TD-240A

OPERATION MANUAL

TEAC INSTRUMENTS CORPORATION

Rev.1.35
2005.JUL

Introduction

We appreciate your kind purchase of TD-240A Digital Indicator.

To take full advantage of high performance of TD-240A, Thoroughly read this operating manual first before use and understand the explanations contained herein for correct operating procedures.

Safety Precautions

Be sure to read for safety.

In order to have an TD-240A Digital Indicator used safely, notes I would like you to surely follow divide into ⚠ WARNING and ⚠ CAUTION, and are indicated by the following documents.Notes indicated here are the serious contents related safely.Please use after understanding the contents well.

⚠ WARNING

Misuse may cause the risk of death or serious injury to persons.

⚠ CAUTION

Misuse may cause the risk of injury to persons or damage to property.

⚠ WARNING

- Use TD-240A with correct supply voltage.
- Do not carry out the direct file of the commercial power supply to a signal input terminal.
- Carefully check wiring, etc. before applying power.
- Set the correct Excitation Voltage for the sensor. （10V is set when TD-240A is dispatched from us.）
- Do not disassemble the main body for modifications or repair.
- Be sure to ground the protective ground terminal.
- When smoke, a nasty smell, or strange sound, please shut off a power supply immediately and extract a power supply cable.
- Do not install in the following environments.
  - Place s containing corrosive gas or flammable gas.
  - Where the product may be splashed with water, oil or chemicals.

⚠ CAUTION

● Be sure to disconnect the power cable when performing the following.
- Attachment/detachment of connectors of options.
- Wiring/connection of cables to terminal blocks.
- Connection of the ground line.

● Take an interval of more than 5 seconds when repeating ON/OFF.

● For connection to the signal I/O terminal block, wire correctly after checking the signal names and terminal block numbers.
Also, turn off the power of the main body before connection/wiring to the signal I/O terminal block.

● Use shielded cables for the connection of strain gauge type sensor, displacement sensor, External input and output or options.

● Take adequate shielding measures when using at the following locations.
- Near a power line.
- Where a strong electric field or magnetic field is formed.
- Where static electricity, relay noise or the like is generated.

● Do not install in the following environments.
- Where the temperature and/or humidity exceeds the range in the specifications.
- Place s with large quantities of salt or iron powder.
- Where the main body is directly affected by vibration or shock.

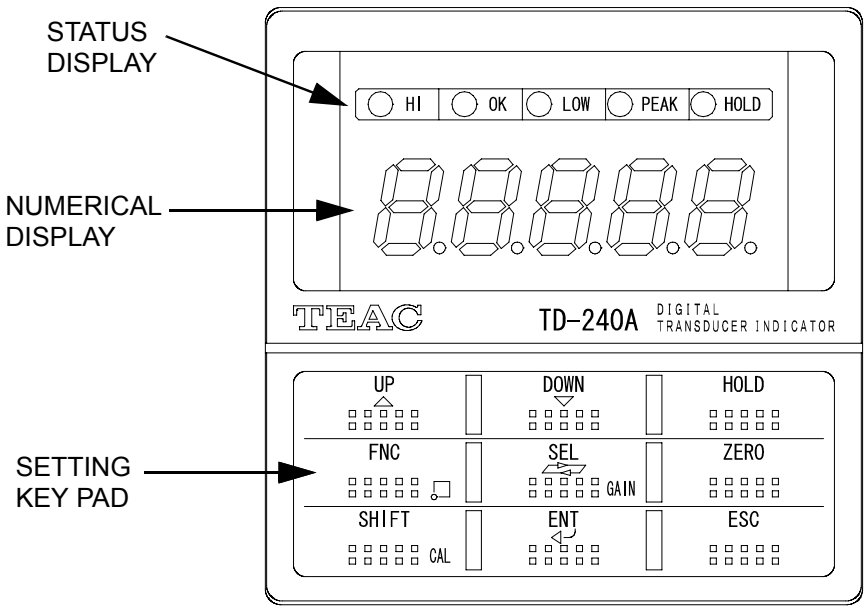
● Do not use it, broken down.

● When you send TD-240A by repair etc., please take sufficient measures against a shock.

CONTENTS

1. FUNCTIONAL DESCRIPTIONS

1-1. Front Panel



1-1-1. Status Display

The TD-240A status is indicated. Setting items are indicated when setting.

HI : This LED turns on when the indicated value is larger than the set value of the high limit（indicated value ＞ high limit）
Operation of the high limit relay is on.

OK : This LED turns on when the indicated value is smaller than the set value of the high limit and larger than the set value of the low limit
（low limit ≦ indicated value ≦ high limit）

LOW : This LED turns on when the indicated value is smaller than the set value of the low limit（indicated value ＜ low limit）
Operation of the low limit relay is on.

PEAK : This LED is blinking when the Peak Hold function is activated.

HOLD : This LED turns on when the indicated value is the held value.

1-1-2. Numerical Display

The three types of display are provided.

1） Indicated value

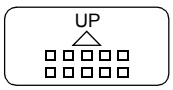
2） Set value

3） Overflow display

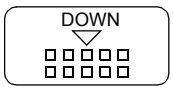
- Minus overflow of the A/D converter -LoAd （－ LOAD）
- Plus overflow of the A/D converter LoAd （LOAD）
- Indicated value overflowed （indicated value ＜－ 19999） oFL1 （OFL1）
- Indicated value overflowed （indicated value ＞ 19999） oFL2 （OFL2）

1-1-3. Setting Key Pad

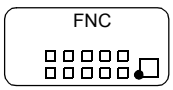
These are keys for commanding settings and operations.



Increments by one the numeric in the blinking digit of the setting item selection or set value.

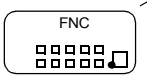


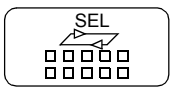
Decrements by one the numeric in the blinking digit of the setting item selection or set value.



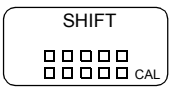
Enters the setting mode. Setting mode “F1” is indicated.
This key sets a decimal point in the span calibration.

Indicated value display → Setting mode“F1” display

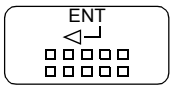




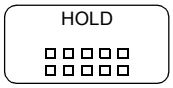
Enters the actual load calibration mode.
Select the setting mode number and the blinking digit of the setting value in setting.

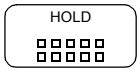


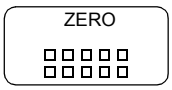
Enters the equivalent input calibration mode.
Inputs the minus sign in setting.



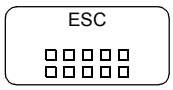
Validates setting items and set values.



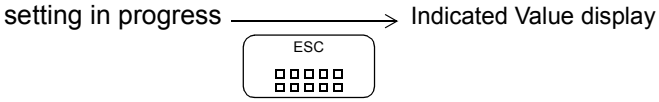
Starts the Hold function. To cancel the Hold function, press  key again.



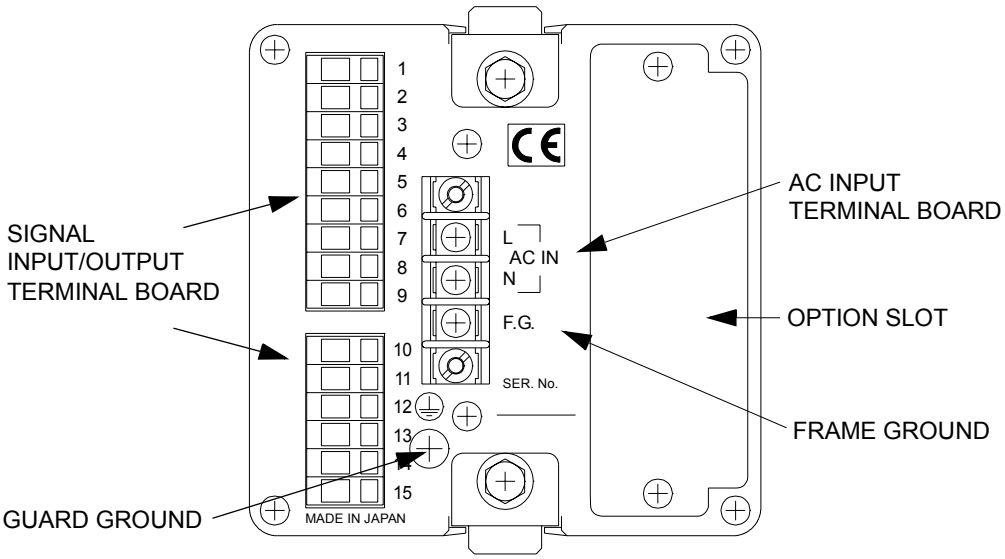
Forcibly resets the indicated value to zero （digital zero function）. When the calibration LOCK is turned off, the digital zero function is not activated using this key.External DZ input is also disabled.



Cancels setting and returns to the indicated value display.



1-2. Rear Panel



1-2-1. GUARD GROUND

This is a guard ground terminal block. Be sure to ground the guard ground terminal to prevent electric shocks and failures due to static electricity.（The frame and the guard ground terminal are conducted.）

1-2-2. Frame Ground (Functional ground)

This is a F.G terminal of AC input.（The frame and the F.G terminal are conducted.）

1-2-3. Options Slot

One option board can in stall in the option slot.

・TD-2403　BCD Parallel data output

・TD-2404　RS-232C Interface

・TD-2407　D/A Converter

1-2-4. AC Power Input Terminal Board

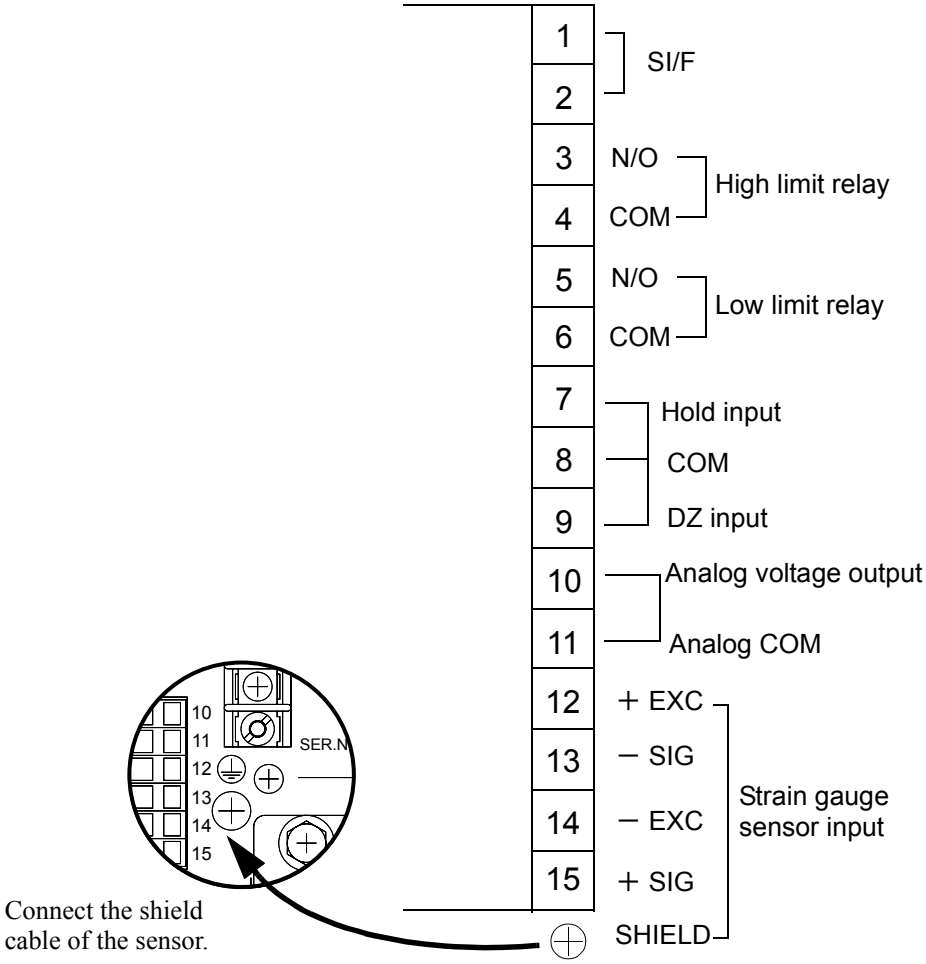
Connect AC power code. The input voltage is 100V-240V AC.

The frequency is 50/60Hz.

1-2-5. Signal Input/Output Terminal Board

This terminal board is used for input/output of control signals, SI/F data output, and input of strain gauge sensor signals.

・Terminal board Assignment



1・2 ： Two-wire serial interface （SI/F）for connecting printers and external display from TEAC.
This interface has no polarity and can connect up to three external devices.
Use parallel two-core cables or captire cables.

3 ～ 6： Output terminals of the high/low limit relays.
3・・・High limit relay （N/O）
4・・・High limit COM
5・・・Low limit relay （N/O）
6・・・Low limit COM
Rating is 250V AC and 0.5A.

７・８ : Terminals for inputting hold signals

7・・・Hold input

8・・・ COM

８・９ : Terminals for inputting digital zero signals. Available in LOCK ON only.

9・・・DZ input

8・・・ COM

10・11 : Terminal for output of a voltage proportional to the sensor input.

Output voltage is approx. 2V per 1mV/V(sensor input).

10・・・Voltage output （0 to Approx. ± 6V）

11・・・ COM

12 ～ 15 : Terminal for connecting a strain gauge sensor

12・・・＋ EXC

13・・・ － SIG

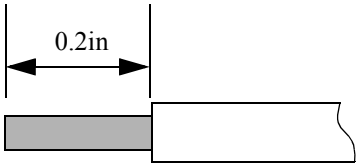
14・・・－ EXC

15・・・ ＋ SIG

2. CONNECTION

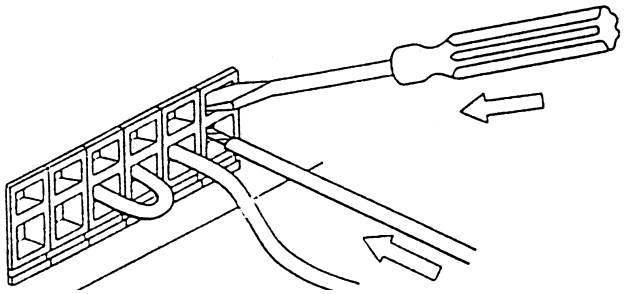
2-1. Connecting to Cage Clamp Terminal Block

1.Strip the casing 0.2in (6mm) on the cable to be connected.



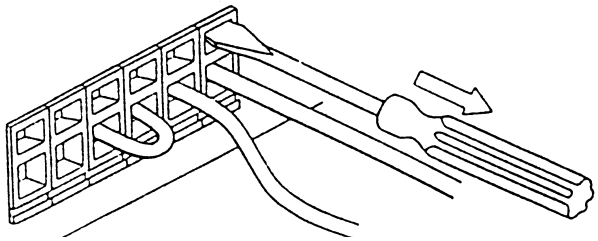
2.Twist the bare wire to fit the terminal hole.

3.Insert the supplied screwdriver into the upper hole and lift upward.



4.Insert the twisted wires into the lower hole.

5.Make sure cable is clamped securely and does not come out with a slight tug.

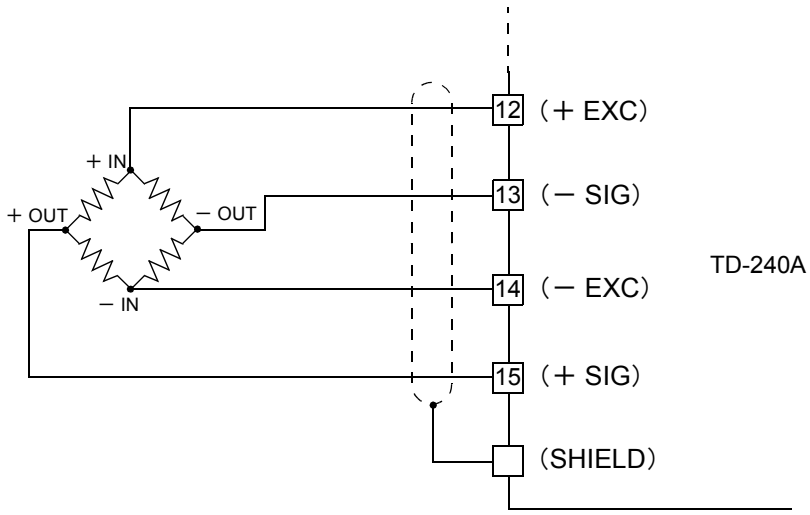


Request

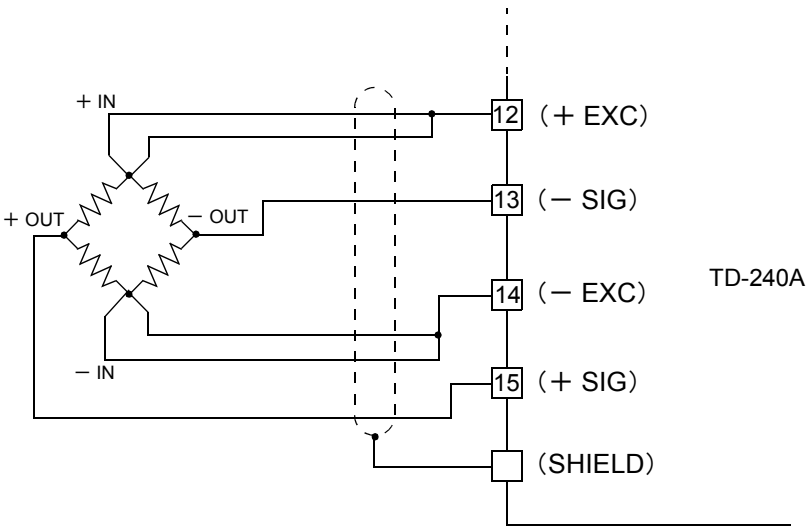
- Cable can be from 24 to 14AWG (0.2 to 2.5mm^2)
- It is not necessary to solder the cable wires or to fix a solderless terminal.
- If several cables to be inserted to the same hole,twist those cable wires together and insert.

2-2. Connecting Strain Gauge Sensor

・4-wire sensor

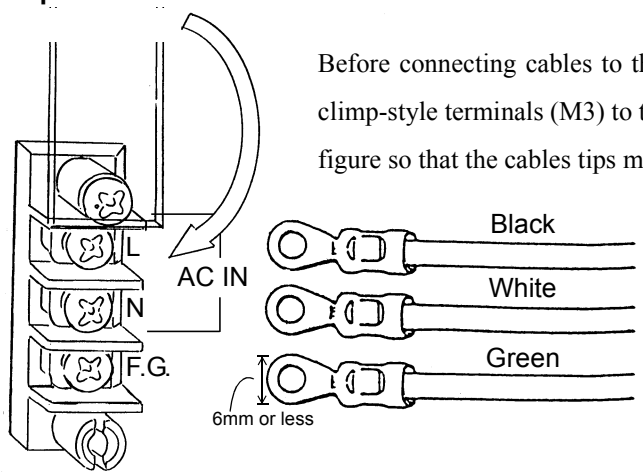


・6-wire sensor



2-3. Connecting Power Input Terminal

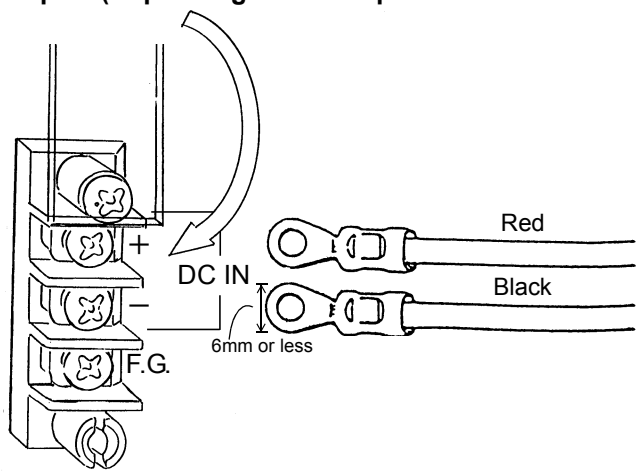
AC spec.



