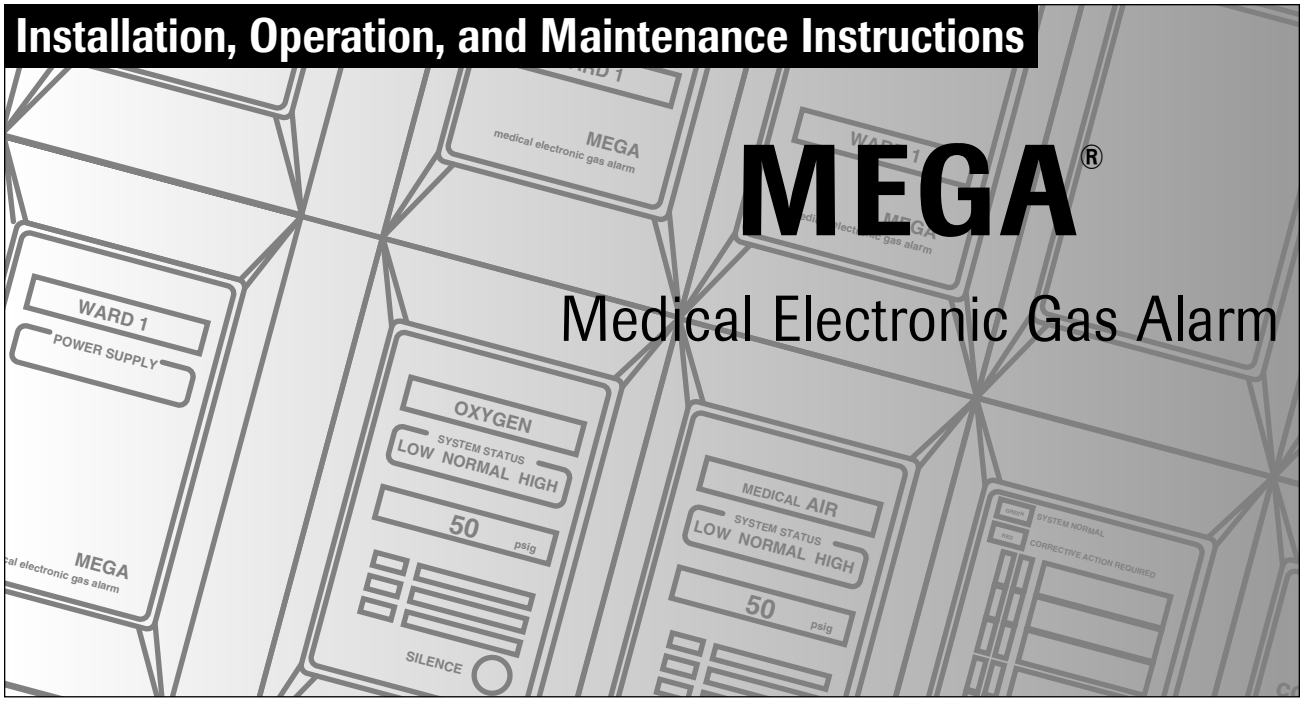
Installation, Operation, and Maintenance Instructions



MEGA®

Medical Electronic Gas Alarm

BEACON MEDICAL PRODUCTS

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Alarm Modular Components

Power Supply Module

Features:

- Provides electrical power for digital display modules, sensor modules, multi-signal alarm modules, and computer interface relay modules.
- Replaceable fuse.
- Audible alarm with volume control.
- Network wiring terminals and tester connection.

Sensor Module

Features:

- Sensor modules are gas/vacuum service specific and connect directly to the pipeline.
- Transmits a signal to a digital display module at the alarm panel.
- Can be located adjacent to the alarm panel or in remote locations from the alarm panel.

Digital Display Module

Features:

- Digital LCD readout of the system pressure or vacuum signal transmitted from a sensor module. LEDs indicate if the levels are low, normal, or high.
- Three user-assigned LED indicators may be connected to dry-contact switches.
- General fault relay activates on any alarm fault condition.
- Can transmit the pressure or vacuum signal to another digital display module for remote applications.
- Can be networked to communicate with a personal computer or Johnson Controls Metasys® building automation system.

Multi-Signal Alarm Module

Features:

- Monitors up to six dry-contact switch signals.
- General fault relay activates on any alarm fault condition.
- Can be networked to communicate with a personal computer or Johnson Controls Metasys® building automation system.

Computer Interface Relay Module

Features:

- Provides an interface between a multi-signal alarm module or the three user-assigned signals on a digital display module and a building automation system computer.
- Not required when communicating with a Johnson Controls Metasys® building automation system.

Blank Module

Features:

- Reserves a space in the alarm panel for future expansion.

Power Supply Blank

Features:

- Used above the power supply module to make the alarm panel rectangular when local sensors are used.

Introduction

Definitions

Area Alarm Panel
Alarm panel which monitors the medical gas and vacuum systems serving a specific area.

Dry-Contact
An electrical contact that is isolated or unconnected from any electrical source.

LCD
Liquid Crystal Display

LED
Light Emitting Diode

Master Alarm Panel
Alarm panel which monitors the medical gas and vacuum sources.

Alarm Configurations

APL
Area alarm panel with local sensors. The sensor modules are mounted directly above the corresponding digital display modules.

APR
Area alarm panel with remote sensors. The sensor modules are located up to 5000 ft from the alarm panel.

MPL
Master alarm panel with local sensors. The sensor modules are mounted directly above the corresponding digital display modules.

MPR
Master alarm panel with remote sensors. The sensor modules or switches are located up to 5000 ft from the alarm panel.

Unpacking

Factory Preassembled Alarm Panels

Alarm panels ordered under the APL, APR, MPL and MPR part number series are preassembled at the factory.

1. Carefully open the carton and verify contents.

APL or MPL
- Factory preassembled rough-in
- Carton(s) of finish components
- Instructions

APR or MPR
- Factory preassembled rough-in
- Carton(s) of finish components
- Carton(s) of remote sensors
- Instructions

2. Remove finish components carton(s).

3. Write the alarm panel location on the finish component carton(s).

4. Store the finish components carton(s) in a safe place for installation after the walls are finished.

5. Proceed to **Rough-In Installation**.

Field Assembled Alarm Panels

Alarms ordered as separate modules are assembled on-site.

1. Carefully open the carton(s) and verify contents.

Refer to diagrams on pages 49-51.

Power Supply Module
- Instructions

Rough-in components:
- Mounting box with dust cover
- (2) End panels
- (2) Grommets
- (4) Screws, #6-20 x 1/4

Finish components:
- Power supply module chassis
- Trim plate
- Cover plate
- (4) Screws, #6-32 x 9/16
- (2) Screws, #6-32 x 3/4
- Gas ID and location labels

Digital Display Module

Rough-in components:
- Mounting box with dust cover
- Interconnect board
- (4) Screws, #6-20 x 1/4

Finish components:
- Digital display module chassis
- Cover plate
- (2) Screws, #6-32 x 1-1/2
- System status labels

Sensor Module

Rough-in components:
- Mounting box with dust cover
- (2) End panels
- Gas/vacuum service rough-in
- (8) Screws, #6-20 x 1/4

Finish components:
- Sensor
- Trim plate
- Cover plate
- (2) Screws, #6-32 x 1-1/2

Multi-Signal Alarm Module

Rough-in components:
- Mounting box with dust cover
- Interconnect board
- (4) Screws, #6-20 x 1/4

Finish components:
- Multi-signal alarm module chassis
- Cover plate
- (2) Screws, #6-32 x 1-1/2
- System status labels

Computer Interface Relay Module

Rough-in components:
- Mounting box with dust cover
- Interconnect board
- (4) Screws, #6-20 x 1/4

Finish components:
- Trim plate
- Cover plate
- (2) Screws, #6-32 x 1-1/2

2. Store the finish components in a safe place for installation after the walls are finished.

3. Proceed to **Rough-In Installation**.

Alarm Panel Rough-In Boxes

Refer to the building plans to determine alarm locations and configurations. Alarm panels may be assembled into horizontal or vertical configurations.

NOTE:
If the alarm panel part number series is APL or MPL, proceed to **Mount Alarm Panel**.

NOTE:
If the alarm panel part number series is APR or MPR, proceed to **Sensor Module Rough-In Boxes**.

1. Arrange the mounting boxes to the desired alarm panel configuration. The larger power supply module mounting box must be at the lower left of the alarm panel.

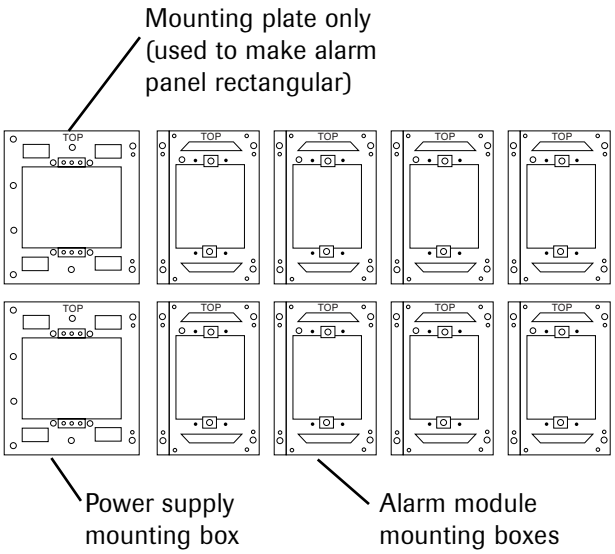


Figure 1. Arrange Mounting Boxes

2. Install a rubber grommet in the hole in the right side of the power supply mounting box.

3. Install an end cap onto the left side of the mounting box which will be adjacent to the power supply. Use (2) #6-20 x 1/4" screws.

NOTE:
The rubber grommet in the power supply mounting box must align with the rubber grommet in the alarm mounting box.

4. Remove the lower rear knockout from the end panel and install a rubber grommet.

5. Place the right flange of the power supply mounting box over the left flange of the alarm module mounting box and attach with (2) #6-20 x 1/4" screws.

6. Assemble remaining mounting boxes using (2) #6-20 x 1/4" screws per mounting box until the desired horizontal width is reached.

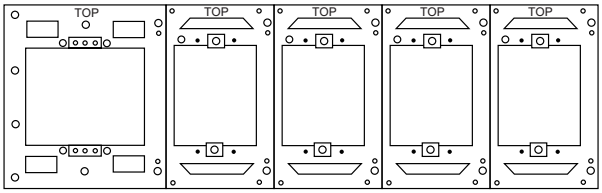


Figure 2. Assemble Horizontal Rows

7. Install an end cap on the last box in the row using (2) #6-20 x 1/4" screws.

NOTE:
Each row of mounting boxes must have end caps attached to both ends.

8. If the alarm panel will contain more than one horizontal row, assemble the next row.

Alarm Panel Rough-In Boxes (Cont.)

NOTE:
If the alarm panel has local sensor modules, they should be mounted directly above the corresponding digital display modules.

9. Install a 1/2" x 2" pipe nipple (supplied by others) between digital display module mounting boxes and sensor module mounting boxes. Refer to **Figure 4**.

10. Place the top of each lower mounting box over the bottom of each upper mounting box and attach with (2) #6-20 x 1/4" screws per pair of mounting boxes. Refer to **Figure 3**.

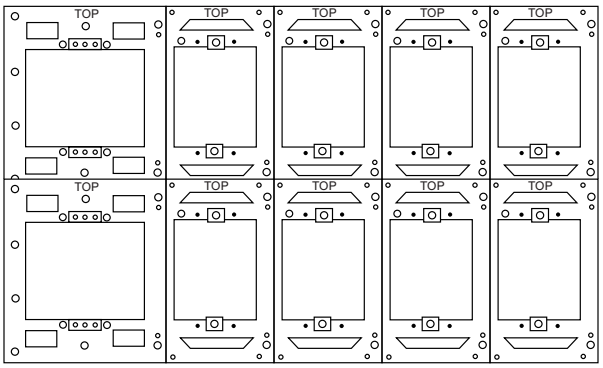


Figure 3. Attach Mounting Boxes

Interconnect Boards

1. Locate the interconnect board for the module to be installed adjacent to the power supply module.

2. Insert the end of the ten-wire ribbon cable through the grommeted opening in the lower left side of the mounting box and into the power supply mounting box.

3. Install interconnect boards into alarm mounting boxes using (2) #6-20 x 1/4" screws. Refer to **Figure 4**.

4. Connect the ten-wire ribbon cable to the plug on the adjacent interconnect board.

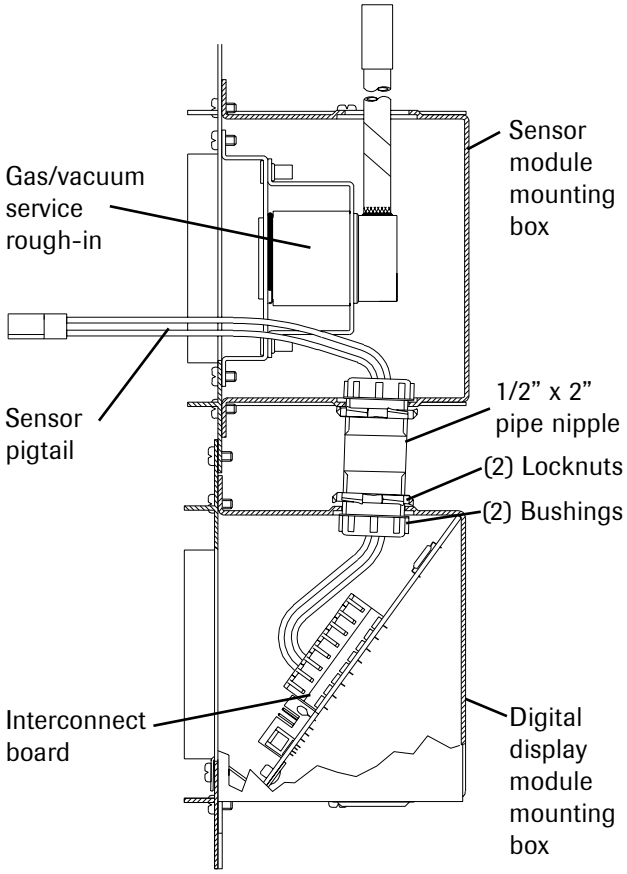


Figure 4. Local Sensor Rough-In Detail

Sensor Pigtail (Local Sensors)

1. Route the sensor pigtail through the pipe nipple. Refer to **Figure 4**.

2. Install the red wire into the T+ terminal (Terminal block 2, terminal 6) on the digital display module interconnect board. To install the wire, use a small flat screwdriver to depress the lever on the terminal block.

3. Install the black wire into the T- terminal (Terminal block 2, terminal 7).

Sensor Module Rough-In Boxes

Remote sensor modules may be installed as individual units or ganged in a panel configuration.

1. If sensor modules are to be ganged, attach the mounting boxes together using (2) #6-20 x 1/4" screws.

2. Install end panels to each end of the assembled mounting boxes or to the sides of each mounting box if installed as individual units.

NOTE:
Sensor modules receive power from their corresponding digital display modules. A separate power supply module is not required for remote sensors.

Gas/Vacuum Service Rough-In

NOTE:
Gas/vacuum service rough-in assemblies are gas specific. Be sure to install the gas/vacuum service rough-in in the correct order according to the building plans.

1. Remove the small knockout from the top of each sensor module mounting box.

2. Insert the gas/vacuum service rough-in assembly into the mounting box and secure with (2) #6-20 x 1/4" screws. Refer to **Figure 4**.

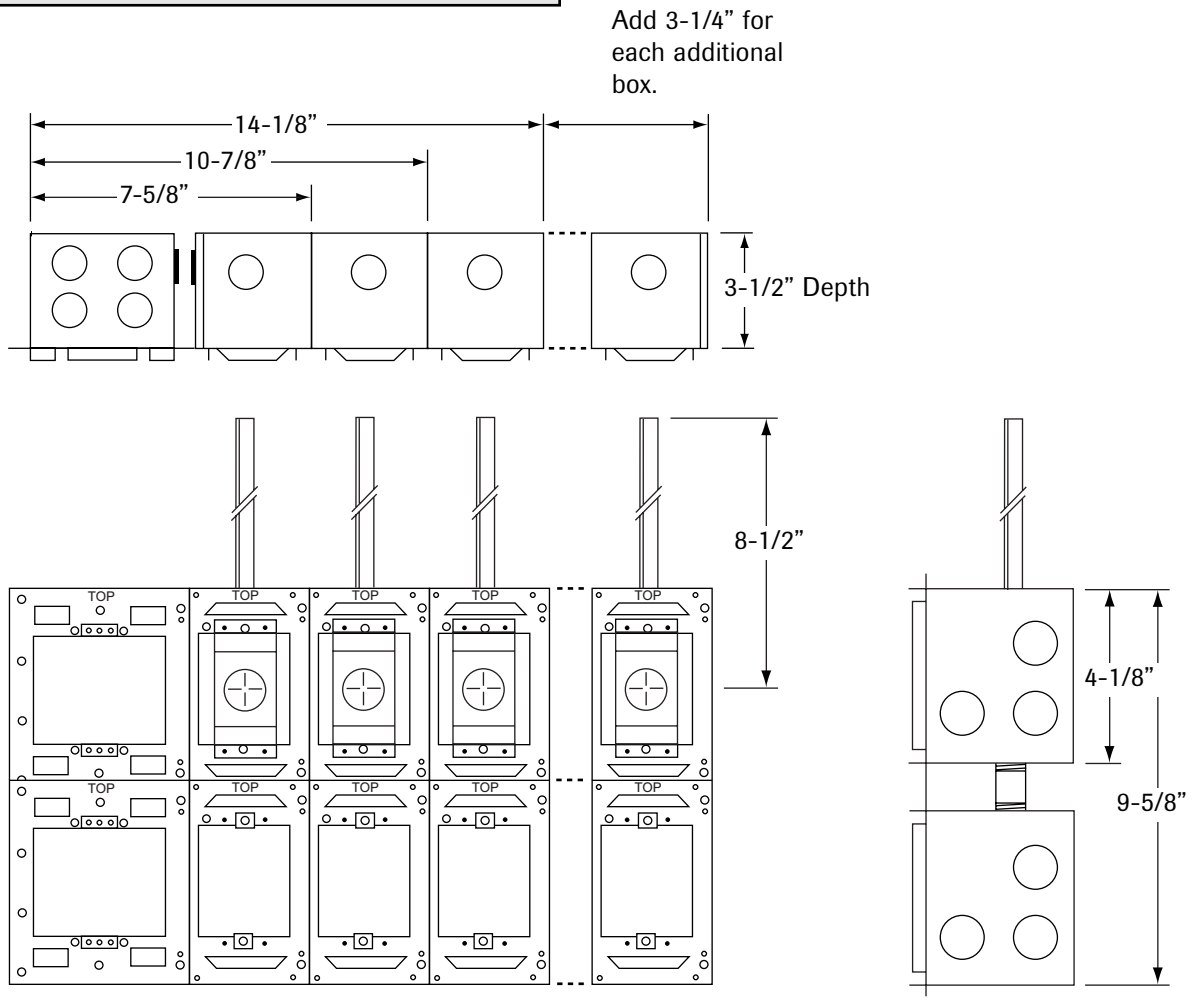


Figure 5. Rough-In Dimensions

Mount Alarm Panel

1. Prepare a rough wall opening large enough to accommodate the rough-in assembly. The opening must have rigid horizontal members to support the rough-in assembly. Refer to **Figure 6**.
2. Insert the rough-in assembly into the wall opening and secure in place with fasteners suitable for the horizontal support materials.

