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Product Data Sheet
PDS 71-T1055/rev.J
January 2006

Model T1055

CLARITY II™ TURBIDIMETER

- 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
- RANGE 0-200 NTU
- RESOLUTION 0.001 NTU
- FULL FEATURED ANALYZER with fully scalable analog outputs and optional fully programmable alarms
- INTUITIVE, USER-FRIENDLY MENU in six languages makes setup and calibration easy



Clarity II is a trademark of Emerson Process Management.

FEATURES AND APPLICATIONS

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. Because it measures turbidity as high as 200 NTU, Clarity II is also suitable for most raw waters. 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 Solu Comp II analyzer. Menu flows and prompts are so intuitive that a manual is practically not needed. Analog outputs are fully scalable. An optional alarm board with three relays is also available. 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.

A dry check is also available to periodically confirm Clarity II operation.

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1.2 SPECIFICATIONS — ANALYZER

Enclosure: ABS (panel mount), polycarbonate (pipe/wall mount); NEMA 4X/CSA 4 (IP65)

Dimensions:

Panel mount version: 6.10 X 6.10 X 3.72 in (155 X 155 X 94.5 mm)

Pipe/ Wall mount version: 6.23 X 6.23 X 3.23 in (158 X 158 X 82 mm)

Conduit openings: Accepts PG 13.5 or ½-in fittings.

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

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

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

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 50°C, (32 to 122°F); RH 10 to 90% (non-condensing)

Power: 85 to 265 Vac, 47.5 to 65.0 Hz. Maximum current without option -60 alarm board: 1.0 amp, with option -60 alarm board: 1.3 amp.

☐ Equipment protected by double insulation.

Hazardous Location:

Class I, Div. 2, Groups A, B, C, & D: T3C Tamb 0°-50°C Suitable for use in Class II and III, Division 2, Groups E, F and G. Enclosure Type 4/4X

FM APPROVED — Install in accordance with control drawing no. 1400311 or 1400312 (FM).

-LR 34186 — Install in accordance with control drawing no. 1400313 or 1400314 (CSA).

-LR 34186 C US (Ordinary Location only)

Inputs: Choice of single or dual input

RFI/EMI: EN-61326 CE

LVD: EN-61010-1

Outputs: Single input analyzer has single output. Dual input analyzer has dual outputs. Outputs are 0-20 mA or 4-20 mA isolated. Maximum load is 600 ohms. Output dampening with 5 sec time constant is user-selectable.

Output Accuracy: 0.05 mA

Alarms: Optional alarm relay board includes three alarms. Alarm 3 can be configured as a fault alarm in-stead of a process alarm. Each relay can be configured independently. Alarm logic (low or high) and dead band are user-programmable.

Relays: Form C, single pole, double throw, epoxy sealed.

Alarm Board Ratings:

	Resistive	Inductive
115 Vac	5.0 A	3.0 A
230 Vac	5.0 A	1.5 A

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

SPECIFICATIONS — SENSOR

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

Incandescent lamp life: two years

LED life: five years

Wetted materials: Delrin[1], glass, EPDM

Accuracy after calibration at 20.0 NTU:

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

0 - 20 NTU: ±2% of reading

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)

[1]*Delrin is a registered trademark of DuPont Performance Elastomers.*

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

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

Response Time: The table shows the time in minutes to percent of final value following a step change in turbidity.

