

## PRO-series Contacting Conductivity Transmitter

(Model PRO-C3 measures Conductivity, Resistivity, and Total Dissolved Solids)



Certified Compliant to  
European Community Standards

### ■ Multiple Measurements.

The PRO-C3 can be selected to measure conductivity ( $\mu\text{S}/\text{cm}$  or  $\text{mS}/\text{cm}$ ), resistivity ( $\text{M}\Omega \cdot \text{cm}$  or  $\text{K}\Omega \cdot \text{cm}$ ) or total dissolved solids (ppm or ppb). Measured parameter and temperature values can be displayed separately or together. The corresponding 4-20 mA analog output can also be shown.

### ■ Ultra-pure Water Capability.

The PRO-C3 transmitter accurately measures conductivity down to  $0.056 \mu\text{S}/\text{cm}$  and resistivity up to  $18.2 \text{M}\Omega \cdot \text{cm}$ , both at  $25.0^\circ\text{C}$ .

### ■ Four Temperature Compensation Methods.

Select from linear slope (% per  $^\circ\text{C}$ ), built-in ammonia temperature properties table, or built-in natural water temperature properties table for accurate temperature-compensated measurements. A "no compensation" mode is also available.

### ■ Versatile Hookup Capability.

PRO-series transmitters can be wired in a two, three or four-wire hookup arrangement to meet your

application requirement.

### ■ Multiple Language Capability.

All screens can be selected for display in English or Spanish. (Different languages such as French or German may also be substituted.)

### ■ "Menu-guided" Operation.

The simple keypad and logical menu structure make this transmitter easy to use. Menu screens guide you through setup, calibration, operation, and test/maintenance functions.

### ■ Compact Size and NEMA 4X Universal Mounting.

The compact PRO-series transmitter can be panel, wall, pipe or integral sensor mounted.

### ■ Passcode-protected Access.

For security, use the passcode feature to restrict configuration and calibration settings to only authorized personnel.

### ■ Electromagnetic Conformance.

All PRO-series transmitters exceed U.S. and meet European standards for EMI and RFI emissions and immunity.

### ■ Unique DRY-CAL™ Calibration.

The PRO-C3 transmitter is very easy to calibrate. Just enter the GLI-certified sensor "calibration constant." A conductivity reference solution is not required. However, conventional wet calibrations can also be performed if desired.

### ■ Isolated 4-20 mA Analog Output.

The isolated 4-20 mA analog output can represent the selected measurement (conductivity, resistivity or TDS), or the measured temperature. During calibration, the analog output is automatically held at the last measured value and, upon completion, returned to its active state.

### ■ Simple Interactive Diagnostics.

Built-in diagnostics continuously test transmitter and sensor operation.

### ■ OEM Versions Available.

PRO-series transmitters can be packaged or configured to accommodate OEM-specific needs.

# Specifications

## Operational:

Display..... Two-line by 16 character LCD

**NOTE:** The measured value (conductivity, resistivity or TDS) and temperature can be displayed separately or shown together on a single screen. The corresponding 4-20 mA analog output value can also be shown.

Measurement	Range(s)
Conductivity .....	μS/cm: 0-2.000, 0-20.00, 0-200.0 or 0-2000 mS/cm: 0-2.000, 0-20.00 or 0-200.0
Resistivity .....	0-19.99 MΩ • cm or 0-999.9 KΩ • cm
TDS .....	0-9999 ppm or 0-9999 ppb
Temperature .....	-4.0 to +392.0°F or -20.0 to +200.0°C
Analog Output.....	4.00-20.00 mA

Ambient Conditions..... Operation: -4 to +140°F (-20 to +60°C); 0 to 95% relative humidity, non-condensing  
Storage: -22 to +158°F (-30 to +70°C); 0 to 95% relative humidity, non-condensing

Temperature Compensation ..... Automatic from -4.0 to +392.0°F (-20.0 to +200.0°C) with selection for Pt 1000 RTD or Pt 100 RTD temperature element, or manually fixed at a user-entered temperature

