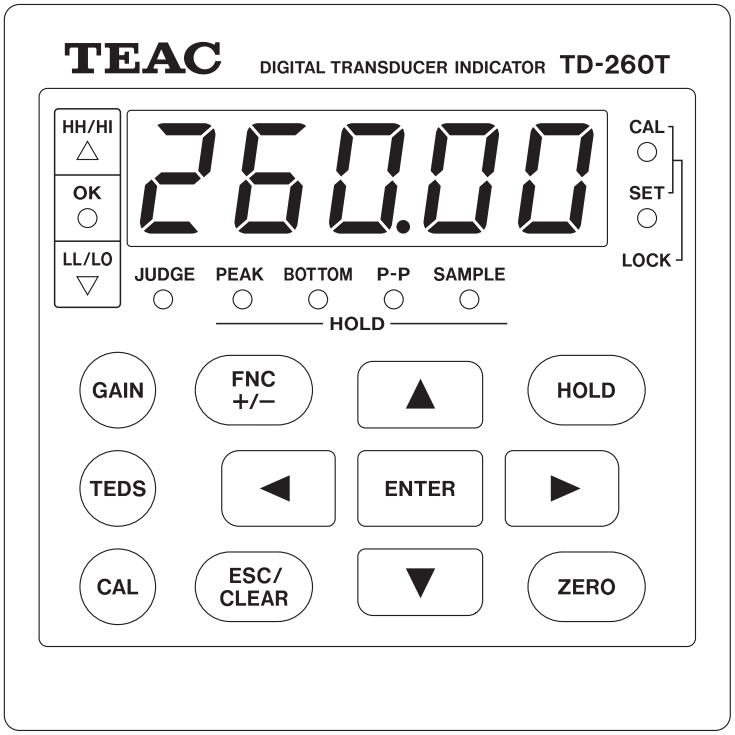
D01156700H

TEAC

Digital Transducer Indicator

TD-260T

Instructions for Use



Introduction

Thank you for purchasing the TD-260T digital transducer indicator ("TD-260T"). Please read this document in its entirety before using the product to get the best performance and ensure safe and proper operation.

Features

- Directly readable, 5-digit digital display (reading scale -19999 +99999)
- Easy sensitivity calibration facilitated by TEDS* support. Auto-calibration using TEDS transducer connection
  *TEDS: Transducer Electronic Data Sheet
- Remote sensing function, ensuring measurement accuracy even with the use of long cables
- Equivalent input calibration. No actual load required for sensitivity adjustment
- Static strain measurement supported, allowing easy identification of a defect on a load cell caused by its plastic deformation
- Comparison functions supported, including for High-High and Low-Low limits as well as High and Low limits
- Different types of hold functions available: peak hold, bottom hold, peak-to-peak hold, and block setting for each hold
- DIN-size design for installation in testing and manufacturing equipment
- Analog voltage output supported. D/A option available for producing an output that corresponds to the TD-260T's reading
- RoHS compliant

NOTE

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Checking Accessories

If anything is missing or damaged, contact us. (For contact information, see the last page.)

Accessories for AC power model

Instructions for Use (CD) x 1
AC power cord x 1
Flathead micro screwdriver x 1
Input/output connector plugs
B2L 3.50/18/180F SN BK BX or its equivalent x 1
BCZ3.81/07/180F SN BK BX or its equivalent x 1

Accessories for DC power model

Instructions for Use (CD) x 1
Flathead micro screwdriver x 1
Input/output connector plugs
B2L 3.50/18/180F SN BK BX or its equivalent x 1
BCZ 3.81/07/180F SN BK BX or its equivalent x 1

Additional accessory for BCD or D/A option-installed model

Ferrite core x 1

An option-installed model is also available in the TD-260T. Before operating the product, make sure that the product package you have received is the one you specified when you placed an order. Note that there are two types of power supply: AC power and DC power. Check the power supply of the product received and determine that it is the one you ordered.

This document describes the safety instructions for the operation of the TD-260T. Before operating the product, read this document carefully to familiarize yourself with the product.

⚠ Warning	Follow the instructions below to avoid risk of serious personal injury and death.
Never use beyond the rated specifications as there is a danger of property damage, injury, fire or electrical shock.	
Never use in flammable gaseous environments including the following locations as there is a danger of explosion. • Locations subject to corrosive or flammable gases • Locations subject to water, oil or chemical splash	
If the product malfunctions (any smoke, odor or noise is present), stop operating the product immediately and unplug the power cord as there is a danger of fire or electrical shock.	
Never attempt to disassemble the product.	
Carefully check connections and wiring before applying power.	
Be sure to ground the product (with ground resistance of 100 Ω or less).	
The electric shock protection class of this product is Class I. The product must be grounded to the protective ground terminal for protection against electric shock.	
To allow the operator to immediately shut off the power to the product, install a switch or circuit breaker that complies with both IEC60947-1 and IEC60947-3 requirements near the product. The switch or breaker installed must also indicate that it functions to shut off the power to the TD-260T.	
Double insulation or reinforced insulation must be provided between the TD-260T and an external device connected to it and between the external device and its power source.	

⚠ Caution	Follow the instructions below to avoid risk of personal injury or property damage.
Disconnect the power cord when performing the following. • Attaching or detaching optional connectors • Wiring or connecting cables to terminal blocks • Connecting the ground line	
Wait for at least five seconds between turning on and off.	
Never touch the rear panel or connectors while the product is turned on.	
When connecting to the signal I/O connector, check the signal name and the pin assignment to prevent a false connection. Be sure to shut off the power to the product as well when making a connection.	
Use a shielded cable when connecting to a load-cell, external I/O or option.	
Take adequate measures when operating in the following locations. • Near a power line • Where a strong electric or magnetic field is present • Where static electricity or noise such as from a relay is generated	
Do not install under the following environments. • Locations subject to temperatures exceeding the specified temperature and humidity ranges • Locations with high salt or iron content • Locations under direct vibration or shock • Outdoor, or locations with an altitude of higher than 2,000 m	
Do not operate a damaged unit.	
The TD-260T is classified as an open-type (built-in) device and must be installed inside a control panel.	
If the top cover and the panel are dirty, wipe them with a soft cloth lightly dampened with a solution of a neutral detergent and water, and then wipe them again with a damp, well wrung-out cloth. DO NOT use a chemically treated dust cloth, paint thinner, or other flammable solvents. Using any of them could damage the coating of the product.	
If the product is used in a manner unintended by the manufacturer, the product safety may be adversely affected.	

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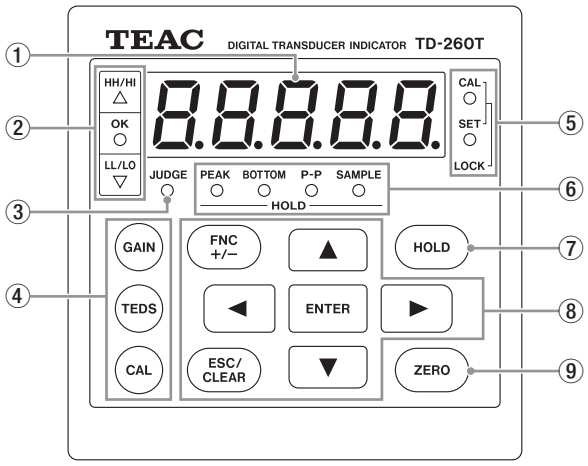
1. Controls and Functions

1-1. Front panel



① Numeric display

The TD-260T shows a continuous reading or a set value on the display.

If the sensor input is erroneous or a reading cannot be displayed, the corresponding overflow message is displayed as shown below.

-LOAD:	A/D converter overflow in the negative direction
LOAD:	A/D converter overflow in the positive direction
-Full:	Display overflow, lower than -19999
Full:	Display overflow, higher than 99999

② Decision output LEDs

The following LEDs show statuses of the TD-260T.

HH/HI

The HH/HI LED shows the operation of the decision output for the High-High limit ("HH") or High limit ("HI"), meaning that the LED displays one of the following solid colors when a displayed reading is higher than the corresponding set value.

Red: shows that the HH decision output is ON.
HH value < displayed reading

Orange: shows that the Hi decision output is ON.
HI value < displayed reading

Note that the light displays solid red when the setting for Enable HH and LL (F1-5) is OFF

OK

The OK LED shows the operation of the OK decision output, meaning that the LED displays solid green when a displayed reading is both higher than the LO value and lower than the HI value.

Green: shows that the OK decision output is ON.
LO value ≦ displayed reading ≦ HI value

LL/LO

The LL/LO LED shows the operation of the decision output for the Low-Low limit ("LL") or Low limit ("LO"), meaning that the LED displays one of the following solid colors when a displayed reading is lower than the corresponding set value.

Red: shows that the LL decision output is ON.
Displayed reading < LL value

Orange: shows that the LO decision output is ON.
Displayed reading < LO value

Note that this LED displays solid red when the setting for Enable HH and LL (F1-5) is OFF.

NOTE

The operations of decision outputs vary depending on the settings for Comparative Output Pattern (F1-15) and Hysteresis (F1-6).
In the above examples, "standard" for Comparative Output Pattern and "0" for Hysteresis are selected.

③ Decision LED (JUDGE)

The LED lights when the decision output is enabled.

With Enable JUDGE Signal (F3-8) set to ON;
the LED lights if the JUDGE signal from A6 is ON, or
the LED remains off if the JUDGE signal from A6 is OFF.

With Enable JUDGE Signal (F3-8) set to OFF,
the LED lights and remains on.

④ Calibration keys

GAIN:	To perform a calibration by applying an actual load, press this key.
TEDS:	To perform a calibration when a TEDS sensor is connected, press this key.
CAL:	To perform a calibration by entering the rated output values, press this key.

⑤ Lock LEDs

CAL:	Lights while changing calibration values is not allowed.
SET:	Lights while changing set values is not allowed.

⑥ Hold-mode LEDs

Each LED displays solid green, showing that the corresponding mode is set, or it displays solid red or orange, showing that the TD-260T is operating in the corresponding mode.

PEAK:	Lights when the TD-260T is operating in the Peak-hold mode.
BOTTOM:	Lights when the TD-260T is operating in the Bottom-hold mode.
P-P:	Lights when the TD-260T is operating in the Peak-to-Peak hold mode.
SAMPLE:	Lights when the TD-260T is operating in the Sample hold mode.

⑦ HOLD key

Pressing this key starts the hold operation. To stop the hold operation, press the key again.