SPECIFICATIONS — MISCELLANEOUS

Weight/shipping weight:

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

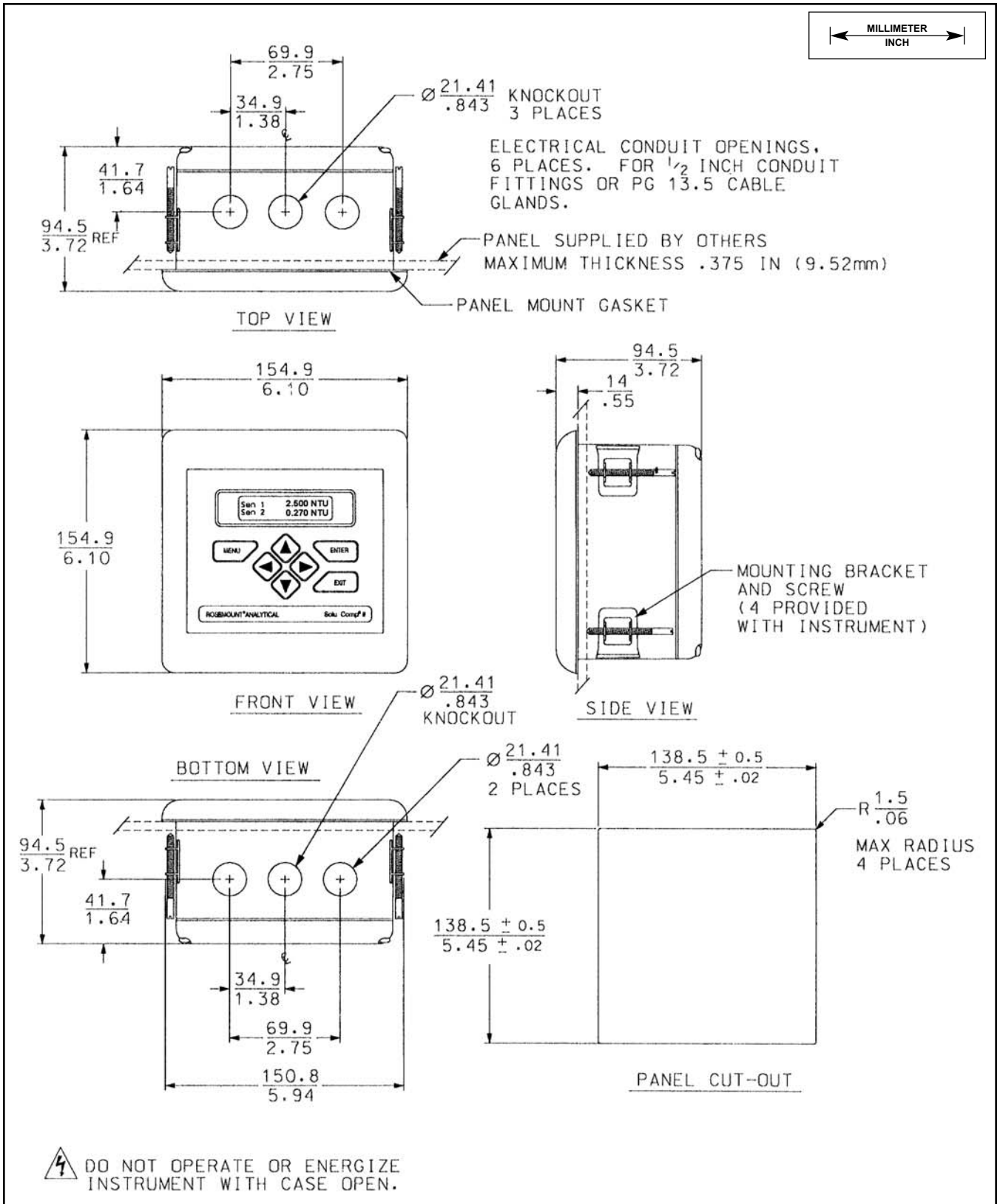
Analyzer: 2 lb/3 lb (1.0 kg/1.5 kg)

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

(rounded to the nearest lb or 0.5 kg)

Specifications subject to change without notice.

