

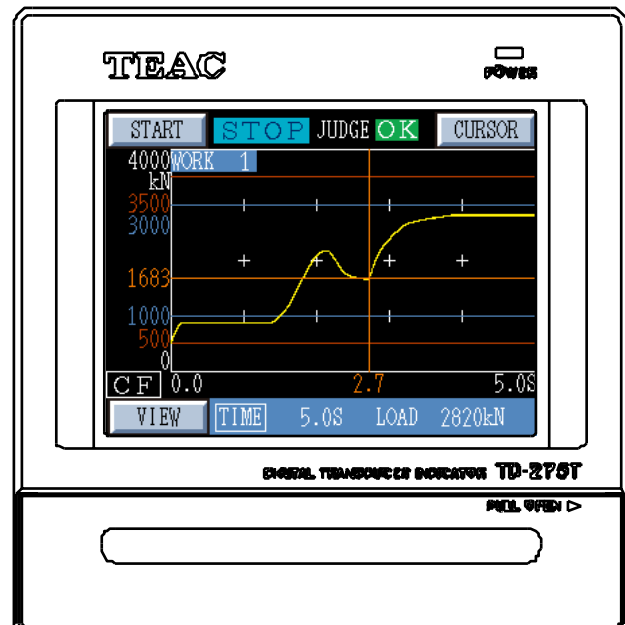
# TEAC

## DIGITAL TRANSDUCER INDICATOR

# TD-275T

### OPERATION MANUAL

Please read this book carefully before using this product



## Introduction

Thank you very much for purchasing TD-275T digital indicator unit.


To ensure optimum performance and proper and safe operation, please read this book carefully and understand it thoroughly before using the instrument.


Information and data about this product, contained in this book, are simply for reference purposes; the Company does not guarantee any intellectual property rights or any other rights of a third party regarding this information or data. Accordingly, the Company does not bear any responsibility for infringement of the intellectual property rights of a third party, and any problems incurred by the use of the products listed herein.

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## For Your Safety

This document describes the safety instructions for the operation of the TD-275T. Before operating the product, read this document carefully to familiarize yourself with the product.

 <b>Warning</b>	Follow the instructions below to avoid risk of serious personal injury and death.
Never use beyond the rated specifications as there is a danger of property damage, injury, fire or electrical shock.	
Never use in flammable gaseous environments including the following locations as there is a danger of explosion.	
<ul style="list-style-type: none"> <li>· Locations subject to corrosive or flammable gases</li> <li>· Locations subject to water, oil or chemical splash</li> </ul>	
If the product malfunctions (any smoke, odor or noise is present), stop operating the product immediately and unplug the power cord as there is a danger of fire or electrical shock.	
Never attempt to disassemble the product.	
Carefully check connections and wiring before applying power.	
Be sure to ground the product (with ground resistance of 100 $\Omega$ or less).	
The electric shock protection class of this product is Class I. The product must be grounded to the protective ground terminal for protection against electric shock.	
To allow the operator to immediately shut off the power to the product, install a switch or circuit breaker that complies with both IEC60947-1 and IEC60947-3 requirements near the product. The switch or breaker installed must also indicate that it functions to shut off the power to the TD-275T.	
Double insulation or reinforced insulation must be provided between the TD-275T and an external device connected to it and between the external device and its power source.	

 <b>Caution</b>	Follow the instructions below to avoid risk of personal injury or property damage.
Disconnect the power cord when performing the following.	
<ul style="list-style-type: none"> <li>· Attaching or detaching optional connectors</li> <li>· Wiring or connecting cables to terminal blocks</li> <li>· Connecting the ground line</li> </ul>	
Wait for at least five seconds between turning on and off.	
Never touch the rear panel or connectors while the product is turned on.	
When connecting to the signal I/O connector, check the signal name and the pin assignment to prevent a false connection. Be sure to shut off the power to the product as well when making a connection.	
Use a shielded cable when connecting to a load-cell, external I/O or option.	
Take adequate measures when operating in the following locations.	
<ul style="list-style-type: none"> <li>· Near a power line</li> <li>· Where a strong electric or magnetic field is present</li> <li>· Where static electricity or noise such as from a relay is generated</li> </ul>	
Do not install under the following environments.	
<ul style="list-style-type: none"> <li>· Locations subject to temperatures exceeding the specified temperature and humidity ranges</li> <li>· Locations with high salt or iron content</li> <li>· Locations under direct vibration or shock</li> <li>· Outdoor, or locations with an altitude of higher than 2,000 m</li> </ul>	
Do not operate a damaged unit.	
The TD-275T is classified as an open-type (built-in) device and must be installed inside a control panel.	
If the top cover and the panel are dirty, wipe them with a soft cloth lightly dampened with a solution of a neutral detergent and water, and then wipe them again with a damp, well wrung-out cloth. DO NOT use a chemically treated dust cloth, paint thinner, or other flammable solvents. Using any of them could damage the coating of the product.	
If the product is used in a manner unintended by the manufacturer, the product safety may be adversely affected.	

## **Repair of failures**

This product has passed exhaustive inspections before being shipped from the factory.

Broken or defective TD-275T shall be repaired or replaced in accordance with the service standards set out by TEAC. In any case, our liability for damages resulting from any defect or deficiencies in TD-275T shall be limited to repair or replacement of TD-275T.

However, this shall not apply to cases in which the manufacturer is liable under the product liability law.

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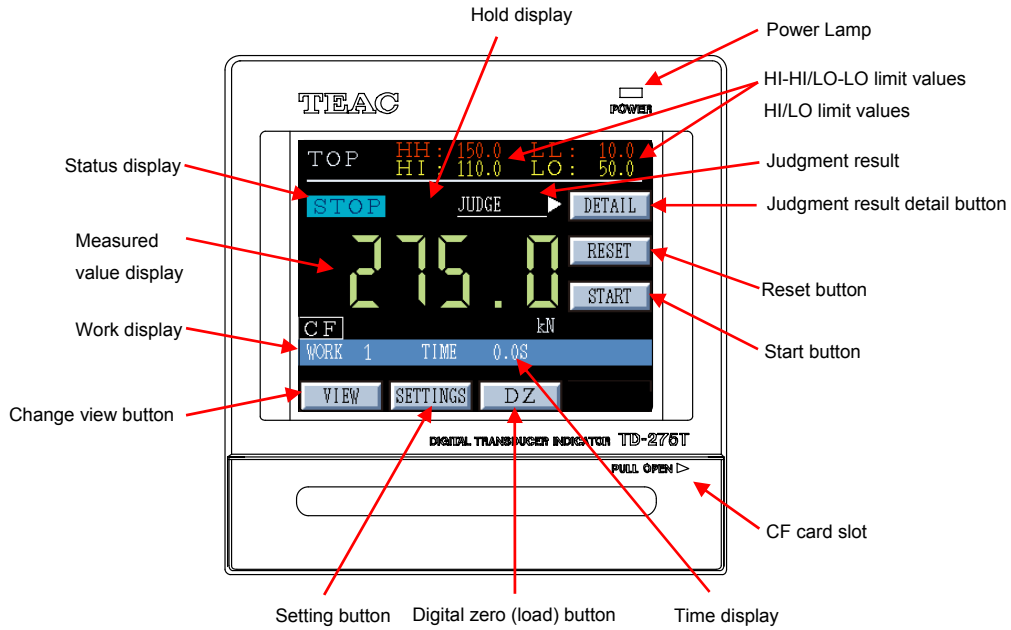
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# 1. Names of Parts and Functions

## 1-1 Front Panel

### 1-1-1 Digital Display Screen (TOP Screen)



**Power Lamp :** Turns on when power is supplied.

**HI-HI/LO-LO limit values :** Indicates the settings of HI-HI/LO-LO limit values.

**HI/LO limit values :** Indicates the settings of HI/LO limit values.

**Status display :** Indicates the operational state of this indicator.

Status	Description
STOP	Indicates that measurement is stopped.
RDY	Indicates that the system is waiting for the measuring start conditions (if set) to
REC	Indicates that measurement is started.

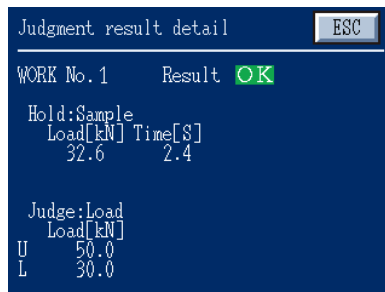
**Hold display :** Gives a display as shown below when a hold condition is met during measurement.

Hold setting	Display
Sample	HOLD
Peak	PEAK

**Judgment result** : If you set the judgment function, a measured value is judged to display the result.

Judgment settings	Display	Description
None		Judgment is not performed.
Load: HI/LO limits	H	The measured value is larger than the HI limit value.
	OK	The measured value is within the HI and LO limit values.
	L	The measured value is smaller than the LO limit value.
Load: HI/LO limits, HI-HI/LO-LO limits	HH	The measured value is larger than the HI-HI limit value.
	H	The measured value is larger than the HI limit value.
	OK	The measured value is within the HI and LO limit values.
	L	The measured value is smaller than the LO limit value.
	LL	The measured value is smaller than the LO-LO limit value.

**Judgment result detail button** : Displays details of the comparison result.



Example of "Judgment result detail" screen

**Measured value display** : Indicates a load value that the indicator receives.

**Reset button** : Stop measurement; and also to clear measured data, hold values, and judgment results.

**Start button** : Starts measurement.

**Work display** : Indicates a selected work number. A number followed by the letter "M" indicates that the number is manually set.

**Time display** : Usually, indicates measuring time. However, hold time is indicated when peak hold or external sample hold is set.

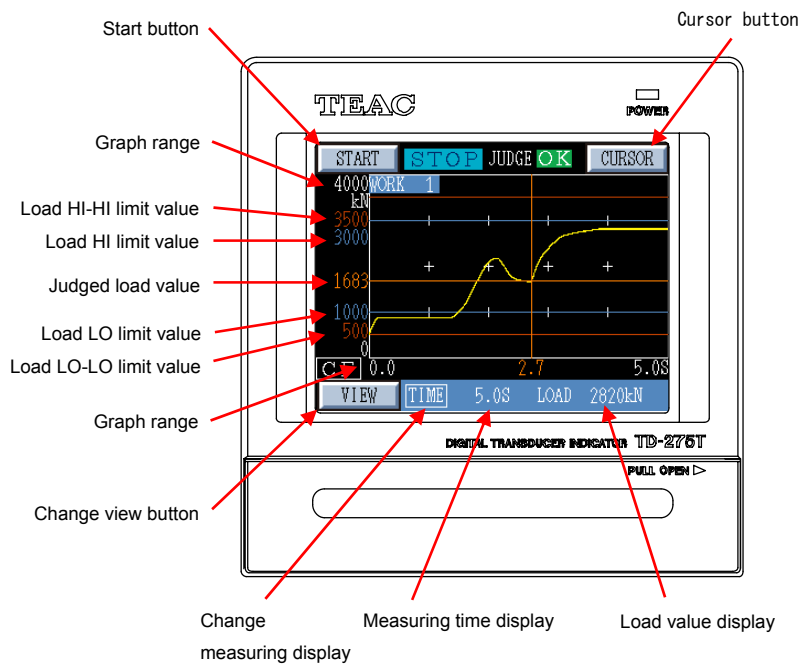
**Change view button** : Changes the view to the graphic screen.

**Setting button** : Navigates you to the settings screen, from which you can perform various settings. Selecting this button clears measured data, hold values, and judgment results.

**Digital zero load button** : Sets an input load value as digital zero.

**CF card slot** : When you insert the CF card to or remove it from the indicator, pull the cover toward you to open it.

### 1-1-2 Graph Display Screen



**Start button** : Starts or stops measurement.

**Cursor button** : Displays a cursor. You can move the cursor, display a cursor value, and scale up or down the waveform. Also you can scale up or down the horizontal axis with a cursor position centered.

**Graph range** : Indicates a predetermined graph range. Graph is plotted within this graph range.

**Load HI-HI limit value**: Indicates the settings of the load HI-HI limit value.

**Load HI limit value** : Indicates the settings of the load HI limit value.

**Judged load value** : Indicates a load value which was judged and time, when a load judgment function is set.

**Load LO limit value** : Indicates the settings of the load LO limit value.

**Load LO-LO limit value**: Indicates the settings of the load LO-LO limit value.

**Change view button** : Changes the view to the digital display screen (TOP screen).

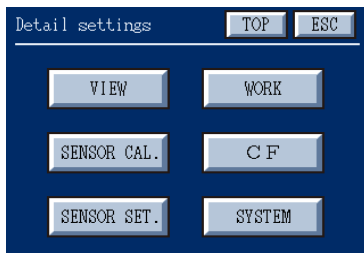
**Change measuring display** : Enables you to change measuring display (axis, scale, grid, etc.)

**Measuring time** : Indicates measuring time.

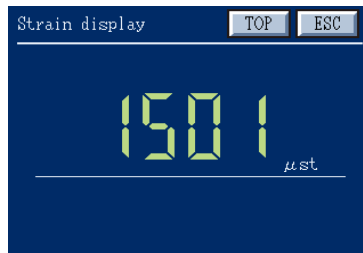
**Load value display** : Indicates a load value that the indicator receives.

### 1-1-3 Display of Operation Panel

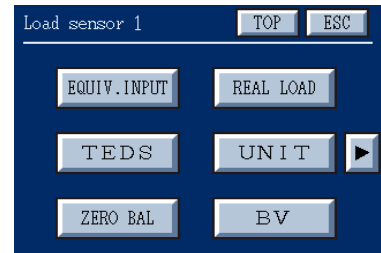
TD-275T is equipped with the touch panel LCD display for initializing sensors or performing various operations. On this panel, the setting selection display, the strain display, the graph display, or other can be selected.



Settings screen



Strain screen



Load sensor calibration screen



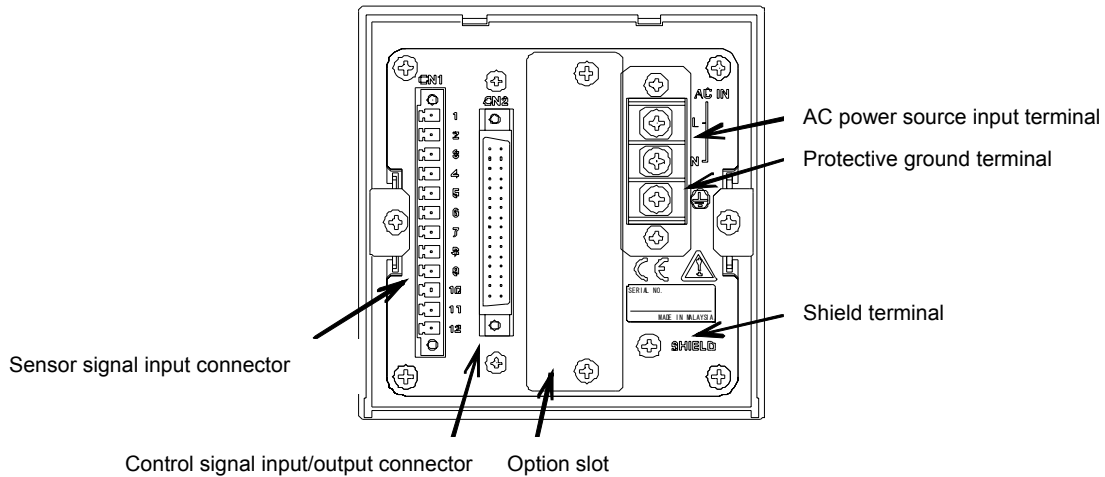
**Caution**

Use your finger to push the touch panel lightly. Do not push the touch panel using a firm object or a sharp-tipped object. Otherwise, the touch panel might be damaged.

Do not push more than one location of the touch panel at a time. If you do so, TD-275T may not recognize your operation correctly.

Note:

## 1-2 Rear Panel



### 1-2-1 Protective Ground Terminal

This is a protective ground terminal screw. Be sure to ground the protective ground terminal to prevent electric shocks and failures due to static electricity.

### 1-2-2 Shield Terminal (SHIELD)

This is a frame ground terminal.

### 1-2-3 Option Slot

Either of the following options can be mounted (Factory pre-installed option).

- D/A converter
- RS-232C interface

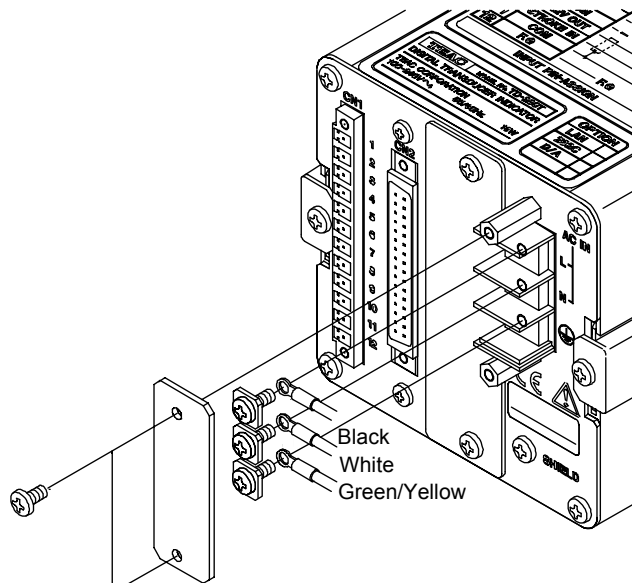
### 1-2-4 AC power Source Input Terminal (AC IN)

The AC power input voltage is 100–240 V AC.

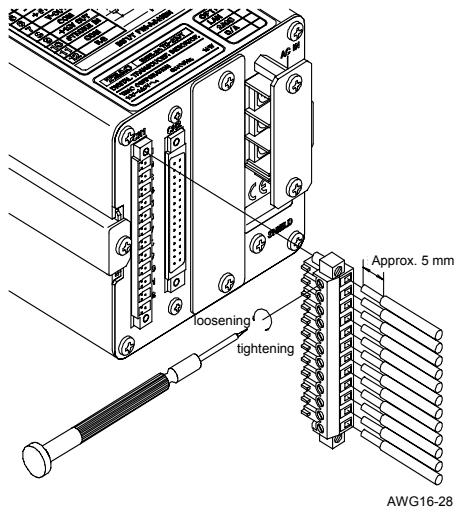
For power supply connection, use power wires that are 0.326 to 2.081 mm<sup>2</sup> in cross-sectional area (22 to 14 AWG).

Connect those wires to the terminal block by using crimp connectors (for M4, 8.5 mm or less in width).

- Power cord wire colors (for the provided AC power cord)
  - L : Black
  - N : White
  - FG : Green/yellow (protective ground)
- The provided AC power cord is only intended for use within Japan, rated for 10 A at 125 V AC. If you want to use the TD-275T at a voltage exceeding the specified voltage or overseas, be sure to use another AC power cord that is more appropriate for your operating
- The frequency is 50 / 60 Hz.



### 1-2-5 Sensor Signal Input Connector



Strip about 5 mm of insulation off each signal wire and lightly twist the bare wire to fit the terminal hole. Use a mini screwdriver to connect the wires. Applicable wire is 1.5φ or less (AWG 28 – 16). Pull the connected cable lightly and check that the cable is securely clamped. In particular, make sure that the sensors are firmly connected.

Compatible connector

Phoenix Contact (supplied with this instrument)  
MC 1.5/12-STF-5.08

1	TEDS
2	GND
3	+EXC (A)
4	-SIG (B)
5	-EXC (C)
6	+SIG (D)
7	V-OUT
8	COM
9	RESERVED
10	RESERVED
11	RESERVED
12	F. G

#### 1, 2: TEDS Sensor Data Input

A TEDS sensor has an NDI-7P output, and so a TEDS conversion cable is used for connection.

1..... + (Orange)  
2..... COM (Green)

#### 3–6: Terminal for connecting a strain gauge sensor.

3..... +EXC (Red A)  
4..... -SIG (Black B)  
5..... -EXC (Blue C)  
6..... +SIG (White D)

#### 7, 8: Terminal for outputting a voltage proportional to the sensor input. Output voltage is approx. 1 V per 1 mV/V sensor input.

7..... Voltage output (0 to approx. ±3 V)  
8..... COM

#### 9–11: Reserved Reserved. Leave unconnected.

#### 12: F.G (Frame Ground) Terminal for connecting the shield (outer sheath) of a load sensor.

## 1-2-6 Control Signal Input/Output Connector

Pin No.	In/Out	Signal Name	Pin No.	In/Out	Signal Name	
A1	IN	Load Digital Zero	B1	IN	Work Select 1	
A2	—	Reserved	B2	IN	Work Select 2	
A3	IN	Measurement Start/Stop	B3	IN	Work Select 3	
A4	—	Reserved	B4	IN	Work Select 4	
A5	IN	Hold Command	B5	IN	External Judgment Reset	
A6	IN	Reset	B6	—	Signal COM	
A7	—	Reserved	B7	—	Signal COM	
A8	—	Reserved	B8	—	Signal COM	
A9	Out	Judgment Output	LL	B9	—	Signal COM
A10	Out		L0	B10	—	Reserved
A11	Out		G0	B11	—	Reserved
A12	Out		H1	B12	Out	Judgment Completed
A13	Out		HH	B13	Out	Measurement Completed
A14	—	Reserved	B14	Out	Load Normal	
A15	—	Reserved	B15	—	Reserved	
A16	—	Reserved	B16	—	Reserved	

Compatible Connector: Fujitsu Connector FCN-361J032-AU  
Cover FCN-360C032-B

### Signal Name and Function

- A1 : Load Digital Zero** Performs digital zero for a load value on the ON edge. However, the digital zero function is not available if the current load value exceeds the “zero limit setting” when the “**zero balance**” value of a load sensor calibration is set as zero.
- A3 : Measurement Start/Stop** Typically, measurement is ready on the ON edge and measurement is terminated on the OFF edge. An actual measurement is started based on the conditions for starting/stopping the measurement which are set on a work-by-work basis. A measurement can be started based on either (1) the start signal or (2) a combination of the start signal and load values. A measurement can be stopped in the same fashion.
- A5 : Hold Command** Functions as a load value hold timing contact signal. During “Sample Hold”, holds and determines the load value at the ON timing. However, when a signal makes an ON-OFF-ON transition, the load value is held at the first ON timing of the measurement. Indication of load values is also held, but the waveform (data) continues to be displayed.
- A6 : Reset** Used to abort all the current operations, regardless of whether they completed successfully or not, and discard the measurement data, if errors or other abnormal conditions occur. The indicator will return back to the state it was when last powered on (The settings are retained).
- A9 (LL) : Load Judgment Output**
- A10 (L0)** Compares a load value held in each hold mode with the load judgment values to produce a NO/GO result, during measurement.
- A11 (G0)**
- A12 (H1)**
- A13 (HH)**
- A2, A4, A7, A8, A14, A15, A16** : Reserved Reserved. Leave unconnected.



