



LOAD TAP CHANGER POSITION MONITORING

The range of INCON Load Tap Changer (LTC) Position Monitors relay critical position information between the LTC and the LTC controller, enabling distribution transformers to run as efficiently as possible. Three different model options and a host of accessories allow you to select the right system solution for your specific application.



BALANCE
TRANSFORMER LOADS



REGULATE
LINE VOLTAGE



REDUCE
POWER COSTS

HIGHLIGHTS & TECHNOLOGY

1250B MODEL

Receives a signal from a synchro transmitter (1292 series)

Provides absolute position feedback

Displays tap position and transmit this information over analog and serial lines

Works with any LTC or voltage regulator

Includes a software draghand feature to report highest and lowest tap position

Programmable through the serial port or front panel

Provides an analog output to SCADA or tap controller

1250-LTC MODEL Includes all 1250B highlights, plus:

On-tap position, deviation from tap center-line

Number of tap changes "up or down to" each tap and total alarms

Number of consecutive tap changes in one direction alarm

"Unstable signal" and loss of signal alarm

Tap change relay acknowledgment

Number of days since passing through neutral alarm

1511-LTC MODEL

Receives signal from a resistive drumswitch or "Slidewire" transmitter, 600 ohms min. total resistance

Provides a more reliable reading of the transmitter through software filtering and higher 24V signal strength

Optional RS-232 port

Optional High/Low limit relays function as programmable drag-hand contacts

Outputs interface to PLCs, SCADA RTUs and substation computers

APPLICATIONS



POWER UTILITIES

Transformer LTC Position, Hydro Dam Gate Position,
Dam Head/Tail Water Level, Industrial Rotary Position



SPECIFICATIONS

MODEL COMPARISON

LTC MONITOR	1250B	1250-LTC	1511-LTC
Applications	Transformer LTC Position, Hydro Dam Gate Position, Dam Head/Tail Water Level, Industrial Rotary Position	Transformer LTC Position, LTC Position Data Collection	Transformer LTC Position
Transducer Type	Synchro (1292)	Synchro (1292)	Resistance Switch (Slidewire)
Input Signal	0-90VAC, 50/60Hz	0-90VAC, 50/60Hz	0-24VDC

ALL MODELS

Resolution (1250B & 1250-LTC)

- $\pm 0.001\%$ of full scale or 6 arc minutes

Accuracy

- $\pm 0.02\%$ of full scale maximum (0.01% typical)

Temperature Drift

- $\pm 0.01\%$ per $^{\circ}\text{C}$

Operating Temperature

- 0° to 55°C

Humidity

- 10% - 90% non condensing

Weight

- 24 ounces

Voltage

- $117 \pm 10\%$

Frequency

- 47 - 63 Hz

Load

- 8 Watts, maximum

Display Type

- 5-digit LED

Digit Height

- 0.56 inch (14.2 mm)

Viewing Distance

- 23 feet

Decimal Point (1250B)

- Field programmable

Optional Analog Outputs

- ± 1 mA, 0-1 mA, 0-2 mA, 4-20 mA (requires 15 to 24 VDC external loop power)

Compliance

- 10 Volts (0-1 mA, ± 1 mA, 0-2 mA)
- 500 Ohms (4-20 mA)
- 5 mA (0-10 VDC, ± 10 VDC) 1511-LTC

Non-Linearity

- $\pm 0.1\%$ of full scale

Resolution

- 12 bits ($\pm 0.025\%$ of full scale)

