

# Multi-Parameter Electrochemical / Optical Water Quality System

- COMPLETE SYSTEM INCLUDES sensors, cable, and instruments.
- MEASURES pH, ORP, Conductivity, Temperature, Free Chlorine, Monochloramine, Dissolved Oxygen, and Turbidity.
- VARIOPOL QUICK-DISCONNECT FITTINGS make replacing sensors easy.
- MULTIPLE INSTRUMENT PLATFORM CHOICES.
- FEATURE-PACKED INSTRUMENTS: dual outputs, three fully-programmable alarm relays, two-line display, HART® or FOUNDATION fieldbus® digital communications.



## FEATURES

The Model WQS water quality system is intended for the determination of pH, ORP, conductivity, temperature, free chlorine or monochloramine, oxygen, turbidity, and particle index in fresh water. The system combines user-specified instruments and sensors to create a customized system for monitoring water quality. Unlike systems from other manufacturers, the Model WQS does not use expensive sample conditioning systems or messy reagents.

Model WQS systems require less than 3 gph (183 mL/min) sample flow. There is little waste, which is important in areas where water is scarce or a sewer is not available.

### Designed for quick startup and low maintenance

- No reagents — free chlorine and monochloramine sensors are completely reagent-free
- Variopol quick disconnect sensors
- Prewired and plumbed
- Low sample flow; <3gph (183 mL/min)

### Multiple Instrument choices

- Analog outputs
- Digital outputs: HART, Foundation fieldbus
- 115/230VAC powered
- 24VDC loop powered
- Alarms/relay contacts

### Ideal for continuous monitoring of water distribution systems:

- Provides constant surveillance of water quality events that may affect the security of your distribution network.
- Helps ensure acceptable water quality parameters are maintained throughout the distribution system.
- Assists in meeting the requirements of the Surface Water Treatment Rule

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® HART is a registered trademark of the HART Communication Foundation.

## APPLICATIONS

Rosemount Analytical recognizes that a “one size fits all” approach to water quality monitoring does not provide the most efficient or economical solution to your needs. That is why Rosemount Analytical offers a flexible approach that lets you choose the analyzers you want to make the measurements you need. We offer platforms that range from basic analog output instruments to transmitters with digital outputs powered by solar energy. Through our Emerson Process Solutions Group we can provide wireless solutions and control systems that allow you to look at each parameter from a central location.

