

# SCM9B

## Isolated, Intelligent Signal Conditioning Products



### SCM9B Modules

Dataforth offers high quality SCM9B products providing cost-effective protection and conditioning for a wide range of valuable industrial control signals and systems. Our extensive line includes fixed and programmable sensor-to-computer and computer-to-analog output interface modules, RS-232/RS-485 converters, RS-485 repeaters, and associated backplanes, accessories, and applications software. All products are European EMC Directive Compliant.

### SCM9B-1000/2000/5000/D100 Sensor-to-Computer Modules

These isolated modules provide complete sensor/RS-232C or /RS-485 interfaces with 15-bit measurement resolution. They accept a variety of voltage, current, thermocouple, RTD/thermistor, strain gage, timer/frequency, and multichannel digital inputs/outputs. "2000" Series modules include additional programmable features such as ASCII output scaling to desired engineering units and linearization using straight-line segment approximation. "5000" Series modules provide four analog input channels. D100 Series modules are DIN rail mountable.

### SCM9B-3000/4000 Computer-to-Analog Output Modules

These are complete, isolated interfaces designed for remote installation and communications with host computers via standard RS-232C and RS-485 serial ports. They offer 12-bit resolution in a range of analog output voltages and currents. "4000" series modules have fully programmable output slopes, true analog readback, and data scaling.

### SCM9B-A1000/2000/D192 Converters and Repeaters

These products convert RS-232C communications signal levels to the correct RS-485 signal requirements, and may also be configured as repeaters to extend communications bus lengths. They are optically isolated, require no external control signals, and are completely transparent to host software.



### ► Features

#### SCM9B Sensor-to-Computer Modules

- 500Vrms Input Isolation
- Programmable Scaling and Linearization
- ASCII Command/Response Protocol
- 15-bit Measurement Resolution
- Continuous Self-Calibration
- DIN Rail Mountable D100 Series

#### SCM9B Computer-to-Analog Output Modules

- 0-1V, ±1V, 0-5V, ±5V, 0-10V, ±10V, 0-20mA, 4-20mA Output Ranges
- 500Vrms Output Isolation
- 12-bit Output Resolution
- Programmable 0.01V/s (mA/s) to 10,000V/s (mA/s) Output Slopes

#### SCM9B Converters and Repeaters

- Transparent to Host
- Optically Isolated Bidirectional Data Flows
- Automatic Internal RS-485 Bus Supervision
- DIN Rail Mountable D192 Model

SCM9B

### ► SCM9B Selection Guide

SCM9B-1000/2000 Sensor-to-Computer Products Page 144 ("2000" Series products have user-programmable features)

MODEL	INPUT RANGE	OUTPUT
<b>Voltage Inputs</b>		
SCM9B-1101/2101	±10mV	RS-232C
SCM9B-1102/2102	±10mV	RS-485
SCM9B-1111/2111	±100mV	RS-232C
SCM9B-1112/2112	±100mV	RS-485
SCM9B-1121/2121	±1V	RS-232C
SCM9B-1122/2122	±1V	RS-485
SCM9B-1131/2131	±5V	RS-232C
SCM9B-1132/2132	±5V	RS-485
SCM9B-1141/2141	±10V	RS-232C
SCM9B-1142/2142	±10V	RS-485
SCM9B-1151/2151	±100V	RS-232C
SCM9B-1152/2152	±100V	RS-485

MODEL	INPUT RANGE	OUTPUT
<b>Current Inputs</b>		
SCM9B-1211/2211	±10mA	RS-232C
SCM9B-1212/2212	±10mA	RS-485
SCM9B-1221/2221	±1mA	RS-232C
SCM9B-1222/2222	±1mA	RS-485
SCM9B-1231/2231	±100mA	RS-232C
SCM9B-1232/2232	±100mA	RS-485
SCM9B-1241/2241	±1A	RS-232C
SCM9B-1242/2242	±1A	RS-485
SCM9B-1251/2251	4-20mA	RS-232C
SCM9B-1252/2252	4-20mA	RS-485

