**Quick Start Guide**
00825-0100-3412, Rev AA
June 2019

# Rosemount™ FCL

## Free Chlorine System with Rosemount 1056 Transmitter


ROSEMOUNT™

EMERSON

## Essential instructions

Read this page before proceeding!

Emerson designs, manufactures, and tests its products to meet many national and international standards. Because these instruments are sophisticated technical products, you must properly install, use, and maintain them to ensure they continue to operate within their normal specifications. The following instructions must be adhered to and integrated into your safety program when installing, using, and maintaining Emerson products. Failure to follow the proper instructions may cause any one of the following situations to occur: loss of life, personal injury, property damage, damage to this instrument, and warranty invalidation.

- Read all instructions prior to installing, operating, and servicing the product.
- If this Reference Manual is not the correct one, call 1-800-999-9307 to request the correct Reference Manual. Save this Reference Manual for future reference.
- If you do not understand any of the instructions, contact your Emerson representative for clarification.
- Follow all warnings, cautions, and instructions marked on and supplied with the product.
- Inform and educate your personnel in the proper installation, operation, and maintenance of the product.
- Install equipment as specified in the installation instructions of the appropriate Reference Manual and per applicable local and national codes. Connect all products to the proper electrical and pressure sources.
- To ensure proper performance, use qualified personnel to install, operate, update, program, and maintain the product.
- When replacement parts are required, ensure that qualified people use replacement parts specified by Rosemount. Unauthorized parts and procedures can affect the product's performance, place the safe operation of your process at risk, and may result in fire, electrical hazards, or improper operation.
- Ensure that all equipment doors are closed and protective covers are in place, except when maintenance is being performed by qualified people, to prevent electrical shock and personal injury.

**⚠ WARNING**

**Hazardous area installation**

Installations near flammable liquids or in hazardous area locations must be carefully evaluated by qualified on site safety personnel. This device is not Intrinisically Safe or Explosion Proof.

To secure and maintain intrinsically safe installation, use an appropriate transmitter/safety barrier/sensor combination. The installation system must be in accordance with the governing approval agency (FM, CSA, or BASEEFA/CENELEC) hazardous are classification requirements. Consult your transmitter Reference Manual for details.

Proper installation, operation, and servicing of this sensor in a hazardous area installation are entirely the operator's responsibility.

## ⚠ WARNING

**Electrical shock**

Making cable connections to and servicing this instrument require access to shock hazard level voltages, which can cause death or serious injury.

Equipment protected throughout by double insulation.

Be sure to disconnect all hazardous voltages before opening the enclosure.

Disconnect relay contacts made to separate power sources before servicing.

Electrical installation must be in accordance with the National Electrical Code (ANSI/NFPA-70) and/or any other national or local codes.

Unused cable conduit entries must be securely sealed by non-flammable closures to provide exposure integrity in compliance with personal safety and environmental protection requirements. Unused conduit openings must be sealed with NEMA 4X or IP65 conduit plugs to maintain the ingress protection rating (IP65).

Safety and performance require that this instrument be connected and properly grounded through a three-wire power source.

Proper use and configuration is the operator's responsibility.

No external power to the instrument of more than 69 Vdc or 43 V peak is allowed, with the exception of power and relay terminals. Any violation will impair the safety protection provided.

Do not operate this instrument without the front cover secured. Refer installation, operation, and servicing to qualified personnel.

## ⚠ WARNING

This product is not intended for use in the light industrial, residential, or commercial environments per the instrument's certification to EN50081-2.

## ⚠ CAUTION

**Sensor/process application compatibility**

The wetted sensor materials may not be compatible with process composition and operating conditions.

Application compatibility is entirely the operator's responsibility.

## ⚠ WARNING

**Physical access**

Unauthorized personnel may potentially cause significant damage to and/or misconfiguration of end users' equipment. This could be intentional or unintentional and needs to be protected against.

Physical security is an important part of any security program and fundamental to protecting your system. Restrict physical access by unauthorized personnel to protect end users' assets. This is true for all systems used within the facility.

## Contents

# 1 Specifications

## Rosemount 1056 Transmitter

For Rosemount 1056 Transmitter specifications, see the Rosemount 1056 Transmitter Reference Manual on Emerson.com/Rosemount: *Manual: Rosemount 1056 Dual-Input Transmitter*.

### Table 1-1: General Specifications

| Characteristic | Specification |
|---|---|
| Sample requirements | • Pressure: 3 to 65 psig (122 to 549 kPa abs). A check valve in the inlet prevents the sensor flow cells from going dry if sample flow is lost. The check valve opens at 3 psig (122 kPa abs). If the check valve is removed, minimum pressure is 1 psig (108 kPa abs).<br>• Temperature: 32 to 122 °F (0 to 50 °C)<br>• Minimum flow: 3 gal/hr (11 L/hr)<br>• Maximum flow: 80 gal/hr (303 L/hr); high flow causes the overflow tube to back up. |
| Sample conductivity | >50 µS/cm at 77 °F (25 °C) |
| Process connection | ¼-in. OD tubing compression fitting (can be removed and replaced with barbed fitting for soft tubing) |
| Drain connection | ¾-in. barbed fitting. Sample must drain to open atmosphere. |
| Wetted parts | Overflow sampler and flow cell: acrylic, polycarbonate, Kynar®, nylon, and silicone<br>Chlorine sensor: Noryl®, Viton®, wood, silicone, polyethersulfone, polyester, and platinum<br>pH sensor (Rosemount™ 3900VP): Stainless steel, glass, Teflon®, polyphenylene sulfide, EPDM, and silicone |
| Response time to step change in chlorine concentration | < 80 sec to 95% of final reading for inlet sample flow of 3 gph (11 L/hr) |

