POA08 - Peracetic Acid

Monitoring and Control System

User Manual

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1. Overview

Peracetic Acid / Peroxyacetic Acid (POAA) has gained wide acceptance as an effective antimicrobial agent due to its high oxidation potential. It is commonly used for wash water disinfection in the food industry due to its broad range of activity, safe by products, wide pH and temperature range. It is also unaffected by protein residue.

Pulse Instruments Model POA08 is a direct measuring monitoring and control system that utilizes a specialized non-membrane sensor which provides a very stable and accurate measurement of Peracetic Acid, even in conditions where a high amount of organic matter is present.

- Measurement Range 0 to 100 ppm
- Simple Set Up and Installation
- Built in Control for Automatic POAA Injection
- Built in Pump Status Indicator
- Audio and Visual Alarm with High and Low Limits
- 4-20mA Output for Data Recording
- Sampling Manifold with Flow Cell, Pressure Switch, and Self Cleaning Sensor
- NEMA 4X Waterproof Enclosure

2. Specifications and Components

2.1 System Specifications

Condition	Specifications
Range	0 to 100 ppm
Resolution	1 ppm
Output	4 to 20mA current loop in proportion to 0-100 ppm
Relay	10A @ 250 VAC
Operating Temperature	0 to 50 °C
Max Pressure / Flow	2 PSI (min) 50 PSI (max) and 2 GPM flow through manifold
Power	110 VAC; 50/60 Hz, 15VA
Enclosure Rating	NEMA 4X / IP65

2.2 System Components

Part Number	Description
POA08-P1	POAA Monitoring and Control Panel
MF-POA08	Manifold with Flow Cell, Flow Meter, Pressure Switch, and Sensor Cleaning Mechanism with Solenoid, Mounted on Polyboard
PL57-020	POAA Sensor, 0-100 ppm
DL-USB-4	USB Datalogger, Configured for 0-100ppm POAA, Pre-Wired
SS500T (optional)	Stainless steel frame. Control Panel and Manifold Pre-mounted.

3. Functions

3.1 Operation

The system features the following operational capabilities:

- Provides a visual numeric value of POAA ppm as measured by the sensor.
- Controls a POAA pump in order to maintain a given setpoint of POAA.
- Disables the POAA pump in the event there is no flow going through the manifold.
- Provides a visual and audio alarm if process values are out of range.
- Controls a solenoid for the sensor cleaning mechanism on a user defined timer.
- Provides a 4-20mA output current for datalogging.

3.2 Control

POAA injection is controlled by the control system to maintain the set point programmed in the controller. When the POAA value drops below the set point, the POAA pump automatically turns on via a control relay and adds oxidizer to the water until the POAA value rises above the set point value. In addition, a green indicator light on the touch screen illuminates when the pump is on.

3.3 Safety Alarms

An alarm condition occurs due to process failure if POAA levels exceed the specified low or high alarm limits. If the POAA value exceeds its low or high alarm set point, the alarm indicator light, strobe light, and (if enabled) audio alarm will turn on, until the alarm is reset or the alarm condition no longer exists. Use the alarm silence switch on the side of the panel to disable the audio alarm if necessary, and the alarm reset pushbutton to reset the alarm. Do not forget to turn the switch back to the ON position after the problem is fixed, so that the audio alarm will sound when the next alarm occurs.

