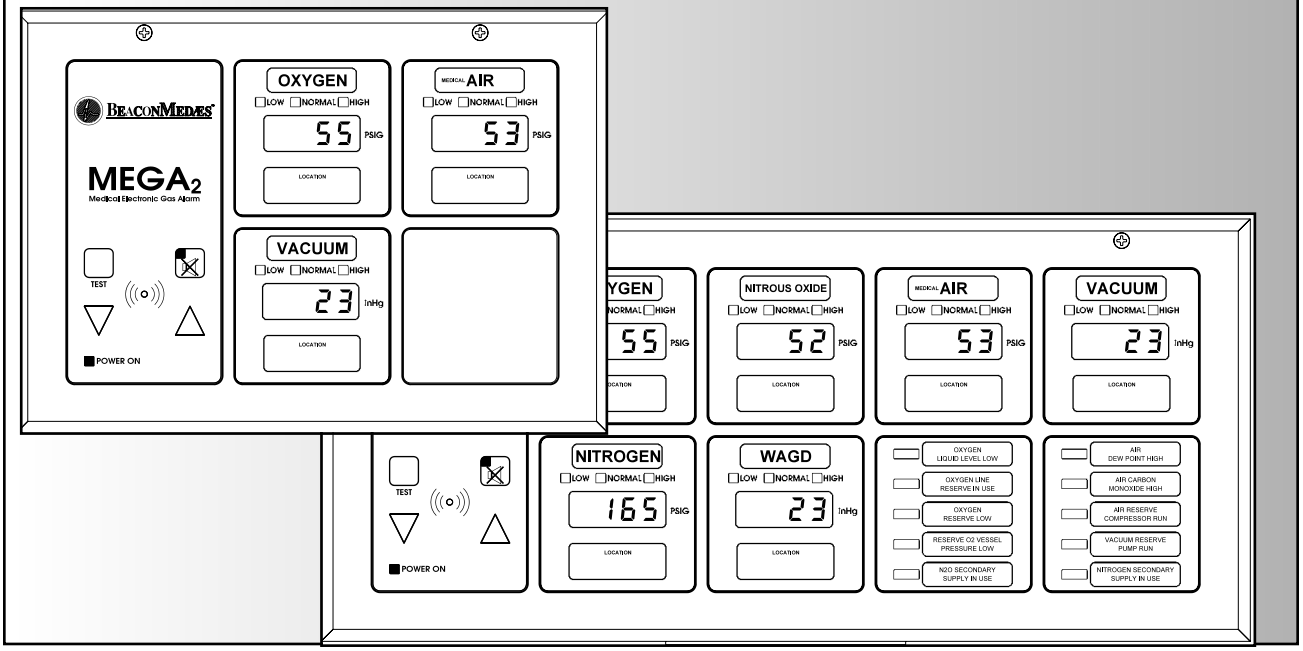
Installation, Operation, and Maintenance Instructions

MEGA$_2$®

Medical Electronic Gas Alarm



BEACONMEDÆS®

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Alarm Modular Components

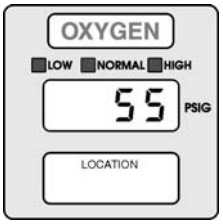
Annunciator Module

Features:

- User interface pushbuttons for alarm panel TEST function, audible alarm MUTE ⊠ and set-up increase △ and decrease ▽.
- Green alarm panel POWER ON and red audible alarm mute indicators.
- Audible alarm with volume control.
- Network wiring terminals and test connector.
- General fault relay that activates on any alarm panel fault condition.

Digital Display Module

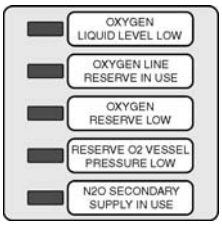
Features:



- Digital LED readout of system pressure signal transmitted from sensor module.
- Adjustable brightness of digital LED readout.
- Individual LED's indicate when system pressure/vacuum is HIGH (red), LOW (red), or NORMAL (green).
- Programmable high and low alarm thresholds.
- Adjustable audible alarm mute duration.
- Individual high and low alarm dry-contact relay outputs.
- Can transmit 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(using Metasys Integrator).

Multi-Signal Module

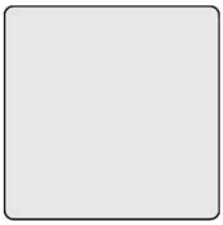
Features:



- Monitors up to five normally closed dry-contact switch signals.
- Separate indicators for each of five signals for normal (green) or abnormal (red) conditions.
- Available (optional) with separate dry-contact relay outputs for each of five signals.
- Can be networked to communicate with a personal computer or Johnson Controls Metasys® building automation system (using Metasys Integrator).

Blank Module

Features:



- Reserves a space in alarm panel for future expansion.
- Used to fill unused alarm panel module locations.

Definitions

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

Auxiliary Fault Relay (optional)
A single-pole double-throw dry-contact relay output located on annunciator module. Used to activate a remote alarm or building management system. The relay will activate whenever ANY audible alarm on panel is in progress. Pressing MUTE button on annunciator module deactivates relay until audible alarm is again reactivated. Relay contact ratings are 2 A @ 30 VDC/0.5 A @ 125 VAC.

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

General Fault Relay
A single-pole double-throw dry-contact relay output located on annunciator module. Used to activate a remote alarm or building management system. The relay will activate whenever ANY audible alarm on panel is in progress. Unlike Auxiliary Fault Relay, pressing MUTE button on annunciator module WILL NOT deactivate relay. The General Fault Relay will deactivate only after alarm condition is corrected and alarm panel resumes normal status. Relay contact ratings are 2 A @ 30 VDC/0.5 A @ 125 VAC.

LED
Light Emitting Diode

Local Sensors
Pressure/vacuum sensors that are mounted inside alarm panel box. The sensor rough-in must be piped to medical gas/vacuum pipelines.

Master Alarm Panel
Alarm panel that monitors medical gas and vacuum source equipment and main pipelines.

Remote Sensors
Pressure/vacuum sensors that are mounted outside of alarm panel box. Sensor rough-ins may be mounted separately or ganged together near pressure/vacuum pipelines. Sensors must then be wired to alarm panel.

Alarm Configuration

All MEGA2 alarm panels are factory pre-configured. The configuration of alarm panel varies dependent upon customer's requirements.
Two sizes of alarm panels are available. The small alarm panel (Figure 1) will accommodate an annunciator module with four alarm modules. The large alarm panel (Figure 2) will accommodate an annunciator module with eight alarm modules.

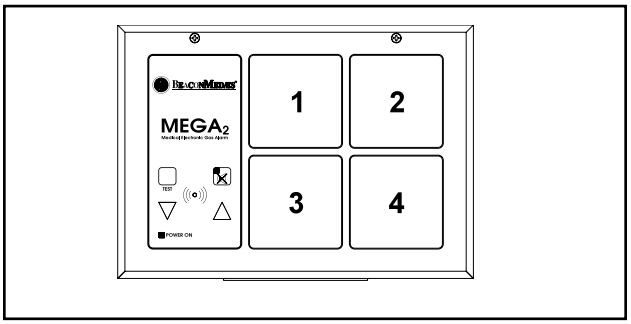


Figure 1: Four Module Panel

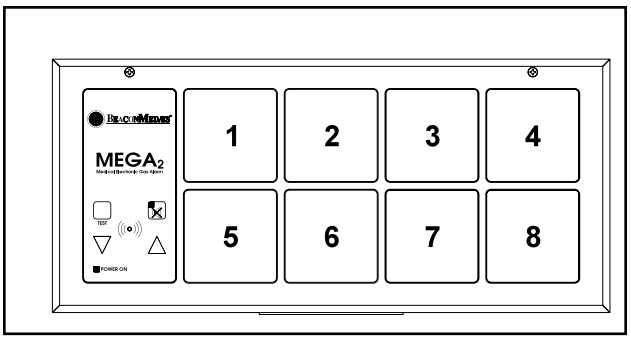


Figure 2: Eight Module Panel

Alarm Configuration

An alarm panel may consist of any combination of digital display modules, multi-signal modules, or blank modules.

If alarm panel is configured with digital display modules, pressure/vacuum sensors will be included for connection to pressure/vacuum pipeline (except for 6-M2N).

Sensors may be located inside alarm panel rough-in box (local sensors) or outside alarm panel rough-in box (remote sensors).

Local sensors must be connected to pressure/vacuum pipelines via copper tubing (Figure 3). Remote sensor may be mounted near pressure/vacuum pipeline and then wired to alarm panel (Figure 4).

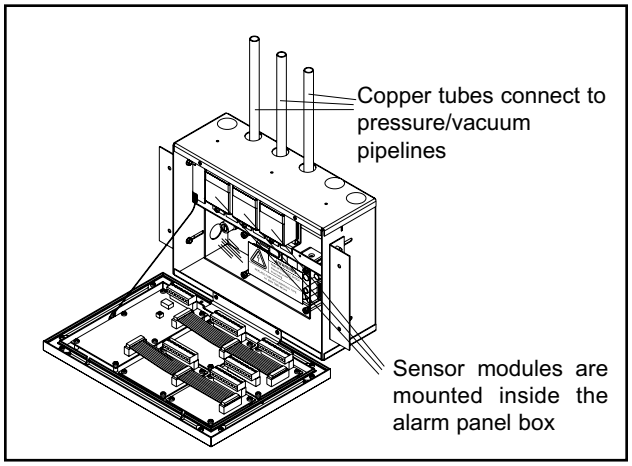


Figure 3: Local Sensors

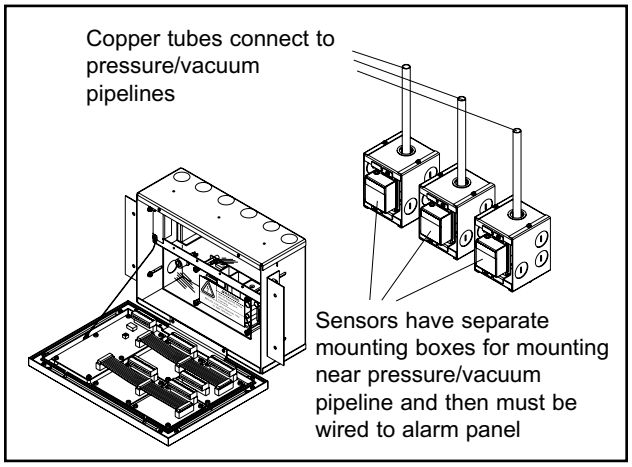
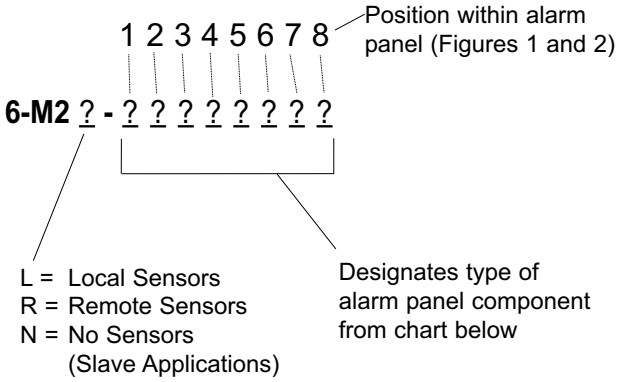


Figure 4: Remote Sensors

The required alarm panel configuration may be specified within the part number scheme as described below:

Part Number Scheme:



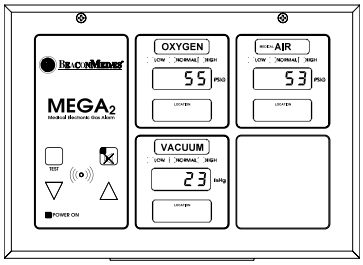
O	OXYGEN	DIGITAL DISPLAY MODULES
D	OXYGEN - 100 PSI	
X	NITROUS OXIDE	
A	MEDICAL AIR	
F	MEDICAL AIR - 100 PSI	
5	AIR (ISO)	
7	LABORATORY AIR	
2	O2-CO2	
4	O2-He	
C	CARBON DIOXIDE	
G	CARBON DIOXIDE - 100 PSI	
1	CO2-O2	
3	He-O2	
H	HELIUM	
V	VACUUM	
6	VACUUM (ISO)	
8	LABORATORY VAC	
W	WAGD	
N	NITROGEN	
9	INSTRUMENT AIR	
J	ARGON	
M	MULTI-SIGNAL MODULE	
R	MULTI-SIGNAL MODULE W/ RELAYS	
B	BLANK	

NOTE:
When an alarm panel is ordered with either local or remote sensors, ALL sensors will either be local or remote. Alarm panels with a combination of local and remote sensors are not available.

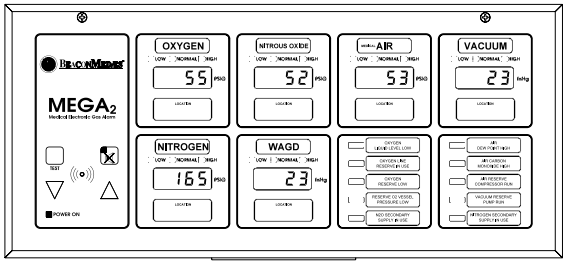
NOTE:
Alarm panel components in table above are listed in order of criticality. Unless otherwise specified, the most critical component will fill position one, the next less critical component will fill position two, etc. etc.

Alarm Configuration

Example: P/N 6-M2R-OAVB



Example: P/N 6-M2R-OXAVNWMM



Unpacking

1. Remove alarm panel back box from shipping carton. Do not remove alarm front panel (wrapped in anti-static shipping bag).
2. If alarm panel is configured with remote sensors, remove sensor rough-in and mounting box from small individual boxes shipped within main alarm panel shipping carton.
3. Store all other components not removed in steps 1 and 2 inside shipping carton in a safe place for installation later.
4. Install back box and sensor rough-in as described in this manual.

Alarm Panel Back Box Mounting

The alarm panel back box will be one of two sizes. The height and depth of both size boxes are the same. Refer to Figure 5 below for dimensions of both boxes.

If alarm panel is configured with digital display modules, sensor assemblies will be included for connection to pressure/vacuum pipeline.

Sensors may be located inside alarm panel rough-in box (local sensors) or outside alarm panel rough-in box (remote sensors).

If equipped with local sensors, copper tubes will extend from top of back box to be connected to pressure/vacuum pipeline.

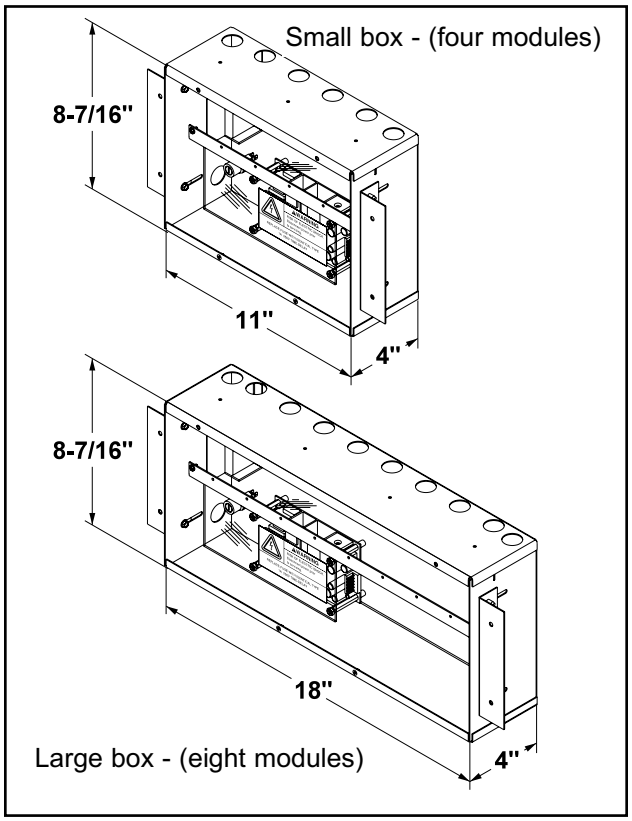


Figure 5: Alarm Panel Back Box Dimensions

1. Prepare a rough wall opening large enough to accommodate alarm panel back box. Alarm panel back box must have rigid vertical members for support on both left and right sides. Power to alarm panel shall enter through lower left or top left conduit hole in back box.
2. Remove cardboard dust cover and insert alarm panel back box into wall opening. Secure with fasteners suitable for vertical supports as shown in Figure 6.

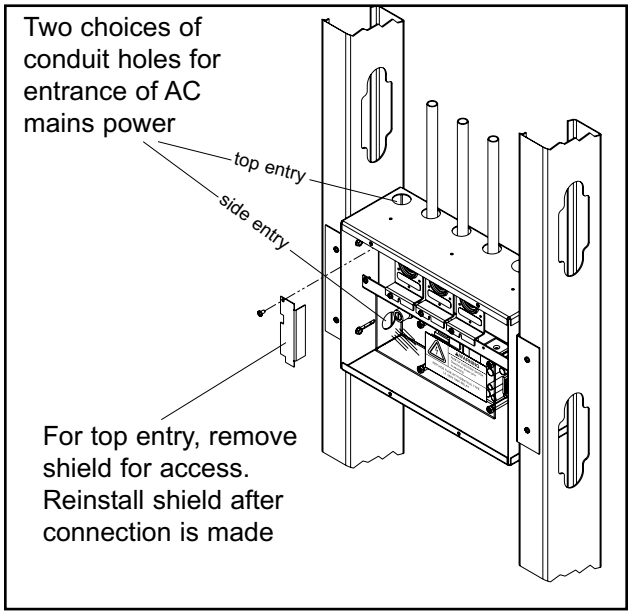


Figure 6: Back Box Mounting

3. Mounting brackets on each side of back box are adjustable and factory preset for 5/8” thick drywall. After drywall installation, front edge of back box should be flush with finished surface of wall. If needed, make any necessary bracket adjustments at this time. Refer to Figure 7.
4. Reinstall cardboard dust cover.

Alarm Panel Back Box Mounting

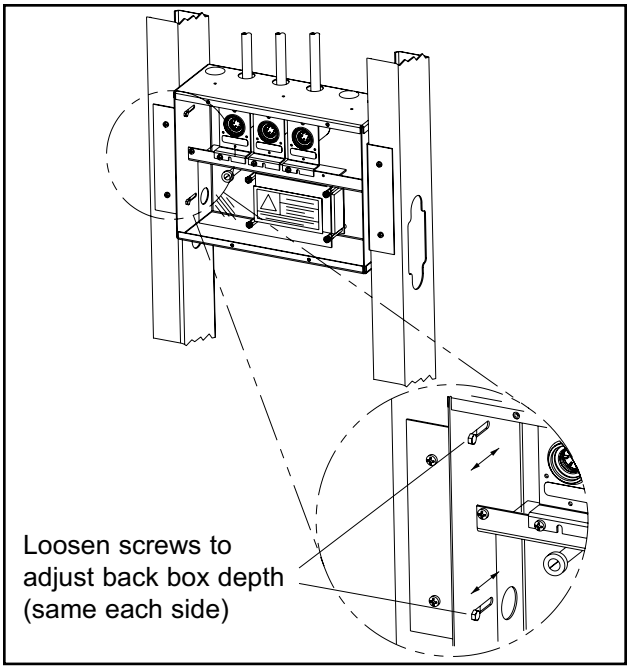


Figure 7: Mounting Bracket Adjustment

Remote Sensor Back Box Mounting

Alarm panels ordered with remote sensors are provided with separate metal boxes for each sensor. Mount each sensor box as follows:

1. Remove sensor rough-in from mounting box (Figure 8).
2. Using four mounting holes provided, attach box to a wall or other structural support. (fasteners by others).
3. Reinstall sensor rough-in.

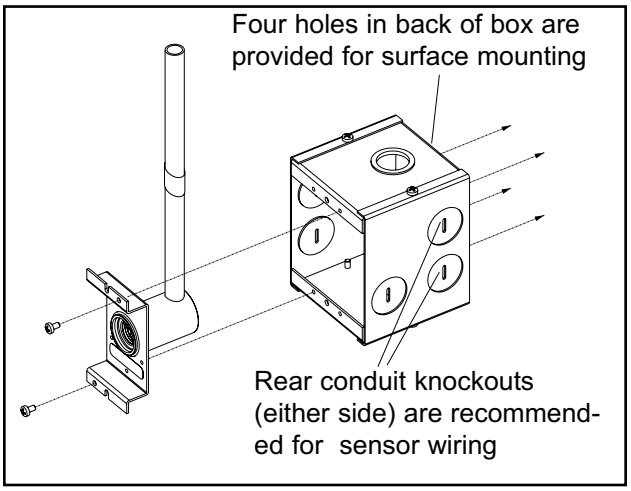


Figure 8: Remote Sensor Back Box

Pipeline Connection

Sensor Module

1. Braze copper extension tubes from sensor rough-in to appropriate pressure/vacuum piping system drops as shown in Figure 9. Braze connections per procedures required by NFPA 99 or CAN/CSA-Z305.1. Use appropriate measures to prevent overheating and damage to internal components of sensor rough-in assemblies.
2. Perform standing pressure tests and cross connection tests as required by NFPA and CSA.

