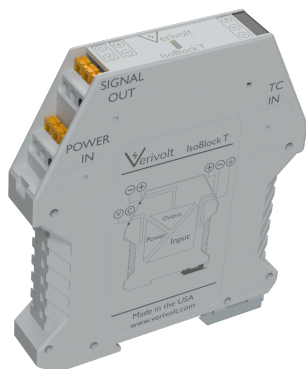


IsoBlock T

Galvanically Isolated Thermocouple Sensor



OVERVIEW

IsoBlock T is a **galvanically isolated thermocouple-to-analog transmitter**. Connect a thermocouple at the input and receive a calibrated **bipolar differential voltage output** (up to $\pm 10\text{ V}$) at the terminals—ideal for PLCs, DAQs, and control systems. The input supports **sub-zero** and **high-temperature** measurements with **no polarity switching** or special configuration.

Thermocouple type is **factory configurable** for **B/E/J/K/N/R/S/T**, with an optional **Custom** mode for raw thermocouple voltage (MCU linearized / mapped). Output scaling, mapping, mains-notch filtering (50/60 Hz), and update rate are firmware-defined and can be **factory customized** to match your application (including custom linearization / scaling profiles).

Example mapping shown (Type K): -200°C to $+1372^{\circ}\text{C}$ mapped at 137.2°C/V ($0^{\circ}\text{C} \rightarrow 0.00\text{ V}$).

SPECIFICATION

Electrical	
Supply Voltage	12–32 VDC (either polarity)
Power Consumption	0.65 W max
Thermocouple Input	Factory configurable: B, E, J, K, N, R, S, T
TC Hot-Junction Range	-210 up to $+1798^{\circ}\text{C}$ Actual usable range depends on thermocouple type.
Input Fault Protection	$\pm 45\text{ V}$ (thermocouple pins)
Isolation	5 kVRMS (1 minute)
Transient Isolation	1500 VRMS
Surge Capability	12.8 kVpk
Output Type	Differential analog pair
Output Range	$\pm 10\text{ V}$ max (differential)
Scale / Mapping	Factory programmable
Scale example	137.2°C/V (linear; type K)
Mechanical	
Mounting Type	DIN rail mounting
Connectivity	Push-in spring terminals Conductor: AWG 24–14 Strip length: 10 mm
Outer Dimensions	99 mm $\times$ 113.65 mm $\times$ 17.6 mm
Weight	140 g
Enclosure	DIN rail housing, UL 94 V0, IP20

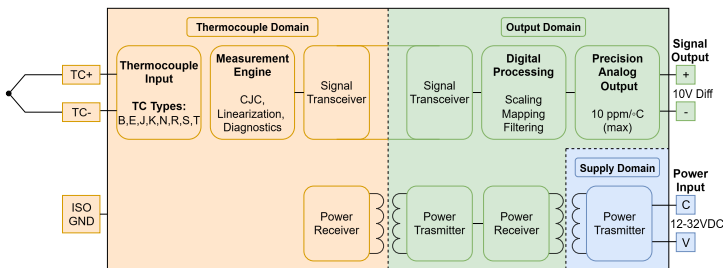
Performance	
TC Conversion Resolution	19-bit; 0.0078125 $^{\circ}\text{C}$ LSB
Realistic Usable Resolution	Application dependent (sensor noise + wiring + filtering). Typical: 13–15 bits
Thermocouple Accuracy	$\pm 0.15\%$ FS max, -20°C to $+85^{\circ}\text{C}$;
Cold-Junction Accuracy	$\pm 0.7^{\circ}\text{C}$ max, -20°C to $+85^{\circ}\text{C}$
50/60Hz Rejection	91 dB typ notch; 50 or 60 Hz
TC Conversion Time	82 ms @ 60 Hz ; 98 ms @ 50 Hz
Update Rate	$\sim 10\text{ Hz}$ typ
Output Resolution	16-bit; $\approx 305\text{ }\mu\text{V/LSB}$ over $\pm 10\text{ V}$ ($\approx 0.042^{\circ}\text{C/LSB}$ at 137.2°C/V)
DAC Linearity	$\pm 1\text{ LSB INL/DNL}$ (max)
Reference Drift	DAC drift: 10 ppm/ $^{\circ}\text{C}$ (max)
CMTI	$\pm 150\text{ kV}/\mu\text{s}$ typ
Example Mapping (Type K)	
0°C	0.00 V
-200°C	-1.46 V
$+1372^{\circ}\text{C}$	+10.00 V
Environmental	
Operating Temp	-40°C to $+105^{\circ}\text{C}$ (typical, enclosure-limited)
Storage / Transport	-40°C to $+55^{\circ}\text{C}$ (typical, enclosure spec)

