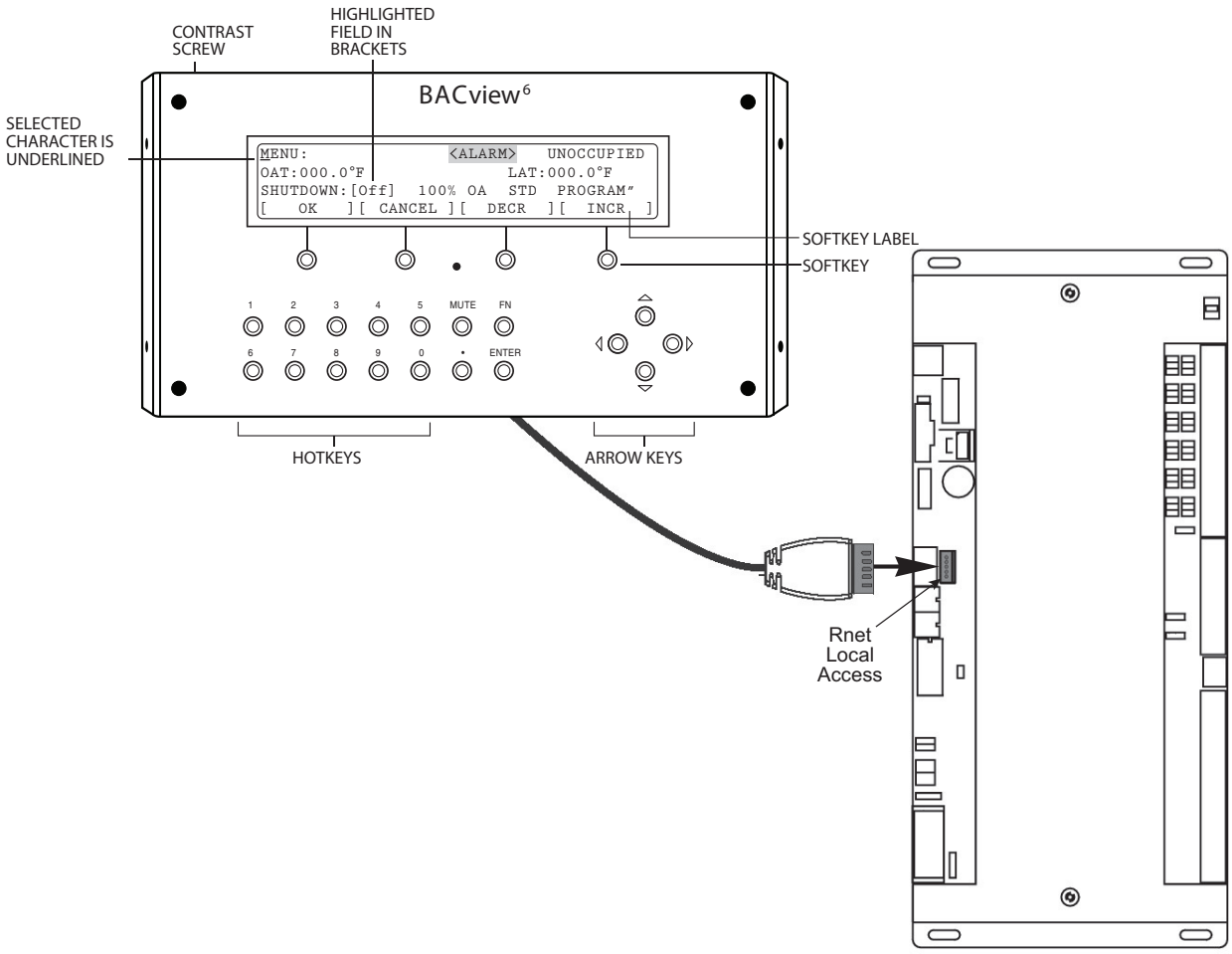


Fig. 6 — BACview Connection to Unit Controller

CHANGING A VALUE OR SETTING

NOTE: Only values or settings that appear between brackets on the screen can be changed. For example: [72.0] or [Off]:

1. Use the arrow keys to highlight the value or setting to be edited.
2. Press ENTER. If not previously logged in, the user will be prompted for the password.
3. Press the left or right arrow key to move the cursor under the character to be changed.
4. Change the character by:
   a. Pressing a number key.
   b. Pressing the DECR or INCR softkey to cycle through binary or multi-state options or to decrease or increase a number.
   c. Pressing the CANCEL softkey to restore the original value.
5. To edit another value in this same screen, repeat Steps 1 through 4.
6. Press the OK softkey to save all changes to the screen.

ALARMS — When an alarm signal is received, the display will turn on the Alarm LED, sound the alarm horn, and list the alarm under Active Alarms on the ALARMS screen. To silence the alarm, press the MUTE button on the keypad. If the user presses MUTE and the FN button at the same time, the horn and the LED will both turn off and all alarms will be moved from the Active Alarms list to the Manually Cleared list. See Alarms section on page 22.

NAVIGATION — Refer to Fig. 6 for BACview interface keypad. To move within a screen and to view additional rows not displayed on the screen use the arrow keys.

The screens that can be accessed from the current screen are shown in brackets and are marked with an arrow. To move from screen to screen, the user can use the arrow keys to highlight one of these screen links and then press ENTER. Softkeys may also be pressed to access a screen shown as a link above the softkey.

NOTE: Using a [Prev] link moves the user to the previously viewed screen.

Pound signs (#####) indicate that a value has too many digits to display in the existing field.

The following screens can be accessed with the BACview interface.

NOTE: The screen displays shown are typical and may vary based on options selected.

LOGIN — This screen will be displayed when the LOGIN link is selected or if the user selects a screen that requires password access.

A screen with the password level "None" can be accessed by anyone, but to edit a field in this screen, the operator must log in with the user password.

A screen with the password level "User" can be accessed and edited only by an operator logged in with the user password.

If the operator selects a screen that requires a password, a LOGIN screen is displayed.

To login: Use the numeric keys to enter the 4-digit password and press the OK softkey. Default password: 1111.

```
Admin or User
Password: [****]

[>  OK   ][>CANCEL ]
```

KEYPAD — On this screen, the user can define the amount of time of inactivity before the BACview interface goes dim.

NOTE: This time can also be defined in the module driver.

This screen also defines the priority (1 to 16) the BACview uses to write to BACnet properties. 1 is the highest priority; 16 is the default.

```
--------- Keypad Configuration --------
   Inactivity Timeout:[ 10]  minutes
   BACnet Write Priority:  0
 [>Prev]
```

BACnet — This screen displays the control module's BACnet device name and ID.

```
 BACnet Device Instance:{1612804}
     Autogenerate Device ID? Y

 [>Prev]
```

MENU SCREEN — The MENU screen displays the following information:

The initial screen shown is the standby screen. Press any key to proceed to the MENU screen.

```
*******  100% OA ATA REV:D  ************
          STANDBY SCREEN
       PRESS ANY KEY TO CONTINUE
       CONDITION:UNOCCUPIED
```

```
MENU:                <ALARM>   UNOCCUPIED
OAT:000.0°F                LAT:000.0°F
SHUTDOWN:[Off]  100%  OA  STD  PROGRAM"
TO GO COOLING SCREEN:[>CLG]
TO GO REHEAT SCREEN:[>HGRH]
TO GO HEATING SCREEN:[>HTG]
TO GO OUTSIDE DAMPER SCREEN:[>DAMPER]
TO GO VFD CTRL SCREEN:[>VFD]
TO GO SET POINTS SCREEN:[>SETPOINTS]
TO GO CONFIGURATION SCREEN:[>CONFIG]
TO GO SCHEDULE SCREEN:[>ALARM]
TO GO TECHNICAL SCREEN:[>TECHNICAL]
[>STATUS] MM/DD/YYYY  HH:MM:SS AM
```

With the Menu screen displayed you can proceed to any of the screens listed in the menu screen by pressing the down arrow to highlight the desired screen and then press ENTER. For the unit to operate, the SHUTDOWN parameter must be set to 'OFF'.

NOTE: The BACview display is a 4-line display. To see the entire screen use the Up and Down arrows to scroll through the entire screen display.

SCHEDULE SCREEN — This screen displays the following information, see Fig. 7.

From this screen the user can select and schedule Daily, Holiday, and Override schedules:

Set schedules as described in Fig. 7.

```
*Unit Schedules*  SCHEDULE MODE SCS:[0]
DAY DD-MON-YYYY 24:MM:SS   Status:Unocc
  [>Daily]  [>Holiday] [>Override]
 [>Prev]   [>Home]   [>CLOCKSET] [>LOGIN]
```

Schedule — The SCS (software control source) selection identifies the control that will determine the unit's operating schedule. The SCS option can be changed on the Schedule screen of the BACview keypad/display. The SCS options are:

SCS = 0 - Interlock Input, not used

SCS = 1 - BACview keypad, schedule screen. Links on the Schedule screen allow the user to access the Daily, Holiday, and Override screens to set four daily schedules, 12 holiday schedules, and 2 override schedules.

SCS = 2 - BAS (building automation system). When this SCS selection is made on the Schedule screen, the unit will be operated by another automatic control system.

SCS = 3 - WebCTRL, not used

SCS = 4 - Override control time in occupied mode. When SCS = 4 is selected, the normal schedule is interrupted and the unit will operate in the Occupied mode for the length of time the user has specified on the Override screen.

Override may also be activated on the Conditions screen. Enter the OVERRIDE TIME in minutes ([000] MIN), then change SET to [On].

DAILY, HOLIDAY, AND OVERRIDE SCREENS — These screens are accessed as links from the SCHEDULE screen and allow the user to set the number of schedules described below:

Up to 4 Daily Schedules

```
Daily Sch 1-   Use?[YES] Stat:OFF (24hr)
Start Time[00]:[00] Stop Time[00]:[00]
DAYS:[MON][TUES][WED][THU][FRI][SAT][SUN]
 [>Prev]   [>Next]   [>Home]   [>LOGIN]
```

Up to 12 Holiday Schedules

```
Holiday Sch 1-Use?[YES] Stat:OFF (24hr)
Start Time[00]:[00] Stop Time[00]:[00]
   Month:[00](1-12) Day:[00](1-31)
 [>Prev]   [>Next]   [>Home]   [>LOGIN]
```

Up to 2 Override Schedules

```
Override Sch 1-Use? [YES] Stat:OFF <24hr>
Start Time[00]:[00] Stop Time[00]:[00]
   Month:[00](1-12) Day:[00](1-31)
 [>Prev]   [>Next]   [>Home]   [>LOGIN]
```

24/7 Schedule

```
Daily Sch 4 - User? YES Stat: ON Cont? Y
Start Time  0 :  0  Stop Time  0 :  0
DAYS: MON  TUES  WED  THU  FRI  SAT [SUN]
 [>Prev]   [>Sched]   [>Home]   [LOGOUT]
```

Shutdown Mode — The unit stops when one of the following conditions occurs:

- Shutdown mode is scheduled through the BACview keypad/display Schedule screen
- Emergency shutdown is activated through the BACview keypad/display Main screen
- Supply fan fault signal is received from the supply fan status input (UI-11)
- LAT signal is received from the sensor (UI-3) for >5 minutes.

SETPOINTS SCREEN — To reach the SETPOINTS screen: From the MENU screen use a softkey to select STATUS which will bring up the INPUTS screen. On the INPUTS screen, use a softkey to select SETPOINTS.

Change setpoints as described in Changing a Value or Setting section on page 7.

NOTE: To return setpoints to the factory setting, change the DEFAULT SP setting from "Off" to "On". Before setpoints can be changed again, the DEFAULT SP setting must be changed to "On".

```
SETPOINTS:       OAT:000.0 F  UNOCCUPIED
 PARAMETER SENSOR   SP  EFFECTIVE SP
 CLG   Y1   OAT  [00.0]°F    00.0°F
 CLG   Y2   OAT  [00.0]°F    00.0°F
 CLG        LAT  [00.0]°F
 CLG        SLT  [00.0]°F
 CLG ENTHALPY    [00.0]BTU/P
 HTG   W1   OAT  [00.0]°F    00.0°F
 HTG   W2   OAT  [00.0]°F    00.0°F
 HTG ENTHALPY    [00.0]BTU/P
 HTG MAX    LAT ELECTRIC HEAT:[000.0]°F
 HTG MAX    LAT GAS FURNACE:  130     F
 HGRH       LAT  [00.0]°F DIFF:[00.0]°F
 HGRH       RAH  [00.0]%
 CO2        CO2  [0000]PPM
 SUPPLY     DPT  [00.0]"H2O
 SUCTION    SLT  [00.0]°F DCC GO TO 10%
 OUTSIDE AIR DAMPER OPEN:[000]%
 CLG UNOCC   Y1     RAT  [00.0]°F
 CLG UNOCC   Y2     RAT  [00.0]°F
 HTG UNOCC   W1     RAT  [00.0]°F
 HTG UNOCC   W2     RAT  [00.0]°F
 HGRH UNOCC         RAH  [00.0]%
 ROOM CTRL             [00.0]°F
 WARM-UP            RAT  [00.0]°F
 LAT LOW LIMIT UNOCCUPIED:[000.0]°F
 LAT CLG UNOCCUPIED:[000.0]°F
 LAT LOW FREEZE STATUS:[000.0°F
 [>PREV]   [>HOME] [>LOGIN] LAT:000.0°F
```

The Setpoints screen is accessible from either the Menu or Inputs screen. The default settings will be displayed in the setpoints screen. These settings should only be changed if there is a customer requirement to do so.

COOLING STATE SCREEN — The Cooling State screen displays the following information:

```
CLG: OAT:000.0°F LAT:000.0°F UNOCCUPIED
COMP   DCC     SP      PROT RAT:000.0°F
Y1:Off 000.0%  00.0°F  Normal
Y2:Off         00.0°F  Normal
SUCTION SETPOINT:00.0°F
SUCTION Y1 OFF:00.0°F     SLT1:00.0°
SUCTION DCC 10%:00.0°F    SLT2:00.0°
OAETPY:00.0BTU/P  OAETPY SP:00.0BTU/P
 [>PREV]    [>HTG]  [>HGRH] SLT:000.0°F
```

HEATING STATE SCREEN — The Heating State screen displays the following information:

```
HTG: OAT:000.0°F LAT:000.0°F UNOCCUPIED
HEAT   MOD    SP          ELECTRIC HEAT
W1:Off 000.0% 00.0°F
W2:Off        00.0°F
HTG MAX    LAT ELECTRIC HEAT:000.0°F
HTG MAX    LAT GAS FURNACE:000.0°F
OAETPY:00.0BTU/P  OAETPY SP:00.0BTU/P
ROOM CTRL:YES
 [>PREV]    [>CLG]  [>HGRH] RAT:000.0°F
```

HGRH (Hot Gas Reheat) SCREEN — This screen displays the following information:

```
HGRH: LAT:000.0°F RAH:000.0% UNOCCUPIED
 VALVES   MRC       MDC      DCC
 CLOSE    000.0%    000.0%   000.0%
LATSP:00.0°F              RAHSP:00.0%
ROOM CTRL:YES    HGRH IS DISABLE
 [>PREV]    [>HTG]    [>CLG] SLT:000.0°F
```

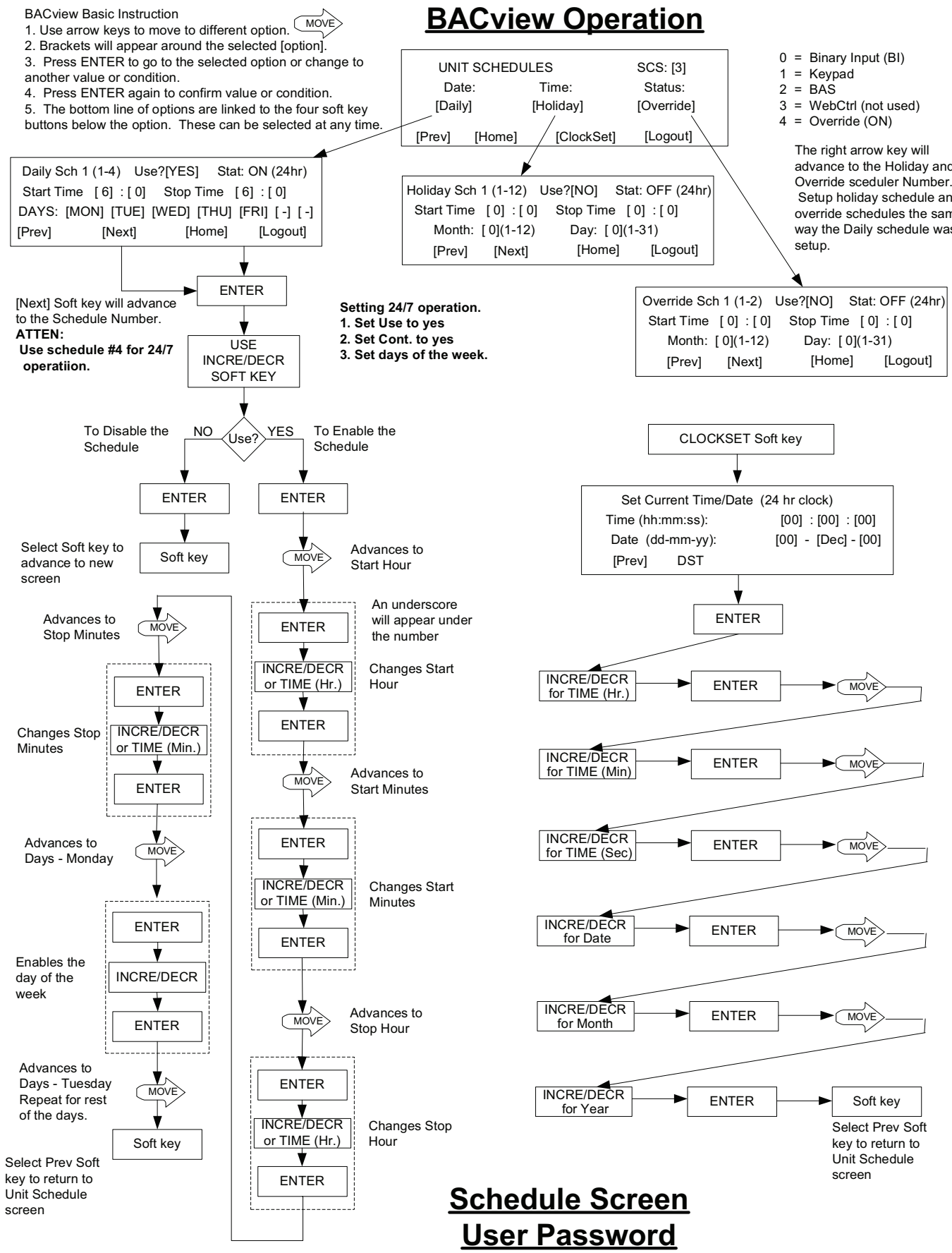


Fig. 7 — Schedule Screen Operation

MOD VFD (VFD Modulation) SCREEN — This screen may be accessed using a softkey link on the HGRH, COOLING STATE, and HEATING STATE screens. The screen displays the following information:

```
VFD:                MANUAL      UNOCCUPIED
   DPT        SPVFD  SPDPT         MODVFD
SF:0.00"H20   00Hz   0.00"H2O       00Hz
CO2:0000PPM                  SPCO2:0000PPM
 [>PREV]     [>CLG]    [>HGRH] [>STATUS]
```

OUTSIDE DAMPER SCREEN — The Outside Damper screen displays the following information:

```
OUTSIDE DAMPER:                 UNOCCUPIED
    DAMPER MIN POSITION
OUTSIDE AIR DAMPER MIN OPEN:[000]%
 [>Prev]
```

INPUTS SCREEN — The INPUTS screen may be accessed using the softkey link for STATUS on the main screen.

This screen displays the following information:

```
INPUTS:                         UNOCCUPIED
        TEMPERATURE    RHTY     ENTHALPY
   ROOM:000.0°F       000.0%    00.0BTU/P
OUTSIDE:000.0°F       000.0%    00.0BTU/P
LEAVING:000.0°F
CO2:0000PPM
SUCTION1:000.0°F
SUCTION2:000.0°F
DPT: SF 0.00"H2O
PROT:Y1 Normal                  Y2 Normal
FILTER:CLOGGED
SF:Off  EF:Off  WH:Off
[>PREV] [>SETPOINTS]              [>COND]
```

CONFIGURATION SCREEN — The CONFIGURATION screen may be accessed using a softkey link on the INPUTS screen.

This screen displays the following information:

```
CONFIGURATION:   **BUILD YOUR PROGRAM**
        G DELAY ON: 000.00 SEC
       G DELAY OFF: 000.00 MIN
     NIGHT SETBACK: YES
    WARM-UP ENABLE: YES
        OAH ENABLE: YES
        RAH ENABLE: YES
         Y2 ENABLE: YES
        BAS ENABLE: YES
        CO2 ENABLE: YES
EXHAUST FAN ENABLE: YES
       WHEEL MOTOR: YES
  ENTHALPY CONTROL: YES
SF VARIABLE FREQ MANUAL: MANUAL CTRL
DEAD BAND Y1 OFF BELOW CLG SP: 0 °F
Y1 DELAY TO ON: 0 MIN
Y2 DELAY TO ON: 0 MIN
DIGITAL COMPRESSOR ENABLE: YES
DIFF TO SHUT OFF STG 1 HTY: 0 %
HGRH  ENABLE: YES
RH% TO RAMP UP DIGITAL COMP: 00 %
HGRH PURGE ENABLED: Off
HGRH PRG SP CYCLE: 000.0 MIN ON: 0.0 MIN
DIFF TO START W1: 0 °F
  DELAY TO ON W1: 0 MIN
DIFF TO START W2: 0 °F
ELECT HEAT or GAS FURNACE: GAS FURNACE
TSTAT OVRD ENABLED: Off
TSTAT SET POINT ADJ. ENABLED: Off
SLT2 ENABLED: Off
           >PID SETTING
[>PREV] [>SETPOINTS] [>SCHEDULE]
```

In the Menu screen scroll down to "Config" by using the down arrow until it is displayed in the BACview screen. Press the ENTER button to display the config screen. Using the arrow keys scroll to the parameter to change.

NOTE: The majority of the configuration type settings are made in the Config Screen, however there may be additional settings on the Setpoints or Conditions screens.

There are 2 formats used in the BACview to change parameters (settings):

1. The number format where a number will be displayed inside parenthesis, i.e., (0.0). A number displayed inside parenthesis can be changed. To change the number, use the arrow keys to highlight the number and press ENTER. The number will then be displayed with a cursor under the character to the right. If only that character needs to change, press a new number, and then press ENTER and the number will be changed and saved. To change other characters use the left or right arrows to get the cursor under the character needing to change. After changing the characters press ENTER to save the changes.
2. The second format used in the BACview is the word or phrase in parenthesis i.e., [YES]. When using this format move the parenthesis around the word to change using the arrows. Once the word to change is chosen, press the ENTER key. Notice the word will begin to flash and the two top right keys will indicate Decrease and Increase. By pressing either key the word will toggle to i.e., [NO] and will continue to flash until the ENTER key is pressed again and the selection is saved.

Table 2 is an example of the configuration display:

Table 2 — Configuration Display

CONFIG SCREEN DISPLAY	FACTORY DEFAULT	PURPOSE
G delay to on	30 Sec.	Delay until fan starts
G delay to off	1 Min	Delay until fan stops
Night setback (A)	No	Not applicable
Warm-up enabled (A)	No	Unit runs prior to occupied mode
OAH Enabled (A)	No	Outside air humidity enable
RAH Enable (A)	Yes	Room air humidity enable
Y2 Enable (A)	Yes	Has second compressor
BAS Enable	Yes	Building automatic system
CO2 Enable (A)	No	Not applicable
Exhaust Fan Enable (A)	Yes	Exhaust fan status enable
Wheel Motor (A)	Yes	Wheel motor status enable
Enthalpy Control (A)	No	Enthalpy control on/off
SF Variable Freq Manual (A)	No DPT Ctrl	VFD DPT or manual control
Dead Band Y1 off below Clg SP	1Deg F	Y1 off below cooling setpoint
Y1 Delay to on	1 Min	Y1 delay to on
Y2 Delay to on	5 Min	Y2 delay to on
Digital Compressor Enable (A)	Yes	Yes/No
Diff to shut off stg 1 Hty	1%	Dead band for humidity control
HGRH Enable (A)	Yes	Yes/No
RH% to Ramp up Digital Comp	10%	Minimum digital compressor capacity
HGRH CC Enable	On	HGRH timed coil clear
HGRH CC SP Cycle	60 Min	On 1 Min Per 60 Min
Diff to start W1	1 Deg F	Differential above SP
Delay to on W1	2 Min	Heat delay after enable
Diff to start W2	3 Deg	Differential above SP
Electric Heat or Gas Heat (A)	Gas Furnace	Select gas or electric heat
Tstat Ovrd Enable	Off	Enable room sensor
Tstat setpoint Adjust Enable	Off	Enable setpoint adjust
SLT2 Enable (A)	Off	Enable suction line temp, comp 2

NOTE: The parameters in Table 2 with the (A) after them are parameters that are configured based on options that were ordered.

For example: Table 2 is for a unit ordered with the optional digital compressor.

SERVICES SCREEN — This screen provides an explanation of the alarms to aid in troubleshooting.

The SERVICES screen can be accessed using a softkey link on the CONFIGURATION screen.

```
ALARM MESSAGES USE HORN:     MEAN:
OAT Sensor Out of Limits:   -10>OAT>158
LAT Sensor Out of Limits:   -10>LAT>158
C1 Protections Lockout: HPS OR LPS OPEN
C2 Protections lockout: HPS OR LPS OPEN
Heat Failure:  LAT<<SP MORE THAN 10 MIN
Check:Supply Fan Fault: _    NO SF INPUT
Check Freeze Stat Alarm:  LAT<40 IN HTG
Check:OAT Setpoints:     HTG SP>=CLG SP
Check:Compressors: OAT>CLG SP ^ LAT>=85
     Coil Freezed: OAT>CLG SP ^ LAT>=85
    Filter Status: OAT>CLG SP ^ LAT>=85
Check:Exhaust Fan:          NO EF INPUT
Check:Wheel Motor:          NO WM INPUT
 [>PREV]   [>HOME]   [>ALARM]
```

ALARMS SCREEN — This screen displays the 100 most recent alarms received.

NOTE: To clear an alarm manually, refer to Basic Control Usage, BACview Display, Alarms.

The ALARMS screen can be accessed using a softkey link on the SERVICES screen or the CONFIGURATION screen

```
Module Event History (100 most recent)
========== ACTIVE ALARMS ==============
  None in buffer.
============ ACTIVE FAULTS ============
  None in buffer.
====== RETURNED-TO-NORMAL (RTN) =======
  None in buffer.
======= MANUALLY CLEARED (CLR) ========
  None in Buffer.
 [>Prev]
```

CONDITIONS SCREEN — From this screen the user can set the time and status of override and can activate room control.

The CONDITIONS screen may be accessed using a softkey link on the INPUTS screen.

This screen displays the following information:

```
CONDITIONS:                  UNOCCUPIED
ALARMS: SENSOR OUT OF LIMITS   [>ALARM]
SENSORS STATUS:NORMAL
SCS:0   FACTORY DEFAULT CTRL
OVERRIDE TIME:[000]MIN         SET[Off]
ROOM CTRL:[YES]  ROOM OVERRIDE:DISABLED
 [>PREV]             [>LOGIN][>SCHEDULE]
```

NOTE: Both BAS Room Ctrl: and Room Ctrl: must say YES to activate room air temperature (RAT) Room Control Override.

TECHNICAL SUPPORT SCREEN — The Technical Support screen displays the following information:

```
TECHNICAL SUPPORT:  ONLY     UNOCCUPIED
           [>USERPW]
           [>PID SETTING]
           [>DELAY]
      _    [>OFFSET]
           [>ROUTER]
           [>BACNET]
  [>PREV]
```

PID SETTING SCREEN — The PID Setting screen displays the following information:

```
SET   PID  P      I      D     SI      DB
CLG:  DA [0.0]%[0.00]%[0.0]%[0.0]s[0.0]
DCCLG:RA [0.0]%[0.00]%[0.0]%[0.0]s[0.0]
DCCLG:DA [0.0]%[0.00]%[0.0]%[0.0]s[0.0]
D2CLG:RA [0.0]%[0.00]%[0.0]%[0.0]s[0.0]
D2CLG:DA [0.0]%[0.00]%[0.0]%[0.0]s[0.0]
HTG:  RA [0.0]%[0.00]%[0.0]%[0.0]s[0.0]
HGRH: RA [0.0]%[0.00]%[0.0]%[0.0]s[0.0]
MDC : DA        [0.00]
SFVFD:RA [0.0]%[0.00]%[0.0]%[0.0]S[0.0]
EFVFD:RA [0.0]%[0.00]%[0.0]%[0.0]S[0.0]
 [>PREV]                      TECH ONLY
```

START-UP

Unit Preparation — Check that unit has been installed in accordance with the installation instructions and applicable codes.

Unit Setup — Make sure that all hoods have been installed, shipping brackets removed, and that the outdoor filters are properly installed.

Internal Wiring — Ensure that all electrical connections in the control box are tightened as required. If the unit has heat, make sure that the leaving air temperature (LAT) sensors have been routed to the supply ducts as required.

Accessory Installation — Check to make sure that all accessories including space sensors and pressure sensors have been installed and wired as required by the instructions and unit wiring diagrams.

Crankcase Heaters — Crankcase heaters are energized as long as there is power to the unit, except when the compressors are running.

Evaporator Fan — Fan belt and fixed pulleys are factory installed. See Fig. 8-17 for fan performance. Make sure that fans rotate in the proper direction. See Tables 3-7 for motor limitations and air quantity limits.

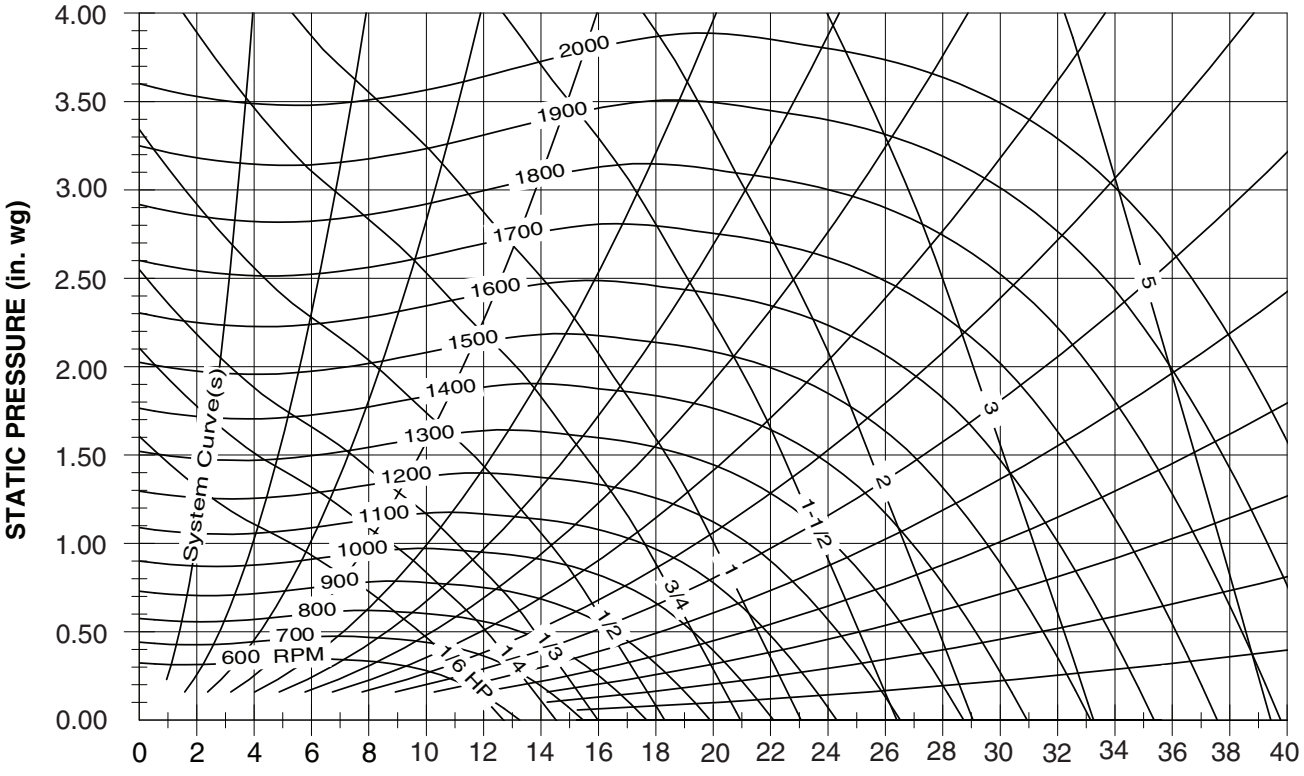


Fig. 8 — Forward Curved Fan Performance (9 x 7 in.)

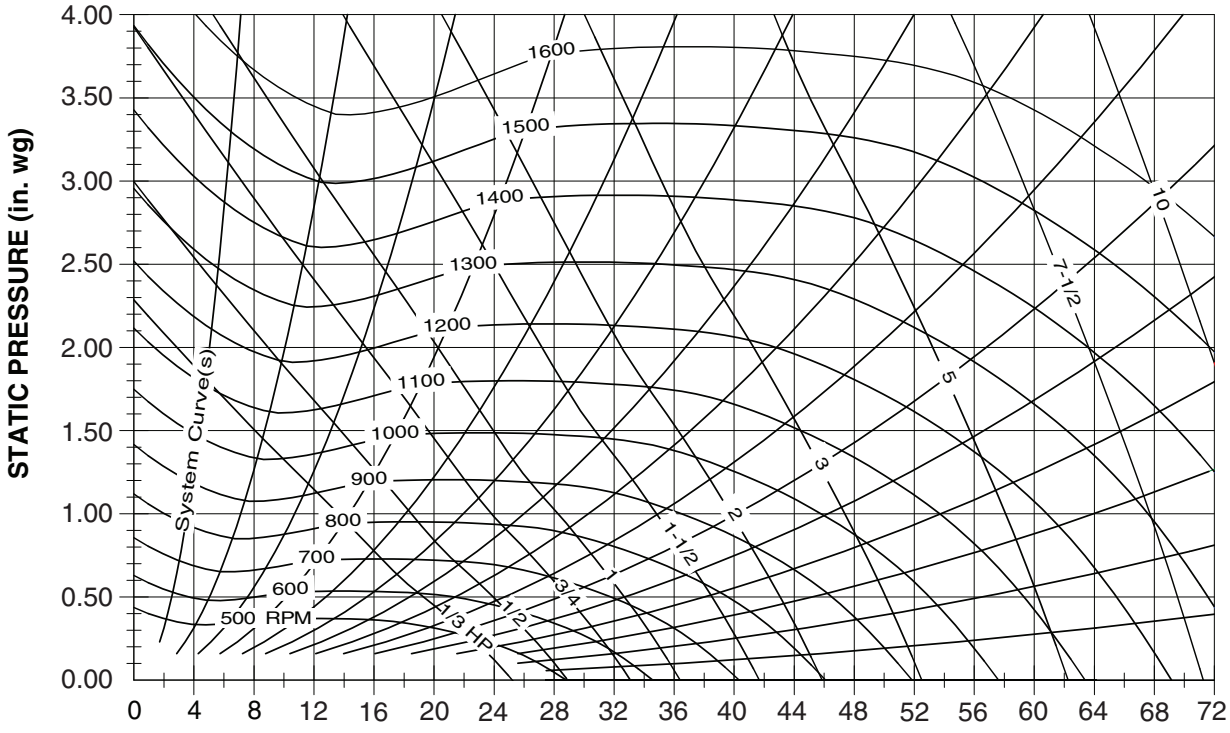


Fig. 9 — Forward Curved Fan Performance (12 x 9 in.)

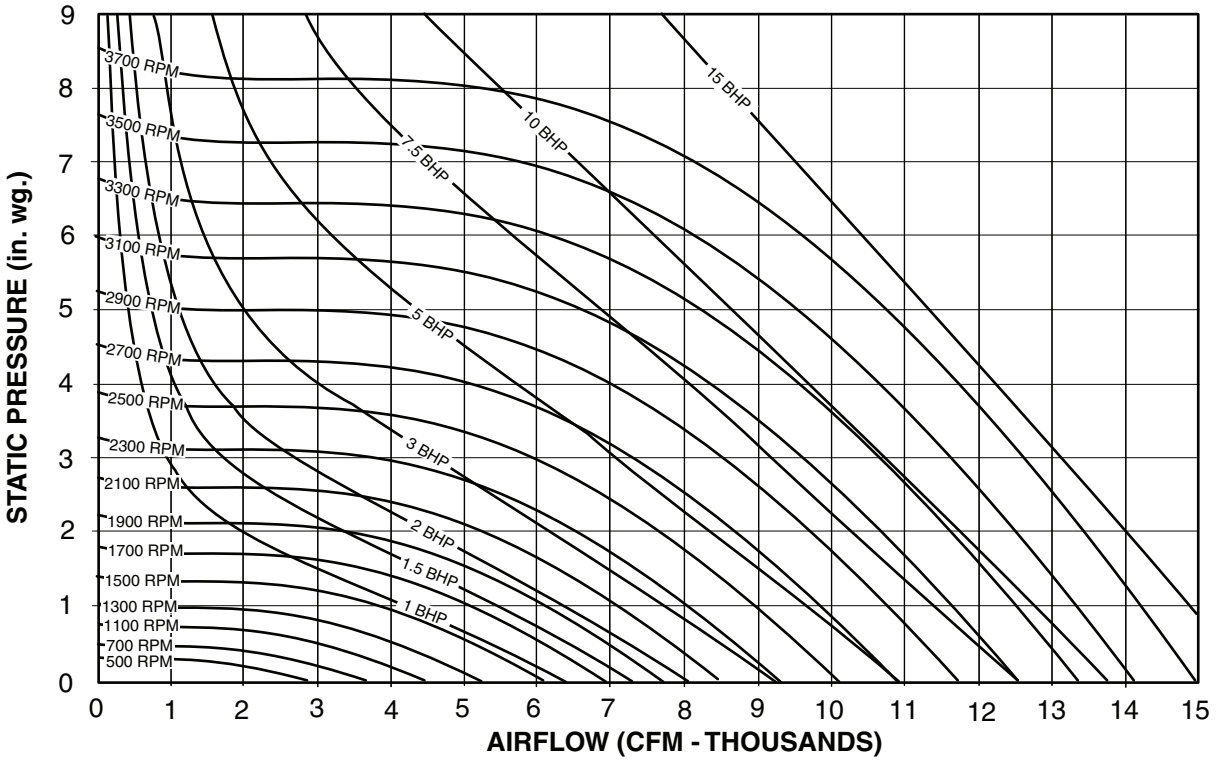


Fig. 10 — Airfoil Fan Performance (12 in.)

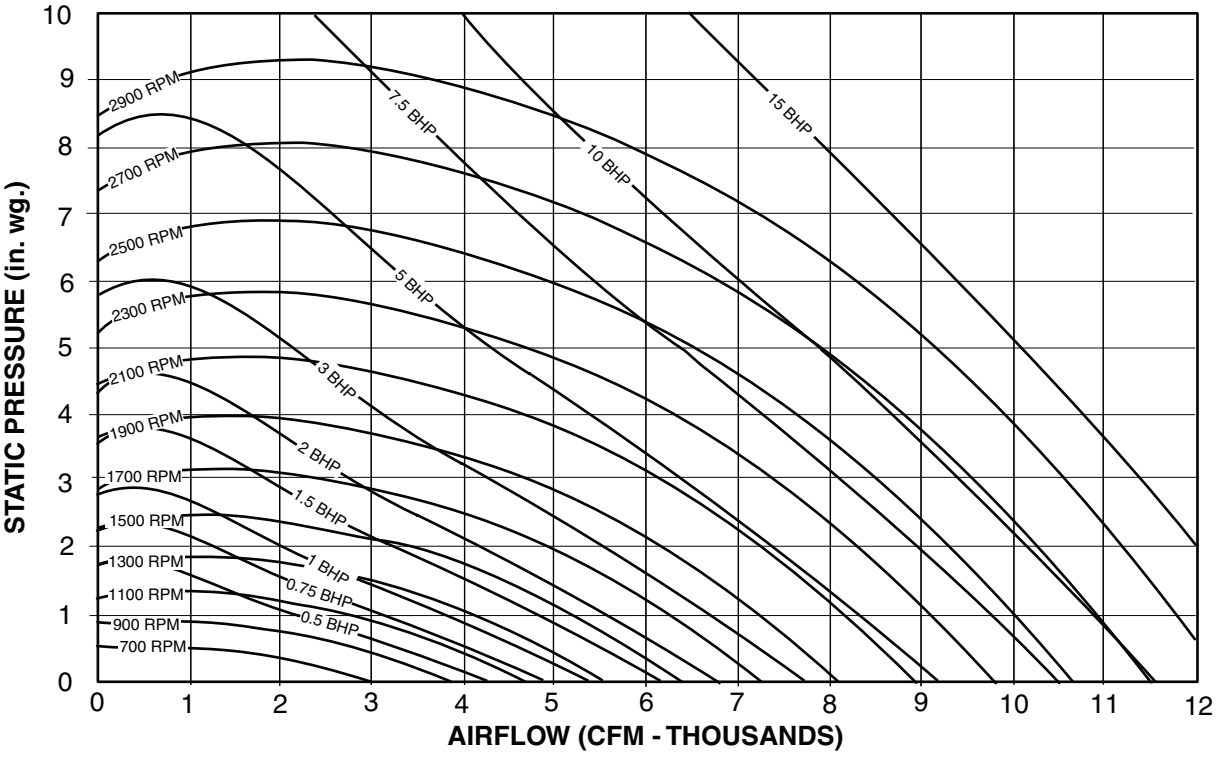


Fig. 11 — Airfoil Fan Performance (15 in.)

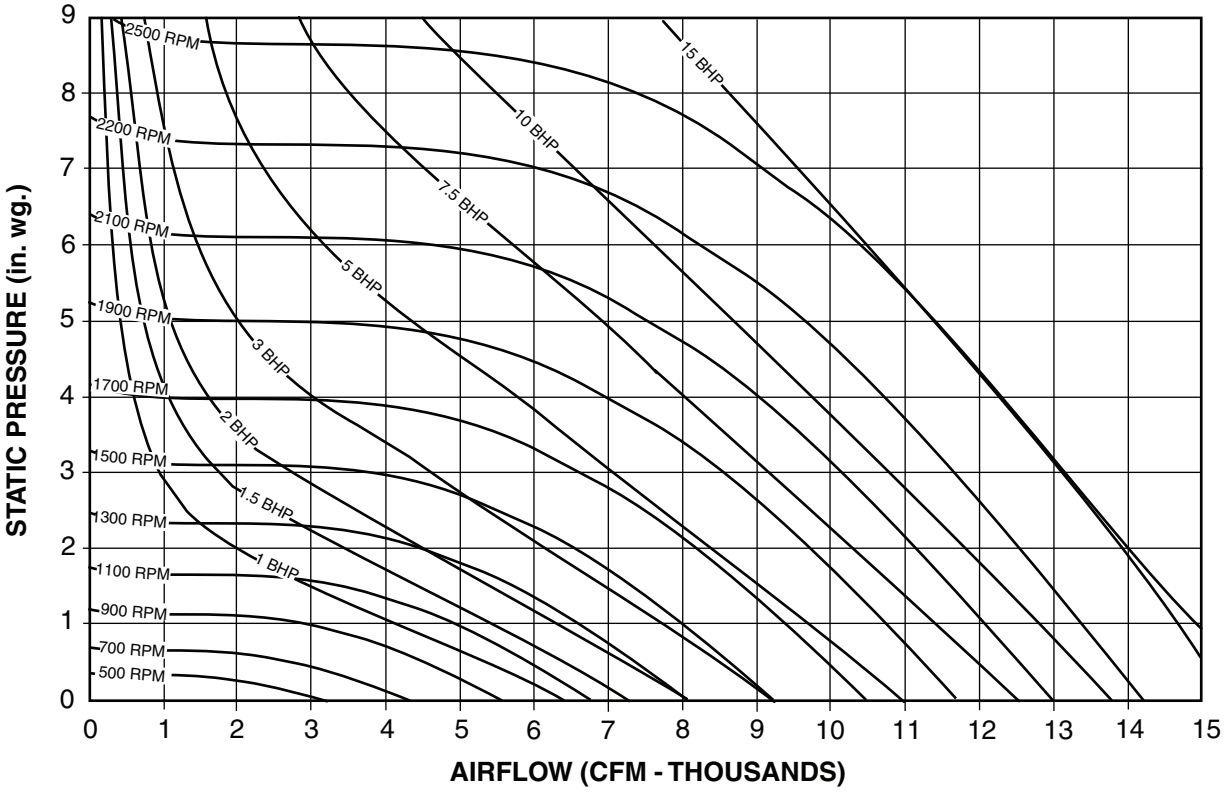


Fig. 12 — Airfoil Fan Performance (18 in.)

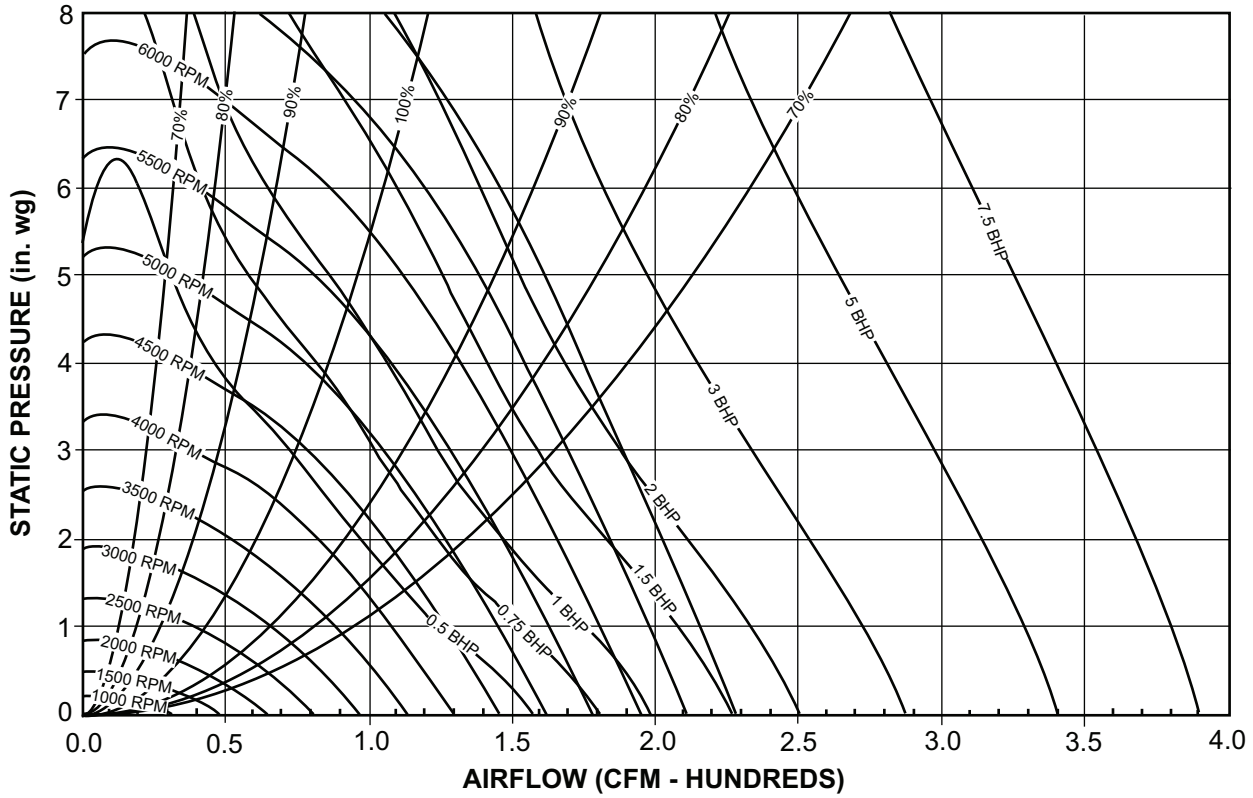


Fig. 13 — Backward Curved Fan Performance (180 mm)

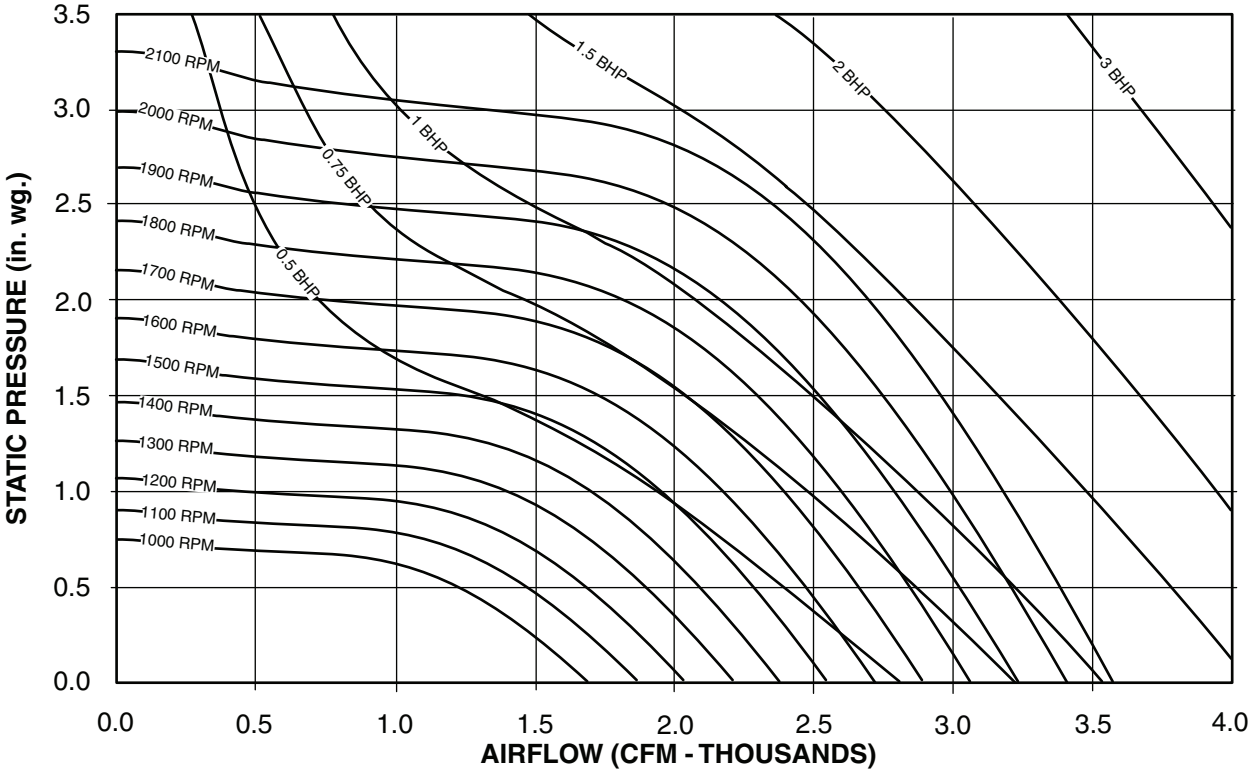


Fig. 14 — Backward Inclined Fan Performance (15 in.)

