

# OMB-CHARTSCAN-1400

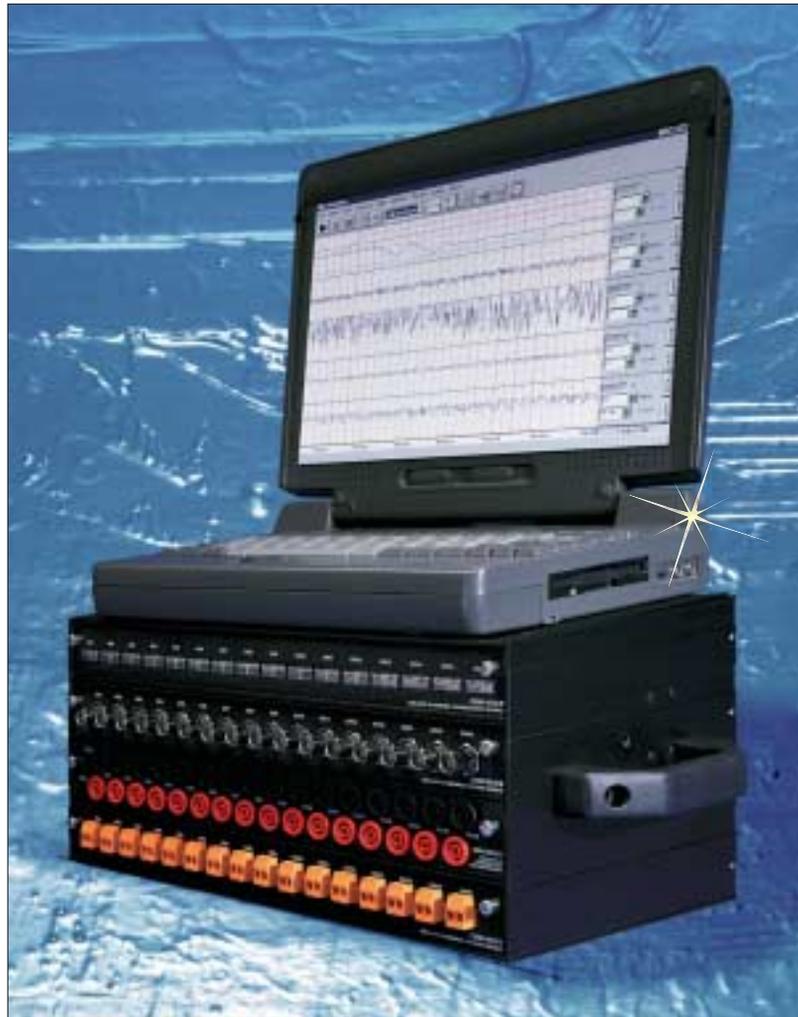
## Portable Voltage and Temperature Recorder



£**2285**

Basic Unit  
with one input module  
and software

- ✓ Measure Isolated Temperature, DC Volts, AC Volts and Waveforms in One Compact Instrument
- ✓ Convenient Signal Connectivity; Recessed Safety Jack, BNC, Subminiature Plug or Screw Terminal Connections
- ✓ Expandable up to 128 Channels
- ✓ Measures 128 Channels in Less Than One Second
- ✓ Single-Channel Burst Mode for Digitising Waveforms at Rates up to 20 kHz
- ✓ 32 Alarm Outputs & 8 Digital Inputs
- ✓ RS-232/RS-422 Interface Standard
- ✓ Optional IEEE 488 Interface
- ✓ Software Support Includes:
  - Chartview Scrolling Strip Chart Application for Effortless Set-Up, Acquisition & Real-Time Display
  - PostView, for Post-Acquisition Viewing of Large Data Files,
  - Calibration Software,
  - LabVIEW for Windows Virtual Instrument (VI) Example



The OMB-CHARTSCAN-1400 portable voltage and temperature recorder is ideal for making isolated temperature and voltage measurements (notebook PC not included)

Shown smaller than actual size.

The OMB-CHARTSCAN-1400 is a next-generation recorder that combines the ease-of-use common in paper-based strip-chart recorders with the advanced features of PC based data acquisition systems. The CHARTSCAN's convenient BNC, safety jack, subminiature plug, and screw terminal connectors make signal connection easier than other data recorders or loggers.