3.4 Pressure Switch

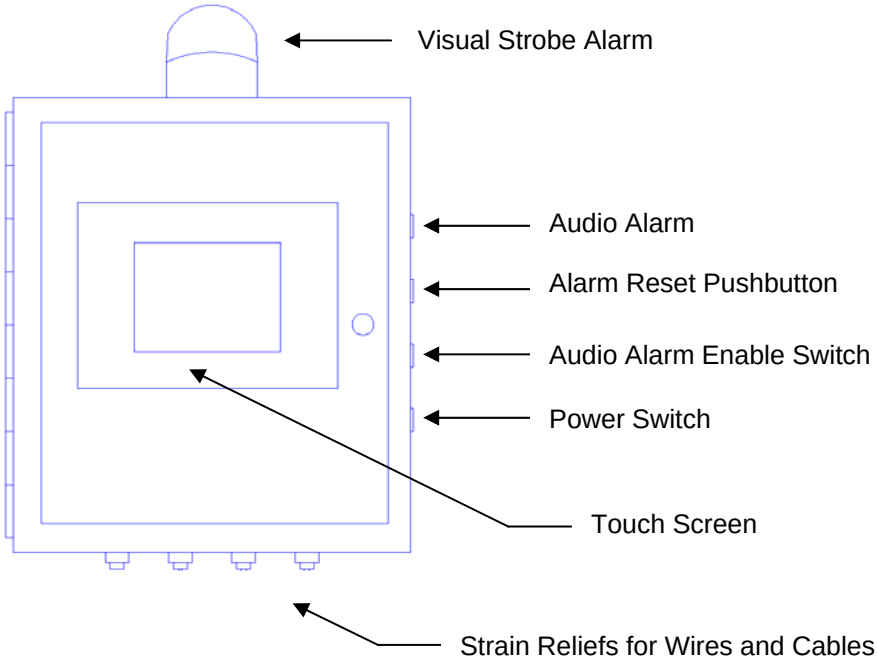
A pressure switch is built into the manifold, and provides the control panel a signal when flow through the manifold is present. A minimum of 2 PSI is required for the pressure switch to actuate. If no flow is detected, the control system will continue monitoring and recording, but will not allow any chemical injection or alarms to activate.

3.5 Flow Cell, Spray Nozzle and Solenoid

Built into the manifold is the flow cell which houses the POAA sensor and the spray nozzle. The spray nozzle is operated by a solenoid and controlled by the control panel, where it repeats on a user defined duration and frequency. The spray nozzle directs a high pressure jet to the surface of the POAA sensor, to rinse any debris.

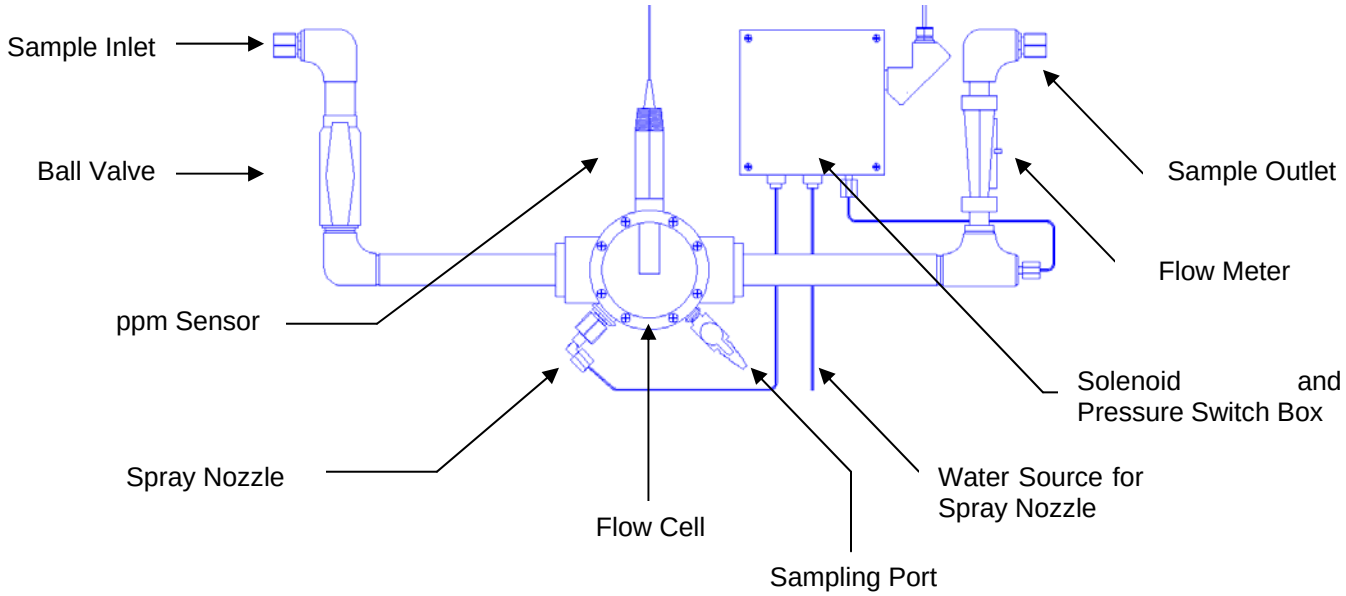
4. Installation & Setup

4.1 Control Panel Overview



- Touch Screen – To access the touch screen, open the latches on the upper and lower right side of the door. The touch screen displays the operating parameters and allows the user to make changes to the system.
- Power Switch – This is the ON/OFF switch for the system.
- Audio Alarm Enable Switch – When in the ON position, the audio alarm will be activated when an alarm condition exists.
- Alarm Reset Pushbutton – When pressed, the system will reset and suppress alarms for the amount of time set in Alarm Reset Delay (see page 9).
- Visual Strobe Alarm – The visual strobe alarm provides a flashing red strobe light when an alarm condition exists.
- Strain Reliefs – These are the openings in the enclosure to allow wires to be run in and out of the control panel. After running a wire or cable through the strain relief, ensure it is tightened to ensure a water-proof seal.

