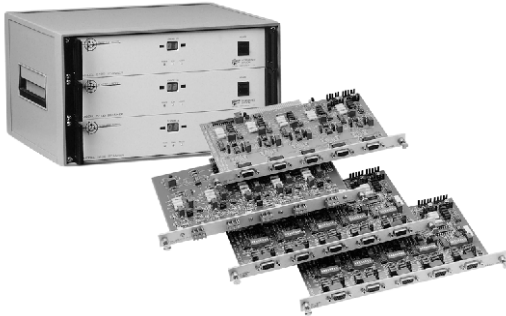


StrainSmart® Data Acquisition System



FEATURES

- From 5 to 1200 input channels - can be configured as needed at any time
- Inputs accepted from strain gages and strain-gage-based transducers (Model 5110A), thermocouples (Model 5120A), sensors with high-level voltage output (Model 5130B), and LVDT's (Model 5140A)
- Built-in bridge completion for 120-, 350-, and 1000-ohm strain gages
- Scanning and recording intervals as short as 0.02 seconds for up to 1200 inputs
- Stable, accurate, low-noise signal conditioning
- Available with PCI and/or PCMCIA hardware Interfaces

DESCRIPTION

System 5000's Model 5100B Scanners acquire test data within 1 millisecond from up to 1200 channels at scan intervals as short as 0.02 seconds. This translates into more accurate test results, and the ability to capture data under static loading conditions immediately before failure.

Sensor connections are quickly made to the cards at the rear of each scanner in System 5000. Strain gage cards include built-in bridge completion for quarter and half bridges, and a constant voltage power supply for 0, 0.5, 1, 2, 5, and 10Vdc bridge excitation.

System 5000's instrumentation hardware is designed to incorporate all the features required for precision strain measurement under static loading conditions, while maintaining flexibility and ease of use. A system can be configured with as few as 5, and as many as 1200, sensors. Since each Model 5100B Scanner can function independently, your System 5000 components can easily be configured with StrainSmart software for each test requirement.

MODEL 5100B SCANNER SPECIFICATIONS



The Model 5100B Scanner is sized for standard 19-in (483-mm) instrumentation racks. Cabinets are available for various system configurations for bench-top or field use.

Since each Model 5100B Scanner can function independently, your System 5000 components can be easily configured for each test requirement. A 100-channel system, for example, can be used as five independent 20-channel systems simply by purchasing additional interface hardware installations.

INPUTS:

Accepts up to four cards (five channels per card and up to 20 channels per scanner).

A/D CONVERTER:

16-bit (15-bit plus sign) successive approximation converter. Usable resolution is typically 15 bits. 40 μ s total conversion time per reading.

SCAN RATE:

1ms per scan. Fifty complete scans per second typical usage. Concurrent scanning for all scanners. Input channels in each single scanner are scanned sequentially at 0.04-ms intervals and stored in random access memory within a 1-ms window.

DIGITAL OUTPUT: NO and NC relay contacts (500mA at 30Vdc into a resistive load).

OPERATIONAL ENVIRONMENT:

Temperature: -10° to +50°C

Humidity: Up to 90% RH, non-condensing

SIZE:

3.5 H x 19 W x 16 D in (89 x 483 x 381mm)

WEIGHT:

16lb (7.25kg)

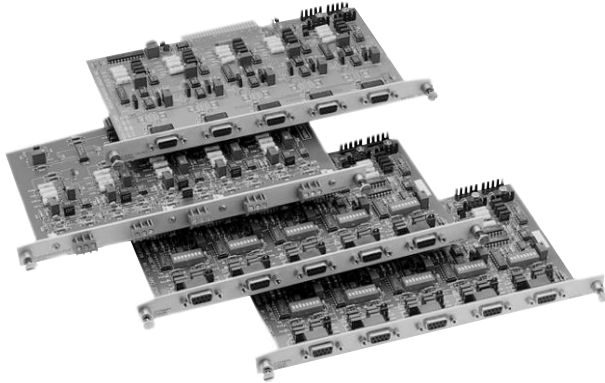
POWER:

115 or 230Vac user-selectable;

\pm 10% of setting; 50/60Hz; 140W max.