- B1: (Work Select 1) External entry of a work number. It is necessary to set this entry prior to A3
- B2 (Work Select 2) "Measurement Start/Stop."
- B3 (Work Select 3) Note that this entry is available only if "**SETTINGS**"→"**WORK INPUT**"→"**EXT INPUT**"
- B4 (Work Select 4) is chosen.

B5 : External Judgment Reset

Resets a Load Judgment Output (A9, A10, A11, A12, A13).  
 Resets the load judgment output of a hold value and switches to continuous judgment output when continuous judgment is "**enabled**."  
 Hold and judgment indications in the screen remain unaffected.

B6, B7, B8, B9 : Signal COM

COM (common) terminal for input/output signals.

B12 : Judgment Completed

Available in a Hold mode which uniquely determines a load hold point, such as Sample Hold. Turns ON when the Hold mode is completed. Turns OFF when a new measurement start/stop signal is received.

B13 : Measurement Completed

Turns ON when measurement is completed and data is stored in CF.  
 Now ready for a new measurement.

B14 : Load Normal

Turns OFF when errors associated with load cells, such as digital zero limit, sensor errors, or display value overflow, are detected.

B10, B11, B14, B15

: Reserved Reserved. Leave unconnected.

### 1-2-7 Input Signal Timing

For input/output signal timing, see a timing chart for each hold mode.

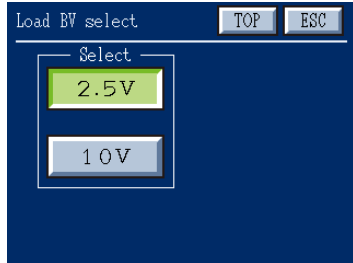
To check the status of each input and output signal, select "**SETTINGS**"→"**DETAIL SET**"→"**SYSTEM**"→"**IN/OUT**"→"**INPUT**" to monitor the status of each external input contact of the indicator in real time. Status signals output from the indicator and each judgment output line of the load contacts can be individually turned on or off by selecting "**IN/OUT**"→"**OUTPUT**."

## 2. Connection

### 2-1 Connecting Strain Gauge Sensor

#### ◇ Setting bridge voltage

Set a bridge voltage in accordance with the specifications of a sensor before connecting the sensor.  
Note that selecting an incorrect bridge voltage may damage the sensor.



Load B.V select screen

From the TOP screen, choose “**SETTINGS**”→“**DETAIL SET**”→“**SENSOR CAL.**”→“**LOAD-CELL**”→“**BV**” to set a bridge voltage.

Select a bridge voltage in accordance with the specifications of a sensor to be connected to TD-275T.

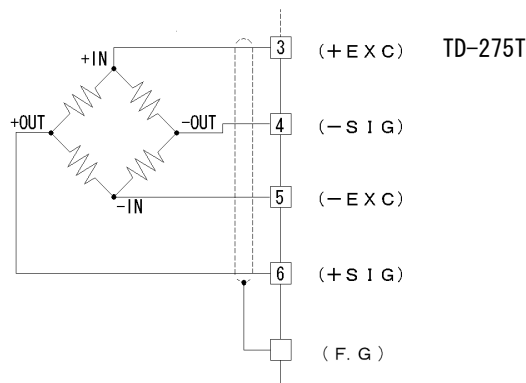
Bridge voltage can be set to 2.5 V or 10 V.



**Caution**

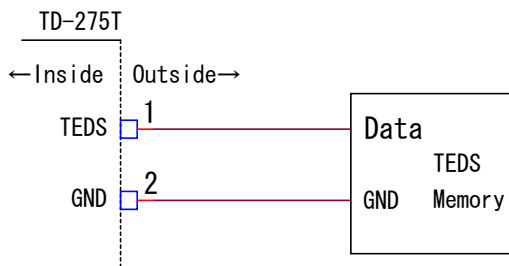
Be sure to set a bridge voltage before connecting a sensor.  
Incorrect connection may damage the sensor.

#### ◇ Connecting Sensor



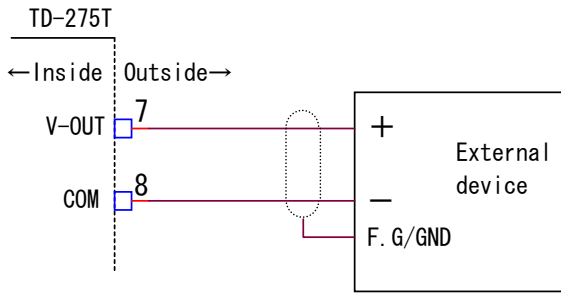
For 6-wire load cell, short-circuit +EXC with +SENSE and -EXC with -SENSE; and connect to terminal No.3 (+EXC) and terminal No.5 (-EXC).

### 2-2 Connecting TEDS Memory



You need to connect TEDS memory to TD-275T when using a TEDS sensor.  
Otherwise, leave it unconnected.

### 2-3 Connecting Voltage Output (V-OUT)



V-OUT is not isolated from the internal circuit. Use a shield cable for connecting V-OUT with an external device and keep an extended wiring cable as short as possible.

Do not short-circuit the voltage output; and do not applying external voltage.

Doing so may cause a failure.

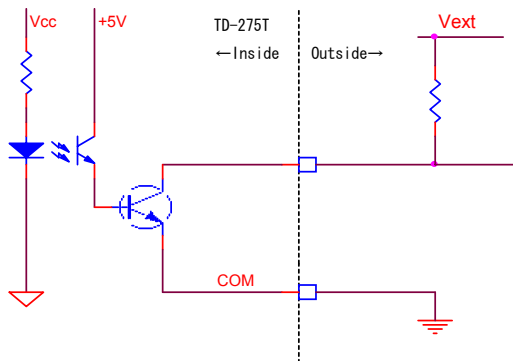
When you do not use the voltage output, leave it unconnected.

Output voltage is approx. 1 V per 1 mV/V (sensor input). This value is voltage output after zero balance of a sensor is achieved.

### 2-4 Connecting Control Signal Input/Output

#### 2-4-1 Connecting External Output

Output equivalent circuit



Open collector output capacity: 30 V (max), 30mA (max).

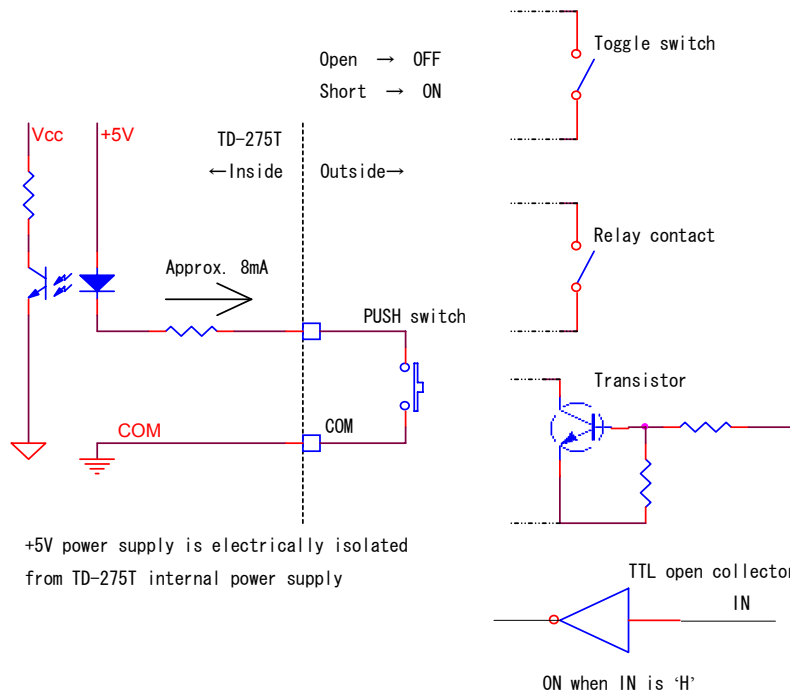
Every control signal output is designed to be electrically isolated from the internal circuit by the photocouplers.

State of output transistor

Output data	Transistor
0	OFF
1	ON

## 2-4-2 Connecting External Input

### Input equivalent circuit

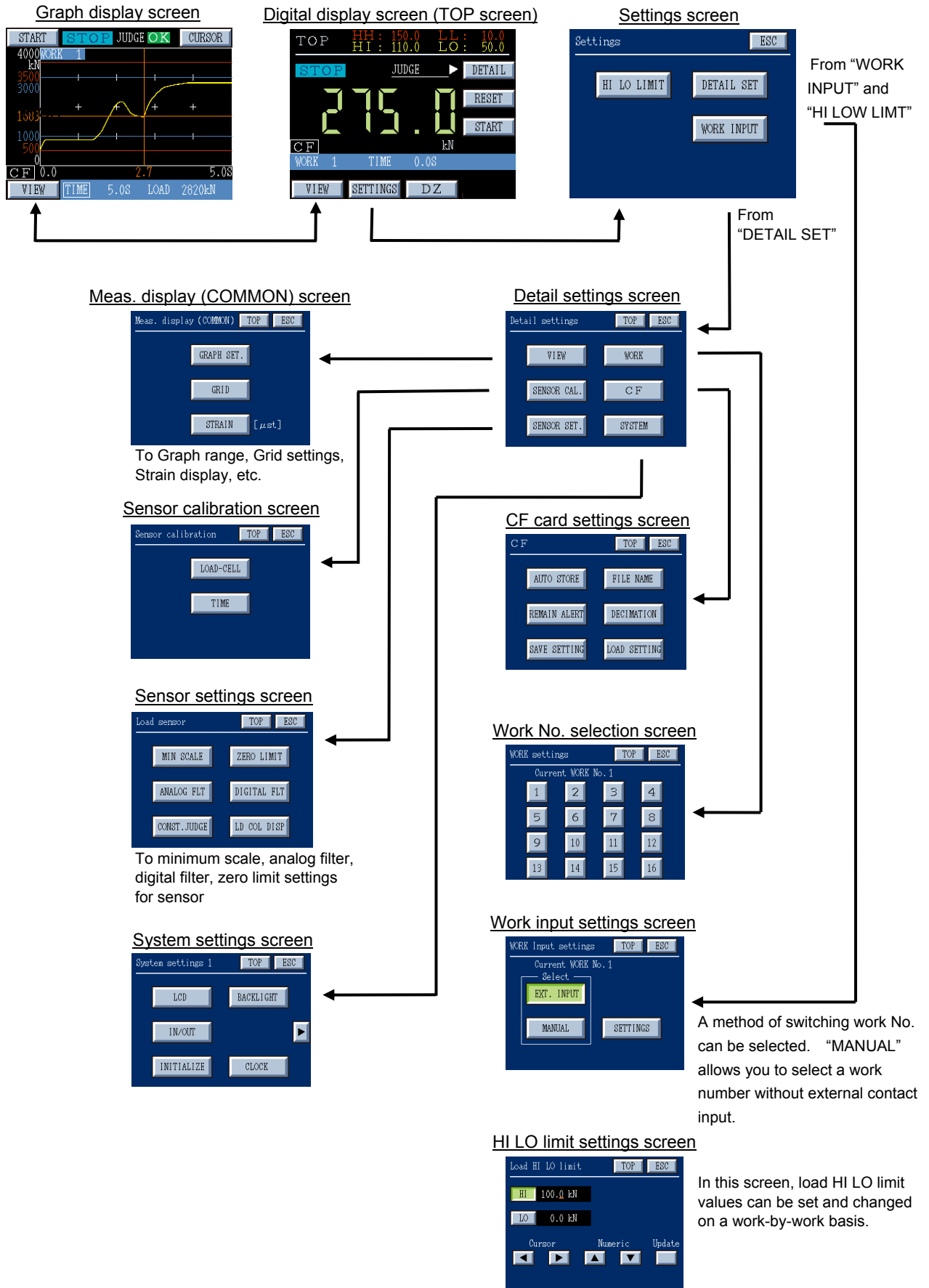


Because a current of approx. 8 mA flows into the external contact when it is turned ON, use a contact element which withstands 10 mA or more.  
Avoid applying external voltage.  
Every control signal input is designed to be electrically isolated from the main circuit by the internal isolated power supply (5 V).

Note:

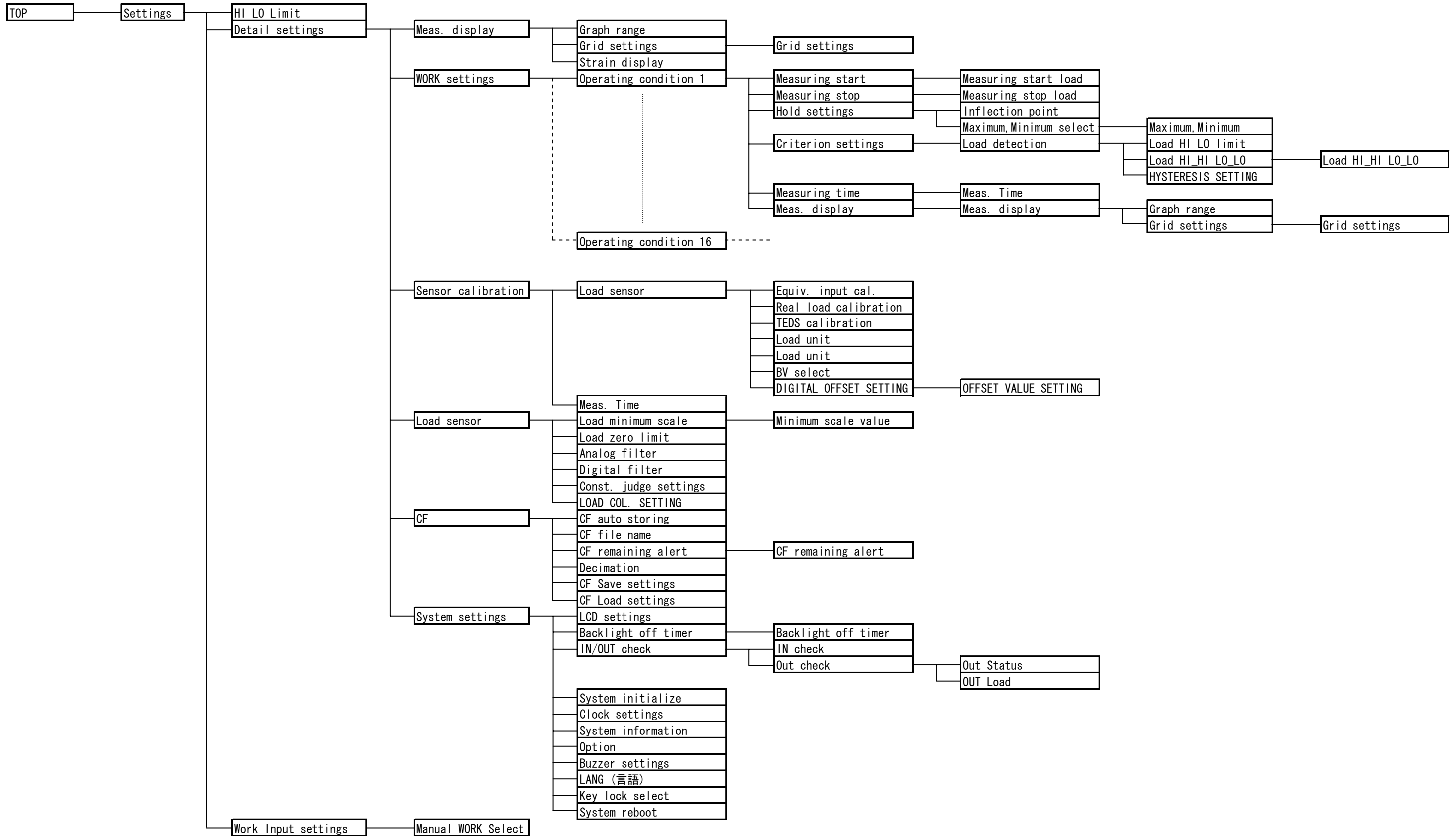
### 3. Setting Mode Configuration

#### 3-1 Screen Configuration



"TOP" button (if available) on each screen allows you to return to the digital display screen (TOP screen).

### 3-2 Setting Screen Hierarchy



## 4. Calibration of Sensor

### 4-1 Calibration of Load

“Calibration” refers to an operation for matching between the TD-275T and a strain gauge sensor. The TD-275T offers the three calibration methods as described below.

#### ◇ Equivalent input calibration

This approach uses no actual loads but key entry of the rated output value (mV/V) of the strain gauge sensor and the rated capacity (value to be displayed). This method is simple and employed when actual loads cannot be applied.

For example, gain will be automatically determined and displayed by entering the values indicated as follows:

For load: 2.001 mV/V-100 N  
For pressure: 2.002 mV/V-10.00 MPa  
For torque: 2.502 mV/V-15.00 N·m

At the time of factory shipment, a data sheet is attached to a strain gauge sensor, indicating the following values.

Rated Capacity ..... Load (Unit: kg, ton, etc.)  
Rated Output ..... Voltage (Unit: mV/V)  
Nonlinearity ..... %R.O  
Hysteresis ..... %R.O  
Input Terminal Resistance .....  $\Omega$   
Output Terminal Resistance .....  $\Omega$   
Zero Balance .....  $\times 10^{-6}$  strain

The rated capacity and rated output are the necessary values for equivalent calibration.

For a TEDS sensor, these data are stored on the internal memory.

#### ◇ Real load calibration

It is an accurate and low-error calibration method by applying a real load to the strain gauge sensor and entering the display value (load value) set on the equivalent input calibration screen.

#### ◇ TEDS calibration

It is a calibration method using the data stored in a TEDS memory in which the rated output value (mV/V) and the rated capacity of a strain gauge sensor are recorded.

Two types of TEDS-compatible memories are available: 1 kBit and 4 kBit. TD-275T supports only 4 kBit memory.

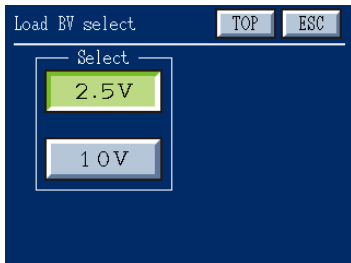
#### 4-2 Before Calibration

##### ◇ Setting bridge voltage

Set a bridge voltage in accordance with the specifications of a sensor.

Note that selecting an incorrect bridge voltage may damage the sensor.

From the TOP screen, select “**SETTINGS**”→“**DETAIL SET**”→“**SENSOR CAL.**”→“**LOAD-CELL**”→“**BV**” to set a bridge voltage.



Load B.V select screen (with 2.5 V selected)



**Caution**

Be sure to set a bridge voltage before connecting a sensor.  
Incorrect connection may damage the sensor.

##### ◇ In case that indication is “unstable”/Zero balance is not achieved

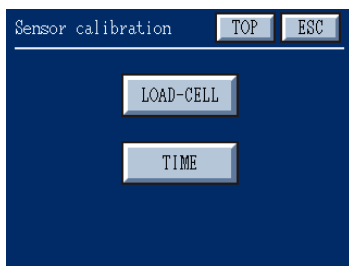
If indication is unstable when a sensor is connected and powered on or if zero balance is not achieved at the moment of calibration, the zero adjustment range (0 to  $\pm 2$  mV/V) may be exceeded.

In this case, switch to the “Strain display” mode (by choosing “**SETTINGS**”→“**DETAIL SET**”→“**VIEW**”→“**STRAIN**”) and check the indicated value.

In this mode, a strain value which includes offset is shown as a sensor output. A sensor output of  $\pm 3$  mV/V is indicated as 0 to  $\pm 6000$   $\mu\text{st}$ .

#### 4-3 Sensor Calibration

From the TOP screen, select “**SETTINGS**”→“**DETAIL SET**”→“**SENSOR CAL.**”





Sensor calibration screen

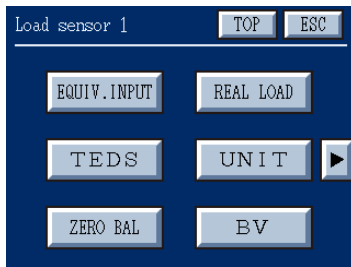
In the Sensor calibration screen, specify settings for load sensor calibrations and measuring time.

From the Sensor calibration screen, select “**LOAD-CELL**” to display the Load sensor screens.

In the Load sensor screen, specify settings for equivalent calibration, TEDS calibration, zero adjustment, real load calibration, unit select, BV select, and digital offset.



Pushing  on the Load sensor 1 screen advances to the Load sensor 2 screen, and pushing  on the Load sensor 2 screen returns to the Load sensor 1 screen.



Load sensor 1 screen



Load sensor 2 screen

Prior to each calibration, select “**ZERO BAL**” on the Load sensor screen to perform zero adjustment. Be sure to perform the zero adjustment to record an initial zero point of a connected sensor. This zero point serves as a base point of “**zero limit**” value, which is available in the Load sensor screen. Further, push the “**UNIT**” button to set the unit of a load sensor. Seven types of units are supported: N, kN, g, kg, MPa, kPa, and Nm.