4.2 Manifold Overview



- Sample Inlet – The sample inlet is the start of the sensor manifold. A sample should be fed through the manifold inlet from a dedicated sampling pump, or off the pressure side of a recirculation pump.
- Ball Valve – Allows or stops the sample from flowing through the manifold. Close the valve when servicing the sensor or manifold.
- Flow Cell – The flow cell houses the sensor and spray assembly in place. The top of the flow cell has a ¾" FNPT opening for the ppm sensor to screw into.
- PPM Sensor – Use PTFE tape on the ¾" threads prior to screwing it into the flow cell for a good seal. Once the sensor is secured, measure the length of cable that will be needed for the sensor to be wired into the transmitter terminal block. See section 4.3. If the excess cable is desired to be cut off, be sure to leave some slack. Ensure that the spray nozzle does not come into direct contact with the ppm sensor tip, this can damage the sensor.
- Solenoid and Pressure Switch Box – This enclosure houses the solenoid used for the sensor spray and the pressure switch. The enclosure has two sets of cables that need to be wired into the control panel. The first set (3-wire power cord) is for the solenoid and must be wired into terminals 4 through 6 (see Section 4.3). The second cable is a two-wire shielded cable for the power switch which must be wired into terminals 7 through 8 (see Section 4.3).
- Flow Meter – Provides a visual indication of the approximate flow rate going through the manifold. For best results the flow rate must be consistent at approximately 1 gallon per minute. A slightly lower or higher flow rate also works as long as the flow rate remains the same at all times.
- Spray Nozzle – The spray nozzle is installed in the flow cell to spray a water jet across the sensor surface at user defined intervals. The depth of the spray nozzle can be adjusted if necessary by loosening the compression fitting. The spray nozzle is pre-connected to the solenoid. Ensure that the spray nozzle does not come into direct contact with the ppm sensor tip, this can damage the sensor.
- Water Source for Spray Nozzle – The ¼" tubing coming out of the Solenoid and Pressure Switch Box provides must be connected to a pressurized water source in order to provide the spray nozzle with water to spray the sensor surface with.

Connect this tubing to a water source such as a city water line using the included ¼" tube to ¼" MNPT connector. Because municipal water contains chlorine, the spraying procedure may cause interference with the ppm reading while the spray is active. Because of this, the system will wait 15 seconds after the spray cycle is complete to allow the ppm reading to stabilize.

- Sampling Port – Allows a sample to be drawn out for calibration or testing.
- Sample Outlet – The manifold outlet allows the sample to be returned to the source (tank, flume, etc.)

4.3 Setup and Wiring

Mount the control panel and the manifold assembly. Provide the sample inlet of the manifold with a sample from the process water which is pressurized and can provide at least 1 GPM of flow. Allow the sample outlet of the manifold to return back to the process. Connect the tubing for the sensor spray into a pressurized water source using the included ¼" tubing adapter. Screw the sensor into the flow cell and open the ball valve to being flow through the manifold. Route the wiring for the sensor and the solenoid and pressure switch through the strain reliefs into the control panel. Wire the wires into the terminals as follows:

From Left to Right

1. POAA Pump Hot
2. POAA Pump Neutral
3. POAA Pump Ground
    - A female power drop cord is provided for the pump. The pump can be hard-wired into these terminals if desired.
4. Solenoid Hot (Black)
5. Solenoid Neutral (White)
6. Solenoid Ground (Green)
7. Pressure Switch (Red)
8. Pressure Switch (Black)
9. (+) 4-20mA Output to Datalogger
10. (-) 4-20mA Output to Datalogger
    - A USB 4-20mA datalogger may be pre-wired into terminals #9 and #10. If the 4-20mA signal needs to be transmitted to another analog recorder, the USB datalogger can be removed, or the 4-20mA signal can run in series with the other recorder.

