

**Upgraded**  
**PORTABLE DATA LOGGER**  
**TDS-303** **FLASH**



**Easy-to-view** NEW  
*high brightness*  
*monitor*

**Compatible** NEW  
*with Ethernet LAN*  
*and wireless LAN*

**Flash memory** NEW  
**32/64/128MB**

**1000 channels**  
*in 4.9 seconds*

**$0.1 \times 10^{-6}$  strain**  
*high resolution mode*

**0.06 seconds/line**  
*High speed print*

**System options - New measurement system** NEW

- 1-gauge 4-wire measurement
- Digital displacement measurement



# TDS-303 **FLASH** launched with upgraded functions. Enjoyable high cost performance

The TDS-303 **FLASH** is a data logger intended for automatic switching multi-channel measurements of strain gauges, DC voltage, thermocouples, Pt RTD and so on. The number of measurement channels is the maximum 30 channels with the data logger itself and the maximum 1000 channels with external switching boxes. The data logger incorporates our performance-proved and patented triple-integration A/D converter to offer high accuracy and high stability. For strain measurement, used is a new compensation method whereby higher accuracy than conventional method, non-influence of initial strain and non-error in the linearity of bridge circuit have been achieved. The upgraded TDS-303 **FLASH** equips flash-memory card slot and Ethernet LAN and options include a new two measurement systems: 1-gauge 4-wire measurement system and digital displacement measurement system.



## A view-enhanced touch panel monitor display



A touch panel in the monitor section which is easy-to-view even under direct sunlight provides easy-to-follow prompts that guide the user through both basic and advanced measurements. Unlike pushbutton, the touch-panel operation is quick, easy and close to error-free.

## High speed print of 1 line of 18 digits in 0.06 second

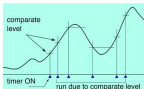


Data list



Graphic display

## Automatic measurement in multi-mode



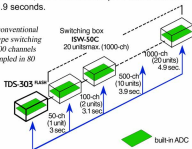
The data logger provides a variety of automatic start functions. For example, measurement starts can be triggered by the timer or by a change in a monitor value. It is also possible to shift from the timer to the monitor comparator, or to shift to either the timer or monitor comparator when one of the monitor values exceeds the setting.

## Quick sampling of 1000 channels in 4.9 seconds

When used with the ISW-50C switching box incorporating an A/D converter, the TDS-303 samples 10000 channels in only 4.9 seconds.

Note:

With the conventional ASW-C type switching boxes, 1000 channels can be sampled in 80 seconds.



## Onboard 10-channel switching box with semiconductor relays



The standard data logger has a built-in 10-channel switching box. The semiconductor relays for switching channels make it possible for the logger to be semi-permanently employed in high speed scan. Option includes expansion up to 30 channels.

## Number of channels 1000

## Strain measurement (in normal resolution mode)

Bridge excitation	DC2V 20mS (50Hz)
Initial value memory range	$\pm 160000 \times 10^{-6}$ strain
Temperature effect on accuracy	$\pm 0.002\%$ reading/ $^{\circ}$ C
Aging effect on accuracy	$\pm 0.02\%$ reading/year

Measurement range	Resolution	Accuracy (25 $^{\circ}$ C $\pm$ 5 $^{\circ}$ C)	Scanning speed 50Hz/60Hz
$\pm 20000 \times 10^{-6}$ strain	1 X $110^{-6}$ strain	$\pm 0.05\%$ rdg + 1digit	60mS/60mS
$\pm 40000 \times 110^{-6}$ strain	1 X $110^{-6}$ strain	$\pm 0.05\%$ rdg + 1digit	90mS/67mS
$\pm 80000 \times 110^{-6}$ strain	2 X $110^{-6}$ strain	$\pm 0.05\%$ rdg + 1digit	90mS/67mS
$\pm 160000 \times 10^{-6}$ strain	4 X $110^{-6}$ strain	$\pm 0.05\%$ rdg + 1digit	90mS/67mS
$\pm 320000 \times 10^{-6}$ strain	8 X $110^{-6}$ strain	$\pm 0.05\%$ rdg + 1digit	90mS/67mS
$\pm 640000 \times 10^{-6}$ strain	16 X $110^{-6}$ strain	$\pm 0.05\%$ rdg + 1digit	90mS/67mS