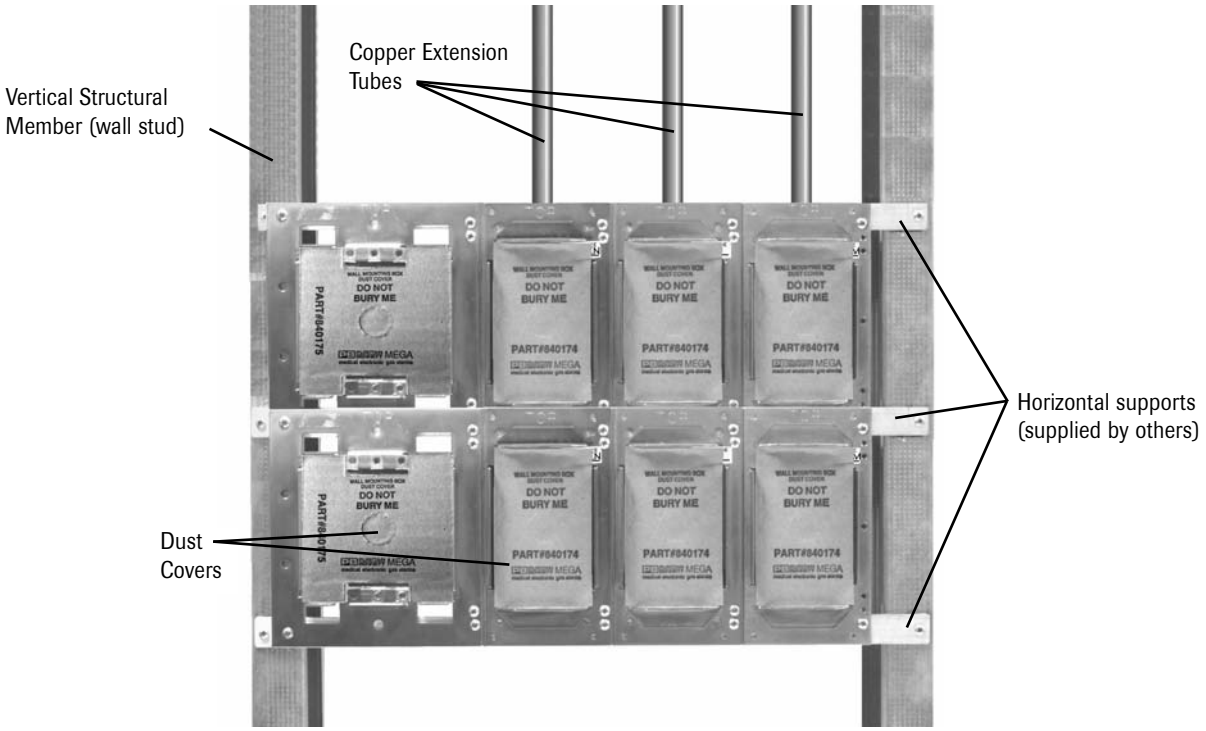


Figure 6. Rough-In Installation

Electrical Connections

NOTE:
Refer to **Wiring Installation** to determine the quantity and routing of alarm signal wires.

1. Connect the power supply conduit from the life safety branch of the building emergency power system to the power supply mounting box using the knockout shown in **Figure 7**.
2. If alarm panels are to be networked, connect the conduit for the network wiring to the power supply mounting box using the knockout shown in **Figure 7**.
3. If using remote sensors or switches, connect the conduit for external signal wiring to the alarm mounting box using the knockout shown in **Figure 7**.

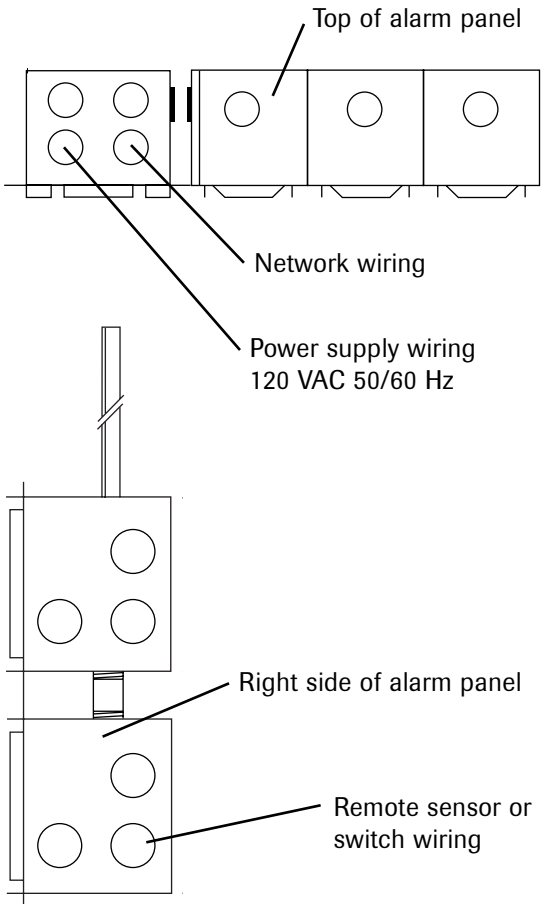


Figure 7. Knockouts

Pipeline Connections

1. Braze the copper extension tubes from the rough-in assembly to the appropriate gas/vacuum piping system drops. Braze the connections per the procedures required by NFPA 99 or CAN/CSA-Z305.1. Use appropriate measures to prevent overheating and damage to the internal components of the gas/vacuum service rough-in assemblies.
2. Perform standing pressure tests and cross-connection tests as required by NFPA and CSA. Note that vacuum service rough-in assemblies include a plastic plug to permit system testing under vacuum.

Dust Covers

1. Install the dust covers to protect the alarm during the finishing of the walls. Refer to **Figure 8**.

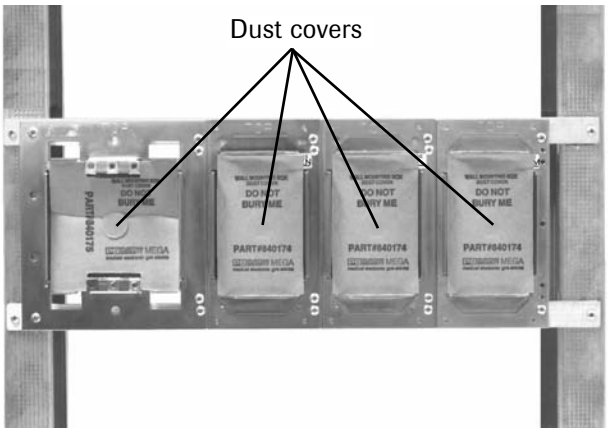


Figure 8. Install Dust Covers

General Requirements

- Per NFPA 99, medical gas alarms shall be powered by the life safety branch of the emergency power system.
- Per NFPA 99, all wiring shall be protected from physical damage by raceways or conduit in accordance with NFPA 70, National Electrical Code.
- Wiring runs should be made with color-coded wire. Record the color, signal and source of the signal for each wiring lead to aid in connection of the alarm finish components
- When routing wiring inside mounting boxes, protect wire covering from damage.

IMPORTANT:

To reduce the possibility of electromagnetic interference adversely affecting alarm performance, follow these guidelines:

- Install alarm wiring in electrical metallic tubing (EMT) or other metallic conduit.
- Verify end panels are installed on both sides of alarm panels.
- Verify that covers are present on all junction boxes.
- Avoid installing alarms near radio transmitters.
- Avoid installing alarms near electrical motors or switchgear.

NOTE:

For sensor, switch, and network wiring, determine the circuit length and then select the proper wire size from the chart below.

Circuit Length (ft)	Copper Wire (AWG)
0 to 2,000	18
2000 to 3,000	16
3,000 to 5,000	14

Wiring Requirements and Routing

- Two conductors are required from each signal switch to each master alarm. Refer to **Schematics 3 and 6**.
- Two conductors are required from each remote sensor module to its corresponding digital display module. Refer to **Schematics 2 and 5**.
- If alarms are to be networked, two conductors are required to daisy-chain between power supplies. Refer to **Schematic 10**.
- If pressure/vacuum data transmission is used, two conductors are required between the two digital display modules. Refer to **Schematic 4**.
- If a computer interface relay module is used, two conductors are required from each relayed signal to the computer interface relay module. Refer to **Schematic 7**.

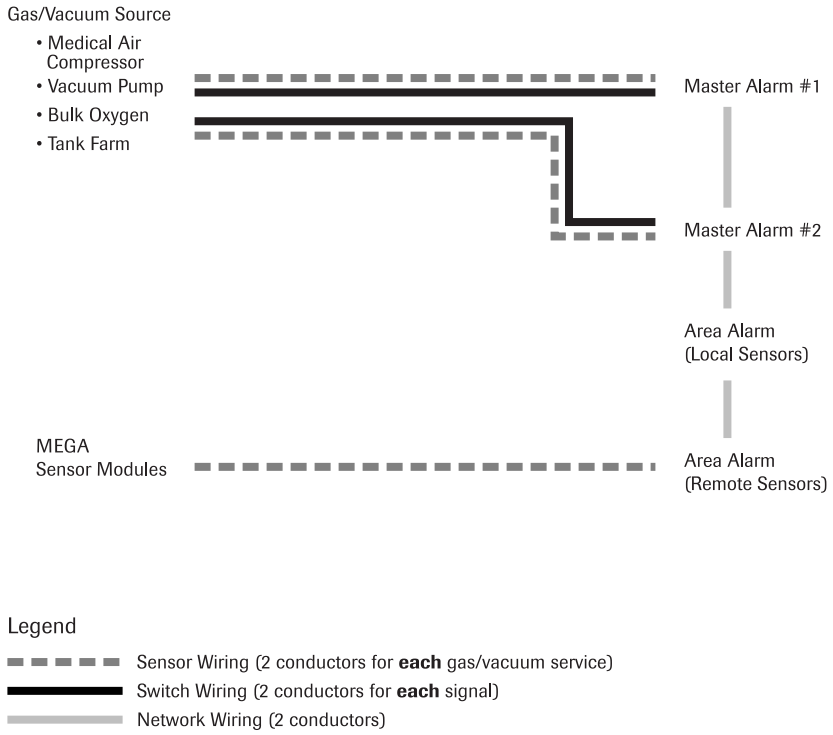


Figure 9. Wire Routing Diagram

Wiring Schematics

The following wiring schematics are provided. If you have any questions, please call Beacon Medical Products Technical Support at 1-800-676-1115.

1. Power Supply Module
2. Sensor Module to Digital Display Module
3. Digital Display Module User-Assigned Signals
4. Remote Pressure/Vacuum Transmission
5. Digital Display Modules As Master Alarms
6. Multi-Signal Alarm Module
7. Computer Interface Relay Module
8. External Signal Relay
9. Remote Pressure/Vacuum Switches
10. MEGA Network

Typical Master Alarm Wiring

Typical wiring diagrams of master alarms for the following systems are provided:

1 Bulk Oxygen System with Reserve

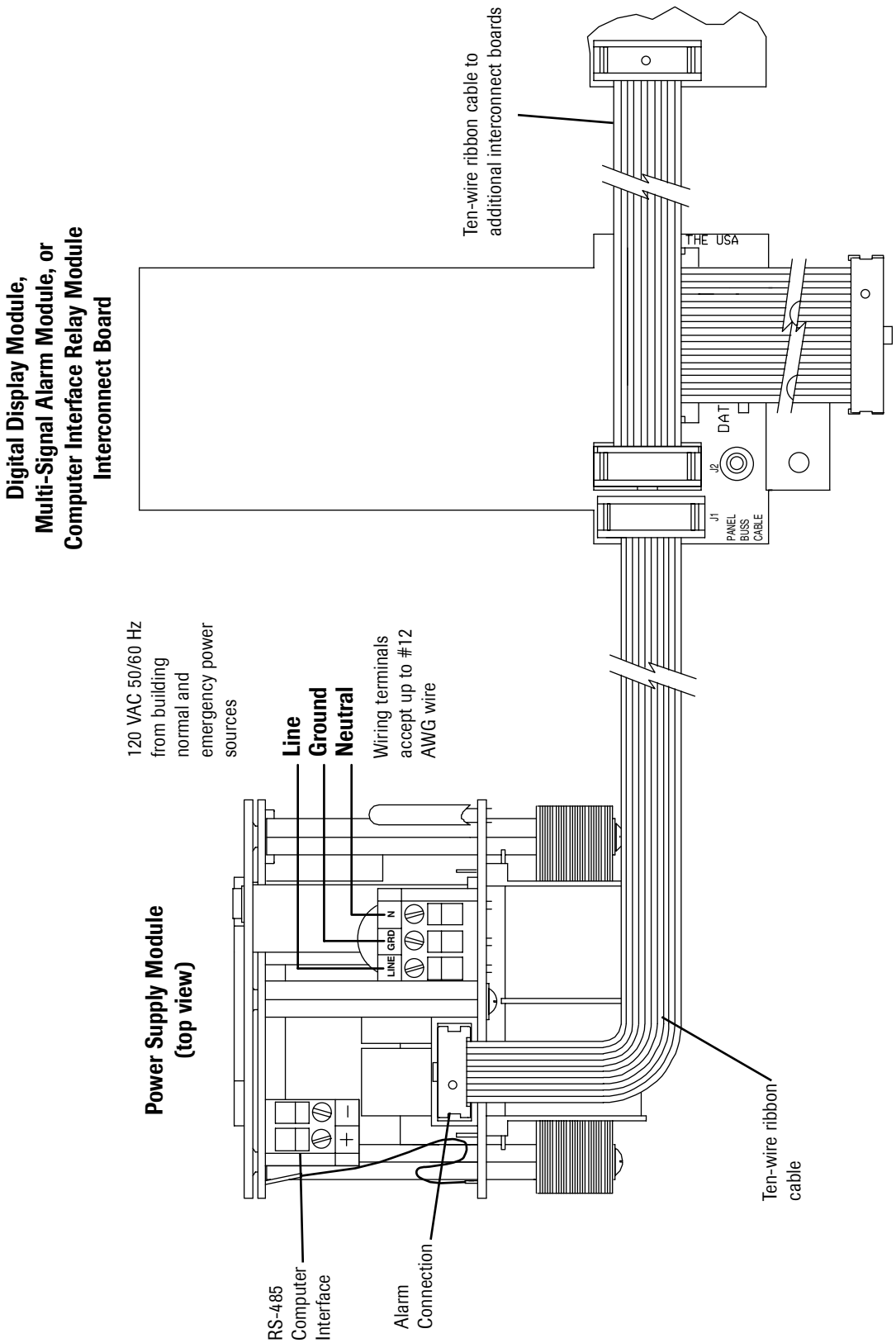
2 Nitrous Oxide Manifold System without Reserve