⑧ Set keys

FNC: Pressing this key while a reading is displayed changes the display to the setup screen.
Each time you press the key while the setup screen is displayed, the display cycles through the function numbers.
Pressing the key while the setup screen is displayed with a digit of the set value blinking changes the sign setting or the decimal point position.

ESC/CLEAR: Pressing this key while the setup screen is displayed cancels the setting, and then displays a reading again.
Pressing the key while the TD-260T is in a hold mode clears the hold value.

ENTER: Pressing this key saves the item or value you have set. Pressing and holding the key while a reading is displayed disables or enables all the keys on the TD-260T. While all the keys are disabled, the key input is disabled, except the ENTER key that can enable all the keys again by being pressed and held.

▲▼: Pressing these keys selects an item you want to set or changes a set value.

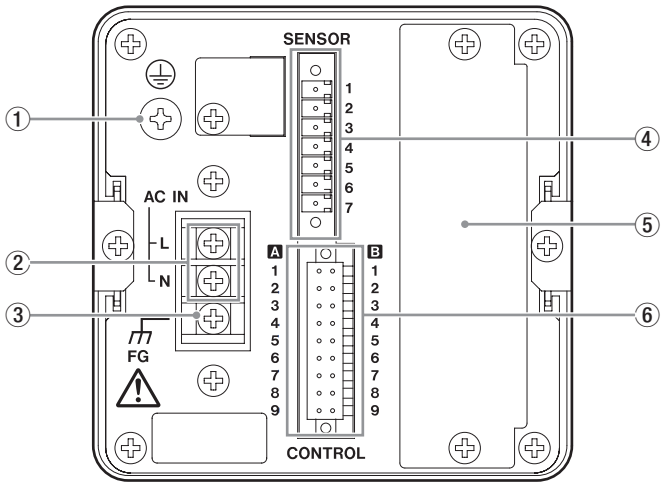
◀▶: Pressing these keys selects a digit you want to make changes to.

⑨ ZERO key

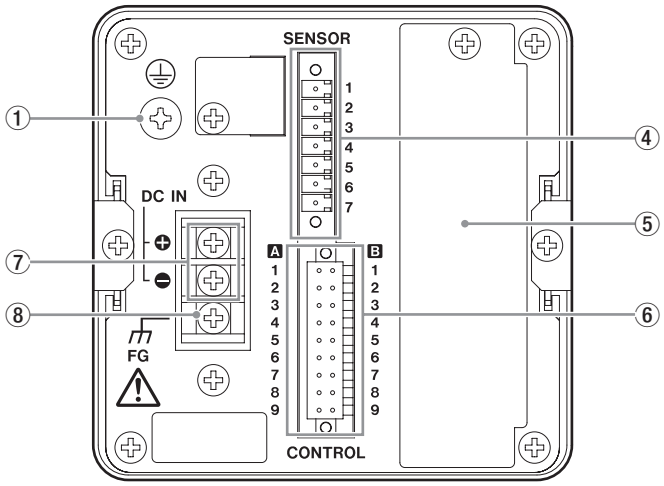
The operation of this key varies depending on the setting for CAL Lock (F3-5).
Pressing this key performs zero-point calibration while the calibration lock setting is OFF.
Pressing this key while the calibration lock setting is ON forces a reading on the display to be zero .
(Digital Zero function)

1-2. Rear panel

AC power model



DC power model



① Protective ground terminal screw

To prevent an electric shock hazard and electrostatic interference, be sure to connect the ground wire to this screw.

② AC power input terminals

Connects AC power. The voltage range is 100 to 240 V AC.

③ Frame ground (FG)

FG terminal for AC power supply. (The protective ground terminal and the FG terminal are electrically connected.)

④ Signal I/O terminal block

Connects a strain gage sensor or TEDS sensor

⑤ Option space

The optional NDIS panel (PN-260ND) can be installed in this area. (Because the option-installed model has an option board pre-installed in this area, the optional panel cannot be installed in the option-installed model.)

For detailed information about the option-installed model, see Chapter 16, "Specifications."

⑥ Control I/O terminal block

Connects control signals, decision outputs, etc.

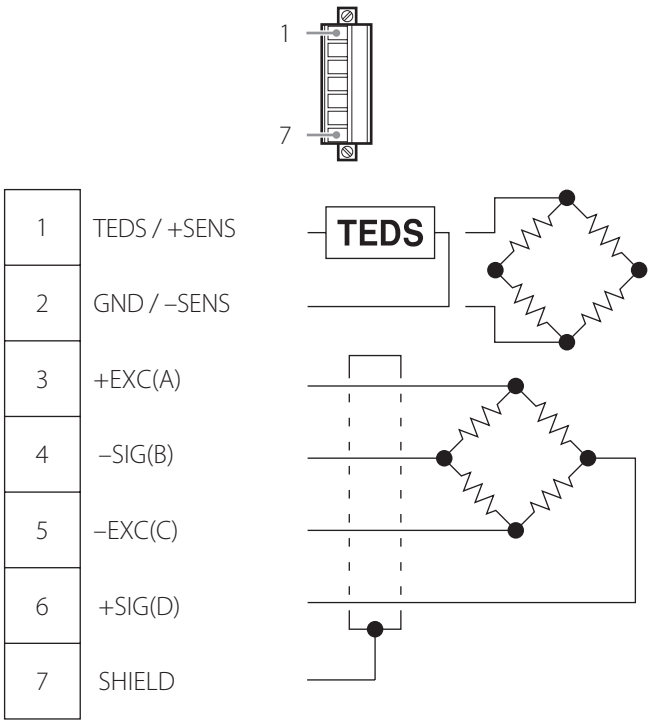
⑦ DC power input terminals

Connects DC power. The voltage range is 10 to 28 V DC.

⑧ Frame ground (FG)

FG terminal for DC power supply. (The protective ground terminal and the FG terminal are electrically connected.)

1-2-1. Signal I/O terminal block

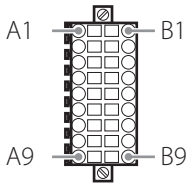


Pin assignment	Signal name	Wiring color
1	TEDS/+SENS	Orange
2	GND/-SENS	Green
3	+EXC (A)	Red
4	-SIG (B)	Black
5	-EXC (C)	Blue
6	+SIG (D)	White
7	Shield	Yellow

- The terminals 1 and 2 on the signal I/O terminal block are used as either remote sense terminals or TEDS sensor data terminals. Before connecting a sensor, you need to set Remote Sense/TEDS (F2-6) to match the function you are going to use.

  The initial setting is 0.Aut: TEDS auto-calibration (disable remote sense).
- The wiring colors shown are those of TEAC strain gage sensors.

1-2-2. Control I/O terminal block



1-2-3. Control I/O signals

Pin assignment	Signal name	Description
A1	V-OUT	Voltage output + An output voltage of about 2 V for an input of 1 mV/V is produced, which is proportionate to the sensor output. V-OUT is not isolated from the internal circuit. A negative output voltage for this output is generated from B1. Make sure that the cable you use is as short as possible.
A2	NC	No connections. Do not use for relay connections.
A3		
A4		
A5	CLEAR	To clear a hold mode other than the sample hold mode, set this signal to ON. To disable this signal, set Enable CLEAR Signal (F2-8) to OFF.
A6	JUDGE	This is the control signal for decision outputs. Only while the control signal is ON, decision outputs are enabled. To disable the signal, set Enable JUDGE Signal (F3-8) to OFF.
A7	HOLD	This is the start signal for a hold mode. While the signal is ON, a hold operation is performed. To disable the signal, set Hold Mode (F2-1) to 0.OFF (disable hold).
A8	D/Z	This signal digitally sets a reading to zero. The function is enabled only while both CAL Lock (F3-5) and Enable Digital Zero (F3-1) are ON. When the TD-260T is turned off, the digitally set zero is cleared.
A9	COM	This is the common terminal for A5, A6, A7, and A8. A photocoupler is used to isolate signals from A5 to A9 and the TD-260T internal circuit.

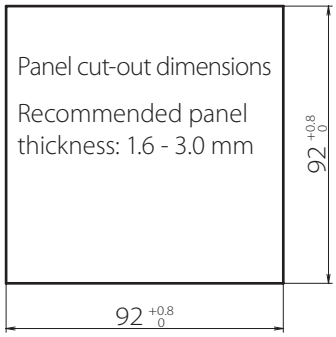
Pin assignment	Signal name	Description
B1	COM	Voltage output - Negative output voltage for A1
B2	LL	LL decision output (a contact)
B3	LO	LO decision output (a contact)
B4	COM	Common terminal for B2 and B3
B5	HH	HH decision output (a contact)
B6	HI	HI decision output (a contact)
B7	COM	Common terminal for B5 and B6
B8	OK	OK decision output (a contact)
B9	COM	Common terminal for B8

Connector used: Weidmüller S2L-SMT-3.50/1890LF3.2 SN BK BX or its equivalent
Applicable plug: Weidmüller B2L 3.50/18/180F SN BK BX or its equivalent

2. Hardware Installation

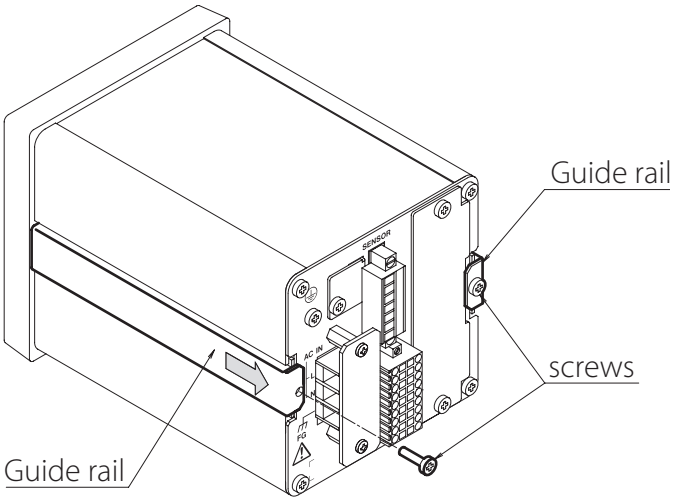
Follow these steps to install the TD-260T inside a control panel.

