Data Sheet

High Speed Data Acquisition System with Printer
8460

The 8460 high speed, configurable data acquisition system combines a thermal printer with a fast sampling rate, deep memory, and a large touch screen display. The system also includes built-in software tools for power analysis and mathematical function editor for performing calculations between multiple channels. This recorder is capable of sampling up to 1 MSa/s on all channels simultaneously in memory mode to capture transient events with confidence. File mode is perfect for long periods of recording with sample rates up to 1 MSa/s on up to 6 channels simultaneously, or up to 100 kSa/s on 36 channels simultaneously.

The built-in printer provides a permanent record of the data. The printer operates in four modes. The fastest is direct mode, which prints to paper only, mixed mode prints to paper while saving the data to internal memory. External control mode starts and stops the printing with a logic signal, and transcription mode prints data previously stored in memory.

The acquisition system can accommodate 4 types of measurement boards with 6 or 12 channels each and is able to measure voltage up to 1000 V RMS, current, temperature and strain gauge.

Choose any combination of 3 boards, for applications ranging from small sensor signal logging to electrical power analysis.

Applications
- Printed record of event activity with date and time stamp
- Measure signals ranging from strain gauge signals to large electrical systems
- Maintenance and failure analysis
- Power analysis of single and three phase systems

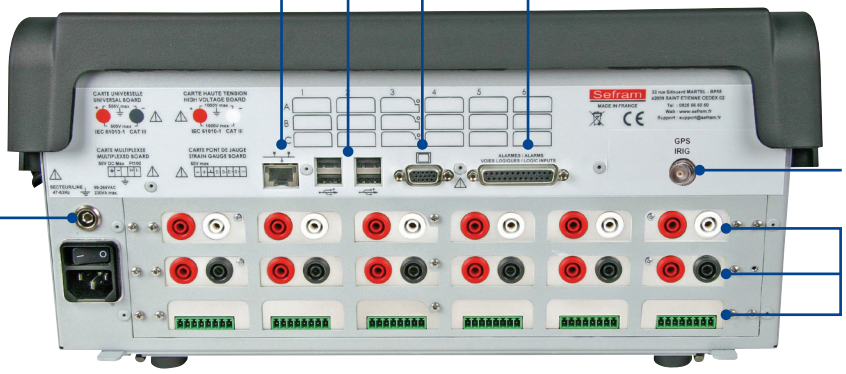
4 measurement board types
- Universal input (6 channels)
- High voltage (6 channels)
- Multiplexed (12 channels)
- Strain gauge (6 channels)

Features and benefits:
- Fast sampling rate: up to 1 MSa/s (1 µs) on each channel
- Up to 36 channels (with multiplexed board)
- 4 measurement board types; Universal, Multiplexed, Strain Gauge, High Voltage
- Measure up to 1000 VAC with the high voltage board
- Temperature measurements supporting thermocouples and Pt100/Pt200/Pt500/Pt1000 sensors
- 270 mm thermal printer
- GPS and IRIG timing options
- 16 bit resolution with multiplexed and strain gauge boards
- 14 bit resolution with universal and high voltage boards
- 500 GB SSD internal memory (2 TB optional)
- 16 logic input channels
- CAT III 1000 V and CAT IV 600 V
- WiFi monitoring and control (standard USB WiFi dongle required)
- Wide TFT display with 15.4 inch touchscreen
- USB host ports and LAN interface
- Free software for control and analysis
- Rugged carrying case included

Front panel

15.4 inch touchscreen
TFT display with touchscreen to facilitate signal viewing and analysis

