SCM7B21/30/31

Isolated Analog Voltage-input Modules

DESCRIPTION

Each SCM7B21/30/31 voltage input module accepts one channel of analog voltage input which is filtered, isolated, amplified, and converted to a high-level analog voltage for output to the process control system.

These modules incorporate a five-pole filtering approach to maximize both time and frequency response by taking advantage of both Thomson (Bessel) and Butterworth characteristics. One pole of the filter is on the field side of the isolation barrier; four are on the process control system side.

After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit and transferred across the transformer isolation barrier, suppressing transmission of common mode spikes and surges. The signal is then reconstructed and filtered for process control system output.

Modules accept a wide 14 - 35VDC power supply range (+24VDC nominal).Their compact packages (2.13"x1.705"x0.605") save space and are ideal for high channel density applications. They are designed for easy DIN-rail mounting using any of the -DIN backpanels.

FEATURES

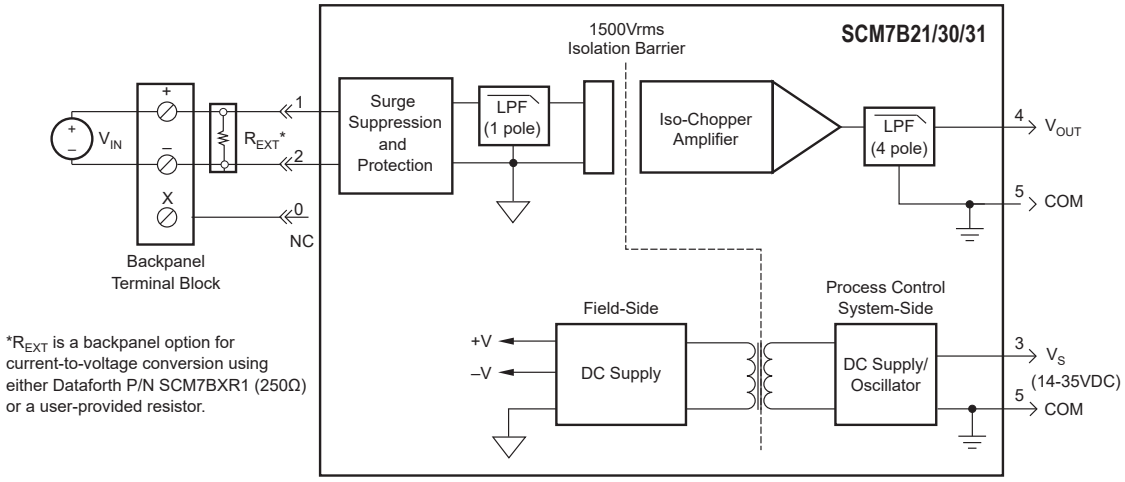
- Accepts Millivolt and Voltage Level Signals
- Provides High-level Voltage-outputs
- 1500Vrms Transformer Isolation
- Accuracy, ±0.03% of Span (typ), ±0.1% (max)
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 120Vrms, Continuous
- Noise, 500µVp-p (5MHz), 250µVrms (100kHz)
- Up to 160dB CMRR
- 85dB NMR at 60Hz, 80dB at 50Hz
- Easy DIN-rail Mounting
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Small Form-factor for High-density Applications
- Protects User Equipment from Lightning and Heavy Equipment Power-line Voltage
- Reduces Electrical Noise in Measured Signals
- Convenient System Expansion and Repair
- Signal Filtering in Noisy Environments
- Simplifies Sensor Interface and Signal Conditioning Design
- Provides Isolation of External Sensors
- Breaks Ground Loops
- Reduces EMC Concerns

APPLICATIONS

- Analog Signal Conditioning
- Industrial Process Control
- Test and Measurement
- System and Signal Monitoring
- Temperature Measurement
- Torque Measurement
- Civil Engineering
- Geotechnical Monitoring



*R_{EXT} is a backpanel option for current-to-voltage conversion using either Dataforth P/N SCM7BXR1 (250Ω) or a user-provided resistor.

