

# TML

TML Pam E-338A

*New  
Product*

**Data Logger**

# TDS-530

**High Performance  
Portable**



**Tokyo Sokki Kenkyujo Co., Ltd.**

# High speed data logger 1000-channel scanning in 0.4 second

# TDS-530

High speed  
High Accuracy

CF card max. 1GB

Interface x 3

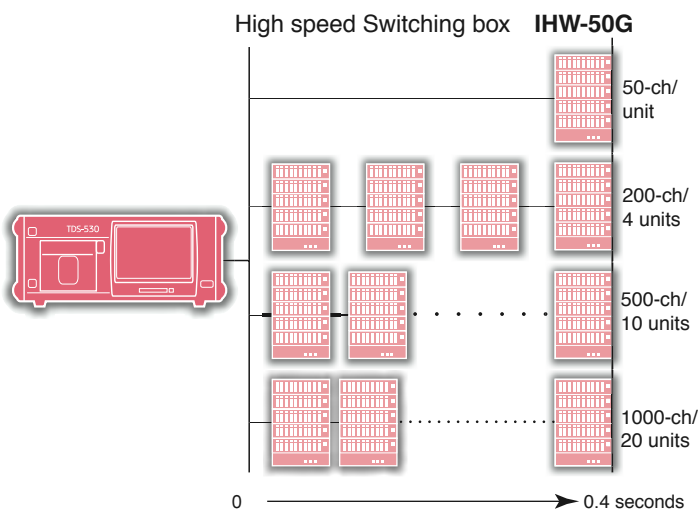
The TDS-530 is an automatic, multi-channel, scanning data logger for reading strain gauges, thermocouples, Pt RTD temperature sensors, strain gauge based (full bridge) transducers and DC voltage. New A/D converter technology provides accuracy and stability at very high scan rates. The TDS-530 in combination with our new IHW-50G high speed switching boxes can provide up to 1,000 channels of data that can be scanned in 0.4 seconds. The unit features a color LCD display and touch panel channel setup and operation. In addition, the unit may be computer controlled through an RS-232C, USB2.0 or Ethernet LAN connection.



## FEATURES

### High Speed Measurement of 1000 Channels in 0.4 sec.

Using the high speed switching box with built-in A/D converters, the TDS-530 can measure the maximum 1,000 channels in only 0.4 seconds. The connection cable is of optical fiber or RS-422. With this combination, 50, 200 and 500 channels can be scanned in 0.4 seconds.



### Color LCD Monitor with Touch-Panel

The TDS-530 can be controlled manually through a color LCD display and touch-panel having excellent contrast and visibility. The display can be toggled between Japanese and English.



### Multi-measurements of Strain, Transducer, DC voltage and Temperature

The TDS-530 data logger is an all-in-one type static strainmeter. The logger can perform various measurements using strain gauges, strain gauge based transducers, DC voltage, thermocouples and Pt RTD. For strain measurements, a high resolution of  $0.1 \times 10^{-6}$  strain is provided.



strain  
gauges



transducers



DC voltage



thermo-  
couples



Pt RTD

### Onboard High Speed Printer

High speed printing of 20 lines/sec. is possible.

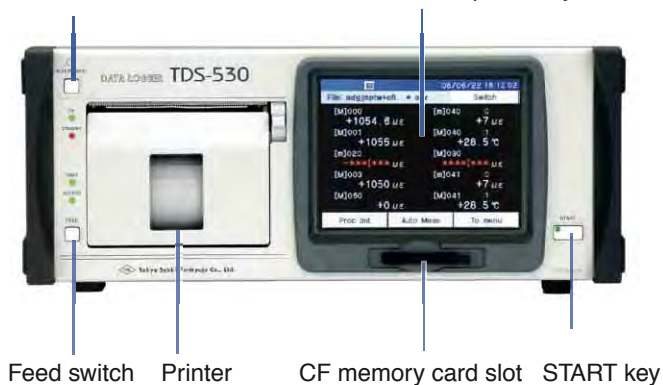
### Built-in 10-channel Switching Box

The TDS-530 is available with 10, 20 or 30 channels on-board. Each bank of 10 channels is available in either standard or high speed units.