Top panel



LAN
Remote control and monitoring

USB host

VGA output

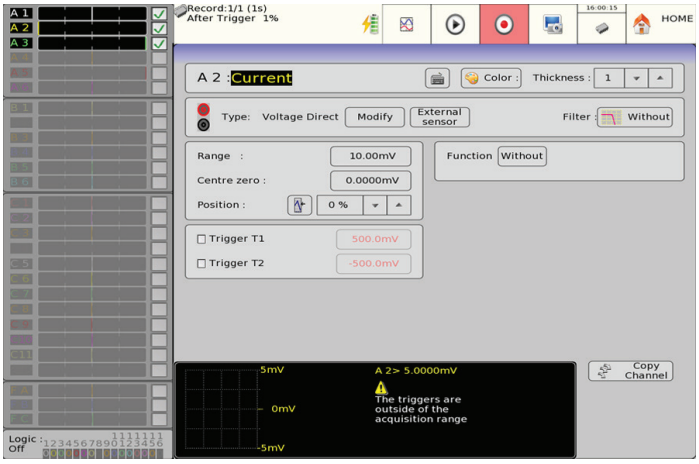
Logical inputs & alarms
Pulse counter and frequency measurements

Earth terminal

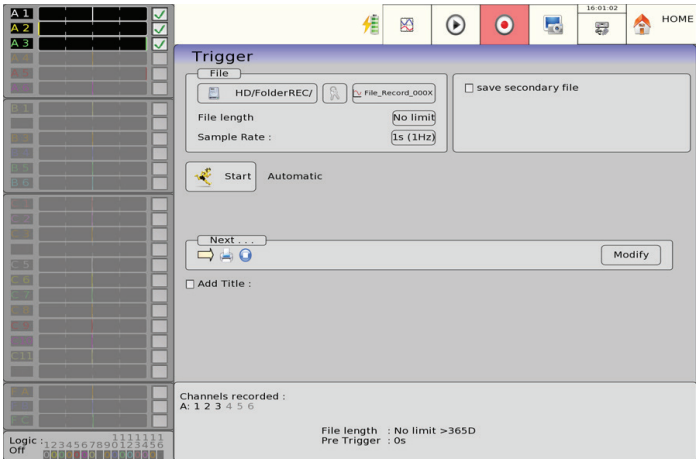
Optional GPS / IRIG
Internal clock synchronization with IRIG or GPS time

Standard 3 board slots
3 additional boards with extension module

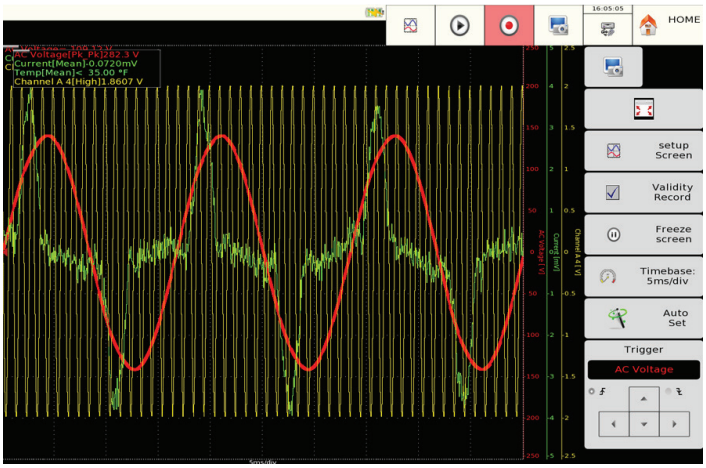
Operation highlights



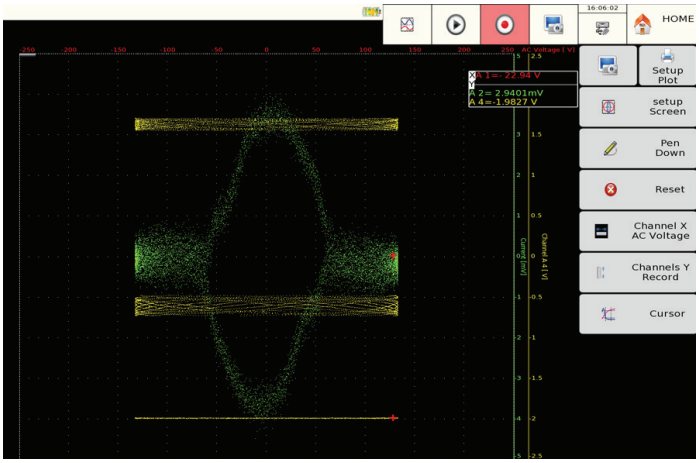
Channel setup displays parameters for up to 12 channels on a single screen



