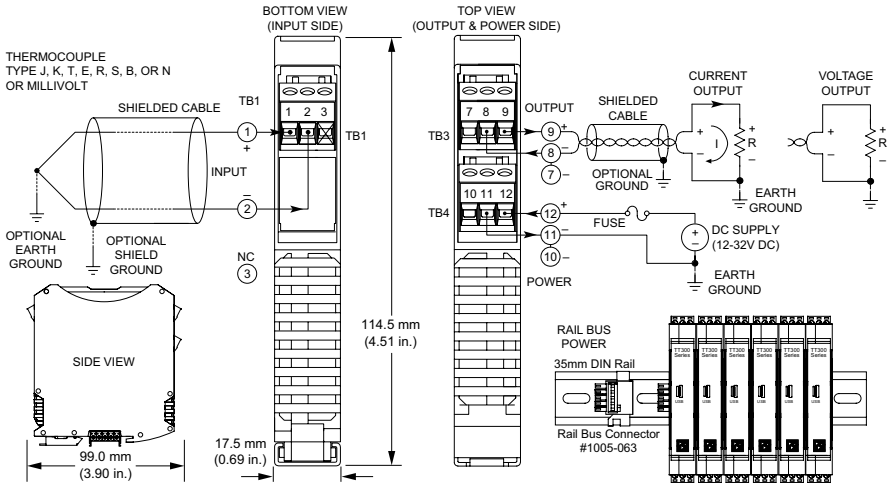
Transmitters: TT330 Series

TT333 Thermocouple/millivolt input four-wire transmitter



Universal thermocouple/millivolt input ◆ Universal current/voltage output ◆ 12-32V DC local/bus power

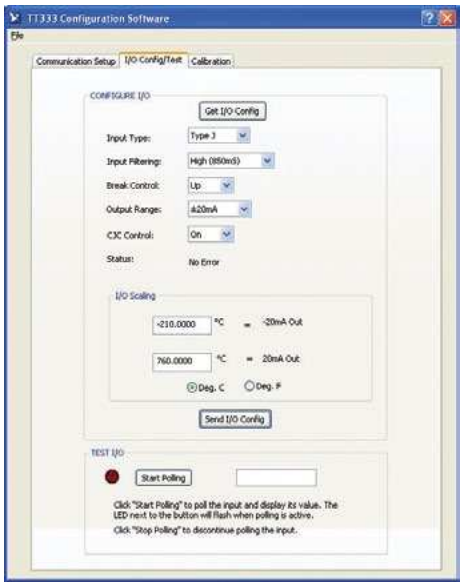
Description

The TT333 model is a space-saving four-wire transmitter that isolates and converts a millivolt or thermocouple sensor input to a proportional control signal. DC current and voltage output are both supported on a single model. An optional DIN rail bus can deliver primary or redundant power to multiple units without wiring.

High-voltage isolation separates the input from the output circuit. Isolation protects from surges, reduces noise, and eliminates ground loop errors.

Setup and calibration are fast and easy with a convenient USB connection to your PC and Acromag's Windows configuration software.

Advanced signal processing capabilities, variable range input, and convenient USB programming make this instrument a very versatile temperature measurement device. These transmitters can withstand harsh industrial environments and operate reliably across a wide temperature range with very low drift. They feature RFI, EMI, ESD, EFT, and surge protection plus low radiated emissions.



TT333 Model software allows you to configure transmitters offline, save the file, and download into units later, at your convenience.

TT330 Series Transmitter Configuration Software is downloadable (FREE) from www.acromag.com.

Windows® XP, Vista, 7, and 8

Key Features & Benefits

- Easy setup and digital calibration via USB with Windows configuration software
- Universal thermocouple or millivolt input (TC Type J, K, T, R, S, E, B, N or ±100mV)
- Universal output connections support ranges up to ±21mA or ±10.5V DC without rewiring
- Space-saving 17.5mm (0.7 inch) unit with pluggable terminals for convenient wiring
- High accuracy, linearity, stability, and reliability
- User-selectable filtering (none, low, med., high)
- Adjustable response times (15ms to 850ms)
- Supports reverse-acting (inverse) output
- Selectable upscale or downscale operation for sensor faults and lead-break detection
- Bus power, local power, or both
- Redundant power ready (rail/local)
- 1500V isolation, 3-way (power, input, output)
- Shock (50g) and vibration (5g) resistant
- Wide ambient operation (-40 to 80°C)
- CE compliant. UL/cUL Class 1 Div 2 Zone 2 approvals

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Bulletin #8400-666c

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Performance Specifications

IMPORTANT: To prevent damage or errors from grounded PCs and surges, Acromag strongly recommends use of their USB-ISOLATOR when configuring a TT330 Series transmitter.

USB Interface

USB Connector
Type: USB Mini-B type socket, 5-pin.
Data rate: 12Mbps. USB v1.1 and 2.0 compatible.
Maximum cable length: 5.0 meters.

USB Transient Protection
Transient voltage suppression on power and data lines.

Driver
Not required. Uses Windows HID drivers.

Input

Default Configuration/Calibration
Input: TC J, -210 to 760°C, med. filter, break: up
Output: 4 to 20mA.