Wire the sensor cable into the transmitter terminals circled below:

10. Black Wire
11. Not Used
12. Bare Shield Wire
13. Clear Wire

Note: If there is an excessive length of cable between the sensor and the terminal blocks of the ppm transmitter, its recommended to trim the sensor cable so that there is not excessive slack. Use caution when stripping the cable as it contains 3 conductors within the single cable (black, bare shield, and clear).

5. Operation

5.1 Sample Loop Requirements

The manifold requires a constant flow rate through it in order for the measurement to be accurate. Built into the manifold is a ball valve and a 0-2 GPM flow indicator. After the sensor is inserted into the manifold and the sample loop has an adequate flow rate, use the ball valve to adjust the flow rate so that the flow indicator reads **1 GPM.**

The flow rate must remain stable before proceeding to calibration. If the flow rate varies on the sample loop, it may be necessary to provide a dedicated sampling pump for the manifold.

5.2 Touch Screen

The touch screen allows the user to view the status of the system and make changes.

Main Screen

The main screen shows the current ppm of Peracetic acid being measured by the system. The High and Low Alarm indicators become red when the alarm is active. The Pump indicator becomes green when the pump is on. The Flow indicator becomes green when flow through the manifold is present. The Menu button allows access to the various options screens:

- Set Points
- Pump Timers
- Alarm Timers
- Spray Nozzle
- Calibration
- Zero
- Graph
- Relay Test
- Password
- Display

Set Points

- Low Alarm Set Point– The alarm will be triggered if the ppm falls below this value.
- High Alarm Set Point– The alarm will be triggered if the ppm rises above this value.
- Control Set Point– The setpoint at which the pump will remain on until the value is reached.
- Dead Band – The hysteresis value for each setpoint.

Pump Timers

- Pump On Delay – The amount of time in minutes the system will wait before allowing the pump to turn off again. This is to prevent the pump from cycling on and off too often.

- Pump On Limit – The maximum amount of time that the pump can be continuously powered on before turning off and activating the alarm. An excessively long time indicates a pump problem.

Alarm Timers

- Alarm On Delay – The amount of time an alarm condition must exist before the alarm is activated. This is to prevent the alarm from being activated if a parameter is outside of range for a short amount of time.
- Alarm Reset Delay – The amount of time the alarms will be suppressed when the Alarm Reset button is pressed.
- Power Up Alarm Delay – The amount of the system will wait after starting up before activating the alarms. This is to give your process time to stabilize on startup.

Spray Nozzle

- Spray Status – Enables or disables the sensor spray feature.
- Spray Frequency – The amount of time in between each spray cycle.
- Spray Duration – The amount of the spray is on for each cycle.

Calibration

- Calibration cannot be done on the touch screen. Refer to section 6 for calibration.
- Offset – Regular calibrations should be performed to ensure the accuracy of the ppm reading. However, in the event that the difference between the sensor reading and a secondary validation method may not differ by much, the Offset feature can be used to adjust the ppm reading by ±5.

Zero

- Used to zero the ppm reading on the touch screen to match a zero on the ppm transmitter.

Graph

- The graph menu will display the ppm reading over a period of the last hour. Using the left arrow in the graph, you can scroll through the previous readings. The system will store up to 24 hours of data in the graphing menu. If the panel power is turned off, the data in the graph will be cleared out.

Relay Test

- Press the Test Pump button to force the pump to be powered on by the control panel. This is intended to assist in priming the pump. If the controller already has the pump powered up because the PAA level is too low, the Pump test button will not do anything.
- Press the Test Alarm button to force the alarm on. This will activate the flashing red strobe light and the audio alarm, if the Audio Alarm Switch is set to the ON position.
- Press the Test Spray button to force the spraying solenoid open which will cause the self-cleaning spray mechanism to activate.
-

