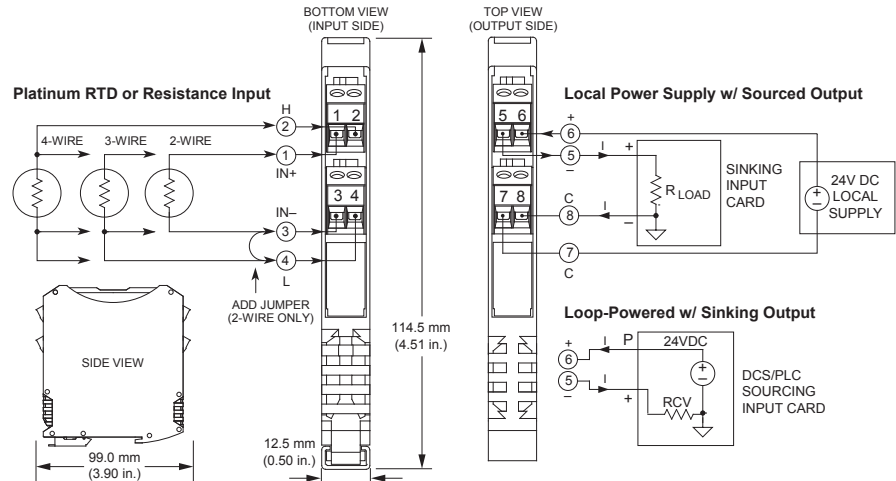


# Transmitters: TT230 Series

**TT231** RTD/resistance input two-wire/three-wire transmitter



100 ohm Pt RTD or 0-900 ohm input ◆ 4-20mA output (sink/source) ◆ 12-32V DC loop/local power

## Description

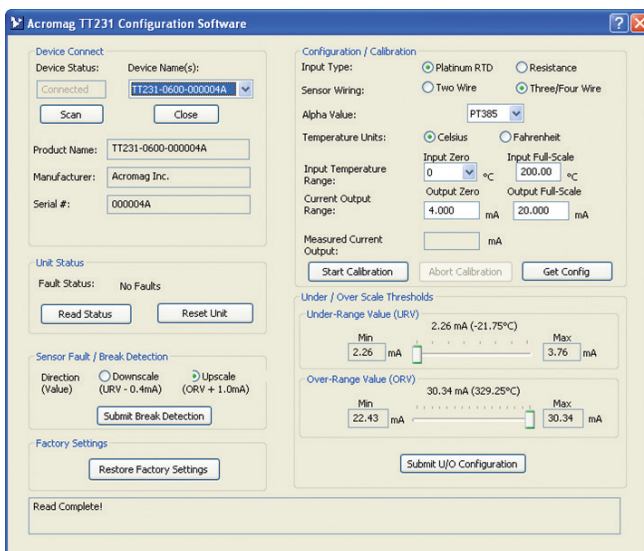
The TT231 model is a space-saving two-wire transmitter that converts a 100 ohm Platinum RTD sensor input to a proportional 4-20mA signal. Power is received from the output loop current or a DC supply when using a three-wire connection. The transmitter provides sensor excitation plus performs linearization, lead-wire compensation, and lead-break detection.

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.

## Key Features & Benefits

- Easy setup and digital calibration via USB with Windows configuration software
- Flexible RTD or linear resistance input ranges (any 100 ohm Pt RTD with 375-393 alpha)
- Space-saving 12.5mm (0.5 inch) unit with pluggable terminals for convenient wiring
- High accuracy, linearity, stability, and reliability
- Advanced analog signal conditioning ASIC eliminates digitization errors
- Low temperature drift (<80ppm/°C)
- Supports sink or source output wiring
- Programmable over/under-range limits
- Selectable upscale or downscale operation for sensor errors and lead-break detection
- 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



TT230 Series Transmitter Configuration Software is downloadable (FREE) from [www.acromag.com](http://www.acromag.com).

Windows XP, Vista, 7, & 8



Tel 877-214-6267 ■ sales@acromag.com ■ www.acromag.com ■ 30765 Wixom Rd, Wixom, MI 48393 USA

# Transmitters: TT230 Series

## TT231 RTD/resistance 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

100Ω Pt RTD,  $\alpha=0.00385 \Omega/\Omega^\circ\text{C}$ , 0-200°C input, 4-20mA output, upscale break detection.

##### Input Configuration

Two-, three- or four-wire sensor input connections.

##### Input Ranges

100 ohm Platinum RTD,  $\alpha = 375\text{-}393$ , 385 (default), -50 to 850°C (-58 to 1562°F).

0 to 900 ohms linear resistance.

Programs in °C, °F, or ohmic integer values only.

##### Zero Adjust

RTD 3/4 wire: -50, -17.78, or 0°C (-58, 0, 32°F).

RTD 2 wire: 0°C (32°F) fixed.

RES: 0 or 100 ohms.

##### Full-Scale Adjust

RTD: up to 850°C (1562°F), 50°C (58°F) span minimum.

Resistance: up to 900 ohms, 8 ohm span minimum.

##### Excitation Current

0.5mA, nominal, each  $\pm$  lead

##### Lead-Wire Compensation

25 ohms per lead

##### Lead Break (Sensor Burnout) Detection

Configurable for either upscale or downscale.

##### Input Filter Bandwidth

-3dB at 700Hz, typical, normal mode filter.

#### ■ Output

##### Output Range

4 to 20mA DC.

Under-scale limit adjustable for 2.1 to 3.6mA, nominal.

Over-scale limit adjustable for 21 to 30mA, nominal.

##### Output Fault Limits (Sensor Fault)

0.4mA below selected under-scale threshold and

1.0mA above over-scale threshold, typical.

##### Output Compliance

$R_{LOAD} = (V_{SUPPLY} - 8.6V) / 0.020A$ .

$R_{LOAD} = 0$  to 750 ohms @ 24V DC.

##### Output Accuracy

Better than  $\pm 0.1\%$  of span, typical for spans less than 500°C. Includes the effects of repeatability, terminal point conformity, and linearization, but does not include sensor error.

##### Ambient Temperature Effect

Better than  $\pm 0.008\%$  per °C of input span or  $\pm 80\text{ppm}/^\circ\text{C}$ , typical. Includes the combined effects of zero and span drift over temperature.

##### Output Response Time (for step input change)

500μs, typical with 250 ohm load (to reach 98% of final output value).

#### ■ 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

9-32V DC SELV (Safety Extra Low Voltage),

30mA max.

##### 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

##### TT231-0600

Transmitter, RTD/resistance 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](http://www.acromag.com) for more information.

##### USB-ISOLATOR

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

ISO9001  
AS9100   
MADE IN USA

  
THE LEADER IN INDUSTRIAL I/O

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