HARDWARE DESCRIPTION

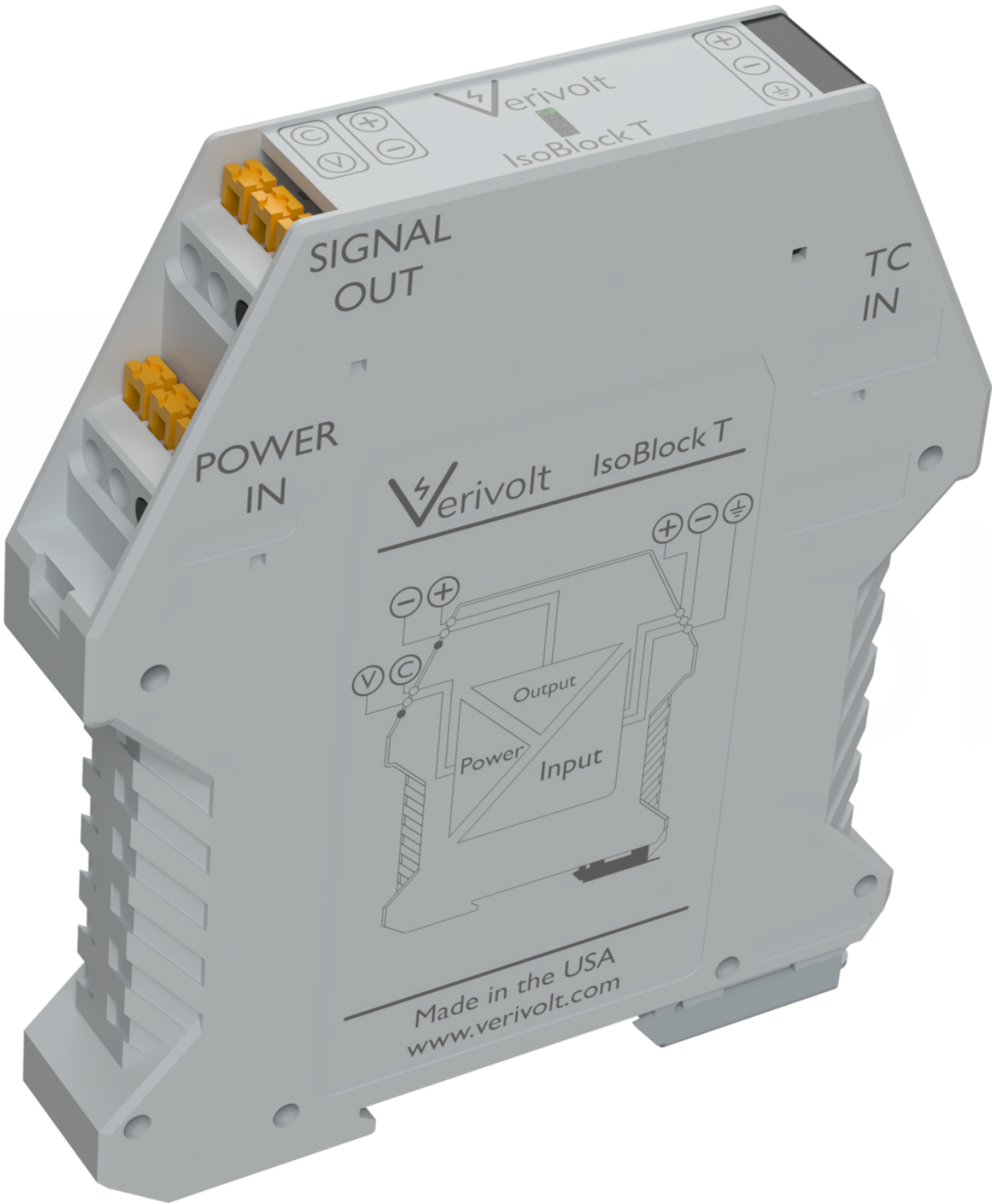
IsoBlock T is organized into **three isolated domains** to maintain accuracy with microvolt-level thermocouple signals in noisy, high common-mode environments: the **Supply Domain**, the **Output Domain**, and the **Thermocouple Domain**.

