



Water Quality Monitor

Q46H/79PR Total Chlorine

OVERVIEW

The Q46H/79PR Total Chlorine Measurement System is a highly versatile on-line monitoring system designed for the continuous measurement of total chlorine in solution. This direct measuring system does not require the addition of chemical reagents to measure total chlorine. The Q46H/79PR is well suited for potable water systems, water reuse systems, cooling towers, aquariums and for monitoring wastewater treatment effluents.

The basic sensing element used in the total chlorine monitor is a 3-electrode amperometric membrane sensor that measures chlorine directly. The chlorine measurement does not alter the sample or add any chemicals to the sample stream, so the water flow can return to the system if desired.

APPLICATIONS

- Potable Water Systems
- Water Reuse Systems
- Cooling Towers
- Aquariums
- Wastewater Treatment Effluents

FEATURES

- **Total Chlorine.** Membraned-covered amperometric sensor that measures total chlorine without the addition of pH buffer, iodine solution or other reagents. The total chlorine sensor can be tank mounted with a submersion assembly or it can be flow cell mounted for sampling applications.
- **Optional pH Sensor.** Active pH measurement with choice of pH sensor types. Selecting this option converts the monitor to a dual analyzer, providing 4...20 mA outputs for both chlorine and pH.
- **Flexibility.** Programmable range options from 0.1...200 ppm through three internal automatic ranges. User ranges of 2.000, 20.00 or 2000.0 ppm..
- **AC or DC Power Options.** Power options include universal 90...260V AC or 12...24V DC power supply systems. All features remain the same in both variations.
- **Analog Output Options.** Two isolated 4...20 mA outputs can be configured to track chlorine and temperature, chlorine and chlorine, or chlorine and pH. Both analog outputs can be individually programmed to fail to specific values. An optional third output is available for tracking all three parameters.



- **PID Output.** PID controller can be configured as one of the two outputs. PID includes manual operation feature and diagnostic “stuck-controller” timer feature for relay notification of control problems.
- **Digital Communications.** Available in Profibus DP, Modbus RTU, Modbus TCP/IP, Ethernet/IP or Datalogger.
- **Relay Contacts.** Three 6 amp SPDT relays are standard and two analog 4...20 mA outputs are standard. Software settings for relay control include setpoint, deadband, phase, delay and failsafe. An optional 3-relay card for 0...30V DC signals is available to bring the total to 6 relays.

SYSTEM OPTIONS

Standard Q46H/79PR systems are AC powered (90...260V AC, 50/60 Hz). A DC version (12...24V DC) is also available. The basic system includes two isolated 4...20 mA outputs and three SPDT alarm relays.

An optional pH sensor is available for pH measurement. With this sensor connected, the second analog output may be configured for pH, instead of temperature, to provide a dual chlorine/pH monitor system.

Q46H/79PR systems can also be supplied with an additional output board. This output board may contain either a third 4...20 mA output or three additional low power relays. Adding the third analog output is the most common as the system then provides isolated outputs for chlorine, pH and temperature.

In addition to the analog output options, Q46H/79PR monitors may be supplied with digital communications: Profibus DP, Modbus RTU, Modbus TCP/IP, Ethernet/IP or Datalogger.



SENSOR & FLOW CELL OPTIONS

Two types of chlorine sensors are available: one is designed for flow cell installation and the other is for submersion applications. Use the flow cell system for total chlorine monitoring below a concentration of 0.5 ppm, when possible. Good control of sample flow and pressure is important for accurate measurement. The standard constant-head flow cell should be used for most applications. A sealed flow cell is available for special applications. Consult your Badger Meter representative for application assistance.

Submersible total chlorine sensors can be used for measuring total chlorine in wastewater effluent or other open-channel applications. Direct measurement with a submersible sensor can provide a dependable monitor without all the sampling and chemicals associated with traditional total chlorine measurement.



Figure 1: Submersion and flow cell sensors



Figure 2: Constant-head flow cell



Figure 3: Sealed flow cell



Figure 4: Sensor handrail mounting



SPECIFICATIONS

Electronic Monitor

DisplayRange	0...2.000, 0...20.00 or 0...200.0 ppm
Accuracy	±0.05 ppm
Repeatability	±0.02 ppm
Zero Drift	< 0.01 ppm/month
Power	100...240V AC, 50/60 Hz, 10 VA max. 12...24V DC, 500 mA max. optional
Analog Outputs	Two isolated 4...20 mA, 500 Ω load max.
Relay Output	Three SPDT, 6A @250V AC standard (3 additional SPST low-voltage relays optional)
Display	4-digit, 0.75 in. numeric LCD with 12-digit second line, LED backlight
Enclosure	NEMA 4X (IP66) Polycarbonate
Weight	6 lb (2.7 kg) with sensor, flow cell and accessories 15 lb (6.8 kg) assembled into panel
Operating Conditions	32...122° F (0...50° C)
Digital Output	Profibus DP, Modbus RTU, Modbus TCP/IP, Ethernet/IP, Datalogger

Sensor and Flow Cell

Chlorine Sensor	Membrane-Covered Amperometric (Polarographic)
Optional pH Sensor	Combination pH sensor, with or without preamplifier
Materials	PVC and 316 Stainless Steel
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 Flow Rate	7...15 gph (0.5...1.0 lpm)



ORDERING INFORMATION

QT-A-BB-C-D-E-F Chlorine Monitor

Suffix A - Power	
1	100...240V AC, $\pm 10\%$, 50/60 Hz
2	12...24V DC (requires 300 mA)
Suffix B - 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
5A	Sensor with sealed flow cell
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
5	Q22 pH sensor, submersible

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

05-0109	Total chlorine membrane cap, pkg of 2
07-0100	NEMA 4X junction box
31-0038	7-c sensor interconnect cable, max. 100 ft
00-0628	Mounting bracket kit for submersible sensor
05-0094	Panel mount bracket kit
47-0005	2 in. U-bolt, 304 SS
55-0048	Fixed flow regulator, 400 cc/min., 1/4 in. inlet & outlet
03-0372	Fixed flow regulator assembly, 400 cc/min., 1/4 in. inlet & outlet, Buna-N

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 chlorine and pH.
- Flow cell for Cl₂ / 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).



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