Data Sheet T5320/401
Supersedes T5320/600

Accu4™ Low-range Turbidimeter System

Model T53 Analyzer/8320 Sensor (with optional Cal-Cube™) measures 0.000-100.0 NTU with auto-ranging scale.

Designed to meet the International Standard for Measurement of Turbidity [ISO 7027-1984 (E)] and USEPA-approved GLI Method 2

Certified Compliant to European Community Standards

Hazardous Area Certification (all pending)

Certification by CE and CSA as safe for:

Class I, Div. 2,
Groups A, B, C, and D

Class II, Div. 2,
Groups E, F, and G

■ **USEPA-approved, Patented Four-beam Measuring Method.**
This microprocessor-based system uses a technologically advanced measuring concept to provide:

- Exceptional accuracy
- Unparalleled measurement stability
- Automatic color compensation
- Superior calibration stability*

*After performing initial calibration, only periodic verification of calibration is required using GLI's patented turbid glass Cal-Cube™ assembly.

■ **Low Maintenance Design.**
The only required maintenance is an occasional, simple cleaning of the sensor flow chamber. (System diagnostics provide automatic alert to clean flow chamber.)

■ **"Menu-guided" Operation.**
The large backlit display, simple keypad, and logical menu structure make the system easy to use. Menu screens contain up to six text lines to guide the operator through setup, verification of calibration, operation, and test/maintenance functions.

■ **Advanced System Diagnostics.**
Built-in diagnostic messages alert operator to system malfunctions requiring immediate attention, and to deteriorating conditions that may restrict performance. A dedicated system alarm relay provides warning if any of these conditions occur.

■ **Long-lasting LED Light Sources.**
The pulsed LEDs produce light of a single wavelength, providing highly accurate, reliable performance. Additionally, they last several years, virtually eliminating light source replacement.

■ **Built-in Sensor Bubble Trap.**
A bubble trap built into the Model 8320 sensor flow chamber eliminates stray light and air in the sample to ensure measuring accuracy.

■ **NEMA 4X Protection.**
NEMA 4X enclosures protect system components from wet environments, providing years of highly reliable, trouble-free operation.

■ **Patented Cal-Cube™ Verification System.**
Verify calibration quickly and easily using GLI's precision turbid glass cube standard. It is factory-certified to known USEPA approved formazin values, and is 100% reproducible. This extremely stable secondary standard is unaffected by light, heat or aging. (A built-in funnel/hose assembly is provided for calibration using a traditional primary turbidity standard such as formazin.)

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

■ **Passcode-protected Access.**
For security, use the T53 analyzer passcode capability to restrict access to configuration settings and verification of calibration to only authorized personnel.

Specifications

Model 8320 Low-range Sensor

Operational:

Flow Rate ..... 0.05 to 7 GPM (0.19 to 26.5 LPM)
Ambient Conditions ..... 32-140°F (0-60°C)
Sample Temperature Range ..... 32-140°F (0-60°C)
Pressure Range: Standard Design ..... 0-50 psig at 68°F (0-3.4 bar at 20°C)
High Pressure Design ..... 0-150 psig at 68°F (0-10.2 bar at 20°C)
Pressure Drop: Standard Design ..... 0.0017 psi at 0.1 GPM (0.0001 bar at 0.36 LPM)
High Pressure Design ..... 0.165 psi at 1.0 GPM (0.012 bar at 3.8 LPM)
Residence Time ..... 9.5 seconds at 1 GPM (3.8 LPM)
Air Venting ..... Integral bubble trap for 0.05 to 0.5 GPM (0.19 to 1.8 LPM) flows. Installation of restrictor valve on the sensor outlet is recommended for flows above 0.5 GPM (1.8 LPM) with air in sample.

Mechanical:

Light Sources ..... Two near-infrared (860 nanometer wavelength) LEDs
Sensor Flow Configuration ..... Flow-through design
Process Connections ..... 1/2 inch NPT female standard; adaptable to 3/8 inch or 1/4 inch NPT, barb or tube fittings
Wetted Materials ..... PVC, polycarbonate, polystyrene, PPO, nitrile, and Buna-N
Cleaning Method ..... Water rinse, wipe surfaces
Enclosure: Standard Design ..... NEMA 4X (≅ CSA type 4; ≅ IP65), compression-molded and fiberglass reinforced polyester (flame retardant) with four integral tabs for surface mounting; see drawing on back page for dimensions
High Pressure Design ..... NEMA 4X (≅ CSA type 4; ≅ IP65), PPO structural foam (V-0 flammability rating per U.L. 94 test method) with four integral tabs for surface mounting; 17.5 H x 13.8 W x 7.6 in. D (445 H x 351 W x 193 mm D)
Mounting Configurations ..... Surface or pipe mount
Net Weight ..... 10 lbs. (4.5 kg) approximately

