

Isolated Transmitters: 600T Series



600T Series Models by Function Guide

◆ 610T Units (4-wire)



Multi-channel, DC-powered isolated transmitters. Designed For high-density panel installations.

◆ 630T Units (4-wire)



Multi-channel AC/DC powered isolators. Provides excitation supply for 2-wire transmitters.

◆ 650T Units (2-wire)



Multi-channel, output loop-powered transmitters with input isolation. Designed to front-end PLC inputs.

◆ 670T Units (2-wire)



Multi-channel, input loop-powered transmitters with output isolation. Designed to isolate PLC outputs to field devices.

	610T	630T	650T	670T
Functions				
4-20mA isolator			X	X
Isolated signal converter/transmitter	X	X		
Signal splitter		X	X	
Channel Configurations				
Single channel units	X	X	X	X
Dual channel units	X	X	X	X
Quad channel units				X
Splitter (one input, two outputs)		X	X	
Power Configurations				
Input loop-powered				X
Output loop-powered (2-wire transmitter)			X	
AC-powered		X		
DC-powered	X	X		
Inputs				
DC voltage input	X		X	
DC current input	X	X	X	X
Thermocouple/millivolt input			X	
RTD/resistance input			X	
AC current input	X			
Outputs				
DC current	X	X	X	X
DC voltage	X			
Isolation Configurations				
Input from output/power	X		X	
Output from input/power	X			X
3-way (input/output/power)	X	X		

600T Series

Isolated Transmitters

611T, 612T	Page 2
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651T, 652T, 653T	6
654T	8
655T, 656T, 653T	10
657T, 658T	12
670T	14

Technical Documentation

Dimensions diagrams	see individual units
Application notes	Page 16
Accessories	21

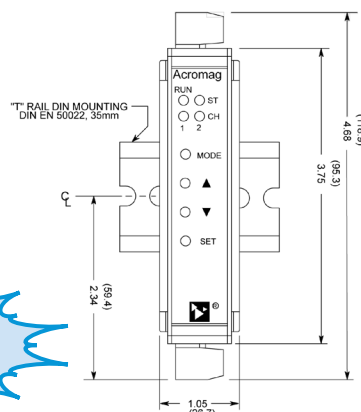


Isolated Transmitters: 600T Series

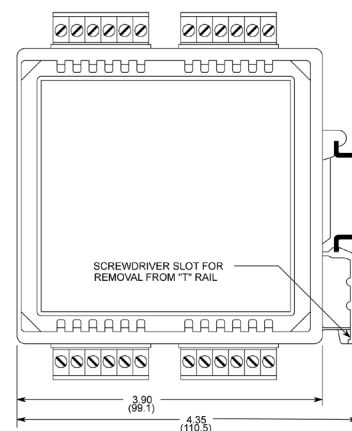
611T, 612T Multi-Channel, Universal DC I/O



**AUTO-CONFIG
SELF-RANGING**



NOTE: ALL DIMENSIONS ARE IN INCHES (MILLIMETERS)



DC current or voltage input ♦ Single/dual-channel DC-powered transmitters

Description

Models

611T: Single I/O channel

612T: Dual I/O channel

These units receive DC current or voltage input signals, provide isolation, and output proportional DC current or voltage signals. With support for universal DC I/O ranges, 610T series transmitters provide a solution for a wide variety of isolation and signal conversion tasks. The single-channel 611T and dual-channel 612T are ideal for panel shops and end-users who require a high-density signal conditioner that can accommodate a broad range of instrumentation applications.

Installation is fast and simple with Acromag's built-in auto-configuration feature. Using your standard calibrator, the 610T's internal microcontroller automatically senses the input source type (voltage or current) and selects the optimum performance range for your zero and full-scale input values. To adjust your output values, simply push the up or down buttons on the front panel until you read the desired output signal on your meter.

Both models provide high-voltage isolation between the input, output and power (3-way). On dual channel units, each channel operates independently, with inputs isolated from each other, to prevent interaction between channels.

For easy troubleshooting, each channel has diagnostic LEDs to identify input over/under range conditions. An additional status LED indicates the unit is operating properly or that the front panel pushbutton lockout feature has been invoked.

Input Ranges

Universal input with automatic configuration

±100mA (self-ranging),
±100V DC (self-ranging),
0 to 20 amps AC (with optional sensor)

Output Ranges

Universal output (user-configured ranges)

0 to 20mA (full range capability),
0 to 10V DC (full range capability)

Power Requirement

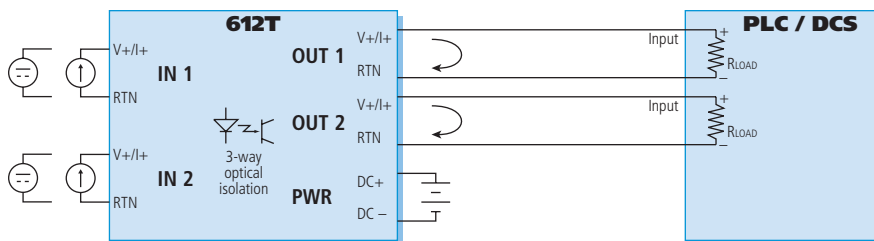
10 to 36V DC

Approvals

CE marked. UL, cUL listed.

Key Features & Benefits

- Universal DC input and output ranges offer flexibility to fit many applications.
- Auto-configuration and self-ranging technologies speed installation without pots, switches, jumpers, or software.
- Optical isolation eliminates ground loops, reduces noise, and blocks transient signals.
- Push-button calibration simplifies field adjustments for faster and easier maintenance.
- Configuration lockout safety feature prevents tampering and accidental changes.
- Reverse-acting output capability enables inverse proportional control signals.
- Each input channel can drive two outputs (a voltage and a current output signal).
- Dual channel model saves space and reduces equipment costs.
- High-resolution Σ - Δ A/D converters deliver superior accuracy for reliable measurements.



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Isolated Transmitters: 600T Series



Performance Specifications

◆ General Input

Analog to Digital Converter (ADC)
16-bit Σ - Δ A/D converter.

Noise Rejection

Normal Mode: Better than 40dB @ 60Hz.
Common Mode: Better than 100dB @ 60Hz.

Input Overvoltage Protection

Bipolar Transient Voltage Suppressors (TVS).

◆ DC Current Input

DC Current Input Range

± 100 mA DC with full range capability.
Minimum recommended span is ± 4 mA.

DC Current Input Impedance

10 ohms.

DC Current Input Accuracy

Better than $\pm 0.1\%$ of output span.

◆ DC Voltage Input

DC Voltage Input Range

± 100 V DC with full range capability.
Minimum recommended span is ± 40 mV.

Input impedance

± 1 V to ± 100 V input: greater than 100K ohms.
 ± 40 mV to ± 1 V input: 1K ohm

DC Voltage Input Accuracy

Better than $\pm 0.1\%$ of output span.

◆ AC Current Input

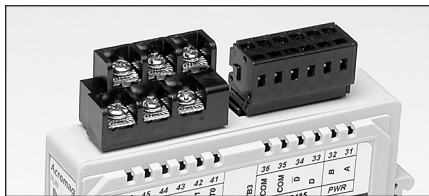
AC Current Input Range (optional)

An optional external AC current sensor is required to monitor AC current signals (Model 5020-350).

AC Current Range	Primary Turns
0 to 20A AC	1
0 to 10A AC	2
0 to 5A AC	4
0 to 2A AC	10
0 to 1A AC	20

AC Current Input Accuracy

Better than $\pm 0.5\%$ of output span.



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

◆ Output (DC V/mA)

Current Output

Range: 0 to 20mA maximum (user-configured range).
Compliance: 11V DC typical.
Load resistance range: 0 to 550 ohms.

Voltage Output

Ranges: 0 to 10V maximum (user-configured range).
Compliance: 10mA max. with short circuit protection.
Output impedance: 1 ohms.

Accuracy (overall input to output)

Better than $\pm 0.1\%$ of span for nominal output ranges of 0 to 10V or 0 to 20mA.

Ambient Temperature Effect

Better than $\pm 0.018\%$ of output span per $^{\circ}\text{C}$ or $\pm 1\mu\text{V}$, whichever is greater.

Output Response Time (for input step change)

800mS typical to 98% of final output value.

◆ 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%, noncondensing.

Power Requirements

611T: 10 to 36V DC. 24V DC @ 55mA.
612T: 10 to 36V DC. 24V DC @ 75mA.

Isolation

3-way (input/output/power). 1500V AC for 60 seconds or 250V AC continuous. Dual channel model includes input-to-input isolation and outputs share a common.

Radiated Field Immunity (RFI)

Complies 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 and EN50082-1.

Surge Withstanding Capability (SWC)

Complies with EN61000-4-5 Level 3 and EN50082-1.

Electrostatic Discharge (ESD)

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

Radiated Emissions

Meets or exceeds EN50081-1 for Class B equipment.

Approvals

CE marked, UL, cUL listed (USA, Canada).
UL3121 general product safety.

◆ 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

611T-0500

Single channel isolated transmitter

612T-0500

Dual channel isolated transmitter
Add "-C" suffix for optional factory configuration.

◆ Accessories (see Page 21)

5020-350

AC current sensor. See Page 20 for details.

PS5R-VD24

Power supply (24V DC, 2.5A).

TBK-B02

Optional terminal block kit, barrier strip style, 4 pcs.

TBK-S02

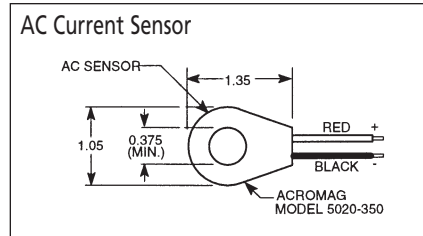
Optional terminal block kit, spring clamp style, 4 pcs.

