

Model C53 Two-sensor Input Conductivity Analyzer (measures conductivity, resistivity or TDS)



Universal-mount 1/2 DIN Style



Certification for Class I, Div. 2
Hazardous Area Locations



■ 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).

■ Ultra-pure Water Capability.

Model C53 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 .

■ Large Backlit LCD Readout.

The large display shows Sensor A and B measured values in 1/2-inch (13 mm) high numerals. The C53 can also display Sensor A and B temperatures, both analog outputs, and a calculated Sensor A and B measurement (% rejection, % passage, ratios A/B or B/A or differences A-B or B-A). Display screen annunciators indicate relay "on/off" status.

■ Universal-mount 1/2 DIN Case.

The C53 is housed in a 1/2 DIN, epoxy-coated, metal NEMA 4X case. Its hinged front panel provides easy wiring access. The supplied bracket and stainless steel hardware enable panel, surface, and pipe mounting.

■ 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 large display, simple keypad, and logical menu structure make the C53 easy to use. Menu screens, containing up to six text lines, guide you through setup, calibration, operation, and test/maintenance functions.

■ Four Temp. Comp. Methods.

Select from these temperature compensation methods to provide accurate measurements: linear slope (% per $^\circ\text{C}$), built-in ammonia temperature properties table or built-in natural water temperature properties table. 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 Calibration.

The C53 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.

Both isolated analog outputs can be set to 0-20 mA or 4-20 mA, and assigned to represent Sensor A or B selected measurement (conductivity, resistivity, or TDS), Sensor A or B 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.

■ Passcode-protected Access.

For security, use the C53's passcode capability to restrict access to configuration settings and calibration to only authorized personnel.

■ Simple Interactive Diagnostics.

Built-in diagnostics continuously tests analyzer and sensor operation.

Specifications

Operational:

Display Graphic dot matrix LCD, 128 x 64 pixels with LED backlighting; 1/2 inch (13 mm) main character height; 1/8 inch (3 mm) auxiliary information character height; menu screens contain up to six text lines

<u>Measurement</u>	<u>Selectable Ranges</u>
Conductivity.....	$\mu\text{S/cm}$: 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 $\text{M}\Omega \cdot \text{cm}$ 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 solid
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..... Up to four electromechanical relays; SPDT (Form C) contacts; U.L. rated 5A 115/230 VAC, 5A @ 30 VDC res.
Operational Mode Each relay (A, B, C, and D) can be assigned to be driven by:

- Sensor A selected measurement (conductivity, resistivity, or TDS) or temperature
- Sensor B 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 point, low alarm point deadband, high alarm point, high alarm point deadband, off delay, and on delay
Status: Not configurable; relay only activates when a "fail" diagnostic WARNING condition exists

Indicators Relay annunciators (A, B, C, and D) indicate respective relay status

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 compensator; or manually fixed at a user-entered temperature

NOTE: 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
- No compensation

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

Power Requirements 90-130 VAC, 50/60 Hz. (10 VA max.) or 180-260 VAC, 50/60 Hz. (10 VA max.)

Calibration Methods:

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 reference solution or sample value (derived by laboratory analysis or comparison reading).

Analog Outputs (two)..... Isolated 0/4-20 mA outputs; each with 0.004 mA (12-bit) resolution and capability to drive up 600 ohm loads

NOTE: Each output can represent Sensor A or B selected measurement (conductivity, resistivity or TDS), Sensor A or B temperature, or a calculated Sensor A and B measurement (% rejection, % passage, ratio A/B, ratio B/A, difference A-B, or difference B-A). Associated values can be entered to define the endpoints at which the minimum and maximum output mA values are desired (range expand). During calibration, both outputs can be selected to hold their present values, transfer to preset values to operate control elements by an amount corresponding to those values, or remain active to respond to the measured value.

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 Certifications:

General Purpose..... CSA/CSA_{NRTL} and FM

Class I, Div. 2 (Groups A-D) CSA/CSA_{NRTL} and FM

Analyzer Performance (Electrical, Analog Outputs):

Accuracy 0.1% of span

Stability 0.05% of span per 24 hours, non-cumulative

Repeatability 0.1% of span or better

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

Mechanical:

Enclosure..... NEMA 4X; polycarbonate face panel, epoxy-coated high-quality cast aluminum door and case with four 1/2 inch (13 mm) conduit holes, nylon mounting bracket, and stainless steel hardware

Mounting Configurations..... Panel, surface, and pipe (horizontal and vertical) mounting

Net Weight 3.5 lbs. (1.6 kg) approximately

Ordering Information



MODEL NUMBER	
C53	Contacting conductivity/resistivity analyzer (with dual input) in 1/2 DIN, NEMA 4X enclosure with hardware for panel, surface or pipe mounting.
RELAYS	
A2	Two electromechanical relays
A4	Four electromechanical relays
COMMUNICATIONS OUTPUT	
A	None
B	HART Protocol
RESERVED CATEGORY	
EQUIPMENT TAGGING (specify tag data)	
N	None
P	Paper
S	Stainless steel

C53 **1** **Product Number**

Choose one from each category.

