FirstCall™ Medical Gas Alarm Zone Valve Box

Operating & Maintenance Manual

Please read and save these instructions. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference.

Table of Contents

Responsibilities

Information contained in this manual pertains to the Powerex FirstCall™ medical gas alarm system. The alarm system will operate as described in this manual when operated and serviced in compliance with the instructions.

Installer Responsibilities

The alarm should be handled, installed, and tested per the recommended practice as described within this manual. Should any repair or replacement become necessary, contact Powerex for original equipment or replacement parts.

User Responsibilities

The alarm should be tested and examined periodically according to facility codes. Any parts which are found to be damaged, corroded, contaminated, etc. should be replaced.

Introduction

Warning Symbols

This manual contains information that is very important to know and understand. This information is provided for SAFETY and to PREVENT EQUIPMENT PROBLEMS. To help recognize this information, observe the following symbols.

⚠ DANGER Danger indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.

⚠ WARNING Warning indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury.

⚠ CAUTION Caution indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate injury.

NOTICE Notice indicates important information, that if not followed, may cause damage to equipment.

NOTE: Note indicates information that requires special attention.

Safety Guidelines

Installation of the Powerex FirstCall alarm zone valve box involves installing the rough-in box, the valves and the transducers, and front panel and making the necessary conduit, plumbing and electrical connections. All installation and testing shall be done in accordance with NFPA 99.

⚠ WARNING Electrical power intended for the alarm to be installed should be disconnected prior to installation.

Attention: l'alimentation électrique a l'intention de faire installer l'alarme devrait déconnecter avant l'installation.

⚠ WARNING This device should only be installed by qualified personnel. Installation should not be attempted by anyone not having general experience with the installation of devices of this nature.

Attention: cet appareil ne devrait installer que le personnel qualifié. L'installation ne devrait pas tenter par une personne n'ayant pas d'expérience générale avec l'installation d'appareils de cette nature.

Product Line Overview

The Powerex FirstCall™ alarm zone valve boxes monitor the status of medical gases in Category 1 healthcare facilities at the location of the emergency shut-off valves. Combining valves and alarm systems in the same box saves installation time and wall space. The alarm systems are ETL listed to UL 1069 and comply with the NFPA 99, 2024 edition. All alarm systems provide audio and visual indications of NFPA 99 medical gas alarm conditions.

Alarm zone valve boxes can contain up to seven ball valves in standard horizontal orientation and up to four ball valves in the vertical orientation. FirstCall™ Area Alarm systems installed in the valve box monitor the pressure of the gases in each valve that are supplied to anesthetizing locations and other Category 1 spaces.

Features and Benefits include:

- Designed and manufactured in the USA.
- 5-year warranty on parts, 2-year warranty on labor.
- Up to 7 gases in standard box and up to 4 gases in vertical box.
- 4-20 mA signal transducers.
- Ethernet connectivity using BACnet over IP protocol to building management system (optional).
- 7" touchscreen HMI with easy-to-use interface for setup and changing settings.

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- Customizable emergency instructions in the event of an alarm.
- Pre-programmed NFPA 99 gas labels and colors.
- Event history log accessible at the screen.
- Alarm test feature can be used quickly without logging in.
- Automatically sets NFPA 99 +/- 20% limits based on current pressure.
- Transducers are gas-specific, and cross-connecting a transducer with an assigned gas input will generate an alarm per NFPA 99, 2024.

PLC + HMI

Combination PLC+HMI monitors inputs from medical gas transducers. Input status is displayed on high quality 7" LED HMI touchscreens with compact built in PLC. Preprogrammed standard settings are included with all medical gas inputs. Alarm set points, alarm messages and descriptions of sources are fully customizable. Alarm and error history is recorded in Alarm History.

The unit is capable of communicating with building monitoring system via Ethernet connection using BACnet over IP. BACnet option must be activated to utilize this feature.

Configuration of Models

Standard (Horizontal) Alarm Zone Valve Box

AZVB-N-VVV...-GGG...(-B)

N = number of valves (1-7)

V = valve size (A, B, C, D, E, or F) {½", ¾", 1", 1-¼", 1-½", and 2", respectively}

G = gas in valve (O, A, V, 2, N, C, W, or I)

B = BACnet Adder (optional)

Disclaimers:

- The order of valves and gases in the part number corresponds to valves and gas transducers installed from top to bottom in the rough-in box.
- A 2" valve cannot be in the upper most position of a multi valve box.
- A 2" valve cannot be immediately above or below a 2" valve.
- A 1-1/2" valve cannot be immediately below a 2" valve.

Vertical Alarm Zone Valve Box

AVZVB-N-VVVV-GGGG(-B)

N = number of valves (1-4)

V = valve size (A, B, or C) {½", ¾", and 1", respectively}

G = gas in valve (O, A, V, 2, N, C, W, or I)

B = BACnet Adder (optional)

Disclaimers:

- The order of valves and gases in the part number corresponds to valves and gas transducers installed from left to right in the rough-in box.
- A vertical box fits valve sizes up to 1".
- For a vertical 4-valve box, at least three of the valves must be 1/2".

Unpacking Guide

Rough-in box electrical components

Rough-in box contains power supply, circuit breaker, terminal blocks, input expansions, and holes for main line power connection.

Trim and Cover Assembly

The trim and cover assembly are shipped detached

from the rough-in box. Trim and cover should only be installed after wall construction is complete.

Transducer Guide

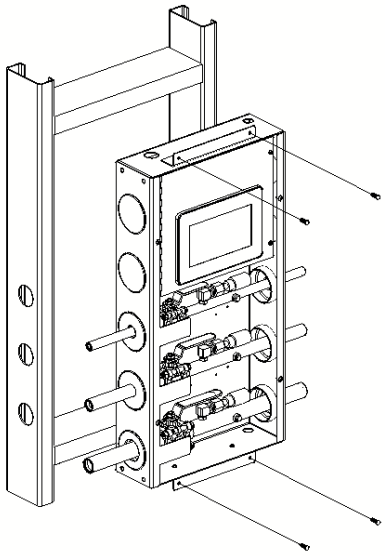
The transducers (included) are unique to each gas. Each transducer is labeled with the appropriate color-coding per NFPA 99 and has a corresponding DISS hex nut attached to the sensing end. Transducers are housed in aluminum with ½" NPS threads on cord end for easy remote installation.

Medical Gas	Part Number
Oxygen	TDCR-O2
Medical Air	TDCR-AIR
Medical Vacuum	TDCR-VAC
Nitrous Oxide	TDCR-N2O
Nitrogen	TDCR-N2
Carbon Dioxide	TDCR-CO2
WAGD	TDCR-WAGD
Instrument Air	TDCR-INST

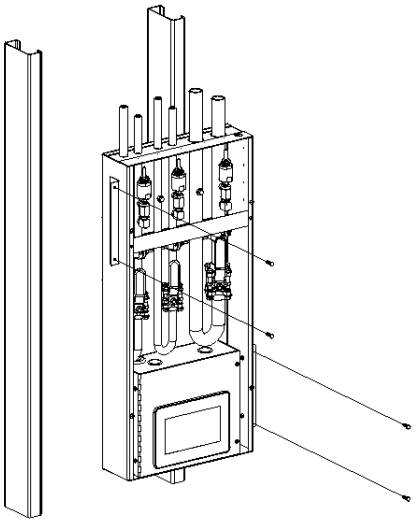
Installation

Rough-In Installation

1. Powerex Zone Valve Boxes must be plumbed left to right (patient use side on the right). Ports on the right side of the valve allow for gauge (optional, not included) and sensing kit installation.
2. The rough-in (back box) is shipped with a cardboard dust cover installed. You will need to remove the dust cover to install the rough-in, perform the pressure test, and complete main line electrical connection. The dust cover should be re-installed after the pressure test and electrical connections are complete to protect the valves and electronics until the wall covering (drywall, paint etc.) is complete.
3. Adjustable depth mounting flanges (top & bottom) should be utilized to align front edge of box to be flush with the drywall surface. NOTE: For vertical zone valve box, the adjustable depth mounting flanges are located to the left & right of the box.
4. Rough-in assembly locations vary depending on unit size and configuration. The FirstCall™ Medical Gas Alarm Zone Valve Box must be installed such that the unit's alarm screen is easily readible and shut-off valves are accessible in case of emergency. The center of the unit's screen is recommended to be at a height of 60" from the floor. Fasten the valve box to horizontal braces installed between the studs so that the front edge of the rough in box will be flush or slightly recessed with the finished wall covering.



Installation of standard alarm zone valve box rough-in



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Installation of vertical alarm zone valve box rough-in

5. Before brazing, remove the plastic tube caps from the valves. Ball valves must be installed in accordance with "Ball Valve Installation" instructions on page 7.
6. The system must be tested (per appropriate standards) to ensure that no cross-connections have been made. The system must be tested (per appropriate standards) for leaks. NOTE: Pressure in the system will increase or decrease with temperature rise or fall.
7. The FirstCall™ Medical Gas Alarm Zone Valve Box provides real time pressure monitoring on the unit's screen, eliminating the need for pressure gauges. After the system passes the leak test, and if desired, gauges may be installed.
8. Gauges (if used) must be installed on the downstream (patient) side of the valve. Pipe sealants used to install the gauges must comply with NFPA 99 or CSA Z7396.1-06. Use care to exclude pipe sealants from the valve cavity and from interior tube surfaces exposed to medical gas flow or vacuum service. Properly applied Teflon tape is an acceptable alternative to pipe sealants.
9. Mark the areas controlled by each valve on the labels provided on each valve.
10. Re-install dust cover until wall covering is complete.
11. After the wall covering is complete, the dust cover may be removed from the rough-in box and the window frame and window may be installed.

⚠ WARNING Make certain the labeling is easily read and that it coincides with the gas service and areas controlled by the valve.

