SCM5B34







Linearized 2- or 3-Wire RTD Input Modules

Description

Each SCM5B34 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 (Figure 1). This voltage output is logic switch controlled, which allows these modules to share a common analog bus without the requirement of external multiplexers.

The SCM5B 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 SCM5B34 modules provides protection against accidental connection of power-line voltages up to 240VAC.

▶ 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 Transient Protection
- Input Protected to 240VAC Continuous
- 160dB CMR
- 95dB NMR at 60Hz, 90dB at 50Hz
- · CSA C/US Certified
- · CE and ATEX Compliant
- · Mix and Match SCM5B Types on Backpanel

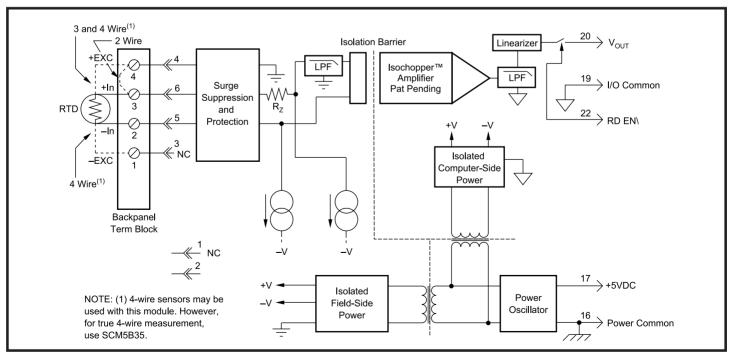


Figure 1: SCM5B34 Block Diagram



Specifications Typical* at T_a=+25°C and +5VDC power

■ 31 A	
Module	SCM5B34
Input Range Limits	-200° C to +850°C (100 Ω Pt) -80°C to +320°C (120 Ω Ni) -100°C to +260°C (10 Ω Cu)
Input Resistance Normal	50ΜΩ
Power Off Overload	40kΩ 40kΩ
Input Protection Continuous Transient	240Vrms max ANSI/IEEE C37.90.1
Sensor Excitation Current 100Ω Pt, 120Ω Ni 10Ω Cu	0.25mA 1.0mA
Lead Resistance Effect 100Ω Pt, 120Ω Ni 10Ω Cu	$^{\pm0.02^{\circ}\text{C}/\Omega^{(1)}}_{\pm0.2^{\circ}\text{C}/\Omega^{(1)}}$
CMV, Input to Output Continuous Transient	1500Vrms max ANSI/IEEE C37.90.1
CMR (50 or 60Hz) NMR	160dB 95dB at 60Hz, 90dB at 50Hz
Accuracy Conformity Error ⁽³⁾ Stability	See Ordering Information ±0.025% Span
Input Offset Output Offset Gain	$\pm 0.01^{\circ}\text{C/}^{\circ}\text{C}$ $\pm 20\mu\text{V/}^{\circ}\text{C}$ $\pm 35\text{ppm of Reading/}^{\circ}\text{C}$
Noise Input, 0.1 to 10Hz	±35μμπ οι Reading/ C
Output, 100kHz Bandwidth, –3dB Response Time, 90% Span	200μVrms 4Hz 0.2s
Output Range	See Ordering Information
Output Resistance Output Protection Output Selection Time (to ±1mV of V _{OUT}) Output Current Limit	50Ω Continuous Short to Ground $6\mu s$ at $C_{load} = 0$ to $2000pF$ $+8mA$
Output Enable Control	
Max Logic "0" Min Logic "1" Max Logic "1" Input Current "0,1"	+0.8V +2.4V +36V 0.5µA
Open Input Response Open Input Detection Time	Downscale 3s
Power Supply Voltage Power Supply Current Power Supply Sensitivity	+5VDC ±5% 30mA
Fower Supply Sensitivity $100Ω Pt, 120Ω Ni$ $10Ω Cu$	0.2°C/V 0.5°C/V
Mechanical Dimensions (h)(w)(d)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)
Environmental Operating Temperature Range Storage Temperature Range Relative Humidity Emissions EN61000-6-4 Radiated, Conducted Immunity EN61000-6-2 RF	-40°C to +85°C -40°C to +85°C 0 to 95% Noncondensing ISM, Group 1 Class A ISM, Group 1 Performance A ±0.5% Span Error
ESD, EFT	Performance B

Ordering Information

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Model	Input Range	Output Range [†]	Accuracy ⁽²⁾
100 Ω Pt ** SCM5B34-01	-100°C to +100°C (-148°F to +212°F)	3, 4	±0.12°C
SCM5B34-02	0°C to +100°C (+32°F to +212°F)	3, 4	±0.06°C
SCM5B34-03	0°C to +200°C (+32°F to +392°F)	3, 4	±0.12°C
SCM5B34-04	0°C to +600°C (+32°F to +1112°F)	3, 4	±0.36°C
SCM5B34-05	-100°C to +200°C (-148°F to +392°F)	3, 4	±0.18°C
10 Ω Cu ** SCM5B34C-01	0°C to +120°C (10Ω at 0°C) (+32°F to +248°F)	3, 4	±0.23°C
SCM5B34C-02	0°C to +120°C (10Ω at 25°C) (+32°F to +248°F)	3, 4	±0.23°C
SCM5B34C-03	0°C to +160°C (10Ω at 0°C) (+32°F to +320°F)	3, 4	±0.32°C
120Ω Ni ** SCM5B34N-01	0°C to +300°C (+32°F to +572°F)	3, 4	±0.23°C

**RTD Standards

Туре	Alpha Coefficient	DIN	JIS	IEC
100Ω Pt 120Ω Ni 10Ω Cu	0.00385 0.00672 0.004274	DIN 43760	JIS C 1604-1989	IEC 751

†Output Ranges Available

Output Range	Part No. Suffix	Example
3. OV to +5V4. OV to +10V	NONE D	SCM5B34-01 SCM5B34-01D

- *Contact factory or your local Dataforth sales office for maximum values.
- (1) " Ω " refers to the resistance in one lead.
- (2) Includes conformity, hysteresis and repeatability.
 (3) Conformity error is ±0.05% Span for SCM5B34N-01.