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 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.

- **Sun Shield 1000G3088-001:** Aluminum shield provides additional protection from harmful effects of direct sunlight.

Selecting Sensor Cell Constant for Use with Model C53 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 CONSTANTS and MEASURING RANGES			
Sensor Cell Constant	Inherent Measuring Range		
	Conductivity (in $\mu\text{S/cm}$)	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.

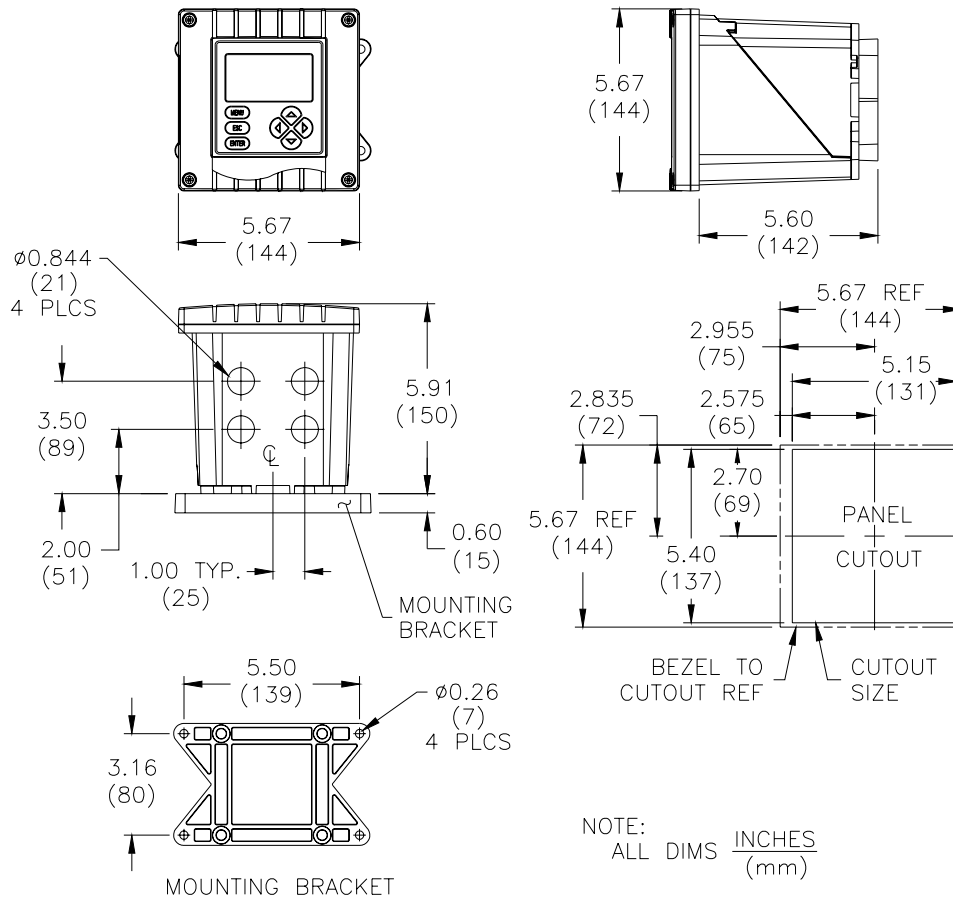
Engineering Specification

- The microprocessor-based analyzer shall have two inputs that shall accept any GLI Model 3422, 3433, 3444 or 3455-series enhanced performance contacting conductivity sensors.
- The analyzer shall independently measure the selected Sensor A and B measurements (conductivity, resistivity or TDS), Sensor A and B temperatures, 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 operable in various languages.
- The analyzer shall have a graphical dot matrix LCD display with 128 x 64 pixels and LED backlighting. The main display character height shall be 1/2 inch (13 mm). Auxiliary information character height shall be 1/8 inch (3mm).
- The analyzer shall have these calibration methods:
 - 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 reference solution or sample value (derived by laboratory analysis or comparison reading).
- The analyzer shall have a passcode to restrict access to configuration settings and calibration to only authorized personnel.
- 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 and relays 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 selected measurement (conductivity, resistivity or TDS), Sensor A or B temperature, or a calculated Sensor A and B measurement (% rejection, % passage, ratio A/B, ratio B/A, difference A-B, or difference B-A). Associated values can be entered to define the endpoints at which the minimum and maximum mA output values are desired. During calibration, both outputs can be selected to hold their present values, transfer to preset values to operate control elements by an amount corresponding to those values, or remain active to respond to the measured value.
- The analyzer shall be Hach Company GLI Model C53.

Dimensions

Inches (mm)



Model 3400-series Contacting Conductivity/Resistivity Sensors (for use with Model C53 analyzer)



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

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