

Water Quality Monitor

Q46F/82 Direct Fluoride

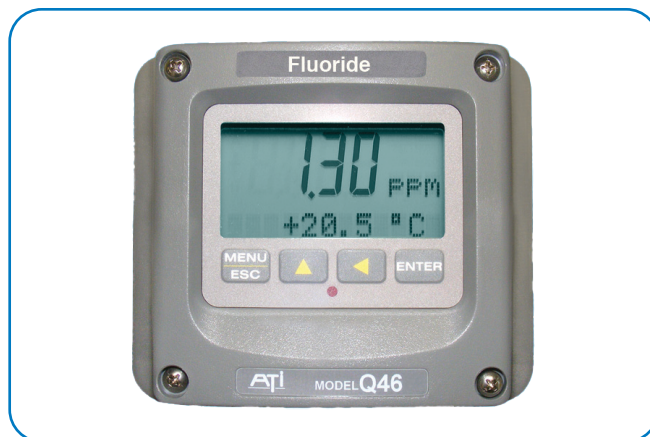
OVERVIEW

Fluoride is commonly added to drinking water to prevent tooth decay. To maintain a target fluoride concentration of approximately 1 ppm, a hydrofluorosilicic acid or sodium fluoride solution is metered into the process stream at a rate proportional to total plant flow. Flow control issues can lead to chemical feed interruption or overfeed conditions. Incorporating an on-line fluoride monitor provides continuous feedback for reliable chemical feed control and consistent fluoride concentration.

The Q46F/82 Direct Fluoride Monitor provides continuous measurement of free fluoride concentration in potable water without external sample conditioning. Utilizing a fluoride-sensitive ion selective electrode (ISE), the system delivers accurate and stable readings from 0.1...1000 ppm. This monitor is recommended for applications where sample pH and conductivity remain relatively constant. For applications with variable sample conditions, use of the Q46F Auto-Chem system with automated sample conditioning is advised.

FEATURES

- **Analog Output Options.** Two isolated 4...20 mA outputs are standard. Default setting provides analog outputs for fluoride 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.
- **Sensor Preamp.** Sensor preamplifier module in Auto-Chem enclosure supports monitor-to-chemistry unit separation up to 300 feet.
- **Relay Outputs.** Three SPDT relays are standard, with relay functions programmable for alarm, control or trouble indication.
- **Flexible Mounting.** NEMA 4X (IP66) enclosure is suitable for wall, pipe or panel mounting.
- **Clear 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

- Potable Water

SENSOR OPERATION

The basic sensing element used in the monitor is a fluoride ion selective electrode (ISE). This sensor contains a lanthanum fluoride crystal that generates a voltage proportional to the activity of fluoride ion in solution. A silver/silver chloride reference electrode contained in the same sensor body provides the second half of the measurement cell. Because ISE electrodes respond to activity rather than concentration, the response is slightly affected by changes in sample pH and conductivity, but these effects are quite small on samples from relatively stable water sources such as well water.



Figure 1: Fluoride sensor

SPECIFICATIONS

Electronic Monitor

Display Range	0...20.00 ppm min., 0...2000 ppm max.
Accuracy	±1 mV concentration equivalent (0.1 ppm @ 1 ppm, 0.5 ppm @ 10 ppm)
Repeatability	±0.5 mV concentration equivalent
Drift	<0.5 ppm per month on 20 ppm scale (stable pH and conductivity)
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.
Relays	Three SPDT, 6 A @ 250V AC, 5 A @ 24V DC
Digital Output	Options for Profibus DP, Modbus RTU, Modbus TCP/IP, Ethernet IP or Datalogger
Display	4-digit, 0.75 in. numeric LCD with 12-digital second line, LED backlight
Enclosure	NEMA 4X (IP66) Polycarbonate, V-0 Flammability
Operating Temperature	Electronics: -4...140° F (-20...60° C)

Sensor

Fluoride Sensor	Combination fluoride ISE sensor
Sensor Cable	10 ft (3.1 m) standard
Response Time	T ₉₀ = 60 seconds
Measurement Chamber	Cast acrylic
Inlet Sample Flow Rate	1...6 gph through flow cell (0.06...0.40 lpm)
Sample Inlet	1/4 in. O.D. instant tube fitting
Sample Outlet	1/4 in. O.D. instant tube fitting
Operating Temperature	36...122 F (2...50° C)
pH Range	5...9 pH but stable to ±0.2 pH
Conductivity	Stable to ±50 µS
Inlet Pressure	Control to <5 psi (0.3 bar) 5...150 psi (0.3...10 bar) for flow plate assembly

ORDERING INFORMATION

QC-A-B-C Fluoride Monitor

Suffix A - Power	
1	100...240V AC ±10%, 50/60 Hz
2	12...24V DC, requires 300 mA
Suffix B - Digital Output	
1	None
2	Profibus DP
3	Modbus RTU
4	Ethernet/IP
5	Modbus TCP/IP
6	Datalogger
Suffix C - System Assembly	
1	None ¹
2	Panel with flow controls, without flow switch
3	Panel with flow controls, with flow switch

¹ Sensor and flow cell only. Customer flow control required.

ACCESSORIES

09-0066	Fluoride standard, 100 mg/L, 120 mL
09-0067	Fluoride standard, 1000 mg/L, 120 mL
09-0028	Q46F fluoride buffer, one gallon bottle (powder only)
05-0108	Fluoride standards dilution kit
63-0108	Fluoride sensor (spare)
05-0093	Q46 Enc. mounting/gland seal kit



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