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

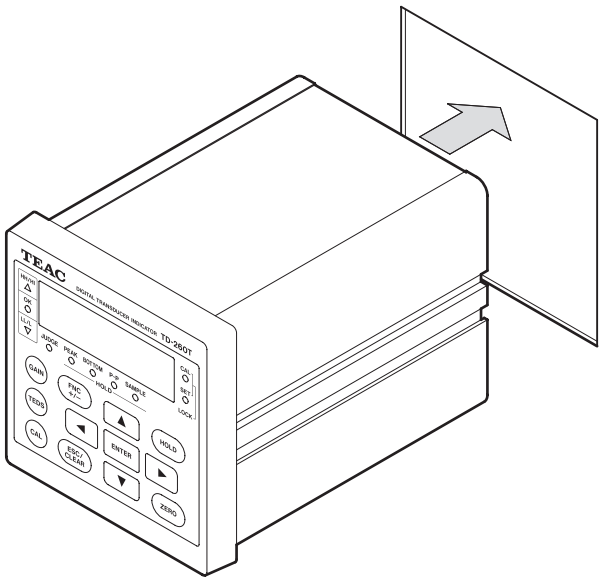


2. Remove the two screws, and then remove the guide rails on the right and left sides.

- DO NOT use screws other than those installed in the TD-260T.

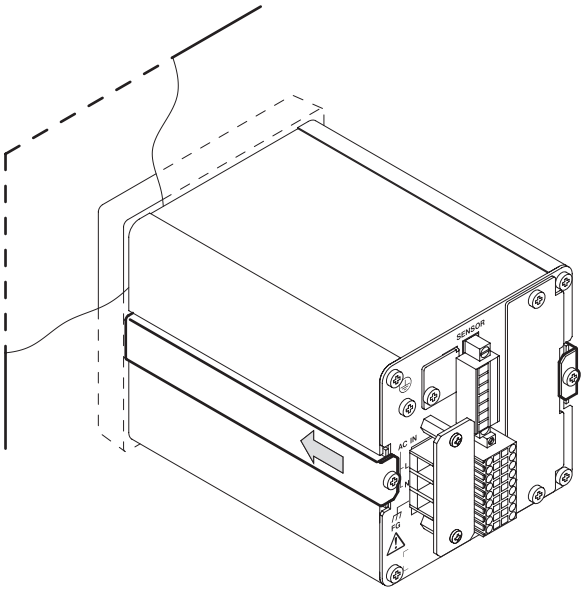


3. Push the TD-260T into the panel cut-out area from the front side of the panel.



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

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



3-1. Connecting to I/O terminal blocks

3-1-1. Connecting to sensor I/O terminal block

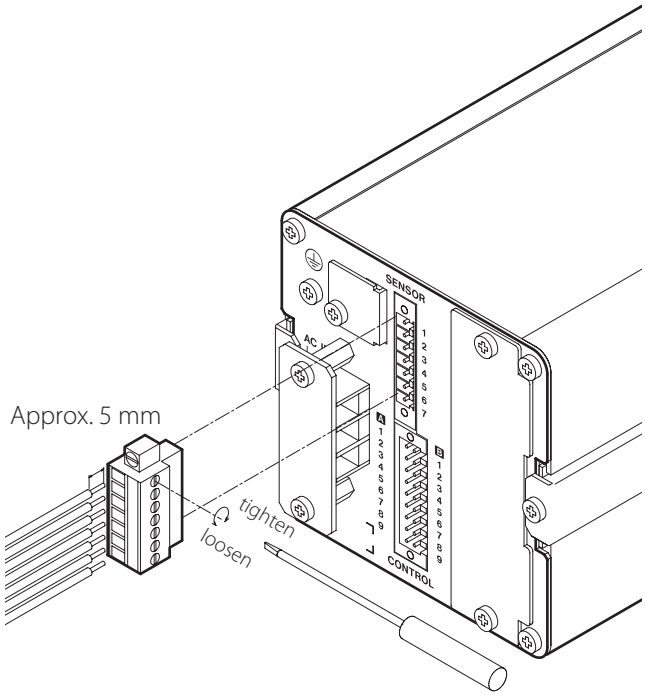
The TD-260T uses a 2-piece sensor input/output terminal block.

To connect wires to the provided connector BCZ 3.81/07/180F SN BK BX or its equivalent and then the connector to the terminal block, use the provided flathead micro screwdriver.

If you want to use a screwdriver other than the provided screwdriver, be sure to use a flathead screwdriver with teeth not exceeding either 2.5 mm in width or 0.4 mm in thickness.

1. **Strip off about 5 mm of the insulation from an end of each wire you connect, and then gently twist each bare end.**

   Use wires 0.2 to 1.5 mm^2 in cross-sectional area (28 to 16 AWG).



2. **While keeping each bare end twisted, insert it into the corresponding hole.**
3. **Secure each wire end to the hole by using the flathead screwdriver.**
4. **Lightly pull each wire and make sure that they are securely clamped.**
5. **Plug the wired connector into the terminal block in the TD-260T, and then secure the connector plug to the terminal block with screws.**

3-1-2. Connecting to control I/O terminal block

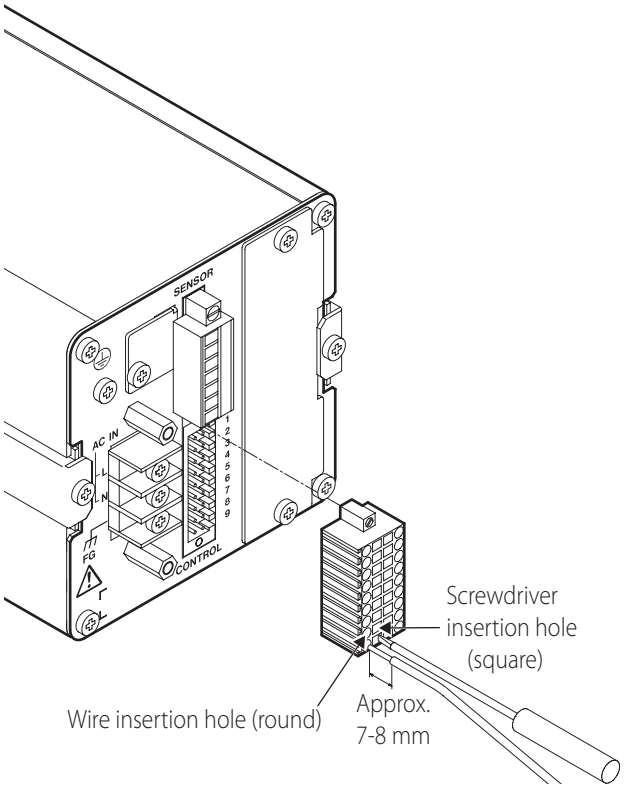
The TD-260T uses a 2-piece control input/output terminal block.

To connect wires to the provided connector B2L 3.50/18/180F SN BK BX or its equivalent and then the connector to the terminal block, use the provided flathead micro screwdriver.

If you want to use a screwdriver other than the provided screwdriver, be sure to use a flathead screwdriver with teeth not exceeding either 2.5 mm in width or 0.4 mm in thickness.

1. **Strip off about 7 to 8 mm of the insulation from an end of each wire you connect, and then gently twist each bare end.**

   Use wires 0.13 to 1.0 mm^2 in cross-sectional area (28 to 18 AWG).



2. **Insert the screwdriver into the square holes next to the wire insertion holes to enlarge the clamp areas.**
3. **While keeping each bare end twisted, insert it into the corresponding hole, and then secure it to the hole.**
4. **Lightly pull each wire and make sure that they are securely clamped.**
5. **Plug the wired connector into the terminal block in the TD-260T, and then secure the connector plug to the terminal block with the screws.**

3-2. Connecting strain gage sensor

3-2-1. About sensor connection terminals

Sensor connection terminals (1, 2) can be used as either remote sensing terminals or TEDS sensor data terminals. Before connecting a sensor, you need to set Remote Sense/TEDS (F2-6) to match the function you are going to use.
The initial setting is 0.Aut: TEDS auto-calibration (disable remote sense). For detailed information, see the section 6-1-2. "Remote Sense/TEDS."

CAUTION

If you want to use a sensor with a 6-wire connection (for remote sensing), set Remote Sense/TEDS (F2-6) to 2.rSE (disable TEDS) before connecting the sensor.

3-2-2. About remote sense

The TD-260T uses a 6-wire connection (for remote sensing) when calibrated at the factory.
Be aware that, if you connect a sensor by using 4 wires, and then perform an equivalent input calibration, an error may occur in a reading, resulting from the bridge voltage drop that is proportionate to the length of the cable extended.
A 6-wire connection (for remote sensing) is excellent for compensating for a voltage drop caused by the extension of the cable length or voltage change due to changes in temperature.
For applications of the TD-260T that may be exposed to varying temperatures including the use of the device in an outdoor installation system, or applications of the TD-260T that require overall accuracy, we recommend the 6-wire connection that includes remote sensing.

3-2-3. About bridge voltage (excitation voltage)

When you set the bridge voltage, make sure that the output voltage from the sensor is relatively high, but that it does not exceed the maximum excitation voltage specified on the sensor test report at the same time.
Setting a voltage that exceeds the sensor's maximum excitation voltage may cause the sensor to malfunction.

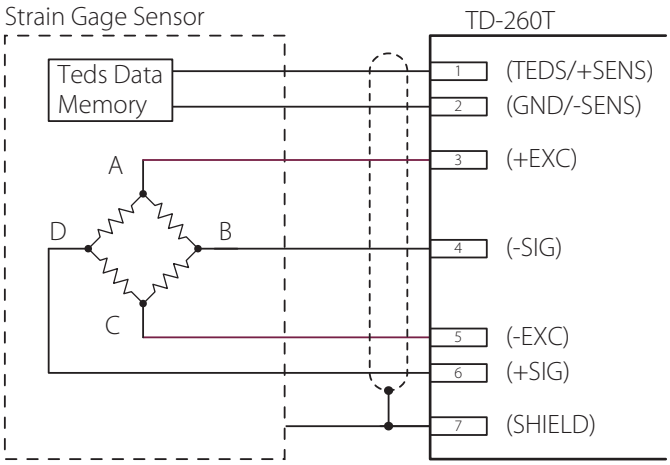
CAUTION

- If the sensor's maximum excitation voltage is lower than 10 V, be sure to set Bridge Voltage (F2-5) to 2.5 before connecting the sensor.
- For TEDS calibration, if the bridge voltage setting is higher than the maximum excitation voltage recorded in the TEDS memory when TEDS data is loaded, the bridge voltage setting is automatically changed to a setting equal to or lower than the maximum excitation voltage..