Avertissement: Assurez-vous que l'étiquetage soit facilement lisible et corresponde au service de gaz et aux zones contrôlées par la vanne.

Wiring for Power

⚠ CAUTION For personal safety, lock out and tag out the associated circuit breaker disconnect for the source of 120-240V AC power.

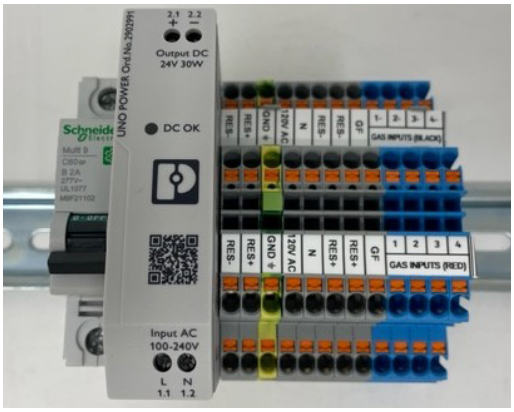
Attention: Pour votre sécurité personnelle, verrouillez et étiquetez le sectionneur du disjoncteur associé pour la source d'alimentation de 120-240V CA.

⚠ CAUTION For personal safety and to avoid damage to the alarm, ensure that the circuit breaker is in the OFF position.

Attention: Pour votre sécurité personnelle et pour éviter d'endommager l'alarme, assurez-vous que le disjoncteur est en position OFF.

Route incoming mains power through the knock-out located either at the top (horizontal valves) or bottom (vertical valves) of the rough-in box with a UL recognized cable with a minimum gauge of 18 AWG and rated for 100-240V AC, 50/60Hz, 2A, single phase power.

All Models of Powerex FirstCall™ Medical Gas Alarm Zone Valve Box must be powered by the life safety branch or critical branch of the essential electrical system as required in NFPA 99.



Ground wire – Strip ½" of insulation and connect the ground wire to the appropriate terminal block (GND).

Neutral wire – Strip ½" of insulation and connect the neutral lead to the appropriate terminal block (N).

Hot wire – Strip the insulation and connect the hot lead to the appropriate terminal block (120V AC).

Ball Valve Installation

Ball valves must be installed in accordance with NFPA99 or CSAZ7396.1-06. Verify the valve is in the fully open position. An internal nitrogen purge must be used during the brazing operation. The purge gas should flow away from the valve body. Brazing alloys per appropriate standards must be used. Before brazing, wet rags must be wrapped around the tube extensions next to the valve flanges to prevent overheating and possible damage to the valve seals. Direct the flame away from the valve body. The valve body temperature must not exceed 300°F to prevent damaging the Teflon

seals. Do not braze the opposite side of the valve assembly until after the first side has cooled.

NOTE: The valve bolts may need to be re-tightened after brazing due to the effects of heating and cooling. Torque the hex nuts in 1/4 turn increments, using a cross pattern until the proper torque setting is reached per the chart below:

Valve Size	Torque (inch-pounds)
0.5″	61
0.75″ to 2.0″	104

Check shuttoff valve handle operation for proper clearance from any obstructions.

Sensor Installation

ZVB Sensor Installation

Sensors must be installed in the Powerex alarm zone valve boxes using appropriate Powerex zone valve box sensing kit.

Part Number	Description
SENSE-O2	Oxygen Sensing Kit
SENSE-AIR	Medical Air Sensing Kit
SENSE-VAC	Medical Vacuum Sensing Kit
SENSE-N2O	Nitrous Oxide Sensing Kit
SENSE-N2	Nitrogen Sensing Kit
SENSE-CO2	Carbon Dioxide Sensing Kit
SENSE-WAGD	WAGD Sensing Kit
SENSE-INST	Instrument Air Sensing Kit

Remove the plug from the top port on the appropriate valve in the zone valve box. Install ⅛″ to ¼″ reducer elbow into the port.

Install the ¼″ to DISS adapter with demand valve into the reducer elbow.

Attach the transducer to the DISS fitting.

Low Voltage Wiring

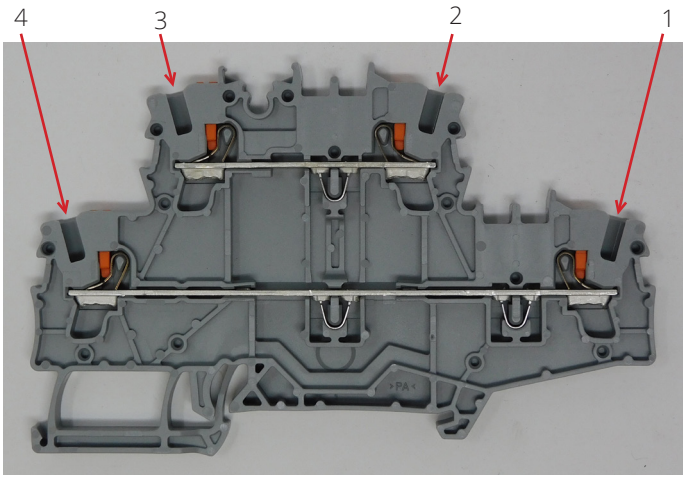
Wire Type and Size

All low voltage wiring must meet the following requirements:

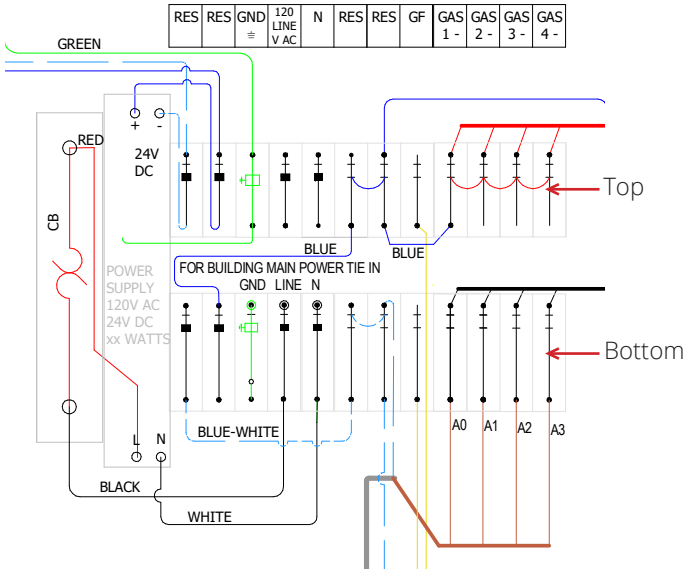
- Stranded wire no smaller than 22 AWG, conductor insulation at least .010in.
- Circuit length not to exceed the following lengths for the indicated wiring gauges:
  - Up to 5000 feet: 18 AWG
  - Up to 3200 feet: 20 AWG
  - Up to 2000 feet: 22 AWG
- Cable must be twisted pair shielded type. Multi-pair cables within one common shield are acceptable.

Wiring Diagram Guide

The terminal blocks in the Powerex FirstCall™ Alarm panels have two tiers, each of which contains an independent circuit.



The wiring diagrams on the following pages show the two independent circuits separated into rows. The top row is the top circuit (2 & 3) and the bottom row is the bottom circuit (1 & 4). The legend applies to both the top and bottom circuits.



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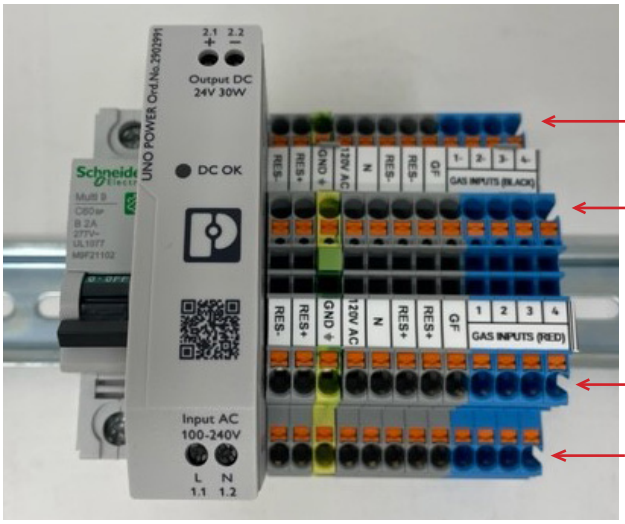
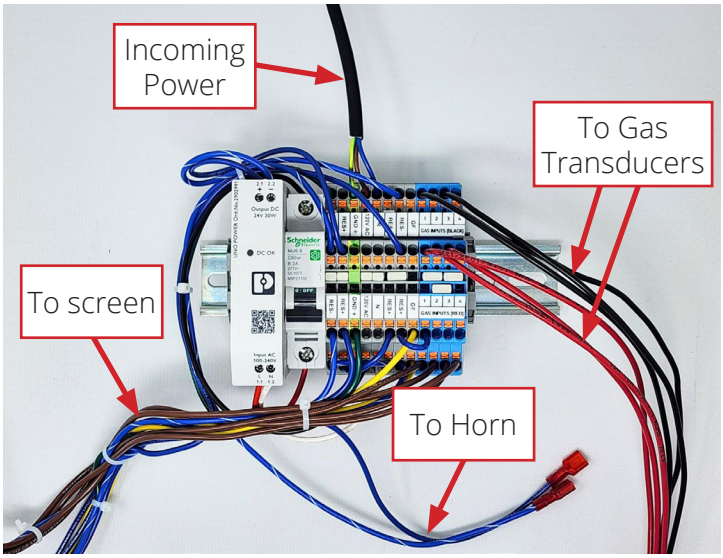
The following image shows a sample terminal block layout from the alarm panel. The top and bottom circuits are labeled and correspond with the labeled circuits on the sample wiring diagram above.



NOTE: The top rows, 2 & 3, of all input terminal blocks (gas inputs and digital signal inputs) is always 24 VDC common. When wiring in gas transducers, the RED wire is always wired into the open input location on the TOP row (2 & 3); the BLACK wire is always wired into the open input location on the BOTTOM row (1 & 4).