Pipeline Connection

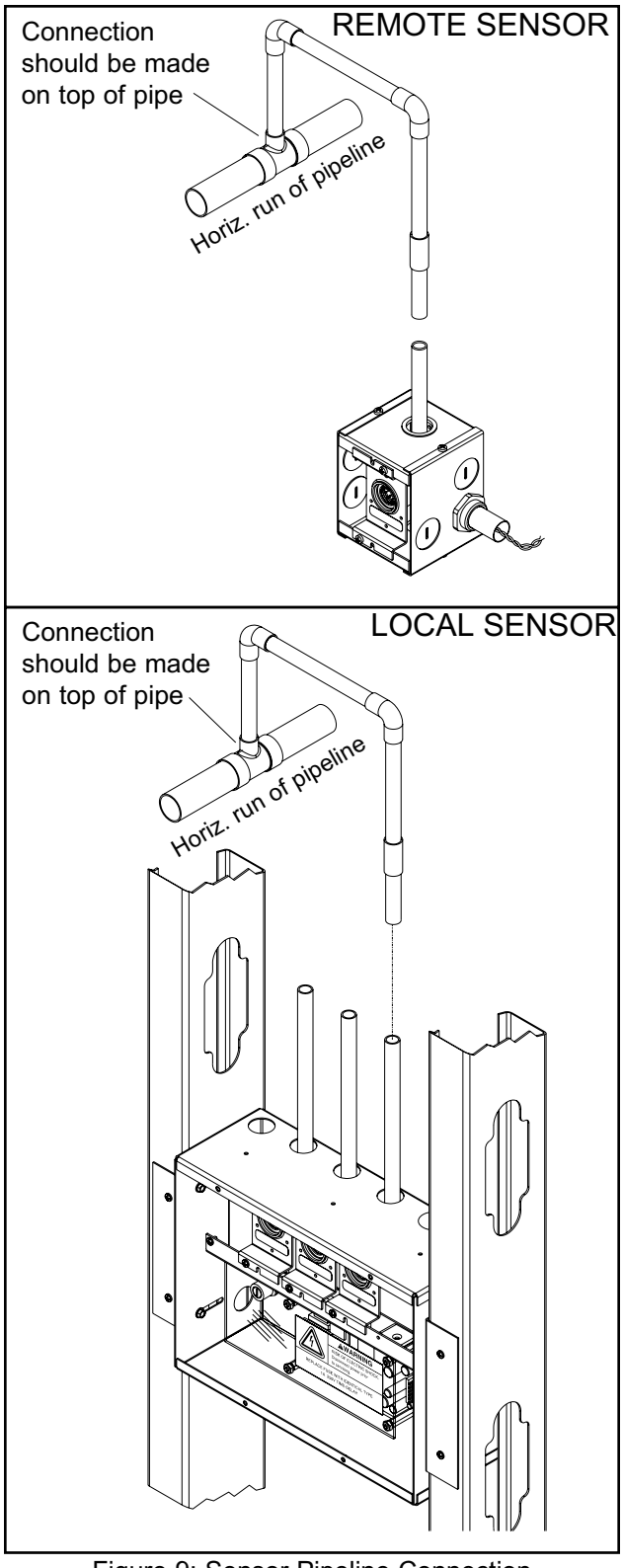
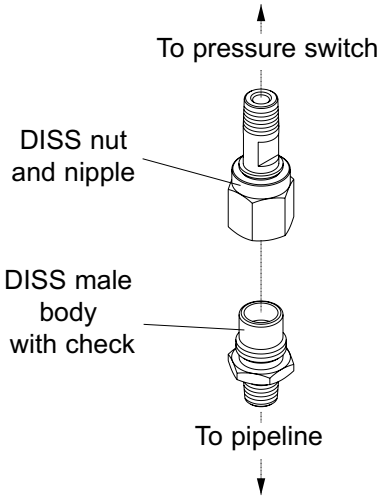


Figure 9: Sensor Pipeline Connection

Pressure Switch

DISS (Diameter Index Safety System) connection kits are recommended for use when attaching pressure switches to pressure/vacuum pipeline. To utilize these kits, a 1/4-18 NPT female thread must be provided in piping system. All necessary components are included in each gas specific kit as shown in Figure 10.



DISS Kit P/N	Gas Service
6-120004-10	Oxygen
6-120004-11	Nitrous Oxide
6-120004-12	Medical Air
6-120004-13	Vacuum
6-120004-14	Nitrogen
6-120004-18	Instrument Air
6-120004-19	Evac. (WAGD)
6-120004-20	Carbon Dioxide
6-120004-21	CO2/O2
6-120004-22	O2/CO2
6-120004-23	He/O2
6-120004-24	O2/He
6-120004-25	Helium

Figure 10: Pressure Switch Pipeline Connection

General Requirements

- Power all alarms from life safety branch of emergency power system as required by applicable standards.
- Protect all wiring from physical damage by raceways or conduit as required by applicable standards.
- Wire master panels directly to switches or sensors as required by applicable standards.
- Wiring runs should be made with color coded wire. Record color, signal, and source of signal for each wiring lead to aid in connection of alarm finish components.
- Avoid installing alarm panels near radio transmitters, electrical motors, or switchgear.

Wire Type And Size

All low voltage MEGA2 wiring must meet the following criteria:

- Copper wire no smaller than 22 AWG.
- Circuit length not to exceed 5000 feet.
- Cable must be twisted pair shielded type. Multi-pair cables within one common shield are acceptable.

Wire Routing

Two 7/8” holes are provided for entrance of AC mains power. One hole on lower left side and one hole on top left of alarm panel back box. NO OTHER HOLES SHOULD BE PUNCHED OR USED. If hole on top left is used, remove shield for access. Reinstall shield after connection is made.

Several additional 7/8” holes are provided on right side of top panel for entrance of low voltage field wiring. Refer to Figure 11.

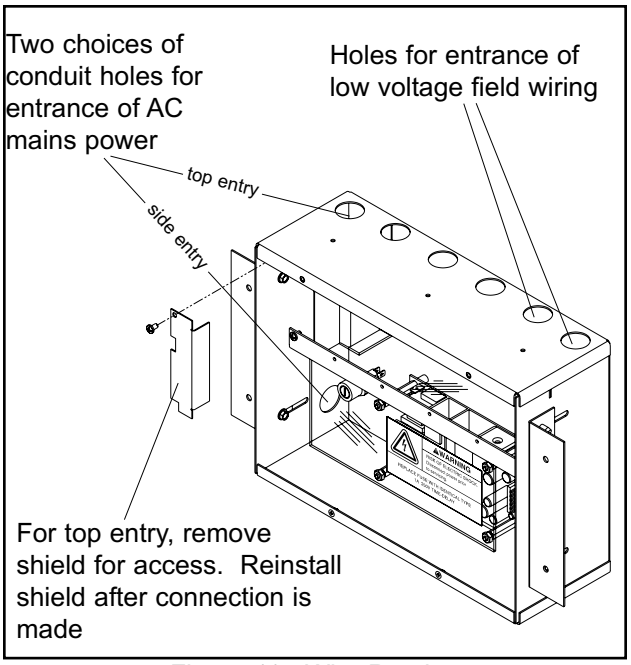


Figure 11: Wire Routing

Determining Number Of Conductors

MEGA2 alarm panels can be ordered in numerous configurations. The following rules along with references to this manual's schematics clarify wiring requirements.

- All alarm panels require 100 to 250 VAC 50/60 Hz. power. Refer to **Wiring Schematic 1** (Pg. 14).
- Sensor modules send pressure/vacuum signals to digital display modules. If the alarm panel configuration contains digital display modules and sensor modules that are remotely mounted, two conductors are required between EACH sensor module and digital display module. A sensor module can not be wired to more than one digital display module. Refer to **Wiring Schematic 2** (Pg. 15).
- Multi-signal modules monitor signals from dry normally closed switch/relay contacts. These signals can originate at source equipment or from pressure switches mounted on main pressure/vacuum pipelines. When two master alarms are required, the same switch/relay contacts can be wired to both alarm panels. Two conductors are required for each alarm panel for each signal. That is, for any given signal, two wires will route to first alarm panel and another two wires will route to second panel. Both pairs of wires will originate from switch/relay contacts. This wiring is duplicated for each source equipment/pressure switch signal. Refer to **Wiring Schematics 3 and 8** (Pgs. 16 and 20).
- Two panels may be connected together so digital display module pressure reading(s) of first panel will be duplicated at second panel. Two conductors for EACH digital display module must be routed from first alarm panel to second alarm panel. Refer to **Wiring Schematic 4** (Pg. 17).
- If an alarm panel is to be connected to a Johnson Controls METASYS® system, two conductors must be connected between alarm panel's annunciator module and monitoring system's two-wire data bus. Refer to **Wiring Schematic 9** (Pg. 21).
- Most building automation systems are capable of monitoring dry normally closed relay contacts. If alarm panel is to be connected to this type of building automation system, two conductors must be routed from alarm panel to building automation system for each signal monitored. Refer to **Wiring Schematics 5,6, and 7** (Pgs. 18 and 19).

Wiring Schematics

The wiring schematics listed below are provided. Call BeaconMedæs at 1-888-4MEDGAS (1-888-463-3427) for technical support .

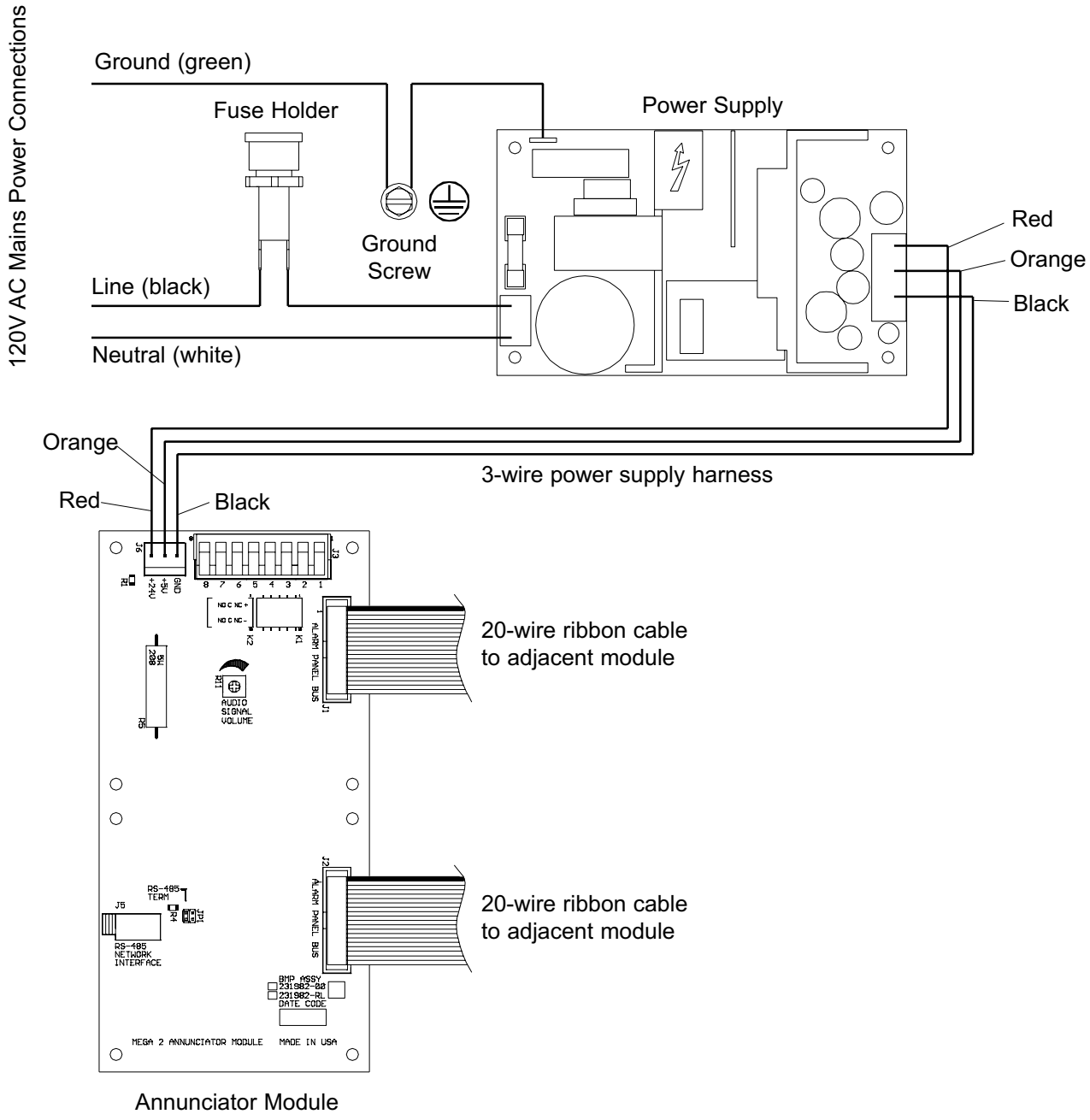
1. Power Supply Module
2. Sensor Module to Digital Display Module
3. Multi-Signal Module
4. Remote Pressure/Vacuum Transmission
5. Multi-Signal Module Relays
6. General Fault/Auxiliary Relays
7. Digital Display Module High/Low Relays
8. Remote Pressure/Vacuum Switches
9. Johnson Controls METASYS®

Alarm Wiring Examples

Wiring examples of master/area alarms for the following systems are provided:

1. Two master alarm panels with digital displays - high-pressure manifold/no reserve (oxygen shown) - Pg. 22.
2. Two master alarm panels with digital displays - liquid manifold/high-pressure reserve (oxygen shown) - Pg. 23.
3. Two master alarm panels with digital displays - liquid bulk/liquid reserve (oxygen shown) - Pg. 24.
4. Two multi-signal master alarm panels - duplex air compressor and vacuum pump systems - Pg. 25.
5. Area alarm panel - gas services for oxygen, medical air, and vacuum - Pg. 26.

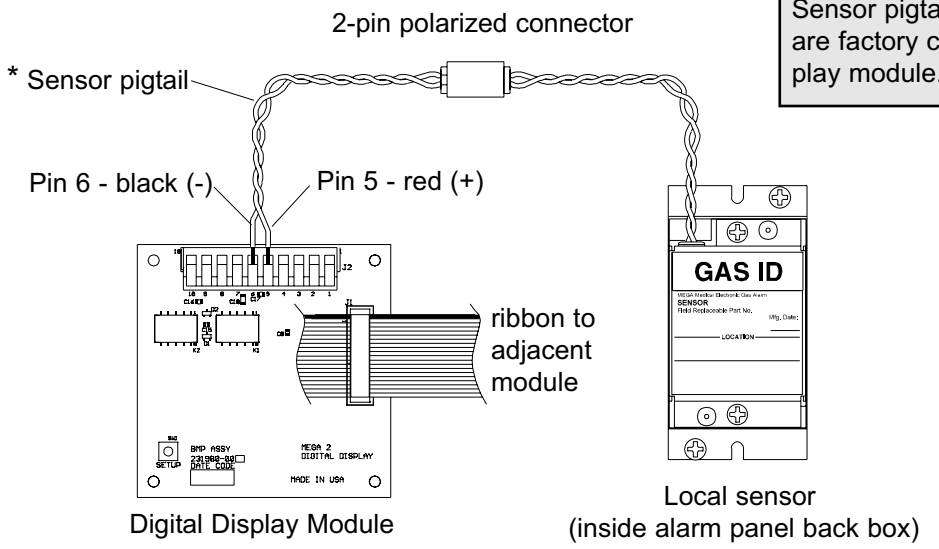
Wiring Schematic 1: Power Supply Module



Wiring Schematic 2: Sensor Module to Digital Display Module

LOCAL SENSOR

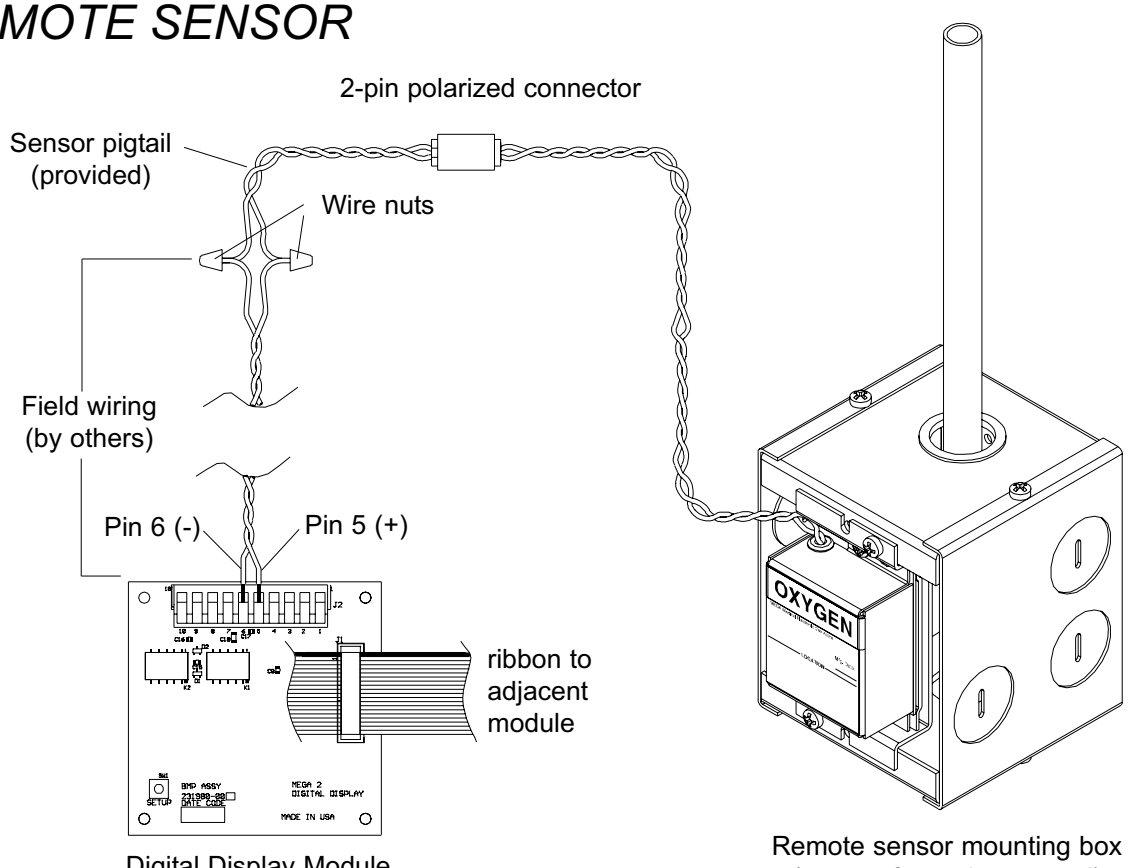
*** NOTE:**
Sensor pigtails for local sensors are factory connected to digital display module.