**NOTE:** The selected measurement (conductivity, resistivity or TDS) determines which of the following temperature compensation methods are available:

- Linear % per °C slope
- Built-in natural water temperature properties table
- Built-in ammonia temperature properties table
- No compensation

Sensor-to-Transmitter Distance..... 300 ft. (91 m) maximum

### Power Requirements (Class 2 Power Supply):

Two-wire Hookup..... 16-30 VDC  
Three-wire Hookup ..... 14-30 VDC (16 VDC minimum with RS-485 serial communication)  
Four-wire Hookup ..... 12-30 VDC (16 VDC minimum with RS-485 serial communication)

### Calibration Methods:

Sensor Zero (all measurements)..... With the dry sensor in air, press keys to initiate automatic system zeroing

Sensor Span: Conductivity ..... GLI DRY-CAL™: Enter the sensor's GLI-certified "calibration constant" and temperature "T" factor  
Sample Cal: Enter one reference solution or sample value (derived by lab analysis or comparison reading)

Resistivity..... GLI DRY-CAL™: Enter the sensor's GLI-certified "calibration constant" and temperature "T" factor

TDS ..... Sample Cal: Enter one reference solution or sample value (derived by lab analysis or comparison reading)

Analog Output..... Isolated 4-20 mA output with 0.004 mA (12-bit) resolution

**NOTE:** Output can represent the selected measurement (conductivity, resistivity or TDS) or measured temperature. Parameter values can be entered to define the endpoints at which the 4 mA and 20 mA analog output values are desired (range expand). During calibration, the analog output is automatically held at the last measured value and, upon completion, returned to its active state.

Maximum Loop Load..... Dependent on power supply voltage, transmitter hookup arrangement, and wire resistance:

Transmitter Hookup Arrangement	Maximum Permissible Loads						
	Power Supply Voltage						
	12 VDC	14 VDC	16 VDC	20 VDC	24 VDC	28 VDC	30 VDC
Two-wire Hookup	----	----	100 ohms	300 ohms	500 ohms	700 ohms	800 ohms
Three-wire Hookup	----	500 ohms	600 ohms	800 ohms	1000 ohms	1200 ohms	1300 ohms
Four-wire Hookup	400 ohms	500 ohms	600 ohms	800 ohms	1000 ohms	1200 ohms	1300 ohms

Memory (non-volatile)..... All user settings are retained indefinitely without battery backup

EMI/RFI Conformance..... Exceeds U.S. and meets European standards for conducted and radiated emissions and immunity; certified CE compliant for applications as specified by EN 50081-2 for emissions and EN 50082-2 for immunity

### Electrical Certifications:

General Purpose (pending)..... UL, C-UL, FM, and CENELEC  
Class 1, Division 2 (pending)..... UL, C-UL and FM: Groups A, B, C, D, F, and G

### Transmitter Performance (Electrical, Analog Outputs):

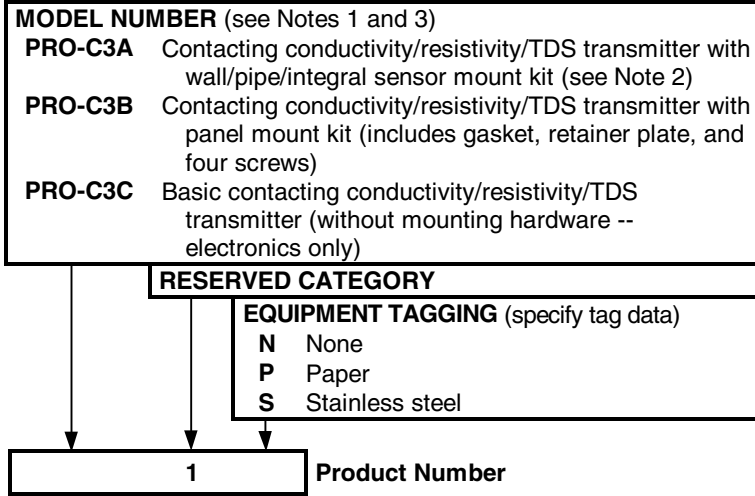
Accuracy\* ..... ± 0.1% of span  
Sensitivity\* ..... ± 0.05% of span  
Repeatability\* ..... ± 0.05% of span  
Temperature Drift\* ..... Zero and Span: ± 0.02% of span per °C  
Response Time ..... 1-60 seconds to 90% of value upon step change (with output filter setting of zero)

\*These performance specifications are typical at 25°C.

