

Clarity II T56 Turbidimeter



Clarity II T56 Turbidimeter

ESSENTIAL INSTRUCTIONS-Read this page before proceeding!

Your instrument purchase from Rosemount Analytical, Inc. is one of the finest available for your particular application. These instruments have been designed, and tested to meet many national and international standards. Experience indicates that its performance is directly related to the quality of the installation and knowledge of the user in operating and maintaining the instrument. To ensure their continued operation to the design specifications, personnel should 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 correct 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, update, program and maintain the product.
- Educate your personnel in the proper installation, operation, and maintenance of the product.
- Install equipment as specified in the Installation section of this manual. Follow appropriate local and national codes. Only connect the product to electrical and pressure sources specified in this manual.
- 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.
- All equipment doors must be closed and protective covers must be in place unless qualified personnel are performing maintenance.

WARNING



RISK OF ELECTRICAL SHOCK

Equipment protected throughout by double insulation.

- Installation and servicing of this product may expose personnel to dangerous voltages.
- Main power wired to separate power source must be disconnected before servicing.
- Do not operate or energize instrument with case open!
- Signal wiring connected in this box must be rated at least 240 V.
- Non-metallic cable strain reliefs do not provide grounding between conduit connections! Use grounding type bushings and jumper wires.
- Unused cable conduit entries must be securely sealed by non-flammable closures to provide enclosure integrity in compliance with personal safety and environmental protection requirements. Unused conduit openings must be sealed with Type 4X or IP66 conduit plugs to maintain the ingress protection rating (Type 4X).
- Electrical installation must be in accordance with the National Electrical Code (ANSI/NFPA-70) and/or any other applicable national or local codes.
- Operate only with front panel fastened and in place.
- Proper use and configuration is the responsibility of the user.

CAUTION

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 user at his own expense, will be required to take whatever measures may be required to correct the interference.

CAUTION

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

About This Document

This manual contains instructions for installation and operation of the Clarity II T56 Turbidimeter.

The following list provides notes concerning all revisions of this document.

Rev. Level	Date	Notes
A	5/12	This is the initial-launch version.
B	6/14	Updated NTU values
C	8/14	Changed turbidity specifications, add FM and CSA Non-incendive field wiring installation drawing

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Section 1: Description and Specifications

1.1 Features and Applications

COMPLETE SYSTEM includes single or dual input analyzer, sensor(s), and debubbler assembly

CHOOSE U.S. EPA METHOD 180.1 or ISO METHOD 7027 compliant sensors

RESOLUTION 0.001 NTU

FULL FEATURED ANALYZER with fully scalable analog outputs and fully programmable alarms with interval timers

INTUITIVE, USER-FRIENDLY MENU in seven languages makes setup and calibration easy

The Clarity II turbidimeter is intended for the determination of turbidity in water. Low stray light, high stability, efficient bubble rejection, and a display resolution of 0.001 NTU make Clarity II ideal for monitoring the turbidity of filtered drinking water. The Clarity II turbidimeter can be used in applications other than drinking water treatment. Examples are monitoring wastewater discharges, condensate returns, and clarifiers.

Both USEPA 180.1 and ISO 7027-compliant sensors are available. USEPA 180.1 sensors use a visible light source. ISO 7027 sensors use a near infrared LED. For regulatory monitoring in the United States, USEPA 180.1 sensors must be used. Regulatory agencies in other countries may have different requirements.

The Clarity II turbidimeter consists of an analyzer, which accepts either one or two sensors, the sensors themselves, and a debubbler/measuring chamber and cable for each sensor. The cable plugs into the sensor and the analyzer, making setup fast and easy. Sensors can be located as far as 50 ft (15.2 m) away from the analyzer.

The Clarity II turbidimeter incorporates the popular and easy to use 56 analyzer. Menu flows and prompts are so intuitive that a manual is practically not needed. Analog outputs are fully scalable. Alarms are fully programmable for high/low logic and dead band. To simplify programming, the analyzer automatically detects whether an EPA 180.1 or ISO 7027 sensor is being used.

Clarity II is available in an optional configuration in which the analyzer, sensor(s), and debubbling flow cell(s) are mounted on a single back plate. The sensor cables are pre-wired to the analyzer, so setup is exceptionally fast and easy. All the user does is mount the unit on a wall, bring in power and sample, and provide a drain. To order this option, consult the factory.

1.2 Specifications - Analyzer

Enclosure: Polycarbonate. Type 4X/CSA 4X IP66

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

Conduit openings: Accepts 1/2" or PG 13.5 conduit fittings.

Display: Large 3.75 x 2.2 in. (95.3 x 55.9 mm) high resolution color LCD for large process variables and user-definable display of diagnostic parameters. Back-Lighting is user adjustable. Main display can be customized to meet user requirements.

Measurement character height: 0.5 in. (13mm)

Security Code: 3-digit code prevents accidental or unauthorized changes in instrument settings and calibration.

Languages: English, French, German, Italian, Spanish, Portuguese, Chinese, Russian and Polish

Units: Turbidity (NTU, FTU, or FNU); total suspended solids (mg/L, ppm, or no units)

Display resolution-turbidity: 4 digits; decimal point moves from x.xxx to xxx.x

Display resolution-TSS: 4 digits; decimal point moves from x.xxx to xxxx

Calibration methods: User-prepared standard, commercially prepared standard, or grab sample. For total suspended solids user must provide a linear calibration equation.

Ambient Temperature and Humidity: 0 to 55°C, (32 to 131°F); RH 5 to 95% (non-condensing)

Altitude: For use up to 2000 meters.

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

Real time clock back-up: 24 hours

Power: 85 to 265 VAC, 47.5 to 65.0 Hz. 20W min. input power.

Equipment protected by double insulation.

Inputs: Single or dual input, EPA 180.1 or ISO 7027 sensors

Outputs: Four 4-20 mA or 0-20 mA isolated current outputs. Fully scalable. Maximum load: 550 ohm. Output 1 has superimposed HART signal

Output Dampening: 0-999 seconds

Current Output Accuracy: ±0.05 mA @25°C

Alarms: Four process alarm relays for turbidity or temperature. Relays can also be programmed for timer, TPC, or fault alarm operation instead of as a process alarm. Each relay can be configured independently. Alarm logic (high or low activation) and deadband are user-programmable.


Terminal Connections Rating:

Power connector (3-leads); 24-12 AWG wire size.

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


Current output connectors (2-leads); 24-16 wire size.

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

RFI/EMI: EN-61326 
LVD: EN-61010-1


Hazardous Location Approvals – Analyzer

CSA approvals:

 Class I, Division 2, Groups A, B, C, & D
Class II, Division 2, Groups E, F, & G
C US Class III T4A Tamb= 50°C

Evaluated to the ANSI/UL Standards. The ‘C’ and ‘US’ indicators adjacent to the CSA Mark signify that the product has been evaluated to the applicable CSA and ANSI/UL Standards, for use in Canada and the U.S. respectively.

FM approvals:

 Class I, Division 2, Groups A, B, C, & D
Class II & III, Division 2, Groups E, F, & G
T4 Tamp = -10 deg C to 60 deg C

Relays: Form C, single pole, double throw, 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

Field wiring terminals: Removable terminal blocks for power, analog outputs, and sensors

1.3 Specifications - Sensor

Method: EPA 180.1 or ISO 7027 (using 860 nm LED source). Must be specified when ordering.

Incandescent lamp life: one year (EPA 180.1)

LED life: three years (ISO 7027)

Wetted materials: Delrin1, glass, EPDM

Accuracy after calibration at 20.0 NTU:

0 - 1 NTU: $\pm 2\%$ of reading or ± 0.015 NTU, whichever is greater.

0 - 20 NTU: $\pm 2\%$ of reading

NOTE: turbidity values of 2-200 NTU can be measured but frequent cleaning may be required to maintain turbidity measurements.

Cable: 20 ft (6.1 m) or 50 ft (15.2 m). Maximum 50 ft (15.2 m). Connector is IP65.

Maximum Pressure: 30 psig (308 kPa abs)

Temperature: 40 - 95°F (5 - 35°C)

Sensor body rating: IP65 when cable is connected

1.4 Specifications - Debubbler and Flow Chamber

Dimensions: 18.1 in. x 4.1 in. diam. (460 mm x 104 mm diam.) (approx.)

Wetted materials: ABS, EPDM, Delrin®, polypropylene, nylon

Inlet: Compression fitting accepts 1/4 in. OD tubing; fitting can be removed to provide 1/4 in. FNPT

Drain: Barbed fitting accepts 3/8 in. ID tubing; fitting can be removed to provide 1/4 in. FNPT. Must drain to atmosphere.

Sample temperature: 40 - 95°F (5 - 35°C)

Minimum inlet pressure: 3.5 psig (125 kPa abs). 3.5 psig will provide about 250 mL/min sample flow.

Maximum inlet pressure: 30 psig (308 kPa abs). Do not block drain tube.

Recommended sample flow: 250 - 750 mL/min

1.5 Specifications - General

Weight/shipping weight (rounded to the nearest lb or 0.5 kg):

Sensor: 1 lb/2 lb (0.5 kg/1.0 kg)

Analyzer: 2 lb/3 lb (1.0 kg/1.5 kg)

Debubbler: 3 lb/4 lb (1.5 kg/2.0 kg)

Specifications subject to change without notice.

1.6 Ordering Information

The Clarity II is a complete system for the determination of turbidity in water. It consists of an analyzer and one or two sensors with a debubbler/measuring chamber assembly and cable for each sensor. A calibration cup is available as an option. Because a sensor cannot be calibrated without a calibration cup, at least one cup must be ordered. Calibration standard (formazin or polymer spheres) must be ordered as a separate item.

T56 Turbidity System Components	
Code	Sensor Type
01	EPA Sensor
02	ISO Sensor
40	EPA Sensor (Second Sensor Option)
41	ISO Sensor (Second Sensor Option)
Code	Measuring Chamber
10	Debubbler Flow Chamber
60	Two Debubbler Flow Chambers
Code	Sensor Cable
20	20' (6.1 m)
21	50' (15.2 m)
23	One 20' (6.1 m), One 50' (15.2 m)
50	Two 20' (6.1 m)
51	Two 50' (15.2 m)
Code	Instrument
30	Single Input (56-03-27-38-HT)
31	Dual Input (56-03-27-37-HT)
Code	Optional
71	Calibration Cup (recommended for calibration)

Ordering Example With Codes: T56 -01 -10 -20 -30

Accessories	
Part #	Description
23554-00	Cable Gland Kit for Model 54e, XMT, 1055, 1056, Quantity 5
23820-00	Pipe/Wall Mounting Bracket for Models 1056, 1057, 5081, 6081, and XMT
23820-01	2" Pipe Mounting Bracket, Stainless Steel
9240048-00	S.S. Tag (specify marking)
24103-00	Flowmeter kit, includes valved rotameter and fittings
24101-00	Calibration cup
8-0108-0002-EPA	Turbidity sensor EPA 180.1 compliant
8-0108-0003-ISO	Turbidity sensor ISO 7027 compliant
1-0901-0009-EPA	Replacement Lamp, EPA
1-0901-0010-ISO	Replacement Lamp, ISO
24097-00	Sensor cable, turbidity, 20'
24098-00	Sensor cable, turbidity, 50'
24138-00	3' Turbidity Sensor Cable for Clarity II
24170-00	Molded debubbler with integral flow chamber
9550145	O-ring for sensor, external, fits molded debubbler
9550322	O-ring for upper and lower debubbler caps
Calibration Standards	
Part #	Description
060-761855	Premixed 4000 NTU Formazin calibration Kit
905-761854	Replacement solution for 4000 NTU premixed Kit

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Section 2.0 – Installation

2.1 Unpacking and Inspection

The Clarity II Turbidimeter is a complete system for the determination of turbidity in drinking water. The system consists of the analyzer, sensor(s), cable(s), and flow chamber/debubbler(s). Consult the table to verify that you have received the parts for the option you ordered.