Digital Display Module

Local sensor
(inside alarm panel back box)

REMOTE SENSOR

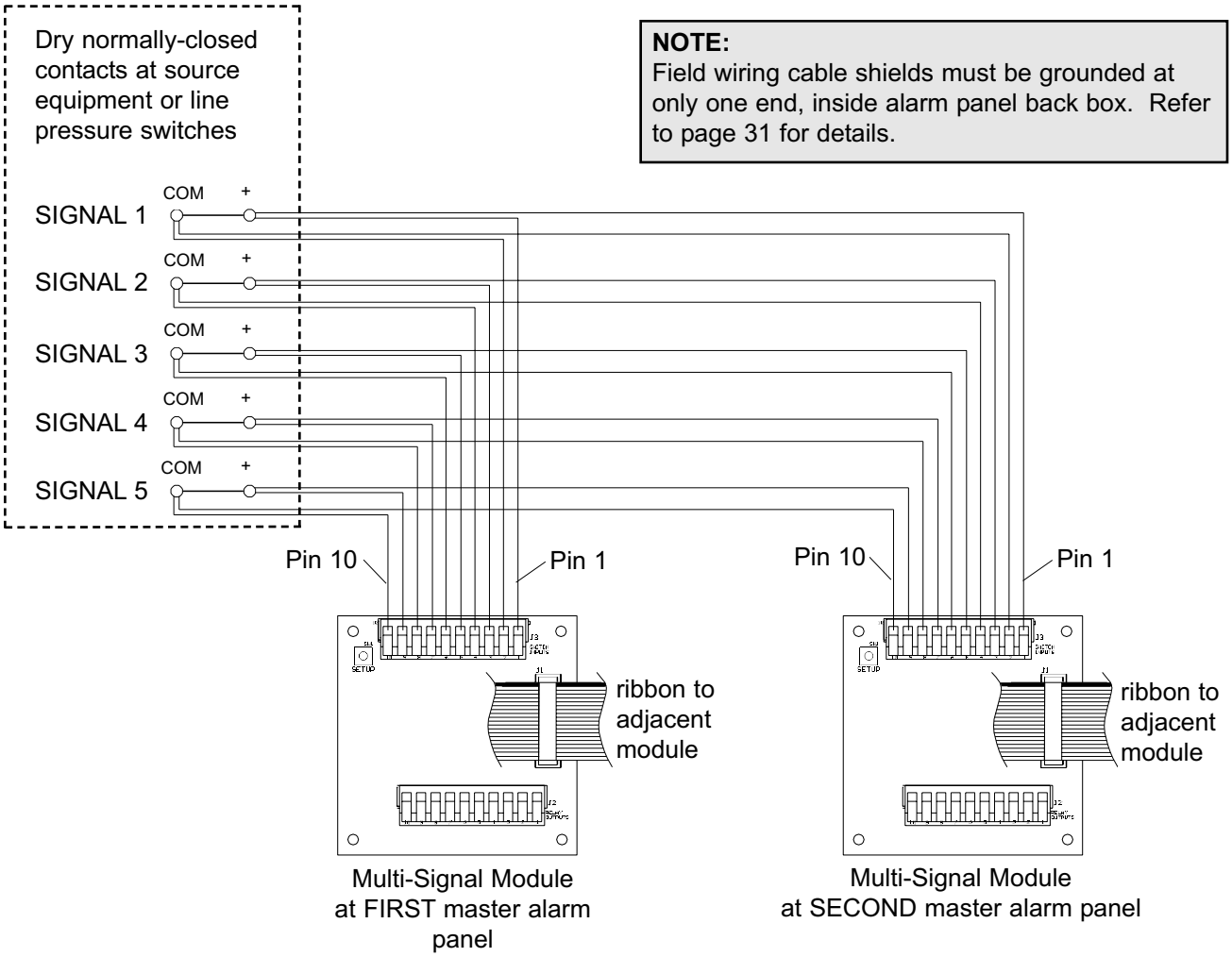


Digital Display Module

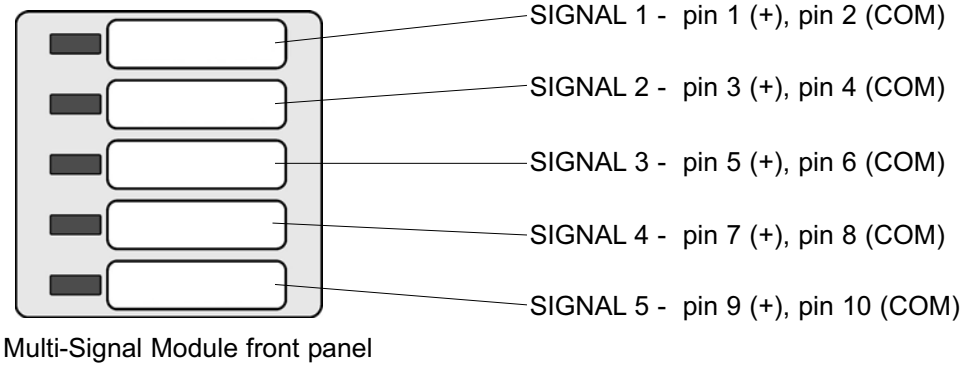
Remote sensor mounting box
(remote from alarm panel)

NOTE:
Field wiring cable shields must be grounded at only one end, inside alarm panel back box. Refer to page 31 for details.

Wiring Schematic 3: Multi-Signal Module



NOTE:
Field wiring cable shields must be grounded at only one end, inside alarm panel back box. Refer to page 31 for details.

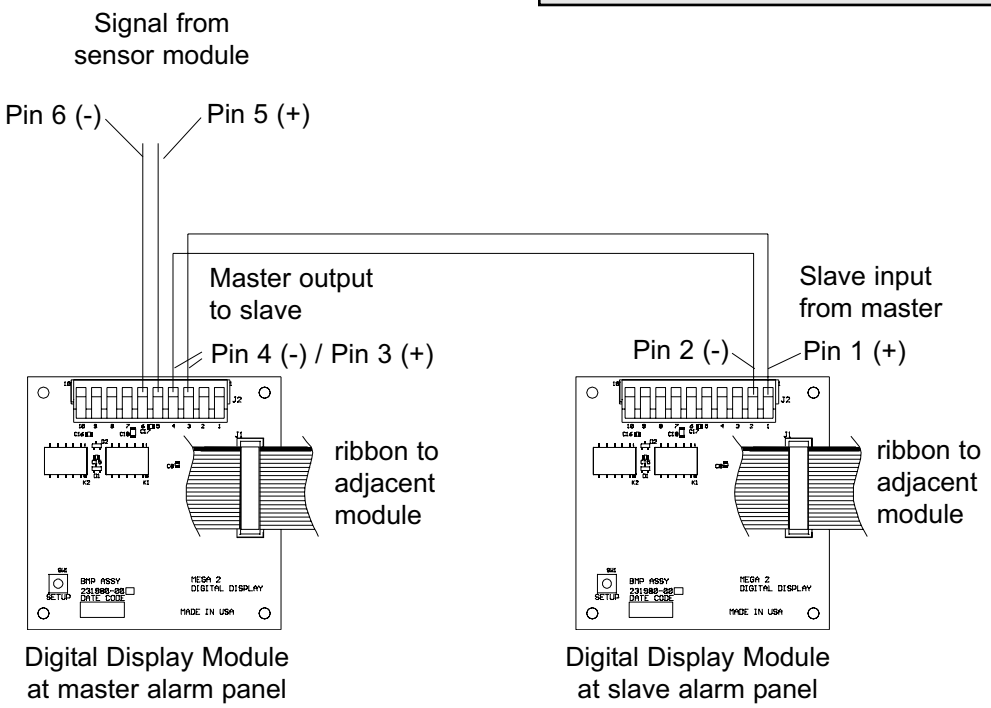


Multi-Signal Module front panel

NOTE:
Installer assigns source signals to desired front panel locations and installs provided labels (Refer to Figure 23, page 31).

Wiring Schematic 4: Remote Pressure / Vacuum Transmission

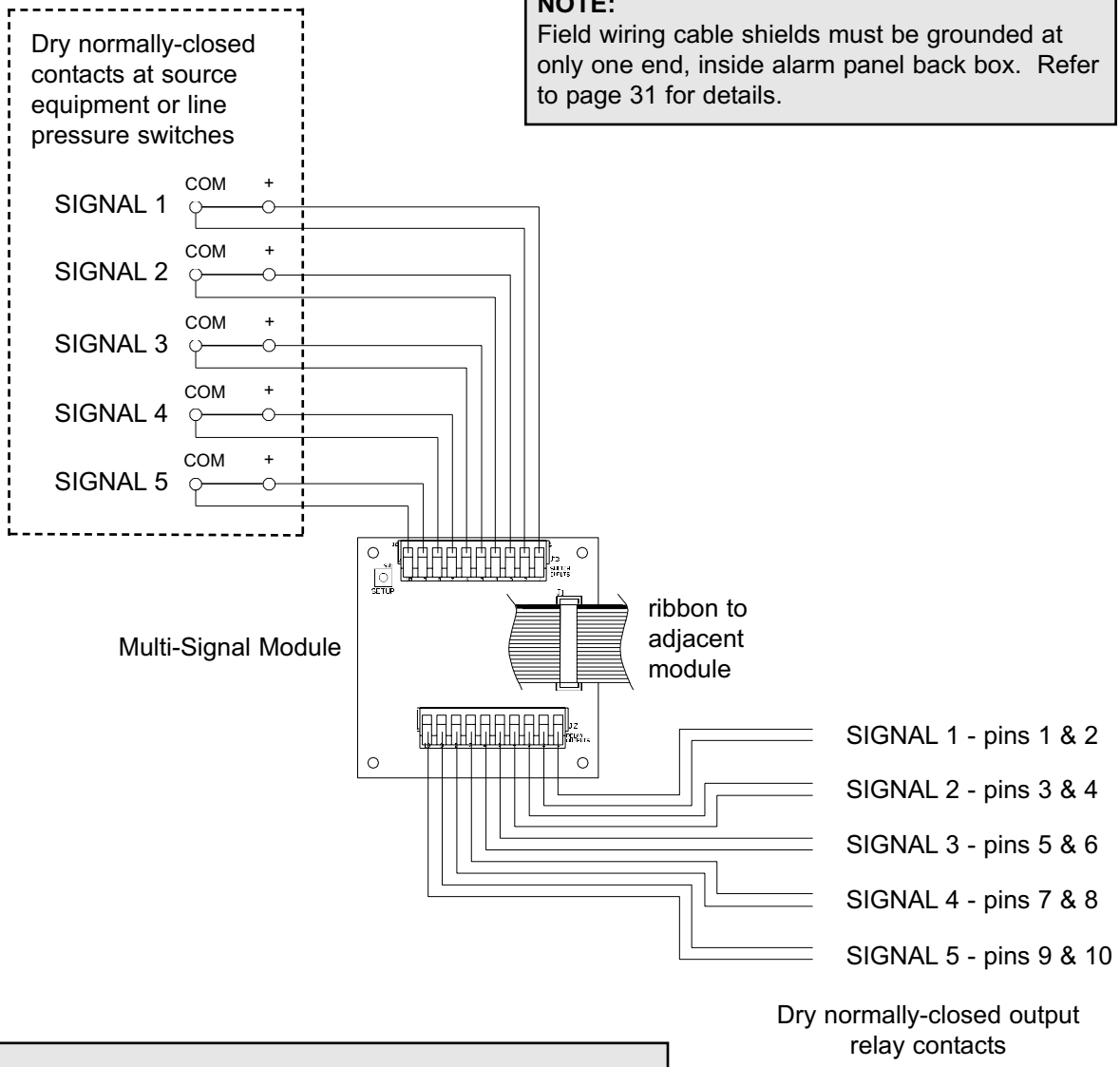
NOTE:
Field wiring cable shields must be grounded at only one end, inside alarm panel back box. Refer to page 31 for details.



NOTE:
The above master to slave wiring configuration DOES NOT comply with NFPA 99 wiring guidelines for two required master panels. In order to comply, EACH master panel must be directly connected to a Sensor Module for each pressure/vacuum service. Additional panels, if desired, may be connected as indicated above.

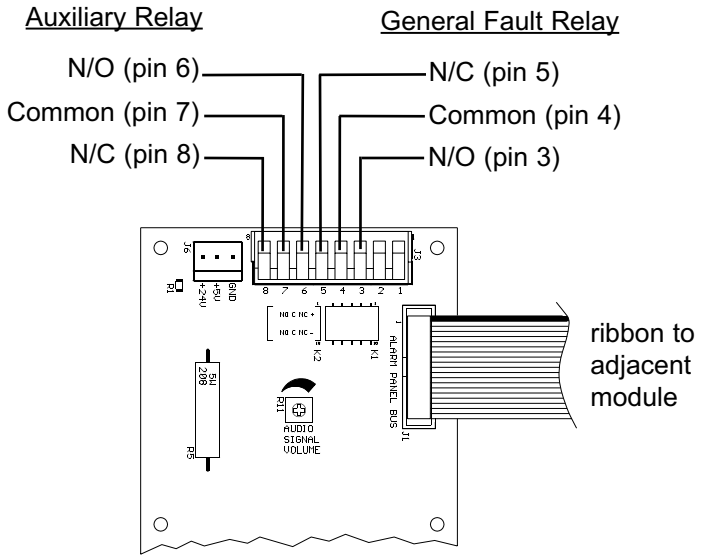
Wiring Schematic 5: Multi-Signal Module Relays (Optional)

NOTE:
Field wiring cable shields must be grounded at only one end, inside alarm panel back box. Refer to page 31 for details.



NOTE:
Output relay contacts are dry normally closed type. Contacts open upon designated alarm activation. Contacts remain open until alarm condition is corrected. Alarm mute DOES NOT affect relay condition. Relay contact ratings are 2 A @ 30 VDC/0.5 A @ 125 VAC.

Wiring Schematic 6: General Fault / Auxiliary Relays



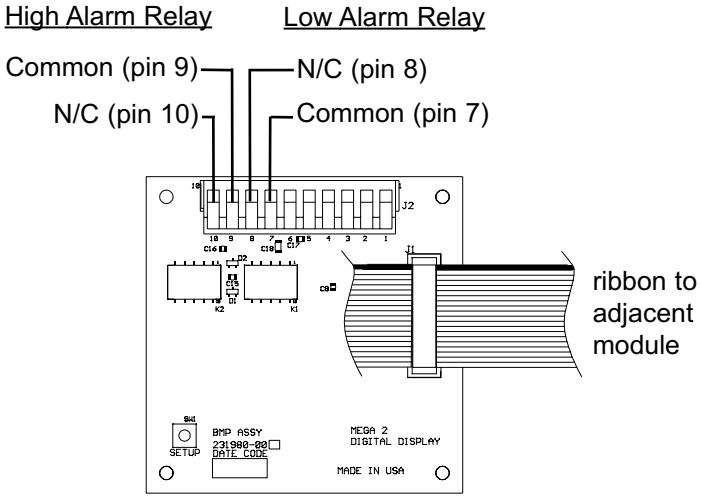
Annunciator Module

NOTE:
General Fault Relay activates when ANY alarm on panel is in progress. Pressing MUTE on Annunciator Module DOES NOT reset relay. Relay deactivates when alarm condition is corrected.

Auxiliary Relay (optional) activates when ANY audible alarm on panel is in progress. Pressing MUTE on Annunciator Module WILL deactivate relay until audible alarm is again reactivated.

Relay contact ratings are 2A @ 30 VDC/0.5 A @ 125 VAC.

Wiring Schematic 7: Digital Display Module High / Low Relays



Digital Display Module

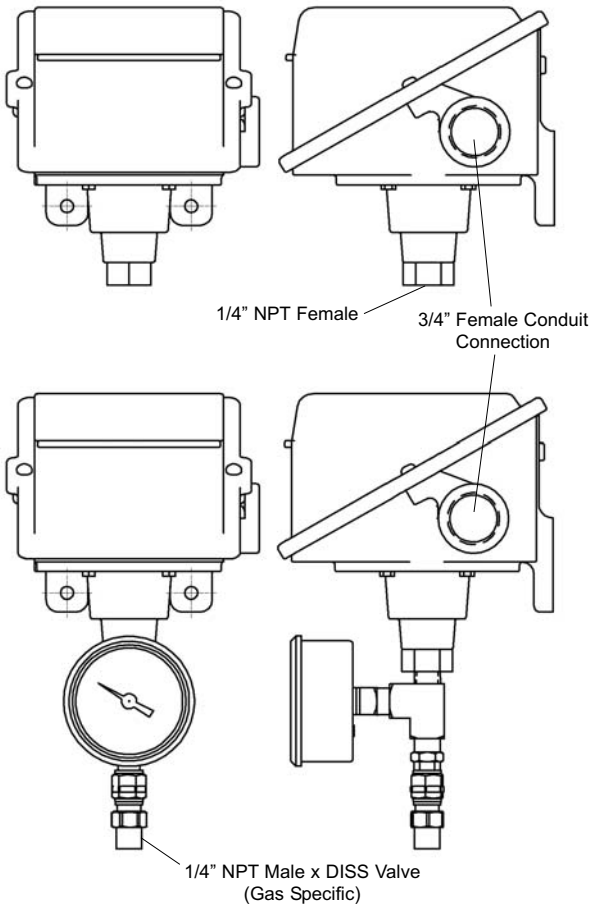
NOTE:
High Alarm Relay activates when high line pressure alarm on digital display module is in progress. When relay activates normally closed contacts open. Pressing MUTE on Annunciator Module DOES NOT deactivate relay. Relay deactivates when high line pressure alarm condition is corrected.

Low Alarm Relay activates when low line pressure alarm on digital display module is in progress. When relay activates normally closed contacts open. Pressing MUTE on Annunciator Module DOES NOT deactivate relay. Relay deactivates when low line pressure alarm condition is corrected.

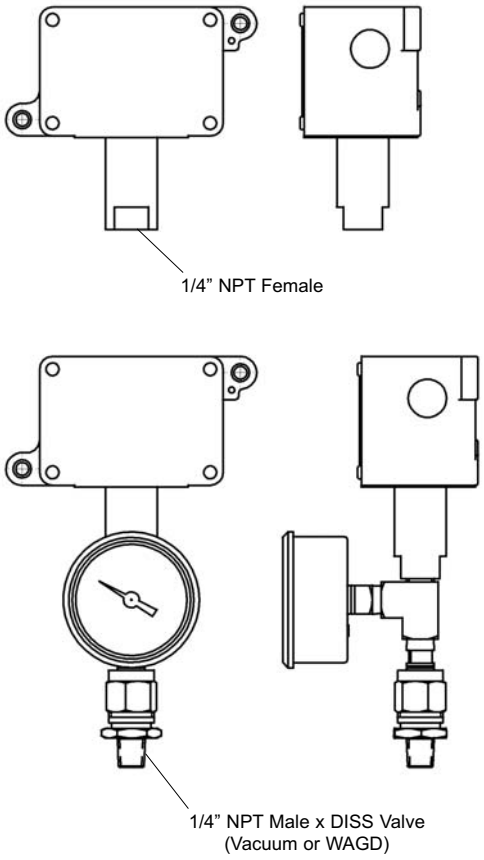
Relay contact ratings are 2A @ 30 VDC/0.5 A @ 125 VAC.