## Strain measurement (in high resolution mode for full bridge only)

Bridge excitation	DC5V 20mS (50Hz) x 2 times
Initial value memory range	$\pm 160000 \times 10^{-6}$ strain
Temperature effect on accuracy	$\pm 0.002\%$ reading/ $^{\circ}$ C
Aging effect on accuracy	$\pm 0.02\%$ reading/year

Measurement range	Resolution	Accuracy (25 $^{\circ}$ C $\pm$ 5 $^{\circ}$ C)	Scanning speed 50Hz/60Hz
$\pm 40000.0 \times 10^{-6}$ strain	$0.1 \times 10^{-6}$ strain	$\pm 0.05\%$ rdg + 3digit	160mS/134mS
$\pm 8000.0 \times 10^{-6}$ strain	$0.2 \times 10^{-6}$ strain	$\pm 0.05\%$ rdg + 3digit	
$\pm 1600.0 \times 10^{-6}$ strain	$0.4 \times 10^{-6}$ strain	$\pm 0.05\%$ rdg + 3digit	
$\pm 3200.0 \times 10^{-6}$ strain	$0.8 \times 10^{-6}$ strain	$\pm 0.05\%$ rdg + 3digit	
$\pm 6400.0 \times 10^{-6}$ strain	$1.6 \times 10^{-6}$ strain	$\pm 0.05\%$ rdg + 3digit	

Note: High resolution mode is available with the built-in switching box, ISF-50C, ASF-50C and SSF-50C.

## DC voltage measurement

Initial value memory range	V/11 $\pm 160000$ mV V/1000 $\pm 160000$ V
Thermal effect on accuracy	$\pm 0.0024\%$ reading/ $^{\circ}$ C
Aging effect on accuracy	$\pm 0.024\%$ reading/year

Measurement range	Resolution	Accuracy (25 $^{\circ}$ C $\pm$ 5 $^{\circ}$ C)
$\pm 40.000$ mV	0.001mV	$\pm 0.05\%$ rdg + 3digit
$\pm 80.000$ mV	0.002mV	$\pm 0.05\%$ rdg + 3digit
$\pm 160.000$ mV	0.004mV	$\pm 0.05\%$ rdg + 3digit
$\pm 320.000$ mV	0.008mV	$\pm 0.05\%$ rdg + 3digit
$\pm 640.000$ mV	0.016mV	$\pm 0.05\%$ rdg + 3digit
$\pm 4.0000$ V	0.0001V	$\pm 0.05\%$ rdg + 2digit
$\pm 8.0000$ V	0.0002V	$\pm 0.05\%$ rdg + 2digit
$\pm 16.0000$ V	0.0004V	$\pm 0.05\%$ rdg + 2digit
$\pm 32.0000$ V	0.0008V	$\pm 0.05\%$ rdg + 2digit
$\pm 64.0000$ V	0.0016V	$\pm 0.05\%$ rdg + 2digit

## Thermocouple temperature measurement

Applicable thermocouples	JIS C1602-1995 T, K, J, B, S, R, E, N
Linearization	Digital calculation