#### 4-3-1 Equivalent Input Calibration





From the Load sensor 1 screen, select “**EQUIV. INPUT.**”





Equiv. input cal. screen

Enter a rated output based on the data sheet of the connected sensor.

Next, enter a rated capacity on the entry screen based on the data sheet of the sensor as well.

Set values by selecting “R.O.” or “DISPLAY” (“R.O.” is selected in the figure on the left), using the   key to place the cursor over a digit you want to change, and using the   key to set a desired value, and then push the “Update” button to confirm.

To change the decimal point position of the indicated value, place the cursor over the decimal point, and use the   key to move the decimal point.

#### 4-3-2 Real Load Calibration

Prior to performing a real load calibration, select “**EQUIV. INPUT**” and set an actual load value as “**DISPLAY**” value in the Equivalent input calibration screen. This load value is reflected in “Real load calibration.”



Real load calibration screen

From the Load sensor 1 screen, select “**REAL LOAD**” to perform “**ZERO**” and “**MEASURE.**”

**ZERO (Zero point measurement):** With the load sensor unloaded, push the “**ZERO**” button to set the zero point of the sensor.

A bar is displayed indicating the zero point amount. The indicated value is zero.

If the indicated value is stable or non-zero is indicated, check the sensor and sensor cable.

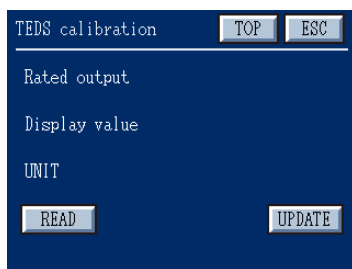
Zero point is adjustable within a range of about  $\pm 2$  mV/V.

**MEASURE (Span adjustment):** Place a weight to be measured on the sensor and push the **“MEASURE”** button.  
A bar is displayed indicating the amount of displacement.  
When your desired display appears, push the **“OK”** button to terminate the processing.  
Just as in the case of zero point measurement, if the indicated value is stable or non-zero is indicated, check the sensor and sensor cable.

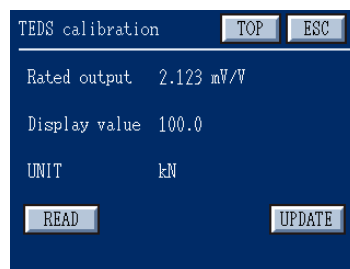
Perform **“ZERO”** and **“MEASURE”** and then push the **“UPDATE”** button. The real load calibration will take effect.

#### 4-3-3 TEDS Calibration

From the Load sensor 1 screen, select **“TEDS.”**



TEDS calibration screen



Example of screen after data read

Push the **“READ”** button on the TEDS calibration screen.

When read is completed, the rated output of the sensor as well as display value (rated capacity) and its unit are displayed on the screen. Then push the **“UPDATE”** button to complete the calibration.

Caution) You need to connect a TEDS-capable sensor to TD-275T if performing TEDS calibration.

◇ **Rated capacity display digit in TEDS calibration**

A TEDS calibration performs a sensitivity calibration by retrieving the memory data in the sensor. A sensor is available in various rated capacities (display values).

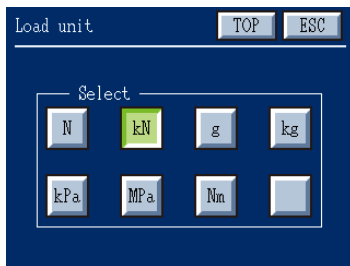
In TEDS calibration, TD-275T displays rated capacity values as shown in the table below.

The TEDS calibration data is stored in TD-275T. Thus, if any changes to display values are required after the calibration is performed, return to the Equivalent input calibration screen and change the value of **“DISPLAY”** and its decimal point position.

TEDS calibrated data (mV/V) display values	Indicator display number of digits after the decimal point
1N	1.000
2N	2.000
3N	3.000
4N	4.000
5N	5.00
10N	10.00
20N	20.00
30N	30.00
40N	40.00
50N	50.0
100N	100.0
200N	200.0
300N	300.0
400N	400.0
500N	500
1KN	1.000
2KN	2.000
3KN	3.000
4KN	4.000
5KN	5.00

#### 4-3-4 Selecting Load Unit

From the Load sensor 1 screen, select “**UNIT.**”



Load unit screen

Set the unit of load.

Available settings: N, kN, g, kg, kPa, MPa, Nm, or NONE.

#### 4-3-5 Adjusting Zero Point

From the Load sensor 1 screen, select “**ZERO BAL.**”

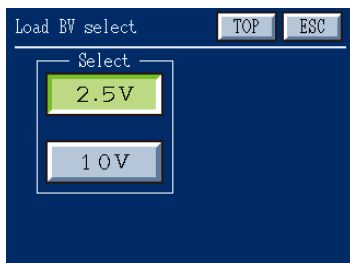


Zero adjustment screen

Be sure to perform the zero adjustment to record an initial zero point of a connected sensor. The zero point serves as a base point for measurement.

#### 4-3-6 Selecting BV (Bridge Voltage)

From the Load sensor 1 screen, select “**BV.**”



Load BV select screen

Set a bridge voltage (EXC) in accordance with the specifications of the sensor.

Available settings: either 2.5 V or 10 V.

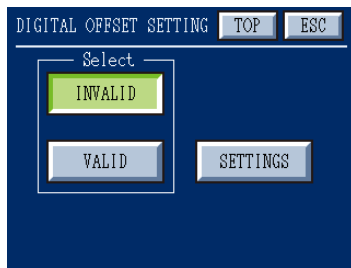


**Caution**

Be sure to set a bridge voltage before connecting a sensor.  
Incorrect connection may damage the sensor.

#### 4-3-7 Setting Digital Offset (Tare)

From the Load sensor 2 screen, select “**DIG. OFFSET.**”



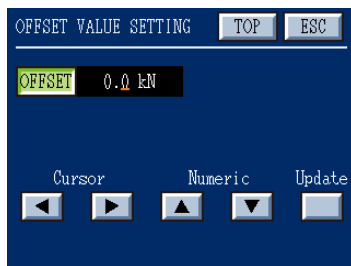
DIGITAL OFFSET SETTING screen

The digital offset function displays a value obtained by subtracting a set digital offset value from a measured value.

This function is disabled for the real load calibration.

**INVALID:** The digital offset function is disabled.

**VALID:** The digital offset function is enabled.



OFFSET VALUE SETTING screen

Select “**SETTINGS**” on the DIGITAL OFFSET SETTING screen to set a digital offset value.

Set values by using the key to place the cursor over a digit you want to change, and using the key to set a desired value, and then push the “Update” button to confirm.

Set the sign by placing the cursor to the leftmost position, and using the key to determine the sign.

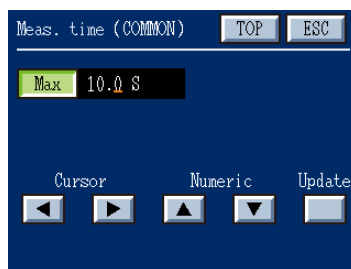
#### 4-4 Setting Measuring Time

From the TOP screen, select “**SETTINGS**”→“**DETAIL SET**”→“**SENSOR CAL**”→“**TIME.**”

Measuring time is set along the time axis (horizontal axis) of the graph display screen.

A measuring time of 0.1 to 99.9 seconds can be set.

A set time serves as the maximum time (from the start of measurement).

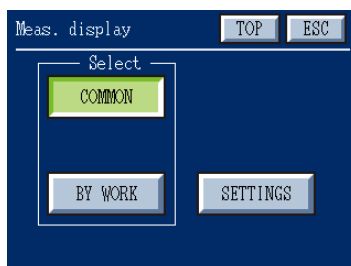


Meas. Time (COMMON) screen

Set the maximum measuring time in the Meas. Time (COMMON) screen.

A measuring time of 0.1 to 99.9 seconds can be set.

Set values by using the key to place the cursor over a digit you want to change, and using the key to set a desired value, and then push the “Update” button to confirm.



Measuring time screen of each work

The measuring time which is set here is applied when you select “**COMMON**” in measuring time setting for each work.

To select “**COMMON,**” from the TOP screen, select “**SETTINGS**”→“**DETAIL SET**”→“**WORK**”→“**Work No.**” (1 to 16)→“**MEAS.TIME**” to access the Measuring time screen.

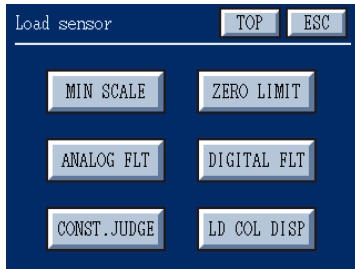
If you want to set a measuring time on a work-by-work basis, select “**BY**

**WORK**”→“**SETTINGS**” in the Measuring time screen to enter a desired value.

## 5. Sensor Settings

Specify load sensor settings for a minimum scale value, digital and analog filters, a zero limit value, constant judgment, and load color display.

From the TOP screen, select “**SETTINGS**”→“**DETAIL SET**”→“**SENSOR SET.**”

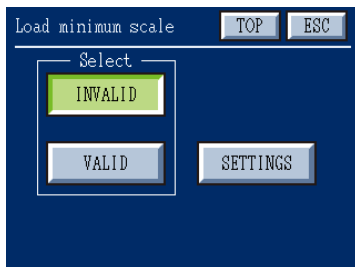


Load sensor screen

The Load sensor screen allows you to determine settings for “**MIN SCALE**”, “**ZERO LIMIT**”, “**ANALOG FLT**”, “**DIGITAL FLT**”, “**CONST. JUDGE**” and “**LD COL DISP.**”

### 5-1 Minimum Scale Settings

From the Load sensor screen, select “**MIN SCALE.**”

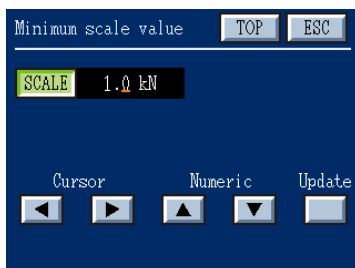


Load minimum scale screen

Select whether the minimum scale settings for load value display are enabled or disabled.

**INVALID:** The minimum scale settings are disabled.





**VALID :** The minimum scale settings are enabled.



Minimum scale value screen

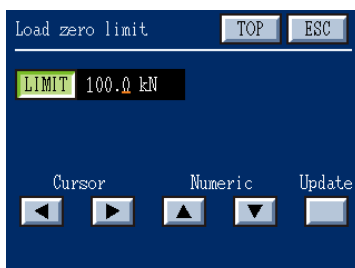
On the “Load minimum scale” screen, select “**SETTINGS**” to enter a minimum scale value.

All load values are truncated according to the specified value.

Set values by using the   key to place the cursor over a digit you want to change, and using the   key to set a desired value, and then push the “**Update**” button to confirm.

### 5-2 Zero Limit Settings





From the Load sensor screen, select “**ZERO LIMIT.**”



Load zero limit screen

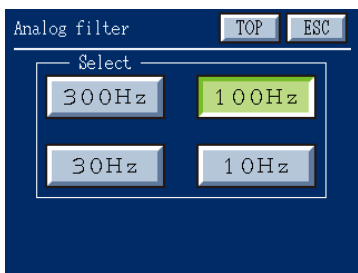
Specify a range where the “DZ” (Digital Zero) function is effective.

The Digital Zero function performs comparison based on a load value set in “**ZERO BAL**” on the Load sensor 1 screen (accessible from the Sensor calibration screen). If the load value detected when the DZ button is pressed exceeds the zero limit value specified here, the Digital Zero function will not work. This will prevent possible failures of the load sensor, such as a shift of the zero point.

Set values by using the   key to place the cursor over a digit you want to change, and using the   key to set a desired value, and then push the “**Update**” button to confirm.

### 5-3 Analog Filter Settings

From the Load sensor screen, select “ANALOG FLT.”



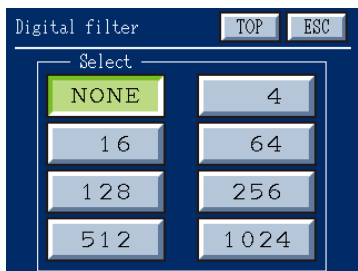
Analog filter screen

This analog filter has a cutoff frequency of 10Hz, 30Hz, 100Hz or 300Hz, and is connected upstream of the A/D converter.

When necessary, such as when load values are unstable, select an appropriate frequency.

### 5-4 Digital Filter Settings

From the Load sensor screen, select “DIGITAL FLT.”

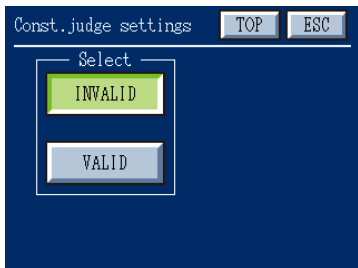


Digital filter screen

This digital filter utilizes the moving average technique. Select the number of measurements: NONE, 4, 16, 64, 128, 256, 512 or 1024.

### 5-5 Constant Judge Settings

From the Load sensor screen, select “CONST. JUDGE.”



Const. judge settings screen

When enabled, until a measured value is held, results obtained by judging the present value according to the judgment conditions are always output.

After a measured value is held, results obtained by judging the held value according to the judgment conditions are output.

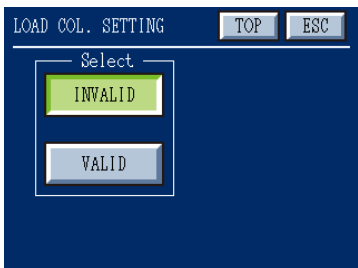
When “NONE” is selected on the Criterion select screen, judgment results are not output.

**INVALID** : After a value is held, results obtained by comparing the held value with the load H\_H/L\_L limits and HI/LO limits are always output (Before a value is held, results are not output).

**VALID** : Results obtained by comparing the present value with the load H\_H/L\_L limits and HI/LO limits are always output. After a value is held, results obtained by comparing the held value with the load H\_H/L\_L limits and HI/LO limits are always output.

### 5-6 Load Value Color Display Settings

From the Load sensor screen, select “LD COL DISP.”



LOAD COL. SETTING screen

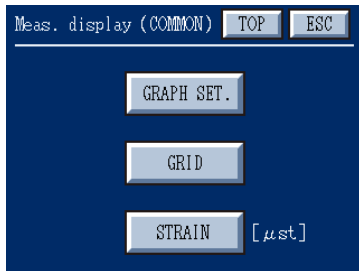
When enabled, load values are displayed in different colors according to the judgment results. Red indicates H\_H and L\_L limit values, yellow indicates HI and LO limit values, and green indicates a normal value.

**INVALID**: Values are displayed in pale yellow.

**VALID**: Values are displayed in different colors according to the judgment results. \*Note

## 6. Measurement Display Settings

From the TOP screen, select “**SETTINGS**”→“**DETAIL SET**”→“**VIEW.**”

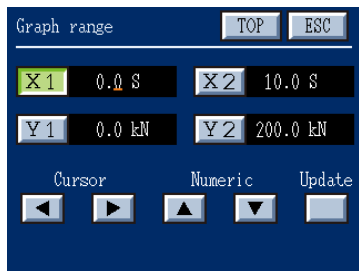


Meas. display (COMMON) screen

The Meas. Display (COMMON) screen allows you to determine settings for “**GRAPH SET.**”, “**GRID**”, and “**STRAIN.**”

### 6-1 Graph Range Settings

From the Meas. display (COMMON) screen, select “**GRAPH SET.**”



Graph range screen







Set the graph range.

**X1:** Set the plot start time along the horizontal axis. In most cases, enter 0.0 s.

**X2:** Set the plot stop time along the horizontal axis. In most cases, enter the measuring time.

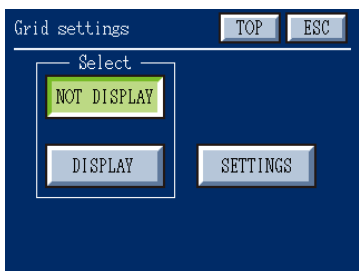
**Y1:** Set the plot value along the load axis. In most cases, enter “0.”

**Y2:** Set the maximum plot value along the load axis. In most cases, enter the maximum load value of the load sensor.

Set values by selecting an axis (X1, X2, Y1, Y2), using the   key to place the cursor over a digit you want to change, and using the   key to set a desired value, and then push the “**Update**” button to confirm. Signs are set by moving to the leftmost position and using the   key (Y1, Y2).

### 6-2 Grid Settings

From the Meas. display (COMMON) screen, select “**GRID.**”

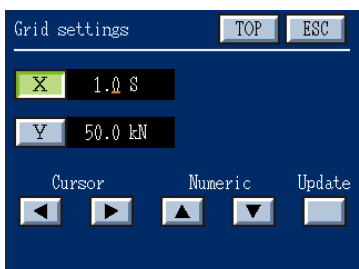


Grid settings screen

The Grid setting screen allows you to specify whether or not to display grid lines.

**NOT DISPLAY:** Grid lines are not displayed on graph screens.

**DISPLAY:** Grid lines are displayed on graph screens.



Grid settings screen





Select “**SETTINGS**” to set grid values.

**X:** Grid lines are plotted along the X axis which you set in “Graph range.”

When you select “Time” as the horizontal axis, about 1/5 to 1/10 of the time setting is suggested.

**Y:** Grid lines are plotted along the Y axis which you set in “Graph range.”

About 1/5 to 1/10 of the maximum plot value is suggested.

Set values by selecting an axis (X, Y), using the   key to place the cursor over a digit you want to change, and using the   key to set a



desired value, and then push the “**Update**” button to confirm.

### 6-3 Strain Display

The screen allows you to check the load sensor, and displays signals from the load sensor in units of the amount of strain.

It is recommended that you note down the strain value shown in “Strain display” when integrating TD-275T with your system.

From the Meas. display (COMMON) screen, select “**Strain.**”



An incoming value is displayed in strain mode (μst).

Strain display screen

Note:

## 7. Work Settings

### 7-1 Setting Work and Switching to a Different Work

To select a work number and set the work, select “**SETTINGS**” → “**DETAIL SET**” → “**WORK**” → “**Work No.**” (1 to 16).

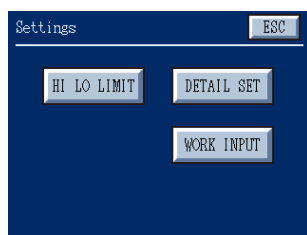
Set the operating condition for each work number.

Work settings allow you to program a maximum of 16 operating conditions.

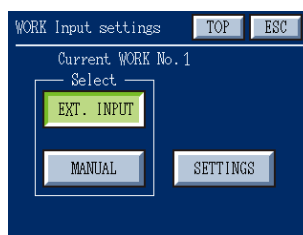
To switch to a different work, select “**SETTINGS**” → “**WORK INPUT**” from the TOP screen.

Select either “**EXT. INPUT**” or “**MANUAL.**” When you select “**MANUAL**”, specify your desired **Work number (1 to 16)**.

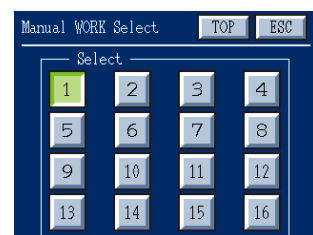
When you want to select a work number by using external signals (control signal inputs: B1, B2, B3, B4), select “**EXT. INPUT.**” In the external input mode, the external input signal given immediately before the measurement starts is applied. Once the measurement starts, if a different external input is given, the work number remains unchanged.



Settings screen



WORK Input settings screen



Manual WORK Select screen

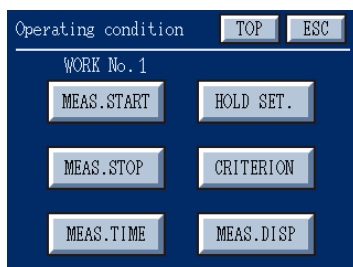


**Caution**

When using an external input signal to select a work number, make sure that a work number is selected before measurement starts.

### 7-2 Various Settings for Each Work

You can define various settings, such as measuring start/stop conditions, hold mode, and load criterion, for each work.



Operating condition screen

From the TOP screen, select “**SETTINGS**” → “**DETAIL SET**” → “**WORK**” → “**WORK No.**” (1 to 16) to set the operating conditions for each work number.

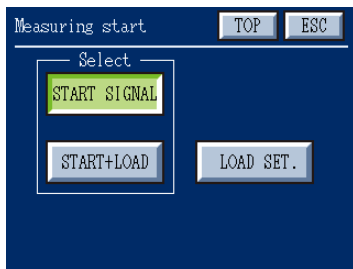
Up to 16 works can be set.

The Operating condition screen contains “**MEAS. START**”, “**MEAS. STOP**”, “**MEAS. TIME**”, “**HOLD SET.**”, “**CRITERION**”, and “**MEAS. DISP.**”

### 7-2-1 Measuring Start Condition Settings

As a measuring start condition, select "START SIGNAL" (the START button on the screen or an external measuring start/stop signal) or "START+LOAD."

From the TOP screen, select "SETTINGS"→"DETAIL SET"→"WORK" →"Work No." (1 to 16)→"MEAS. START."



Measuring start screen

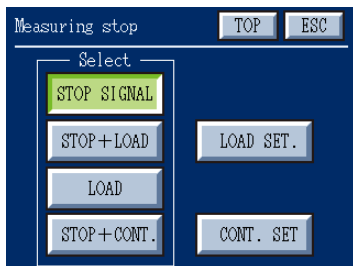
**START SIGNAL** : Measurement is started through a start signal (when the START button on the screen or an external measuring start/stop signal is turned ON).

**START+LOAD** : Measurement is started through a start signal and when the load value set in "LOAD SET." is exceeded (AND condition).

### 7-2-2 Measuring Stop Condition Settings

As a measuring stop condition, select "STOP SIGNAL" (when the measuring time expires or when an external measuring start/stop signal is turned OFF), or "STOP+LOAD."

From the TOP screen, select "SETTINGS"→"DETAIL SET"→"WORK" →"Work No." (1 to 16)→"MEAS. STOP."



