TML

Data Logger

TDS-630

High Performance Easy Handling

Tokyo Sokki Kenkyujo Co., Ltd.

High Speed and High Functionality achieved by enhancing Measurement Speed and Processing Function

Repeated Measurements in 0.1 seconds per 1000 channels

TML-LINK High Speed Mode | **LAN/USB/RS232C** | **7.5" Color LCD**

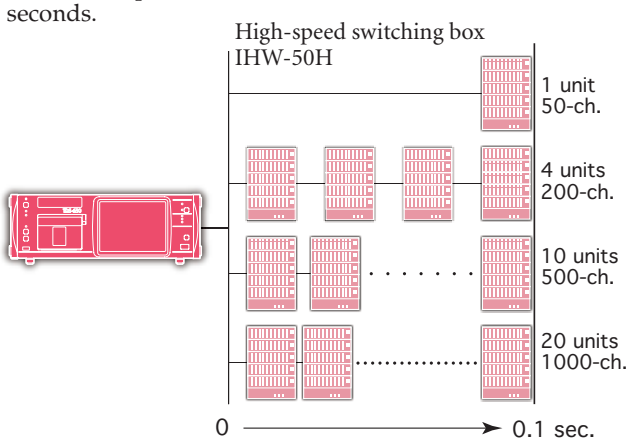
The TDS-630 is a high performance data logger with unmatched convenience of operation in addition to high speed, high reliability and high function. The newly developed high performance A/D converter offers very stable measurement at a speed of 0.04 seconds per channel. In high-speed mode, repeated measurements at a speed of 0.1 seconds for the maximum 1000 channels are possible. High-brightness and easy-to-view color touch screen is provided. A large capacity data memory, high-speed printer, internal timer, compact flash memory card and the like make easy and versatile automatic measurement possible without personal computer. LAN, USB and RS-232C interfaces are equipped to enable the optimum online measurement. Option includes analog output board for voltage output working together with the monitor.

TDS-630

FEATURES

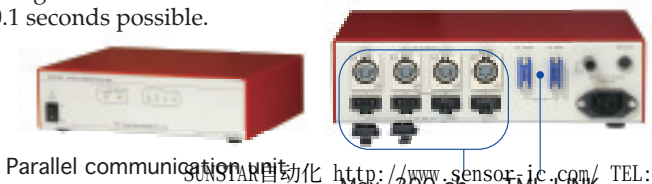
High-speed measurement of 1000 channels in 0.1 seconds

In combination with a high-speed switching box IHW-50H adopting a new high-speed communication method, the maximum 1000 channels can be measured in 0.1 seconds. Connection cable is TML-LINK exclusive cable. This composition also makes it possible to measure 50, 200 and 500 channels in 0.1 seconds.



Connection of parallel communication unit (Option)

Using the A/D converter-integrated high-speed switching box IHW-50G, the maximum 1000 channels can be measured in 0.4 seconds. Furthermore, connection with TDS-630 via TML-LINK cable through parallel communication unit PCU-4A designed for IHW-50G makes measurement of 1000 channels in 0.1 seconds possible.



Multi-input measurements of strain, strain-gauge-based transducer, DC voltage and temperature

The TDS-630 data logger is so-called all-in-one type static strainmeter. With one unit, various measurement using strain gauges, strain-gauge-based transducers, DC voltage, thermocouples and Pt RTD are possible. A high resolution of 0.1×10^{-6} in strain measurement is available.

Color LCD monitor with touch screen

The color LCD monitor has excellent visibility and convenience of operation and the screen can be toggled between English and Japanese. Hard copy of the display is possible.

