SCM7B32/33

Isolated Process Current/Voltage-input Modules

DESCRIPTION

The SCM7B32 current-input modules accept input signals in the 4-20mA or 0-20mA ranges from the field and provide a high-level output to the process control system (Figure below). Current-to-voltage conversion occurs internal to the module, which is factory calibrated to ensure the highest accuracy.

SCM7B33 voltage-input modules accept input signals in the +1V to +5V or 0 to +5V ranges from the field and provide a high-level output to the process control system. As an alternative, the SCM7B33 can be used with an external 250Ω resistor (Dataforth SCM7BXR1 or equivalent), to accept input signals in the 4-20mA or 0-20mA ranges. Using the external sense resistor allows the module to be removed without disrupting the current loop. All SCM7B33s are shipped with a SCM7BXR1 resistor.

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 (conversion-SCM7B32 only), 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

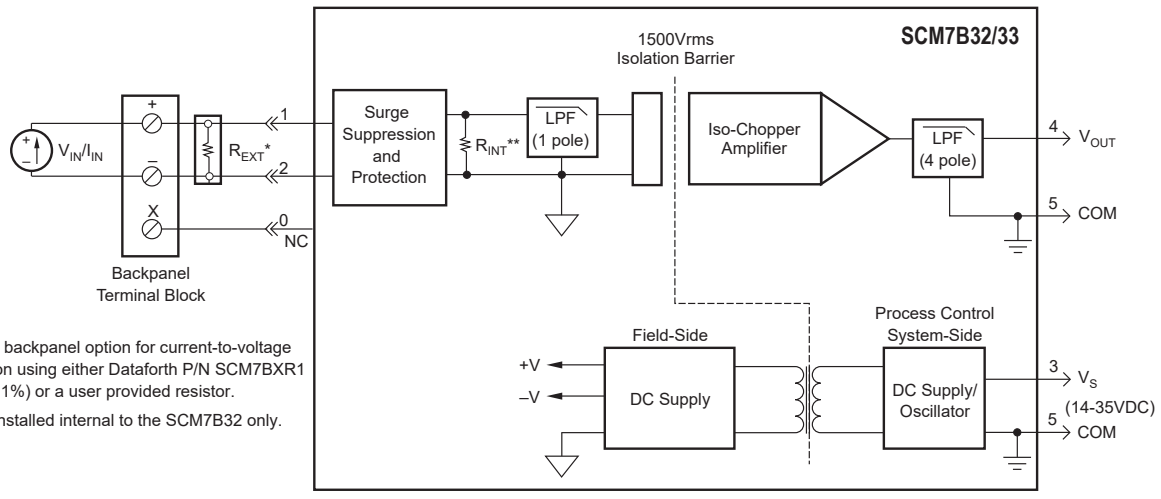
- Accepts Current or Voltage Input
- Provides High-level Voltage-outputs
- 1500Vrms Transformer Isolation
- Accuracy, ±0.03% of Span (typ), ±0.1% (max)
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 120Vrms, Continuous
- Noise, 500µVp-p (5MHz), 300µVrms (100kHz)
- 105dB CMRR
- Easy DIN-rail 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, 0.1%) or a user provided resistor.

**R_{INT} is installed internal to the SCM7B32 only.

SCM7B32/33 Block Diagram - For Module Dimensions and Pinouts, See Page 2-26

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Specifications

Typical* at T_A = + 25°C and +24VDC

Module	SCM7B32	SCM7B33
Input		
Signal Range	4-20mA, 0-20mA	+1V to +5V, 0 to +5V
Bias Current	N/A	±0.1nA
Resistance		
Normal	<100Ω	2MΩ
Power Off	<100Ω	2MΩ
Overload	30kΩ	2MΩ
Protection		
Continuous	120Vrms (max)	120Vrms (max)
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
Output		
Signal Range(1)	†	†
Effective Available Power(1)	40mW	40mW
Resistance	<1Ω	<1Ω
Protection	Continuous Short-to-Ground	Continuous Short-to-Ground
Voltage/Current Limit	±12V, ±14mA	±12V, ±14mA
CMV (Input-to-Output)		
Continuous	1500Vrms	1500Vrms
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMRR (50 or 60Hz)	105dB	105dB
Accuracy(2)	±0.03% Span (typ) ±0.1% Span (max)	±0.03% Span (typ) ±0.1% Span (max)
Linearity(3)	±0.01% Span (typ) ±0.02% Span (max)	±0.01% Span (typ) ±0.02% Span (max)
Stability (–40°C to +85°C)		
Gain	±35ppm/°C	±35ppm/°C
Input Offset	N/A(4)	N/A(4)
Output Offset	±0.003% Span/°C	±0.003% Span/°C
Noise		
Peak at 5MHz B/W	500µV	500µV
RMS at 10Hz to 100kHz B/W	300µV	300µV
Peak at 0.1Hz to 10Hz B/W	1µV RTI(5)	1µV RTI(5)*
Frequency and Time Response		
Bandwidth, –3dB	100Hz	100Hz
NMR (–3dB at 100Hz)	80dB per Decade Above 100Hz	80dB per Decade Above 100Hz
Step Response, 90% Span	5ms	5ms
Supply Voltage	14 - 35VDC	14 - 35VDC
Current(1)	12mA	12mA
Sensitivity	±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)
Environmental		
Operating Temperature Range	–40°C to +85°C	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1	ISM, Group 1
Radiated, Conducted	Class A	Class A
Immunity EN61000-6-2	ISM, Group 1	ISM, Group 1
RF	Performance A ±0.5% Span Error	Performance A ±0.5% Span Error
ESD, EFT	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. For SCM7B33, does not include SCM7BXR1 accuracy.
(3) Linearity is calculated using the best-fit straight line method.
(4) Input offset term included in output offset specification.
(5) RTI = Referenced to Input.

Ordering Information

Model	Input Range
SCM7B32-01	4-20mA
SCM7B32-02	0-20mA
SCM7B33-01	+1V to +5V
SCM7B33-02	0 to +5V

†Output Ranges Available

Output Range	Part No. Suffix	Example
+1V to +5V	NONE	SCM7B32-01
0 to +5V	A	SCM7B32-01A
0 to +10V	D	SCM7B32-01D

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