The OMB-CHARTSCAN-1400 is a compact, portable instrument which scans at 147 readings/s. Because of its unique configuration, the OMB-CHARTSCAN-1400 offers an unrivaled low cost per channel. It connects to a computer via an RS-232/RS-422 interface, Hayes-compatible modem, or optional IEEE 488 interface; and can stream data direct-to-disk (your PC's hard drive) in real time. For stand-alone operation, the OMB-CHARTSCAN-1400 comes standard with 128K readings (256 Kbytes) deep memory that is expandable to 4M readings(8 Mbytes).



## CHARTVIEW SOFTWARE

The OMB-CHARTSCAN-1400 includes ChartView, Windows-based setup and acquisition application. ChartView provides a graphical spreadsheet style user interface that lets you easily configure your hardware, acquisition, and display parameters. ChartView features a no programming approach that enables data collection and display within minutes.

ChartView provides a number of data display options including a real-time smooth scrolling trend display, digital meters, analogue meters, and bar graph meters. The collected data is stored to disk in an ASCII format so it may be easily imported into other applications, such as Microsoft Excel, for post acquisition display and analysis. In addition, ChartView also provides a real-time link to Excel using Dynamic Data Exchange (DDE). The OMB-CHARTSCAN-1400 also includes PostView, a post acquisition graphics display program that integrates seamlessly into ChartView. Using PostView's intuitive on-screen controls, you can expand, contract and auto-scale waveforms as well as scroll in either direction. PostView also provides hardcopy printout of the waveform.

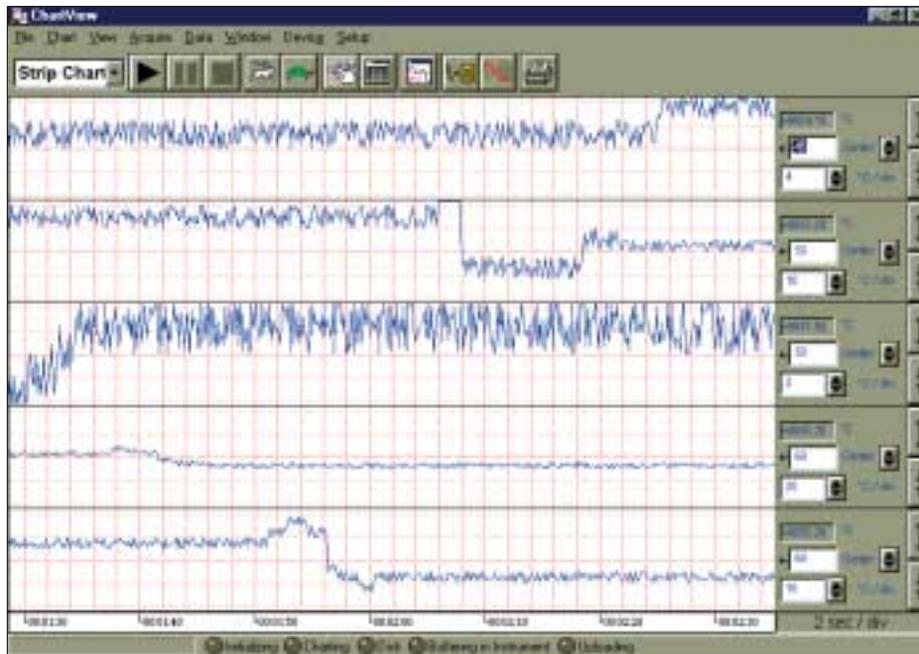
The Standard ChartView is included with the OMB-CHARTSCAN-1400. An optional enhanced version of ChartView, ChartView Plus, is also available. The table to the right summarises the differences between ChartView and ChartView Plus.

### ISOLATED INPUT

The OMB-CHARTSCAN-1400 is ideal for temperature and voltage measurements that require channel-to-channel isolation. The OMB-CHARTSCAN-1400 provides 500 V isolation for high voltage applications using the OMB-CSN14-HV-S module and 200 V isolation when the thermocouple and other voltage modules are used. The OMB-CHARTSCAN-1400 achieves this high isolation by using individual relays on each channel, yet still maintains a very fast 147 channels/s scan rate.

