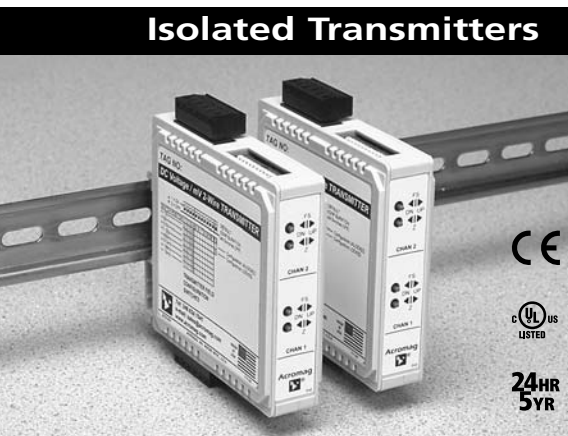




## Isolated Transmitters



## 650T Units Multi-Channel, Two-Wire Transmitters DC Voltage Input

### Models

654T: Dual DC voltage input channels

### Input Ranges

Bipolar:  $\pm 78\text{mV}$  to  $\pm 625\text{mV}$  (selectable ranges)  
Unipolar: 0–1.25 to 0–10V DC (selectable ranges)

### Output Range

4 to 20mA DC

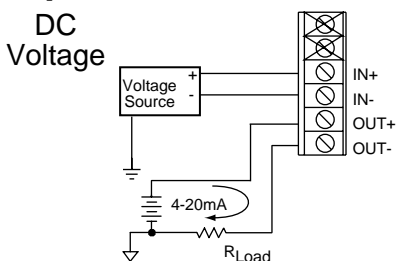
### Power Requirement

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

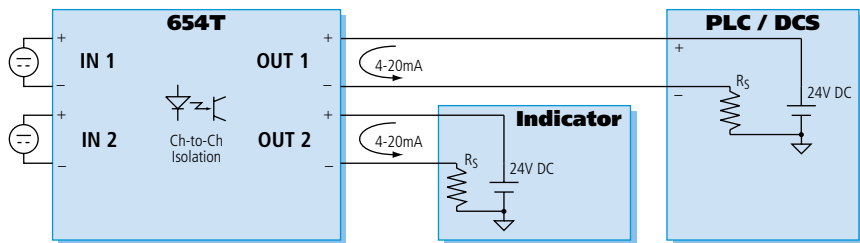
### Approvals

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

## Input Connections



## Dual-Channel Loop-Powered Transmitter



## Description

These units accept DC voltage input signals, provide isolation, and output proportional DC current signals. With two independent I/O channels in a slim package, the 654T is ideal for panel shops and end-users who require a high-density signal conditioner that can cover a broad range of measurement applications.

Configuration is fast and easy. First, you select the input range for each channel with simple DIP switches. Then, you set your zero/full-scale output values using the noninteractive increase/decrease toggle switches on the front panel to modify the output signal until the desired output value is read on your voltmeter. The switches make it easy to calibrate a normal (proportional) or reverse-acting (inverse) response in seconds. After setting the desired calibration, you can engage the safety lockout feature on the DIP switch to prevent accidental changes and unauthorized tampering.

The 654T provides two independent high-voltage input isolation circuits. Loss of power or a failure on one channel has no effect on the other. The second channel can be used as a built-in spare for reduced downtime should the first channel fail. The spare channel becomes operational by simply moving the wired terminal block over to the vacant channel.

## Special Features

- DIP switch-configuration simplifies installation without analog pots, jumpers, or software.
- Isolation eliminates ground loops, reduces noise, and blocks transient signals.
- One-step calibration with increase/decrease toggle switches simplifies field adjustments for faster and easier maintenance.
- Automatic self-calibration compensates for temperature effects and component aging to deliver maintenance-free operation.
- Configuration lockout safety feature helps prevent tampering and accidental calibration changes.
- Reverse-acting output capability enables inverse proportional control signals.
- Dual channel model saves space and reduces equipment costs.
- High-resolution 16-bit  $\Sigma\text{-}\Delta$  A/D converters deliver superior accuracy for more reliable measurements.
- Built-in transient voltage suppressors protect circuitry from electrical interference.



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



## Performance

### General Input

Analog to Digital Converter (ADC)  
16-bit  $\Sigma$ - $\Delta$  A/D converter.

### Noise Rejection

Normal Mode: Better than 40dB @ 60Hz with 100 ohm input unbalance.  
Common Mode: Better than 140dB @ 60Hz with 100 ohm input unbalance.

### Input Overvoltage Protection

Bipolar Transient Voltage Suppressors (TVS).

### DC Voltage Input

#### Input Range

DIP switch-selectable. See table below.

Input Range	Recommended Minimum Span (10%)
A) $\pm 78$ mV	15mV
B) $\pm 156$ mV	31mV
C) $\pm 313$ mV	62mV
D) $\pm 625$ mV	124mV
E) 0 to 1.25V	125mV
F) 0 to 2.5V	250mV
G) 0 to 5V	500mV
H) 0 to 10V	1000mV

Span adjust: See table above.

Zero adjust: 100% full range.

#### Input Impedance

110K ohms, typical

### Output

#### Output Range

Range: 4 to 20mA DC, 3.8 to 24mA range typical.

#### Output Compliance

$R_{LOAD} = (V_{SUPPLY} - 12V) / 0.02A$   
600 ohms at 24V DC supply

#### Output Response Control

Proportional/inverse selectable.

#### Ambient Temperature Effect

Better than  $\pm 0.018\%$  of input span per  $^{\circ}C$  ( $\pm 0.01\%$  per  $^{\circ}F$ ).

#### Output Resolution

Output resolves to 1 part in 6546 for the nominal 4 to 20mA output span.

