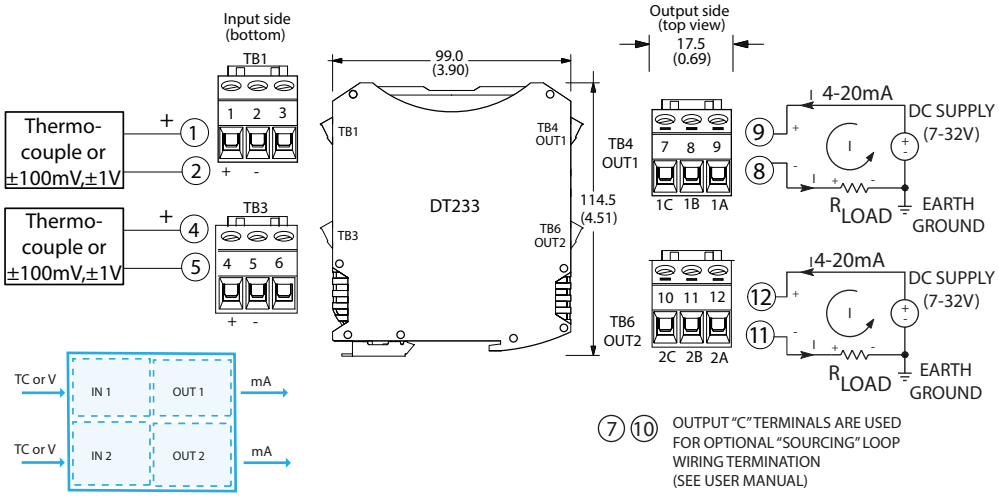
Transmitters: DT230 Series

DT233 Thermocouple/millivolt input two-wire dual transmitter



Dual channels ◆ Universal thermocouple, mV input ◆ 4-20mA outputs (sink/source) ◆ 7-32V DC loop/local power

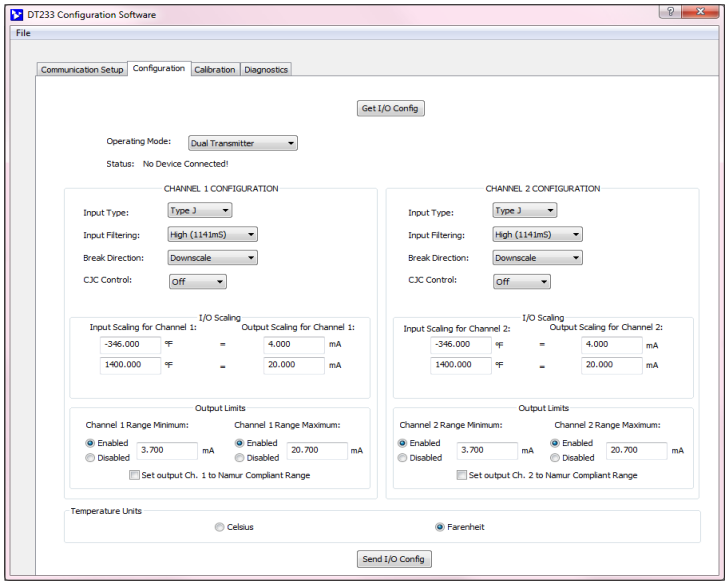
Description

DT230 series signal conditioners provide two independent I/O channels in a single, space-saving unit. The DT233 model is a dual two-wire transmitter that isolates and converts millivolt or thermocouple sensor inputs to proportional 4-20mA control signals. Power is received from the output loop current.

High-voltage isolation separates all input and output circuits from each other. Isolation protects from surges, reduces noise, and helps eliminate ground loop errors.

Setup and calibration are fast and easy with a convenient USB connection to your PC and Acromag's Windows configuration software. The Android app enables setup with mobile devices.

Advanced signal processing capabilities, variable range input/output, and convenient USB programming make this instrument very versatile. 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.



Save configuration files for convenient copy/restore capability.

