Quick Start Guide
00825-0200-3412, Rev AA
January 2020

Rosemount™ FCL

Free Chlorine System with Rosemount 56 Transmitter

ROSEMOUNT™

EMERSON.

Essential instructions

Read this page before proceeding!

Your instrument purchase from Emerson is one of the finest available for your particular application. Emerson designs, manufactures, and tests its products to meet many national and international standards. Experience indicates that its performance is directly related to the quailty of the installation and knowledge of the user in operating and maintaining the instrument. To ensure continued operation to the design specifications, read this Manual thoroughly before proceeding with installation, commissioning, operation, and maintenance of this instrument. If this equipment is used in a manner not specified by the manufacturer, the protection provided by it against hazards may be impaired. 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.

- Ensure that you have received the correct model and options from your purchase order. Verify that this Manual covers your model and options. If not, call 1-800-854-8257 or 949-757-8500 to request the corrrect Manual.
- For clarification of instructions, contact your Rosemount representative.
- Follow all warnings, cautions, and instructions marked on and supplied with the product.
- Use only qualified personnel to install, operate, program, and maintain 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.
- Use only factory documented components for repair. Tampering or unauthorized substitution of parts and procedures can affect the performance and cause unsafe operation of your process.

⚠ 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.

Disconnect main power and relay contacts wired to separate power sources before servicing.

Do not operate or energize instrument with case open.

Non-metallic cable strain reliefs do not provide grounding between conduit connections. Use grounding type bushings and jumper wires.

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).

Operate only with front and rear panels fastened and in place over terminal area.

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

⚠ 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

Radio interference

This product generates, uses, and can radiate radio frequency energy and thus can cause radio communication interference. Improper installation or operation may increase such interference. As temporarily permitted by regulation, this unit has not been tested for compliance within the limits of Class A computing devices, pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference.

Operation of this equipment in a residential area may cause interference, in which case the operator, at his own expense, will be required to take whatever measures may be required to correct the interference.

⚠ 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 56 Transmitter

For Rosemount 56 Transmitter specifications, see the Rosemount 56 Transmitter Reference Manual on Emerson.com/Rosemount: *Manual: Rosemount 56 Advanced Dual-Input Transmitter*.

Table 1-1: General Specifications

Characteristic	Specifications
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).
Temperature	32 to 122 °F (0 to 50 °C)
Minimum flow	3 gal/hr (11 L/hr)
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, silicone Chlorine sensor: Noryl™, Viton™, wood, silicone, polyethersulfone, polyester, and platinum pH sensor (3900 VP): stainless steel, glass, Teflon™, polyphenylene sulfide, EPDM, and silicone
Response time	< 80 sec to 95% of final reading for inlet sample flow of 3 gph (11 L/hr)
Weight/shipping weight(1)	Rosemount FCL-01: 10 lb./13 lb. (4.5 kg/6.0 kg) Rosemount FCL-02: 11 lb./14 lb. (5.0 kg/6.5 kg)

(1) Rounded to the nearest 1 lb. (0.5 kg)

Table 1-2: Sensor Specifications

Characteristics	Specifications
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, permanganate, 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 56-03-24-38-HT 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 56-03-24-38-HT 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. Install the system in an area where vibrations and electromagnetic and radio frequency interference are minimized or absent.
3. Be sure there is easy access to the transmitter and sensor(s).

2.3 Sample requirements

Be sure the sample meets the following requirements:

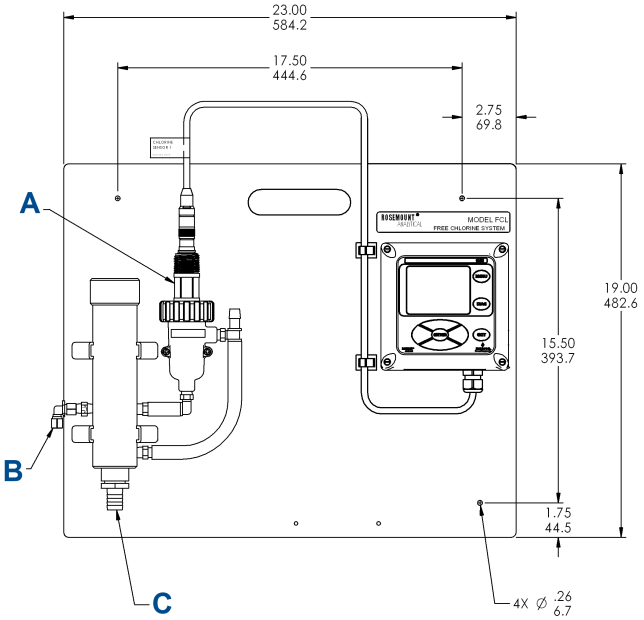
1. Temperature: 32 to 122 °F (0 to 50 °C)
2. Pressure: 3 to 65 psig (122 to 549 kPa abs)
3. Minimum flow: 3 gal/hr (11 L/hr)

2.4 Mounting, inlet, and drain connections

The Rosemount™ FCL is intended for wall mounting only.