3 Duplex Medical Air Compressor

4 Nitrogen Manifold System without Reserve

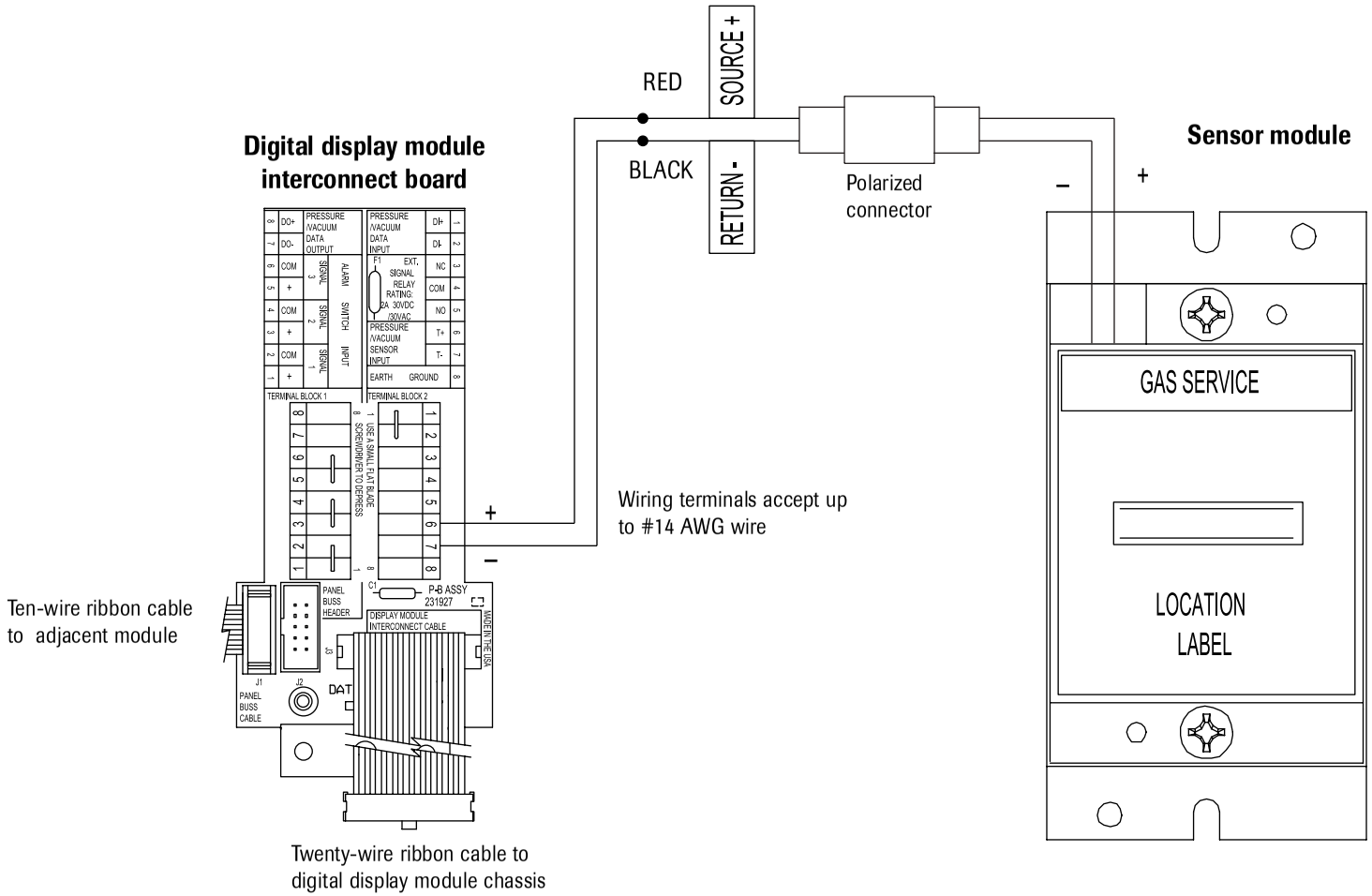
5 Duplex Vacuum Pump System

Wiring Schematic: Power Supply Module



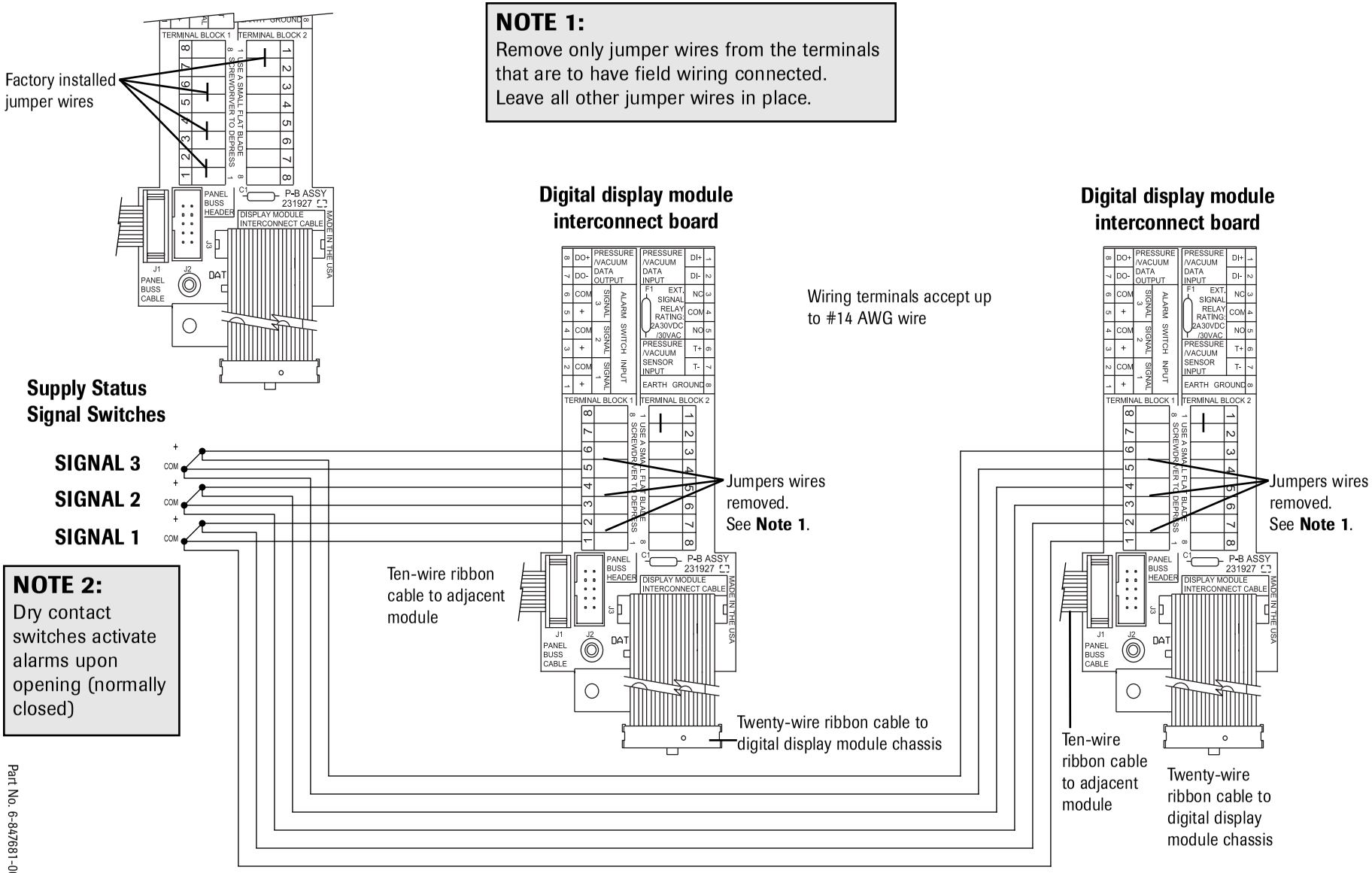
Schematic 1. Power Supply Module

NOTE:
Maintain correct sensor polarity.



Schematic 2. Sensor Module to Digital Display Module

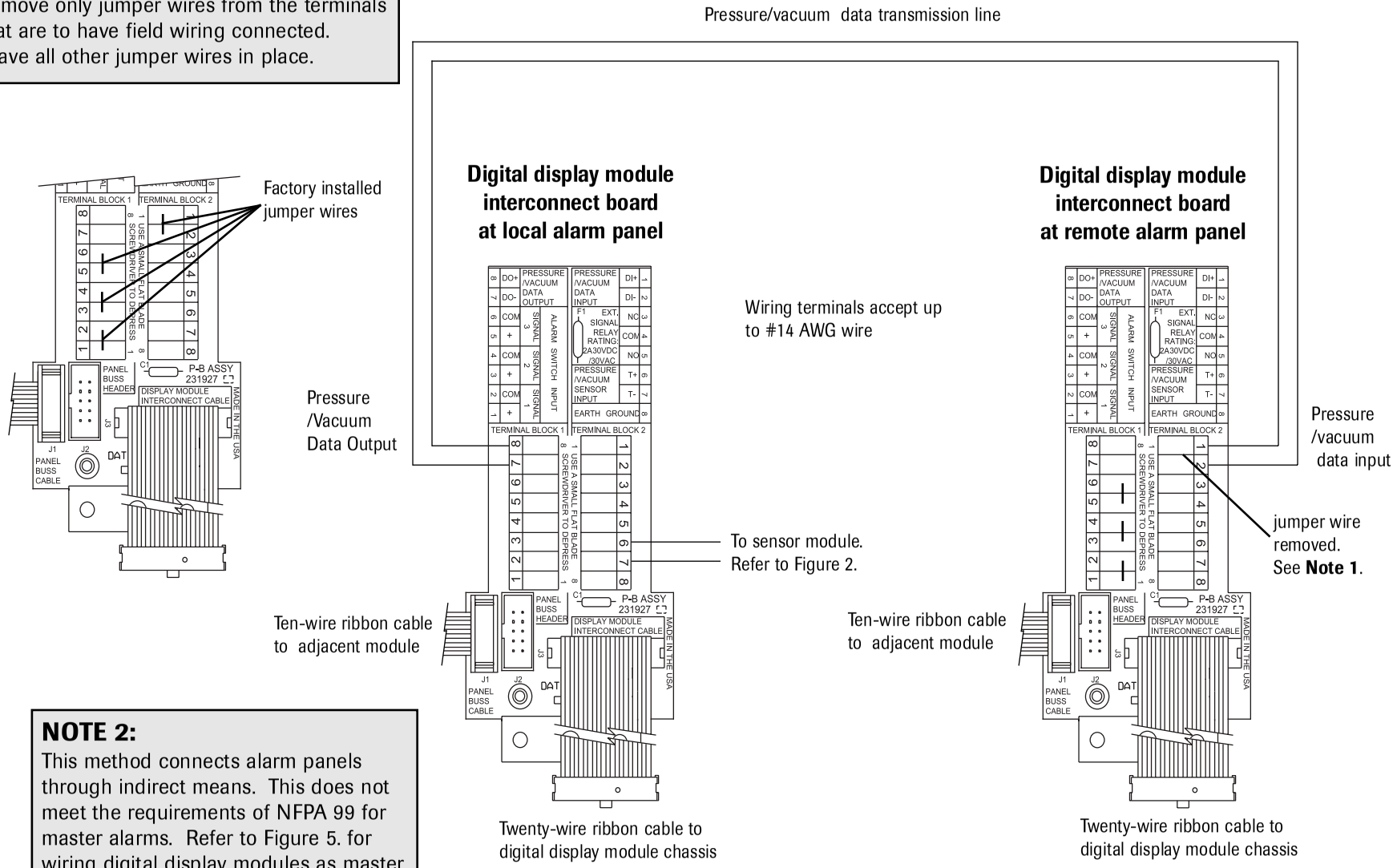
NOTE 1:
Remove only jumper wires from the terminals that are to have field wiring connected. Leave all other jumper wires in place.



NOTE 2:
Dry contact switches activate alarms upon opening (normally closed)

Schematic 3. Digital Display Module User-Assigned Signals

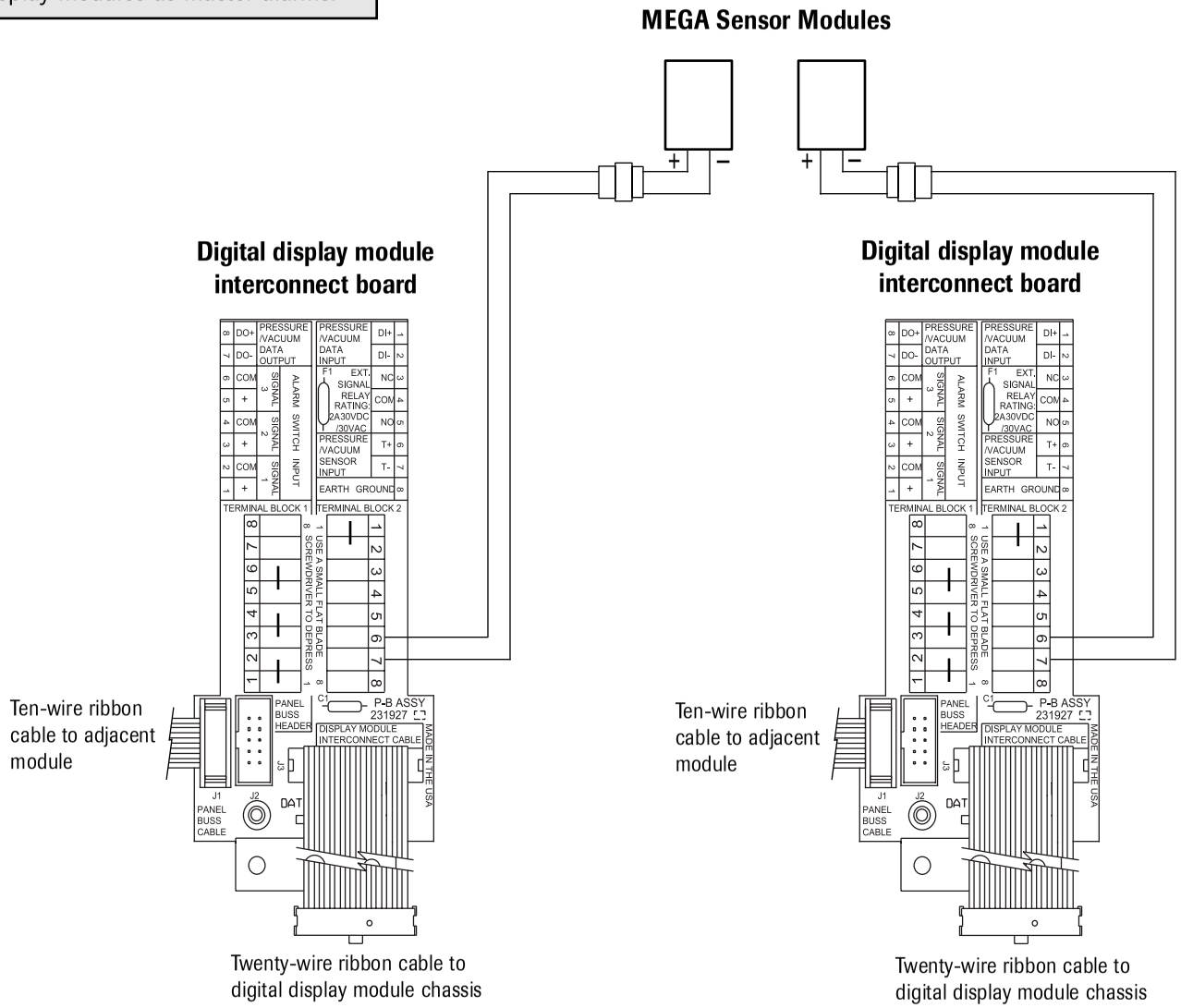
NOTE 1:
Remove only jumper wires from the terminals that are to have field wiring connected. Leave all other jumper wires in place.



NOTE 2:
This method connects alarm panels through indirect means. This does not meet the requirements of NFPA 99 for master alarms. Refer to Figure 5. for wiring digital display modules as master alarms.

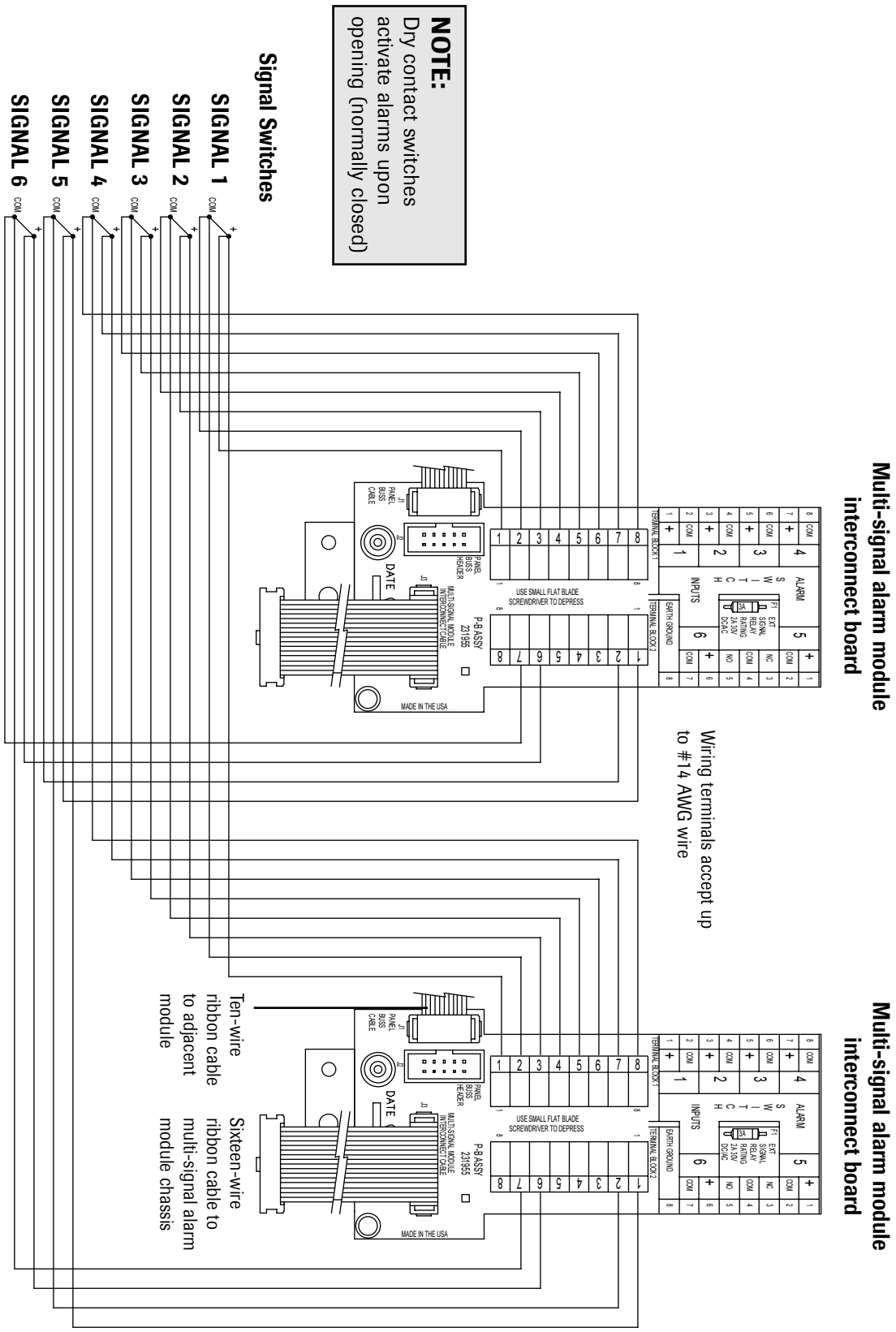
Schematic 4. Digital Display Module Remote Pressure/Vacuum Transmission

NOTE:
Two MEGA sensor modules are required to meet NFPA 99 requirements when using digital display modules as master alarms.

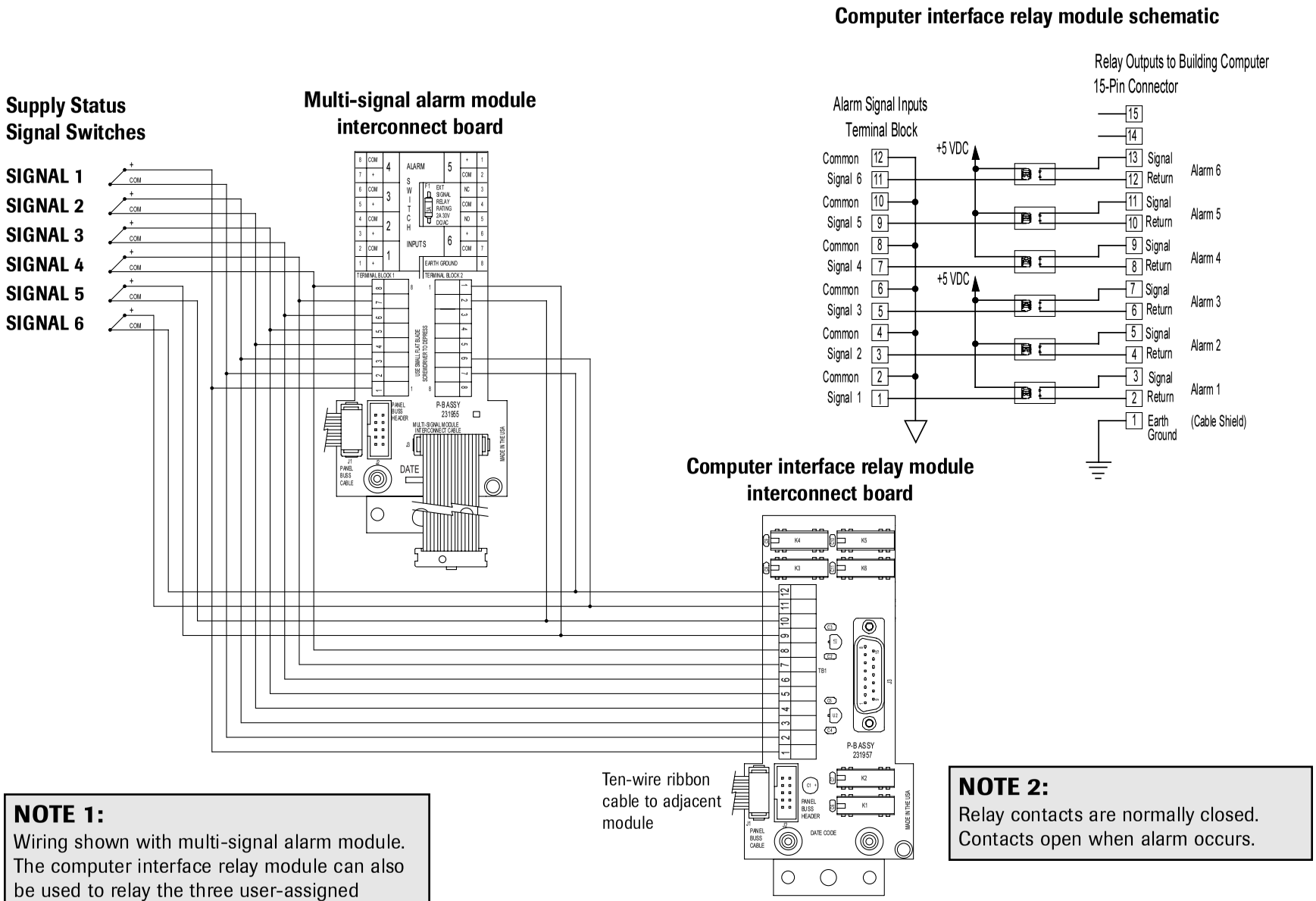


Schematic 5. Digital Display Modules As Master Alarms

Wiring Schematic: Multi-Signal Alarm Module



Schematic 6. Multi-Signal Alarm Module



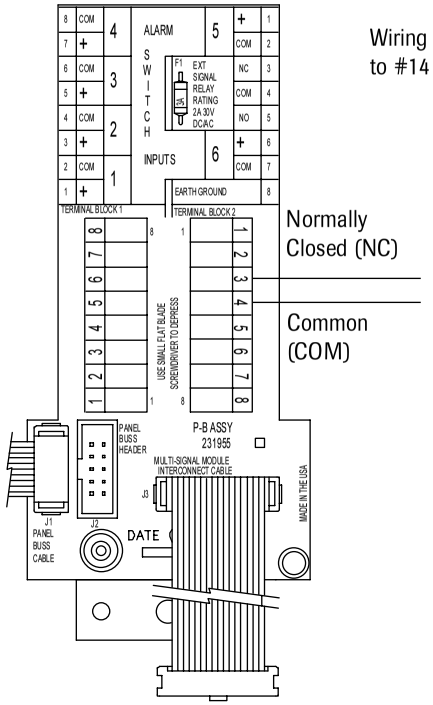
NOTE 1:
Wiring shown with multi-signal alarm module. The computer interface relay module can also be used to relay the three user-assigned signals on a digital display module.

