

Water Quality Monitor

Q46UV

OVERVIEW

Water quality monitoring continues to grow in importance as water sources come under increasing pressure. Conventional measurements of turbidity, pH, conductivity and color provide useful information but do not reflect changes in dissolved organic constituents. Many of these dissolved organic compounds absorb UV energy. A UV-254 absorption measurement has increasingly become a useful indicator of organic carbon content, providing operators with real-time information on contaminant levels.

The Q46UV monitor is an on-line monitoring system designed for the continuous measurement UVA (Absorbance) or UVT (Transmittance) in water or wastewater systems. In addition, the monitor also measures turbidity, providing simultaneous measurement of two important water quality indicators. Monitors may also display DOC (Dissolved Organic Carbon) instead of UVA or UVT.

The full scale operating range for UVA measurement is 0–1.3 ABS and for UVT is 0–100% T. The overall range of the turbidity measurement is 0.2–1000 NTU. Analog outputs for both UV and turbidity may be scaled for much lower overall ranges depending on application requirements.

Q46UV Monitors are available in two electronic versions: an AC powered monitor with integral alarm relays and dual 4–20 mA output capability, and a 12–24V DC unit with dual output and relays. Options are available to add either a third 4–20 mA output or 3 additional low power SPST relays. Low power relays are required for installations using Badger Meter's automatic chemical cleaning system. In addition, a digital output option for Profibus, Modbus, or Ethernet is available.

FEATURES

- Long life pulsed UV LED for extended service life
- 20 mm measurement path for high sensitivity
- 860 nm IR turbidity measurement (ISO-7027)
- IR sensor measures both 90° scatter and absorption
- Analog outputs for both UVA and turbidity
- User editable table for UVA vs DOC/TOC/COD/BOD
- Automatic sensor fouling compensation
- Optional 3rd output for DOC
- Optional chemical cleaning (Q-Clean) system



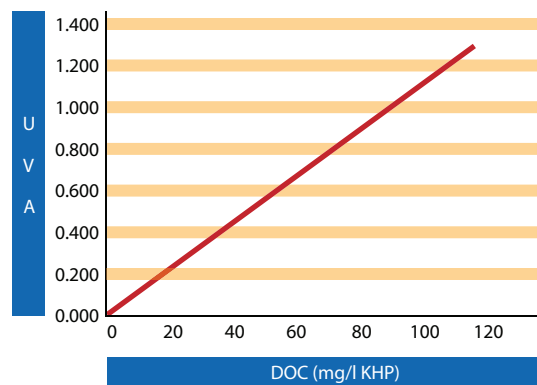
APPLICATIONS

- Raw Water
- Treated Water
- Recycled Water
- Wastewater Effluents

DISSOLVED ORGANIC CARBON

UV-254 measurements are a practical indicator of dissolved organic compounds in water. Traditional methods such as TOC, COD, and BOD all capture more organics and other potential contaminants but have the drawback of being expensive and maintenance intensive. In fact, most are done only in the laboratory due to the complexity of on-line systems.

UV-254 measurement is much simpler and can be correlated to DOC levels. It has the advantage of being nearly real time, providing input to treatment control systems and alarming of abnormal conditions. Routine maintenance consists of cleaning the optical surfaces, which is generally simple and quick.



UV & TURBIDITY OPTICS

The Q46UV sensor provides additional optical measurements for added measurement capabilities and increased reliability. Infrared sensors for measuring both 90° Scatter Turbidity and IR absorption are built into the UVA sensor. These additional optics allow for the measurement of both UV-254 and turbidity, a unique capability to enhance the usefulness of the monitoring package, especially in raw water monitoring applications. The IR absorption measurement is used to correct measurements for minor optical fouling that can occur over weeks or months of operation.