The AZVB arrives pre-wired for installation. Field wiring is required for incoming power and transducers. Fully wired electronics for a 3-gas AZVB unit are pictured below.



Sensor wiring

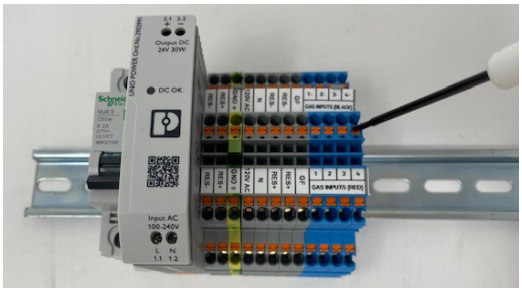
⚠ CAUTION For personal safety, lock out and tag out the associated circuit breaker disconnect for the source of 120-240V AC power.

Attention: Pour votre sécurité personnelle, verrouillez et étiquetez le sectionneur du disjoncteur associé pour la source d'alimentation de 120-240V CA.

⚠ CAUTION For personal safety and to avoid damage to the alarm, ensure that the circuit breaker is in the OFF position.

Attention: Pour votre sécurité personnelle et pour éviter d'endommager l'alarme, assurez-vous que le disjoncteur est en position OFF.

The terminal blocks are push-in style with a release button. A small flat-head screwdriver (or similar tool) should be used to depress the release button to make wire insertion easier.

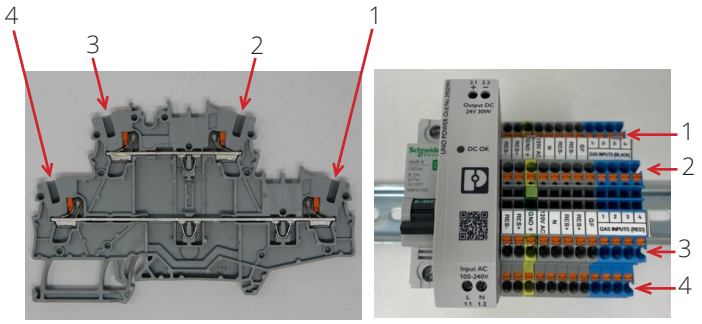


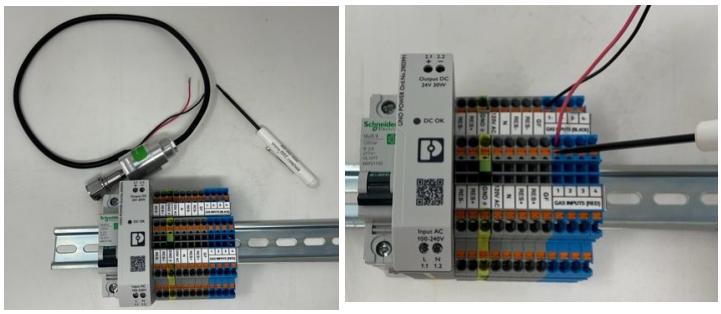
Install the sensor wires into the appropriate terminal block. The unit is manufactured according to part number configuration and thus includes enough terminal blocks for monitoring all gases. The product's PLC+HMI is pre-programmed to display the monitoring information of the gases according to part number order. For horizontal boxes, the order is from top valve/gas (nearest screen) to bottom valve/gas (nearest floor). For vertical boxes, the order is from leftmost valve/gas to rightmost valve/gas. Install the sensors in the order they are to be displayed on the screen.

NOTE: Terminal blocks for transducer wiring are blue. Wiring anything other than Powerex provided alarm panel transducers into the terminal blocks provided for the transducers may result in damage to the PLC.

The red wire (power wire) will always be installed in the open top/central terminal locations assigned, as 2 and 3 in the image below. The black wire (signal wire) will always be installed in the bottom terminal locations, assigned 1 and 4 in the image below. Reversing these locations will result in incorrect readings from the transducers and potential mismatch alarms. (See page

10 for detailed terminal block explanation)

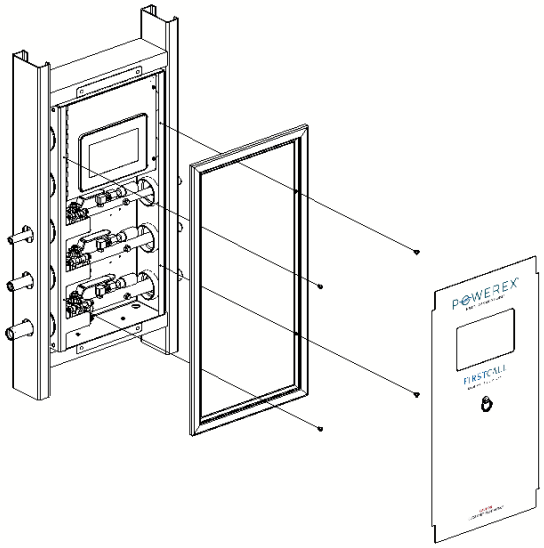




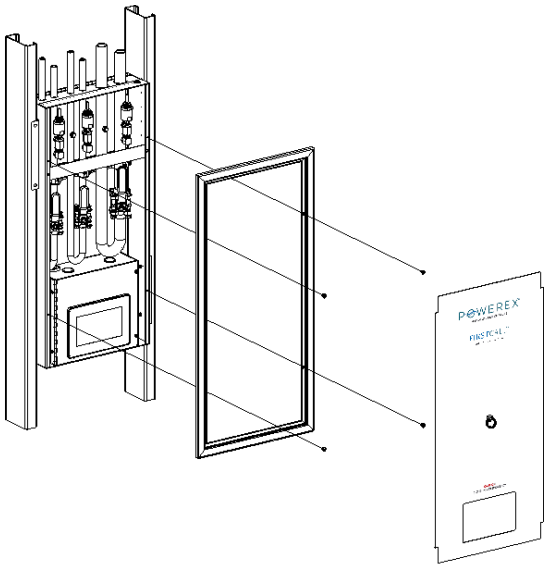
It is important that the sensors are wired to the correct terminal block. Per NFPA 99, an alarm will sound for cross-connected sensors.

Trim and Cover Assembly

1. Remove dust cover from rough-in box and discard.
2. Attach front trim piece by aligning slots with dust cover holes and using dust cover screws.
3. Install the removable polycarbonate cover so that the cutout lines up with the touchscreen.



Installation of standard alarm zone valve box trim assembly



Installation of vertical alarm zone valve box trim assembly

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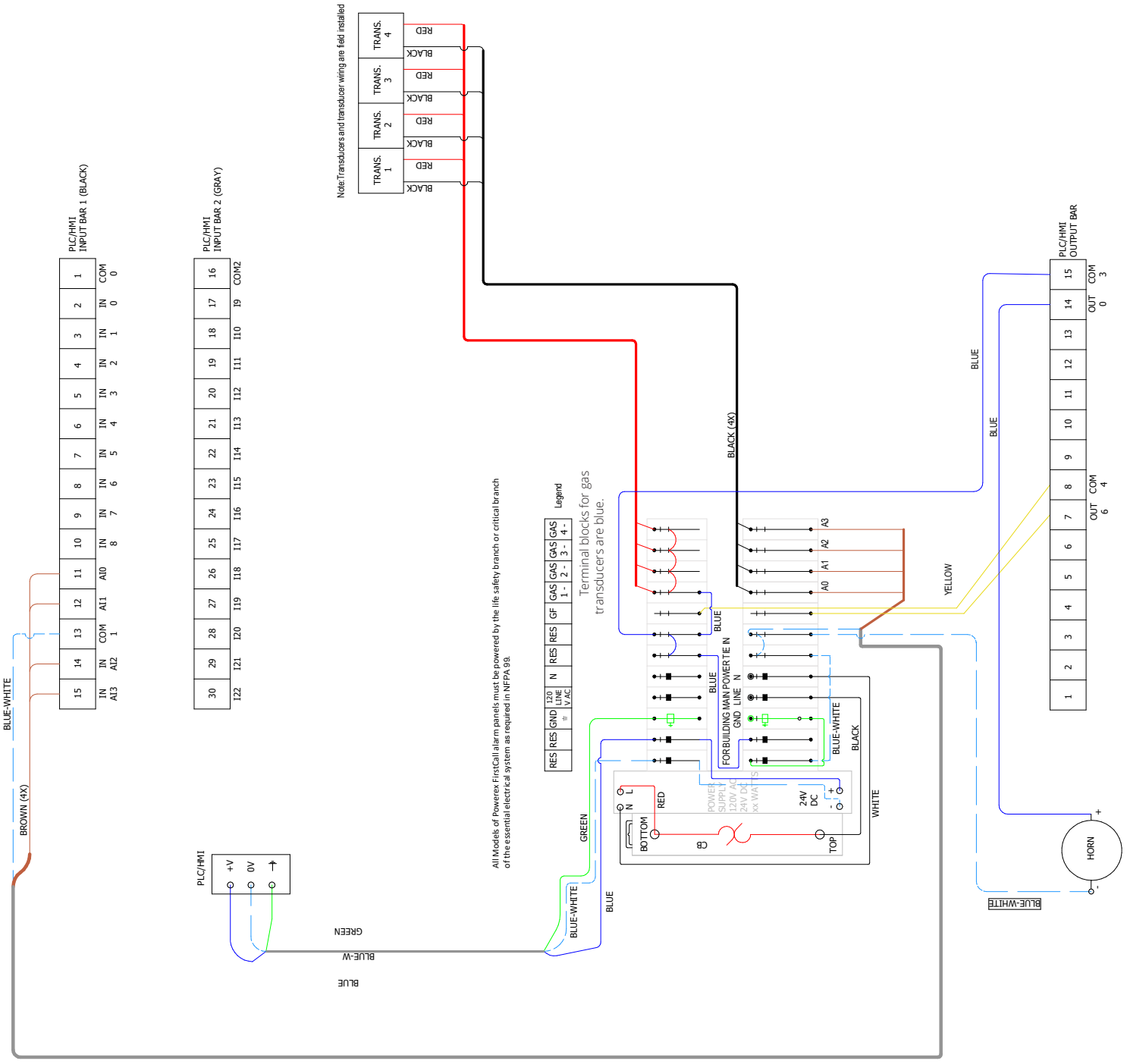
Area Alarm Panel Wiring Schematic