DIN RAIL 3.0 or DIN RAIL 16.7

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

20RM-16-DIN

19" rack-mount kit with DIN rail.
Holds sixteen 610T series transmitters.

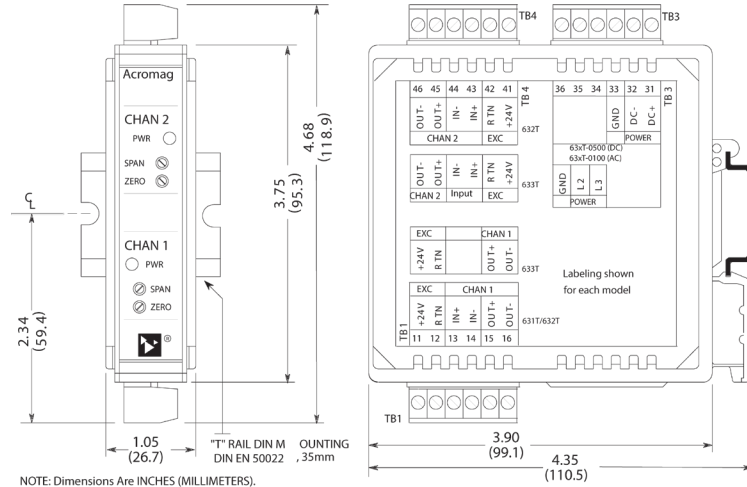


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Isolated Transmitters: 600T Series

631T, 632T, 633T Multi-Channel 4-Wire Isolators



DC current input ♦ Single/dual-channel AC/DC-powered isolators ♦ Signal splitter

Description

Models

631T: Single I/O channel

632T: Dual I/O channel

633T: Single input, dual output (splitter)

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. Galvanic isolation eliminates ground loops, reduces noise, and blocks transient signals.

Units are shipped with factory calibration for quick installation. These isolators also automatically compensate for load resistance variations, so re-calibration is rarely necessary. However, adjustable zero and span trim pots are provided to ensure precise calibration for maintenance requirements and long term serviceability.

These isolators generate a 24V input excitation supply suitable for powering one or two 2-wire transmitters. The supply is current limited at each output to prevent any excitation short from pulling down the internal power supply. The internal DC supply improves system performance by isolating loops on a single or dual channel basis. It saves space, complexity, and the expense of installing additional supplies to power your field loops.

Input / Output Ranges

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

Power Requirement

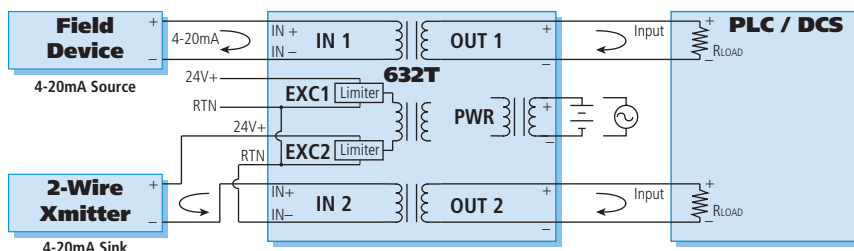
12-36V DC
90-250V AC (125V DC $\pm 10\%$)
Four-wire isolated transmitter

Approvals

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

Key Features & Benefits

- Two channels in a single unit saves space and reduces costs.
- Signal splitter model (633T) provides two identical isolated outputs from one input signal.
- Built-in isolated excitation supply with short circuit protection can drive up to two field 2-wire process loops.
- Full isolation safely separates each input channel, each output channel, the excitation supply, and power.
- Excellent accuracy and stability ensure reliable operation in hostile environments.
- Low input burden keeps voltage drop to less than 1.5V for full-scale current.
- Supports wide 0 to 1000 ohm load range and no trimming is required if the load varies.
- Current limiting safely limits output to 27mA.
- Pluggable terminals, zero/span trim pots and power LEDs make installation, maintenance, and long term service easy.



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Isolated Transmitters: 600T Series



Performance Specifications

Reference Test Conditions

Input/output current 4 to 20mA; Output load 250 ohms; Power 24V DC or 115V AC; 77°F (25°C).

Input Range

4 to 20mA input (each channel).

Input Burden

Voltage drop (631T, 632T):
Less than 1.5V (75 ohms) at full scale.
Voltage drop (633T):
Less than 3.0V (150 ohms) at full scale.

Input Overvoltage Protection

Bipolar Transient Voltage Suppressors (TVS).

Input Excitation

24V DC $\pm 10\%$, 22mA maximum each. Fully isolated.
Includes independent current limiting at EXC1 and EXC2 near 23mA, each.

Output Range

4-20mA DC output (each channel).

Output Trim Range

Zero and full-scale adjustment to $\pm 4\%$.

Output Limiting

Outputs are limited to 27mA.

Output Load

0 to 1000 ohms (631T).
0 to 950 ohms (632T, 633T).

Output Load Resistance Effect

Less than $\pm 0.01\%$ of output span effect for a ± 100 ohm change in load resistance.

Output Response Time (for input step change)

25ms typical to 98% of final output value.

Accuracy

$\pm 0.05\%$ of output span. Error includes the combined effects of isolator repeatability, hysteresis, terminal point linearity and adjustment resolution.

Temperature Drift

Better than $\pm 50\text{ppm}/^\circ\text{C}$ ($\pm 0.005\%/^\circ\text{C}$) over the ambient temperature range. This specification includes the combined effects of zero and span over temperature.

Calibration

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

Bandwidth

-3dB at 50Hz, typical with a 500 ohm load.

Noise Rejection

Common mode: Better than 100dB at 60Hz, typical.
Normal mode: -6dB at 60Hz, typical, 500 ohm load.

LED Indicators

Green, one LED per output channel.
Constant ON indicates power applied.

◆ Environmental

Ambient Temperature

Operating: -25 to 75°C (-13 to 167°F),
[if excitation supplies are used on 632T or 633T
-25 to 60°C (-13 to 140°F)]
Storage: -40 to 85°C (-40 to 185°F)

Relative Humidity

5 to 95%.

Power Requirement

DC-powered units: 12-36V DC SELV.
AC-powered units: 90-250V AC (125V DC $\pm 10\%$)
631T: 1.5 watts without excitation, 2.4 watts with excitation.
632T, 633T: 3.0 watts without excitation, 4.8 watts with excitation.

Isolation

Inputs, outputs, individual channels, power, and excitation supplies 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).

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.

Meets Immunity Standards Per EN50082-1

Electrostatic Discharge (ESD) Immunity
4KV direct contact and 8KV air-discharge to the enclosure port per EN61000-4-2.

Radiated Field Immunity (RFI)

10V/M, 80 to 1000MHz AM and 900MHz keyed carrier, per EN61000-4-3 and ENV50204.

Electrical Fast Transient Immunity (EFT)

2KV to power and 1KV to signal I/O per EN61000-4-4.

Conducted RF Immunity (CRFI)

10Vrms, 150KHz to 80MHz, per EN61000-4-6.

Surge Immunity

0.5KV per EN61000-4-5.

Emissions Per European Norm EN50081-1

Radiated Frequency Emissions
30 to 1000MHz per EN55022 Class B.

Approvals

CE marked, UL & cUL listed.
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.

Ordering Information

◆ Models

[631T-0100](#)

Single channel isolator, AC-powered

[631T-0500](#)

Single channel isolator, DC-powered

[632T-0100](#)

Dual channel isolator, AC-powered

[632T-0500](#)

Dual channel isolator, DC-powered

[633T-0100](#)

Single input with dual isolated output, AC-powered

[633T-0500](#)

Single input with dual isolated output, DC-powered

◆ Accessories (see Page 21)

[PSSR-VD24](#)

Power supply (24V DC, 2.5A).

[TBK-B02](#)

Optional terminal block kit, barrier strip style, 4 pcs.

[TBK-S02](#)

Optional terminal block kit, spring clamp style, 4 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](#)

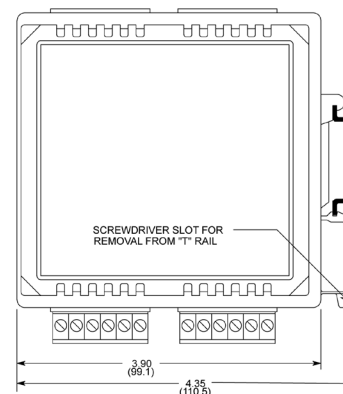
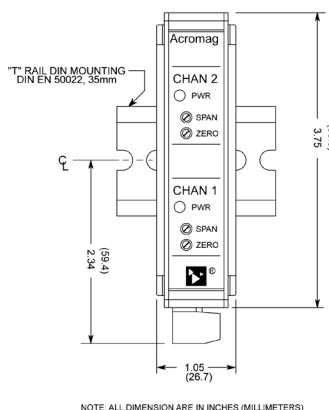
19" rack-mount kit with DIN rail.
Holds sixteen 630T transmitters.

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Isolated Transmitters: 600T Series

651T, 652T, 653T Multi-Channel, Two-Wire Isolators



65XT ISOLATOR
ENCLOSURE DIMENSIONS

DC current input ♦ Single/dual-channel DC-powered isolators ♦ Signal splitter

Description

Models

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

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.