Before connecting cables to the terminal block, put on climp-style terminals (M3) to the cables as shown in the figure so that the cables tips might not straggle.

Connect AC power code. The input voltage is 100V-240V AC.
The frequency is 50/60Hz.

DC spec. (Depending on the request at the time of order)



Connect the positive (+) side of the power source to the red screw side of the terminal block on the back of the TD-240A, and its negative (-) side to the black screw side.The input voltage is 12V-24V DC.

⚠ CAUTION

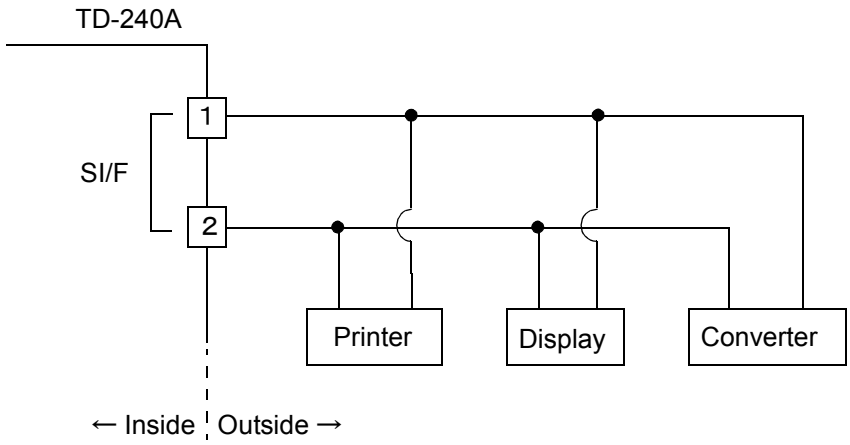
Be aware that the voltage drops depending on the wire thickness and length.
Also, never input an AC power source. Doing so will cause a failure.

2-4. Connecting SI/F

Two-wire serial interface （SI/F）for connecting printers and external display from TEAC.

This interface has no polarity and can connect up to three external devices.

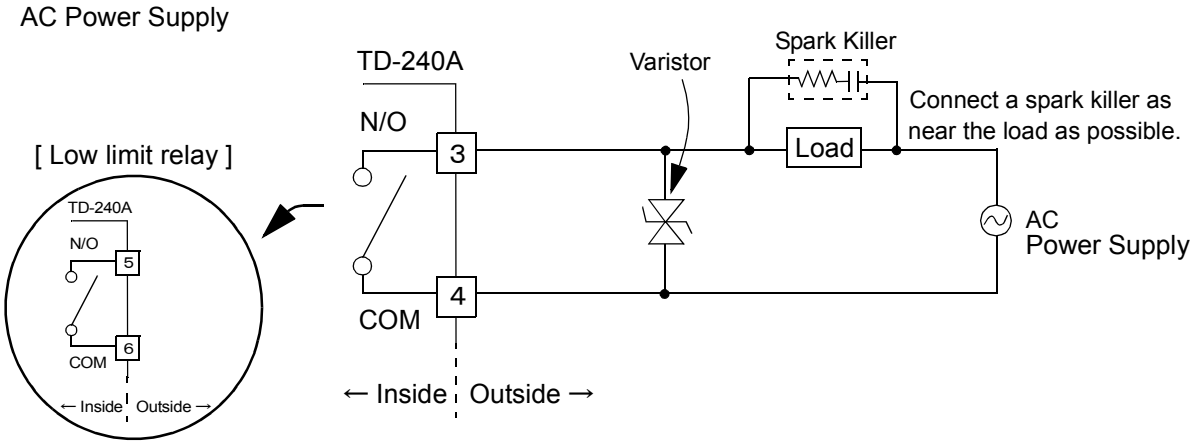
Use parallel two-core cables or captire cables.

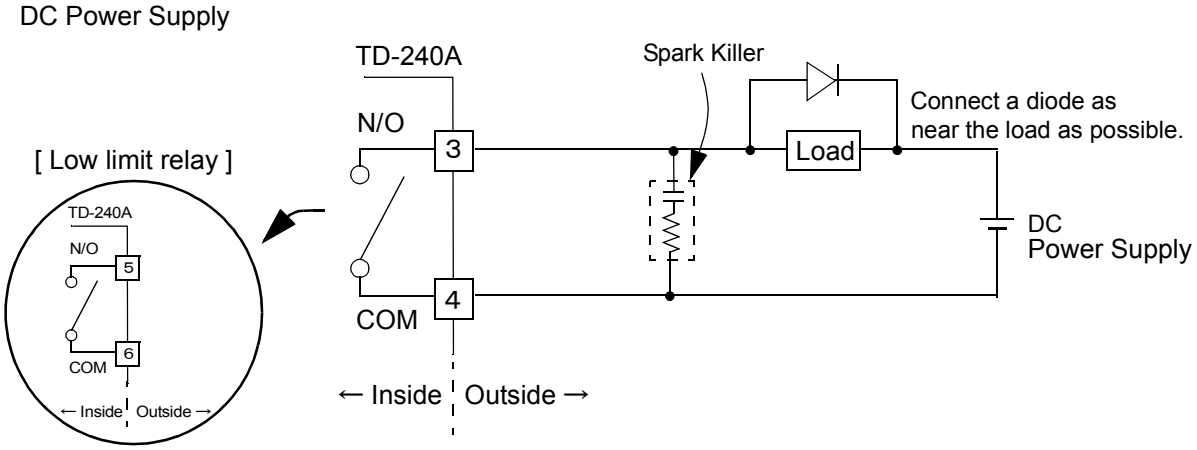


2-5. Connecting High / Low Limit Relays

・Connecting External Load

[High limit relay]





⚠ CAUTION

Overvoltage and overcurrent may cause breakdown of the relay as well as shortening its life.

It is recommended to connect a spark killer etc. to the connected load according to AC/DC (refer to the connection examples). With a noise killer, you can make the life of the relay longer as well as making it resistible against noise.

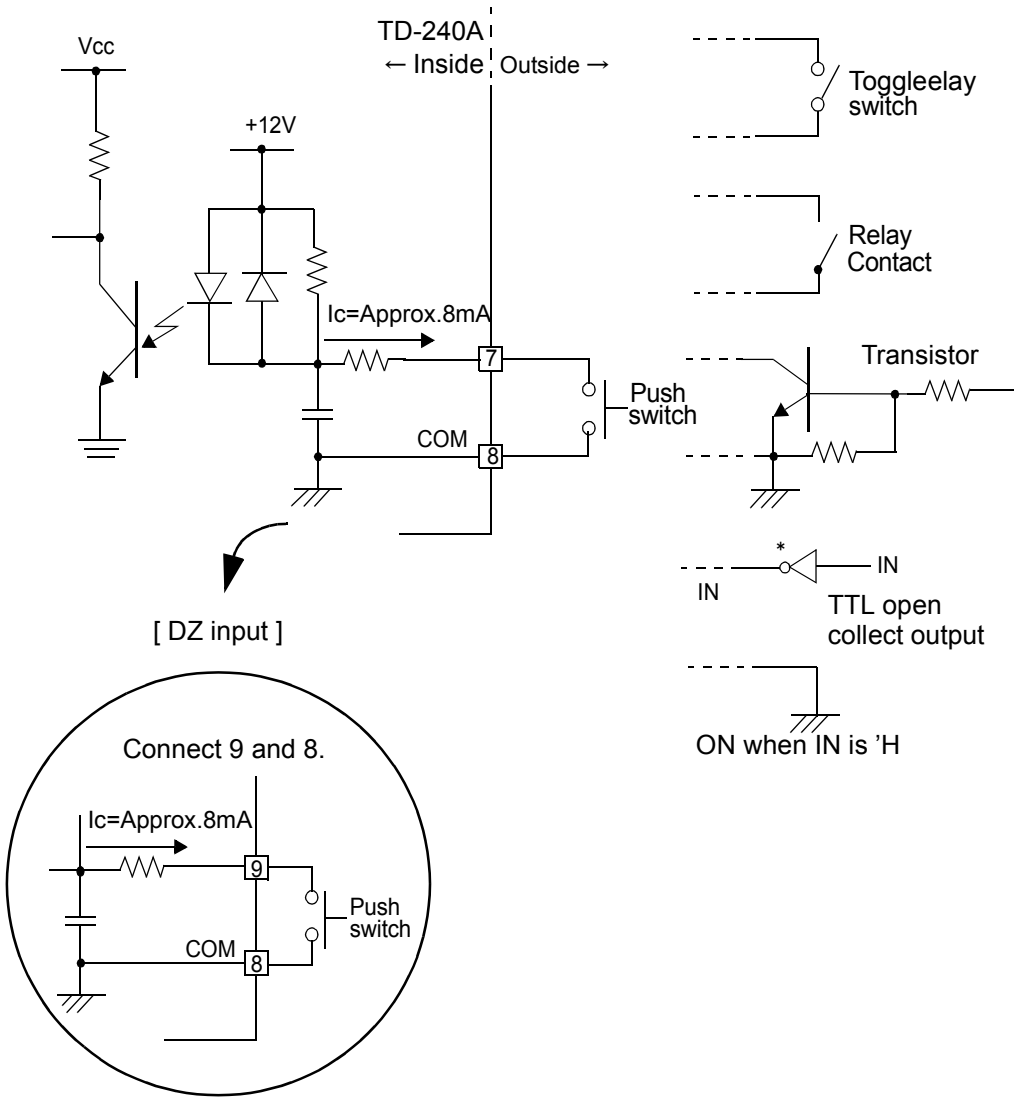
Never short-circuit the load.

Should you do it, the equipment will break down.

2-6. Connecting Hold and Digital Zero Signals

・Equivalent circuit （input）

[Hold input]



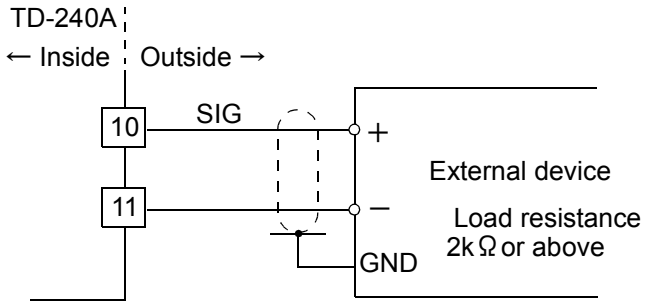
⚠ CAUTION

- Avoid applying external voltages to the signal
- Use external elements which withstands Ic=10mA
- Leakage current from external element must be 30 μA or below.

2-7. Connecting Voltage Output (VOL OUT)

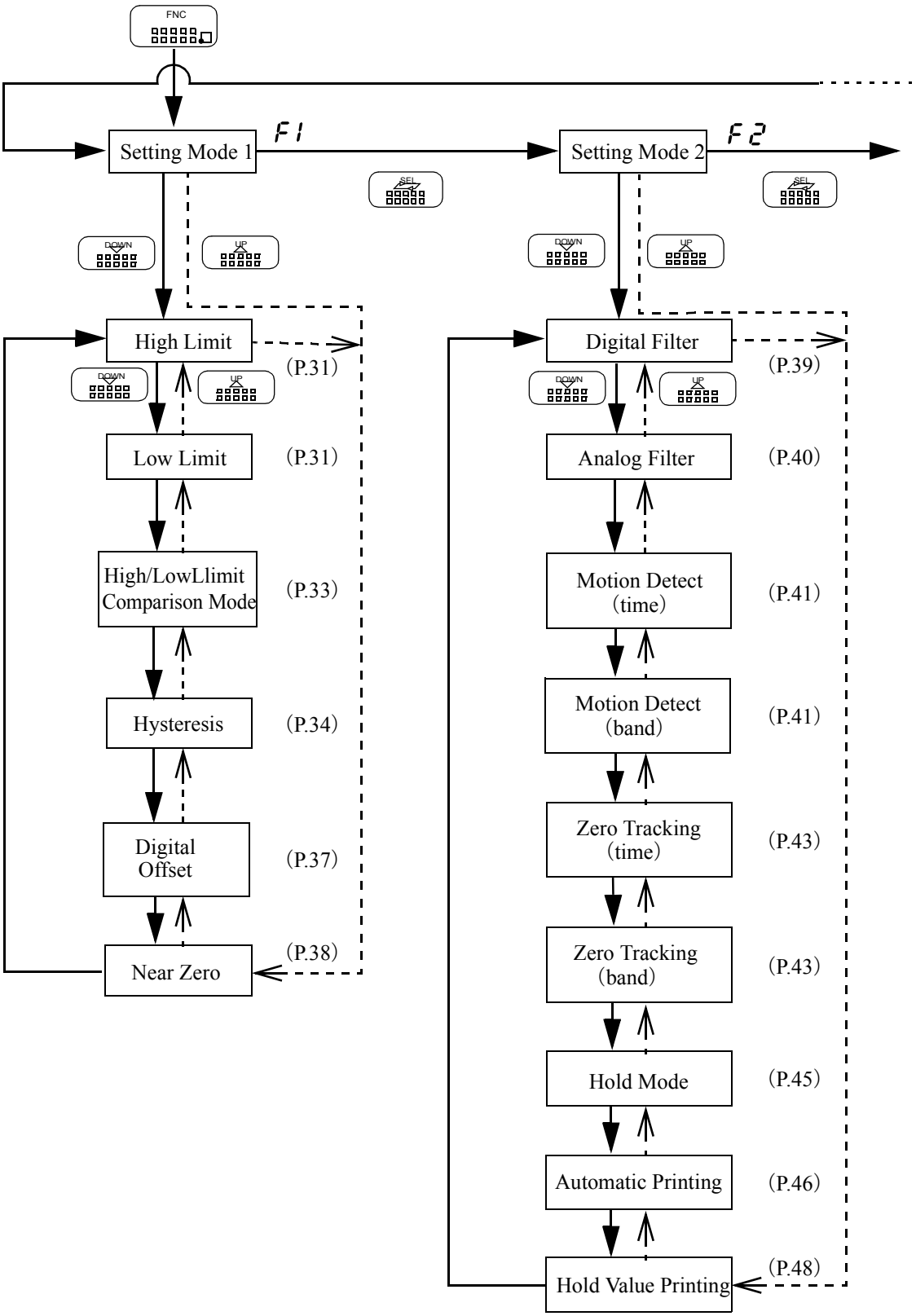
Terminal for out put of a voltage proportional to the sensor input .

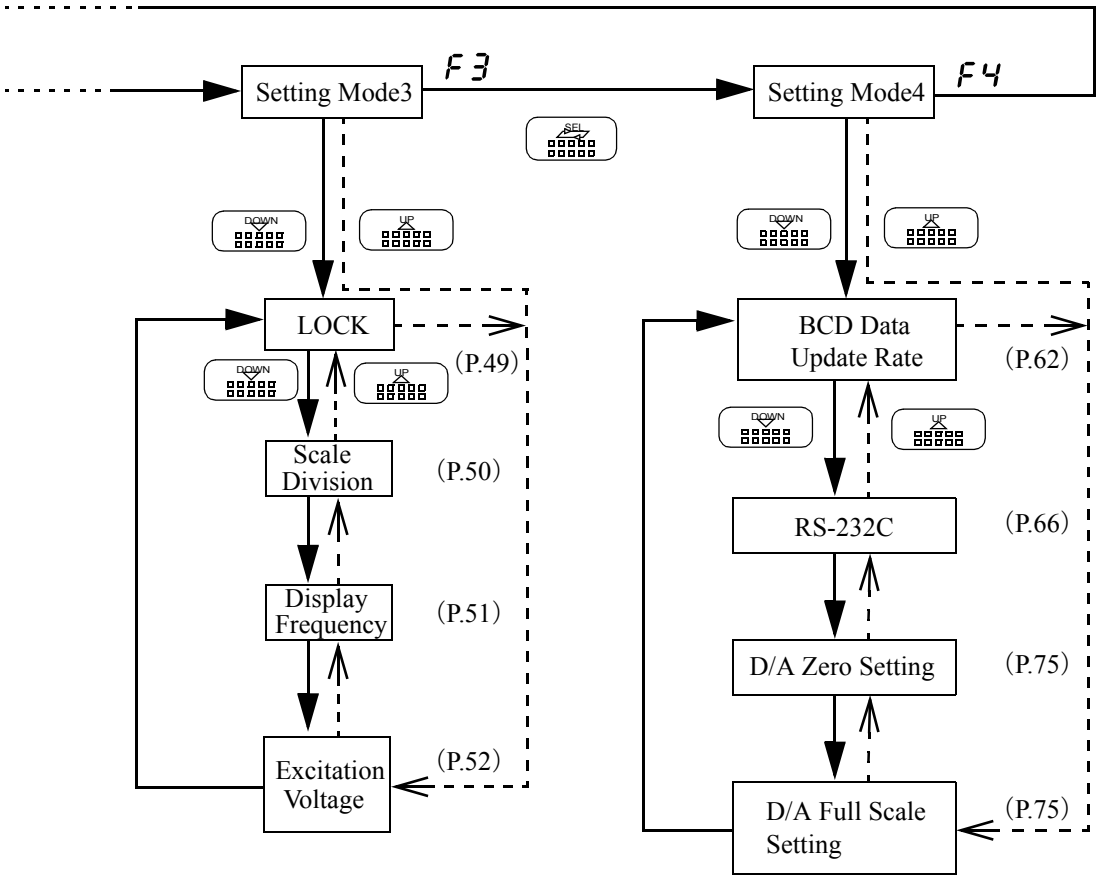
Output voltage is approx. 2V per 1mV/V(sensor input).