Measuring stop screen

**STOP SIGNAL** : Measurement is stopped through a stop signal (when the measuring time expires or an external measuring start/stop signal is turned OFF).

**STOP+LOAD** : Measurement is stopped through a stop signal or when the following conditions are met (OR condition).

Measurement is stopped differently depending on which value (measuring start load or measuring stop load) is large. The value set in "LOAD SET." on the "Measuring start" screen is referred to as a measuring start load value, even when "START SIGNAL" is selected.

- **Measuring start load ≤ measuring stop load:**

Measurement is stopped when the load value is larger than the measuring start load and measuring stop load values.

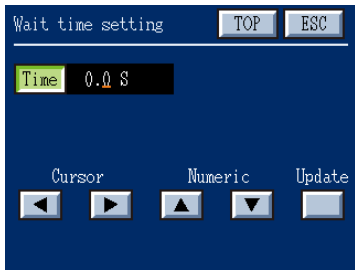
- **Measuring start load > measuring stop load:**

Measurement is stopped after the load value is equal to or larger than the measuring start load value and when the load value is equal to or less than the measuring stop load value.





**LOAD** : Measurement is stopped when the measuring time expires or when the above-listed load setting conditions are met (irrelative of whether or not an external measuring start/stop signal is turned OFF).

**STOP+CONT.** : Measurement is performed continuously (continuous measurement).

During continuous measurement, measurement data can not



Wait time settings screen

You can set a wait time between 0.0 and 99.9 seconds. Set values by using the   key to place the cursor over a digit you want to change, and using the   key to set a desired value, and then push the **“Update”** button to confirm.



- When you select “STOP+CONT.”, measurement data can not be recorded on a CF card. In addition, DZ (Digital Zero) is disabled during continuous measurement.
- When you set a wait time of 0 seconds, a measurement completed output signal is turned ON for about 0.5 milliseconds.

Note:

◇ **Stopping Continuous Measurement**

Continuous measurement can be stopped in the following ways:

- Turn OFF the external measuring start/stop signal.
- When the continuous measurement is started through the START button, push the START button again.

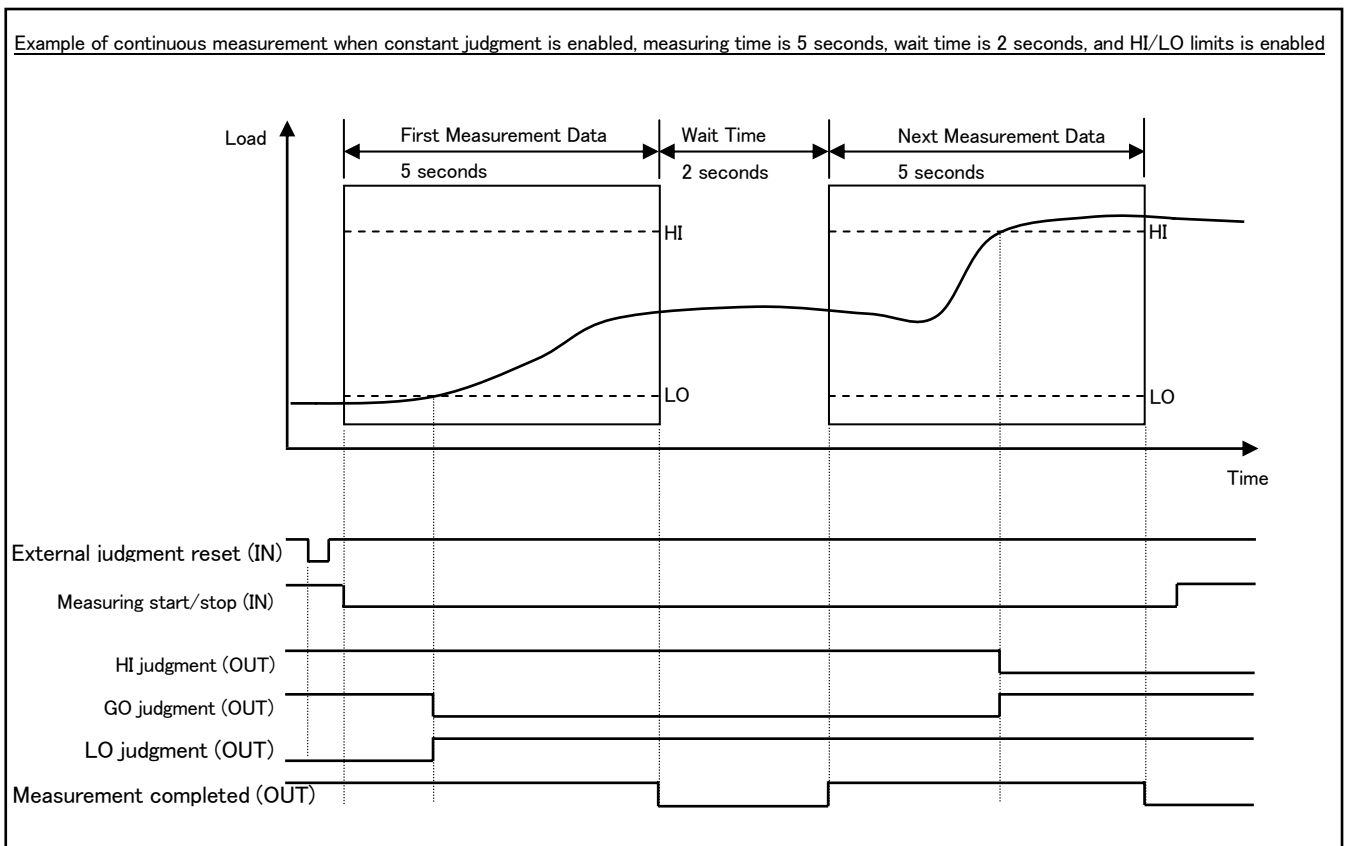
◇ **Switching to a Different Work Number during Continuous Measurement**

When you select “STOP+CONT.”, you can switch to a different work number for each measuring time.

A work number is checked on completion of measurement (when the measuring time expires). Therefore, the next work number needs to be determined at least 0.1 seconds before the present measurement is completed. When switching to a different work number and performing continuous measurement, set “STOP + CONT.” in all work numbers which you want to use.

◇ **Judgment Result Display and Completed Signal**

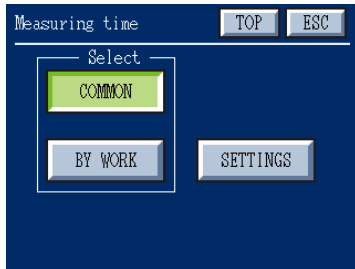
- When HOLD is PEAK or INF.PNT, too short wait time does not allow for enough time to check judgment result of held values on the screen. After judgment result is displayed, the next measurement may be started immediately.
- During continuous measurement, judgment completed signal (if the judgment condition is true) and measurement completed signal are turned ON for each measuring time. When you set a wait time of 0 seconds, a completed signal is turned ON for about 0.5 milliseconds.



### 7-2-3 Measuring Time Settings

Set the maximum measuring time.

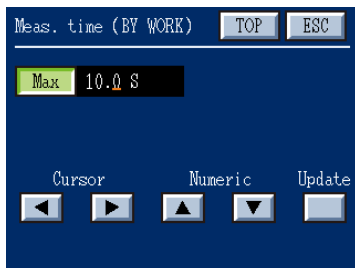
From the TOP screen, select “**SETTINGS**”→”**DETAIL SET**”→”**WORK**” →”**Work No.**” (1 to 16)→”**MEAS. TIME.**”



Measuring time screen

**COMMON** : The measuring time which is set by selecting “**SETTINGS**”→”**DETAIL SET**”→”**SENSOR CAL.**”→”**TIME**” from the TOP screen is applied.





**BY WORK**: The measuring time which is set by using the “**SETTINGS**” button in the Measuring time screen is applied. Select when you want to set a measuring time on a work-by-work basis.



Meas. time (BY WORK) screen

Select “**SETTINGS**” in the Measuring time screen to set a measuring time for this work. The measuring time set here is applied when “**BY WORK**” is selected.

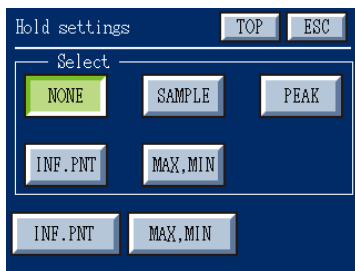
You can set a measuring time between 0.1 and 99.9 seconds.

Set values by using the   key to place the cursor over a digit you want to change, and using the   key to set a desired value, and then push the “**Update**” button to confirm.

### 7-2-4 Setting Hold Conditions

Select how load values are held during a measuring period and specify the settings.

From the TOP screen, select “**SETTINGS**”→”**DETAIL SET**”→”**WORK**” →”**Work No.**” (1 to 16)→”**HOLD SET.**”



Hold settings screen

**NONE** : Tracking display without peak or other hold.

**SAMPLE** : Holds the load value when an external “Hold Command” signal is turned ON during a measuring period. If a signal makes a continuous ON/OFF transition during a measuring period, the load value at the first ON transition is held.

**PEAK** : Holds the maximum load value obtained during a measuring period.

**INF.PNT** : Captures an inflection point of load values during a measuring period and hold the load value at the moment.

**MAX, MIN** : According to the conditions set by choosing “**MAX, MIN**” on the Hold settings screen, when the difference between the peak and valley loads multiplied by the scaling factor exceeds the predefined level, holds the value at the peak as the maximum value and the value at the valley as the minimum value.

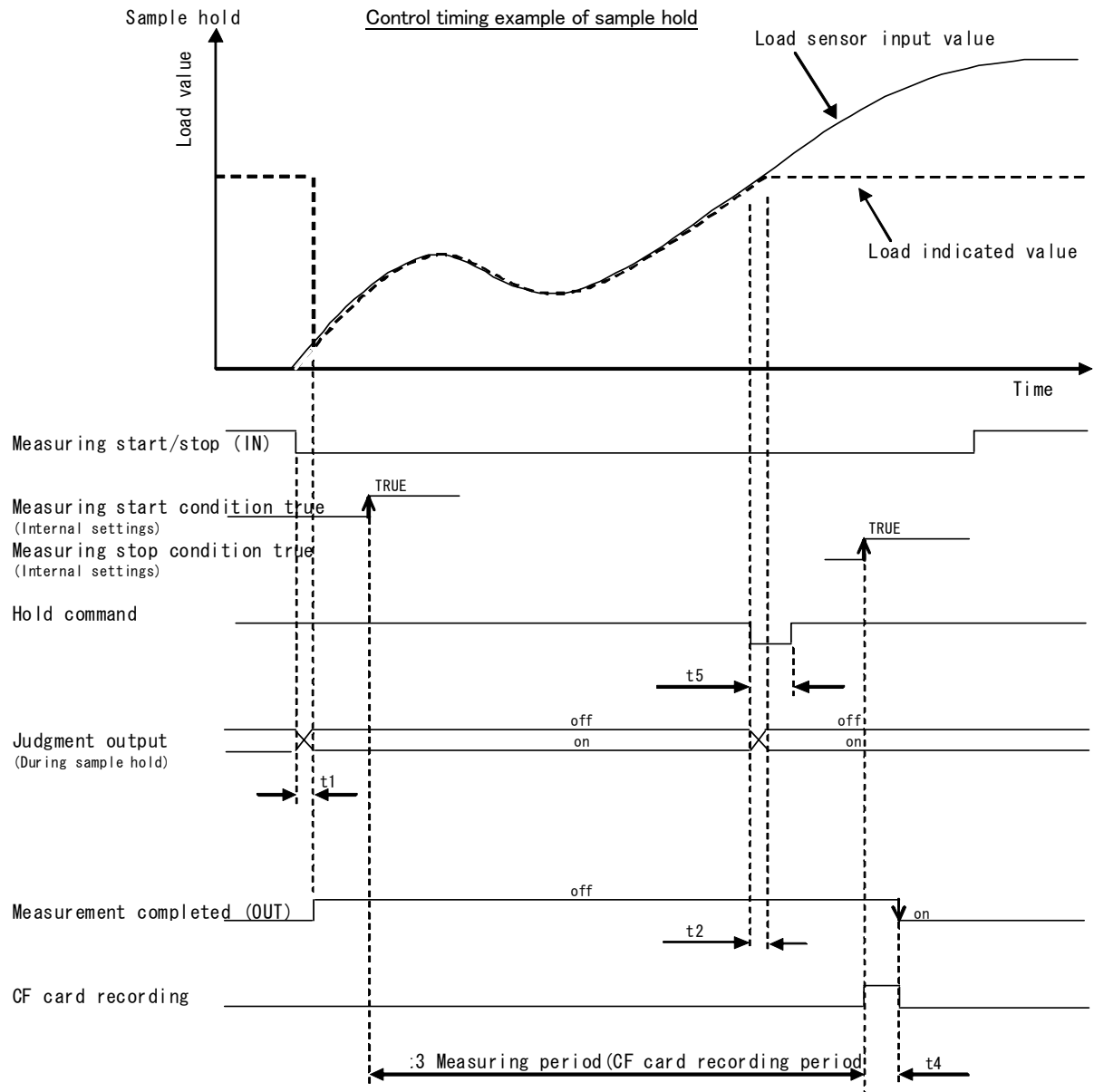
### 7-2-4-1 Sample Hold

Holds the load value at a certain point when the hold command signal (external A5 signal pin) is turned ON during a measuring period.

The limits are set as discussed in "7-2-5 Setting the Load Limits."

Compares the held load value against the HI LO limits and HI\_HI LO\_LO limits and outputs the judgment result.

From the TOP screen, select "SETTINGS" → "DETAIL SET" → "WORK" → "Work No." (1 to 16) → "HOLD SET." → "SAMPLE."



- t1: A delay time between the moment when the measuring start input is detected and the moment when the load indicated values and internal data hold are released and judgment output and measurement completed signal are turned OFF. 1ms (MAX)
- t2: A delay time between the moment when the hold command is entered and the moment when the indicated values and internal data are held, or between the moment when the measurement is completed and the moment when judgment output and judgment completed output are validated. 1ms (MAX)
- t3: Measuring period, up to a maximum of 99.9 seconds (depending on the measuring time settings (horizontal axis))
- t4: CF card recording time, up to a maximum of 20 seconds (measuring time: 99.9 seconds)
- t5: External hold signal input time 10ms (MIN)

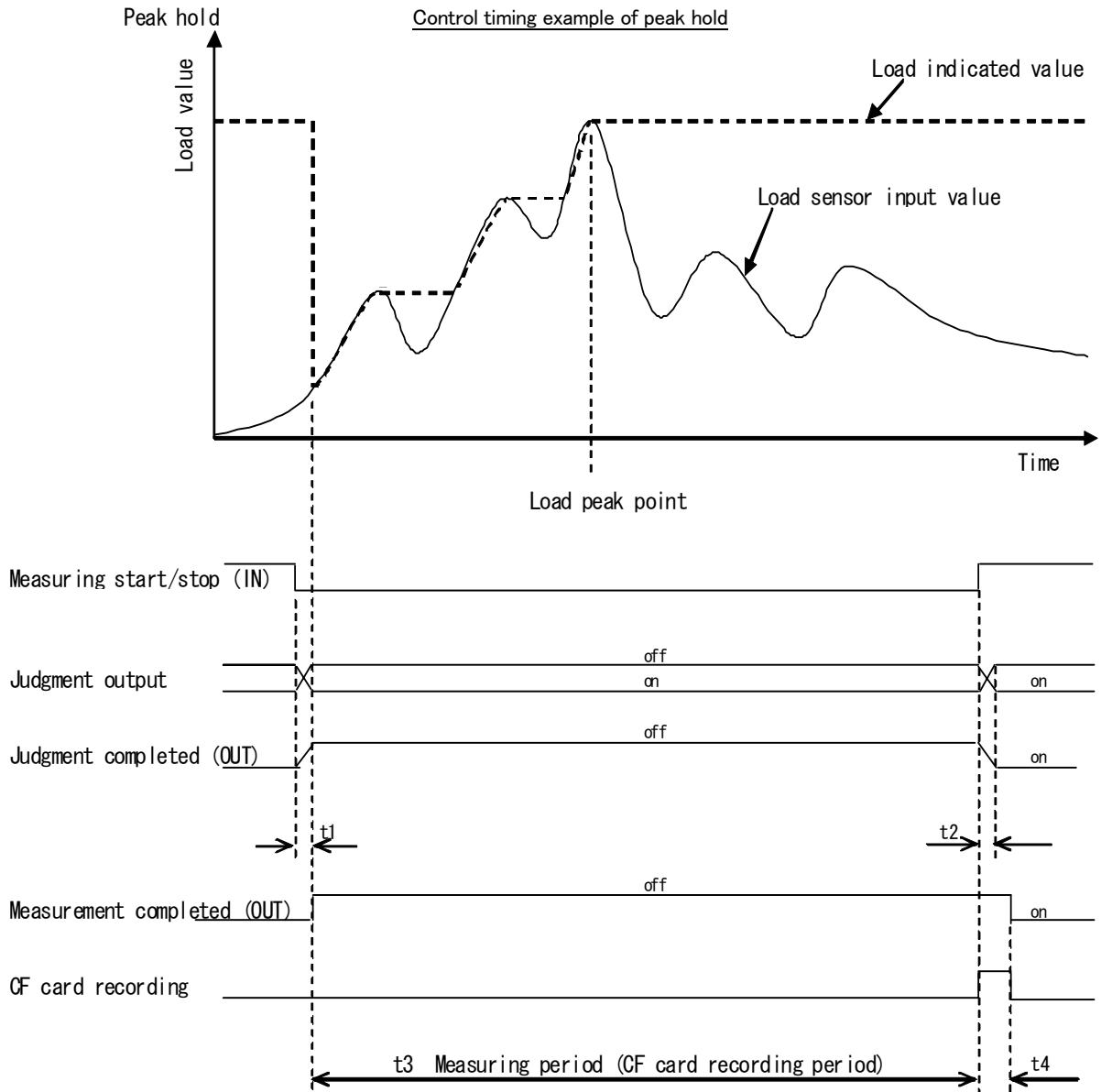
### 7-2-4-2 Peak Hold

Holds the maximum load value obtained during a measuring period.

Compares the peak held load value against the HI LO limits and HI\_HI LO\_LO limits and outputs the judgment result.

The limits are set as discussed in "7-2-5 Setting the Load Limits."

From the TOP screen, select "SETTINGS" → "DETAIL SET" → "WORK" → "Work No." (1 to 16) → "HOLD SET." → "PEAK."



t1: A delay time between the moment when the measuring start input is detected and the moment when the load indicated values and internal data hold are released and judgment output and measurement completed signal are turned OFF. 1ms (MAX)

t2: A delay time between the moment when the measurement is completed and the moment when judgment output and judgment completed output are validated. 1ms (MAX)

t3: Measuring period, up to a maximum of 99.9 seconds (depending on the measuring time settings (horizontal axis))

t4: CF card recording time, up to a maximum of 20 seconds (measuring time: 99.9 seconds)



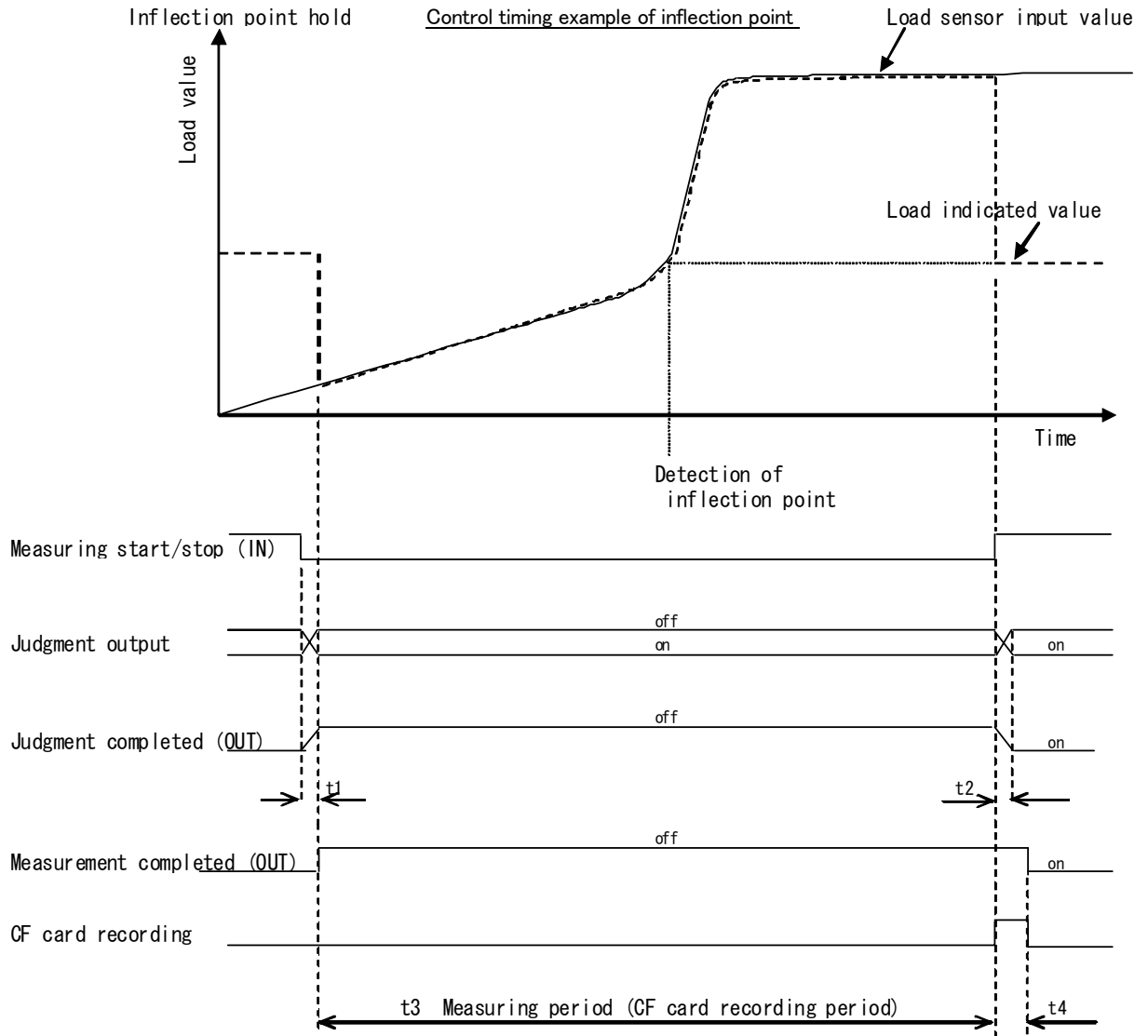
### 7-2-4-3 Inflection Point Hold

Captures the change of the slope of the load value during a measuring period and holds the value.