Wiring Schematic 8: Remote Pressure / Vacuum Switches

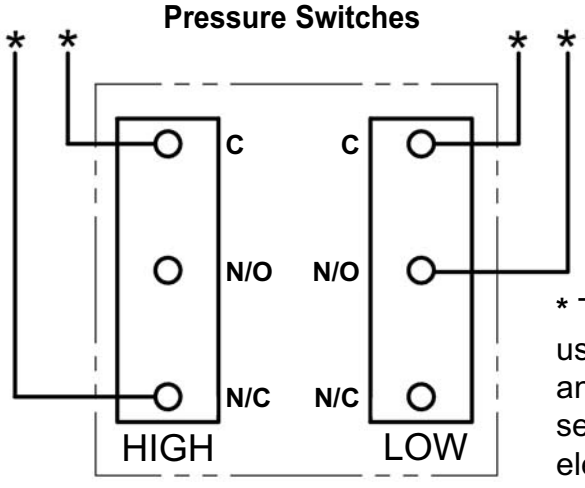
P/N 6-129030-XX thru 6-129032-XX Series Pressure Switches



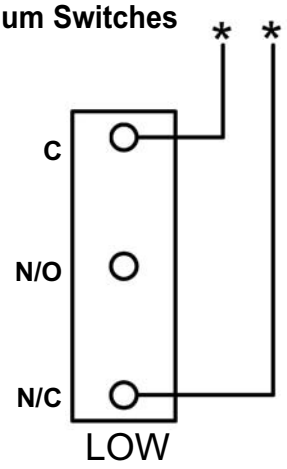
P/N 6-129033-XX Series Vacuum Switches



Typical Wiring Schematic for above Pressure Switches

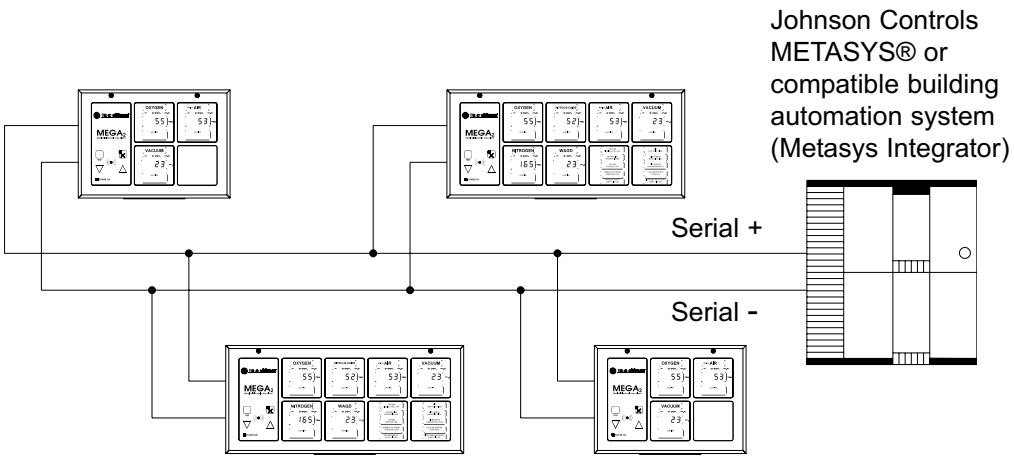


Typical Wiring Schematic for above Vacuum Switches

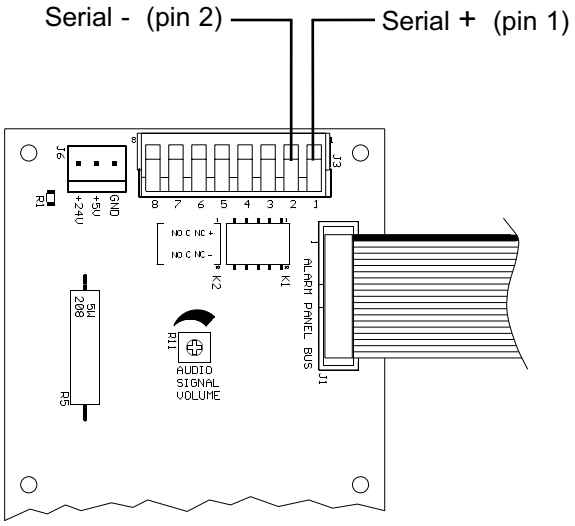


* Terminals to be used for MEGA 2 and other systems sensing fault on electrical contacts opening.

Wiring Schematic 9: Johnson Controls METASYS®

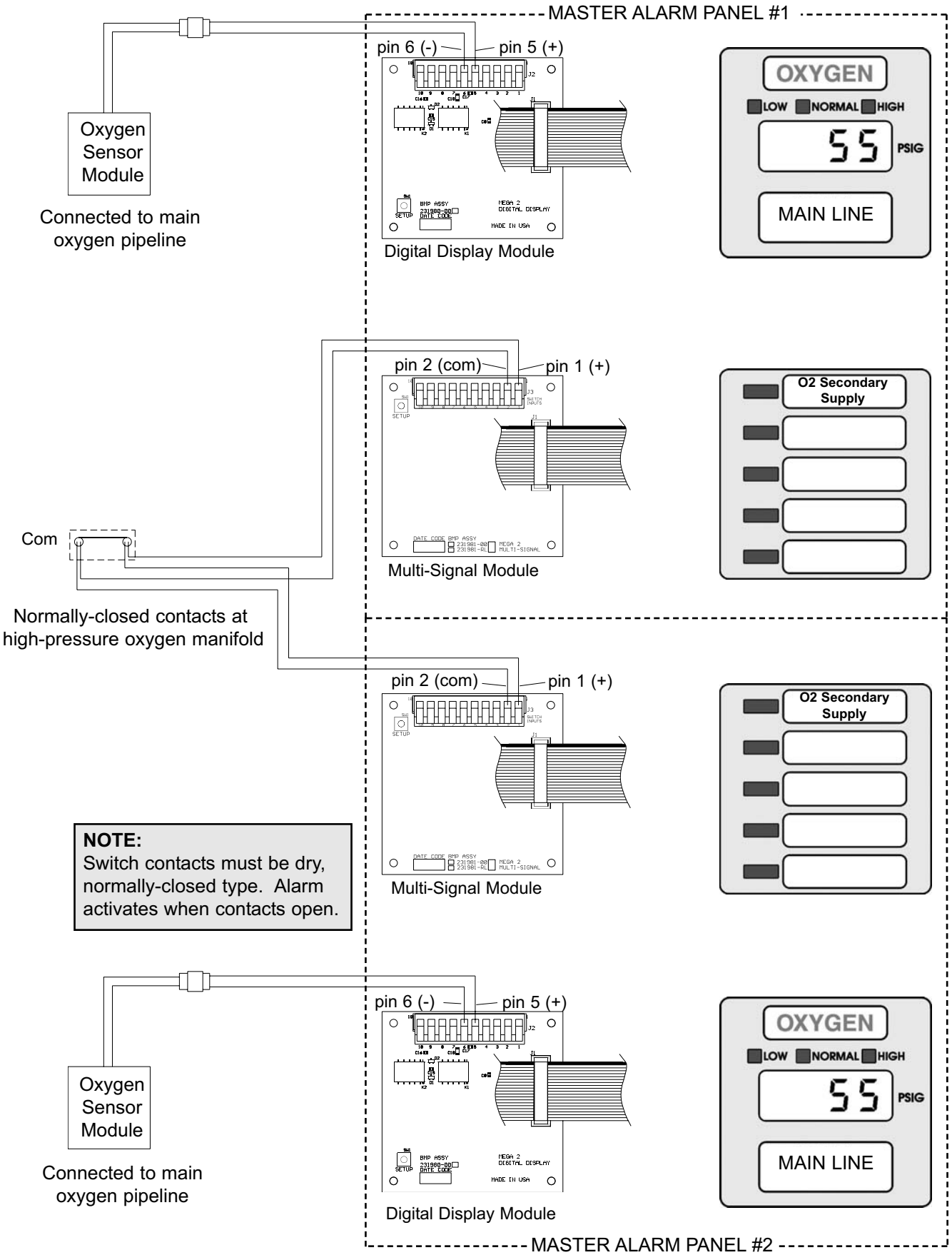


NOTE:
Maintain correct network wiring polarity.



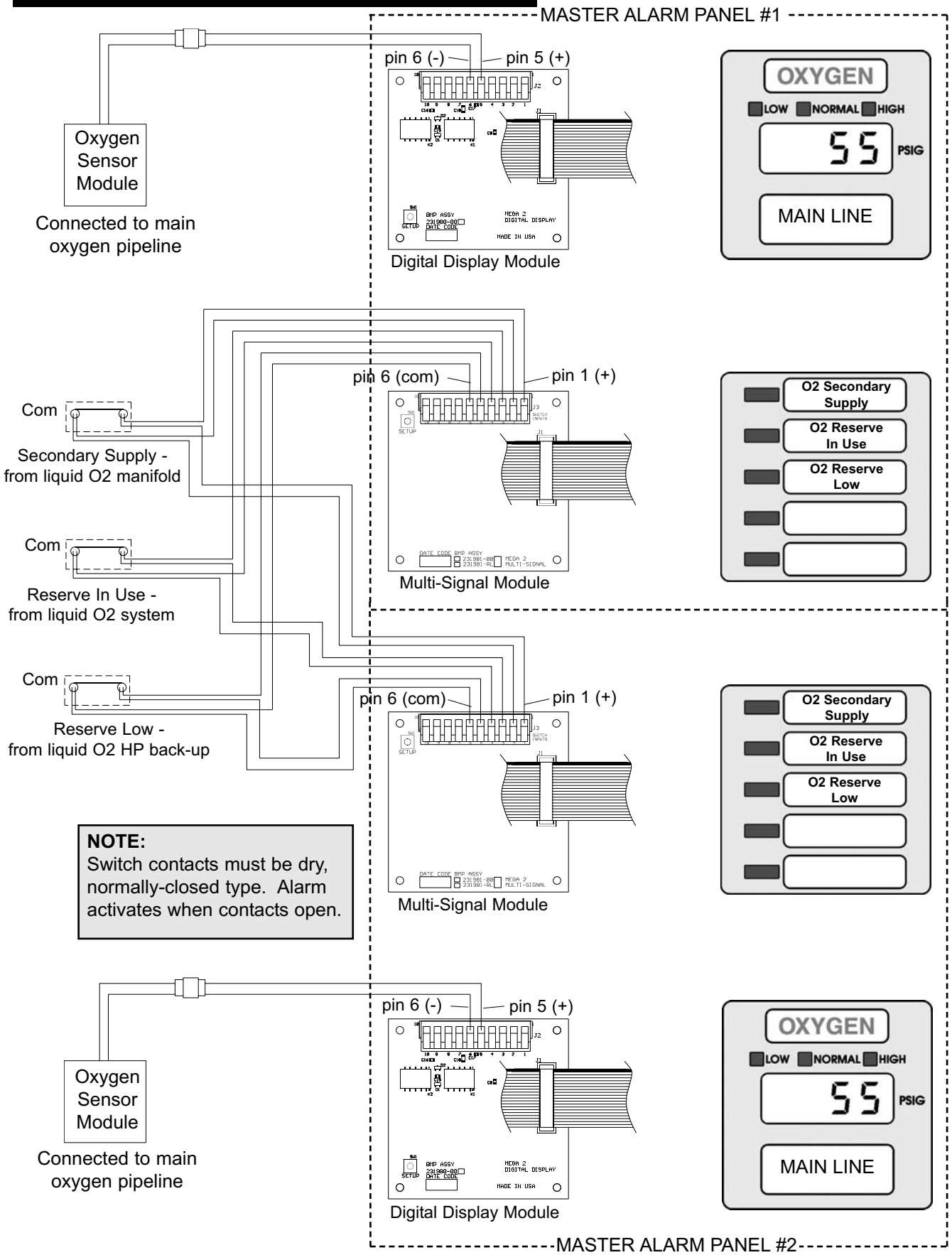
Annunciator Module of each alarm panel connected to the network shown above

Typical Master/Area Alarm Wiring Examples



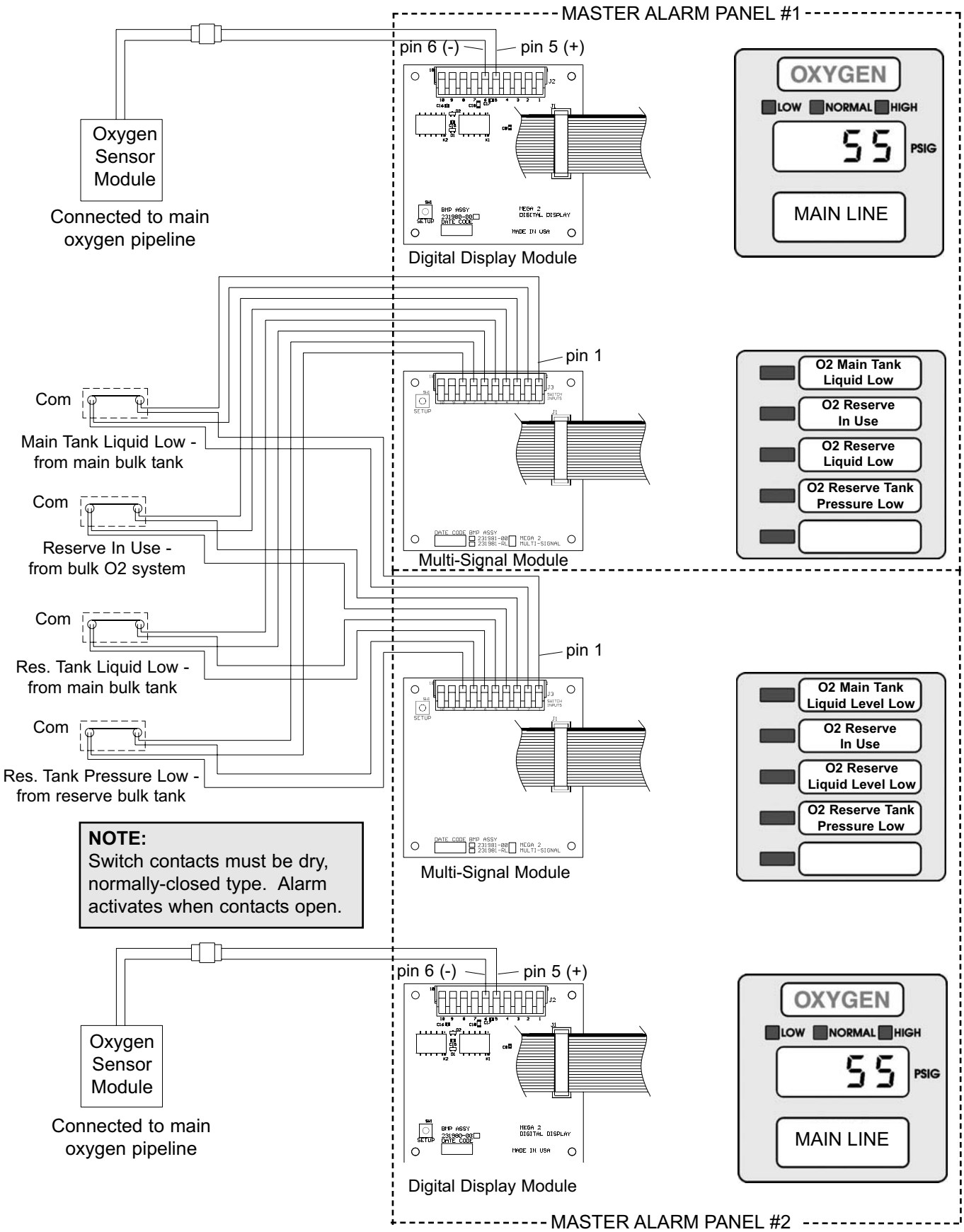
Example 1: Two master alarm panels with digital displays - high-pressure manifold/no reserve (oxygen shown).

Typical Master/Area Alarm Wiring Examples



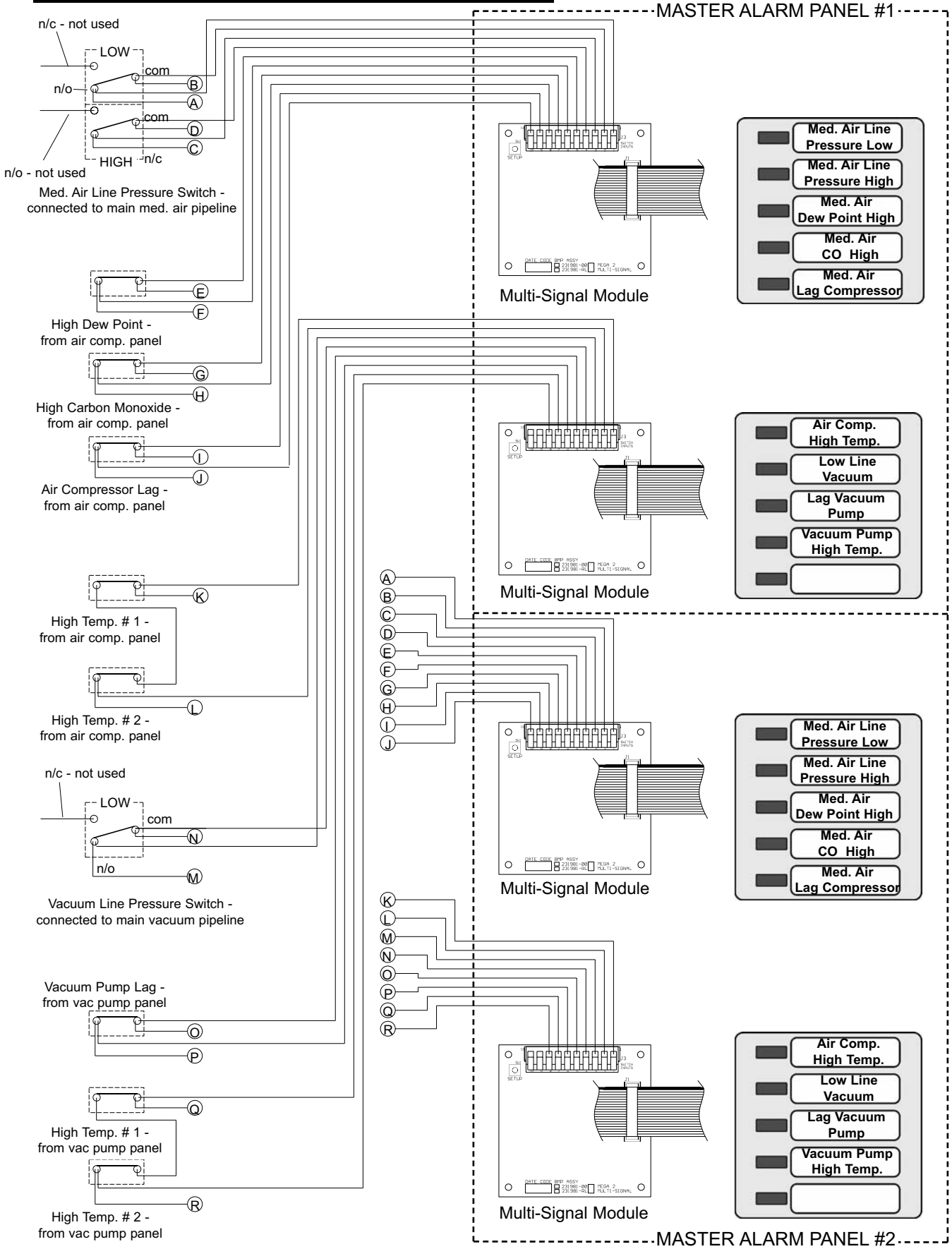
Example 2: Two master alarm panels with digital displays - liquid manifold/high-pressure reserve (oxygen shown).

Typical Master/Area Alarm Wiring Examples



Example 3: Two master alarm panels with digital displays - liquid bulk/liquid reserve (oxygen shown).

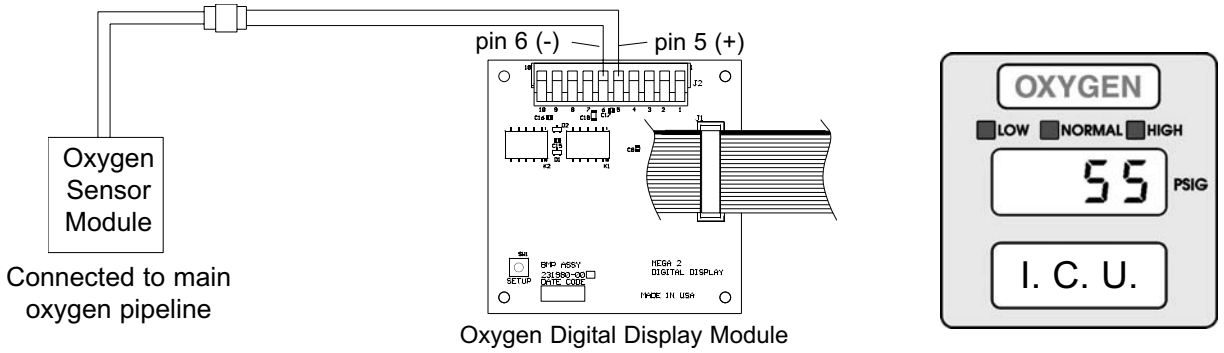
Typical Master/Area Alarm Wiring Examples

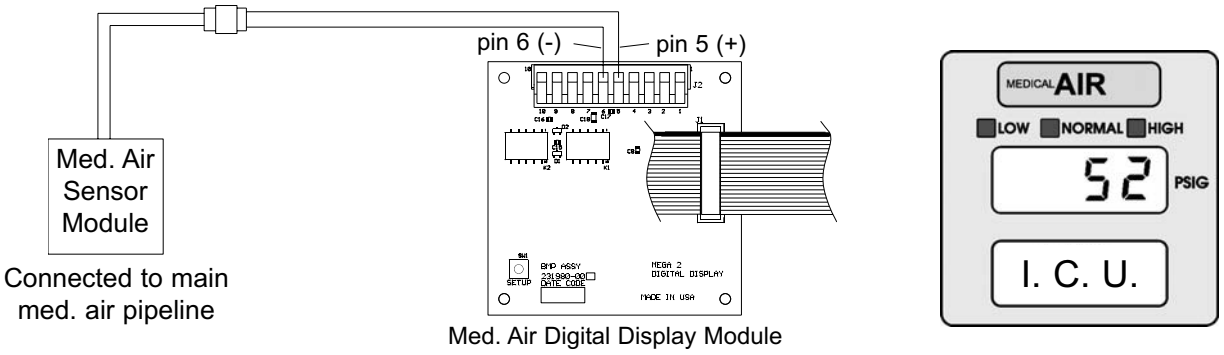


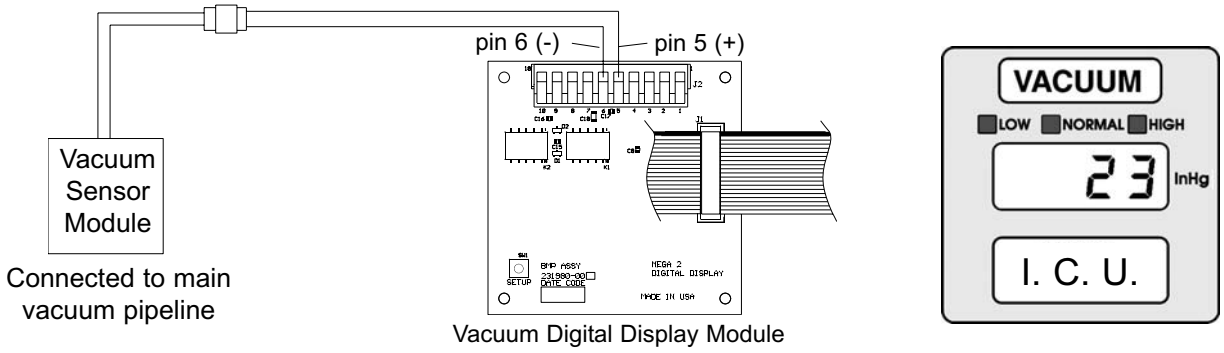
Example 4: Two multi-signal master alarm panels - duplex air compressor and vacuum pump systems.