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

980mS typical to 98% of final output value.

#### Accuracy (overall input to output)

$\pm 0.1\%$  of output span.

### Environmental

#### Ambient Temperature

Operating:  $-25$  to  $75^{\circ}C$  ( $-13$  to  $167^{\circ}F$ ).  
Storage:  $-40$  to  $85^{\circ}C$  ( $-40$  to  $185^{\circ}F$ ).

#### Relative Humidity

5 to 95%, noncondensing.

#### Power Requirement

12 to 50V DC @ 25mA 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)

Designed to comply with EN61000-4-3 Level 3 and EN50082-1.

#### Electromagnetic Field Immunity (EMI)

Less than  $\pm 0.25\%$  of output span effect.

#### Electrical Fast Transient (EFT)

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

#### Electrostatic Discharge (ESD)

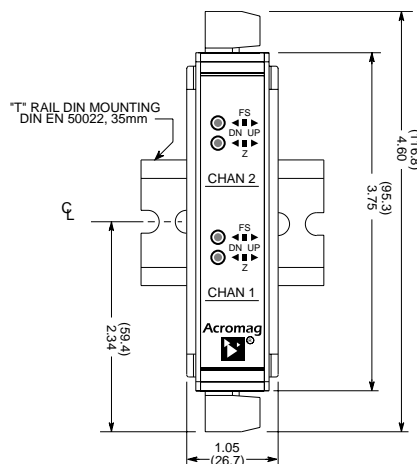
Complies with EN61000-4-2 Level 3 (8KV air or 4KV direct) and EN50082-1.

#### Radiated Emissions

Meets or exceeds EN50081-1 for Class B equipment.

#### Approvals

CE marked  
UL listed (UL508 and UL1604)  
cUL listed (C22.2, 142-M1987 and 213-M1987).  
Hazardous Loc.: Class I; Division 2; Groups A, B, C, D.



NOTE: ALL DIMENSION ARE IN INCHES (MILLIMETERS)

### 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 #12-24.

#### Printed Circuit Boards

Military grade FR-4 epoxy glass circuit board.

#### Dimensions

1.05W x 4.68H x 4.35D inches.  
26.7W x 118.9H x 110.5D millimeters.

#### Shipping Weight

1 pound (0.45 Kg) packed.

## Ordering Information

### Models

654T-0600 (add "-C" for factory calibration)  
Dual channel DC voltage 2-wire transmitter.

### Accessories (see Page 108)

#### PS5R-D24

Power supply (24V DC, 2.1A).  
See Power Supplies on page 183.

#### TBK-B01

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

#### TBK-S01

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

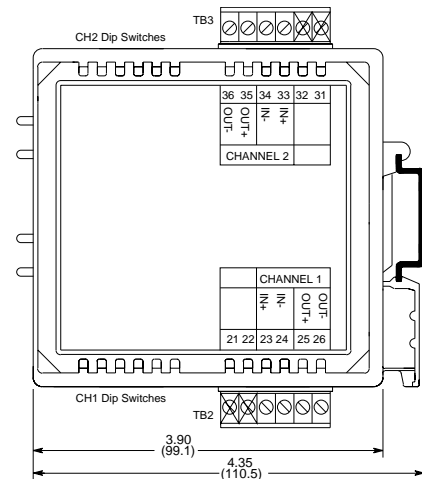
#### DIN RAIL 3.0

#### 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.





## Accessories

### Terminal Blocks

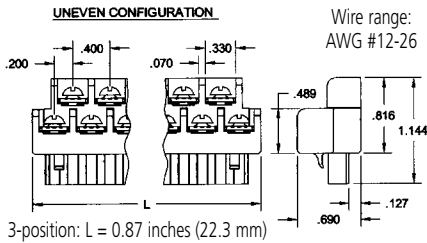
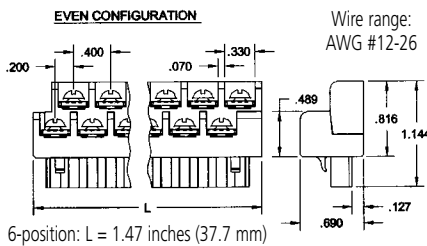


Barrier strip (left) and spring clamp (right).

#### Ordering Information

See individual I/O modules for compatibility.

#### Barrier Strip Terminal Blocks

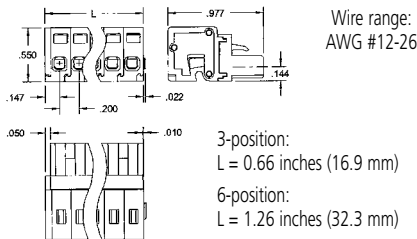


**TBK-B01**  
Terminal block kit,  
two 6-position pieces

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

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

#### Spring Clamp Terminal Blocks



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

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

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

### Mounting Hardware

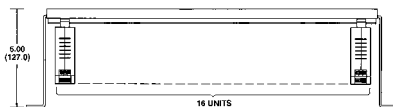
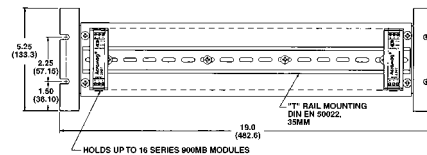


#### DIN-Rail Mounting

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

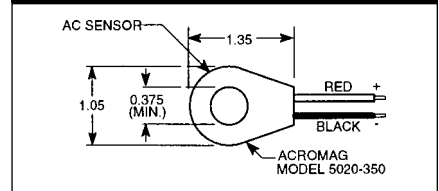
**Output**  
24V DC, 2.1A (50W)

#### Ordering Information

PSSR-D24  
Universal 50W power supply

See Power Supplies on page 183 for other models and more information.

### AC Current Sensor



#### Ordering Information

5020-350  
AC current sensor