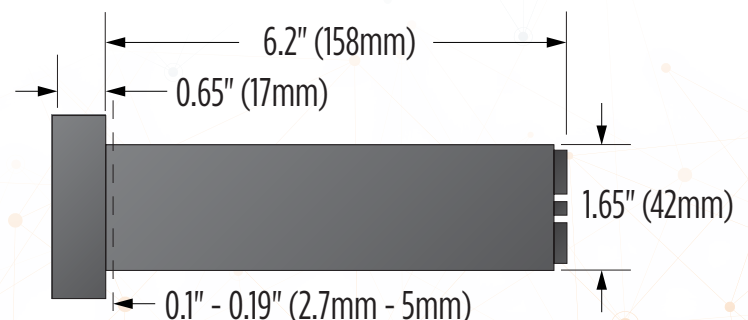
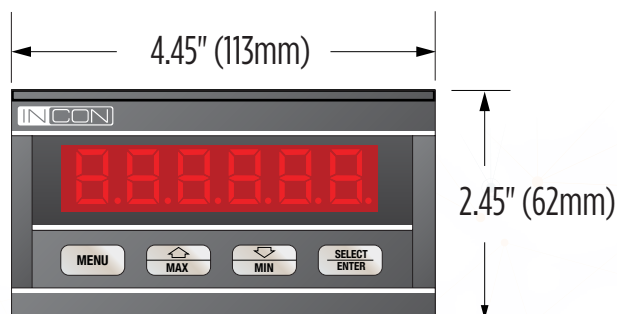
Optional Hi/Lo Relay Contact Rating

- 3A @ 125/250 VAC (resistive), 30 VDC

Communication Options

- RS-232 (ASCII)
- RS-485 Full Duplex (MODBUS)

COMPONENTS & DIMENSIONS





ORDERING INFORMATION

1250B PROGRAMMABLE POSITION MONITOR

The 1250B is a versatile programmable position monitor. Its main application is for Transformer LTC position monitoring, but its non-linear conversion table gives it the ability to convert non-linear rotary motion into a linear scale for additional applications.



BUILD A MODEL NUMBER

1250B-U-W-Y

U = Output Options

- 0 = 0-1 mA
- 1 = ± 1 mA
- 2 = 0-2 mA
- 4 = 4-20 mA

W = Control / Isolation

- R = Hi/Lo Relay Limits
- I = Input Isolation

Y = Comm. Options

- S = RS-232 Serial
- M = RS-485 MODBUS

ORDERING INFORMATION

Part Number	Model	Description
855x379	1250B-I	Franklin 1250B-1 Programmable Position Monitor, 1mA
855x376	1250B-4	Franklin 1250B-4 Programmable Position Monitor, 4-20mA
855x362	1250B-0-R	Franklin 1250B-0-R Programmable Position Monitor, 0-1mA R
855x367	1250B-0	Franklin 1250B-0 Programmable Position Monitor, 0-1 mA
855x383	1250B-0-M	Franklin 1250B-0-M Programmable Position Monitor, 0-1mA M
855x373	1250B-1-I	Franklin 1250B-1-I Programmable Position Monitor, 1mA I
855x363	1250B-0-I	Franklin 1250B-0-I Programmable Position Monitor, 0-1mA I
855x364	1250B-0-R-M	Franklin 1250B-0-R-M Programmable Position Monitor, 0-1mA R-M
855x382	1250B-4-M	Franklin 1250B-4-M Programmable Position Monitor, 4-20mA M
855x368	1250B-0-S	Franklin 1250B-0-S Programmable Position Monitor, 0-1mA S
855x366	1250B-4-I	Franklin 1250B-4-I-M Programmable Position Monitor, 4-20mA I-M
855x370	1250B-4-R-M	Franklin 1250B-4-R-M Programmable Position Monitor, 4-20mA R-M
855x377	1250B-1-I-M	Franklin 1250B-1-I-M Programmable Position Monitor, 1mA I-M
855x369	1250B-0-I-S	Franklin 1250B-0-I-S Programmable Position Monitor, 0-1mA I-S
855x358	1250B-1-R-M	Franklin 1250B-1-R-M Programmable Position Monitor, 1mA R-M
855x365	1250B-4-I-S	Franklin 1250B-4-I-S Programmable Position Monitor, 4-20mA I-S
855x356	1250B-4-R-I-S	Franklin 1250B-4-R-I-S Programmable Position Monitor 4-20mA RIS
855x371	1250B-1-R-I-S	Franklin 1250B-1-R-I-S Programmable Position Monitor, 1mA R-I-S
855x359	1250B-0-I-M	Franklin 1250B-0-I-M Programmable Position Monitor, 0-1mA I-M



ORDERING INFORMATION

1250-LTC PROGRAMMABLE POSITION MONITOR

The 1250-LTC is designed specifically for transformer LTC position monitoring, providing enhanced analysis of LTC position. The 1250-LTC enables predictive maintenance by logging historical data about LTC movement, with programmable alarms.



