SCM5B40/41

Analog Voltage Input Modules, Wide Bandwidth

FEATURES

- ACCEPTS MILLIVOLT AND VOLTAGE LEVEL SIGNALS
- HIGH LEVEL VOLTAGE OUTPUTS
- 1500Vrms TRANSFORMER ISOLATION
- ANSI/IEEE C37.90.1-1989 TRANSIENT PROTECTION
- INPUT PROTECTED TO 240VAC CONTINUOUS
- 100dB CMR
- 10kHz SIGNAL BANDWIDTH
- ±0.05% ACCURACY
- ±0.02% LINEARITY
- ±1µV/°C DRIFT
- CSA CERTIFIED, FM APPROVED, CE COMPLIANT
- MIX AND MATCH SCM5B TYPES ON BACKPANEL

DESCRIPTION

Each SCM5B40 and SCM5B41 wide bandwidth voltage input module provides a single channel of analog input which is amplified, isolated, and converted to a high level analog voltage output (Figure 1). This voltage output is logic-switch controlled, allowing these modules to share a common analog bus without the requirement of external multiplexers.

The SCM5B modules are designed with a completely isolated computer side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin to I/O Common, pin 19.

The input signal is processed through a pre-amplifier on the field side of the isolation barrier. This pre-amplifier has a gain-bandwidth product of 5MHz and is bandwidth limited to 10kHz. After amplification, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common mode spikes or surges. The module is powered from +5VDC, ±5%.

A special input circuit on the SCM5B40 and SCM5B41 modules provides protection against accidental connection of power-line voltages up to 240VAC.

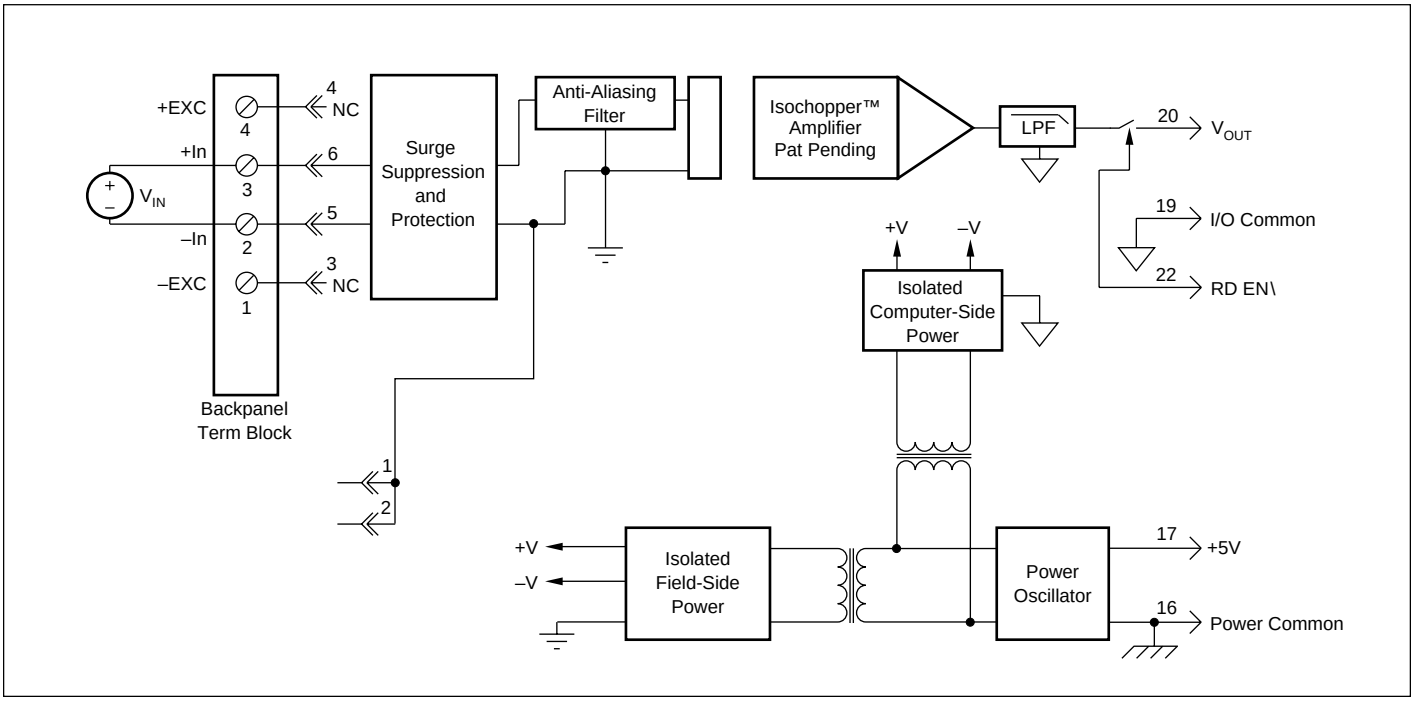

FIGURE 1. SCM5B40/41 Block Diagram.