Item	Model/part number
Single Input Turbidity Analyzer with HART	56-03-27-38-HT
Dual Input Turbidity Analyzer with HART	56-03-27-37-HT
Sensor-EPA standard	8-0108-0002-EPA
Sensor-ISO standard	8-0108-0003-ISO
Cable-3 ft (0.9 m)	24138-00
Cable-20 ft (6.1 m)	24097-00
Cable-50 ft (15.2 m)	24098-00
Calibration cup	24101-00
Molded chamber/debubbler	24170-00

2.2 Installation

2.2.1 General Information

1. Although the analyzer is suitable for outdoor use, do not install it in direct sunlight or in areas of extreme temperatures.
2. Install the analyzer in an area where vibration and electromagnetic and radio frequency interference are minimized or absent.
3. Keep the analyzer and sensor wiring at least one foot from high voltage conductors. Be sure there is easy access to the analyzer.
4. The analyzer is suitable for panel, pipe, or surface mounting. Refer to the table below.

Type of Mounting	Figure
Panel	2-1
Wall and Pipe	2-2

WARNING



RISK OF 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.

Fig. 2-1 T56 Panel Mounting Installation dimensions

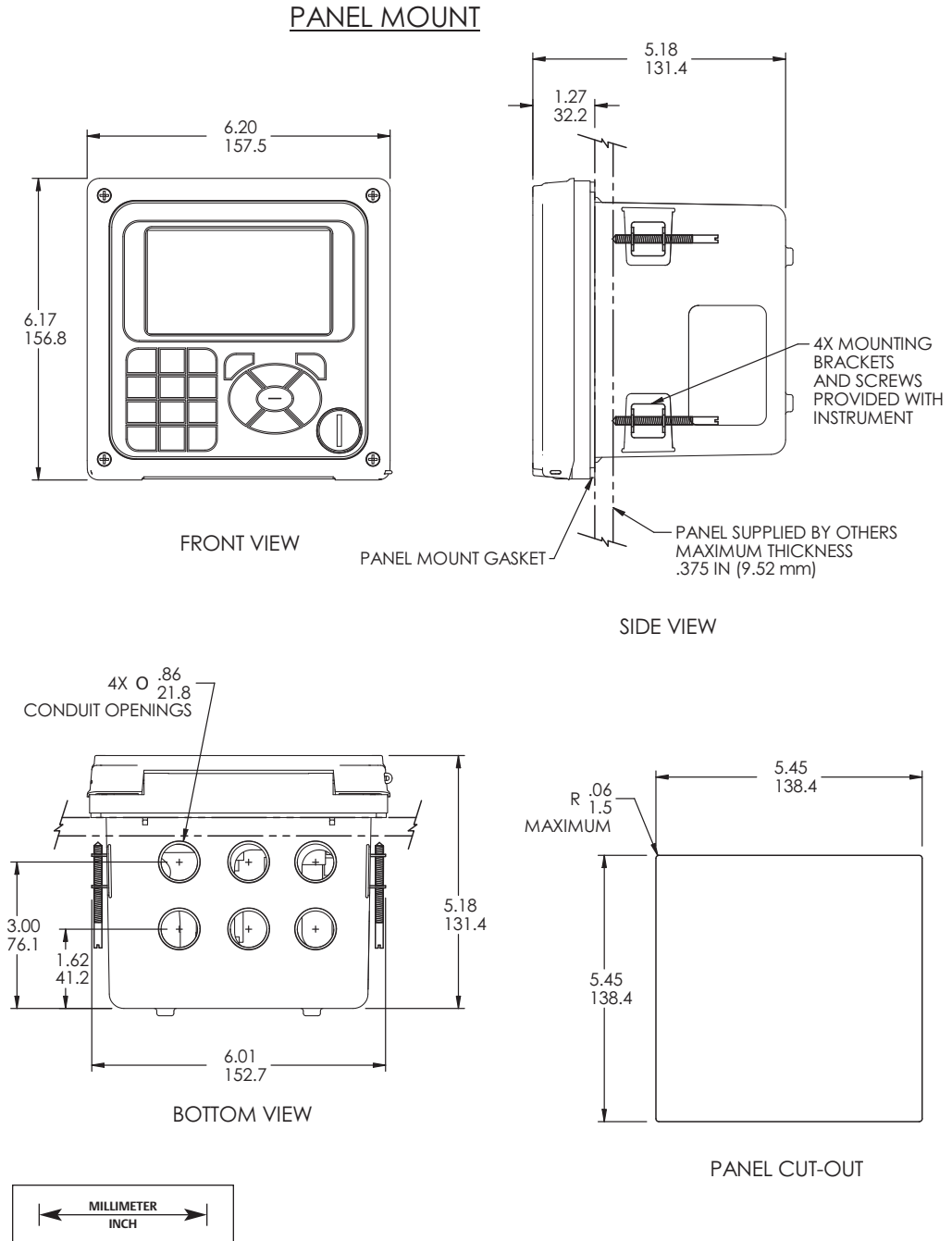
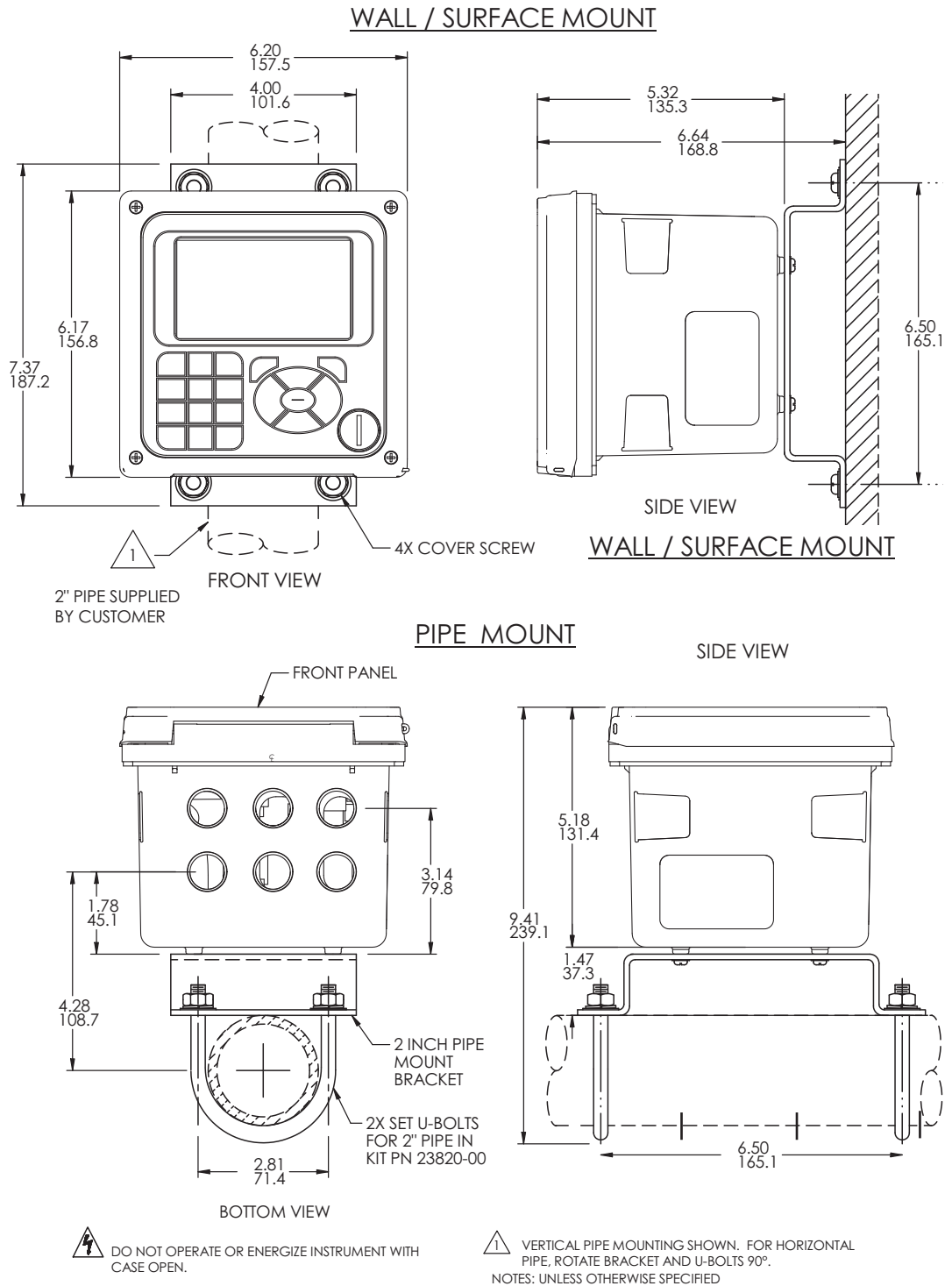


Fig. 2-2 T56 Pipe and Wall Mounting Installation dimensions



2.3 Installation – Debubbler Assembly

See Figure 2-3 for installation.

Connect the sample line to the inlet fitting. The fitting accepts 1/4-inch OD tubing. See Section 2.6 for recommended installation of the sample port.

Attach a piece of 3/8 inch ID soft tubing to the drain fitting. The debubbler must drain to atmosphere.

NOTE:

During operation, the debubbler is under pressure. A 0.040 inch (1 mm) orifice in the outlet provides the pressure. Back pressure helps prevent outgassing, which can lead to bubbles accumulating on the sensor face resulting in erroneous readings. **DO NOT EXCEED 30 psig (308 kPa abs) inlet pressure.**

! WARNING

Before removing the sensor, be absolutely certain that the process pressure is reduced to 0 psig and the process temperature is lowered to a safe level!