NOTE

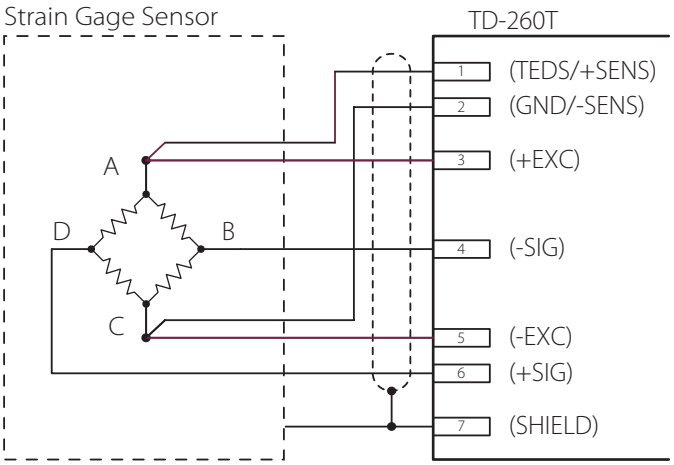
- The initial setting is 2.5 V.

TEDS sensor & 4-wire connection



If you do not use the TEDS function, you do not need to connect any device to the terminal 1 or 2.

6-wire connection

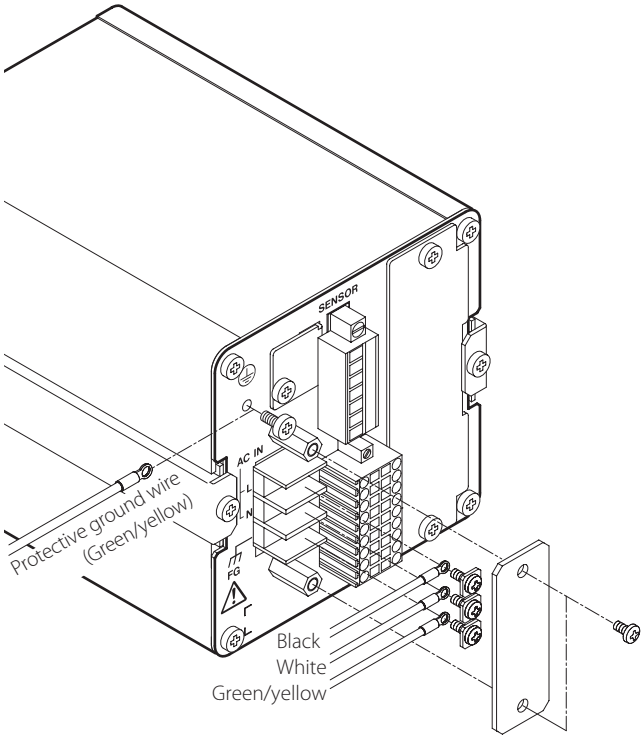


3-3. Connecting to power input terminals, FG terminal, and protective ground terminal

Check the power supply and determine that the type of the power supply you have received conforms to the specifications that were provided at the time of order placement, and then connect the AC or DC power supply.

3-3-1. AC power supply

The AC power input voltage is 100–240 V AC.
For power supply connection, use power wires that are 0.326 to 2.081 mm^2 in cross-sectional area (22 to 14 AWG).
Connect those wires to the terminal block by using crimp connectors (for M3, 6 mm or less in width).
For grounding, use a ground wire (green/yellow) that is 3.309 mm^2 in cross-sectional area (12 AWG).
Connect the wire to the protective ground terminal by using a crimp connector (for M4).



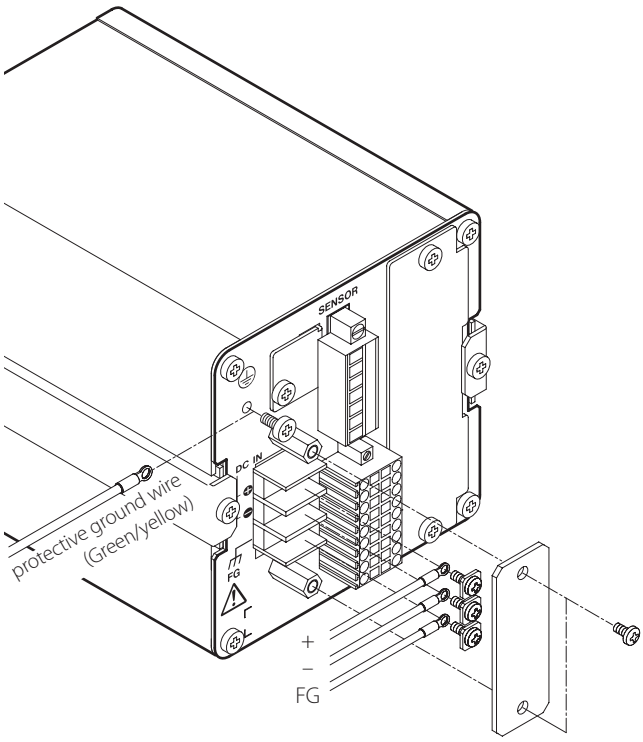
- Power cord wire colors (for the provided AC power cord)
  L: Black
  N: White
  FG: Green/yellow
- The provided AC power cord is only intended for use within Japan, rated for 10 A at 125 V AC. If you want to use the TD-260T at a voltage exceeding the specified voltage or overseas, be sure to use another AC power cord that is more appropriate for your operating
- The FG terminal is internally connected to the protective ground.
- The frequency is 50–60 Hz.

CAUTION

- For the TD-260T to warm up, wait for more than 5 minutes after it is turned on.
- Be sure to install the cover over the power input terminal block.

3-3-2. DC power supply

The DC power input voltage is 10–28 V DC.
For power supply connection, use power wires that are 0.326 to 2.081 mm^2 in cross-sectional area (22 to 14 AWG). Connect those wires to the terminal block by using crimp connectors (for M3, 6 mm or less in width).
For grounding, use a ground wire (green/yellow) that is 3.309 mm^2 in cross-sectional area (12 AWG).
Connect the wire to the protective ground terminal by using a crimp connector (for M4).



- The FG terminal is internally connected to the protective ground.
- The current draw at 12 V DC input is about 0.8 A.

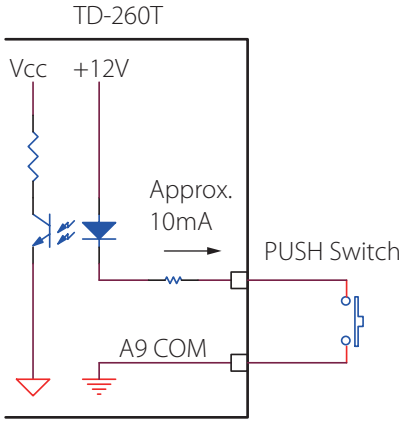
CAUTION

- If you want to use the TD-260T as a CE compliant unit, the length of the power cord to be used for the TD-260T must be 3 m or less.
- For the TD-260T to warm up, wait for more than 5 minutes after it is turned on.
- Be sure to install the cover over the power input terminal block.

3-4. Connecting to control I/O terminals

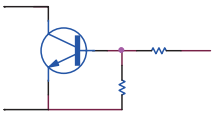
3-4-1. Connecting external input

An input signal is generated from an external input circuit when a control terminal and COM terminal on the external input circuit are short-circuited and then opened.
Terminals can be short-circuited through contact or noncontact technologies (transistor, TTL open collector).

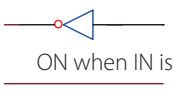


When contact signal is used:

When transistor is used:

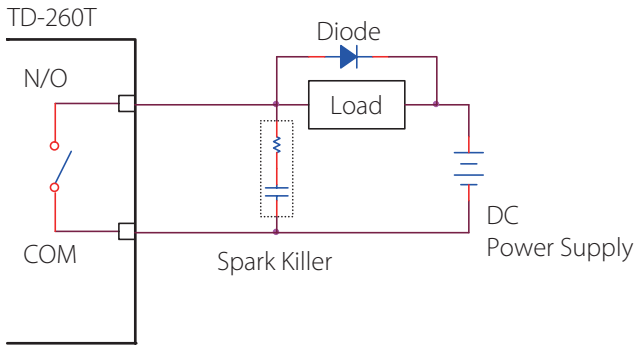


When TTL open collector is used:



- The current draw is about 10 mA when the external contact is in ON state. Use a contact device with a withstand voltage of 20 V or more and about 20 mA capacity in ON state.
- The common terminal for control input/output terminals A5 (CLEAR), A6 (JUDGE), A7 (HOLD), and A8 (D/Z) is A9 (COM).
- Do not apply external voltages.

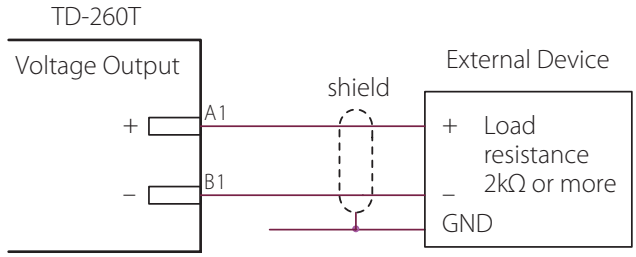
3-4-2. Connecting decision outputs



- Relays are used for decision outputs. The relay contact rating is 1 A and 30 V DC. Be sure to use relays within the specified current and voltage ratings.
- Install a spark killer for noise reduction as close to the load circuit, such as relay coil, you use as possible.
- Use a rectifying diode.
- The common terminal for control output terminals B5 (HH) and B6 (HI) is B7 (COM).
- The common terminal for control output terminals B2 (LL) and B3 (LO) is B4 (COM).

3-4-3. Connecting voltage output (V-OUT)

The output voltage is proportionate to the sensor input and approximately 2 V for a sensor input of 1 mV/V.
The above output voltage is produced after the zero point of the sensor has been calibrated during the calibration procedure.
With the digital zero function (D/Z), the output voltage cannot be reduced to zero.



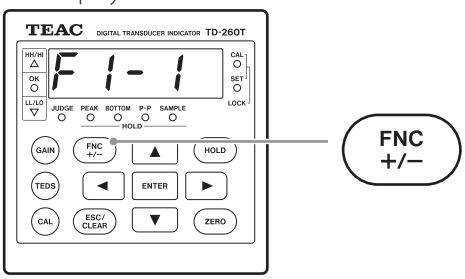
- This output is not isolated from the internal circuit. Be sure to install an external device as close to this output as possible by using 2-core shielded cables or equivalent.

4-1. Changing set values

Each setup screen can be identified with its setup screen number consisting of a function number and a suffix number, F1-1, for example.
To change a set value, you need to put the TD-260T into the corresponding setup mode by displaying the appropriate setup screen number and then pressing ENTER.

