CAMERON
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LINCO TA-1000 Plus

Temperature averager

APPLICATIONS

Data for net volume calculation

ADVANTAGES

- Accuracy within 0.15 degF [0.08 degC]
- Eliminated requirement for calibration
- Support of single or dual flow line applications
- Modbus® communications, analog inputs and outputs, and compensated volume and net pulse output
- Capability of mounting to panel or 2-in pole
- Display of up to 11 parameters per channel
  - Probe temperature
  - Probe count
  - Probe average temperature
  - Pulse input count
  - Counts per hour
  - Probe alarm
  - BS&W (current, average, and alarm)
  - Pressure (current, average, and alarm)
  - Other (current, average, alarm)
  - Volume correction factor
  - Net volume

For three decades, Cameron temperature averagers have been a preferred device to support the determination of the temperature-corrected net volume of crude oil. With more than 20,000 units installed, our durable temperature averagers have provided the essential flow-weighted-average temperature information necessary to correct the gross volume registered by positive displacement and other types of flowmeters.

LINCO* TA-1000 Plus temperature averager is capable of acquiring more data, including flow-weight-average pressure, BS&W, and live net standard volume.

LINCO TA-1000 Plus temperature averager.

The temperature averager is more effective compared with conventional mechanical temperature correction methods installed on a meter and is simple to operate compared with a flow computer. Like a flow computer, the LINCO TA-1000 Plus temperature averager offers Modbus communication and a variety of input and output capabilities to support increased automation. Additionally, it offers a self-calibrating temperature input.

Not only is the temperature measurement highly accurate, but measurement integrity is assured through the elimination of manual calibration errors and drift over time. The savings from this feature begin during the simplified initial startup and continue by not needing routine calibrations. The self-calibration routine occurs each one-second sample interval when all the inputs and outputs are updated. Flow-weighted values, gross and net flow totals, and alarms can be reset with the press of a button or by Modbus command once any enabled security features are satisfied.

Fail-safe operation

In the event of a power outage, vital temperature information and alarms are retained in the device's nonvolatile memory. In addition, when digital outputs are enabled, an alarm relay can automatically shut down external equipment in the event of a power failure, probe failure, or analog input failure.

Enhanced security

With custody transfer operations, security is always a concern. Cameron helps minimize the risk of tampering with logged values by including a mechanical lockout with every LINCO TA-1000 Plus averager. The lockout restricts access to the reset button, preventing an unauthorized user from resetting totals. Security can also be enhanced in the weatherproof model with optional hex standoff door fasteners that are drilled for use with a wire seal.

LINCO TA-1000 Plus

Simplified upgrades

Replacing a legacy averager with the LINCO TA-1000 Plus averager is easy. Identify if you require a weatherproof (Div. 2) or explosion-proof model. With the explosion-proof model, choose if you want the additional conduit openings offered by a terminal housing. Then, determine if you need a single- or dual-channel model. The existing temperature probes can be reused with a LINCO TA-1000 Plus averager.

In most cases, features previously provided with an option board are integrated as standard into the LINCO TA-1000 Plus averager.

Legacy TA Model and Part Numbers Replaced by Single-Channel LINCO TA-1000 Plus Averager

Model	Part numbers
TA-500	3L-500H, 3L-7604HH, 3L-7599, 3L-8615, 3L-TA Modbus
TB-1000	3L-7604H, 3L-7604HH, 3L-7853, 3L-TA Modbus
TP-1000	3L-AL, 3L-7604H, 3L-7604HH, 3L-TA Modbus

Legacy TA Model and Part Numbers Replaced by Dual-Channel LINCO TA-1000 Plus Averager

Model	Part numbers
TA-1000	3L-AL, 3L-7604H, 3L-7604HH, 3L-5569, 3L-8615, 3L-7806, 3L-TA Modbus

Ordering information

Base device features

- Temperature probe input (one per channel)
- Volume (pulse) input (one per channel)
- Two digital/relay outputs
  - Alarms for invalid inputs
  - BS&W divert valve control when analog input is present
  - Net pulse output when enabled
- Modbus communications (RS-232 and RS-485 communications share Port 2 and cannot be used simultaneously; Port 1 [USB] is reserved for diagnostic use.)
- Analog input/output
- Compensated volume and net pulse output

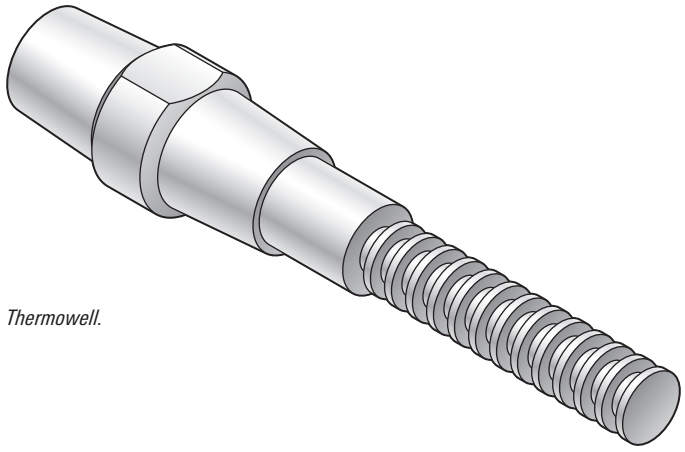
LINCO TA-1000 Plus Temperature Averager Ordering Information