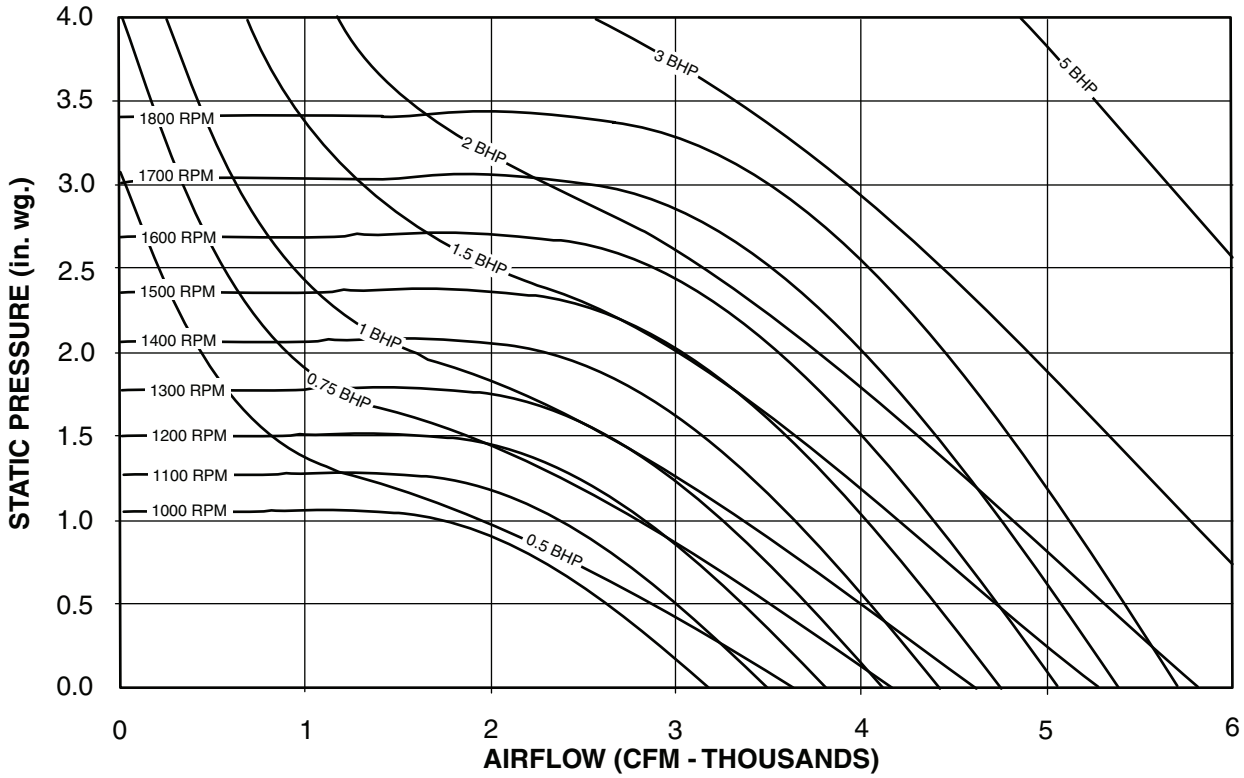


Fig. 15 — Backward Inclined Fan Performance (18.5 in.)

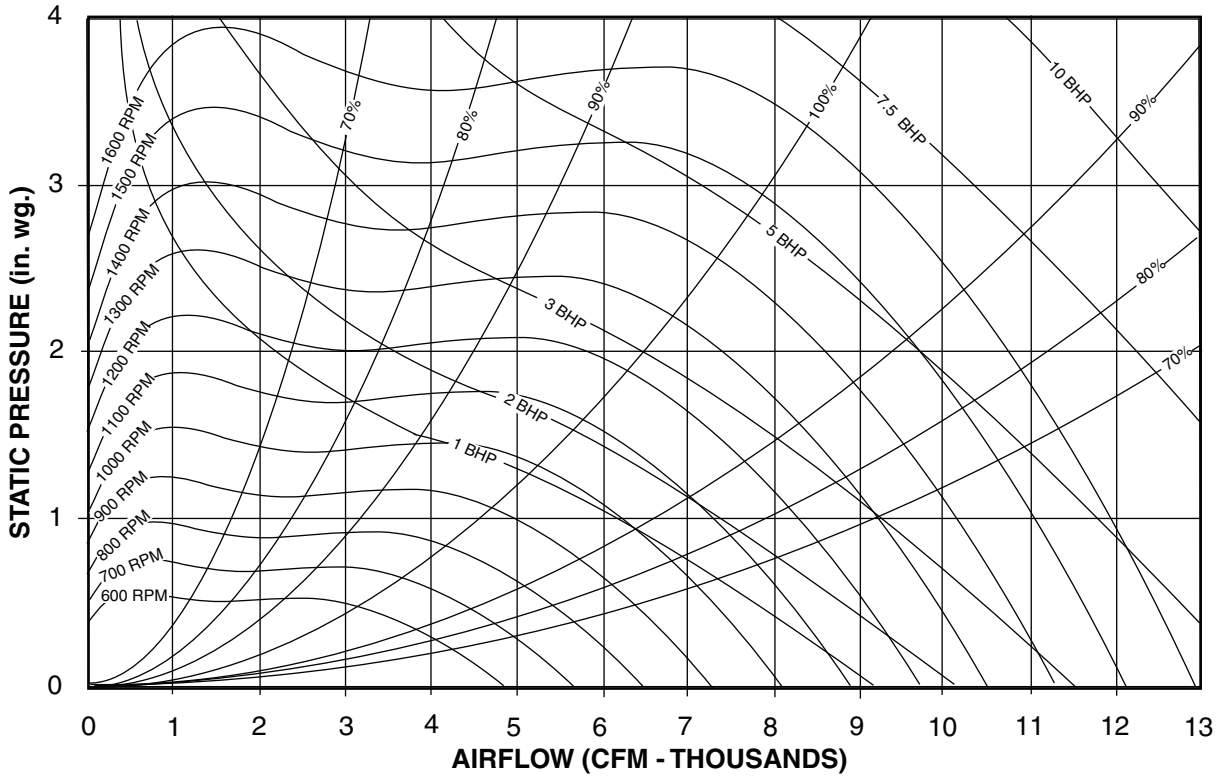


Fig. 16 — Backward Inclined Fan Performance (24.5 in.)

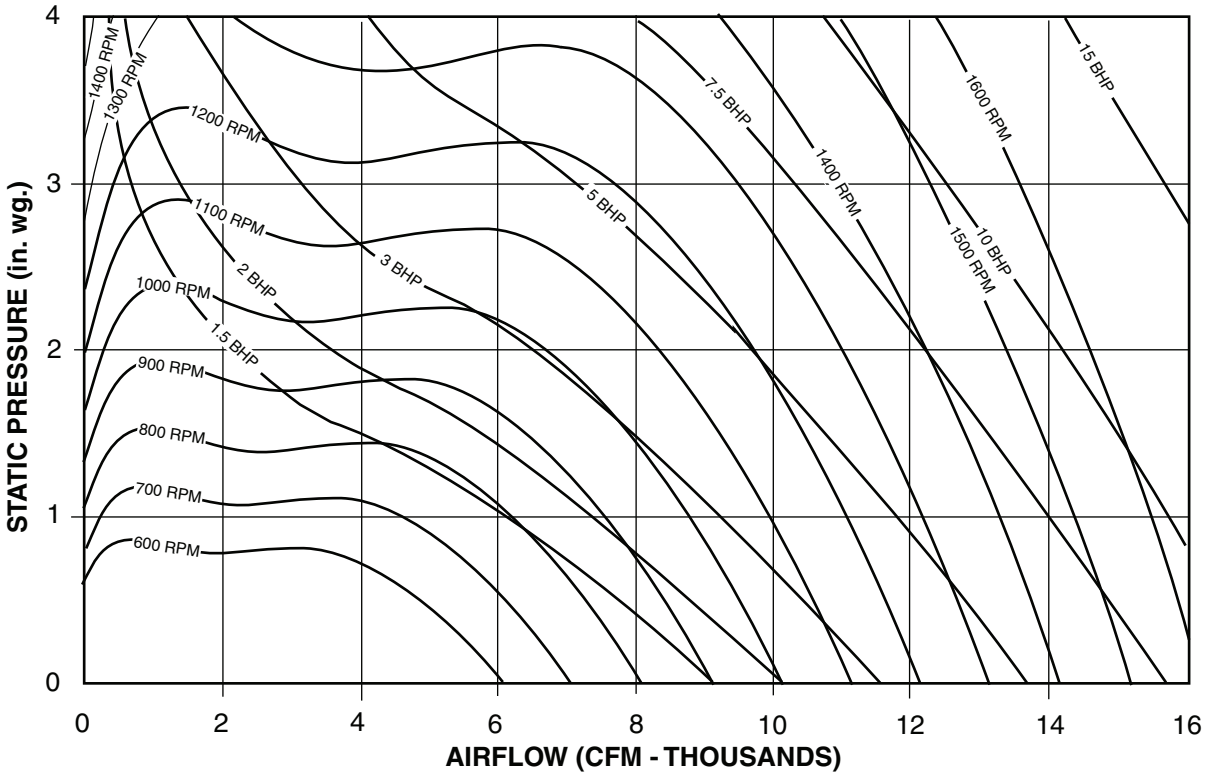


Fig. 17 — Backward Inclined Fan Performance (27 in.)

GENERAL INFORMATION

Application Limits

ELECTRIC HEAT

- No more than a 75 degree temperature rise
- Minimum 50 CFM per kW (all units)

GAS HEAT

- No more than a 95 degree temperature rise
- No more than a 50 degree temperature rise on Horizontal Discharge

AIRFLOW (EVAPORATOR)

- Minimum face velocity 150 FPM
- Maximum Face Velocity 500 FPM

ENERGY CONSERVATION WHEEL

Maximum Pressure Drop 1.75 in.

Table 3 — Airflow Limits

UNIT SIZE 62D	62DA,DB,DC,DD*		62DC,DD†	
	Min. CFM	Max. CFM	Min. CFM	Max. CFM
07	700	1,500	1,500	2,500
08	800	1,800	1,800	3,000
09	900	2,100	2,100	3,500
12	1,100	2,200	2,200	3,700
14	1,350	2,900	2,900	4,600
15	1,700	3,600	3,600	5,800
16	2,000	4,400	4,400	6,500
20	2,400	4,400	4,400	6,500
22	2,400	4,400	4,400	6,500
24	2,400	6,000	6,000	9,000
30	3,400	9,000	7,000	11,000
34	4,000	8,000	8,000	12,000
38	4,800	9,000	9,000	12,000

* 62DC and DD without ECW (Energy Conservation Wheel).
† 62DC and DD with ECW.

Table 4 — Compressor Electrical Data

VOLTAGE		UNIT SIZE 62D												
		07	08	09	12	14	15	16	20	22	24	30	34	38
Number of Compressors		1	1	1	2	2	2	2	2	2	2	2	2	4
208-230/3/60	RLA (each)	16.0	19.0	23.2	13.7	16.0	22.4	25.0	29.5	29.5	30.1	48.1	55.8	29.5
	LRA	110.0	123.0	164.0	83.1	110.0	149.0	164.0	195.0	195.0	225.0	245.0	340.0	195.0
460/3/60	RLA (each)	7.8	9.7	11.2	6.2	7.8	10.6	12.2	14.8	14.8	16.7	18.6	26.9	14.8
	LRA	52.0	62.0	75.0	41.0	52.0	75.0	100.0	95.0	95.0	114.0	125.0	173.0	95.0
575/3/60	RLA (each)	5.7	7.4	7.9	4.8	5.7	7.7	90.0	12.2	12.2	12.2	14.7	23.7	12.2
	LRA	38.9	50.0	54.0	33.0	38.9	54.0	78.0	80.0	80.0	80.0	100.0	132.0	80.0

Table 5 — Condenser Fan Motor Electrical Data

VOLTAGE		UNIT SIZE 62D												
		07	08	09	12	14	15	16	20	22	24	30	34	38
Number of Fans		1	1	1	2	2	2	2	2	2	2	2	2	2
208/230-3-60	FLA	3.0	4.0	4.0	2.3	2.3	4.0	4.0	4.0	4.0	4.0	5.6	5.6	5.6
460-3-60	FLA	1.5	2.0	2.0	1.2	1.2	2.0	2.0	2.0	2.0	2.0	2.8	2.8	2.8
575-3-60	FLA	0.8	1.8	1.8	0.8	0.8	0.8	1.8	1.8	1.8	1.8	2.3	2.3	2.3

Table 6 — Supply and Exhaust Fan Motor Electrical Data

VOLTAGE		MOTOR HP										
		1/2	3/4	1	1 1/2	2	3	5	7 1/2	10	15	20
208/230-3-60	FLA	2.8	3.4	3.2	4.8	6.3	9.8	15.7	22.3	29.0	43.4	57.0
460-3-60	FLA	1.4	1.7	1.5	2.0	2.9	4.1	6.8	10.0	12.9	18.9	24.5
575-3-60	FLA	0.8	1.3	1.1	1.6	2.3	3.3	5.2	7.6	10.1	15.1	19.6

Table 7 — Energy Conservation Wheel Electrical Data

VOLTAGE		WHEEL SIZE (in.)			
		36	42	48	54
208/230-3-60	FLA	2.5	2.5	2.5	3.0
460-3-60	FLA	1.3	1.3	1.3	1.5
575-3-60	FLA	1.0	1.3	1.0	1.5

LEGEND

FLA — Full Load Amps
RLA — Rated Load Amps

CONTROLS

Setpoints — 62DA,DB,DC,DD 100% OA Units — The 100% Outdoor Air Program factory default settings are listed in Table 8. The default settings can be changed at the Setpoints screen, however, a 2° F difference must be maintained between the cooling and heating setpoints. If the cooling and heating set points are set so the difference is < 2° F, the controller will automatically change the values of the setpoints. These values set by the controller are shown on the Setpoint screen as EFFECTIVE SP. To prevent overlapping between heating and cooling setpoints, the system compares the value of each. If the values are equal, the system sends a signal to alarm and changes the setpoints to the factory default settings.

To reach the Setpoints screen:

From the MENU screen use a softkey to select STATUS (INPUTS). On the INPUTS screen, use a softkey to select SETPOINTS.

Table 8 — Setpoints

SETPOINT	DESCRIPTION	DEFAULT SETTING	RANGE
Cooling Y1	Cooling 1 - OAT	60 F	50-100
Cooling Y2	Cooling 2 - OAT	75 F	50-100
Cooling	Cooling - LAT	70 F	35-100
SLT Control	Suction Line Temperature (Compressor Control)	45 F	35-100
Cooling	Cooling - Enthalpy	24 BTU/lb	15-45
Heating W1	Heating W1 - OAT	55 F	35-100
Heating W2	Heating W2 - OAT	70 F	35-100
Heating	Heating - Enthalpy	23 BTU/lb	15-45
Heating	Heating LAT	72 F	50-110
Heating	Heating Max LAT Electric Heat	120 F	50-120
Heating	Heating Max LAT Gas Heat	130 F	50-130
HGRH	HGRH Lat, Diff	70, 1 F	35-100, 0-10
HGRH	HGRH RAH	55% RH	0-100
CO2	CO2 PPM	800 PPM	0-2000
Supply Fan	Supply Fan DP Transmitter	1” W.C.	0-10
SLT	Suction Line Temperature (Compressor off)	28 F	28-100
SLT	Suction Line Temperature (Compressor to 10%)	32 F	30-100
OA Damper	OA Damper	0 % Open	0-100
Cooling Unoccupied	Cooling Unoccupied - RAT - Y1	80 F	35-100
Cooling Unoccupied	Cooling Unoccupied - RAT - Y2	85 F	35-100
Heating Unoccupied	Heating Unoccupied - RAT - W1	65 F	35-100
Heating Unoccupied	Heating Unoccupied - RAT - W2	60 F	35-100
HGRH Unoccupied	HGRH Unoccupied - RAH	60% RH	0-100
Room Control	Room Control Setting	75 F	35-100
Warm-Up	Warm-Up - RAT	70 F	35-100
LAT Low Limit Unoccupied	Low Limit Unoccupied - LAT	40 F	35-100
LAT Cooling Unoccupied	Cooling Unoccuped - LAT	60 F	35-100
Freeze Status	Freeze Status - LAT	38 F	35-100

100% Outside Air Operation

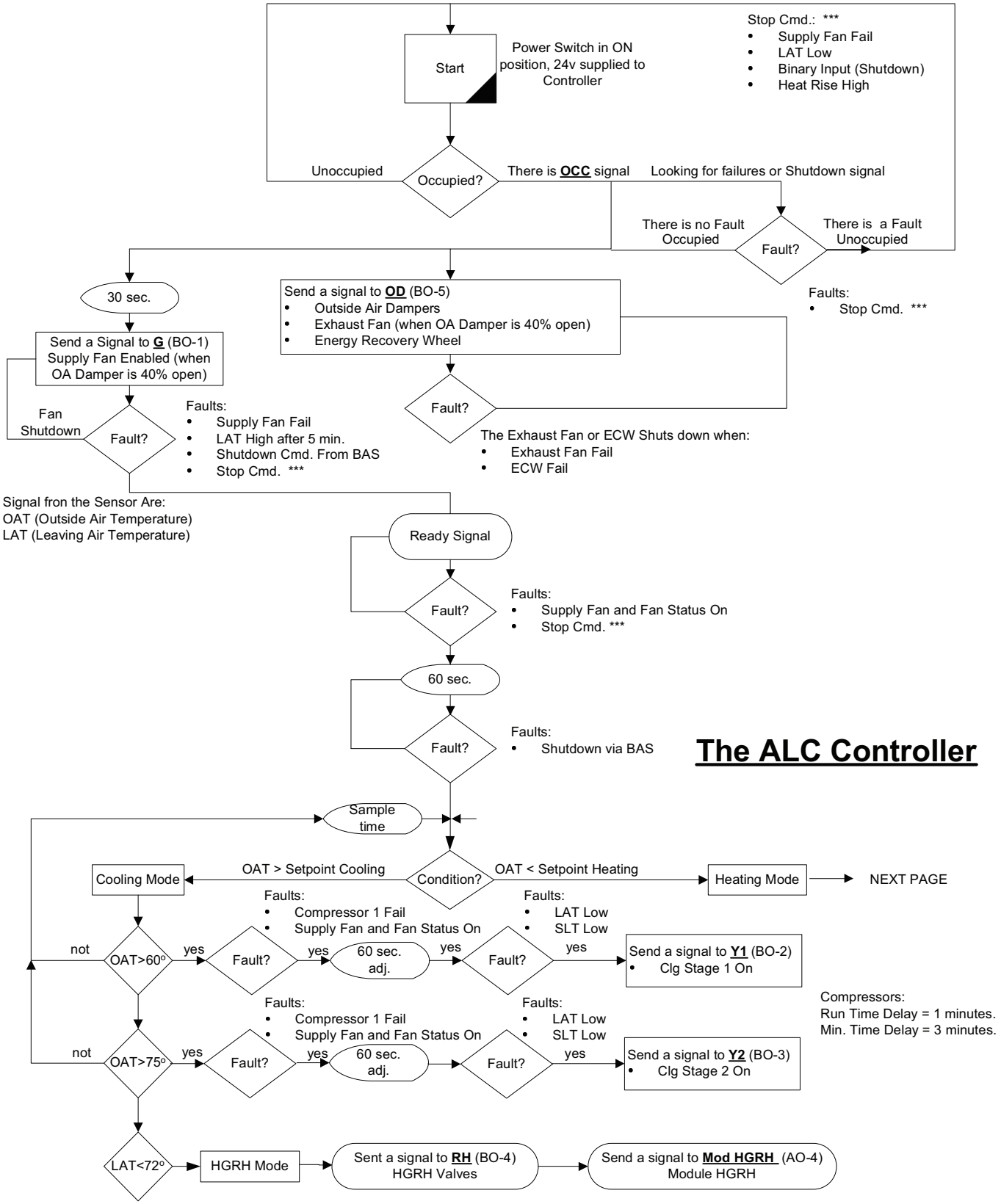


Fig. 18A — Sequence of Operation (Cooling)

Sequence of Operation — 100% OA Unit 62DA, DB, DC, DD
Heating Mode

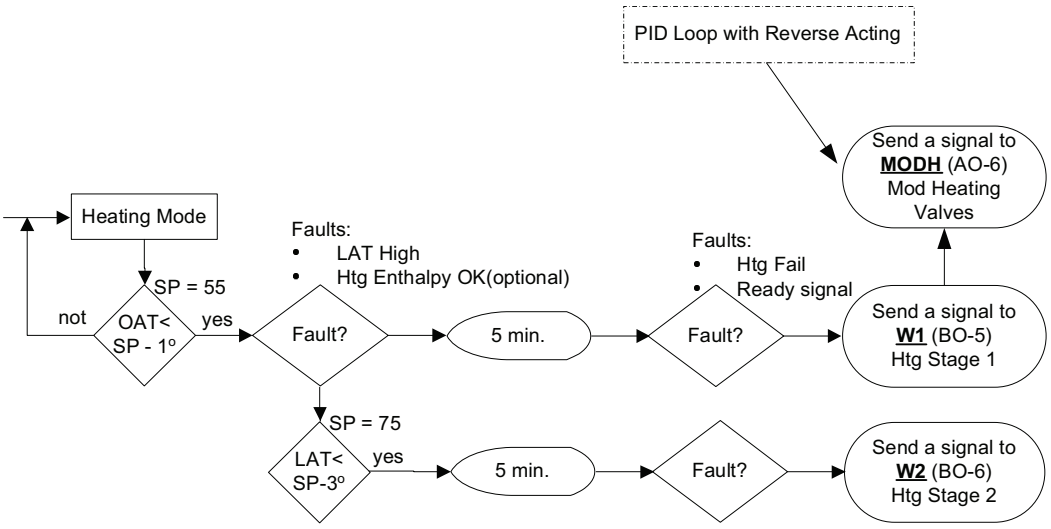


Fig. 18B — Sequence of Operation (Heating)

Sequence of Operation — 100% Outdoor Air Units — 62DA,DB,DC,DD — Operation of the dedicated outdoor air unit is based upon the occupancy schedule that the installer or user programs into the controller. See Fig. 18A and 18B.

NOTE: The temperatures listed below are default values and may be adjusted to meet the needs of the application.

START OF OPERATION — When the unit is turned on, 24 volts AC is supplied to the controller. The controller will check the operating schedule and if it senses an occupied status, then the system checks for faults. If there are no faults, after 30 seconds, the controller will initiate the following actions:

- open the outside-air damper
- start the supply fan (when outside-air damper is 40% open)
- start the optional exhaust fan (when outside-air damper is 40% open)
- start the optional energy recovery wheel
- verifies the supply fan and optional exhaust fan motor operation via the signal received from the airflow switch
- verifies ECW operation via current setting switch

COOLING MODE — When the supply fan is running, the system monitors the outdoor-air temperature.

If OAT > 60 F, first stage compressor is started.

If OAT ≥ 75 F, second stage compressor is started (size 12 and larger)

If OAT falls to 70 F, second stage compressor will be turned off.

If OAT < 59 F, first stage compressor will be turned off.

NOTE: If the 62D unit is not equipped with hot gas reheat (HGRH), the leaving air temperature (LAT) is not controlled unless it is equipped with a digital compressor. Units with a digital compressor will modulate the digital compressor's capacity to maintain a 70 F (default value) leaving-air temperature.

NOTE: Compressors have a 5-minute time delay for restart.

HOT GAS REHEAT (HGRH) MODE — If the unit is equipped with an optional hot gas reheat system, when the supply fan is running and the unit is in Cooling mode the system monitors the leaving-air temperature. If the leaving-air temperature is < 72 F, then the HGRH mode will be enabled. If the 62D unit is equipped with cycling HGRH control, the leaving-air temperature will typically be within approximately ± 1.5° F of the LAT set point. For units equipped with modulating HGRH control, the leaving-air temperature will typically be within approximately ± 0.5° F of the LAT set point. If LAT > (72 F + 1° F), HGRH is disabled.

NOTE: Units with a digital compressor and HGRH use modulating HGRH control. Digital compressor equipped units have a suction temperature sensor.

DEHUMIDIFICATION — On units equipped with a digital compressor, a dehumidification routine may be enabled. If the LAT set point is achieved, the controller will check leaving air humidity. If the leaving air humidity is 3% above the leaving air humidity set point (default is 50% RH), the digital compressor will ramp up in capacity as necessary to satisfy the leaving air humidity set point. If the LAT goes below the set point, modulating HGRH will be enabled to maintain the LAT. The controller will balance the capacity of the compressor and the use of HGRH to first satisfy LAT and then, if necessary dehumidify.

HEAT — The 62D unit may be equipped with gas or electric heat. The gas heat may be staged or modulating control. The electric heat may be staged or SCR control.

SET POINTS — The control set points are the same for gas or electric heat but are dependent on the type of unit, 100% outdoor air (62DA, DB, DC, DD). Values shown are default values and may be adjustable.

STAGED HEATING — Heating mode will be initiated based upon the outdoor-air temperature (OAT) heating set point (default is 55 F).

If OAT < 55 F, first stage heat is initiated. The heat type may be a gas furnace or electric heater.

If LAT ≤ 69 F, (heating, SP minus 3 F, adjustable) second stage heat is initiated.

If LAT ≥ 73 F, (heating SP plus 1 F, non-adjustable) second stage heat turns off.

If OAT ≥ 56 F, (heating OAT SP plus 1 F, non-adjustable) first stage heat turns off.

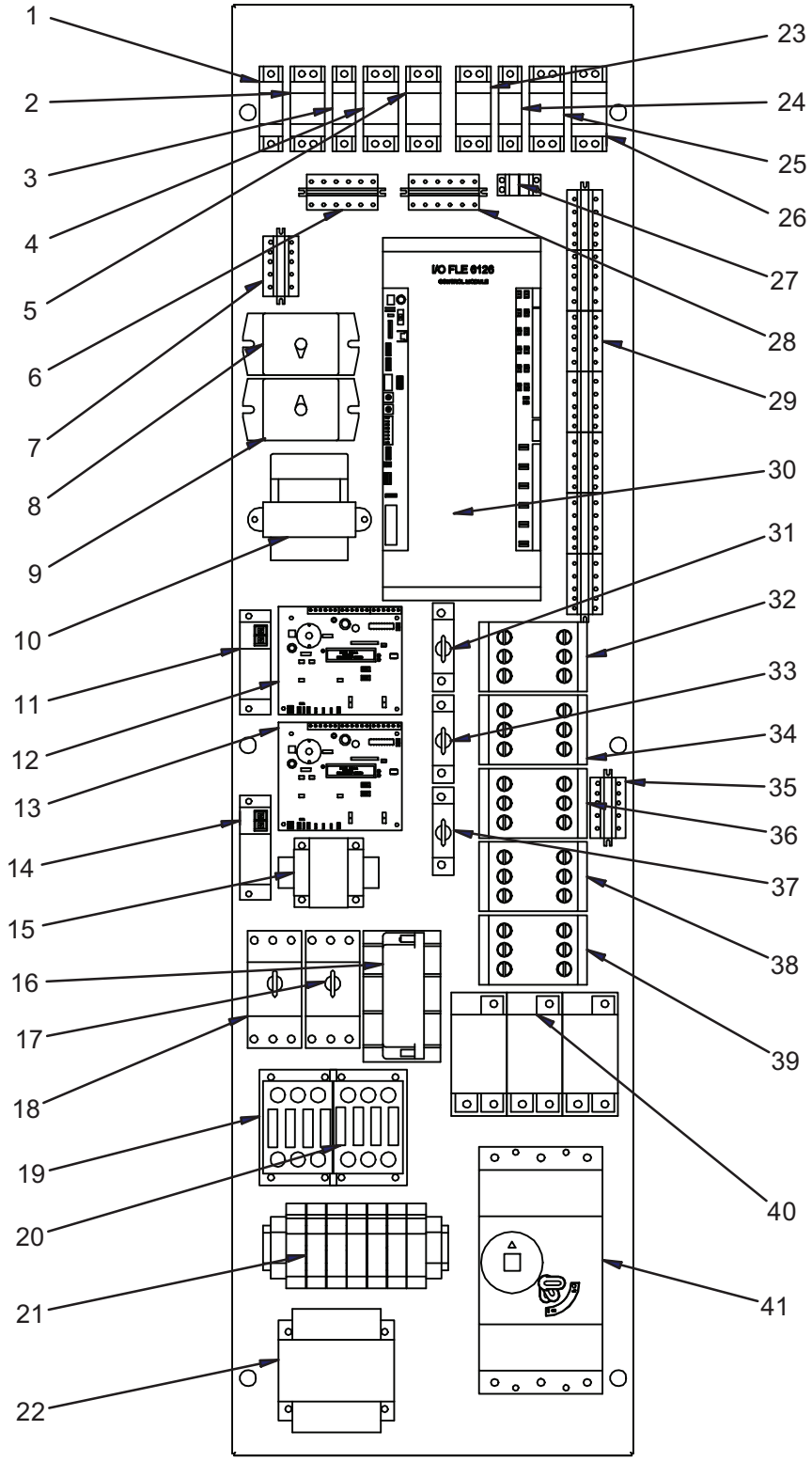
NOTE: The system monitors the leaving-air temperature and will turn off the heating stages if the LAT is greater than 120 F for electric heat or 130 F for gas heat or the value of the LAT sensor is out of limits.

MODULATING GAS OR SCR ELECTRIC HEAT — If the OAT is below OAT heating set point (default is 55 F), heating will be initiated. The modulating heat valve(s) or

SCRs will control to a LAT of 72 F. Units with modulating gas heat may also have 'Warmup' control. Warmup control (sometimes called high fire override) is used to quickly raise the space temperature. For example, if the space is cold early in the morning, the unit will sense the low space temperature and go into high fire override even if the outdoor temperature is not that cold. After the space temperature is in the normal range, the unit will then go back to the modulating output mode.

REHEAT OVERRIDE — If room temperature control is desired, hot gas reheat may be overridden via ROOM CTRL function accessible on the BACview Conditions screen. When the override is activated, the HGRH mode will be controlled to adjust the room temperature to the set point (CONTROL ROOM SP) as configured on the BACview display.

Control Box — A typical control box layout is shown in Fig. 19. The components will vary based on the equipment options.



ITEM NO.	DESCRIPTION
1	Outdoor damper relay (ODR)
2	Reheat relay (RHR)
3	Heat relay #2 (HR2)
4	Heat relay #1 (HR1)
5	Cool relay #2 (CR2)
6	Terminal board #4 (TB4)
7	Terminal board A (TBA)
8	Time delay #1 (TD1)
9	Time delay #2 (TD2)
10	Transformer #1 (T1)
11	Compressor #2 - current sensor (CC2-CS)
12	Modulation reheat controller #1 (MRC)
13	Modulating discharge line controller (MDC)
14	Compressor #1 - current sensor (CC1-CS)
15	Isolation transformer #3 (T3)
16	Digital compressor module
17	Outdoor fan #1 motor starter protector (MSP-FC1)
18	Outdoor fan #2 motor starter protector (MSP-FC2)
19	Outdoor fan contactor #1 (FC1)
20	Outdoor fan contactor #2 (FC2)
21	Fuses 1,2,3,4,5,8,9,10 (F1,F2,F3,F4,F5,F8,F9,F10)
22	Transformer #2 (T2)
23	Cool relay #1 (CR1)
24	Motor wheel relay (MWR)
25	Exhaust fan relay (EFR)
26	Blower relay (BR)
27	Terminal board #5 (TB5)
28	Terminal board #2 (TB2)
29	Terminal board #3 (TB3)
30	Controller I/O Flex 6126,ALC (ALC)
31	Wheel motor starter protector (MSP-WM)
32	Wheel motor contactor (WMC)
33	Exhaust motor starter protector (MSP-EC)
34	Exhaust fan contactor (EFC)
35	Terminal board #1 (TB1)
36	Blower contactor (BC)
37	Blower motor starter protector (MSP-BC)
38	Compressor contactor #2 (CC2)
39	Compressor contactor #1 (CC1)
40	Power distribution block (PDB)
41	Integral disconnect switch

Fig. 19 — Control Box

ALARMS

An alarm will be displayed on the BACview screen when the alarm is active. The display will show the code for the active alarm, for example, sf_fail_1, for a supply fan fault. See Table 9 for alarm codes.

TYPICAL WIRING SCHEMATICS

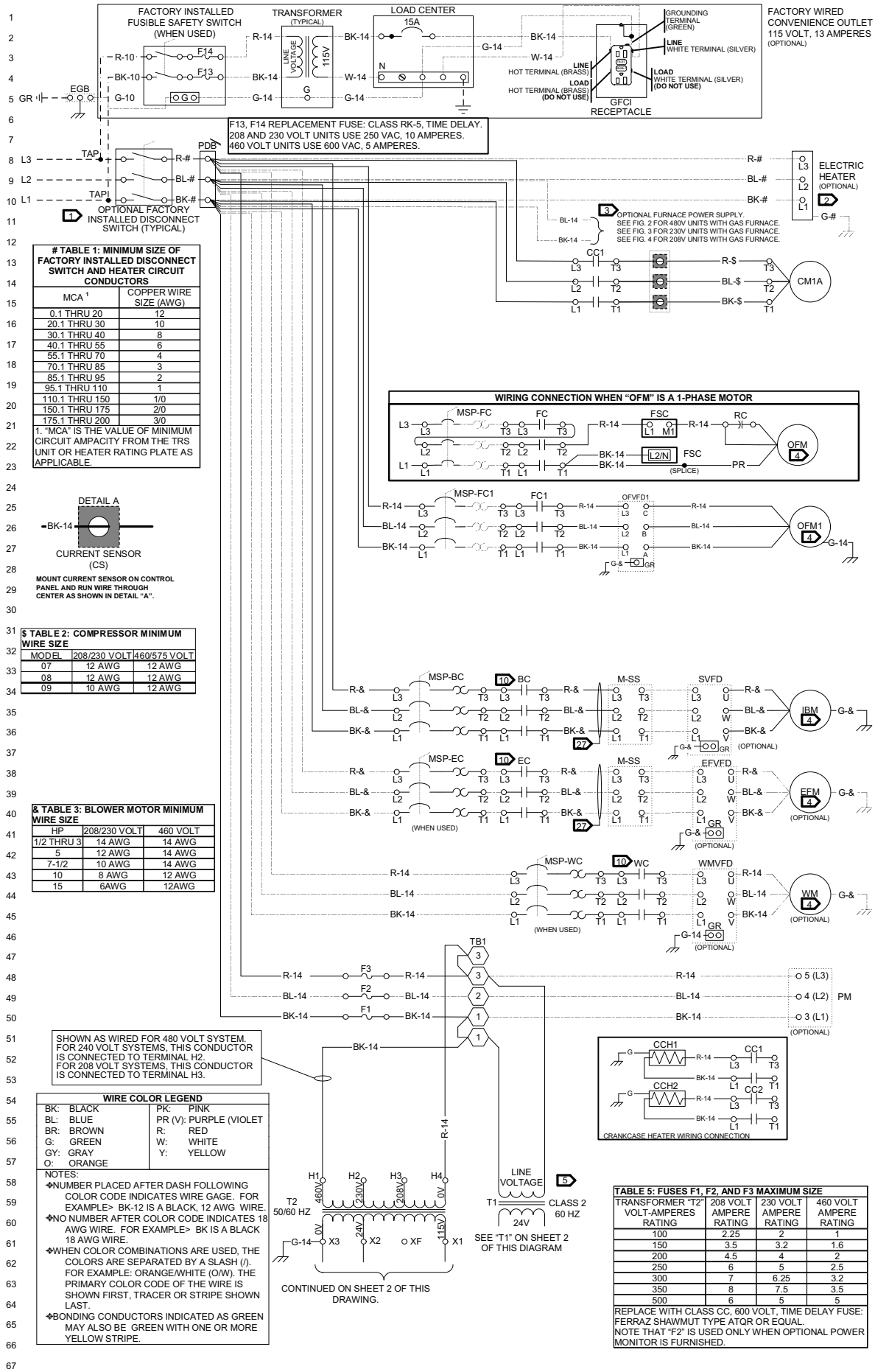
See Fig. 20-22 for typical wiring diagrams.

⚠ CAUTION

The wiring diagrams in this section are "typical" diagrams and may not completely represent all unit options. The best wiring diagram to use is the unit specific wiring diagram provided with the unit.

Table 9 — Alarm Codes

ALARM	DESCRIPTION	DISPLAY INDICATION	AUDIBLE ALARM	TIME DELAY	ALARM CONDITION
Filter	Replace Filter	cfi_1	X	2 min	Differential Pressure Switch (N.O.) closes
Supply Fan	Check:Supply Fan Fault	sf_fail_1	X	90 sec	Airflow Switch (N.O.) opens
Compressor 1	C1 Protections Lockout	c1_fail_1	X	10 min	Current Sensor Input
Compressor 2	C2 Protections Lockout	c2_fail_1	X	10 min	Current Sensor Input
Heating	Heat Failure	heating_1	X	30 sec	LAT is equal or less than 50°F
Exhaust Fan	Check:Exhaust Fan	ef_fail_1	X	1 min	Airflow Switch (N.O.) opens
Wheel Motor	Check:Wheel Motor	wm_fail_1	X	5 min	Current Sensor Input
High LAT	High LAT Temperature	hi_lat_1	X	3 min	120°F(Elec Heat) /130°F (Gas Heat)
Low LAT	Low LAT Temperature	lo_lat_1		3 min	40°F (Occupied) /48°F (Unoccupied)
Digital Compressor #1 Safety	Low Suction temperature Cir #1	dc_10_1		No delay	<32°F SLT, digital comp unloads to 10%
Digital Compressor #1 Shutdown	Low Suction temperature Cir #1	ll_slt_1		No delay	<28°F SLT
Digital Compressor #2 Shutdown	Low Suction temperature Cir #2	ll_slt2_1		No delay	<28°F SLT
freezestat_1	Check: Freeze Status Alarm	freeze_1	X	No delay	<40°F SLT
Sensor Failure	Sensors Out of Limits	sensor_1	X	5 sec	Above High/Below Low Limits
High Supply Fan Static Pressure	High Static pressure	sf_dpt_hi_1		No delay	> Setpoint(1.0" default) plus 1.0"
High Exhaust Fan Static Pressure	High Exhaust static pressure	ef_dpt_hi_1		No delay	> Setpoint(1.0" default) plus 1.0"



 # TABLE 1: MINIMUM SIZE OF FACTORY INSTALLED DISCONNECT SWITCH AND HEATER CIRCUIT CONDUCTORS

MCA [1]	COPPER WIRE SIZE (AWG)
0.1 THRU 20	12
20.1 THRU 30	10
30.1 THRU 40	8
40.1 THRU 55	6
55.1 THRU 70	4
70.1 THRU 85	3
85.1 THRU 95	2
95.1 THRU 110	1
110.1 THRU 150	1/0
150.1 THRU 175	2/0
175.1 THRU 200	3/0

1. "MCA" IS THE VALUE OF MINIMUM CIRCUIT AMPACITY FROM THE TRS UNIT OR HEATER RATING PLATE AS APPLICABLE.

$ TABLE 2: COMPRESSOR MINIMUM WIRE SIZE

MODEL	208/230 VOLT	460/575 VOLT
07	12 AWG	12 AWG
08	12 AWG	12 AWG
09	10 AWG	12 AWG

& TABLE 3: BLOWER MOTOR MINIMUM WIRE SIZE

HP	208/230 VOLT	460 VOLT
1/2 THRU 3	14 AWG	14 AWG
5	12 AWG	14 AWG
7-1/2	10 AWG	14 AWG
10	8 AWG	12 AWG
15	6AWG	12AWG

WIRE COLOR LEGEND

BK: BLACK	PK: PINK
BL: BLUE	PR (V): PURPLE (VIOLET
BR: BROWN	R: RED
G: GREEN	W: WHITE
GY: GRAY	Y: YELLOW
O: ORANGE	

NOTES:
- NUMBER PLACED AFTER DASH FOLLOWING COLOR CODE INDICATES WIRE GAGE. FOR EXAMPLE> BK-12 IS A BLACK, 12 AWG WIRE.
- NO NUMBER AFTER COLOR CODE INDICATES 18 AWG WIRE. FOR EXAMPLE> BK IS A BLACK 18 AWG WIRE.
- WHEN COLOR COMBINATIONS ARE USED, THE COLORS ARE SEPARATED BY A SLASH (/). FOR EXAMPLE: ORANGE/WHITE (O/W). THE PRIMARY COLOR CODE OF THE WIRE IS SHOWN FIRST, TRACER OR STRIPE SHOWN LAST.
- BONDING CONDUCTORS INDICATED AS GREEN MAY ALSO BE GREEN WITH ONE OR MORE YELLOW STRIPE.

TABLE 5: FUSES F1, F2, AND F3 MAXIMUM SIZE

TRANSFORMER "T2" VOLT-AMPERES RATING	208 VOLT AMPERE RATING	230 VOLT AMPERE RATING	460 VOLT AMPERE RATING
100	2.25	2	1
150	3.5	3.2	1.6
200	4.5	4	2
250	6	5	2.5
300	7	6.25	3.2
350	8	7.5	3.5
500	6	5	5

REPLACE WITH CLASS CC, 600 VOLT, TIME DELAY FUSE: FERRAZ SHAWMUT TYPE ATQR OR EQUAL.
NOTE THAT "F2" IS USED ONLY WHEN OPTIONAL POWER MONITOR IS FURNISHED.

Fig. 20 — Typical Wiring Schematics 62DA,DB,DC,DD 07-09

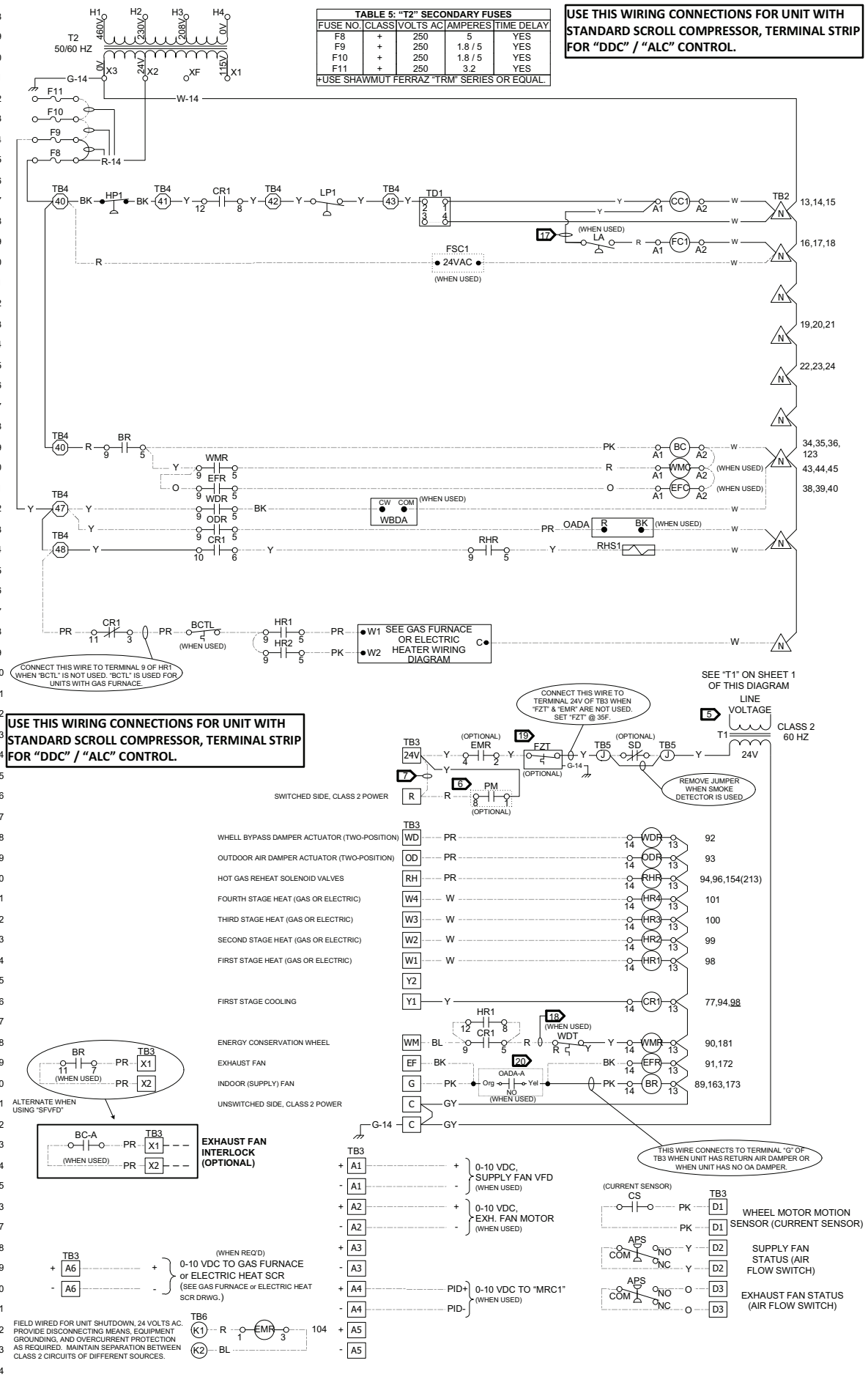


Fig. 20 — Typical Wiring Schematics 62DA,DB,DC,DD 07-09 (cont)

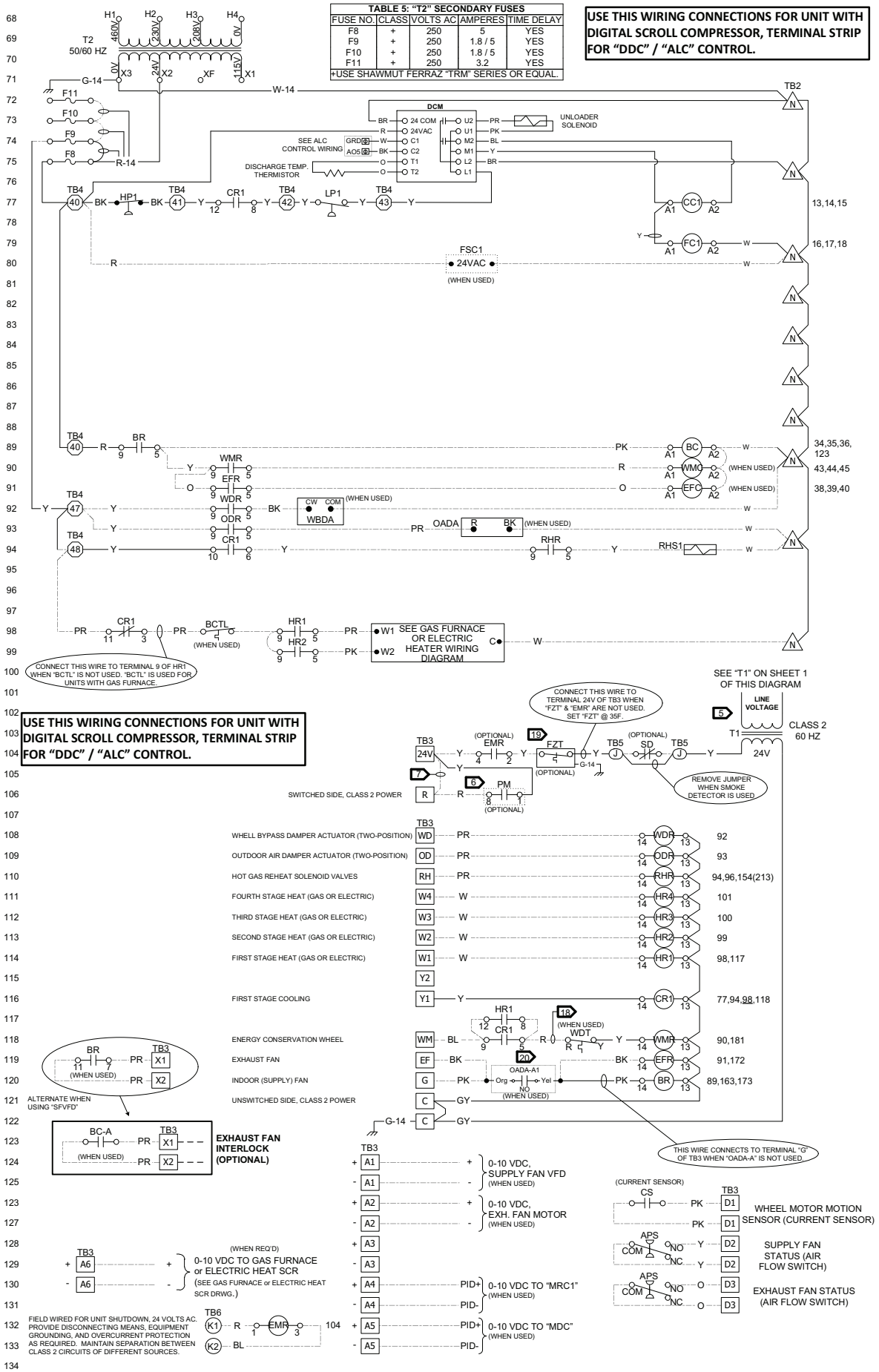


Fig. 20 — Typical Wiring Schematics 62DA,DB,DC,DD 07-09 (cont)

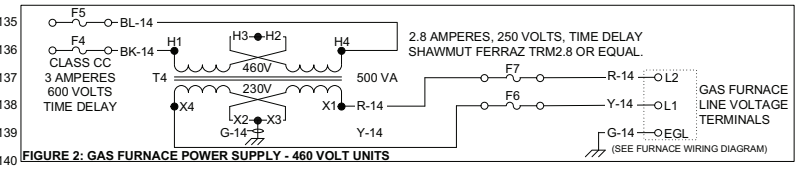


FIGURE 2: GAS FURNACE POWER SUPPLY - 460 VOLT UNITS

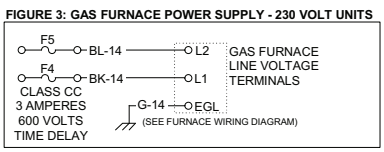


FIGURE 3: GAS FURNACE POWER SUPPLY - 230 VOLT UNITS

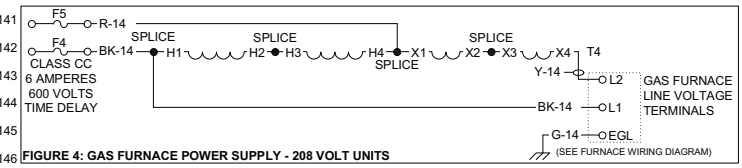
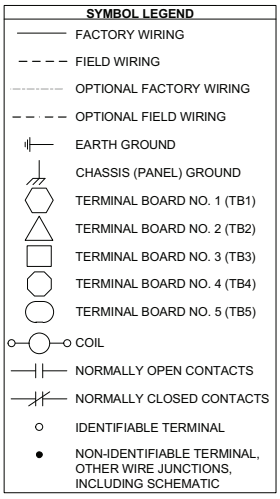


FIGURE 4: GAS FURNACE POWER SUPPLY - 208 VOLT UNITS



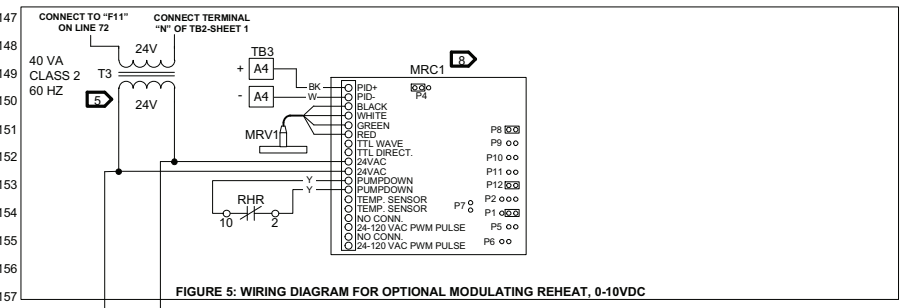


FIGURE 5: WIRING DIAGRAM FOR OPTIONAL MODULATING REHEAT, 0-10VDC

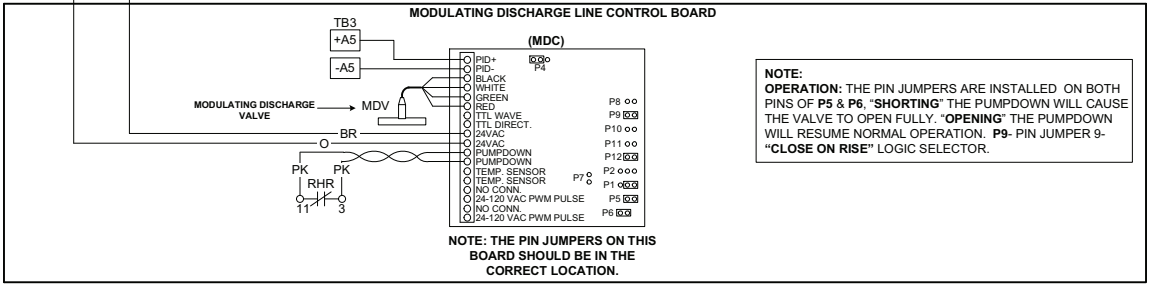


FIGURE 6: SVFD CONTROL

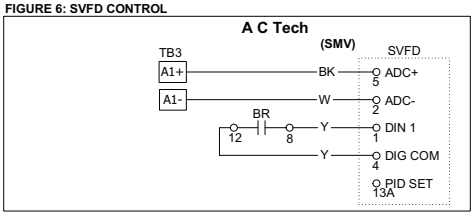
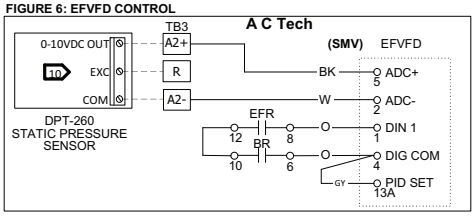
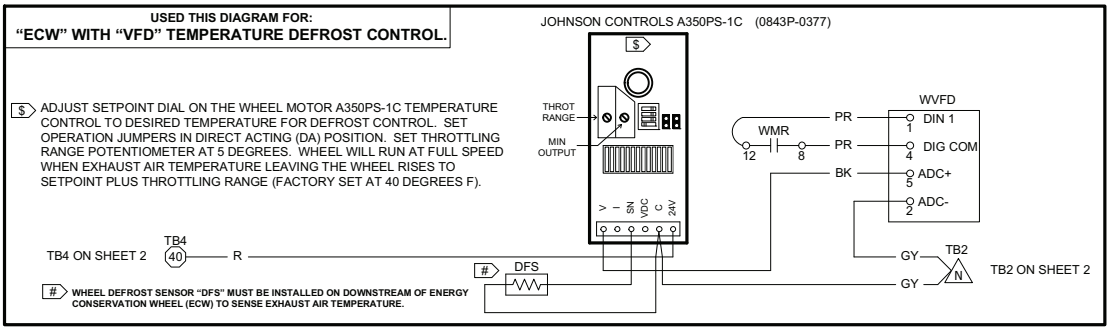
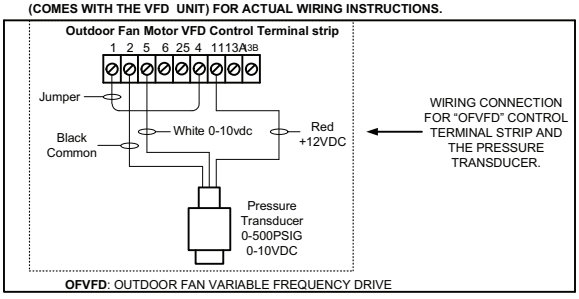


FIGURE 6: EFVFD CONTROL





WHEN USED: TYPICAL OFVFD WIRING CONNECTIONS. SEE VFD MANUAL (COMES WITH THE VFD UNIT) FOR ACTUAL WIRING INSTRUCTIONS.