### Table 1-1: General Specifications *(continued)*

| Characteristic | Specification |
|---|---|
| Weight/shipping weight (rounded up to nearest 1 lb. or 0.5 kg) | Rosemount FCL-01: 10 lb./13 lb. (4.5 kg/6.0 kg)<br>Rosemount FCL-02: 11 lb./14 lb. (5.0 kg/6.5 kg) |

### Table 1-2: Sensor Specifications

| Characteristic | Specification |
|---|---|
| Free chlorine range | 0 to 10 ppm as $Cl_2$. For higher ranges, consult the factory. |
| pH correction range | 6.0 to 9.5. For samples having pH between 9.5 and 10.0, consult the factory. If pH <6.0, correction is not necessary. For manual pH correction, choose option -01. For continuous pH correction, choose option -02. |
| Accuracy | Accuracy depends on the accuracy of the chemical test used to calibrate the sensor. |
| Interferences | Monochloramine, permangante, and peroxides |
| Electrolyte volume | 25 mL (approx.) |
| Electrolyte life | 3 months (approx.); for best results, replace electrolyte monthly. |

# 2 Install

## 2.1 Unpack and inspect

**Procedure**

1. Inspect the shipping container(s). If there is damage, contact the shipper immediately for instructions.
2. If there is no apparent damage, unpack the container(s).
3. Ensure that all items shown on the packing list are present.

   If items are missing, notify Emerson immediately.

### 2.1.1 Rosemount™ FCL-01 (free chlorine without continuous pH correction)

The Rosemount FCL-01 consists of the following items mounted on a back plate.

1. Rosemount 1056-03-24-38-AN transmitter with sensor cable attached.
2. Constant head overflow sampler with flow cell for chlorine sensor.

The free chlorine sensor (Rosemount 499ACL-01-54-VP), three membrane assemblies, and a bottle of electrolyte solution are in a separate package.

### 2.1.2 Rosemount™ FCL-02 (free chlorine with continuous pH correction)

The Rosemount FCL-02 consists of the following items mounted on a back plate:

1. Rosemount 1056-03-24-32-AN transmitter with sensor cables attached.
2. Constant head overflow sampler with flow cells for pH and chlorine sensors.
3. Stand to hold pH buffer solution during calibration.

The free chlorine sensor (Rosemount 499ACL-01-54-VP), shipped with three membrane assemblies and a bottle of electolyte solution, and the Rosemount 3900VP-02-10 pH sensor are in separate packages.

## 2.2 General installation information

1. Although the system is suitable for outdoor use, do not install it in direct sunlight or in areas of extreme temperature.

**⚠ CAUTION**

**Hazardous areas**

The system is not suitable for use in hazardous areas.

2. To keep the transmitter enclosure watertight, install plugs (provided) in the unused conduit openings.
3. Install the system in an area where vibrations and electromagnetic and radio frequency interference are minimized or absent.
4. Be sure there is easy access to the transmitter and sensor(s).

## 2.3 Sample requirements

Be sure the sample meets the following requirements:

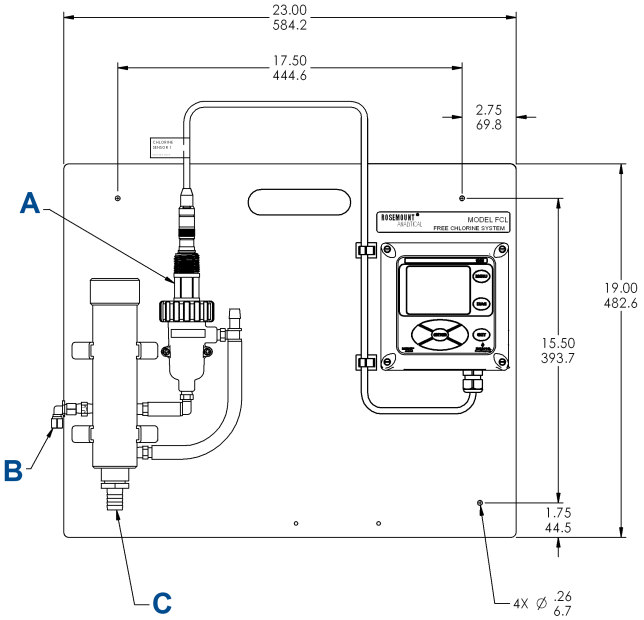
1. Temperature: 32 to 122 °F (0 to 50 °C )
2. Pressure: 3 to 65 psig (122 to 549 kPa abs)
3. Minimum flow: 3 gal/hr (11 L/hr)

## 2.4 Mounting, inlet, and drain connections

The Rosemount™ FCL is intended for wall mounting only.

