

Water Quality Monitor

Q46S/81 Dissolved Sulfide

OVERVIEW

Sulfides can be found naturally in well water and can build up in wastewater collection systems due to anaerobic conditions frequently found there. In addition, sulfides are used in mercury removal processes and are frequently found in tanning wastes. In drinking water systems, sulfides cause taste and odor problems. And in wastewater systems, sulfides cause damage to concrete structures in collection systems and contribute to odor problems in treatment facilities.

Measurement of dissolved sulfide concentrations has been done primarily by the use of analyzers employing ion selective electrodes (ISE) for sensing. While providing adequate sensitivity, ISE-based systems require frequent zero and span adjustments to maintain measurement accuracy. Because of this, most ISE-based monitoring systems are relatively expensive and require frequent service.

Badger Meter's Q46S/81 Dissolved Sulfide Monitor provides an improved method for measuring sulfides in solution.

FEATURES

- **Sulfide Measurement.** Sulfide ion is measured selectively by conversion to hydrogen sulfide.
- **Gas Phase Sensing.** Measurement is made without contact between sample and sensor, eliminating the potential for sensor fouling.
- **Chemistry Module Power Options.** Power options include 115 or 230V AC, 50/60 Hz.
- **Three Control Relays.** Relays are programmable for setpoint, deadband and time delay.
- **Sample Line Cleaning.** Internal sequencing and relay system for automated sample line cleaning.
- **Flexible Mounting.** NEMA 4X (IP66) enclosure is suitable for wall, pipe or panel mounting.
- **Digital Communications.** Available in Profibus DP, Modbus RTU, Modbus TCP/IP, Ethernet/IP or Datalogger.
- **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

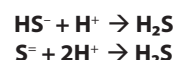
- Well Water
- Wastewater
- Tanning Waste



THEORY OF OPERATION

Because measuring the sulfides in a solution using an ISE is relatively difficult, the Q46S/81 monitor takes a different approach to the measurement, employing a unique gas-phase method to continuously monitor sulfide without contact between the sensor and the water sample.

In operation, a small amount of sample is pumped into the system and mixed with acid. In acidic solution, the sulfide ion is converted to hydrogen sulfide gas as follows:



The mixed sample flows into a special chamber where the hydrogen sulfide is stripped from the sample. A gas conditioning module prepares the gas sample for measurement prior to contact with a special H₂S gas sensor designed for the system. Sensor signals are amplified and displayed on a large-format, backlit LCD display in the Q46S electronics unit.

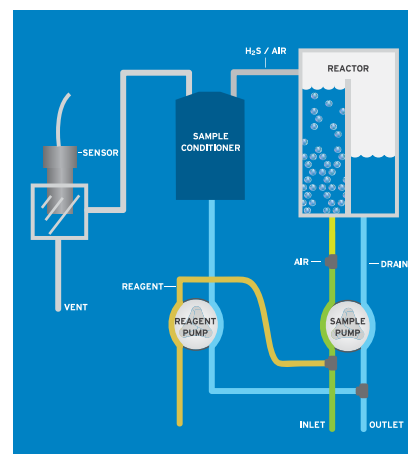


Figure 1: Submersion and flow cell sensors

SENSOR STABILIZATION

A sample inlet overflow block is provided on the bottom of the chemistry module. Sample is connected using 1/4-inch I.D. flexible tubing, with a recommended flow rate of 5–20 gallons per hour. While the monitor uses only a small fraction of this sample, the higher flow keeps sample delivery times to a minimum. Excess sample simply overflows to a gravity drain chamber requiring a 1/2-inch I.D. flexible tube.

Sulfide monitoring systems are extremely easy to operate and maintain, with acid usage of one gallon every 25 days at standard flow rates. Sample and acid are pumped using long-life peristaltic pump tubing that requires replacement approximately every 6 months. Pump heads are designed for easy tube changes, requiring about 10 minutes to replace both pump tubes. The sulfide sensor requires no maintenance other than an occasional visual inspection to insure that no deposits have collected due to airborne particulates.

The gas stripping technique for monitoring sulfide in solution provides an extremely sensitive on-line monitor. Measurements down to low parts-per-billion can be done easily, and zero and span stability inherent in the sensor allow for monthly calibration cycles.