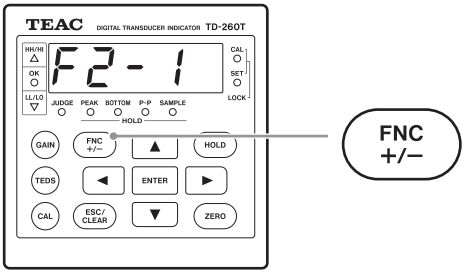
1. To Enter the setup screen number, press FNC.

The display shows "F1-1."



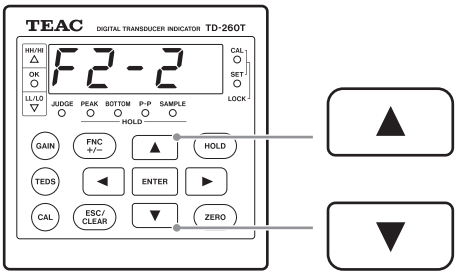
2. To change the function number, press FNC.

Each time you press FNC, the display cycles through function numbers such as F2 and F3.



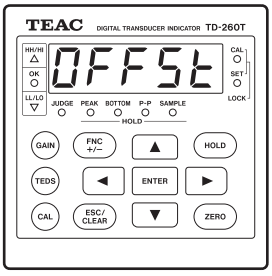
3. To change the suffix number, press ▲ or ▼.

Each time you press ▲, the suffix number is increased by one, or each time you press ▼, the suffix number is decreased by one.

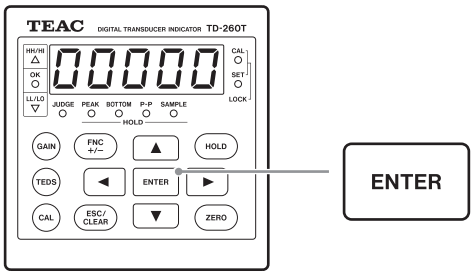


NOTE

If you press ENTER while the setup screen number is displayed, the display switches to the setup mode screen, shown in Step 5 of this section, before the setup item name and set value appear.
If you do not enter any key for 0.5 seconds, the setup item name appears, followed by the set value.

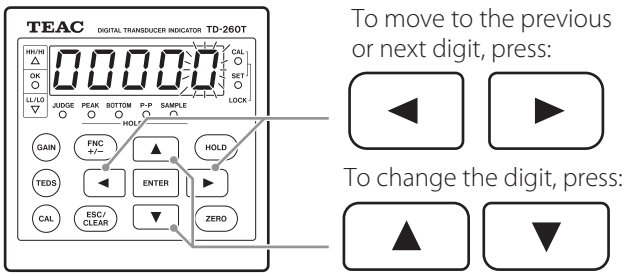


4. To switch to the setup mode, press ENTER.

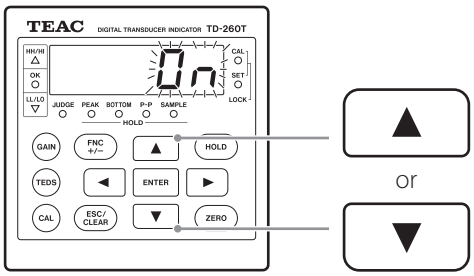


For detailed information about operating each setup screen, see the next chapters.

5. To change a setting in the setup mode, do the following.
If the displayed value includes a blinking digit, you can change it by pressing the arrow buttons; if you press ▲ or ▼, the blinking digit increases or decreases. To move to the previous or next digit, press ◀ or ▶.

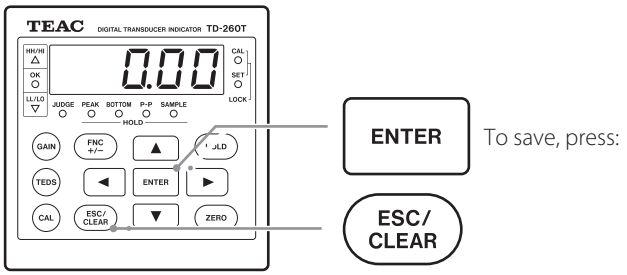


If the entire value or text on the display blinks, you can select another setting by pressing ▲ or ▼.



6. To save the selection, press ENTER, and then to exit the setup mode, press ESC.

A reading is displayed.



CAUTION

The display also shows a reading again if you do not press any key for one minute.

4-2. List of setup items and settings

4-2-1. F1 setup screens

x: Applicable

Setup screen number	Setup item name / Displayed text	Initial setting	Setting range	Page	SET Lock	CAL Lock	Unit
F1-1	HI value HI	150.00	-19999 to 9999	30	x		
F1-2	LO value LO	050.00	-19999 to 99999	31	x		
F1-3	HH value HH	999.99	-19999 to 99999	31	x		
F1-4	LL value LL	-199.99	-19999 to 99999	32	x		
F1-5	Enable HH and LL HH-LL	OFF	OFF, ON	32	x		
F1-6	Hysteresis HYS	000.00	00000 to 19999	34	x		
F1-7	Comparison Mode COMP	0.ALL	0.ALL: Always compare to generate decision outputs 1.Stb: Compare to generate decision output when stabilized 2.no0: Always compare to generate decision outputs except near zero 3.n0S: Compare to generate decision outputs when stabilized except near zero 4.HLd: Compare to generate decision outputs when in hold mode 5.OFF: Do not compare	36	x		
F1-8	Near Zero NEAr-0	001.00	00000 to 09999	36	x		
F1-9	Motion Detection Time Md t	1.5	0.0 to 9.9	37	x		Sec
F1-10	Motion Detection Bandwidth Md L	000.05	00000 to 00999	37	x		
F1-11	Zero Tracking Time Interval Zt t	0.0	0.0 to 9.9	38	x		Sec
F1-12	Zero Tracking Bandwidth Zt L	000.00	00000 to 00999	38	x		
F1-13	Digital Zero Limit 0 LIn	99999	00000 to 99999	50	x		
F1-14	Clear Digital Zero 0 CLr	0 CLr		51	x		
F1-15	Comparative Output Pattern C Out	0.nor	0.nor: Standard output 1.ArE: Area output	35	x		

4-2-2. F2 setup screens

x: Applicable

Setup screen number	Setup item name / Displayed text	Initial setting	Setting range	Page	SET Lock	CAL Lock	Unit
F2-1	Hold Mode HoLd	1.SPL	0.OFF:Disable hold 1.SPL: Sample hold 2.PEk: Peak hold 3.bot: Bottom hold 4.P2P: Peak-to-Peak hold	43	x		
F2-2	Digital Offset OFFSt	00000	-19999 to 19999	52	x		
F2-3	Digital Filter d FLt	OFF	Moving average: OFF, 4, 8, 16, 32, 64, 128, 256	39	x		# of times
F2-4	Analog Filter A FLt	100	3, 10, 30, 100, 300	39	x		Hz
F2-5	Bridge Voltage bu	2.5	10, 2.5	24		x	V
F2-6	Remote Sense/TEDS rSEn	0.Aut	0.Aut: TEDS auto-calibration 1.tEd: Enable TEDS/disable remote sense 2.rSE: Enable remote sense/disable TEDS	23		x	
F2-7	External Hold Mode E HLd	0.LEv	0.LEv: Level, 1.PLS: Pulse	43	x		
F2-8	Enable CLEAR Signal CLEAr	ON	OFF, ON	44	x		

4-2-3. F3 setup screens

x: Applicable

Setup screen number	Setup item name / Displayed text	Initial setting	Setting range	Page	SET Lock	CAL Lock	Unit
F3-1	Enable Digital Zero dO En	ON	OFF, ON	51	x		
F3-2	Enable Block Setting SECt	OFF	OFF, ON	44	x		
F3-3	Minimum Scale SCALE	1	1, 2, 5, 10	24		x	
F3-4	Display Refresh Rate dI SP	4	4, 6, 10, 20	25		x	# of times
F3-5	CAL Lock C LOC	OFF	OFF, ON	22			
F3-6	SET Lock S LOC	OFF	OFF, ON	40			
F3-7	Static Strain Mode uSt	OFF	OFF, ON	40	x		
F3-8	Enable JUDGE Signal JudgE	OFF	OFF, ON	45	x		

4-2-4. F4 setup screens

x: Applicable

Setup screen number	Setup item name / Displayed text	Initial setting	Setting range	Page	SET Lock	CAL Lock	Unit
F4-1	BCD Data Refresh Rate bcd	100	1, 2, 5, 10, 20, 50, 100	56	x		# of times /sec
F4-2	BCD Output Check C bcd	C bcd		56			
F4-3	RS-232C Interface Setting 232c	13100	1 3 1 0 0 ↑ ↑ ↑ ↑ ↑ a b c d e a Transmission mode 0: Command transmission mode 1: Continuous transmission mode b Baud rate 0: 1200bps 1: 2400bps 2: 4800bps 3: 9600bps 4: 19200bps c Data bits 0: 7bits 1: 8bits d Parity bits 0: None 1: Odd 2: Even e Stop bits 0: 1bit 1: 2bits	58	x		
F4-4	DA Zero dA 0	000.00	-19999 to 99999	67	x		
F4-5	DA Full Scale dA F	100.00	-19999 to 99999	67	x		
F4-6	Save TEDS Data tEd 0	2.000		70	x		
F4-7	Restore TEDS Data tEd 1	00000		71	x		
F4-8	Decision-Output Check C Out	C Out	Turn on the decision outputs for HH, HI, OK, LO, and LL, one by one	41			
F4-9	Control-Input Check C In	C IN	Show the ON/OFF state of CLEAR, HOLD, JUDGE, and DZ on the LED display	41			
F4-10	Beep bEEP	ON	OFF, ON	42	x		
F4-11	Select Data Output d Out	0.dSP	0.dISP: Reference the display; hold value is sent in hold mode 1.InP: Reference the input; input value is sent in hold mode	42	x		

5. Error Messages

LoAd	ADC overflow in the positive direction
-LoAd	ADC overflow in the negative direction
FuLL	Display overflow in the positive direction (higher than 99999)
-FuLL	Display overflow in the negative direction (lower than –19999)
oFuL	Input higher than 3.2 mV/V
-oFuL	Input lower than -3.2 mV/V
Err00	• Exceeding zero-point adjustable range • Zero-point adjustment not complete within the specified time period
Err01	Sensor input during calibration higher than 3.2 mV/V
Err03	Rated capacity set to 0000
Err04	Sensor input lower than adjustable range (aprrox. 0.28 mV/V)
Err05	Negative sensor output during actual load calibration
Err06	TEDS-supported sensor not connected
Err07	Wrong password for TEDS save operation
Err08	Invalid set value
Err09	Rated output outside setting range (lower than 0.28 mV/V or higher than 3.2 mV/V)
Err 10	Sensor mismatch: different from the sensor used for TEDS calibration
Err 12	BV10V unsupported sensor used. BV auto-set to 2.5 V
Err 13	Invalid operation
Err 14	Digital zero limit error
ErrFF	Error other than those shown above
dErr	DA output higher than 10.9 V
-dErr	DA output lower than -10.9 V
cErr0	G-000 check error (IRAM)
cErr 1	G-001 check error (SRAM)
cErr2	G-002 check error (EEPROM)
cErr3	G-003 check error (TEDS)
noCAL	Not calibrated at the factory
no_dA	DA not adjusted at the factory
0-CAL	Adjusting zero-point now
tEdS	• Accessing TEDS now • Calibrating TEDS now

Calibration shown in this document is the process of adjusting parameters to determine a reading to be displayed on the TD-260T when a strain gage sensor is connected. The following three calibration methods are available in the TD-260T.

