

## Product Datasheet - Technical Specifications



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# Transmitters: TT230 Series

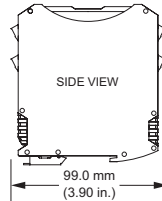
## TT239 Frequency/pulse/PWM input two-wire transmitter



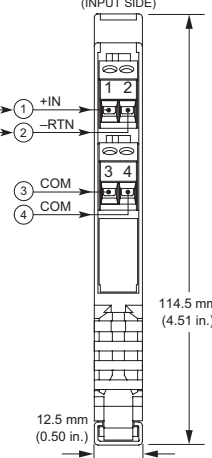
### Frequency/Pulse Input



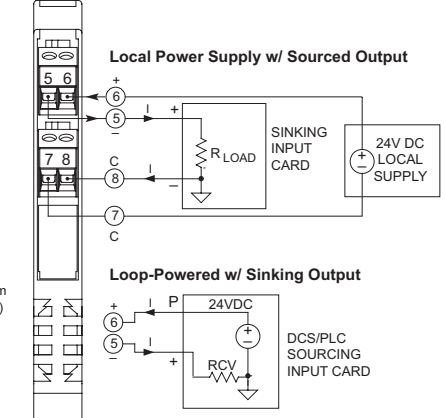
MAG PICKUP  
ENCODER  
LINE FREQ  
TTL/PNP/NPN  
DRY CONTACT  
2/3-WIRE PROX SWITCH  
TURBINE FLOWMETER  
PULSE UNI/BIPOLAR  
PWM/DUTY CYCLE



### BOTTOM VIEW (INPUT SIDE)



### TOP VIEW (OUTPUT SIDE)



Multi-range frequency/pulse input ♦ 4-20mA output (sink/source) ♦ 12-32V DC local/local power

### Description

The TT239 model is a space-saving two-wire transmitter that isolates and converts a frequency, pulse, or pulse-width modulation (PWM) input to a proportional 4-20mA signal. You can select to measure either the input frequency or the duty cycle. Power is received from the output loop current or a DC supply when using a three-wire connection.

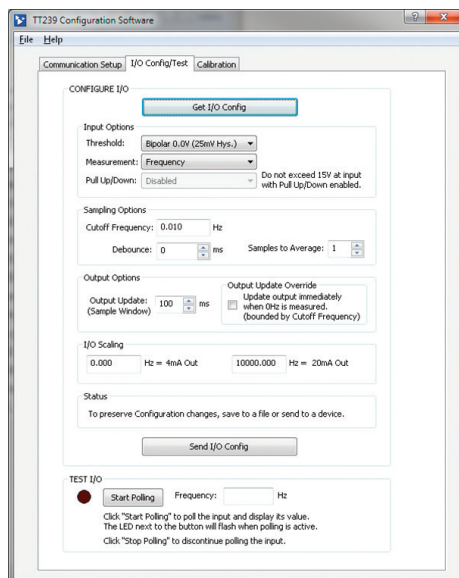
High-voltage isolation separates the input from the output circuit. Isolation protects from surges, reduces noise, and eliminates ground loop errors.

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 frequency 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
- Measures frequency or duty cycle and interfaces many input types up to 100KHz
- Accepts input amplitudes up to 120VRMS ( $\pm 170V$  DC, unipolar or bipolar)
- Adjustable 0Hz cut-off, sample averaging, and output update time
- Software configurable pull-up/down resistors (+4V DC input pull-up for sensors/transducers)
- 1500V isolation between input/output circuits
- Space-saving 12.5mm (0.5 inch) unit with pluggable terminals for convenient wiring
- Fast response time and high accuracy
- Supports normal or reverse-acting output
- Supports sink or source output wiring
- NAMUR-compliant output loop current
- Shock (25g) and vibration (4g) resistant
- 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

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

TT239 Model software allows you to configure transmitters offline, save the file, and download into units later, at your convenience.

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# Transmitters: TT230 Series

## TT239 Frequency/pulse/PWM input two-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

±5.0V Square Wave; Input Threshold = Bipolar 0.0V;  
Hysteresis ±25mV; Measurement = Frequency;  
Pull Up/Down = Disabled; Excitation = Enabled;  
0Hz Cutoff = 0.5Hz; Sample Average = 1;  
Output Range = 4-20mA; I/O Scaling = 0Hz to 10KHz,  
Normal Acting; Output Update = 100ms.

##### Frequency Input

Configurable for any range from 0Hz to 100KHz.  
Accepts unipolar (non-zero crossing) or bipolar (zero crossing) input signals. 0.5Hz minimum span.  
10µs minimum pulse width.