BUILD A MODEL NUMBER

1250-LTC-U-W-Y

U = Output Options

- 0 = 0-1 mA
- 1 = ± 1 mA
- 2 = 0-2 mA
- 4 = 4-20 mA

W = Control / Isolation

- R = Hi/Lo Relay Limits
- I = Input Isolation

Y = Comm. Options

- S = RS-232 Serial
- M = RS-485 MODBUS

ORDERING INFORMATION

Part Number	Model	Description
855x129	1250-LTC-4-I-S	Franklin 1250-LTC-4-I-S Load Tap Changer Monitor, 4-20mA I-S
855x118	1250-LTC-4-I-M	Franklin 1250-LTC-4-I-M Load Tap Changer Monitor, 4-20mA I-M
855x360	1250-LTC-1-R-M	Franklin 1250-LTC-1-R-M Load Tap Changer Monitor, 1mA R-M

1511-LTC PROGRAMMABLE POSITION MONITOR

The 1511-LTC provides basic LTC tap position monitoring using the LTC's existing position feedback device. Slidewire voltage measurements are filtered by firmware to give a stable, reliable tap position reading. Simple to install and easily calibrated to any LTC Slidewire.



BUILD A MODEL NUMBER

1511-LTC-U-W-Y

U = Output Options

- 0 = 0-1 mA
- 1 = ± 1 mA
- 2 = 0-2 mA
- 4 = 4-20 mA

W = Control / Isolation

- R = Hi/Lo Relay Limits

Y = Comm. Options

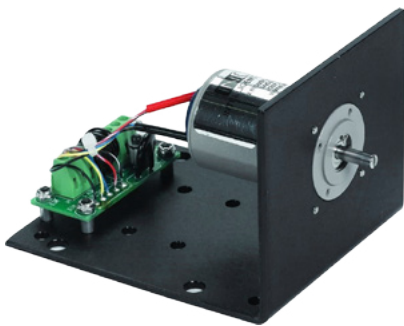
- S = RS-232 Serial
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ACCESSORIES

SYNCHRO TRANSMITTERS

The Synchro Transmitter is the preferred position indicating technology where reliability, rugged design, and accurate absolute position data are critical. The Transmitter is available with a surge suppression option and a mounting bracket. Designed for use with 1250B and 1250-LTC, solid-state INCON Programmable Position Monitors.



Model	Description
1292	Synchro transmitter
1292K	Synchro transmitter with "L" install bracket
1292S	Synchro transmitter with surge protection circuit
1292KS	Synchro transmitter with install bracket and surge protection circuit
1293	Flexible coupling shaft - see page 6
1945	15 VDC Loop Power Supply (For 4-20 mA Analog Output) - see page 5

Highlights

- Extra-rugged right-angle "L" bracket assembly option for secure, parallel-to-surface mounting
- Circuit board terminations option for easy wiring connections, without crimp-lugs
- Surge suppression option for transient protection
- Highly accurate output signal corresponds to rotary position
- Absolute position sensor, no zero-position loss after power-down
- Reliable, rugged, long-life transmitter
- Very fine resolution-extremely accurate and reliable
- Does not require re-zeroing or periodic calibration
- Excellent signal/noise immunity
- Stable over time and temperature
- Virtually unlimited life
- Can be retrofitted to older LTC's without existing synchros

Applications

- Ideal for power, process, and industrial equipment applications
- Transformer load tap changers
- Equipment position
- Hydro-electric spillway & generator gates
- Valves of all kinds
- Machine tools
- Cable reels and hoists
- Screw conveyors, and more