NOTE 2:
Relay contacts are normally closed. Contacts open when alarm occurs.

Schematic 7. Computer Interface Relay Module

NOTE:
The external signal relay on the digital display module or the multi-signal alarm module is a general fault relay. It activates upon any alarm condition on the module.

Multi-signal alarm module interconnect board



Wiring terminals accept up to #14 AWG wire

Normally Closed (NC)

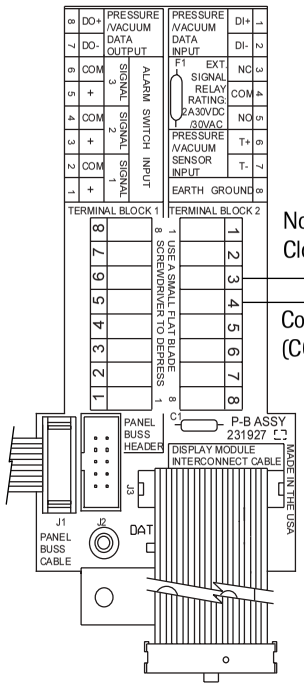
Relay output to other equipment 30 VDC/30 VAC 2A Max

Common (COM)

Ten-wire ribbon cable to adjacent module

Sixteen-wire ribbon cable to multi-signal alarm module chassis

Digital display module interconnect board



Normally Closed (NC)

Relay output to other equipment 30 VDC/30 VAC 2A Max

Common (COM)

Ten-wire ribbon cable to adjacent module

Twenty-wire ribbon cable to digital display module chassis

Schematic 8. Digital Display Module/Multi-Signal Alarm Module External Signal Relay

Nitrogen

P/N 6-129021-01

1. Switch contacts shown in dynamic 175 psi line pressure condition.
2. Circuit No. 1: Set for open contacts 0-140 psi, closed above 140 psi.
3. Circuit No. 2: Set for closed contacts 190 psi, open above 190 psi.

Oxygen

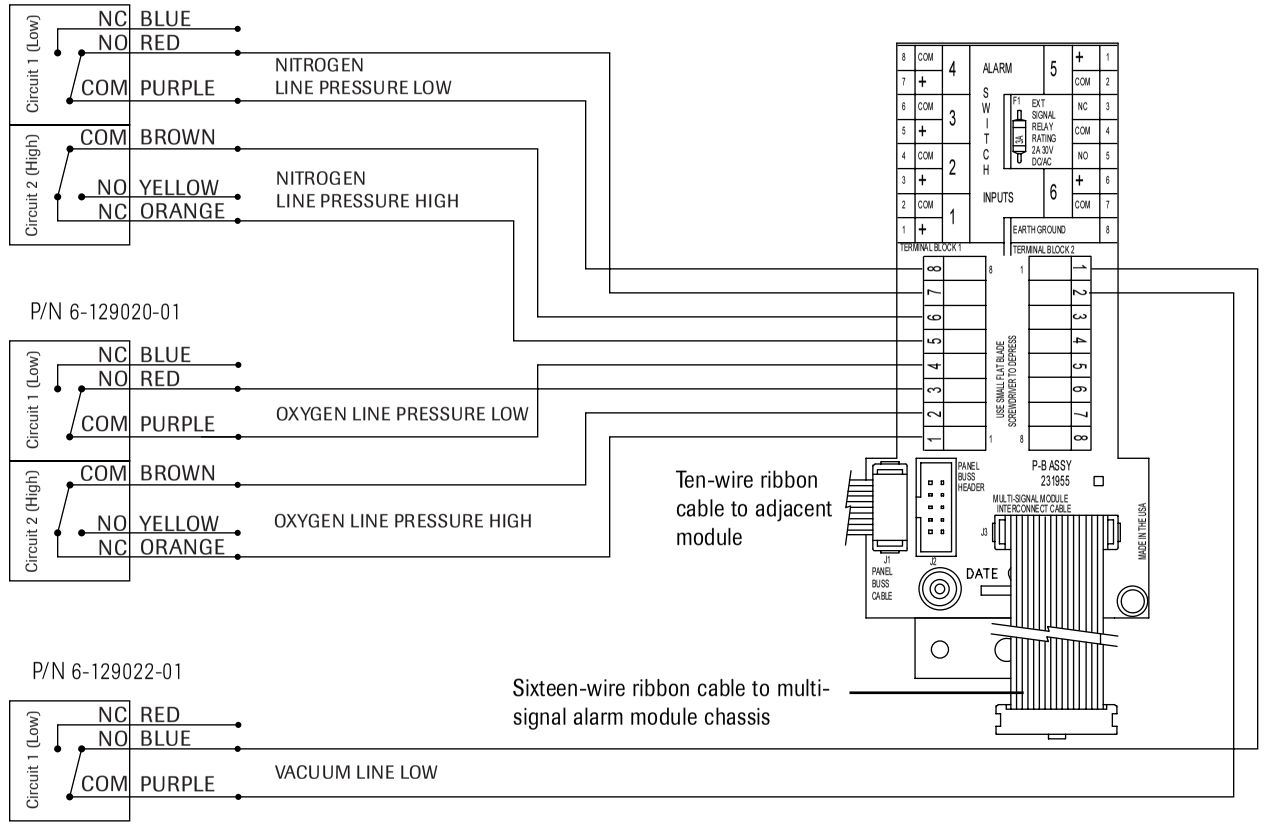
P/N 6-129020-01

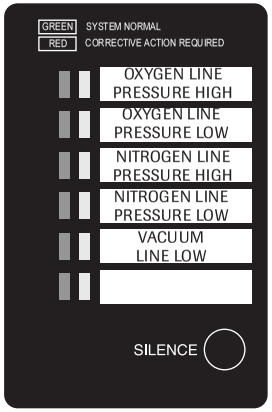
1. Switch contacts shown in dynamic 50 psi line pressure condition.
2. Circuit No. 1: Set for open contacts 0-40 psi, closed above 40 psi.
3. Circuit No. 2: Set for closed contacts 0-60 psi, open above 60 psi.

Vacuum

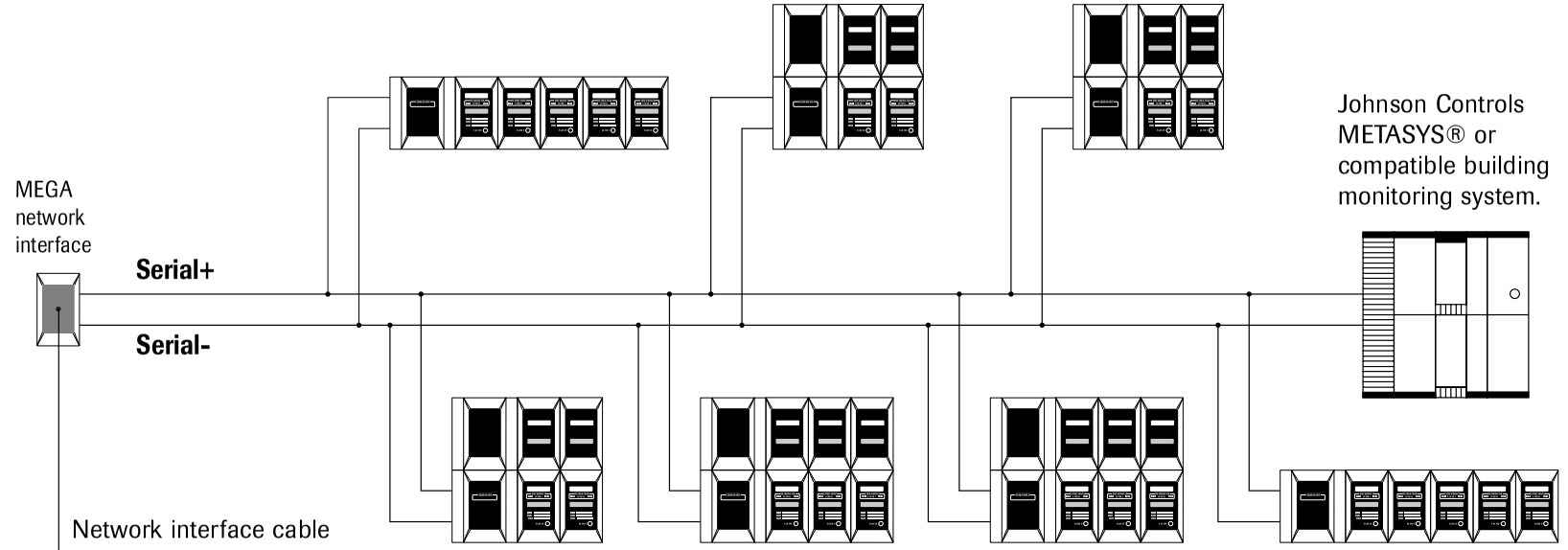
P/N 6-129022-01

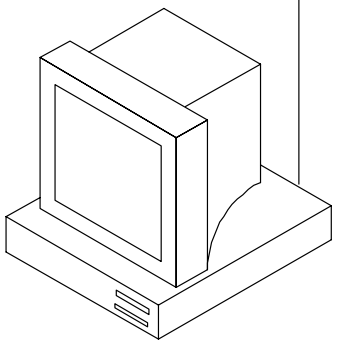
1. Switch contacts shown in dynamic 20 in Hg vacuum condition.
2. Circuit No. 1: Set for open contacts 0-12 in Hg vacuum, closed for vacuum levels above 12 in Hg.





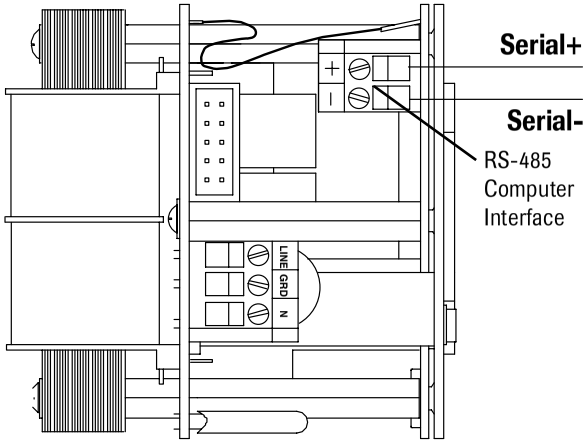
Schematic 9. Pressure/Vacuum Switches to Multi-Signal Alarm Module





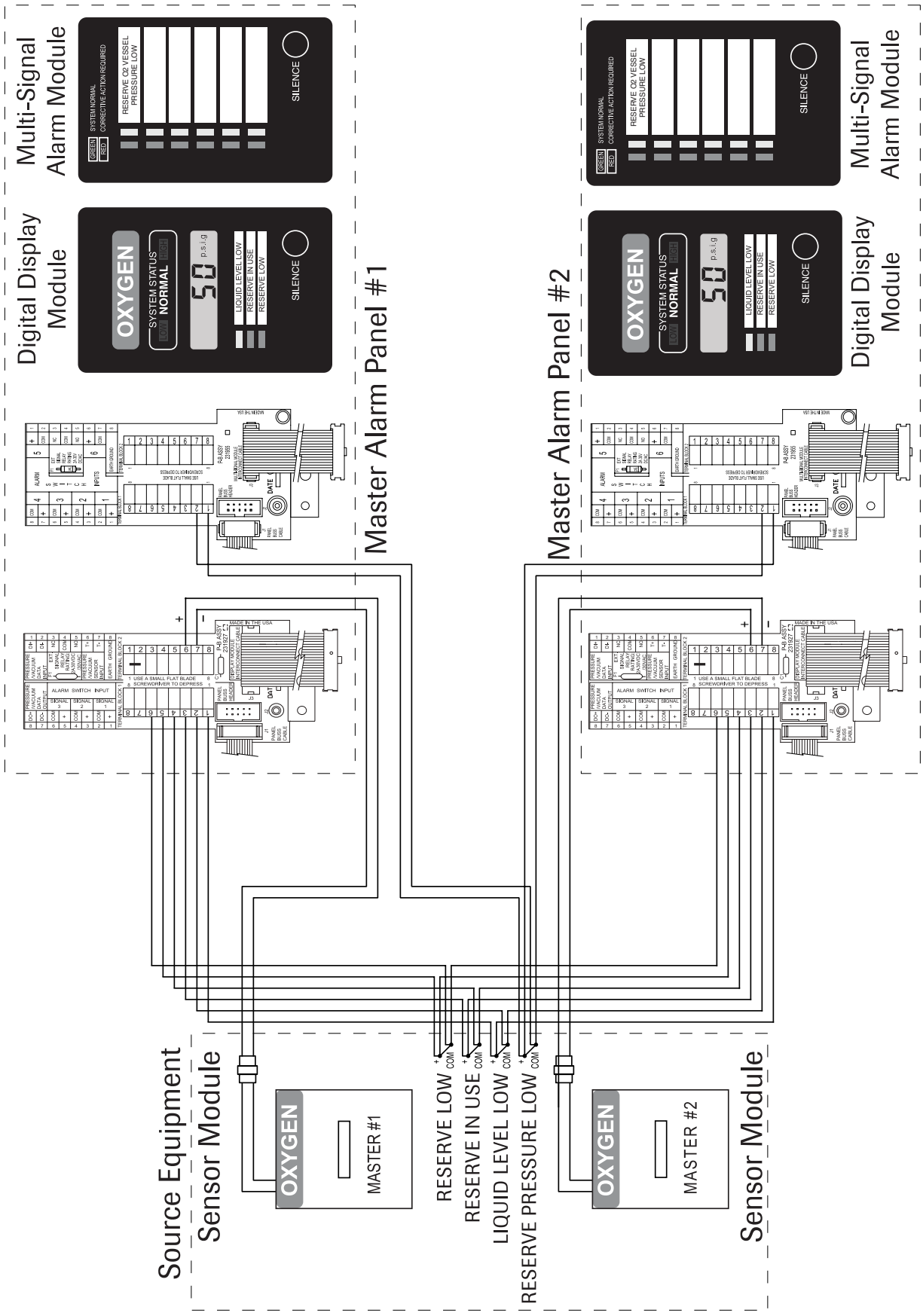
Personal computer
with MEGA Network
Monitor software

Power Supply Module (top view)

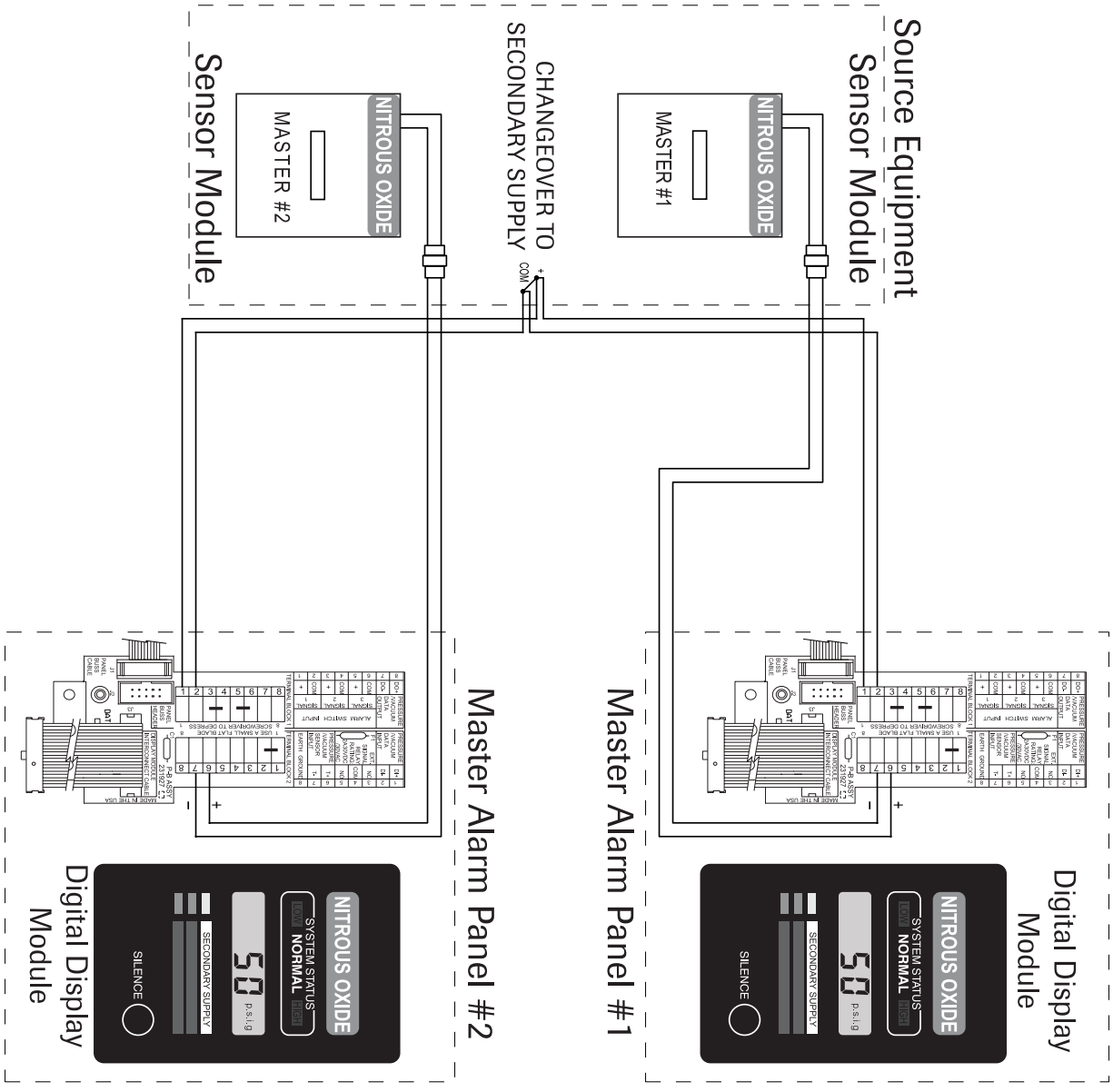


NOTE:
Maintain correct network wiring polarity.