Fan Speed Control (FSC), P266, Pressure Transducer Connection

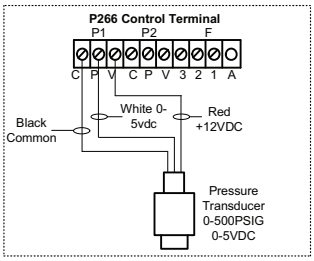
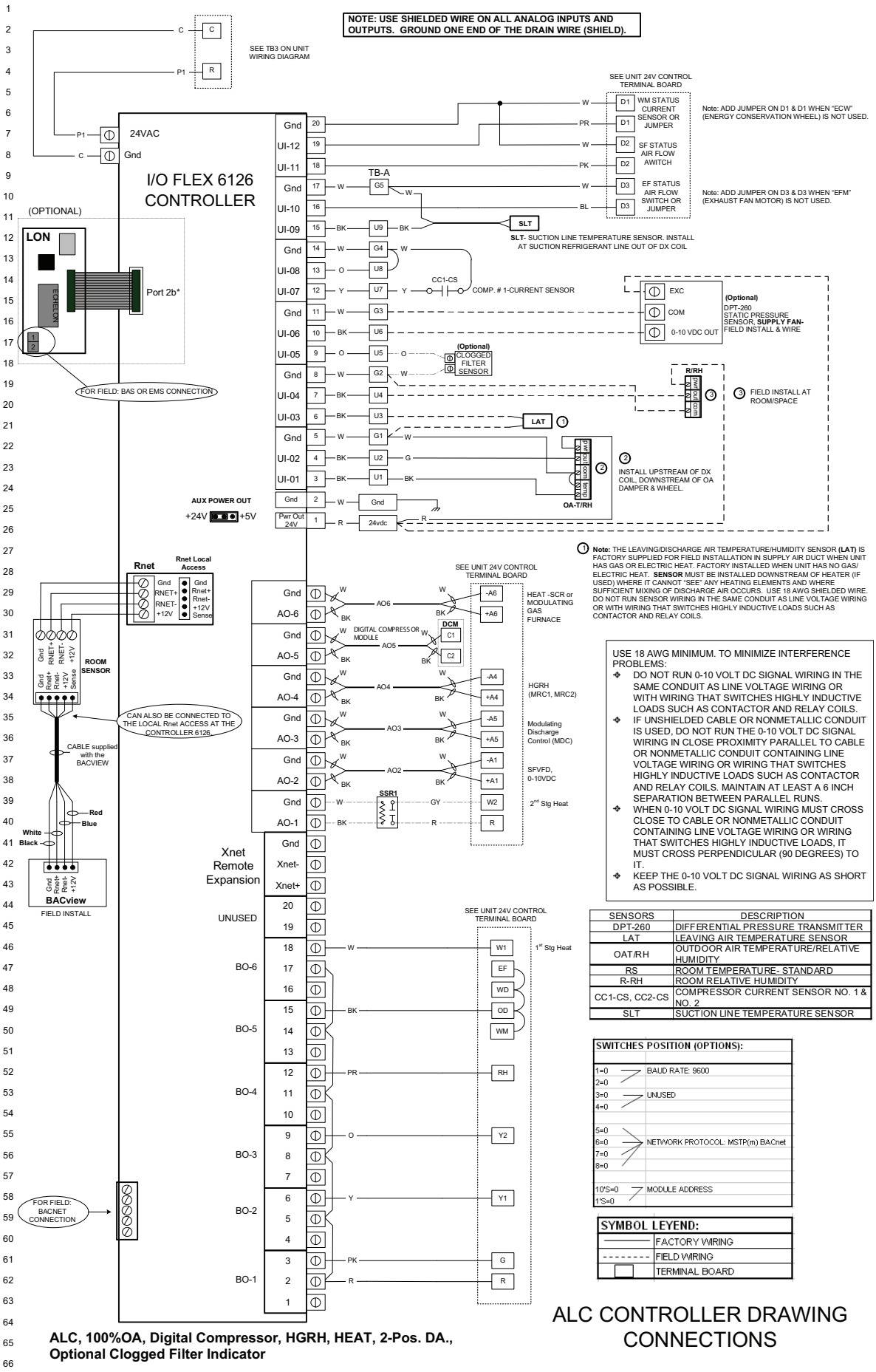


Fig. 20 — Typical Wiring Schematics 62DA,DB,DC,DD 07-09 (cont)



ALC, 100%OA, Digital Compressor, HGRH, HEAT, 2-Pos. DA., Optional Clogged Filter Indicator

ALC CONTROLLER DRAWING CONNECTIONS

Fig. 20 — Typical Wiring Schematics 62DA,DB,DC,DD 07-09 (cont)

LEGEND

FUNCTIONAL DESIGNATION	ITEM	LINE NUMBER	DESCRIPTION
APS	001	98	SUPPLY AIR DIFFERENTIAL PRESSURE SWITCH
BC,SVFD	101	89,158	INDOOR BLOWER MOTOR CONTACTOR/ "BC"VARIABLE FREQUENCY DRIVE (OPTIONAL)
BC-A1 & A2	102	#	"BC" AUXILIARY CONTACT NO. 1 & NO. 2
BCTL	002	98	BLOWER COMPARTMENT HIGH TEMPERATURE LIMIT
	003		
	004		
	005		
	006		
BR	103	120	BLOWER RELAY
CC1	104	77,79	COMPRESSOR CONTACTOR NO. 1
CC1-A	105	#	"CC" AUXILIARY CONTACT
	106		
	107		
CCH1	007	52	COMPRESSOR CRANKCASE HEATER NO. 1
	008		
CM1	009	14,17	COMPRESSOR NO. 1
	010		
CR1	108	117	COOL RELAY NO. 1
EFC	109	91	EXHAUST FAN CONTACTOR (WHEN USED)
	011		
EFM	012	39	EXHAUST FAN MOTOR
EFR	110	119	EXHAUST FAN MOTOR RELAY (WHEN USED)
EFVFD	013	38,173	EXHAUST FAN VARIABLE FREQUENCY DRIVE (OPTIONAL)
EGB	111	5	EQUIPMENT GROUNDING BAR
WMR	112	118	ENERGY WHEEL MOTOR RELAY (WHEN USED)
F1,F2,F3	113	50,49,48	FUSING - SEE FUSE TABLE
F4,F5	114	SHEET 3	FUSING (WHEN USED) - SEE FUSE TABLE
F6,F7	115	SHEET 3	FUSING (WHEN USED) - SEE FUSE TABLE
F8	116	75	FUSING - SEE FUSE TABLE
F9	117	74	FUSING - SEE FUSE TABLE
F10	118	73	FUSING (WHEN USED) - SEE FUSE TABLE
F11	119	72	FUSING (WHEN USED) - SEE FUSE TABLE
F13,F14	014	3,4	FUSING (WHEN USED) - SEE FUSE TABLE
FC1	120	82	OUTDOOR FAN MOTOR CONTACTOR NO. 1
	121		
FZT	015	104	OPTIONAL FREEZE'STAT
FSC1	016	28,73	ELECTRONIC FAN SPEED CONTROL NO. 1
	017		
HP1	018	77	HIGH PRESSURE CUTOUT NO.1
	019		
HR1 TO HR4	122	112 TO 115	HEAT RELAY NO.1 TO NO. 4 (WHEN USED)
IBM	020	35	INDOOR BLOWER MOTOR
LA1	021	82	LOW AMBIENT FAN CYCLING CONTROL NO. 1 (WHEN USED)
	022		
	023		
	024		
LP1	025	77	LOW PRESSURE CUTOUT NO. 1
	026		
MRC1	123	149(207)	MODULATING REHEAT TEMPERATURE CONTROL BOARD NO. 1
	124		
MRV1	027	151	MODULATING HOT GAS REHEAT VALVE NO. 1 (WHEN USED)
	028		
MSP-BC	125	34,35,36	INDOOR BLOWER MOTOR STARTER PROTECTOR
	126		
	127		
MSP-EFC	128	38,39,40	EXHAUST BLOWER MOTOR STARTER PROTECTOR (WHEN USED)
MSP-FC1	129	26,27,28	OUTDOOR FAN NO. 1 MOTOR STARTER PROTECTOR
	130		
MSP-WC	131	43,44,45	WHEEL MOTOR STARTER PROTECTOR (WHEN USED)
OADA	029	93	TWO POSITION OUTDOOR AIR DAMPER ACTUATOR (WHEN USED)
ODR	132	110	OUTDOOR AIR DAMPER RELAY (WHEN USED)
OFM1	030	27	OUTDOOR FAN MOTOR NO. 1
	031		
PDB	133	8	POWER DISTRIBUTION BLOCK
PM	134	49,106	POWER MONITOR (OPTIONAL)
RC1	032	26	OFM1 RUN CAPACITOR
RHR	136	111	REHEAT RELAY (WHEN USED)
RHS1	033	94	HOT GAS REHEAT SOLENOID VALVE NO. 1
	034		
	035		
T1	137	59 (103)	CONTROL TRANSFORMER NO. 1
T2	138	59 (69)	CONTROL TRANSFORMER NO. 2
T3	139	149(205)	CONTROL TRANSFORMER NO. 3 (WHEN USED)
T4	036	137(142)	CONTROL TRANSFORMER NO. 4 (WHEN USED)
TB1	140	SHEET 1	TERMINAL BOARD NO. 1
TB2	141	SHEET 2	TERMINAL BOARD NO. 2
TB3	142	SHEET 2	TERMINAL BOARD NO. 3
TB4	143	SHEET 2	TERMINAL BOARD NO. 4
TB5	144	104	TERMINAL BOARD NO. 5
TD1	145	77	TIME DELAY NO. 1
	148		
WBDA	037	92	WHEEL BYPASS DAMPER ACTUATOR (WHEN USED)
WMC	146	90	WHEEL MOTOR CONTACTOR (WHEN USED)
WDR	147	109	WHEEL BYPASS DAMPER RELAY (WHEN USED)
WDT	038	88	WHEEL DEFROST THERMOSTAT (WHEN USED)
WM	039	44	WHEEL MOTOR (WHEN USED)
WMVFD	040	43,187	WHEEL MOTOR VARIABLE FREQUENCY DRIVE (OPTIONAL)

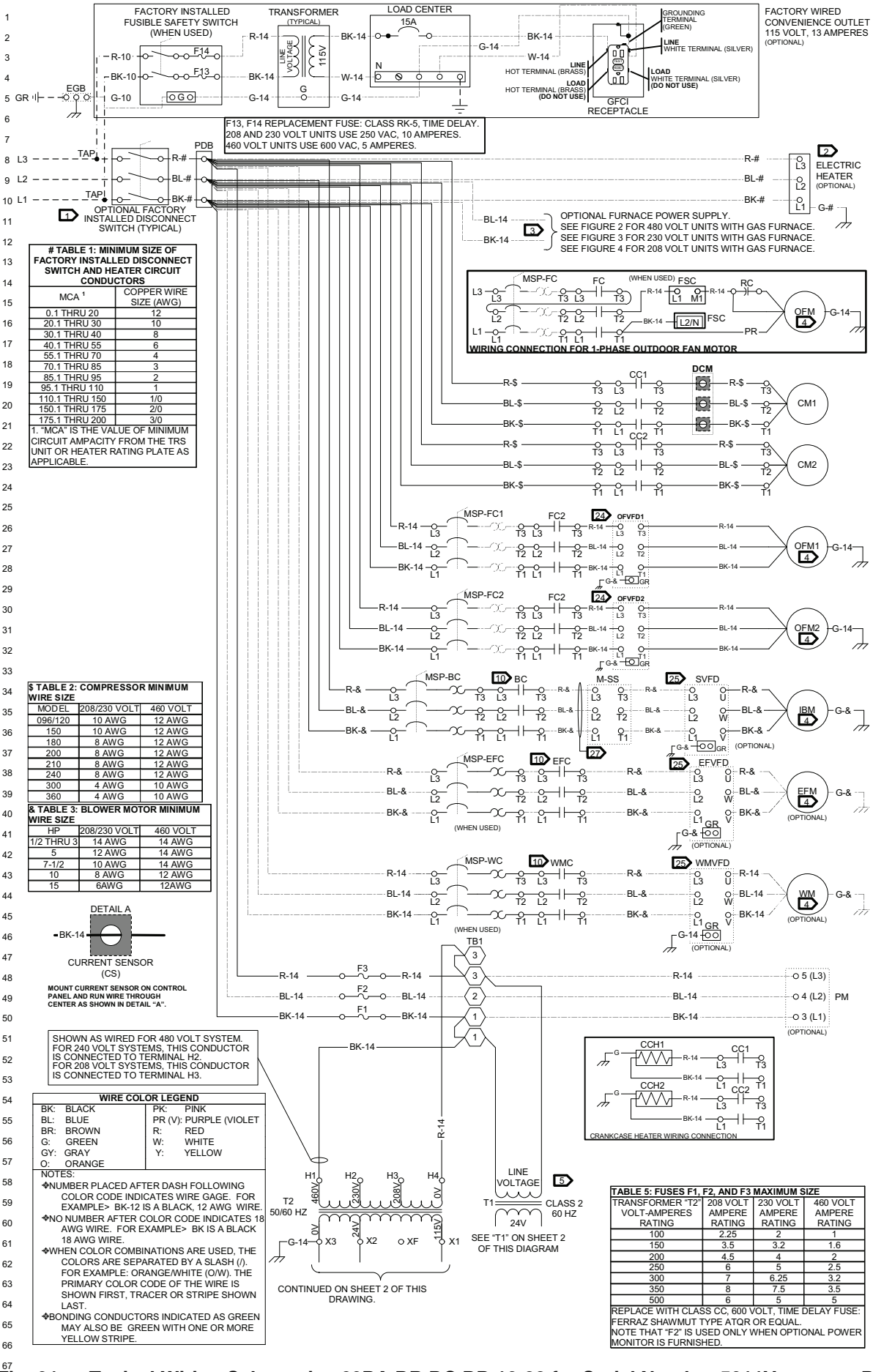
1. FIELD POWER SUPPLY PER UNIT RATING PLATE. MINIMUM CIRCUIT AMPACITY AND MAXIMUM SIZE OF TIME-DELAY FUSE OR HACR-TYPE CIRCUIT BREAKER PER UNIT RATING PLATE. PROVIDE DISCONNECTING MEANS AND EQUIPMENT GROUNDING AS REQUIRED.
2. TYPICAL HEATER SHOWN. SOME HEATERS REQUIRE MULTIPLE FACTORY WIRED BRANCH CIRCUITS (ONE CIRCUIT SHOWN). SEE WIRING DIAGRAM IN HEATER FOR ACTUAL HEATER WIRING DETAIL.
3. SEE THE FURNACE WIRING DIAGRAM FOR FURNACE INTERNAL WIRING.
4. TYPICAL MOTOR SHOWN. SEE CONNECTION DIAGRAM ON MOTOR FOR ACTUAL WIRING DETAIL.
5. TYPICAL CLASS 2 TRANSFORMER SHOWN. SEE TRANSFORMER LABEL FOR CONNECTION DIAGRAM AND/OR LEAD COLOR CODING. INSULATE SEPARATELY ANY UNUSED LEADS. POLARITY IS NOT INDICATED. SOME MODELS USE CIRCUIT BREAKER ON TRANSFORMER SECONDARY. THIS CIRCUIT BREAKER IS NOT SHOWN.
6. IF POWER MONITOR OUTPUT CONTACTS DO NOT TRANSFER WHEN POWER IS APPLIED TO UNIT (LED GLOWS RED DURING FAULT CONDITIONS):
   1. VERIFY THAT ALL THREE PHASES ARE PRESENT AND ARE OF THE CORRECT VOLTAGE. IF ALL THREE PHASES ARE PRESENT AND ARE OF THE CORRECT VOLTAGE, PHASE ROTATION MAY BE INCORRECT. PERFORM STEP 2.
   2. DISCONNECT POWER TO TRS UNIT. VERIFY THAT POWER IS IN FACT DISCONNECTED. SWAP ANY TWO OF THE THREE UNIT POWER SUPPLY WIRES. WHEN POWER IS REAPPLIED, OUTPUT CONTACTS SHOULD NOW TRANSFER.
7. INSTALL JUMPER WHEN OPTIONAL POWER MONITOR IS NOT USED. JUMPER MUST NOT BE INSTALLED WHEN OPTIONAL POWER MONITOR IS USED.
8. THE FOLLOWING PIN JUMPERS ARE INSTALLED:
   - P1- BETWEEN CENTER AND RIGHT PINS
   - P8
   - P12

   NOTE THAT P4 IS FOR INTERNAL POWER SELECTION - DO NOT CHANGE. SEE THE TEMPERATURE CONTROL BOARD PRODUCT/TECHNICAL BULLETIN FOR COMPLETE INFORMATION.
9. THESE CONDUCTORS ARE USED ONLY WHEN "MRC2" IS USED.
10. THIS CONTACTOR IS NOT USED WHEN "VFD" (VARIABLE FREQUENCY DRIVE) IS USED.
11.
12.
13.
14.
15.
16.
17. THIS WIRE CONNECTS DIRECTLY TO 24V COIL (A1) OF FAN CONTACTOR (FC) WHEN "LA" (LOW AMBIENT FAN CYCLING CONTROL) IS NOT USED.
18. THIS WIRE CONNECTS TO TERMINAL 14 OF "WMR" WHEN "WDT" IS NOT USED.
19. WHEN UNIT HAS HEATER, INSTALL THE BULB OF THE FREEZESTAT ON DISCHARGE AIR DUCT. IT IS FACTORY INSTALL WHEN UNIT HAS NO HEATER.
20. "OADA-A" (OUTSIDE AIR DAMPER ACTUATOR-AUXILIARY): DO NOT WIRE BLOWER RELAY (BR) TO DAMPER ACTUATOR-AUXILIARY WHEN UNIT HAS "O.A. + R.A. DAMPER". WIRE THE EXHAUST FAN RELAY TO DAMPER ACTUATOR-AUXILIARY WHEN "EFR" IS USED.
21.
22.
27. THESE WIRES CONNECT DIRECTLY TO SUPPLY MOTOR WHEN OPTIONAL MOTOR SOFT START IS NOT USED.

LEGEND

FUNCTIONAL DESIGNATION	ITEM	LINE NUMBER	DESCRIPTION
EMR	148	132	OPTIONAL ENERGY MANAGEMENT RELAY
TB6	149	132,238	TERMINAL BOARD NO. 6 (OPTIONAL)
	150		
	151		
TB7	152	278	TERMINAL BOARD NO. 7 (WHEN USED)
	153		
	154		
	155		
MSS	156	34,38	MOTOR SOFT START (WHEN USED)
	157		

Fig. 20 — Typical Wiring Schematics 62DA,DB,DC,DD 07-09 (cont)



 # TABLE 1: MINIMUM SIZE OF FACTORY INSTALLED DISCONNECT SWITCH AND HEATER CIRCUIT CONDUCTORS

MCA [1]	COPPER WIRE SIZE (AWG)
0.1 THRU 20	12
20.1 THRU 30	10
30.1 THRU 40	8
40.1 THRU 55	6
55.1 THRU 70	4
70.1 THRU 85	3
85.1 THRU 95	2
95.1 THRU 110	1
110.1 THRU 150	1/0
150.1 THRU 175	2/0
175.1 THRU 200	3/0

1. "MCA" IS THE VALUE OF MINIMUM CIRCUIT AMPACITY FROM THE TRS UNIT OR HEATER RATING PLATE AS APPLICABLE.

$ TABLE 2: COMPRESSOR MINIMUM WIRE SIZE

MODEL	208/230 VOLT	460 VOLT
096/120	10 AWG	12 AWG
150	10 AWG	12 AWG
180	8 AWG	12 AWG
200	8 AWG	12 AWG
210	8 AWG	12 AWG
240	8 AWG	12 AWG
300	4 AWG	10 AWG
360	4 AWG	10 AWG

& TABLE 3: BLOWER MOTOR MINIMUM WIRE SIZE

HP	208/230 VOLT	460 VOLT
1/2 THRU 3	14 AWG	14 AWG
5	12 AWG	14 AWG
7-1/2	10 AWG	14 AWG
10	8 AWG	12 AWG
15	6AWG	12AWG

WIRE COLOR LEGEND

BK: BLACK	PK: PINK
BL: BLUE	PR (V): PURPLE (VIOLET
BR: BROWN	R: RED
G: GREEN	W: WHITE
GY: GRAY	Y: YELLOW
O: ORANGE	

NOTES:
- NUMBER PLACED AFTER DASH FOLLOWING COLOR CODE INDICATES WIRE GAGE. FOR EXAMPLE> BK-12 IS A BLACK, 12 AWG WIRE.
- NO NUMBER AFTER COLOR CODE INDICATES 18 AWG WIRE. FOR EXAMPLE> BK IS A BLACK 18 AWG WIRE.
- WHEN COLOR COMBINATIONS ARE USED, THE COLORS ARE SEPARATED BY A SLASH (/). FOR EXAMPLE: ORANGE/WHITE (O/W). THE PRIMARY COLOR CODE OF THE WIRE IS SHOWN FIRST, TRACER OR STRIPE SHOWN LAST.
- BONDING CONDUCTORS INDICATED AS GREEN MAY ALSO BE GREEN WITH ONE OR MORE YELLOW STRIPE.

TABLE 5: FUSES F1, F2, AND F3 MAXIMUM SIZE

TRANSFORMER "T2" VOLT-AMPERES RATING	208 VOLT AMPERE RATING	230 VOLT AMPERE RATING	460 VOLT AMPERE RATING
100	2.25	2	1
150	3.5	3.2	1.6
200	4.5	4	2
250	6	5	2.5
300	7	6.25	3.2
350	8	7.5	3.5
500	6	5	5

REPLACE WITH CLASS CC, 600 VOLT, TIME DELAY FUSE: FERRAZ SHAWMUT TYPE ATQR OR EQUAL.
NOTE THAT "F2" IS USED ONLY WHEN OPTIONAL POWER MONITOR IS FURNISHED.

Fig. 21 — Typical Wiring Schematics 62DA,DB,DC,DD 12-38 for Serial Number 5211Vxxxxx or Prior

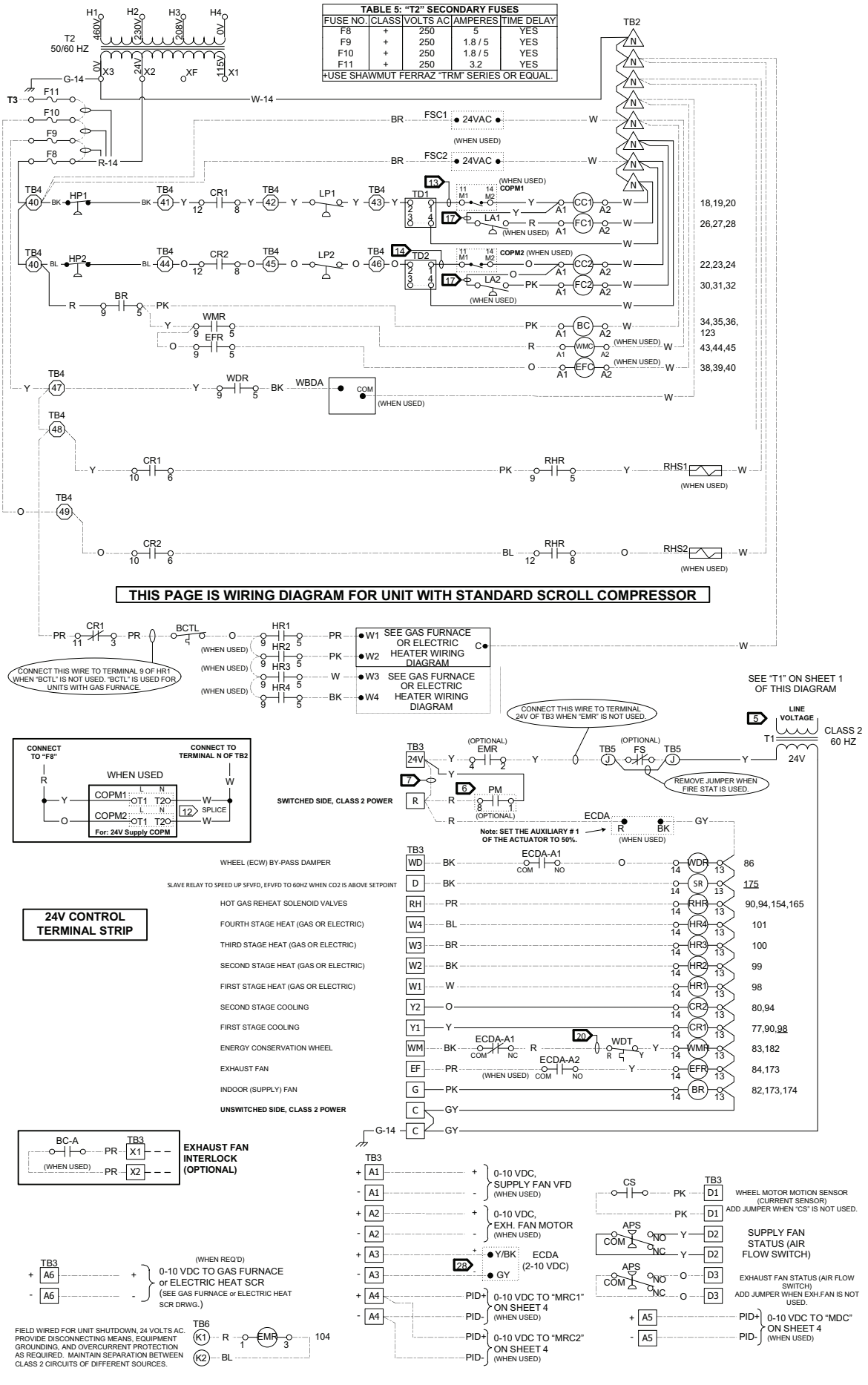


Fig. 21 — Typical Wiring Schematics 62DA,DB,DC,DD 12-38 for Serial Number 5211Vxxxxx or Prior (cont)

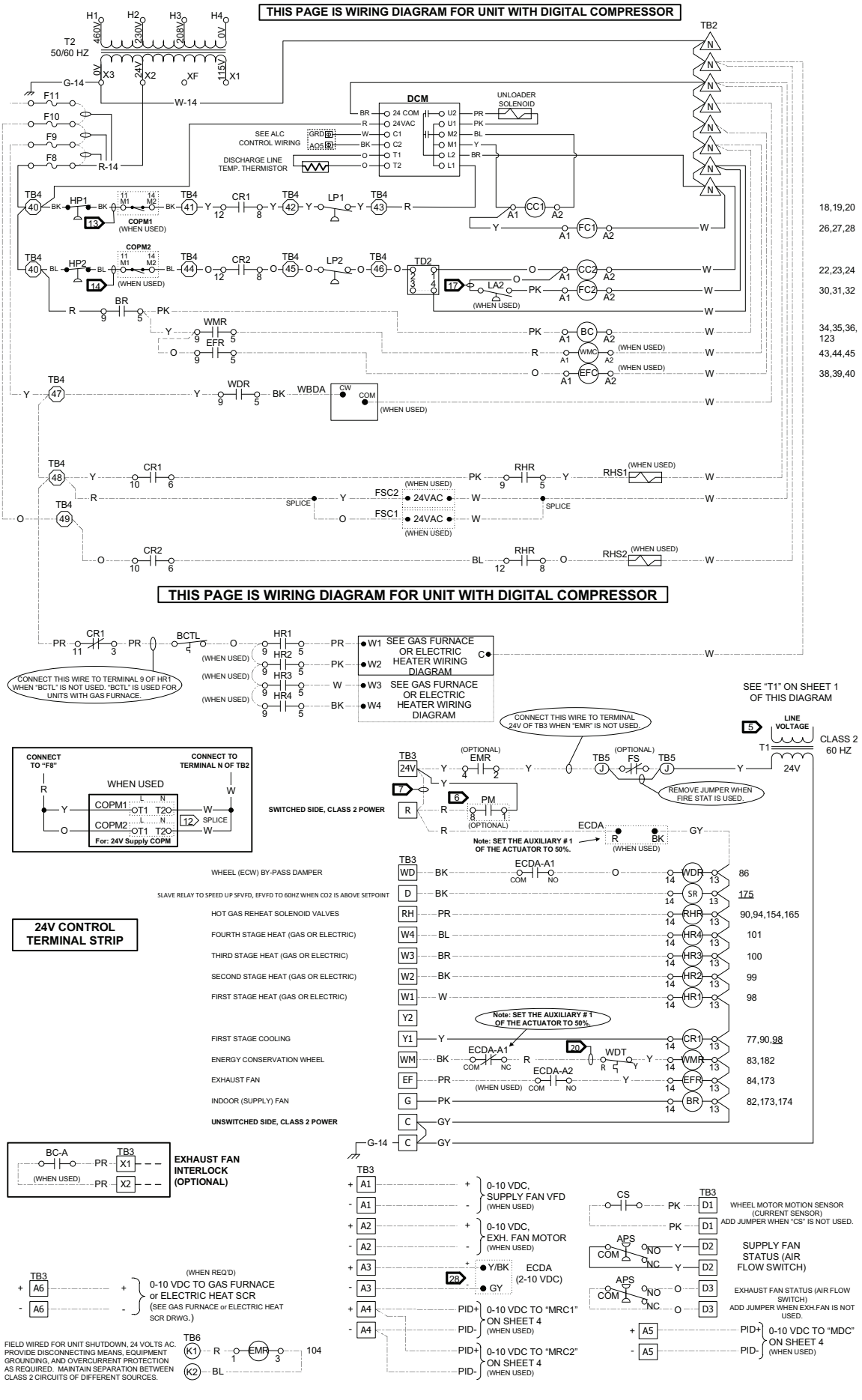


Fig. 21 — Typical Wiring Schematics 62DA,DB,DC,DD 12-38 for Serial Number 5211Vxxxxx or Prior (cont)

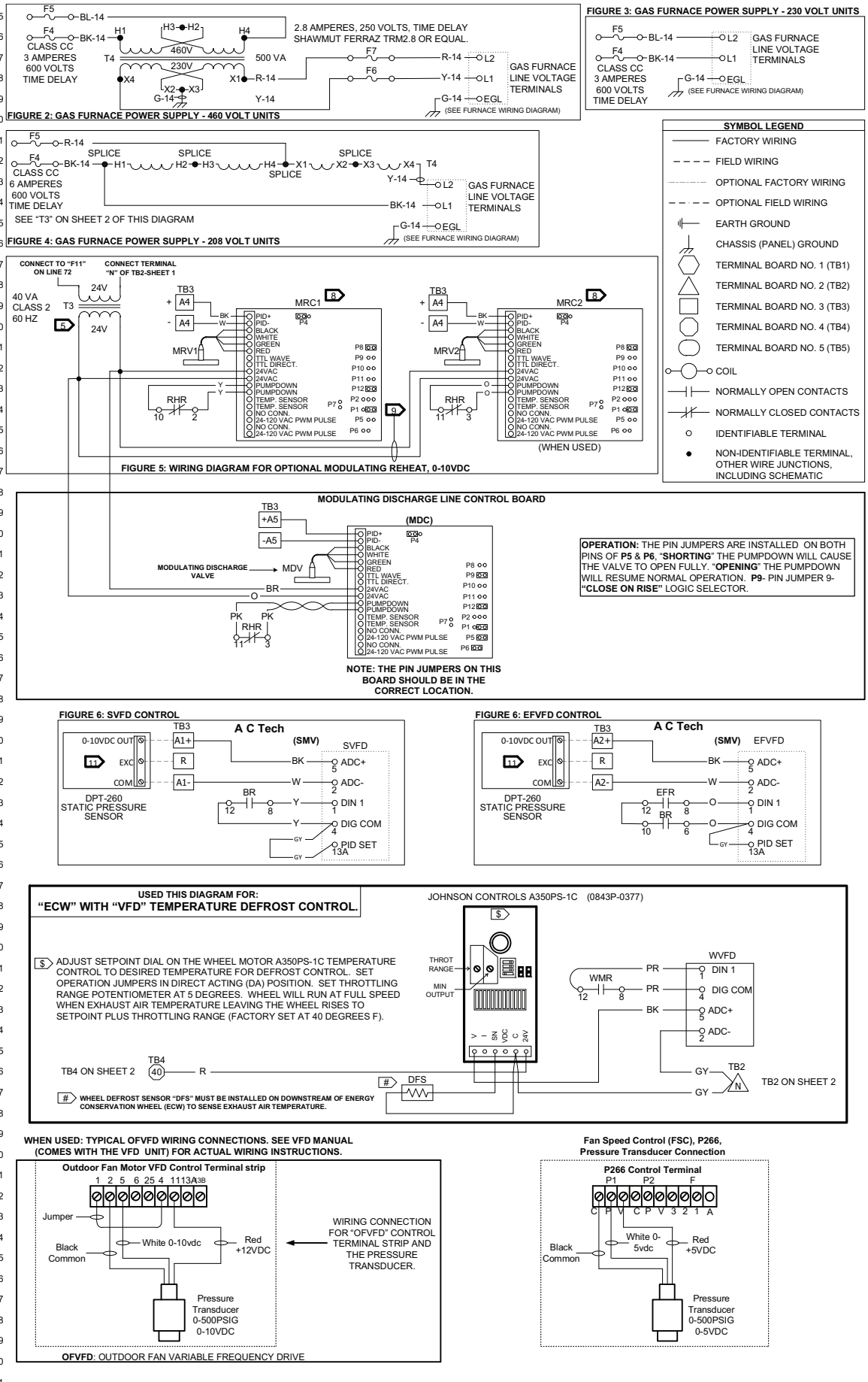
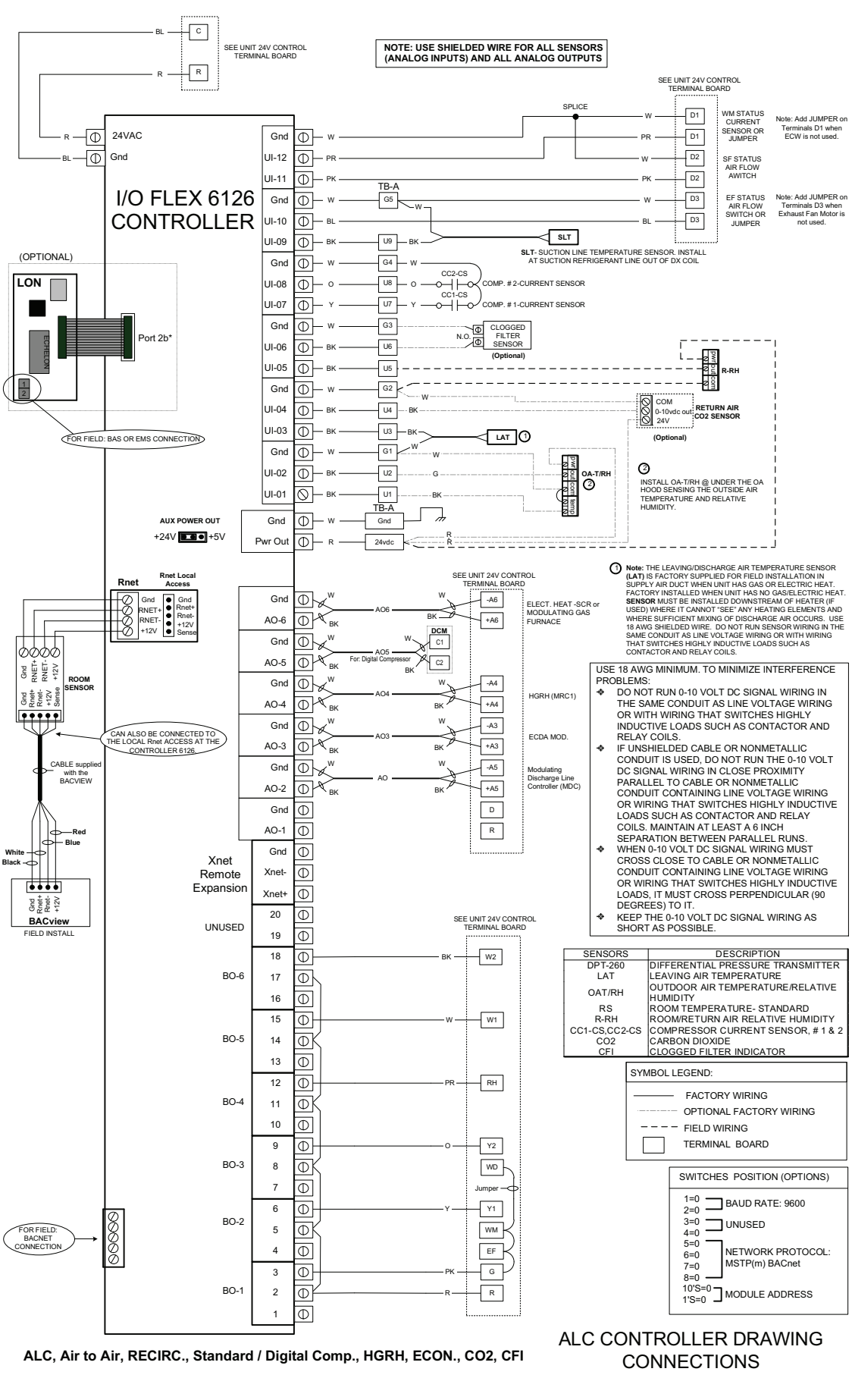


Fig. 21 — Typical Wiring Schematics 62DA,DB,DC,DD 12-38 for Serial Number 5211Vxxxxx or Prior (cont)



ALC, Air to Air, RECIRC., Standard / Digital Comp., HGRH, ECON., CO2, CFI

Fig. 21 — Typical Wiring Schematics 62DA,DB,DC,DD 12-38 for Serial Number 5211Vxxxxx or Prior (cont)

LEGEND			
FUNCTIONAL DESIGNATION	ITEM	LINE NUMBER	DESCRIPTION
APS	001	98	SUPPLY AIR DIFFERENTIAL PRESSURE SWITCH
BC,SVFD	101	83,34,170	INDOOR BLOWER MOTOR CONTACTOR/ "BC"VARIABLE FREQUENCY DRIVE (OPTIONAL)
BC-A1 & A2	102	#	"BC" AUXILIARY CONTACT NO. 1 & NO. 2
BCTL	002	98	BLOWER COMPARTMENT HIGH TEMPERATURE LIMIT
	003		
	004		
	005		
	006		
BR	103	120	BLOWER RELAY
CC1	104	77	COMPRESSOR CONTACTOR NO. 1
CC1-A	105	#	"CC" AUXILIARY CONTACT
CC2	106	80	COMPRESSOR CONTACTOR NO. 2
CC2-A	107	#	"CC" AUXILIARY CONTACT
CCH1	007	52	COMPRESSOR CRANKCASE HEATER NO. 1
CCH2	008	54	COMPRESSOR CRANKCASE HEATER NO. 2
CM1	009	19	COMPRESSOR NO. 1
CM2	010	23	COMPRESSOR NO. 2
CR1,CR2	108	117,116	COOL RELAY NO. 1 & NO. 2
EFC	109	85	EXHAUST FAN CONTACTOR (WHEN USED)
	011		
EFM	012	39	EXHAUST FAN MOTOR
EFR	110	119	EXHAUST FAN MOTOR RELAY (WHEN USED)
EFVFD	013	38,170	EXHAUST FAN VARIABLE FREQUENCY DRIVE (OPTIONAL)
EGB	111	5	EQUIPMENT GROUNDING BAR
WMR	112	118	ENERGY WHEEL MOTOR RELAY (WHEN USED)
F1,F2,F3	113	50,49,48	FUSING - SEE FUSE TABLE
F4,F5	114	SHEET 3	FUSING (WHEN USED) - SEE FUSE TABLE
F6,F7	115	SHEET 3	FUSING (WHEN USED) - SEE FUSE TABLE
F8	116	75	FUSING - SEE FUSE TABLE
F9	117	74	FUSING - SEE FUSE TABLE
F10	118	73	FUSING (WHEN USED) - SEE FUSE TABLE
F11	119	72	FUSING (WHEN USED) - SEE FUSE TABLE
F13,F14	014	3,4	FUSING (WHEN USED) - SEE FUSE TABLE
FC1	120	78	OUTDOOR FAN MOTOR CONTACTOR NO. 1
FC2	121	81	OUTDOOR FAN MOTOR CONTACTOR NO. 2
	015		
FSC1	016	28,73	ELECTRONIC FAN SPEED CONTROL NO. 1
FSC2	017	32,75	ELECTRONIC FAN SPEED CONTROL NO. 2
	000		
HP1	018	77	HIGH PRESSURE CUTOUT NO.1
HP2	019	80	HIGH PRESSURE CUTOUT NO.2
HR1 TO HR4	122	112 TO 115	HEAT RELAY NO.1 TO NO. 4 (WHEN USED)
IBM	020	35	INDOOR BLOWER MOTOR
LA1	021	78	LOW AMBIENT FAN CYCLING CONTROL NO. 1 (WHEN USED)
LA2	022	81	LOW AMBIENT FAN CYCLING CONTROL NO. 2 (WHEN USED)
	023		
	024		
LP1	025	77	LOW PRESSURE CUTOUT NO. 1
LP2	026	80	LOW PRESSURE CUTOUT NO. 2
MRC1	123	149(207)	MODULATING REHEAT TEMPERATURE CONTROL BOARD NO. 1
MRC2	124	149(207)	MODULATING REHEAT TEMPERATURE CONTROL BOARD NO. 2
MRV1	027	151	MODULATING HOT GAS REHEAT VALVE NO. 1 (WHEN USED)
MRV2	028	151	MODULATING HOT GAS REHEAT VALVE NO. 2 (WHEN USED)
MSP-BC	125	34,35,36	INDOOR BLOWER MOTOR STARTER PROTECTOR
	126		
	127		
MSP-EFC	128	38,39,40	EXHAUST FAN MOTOR STARTER PROTECTOR (WHEN USED)
MSP-FC1	129	26,27,28	OUTDOOR FAN NO. 1 MOTOR STARTER PROTECTOR
MSP-FC2	130	30,31,32	OUTDOOR FAN NO. 2 MOTOR STARTER PROTECTOR
MSP-WC	131	43,44,45	WHEEL MOTOR STARTER PROTECTOR (WHEN USED)
OADA	029	88	TWO POSITION OUTDOOR AIR DAMPER ACTUATOR (WHEN USED)
ODR	132	110	OUTDOOR AIR DAMPER RELAY (WHEN USED)
OFM1	030	27	OUTDOOR FAN MOTOR NO. 1
OFM2	031	31	OUTDOOR FAN MOTOR NO. 2
PDB	133	8	POWER DISTRIBUTION BLOCK
PM	134	49,106	POWER MONITOR (OPTIONAL)
RC1,RC2	032	26,30	OFM1 RUN CAPACITOR & OFM2 RUN CAPACITOR
RHR	136	111	REHEAT RELAY (WHEN USED)
RHS1	033	90	HOT GAS REHEAT SOLENOID VALVE NO. 1
RHS2	034	94	HOT GAS REHEAT SOLENOID VALVE NO. 2
	035		
T1	137	59 (103)	CONTROL TRANSFORMER NO. 1
T2	138	59 (69)	CONTROL TRANSFORMER NO. 2
T3	139	149(205)	CONTROL TRANSFORMER NO. 3 (WHEN USED)
T4	036	137(142)	CONTROL TRANSFORMER NO. 4 (WHEN USED)
TB1	140	SHEET 1	TERMINAL BOARD NO. 1
TB2	141	SHEET 2	TERMINAL BOARD NO. 2
TB3	142	SHEET 2	TERMINAL BOARD NO. 3
TB4	143	SHEET 2	TERMINAL BOARD NO. 4
TB5	144	104	TERMINAL BOARD NO. 5
TD1,TD2	145	77,80	TIME DELAY NO. 1 & NO. 2
WBDA	037	86	WHEEL BYPASS DAMPER ACTUATOR (WHEN USED)
WMC	146	84	WHEEL MOTOR CONTACTOR (WHEN USED)
WDR	147	109	WHEEL BYPASS DAMPER RELAY (WHEN USED)
WDT	038	83	WHEEL DEFROST THERMOSTAT (WHEN USED)
WM	039	44	WHEEL MOTOR (WHEN USED)
WMVFD	040	43,181	WHEEL MOTOR VARIABLE FREQUENCY DRIVE (OPTIONAL)

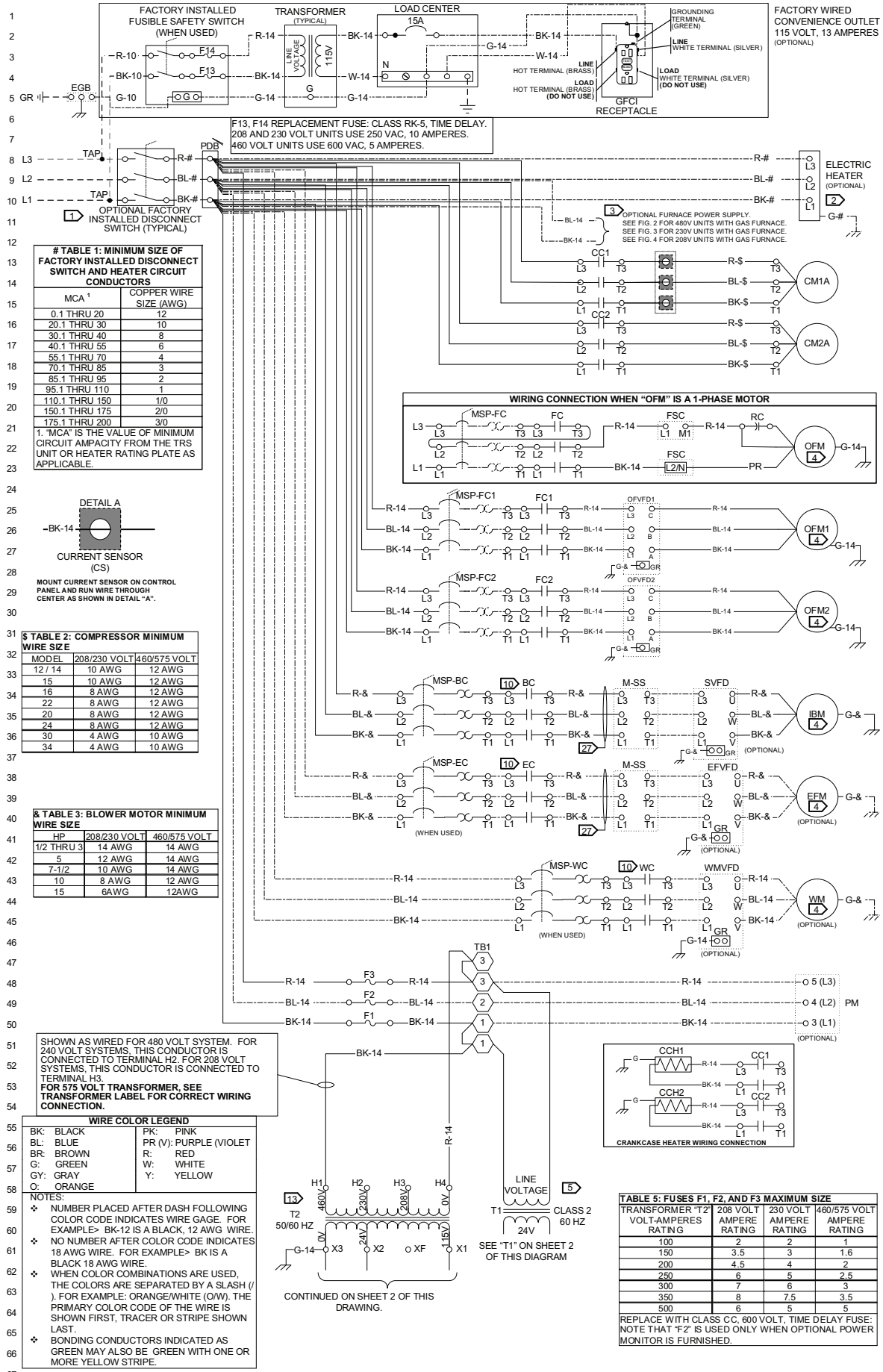
LEGEND			
FUNCTIONAL DESIGNATION	ITEM	LINE NUMBER	DESCRIPTION
EMR	148	132	OPTIONAL ENERGY MANAGEMENT RELAY
TB6	149	132	TERMINAL BOARD NO. 6 (OPTIONAL)
A350PS-1C	150	178	JOHNSON CTRLS, A350PS-1C (OPTIONAL)
	151		
	152		
MDC	153	160	MODULATING DISCHARGE CONTROLLER
MDV	154	162	MODULATING DISCHARGE VALVE
M-SS	156	34	MOTOR SOFT START - OPTIONAL
DCM	156	72 Sheet 5(31)	DIGITAL COMPRESSOR CONTROL MODULE
SR	157	110	SLAVE RELAY (OPTIONAL)

1. FIELD POWER SUPPLY PER UNIT RATING PLATE. MINIMUM CIRCUIT AMPACITY AND MAXIMUM SIZE OF TIME-DELAY FUSE OR HACR-TYPE CIRCUIT BREAKER PER UNIT RATING PLATE. PROVIDE DISCONNECTING MEANS AND EQUIPMENT GROUNDING AS REQUIRED.
2. TYPICAL HEATER SHOWN. SOME HEATERS REQUIRE MULTIPLE FACTORY WIRED BRANCH CIRCUITS (ONE CIRCUIT SHOWN). SEE WIRING DIAGRAM IN HEATER FOR ACTUAL HEATER WIRING DETAIL.
3. SEE THE FURNACE WIRING DIAGRAM FOR FURNACE INTERNAL WIRING.
4. TYPICAL MOTOR SHOWN. SEE CONNECTION DIAGRAM ON MOTOR FOR ACTUAL WIRING DETAIL.
5. TYPICAL CLASS 2 TRANSFORMER SHOWN. SEE TRANSFORMER LABEL FOR CONNECTION DIAGRAM AND/OR LEAD COLOR CODING. INSULATE SEPARATELY ANY UNUSED LEADS. POLARITY IS NOT INDICATED. SOME MODELS USE CIRCUIT BREAKER ON TRANSFORMER SECONDARY. THIS CIRCUIT BREAKER IS NOT SHOWN.
6. IF POWER MONITOR OUTPUT CONTACTS DO NOT TRANSFER WHEN POWER IS APPLIED TO UNIT (LED GLOWS RED DURING FAULT CONDITIONS):
   1. VERIFY THAT ALL THREE PHASES ARE PRESENT AND ARE OF THE CORRECT VOLTAGE. IF ALL THREE PHASES ARE PRESENT AND ARE OF THE CORRECT VOLTAGE, PHASE ROTATION MAY BE INCORRECT. PERFORM STEP 2.
   2. DISCONNECT POWER TO TRS UNIT. VERIFY THAT POWER IS IN FACT DISCONNECTED. SWAP ANY TWO OF THE THREE UNIT POWER SUPPLY WIRES. WHEN POWER IS REAPPLIED, OUTPUT CONTACTS SHOULD NOW TRANSFER.
7. INSTALL JUMPER WHEN OPTIONAL POWER MONITOR IS NOT USED. JUMPER MUST NOT BE INSTALLED WHEN OPTIONAL POWER MONITOR IS USED.
8. THE FOLLOWING PIN JUMPERS ARE INSTALLED:
   - P1- BETWEEN CENTER AND RIGHT PINS
   - P8
   - P12

   NOTE THAT P4 IS FOR INTERNAL POWER SELECTION - DO NOT CHANGE. SEE THE TEMPERATURE CONTROL BOARD PRODUCT/TECHNICAL BULLETIN FOR COMPLETE INFORMATION.
9. THESE CONDUCTORS ARE USED ONLY WHEN "MRC2" IS USED.
10. THIS CONTACTOR IS NOT USED WHEN "VFD" (VARIABLE FREQUENCY DRIVE) IS USED.
11. DPT-260 BUILDING DIFFERENTIAL STATIC PRESSURE SENSOR IS FACTORY SUPPLIED FOR FIELD INSTALLATION AND WIRING.
12. TYPICAL, SEE CONNECTION DIAGRAM ON COMPRESSOR FOR ACTUAL **COMPRESSOR OVERLOAD PROTECTION MODULE** ("COPM"-IF USED) WIRING. SENSOR WIRING NOT SHOWN.
13. THIS WIRE CONNECTS DIRECTLY TO TERMINAL 41 OF TB4 WHEN "COPM1", **COMPRESSOR OVERLOAD PROTECTION MODULE NO. 1**, IS NOT USED.
14. THIS WIRE CONNECTS DIRECTLY TO TERMINAL 44 OF TB4 WHEN "COPM2", **COMPRESSOR OVERLOAD PROTECTION MODULE NO. 2**, IS NOT USED.
15.
16.
17. THIS WIRE CONNECTS DIRECTLY TO 24V COIL (A1) OF FAN CONTACTOR (FC) WHEN "LA" (LOW AMBIENT FAN CYCLING CONTROL) IS NOT USED.
18.
19.
20. THIS WIRE CONNECTS TO TERMINAL 14 OF "EWR" WHEN "WDT" IS NOT USED.
21.
22.
23.
24. THE OFVFD IS OPTIONAL. WHEN OFVFD IS NOT USED, CONNECT THE WIRES OF THE MOTOR TO ITS APPROPRIATE FAN CONTACTOR (FC).
25. THE VFDs (SFVFD, EFVFD, WMVFD) ARE OPTIONAL. WHEN THESE VFDs ARE NOT USED, CONNECT THE MOTOR WIRES TO ITS APPROPRIATE CONTACTOR (BC, EFC, WC).
26.
27. THESE WIRES CONNECT DIRECTLY TO SUPPLY MOTOR WHEN OPTIONAL MOTOR SOFT START IS NOT USED.