Model T53 Analyzer

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

Measurement	Auto-ranging Scale
Turbidity	0.000-100.0 NTU with auto-ranging and decimal point shift above 1.000 NTU and above 10.00 NTU
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 ..... Four electromechanical relays; SPDT (Form C) contacts; U.L. rated 5A 115/230 VAC, 5A @ 30 VDC resistive
Operational Mode ..... Each relay (A, B, C, D) can be driven by the measured turbidity or detected system diagnostic conditions
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 ..... Setting for FAIL, WARN or ALL system diagnostic conditions to activate relay when specific conditions exist (analyzer, light source 1/2 or detector 1/2 failure, sensor chamber dirty or sensor chamber unknown)
Indicators ..... Relay annunciators (A, B, C, D) indicate respective relay on/off status

Sensor-to-Analyzer Distance ..... 30 feet (9 m) maximum (consult factory if longer distances are required)

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

Calibration Methods: Primary ..... Enter one primary standard value (formazin is recommended).
Cube Cal ..... Temporarily insert optional GLI Cal-Cube™ assembly into sensor and enter its factory-certified standard value.
Sample ..... Enter one sample value determined by laboratory analysis or calibrated portable meter.
Analog Outputs (two) ..... Isolated 0/4-20 mA; each with 0.004 mA (12-bit) resolution and capability to drive up to 600 ohm loads

NOTE: *Each output represents the measured turbidity. Turbidity values can be independently entered for each output 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.*

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 up to 15 analyzers over 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)
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 50081-1 for emissions and EN 50082-2 for immunity
Electrical Certifications:
General Purpose ..... CSA/CSA_{NRTL} and FM (UL pending)
Class I, Div. 2 (Groups A, B, C, and D) .... CSA/CSA_{NRTL} and FM (UL pending)

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 ..... 5 lbs. (2.3 kg) approximately

Specifications (continued)

Accu4™ Turbidimeter System Performance (Electrical, Analog Outputs)

System Accuracy ..... ± 2% of reading, all ranges
Sensitivity ..... 0.001 NTU
Repeatability ..... 0.1% of span or better
Temperature Drift ..... Zero and Span: 0.01% of span per °C

Ordering Information

Model T53 Analyzer

MODEL NUMBER
T53: Turbidity analyzer in 1/2 DIN, NEMA 4X enclosure with hardware for panel, surface or pipe mounting.

COMMUNICATIONS OUTPUT
A None
B HART Protocol

RESERVED CATEGORIES

LINE FREQUENCY
1 For use with 60 Hz. line power
2 For use with 50 Hz. line power

EQUIPMENT TAGGING (specify tag data)
N None
P Paper
S Stainless steel

T53 4A **Product Number**

Choose one from each category.

Model 8320 Low-range Sensor

MODEL NUMBER
8320T: Low-range turbidity sensor in NEMA 4X (CSA type 4) surface mount enclosure to continuously monitor from 0.000 to 100.0 NTU. Sensor includes a 20 ft. (6 m) long 10-conductor (plus two shields) cable.

RESERVED CATEGORIES

OPERATING PRESSURE RANGE
0 Standard (0-50 psig at 68°F)
1 High Pressure (0-150 psig at 68°F)

INSTALLATION CONNECTIONS
C3 PVC, 1/2 inch NPT female

EQUIPMENT TAGGING (specify tag data)
N None **P** Paper **S** Stainless steel

AGENCY CERTIFICATION
N None
C CSA Certified
E Certified CE Compliant

8320T 1A C3 **Product Number**

Choose one from each category.

Accu4™ Low-range Turbidimeter System Accessories

- **Standard Pressure Sensor Pipe Mounting Kit 8320A1070-001**
  Includes hardware to horizontal or vertical pipe mount only the standard pressure design Model 8320 sensor.
- **High Pressure Sensor Pipe Mounting Kit 8220G1040**
  Includes hardware to horizontal or vertical pipe mount only the high pressure design Model 8320 sensor.
- **Cal-Cube™ Assembly 8220G1300**
  Each assembly is labeled with a factory-certified calibration value.
- **Interconnect Cable 1W5002**
  When a length longer than the integral 20 ft. (6 m) sensor cable is needed, order this identical replacement cable. In this case, the sensor is not supplied with an integral cable. This 1W5002 cable is for direct connection between sensor and analyzer without using a junction box. Specify required length in whole feet up to 30 ft. (9 m) maximum.
- **Software Tool Kit 1000G3311**
  For use with IBM-compatible PC. The software can create and download multiple sets of analyzer configuration values. The kit includes a GLI software CD-ROM and 10 ft. (3 m) cable terminated with an RS-232 connector and stripped/tinned wires for connection to the analyzer.
- **Sun Shield 1000G3088-001**
  Aluminum shield with gray painted enamel finish provides additional protection for analyzer from harmful effects of direct sunlight.

Engineering Specification

1. The system shall consist of a Model T53 analyzer and a Model 8320 sensor, and shall employ a four-beam ratiometric measuring method, approved by EPA as outlined in GLI Method 2, to continuously monitor turbidity.
2. The system shall meet the International Standard for Measurement of Turbidity [ISO 7027-1984(E)] and USEPA-approved GLI Method 2*, and shall auto range from 0.000 to 100.0 NTU with automatic decimal point positioning.