### FASTER SCANNING

The OMB-CHARTSCAN-1400 offers a faster scanning than typical strip-chart recorders and exceeds the typical two Hz rate found on most strip chart, multi-point or hybrid recorders. The unit provides an array of scanning capabilities to meet your applications requirements. Because data-logging and chart recording applications frequently require the logging at fixed time intervals, the OMB-CHARTSCAN-1400 uses the standard hours-minutes-seconds (hh:mm:ss.s) format to specify the time interval between channel scans. Users can configure the unit to begin and end data logging on a specified event such as TTL signal, temperature level, IEEE GET, alarm condition, absolute time of day, or upon completion of a specified number of readings.



OMB-CHARTSCAN-1400 data logging software provides effortless real-time scrolling and data capture to disk

ChartView & ChartView Plus Feature Overview		
Feature	ChartView	ChartView Plus
Display Groups	1	64
Display Charts	16	16
Channels per Chart	1	up to 4
Overlapped Channels		√
Auto-Rear		√
Alarm Logging		√
Chart Setup Wizard√		√
Individual Channel Positioning√		√
Remote Operation√		√
Separate Pre- & Post-Scan Number	√	√
Separate Pre- & Post-Scan Rate	√	√
Alarm Channels	32	32
mX+b Scaling	√	√
mX+b Scaling with Reference Channel		√
Digital Inputs	√	√
Digital/Analogue Bar Graph Meters	√	√
Engineering Units	√	√
Label Channels	√	√
Links to Excel	√	√
PostView Included	√	√
Scale Data to User Units	√	√
Stand-Alone Operation	√	√
Uniform and Scaled Grids	√	√

### EXPANSION OPTIONS

The OMB-CHARTSCAN-1400 can accommodate up to four plug-in option modules for a total of 64 channels. For larger systems, the OMB-CSN-EXP expansion chassis connects directly to the main unit to allow four additional plug-in modules, expanding the system from 64 to 128 channel capacity. Power is derived directly from the main unit so no additional power supplies or cables are required.

## PROGRAMMABLE SCAN RATES

The OMB-CHARTSCAN-1400 offers programmable scan rates for applications requiring acceleration of the measurement rate on a specified event, such as an alarm condition. For example, you can program the instrument to scan once per minute and then, upon the occurrence of a specified alarm condition, switch to scanning once per second. Upon cessation of the alarm condition, the unit resumes scanning at the rate of once per minute.

## SCANNING TECHNIQUES

The OMB-CHARTSCAN-1400 offers three measuring modes for application flexibility. These include a line-cycle integration mode, a high-speed multichannel scanning mode, and a single-channel burst mode.

## HIGH-SPEED MULTICHANNEL SCANNING

When line-cycle averaging is enabled, the OMB-CHARTSCAN-1400 can average 1, 2, 4, 8, 16, or 32 samples per channel. When the unit is configured to take 1 sample per channel, it can scan 147 channels/s or all 128 channels in under one second. This is important when trying to time-correlate a large number of channels.

Line Cycle Integration					
Line Cycles Per Reading	DC Volts & Thermocouples		AC Volts		Maximum Channel Number
	50 Hz	60 Hz	50 Hz	60 Hz	
1	38.5*	44*	38.5*	44*	128
2	19.2*	22*			128
4	9.6*	11*			128
8	4.8*	5.5*			122

\*CHANNELS/S

## SINGLE-CHANNEL BURST MODE

In single-channel burst mode, the OMB-CHARTSCAN-1400 can sample at up to 20 kHz on a single channel and store the data in its memory, which can be expanded up to 4M readings. When performing post-acquisition waveform analysis such as fast Fourier transforms (FFTs), the unit can return each data point in a waveform to your program. Alternatively, the unit can provide a true RMS value of the sampled voltage.

## ACCURACY

The OMB-CHARTSCAN-1400 has a number of features and capabilities that enable it to deliver the high accuracy demanded by many research applications.