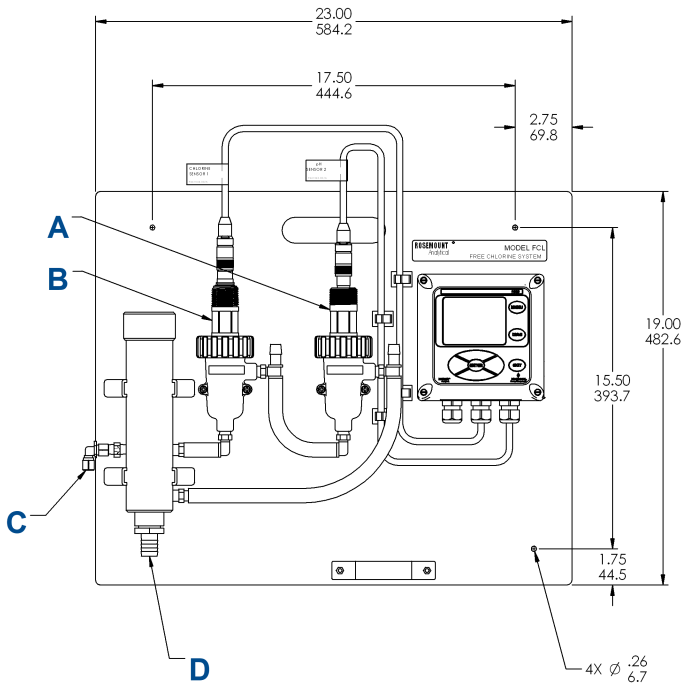
Refer to Figure 2-1 or Figure 2-2 for details. The sensor(s) screw into the flow cell adapters as shown in the figures. For Rosemount FCL-02 (free chlorine with continuous pH adjustment), you must also install the pH sensor.

**Figure 2-1: Rosemount FCL-01**




*A. Chlorine sensor*
*B. Inlet*
*C. Drain*

**Figure 2-2: Rosemount FCL-02**




*A. pH sensor*
*B. Chlorine sensor*
*C. Inlet*
*D. Drain*

A ¼-in. OD tubing compression fitting is provided for the sample inlet. If desired, you can remove the compression fitting and replace it with a barbed fitting. The fitting screws into a ¼-in. FNPT check valve. The check valve prevents the sensor flow cell from going dry if sample flow is lost.

The sample drains through a ¾-in. barbed fitting.

1. Attach a piece of soft tubing to the fitting and allow the waste to drain to open atmosphere.

**Important**
Do not restrict the drain line.

2. Adjust the sample flow until the water level is even with the central overflow tube and excess water is flowing down the tube.
3. Confirm that sample is flowing through the flow cells.

## 2.5 Install the sensor(s)

Emerson provides the Rosemount™ FCL with the sensor cable pre-wired to the transmitter.

### Procedure

1. Connect the chlorine sensor (Rosemount 499ACL-01-54-VP) to the cable labeled `CL`.
2. Connect the pH sensor (Rosemount 3900-VP-02-10) to the cable labeled `pH`.

   The terminal end of the sensor is keyed to ensure proper mating with the cable receptacle.
3. Once the key has slid into the mating slot, tighten the connection by turning the knurled ring clockwise.
4. Screw the sensor(s) into the plastic fitting(s), which are held in the flow cell(s) by the union nut.

   Do not remove the protective cap on the sensor(s) until ready to put the sensor(s) in service.

# 3 Wire

## 3.1 Wire power

Wire AC mains power supply to the power supply board, which is mounted vertically on the left hand side of the transmitter enclosure.

**⚠ WARNING**

**Electrical shock**

Electrical installation must be in accordance with the National Electrical Code (ANSI/NFPA-70) and/or any other applicable national or local codes.

The power connector is at the top of the board.

### Procedure

1. Unplug the connector from the board and wire the power cable to it.

   Lead connections are marked on the connector. (`L` is live or hot; `N` is neutral; the ground connection has the standard symbol.)

2. Run the power wiring through the conduit opening nearest the power terminal.

   AC power wiring should be 14 gauge or greater.

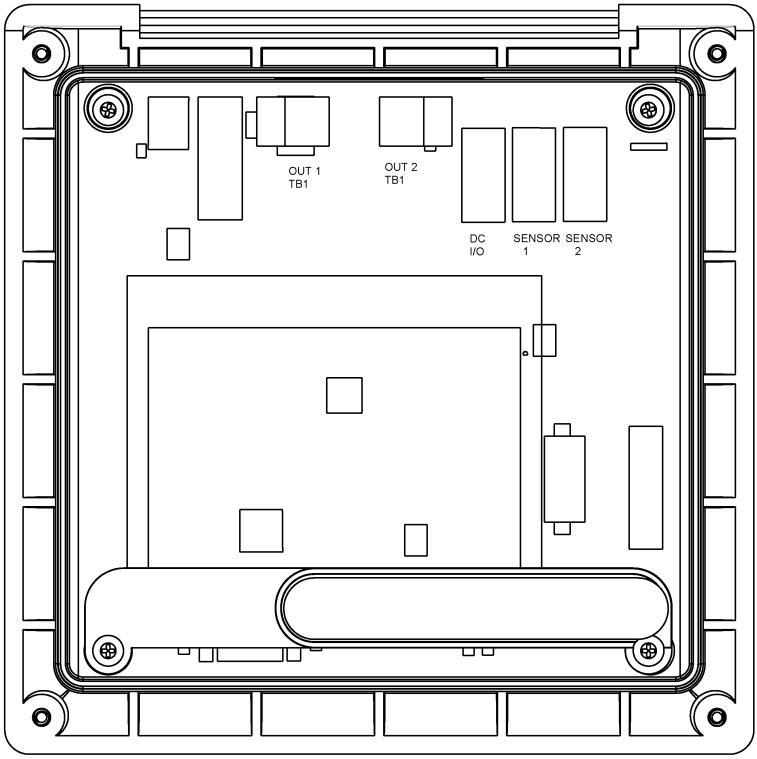
3. Provide a switch or breaker to disconnect the transmitter from the main power supply.
4. Install the switch or breaker near the transmitter and label it as the disconnecting device for the transmitter.