## ELECTROCHEMICAL MEASUREMENTS AVAILABLE

- pH
- ORP
- Conductivity
- Free Chlorine
- Monochloramine
- Dissolved Oxygen

## OPTICAL MEASUREMENTS AVAILABLE

- Turbidity

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# WATER QUALITY FLOW SYSTEM SPECIFICATIONS

**Sample Inlet:** 1/4 inch OD tubing compression fitting or 1/4 FNPT

**Sample Flow:** minimum 2.2 gal/hr (134 mL/min)  
maximum 5.0 gal/hr (305 mL/min)

**Input Pressure:** 5 psig (1.6 kPa) to 1,000 psig (7900 kPa)

**Sample Temperature:** 32 to 122°F (0 to 50°)

**Wetted Materials:** Polypropylene, acrylic, CPVC, brass, 316 stainless steel

## SENSOR SPECIFICATIONS — pH/ORP

**Model Number pH:** 3900VP-02-10

**Model Number ORP:** 3900VP-02-12

**Measured Range:** pH: ACCUGLASS 0-14;  
ORP: -1400 to +1400 mV

**Temperature Compensation:** pH: Automatic 32° to 185°F (0° to 85°C);  
ORP: Temperature compensation is not required.

## SENSOR SPECIFICATIONS — CONDUCTIVITY

**Model Number:** 400VP-13

**Wetted Materials:** Titanium, 316 SST, PEEK, EPDM

**Cell Constants:** 0.1/cm, 1.0/cm

**Linear Range:**

When used with 54e platform: 2 - 20,000  $\mu\text{S}/\text{cm}$  at 25°C

When used with 1055 platform: 20 - 2,000  $\mu\text{S}/\text{cm}$  25°C

When used with Xmt platform: 10 - 20,000  $\mu\text{S}/\text{cm}$  25°C

## SENSOR SPECIFICATIONS — FREE CHLORINE

**Model Number:** 499ACL-01-54-VP

**Linear Range:** 0 to 10 ppm (mg/L) as  $\text{Cl}_2$ .

**Cathode:** platinum (normally wetted)

**Accuracy:** Accuracy depends on the accuracy of the chemical test used to calibrate the sensor.

**pH Range:** Continuous pH correction defined between 6.0 and 9.5.

**Minimum Sample Conductivity:** 50  $\mu\text{S}/\text{cm}$

**Response Time:** 22 sec to 95% of final reading at 25°C

**Electrolyte Volume:** 25 mL (approx.)

**Electrolyte Life:** 3 months (approx.)

# SENSOR SPECIFICATIONS — MONOCHLORAMINE

**Linear Range:** 0 - 15 ppm (mg/L)

**Cathode:** gold mesh

**Accuracy:** Accuracy depends on the accuracy of the laboratory method used to calibrate the sensor.

**Linearity:** 2% (typ.)

**pH range:** Response is practically independent of pH between pH 7.0 and 10.0. Sensor current at pH 10.0 is within 5% of sensor current at pH 7.0.

**Sample Conductivity:** >10  $\mu\text{S}/\text{cm}$  at 25°C

**Response time:** <30 sec to 90% of final reading (0 to 2 ppm) at 25°C.

**Drift:** <2% of reading per week

**Electrolyte Volume:** 25 mL (approx.)

**Electrolyte Life:** 3 months (approx.)

# SENSOR SPECIFICATIONS — DISSOLVED OXYGEN

**Range:** 0 to 20 ppm (mg/L) as  $\text{O}_2$ .

**Cathode:** gold (not normally wetted)

**Accuracy:**  $\pm 0.2$  ppm at 25°C

**Repeatability:**  $\pm 0.05$  ppm at 25°C

**Response time:** 25 sec to 63% of final reading at 25°C

**Electrolyte Volume:** 25 mL (approx.)

**Electrolyte Life:** 4 to 6 months (approx.)

# MODEL 56 SPECIFICATIONS

**Case:** Polycarbonate.

**Dimensions:** 6.2 x 6.2 x 5.2 in. (157 x 157 x 132mm)

**Conduit openings:** Accepts (6) PG13.5 or 1/2 in. conduit fittings

**Display:** Large 3.75 x 2.2 in. (95.3 x 55.9mm) high resolution color LCD displays large process variables and user-definable display of diagnostic parameters. Calibration, programming and information screens display clear, easy-to-read characters. The color display is back-lit and backlighting intensity is user adjustable. Measurement character height: (.5") 13mm. Main display can be customized to meet user requirements.

**Ambient temperature and humidity:** -10 to 60°C, (14 to 140°F) RH 5 to 95% (non-condensing). For Turbidity only: 0 to 55°C (32 to 131°F). RH 5 to 95% (non-condensing).

**Note:** Some degradation in display response or performance may occur below -5°C (23°F) and above 55°C (131°F). Above 60°C, the following components will progressively and automatically shut down: display, USB communications port, current outputs, alarm relays, main circuit board.

**WARNING:** Always remove USB memory device if ambient temp exceeds 60°C. Do not access USB port if combustible atmosphere is present.