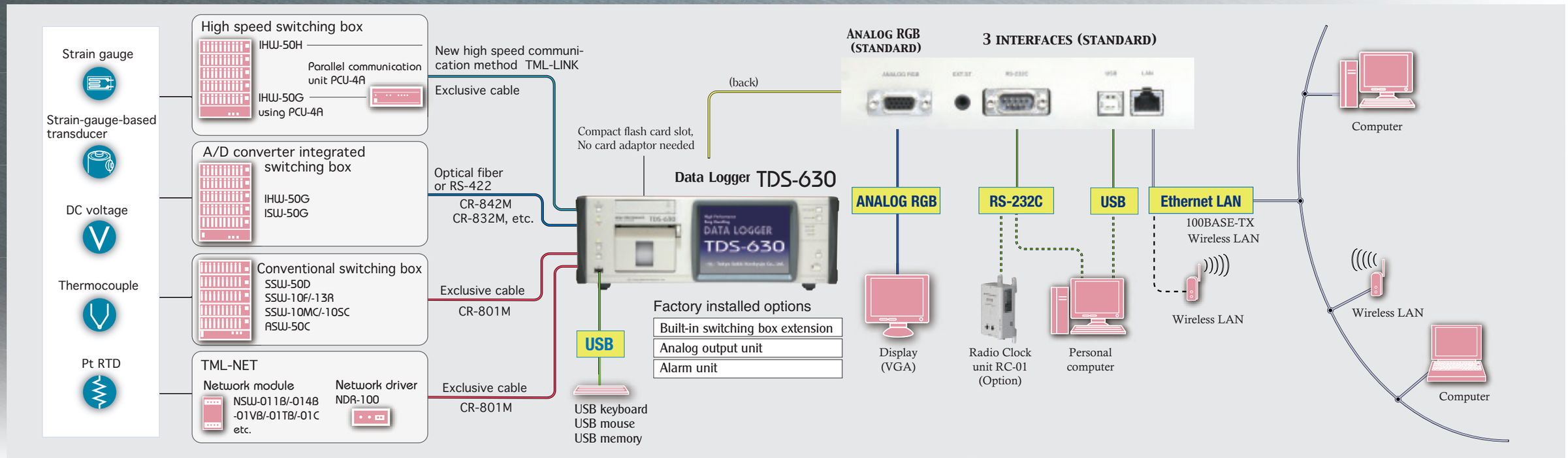
Onboard analog output for up to 20 channels (Option)

The measured values of channels monitored by TDS-630 are D/A converted and output in voltage.

- Output according to high-speed A/D converter mode
- Sine wave output using the waveform retrieval function (Option)

High performance Easy handling

System Diagram



Onboard High-Speed Printer

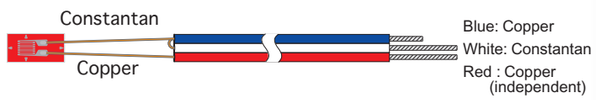
The printing speed is as fast as 0.05 seconds/line.

Built-in 10 channel switching box (Standard)

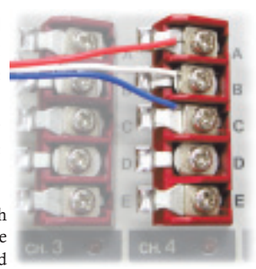
A 10-channel switching box is incorporated and can be extended up to 30 channels every 10-channel unit.

Simultaneous measurement of both strain and temperature with 1 channel

Temperature-integrated strain gauges:
FLA-2T, QFLA-2T, etc.



Our unique temperature-integrated strain gauges have so far needed 2 channels for strain and temperature measurements, but with TDS-630, you can measure both strain and thermocouple type T simultaneously on the identical channel.



*One channel measurement with temperature-integrated stain gauge is available with ISW-50G and IHW-50G as well as the built-in switching box.

1-gauge 4-wire strain measurement method

Patented

Strain can be measured by merely connecting a modular plug.

Our developed 1-gauge 4-wire method makes strain measurement possible by plugging strain gauges with leadwires in 4-wire system and modular plug in the input receptacles of TDS-630 or its external switching boxes This one-touch connection serves to drastically save time and labor required for leadwire connection especially in multi-channel measurement. The advantages of this measurement method are:

- **No correction needed in quarter bridge configuration**
- **No sensitivity deterioration caused by the resistance of leadwires**
- **Not influenced by the thermal output of leadwires**
- **No influence of contact resistance**
- **Easy connection with a modular plug – No lead-free soldering required.**

1- gauge 4-wire strain gauges

The built-in switching box has modular plug receptacles in addition to conventional terminal boards and NDIS connectors.