Input / Output Ranges

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

Power Requirement

12 to 36V DC (loop-powered)
Two-wire transmitter

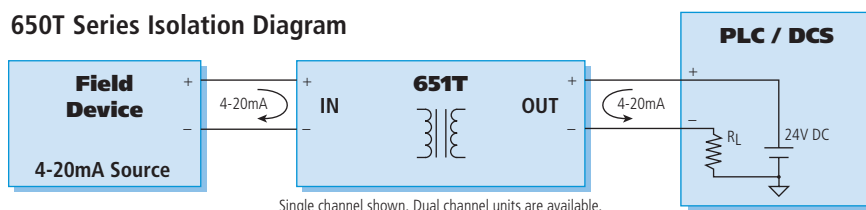
Approvals

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

Key Features & Benefits

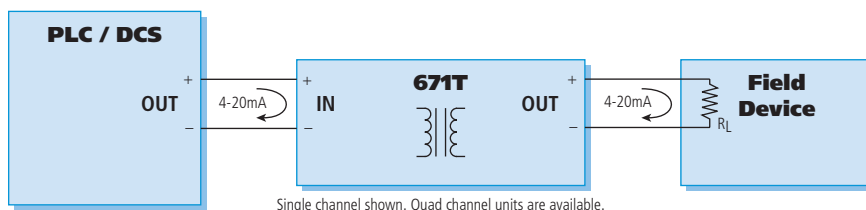
- Two channels in a single unit saves space and reduces costs.
- Signal splitter model (653T) provides two identical outputs from one input signal.
- Galvanic isolation eliminates ground loops, reduces noise, and blocks transient signals.
- Independent channels prevent signal interaction and offer spares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

650T Series Isolation Diagram



Note: 650T series transmitters are for two-wire transmitter interfaces (sinks current).
For application notes using 650T Transmitters, refer to Page 16.

670T Series Isolation Diagram



Note: 670T series transmitters are for output resistive loads only (sources current).
For more information on the 670T Transmitter, refer to Page 14. Application notes are on Page 16.



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Isolated Transmitters: 600T Series



Performance Specifications

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).

$RI = (P_{supply} - 12V) / 0.02$

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 45Hz, 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 & cUL listed.

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 21)

PSSR-VD24

Power supply (24V DC, 2.5A).

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.

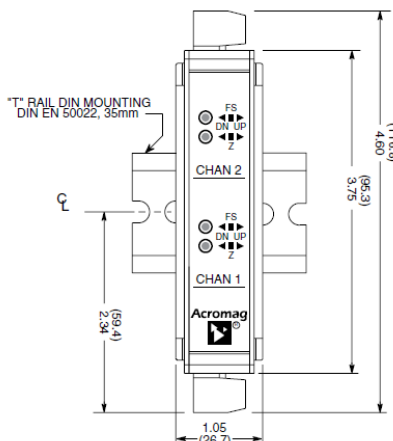


Optional terminal blocks: barrier strip (left) and spring clamp (right). Cage clamp terminal is standard.

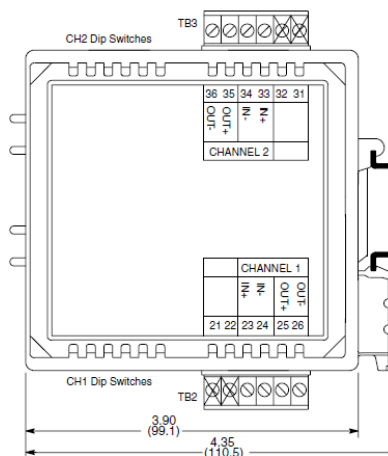


Isolated Transmitters: 600T Series

654T Multi-Channel, Two-Wire Transmitters



NOTE: ALL DIMENSIONS ARE IN INCHES (MILLIMETERS)



DC voltage input ♦ Dual-channel DC-powered transmitters

Description

Models

654T: Dual DC voltage input channels

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.

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

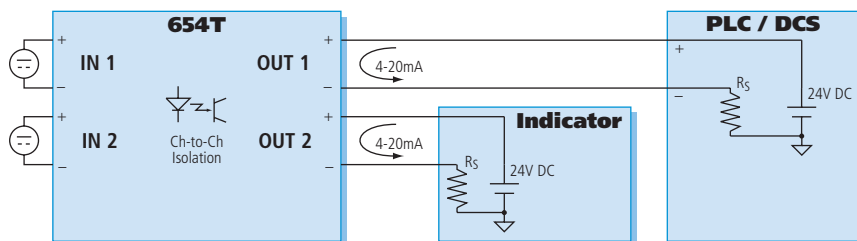
Approvals

UL, cUL listed

Class I; Division 2; Groups A, B, C, D.

Key Features & Benefits

- 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.



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Isolated Transmitters: 600T Series



Performance Specifications

◆ General Input

Analog to Digital Converter (ADC)

16-bit $\Sigma\text{-}\Delta$ 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) $\pm 78\text{mV}$	15mV
B) $\pm 156\text{mV}$	31mV
C) $\pm 313\text{mV}$	62mV
D) $\pm 625\text{mV}$	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 $^{\circ}\text{C}$ ($\pm 0.01\%$ per $^{\circ}\text{F}$).

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°C (-13 to 167°F).

Storage: -40 to 85°C (-40 to 185°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

UL & cUL listed.

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 #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

Dual channel DC voltage 2-wire transmitter.

◆ Accessories (see Page 21)

PS5R-VD24

Power supply (24V DC, 2.5A).

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

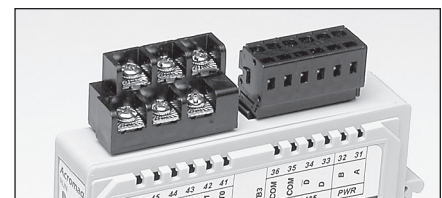
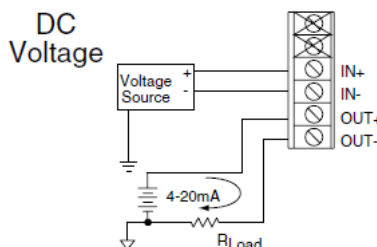
DIN rail strip, Type T, 3 inches (75mm) or 16.7 inches (425mm)

20RM-16-DIN

19" rack-mount kit with DIN rail.

Holds sixteen 650T transmitters.

Input Connections



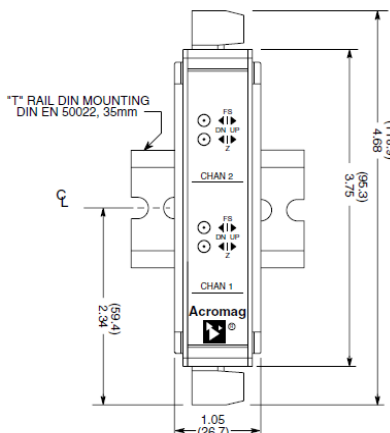
Optional terminal blocks: barrier strip (left) and spring clamp (right). Cage clamp terminal is standard.



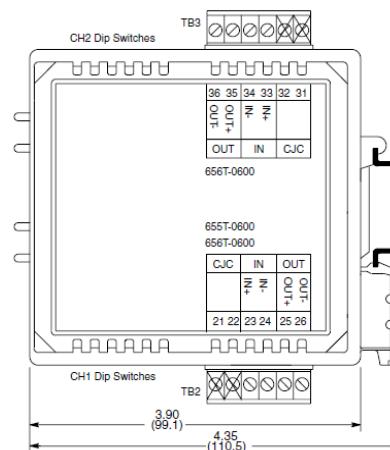


Isolated Transmitters: 600T Series

655T, 656T Multi-Channel, Two-Wire Transmitters



NOTE: ALL DIMENSIONS ARE IN INCHES (MILLIMETERS)



Thermocouple and millivolt input ♦ Single/dual channel loop-powered transmitter

Description

Models

655T: Single TC/mV input channel

656T: Dual TC/mV input channel

These units accept universal thermocouple and millivolt input signals, provide isolation, and output proportional DC current signals. The output can also be linearized to the input sensor signal. Single-channel 655T and dual-channel 656T units are ideal for panel shops and end-users who require a high-density signal conditioner that can cover a broad range of temperature measurement applications.

Configuration is fast and easy. First, you select the input type with a simple DIP switch. Then, you set your zero/full-scale output values using a toggle switch on the front panel to increase or decrease the signal until you read the desired output value on your voltmeter. The toggles make it easy to calibrate a normal (proportional) or reverse-acting (inverse) response in seconds. After setting the desired calibration, just press the mode/set toggle and your configuration settings are safely saved to nonvolatile memory.

Both models provide high-voltage input isolation (output and power circuits share a common). On dual channel units, each channel operates independently, with inputs isolated from each other, to prevent interaction between channels.

Input Ranges

TC types: J, K, T, R, S, E, B, N
(DIP switch selection)

DC voltage: $\pm 15.6\text{mV}$ to $\pm 62.5\text{mV}$, 0 to 1V DC

Output Ranges

4 to 20mA DC

Power Requirement

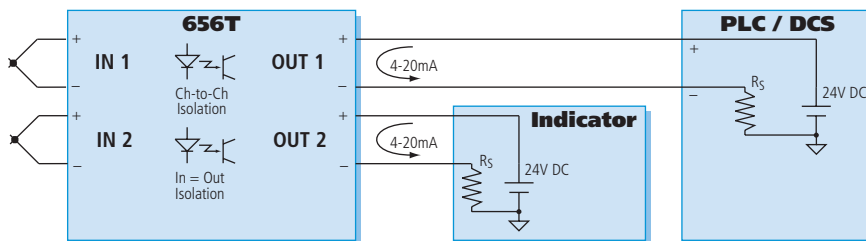
12 to 50V DC (loop-powered)
Two-wire transmitter

Approvals

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

Key Features & Benefits

- Selectable thermocouple input types offer flexibility to fit many applications.
- DIP switch-configuration and self-ranging technologies speed installation without pots, jumpers, or software.
- Linearizer function provides an output that is linear to the temperature or millivolt signal.
- Isolation eliminates ground loops, reduces noise, and blocks transient signals.
- Toggle-switch calibration simplifies field adjustments for faster and easier maintenance.
- Configuration lockout safety feature prevents tampering and accidental changes.
- Reverse-acting output capability enables inverse proportional control signals.
- Dual channel model saves space and reduces equipment costs.
- CJC control only requires a millivolt source to calibrate modules
- High-resolution $\Sigma\text{-}\Delta$ A/D converters deliver superior accuracy for reliable measurements.



