

Universal Input DIN Rail Signal Conditioner



DRI-U Series



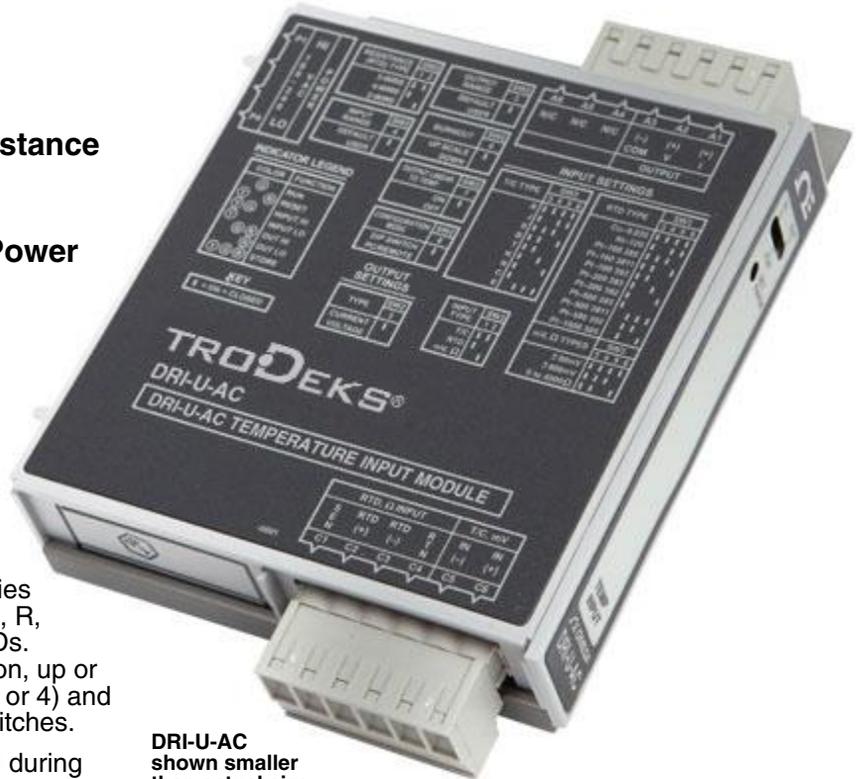
- ✓ Accepts Thermocouple, RTD, Resistance and Voltage Input
- ✓ Field Configurable Input Ranges
- ✓ AC (DRI-U-AC) or DC (DRI-U-DC) Power
- ✓ Eliminates Ground Loops
- ✓ Provides an Isolated DC Output in Proportion to the Input

The DRI-U Series is a DIN rail mount, thermocouple, RTD, resistance or voltage input signal conditioner with 1800V isolation between input, output and power. The field configurable input and output offers flexible, wide ranging capability for most temperature signal conditioning applications. The DRI-U Series is configured via DIP switch for Types J, K, T, E, R, S, B, N, or C thermocouples or Pt, Ni or Cu RTDs. Additionally, functions such as signal linearization, up or down-scale burnout, number of RTD leads (2, 3 or 4) and voltage or current output are also set via dip-switches.

Accuracy and performance during warm-up and during changes in ambient temperature are maximized. The cold-junction compensation technique utilizes two temperature sensors to measure the differential temperature near the terminal block. Using heat transfer calculations with the measured differential temperature and the known thermal conductivity of the PCB, the terminal junction temperature is determined with extreme accuracy. Even during unstable thermal states such as start-up, ambient temperature changes or changing load or power, the DRI-U Series performs extremely accurate thermocouple temperature measurement.

System performance and productivity are improved due to reduced warm up time, fewer temperature measurement errors and tighter process control for higher quality. Most significantly, it allows calibration to be checked quickly and accurately without the effects of rapid ambient temperature changes due to opening a control panel door, which often causes erroneous readings and miscalibrations that are a common cause of measurement errors.

Touch calibration technology allows easy field ranging for any of the thermocouple or RTD input types. For example, the dip-switch configured range for the J Type thermocouple is -210 to 760°C (-346 to 1400°F). Using a thermocouple simulator as a reference, the DRI-U Series could be ranged for 0 to 50°C (32 to 122°F) or 0 to 500°C (32 to 932°F) by simply applying the desired minimum and maximum input levels and pushing the range button to store the levels in non-volatile memory. The output is ranged by applying an input signal to achieve an accurate output level and pushing the range button.



DRI-U-AC shown smaller than actual size.

The DRI-U Series field configurable thermocouple or RTD input signal conditioner is useful in eliminating ground loops and interfacing temperature sensors to data acquisition and control systems. Three-way isolation completely eliminates ground loops from any source. Isolation protects expensive SCADA systems from ground faults and allows the noise reduction benefits of grounded thermocouples or sensors to be realized.

The DRI-U Series employs the latest analog to digital signal processing technology and advanced low-power microprocessors. Cold junction compensation (CJC) of thermocouples, and lead length compensation for RTDs ensures an extremely accurate and stable signal for virtually any temperature sensor to DC signal conversion.