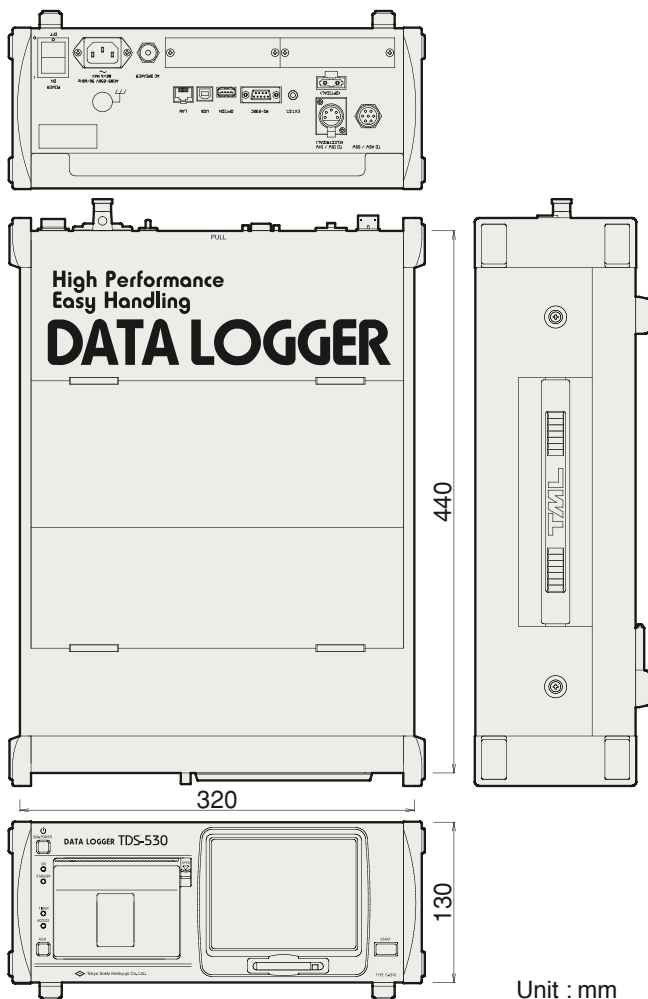
## Front panel

Sub-power switch

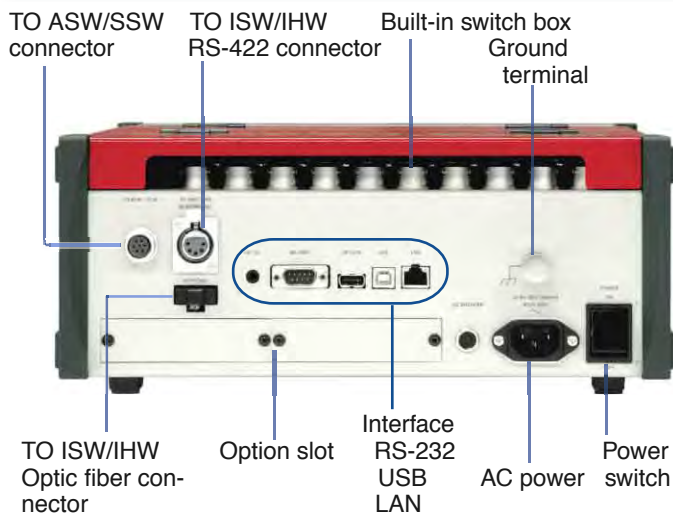
Color LCD with touch-panel keys



## Outer view



## Back panel



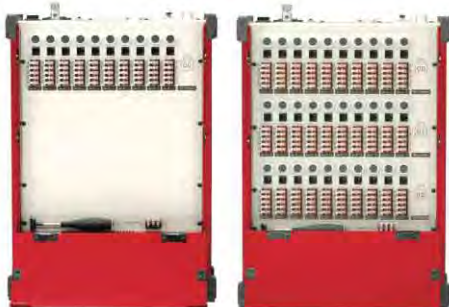
## OPTIONS

### Built-in Switching Box Extension

Factory installed option

Standard unit : Equivalent to switching box **ISW-G**  
High speed unit : Equivalent to switching box **IHW-G**

Specify the number of 10-channel units of on-board data acquisition desired (maximum of 3 units). Both standard and high speed units are available.