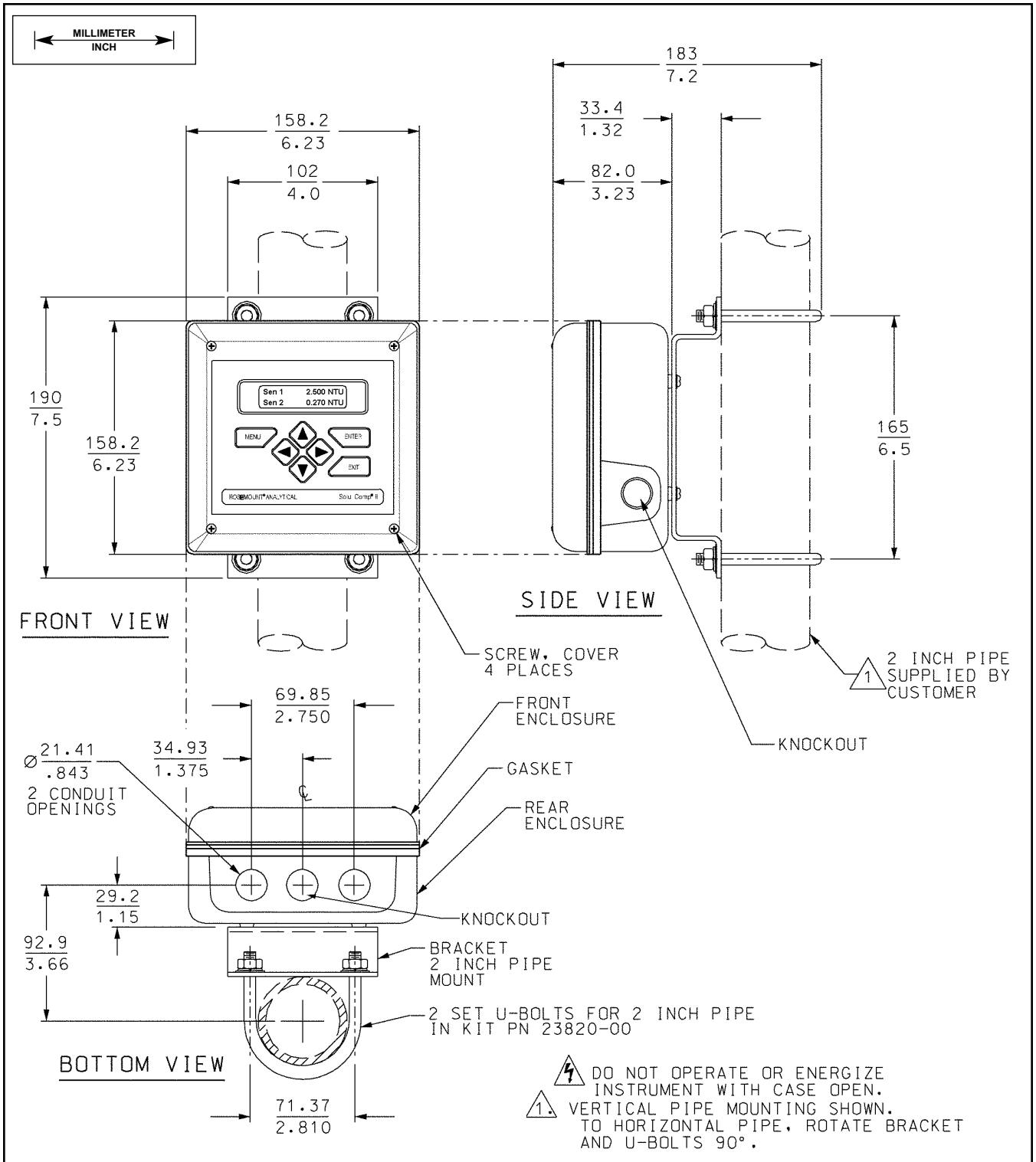
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PANEL MOUNT INSTALLATION

Access to the wiring terminals is through the rear cover. Four screws hold the cover in place.