##### Input Ranges

| Frequency Input | Output Update | Input Resolution  | Typical Accuracy |
|-----------------|---------------|-------------------|------------------|
| 0 to 100Hz      | Any rate      | 1 part in 60000   | ±0.05Hz          |
| 0 to 1KHz       | Any rate      | 1 part in 6000    | ±0.5Hz           |
| 0 to 5KHz       | Any rate      | 1 part in 1200    | ±1Hz             |
| 0 to 10KHz      | 10ms          | 1 part in 60000   | ±200Hz           |
| 0 to 10KHz      | 100ms         | 1 part in 600000  | ±20Hz            |
| 0 to 10KHz      | 1000ms        | 1 part in 6000000 | ±2Hz             |
| 0 to 100KHz     | 10ms          | 1 part in 60000   | ±400Hz           |
| 0 to 100KHz     | 100ms         | 1 part in 600000  | ±40Hz            |
| 0 to 100KHz     | 1000ms        | 1 part in 6000000 | ±4Hz             |

| PWM Input Carrier Freq | Cycle Range | Input Resolution | Typical Accuracy |
|------------------------|-------------|------------------|------------------|
| 0 to 100Hz             | 1 to 99%    | 1 part in 60000  | ±0.02%           |
| 0 to 1KHz              | 10 to 90%   | 1 part in 6000   | ±0.2%            |
| 0 to 3KHz              | 20 to 80%   | 1 part in 1200   | ±2.0%            |

##### Input Scaling Adjust

Zero: Adjustable over 0 to 99% of full-scale input.

Full scale: Adjustable over 0.5Hz to 100KHz.

Cut-off frequency: Adjustable over 0.01Hz to 100KHz.

##### Input Pull-up/Pull-down (internal, software-select)

Configurable 12.4KΩ pull-up to +4V and 1KΩ pull-down to -FRN, or disabled. 15V DC maximum input. 4V pull-up with ±28mV hysteresis or 3V when ±84mV.

##### Unipolar Signal Configuration:

Amplitude: 0 to 3V DC min., 0 to 170V DC max.

Thresholds: Configurable for 1.6V DC (±25mV hysteresis) or 5V DC (±83mV hysteresis), typical.

##### Bipolar Signal Configuration:

Amplitude: ±50 to ±200mV min. (depending on range and hysteresis), 120Vrms max. (±170V DC).

Thresholds: 0mV nominal (±25 or ±83mV hysteresis).

#### ■ Output

##### Output Range

4 to 20mA DC, wired as sink or source.

Under-range capability 3.6mA. Over-range 24mA.

##### Output Compliance

$R_{LOAD} = (V_{SUPPLY} - 12V) / 0.020A$ .

$R_{LOAD} = 0$  to 600 ohms @ 24V DC.

##### Output DAC Resolution

16-bit D/A converter

##### Output Update

Software configurable from 10ms to 5000ms.

Determines the rate at which the output signal is updated, unless optionally overridden.

##### Output Settling Time

1ms, 0% to 98% for a step-change in input, typical.

##### Output Accuracy

Better than ±0.05% of span, typical (±0.1% max.) for nominal input spans. Includes the effects of repeatability, terminal point conformity, and linearization, but does not include sensor error.

##### Ambient Temperature Effect

Better than ±0.0020% per °C of input span or ±20ppm/°C, typical. Includes the combined effects of zero and span drift over temperature.

#### ■ Environmental

##### Temperature Range

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

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

##### 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

II 3 G Ex nA IIC T4 Gc -40°C ≤ Ta ≤ +80°C

#### ■ 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

#### TT239-0600

Transmitter, isolated frequency/pulse/PWM 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