3. SETTING MODE CONFIGURATION

3-1. Selection of Setting Items

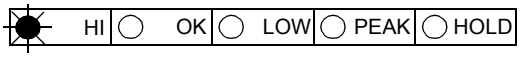



F3
Setting Mode3
SEL
F4
Setting Mode4
DOWN
UP
LOCK
(P.49)
Scale Division
(P.50)
Display Frequency
(P.51)
Excitation Voltage
(P.52)
BCD Data Update Rate
(P.62)
RS-232C
(P.66)
D/A Zero Setting
(P.75)
D/A Full Scale Setting
(P.75)

3-2. Display of Setting Items

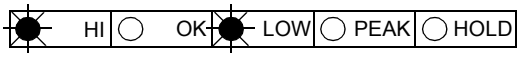
· Mode1

(1) High Limit

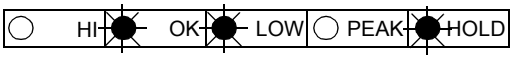


(2) Low Limit

(3) High/Low Limit Comparison Mode

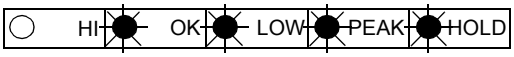


(4) Hysteresis



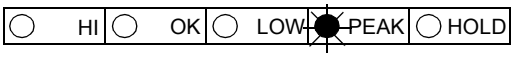
(5) Digital Offset

(6) Near Zero

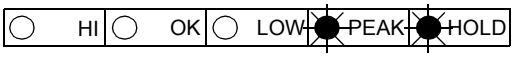


· Mode2

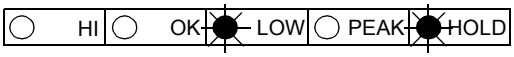
(1) Digital Filter



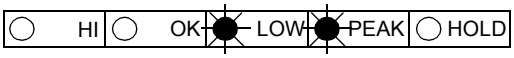
(2) Analog Filter



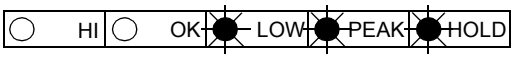
(3) Motion Detect（time）



(4) Motion Detect（band）

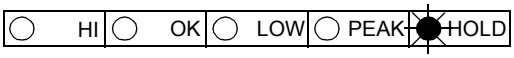


(5) Zero Tracking （time）

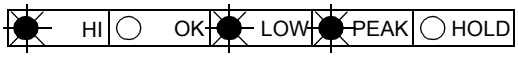


(6) Zero Tracking（band）

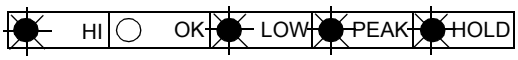
(7) Hold Mode



(8) Automatic Printing

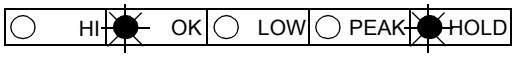


(9) Hold value Printing

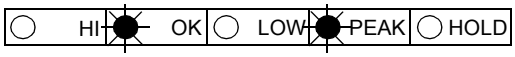


· Mode3

(1) LOCK

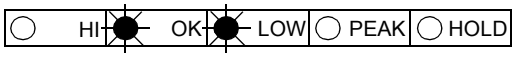


(2) Scale Division



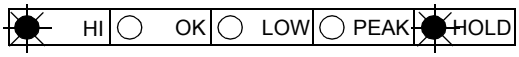
(3) Display Frequency

(4) Excitation Voltage

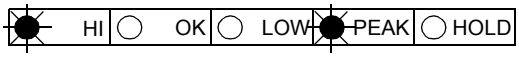


· Mode4

(1) BCD Data Update Rate

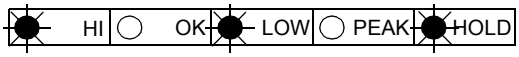


(2) RS-232C



(3) D/A Zero Setting

(4) D/A Full Scale Setting



3-3. List of Values

Setting Mode1

	Item	Default	Set Value LOCK	Calibration LOCK
1	High Limit	075.00	○	
2	Low Limit	025.00	○	
3	High/Low Limit Comparison Mode	0	○	
4	Hysteresis	00.00	○	
5	Digital Offset	000.00	○	
6	Near Zero	001.00	○	

Setting Mode2

	Item	Default	Set Value LOCK	Calibration LOCK
1	Digital Filter	0	○	
2	Analog Filter	2	○	
3	Motion Detect（time）	1.5	○	
4	Motion Detect（band）	05	○	
5	Zero Tracking（time）	0.0	○	
6	Zero Tracking（band）	00	○	
7	Hold Mode	0	○	
8	Automatic Printing	1	○	
9	Hold Value Printing	0	○	

Setting Mode3

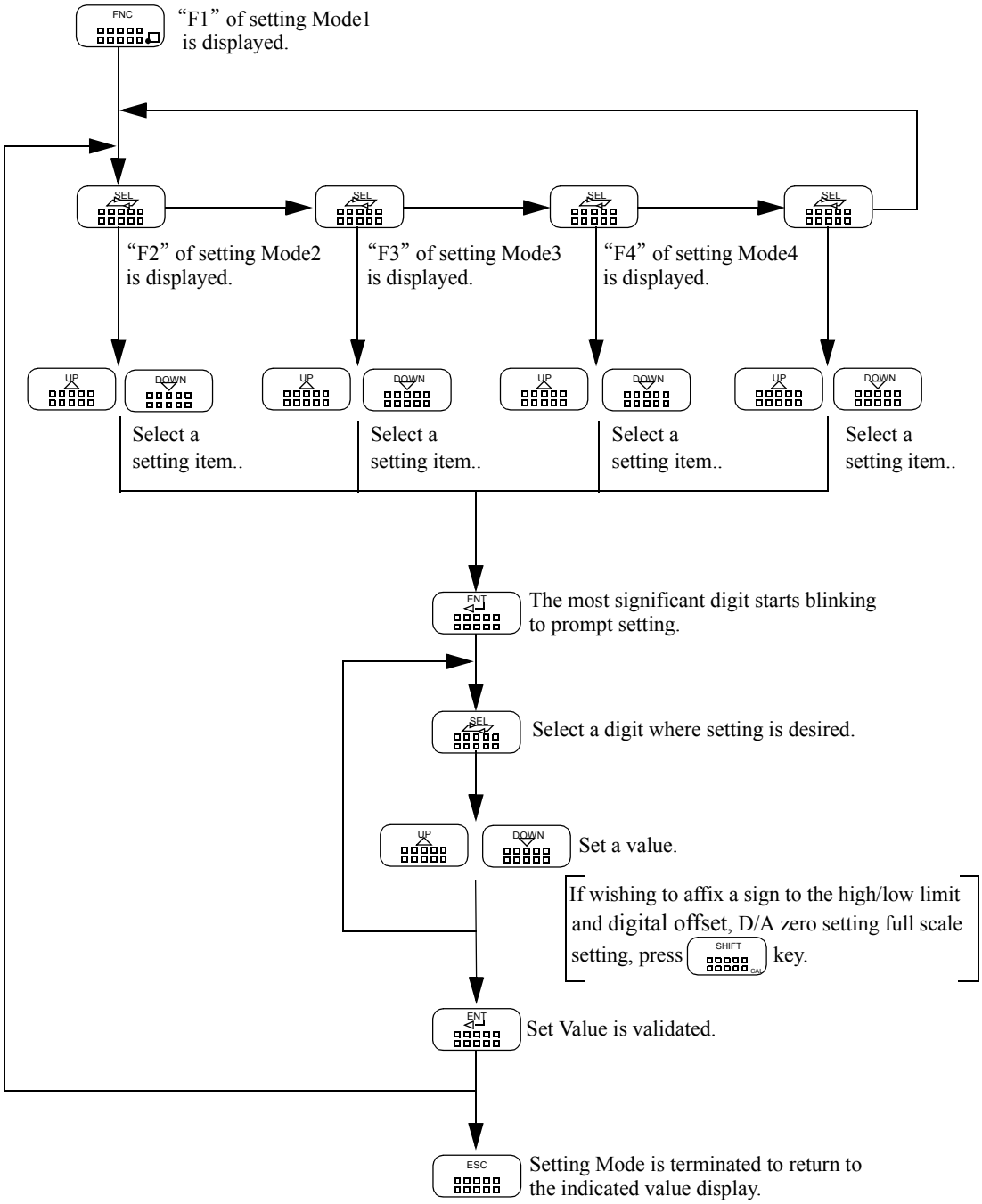
	Item	Default	Set Value LOCK	Calibration LOCK
1	LOCK	0000		
2	Scale Division	0.01		○
3	Display Frequency	3		○
4	Excitation Voltage	1		○

Setting Mode4

	Item	Default	Set Value LOCK	Calibration LOCK
1	BCD Data Update Rate	0	○	
2	RS-232C	13010	○	
3	D/A Zero Setting	000.00	○	
4	D/A Full Scale Setting	100.00	○	

※ default：factory-set value

3-4. Setting Procedure



If one minute has elapsed after FNC key is pressed without any key hit before ENT key is pressed,the setting is canceled and the indicated value is displayed again. The set value is not stored in this case.

4. CALIBRATION

"Calibration" refers to an operation whereby matching between the TD-240A and a strain gauge sensor is obtained. The TD-240A uses the two calibration methods as described below.

◇ Equivalent Input Calibration

This approach uses no actual loads but key entry of the rated output value of the strain gauge sensor (mV/V) and the rating value (value to be displayed).

This method is simple and employed when actual loads cannot be applied.

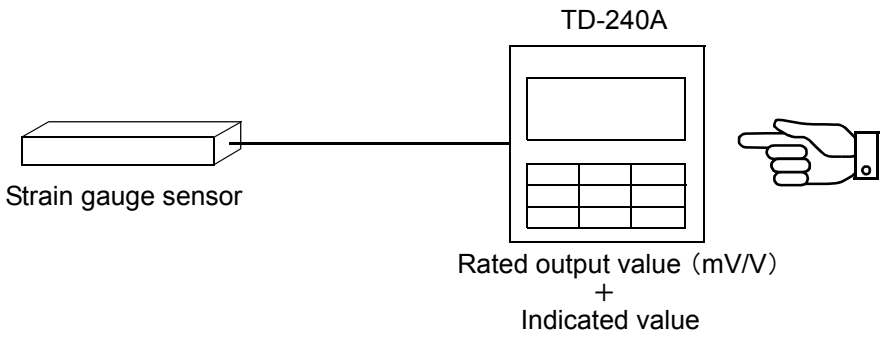
For example

Gain will be automatically decided by registering the values indicated as follows:

for load: 2.001mV/V - 100.0kgf

for pressure: 2.002mV/V - 10.00kgf/cm2, and

for torque: 2.502mV/V - 15.00kgf•m.



A data sheet will be attached to a strain gauge sensor you buy.

On the data seat, the following values are listed.

Capacity ..... Load (unit: Kg, t, etc.)

Rated Output..... Voltage (unit: mV/V)

Non-Linearity, Hysterisis,

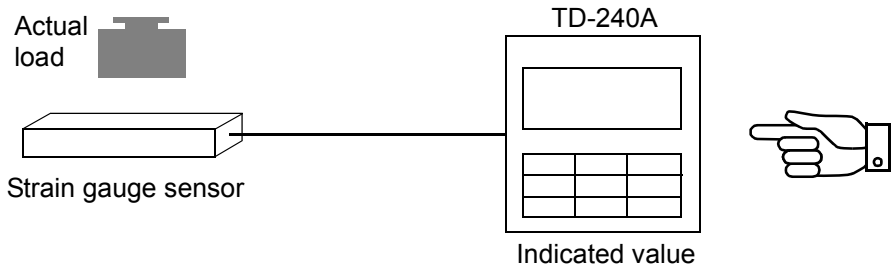
Input Resistance, Output Resistance,

Zero Balance, etc.

The Capacity and the Rated Output are necessary values for the equivalent input calibration. Input these two values to TD-240A.

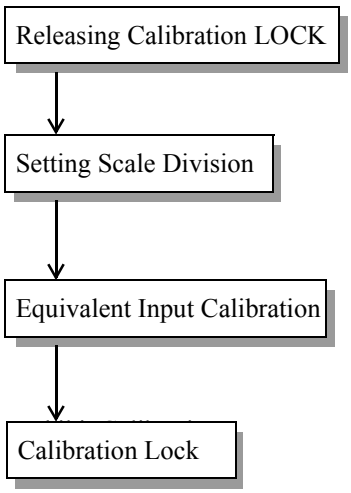
◇ Actual Load Calibration

This approach provides calibration by applying an actual load to the strain gauge sensor and inputting the actual load value. This calibration is without little errors and more correct.



4-1. Equivalent Input Calibration Procedure

The equivalent input calibration uses the following procedure :



Release the Calibration LOCK that inhibits calibration.

Set the minimum value of the digital change desired (omissible if no desired value is present)

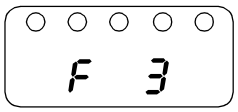
Set the rated output vale and zero point of the strain gauge sensor.

Set the calibration of ON to prevent misoperation.

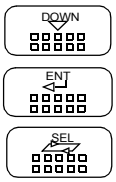
・Releasing Calibration LOCK

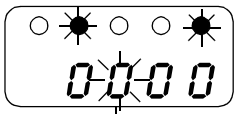
Releasing Calibration LOCK

1)Select setting mode 3.

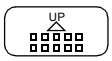


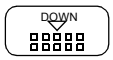
2)Select calibration lock.

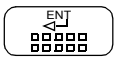




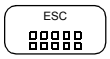
Calibration LOCK
1 : ON
0 : OFF

Use 

and 

key to set the calibration lock of OFF（0）. then use 

key to validate the setting.

To return to the indicated value display, press 

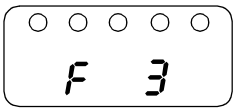
key.

・Setting of Scale Division （Omissible if no change is needed）

Setting of Scale Division

1) Select setting mode 3.

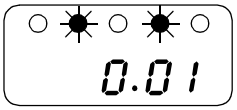
FNC → SEL → SEL

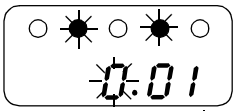


2) Set the scale division.

DOWN Press twice.

ENT





Scale Division（001 to 100）

Use UP DOWN and SEL keys to set the scale division,

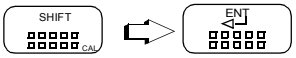
then use ENT key to validate the setting.

To return to the indicated value display, press ESC key.

・Equivalent Input Calibration

Equivalent Input Calibration

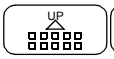
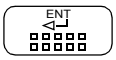
1) Start the equivalent input calibration.

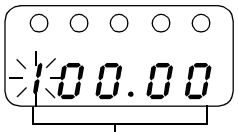


Example of a sensor having the output value of 2.010mV/V for rated 100.00kgf(N)

Rated Output Value(0.500 to 3.000mV/V)

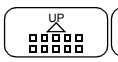
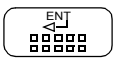
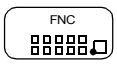
2) Set the rated output value of the sensor.

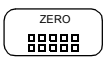
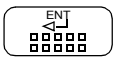
Use  and  keys to set the rated output value, then use  key to validata the setting.

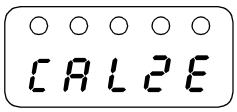


Rated Value(00000 to 19999)

3) Set the rated value.

Use  and  keys to set the rated value, then use  key to validate the setting. Press  key at a blinking digit to place a decimal point immediately after the digit.

4) Place the sensor without load and set the zero point. Check that the sensor is unloaded,then press  and  keys in this order.



If the indicated value following the display CAL2E is zero, the equivalent input calibration is terminated.

If a calibration error display appears, take a proper action according to the error, then perform calibration again.

cErrS …Span set value is "00000". Set a correct span value.

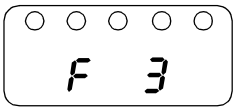
On completion of calibration, turn on the calibration LOCK.

· Calibration LOCK

CalibrationLOCK

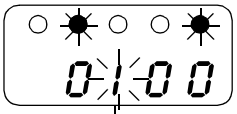
1) Select setting mode 3.

FNC → SEL → SEL



2) Select calibration lock.

DOWN → ENT → SEL



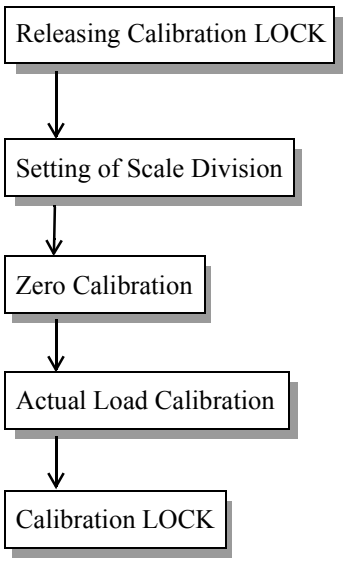
Calibration LOCK
1 : ON
0 : OFF

3) Use UP and DOWN key to set the calibration lock of ON (1). then use ENT key to validate the setting.

To return to the indicated value display, press ESC key.

4-2. Actual Load Calibration

The actual load calibration uses the following procedure



Release the calibration LOCK that inhibits calibration.

Set the minimum value of the digital change desired.
（omissible if no desired value is present）.

Set the zero point of the strain gauge sensor.

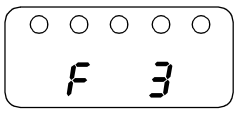
Set the span(gain) point of the strain gage sensor.

Set the calibration of ON to prevent misoperation.

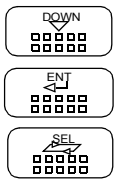
· Releasing Calibration LOCK

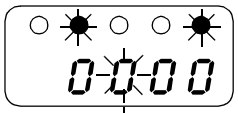
Releasing Calibration LOCK

1) Select setting mode 3.



2) Select calibration lock.





Calibration LOCK
1:ON
0:OFF

Use UP and DOWN key to set the calibration lock of OFF (0). then use ENT key to validate the setting.

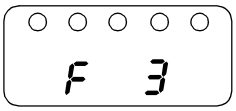
To return to the indicated value display, press ESC key.

・Setting of Scale Division（omissible if no change is needed）

Setting of Scale Division

1) Select setting mode 3.

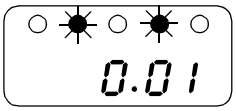
FNC ⇨ SEL ⇨ SEL

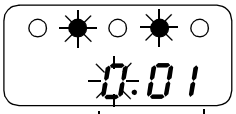


2) Set the scale division.

DOWN Press twice.

ENT





Scale Division（001to 100）

Use UP DOWN and SEL keys to set the scale division,

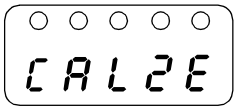
then use ENT key to validate the setting.

To return to the indicated value display, press ESC key.

・Zero Calibration

Zero Calibration

1)Check that the sensor is unloaded, then press ZERO and ENT keys in this order.

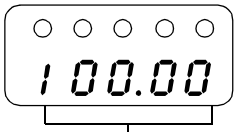


If the indicated value following the display CAL2E is zero, the zero calibration is terminated.

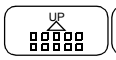
・Actual Load Calibration

Actual Load Calibration

1) Apply an actual load to the sensor and set the actual load value.

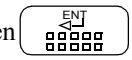


Indicated Value of（00000 to 19999）
Actual Load Value

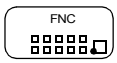
Use 

and 

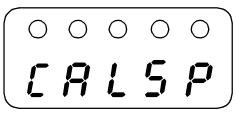
keys to set the actual load value,

then 

key to validate the setting.

To move the decimal point, press 

key at a blinking digit.



If the indicated value following the display CALSP is Actual Load, the Actual Load calibration is terminated.

If a calibration error display appears, take a proper action according to the error, then perform calibration again.

cErr5 …Span set value is "00000".
Set a correct span value.

cErr6 …Output of the strain gauge sensor does not reach the span adjustment range.
Confirm whether an actual load is put on the strain gauge sensor. Calibration may not be performed without load

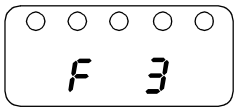
cErr7 …Output of the strain gauge sensor is on the minus side.
Check to see if the +SIG and -SIG wiring if the sensor is reversed.

On completion of calibration, turn on the calibration LOCK.

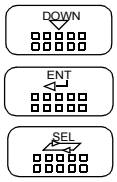
· Calibration LOCK

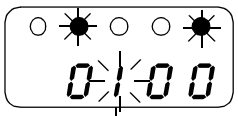
Calibration LOCK

1) Select setting mode 3.

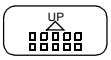


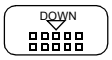
2) Select calibration lock.

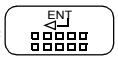




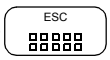
Calibration LOCK
1 : ON
0 : OFF

3） Use 

and 

key to set the calibration lock of ON （1）. then use 

key to validate the setting

To return to the indicated value display, press 

key.