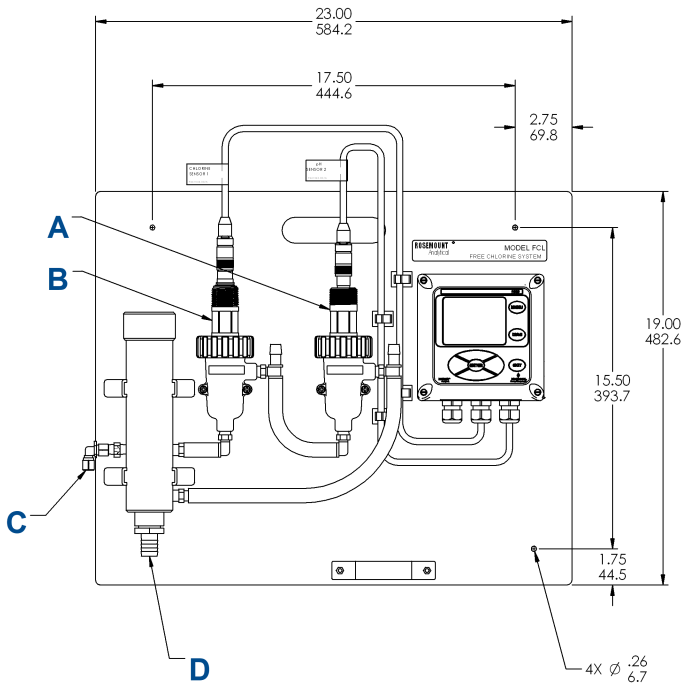
Refer to Figure 2-1 or Figure 2-2 for details. The sensor(s) screw into the flow cell adapters as shown in the figures. For Rosemount FCL-02 (free chlorine with continuous pH adjustment), you must also install the pH sensor.

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 on the left hand side of the transmitter enclosure beneath the gray plastic cover.

⚠ 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.

Procedure

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

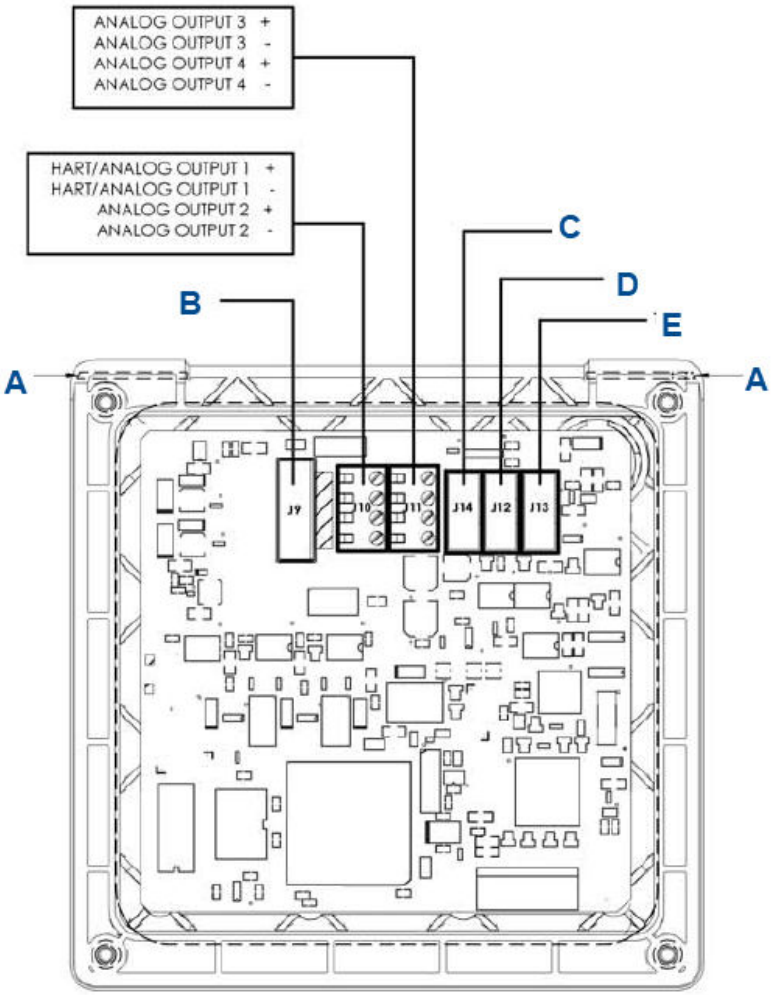
   Lead connections are marked on the connector. (`L` is live or hot; `N` is neutral; the ground connection has the standard symbol.)
2. Provide a switch or breaker to disconnect the transmitter from the main power supply.
3. Install the switch or breaker near the transmitter and label it as the disconnecting device for the transmitter.

