

DI-5B34 Linearized 2- or 3-Wire RTD Input Modules

FEATURES

- Interfaces to 100Ω Platinum, 10Ω Copper, or 120Ω Nickel RTDs
- Linearizes RTD Signal
- High Level Voltage Outputs
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1-1989 Transient Protection
- Input Protected to 240VAC Continuous
- 160dB CMR
- 95dB NMR AT 60Hz, 90dB AT 50Hz
- CSA Certified
- Mix and Match DI-5B Types

DESCRIPTION

Each DI-5B34 RTD input module provides a single channel of RTD input which is filtered, isolated, amplified, linearized, and converted to a high level analog voltage output (see block diagram). This voltage output is logic switch controlled, which allows these modules to share a common analog bus without the requirement of external multiplexers.

The DI-5B modules are designed with a completely isolated computer side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin to I/O Common, pin 19.

RTD excitation is provided from the module by two matched current sources. When using a three-wire RTD, this method allows an equal current to flow in each RTD lead, which cancels the effects of lead resistances. The excitation currents are very small (0.25mA for 100Ω Pt and 120Ω Ni, and 1.0mA for 10Ω Cu) which minimizes self-heating of the RTD.

Signal filtering is accomplished with a six-pole filter which provides 95dB of normal-mode-rejection at 60Hz and 90dB at 50Hz. Two poles of this filter are on the field side of the isolation barrier, and the other four are on the computer side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common mode spikes or surges. The module is powered from +5VDC, ±5%.

A special input circuit on the DI-5B34 modules provides protection against accidental connection of power-line voltages up to 240VAC.