Typical Master/Area Alarm Wiring Examples

NOTE:
Field wiring cable shields must be grounded at only one end, inside alarm panel back box. Refer to page 31 for details.







Example 5: Area alarm panel - gas services for oxygen, medical air, and vacuum.

Line Voltage Electrical Connection

1. Remove four nuts from plastic power supply shield.
2. Remove plastic shield from power supply. The plastic shield contains an in-line fuse holder that is wired to a two-pin plug on left side of power supply assembly. Remove two-pin plug from power supply.
3. The incoming line voltage hot and neutral wires should be connected via wire nuts to black (hot) and white (neutral) wires of power supply two-pin harness. Connect incoming ground wire to alarm box green ground wire. Refer to Figure 12.
4. Carefully position wires in bottom left corner of alarm panel box. Reconnect two-pin harness to power supply male connector. Harness connector is keyed to prevent incorrect orientation, however, use care to ensure correct pin alignment.
5. Reinstall plastic power supply shield while making sure all high voltage wires are contained within plastic shield.
6. Secure plastic shield with four nuts.

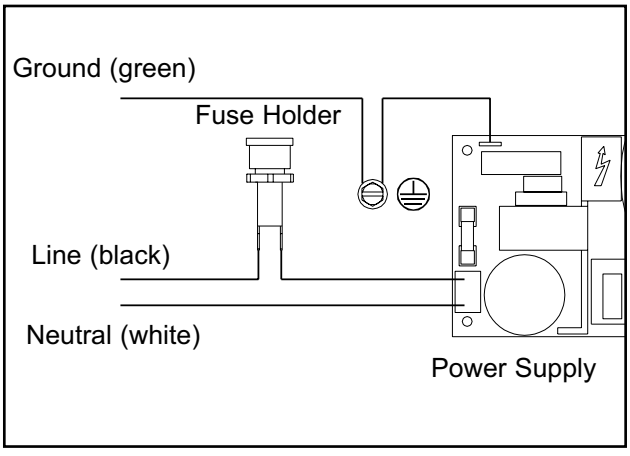


Figure 12: Line Voltage Connection

Front Panel Installation

ATTENTION:
Observe Precautions for Handling
ELECTROSTATIC SENSITIVE DEVICES

1. Remove front panel assembly from static shielding shipping bag.
2. Remove two front panel hinge mounting screws and lanyard mounting screw from alarm panel back box assembly (Figure 13).
3. Attach front panel hinge and lanyard to alarm panel back box using screws removed in step 2 as shown in Figure 14. Large (8-module) back boxes use two lanyards, one on each side.

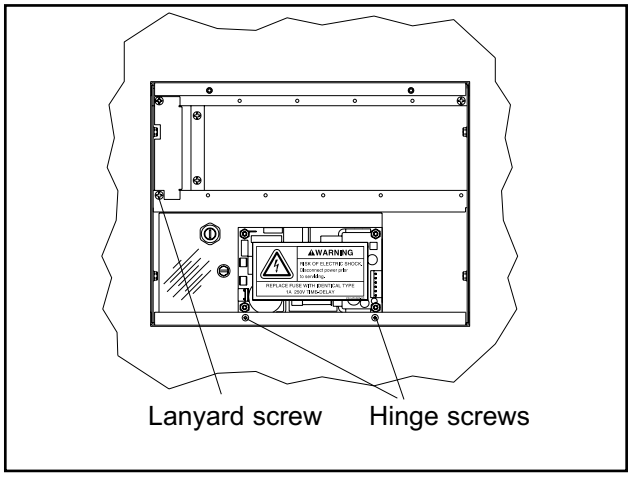


Figure 13: Front Panel Hinge and Lanyard Screws

Front Panel Installation

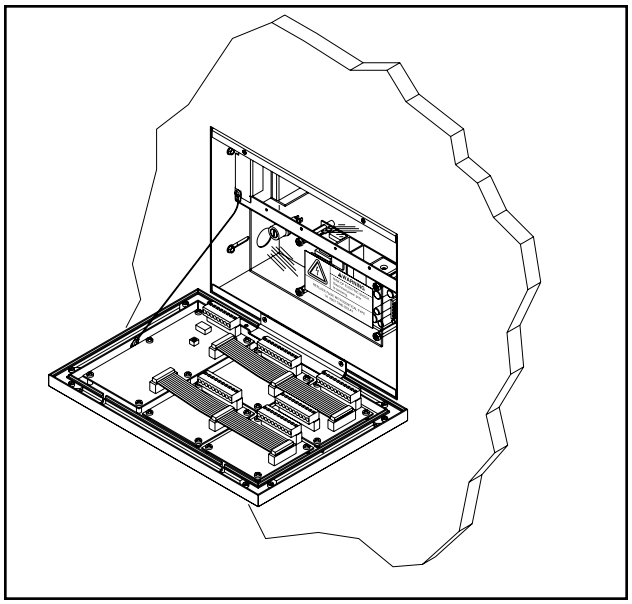


Figure 14: Attach Front Panel and Lanyard

4. The alarm panel's power supply is factory installed with a three-wire harness attached to its right side. Connect loose end of three wire harness to male connector on annunciator module circuit board as shown in Figure 15. The harness connector is keyed to prevent incorrect orientation, however, use care to ensure correct pin alignment.

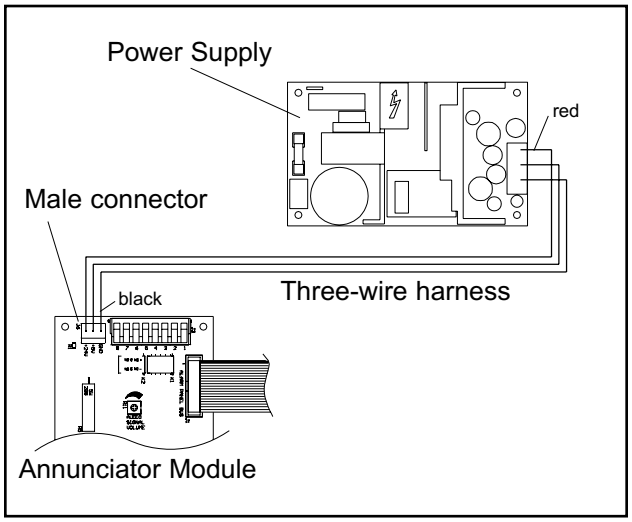


Figure 15: Power Supply Wire Harness

Sensor Installation

Remote Sensors:

1. Remove sensor module from shipping carton. Each sensor module is shipped with a wiring pigtail that has a two-pin polarized connector.
2. Wire nut pigtail to field installed wiring inside sensor mounting box. Note polarity of wiring and corresponding field wiring color or number for later.

NOTE:
Field wiring cable shields must be grounded at only on one end, inside alarm panel back box. Refer to page 31 for details.

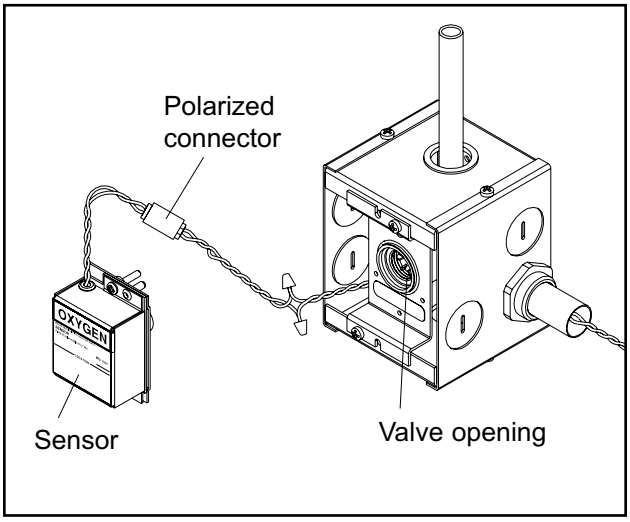


Figure 16: Sensor Module Connection

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

3. Join polarized connector in sensor mounting box to mating connector on sensor module. Refer to Figure 16.
4. Insert sensor into valve opening in sensor rough-in. An indexing pin provides for proper orientation and prevents gas service cross-connection. Push sensor all the way in and secure with (2) #6-32 x 1-1/4" screws.

Sensor Installation

5. Tuck excess wiring into open space behind sensor.
6. Mark location monitored by sensor in space provided on sensor label. Refer to Figure 17.

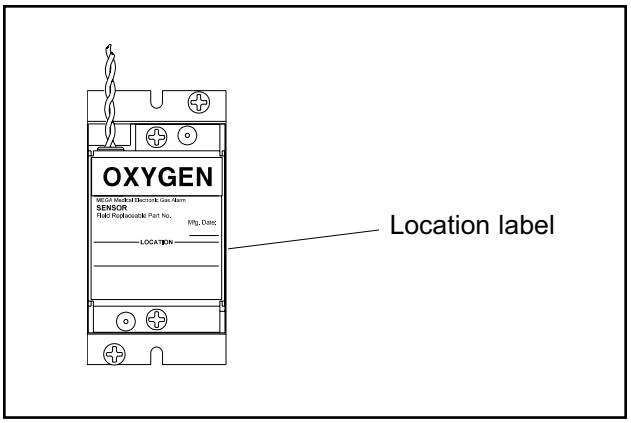


Figure 17: Sensor Module Location Label

Local Sensors:

1. Remove sensor module from shipping carton.

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

2. Insert sensor into valve opening in pressure/vacuum service rough-in. An indexing pin provides for proper orientation and prevents gas service cross-connection. Push sensor all the way in and secure with (2) #6-32 x 1-1/4" screws. Repeat this process for all sensors within alarm panel.
3. The digital display module(s) located on front panel assembly are factory wired with a harness and polarized two-pin connector for each sensor module. Each digital display module is labeled with the gas type. Match gas type of each sensor to gas type of each digital display module and join polarized connectors of sensor and digital display module harnesses.
4. Mark location monitored by sensor in space provided on sensor label. Refer to Figure 17.

Remote Sensor Wiring

1. Identify each pair of field installed sensor wires inside alarm panel back box assembly. Note polarity of each wire from previously installed remote sensor module.
2. Route each pair of sensor wires as shown in Figure 18 to appropriate digital display module. Each digital display module is labeled with the gas type. Verify the appropriate remote sensor wires are connected to correct digital display module.

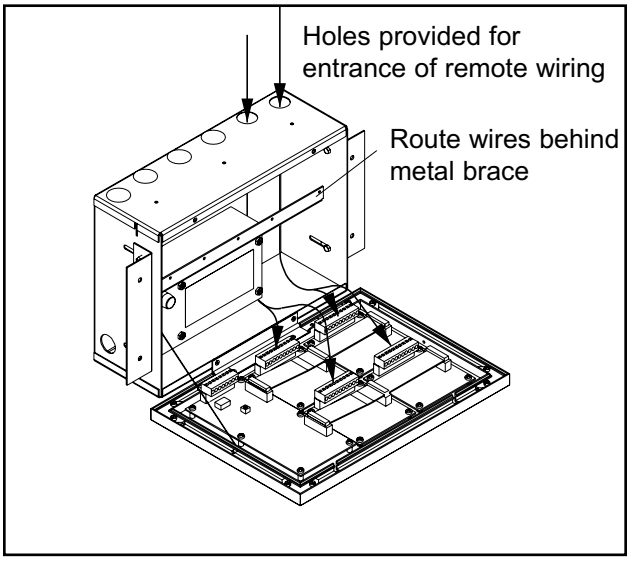


Figure 18: Remote Sensor Wire Routing

Remote Sensor Wiring

3. Connect positive sensor wire to terminal 5 and negative sensor wire to terminal 6 for each remote sensor and digital display module. Refer to Figure 19.
4. Blank digital display module location labels are provided so each digital display module may be identified with area/zone that it is monitoring. Insert location labels (if desired) as shown in Figure 20.

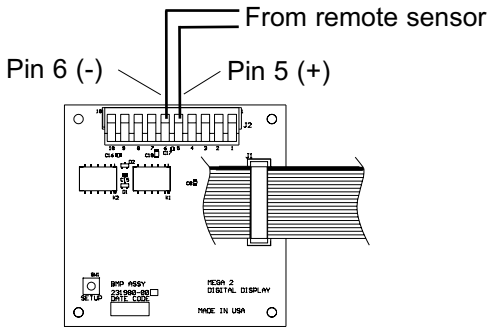


Figure 19: Remote Sensor Wire Termination

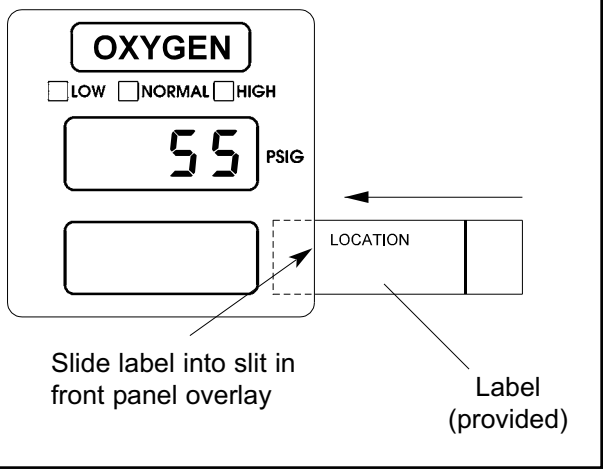


Figure 20: Digital Display Module

Source Equipment Wiring

1. Identify each pair of field installed source equipment signal wires inside alarm panel back box assembly.
2. Route each pair of signal wires as shown in Figure 21 to appropriate multi-signal module.

⚠ CAUTION:
Source equipment signal wires must be connected to normally-closed, dry contacts. No electrical voltage can be present and contacts must be closed during normal equipment operation. When contacts open, an alarm condition will be activated.

NOTE:
Each pair of terminals labeled on the multi-signal module connector is labeled “+” and “COM”. Ensure that when a source equipment dry contact is wired to two master panels, the same side of the dry contact is connected to the same terminal at both panels. For example, if the source equipment’s normally closed contact is wired to the “+” of the first master panel, ensure it is also connected to the “+” terminal of the second master panel.

3. Connect each pair of signal wires to desired multi-signal module terminals. The terminals are labeled “Signal 1” through “Signal 5”. Signal 1 corresponds to top row of indicators on front panel of multi-signal module. Signal 5 corresponds to bottom row. Refer to Figure 22.
4. Insert appropriate source equipment label into multi-signal module front panel as shown in Figure 23. A sheet of common source equipment signals has been provided for convenience. Blank labels are also provided.

Source Equipment Wiring

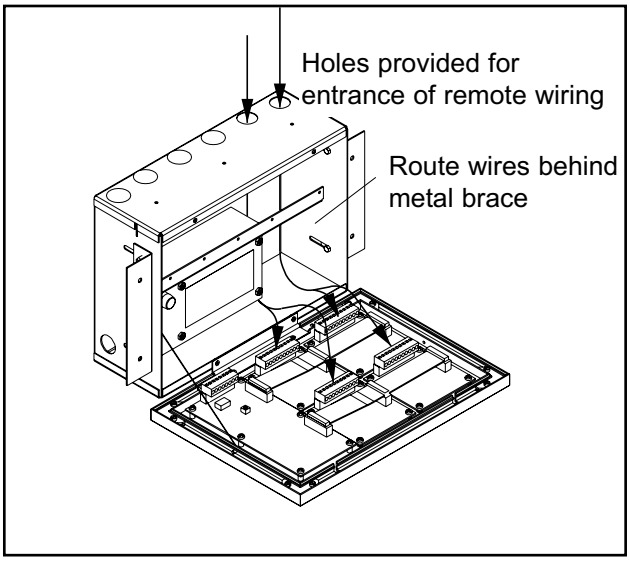


Figure 21: Source Equipment Wire Routing

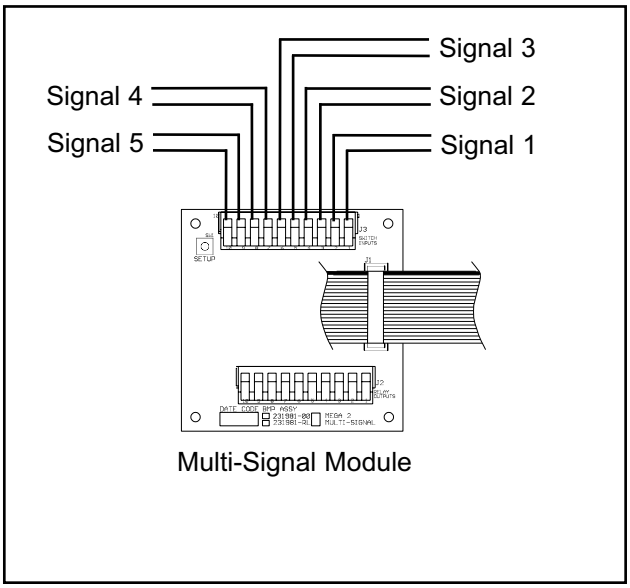


Figure 22: Source Signal Wiring Termination

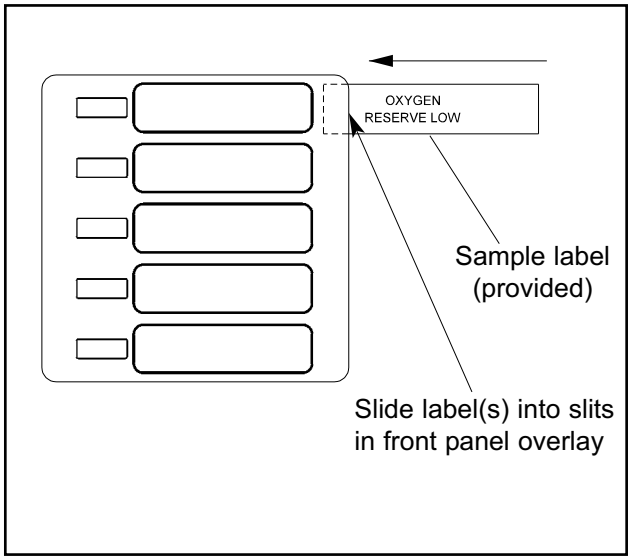


Figure 23: Multi-Signal Front Panel Labeling

Field Wiring Cable Shield Grounding

All field wiring cable shields must be grounded inside alarm panel back box. A grounding screw is provided in upper right corner of alarm back box as shown in Figure 24. Shields from several cables may be wrapped together and crimped into one ring lug (by others) .