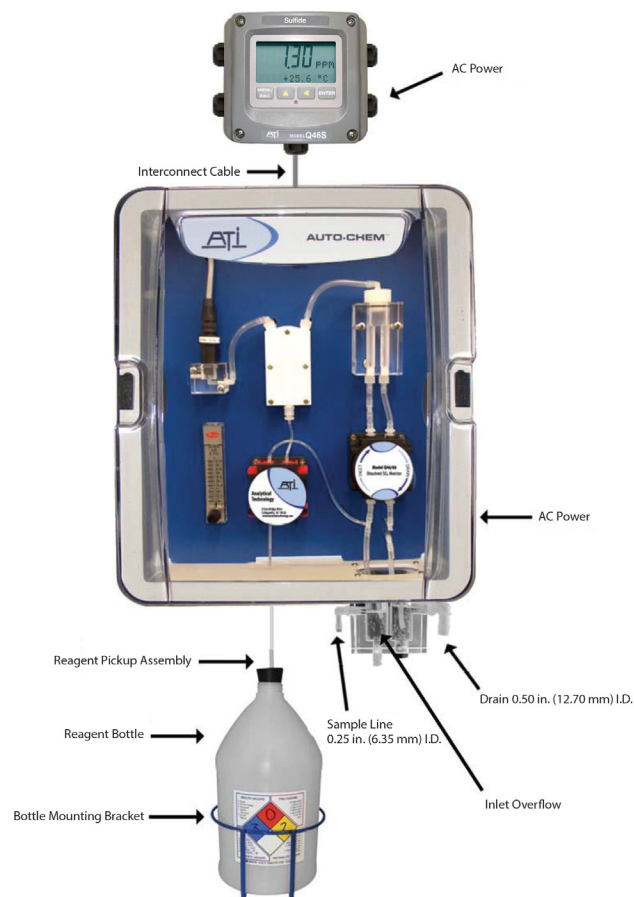


Figure 2: Dissolved sulfite typical system

SPECIFICATIONS

Electronic Monitor

Display Range	0–2.000 or 0–20.00 ppm
Accuracy	±0.002 ppm
Repeatability	±0.002 ppm
Linearity	0.5° of F.S.
Zero Drift	< 0.005 ppm/month
Power	100–240V AC, ±10°, 50/60 Hz
Analog Outputs	Two isolated 4–20 mA, 500 Ω load max.
Relays	Three SPDT, 6A @250V AC, 5A @ 24V DC
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	–4 to 140° F (–20 to 60° C)
Weight	2.5 lb (1.1 kg)
Digital Output	Profibus DP, Modbus RTU, Modbus TCP/IP, Ethernet/IP, Datalogger

Chemistry Module

Sulfite Sensor	Membraned H ₂ S Gas Sensor
Sensor Cable	25 ft (7.5 m) standard, 100 ft max.
Response Time	95% in 3 minutes
Sample Pump	Internal tubing pump, 7 cc/min
Acid Pump	Internal tubing pump, 0.1 cc/min
Air Supply	Diaphragm air pump with precision flow control
Air Stripping Chamber	Cast acrylic
Inlet Sample Flow Rate	5–20 gph at inlet overflow assembly
Sample Inlet	1/4 in. I.D. hose barb
Sample Drain	1/2 in. I.D. hose barb
Power	115 or 230V AC (customer specified)
Operating Temperature	36 to 122° F (2 to 50° C)
Enclosure	Kydex with acrylic cover, V-0 Flammability
Weight	15 lb (6.8 kg)

ORDERING INFORMATION

QM-A-B Dissolved Sulfide Monitor

Suffix A - Power	
8	115V AC, 50/60 Hz
9	230V AC, 50/60 Hz
Suffix B - Digital Output	
1	None
2	Profibus DP
3	Modbus RTU
4	Ethernet/IP
5	Modbus TCP/IP
6	Datalogger

ACCESSORIES

31-0038	Sensor interconnect cable (max. 100 ft)
47-0005	2 in. U-bolt, 304 SS
05-0094	Panel mount bracket kit



