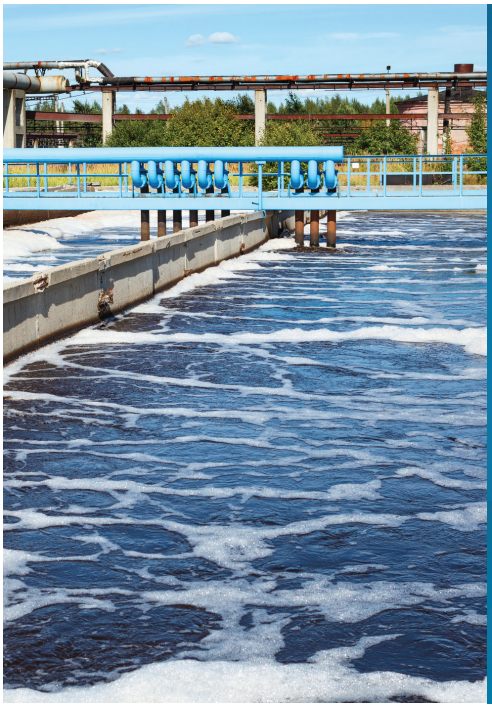
SuspendedSolids**Monitor**

Model Q46/88



Suspended Solids Sensor

The Model Q46/88 is an on-line monitoring system designed for the continuous measurement of suspended solids in water. It is intended for continuous monitoring of aeration tank mixed liquor, clarifier effluent, industrial process water, and other applications containing relatively high levels of suspended solids.

The system provides measurement over one of three selectable operating ranges, 0-100.0 mg/L, 0-1000 mg/L, or 0-10.00 g/L. The sensing element used for suspended solids measurement is an optical sensor measuring infrared “backscatter”, a method suitable for high solids levels. For applications where sensor fouling is frequent, an Auto-Clean version of the system is available that uses ATI’s Q-Blast air cleaner assembly.

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SENSOR OPERATION

Suspended solids sensors are optical devices operating in the infrared region. Unlike turbidity sensors that use 90 degree scatter to optimize sensitivity, suspended solids sensors use “backscatter” to allow solids measurements at much higher levels. Operation with infrared light ensures very long sensor life and minimizes the effects of changing sample color.

Sensors are designed to withstand the rigorous conditions of wastewater and industrial process streams, and to provide years of service with nothing more than occasional cleaning of the sensing surface. The sensor has no protruding surfaces near the sensing element to prevent accumulation of fibrous materials. The sensor is easily pipe mounted using mounting adapters available from ATI.

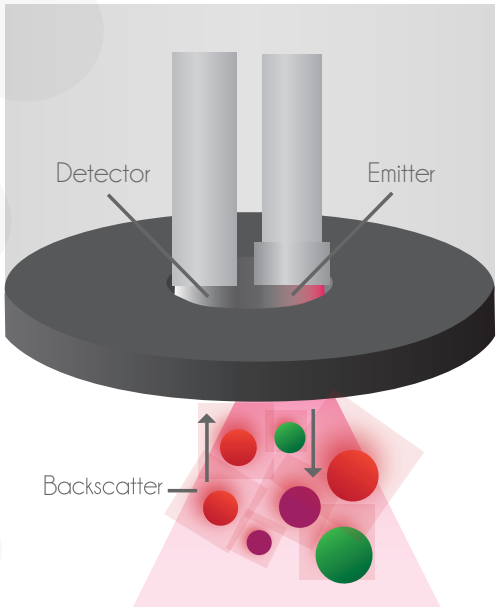
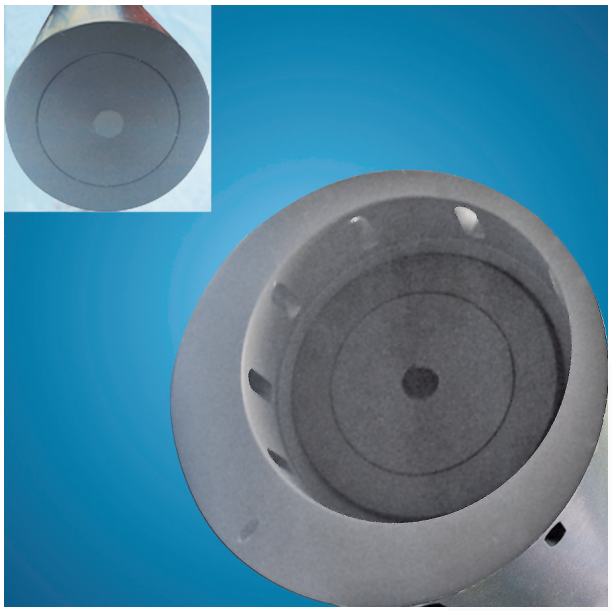