5. SETTING OF FUNCTIONS

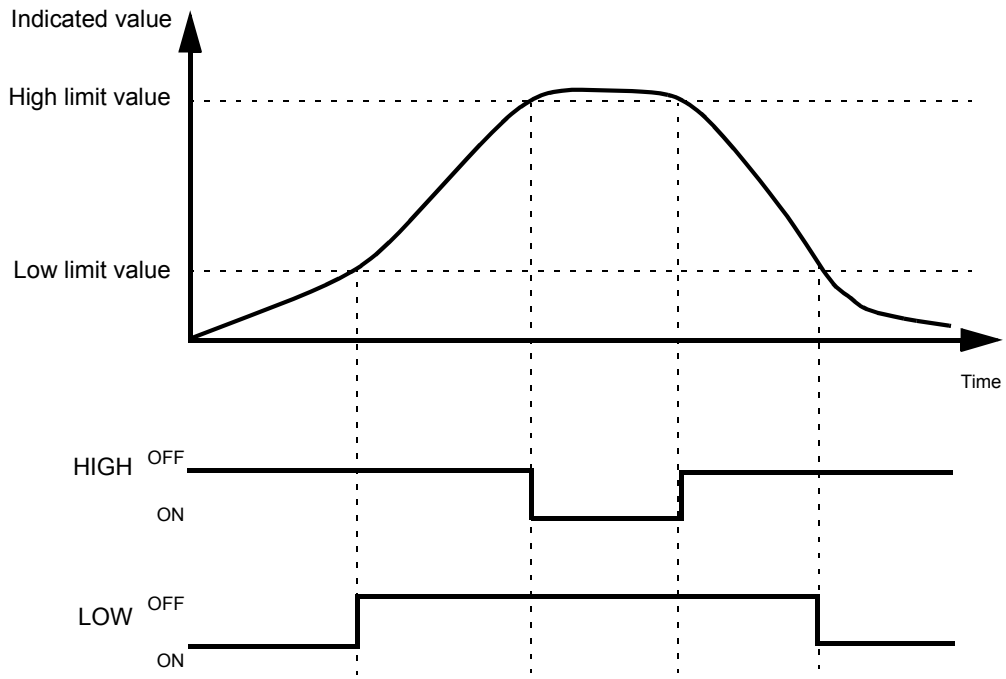
5-1. High /Low Limit Value

High / Low limit value are functions whereby the high output is turned on when the indicated value exceeds the high / low output is turned on when it drops below the low limit.

＜ HIGH/LOW output conditions ＞

HIGH : Indicated value ＞ High limit value

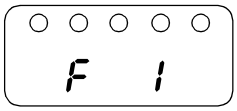
LOW : Indicated value ＜ Low limit value



Setting of High/Low Limit Value

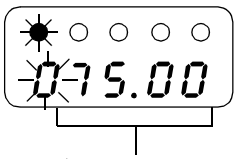
1) Select setting mode 1.

FNC



2) Select high limit value.

DOWN ENT



High Limit Value (00000 to ± 19999)

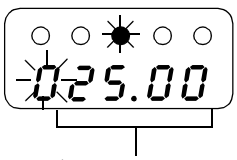
Use UP DOWN and SEL keys to set the high limit value.

Press SHIFT CAL key to place a minus sign. press ENT key to validate the setting.

3) Select low limit value.

DOWN

ENT



Low Limit Value (00000 to ± 19999)

Use UP DOWN and SEL key to set the low limit value.

Press SHIFT CAL key to place a minus sign.

Press ENT key to validate the setting

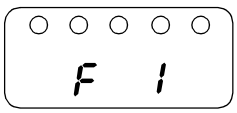
To return to the indicated value display, press ESC key.

5-2. High / Low Limit Comparator Mode

High / Low Limit Comparator Mode

1)Select setting mode 1.

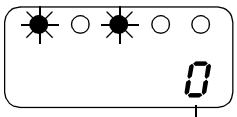
FNC



2)Select high / low limit comparator mode.

DOWN Press three times.

ENT



High / Low Limit Comparator Mode

- 3 : Comparison is made at stable status except for near zero.
- 2 : Comparison is always made except for near zero
- 1 : Comparison is made in the stabl status.
- 0 : Comparison is always made.

Use UP and DOWN keys to set the high / low Limit Comparator Mode, then use ENT key to validate the setting.

To return to the indicated value display, press ESC key.

Except for Mode 0 （Comparison is always made）of the High / Low Limit Comparator Mode, setting is closely related to Near Zero and Motion Detect functions. For details, see Near Zero on page 38 and Motion Detect on page 41 .

5-3. Hysteresis

The Hysteresis function provides a range of high/low limit comparator off. Usually the high limit comparator is turned on when the indicated value is above the high limit value and turned off when below. If you set a hysteresis range, the comparator is turned off when the indicated value is below the high limit value by the hysteresis setting. This is effective in preventing chattering caused when signals are slightly varying (vibrating).

〈Comparison conditions〉

・High limit

ON conditions : Indicated value ＞ High limit value

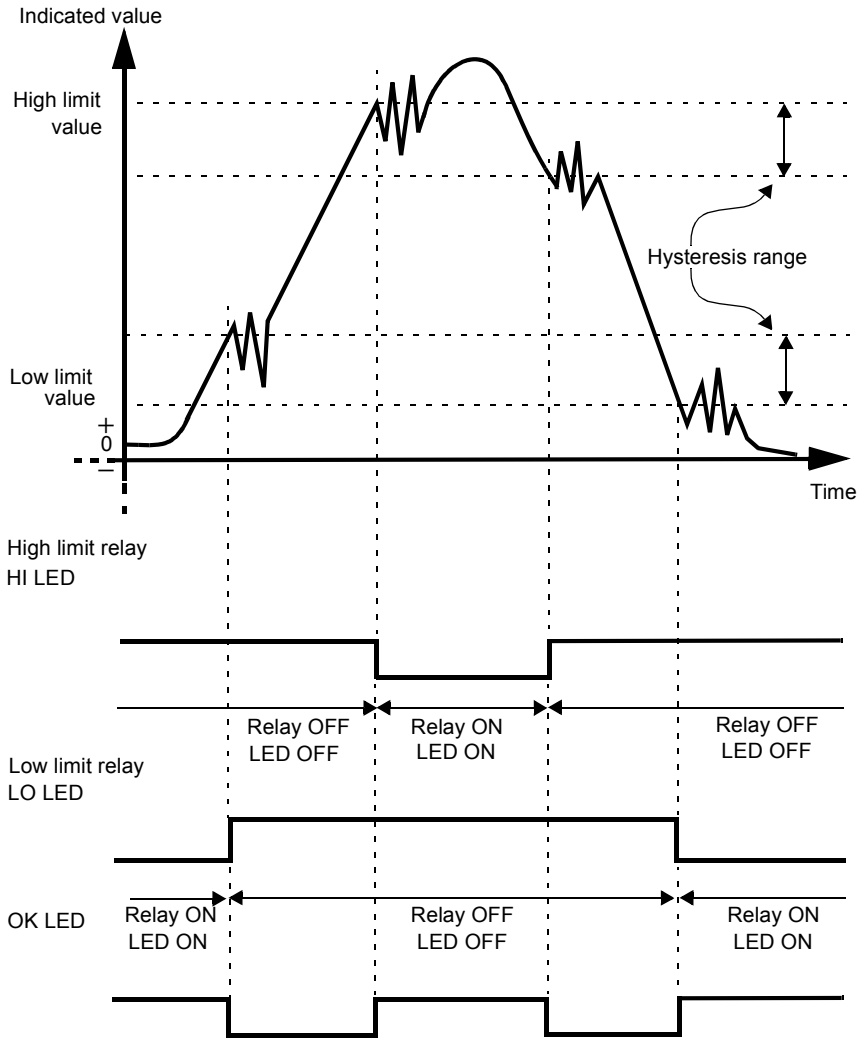
OFF conditions: Indicated value ≦ (High limit value － Hysteresis set value)

・Low limit

ON conditions : Indicated value ＜ Low limit value

OFF conditions: Indicated value ≧ (Low limit value ＋ Hysteresis set value)

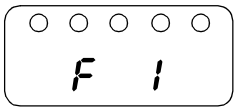
・Hysteresis operation



Setting of Hysteresis

1) Select setting mode 1.

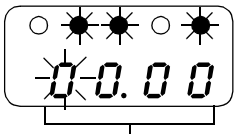
FNC



2) Select hysteresis.

DOWN Press four times.

ENT



Hysteresis（0000 to 9999）

Use UP DOWN and SEL keys to set the hysteresis range,

then use ENT key to validate the setting.

To return to the indicated value display, press ESC key.

Hysteresis setting is the same for high / low limit.

5-4. Digital Offset

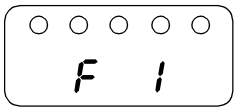
This function subtracts a set value from the indicated value. If you make digital offset, the value which is obtained by subtracting the set value from the indicated value will be displayed. This is convenient when you cannot obtain zero by unloading the equipment for some reason or when you want to give offset.

(Indicated value to be displayed) = (Actual indicated value) - (Digital offset setting value)

Setting of Digital Offset

1) Select setting mode 1.

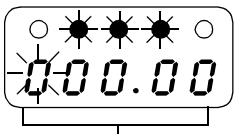
FNC



2) Select digital offset.

DOWN Press five times.

ENT



Digital Offset (00000 to ± 19999)

Input an digital offset setting value with UP DOWN and SEL keys and validate it with ENT key. Press SHIFT CAL key to put minus sign.

To return to the indicated value display, press ESC key.

5-5. Near Zero

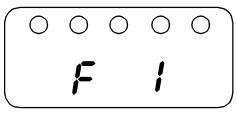
The Near Zero function detects that the indicated value is near zero.

Near Zero ON/OFF is closely related to Automatic Printing and High and Low Limit Comparator Mode.
For details, see High and Low Limit Comparator Mode on page 33 and Automatic Printing on page 46 .

Setting of Near Zero

1) Select setting mode 1.

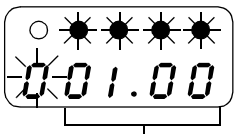
FNC



2) Select near zero.

DOWN Press six times.

ENT



Near Zero (00000 to 19999)

Use UP DOWN and SEL keys to set the near zero.

then use ENT key to validate the setting.

To return to the indicated value display, press ESC key.

The Near Zero function operates at an absolute value.

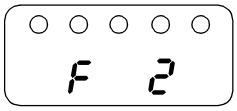
5-6. Digital Filter

The Digital Filter function obtains the moving average of Analog-to-Digital（A/D）converted data and stabilizes the indicated values. The moving average count can be selected from 4 to 64.

Setting of Digital Filter

1) Select setting mode 2.

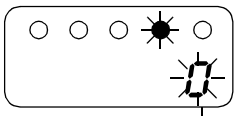
FNC → SEL



2) Select digital filter.

DOWN

ENT



Digital Filter

5 : 64 times	2 : 8 times
4 : 32 times	1 : 4 times
3 : 16 times	0 : OFF

Use UP and DOWN keys to set the digtal filter,

then use ENT key to validate the setting.

To return to the indicated value display, press ESC key.

5-7. Analog Filter

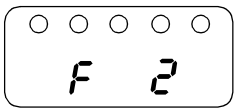
This is a lowpass filter filtering the strain gage sensors input signal and cutout the noise element.

Lowpass filter cutout freguency is selectable in the 4/10/100/3k Hz.

Setting of Analog Filter

1) Select setting mode 2.

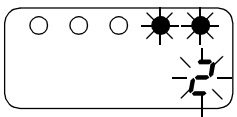
FNC → SEL



2) Select analog filter.

DOWN Press twice.

ENT



Analog Filter

- 3 : 3kHz
- 2 : 100Hz
- 1 : 10Hz
- 0 : 4Hz

Use UP and DOWN keys to set the analog filter,

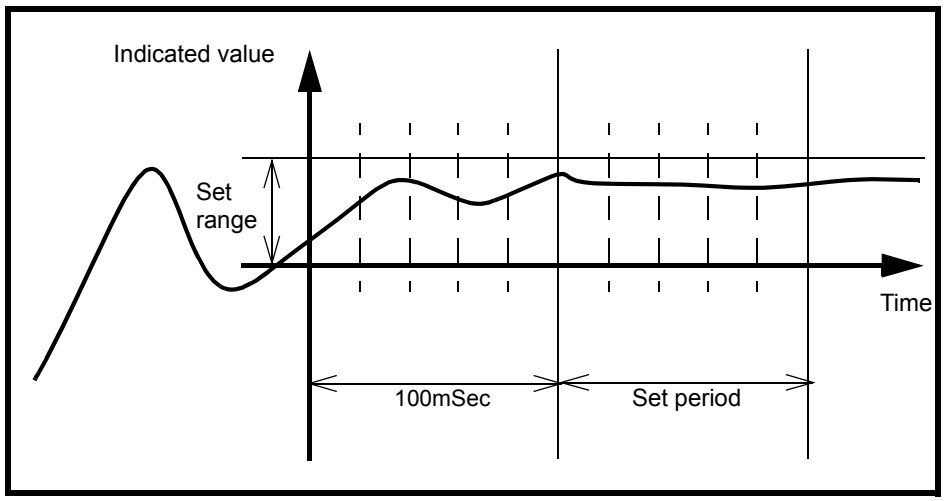
then use ENT key to validate the setting.

To return to the indicated value display, press ESC key.

5-8. Motion Detect

Setting of parameters for detecting stable measurement is required.

If the difference between the current indicated value and that of 100msec before fall within the specified range and the status last for a specified time, indicated values are assumed stable.

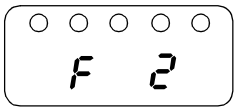


Whether the indicated value is stable or not is closely related to Automatic Printing and High and Low Limit Comparator Mode. For details, see High and Low Limit Comparator Mode on page 33 and Automatic Printing on page 46

Setting of Motion Detect

1) Select setting mode 2.

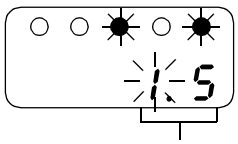
FNC → SEL



2) Select motion detect（time）.

DOWN Press three times.

ENT

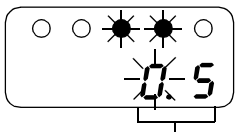


Motion Detect(time)
（0.0 to 9.9s）

Use UP DOWN and SEL keys to set the motion detect（time）

then use ENT key to validate the setting.

3) Select motion detect（range）.



Motion Detect（range）
（00 to 99division）

Use UP DOWN and SEL keys to set the motion detect（range）

then use ENT key to validate the setting.

To return to the indicated value display, press ESC key.

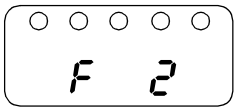
5-9. Zero Tracking

The Zero Tracking function automatically tracks and compensates a fine shift of the zero point due to a factor such as a drift.

Setting of Zero Tracking

1) Select setting mode 2.

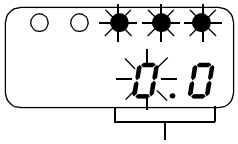
FNC → SEL



2) Select zero tracking（Time）.

DOWN Press five times.

ENT



Zero Tracking（Time）
（0.0 to 9.9S）

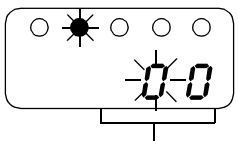
Use UP DOWN and SEL keys to set the zero tracking （time）,

then use ENT key to validate the setting.

3) Select zero tracking（range）.

DOWN

ENT



Zero Tracking（range）
（00 to 99）

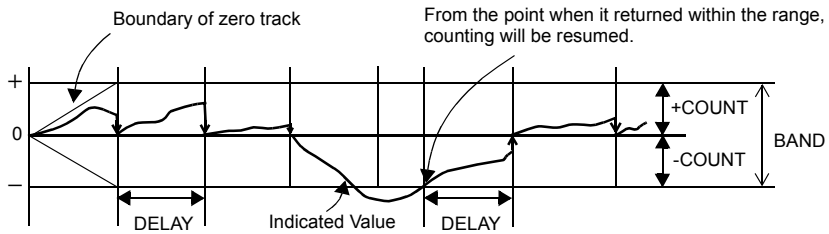
Use UP DOWN and SEL keys to set the zero tracking （range）,

then use ENT key to validate the setting.

To return to the indicated value display, press ESC key.

・The Zero Tracking function automatically resets the zero point to zero at a specified time interval when the zero point move amount is below the specified range.

・The time（tracking delay）is set in units of 0.1 seconds, from 0.1 to 9.9 seconds. The range（tracking band）is set in units of quarters of the indicated value.（The indicated value 02 corresponds to 0.5 scales and 12, 3 scales.）If the time is set to 0.0 sec. and range to 00, the Zero Tracking function does not work.



BAND=COUNT × the minimum digital scale × 2

Request

The Zero Tracking works from where the indicated value is zero. It does not work when the indicated value exceeds the tracking band. In this case,specify the zero point using the Digital Zero or Zero Calibration.

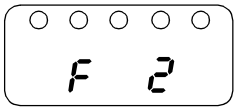
5-10. Hold Mode

The TD-240A provides the Peak Hold function to hold and display the peak value (maximum value) of the input signal, and the Sample Hold function to hold and display an optional point.

Setting of Hold Mode

1) Select setting mode 2.

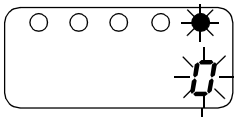
FNC → SEL



2) Select hold mode.

DOWN Press seven times.

ENT



Hold Mode

1 : Peak Hold
0 : Sample Hold

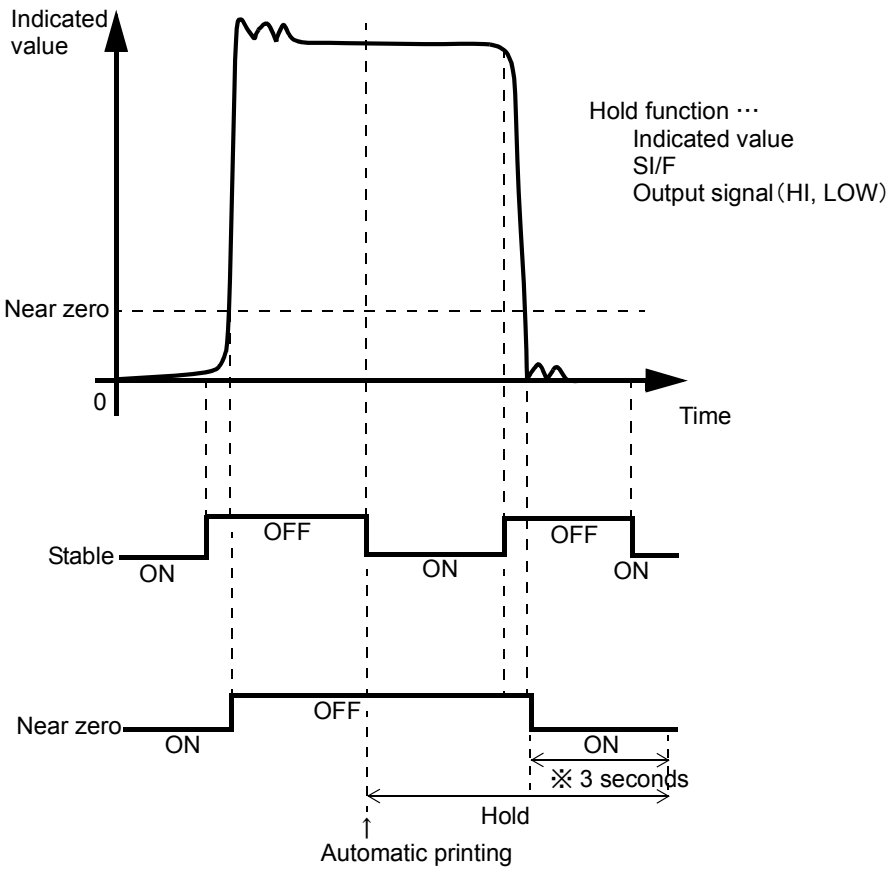
Use UP and DOWN keys to set the hold mode, then use ENT key to validate the setting.

To return to the indicated value display, press ESC key.