### DC Driving System

Factory installed option

DC Power Unit 12V **DCC-530-12**  
RPC-1A Connection Adaptor **DCC-530-RPC**

### External Starter CR-917

### TML-NET Network Driver NDR-100

This is a driver interface which runs TML-NET compatible transducers or network modules from the data logger. Distributed data acquisition system is set up.



### Lower Power Telemetry Modem TRG-200L / TRG-700L

This low-power wireless transmission requires no special license. The wireless modem used for data transmission is ideally suited for battery driven long term unattended remote measurement.

### Exclusive Recording Paper P-80

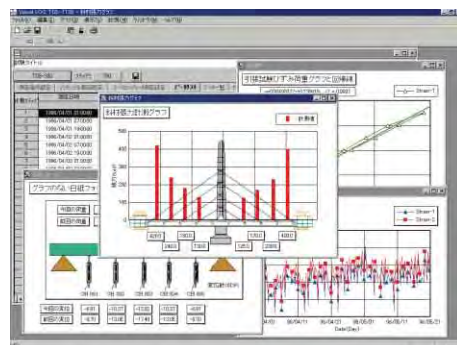
5 rolls/box



### Measurement Software

**Visual LOG<sup>®</sup>**

Static Measurement Software **TDS-7130**

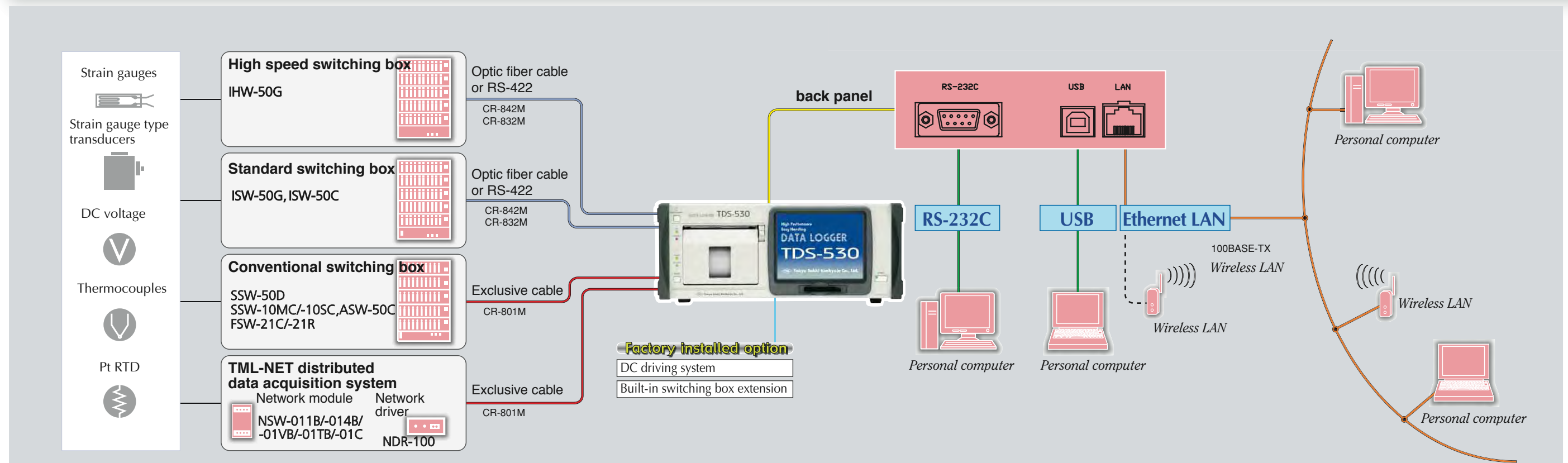


### Compact Flash Memory Cards



128MB/512MB/1GB  
NB: Our specified cards should be used.





## Simultaneous measurement of strain and temperature with one channel

Using TML temperature-integrated strain gauges such as FLA-2T/QFLA-2T, etc.

Constantan  
Cu

BLU - Cu  
WHT - Cu-Ni  
RED - Cu

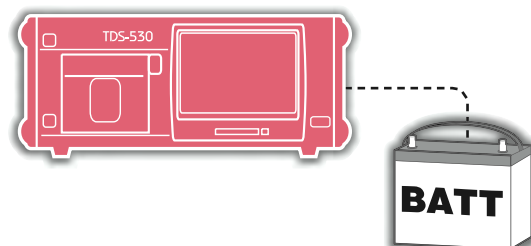
The temperature-integrated strain gauge has till now needed 2 channels for strain and temperature, but with the TDS-530, both strain and thermocouple type T can be measured at one channel by connection in 3-wire quarter bridge.