### Mechanical:

Enclosure..... Polycarbonate; NEMA 4X general purpose; choice of included mounting hardware  
Mounting Configurations ..... Panel, wall, pipe or integral sensor mounting  
Dimensions ..... With Back Cover: 3.75 in. W x 3.75 in. H x 2.32 in. D (95 mm W x 95 mm H x 60 mm D)  
Without Back Cover for Panel Mount: 3.75 in. W x 3.75 in. H x 0.75 in. D (95 mm W x 95 mm H x 19 mm D)  
Net Weight..... 10 oz. (280 g) approximately

# Ordering Information



Choose item from each category.

## Ordering Notes:

- The standard on-screen languages for PRO-series transmitter operation are English and Spanish. A different language (French, German, etc.) may be substituted for Spanish. Please specify the desired language.
- This mounting kit includes all hardware needed to wall, pipe or integral sensor mount the transmitter. When integrally mounting the transmitter onto a GLI sensor, please specify the sensor part number with a "PRO1" suffix to ensure a correct sensor cable length and coupling. When the coupling is not required (replacement sensor), please specify the sensor part number with a "PRO2" suffix.
- Each transmitter is supplied with a CD-ROM containing operating manuals (in PDF-file format) for all of the PRO-series transmitters. Paper manuals are also available (see Accessories below).

## Accessories (order separately):

- Retrofit Wall/Pipe/Integral Sensor Mount Kit 1000A3457-001**  
This hardware kit enables an existing panel-mounted PRO-series transmitter to be wall, pipe or integral sensor mounted.
- Retrofit Panel Mount Kit 1000A3455-001**  
This hardware kit enables an existing wall, pipe or integral sensor-mounted PRO-series transmitter to be panel mounted.

## Couplings to Retrofit Transmitter onto Sensor

Installed Sensor	Required Coupling	
	Part Number	Size
3422-series	3P2120-103	1/2 x 1/2-inch
3433-series	3P2120-122	3/4 x 1/2-inch
3444-series	3P2120-103	1/2 x 1/2-inch
3455-series	3P2120-103	1/2 x 1/2-inch

## Operating Manual No. PRO-C3

A paper booklet operating manual for the PRO-C3 contacting conductivity transmitter.

## Contacting Conductivity Sensors

Refer to Data Sheet 3400 for sensor details.

## Selecting Sensor Cell Constant for Use with PRO-C3 Transmitter

A sensor's inherent measuring range is determined by its basic cell constant. Choose a sensor with a cell constant that can handle your measurement needs. The table below lists cell constants and their corresponding measuring ranges.

SENSOR CELL CONSTANTS and MEASURING RANGES			
Sensor Cell Constant	Inherent Measuring Range		
	Conductivity (in $\mu\text{S}/\text{cm}$ )	Resistivity (in $\text{M}\Omega \cdot \text{cm}$ )	TDS (in ppm)
0.05	0-100	0.002-20	See Note A
0.5	0-1000	0.001-20	See Note A
1	0-2000	not applicable	See Note A
5	0-10,000	not applicable	See Note A
10	0-200,000	not applicable	See Note A

**NOTE A:** To determine which cell constant to use, convert the full-scale TDS value to its equivalent conductivity value at 25°C. Do this by multiplying the TDS value by "2." Then find the range in the Conductivity column corresponding to the calculated value. The cell constant to use is in that row.