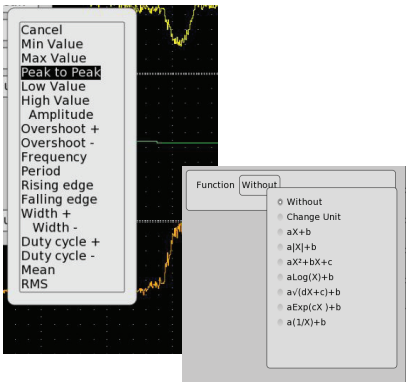
Comprehensive triggering capabilities: Configure triggers on analog and logic channels. Select from multiple combinations of thresholds, channels and conditions.



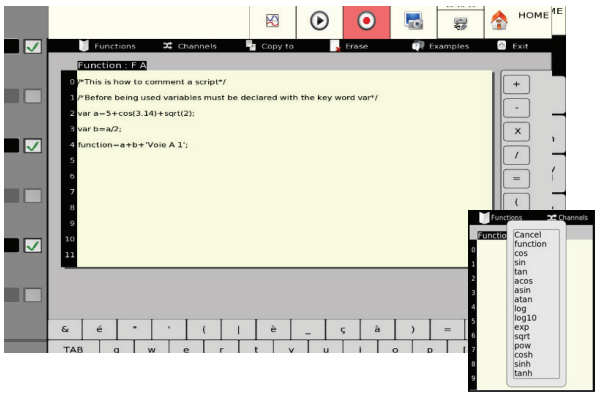
Oscilloscope like display mode with 100 kHz bandwidth



XY mode for plotting one varying signal versus another



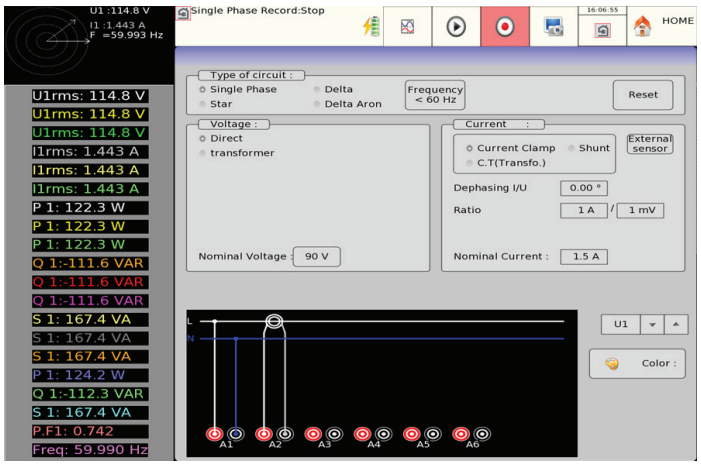
Use measurement calculations for on screen display, or software defined formulas on individual channels

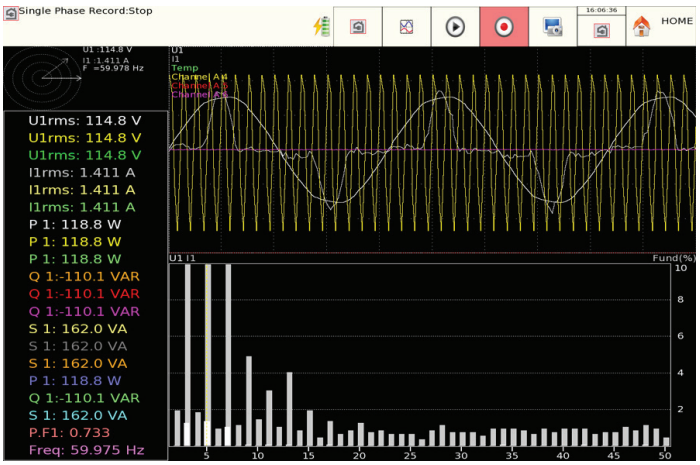


Create user defined formulas on multiple channels with the included text editor for even greater control. The results are shown as dedicated virtual channels for ease of measurement.