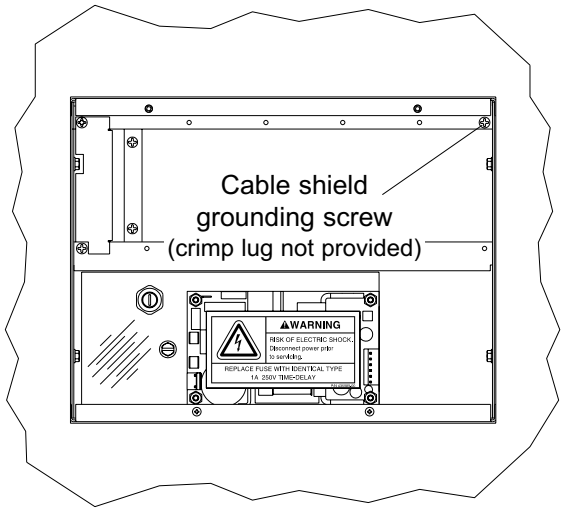


Figure 24: Field Wiring Cable Shield Grounding

⚠ CAUTION:

Keep shield wires to ground screw as short as possible so they can not touch front panel circuit boards when front panel is closed

Building Automation System Wiring

There are several methods of connecting MEGA2 alarm panels to a building automation system depending upon what type of information is required and what type of building automation system is being used.

Multi-Signal Module Relays:
As an option, mutli-signal modules may be ordered with five output relays, one for each of five signals that multi-signal is capable of monitoring. Each relay has a set of dry, normally-closed contacts that will open when an alarm is activated on corresponding front panel signal. For example, when an alarm condition activates on top multi-signal front panel alarm location (Signal 1), relay labeled "Signal 1" will activate opening its contacts. Relay contacts will remain open as long as alarm condition is active, even if audible alarm is silenced by MUTE button. When alarm condition is corrected, relay contacts will close. Relay contact ratings are 2 A @ 30 VDC/0.5 A @ 125 VAC. Refer to Schematic 5 (Pg. 18).

Digital Display Module High/Low Relays:
Each digital display module is supplied with two separate output relays. One relay for high line pressure alarm and another for low line pressure alarm. Each relay has a set of dry, normally-closed contacts that will open when an alarm is activated on corresponding front panel signal. For example, when a low pressure alarm condition activates on digital display module front panel, relay labeled "Low Relay" will activate, opening its contacts. Relay contacts will remain open as long as alarm condition is active, even if audible alarm is silenced by MUTE button. When alarm condition is corrected, relay contacts will close. Relay contact ratings are 2 A @ 30 VDC/0.5 A @ 125 VAC. Refer to Figure Schematic 7 (Pg. 19).

Annunciator Module General Fault Relay:
The annunciator module is supplied with an alarm panel general fault output relay. This relay has a set of dry contacts that may be wired either normally open or normally closed. The relay will activate when ANY alarm on ENTIRE alarm panel is activated. Relay will remain activated as long as alarm condition is active, even if audible alarm is silenced by MUTE button. When alarm condition is corrected, relay will deactivate. Relay contact ratings are 2 A @ 30 VDC/0.5 A @ 125 VAC. Refer to Schematic 6 (Pg. 19).

Annunciator Module Auxiliary Relay:
As an option, annunciator module may be supplied with an additional auxiliary relay. This auxiliary relay does not replace general fault relay described above. Auxiliary relay has a set of dry contacts that may be wired either normally open or normally closed. Like general fault relay, auxiliary relay will activate when ANY alarm on ENTIRE alarm panel is initiated. Unlike general fault relay, auxiliary relay will deactivate when audible alarm is silenced by MUTE button. If alarm condition is still active when mute function cancels, auxiliary relay will reactivate. Relay contact ratings are 2 A @ 30 VDC/0.5 A @ 125 VAC. Refer to Schematic 6 (Pg. 19).

Building Automation System Wiring

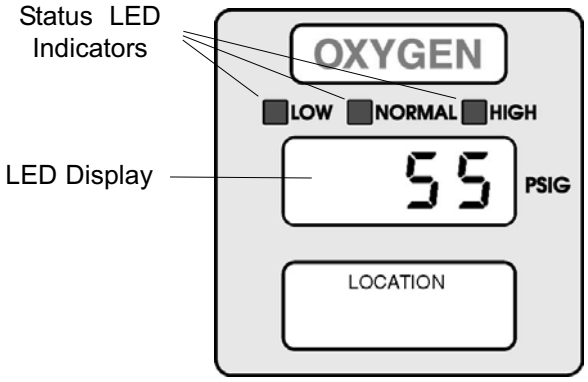
Johnson Controls METASYS® System: The MEGA2 alarm panel is compatible with Johnson Controls METASYS® building automation system (Using METASYS® Integrator). Each MEGA2 alarm panel is connected to a common two-wire RS-485 serial computer interface bus. Two wires are connected to pins 1 and 2 of annunciator module and then connected to common data bus. Refer to Schematic 9 (Pg. 21) for details. Each digital display module and multi-signal module within alarm panel is field programmed with a unique network address. Using this address, Johnson Controls system can monitor alarm panel status including digital pressure readings and programmed alarm set points.

Slave Panel Wiring

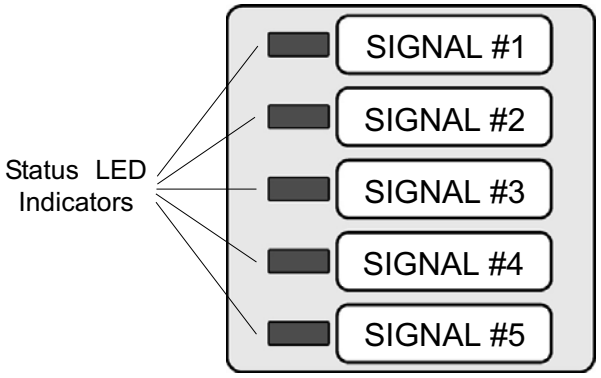
Digital display modules of two alarm panels may be wired together in such a way that pressure readings of first panel can be duplicated at second panel. Each digital display module has RS-422 digital outputs and inputs. By connecting digital output (master output) of first panel to digital inputs (slave input) of the second panel, second panel will duplicate pressure readings. Refer to Schematic 4 (Pg. 17) for details.

Start-Up and Checking

1. Turn on electrical power to alarm panel.
2. Make following observations:
   - POWER ON light illuminates on front of alarm panel.
   - Digital display and multi-signal modules warm-up for ten seconds. During warm-up, no audible or visual alarms activated. After warm-up, audible and visual alarms are initiated for any active alarm.
3. Press MUTE button to silence audible alarm.
4. Pressurize piping system (medical gas and vacuum).
5. Make following observations:
   - Digital display modules display actual pipeline pressures or vacuum levels.
   - If digital display module pipeline pressures and vacuum levels are within pre-set limits, NORMAL indicator is illuminated.
   - If digital display module pipeline pressures and vacuum levels are outside pre-set limits, status indicators show HIGH or LOW.
   - If a fault code is displayed (-F1-, -F2-, -F3- or -F4-) refer to **Troubleshooting Guide**.
   - Multi-signal modules indicate current status from dry-contact switches. Unused signals can be disabled. Refer to **Set-Up Procedure**.



Digital Display Module



Multi-Signal Module

NOTE:
If any module appears to be malfunctioning, refer to **Troubleshooting Guide**.

Set-Up Procedure

Digital Display Module

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

Gas/Vacuum Service	Alarm Set Point	
	Low	High
Pressure (50 psig)	40 psig	60 psig
Pressure (100 psig)	80 psig	120 psig
Nitrogen, Instr. Air	140 psig	190 psig
Vacuum/WAGD	12 in Hg.	none

Changing units and alarm set points:

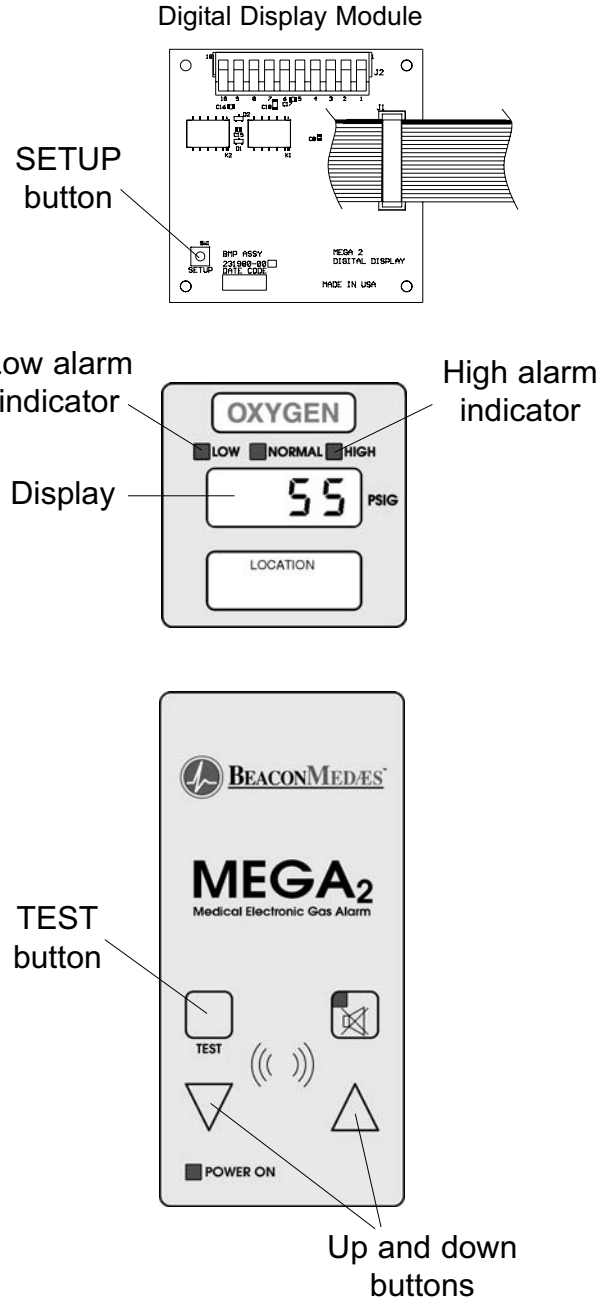
1. Loosen two screws on front of alarm panel. Hinge open alarm panel's front cover.
2. Locate SETUP button on circuit board of digital display module to be adjusted.
3. Press and release SETUP button. Audible alarm will chirp and **SEtI** will be displayed.
4. Press and release TEST button on front of alarm panel. Current unit of measure will be displayed. Select desired unit of measure by pressing either △ or ▽ buttons. Available units of measure are:

   H PA (kPa)
   PSI (psig)
   InH9 (in Hg)
   mmH9 (mm Hg)

5. Press and release TEST button. The LOW indicator will illuminate and **Lo** will be displayed. After two seconds current low alarm setting will be displayed. Select desired low alarm setting by pressing either △ or ▽ buttons. Low alarm setting ranges are:

   0 to **1380** (**1725***) (kPa)
   0 to **200** (**250***) (psig)
   0 to **32** (in Hg)
   0 to **800** (mm Hg)

*N2 and instrument air only, DDM firmware 1.0.6 or later



NOTE:
Audible alarm will chirp with each button push.

If module is idle for more than one minute during set-up procedure, module will chirp three times, return to monitor mode and will default to previous settings. No changes to settings will be saved.

The set-up must be completed and the module must display **donE** in order for changes to be saved.

Set-Up Procedure

Digital Display Module

6. Press and release TEST button.
   HIGH indicator will illuminate and Hi will be displayed. After two seconds current high alarm setting will be displayed. Select desired high alarm setting by pressing either △ or ▽ buttons. High alarm setting ranges are:

   0 to 1380 (1725*) (kPa)
   0 to 200 (250*) (psig)
   0 to 32 or nonE (in Hg)
   0 to 800 or nonE (mm Hg)

   *N2 and instrument air only, DDM firmware 1.0.6 or later

7. Press and release TEST button to save changes. donE will be displayed for two seconds. Digital display module will return to monitoring mode.

Digital Display Module (Advanced)

Two additional levels of "advanced" set-up features are available.

The first advanced level, SEt2, is used to adjust basic communication related parameters. The parameters adjustable within SEt2 are listed below:

Addr (network address)

A network address uniquely identifies each digital display module to a personal computer or Johnson Controls Metasys® system. Address range is 0 to 255. Factory setting is 0.

bAUd (baud rate)

Used to set communication speed. User choices are 4800 or 9600. Factory setting is 4800.

ndF (network data format)

Defines data word length transmitted to building automation system. User choices are 8 (bits) or 16 (bits). Factory setting is 8.

PdF (pressure data format)

Defines data word length transmitted to a slave alarm panel. User choices are 8 (bits) or 16 (bits). Factory setting is 8.

The second advanced level, SEt3, is used to adjust other miscellaneous parameters as listed below:

SErU (gas service identification)

Used to set digital display module's gas service identification for communication with a digital sensor.

User choices are:

O2	(oxygen)
n2O	(nitrous oxide)
Air	(medical air)
VAC	(vacuum)
n2	(nitrogen)
LAir	(lab air)
LVAC	(lab vacuum)
Argn	(argon) (Firmware 1.0.6 or later)
IAir	(instrument air)
VAGd	(WAGD)
CO2	(carbon dioxide)
C-O2	(CO2/O2)
O2-C	(O2/CO2)
HEO2	(He/O2)
O2HE	(O2/He)
HE	(Helium)
nonE	(none)

NOTE:
Set to nonE if using analog sensors.

oFFS (display offset)

Used to adjust digital module's display. User choices are 0, 1, 2, -1, or -2. Factory setting is 0.

Set-Up Procedure

Digital Display Module (Advanced)

rEPt (audible alarm repeat)
Used to set time interval for reactivation of audible alarm after alarm MUTE button has been pressed. User choices are oFF, 1, 5, 15, 30 (minutes), 1hr, 8hr, 12hr or 24hr (hour). Factory setting is oFF. When set to oFF, audible alarm will not reactivate after an active alarm has been silenced. Any new alarm will reactivate audible alarm.

Int5 (display intensity)
Used to adjust digital module's display brightness. Factory setting is maximum intensity.

NOTE:
If module is idle for more than one minute during set-up procedure, module will chirp three times, return to monitor mode and will default to previous settings. No changes to settings will be saved.

Set-up must be completed and module must display donE in order for changes to be saved.

Changing Communication Parameters - (SEt2):

1. Press and HOLD SETUP button for TWO seconds until SEt2 is displayed.
2. Press and release TEST button on front of alarm panel. Addr will be displayed for one second and then current network address. Select desired address by pressing △ or ▽ buttons. Each module must have a unique address.
3. Press and release TEST button. bAUd will be displayed for one second and then current baud rate. Select desired baud rate by pressing △ or ▽ buttons.
4. Press and release TEST button. ndF will be displayed for one second and then current network data format. Select desired data format by pressing △ or ▽ buttons.
5. Press and release TEST button. PdF will be displayed for one second and then current pressure data format. Select desired data format by pressing △ or ▽ buttons.
6. Press and release TEST button to save changes. donE will be displayed for two seconds. Digital display module will return to monitoring mode.

Changing Miscellaneous Parameters - (SEt3):

1. Press and HOLD SETUP button for FOUR seconds until SEt3 is displayed.
2. Press and release TEST button on front of alarm panel. SErU will be displayed for one second and then current gas service identification. Select desired gas service by pressing △ or ▽ buttons.
3. Press and release TEST button. oFFS will be displayed for one second and then current display offset. Select offset by pressing △ or ▽ buttons.
4. Press and release TEST button. rEPt will be displayed for one second and then current audible alarm repeat time. Select desired repeat time by pressing △ or ▽ buttons.
5. Press and release TEST button. Int5 will be displayed. Select desired display brightness by pressing △ or ▽ buttons. Each push will change brightness of display. Audible alarm will chirp one time with each push and two times when limit reached.
6. Press and release TEST button to save changes. donE will be displayed for two seconds. Digital display module will return to monitoring mode.

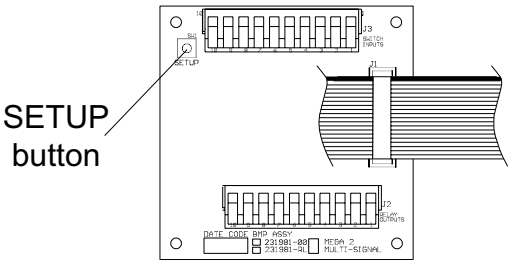
Set-Up Procedure

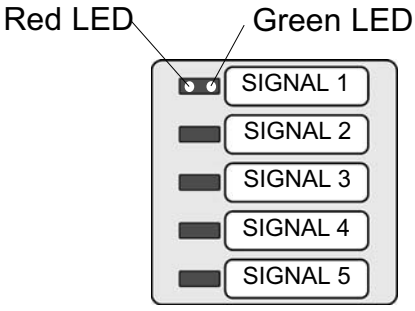
Multi-Signal Module

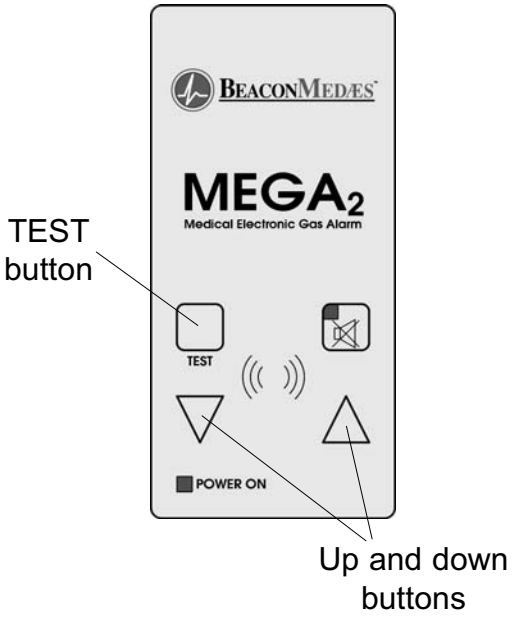
Changing signal options:

1. Loosen two screws on front of alarm panel. Hinge open front cover.
2. Locate SETUP button on circuit board of multi-signal module to be adjusted.
3. Press and release SETUP button. Audible alarm will chirp and both green and red indicators for top location (Signal 1) will illuminate.
4. Using either △ or ▽ buttons, enable or disable Signal 1 location. When red indicator is illuminated, location is ENABLED. Turning off red indicator disables location. Signal locations can not be disabled if wired to a closed-contact circuit.
5. Press and release TEST button on front of alarm panel. Both green and red indicators for second location (Signal 2) will be illuminated.
6. Using either △ or ▽ buttons, enable or disable Signal 2 location. When red LED is illuminated, location is enabled. Turning off red LED disables location.
7. Repeat steps 5 and 6 above for remaining signal locations (Signal 3, 4, and 5).
8. Press and release TEST button to save changes. LEDs will sweep from top to bottom to indicate end of set-up sequence has been reached. Multi-signal module will return to monitoring mode.

Multi-Signal Alarm Module Circuit Board







NOTE:
Audible alarm will chirp with each button push.

If module is idle for more than one minute during set-up procedure, module will chirp three times, return to monitor mode and will default to previous settings. No changes to settings will be saved.

The set-up must be completed in order for changes to be saved.

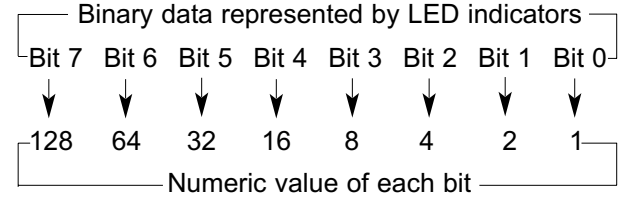
Set-Up Procedure

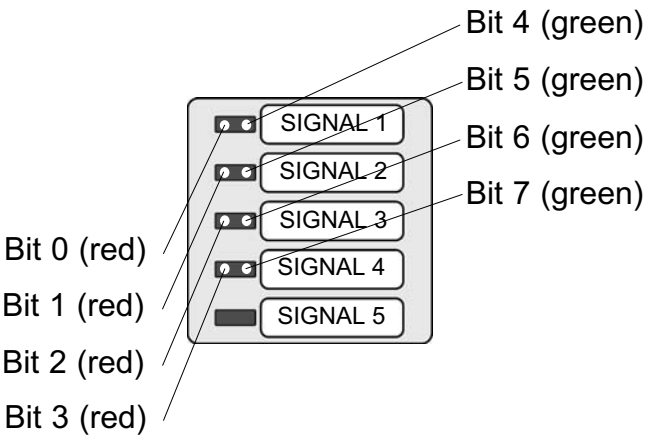
Multi-Signal Module (Advanced)

Two additional levels of “advanced” set-up features are available. The first level is used to adjust basic communication related parameters. The second level is used to adjust alarm repeat time and display intensity.