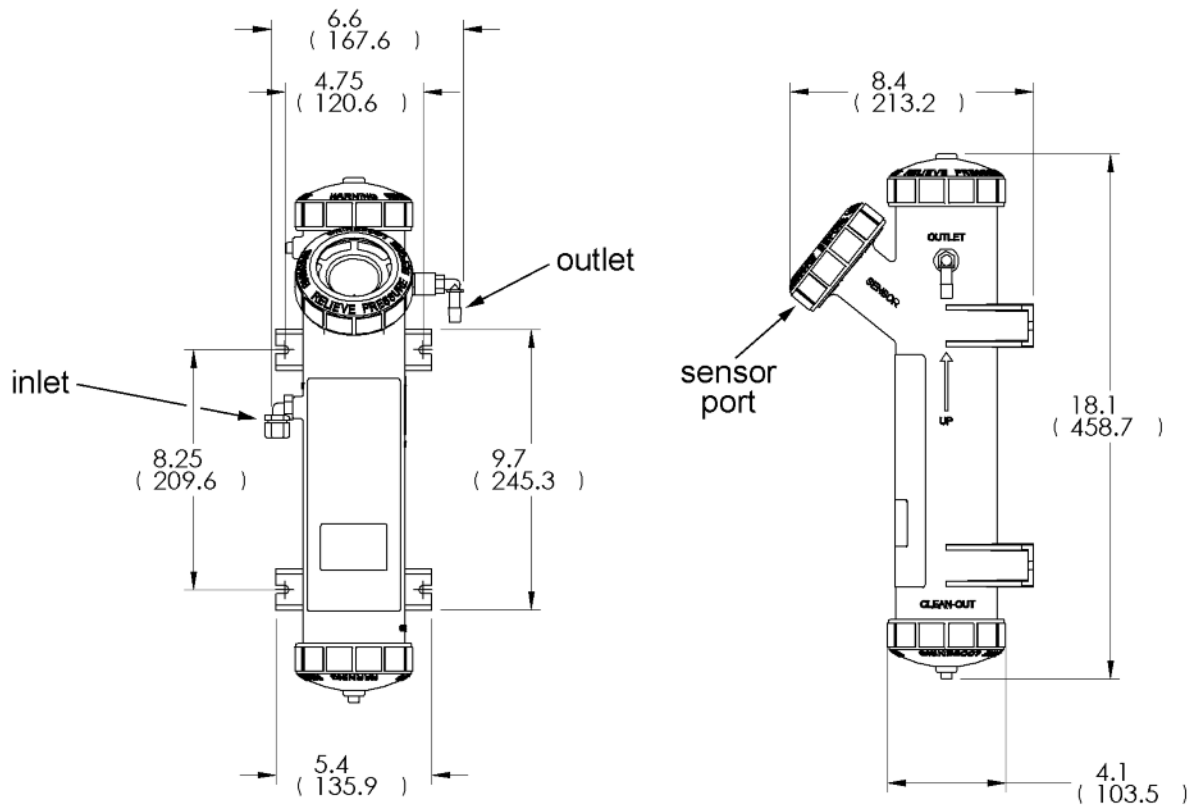
The amount of pressure in the debubbler can be estimated from the flow rate. See Table 2-1.

To control and monitor sample flow, a valved rotameter with fittings is available (PN 24103-00). Attach the rotameter to the debubbler outlet. The rotameter can also be used to increase back pressure on the debubbler if additional pressure is needed to prevent outgassing.

TABLE 2-1. Approximate debubbler pressure as a function of flow (0.040 inch outlet orifice)

gph	psig	mL/min	kPa abs
2	1	100	110
4	3	200	120
6	8	300	140
8	14	400	160
10	21	500	190
11	26	600	240
12	31	700	280
–	–	800	340

Fig. 2-3 Debubbler and Flow Chamber



2.4 Installation – Sensor

Unscrew the nut on the side of the debubbler. Insert the sensor in the mouth of the measuring chamber. Be sure the pin on the debubbler lines up with the hole in the sensor. Replace the nut. Remove the protective cap from the sensor and screw the cable onto the receptacle. The plug and receptacle are keyed for proper alignment.

The sensor is rated to IP65 when properly connected to the cable. To prevent possible water damage to the connector contacts, be sure the cable receptacle and the connector on the back of the sensor are dry when connecting or disconnecting the cable.

Fig. 2-4 Sensor

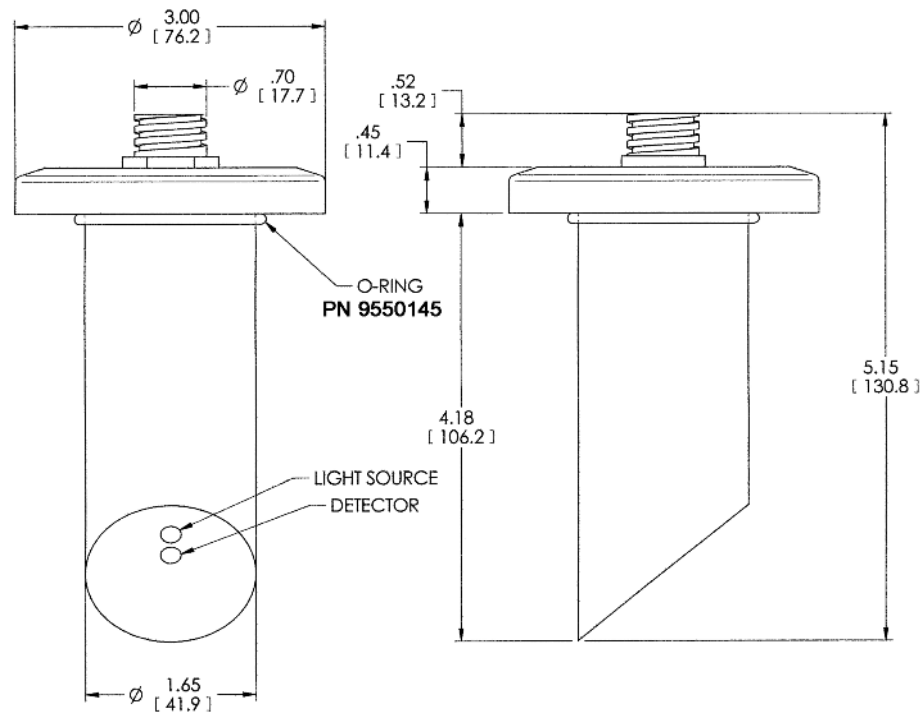


Fig. 2-5 FM Non-incendive field wiring installation for the 56-27-37 Analyzer

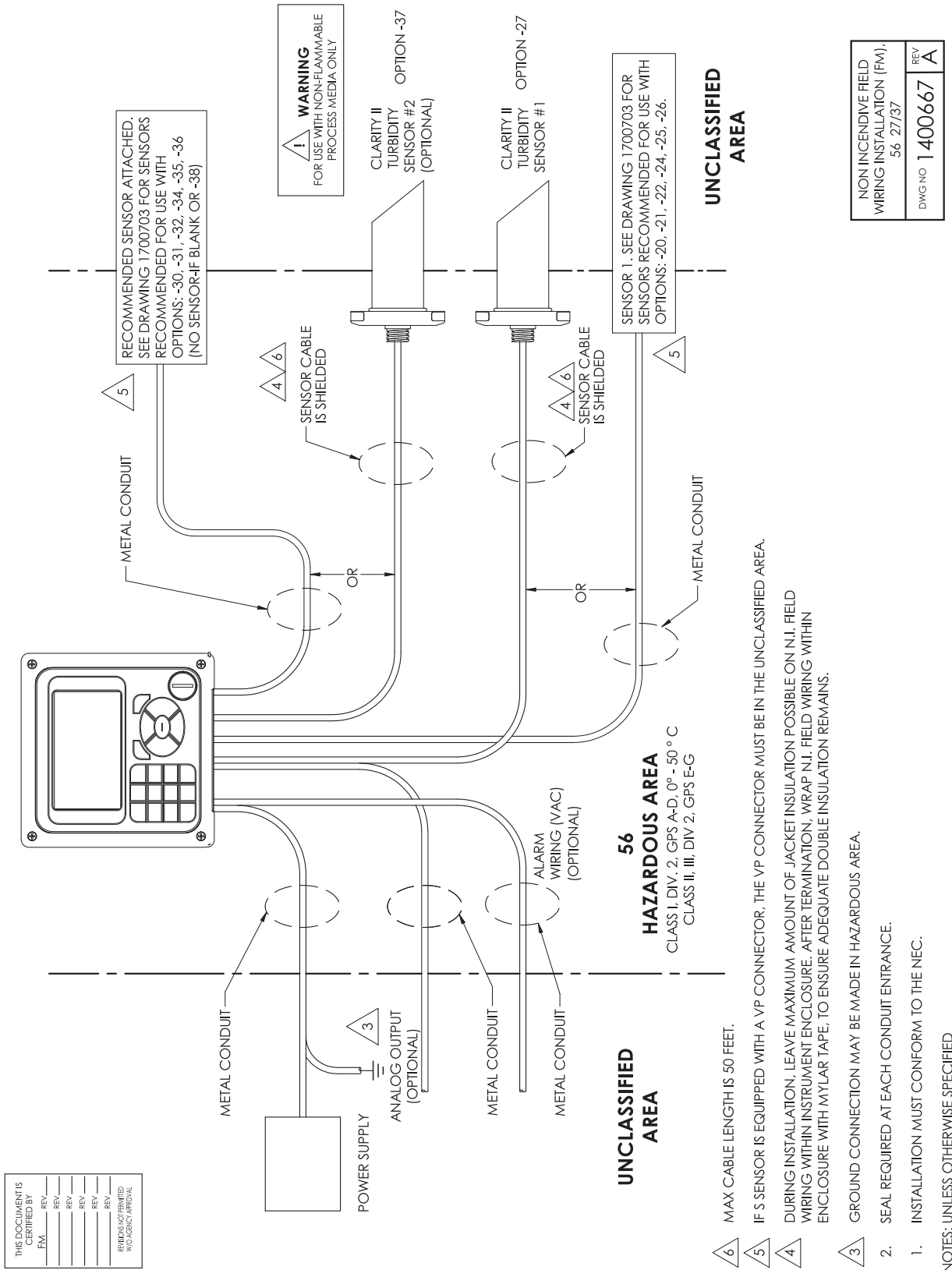
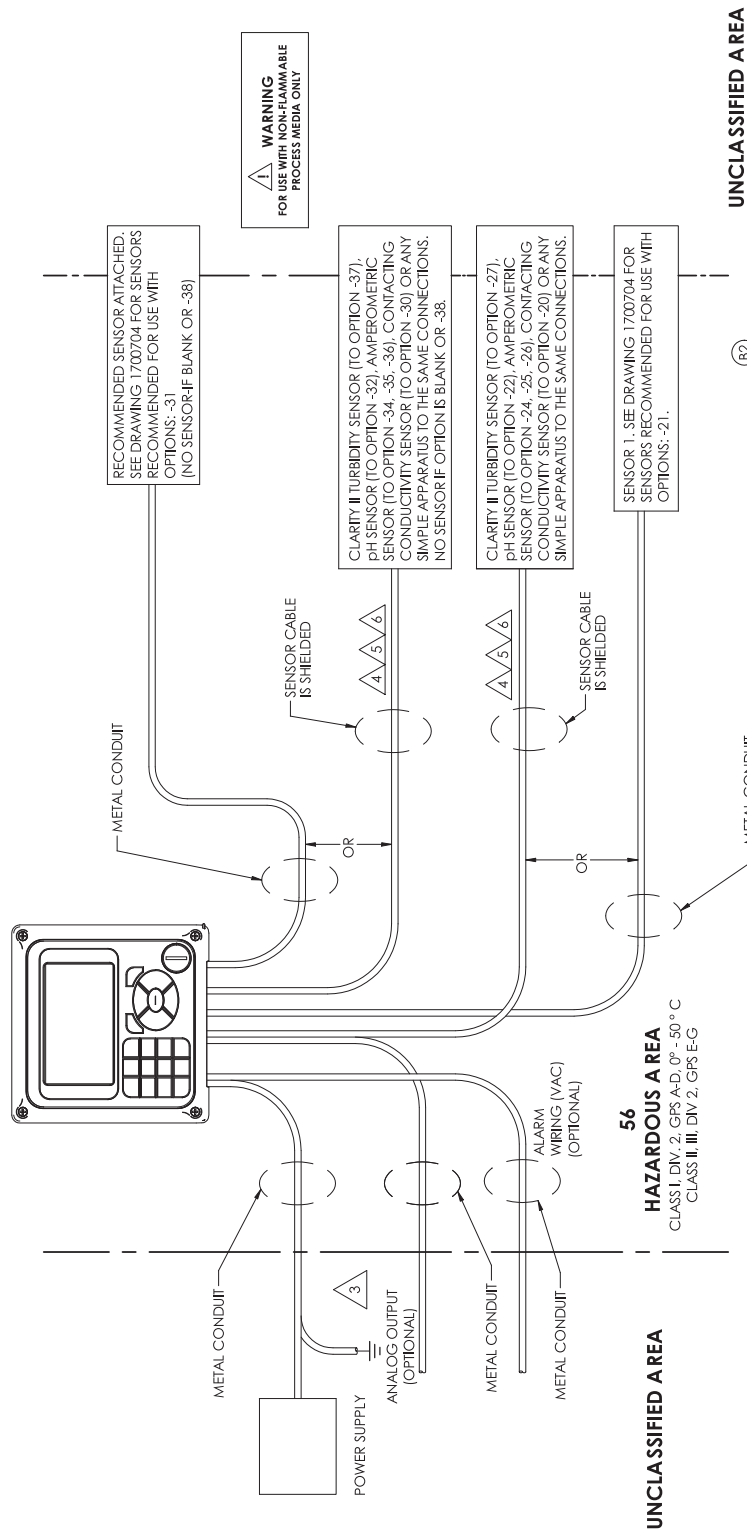