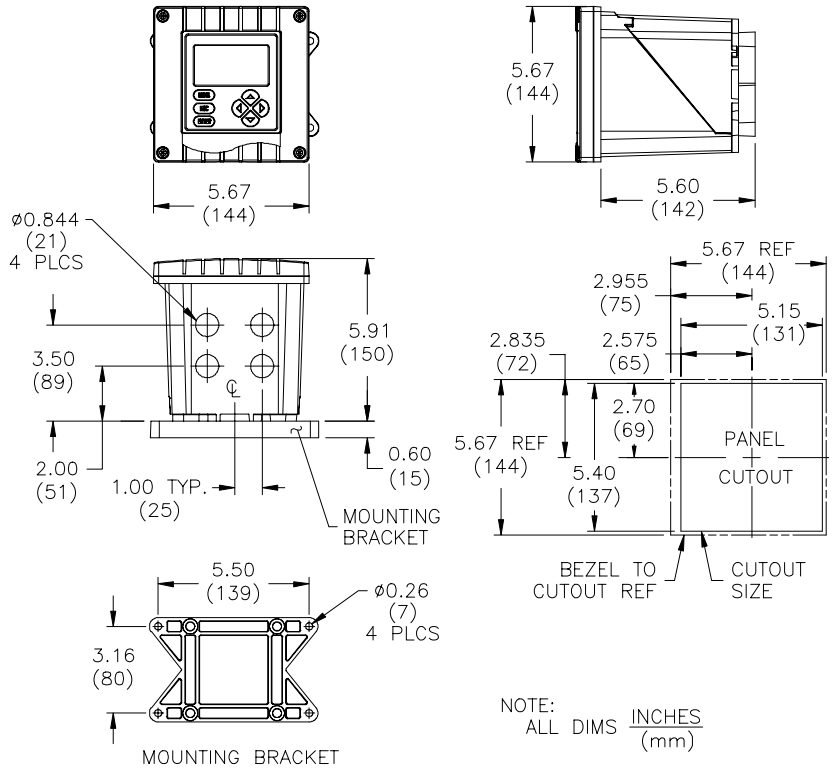
   *Consult GLI for Method 2 technology review.
3. The sensor shall have a built-in bubble trap to eliminate air in the sample.
4. The analyzer shall have a graphical dot matrix LCD display with 128 x 64 pixels and LED backlighting. The main display character height shall be 1/2 inch (13 mm). Auxiliary information character height shall be 1/8 inch (3 mm). Menu screens shall contain up to six text lines.
5. The system shall have self-diagnostic capability, including preprogrammed diagnostic messages to identify specific causes of deteriorating conditions or system malfunctions.
6. The analyzer shall have two isolated 0/4-20 mA analog outputs, each representing the measured turbidity. Turbidity values can be entered to define the endpoints at which the minimum and maximum milliamp 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.
7. The analyzer shall have a passcode to restrict access to configuration settings and calibration to authorized personnel only.
8. The analyzer shall have relays that can be selected to function as dedicated system diagnostic alarm relays to alert the operator when abnormal conditions exist.
9. The system shall have automatic color compensation and continuous zero point checking.
10. The system electronics shall be in NEMA 4X enclosures for protection from wet environments.
11. The system shall be configurable using its RS-232 port and GLI's optional software tool kit, or through HART protocol.
12. The system shall be GLI International, Inc. Accu4™ Low-range Turbidimeter System (Model T53/8320).

Optional:

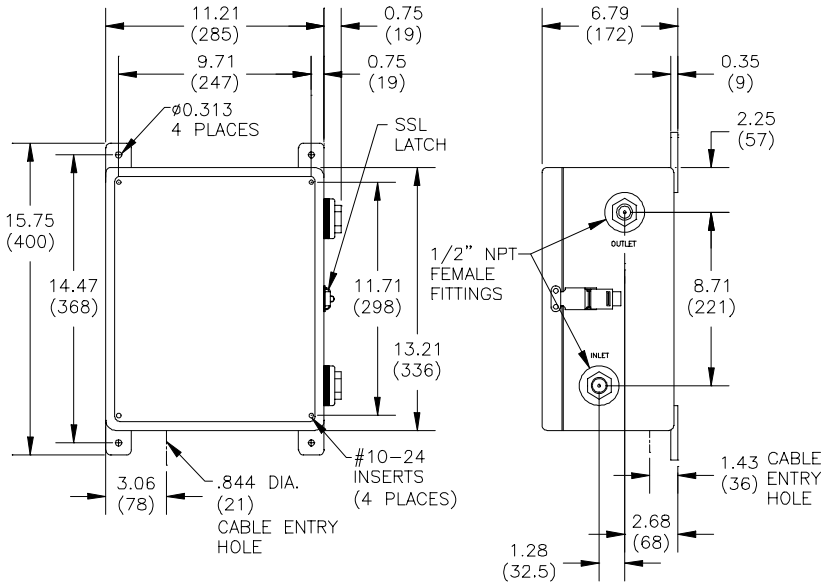
13. The system shall include a turbid glass Cal-Cube™ assembly with a factory-certified calibration value for periodic verification of calibration.

Dimensions

Model T53 Analyzer



Model 8320 Low-range Sensor (standard pressure design)



Data Sheet T5320

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