## HIGH RESOLUTION

The OMB-CHARTSCAN-1400 is equipped with a high-speed 16-bit A/D converter. This enables the OMB-CHARTSCAN-1400 to offer up to 0.1°C and 3.05 µV resolution with the OMB-CSN14-TC-P thermocouple/volt scanning module.

## NOISE FILTERING

The OMB-CHARTSCAN-1400 reduces noise by sampling and averaging 32 measurements per line cycle. The OMB-CHARTSCAN-1400 also offers the flexibility to average across multiples of 1, 2, 4, or 8 line cycles.

## HIGH-ACCURACY COLD JUNCTION COMPENSATION

The OMB-CHARTSCAN-1400's OMB-CSN14-TC-P thermocouple/volt scanning module features multiple, strategically-located temperature sensors that provide high-accuracy, cold-junction compensation across all inputs.

## ACCURATE LINEARISATION

The OMB-CHARTSCAN-1400 enables quick and accurate linearisation by providing built-in lookup tables for popular thermocouple types, including J, K, T, E, R, S, B, and N.

## ALARMS

Detecting an alarm condition is a common requirement in logging applications and the OMB-CHARTSCAN-1400 offers a number of modes to facilitate alarm detection. With 32 digital TTL alarm outputs available on the 50-pin rear panel connector or 16 outputs via the high-current capacity OMB-CSN-RELAY option, multiple conditions can be set and monitored.

Unlike some instruments which allow only one channel to be assigned to a single alarm output, the OMB-CHARTSCAN-1400 allows one or more channels to be logically "OR-ed" and connected to an alarm output.

## REAL-TIME CLOCK

The OMB-CHARTSCAN-1400 features a real-time clock that allows you to synchronise acquisition to a specific time of day. During acquisition, the OMB-CHARTSCAN-1400 stores the time and date of every data scan in memory, enabling later retrieval of this information for use in plotting and analysing measurements.

## MEMORY

For high-speed and long-term data logging, the OMB-CHARTSCAN-1400 is equipped with 128K readings of data storage, which can be field expanded to 4M readings. Since each application requires different measurements, the unit makes each channel's high, low, and last readings available throughout acquisition.

## COMMUNICATION

Connecting your computer to the OMB-CHARTSCAN-1400 is simple via the standard RS-232/RS-422 interface. In addition, an optional IEEE 488 interface can be added via a simple plug-in module.

## TEMPERATURE & VOLTAGE MODULES

OMB-CHARTSCAN-1400 input modules are ideal for making isolated temperature and voltage measurements. Each features 16 isolated inputs and plugs directly in the OMB-CHARTSCAN-1400.

Depending upon the module and signal input, each card uses either standard BNC, safety jack, removable screw terminal block or thermocouple plugs for quick and easy input connections. The modules slide into a shielded metal enclosure within the OMB-CHARTSCAN-1400, keeping noise to a minimum and maintaining a stable internal temperature for accurate CJC reading.

All scanning modules for the OMB-CHARTSCAN-1400 feature isolated differential input capabilities that can make accurate measurements in high common-mode voltage applications.



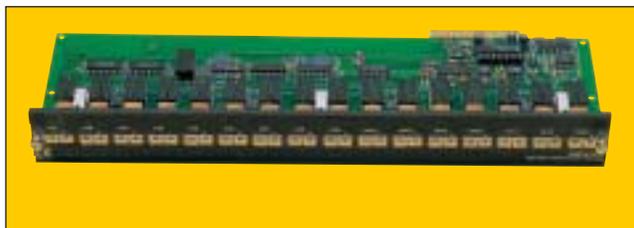
## TEMPERATURE SCANNING

The OMB-CHARTSCAN-1400 scans the most popular thermocouple types and voltages up to  $\pm 10$  V using the OMB-CSN14-TC-P 16-channel thermocouple and voltage module. Convenient subminiature plugs are used for signal input.