Setting Communication Parameters:

A network address uniquely identifies each multi-signal alarm module to a personal computer or Johnson Controls Metasys® system. Address range is 0 to 255. Factory default setting is 0. Since a multi-signal alarm module does not have a digital display, network address is shown as a binary number on specific red and green front panel LED indicators. Table below assigns a numeric value to each specific LED indicators. For example, if LED indicators for bits 0, 1, 2, and 3 were all illuminated, network address would be 15 (1+2+4+8=15).





1. Press and HOLD set-up button. Audible alarm will chirp when set-up button is first pushed and again two seconds later. Release button after second audible alarm chirp. Multi-signal alarm module front panel LED indicators (Bit 0 through Bit 7) will show current network address. If no indicators are illuminated, address is 0 (factory setting).
2. Using either △ or ▽ buttons, select desired network address between 0 and 255.
3. Press and release TEST button on front of alarm panel. Front panel LED indicators (Bit 0 and Bit 4) will show current communication baud rate. If only Bit 4 LED is illuminated, baud rate is 4800 (factory setting). If BOTH Bit 0 and Bit 4 LEDs are illuminated, baud rate is 9600.
4. Using either △ or ▽ buttons, select desired baud rate (4800 or 9600).
5 Press and release TEST button on front of alarm panel. Front panel LED indicators (Bit 1 and Bit 5) will show current communication data format. If only Bit 5 LED is illuminated, data format is 8-bit word length (factory setting). If BOTH Bit 1 and Bit 5 LEDs are illuminated, data format is 16-bit word length.
6. Using either △ or ▽ buttons, select desired data format (8-bit or 16-bit).
7. Press and release TEST button to save changes. LEDs will sweep from top to bottom to indicate end of set-up sequence has been reached. Multi-signal module will return to monitoring mode.

Set-Up Procedure

Multi-Signal Module (Advanced)

Setting Audible Alarm Repeat Time and Display Intensity:

Used to set time interval for reactivation of audible alarm after alarm MUTE button has been pressed.

1. Press and HOLD SETUP button. Audible alarm will chirp when SETUP button is first pushed, again after two seconds and a third time after four seconds. Release button after third audible alarm chirp. Multi-signal module front panel LED indicators will show current audible alarm repeat time as shown below:

Indicator Illuminated	Repeat Time
None	OFF
Signal 1 - red	1 Min.
Signal 2 - red	5 Min.
Signal 3 - red	15 Min.
Signal 4 - red	30 Min.
Signal 1 - green	1 Hr.
Signal 2 - green	2 Hr.
Signal 3 - green	8 Hr.
Signal 4 - green	12 Hr.
Signal 5 - green	24 Hr.

2. Using either △ or ▽ buttons, select desired audible alarm repeat time.
3. Press and release TEST button on front of alarm panel. All LED indicators will illuminate.
4. Select desired display brightness by pressing either △ or ▽ buttons. Each push will increase or decrease brightness of display. Audible alarm will chirp one time with each button push and two times when limit is reached.
5. Press and release TEST button to save changes. LEDs will sweep from top to bottom to indicate end of set-up sequence. Multi-signal module will return to monitoring mode.

Monitoring Mode

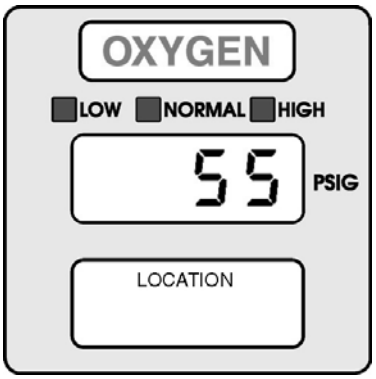
Monitoring mode is the normal operating mode of the $MEGA_2$ system.

Digital Display Module:

Digital display modules monitor pipeline pressure or vacuum.

- The LED display indicates pipeline pressure or vacuum.
- If piping pressure or vacuum level is within high and low alarm limits, green NORMAL indicator is illuminated.
- If pressure or vacuum level drops to, or below, low alarm set-point, audible alarm activates and red LOW indicator flashes.
- If pressure or vacuum level rises to, or above, high alarm set-point, audible alarm activates and red HIGH indicator flashes.
- When front panel alarm MUTE button is pressed, audible alarm is silenced. Alarm indicator remains illuminated, but does not flash.
- Visual indicator will remain illuminated as long as alarm condition remains.
- If audible alarm repeat time has been set, audible alarm will reactivate, and visual indicator will again flash after specified time.

NOTE:
Sensor faults will be displayed as -F1-, -F2-, -F3- or -F4- error codes. Refer to troubleshooting section for details.



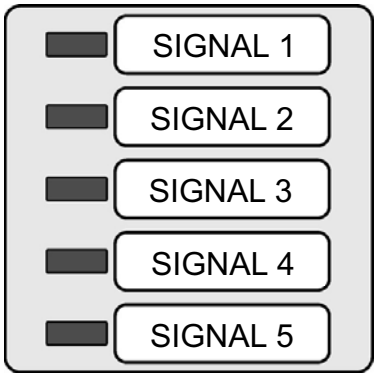
Operation

Monitoring Mode

Multi-Signal Module:

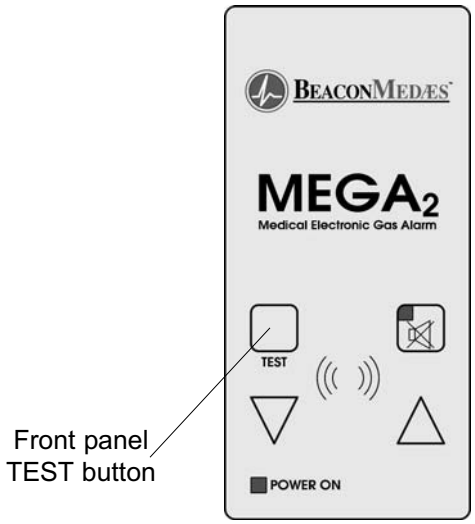
Multi-Signal modules monitor up to five dry-contact switches.

- If the signal is normal (switch contacts closed), green indicator for signal is illuminated.
- If an alarm occurs (switch contacts open), audible alarm activates and red indicator for signal flashes.
- When front panel alarm MUTE button is pressed, audible alarm is silenced. Alarm indicator remains illuminated, but does not flash.
- Visual indicator will remain illuminated as long as alarm condition remains.
- If audible alarm repeat time has been set, audible alarm will reactivate, and visual indicator will again flash after specified time.



Testing

Periodic testing of alarm system is recommended. Digital display modules and multi-signal alarm modules have built-in self-test modes. Front panel TEST button will initiate self-test mode on all alarm panel modules at same time.



Digital Display Module:

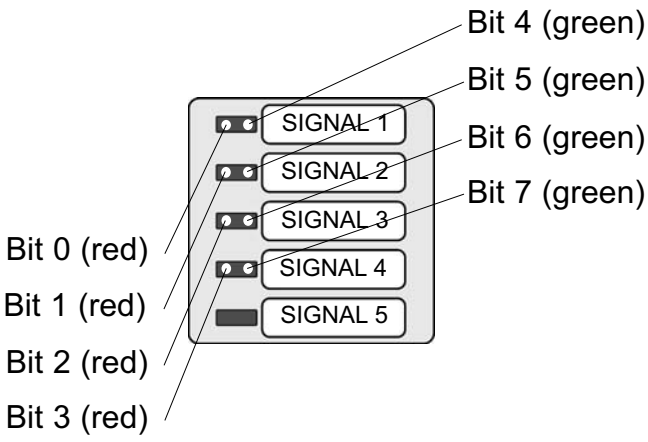
Press and hold the front panel TEST button for five seconds to initiate the following sequence:

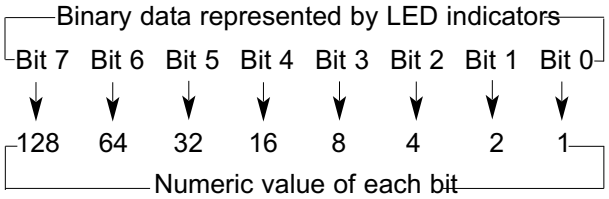
- Audible alarm sounds briefly as tESt is displayed.
- All LED display segments and LOW, NORMAL, and HIGH indicators flash for five seconds (firmware up to revision 1.0.3).
- LED display segments and LOW, NORMAL, and HIGH indicators illuminate in sequence (firmware revision 1.0.4 and later).
- Firmware revision (e.g. 1.0.6) is displayed for two seconds.
- Addr is briefly displayed and then current MEGA network module address is displayed for two seconds. (Factory default address is 0).
- Current units of measure setting (e.g. PSI) is displayed for two seconds.
- Lo is briefly displayed, LOW alarm indicator is illuminated, and current low alarm set point is displayed for two seconds.
- Hi is briefly displayed, HIGH alarm indicator is illuminated, and current high alarm set point is displayed for two seconds.
- Module returns to monitoring mode.

Multi-Signal Module:

Press and hold front panel TEST button for five seconds to initiate following sequence:.

- Audible alarm sounds briefly.
- All red and green indictors flash for five seconds.
- Software revision is displayed as follows:
  - Expressed as a three digit number (e.g. 1.0.2).
  - Each digit of number is displayed separately for two seconds and separated from the next digit by a brief flashing of all indicators.
  - Each number is displayed in a binary code where each multi-signal module indicator has a binary value.
  - Example: Software revision 1.0.2 would be displayed as follows:
    - First digit is determined by two second illumination of top left indicator (bit 0 = number 1).
    - All indicators quickly flash.
    - Second digit is determined to be 0 because no indicators are illuminated for two seconds.
    - All indicators quickly flash.
    - Third digit of is determined by two second illumination of second left indicator (bit 1 = number 2).
- After all three digits of software revision have been displayed, all indicators illuminate for one second before displaying current MEGA network address.
- Current network address is displayed for two seconds in a binary code where each multi-signal module indicator has a binary value.
- All indicators illuminate for one second and module returns to monitoring mode.





Power Supply Assembly:
The power supply assembly converts AC mains power to +5 and +24 volts DC. AC mains power can be any value between 100 and 250 volts AC. In order to verify power supply assembly is functioning correctly, perform following procedure.

1. Loosen two front panel screws and open alarm panel.
2. If no indicator lights or LED displays are illuminated on front of alarm panel, first verify internal fuse is good (Figure 25). If fuse is good, continue this procedure.
3. Using a digital volt meter, measure DC voltage between black (-) and orange (+) wires where power supply harness plugs into annunciator module (Figure 26). **When making measurements, do not disconnect cable from annunciator board**. Insert meter probes into back of white plastic connector.
4. Verify DC voltage is 4.5 to 5.5 volts.
5. Measure voltage between black (-) and red (+) wires.
6. Verify DC voltage is 22.0 to 26.0 volts.
7. If voltages above are not within specification, verify correct AC input power as follows:

⚠ WARNING:
RISK OF ELECTRIC SHOCK !
USE EXTREME CAUTION -
The remainder of this procedure requires removal of the clear plastic power supply shield. Even if fuse is removed, the high voltage input wiring remains energized.

8. Remove four keps nuts and plastic shield from power supply. Do not disconnect wires from fuse holder or harness from power supply.
9. Position plastic shield (wires attached) so that power supply's AC input connector is accessible.
10. Using a digital volt meter, measure AC voltage between white (neutral) and black (line) wires on back of power supply connector (Figure 27). Verify AC input voltage is 100 to 250 volts.
11. If AC input voltage is within specification, replace power supply assembly.

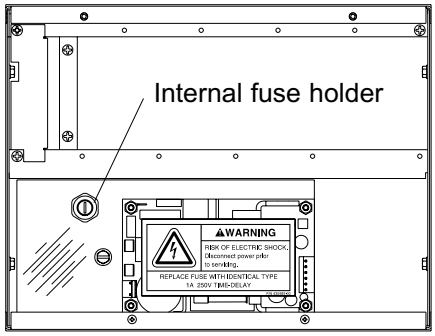


Figure 25: Alarm Panel Internal Fuse

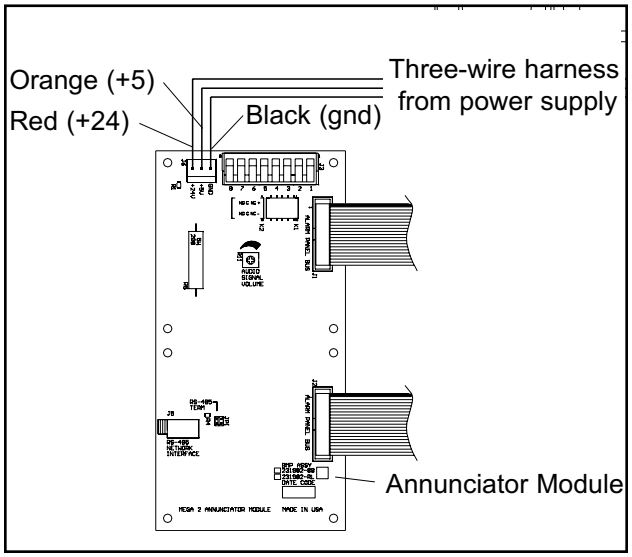


Figure 26: Power Supply Output Testing

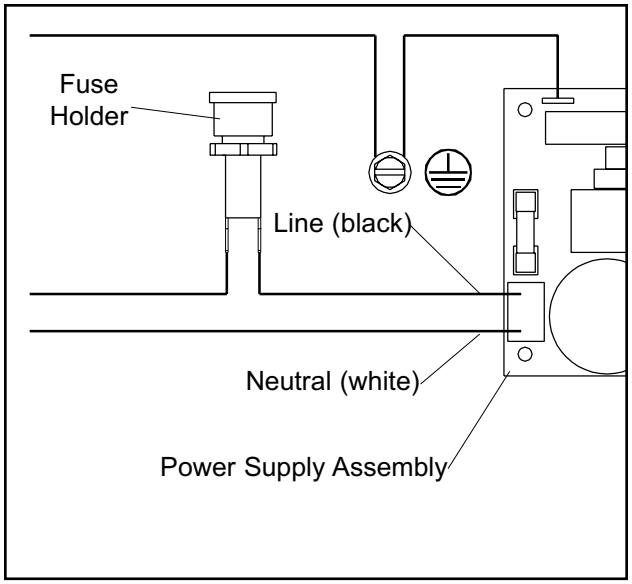


Figure 27: Power Supply AC Input Testing

Troubleshooting Guide

Symptom	Possible Cause	Corrective Action
1) No visual indicators illuminated on entire alarm panel	a. AC power is not turned on. b. Blown internal fuse. c. AC power wiring is not connected. d. Three-wire power supply harness is not connected between power supply and annunciator board e. Faulty power supply assembly.	a. Check AC power source. b. Replace fuse. c. Check AC entrance wiring at power supply terminals. Verify two-pin plastic connector is plugged into power supply circuit board. d. Check connections on each end including orientation of cable connectors. Reconnect if necessary. e. Replace power supply assembly.
2) No visual indicators illuminated on isolated module(s). Green annunciator module POWER indicator is illuminated.	a. 20-wire ribbon cable(s) between annunciator module and digital display or multi-signal modules not connected. b. Faulty 20-wire ribbon cable. c. Faulty digital display or multi-signal module. d. Faulty annunciator module.	a. Reconnect ribbon cable(s). b. All alarm panels have two 20-wire ribbon cables (attached to annunciator connectors “J1” and “J2”). Remove suspect cable (both ends) and replace with other cable. If problem is corrected, replace faulty cable. c. If alarm panel contains another working digital display or multi-signal module, unplug ribbon cable from working module and connect to non-working module. If module does not illuminate, replace faulty digital display or multi-signal module. d. Replace faulty annunciator module.
3) Constant audible alarm that can not be silenced by pressing front panel MUTE button. No visual alarm on any digital display or multi-signal module.	a. Faulty digital display or multi-signal module. b. Faulty 20-wire ribbon cable. c. Faulty annunciator module.	a. Disconnect digital display and/or multi-signal modules one at a time from 20-wire ribbon cables. If disconnecting a module cancels audible alarm, replace that faulty module. b. After all modules have been disconnected from 20-wire ribbon cables, disconnect each cable, one at a time from annunciator module. If disconnecting ribbon cable cancels alarm, replace that faulty cable. c. If both 20-wire ribbon cables have been removed from annunciator module, and audible alarm has not cancelled, replace faulty annunciator module.

Symptom	Possible Cause	Corrective Action
4) Visual indicators are dimly illuminated or vary in brightness between one or more digital display or multi-signal modules. Front panel green POWER indicator is illuminated brightly.	a. Programmable display intensity levels have been set too low or at different values between modules. b. Faulty digital display or multi-signal module.	a. Reset display intensity values for each module. Refer to **Set-Up** instructions pages 35 - 40. b. Replace faulty module.
5) Flashing visual indicator and audible alarm on digital display or multi-signal module that can not be silenced by pressing front panel MUTE ⊠ button. When MUTE button is pressed, visual indicator continues to flash.	a. 20-wire ribbon cable not connected well to annunciator module or digital display/multi-signal module with visual alarm. b. Faulty 20-wire ribbon cable. c. Faulty annunciator module. d. Faulty digital display or multi-signal module.	a. Reconnect ribbon cable(s). b. All alarm panels will incorporate two 20-wire ribbon cables. Exchange cable connected to affected module with other one (assuming all modules connected to that cable are working correctly). If problem follows cable, replace cable. c. Cause an alarm condition (by unplugging field wiring connector) on another module that is connected to same 20-wire ribbon cable. Verify visual indicators on this test module stop flashing when MUTE ⊠ button is pressed. If visual indicators continue to flash, replace faulty annunciator module. d. If visual indicators on test module (step c) stop flashing when MUTE ⊠ button is pressed, replace faulty digital display or multi-signal module.
6) Audible alarm does not sound when visual indicator is illuminated. Pressing front panel MUTE ⊠ button causes visual indicator to stop flashing but remain illuminated.	a. 20-wire ribbon cable not connected well to annunciator module or digital display/multi-signal module with visual alarm. b. Faulty 20-wire ribbon cable. c. Faulty annunciator module. d. Faulty digital display or multi-signal module.	a. Reconnect ribbon cable(s). b. All alarm panels will incorporate two 20-wire ribbon cables. Exchange cable connected to affected module with other one (assuming all modules connected to that cable are working correctly). If problem follows cable, replace cable. c. Cause an alarm condition (by unplugging field wiring connector) on another module that is connected to same 20-wire ribbon cable. Verify audible alarm on this test module activates. If audible alarm does not activate, replace faulty annunciator module. d. If audible alarm on test module (step c) activates, replace faulty digital display or multi-signal module.

Troubleshooting Guide

Symptom	Possible Cause	Corrective Action
7) Audible alarm reactivates a short period of time after MUTE ⊠ button has been pressed.	a. A new alarm condition has occurred. b. Programmable alarm repeat function has reactivated audible alarm.	a. If alarm condition previously silenced self-corrects and then reactivates again, alarm panel treats as a new alarm condition. Flashing visual indicators represent new alarm conditions. After being silenced, visual indicators will stop flashing, but remain illuminated. b. Set alarm repeat value at desired time interval. Refer to **Set-Up** instructions pages 35 - 40.
8) Audible alarm activates when it should, but sound level is too low.	a. Audible alarm volume is set too low. b. Faulty annunciator module.	a. Adjust alarm volume potentiometer located on annunciator module clockwise to increase. Factory default setting is max. clockwise position (max. volume). b. Replace faulty annunciator module.
9) Multi-signal alarm will not activate on one master alarm when source contacts open. Second master works correctly.	a. Field wiring misconnection. b. Faulty multi-signal module.	a. Correct field wiring. Verify multi-signal module is connected to correct source equipment switch. b. Replace multi-signal module.
10) Multi-signal alarm will not activate on either master alarm when source contacts open.	a. Field wiring misconnection.	a. Correct field wiring. Verify common wire of both master panels are connected to same side of source equipment switch.
11) One or more multi-signal alarms are in alarm condition even though they are not wired to source equipment.	a. Unused signals have not been turned off.	a. Perform programming procedure in order to turn off unused signals. Refer to **Set-Up** instructions pages 35 through 40.
12) High or low pressure alarm activated when digital display indicates pressure or vacuum is within normal limits.	a. Alarm set-points have been changed. b. Faulty digital display module.	a. Use digital display module test mode as described on page 41 to check current set-points. If incorrect, reprogram low and/or high alarm set-pints. Refer to **Set-Up** instructions pages 35 through 40. b. Replace faulty digital display module.

