

# TC-100 Transformer Temperature Controller for Dry-Type Transformers



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## Description

The TC-100 Transformer Temperature Controller monitors up to three (3) ventilated Dry-Type transformer windings and (1) ambient temperature. The TC-100 operates relays by comparing the highest winding temperature to stored set point temperatures and displays four (4) thermocouple inputs as well as the stored maximum temperature and its associated winding. The unit provides Fans, Alarm, and Trip output relays. Up to two Fans can be controlled via the TC-100. Each Fan operating contact is fuse protected. A yellow LED indicates that fans are on. A fan exerciser turns the fans on automatically at periodic intervals to prevent fan motor seizing (on-time and interval is programmable).

Form C contacts are provided for notification of alarm conditions. A red LED illuminates to indicate that the alarm is actuated. An internal audible alarm also sounds when the unit goes into alarm condition. This audible buzzer can be silenced without canceling the alarm. The alarm and trip relays can be configured as a fail-safe relay (normally energized when the unit is powered up). For example if the alarm relay was configured as a fail-safe; If supply control power to the TC-100 is interrupted, the alarm relay changes state for notification of this condition. The alarm circuit is also used for notification of an open or missing thermocouple. If a thermocouple were to open, the alarm relay operates and the corresponding channel will read “-” on the LED display. It is important to note that a failed thermocouple will not cause the device to trip the transformer off-line.

Form C contacts are provided to trip the transformer off-line if any of the winding temperatures exceed the trip setting. A red LED indicates that the trip relay has actuated.

A test function is provided to: test the digital display and all of the LEDs; simulate over-temperature conditions; and check the internal temperature of the monitor.

A 4-20 mA analog signal is provided for remote indication or for use with SCADA systems.

The TC-100 has built in monitoring functions and logging functions to help you shed some light on the unknowns of the operation of your transformer. Temperature trending lets you understand the hour of the day that the transformer runs hotter, and modify its loading to extend the life of your transformer; logging information lets you restore the operation of your system faster, by letting you correlate tripping and alarming events to the overall conditions of your system; and fan wear information can be used to perform preventive maintenance to increase the uptime in your transformers.

## Features and Benefits

### Control

- Thermocouple inputs (E or K type thermocouples)
- Automatic correlation throughout entire temperature range to compensate for thermocouple non-linearity
- Programmable on and off set-points
- Alarm relay for remote monitoring
- Trip relay for remote monitoring
- Two fan power relays
- Fan failure detection to start a backup fan or alarm
- Fan exerciser (cycle time and duration) to reduce fan wear
- Fans can be operated automatically or manually

### Metering

- Average temperature (all three windings)
- Maximum instantaneous temperature (all three windings)
- Maximum temperature memory per winding
- Fans hours of operation
- Winding 1, Winding 2, Winding 3, and Ambient Temperature

### Monitoring

- Trending
- Fan failure
- Fan Wear
- Alarm Log
- Trip Log
- Test mode
- Detect failed sensors
- Self-Diagnostics

### Communications

- USB Port in the front
- Modbus-RTU communications
- Programming and monitoring Software (The unit can be completely programmed through the front of the unit)
- 4-20mA output for integration with SCADA systems

### Hardware

- 1 Trip Relay(Form C)
- 1 Alarm Relay (Form C)
- 2 Power Fan relays (1 NO each)
- 2 Digital Inputs
- 4-20mA output for integration with SCADA systems
- Local Alarm 95 db
- Available in Semi-Flush or Hinge Panel mounting versions