1. Equivalent input calibration

It is a simple calibration method that requires not the use of an actual load, but only the key entry of the rated output (mV/V) and rated capacity (value you want to display) of a strain gage sensor. With this method, you can easily perform a calibration if an actual load cannot be applied.
Examples:

In case of load, enter:
100 kN for the rated capacity and 2.001 mV/V for the rated output

In case of pressure, enter:
10.00 MPa for the rated capacity and 2.002 mV/V for the rated output

In case of torque, enter:
15.00 N · m for the rated capacity and 2.502 mV/V for the rated output.

As shown above, enter values specified on a test report so that the TD-260T automatically determines and displays a gain.

2. Actual load calibration

It is a calibration method that requires you apply an actual load to a strain gage sensor and then measure it.
For accurate calibration, which minimizes errors, you need to apply a load that is close to the sensor's maximum measurable value.

3. TEDS calibration

It is a calibration method that uses data on the rated output (mV/V) and rated capacity of a strain gage sensor both stored in the TEDS memory.
The TEDS memory is available in 1-kilobit and 4-kilobit sizes. Note that the TD-260T supports the 4-kilobit memory only.

Checking a sensor before calibration

Calibration cannot be done if the TD-260T displays an unstable reading or error when you connect a sensor to the TD-260T and then turn it on. In that case, set the TD-260T to the static strain mode by performing Static Strain Mode (F3-7), and then check a reading on the display again. In this mode, the output from the sensor is displayed in microstrains; the displayed output is 0 to ±6400.0 for the input of 0 to ±3.2 mV/V.

CAUTION

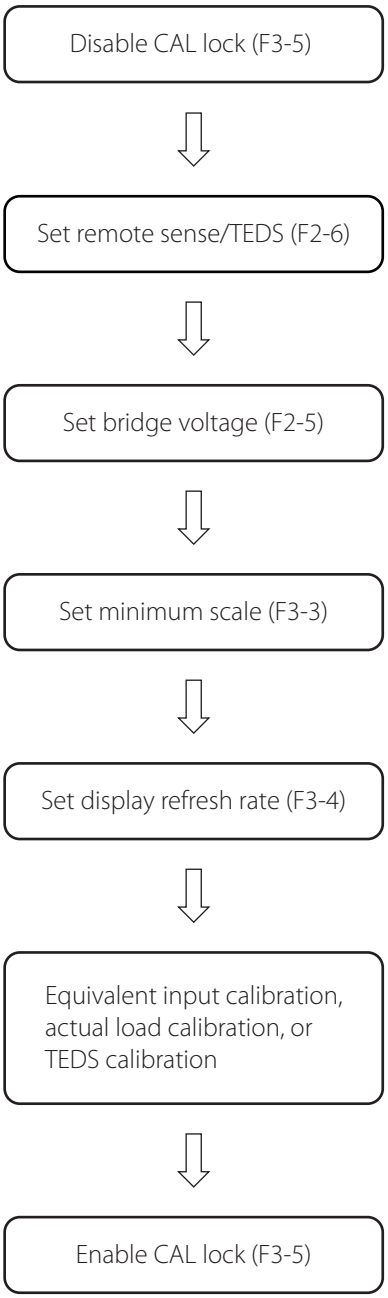
The terminals (1 and 2) on the signal input/output terminal block can be used as either remote sense terminals or the TEDS sensor data terminals. Before connecting a sensor, you need to change the setting for Remote Sense/ TEDS (F2-6) to match the function you are going to use. The initial setting is 0.Aut: TEDS auto-calibration (disable remote sense). For detailed information, see the section 6-1-2. "Remote Sense/TEDS."

The test report included with a strain gage sensor provides the following information.
Rated Capacity: load, atomospheric pressure, etc. (Unit: kN, Mpa, etc.)
Rated output: voltage (Unit: mV/V)
Linearity: %R.O
Hysteresis: %R.O
Safe excitation voltage (maximum): V (bridge voltage)
Input Terminal Resistance: Ω
Output Terminal Resistance: Ω
Zero Balance: x10-6 strain (microstrain)

- Data required for equivalent input calibration are rated capacity and rated output.
- TEDS sensor has the above data saved in its internal memory.

6-1. Common calibration procedure

The three calibration methods available in the TD-260T, equivalent input calibration, actual load calibration, and TEDS calibration, follow the same steps before and after calibration. Below is the flow chart of the calibration procedure.



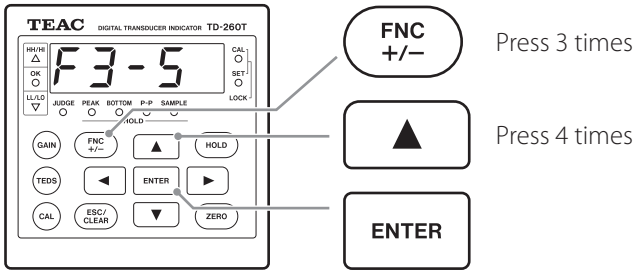
Shown inside the brackets ( ) are setup screen numbers.

This section provides information about the steps to be performed before and after calibration, followed by equivalent input calibration, actual load calibration, and TEDS calibration.

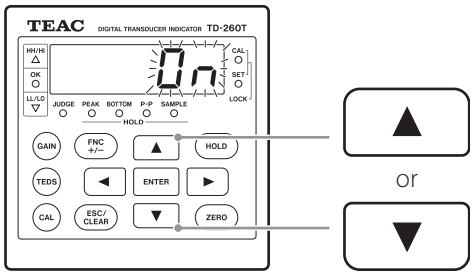
6-1-1. Enabling and disabling CAL lock

Normally the TD-260T is used with the calibration lock set to ON. Be sure to set the calibration lock to OFF before calibration, and then set it to ON again after calibration.

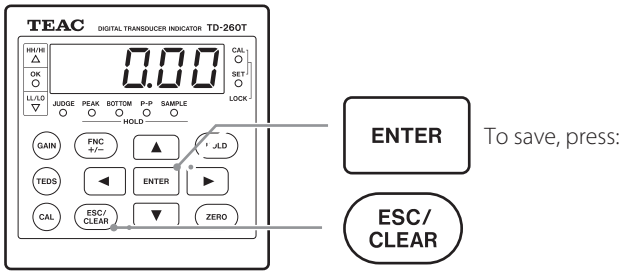
1. Enter the setup screen number F3-5.



2. To select ON or OFF, press ▲ or ▼.



3. To save the selection, press ENTER, and then to exit the setup mode, press ESC.



CAUTION

- The calibration lock setting changes the function of the ZERO key.
  If you press ZERO with the calibration lock set to ON, the displayed reading is digitally set to zero.
  With the calibration lock set to OFF, zero-point calibration is performed.
- To prevent the calibration values from being accidentally changed, be sure to set the calibration lock to ON.

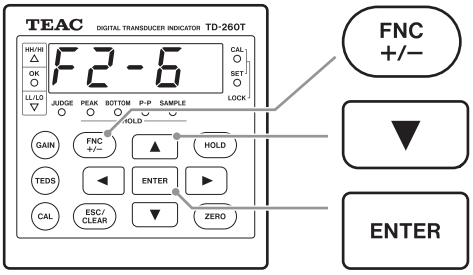
NOTE

For detailed information about setup items whose settings cannot be changed with the calibration lock set to ON, see the section 4-2. "List of setup items and settings."

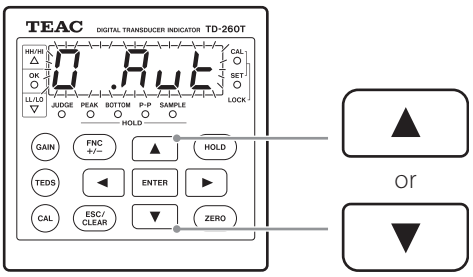
6-1-2. Remote Sense/TEDS

The signal input terminals (1 and 2) can be used as either remote sense terminals or TEDS sensor data terminals.
You need to set the terminals to one of the available settings before connecting a sensor to the TD-260T.

1. Enter the setup screen number F2-6.



2. To change the setting, press ▲ or ▼.



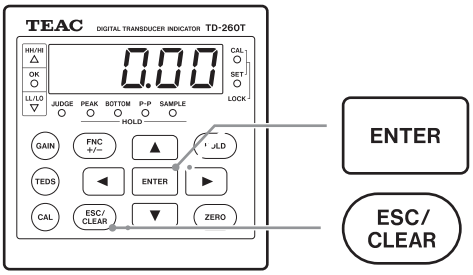
The following three settings are available.

0.Aut: TEDS auto-calibration (disable remote sense)
If the currently connected TEDS transducer is recognized as a transducer different from the one used for last calibration, calibration is automatically performed when you turn the TD-260T on.

1.tEd: Enable TEDS (disable remote sense)
You need to manually perform TEDS calibration.

2.rSE: Enable remote sense (disable TEDS)
You need to connect a 6-wire sensor.

3. To save the selection, press ENTER, and then to exit the setup mode, press ESC.



CAUTION

If you want to use a 6-wire connection (for remote sensing), be sure to select 2.rSE to enable remote sense and disable TEDS before connecting a sensor.
Connecting a TEDS sensor with this setting may damage the sensor and the TD-260T.

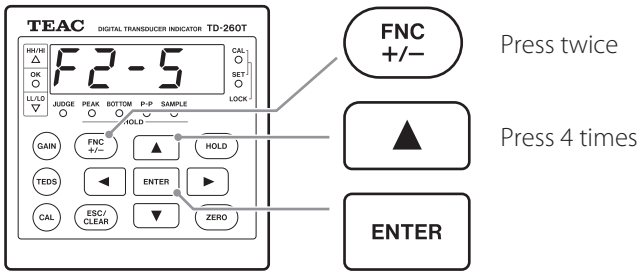
NOTE

- The initial setting is 0.Aut: TEDS auto-calibration (disable remote sense).
- If you use neither remote sense nor TEDS sensor, be sure to select 0.Aut: TEDS auto-calibration.