Password

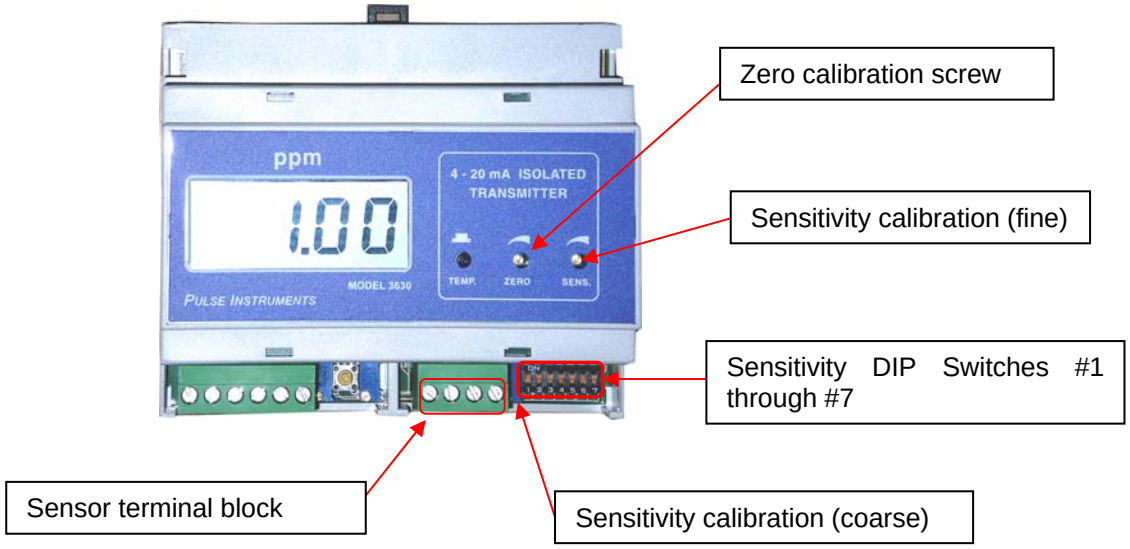
- The password can be changed in the password menu to any four digit number. The default password is a blank entry. Please note the password in a safe place if it is changed.

Display

- Adjust the brightness of the display up or down.

6. Calibration

Zero calibration and sensitivity calibration are done on the transmitter located inside the monitor panel.



6.1 Step 1: Zero Calibration

Perform a zero calibration by following these steps:

1. Remove the sensor terminal block from the transmitter by pulling it directly away from the transmitter.
2. Use a screwdriver to adjust the zero calibration screw so that the meter reads exactly 0.00.
3. Plug the sensor terminal block back into the transmitter.

6.2 Sensitivity Calibration

The sensitivity calibration is used to adjust the sensitivity of the meter so that it outputs a value to the display which correctly represents the actual concentration of Peracetic acid. Prior to performing a sensitivity calibration, ensure that the sensor has been installed with a steady sample flowing through the manifold for at least 30 minutes. This allows the sensor temperature to stabilize.

*Note: The ppm sensor's sensitivity naturally declines with time. The ppm transmitter has a total of 7 DIP switches, which can be set to ON (up) or OFF (down). Switches 1 and 2 correlate to the desired sensitivity. Switches 3 through 6 should always be OFF (down). Switch 7 should always be ON (up). See photo above for the location of the DIP switches . Follow the procedure below to perform a calibration.

DIP switch sensitivity table.

Switch Configuration	Switch 1 Position	Switch 2 Position	Sensitivity of PPM Sensor
#1	OFF (down)	ON (up)	Low
#2	ON (up)	OFF (down)	Medium
#3	OFF (down)	OFF (down)	High

To perform the sensitivity calibration, open the swing door of the control panel so that the transmitter can be accessed. Follow the steps below:

Ensure the flow rate is stable going through the manifold and that the Peracetic acid concentration will not significantly change during the calibration (i.e. not washing product).

1. Take a sample of the water at the sample valve and determine ppm using a titration test or a similar method. We recommend a Peracetic Acid test kit, Pulse Instruments part # 7191-01.
2. Using switch configuration #1, adjust the coarse sensitivity screw to match the ppm reading on the controller display to the test result. If the ppm display is lower than the test result, turn the sensitivity screw clockwise. If the ppm display is higher than the test result, or the transmitter reads “1 “ on its display, turn the sensitivity screw counter-clockwise until the values match.
3. The coarse sensitivity screw has a maximum of 30 rotations from full left to full right. When the maximum number of turns is exceeded the switch will click on additional rotations. If the ppm reading on the display cannot be adjusted to match the test result after covering the full range of the sensitivity screw, repeat steps 2 and 3 using the next switch configuration.

6.3 Maintenance

The sensor may require an additional routine cleaning.

1. Close the ball valve on the manifold to stop the flow.
2. Unscrew the sensor from the manifold.
3. Using a moist soft towel, wipe the tip of the sensor to ensure that it is clean.
4. Reinstall the sensor and sensor cable and open the ball valve to resume flow through the manifold.

7 Contact

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