SCM5B30/31
Analog Voltage Input Modules, Narrow Bandwidth

Description
Each SCM5B30 and SCM5B31 voltage input module provides a single channel of analog input which is filtered, isolated, amplified, 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.

Signal filtering is accomplished with a six-pole filter which provides 95dB of normal-mode rejection at 60Hz and 90dB at 50Hz. Two poles of this filter are on the field side of the isolation barrier, and the other four are on the computer side.

After the initial field-side filtering, 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 SCM5B30 and SCM5B31 modules provides protection against accidental connection of power-line voltages up to 240VAC.

Features
- Accepts Millivolt and Voltage Level Signals
- High-Level Voltage Outputs
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- 160dB CMR
- 95dB NMR at 60Hz, 90dB at 50Hz
- ±0.03% Accuracy
- ±0.005% Linearity
- ±1μV/°C Drift
- CSA C/US Certified
- CE and ATEX Compliant
- Mix and Match SCM5B Types on Backpanel

Figure 1: SCM5B30/31 Block Diagram
### Specifications

**Module** | **SCM5B30** | **SCM5B31**
---|---|---
**Input Range** | ±10mV to ±1V | ±1V to ±40V
**Input Bias Current** | ±0.5nA | ±0.05nA
**Input Resistance**
Normal | 50MΩ | 650kΩ (-01 thru -06) 2MΩ (-07 thru -10)
Power Off | 40kΩ | 650kΩ (-01 thru -06) 2MΩ (-07 thru -10)
Overload | 40kΩ | 650kΩ (-01 thru -06) 2MΩ (-07 thru -10)
**Input Protection**
Continuous | 240Vrms max | *
Transient | ANSI/IEEE C37.90.1 | *
**CMV, Input to Output**
Continuous | 1500Vrms max | *
Transient | ANSI/IEEE C37.90.1 | *
NMR | 95dB at 60Hz, 90dB at 50Hz | *
**Accuracy**
Typical at $T_a = +25^\circ$C and +5VDC power | ±0.03% Span | *
**Linearity** | ±0.005% Span | *
**Stability**
Input Offset | ±1µV/°C | ±20µV/°C
Output Offset | ±20µV/°C | ±50µV/°C
Gain | ±25ppm/°C | ±50ppm/°C
**Noise**
Input, 0.1 to 10Hz | 0.2µVrms | 2µVrms
Output, 100kHz | 200µVrms | *
Bandwidth, -3dB | 4Hz | *
Response Time, 90% Span | 0.2s | *
**Output Range** | See Ordering Information | *
**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 | *
**Mechanical Dimensions**

| (h)(w)(d) | 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 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 | *

### Ordering Information

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<thead>
<tr>
<th>Model</th>
<th>Input Range</th>
<th>Output Range†</th>
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<tbody>
<tr>
<td>SCM5B30-01</td>
<td>–10mV to +1mV</td>
<td>1, 2</td>
</tr>
<tr>
<td>SCM5B30-02</td>
<td>−10mV to +10mV</td>
<td>1, 2</td>
</tr>
<tr>
<td>SCM5B30-03</td>
<td>−100mV to +100mV</td>
<td>1, 2</td>
</tr>
<tr>
<td>SCM5B30-04</td>
<td>−10mV to +10mV</td>
<td>3, 4</td>
</tr>
<tr>
<td>SCM5B30-05</td>
<td>−50mV to +50mV</td>
<td>3, 4</td>
</tr>
<tr>
<td>SCM5B30-06</td>
<td>−100mV to +100mV</td>
<td>3, 4</td>
</tr>
<tr>
<td>SCM5B30-07</td>
<td>−1V to +1V</td>
<td>1, 2</td>
</tr>
<tr>
<td>SCM5B31-01</td>
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<tr>
<td>SCM5B31-02</td>
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<td>1, 2</td>
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<td>3, 4</td>
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### Output Ranges Available

<table>
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<tr>
<th>Output Range</th>
<th>Part No. Suffix</th>
<th>Example</th>
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<tbody>
<tr>
<td>−5V to +5V</td>
<td>NONE</td>
<td>SCM5B30-01</td>
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<tr>
<td>−10V to +10V</td>
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<td>SCM5B30-01D</td>
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<tr>
<td>0V to +5V</td>
<td>NONE</td>
<td>SCM5B30-04</td>
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<tr>
<td>0V to +10V</td>
<td>D</td>
<td>SCM5B30-04D</td>
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</tbody>
</table>

### NOTES:

*Contact factory or your local Dataforth sales office for maximum values.
(Same specification as SCM5B30. Includes linearity, hysteresis and repeatability.
(2) RTI = Referenced to input.
(3) Same as SCM5B31-01 with 50Ω input resistance.