6-1-3. Bridge voltage

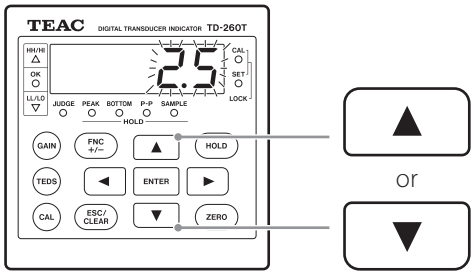
You need to set the bridge voltage, which is supplied to a strain gage sensor.

1. Enter the setup screen number F2-5.

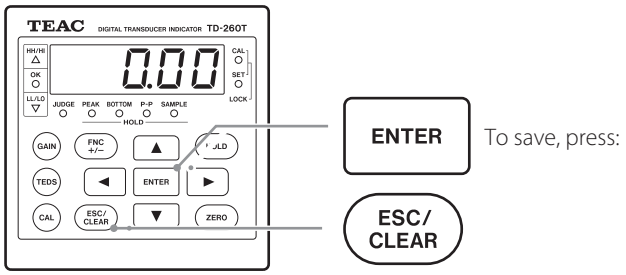


2. To enter 2.5 or 10, press ▲ or ▼.

Making sure that the output voltage from the sensor is relatively high, but that it does not exceed the maximum excitation voltage specified on the sensor test report at the same time, choose between the two values.



3. To save the selection, press ENTER, and then to exit the setup mode, press ESC.



CAUTION

- Setting a voltage that exceeds the sensor's maximum excitation voltage may cause the sensor to malfunction.

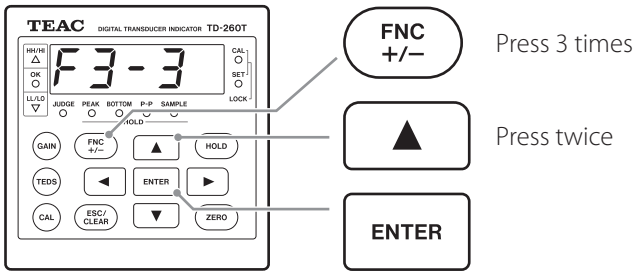
NOTE

- The initial setting is 2.5 V.
- For TEDS calibration, if the bridge voltage setting is higher than the maximum excitation voltage recorded in the TEDS memory when TEDS data is loaded, the bridge voltage setting is changed to a setting equal to or lower than the maximum excitation voltage.

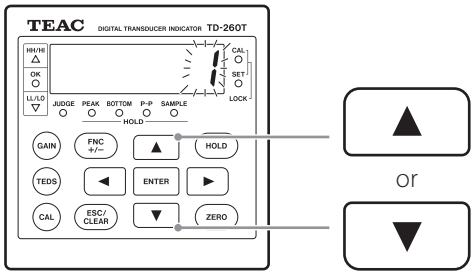
6-1-4. Minimum scale

You can set the minimum increment value that is used to display a change in the digital reading.

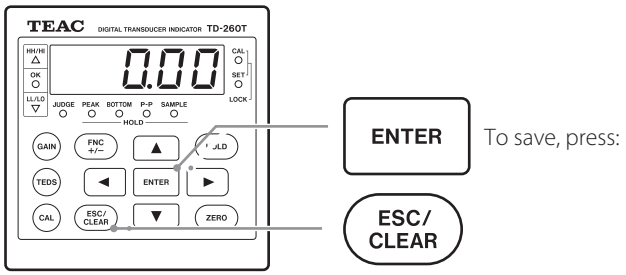
1. Enter the setup screen number F3-3.



2. To select 1, 2, 5, or 10, press ▲ or ▼.



3. To save the selection, press ENTER, and then to exit the setup mode, press ESC.



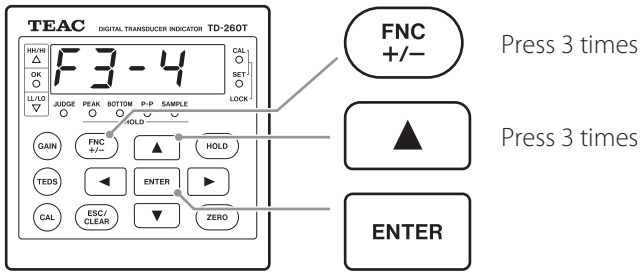
NOTE

The initial setting is 1.

6-1-5. Display Refresh Rate

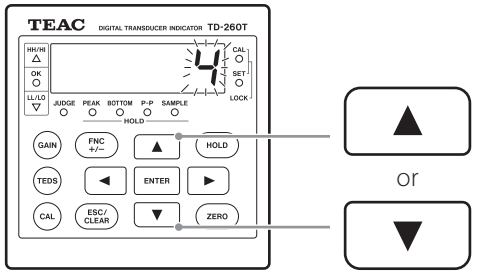
You can select the display refresh rate per second for a reading.

1. Enter the setup screen number F3-4.

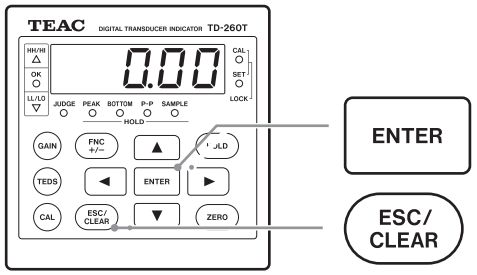


2. All the digits of the displayed value blinks.

To select 4, 6, 10, or 20, press ▲ or ▼.



3. To save the selection, press ENTER, and then to exit the setup mode, press ESC.

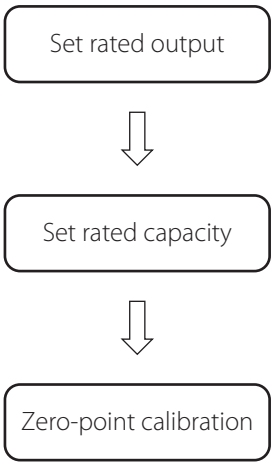


NOTE

The initial setting is 4.

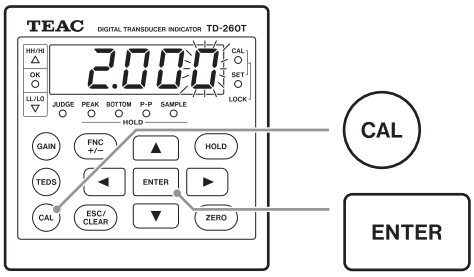
6-2. Equivalent input calibration

You can determine the calibration values by setting the rated output and rated capacity shown on the test report.
Using this calibration method, you can easily perform a calibration without applying an actual load.



1. Press CAL, and then press ENTER.

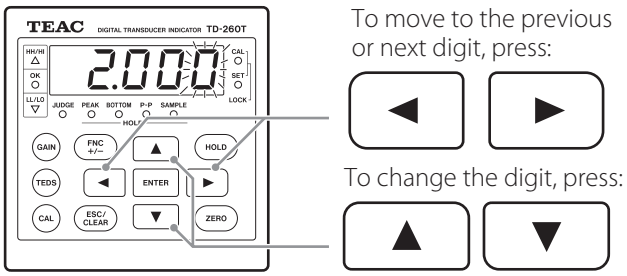
The rated output (mV/V) appears on the display with the least significant digit blinking.



2. To set the rated output;

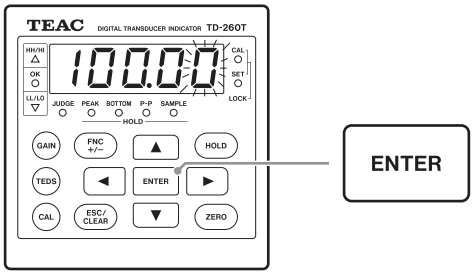
change the blinking digit of the value by pressing ▲ or ▼.

To move to the previous or next digit, press ◀ or ▶.



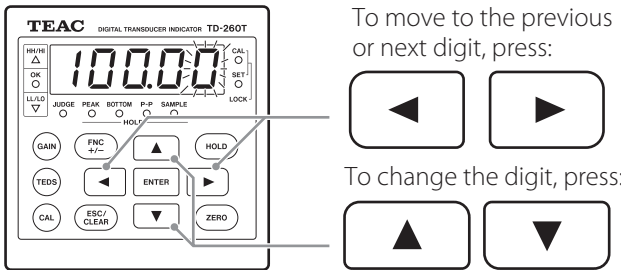
3. To save the rated output you entered, press ENTER.

The rated capacity appears with the least significant digit blinking.

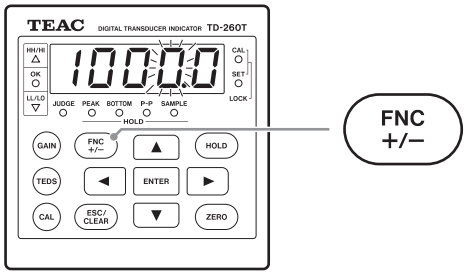


4. To set the rated capacity;

change the blinking digit of the value by pressing ▲ or ▼. To move to the previous or next digit, press ◀ or ▶.



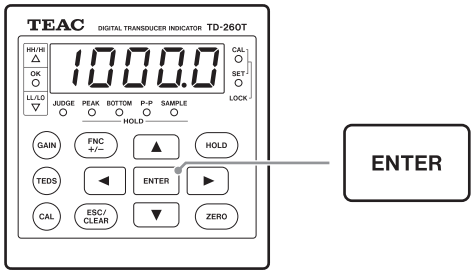
To change the decimal point position, blink the digit you want to the left of the decimal point by pressing ◀ or ▶, and then press FNC.



NOTE

The position of the decimal point you set in this step is used for readings on the TD-260T.

5. To save the rated capacity you entered, press ENTER.



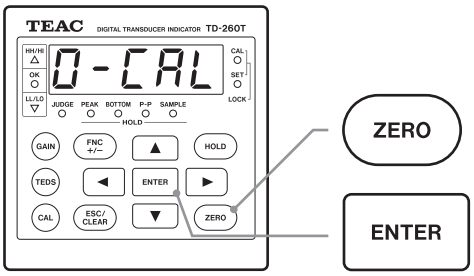
CAUTION

If you use the D/A option, the rated capacity is set as the D/A full scale value.

6. To perform zero-point calibration;

with no load on the sensor, press ZERO, and then press ENTER.

