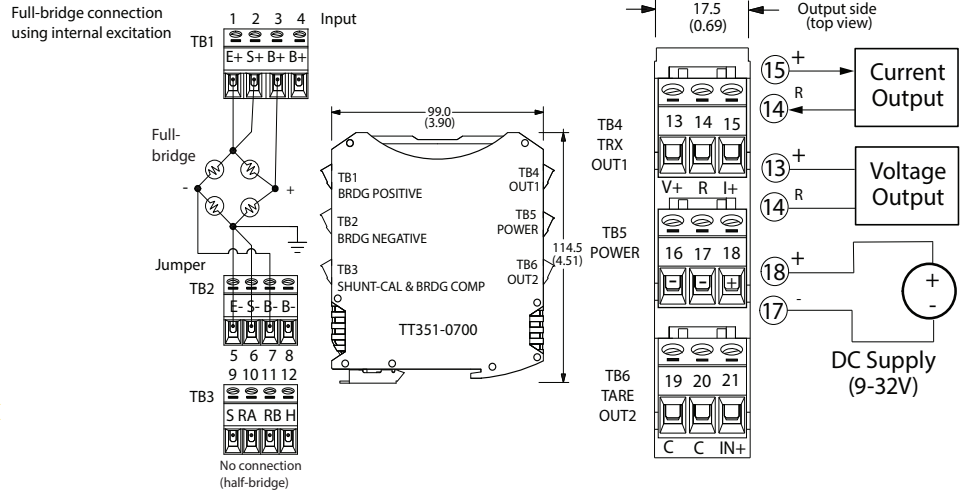


# Transmitters: TT350 Series

## TT351 Strain gauge/load cell input four-wire transmitter



Strain gauge/load cell input ◆ Universal current/voltage output ◆ 9-32V DC local/bus power

### Description

The TT351 model is a space-saving four-wire transmitter that converts a four or six wire strain gauge bridge or load cell or millivolt sensor signal to an isolated voltage or current output signal. An optional DIN rail bus can deliver primary or redundant power to multiple units.

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

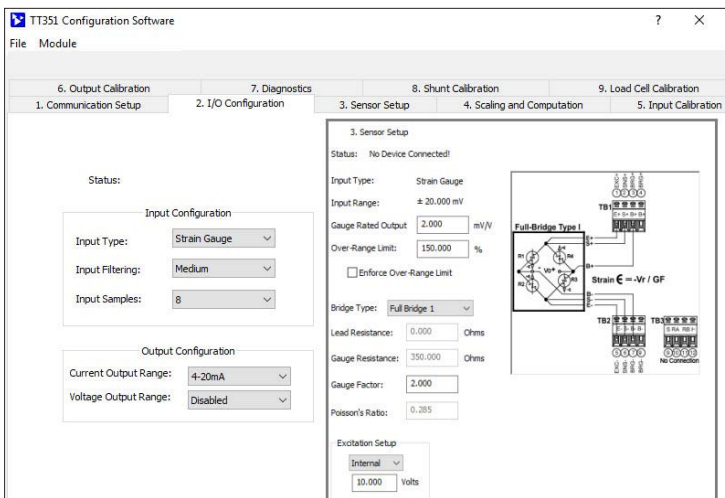
The transmitter's input circuit allows true 6-wire bridge measurement and includes an adjustable bridge excitation supply (4 to 11V DC) with a remote sense feature. Sense wires ensure the programmed

excitation voltage is measured at the sensor and enable lead-wire compensation. The differential input performs true ratiometric conversions for extremely stable measurements that remain accurate over time and temperature.

Advanced signal processing capabilities, variable range input, and convenient USB programming make this instrument a very versatile strain/load 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 or Agility™ app for Android® devices
- Flexible SG bridge, load cell, or mV input
- Digitally adjustable sensor excitation
- Space-saving 17.5mm (0.7 inch) unit with pluggable terminals for convenient wiring
- High accuracy, linearity, stability, and reliability
- Remote sense and measurement of bridge excitation vev
- Ratio-metric input measurement of sensor  $V_o$
- Optional automatic null-compensation/zero-balance of bridge output  $V_o$
- User-specified input over-range limiting
- Bus power, local power, or both
- Redundant power ready (rail/local)
- Separate voltage & current output terminals
- Shock (25g) and vibration (4g) resistant
- Wide ambient operation (-40 to 70°C)
- CE compliant. UL/cUL Class I Div 2, ATEX / IECEx Zone 2



TT350 Series Transmitter Configuration Software is downloadable (FREE) from [www.acromag.com](http://www.acromag.com).

Windows® 7 and newer.