**Dimensions**

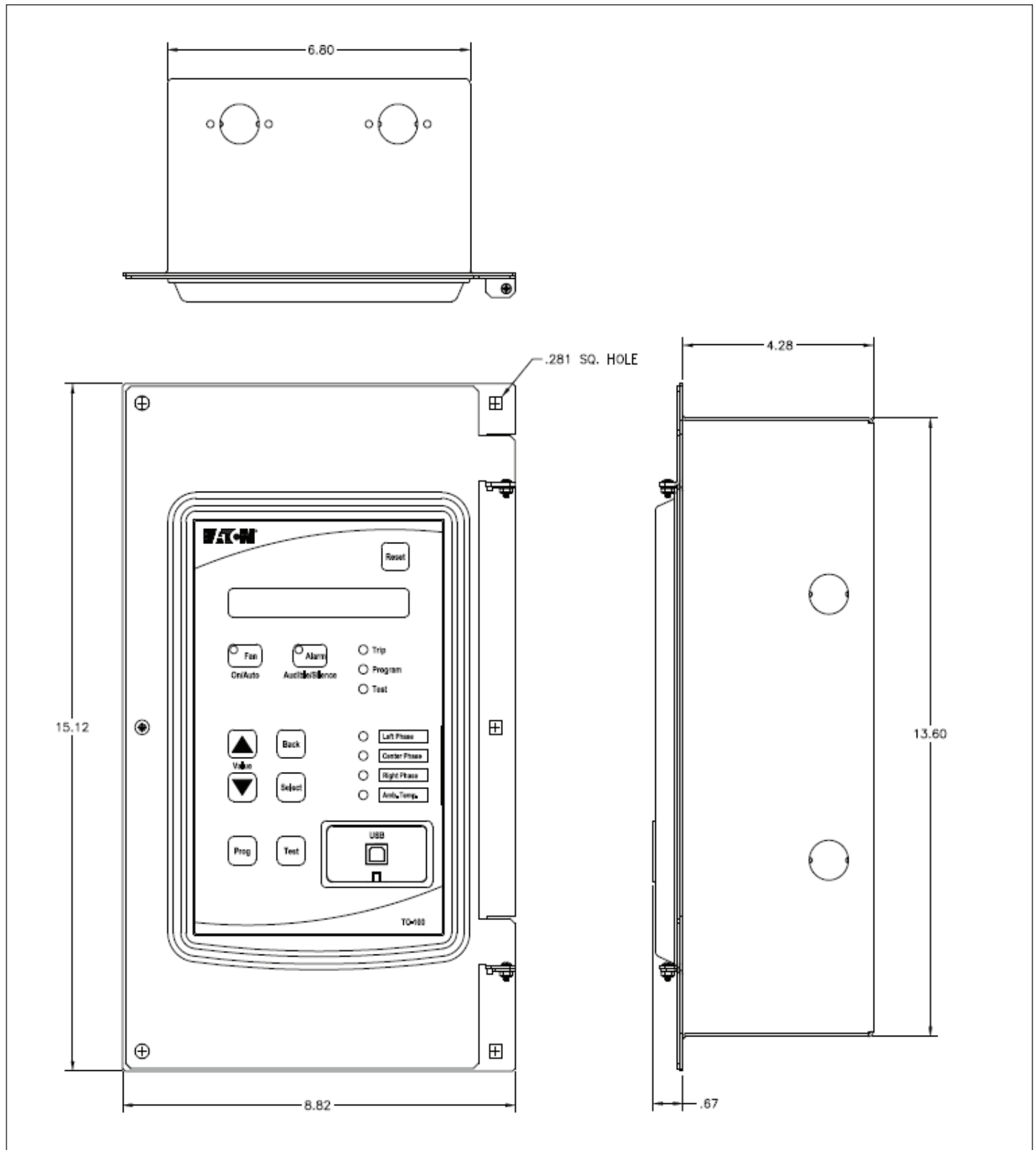