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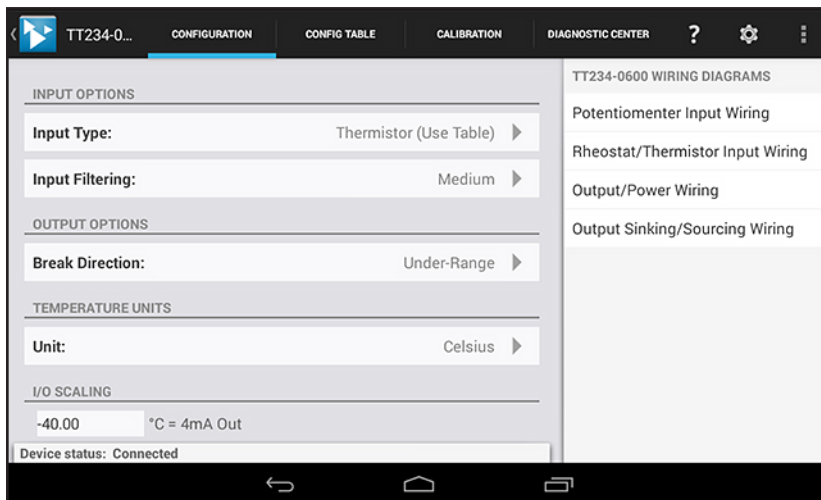
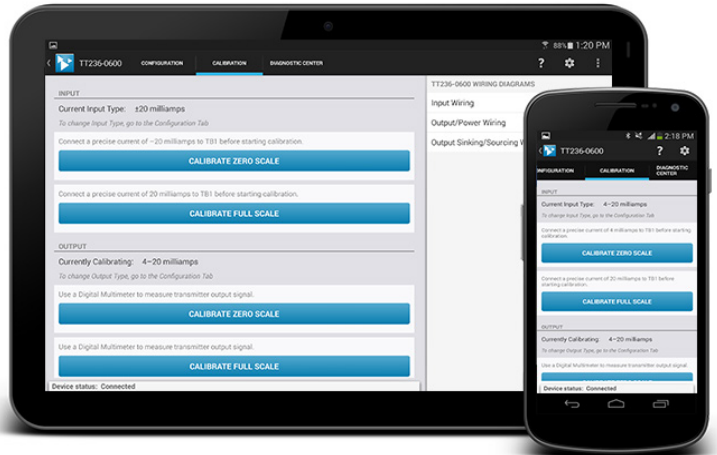
# Transmitters: TT Series

## Acromag Agility™ Config Tool Mobile Application

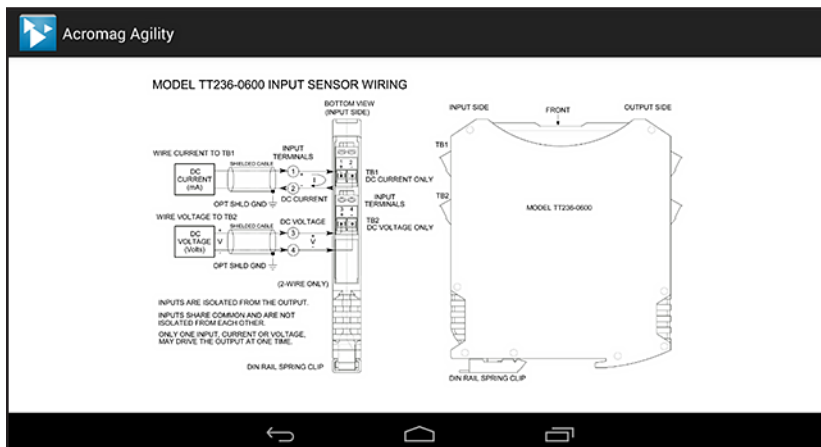
The Agility™ Config Tool is a mobile application that allows easy setup and configuration of Acromag TT Series transmitters via a tethered mobile device.

This free app is available for Android devices at the Google Play store at [Acromag Agility™ Config Tool](#).

Demo the software, no need for a module. To enter demo mode simply tap the  icon in the upper left corner 8 times.



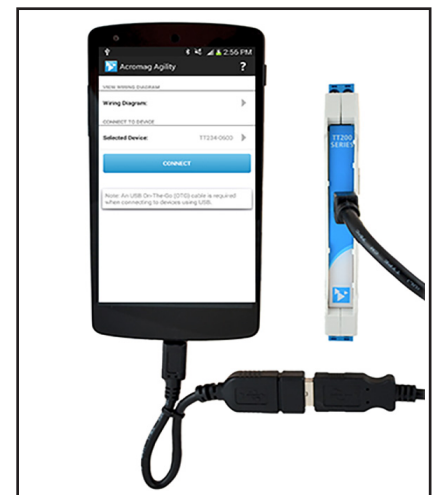
With a couple of taps, quickly configure input, output, unit and scaling options.



Quick and easy access to the wiring diagram, even offline without internet access.

### Key Features & Benefits

- Connects to Acromag TT Series transmitters (except models TT231)
- Requires the use of USB OTG Cable (Acromag part #: 5028-565) and USB A to Mini B Cable (Acromag part #: 4001-113)
- Configures and calibrates TT Series products via phone or tablet running Android 4.3 ICS (Ice Cream Sandwich) or later.
- View wiring diagrams, even without an internet connection
- Perform quick and easy field diagnostics and troubleshooting
- Ideal for field technicians



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