Isolated Transmitters: 600T Series



Performance Specifications

◆ General Input

Analog to Digital Converter (ADC)
16-bit S-D A/D converter.

Noise Rejection

Normal Mode: Better than 40dB @ 60Hz.
Common Mode: Better than 100dB @ 60Hz.

Input Overvoltage Protection

Bipolar Transient Voltage Suppressors (TVS).

◆ Thermocouple Input

Input Ranges (switch-selectable)

TC Type	Temperature Range	Accuracy
J	-210 to 760°C (-346 to 1400°F)	±0.5°C
K	200 to 1372°C (-328 to 2502°F)	±0.5°C
T	-260 to 400°C (-436 to 752°F)	±0.5°C
R	-50 to 1768°C (-58 to 3214°F)	±1.0°C
S	-50 to 1768°C (-58 to 3214°F)	±1.0°C
E	-200 to 1000°C (-328 to 1832°F)	±0.5°C
B	260 to 1820°C (500 to 3308°F)	±1.0°C
N	-230 to 1300°C (-382 to 2372°F)	±0.5°C

Span adjust: Full range. 100°C or 3mV minimum span recommended.

Zero adjust: 0 to 90 % of full range.

Thermocouple Linearization

On/off selectable.

Thermocouple Break Detection

TC sensor failure can be configured for either upscale or downscale.

Cold Junction Compensation (CJC) Control

On/off selectable.

◆ Millivolt Input

Input Range

Ranges: ±15.6, ±31.3, ±62.5mV
0 to 0.125, 0.25, 0.5, 1.0V DC
Span adjust: 10 to 100% of range.
Zero adjust: 0 to 90% of range.

◆ Output

Output Range

Range: 4 to 20mA DC, 3.8 to 22mA range typical.

Output Compliance

$R_{load} = (V_{supply} - 12V) / 0.02A$

Output Response Control

Proportional/inverse selectable.

Ambient Temperature Effect

Better than ±0.006% of input span per °C or ±100ppm/°C, whichever is greater.

Output Response Time (for input step change)

700mS typical to 98% of final output value.

◆ Environmental

Ambient Temperature

Operating: -25 to 75°C (-13 to 167°F).
Storage: -40 to 85°C (-40 to 185°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)

Complies with EN61000-4-3 Level 3 and EN50082-1.

Electromagnetic Field Immunity (EMI)

Less than ±0.25% of output span effect.

Electrical Fast Transient (EFT)

Complies with EN61000-4-4 Level 3 and EN50082-1.

Electrostatic Discharge (ESD)

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

Radiated Emissions

Meets or exceeds EN50081-1 for Class B equipment.

Approvals

UL & cUL listed.

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 #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

655T-0600

Single channel TC 2-wire transmitter. Full feature set.

656T-0600

Dual channel TC 2-wire transmitter. Full feature set.

Add "-C" suffix for optional factory configuration.

656T-E600

Dual channel TC 2-wire transmitter. Economy version.
TC Type J, K and 0-125mV input ranges only.
No linearization. No inverse output (proportional only).

Accessories (see Page 21)

P55R-VD24

Power supply (24V DC, 2.5A).

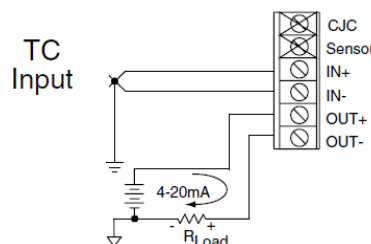
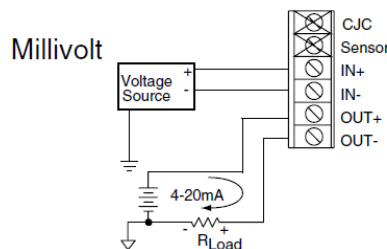
DIN RAIL 3.0

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 series transmitters.

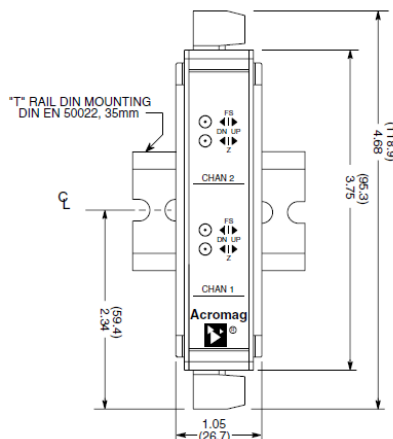


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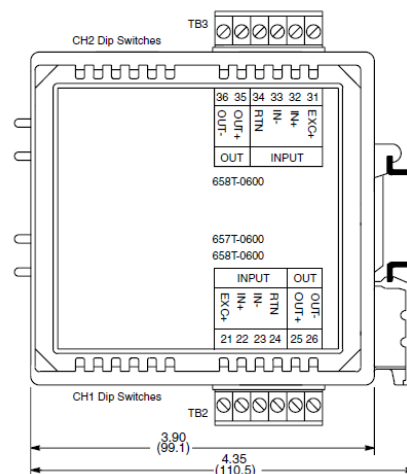


Isolated Transmitters: 600T Series

657T, 658T Multi-Channel, Two-Wire Transmitters



NOTE: ALL DIMENSIONS ARE IN INCHES (MILLIMETERS)



RTD / resistance input ♦ Single/dual channel loop-powered transmitter

Description

Models

657T: Single RTD input channel

658T: Dual RTD input channels

These units accept universal RTD or resistance input signals and output proportional DC current signals. The output can also be linearized to the input sensor signal. Single-channel 657T and dual-channel 658T units are ideal for panel shops and end-users who require a high-density signal conditioner that can accommodate a broad range of temperature measurement applications.

Configuration is fast and easy. First, you select the input type with a simple DIP switch. Then, you set your zero/full-scale output values using a toggle switch on the front panel to increase or decrease the signal until you read the desired output value on your voltmeter. The toggles make it easy to calibrate a normal (proportional) or reverse-acting (inverse) response in seconds. After completing the calibration, just press the mode/set toggle and your configuration settings are safely saved to nonvolatile memory.

Input Ranges

RTD: 100 ohm Pt, 120 ohm Ni, 10 ohm Cu
Resistance: 0 to 500 ohms

Output Range

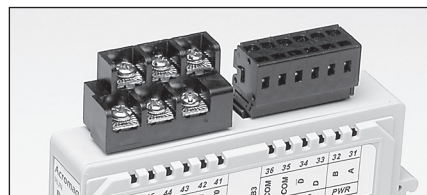
4 to 20mA DC

Power Requirement

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

Approvals

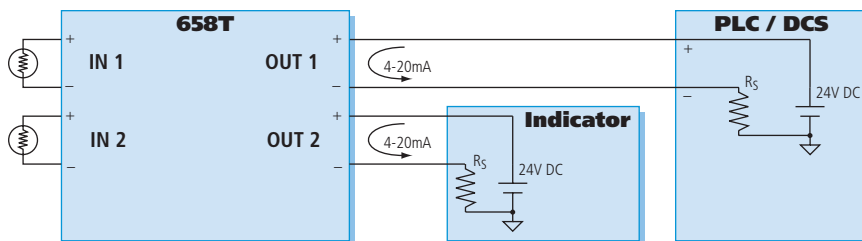
UL, cUL listed
Class I; Division 2; Groups A, B, C, D.



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

Key Features & Benefits

- Selectable RTD input types offer flexibility to fit many applications.
- DIP switch-configuration and self-ranging technologies speed installation without pots, jumpers, or software.
- Toggle-switch calibration simplifies field adjustments for faster and easier maintenance.
- Configuration lockout safety feature prevents tampering and accidental changes.
- Reverse-acting output capability enables inverse proportional control signals.
- Dual channel model saves space and reduces equipment costs.
- High-resolution Σ - Δ A/D converters deliver superior accuracy for reliable measurements.
- Lead break detection supports upscale or downscale failsafe mode.



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Isolated Transmitters: 600T Series



Performance Specifications

◆ General Input

Analog to Digital Converter (ADC)
16-bit S-D A/D converter.

Noise Rejection

Normal Mode: Better than 40dB @ 60Hz.
Common Mode: Better than 100dB @ 60Hz.

Input Overvoltage Protection

Bipolar Transient Voltage Suppressors (TVS).

Input Impedance

400K ohm at 10mV span;
input current, $\pm 25\text{nA}$, typical ($\pm 30\text{nA}$, max.).

◆ RTD Input

RTD Input Ranges

100 Ohm μs , 120 Ω Ni, or 10 Ω Cu; user-configured.

RTD	°C Range (°F Range)	Accuracy
Pt1	-200 to 850°C (-328 to 1562°F)	$\pm 0.25^\circ\text{C}$
Pt2	-200 to 850°C (-328 to 1562°F)	$\pm 0.25^\circ\text{C}$
Ni	-80 to 320°C (-112 to 608°F)	$\pm 0.25^\circ\text{C}$
Cu	200 to 260°C (-328 to 500°F)	$\pm 1.00^\circ\text{C}$

Alpha: Pt1 ($\alpha = 1.3850$), Pt2 ($\alpha = 1.3911$),
Ni $\alpha = 1.6720$, Cu ($\alpha = 1.4272$).

2, 3, or 4-wire configurations supported. Module provides sensor excitation, linearization, lead-wire compensation, and sensor break detection.

RTD Excitation Current

0.5mA DC typical, all types.

RTD Lead-Wire Compensation

25 ohms per lead.

