

Water Quality Monitor

Q46H/65 Chlorine Dioxide

OVERVIEW

Chlorine dioxide (ClO_2) is a powerful oxidizing agent used for disinfection of potable water, cooling towers, and food wash water. It is also widely used for the bleaching of pulp in paper mills. As a disinfectant, ClO_2 has advantages over chlorine in that it does not react with ammonia and many organic compounds while proving more effective at controlling bacteria, spores, viruses and cysts. It is particularly well suited for removing biofilms from the inside of piping systems.

Badger Meter's Q46H/65 Chlorine Dioxide Monitor provides an economical and reliable measurement system for monitoring and controlling ClO_2 treatment systems. With a variety of outputs including 4...20 mA analog, PID control and digital communications, the Q46H/65 is adaptable to any ClO_2 application.

FEATURES

- **pH Input Option.** Enables the monitor to measure both dissolved ozone and pH. One analog output may be assigned to the pH measurement, allowing remote monitoring and recording of both variables.
- **Flexibility.** Programmable range options from 0...200 ppb to 0...200 ppm provide maximum application flexibility.
- **AC or DC Power Options.** Power options include universal 100...240V AC or 12...24V DC.
- **Analog Output Options.** Two isolated 4...20 mA outputs are standard with an option for a third output, if required. Default setting provides analog outputs for ozone and temperature.
- **PID Output.** Standard PID control function assignable to one analog output.
- **Digital Communications.** Available in Profibus DP, Modbus RTU, Modbus TCP/IP, Ethernet/IP or Datalogger.
- **Relay Outputs.** Three SPDT relays are standard, with relay functions programmable for alarm, control or trouble indication. Three additional low power relays available as an option.
- **Flexible Mounting.** NEMA 4X (IP66) enclosure is suitable for wall, pipe or panel mounting.
- **Clear LCD Display.** Backlit large LCD display provides clear visibility in any lighting conditions. A scrolling second line on the display provides additional information and programming prompts.



APPLICATIONS

- Food Washing
- Cooling Water
- Pulp and Paper Mill
- Potable Water Treatment

INTERFERENCE-FREE ClO_2 MEASUREMENT

Q46H/65 monitors use a polarographic membraned sensor to accurately measure chlorine dioxide in water. The sensor operates much like a battery, generating current that is linearly proportional to the concentration of chlorine dioxide in solution. A chlorine dioxide permeable membrane isolates the sensor from the measured sample and insures that the measurement is interference free.

Two versions of the sensor are available: a sensor intended for installation in a flow cell and a sensor intended for submersion applications. The sensors require minimal maintenance and are easy to use and maintain. An integral RTD provides temperature compensation and allows temperature to be displayed and transmitted from the monitor.



Figure 1: Submersion and flow cell sensors

SENSOR STABILIZATION

Chlorine dioxide sensors require 2...4 hours of stabilization time when first installed or after membrane change. Badger Meter offers a battery powered "polarizer" that can be used to stabilize a spare sensor so it is ready to run within a few minutes of installation. Polarizers simply plug into the sensor connector and require no adjustments.



Figure 2: Sensor polarizer

FLOW OPTIONS

Chlorine dioxide sensors require a steady flow of sample across the membrane at the tip of the sensing assembly. Badger Meter offers a number of options for flow cells, including the standard constant-head overflow system, a sealed flow cell for pressures up to 50 psi, and a low-volume flow cell where low sample flow is important. A 1-1/2 inch flow tee is also available for in-line applications with reliable constant flow and pressure conditions. For simplicity of installation, complete flow control assemblies are available.