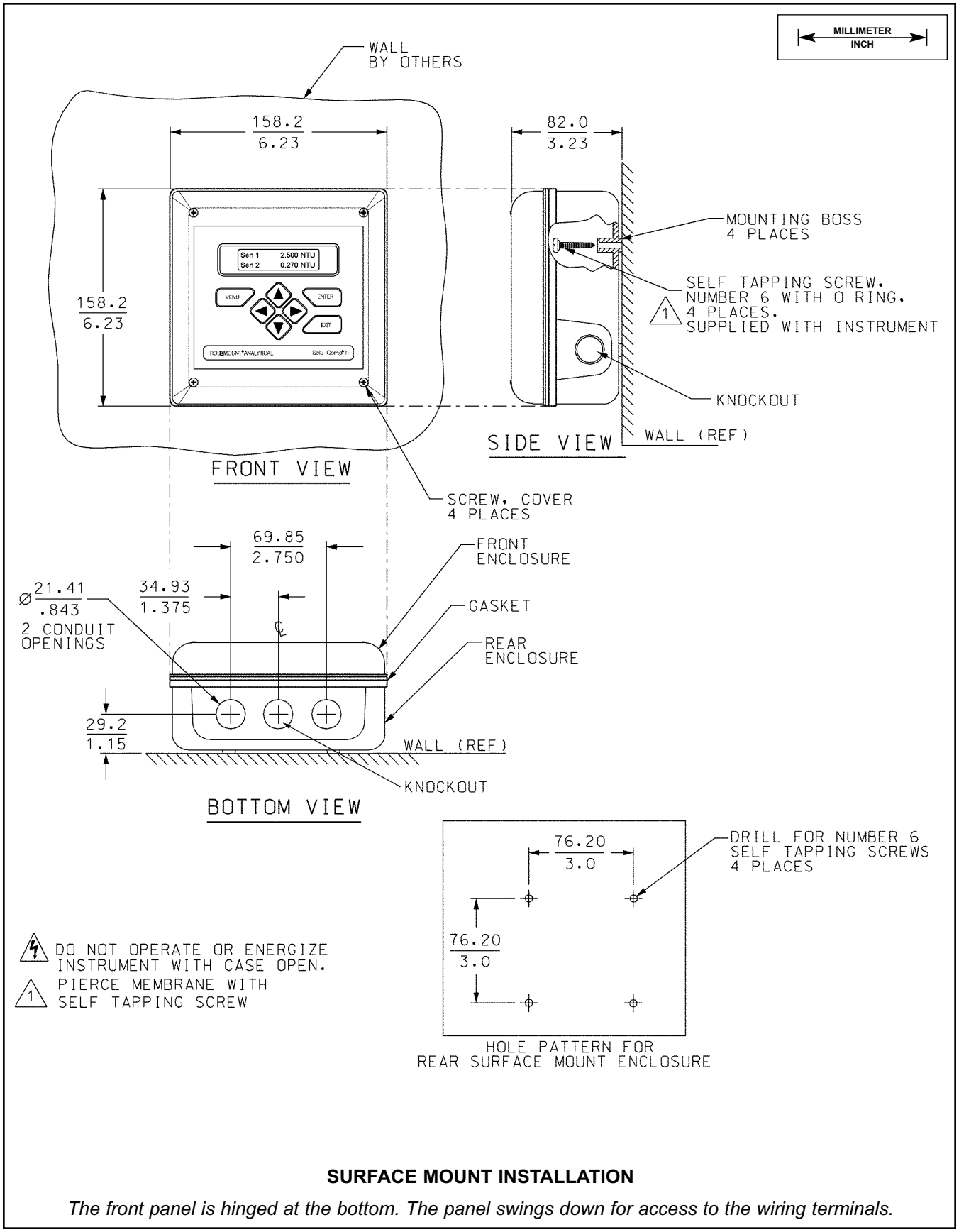
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PIPE MOUNT INSTALLATION

The front panel is hinged at the bottom. The panel swings down for access to the wiring terminals.