Compares the load value held at the inflection point against the HI LO limits and HI\_HI LO\_LO limits and outputs the judgment result.

The limits are set as discussed in “7-2-5 Setting the Load Limits.”

From the TOP screen, select “**SETTINGS**”→“**DETAIL SET**”→“**WORK**” →“**Work No.**” (1 to 16)→“**HOLD SET.**”→“**INF.PNT.**”



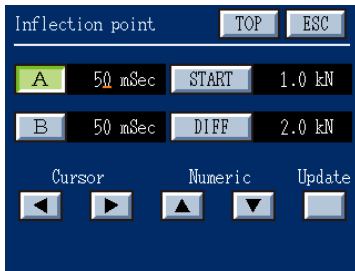
t1: A delay time between the moment when the measuring start input is detected and the moment when the load indicated values and internal data hold are released and judgment output and measurement completed signal are turned OFF. 1ms (MAX)

t2: A delay time between the moment when the measurement is completed and the moment when judgment output and judgment completed output are validated. 1ms (MAX)

t3: Measuring period, up to a maximum of 99.9 seconds (depending on the measuring time)

t4: CF card recording time, up to a maximum of 20 seconds (measuring time: 99.9 seconds)

## ◇ Detection of Inflection Point



Inflection point screen

In the Inflection point screen, set the load difference E, detection time A, detection time B and detection start load value.





**START** : Set a start load value from which the inflection point detection is started.

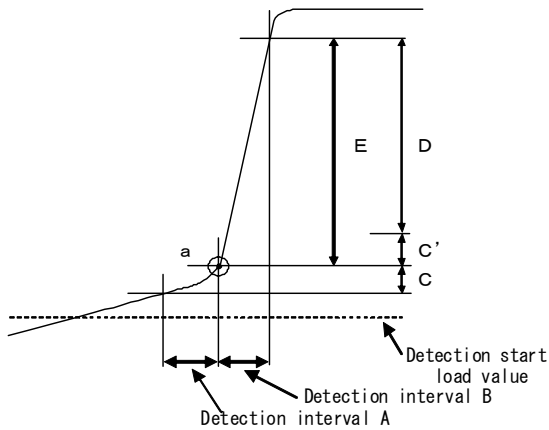
When the measuring start conditions are met and the load value exceeds the detection start load value, the inflection point hold is started.

**A** : Set the detection time A, specified in hours.

**B** : Set the detection time B.

**DIFF** : Set the difference (D) between the load changes.

Set values by selecting an item ("A" is selected in the figure on the left), using the   key to place the cursor over a digit you want to change, and using the   key to set a desired value, and then push the "Update" button to confirm.



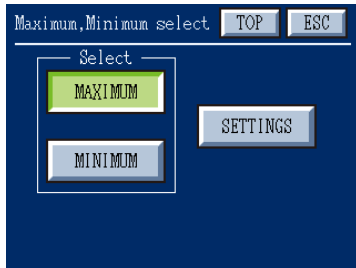
Let C be load change in detection time A and E be load change in detection time B. When subtracting C from E, if the difference (D) exceeds the value specified in "DIFF", point a is held as the inflection point.

The inflection point is normally detected with  $A = B$ , but it may easily be detected with  $A < B$  where the slope is gradual.

### 7-2-4-4 Maximum/Minimum Value Hold

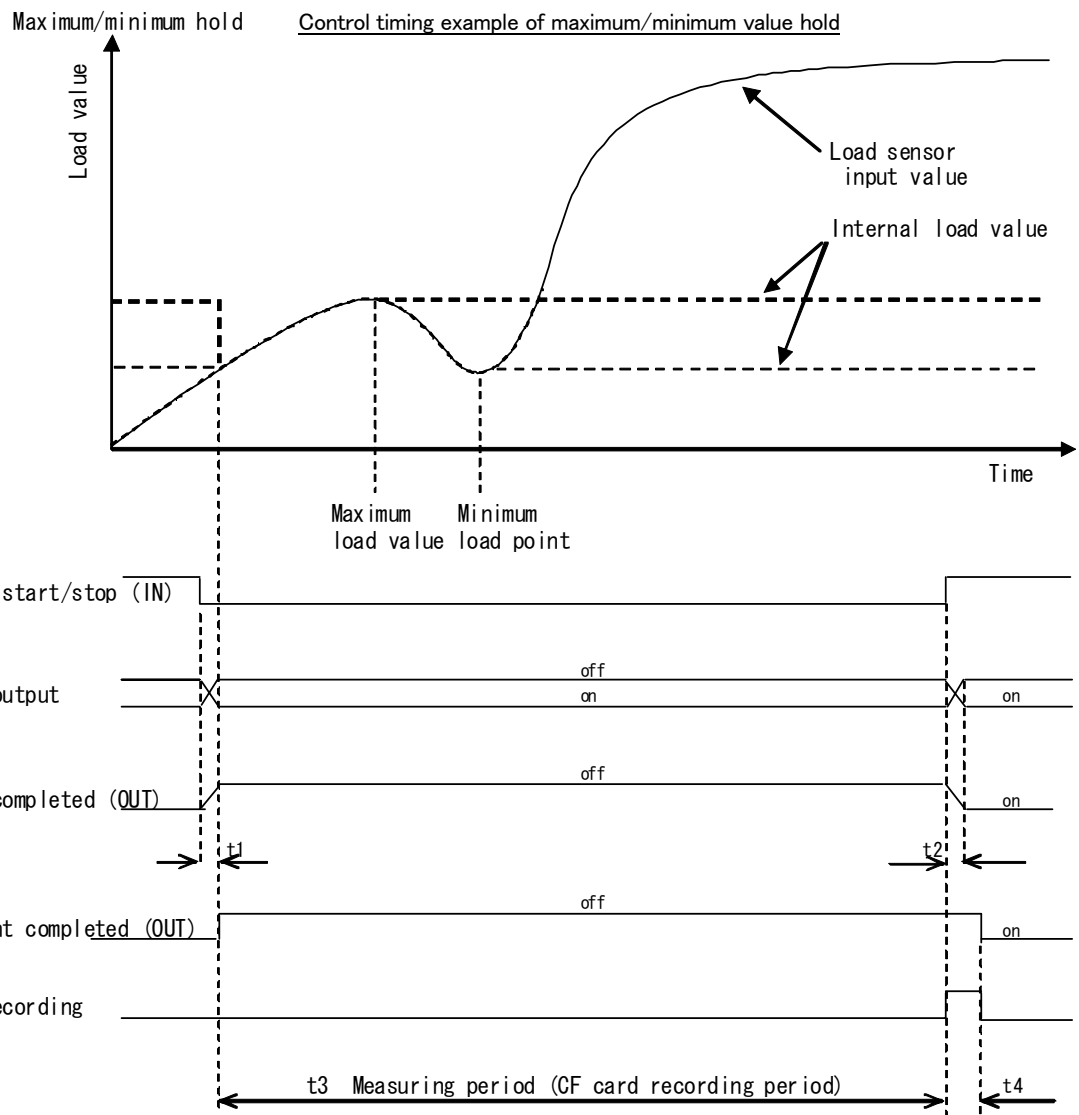
Holds the load value at the moment when the maximum or minimum value is attained during a measuring period.  
 Compares the held load value against the HI LO limits and HI\_HI LO\_LO limits and outputs the judgment result.  
 The limits are set as discussed in "7-2-5 Setting the Load Limits."

From the TOP screen, select "SETTINGS" → "DETAIL SET" → "WORK" → "Work No." (1 to 16) → "HOLD SET." → "MAX, MIN."



Maximum, Minimum select screen

Select "MAXIMUM" to set the maximum hold mode, or "MINIMUM" to set the minimum hold mode.



t1: A delay time between the moment when the measuring start input is detected and the moment when the load indicated values and internal data hold are released and judgment output and measurement completed signal are turned OFF. 1ms (MAX)

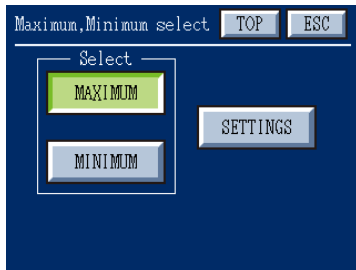
t2: A delay time between the moment when the measurement is completed and the moment when judgment output and judgment completed output are validated. 1ms (MAX)

t3: Measuring period, up to a maximum of 99.9 seconds

t4: CF card recording time, up to a maximum of 20 seconds (measuring time: 99.9 seconds)

### ◇ Maximum and Minimum Settings

When you select the “**Max, Min**” button on the Hold settings screen, the Maximum, Minimum select screen is displayed.



Maximum, Minimum select screen

Select “**MAXIMUM**” to set the maximum hold mode, or “**MINIMUM**” to set the minimum hold mode.





Then, determine the following settings.

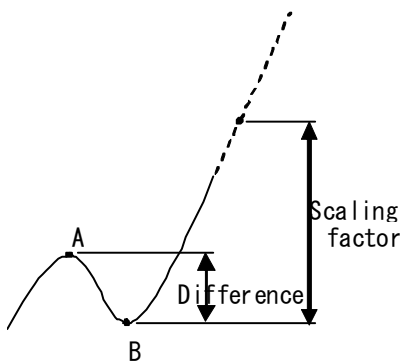


Maximum, Minimum screen

**DIFF** : Set the difference between the maximum and minimum load values.

**x** : Enter the detection condition for the maximum and minimum values, specified as a scaling factor.

Set values by selecting “DIFF” or “X” (“DIFF” is selected in the figure on the left), using the   key to place the cursor over a digit you want to change, and using the   key to set a desired value, and then push the “**Update**” button to confirm.

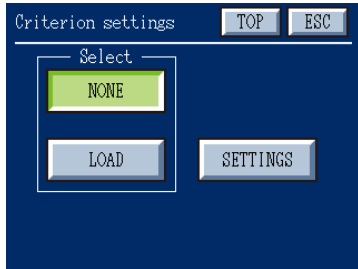


### Detection of the Maximum and Minimum Values

When the maximum and minimum values are detected and the difference exceeds the product of “Diff” and “x”, point A is held in the maximum value hold and point B is held in the minimum value hold.

### 7-2-5 Setting the Load Limits

Criteria for comparison and judgment can be set for load values (HI/LO and HI\_HI/LO\_LO limits) on a work-by-work basis. Comparison and judgment are performed against values held under each hold condition.



Criterion Select screen

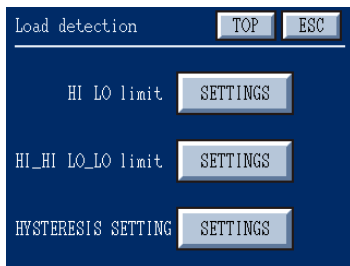
From the TOP screen, select “**SETTINGS**”→“**DETAIL SET**”→“**WORK**” → “**Work No.**” (1 to 16)→“**CRITERION.**”

**NONE** : No comparison and judgment are performed.

**LOAD** : Comparison and judgment are performed for a load value at the moment of being held.

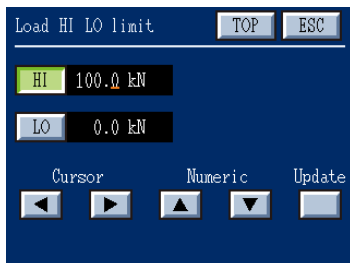
#### ◇ Setting the Limits

Load detection function allows you to specify HI/LO limits and HI\_HI/LO\_LO limits. For HI\_HI/LO\_LO limits, you have the option of enabling or disabling it. In the HYSTERESIS SETTING screen, you can set the width of hysteresis.



Load detection screen

In the **Criterion settings** screen, select “**LOAD**”→“**SETTINGS**” to set the HI LO limit, HI\_HI LO\_LO limit, and HYSTERESIS SETTING.

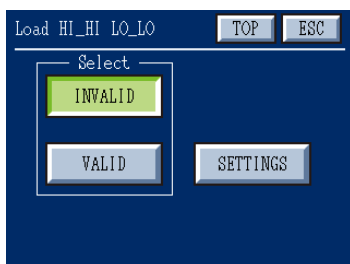


Load HI LO limit screen

#### Load HI LO limit screen

Set values by selecting “HI” or “LO” (“HI” is selected in the figure on the left), using the key to place the cursor over a digit you want to change, and using the key to set a desired value, and then push the “**Update**” button to confirm.

- Comparison and judgment conditions
  - HI or HH ON condition: indicated value > HI or HH limit value
  - LO or LL ON condition: indicated value < LO or LL limit value
- Setting conditions for each limit value
  - LL limit value ≤ LO limit value ≤ HI limit value ≤ HH limit value

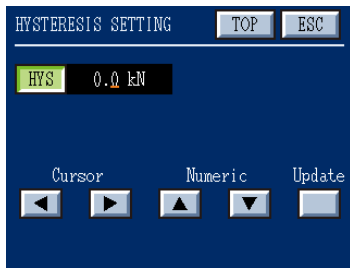


Load HI\_HI LO\_LO screen

#### Load HI\_HI LO\_LO screen

HH and LL limit values can be disabled when not used.

Select “**SETIINGS**” to set HH and LL limit values in the same manner as HI and LO limit values.



Load HI LO limit screen

### HYSTERESIS SETTING screen

When constant judgment is enabled, the hysteresis function for judging against HI and LO limit values and HH and LL limit values becomes effective.

Set a hysteresis value by using the key to place the cursor over a digit you want to change, and using the key to set a desired value, and then push the “Update” button to confirm.

When constant judgment is enabled in the Load sensor screen, the hysteresis function becomes effective.

**Caution**

When you set a value other than 0.0 in “HYS”, the hysteresis function becomes effective.

- Once the HI judgment output becomes ON, the state continues until a measured load value falls below a value obtained by subtracting the hysteresis value from the HI limit value.
- Once the LO judgment output becomes ON, the state continues until a measured load value exceeds a value obtained by adding the hysteresis value to the LO limit value.

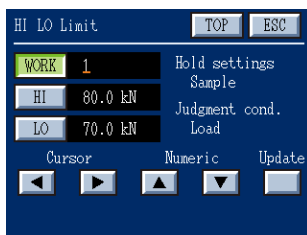
HH judgment and LL judgment function similarly.

A hysteresis setting value is common to all load limit values.

If a hysteresis value is large, for example, so that a value obtained by subtracting the hysteresis value from the HI limit value overlaps the LO limit value, a judgment result based on the HI and LO limit values takes precedence over a judgment result in which a hysteresis value is considered.

#### ◇ Shortcut to load HI and LO limit value setting

To set load HI and LO limit values, usually access the TOP screen → “SETTINGS” → “DETAIL SET” → “WORK” → “Work No.” (1 to 16) → “CRITERION” → “LOAD” - “SET.” Alternatively, you can use “SETTINGS” → “HI LO LIMIT” as a shortcut.



Example of HI LO Limit for load

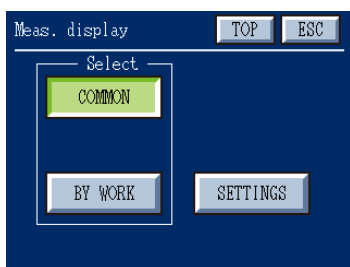
The load HI and LO limit values set in this screen apply to the settings made on a work-by-work basis.

Set values by selecting an item (“WORK” is selected in the figure on the left), using the key to place the cursor over a digit you want to change, and using the key to set a desired value, and then push the “Update” button to confirm.

### 7-2-6 Measuring Display Settings

Set the measuring display conditions.

From the TOP screen, select “SETTINGS” → “DETAIL SET” → “WORK” → “Work No.” (1 to 16) → “MEAS. DISP.”

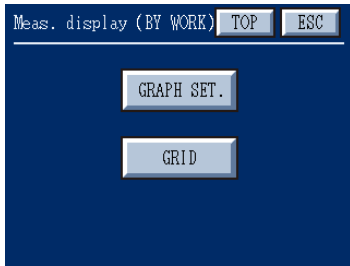


Meas. display screen

**COMMON:** The graph and grid settings defined by

choosing “SETTINGS” → “DETAIL SET” → “VIEW” from TOP screen is applied.

**BY WORK:** The measuring display set by using the “SETTINGS” button in the Meas. display screen is applied. Select when you want to set the measuring display conditions on a work-by-work basis.



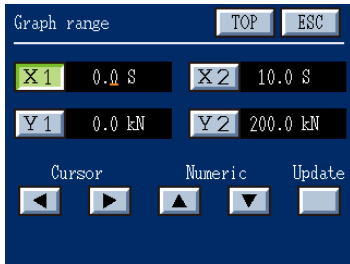
Meas.display (BY WORK)

From the “Meas. display” screen, select “**SETTINGS.**”

In the “Meas.display (BY WORK)” screen, set the measuring display conditions (“**GRAPH SET.**”, “**GRID**”, “**GRAPH DISP.**”, “**ANALYSIS**”) for this work.

### 7-2-6-1 Graph Range Settings







From the Meas. display (COMMON) screen, select “**GRAPH SET.**”



Graph range screen

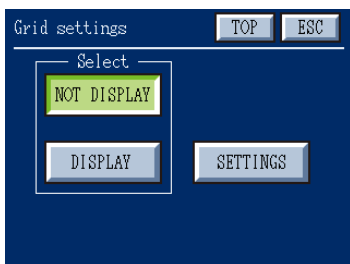
Set the graph range.

- X1** : Set the plot start time along the horizontal axis. In most cases, enter 0.0 s.
- X2** : Set the plot stop time along the horizontal axis. In most cases, enter the measuring time.
- Y1** : Set the plot value along the load axis. In most cases, enter “0.”
- Y2** : Set the maximum plot value along the load axis. In most cases, enter the maximum load value of the load sensor.

Set values by selecting an axis (X1, X2, Y1, Y2), using the   key to place the cursor over a digit you want to change, and using the   key to set a desired value, and then push the “**Update**” button to confirm. Signs are set by moving to the leftmost position and using the   key (Y1, Y2).

### 7-2-6-2 Grid Settings

From the Meas. display (COMMON) screen, select “**GRID.**”

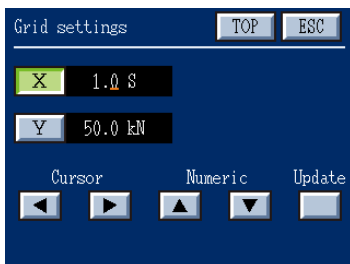


Grid settings screen

The Grid setting screen allows you to specify whether or not to display grid lines.

**NOT DISPLAY:** Grid lines are not displayed on graph screens.





**DISPLAY:** Grid lines are displayed on graph screens.



Grid settings screen

Select “**SETTINGS**” to set grid values.

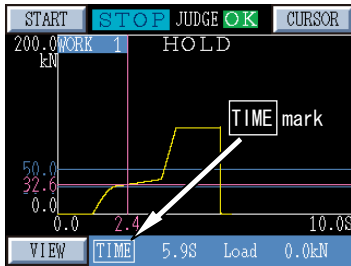
- X** : Grid lines are plotted along the X axis which you set in “Graph range.” When you select “Time” as the horizontal axis, about 1/5 to 1/10 of the time setting is suggested.
- Y** : Grid lines are plotted along the Y axis which you set in “Graph range.” About 1/5 to 1/10 of the maximum plot value is suggested.

Set values by selecting an axis (X, Y), using the   key to place the cursor over a digit you want to change, and using the   key to set a desired value, and then push the “**Update**” button to confirm.

### 7-2-6-3 Measuring Display Settings from the Graph Screen

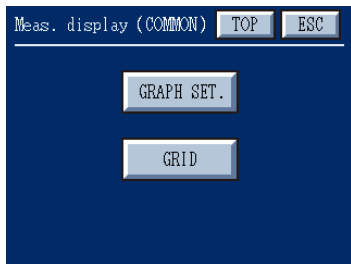
When you push the **TIME** mark on the Graph screen, a shortcut to the Meas. Display screen is provided.

This shortcut allows you to change the display range or grids directly from the Graph screen.



Graph screen

When you push the **TIME** mark on the Graph screen, a shortcut to the Meas. Display screen is provided.



Meas. display (COMMON) screen

Even when the settings are changed from this screen, the measurement data is not discarded.

When "COMMON" is selected, the common settings are changed.

When "BY WORK" is selected, settings by work are changed.

The figure on the left is displayed when "COMMON" is selected.

Note:



## 8. CF (Compact Flash) Settings



CF screen

The CF screen allows you to determine settings for storing onto a compact flash card.

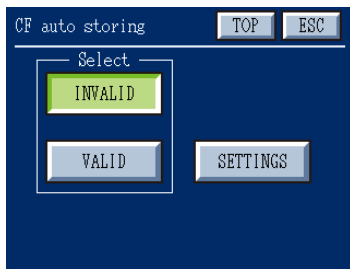
From the TOP screen, select “**SETTINGS**”→”**DETAIL SET**”→”**CF.**”



**Caution**

When recorded data is stored, the filename (if date is set) and timestamp are generated based on the system clock. Make sure that the system clock is accurate.

