

FUEL SENTRY TANK GAUGE

Model TG-EL-D4A

The **Fuel Sentry Model TG-EL-D4A Tank Gauge and Leak Detection System** is a remote reading, microprocessor based tank gauge, with six intrinsically safe sensor inputs that can monitor one or two tanks. The leak detection system is designed for use with double wall tanks, vaulted tanks, single wall tanks with spill basins, and double wall piping. The TG-EL-D4A is designed for use with all fuel oils (No. 2 through No. 6), diesel, kerosene, jet, and most other petroleum products.

Tank gauges are required by NFPA 30 Flammable and Combustible Liquids Code and NFPA 31 Standard for the Installation of Oil-Burning Equipment, and NFPA 110 Standard for Emergency and Standby Power Systems.

Features Include

- **Automatic delivery detection**
- **Oil delivery verification / shortage detection**
- **Idle tank theft alarm**
- **Overfill alarm**
- **Auto-Stik stick chart generation**
- **Easy to read bar graph display**
- **Six intrinsically safe sensor inputs**
- **Daily HD-A2-C automatic leak sensor testing**
- **Sensor wiring fault detection**
- **Printer with delivery, consumption, status, and alarm reports**
- **RS-485 Modbus standard**
- **Fully field configurable**

Monitors one or two tank volumes via any combination of sensors

- TG-EL-WF-(7 or 12)-C wire float level sensor
- TG-EL-HLT-(7 or 15)-C drop-in head level sensor
- TG-EL-ULT-18-C ultrasonic level sensor
- Most other 4-20 mA level, head, bubbler, ultrasonic, or magnetostrictive sensors

Leak Detection Sensor Inputs

- HD-A2-C discriminating leak sensor
- RBS or PS-LDS float leak switch
- Most other contact closure leak sensors
- Leak sensor wiring fault detection

The TG-EL-D4A system consists of the indicator/monitor, optional printer, level sensor(s), leak sensor(s), and optional delivery flow meter. The TG-EL-D4A accepts up to 6 sensors in any combination. For example:

Single tank: (1) level, (1) head level, (4) leak
Single tank: (1) head level, (1) flow meter, (4) leak
Dual tank: (2) level, (4) leak (2 per tank)



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Capabilities

Leak Sensor Testing

All leak detection systems must be tested periodically over the 20-30 year life of the tank. The Fuel Sentry can automatically test each HD-A2-C discriminating leak sensor every day and print the result. Inspectors can remotely initiate HD-A2-C testing from the Fuel Sentry at any time. Non-discriminating (wet/ dry) leak sensor wiring faults (opens or shorts) can be monitored, and alarmed, by the TG-EL-D4A if a model WFTN-1 network is installed at each sensor.

Oil Delivery Verification

With the high price of oil, it is important to pay only for the oil that is actually delivered. With a single level (or head) sensor, the TG-EL-D4A can automatically detect a delivery and print a time/ date stamped 'gallons delivered' report which is used to verify the invoice before payment.

The TG-EL-D4A can also accept a flow meter signal, in addition to a level sensor, for higher accuracy delivery reporting.

Delivery 'shorting' by air injection, or waste fluid blending, changes oil density which makes the oil truck delivery meter reading inaccurate. With two sensors per tank: head plus either level or delivery flow, the TG-EL-D4A can note suspicious oil density changes on the 'gallons delivered' printed report.

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Idle Tank Theft Alarm

If the gallons in an idle tank drop excessively, the TG-EL-D4A can activate a time/ date stamped "theft alarm." An external "tank is idle" contact closure (from an emergency generator, pump set, or...) input detects small, slow volume changes. If this input is not available, the Fuel Sentry can trigger a theft alarm based on a higher than normal fuel consumption rate.

Overfill Alarm

The TG-EL-D4A can activate an FA-AV-x-D3 audible/ visual overfill alarm located near the tank fill pipe to warn the driver to stop filling the tank. The audible alarm self-silences.

Data Logging, Printer, Communications

For a single tank configuration, the TG-EL-D4A automatically logs the following data into non-volatile memory:

- Last 2 inventories at midnight
- Last 14 deliveries with time/ date
- Last 14 daily consumptions (midnight to midnight)
- Last 10 weekly consumptions (Sunday midnight to Sunday midnight)

For dual tank configurations, the data quantities are half of the above for each tank. The last 10 alarm (or status) messages are displayed with time/ date stamp. Reports based on the above data can be automatically printed after every delivery, at midnight, after an alarm, or manually on demand. The data can also be read via RS485 Modbus (standard).

Fully Field Configurable

The TG-EL-D4A can be completely field configured from it's LCD menus and keypad, or with the TG-EL-D4A_Edit PC-based software via the TG-EL-D4A USB port.

Sensor type, function, channel, and calibration data can be configured. Relay functions can be assigned (high, overfill alarm, low, leak, theft, pump start, system error, ..., common alarm).

The 51-point stick chart (volume versus level) can be generated in three ways:

1. Based on tank dimensions for standard shapes.
2. Manually entered values from the tank manufacturer's stick chart.
3. 'Auto-Stick' based on TG-EL-D4A data logging of flow meter and level sensor signals during a reduced rate tank fill. The flow meter can be temporary or permanent.

The resulting stick chart can be printed on the optional printer.