1-4 Gas Area Alarm Panels – AP000A004AJ

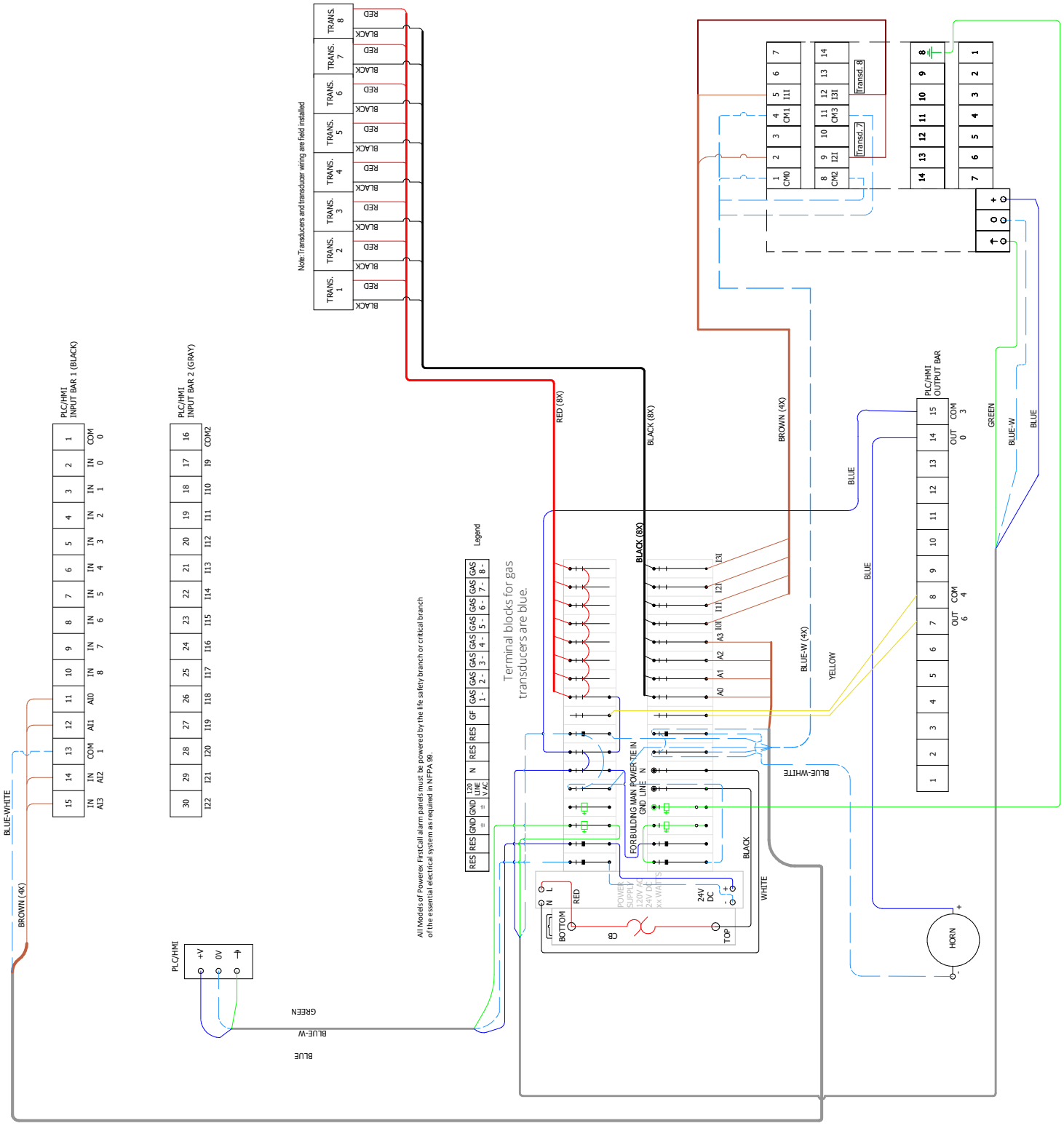
NOTE: All Powerex Alarm Panels are compatible with 110-240 VAC at 50/60 Hz



Area Alarm Panel Wiring Schematic

5-8 Gas Area Alarm Panels – AP000A008AJ

NOTE: All Powerex Alarm Panels are compatible with 110-240 VAC at 50/60 Hz



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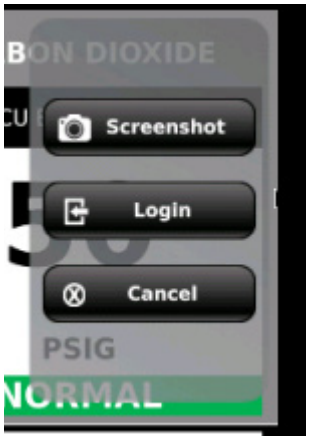
Setup and Configuration

Login to Settings

Press upper right part of screen for at least 3 seconds.

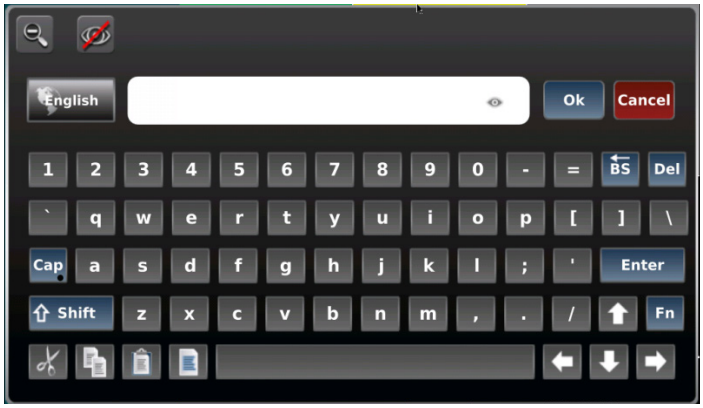
Window pops up, press the middle button for login.



For user select “USER.”

Default password is **Pass123**. This password can be changed in the settings screen. **NOTE:** The password is case sensitive.

Keyboard Basics



All FirstCall™ Medical Gas Alarm Zone Valve Boxes use a full QWERTY keyboard to easily add zone names, create customized alarm instructions, and create customized alarm conditions.

The keyboard has the ability to use CAPS lock, as well as cut/copy/paste for when you want to use the same information in a different location.

To maximize the keyboard size to fit the entire screen, press the zoom button in the upper left corner.

The PLC has a USB port on the side. A keyboard or a mouse with a USB connection can plug into the PLC and be used for setup and navigation. There is only 1 USB port, so to use both the keyboard and a mouse, a separate USB splitter is required.

Once the correct password is entered, the alarm panel will now be in “Settings” mode. The Test button at the bottom will be changed to a “Settings” gear icon.

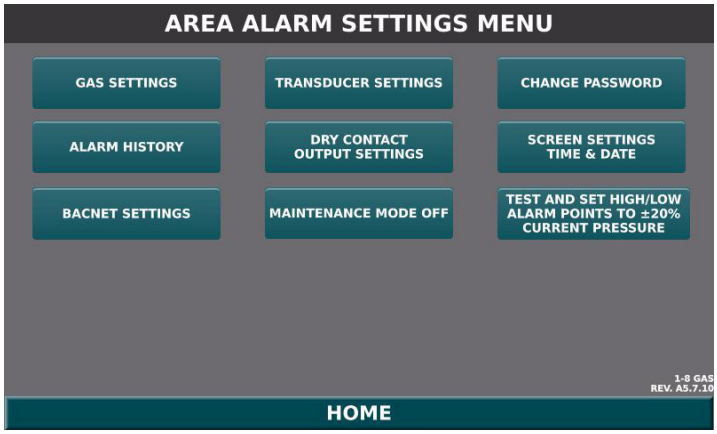
Zone Served Block

Click the lower right black-colored bar on the home screen to add text to the Zone Served Block. There is enough room for 3 lines of text.

Gas Badges

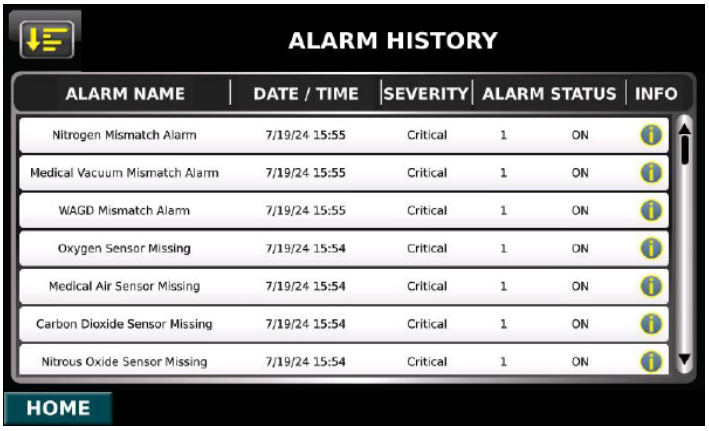
Text can be added to the black-colored bar underneath the gas to further specify the location where each gas is being used.

Settings Menu



Basic Settings for All Alarm Panel Types

Alarm History



The Alarm History screen shows a record of all alarm events up to 32, including the specific alarm condition and the date and time of the alarm event.