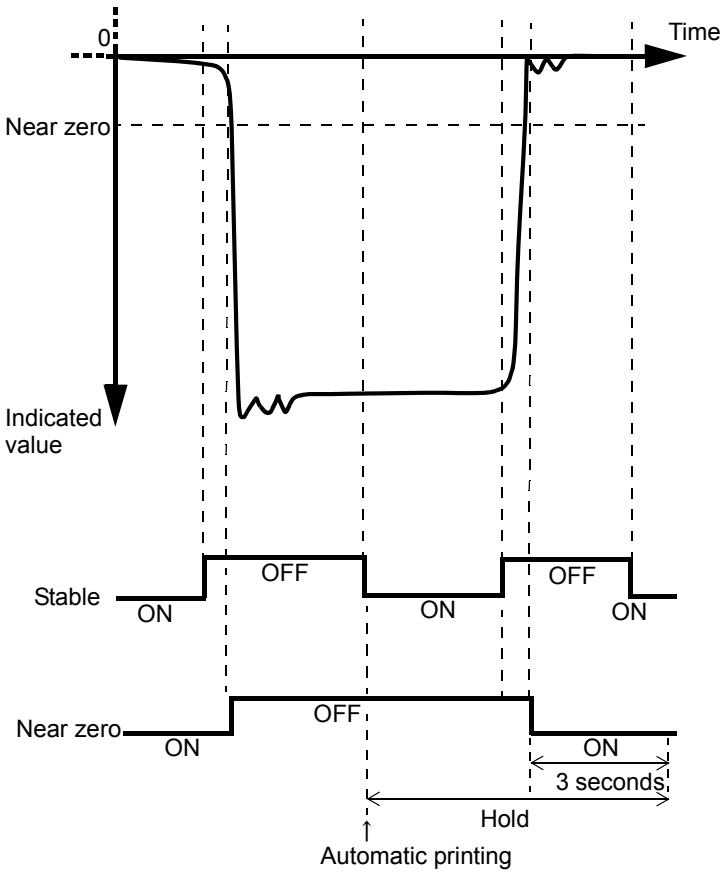
5-11. Automatic Printing

The Automatic Printing function automatically prints out indicated values on a TEAC printer connected to the TD-240A over the SI/F. Printing is made when indicates vales are stable. （Parameter for stabilization is set in the Motion Detect function.）The stabilized indicated value can be held for three seconds（indicated value hold function）.

・Operation of the indicated value hold function



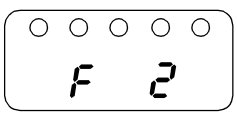
※ If the state of Near Zero ON is not keeping for three minutes, the hold values was not canceled.



Setting of Automatic Printing

1) Select setting mode 2.

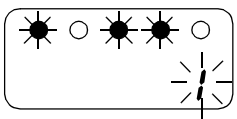
FNC → SEL



2) Select automatic printing.

DOWN Press eight times.

ENT



Automatic printing

- 2 : Automatic printing ON, Indicated value HOLD
- 1 : Automatic printing ON
- 0 : Automatic printing OFF

Use UP and DOWN keys to set the automatic printing,

then use ENT key to validate the setting.

To return to the indicated value display, press ESC key.

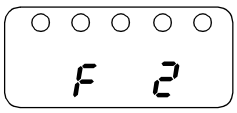
5-12. Hold Value Printing

The Hold Value Printing function automatically prints out the peak value （held value） on a TEAC printer connected to the TD-240A over the SI/F.

Setting of Hold Value Printing

1) Select setting mode 2.

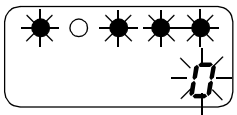
FNC ⇨ SEL



2) Select hold value printing.

DOWN Press nine times.

ENT



Hold Value Printing

1 : Hold value printed when Hold is canceled

0 : No printing

Use UP and DOWN keys to set the hold value printing.

then use ENT key to validate the setting.

To return to the indicated value display, press ESC key.

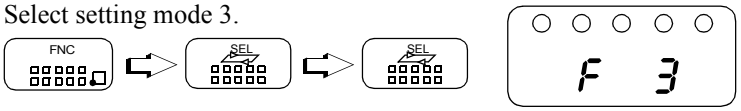
If setting Hold Value Printing when the hold value canceled, Automatic Printing did not work.

5-13. LOCK

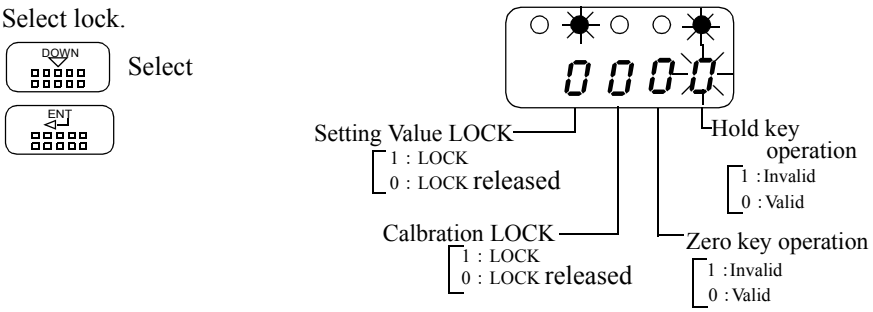
The Setting value LOCK function inhibits changes to setting to prevent changes to set values or calibrated values through misoperation.

Setting of LOCK

1) Select setting mode 3.



2) Select lock.



Use UP DOWN and SEL key to set the lock,

then use ENT key to validate the setting.

To return to the indicated value display, press ESC key.

For setting items locked by using set value LOCK and calibration value LOCK , see the set value list on page 17.

The Digital Zero function by using the ZERO key on the front panel is not effective when the Setting value LOCK （calibrated value）is released（nor is it effective from the rear panel DZ）. On completion of calibration set the calibration value LOCK.

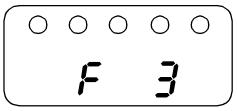
5-14. Scale Division

This function sets the minimum value of the digital change.

Setting of Scale Division

1) Select setting mode 3.

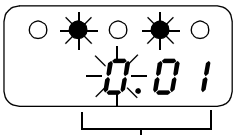
FNC → SEL → SEL



2) Select scale division.

DOWN Press twice.

ENT



Scale Division
(001 to 100)

Use UP DOWN and SEL key to set the scale division,

then use ENT key to validate the setting.

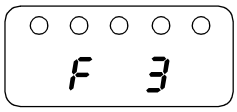
To return to the indicated value display, press ESC key.

5-15. Display Frequency

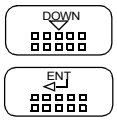
The Display frequency function is used to select the times the indicated values are displayed per second. A/D conversion count is fixed to 100 per second.

Setting of Display Count

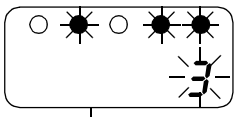
1) Select setting mode 3.



2) Select display frequency.

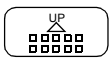


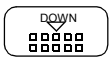
Press three times.



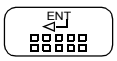
Display Frequency

- 3 : 25/sec.
- 2 : 13/sec.
- 1 : 6/sec.
- 0 : 3/sec.

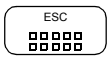
Use 

and 

keys to set the display frequency,

then use 

key to validate the setting.

To return to the indicated value display, press 

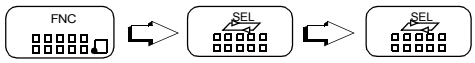
key.

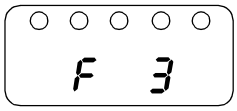
5-16. Excitation Voltage

This function selects the bridge excitation voltage to be supplied to the strain gauge sensor.

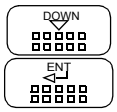
Setting Excitation Voltage

1) Select setting mode 3.

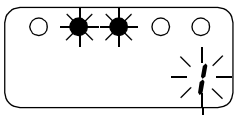




2) Select excitation voltage.

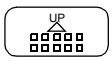


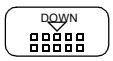
Press four times.

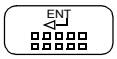


Excitation Voltage

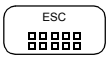
1 : 10 V
0 : 2.5V

Set excitation voltage with 

and 

keys and validate it with 

key.

To return to the indicated value display, press 

key.

⚠ CAUTION

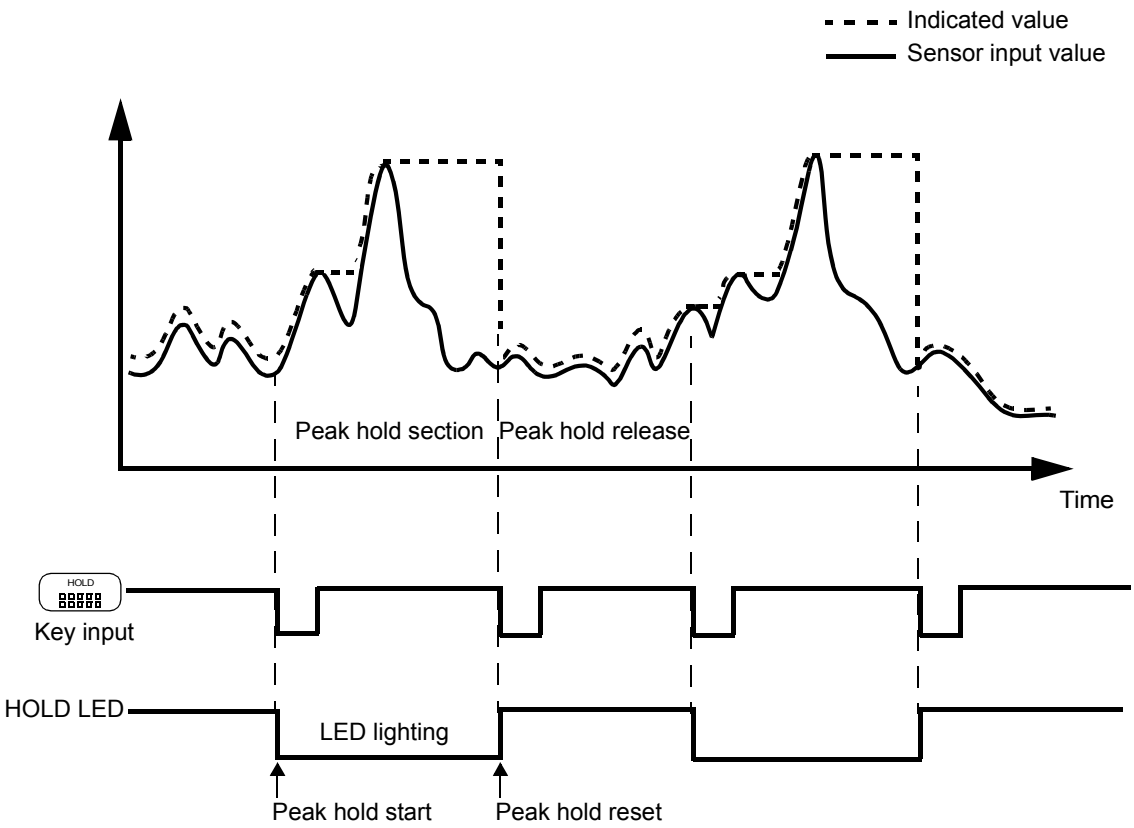
Use a strain gauge sensor to be connected to the TD-240A whose maximum excitation voltage is above the bridge excitation voltage specified.

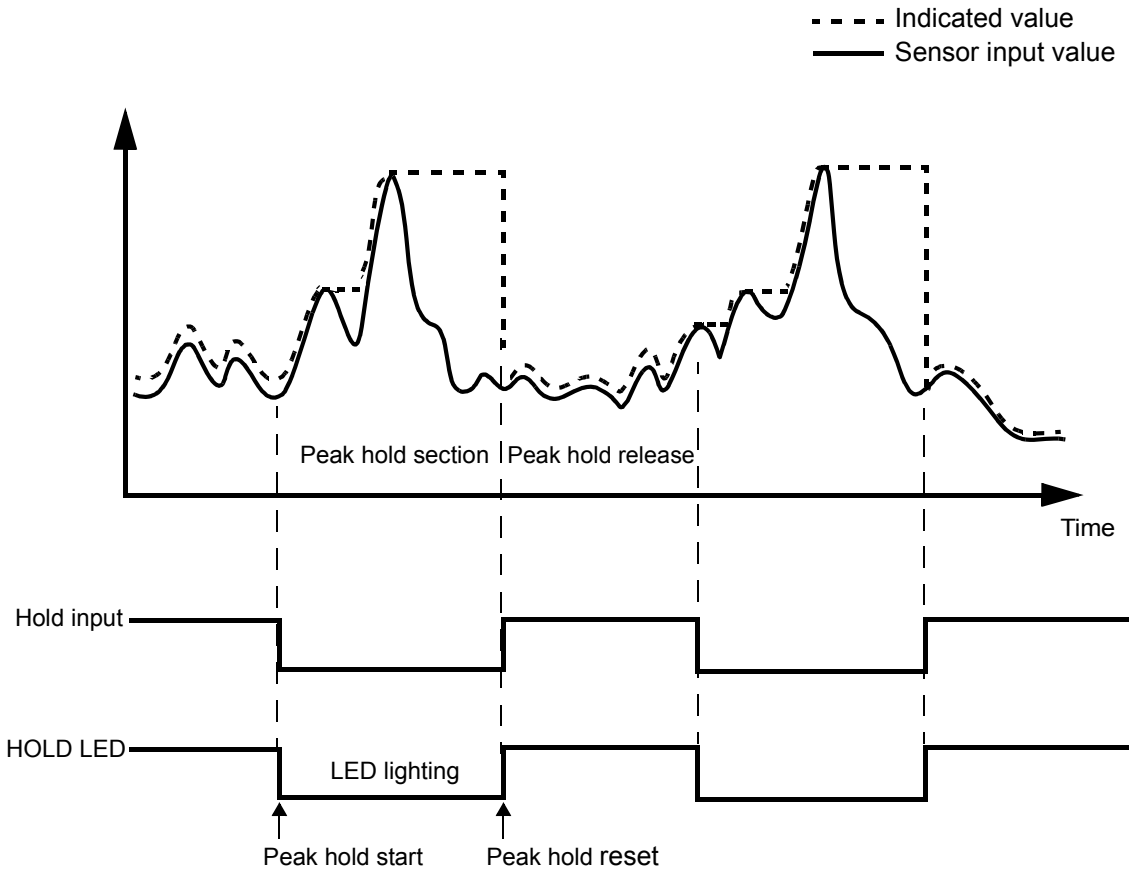
If the bridge excitation voltage is greater than the maximum excitation voltage of the sensor, the sensor may overheat or may be damaged.

6 HOLD FUNCTION

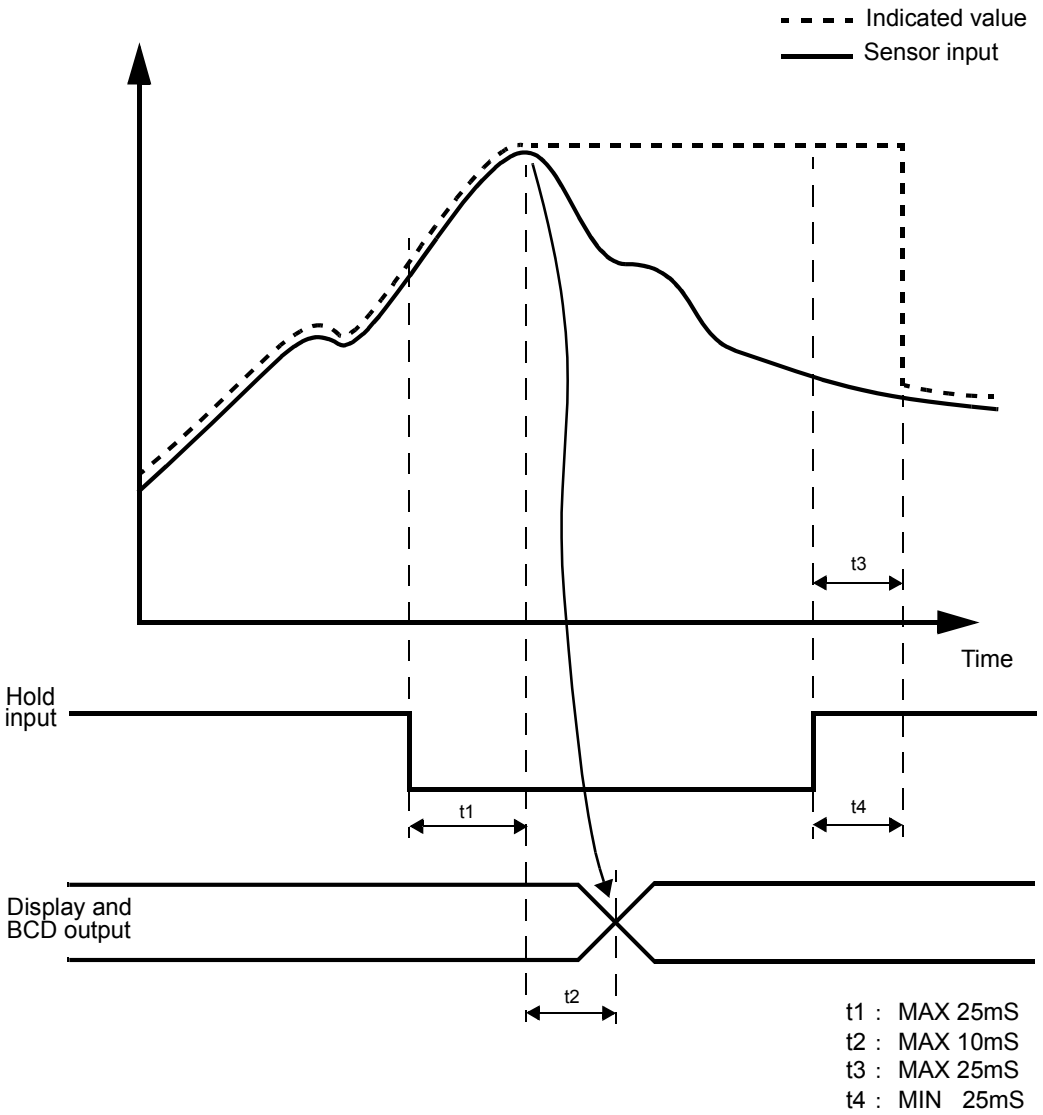
6-1. Peak Hold

・Peak Hold Operation




Indicated value
Sensor input value
Peak hold section
Peak hold release
Time
Hold input
HOLD LED
LED lighting
Peak hold start
Peak hold reset

· Timing Chart



t1 : Time from the short-circuiting of the hold input (OFF → ON) to the display of the peak hold value.

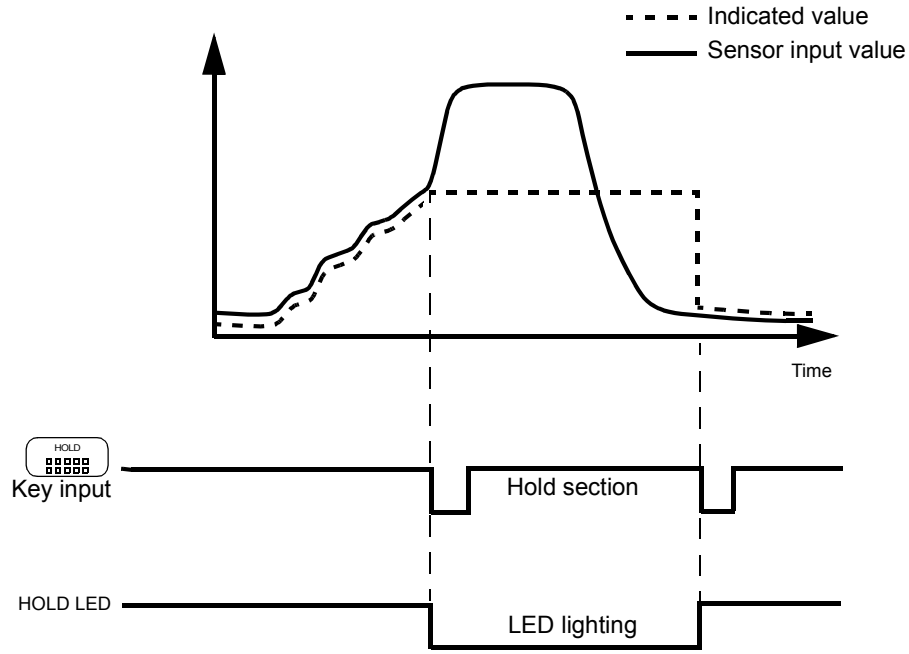
t2 : Time until the A/D conversion of the analog value.