Model TG-EL-D4A Tank Gauge Control Panel



Model TG-EL-D4A Tank Gauge
Optional Panel Mounted Printer

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Instrument

Input Power: 120 VAC +/-15%, 50/60 Hz, 21 VA

Case Size:
TG-EL-D4A-00-x: 8" H x 3.5" W x 7.7" D

TG-EL-D4A-Ex-x: 16.5" H x 14.75" W x 9" D

Enclosure: NEMA 4 faceplate

Ambient Temp: 32° F to 122° F

Display: High contrast LCD
4" high, 0.5% resolution bargraph

Inputs (9 total)

Multi-purpose (6): 6 channels, I.S. Class I, Division 2, Group D

Contact Closure (3): 28.4 VDC, 26 mA

2 wire 4-20 mA: 13 VDC @ 21 mA for each transmitter + wiring.
0.006% resolution,
0.1% accuracy

Contact Closure (3): 3 channels, non-I.S., non WFTN-1

1 channel: 120 VAC, 10 mA
2 channel: 15 VDC, 30 mA

Outputs

Relays (8 total): 2 channels SPDT, 10 A res., ½ HP, 120 VAC
4 channels SPST NO, 1.5 A pilot, 120 VAC

4-20 mA: 2 channels 650 ohms max, volume or depth

Communications

USB: TG-EL-D4A_Edit PC software

RS485: Modbus, ASCII or RTU
1200-38400 baud

Printer Specifications

Input Power: 120 VAC +/-15%, 50/60 Hz, 20 VA

Case Size: 4.6" H x 4" W x 2.8" D

Enclosure: NEMA 1

Ambient Temperature: 32° to 122° F

Paper: 2.3" W, thermal, 30 columns

Ordering Information

Description	Catalog Number
Tank Gauge Chassis Options:	
Tank Gauge, no enclosure, no printer	TG-EL-D4A-00- <u>x</u> -0
Tank Gauge, with wall mount enclosure, no printer	TG-EL-D4A-E0- <u>x</u> -0
Tank Gauge, with wall mount enclosure, with printer	TG-EL-D4A-EP- <u>x</u> -0
Communication Options:	
RS485 Modbus	replace X with 0
Level Sensors:	
Wire Float level sensor, 4-20 mA output, 7 ft maximum depth	TG-EL-WF-7-C
Wire Float level sensor, 4-20 mA output, 12 ft maximum depth	TG-EL-WF-12-C
Submersible Head Level sensor, 4-20 mA, 7 ft depth	TG-EL-HLT-7-C
Submersible Head Level sensor, 4-20 mA, 15 ft depth	TG-EL-HLT-15-C
Ultrasonic level sensor, 4-20 mA, 18 ft maximum depth	TG-EL-ULT-18-C
Leak Sensors:	
Discriminating Leak Sensor, Dry-H ₂ O - Oil, 4-20 mA	HD-A2-C
Additional Options:	
Ship loose printer for panel mounting (for use only with JC-TGD-00-X-0 tank gauge)	JC-TGD-PRINTER
Two wire direct burial cable (for use with TG-EL-WF, TG-EL-ULT, RBS, and HLS devices)	26302
Detector Guard for HD-A2-C for sumps, vault floors, bright areas	HD-HSG
Wiring Fault Test Network (field-mounted at RBS, HLS, and other non-discriminating (wet/dry) contact closure leak or level sensors)	WFTN-1
Four wire vented direct burial cable (for use with TG-EL-HLT-X-C)	26000

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Suggested Specifications

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Provide a microprocessor-based tank gauging, leak detection, and overfill prevention system per NFPA 30 Flammable and Combustible Liquids Code, NFPA 31 Standard for the Installation of Oil-Burning Equipment, and NFPA 110 Standard for Emergency and Standby Power Systems. The tank gauge shall be provided complete with printer and RS-485 Modbus interface to the BAS for each storage tank indicated on the drawings. The indicator, printer, level sensors, leak sensors, and overfill alarm station shall be supplied by one manufacturer. The indicator and sensors shall be intrinsically safe for Class 1, Division 1, Group D hazardous locations as defined by the National Electric Code. The system shall be a Preferred Utilities Mfg Corp Model TG-EL-D4A with printer, HD-A2-C leak sensors, FA-AV-x-D3 Fil-A-Larm, and TG-EL-WF-x-C, or TG-EL-HLT-x-C, or TG-EL-ULT-x-C level sensor, as appropriate.

The indicator shall have a bright 4" bargraph display that is clearly visible from 20 foot viewing distance and shall be able to monitor either 1 or 2 tanks. All sensor signals shall be either 4-20 mA or contact closure for easy interchangeability of field devices. All leak sensors shall be automatically tested by the indicator on a daily basis with the result shown on the printed reports. Continuous sensor wiring fault detection (open or shorted) shall be provided. Automatic delivery detection logic shall trigger a printed, and data logged, report displaying the time, date, and amount delivered for delivery verification. The system shall be field upgradeable to dual sensors for higher accuracy delivery reporting and/or density shift detection in the event that delivery 'shorting' is suspected. Provide idle tank theft alarming capability for standby tanks or emergency generator tanks as required.

The printer shall automatically, or manually, print:

- Current inventory
- Time/ date
- Gallons of the last 7 deliveries
- Last 7 daily consumptions
- Last 5 weekly consumptions
- Last 10 time/ date stamped alarms

The tank gauge system shall be fully field configurable. It shall be able to automatically generate a stick chart based on measured delivery flow and measured level if an accurate stick chart is not available for the tank.