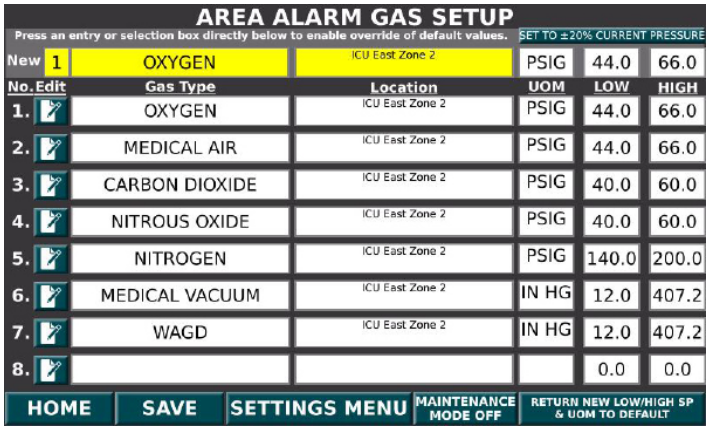
This screen is also accessible via the home screen by pressing the status bar at the lower left part of the screen. The status bar will either be green colored and read “NORMAL” or red colored with the current alarm event.

This screen also has the ability to sort the alarm history list by a number of different criteria. The default sort is “Time”. The alarm history list can be sorted differently by pressing the Alarm History Sort button in the upper left corner.

An alarm event will create two lines in the alarm history. The first line is created when the alarm first occurs. The second line is created when the alarm resolves itself.

Alarms are NOT required to be acknowledged or cleared. Alarms automatically clear when the alarm condition is resolved.

Gas Settings



In the gas settings page, you are able to change the medical gas type, add/subtract a gas, designate the location monitored for each gas, and manually change the high/low alarm settings. **NOTE:** All FirstCall™ Medical Gas Alarm Zone Valve Boxes are pre-programmed from the factory with the correct medical gases and default high/low alarm settings.

Location where each gas is being used can be entered in this screen as well as via the home screen.

To edit/add/delete a gas badge, first press the edit button next to the row number on the left. This makes that row active in the editing row at the top highlighted in yellow.

The gas is edited in the first column, and can be selected from a preloaded list of NFPA 99 medical gases. The correct NFPA 99 color combination is automatically selected when a gas is selected.

NFPA 99 Gas Color Combinations:

Oxygen	Instrument Air	O2 / He
Medical Air	Helium	Lab Air
Medical Vacuum	Surgical Air	Lab Vacuum
Nitrous Oxide	Argon	Oxygen Hyp.
Nitrogen	CO2 / O2	Medical Air Hyp.
Carbon Dioxide	O2 / CO2	Carbon Dioxide Hyp.
WAGD	He / O2	AGSS

The Unit of Measure (UOM) for each gas can be changed. For all NFPA 99 applications, PSIG should be selected for all positive pressure gases and IN HG

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should be selected for Medical Vacuum, WAGD, and Lab Vacuum.

High/Low settings default settings for each gas are as follows:

Medical Gas	Low Setpoint (PSI)	High Setpoint (PSI)
Oxygen	44	66
Medical Air	44	66
Medical Vacuum	12 inHg	N/A
Nitrous Oxide	40	60
Nitrogen	140	200
Carbon Dioxide	40	60
WAGD	12 inHg	N/A
Instrument Air	140	200

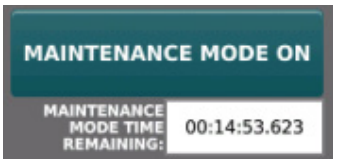
High/Low settings can be changed one of two ways:

1. Manually input.
2. Automatically set to +/- 20% of current pressure using the button at the top right. This is the best way to ensure accurate NFPA 99 compliant high/low settings. This feature is also available on the Settings Menu page.

Press the "SAVE" button at the bottom to save changes.

Press the "SETTINGS MENU" button to return to the settings screen or the "HOME" button to return to the home screen.

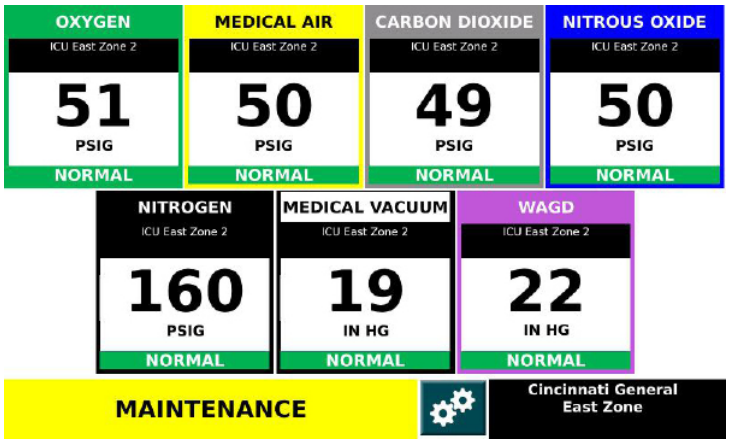
Maintenance Mode (image toggled)



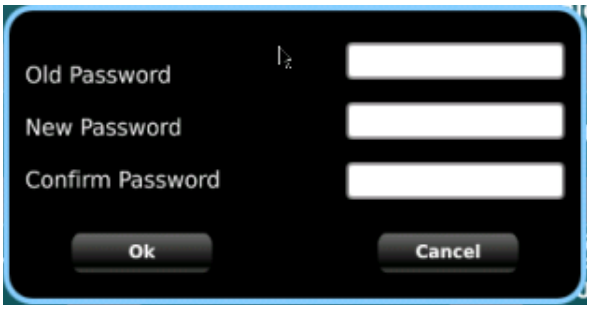
When Maintenance Mode is toggled, the alarm horn will not activate during a normal alarm event. This allows a technician to perform maintenance without setting off the loud alarm.

Maintenance mode will automatically toggle back to normal after 15 minutes. A timer is displayed below the button.

The lower right bar on the home screen that is typically green and displays "NORMAL" will now be yellow and display "MAINTENANCE."

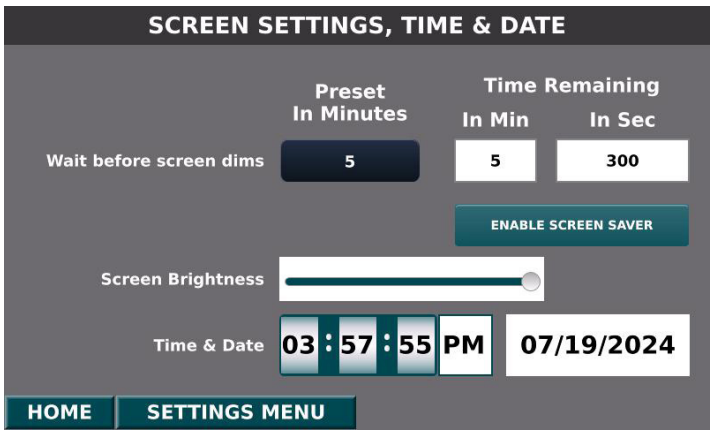


Change Password



To change the password, press the "Change Password" button, enter the old password, enter the desired new password, and confirm the desired new password.

Screen saver and brightness settings



The FirstCall™ Medical Gas Alarm Zone Valve Box is factory-set with a 5 minute screen saver. The screen saver dims the panel to 10% after 5 minutes. This time limit can be changed. The boxes to the right show the time remaining until the screen saver is enabled.

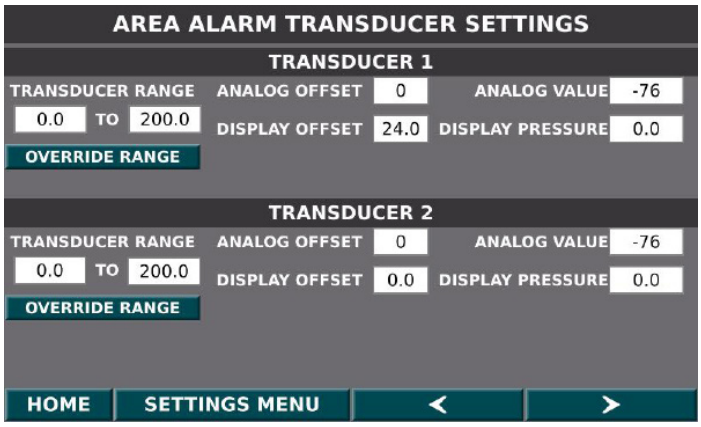
To disable the screen saver, press the "DISABLE SCREEN SAVER" button.

Screen brightness is set to 50% from the factory. This can be changed higher or lower depending on preference.

To maximize the lifespan of the screen, Powerex advises that the screen saver remain enabled and the default screen brightness be no higher than 50%.

Time and date can be manually adjusted by using the buttons towards the bottom of the screen.

Transducer Settings



The Powerex FirstCall™ Medical Gas Alarm Zone Valve Box come with the ability to adjust the displayed value of the pressure, as well as override the standard pressure range of the installed transducer.

For example, if the transducer reads 52, and the desired display is 50, enter -2 under "display offset."

Use the arrows at the bottom to scroll through the different transducers if there are more than 2.

The Transducer Range settings should never have to be overridden by a user. If an alarm panel is required to be expanded with a new gas that falls outside the standard range, please contact Powerex Technical Service for instruction.