TABLE 5: "T2" SECONDARY FUSES				
FUSE NO.	CLASS	VOLTS AC	AMPERES	TIME DELAY
F8	+	250	5	YES
F9	+	250	1.8 / 5	YES
F10	+	250	1.8 / 5	YES
F11	+	250	3.2	YES
+USE SHAWMUT FERRAZ "TRM" SERIES OR EQUAL.				

Fig. 21 — Typical Wiring Schematics 62DA,DB,DC,DD 12-38 for Serial Number 5211Vxxxxx or Prior (cont)



 # TABLE 1: MINIMUM SIZE OF FACTORY INSTALLED DISCONNECT SWITCH AND HEATER CIRCUIT CONDUCTORS

MCA [1]	COPPER WIRE SIZE (AWG)
0.1 THRU 20	12
20.1 THRU 30	10
30.1 THRU 40	8
40.1 THRU 55	6
55.1 THRU 70	4
70.1 THRU 85	3
85.1 THRU 95	2
95.1 THRU 110	1
110.1 THRU 150	1/0
150.1 THRU 175	2/0
175.1 THRU 200	3/0

1. "MCA" IS THE VALUE OF MINIMUM CIRCUIT AMPACITY FROM THE TRS UNIT OR HEATER RATING PLATE AS APPLICABLE.

$ TABLE 2: COMPRESSOR MINIMUM WIRE SIZE

MODEL	208/230 VOLT	460/575 VOLT
12 / 14	10 AWG	12 AWG
15	10 AWG	12 AWG
16	8 AWG	12 AWG
22	8 AWG	12 AWG
20	8 AWG	12 AWG
24	8 AWG	12 AWG
30	4 AWG	10 AWG
34	4 AWG	10 AWG

& TABLE 3: BLOWER MOTOR MINIMUM WIRE SIZE

HP	208/230 VOLT	460/575 VOLT
1/2 THRU 3	14 AWG	14 AWG
5	12 AWG	14 AWG
7-1/2	10 AWG	14 AWG
10	8 AWG	12 AWG
15	6AWG	12AWG

WIRE COLOR LEGEND

BK: BLACK	PK: PINK
BL: BLUE	PR (V): PURPLE (VIOLET
BR: BROWN	R: RED
G: GREEN	W: WHITE
GY: GRAY	Y: YELLOW
O: ORANGE	

NOTES:
- NUMBER PLACED AFTER DASH FOLLOWING COLOR CODE INDICATES WIRE GAGE. FOR EXAMPLE> BK-12 IS A BLACK, 12 AWG WIRE.
- NO NUMBER AFTER COLOR CODE INDICATES 18 AWG WIRE. FOR EXAMPLE> BK IS A BLACK 18 AWG WIRE.
- WHEN COLOR COMBINATIONS ARE USED, THE COLORS ARE SEPARATED BY A SLASH (/). FOR EXAMPLE: ORANGE/WHITE (O/W). THE PRIMARY COLOR CODE OF THE WIRE IS SHOWN FIRST, TRACER OR STRIPE SHOWN LAST.
- BONDING CONDUCTORS INDICATED AS GREEN MAY ALSO BE GREEN WITH ONE OR MORE YELLOW STRIPE.

TABLE 5: FUSES F1, F2, AND F3 MAXIMUM SIZE

TRANSFORMER "T2" VOLT-AMPERES RATING	208 VOLT AMPERE RATING	230 VOLT AMPERE RATING	460/575 VOLT AMPERE RATING
100	2	2	1
150	3.5	3	1.6
200	4.5	4	2
250	6	5	2.5
300	7	6	3
350	8	7.5	3.5
500	6	5	5

REPLACE WITH CLASS CC, 600 VOLT, TIME DELAY FUSE: NOTE THAT "F2" IS USED ONLY WHEN OPTIONAL POWER MONITOR IS FURNISHED.

Fig. 22 — Typical Wiring Schematics 62DA,DB,DC,DD 12-38 for Serial Numbers 0112Vxxxxx or Later

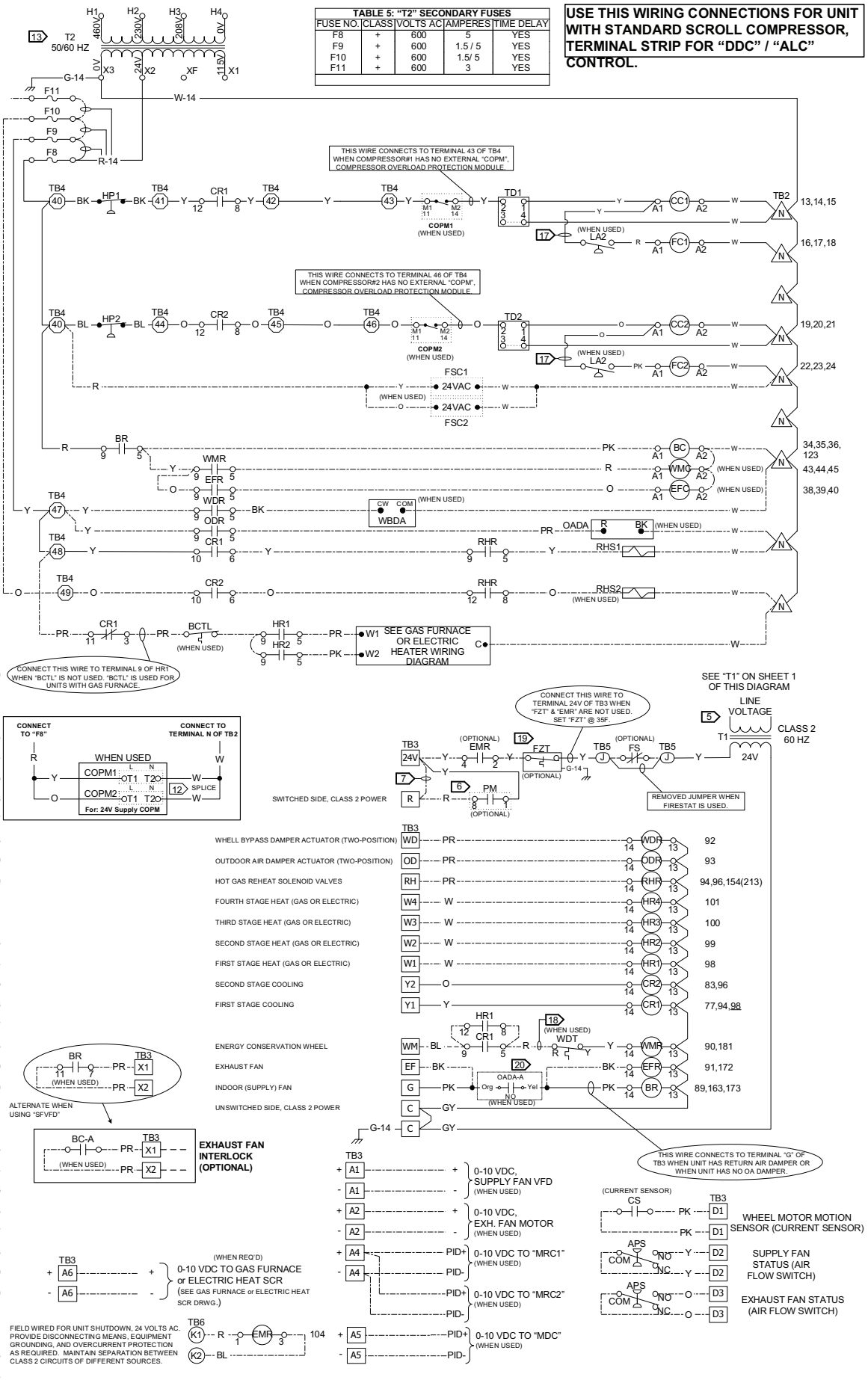


Fig. 22 — Typical Wiring Schematics 62DA,DB,DC,DD 12-38 for Serial Numbers 0112Vxxxxx or Later (cont)

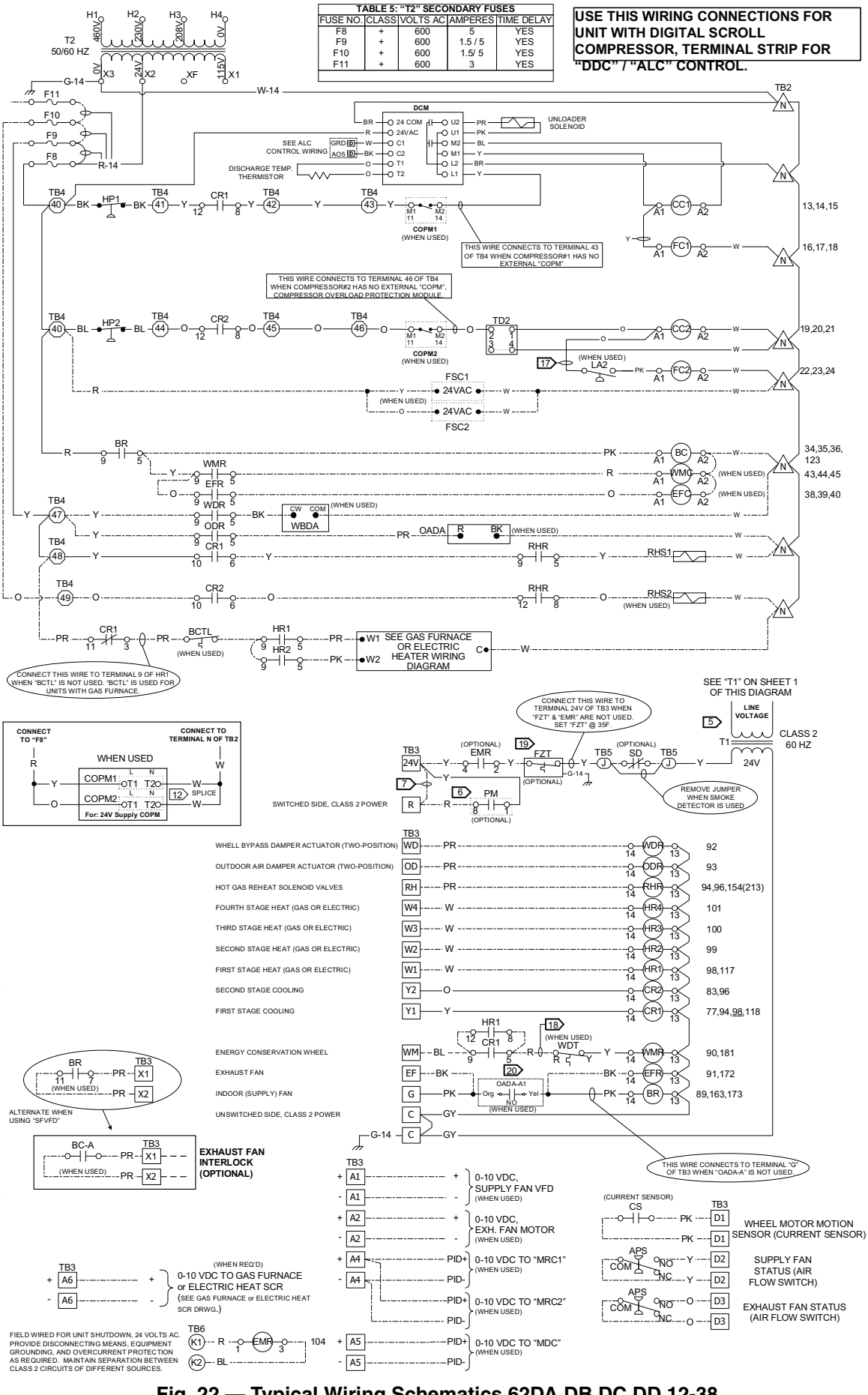


Fig. 22 — Typical Wiring Schematics 62DA,DB,DC,DD 12-38 for Serial Numbers 0112Vxxxxx or Later (cont)

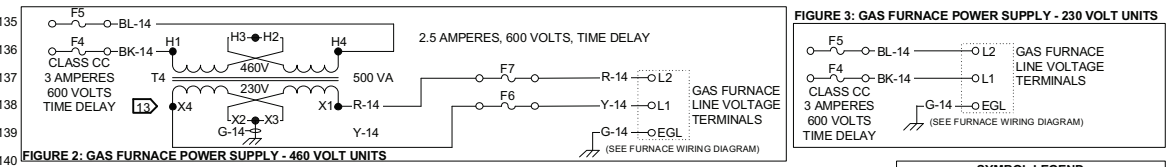


FIGURE 2: GAS FURNACE POWER SUPPLY - 460 VOLT UNITS

FIGURE 3: GAS FURNACE POWER SUPPLY - 230 VOLT UNITS

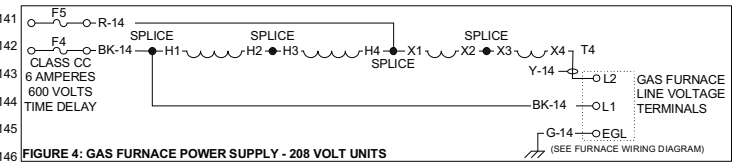
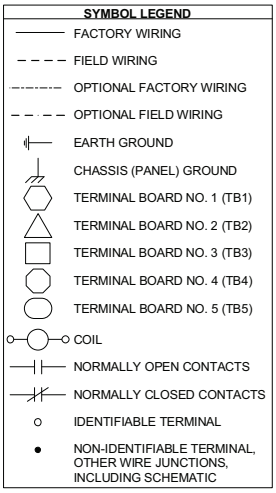


FIGURE 4: GAS FURNACE POWER SUPPLY - 208 VOLT UNITS



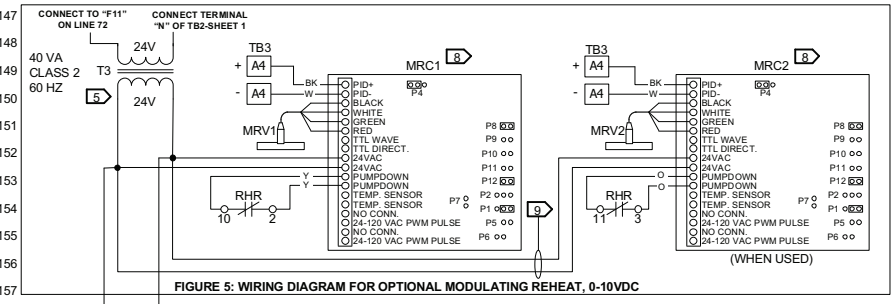
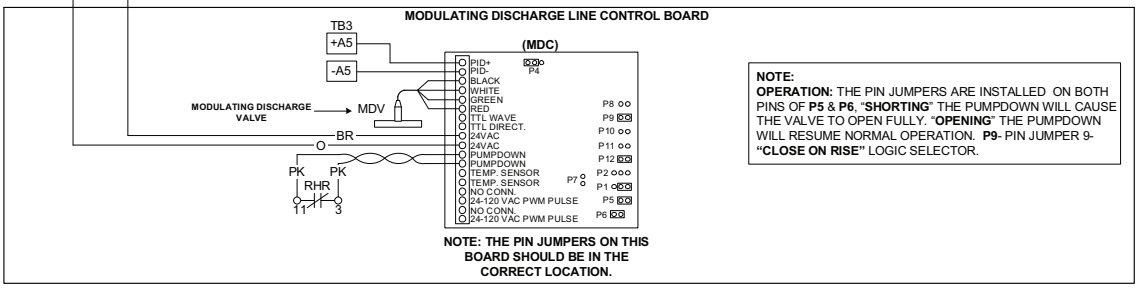
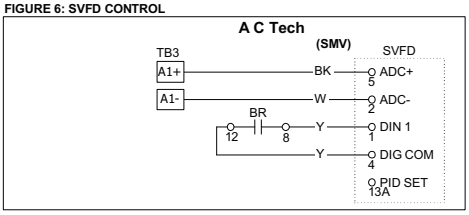
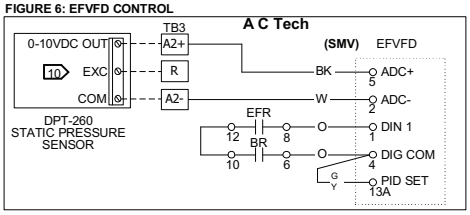
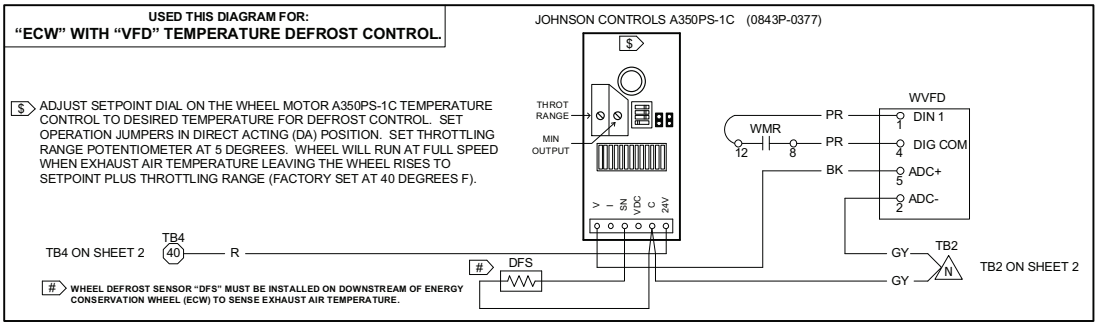


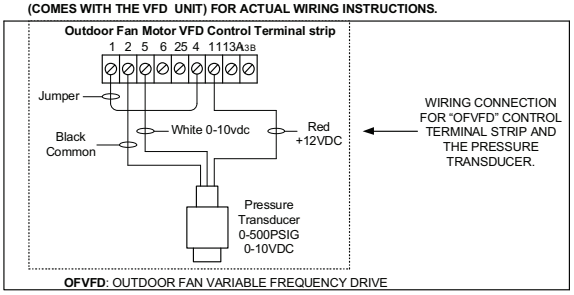
FIGURE 5: WIRING DIAGRAM FOR OPTIONAL MODULATING REHEAT, 0-10VDC











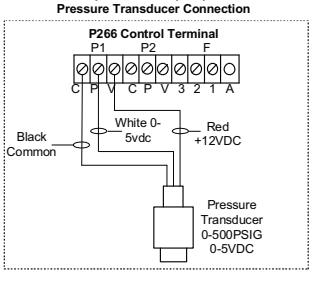


Fig. 22 — Typical Wiring Schematics 62DA,DB,DC,DD 12-38 for Serial Numbers 0112Vxxxxx or Later (cont)

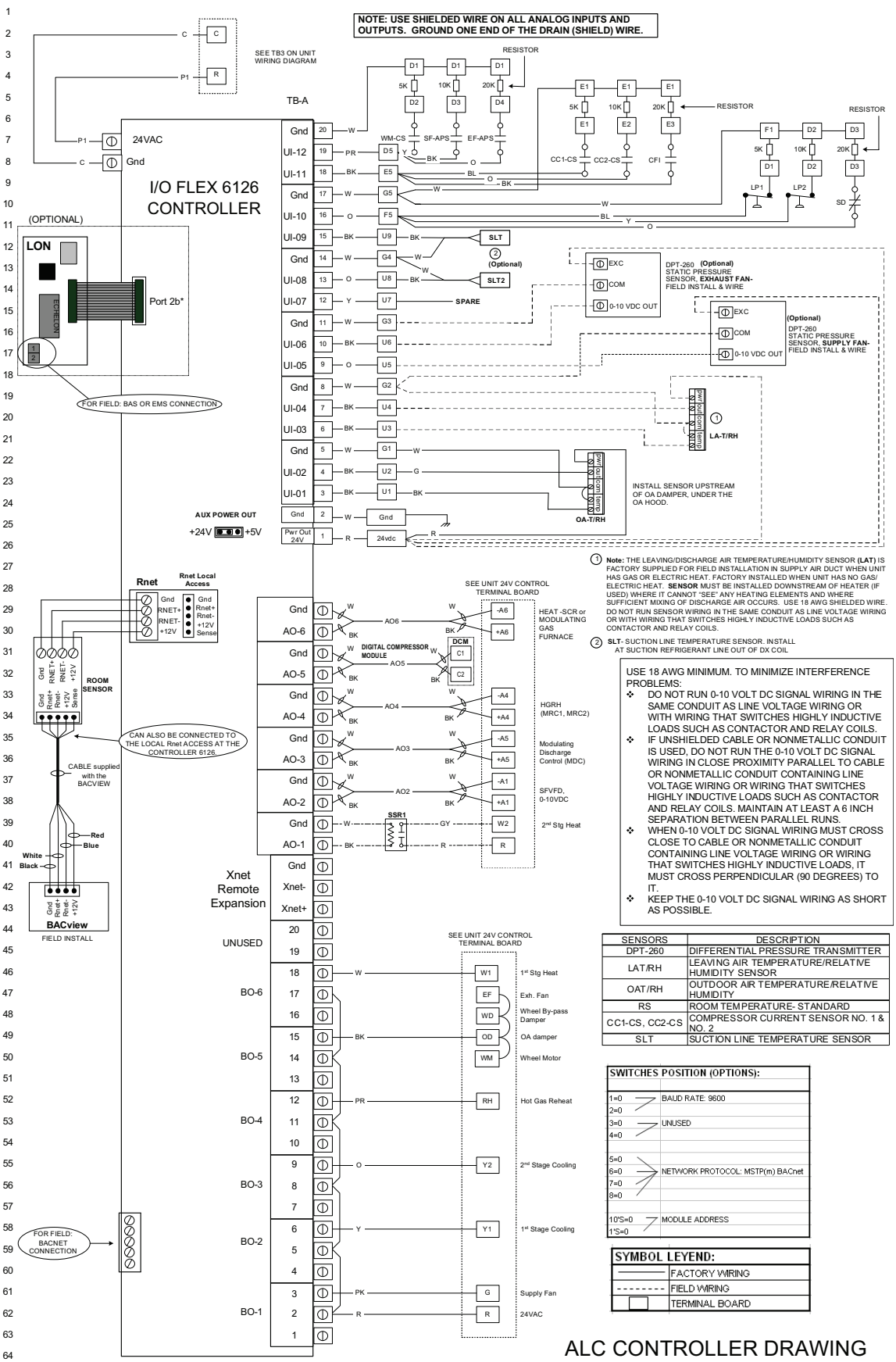


Fig. 22 — Typical Wiring Schematics 62DA,DB,DC,DD 12-38 for Serial Numbers 0112Vxxxxx or Later (cont)

LEGEND

FUNCTIONAL DESIGNATION	ITEM	LINE NUMBER	DESCRIPTION
APS	001	98	SUPPLY AIR DIFFERENTIAL PRESSURE SWITCH
BC,SVFD	101	89,158	INDOOR BLOWER MOTOR CONTACTOR/ "BC"VARIABLE FREQUENCY DRIVE (OPTIONAL)
BC-A1 & A2	102	#	"BC" AUXILIARY CONTACT NO. 1 & NO. 2
BCTL	002	98	BLOWER COMPARTMENT HIGH TEMPERATURE LIMIT
	003		
	004		
	005		
	006		
BR	103	120	BLOWER RELAY
CC1	104	77,79	COMPRESSOR CONTACTOR NO. 1
CC1-A	105	#	"CC" AUXILIARY CONTACT
CC2	106	83,85	COMPRESSOR CONTACTOR NO. 2
CC2-A	107	#	"CC" AUXILIARY CONTACT
CCH1	007	52	COMPRESSOR CRANKCASE HEATER NO. 1
CCH2	008	54	COMPRESSOR CRANKCASE HEATER NO. 2
CM1	009	14,17	COMPRESSOR NO. 1
CM2	010	20,23	COMPRESSOR NO. 2
CR1,CR2	108	117,116	COOL RELAY NO. 1 & NO. 2
EFC	109	91	EXHAUST FAN CONTACTOR (WHEN USED)
ECDA	011	107128	ECONOMIZER DAMPER ACTUATOR (WHEN USED)
EFM	012	39	EXHAUST FAN MOTOR
EFR	110	119	EXHAUST FAN MOTOR RELAY (WHEN USED)
EFVFD	013	38,173	EXHAUST FAN VARIABLE FREQUENCY DRIVE (OPTIONAL)
EGB	111	5	EQUIPMENT GROUNDING BAR
WMR	112	118	ENERGY WHEEL MOTOR RELAY (WHEN USED)
F1,F2,F3	113	50,49,48	FUSING - SEE FUSE TABLE
F4,F5	114	SHEET 3	FUSING (WHEN USED) - SEE FUSE TABLE
F6,F7	115	SHEET 3	FUSING (WHEN USED) - SEE FUSE TABLE
F8	116	75	FUSING - SEE FUSE TABLE
F9	117	74	FUSING - SEE FUSE TABLE
F10	118	73	FUSING (WHEN USED) - SEE FUSE TABLE
F11	119	72	FUSING (WHEN USED) - SEE FUSE TABLE
F13,F14	014	3,4	FUSING (WHEN USED) - SEE FUSE TABLE
FC1	120	82	OUTDOOR FAN MOTOR CONTACTOR NO. 1
FC2	121	88	OUTDOOR FAN MOTOR CONTACTOR NO. 2
FZT	015	104	OPTIONAL FREEZE'STAT
FSC1	016	28,73	ELECTRONIC FAN SPEED CONTROL NO. 1
FSC2	017	32,75	ELECTRONIC FAN SPEED CONTROL NO. 2
HP1	018	77	HIGH PRESSURE CUTOUT NO.1
HP2	019	83	HIGH PRESSURE CUTOUT NO.2
HR1 TO HR4	122	112 TO 115	HEAT RELAY NO.1 TO NO. 4 (WHEN USED)
IBM	020	35	INDOOR BLOWER MOTOR
LA1	021	82	LOW AMBIENT FAN CYCLING CONTROL NO. 1 (WHEN USED)
LA2	022	88	LOW AMBIENT FAN CYCLING CONTROL NO. 2 (WHEN USED)
	023		
	024		
LP1	025	77	LOW PRESSURE CUTOUT NO. 1
LP2	026	83	LOW PRESSURE CUTOUT NO. 2
MRC1	123	149(207)	MODULATING REHEAT TEMPERATURE CONTROL BOARD NO. 1
MRC2	124	149(207)	MODULATING REHEAT TEMPERATURE CONTROL BOARD NO. 2
MRV1	027	151	MODULATING HOT GAS REHEAT VALVE NO. 1 (WHEN USED)
MRV2	028	151	MODULATING HOT GAS REHEAT VALVE NO. 2 (WHEN USED)
MSP-BC	125	34,35,36	INDOOR BLOWER MOTOR STARTER PROTECTOR
	126		
	127		
MSP-EFC	128	38,39,40	EXHAUST BLOWER MOTOR STARTER PROTECTOR (WHEN USED)
MSP-FC1	129	26,27,28	OUTDOOR FAN NO. 1 MOTOR STARTER PROTECTOR
MSP-FC2	130	30,31,32	OUTDOOR FAN NO. 2 MOTOR STARTER PROTECTOR
MSP-WC	131	43,44,45	WHEEL MOTOR STARTER PROTECTOR (WHEN USED)
OADA	029	93	TWO POSITION OUTDOOR AIR DAMPER ACTUATOR (WHEN USED)
ODR	132	110	OUTDOOR AIR DAMPER RELAY (WHEN USED)
OFM1	030	27	OUTDOOR FAN MOTOR NO. 1
OFM2	031	31	OUTDOOR FAN MOTOR NO. 2
PDB	133	8	POWER DISTRIBUTION BLOCK
PM	134	49,106	POWER MONITOR (OPTIONAL)
RC1,RC2	032	26,30	OFM1 RUN CAPACITOR & OFM2 RUN CAPACITOR
RHR	136	111	REHEAT RELAY (WHEN USED)
RHS1	033	94	HOT GAS REHEAT SOLENOID VALVE NO. 1
RHS2	034	96	HOT GAS REHEAT SOLENOID VALVE NO. 2
	035		
T1	137	59 (103)	CONTROL TRANSFORMER NO. 1
T2	138	59 (69)	CONTROL TRANSFORMER NO. 2
T3	139	149(205)	CONTROL TRANSFORMER NO. 3 (WHEN USED)
T4	036	137(142)	CONTROL TRANSFORMER NO. 4 (WHEN USED)
TB1	140	SHEET 1	TERMINAL BOARD NO. 1
TB2	141	SHEET 2	TERMINAL BOARD NO. 2
TB3	142	SHEET 2	TERMINAL BOARD NO. 3
TB4	143	SHEET 2	TERMINAL BOARD NO. 4
TB5	144	104	TERMINAL BOARD NO. 5
TD1	145	77	TIME DELAY NO. 1 & NO. 3
TD2	148	83	TIME DELAY NO. 2 & NO. 4
WBDA	037	92	WHEEL BYPASS DAMPER ACTUATOR (WHEN USED)
WMC	146	90	WHEEL MOTOR CONTACTOR (WHEN USED)
WDR	147	109	WHEEL BYPASS DAMPER RELAY (WHEN USED)
WDT	038	88	WHEEL DEFROST THERMOSTAT (WHEN USED)
WM	039	44	WHEEL MOTOR (WHEN USED)
WMVFD	040	43,187	WHEEL MOTOR VARIABLE FREQUENCY DRIVE (OPTIONAL)

1. FIELD POWER SUPPLY PER UNIT RATING PLATE. MINIMUM CIRCUIT AMPACITY AND MAXIMUM SIZE OF TIME-DELAY FUSE OR HACR-TYPE CIRCUIT BREAKER PER UNIT RATING PLATE. PROVIDE DISCONNECTING MEANS AND EQUIPMENT GROUNDING AS REQUIRED.
2. TYPICAL HEATER SHOWN. SOME HEATERS REQUIRE MULTIPLE FACTORY WIRED BRANCH CIRCUITS (ONE CIRCUIT SHOWN). SEE WIRING DIAGRAM IN HEATER FOR ACTUAL HEATER WIRING DETAIL.
3. SEE THE FURNACE WIRING DIAGRAM FOR FURNACE INTERNAL WIRING.
4. TYPICAL MOTOR SHOWN. SEE CONNECTION DIAGRAM ON MOTOR FOR ACTUAL WIRING DETAIL.
5. TYPICAL CLASS 2 TRANSFORMER SHOWN. SEE TRANSFORMER LABEL FOR CONNECTION DIAGRAM AND/OR LEAD COLOR CODING. INSULATE SEPARATELY ANY UNUSED LEADS. POLARITY IS NOT INDICATED. SOME MODELS USE CIRCUIT BREAKER ON TRANSFORMER SECONDARY. THIS CIRCUIT BREAKER IS NOT SHOWN.
6. IF POWER MONITOR OUTPUT CONTACTS DO NOT TRANSFER WHEN POWER IS APPLIED TO UNIT (LED GLOWS RED DURING FAULT CONDITIONS):
   1. VERIFY THAT ALL THREE PHASES ARE PRESENT AND ARE OF THE CORRECT VOLTAGE. IF ALL THREE PHASES ARE PRESENT AND ARE OF THE CORRECT VOLTAGE, PHASE ROTATION MAY BE INCORRECT. PERFORM STEP 2.
   2. DISCONNECT POWER TO TRS UNIT. VERIFY THAT POWER IS IN FACT DISCONNECTED. SWAP ANY TWO OF THE THREE UNIT POWER SUPPLY WIRES. WHEN POWER IS REAPPLIED, OUTPUT CONTACTS SHOULD NOW TRANSFER.
7. INSTALL JUMPER WHEN OPTIONAL POWER MONITOR IS NOT USED. JUMPER MUST NOT BE INSTALLED WHEN OPTIONAL POWER MONITOR IS USED.
8. THE FOLLOWING PIN JUMPERS ARE INSTALLED:
   - P1- BETWEEN CENTER AND RIGHT PINS
   - P8
   - P12

   NOTE THAT P4 IS FOR INTERNAL POWER SELECTION - DO NOT CHANGE. SEE THE TEMPERATURE CONTROL BOARD PRODUCT/TECHNICAL BULLETIN FOR COMPLETE INFORMATION.
9.
10. THIS CONTACTOR IS NOT USED WHEN "VFD" (VARIABLE FREQUENCY DRIVE) IS USED.
11.
12. TYPICAL, SEE CONNECTION DIAGRAM ON COMPRESSOR FOR ACTUAL **COMPRESSOR OVERLOAD PROTECTION MODULE** ("COPM"-IF USED) WIRING. SENSOR WIRING NOT SHOWN.
13. TYPICALTRANSFORMER SHOWN. FOR 575 VOLT, SEE TRANSFORMER LABEL FOR WIIRING CONNECTION DIAGRAM.
14.
15.
16.
17. THIS WIRE CONNECTS DIRECTLY TO 24V COIL (A1) OF FAN CONTACTOR (FC) WHEN "LA" (LOW AMBIENT FAN CYCLING CONTROL) IS NOT USED.
18. THIS WIRE CONNECTS TO TERMINAL 14 OF "WMR" WHEN "WDT" IS NOT USED.
19. WHEN UNIT HAS HEATER, INSTALL THE BULB OF THE FREEZESTAT ON DISCHARGE AIR DUCT. IT IS FACTORY INSTALL WHEN UNIT HAS NO HEATER.
20. "OADA-A" (OUTSIDE AIR DAMPER ACTUATOR-AUXILIARY): DO NOT WIRE BLOWER RELAY (BR) TO DAMPER ACTUATOR-AUXILIARY WHEN UNIT HAS "O.A. + R.A. DAMPER". WIRE THE EXHAUST FAN RELAY TO DAMPER ACTUATOR-AUXILIARY WHEN "EFR" IS USED.
21.
22.
27. THESE WIRES CONNECT DIRECTLY TO SUPPLY MOTOR WHEN OPTIONAL MOTOR SOFT START IS NOT USED.

LEGEND

FUNCTIONAL DESIGNATION	ITEM	LINE NUMBER	DESCRIPTION
EMR	148	132	OPTIONAL ENERGY MANAGEMENT RELAY
TB6	149	132,238	TERMINAL BOARD NO. 6 (OPTIONAL)
	150		
	151		
TB7	152	278	TERMINAL BOARD NO. 7 (WHEN USED)
	153		
	154		
	155		
MSS	156	34,38	MOTOR SOFT START (WHEN USED)
	157		

Fig. 22 — Typical Wiring Schematics 62DA,DB,DC,DD 12-38 for Serial Numbers 0112Vxxxxx or Later (cont)

SENSORS

Sensor List — See Table 10-12 for a list of sensors and sensor temperature resistance data.

Table 10 — Sensor List

REF	DESCRIPTION	VENDOR	VENDOR MODEL	WHERE USED? 62DA,DB,DC,DD
ZAT-RS	RS STANDARD- ZONE SENSOR	Automated Logic Corp	RS-B	x
OAT	SENSOR, OA, Temp. (Thermistor)	Greystone	TE200F24	
OAT/RH	SENSOR,OA,Temp (Thermisistor), Humdity (0-10V)	Greystone	RH300A03J	x
RAT/RH	SENSOR,Room Sensor(Thermistor) / Humidity(0-10)	Greystone	RH100A03J	
LAT	SENSOR,Temp, Duct, Thermistor	Greystone	TE200B24D2	
Duct Sensor, T/RH	SENSOR,Duct,Temp (Thermistor), Humidity (0-10VDC)	Greystone	RH200A03J	x
CS	SENSOR,CURRENT: 2-Qty for 2 Comp.	Greystone	CS-GNG-100	x
		Miller Bearings/ Stromquist & Co.	Hawkeye 900	
R-RH	SENSOR,HUMIDITY,SPACE,0-10VDC	Greystone	RH100A03	
SLT	SENSOR,TEMP,10K,T2,THERMISTOR,STRAP	Greystone	TE200ER24A2	x
APS-SUPPLY	AIR SWITCH, PRESS. DIFF. ASSY	N/A	N/A	x
LONWORKS	LON WORKS CARD	N/A	N/A	x
RAT/RH	SENSOR,Room Sensor(Thermistor) / Humidity(0-10)	Greystone	RH100A03J	x
Duct Hum.Sensor	SENSOR,HUMIDITY, DUCT,0-10VDC	Greystone	RH200A03	x
Duct Sensor, T/RH	SENSOR,Duct,Temp (Thermistor), Humidity (0-10VDC)	Greystone	RH200A03J	x
DPT for SVFD or EVFD	PRESS TRANSMITTER DPT260, 0-10*WC OR 0 TO 1.	Greystone	LP2B03-1	
		Johnson Controls	DPT260-MS2	
		Greystone	LP2B00-1	x
		Johnson Controls	DPT260-MS1	
CO2, Duct	TRANSMITTER CO2 DUCT, 0-10VDC	Greystone	CDD1A6000	x
CO2, Wall Mount	SENSOR, CO2, WALL MOUNT,0-10VDC	Greystone	CDD1A4000	x
		Johnson Controls	CD-W00-00-0/OBS	

NOTES:

1. Sensors that do not have an 'x' in the where used column are alternate vendor items or previously used sensors. For example, the TE200F24 OA (Outdoor Air) temperature sensor has been replaced by the RH300A03J, combination temperature and humidity sensor.
2. Prior to January 2010 RTD (Resistance Temperature Device) used; January 2010 and after thermistors were used.

Table 11 — Greystone RTD (Resistance Temperature Devices) Sensor Temperature Resistance (Used Before 2010)

TEMP (Deg C)	RES (ohms)	TEMP (Deg F)
-40	705.06	-40.0
-39	709.47	-38.2
-38	713.90	-36.4
-37	718.33	-34.6
-36	722.78	-32.8
-35	727.25	-31.0
-34	731.72	-29.2
-33	736.21	-27.4
-32	740.71	-25.6
-31	745.22	-23.8
-30	749.74	-22.0
-29	754.27	-20.2
-28	758.85	-18.4
-27	763.38	-16.6
-26	767.95	-14.8
-25	772.53	-13.0
-24	777.13	-11.2
-23	781.74	-9.4
-22	786.36	-7.6
-21	790.99	-5.8
-20	795.63	-4.0
-19	800.29	-2.2
-18	804.95	-0.4
-17	809.63	1.4
-16	814.32	3.2
-15	819.03	5.0
-14	823.74	6.8
-13	828.47	8.6
-12	833.21	10.4
-11	837.96	12.2
-10	842.72	14.0
-9	847.50	15.8
-8	852.28	17.6
-7	857.08	19.4
-6	861.89	21.2
-5	866.71	23.0
-4	871.55	24.8
-3	876.39	26.6
-2	881.25	28.4
-1	886.12	30.2
0	891.00	32.0
1	895.89	33.8
2	900.80	35.6
3	905.71	37.4
4	910.64	39.2
5	915.58	41.0
6	920.54	42.8
7	925.50	44.6
8	930.48	46.4
9	935.46	48.2
10	940.46	50.0
11	945.48	51.8
12	950.50	53.6
13	955.53	55.4
14	960.58	57.2
15	965.64	59.0
16	970.71	60.8
17	975.80	62.6
18	980.89	64.4
19	986.00	66.2
20	991.12	68.0
21	996.25	69.8
22	1001.39	71.6
23	1006.55	73.4
24	1011.71	75.2
25	1016.89	77.0
26	1022.08	78.8
27	1027.29	80.6
28	1032.50	82.4
29	1037.73	84.2
30	1042.97	86.0
31	1048.22	87.8
32	1053.48	89.6
33	1058.76	91.4
34	1064.05	93.2
35	1069.05	95.0
36	1074.66	96.8
37	1079.98	98.6
38	1085.32	100.4
39	1090.67	102.2
40	1096.03	104.0
41	1101.40	105.8
42	1106.79	107.6
43	1112.19	109.4
44	1117.60	111.2
45	1123.02	113.0
46	1128.46	114.8
47	1133.91	116.6
48	1139.37	118.4
49	1144.84	120.2
50	1150.33	122.0
51	1155.82	123.8
52	1161.34	125.6
53	1166.86	127.4
54	1172.40	129.2
55	1177.95	131.0
56	1183.51	132.8
57	1189.08	134.6
58	1194.67	136.4
59	1200.27	138.2
60	1205.88	140.0
61	1211.51	141.8
62	1217.15	143.6
63	1222.80	145.4
64	1228.47	147.2
65	1234.15	149.0
66	1239.84	150.8
67	1245.54	152.6
68	1251.26	154.4
69	1256.99	156.2
70	1262.73	158.0
71	1268.49	159.8
72	1274.26	161.6
73	1280.05	163.4
74	1285.85	165.2
75	1291.66	167.0
76	1297.48	168.8
77	1303.32	170.6
78	1309.17	172.4
79	1315.04	174.2
80	1320.92	176.0
81	1326.81	177.8
82	1332.72	179.6
83	1338.64	181.4
84	1344.58	183.2
85	1350.53	185.0
86	1356.49	186.8
87	1362.47	188.6
88	1368.46	190.4
89	1374.47	192.2
90	1380.49	194.0
91	1386.52	195.8
92	1392.57	197.6
93	1398.63	199.4
94	1404.71	201.2
95	1410.80	203.0
96	1416.91	204.8
97	1423.03	206.6
98	1429.17	208.4
99	1435.32	210.2
100	1441.48	212.0
101	1447.66	213.8
102	1453.86	215.6
103	1460.07	217.4
104	1466.29	219.2
105	1472.54	221.0
106	1478.79	222.8
107	1485.06	224.6
108	1491.35	226.4
109	1497.65	228.2
110	1503.97	230.0
111	1510.30	231.8
112	1516.65	233.6
113	1523.02	235.4
114	1529.40	237.2
115	1535.79	239.0
116	1542.21	240.8
117	1548.63	242.6
118	1555.08	244.4
119	1561.54	246.2
120	1568.01	248.0

NOTE: Prior to January 2010 RTD (Resistance Temperature Device) used, January 2010 and after thermistors were used.

Table 12 — Type 2 Thermistor Sensor Temperature Resistance Table (2010 and Beyond)

TEMP (Deg C)	RES (ohms)	TEMP (Deg F)
-40	337200.0	-40.0
-39	315500.0	-38.2
-38	295400.0	-36.4
-37	276700.0	-34.6
-36	259300.0	-32.8
-35	243100.0	-31.0
-34	228000.0	-29.2
-33	213900.0	-27.4
-32	200800.0	-25.6
-31	188600.0	-23.8
-30	177200.0	-22.0
-29	166500.0	-20.2
-28	156600.0	-18.4
-27	147300.0	-16.6
-26	138600.0	-14.8
-25	130500.0	-13.0
-24	122900.0	-11.2
-23	115800.0	-9.4
-22	109200.0	-7.6
-21	103000.0	-5.8
-20	97130.0	-4.0
-19	91660.0	-2.2
-18	86540.0	-0.4
-17	81730.0	1.4
-16	77220.0	3.2
-15	72980.0	5.0
-14	69000.0	6.8
-13	65260.0	8.6
-12	61750.0	10.4
-11	58450.0	12.2
-10	55340.0	14.0
-9	52420.0	15.8
-8	49670.0	17.6
-7	47080.0	19.4
-6	44640.0	21.2
-5	42340.0	23.0
-4	40170.0	24.8
-3	38120.0	26.6
-2	36200.0	28.4
-1	34380.0	30.2
0	32660.0	32.0
1	31040.0	33.8
2	29510.0	35.6
3	28060.0	37.4
4	26690.0	39.2
5	25400.0	41.0
6	24180.0	42.8
7	23020.0	44.6
8	21920.0	46.4
9	20890.0	48.2
10	19900.0	50.0
11	18970.0	51.8
12	18090.0	53.6
13	17260.0	55.4
14	16470.0	57.2
15	15710.0	59.0
16	15000.0	60.8
17	14320.0	62.6
18	13680.0	64.4
19	13070.0	66.2
20	12490.0	68.0
21	11940.0	69.8
22	11420.0	71.6
23	10920.0	73.4
24	10450.0	75.2
25	10000.0	77.0
26	9572.0	78.8
27	9165.0	80.6
28	8777.0	82.4
29	8408.0	84.2
30	8056.0	86.0
31	7721.0	87.8
32	7402.0	89.6
33	7098.0	91.4
34	6808.0	93.2
35	6531.0	95.0
36	6267.0	96.8
37	6015.0	98.6
38	5774.0	100.4
39	5545.0	102.2
40	5326.0	104.0
41	5116.0	105.8
42	4916.0	107.6
43	4725.0	109.4
44	4543.0	111.2
45	4368.0	113.0
46	4201.0	114.8
47	4041.0	116.6
48	3888.0	118.4
49	3742.0	120.2
50	3602.0	122.0
51	3468.0	123.8
52	3340.0	125.6
53	3217.0	127.4
54	3099.0	129.2
55	2987.0	131.0
56	2878.0	132.8
57	2775.0	134.6
58	2675.0	136.4
59	2580.0	138.2
60	2489.0	140.0
61	2401.0	141.8
62	2317.0	143.6
63	2236.0	145.4
64	2158.0	147.2
65	2084.0	149.0
66	2012.0	150.8
67	1944.0	152.6
68	1878.0	154.4
69	1814.0	156.2
70	1753.0	158.0
71	1695.0	159.8
72	1638.0	161.6
73	1584.0	163.4
74	1532.0	165.2
75	1482.0	167.0
76	1433.0	168.8
77	1387.0	170.6
78	1342.0	172.4
79	1299.0	174.2
80	1258.0	176.0
81	1218.0	177.8
82	1179.0	179.6
83	1142.0	181.4
84	1106.0	183.2
85	1072.0	185.0
86	1039.0	186.8
87	1007.0	188.6
88	975.9	190.4
89	946.1	192.2
90	917.4	194.0
91	889.7	195.8
92	863.0	197.6
93	837.2	199.4
94	812.3	201.2
95	788.2	203.0
96	765.0	204.8
97	742.6	206.6
98	720.9	208.4
99	700.0	210.2
100	679.8	212.0
101	660.2	213.8
102	641.3	215.6
103	623.1	217.4
104	605.4	219.2
105	588.4	221.0
106	571.9	222.8
107	555.9	224.6
108	540.4	226.4
109	525.5	228.2
110	511.0	230.0
111	497.0	231.8
112	483.5	233.6
113	470.4	235.4
114	457.7	237.2
115	445.4	239.0
116	433.5	240.8
117	421.9	242.6
118	410.8	244.4
119	399.9	246.2
120	289.4	248.0

NOTES:

1. Sensor tolerance is ± 0.2 C in the range 0 to 70 C.
2. Prior to January 2010 RTD (Resistance Temperature Device) used, January 2010 and after thermistors were used.