### 8-1 Auto Store and Capture Settings



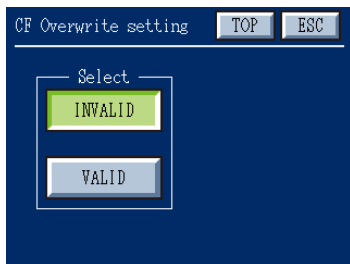
CF auto storing screen

From the CF screen, select “**AUTO STORE.**”

Specify whether recorded data is automatically stored (“**VALID**”) on a CF card or not (“**INVALID.**”)

**INVALID** : Recorded data is manually stored.

**VALID** : Data recorded from measuring start to stop is automatically stored onto a CF card once the measurement is stopped.



CF Overwrite setting screen

When you select “**VALID**”, select “**SETTINGS**” next to “**VALID**” and specify whether previous data is overwritten (“**VALID**”) or not (“**INVALID.**”)

**INVALID** : Previous data is not overwritten.

**VALID** : Previous data is deleted so that approx. 10 MB of free capacity is available when new data is stored or a CF card is inserted. Data to be deleted is files which are of the same file format in the recording working folder.



**Caution**

- When the overwrite function is enabled, previous data is deleted and then new data is written on completion of measurement. Wait awhile before starting the subsequent measurement.
- Repeated write and deletion of data may cause slower access. In this case, format the CF card.

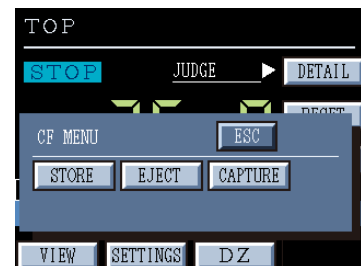
### ◇ Manually storing recorded data

When a CF card is inserted, a CF mark is displayed.

To store on the CF card, push the CF



TOP screen for manual storing

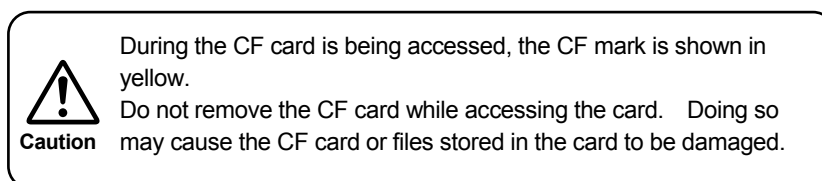


CF menu displayed

To manually store data recorded from measuring start to stop, begin by pushing the **CF** mark on the screen to display the CF screen.

When you select “**STORE**”, the recorded data is stored on the CF card. Once the store has been finished, the filename is displayed. Push “**OK**” to confirm.

Caution) The CF mark is displayed to indicate that a CF card is inserted.



#### ◇ Capture

To store a digital display screen or a graph display screen, begin by pushing the CF mark \* on the screen to display the CF menu.

When you select “**CAPTURE**”, the menu image is stored in the bitmap format on the CF card. Once the store has been finished, the filename is displayed. Push “**OK**” to confirm.

The file is saved in the BMP format in a folder as follows:

Target directory: ¥BMP

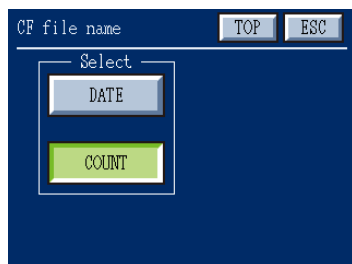
Filename: MMDDnnnn.BMP

MM : Month

DD : Day

nnnn : serial number, starting at 0001

## 8-2 Filename Settings



CF file name screen

From the CF screen, select “**FILE NAME.**”

Select the format of files you want to store on a CF card.

**DATE** : Files are given a name of hhmmss (where hh, mm, and ss represent the hour, minute, and second when the measurement was started, respectively) and saved under a folder with a name of YYYYMMDD (where YYYY, MM, and DD represent the year, month, and day when the measurement was started, respectively).

Example: Under Work No. 1, measurement started on January 03, 2008 at 12:54:16

**¥WORK1¥20080103¥125416.CSV**

**COUNT** : Files are named sequentially beginning with TD0001 and saved under a folder which is named sequentially beginning with TD001.


Example: Under Work No. 2, the first file to be recorded

**¥WORK2¥TD001¥TD0001.CSV**

When you select “**COUNT**”, one folder can contain a maximum of 5,000 files. Subsequent files are saved under a specific folder with the number incremented by one every 5000 files and again are named sequentially beginning with TD0001.

Example: If 6000 files are recorded under Work No. 2, the files are saved under two different folders as follows:

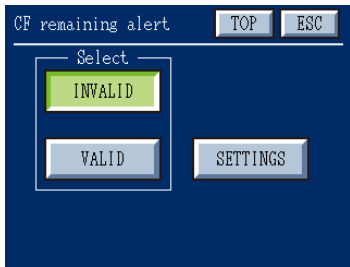
- 1<sup>st</sup> to 5000<sup>th</sup> files      ¥WORK2¥TD001¥TD0001.CSV to TD5000.CSV
- 5001<sup>st</sup> to 6000<sup>th</sup> files    ¥WORK2¥TD002¥TD0001.CSV to TD1000.CSV



**Caution** If more than one measurement was performed in one second or less, select **“COUNT.”** If you select **“DATE”**, files with the same date and time are not saved.

### 8-3 Remaining Alert and Limit Settings

From the CF screen, select **“REMAIN ALERT.”**

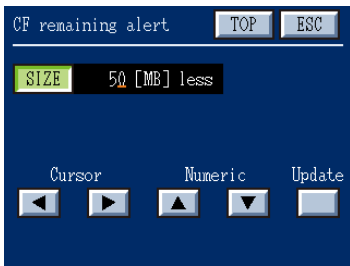


CF remaining alert screen

The CF remaining alert screen allows you to select whether or not an alert is issued before the CF card is full and, if you select that such an alert is issued, to define when the alert is issued.





**INVALID:** Alert is not issued.

**VALID :** Alert is issued.



CF remaining alert screen

When you select **“VALID”**, select **“SETTINGS”** next to **“VALID”** and then define the minimum remaining capacity below which an alert is issued.


Set values by using the   key to place the cursor over a digit you want to change, and using the   key to set a desired size (MB), and then push the **“Update”** button to confirm.

#### ◇ Remaining capacity alert



CF remaining alert displayed

When the remaining capacity of your CF card falls below the specified size, an indication of how much capacity remains on the card is given.



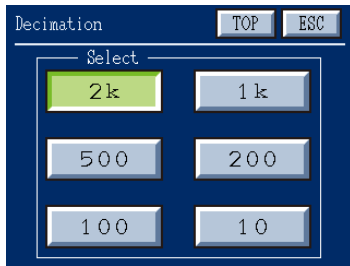
**Caution** Even after the capacity of your CF card falls below the predefined size, you can save additional files. However, if your CF card is full, you can no longer save files and an alert is issued to indicate that there is no capacity left on the CF card.

Files are saved until the CF card is full. Even after the CF card is full, measurement can be still performed. However, files can be no longer saved.

In this case, use another new CF card or erase the files stored on the CF card or format the card (refer to Section 8-8).

### 8-4 Decimation

From the CF screen, select “**Decimation.**”



Decimation screen

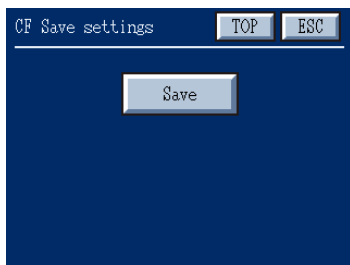
This function allows you to decimate measurement data and then store the reduced data on a CF card.

Before performing measurements, set 2 k, 1 k, 500 Hz, 200 Hz, 100Hz, or 10 Hz. Data with a specified sampling rate will be written.

The actual sampling rate is 2 k. When you specify not to decimate data, select “2 k.”

### 8-5 Saving a Setup File

From the CF screen, select “**SAVE SETTING.**”



CF Save settings screen

Various setting information of TD-275T is saved in a setup file (TD-CNF.PRM) on a CF card.

Filename: TD\_CNF.PRM

Target directory: ¥ (root directory)

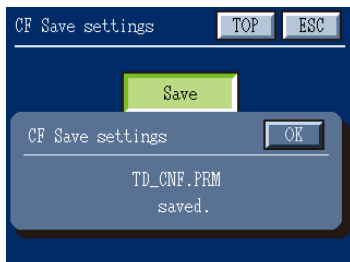


Save confirmation

When you push “**Save**” button on the CF Save settings screen, a confirmation dialog is displayed asking whether to continue. Push the “**OK**” button to save the setup file.

If the setup file already exists, a confirmation dialog is displayed asking whether to overwrite the file. Push the “**OK**” button to overwrite the file.

Any existing setup file is renamed to TD\_CNF.BAK. If the TD\_CNF.BAK file already exists, the existing file is deleted.

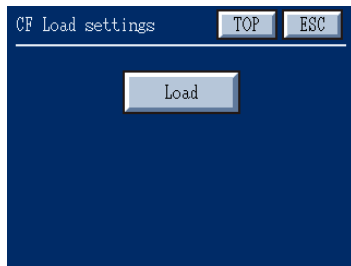


Settings saved

Once the setup file has been saved, the filename (TD\_CNF.PRM) is displayed. Push “**OK**” to confirm.

## 8-6 Loading a Setup File

From the CF screen, select "LOAD SETTING."

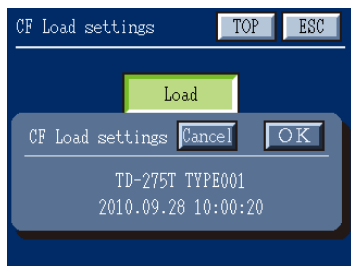


CF Load settings screen

You can load the setup file from the CF card and change the settings.

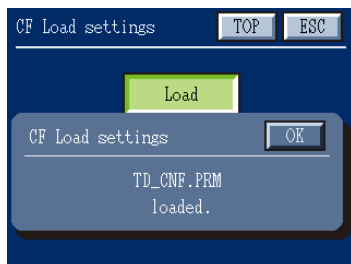
Filename: TD\_CNF.PRM

Target directory: ¥ (root directory)



Load confirmation

When you push the "Load" button on the CF Load settings screen, the information about the setup file is displayed. Push the "OK" button to read the setup file.



Settings loaded

Once the setup file has been read, the filename (TD\_CNF.PRM) is displayed. Push "OK" to confirm.

### ◇ Cautions when loading settings



Caution

- The sensor calibration values in TD-275T are not changed. After determining the settings for sensor calibration, load the settings.
- It is recommended to use a setup file with the same version of firmware currently installed in TD-275T. Using firmware with a different version can lead to errors because of the difference in specifications.
- If the number of digits after the decimal point used to display load values is different from that used in the setup file, errors will occur.
- After the setup file is loaded, check the settings of TD-275T.
- If the setup file fails to be loaded, the settings are not changed.
- Do not edit the setup file.

## 8-7 Installing and Removing a CF Card

### ◇ Installing a CF card

- Open the CF card slot cover on the front panel.
- Insert a CF card into the CF card slot.
- Make sure that the LED indicator, located to the right of the CF card slot, goes up.
- Close the CF card slot cover on the front panel.

When a CF card is recognized by TD-275T, a CF mark is displayed on the screen.

When a CF card is inserted, a CF mark is displayed.



CF mark displayed



**Caution**

When you insert a CF card, 16 folders (WORK1 to WORK16) are created under the root directory of the CF card.

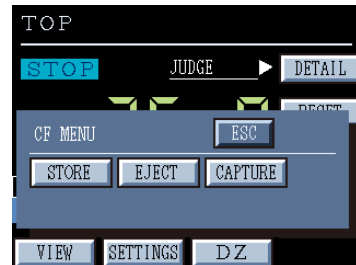
### ◇ Removing a CF Card

- Push the CF mark to display the CF MENU.

Touch the CF mark to display the CF MENU.



CF mark displayed



CF MENU displayed

- Select "**EJECT**" on the CF MENU.
- Open the CF card slot cover on the front panel.
- Make sure that the LED indicator, located to the right of the CF card slot, is off.
- Push the eject button, located to the left of the CF card slot, gently to remove the CF card.
- Close the CF card slot cover on the front panel.



**Caution**

During the CF card is being accessed, the CF mark is shown in yellow.

Do not remove the CF card while accessing the card.

Doing so may cause the CF card or files stored in the card to be damaged.

### 8-8 File Erase and Format

TD-275T supports a CF card formatted with FAT16 and FAT32.

FAT32 is recommended.

Before using a CF card with TD-275T, format it on your PC.

To erase files stored on the CF card or format the CF card, use your PC.

You can not erase files stored on the CF or format the CF card directly from TD-275T.

If the CF card is full, use another new CF card or erase the files stored on the CF card or format the card.

### 8-9 Recorded Data Format

Files are stored on a CF card in CSV format.

A file consists of header and data sections.

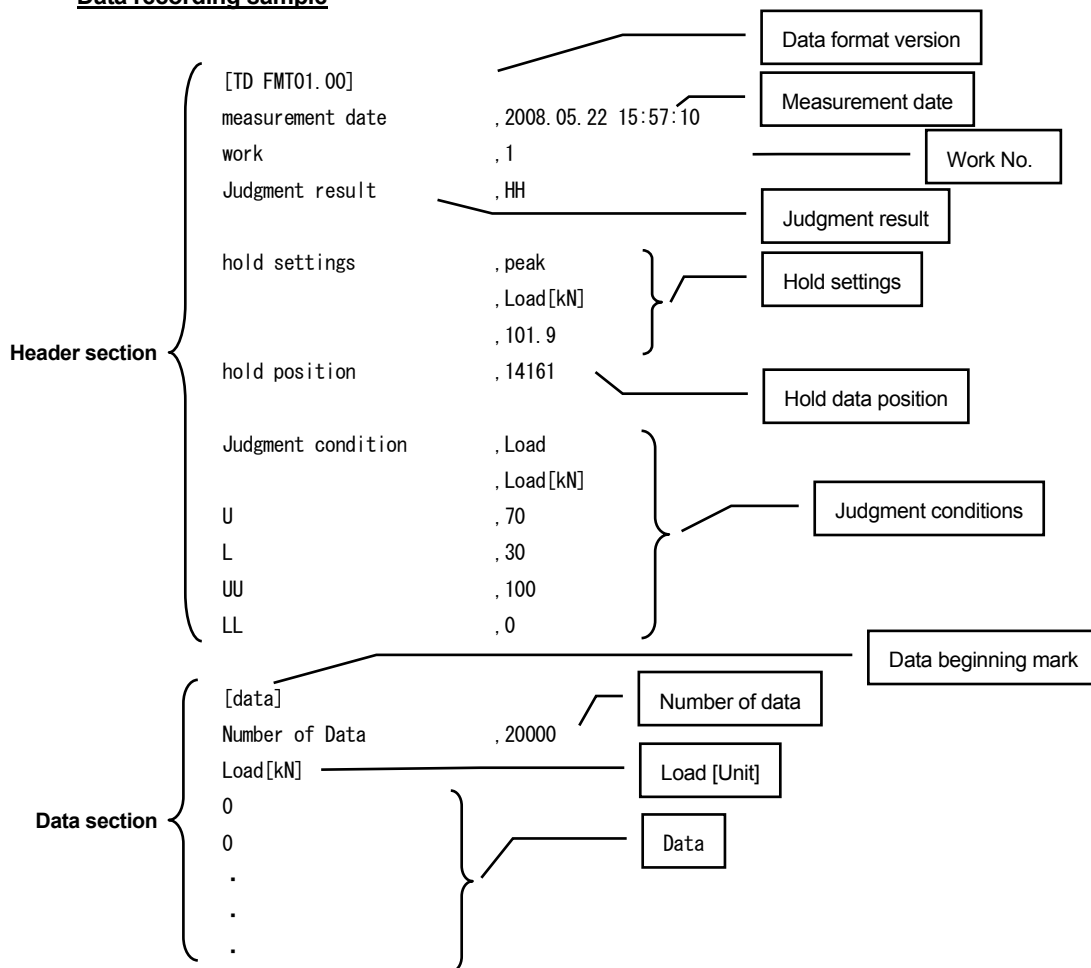
#### ◇ Header section

The header section contains measurement date, work No., judgment result, hold settings, judgment status, and other configuration information.

#### ◇ Data section

The data section contains load data.



#### Data recording sample

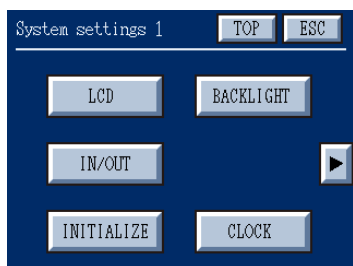


## 9. System Settings

The System settings screen allows you to determine settings for the backlight and contrast of the LCD, the backlight timer, check of external IN/OUT signals, the clock, the system information, the buzzer, key lock, system reboot, and optional board (if installed).

From the TOP screen, select “**SETTINGS**”→”**DETAIL SET**”→”**SYSTEM.**”

Pushing  on the System settings 1 screen advances to the System settings 2 screen and pushing  on the System settings 2 screen returns to the System settings 1 screen.



System settings 1 screen



System settings 2 screen

### 9-1 LCD Settings



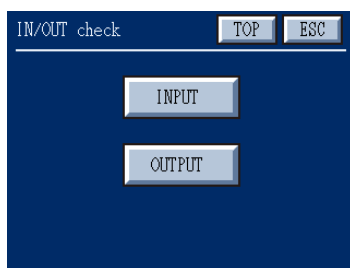
LCD screen

From the System settings 1 screen, select “**LCD.**”

Adjust the brightness and contrast of the LCD.

The optimal values are factory pre-set, however you may need to change the values according to the ambient temperature. In this case, set the brightness and contrast as appropriate, and then push the “**APPLY**” button to confirm.

### 9-2 IN/OUT (IN/OUT check)

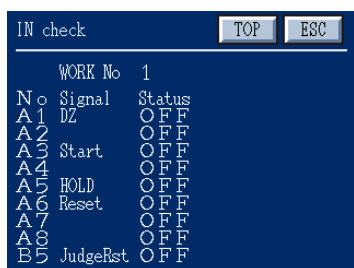


IN/OUT check screen

From the System settings 1 screen, select “**IN/OUT.**”

The IN/OUT check screen allows you to check whether the externally connected input signals are ON or OFF, and to turn the output signals ON or OFF, regardless of the status given from the indicator, and check the connections easily.

#### ◇ IN (Input check)



IN check screen

From the IN/OUT check screen, select “**INPUT.**”

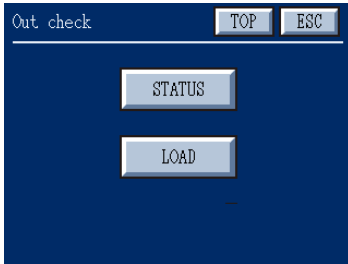
You can check the status of the externally connected input signals.

When an input signal is turned on, the signal will have a status of “**ON.**”



### ◇ OUT (Output check)

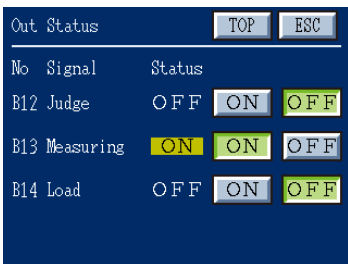
The Out check screen allows you to turn the contact outputs ON or OFF, regardless of the status given from the indicator, and check the connections easily.



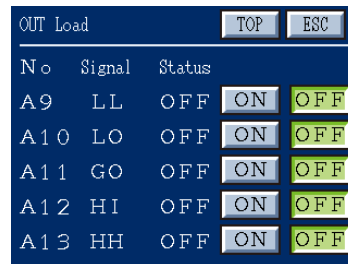
Out check screen

From the IN/OUT check screen, select **“OUTPUT.”**

The Out check screen allows you to turn each contact output of status signals, load comparison ON/OFF. Therefore, TD-275T in combination with the connected system can be checked.



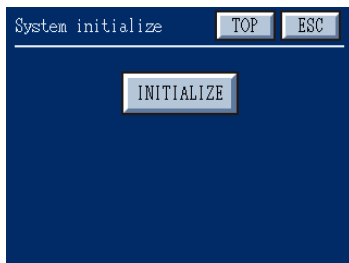
Status (Contact) check screen



Load (Contact) check screen

You can turn a signal output ON or OFF by pushing the ON or OFF button next to the output.

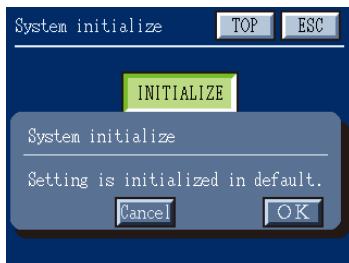
### 9-3 Initializing Settings



System initialize screen

From the System settings 1 screen, select **“INITIALIZE.”**

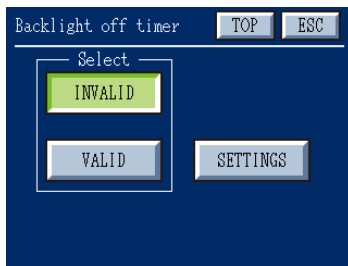
This function is used to reset various settings of TD-275T to their defaults.



System initialize screen

Push the **“INITIALIZE”** button on the System initialize screen and then push the **“OK”** button to initialize the system.

## 9-4 Backlight Off Timer Settings



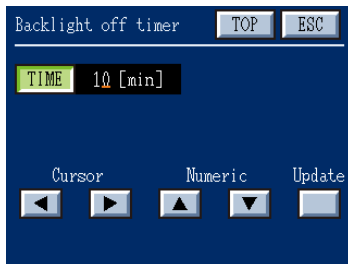
Backlight off timer screen

From the System settings 1 screen, select “**BACKLIGHT.**”

Specify whether or not you should set a timer for your screen backlight so that your LCD screen becomes dark when a specified time is elapsed after no operation takes place on the touch panel.

