



## Isolated Transmitters



## 650T Units Multi-Channel, Two-Wire Transmitters

### DC Current Input

#### Models

- 651T: Single I/O channel
- 652T: Dual I/O channel
- 653T: Single input, dual output (splitter)

#### Input / Output Ranges

- 4 to 20mA DC input
- 4 to 20mA DC output

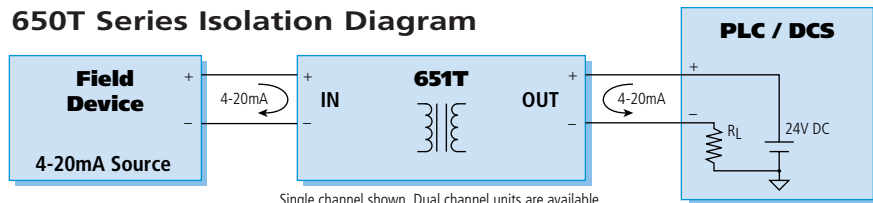
#### Power Requirement

- 12 to 50V DC (loop-powered)
- Two-wire transmitter

#### Approvals

- CE marked. UL, cUL listed
- Class I, Division 2, Groups A, B, C, D.

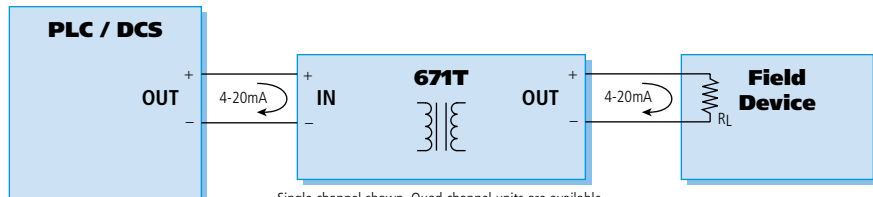
### 650T Series Isolation Diagram



Single channel shown. Dual channel units are available.

Note: 650T series transmitters are for two-wire transmitter interfaces (sinks current). For application notes using 650T Transmitters, refer to Page 134.

### 670T Series Isolation Diagram



Single channel shown. Quad channel units are available.

Note: 670T series transmitters are for output resistive loads only (sources current). For more information on the 670T Transmitter, refer to Page 132. Application notes are on Page 134.

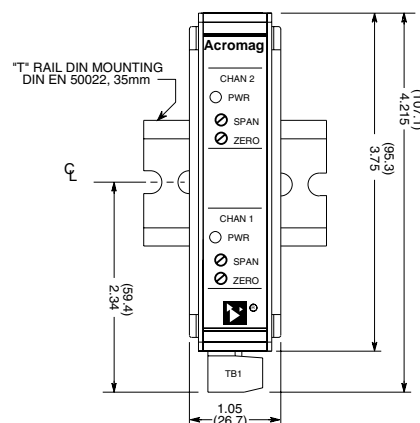
### Description

These units receive 4-20mA process current inputs and provide isolated 4-20mA output signals. Each channel operates independently and is isolated from the others to prevent interaction between channels.

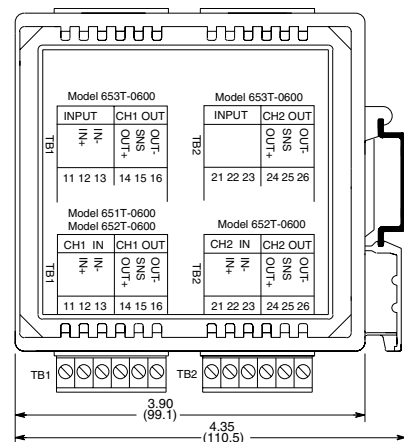
For easy troubleshooting, each unit has LEDs and diagnostic test points. Power LEDs help identify output open loop conditions. The precision 10 ohm sense resistor enables monitoring of the output signal without disturbing field wiring.

### Special Features

- Two channels in a single unit saves space and reduces costs.
- Signal splitter model (653T) provides two identical outputs from one input signal.
- Galvanic isolation eliminates ground loops, reduces noise, and blocks transient signals.
- Independent channels prevent signal interaction and offer spares for later use.
- Power LEDs provide a visual indication of operational process loops.
- Excellent accuracy and stability ensure reliable operation in noisy environments.