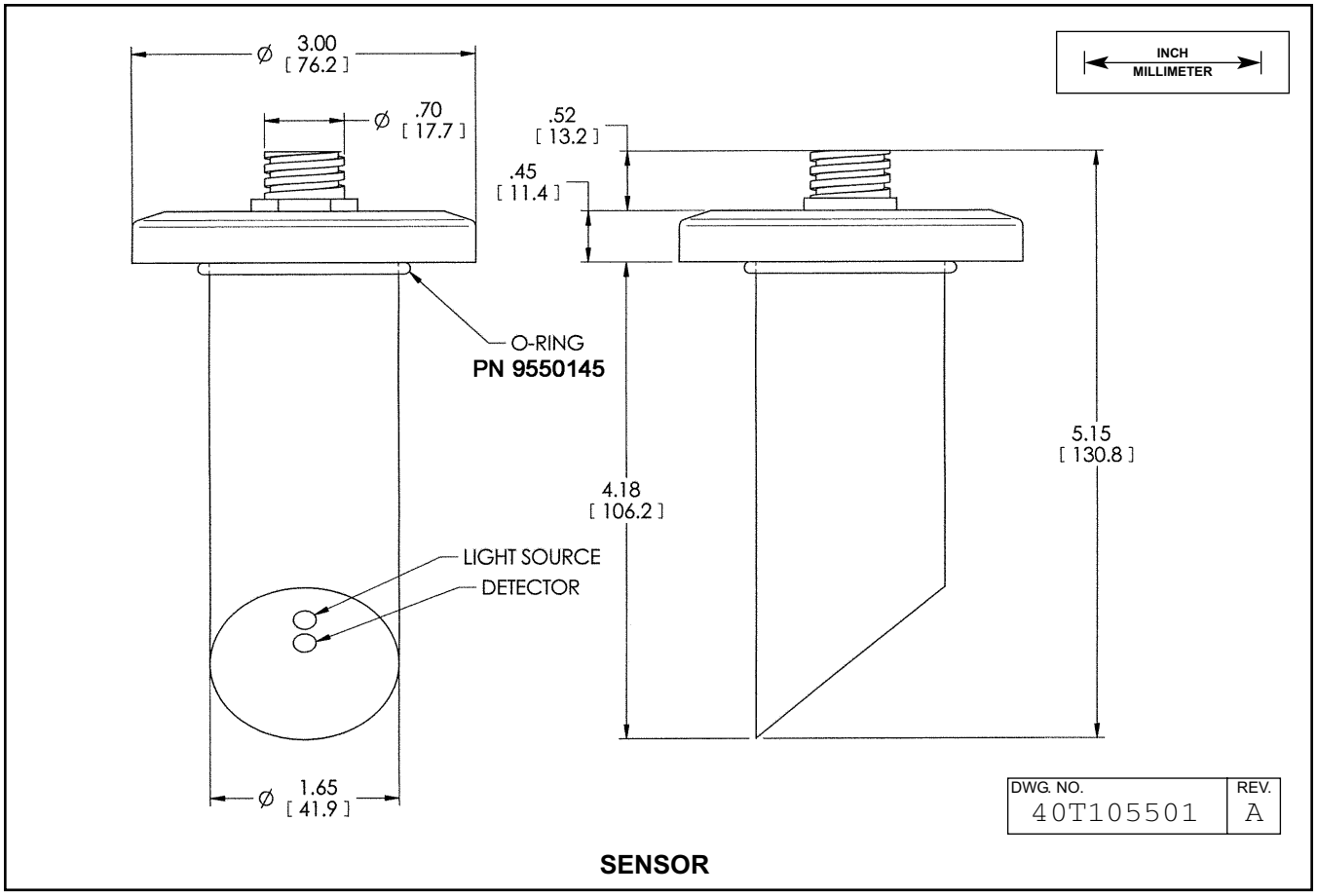
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