**► SCM9B Selection Guide (Continued)**

<u>MODEL</u>	<u>INPUT RANGE</u>	<u>OUTPUT</u>
<b>Thermocouple Inputs</b>		
SCM9B-1311	J Thermocouple	RS-232C
SCM9B-1312	J Thermocouple	RS-485
SCM9B-1321	K Thermocouple	RS-232C
SCM9B-1322	K Thermocouple	RS-485
SCM9B-1331	T Thermocouple	RS-232C
SCM9B-1332	T Thermocouple	RS-485
SCM9B-1341	E Thermocouple	RS-232C
SCM9B-1342	E Thermocouple	RS-485
SCM9B-1351	R Thermocouple	RS-232C
SCM9B-1352	R Thermocouple	RS-485
SCM9B-1361	S Thermocouple	RS-232C
SCM9B-1362	S Thermocouple	RS-485
SCM9B-1371	B Thermocouple	RS-232C
SCM9B-1372	B Thermocouple	RS-485
SCM9B-1381	C Thermocouple	RS-232C
SCM9B-1382	C Thermocouple	RS-485

<u>MODEL</u>	<u>INPUT RANGE</u>	<u>OUTPUT</u>
<b>RTD Inputs</b>		
SCM9B-1411	.00385 RTD	RS-232C
SCM9B-1412	.00385 RTD	RS-485
SCM9B-1421	.00392 RTD	RS-232C
SCM9B-1422	.00392 RTD	RS-485
SCM9B-1431	.00388 RTD	RS-232C
SCM9B-1432	.00388 RTD	RS-485
SCM9B-1451	2252Ω Thermistor	RS-232C
SCM9B-1452	2252Ω Thermistor	RS-485
SCM9B-1461	TD Thermistor	RS-232C
SCM9B-1462	TD Thermistor	RS-485

<u>MODEL</u>	<u>INPUT RANGE</u>	<u>OUTPUT</u>
<b>Strain Gage Inputs</b>		
SCM9B-1511/2511	±30mV Bridge, 5V Excitation	RS-232C
SCM9B-1512/2512	±30mV Bridge, 5V Excitation	RS-485
SCM9B-1521/2521	±30mV Bridge, 10V Excitation	RS-232C
SCM9B-1522/2522	±30mV Bridge, 10V Excitation	RS-485
SCM9B-1531/2531	±100mV Bridge, 5V Excitation	RS-232C
SCM9B-1532/2532	±100mV Bridge, 5V Excitation	RS-485
SCM9B-1541/2541	±100mV Bridge, 10V Excitation	RS-232C
SCM9B-1542/2542	±100mV Bridge, 10V Excitation	RS-485
SCM9B-1551/2551	1-6V Bridge, 8V Excitation	RS-232C
SCM9B-1552/2552	1-6V Bridge, 8V Excitation	RS-485
SCM9B-1561/2561	1-6V Bridge, 10V Excitation	RS-232C
SCM9B-1562/2562	1-6V Bridge, 10V Excitation	RS-485

<u>MODEL</u>	<u>INPUT RANGE</u>	<u>OUTPUT</u>
<b>Timer/Frequency Inputs</b>		
SCM9B-1601/2601	Frequency	RS-232C
SCM9B-1602/2602	Frequency	RS-485
SCM9B-1611/2611	Timer	RS-232C
SCM9B-1612/2612	Timer	RS-485
SCM9B-1621	Event Counter	RS-232C
SCM9B-1622	Event Counter	RS-485
SCM9B-1631/2631	Accumulator, Frequency	RS-232C
SCM9B-1632/2632	Accumulator, Frequency	RS-485
SCM9B-1641/2641	Accumulator, Timer	RS-232C
SCM9B-1642/2642	Accumulator, Timer	RS-485