NOTE: ALL DIMENSION ARE IN INCHES (MILLIMETERS)





## ■ Performance

### Reference Test Conditions

Input/Output current: 4 to 20mA; output load 500 ohms; 77°F (25°C).

### Input range

4 to 20mA input (each channel).

### Input burden

Voltage drop (651T, 652T): Less than 1.5V, typical (75 ohm equivalent).

Voltage drop (653T): Less than 3.0V, typical (150 ohm equivalent).

### Output range

4-20mA DC output (each channel).

$R_L = (P_{SUPPLY} - 12V) / 0.02$

### Output compliance

$P_{SUPPLY} = 12V + (0.02 \times R_{LOAD})$

### Output limiting

Outputs are limited to 36mA.

### Output ripple

Less than  $\pm 0.1\%$  of the maximum output span.

### Accuracy

$\pm 0.1\%$  of output span. Error includes the combined effects of isolator repeatability, hysteresis, terminal point linearity and adjustment resolution.

### Ambient temperature effect

Less than  $\pm 0.006\%$  of input span per °F ( $\pm 0.01\%$  per °C) over the ambient temperature range for reference test conditions. This specification includes the combined effects of zero and span over temperature.

### Calibration

Two 15-turn potentiometers (zero and span) per channel, accessible from front of the unit.

### Bandwidth

-3dB at 4.5Hz, typical.

### Response time

For a step input, the output reaches 98% of output span in 15mS, typical.

### Noise rejection

Common mode: 100dB at 60Hz, typical.

Normal mode: -5dB at 60Hz, 100 ohm source, typical.

### Diagnostics

LED power indicator: Off for output open loop detection, power, or load compliance problem.

Field test points: An internal 10 ohm sense resistor provides test points for monitoring the output signal current during field maintenance.

## ■ Environmental

### Ambient Temperature

Operating: -25 to 70°C (-13 to 158°F).

Storage: -40 to 85°C (-40 to 185°F).

### Relative Humidity

5 to 95%.

### Power Requirement

12 to 50V DC for each output channel.

### Isolation

Inputs, outputs, and individual channels are isolated from each other for common-mode voltages up to 250V AC, or 354V DC off ground, on a continuous basis (will withstand 1500V AC dielectric strength test for one minute without breakdown).

### Radiated Field Immunity (RFI)

Complies with EN61000-4-3 Level 3 (10V/m, 30 to 1000MHz) and European Norm EN50082-1.

### Electromagnetic Field Immunity (EMI)

Less than  $\pm 0.25\%$  of output span effect under the influence of electromagnetic fields from switching solenoids, commutator motors, and drill motors.

### Surge Immunity

Complies with EN61000-4-5 Level 3 (2KV) and European Norm EN50082-1.

### Electrical Fast Transient (EFT)

Complies with EN61000-4-4 Level 3 (2KV) and European Norm EN50082-1.

### Electrostatic Discharge (ESD)

Complies with EN61000-4-2 Level 3 (8KV air, 4KV direct to the enclosure port) and European Norm EN50082-1.

### Radiated Emissions

Meets or exceeds European Norm EN50081-1 for Class B equipment.

### Approvals

CE marked

UL listed (UL508 and UL1604).

cUL listed (C22.2, 142-M1987 and 213-M1987).

Hazardous Locations: Class I: Div. 2; Groups A, B, C, D

## ■ Physical

### Enclosure

Case: Self-extinguishing NYLON type 6.6 polyamide thermoplastic UL94 V-2 NEMA Type 1 enclosure.

### Connectors (Removable Terminal Blocks)

Wire Range: AWG #14-22 (AWG #12 stranded only).

### Printed Circuit Boards

Military grade FR-4 epoxy glass circuit board.

### Dimensions

1.05W x 4.68H x 4.35D inches.

26.7W x 95.3H x 110.5D millimeters.

### Shipping Weight

1 pound (0.45 Kg) packed.

