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 for 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.

600T Series

Isolated Transmitters

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Channel Configurations

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<tr>
<td>Single channel units</td>
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<td>Dual channel units</td>
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<tr>
<td>Splitter (one input, two outputs)</td>
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Power Configurations

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<td>Input loop-powered</td>
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<tr>
<td>Output loop-powered (2-wire transmitter)</td>
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<tr>
<td>AC-powered</td>
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<tr>
<td>DC-powered</td>
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Inputs

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<tr>
<td>DC voltage input</td>
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<td>DC current input</td>
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<td>Thermocouple/millivolt input</td>
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<tr>
<td>RTD/resistance input</td>
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<td>AC current input</td>
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Outputs

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<td>DC voltage</td>
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Isolation Configurations

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<td>Input from output/power</td>
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<tr>
<td>Output from input/power</td>
<td>x</td>
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<td>x</td>
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<tr>
<td>3-way (input/output/power)</td>
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</table>
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 proportion-al 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.

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.
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).

◆ DC Current Input
DC Current Input Range
±100mA DC with full range capability.
Minimum recommended span is ±4mA.

DC Current Input Impedance
10 ohms.

DC Current Input Accuracy
Better than ±0.1% of output span.

◆ DC Voltage Input
DC Voltage Input Range
±100V DC with full range capability.
Minimum recommended span is ±40mV.

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

DC Voltage Input Accuracy
Better than ±0.1% of output span.

◆ AC Current Input (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 ±0.5% of output span.

◆ 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 ±0.1% of span for nominal output ranges of 0 to 10V or 0 to 20mA.

Ambient Temperature Effect
Better than ±0.018% of output span per °C or ±1µV, 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 ±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)

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)
PS5R-SD24
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.

Tel: 248-295-0880 ■ Fax: 248-624-9234 ■ sales@acromag.com ■ www.acromag.com ■ 30765 S Wixom Rd, Wixom, MI 48393 USA
**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.

**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.

**Input / Output Ranges**
- 4 to 20mA DC input
- 4 to 20mA DC output

**Power Requirement**
- 15-36V DC
- 90-250V AC (125V DC ±10%)

**Isolated Transmitters: 600T Series**
- Tel: 248-295-0880
- Fax: 248-624-9234
- sales@acromag.com
- www.acromag.com
- 30765 S Wixom Rd, Wixom, MI 48393 USA
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 ±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 ±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 ±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
±0.05% of output span. Error includes the combined effects of isolator repeatability, hysteresis, terminal point linearity and adjustment resolution.

Temperature Drift
Better than ±50ppm/°C (±0.005%/°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: -60dB 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: 15-36V DC SELV.
AC-powered units: 90-250V AC (125V DC ±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 ±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)
10kVrms, 150kHz to 80MHz, per EN61000-4-4.

Surge Immunity
0.5kV per EN61000-4-5.

Emissions Per European Norm EN50081-1
Radiated Frequency Emissions
30 to 1000MHz per EN50502 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)
PS5R-SD24 Power supply (24V DC, 2.5A).
TBK-802 Optional terminal block kit, barrier strip style, 4 pcs.
TBK-502 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)

Tel: 248-295-0880 Fax: 248-624-9234 sales@acromag.com www.acromag.com 30765 S Wixom Rd, Wixom, MI 48393 USA
**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

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**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

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**650T Series Isolation Diagram**

- **Field Device**
- **4-20mA Source**
- **IN**
- **65TT**
- **OUT**

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 16.

**670T Series Isolation Diagram**

- **PLC / DCS**
- **OUT**
- **IN**
- **67TT**
- **OUT**

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 14. Application notes are on Page 16.

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**Contact**

Tel: 248-295-0880  ■  Fax: 248-624-9234  ■  sales@acromag.com  ■  www.acromag.com  ■  30765 S Wixom Rd, Wixom, MI 48393 USA
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).

Output compliance
Psupply = 12V + (0.02 x Rload)

Output limiting
Outputs are limited to 36mA.

Output ripple
Less than ±0.1% of the maximum output span.

Accuracy
±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 ±0.006% of input span per °F (±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 ±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)
PS5R-SD24
Power supply (24V DC, 2.5A).

TBRK-801
Optional terminal block kit, barrier strip style, 2 pcs.