Fig. 2-6 CSA Non-incendive field wiring installation



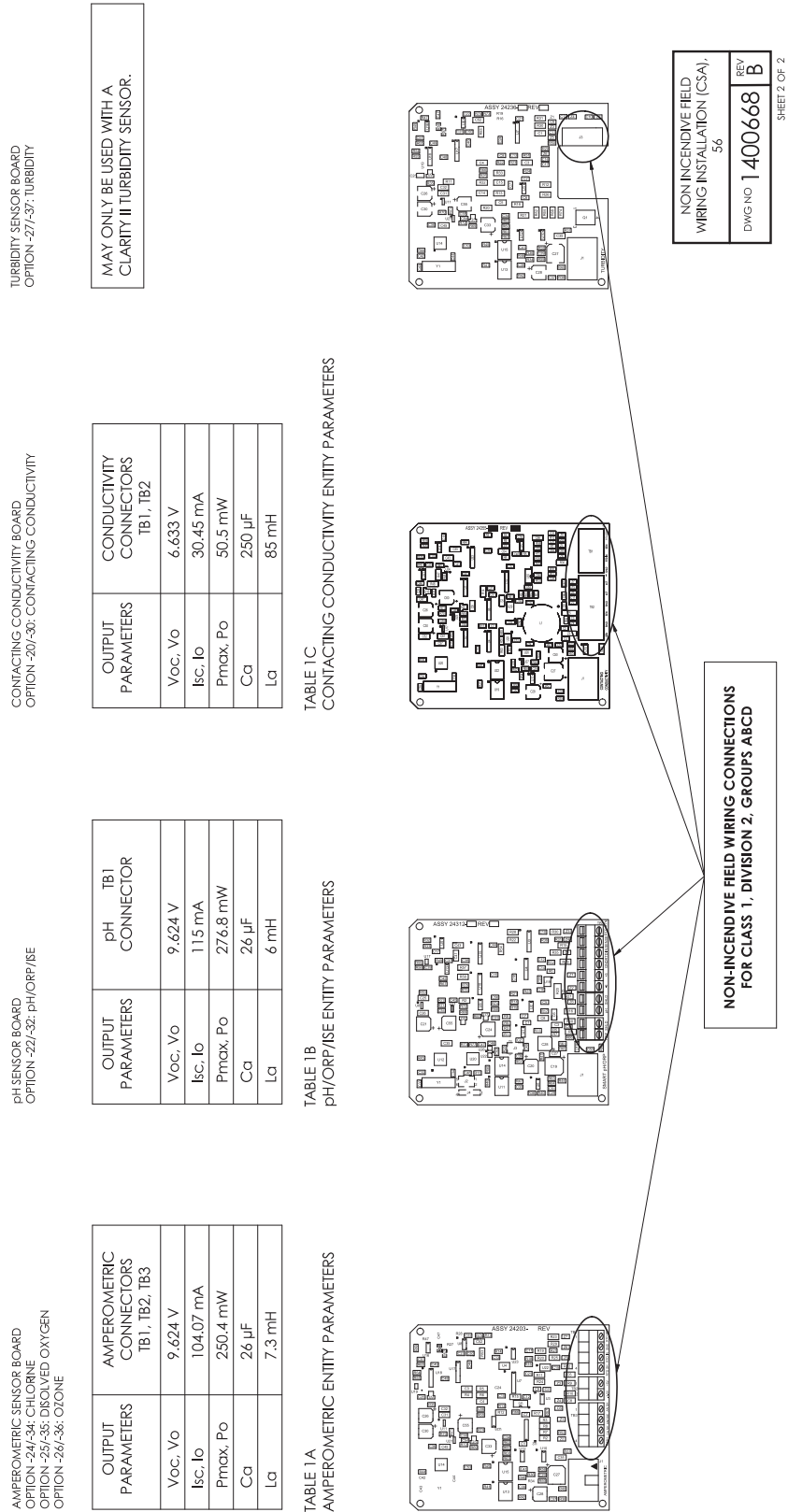
- △ 6 NON-INCENDIVE FIELD WIRING METHODS MAY BE USED FOR CONNECTING SENSOR TO THE TURBIDITY, AMPEROMETRIC, PH AND CONTACTING CONDUCTIVITY SENSOR BOARDS. ATTACHED PH, CONTACTING CONDUCTIVITY OR AMPEROMETRIC SENSORS MUST BE CSA APPROVED AS NON-INCENDIVE FOR CLASS 1, DIVISION 2. GROUPS ABCD WITH ENITY INPUT VALUES OF V_{max} AND $I_{max} \geq V_{oc}$ AND I_{cc} LISTED IN TABLES 1A TO 1C AND THE C AND U OF THE SENSOR AND INTERCONNECTED WIRING MUST BE $\leq C_g$ AND I_{cc} LISTED IN TABLES 1A TO 1C OR BE CLASSIFIED AS 'SIMPLE APPARATUS'. SIMPLE APPARATUS ARE DEVICES WHICH ARE INCAPABLE OF GENERATING OR STORING MORE THAN 1.2 V, 0.1 A, 25 mW OR 20 μ J (pH/ORP/ISE AND AMPEROMETRIC SENSORS WITHOUT PREAMPS AND CONTACTING CONDUCTIVITY SENSORS QUALIFY AS SIMPLE APPARATUS).
- △ 5 MAX CABLE LENGTH IS 50 FEET.
- △ 4 DURING INSTALLATION, LEAVE MAXIMUM AMOUNT OF JACKET INSULATION POSSIBLE ON N.J. FIELD WIRING WITHIN INSTRUMENT ENCLOSURE. AFTER TERMINATION, WRAP N.J. FIELD WIRING WITHIN ENCLOSURE WITH MYLAR TAPE, TO ENSURE ADEQUATE DOUBLE INSULATION REMAINS.
- △ 3 GROUND CONNECTION MAY BE MADE IN HAZARDOUS AREA.
2. SEAL REQUIRED AT EACH CONDUIT ENTRANCE.
 1. INSTALLATION MUST CONFORM TO THE CEC.

NOTES: UNLESS OTHERWISE SPECIFIED

NON-INCENDIVE FIELD WIRING INSTALLATION (CSA), 56	
DIWG NO	REV
1400668	B

SHEET 1 OF 2

Fig. 2-7 CSA Non-incendive field wiring installation



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Section 3.0 Wiring

3.1 General

The T56 is easy to wire. It includes removable connectors and slide-out signal input boards. The front panel is hinged at the bottom. The panel swings down for easy access to the wiring locations.

3.1.1. Removable connectors and signal input boards

The T56 uses removable signal input boards and communication boards for ease of wiring and installation. Each of the signal input boards can be partially or completely removed from the enclosure for wiring. The T56 has three slots for placement of up to two signal input boards and one communication board

Slot 1-Left	Slot 2 – Center	Slot 3 – Right
Profi board	Signal Board 1	Signal Board 2

3.1.2. Signal input boards

Slots 2 and 3 are for signal input measurement boards. Wire the sensor leads to the measurement board following the lead locations marked on the board. After wiring the sensor leads to the signal board, carefully slide the wired board fully into the enclosure slot and take up the excess sensor cable through the cable gland. Tighten the cable gland nut to secure the cable and ensure a sealed enclosure.

NOTE:

For the purpose of replacing factory-installed signal input boards, Rosemount Analytical Inc. is the sole supplier.

3.1.3. Digital communication boards

HART digital communications is standard on the T56. A Profibus DP communication board is available as an option for the T56 communication with a host. HART communications supports Bell 202 digital communications over an analog 4-20mA current output. Profibus DP is an open communications protocol which operates over a dedicated digital line to the host.

3.1.4 Alarm relays

Four alarm relays are supplied with the switching power supply (85 to 264VAC, -03 order code) and the 24VDC power supply (20-30VDC, -02 order code). All relays can be used 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 as an interval timer, typically used to activate pumps or control valves. As process alarms, alarm logic (high or low activation or USP*) and deadband are user-programmable. Customer-defined failsafe operation is supported as a programmable menu function to allow all relays to be energized or not-energized as a default condition upon powering the analyzer. The USP* alarm can be programmed to activate when the conductivity is within a user-selectable percentage of the limit. USP alarming is available only when a contacting conductivity measurement board is installed.

3.2 Preparing Conduit Openings

There are six conduit openings in all configurations of T56. (Note that four of the openings will be fitted with plugs upon shipment.)

Conduit openings accept 1/2-inch conduit fittings or PG13.5 cable glands. To keep the case watertight, block unused openings with Type 4X or IP65 conduit plugs.