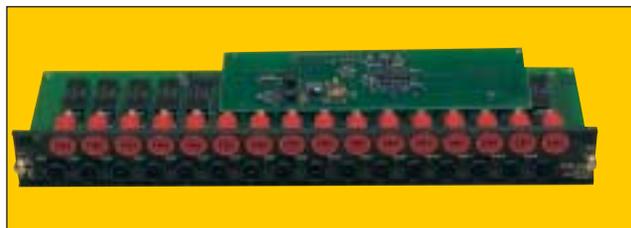
## VOLTAGE SCANNING

To meet your application needs, the low-voltage scanning modules support the most popular connectors used today. The low-voltage options (up to  $\pm 10$  V) are available with either BNC, removable screw-terminal, or safety-jack inputs. The high-voltage (up to  $\pm 250$  V) scanning module features safety-jack inputs only.

OMB-CHARTSCAN-1400 Modules			
Model Number	Type	Input	Connector Types
OMB-CSN14-TC-P	T/C and Voltage	J,K,T,E,R,S,B,N, $\pm 10$ , $\pm 5$ V, $\pm 1$ V, and $\pm 100$ mV	Subminiature plug
OMB-CSN14-LV-B	Low Voltage	$\pm 10$ , $\pm 5$ V, $\pm 1$ V, and $\pm 100$ mV	BNC
OMB-CSN14-LV-T	Low Voltage	$\pm 10$ , $\pm 5$ V, $\pm 1$ V, and $\pm 100$ mV	Screw Terminal
OMB-CSN14-LV-S	Low Voltage	$\pm 10$ , $\pm 5$ V, $\pm 1$ V, and $\pm 100$ mV	Safety Jack
OMB-CSN14-HVX-S	High Voltage	$\pm 250$ V, $\pm 25$ V, $\pm 2.5$ V	Safety Jack
OMB-CSN14-HVA-S	High Voltage	$\pm 250$ V, $\pm 25$ V, $\pm 2.5$ V	Safety Jack

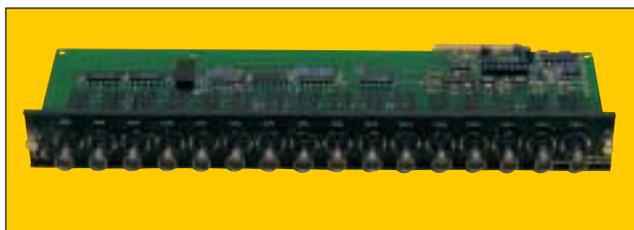


OMB-CSN14-TC-P 16-channel thermocouple and voltage scanning module

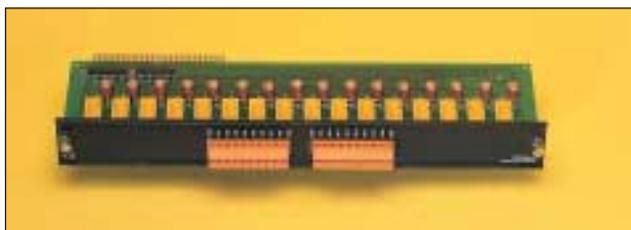


OMB-CSN14-HVX-S or OMB-CSN14-HVA-S 16-channel high-voltage scanning module with safety-jack input

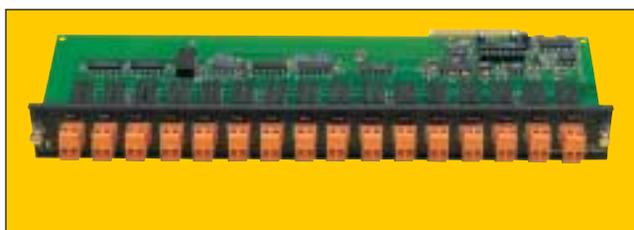
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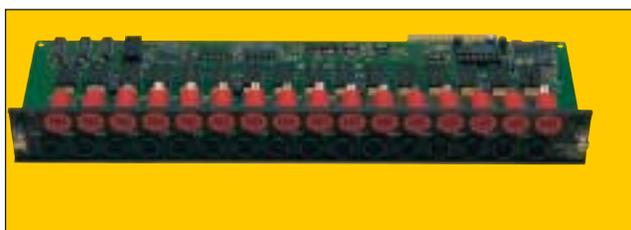
OMB-CSN14-LV-B 16-channel low-voltage scanning module with BNC connections



OMB-CSN-RELAY cards supports 16 high-current alarm outputs



OMB-CSN14-LV-T 16-channel low-voltage scanning module with removable screw-terminal input