The tools you need

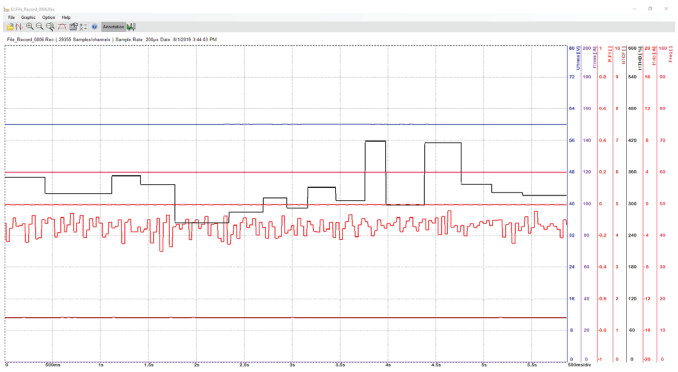
Energy / Power Analysis





Analyze up to 4 power networks simultaneously in three phase configurations Delta, Delta (Aron), or Star. The real time display of Fresnel diagram, oscilloscope mode, and harmonics (up to 50th) measure and display voltage, current and frequency up to 1 kHz.

Sefram Viewer and Pilot for 8460 are license free software that can be downloaded from www.bkprecision.com. The software tools provide the following features:



Sefram Viewer

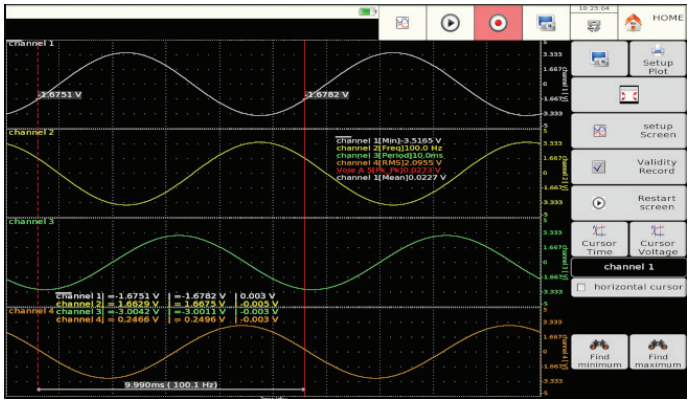
- Post acquisition analysis
- Display measurement results in graphical or numerical format
- 7 math functions such as y=ax+b, y=ln(x)+b, and y=exp(cx)+b

Sefram Pilot for 8460

- Remote control and setup
- Channel and trigger configuration
- Export measurement data to a computer
- Start and stop recording
- Real time display

Virtual Network Computing (VNC) capability

The recorder's built-in VNC provides a graphical desktop system to remotely control the instrument from a computer with a full graphical interface that replaces the instrument's front panel using a mouse and keyboard



Full control of the Data Acquisition System on a computer or mobile device

Measurement Boards

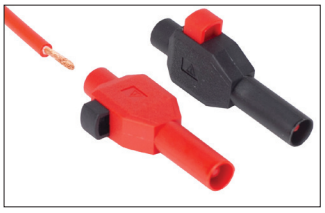
Configure the 8460 to fit your needs with any combination of module boards with up to 3 in the base unit.