## 3.2 Wire analog outputs

Two analog output currents are located on the main circuit board, which is attached to the inside of the enclosure door.

Figure 3-1 shows the locations of the terminals. The connectors can be detached for wiring. TB-1 is output 1. TB-2 is output 2. Polarity is marked on the circuit board.

**Figure 3-1: Analog output connections**




The analog outputs are on the main board near the hinged end of the enclosure door.

For best EMI/RFI protection, use shielded output signal cable enclosed in earth-grounded metal conduit.

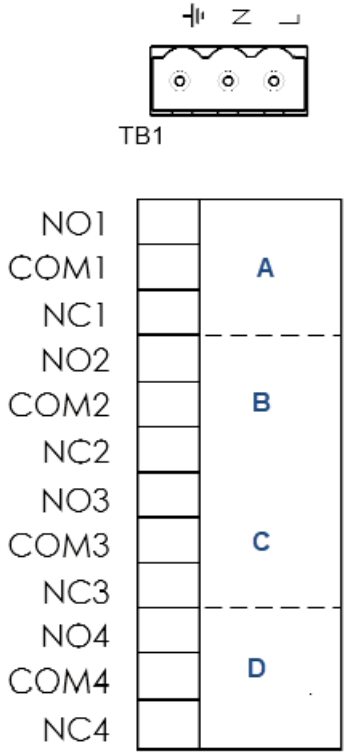
Keep output signal wiring separate from power wiring. Do not run signal and power or relay wiring in the same conduit or close together in a cable tray.

## 3.3 Alarm wiring

The alarm relay terminal strip is located just below the power connector on the power supply board.

See Figure 3-2.

**Figure 3-2: Alarm relay connections**




*A. Alarm relay 1*
*B. Alarm relay 2*
*C. Alarm relay 3*
*D. Alarm relay 4*

1. To remove the cover, grab it by the upper edges and pull straight out. The relay terminal strip is at the top of the board.
2. Bring the relay wires through the rear conduit opening on the left hand side of the enclosure and make connections to the terminals strip.
3. Replace the cover. The two tabs on the back edge of the cover fit into slots at the rear of the enclosure, and the three small slots in the front of the cover snap into the three tabs next to the relay terminal strip. See Figure 3-2. Once the tabs are lined up, push the cover to snap it in place.

Keep alarm relay wiring separate from signal wiring. Do not run signal and power or relay wiring in the same conduit or close together in a cable tray.

## 3.4 Wire sensor

The Rosemount™ FCL is provided with sensor cables pre-wired to the transmitter. If it is necessary to replace the sensor cable, refer to the instructions below.

### Procedure

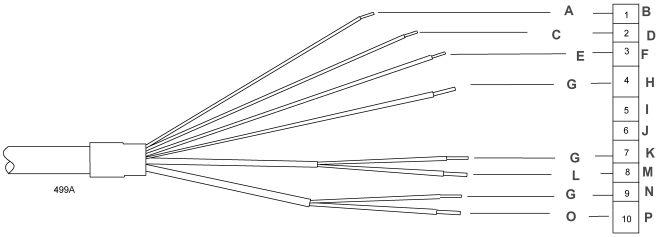
1. Shut off power to the transmitter.
2. Loosen the four screws holding the front panel in place and let it drop down.
3. Locate the appropriate signal board.

| Slot 1 (left) | Slot 2 (center) | Slot 3 (right) |
|---|---|---|
| communication | input 1 (chlorine) | input 2 (optional) |

4. Loosen the gland fitting and carefully push the sensor cable up through the fitting as you pull the board forward to gain access to the wires and terminal screws.
5. Wire the sensor to the signal board.

   Refer to the wiring diagrams in Figure 3-3 and Figure 3-4.

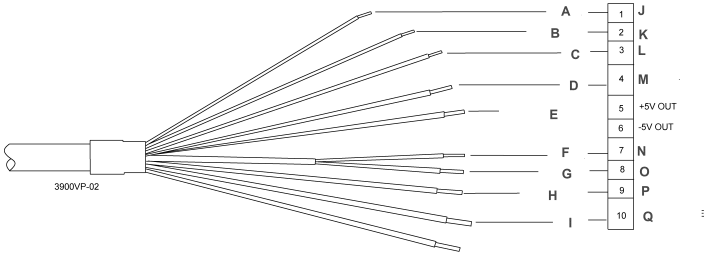
**Figure 3-3: Wiring Diagram for Free Chlorine Sensor**




*A. White*
*B. Resistance temperature device return*
*C. White/red*
*D. Resistance temperature device sense*
*E. Red*
*F. Resistance temperature device in*
*G. Clear*
*H. Resistance temperature device shield*
*I. +5 V out*
*J. -4.5 V out*
*K. Anode shield*
*L. Orange*
*M. Anode*
*N. Cathode shield*
*O. Gray*
*P. Cathode*

Connect green wire to metal conduit ground plate in bottom of enclosure.

