SCIM5B47

Linearized Thermocouple Input Modules

Description

SCIM5B47 thermocouple input module provides a single channel of thermocouple input which is filtered, isloated, amplified, linerized and converted to a high level analog voltage output (Figure 1).This signal output is controlled by a logic-switch which enables these modules to share a common analog bus. No external multiplexers are 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.

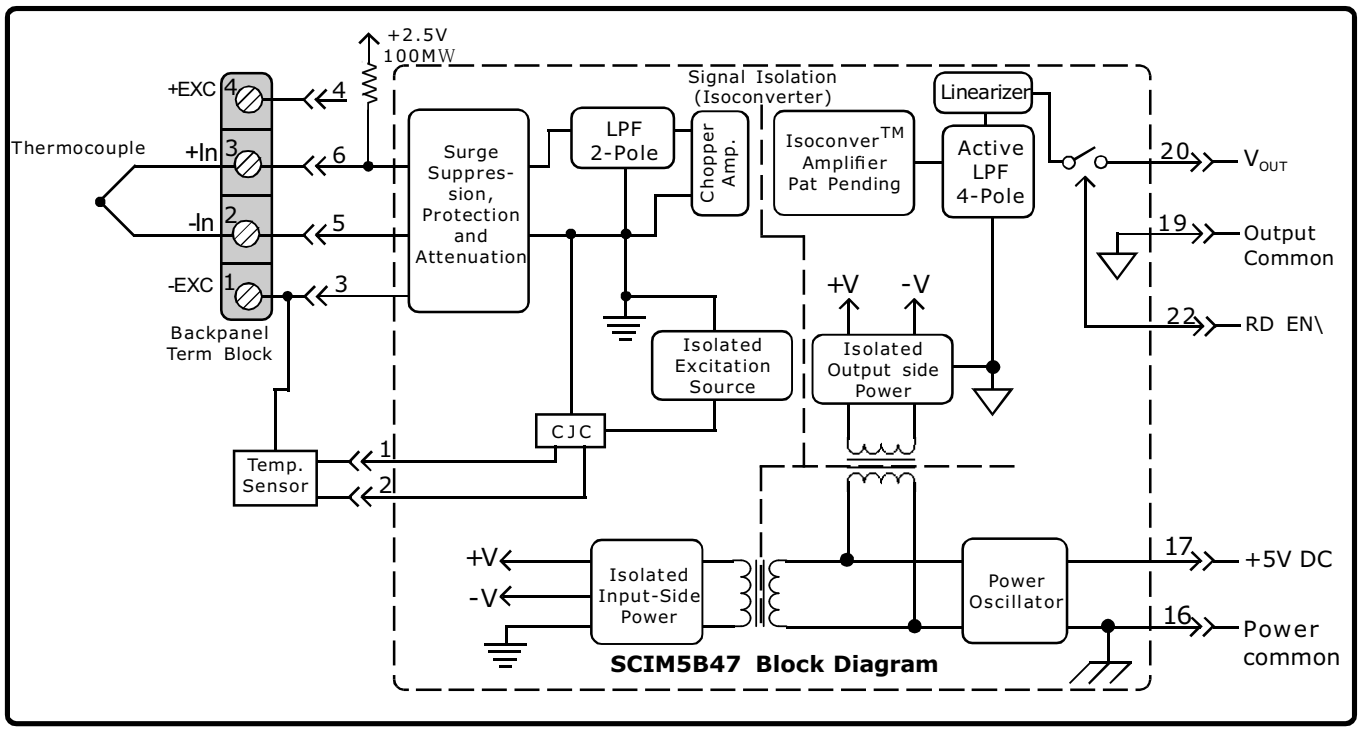
The SCIM5B47 can interface to eight industry standard the thermocouple types J,K,T,E,R,S,N and B.whose corresponding output signal operates over a 0V to +5V range. Each module is cold junction compensated to correct parasitic thermocouple formed by the thermocouple wire and screw terminals on the mounting back panel. Up scale open thermocouple detect is provided by an internal pull-up resistor. Down scale indication can be implimented by installing an external 47MΩ ±20% tolerance between screw terminal 1 & 3 on the SCIMPB01/02/03/04/05/06/07 back panel signal filtering is accomplished with a six pole filter which provides 95dB of normal mode rejection ratio at 60Hz and 90dB at 50Hz. Two poles of this filter on the input side of the isolation barrier and the other four on the output side.

After the initial field-side filtering the input signal is chopped by a property converter circuit isolation is provided by transformer coupling which eliminates common mode spikes are surges. The module is powered from +5V DC, ±5%.

A special input protection circuit on the SCIM5B30 and SCIM5B31 modules protects against accidental high-line voltages up to 250VAC.

