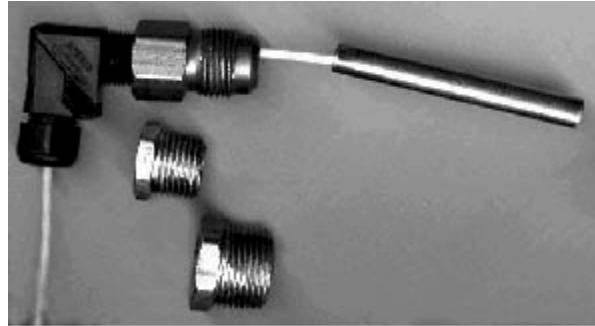


TTC-1000 Transformer Temperature Controller



DESCRIPTION

The Transformer Temperature Controller (TTC) is a full feature temperature measurement and control device available with up to three temperature probes and calculated winding temperature for the management of transformer cooling and Load Tap Changer (LTC) conditioning monitoring applications. The TTC is ideal for both retrofit and new transformer applications. The TTC is it **does not require calibration**. Because the accuracy is guaranteed over the entire temperature range, the temperature probes are interchangeable and can be installed up to 250 feet from the controller. Also, there are no maintenance items such as potentiometers or batteries. Just set it and go.

The TTC has up to six programmable output relays with Trip Duty rated form C contacts. The built-in programmable scheme logic provides the ability to:

- Control Fans and Pumps
- Load Pickup Cooling™ for transformer pre-cooling
- Provide high temperature alarms
- Generate Trip signals
- Provide LTC Condition Alarm
- Periodic exercising of fan banks

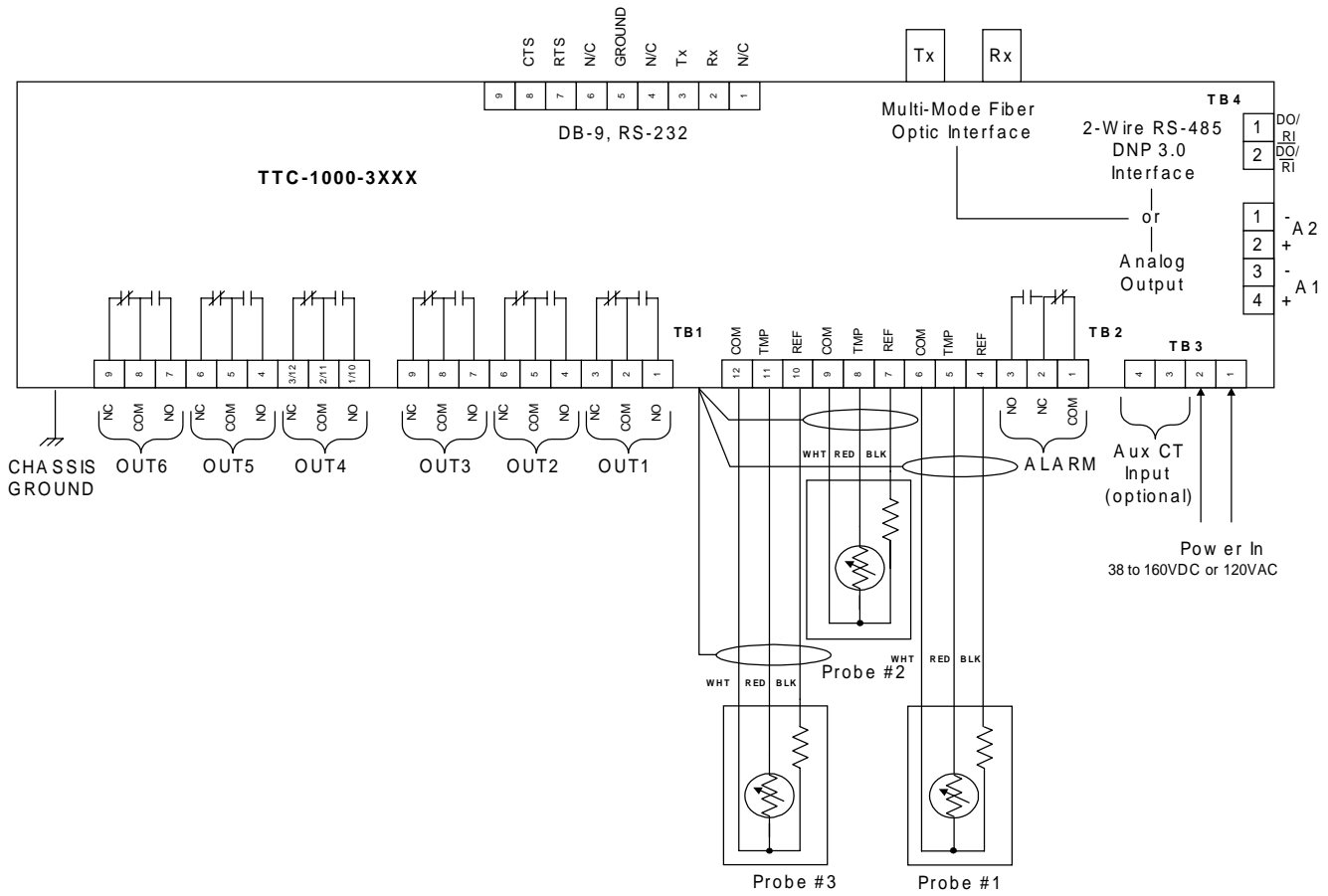
The TTC also includes an RS-232 communications interface for settings and status that uses the terminal emulation software installed on your PC and does not require special software. Setting files can be either uploaded or downloaded. There are many additional features available including analog outputs, data logging, time stamped min/max temperature display, and DNP3.0 communications with a **Life Time Warranty** at an affordable price.