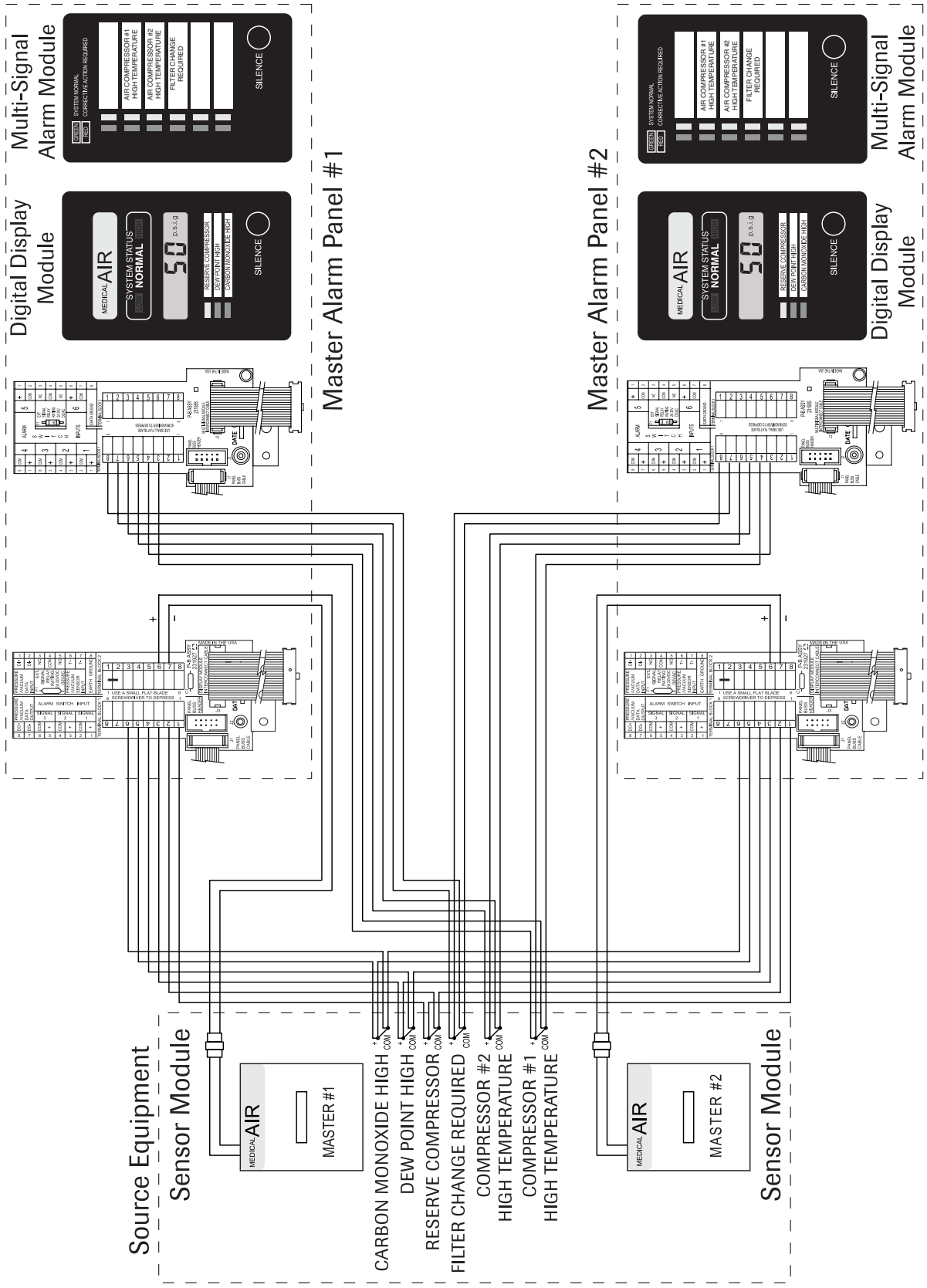
Schematic 10. MEGA Network



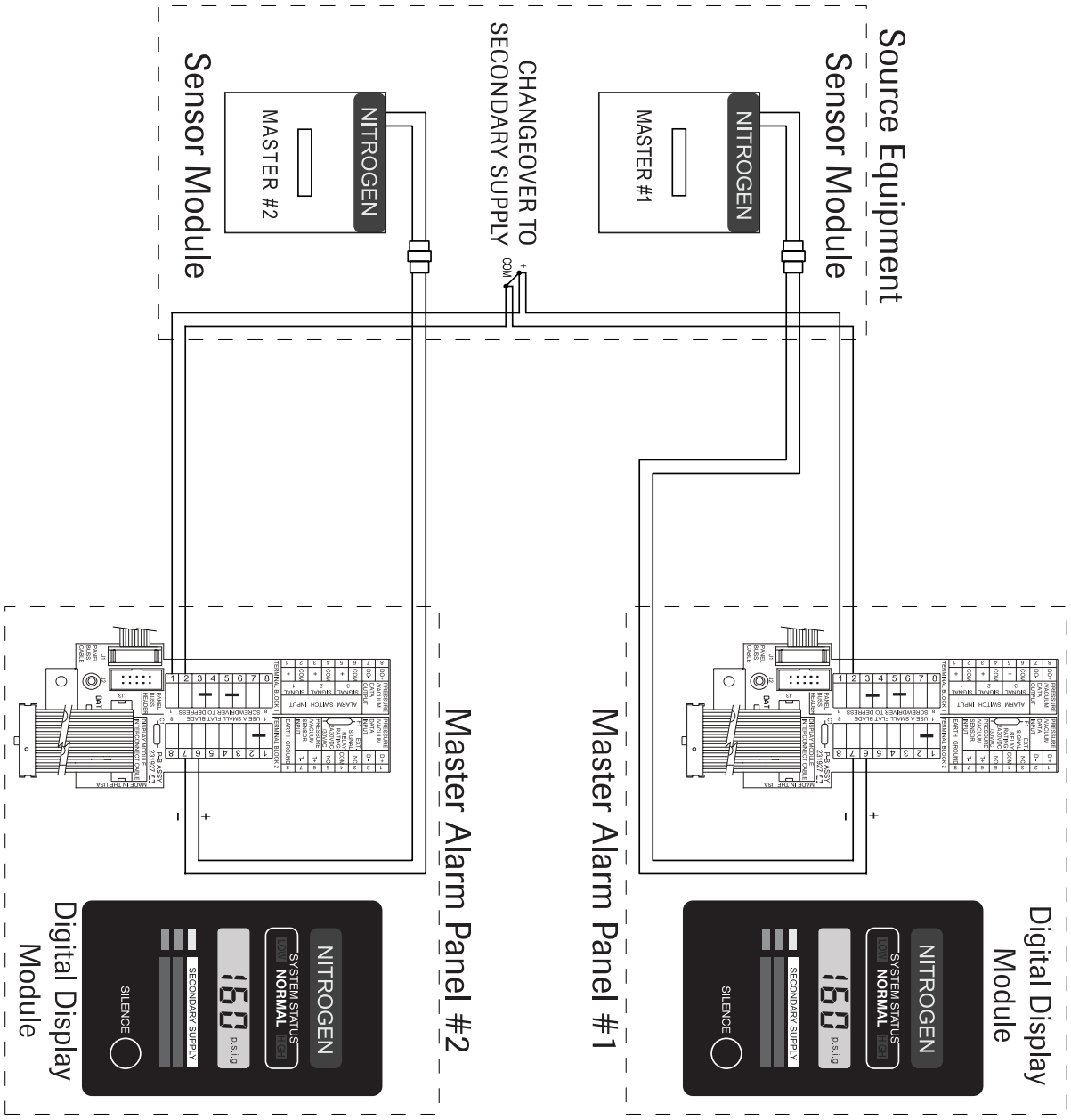
Example 1. Bulk Oxygen System With Reserve



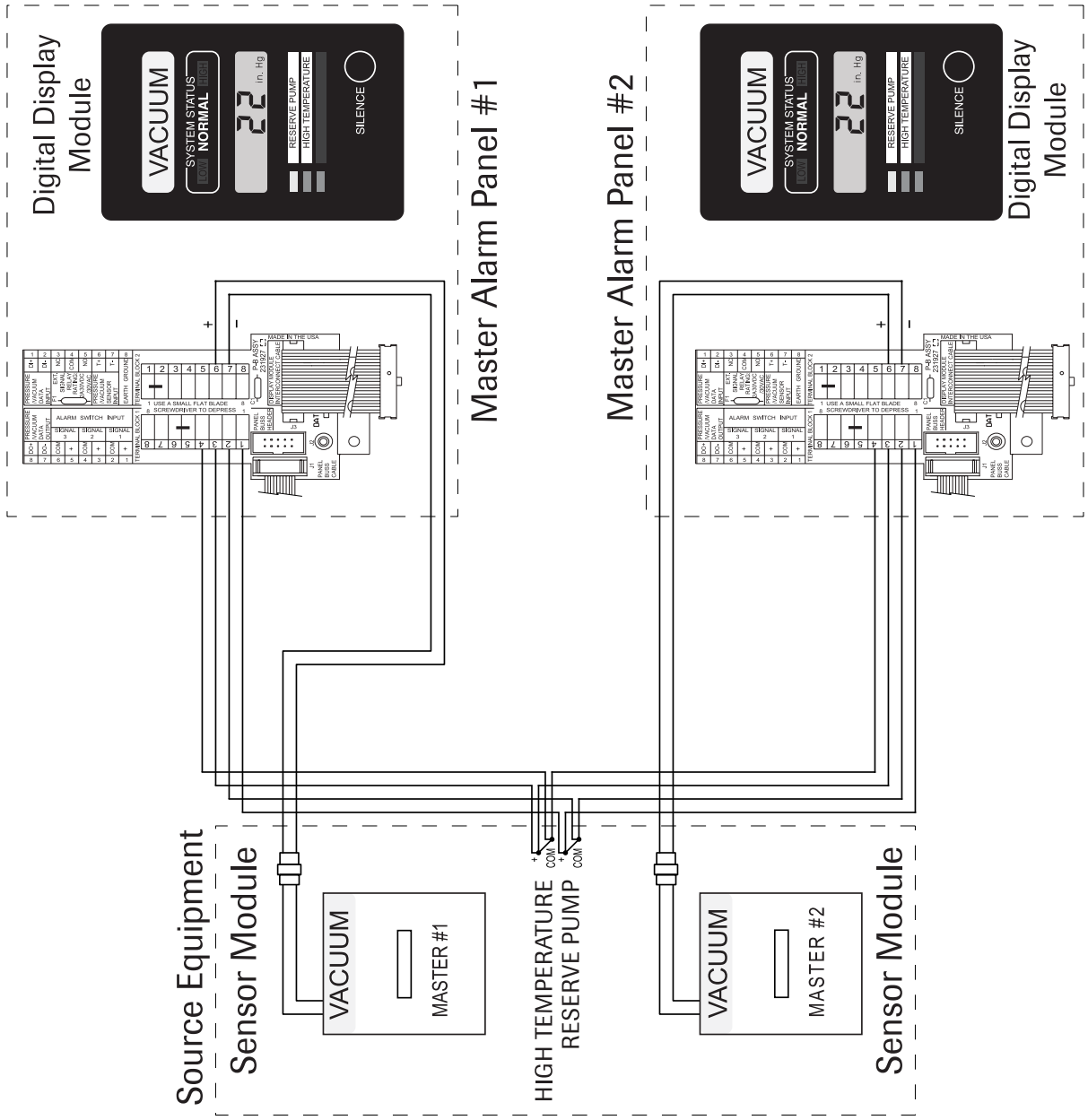
Example 2. Nitrous Oxide Manifold System Without Reserve



Example 3. Duplex Medical Air Compressor



Example 4. Nitrogen Manifold System Without Reserve



Example 5. Duplex Vacuum Pump System

Power Supply Module

WARNING: SHOCK HAZARD
Verify supply voltage is turned off at circuit breakers prior to connection of power supply module. Serious injury or death can result from electrical shock.

1. Remove the dust cover from the mounting box.

2. Strip 1/4" insulation from LINE, GROUND and NEUTRAL leads and insert into the appropriate terminals on the POWER SUPPLY TRANSFORMER terminal block. Tighten the terminal screws. Refer to **Figure 10** and **Schematic 1**.

3. Connect the ten-wire ribbon cable from the adjacent module to the connector labeled ALARM CONNECTION on the power supply chassis. Refer to **Figure 10** and **Schematic 1**.

4. If alarms are to be networked, strip 1/4" insulation from network leads and insert into the appropriate terminals on the COMPUTER INTERFACE terminal block. Tighten the terminal screws. Refer to **Figure 10** and **Schematic 10**.

6. Install the power supply module chassis in the mounting box and secure with (4) #6-32 x 9/16" screws. Refer to **Figure 11**.

7. Install the location label. Refer to **Figure 11**.

8. Install the trim plate using (2) #6-32 x 3/4" screws. **Do not tighten**. Refer to **Figure 12**.

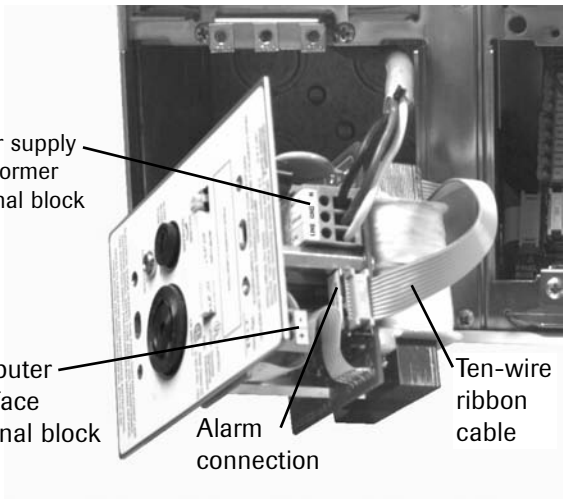


Figure 10

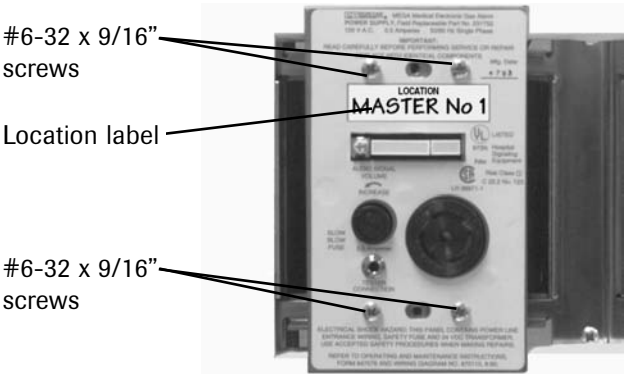


Figure 11

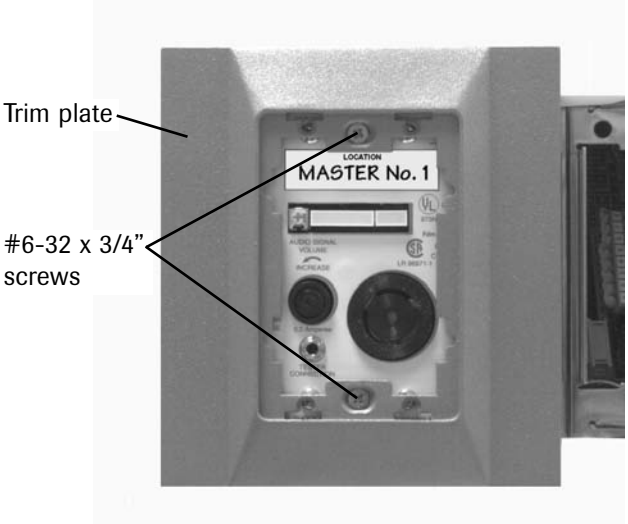


Figure 12

Digital Display Module

1. Remove the dust cover from the mounting box.

2. Connect the twenty-wire ribbon cable from the interconnect board to the digital display module chassis. Refer to **Figure 13**.

3. Install the digital display module chassis into the mounting box using (2) #6-32 x 1-1/2" screws. **Do not tighten.** Refer to **Figure 14**.

4. If user-assigned signal inputs are in use, install system status labels. Refer to **Figure 14**.

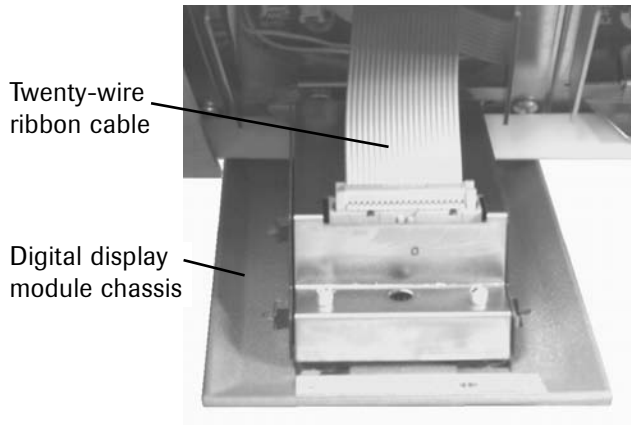


Figure 13

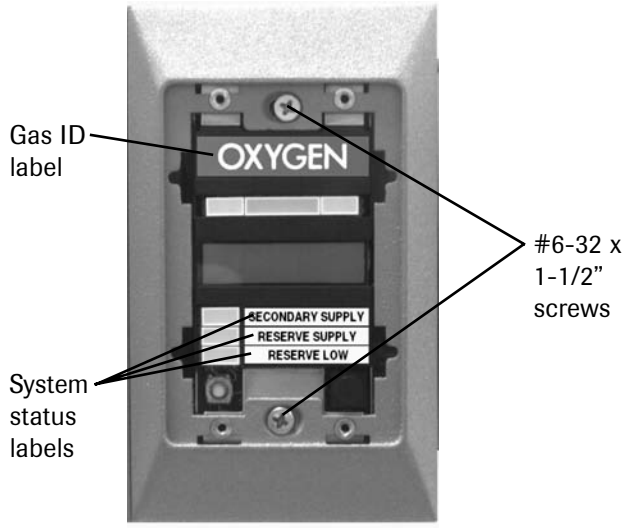


Figure 14

Sensor Module

1. Remove the dust cover from the mounting box.

2. Join the polarized connector in the mounting box to the mating connector on the sensor. Refer to **Figure 15**.

IMPORTANT:
Remove the blue protective netting from the sensor connector.

