

# DI-8B47 Linearized Thermocouple Input Modules

## FEATURES

- Interfaces to Types J, K and T
- Linearizes Thermocouple Signal
- High Level Voltage Outputs
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1
- Input Protected to 240VAC Continuous
- 120dB CMR
- 70dB NMR at 60Hz
- Low Drift with Ambient Temperature
- Accurate CJC -40°C to +85°C
- CSA, FM, and CE Certifications Pending
- Mix and Match Module Types

## DESCRIPTION

DI-8B modules are an optimal solution for monitoring real-world process signals and providing high level signals to a data acquisition system. Each DI-8B47 module isolates, filters, amplifies, and linearizes a single channel of temperature input from a thermocouple and provides an analog voltage output.

Linearization is accomplished using a four breakpoint piecewise linear approximation.

The DI-8B47 can interface to industry standard thermocouple type J, K, and T and has an output signal of 0V to +5V. Each module is cold-junction compensated to correct for parasitic thermocouples formed by the thermocouple wire and screw terminals on the mounting backpanel. Upscale open thermocouple detect is provided by an internal pull-up resistor.

Signal filtering is accomplished with a three-pole filter optimized for time and frequency response which provides 70dB of normal-mode-rejection at 60Hz. One pole of this filter is on the field side of the isolation barrier for anti-aliasing, and the other two are on the system side.

A special input circuit on the DI-8B47 module provides protection against accidental connection of power-line voltages up to 240VAC.

The modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise.