NB: The simultaneous measurement is available with not only built-in switching box but with ISW-50G or IHW-50G switching box.

## DC driving system Option

DC driving system can be provided as a factory installed option. Besides AC operation, DC driving is possible by merely connecting to a commercial battery.



## 1-Gauge 4-Wire Strain Measurement Patent

Strain measurement can be made by only connecting a modular plug (RJ12).

Our 1-gauge 4-wire strain measurement method makes it possible to connect the modular plug coming in 4 wire system from a strain gauge. Time consuming soldering/wiring work needed for multi-channel measurements is eliminated by using the modular plugs. The 4-wire method features:

- Unnecessary correction in quarter bridge method
- No sensitivity drop due to leadwire resistance
- No influence of leadwire thermal output
- No influence of contact resistance
- Lead-free connection with modular plugs



The built-in switching box of the TDS-530 has modular-plug compatible connector receptacles as well as ordinary connector terminals and NDIS connector receptacles.

## Main Compatible Switching Boxes

### High Speed Switching Box IHW-50G

50 channels/0.4 sec. (1 unit)  
1000 channels/0.4 sec. (20 units)



An optional model with both terminals and connectors

### Switching Box ISW-50G

50 channels/2 sec. (1 unit)  
1000 channels/2 sec. (20 units)



An optional model with both terminals and connectors

### Switching Box SSW-50D

50 channels/3 sec. (1 unit)  
1000 channels/60 sec. (20 units)



## Comparison of functions of main compatible switching boxes

Switching Box	No. of channels	Connector compatible	1G4W	Strain	Const. current	High resolution	DC voltage	Thermo-couples	Pt RTD	Arrestor	Scanning speed	1000-channel measurement	Switching relay	Remarks
IHW-50G	50	—	●	●	●	●	●	●	●*1	●	0.04S	0.4S	Semiconductor relay	1-channel simultaneous measurement using temperature integrated strain gauge available
IHW-50G-05		●	●	●	●	●	●	●	●*1	●	0.04S	2S	Semiconductor relay	1-channel simultaneous measurement using temperature integrated strain gauge available
ISW-50G	50	—	●	●	●	●	●	●	●*1	●	0.04S	3S	Semiconductor relay	
ISW-50G-05		●	●	●	●	●	●	●	●*1	●	0.06S	60S	Semiconductor relay	
SSW-50D	50	—	●	●	●	●	●	●	—	—	0.06S	60S	Special relay	
SSW-50D-05		●	●	●	●	●	●	●	—	—	0.06S	60S	Special relay	
ASW-50C	50	—	●	●	●	●	●	●	—	—	0.06S	60S	Special relay	
ASW-50C-05		●	●	●	●	●	●	●	—	—	0.06S	60S	Special relay	

\*1: Pt RTD with 100 Ω 3-wire only available

# SPECIFICATIONS

**Number of channels** 1000

## Strain Measurement (in normal mode)

**Bridge excitation** DC2V 24ms(50Hz)  
**Initial unbalance memory range**  $\pm 160000 \times 10^{-6}$  strain

Measuring range	Resolution	Scanning speed 50Hz/60Hz
$\pm 40000 \times 10^{-6}$ strain	$1 \times 10^{-6}$ strain	With the built-in switching box, IHW-50G, ISW-50G 40ms/34ms
$\pm 80000 \times 10^{-6}$ strain	$2 \times 10^{-6}$ strain	
$\pm 160000 \times 10^{-6}$ strain	$4 \times 10^{-6}$ strain	With ASW-50C, SSW-50C/-50D, ISW-50C 60ms/50ms
$\pm 320000 \times 10^{-6}$ strain	$8 \times 10^{-6}$ strain	
$\pm 640000 \times 10^{-6}$ strain	$16 \times 10^{-6}$ strain	