**Figure 3-4: Wiring Diagram for 3900VP-10 pH Sensor (Blue Cable)**




*A. White*
*B. White/red*
*C. Red*
*D. Blue*
*E. Clear (not used)*
*F. Clear*
*G. Orange*
*H. White/gray*
*I. Gray*
*J. Resistance temperature device return*
*K. Resistance temperature device sense*
*L. Resistance temperature device in*
*M. Ground solution*
*N. pH shield*
*O. In pH/ORP*
*P. Reference shield*
*Q. In reference*

Green (connect to green grounding screw at bottom of enclosure).

6. Once the cable has been connected to the board, slide the board fully into the enclosure while taking up the excess cable through the cable gland.
7. Tighten the gland nut to secure the cable and ensure a sealed enclosure.

## 3.5 Quick Start

### Procedure

1. Once connections are secured and verified, apply power to the transmitter.
   When the transmitter is powered up for the first time, **Quick Start** screens appear. Using Quick Start is easy.

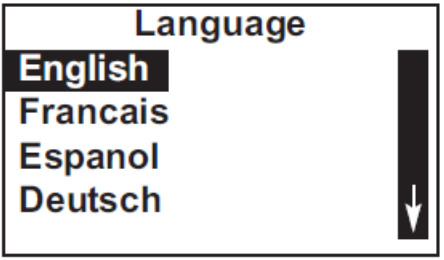
a. A backlit field shows the position of the cursor.

b. To move the cursor left or right, use the keys to the left or right of the **ENTER** key. To scroll up or down or to increase or decrease the value of a digit, use the keys above and below the **ENTER** key. Use the left and right keys to move the decimal point.

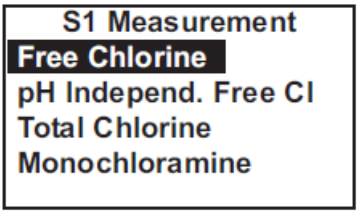
c. Press **ENTER** to store a setting. Press **EXIT** to leave without storing changes. Pressing **EXIT** also returns the display to the initial **Quick Start** screen.

d. A vertical black bar with a downward pointing arrow on the right side of the screen means there are more items to display. Continue scrolling down to display all the items. When you reach the bottom of the list, the arrow points up.

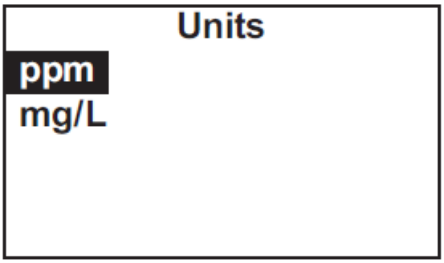
2. Choose the desired language. Scroll down to display more choices.




3. Choose Free Chlorine for sensor 1 (S1).

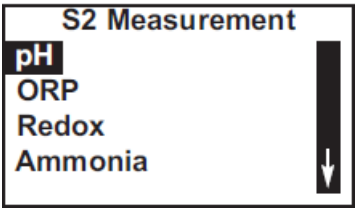



4. Choose the desired units for chlorine.

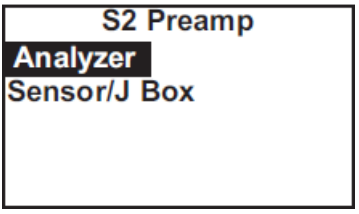



The screens in Step 5 and Step 6 only appear if you have a Rosemount™ FCL-02.

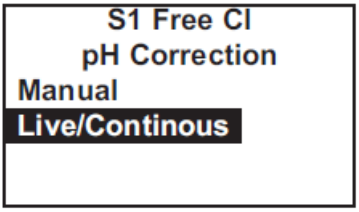
5. If you have a Rosemount FCL-01, go to Step 8. Otherwise, choose pH for Sensor 2 (S2).



