SCIM5B35

Linearized 4-Wire RTD Input Modules

Description

SCIM5B35 RTD input module can be used where a very high level of accuracy is required,the SCIM5B35 is a 4-Wire RTD input module which offers a significant advantage over 3-Wire measurement techniques (Figure 1).The SCIM5B35 measures only the voltage dropped across the RTD and almost ignores the resistance of RTD lead wires. The SCIM5B34 3-Wire RTD module provides lead resistance compensation, but requires equal lead resistances, where as the SCIM5B35 does not require matched lead resistances.

The SCIM5B35 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. This signal output is controlled by a logic switch which allows these modules to share a common analog bus. No external multiplexers required.

The SCIM5B modules are designed with a completely isolated output side circuitry which can be floated to more than ±50V from Power Common, pin 16. No connection is required between I/O Common and Power Common for proper operation of the output switch. the output switch can be turned on continuously by simply shorting pins 22,19.

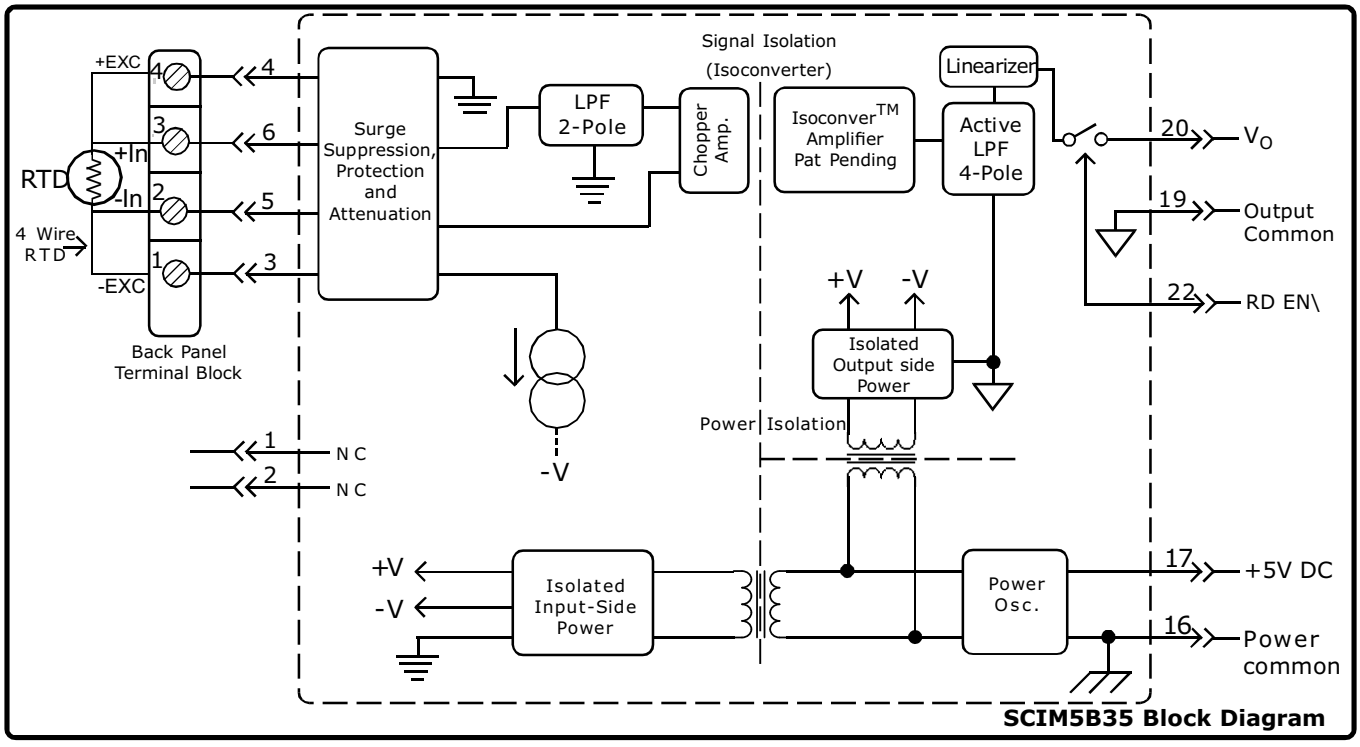
The RTD excitation is provided from the module by a precision current source. The excitation current is available on two leads which are separate from the two input signal measuring leads.The excitation current does not flow in the input signal leads,which allows RTD measurement to be totally independent of lead resistance. The excitation current is very small (0.25mA for 100Ω Pt and 120Ω Ni, and 1.0mA for 10Ω Cu) which reduces self-heating of the RTD.

Input 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 input side of the isolation barrier, and the other four are on the output side. After the initial field-side filtering, the input signal is chopped by a proprietary converter circuit.Isolation is provided by transformer coupling,which eliminates common mode spikes or surges. The module is powered from +5V DC, ±5%

A special input protection circuitry on the SCIM5B35 module protects against accidental input voltages up to 250V AC.