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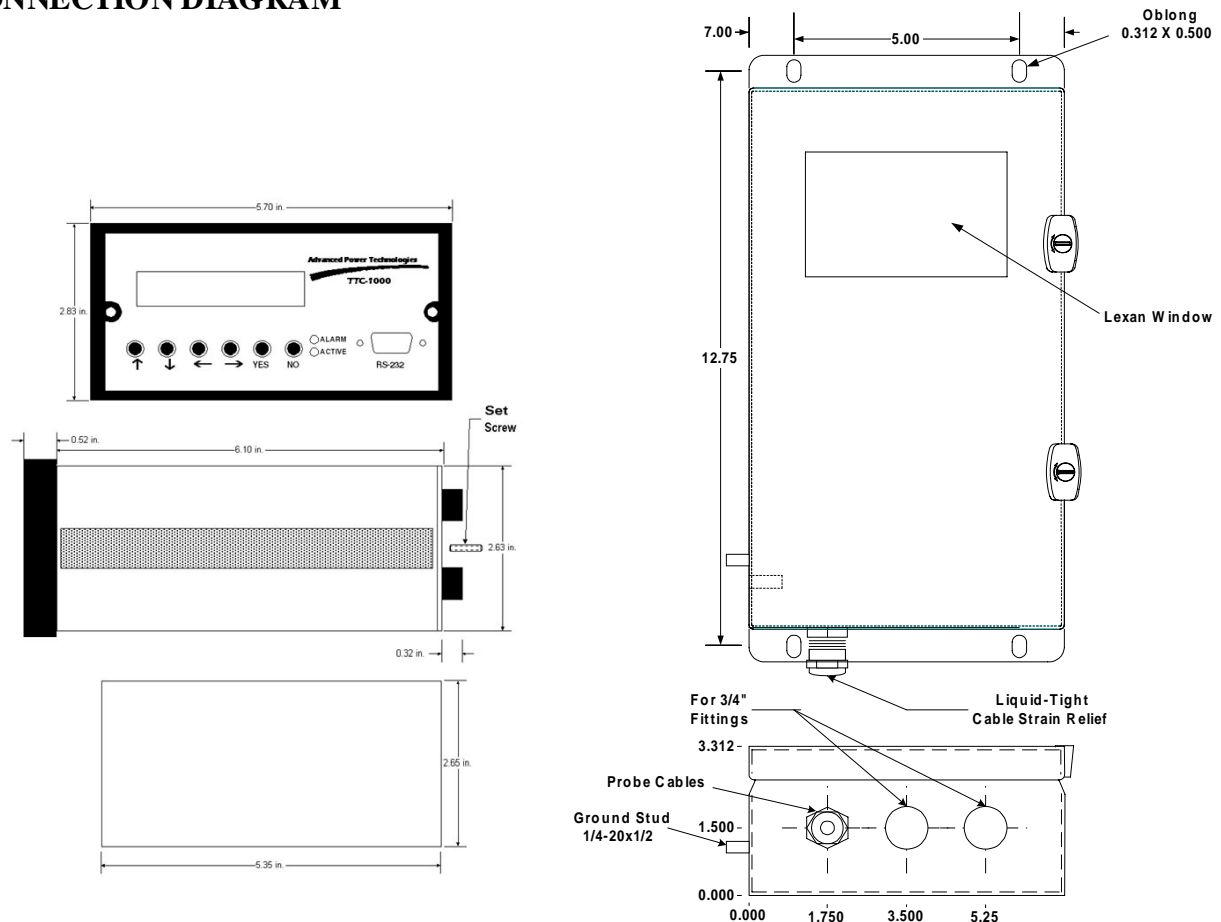
FEATURES

The TTC-1000 is an advanced microprocessor based transformer temperature controller that contains a full compliment of programmable features:

- Up to three universal temperature probes measure temperatures from 0 to 160 °C, **Without Calibration.**
- Contains no maintenance items and does not require calibration.
- Four independent temperature set points per temperature probe with settable pickup and drop out temperatures for hysteresis and over and under temperature operation.
- Dual load pickup set points for transformer pre-cooling.
- Built-in LTC condition monitoring. Settable time delay on pickup improves sensitivity and reduces false alarms. Also includes rate of rise feature for detecting rapid temperature increases in the LTC tank. Mag mount probe available. Use three probe units for monitoring transformers with two separate LTC tanks.
- AUX CT input for winding hot spot temperature measurement based on top oil temperature. Split core CT provided.
- Built-in fan bank alternate feature.
- Three independent time set points for fan exercising. Programmable counter enables selection of daily, weekly, or monthly exercising.
- Programmable scheme logic with up to six programmable form C relay outputs.
- Dedicated form B Device Alarm Relay with built in self check.
- Minimum and maximum temperature display time stamped with date and time.
- Data logging feature permits recording of time stamped temperature and load data.
- Flash memory permits firmware upgrades through a remote PC.
- DNP3.0 Level 1 Communications, read all binary and analog outputs and command cooling remotely (optional). Available with multi-mode fiber interface.
- Dual analog outputs programmable to 0 to 1 or 4 to 20 mA (optional).
- Dual optically isolated inputs for remote cooling control or reporting liquid level or sudden pressure alarms through DNP3.0 (optional).
- Operates over a wide voltage range of 38 to 160 VDC or 120 VAC.
- Mounting available in a NEMA 4X enclosure, heater option available.
- Substation hardened to ANSI Fast Transient and Surge Withstand of C37.90.1 and RFI/EMI requirements of C37.90.2.
- **Lifetime Warranty**



CONNECTION DIAGRAM



MOUNTING

SPECIFICATIONS

Power Supply Input Operating Range: 38 VDC to 160 VDC or 120 VAC +/- 10%, 3 Watts Max

Operating Temperature Range: -35 °C to +85 °C, 95% Relative Humidity (non condensing)

Liquid Temperature Measurement Range: -35 °C to +160 °C

LTC Differential Measurement Range: -20 to +20 °C

Winding Temperature Measurement Range: -35 °C to +180 °C

Temperature Measurement Accuracy: Avg error over entire measurement range ± 1 °C.

Absolute error at any temperature ± 1.5 °C.

Output Contact Rating: 30 amps make for 250 msec, 10 amps continuous at 250VAC.

Optically Isolated Inputs: Operates from 38 to 160VDC. External wetting voltage required.

Alarm Contact Rating: 0.4 amp continuous at 160VDC (NEMA), 0.15 amp continuous at 160VDC (Panel)

Analog Output: Selectable, 0 to 1 mA or 4 to 20 mA.

Maximum load 9,500 ohms (0 to 1mA), 450 ohm (4 to 20 mA).

Communications Interfaces: Front Panel Mounted RS-232 DB-9 Null Modem Interface

SCADA Interface: DNP3.0 Level 1 Protocol using half duplex RS-485 interface or Multi-Mode fiber optics.

Current Measurement Range: 0 to 10A

Panel Mount Version Dimensions: 5.32" W x 2.61" H x 6" D, Aluminum

NEMA 4X Enclosure Version Dimensions: 10" H x 6" W x 3" D, 304 Stainless Steel

Surge Withstand/Fast Transient: Relay outputs and station battery inputs: ANSI C37.90.1

EMI Withstand: ANSI C37.90.2

Electrostatic Discharge: IEC 801-2

Timers: Output Pickup Timer, and Load Pickup Timer: 0 to 255 seconds

ORDERING INFORMATION

UNIT P/N's:

TTC-	1000-	v	w	x	y	z
		Panel Mounting	0			1 Extra RS-232 Port
		NEMA 4X Enclosure	3			3 Multi-Mode Fiber Interface
		NEMA 4X with Heater	4			
		No telemetry outputs	0			0 4 form C Outputs, No inputs
		Single analog output	2			1 6 form C Outputs, No inputs
		Dual analog output	3	1		2 4 form C Outputs, 2 inputs
		Triple analog output	4	2		4 Connectorized 4 form C Outputs
		RS485w/Dnp3 Level 1	5	3		5 6 form C Outputs, 2 inputs
		RS485w/Dnp3 Level 1 & sngl analog output (NEMA only)	6	4		
		RS485w/Dnp3 Level 1 & dual analog outputs (NEMA only)	7	6		
				1		1 Single Probe
				2		2 Dual Probe
				3		3 AUX CT, Single Probe
				4		4 AUX CT, Dual Probe
				6		6 Three Probe (NEMA)
				7		7 Three Probe w/AUX CT (NEMA)

PROBE P/N's:

TTC-	PROBE-	0	t	-zzz
				Probe lead length, zzz=10 to 250 ft
		Ambient Temperature Probe	0	0
		Universal Well Probe w/Snap Elbow	0	1
		Magnetic Surface Mount Probe	0	2
		ANSI C57 Well Probe w/Snap Elbow	0	5
		Universal Well Probe Liquid Tight Rdy	1	1
		ANSI C57 Well Probe Liquid Tight Rdy	1	2
		5/16" Well Probe w/Snap Elbow	2	1
		1/4" Well Probe w/Snap Elbow	3	1

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