Test & Set High/Low Alarm Points to ±20% Current Pressure

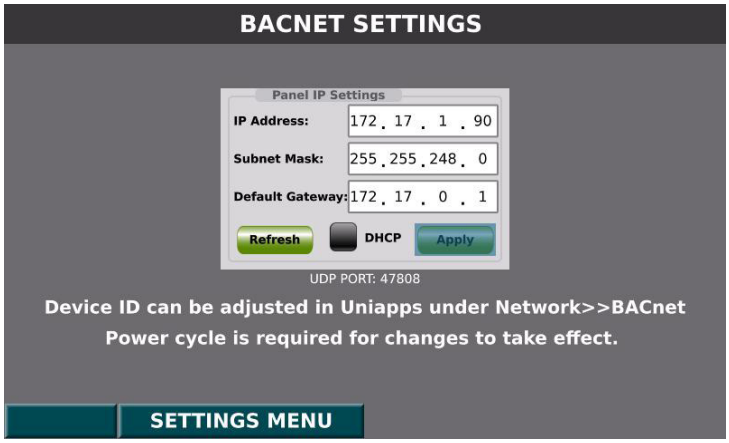
This unique feature easily allows for compliance with NFPA 99 2018 edition 5.1.9.4.2, stating that Area Alarm Panels for medical gas systems shall indicate if the pressure in the lines in the area being monitored increases or decreases by 20 percent from the normal line pressure.

The FirstCall™ Medical Gas Alarm Zone Valve Box will automatically calculate the high/low set points based on the current pressure measured by the transducers.

The low limit for Medical Vacuum and WAGD systems will still stay at 12" Hg even when this feature is used.

The high/low settings will also appear on the gas badge on the home screen for 5 seconds.

BACnet Settings (Option)



The IP address for the PLC is already preloaded, but is able to be changed if required.

Subnet Mask is defaulted to 255, 255, 255, 0 – this can be changed if required.

Default Gateway is set at 0, 0, 0, 0 – this can be changed if required.

Press "Apply" to save settings, and the PLC will reboot after pressing "OK."

See the BACnet Object Names chart in Appendix A for list of names for alarm conditions, gas pressures, and set points that will display on the BACnet explorer.

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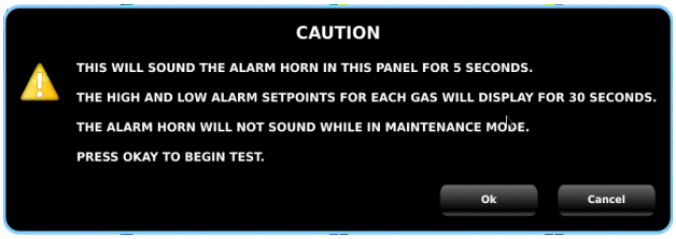
Operation

TEST Feature

To test the alarm horn, press the "TEST" button in the center of the lower bar. A caution window will pop up, warning the user that the alarm horn will sound and asking to confirm. To proceed with the test, press "OK."



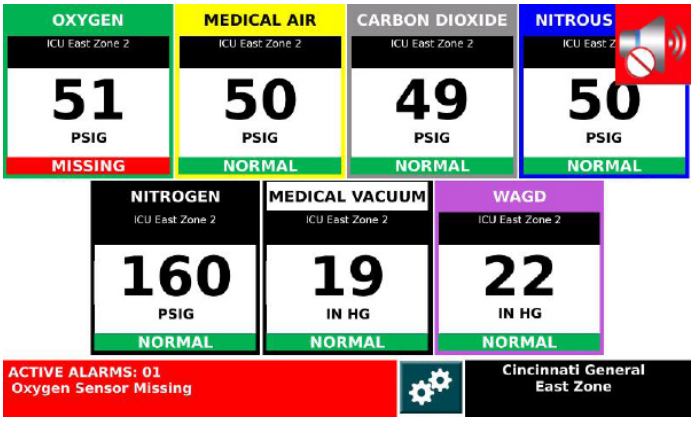
The alarm horn will sound for 5 seconds.

For Area Alarms, the high/low pressure settings will display on the gas badge for 30 seconds.

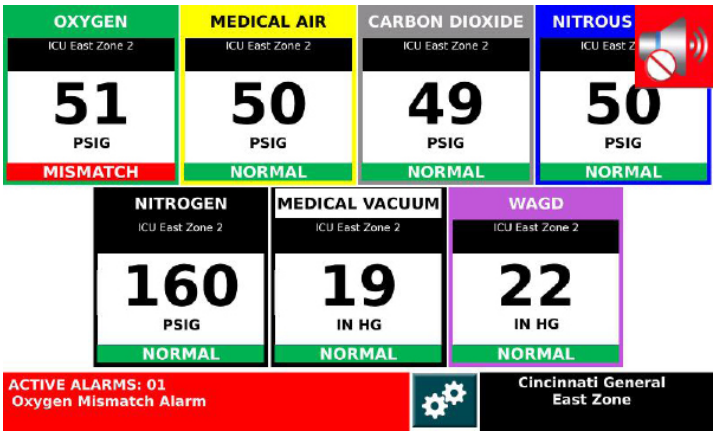
Alarm Event

Area Alarms – there are 4 different alarm conditions for area alarm gas badges:

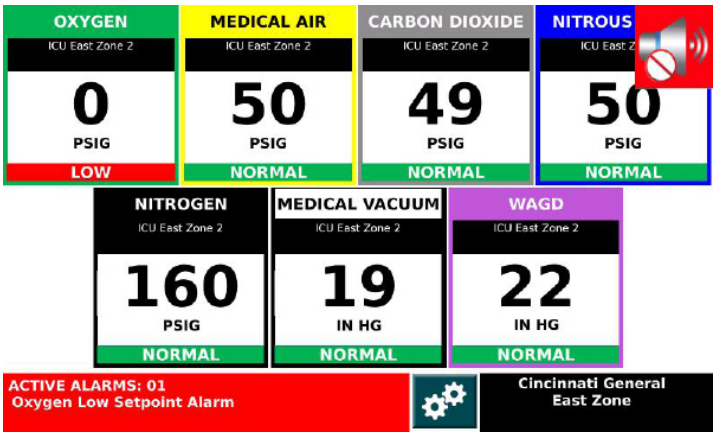
1. Missing – panel does not detect a transducer connected.



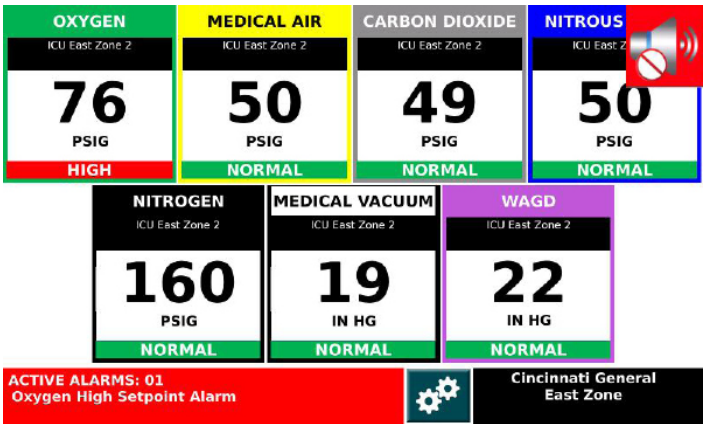
2. Mismatch – panel detects a transducer connected, but it is the wrong gas type.



3. Low – gas pressure less than 20% below nominal.



4. High – gas pressure greater than 20% above nominal.



Silencing the Alarm

In the event of an alarm, pressing the silence button will silence the horn indefinitely. The Alarm Banner at the bottom will remain.

Alarm Banner

The alarm banner displays all active alarm conditions. Every three seconds, the next active alarm condition is displayed.

Next to "ACTIVE ALARMS" is a number displayed. This number corresponds to the number of active alarms.

When there are no active alarm conditions, the alarm banner will disappear. A large green box will display "NORMAL".

Maintenance

Zone Valve Box Maintenance

1. Ball valves should be operated periodically and tested for closure ability and leakage. If seals stick or leak, they should be replaced.
2. Clean the exterior of the valve boxes routinely with soap and water. Strong solvents will damage the polycarbonate window and the silk screened printing on the window.
3. The ball valves have a removable swing out body design which allows for the changing of internal components. All valve bodies can be accessed by loosening all bolts and nuts and removing only one bolt, for valves sizes up to 2" valves, at this point the body may be swung out for servicing. Refer to the next pages for details and part numbers.

⚠ WARNING To protect the lives of patients, always notify the appropriate medical facility staff before shutting off the supply of medical gas or vacuum through a ball valve. Do not close ball valves except in cases of emergency. Authorized hospital should close ball valves in the event of fire, explosion or damage to the pipeline or equipment.

Avertissement: Afin de protéger la vie des patients, veuillez toujours informer le personnel médical approprié avant de fermer l'alimentation en gaz médical ou en vide à l'aide d'une vanne à bille. Ne fermez pas les vannes à bille sauf en cas d'urgence. L'hôpital autorisé doit fermer les vannes à bille en cas d'incendie, d'explosion ou de dommages au pipeline ou à l'équipement.

