

Water Quality Monitor

Q46C2 2E Resistivity Monitor

OVERVIEW

Trace Contamination Detection

Low-level conductivity measurements are essential for monitoring a variety of high purity water systems. The proper operation of deionizers, reverse osmosis membranes, ion exchange systems, and heat exchangers require constant monitoring to provide high quality production.

The Q46C2 Conductivity monitor provides the reliable and accurate low-level measurements required for such high purity water systems. Monitors provide large, easy-to-read LCD displays with a second display line for indication of temperature or other operational information. And for those applications where results in resistivity units are preferred, Q46C2 monitors can be programmed to display readings in Meg-ohm units instead of microSiemens.

INSTALLATION

2-Electrode conductivity sensors can be installed in a variety of ways, including simple 1 inch pipe tees, union-mount pipe assemblies, and sanitary-style pipe clamps. The method used depends on specific application requirements.



Figure 1: 2-Electrode sensor

Regardless of the mounting method, 2-Electrode conductivity sensors should always be mounted so that the sensing electrodes at the tip of the sensor are completely immersed in the process water. It is best to have sample flow directed at the sensor, but in all cases the sensor should not be mounted at the top of a horizontal pipe run to avoid entrained air problems.

CONCENTRATION/TDS MONITOR

Q46C2 monitors can also be configured to measure and display the concentration of chemicals used in various process applications. The user defined concentration table requires data on both concentration vs. conductivity and temperature vs. conductivity for the chemical of interest. You can enter six data points each for concentration and conductivity within the specified measuring range. Temperature compensation can either be made by custom compensation table or a single linear compensation factor.

For applications where there are several chemicals dissolved in solution, the Q46C2 monitor can be configured to measure and display the concentration of total dissolved solids (TDS). You simply enter the TDS factor that best converts the process conductivity into concentration units. Temperature compensation can either



be made by custom compensation table or a single linear compensation factor.

FEATURES

- **Adaptability.** Concentration version for direct display of chemical concentrations. Also available in a TDS (Total Dissolved Solids) version.
- **Customized Response.** A user configurable table for a custom concentration curve is available.
- **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 conductivity and temperature.
- **Extra Outputs.** Expansion board to add a third 4...20 mA analog output.
- **AC or DC Power Options.** Power options include universal 100...240V AC $\pm 10\%$ or 12...24V DC.
- **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.
- **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.
- **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.



Badger Meter

THERMAL STABILITY

2-Electrode conductivity sensors are designed using electrodes with large surface areas and electrode insulators with a low coefficient of thermal expansion. This type of construction allows the sensor to be used over a wide temperature range without significant change in the sensor cell constant. By maintaining the integrity of the cell constant, the 2-Electrode system provides a highly reliable conductivity measurement over a wide temperature range.



Figure 2: Inline sensor



Figure 3: 1-1/2 inch Sanitary sensor



Figure 4: Submersible sensor

SENSOR CELL CONSTANTS

2-Electrode conductivity sensors are classified by “cell constant” or “K.” The K value for a specific sensor relates to the electrode geometry. A sensor with a low K value is designed to provide high accuracy in low conductivity waters. However, the low K sensor is a poor choice for use in higher conductivity waters, as the response to changing conductivity becomes non-linear. A sensor with a higher K value, on the other hand, provides better accuracy in higher conductivity waters, but performs poorly in low conductivity waters. The Q46C2 system offers two sensor cell constants for use in the indicated conductivity ranges.