Compatible Switching Boxes

High-speed switching box
IHW-50H
50 ch./0.1 sec. (with 1 unit only)
1000 ch./0.1 sec. (with 20 units)

NEW

High-speed switching box
IHW-50G
50 ch./0.4 sec. (with 1 unit only)
1000 ch./0.4 sec. (with 20 units)

The photo shows connector compatible model (option).

Switching box
ISW-50G
50 ch./2 sec. (with 1 unit only)
1000 ch./2 sec. (with 20 units)

The photo shows connector compatible model (option).

Switching box
SSW-50D
50 ch./3 sec. (with 1 unit only)
1000 ch./60 sec. (with 20 units)

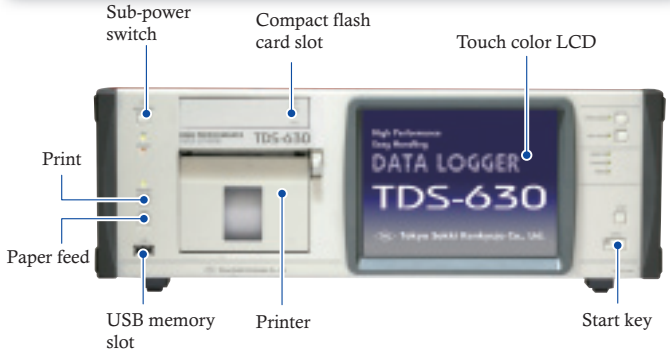
Functional Comparison between Switching Boxes

Switching box	No. of channels	Connector compatible	1-gauge 4-wire	Strain	Constant current	High resolution	DC voltage	Thermocouples	Pt-RTD	Built-in arrester	Switching speed	1000-ch measure	Description
IHW-50H	50	–	●	●	●	●	●	●	●*1	●	0.01s	0.1s	with 1 channel measurement function of temperature-integral strain gauge
IHW-50H-05		●											
PCU-4A+IHW-50G	50	–	●	●	●	●	●	●	●*1	●	–	0.1s	with PCU-4A for IHW-50G
PCU-4A+IHW-50G-05		●											
IHW-50G	50	–	●	●	●	●	●	●	●*1	●	0.04s	0.4s	with 1 channel measurement function of temperature-integral strain gauge
IHW-50G-05		●											
ISW-50G	50	–	●	●	●	●	●	●	●*1	●	0.04s	2s	with 1 channel measurement function of temperature-integral strain gauge
ISW-50G-05		●											
SSW-50D	50	–	●	●	●	●	●	●	–	–	0.06s	60s	
SSW-50D-05		●											
ASW-50C	50	–	●	●	●	●	●	●	–	–	0.06s	60s	
ASW-50C-05		●											

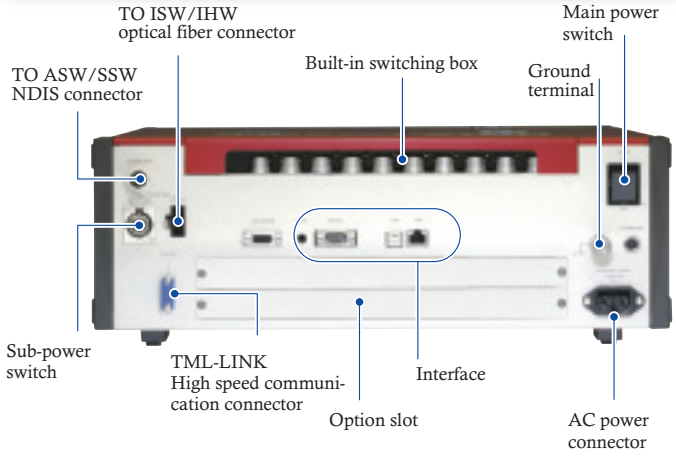
NB. *1 Pt100 3W RTD only ● : Available – : Not available

Scanning method of all models is semi-conductor relay.