Features

- J,K,T,E,R,S,N and B types of Thermocouple input
- Linearizes Thermocouple signal
- High level voltage outputs
- 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
- ±1μV / °C Drift
- CSA Certified, FM Approved, CE and ATEX Compliant
- Mixes and Matches with all SCIM5B Types on Backpanel



SCIM5B47 Block Diagram

Specifications

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

Module	SCIM5B47
Input	
Range	-0.1V to +0.5V
Bias Current	-25nA
Resistance	
Normal	50MΩ
Power off	40KΩ
Overload	40KΩ
Protection	
continuous	250V rms max
Transient	ANSI/IEEE C37.90.1
CMV, Input to Output	
Continous	1500V rms max
Transient	ANSI/IEEE C37.90.1
CMR (50 or 60Hz)	160dB
NMR	95dB at 60Hz, 90dB at 50Hz
Accuracy	See ordering information
Stability	
Input Offset	±1μV /°C(2)
Output Offset	±20μV /°C(2)
Gain	±25ppm/°C
Noise	
Input, 0.1 to 10Hz	0.2μV rms
Output, 100KHz	300uV p-p, 150mV rms
Bandwidth, -3dB	4Hz
Responce Time, 90% span	200mS
Output	
Range	See ordering information
Resistance	50Ω
Protection	Continuous Short to Ground
Selection Time	6us at C_{LOAD} =0 to 2000pF
(to ±1mV of V_{OUT})	
Current Limit	±8mA
Output Enable Control	
Max Logic "0"	+0.8V
Min Logic "1"	+2.4V
Max Logic "1"	+36V
Input Current "0.1"	0.5μA
Open Input Responce	Upscale
Open Input Detection Time	<10s
Cold Junction Compensation	
Accuracy, 25°C	±0.25°C
Accuracy, +5°C to 45°C	±0.5°C
Accuracy, -40°C to +85°C	±1.25°C
Power supply voltage	+5V DC ±5%
Power supply Current	30mA
Power supply Sensitivity	±2uV/% RTI(3)
Mechanical Dimensions	2.28" x 2.26" x 0.60"
(H) (W) (D)	(58mm x 57mm x 15mm)
Environmental	
Operating Temp.Range	-40°C to +85°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	Performance A ±0.5% Span Error
ESD,EFT,Surge,Voltage Dips	Performance B

Note:

1). Includes conformity, hysteresis and repeatability. Does not include CJC accuracy.
2). This is equivalent to °C as follows: Type J0.020 °C/°C, Type K,T 0.025°C/°C, Type E 0.016°C/°C, types R, S 0.168°C/°C, type N 0.037°C/°C, type C 0.072°C/°C
3). Referenced to input.

Ordering Information

Model	CJC Type y	Input Range	Output Range	Accuracy(1)	
SCIM5B47J-01	J	0°C to +760°C (+32°F to +1400°F)	1,2,3,4,8	±0.08%	±0.61°C
SCIM5B47J-02	J	-100°C to +300°C (-148°F to +572°F)	1,2,3,4,8	±0.08%	±0.32°C
SCIM5B47J-03	J	0°C to +500°C (+32°F to +932°F)	1,2,3,4,8	±0.07%	±0.36°C
SCIM5B47K-04	K	0°C to +1000°C (+32°F to +1832°F)	1,2,3,4,8	±0.08%	±0.80°C
SCIM5B47K-05	K	0°C to +500°C (+32°F to +932°F)	1,2,3,4,8	±0.08%	±0.38°C
SCIM5B47T-06	T	-100°C to +400°C (-148°F to +752°F)	1,2,3,4,8	±0.16%	±0.80°C
SCIM5B47T-07	T	0°C to +200°C (+32°F to +392°F)	1,2,3,4,8	±0.13%	±0.25°C
SCIM5B47E-08	E	0°C to +1000°C (+32°F to +1832°F)	1,2,3,4,8	±0.10%	±1.0°C
SCIM5B47R-09	R	+500°C to +1750°C (+932°F to +3182°F)	1,2,3,4,8	±0.10%	±1.3°C
SCIM5B47S-10	S	+500°C to+1750°C (+932°F to +3182°F)	1,2,3,4,8	±0.10%	±1.3°C
SCIM5B47B-11	B	+500°C to+1800°C (-148°F to +1400°F)	1,2,3,4,8	±0.15%	±2.0°C
SCIM5B47J-12	J	-100°C to +760°C (+32°F to +1400°F)	1,2,3,4,8	±0.08%	±0.70°C
SCIM5B47K-13	K	-100°C to+1350°C (-148°F to +2462°F)	1,2,3,4,8	±0.08%	±1.20°C
SCIM5B47K-14	K	0°C to +1200°C (+32°F to +2192°F)	1,2,3,4,8	±0.08%	±0.96°C
SCIM5B47N-15	N	-100°C to+1300°C (-148°F to +2372°F)	1,2,3,4,8	±0.08%	±1.15°C

Output Ranges Available

Output Range	Part No. Suffix	Example
1. -5V to +5V	Z	SCIM5B47J-01Z
2. -10V to +10V	X	SCIM5B47J-01X
3. 0V to +5V	NONE	SCIM5B47J-01
4. 0V to +10V	D	SCIM5B47J-01D
8. 1V to +5V	Y	SCIM5B47J-01Y

y **Thermocouple Alloy Combinations**

Standards: DIN IEC 584, ANSIMC96-1-82, JISC 1602-1981

Type	Material
J	Iron vs. Copper-Nickel
K	Nickel-Chromium vs. Nickel-Aluminum
T	Copper vs. Copper-Nickel
E	Nickel-Chromium vs. Copper-Nickel
R	Platinum-13% Rhodium vs. Platinum
S	Platinum-10% Rhodium vs. Platinum
B	Platinum-30% Rhodium vs. Platinum-6% Rhodium
N	Nickel-14.2% Chromium-1.4% Silicon vs. Nickel-4.4% Silicaon-0.1% Magnesium