Figure 1. TC-100 Dimensions

**Drilling Pattern**

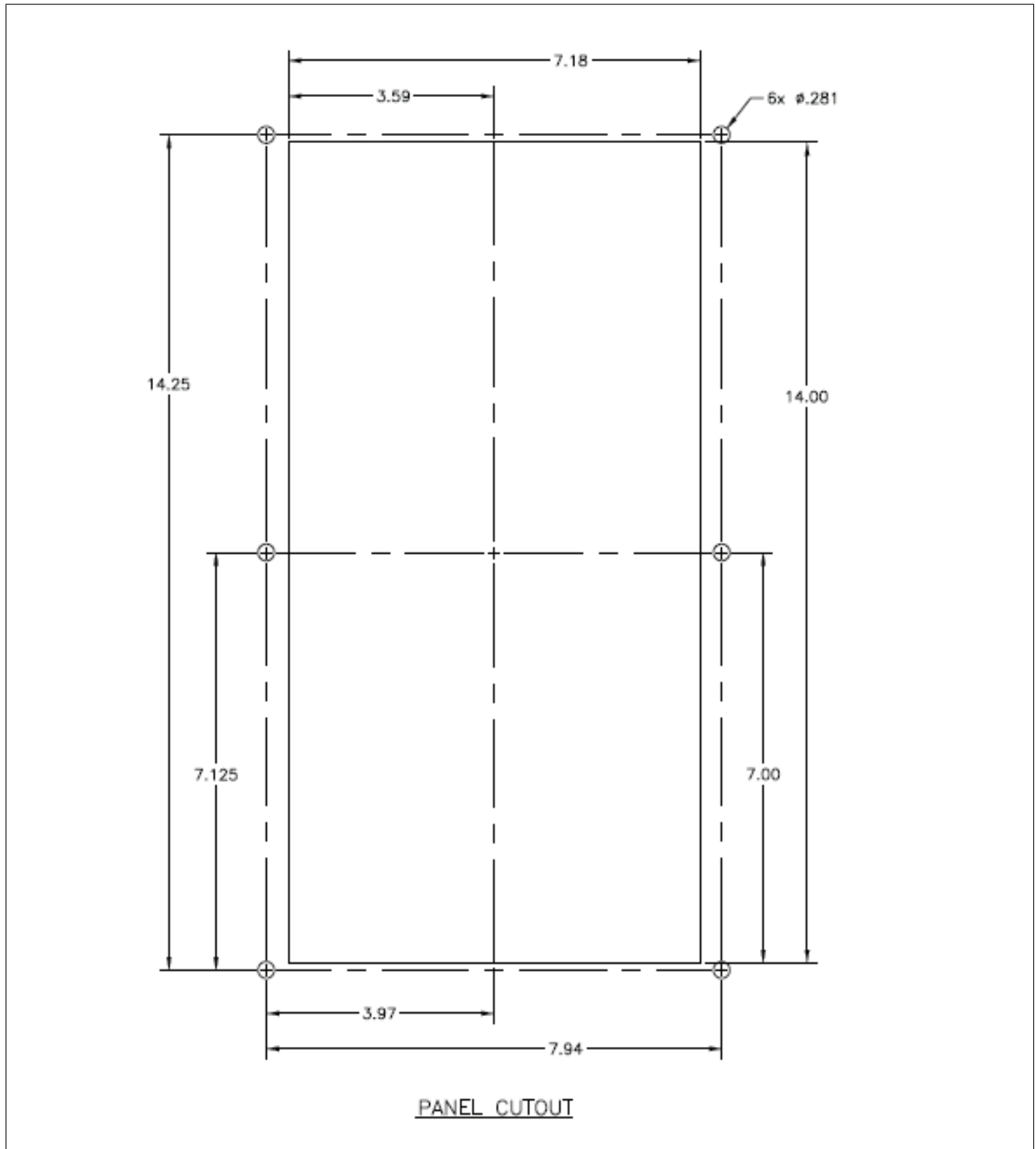
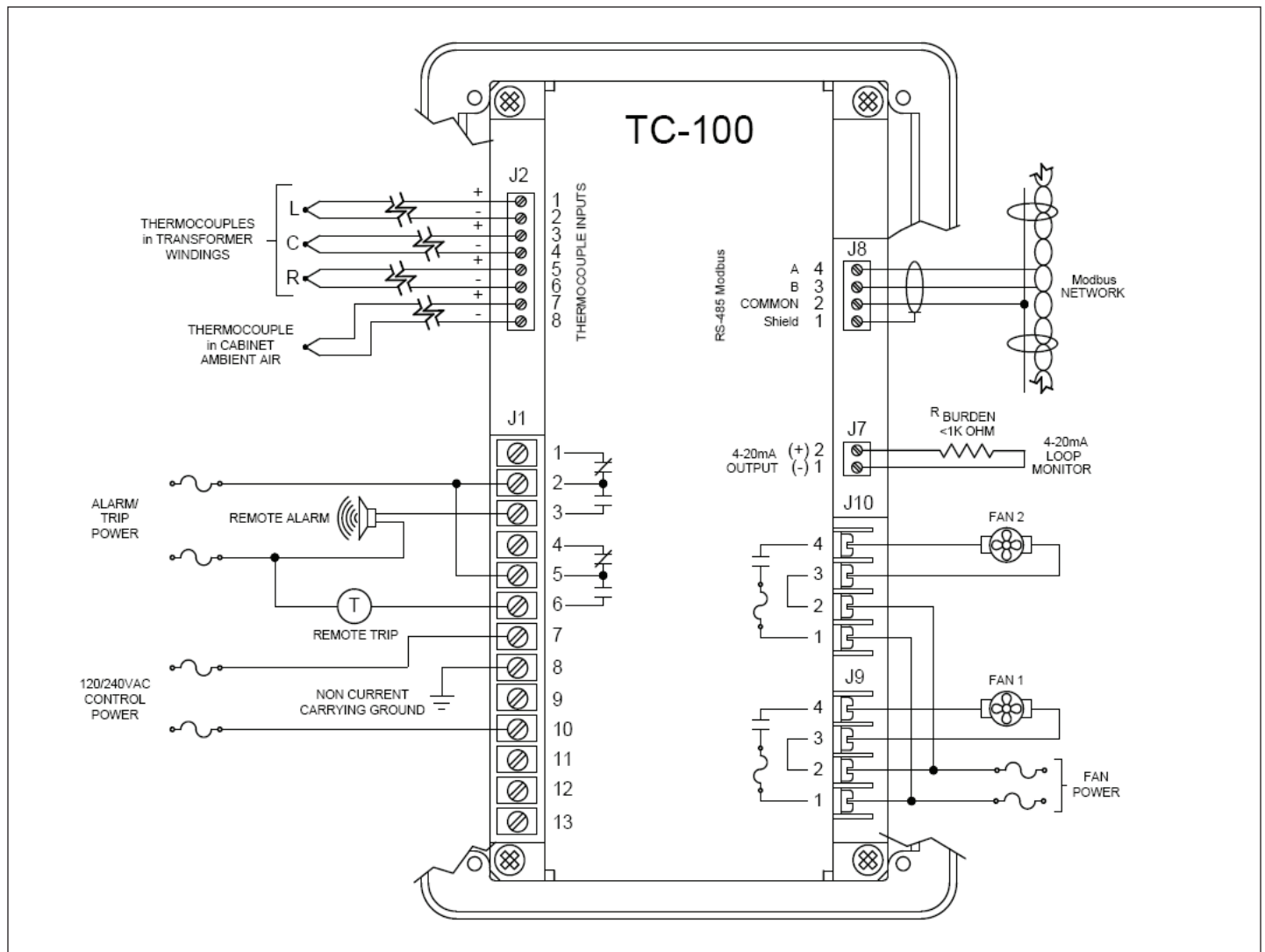