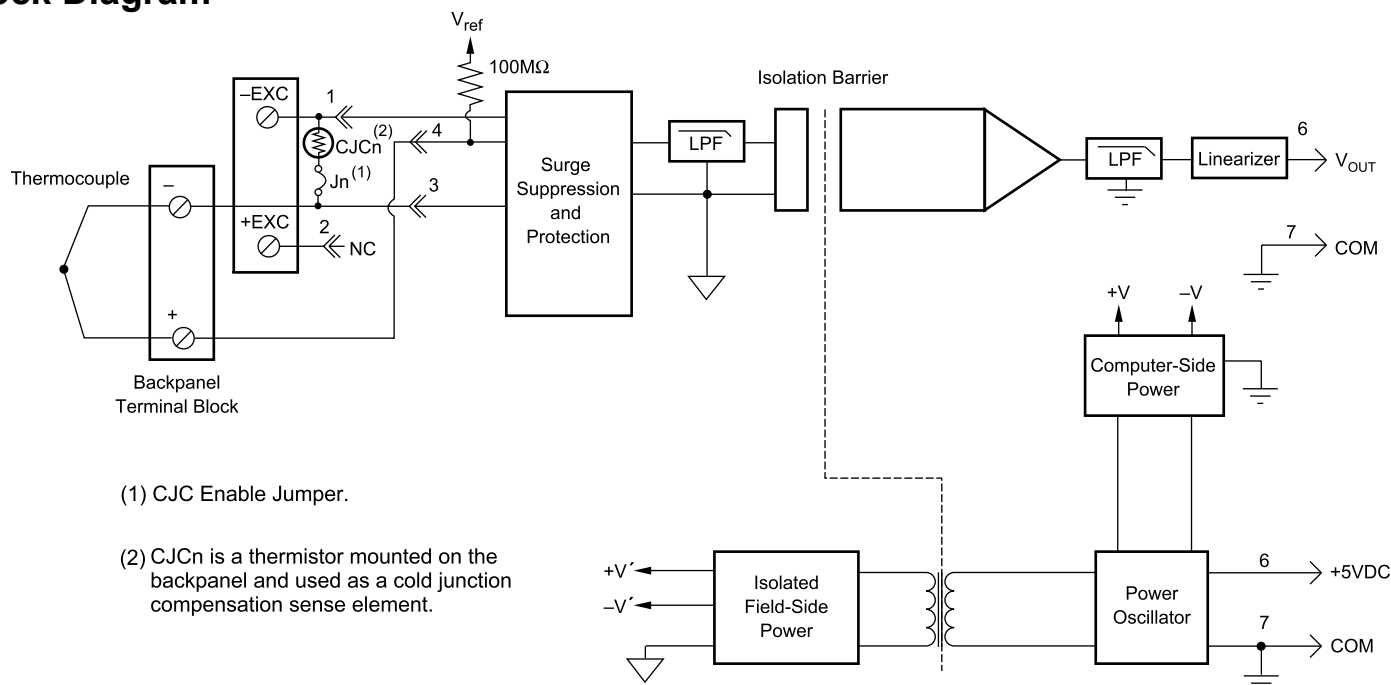
## SPECIFICATIONS

Typical at  $T_A = +25^\circ\text{C}$  and +5V Power

|                            |                       | DI-8B47   |
|----------------------------|-----------------------|---|
| Input Range                |                       | -0.1V to +0.5V  |
| Input Bias Current         |                       | -25nA   |
| Input Resistance           | Normal                | 50M $\Omega$  |
|                            | Power Off             | 450k $\Omega$   |
|                            | Overload              | 450k $\Omega$   |
| Input Protection           | Continuous            | 240VAC  |
|                            | Transient             | ANSI/IEEE C37.90.1  |
| Sensor Excitation Current  |                       | 0.25mA  |
| Lead Resistance Effect     |                       | $\pm 0.02^\circ\text{C}/\Omega$   |
| CMV, Input to Output       |                       | 1500Vrms max  |
| Transient, Input to Output |                       | ANSI/IEEE C37.90.1  |
| CMR (50Hz or 60Hz)         |                       | 120dB   |
| NMR                        |                       | 70dB at 60Hz  |
| Accuracy                   |                       | See Ordering Information on Page 2  |
| Stability                  | Offset                | $\pm 20\text{ppm}/^\circ\text{C}$   |
|                            | Gain                  | $\pm 75\text{ppm}/^\circ\text{C}$   |
| Noise                      | Output, 100kHz        | 250 $\mu\text{Vrms}$  |
|                            | Bandwidth, -3dB       | 3Hz   |
| Response Time, 90% Span    |                       | 150ms   |
| Output Range               |                       | 0 to +5V  |
| Output Protection          | Continuous            | Continuous Short to Ground  |
|                            | Transient             | ANSI/IEEE C37.90.1  |
| Cold Junction Compensation |                       |   |
| Accuracy, 25°C             |                       | $\pm 0.5^\circ\text{C}$   |
| Accuracy, -40°C to +85°C   |                       | $\pm 1.5^\circ\text{C}$   |
| Power Supply Voltage       |                       | +5VDC $\pm 5\%$   |
| Power Supply Current       |                       | 30mA  |
| Power Supply Sensitivity   |                       | $\pm 25\text{ppm}/\%$   |
| Mechanical Dimensions      |                       | 1.11" $\times$ 1.65" $\times$ 0.40"<br>(28.1mm $\times$ 41.9mm $\times$ 10.2mm) |
| Environmental              | Operating Temperature | -40°C to +85°C  |
|                            | Storage Temperature   | -40°C to +85°C  |
|                            | Relative Humidity     | 0 to 95% Noncondensing  |

# DI-8B47 Linearized Thermocouple Input Module

## Block Diagram



## Ordering Information

| Model Number | TC Type | Input Range                           | Accuracy*      |
|--------------|---------|---------------------------------------|----------------|
| DI-8B47J-01  | J       | 0°C to +760°C (+32°F to +1400°F)      | ±0.24% ±1.82°C |
| DI-8B47J-02  | J       | -100°C to +300°C (-148°F to +572°F)   | ±0.24% ±0.96°C |
| DI-8B47J-03  | J       | 0°C to +500°C (+32°F to +932°F)       | ±0.21% ±1.05°C |
| DI-8B47J-12  | J       | -100°C to +760°C (-148°F to +1400°F)  | ±0.24% ±2.10°C |
| DI-8B47K-04  | K       | 0°C to +1000°C (+32°F to +1832°F)     | ±0.24% ±2.40°C |
| DI-8B47K-05  | K       | 0°C to +500°C (+32°F to +932°F)       | ±0.24% ±1.05°C |
| DI-8B47K-13  | K       | -100°C to +1350°C (-148°F to +2462°F) | ±0.24% ±3.60°C |
| DI-8B47K-14  | K       | 0°C to +1200°C (+32°F to +2192°F)     | ±0.24% ±2.88°C |
| DI-8B47T-06  | T       | -100°C to +400°C (+32°F to +392°F)    | ±0.48% ±2.40°C |
| DI-8B47T-07  | T       | 0°C to +200°C (+32°F to +392°F)       | ±0.39% ±0.75°C |

\* Includes conformity, hysteresis, and repeatability. Does not include CJC Accuracy.



241 Springside Drive  
Akron, Ohio 44333  
330-668-1444

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