Measurement range in $^{\circ}$ C	Resolution $^{\circ}$ C	Accuracy $\pm$ (%rdg + C) (25 $^{\circ}$ C $\pm$ 5 $^{\circ}$ C)		
		External RJC	Internal RJC	Internal RJC
-250 ~ -200	0.1	0.19 + 0.5	0.19 + 3.8	
-200 ~ -100	0.1	0.088 + 0.2	0.088 + 1.6	
-100 ~ +400	0.1	0.060 + 0.2	0.060 + 0.9	
-200 ~ -160	0.1	0.11 + 0.3	0.11 + 1.8	
-160 ~ 0	0.1	0.073 + 0.2	0.073 + 1.1	
0 ~ +960	0.1	0.052 + 0.1	0.052 + 0.7	
+960 ~ +1370	0.1	0.059 + 0.6	0.059 + 1.2	
-200 ~ -160	0.1	0.09 + 0.2	0.09 + 1.4	
-160 ~ 0	0.1	0.069 + 0.1	0.069 + 1.0	
0 ~ +700	0.1	0.05 + 0.1	0.05 + 0.6	
+700 ~ +1200	0.1	0.051 + 0.4	0.051 + 0.8	
+200 ~ +800	0.2	0.025 + 1.5	0.025 + 1.5	
+500 ~ +800	0.1	0.027 + 0.6	0.027 + 0.6	
+800 ~ +1760	0.1	0.033 + 0.4	0.033 + 0.4	
- 10 ~ +200	0.1	0.054 + 0.6	0.054 + 1.3	
+200 ~ +1760	0.1	0.05 + 0.4	0.05 + 0.8	
- 10 ~ +150	0.1	0.053 + 0.6	0.053 + 1.3	
+150 ~ +1760	0.1	0.046 + 0.4	0.046 + 0.8	
- 210 ~ +500	0.1	0.096 + 0.2	0.096 + 1.6	
+550 ~ +1000	0.1	0.051 + 0.3	0.051 + 0.7	
-200 ~ 0	0.1	0.101 + 0.4	0.101 + 1.8	
0 ~ +1090	0.1	0.050 + 0.2	0.050 + 0.7	
+1090 ~ +1300	0.1	0.051 + 0.6	0.051 + 0.9	

Notes: The accuracy of thermocouples is not included. Thermocouple B does not use RJC (reference junction compensation). Thermocouples can not be measured when ISF-50C is used in ASF mode.

## Pt RTD temperature measurement

Applicable RTD	JIS C1604-1997 Pt100
Measurement method	3-wire (Pt3A), 4-wire (Pt4W) (Pt3W only for the built-in switching box)
Linearization	Digital calculation
Thermal effect on accuracy	Pt100 3W $\pm 0.0020\%$ reading/ $^{\circ}$ C Pt100 4W $\pm 0.012\%$ reading/ $^{\circ}$ C
Aging effect on accuracy	Pt100 3W $\pm 0.05\%$ reading/year Pt100 4W $\pm 0.03\%$ reading/year

Sensor mode	Measurement range	Resolution	Accuracy
Pt100 3W	-200 ~ +850 $^{\circ}$ C	0.1 $^{\circ}$ C	$\pm 0.05\%$ rdg + 0.3 $^{\circ}$ C
Pt100 4W	-200 ~ +850 $^{\circ}$ C	0.1 $^{\circ}$ C	$\pm 0.05\%$ rdg + 0.2 $^{\circ}$ C

Notes: Pt4W is available only when using a switching box with exclusive RTD unit.  
RTD can not be measured when using ISF-50C in ASF mode.

## Measurement mode

INITIAL, DIRECT and MEASURE: Settable for each channel  
(Temperature is DIRECT mode only.)

## Scanning speed

A/D speed setting	50Hz area		60Hz area	
	60ms	80ms	60ms	80ms
Normal resolution	60ms	80ms	50ms	67ms
High resolution	160ms	180ms	130ms	150ms

where normal resolution is within  $\pm 0.0000 \times 10^{-6}$  strain or high resolution within  $\pm 0.0001 \times 10^{-6}$  strain.

## Measurement channel switching method

Scanning	Automatic switching measurement from first channel to last channel (possible Jump)
Monitor	Repeat measurements of monitor channels (maximum 8 channel) Graphic monitor according to time (maximum 2 channels)
Measurement start	Pressing start key or external control (manual) Interval timer, monitor comparator, GP-IB or RS-232C
Program setting	Settable for each channel
Coefficient	$\pm 0.001$ -9.999
Unit	$\mu$ C, mV, $^{\circ}$ C, kgf, mm, etc. 38 kinds
Decimal point	Settable to any digit
Initial value	Writable to any channels
Sensor mode	Strain, high resolution, temperature, voltage and jump

## Simple measure

Full simple	Coefficient : 1
Unit	$\mu$ C
Decimal	all
Auto simple	Coefficient : 1
Unit	Follows sensor mode
Decimal point	Follows sensor mode

## Self-diagnostics

ROM/RAM, Version, Measurement mode, Battery, Scattering, Insulation, Sensitivity and Burn-out

## Interval timer

Function	Automatic start at a set time interval or time
Clock	Year, Month, Day, Hour, Minute, Second
Clock accuracy	$\pm 1$ sec/day (25 $^{\circ}$ C $\pm$ 5 $^{\circ}$ C)
Interval	Hour, Minute, Second: Settable up to 99 hours 59 minutes and 59 seconds for every step
Number of starts	Maximum 99 times per step or infinite
Number of steps	Programmable up to 30 steps
Real time start	Settable start time (day, hour, sec.) for every step
GOTO step	Lopped to previous program step
GOTO comparator	Moves to step 1 of monitor comparator
Sleep function	When it takes more than 1 minutes from the end of previous scan to the start of next scan, power is automatically switched off.