**INVALID:** Disable the backlight off timer.





**VALID :** Enable the backlight off timer.



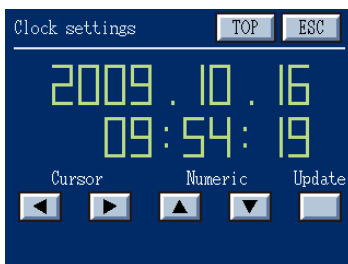
Backlight off timer screen

Select “**SETTINGS**” next to “**VALID**” to set time.

You can set, in steps of one minute, to a maximum of 999 minutes.

Set values by using the   key to place the cursor over a digit you want to change, and using the   key to set a desired time, and then push the “**Update**” button to confirm.

## 9-5 Clock Settings







Clock settings screen

From the System settings 1 screen, select “**CLOCK.**”

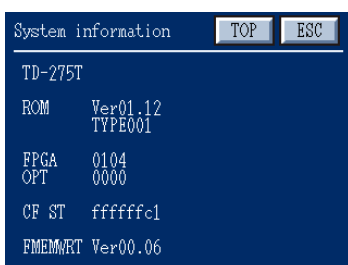
Set the system clock. This clock function is used to indicate the name (date) and timestamp of files, which are stored on a CF card.

If necessary, use the function to adjust the system time.

When the “**Update**” button is pushed, a cursor should appear. Set values by using the   key to place the cursor over a digit you want to change, and using the   key to set the present date (year.month.day) and time values, and then push the “**Update**” button to confirm.

- The clock is backup with an embedded battery. When you need to replace the battery, contact your local office or service representative.

## 9-6 System Information



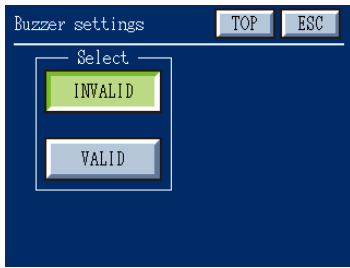
System information screen

From the System settings 2 screen, select “**SYSTEM INFO.**”

This should display various version and configuration information for your TD-275T.

When you contact us for help, you may need to provide the system information.

### 9-7 Buzzer Settings



Buzzer settings screen

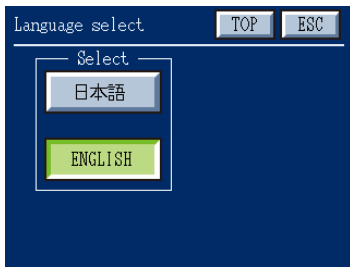
From the System settings 2 screen, select “**BUZZER.**”

Specify whether or not the buzzer sounds when pushing on the touch panel.

**INVALID:** The buzzer does not sound.

**VALID :** The buzzer sounds.

### 9-8 LANG (言語)



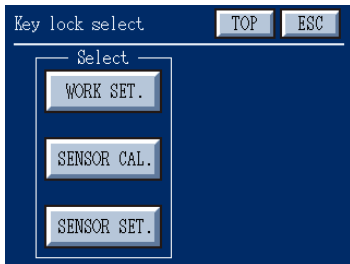
Language select screen

Select which language you want to use: Japanese or English.

**日本語 :** Screen text is displayed in Japanese.

**ENGLISH :** Screen text is displayed in English.

### 9-9 Key Lock Select



Key lock select screen

The Key lock select screen allows you to prevent changes in the settings on the Work settings screen, the Sensor calibration screen, and the Sensor settings screen.

**WORK SET. :** Prevents changes in the settings on the Work settings screen.

**SENSOR CAL. :** Prevents changes in the settings on the Sensor calibration screen.

**SENSOR SET. :** Prevents changes in the settings on the Sensor settings screen.

Caution: Key locked settings are prevented from being modified, but are allowed to be displayed.

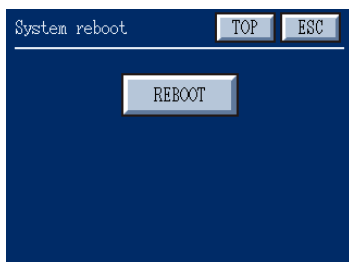
### 9-10 Reboot

When this button is pushed, the system is rebooted.

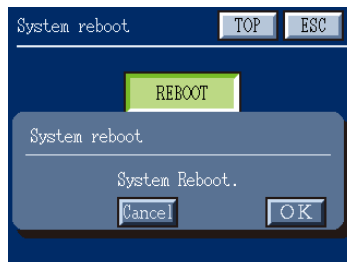
When you select “**REBOOT**” on the System settings 2 screen, a confirmation dialog is displayed asking whether to reboot the system.

Select “**OK**” to reboot the system or “**Cancel**” to cancel the operation.

A few seconds after you select “**OK**”, a system reboot will start and the reboot screen will open.



System reboot screen



System reboot confirmation

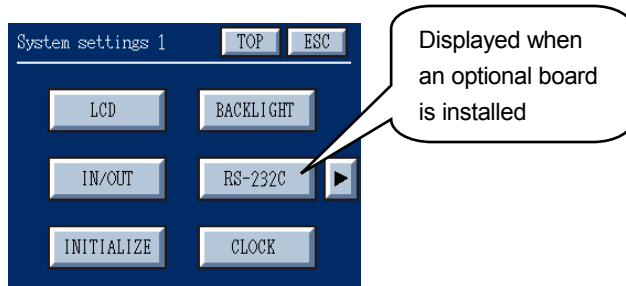
## 10. Settings When an Optional Board Is Installed

### ◇ Option settings

The option settings are enabled only when an optional board is installed in the option slot provided on the back of TD-275T.

Select **“SETTINGS”** → **“DETAIL SET”** → **“SYSTEM.”** When an optional board is installed, a button for setting the option appears.

Example: when a D/A converter is installed



System screen

### 10-1 Setting D/A Converter

This function applies to a device with an optional D/A converter installed.

This D/A converter is provided to obtain an analog output which is linked with indicated values from the indicator.

The analog output has a range of 0 to  $\pm 10$  V for voltage output or from 4 to 20 mA for current output.

For any digital value you have set with the D/A zero setting and the D/A full scale setting functions, you can obtain an analog output of zero (0 V, 4 mA) to full scale ( $\pm 10$  V, 20 mA).

The D/A output circuit and the main circuit are isolated. The resolution is  $1/\pm 10000$  for 0 to  $\pm 10$  V and the conversion rate is 500 times per second. The output has an over range of about +10%.

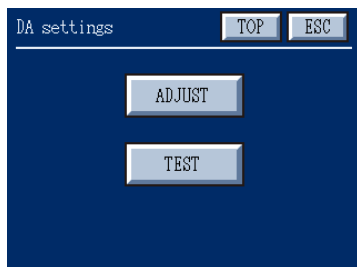
A current output of 4 mA corresponds to a voltage output of 0 V, and a current output of 20 mA corresponds to a voltage output of 10 V.

Use a current output of 4 mA (0 V) to 20 mA (+10 V).

Current output and voltage output are not set independently to zero or full scale.

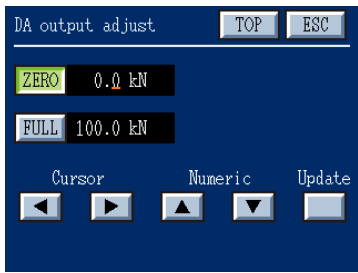
### ◇ DA Settings

From the TOP screen, select **“SETTINGS”** → **“DETAIL SET”** → **“SYSTEM”** → **“DA.”**



DA settings screen

### 10-1-1 DA Output Adjustment




DA settings screen

From the DA settings screen, select “**ADJUST**” to adjust DA output.

The DA output adjust screen allows you to set load values at DA zero and at DA full scale.

Set values by selecting an item (“ZERO” is selected in the figure on the left), using the key to place the cursor over a digit you want to change, and using the key to set a desired load value, and then push the “Update” button to confirm.

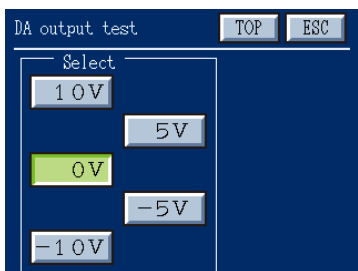


Current output and voltage output are not set independently to zero or full scale.  
**Caution** Use a current output of 4 mA (0 V) to 20 mA (+10 V).

#### Setting Examples

Example 1		Example 2		Example 3		Example 4	
DA zero	000.00	DA zero	020.00	DA zero	020.00	DA zero	-10.00
DA full scale	100.00	DA full scale	100.00	DA full scale	-100.00	DA full scale	20.00
Indicated value	DA output	Indicated value	DA output	Indicated value	DA output	Indicated value	DA output
100.00	10V	120.00	10V	120.00	-10V	10.00	10V
:	:	:	:	:	:	:	(20mA)
000.00	0V	020.00	0V	020.00	0V	0.00	5V
:	:	:	:	:	:	:	(12mA)
-100.00	-10V	-80.00	-10V	-80.00	10V	-10.00	0V
							(4mA)

### 10-1-2 Output Test



DA output test screen

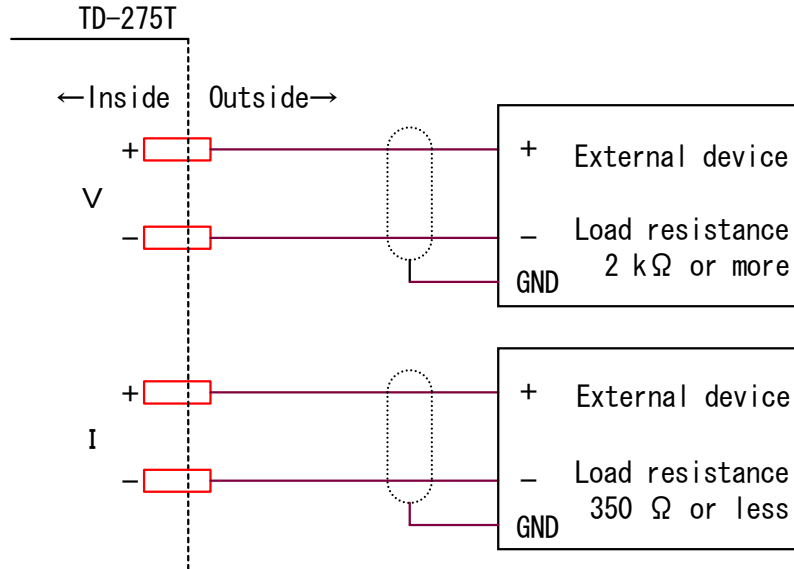
From the DA settings screen, select “**TEST**” to allow a DA output test.

A DA output test is performed by outputting any specified voltage ( $\pm 10$  V,  $\pm 5$  V, or 0 V) from the D/A converter.

Select the button representing the voltage you want to be output from the D/A converter (in this case, 0 V).

**10-1-3 Voltage and Current Output Connections**

- Connect an external device (with a load resistance of 2 kΩ or more) to the "V"+ (plus) and the "V"- (minus) for voltage output.
- Connect an external device to the "I"+ (plus) and the "I"- (minus) for current output.

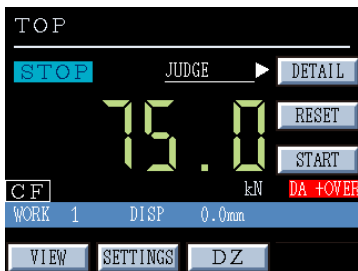


**10-1-4 Resolution**

The D/A converter provides a frequency of 1/±10000 for 0 to ±10 V and 1/10000 for 4 to 20 mA.

**10-1-5 D/A Output Error**

This is an overflow alert which is output only when a D/A option is provided.



DA alert display

The alert is issued when the DA output is +10 V higher and -10 V lower than the linear limits.

"RESET" will clear the alert.

Overflow alert display

## 10-2 Setting RS-232C Interface

This function applies to TD-275T with an optional RS-232C interface installed.

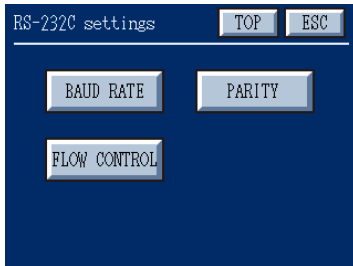
RS-232C interface is used to read out the indicated values or recorded data from TD-275T.

It is useful when connecting TD-275T with a computer, a process controller or a sequencer, etc. to perform tasks such as control, aggregation, recording, etc.

The internal and external circuits are electrically isolated via a photocoupler.

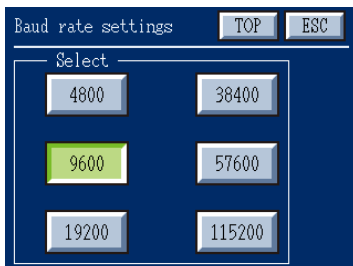
### ◇ RS-232C Settings

From the TOP screen, select “**SETTINGS**”→”**DETAIL SET**”→”**SYSTEM**”→”**RS-232C settings.**”



RS-232C settings screen

### 10-2-1 Baud Rate Settings

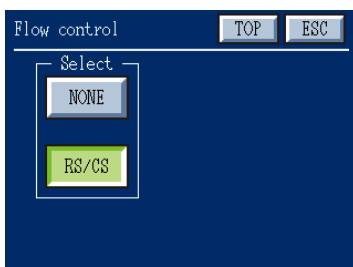


Baud Rate Settings screen

From the RS-232 settings screen, select “**Baud Rate**” and set a communication speed.

Available settings: 4800 bps, 9600 bps, 19200 bps, 38400 bps, 57600 bps, or 115200 bps.

### 10-2-2 Flow Control Setting

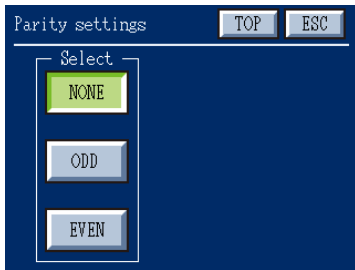


Flow Control Screen

From the RS-232C settings screen, select “**FLOW CONTROL**” to set whether or not hardware flow control is enabled.

Available settings: “NONE” or “RS/CS.”

### 10-2-3 Parity Settings



Parity setting Screen

From the RS-232C settings screen, select “**PARITY**” to set a communication error detection code.

Available settings: None, Odd, or Even.

### 10-2-4 Communication Specifications

#### ◇ Standard

- Signal level : Based on RS-232C
- Transmitting distance : Approx. 10 m
- Transmitting method : Asynchronous, Full duplex
- Transmitting speed : 4800, 9600, 19200, 38400, 57600, 115200 bps
- Bit configuration : Start bit 1  
Character length 8 bit  
Stop bit 1 bit  
Parity none, odd, or even
- Code : ASCII
- Flow control : none or RS/CS

#### ◇ Connector Pin Assignment

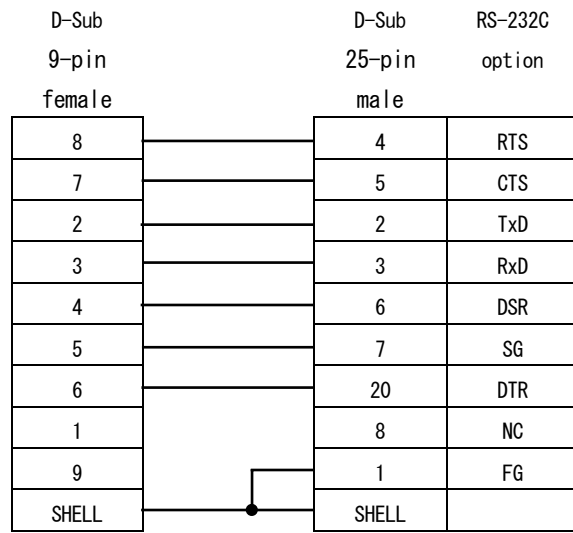
Adaptable plug: 25-pin D-sub connector (ex. JAE DB-25P-NR)

No.			No.		
1		FG	14		
2	Output	TxD	15		
3	Input	RxD	16		
4	Output	RTS	17		
5	Input	CTS	18		
6	Input	DSR	19		
7		SG	20	Output	DTR
8			21		
9			22		
10			23		
11			24		
12			25		
13					



◇ Cable connection sample

Cross cable connection sample

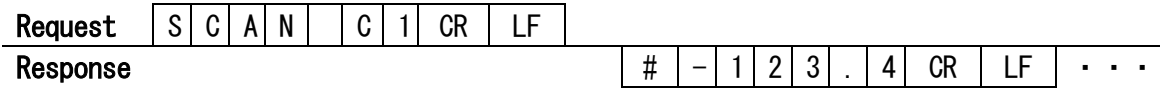


Note:

### 10-2-5 Communication Format

Request is a command sent from a host computer to TD-275T and Response is data sent from TD-275T to a host computer. All characters are ASCII, except [CR] and [LF].

([CR]:Carriage Return (0x0D), [LF]:LineFeed (0x0A))



### 10-2-6 Control Commands

Communication conditions are set in the RS-232C settings screen (accessible from the System settings screen).

Caution: Control commands are entered, using uppercase or lowercase single-byte characters.

#### ◇ HD command

Function : To acquire the model number, hardware version, and ROM version

Argument : none

Description

The command sends the model number, hardware version, and ROM version.

#### ◇ SCAN command

Function : To acquire the current value

Argument : frequency or STOP

Description

The command returns the current values at the specified frequency.

When you set the horizontal axis to “displacement”, load and displacement are returned.

When the settings screen is being displayed and when DZ (Digital Zero) or displacement adjustment is being performed, no data is transmitted.

During the current value is transmitted, any commands other than HD and SCAN STOP are ignored.

Arguments	Transmission Frequency [Hz]	Remarks
C1 to C9	1 to 9	1 pitch (C1, C2, C3, ...)
C10 to C100	10 to 100	10 pitches (C10, C20, C30, ...)
STOP	—	Stop the transmission

If no argument is taken, the current value is returned only once.

If STOP is taken as an argument, the transmission is stopped and \* is returned.

Command examples

Example 1 SCAN C1

Example 2 SCAN STOP

Data examples

Load only (7 letters + CR +LF)

# 12.3

#-123.4

Load and displacement (Only TD-280T: 14 letters + CR +LF)

#-123.4, - 12.3

# 0.0, 123.4

#### Communication speed

On a transmission of load and displacement, C54 or beyond requires a communication speed of 19200 bps or more.

#### Processings when the transmission is stopped by flow control

When the transmit buffer has enough free space, the current value is written into the transmit buffer.

After the transmit buffer is full, the current value is not written into the transmit buffer.

Therefore, the number of data and the measuring time may be inconsistent.

#### About data transmission

The RS-232C controller has its built-in FIFO transmit/receive buffers and transmits data collectively for efficient data transmission.

Transmission frequency [Hz]	Data to be transmitted [Sampling]	
	Load only	Load and displacement (Only TD-280T)
1 to 10	1	
20	2	
30	3	
40	4	2
50	5	3
60 to 100	6	3

In case of load only, 9 bytes/sampling

In case of load and displacement, 16 bytes/sampling (Only TD-280T)

If the transmission is stopped by flow control, a maximum of 2 K byte of consecutive data will be transmitted on a restart of transmission.

◇ **TR\_ACQ\_DAT command**

Function : To acquire the recorded data

Argument : none Data is transmitted as characters (ASCII)

BIN Data is transmitted as binary (float)

BIN\_S Data is transmitted as binary (short)

Description

- When no argument is specified, the recorded data is transmitted as characters.

Order in which data is transmitted

the number of data per line, the number of lines transmitted

Measurement data

•  
•  
•

\*  
  
When the number of data per line is 1, load is transmitted.  
When the number of data per line is 2, load, followed by displacement, are transmitted (Only TD-280T).  
When no measurement data is available, the number of lines transmitted is 0.

Command examples

TR\_ACQ\_DAT

Data examples

2, 20000

-123. 4, - 12. 3

•  
•  
•

200. 1, - 50. 3

\*  
  
• When BIN is taken as argument, the measurement data is transmitted as float (4 bytes).  
Order in which data is transmitted  
the number of data per line, the number of lines transmitted (character)  
Measurement data (float)

•  
•  
•

\* (character)  
  
• When BIN\_S is taken as argument, the measurement data is transmitted as short (2 bytes).  
Order in which data is transmitted  
the number of data per line, the number of lines transmitted, n, n (character; when the number of data per line is 1, a single "n" appears)  
Measurement data (short)

•  
•  
•

\* (character)

Caution: Measured value = Measurement data × 10n

◇ **VERBOSE command**

Function : To set how the status is transmitted

Argument : Mode 0 or 1

Description

When Mode 0 is specified, !ACQ\_START and !ACQ\_END messages are not returned.

When Mode 1 is specified, !ACQ\_START and !ACQ\_END messages are returned.

When no argument is specified, the VERBOSE mode setting (0 or 1) and OK are returned.

Messages

!ACQ\_START: a message when the measurement is started.

!ACQ\_END: a message when the measurement is ended.

The messages are transmitted each time the measurements are started or ended.

Command examples: When Mode 1 is specified

VERBOSE 1 (Request)

OK (Response)

◇ **HOLD\_POS command**

Function : To acquire the hold position

Argument : none

Description

The command returns the position of data which is held in the specified hold mode (i.e. the number of data from the beginning).

When no data is held, -1 is returned.

Get the measurement data using the TR\_ACQ\_DAT command.

The command has no effect during measurement is being performed.

◇ **ACQ\_START command**

Function : To start the measurement

Argument : none

Description

The command is effective only when the measurement screen is displayed.

When measurement is being performed, ERR-48 is returned.

Command examples

ACQ\_START (Request)

OK (Response)

◇ **ACQ\_END**

Function : To end the measurement

Argument : none

Description

The command is effective only when the measurement screen is displayed.

When no measurement is being performed, ERR -48 is returned.

Command examples

ACQ\_END (Request)

OK (Response)

◇ **ACQ\_RESET command**

Function : To reset the measurement status

Argument : none

Description

The command is effective only when the measurement screen is displayed.