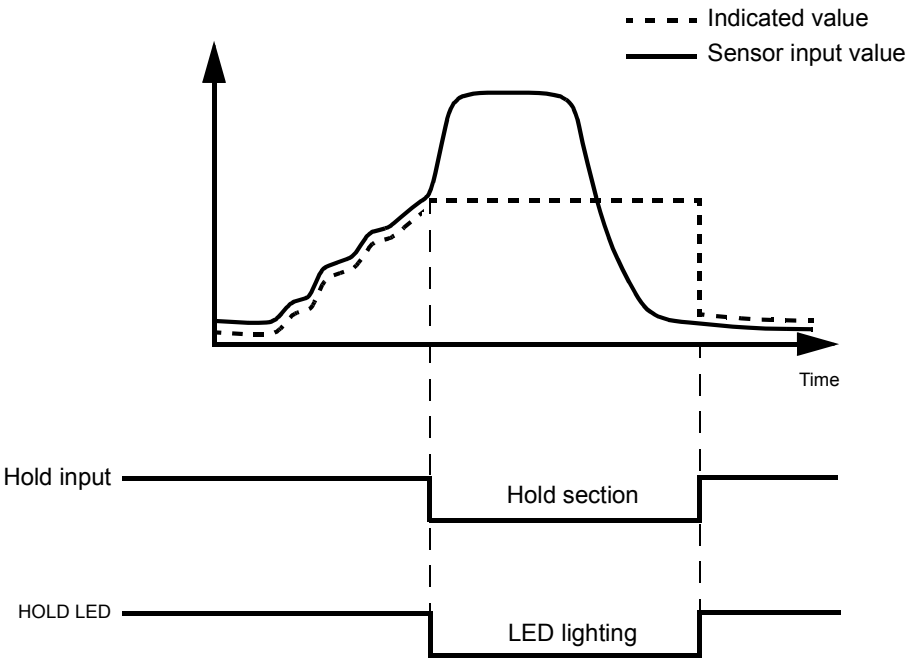
t3 : Time from the input of the hold input (ON → OFF) to the reset of the analog peak hold value.

t4 : The minimum tracking (resetting) time required for resetting the display of the held value.

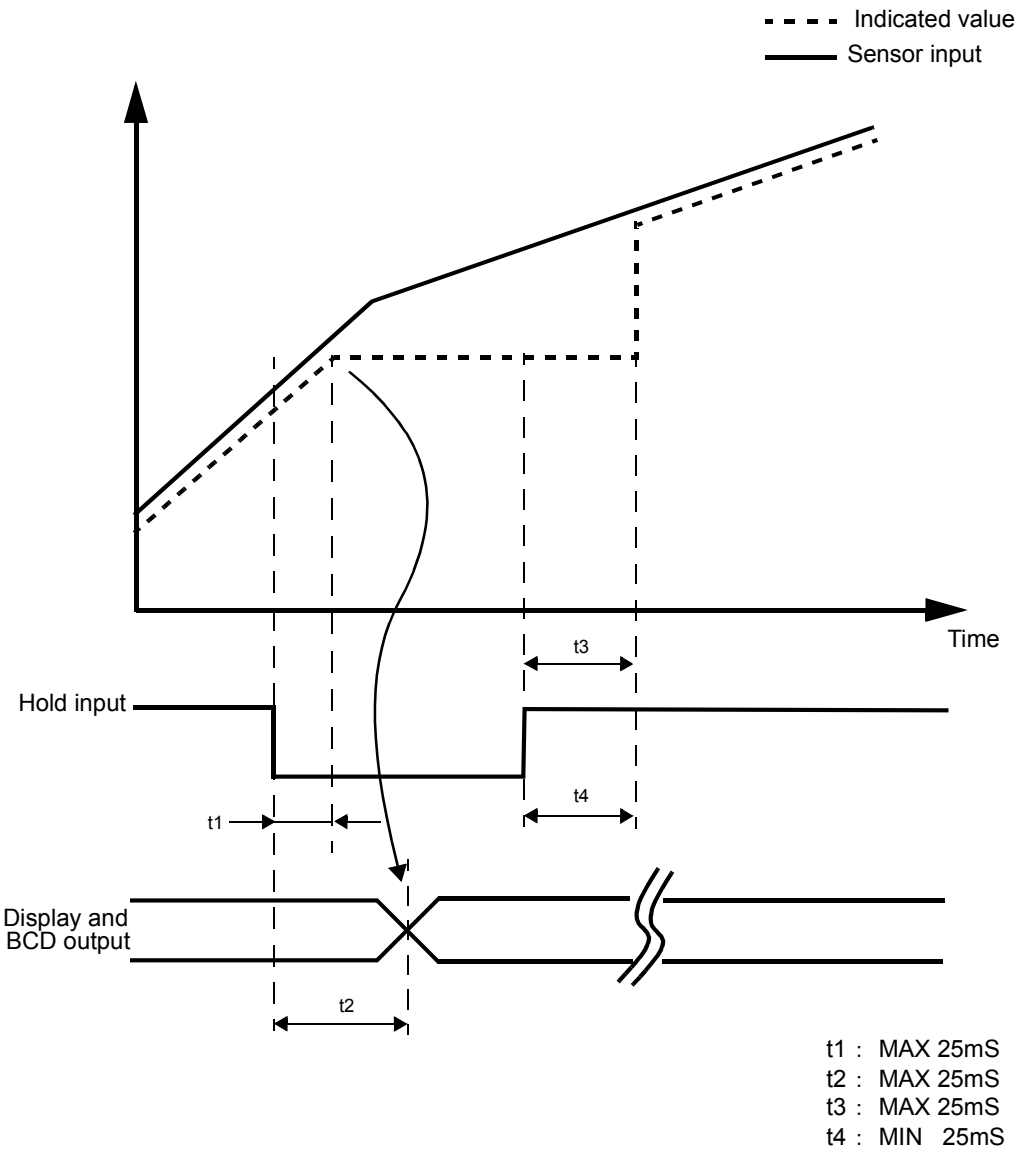
6-2. Sample Hold Operation (Digital Hold)

・Sample Hold Operation





· Timing Chart



t1 : Time from the short-circuiting of the hold input (OFF → ON) to the display of the hold value.

t2 : Time from start of the hold to the A/D conversion of the hold value.

t3 : Time from the input of the hold input (ON → OFF) to the reset of the analog hold.

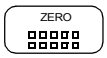
t4 : The minimum tracking (resetting) time required for resetting the display of the held value.

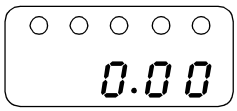
7. DIGITAL ZERO FUNCTION

This function makes the indicated value zero instantly by a key operation.

Setting of Digital Zero

1) Perform digital zero.





2) When the indicated value becomes zero, digital zero is completed.

Digital zero will not work when the calibration value LOCK is turned off.

It only works when the calibration value LOCK is turned on.

If you turn off the power, digital zero will be reset.

8. BCD DATA OUTPUT（TD-2403）

The BCD Data Output Interface is for transferring indication values in BCD (Binary coded Decimal) from to PC's PLC's or sequences for controlling, processing and recording data.

The internal and external circuits are opto-isolated.

8-1. Connector Pin Assignment

Amphenol Connector （36-Pin）

No.		Signal	No.		Signal
1	*	COM	19	*	COM
2	Out	1	20		
3	Out	2	21		
4	Out	4	22	Out	Near Zero
5	Out	8	23	Out	Minus（polarity）
6	Out	10	24	Out	OVER
7	Out	20	25	Out	P.C（stable）
8	Out	40	26	Out	STROBE
9	Out	80	27	In	BCD Data hold
10	Out	100	28	In	Logic Switching
11	Out	200	29		
12	Out	400	30		
13	Out	800	31		
14	Out	1000	32		
15	Out	2000	33		
16	Out	4000	34		
17	Out	8000	35		
18	Out	10000	36		

Compatible connector is DDK57-30360 or equivalent.

8-2. Logic Switching

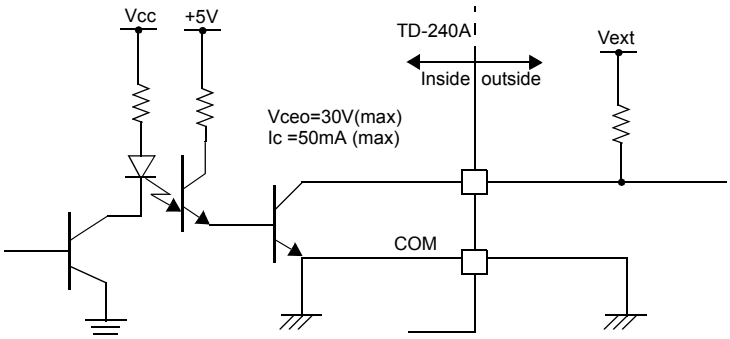
The logic Switching function is used to switch between the signal output logics, positive logic and negative logic. Pin 28 is used for this purpose.

When COM and pin 28 are left open, the negative logic is used. When COM and pin 28 are short-circuited, the positive logic is used.

8-3. Equivalent Circuit

・Output

The signal output circuit employs the TTL open collector output



● Internal transistor status

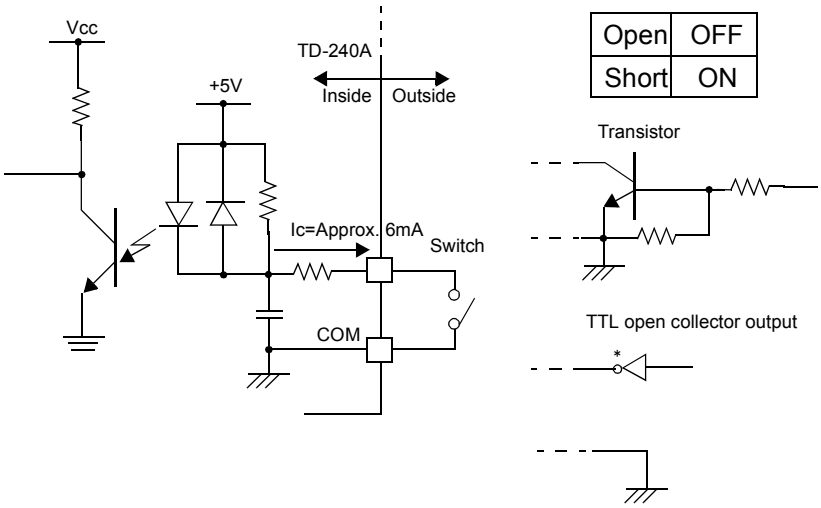
Output data	Negative	Positive
0	OFF	ON
1	ON	OFF

● Output pin level

Output data	Negative	Positive
0	H	L
1	L	H

Through logic switching（pin 28）

・Input



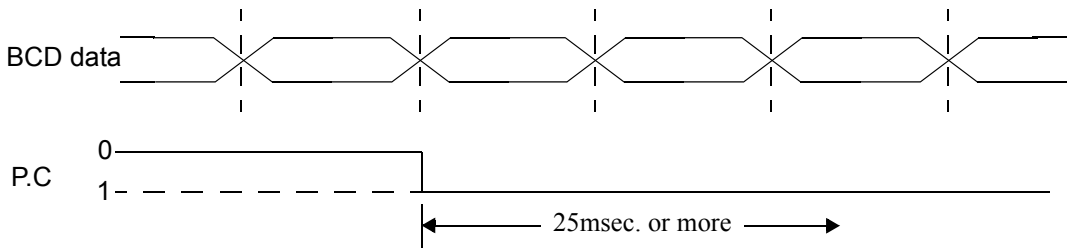
⚠ 注 意

- Avoid applying external voltages to the signal input circuit.
- Use external elements which withstands Ic=10mA or above
- Leakage current from external element must be 30 μ A or below.

8-4. Signal Timing

・P.C

P.C goes on with the BCD data when measurement is stable. Perform data read approximately 25msec. after the trailing edge of the P.C

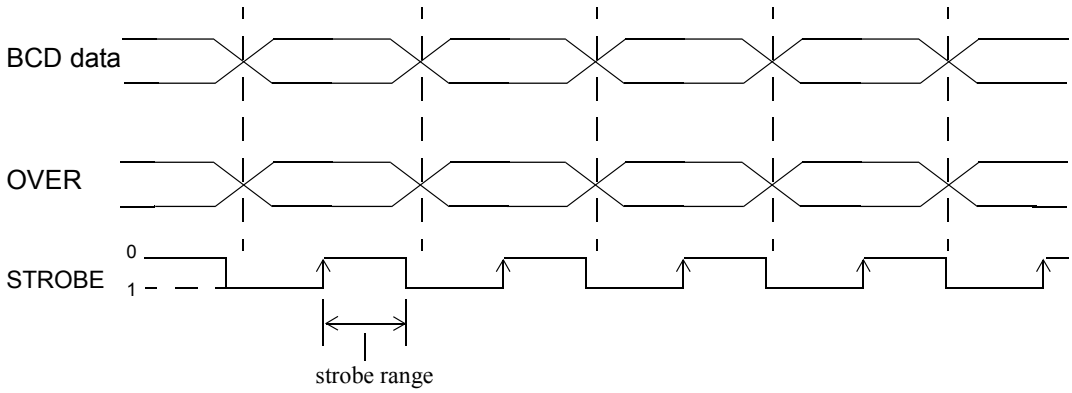


・OVER

Output when LOAD or -LOAD, and OFL1 or OFL2 are specified.

・STROBE

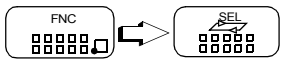
BCD data is updated on a per A/D conversion and the strobe pulse synchronous with the BCD data is output.Use the rising edge of the pulse to read data

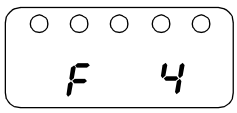


8-5. BCD Data Update Rate Selection

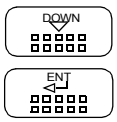
BCD Data Update Rate Selection

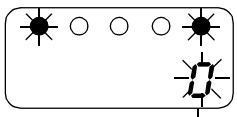
1) Select setting mode 4.





2) Set the update rate of BCD parallel data output.





BCD Update Rate

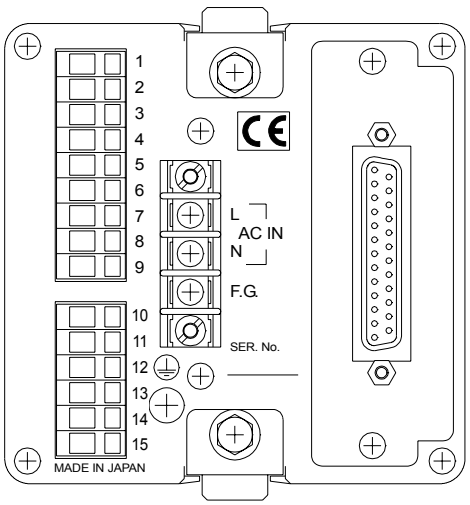
0 :	100 times/sec.	STROBE Range	5msec
1 :	50 times/sec.	〃	10msec
2 :	20 times/sec.	〃	25msec
3 :	10 times/sec.	〃	50msec
4 :	5 times/sec.	〃	100msec
5 :	2 times/sec.	〃	250msec
6 :	1 times/sec.	〃	Approx. 500msec

Normaly, BCD data update synchronous the A/D conversion (100 times/sec).

When the BCD input equipment is low ability and can not read out the high rate of 100 times/sec., set the BCD data update rate is low.

9. RS-232C INTERFACE（TD-2404）

RS-232C interface is used to read out the indicated value and the state of TD-240A and to write set values into TD-240A. It is convenient to connect TD-240A with a computer, a process controller and a sequencer, etc. to make processing such as control, aggregation, recording and so on.



9-1. Communication Specifications

9-1-1. Standard

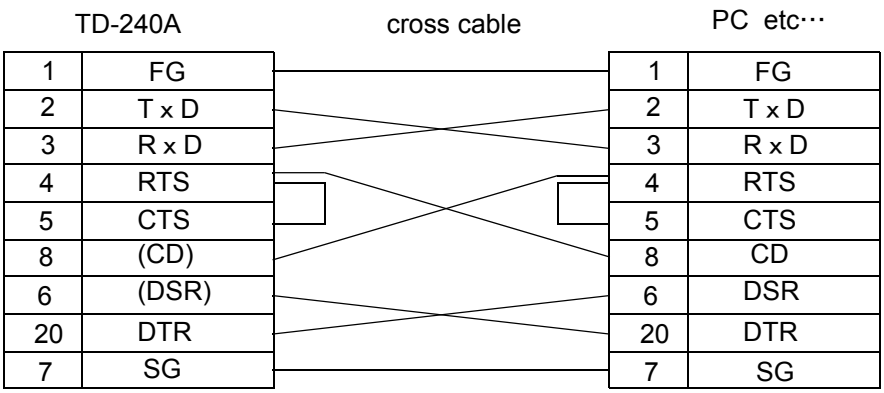
Signal level	: Based on RS-232C
Transmitting distance	: Approx.15m
Transmitting method	: Asynchronous, Full duplex
Transmitting speed	: 1200, 2400, 4800, or 9600bps selectable
Bit configuration	: Start bit 1
	Character length 7 or 8 bit selectable
	Stop bit 1or 2 bit Selectable
	Parity none,odd or even selectable
Code	: ASCII

9-1-2. Connector Pin Assignment

Adaptable plug :25-pin D-sub connector

1	*	FG	14		
2	out	TxD	15		
3	in	RxD	16		
4	out	RTS	17		
5	in	CTS	18		
6			19		
7	*	SG	20	out	DTR
8			21		
9			22		
10			23		
11			24		
12			25		
13					

9-1-3. About Cables



※ The avobe diagram is for connecting a personal computer as a DTE(Data Terminal Equipment)device.

If it is a DCE (Data Circuit-terminating Equipment)device,connect pin to pin (DTR to DTR, DSR to DSR etc.)

※ Cables should be prepared after checking connector type and pin assignments of the connected device.

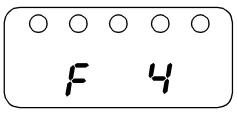
9-2. Setting RS-232C Interface

This will set the RS-232C communication conditions of TD-240A.

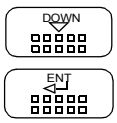
Setting of RS-232C

1) Select setting mode 4.

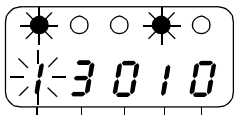
Press three times.



2) Select RS-232C.



Press twice.



Communication Mode

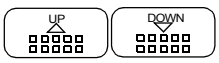
- 2 : Communication Mode 2 (transmits when printed)
- 1 : Communication Mode 1 (transmits continuously)
- 0 : Communication Mode 0 (performs communication by a command)

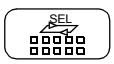
Stop Bit
- 1 : 2bit
- 0 : 1bit

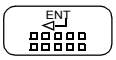
Parity Bit
- 2 : Even number
- 1 : Odd number
- 0 : None

Character Length
- 1 : 8bit
- 0 : 7bit

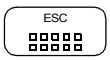
Baud Rate
- 3 : 9600bps
- 2 : 4800bps
- 1 : 2400bps
- 0 : 1200bps

3) Input RS-232C with 

and 

keys and validate it with 

key.

To return to the indicated value display, press 

key.

9-3. Communication Mode

1. Communication Mode 0

This mode performs communication by a command from the host computer.

In this mode, you can read out the indicated value, status, set values and write in set values.

2. Communication Mode 1

This mode continuously transmits the indicated values and the status.

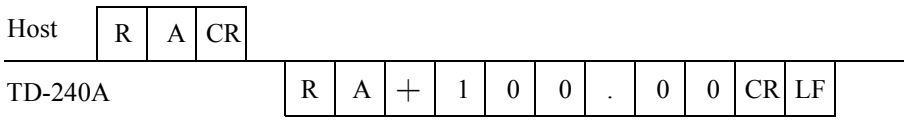
3. Communication Mode 2

This mode transmits the indicated values when they are printed.