Diagram Cross-Section



Auto-Clean Suspended Solids Sensor

FEATURES

Flexibility. Wide range capability, with selectable ranges of 0-100.0 mg/L, 0-1000 mg/L, or 0-10.00 g/L provide maximum application flexibility.

Sensor Diagnostics. System automatically checks for sensor fouling, “dry cell”, and light source intensity.

Auto-Cleaning. Automatic “Air Blast” sensor cleaning system available for reducing maintenance in applications where sensor fouling is a problem.

AC or DC Power Options. Power options include universal 100-240 VAC +/- 10%, or 12-24 VDC.

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 suspended solids and temperature.

Extra Outputs. Expansion board to add a third 4-20 mA analog output or to add three additional non-isolated low power relays.

PID Output. Standard PID control function assignable to one analog output.

Relay Contacts. Three SPDT relays are standard, with relay functions programmable for alarm, control, or trouble indication. Three additional low power relays available as an option.

Clear Display. Back-lit large LCD display provides clear visibility in any lighting condition. A scrolling second line on the display provides additional information and programming prompts.

Digital Communications. Communication options for Profibus-DP, Modbus-RTU, Modbus-TCP/IP or Ethernet-IP.

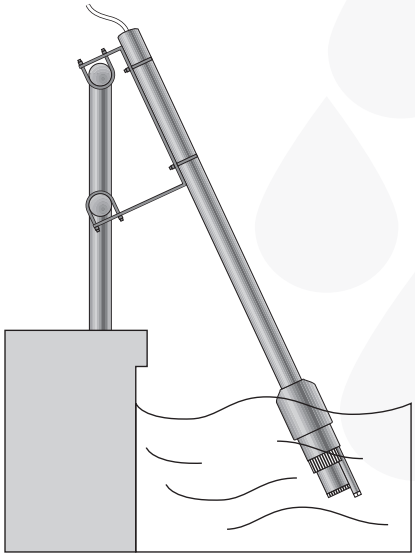
Flexible Mounting. NEMA 4X (IP-66) enclosure is suitable for wall, pipe, or panel mounting.

INSTALLATION

The monitor should be mounted within the maximum sensor cable length. Locating the sensor within 25 feet of the monitor is generally preferred for ease of operation and calibration. Distances greater than 25 feet require a junction box and interconnect cable.

Most applications for suspended solids monitoring are done using a submersible sensor coupled to a 1" pipe. This method can be used where flow is reasonably constant, and hydraulic head is seemingly consistent.

Auto-Clean sensors are mounted to a 1" pipe using a standard 1" NPT thread by 2" NPT thread pipe coupling. The mounting pipe can be secured to standard 1½" or 2" pipe rail using a mounting bracket kit available from ATI.



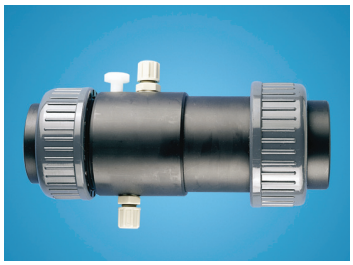
SENSOR CLEANING OPTION

Optical sensors used for monitoring biologically active systems such as aeration tanks or aerobic digesters will require periodic cleaning to maintain the integrity of the measurement. Biological slime deposited on the optical surface will degrade the ability to transmit IR light into the sample. The frequency of cleaning varies widely depending on the turbulence in the process.