The Agility™ Config Tool is downloadable (FREE) at the [Google Play Store](https://play.google.com/store/apps/details?id=com.acromag.agility) For Android Devices only

TT351 Model software allows you to configure transmitters offline, save the file, and download into units later, at your convenience.



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## TT351 Strain gauge/load cell input four-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 TT350 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.

#### ■ General Input

##### Analog to Digital Converter (ADC)

24-bit sigma-delta A/D converter.

##### Resolution

Varies from 13.5 to 20.5 bits per filter and gain selection.

##### Input Reference Test Conditions

Strain gauge/mV; Excitation = 10V; Rated Output = 1mV/V; Range =  $\pm 10$ mV; Ambient Temperature = 25°C; Power Supply = 24V DC.

##### Accuracy (overall input to output)

Better than  $\pm 0.1\%$  of span, typical.  
This value does not include sensor errors.

##### Ambient Temperature Effect

Better than 0.008% of input span per °C ( $\pm 80$ ppm/°C).

##### Noise Rejection

Normal mode @ 60Hz:  
-19dB (no filter), -34dB (low filter), >80dB (med/high filter)  
Common mode @ 60Hz:  
-136dB, typical with 100 ohm input unbalance.

##### Input Overvoltage Protection

Bipolar Transient Voltage Suppressors (TVS).

#### ■ Bridge Input

##### Input Types

Select from basic load cell, two quarter-bridge options, two half-bridge options, three full-bridge options, or millivolts.

##### Input Span/Range

Bipolar input range is determined from the  $\pm$  product of the gauge's rated output and the nominal excitation selection ( $2mV/V \times 10V = \pm 20mV$  range).

##### Input Over-range

The actual input range is up to (user-specified)  $\pm 150\%$  of the range obtained via the  $\pm$  product of the gauge's rated output and the nominal excitation applied.

##### Input Sensitivity

Accepts gauge rated outputs up to 1mV/V to 10mV/V. The range of your input signal is the  $\pm$  product of the excitation voltage and your gauge's rated output.

##### Input Impedance

$\pm 1N$  at 15M ohms,  $\pm 5EN$  at 73.2K ohms, typical.

##### Input Lead Resistance

Module has sufficient overdrive to guarantee 10V bridge excitation with 5 ohms/lead and 100mA of internal excitation current. Larger lead resistances may limit the maximum achievable internal bridge excitation.

##### Input Bridge Excitation (Internal)

Adjustable from 4V to 11V, 120mA maximum. Internal excitation must be turned OFF before external excitation supply connection.

##### Input Bridge Excitation (External)

4V to 11V. The internal excitation must be turned OFF for connection to an external excitation supply.

#### ■ Digital (Trigger) Input

##### Input Type

"Active High" input, 100ms minimum.

##### 15-30V DC (6.65K ohms).

See connection diagram.

##### Operation (Tare/Alarm Modes)

The trigger function is set for "Auto-Tare" mode by default.

#### ■ Output (DC V/mA)

##### D/A Converter

16-bit

##### Current Output

Ranges: 0-20mA, 4-20mA.  
Compliance: 10V minimum (525 ohm load).

##### Voltage Output

Ranges: 0-5V,  $\pm 5V$ , 0-10V,  $\pm 10V$ .  
Compliance: 10mA maximum with short circuit protection.  
1 ohm output impedance.

##### Output Response Time to 98% (for step input change)

No filter: 264ms. Medium filter: 472ms.  
Low filter: 292ms. High filter: 2547ms.

#### ■ Environmental

##### Operating temperature

-40 to 70°C (-40° to 158°F).

##### Storage temperature

-40 to 85°C (-40 to 185°F).

##### Relative humidity

5 to 95% non-condensing.

##### Power Requirement

Supply	Ptot	Current Draw
9V	3.05W	339mA Max.
12V	3.05W	254mA Max.
15V	3.05W	203mA Max.
24V	3.05W	127mA Max.
32V	3.05W	95mA Max.

##### Isolation

4-way (input/output/trigger/power). Input/excitation, analog output, trigger, and power circuits are isolated from each other for up to 1500V AC for 60 seconds or 250V AC continuous.

##### Shock and Vibration Immunity

Vibration: 4g.  
Shock: 25g.

##### Approvals

CE compliant. UL/cUL listed 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

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

##### [TT351-0700](#)

Four-wire transmitter. Bridge input. CE, UL508.

##### [TT351-0710](#)

Four-wire transmitter. Bridge input. CE, ULC1D2, ATEX/IECEx Zone 2.

#### Services

##### [TT351-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

##### [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.