SCM7B40/41

Isolated Analog Voltage-input Modules, Wide Bandwidth

DESCRIPTION

Each SCM7B40/41 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

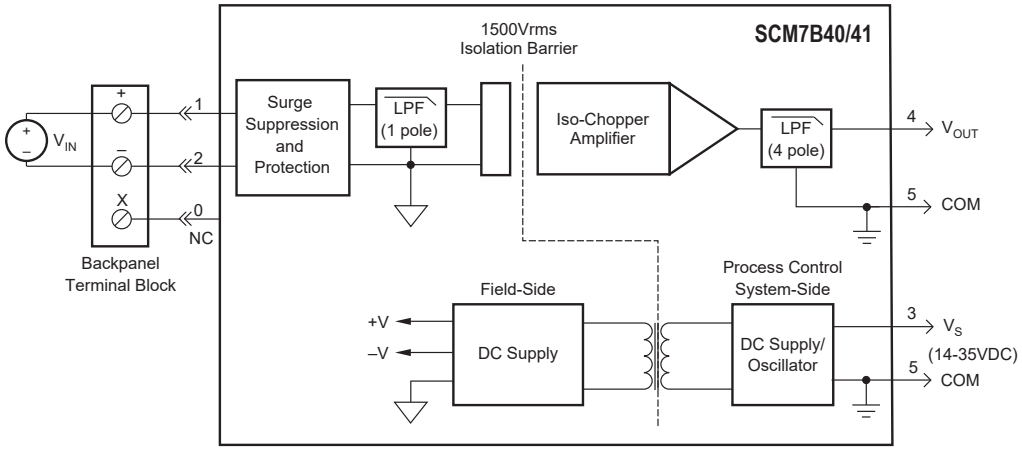
- Accepts Millivolt or Voltage Inputs
- Provides High-level Voltage-outputs
- 10kHz Bandwidth
- 1500Vrms Transformer Isolation
- Accuracy, ±0.03% of Span (typ) ±0.1% (max)
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 120Vrms, Continuous
- Noise, 2mVp-p (5MHz), 1mVrms (100kHz)
- Up to 110dB 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



SCM7B40/41 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	SCM7B40	SCM7B41
Input		
Signal Range	–1V to +1V	–10V to +40V
Bias Current	±1nA	±0.1nA
Resistance		
Normal	50MΩ	500kΩ (min)
Power Off	30kΩ (min)	500kΩ (min)
Overload	30kΩ (min)	500kΩ (min)
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)	110dB	110dB
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	±55ppm/°C
Input Offset	±0.5µV/°C	±5µV/°C
Zero Suppression	±0.005%(V_z)(4)/°C	±0.005%(V_z)(4)/°C
Output Offset	±0.002% Span/°C	±0.002% Span/°C
Noise		
Peak at 5MHz B/W	2mV	2mV
RMS at 10Hz to 100kHz B/W	1mV	1mV
Peak at 0.1Hz to10Hz B/W	1µV RTI(5)	1µV RTI(5)
Frequency and Time Response		
Bandwidth, –3dB	10kHz	10kHz
NMR	80dB per Decade above10kHz	80dB per Decade above10kHz
Step Response, 90% Span	50µs	50µs
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.
(3) Linearity is calculated using the best-fit straight line method.
(4) V_z is the nominal input voltage that results in a 0V output.
(5) RTI = Referenced to Input.

Ordering Information

Model	Input Range
SCM7B40-02	0 to +100mV
SCM7B40-03	0 to +1V
SCM7B40-07	±100mV
SCM7B40-08	±1V
SCM7B41-01	0 to +10V
SCM7B41-02	±5V
SCM7B41-03	10V
SCM7B41-04	0 to +5V
SCM7B41-05	0 to +20V
SCM7B41-06	0 to +40V

†Output Ranges Available

Output Range	Part No. Suffix	Example
+1V to +5V	NONE	SCM7B40-02
0 to +5V	A	SCM7B40-02A
0 to +10V	D	SCM7B40-02D

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