**Storage temperature:** -20 to 60°C, (-4 to 140°F)

**Power:** Code -02: 20 to 30 VDC, 20 W  
Code -03: 85 to 264 VAC, 47.5 to 65.0 Hz, 20 W

**Real time clock back-up:** 24 hours.

**Ordinary Locations:**



**Options for UL:** 02, 03, 20, 21, 22, 24, 25, 26, 27, 30, 31, 32, 34, 35, 36, 37, 38, and HT.

**Pollution Degree 2:** Normally only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation must be expected.

**Altitude:** for use up to 2000 meter (6562 ft.)

**RFI/EMI:** – EN-61326



**LVD:** – EN-61010-1

**Input:** One or two isolated sensor inputs. Measurement choices of pH/ORP, resistivity/conductivity/TDS, % concentration, ratio conductivity, total and free chlorine, monochloramine, dissolved oxygen, dissolved ozone, turbidity, pulse flow, temperature and raw 4-20mA input. For contacting conductivity measurements, temperature element must be a Pt1000 RTD. For other measurements (except ORP, flow and turbidity), use either a PT100 RTD, PT1000 RTD, or 22k NTC (D.O. only).

**Outputs:** Four actively powered 4-20 mA or 0-20 mA isolated current outputs. Fully scalable. Max Load: 550 Ohms. Outputs can be programmed for PID control. Output dampening can be enabled with time constants from 0 to 999 seconds. HART digital communications which is superimposed on output 1 is standard on all units (option code -HT).

**Alarms:** Four alarm relays for process measurement(s) or temperature. Any relay can be programmed for any measurement, timer, TPC or fault alarm operation, instead of a process alarm. When selected, a fault alarm will activate the relay when a sensor or analyzer fault occurs. Each relay can be configured independently. Alarm logic (high or low activation or USP\*) and deadband are user-programmable.

\*USP alarm can be programmed to activate when the conductivity is within a user-selectable percentage of the limit. *conductivity/resistivity measurement only*

**Relays:** Form C, SPDT, epoxy sealed

Maximum Relay Current	
Power	Resistive
28 VDC 5.0 A	5.0 A
115 VAC 5.0 A	5.0 A
230 VAC 5.0 A	5.0 A

**Inductive load:** 1/8 HP motor (max.), 115/240 VAC

**Terminal Connections Rating:**

Power connector (-02 24VDC power supply and -03 85-264VAC power supply): 24-12 AWG wire size.

Signal board terminal blocks: 26-16 AWG wire size.

Current output connectors: 26-16 AWG wire size.

Alarm relay terminal blocks: 24-12 AWG wire size.

**Weight/Shipping Weight:** (rounded up to nearest lb or nearest 0.5 kg): 3 lbs/4 lbs (1.5 kg/2.0 kg)

# MODEL 1056 SPECIFICATIONS

**The Model 1056 dual-input analyzer** offers single or dual sensor input with an unrestricted choice of dual measurements. This multi-parameter instrument offers a wide range of measurement choices supporting most industrial, commercial, and municipal applications.

## SPECIFICATIONS - GENERAL

**Enclosure:** Polycarbonate. NEMA 4X/CSA 4 (IP65).

**Dimensions:** Overall 155 x 155 x 131mm (6.10 x 6.10 x 5.15 in.). Cutout: 1/2 DIN 139mm x 139mm (5.45 x 5.45 in.)

**Conduit Openings:** Accepts 1/2" or PG13.5 conduit fittings

**Display:** Monochromatic graphic liquid crystal display. 128 x 96 pixel display resolution. Backlit. Active display area: 58 x 78mm (2.3 x 3.0 in.).

**Ambient Temperature and Humidity:** 0 to 55°C (32 to 131°F). Turbidity only: 0 to 50°C (32 to 122°F), RH 5 to 95% (non-condensing)

**Storage Temperature Effect:** -20 to 60°C (-4 to 140°F)

**Power:** Code -01: 115 VAC ±15% 60 Hz ±6%, 10W; 230 VAC ±15% 50 Hz ±6%, 10 W.

Code -02: 20 to 30 VDC. 15 W.

Code -03: 84 to 265 VAC, 47 to 63.0 Hz. 15 W.