## Monitor comparator

Function	Automatic start according to a set amount of variables on a channel monitor
Amount of variables	Settable for every step, maximum 999999
Number of starts	Maximum 99 times per step or infinite
Number of steps	Programmable up to 30 steps
GOTO step	Lopped to previous program step
GOTO interval	Moves to step 1 of interval

## Data memory

Function	Stores and retrieves measurement data
Storing contents	Measurement mode, channel number, measurement data, clock data, data number
Capacity of data	Maximum 130000 data (standards)
Data storing period	About 20 days (with full charge)

## Floppy disk

Number of disk drives	1
Applicable disk	3.5" 2HD/2DD (auto-selection)
Format	2HD (1.44MB), 2HD (1.2MB), 2DD (720KB)

**Memory card**

Memory capacity	32MB, 64MB, 128MB (FAT16)
Type of card	Flash card or compact flash card* (For use, a conversion adaptor is needed.)
Standard of card	Conforms to PC card standard (Type II)
Maximum number of files	512 files
Capacity of storing data	About 147000 data per 2MB Conditions: 1000 channel/measurement, sequential file, with header, with time data, data format = 303 format

**Interface**

Function	GP-IB, RS-232C, LAN Receiving control commands and sending measurement data, etc.
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**Display**

Indicator	Translucent LCD with LED backlight
Resolution	240 x 64 dots
Contents	Measurement data, listing of settings, X-Y monitor, Y-T monitor, etc.

**Printer**

Print	Measurement data, set values, check result, etc.
Printing system	Thermal line dot method, 18 digits/line
Print speed	0.065 sec/line
Applicable paper	P-60 (60mm wide, 25mm roll, 7200 lines/roll)

**Built-in switching box**

Number of channels	Maximum 30 channels (standard 10 channels)	
Strain measurement	Quarter bridge in 3-wire system	120, 240, 350Ω
	Half bridge	60~1000Ω
	Half bridge with common dummy	60~1000Ω
	Full bridge	60~1000Ω
	Full bridge in constant current	350Ω
	Full bridge in high resolution mode	120~1000Ω
Sensor cable extension range	Full bridge in constant current	350Ω
	Full bridge in constant current and high resolution mode	350Ω

Full bridge 350Ω in constant current	Within a travel resistance of 400Ω
Full bridge 350Ω in constant current and high resolution mode	Within a travel resistance of 160Ω

Sensitivity change (when using TML 0.5mm <sup>2</sup> 4-core shielded cable)	
Full bridge 350Ω in constant current and/or high resolution mode	+0.1~-0.5% per 100Ω of travel resistance

Leadwire resistance correction Comet B (Quarter bridge in 3-wire, half bridge 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]	DC640mV
	V [1/100]	DC64V
	Input impedance	More than 1MΩ

Thermocouple temperature measurement	Applicable thermocouples: JIS C1602-1995 T,K,J,B,S,R,E,N
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PT RTD temperature measurement	JIS C1604-1997 Pt100 (500mA constant current 3-wire)
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Channel change-over	Semiconductor relay
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**Operating environment**

0~45°C, less than 85%RH (without condensation)

**Power supply**

AC65~250V, 50/60Hz, 115V max.  
DC82~34V, 3A max. (using DC pack option)  
DC11~18V, 6A max. (using DC pack option)

**Dimension**

320(W) x 130(H) x 440(D) mm (except projecting parts)

**Weight**

9 kg

**Standard accessories**

Operation manual	1 copy
Software Ethernet LAN setup CD	1 pc.
AC power cable (CR-01)	1 pc.
Earth wire (CR-20)	1 pc.
Print paper (P-60)	2 rolls
7-pin connector plug	10 pcs.
Phillips screwdriver	1 pc.
Vinyl cover	1 pc.
Test and inspection data	1 pc.