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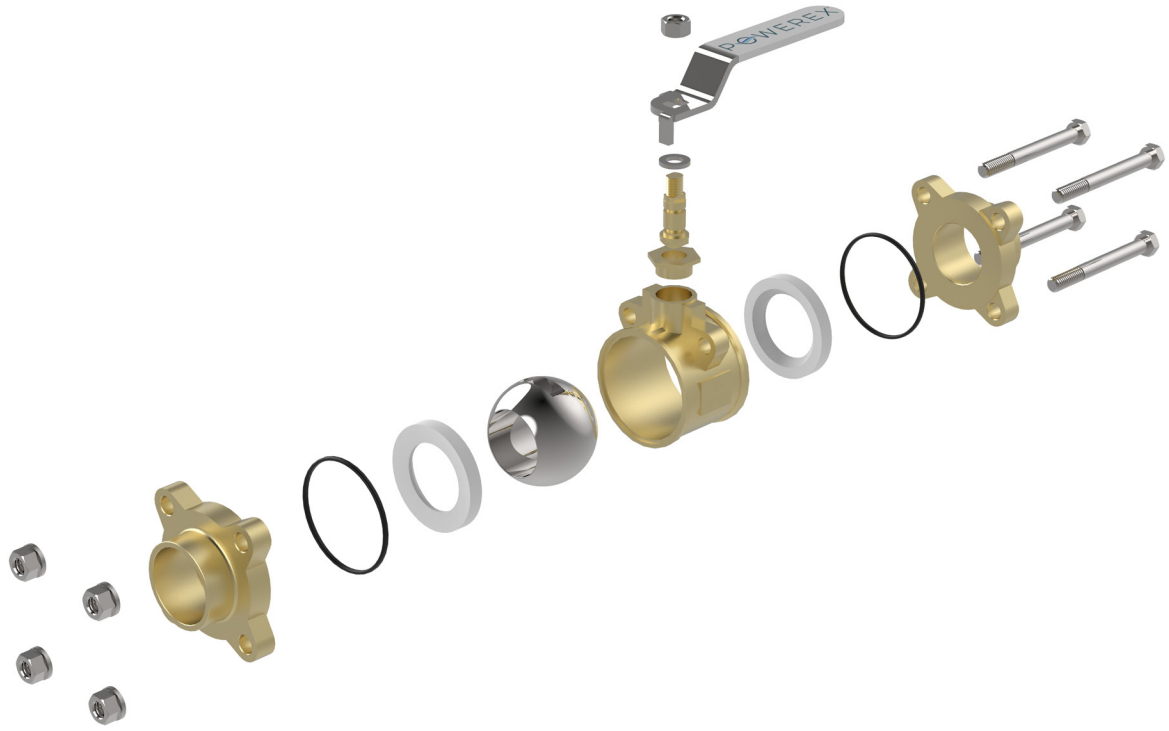
Model Numbers

0.5″	0.75″	1″	1.25″	1.5″	2″
VP002601AV	VP002602AV	VP002603AV	VP002604AV	VP002605AV	VP002606AV

Removal of Seals & O-Rings

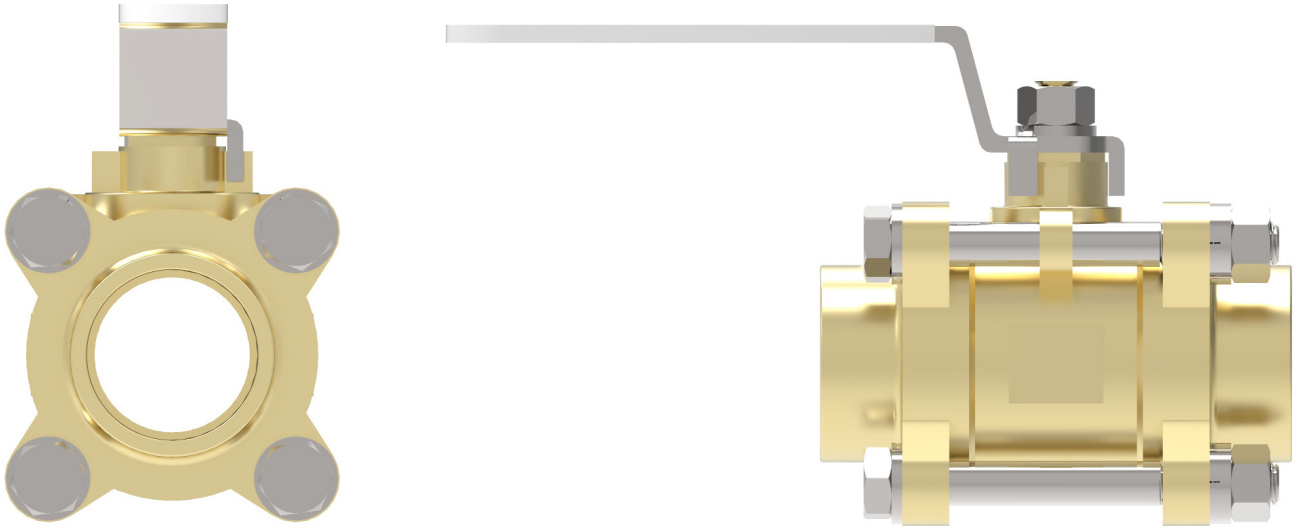
Remove and discard the worn-out seals and o-rings from Ball Valve.



Seal Kit Part Number	Valve Size	Seal Kits Include the Following:
VP002701AV	0.5″	2 Ball Seal Seats 2 Flange O Rings 1 Stem Seal 1 Stem Thrust Washer
VP002702AV	0.75″	
VP002703AV	1″	
VP002704AV	1.25″	
VP002705AV	1.5″	
VP002706AV	2″	

Ball Valve Torque

1/2″ through 2″ ball valve configuration shown



Part Number	Valve Size	Bolt Size	kgf-cm	in-lbs
VP002601AV	0.5″	1/4-20 x 2-1/4″	70	61
VP002602AV	0.75″	5/16-18 x 2-1/2″	120	104
VP002603AV	1″	5/16-18 x 2-3/4″	120	104
VP002604AV	1.25″	3/8-16 x 3-1/4″	120	104
VP002605AV	1.5″	3/8-16 x 3-3/4″	120	104
VP002606AV	2″	1/2-13 x 4-3/4″	120	104

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Alarm Panel Maintenance

⚠ CAUTION For personal safety, lock out and tag out the associated circuit breaker disconnect for the source of 120-240V AC power.

Attention: Pour votre sécurité personnelle, verrouillez et étiquetez le sectionneur du disjoncteur associé pour la source d'alimentation de 120-240V CA.

⚠ CAUTION For personal safety and to avoid damage to the alarm, ensure that the circuit breaker is in the OFF position.

Attention: Pour votre sécurité personnelle et pour éviter d'endommager l'alarme, assurez-vous que le disjoncteur est en position OFF.

Cleaning

Be sure to use a microfiber cloth or soft lint-free cloth when cleaning any smudges off of the HMI. Do not use a paper towel or tissue paper, wet or dry. To prevent cracking, do not apply an excessive amount of pressure to the screen.

Battery

The alarm panel includes an onboard battery to maintain memory in the event of a power outage.

Low battery power will trigger an alarm – replace with a standard CR2032 battery.

NOTE: In this particular case, the AC power to the alarm panel must be kept on during battery replacement. Otherwise all saved settings will be lost if the battery is removed while power is disconnected.

Maintenance Mode

Toggling the Maintenance Mode button will allow settings to be changed on the alarm panel without triggering an audible alarm. Maintenance mode is automatically turned off after 15 minutes. A timer is shown near the button once it's activated. On the main screen, the Green "Normal" bar changes to Yellow "Maintenance."

Parts Maintenance List

Description	Part Number
Tranducers	
Oxygen	TDCR-O2
Medical Air	TDCR-AIR
Medical Vacuum	TDCR-VAC
Nitrous Oxide	TDCR-N2O
Nitrogen	TDCR-N2
Carbon Dioxide	TDCR-CO2
WAGD	TDCR-WAGD
Instrument Air	TDCR-INST
Terminal Blocks	PE000652AV
Ground Terminal Block	PE000653AV
Blue Terminal Block	PE000662AV
Micro SD Card	PE000467AV
Horn	PE001012AV
Circuit Breaker	PE0013101AV
Power Supply	PE0004109AV
7" PLC + HMI	PE0004100AV
Expansion Adapter	PE0004102AV
Analog Expansion Module	PE0004103AV

Troubleshooting Guide

Issue	Possible Cause	Corrective Action
No power	AC Power not available to the alarm panel	Connect AC power to the alarm panel power supply
	Blown fuse at the building electrical panel	Check the building's primary electrical panel and make sure the circuit breaker is switched to ON
	Alarm panel fuse lever in the OFF position	Switch the alarm panel fuse lever to the ON position
No audible alarm	Loose wire connection	With the alarm panel circuit breaker in the OFF position, make sure the wires are properly connected to the horn
	Alarm in maintenance Mode	Either wait 15 minutes for Maintenance Mode to automatically turn off, or go into settings and turn off Maintenance Mode
	Faulty horn	Replace horn (see replacement part list for part number)
Screen is not functioning	Faulty power supply	Replace power supply
	Wiring harness disconnected	Make sure the wiring harness from the power supply and terminal blocks are properly installed in the back of the PLC
	Alarm panel fuse lever in the OFF position	Switch the alarm panel fuse lever to the ON position
	AC power wiring is not properly connected	Make sure AC wiring is properly installed in the alarm panel power supply terminals
	HMI/PLC is faulty	Replace HMI/PLC. Contact Powerex Technical Service for additional assistance
"MISSING" alarm on Area gas badge	Sensor wires not connected	Make sure sensor wires are properly installed in the assigned terminal blocks
	Faulty sensor	Replace sensor (see replacement part list for part number)
Area gas display pressure reading not matching gauge on pipeline	Faulty gauge on pipeline	Check gauge on pipeline, replace if faulty
	Sensor out of calibration	Adjust the sensor offset using the "TRANSDUCER SETTINGS" function in the settings menu. Replace sensor if necessary (see replacement part list for part number)

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Specifications

Operating temperature range: -4°F to 131°F

Storage temperature range: -22°F to 158°F

AC input: 120-240 VAC at 50/60 Hz

Input fuse: 2 Amp

Power consumption: 30 W Maximum

Pressure measurement accuracy: All positive pressure transducers: 0-200 psi ±0.5% at full scale

All vacuum transducers: 0-30 inHg ±0.5% at full scale

Dimensions (Width X Height X Depth)

- Transducers: 1.18″ Diameter X 2.03″ tall (Does not include DISS fitting)
- Rough-in box - Standard, 1 Valve: 13.2″ X 16.0″ X 4.2″
- Rough-in box - Standard, 2 Valves: 13.2″ X 20.9″ X 4.2″
- Rough-in box - Standard, 3 Valves: 13.2″ X 25.8″ X 4.2″
- Rough-in box - Standard, 4 Valves: 13.2″ X 25.8″ X 4.2″
- Rough-in box - Standard, 5 Valves: 13.4″ X 47.0″ X 4.2″
- Rough-in box - Standard, 6 Valves: 13.4″ X 47.0″ X 4.2″
- Rough-in box - Standard, 7 Valves: 13.4″ X 47.0″ X 4.2″
- Rough-in box - Vertical: 14.0″ X 30.6″ X 4.2″

Appendix A. BACnet Object Names

Note: BACnet must be activated to access BACnet objects.