Power is transferred across isolation using an internal **isolated power link** from one domain to another. This **cascaded power isolation** helps reduce conducted noise and leakage between domains while supporting robust high-voltage isolation performance.

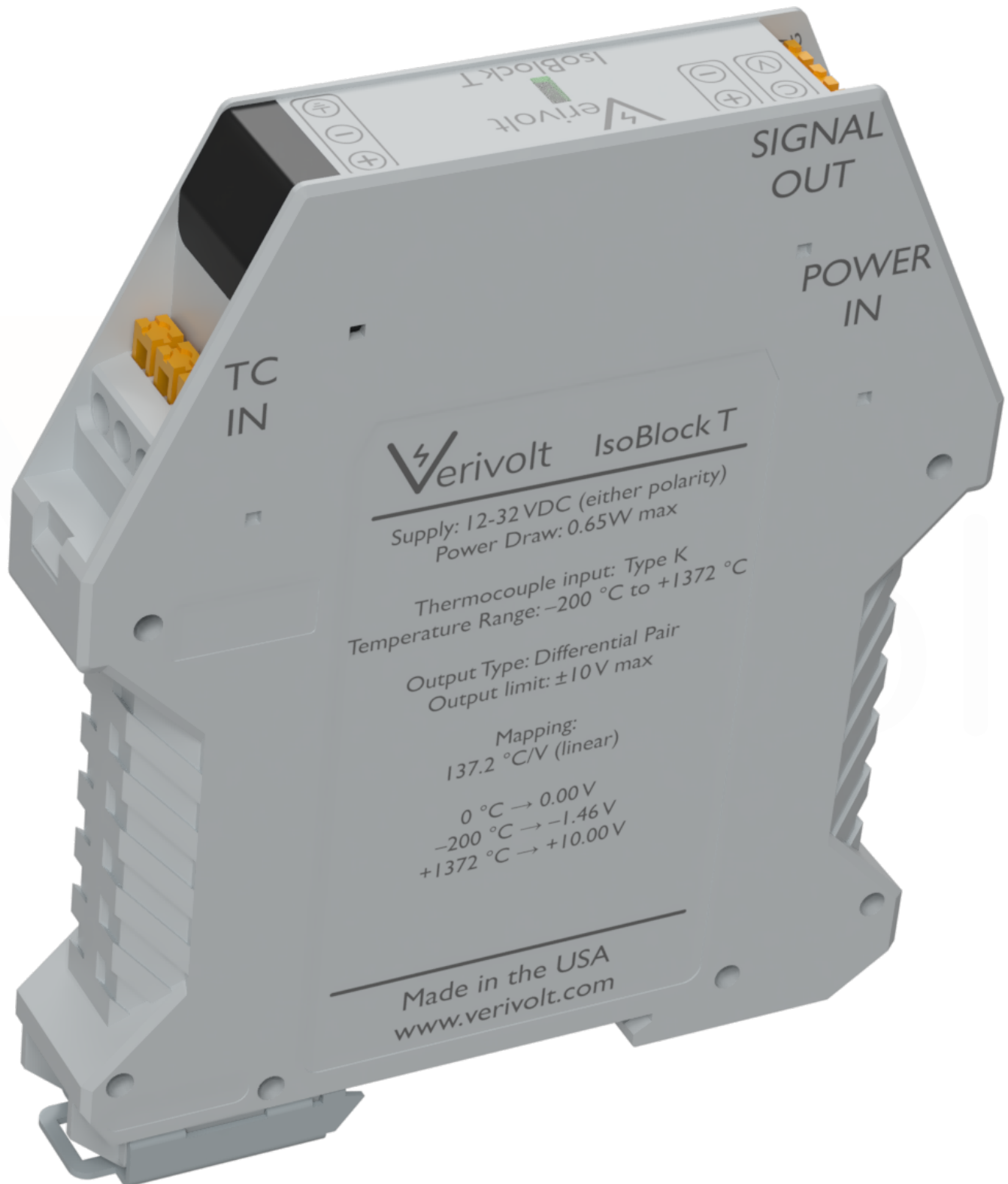
The thermocouple front-end performs **cold-junction compensation**, **linearization**, and **input diagnostics**. Measurements cross the **signal isolation barrier** to the Output Domain, where the MCU applies the configured **filtering**, **scaling**, and **mapping**. A precision DAC and output driver then generate the specified **bipolar differential voltage output**.