Features

- 100Ω Platinum, 10Ω Copper, or 120Ω Nickel RTD Input True 4-Wire input
- Linearizes RTD Signal
- Standard Output of either 0 to 10V/±10V, 0 to 5V, 1 to 5V
- 1.5KV Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- 250V AC Continuous Protected on Input
- 160dB CMR
- 95dB NMR at 60Hz, 90dB at 50Hz
- CSA , CE and ATEX Compliant
- Mixes and Matches with all SCIM5B Types on Backpanel



SCIM5B35 Block Diagram

Specifications

Typical at T_A=+25°C and +5V Power supply

Module	SCIM5B35
Input	
Range Limits	-200°C to +850°C (100Ω Pt) -80°C to +320°C (120Ω Ni) -100°C to 260°C (10Ω Cu)
Resistance	
Normal	50MΩ
Power off	40KΩ
Overload	40KΩ
Protection	
Continuous	250V rms max
Transient	ANSI/IEEE C37.90.1
Sensor Excitation Current	
100W Pt, 120Ω Ni	0.25mA
10W Cu	1.0mA
Lead Resistance Effect	
100W Pt, 120Ω Ni	±0.0005°C / Ω (1)
10W Cu	±0.005°C / Ω (1)
CMV, Input to Output	1500Vrms max
Continuous	ANSI/IEEE C37.90.1
Transient	160dB
CMR (50 or 60Hz)	95dB at 60Hz, 90dB at 50Hz
NMR	
Accuracy	See Ordering Information
Conformity Error (3)	±0.025% Span
Stability	
Input Offset	±0.01°C/°C
Output Offset	±20uV/°C
Gain	±35ppm of Reading / °C
Noise	
Input, 0.1 to 10Hz	0.2uV rms
Output, 100KHz	200uV rms
Bandwidth - 3dB	4Hz
Response Time, 90% Span	200mS
Output	
Range	See Ordering Information
Resistance	50Ω
Protection	Continuous Short to Ground
Selection Time (to ±1mV of V_{OUT})	6uS at C_{load} =0 to 2000pF
Current Limit	+8mA
Output Enable Control	
Max Logic "0"	+0.8V
Min Logic "1"	+2.4V
Max Logic "1"	+36V
Input Current "0,1"	0.5uA
Open input Response	
Lead 1,4	Downscale
Lead 2,3	Non-deterministic
Open Input Detection Time	3s
Power supply voltage	+5V DC ±5%
Power supply Current	30mA
Power supply Sensitivity	
100Ω Pt, 120Ω Ni	±0.2°C / V
10Ω Cu	±0.5°C / v
Mechanical Dimensions (H) (W) (D)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)
Environmental	
Operating Temp.Range	-40°C to +85°C
ATEX Group II, Cat, 3	-20°C to +40°C
Storage Temp. Range	-40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF Susceptability	Performance A ±0.5% Span Error
ESD,EFT,surge,voltage dips	Performance B

Notes:
(1). "Ω" refers to the resistance in one lead.
(2). Includes conformity, hysteresis and repeatability.
(3). Conformity error is ±0.05% Span for SCIM5B35N-01

Ordering Information

Model	Input Range	Output Range (DC)	Accuracy (2)
100Ω Pt **			
SCIM5B35-01	-100°C +100°C (-148°F to +212°F	1,2,3,4,8	±0.12°C
SCIM5B35-02	0°C to +100°C (+32°F to +212°F	1,2,3,4,8	±0.06°C
SCIM5B35-03	0°C to +200°C (+32°F to +392°F	1,2,3,4,8	±0.12°C
SCIM5B35-04	0°C +600°C (+32°F to +1112°F)	1,2,3,4,8	±0.36°C
SCIM5B35-05	-100°C +200°C (+148°F to +392°F)	1,2,3,4,8	±0.18°C
10Ω Cu **			
SCIM5B35C-01	0°C +120°C (10Ω at 0°C) (+32°F to +248°F)	1,2,3,4,8	±0.23°C
SCIM5B35C-02	0°C +120°C (10Ω at 25°C) (+32°F to +248°F)	1,2,3,4,8	±0.23°C
SCIM5B35C-03	0°C +160°C (10Ω at 0°C) (+32°F to +320°F)	1,2,3,4,8	±0.32°C
120Ω Ni **			
SCIM5B35N-01	0°C +300°C (+32°F to +572°F)	1,2,3,4,8	±0.23°C

** RTD Standards

Type	Alpha Coefficient	DIN	JIS
100Ω Pt 120Ω Ni 10Ω CU	0.00385 0.00672 0.004274	DIN 43760	JIS C 1604-1989

Output Ranges Available

Output Range	Part No. Suffix	Example
1.-5V to +5V	Z	SCIM5B35-01Z
2.-10V to +10V	X	SCIM5B35-01X
3. 0V to +5V	NONE	SCIM5B35-01
4. 0V to +10V	D	SCIM5B35-01D
8. 1V to +5V	Y	SCIM5B35-01Y