

Model C33 Two-sensor Input Conductivity Analyzer

(measures conductivity, resistivity, TDS, or calculated measurement)



Panel-mount 1/4 DIN Style



■ Multiple Measurements.

Sensor A and B can be independently selected to measure conductivity ($\mu\text{S}/\text{cm}$ or mS/cm), resistivity ($\text{M}\Omega \bullet \text{cm}$ or $\text{K}\Omega \bullet \text{cm}$), or total dissolved solids (ppm or ppb). The measured values or temperatures for Sensor A or B can be displayed separately or together (four total measurements). Both analog outputs can also be displayed. The Model C33 can provide a calculated Sensor A and B measurement (% rejection, % passage, ratio A/B, ratio B/A, difference A-B, or difference B-A). Front panel red LEDs indicate relay "on/off" status.

■ Ultra-pure Water Capability.

Model C33 accurately measures conductivity down to $0.056 \mu\text{S}/\text{cm}$ and resistivity up to $18.2 \text{M}\Omega \bullet \text{cm}$, both at 25.0°C .

■ Backlit LCD Readout.

The two-line, 16 character backlit LCD provides excellent viewing contrast under all lighting conditions.

■ Panel-mount 1/4 DIN Case with NEMA 4X Front Panel.

The C33 is housed in a 1/4 DIN, plastic case that features a NEMA 4X front panel.

■ Multiple Language Capability.

All screens can be selected for display in English, French, German, or Spanish. (Other available languages can be substituted.)

■ "Menu-guided" Operation.

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

■ Passcode-protected Access.

For security, use the C33's passcode capability to restrict access to configuration settings and calibration to authorized personnel only.

■ Four Temp. Comp. Methods.

Select from linear slope (% per $^\circ\text{C}$), built-in ammonia temperature properties table, or built-in natural water temperature properties table to provide accurate temperature-compensated measurements. A "no compensation" mode is also available. (For special solution compensation requirements, use GLI's optional software tool kit to create a custom 10-point temperature table.)

■ Unique DRY-CAL™.

The C33 is very easy to calibrate. Just enter the GLI-certified sensor "calibration constant." Conventional wet sample and zeroing calibration methods are also provided.

■ Two 0/4-20 mA Analog Outputs.

Each of the two isolated analog outputs can be set to 0-20 mA or 4-20 mA, and assigned to represent Sensor A or B's selected measurement (conductivity, resistivity, or TDS), Sensor A or B's temperature, or a calculated Sensor A and B measurement. During calibration, both outputs can be held at their present values, transferred to preset values, or remain active to respond to the measured value.

■ OEM Versions Available.

These analyzers can be manufactured to accommodate OEM-specific needs.

■ Simple Interactive Diagnostics.

Built-in diagnostics continuously tests analyzer and sensor operation.

Specifications

Operational:

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

NOTE: Sensor A or B's measured values or temperatures can be separately displayed, or all four measurements can be displayed together on one screen. Both outputs are displayed together on a screen. Also, a calculated Sensor A and B measurement can be displayed.

<u>Measurement</u>	<u>Selectable Ranges</u>
Conductivity.....	0-2.000, 0-20.00, 0-200.0, or 0-2000 in $\mu\text{S}/\text{cm}$ or mS/cm
Resistivity.....	0-19.99 $\text{M}\Omega \cdot \text{cm}$, or 0-999.9 $\text{K}\Omega \cdot \text{cm}$
TDS.....	0-9999 ppm, or 0-9999 ppb
Calculated Sensor A and B Measurement:	
% rejection.....	0-100%
% passage.....	0-100%
Ratio A/B or Ratio B/A.....	0-9.999, 0-99.99, 0-999.9, or 0-9999
Difference A-B or Difference B-A.....	Same ranges as those listed above for conductivity, resistivity, and total dissolved solids
Temperature.....	-4.0 to +392.0°F or -20.0 to +200.0°C
Analog Outputs (1 and 2).....	0.00-20.00 mA or 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

Relays:

Types/Outputs.....Two electromechanical relays; SPDT (Form C) contacts; U.L. rated 5A 115/230 VAC, 5A @ 30 VDC resistive

Operational Mode.....Each relay (A and B) can be assigned to be driven by:
 Sensor A's selected measurement (conductivity, resistivity, or TDS), or temperature
 Sensor B's selected measurement (conductivity, resistivity, or TDS), or temperature
 Calculated Sensor A and B measurement (% rejection, % passage, ratio A/B or B/A, or difference A-B or B-A)

Function Modes: Control.....Settings for high/low phasing, setpoint, deadband, overfeed timer, off delay, and on delay
Alarm.....Settings for low alarm. pt., low alarm. pt. deadband, high alarm. pt., high alarm. pt. deadband, off delay, and on delay
Status:.....Not configurable; relay only activates when a "fail" diagnostic condition exists

Indicators.....Relay A and B LEDs indicate respective relay status

Temperature Compensation.....Automatic or manual, -4.0 to +392.0°F (-20.0 to +200.0°C), with selection for temperature compensator (Pt 1000 RTD or Pt 100 RTD); the selected Sensor A or B measurement (conductivity, resistivity or TDS) determines which of the following temperature compensation methods are available:

 Linear % per °C slope, built-in ammonia temperature properties table,
 built-in natural water temperature properties table, or no compensation

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

Power Requirements.....90-130 VAC, 50/60 Hz. (10 VA max.) or 190-260 VAC, 50/60 Hz. (10 VA max.)