Universal Board	
High Voltage Board	
Multiplexed Board	
Strain Gauge Board	

Measurement Boards				
	Universal	**High Voltage**	**Multiplexed**	**Strain Gauge**
Channels	6	6	12	6
Maximum Voltage	± 500 V or 424 VRMS	± 1000 V or 1000 VRMS	± 25 VDC	± 25 VDC
RMS Voltage	√	√	-	-
Resolution	14 bit	14 bit	16 bit	16 bit
Sampling Rate	1 MSa/s	1 MSa/s	5 kSa/s	100 kSa/s
Voltage	√	√	√	√
Current	√	√	√	-
Frequency	√	√	-	-
Thermocouple	√	-	√	√
Counter	√	√	-	-
Power Analysis	√	√	-	-
PRT Sensor	-	-	Pt100/Pt200/Pt500/Pt1000	Pt100/Pt1000

Included accessories

Also included: AC mains adapter 100 / 240 V, 25 pin male connector and backshell, soft wipe, stylus, screwdriver.



One set of bare wire to banana adapters per channel

Rugged case

Ordering information

Description	Base Unit	Measurement Boards				Options	
		Universal	High voltage	Multiplexed	Strain gauge	GPS	IRIG
Part Number	8460	984401000	916006000	984402000	984402500	984602500	984603000

The 8460 base can be ordered with any combination of up to 3 measurement boards and any number of options.

Specifications, Base Unit

Note: All specifications apply to the unit after a temperature stabilization time of 30 minutes over an ambient temperature range of 23 °C ± 5 °C.

Power Analysis Function	
Networks	Single phase, 3 phase
Frequency	50-60 Hz, 400 Hz, 1000 Hz
Display	Fresnel diagram, oscilloscope, data
Measurements	Mean value, RMS, peak, crest factor, THD and DF for voltage & current, active, reactive and apparent power, power factor (ø)
Harmonics	Calculated up to rank 50, with display and record

Logic Input and Alarms	
Channels	16
TTL Maximum Voltage	24 V
Sampling Interval	1 µs (1 MSa/s) each channel
Sensor Supply	9 to 15 VDC
Alarms	A & B, 0 to 5 V output

IRIG Option	
Accuracy	5 ms
Sampling Time Accuracy	10 E -12 (only for sampling rate ≥ 200 µs)
IRIG Formats	IRIG-AI33, AI32, A003, A002, BI23, BI22, B003, B002 and AFNOR NFS 87-500
IRIG Signal Amplitude Range	600 mVpp to 8 Vpp
Input Impedance	50 Ω

GPS Option	
Output Accuracy	< ± 100 ns (TCXO, OCXO LQ) < ± 50 ns (OCXO MQ, OCXO HQ)
Output Frequency	10 MHz TTL
Resolution	100 ns
Generated Time Codes	B002, BI22, B003, BI23, B006, BI26, B007, BI27, IEEE1344, C37.118, AFNOR
Input Impedance	50 Ω

Data Acquisition System		
Memory Mode	Fastest sampling rate*	1 MSa/s up to 36 channels
	Memory	128 M words
File Mode (SSD disk streaming)	Fastest sampling rate*	1 MSa/s up to 6 channels
	Internal SSD memory	500 GB (2 TB option)

* Universal and high voltage measurement board

Printer		
Paper Width		270 mm
Paper Speed	Direct mode	1 mm/hr to 200 mm/sec
	Mixed mode	1 mm/hr to 50 mm/sec
	Transcription mode	10 mm/sec
	External control mode	50 mm/sec
Resolution	Y axis	8 dots/mm
	X axis	16 dots/mm
	XY mode	8 dots/mm (both axis)

General	
Internal Solid State Memory	500 GB (2 TB optional)
Operating Temperature	0 to 40 °C
Storage Temperature	-20 to 60 °C
Display	15.4" TFT LCD 1280 x 800 dots
Power Supply	99 VAC to 264 VAC, 47 to 63 Hz (80 VA max)
Interfaces	6 USB host ports, VGA, LAN
Weight (one card installed)	24.25 lbs (11 kg)
Dimensions (W x H x D)	15.57" x 17.32" x 7.68" (370 x 440 x 195 mm)
Warranty	2 Years
Supplied Accessories	Power cord, 25 pin male connector and backshell, rugged carrying case, bare wire to banana adapters, multiplexed board connectors (12), strain gauge board connectors (6), Stylus, soft wipe, screw-driver, calibration certificate and test report

Specifications, Measurement Boards

Note: All specifications apply to the unit after a temperature stabilization time of 30 minutes over an ambient temperature range of 23 °C ± 5 °C.