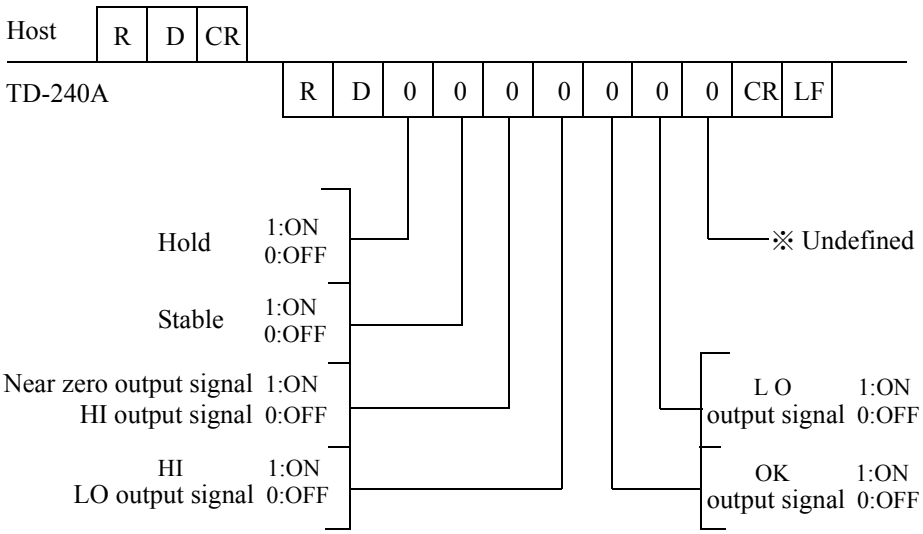
9-4. Communication Format

1. Communication Mode 0

- **Reading Out the Indicated Value** (the sign, indicated value with 5 digits and decimal point)



- **Reading Out the Status** (seven digits)



・Write in of the set value

High Limit	W	0	1							CR	LF	(Set value LOCK)
Low Limit	W	0	2							CR	LF	(Set value LOCK)
High/Low Limit Comparison Mode	W	0	3	0	0	0	0	0		CR	LF	(Set value LOCK)
Hysteresis	W	0	4	0	0					CR	LF	(Set value LOCK)
Digital Offset	W	0	5							CR	LF	(Set value LOCK)
Near Zero	W	0	6	0						CR	LF	(Set value LOCK)
Digital Filter	W	1	1	0	0	0	0	0		CR	LF	(Set value LOCK)
Analog Filter	W	1	2	0	0	0	0	0		CR	LF	(Set value LOCK)
MD（stable time）	W	1	3	0	0	0	0			CR	LF	(Set value LOCK)
MD（stable band）	W	1	4	0	0	0	0			CR	LF	(Set value LOCK)
Zero Tracking（time）	W	1	5	0	0	0	0			CR	LF	(Set value LOCK)
Zero Tracking（band）	W	1	6	0	0	0	0			CR	LF	(Set value LOCK)
Hold Mode	W	1	7	0	0	0	0	0		CR	LF	(Set value LOCK)
Automatic Printing	W	1	8	0	0	0	0	0		CR	LF	(Set value LOCK)
Hold Value Printing	W	1	9	0	0	0	0	0		CR	LF	(Set value LOCK)

Set value No.　　Max 5digits

Sign bit

0 : In signed setting, this will be recognized as plus.

－ : This will be recognized as minus.

※ Do not put other than zero into a place which is set zero.

LOCK	W	2	1	0	0					CR	LF	
Scale Division	W	2	2	0	0	0	0	0		CR	LF	(calibration LOCK)
Display Frequency	W	2	3	0	0	0	0	0		CR	LF	(calibration LOCK)
Excitation Voltage	W	2	4	0	0	0	0	0		CR	LF	(calibration LOCK)
BCD Data Update Rate	W	3	1	0	0	0	0	0		CR	LF	(calibration LOCK)
RS-232C	W	3	2	0						CR	LF	(calibration LOCK)
D/A Zero Setting	W	3	3							CR	LF	(calibration LOCK)
D/A Full Scale Setting	W	3	4							CR	LF	(calibration LOCK)

Set value No. Max 5digits

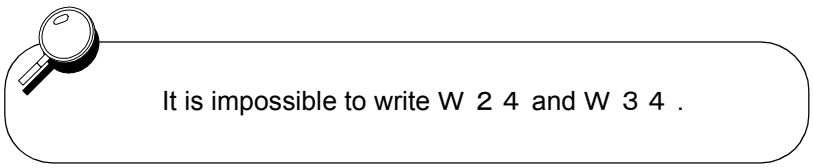
Sign bit

(calibration LOCK)

0 : In signed setting, this will be recognized as plus.

— : This will be recognized as minus.

※ Do not put other than zero into a place which is set zero.



・Reading out Set Values

Host	W			CR										
TD-240A					W								CR	LF

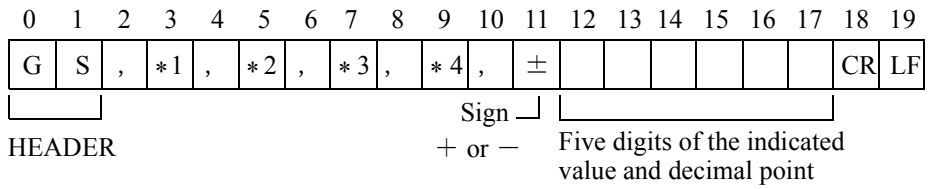
Set value No. Set value No. The same format as write-in of set values.

・Command (host → TD-240A)

Hold	C E CR	
Hold Reset	C F CR	
Digital Zero	C G CR	(This is effective only when the calibration value LOCK is "1.")
Digital Zero Reset	C H CR	(This is effective only when the calibration value LOCK is "1.")
Print Instruction	C I CR	(This will issue print a command onto SIF.)

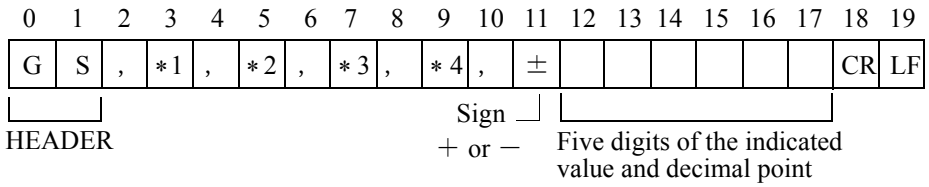
2. Communication Mode 1

This mode will continuously transmit the indicated values.



3. Communication Mode 2

This mode will transmit when the indicated value is printed.



＊1

O.....Over Load（LOAD，OFL）
S .....Stable
M.....Not Stable
H.....Hold

＊1 Priority　H＞O＞（S or M）

＊2

A.....Zero Tracking OFF
T .....Zero Tracking ON

＊3

H.....High Limit ON
L .....Low Limit ON
G.....High / Low Limit OFF
N.....High / Low Limit ON
F .....Compare OFF

＊3 Priority　　N＞（H or L） F＞G

＊4

N.....Zero Near OFF
Z .....Zero Near ON

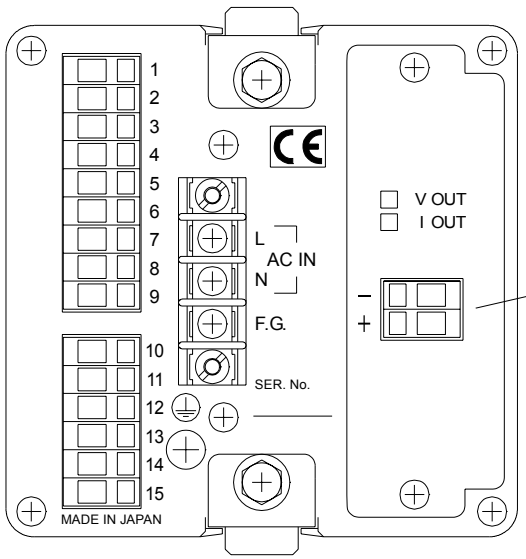
10. D/A CONVERTER（TD-2407）

This is a converter to obtain an analog output which is linked with the indicated values of TD-240A.

The range of the analog output is from 0 to +10V for the voltage output or from 4 to 20mA for the constant 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 from zero (0V, 4mA) to full scale (+10V, 20mA) of analog output.

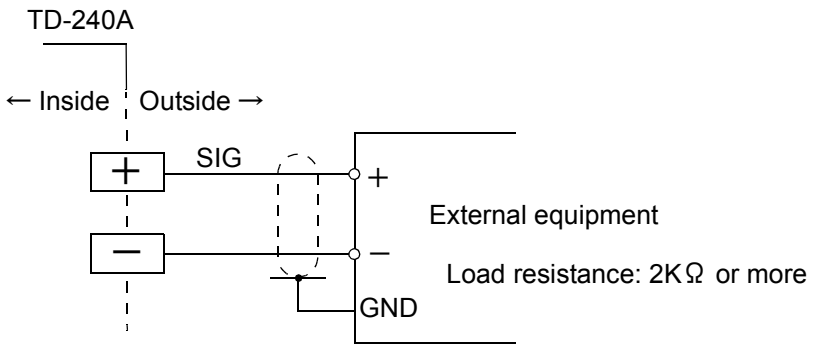
The output circuit and the main circuit are isolated. The resolution is 1/3000 for the voltage from 0 to +10V and the conversion rate is 100 times per a second. The output has an overrange of about ± 10%FS.



These are terminals to obtain voltage or current signal of the voltage/current output terminal. + is for signal and - for ground. You can obtain voltage from 0 to +10V or current from 4 to 20mA.

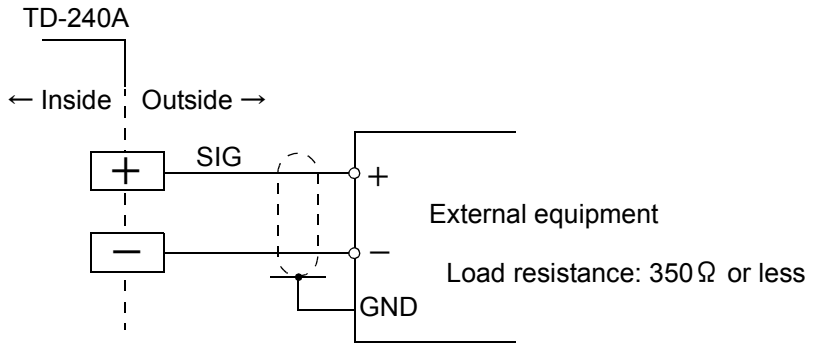
10-1. Obtaining Voltage Output Signal

Use + and - terminals of TD-240A connecting to them an external equipment (with load resistance of 2KΩ or more).



10-2. Obtaining Current Output Signal

Use + and - terminals of TD-240A connecting to them an external equipment (with load resistance of 350Ω or less).



10-3. About Resolution

The D/A converter has the resolution of 1/3000 for 0 to 10V (4 to 20mA).

⚠ CAUTION

- The D/A converter is an option.
- Do not apply voltage externally. If you do, it will break down.
- Do not short-circuit the voltage output. Short-circuiting may cause failure. Connecting a capacity load might cause oscillation.

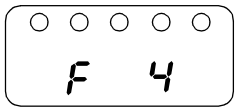
10-4. Setting D/A Zero Full Scale

This will set the D/A zero full scale of TD-240A.

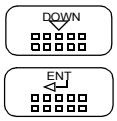
Setting D/A Zero Full Scale

1)Select setting mode 4.

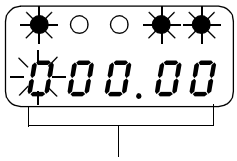
Press three times.



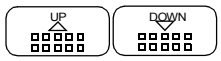
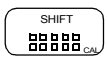
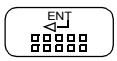
2)Set D/A zero.



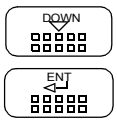
Press three times.



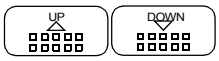
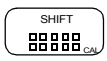
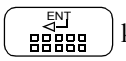
D/A Zero Value (00000 to ± 19999)

Set D/A zero with  and  keys. Press  key to put minus sign. When you have made setting, validate it with  key.

3） Set D/A full scale.



Press one times.

Set D/A full scale with  and  keys. Press  key to put minus sign. When you have made setting, validate it with  key.

10-5. About D/A Output Error

This is an error which is output only when D/A option is provided.

dEr 1

D/A output is less than the range of output.

For current output: 4mA - 25% or less (about 0mA or less)

For voltage output: 0V - 25% or less (about -2.5V or less)

dEr 2

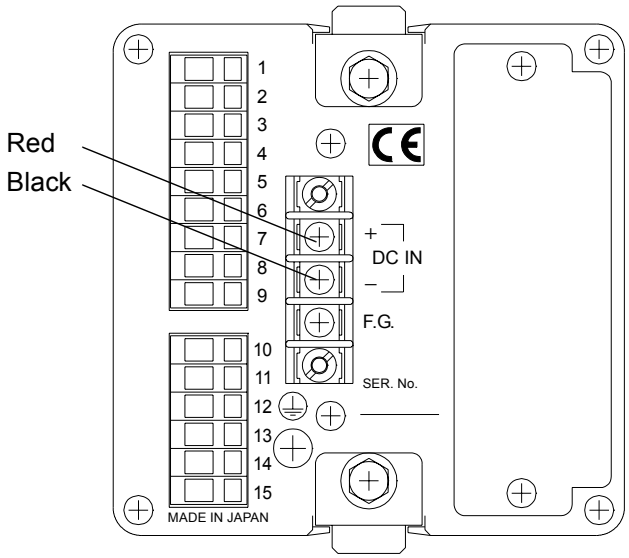
The D/A output exceeds the range of the output.

For current output: 20mA + 25% or more (about 24mA or more)

For voltage output: 10V + 25% or more (about 12.5V or more)

11. DC POWER SOURCE

By specifying at the time of shipment, TD-240A can be used with DC power supply.



Connect the positive (+) side of the power source to the red screw side of the terminal block on the back of the TD-240A, and its negative (-) side to the black screw side.

Input voltage range (voltage between terminals of the F340A)

DC12 ～ 24V（± 15%）

⚠ CAUTION

Be aware that the voltage drops depending on the wire thickness and length.
Also, never input an AC power source. Doing so will cause a failure.

Power consumption

15W max

Request

Use a source power (or battery) of 3A DC or more.

12. OVERSCALE/ERROR DISPLAYS

12-1. Overscale Display

Minus overflow of the A/D converter（under -3.2mV/V between ± SIG）	-LoAd
Plus overflow of the A/D converter（over 3.2mV/V between ± SIG）	LoAd
Indicated value overflowed（indicated value<-1999）	oFL1
Indicated value overflowed（indicated value>1999）	oFL2

12-2. Calibration Error Display

Span set value is "00000"	cErr5
Output of the strain gauge sensor does not reach the span adjustment range.	cErr6
Output of the strain gauge sensor is on the minus（negative）side.	cErr7

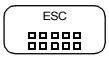
13. SELF-CHECK FUNCTION AND INITIALIZATION

13-1. Self-Check

The TD-240A incorporates the Self-check Function to detect errors in the internal circuits and in programs and the Visual-check Function to visually check the indicator.

Setting Method

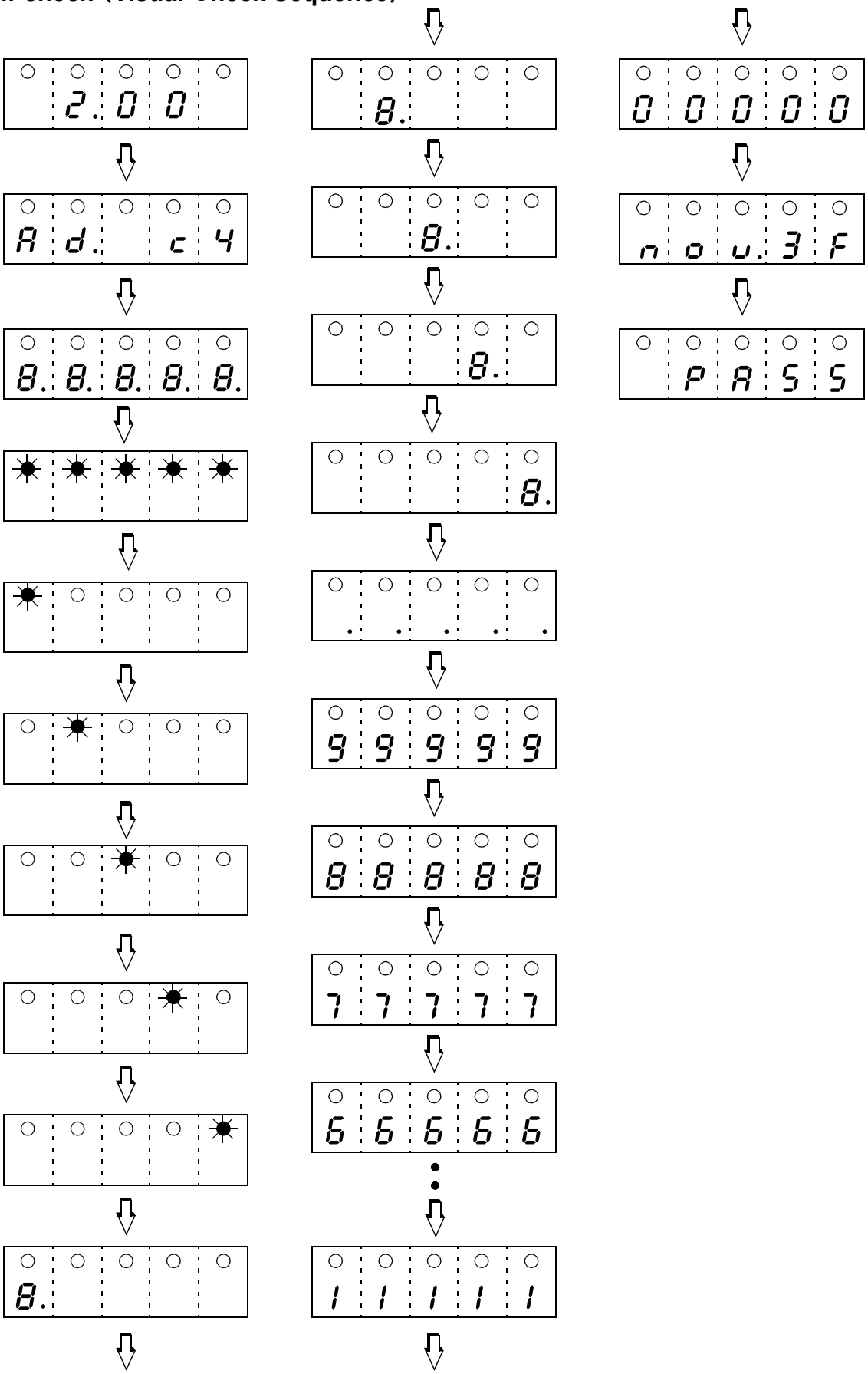
1） Turn off the power to the TD-240A.

2） Turn on the power with 

key held down.

The self-check is completed in 30 seconds. The display " PASS " should appear, then the indicate value should follow.This ensures that the TD-240A is in normal operation.

Self-check（Visual-Check Sequence）

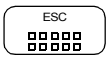


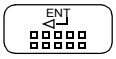
13-2. Initialization

The Initialization is an operation to reset the memory to the factory setting. This operation resets all set values except calibrated values（obtained through zero calibration and span calibration）to the factory setting

Setting Method

1）Turn off the power to the TD-240A.