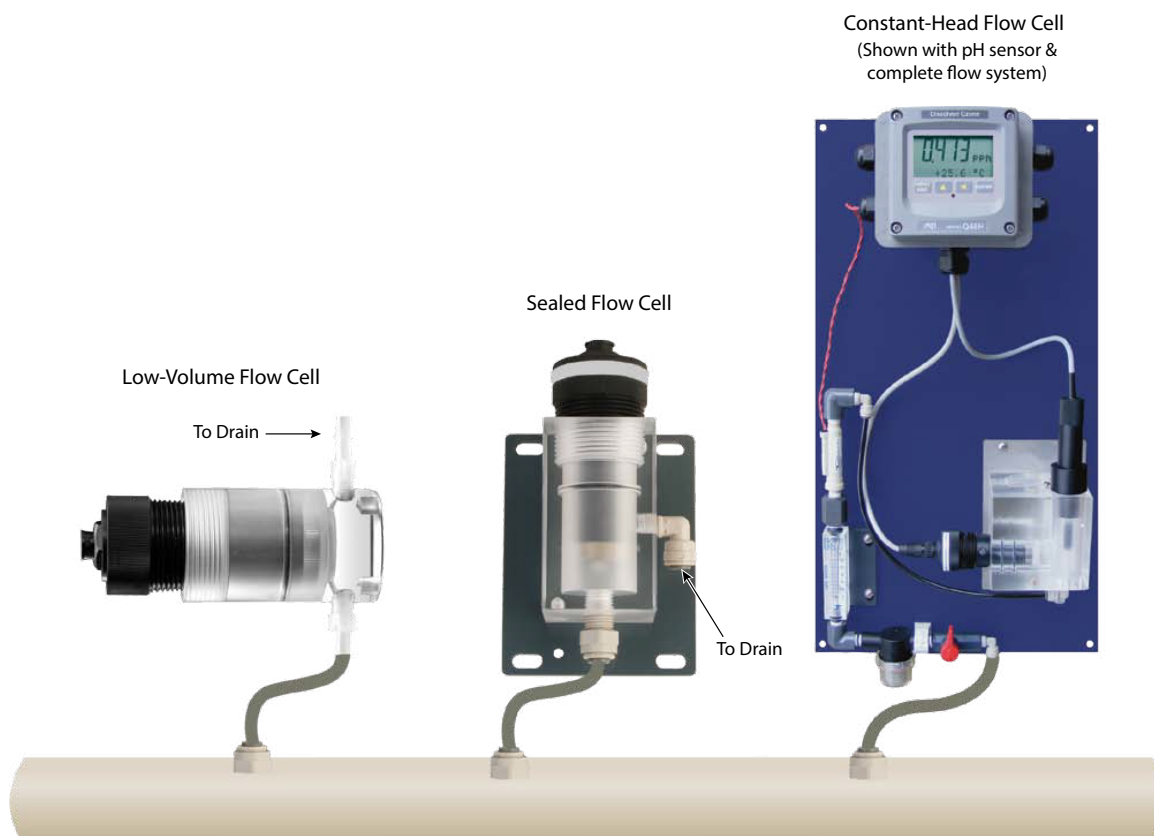


Figure 3: Flow option overview

SPECIFICATIONS

Electronic Monitor

Display Range	0...200 ppb; 0...2,000, 0...20.00 or 0...200.0 ppm
Accuracy	0.5% of selected range or 0.02 ppm
Repeatability	0.3% of selected range or 0.01 ppm
Non-Linearity	0.1 of selected range
Temperature	0.01% of span/°C
Power	100...240V AC, 50/60 Hz, 10 VA max. 12...24V DC, 500 mA max.
Analog Outputs	Two isolated 4...20 mA, 500 Ω load max. (3rd output optional)
Relay Output	Three SPDT, 6A @250V AC, 5A @ 24V DC (3 additional SPST non-isolated, 1A @ 30V DC optional)
Display	4-digit, 0.75 in. numeric LCD with 12-digital second line, LED backlight
Enclosure	NEMA 4X Polycarbonate V-0 Flammability
Operating Temperature	-4...140° F (-20...60° C)
Weight	6 lb (2.7 kg) with sensor, flow cell and accessories
Digital Output	Profibus DP, Modbus RTU, Modbus TCP/IP, Ethernet/IP, Datalogger
Zero Drift	< 0.01 ppm/month

Sensor and Flow Cell

Ozone Sensor	Membrane-Covered Amperometric (Polarographic)
Materials	PVC and 316 SS
Response Time	90% in 60 sec
Temperature Limits	32...122° F (0...50° C)
Pressure Limit	0...50 psig
Sensor Cable	25 ft (7.5 m) standard
Sensor Flow Cell	Clear acrylic constant-head overflow standard (Sealed acrylic flow cell optional)
Sample Connections	1/4 in. I.D. hose barb inlet, 1/2 in. I.D. hose barb drain for standard flow cell
Temperature Sensor	Internal Pt100 RTD

ORDERING INFORMATION

QA-A-BB-C-D-E-F Chlorine Dioxide Monitor

Suffix A - Power	
1	100...240V AC, $\pm 10\%$, 50/60 Hz
2	12...24V DC (requires 300 mA)
Suffix BB - Sensor Type	
1A	Sensor with constant-head flow cell & 25 ft (7.5 m) cable
2A	Submersible sensor with 25 ft (7.5 m) cable
3A	Sensor with sealed low-volume flow cell
4A	Sensor with 1-1/2 in. flow tee
5A	Sensor with sealed flow cell
6A	Flow sensor only, no flow cell (use with extreme caution)
WW	None
Suffix C - pH Sensor Input	
1	None
2	Q22 pH sensor w/ battery preamp, 25 ft (7.5 m) cable
3	Standard pH sensor w/ 25 ft (7.5 m) cable & adapter for overflow cell
4	Standard pH sensor w/ 25 ft (7.5 m) cable & sealed flow cell

Suffix D - Digital Output	
1	None
2	Profibus DP
3	Modbus RTU
4	Ethernet/IP
5	Modbus TCP/IP
6	Datalogger
Suffix E - Optional Output	
A	None
B	One additional 4...20 mA output
C	Three additional low power relays (SPST, 0.5 A max.)
Suffix F - System Assembly	
1	None
2	Panel w/ flow controls, w/o flow switch
3	Panel w/ flow controls, w/ flow switch

ACCESSORIES

07-0100	NEMA 4X junction box
31-0001	5-c sensor interconnect cable, max. 100 ft (O ₃ only)
31-0038	7-c sensor interconnect cable, max. 100 ft
00-0930	Mounting bracket kit for submersible sensor
00-0570	Chlorine dioxide polarizer, flow cell style
00-0571	Chlorine dioxide polarizer, submersible style
05-0094	Panel mount bracket kit
47-0005	2 in. U-bolt, 304 SS
55-0057	Fixed flow regulator, 400 cc/min. 1/4 in. inlet & outlet, Viton
03-0371	Fixed flow regulator assembly, 400 cc/min. 1/4 in. inlet & outlet

NOTES:

- All systems are supplied w/ one package of membranes, one 120 cc bottle of electrolyte and one spare parts kit containing 3 each of all O-rings and special screws.
- Suffix C, option 2, 3 or 4 allows Q46H to supply outputs for both ClO₂ and pH.
- Flow cell for ClO₂ / pH combo systems should be kept within 25 feet of monitor.
- Buffer packet for pH 4 & 7 supplied with Suffix C, option 2, 3 or 4.
- Pipe mount requires two 2-inch U-bolts (47-0005).