Universal Input Board		
Number of Channels		6
Voltage		
Maximum Input Voltage		± 500 VDC or 424 VRMS
Accuracy		± 0.1% of the full scale
DC Voltage Ranges		± 0.5 mV to ± 500 V
AC Voltage Ranges		200 mV to 500 V
RMS Voltage Accuracy		1% of full range
Response Time		100 ms typical (40 ms to 50 Hz)
Crest Factor		2
Input Impedance (DC)		1 MΩ for ranges > 1 V, 25 MΩ for ranges < 1 V
Input Capacitance		150 pF
High Input Impedance Option		10 MΩ for ranges > 1 V, 25 MΩ for ranges < 1 V
Channel Isolation		> 100 MΩ at 1500 VDC
Safety		CAT III 500 V
Bandwidth and Filters		
Bandwidth (-3 dB)		100 kHz
True RMS Bandwidth		5 Hz to 500 Hz
Analog Filters		100 Hz, 1 kHz, 10 kHz
Slope		40 dB/decade
Digital Filters		< 100 Hz
Sensitivity		100 mV RMS min.
Duty Cycle		10%
Frequency Range		1 Hz to 100 kHz
Basic Accuracy		0.02% of full scale
Data Acquisition		
Resolution		14 bits
Sampling Interval		1 µs (1 MSa/s) each channel
RMS Sampling Interval		200 µs (5 kSa/s) each channel
Temperature		
Sensor Range by Type (cold junction compensation: ± 1.25 °C)	J	410 °F to 2192 °F (210 °C to 1200 °C)
	K	482 °F to 2498 °F (250 °C to 1370 °C)
	T	392 °F to 752 °F (200 °C to 400 °C)
	S	122 °F to 3200 °F (50 °C to 1760 °C)
	B	392 °F to 3308 °F (200 °C to 1820 °C)
	E	482 °F to 1832 °F (250 °C to 1000 °C)
	N	482 °F to 2372 °F (250 °C to 1300 °C)
	C	32 °F to 4208 °F (0 °C to 2320 °C)
	L	392 °F to 1652 °F (200 °C to 900 °C)

High Voltage Board	
Number of Channels	6
Voltage	
Maximum Input Voltage	± 1000 VDC or 1000 VRMS
Accuracy	± 0.2% of the full scale
DC Voltage Ranges	± 50 mV to ± 1000 V
AC Voltage Ranges	100 mV to 1000 VRMS
RMS Voltage Accuracy	1% of full range
Response Time	100 ms typical (40 ms to 50 Hz)
Crest Factor	2.2
Input Impedance	11 MΩ for ranges < 10 V, 25 MΩ for ranges ≥ 1 V
Input Capacitance	150 pF
Channel Isolation	> 100 MΩ at 1500 VDC
Safety	CAT III 1000 V and CAT IV 600 V
Bandwidth and Filters	
Bandwidth	26 kHz
True RMS Bandwidth	5 Hz to 500 Hz
Analog Filters	100 Hz, 1 kHz, 10 kHz
Slope	40 dB/decade
Digital Filters	< 100 Hz
Sensitivity	300 mV RMS min.
Duty Cycle	10%
Frequency Range	10 to 100 kHz
Basic Accuracy	0.2% of full scale
Data Acquisition	
Resolution	14 bits
Sampling Interval	1 µs (1 MSa/s) each channel
RMS Sampling Interval	200 µs (5 kSa/s) each channel

Specifications, Measurement boards (cont.)

Note: All specifications apply to the unit after a temperature stabilization time of 30 minutes over an ambient temperature range of 23 °C ± 5 °C.