TBRK-501
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

Optional terminal blocks: barrier strip (left) and spring clamp (right). Cage clamp terminal is standard.
654T Multi-Channel, Two-Wire 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: ±78mV to ±625mV (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 Σ-Δ A/D converters deliver superior accuracy for more reliable measurements.
- Built-in transient voltage suppressors protect circuitry from electrical interference.
Performance Specifications

◆ General Input
Analog to Digital Converter (ADC)
16-bit S-D 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  Recommended
  Range Minimum Span (10%)

A) ±75mV 15mV
B) ±156mV 31mV
C) ±313mV 62mV
D) ±625mV 124mV
E) 0 to 1.25V 25mV
F) 0 to 2.5V 50mV
G) 0 to 5V 100mV
H) 0 to 10V 200mV

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
Load = (Supply - 12V) / 0.02A
600 ohms at 24V DC supply

Output Response Control
Proportional/inverse selectable.

Ambient Temperature Effect
Better than ±0.018% of input span per °C (±0.01% per °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)
±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 ±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)

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.
Add “-C” suffix for optional factory configuration.

◆ Accessories (see Page 21)
PSSR-SD24
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
DC Voltage

Input Source
IN+
IN-
OUT+
OUT-

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

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**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: ±15.6mV to ±62.5mV, 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 Σ-Δ A/D converters deliver superior accuracy for reliable measurements.

---

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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)

<table>
<thead>
<tr>
<th>TC Type</th>
<th>Temperature Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>-210 to 760°C (-346 to 1400°F)</td>
<td>±0.5°C</td>
</tr>
<tr>
<td>K</td>
<td>200 to 1372°C (-328 to 2502°F)</td>
<td>±0.5°C</td>
</tr>
<tr>
<td>T</td>
<td>-260 to 400°C (-436 to 752°F)</td>
<td>±0.5°C</td>
</tr>
<tr>
<td>R</td>
<td>-50 to 1768°C (-58 to 3214°F)</td>
<td>±1.0°C</td>
</tr>
<tr>
<td>S</td>
<td>-50 to 1768°C (-58 to 3214°F)</td>
<td>±1.0°C</td>
</tr>
<tr>
<td>E</td>
<td>-200 to 1000°C (-328 to 1832°F)</td>
<td>±0.5°C</td>
</tr>
<tr>
<td>B</td>
<td>260 to 1200°C (500 to 2122°F)</td>
<td>±1.0°C</td>
</tr>
<tr>
<td>N</td>
<td>-230 to 400°C (-382 to 752°F)</td>
<td>±0.5°C</td>
</tr>
</tbody>
</table>

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
0.0 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
RL = (Vsupply - 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.

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

Accessories (see Page 21)
PS5R-SD24
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

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

Connectors (Removable Terminal Blocks)

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)
PS5R-SD24
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
**657T, 658T** Multi-Channel, Two-Wire Transmitters

**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.

**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 S-D A/D converters deliver superior accuracy for reliable measurements.
- Lead break detection supports upscale or downscale failsafe mode.

---

**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.
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- Lead break detection supports upscale or downscale failsafe mode.

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**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.

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**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 S-D A/D converters deliver superior accuracy for reliable measurements.
- Lead break detection supports upscale or downscale failsafe mode.

---

**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 S-D A/D converters deliver superior accuracy for reliable measurements.
- Lead break detection supports upscale or downscale failsafe mode.
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, ±25nA, typical (±30nA, max.).

**RTD Input**

RTD Input Ranges

- 100W Pt, 120W Ni, or 10W Cu; user-configured.
- RTD °C Range (°F Range) Accuracy
  - Pt1 -200 to 850°C (-328 to 1562°F) ±0.25°C
  - Pt2 -200 to 850°C (-328 to 1562°F) ±0.25°C
  - Ni -80 to 320°C (-112 to 608°F) ±0.25°C
  - Cu -200 to 260°C (-328 to 500°F) ±1.00°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

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

Output Response Control

Proportional/inverse selectable.