## ■ Ordering Information

### Models

651T-0600

Single channel 2-wire transmitter

652T-0600

Dual channel 2-wire transmitter

653T-0600

Single input with dual isolated output transmitter

## Accessories (see Page 138)

P55R-D24

Power supply (24V DC, 2.1A).

See Power Supplies on page 213.

TBK-B01

Optional terminal block kit, barrier strip style, 2 pcs.

TBK-S01

Optional terminal block kit, spring clamp style, 2 pcs.

DIN RAIL 3.0

DIN RAIL 16.7

DIN rail strip, Type T, 3 inches (75mm) or 16.7 inches (425mm)

20RM-16-DIN

19" rack-mount kit with DIN rail.

Holds sixteen 650T transmitters.



Optional terminal blocks: barrier strip (left) and spring clamp (right). Cage clamp terminal is standard.



## Accessories

### Terminal Blocks

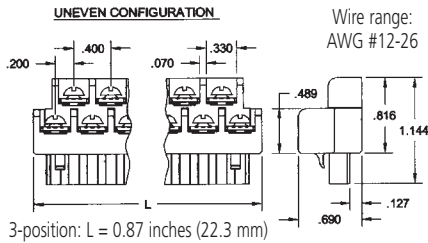
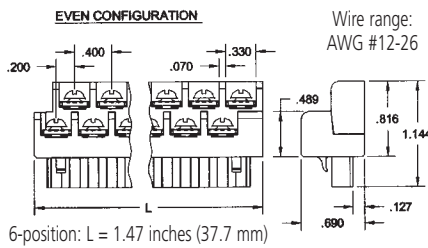


Barrier strip (left) and spring clamp (right).

#### Ordering Information

See individual I/O modules for compatibility.

#### Barrier Strip Terminal Blocks

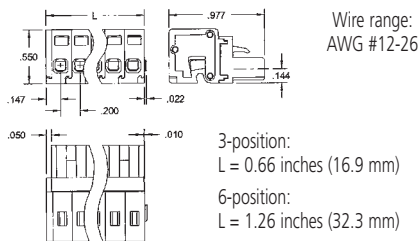


**TBK-B01**  
Terminal block kit,  
two 6-position pieces

**TBK-B02**  
Terminal block kit,  
four 6-position pieces

**TBK-B03**  
Terminal block kit,  
one 3-position and  
three 6-position pieces

#### Spring Clamp Terminal Blocks



**TBK-S01**  
Terminal block kit,  
two 6-position pieces

**TBK-S02**  
Terminal block kit,  
four 6-position pieces

**TBK-S03**  
Terminal block kit,  
one 3-position and  
three 6-position pieces

### Mounting Hardware



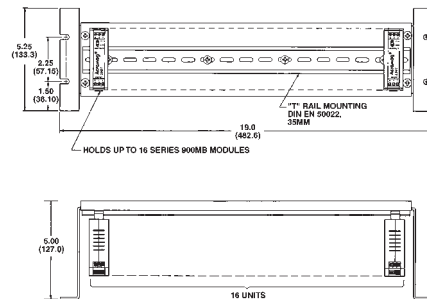
#### DIN-Rail Mounting

For your convenience, Acromag offers several mounting accessories to simplify your system installation. Our 19" rack-mount kit provides a clean solution for mounting your I/O modules and a power supply. Or you can buy precut DIN rail strips for mounting on any flat surface.

#### Ordering Information

20RM-16-DIN  
19" rack-mount kit with DIN rail.

DIN RAIL 3.0  
DIN RAIL 16.7  
DIN rail strip, Type T, 3 inches (75mm) or  
16.7 inches (425mm)



### Power Supplies



#### 50W Supply

**Input Power Requirement**  
85 to 264V AC or 105 to 370V DC

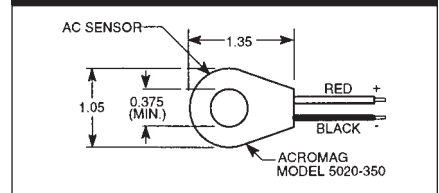
**Output**  
24V DC, 2.1A (50W)

#### Ordering Information

PSSR-D24  
Universal 50W power supply

See Power Supplies on page 213 for other models and more information.

### AC Current Sensor



#### Ordering Information

5020-350  
AC current sensor