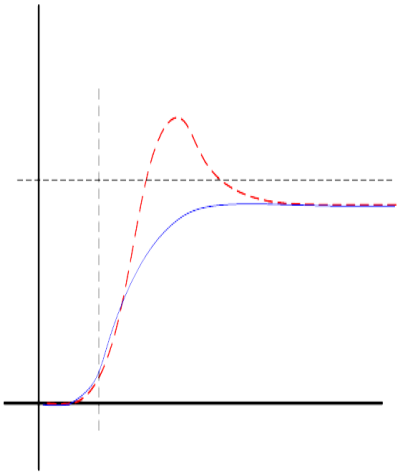
Advanced Power Technologies

TTC-1000

Monitor With Confidence™

- Liquid Temperature
- Winding Hotspots
- LTC Differential
- Ambient Temperature
- Load Current
- High-Precision RTDs
- No Calibration Required, Ever.

Complete Monitoring for Your Power Transformer



"Smart Grid" Ready

Load Based Pre-Cooling

Track LTC Position for Complete LTC Monitoring

SCADA Communications

Consolidate Alarms with Mini-RTU Capability

Simple to Configure

Highly Cost Effective & Easy to Install

Lifetime Warranty™

TTC-1000

Intelligent Transformer Temperature Control

Available in 2 Mounting Options

Panel Mount – For mounting within the transformer control cabinet. (As shown on cover)

7.2″ W x 3.558″ H x 6″ D

NEMA 4X Enclosure – For mounting on the exterior of the transformer, typically used for retrofit applications. Heater option available.

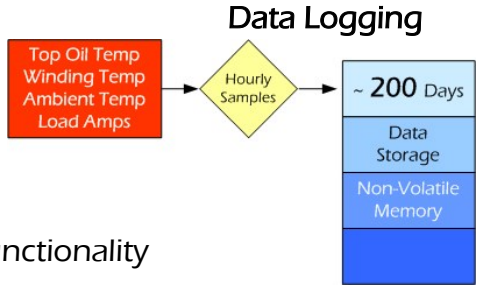
15.25″ H x 7″ W x 5.25″ D

Monitor Critical Temperatures

- Up to 3 Temperature **Probes** (–35 to 160 °C)
- **Set Points** for Alarms & Fan **Control**
- Up to 3 Calculated Winding **Hotspot** Temperatures
- Monitor **Ambient** Temperature to Calculate **Loss-of-Life**
- Up to 2 **LTC** Differential Temperatures Simultaneously
  - **Mag-Mount Probes** Available

Collect Data & Communicate It

- Temperature, Load, and Min/Max **Data Logging**
- LTC Position & Differential Temp **Data Logging**
- Up to 4 Analog Outputs (0 to 1 **OR** 4 to 20 mA)
- Up to 14 Optically Isolated Digital Inputs for **Mini-RTU** Functionality
- **DNP3.0** Level 1 or **MODBUS RTU** Communications via Multi-Mode **Fiber**



Advanced Power Technologies

"On-Line" LTC Monitoring

LTCs are a critical **Point of Failure** on your transformer...

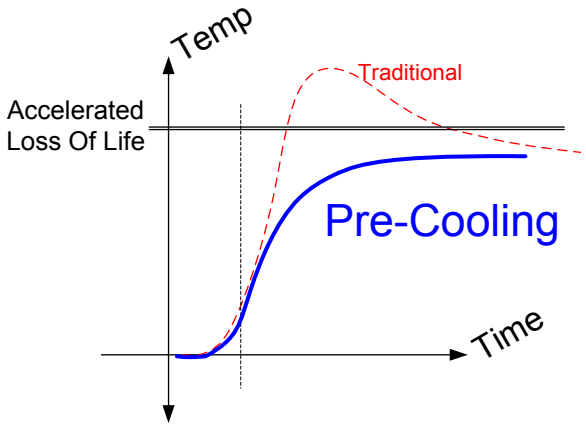
What is your LTC doing right **NOW?**

- **Continuous** LTC Differential Monitoring (-20 to +20 °C)
- Patented **Dual-Algorithm** LTC Condition Monitoring™
  - **Protect** Against Dangerous "Coking" Contacts
  - Alarm for **Rapid** LTC **Heating** Events
- Patented *Sensorless* LTC **Position** Monitoring™
  - Know with Certainty Which Taps are Getting Hot
  - Monitor Tap Change **Operate Times** and Alarm

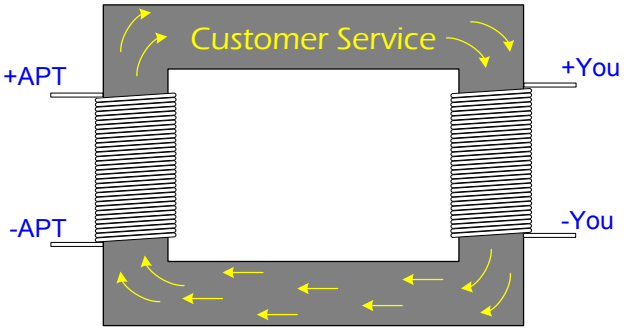
Cool Your Transformer

With Confidence...