## Strain Measurement (in high resolution mode, full bridge only)

**Bridge excitation** DC5V 48ms (50Hz)  
**Initial memory range**  $\pm 16000.0 \times 10^{-6}$  strain

Measuring range	Resolution	Scanning speed 50Hz/60Hz
$\pm 4000.0 \times 10^{-6}$ strain	$0.1 \times 10^{-6}$ strain	With the built-in switching box, IHW-50SG, ISW-50G 120ms/100ms
$\pm 8000.0 \times 10^{-6}$ strain	$0.2 \times 10^{-6}$ strain	
$\pm 16000.0 \times 10^{-6}$ strain	$0.4 \times 10^{-6}$ strain	With ASW-50C, SSW-50C/-50D, ISW-50C 160ms/134ms
$\pm 32000.0 \times 10^{-6}$ strain	$0.8 \times 10^{-6}$ strain	
$\pm 64000.0 \times 10^{-6}$ strain	$1.6 \times 10^{-6}$ strain	

## DC Voltage Measurement

**Initial memory range** V 1/1  $\pm 160.000$ mV  
V 1/100  $\pm 16.0000$ V

## Thermocouple Temperature Measurement

**Applicable thermocouples** JIS C1602-1955 T,K,J,B,S,R,E,N  
**Linearization** Digital operation

## Pt RTD Temperature Measurement

**Applicable Pt RTD** JIS C1604-1997 Pt100  
**Measuring method** 3-wire (Pt3W), 4-wire (Pt4W)  
(Pt13W only for the built-in switching box)  
**Linearization** Digital operation

**Measurement Mode** INITIAL, DIRECT, MEASURE

## Switching Box Scanning Time (in normal strain mode) (50Hz)

No. of channels	IHW-50G	ISW-50G	AWS/SSW
50	0.4 sec.	2 sec.	3 sec.
500	0.4 sec.	2 sec.	30 sec.
1000	0.4 sec.	2 sec.	60 sec.

## Channel Switching Method

**Scanning** Automatic from first to last channel(Jump available)  
Infinite scanning in FREE RUN mode (max. 10-ch)  
**Monitoring** Repetition of monitor channels (max. 10 channels)  
Y-T, graphic monitor (max. 10 channels)  
**Measurement start** Start key and external contact (manual)  
FREE RUN, Interval Timer, Monitor Comparator  
LAN, USB, RS-232C

## Channel Settings

**Coefficient** Settable for each channel  
 $\pm (1.00000 \times 10^{-9} \sim 1.00000 \times 10^{+9})$   
**Unit**  $\mu\epsilon$ , mV, N,  $^{\circ}\text{C}$ , mm, etc. up to 38 units  
**Decimal point** Optically settable 0-6 digits for display below decimal point  
**Initial value** Writable for each channel

## Sensor mode

**Strain** 3-wire 1/4 bridge 120/240/350  $\Omega$   
1/2 common dummy, 1/2 and Full bridge  
Full bridge constant current 350  $\Omega$ ,  
Full bridge high resolution mode  
Full bridge constant current 350  $\Omega$  and High resolution mode  
1-gauge 4-wire 120/240/350  $\Omega$   
**DC voltage** V 1/1 [640mV] V 1/100 [64V]  
**Temperature** T,K,J,B,S,R,E,N, Pt100 3W, Pt100 4W  
**Others** TML-NET, temperature-integrated strain gauges with 120/240/350  $\Omega$ , JUMP, etc.

## SIMPLE Measure

**Full SIMPLE** Coefficient 1.000/ Unit  $\mu\epsilon$  / No decimal point  
**Auto SIMPLE** Coefficient 1.000 / Unit and decimal point follow sensor mode.

## Check Function

Insulation, stabilized insulation, sensitivity, dis-persion, thermocouple disconnection, etc.  
**Self-diagnosis** Confirmation of firmware operation environment  
**Time** Accuracy  $\pm 1$  sec/day ( $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$ )  
**FREE RUN** Repetition of scan

## Interval timer

### Function

Automatic measurement at the set intervals or real time

### Time

Year/Month/Day/Hour/Minute/Second

### Accuracy

$\pm 1$  sec./day ( $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$ )

### Time intervals

Hour/Minute/Second, Settable for every step up to 99 hrs. 59 min. and 59 sec.