3. Insert the sensor into the valve opening in the gas/vacuum service rough-in. An indexing pin provides for proper orientation and prevents gas service cross-connection. Push the sensor all the way in and secure with (2) #6-32 x 3/4" screws.

4. Tuck excess wiring into the open space behind the sensor.

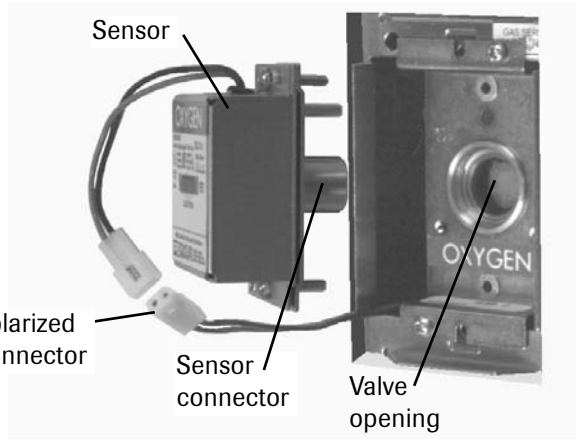


Figure 15

Sensor Module (Continued)

5. Mark the location monitored by the sensor in the space provided on the sensor label. Refer to **Figure 16**.

6. Install trim plate using (2) #6-32 x 1-1/2" screws. **Do not tighten**. Refer to **Figure 16**.

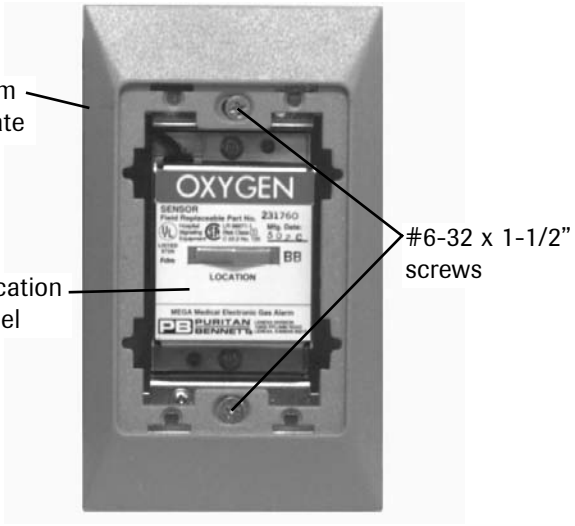


Figure 16

Multi-Signal Alarm Module

1. Remove the dust cover from the mounting box.

2. Install system status labels on the multi-signal alarm module chassis.

NOTE:
The system status label sheet contains the most typical messages and additional blank labels for user-specific messages.

3. Connect the sixteen-wire ribbon cable from the multi-signal alarm module interconnect board to the connector on the back of the multi-signal alarm module chassis.

4. Install the multi-signal alarm module chassis into the mounting box using (2) #6-32 x 1-1/2" screws. **Do not tighten**. Refer to **Figure 17**.

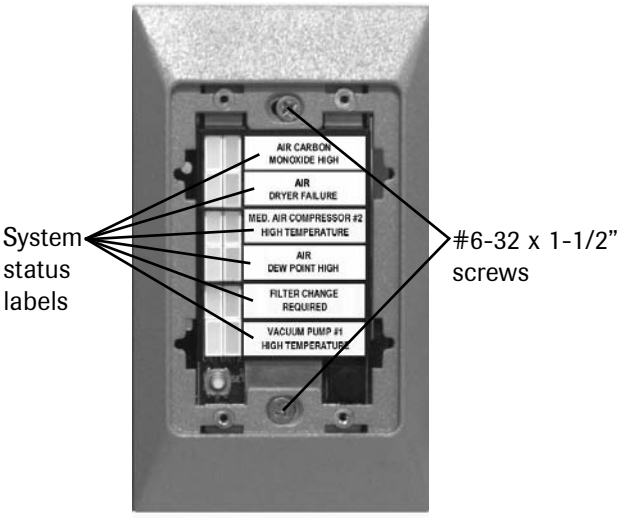


Figure 17

Computer Interface Relay Module

1. Install trim plate using (2) #6-32 x 1-1/2" screws. **Do not tighten**. Refer to **Figure 18**.

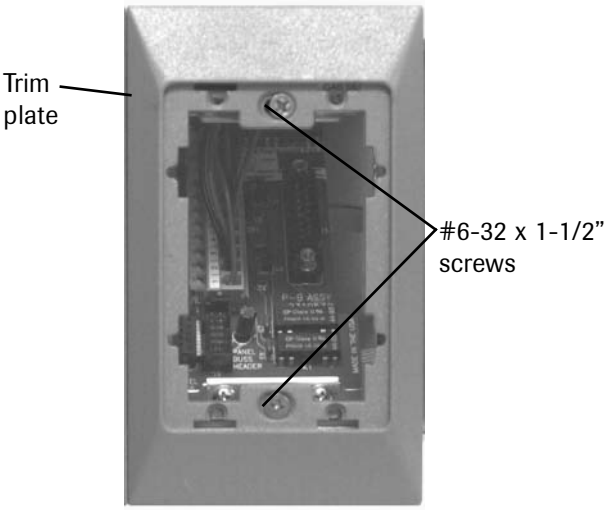


Figure 18

Blank Module

1. Install trim plate using (2) #6-32 x 1-1/2" screws. **Do not tighten**.

Finish Installation

Trim Plate Alignment

1. Align all trim plates on the alarm panel and tighten the screws.

NOTE:
Do not over-tighten screws.

Cover Plates (All Modules)

1. Remove the protective film from the front and back of the cover plate.

2. Insert the two tabs at the bottom of the cover plate into the slots in the base of the trim plate opening. Bend the cover plate slightly until the two tabs at the top of the cover plate fit into the two slots at the top of the trim plate opening. Refer to **Figure 19**.

NOTE:
Verify the cover plate is for the correct type of alarm module.

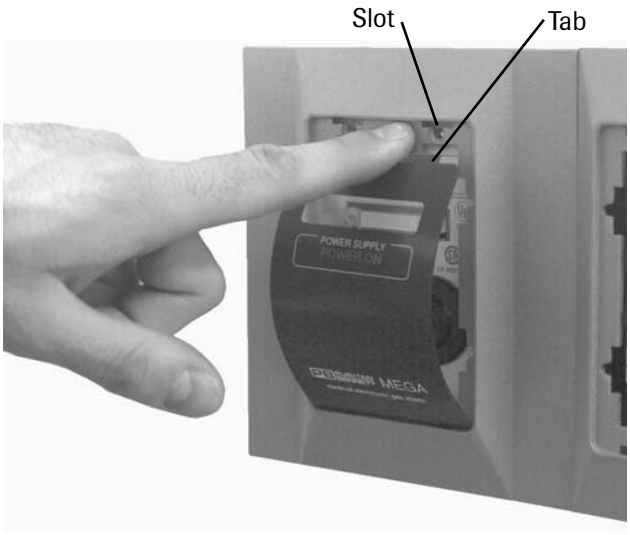
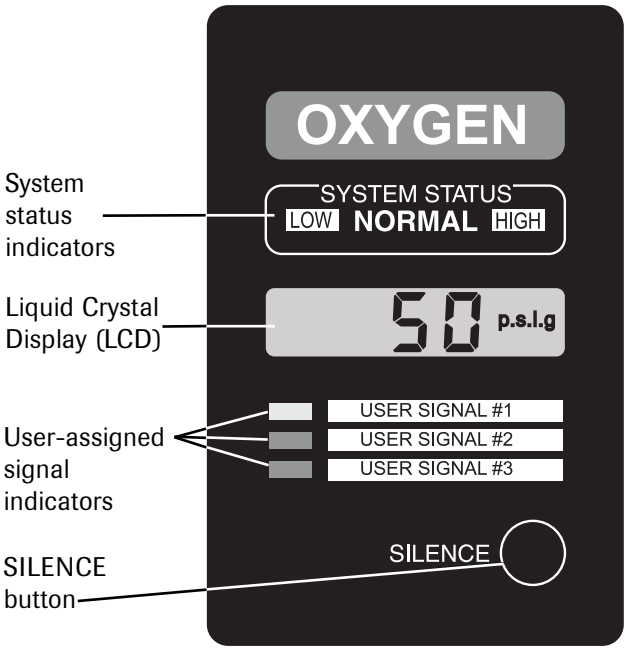


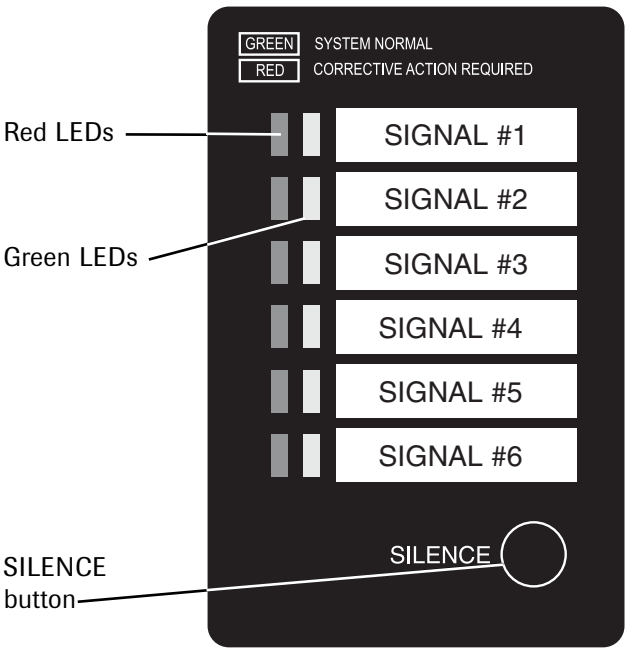
Figure 19

Start-Up and Checking

1. Turn on electrical power to the alarm panel.
2. Make the following observations:
   - The POWER ON light illuminates on the power supply module.
   - Digital display modules and multi-signal alarm modules warm-up for ten seconds. During the warm-up no alarms sound and all LEDs indicate normal. After the warm-up period any alarm conditions activate.
   - Multi-signal alarm modules indicate a red LED and audible alarm for any signals with open switches or unused signals.
3. Press the SILENCE button on **EACH** alarming module to silence the audible alarms.
4. Pressurize the piping system (medical gas and vacuum).
5. Make the following observations:
   - Digital display module LCDs display the actual pipeline pressure or vacuum levels.
   - If the levels are within pre-set limits, the system status indicators show NORMAL.
   - If the pressure or vacuum level is outside the pre-set limits, the system status indicators show HIGH or LOW.
   - If a fault code is displayed (-F1-, -F2-, or -F3-) refer to **Troubleshooting Guide**.
   - If wired, digital display module user-assigned signals indicate the current status from dry-contact switches.
   - Multi-signal alarm modules indicate the current status from dry-contact switches. Unused signals can be disabled. Refer to **Set-Up Procedure**.



Digital Display Module



Multi-Signal Alarm Module

NOTE:
If any modules appear to be malfunctioning, refer to **Troubleshooting Guide**.

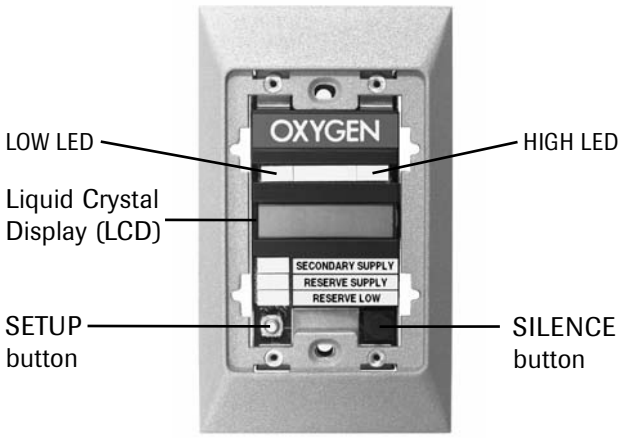
Operation

Set-Up Procedure

Digital Display Module

Digital display modules are shipped from the factory with the following settings:

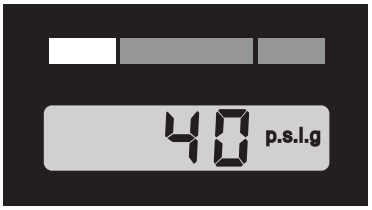
Gas/Vacuum Service	Alarm Set Points	
	Low	High
Pressure (50 psig)	40 psig	60 psig
Nitrogen	140 psig	190 psig
Vacuum/WAGD	12 in Hg.	32 in Hg.



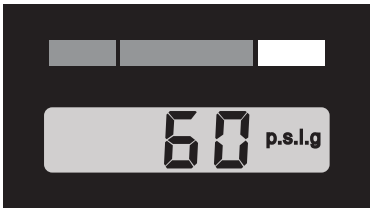
Changing units and alarm set points:

1 Remove the cover plate.
2 Press the SETUP button to enter setup mode. SEt will display for two seconds.
3. The display unit of measure will flash. Press the SILENCE button to cycle through the units (psig, in. Hg, kPa).
4. Press the SETUP button to advance to the low alarm set point. The LOW LED illuminates and the low set point flashes.
5. Press the SILENCE button to increment the low set point. Press and hold the SILENCE button to increase the increment rate. After the display reaches the maximum (200 psig, 32 in. Hg, or 1380 kPa) it rolls back to 0.
6. Press the SETUP button to advance to the high alarm set point. The HIGH LED illuminates and the high set point flashes.
7. Press the SILENCE button to increment the high set point. Press and hold the SILENCE button to increase the increment rate. After the display reaches the maximum (200 psig, 32 in. Hg, or 1380 kPa) it rolls back to 0.
8. Press the SETUP button to save changes and exit setup mode. The LCD displays donE for two seconds, then the module returns to monitoring mode.

Display Units



Low Alarm Set Point



High Alarm Set Point

NOTE:
If the module is idle for more than one minute during the setup procedure, the module will default to the previously set program.

Set-Up Procedure

Digital Display Module (Advanced)

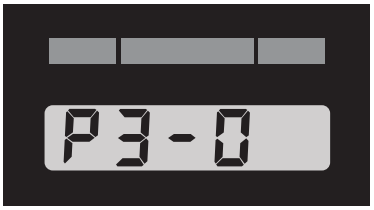
Warning:
The following advanced setup options should only be performed by qualified personnel. Improperly set addresses can cause the alarm not to communicate with a computer or building monitoring system.

The network address uniquely identifies each digital display module to a personal computer or Johnson Controls Metasys® system.

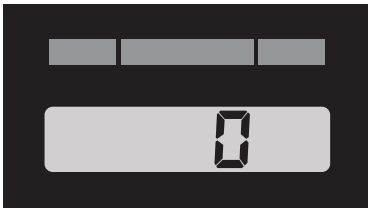
An external computer is required to program network addresses on digital display modules prior to software revision 3.0.

The reading offset is used to adjust the display by a maximum of ±2 psig for pressure or ±1 in Hg. for vacuum (this feature is only available with software 3.0 or higher).

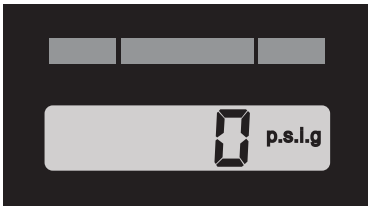
Digital display modules are shipped from the factory with the network address and the reading offset set to zero.



Software Revision



Network Address



Reading Offset

Changing network address and reading offset: (Software 3.0 and higher)

1 Remove the cover plate.
2. Press the SETUP button then quickly press the SILENCE button.
3. The software revision will display for approximately 4 seconds (e.g. P3-0).
4. The network address will flash.
5. Press the SILENCE button to increment the address. Press and hold the SILENCE button to increase the increment rate. After the display reaches the maximum of 255 it rolls back to 0.
6. Press the SETUP button to advance to the reading offset. The reading offset flashes.
7. Press the SILENCE button to increment the reading offset. The offset will cycle 0,1,2,-2,-1 and then roll back to 0.
8. Press the SETUP button to save changes and exit setup mode. The LCD displays donE for two seconds, then the module returns to monitoring mode.

NOTE:
If the module is idle for more than one minute during the setup procedure, the module will default to the previously set program.

Set-Up Procedure

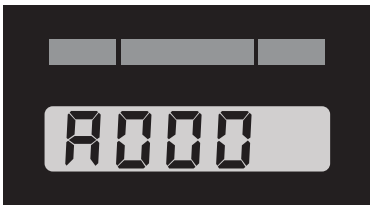
Digital Display Module (Advanced)

Warning:
The following advanced setup options should only be performed by qualified personnel. Improperly set addresses can cause the alarm not to communicate with a computer or building monitoring system.

Viewing the firmware revision and network address: (Software 2.1 and lower)

1 Remove the cover plate.
2. Press the SETUP button then quickly press the SILENCE button.
3. The software revision displays for approximately 4 seconds (e.g. P2-1).
4. The network address displays for approximately 5 seconds (e.g. A000), then the module returns to monitoring mode.

Software Revision



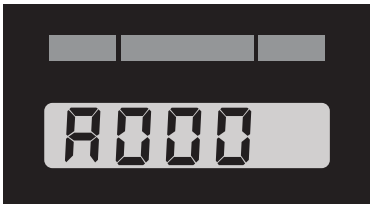
Network Address

Resetting the network address to zero: (Software 2.1 and lower)

1 Remove the cover plate.
2. Press the SETUP button then quickly press the SILENCE button.
3. The software revision displays for approximately 4 seconds (e.g. P2-1).
4. The network address displays for approximately 5 seconds.
5. While the network address is displayed, press and hold the SILENCE button until donE is displayed.