RTD Break Detection

Configurable for either upscale or downscale.

◆ Resistance Input

Resistance Input Range

0 to 500 ohms.

Resistance Accuracy

± 0.05 ohms.

◆ Output

Output Range

Range: 4 to 20mA DC, 3.8 to 22mA range typical.

Output Compliance

$R_{\text{load}} = (V_{\text{supply}} - 12V) / 0.02A$

Output Response Control

Proportional/inverse selectable.

Ambient Temperature Effect

Better than $\pm 0.006\%$ of input span per $^\circ\text{C}$ or $\pm 100\text{ppm}/^\circ\text{C}$, whichever is greater.

Output Response Time (for input step change)

700mS typical to 98% of final output value.

◆ Environmental

Ambient Temperature

Operating: -25 to 75°C (-13 to 167°F).

Storage: -40 to 85°C (-40 to 185°F).

Relative Humidity

5 to 95%, noncondensing.

Power Requirement

12 to 50V DC @ 25mA for each output channel.

Isolation

Not isolated.

Radiated Field Immunity (RFI)

Complies 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 and EN50082-1.

Electrostatic Discharge (ESD)

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

Radiated Emissions

Meets or exceeds EN50081-1 for Class B equipment.

Approvals

UL & cUL listed.

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 #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

657T-0600 (add "-C" for factory calibration)
Single channel RTD 2-wire transmitter

658T-0600 (add "-C" for factory calibration)
Dual channel RTD 2-wire transmitter

Add "-C" suffix for optional factory configuration.

◆ Accessories (see Page 21)

PSSR-VD24

Power supply (24V DC, 2.5A).

TBK-B01

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

TBK-S01

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

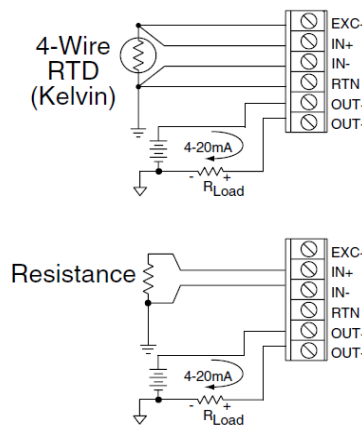
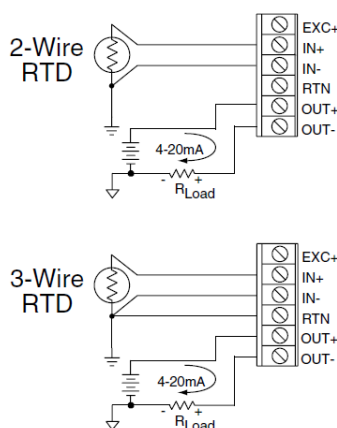
DIN RAIL 3.0

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.

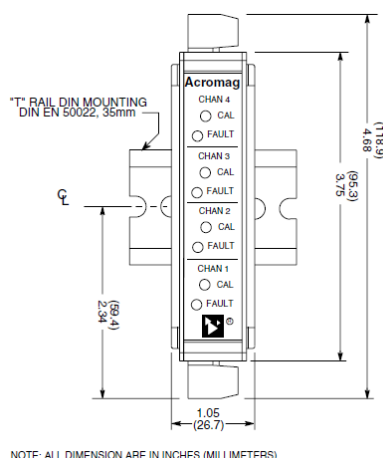


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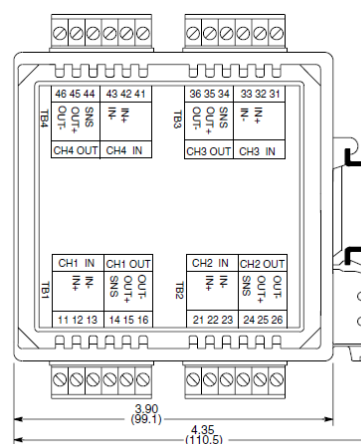


Isolated Transmitters: 600T Series

671T, 672T, 674T Multi-Channel, Two-Wire Isolators



NOTE: ALL DIMENSIONS ARE IN INCHES (MILLIMETERS)



DC current input ♦ Single, dual, or quad I/O loop-powered isolators

Description

Models

671T: Single I/O channel

672T: Dual I/O channel

674T: Quad I/O channel

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. Fault LEDs identify output open loop conditions and load compliance problems. The precision 10 ohm sense resistor enables monitoring of the output signal without disturbing field wiring.

Input / Output Ranges

4 to 20mA DC input

4 to 20mA DC output

Power Requirement

Loop-powered

(power derived from input signal current)

Approvals

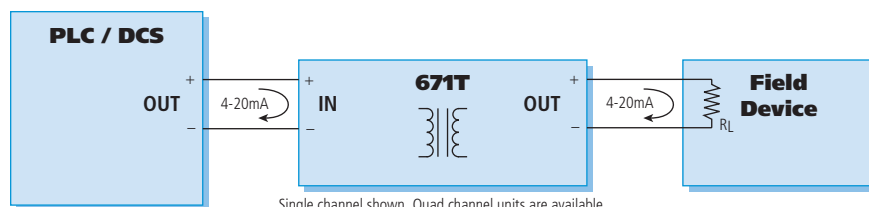
CE marked. UL, cUL listed.

Class I; Division 2; Groups A, B, C, D

Key Features & Benefits

- Multiple channels on a single unit saves space and reduces costs.
- Galvanic isolation eliminates ground loops, reduces noise, and blocks transient signals.
- Independent channels prevent signal interaction and offer spares for later use.
- Fault LEDs provide a clear visual warning of open or failed process loops.
- Single calibration pot per channel enables one-step, precise calibration.

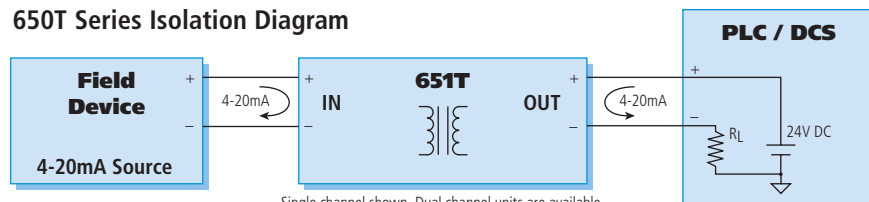
670T Series Isolation Diagram



Single channel shown. Quad channel units are available.

Note: 670T series transmitters are for output resistive loads only (sources current). For application notes using 670T Transmitters, refer to Page 16.

650T Series Isolation Diagram



Single channel shown. Dual channel units are available.



Tel: 248-295-0880 ■ sales@acromag.com ■ www.acromag.com ■ 30765 S Wixom Rd, Wixom, MI 48393 USA

Isolated Transmitters: 600T Series



Performance Specifications

IMPORTANT: The 671T transmitter is an input loop powered current isolator. Its input voltage burden is normally a function of its output voltage drop and is computed as $4.9V + I_{out} \times R_{out}$. If the output load resistance R_{out} is excessive relative to the input loop voltage, or R_{out} is open-circuited, the input voltage burden may increase up to the limit of available input loop voltage. Consequently, if there are any loop-powered transmitters connected in series in the 671T input loop, this output loop fault can pinch-off excess input loop voltage, reducing the available voltage to power any series-connected transmitters in the loop, potentially causing them to lose regulation of the input loop current. You could select a different current isolator than 671T, or a different series transmitter that is separately powered to avoid this fault condition.

Reference Test Conditions

Input/Output current: 4 to 20mA; output load 250 ohms; 77°F (25°C).

Input

4 to 20mA input (each channel).

Input burden

The voltage drop is a function of the input current and load resistance and is calculated as follows:

Input Voltage Drop = $4.9V DC + (0.0212A \times R_{load})$

Example:

For $R_{load} = 250$ ohms, $V_{drop} = 10.2V DC$

Output

4-20mA DC output (each channel).

Output load

0 to 525 ohms.

Accuracy

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

Calibration

One 15-turn potentiometer per channel accessible from front of the unit.

Ambient temperature effect

Less than $\pm 0.01\%$ of output span per °F ($\pm 0.018\%$ per °C) over the ambient temperature range for reference test conditions. This specification includes the combined effects of zero and span over temperature.

Output ripple

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

Bandwidth

-3dB at 2.2Hz, typical.

Response time

For a step input, the output reaches 98% of output span in less than 300ms, typical, into 250 ohms.

Noise rejection

Common mode: 110dB at 60Hz, typical.

Diagnostics

LED fault indicator: Lights for output open loop detection 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 with a voltmeter.

◆ 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

Power is derived from the input signal loop. In the event of an open output circuit, the input loop voltage drop is limited below 20V, nominal. Isolator has reverse polarity protection.

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 (10V/m, 80 to 1000MHz AM and 900MHz keyed) 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.

Electrical Fast Transient (EFT)

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

Surge Immunity

Complies with EN61000-4-5 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 & cUL listed.

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 118.9H x 110.5D millimeters.

Shipping Weight

1 pound (0.45 Kg) packed.

Ordering Information

◆ Models

671T-0600

Single channel isolated transmitter

672T-0600

Dual channel isolated transmitter

674T-0600

Quad channel isolated transmitter

◆ Accessories (see Page 21)

PSSR-VD24

Power supply (24V DC, 2.5A).

TBK-B01

Optional terminal block kit, barrier strip style, 2 pcs. (For use with 671T and 672T model.s)

TBK-B02

Optional terminal block kit, barrier strip style, 4 pcs. (For use with 674T model.)

TBK-S01

Optional terminal block kit, spring clamp style, 2 pcs. (For use with 671T and 672T model.s)

TBK-S02

Optional terminal block kit, spring clamp style, 4 pcs. (For use with 674T model.)

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 670T transmitters.