NOTE:

Use watertight fittings and hubs that comply with your requirements. Connect the conduit hub to the conduit before attaching the fitting to the analyzer.

3.3 Preparing Sensor Cable

The T56 is intended for use with all Rosemount Analytical sensors. Refer to the sensor installation instructions for details on preparing sensor cables.

3.4 Power, Output, and Sensor Connections

3.4.1 Power wiring

Two Power Supplies are offered for the T56:

- a. 24VDC (20 – 30V) Power Supply (-02 ordering code)
- b. 85 – 265 VAC Switching Power Supply (-03 ordering code)

AC mains leads and 24VDC leads are wired to the Power Supply board which is mounted vertically on the left side of the main enclosure cavity. Each lead location is clearly marked on the Power Supply board. Wire the power leads to the Power Supply board using the lead markings on the board.

The grounding plate is connected to the earth terminal of the -03 (85-265VAC) power supply. The green colored screws on the grounding plate are intended for connection to some sensors to minimize radio frequency interference. The green screws are not intended to be used for safety purposes.

3.4.2 Current output wiring

All instruments are shipped with four 4-20mA current outputs. Wiring locations for the outputs are on the Main board which is mounted on the hinged door of the instrument. Wire the output leads to the correct position on the Main board using the lead markings (+/positive, -/negative) on the board. Male mating connectors are provided with each unit.

3.4.3 Alarm relay wiring

Four alarm relays are supplied with the switching power supply (85 to 265VAC, -03 order code) and the 24VDC power supply (20-30VDC, -02 order code). Wire the relay leads on each of the independent relays to the correct position on the power supply board using the printed lead markings (NO/Normally Open, NC/Normally Closed, or Com/Common) on the board.

3.4.4 Sensor wiring to signal boards

Plug the pre-terminated sensor cable connector directly into the turbidity signal board mating connector.

WARNING



RISK OF 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.

3.4.5 Sensor

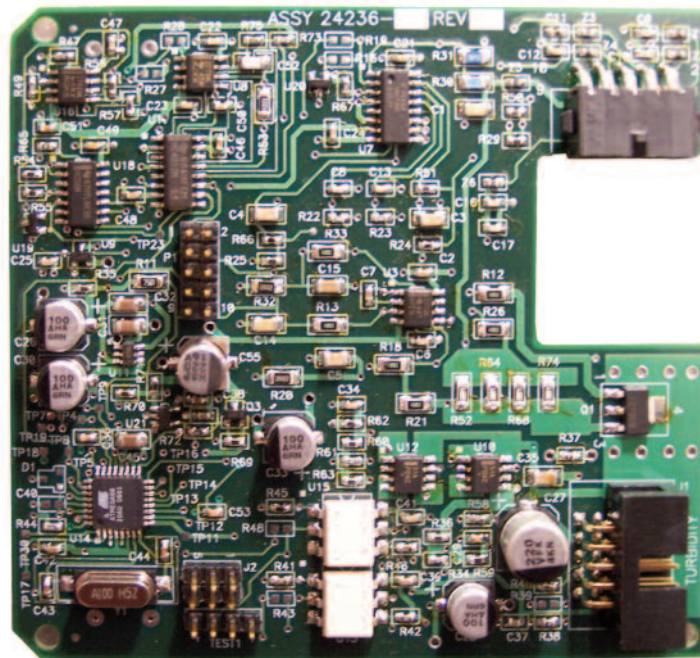
The sensor cable is pre-wired to a plug that inserts into a receiving socket on the signal board. See Figures 3-1. The cable also passes through a strain relief fitting. To install the cable:

1. Remove the wrenching nut from the strain relief fitting.
2. Insert the plug through the hole in the bottom of the enclosure nearest the sensor socket. Seat the fitting in the hole.
3. Slide the wrenching nut over the cable plug and screw it onto the fitting.
4. Loosen the cable nut so the cable slides easily.
5. Insert the plug into the appropriate receptacle. To remove the plug, squeeze the release clip and pull straight out.
6. Adjust the cable slack in the enclosure and tighten the cable nut. Be sure to allow sufficient slack to avoid placing stress on the cable and connections.
7. Plug the cable into the back of the sensor. The sensor is rated to IP65 when properly connected to the cable. To prevent possible water damage to the connector contacts, be sure the cable receptacle and the connector on the back of the sensor are dry when connecting or disconnecting the cable.
8. Place the sensor in either the measuring chamber or the calibration cup. **The sensor must be in a dark place when power is first applied to the analyzer.**

NOTE:

If “S1 Warning” appears, check sensor cable connection and confirm sample water flow at debubbler drain outlet.

Fig. 3-1 Turbidity signal board with plug-in Sensor connection



IMPORTANT NOTE:

When using EPA/incandescent sensors (PN 8-0108-0002-EPA):

- DO NOT power up the instrument without the sensor connected
- DO NOT disconnect and reconnect a sensor while an analyzer is powered

If this is inconvenient or cannot be avoided:

1. Cycle power to the instrument after connecting the sensor or...
2. Perform a Slope Calibration or Standard Calibration routine after connecting the sensor.

Following these guidelines will extend the life of the incandescent lamp and avoid premature warnings and faults due to reduced lamp life.

Section 4.0 Display and Operation

4.1 User Interface

The T56 has a large display which shows two live measurement readouts in large digits and up to six additional process variables or diagnostic parameters concurrently. The display is back-lit and the format can be customized to meet user requirements. The ENTER/MENU key allows access to Calibration, Hold (of current outputs), Programming, Display, Data and HART functions. In addition, a dedicated INFO key is available to provide access to useful diagnostic and instrument information regarding installed sensor(s) and any problematic conditions. The display flashes a red banner to indicate a Fault condition and a yellow banner for a Warning condition. Help screens are displayed for fault and warning conditions to guide the user in troubleshooting. During calibration and programming, key presses guide the user step-by-step through procedures. An alpha-numeric keypad similar to a cell phone keypad is available to allow the user to enter data during programming and calibration or lengthy tags to describe process points, sensors, or instrumentation.



4.2 Instrument Keypad

There are three **Function keys**, four **Navigation keys** and an **alpha-numeric keypad** on the instrument keypad.

Function keys

The **ENTER/MENU** key is used to access menus for programming and calibrating the instrument as well as retrieving stored data. Eight top-level menu items appear when pressing the ENTER/MENU key from the main display of live readings:

- **Calibrate:** calibrate attached sensors and analog outputs.
- **Program:** Program outputs, relays, measurement, temperature, and security codes.
- **Hold:** Suspend current outputs.
- **Display Setup:** Program graphic trend display, brightness, main display format, tags, language, and warnings.
- **Data storage and retrieval:** Enable data and event storage, download data, and view events.
- **HART or Profibus:** Program HART and Profibus communication parameters.
- **Time and Date:** Set and view real-time clock settings.
- **Reset:** Reset all instrument settings, calibration settings or current outputs to factory defaults.

Calibrate	Data storage and retrieval
Program	HART
Hold	Time and Date
Display setup	Reset

The **ENTER/MENU key** is also used to enter selections or enable programming and calibration steps.

The **EXIT key** returns to the previous menu level.

The **INFO key** provides detailed instructions and explanations during programming and calibrating procedures. It also provides troubleshooting tips for all faults and warnings that may occur during calibration or continuous operation in process.

Navigation Keys

The four **Navigation keys** arranged around the **ENTER/MENU key** operate in an intuitive manner similar to the navigation keys on a computer keyboard. During menu operation, these keys are used to move the highlighted screen selection to another adjacent screen item. During tag entry, the left key is used to delete entries during active alpha-numeric character entry.

Alpha-numeric Keypad

The **alpha-numeric keypad** has 12 keys as outlined below.

- Nine keys are alpha-numeric
- One key is a dedicated “1” key
- One key is a dedicated “0” key
- One key is a dedicated “.” (decimal point) key

The **alpha-numeric keypad** operates the same as entries on a mobile phone. The nine alpha-numeric keys have multiple characters that can be entered for tag entries or during programming and calibration steps. Character selections are made by pressing the key multiple times to toggle to characters that are available on each key.

4.3 Main Display

The T56 displays one or two primary measurement values, up to six secondary measurement values, fault and warning banner, alarm relay flags, and a digital communications icon.

Process Measurements:

Two process variables are displayed if two signal boards are installed. One process variable and process temperature is displayed if one signal board is installed with one sensor. The Upper display area shows the Sensor 1 process reading. The Center display area shows the Sensor 2 process reading. For dual conductivity, the Upper and Center display areas can be assigned to different process variables as follows:

For single input configurations, the Upper display area shows the live process variable and the Center display area can be assigned to Temperature or blank.

Secondary Values:

Up to six secondary values are shown in six display quadrants at the bottom half of the screen. All six secondary value positions can be programmed by the user to any display parameter available.

4.4 Menu System

The T56 menu system is similar to a computer. Pressing the ENTER/MENU key at any time opens the top-level menu including Calibration, Hold, Programming, Display, Data and HART functions. To find a menu item, use the directional Navigation keys to highlight a menu item. Press ENTER/MENU and simply direct the cursor to the desired operation and follow the screen prompts. Pressing the BACK screen control available on some menu screens will revert to the immediate previous menu screen. Pressing the EXIT key will return to the previous hierarchical menu level.

Fault and Warning banner:

If the analyzer detects a problem with itself or the sensor the word Fault banner (red) and/or Warning banner (yellow) will appear at the bottom of the main display. A fault requires immediate attention. A warning indicates a problematic condition or an impending failure. For detailed troubleshooting assistance, press INFO.

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Section 5.0. Programming the Analyzer - Basics

5.1 General

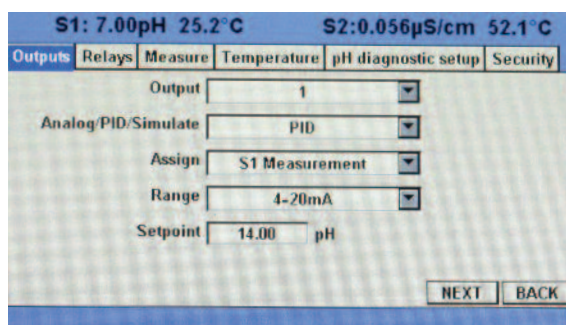
Typical programming steps include the following listed procedures. Each of these programming functions are easily and quickly accomplished using the intuitive menu systems.

- Configure and assign values to the current outputs
- Set a security code for two levels of security access
- Accessing menu functions using a security code
- Enabling and disabling Hold mode for current outputs
- Choosing the frequency of the AC power (needed for optimum noise rejection)
- Resetting all factory defaults, calibration data only, or current output settings only

5.2 Configuring and Ranging the Current Outputs

The T56 accepts inputs from two sensors and has four analog current outputs. Ranging the outputs means assigning values to the low (0 or 4 mA) and high (20 mA) outputs. This section provides a guide for configuring and ranging the outputs. ALWAYS CONFIGURE THE OUTPUTS FIRST.