3.2 Wire analog outputs

Four analog current outputs 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.

Figure 3-1: Analog Output Connections



A. Hinge pin
B. To power supply PCB (ribbon cable)
C. To digital I/O communication board
D. To sensor 1 signal board
E. To sensor 2 signal board

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

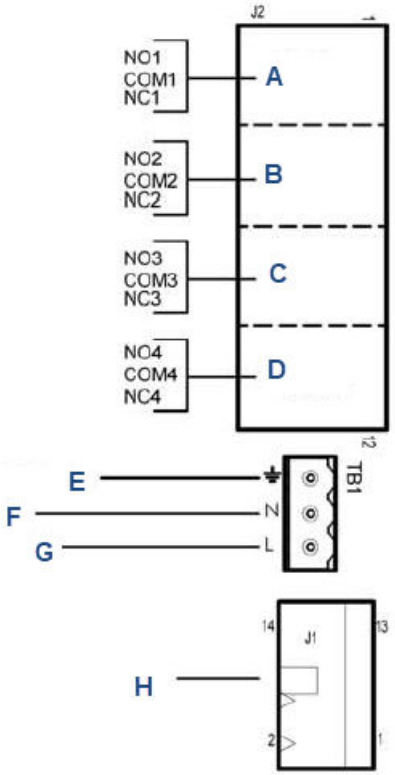
For best EMI/RFI protection, use shielded output signal cable enclosed in earth-grounded metal conduit.

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 Wire alarm relays

The alarm relay terminal strip is located on the power supply board, which is mounted on the left hand side of the enclosure beneath the gray plastic cover.

Figure 3-2: Alarm Relay Connections



A. Alarm relay 1
B. Alarm relay 2
C. Alarm relay 3
D. Alarm relay 4
E. Earth ground
F. Neutral
G. Line power
H. To main board (ribbon cable)

Procedure

1. To remove the cover, grab it by the upper edges and pull straight out.

   The relay strip is at the top of the terminal board. See Figure 3-2.

2. Bring the relay wires through the rear conduit opening on the left hand side of the enclosure and make connections to the terminal 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 on the front of the cover snap into the three tabs next to the relay terminal strip. See Figure 3-2.

   Keep alarm wiring separate from signal wiring. Do not run signal and power or relay wiring in the same conduit or close together in a 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. 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.
6. 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.

   a. The cursor, shown by dark blue backlighting, is on the language control box. To change the language, press the **ENTER/MENU** key. A list of available languages, shown two at a time, appears. Using the **Up** and **Down** keys, scroll (see) to display the choices. Press **ENTER/MENU** to select the desired language. Press **Down** to move the cursor to the temperature control box. To change units, press **ENTER/MENU** and scroll to either °F or °C. Press **ENTER/MENU** to store the selection.

   b. To move to the next screen, use the navigation keys to move the cursor to **NEXT** and press **ENTER/MENU**.

2. The next screen lists navigation rules. Press **ENTER/MENU** for the next screen.
3. Configure sensor 1.
   Sensor 1 is the free chlorine sensor. The screen has three control boxes.

   a) For measurement, choose Free chlorine.

   Important
   Do not choose pH-independent free chlorine.

   b) Choose the desired units, mg/L or ppm.

   c) If you have a Rosemount™ FCL-02 (with pH sensor), the third control box lets you choose between live/continuous or manual pH correction.
   If you choose live/continous (recommended), the transmitter will use the pH measured by the pH sensor to correct the chlorine reading for pH changes. If you choose manual (not recommended), a fourth control box appears to let you enter the manual pH, and the transmitter will use the entered value to correct the chlorine reading.

   d) If you have a Rosemount FCL-01 (no pH sensor), enter the pH of the process liquid in the third control box.

   e) Move the cursor to NEXT and press **ENTER/MENU**. If you have a Rosemount FCL-01, the display changes to show some basic

keypad operation guidelines. Press **ENTER/MENU** to show the main display. If you have a Rosemount, go to the next step.