62DA,DB,DC,DD 100% OA UNITS CONTROLLER INFORMATION (See Tables 13-16)

Table 13 — Controller Inputs

NUMBER	NAME	TYPE	SENSOR TYPE
UI-01	Outside Air Temperature	Analog	Termistor, type II, 10k at 77 deg F
UI-02	Outside Air Humidity	Analog	0 to 10 volts DC
UI-03	Leaving Air Temperature	Analog	Termistor, type II, 10k at 77 deg F
UI-04	Space Air Humidity	Analog	0 to 10 volts DC
UI-05	Clogged Filter indicator	Binary	Dry Contact (N.O.)
UI-06	Supply Pressure Transmitter (Optional)	Analog	0 to 10 volts DC
UI-07	Compressor 1 Protection Status	Binary	Dry Contact - Proof
UI-08	Compressor 2 Protection Status	Binary	Dry Contact - Proof
UI-09	Suction Line Temperature	Analog	Termistor, type II, 10k at 77 deg F
UI-10	Exhaust Fan Status (Optional)	Binary	Dry Contact - Proof
UI-11	Supply Fan Status	Binary	Dry Contact - Proof
UI-12	Wheel Motor Motion Sensor (Optional)	Binary	Dry Contact - Proof

Table 14 — Controller Outputs

NUMBER	NAME	TYPE	SENSOR TYPE
AO-01	Heat Stage 2 (W2)	Analog	0 to 10 volts DC (used as binary)
AO-02	Supply Fan VFD Modulation	Analog	0 to 10 volts DC
AO-03	Discharge Control Valve (MDC) Modulating	Analog	0 to 10 volts DC
AO-04	Hot Gas Reheat (HGRH) Modulation	Analog	0 to 10 volts DC
AO-05	Digital Compressor Control	Analog	0 to 5 volts DC
AO-06	Supply Pressure Transmitter (Optional)	Analog	0 to 10 volts DC
BO-01	Supply Fan (G)	Binary	Relay / Triac Output
BO-02	Compressor 1 (Y1)	Binary	Relay / Triac Output
BO-03	Compressor 2 (Y2)	Binary	Relay / Triac Output
BO-04	Hot Gas Reheat Valve (HGRH)	Binary	Relay / Triac Output
BO-05	OA Damper, Wheel Motor, Wheel Damper, Exhaust Fan	Binary	Relay / Triac Output
BO-06	Heat Stage 1 (W1)	Binary	Relay / Triac Output

→

Table 15 — PID Settings and Control

NAME	PROPORTIONAL	INTEGRAL	DERIVATIVE	SI	DEAD BAND
Cooling PID	1	0.3	0	1	0
Digital Comp PID - RAT	1	0.3	0	1	0
Digital Comp PID - LAT	1	0.3	0	1	0
Heating PID - RAT	1	0.05	0	5	0
HGRH PID - RAT	1	0.05	0	5	0
Mod. Discharge Control Valve - LAT	—	0.5	—	—	—
Supply Fan VFD - RAT	1	1	0	1	0
Exhaust Fan VFD - RAT (When Used)	1	1	0	1	0

NOTE: The PID settings are factory set, to what is considered an optimum setting. However, there are times when these settings may need to be adjusted to get better environmental control of the space as well as unit operation. This can be done by contacting the factory to get recommendations and the required password.

Table 16 — Time Delays and Other Settings

NAME	SETTING	RANGE
Supply Fan (G) On delay	30 seconds	0-180
Supply Fan (G) Off delay	1 minute	0-9
Dead Band (Y1) Off , Clg SP	1 F	0-9
Comp 1 (Y1) Delay to On	1 minute	0-9
Comp 2 (Y2) Delay to On	5 minute	0-9
Diff. to Shut Off Stg 1 Humidity	5 %	0-9
RH % to Ramp-up Digital Compressor	10 %	0-100
Diff to Start W1	1 F	0-9
Delay to On W1	2 minute	0-9
Diff to Start W2 (Below W1 SP)	3 F	0-9

HEATING

The 62D units may be equipped with gas or electric heat. The gas heat may be staged or modulating control. The electric heat may be staged or SCR (Silicon Controlled Rectifier) control.

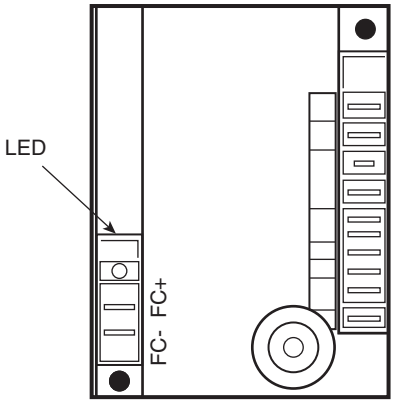
Setpoints — The control setpoints are the same for gas or electric heat but are dependent on the type of unit, 100% outdoor air (62DA, DB, DC, DD).

100% OA Units — Heating mode will be initiated based upon the outdoor air temperature (OAT) heating setpoint (default is 55° F).

If the unit has modulating gas heat or SCR controlled electric heat, the control will modulate to maintain a LAT (default is 90° F) and RAT setpoint.

If the supply fan is set to enable only for cooling or heating, it will continue to operate for two minutes after a heating mode.

Ignition Control — Units equipped with gas heat have an electronic ignition control. The control is equipped with an LED for diagnostics and service. See controller diagram Fig. 23.



SERIES 35-61 IGNITION CONTROL MODULE

Fault Conditions and LED Key

LED Steady On	System Control Fault
1 Flash	Combustion Air Flow Fault
2 Flash	Flame with No Call for Heat
3 Flash	Ignition Lockout

NOTE: LED flashes on for $^1/_4$ second, and off for $^1/_4$ second during default condition. Pause between fault codes is 3 seconds.

Fig. 23 — Controller Diagram

Flame Current Sensor — The flame current sensor may be tested by the following procedure:

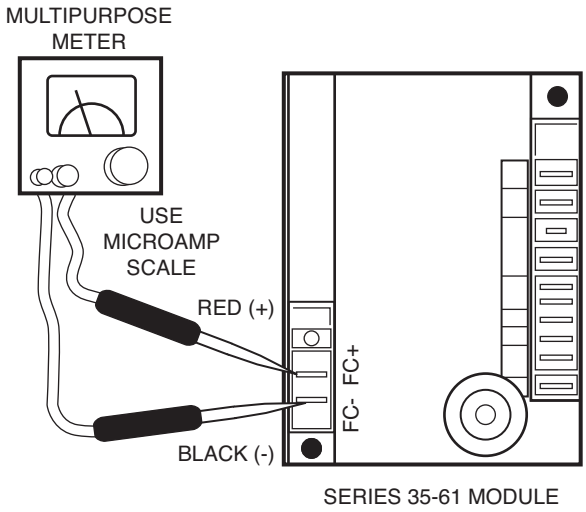


Fig. 24 — Flame Current Detection

SERVICE CHECKS — Flame current is the current which passes through the flame from the sensor to ground. The minimum flame current necessary to keep the system from lockout is 0.7 microamps. To measure flame current, connect analog DC microammeter to the FC– and FC+ terminals per Fig. 24. Meter should read 0.7 μA or higher. If the meter reads below "0" on scale, meter leads are reversed. Disconnect power and reconnect meter leads for proper polarity.

See Table 17 for a detailed explanation of the LED codes.

Table 17 — LED Codes

LED CODE	SYSTEM	DESCRIPTION	ACTIONS
None	No Power to T1	On call for heat nothing happens.	1. Check for open fuse or circuit breaker. 2. Check for poor wiring connection. 3. Check for failed 24V transformer.
Steady On	No Operation	24 VAC across terminal 24 VAC/V2-Gnd when thermostat calling for heat.	1. System fault. Repeated lockouts (5) during continuous call for heat. 2. Check input voltage and inlet gas pressure during system operation. 3. Check for condensate or blockage in air tube or pressure switch. 4. Check for blocked vent condition or obstruction in heat exchanger tube. 5. If sequencer is used check delay time setting. 6. Control fault. Replace control.
None	Open Limit Switch	Thermostat call for heat. No power across terminals V1/V2 on control.	1. Check for proper operation of circulating air supply system and for air filter blockage. 2. Check manifold pressure when limit cools and closes. Natural gas 3.5 in. wg / LP gas 10.0 in. wg Low combustion blower air output. Flue gas temp exceeds 550 F. Inspect for debris accumulation, proper wheel attachment, proper voltage to blower.
1 Flash	Air Flow Fault	Pressure switch contacts in **closed** position for 30 seconds with no output to combustion blower. Remains in this mode with combustion blower off.	1. Check for short in wiring to pressure switch. 2. Check pressure switch for closed contacts (with leads disconnected). 3. Replace pressure switch.
		Open pressure switch or flame rollout switch when inducer (IND terminal) is energized. If switch remains open for more than 30 seconds after combustion blower is energized, control will remain in this mode with IND terminal (blower) energized.	1. Failed combustion blower. 2. Check connections and air tube from draft inducer to air switch for leaks. 3. Check rollout switch manual reset - depress reset. 4. Check supply tube from draft inducer housing to pressure switches for condensate - drain line and reconnect. 5. Check pressure switch for condensate accumulation. 6. Replace pressure switch.
2 Flash	Flame Fault	Flame sense failure/flame present with no call for heat.	1. Check for voltage to gas valve with thermostat in off position. Valve should not be powered. 2. If valve is not energized, check for gas flow (manifold pressure reading greater than 0). If gas flow, turn off main shut-off valve or replace gas valve.
3 Flash	Lockout	Failure to light and or carryover, loss of flame or flame signal during ignition or operating cycle. Control will initiate up to 3 igntion re-trials before lockout.	1. Verify gas supply available and operation of gas valve - manifold pressure at start of ignition cycle. Check for power to valve terminals LO and COM while spark is energized. 2. Is spark present? If not check igniter for debris between electrodes, cracked ceramic and check ignition wire for short to ground. 3. Check flame sensor wiring connections to electrode and control and for any abrasions. 4. Check for cracked ceramic on flame sensor or grounded sensor rod. 5. Verify that ample air supply and proper venting of flue gases occurs during operating cycle. 6. Check for circulating air leaks into burner compartment during operation. 7. Check for re-circulation of flue gases into combustion air supply. 8. If all conditions satisfactory - replace ignition control.

Staged Heat — If the OAT is below OAT heating setpoint, first stage heating will be initiated. If the leaving air temperature (LAT) is below the LAT setpoint (default is 72 F), the second stage of heating will be initiated.

When system is powered up 24 VAC will be applied to the ignition control (IC) terminals 24VAC / R and to the Timer Relay Control (TR1). The ignition control will reset, perform a self check routine, initiate full time flame sensing, flash the diagnostic LED for up to four seconds and enter the thermostat scan standby state. The amber light on the TR1 will be lit indicating it is in the ready position.

See Fig. 25-27 for staged heat wiring diagram and typical horizontal and vertical installation.

CALL FOR HEAT

1. Controller (first stage or first and second stage) closes on call for heat.
2. 24 VAC to is supplied to IC terminal TH, provided limit switch is in closed position.
3. The control will check that pressure switch contacts are open (IC terminal PSW is not powered).
4. Combustion blower is then energized at high speed.
5. When the Air Switch (APS1) closes, a 15-second prepurge period begins.
6. At end of pre-purge period, the spark commences and the first and second stage gas valves are energized for the trial for ignition period.

7. Burners ignite and cross light, operating at maximum input rate (Manifold pressure 3.5 in. wg).
8. The TR1 is powered (terminal 7) simultaneously (SR LED lit) and begins timing a 90-second warm-up period while maintaining the combustion blower at high speed (FR LED lit). The TR1 will maintain this mode of operation, regardless of status of thermostat second stage.
9. When flame is detected by flame sensor, the spark is shut-off immediately and gas valves and combustion blower remain energized.
10. When the initial timer in TR1 times out, it defaults the gas valve to low fire and the combustion blower to low speed and returns control of the operating mode to the temperature controller. The SR LED turns off and the MR LED is lit.
11. If the controller is calling for second stage heat TR1 terminal 6 is powered. After a short time delay (approximately 15 seconds), the system switches the combustion blower to high speed (FR LED lit) and the second stage gas valve at 3.5 in. wg manifold pressure (CR LED lit), provided the High Air Pressure Switch (APS2) is proved.
12. During heating operation, the thermostat, pressure switch and main burner flame are constantly monitored by the IC to assure proper system operation.
13. Operation continues on High fire until the second stage thermostat is satisfied, opening the second stage contact and de-energizes terminal 6 on the TR1, turning off the second stage gas valve and returning the combustion blower to low speed.
14. When the thermostat (controller) is satisfied and the demand for heat ends, the first stage valve is de-energized immediately, the control senses loss of flame and a 30-second post-purge occurs (at high speed) before de-energizing the combustion blower.

IGNITION AND OPERATIONAL FAILURES DURING A CALL FOR HEAT RESULT IN "LOCKOUT" OF THE IGNITION CONTROL

1. If flame is lost during an operational cycle, the control will respond within 0.8 seconds. The spark will be energized for a trial for ignition period to attempt to relight burners and prove flame sensor. If flame is re-established, normal operation resumes.
2. If the burners fail to light or carryover during a trial for ignition, the control will attempt two additional ignition trials. If no flame is present at the flame sensor within 10 seconds, the spark and gas valve will be de-energized. A 15-second inter-purge period begins and the combustion blower continues to run. After the inter-purge period another ignition trial will take place.
3. If burner fails to light or prove the flame sensor following the two additional trials the control will go into lockout. The valve relay in the IC will be de-energized, shutting of the gas valve immediately and the combustion blower following a 30-second post-purge period.

Recovery from Lockout

1. If the thermostat (controller) is still calling for heat one hour after a lockout occurs, the control will automatically reset and initiate a call for heat sequence.
2. The ignition control may also be manually reset, by turning the thermostat (controller) down and back up to previous temperature setting or removing power (24V) to IC terminal 24VAC.

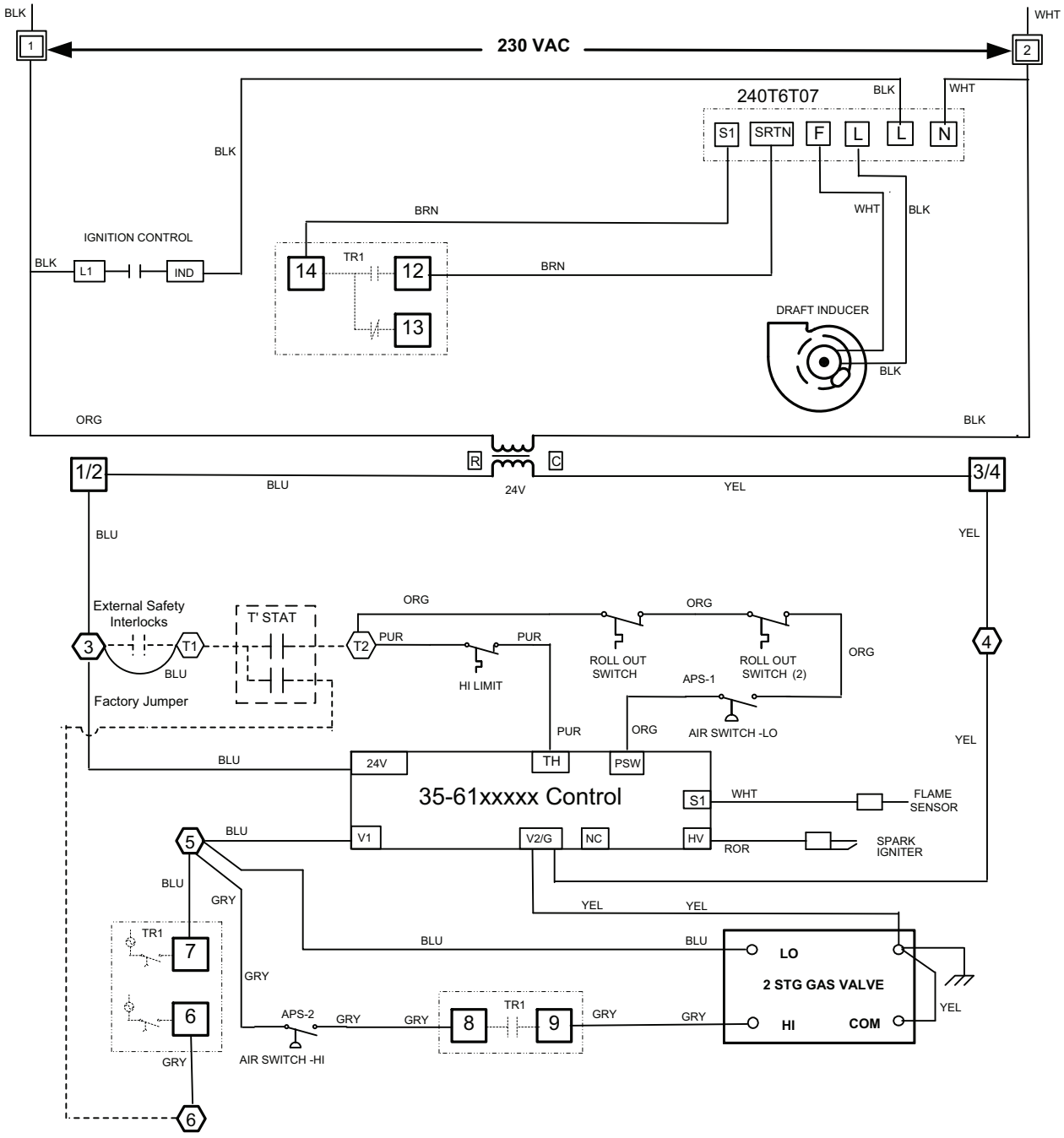
IC Fault Conditions and LED Key — Table 18 shows a list of LED flashing codes and their meanings.

Table 18 — LED Codes

LED	MEANING
LED Steady On	Internal Control Fault
1 Flash	Combustion Air Flow Fault
2 Flash	Flame with No Call for Heat
3 Flash	Ignition Lockout

NOTE: LED flashes on for ¼ second, and off for ¼ second during fault condition. Pause between fault codes is 3 seconds.

1. If during the initial call for heat the air switch contacts are closed for 30 seconds without an output to the combustion blower, an airflow fault occurs (one LED flash) and control will remain in this mode.
2. If the airflow switch remains open (or a rollout switch is open) for more than 30 seconds after the combustion blower output (IND) is energized, an airflow fault occurs (one LED flash), and control will stay in this mode with combustion blower on, waiting for airflow switch (or rollout) to close.
3. If the airflow signal is lost during operation, the control immediately de-energizes the gas valve and maintains blower operation. If the call for heat remains and proper airflow is not detected, and airflow fault occurs (one LED flash). If proper airflow is detected at any time, the normal sequence will begin with pre-purge.
4. If the main valve fails to close properly at the end of a heating cycle and a flame is maintained, the combustion blower will continue in operation. If the valve does close completely later removing the flame signal, the blower will run for the post purge period and shut off.



CUSTOMER PROVIDED COMPONENT

CUSTOMER / FIELD WIRING

INTERNAL TERMINAL CONNECTION

EXTERNAL TERMINAL CONNECTION

(2) 2nd ROLLOUT SWITCH ON HORIZONTAL BURNER TRAY ONLY

TIMER RELAY – TR1-090HH15

TR1 TIMER RELAY TERMINAL CONNECTION

Fig. 25 — Staged Heat Wiring Diagram

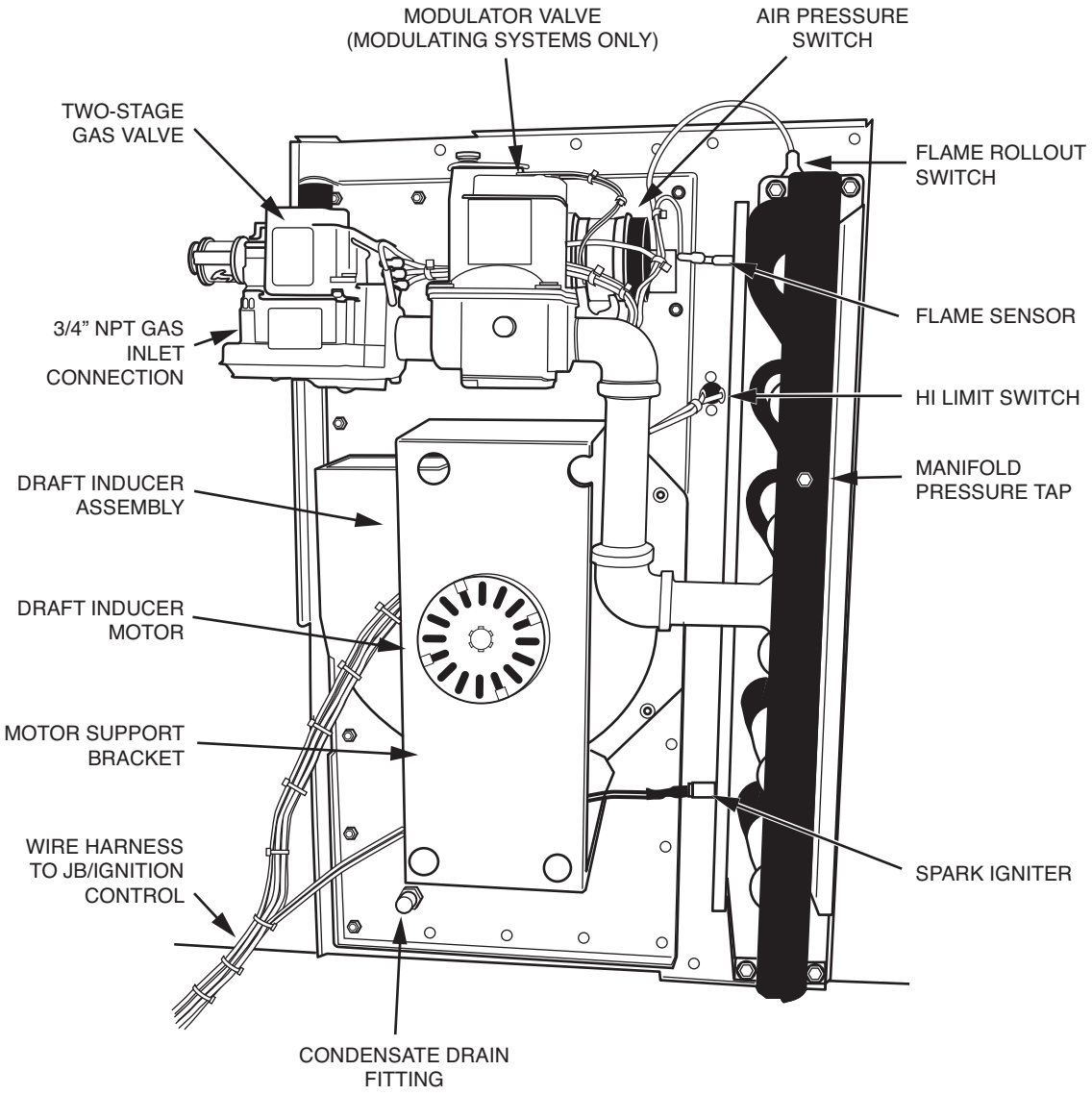


Fig. 26 — Horizontal Unit with Modulating Gas Heat

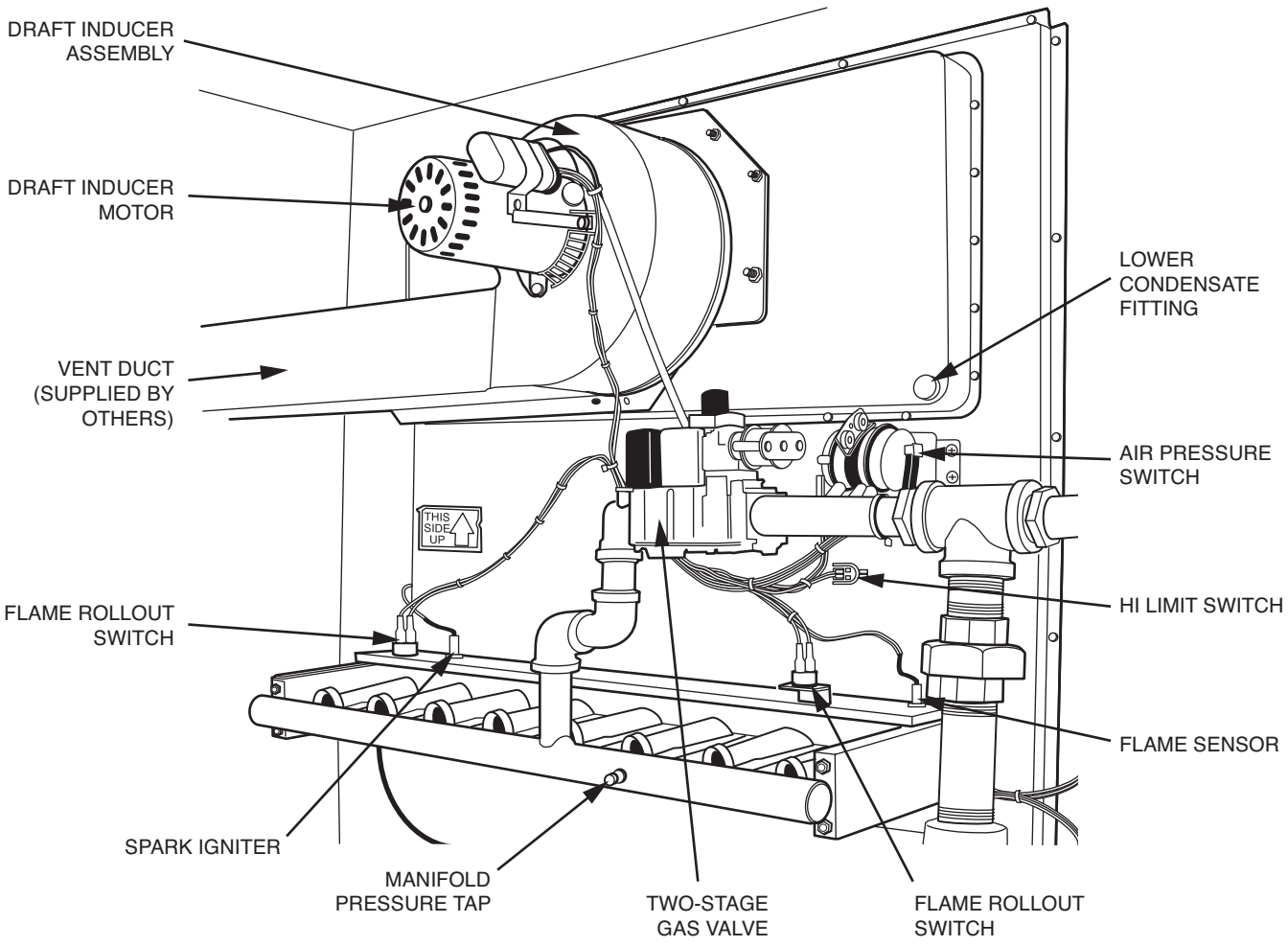


Fig. 27 — Vertical Unit with Staged Gas Heat

Draft Fan Pressure Measurement HM Series Furnace Module

1. Remove air pressure supply tube from fan at pressure switch connection. See Fig. 28, A.
2. Insert "T" into supply tube. See Fig. 28, B.
3. Attach additional piece of tubing from "T" to pressure switch. See Fig. 28, C.
4. Connect remaining leg of "T" to pressure measuring device (measure in. wg) See Fig. 28, D.

   NOTE: Connect to "low" side of digital monometer as combustion blower pressure is negative at test point.
5. Place system in operation and observe pressure reading. Check chart below to ensure that pressure is greater than noted for ambient operation.
6. After heater fires, allow unit to operate for 10 to 15 minutes. Observe pressure reading and check Table 19 to verify pressure is greater than noted for "steady state."

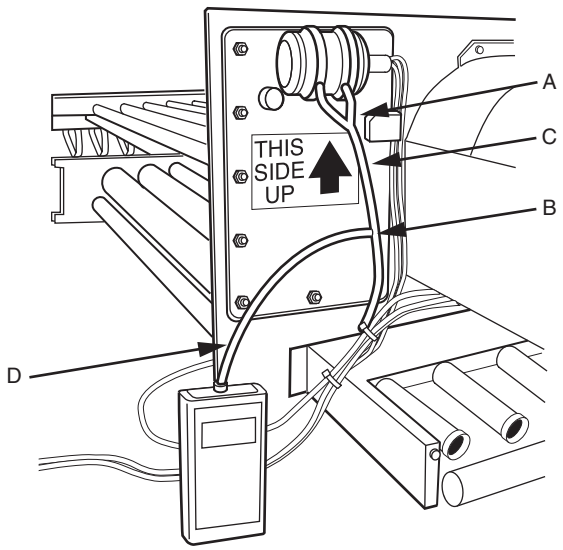


Fig. 28 — Draft Fan Pressure Measurement

Table 19 — Pressure Reading

SERIES	AMBIENT (Min. in. wg)	HIGH FIRE STEADY STATE (Min. in. wg)
HMA	-3.50	-1.70
HMB	-3.50	-1.90
HMG	-2.80	-1.70

NOTE: Readings below those noted indicate a potential problem with the installation and may be the result of low voltage to combustion blower motor, a loose or damaged blower wheel, restriction in the vent piping, inadequate vent system, or negative pressure in the building (indoor applications only).

Manifold Pressures — The gas valve manifold pressures may be measured at the gas valve test ports, see Fig. 29. See Tables 20 and 21 for typical gas heat data points and modulating gas heat data points.

Modulating Gas Heat — If the OAT is below OAT heating setpoint, heating will be initiated. The modulating heat valve(s) will control to a LAT of 72 F. Units with modulating gas heat may also have 'Override' control. Override control (sometimes called high fire override) is used to quickly raise the space temperature. For example, if the space is cold early in the morning, the unit will sense the low space temperature and go into high fire override even if the outdoor temperature is not that cold. After the space temperature is in the normal range, the unit will then go back to the modulating output mode.

Units equipped with the optional modulating gas heat control will have several components in addition to the standard gas valve. These components includes the following:

MODULATING GAS VALVE — For an example of a modulating gas valve, see Fig. 30.

SIGNAL CONDITIONER (SC30) — See Fig. 31. The signal conditioner has three functions:

1. Convert the 62D controller's DC output signal of 0 to 10 VDC to a 0 to 20 VDC signal to provide compatibility with the modulating gas valve
2. Controls the normally open relay used to switch inducer speed and gas valve stage. Closes or opens the relay based on the 62D controller's DC output to the SC30. Relay closes at approximately 5.3 VDC input. Relay opens at approximately 4.7 VDC input
3. Provides an adjustable timer (0 to 30 secs) and adjustable VDC (5 to 15 VDC) output to the modulating gas valve at start up (powering of the SC30). Adjustment potentiometers:
   - R18 - 0 to 30 sec timer
   - R22 - 5 to 15 VDC output voltage

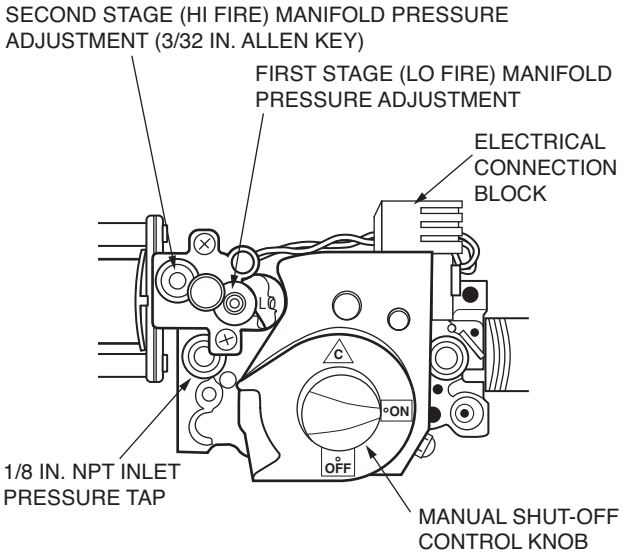


Fig. 29 — Gas Valve Manifold Pressure Ports

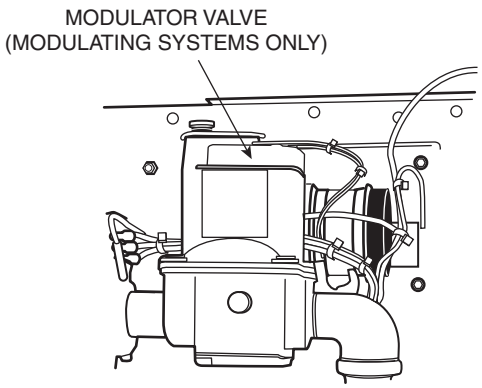


Fig. 30 — Modulating Gas Valve

Table 20 — Typical Gas Heat Data Points

Type of Gas: Natural Gas Pressure at Inlet (burner off): 13.5 in. wg max. Supply voltage at JB: Marked VAC ± 5%

HEATER OPERATING DATA	LOW FIRE	HIGH FIRE
Gas Pressure at Train Inlet	13.3 in. wg	13.0 in. wg (See rating plate for minimum)
Gas Pressure at Burner Manifold	1.1 to 1.3 in. wg	3.3 to 3.5 in. wg
Gas Input Rate	25 to 35% Maximum Input	Rated input less 5% Max.
CO2 in Flue Gas	1.8 to 3.2%	6.2 to 7.2%
CO in Flue Gas	<300 ppm	<50 ppm
Flue Gas Temperature at Discharge	>200 F	420 to 520 F Ambient Temperature: –40 to 70 F
Draft Fan at Discharge	–0.80 to –2.00 in. wg	–1.75 to –2.40 in. wg

Table 21 — Additional Data Points for Modulating Gas Heat

MODULATING SYSTEM OPERATION	ANALOG SIGNAL TO SC30	VDC TO MOD VALVE	MANIFOLD PRESSURE
(if applicable)	Initial Call for Heat 0 VDC 5 VDC 10 VDC	12.5 to 13.0 VDC 0.5 to 1.0 VDC 9.5 to 10.0 VDC 18.0 to 19.0 VDC	1.1 to 1.4 in. wg 0.4 to 0.6 in. wg 0.9 to 1.2 in. wg 3.2 to 3.5 in. wg

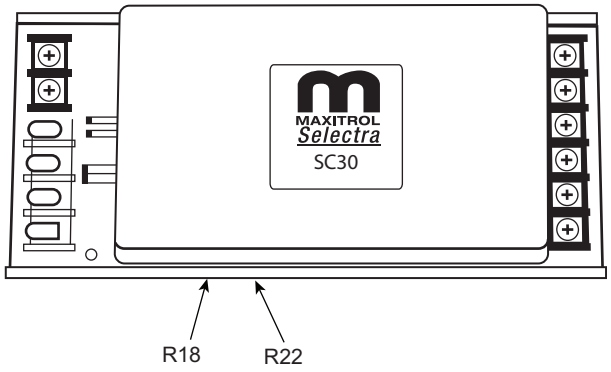


Fig. 31 — Signal Conditioner SC30

To avoid internal damage to the SC30 Signal Conditioner the transformers secondary must not be grounded in any portion of the circuit external to the SC30 Signal Conditioner. If existing transformer is grounded, a separate isolated transformer must be used.

INDUCER FAN SPEED CONTROL — For an example of an inducer fan speed control, see Fig. 32.

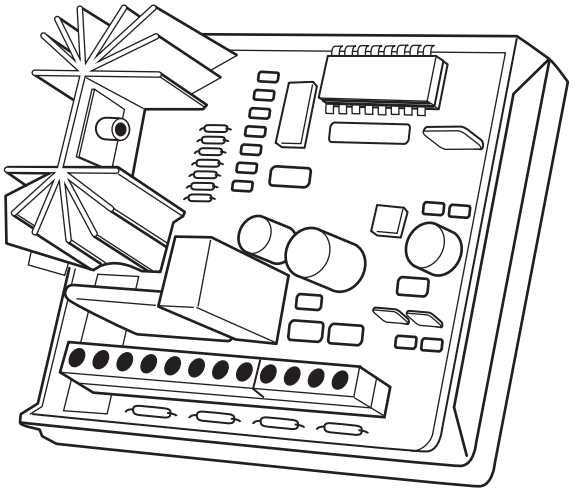


Fig. 32 — Inducer Fan Speed Control

TIMER RELAY CONTROL (TR1) — See Figure 33. The timer function is as follows:

1. The TR1 receives a 24 vac signal (terminal 7), normally from the ignition control MV gas valve output or the thermostat circuit (see Note 1). Upon receiving the signal the TR1 begins multiple tasks. It starts Timer No. 1, lights the SR LED, places the 2-stage gas valve in either the high or low pressure stage (terminal 9), places the inducer in either the high or low speed (terminal 12, 13) and powers the Series 3 or SC30 (terminal 10).

   The TR1 maintains this mode throughout Timer No. 1's duration, regardless of the temperature controller input (it is ignoring terminal 6). The initial gas valve stage, intial inducer stage, and legth of time are customer specified and programmed into the TR1. Specifying these factors can eliminate problems associated with lighting the burner at an undesirable input and condensation occuring at start-up. (When using the Maxitrol modulating system, the SC30 and Series 3 controllers output a constant voltage to the modulating gas valve thereby fixing an approximate input rate during the set time after power up. The time, which is often set equal to the TR1 Timer No.1 duration, and the output voltage are fixed or adjustable. See SC30 and Series 3 literature.)
2. When Timer No. 1 expires, the TR1 defaults the gas valve and inducer to low pressure/speed mode and hands control of the required mode, high or low, to the temperature control system. The MR LED lights and the SR LED goes out. The terminal 6 input signal (0 to 24 VAC) now determines if the gas valve and inducer will remain in the low pressure/speed mode or switch over to the high pressure/speed mode.

   When the terminal 6 input signals the TR1 to switch to the high output mode, it starts Timer No. 2. Timer No. 2 is programmed to a customer specified time and is used to buffer the low to high switch point. When Timer No. 2 expires, the system switches from low output mode to high output mode (see Note 2).
3. The FR LED lights when the inducer operates in high speed.
4. The CR LED lights when the gas valve operates in the high pressure stage.
5. Use terminal 8 to accept a "made" inducer high air flow switch (HAFS) signal. If the 24 VAC signal is not received, the TR1 keeps the gas valve in the low pressure stage, regardless of the terminal 6 input signal.

NOTE 1: Timer No. 1 resets each time power is removed from terminal 7. Tip: By reseting each time power is removed from terminal 7, the fan purge setting and time do not need to be considered, and the start time duration will be the same, even after failed ignition attempt(s).

NOTE 2: Immediate low mode to high mode changeover after Timer #1 expiration, or upon recieving required terminal 6 signal, can be accomplished by specifying Timer No. 2 to zero seconds.

⚠ WARNING

To avoid internal damage to the TR1, Transformer No. 2 (see Fig. 34) secondary must not be gounded in any portion of the circuit external to the A1093/SC30. A separate, independent transformer is recommended.

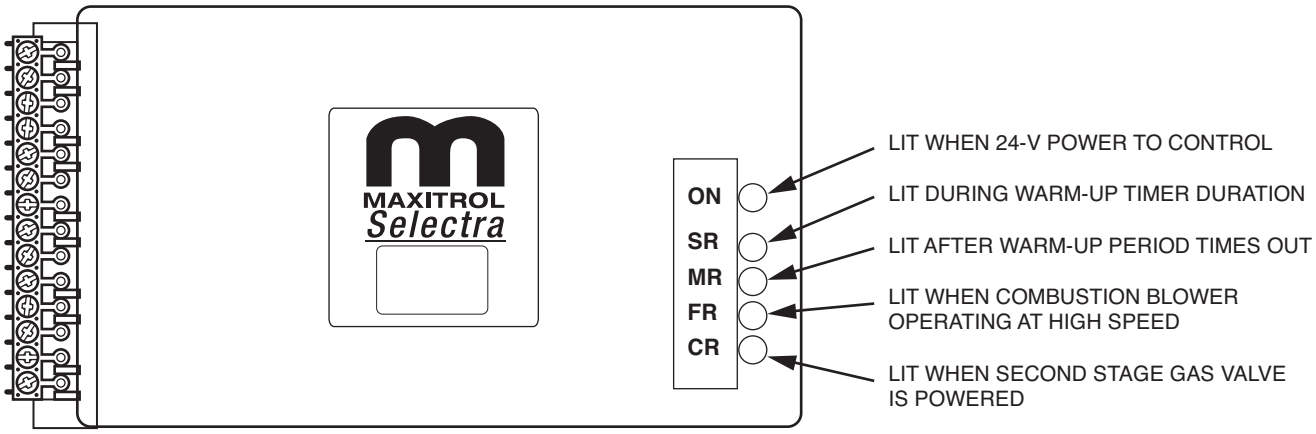


Fig. 33 — Timer Relay Control (TR1)

SEQUENCE OF OPERATION FOR ELECTRONIC MODULATION WITH INDUCER SPEED CONTROL — When the system is powered up 24 VAC will be applied to the ignition control (IC) terminals 24VAC/R and to the Timer Relay Control (TR1). The ignition control will reset, perform a self check routine, initiate full time flame sensing, flash the diagnostics LED for up to four seconds and enter the thermostat scan standby state. The amber light on the TR1 will be lit indicating it is in the ready position. See Fig. 33.

Call for Heat

1. Thermostat (heat enable) closes on call for heat.
2. 24 VAC to is supplied to IC terminal TH, provided limit switch is in closed position.
3. The control will check that pressure switch contacts are open (IC terminal PSW is not powered).
4. Combustion blower is then energized at high speed.
5. When the Air Switch (APS1) closes, a 15-second pre-purge period begins.
6. At end of pre-purge period, the spark commences and the first stage gas valve is energized for the trial for ignition period.
7. TR1 is powered (terminal 7) simultaneously (SR LED lit) and begins timing a 90-second warm-up period while maintaining the combustion blower at high speed (FR LED lit) and powers the SC30. The SC30 will output 12 to 13 VDC to the modulating control valve during the timing duration (90 seconds) of TR1, regardless of the analog input signal to SC30 terminals 7 and 8.
8. Burners ignite and cross light, operating at the adjusted mid-fire input rate (manifold pressure set at 1.2 in. to 1.5 in. wg).
9. When flame is detected by flame sensor, the spark is shutoff immediately and gas valve(s) and combustion blower remain energized.
10. When the initial timer in TR1 times out, it defaults the gas valve to low fire and the combustion blower to low speed and returns control of the operating mode to the building temperature controller. The SR LED turns off and the MR LED is lit.
11. If the controller is providing an analog signal between 0.5 and 5.3 VDC to the SC30 control, the system will continue to run at low speed combustion blower and with only the first stage valve open. The modulating valve will be powered proportional to the input voltage signal from the controller, and will open or close changing the gas manifold pressure. Manifold pressure will vary from 0.3 to 1.2 in. wg operating in this mode.
12. If the signal increases above 5.3 VDC, the SC30 relay closes powering terminal 6 on the TR1, and starts a second time delay of 15 seconds. At the end of this time delay the fan switches to high speed (FR LED lit) and the second stage gas valve opens (CR LED lit) through the TR1 (terminal 9) provided the High Air Switch contacts are closed. The manifold pressure will vary from 1.4 to 3.5 in. wg in this mode.
13. During heating operation, the thermostat, pressure switch and main burner flame are constantly monitored by the IC to assure proper system operation.
14. Operation continues in the high fire mode until the controller input signal to the SC30 control drops to 4.7 VDC. At this point the SC30 relay circuit opens (SC30 terminal 5 has no output) de-energizing the second stage valve and the TR1 switches the combustion blower to low speed operation. Low-fire modulation will continue as in Step 11.
15. When the thermostat (temperature controller) is satisfied and the demand for heat ends, the heat enable contact opens and the first stage valve is de-energized immediately, the control senses loss of flame and a 30-second post-purge occurs (at high speed) before de-energizing the combustion blower.

Ignition and Operational Failures during a call for Heat Result in “lockout” of theIgnition Control

1. If flame is lost during an operational cycle, the control will respond within 0.8 seconds. The spark will be energized for a trial for ignition period to attempt to relight burners and prove flame sensor. If flame is re-established, normal operation resumes.
2. If the burners fail to light or carryover during a trial for ignition, the control will attempt two additional ignition trials. If no flame is present at the flame sensor within 10 seconds, the spark and gas valve will be de-energized. A 15-second inter-purge period begins and the combustion blower continues to run. After the inter-purge period another ignition trial will take place.
3. If burner fails to light or prove the flame sensor following the two additional trials the control will go into lockout. The valve relay in the IC will be de-energized shutting of the gas valve immediately and the combustion blower following a 30-second post-purge period.

Recovery from Lockout

1. If the thermostat (controller) is still calling for heat one hour after a lockout occurs, the control will automatically reset and initiate a call for heat sequence.
2. The ignition control may also be manually reset, by turning the thermostat (controller) down and back up to

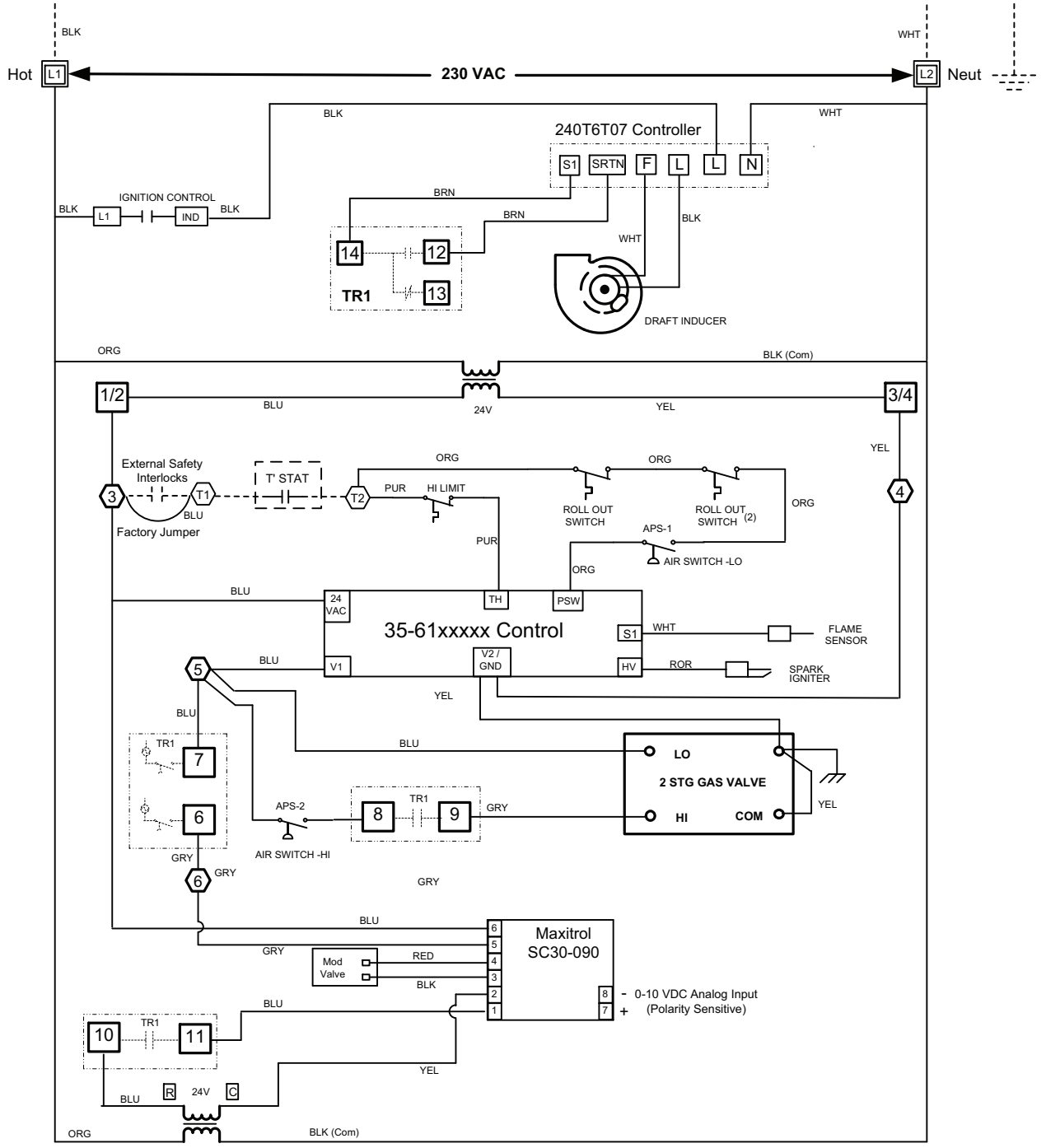
previous temperature setting or removing power (24V) to IC terminal 24VAC.

Fault Conditions and LED Key — Table 22 shows a list of LED flash codes and their meanings.

Table 22 — LED Codes

LED	MEANING
LED Steady On	Internal Control Fault
1 Flash	Combustion Air Flow Fault
2 Flash	Flame with No Call for Heat
3 Flash	Ignition Lockout

NOTE: LED flashes on for ¼ second, and off for ¼ second during fault condition. Pause between fault codes is 3 seconds.



CUSTOMER PROVIDED COMPONENT

CUSTOMER / FIELD WIRING

INTERNAL TERMINAL CONNECTION

EXTERNAL TERMINAL CONNECTION

TR1 TERMINAL CONNECTION

TIMER RELAY – TR1-090LH15

(2) 2nd ROLLOUT SWITCH ON HORIZONTAL BURNER TRAY ONLY

Fig. 34 — Modulating Heat Wiring Diagram

Electric Heat — The 62D units may be equipped with electric heat. The electric heat control may be staged or SCR control. Staged electric heat units with nominal heater capacity of 10 to 25 kW are two stages, 30 kW and larger staged heaters are four stage. SCR control is available on all heater sizes. See Fig. 35-37 for electric heater wiring diagrams.