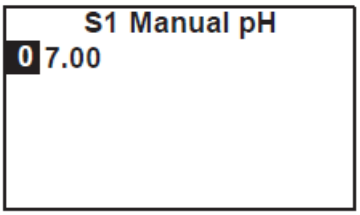

6. Choose Analyzer.



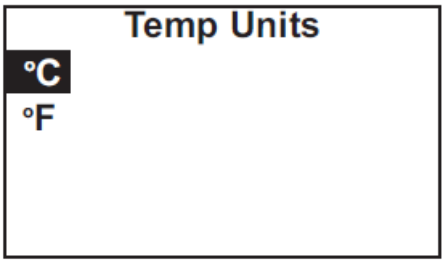

7. Choose Live/Continuous. Go to Step 9.




8. The screen below appears only if you have an FCL-01. Enter the pH of the process liquid.

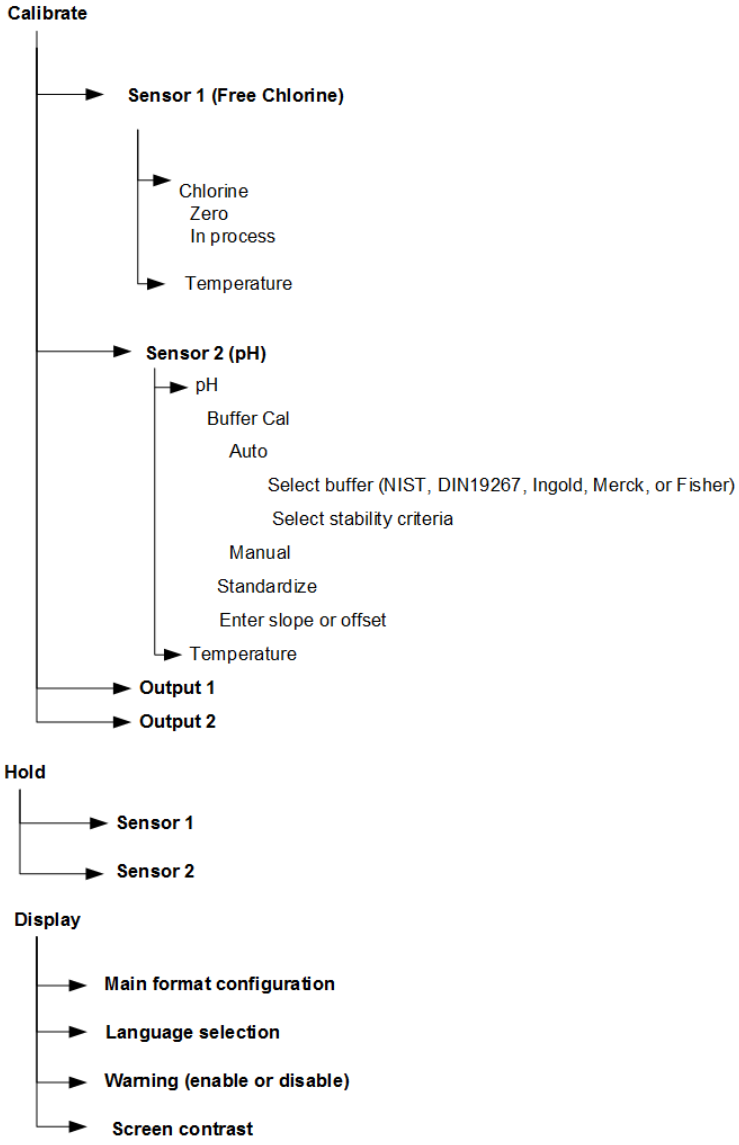


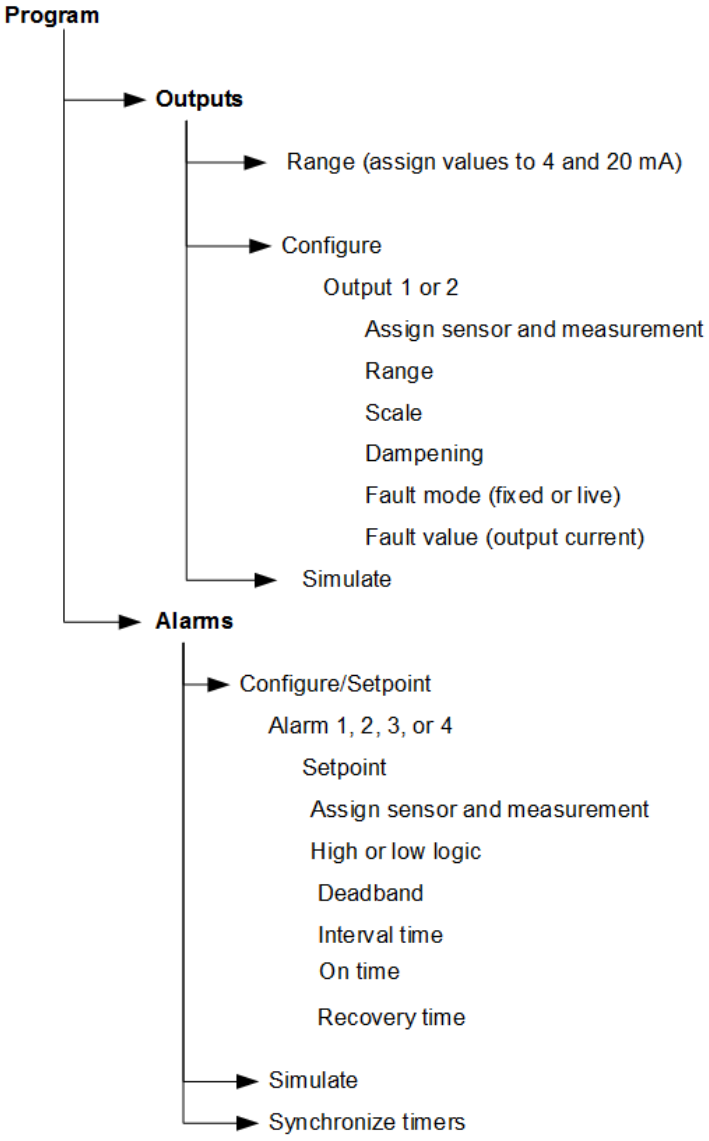

9. Choose the desired temperature units.

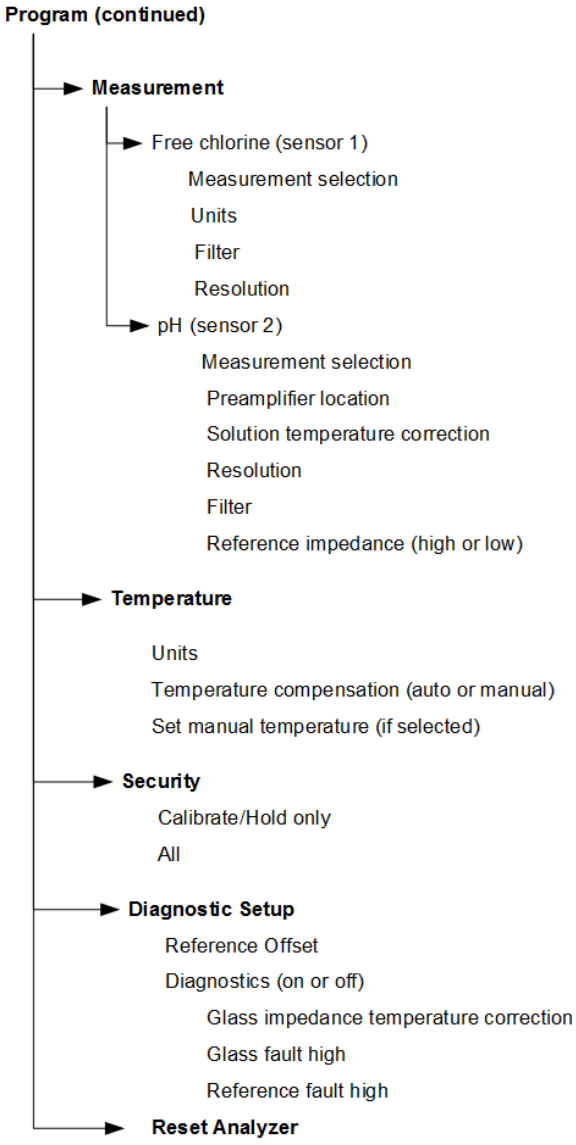



The main display appears. The outputs and alarms (if an alarm board is present) are assigned to default values.

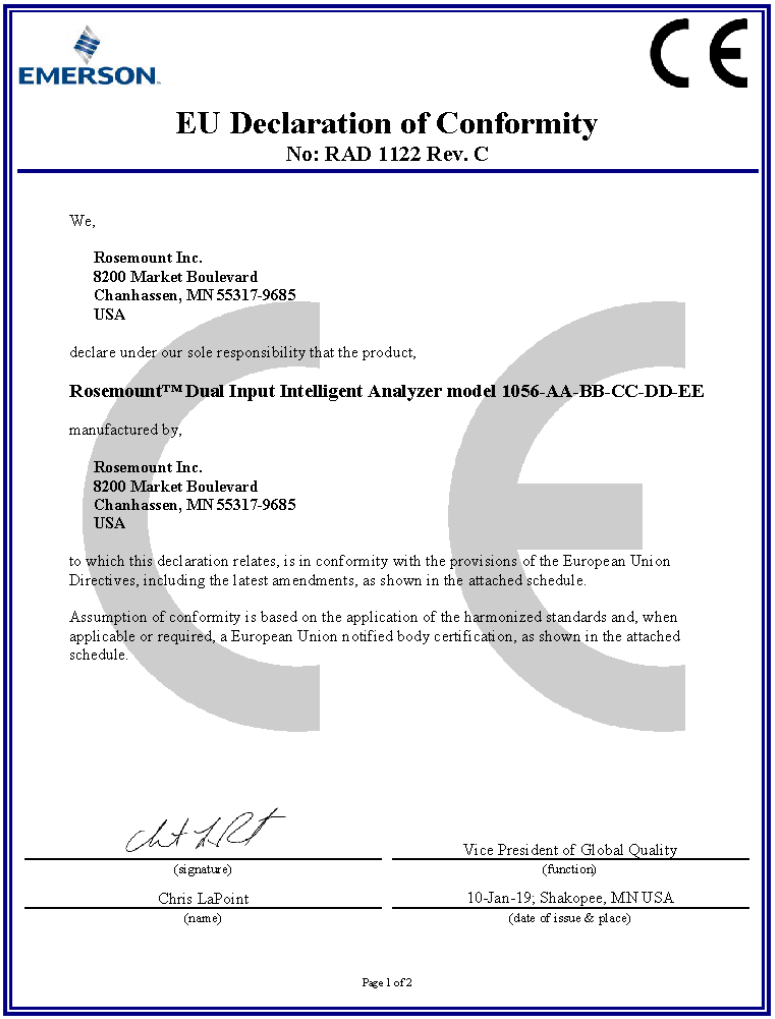
10. To change outputs, alarms, and other settings, go to the **Main Menu** and choose Program. Follow the prompts.


Calibrate
Sensor 1 (Free Chlorine)
Chlorine
Zero
In process
Temperature
Sensor 2 (pH)
pH
Buffer Cal
Auto
Select buffer (NIST, DIN19267, Ingold, Merck, or Fisher)
Select stability criteria
Manual
Standardize
Enter slope or offset
Temperature
Output 1
Output 2
Hold
Sensor 1
Sensor 2
Display
Main format configuration
Language selection
Warning (enable or disable)
Screen contrast


Program
Outputs
Range (assign values to 4 and 20 mA)
Configure
Output 1 or 2
Assign sensor and measurement
Range
Scale
Dampening
Fault mode (fixed or live)
Fault value (output current)
Simulate
Alarms
Configure/Setpoint