- Patented **Load Pickup Cooling**™
  - Transformer **PRE-Cooling**
  - **Extend** Transformer **Life**
  - Longer Short-Term Overloads
  - **Sustain** Paper Insulation **DP** Levels
  - Ideal for **Wind Farm** Load Cycles
- Up to **8** Form C Relay Outputs
  - **Control** Fans and Pumps
  - **Flexible** Logic Programmability
  - **Alarm** or Trip on High Oil & Winding Temperature
- Monitor your cooling System using **6** Additional Aux CTs



Additionally...



- **Exceptional** Customer Service
- Periodic Fan **Exercising**.
- Fan Bank **Alternate** Feature
- Built In Self Check
- Dedicated Form B **Device Alarm** Relay
- Easy to use, Excel-Based Setting Templates

Rev. 20150220 Copyright 2015 Advanced Power Technologies, LLC
U.S. Patent No.: 6714022, 6222714, 7323852, 7417411 and Patents Pending

Lifetime Warranty™

TTC-1000 Model Option Table

Select **One** Option from each Feature Matrix

Ordering Information

TTC-1000 – U V W X Y Z

Mounting (U)

Panel Mounting	0
NEMA 4X Enclosure	3
NEMA 4X w/ Heater	4

Extra Auxiliary CTs (Z)

0	No Extra Auxiliary CTs
1 - 8	1 or More Extra Auxiliary CTs (Enter Number of Extra CTs)

Analog Outputs, DNP & MODBUS (V)

	Communications: No	DNP 3.0	MODBUS RTU
No Analog Outputs	0	5	1
1 Analog Output	2	6	9
2 Analog Outputs	3	7	A
3 Analog Outputs	4	8	B
4 Analog Outputs	G	S	T
1 Isolated Analog Output	C	H	M
2 Isolated Analog Outputs	D	J	N
3 Isolated Analog Outputs	E	K	P
4 Isolated Analog Outputs	F	L	R

Multi-Mode Fiber, 12 Optically Isolated Digital Inputs, Extra RS-232 Port (X)

No Digital Inputs, No RS-232 Port	12 Digital Inputs	Extra RS-232 Port	12 Digital Inputs & Extra RS-232 Port	
0	5	1	7	No Fiber
3	6	4	8	Multi-Mode Fiber for DNP or MODBUS
9	B	A	C	V-Pin Multi-Mode Fiber for DNP or MODBUS

Temperature Probe Channels & Auxiliary CT1 (W)

	No Auxiliary CT	1 Auxiliary CT
1 Temperature Probe Channel	1	3
2 Temperature Probe Channels	2	4
3 Temperature Probe Channels	6	7

Form C Relay Outputs, 2 Optically Isolated Digital Inputs, Sensorless Tap Position Monitoring (TPM) (Y)

No Digital Inputs, No Tap Position Monitoring	2 Digital Inputs	Tap Position Monitoring (TPM)	
0	2	■	4 form C Outputs
1	5	6*	6 form C Outputs (* 2 inputs with TPM
8	■	9	8 form C Outputs

TTC-PROBE – X Y - Z Z Z

Probes must be ordered separately from the main TTC-1000 unit

Probe Type (X Y)

Ambient Temperature Probe (50 ft lead)	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 Ready†	1	1
ANSI C57 Well Probe Liquid Tight Ready	1	2
5/16" Well Probe w/ Snap Elbow	2	1
1/4" Well Probe w/ Snap Elbow	3	1
Ceramic Probe for Dry Types 160°	5	1

NOTE: † Handles thermometer well diameters of:
- 0.375 inches
- 0.500 inches
- 0.625 inches
- 0.700 inches

Additional Lead Length (Z Z Z)

Z Z Z — Probe lead length (10 to 250 feet). Enter 3 digit length. Example: 050

NOTE: A 10 ft. lead length is automatically included, with the exception of the Ambient probe which is 50 ft. Add additional lead length as needed.

Retrofit Mounting Bracket available for NEMA 4X enclosure option P/N 80001000167:

Additional Specifications:

Operating Temperature Range: -50 °C to +85 °C, 95% Relative Humidity (non condensing)
Universal Power Supply: 38 to 290 VDC or 120 VAC
Winding Temp Measurement Range: -35 °C to +180 °C
Temperature Measurement Accuracy: Avg error over entire range ± 1 °C. Absolute error at any temperature ± 1.5 °C for temperatures within the range of 23°C - 160°C. Below 23 °C the error is ± 3.5 °C.
Output Contact Rating: 30 amps make for 250 msec, 10 amps continuous at 250VAC.
Optically Isolated Inputs: Operates from 38 to 290 VDC or 24 VAC to 260 VAC. External wetting voltage required.
Alarm Contact Rating: 0.4 amp continuous at 290 VDC (NEMA), 0.15 amp continuous at 290 VDC (Panel)
Analog Output: Selectable, 0 to 1 mA or 4 to 20 mA. Maximum load 10,000 Ohms (0 to 1mA), 510 Ohms (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, Multi-Mode or V-Pin fiber optics.
Current Measurement Range: 0 to 50 A
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

Advanced Power Technologies

www.AdvPowerTech.com
215 State Route 10, Building 2
Randolph, NJ 07869
Phone: (973) 328-3300

Rev. 20150930 Copyright 2015 Advanced Power Technologies, LLC
U.S. Patent No.: 6222714, 6714022, 7323852, 7417411, 8260472, 8274769, and Patents Pending