SPECIFICATIONS Typical at T_A = +25°C and +5V Power.

Module	SCM5B40	SCM5B41
Input Range	±10mV to ±100mV	±1V to ±40V
Input Bias Current	±0.5nA	±0.05nA
Input Resistance		
Normal	200MΩ	650kΩ (minimum)
Power Off	40kΩ	650kΩ (minimum)
Overload	40kΩ	650kΩ (minimum)
Input Protection		
Continuous	240Vrms Max	*
Transient	ANSI/IEEE C37.90.1-1989	*
CMV, Input to Output		
Continuous	1500Vrms max	*
Transient	ANSI/IEEE C37.90.1-1989	*
CMR (50Hz or 60Hz)	100dB	*
NMR (–3dB at 10kHz)	120dB per Decade above 10kHz	*
Accuracy[1]	±0.05% Span ±10µV RTI[2] ±0.05%(V_Z[3])	±0.05% span ±0.2mV RTI[2] ±0.05% (V_Z[3])
Nonlinearity	±0.02% Span	*
Stability		
Input Offset	±1µV/°C	±20µV/°C
Output Offset	±40µV/°C	*
Gain	±25ppm/°C	±50ppm/°C
Noise		
Input, 0.1 to 10Hz	0.4µVrms	2µVrms
Output, 100kHz	10mVp-p	*
Bandwidth, –3dB	10kHz	*
Rise Time, 10 to 90% Span	35µs	*
Settling Time, to 0.1%	250µs	*
Output Range	±5V or 0V to +5V	*
Output Resistance	50Ω	*
Output Protection	Continuous Short to Ground	*
Output Selection Time (to ±1mV of V_{OUT})	6µs at C_{load} = 0 to 2000pF	*
Output Current Limit	±8mA	*
Output Enable Control		
Max Logic "0"	+0.8V	*
Min Logic "1"	+2.4V	*
Max Logic "1"	+36V	*
Input Current, "0", "1"	0.5µA	*
Power Supply Voltage	+5VDC ±5%	*
Power Supply Current	30mA	*
Power Supply Sensitivity	±2µV/% RTI[2]	±200µV/% RTI[2]
Mechanical Dimensions	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)	*
Environmental		
Operating Temp. Range	–40°C to +85°C	*
Storage Temp. Range	–40°C to +85°C	*
Relative Humidity	0 to 95% Noncondensing	*
Emissions	EN50081-1, ISM Group 1, Class A (Radiated, Conducted)	*
Immunity	EN50082-1, ISM Group 1, Class A (ESD, RF, EFT)	*

* Same specification as SCM5B40.
NOTES: (1) Includes nonlinearity, hysteresis and repeatability.
(2) RTI = Referenced to input.
(3) V_Z is the input voltage that results in 0V output.

ORDERING INFORMATION

MODEL	INPUT RANGE	OUTPUT RANGE
SCM5B40-01	–10mV to +10mV	–5V to +5V
SCM5B40-02	–50mV to +50mV	–5V to +5V
SCM5B40-03	–100mV to +100mV	–5V to +5V
SCM5B40-04	–10mV to +10mV	0V to +5V
SCM5B40-05	–50mV to +50mV	0V to +5V
SCM5B40-06	–100mV to +100mV	0V to +5V
SCM5B41-01	–1V to +1V	–5V to +5V
SCM5B41-02	–5V to +5V	–5V to +5V
SCM5B41-03	–10V to +10V	–5V to +5V
SCM5B41-04	–1V to +1V	0V to +5V
SCM5B41-05	–5V to +5V	0V to +5V
SCM5B41-06	–10V to +10V	0V to +5V
SCM5B41-07	–20V to +20V	–5V to +5V
SCM5B41-08	–20V to +20V	0V to +5V
SCM5B41-09	–40V to +40V	–5V to +5V
SCM5B41-10	–40V to +40V	0V to +5V