Specifications

Model	1292	1292K	1292S	1292KS
Mounting	Synchro flange	"L" bracket	Synchro flange	"L" bracket
Wire Terminations	Ring lugs (provided)	Ring lugs (provided)	Phoenix terminal blocks	Phoenix terminal blocks
Wire Size	22-18 AWG	22-18 AWG	28-14 AWG	28-14 AWG
Surge Protection	None	None	150 Volt, 14 mm Metal Oxide Varistors (3 ea.)	150 Volt, 14 mm Metal Oxide Varistors (3 ea.)
Fuse Protection	None	None	5A Fast Blow	5A Fast Blow



POWER SUPPLY

An adjustable 12 to 15 Volt DC regulated Power Supply that is used to provide loop power for INCON Panel Meters ordered with the 4 to 20 milliamp analog output option.



Model	Description
1945	Power supply

Note: This product is a Class 1 power supply and requires the chassis to be connected to earth ground at end application. Use 700 °C iron for soldering input connections. Tolerance for 230 VAC operations is +15% to -10%.

Highlights

- VDE transformer construction (full rated to 50 °C)
- + 0.05% regulation - Foldback/current limit
- T.C. burned-in to MIL - 883 Lev. B
- UL recognized/CSA certified
- Chassis notched for AC input
- 100/120/220/230-240 VAC power
- Industry standard frame size

Applications

- The 1945 power supply has inherently low conducted and radiated noise levels for most system applications that meet the requirements of FCC Docket 20780 for Class A equipment and VDE 0871 for Class A equipment without additional noise filtering.
- Convection cooling is adequate where non-restricted airflow is available. When operating in a confined area, moving air or conduction cooling is recommended.
- The five-wire input to the 1945 provides four voltage ranges: 100/ 120/220/230-240. Extended low line tolerance provides additional drop out margin in areas where line voltages are marginal. Inputs must be fused.

Specifications

- AC Input: 100/120/220/230-240 VAC, ± 10%, 47-63 Hz (derate output current 10% for 50 Hz operation)
- Fuse at: 0.5 / 0.25 amps for 100 -120 / 220 - 240 VAC
- DC Output: 12 - 15 V (± 5%) Adjustable
- Line Regulation: ± 0.05% for a 10% line change
- Load Regulation: ± 0.05% for a 50% load change
- Output Ripple: 5.0 mV PK-PK maximum
- Transient Response: ≤ 50µs for a 50 to 100 % load change
- Short Circuit and Overload Protection: Automatic current limit / foldback
- Over Voltage Protection: Not Available
- Remote Sensing: Not Available
- Stability: ± 0.3% for 24 hour period after 1 hour warm-up
- Temperature Rating: 0 °C to 50 °C full-rated derated linearly to 40% at 70 °C
- Temperature Coefficient: ± 0.03%/°C maximum
- Efficiency: 55%
- Vibration: Per ML-STD-8100 method 514.3 category 1 procedure I
- Shock: Per ML-STD-8100 method 516.3 procedure III
- Weight: 2 lbs (1 kg) [Shipping: 3 lbs (1.5 kg)]

Safety: The 1945 power supply is designed to meet or exceed requirements of the following specifications: IEC 380, IEC 435, VDE 0730 Part 2, VDE 0804, ECMA-57, CEE 10 Part 2P, UL 1012, CSA 22.2 No. 143, CSA 22.2 No. 154. Specifically, field terminal to terminal spacing is 5.25 mm with 9.0 mm creepage to other metal. Leakage current is less than 5.0 mA and dielectric withstanding voltages are 3750 VAC input to chassis. 3750 VAC input to output and 300 VDC output to chassis.



AC LINE POWER CONDITIONER

The AC Line Power Conditioner provides output that is clean, voltage stabilized, and virtually free of transient spikes and noise. It is designed to be used with the model 1250-LTC or 1250B Programmable Position Monitors and their synchro transmitter.