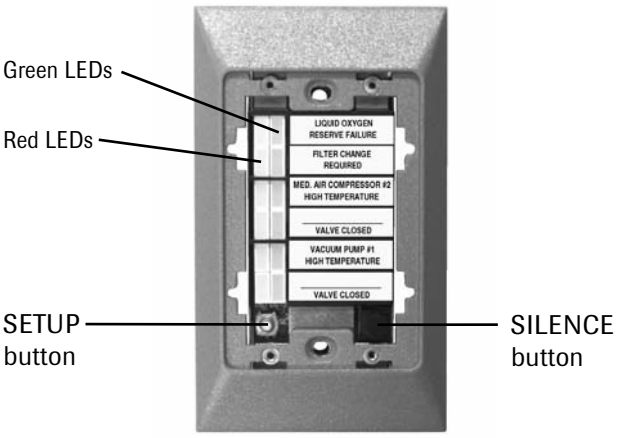
Software Revision

Network Address



Set-Up Procedure

Multi-Signal Alarm Module



Changing signal options:

1. Remove the cover plate.
2. Press the SETUP button to enter setup mode.
3. The top green LED flashes briefly, then the red LED turns on.
4. Press the SILENCE button to cycle through the following signal options:
   - Constant Red
   - Flashing Red
   - Disable

NOTE:
Disable is only available if the signal input is not wired to a signal switch from a supply source. If a switch is later wired to the signal input, the signal will automatically be reactivated with the Constant Red signal option.

5. Press the SETUP button to advance to the next alarm signal.
6. Repeat step 4 for each signal.
7. After all of the alarm signals have been programmed, press the SETUP button to save changes and exit setup mode.

NOTE:
If the module is idle for more than one minute during the setup procedure, the module will default to the previously set program.

Set-Up Procedure

Multi-Signal Alarm Module (Advanced)

The network address uniquely identifies each multi-signal alarm module to a personal computer or Johnson Controls Metasys® system.

An external computer is required to program network addresses on multi-signal alarm modules. Contact Beacon Medical Products for assistance.

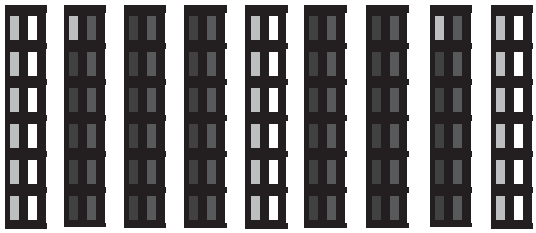
Technical Support: 1-800-676-1115

Warning:
The following advanced setup options should only be performed by qualified personnel. Improperly set addresses can cause the alarm not to communicate with a computer or building monitoring system.

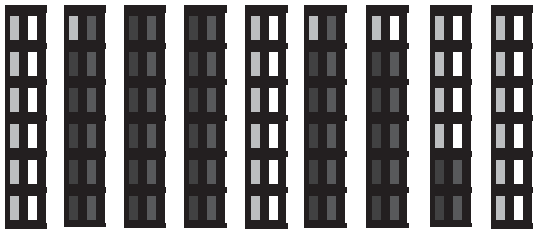
Viewing the software revision and network address:

1 Remove the cover plate.
2. Press the SETUP button and SILENCE buttons simultaneously.
3. All LEDs will illuminate for approximately 2 seconds.
4. A number of LEDs representing the first digit of the software revision will display for 1 second.
5. A number of LEDs representing the second digit of the software revision will display for 1 second.
6. A number of LEDs representing the third digit of the software revision will display for 1 second.
7. All LEDs will illuminate for approximately 2 seconds.
8. A number of LEDs representing the first digit of the network address will display for 1 second.
9. A number of LEDs representing the second digit of the network address will display for 1 second.
10. A number of LEDs representing the third digit of the network address will display for 1 second.
11. All LEDs will illuminate for approximately 2 seconds then the module returns to monitoring mode.

Examples:



1 0 0 0 0 1
Software 1.0.0 Address 001



1 0 0 1 2 8
Software 1.0.0 Address 128

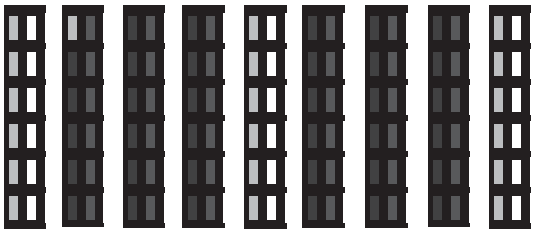
Note:
No LEDs illuminated for one second indicates zero for that digit.

Set-Up Procedure

Multi-Signal Alarm Module (Advanced)

Resetting the network address to zero:

1 Remove the cover plate.
2. Press the SETUP button and SILENCE buttons simultaneously.
3. All LEDs will illuminate for approximately 2 seconds.
4. A number of LEDs representing the first digit of the firmware revision will display for 1 second.
5. A number of LEDs representing the second digit of the firmware revision will display for 1 second.
6. A number of LEDs representing the third digit of the firmware revision will display for 1 second.
7. All LEDs will illuminate for approximately 2 seconds.
8. A number of LEDs representing the first digit of the network address will display for 1 second.
9. Press and hold the SILENCE button until all LEDs flash briefly. This resets the network address to zero.
10. The module returns to monitoring mode.



Note:
No LEDs illuminated for one second indicates zero for that digit.

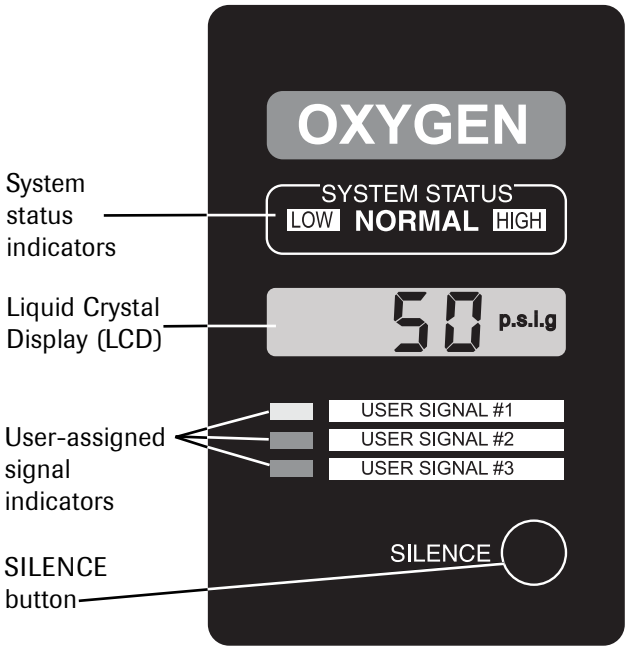
Monitoring Mode

Monitoring mode is the normal operating mode of the MEGA System.

Digital Display Module

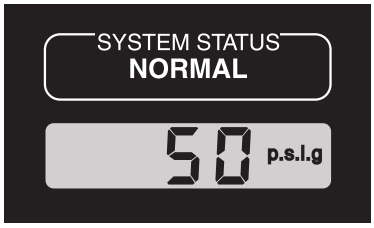
Digital display modules monitor pipeline pressure or vacuum and dry-contact switches.

- If all piping system functions are normal, the green NORMAL indicator is illuminated.
- If an alarm condition occurs, the audible alarm sounds and the appropriate alarm indicator(s) illuminate.
- Press the SILENCE button to silence the audible alarm.
- The visual indicator(s) remain illuminated as long as the alarm condition remains.
- Notify appropriate personnel of the alarm condition.

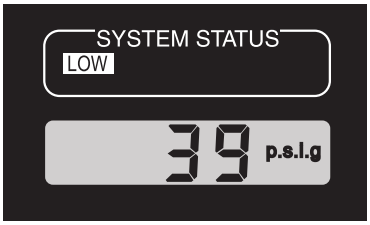


Pressure or Vacuum Level Monitoring:

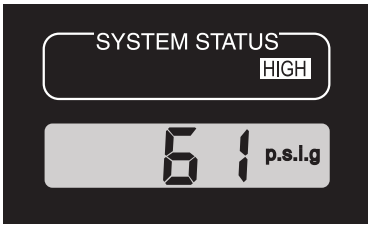
- The LCD displays the pipeline pressure or vacuum level.
- If the pressure or vacuum is normal, the system status indicator is NORMAL.
- If the pressure or vacuum level is below the low set-point, the system status indicator is LOW and there is an audible alarm.
- If the pressure or vacuum level is above the high set-point, the system status indicator is HIGH and there is an audible alarm.



Normal



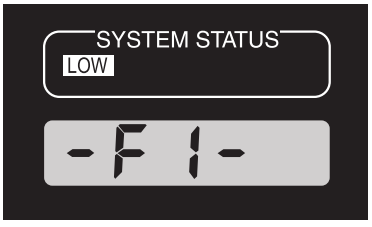
Low Alarm



High Alarm

Fault Codes:

- An open circuit in the sensor module or wiring disconnected results in a flashing LOW system status indicator, -F1- in the display and an audible alarm.
- A fault in the sensor module results in a flashing LOW system status indicator, -F2- in the display and an audible alarm.



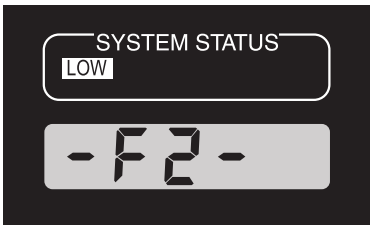
Open Circuit

Monitoring Mode

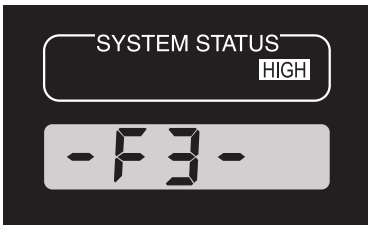
Digital Display Module (Continued)

Fault Codes (Continued):

- A short circuit in the sensor module or connecting wiring results in a flashing HIGH system status indicator, -F3- in the display and an audible alarm.



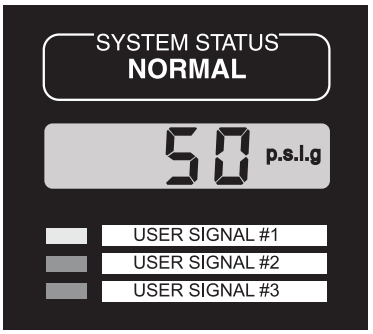
Sensor Fault



Short Circuit

User Assigned Alarm Signals:

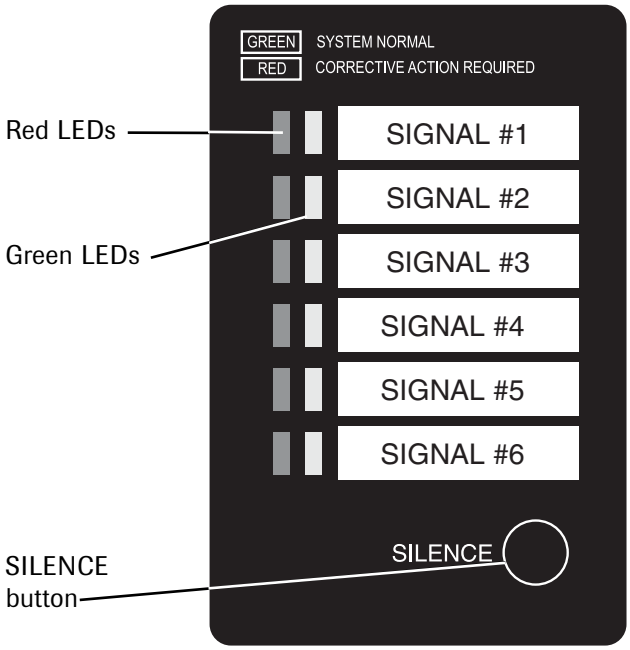
- When an alarm condition occurs for user assigned signal #1, the system status NORMAL light flashes, the yellow signal indicator LED illuminates and the audible alarm sounds.
- When an alarm condition occurs for user assigned signal #2, the system status indicator goes off, the red signal indicator LED illuminates and the audible alarm sounds.
- When an alarm condition occurs for user assigned signal #3, the system status indicator goes off, the red signal indicator LED flashes and the audible alarm sounds.
- Multiple alarms occurring simultaneously results in multiple LEDs illuminated. The audible alarm sounds as each new alarm occurs.



Multi-Signal Alarm Module

Multi-signal alarm modules monitor up to six dry-contact switches.

- If the signal is normal (switch contacts closed), the green signal indicator LED for the signal is illuminated.
- If an alarm condition occurs, the audible alarm sounds and the red indicator LED for the signal illuminates or flashes depending on the signal programming.
- Press the SILENCE button to silence the audible alarm.
- The visual indicator will remain illuminated as long as the alarm condition remains.
- Notify appropriate personnel of the alarm condition.



Testing

Periodic testing of the alarm system is recommended. Digital display modules and multi-signal alarm modules have a built-in self-test mode.

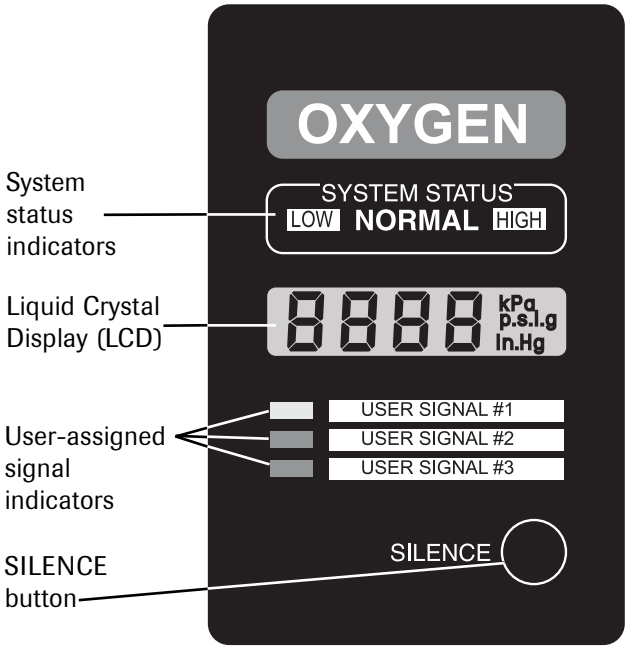
NOTE:
If any phase of the self-test fails to function, refer to the troubleshooting guide.

NOTE:
Notify appropriate personnel before testing alarm system.

Digital Display Module

Press and hold the SILENCE button for five seconds.

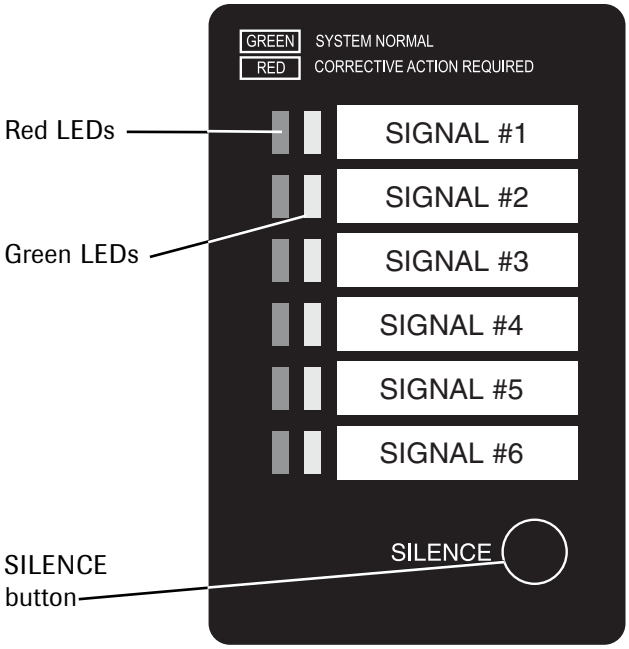
- The audible alarm sounds briefly.
- All LCD segments display and all LEDs illuminate and flash for ten seconds.
- The LOW system status LED illuminates and the low alarm set point flashes for two seconds.
- The HIGH system status LED illuminates and the high alarm set point flashes for two seconds.
- The module returns to monitoring mode.



Multi-Signal Alarm Module

Press and hold the SILENCE button for five seconds.

- The audible alarm sounds for two seconds, then turns off.
- All six green LEDs illuminate for one second, then turn off.
- All six red LEDs illuminate for one second, then turn off.
- The first green LED begins the test sequence by flashing once, followed by the first red LED which displays the programmed display mode for two seconds.
- This sequence continues until all six signals display.
- The module returns to monitoring mode.



Testing

Manual Testing

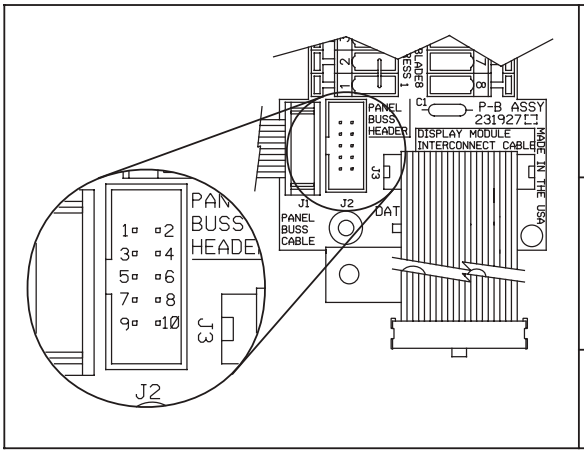
This testing requires partial disassembly of the individual modules.

NOTE:
Notify appropriate personnel before testing alarm system.

CAUTION:
To prevent possible damage to alarm circuit boards from electrostatic discharge (ESD), always touch the grounded alarm mounting boxes (or other grounded metallic object) before handling alarm modules, interconnect circuit boards, or interconnection wiring.

Power Supply Module

- Check the illumination of the POWER ON light.
- Remove the cover plate and check the fuse.
- Check the audible alarm volume setting by placing any digital display module or multi-signal alarm module in test mode. The volume control is located on the front of the power supply chassis.
- Remove the adjacent module and disconnect it from the interconnect circuit board. Carefully check the output at the power supply ten-pin connection (J2) on the circuit board as defined in the chart below.



Pin	Designation	Pin	Designation
1	Serial +	6	Ground
2	Serial -	7	+12 VDC
3	Alarm	8	+12 VDC
4	Earth Ground	9	+24 VDC
5	Ground	10	+24 VDC

Output Voltage	Results
Between pins 7 or 8 (+12 VDC) and pins 5 or 6 (Ground)	Not less than 11.5 VDC
Between pins 9 or 10 (+24 VDC) and pins 5 or 6 (Ground)	Not less than 23.0 VDC

Audible Alarm Function:	Results
Use a jumper wire to connect pin 3 (Alarm) and pins 5 or 6 (Ground).	The audible alarm will sound.

Digital Display Module

- Press the silence button for five seconds to begin the self-test sequence. Check for proper function and for correct high and low set points.
- Remove the cover plate and two screws holding the display chassis in place. Remove the chassis from the mounting box and allow to hang by the interconnecting cable.
- Observe the interconnect board and check for:
  - Jumper wires between any unused signal terminals.
  - Signal wires from remote sources (sensor module, dry-contact switches, data output, data input, etc.) properly connected to input contacts on the terminal blocks.

Manual Testing (Continued)

Sensor Module

- Remove the cover plate and the two screws holding the trim-plate to access the sensor module.
- Check wiring for proper connections, field wiring wire nuts and polarized connection.
- Check continuity of field wiring by disconnecting the polarized connector and jumping the pins on the field wiring portion to produce an audible alarm, high pressure indication and -F3- on the LCD of the digital display module serving the sensor module.