SCM7B21/30/31 Block Diagram - For Module Dimensions and Pinouts, See Page 2-26

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

©1984-2024 Dataforth Corporation, All Rights Reserved ISO9001:2015-Registered QMS

Specifications

Typical* at T_A = + 25°C and +24VDC

Module	SCM7B21	SCM7B30	SCM7B31
Input			
Signal Range	±10V	See Table**	See Table**
Bias Current	±0.1nA	±0.5nA	±0.05nA
Resistance			
Normal	2MΩ (min)	50MΩ	500kΩ (min)
Power Off	2MΩ (min)	30kΩ (min)	500kΩ (min)
Overload	2MΩ (min)	30kΩ (min)	500kΩ (min)
Protection			
Continuous	120Vrms (max)	120Vrms (max)	120Vrms (max)
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
Output			
Signal Range(1)	±10V	†	†
Effective Available Power(1)	10mW	40mW	40mW
Resistance	<1Ω	<1Ω	<1Ω
Protection	Continuous Short-to-Ground	Continuous Short-to-Ground	Continuous Short-to-Ground
Voltage/Current Limit	±12V, ±14mA	±12V, ±14mA	±12V, ±14mA
CMV (Input-to-Output)			
Continuous	1500Vrms	1500Vrms	1500Vrms
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMRR (50 or 60Hz)	100dB	160dB	120dB
Accuracy(2)	±0.03% Span (typ)	±0.03% Span (typ)	±0.03% Span (typ)
	±0.1% Span (max)	±0.1% Span (max)	±0.1% Span (max)
Linearity(3)	±0.01% Span (typ)	±0.01% Span (typ)	±0.01% Span (typ)
	±0.02% Span (max)	±0.02% Span (max)	±0.02% Span (max)
Stability (–40°C to +85°C)			
Gain	±55ppm/°C	±35ppm/°C	±55ppm/°C
Input Offset	N/A(4)	±0.5µV/°C	±5µV/°C
Zero Suppression	N/A	±0.005%(V_Z)(5)/°C	±0.005%(V_Z)(5)/°C
Output Offset	±0.001% Span/°C	±0.002% Span/°C	±0.002% Span/°C
Noise			
Peak at 5MHz B/W	1mV	500µV	500µV
RMS at 10Hz to 100kHz B/W	250µV	250µV	250µV
Peak at 0.1Hz to10Hz B/W	1µV RTI(6)	1µV RTI(6)	1µV RTI(6)
Frequency and Time Response			
Bandwidth, –3dB	300Hz	3Hz	3Hz
NMR (50/60Hz)	80dB per Decade above 300Hz	80/85dB	80/85dB
Step Response, 90% Span	1.5ms	165ms	165ms
Supply Voltage	14 - 35VDC	14 - 35VDC	14 - 35VDC
Current(1)	16mA	12mA	12mA
Sensitivity	±0.0002%/%V_S	±0.0001%/%V_S	±0.0001%/%V_S
Mechanical Dimensions (h)x(w)x(d)	2.13" x 1.705" x 0.605" (54.1mm x 43.3mm x 15.4mm)	2.13" x 1.705" x 0.605" (54.1mm x 43.3mm x 15.4mm)	2.13" x 1.705" x 0.605" (54.1mm x 43.3mm x 15.4mm)
Environmental			
Operating Temperature Range	–40°C to +85°C	–40°C to +85°C	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C	–40°C to +85°C	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing	0 to 95% Noncondensing	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1	ISM, Group 1	ISM, Group 1
Radiated, Conducted	Class A	Class A	Class A
Immunity EN61000-6-2	ISM, Group 1	ISM, Group 1	ISM, Group 1
RF	Performance A ±0.5% Span Error	Performance A ±0.5% Span Error	Performance A ±0.5% Span Error
ESD, EFT	Performance B	Performance B	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Output Range and Supply Current specifications are based on minimum output load resistance. Minimum output load resistance is calculated by V_{OUT}^2/P_E, where P_E is the Output Effective Available Power that guarantees output range, accuracy, and linearity specifications.
(2) Accuracy includes the effects of repeatability, hysteresis, and linearity.
(3) Linearity is calculated using the best-fit straight line method.
(4) Input offset term included in output offset specification.
(5) V_Z is the nominal input voltage that results in a 0V output.
(6) RTI = Referenced to Input.
(7) SCM7B21 is available only as ±10V output.

**Ordering Information

Model	Input Range
SCM7B21(7)	±10V
SCM7B30-01	0 to +10mV
SCM7B30-02	0 to +100mV
SCM7B30-03	0 to +1V
SCM7B30-05	+1V to +5V
SCM7B30-06	±10mV
SCM7B30-07	±100mV
SCM7B30-08	±1V
SCM7B31-01	0 to +10V
SCM7B31-02	±5V
SCM7B31-03	±10V
SCM7B31-04	0 to +5V
SCM7B31-05	0 to +20V
SCM7B31-06	±20V
SCM7B31-07	0 to +50V
SCM7B31-08	±50V

†Output Ranges Available

Output Range	Part No. Suffix	Example
+1V to +5V	NONE	SCM7B30-01
0 to +5V	A	SCM7B30-01A
0 to +10V	D	SCM7B30-01D

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

©1984-2024 Dataforth Corporation, All Rights Reserved ISO9001:2015-Registered QMS