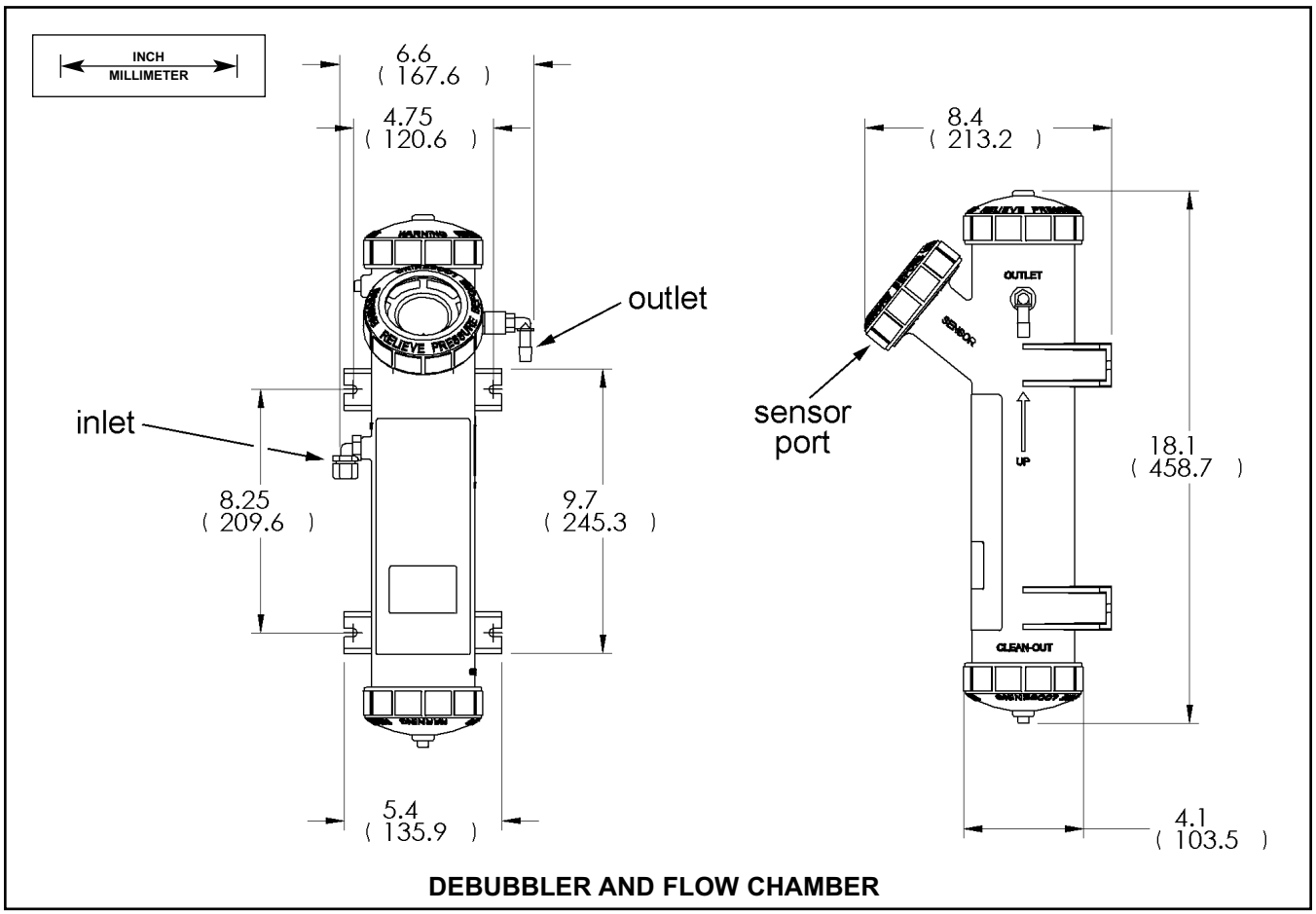
SURFACE MOUNT INSTALLATION