BACnet Object Name	Object Name Description
Gas 1 Display	The displayed pressure value for Gas 1.
Gas 2 Display	The displayed pressure value for Gas 2.
Gas 3 Display	The displayed pressure value for Gas 3.
Gas 4 Display	The displayed pressure value for Gas 4.
Gas 5 Display	The displayed pressure value for Gas 5.
Gas 6 Display	The displayed pressure value for Gas 6.
Gas 7 Display	The displayed pressure value for Gas 7.
Gas 1 High Setpoint	The High Pressure alarm set point for Gas 1.
Gas 2 High Setpoint	The High Pressure alarm set point for Gas 2.
Gas 3 High Setpoint	The High Pressure alarm set point for Gas 3.
Gas 4 High Setpoint	The High Pressure alarm set point for Gas 4.
Gas 5 High Setpoint	The High Pressure alarm set point for Gas 5.
Gas 6 High Setpoint	The High Pressure alarm set point for Gas 6.
Gas 7 High Setpoint	The High Pressure alarm set point for Gas 7.
Gas 1 Low Setpoint	The Low Pressure alarm set point for Gas 1.
Gas 2 Low Setpoint	The Low Pressure alarm set point for Gas 2.
Gas 3 Low Setpoint	The Low Pressure alarm set point for Gas 3.
Gas 4 Low Setpoint	The Low Pressure alarm set point for Gas 4.
Gas 5 Low Setpoint	The Low Pressure alarm set point for Gas 5.
Gas 6 Low Setpoint	The Low Pressure alarm set point for Gas 6.
Gas 7 Low Setpoint	The Low Pressure alarm set point for Gas 7.
Gas 1 Mismatch Alarm	Transducer Gas Type Mismatch Alarm Status for Gas 1; 0=No Alarm, 1=Alarm
Gas 1 High Setpoint Alarm	Gas 1 High Pressure Alarm Status; 0=No Alarm, 1=Alarm
Gas 1 Low Setpoint Alarm	Gas 1 Low Pressure Alarm Status; 0=No Alarm, 1=Alarm
Gas 1 Sensor Monitoring	Gas 1 Pressure Transducer Missing Alarm Status; 0=No Alarm, 1=Alarm
Gas 2 Mismatch Alarm	Transducer Gas Type Mismatch Alarm Status for Gas 2; 0=No Alarm, 1=Alarm
Gas 2 High Setpoint Alarm	Gas 2 High Pressure Alarm Status; 0=No Alarm, 1=Alarm
Gas 2 Low Setpoint Alarm	Gas 2 Low Pressure Alarm Status; 0=No Alarm, 1=Alarm
Gas 2 Sensor Missing	Gas 2 Pressure Transducer Missing Alarm Status; 0=No Alarm, 1=Alarm
Gas 3 Mismatch Alarm	Transducer Gas Type Mismatch Alarm Status for Gas 3; 0=No Alarm, 1=Alarm
Gas 3 High Setpoint Alarm	Gas 3 High Pressure Alarm Status; 0=No Alarm, 1=Alarm
Gas 3 Low Setpoint Alarm	Gas 3 Low Pressure Alarm Status; 0=No Alarm, 1=Alarm
Gas 3 Sensor Missing	Gas 3 Pressure Transducer Missing Alarm Status; 0=No Alarm, 1=Alarm

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BACnet Object Name	Object Name Description
Gas 4 Mismatch Alarm	Transducer Gas Type Mismatch Alarm Status for Gas 4; 0=No Alarm, 1=Alarm
Gas 4 High Setpoint Alarm	Gas 4 High Pressure Alarm Status; 0=No Alarm, 1=Alarm
Gas 4 Low Setpoint Alarm	Gas 4 Low Pressure Alarm Status; 0=No Alarm, 1=Alarm
Gas 4 Sensor Missing	Gas 4 Pressure Transducer Missing Alarm Status; 0=No Alarm, 1=Alarm
Gas 5 Mismatch Alarm	Transducer Gas Type Mismatch Alarm Status for Gas 5; 0=No Alarm, 1=Alarm
Gas 5 High Setpoint Alarm	Gas 5 High Pressure Alarm Status; 0=No Alarm, 1=Alarm
Gas 5 Low Setpoint Alarm	Gas 5 Low Pressure Alarm Status; 0=No Alarm, 1=Alarm
Gas 5 Sensor Missing	Gas 5 Pressure Transducer Missing Alarm Status; 0=No Alarm, 1=Alarm
Gas 6 Mismatch Alarm	Transducer Gas Type Mismatch Alarm Status for Gas 6; 0=No Alarm, 1=Alarm
Gas 6 High Setpoint Alarm	Gas 6 High Pressure Alarm Status; 0=No Alarm, 1=Alarm
Gas 6 Low Setpoint Alarm	Gas 6 Low Pressure Alarm Status; 0=No Alarm, 1=Alarm
Gas 6 Sensor Missing	Gas 6 Pressure Transducer Missing Alarm Status; 0=No Alarm, 1=Alarm
Gas 7 Mismatch Alarm	Transducer Gas Type Mismatch Alarm Status for Gas 7; 0=No Alarm, 1=Alarm
Gas 7 High Setpoint Alarm	Gas 7 High Pressure Alarm Status; 0=No Alarm, 1=Alarm
Gas 7 Low Setpoint Alarm	Gas 7 Low Pressure Alarm Status; 0=No Alarm, 1=Alarm
Gas 7 Sensor Missing	Gas 7 Pressure Transducer Missing Alarm Status; 0=No Alarm, 1=Alarm
Internal Battery Low	PLC/HMI Battery Alarm Status; 0=Normal, 1=Alarm (NOTE: To maintain saved settings, change the battery while the HMI/PLC is still powered by 24VDC power.)
Is Any Alarm Active	General Fault Status; 0=No Alarm, 1=Alarm

Powerex Limited Warranty

Warranty and Remedies.

(a) Standard Period of Warranty – Parts and Labor. Powerex warrants and represents all Products shall be free from Defects for the first twenty-four (24) months from the date of shipment by Powerex. During such warranty period, Powerex shall be fully liable for all Defects in the Products (the "Product Defects"), i.e., all costs of repair or replacement, which may include "in and out" charges, so long as the Products are located in the United States or Canada, and the Products are reasonably located and accessible by service personnel for removal. "In and out" charges include the costs of removing a Product from buyer's equipment for repair or replacement.

(b) Additional Period of Warranty – Parts Only (No Labor). In addition to the above, Powerex warrants the products described herein shall be free of Defects for a period of sixty (60) months from the date of shipment by Powerex, with the exception of any components which are recommended to be replaced in less than sixty months in our Installation/Operation manuals. Within said period Powerex will repair or replace any part or component which is proven to be defective in either material or workmanship. This warranty covers parts only. Labor is not included. This warranty is valid only when the product has been properly installed according to Powerex specifications, used in a normal manner and serviced according to factory recommendations. This warranty does not cover failures due to damage which occurs in shipment or failures which result from accidents, misuse, abuse, neglect, mishandling, alteration, misapplication or damage due to acts of nature.

(c) General. Powerex warrants each Powerex branded Pipeline Accessory (collectively "Products", individually each a "Product") to be free from defects in material and workmanship ("Defects") at the date of shipment. EXCEPT AS SET FORTH BELOW, NO OTHER WARRANTY, WHETHER EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, SHALL EXIST IN CONNECTION WITH THE SALE OR USE OF SUCH PRODUCTS. TO THE EXTENT PERMITTED BY LAW, ANY AND ALL IMPLIED WARRANTIES ARE EXCLUDED. All warranty claims must be made in writing and delivered to Powerex in accordance with the procedures set forth on its website (www.powerexinc.com), or such claim shall be barred. Upon timely receipt of a warranty claim, Powerex shall inspect the Product claimed to have a Defect, and Powerex shall replace any Product which it determines to have had a Defect; provided, however, that Powerex may elect, upon return of the Product, to refund to buyer any part of the purchase price of such Products paid to Powerex. Freight for returning Products to Powerex for inspection or for shipping warranty parts shall be paid by buyer where permitted by applicable law. Powerex is not responsible for any import fees, taxes, duties, licenses or other fees imposed by any governmental authority upon the production, sale, shipment and/or use of Products covered hereunder. The warranties and remedies herein are the sole and exclusive remedy for any breach of warranty or for any other claim based on any Defect, or non-performance of the Products, whether based upon contract, warranty or negligence.

(d) Coverage. The warranty provided herein applies to Powerex pipeline products only.

(e) Exceptions. Notwithstanding anything to the contrary herein, Powerex shall have no warranty obligations with respect to Products:

(i) That have not been installed in accordance with Powerex's written specifications and instructions;

(ii) That have not been maintained in accordance with Powerex's written instructions;

(iii) That have been materially modified without the prior written approval of Powerex; or

(iv) That experience failures resulting from operation, either intentional or otherwise, in excess of rated capacities or in an otherwise improper manner.

The warranty provided herein shall not apply to: **(i)** any defects arising from corrosion, abrasion, use of insoluble lubricants, or negligent attendance to or faulty operation of the Products; **(ii)** ordinary wear and tear of the Products; or **(iii)** defects arising from abnormal conditions of temperature, dirt or corrosive matter; **(iv)** any OEM component which is shipped by Powerex with the original manufacturer's warranty, which shall be the sole applicable warranty for such component.

Limitation of Liability. NOTWITHSTANDING ANYTHING TO THE CONTRARY HEREIN, TO THE EXTENT ALLOWABLE

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