High density DIN rail mounting offers a very compact solution and saves valuable panel space. Power is delivered to the DRI-U Series using the exclusive ACPB (AC power) or DCPB (DC power) rail which reduces wiring requirements and the need to daisy-chain power. Plug-in screw terminals ensure easy installation and low Mean-Time-To-Repair (MTTR).

The DRI-U Series is equipped with front panel LEDs for input power (green-on), input overrange and underrange; input open circuit (yellow-on); and switch setting error (red-on).



The DRI-U Series can be configured via dip-switches for a wide variety of temperature input ranges for RTD, thermocouple, resistance and voltage inputs. Inputs can be offset by >90% or adjusted down to <10% of the full scale span.

The factory default configuration for the DRI-U Series is as follows:

- Input Type:** Thermocouple, Type J
- Input Range:** 0 to 500°C (32 to 932°F)
- Burnout:** Upscale
- Output Range:** 4 to 20 mA

Specifications

INPUT

- Input Types and Ranges:** See tables
- Impedance:** $\geq 1.0 \text{ M}\Omega$ typical for thermocouple and voltage inputs
- RTD Excitation:** $\leq 0.3 \text{ mA}$
- Burnout Detection:** Upscale or downscale
- CJC Error:** $\leq \pm 0.1^\circ\text{C}$ max (the output is ensured to be within $\pm 0.5^\circ\text{C}$ of rated accuracy 30 seconds after powering)

OUTPUT

- Voltage:**
 - Range:** DRI-U-AC; 0 to 10V; DRI-U-DC; 0 to 5V or 2 to 10V
 - Drive:** 10 mA (1000 Ω load min)
- Current:**
 - Range:** DRI-U-AC: 0 to 20 mA; DRI-U-DC; 0 to 20 mA, 4 to 20 mA
 - Drive:** 15V (750 Ω max)
- Isolation:** 1800 Vdc or peak AC between input, output and power

Configuration:

- SW1:** Pushbutton, input and output ranging
- SW2:** Linearization, burnout, output (voltage or current), and initialization mode
- SW3:** Input type

Accuracy:

- Input A/D:** See tables
- Linearization:** $\leq \pm 0.05\%$ of accuracy range max
- Output:** $\leq \pm 10 \text{ mA}$ for current output; $\leq \pm 5 \text{ mV}$ for voltage output

Thermal Stability:

- CJC:** $\pm 0.01^\circ\text{C}/^\circ\text{C}$ change in ambient max
- Zero:** $\pm 0.0075\%$ of full scale/ $^\circ\text{C}$ change in ambient max
- Span:** $\pm 0.0075\%$ of full scale/ $^\circ\text{C}$ change in ambient max
- Long Term:** $\pm 0.1\%$ max over a 9 month period

Response Time:

- Turn On Time:** ≤ 5 seconds to establish output within 99% or 2°C of final value or 0.5°C within 30 seconds

LED Indicator:

- Power (Green):** On when power is on, flashes for thermocouple burnout
- Input (Yellow):** Flashes for out of range
- Red:** Flashes for switch setting error
- Calibration:** 1 green, 1 yellow and 1 red LEDs indicate steps in ranging process

Common Mode Rejection:

- ESD Susceptibility:** Capable of meeting IEC 801-2 level 3 (8 kV)

Humidity (Non-Condensing):

- Operating:** 15 to 95% RH @ 45°C (113°F)
- Soak:** 90% RH for 24 Hours @ 60°C (140°F)

Temperature:

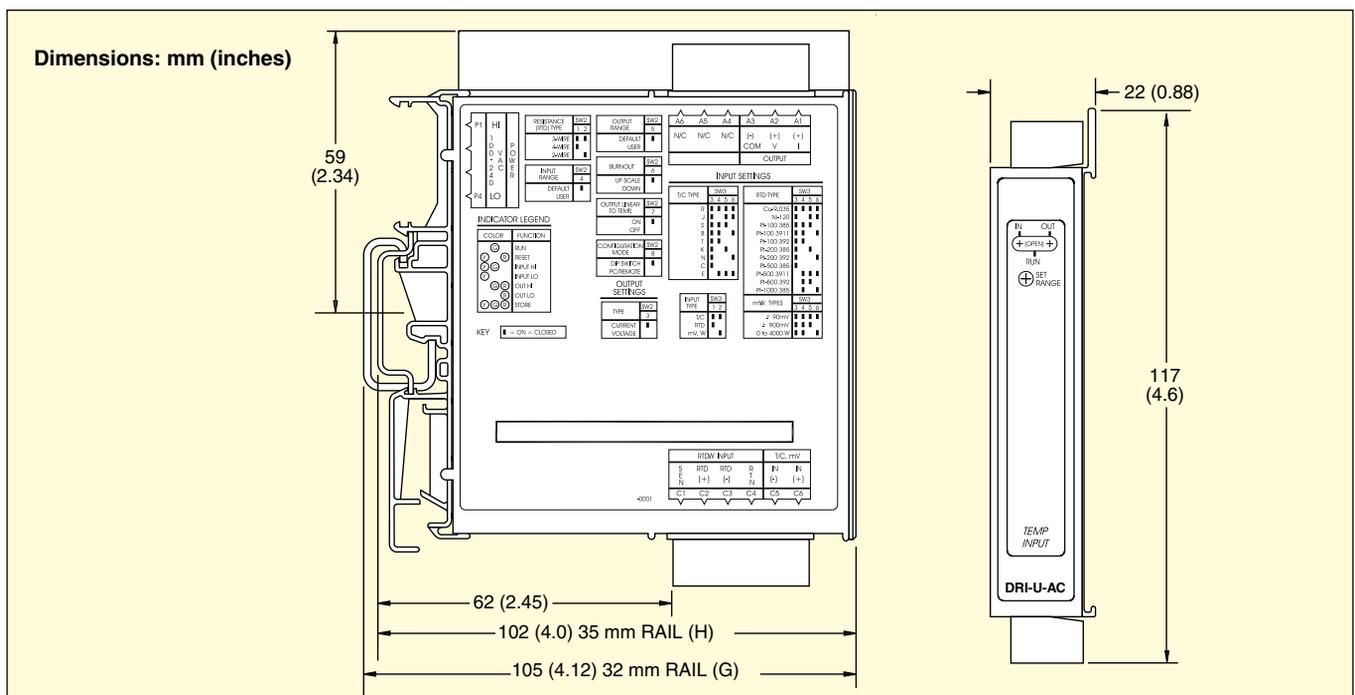
- Operating:** -25 to 65°C (-13 to 149°F)
- Storage:** -25 to 70°C (-13 to 158°F)

