



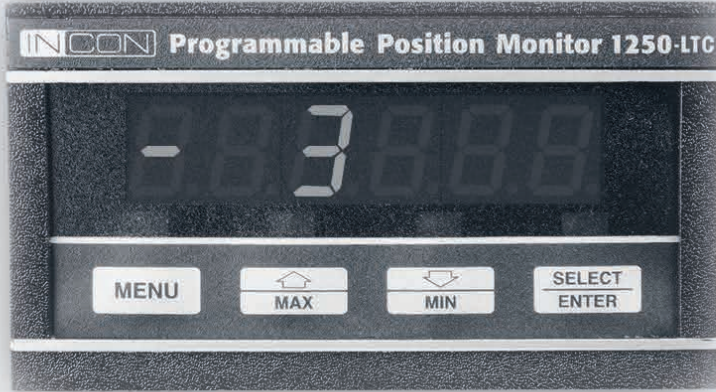
Franklin Electric
GRID SOLUTIONS



INCON[®]

PROGRAMMABLE LOAD TAP CHANGER POSITION MONITOR

FOR UTILITY DISTRIBUTION TRANSFORMERS



TRANSFORMER #1



TRANSFORMER #2



TRANSFORMER #3

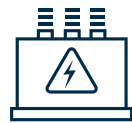


TRANSFORMER #4

THE UTILITY INDUSTRY'S STANDARD

The INCON® 1250-LTC Programmable Load Tap Changer (LTC) Position Monitor relays critical position information between a distribution transformer LTC and the LTC controller, enabling utilities to run their transformers as efficiently as possible.

With over 40 years of proven service in over 33,000 utility transformers around the globe, the 1250-LTC does so much more than just monitor tap position. It is a vital tool that utilities use to predict transformer maintenance and prevent the failure of their LTC's.



PRECISION TRANSFORMER LTC MONITORING

The 1250-LTC is a highly advanced solid-state instrument, which measures the absolute position of a Synchro Transmitter connected to the LTC drive shaft. It provides a user-definable visual digital display indication of tap position as well as both analog and digital signal outputs suitable for a variety of monitoring and control applications. LTC position monitors can feed data directly into a SCADA and MODBUS system to help utilities:

- Ensure transformer loads are balanced.
- Regulate line voltage by adjusting feeder voltage.
- Reduce power costs by providing minimum line voltage to the customer.
- Deploy predictive transformer maintenance with intelligence.



TAP CHANGE ACKNOWLEDGMENT

The 1250-LTC can be programmed to close one of its relays upon completion of each tap change. This can be used as a feedback acknowledgment that the requested tap change was successful.



ON-TAP DEVIATION MONITORING

Most LTC's rotate about 9 to 11 degrees with each tap change. The 1250-LTC can measure in increments of 1/10th of a degree. A special feature of the 1250-LTC is its ability to monitor small discrepancies in tap position. A programmable limit can be set to give an alarm when the discrepancy in tap position reaches the limit. Inaccurate tap position can be an early indicator of wear in the LTC mechanism or possible impending failure.



RUNAWAY LTC AVOIDANCE

If, for some reason, the LTC controller gets a faulty voltage reading, the LTC can run away in one direction; a serious condition that can effect transformer operation. The 1250-LTC has a programmable alarm that can be used to cut power to the drive motor if it detects too many tap changes in one direction.



MAINTENANCE PLANNING

In the course of its life, an LTC may move up and down through the same few taps. As a result, these taps will have much more wear than the rest of the contacts. The 1250-LTC keeps a count of how many tap changes were made up to and down to every tap. This data helps utilities plan maintenance and replacement of the LTC contacts. The total tap change count aids utilities in maintenance planning and lets the utility know when the LTC drive mechanism needs maintenance.