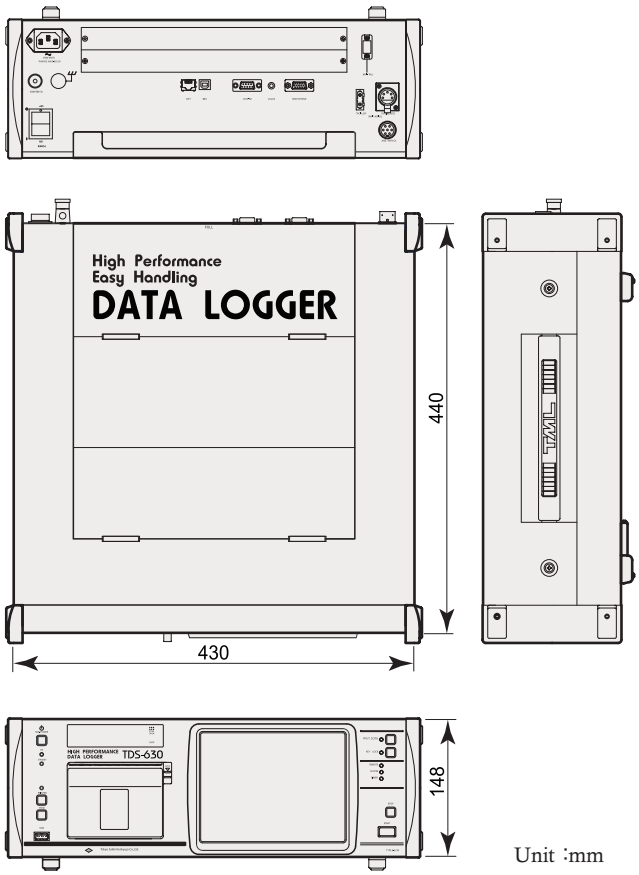
Front Panel



Rear Panel



Outer View



Unit :mm

OPTIONS

Built-in switching box extension (Factory installed option)

The standard TDS-630 incorporates 10 channel switching box. Channel extension is available up to 30 channels every 10 channels.

Parallel Communication Unit PCU-4A (for IHW-50G)

The PCA-4A is connected with the TDS-630 and can let 4 units of IHW-50G run in parallel.

Maximum 20 channel analog output unit (Factory installed option)

The measured digital values of the channels monitored by TDS-630 are converted into analog voltage values to be output. Retrieval function of sine wave is available as an option.
Output range: 0 ~ +5V, ±5V, ±10V
Data renewal time: Fastest 0.1 sec. (according to monitor frequency)

Alarm Unit (Factory installed option)

In the measurement using the alarm function of TDS-603, alarm signals are output.
Output signals: SEP, UP, LOW, MID

Radio Clock Unit RC-01

The clock of TDS-630 is automatically adjusted by receiving time signal of radio stations. The clock is compatible with the JJY radio stations in Japan. The RS-232C port is used.

Recording Paper P-80

5 rolls/box

TML-NET Network Driver NDR-100

NDR-100 is a driver interface to get TML-NET compatible transducers and network modules operated from TDS-630. A dispersion type data acquisition system can be configured.

SPECIFICATIONS

Number of channels 1000

Strain Measurement (in normal mode)

Bridge excitation DC2V 24ms(50Hz)

Initial memory range ±160000 x 10^{-6} strain

Measuring range and resolution

Measuring range	Resolution
±40000x10^{-6} strain	1x10^{-6} strain
±80000x10^{-6} strain	2x10^{-6} strain
±160000x10^{-6} strain	4x10^{-6} strain
±320000x10^{-6} strain	8x10^{-6} strain
±640000x10^{-6} strain	16x10^{-6} strain

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

Bridge excitation DC5V 48ms (50Hz)