0.05 K Sensor: 0...2,000, 0...20.00 or 0...200.0 μS ; 0...20.00M Ω or 0.200.0 k Ω

0.50 K Sensor: 0...20.00, 0...200.0 or 0...2000 μS

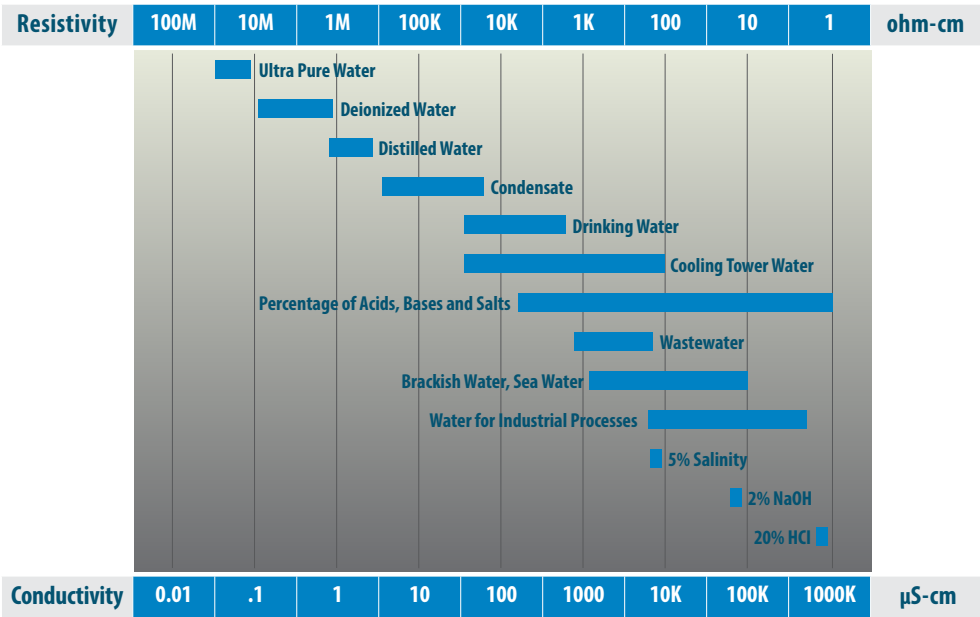


Figure 5: Conductivity ranges of typical solutions

SPECIFICATIONS

Electronic Monitor

Display Range	0...2.000 / 20.00 / 200.0 / 2000 µS
Accuracy	0.1% of selected range
Repeatability	0.1% of selected range
Non-Linearity	0.1% of selected range
Temperature Drift	0.03% of span/°C
Power	100...240V AC, ±10%, 50/60 Hz, 10 VA max. 12...24V DC, 500 mA max.
Analog Outputs	Two isolated 4...20 mA, 500 Ω load max. (3rd output optional)
Relays	Three SPDT contacts rated 6 amp @ 250V AC, 5 amp @ 24V DC (3 additional low power SPST non-isolated relays optional)
Display	4-digit, 0.75 in. numeric LCD with 12 character second line, LED backlight
Enclosure	NEMA 4X polycarbonate V-0 flammability
Operating Conditions	–4...140° F (–20...60° C)
Weight	6 lb (2.7 kg) with sensor
Sensitivity	0.05% of span
Digital Output	Profibus DP, Modbus RTU, Modbus TCP/IP, Ethernet/IP, Datalogger
Mounting	Wall mounting kit standard; panel mount bracket and pipe U-bolts available
Size	5.6 in. W × 4.9 in. H × 6.4 in. D (142.2 mm × 124.5 mm × 162.6 mm)

Sensor

Sensor Type	2-electrode
Materials	Titanium; PEEK
Cable Length	15 ft (4.6 m) standard, 60 ft (18.3 m) max. with junction box
Temperature Limits	14...257° F (0...125° C)
Pressure Limit	100 psig max.
Connection	1/2 in. NPT or 1/2 inch sanitary style
Temperature Element	Pt1000 RTD

NOTES:

- All sensor cable lengths greater than 30 feet require a junction box (07-0100) and sensor interconnect cable (31-0057).
- Pipe mount requires two 2-inch U-bolts (47-0005).
- Sensor types 22 and 23 are not for use in extremely wet environments.

QX-A-B-C-D-E-F 2-Electrode Monitor

Suffix A - Power	
1	100...240V AC, $\pm 10\%$, 50/60 Hz
2	12...24V DC (requires 500 mA)
Suffix B - Sensor Type	
WW	None
21	0.05 Cell, titanium, 1/2 in. NPT compression fitting
22	0.05 Cell, titanium, 1/2 in. fitting, with connector (Requires cable option QE)
23	0.50 Cell, titanium, 1/2 in. fitting, with connector (Requires cable option QE)
24	0.50 Cell, titanium, 1/2 in. compression fitting
25	0.50 Cell, 316SS, 1/2 in. sanitary fitting
26	0.05 Cell, 316SS, 1/2 in. sanitary fitting
27	0.05 Cell, titanium, submersible
28	0.50 Cell, titanium, submersible
Suffix C - Cable Length	
AC	15 ft
QE	25 ft Quick release plug
AF	30 ft
WW	None

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
Suffix F - Measurement Type	
1	Conductivity
2	Concentration

ACCESSORIES

07-0100	Universal Junction Box, NEMA 4X
31-0057	Sensor interconnect cable
05-0094	Panel mount bracket kit
47-0005	2 in. U-bolt, 304SS
07-0201	1/2 DIN panel mount kit
51-0067	Conductivity Standard - 10 μ S, package of 6 100 cc bottles
09-0046	Conductivity Standard - 84 μ S, 500 mL

CERTIFICATION