MORE THAN AN LTC POSITION MONITOR

In addition to basic LTC tap position, the 1250-LTC monitors several additional important characteristics related to LTC movement. Programmable alarm options to help utilities automate transformer maintenance include:

- Pass-Through-Neutral Alarm
- One-Direction Change Count Alarm
- Tap Change Acknowledgment
- Unstable / Lost Synchro Signal
- On-Tap Deviation
- Up/Down Count
- Total Tap Change Count
- Low Tap / High Tap



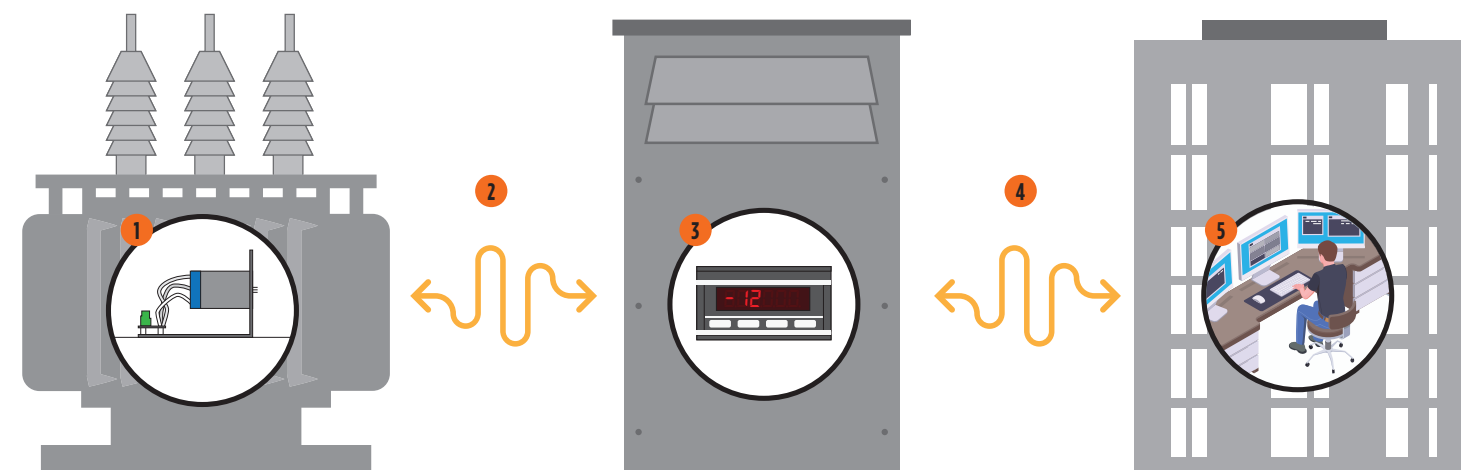
NEUTRAL TAP ASSURANCE

It is important for an LTC to pass through the neutral tap occasionally. If it doesn't the reversing switch may become sticky and inoperable. The 1250-LTC has a programmable alarm that tells the utility if it has been too many days since the LTC has passed through the neutral tap.



HOW IT WORKS:

- 1 The 5-wire Synchro Transmitter is mechanically coupled directly to the transformer's LTC drive mechanism.
- 2 Vital LTC position data is transmitted via AC signal to the LTC Position Monitor. The AC signal is 0-90 VAC and in-phase with the surrounding AC systems making it immune to noise.
- 3 Inside the substation control room, the signal from the Synchro Transmitter is interpreted by the LTC Position Monitor as an angle, which is precisely converted to a tap position by firmware.
- 4 The LTC position is fed to a central dispatch center via analog output signal through a Remote Terminal Unit (RTU).
- 5 Signals from a network of LTC Position Monitors can be fed into a utility's SCADA system, providing remote LTC position information for an entire network of transformers.



The logo for INCON, featuring the word "INCON" in a bold, white, sans-serif font with a registered trademark symbol (®) to the upper right. The text is contained within a white rectangular border with rounded corners. The background of the entire page is a photograph of a power substation at dusk or dawn, with large transformers and insulators visible against a dark blue and orange sky.

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