SCM7B36

Isolated Potentiometer-input Modules

DESCRIPTION

Each SCM7B36 Potentiometer-input module provides a single channel of resistance input which is filtered, isolated, amplified, and converted to a high-level analog voltage output.

The SCM7B36 module interfaces to slidewires and potentiometers in both two-wire or three-wire configuration and incorporates a five-pole filtering approach to maximize both time and frequency response by taking advantage of both (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. In the 3-wire configuration, lead resistance compensation is provided if the resistance of the "x" lead is closely equivalent to that of the "+" lead. Internal to the module, measurement error due to lead resistance is canceled.

In response to the low-level current excitation, and after 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.

Six standard input resistance ranges are offered, from 100Ω to 10kΩ, with three output ranges available: 0-5V, 1-5V, and 0-10V. Modules accept a wide 14-35VDC power supply range (+24VDC nominal). Their compact packages (2.13" x 1.705" x 0.605") 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

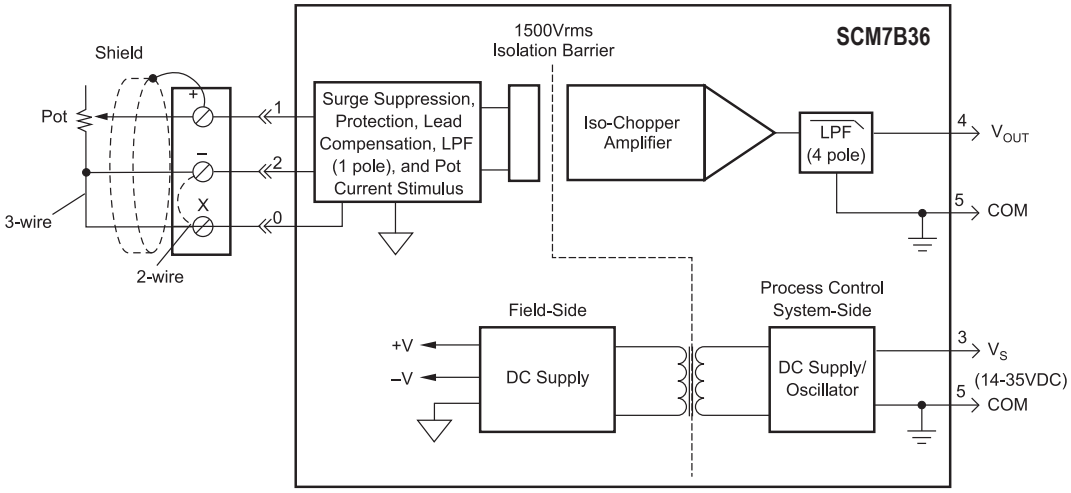
- 2-wire Transmitter Interface
- Accepts 4-20mA Signals
- Provides an Isolated +24VDC Supply to Power the Loop
- Provides High-level Voltage-outputs
- 1500Vrms Transformer Isolation
- Accuracy, ±0.03% of Span (typ) ±0.1% (max)
- ANSI/IEEE C37.90.1 Transient Protection
- 120Vrms Input Protection
- 105dB 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



SCM7B36 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	SCM7B36
Input Range	(See Ordering Information)
Protection	
Continuous	120Vrms (max)
Transient	ANSI/IEEE C37.90.1
Sensor Excitation Current	65µA (10kΩ) to 260µA (100Ω)
Lead Resistance Effect (3-wire)(1)	
-01 thru -04	: ±0.005Ω/
-05	: ±0.02Ω/Ω
-06	: ±0.04Ω/Ω
Output Range(2)	
(See Output Range)	†
Effective Available Power(2)	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)	120dB
Accuracy(3)	±0.03% Span (typ)
	±0.1% Span (max)
Linearity(4)	±0.01% Span (typ)
	±0.02% Span (max)
Stability (–40°C to +85°C)	
Input Offset	±0.01Ω/°C
Output Offset	±30µV/°C
Gain	±60ppm/°C
Noise Peak at 5MHz B/W	1mV
RMS at 10Hz to 100kHz B/W	250µV
Peak at 0.1Hz to 10Hz B/W	1µV RTI(5)
Open Input Response	
'+' Lead	Upscale
'–' Lead	Non-deterministic
'x' Lead	Downscale
Open Input Detection Time	<5s
Frequency and Time Response	
Bandwidth, –3dB	3Hz
NMR (50/60Hz)	80/85dB
Step Response, 0 to 90%	250ms
Supply Voltage	14-35VDC
Current(2)	12mA
Sensitivity	±0.0001%/%V_S
Mechanical Dimensions	2.13" x 1.705" x 0.605"
(h)x(w)x(d)	(54.1mm x 43.3mm x 15.4mm)
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.
(1) Lead resistance effect is given for the condition of not having the NTC thermistor installed in the backpanel. As a general rule, as long as the lead resistance of the (+) lead matches the parallel combination of the thermistor and lead resistance in the (X) lead, the given specifications apply.
(2) 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 and accuracy specifications.
(3) Accuracy includes the effects of repeatability, hysteresis, and linearity, but does not include sensor accuracy.
(4) Linearity is calculated using the best-fit straight line method.
(5) RTI = Referenced to Input.

Ordering Information

Model	Input Range
SCM7B36-01	0 to 100Ω
SCM7B36-02	0 to 200Ω
SCM7B36-03	0 to 500Ω
SCM7B36-04	0 to 1kΩ
SCM7B36-05	0 to 5kΩ
SCM7B36-06	0 to 10kΩ

†Output Ranges Available

Output Range	Part No. Suffix	Example
+1V to +5V	NONE	SCM7B36-01
0 to +5V	A	SCM7B36-01A
0 to +10V	D	SCM7B36-01D

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