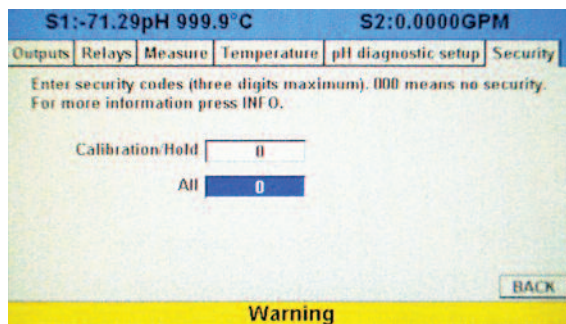
To configure the outputs, access the Outputs screen by pressing ENTER/MENU then Program from the main screen. Outputs 1-4 can be set to Analog, PID or Simulation. Also, output assignments, scaling the range, linear or logarithmic outputs, output dampening, output setpoints and output fault levels can be set for each output if desired.



5.3 Setting a Security Code

The security codes prevent accidental or unwanted changes to program settings, displays, and calibration. T56 has two levels of security code to control access and use of the instrument to different types of users. The two levels of security are:

- **All:** This is the Supervisory security level. It allows access to all menu functions, including Programming, Calibration, Hold and Display.
- **Calibration/Hold:** This is the operator or technician level menu. It allows access to only calibration and Hold of the current outputs.

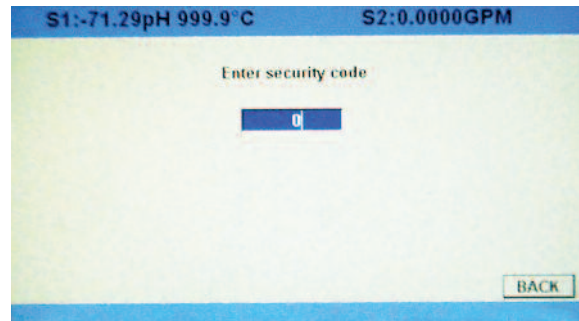


The set security codes, access the Security screen by pressing ENTER/MENU from the main screen. Upon entry of the proper code, the follow security screen will appear.

5.4 Security Access

When entering the correct access code for the **Calibration/Hold** security level, the Calibration and Hold menus are accessible. This allows operators or technicians to perform routine maintenance. This security level does not allow access to the Program or Display menus. When entering the correct access code for **All** security level, the user has access to all menu functions, including Programming, Calibration, Hold and Display.

To use T56 menus using a security code, access the Security screen by pressing ENTER/MENU from the main screen. If a security code is currently programmed, the follow security screen will appear. Enter the code.

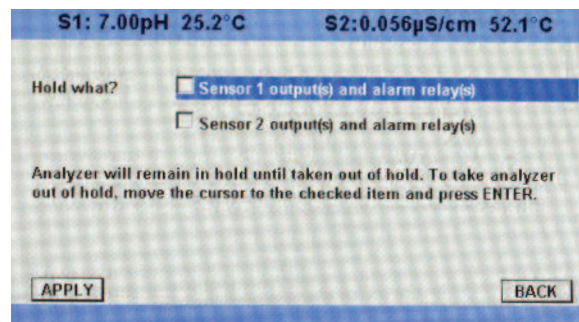


1. If a security code has been programmed, selecting the Calibrate, Hold, Program or Display top menu items causes the security access screen to appear
2. Enter the three-digit security code for the appropriate security level.
3. If the entry is correct, the appropriate menu screen appears. If the entry is incorrect, the **Invalid Code** screen appears. The **Enter Security Code** screen reappears after 2 seconds.

5.5 Using Hold

To prevent improper operation of systems or pumps that are controlled directly by the current output, place the analyzer in hold before removing the sensor for calibration and maintenance. During hold, all outputs remain at the last value. **Once in hold, all current outputs remain on Hold indefinitely.** Be sure to remove the analyzer from hold once calibration is complete

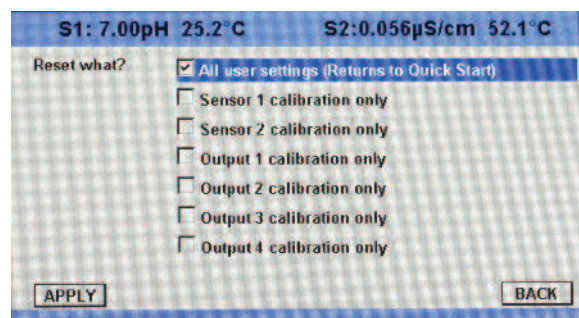
To hold the outputs and alarm relays, access the Hold screen by pressing ENTER/MENU from the main screen.



5.6 Resetting Factory Default Settings

This section describes how to restore factory calibration and default values. The process also clears all fault messages and returns the display to the first Quick Start screen. The T56 offers three options for resetting factory defaults.

- a. reset all settings to factory defaults
- b. reset sensor calibration data only
- c. reset analog output settings only

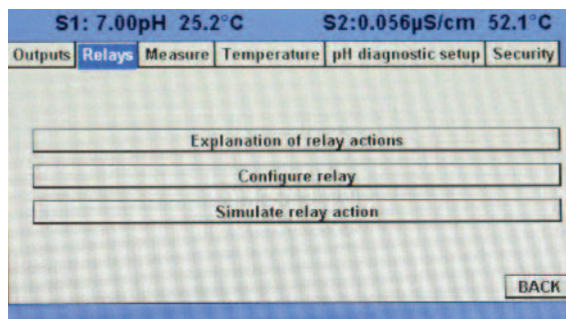


To reset to factory defaults, reset calibration data only or reset analog outputs only, access the Reset screen by pressing ENTER/MENU from the main screen.

5.7 Programming Alarm Relays

The T56 24VDC (-02 order code) and the AC switching power supply (-03 order code) provide four alarm relays for process measurement or temperature. Each alarm can be configured as a fault alarm instead of a process alarm. Also, each relay can be programmed independently and each can be programmed as an interval timer or one of four advanced timer functions. This section describes how to configure alarm relays, simulate relay activation, and synchronize timers for the four alarm relays.

This section provides details to program the following alarm features. To program the alarm relays, access the Program screen by pressing ENTER/MENU from the main screen and then select the Relay tab and the Configure relay control.

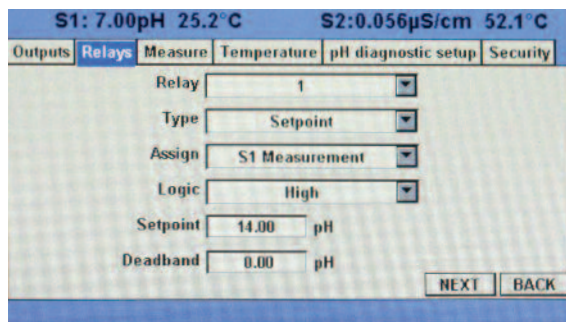


The following relay functions can be programmed to any relay from the Configure Relay screen:

1. assign a relay
2. define a relay function
3. assign a Measurement
4. set relay logic
5. enter setpoints
6. set deadband
7. set normal state
8. set USP Safety level (contacting conductivity)

To program these relay functions, access the Configure Relay screen by pressing ENTER/MENU from the main Relay programming screen.

1. To assign a relay, highlight the desired Relay 1-4 and press ENTER/MENU.
2. To define a relay function, select from Setpoint, Interval Timer, TPC, Bleed and Feed, Water Meter, Delay timer, Date and Time, Fault or None and press ENTER/MENU.
3. To assign a measurement to a specific relay, select the desired measurement or temperature input and press ENTER/MENU.
4. To set relay logic to activate alarms at a High reading or a Low reading, select high or low and press ENTER/MENU.

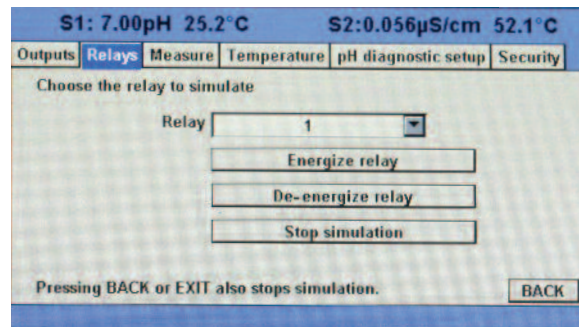
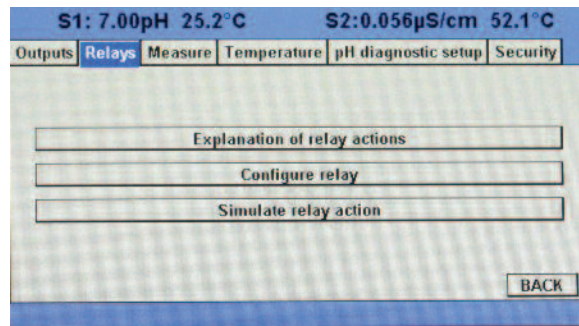


5. To enter setpoints for relays, enter the desired value for the process measurement or temperature at which to activate an alarm event and press ENTER/MENU.
6. To set deadband as a measurement value, enter the change in the process value needed after the relay deactivates to return to normal (and thereby preventing repeated alarm activation) and press ENTER/MENU.
7. To set the Normal alarm condition, select Open or Closed and press ENTER/MENU. Program the normal state to define the desired alarm default state to normally open or normally closed upon power up.
8. To set USP Safety, enter the percentage below the limit at which to activate the alarm and press ENTER/MENU. NOTE: USP Safety only appears if a contacting conductivity board is installed.

This section provides details to simulate relay action. To simulate relays, access the Program screen by pressing ENTER/MENU from the main screen and then select the Relay tab.

To simulate alarm relay conditions, access the Simulate Relay Action screen by pressing ENTER/MENU from the main Relay programming screen.

Alarm relays can be manually set for the purposes of checking devices such as valves or pumps. Under the Alarms Settings menu, this screen will appear to allow manual forced activation of the alarm relays. Select the desired alarm condition to simulate.



Section 6.0 Programming - Turbidity

6.1 Programming Measurements – Introduction

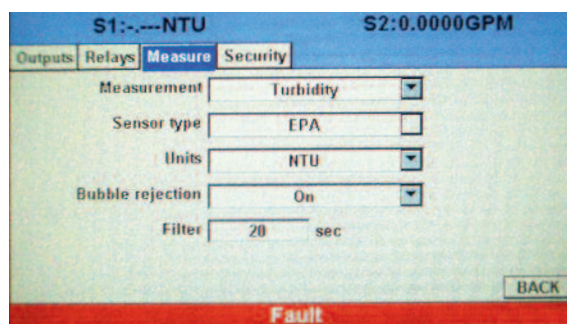
The T56 automatically recognizes each installed measurement board upon first power-up and each time the analyzer is powered. Completion of Quick Start screens upon first power up enable measurements, but additional steps may be required to program the analyzer for the desired measurement application.

6.2 Turbidity Measurement Programming

This section describes how to configure the T56 analyzer for Turbidity measurements. The following programming and configuration functions are covered.