Note: Code -02 and -03 power supplies include four programmable relays

Equipment protected by double insulation

**RFI/EMI:** EN-61326

**LVD:** EN-61010-1



**Inductive load:** 1/8 HP motor (max.), 40 VAC

Maximum screw torque for power lead connector and relay terminal blocks is 0.6 N·m

\*Relays only available with -02 power supply (20 - 30 VDC) or -03 switching power supply (84 - 265 VAC)

**Inputs:** One or two isolated sensor inputs

**Outputs:** Two 4-20 mA or 0-20 mA isolated current outputs. Fully scalable. Max Load: 550 Ohm. Output 1 has superimposed HART signal (configurations 1056-0X-2X-3X-HT only)

**Current Output Accuracy:** ±0.05 mA @ 25 °C

**Terminal Connections Rating:** Power connector (3-leads): 18-12 AWG wire size. Signal board terminal blocks: 26-16 AWG wire size. Current output connectors (2-leads): 24-16 AWG wire size. Alarm relay terminal blocks: 18-16 AWG wire size (-02 24 VDC power supply and -03 84-265VAC power supply)

**Alarms relays\*:** Four alarm relays for process measurement(s) or temperature. Any relay can be configured as a fault alarm instead of a process alarm. Each relay can be configured independently and each can be programmed with interval timer settings.

**Relays:** Form C, SPDT, epoxy sealed



Maximum Relay Current	
	Resistive
28 VDC	5.0 A
115 VAC	5.0 A
230 VAC	5.0 A

**Weight/Shipping Weight:** (rounded up to nearest lb or nearest 0.5 kg): 3 lbs/4 lbs (1.5 kg/2.0 kg)

# SOLU COMP MODEL Xmt SPECIFICATIONS

The *Solu Comp Model Xmt Two-Wire Transmitter* is intended for the determination of pH/ORP, conductivity, dissolved oxygen, free chlorine and monochloramine. For free chlorine measurements, which often require continuous pH correction, a second input for a pH sensor is standard. The Solu Comp Xmt is available with HART communications.



## SPECIFICATIONS - GENERAL

**Case:** ABS. Pipe, surface, and panel mount versions are NEMA 4X/CSA 4 (IP65).

### Dimensions

**Panel (code -10):** 6.10 x 6.10 x 3.72 in.  
(155 x 155 x 94.5 mm)

**Surface/Pipe (code -11):** 6.23 x 6.23 x 3.23 in.  
(158 x 158 x 82 mm); see page 5 for dimensions of pipe mounting bracket.

**Conduit openings:** Accepts PG13.5 or 1/2 in. conduit fittings

**Ambient Temperature:** 32 to 122°F (0 to 50°C).  
Some degradation of display above 50°C.

**Storage Temperature:** -4 to 158°F (-20 to 70°C)

**Relative Humidity:** 10 to 90% (non-condensing)

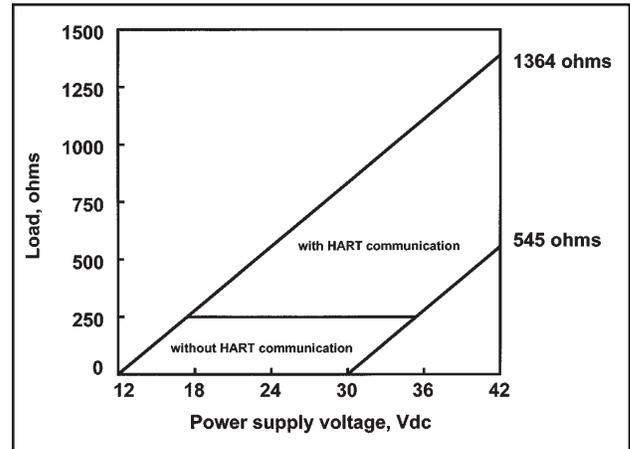
**Display:** Two line, 16-character display. Character height: 4.8 mm; first line shows process variable (pH, ORP, conductivity, % concentration, oxygen, ozone, chlorine, or monochloramine), second line shows process temperature and output current. For pH/chlorine combination, pH may also be displayed. Fault and warning messages, when triggered, alternate with temperature and output readings.