**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 ±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.

**Connectors (Removable Terminal Blocks)**


**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)**

- PS5R-SD24
  - Power supply (24V DC, 2.5A).
- TBK-801
  - 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

**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.

**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**

**PLC / DCS**

\[ \text{OUT} \rightarrow 4-20\text{mA} \rightarrow \text{IN} \rightarrow 4-20\text{mA} \rightarrow \text{OUT} \]

**Field Device**

\[ \text{IN} \rightarrow 4-20\text{mA} \rightarrow \text{OUT} \]

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**

**Field Device**

\[ 4-20\text{mA} \rightarrow \text{IN} \rightarrow 4-20\text{mA} \rightarrow \text{OUT} \]

**PLC / DCS**

\[ \text{OUT} \rightarrow 24V \text{DC} \rightarrow \text{IN} \rightarrow 4-20\text{mA} \]

Single channel shown. Dual channel units are available.

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Performance Specifications

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 x Rload)
Example:
For Rload = 250 ohms, Vdrop = 10.2V DC

Output
4-20mA DC output (each channel).

Output load
0 to 525 ohms.

Accuracy
Better than ±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 ±0.01% of output span per °F (±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 ±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.

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)
PS5R-SD24 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.)
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)

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 ±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.

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)
PS5R-SD24 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.)
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)
**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.

**Process Measurement**
- Pressure
- Flow
- Level
- Temperature
- Speed

**Diagram**

**Notes:**
1. Isolator input load = 75 ohms maximum (1.5V DC drop).
2. Input loop is unaffected by faults in output loop.
3. Series 652T provides spare channel.

**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.

**Diagram**

**Notes:**
1. Input isolator load = 150 ohms maximum (3V DC drop).
2. Input loop is unaffected by faults in either output loop.
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.

Notes:
1. Isolator input load equation:
   Input ohms @20mA = 250 ohms + output resistance (ohms).
2. Isolator input voltage drop for this application is 6V DC (300 ohms @ 20mA).
3. Series 672T provides spare channel.

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.

Notes:
1. Three modules require only 3" of panel space!
2. High density = high value:
   Two AI's per inch of panel space!
   Four AO's per inch of panel space!
**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

**Notes:**
1. Three modules require only 3" of panel space!
2. High density = high value:
   - Two AI's per inch of panel space!
   - Four AO's per inch of panel space!
3. PS5R requires 1.5" of panel space!

**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.

**Notes:**
1. Isolator input load (per channel) = 75 ohms max. (1.5V DC drop)
2. Input loop(s) are unaffected by faults on output loop(s)
3. AC powered models operate on 90 - 265V AC or 125V DC ±10%
4. DC powered models operate on 15 - 36V DC
5. 63xT 4-wire isolators are ideal for isolating both input and output signals for a controller/system.
**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.

**Notes:**
1. Isolator input load = 150 ohms max. (3V DC drop)
2. Input loop is unaffected by faults on either output loop.
3. AC-powered models operate on 90 - 265V AC or 125V DC ±10%.
4. DC-powered models operate on 15 - 36V DC.

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**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)

**Notes:**
1. Resistance load on primary loop is 225 ohms maximum (4.5V DC drop)
2. Input loop is unaffected by faults on any output loop
3. AC-powered models operate on 90 - 265V AC or 125V DC ±10%.
4. DC-powered models operate on 15 - 36V DC.
Many Acromag instruments with DC current inputs 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 milliampere 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:

**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 AC Current**
- **Sensor Output (red/black wires)**

<table>
<thead>
<tr>
<th>Sensor Turns</th>
<th>AC Current Input Range</th>
<th>Sensor Output (red/black wires)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 to 20 Amps AC</td>
<td>0 to 11.17mA DC</td>
</tr>
<tr>
<td>2</td>
<td>0 to 10 Amps AC</td>
<td>0 to 11.17mA DC</td>
</tr>
<tr>
<td>4</td>
<td>0 to 5 Amps AC</td>
<td>0 to 11.17mA DC</td>
</tr>
<tr>
<td>10</td>
<td>0 to 2 Amps AC</td>
<td>0 to 11.17mA DC</td>
</tr>
<tr>
<td>20</td>
<td>0 to 1 Amps AC</td>
<td>0 to 11.17mA DC</td>
</tr>
</tbody>
</table>

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.
### 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.*

#### 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.

#### 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-SD24  
Universal 60W power supply  
Visit www.acromag.com for additional models and more information.

#### Cables

**Ordering Information**

5020-350  
AC current sensor  
5035-355  
Ethernet straight cable, CAT5, 3 feet long, shielded  
5035-360  
Ethernet crossover cable, CAT5E, 5 feet long, shielded

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**Isolated Transmitters: 600T Series**

*Ordering Information*

Isolated Transmitters: 600T Series  
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