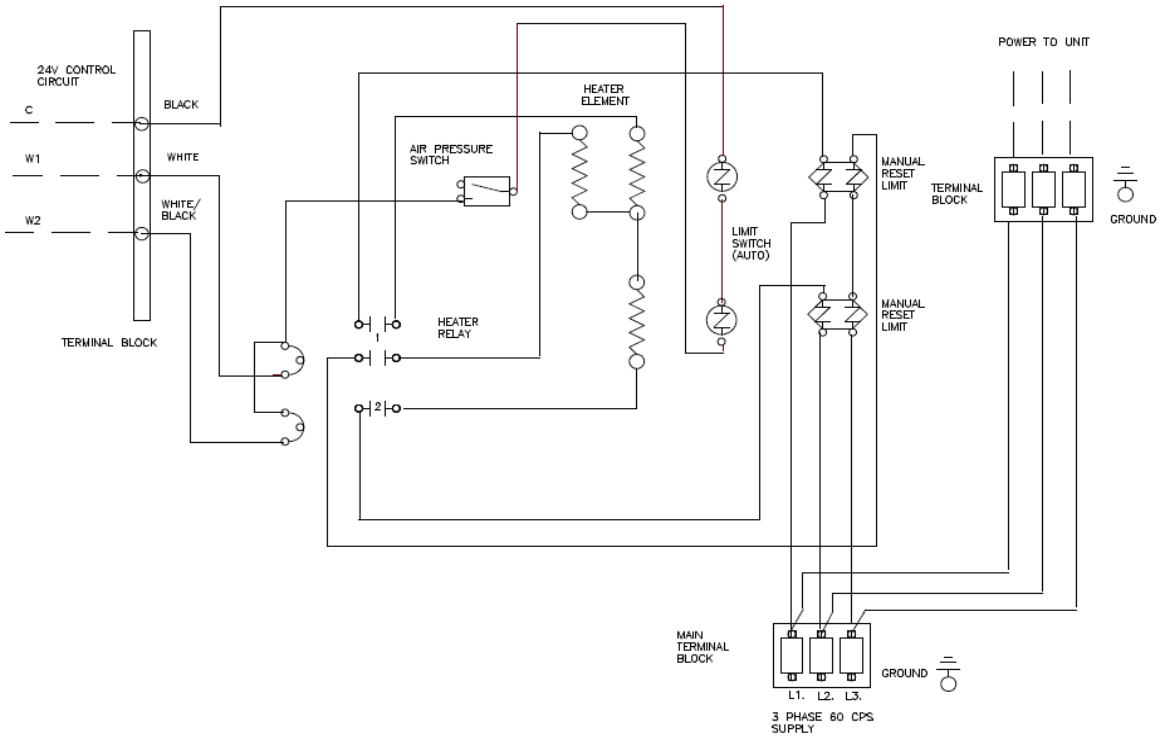


Fig. 35 — Two-Stage, 3-Element Electric Heat

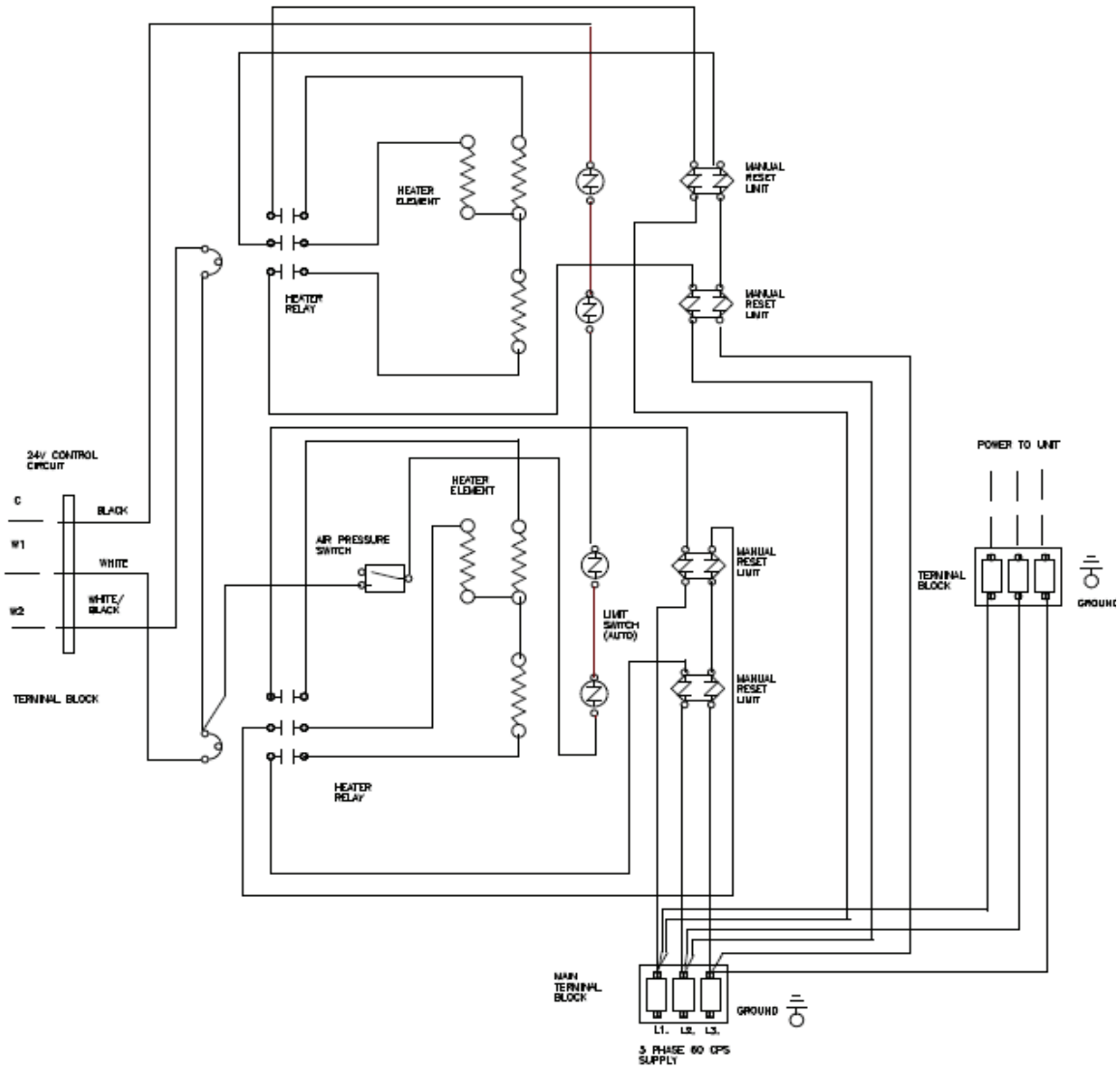


Fig. 36 — Two-Stage, 6-Element Electric Heat

SCR Controlled Electric Heat — If the OAT is below OAT heating setpoint, heating will be initiated. The SCRs will control to a LAT of 72 F.

Units equipped the optional SCR controlled electric heat will utilize a SCR power control, see Fig. 38 and 39. This power control will convert a 0 to 10 VDC input signal from the 62D controller to vary the heater output to maintain the desired leaving-air temperature (LAT). The power control has a DIP switch configuration for the type of input signal. See Table 23 for proper switch settings.

Table 23 — Power Switch Settings

INPUT SIGNAL	SWITCH #1	SWITCH #2	SWITCH #3	SWITCH #4
0 to 10 Vdc Control Signal (2 to 10 Vdc Control Range)	Off	Off	Off	On

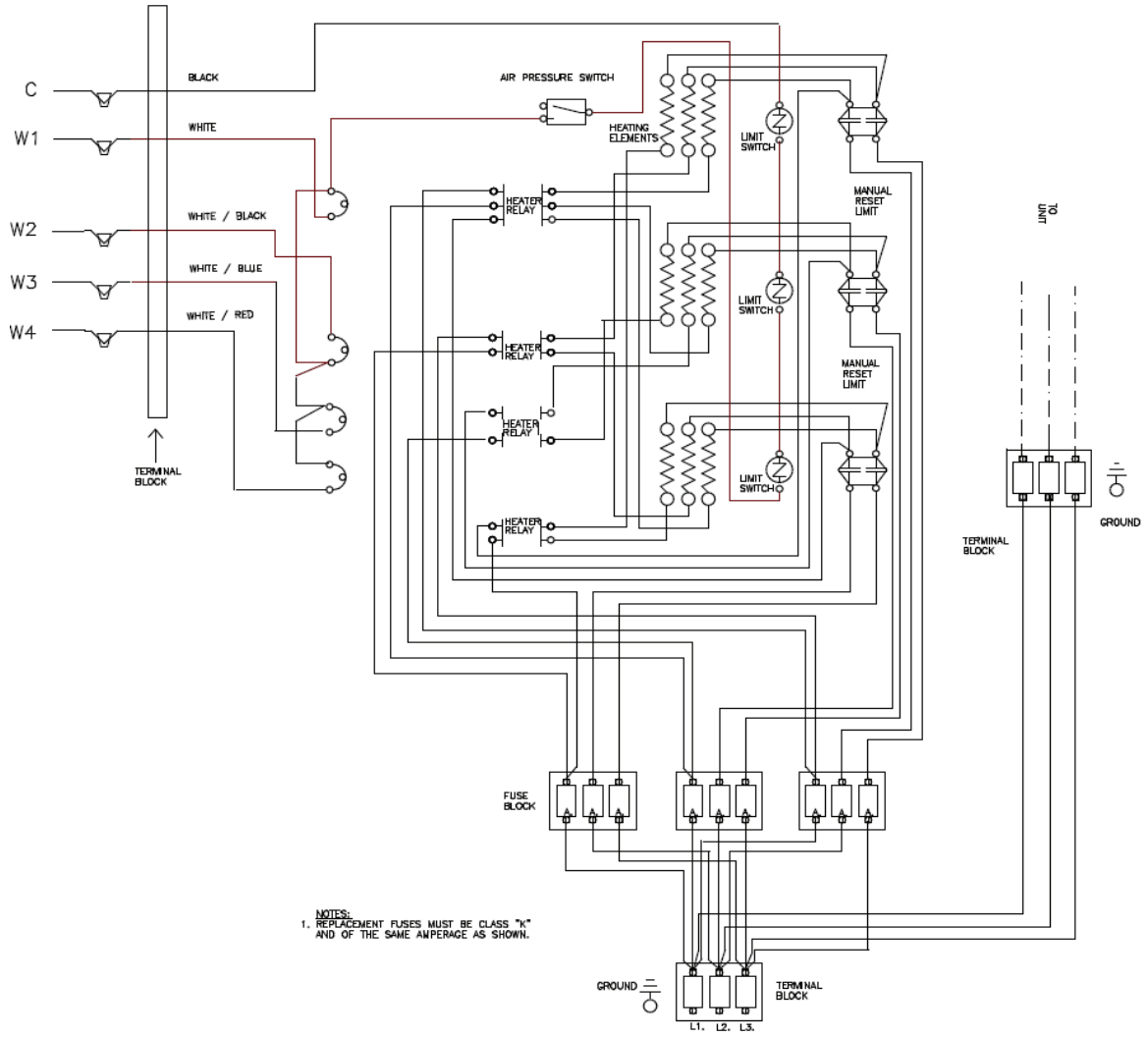


Fig. 37 — Four-Stage, Nine-Element Electric Heat

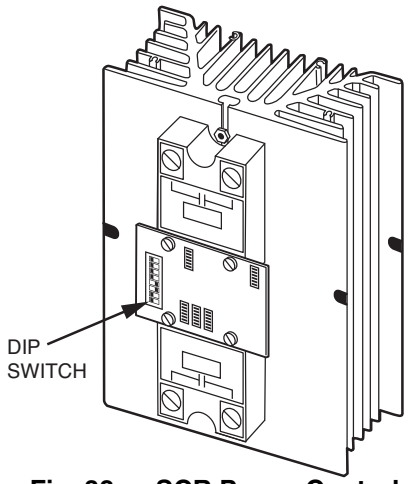


Fig. 38 — SCR Power Control

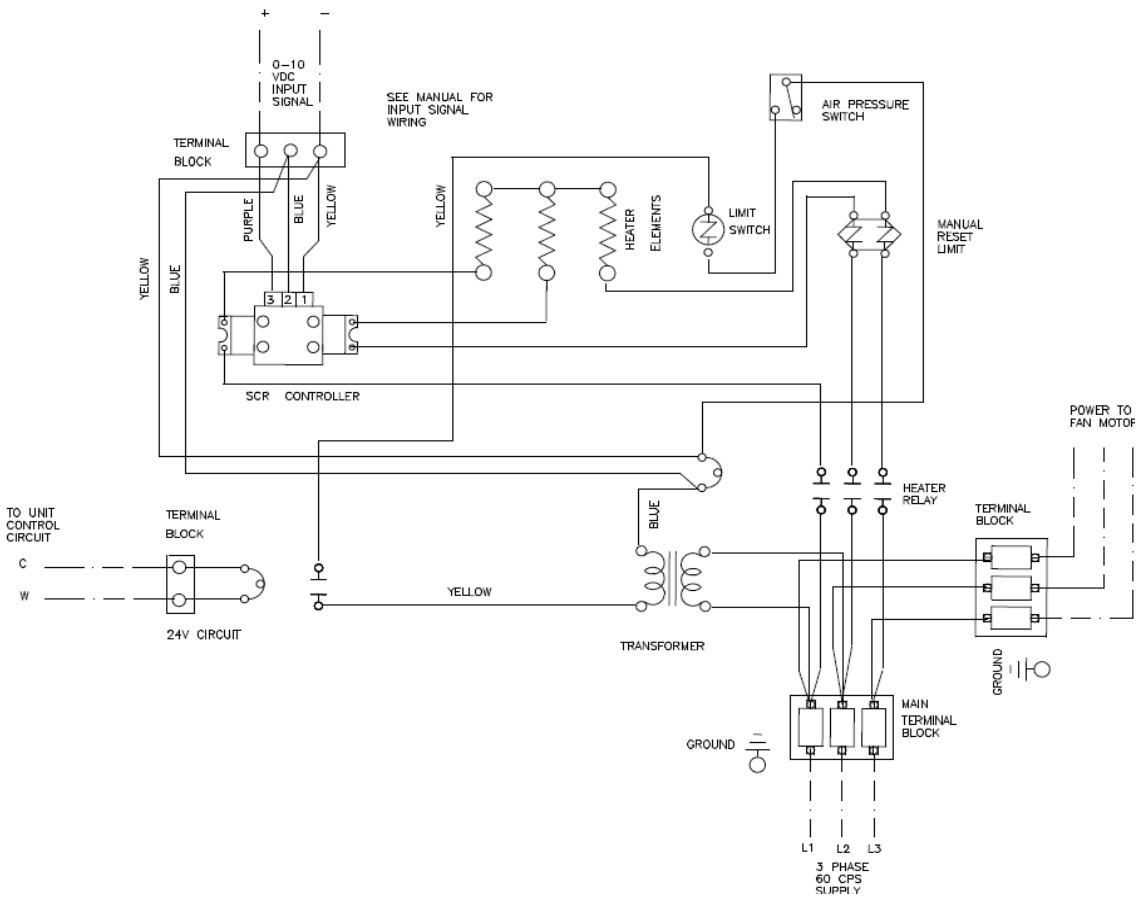


Fig. 39 — SCR Control Electric Heat

MAJOR SYSTEM COMPONENTS

Digital Scroll Compressor — The 62D unit may be optionally equipped with a digital scroll compressor. The digital compressor's capacity is modulated by rapidly switching a normally closed (N.C.) unloader solenoid on and off. When the solenoid is energized, i.e., open, the compressor is unloaded. When the solenoid valve is not energized, the compressor is loaded. By varying the length of time the solenoid is energized provides a modulating effect and determines the average capacity of the compressor. Units equipped with the digital compressor will incorporate a digital compressor controller, see Fig. 40. The digital compressor controller provides the interface between the 62D controller and the digital compressor. The device provides control, protection and diagnostics. The control can detect faults and provides 3 levels of protection: reduced capacity, trip, and lockout.

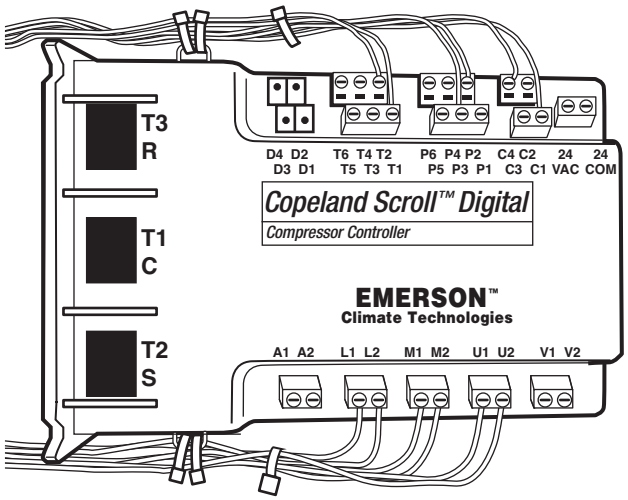


Fig. 40 — Digital Compressor Control

Compressor Controller Inputs/Outputs, see Fig. 41.

- Controller power input
  - 24 VAC
  - 24 Common
- Capacity demand signal - 0 to 5 VDC input from the 62D controller
  - C1 - Common
  - C2 - +5 VDC signal
  - Less than 0.5 VDC is considered a loss of signal
  - 1.4 VDC to 5.0 VDC corresponds to 10% to 100% com pressor capacity (see Table 24)
  - Compressor controller updates the demand once every 20 seconds
- Suction pressure transducer - 0 to 5 VDC input from suction pressure transducer
  - P1 - Common
  - P2 - Signal
  - P3 - +5 VDC supply
- Discharge temperature transducer T1/T2
- Compressor contactor coil - M1/M2
- Unloader solenoid - U1/U2

Table 24 — 15-Second Cycle Controller 543-0024-001

DEMAND SIGNAL (VDC)	LOADED %	UNLOADED %	TIME LOADED	TIME UNLOADED
1.00	Off	Off	Off	Off
1.44	10%	90%	1.5 seconds	13.5 seconds
3.00	50%	50%	7.5 seconds	7.5 seconds
4.20	80%	20%	12 seconds	3 seconds
5.00	100%	0%	15 seconds	0 seconds

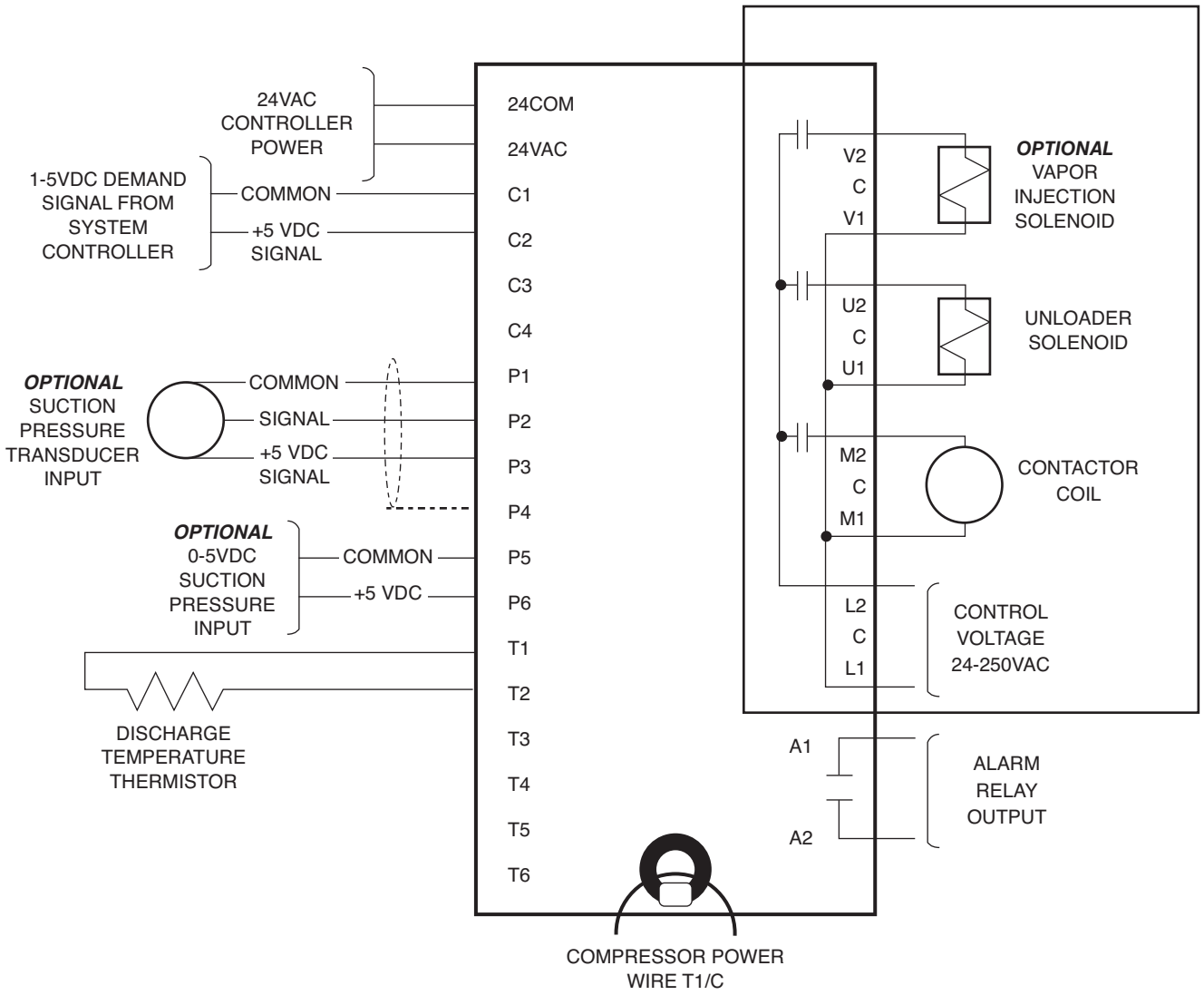


Fig. 41 — Controller Inputs/Outputs

The controller has three LEDs, see Fig. 42.

- Green "Power" LED
  - On when 24 VAC is supplied to the compressor controller
  - Flashes during 2-minute anti-short cycle timer
- Yellow "Unloader" LED
  - On when the unloader solenoid is energized
  - Off when the unloader solenoid is de-energized
- Red "Alert" LED
  - Off - no faults detected
  - Blinking - fault detected
  - Flashes code indicating which alert is active
  - The code is interpreted by counting the number of flashes (1 to 9). See Table 25 for LED Alert codes.
  - Flash codes are separated by a 2-second pause

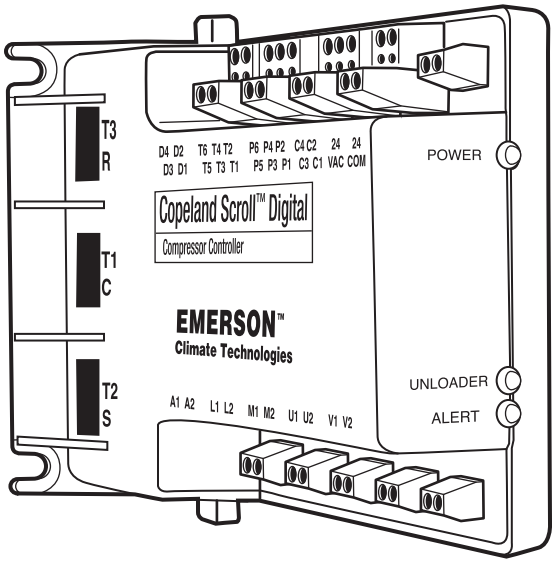


Fig. 42 — LEDs on Controller

Table 25 — LED Alert Codes

NO. OF FLASHES	ALERT NAME	EVENT TRIGGER	ACTION TAKEN	REQUIRED TO RESET/RESTART COMPRESSOR	REQUIRED TO CLEAR ALERT CODE AND OPEN ALARM RELAY CONTACTS
1	None	None	None	None	None
2	High Discharge Temperature Trip	Discharge temperature greater than 268 F or Discharge Thermistor is short circuited	De-energize compressor contactor. Close alarm relay contacts. De-energize unloader solenoid.	30-minute cool down timer and discharge temperature below 250 F	60-minutes of un interrupted, alert free minutes of run time
2	High Discharge Temperature Lockout	5 High Discharge Temperature Trips within 4 hours	De-energize compressor contactor. Close alarm relay contacts. De-energize unloader solenoid.	Controller 24VAC power must be cycled off/on.	Controller 24VAC power must be cycled off/ on.
3	Compressor Protector Trip	Demand signal 1.4 VDC or higher AND compressor internal overload protector open OR power not available at the compressor (fuse, breaker, loose wire)	De-energize compressor contactor. Close alarm relay contacts. De-energize unloader solenoid.	Wait for 2 minute anti-short cycle timer to reset	Demand signal 1.4VDC or higher AND compressor current detected
4	Locked Rotor	Controller senses a locked rotor in compressor	De-energize compressor contactor. Close alarm relay contacts. De-energize unloader solenoid.	Controller 24VAC power must be cycled off/on.	Controller 24VAC power must be cycled off/ on.
5	Demand Signal lost	Demand signal below 0.5 VDC	De-energize compressor contactor. Close alarm relay contacts. De-energize unloader solenoid.	Demand signal above 0.5 VDC AND 2-minute anti-short cycle timer has reset	Demand signal above 0.5 VDC
6	Discharge Thermistor Fault	Discharge Thermistor is not connected to the compressor controller	Limit maximum capacity of compressor to 50% unloader modulation. Close alarm relay contacts.	Thermistor re-connected.	Thermistor re-connected.
7	None	None	None	None	None
8	Compressor contactor fault	Compressor current is detected when demand signal is less than 1.4 VDC.	Re-energize compressor contactor. Close alarm relay contacts. Unloader solenoid is energized. Compressor runs unloaded until demand signal rises above 1.4 VDC.	Compressor continues to run.	Demand signal is above 1.4 VDC or no compressor current is detected.
9	Low 24 VAC supply	Compressor controller 24 VAC supply is below 18.5 VAC	Trip compressor. Close alarm relay contacts.	24 VAC supply above 19.5 VAC AND anti-short cycle timer is complete.	24 VAC supply above 19.5 VAC AND anti-short cycle timer is complete.

Energy Conservation Wheel (ECW) — The 62D unit may be optionally equipped with an enthalpy type energy recovery wheel. The ECW should rotate whenever the supply and exhaust fans are operating.

FROST CONTROL — The wheel may be equipped with VFD (variable frequency drive) for frost control. The VFD will slow the rotating speed to the configured minimum speed when the temperature of the return air coming off the wheel is equal to or less than 40 F (configurable in the VFD controller). Slowing the wheel with inhibit the formation of frost. Refer to the VFD section for additional info on the VFD.

Before starting:

1. Does the ECW rotate freely by hand? If not, check the seals and if necessary adjust per the instructions below.
2. Is the ECW rotation direction correct per the arrow? See Fig. 43.
3. Is the outdoor and exhaust air flow correct based on the unit configuration?
4. Is the drive belt(s) tight?

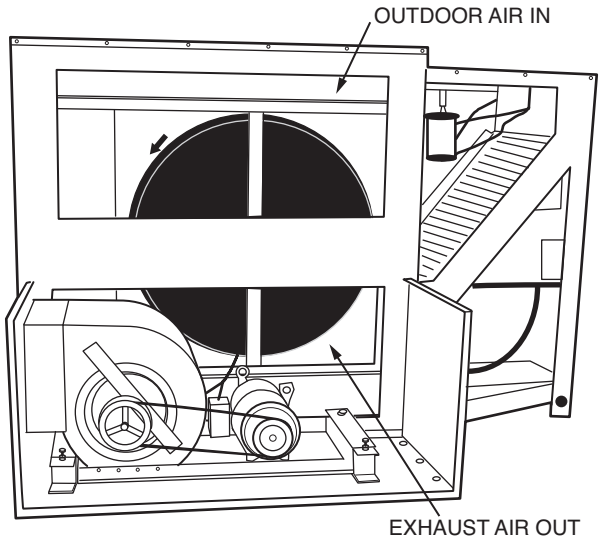


Fig. 43 — ECW Rotation

SEALS — The ECW is provided with a neoprene bulb seal which provides not only an effective seal in both the peripheral and side-to-side sealing directions but also one which is easily adjusted to compensate for seal run-in, shipping misalignment, etc. The neoprene bulb is attached to a metal reinforced U-shaped neoprene grip. The metal/neoprene grip allows for an expandable grip range which can be moved closer or further from the sealing face as needed. The peripheral bulb seals against the wheel outer band and the inner bulb seals against the wheel face. With the wheel stopped, move seals as close to the sealing surface as possible but without exceeding grip range of bulb seal and without pressing the bulb down against the seal face. Bump the motor. If the motor will not turn, the seal is too close and should be nudged back where needed. The seal will seek its equilibrium position based on the closest part of the sealing face. Because the seal is meant to be a noncontact seal, small gaps may be seen between seal and sealing surface once the equilibrium position is reached. Seal leakage is meant to be under 5% at 1 inch of differential between supply and exhaust.

Some seal run-in is to be expected, so do not be alarmed by small amounts of wear in the neoprene.

MAINTENANCE

Bearings — Most units will be equipped with permanently lubricated inboard bearings. These bearings should require no maintenance for the life of the equipment. If the ECW is equipped with external flanged bearings, lubricate annually with a petroleum based lubricant.

Drive Motor and Belt(s)— No maintenance is required.

Seals — No maintenance other than periodic adjustment.

Wheel — The wheel is designed to last the life of the equipment. It should be protected by a MERV 8 filter to keep dust and dirt from the heat transfer surface. The wheel is somewhat self cleaning through its normal action of rotating in and out of countercurrent air flow streams. If the wheel becomes dirty, it may be cleaned by blowing out the wheel with compressed air (20 psig maximum). In cases of severe contamination, the wheel may be washed with water following the procedures outlined below:

1. Turn off the unit and disconnect power.
2. Open the ECW access door and slide the cassette assembly out of the unit until the stop is reached.
3. With the wheel out, wash the media carefully with water. Once clean allow the media to dry. This may take several hours.

Re-install the ECW in the unit and close the access door. Operate the unit. It may take several hours for the dessicant to completely dry and for the wheel to return to normal operation, i.e., energy recovery.

Condenser Fan Motors and Head Pressure Control — The 62D unit may be equipped with head pressure (discharge pressure) control. This control may be one of the following dependent on unit configuration:

- Non Cycling - no head pressure control, uses 3 phase motor(s)
- Fan Cycling - based on discharge pressure, controlled by a discharge pressure switch, uses 3 phase motor(s)
- Vari-Speed - Variable Speed condenser fan control

SIZES 07 TO 20 — Use a single-phase condenser fan motor (OFM) with either a P66 or P266 controller.

P66 controller - last used on S/N 4210Vxxxxx — Condenser fan is off if discharge pressure is less than 380 psig. The condenser fan motor is at full speed if discharge pressure is greater than 430 psig. See Fig. 44.

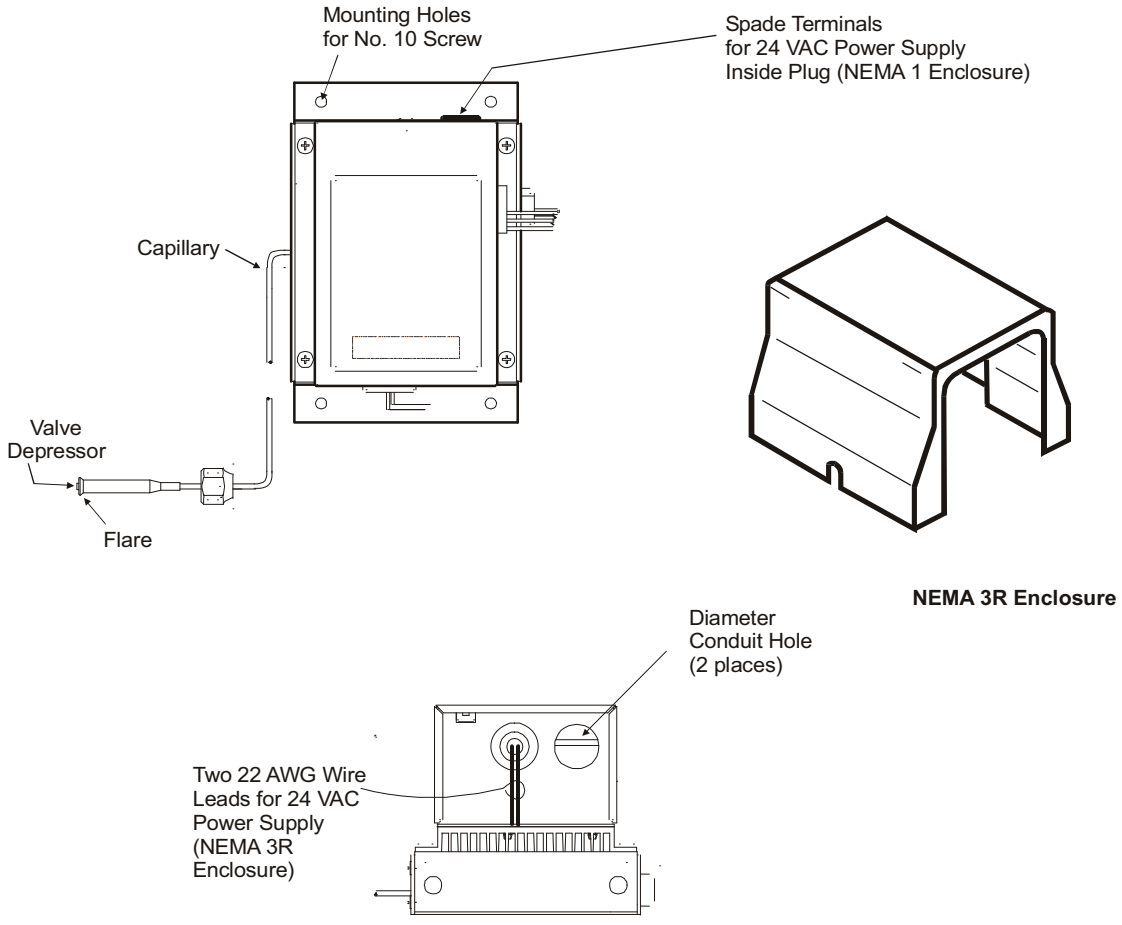


Fig. 44 — P66 Controller

Set-up and Adjustments - To adjust the operating range:

1. Apply a reliable pressure gauge to the controlled system to monitor the pressure adjustments.
2. Access the operating range adjustment screw through the opening in the top left corner of the P66. See Fig. 45.

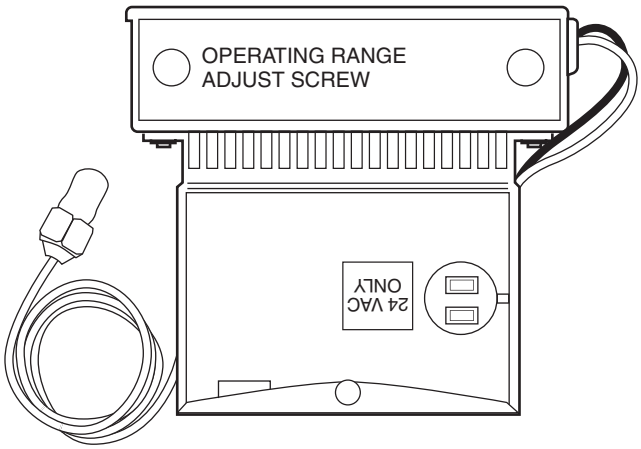


Fig. 45 — Operating Range Adjustment Screw Location

3. Turn the adjustment screw ½ turn or less clockwise to increase the operating range pressure or ½ turn or less to decrease the operating range pressure.

   NOTE: ½ turn = approximately 35 psig.

IMPORTANT: Do not adjust the operating range screw more than ½ turn without allowing the system pressure to stabilize. Check the system and repeat as necessary to obtain the desired operating range.

P266 controller - first used on S/N 4310Vxxxxx — Condenser fan is off if discharge pressure is less than 305 psig. The condenser fan motor is at full speed if discharge pressure is greater than 405 psig. See Fig. 46 and 47.

Replacing the P266 controller - It may be necessary to set-up the controller's Start pressure and End Pressure values. All other values should be left at the default value. See Fig. 48. To change settings and values on the P266 controller:

1. Position all the switches on the DIP block to the OFF position.
2. Position the following numbered switches to the ON position: 128, 16, 4, and 2. (Value = 150). See Table 26 for LED flash values.

Press and hold the push button until the LED flashes 3 times to save the Start pressure value.

Position all the switches on the DIP block to the OFF position.

Position the following numbered switches to the ON position: 128, 64, and 8. (Value = 200)

Press and hold the push button until the LED flashes 4 times to save the End pressure value.

SIZE 22 TO 38 — Use three-phase condenser fan motors (OFM). If equipped with variable-speed head pressure control, the condenser fan VFD speed will be controlled by a discharge pressure transducer (0 to 500 psig, 2 to 10 VDC pressure transducer). The motor speed is controlled by an AC Tech VFD. Condenser fan is off if discharge pressure is less than 310 psig. The condenser fan motor is at full speed if discharge pressure is greater than 410 psig. Refer to Condenser Head Pressure Control using AC Tech VFD info in Appendix A. Refer to Appendix D for general information on the AC Tech VFD.

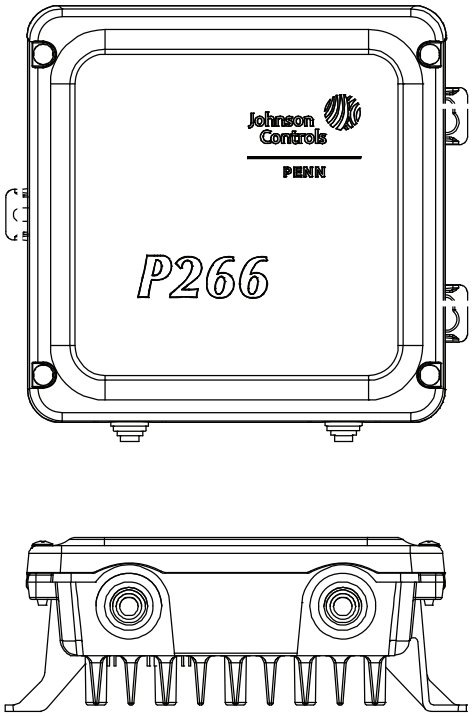


Fig. 46 — P266 Controller

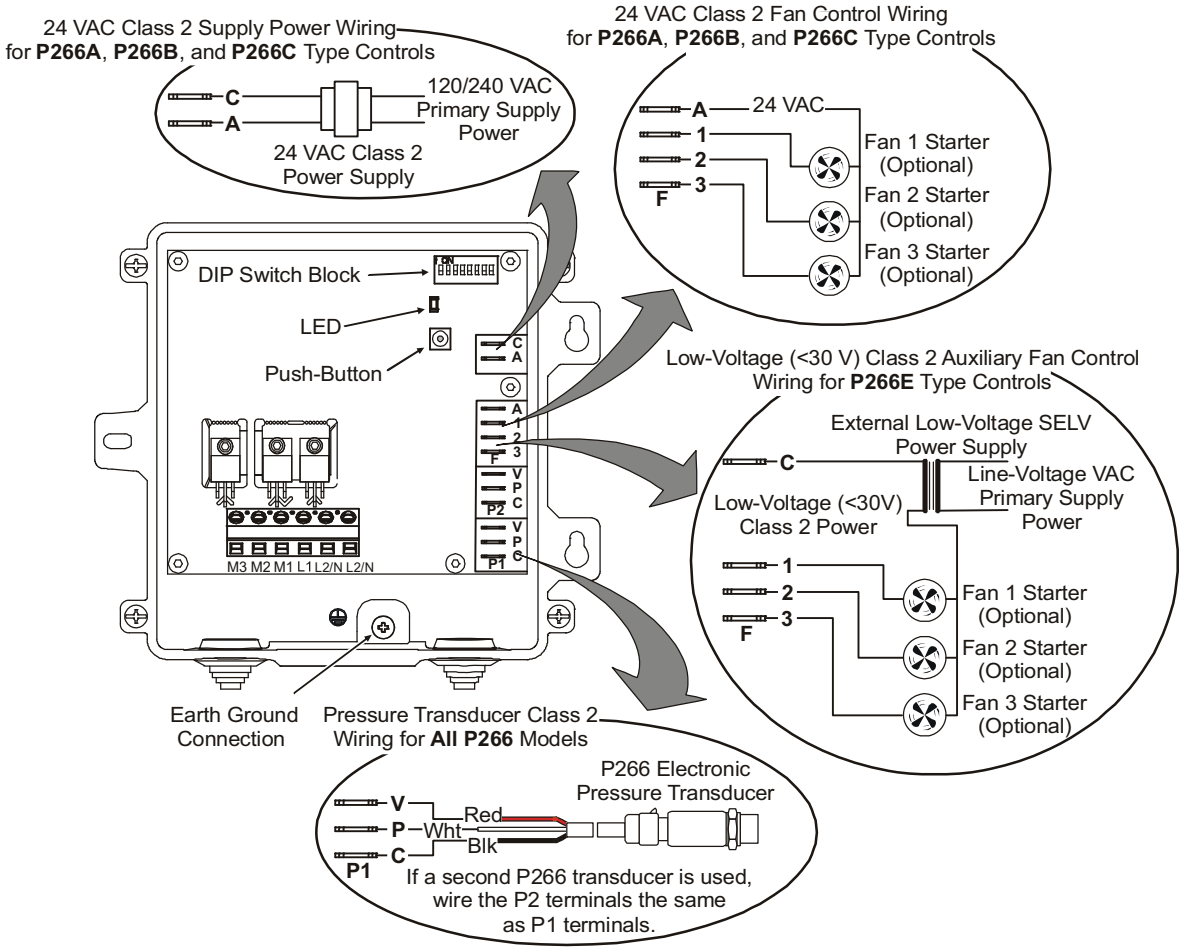


Fig. 47 — P266 Replacement

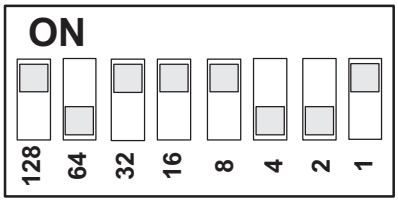
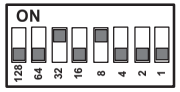
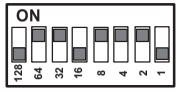
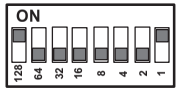
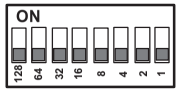
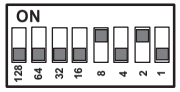
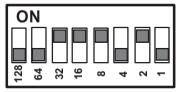


Fig. 48 — DIP Block to OFF position

Table 26 — R266 LED Flash Sequence

RELEASE PUSH BUTTON AFTER...	VALUE/MODE NAME (BINARY SWITCH NUMBER)	VALUE RANGE/MODE SETTINGS (EXAMPLE DEFAULT SETTINGS)	SWITCH NUMBER AND POSITION DESCRIPTION OF VALUE/SETTING	DIP SWITCH BLOCK EXAMPLE DEFAULT SETTINGS
Two Flashes	**Low Speed Mode** (Switch 128)	Settings: ON or Off (Default Setting: **Off**)	Switch 128 Off = No voltage to motor when sensed pressure is below start pressure. Switch 128 ON = Start voltage to motor when sensed pressure is at or below start pressure.	
	Start Voltage Value (Switches 1 to 64)	Value Range: 10 to 90 (Default Value: **40**)	Position Switches 1 to 64 ON or Off so that the sum of the switches set to ON equals the Start Voltage Value.	
Three Flashes	**Start Pressure Value** (Switches 1 to 128)	Value Range: 10 to 230 (Default Value: **110**)	Position Switches 1 to 128 ON or Off so that the sum of the switches set to ON equals the Start Pressure Value.	
Four Flashes	**End Pressure Value** (Switches 1 to 128)	Value Range: [Start Pressure + 8] to 240 (Default Value: **129**)	Position the Switches 1 to 128 ON or Off so that the sum of the switches set to ON equals the End Pressure Value.	
Five Flashes (Switches 64 and 128 Off)	**Split Winding Mode** (Switch 32)	Settings: ON or Off (Default Setting: **Off**)	Switch 32 ON = M2 Triac enabled to power split windings. Switch 32 Off = M2 Triac is disabled.	
	End Voltage Mode (Switch 16)	Settings: ON or Off (Default Setting: **Off**)	Switch 16 ON = Provides 95% of P266 input voltage to motor. Switch 16 Off = Provides 97% of P266 input voltage to motor.	
	Digital Scroll Compressor Algorithm (Switch 8)	Settings: ON or Off (Default Setting: **Off**)	Switch 8 ON = Digital Scroll algorithm enabled. Switch 8 Off = Digital Scroll algorithm disabled.	
	Low Speed Capacitor Mode (Switch 4)	Settings: ON or Off (Default Setting: **Off**)	Switch 4 ON = Low-speed capacitor is available. Switch 4 Off = Low-speed capacitor is not available.	
	Number of Auxiliary Fan Stages (Switches 1 and 2)	Settings: ON or Off (Default Setting: **Off - Off**)	Position switches 1-Off and 2-Off for no auxiliary fans. Position switches 1-On and 2-Off for auxiliary fan 1. Position switches 1-Off and 2-On for auxiliary fans 1 and 2. Position switches 1-On and 2-On for auxiliary fan 1, 2, and 3.	
Six Flashes (Switch 128 Off)	**Auxiliary Fan Overlap** (Switches 1 to 64)	Value Range: 1 to 90 (Default Value: **10**)	Position Switches 1 to 64 ON or Off so that the sum of the switches set to ON equals the Auxiliary Fan Overlap Value.	
Seven Flashes (Switch 128 Off)	**Changeover Voltage Value** (Switch 1 to 64)	Value Range: 10 to 80 (Default Value: **60**)	Position Switches 1 to 64 ON or Off so that the sum of the switches set to ON equals the Changeover Voltage value.	

→ **VFD —** An AC Tech (Lenze) VFD may be used to control the speed of various motors:

1. If the supply fan if equipped with a VFD, the supply fan VFD speed will be controlled by a duct pressure sensor (DPT 260 low pressure transducer, see Fig. 49.) The modulation is controlled by a reverse acting PID module (0 to 10 vdc). When the controller receives a signal (UI-06) from the differential pressure transmitter the PID module sends a command signal to modulate the supply fan speed to maintain the supply fan ESP setpoint. See Appendix B.

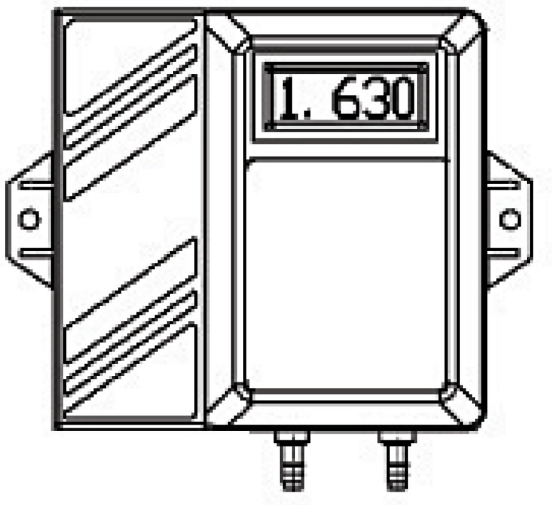


Fig. 49 — DPT260 Press Sensor

2. If the power exhaust fan is equipped with a VFD, the power exhaust fan VFD speed will be controlled by a building pressure transducer (DPT 260 low pressure transducer) and the ECW if equipped with VFD Temperature Defrost. The modulation is controlled by a reverse acting PID module (0 to 10 vdc). When the controller receives a signal (UI-09) from the differential pressure transmitter the PID module sends a command signal to modulate the exhaust fan speed to maintain the exhaust fan ESP setpoint. See Appendix C.

For general information on the AC TECH VFD, refer to Appendix D. The VFD password is "225."

Refrigerant Charge — Amount of refrigerant charge is listed on unit nameplate. Refer to Carrier GTAC II; Module 5; Charging, Recovery, Recycling, and Reclamation section for changing methods and procedures.

Unit panels must be in place when unit is operating during changing procedure.

NOTE: Do not use recycled refrigerant as it may contain contaminants.

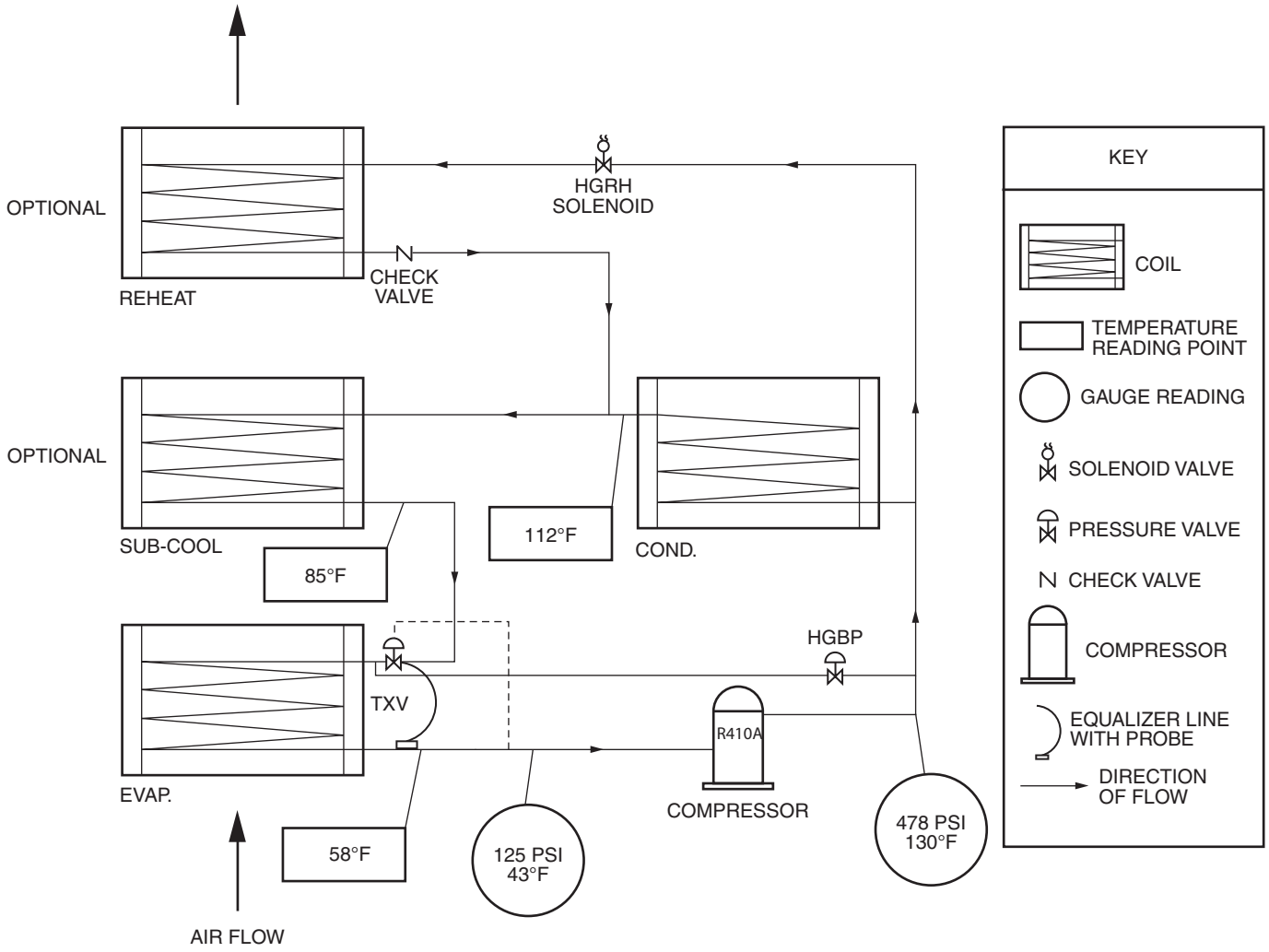
NO CHARGE — Use standard evacuating techniques. After evacuating system, weigh in the specified amount of refrigerant from the unit nameplate.

Adjusting the Charge — Connect the gage set and a temperature measuring device to the liquid line. Ensure that all condenser fans are operating. It may be necessary to block part of the coil on cold days to ensure that condensing pressures are high enough to turn on the fans. Adjust the refrigerant charge in each circuit to obtain the desired ubcooling as detailed in Table 27. See Fig. 50 and 51.

NOTE: Unit may be equipped with an optional sub cooling coil indoor air cfm must be within the normal operating range for the unit.