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Isolated Transmitters: 600T Series

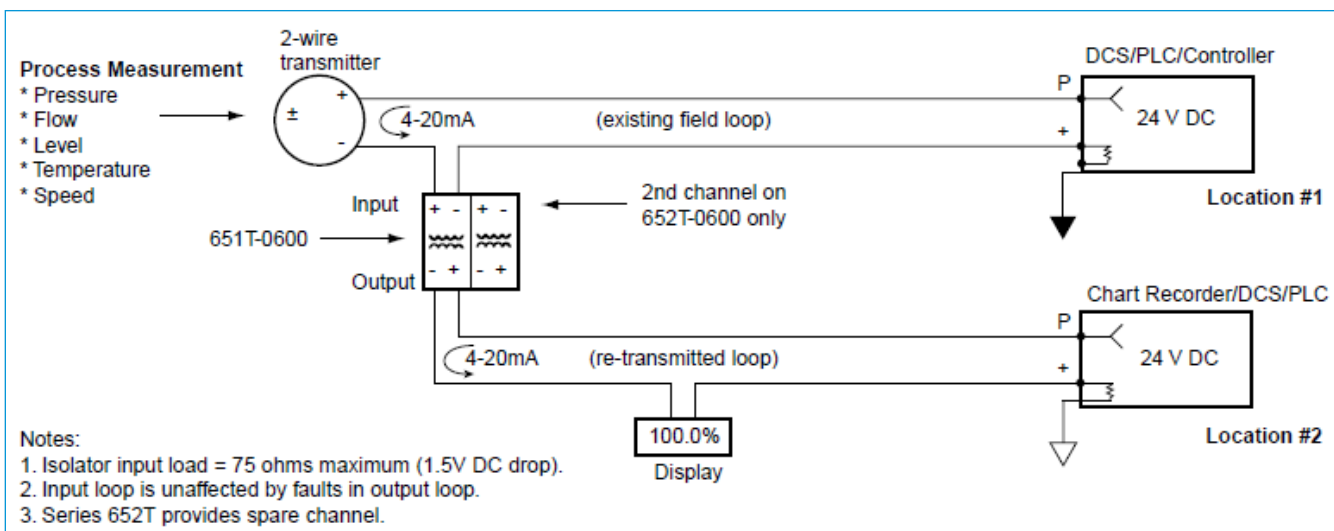
Application Notes

Application 1

Retransmitting a signal from a two-wire loop to a second location.

Solution

Use either a model 651T-0600 (single channel) or 652T-0600 (dual channel) transmitter.

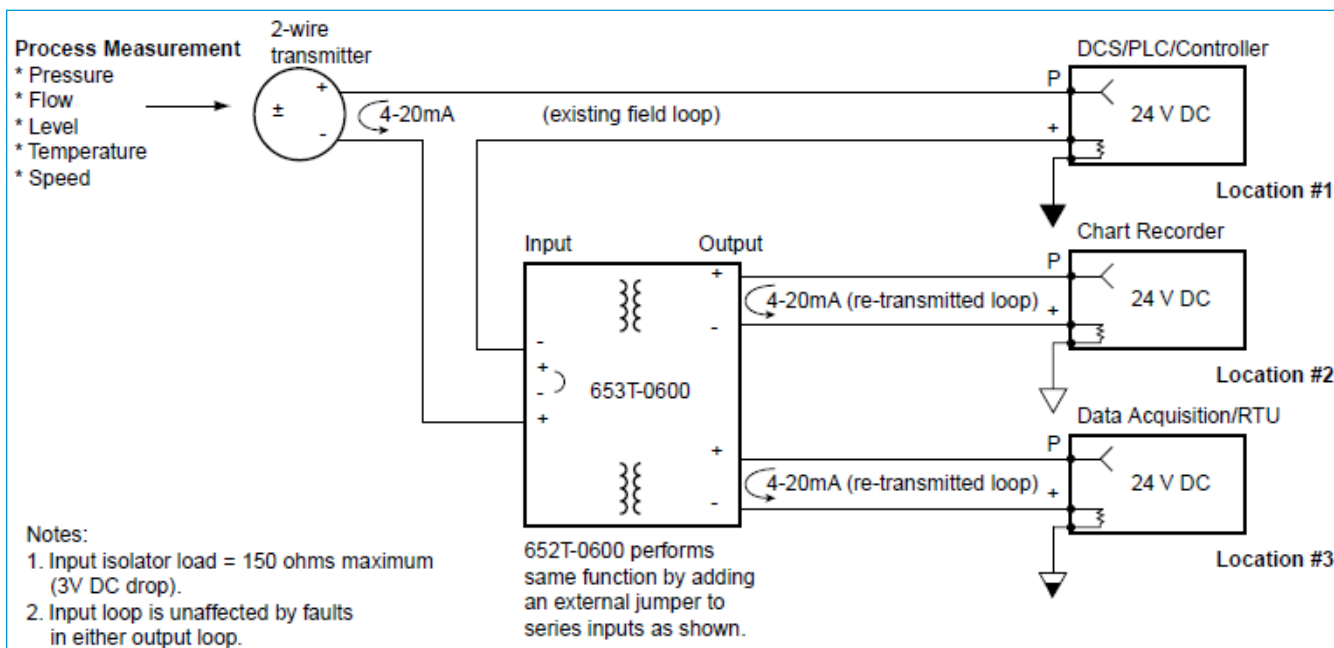


Application 2

Splitting a signal from a two-wire loop: two outputs for different locations.

Solution

Use either a 653T-0600 (single input, dual output) or 652T-0600 (dual input, dual output) unit.



Isolated Transmitters: 600T Series



Application Notes

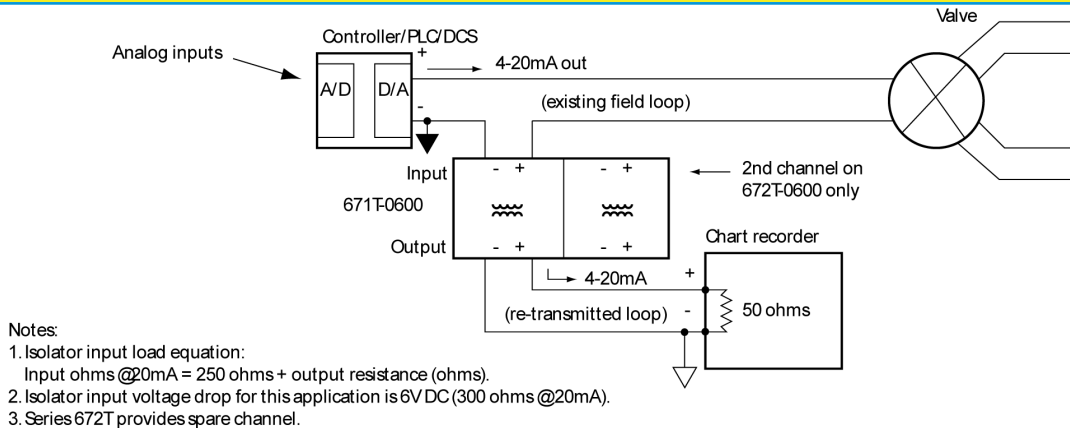
Application 3

Retransmitting a signal output from a controller or a D/A card.

Solution

Use either a model 671T-0600 (single channel) or 672T-0600 (dual channel) transmitter.

IMPORTANT: The 671T transmitter is an input loop powered current isolator. Its input voltage burden is normally a function of its output voltage drop and is computed as $4.9V + I_{out} \times R_{out}$. If the output load resistance R_{out} is excessive relative to the input loop voltage, or R_{out} is open-circuited, the input voltage burden may increase up to the limit of available input loop voltage. Consequently, if there are any loop-powered transmitters connected in series in the 671T input loop, this output loop fault can pinch-off excess input loop voltage, reducing the available voltage to power any series-connected transmitters in the loop, potentially causing them to lose regulation of the input loop current. You could select a different current isolator than 671T, or a different series transmitter that is separately powered to avoid this fault condition.

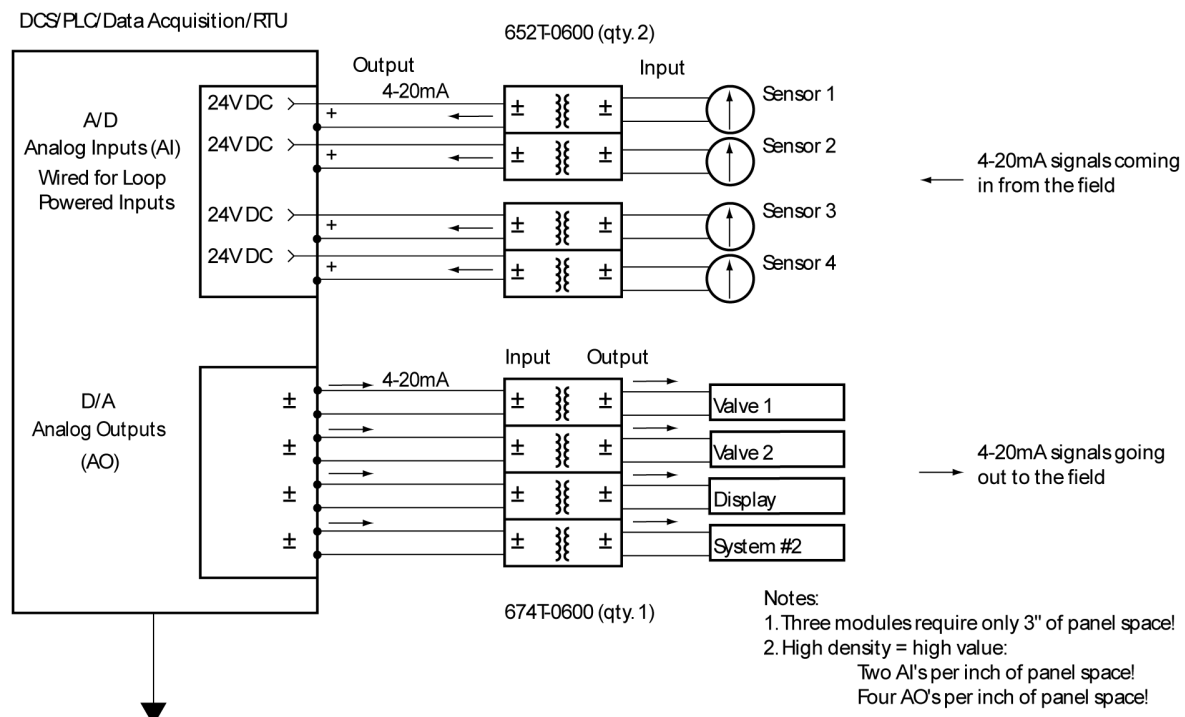


Application 4

Low-cost, channel-to-channel isolation of 4-20mA signals for controllers.