OMB-CSN14-LV-S 16-channel low-voltage scanning module with safety-jack input

## Specifications

Number of Slots: 4  
(expandable to 8 with OMB-CSN-EXP option discussed below)  
Number of Channels: Up to 64 differential thermocouple or voltage inputs; accepts OMB-CSN14-TC-P, OMB-CSN14-LV-T, OMB-CSN14-LV-B, OMB-CSN14-LV-S, and OMB-CSN14-HV-S scanning modules (expands to 128 channels; see OMB-CSN-EXP below)  
**A/D Resolution:** 16-Bits  
**Scan Interval:** Relative time between channel scans; minimum = 6.8 ms; maximum = 99:59:59.9 (hh:mm:ss.s)

## SCANNING RATES

**Multichannel:** Rates up to 147 channels/s (50 Hz or 60 Hz)  
**32 point averaging:** 44 channels/s (60 Hz); 38.5 channels/s (50 Hz),  
**Single Channel Burst:** 20 K samples/s, single-channel burst mode

## Programmable Triggering

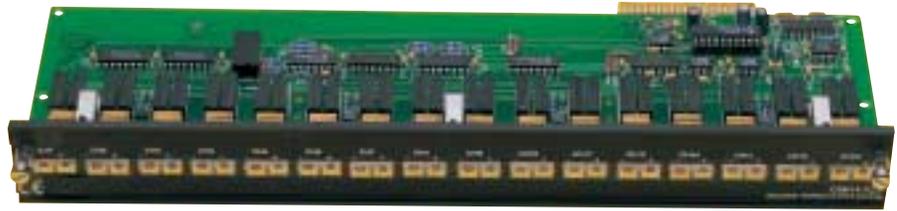
**Trigger Criteria:** Temperature or voltage above or below a level, absolute time of day, alarm condition (on or off), IEEE GET, IEEE TALK, external TTL trigger (level high or level low), specified number of readings  
**Level Trigger:** Programmable value for any one channel  
**TTL Trigger:** Programmable for high or low level  
**Pre-Trigger Count:** Programmable (< memory size - 1)  
**Post-Trigger Count:** Programmable

## Alarms and Digital I/O

**Number of Digital Alarm Outputs:** 32 TTL-level compatible and 16 high current outputs using the optional OMB-CSN-RELAY module  
**Number of Digital Inputs:** 8 bits, TTL compatible  
**Connector:** 50 pin D-connector; mating connector supplied  
**Data Storage & Format**  
**Storage:** 128K readings standard; optional 500K readings, 2M readings, & 4M readings user-installable  
**Data Formats:** ACSII or binary  
**Note:** High-speed DMA transfers use binary format only  
**RS-232/RS-422 Interface (included)**  
**Baud Rates:** 300, 2400, 4800 & 9600  
**Data Bits:** 8 / **Stop Bits:** 1  
**Parity:** Even, odd, none  
**Handshaking:** RTS/CTS, XON/OFF  
**Connector:** Male DB-9

## GENERAL

**Indicators:** LEDs for alarm, scanning, error, send, receive, power & trigger status  
**Power:** 105 to 125 or 210 to 250 Vac, 50/60 Hz; 20 VA max  
**Warm-Up:** One hour to rated accuracy  
**Environment:** 0 to 50°C; 0 to 95% RH non-condensing to 35°C; linearly derate 3% RH/°C from 35 to 50°C



OMB-CSN14-TC-P 16-channel thermocouple and voltage scanning module shown smaller than actual size

## Dimensions:

330W x 241 D x 152mm H  
(13 x 9.5 x 6")

**Weight:** 4.3 kg (9.6 lbs)

## Digital I/O and Alarms:

Female DB50 (32 alarms, 8 digital inputs, 10 ground pins)  
**Trigger Input:** BNC  
**TTL Output:** BNC

## Optional Communication Interfaces

**OMB-CSN-COM-488 IEEE 488 Interface**  
**Implementation:** SH1, AH1, T6, TE4, L4, LE4, SR1, PP0, RL0, DC1, DT1, C0, & E1