Model	Description
1932	AC line power conditioner

Highlights

- Regulates line voltage
- Filters harmonic noise for increased stability, accuracy and reliability
- Includes lightning arrestors and surge protection

Specifications

- Input Voltage: 105 to 135 VAC @ 60 Hz
- Output Voltage: 115 VAC @ 60 Hz \pm 3%
- Load: 10 VA (Min.) to 25 VA (Max.)
- Temperature range: -13 to 158 °F (- 25 to 70 °C)
- Fuse: External 5 Amp (Max) not supplied but required

FLEXIBLE COUPLING

The "Quick Connect" Flexible Coupling is designed for unique mounting and connecting applications. It makes retrofits to older equipment easy with standard lengths and coupling diameters to fit most LTC applications.



Model	Description
1293-KIT	Universal coupling kit, includes an 18 inch flexible shaft and one each 0.250", 0.375" and 0.500" couplings
1293-48-625	1293-48-625 Quick-Connect Flexible Shaft with 0.625" coupling diameter

BUILD A MODEL NUMBER

1293-X-Y

X = Shaft Length

- 9 = 9 inches
- 18 = 18 inches
- X = Custom length, X inches

Y = Coupling Diameter

- 250 = 0.25 inch
- 375 = 0.375 inch
- 500 = 0.50 inch

Highlights

- Quickly connects to all Model 1292 Synchro Transmitters
- Secure, positive attachment to an LTC shaft
- Two standard lengths
- Three standard coupling sizes
- Custom designs available



TRANSMITTER RETROFIT KIT

Provides easy Synchro Transmitter retrofit to voltage regulators.



Model	Description
1265-5.75	5.75" dial face diameter transmitter retrofit kit
1265-6.25	6.25" dial face diameter transmitter retrofit kit
1265-7.19	7.19" dial face diameter transmitter retrofit kit
1265-7.62	7.62" dial face diameter transmitter retrofit kit
1265-8.00	8" dial face diameter transmitter retrofit kit
1269-10	10 foot (3 m) interface cable
1269-20	20 foot (6.1 m) interface cable
1269-50	50 foot (15.2 m) interface cable

Note: The 1265 does NOT include lightning / surge protection. If needed, MOV protection should be installed in a nearby junction box.

Highlights

- Some Load Tap Changers and Voltage Regulators can not be equipped with Selsyn® synchro transmitters. This problem can be easily solved with the INCON model 1265 Transmitter Retrofit Kit.
- For those applications where there is no easy way to retrofit a transmitter to the LTC drive mechanism, INCON offers the Model 1265 Transmitter Retrofit Kit.
- The 1265 retrofit kit replaces the glass lens on the local indicator dial.
- The 1265 is designed for use with the INCON model 1250B Programmable Position Monitor, which displays the LTC position and can transmit a proportional analog signal to SCADA.
- The Kit comes complete with a Synchro, mounted on a clear Lexan Dial and a two-pronged engagement arm that tracks the position of the Dial Indicator needle.
- The Kit also includes the mating connector pieces, to facilitate assembly of a field wiring cable, although it is recommended that the factory-assembled cable be used.
- Provides accurate Tap Position Status in remote locations.
- Proven reliability with many in Utility & Industrial operations for over 20 years.
- Does not interfere with mechanical draghand operation.
- Highly reliable and accurate (1292) synchro transmitter is included.
- Saves manual reporting time and money.
- Maintenance free.
- Can be retrofitted to older LTC's without existing synchros.

Specifications

- Power input: 115 Volts AC
- Output signal: 0 to 90 Volts AC
- Isolation: 900 Volts, rotor to stators
- Temperature range: -40 to 158 °F (-40 to 70 °C)
92% humidity (non-condensing)
- Display type: Clear, Lexan dial face 5.75, 6.25, 7.19, 7.62 or 8.00 inches
- Depth to front surface: 4.0 inches (10.2 cm) with cable off