Calibration Methods:

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

1-POINT SAMPLE Method.....Enter one sample value derived by laboratory analysis or comparison reading.

ZERO Method.....With the dry sensor in air, press keys to initiate automatic system zeroing.

Analog Outputs.....Two isolated 0/4-20 mA outputs; each with 0.004 mA (12-bit) resolution and capability to drive up to 600 ohm loads; each output can be assigned to represent one of these measurements:

- Sensor A conductivity, resistivity, or TDS
- Sensor B conductivity, resistivity, or TDS
- Sensor A temperature
- Sensor B temperature
- Calculated Sensor A and B measurement

NOTE: Parameter (or calculated measurement) values can be entered to define the endpoints at which the minimum and maximum output mA values are desired.

Communication: RS-232.....Enables configuration and retrieval of measured data for one analyzer using IBM-compatible PC and GLI optional software tool kit

HART Protocol.....Enables configuration and retrieval of measured data for multiple analyzers over a communication link using appropriate hand-held terminal or data system with HART software

Memory Backup (non-volatile).....All user settings are retained indefinitely in memory (EEPROM)

Electrical Certification.....UL General Purpose

Analyzer Performance (Electrical, Analog Outputs):

Accuracy.....0.1% of span

Stability.....0.05% of span per 24 hrs., non-cumulative

Repeatability.....0.1% of span or better

Temperature Drift.....Zero and Span: less than 0.03% of span per °C

Mechanical:

Enclosure.....Polycarbonate with NEMA 4X front panel; general purpose; two zinc-plated steel brackets for panel mounting

Mounting Configuration.....Panel mounting

Net Weight.....1.7 lbs. (0.8 kg) approximately

Ordering Information



MODEL NUMBER	
C33 Contacting conductivity/resistivity analyzer (with dual input) in 1/4 DIN panel mount case with NEMA 4X front panel. Includes two brackets with adjustable screws for panel mounting.	
COMMUNICATIONS OUTPUT	
A None B HART Protocol	
RESERVED CATEGORY	
COMPANY ID NAMEPLATE	
N GLI Nameplate B Customer-specified Nameplate (see Note 1) C No Nameplate	
EQUIPMENT TAGGING (specify tag data)	
N None P Paper S Stainless steel	
C33	1
Product Number	

Choose item from last category.

NOTE 1: The nameplate cannot be printed with a company logo. Please specify the desired name which is printed in only capital letters.

Accessories (order separately):

- **Enhanced Performance Contacting Conductivity Sensors:** Refer to data sheet 2468 for details.
- **Software Tool Kit 1000G3311:** This kit is for use with an IBM-compatible PC. The software can create and download custom

temperature compensation tables, and multiple sets of analyzer configuration values. The kit includes a GLI software CD-ROM and ten-foot cable terminated with an RS-232 connector and stripped/tinned wires for connection to the analyzer.

Selecting Sensor Cell Constant for Use with Model C33 Analyzer

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 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.