The front panel is hinged at the bottom. The panel swings down for access to the wiring terminals.

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SENSOR



DEBUBBLER AND FLOW CHAMBER

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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 a cable for each sensor. An alarm board containing three relays and a calibration cup are available as options. Because a sensor cannot be calibrated without a calibration cup, at least one cup must be ordered. A dry check is recommended to confirm operation periodically. Calibration standard (formazin or polymer spheres) must be ordered as a separate item. Clarity II Analyzer Model T1055 is certified by FM and CSA as Non-Incendive for installation in hazardous areas classified as Class I, Div. 2.

MODEL T1055 TURBIDITY SYSTEM

CODE	Sensor type (required selection)
01	Compliant with EPA Method 180.1
02	Compliant with ISO 7027

CODE	Mounting (required selection)
10	Panel mounting enclosure
11	Pipe/wall mounting enclosure, UV resistant (Pipe mounting requires accessory PN 23820-00)

CODE	Number of sensors (required selection)
21	One sensor
22	Two sensors

CODE	Measuring chamber (required selection)
30	Molded chamber/debubbler with integral flow cell (must drain to atmosphere)

CODE	Cable length for first sensor (required selection)
40	20 ft (6.1 m)
41	50 ft (15.2 m)

CODE	Cable length for second sensor (optional selection)
50	20 ft (6.1 m)
51	50 ft (15.2 m)

CODE	Optional options
60	Alarm board with three alarm relays
71	Calibration cup (one calibration cup can be used with multiple analyzers)

ACCESSORIES

PN	DESCRIPTION	WEIGHT	SHIPPING WT
23820-00	Pipe mounting kit, includes U-bolts, mounting bracket, nuts, washers, and screws	2 lb (1.0 kg)	4 lb (2.0 kg)
24101-00	Calibration cup	1 lb (0.5 kg)	1 lb (0.5 kg)
24102-00	Operational check cup	1 lb (0.5 kg)	1 lb (0.5 kg)
8-0108-0002-EPA	Replacement sensor, USEPA-compliant	1 lb (0.5 kg)	1 lb (0.5 kg)
8-0108-0003-ISO	Replacement sensor, ISO-compliant	1 lb (0.5 kg)	1 lb (0.5 kg)
24103-00	Flowmeter kit, includes valved rotameter and fittings	1 lb (0.5 kg)	1 lb (0.5 kg)
9240048-00	Tag, stainless steel, specify markings	1 lb (0.5 kg)	1 lb (0.5 kg)
9550145	O-ring for sensor, external, fits molded debubbler		
24170-00	Molded debubbler with integral flow chamber		

CALIBRATION STANDARDS

PN	DESCRIPTION	WEIGHT	SHIPPING WT
060-761855	Calibration kit (includes 4000 NTU formazin standard, pipet, pipet bulb, and volumetric flask)	1 lb (0.5 kg)	2 lb (1.0 kg)
905-761854	Formazin standard, 4000 NTU, 125 mL	1 lb (0.5 kg)	1 lb (0.5 kg)

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SAMPLE ENGINEERING SPECIFICATION
CLARITY II ONLINE TURBIDIMETER (EPA or ISO)