Figure 2. TC-100 Drilling Pattern

**Wiring Diagram**



**Figure 3. External Wiring**

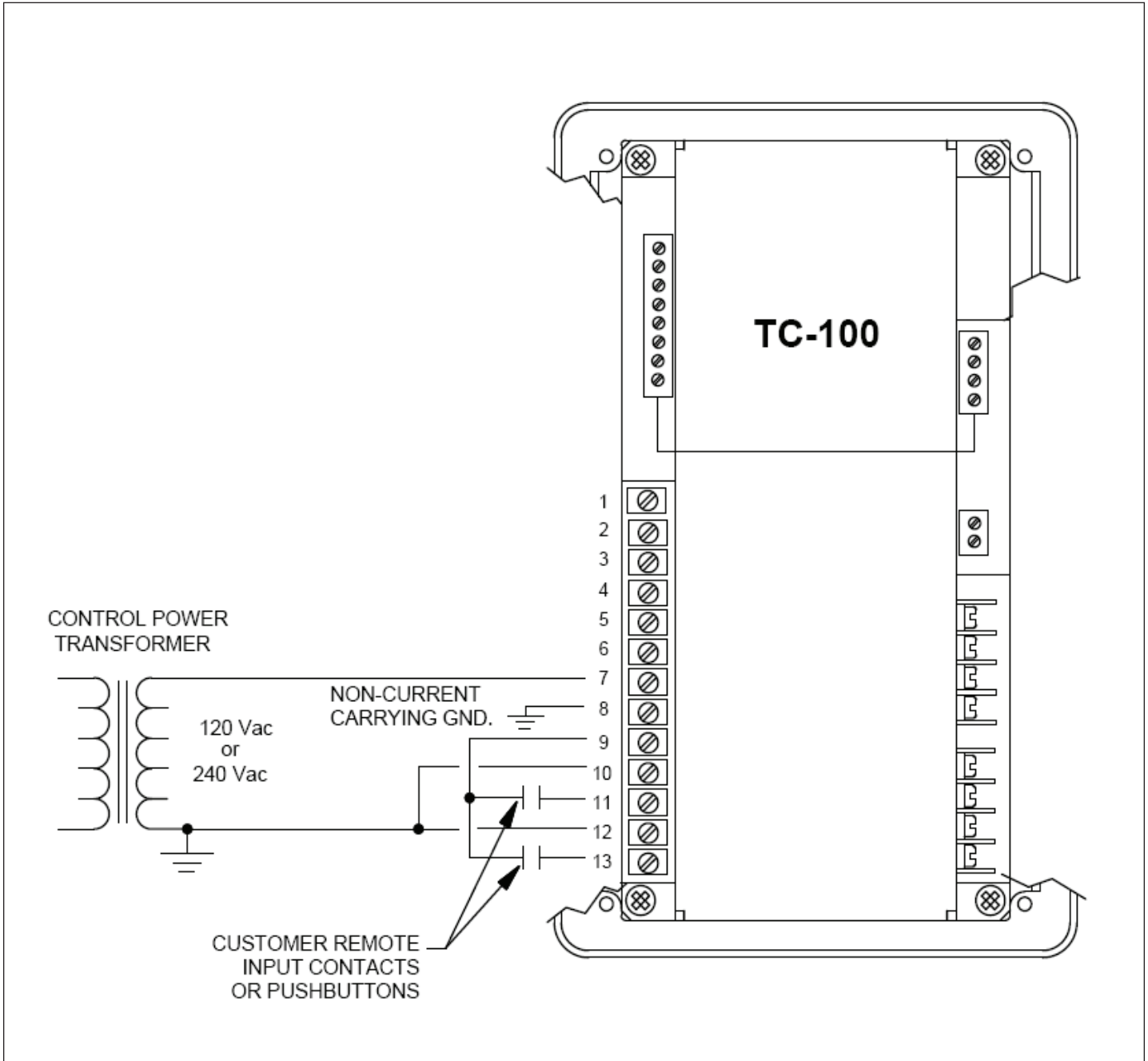


Figure 4. Typical Digital Inputs Wiring

## Technical Specifications

### Control Power

Nominal rating:	120 Vac or 240 Vac (+10%, -25%)
Frequency:	50 or 60 Hz
Power use:	15 VA maximum
Operating range:	120 Vac: 90–132 Vac 240 Vac: 180–264 Vac
Ride-through time:	20 cycles at nominal Vac

### Environmental

Operating Temperature	-30 to +72 °C
Storage Temperature	-50 to +72 °C
Relative Humidity	0 to 90% (non-condensing)

### Measurement Accuracy

Temperature:	±1 °C ± one count under normal conditions ±2 °C ± one count under extreme conditions Extreme conditions are: Ambient temperature colder than -10°C Winding to unit temperature greater than 210°C
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### Discrete Inputs

Number of Inputs	Two (2) programmable
Rating	1.2 VA at 120 Vac Max. OFF = 36 Vac Min. ON = 86 Vac (built in power source available)

### Outputs

Output Fans	Two (2) individually configurable SPST contacts Rated 30 Amps @ 120/240 VAC, 1 HP @ 120 VAC, 2 HP @ 240 VAC for each contact
Output Alarm	One (1) SPDT contact Rated 10 Amps @ 120/240 VAC (resistive) configurable for normal or fail-safe operations
Output Alarm	One (1) SPDT contact Rated 10 Amps @ 120/240 VAC (resistive) configurable for normal of fail-safe operation
Remote Analog Output	4-20 mA into a load of up to 1000 ohms max. proportional to hottest winding temperature ±1%

### EMC

Immunity:	-ANSI/IEEE C37.90.1-2002 - Standard Surge Withstand Capability (SWC) Tests for Protective Relays and Relay Systems - ANSI/IEEE C37.90.2-2004, Standard Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers. - EN 61000-4-2 ESD - EN 61000-4-3 RF Radiated Immunity - EN 61000-4-4 EFT/Burst Immunity - EN 61000-4-5 Surge Immunity - EN 61000-4-6 RF Conducted Immunity - EN 61000-4-8 Power Frequency Magnetic Field Immunity - EN 61000-4-11 Voltage Variation Immunity
Emissions:	- EN 50011 CISPR-11, Class A - CFR 47 FCC Part 15 Subpart B Class A

### Clock

Accuracy	+/-1 1 minute/month @ 25 °C
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### Logging

Trend Data	100 entries, logging interval programmable from 1 minute to 30 days
Alarm Events	Last 25 alarm events
Trip Events	Last 25 trip events

## Ordering Information

Table 1. Catalog Ordering Information for TC-100 Transformer Temperature Controller for Dry-Type Transformers

TC-100 Transformer Temperature Controller	Catalogue
Choose from the following options.	
<b>Hardware Option 1</b>	
Barrier Cabinet,	TC-100-Barrier
Controller Only (Semi Flush Mounting)	TC-100
Controller with Barrier Cabinet (Hinge Front Panel)	TC-101

# Technical Data TD02602013E

Effective July 2010

## TC-100 Transformer Temperature Controller for Dry-Type Transformers

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