Initial memory range ±160000 x 10^{-6} strain

Measuring range and resolution

Measuring range	Resolution
±4000.0x10^{-6} strain	0.1x10^{-6} strain
±8000.0x10^{-6} strain	0.2x10^{-6} strain
±16000.0x10^{-6} strain	0.4x10^{-6} strain
±32000.0x10^{-6} strain	0.8x10^{-6} strain
±64000.0x10^{-6} strain	1.6x10^{-6} strain

Strain Measurement (in high resolution mode, TML-LINK)

Bridge excitation DC2V 4ms (50Hz)

Strain high-resolution mode not available

Initial memory range ±160000 x 10^{-6} strain

Measuring range and resolution

Measuring range	Resolution
±40000x10^{-6} strain	1x10^{-6} strain
±80000x10^{-6} strain	2x10^{-6} strain
±160000x10^{-6} strain	4x10^{-6} strain
±320000x10^{-6} strain	8x10^{-6} strain
±640000x10^{-6} strain	16x10^{-6} strain

DC Voltage measurement

Initial memory range V 1/1: ±160.000mV V 1/100: ±16.0000V

Measuring range V 1/1: ±640mV V 1/100: ±64V

Thermocouple measurement T,K,J,B,S,R,E,N

Linearization Digital operation

Pt RTD measurement Pt100 3-wire (Pt3W) & 4-wire (Pt4W)
(Pt13W only for the built-in switching box)

Linearization Digital operation

Measurement mode INITIAL, DIRECT, MEASURE, AUTOSIMPLE & Connection (Processing measured values)

Measurement time by switching box (for all channels except high-resolution mode)

Normal mode

Switching box		IHW-50H	IHW-50G	ISW-50G	AWS/SSW
Scanning time	50 ch.	0.4 sec.	0.4 sec.	2 sec.	3 sec.
(in 50Hz area)	1000 ch.	0.4 sec.	0.4 sec.	2 sec.	60 sec.

Note 1: In the thermocouple mode, the time should be added by time for one channel every 10 channels.
Note 2: In the temperature-integrated strain gauge mode, some additional time is needed.
Note 3: TML-NET requires 200ms per channel for scanning and monitoring.
Note 4: High-resolution model needs 3 time of normal measuring time per channel.

High-speed mode (TML-LINK)

Applicable switching box IHW-50H and combination of parallel communication unit PCU-4A and IHW-50G

Scanning time	50 ch.	Less than 0.1 sec.
(in 50/60Hz area)	1000 ch.	Less than 0.1 sec.
Repetition interval		0.1, 0.2, 0.5, 1 sec. in sampling measurement

Note 1: In the thermocouple mode, the time should be added by the time for on channel every 10 channels.
Note 2: In the temperature-integrated strain gauge mode, some additional time is needed.
Note 3: In high-speed mode, high-resolution and TML-NET can not be used.

Channel Switching Method

Scanning measurement: Automatic from 1st to last channel(Jump available)
Infinite scanning in FREE RUN mode (Max. 10-ch)

Monitor measurement : Repeted measuremnt of monitor channels(Max 30 ch)

Scanning measurement start
: Manual/Auto/Interface

Monitor measurement start
: Always monitoring while monitor is switched on

Channel Settings Capable of setting for each channel

Coefficient ±(0.0001 ~ 99999)

Unit 39 kinds including με, mV, N, ℃ and mm
Optional units of 10 kinds

Decimal point Any in 0-5 digits can be set for less than decimal point

Sensor mode 3-wire quarter, 1-gauge 4-wire, half bridge with common dummy, half bridge, full bridge, constant current 350Ω full bridge, full bridge high-resolution

Sensor mode 350Ω full bridge high-resolution, voltage(640mV/64V), thermocouple, Pt RTD, TML-NET, temperature-integrated strain gauge, readout with TEDS, etc.
Applicable mode depends on switching boxes to be connected.

Extended channel setting Functional operation and operation between channels up to 1000 channels.

Check Function Insulation, sensitivity, dispersion, thermocouple open-circuit, ham component, DIRECT, etc.