Table 27 — Refrigerant Charge Adjustment

	AMBIENT AIR TEMP.					
	95 F	85 F	75 F	65 F	55 F	45 F
SUBCOOL CONDENSER	16 - 18 F	18 - 20 F	20 - 22 F	22 - 24 F	24 - 26 F	26 - 28 F
SUPERHEAT	15 - 18 F	13 - 16 F	11 - 14 F	10 - 13 F	8 - 12 F	8 - 10 F
SUBCOOL COIL	40 F	45 F	50 F	55 F	60 F	65 F



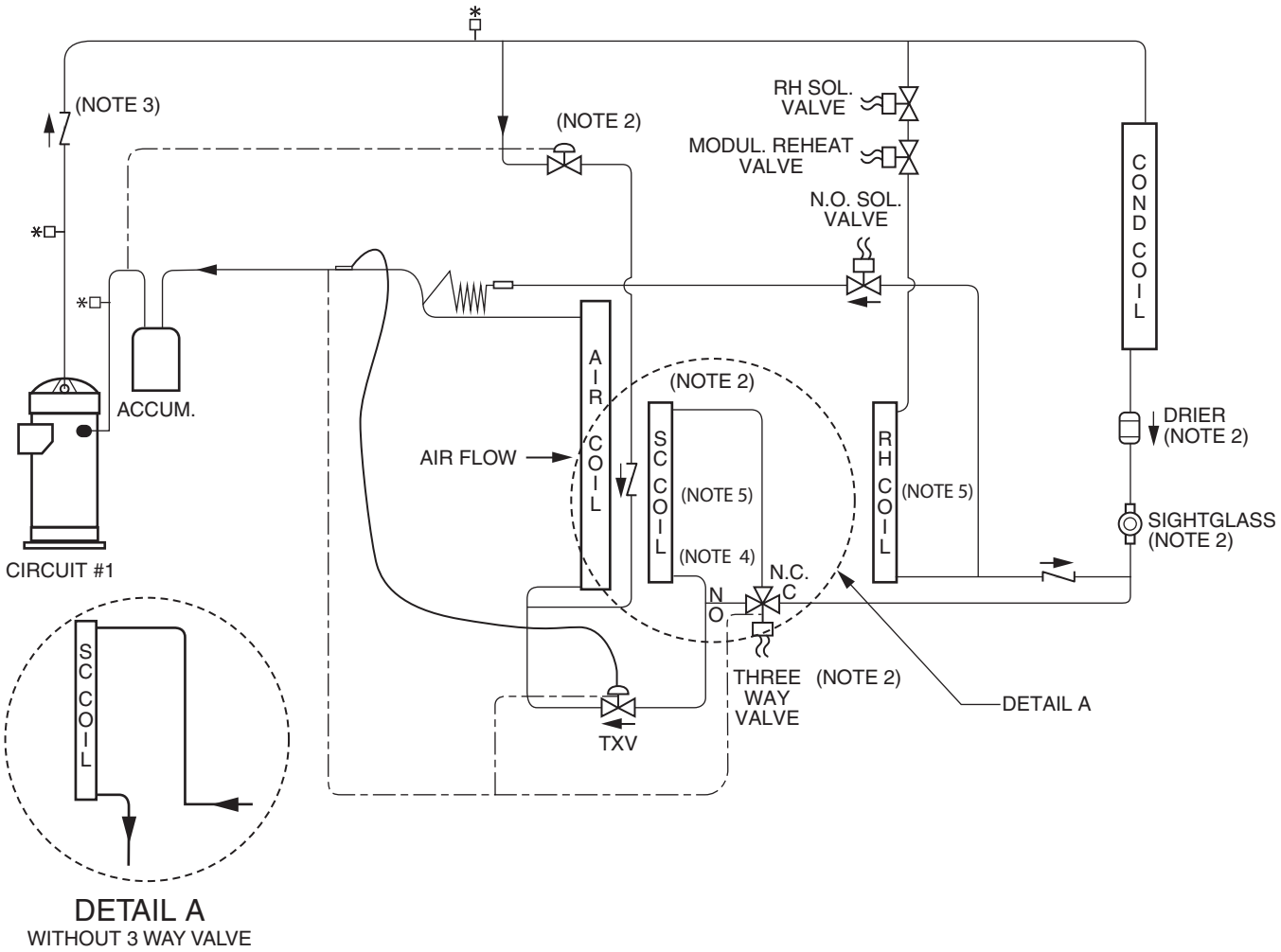
EXAMPLE 1

Superheat at Evaporator Coil	Sub-Cooling at Consender Coil	Sub-Cooling at Sub-Cooling Coil (When Applicable)
58°F	130°F	130°F
– 43°F	– 112°F	– 85°F
15°F	18°F	45°F

LEGEND

HGBP— Hot Gas Bypass
TXV— Thermostatically Controlled Expansion Valve

Fig. 50 — Adjusting the Charge



LEGEND

*— Indicates pressure taps
— - — Indicates equalizing line
RH— Reheat
SOL— Solenoid
TXV— Thermostatically Controlled Expansion Valve

NOTES:

1. Locate TXV bulb at either 7 o'clock or 5 o'clock, if applicable.
2. Optional.
3. Reheat plus on circuit No. 1 unless otherwise specified.
4. Three-way valve lables:
   C - Common or Discharge
   N.O. - Main condenser
   N.C. - Auxiliary condenser
5. Subcooling coil is to be installed on bottom side of air to refrigerate coil. Reheat on top or downstream of subcooling coil.

Fig. 51 — Typical Refrigeration Diagram

APPENDIX A — CONDENSER HEAD PRESSURE CONTROL

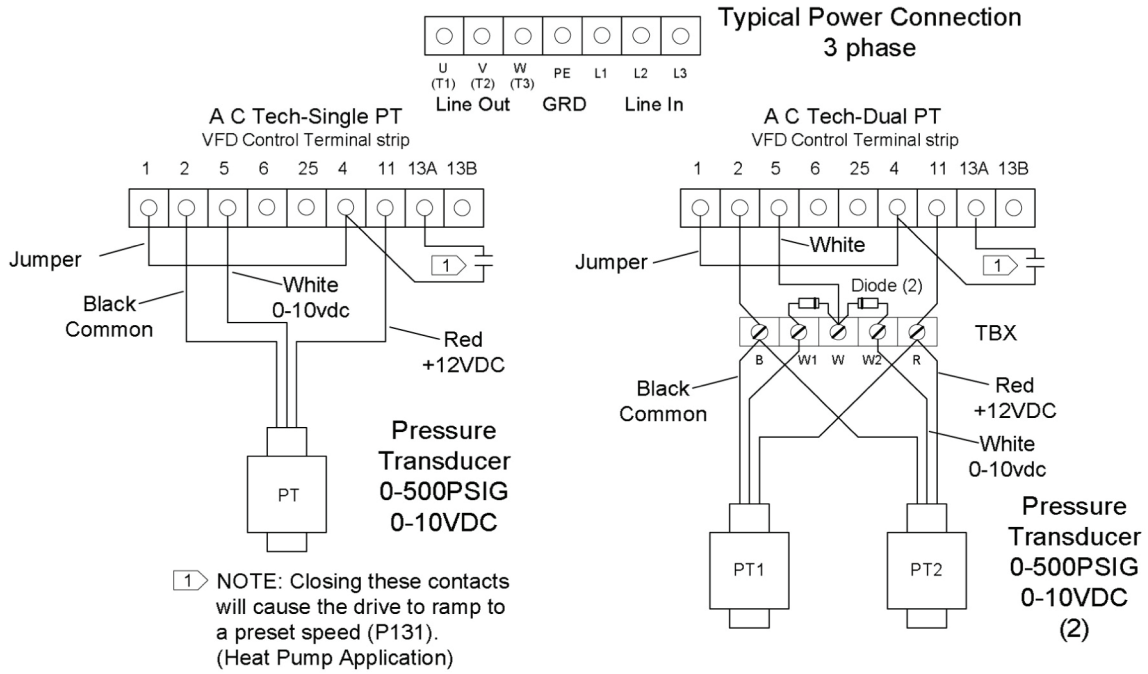
Condenser Head Pressure Control using an AC Tech VFD with Pressure Transducer

Up to 1 1/2 HP Condenser Fan Motor (3 Phase)

Equipment Needed

- AC Tech SMV Variable Frequency Drive-NEMA4x
- 208-230V Part No. 0841P-0288
- 460V Part No. 0841P-0289
- Pressure Transducer 0-500 PSIG, 0 to 10 vdc FS Addison Part No. 0844P-0157
- Rectifier Diode, 1N4004G-T Part No. 0843P-0581, 2 required for dual PT (Pressure Transducer)
- Terminal Board, Part No. 0825N-0005A, 1 required for dual PT (Pressure Transducer)

Wiring



NOTE: The drive will respond to the highest tranducer output.

AC Tech Password: 225

PARAMETER	DESCRIPTION	SINGLE PT R-410A	DUAL PT R-410A
P100	Terminal Strip	01	01
P101	0 to 10 vdc	01	01
P104	Acceleration Time	2	2
P110	Start On Power-Up	01	01
P121	Auto Reference: Preset	03	03
P131	Preset Speed (Hz)	60	60
P160	Speed at Minimum Signal	–186	–174
P161	Speed at Maximum Signal	114	126
P184	Minimum Speed	10	10

NOTE: At these settings the condenser fan will start at 98 F and run full speed at 118 F. R-410A pressures would be 310 and 410 PSIG.
* 0962I-4024 RevC Condenser Head Pressure Control with ramp and preset, Using AC Tech-SMV Drive 12-22-10 MW.

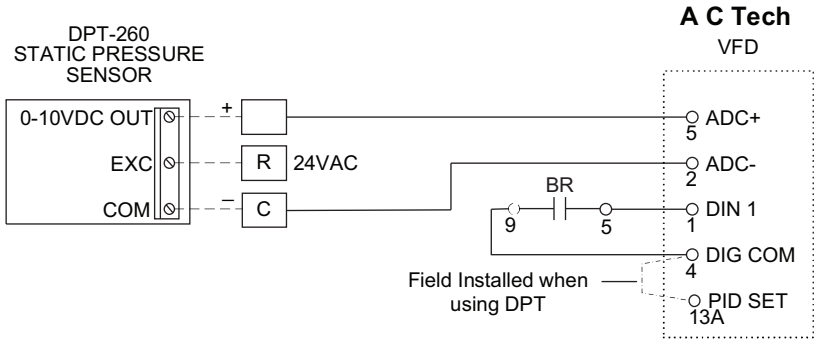
→ APPENDIX B — STATIC PRESSURE CONTROL USING SUPPLY FAN VFD

Control of Duct Static Pressure using an AC Tech Supply Fan VFD with PID feedback and Differential Pressure Transmitter

Equipment Needed

- AC Tech SMV Variable Frequency Drive
- DPT 260 Very Low Differential Pressure Transducer
  Addison Part # 0844P-0153 (0 to 10 in.wg)
  0844P-0154 (0 to 1 in. wg)

Wiring



Settings
DPT 260

1. Wire per above.
2. Select Pressure Range. (0 to 1, 0 to 2.5, 0 to 5.0 in. wg)
3. Select Directional mode. Unidirectional for supply and exhaust fan.
4. Select output (0 to10 vdc).
5. Push and hold button to zero the unit.

PARAMETER	DESCRIPTION	SETTING
P100	Terminal Strip	1
P101	0 to 10 vdc	1
P102	HZ	30
P110	Start On Power-Up	1

NOTE: In addition to setting the parameters described above, it will be necessary to “tune” the PID loop as follows:

1. Increase P207 (Proportional Gain) until the system becomes unstable, then decrease P207 by 10 to 15%.
2. Next, increase P208 (Integral Gain) until feedback matches set-point and hunting has stopped.

Tuning the PID loop will require trial, error and patience.

→ APPENDIX C — STATIC PRESSURE CONTROL USING EXHAUST FAN VFD

Control of Static Pressure using an AC Tech Exhaust Fan VFD with PID feedback and Differential Pressure Transmitter

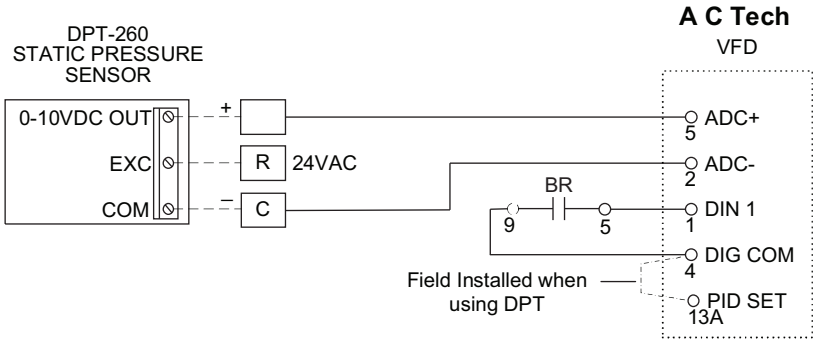
Equipment Needed

- AC Tech SMV Variable Frequency Drive
- DPT 260 Very Low Differential Pressure Transducer

  Addison Part # 0844P-0153 (0 to 10 in.wg)

  0844P-0154 (0 to 1 in. wg)

Wiring



Settings

DPT 260

1. Wire per above.
2. Select Pressure Range. (0 to 1, 0 to 2.5, 0 to 5.0 in. wg)
3. Select Directional mode. Unidirectional for supply and exhaust fan.
4. Select output (0 to10 vdc).
5. Push and hold button to zero the unit.

PARAMETER	DESCRIPTION	SETTING
P100	Terminal Strip	1
P101	0 to 10 vdc	1
P102	HZ	30
P110	Start On Power-Up	1
P111	Coast	0
P121	Auto Reference: Keypad	6
P200	Normal Acting	1
P201	0 to10 vdc (TB-5)	1
P202	Changes Position of Decimal Point.	2-4
P204	Feedback Signal Range (min)	0
P205	Feedback Range (max) (0 to 1, 0 to 2.5, 0 to 5.0 in. wg)	1

NOTE: In addition to setting the parameters described above, it will be necessary to “tune” the PID loop as follows:

1. Increase P207 (Proportional Gain) until the system becomes unstable, then decrease P207 by 10 to15%.
2. Next, increase P208 (Integral Gain) until feedback matches set-point and hunting has stopped.

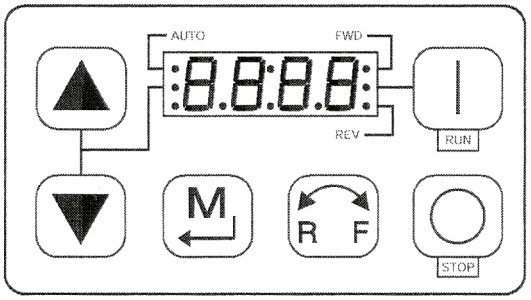
Tuning the PID loop will require trial, error and patience.

APPENDIX D — AC TECH (LENZE) VFD GENERAL INFORMATION

(See Appendices A, B and C for specific default values)

VFD Commissioning

LOCAL KEYPAD AND DISPLAY





START BUTTON:

In Local Mode (P100 = 0, 4), this button will start the drive.



STOP BUTTON: stops the drive, regardless of which mode the drive is in.

> **WARNING!**
> When JOG is active, the STOP button will not stop the drive!



ROTATION:

In Local Mode (P100 = 0, 4), this selects the motor rotation direction:

- The LED for the present rotation direction (FWD or REV) will be on
- Press R/F; the LED for the opposite rotation direction will blink
- Press M within 4 seconds to confirm the change
- The blinking direction LED will turn on, and the other LED will turn off

When rotation direction is changed while the drive is running, the commanded direction LED will blink until the drive is controlling the motor in the selected direction.



MODE:

Used to enter/exit the Parameter Menu when programming the drive and to enter a changed parameter value.





UP AND DOWN BUTTONS:

Used for programming and can also be used as a reference for speed, PID setpoint, or torque setpoint.

When the ▲ and ▼ buttons are the active reference, the middle LED on the left side of the display will be on.

INDICATING LEDs

FWD/REV LEDs: Indicate the present rotation direction. See ROTATION above.

AUTO LED: Indicates that the drive has been put into Auto mode from one of the TB13 inputs (P121...P123 set to 1...7).
Also indicates that PID mode is active (if enabled).

RUN LED: Indicates that the drive is running

▲ ▼ LED: Indicates that the ▲ ▼ are the active reference.

> **Note**
> If the keypad is selected as the auto reference (P121...P123 is 6) and the corresponding TB-13 input is closed, the AUTO LED and ▲ ▼ LEDs will both be on

Drive Display and Modes of Operation

SPEED MODE DISPLAY — In the standard mode of operation, the drive frequency output is set directly by the selected reference.

COMMISSIONING

Local Keypad and Display

START BUTTON — In Local Mode (P100 = 0, 4), this button will start the drive.

STOP BUTTON — Stops the drive, regardless of which mode the drive is in.

⚠ WARNING

When JOG is active, the STOP button will not stop the drive!

ROTATION — In Local Mode (P100 = 0, 4), this selects the motor rotation direction:

- The LED for the present rotation direction (FWD or REV) will be on
- Press R/F; the LED for the rotation direction will blink
- Press M within 4 seconds to confirm the change
- The blinking direction LED will turn on, and the other LED will turn off

When rotation direction is changed while the drive is running, the commanded direction LED will blink until the drive is controlling the motor in the selected direction.

MODE — Used to enter/exit the Parameter Menu when programming the drive and to enter a changed parameter value.

UP AND DOWN BUTTONS — Used for programming and can also be used as a reference for speed, PID set point or torque set point.

When the UP and DOWN buttons are the active reference, the middle LED on the left side of the display will be on.

INDICATING LEDs

- FWD/REV LEDs: indicate the rotation direction. See ROTATION above.
- AUTO LED: Indicates that the drive has been put into Auto mode from one of the T813 inputs (P121…P123 set to 1…7).
- Also indicates that PID mode is active (if enabled).
- RUN LED: Indicates that the drive is running.
- UP/DOWN LED: Indicates that the UP/DOWN buttons are the active reference.

NOTE: If the keypad is selected as the auto reference (P121…P123 is 6) and the corresponding TB-13 input is closed, the AUTO LED and UP/DOWN LEDs will both be on.

Drive Displays and Modes of Operation

SPEED MODE DISPLAY — In the standard mode of operation, the drive frequency output is set directly by the selected reference (keypad, analog reference, etc.). In this mode, the drive display will show the drive's output frequency.

PID MODE DISPLAY — When the PID mode is enabled and active, the normal run display shows the actual PID set point. When PID mode is not active, the display returns to showing the drive's output frequency.

TORQUE MODE DISPLAY — When the drive is operating in Vector Torque mode, the normal run display shows the drive's output frequency,

Parameter Setting

ELECTRONIC PROGRAMMING MODULE (EPM) — The EPM contains the drive's operational memory. Parameter settings are stored in the EPM and setting changes are made to the "User settings" in the EPM.

An optional EPM Programmer (model EEPM1RA) is available that allows:

- An EPM to be copied directly to another EPM.
- An EPM to be copied to the memory of the EPM Programmer.
- Stored files can be modified in the EPM Programmer.
- Stored files can be copied to another EPM.

As the EPM Programmer is battery operated, parameter settings can be copied to an EPM and inserted into a drive without power being applied to the drive. This means that the drive will be fully operational with the new settings on the next application of power.

Additionally, when the drive's parameter settings are burned into an EPM with the EPM Programmer, the settings are saved in two distinct locations: the "User settings" and the "OEM default settings." While the User settings can be modified in the drive, the OEM settings cannot. Thus, the drive can be reset not only to the "factory" drive default settings (shown in this manual), but can be set to the Original Machine settings as programmed by the OEM.

While the EPM can be removed for copying or to use in another drive, it must be installed for the drive to operate (a missing EPM will trigger an F_FI fault).

APPENDIX D — AC TECH (LENZE) VFD INFORMATION (cont)

Basic Setup Parameters

CODE		POSSIBLE SETTINGS		ADDITIONAL INFORMATION
No.	**Name**	**Default**	**Selection**	
P100	Start Control Source	0	0 Local Keypad	Use RUN button on front of drive to start
			1 Terminal Strip	Use start/stop circuit wired into the terminal strip.
			2 Remote Keypad Only	Use RUN button on optional remote keypad to start
			3 Network Only	· Start command must come from network (Modbus, CANopen, etc.) · Requires optional communication module (refer to the network module documentation) · Must also set one of the TB-13 inputs to 9 (Network Enable); see P121... P123
			4 Terminal Strip or Local Keypad	Allows start control to be switched between terminal strip and local keypad using one of the TB-13 inputs. See note below.
			5 Terminal Strip or Remote Keypad	Allows start control to be switched between terminal strip and optional remote keypad using one of the TB-13 inputs. See note below.
P101	Standard Reference Source	0	0 Keypad (Local or Remote)	Selects the default or torque reference when no Auto Reference is selected using the TB-13 inputs
			1 0-10 VDC	
			2 4-20 mA	
			3 Preset #1	
			4 Preset #2	
			5 Preset #3	
			6 Network	
P102	Minimum Frequency	0.0	0.0 (Hz) P103	· P012, P103 are active for all speed references · When using an analog speed reference, also see P160, P161
P103	Maximum Frequency	60.0	7.5 (Hz) 500	
WARNING! Consult motor/machine manufacturer before operating above rated frequency. Overspeeding the motor/machine may cause damage to equipment and to personnel!				
P104	Acceleration Time 1	20.0	0.0 (s) 3600	· P104 = time of frequency change from 0 Hz to P167 (base frequency) · P105 = time of frequency change from P167 to 0 Hz · For S-ramp accel/decel, adjust P106
P105	Deceleration Time 1	20.0	0.0 (s) 3600	
Example: If P103 = 120 Hz, P104 = 20.0 s and P167 (base frequency) = 60 Hz; the rate of frequency change from 0 Hz to 120 Hz = 40.0 s				
P106	S-Ramp Integration Time	0.0	0.0 (s) 50.0	· P106 = 0.0: Linear accel/decel ramp · P106 > 0.0: Adjusts S-ramp curve for smoother ramp
P107*	Line Voltage	1*	0 Low (120, 200, 400, 480 VAC) 1 High (120, 240, 480, 600 VAC)	* The default setting is 1 for all drives except when using “reset 50” (Parameter P199, selection 4) with 480 V models. In this case, the default setting is 0.
P108	Motor Overload	100	30 (%) 100	P108 = motor current rating / SMV output rating x 100 Example: if motor = 3 amps and SMV = 4 amps, then P108 = 75%
P109	Motor Overload Type	0	0 Speed Compensation 1 No Speed Compensation	

* Any changes to this parameter will not take effect until the drive is stopped.

NOTES:

1. P100 WARNING: P100 = 0 disables TB-1 as a STOP input! STOP circuitry may be disabled if parameters are reset back to defaults (see P199).
   P100 = 4,5: To switch between control sources, one of the TB-13 inputs (P121…P123) must be set to 08 (Control Select);
   TB-13x OPEN (or not configured): Terminal strip control
   TB-13x CLOSED: local (P100 = 4) or Remote (P100 = 5) keypad
   P100 = 0,1,4: Network can take control if P121…P123 = 9 and the corresponding TB-13x input is CLOSED.
   The STOP button on the front of the drive is always active except in JOG mode.
   An F_RL fault will occur if the Assertion Level switch (ALsw) position does not match the P120 and P100 is set to a value other than 0.
2. P103: P103 cannot be set below Minimum Frequency (P102)
   To set P103 above 120 Hz:
   - Scroll up to 120 Hz, display shows H Fr (flashing)
   - Release s button and wait one second
   - Press s button again to continue increasing P103
3. P108: Do not set above rated motor current as listed on the motor dataplate. The motor thermal overload function of the SMV is UL approved as a motor protection device. If the line power is cycled, the motor thermal state is reset to cold state. Cycling power after an overload fault could result in significantly reducing motor life.

APPENDIX D — AC TECH (LENZE) VFD INFORMATION (cont)

Basic Setup Parameters (cont)

CODE		POSSIBLE SETTINGS		ADDITIONAL INFORMATION
No.	**Name**	**Default**	**Selection**	
P110	Start Method	0	0 Normal	
			1 Start on Power-up	Drive will automatically start when power is applied.
			2 Start with DC Brake	When start command is applied, drive will apply DC braking according to P174, P175 prior to starting the motor.
			3 Auto Restart	Drive will automatically restart after faults, or when power is applied.
			4 Auto Restart with DC Brake	Combine settings 2 and 3
			5 Flying Start/Restart #1	· Drive will automatically restart after faults, or when power is applied. · After 3 failed attempts, drive will Auto Restart with DC brake. · P110 = 5: performs speed search, starting at Max Frequency (P103) · P110 = 6: Performs speed search, starting at the last output frequency prior to faulting or power loss. · If P111 = 0, a flying START is performed when a start command is applied.
			6 Flying Start/Restart #2	
WARNING: Automatic starting/restarting may cause damage to equipment and/or injury to personnel! Automatic starting/restarting should only be used on equipment that is inaccessible to personnel.				
P111	Stop Method	0	0 Coast	Drive's output will shut off immediately upon a stop command, allowing the motor to coast to a stop.
			1 Coast with DC Brake	The drive's output will shut off and then the DC Brake will activate (see P174, P175).
			2 Ramp	The drive will ramp the motor to a stop according to P105 or P126.
			3 Ramp with DC Brake	The drive will ramp the motor to 0 Hz and then the DC Brake will activate (see P174, P175).
P112	Rotation	0	0 Forward Only	If PID mode is enabled, reverse direction is disabled (except for Jog).
			1 Forward and Reverse	

NOTE:
P110: P110 = 0, 2: Start command must be applied at least 2 seconds after power-up; F_UF fault will occur if start command is applied too soon.
P110 = 1, 3...6: For automatic start/restart, the start source must be the terminal strip and the start command must be present.
P110 = 2, 4...6: If P175 = 999.9 dc braking will be applied for 15 s.
P110 = 3...6: Drive will attempt 5 restarts, if all restart attempts fail, drive displays LC (fault lockout) and requires manual reset.
P110 = 5,6: If drive cannot catch the spinning motor, drive will trip to F_rF fault.

APPENDIX D — AC TECH (LENZE) VFD INFORMATION (cont)

I/O Setup Parameters

CODE		POSSIBLE SETTINGS		ADDITIONAL INFORMATION
No.	**Name**	**Default**	**Selection**	
P120	Assertion Level	2	1 Low 2 High	P120 and the Assertion Level Switch must both match the desired assertion level unless P100, P121...P123 are all set to 0. Otherwise, an F.AL fault will occur.
P121 **P122** **P123**	TB-13A Input Function TB-13B Input Function TB-13C Input Function	0	0 None	Disables input
			1 AUTO Reference: 0-10 VDC	For frequency mode see P160...P161, For PID mode, see P204...P205, For vector torque mode, see P330.
			2 AUTO Reference: 4-20 mA	For frequency mode see P131...P137, For PID mode, see P231...P233, For vector torque mode, see P331...P333.
			3 AUTO Reference: Preset	
			4 AUTO Reference: MOP Up 5 AUTO Reference: MOP Down	· Normally open: Close input to increase or decrease speed, PID set point or torque set point. · MOP Up is not active while in STOP.
			6 AUTO Reference: Keypad	
			7 AUTO Reference: Network	
			8 Control Select	Use when P100 = 4, 5 to switch between terminal strip control and local or remote keypad control.
			9 Network Enable	Required to start the drive through the network.
			10 Reverse Rotation	Open = Forward Closed = Reverse
			11 Start Forward 12 Start Reverse	See note for typical circuit.
			13 Run Forward 14 Run Reverse	See note for typical circuit.
			15 Jog Forward	Jog Forward speed = P134
			16 Jog Reverse	Jog Reverse speed = P135 Active even if P112 = 0
			17 Accel/Decel #2	See P125, P126
			18 DC Brake	See P174; close input to override P175
			19 Auxiliary Ramp to Stop	Normally closed; Opening input will ramp the drive to STOP according to P127, even if P111 is set to Coast (0 or 1).
			20 Clear fault	Close to reset fault.
			21 External Fault F_EF	Normally closed circuit; open to trip.
			22 Inverse External Fault F_EF	Normally open circuit; close to trip.
WARNING! Jog overrides all STOP commands! To stop the drive while in Jog mode, the Jog input must be deactivated or a fault condition induced.				
P125	Acceleration Time 2	20.0	0.0 (s) 3600	· Selected using TB13A...TB13C (P121... P123 = 17) · For S-ramp acel/decel, adjust P106
P126	Deceleration Time 2	20.0	0.0 (s) 3600	
P127	Deceleration Time for Auxiliary Ramp to Stop	20.0	0.0 (s) 3600	· Selected using TB13A...TB13C (P121... P123 = 19) · For S-ramp acel/decel, adjust P106 · Once executed, this ramp time has priority over P105 and P126)

NOTE:
P121-123: When input is activated, settings 1...7 override P101
When TB-13A... TB-13C are configured for Auto References other than MOP, TB-13C overrides TB-13B, and TB-13B overrides TB-13A. Any other Auto Reference will have priority over MOP.
Settings 10... 14 are only valid in Terminal mode (P100 = 1,4,5)
If Start/Run/Jog Forward and Start/Run/Jog Reverse are both activated, drive will STOP.
If Jog input is activated while the drive is running, the drive will enter Jog mode; when Jog input is deactivated, drive will STOP.
An F_AL fault will occur if the Assertion Level switch (ALsw) position does not match the P120 setting and any of the digital inputs (P121...P123) are set to a value other than 0.
An F_IL fault will occur under the following conditions:
- TB-13A... TB-13C settings are duplicated (each setting, except 0 and 3, can only be used once)
- One input is set to “MOP Up” and another is not set to “MOP Down,” or vice-versa.
- One input is set to 10 and another is set to 11...14.
- One input is set to 11 or 12 and another is set for 13 or 14.
Typical control circuits are shown below:
- If any input is set to 10, 12 or 14, P112 must be set to 1 for reverse action to function.

APPENDIX D — AC TECH (LENZE) VFD INFORMATION (cont)

I/O Setup Parameters (cont)

CODE		POSSIBLE SETTINGS		ADDITIONAL INFORMATION
No.	**Name**	**Default**	**Selection**	
P131	Preset Speed #1	0.0	0.0 (Hz) 500	
P132	Preset Speed #2	0.0	0.0 (Hz) 500	
P133	Preset Speed #3	0.0	0.0 (Hz) 500	
P134	Preset Speed #4	0.0	0.0 (Hz) 500	
P135	Preset Speed #5	0.0	0.0 (Hz) 500	
P136	Preset Speed #6	0.0	0.0 (Hz) 500	
P137	Preset Speed #7	0.0	0.0 (Hz) 500	
P140	Relay Output TB-16, 17	0	0 None	Disables the output
			1 Run	Energizes when the drive is running
			2 Reverse	Energizes when reverse rotation is active
			3 Fault	De-energizes when the drive trips, or power is removed
			4 Inverse Fault	Energizes when the drive trips
			5 Fault Lockout	P110 = 3... 6: De-energizes if all restart attempts fail
			6 At Speed	Energizes when output frequency = commanded frequency
			7 Above Preset #6	Energizes when output freq. > P136
			8 Current Limit	Energizes when motor current = P171
			9 Follower loss (4-20 mA)	Energizes when 4-20 mA signal falls below 2 mA
			10 Loss of Load	Energizes when motor load drops below P145; see also P146
			11 Local Keypad control Active	Energizes when the selected source is active for start control
			12 Terminal Strip Control Active	
			13 Remote Keypad Control Active	
			14 Network Control Active	
			15 Standard Reference Active	Energizes when P101 reference is active
			16 Auto Reference Active	Energizes when Auto Reference is activated using TB-13 input; see P121... P123
			17 Sleep Mode Active	See P240... P242
			18 PID Feedback < Min. Alarm	Energizes when PID feedback signal < P214
			19 Inverse PID Feedback < Min. Alarm	De-energizes when PID feedback signal < P214
			20 PID Feedback> Max Alarm	Energizes when PID feedback signal > P215
			21 Inverse PID Feedback> Max Alarm	De-energizes when PID feedback signal > P215
			22 PID Feedback within Min/Max Alarm range	Energizes when PID feedback signal is within the Min/Max Alarm range; see P214, P215
			23 PID Feedback outside Min/Max Alarm range	Energizes when PID feedback signal is outside the Min/Max Alarm range; see P214, P215
			24 Reserved	
			25 Network Activated	Requires optional communication module (refer to the network module documentation)
P142	TB-14 Output	0	0...23 (same as P140)	
			24 Dynamic Braking	For use with Dynamic Braking option
			25 Network Activated	Requires optional communication module (refer to the network module documentation)
P145	Loss of Load Threshold	0	0 (%) 200	P140, P142 = 10: Output will energize if motor load falls below P145 value longer than P146 time
P146	Loss of Load Delay	0.0	0.0 (s) 240.0	
P150	TB-30 Output	0	0 None	2-10 VDC signal can be converted to 4-20 mA with a total circuit impedance of 500 ohms
			1 0-10 VDC Output Frequency	
			2 2-10 VDC Output Frequency	
			3 0-10 VDC Load	
			4 2-10 VDC Load	
			5 0-10 VDC Torque	
			6 2-10 VDC Torque	
			7 0-10 VDC Power (kW)	
			8 2-10 VDC Power (kW)	
			9 Network Controlled	Requires optional communication module (refer to the network module documentation)
P152	TB-30 Scaling: Frequency	60.0	3.0 (Hz) 2000	If P150 = 1 or 2, sets the frequency at which output equals 10 VDC
P153	TB-30 Scaling: Load	200	10 (%) 500	If P150 = 3 or 4, sets the Load (as a percent of drive current rating) at which output equals 10 VDC

INPUT FUNCTION			
PRESET SPEED	**13A**	**13B**	**13C**
1	X	—	—
2	—	X	—
3	—	—	X
4	X	X	—
5	X	—	X
6	—	X	X
7	X	X	X

APPENDIX D — AC TECH (LENZE) VFD INFORMATION (cont)
Advanced Setup Parameters

CODE		POSSIBLE SETTINGS		ADDITIONAL INFORMATION
No.	**Name**	**Default**	**Selection**	
P154	TB-30 Scaling: Torque	100	10 (%) 1000	If P150 = 5 or 6, sets the Torque (as a percent of motor rated torque) at which output equals 10 VDC
P155	TB-30 Scaling: Power (kW)	1.0	0.1 (kW) 200.0	If P150 = 7 or 8, sets the power at which output equals 10 VDC
P160	Speed at Minimum Signal	0.0	-999.0 (Hz) 1000	
P161	Speed at Maximum Signal	60.0	-999.0 (Hz) 1000	
P162	Analog Input Filter	0.01	0.00 (s) 10.00	Adjusts the filter on the analog inputs (TB-5 and TB-25) to reduce the effect of signal noise.
P163	TB-25 Loss Action	0	0 No Action 1 Fault F_FoL 2 Go to Preset when TB-25 is: Speed reference: P137 PID feedback source: P137 PID set point reference: P233 Torque reference: P333	· Selects the reaction to a loss of the 4-20 mA at TB-25. · Signal is considered lost if it falls below 2 mA · Digital outputs can also indicate a loss of 4-20 mA signal; see P140, P142
P166	Carrier Frequency	See Notes	0 4 kHz 1 6 kHz 2 8 kHz 3 10 kHz	· As carrier frequency is increased, motor noise is decreased · Automatic shift to 4 kHz at 120% load · NEMA 4X (IP65) Models: Default = 0 (4 kHz) · NEMA 1 (IP31) Models: Default = 1 (6 kHz)
P167*	Base Frequency	60.0	10.0 (Hz) 1500	
P168	Fixed Boost		0.0 (%) 30.0	
P169	Accel Boost	0.0	0.0 (%) 20.0	Accel Boost is only active during acceleration
P170	Slip Compensation	0.0	0.0 (%) 10.0	Increase P170 until the motor speed no longer changes between no load and full load conditions
P171*	Current Limit	200	30 (%) $CLim_{max}$	· When the limit is reached, the drive displays CL, and either the acceleration time increases or the output frequency decreases. · Digital outputs can also indicate when the limit is reached; see P140, P142. · Refer to section 2.2 for $CLim_{max}$
P174	DC Brake Voltage	0.0	0.0 (%) 30.0	Setting is a percent of the nominal DC bus voltage.
P175	DC Brake Time	0.0	0.0 (s) 999.9	
P178	Display Frequency Multiplier	0.00	0.00 650.00	· Allows frequency display to be scaled · P178 = 0.00: Scaling disabled · P178 > 0.00: = Actual Frequency X P178
	Example: If P178 = 29.17 and actual frequency = 60 Hz, then Drive displays 1750 (rpm)			
P179	Run Screen Display	0	0 (Parameter Number) 599	· 0 = Normal Run Screen, this display depends on mode of operation. · Other selections choose a diagnostic parameter to display (P501...P599)

* Any changes to this parameter will not take effect until the drive is stopped.

NOTES:

1. P161: P160 sets the output frequency at 0% analog input
   P161 sets the output frequency at 100% analog input
   P160 or P161 < 0.0 Hz: For scaling purposes only; does not indicate opposite direction!
   P160 > P161: Drive will react inversely to analog input signal
2. P168: P167 = rated motor frequency for standard applications
   P168 = default setting depends on drive rating
3. P175: CONFIRM MOTOR SUITABILITY FOR USE WITH DC BRAK!NG
   DC Brake voltage (P174) is applied for the time specified by P175 with the following exceptions:
   if P111 = 1, 3 and P175 = 999.9 the brake voltage will be applied continuously until a run or fault condition occurs.
   if P110 = 2, 4... 6 and P175 = 999.9 the brake voltage will be applied for 15 s
   if P121...P123 = 18 and the corresponding TB-13 input is CLOSED, brake voltage will be applied until the TB-13 input is OPENED or a fault condition occurs.

APPENDIX D — AC TECH (LENZE) VFD INFORMATION (cont)
Advanced Setup Parameters (cont)

CODE		POSSIBLE SETTINGS		ADDITIONAL INFORMATION
No.	**Name**	**Default**	**Selection**	
P181	Skip frequency 1	0.0	0.0 (Hz) 500	Drive will not run in the defined range; used to skip over frequencies that cause mechanical vibration. P181 and P182 define the start of the skip ranges. P184 > 0 defines the bandwidth of both ranges.
P182	Skip frequency 2	0.0	0.0 (Hz) 500	
P184	Skip frequency bandwidth	0.0	0.0 (Hz) 10.0	
P194	Password	225	0000 9999	Must enter password to access parameters P194 = 0000: Disables password
P197	Clear Fault History	0	0 No Action	
			1 Clear Fault History	
P199	Program Selection		0 Operate from User settings	
			1 Operate from OEM settings	See Notes 1, 2 and 3
			2 Reset to OEM default settings	See Note 1
			3 Reset to 60 Hz default settings	· See Note 4 · Parameters are reset to the defaults listed in this manual. · For P199 = 4, the following exceptions apply: - P103, P161, P167 = 50.0 Hz - P304 = 50 Hz: - P305 = 1450 RPM - P107 = 0 (480 V drives only)
			4 Reset to 50 Hz default settings	
			5 Translate	See Note 5
	WARNING! Modification of P199 can affect drive functionality! STOP and EXTERNAL FAULT circuitry may be disabled! Check P100 and PI21... P123			

NOTES:
1. P184: Bandwidth (Hz) = fs (Hz) + P184 (Hz) fs = P181 or P182
   Example: P181 = 18 Hz and P184 = 4 Hz; skip range is from 18 to 22 Hz
2. P199:If the EPM does not contain valid OEM settings, a flashing CF will be displayed when P199 is set to 1 or 2.

   When P199 is set to 1, the drive operates from the OEM settings stored in the EPM Module and no other parameters can be changed (CE will be displayed if attempted).

   Auto Calibration is not possible when operating from OEM Settings.

   Reset 60 and Reset 50 will set the Assertion Level (P120) to “2” (High). P120 may need to be reset for the digital input devices being used. An F_FL fault may occur if P120 and the Assertion switch are not set identically.

   If an EPM that contains data from a previous compatible software version is installed:
   - The drive will operate according to the previous data, but parameters cannot be changed (cE will be displayed if attempted).
   - To update the EPM to the current software version, set P199 = 5. The parameters can now be changed but the EPM is incompatible with previous software revisions.

APPENDIX D — AC TECH (LENZE) VFD INFORMATION (cont)

PID Parameters

CODE		POSSIBLE SETTINGS		ADDITIONAL INFORMATION
No.	**Name**	**Default**	**Selection**	
P200	PID Mode	0	0 Disabled 1 Normal-acting 2 Reverse-acting	· Normal-acting: As feedback increases, motor speed decreases · Reverse-acting: As feedback increases, motor speed increases · PID mode is disabled in Vector Torque mode (P300 = 5)
P201	PID Feedback Source	0	0 4-20 mA (TB-25)	Must be set to match the PID feedback signal.
P202	PID Decimal Point	1	0 PID Display = XXXX 1 PID Display = XXX.X 2 PID Display = XX.XX 3 PID Display = X.XXX 4 PID Display = .XXXX	Applies to P204, P205, P214, P215, P231...P233, P242, P522, P523
P204	Feedback at Minimum Signal	0.0	-99.9 3100.0	Set to match the range of the feedback signal being used Example: Feedback signal is 0 - 300 PSI: P204 = 0.0, P205 = 300.0
P205	Feedback at Maximum Signal	100.0	-99.9 3100.0	
P207	Proportional Gain	5.0	0.0 (%) 100.0	Used to tune the PID loop: · Increase P207 until system becomes unstable, then decrease P207 by 10-15% · Next, increase P208 until feedback matches set point · If required, increase P209 to compensate for sudden changes in feedback
P208	Integral Gain	0.0	0.0 (s) 20.0	
P209	Derivative Gain	0.0	0.0 (s) 20.0	
P210	PID Setpoint Ramp	20.0	0.0 (s) 100.0	· Time of set point change from P204 to P205 or vice versa. · Used to smooth the transition from one PID set point to another, such as when using the Preset PID set points (P231... P233)
P214	Minimum Alarm	0.0	P204 P205	Use with P140, P142 = 18...23
P215	Maximum Alarm	0.0	P204 P205	
P231	Preset PID Setpoint #1	0.0	P204 P205	TB-13A activated; P121 = 3 and P200 = 1 or 2
P232	Preset PID Setpoint #2	0.0	P204 P205	TB-13B activated; P122 = 3 and P200 = 1 or 2
P233	Preset PID Setpoint #3	0.0	P204 P205	TB-13C activated; P123 = 3 and P200 = 1 or 2
P240	Sleep Threshold	0.0	0.0 (Hz) 500.0	· If drive speed < P240 for longer than P241, output frequency = 0.0 Hz; drive display = SLP · P240 = 0.0: Sleep mode is disabled. · P200 = 0... 2: Drive will start again when speed command is above P240. · P242 > 0.0: Drive will restart when the PID feedback differs from the set point by more than the value of P242 or when the PID loop a speed above P240.
P241	Sleep Delay	30.0	0.0 (s) 300.0	
P242	Sleep Bandwidth	0.0	0.0 B_{max} Where: B_{max} = I(P205 - P204)I	

NOTES:

1. P200: To activate PID mode, one of the TB-13 inputs (P121...P123) must be used to select the Auto Reference that matches the desired PID set point reference. If the selected PID set point reference uses the same analog signal as the PID feedback (P201), an F_IL fault will occur.
   EXAMPLE: The desired PID set point reference is the keypad (up and down arrow keys). Set TB-13x = 6 (Auto Reference: Keypad):
   - TB-13x = closed: PID mode is active.
   - TB-13x = open: PID mode is disabled and the drive speed will be controlled by the reference selected in P101.
2. P209: Derivative Gain is very sensitive to noise on the feedback signal and must be used with care.
   Derivative Gain is not normally required in pump and fan applications.

APPENDIX D — AC TECH (LENZE) VFD INFORMATION (cont)

Vector Parameters

CODE		POSSIBLE SETTINGS		ADDITIONAL INFORMATION
No.	**Name**	**Default**	**Selection**	
P300*	Drive Mode	0	0 Constant V/Hz	Constant torque V/Hz control for general applications
			1 Variable V/Hz	Variable torque V/Hz control for centrifugal pump and fan applications
			2 Enhanced Constant V/Hz	For single or multiple motor applications that require better performance than settings 0 or 1, but cannot use Vector mode, due to: · Missing required motor data · Vector mode causing unstable motor operation
			3 Enhanced Variable V/Hz	
			4 Vector Speed	For single-motor applications requiring higher starting torque and speed regulation
			5 Vector Torque	For single-motor applications requiring torque control independent of speed
P302*	Motor Rated Voltage		0 (V) 600	· Default setting = drive rating · Set to motor nameplate data
P303*	Motor Rated Current		0.0 (A) 500.0	
P304*	Motor Rated Frequency	60	0 (Hz) 1000	Set to motor nameplate data
P305*	Motor Rated Speed	1750	300 (RPM) 65000	
P306*	Motor Cosine Phi	0.80	0.40 0.99	
P310*	Motor Stator Resistance	0.00	0.00 (ohms) 64.00	· Will be automatically programmed by p399 · Changing these settings can adversely affect performance. Contact factory technical support prior to charging.
P311*	Motor Stator Inductance	0.0	0.0 (mH) 2000	
P330	Torque Limit	100	0 (%) 400	When P300 = 5, sets the maximum output torque.
P331	Preset Torque Setpoint #1	100	0 (%) 400	TB-13A activated; P121 = 3 and P300 = 5
P332	Preset Torque Setpoint #2	100	0 (%) 400	TB-13B activated; P122 = 3 and P300 = 5
P333	Preset Torque Setpoint #3	100	0 (%) 400	TB-13C activated; P123 = 3 and P300 = 5
P340*	Current Loop P Gain	0.25	0.0 16.0	Changing these settings can adversely affect performance. Contact factory technical support prior to changing.
P341*	Current Loop I Gain	65	12 (ms) 9990	
P342*	Speed Loop Adjustment	0.0	0.0 (%) 20.0	
P399	Motor Automation	0	0 Calibration Not Done	· If P300 = 2...5, motor calibration must be performed, but motor data must be programmed first. · An alternating CRL / Err will occur if: - motor calibration is attempted with P300 = 0 or 1 - motor calibration is attempted before programming motor data
			1 Calibration Enabled	
			2 Calibration Complete	

* Any changes to this parameter will not take effect until the drive is stopped.

NOTES:

1. P300: To configure the drive for either Vector mode or Enhanced V/Hz mode;
   P300 = 4,5:
   - Set P302... P306 according to motor nameplate
   - Set P399 = 1
   - Make sure motor is cold (20 - 25 C) and apply a Start command
   - Display will indicate CRL for about 40 seconds
   - Once the calibration is complete, the display will indicate StoP; apply another Start command to actually start the motor.
   - If an attempt is made to start the drive in Vector or Enhanced V/Hz mode before performing the Motor Calibration, the drive will display F_n Id and will not operate.

   P300 = 2, 3: Same as above but only need to set P302... P304
2. P306: If motor cosine phi is not known, use one of the following formulas:
   cos phi = motor Watts I (motor efficiency X P302 X P303 X 1.732)
   cos phi = cos [sin (magnetizing current I motor current)]
3. To run the Auto Calibration P399:
   - Set P302 .... P306 according to motor nameplate.
   - Set P399 = 1
   - Make sure motor is cold (20 - 25 C)
   - Apply a Start command.
   - Display will indicate CAL for about 40 seconds.
   - Once the calibration is complete, the display will indicate StoP; apply another Start command to actually start the motor.
   - Parameter P399 will now be set to 2.

APPENDIX D — AC TECH (LENZE) VFD INFORMATION (cont)

Network Parameters

CODE		POSSIBLE SETTINGS		ADDITIONAL INFORMATION
No.	Name	Default	Selection	
P400	Network Protocol		0 Not Active	This parameter will only display the selection for the module that is installed.
			1 Remote Keypad	
			2 Modbus RTU	
			3 CANopen	
			4 DeviceNet	
			5 Ethernet	
			6 Profibus	
P401...P499		Module Specific Parameters		Refer to the Reference Guide specific to the module installed.

Diagnostic Parameters

CODE		DISPLAY RANGE (Read Only)	ADDITIONAL INFORMATION
No.	Name		
P500	Fault History		· Displays the last 8 faults · Format: n.xxx where: n = 1…8; 1 is the newest fault xxx = fault message
P501	Software version		Format: x.yz
P502	Drive ID		A flashing display indicates that the Drive ID stored in the EPM does not match the drive model it is plugged into.
P503	Internal Code		Alternating xxx-; -yy
P505	DC Bus Voltage	0 (VDC) 1500	
P506	Motor Voltage	0 (VAC) 1000	
P507	Load	0 (%) 255	Motor load as % of drive's output current rating.
P508	Motor Current	0.0 (A) 1000	Actual motor current
P509	Torque	0 (%) 500	Torque as % of motor rated torque (vector mode only)
P510	kW	0.00 (kW) 650.0	
P511	kWh	0.0 (kWh) 9999999	Alternating display: xxx-; yyyy when value exceeds 9999
P512	Heatsink Temp	0 (C) 150	Heatsink temperature
P520	0-10 VDC Input	0.0 (VDC) 10.0	Actual value of signal at TB-5
P521	4-20 mA Input	0.0 (mA) 20.0	Actual value of signal at TB-25
P522	TB-5 Feedback	P204 P025	TB-5 signal value scaled to PID feedback units
P523	TB-25 Feedback	P204 P025	TB-25 signal value scaled to PID feedback units
P525	Analog Output	0 (VDC) 10.0	See P150…P155
P527	Actual Output Frequency	0 (Hz) 500.0	
P528	Network Speed Command	0 (Hz) 500.0	Command speed if (Auto: Network) is selected as the speed source
P530	Terminal and Protection Status		Indicates terminal status using segments of the LED display.
P531	Keypad Status		Indicates keypad button status using segments of the LED display.
P540	Total Run Time	0 (h) 9999999	Alternating display: xxx-; yyyy when value exceeds 9999
P541	Total Power On Time	0 (h) 9999999	

Terminal and Protection Status Display — Parameter P530 allows monitoring of the control terminal points and common drive conditions:

An illuminated LED segment indicates:

- the protective circuit is active (LED 1)
- the Logic Assertion Switch is set to High (+)
- input terminal is asserted (LED 2)
- output terminal is energized (LED 4)
- the Charge Relay is not a terminal, this segment will be illuminated when the Charge Relay is energized (LED 4).

Keypad Status Display — Parameter P531 allows monitoring of the keypad push buttons:

An illuminated LED segment indicates when the button is depressed.

TROUBLESHOOTING AND DIAGNOSTICS

Status/Warning Messages

STATUS/WARNING		CAUSE	REMEDY
br	DC-injection brake active	DC-injection brake activated: · activation of digital input (P121...P123 = 18) · automatically (P110 = 2, 4...6) · automatically (P111 = 1, 3)	Deactivate DC-injection brake: · deactivate digital input · automatically after P175 time has expired
bF	Drive ID warning	The Drive ID (P502) stored on the EPM does not match the drive model.	· Verify motor data (P302…P306) and perform Auto Calibration · Set drive mode (P300) to 0 or 1 · Reset the drive (P199 to 3 or 4) and reprogram
CAL	Motor Auto-calibration is being performed	See P300, P399	
cE	An EPM that contains valid data from a previous software version has been installed	An attempt was made to change parameter settings	Parameter settings can only be changed after the EPM data is converted to the current version (P199 = 5)
CL	Current Limit (P171) reached	Motor overload	· Increase P171 · Verify drive/motor are proper size for application
dEC	Decel Override	The drive has stopped decelerating to avoid tripping into an HF fault, due to excessive motor regen (2 sec max)	If drive trips into HF fault: · Increase P105, P126 · Install Dynamic Braking option
Err	Error	Invalid data was entered, or an invalid command was attempted	
FCL	Fast Current Limit	Overload	Verify drive/motor are proper size for application
FSt	Flying Restart Attempt after Fault	P110 = 5, 6	
GE	OEM Setting operation warning	An attempt was made to change parameter settings while the drive is operating in OEM Settings mode (P199 = 1)	In OEM Settings mode, making changes to parameters is not permitted.
GF	OEM Defaults data warning	An attempt was made to use (or reset to) the OEM default settings (P199 = 1 or 2) using an EPM without valid OEM data.	Install an EPM containing valid OEM defaults data.
LC	Fault Lockout	The drive attempted 5 restarts after a fault but all attempts were unsuccessful (P110 = 3...6).	· Drive requires manual reset. · Check fault history (P500) and correct fault condition.
PdEC	PID Deceleration Status	PID setpoint has finished its ramp but the drive is still decelerating to a stop.	
PId	PID Mode Active	Drive has been put into PID Mode. See P200.	
SLP	Sleep Mode is active	See P240...P242	
SP	Start Pending	The drive has tripped into a fault and will automatically restart (P110 = 3...6).	To disable Auto-Restart, set P110 = 0...2
SPd	PID Mode disabled	Drive has been taken out of PID Mode. See P200.	
StoP	Output frequency = 0 Hz (outputs U, V, W inhibited)	Stop has been commanded from the keypad, terminal strip, or network.	Apply Start command (Start Control source depends on P100)

Drive Configuration Messages — When the Mode button is pressed and held, the drive's display will provide a 4-digit code that indicates how the drive is configured. If the drive is in a Stop state when this is done, the display will also indicate which control source commanded the drive to Stop (the two displays will alternate every second).

Configuration Display

Format = x_y_zz

x = Control Source:

L = Local Keypad

t = Terminal Strip

r = Remote Keypad

n = Network

y = Mode:

S = Speed mode

P = PID mode

t = Vector Torque mode

zz = Reference:

CP = Keypad up/down

EU = 0-10 VDC (TB-5)

EI = 4-20 rnA (TB-25)

JG = Jog

nt = Network

OP = MOP

P1__P7 = Preset 1...7

Example:

- L_S_CP = Local Keypad Start control, Speed mode, Keypad speed reference
- t_P EU = Terminal Strip Start control, PID mode, 0-10 VDC set point reference
- n_t_P2 = Network Start control, Vector Torque mode, Preset Torque #2 reference

Stop Source Display

Format = x_StP

L_StP = Stop command came from Local Keypad

t_Stp = Stop command came from Terminal Strip

r_StP = Stop command came from Remote Keypad

n_Stp = Stop command came from Network

Fault Messages — The messages below show how they will appear on the display when the drive trips. When looking at the Fault History (P500), the 'F' will not appear in the fault message.