<u>MODEL</u>	<u>DIGITAL INPUTS</u>	<u>DIGITAL OUTPUTS</u>	<u>RS OUTPUT</u>
<b>Digital Inputs/Outputs</b>			
SCM9B-1701	7	8	RS-232C
SCM9B-1702	7	8	RS-485
SCM9B-1711	15 and/or	15	RS-232C
SCM9B-1712	15 and/or	15	RS-485

**SCM9B-5000 Four Channel Sensor-to-Computer Products Page 148**

<u>MODEL</u>	<u>INPUT RANGE</u>	<u>OUTPUT</u>
<b>Voltage Inputs</b>		
SCM9B-5111	±100mV	RS-232C
SCM9B-5112	±100mV	RS-485
SCM9B-5121	±1V	RS-232C
SCM9B-5122	±1V	RS-485
SCM9B-5131	±5V	RS-232C
SCM9B-5132	±5V	RS-485
SCM9B-5141	±10V	RS-232C
SCM9B-5142	±10V	RS-485
SCM9B-5151	±100V	RS-232C
SCM9B-5152	±100V	RS-485

<u>MODEL</u>	<u>INPUT RANGE</u>	<u>OUTPUT</u>
<b>Current Inputs</b>		
SCM9B-5251	4-20mA	RS-232C
SCM9B-5252	4-20mA	RS-485

<u>MODEL</u>	<u>INPUT RANGE</u>	<u>OUTPUT</u>
<b>Thermocouple Inputs</b>		
SCM9B-5311	J Thermocouple	RS-232C
SCM9B-5312	J Thermocouple	RS-485
SCM9B-5321	K Thermocouple	RS-232C
SCM9B-5322	K Thermocouple	RS-485
SCM9B-5331	T Thermocouple	RS-232C
SCM9B-5332	T Thermocouple	RS-485
SCM9B-5341	E Thermocouple	RS-232C
SCM9B-5342	E Thermocouple	RS-485

<u>MODEL</u>	<u>INPUT RANGE</u>	<u>OUTPUT</u>
<b>Thermistor inputs</b>		
SCM9B-5451	2252Ω Thermistor	RS-232C
SCM9B-5452	2252Ω Thermistor	RS-485

**SCM9B-D100 DIN Rail Mount Sensor-to-Computer Modules Page 150**

<u>MODEL</u>	<u>INPUT RANGE</u>	<u>OUTPUT</u>
<b>Voltage Inputs</b>		
SCM9B-D110	±10mV	RS-485
SCM9B-D111	±100mV	RS-485
SCM9B-D112	±1V	RS-485
SCM9B-D113	±5V	RS-485
SCM9B-D114	±10V	RS-485
SCM9B-D115	±100V	RS-485

<u>MODEL</u>	<u>INPUT RANGE</u>	<u>OUTPUT</u>
<b>Current Inputs</b>		
SCM9B-D125	4-20mA	RS-485

<u>MODEL</u>	<u>INPUT RANGE</u>	<u>OUTPUT</u>
<b>Thermocouple Inputs</b>		
SCM9B-D131	J Thermocouple	RS-485
SCM9B-D132	K Thermocouple	RS-485
SCM9B-D133	T Thermocouple	RS-485
SCM9B-D134	E Thermocouple	RS-485
SCM9B-D135	R Thermocouple	RS-485
SCM9B-D136	S Thermocouple	RS-485
SCM9B-D137	B Thermocouple	RS-485
SCM9B-D138	C Thermocouple	RS-485

<u>MODEL</u>	<u>INPUT RANGE</u>	<u>OUTPUT</u>
<b>RTD/Thermistor Inputs</b>		
SCM9B-D141	.00385 RTD	RS-485
SCM9B-D142	.00392 RTD	RS-485
SCM9B-D143	.00388 RTD	RS-485
SCM9B-D145	2252Ω Thermistor	RS-485
SCM9B-D146	TD Thermistor	RS-485