Multiplexed Board		
Number of Channels		12
Voltage		
Maximum Input Voltage		± 25 VDC
DC Voltage Range		± 0.5 mV to ± 25 V
Accuracy		± 0.1% of the full scale
Input Impedance (DC)		1 MΩ for ranges > 2 V, 10 MΩ for ranges < 2 V
Input Capacitance		150 pF
Bandwidth and Filters		
Digital Filters		< 100 Hz
Data Acquisition		
Resolution		16 bits
Sampling Interval		200 µs (5 kSa/s) each channel
Temperature with Thermocouple		
Sensor Range by Type (cold junction compensation: ± 1.25 °C)	J	410 °F to 2192 °F (210 °C to 1200 °C)
	K	482 °F to 2498 °F (250 °C to 1370 °C)
	T	392 °F to 752 °F (200 °C to 400 °C)
	S	122 °F to 3200 °F (50 °C to 1760 °C)
	B	392 °F to 3308 °F (200 °C to 1820 °C)
	E	482 °F to 1832 °F (250 °C to 1000 °C)
	N	482 °F to 2372 °F (250 °C to 1300 °C)
	C	32 °F to 4208 °F (0 °C to 2320 °C)
	L	392 °F to 1652 °F (200 °C to 900 °C)
Temperature with RTD		
Current	Pt100	1.0 mA
	Pt200	0.5 mA
	Pt500	0.2 mA
	Pt1000	0.1 mA
Temperature Range		-392 °F to 1562 °F (-200 °C to +850 °C)
Measurements		2, 3, 4 wires
Accuracy at 20 °C		± 0.03 °C

Strain Gauge Board		
Number of channels		6
Strain Gauge		
Units		µStr
Bridge Type		Full Bridge, Half Bridge
Bridge Voltage		± 1 V and ± 2.5 V
Accuracy		± 0.2% of the full scale
Ranges (µStr)		1,000, 2,000, 5,000, 10,000
Voltage		
Maximum Input Voltage		50 VDC
Accuracy		± 0.2% of the full scale
DC Voltage Range		1 mV to 50 V
Input Impedance		2 MΩ for ranges < 1 V, 1 MΩ for ranges > 1 V
Bandwidth and Filters		
Bandwidth (-3 dB)		18 kHz
Analog Filters		100 Hz, 1 kHz
Digital Filters		< 100 Hz
Data Acquisition		
Resolution		16 bits
Sampling Interval		10 µs (100 kSa/s) each channel
Temperature with Thermocouple		
Sensor Range by Type (cold junction compensation: ± 1.25 °C)	J	410 °F to 2192 °F (210 °C to 1200 °C)
	K	482 °F to 2498 °F (250 °C to 1370 °C)
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	L	392 °F to 1652 °F (200 °C to 900 °C)
Temperature with RTD		
Current	Pt100	1.0 mA
	Pt200	0.5 mA
Temperature Range		-392 °F to 1562 °F (-200 °C to +850 °C)
Measurements		2, 3, 4 wires
Accuracy at 20 °C		± 0.03 °C

About B&K Precision

For more than 60 years, B&K Precision has provided reliable and value-priced test and measurement instruments worldwide.

Our headquarters in Yorba Linda, California houses our administrative and executive functions as well as sales and marketing, design, service, and repair. Our European customers are most familiar with B&K through our French subsidiary, Sefram. Engineers in Asia know us through our B+K Precision Taiwan operation. Our B&K Brasil office supports our expanding customer base in Brazil and other South American countries. The independent service center in Singapore services customers in Singapore, Malaysia, Vietnam, and Indonesia.

B&K Precision group member Independent service center Service center location

Quality Management System

B&K Precision Corporation is an ISO9001 registered company employing traceable quality management practices for all processes including product development, service, and calibration.

ISO9001:2015

Certification body NSF-ISR
Certificate number 6Z241-IS8

NSF-ISR
Registered to ISO 9001

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