Solution

Use either a 652T-0600 (dual channel) for A/D cards or a 674T-0600 (quad channel) for D/A cards.



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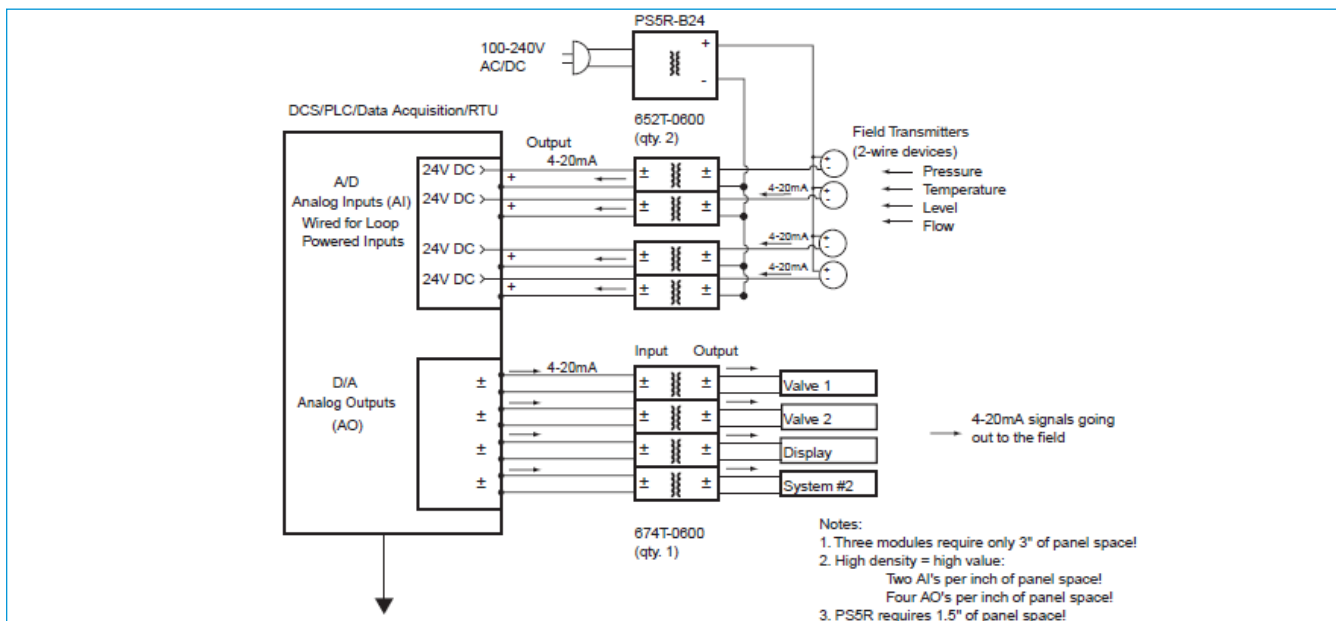
600T Application Notes

Application 5

Powering field transmitters (2-wire) and providing low-cost isolation of 4-20mA signals for controllers.

Solution

Model 652T-0600
Model 674T-0600
Model PS5R-SB24

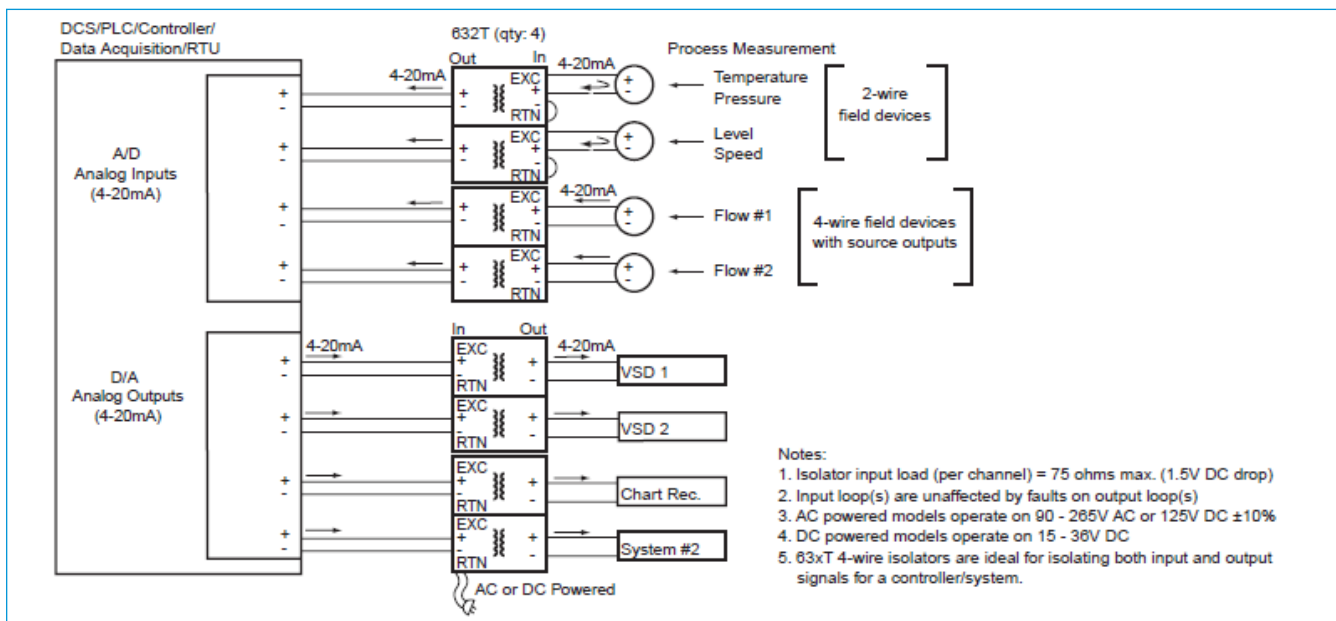


Application 6

Require 4-wire isolators for input and output signals for controller. Built-in excitation supply needed for some field 2-wire devices.

Solution

Model 632T-0100 (dual channel, AC powered) or
Model 632T-0500 (dual channel, DC powered).
Model 631T for single channel 4-wire isolators.



Isolated Transmitters: 600T Series



630T Application Notes

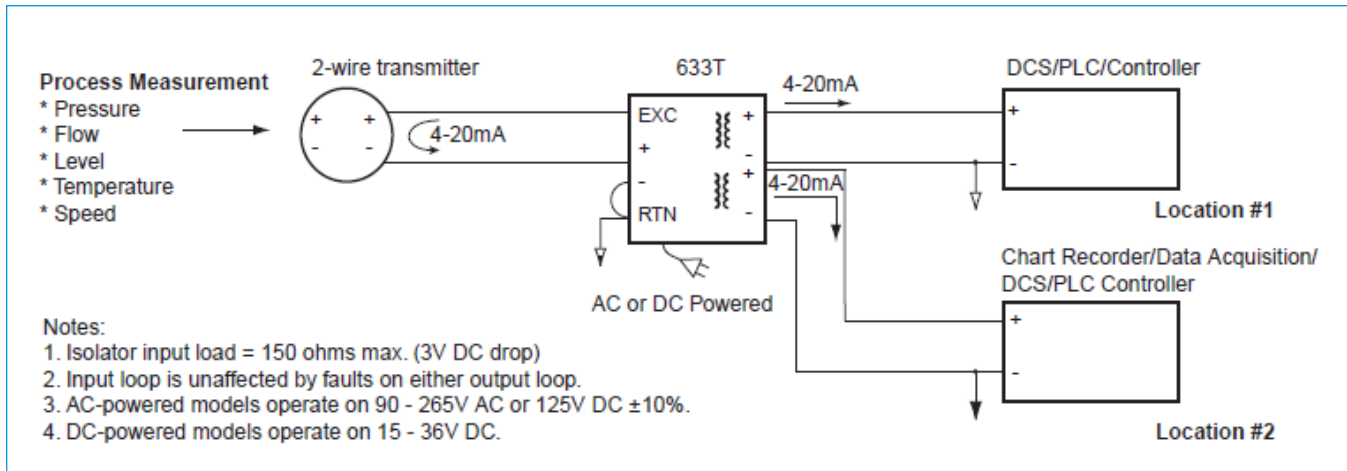
Application 7

Require a 4-wire isolator "splitter" to excite a field device and re-transmit 4-20mA to two locations.

Solution

Model 633T-0100 (AC powered) or
Model 633T-0500 (DC powered).

Use additional 633T units for re-transmitting to more locations. Install inputs in series with primary 4-20mA loop or the re-transmitted loops as required.