SPECIFICATIONS

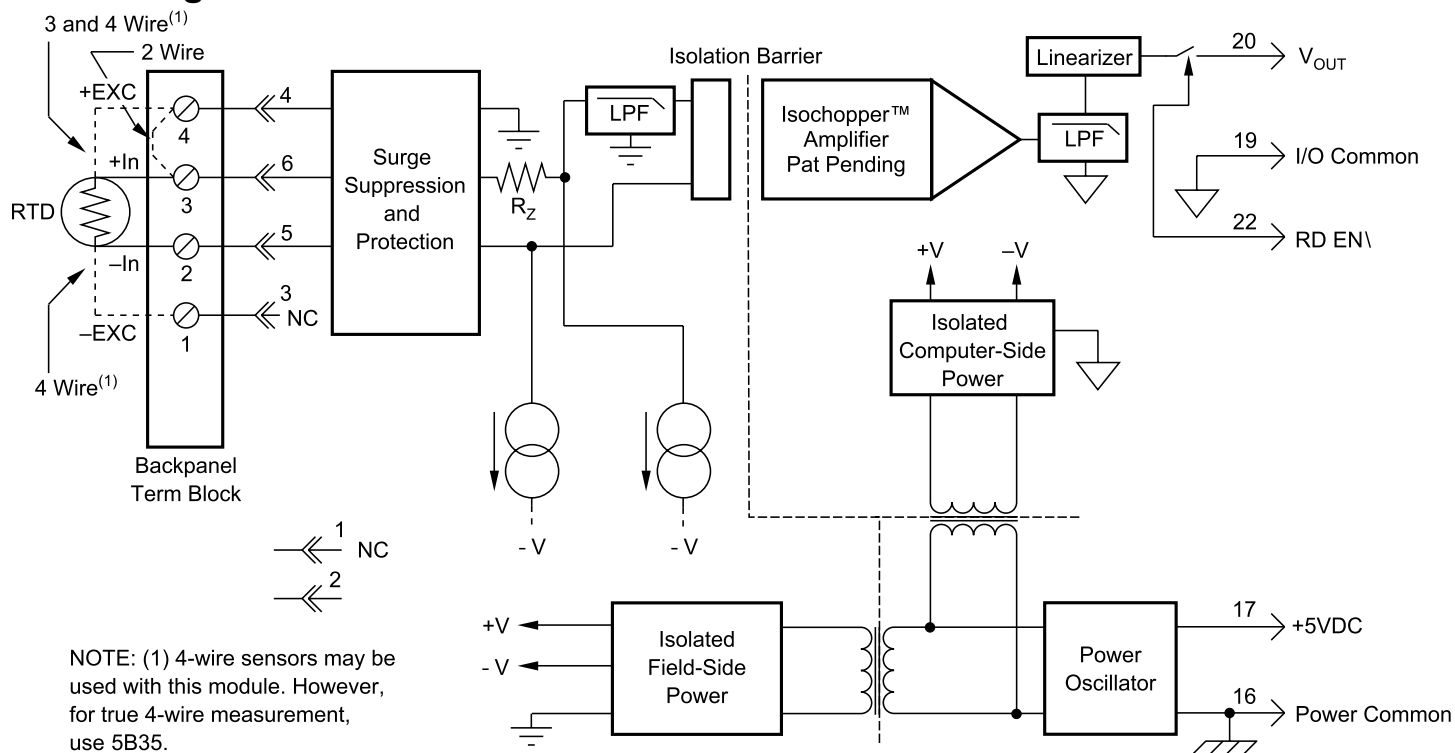
Typical at T_A = +25°C and +5V Power

| | | DI-5B34 |
|--|---|---|
| Input Range Limits: | 100Ω Pt 120Ω Ni 10Ω Cu | -200°C to +850°C -80°C to 320°C -100°C to 260°C |
| Input Resistance: | Normal Power Off Overload | 50MΩ 40kΩ 40kΩ |
| Input Protection: | Continuous Transient | 240Vrms max ANSI/IEEE C37.90.1-1989 |
| Sensor Excitation Current | 100Ω Pt, 120Ω Ni 10Ω Cu | 0.25mA 1.0mA |
| Lead Resistance Effect | 100Ω Pt, 120Ω Ni 10Ω | ±0.02°C/Ω* Cu ±0.2°C/Ω* |
| CMV, Input to Output: | Continuous Transient | 1500Vrms max ANSI/IEEE C37.90.1-1989 |
| CMR (50 or 60Hz) | | 160dB |
| NMR | | 95dB at 60Hz, 90dB at 50Hz |
| Accuracy | | See Ordering Information |
| Conformity Error | | ±0.05% Span |
| Stability: | Input Offset Output Offset Gain | ±0.02°C/°C ±20μV/°C ±50ppm of reading/°C |
| Noise: | Input, 0.1 to 10Hz Output, 100kHz | 0.2μVrms 200μVrms |
| Bandwidth, -3dB | | 4Hz |
| Response Time, 90% Span | | 0.2s |
| Output Range | | 0V to +5V |
| Output Resistance | | 50Ω |
| Output Protection | | Continuous Short to Ground |
| Output Selection Time (to ±1mV of VOUT) | | 6μs at C _{load} = 0 to 2000pF |
| Output Current Limit | | ±14mA max |
| Output Enable Control: | Max Logic "0" Min Logic "1" Max Logic "1" Input Current, "0,1" | +0.8V +2.4V +36V 0.5μA |
| Power Supply Voltage | | +5VDC ±5% |
| Power Supply Current | | 30mA |
| Power Supply Sensitivity: | 100Ω Pt, 120Ω Ni 10Ω Cu | 0.2°C/V 0.5°C/V |
| Environmental: Operating Temperature Storage Temperature Relative Humidity RFI Susceptibility | | -40°C to +85°C -40°C to +85°C 0 to 95% Noncondensing ±0.5% Span Error at 400MHz, 5W, 3ft |
| Mechanical Dimensions | | 2.28" × 2.26" × 0.60" (58mm × 57mm × 15mm) |

* "Ω" refers to the resistance in one lead.

DI-5B34 Linearized 2- or 3-Wire RTD Input Modules

Block Diagram



Ordering Information

| Model Number | Input Range | Output Range | Accuracy* |
|---|---|--------------|-----------|
| 100Ω Pt, $\alpha = 0.00385$ | | | |
| DI-5B34-01 | -100°C (-148°F) to +100°C (+212°F) | 0V to +5V | ±0.32°C |
| DI-5B34-02 | 0°C (32°F) to +100°C (+212°F) | 0V to +5V | ±0.13°C |
| DI-5B34-03 | 0°C (32°F) to +200°C (+392°F) | 0V to +5V | ±0.26°C |
| DI-5B34-04 | 0°C (32°F) to +600°C (+1112°F) | 0V to +5V | ±0.78°C |
| 10Ω Cu, $\alpha = 0.004274$ | | | |
| DI-5B34C-01 | 0°C (32°F) to +120°C (+248°F) (10Ω at 0°C) | 0V to +5V | ±0.23°C |
| DI-5B34C-02 | 0°C (32°F) to +120°C (+248°F) (10Ω at 25°C) | 0V to +5V | ±0.23°C |
| DI-5B34C-03 | 0°C (32°F) to +160°C (+320°F) (10Ω at 0°C) | 0V to +5V | ±0.32°C |
| 120Ω Ni, $\alpha = 0.00672$ | | | |
| DI-5B34N-01 | 0°C (32°F) to +300°C (+572°F) | 0V to +5V | ±0.40°C |

*Includes conformity, hysteresis, and repeatability.

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