TURBIDIMETER

1. The turbidimeter shall be a complete system consisting of sensor, analyzer, flow chamber/debubbler, and interconnecting cable. The analyzer shall accept input from either one or two sensors. Both USEPA Method 180.1 and ISO Method 7027 sensors shall be available. The analyzer shall automatically recognize which sensor is being used.
2. The turbidimeter shall have the following accuracy (after calibration with 20.0 NTU standard): a) 0 - 1 NTU: ±2% of reading or 0.015 NTU, whichever is greater; b) 0 - 20 NTU: ±2% of reading
3. The response time at 4 gph (250 mL/min) to 90% of final value following a step change shall be 4.5 minutes.
4. The sensor shall be constructed of corrosion-resistant Delrin with glass lamp and detector windows.
5. Incandescent lamp life (USEPA-compliant sensor) shall be at least two years. LED life (ISO-compliant sensor) shall be at least five years.
6. The sensor shall include advanced diagnostics, which will continuously measure the lamp intensity and automatically adjust the lamp output thereby maintaining the correct lamp intensity, correct for lamp drifting and aging, and allow for longer sensor operation with reduced calibration requirements.
7. The measuring chamber shall be constructed of ABS and Delrin. A bubble removal section shall allow entrained bubbles to escape from the sample before measurement.
8. The turbidimeter shall accept a sample stream having temperature between 40 and 95°F (5 and 35°C) with inlet pressure as high as 30 psig (308 kPa abs) with drain to open atmosphere.
9. The sample chamber shall include a two-stage removal of entrained bubbles and outgassed bubbles to prevent erroneous turbidity readings.

ANALYZER

1. The analyzer shall have a two-line back-lit display.
2. The analyzer shall measure turbidity in the range 0 to 200 NTU with a display resolution of 0.001 NTU. Display units shall be user selectable among NTU, FTU, and FNU.
3. The analyzer shall display menu items and prompts in a language selected by the user. The languages shall be English, German, French, Spanish, Italian, and Portuguese.
4. The analyzer shall allow direct button key access to comprehensive diagnostics from the main display screen.
5. The analyzer shall allow the user to customize the readouts on the main display screen.
6. A user-defined security code shall be available to protect against accidental or unauthorized changes to program settings and calibration.
7. Bubble rejection, signal averaging, and output hold features shall be available.
8. The analyzer shall continuously monitor itself and the sensor for faults. The analyzer shall display fault and warning messages when problems such as lamp/LED failure, weak lamp, or sensor failure are detected.
9. The single input analyzer shall have single output, and the dual input analyzer shall have dual output. User-selectable 0-20 mA and 4-20 mA outputs shall be provided. Outputs shall be isolated with 600 ohm maximum load.
10. An optional alarm board with three relays shall be available. The alarms shall be fully programmable for high/low logic and deadband. One alarm shall be configurable as a fault alarm.
11. Environmental limits for the analyzer shall be 32 to 122°F (0 to 50°C) and 10 to 90% relative humidity.
12. Interconnecting cable shall plug into the sensor and analyzer. Integral cable or cable with fly leads shall not be permitted. Maximum cable length shall be 50 ft (15.2 m).
13. Field wiring terminal blocks for power, sensor, analog outputs, and alarm relays shall be removable for ease of wiring.
14. The analyzer enclosure shall be NEMA 4X/CSA 4 (IP65), and the power requirements shall be in the range of 85 – 265 Vac, 47.5 – 65.0 Hz.
15. If so programmed, the analyzer shall convert measured turbidity to a total suspended solids (TSS) reading using a linear equation entered by the user. Units for TSS shall be user selectable among ppm, mg/L, or no units.
16. The analyzer shall be certified by FM and CSA as Nonincendive for installation in hazardous areas classified as Class I, Div. 2.

CALIBRATION

1. The analyzer shall offer three methods of Calibration: two-point slope calibration with de-ionized water and diluted Formazin, standard calibration to a commercial standard, and calibration to a grab sample measured on a reference turbidimeter.
2. A maximum of 400 mL of calibration standard shall be required to calibrate the analyzer.
3. Accessories, unless noted: Calibration Cup, Operational Check Cup, and Alarm relay board.

The Clarity II Turbidimeter shall include a two-year factory warranty.

The analyzer shall be Rosemount Analytical Model T1055 Clarity II turbidimeter or approved equal.

Emerson Process Management

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