**Built-in switching box expansion**

Up to 30 channels every 10 channels

The standard onboard switching box is provided with 10 channels.

**Data memory expansion**

(Total 2M byte after expansion)

**External display unit EDU-11****External starter CR-917****DC pack DCC-303**

DCC-303-12  
12V type (11-18V)

DCC-303-24  
24V type (22-34V)

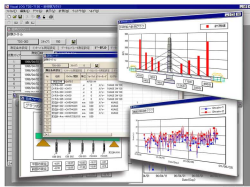
**Remote power controller RPC-1A**

The controller makes battery operation available in a place where AC power source is not provided, and also has a power on/off function.

**Flash memory card****Card adaptor**

# DATA LOGGER

## Static measurement software TDS-7130



The TDS-7130 is a static measurement software for MS Windows<sup>TM</sup>. The software is designed for multipoint automatic measurements using TML data logger and its compatible switching boxes through GP-IB (IEEE488) or RS-232C interface. From measurement condition settings to numerical and graphic process of measurement data can be achieved by the software. The text, analyzed and graphic data can be used well in preparing a report or paper by import or pasting.

### Compatible instruments:

- Data Logger
  - TDS-300/TDS-303/TDS-602
  - TDS-102
  - THS-1100
- DRA-30A (in static measurement mode only)
- NIF-100

MS-Windows is a registered trademark of Microsoft Corporation.

Compact flash is a registered trademark of SanDisk Corporation.

Visual LOG is a registered trademark of Tokyo Sokki Kenkyujo Co., Ltd.

Specifications are subject to change without prior notice.



ISO9001



Approval Certificate No: 9957261  
Design and manufacture of strain measuring equipment  
and transducers  
No.2 and No.3 Production Divisions



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# Smarter - Builds up measurement styles with new functions

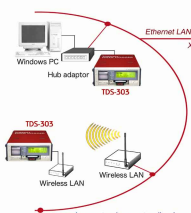
## Incorporating flash memory card slot

TDS-303 <sup>TABLE</sup> has got compatible with flash memory cards for recording data. The applicable card capacities are 3 types of 32MB, 64MB and 128MB (FAT16).

(Note: The SRAM card for the previous model can not be used.)



## Onboard Ethernet LAN port helps the user build a network environments.



Ethernet LAN

X port



### TDS-303 LAN setup software

TDS-303 <sup>TABLE</sup> incorporates Ethernet LAN port and is supplied with a setup CD for Windows™ for immediate use on your LAN environments. Access can be made freely by merely allocating COM port and setting IP address according to the in-service environments. Also, combination with commercial wireless LAN unit makes it possible to structure wireless LAN, and with the supplied setup CD, COM port can be assigned. For measurement, use an optional "Static Measurement Software Visual LOG® TDS-7130".

Compatible OS: Windows 2000/XP



When starting the XPort installer, the TDS-303 connected with LAN can be automatically acknowledged. Set an IP address according to the LAN environment.

## System options to use the conventional TDS-303 effectively

### 1-Gauge 4-Wire Measurement System <sup>[Patent pending]</sup>

Our developed 1-gauge 4-wire method serves to offset the component of temperature variation without influence of the resistance of the lead wires between strain gauges and the exclusive switching box. Any kinds of lead wires in multi-channel measurements can be used. Since there is no deterioration in sensitivity due to extended lead wires, extremely thin lead wires can be used. The use of easy-to-connect modular plugs enhances the working efficiency.



Cable extension with modular plug

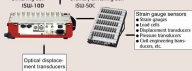
4-wire type modular plug

### Digital Displacement Measurement System

A switching box model ISW-10D for optical digital displacement transducers is available. By cascading the ISW-10D and ordinary switching box model ISW-50C, the optical digital displacement transducers can be used together with strain gauge sensors such as strain gauges, load cells, displacement transducers and pressure transducers.