During calibration and programming, messages, prompts, and editable values appear on the two-line display.

**Temperature resolution:** 0.1°C ( $\leq 99.9^\circ\text{C}$ );  
1°C ( $\geq 100^\circ\text{C}$ )

**RFI/EMI:** EN-61326

**Digital Communications:** For details, see specifications for the measurement of interest.



**Power & Load Requirements:** Supply voltage at the transmitter terminals should be at least 12 Vdc. Power supply voltage should cover the voltage drop on the cable plus the external load resistor required for HART communications (250  $\Omega$  minimum). Minimum power supply voltage is 12 Vdc. Maximum power supply voltage is 42.4 Vdc (30 Vdc for intrinsically safe operation). The graph shows the supply voltage required to maintain 12 Vdc (upper line) and 30 Vdc (lower line) at the transmitter terminals when the current is 22 mA.

**Analog Output:** Two-wire, 4-20 mA output with superimposed HART digital signal. Fully scalable over the operating range of the sensor.

**Output accuracy:**  $\pm 0.05$  mA

# MODEL CLARITY II

## TURBIDITY SYSTEM SPECIFICATIONS

Model Clarity II Turbidity System is comprised of the following components:

- 1056 Turbidity Instrument (single or dual channel)
- Turbidity Sensor
- Flow-through Sampling Chamber/Debubbler
- Cable (20 ft) with quick disconnect NEMA connector
- Calibration Cup & Secondary Standard

CLARITY II is a 4-wire, AC-powered analyzer capable of dual sensor measurement.

**Measurement Methodology:** EPA 180.1 or ISO 7027, depending on sensor selection

**Power Requirements:** 115/230 VAC  $\pm 15\%$ , 50/60 Hz  $\pm 6\%$ , 8.0W

**Display:** Two-line, 16-character, back-lit display. Character height: 4.8 mm. Display can be customized to meet individual readout requirements.

**Languages:** English, French, German, Spanish, Italian, Portuguese

**Outputs:** Two 4-20 mA or 0-20 mA isolated outputs with programmable span over  $\pm 200$  NTU range or 0-999 ppm range (software switchable). Continuously adjustable.

**Alarms:** optional three-alarm relay module for process measurement(s).

**Operating Temperature Range:** 0 to 50°C (32 to 122°F)

**Case:** ABS; Pipe, surface, and panel mount versions; NEMA 4X / CSA 4 (IP65)

**Range:** 0.000 to 200 NTU (Nephelometric Turbidity Units)  
0.000 to 900 ppm (Total Suspended Solids)

**Accuracy:**

RANGE	ACCURACY
0.000 - 1.00 NTU	$\pm 0.01$ NTU or $\pm 2\%$ of reading
1.00 - 200 NTU	$\pm 2\%$ of reading
Overall	$\pm 0.01$ NTU or $\pm 2\%$ of reading