**Programmable Parameters:** Alarm set points, thermocouple types, temperature units, IEEE 488 connector with metric studs

## OMB-CSN-EXP Expansion Chassis

**Number of Slots:** 4  
**Number of Channels:** Up to 64 in any combination of OMB-CSN14 modules for the OMB-CHARTSCAN-1400  
**Power:** Powered from the OMB-CHARTSCAN-1400, no external connection needed

**Environment:** 0 to 50°C; 0 to 95% RH non-condensing to 35°C; linearly derate 3% RH/°C from 35 to 50°C

## Dimensions:

330 W x 241 D x 152mm H  
(13 x 9.5 x 6")

**Weight:** 1.82 kg (4 lb)

## OMB-CSN-RELAY

### Alarm Monitoring Module

**Relay Alarm Outputs:** 16  
**Contact Rating:** 8 amps @ 250 V  
**Maximum Current:** 10 amps per bank of 8

## OMB-CSN14-TC-P 16-Channel Thermocouple and Voltage Scanning Module

**Number of Channels:** 16 differential; programmable by channel for specific thermocouple type or voltage input  
**Inputs:** J, K, T, E, R, S, B, N,  $\pm 10V$ ,  $\pm 5V$ ,  $\pm 1V$  &  $\pm 100$  mV  
**Input Connectors:** Subminiature plug  
**Maximum Allowable Input:**  $\pm 25V$  rms  
**Input Impedance:** 1M Ohm  
**Input Bias Current:** 20 nA max  
**Maximum Common Mode Voltage:** 200 Vdc or AC peak  
**Maximum Normal Mode Voltage:** 10 Vdc or AC peak  
**Channel to Power Ground Isolation:** 200 Vdc or AC peak

## Channel to Channel Isolation:

200 Vdc or AC peak  
**Temperature Coefficient:**  $<(0.1 \times \text{rated accuracy})\%/^{\circ}C$   
**Line Cycle Noise Rejection:** Software enabled for the averaging of 1 to 255 samples over multiple AC line cycles.

## Temperature Specifications

### TEMPERATURE RANGE AND ACCURACY TEMPERATURE SPECIFICATIONS

Type	Range	Accuracy
J	-100 to +760°C	$\pm 0.5^{\circ}C$
	-200 to -100°C	$\pm 0.8^{\circ}C$
K	-100 to +1372°C	$\pm 0.6^{\circ}C$
	-200 to -100°C	$\pm 0.8^{\circ}C$
T	-100 to +400°C	$\pm 0.5^{\circ}C$
	-200 to -100°C	$\pm 0.8^{\circ}C$
E	-100 to +1000°C	$\pm 0.7^{\circ}C$
	-200 to -100°C	$\pm 0.9^{\circ}C$
R	0.0 to +1780°C	$\pm 2.0^{\circ}C$
S	0.0 to +1780°C	$\pm 2.0^{\circ}C$
B	+350 to +1820°C	$\pm 2.0^{\circ}C$
N	-100 to +1300°C	$\pm 0.6^{\circ}C$
	-200 to -100°C	$\pm 0.9^{\circ}C$

**Units:** °C, °F, °K, °R, mV & Volts

**Fault Detection:** Open thermocouple  
**AC/DC Voltage, Range and Resolution**

Range	Resolution
$\pm 100$ mV	3.05 $\mu V$ /bit
$\pm 1$ V	30.5 $\mu V$ /bit
$\pm 5$ V	153 $\mu V$ /bit
$\pm 10$ V	306 $\mu V$ /bit

**Accuracy:**  $\pm 0.02\%$  of range

## OMB-CSN14-LV-T 16-Channel Isolated Low-Voltage Scanning Module

**Number of Inputs:** 16 differential; programmable by channel for specific input range  
**Input Connectors:** Removable screw terminal block

### Range and Resolution

Range	Resolution
$\pm 100$ mV	3.05 $\mu V$ /bit
$\pm 1$ V	30.5 $\mu V$ /bit
$\pm 5$ V	153 $\mu V$ /bit
$\pm 10$ V	306 $\mu V$ /bit