Alarm 1, 2, 3, or 4
Setpoint
Assign sensor and measurement
High or low logic
Deadband
Interval time
On time
Recovery time
Simulate
Synchronize timers


Program (continued)
Measurement
Free chlorine (sensor 1)
Measurement selection
Units
Filter
Resolution
pH (sensor 2)
Measurement selection
Preamplifier location
Solution temperature correction
Resolution
Filter
Reference impedance (high or low)
Temperature
Units
Temperature compensation (auto or manual)
Set manual temperature (if selected)
Security
Calibrate/Hold only
All
Diagnostic Setup
Reference Offset
Diagnostics (on or off)
Glass impedance temperature correction
Glass fault high
Reference fault high
Reset Analyzer

# A EU Declaration of Conformity



EMERSON

CE

## EU Declaration of Conformity

**No: RAD 1122 Rev. C**

We,

**Rosemount Inc.**
**8200 Market Boulevard**
**Chanhassen, MN 55317-9685**
**USA**

declare under our sole responsibility that the product,

**Rosemount™ Dual Input Intelligent Analyzer model 1056-AA-BB-CC-DD-EE**

manufactured by,

**Rosemount Inc.**
**8200 Market Boulevard**
**Chanhassen, MN 55317-9685**
**USA**

to which this declaration relates, is in conformity with the provisions of the European Union Directives, including the latest amendments, as shown in the attached schedule.