**Readout Units:**

Turbidity: NTU, FNU, FTU - software switchable

Suspended Solids: ppm mg/L, none - software switchable

**Display Resolution:**

Turbidity: 0.001 NTU

Suspended Solids: 0.1

**EMI/RFI:**

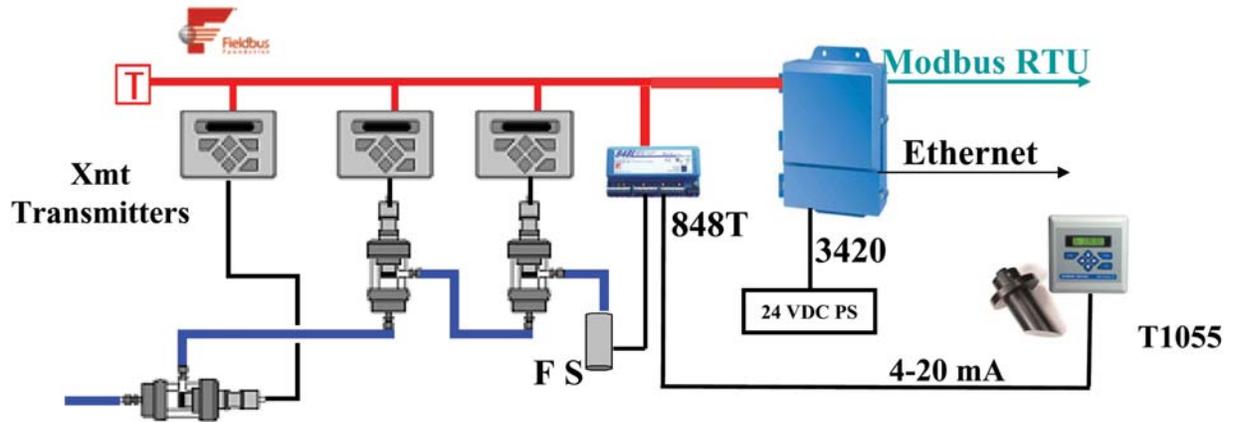
EN61326 

**LVD:**

EN61010-1



**Electrochemical Water Quality System**



- 3420 Fieldbus Interface Module and Xmt Transmitter Solution
  - Only 1 power Connection to the 3420
  - Reduced transmitter wiring using Fieldbus
  - Flow switch added to Fieldbus via a Rosemount 848T.
  - Can accommodate non-Fieldbus Analyzers via their 4-20 mA output through the Rosemount 848T

Monitoring with Foundation Fieldbus



Combination Electrochemical/Optical Water Quality System (SQ 8899)

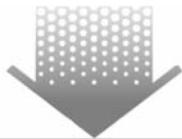
## ORDERING INFORMATION

**Multi-parameter Electrochemical/Optical Water Quality Systems for Water Integrity.** Measure pH,ORP, conductivity, dissolved oxygen, free chlorine, ozone, monochloramine, temperature, turbidity and particle index in simple plug and plumb packages. *Customer must consult factory to finalize configuration.*

<b>Model WQS Multi-parameter Electrochemical/Optical Water Quality System</b>	
<b>CODE</b>	<b>INSTRUMENT (required selection)</b>
01	1056
02	56
03	Xmt
<b>CODE</b>	<b>ELECTROCHEMICAL MEASUREMENT (optional selection)</b>
20	pH
21	ORP
22	Contacting Conductivity
23	Free Chlorine
24	Monochloramine
25	Dissolved Oxygen
26	Temperature
<b>CODE</b>	<b>OPTICAL MEASUREMENT (optional selection)</b>
30	Turbidity
<b>CODE</b>	<b>ACCESSORIES (optional selection)</b>
40	Power and Current Output Junction Box
41	Mounting Stand
42	Flow Switch
<b>CODE</b>	<b>CUSTOM FACTORY CONFIGURATION (required selection)</b>
99SQ	Factory System Code
<b>WQS -02 -20 -21 -22 -23 -26 -30 -99SQ8899                      EXAMPLE</b>	

## REPLACEMENT SENSORS

<b>PN</b>	<b>DESCRIPTION</b>
3900VP-02-10	pH sensor
3900VP-02-12	ORP sensor
400VP-13	Conductivity sensor
499ACL-01-54-VP	Free Chlorine sensor
499ACL-03-54-VP	Monochloramine sensor
499ADO-54-VP	Dissolved Oxygen sensor
8-0108-0003-ISO	Turbidity sensor ISO
8-0108-0002-EPA	Turbidity sensor EPA



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the right answers,  
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