### Real time start

Settable start time (day/hour/minute/second) for every step

### Number of start times

Max. 99 times per step or infinite

### Number of steps

Programmable maximum 50 steps

### GOTO step

Programmable loop to previous step

### GOTO comparator

Moves to step 1 of monitor comparator

### Sleep function

Automatic power OFF when halting more than 1 minute

## Monitor comparator

### Function

Automatic measurement according to the set amount of change

### Amount of change in input

Settable for every step, max.  $\pm 999999$

### Number of start times

Max. 99 times per step or infinite

### Number of steps

Programmable maximum 50 steps

### GOTO step

Programmable loop to previous step

### GOTO interval

Moves to step 1 of interval

## Data Memory

### Capacity of data

8M byte (for 2000 scans with 1000 channels) in Binary recording format

## Memory card

### Standards

Compact flash TYPE 1

### Applicable card

Compact flash card 32MB ~ 1GB

## Interface

### Display

### Indicator

Color TFT liquid crystal display (with touch panel)

### Resolution

320 x 240 dots

### Contents

Measurement data, setting list, numerical monitor, etc.

## Printer

### Printing method

Thermal line dot method, 24 digits/line

### Printing speed

0.05 sec./line (200mm/s)

### Applicable paper

P-80 (80mm wide, 25m/roll, 7200 lines/roll)

## Built-in switching box

### Number of channels

Max. 30 (Standard 10 channels)

### Switching relay

Semiconductor relay (surge absorber provided)

### Strain measurement

3-wire 1/4 bridge 120, 240, 350  $\Omega$   
1/2 bridge 60 ~ 1000  $\Omega$   
1/2 bridge common dummy 60 ~ 1000  $\Omega$  \*  
Full bridge 60 ~ 1000  $\Omega$   
Full bridge constant current 350  $\Omega$   
Full bridge high resolution 120 ~ 1000  $\Omega$   
Full bridge constant current high resolution 350  $\Omega$   
1-gauge 4-wire 120, 240, 350  $\Omega$   
\* 1/2 bridge common dummy is not available in high resolution mode.

## Sensor cable extension

Full bridge constant current 350  $\Omega$  Within 400  $\Omega$  in total resistance of cable  
Full bridge constant current high resolution 350  $\Omega$  Within 160  $\Omega$  in total resistance of cable

## Sensitivity change (when using our standard 0.5mm<sup>2</sup> 4-core shielded cable)

Full bridge constant current 350  $\Omega$   $+0.1 \sim -0.5\%$ /100  $\Omega$  in total resistance of cable  
Full bridge constant current high resolution 350  $\Omega$   $+0.1 \sim -0.5\%$ /100  $\Omega$  in total resistance of cable

Full bridge constant current high resolution 350  $\Omega$   $+0.1 \sim -0.5\%$ /100  $\Omega$  in total resistance of cable

## Leadwire resistance correction range

Comet B (3-wire 1/4 bridge, 1/2 bridge common dummy)

Gauge resistance	Leadwire resistance correction range
120 $\Omega$	Less than 100 $\Omega$
240 $\Omega$	Less than 200 $\Omega$
350 $\Omega$	Less than 300 $\Omega$

## DC voltage measurement

V 1/1  $\pm 640$ mV  
V 1/100  $\pm 64$ V

## Input impedance

More than 1M  $\Omega$

## Temperature measurement

### Applicable thermocouples

T,K,J,B,S,R,E,N JIS C1602-1995

### Applicable Pt RTD

Pt100 (500mA constant current 3-wire system) JIS C1604-1997

## Operating Environments

0 ~  $+50^{\circ}\text{C}$ , less than 85% RH (without condensation)

## Power supply

AC85 ~ 250V 50/60Hz 80VA max.

## Dimensions

320 (W) x 130 (H) x 440 (D)mm excluding projected parts

## Weight:

8 kg. (with 10-channl built-in switching box)

*Specifications subject to change without prior notice*



Approval Certificate ISO9001

Design and manufacture of strain gauges, strain measuring equipment and transducers



**Tokyo Sokki Kenkyujo Co., Ltd.**  
**www.tml.jp/e**

8-2, Minami-Ohi 6-Chome, Shinagawa-Ku, TOKYO 140-8560, JAPAN  
TEL: TOKYO 03-3763-5611 FAX: TOKYO 03-3763-5617