Cleaning can be done manually by simply wiping the sensor as needed, but ATI also offers an automatic air-blast cleaning system as an option. The "Q-Blast" air cleaning system is controlled by the Q46/88 Suspended Solids Monitor and provides a compact air compressor system that periodically applies pulses of compressed air across the optical surface to remove accumulated biofouling. This system greatly reduces the requirement for manual maintenance, with cleaning frequency programmed to occur as often as necessary.

APPLICATION OPTIONS

For applications where a sample is coming off a pressurized pipe, the suspended solids sensor can be used in one of two available flowcells. For applications where suspended solids are generally less than 1000 mg/l, a flowcell with 1/4" I.D. inlet and outlet fitting can normally be used. For suspended solids applications running in the 1000 to 10,000 mg/l range, a 1 1/2" flow tee provides a much larger flow path to avoid plugging problems. The flowcell is suitable for flowrates up to 0.5 GPM (1.9 LPM) while the 1 1/2" flow tee can handle 10 GPM (38 LPM).



Flowcell Assembly

1 1/2" Flow Tee

Q46/88 **SPECIFICATIONS**

ELECTRONIC MONITOR

Display Range	0-100.0 / 0-1000 mg/L, 0-10.00 g/L
Accuracy	2.0% of selected range
Repeatability	1.0% of selected range
Non-Linearity	2% of selected range
Temperature Drift	0.01% of span/°C
Power	100-240 VAC, +/- 10%, 50/60 Hz 12-24 VDC, 500 mA max.
Analog Outputs	Two isolated 4-20 mA, 500 Ω load max. (3rd output optional)
Relays	Three SPDT, 6A @250 VAC, 5A @24 VDC (3 additional SPST non-isolated, 1A @30 VDC optional)
Display	4-digit, 0.75" numeric LCD with 12-digital second line, LED back light.
Enclosure	NEMA 4X Polycarbonate V-0 Flammability
Operating Conditions	-20 to 60°C (-4 to 140°F)
Weight	6 lbs. (2.7 kg) with sensor, flowcell and accessories
Digital Output	Profibus DP, Modbus RTU or TCP/IP, or Ethernet IP
Mounting	Wall mounting kit standard, Panel mount bracket and pipe u-bolts available
Size	5.6"W x 4.9"H x 6.4"D

SENSOR

Sensor Type	Optical Backscatter
Materials	PVC
Measurement Angel	180° Backscatter
Response Time	95% in 60 seconds
Temperature Limit	0-50°C
Sensor Cable	4-conductor sensor cable, 30 ft standard, 350 ft max
Pressure Limit	100 PSIG max.
Temperature Element	Integral to Sensor

ORDERING INFORMATION

Model Q46/88 A-B-C-D Suspended Solids

Suffix A - Power
1 - 100-240 VAC, +/-10%, 50/60 Hz
2 - 12- 24 VDC, (requires 300 mA)
3 - 100-240 V +/- 10%, 50/60 Hz with Q-Blast Auto-Clean Assembly
4 - 12-24 VDC with Q-Blast Auto-Clean Assembly (requires 1.0 A)

Suffix B - Sensor Type
1 - Submersible SS sensor with 30 ft. (10m) cable
2 - Auto-Clean Submersible SS sensor with 30 ft. (10m) cable
3 - SS sensor with 1 1/2" flow tee
4 - SS sensor with high solids flowcell

Suffix C - Optional Output
1 - None
2 - One additional 4-20mA output
3 - Three additional low power relays (SPST, 0.5A Max) -
Required when options A3 or A4 is selected.

Suffix D - Digital Output
1 - None
2 - Profibus-DP
3 - Modbus-RTU
4 - Ethernet-IP
5 - Modbus TCP/IP

ACCESSORIES

00-1637 Q-Blast system plate assembly with power junction box
00-0628 Submersion mounting bracket kit for standard sensors
07-0100 Universal Junction Box, NEMA 4X
31-0001 5 conductor sensor interconnect cable (max. 1000 ft.)
00-0624 Mounting bracket kit for auto-clean sensor
00-1689 Pipe adapter for standard sensor
45-0043 Pipe adapter for auto-clean sensor
05-0094 Panel mount bracket kit
47-0005 2" U-bolt, 304SS
00-0930 Auto-Clean Monitor Mounting Bracket

NOTES:

1 - Pipe mount requires two 2" U-bolts (47-0005)

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