	Part number	Channels	Terminal housing option
Weatherproof	50275434	One	Not applicable
	50275437	Two	Not applicable
Explosion-proof	50275440	One	No
	50275446	One	Yes
	50275449	Two	Yes

Optional accessory

Thermowell and temperature sensor bundle package (bundle part number 50292859)

The LINCO TA-1000 averager relies on a fast-acting, reliable thermowell and temperature sensor, conveniently available as a bundled package.



Thermowell.

Thermowell (individual part number 3L-TA-TW0-010)
Matches to sensor 3L-9306

- 0.75-in NPT process connection
- 3.25-in U dimension
- 316 stainless steel
- 2.50-in finned section for fast thermal transfer

Temperature sensor (individual part number 3L-9306)

- Element: Tip-sensitive 3,000-ohm single-element thermistor
- Temperature range: –40 to 257 degF [–40 to 125 degC]
- Probe length: 4.5 in
- Probe diameter: 0.125 in
- Thermowell connection: 0.125-in NPT
- Instrument connection: none; unthreaded
- Lead length: 9-ft PVC sheath suitable for nonhazardous area

LINCO TA-1000 Plus

General specifications

Electrical safety classification	Approved by CSA for US and Canada
	Explosion-proof†: CSA Class I, Div. 1, Groups C and D, T6
	Weatherproof†: CSA Class I, Div. 2, Groups B, C, D, T6
Enclosure	**Weatherproof†**
	Molded fiberglass-reinforced polyester, Lexan® polycarbonate viewing window
	Type 4/IP66 rating
	Dimensions (H × W × D), in: 6.91 × 6.5 × 4.25
	Explosion-proof†
	Cast aluminum, painted with epoxy and polyurethane
	Type 4/IP66 rating
	Dimensions (H × W × D), in: 6.8 × 10.33 × 5.69
	Dimensions with optional terminal housing (H × W × D), in: 11.53 × 10.33 × 5.69
Weight	Weatherproof†: 3.2 lbm
	Explosion-proof†: 5.2 lbm
	Explosion-proof† with optional terminal housing: 8.1 lbm
System power	120 VAC, 50/60 Hz at 250 mA
	8–30 VDC at 200 mA
Operating temperature	–40 to 158 degF [–40 to 70 degC]
Display	Backlit LCD
	Two rows, 16 alphanumeric characters per row
	Manual or automatic scrolling (user configurable)
	LCD readout parameters
	Probe temperature
	Probe count
	Probe average temperature
	Pulse input count
	Counts per hour
	Probe alarm
	BS&W (live reading, average, and alarm) with analog input option
	Pressure (live reading, average, and alarm) with analog input option
	Other (live reading, average, and alarm) with analog input option
	Volume correction factor with compensated volume and net pulse output option
	Net volume with compensated volume and net pulse output option
Controls	**Weatherproof† unit**
	External display switch cycles forward or backward through LCD readout parameters
	Internal button resets totals and alarms
	Internal buttons (step, increment, enter) for device configuration
	Explosion-proof† unit
	External switch (right conduit entry) cycles forward through LCD readout parameters
	External switch (left conduit entry) that resets totals and alarms and is protected by custody-transfer lockout
	Keypad buttons (step, increment, enter) enable device configuration; remove lid to access
Communications	Port 1 (USB) reserved for diagnostic use
	Port 2 for serial RS-232 and RS-485 communications
	RTU Modbus protocol
I/O, standard	**Temperature probe input**
	Quantity: one per channel (two inputs possible)—optional
	Supports single-element thermistor probe
	Operating temperature: –40 to 257 degF [–40 to 125 degC]
	Accuracy ±0.15 degF
	24-bit self-calibrating ADC (probes are interchangeable)
	Automated wire length compensation
	Volume (pulse) input
	Quantity: one per channel (2 inputs possible)
	Optically isolated input
	Dry contact closure, 180 Hz max
	AC input, 120 VAC, 180 Hz max
	DC input, 9–30 VDC, 230 Hz max
	Digital or relay outputs
	Quantity: two
	5-A single-pull double-throw dry contact relay
	Pulse duration: 1 second
	Alarms on invalid probe, pulse input, or analog input where applicable
	BS&W divert valve control (with analog input option enabled)
	Net pulse output (when option is enabled)
I/O, optional	**Analog inputs**
	Quantity: 2
	Configurable as 0–5 VDC, 1–5 VDC, or 4–20 mA signal
	Provides readings from a pressure transmitter, densitometer, or BS&W detector
	Averages measurements from any device with a 0–5 VDC, 1–5 VDC, or 4–20 mA output
	Accuracy: ±0.030% of span at 77 degF [25 degC]
	Temperature effect: ±0.25% of span over operating temperature range
	Impedance: >60,000 ohm for voltage inputs; approximately 250 ohm for 4-20 mA input
	Transmitter voltage supply: 24 VDC at 20 mA when AC-powered, 8-30 VDC when DC-powered
	Single-ended inputs
	Sample rate: 1 sec
	24-bit self-calibrating ADC
	Analog outputs
	Quantity: 2
	Configurable for transmitting a live probe temperature or average temperature, or an analog input value
	Type 4-20 mA, optically isolated, externally powered
	Accuracy: ±0.1% of span at 77 degF [25 degC]
	Temperature effect: 27.8 ppm/degF [±50 ppm/degC]
	Output load R (ohms) = [supply (volts) – 5.5] / 0.02
	Maximum voltage: 30 VDC
	D/A resolution: 16 bits