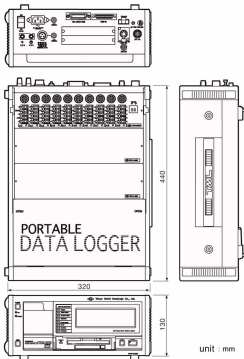
Switching box ISW-10D

Ordinary switching box ISW-50C

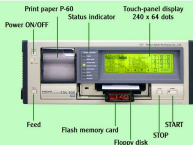


Strain gauge sensors  
• Strain gauges  
• Load cells  
• Displacement transducers  
• Pressure transducers  
• Lab engineering instruments, etc.

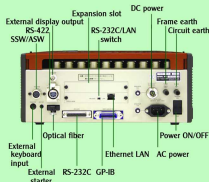
## Outer View & Dimensions



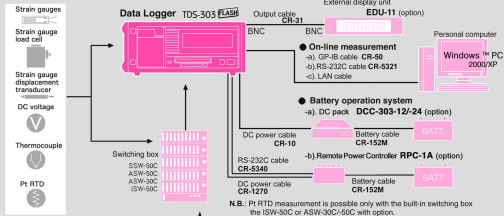
## Front Panel



## Rear Panel



## System Diagram



### New Measurement System Option

1-gauge 4-wire measurement system



1-gauge 4-wire strain gauge

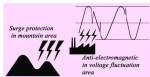
Digital displacement measurement system



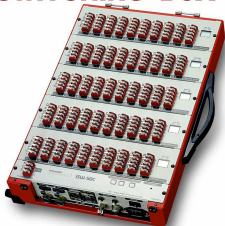
Optical digital displacement transducer

## Anti-electromagnetic-noise measurement system

The built-in switching box and external switching box ISW-50C have a surge arrester inside to avoid an influence of thunderbolt induced from sensor cables. In addition, as the optical fiber cable and RS-422 cable electrically insulate the data logger from the switching box, the ISW-50C is resistive to noise.



# SWITCHING BOX ISW-50C



The ISW-50C is an A/D-converter-incorporated switching box developed to expand measurement channels in combination with the TDS-303 data logger. As the switching box is connected to the data logger through an optical fiber cable of high speed data transfer or insulated RS-422 cable it is little affected by noise.

## Features

- Electrically insulated from the data logger
- Capable of measure strains, DC voltage, thermocouples and Pt RTD.
- 0.06 sec./channel sampling speed. 4.9 seconds for scanning 1000 channels maximum with parallel sampling of the A/D converters.
- Usable like the ordinary switching box ASW/SSW. In case of using the ISW-50C in the ASW mode, temperature measurements with thermocouples or Pt RTD are not available.
- ISW-50C-50 with input/output connectors is an option.
- Lightning surge absorber is provided.

Number of channels	50
Connection with TDS-303	By optical fiber cable or RS-422 cable
Operating environment	0 ~ +50°C Less than 85%RS (without condensation)
Power supply	AC85 - 250V 50/60Hz 23VA max. DC9 - 15V 2A max.
Dimensions	298(W) x 100(H) x 460(D) mm (excluding projected parts)
Weight	7 kgs.

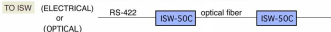
### Standard accessories

Operation manual	.....1 copy
Connection cable (2m) Optical fiber or RS-422	.....1 pc.
AC power cable (CR-01)	.....1 pc.
Earth wire (CR-20)	.....1 pc.
Phillips screwdriver	.....1 pc.

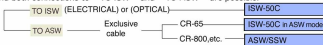
### Notices in Using Several Switching Boxes

*Not only ISW-50C but ASW/SSW switching boxes can be used together.*

- 1) There are two connector receptacles "TO ISW" and "TO ASW" for switching box connection on the rear panel of the TDS-303 data logger. The "TO ISW" connectors are two: "Electrical" for RS-422 cable (CR-832N) and "Optical" for optical fiber cable (CR-842M, etc.), and either connector is used. You can not use both at the same time, but you may mix the RS-422 cable and optical fiber cable in cascading several ISW-50C switching boxes.



And both connections to "TO ISW" and "TO ASW" are possible.



- 2) The ISW-50C in the ASW mode and ASW/SSW series can not be connected to "TO ISW".  
 3) In case of connecting the ISW-50C in the ASW mode to "TO ASW", temperature measurement using thermocouple or Pt RTD are not available.