**Accuracy:**  $\pm 0.02\%$  of range

**Line Cycle Noise Rejection:** Software enabled for the averaging of 1 to 255 samples over multiple AC line cycles

### Maximum Common Mode Voltage:

200 Vdc or AC peak  
**Input Impedance:** 1M Ohm  
**Input Bias Current:** 20 nA max  
**Maximum Normal Mode Voltage:** 10 Vdc or AC peak

**Common Mode Rejection:**

100 dB typ

**Maximum Allowable Input:**

±25 V rms

**Channel-to-Power Ground****Isolation:** 200V peak**Channel-to-Channel Isolation:**

200V peak

**Temperature Coefficient:**

&lt; (0.1 x rated accuracy)%/°C

**OMB-CSN14-LV-B 16-Channel****Isolated Low-Voltage Scanning****Module** Same specification as the OMB-CSN14-LV-T except with a BNC input connector**OMB-CSN14-LV-S 16-Channel****Isolated****Low-Voltage Scanning Module**

Same specification as the CSN14-LV-T except with a safety jack input

**OMB-CSN14-HVX-S or****OMB-CSN14-HVA-S 16-Channel****Isolated****High-Voltage Scanning Module****Number of Inputs:** 16 differential; programmable by channel for any input range**Input Connectors:** Safety jack**Range and Resolution**

Range	Resolution
±2.5 V	78.14 µV/bit
±25 V	781.4 µV/bit
±250 V	7.814 mV/bit

**Accuracy:** ±0.02% of range**Line Cycle Noise Rejection:**

Software enabled for the averaging of 1 to 255 samples over multiple AC line cycles

**Maximum Allowable Input:** 500 Vdc or AC peak**Input Impedance:** 10M Ohm**Input Bias Current:** 20 pA max**Maximum Common Mode Voltage:****OMB-CSN14-HVX-S:**

500Vdc or AC peak

**OMB-CSN14-HVA-S:**

50Vdc or AC peak

**Maximum Normal Mode Voltage:**

500 Vdc or AC peak

**Common Mode Rejection:**

100 dB typ

**Channel-to-Power Ground****Isolation:**

500 Vdc or AC peak

**Channel-to-Channel Isolation:**

500 Vdc or AC peak

**Temperature Coefficient:**

&lt;0.01%/°C



The OMB-CHARTSCAN-1400 portable voltage and temperature recorder is ideal for making isolated temperature and voltage measurements (notebook PC not included). Shown smaller than actual size.

**To Order (Specify Model Number)**

Model Number	Price	Description
OMB-CHARTSCAN-1400	£1635	High-speed isolated temperature & voltage measurement instrument, includes RS-232 interface
OMB-CSN-EXP	735	Four-Slot Expansion Chassis
OMB-CSN14-TC-P	650	16-channel thermocouple/volt scanning module
OMB-CSN14-LV-T	650	16-channel low-voltage scanning module with removable screw terminal input
OMB-CSN14-LV-B	650	16-channel low-voltage scanning module with BNC input
OMB-CSN14-LV-S	650	16-channel low-voltage scanning module with safety jack input
OMB-CSN14-HVA-S	815	16-channel high-voltage scanning with safety jack input (50V max CMV)
OMB-CSN14-HVX-S	1145	16-channel high-voltage scanning module with safety jack input (500V max CMV)
OMB-CSN-RELAY	570	16-channel alarm/relay module

OMB-CHARTSCAN-1400 unit is supplied with ChartView and PostView Software, DB50 digital I/O port mating connector, instruction manual and rack-mount kit

**Ordering Example:** OMB-CHARTSCAN-1400 Data Acquisition System, OMB-CSN14-TC-P 16-channel low-voltage thermocouple module and OMB-CA-47 Cable, £1635 + 650 + 37 = £2322

**Options and Accessories**

Model Number	Price	Description
OMB-CA-47	£37	RS-232 serial port cable
OMB-CA-7-3	82	Shielded IEEE 488 cable, 1.8m
OMB-CA-161	62	Cables, probe & alligator clips for safety jack-input
OMB-CSN-COM488	242	IEEE 488 interface option
CHARTVIEW PLUS	283	Software option for OMB-CHARTSCAN-1400
OMB-CSN-MEM8	570	8 Mbyte memory option (4M readings)