Assumption of conformity is based on the application of the harmonized standards and, when applicable or required, a European Union notified body certification, as shown in the attached schedule.

| | |
|---|---|
| (signature) | Vice President of Global Quality (function) |
| Chris LaPoint (name) | 10-Jan-19; Shakopee, MN USA (date of issue & place) |

Page 1 of 2

EMERSON

CE

# EU Declaration of Conformity

**No: RAD 1122 Rev. C**

The product,

**Rosemount™ Dual Input Intelligent Analyzer model 1056-AA-BB-CC-DD-EE**

Where

AA is Power:
- 01 115/230VAC, no relays
- 02 24 VDC, 4 alarm relays
- 03 85-265VAC, 4 alarm relays

BB is Measurement 1:
- 20 Contacting Conductivity
- 21 Toroidal Conductivity
- 22 pH/ORP/ISP
- 23 Flow/Current
- 24 Chlorine
- 25 Dissolved Oxygen
- 26 Ozone
- 27 Turbidity

CC is Measurement 2:
- 30 Contacting Conductivity
- 31 Toroidal Conductivity
- 32 pH/ORP/ISP
- 33 Flow/Current
- 34 Chlorine
- 35 Dissolved Oxygen
- 36 Ozone
- 37 Turbidity
- 38 None

DD is Communication Output:
- AN 4-20 mA analog signaling
- HT 4-20 mA plus HART comm.
- DP Profibus protocol

EE is UL option:
- Blank if no selection
- UL UL, Ordinary Location

to which this declaration relates, is in conformity with relevant Union harmonization legislation:

**EMC Directive (2014/30/EU)**

Harmonized Standards:
EN 61326-1:2013

**Low Voltage Directive (2014/35/EU)**

Harmonized Standard:
EN 61010-1:2010

**RoHS Directive (2011/65/EU)**

Harmonized Standard:
EN 50581:2012

Page 2 of 2

# B China RoHS Table

*含有China RoHS管控物质超过最大浓度限值的部件型号列表 1056*
*List of 1056 Parts with China RoHS Concentration above MCVs*

| 部件名称 Part Name | 有害物质 / Hazardous Substances | | | | | |
|---|---|---|---|---|---|---|
| | 铅 Lead (Pb) | 汞 Mercury (Hg) | 镉 Cadmium (Cd) | 六价铬 Hexavalent Chromium (Cr +6) | 多溴联苯 Polybrominated biphenyls (PBB) | 多溴联苯醚 Polybrominated diphenyl ethers (PBDE) |
| 电子组件 Electronics Assembly | X | O | O | O | O | O |
| 传感器组件 Sensor Assembly | X | O | O | O | O | O |

*本表格系依据SJ/T11364的规定而制作.*
*This table is proposed in accordance with the provision of SJ/T11364.*

*O: 意为该部件的所有均质材料中该有害物质的含量均低于GB/T 26572所规定的限量要求.*
*O: Indicate that said hazardous substance in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.*

*X: 意为在该部件所使用的所有均质材料里，至少有一类均质材料中该有害物质的含量高于GB/T 26572所规定的限量要求.*
*X: Indicate that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.*

| 部件名称 Part Name | 组装备件说明 Spare Parts Descriptions for Assemblies |
|---|---|
| 电子组件 Electronics Assembly | 电子线路板组件 Electronic Board Assemblies<br>液晶显示屏或本地操作界面显示屏 LCD or LOI Display |
| 传感器组件 Sensor Assembly | 传感器模块 Sensor Module |

**Quick Start Guide**
**00825-0100-3412, Rev. AA**
**June 2019**

**GLOBAL HEADQUARTERS**
6021 Innovation Blvd.
Shakopee, MN 55379
+1 866 347 3427
+1 952 949 7001
liquid.csc@emerson.com

**EUROPE**
Emerson Automation Solutions
Neuhofstrasse 19a PO Box 1046
CH-6340 Baar
Switzerland
+41 (0) 41 768 6111
+41 (0) 41 768 6300
liquid.csc@emerson.com

**MIDDLE EAST AND AFRICA**
Emerson Automation Solutions
Emerson FZE
Jebel Ali Free Zone
Dubai, United Arab Emirates, P.O. Box 17033
+971 4 811 8100
+971 4 886 5465
liquid.csc@emerson.com

**ASIA-PACIFIC**
Emerson Automation Solutions
1 Pandan Crescent
Singapore 128461
Republic of Singapore
+65 6 777 8211
+65 6 777 0947
liquid.csc@emerson.com

Linkedin.com/company/Emerson-Automation-Solutions
twitter.com/rosemount_news
Facebook.com/Rosemount
youtube.com/RosemountMeasurement



ROSEMOUNT™

EMERSON™