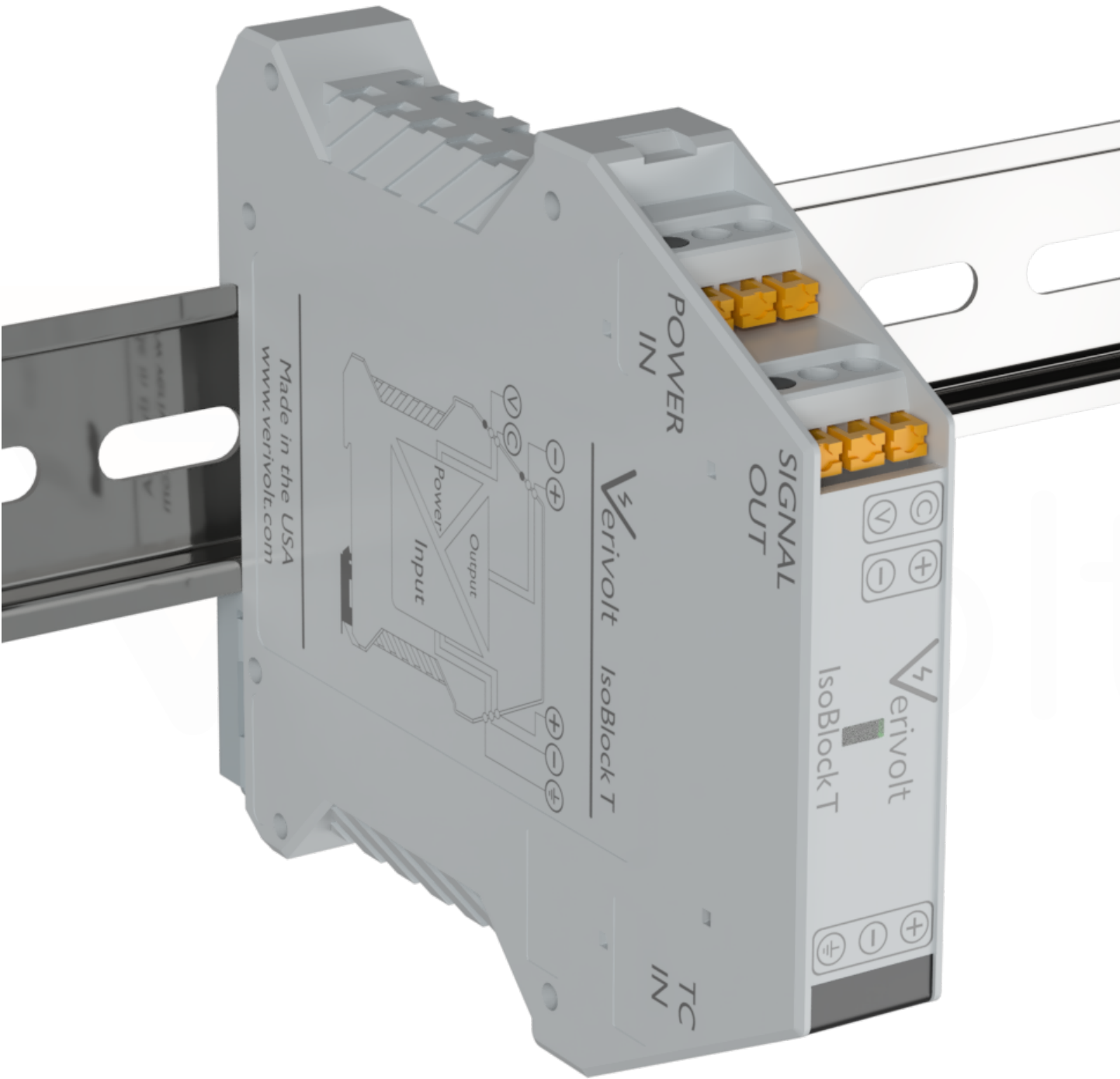
Front Side



Back Side



DIN Mounted



Mechanical Drawing