**► SCM9B Selection Guide (Continued)**

<u>MODEL</u>	<u>INPUT RANGE</u>	<u>OUTPUT</u>
<b>Timer/Frequency Inputs</b>		
SCM9B-D161	Frequency	RS-485

<u>MODEL</u>	<u>DIGITAL INPUTS</u>	<u>DIGITAL OUTPUTS</u>	<u>RS OUTPUT</u>
<b>Digital Input/Outputs</b>			
SCM9B-D171	6	0	RS-485
SCM9B-D172	0	6	RS-485

**SCM9B-3000/4000 Computer-to-Analog Output Products Page 153**  
 ("4000" Series products have user-programmable features)

<u>MODEL</u>	<u>OUTPUT RANGE</u>	<u>INPUT</u>
<b>Voltage Output</b>		
SCM9B-3121/4121	±1V	RS-232C
SCM9B-3122/4122	±1V	RS-485
SCM9B-3131/4131	±5V	RS-232C
SCM9B-3132/4132	±5V	RS-485
SCM9B-3141/4141	±10V	RS-232C
SCM9B-3142/4142	±10V	RS-485
SCM9B-3161/4161	0 to 1V	RS-232C
SCM9B-3162/4162	0 to 1V	RS-485
SCM9B-3171/4171	0 to 5V	RS-232C
SCM9B-3172/4172	0 to 5V	RS-485
SCM9B-3181/4181	0 to 10V	RS-232C
SCM9B-3182/4182	0 to 10V	RS-485

<b>Current Output</b>		
SCM9B-3251/4251	0 to 20mA	RS-232C
SCM9B-3252/4252	0 to 20mA	RS-485
SCM9B-3261/4261	4 to 20mA	RS-232C
SCM9B-3262/4262	4 to 20mA	RS-485

**SCM9B-A1000/A2000 Converters/Repeaters Page 155**

<u>MODEL</u>	<u>DESCRIPTION</u>
SCM9B-A1000-115	RS-232C/RS-485 Converter/Repeater, 115VAC
SCM9B-A1000-230	RS-232C/RS-485 Converter/Repeater, 230VAC
SCM9B-A2000	RS-232C/RS-485 Converter/Repeater, +10 to +30VDC

**SCM9B-D192 DIN Rail Mount RS-485 Repeater Page 156**

<u>MODEL</u>	<u>DESCRIPTION</u>
SCM9B-D192	RS-485 Repeater

**SCM9B-H1700 Digital I/O Boards Page 158**

<u>MODEL</u>	<u>DESCRIPTION</u>
SCM9B-H1750	24 Digital Inputs/Outputs
SCM9B-H1770	64 Digital Inputs/Outputs
SCM9B-HCA1	4 Ribbon Connector Assembly

**Accessories and Software Page 159**

<u>MODEL</u>	<u>DESCRIPTION</u>
SCM9B-PB08	8 Channel Backpanel
SCM9B-PB14	14 Channel Backpanel
SCM9B-S300	Utility Software
MA-1001	User's Manual, SCM9B-1000
MA-1002	User's Manual, SCM9B-2000
MA-1003	User's Manual, SCM9B-3000/4000
MA-1004	User's Manual, SCM9B-1700
MA-1005	User's Manual, SCM9B-A1000/A2000
MA-1011	User's Manual, SCM9B-5000
MA-1013	User's Manual, SCM9B ModBus Protocol
MA-1014	User's Manual, SCM9B-D100

**SCM9B Reliability Data**

Failure rate calculations for the SCM9B modules are derived from the MIL-HDBK-217E specification. The stress-analysis method is used at naval sheltered environment, 40°C temperature, and quality level of B-2. Our specified humidity level is 95% RH noncondensing.

<u>MODEL</u>	<u>FAILURES/10<sup>6</sup> HRS</u>	<u>MTBF (HRS)</u>
SCM9B-1xxx/2xxx/3xxx/4xxx/5xxx	9.52	105,000
SCM9B-17xx	8.16	123,000