The command is equivalent to pushing the RESET button on the screen where the measured values are displayed.

Command examples

ACQ_RESET	(Request)
OK	(Response)

◇ **SET\_DATE command**

Function : To set the date and time

Argument: Date and Time

Description

The command sets a specified date and time.

YYYY. MM. DD hh:mm:ss

- YYYY : Year
- MM : Month
- DD : Day
- hh : Hour
- mm : Minute
- ss : Second

Command examples

SET_DATE 2008. 10. 01 01:30:00	(Request)
OK	(Response)

Caution: Do not attempt to set an irrelevant date and time, such as 15 month.

◇ **GET\_DATE command**

Function : To acquire the date and time

Argument: none

Description

The command returns the current date and time.

For the format of argument, refer to the SET\_DATE command.

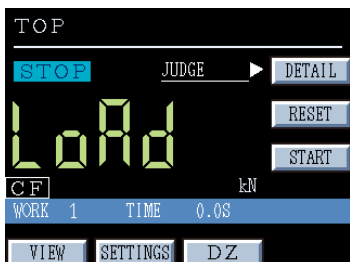
Command examples

GET_DATE	(Request)
2009. 10. 01 01:30:00	(Response)
OK	(Response)

## 11. Overscale/Error Displays

This section describes overscales and errors which may be displayed on each screen.

### 11-1 Errors Related to Load Sensor



#### LOAD:

This error indicates that an input signal from the load sensor exceeds +3.0 mV. It also indicates that a sensor signal exceeds 3.0 mV/V. The sensor and the cables require to be checked.

If you encounter this error during use of the system, possible causes include an overload on the sensor, etc.

From the TOP screen, select “**SETTINGS**”→“**DETAIL SET**”→“**VIEW**”→“**STRAIN**” and then check an indicated value. If the indicated value is larger than a rated output (4000 to 6000) of the connected sensor, a failure may occur in the sensor.

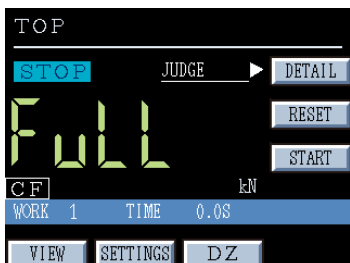


#### -LOAD:

This error indicates that an output from the load sensor goes beyond the negative limit value. The sensor and the cables require to be checked.

As in the LOAD error, select “STRAIN” so as to check an indicated value.

For possible causes, refer to the description of the LOAD error.



#### FuLL:

This alarm indicates that an overflow of a positive indicated value occurs.

For example, suppose that a sensor rated-output of 1.234 mV/V is set to an indicated value of 5000. If an input from the sensor goes beyond 2.468 mV/V, the indicated value exceeds 9999, which causes the indicated value error “FuLL.”

This error relates to an indicated value. However, note that when “FuLL” occurs, the sensor also is overloaded (i.e. an output from the sensor exceeds the rated output).

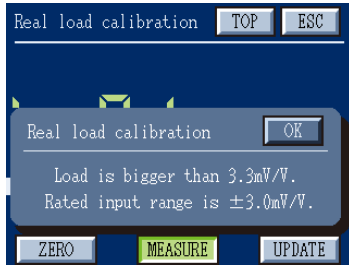


#### -FuLL:

This alarm indicates that an overflow of a negative indicated value occurs.

## 11-2 Errors During Load Sensor Calibration

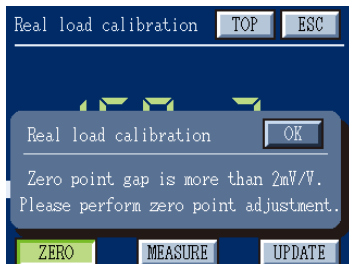
### ◇ Errors during real load calibration



Input-range over error screen

#### Input-range over error

This error shows that the signal from the sensor exceeds the input range (3 mV/V) of the indicator. This 3 mV/V includes the zero point of the sensor.

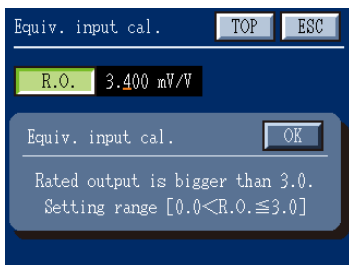


Zero balance error screen

#### Zero balance error

This error shows that during zero point measurement, the signal from the sensor is larger than  $\pm 2$  mV/V. Check a zero balance value, and then adjust it to 2 mV/V or less.

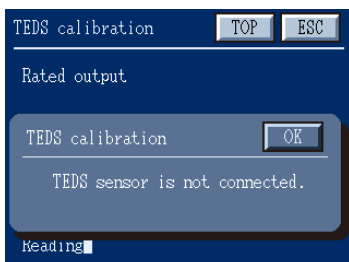
### ◇ Error during equivalent input calibration



Input over error screen

Refer to the sensor data to enter the correct rated output. A rated output larger than 3 mV/V is an input over and therefore cannot be set.

### ◇ Error during TEDS calibration



TEDS unconnected error screen

This error shows that a TEDS sensor is not connected to the indicator.

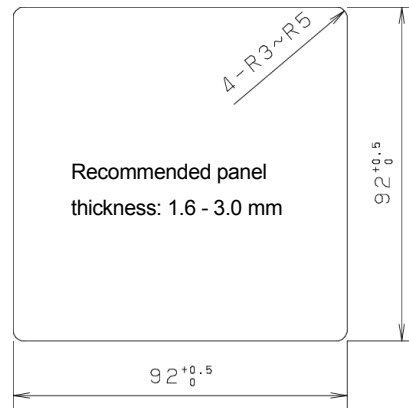
Check the connection between the sensor and the indicator. Further, make sure that a TEDS-capable sensor is used.



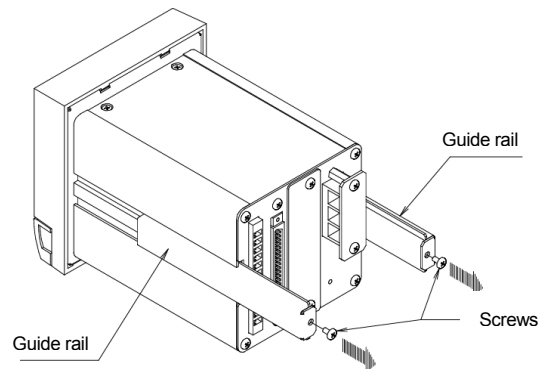
## 12. Hardware Installation

Follow these steps to install the TD-275T inside a control panel.

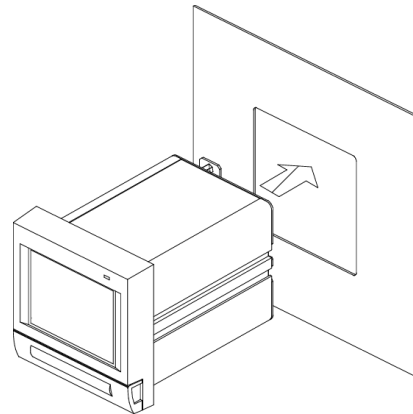
1. Cut out the panel according to the dimensions in the panel cut-out drawing.



2. Remove the two screws, and then remove the guide rails on the right and left sides.

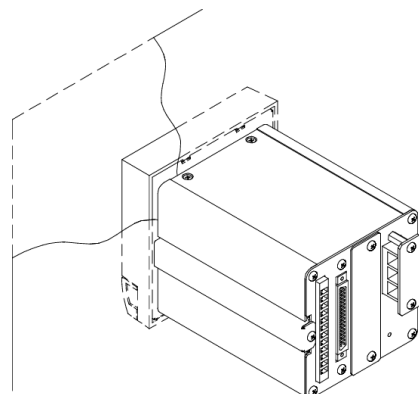


3. Push the TD-275T into the panel cut-out area from the front side of the panel.



4. Put the guide rails that were removed in Step 2, back in place from the rear side, and then secure them with the two screws.

( Recommended tightening torque:  $0.6 \pm 0.1$  N · m [ $6 \pm 1$  kgf · cm] )



## 13. Specifications

### Load Sensor Input

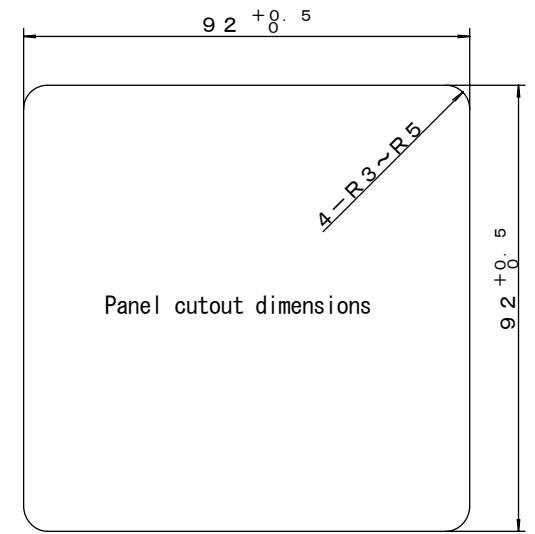
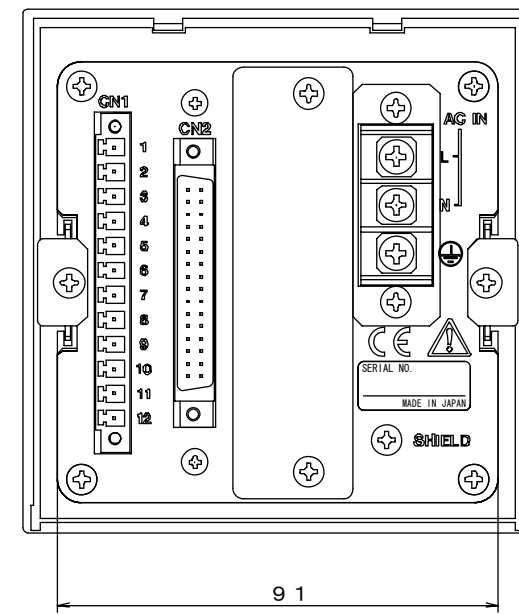
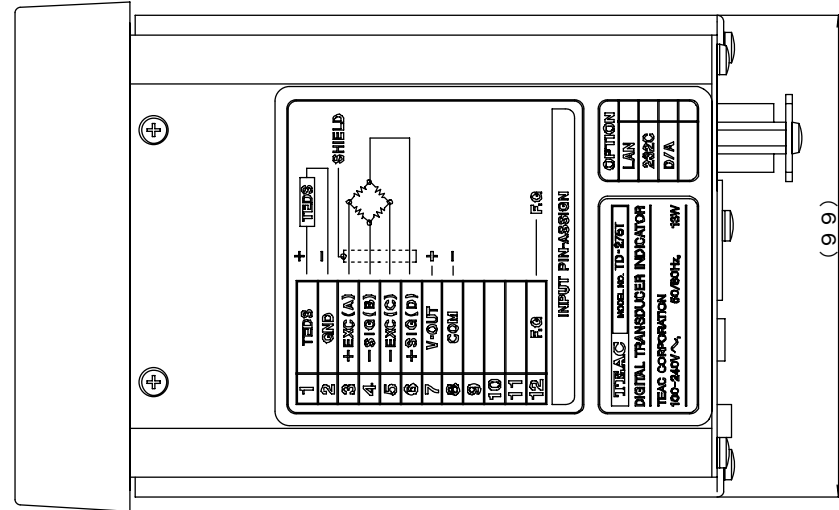
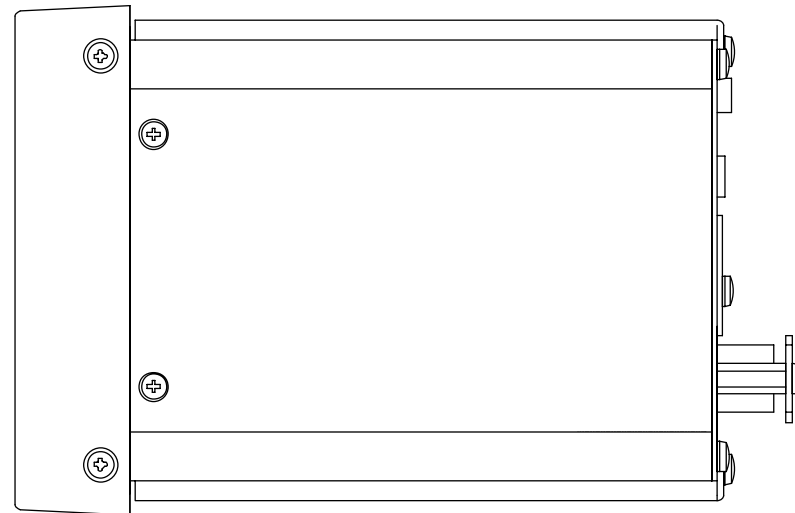
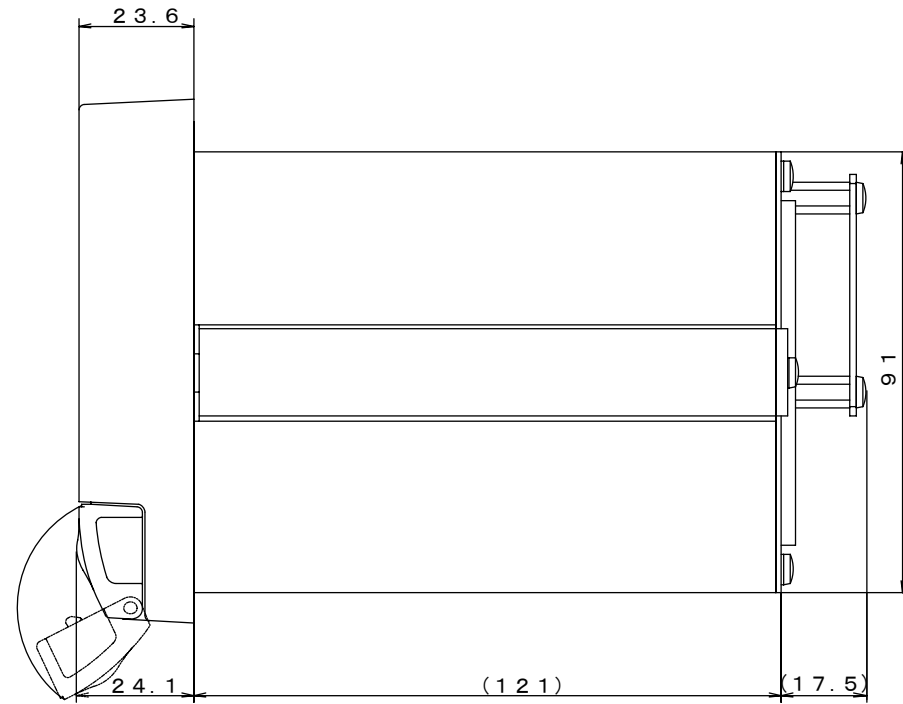
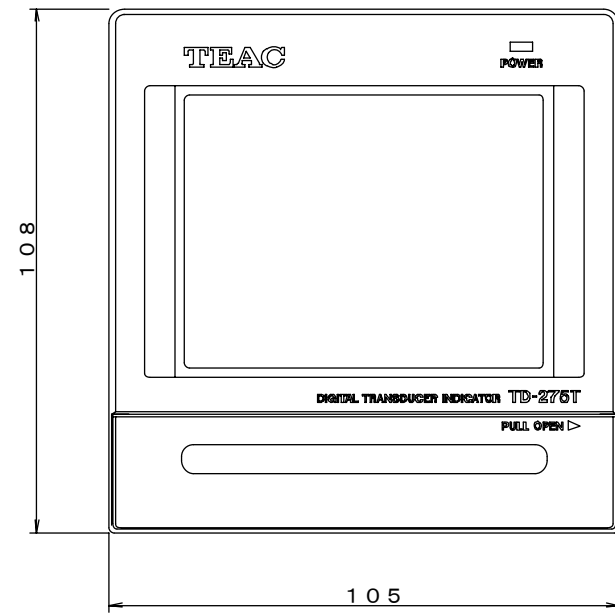
- |                          |  |                       |
|--------------------------|--|-----------------------|
| 1) Input/Range           | : Strain gauge sensor  | $\pm 3.0$ mV/V        |
| Input connector          | : Screw connection-type terminal (pitch 5.08 mm, 12P)                                    |                       |
| 2) Excitation Voltage    | : 2.5 V DC ( $\pm 10\%$ )/10 V DC ( $\pm 10\%$ )   | Current: 30 mA        |
| 3) Calibration method    | : Equivalent Input/TEDS/Real Load  |                       |
| Calibration range        | : 0.5 to 3.0 mV/V  |                       |
| Calibration Accuracy     | : $\leq 0.1\%$ F.S (excitation voltage = 10 V)   |                       |
| 4) Zero balancing        |  | : 0 to $\pm 2.0$ mV/V |
| 5) Accuracy Nonlinearity | : $\leq 0.02\%$ F.S $\pm 1$ digit (excitation voltage = 10 V, Input $\geq 1.0$ mV/V)     |                       |
| Zero drift               | : $\leq 0.5\mu\text{V}/^\circ\text{C}$ (Input conversion value)                          |                       |
| Gain drift               | : $\leq 0.01\%$ F.S/ $^\circ\text{C}$ (excitation voltage = 10 V, Input $\geq 1.0$ mV/V) |                       |
| 6) Analog filter         | : Selectable from 10, 30, 100 (default), 300 Hz  |                       |
| Low pass filter          | : Attenuation -6 dB/OCT  |                       |
| 7) A/D converting rate   | : 2000 times per second  | Quantization 16 bits  |
| 8) TEDS function         | : IEEE 1451.4 Class 2 mix mode interface   |                       |
| 9) Peak-hold function    | : Digital hold   |                       |
| 10) Analog output        | : Approx. 1.0 V (per sensor input 1.0 mV/V)  |                       |
- Note) F.S in this specification is about  $\pm 32768$  (16 bit).

### Common Section

- |   |   |
|---|---|
| 1) Display/Operation  | : 3.5 inch STN color LCD model (320×240 dot)  |
| Operation   | : Touch panel   |
| Load display range  | : 0 to $\pm 9999$   |
| Decimal point   | : Selectable display position   |
| Display timing  | : 3 times/sec.  |
| Time axis setting   | : 0.1 to 99.1 sec.  |
| 2) Indication items   | : Digital load value, Waveform, Setting, Distortion, etc.   |
| 3) Setting items  |   |
| Comparison judgment value setting                                     |   |
| Load  | : HI/LO/HI-HI/LO-LO limit   |
| Hold function   | : Inflection point, Sample, Peak, Maximum value, Minimum value  |
| Other function settings   | : Analog/Digital filter, Digital zero, Measurement start/end conditions, Graph setting, CF card setting, Minimum scale, etc.          |
| Measurement work setting memory                                       | : Selectable 16 kinds (Comparison value judgment, Hold setting, Measurement start/end conditions)                                     |
| Clock function  | : Management and storage of data by a real-time clock   |
| 4) Judgment output signal   |   |
| Load  | : HI/LO/HI-HI/LO-LO limit, GO output, each "a" contact  |
| Point of contact  | : Rating voltage: 30 V Current: 50 mA Insulation: Photocoupler  |
| 5) Control input/output signal  | : Measurement Start/End, Sample Hold, Reset, Load Digital Zero, Work Select inputs; Measurement Completed, Judgment Completed outputs |
| Connector   | : Multi-electrode connector (FCN-365P032-AU)  |
| Rated input signal  | : Dry contact input (Contact, Transistor opening collector, etc.)   |
| Outflow current   | : Approx. 10 mA   |
| Output signal   | : Rated Voltage: 30 V Current: 50 mA  |
| Insulation  | : Photocoupler  |
| 6) CF card  | : Saving data to CF card on CSV format.   |
| Saving load data, their settings, judgment results, etc.              |   |
| from start to stop, or from automatic start level to judgment output. |   |
| Supporting CF cards with capacities of 256 MB to 16 GB.               |   |

7) Options	: Only one option can be installed (except CF card)	
RS-232C	: Signal level	RS-232C Conformity
	Electrical transmission distance	Approx. 10m
	Transfer method	Start/Stop synchronization, Full duplex
	Transfer speed	4800/9600/19200/38400/57600/115200 bps
	Bit pattern	Start bit           1 bit
		Character length   8 bits
		Stop bit            1 bit
		Parity bit          Selectable from Nothing/Odd number/Even number
		Code                ASCII
D/A converter	: D/A Zero setting (For a digital value by full scale setting)	
	Voltage output	0 to ±10 V (Load ≥ 2 kohms)
	Current output	4 to 20 mA (Load ≤ 350 ohms)
	CAL function: 0 or 10 V cal signal, and 4 or 20 mA cal signal can be output by operating the indicator, regardless of sensor input.	
8) Power supply	: 100 to 240 V ±10% 50 / 60Hz AC, Approx. 13 W	
9) Ambient Temperature/Humidity		
	Temperature	: Operation        0 to +40°C
		Storage           -20 to +60°C
	Humidity	: ≤85%RH (Non-condensing)
10) Dimension (W×H×D)	: Approx. 105 mm×108 mm×145.1 mm	
11) Weight	: Approx. 1.05 kg	
12) Accessories	: Instruction Manual (CD-ROM)	1
	Brief Instruction Manual	1
	Sensor input connector	1
	Phoenix Contact MC1.5/12-STF-5.08	
	Control input/output connector/plug (FUJITSU)	
	Connector   FCN-361J032-AU	1
	Cover       FCN-360C032-B	1
	AC power cord	1
Safety standard	Installation class I, EN61010-1 Pollution degree 2 Overvoltage category II, CE marking	
EMC	VCCI (Class A), EN61326 (Class A), EN61000-3-2, EN61000-3-3	

# 14. Dimensions



\* Recommended board thickness: 1.6 to 3.0 mm  
(Please consult us regarding other board thicknesses.)