1. Measurement type: Turbidity Select Turbidity or TSS calculation (estimated TSS)
2. Sensor type: Select EPA or ISO
3. Measurement units: NTU, FTU, FNU
4. Filter: 20 sec Override the default input filter, enter 0-999 seconds
5. Bubble Rejection: On Intelligent software algorithm to eliminate erroneous readings caused by bubble accumulation in the sample

1. To program the Measurement type, Select Turbidity or TSS calculation (estimated TSS) and press ENTER/MENU.
2. To program the Sensor type: Select EPA or ISO and press ENTER/MENU.
3. To program Measurement units: NTU, FTU, FNU and press ENTER/MENU.
4. To Override the default input filter, enter 0-999 seconds and press ENTER/MENU.
5. To program Bubble Rejection, select On or Off and press ENTER/MENU.



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Section 7.0 Calibration

7.1 Calibration – Introduction

Calibration is the process of adjusting or standardizing the analyzer to a lab test or a calibrated laboratory instrument, or standardizing to some known reference. Completion of Quick Start upon first power up enables live measurements but does not ensure accurate readings in the lab or in process. Calibration should be performed with each attached sensor to ensure accurate, repeatable readings.

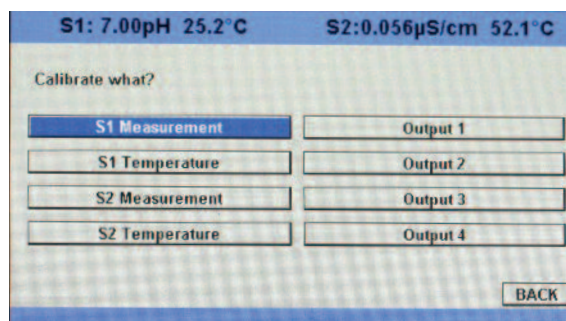
7.2 Turbidity

This section describes how to calibrate the turbidity sensor against a user-prepared standard as a 2-point calibration with deionized water, against a 20 NTU user-prepared standard as a single point calibration, and against a grab sample using a reference turbidimeter.

To calibrate the turbidity sensor, access the Calibration screen by pressing ENTER/MENU from the main screen, select S1 or S2 Measurement and press ENTER/MENU. Press INFO at any time to learn more about this procedure. A yellow screen will appear with detailed instructions and information.

The following calibration routine is covered:

1. Slope Calibration Slope cal with pure water and a standard of known turbidity
2. Standardize Calibration Standardizing the sensor to a known turbidity
3. Grab Calibration Standardizing the sensor to a known turbidity based on a reference turbidimeter



1. To calibrate the turbidity loop using Slope Calibration with pure water and a standard of known turbidity, follow the step-by-step procedures displayed on-screen.
2. To calibrate the turbidity loop using Standardize Calibration by Standardizing the sensor to a known turbidity, follow the step-by-step procedures displayed on-screen.
3. To calibrate the turbidity loop using Grab Calibration by Standardizing the sensor to a known turbidity based on a reference turbidimeter, follow the step-by-step procedures displayed on-screen.

7.2.1 Slope Calibration – Turbidity

This section describes how to conduct a 2-point calibration of the turbidity sensor against a user-prepared 20NTU standard. The calibration requires two steps. First, immerse the sensor in filtered water having very low turbidity and measure the sensor output. Next, increase the turbidity of the filtered water by a known amount, typically 20 NTU, and measure the sensor output again. The analyzer takes the two measurements, applies a linearization correction (if necessary), and calculates the sensitivity. Sensitivity is the sensor output (in mV) divided by turbidity. A typical new sensor has a sensitivity of about 10 mV/NTU. As the sensor ages, the sensitivity decreases. The figure below illustrates how turbidity calibration works. Before beginning the calibration, the analyzer does a dark current measurement. Dark current is the signal generated by the detector when no light is falling on it. The analyzer subtracts the dark current from the raw scattered light signal and converts the result to turbidity. In highly filtered samples, which scatter little light, the dark current can be a substantial amount of the signal generated by the detector.

7.2.2 Standardize Calibration – Turbidity

The turbidity sensor can also be calibrated against a commercial standard. Stable 20.0 NTU standards are available from a number of sources. Calibration using a commercial standard is simple. Filtered deionized water is not required. Before beginning the calibration, the analyzer does a dark current measurement. Dark current is the signal generated by the detector even when no light is falling on it. The analyzer subtracts the dark current from the raw scattered light signal and converts the result to turbidity. In highly filtered samples, which scatter little light, the dark current can be a substantial amount of the signal generated by the sensor.

7.2.3 Grab Calibration – Turbidity

If desired, the turbidity sensor can be calibrated against the turbidity reading from another instrument. The analyzer treats the value entered by the user as though it were the true turbidity of the sample. Therefore, grab sample calibration changes the sensitivity, it does not apply an offset to the reading.

Section 8.0 Maintenance

8.1 Overview

The 56 Analyzer used in the Clarity II turbidimeter needs little routine maintenance. Clean the analyzer case and front panel by wiping it with a clean soft cloth dampened with water ONLY. Do not use solvents, like alcohol, that might cause a buildup of static charge.

A few of the components of the analyzer are replaceable. See Tables 8-1 and 8-2.

WARNING

Explosion Hazard. Do not disconnect equipment when a flammable or combustible atmosphere is present.

8.2 Sensor

8.2.1 Cleaning the sensor

Clean the sensor by rinsing it with water followed by wiping with a soft tissue. If water is inadequate, wash with a mild detergent solution followed by thorough rinsing with water. **Do not scratch the lamp or photodiode windows.**

If mineral scale is present, use a dilute acid solution applied with a cotton swab to clean away the deposit. Rinse thoroughly with water.

Do not use abrasive cleaners or solvents.

8.2.2 Replacing the lamp/LED board

The USEPA-compliant sensor uses a tungsten filament lamp (PN 1-0901-0004-EPA) as the light source. The lamp has an expected life of about one year. The ISO-compliant version uses an infrared LED (PN 1-0901-0005-ISO). Its expected life is three years. The 56 analyzer continuously monitors the source intensity and corrects for changes in source intensity caused by age. When the source intensity becomes too low, the analyzer warns the user. The user should replace the lamp as soon as possible.

To replace the lamp/LED board:

1. Turn off power to the analyzer.

WARNING

Explosion Hazard. Do not disconnect equipment when a flammable or combustible atmosphere is present.

2. Remove the sensor from the measuring chamber and disconnect the cable.

WARNING



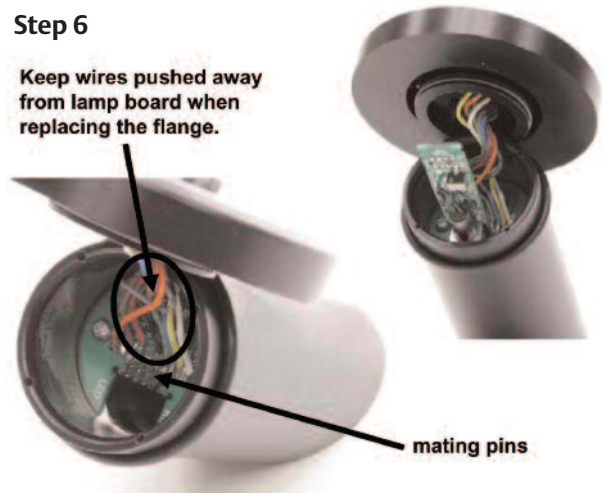
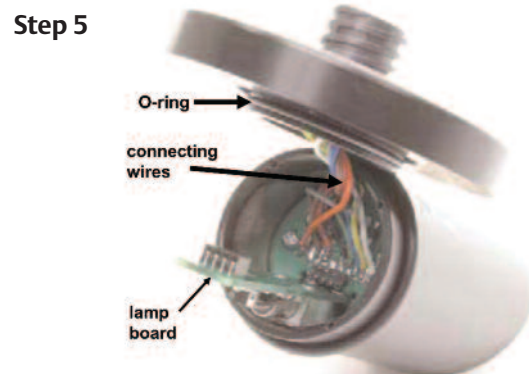
Before removing the sensor, be absolutely certain that the process pressure is reduced to 0 psig and the process temperature is lowered to a safe level!

NOTE:

If you have a dual input analyzer, you can reapply power at this point. The initial reading from the other sensor will be momentarily zero. After about 60 seconds the reading will reach its final value.

3. Using a small Phillips screwdriver, remove the two screws holding the top flange of the sensor to the body.
4. Using a slight back and forth twisting motion carefully pull the flange from the sensor body. You are pulling against a single O-ring seal. Don't pull too hard.
5. Using your thumb and forefinger, remove the lamp/LED circuit board from the sensor.
6. Insert the replacement board in the sensor and push the socket on the replacement board into the mating pins in the sensor.
7. Place the desiccant package in the sensor body.
8. Orient the flange so that the screw holes line up with the holes in the sensor body. Push the flange back on the sensor body and replace the screws. Don't let wires push on lamp board. It may be necessary to turn the flange a small amount until the holes line up.
9. Place the sensor in the calibration cup and reconnect the cable.
10. Calibrate the sensor using either slope or standard calibration (Section 6.2 or 6.3). Do not use grab calibration. Failure to calibrate the sensor may reduce the life of the sensor. See Sections 8.2.5 and 8.2.6.

Fig. 8-1 Replacing the Lamp/LED Board



8.3 Debubbler and Measuring Chamber

8.3.1 Cleaning the sensor

1. Turn off the sample supply to the debubbler.

WARNING



BEFORE DISCONNECTING THE SAMPLE AND DRAIN LINES OR REMOVING THE SENSOR, be absolutely certain the process pressure is reduced to 0 psig and the process temperature is at a safe level.

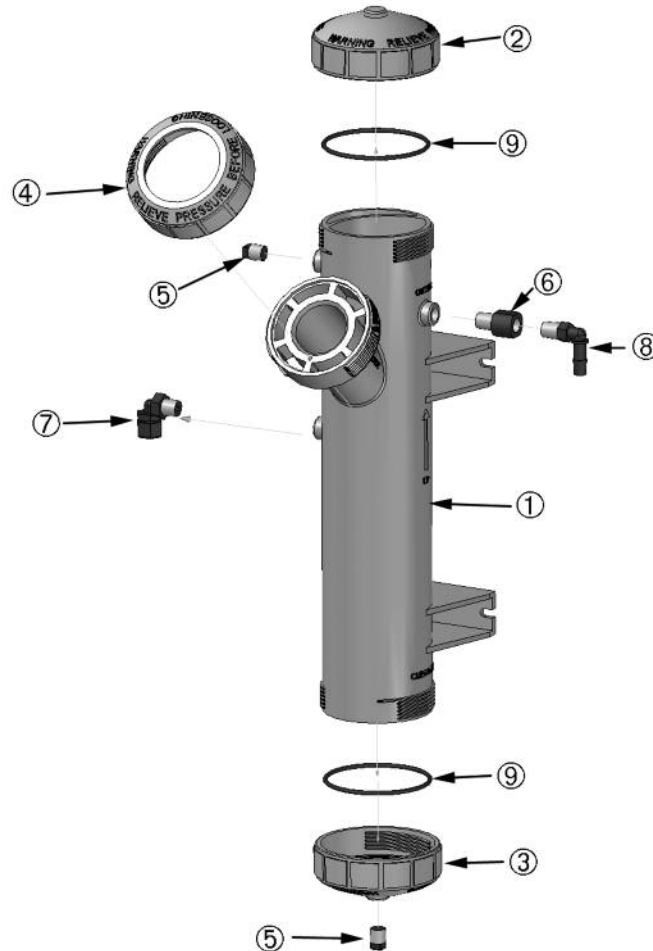
2. Remove the sensor and put it in a safe place. The calibration cup is a good place to store the sensor.
3. Loosen the small drain plug in the base plug and allow the sample in the debubbler to drain out. See Figure 8-4. Replace the drain plug.
4. Unscrew the upper and lower caps. Be careful not to lose the O-rings.
5. Use a stream of water, a brush, or a rag to flush and clean out the inside of the debubbler and measuring chamber.
6. Inspect the O-rings for signs of damage and replace if necessary. The part number for the O-ring (one each) is 9550316.
7. Replace the upper and lower caps.
8. Replace the sensor.