# Engineering Specification

- The microprocessor-based transmitter shall accept any GLI Model 3422, 3433, 3444 or 3455-series enhanced performance contacting conductivity sensor.
- The transmitter shall measure the selected parameter (conductivity, resistivity or TDS) and process temperature.
- The transmitter shall be operable in multiple languages.
- The transmitter have a two-line by 16 character LCD. It shall display the measured value and temperature separately or together on a single screen.
- The corresponding 4-20 mA analog output value shall also be shown.
- The transmitter shall have these calibration methods:
  - Sensor Zero: With the dry sensor in air, press keys to initiate automatic system zeroing.
  - GLI DRY-CAL™: Enter the sensor's GLI-certified "calibration constant" and temperature "T" factor.
  - 1-Point Sample: Enter one sample value (determined by laboratory analysis or comparison reading).
- The transmitter shall have a passcode to restrict configuration and calibration settings to only authorized personnel.
- Depending on the selected parameter (conductivity, resistivity or TDS), the transmitter shall provide one or more of the following temperature compensation methods:
  - Linear slope (% per °C).
  - Built-in ammonia properties table.
  - Built-in natural water properties table.
  - No compensation.

## Engineering Specification (continued)

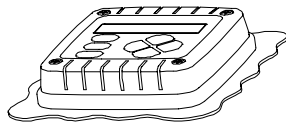
- The transmitter shall have user-test diagnostics for transmitter and sensor operation without requiring special test equipment.
- The transmitter shall have an isolated 4-20 mA analog output that can be

assigned to represent the selected parameter (conductivity, resistivity or TDS) or measured temperature. Parameter values can be entered to define the endpoints at which the 4 mA and 20 mA analog output values are desired (range expand). During calibration, the analog output

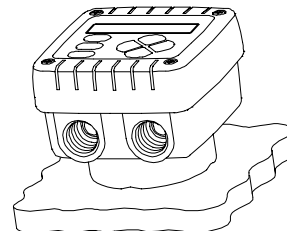
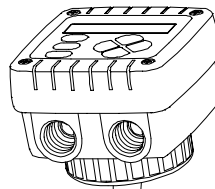
is automatically held at the last measured value and, upon completion, returned to its active state.

- The transmitter shall be GLI International, Inc. Model PRO-C3.

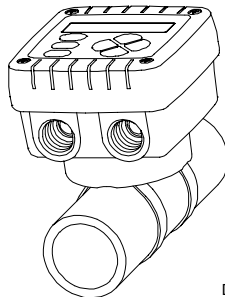
## Mounting Configurations



PANEL MOUNT

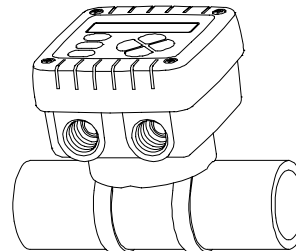


WALL MOUNT



VERTICAL PIPE MOUNT

INTEGRAL SENSOR MOUNT  
(COUPLING AND SENSOR APPEAR  
DIFFERENTLY FOR EACH MEASUREMENT TYPE)

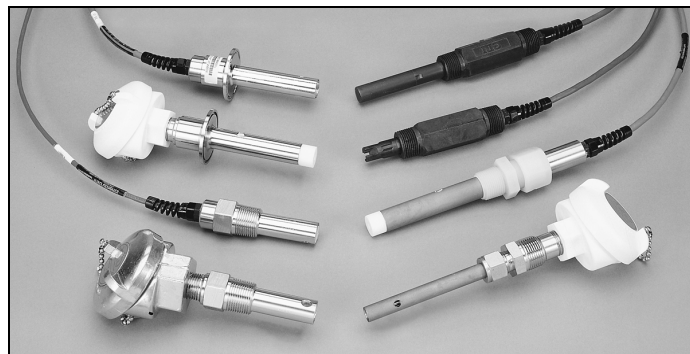


HORIZONTAL PIPE MOUNT

### Model 3400-series Contacting Conductivity/ Resistivity Sensors

(for use with PRO-C3 Transmitter)

For complete details and specifications,  
refer to data sheet 3400.



Data Sheet PRO-C3

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