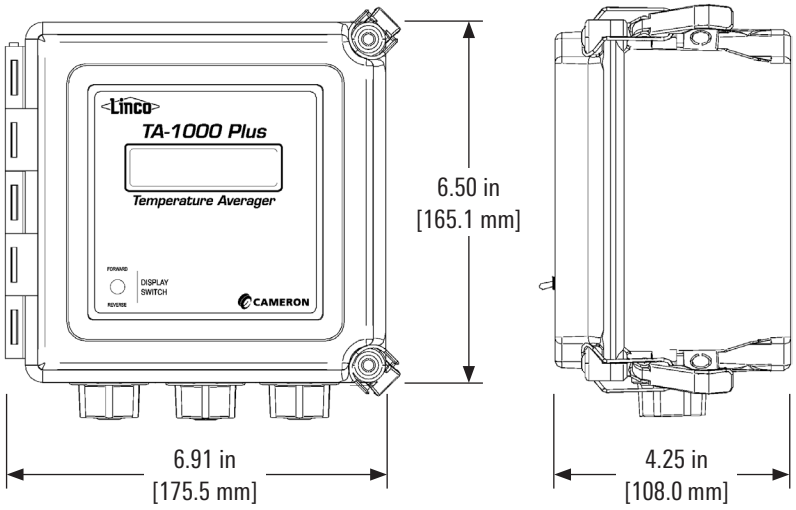
† Explosion-proof and weatherproof as defined by CEC and NEC codes.

LINCO TA-1000 Plus

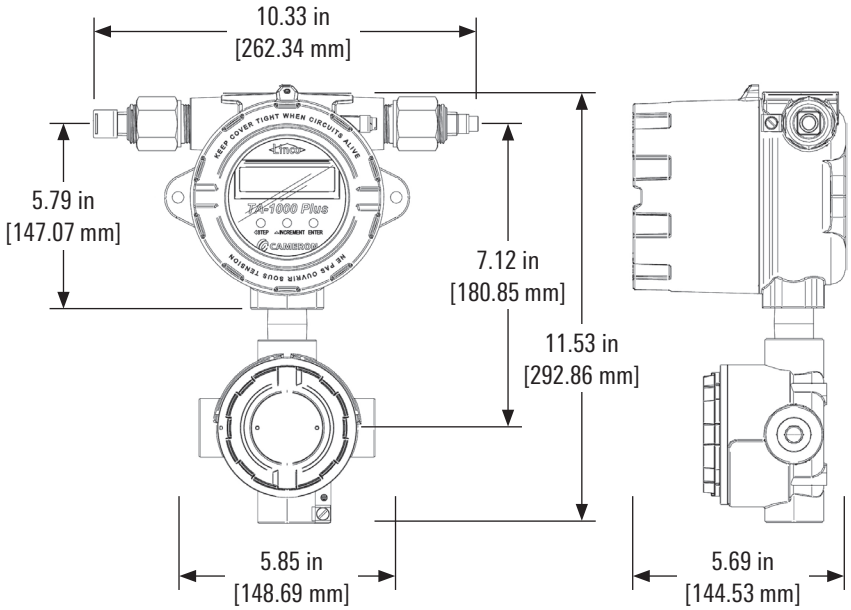
Compensated volume	
	API MPMS 11.1-compliant temperature compensation
	Compensates for pressure when a live pressure input is supplied via Analog 1
	Enables net volume calculations based on user-entered gravity and meter factor along with a TA-supplied average temperature and raw pulse input
	For use with single flow measurement channel
Net pulse output	
	Quantity: one
	Outputs the compensated net volume using digital output 2
	For use with single flow measurement channel

Alarms	Alerts user to a temperature or analog input reading that remains outside the specified range for four consecutive flow counts
	Temperature limits (high, low) are user-configurable
	Default fail temperature alarms are determined by the operating range of the probe
Data Storage	Nonvolatile ferroelectronic RAM memory ensures that data is never lost and operates at higher speeds than traditional memory types
	No lithium battery required

Dimensions



Weatherproof† LINCO TA-1000 Plus averager assemblies.



Explosion-proof† LINCO TA-1000 Plus averager assembly shown with optional terminal housing.

† Explosion-proof and weatherproof as defined by CEC and NEC codes.

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