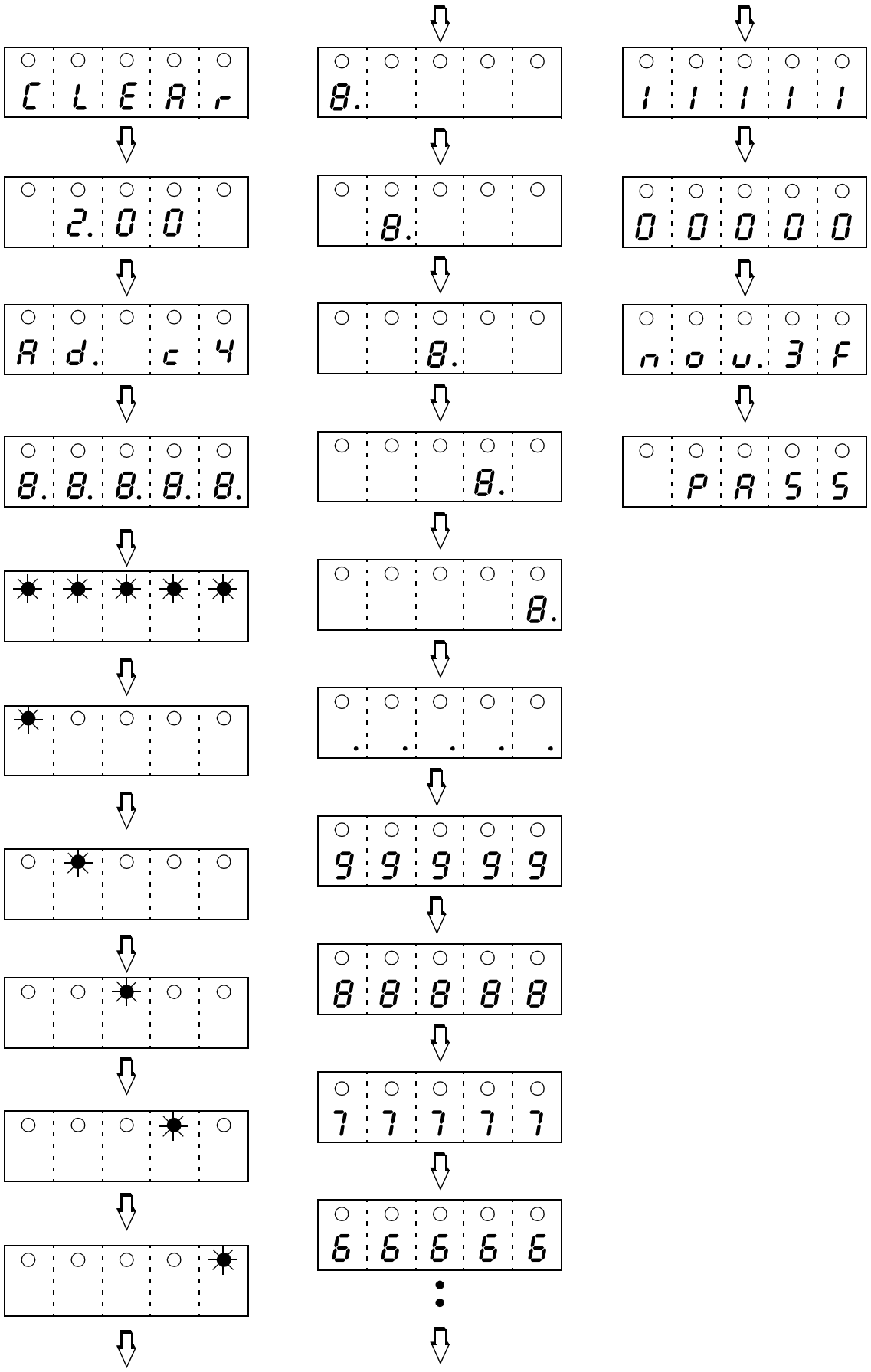
2）Turn on the power with 

and 

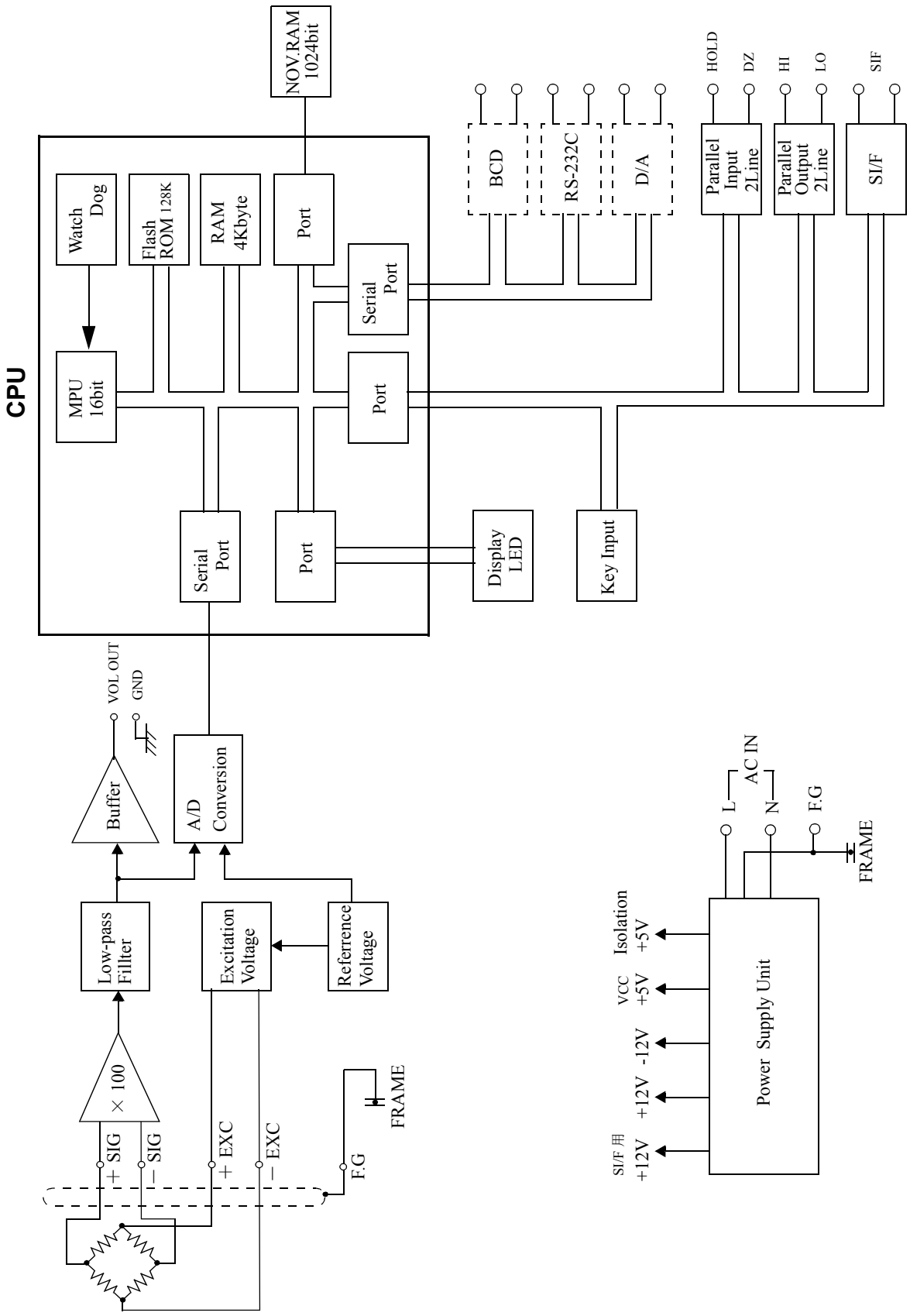
keys held down.

The initialization follows the self-check.

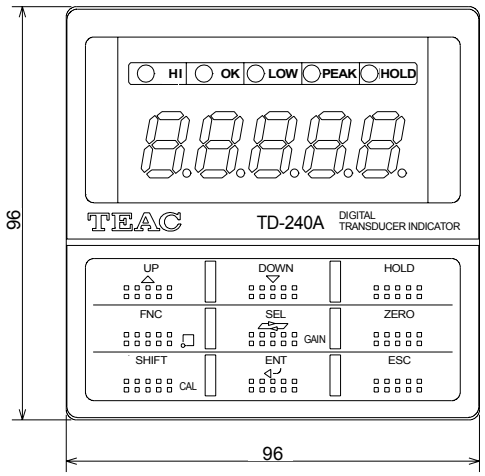
Initialization Sequence



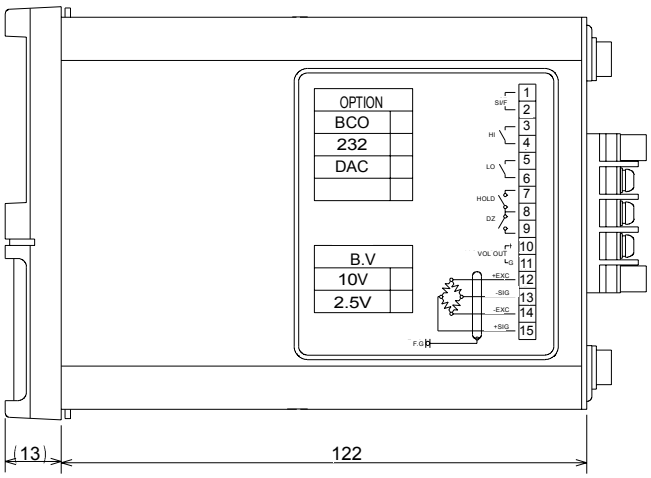
13-3. TD-240A Block Diagram



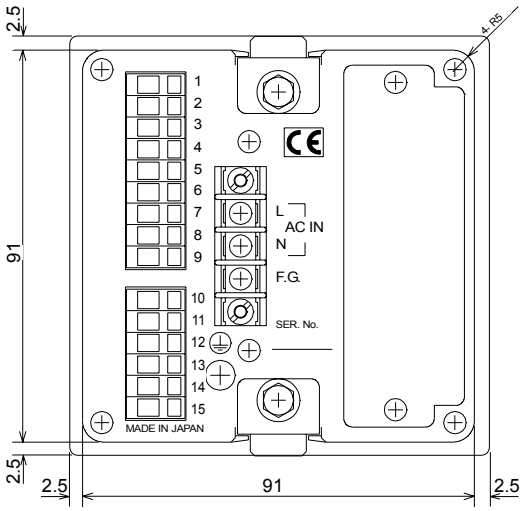
14. DIMENSIONS



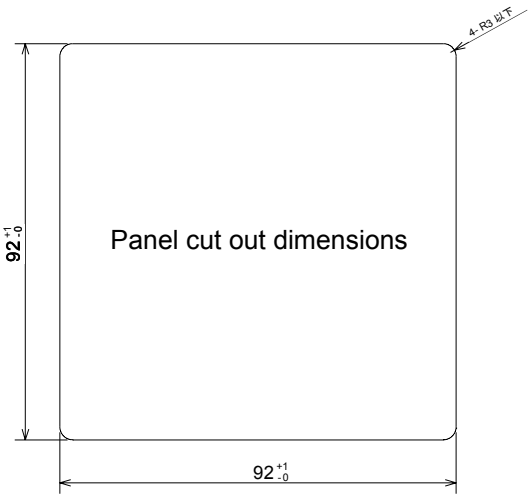
（Front）



（Side）



（Rear）



Unit：mm

15. SPECIFICATIONS

15-1. Analog Section

Bride Voltage	DC 10V ± 10% DC 2.5V ± 10% Output current of max 30mA Changable by setting key Pad
Signal input range	－ 3.0 to 3.0mV/V
Equivalent input calibration range	0.5 ～ 3.0mV/V
Equivalent input calibration error	＜ 0.1%FS（0.5mV/V input）
Actual load calibration range	0.5 ～ 3.0mV/V
Zero adjustment range	0 ～± 2.0mV/V
Analog input signal sensitivity	1 μ V/count
Accuracy	Non-linearity：＜ 0.02%FS（of 3mV/V input） Zero drift ：＜ 0.5 μ V/ ℃ Gain drift ：＜ 25ppm/ ℃
A/D converter	100 times /sec. Resolution：16 bits （binary）
Analog filter	4Hz, 10Hz, 100Hz（Initial）, 3 k Hz Changable by setting key pad

Peak hold function （high-speed analog hold system）

Operation response speed：Approx. 1kHz
（Sin wave : 3mV/V input,
Analog Filter.3kHz）
Accuracy：＜ 0.1%FS
Reset time：＜ 50 μ S

15-2. Indicator Section

Indicator	Numeric display （5 digits）, 15mm in height, red LED	
	Numeric	5digits ± 8.8.8.8.8.
	Indicatid value	－ 19999 to 19999
	Decimal point	Selectable
Items	Status	HI，OK，LOW，PEAK，HOLD Red LED 5
	Count	3，6，13，25times/sec. Selectable

15-3. Setting Section

Items

Calibration：Zero/Span calibration （actual load calibration, equivalent input calibration）
High limit value, Low limit value, High/Low limit comparison mode, Hysteresis, Digital offset, Near zero, Digital filter, Analogfilter, Motion detect, Zero tracking, Hold mode, Automatic printing, Hold value printing, LOCK, Scale division, Display frequency, Excitation Voltage, BCD data update rate, RS-232C, D/A converter setting, D/A converter fullscael setting.

15-4. External Signals

High limit relay, Low limit relay, Analog voltage output, Hold signal input, Digital zero signal input.

15-5. Interface

SI/F output

15-6. Option

- TD-2403 BCD Parallel data output
- TD-2404 RS-232C Interface
- TD-2407 D/A Converter

15-7. General Specifications

Power voltage	- AC spec: 100V to 240V AC (＋ 10% － 15%) [Free power supply 50Hz/60Hz] - DC spec: 12V to 24V DC (± 15%) (Depending on the request at the time of order)
Power consumption	- AC spec: 15W max. - DC spec: 15W max.
Rush current (Typ)	20A, 2.5 msec.: 100V AC mean load state (ordinary temperature, at cold-start time) 40A, 2.5 msec.: 200V AC mean load state (ordinary temperature, at cold-start time)
Ambient conditions	Temperature：Operation － 10 to ＋ 40 ℃ Storage － 40 to ＋ 80 ℃ Humidity：＜ 85%RH（non-condensation）
Dimensions	96W × 96H × 135D（mm）（excluding protrusions）
Panelcutout dimension	92 × 92 $^{+1}_{-0}$（mm）
Weight	Approx.0.9kg

15-8. Accessories

- AC power cord 1
- Mini screwdriver for terminal board connection . . 1
- Ferrite core 2
- 3P － 2P conversion adapter 1
- BCD Output connector . . . . . 1（when BCD option is supplied）
- TD-240A operational manual

16. CONFORMITY TO EC DIRECTIVES

The TD-240A digital indicator conforms to EC directives (based on the EC council of ministers), carrying a CE mark.

- Low voltage directive: EN61010-1
- EMC directive: EN61326-1

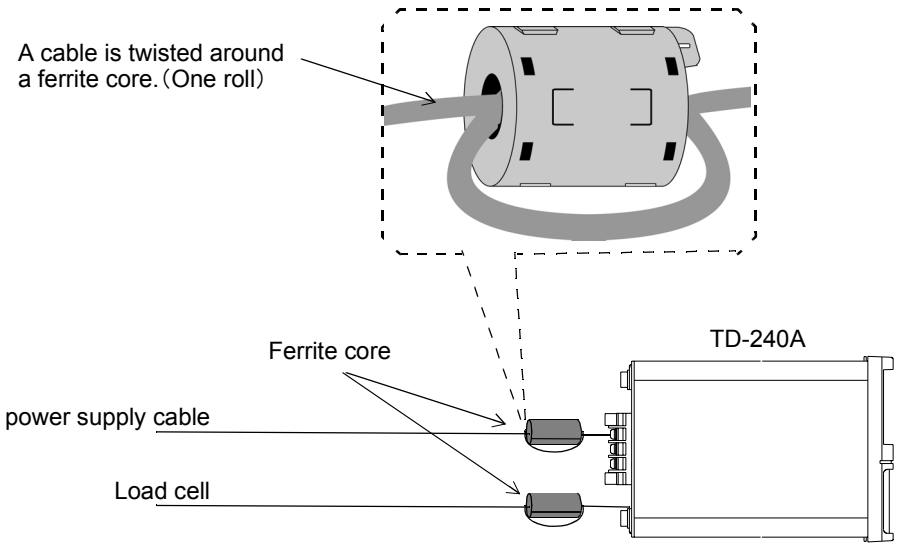
(EN55011, EN61000-4-2, EN61000-4-3, EN61000-4-4
EN61000-4-5, EN61000-4-6, EN61000-4-8
EN61000-4-11, EN61000-3-2, EN61000-3-3)

When installing, attention should be given to the following.

1. Since the TD-240A is defined as an open type (built-in equipment), be sure to install the TD-240A and fix to a panel or the like for use.
2. Use the attached power cable.
3. Use shielded cables for others (load cell, external I/O, option).

Attachment of a ferrite core

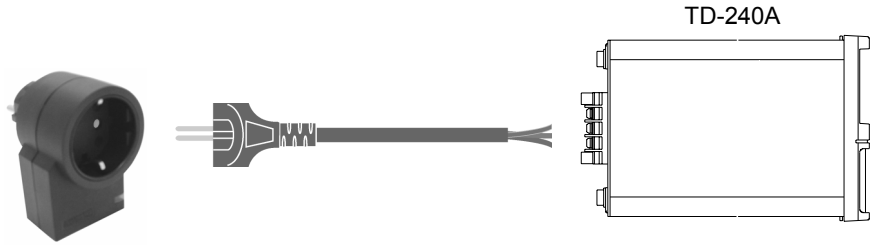
It is necessary to twist a power supply cable and sensor cables, such as a load cell, around an attached ferrite core.（Common to AC spec. and DC spec.）



Connection of Lightning serge protect

The F340A main body conforms to EMC directive EN61000-4-5 (lightning surge immunity) in combination with the lightning surge protect.

● AC Spec.

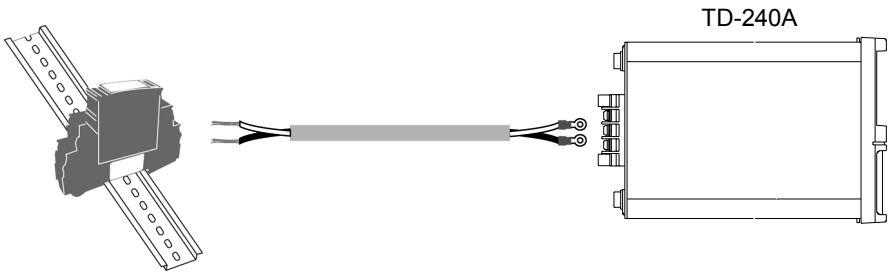


Lightning surge protect
MAINTRAB MNT-1D

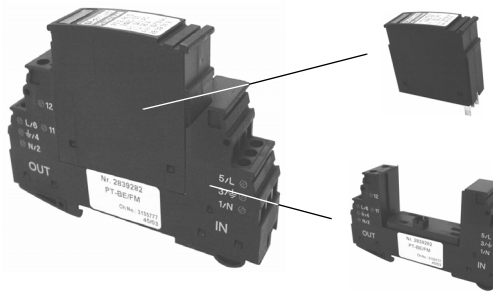
The cable of the EU outlet shape is required for connection of lighting serge protect. (Option)

＊ MAINTRAB MNT-1Dis a trademark of PHOENIX CONTACT.

● DC Spec.



Lightning surge protect



PT 2-PE/S-24AC-ST

PT-BE/FM
（DIN rail attachment type）

＊ PT-BE/FM、PT 2-PE/S-24AC-ST is a trademark of PHOENIX CONTACT.

This lightning surge protect is not a standard accessory (optionally available).
Purchase it from PHOENIX CONTACT or us.

TEAC

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