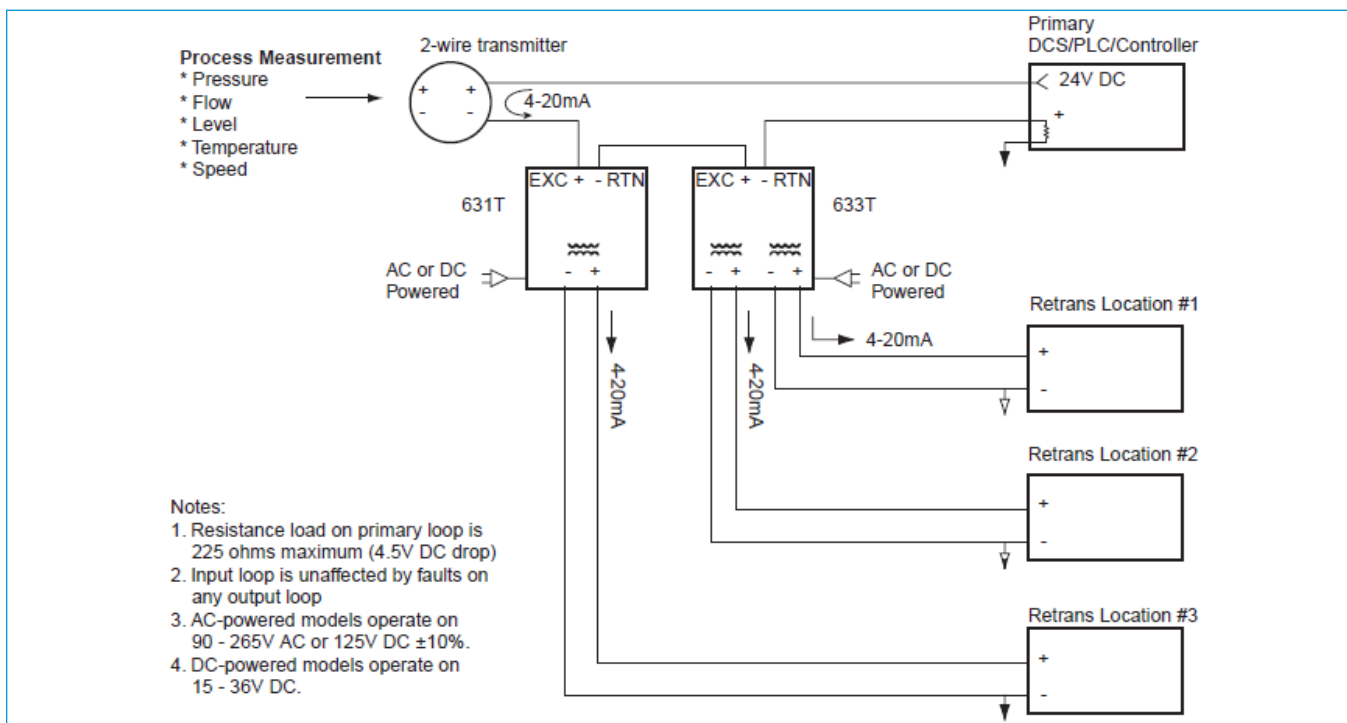


Application 8

Require 4-wire isolators to retransmit a 4-20mA signal to three locations.

Solution

Model 633T-0x00 (splitter) and
Model 631T-0x00 (one channel isolator).
(Where x = 1 or 5 for AC or DC power)



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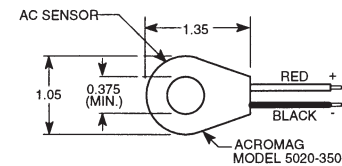


Isolated Transmitters: 600T Series

5020-350 Application Notes

1/24
HOUR
STOCK ITEM

2
YEAR
WARRANTY



Using Acromag's AC current sensor Model 5020-350

Many Acromag instruments with DC current input can be used in conjunction with an external AC Current Sensor to precondition an AC current input signal. This sensor is a highly accurate toroidal instrument transformer that converts an AC current signal to a safe, low-level, DC milliamper signal (0 to 11.17mA).

The transmitters only accept the isolated low-level signal produced by the AC current sensing transformer and cannot be connected directly to the source of AC power without damage or safety risk. The AC Current Sensor is fully insulated and designed for mounting near the source of the AC current. The input AC current range is a simple function of the number of turns placed on the AC Current Sensor (see the table below). The benefits to using an external sensor (external from the transmitter) include the following:

◆ Low losses:

It is not practical to run AC currents over long distances because of significant resistance voltage drops at high currents. The low-level DC milliamper signal output from the AC Current Sensor can be transmitted safely over long distances, allowing the transmitter to be remotely located from the AC power wiring.

◆ Safety:

The AC Current Sensor's output leads can be open or short circuited and these conditions do not affect the AC current loop or cause damage to the sensor. Likewise, the wires connecting the AC Current Sensor to the transmitter can be easily removed from the transmitter's input terminals without concern or hazard.

◆ Ease of Calibration:

The AC current input range can be easily scaled in the field by simply changing the number of primary turns at the sensor, with no additional calibration required. That is, the AC current input span is a simple function of the number of primary turns placed on the AC Current Sensor and sensor/transmitter calibration is not affected by this. Refer to Applications "A" & "B" of the diagrams on the next page.

Sensor Primary Turns	AC Current Input Range	Sensor Output (red/black wires)
1	0 to 20 Amps AC	0 to 11.17mA DC
2	0 to 10 Amps AC	0 to 11.17mA DC
4	0 to 5 Amps AC	0 to 11.17mA DC
10	0 to 2 Amps AC	0 to 11.17mA DC
20	0 to 1 Amps AC	0 to 11.17mA DC

The AC Current Sensor is isolated and can be used in AC circuits up to 250V AC, 50 or 60 Hz. It is designed to be mounted at the source of the AC current to be measured. The transmitter can be located remotely from the AC signal and wired using small gauge wire. The sensor's output wires can be shorted, open-circuited, or removed from the transmitter's input terminals, without hazard to personnel or the AC Current Sensor.

DANGER:

If the AC Current Sensor is used with an AC Current Transformer (C.T.), disconnect power to the C.T., or short the output of the C.T., before removing the wire going through the AC Current Sensor. If this is not done, an open circuited C.T. will generate high voltages (hazardous) and possible C.T. damage.

The output wires of the sensor are polarized: the Red wire is (+) plus and the Black wire is (-) minus. Normally, these output wires are attached to one end of a cable (user supplied) and the other end connects to the transmitter's input. Connect the Current Sensor output leads to the transmitter input by connecting Red (+) to the transmitter's plus (+) terminal, and Black (-) to the transmitter's minus (-) terminal. Proper polarity must be observed.

WARNING:

The input to the module can only come from the AC Current Sensor output wires (red/black). If AC current is directly attached to the transmitter's input terminals, the transmitter will be destroyed and safety compromised.

For most applications, it is recommended that the minus (-) transmitter input terminal be connected to an earth ground. The connections between the AC Current Sensor would be floating if not grounded. Grounding eliminates the risk of high common-mode voltages from showing up on the wires and reduces noise pickup.

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Isolated Transmitters: 600T Series



Accessories

◆ Terminal Blocks

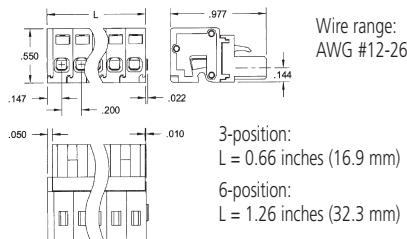
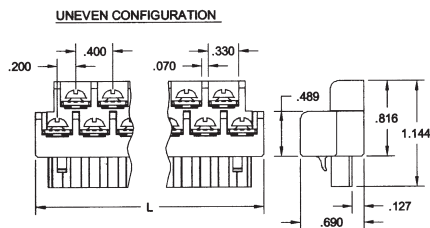


Barrier Strip Terminal Blocks*

Spring Clamp Terminal Blocks*

Ordering Information

* I/O modules ship with cage clamp terminal blocks. Terminal block kits are for replacement purposes. See I/O module information for compatibility



Barrier Strip

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

TBK-S01

Terminal block kit, two 6-position pieces

TBK-S02

Terminal block kit, four 6-position pieces

TBK-S03

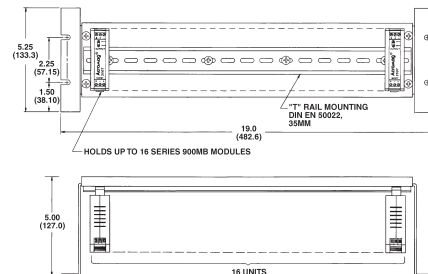
Terminal block kit, one 3-position and three 6-position pieces

◆ 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

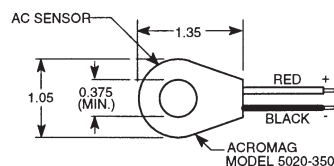
19" rack-mount kit with DIN rail.

DIN RAIL 3.0

DIN RAIL 16.7

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

◆ AC Current Sensor



This external sensor measures a 0-20A AC signal and provides a DC mA output for an Ethernet input module. It enables remote mounting of the I/O module for safe monitoring of the AC signal.

Ordering Information

5020-350

AC current sensor

◆ Power Supplies



60W Universal Slimline Power Supply

Input Power Requirement
85 to 264V AC or 100 to 370V DC

Output
24V DC, 2.5A (60W)

Ordering Information

PS5R-VD24

Universal 60W power supply

Visit www.acromag.com for additional models and more information.

◆ Cables

STRAIGHT CAT5 CABLE



CONNECTS 900EN-S005 SWITCH TO 900EN ETHERNET I/O MODULE

Ordering Information

5035-355

Ethernet straight cable, CAT5, 3 feet long, shielded

5035-360

Ethernet crossover cable, CAT5E, 5 feet long, shielded

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