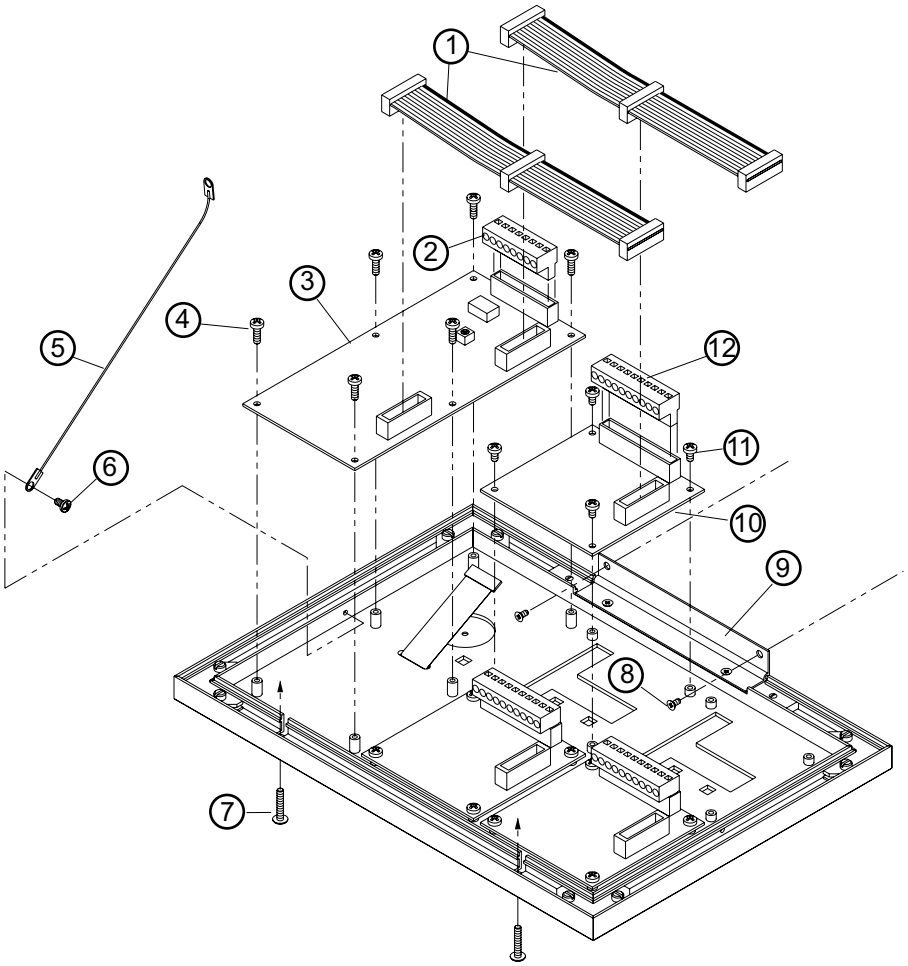
Troubleshooting Guide

Symptom	Possible Cause	Corrective Action
13)Pressure or vacuum digital display does not match pressure or vacuum levels in pipeline.	a. Incorrect digital display "unit of measure". b. Faulty digital display module. c. Faulty sensor module.	a. Use digital display module test mode as described on page 41 to check current unit of measure (PSI, in Hg, kPa, mm Hg). If incorrect, reprogram unit of measure. Refer to **Set-Up** instructions pages 35 through 40. b. If alarm panel contains another working digital display module, remove field wiring connector from suspect module and connect to working (test) module. If test module provides correct reading, replace faulty digital display module. c. If test module in step b above also gives incorrect display, replace faulty sensor module.
14)Low alarm with -F1- display on digital display module.	No pressure or vacuum signal to digital display module as a result of: a. Sensor wiring disconnected or wiring polarity reversed. b. Faulty digital display module. c. Faulty sensor module.	a. Correct sensor wiring. If sensor is mounted remotely, verify field wiring continuity and polarity from sensor to digital display module connector pins 5 (+) and 6 (-). b. If alarm panel contains another working digital display module, remove field wiring connector from suspect module and connect to working (test) module. If test module provides any reading other than -F1- , replace faulty digital display module. c. If test module in step b above also gives -F1-, replace faulty sensor module.
15)Low alarm with -F2- display on digital display module.	Pressure or vacuum signal to digital display module out of measurement range (too low) as a result of: a. No pressure or vacuum in pipeline. b. Faulty digital display module. c. Faulty sensor module.	a. Apply appropriate pressure or vacuum to pipeline. b. If alarm panel contains another working digital display module, remove field wiring connector from suspect module and connect to working (test) module. If test module provides any reading other than -F2-, replace faulty digital display module. c. If test module in step b above also gives -F2-, replace faulty sensor module.

Troubleshooting Guide

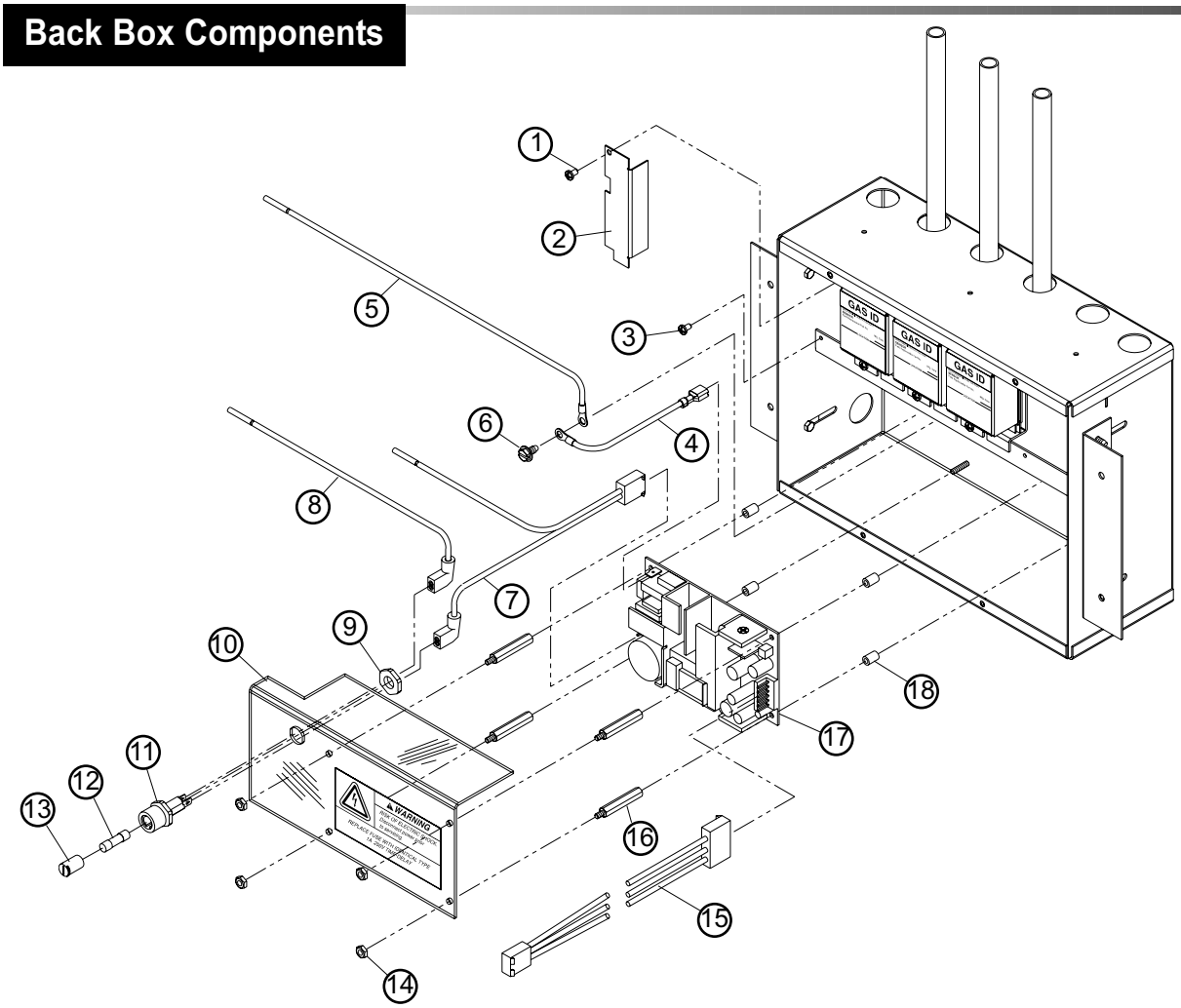
Symptom	Possible Cause	Corrective Action
16) High alarm with -F3- display on digital display module.	Pressure or vacuum signal to digital display module out of measurement range (too high) as a result of: a. Shorted sensor wiring. b. Faulty digital display module. c. Faulty sensor module. d. Digital display module gas/vacuum service programmed to nonE with digital sensor connected.	a. Correct sensor wiring. b. If alarm panel contains another working digital display module, remove field wiring connector from suspect module and connect to working (test) module. If test module provides any reading other than -F3-, replace faulty digital display module. c. If test module in step b above also gives -F3-, replace faulty sensor module. d. Program digital display module for the correct gas/vacuum service. Refer to **Set-Up** instructions page 36.
17) High and low alarm with -F4- display on digital display module.	Gas/vacuum service mismatch between digital display module and digital sensor module as a result of: a. Sensor wired to wrong digital display module. b. Digital display module programmed with the wrong service.	a. Correct sensor wiring. b. Program digital display module for the correct gas/vacuum service. Refer to **Set-Up** instructions page 36.
18) No blinking LED on digital sensor module.	No power to digital sensor due to: a. Faulty wiring. b. Faulty digital sensor module.	a. Correct sensor wiring. b. Replace digital sensor module.
19) Fast blinking LED on digital sensor module.	Sensor out of range: a. Vacuum digital sensor module connected to pressure service. b. Pressure digital sensor module connected to vacuum service. c. Faulty digital sensor module.	a. Verify piping connections. Vacuum sensor maximum overpressure: 30 psi. b. Verify piping connections. c. Replace digital sensor module.

Front Panel Components



ITEM	PART NUMBER	DESCRIPTION
1	6-868163-00	20-wire Ribbon Cable (4-module alarm box)
-	6-868164-00	20-wire Ribbon Cable (8-module alarm box)
2	6-865315-00	Field Wiring Connector - Annunciator Module
3	6-231982-00	Circuit Board - Annunciator Module (includes item 2)
-	6-231982-RL	Circuit Board - Annunciator Module with Auxiliary Relay (includes item 2)
4	6-811611-00	Screw - #6-32 x 7/16”, Pan Head
5	6-838104-00	Lanyard
6	6-814669-00	Screw - #6-20 x 1/4”, Pan Head, Self-Tapping
7	6-811752-00	Screw - #6-32 x 1-1/4”, Pan Head
8	6-811058-00	Screw - #4-40 x 1/4”, Flat Head
9	6-838982-00	Hinge
10	6-231980-00	Circuit Board - Digital Display Module (includes item 12)
-	6-231981-00	Circuit Board - Multi-Signal Module (includes item 12)
-	6-231981-RL	Circuit Board - Multi-Signal Module with Relays (includes item 12)
11	6-811608-00	Screw - #6-32 x 1/4”, Pan Head
12	6-865316-00	Field Wiring Connector - Digital Display/Multi-Signal Module

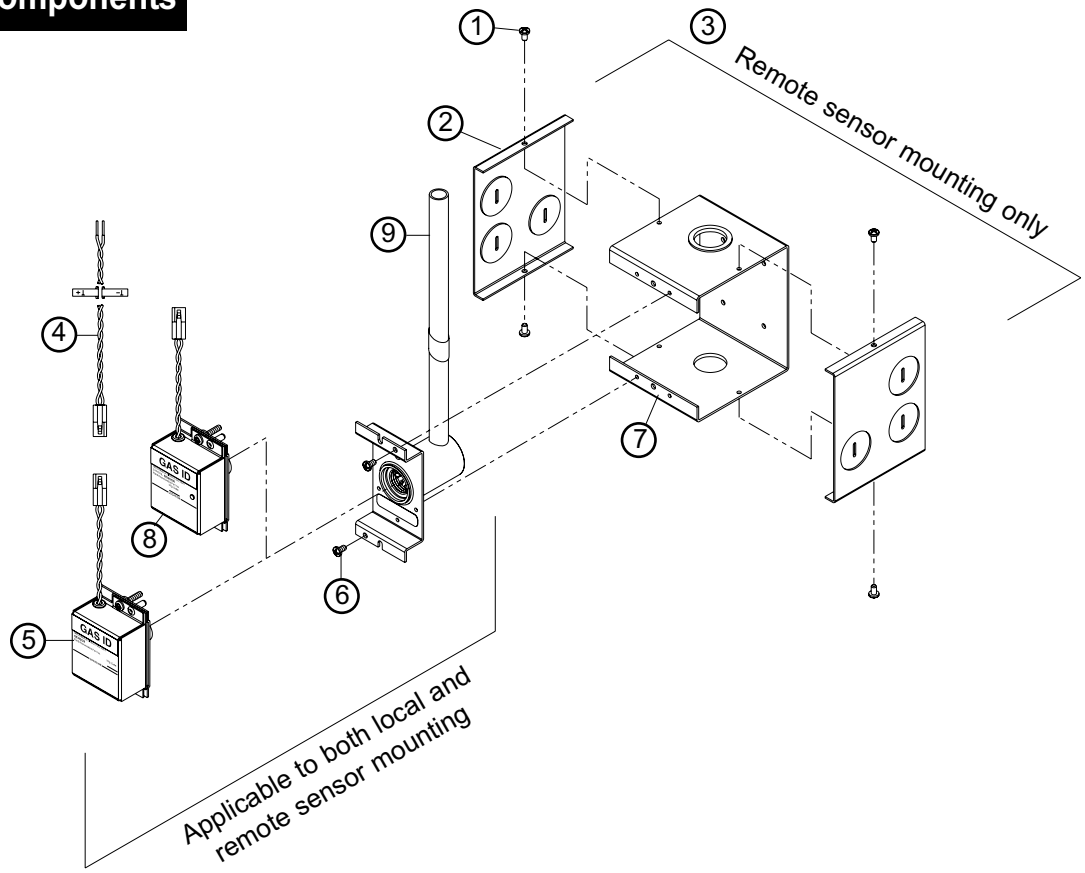
Back Box Components



ITEM	PART NUMBER	DESCRIPTION
1	6-814669-00	Screw - #6-20 x 1/4”, Pan Head, Self-Tapping
2	6-425458-00	Shield
3	6-814669-00	Screw - #6-20 x 1/4”, Pan Head, Self-Tapping
4	6-231938-00	Wire Harness - Power Supply Ground
5	6-231941-00	Wire Harness - Ground
6	6-814008-00	Screw - Grounding
7	6-231937-00	Wire Harness - AC Input
8	6-231939-00	Wire Harness - Fuse
9	Included In Item 11	Nut - Fuse Holder
10	6-616506-00	Shield - Power Supply
11	6-865500-00	Fuse Holder
12	6-865546-00	Fuse - 1.0 Amp, 250VAC, Time Delay
13	Included In Item 11	Fuse Holder Cap
14	6-827530-00	Nut - #6-32, Keps
15	6-231936-00	Wire Harness - Power Supply DC Output
16	6-829628-00	Standoff
17	6-867540-00	Power Supply Assembly
18	6-831904-00	Spacer

Replacement Parts

Sensor Components



ITEM	PART NUMBER	DESCRIPTION
1	6-814669-00	Screw - #6-20 x 1/4", Pan Head, Self-Tap
2	6-425428-00	End Cap
3		Sensor Mounting Assy. (incl. items 1,2,6,7& 9)
-	6-129340-10	Oxygen
-	6-129340-11	Nitrous Oxide
-	6-129340-12	Medical Air
-	6-129340-13	Vacuum
-	6-129340-14	Nitrogen
-	6-129340-16	Air (ISO)
-	6-129340-17	Vacuum (ISO)
-	6-129340-18	Instrument Air
-	6-129340-19	WAGD
-	6-129340-20	Carbon Dioxide
-	6-129340-21	CO2/O2
-	6-129340-22	O2/CO2
-	6-129340-23	He/O2
-	6-129340-24	O2/He
-	6-129340-25	Helium
-	6-129340-26	Lab Air
-	6-129340-27	Lab Vacuum
-	6-129340-28	O2 (100 PSI)
-	6-129340-29	Air (100 PSI)
-	6-129340-30	CO2 (100 PSI)
-	6-129340-31	Argon

ITEM	PART NUMBER	DESCRIPTION
4	6-231935-00	Sensor Pigtail
5		Analog Sensor
-	6-231760-00	Oxygen
-	6-231761-00	Nitrous Oxide
-	6-231762-00	Medical Air
-	6-231763-00	Vacuum
-	6-231764-00	Nitrogen
-	6-231765-00	Helium
-	6-231766-00	Lab Air
-	6-231767-00	Lab Vacuum
-	6-231768-00	Instrument Air
-	6-231769-00	WAGD
-	6-231770-00	Carbon Dioxide
-	6-231771-00	CO2/O2
-	6-231772-00	O2/CO2
-	6-231773-00	He/O2
-	6-231774-00	O2/He
-	6-231776-00	Air (ISO)
-	6-231777-00	Vacuum (ISO)
-	6-231778-00	Oxygen (100PSI)
-	6-231779-00	Air (100 PSI)
-	6-231780-00	CO2 (100 PSI)
6	6-814669-00	Screw - #6-20 x 1/4", Pan Head, Self-Tap
7	6-425555-00	Mounting Box

ITEM	PART NUMBER	DESCRIPTION
8		Digital Sensor
-	6-232460-00	Oxygen
-	6-232461-00	Nitrous Oxide
-	6-232462-00	Medical Air
-	6-232463-00	Vacuum
-	6-232464-00	Nitrogen
-	6-232465-00	Helium
-	6-232466-00	Lab Air
-	6-232467-00	Lab Vacuum
-	6-232468-00	Instrument Air
-	6-232469-00	WAGD
-	6-232470-00	Carbon Dioxide
-	6-232471-00	CO2/O2
-	6-232472-00	O2/CO2
-	6-232473-00	He/O2
-	6-232474-00	O2/He
-	6-232476-00	Air (ISO)
-	6-232477-00	Vacuum (ISO)
-	6-232478-00	O2 (100 PSI)
-	6-232479-00	Air (100 PSI)
-	6-232480-00	CO2 (100 PSI)
-	6-232481-00	Argon
9		Console Rough-In
-	6-233010-00	Oxygen O2 (100 PSI)
-	6-233011-00	Nitrous Oxide
-	6-233012-00	Medical Air Air (100 PSI) Lab Air
-	6-233013-00	Vacuum Lab Vacuum
-	6-233014-00	Nitrogen
-	6-233016-00	Air (ISO)
-	6-233017-00	Vacuum (ISO)
-	6-233018-00	Instrument Air
-	6-233019-00	WAGD
-	6-233020-00	Carbon Dioxide CO2 (100 PSI)
-	6-233021-00	CO2/O2
-	6-233022-00	O2/CO2
-	6-233023-00	He/O2
-	6-233024-00	O2/He
-	6-233031-00	Argon

NOTE:
Before ordering replacement sensor, determine whether faulty sensor is analog or digital type by part number listed on sensor label.

Faulty sensors must be replaced with same type.

Field Installation Kits

Field installation kits include everything required to replace a blank module with a digital display module or a multi-signal module. Digital display module kits include sensors.

ITEM	PART NUMBER	DESCRIPTION
1		Digital Display Module
-	6-290980-10	Oxygen
-	6-290980-11	Nitrous Oxide
-	6-290980-12	Medical Air
-	6-290980-13	Vacuum
-	6-290980-14	Nitrogen
-	6-290980-16	Air (ISO)
-	6-290980-17	Vacuum (ISO)
-	6-290980-18	Instrument Air
-	6-290980-19	WAGD
-	6-290980-20	Carbon Dioxide
-	6-290980-21	CO2/O2
-	6-290980-22	O2/CO2
-	6-290980-23	He/O2
-	6-290980-24	O2/He
-	6-290980-25	Helium
-	6-290980-26	Lab Air
-	6-290980-27	Lab Vacuum
-	6-290980-28	O2 (100 PSI)
-	6-290980-29	Air (100 PSI)
-	6-290980-30	CO2 (100 PSI)
-	6-290980-31	Argon
2		Multi-Signal Module
-	6-290981-00	W/O Relays
-	6-290981-RL	W/ Relays

Notes

Notes

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