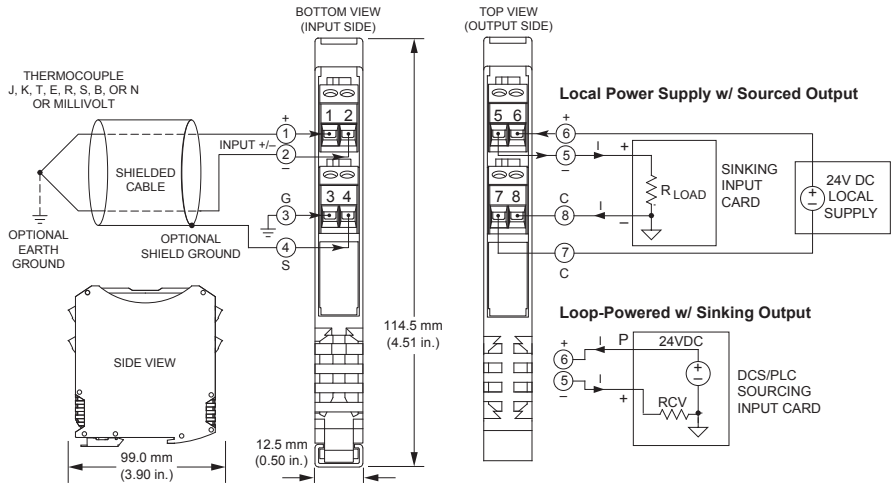
Transmitters: TT230 Series

TT233 Thermocouple/millivolt input two/three-wire transmitter



Universal thermocouple or ±100mV input ◆ 4-20mA output (sink/source) ◆ 12-32V DC loop/local power

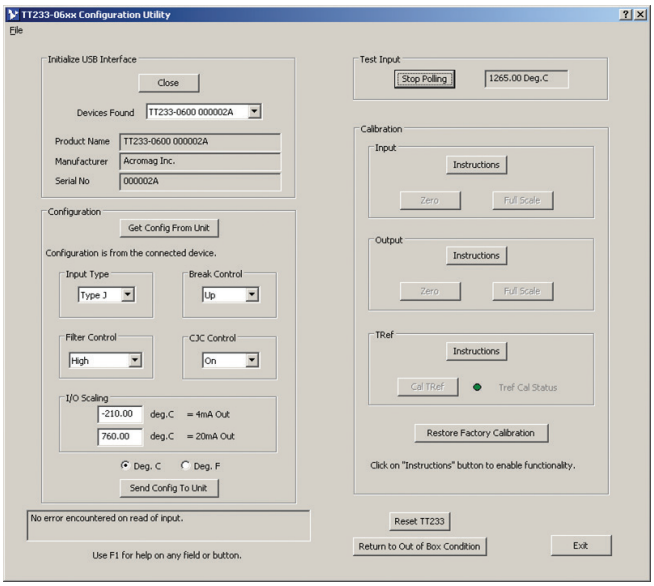
Description

The TT233 model is a space-saving two-wire transmitter that isolates and converts a millivolt or thermocouple sensor input to a proportional 4-20mA control signal. Power is received from the output loop current or a DC supply when using a three-wire connection. The transmitter performs thermocouple linearization, cold-junction compensation, and lead-break detection.

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.



TT233 Model software allows you to configure transmitters offline, save the file, and download settings into units later, at your convenience.

TT230 Series Transmitter Configuration Software is downloadable (FREE) from www.acromag.com. Windows XP, Vista, 7, & 8

The Agility™ Config Tool is downloadable (FREE) at the Google Play Store For Android Devices only

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)
- Space-saving 12.5mm (0.5 inch) unit with pluggable terminals for convenient wiring
- High accuracy, linearity, stability, and reliability
- Low temperature drift (<80ppm/°C)
- User-selectable filtering (none, low, med., high)
- Supports sink or source output wiring
- Supports reverse-acting (inverse) output
- Selectable upscale or downscale operation for sensor errors and lead-break detection
- 1500V input isolation
- NAMUR-compliant output loop current
- Shock (25g) and vibration (4g) resistant
- Mounts on Type T DIN-rail
- Wide ambient operation (-40 to 80°C)
- CE compliant. UL/cUL Class I Div 2, ATEX / IECEx Zone 2 approvals

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Bulletin #8400661M

Transmitters: TT230 Series

TT233 Thermocouple input two-wire/three-wire transmitter

Performance Specifications

IMPORTANT: To prevent damage or errors from grounded PCs and surges, Acromag strongly recommends use of their USB-ISOLATOR when configuring a TT230 Series transmitter.

USB Interface

USB Connector
USB Mini-B type socket, 5-pin.

USB Data Rate
12Mbps. USB v1.1 and 2.0 compatible.

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

USB Cable Length
5.0 meters maximum.

Driver
Not required. Uses built-in Human Interface Device (HID) USB drivers of the Windows operating system.

Input

Default Configuration/Calibration
Input: TC J, -210 to 760°C, high 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. Does not include 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)

Zero Scaling Adjust
0 to 95% of range, typical

Full Scale Adjust
5 to 100% of full scale range, typical

Lead Break (Sensor Burnout) Detection
Configurable for either upscale (24mA) or downscale (3.3mA) operation.

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

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

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

Input Filter Bandwidth
Normal mode plus digital filtering within the ADC. Bandwidth (-3dB) varies with digital filter setting from 4Hz without filtering to 0.33Hz with high filtering.

Noise Rejection (Common Mode, High Filter)
155dB @ 60Hz, typical with 100 ohm input unbalance.

Output

Output Range
4 to 20mA DC.

Output Compliance
$R_{LOAD} = (V_{SUPPLY} - 11V) / 0.020A.$
R_{LOAD} = 0 to 650 ohms @ 24V DC.

Output Response Time (for step input change)

Time to reach 98% of final output value (typical)	
No filtering	104 milliseconds
Low filter	380 milliseconds
Medium filter	760 milliseconds
High filter	960 milliseconds

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 and output circuits.

Shock and Vibration Immunity
Vibration: 4g, per IEC 60068-2-6
Shock: 25g, per IEC 60068-2-27

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

Approvals
CE compliant. Designed for UL/cUL Class I Division 2 Groups ABCD, ATEX / IECEx Zone 2.

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
12.5 x 114.5 x 99.0 mm (0.5 x 4.51 x 3.90 inches)

Shipping Weight
0.22 kg (0.5 pounds) packed

Ordering Information

Models

TT233-0600
Transmitter, thermocouple/millivolt input.

Services

TT230-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)

ISO9001
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