4. Configure sensor 2.

   Sensor 2 is the pH sensor. The screen has two control boxes.

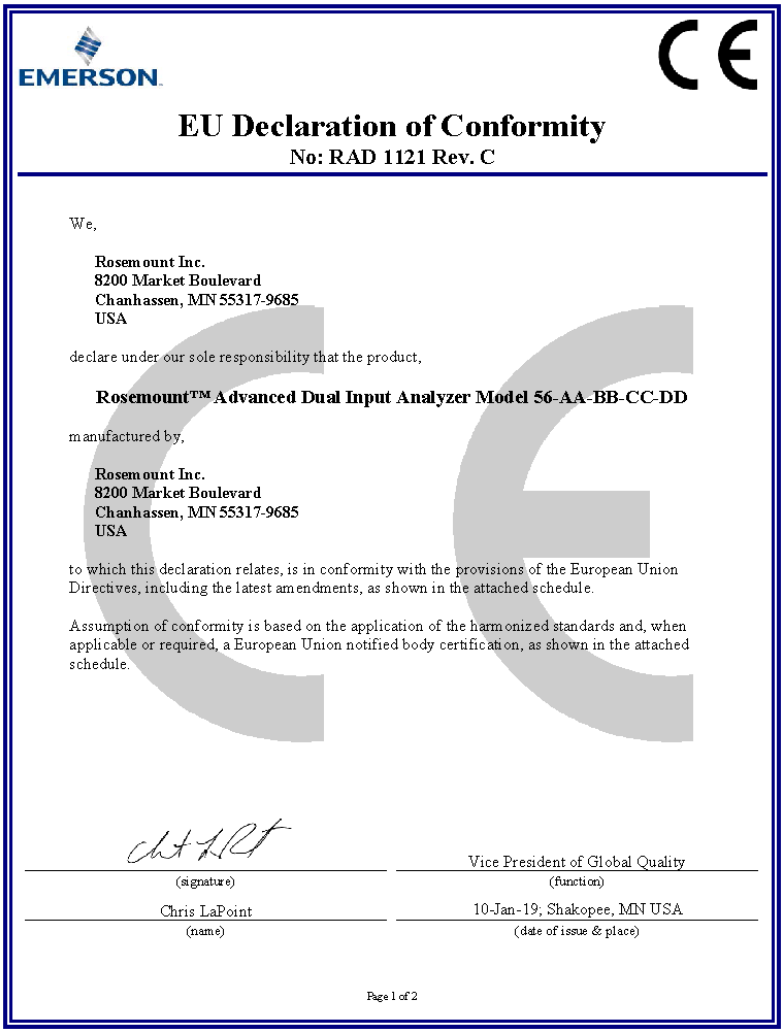
   a) For measurement, choose pH.

   b) For pre-amplifier location, choose analyzer.

   c) Move the cursor to NEXT and press **ENTER/MENU**. The display changes to show some basic keypad operation guidelines. Press **ENTER/MENU** to show the main display.

The outputs, alarms, display configuration, and data logging are all assigned to default values. The default value for data logging is disabled.

A EU Declaration of Conformity



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EU Declaration of Conformity

No: RAD 1121 Rev. C

We,

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

declare under our sole responsibility that the product,

Rosemount™ Advanced Dual Input Analyzer Model 56-AA-BB-CC-DD

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)

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EU Declaration of Conformity

No: RAD 1121 Rev. C

The product,

Rosemount™ Advanced Dual Input Analyzer Model 56-AA-BB-CC-DD

Where

AA is power:	BB is Measurement 1:	CC is Measurement 2:	DD is Communication output:
02 24 VDC, 4 alarm relays	20 Contacting Conductivity	30 Contacting Conductivity	HT 4-20 mA plus HART com
03 85-265VAC, 4 alarm relays	21 Toroidal Conductivity	31 Toroidal Conductivity	DP Profibus protocol
	22 pH/ORP/ISP	32 pH/ORP/ISP	
	23 Flow/4 to 20mA current	33 Flow/4 to 20mA current	
	24 Chlorine	34 Chlorine	
	25 Dissolved Oxygen	55 Dissolved Oxygen	
	26 Ozone	36 Ozone	
	27 Turbidity	37 Turbidity	
		38 None	

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

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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 56
List of 56 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 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

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