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SENSOR CARD SPECIFICATIONS



Strain gages, strain-gage-based transducers, thermocouples, LVDT's, potentiometers and other transducers can be intermixed in multiples of 5 by choosing the appropriate sensor card.

MODEL 5110A STRAIN GAGE CARD

CHANNELS: Five per card.

INPUTS:

Strain Gages:

120 Ω , 350 Ω , 1000 Ω quarter bridges; 60 Ω to 5000 Ω half and full bridges.

Jumper-selectable completion resistors (0.02% \pm 3ppm/ $^{\circ}$ C typ).

Measurement Range:

Normal range mode: \pm 16 380 $\mu\epsilon$

High range mode: \pm 163 800 $\mu\epsilon$

Low range mode: \pm 1638 $\mu\epsilon$

Resolution:

Normal range mode: 1 $\mu\epsilon$

High range mode: 10 $\mu\epsilon$

Low range mode: 0.1 $\mu\epsilon$

Strain Gage Based Transducers:

60 Ω to 5000 Ω impedance

Measurement Range:

Normal range mode: \pm 8mV/V

High range mode: \pm 80mV/V

Low range mode: \pm 0.8mV/V

Resolution:

Normal range mode: 0.5 μ V/V

High range mode: 5.0 μ V/V

Low range mode: 0.05 μ V/V

Input Impedance:

220M Ω each input.

Input Protection: \pm 40V

Source Current: \pm 25nA max.

Input Connector: Nine-pin D-sub style.

AMPLIFIER:

Zero Temperature Stability:

\pm 1.2 μ V/ $^{\circ}$ C RTI, \pm 100 μ V/ $^{\circ}$ C RTO, after 30-minute warm-up.

Gain Accuracy & Stability:

\pm 0.1% at +23 $^{\circ}$ C; \pm 100ppm/ $^{\circ}$ C

Common-Mode Voltage:

\pm 10V

Common-Mode Rejection (dc to 5Hz):

100dB typical

System Noise (Normal Mode Operation):

\pm 2 $\mu\epsilon$ typical (\pm 4ADC counts)

System Coarse Balance Range:

\pm 100% of measurement range (typically \pm 16 383 $\mu\epsilon$)

CALIBRATION:

Two shunt calibration points are available on each channel. Switch-selectable.

Calibration switches, A and B, are software selectable.

EXCITATION:

0.0, 0.5, 1.0, 2.0, 5.0, and 10.0Vdc.

Software-programmable.

Accuracy:

\pm 5mV typical

Current:

250mA max. (50mA per channel).

Over-current protected.

Load Regulation:

<0.05% of full scale for a load variation of 10% to 100% of full load

Temperature Stability:

Better than \pm 0.005%/ $^{\circ}$ C

FILTER:

Type:

Four-pole Butterworth

Cutoff Frequency (-3dB):

5HZ



StrainSmart® Data Acquisition System

MODEL 5120A THERMOCOUPLE CARD

CHANNELS: Five per card.

INPUTS:

Thermocouple types J, K, T, E, R, S, and B.
Built-in electronic cold-junction compensation.
Software-selectable
Open sensor detection

Input Impedance: 22M Ω each input.
Input Protection: $\pm 40V$
Source Current: $\pm 0.5nA$ typical; $\pm 5nA$ max

INPUT CONNECTOR:

Removable three-position screw terminal

AMPLIFIER:

Zero Temperature Stability:
 $\pm 1.2\mu V/^{\circ}C$ RTI, $\pm 100\mu V/^{\circ}C$ RTO, after 30-minute warm-up.