Multi-Signal Alarm Module

- Press the silence button for five seconds to begin the self-test sequence. Check for proper function and correct indicator LED illumination.
- Remove the cover plate and the two screws holding the display chassis in place. Gently pull the display chassis from the mounting box and allow to hang by the interconnecting cable.
- Observe the interconnect board and verify signal wires from dry-contact switches are properly connected on the terminal blocks.
- Open and close each user assigned dry-contact switch at its remote location or disconnect one of the two wires entering the module at the interconnect board terminal block. Observe the display indicator LEDs and listen for the audible alarm when the switch is open or the wire is disconnected.

Computer Interface Relay Module

- Remove the cover plate and the two screws holding the trim-plate in place to access the relay module interconnect board.
- Observe the interconnect board and verify signal wires from dry-contact switches are properly connected on the terminal block and fifteen-pin computer cable is properly connected.
- Open and close each dry-contact switch at its remote location or disconnect one of the two wires entering the module at the interconnect board terminal block. Observe the remote monitor computer response.

Troubleshooting Guide

Symptom	Possible Cause	Corrective Action
1. No visual indicators illuminated on power supply and adjacent modules.	a. AC power is not turned on. b. Blown fuse. c. AC power wiring not connected. d. Faulty power supply chassis.	a. Check AC power source. b. Replace fuse. c. Check AC entrance wiring at power supply terminals. d. Replace power supply chassis.
2. POWER ON indicator on power supply illuminated, but all other visual indicators on adjacent modules are not illuminated.	a. Ten-wire ribbon cable loose or disconnected. b. Faulty power supply chassis.	a. Check ten-wire ribbon cable connections at interconnect boards and power supply terminal. b. Replace power supply chassis.
3. No visual indicators illuminated on isolated modules.	a. Display chassis interconnect cable loose or disconnected. b. Ten-wire ribbon cable loose or disconnected. c. Faulty display chassis.	a. Check display chassis interconnect cable. b. Check ten-wire ribbon cable connection at interconnect boards. c. Replace display chassis.
4. Audible alarm will not silence.	a. Faulty digital display module chassis or faulty multi-signal alarm module chassis. b. Faulty power supply chassis.	a. Begin with the module indicating a visual alarm farthest from power supply and in turn disconnect interconnect cables from back of chassis until audible alarm is silenced. Replace faulty display chassis. b. Turn off AC power. Remove power supply chassis from mounting box. Disconnect ten-wire ribbon cable from alarm connection on power supply chassis. Reinstall power supply chassis into mounting box. Turn on AC power. If audible alarm persists, replace power supply chassis.

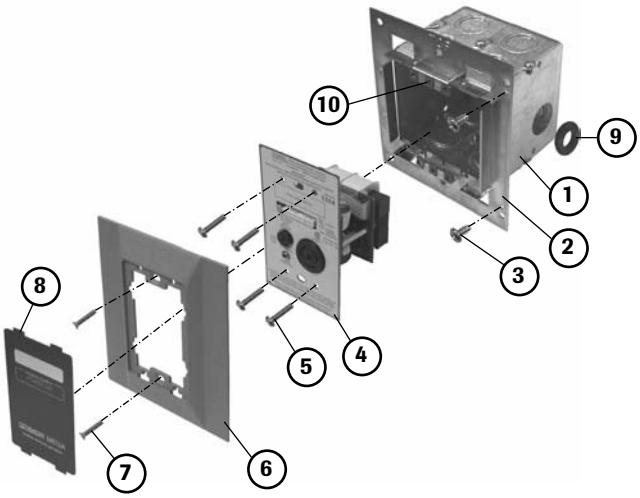
Symptom	Possible Cause	Corrective Action
5. Audible alarm does not sound when visual indicator is illuminated.	a. Faulty display chassis or interconnect board.	a. Use test mode of another module to verify audible alarm is functioning. If alarm sounds, replace alarm module chassis. If alarm does not sound after installation of new display chassis, replace interconnect board.
	b. Faulty alarm in power supply chassis.	b. Replace power supply chassis.
6. User assigned alarm indicator activated when system is normal.	a. Faulty dry contact switch at supply source.	a. Replace or repair switch.
	b. Faulty field wiring.	b. Check wiring for continuity and check connections.
	c. Faulty display chassis.	c. Locate + and COM terminals for the signal input on interconnect board. Use a jumper wire to close the signal circuit. If indicator goes out the problem is in field wiring or dry-contact switch. If indicator does not go out, problem is confined to interconnect board or display module chassis. Replace display chassis first, then interconnect board if necessary.
7. Unused user assigned alarm indicator is illuminated and audible alarm is sounding.	a. No jumper wire between unused terminals on interconnect board (Digital Display Modules).	a. Locate + and COM terminals for the signal input on interconnect board. Install jumper between terminals for unused signals.
	b. Alarm signal not disabled (Multi-Signal Alarm Modules).	b. Run set-up program and disable alarm for that signal.
8. High or low pressure alarm activated when digital display indicates pressure or vacuum is within the normal range.	a. Alarm set-points have been changed.	a. Use self-test mode to check current set-points. Use set-up mode to readjust set-points if required.
	b. Faulty display chassis.	b. If alarm is activated when display pressure or vacuum is within set limits, replace display chassis.

Symptom	Possible Cause	Corrective Action
9. Digital display module LCD is blank or erroneous characters are displayed while other indicators are functioning correctly.	a. Faulty display chassis.	a. Replace display chassis.
10. Low pressure or vacuum alarm with -F1- display on digital display module LCD.	No pressure or vacuum signal to the display chassis as a result of: a. Field wiring disconnected. b. Field wiring polarity reversed. c. Wiring connection at interconnect board not made. d. Sensor module not connected to field wiring. e. Faulty sensor module. f. Display chassis is faulty. g. Faulty interconnect board.	 a. Complete wiring. b. Check wiring polarity. c. Check wiring connections at interconnect board SENSOR INPUT or DATA INPUT terminal. d. Confirm wiring connections at sensor. e. Replace sensor. f. Replace display chassis. g. Replace interconnect board.
11. Low pressure or vacuum alarm activated with -F2- display on digital display module LCD.	a. No line pressure or vacuum in pipeline. b. Faulty sensor module.	a. Pressurize or pull vacuum on piping. b. Replace sensor.
12. High pressure or vacuum alarm with -F3- display on digital display module LCD.	a. Short in field wiring from sensor. b. Faulty sensor, interconnect board or display chassis.	a. Check wiring for short. b. Disconnect sensor input wires from interconnect board. If display changes to -F1- then sensor is faulty. If it remains -F3- then interconnect board or display chassis are faulty. Replace as necessary.
13. Remote computer signals not being relayed when signal switch is opened or closed.	a. Field wiring disconnected. b. Relay not held closed during normal operation (faulty relay on module).	a. Complete wiring. b. Replace module as necessary.

Power Supply Module

Item	Part Number	Description
	6-129278-00	120 VAC Power Supply Assembly
	6-129316-00	240 VAC Power Supply Assembly*
1.	6-490078-00	Mounting Box
2.	6-425426-00	Mounting Plate
3.	6-814669-00	Screw #6-20 x 1/4" Pan-Head Self-Tapping
4.	6-231752-00	120 VAC Power Supply Chassis
	6-231752-20	240 VAC Power Supply Chassis*
5.	6-811635-00	Screw #6-32 x 9/16" Pan-Head (4 required)
6.	6-325161-00	Trim Plate
7.	6-811064-00	Screws #6-32 x 3/4" Flat-Head (2 required)
8.	6-435515-00	Cover Plate
9.	6-831910-00	Rubber Grommet
10.	6-826001-00	"U"-Type Speed Nut #6-32 (6 required)
—	6-435691-00	LOCATION Labels (10 each) not shown
—	6-865548-00	For 120 VAC Power Supply: 0.5 Ampere 250 Volt "Slow Blow" Fuse (Bussmann GMD 1/2-A or equivalent) not shown

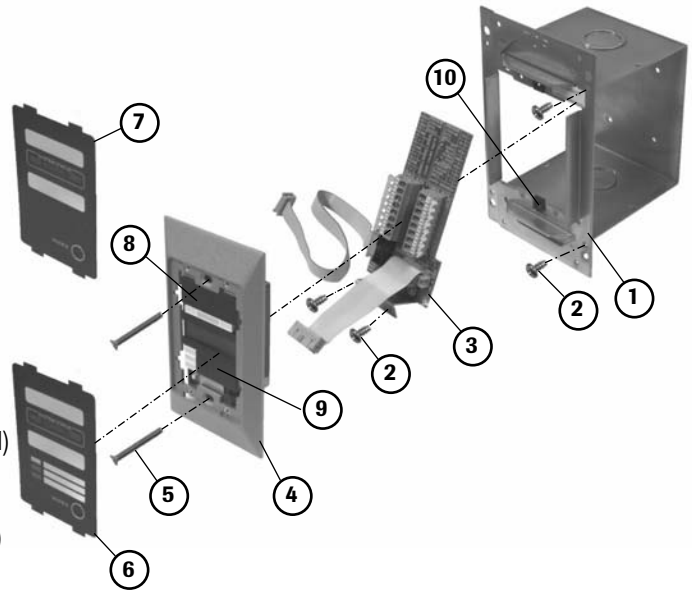
*The 240 VAC power supply is not UL listed.



Item	Part Number	Description
—	6-865549-00	For 240 VAC Power Supply: 0.25 Ampere 250 Volt "Slow Blow" Fuse (Bussmann GMD 1/4-A or equivalent) not shown

Digital Display Module

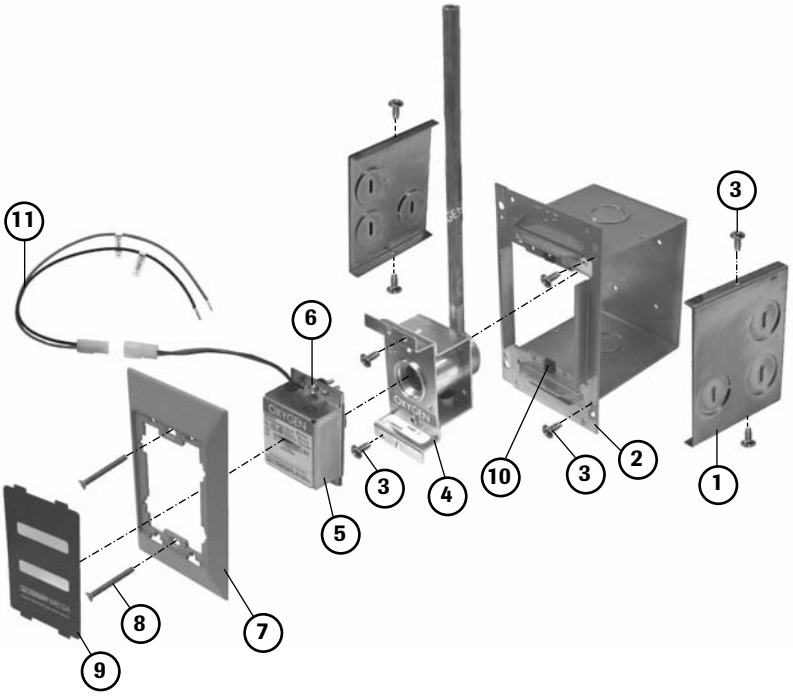
Item	Part Number	Description
		Digital Display Module
	6-129275-00	Pressure–50 psig
	6-129276-00	Vacuum/WAGD
	6-129277-00	Nitrogen–200 psig
1.	6-425427-00	Mounting Box
2.	6-814669-00	Screw #6-20 x 1/4" Pan-Head Self-Tapping
3.	6-231927-00	Interconnect Board
4.		Display Chassis
	6-290466-00	Pressure–50 psig
	6-290467-00	Vacuum/WAGD
	6-290468-00	Nitrogen–200 psig
5.	6-811065-00	Screw #6-32 x 1-1/2" Flat-Head (2 required)
6.	6-435517-00	Cover Plate
7.	6-435711-00	Cover Plate (Area Alarm)
8.		Gas Service Identification Labels (10 each)
	6-435524-00	Vacuum
	6-435526-00	Nitrogen
	6-435720-00	Oxygen
	6-435721-00	Nitrous Oxide
	6-435722-00	Air
	6-435525-00	WAGD (5 each)
9.	6-435512-00	System Status Labels
10.	6-826005-00	"U"-Type Speed Nut #6-32 (2 required)
—	6-425428-00	End Cap (not shown)



Sensor Module

Item	Part Number	Description
	6-129280-00	Oxygen
	6-129281-00	Nitrous Oxide
	6-129282-00	Air
	6-129283-00	Vacuum
	6-129284-00	Nitrogen
	6-129289-00	WAGD
	6-129290-00	Carbon Dioxide
	6-129291-00	Carbon Dioxide/Oxygen
	6-129292-00	Oxygen/Carbon Dioxide
	6-129293-00	Helium/Oxygen
	6-129294-00	Oxygen/Helium
	6-159280-00	Oxygen-International Labeling
	6-159282-00	Air-International Labeling
	6-159290-00	Vacuum-International Labeling
1.	6-425428-00	End Cap
2.	6-425427-00	Mounting Box
3.	6-814669-00	Screw #6-20 x 1/4" Pan-Head Self-Tapping
4.		Gas Service Rough-In Assembly
	6-233015-00	Oxygen-International Labeling
	6-233016-00	Air-International Labeling
	6-233017-00	Vacuum-International Labeling
	6-233021-00	Carbon Dioxide/Oxygen
	6-233022-00	Oxygen/Carbon Dioxide
	6-233023-00	Helium/Oxygen
	6-233024-00	Oxygen/Helium
	6-233010-00	Oxygen
	6-233011-00	Nitrous Oxide
	6-233012-00	Air
	6-233013-00	Vacuum
	6-233014-00	Nitrogen
	6-233019-00	WAGD
	6-233020-00	Carbon Dioxide
5.		Sensor (field replacement unit - includes item 11)
	6-231760-00	Oxygen
	6-231761-00	Nitrous Oxide
	6-231762-00	Air
	6-231763-00	Vacuum
	6-231764-00	Nitrogen
	6-231769-00	WAGD
	6-231770-00	Carbon Dioxide
	6-231774-00	Oxygen/Helium
	6-231773-00	Helium/Oxygen
	6-231772-00	Oxygen/Carbon Dioxide
	6-231771-00	Carbon Dioxide/Oxygen
	6-231775-00	Oxygen-International Labeling
	6-231776-00	Air-International Labeling
	6-231777-00	Vacuum-International Labeling

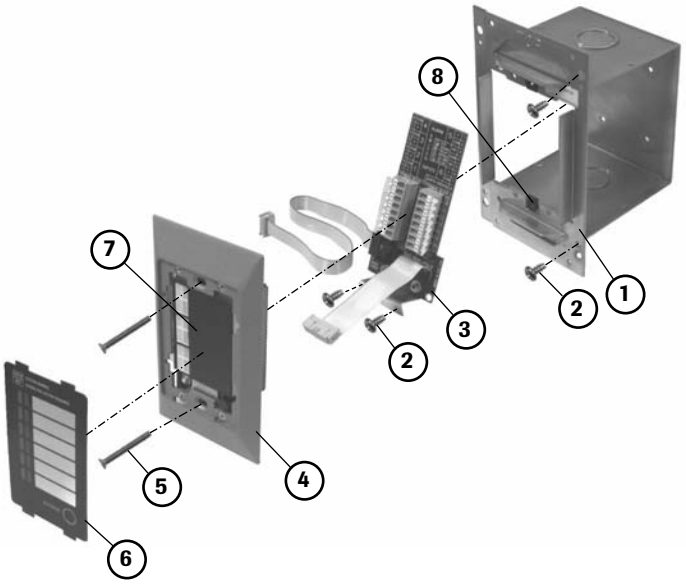
Item	Part Number	Description
6.	6-811610-00	Screw #6-32 x 3/4" Pan-Head (2 required)
7.	6-325160-00	Trim Plate
8.	6-811065-00	Screw #6-32 x 1-1/2" Flat-Head (2 required)
9.	6-435510-00	Cover plate
10.	6-826005-00	"U"-Type Speed Nut #6-32 (2 required)
11.	6-231935-00	Sensor Pigtail



Replacement Parts

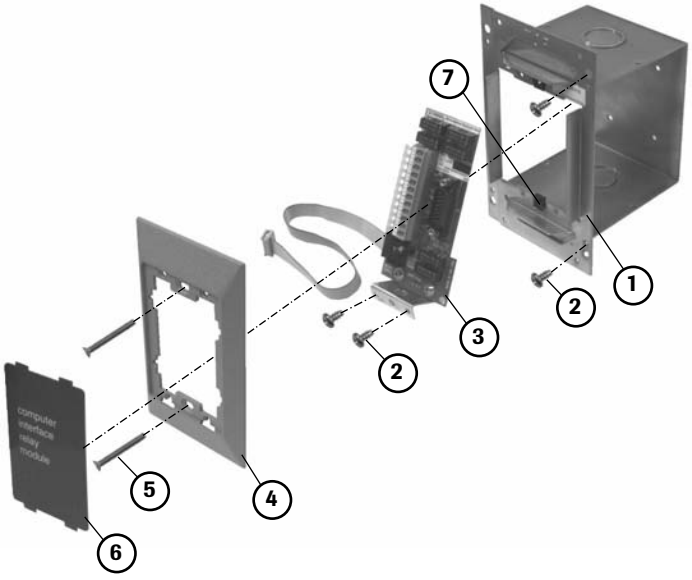
Multi-Signal Alarm Module

Item	Part Number	Description
	6-129301-00	Multi-Signal Alarm Module (Complete)
1.	6-425427-00	Mounting Box
2.	6-814669-00	Screw #6-20 x 1/4" Pan-Head Self-Tapping
3.	6-231955-00	Interconnect Board
4.	6-290469-00	Display Chassis
5.	6-811065-00	Screw #6-32 x 1-1/2" Flat-Head (2 required)
6.	6-435516-00	Cover Plate
7.	6-435603-00	System Status Labels
8.	6-826005-00	"U"-Type Speed Nut #6-32 (2 required)
—	6-425428-00	End Cap (not shown)



Computer Interface Relay Module

Item	Part Number	Description
	6-129312-00	Computer Interface Relay Module
1.	6-425427-00	Mounting Box
2.	6-814669-00	Screw #6-20 x 1/4" Pan-Head Self-Tapping
3.	6-231957-00	Interconnect Board with Relays
4.	6-325160-00	Trim Plate
5.	6-811065-00	Screw #6-32 x 1-1/2" Flat-Head (2 required)
6.	6-435604-00	Cover Plate
7.	6-826005-00	"U"-Type Speed Nut #6-32 (2 required)
—	6-425428-00	End Cap (not shown)



Other

Item	Part Number	Description
—	6-435712-00	Cover Plate (Blank)
—	6-847681-00	Installation, Operation, and Maintenance Instructions

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