Power:

- DRI-U-AC:** 100 to 240 Vac $\pm 10\%$, 50 to 400 Hz; 2.5 W max
- DRI-U-DC:** 9 to 30 Vdc $\pm 10\%$; 2.5 W max

Wire Terminal:

- Weight:** 227 g (0.50 lb)





Thermocouple Input Types and Ranges

Type	Input Range	Accuracy Range	Input (A/D) Accuracy
J	-210 to 760°C -346 to 1400°F	-100 to 760°C -148 to 1400°F	±0.25°C
K	-270 to 1370°C -454 to 2498°F	-100 to 1370°C -148 to 2498°F	±0.3°C
T	-270 to 400°C -454 to 752°F	0 to 400°C 32 to 752°F	±0.25°C
E	-270 to 1000°C -454 to 1832°F	-100 to 1000°C -148 to 1832°F	±0.25°C
R	0 to 1760°C 32 to 3200°F	200 to 1760°C 392 to 3200°F	±1.0°C
S	0 to 1760°C 32 to 3200°F	400 to 1760°C 752 to 3200°F	±1.0°C
B	0 to 1800°C 32 to 3272°F	400 to 1800°C 752 to 3272°F	±2.0°C
N	-270 to 1300°C -454 to 2372°F	70 to 1300°C 158 to 2372°F	±0.4°C
C	0 to 2320°C 32 to 4208°F	0 to 2320°C 32 to 4208°F	±0.5°C

Input to output error at 25°C is less than or equal to the input accuracy plus the linearization accuracy plus the output accuracy (plus the CJC error for thermocouple inputs).

RTD Input Types and Ranges

Type	Input Range	Input (A/D) Accuracy
Cu-9.035	-40 to 260°C -40 to 500°F	±0.25°C
Ni-120 067	-80 to 320°C -112 to 608°F	±0.15°C
Pt-100 385	-200 to 850°C -328 to 1562°F	±0.15°C
Pt-100 3911	-200 to 630 °C -328 to 1166°F	±0.15°C
Pt-100 392	-200 to 630°C -328 to 1166°F	±0.15°C
Pt-200 385	-200 to 850°C -328 to 1562°F	±0.20°C
Pt-200 392	-200 to 630°C -328 to 1166°F	±0.20°C
Pt-500 385	-200 to 850°C -328 to 1562°F	±0.20°C
Pt-500 3911	-200 to 630°C -328 to 1166°F	±0.20°C
Pt-500 392	-200 to 630°C -328 to 1166°F	±0.20°C
Pt-1000 385	-200 to 850°C -328 to 1562°F	±0.20°C

Voltage and Resistance Input

Type	Input Range	Accuracy Range	Input (A/D) Accuracy	Minimum Span
Voltage	±90 mV	±90 mV	±12 µV	3 mV
Voltage	-100 to 900 mV	-100 to 900 mV	±25 µV	3 mV
Resistance	10 to 4000 Ω	10 to 4000 Ω	±1.0 Ω	10 Ω

To Order	
Model No.	Description
DRI-U-AC	AC powered universal input DIN rail signal conditioner
DRI-U-DC	DC powered universal input DIN rail signal conditioner
ACPB-2	AC power distribution bus for 2 DRI-U-AC modules
ACPB-4	AC power distribution bus for 4 DRI-U-AC modules
ACPB-8	AC power distribution bus for 8 DRI-U-AC modules
DCPB-2	DC power distribution bus for 2 DRI-U-DC modules
DCPB-4	DC power distribution bus for 4 DRI-U-DC modules
DCPB-8	DC power distribution bus for 8 DRI-U-DC modules

Note: An ACPB power rail is required to power the **DRI-U-AC** modules and is ordered separately.