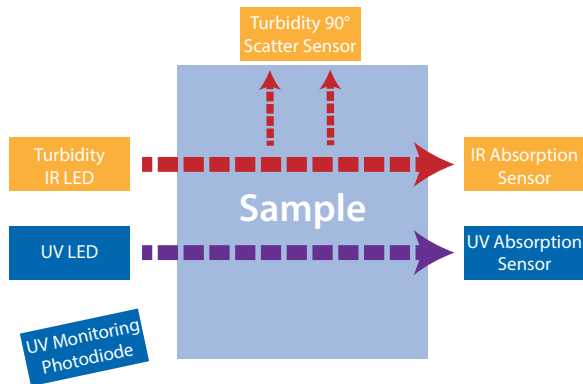


Figure 1: Sample of optics

AUTOMATIC SENSOR CLEANING

Sensors in contact with raw or settled water samples may experience fouling from iron and manganese. Pre-chlorination causes iron and manganese to precipitate out of solution and coat surfaces that are in contact with the sample. While manual sensor cleaning is easy, Badger Meter offers Q-Clean, an automatic sensor cleaning system that reduces user maintenance.

The cleaning system consists of an automatic sensor wash system that injects a cleaning solution into the sensor flow chamber at the frequency programmed by the operator. The cleaning solution contains chemicals that dissolve iron and manganese that has accumulated on optical surfaces. The duration of the cleaning cycle is about 15 minutes but can be changed by the operator to meet specific application requirements.



Figure 2: Automatic sensor cleaning

SPECIFICATIONS

Electronic Monitor

Measurement / Range	UVA (0–1.3 ABS), UVT (0–100%), SUVA Surrogate measurements DOC, TOC, BOD, COD Turbidity: 0–4000 NUT IR: 90° scatter per ISO-7027
Accuracy	±0.5% UVT
Repeatability	±0.05% UVT
Wetted Materials	Anodized aluminum sensor (20 mm optical path) PVC flow cell
Response Time	90% in 3 minutes
Power	100–240V AC, 50/60 Hz, 10 VA max. 24V DC optional
Cleaning	Standard: Manual cleaning Optional: Q-Clean cleaner system
Optical Sources	254 nm UV LED and Narrow 254 nm filter photodiode 780 nm IR LED for turbidity
Dimensions	Probe diameter: 1.54 in. (39 mm), Probe length: 6.3 in. (160 mm) Controller: 5.6 × 4.9 × 6.6 in. (142 × 125 × 168 mm)
Display	4-digit, 0.75 in. numeric LCD with 12-digital second line, LED backlight
Sensor Temperature Limits	Operating: 36 to 113° F (2 to 45° C) Storage: –40 to 158° F (–40 to 70° C)
Readout Temperature Limits	Operating: –13 to 140° F (–25 to 60° C) Storage: –40 to 158° F (–40 to 70° C)
Enclosure	Probe: NEMA 6P (IP68) Control unit: NEMA 4X (IP66)
Analog Outputs	Two isolated 4–20 mA, 500 Ω load max. UVA + Turbidity, DOC or Temperature NOTE: A third 4–20 mA output is supplied if the Q-Clean is not used.
Relay Outputs	Three SPDT, 6 A @ 250V AC, 5 A @ 24V DC
Optional Cleaner Relays	Three low power relays for cleaner system control

ORDERING INFORMATION

Q46UV-A-B-C-D Monitor

Suffix A - Power	
1	100–240V AC, $\pm 10\%$, 50/60 Hz
2	12–24V DC (requires 300 mA, 600 mA with Q-Clean)
Suffix B - Sensor Type	
U3	Sensor, flow cell, Q-Clean
U4	Flow sensor, flow cell on Calibration panel
2A	Submersible sensor, 25-ft cable
5A	Sensor, sealed flow cell
WW	None
Suffix C - Digital Output	
1	None
2	Profibus DP
3	Modbus RTU
4	Ethernet/IP
5	Modbus TCP/IP
6	Datalogger
Suffix D - Optional Output	
A	None
B	One additional 4–20 mA output
C	Three additional low power relays

ACCESSORIES

00-1690	Sensor submersion mounting bracket kit
00-1689	1 in. mounting adapter for standard sensor
07-0100	Universal junction box, NEMA 4X
31-0185	4-conductor interconnect cable, specify length, 500 ft. max.
05-0094	Panel mount bracket kit
47-0005	2 in. U-bolt, 304 stainless steel