8.3.2 Cleaning the orifice

1. Turn off the sample to the debubbler.
2. Disconnect the drain line. Unscrew the drain fitting from the orifice; then unscrew the orifice from the debubbler body. See Figure 8-4.
3. Use a stream of water to flush out any residue accumulated in the orifice. Direct the stream of water counter to the normal flow through the orifice.
4. If the material plugging the orifice cannot be removed with flushing, use a toothpick or a stiff wire to push out the obstruction. Push counter to the normal flow through the orifice.
5. Reinstall the orifice and reconnect the drain line. Turn on the sample flow.
6. If the blockage cannot be removed or the orifice is damaged during cleaning, replace the orifice (PN 33947-00).

8.4 List of Replacement Parts

Fig. 3-2 Molded Debubbler Assembly



LOCATION IN FIGURE 8-4	DESCRIPTION	PART NUMBER
—	Replacement lamp board assembly, USEPA-compliant sensor	1-0901-0009-EPA
—	Replacement lamp board assembly, ISO-compliant sensor	1-0901-0010-ISO
—	Replacement sensor, USEPA-compliant	8-0108-0002-EPA
—	Replacement sensor, ISO-compliant	8-0108-0003-ISO
1	Debubbler housing	34015-00
2	Upper cap for debubbler	34014-00
3	Lower cap for debubbler	34014-01
4	Sensor nut	34014-02
5	Pipe plug, 1/4 inch MNPT (2 places)	3000854
6	Orifice assembly	33947-00
7	Sample inlet elbow, 1/4 in compression fitting x 1/4 in MNPT	9321010
8	Sample drain elbow, 3/8 in barb x 1/4 in MNPT	9322036
9	O-ring, one each, for upper and lower caps	9550322
not shown	O-ring, one each, for sensor	9550145

Section 9.0 Return of Material

9.1 General

To expedite the repair and return of instruments, proper communication between the customer and the factory is important. Before returning a product for repair, call 1-949-757-8500 for a Return Materials Authorization (RMA) number.

9.2 Warranty Repair

The following is the procedure for returning instruments still under warranty:

1. Call Rosemount Analytical for authorization.
2. To verify warranty, supply the factory sales order number or the original purchase order number. In the case of individual parts or sub-assemblies, the serial number on the unit must be supplied.
3. Carefully package the materials and enclose your “Letter of Transmittal” (see Warranty). If possible, pack the materials in the same manner as they were received.
4. Send the package prepaid to:
Rosemount Analytical
2400 Barranca Parkway
Irvine, CA 92606
Attn: Factory Repair
RMA No. _____
Mark the package: Returned for Repair
Model No. ____

9.3 Non-Warranty Repair

The following is the procedure for returning for repair instruments that are no longer under warranty:

1. Call Rosemount Analytical for authorization.
2. Supply the purchase order number, and make sure to provide the name and telephone number of the individual to be contacted should additional information be needed.
3. Do Steps 3 and 4 of Section 9.2.

NOTE

Consult the factory for additional information regarding service or repair.

Appendix

This procedure describes how to verify linearity between turbidity and TSS.

1. Collect a sample of the process liquid-you may need 10 L or more if you use the Clarity II for measuring turbidity. If you use a laboratory turbidimeter, you will need less volume. The Clarity II requires about 500 mL for the measurement; laboratory turbidimeters require 50 mL or less. Verify that the turbidity of the sample is less than 200 NTU. Store in a clean bottle.
2. Filter a portion of the sample to obtain at least 5 L of dilution liquid. The filtrate is needed to dilute the sample in subsequent steps. Verify that the turbidity of the dilution water is low. If filtering the sample is impractical, use deionized water for dilution.
3. Measure the total suspended solids (TSS) in the sample obtained in step 1. Thoroughly mix the sample before withdrawing liquid. A magnetic stirrer is best, but inverting the sample repeatedly for about a minute works, too. Avoid violent shaking or mixing. Refer to any standard reference work on water and wastewater testing for the procedure for determining TSS.
4. Dilute the sample from step 1, by a factor of 0.9, 0.7, 0.5, 0.3, and 0.1. See the table for recommended volumes. Measure TSS and turbidity for each dilution. For lower TSS values, use a larger volume of sample.

Dilution factor	Volume of stock, mL	Final volume, mL	Volume for Clarity II, mL	Volume for TSS, mL
1.00	--	--	500	50 - 250
0.9	900	1000	500	50 - 250
0.7	700	1000	500	50 - 250
0.5	500	1000	500	50 - 250
0.3	300	1000	500	50 - 250
0.1	100	1000	500	50 - 250

5. Plot the data obtained in step 4, with turbidity on the y-axis and TSS on the x-axis. Fit the best straight line to the data.
6. Locate two points (P1 and P2) on the line separated as much as possible. Read the ppm and NTU value for each point and enter these into the analyzer. See Section 6.5.2.

WARRANTY

Seller warrants that the firmware will execute the programming instructions provided by Seller, and that the Goods manufactured or Services provided by Seller will be free from defects in materials or workmanship under normal use and care until the expiration of the applicable warranty period. Goods are warranted for twelve (12) months from the date of initial installation or eighteen (18) months from the date of shipment by Seller, whichever period expires first. **Consumables, such as glass electrodes, membranes, liquid junctions, electrolyte, o-rings, catalytic beads, etc., and Services are warranted for a period of 90 days from the date of shipment or provision.**

Products purchased by Seller from a third party for resale to Buyer ("Resale Products") shall carry only the warranty extended by the original manufacturer. Buyer agrees that Seller has no liability for Resale Products beyond making a reasonable commercial effort to arrange for procurement and shipping of the Resale Products.

If Buyer discovers any warranty defects and notifies Seller thereof in writing during the applicable warranty period, Seller shall, at its option, promptly correct any errors that are found by Seller in the firmware or Services, or repair or replace F.O.B. point of manufacture that portion of the Goods or firmware found by Seller to be defective, or refund the purchase price of the defective portion of the Goods/Services.

All replacements or repairs necessitated by inadequate maintenance, normal wear and usage, unsuitable power sources, unsuitable environmental conditions, accident, misuse, improper installation, modification, repair, storage or handling, or any other cause not the fault of Seller are not covered by this limited warranty, and shall be at Buyer's expense. Seller shall not be obligated to pay any costs or charges incurred by Buyer or any other party except as may be agreed upon in writing in advance by an authorized Seller representative. All costs of dismantling, reinstallation and freight and the time and expenses of Seller's personnel for site travel and diagnosis under this warranty clause shall be borne by Buyer unless accepted in writing by Seller.

Goods repaired and parts replaced during the warranty period shall be in warranty for the remainder of the original warranty period or ninety (90) days, whichever is longer. This limited warranty is the only warranty made by Seller and can be amended only in a writing signed by an authorized representative of Seller. Except as otherwise expressly provided in the Agreement, THERE ARE NO REPRESENTATIONS OR WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, AS TO MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE, OR ANY OTHER MATTER WITH RESPECT TO ANY OF THE GOODS OR SERVICES.

RETURN OF MATERIAL

Material returned for repair, whether in or out of warranty, should be shipped prepaid to:

**Emerson Process Management
Rosemount Analytical
2400 Barranca Parkway
Irvine, CA 92606**

The shipping container should be marked:

Return for Repair
Model _____

The returned material should be accompanied by a letter of transmittal which should include the following information (make a copy of the "Return of Materials Request" found on the last page of the Manual and provide the following thereon):

1. Location type of service, and length of time of service of the device.
2. Description of the faulty operation of the device and the circumstances of the failure.
3. Name and telephone number of the person to contact if there are questions about the returned material.
4. Statement as to whether warranty or non-warranty service is requested.
5. Complete shipping instructions for return of the material.

Adherence to these procedures will expedite handling of the returned material and will prevent unnecessary additional charges for inspection and testing to determine the problem with the device.

If the material is returned for out-of-warranty repairs, a purchase order for repairs should be enclosed.



EC Declaration of Conformity

56-0X-2Y-3Y-Z

We,
Emerson Process Management
Blegistrasse 21
Barr, Switzerland CH 6341

Declare under our sole responsibility that the product,

Model 56-0X-2Y-3Y-Z Advanced Dual Input Analyzer;

Where X is: 2 24VDC Power Supply
3 85-265VAC Switching Power Supply

Where Y is: 0 Contacting Conductivity
1 Toroidal Conductivity
2 pH/ORP/ISE
3 Flow/Current Input
4 Chlorine
5 Dissolved Oxygen
6 Ozone
7 Turbidity
8 None

Where Z is: HT HART communications
DP Profibus communications

manufactured by,

Emerson Process Management
Rosemount Analytical
2400 Barranca Parkway
Irvine, California 92606
USA

to which this declaration relates, is in conformity with the provisions of the European community 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 Community notified body certification, as shown in the attached schedule.

(signature)

Andy Kemish

(name printed)

Vice President Analytical Europe

(function name printed)

November 29, 2010

(date of issue)



ROSEMOUNT
Analytical



**Schedule
EC Declaration of Conformity**

EMC Directive (2004/108/EC)

Model 56-0X-2Y-3Y-Z Advanced Dual Input Analyzer;

EN 61326-1: 2006
EN 61000-3-2: 1995
EN 61000-3-3: 1995

Low Voltage Directive (2006/95/EC)

Model 56-0X-2Y-3Y-Z Advanced Dual Input Analyzer;

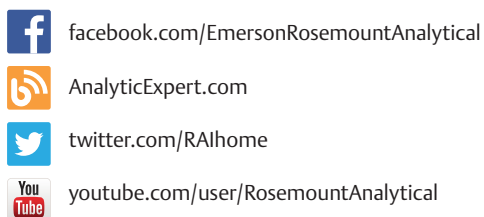
EN 61010-1:2001

CE marking was first affixed to this product in 2010



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Credit Cards for U.S. Purchases Only.



Emerson Process Management

2400 Barranca Parkway
Irvine, CA 92606 USA
Tel: (949) 757-8500
Fax: (949) 474-7250
rosemountanalytical.com

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