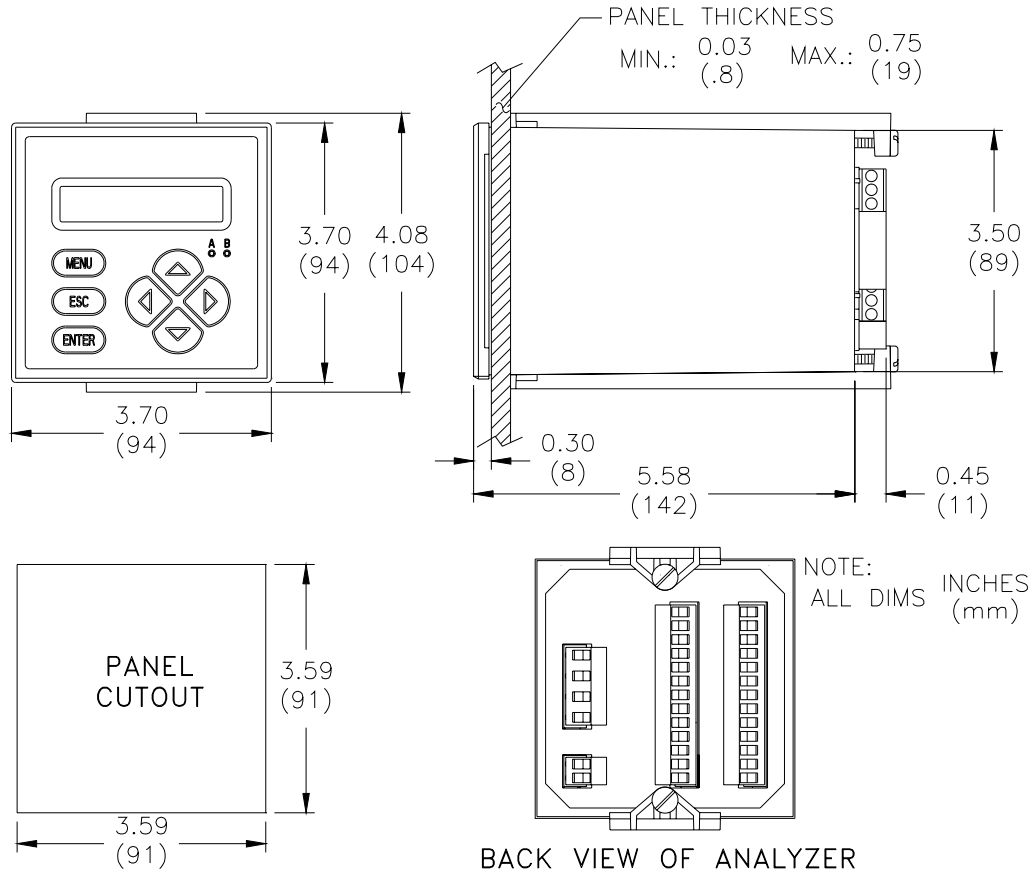
Engineering Specification

- The microprocessor-based analyzer shall have two inputs which accept any GLI Model 3422, 3433, 3444, and 3455-series enhanced performance contacting conductivity sensors.
- The analyzer shall independently measure the selected Sensor A and B parameters (conductivity, resistivity, or TDS), Sensor A or B's temperature, and a calculated Sensor A and B measurement (% rejection, % passage, ratio A/B, ratio B/A, difference A-B, or difference B-A).
- The analyzer shall be configurable for multiple languages.
- The analyzer shall have a two-line by 16 character backlit LCD. It shall display Sensor A and B's measured values or temperatures on separate screens, or all four measurements together on one screen. Both analog outputs shall be displayed together on a screen. The analyzer shall also separately display a calculated Sensor A and B measurement.
- The analyzer shall have these calibration methods:
 - GLI DRY-CAL™ Method: Enter the sensor's GLI-certified "calibration constant" and temperature "T" factor.
 - 1-POINT SAMPLE Method: Enter one sample value derived by laboratory analysis or comparison reading.
 - ZERO Method: With the dry sensor in air, press keys to initiate automatic system zeroing.
- The analyzer shall have a passcode to restrict access to configuration settings and calibration to authorized personnel only.
- The analyzer shall provide four temperature compensation methods:
 - Linear slope (% per °C).
 - Built-in ammonia properties table.
 - Built-in natural water properties table.
 - No compensation.

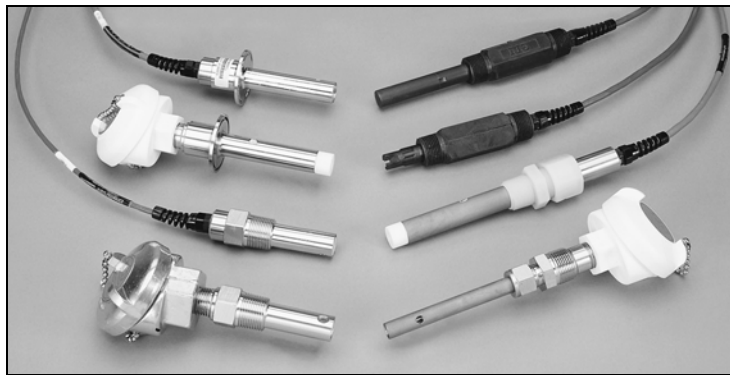
(For special solution compensation requirements, GLI's optional software tool kit shall enable a custom 10-point
- temperature table to be created and downloaded using an IBM-compatible PC.)
- The analyzer shall have user-test diagnostics for outputs, relays, and alarm LEDs without requiring special test equipment.
- The analyzer shall be configurable using its RS-232 port and GLI's optional software tool kit, or through HART protocol.
- The analyzer shall have two isolated 0/4-20 mA analog outputs. Each output can be assigned to represent Sensor A or B's selected measurement (conductivity, resistivity, or TDS), Sensor A or B's temperature, or a calculated Sensor A and B measurement (% rejection, % passage, ratio A/B, ratio B/A, difference A-B, or difference B-A). Parameter (or calculated measurement) values can be entered to define the endpoints at which the minimum and maximum mA output values are desired.
- The analyzer shall be Hach GLI Model C33.

Dimensions

Inches (mm)



Model 3400-series Contacting Conductivity/Resistivity Sensors (for use with Model C33 Analyzer)



For complete details and specifications, refer to data sheet 2468.

Lit. No. G162 Rev. 1

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