Self-diagnosis Confirmation of firmware operation environment

Clock Accuracy ±3 sec./day (23℃±5℃)
* Automatic adjustment with optional radio clock

FREE-RUN function Repetition of scanning (combination with sampling function not available)

Interval timer function (10 systems)

Time interval Hour, minute and second, capable of setting up to 99 hours, 59 miniutes and 59 seconds for each step

Real time Capable of setting start time (month, day, hour, and minute) for each step

Sleep function Automatic ON/OFF of power in time interval measurement

Monitor comparator (10 systems) Automatic measurement according to the set amount of variation for monitor channel (1 ch)

Amount of comparison Capable of setting for every step, ±999999 maximum

Internal memory Recording/retrieval, file transfer, reading from interface

Format Binary, CSV, Bitmap (a hard copy of sccreen)

Capacity 1GB

External memory Recording/retrieval of data, file transfer, firmware upgrade, reading from interface

Type of device Compact Flash® card type I, USB memory

Format Binary, CSV, Bitmap (a hard copy of screen)

Capacity 32MB - 4GB

Interface LAN, USB, RS-232C

Display (Front panel)

LCD display 7.5" color TFT LCD (with touch screen)

Resolution 640 x 480 dots

LED indicator POWER, STANDBY, PRINTER, ACCESS, TIMER , etc.

External display The same display as the front screen by connecting an external display screen (RGB)

Built-in printer

Printing system & speed Thermal sensitive line dot system, 24 digits/line
0.05 sec/line/channel

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

Built-in switching box Max. 30 (Standard 10 channels)

Switching relay Semiconductor relay (with surge absorber for each channel)

Strain measurement 3-wrie quarter bridge, 1-gauge 4-wire 120, 240, 350Ω
Half bridge/half bridge with common dummy 60~1000Ω*
Full bridge 60 ~ 1000Ω
Full bridge with constant current 350Ω
Full bridge high-resolution 120 ~ 1000Ω*
Full bridge high-resolution with constant current 350Ω*
Temperature-integrated stain gauge mode 120, 240, 350Ω
* Not available for high-speed mode

Sensor cable extension
350Ω full bridge with constant current Within a total resistance of 400Ω
High-resolution 350Ω full bridge with constant current Within a total resistance of 160Ω

Sensitivity change (using TML standard 0.5mm² 4-core shielded cable)
350Ω full bridge with constant current and High-resolution 350Ω full bridge with constant current : +0.1 ~ −0.5% per 100Ω of total cable resistance

Correction range of leadwire resistance:
Comet B (3-wire quarter with common dummy)

Gauge resistance	Leadwire resistance correction range
120Ω	Less than 100Ω
240Ω	Less than 200Ω
350Ω	Less than 300Ω

DC voltage measurement V 1/1 : ±640m V 1/100 : ±64V

Input impedance More than 1MΩ

Thermocouples T,K,J,B,S,R,E,N

Pt RTD Pt100 (500μA constant current 3-wire)

Connectin with external switching box

TML-LINK High-speed switching box IHW-50H, 20 units max. or parallel communication unit PCU-4A, 5 units

ISW/IHW Switching box IHW-50G or ISW-50G, 20 units max.
Electrical: RS-422 cable Optical: Optical fiber cable

ASW/SSW Switching box SSW-50D, SSW-10F/-13R, ASW-50C 20 units max. (a power booster needed)

TML-NET Network module connection (One NDR-100 is required for every 100 cahnnels of module.)

Operational environment 0 ~ +50℃, Less than 85%RH, without condensation

Power requirement Rating : 100 ~ 240Vac, 50/60Hz
Permissible : 85 ~ 265Vac, 50/60Hz
Power consumption 150VA max.

Dimensions 430 W x 148H x 440D mm (excluding bracket and projecting parts)

Weight: 10 kg. (without options)

Specifications subject to change without prior notice

LLOYD'S REGISTER QUALITY ASSURANCE · ISO9001 · UKAS MANAGEMENT SYSTEMS 001

Approval Certificate ISO9001
Design and manufacture of strain gauges, strain measuring equipment and transducers

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