Input Ranges and Accuracy

Input	Range	Accuracy
TC J	-210 to 760°C (-346 to 1400°F)	±0.5°C
TC K	-200 to 1372°C (-328 to 2502°F)	±0.5°C
TC T	-260 to 400°C (-436 to 752°F)	±0.5°C
TC R	-50 to 1768°C (-58 to 3214°F)	±1.0°C
TC S	-50 to 1768°C (-58 to 3214°F)	±1.0°C
TC E	-200 to 1000°C (-328 to 1832°F)	±0.5°C
TC B	260 to 1820°C (500 to 3308°F)	±1.0°C
TC N	-230 to 1300°C (-382 to 2372°F)	±1.0°C
mV	-100 to 100mV	±0.1mV

Error includes the effects of repeatability, terminal point conformity, and linearization (but not CJC error).

Thermocouple Reference (Cold Junction Compensation)
±0.2°C typical, ±0.5°C maximum at 25°C.

Ambient Temperature Effect
Better than ±80ppm/°C (±0.008%/°C).

Scaling Adjust
Zero: 0 to 95% of range, typical.
Full scale: 5 to 100% of full scale range, typical.

Lead Break (Sensor Burnout) Detection
Upscale/downscale ±5% full scale range typical.

Input Over-Voltage Protection
Bipolar Transient Voltage Suppressers (TVS), 5.6V clamp level typical.

Input Resolution
Millivolt input: 0.0025% (1 part in 40,000)
Thermocouple input: 0.1°C.

Input Impedance
Current input: 24.9 ohms.
Voltage input: 15M ohms

Input Filter
Selectable digital filtering settings (none, low, medium, and high)

Noise Rejection
Normal mode @ 60Hz:
>0.5dB (no filter), >80dB (high filter)
Common mode @ 60Hz:
>100dB (no filter), >130dB (high filter)

Output

Output Range

Range	Over-Range	Resolution
±10V	±10.5V	1 part in 62415
±5V	±5.25V	1 part in 31208
0 to 10V	–0.5527 to +10.5V	1 part in 59240
0 to 5V	–0.27634 to +5.25V	1 part in 60262
±20mA	±21mA	1 part in 62259
0 to 20mA	–1.1054 to 21mA	1 part in 58596
4 to 20mA	–1.1054 to 21mA	1 part in 46877

Output Load
Voltage output: 1K ohms minimum.
Current output: 0-550 ohms.

Output Response Time (for step input change)

Time to reach 98% of final output value (typical)	
No filter	15 milliseconds
Low filter	40 milliseconds
Medium filter	120 milliseconds
High filter	850 milliseconds

Output Ripple
Less than ±0.1% of output span.

Output Ambient Temperature Drift
Better than ±80ppm/°C (±0.0080%/°C.

Environmental

Operating temperature
-40 to 80°C (-40° to 176°F).

Storage temperature
-40 to 85°C (-40 to 185°F).

Relative humidity
5 to 95% non-condensing.

Power Requirement
12-32V DC SELV (Safety Extra Low Voltage), 24mA max.

Isolation
1500V AC peak. 250V AC (354V DC) continuous isolation between input, output, and power (3-way).

Shock and Vibration Immunity
Vibration: 5g, per IEC 60068-2-64.
Shock: 50g, per IEC 60068-2-27

Approvals
CE compliant. UL/cUL listing.
Designed for Class I; Division 2; Groups ABCD; Zone 2.

Electromagnetic Compatibility (EMC) Compliance
Radiated Emissions: BS EN 61000-6-4, CISPR 16.
RFI: BS EN 61000-6-2, IEC 61000-4-3.
Conducted RFI: BS EN 61000-6-2, IEC 61000-4-6.
ESD: BS EN 61000-6-2, IEC 61000-4-2.
EFT: BS EN 61000-6-2, IEC 61000-4-4.
Surge Immunity: BS EN 61000-6-2, IEC 61000-4-5.

Physical

General
General-purpose enclosure designed for mounting on 35mm "T-type" DIN rail.

Case Material
Self-extinguishing polyamide, UL94 V-0 rated, color light gray. General-purpose NEMA Type 1 enclosure.

I/O Connectors
Removable plug-in terminal blocks rated for 12A/250V; AWG #26-12, stranded or solid copper wire.

Dimensions
17.5 x 114.5 x 99.0 mm (0.7 x 4.51 x 3.90 inches).

Shipping Weight
0.22 kg (0.5 pounds) packed.

Ordering Information

Models

TT333-0700
Four-wire transmitter, thermocouple/millivolt input.

Services

TT330-Config/Cal
Factory custom configuration/calibration service. Specify input type, input/output zero and full-scale values, filtering, and sensor fault settings on order.

Software

TTC-SIP (recommend one kit per customer)
Software Interface Package for Acromag TT Series transmitters. Includes configuration software CD-ROM (5040-944), isolator (USB-ISOLATOR) and two USB cables (4001-112, 4001-113).

Accessories

See www.acromag.com for more information.

USB-ISOLATOR
USB-to-USB isolator, includes USB cable (4001-112).

TTBUS-KIT
DIN rail bus power connector and left/right terminal blocks. One kit supports multiple transmitters.

ISO9001
AS9100
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