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 (Figure 1).

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" max) 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 Typical, ±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

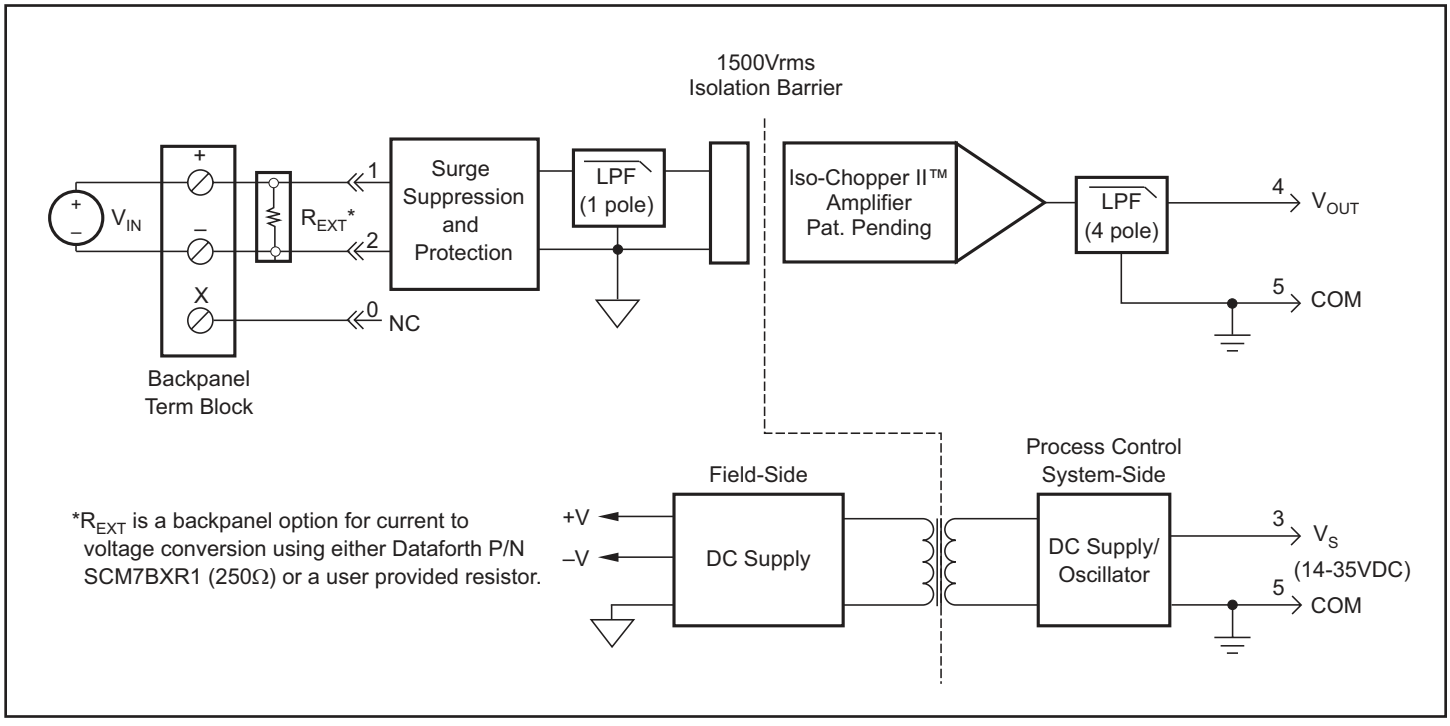

Figure 1: SCM7B21/30/31 Block Diagram

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Specifications Typical* at 25°C and +24VDC

Module	SCM7B21	SCM7B30	SCM7B31
Input			
Signal Range	±10V	±10mV to ±1V	±1V to ±50V
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	*	*
Transient	ANSI/IEEE C37.90.1	*	*
Output			
Signal Range(1)	±10V	†	†
Effective Available Power(1)	10mW	40mW	*
Resistance	<1Ω	*	*
Protection	Continuous Short to Ground	*	*
Voltage/Current Limit	±12V, ±14mA	*	*
CMV (Input-to-Output)			
Continuous	1500Vrms	*	*
Transient	ANSI/IEEE C37.90.1	*	*
CMRR (50 or 60Hz)	100dB	160dB	120dB
Accuracy(2)	±0.03% Span typical, ±0.1% Span max	*	*
Linearity(3)	±0.01% Span typical, ±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	*
Output Offset	±0.001% Span/°C	±0.002% Span/°C	*
Noise			
Peak at 5MHz B/W	1mV	500µV	*
RMS at 10Hz to 100kHz B/W	250µV	*	*
Peak at 0.1Hz to10Hz B/W	1µV RTI(6)	*	*
Frequency and Time Response			
Bandwidth, –3dB	300Hz	3Hz	*
NMR (50/60Hz)	80dB per Decade above 300Hz	80/85dB	*
Step Response, 90% Span	1.5ms	165ms	*
Supply Voltage	14 to 35VDC	*	*
Current(1)	16mA	12mA	*
Sensitivity	±0.0002% ⅋ $_S$	±0.0001% ⅋ $_S$	*
Mechanical Dimensions (h)(w)(d)	2.13" x 1.705" x 0.605" max (54.1mm x 43.3mm x 15.4mm max)	* *	* *
Environmental			
Operating Temperature Range	–40°C to +85°C	*	*
Storage Temperature 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	Performance B	*	*

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
* Specification same as preceding model.
(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	+1 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
+1 to +5V	NONE	SCM7B30-01
0 to +5V	A	SCM7B30-01A
0 to +10V	D	SCM7B30-01D

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