Gain Accuracy & Stability:
0.1% $\pm 100ppm/^{\circ}C$

Common-Mode Rejection (dc to 5Hz):
100dB typical

Common-Mode Voltage:
 $\pm 10V$

System Noise (Normal Mode Operation):
 $\pm 10\mu V$ typical ($\pm 4ADC$ counts)

MEASUREMENT RANGE: $\pm 81.9mV$

RESOLUTION: 2.5 μV

FILTER:

Type:
Four-pole Butterworth

Cutoff Frequency (-3dB):
5HZ

MODEL 5130B HIGH-LEVEL INPUT CARD

CHANNELS: Five per card.

INPUTS: DC volts (differential)

Input Impedance: 22M Ω each input.
Input Protection: $\pm 40V$
Source Current: $\pm 0.5nA$ typical; $\pm 5nA$ max

INPUT CONNECTOR: Nine-pin D-sub style

AMPLIFIER:

Zero Temperature Stability:
 $\pm 1.2\mu V/^{\circ}C$ RTI, $\pm 100\mu V/^{\circ}C$ RTO, after 30-minute warm-up.

Gain Accuracy & Stability:
0.1% $\pm 100ppm/^{\circ}C$

Common-Mode Rejection (dc to 5Hz):
100dB typical

Common-Mode Voltage:
 $\pm 10V$

System Noise (Normal Mode Operation):
 $\pm 4ADC$ counts typical (0 to 15V excitation).
 $\pm 10ADC$ counts typical (20 to 30V excitation)

MEASUREMENT RANGES: ± 1 , ± 2 , ± 5 , $\pm 10Vdc$

RESOLUTION: 30.5, 61, 152.5, 305 μV

EXCITATION:

0, 0.5, 1.0, 2.0, 5.0, 10.0, 15.0, 20.0, 25.0 and 30.0Vdc

Accuracy:
 $\pm 10mV$ typical

Current:
250mA max (50mA per channel) at 1 to 15V.
200mA max (40mA per channel) at 20V.
150mA max (30mA per channel) at 25 to 30V.

Over-current protected.

Max current limit selected by jumpers.

Load Regulation:

<0.05% of full scale for a load variation of 10% to 100% of full load

Temperature Stability:
Better than $\pm 0.005\%/^{\circ}C$

FILTER:

Type:
Four-pole Butterworth

Cutoff Frequency (-3dB):
5HZ

MODEL 5140A LVDT INPUT CARD

CHANNELS: Five per card.

INPUTS: Three- to six-wire transducers

Input Impedance: 10M Ω each input.
Input Protection: $\pm 40V$
Source Current: $\pm 0.5nA$ typical; $\pm 5nA$ max

INPUT CONNECTOR: Nine-pin D-sub style

AMPLIFIER:

Zero Temperature Stability:
 $\pm 1.2\mu V/^{\circ}C$ RTI, $\pm 100\mu V/^{\circ}C$ RTO, after 30-minute warm-up.

Gain Accuracy:
0.25% typical

Common-Mode Rejection (dc to 5Hz):
100dB typical

Common-Mode Voltage:
 $\pm 10V$

System Noise (Normal Mode Operation):
 $\pm 4ADC$ counts typical



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MEASUREMENT RANGES: ± 0.5 , ± 1 , ± 2.5 , ± 5 Vrms

RESOLUTION: 15.25, 30.5, 76.2, 152.5 μ Vrms

CALIBRATION: Excitation sample

EXCITATION:

3.0Vrms, 5000Hz or 2500Hz sine wave.
Software-selectable

Accuracy:

± 5 mVrms typical

Current:

± 250 mA max (± 50 mA per channel).
Over-current protected

Load Regulation:

<0.1% of full scale for a load variation of 10% to 100% of
full load

Temperature Stability:

Better than $\pm 0.05\%$ /°C

FILTER:

Type:

Four-pole Butterworth

Cutoff Frequency (-3dB):

5HZ



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