Windows configuration software (FREE) at www.acromag.com

Android Agility™ app (FREE) at [Google Play Store](#)

Key Features & Benefits

- Operate as a dual transmitter, a single transmitter, or a signal splitter
- Easy configuration via USB with Windows software or Agility™ app for Android
- Independently adjustable and scalable input and output ranges
- Selectable thermocouple/millivolt input types: (TC Type J, K, T, R, S, E, B, N, ±100mV, ±1V)
- 4-20mA current loop outputs support sinking or sourcing circuit configurations
- Supports reverse-acting (inverse) output
- User-configurable output range clamp levels support NAMUR-compliant operation
- Selectable up/downscale sensor break detection
- Very low 7V two-wire loop burden
- High accuracy, linearity, stability, and reliability
- User-selectable filtering (none, low, med, high)
- Space-saving 17.5mm (0.7 inch) unit with pluggable terminals for convenient wiring
- 1500V isolation, 4-way (inputs/outputs)
- Wide ambient operation (-40 to 80°C)
- CE compliant. UL/cUL Class I Div 2, ATEX / IECEx Zone 2

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Transmitters: DT230 Series Series

DT233 Thermocouple/millivolt input two-wire dual transmitter

Performance Specifications

IMPORTANT: To prevent ground loop error between a grounded PC and a grounded input signal, Acromag strongly recommends use of a USB isolator like Acromag's USB-Isolator when configuring a DT230 Series transmitter.

USB Interface

USB Connection
Type: USB Mini-B type socket, 5-pin.
Data Rate: 12Mbps. USB v1.1 and 2.0 compatible.
Maximum cable length: 5.0 meters.
Transient voltage suppression on power and data lines.

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

Input (two channels)

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

A/D Converters (ADC)
Two 24-bit Sigma Delta ADCs (only 16-bits used).

Input Ranges

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 -170°C (-382 to -274°F)	±1.0°C
TC N	-230 to -1300°C (-274 to 2372°F	±0.5°C
mV	-100 to 100mV	±0.05%

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
0 to 110% of nominal range.

Lead Break (Sensor Burnout) Detection
Upscale/downscale.

Imput Impedance
15M ohms.

Input Over-Voltage Protection
Bipolar Transient Voltage Suppression (TVS) and diode clamping.

Input Filter
RC filter plus variable digital filter (none, low, medium, high).

Noise Rejection (@ 60Hz)
Common Mode: 100dB no filter (135dB high filter).
Normal Mode: 0.5dB no filter (>80dB high filter).

Output (two channels)

D/A Converters (DAC)
Two 16-bit D/A converters.

Output Ranges
4-20mA DC 3.5-24mA under/over-range capability.

Output Accuracy
±0.05%, typical. ±0.1%, maximum.

Output Compliance
R_{LOAD} = (V_{SUPPLY} - 7V) / 0.020A.
R_{LOAD} = 0 to 850 ohms @ 24V DC.

Output Response Time (for step input change)

Time to reach 98% of output value (typical)	
No filtering	14 milliseconds
Low filter	47 milliseconds
Medium filter	156 milliseconds
High filter	1154 milliseconds

Output Ripple
Less than ±0.1% of output span.

Environmental

Operating temperature
Operation: -40 to 80°C (-40° to 176°F).
Storage: -40 to 85°C (-40 to 185°F).

Relative humidity
5 to 95% non-condensing.

Power Requirement
Loop-powered, 7-32V DC SELV, 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.

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

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).
Unit weight: 0.16 kg (0.35 pounds).
Shipping Weight: 0.22 kg (0.5 pounds) packed.

Ordering Information

Models

DT233-0600
Two-wire dual transmitter, thermocouple/millivolt inputs, isolated current or voltage outputs.

Services

DT230-Config/Cal
Factory custom configuration/calibration service. Specify input type, input/output, zero, full-scale values, filtering, and sensor fault settings* on order.
** Sensor fault settings are only available for models DT233, DT235, DT333 and DT335.*

Software

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

Agility Mobile Application
Software configuration software for an Android smart device. Download for free from the Google Play Store. Requires 5028-565 and 4001-113 cables.

Accessories

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

4001-112
USB cable, 1 meter, with Type A to Type B plugs.

4001-113
USB cable, 1 meter, with Type A to Mini-B plugs.

4001-252
DIN rail end stop for hazloc approvals.

5028-565
USB-OTG 6 inch cable.

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