APPENDIX D — AC TECH (LENZE) VFD INFORMATION (cont)
Fault Messages

FAULT		CAUSE	REMEDY*
F_AF	High Temperature fault	Drive is too hot inside	· Reduce drive load. · Improve cooling.
F_AL	Assertion Level fault	· Assertion Level switch is changed during operation. · P120 is changed during operation. · P100 or P121...P123 are set to a value other than 0 and P120 does not match the Assertion Level Switch.	Make sure the Assertion Level switch and P120 are both set for the type of input devices being used, prior to setting P100 or P121...P123. See 3.2.3 and P120.
F_bF	Personality fault	Drive Hardware	· Cycle Power. · Power down and install EPM with valid data. · Reset the drive back to defaults (P199 = 3, 4) and then re-program. · If problem persists, contact factory technical support.
F_CF	Control fault	An EPM has been installed that is either blank or corrupted.	
F_cF	Incompatible EPM fault	An EPM has been installed that contains data from an incompatible parameter version.	
F_dbF	Dynamic Braking fault	Dynamic braking resistors are overheating	· Increase active decel time (P105, P126, P127). · Check mains voltage and P107.
F_EF	External fault	· P121...P123 = 21 and that digital input has been opened. · P121...P123 = 22 and that digital input has been closed.	· Correct the external fault condition. · Make sure digital input is set properly for NC or NO circuit.
F_F1	EPM fault	EPM missing or defective.	Power down and replace EPM.
F_F2 ... F_F12	Internal faults		Contact factory technical support.
F_Fnr	Invalid message received	· A network message was received while in Remote Keypad mode. · A remote keypad message was received while in Network mode.	Only the remote keypad or the network can be connected at one time; see P100.
F_FoL	Loss of 4-20 mA signal fault	4-20 mA signal (at TB-25) is below 2 mA (P163 = 1).	Check signal/signal wire
F_GF	OEM Defaults data fault	Drive is powered up with P199 = 1 and OEM settings in the EPM are not valid.	Install an EPM containing valid OEM Defaults data or change P199 to 0.
F_HF	High DC Bus Voltage fault	Mains voltage is too high	Check mains voltage and P107.
		Decel time is too short, or too much regen from motor.	Increase active decel time (P105, P126, P127) or install Dynamic Braking option.
F_IL	Digital Input Configuration fault (P121...P123)	More than one digital input set for the same function.	Each setting can only be used once (except settings 0 and 3).
		Only one digital input configured for MOP function (Up, Down).	One input must be set to MOP Up; another must be set to MOP Down.
		PID mode is entered with set point reference and feedback source set to the same analog signal.	Change PID setpoint reference (P121...P123) or feedback source (P201).
		One of the digital inputs (P121...P123) set to 10 and another is set to 11...14	Reconfigure digital inputs.
		One of the digital inputs (P121...P123) set to 11 or 12 and another is set to 13 or 14.	
		PID enabled in Vector Torque mode (P200 = 1 or 2 and P300 = 5).	PID cannot be used In Vector Torque mode
F_JF	Remote keypad fault	Remote keypad disconnected	Check remote keypad connections.
F_LF	Low DC Bus Voltage fault	Mains voltage too low.	Check mains voltage.
F_nId	No Motor ID fault	An attempt was made to start the drive in Vector or Enhanced V/Hz mode prior to performing the Motor Auto-calibration.	See P300...P399 for Drive Mode setup and calibration.
F_ntF	Module communication fault	Communication failure between drive and Network Module.	Check module connections.
F_nF1 ... F_nF9	Network Faults	Refer to the module documentation for Causes and Remedies.	
F_OF	Output fault: Transistor fault	Output short circuit	Check motor/motor cable.
		Acceleration time too short	Increase P104, P105.
		Severe motor overload, due to: · Mechanical problem · Drive/motor too small for application	· Check machine/system. · Verify drive/motor are proper size for application.
		Boost values too high.	Decrease P168, P169.
		Excessive capacitive charging current of the motor cable	· Use shorter motor cables with lower charging current. · Use low capacitance motor cables. · Install reactor between motor and drive.
		Failed output transistor	Contact factory technical support.
F_OFl	Output fault: Ground fault	Grounded motor phase	Check motor and motor cable.
		Excessive capacitive charging current of the motor cable	Use shorter motor cables with lower charging current.

* The drive can only be restarted if the error message has been reset.

APPENDIX D — AC TECH (LENZE) VFD INFORMATION (cont)

Fault Messages (cont)

FAULT		CAUSE	REMEDY*
F_PF	Motor Overload fault	Excessive motor load for too long.	· Verify proper setting of P108. · Verify drive and motor are proper size for application.
F_rF	Flying Restart fault	Controller was unable to synchronize with the motor during restart attempt; (P110 = 5 or 6)	Check motor/load.
F_SF	Single-Phase fault	A mains phase has been lost	Check mains voltage.
F_UF	Start fault	Start command was present when power was applied (P110 = 0 or 2).	· Must wait at least 2 seconds after power-up to apply Start command. · Consider alternate starting method (see P110).

* The drive can only be restarted if the error message has been reset.

POINT NAME	DESCRIPTION	NAME	TYPE:ID	READ ONLY	OBJECT TYPE	REGISTER	TYPE	ID	SNVT#	SNV	DIRECTION
CODE OF ALARMS	ALARM : SEE ALARM CODE TO Identify	ca_1	AV:164	?	float value	40005	data float	3	2	SNVT_count (8)	Output (non-polled)
ALARM SOUND ACTIVATION	Alarm Sound Activation Command.	galarm_1	BV:12	?	discrete in	10008	binary in	8	42	SNVT_alarm (88)	Output (non-polled)
UNIT OPERATION FROM BAS	Building Automation System Control.	enable_bas_1	BV:1		discrete out	1	binary out	1	39	SNVT_count_inc (9)	Input (polling)
CO2	CO2 Sensor.	co2_1	AV:3	?	float value	40001	data float	1	24	SNVT_ppm (29)	Output (non-polled)
CO2 SP	CO2 Set Pt.	co2_sp_1	AV:4		float value	40003	data float	2	30	SNVT_ppm (29)	Input (polling)
COMP 1 CMD	Compressor 1 Start Command.	comp_1_cmd_1	BV:14	?	discrete in	10001	binary in	1	44	SNVT_count_inc (9)	Output (non-polled)
COMP 2 CMD	Compressor 2 Start Command.	comp_2_cmd_1	BV:15	?	discrete in	10002	binary in	2	45	SNVT_count_inc (9)	Output (non-polled)
DAMPER MIN OPEN	Damper Minimum % Open.	da_min_1	AV:256		float value	40015	data float	8	13	SNVT_lev_percent (81)	Input (polling)
DIGITAL COMP CTRL	Digital Compressor Ctrl (DCC).	mcc_1	AV:174	?	float value	40017	data float	9	3	SNVT_lev_percent (81)	Output (non-polled)
CODENSER VALVE CTRL	Discharge Valve Control.	mdc_1	AV:39	?	float value	40007	data float	4	29	SNVT_lev_percent (81)	Output (non-polled)
ECONOMIZER CTRL	Economizer Ctrl (ECON).	econ_value_1	AV:257	?	float value	40019	data float	10	14	SNVT_lev_percent (81)	Output (non-polled)
OD / EF / WM / WD CMD	Exhaust Fan, Whell, Outside Damper Command.	exh__wheel_1	BV:114	?	discrete in	10003	binary in	3	41	SNVT_count_inc (9)	Output (non-polled)
HEATING 1 CMD	Heat 1 Start Command.	htg_1_command_1	BV:132	?	discrete in	10004	binary in	4	43	SNVT_count_inc (9)	Output (non-polled)
HEATING 2 CMD	Heat 2 Start Command.	htg_2_command_1	BV:17	?	discrete in	10005	binary in	5	46	SNVT_count_inc (9)	Output (non-polled)
HTG CTRL	Heat Ctrl (Gas Furnace or Electric Heat) Modulating	htg_valve_stat_1	AV:18	?	float value	40021	data float	11	6	SNVT_lev_percent (81)	Output (non-polled)
HGRH CTRL	Hot Gas Re Heat Ctrl in base of Leaving A. Temp Mod ulating.	mrc_1	AV:21	?	float value	40025	data float	13	8	SNVT_lev_percent (81)	Output (non-polled)
REHEAT CMD	Hot Gas Reheat Solenoid Valve Relay Command (RHR).	reheat_cmd_1	BV:18	?	discrete in	10006	binary in	6	47	SNVT_count_inc (9)	Output (non-polled)
LAT HTG 2 SP	Leaving A. Temp. 2 Stage Htg. Set Pt. in Occupied.	la_hsp2_1	AV:29		float value	40031	data float	16	23	SNVT_temp_p (105)	Input (polling)
LAT CLG OCC SP	Leaving A. Temp. Clg Set Pt. in Occupied.	latclgsp_1	AV:218		float value	40033	data float	17	9	SNVT_temp_p (105)	Input (polling)
LAT CLG UNOCC SP	Leaving A. Temp. Clg Set Pt. in Unoccupied.	latclgspu_1	AV:224		float value	40035	data float	18	10	SNVT_temp_p (105)	Input (polling)
LAT HGRH SP	Leaving A. Temp. Reheat Set Pt. in Occupied.	lathgrh_1	AV:241		float value	40037	data float	19	11	SNVT_temp_p (105)	Input (polling)
LEAVING AIR TEMP	Leaving A. Temp. Sensor	slat_1	AV:30	?	float value	40039	data float	20	25	SNVT_temp_p (105)	Output (non-polled)
CONDITION	Mode of Operation of the Unit on time.	cond_1	AV:5	?	float value	40009	data float	5	33	SNVT_count (8)	Output (non-polled)
NIGHT SET BACK ENABLE	Night Set Back Activation.	nsben_1	BV:45		discrete out	2	binary out	2	49	SNVT_count_inc (9)	Input (polling)
OA ENTPY CLG SP	Outside A. Enthalpy Clg Set Pt.	oaecsp_1	AV:277		float value	40047	data float	24	20	SNVT_enthalpy (153)	Input (polling)
OA ENTPY HTG SP	Outside A. Enthalpy Htg Set Pt.	oaehsp_1	AV:278		float value	40049	data float	25	21	SNVT_enthalpy (153)	Input (polling)
OA ENTPY	Outside A. Enthalpy Value.	oa_entpy_1	AV:276	?	float value	40041	data float	21	19	SNVT_enthalpy (153)	Output (non-polled)
OUTSIDE AIR RELATIVE HTY	Outside A. Relative Humidity Sensor	oah_1	AV:41	?	float value	40053	data float	27	31	SNVT_lev_percent (81)	Output (non-polled)
OUTSIDE AIR TEMP	Outside A. Temp. Sensor.	soat_1	AV:42	?	float value	40055	data float	28	32	SNVT_temp_p (105)	Output (non-polled)
OA CLG 1 SP	Outside A. Temp.1 Stage Clg. Set Pt.	oa_sp1_1	AV:34		float value	40043	data float	22	26	SNVT_temp_p (105)	Input (polling)
OA HTG 1 SP	Outside A. Temp.1 Stage Htg. Set Pt.	oa_hsp1_1	AV:36		float value	40051	data float	26	28	SNVT_temp_p (105)	Input (polling)
OA CLG 2 SP	Outside A. Temp.2 Stage Clg. Set Pt.	oa_sp2_1	AV:35		float value	40045	data float	23	27	SNVT_temp_p (105)	Input (polling)
RA ENTPY	Room A. Enthalpy Value.	ra_entpy_1	AV:280	?	float value	40057	data float	29	22	SNVT_enthalpy (153)	Output (non-polled)
ROOM AIR RELATIVE HTY	Room A. Relative Humidity Sensor	rah_1	AV:53	?	float value	40059	data float	30	34	SNVT_lev_percent (81)	Output (non-polled)
ZONE AIR TEMP	Room A.Temp. Sensor.	space_tempera_1	AV:63	?	float value	40075	data float	38	38	SNVT_temp_p (105)	Output (non-polled)
HGRH RAH SP DC CTRL	Room Air Relative Humidity Reheat Set Pt. for DCC.	hgrhrah_sp_1	AV:176		float value	40027	data float	14	4	SNVT_lev_percent (81)	Input (polling)
HGRH RAH UNOCC SP	Room Air Relative Humidity Reheat Set Pt. in Unoccupied.	hgrhrahu_sp_1	AV:178		float value	40029	data float	15	5	SNVT_lev_percent (81)	Input (polling)
CLG 1 UNOCC SP	Room Air Temp 1 Stage Clg. Set Pt. in Unoccupied.	cusp_1	AV:6		float value	40011	data float	6	37	SNVT_temp_p (105)	Input (polling)
CLG 2 UNOCC SP	Room Air Temp 2 Stage Clg. Set Pt. in Unoccupied.	cusp2_1	AV:255		float value	40013	data float	7	12	SNVT_temp_p (105)	Input (polling)
RAT HTG 1 UNOCC SP	Room Air Temp Htg 1 Set Pt. in Unoccupied.	husp_1	AV:27		float value	40023	data float	12	15	SNVT_temp_p (105)	Input (polling)
RAT HTG 2 UNOCC SP	Room Air Temp Htg 2 Set Pt. in Unoccupied.	husp2_1	AV:258		float value	40079	data float	40	51	SNVT_temp_p (105)	Input (polling)
WARM UP HTG SP	Room Air Temp Warm-up Htg Set Pt. .	wuphsp_1	AV:281		float value	40081	data float	41	52	SNVT_temp_p (105)	Input (polling)
ROOM CTRL OVERRIDE SP	Room Ctrl Temp. Override(Reheat & Heat) Enable.	room_or_setpoint_1	AV:55		float value	40061	data float	31	35	SNVT_temp_p (105)	Input (polling)
ROOM CTRL OVERRIDE ENABLE	Room Ctrl Temp. Override(Reheat) Activation.	room_control_1	BV:30		discrete out	3	binary out	3	48	SNVT_count_inc (9)	Input (polling)
SOFTWARE CTRL SOURCE	Schedule control (Software Control Source, SCS)	ctrl_source_1	AV:15		float value	40067	data float	34	1	SNVT_count (8)	Input (polling)
SUCTION LINE TEMP	Suction Line Temp Sensor.	sr_1	AV:275	?	float value	40073	data float	37	18	SNVT_temp_p (105)	Output (non-polled)
SUCTION LINE TEMP Y1= OFF SP	Suction Line Temp. Set Pt. ctrl Comp. 1 (Y1).	slssp_1	AV:273		float value	40069	data float	35	16	SNVT_temp_p (105)	Input (polling)
SUCTION LINE TEMP DC=10 SP	Suction Line Temp. Set Pt. ctrl Comp.1 (Dig Scroll Y1 10%).	slssp1_1	AV:274		float value	40071	data float	36	17	SNVT_temp_p (105)	Input (polling)
SF DPT SP	Supply Fan Differential Presure Transducer (DPT) Set Pt.	supply_esp_1	AV:59		float value	40063	data float	32	36	SNVT_press_p (113)	Input (polling)
SF DPT	Supply Fan Differential Presure Transducer (DPT).	sf_pressure_value_1	AV:58	?	float value	40077	data float	39	50	SNVT_press_p (113)	Output (non-polled)
SF CMD	Supply Fan Relay Command (BR).	supply_fan_command_1	BV:11	?	discrete in	10007	binary in	7	40	SNVT_count_inc (9)	Output (non-polled)
SF VFD Ctrl	Supply Fan Variable Frecuency Drive (VFD).	sf_vfd_module_1	AV:197	?	float value	40065	data float	33	7	SNVT_freq_hz (76)	Output (non-polled)

APPENDIX F — I/O FLEX 6126 INTEGRATION GUIDE

WHAT IS THIS DOCUMENT ABOUT

This document will enable you to integrate the I/O Flex 6126 into the building automation (BAS) system, which is speaking one of the protocols listed below.

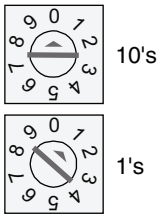
Assumption — The controller has been configured by the factory and is functioning correctly. The factory should supply the site integrator with an object listing, which enables the integrator to gather information from the controller.

CONFIGURING THE I/O FLEX 6126 FOR ARC156

1. Turn off the I/O Flex 6126's power.
2. Using the rotary switches, set the control module's address to match the address in the control module's device properties dialog box in Sitebuilder.

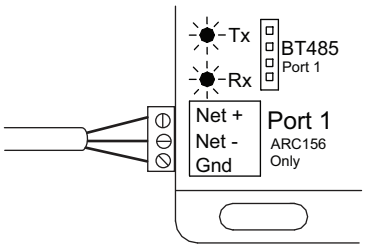
   Set the tens (10's) switch to the ten digit of the address, and set the ones (1's) switch to the ones digit.

   Example: If the control module's address is 01, point the arrow on the tens (10's) switch to 0 and the arrow on the ones (1's) switch to 1.



3. Connect the communications wiring to Port 1 in the screw terminal labeled Net +, Net -, and Gnd.

   NOTE: Use the same polarity throughout the network segment.



4. If the I/O Flex 6126 is at either end of a network segment, connect a BT485 to the I/O Flex 6126.
5. Turn on the I/O Flex 6126's power.
6. Set the correct network number to the unique BACnet ARC156 at the site.

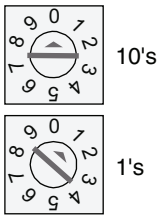
BACNET MS/TP

BACnet Master Slave/Token Passing or MS/TP is used for communicating BACnet over a sub-network of BACnet-only controllers. Each controller on the network has the ability to heat the broadcast of any other controller on the network. The speed of an MS/TP network ranges from 9600 baud to 76.8K baud.

CONFIGURING THE I/O FLEX 6126 FOR BACNET MS/TP

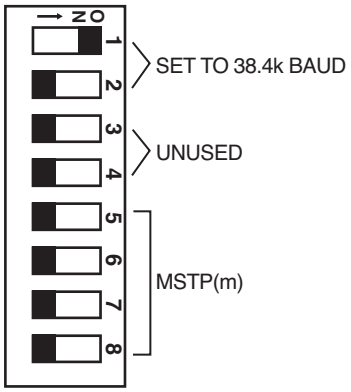
1. Turn off the I/O Flex 6126's power.
2. Using the rotary switches, set a unique address to match the address in the control module's device properties dialog box on SiteBuilder. Set the tens (10's) switch to the tens digit of the address, and set the ones (1's) switch to the ones digit.

   Example: If the control module's address is 01, point the arrow on the tens (10's) switch to 0 and the arrow on the ones (1's) switch to 1.



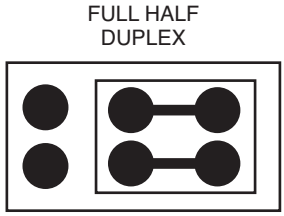
3. Set the Comm Selector DIP Switches SW1 and SW2 for the appropriate communications speed (9600, 19.2k, 38.4k, or 76.8k bps).

   NOTE: Use the same baud rate for all control modules on the network segment.
4. Set the Comm Selector DIP switches SW5 through SW8 for BACnet MS/TP (m) master or (s) slave. The following example shows the DIP switches set for 38.4k baud and BACnet MS/TP (m).

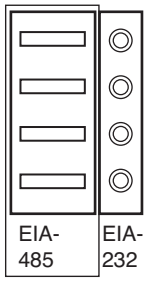


NOTE: MS/TP (m) is recommended.

5. Set the duplex for half (two-wire).



6. Set the Communications Selection jumper to EIA-485.

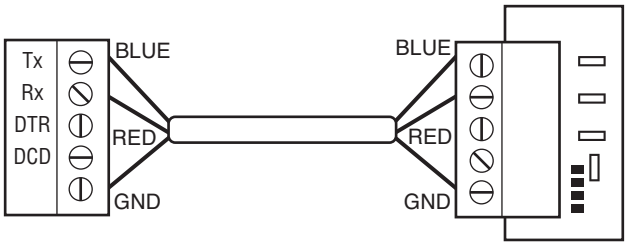


7. Configure Port 2a for BACnet MS/TP. Connect to Net+, Net-, and Gnd.

   Wire Specifications:

   - A dedicated 22 AWG to 18 AWG twisted pair wire (EIA 485)
   - 2000 feet (610 meters) for 76.8 kbps, or
   - 3000 feet (914.4 meters) for 9600 bps, 19.2 kbps, or 39.4 kbps, before needing a repeater.
   - Devices should be daisy chained and not star wired.

   NOTE: Use the same polarity throughout the network segment.



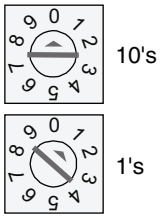
8. Turn on the I/O Flex 6126's power.
9. Set the correct network number to the unique BACnet MS/TP network at the site.

BACnet PTP (Peer-to-Peer) — The PTP is used to connect two distinct BACnet networks so that information can be shared between the networks. The PTP uses an EIA-232 connection between the two BACnet half-routers. This connection allows for two different BACnet networks to speak to each other, even at different baud rates.

CONFIGURING THE I/O FLEX 6126 FOR BACNET PTP

1. Turn off the I/O Flex 6126's power.
2. Using the rotary switches, set a unique address to match the address in the control module's device properties dialog box in sitebuilder. Set the tens (10's) switch to the tens digit of the address, and set the ones (1's) switch to the ones digit.

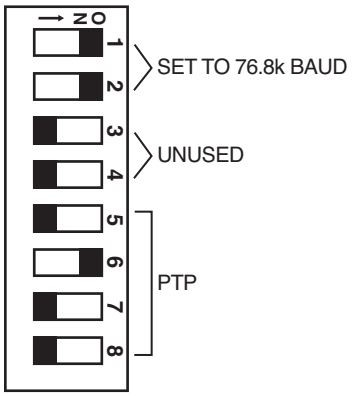
   Example: If the control module's address is 01, point the arros on the tens (10's) switch to 0 and the arrow on the ones (1's) switch to 1.



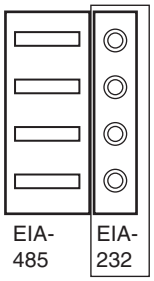
3. Set the Comm Selector DIP Switches SW1 and SW2 for the appropriate communications speed (9600, 19.2k, 38.4k, or 76.8k bps).

   NOTE: Use the same baud rate for all control modules on the network segment.

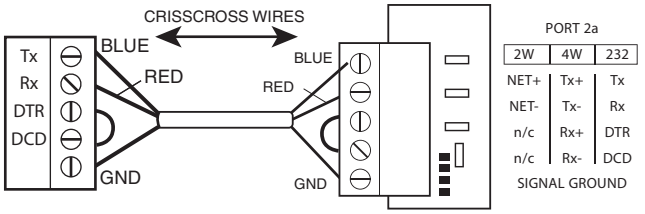
4. Set the Comm Selector DIP switches SW5 through SW8 for BACnet PTP. The following example shows the DIP switches set for 76.8k baud and BACnet PTP.



5. Set the Communications Selection jumper to EIA-232. EIA-232 indicates the controller will be connected to one device speaking this protocol.



6. To wire I/O Flex 6126 to another device:
   - Configure Port 2a for BACnet PTP
   - Connect to Net+, Net-, and Gnd
   - Connect to Tx, Rx, DTR, DCD, and Gnd using three wire termination with pins 3 and 4 jumpered. Wiring must go plus-to-minus and minus-to-plus, Gnd_to_Gnd.



7. See the following table to wire I/O Flex 6126 to a modem.

   NOTE: Do not power the device from the same transformer that powers the I/O Flex 6126.

MODEM (25 PIN) (NULL MODEM CABLE)	NULL MODEM CABLE (9-PIN)	S2-DB9 (9-PIN)	CONTROLLER (5 PIN)
TX - pin2	TX- pin3	TX - pin3	TX - pin1
RX - pin3	RX - pin2	RX - pin2	RX - pin2
DTR - pin20	DTR - pin4	DTR - pin4	DTR - pin3
DCD - pin8	DCD - pin1	DCD - pin1	DCD - pin4
GND - pin7	GND - pin5	GND - pin5	GND - pin5

8. Turn on the I/O Flex 6126's power.

Modbus — The Modbus protocol is used mostly in the industrial process market to communicate between PLCs (Programmable Logic Controllers). Although there is no official standard, there is extensive documentation on Modbus and

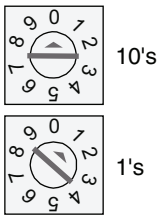
most companies who choose to interface using this protocol follow the same format.

Modbus is not a protocol that is particularly well suited for building automation because of its limited master/slave structure, but as it is fairly simple to construct an interface, many companies do offer Modbus as an open protocol solution.

CONFIGURING THE I/O FLEX 6126 FOR MODBUS RTU OR ASCII - 6126

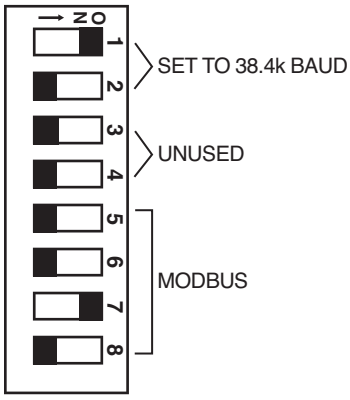
1. Turn off the I/O Flex 6126's power.
2. Using the rotary switches, set a unique address to match the address in the control module's device properties dialog box in SiteBuilder. Set the tens (10's) switch to the tens digit of the address, and set the ones (1's) switch to the ones digit.

   Example: If the control module's address is 01, point the arrow on the tens (10's) switch to 0 and the arrow on the ones (1's) switch to 1.

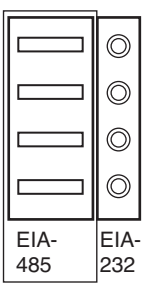


3. Set the Comm Selector DIP Switches SW1 and SW2 for the appropriate communications speed (9600, 19.2k, 38.4k, or76.8k bps).

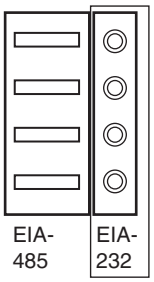
   NOTE: Use the same baud rate for all control modules on the network segment.
4. Set the Comm Selector DIP switches SW5 through SW8 for Modbus. The following example shows the DIP switches set for 38.4k baud and Modbus.



5. Set the Communications Selector jumper to EIA-232 or EIA-485.
   a. If EIA-485, the controller will be daisy-chained to the network of devices.



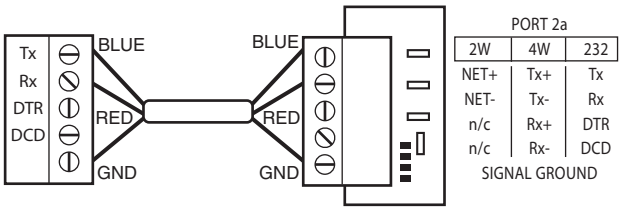
   b. If EIA-232, the controller will be connected to one device.



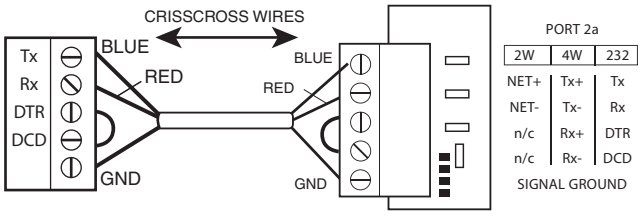
6. Configure Port 2a for Modbus using EIA-485. Connect to Net+, Net-, and Gnd.

   Wire Specifications:
   - A dedicated 22 AWG to 18 AWG twisted pair wire (EIA 485)
   - 3000 feet (914.4 meters) for 9600 bps, 19.2 kbps, or 39.4 kbps
   - Devices should be daisy chained and not star wired.

   NOTE: Use the same poilarity throughout the network segment.



7. Configure Port 2a for Modbus using EIA-232. Connect to Tx, Rx, DTR, DCD, and Gnd using three wire termination with pins 3 and 4 jumpered. Wiring must go plus-to-minus-to-plus, Gnd to Gnd, and Gnd connect to Tx, Rx, DTR, DCD, and Gnd using three wire termination with pins 3 and 4 jumpered. Wiring must go plus-to-minus and minus-to-plus, Gnd-to-Gnd.



8. Do not power the device from the same transformer that powers the I/O Flex 6126.
9. Turn on the I/O Flex 6126's power.

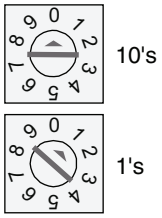
Johnson Controls (N2) — N2 is not a standard protocol, but one that was created by Johnson Controls, Inc. that has been made open and available to the public. Johnson Controls is the only company to use N2 Bus as their standard network protocol. Because it is open and still prevalent within the industry, N2 is a standard offering for our controllers.

CONFIGURING THE I/O FLEX 6126 FOR N2

1. Turn off the I/O Flex 6126's power.
2. Using the rotary switches, set a unique address to match the address in the control module's device properties dialog box in SiteBuilder. Set the tens (10's) switch to the

tens digit of the address, and set the ones (1's) switch to the ones digit.

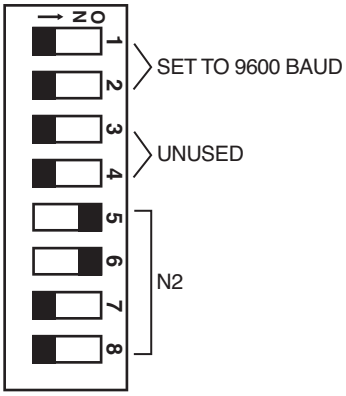
Example: If the control module's address is 01, point the arrow on the tens (10's) switch to 0 and the arrow on the ones (1's) switch to 1.



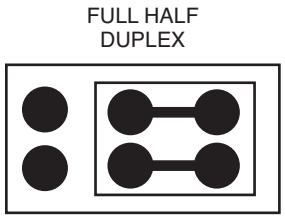
3. Set the Comm Selector DIP Switches SW1 and SW2 for 9600 bps.

   NOTE: Use the same baud rate for all control modules on the network segment.

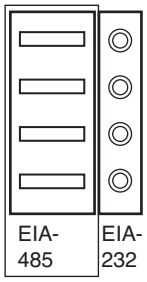
4. Set the Comm Selector DIP switches SW5 through SW8 for Johnson Controls N2. The following example shows the DIP switches set for 9600 baud and N2.



5. Set the duplex for half (two-wire).



6. Set the communications selection jumper to EIA-485.

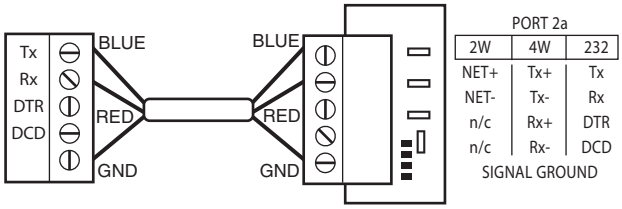


7. Configure Port 2a for N2. Connect to Net+, Net-, and Gnd.

   Wire Specifications

   - A dedicated 22 AWG to 18 AWG twisted pair wire (EIA 485)
   - 3000 feet (914.4 meters) for 9600 bps, 19.2 kbps, or 39.4 kbps
   - Devices should be daisy chained and not star wired.

   NOTE: Use the same poilarity throughout the network segment.



8. Turn on the I/O Flex 6126's power.

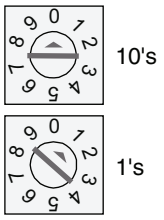
LonWorks — LonWorks is open protocol that was originally developed by Echelon Corporation. It is now maintained by Echelon in collaboration with members of the LonMark Interoperability Association. It requires the use of Echelon's Neuron microprocessor to encode and decode the LonWorks packets.

The LonWorks protocol is based on the concept of using standardized functional profiles to control similar pieces of equipment. OEM control modules are LonWorks devices, but are not LonMark devices. A LonMark device has been thoroughly tested by Echelon (LonMark.org) and has been given the LonMark logo indicating compliance with LonWorks profile specification. All LonMark devices require the use of proprietary hardware manufactured by Echelon Corp. In order to reduce the cost of adding that hardware on every module, OEM formats the data packets in a manner specified by the LonWorks documentation and hands them off to the SLTA-10, which is manufactured by Echelon. That way when a particular network configuration requires LonWorks, only the cost associated with a particular application is applied.

CONFIGURING THE I/O FLEX 6126 FOR THE LON PLUG-IN

1. Turn off the I/O Flex 6126's power.
2. Using the rotary switches, set a unique address to match the address in the control module's device properties dialog box in SiteBuilder. Set the tens (10's) switch to the tens digit of the address, and set the ones (1's) switch to the ones digit.

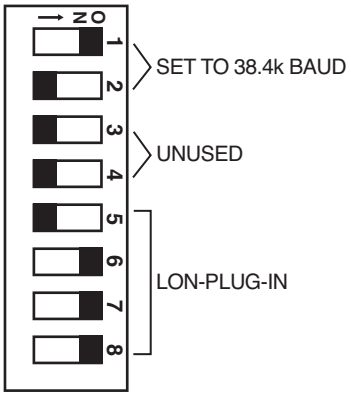
   Example: If the control module's address is 01, point the arros on the tens (10's) switch to the tens digit of the address, and set the ones (1's) switch to 1.



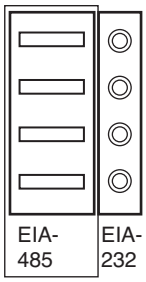
3. Set the Comm Selector DIP Switches SW1 and SW2 for the appropriate communications speed (9600, 19.2k, 38.4k, or 76.8k bps).

   NOTE: Use the same baud rate for all control modules on the network segment.

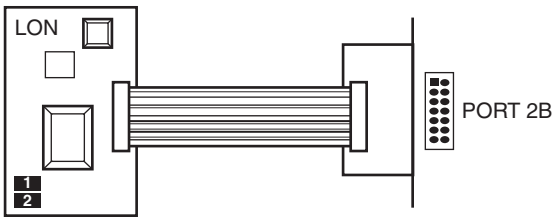
4. Set the Comm Selector DIP switches SW5 through SW8 for LON. The following example shows the DIP switches set for 38.4k baud and LON Plug-in.



5. Set the Communications Selection jumper to EIA-485.



6. Connect Port 2b to the LON plug-in card with the supplied ribbon cable.



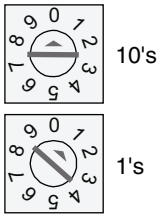
7. Turn on the I/O Flex 6126's power.

CONFIGURING THE I/O FLEX 6126 FOR LONTALK VIA SLTA

The I/O Flex 6126 can be configured as an application node in a LonWorks system. An Echelon Serial-to-LonWork adapter (SLTA-10) provides the network interface between each I/O Flex 6126 and the LonWorks network. An additional SLTA-10 is required if connecting a host computer running LonWorks network management software to the LonWorks network.

1. Turn off the I/O Flex 6126's power.
2. Using the rotary switches, set a unique address to match the address in the control module's device properties dialog box in SiteBuilder. Set the tens (10's) switch to the tens digit of the address, and set the ones (1's) switch to the ones digit.

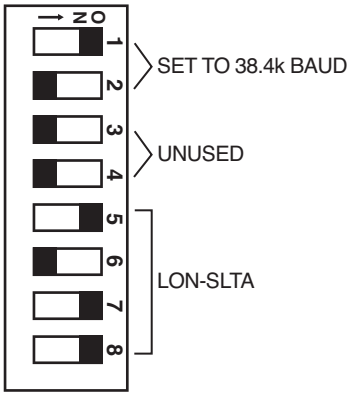
   Example: If the control module's address is 01, point the arrow on the tens (10's) switch to 0 and the arrow on the ones (1's) switch to 1.



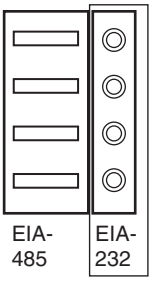
3. Set the Comm Selector DIP Switches SW1 and SW2 for the appropriate communications speed (9600, 19.2k, 38.4k, or 76.8k bps).

   NOTE: Use the same baud rate for all control modules on the network segment.

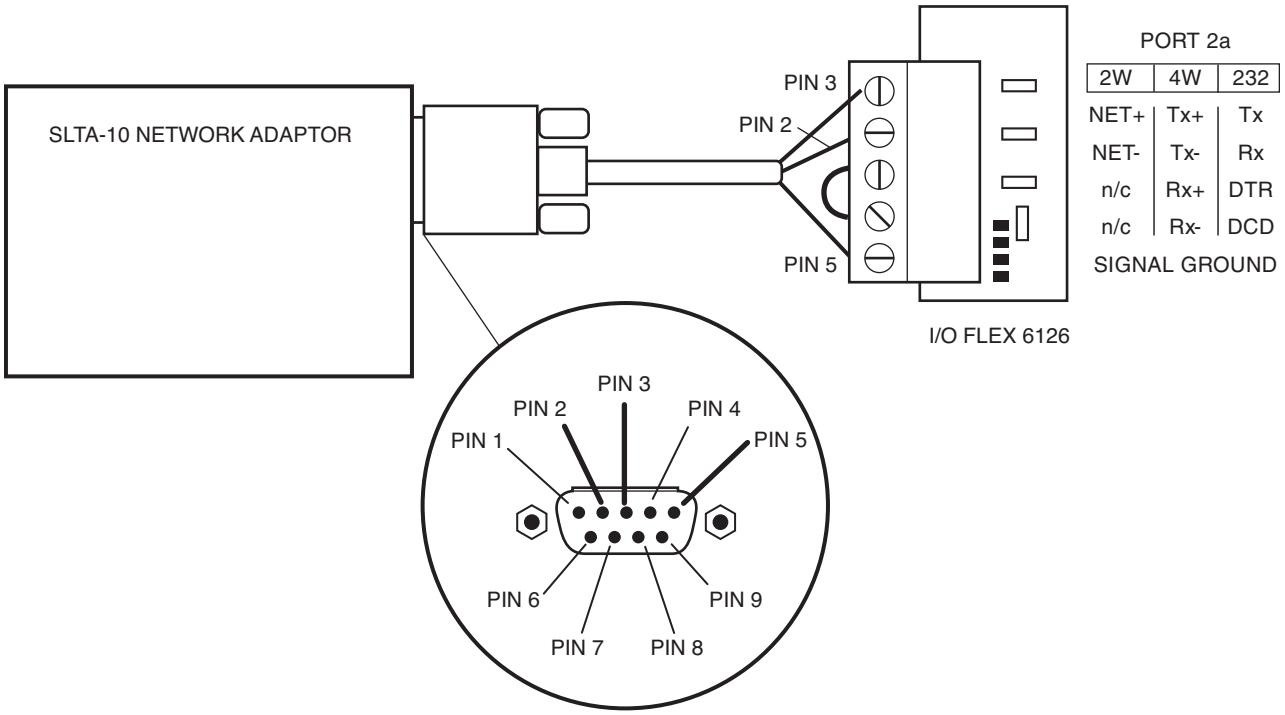
4. Set the Comm Selector DIP switches SW5 through SW8 for LON. The following example shows the DIP switches set for 38.4k baud and LON-SLTA.



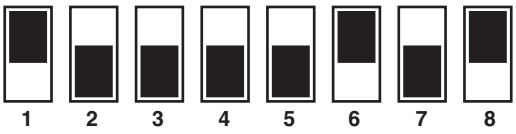
5. Set the Communications Selection jumper to EIA-232. EIA-232 indicates the controller will be connected to one other device speaking this protocol.



6. Configure Port 2a for LON using EIA-232. Connect to Tx, Rx, DTR, DCD, and Gnd using three wire termination with pins 3 and 4 jumpered. Wiring must go plus-to-minus and minus-to-plus , Gnd-to-Gnd.



7. Do not power the SLTA-10 from the same transformer that powers the I/O Flex 6126.
8. Set the following SLTA-10 dipswitch settings.



9. Turn on the I/O Flex 6126's power.

TROUBLESHOOTING

Most Common Communication Programs

WIRING TERMINATION

- If wiring an EIA-485 connection, the wire is terminated plus (+) to plus (+) and minus (-) to minus (-). If the receive LED is solid, this means the connection is incorrectly terminated.
- If the wiring is an EIA-232 connection, the wire must connect plus (+) to minus (-) and minus (-) to plus (+). The GND must be connected to GND.

JUMPER SELECTION

- Make sure the jumper for the communication port is set to the communication networks wiring type EIA-485 or EIA-232.

DIPSWITCH SELECTION

- Make sure the correct protocol is chosen (switches 5, 6, 7, and 8).
- Make sure the correct baud rate is chosen (switches 1 and 2).
  NOTE: These settings are defined at controller start-up. Power must be cycled to make a settings change.

ADDRESSING

- The rotary address switches define the controllers' individuality on the network. Each controller must have a unique address.

BACnet MSTP

VERIFY BAS AND CONTROLLER SETTINGS

1. Both set to speak BACnet MS/TP.
   - SW3 (switches 3, 4, 5, and 6)
   - By getting a Modstat of the controller through the BACview. Hit the "FN" key and the '.' key at the same time. Scroll to the bottom of the page to the section entitled "Network Communications" to view and activate protocol and baud rate.
2. Both set for the same baud rate.
   - SW3 (switches 1 and 2)
   - Verify via the BACview by obtaining a Modstat
3. BAS configured to speak 2 — wire EIA-485 to the controller.
4. Both set to 8 data bits, no parity, and 1 stop bit.
5. Rotary address switches set for the controller's unique slave address.
6. Proper connection wiring.
7. BAS reading or writing to the proper BACnet objects in the controller - download the latest points list for the controller to verify.
8. BAS is sending requests to the proper MS/TP MAC address of the controller.
9. Present the BAS company with a copy of your controller's BACnet PICS so that they know which BACnet commands are supported.

It may be necessary to adjust the following two MS/TP protocol timing settings through the BACview 6.

MAX MASTERS — This defines the highest MS/TP Master MAC address on the MS/TP network.

For example, if there are 3 master nodes on an MS/TP network, and their MAC addresses 1, 8, and 16, then Max Masters would be set to 16 (since this is the highest MS/TP MAC address on the network).

This property optimizes MS/TP network communications by preventing token passes and "poll for master" requests to non-existent master nodes.

In the example, MAC address 16 would know to pass the token back to MAC address 1 instead of counting up to MAC address 127. Each MS/TP master node on the network must have their max masters set to this same value. The default is 127.

MAXINFO FRAMES — This defines the maximum number of responses that will be sent when the controller receives the token.

Any positive integer is a valid number. The default is 10 and should be ideal for the majority of applications. In cases where the controller is the target of many requests, this number could be increased as high as 100 or 200.

NOTE: MS/TP networks can be comprised of both Master and Slave nodes. Valid MAC addresses for Master nodes are 0-127 and valid addresses for slave nodes are 0-254.

If the integrator attempts to communicate to the controller but does not get a response, make sure the controller is set as a BACnet MS/TP (m) master. The BACnet software asks the controller "Who Is." This is to auto-locate devices on the network. Only controllers set as masters will answer this request.

BACnet PTP

VERIFY BAS AND CONTROLLER SETTING

1. Both set to speak N2.
   - SW3 (switches 3, 4, 5, and 6)
   - By getting a Modstat of the controller through the BACview. Hit the "FN" key and the '.' key at the same time. Scroll to the bottom of the page to the section entitled "Network Communications" to view the active protocol and baud rate.
2. Both set for the same baud rate.
   - SW3 (switches 1 and 2)
   - Verify via the BACview by obtaining a Modstat
3. BAS set to speak 2-wire EIA-232 to the controller.
4. Both set to 8 data bits, no parity, and 1 stop bit.
5. Rotary address switches set for the controller's unique slave address.
6. Proper connection wiring.
7. BAS reading or writing to the proper BACnet objects in the controller, download the latest points list for the controller to verify.
8. BAS is sending requests to the proper BACnet device instance of the controller.
9. Present the BAS company with a copy of your controller's BACnet PICS so that they know which BACnet commands are supported.

Modbus

Verify BAS and controller settings:

1. Both set to speak Modbus (RTU).
   - SW3 (Switches 3, 4, 5, and 6)
   - By getting a Modstat of the controller through the BACview. Hit the "FN" key and the '.' key at the same time. Scroll to the bottom of the page to the section entitled "Network Communications" to view the active protocol and baud rate.
2. Both set for the same baud rate.
   - SW3 (switches 1 and 2)
   - Verify cia the BACview by obtaining a Modstat
3. BAS configured to speak 2, wire EIA-485 to the controller.
4. Both set to 8 data bits, no parity, and 1 stop bit.
5. Rotary address switches set for the controller's unique slave address.
6. Proper connection wiring.
7. BAS must be reading or writing to the proper Modbus register numbers on the controller. Download the latest points list for the controller to verify.
8. BAS is sending requests to the proper slave address of the controller.

CODES	NAME	DESCRIPTION
01	Illegal Function	The Modbus function code used in the query is not supported by the controller.
02	Illegal Data Address	The registered address used in the query is not supported by the controller.
04	Slave Device Failure	The Modbus Master has attempted to write to a non-existent register or a read-only register in the controller.

N2

VERIFY BAS AND CONTROLLER SETTINGS:

1. Both set to speak N2.
   - SW3 (switches 3, 4, 5, and 6)
   - By getting a Modstat of the controller through the BACview. Hit the "FN" key and the '.' key at the same time. Scroll to the bottom of the page to the section entitled "Network Communications" to view the active protocol and baud rate.
2. Both set for 9600 baud rate.
   - SW3 (switches 1 and 2)
   - Verify via the BACview by obtaining a Modstat
3. BAS configured to speak 2, wire EIA-485 to the controller.
4. Both set to 8 data bits, no parity, and 1 stop bit.
5. Rotary address switches set for the controller's unique slave address.
6. Proper connection wiring.
7. BAS reading or writing to the proper network point addresses in the controller download the latest point list for the controller to verify.
8. BAS is sending requests to the proer slave address of the controller.

LonWorks

VERIFY BAS AND CONTROLLER SETTINGS:

1. Both set to speak LonWorks protocol.
   - SW3 (switches 3, 4, 5, and 6)
   - By getting a Modstat of the controller through the BACview. Hit the "GN" key and the '.' key at the same time. Scroll to the bottom of the page to the section entitled "Network Communications" to view the active protocol and baud rate.
2. Both set for 9600 baud rate.
   - SW3 (switches 1 and 2)
   - Verify via the BACview by obtaining a Modstat
3. Configure BAS to speak 2 wire EIA-485 to the SLTA or LonWorks Plug-in.
4. Proper connection wiring.
5. BAS reading or writing to the proper network point addresses in the controller, download the latest points list for the controller to verify.

6. BAS is sending requests to the proper slavce address of the controller from the SLTA-10 or LonWorks Plug-in card.

COMMISSIONING THE I/O FLEX 6126 FOR LONWORKS

Before a device can participate on a LonWorks network, it must be commissioned. Commissioning allows the system integrator to associate the device hardware with the LonWorks system's network layout diagram. This is done using the device's unique Neuron ID. Together, the I/O Flex 6126 and its SLTA-10 serve as a single LonWorks device or node. The SLTA-10's internal Neuron chip provides a unique Neuron ID.

A network management tool such as Echelon's LonMarker is used to commission each device, as well as to assign addressing. Specific instructions regarding the commissioning of LonWorks devices should be obtained from documentation supplied with the LonWorks network management tool.

When a new device is first commissioned onto the LonWorks network, the system integrator must upload the device's External Interface File (XIF) information. LonWorks uses the XIF to determine the points (network variables) that are available from a device. A typical LonWorks device has a set of predefined network variables. These are the variables bound or accessed by the network management tool. The network variables defined on the I/O Flex 6126 Network Variables Property pages determine its XIF information. If any information is changed, added, or deleted on the Network Variable Property pages, the I/O Flex 6126 must be removed from the network management tool's database and recommissioned, including uploading the XIF information again.

There are some issues with LonWorks that should be considered when using the I/O Flex 6126:

Device Configuration Information (XIF)

- When members or the object cache are modified, modify the device configuration information (XIF) from that originally imported into the LonWorks network management tool. The new information will not be recognized by the network management tool until it is imported again from the I/O Flex 6126.
- The user must first undefine all the network variable bindings and the device, recommission the device, and establish the network variable bindings again.
- Modifications to the object cache should be avoided once the device is fully commissioned and operational. Any modifications to the addressing schemes should also be avoided once the I/O Flex 6126 is commissioned.

Address Parameters

- If the address parameters are modified, the SLTA-10 will be set to Node Offline, and Unconfigured, which means it no longer communicates with the LonWorks network.
- This does not require deletion or importing the device configuration information again but does require the device to be recommissioned by the network management tool.
- Point Configuration
- When the I/O Flex 6126 is first commissioned onto the LonWorks network, the system integrator should use the browse features of the network management tool to check the data that is available from the module.
- Any changes in point count and point configuration should be made prior to performing any further system integration.
- I/O Flex 6126 may be deleted and re-imported as many times as necessary to ensure that the points are correct.
  NOTE: For these reasons, all parameters on the module driver parameter page should be configured prior to connecting this device to a LonWorks network.
- The browse features of the network management tool allows the ability to read real-time values from the I/O Flex 6126. This provides all of the tools necessary to test an integration prior to binding network variables to other LonWorks nodes.

Communication LEDs — The LEDs indicate if the controller is speaking to the devices on the network. The LEDs should reflect communication traffic based on the baud rate set. The higher the baud rate, the more quickly the LEDs flash on and off, and the brighter they appear.

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START-UP CHECKLIST FOR 62DA,DB,DC,DD07-38 Dedicated Vertical or Horizontal 100% Outdoor Air Unit with Optional Energy Conservation Wheel

A. PROJECT INFORMATION

Job Name _____ Installing Contractor _____
Address _____ Sales Office _____
City _____ State _____ Zip _____ Start-up Performed By _____

Software

Version _____

B. PRE-START-UP

1. Are the DIP switch settings correct?	☐ Yes	☐ No
2. Have all packing materials been removed from the unit?	☐ Yes	☐ No
3. Have all compressor shipping holddown bolts and brackets been removed?	☐ Yes	☐ No
4. Has the power exhaust hood been installed?	☐ Yes	☐ No
5. Have all options and accessories been installed?	☐ Yes	☐ No
6. Are all electrical connections and terminals tight?	☐ Yes	☐ No
7. Has the gas piping been inspected for leaks? (Gas Heat Units only)	☐ Yes	☐ No
8. Have return air filters and oudoor air filters been cleaned and placed properly?	☐ Yes	☐ No
9. Is the unit level within tolerances for proper condensate drainage?	☐ Yes	☐ No
10. Have the fan wheels and propellers been checked for location in housing/orifice and set screws tightened?	☐ Yes	☐ No
11. Are fan sheaves aligned and belts properly tensioned?	☐ Yes	☐ No
12. Are suction, discharge, and liquid service valves on each unit open?	☐ Yes	☐ No
13. Have the crankcase heaters been on for 24-hours before startup?	☐ Yes	☐ No

C. UNIT START-UP

Electrical

Supply Voltage L1-L2 _____ L2-L3 _____ L3-L1 _____
Compressor Amps _____ Compressor No. 1 L1 _____ L2 _____ L3 _____
Compressor Amps _____ Compressor No. 2 L1 _____ L2 _____ L3 _____
Supply Fan Amps (CV) _____ Exhaust Fan Amps _____
(VAV) _____ (VAV fan supply amps reading must be taken with a true RMS meter for accurate readings.)

Temperatures

Outdoor Air Temperature _____ F DB (Dry Bulb)
Return Air Temperature _____ F DB _____ F WB (Wet Bulb)
Cooling Supply Air _____ F
Gas Heat Supply Air _____ F (Gas heat only)
Electric Heat Supply Air _____ F (Electric heat only, if equipped)

Pressures

Gas Inlet Pressure _____ in. wg (Gas heat units only)
Gas Manifold Pressure Stage No. 1 _____ in. wg Stage No. 2 _____ in. wg (Gas heat only)
Refrigerant Suction Circuit No. 2 _____ psig Circuit No. 2 _____ psig
Refrigerant Discharge Circuit No. 2 _____ psig Circuit No. 2 _____ psig

Heating Operating Data

Gas Pressure at Supply Inlet	_____ in. wc	_____ in. wc
Gas Pressure at Heater Manifold	_____ in. wc	_____ in. wc
CO_2 in Flue Gas	_____ %	_____ %
CO in Flue Gas	_____ ppm	_____ ppm
Flue Gas Temperature at Discharge	_____ F	_____ F
Draft Fan Pressure	_____ in. wc	_____ in. wc

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