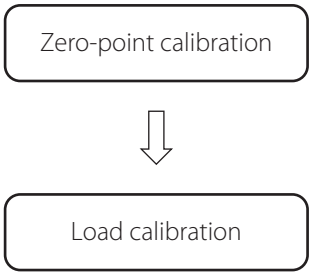
The display shows "0-CAL," followed by zero for a reading, showing that the zero-point calibration is completed.



If a calibration error is displayed, make the appropriate correction, and then repeat the calibration.

6-3. Actual load calibration

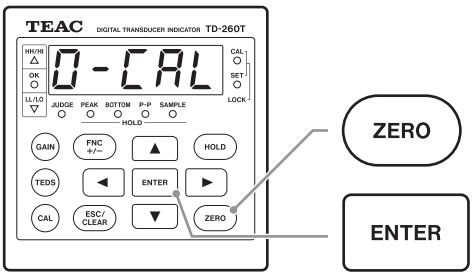
You can perform a calibration by applying an actual load to the sensor.



1. To perform zero-point calibration;

with no load on the sensor, press ZERO, and then press ENTER.

The display shows "0-CAL," followed by zero for a reading, showing that the zero-point calibration is completed.

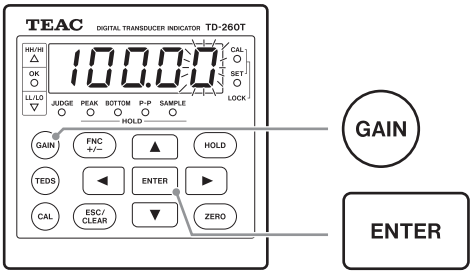


If a calibration error is displayed, make the appropriate correction, and then repeat the calibration.

2. To perform a calibration by using a load;

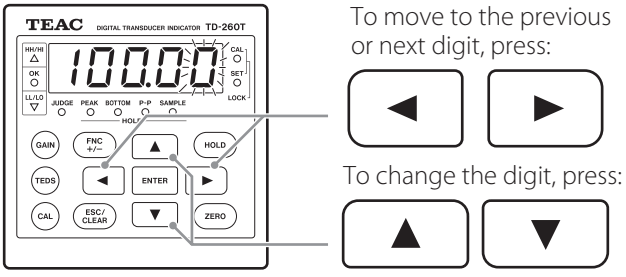
apply an actual load to the sensor. Press GAIN, and then press ENTER.

The value for the rated capacity appears with the least significant digit blinking.

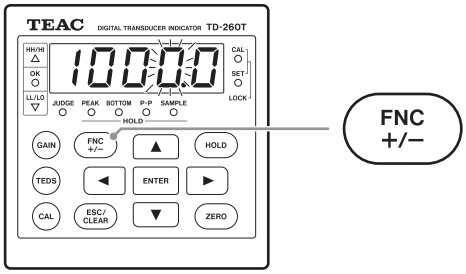


3. To set the rated capacity;

Now you need to enter the value of the load that is applied to the sensor. To do so, change the blinking digit of the value by pressing ▲ or ▼. To move to the previous or next digit, press ◀ or ▶.



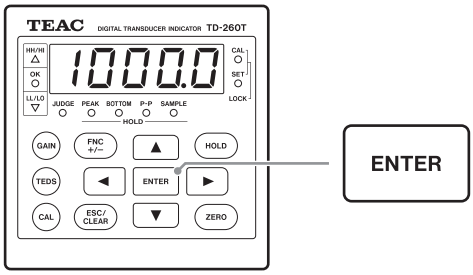
To change the decimal point position, blink the digit you want to the left of the decimal point by pressing ◀ or ▶, and then press FNC.



NOTE

The position of the decimal point you set in this step is used for readings on the TD-260T.

4. To save the rated capacity you entered, press ENTER.



If a calibration error is displayed, make the appropriate correction, and then repeat the calibration.

CAUTION

If you use the D/A option, the rated capacity is set as the D/A full scale value.

6-4. TEDS calibration

A TEDS sensor has calibration information including the rated output and capacity stored in its internal memory.
Using TEDS calibration, you can load the calibration information and automatically register it as calibration values.

Load TEDS data and modify loaded data

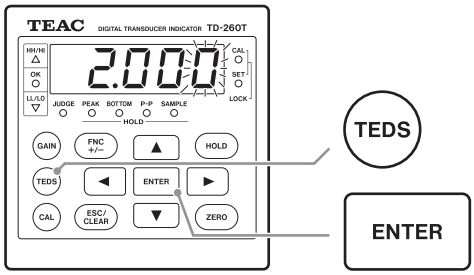
⇩

Zero-point calibration

1. To load the TEDS data;

press TEDS, and then press ENTER.

The rated output (mV/V) you loaded appears with the least significant digit blinking.



If you want to change the displayed data, you can change the blinking digit of the value by pressing ▲ or ▼.

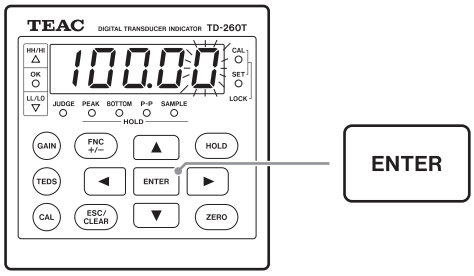
To move to the previous or next digit, press ◀ or ▶.

CAUTION

If the bridge voltage setting is higher than the maximum excitation voltage recorded in the TEDS memory when TEDS data is loaded, the bridge voltage setting is automatically changed to a setting equal to or lower than the maximum excitation voltage.

2. To save the rated output or the change you made, press ENTER.

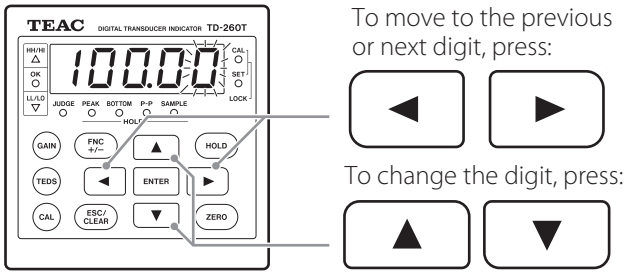
The rated capacity appears with the least significant digit blinking.



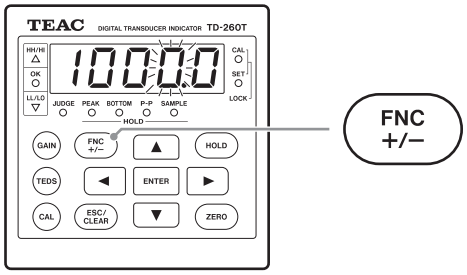
3. To set the rated capacity;

If you want to change the displayed data, you can change the blinking digit of the value by pressing ▲ or ▼.

To move to the previous or next digit, press ◀ or ▶.



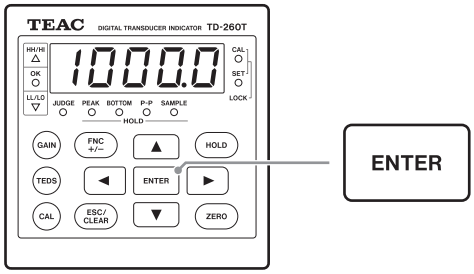
To change the decimal point position, blink the digit you want to the left of the decimal point by pressing ◀ or ▶, and then press FNC.



NOTE

The position of the decimal point you set in this step is used for readings on the TD-260T.

4. To save the rated capacity or the change you made, press ENTER.



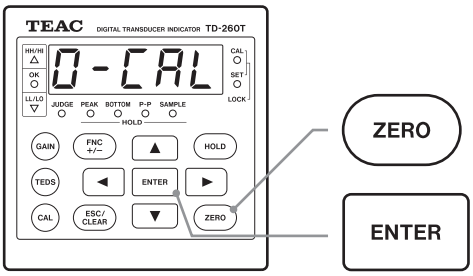
CAUTION

If you use the D/A option, the rated capacity is set as the D/A full scale value.

5. To perform zero-point calibration;

with no load on the sensor, press ZERO, and then press ENTER.

The display shows "0-CAL," followed by zero for a reading, showing that the zero-point calibration is completed.



If a calibration error is displayed, make the appropriate correction, and then repeat the calibration.

NOTE

- If Remote Sense/TEDS (F2-6) is not set to 0.Aut or 1.tEd, "Err08" appears on the display, followed by a reading.
- If Remote Sense/TEDS (F2-6) is set to 2.rSEn, "Err13" appears on the display, followed by a reading.
- If Remote Sense/TEDS (F2-6) is set to a value other than 2.rSEn, and a TEDS sensor is not connected to the TD-260T, "Err06" appears on the display, followed by a reading.

6-4-1. Displayed digits of rated capacity for TEDS calibration

Rated capacity for TEDS sensor	Unit	Reading
1	N, kN	01.000
2	N, kN	02.000
3	N, kN	03.000
4	N, kN	04.000
5	N, kN	005.00
10	N, kN	010.00
20	N, kN	020.00
30	N, kN	030.00
40	N, kN	040.00
50	N, kN	0050.0
100	N, kN	0100.0
200	N, kN	0200.0
300	N, kN	0300.0
400	N, kN	0400.0
500	N, kN	00500

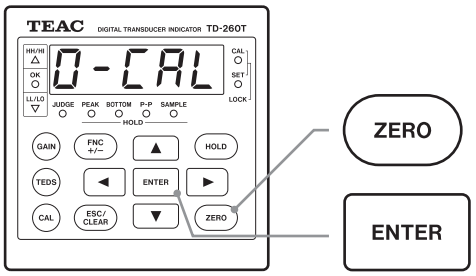
6-5. Zero-point calibration

Using the analog circuit on the input of the strain amplifier, you can set the A/D input voltage to zero.

1. Set CAL Lock (F3- 5) to OFF.

2. With no load on the sensor, press ZERO, and then press ENTER.

The display shows "0-CAL," followed by zero for a reading, showing that the zero-point calibration is completed.



If a calibration error is displayed, make the appropriate correction, and then repeat the calibration.

3. Set CAL Lock (F3-5) to ON.

NOTE

You can set the sensor input of up to +2 or down to -2 mV/V to zero.

7-1. Setting HI, LO, HH, and LL values

You can set HI, LO, HH, and LL values, compare each with a reading, and then generate each decision output so that a comparison result is determined.

CAUTION

If you press ENTER to save settings while they do not meet the condition LL value < LO value < HI value < HH value, "Err08" appears, and the settings cannot be saved. In that case, enter values that meet the condition above, and then press ENTER again.

NOTE

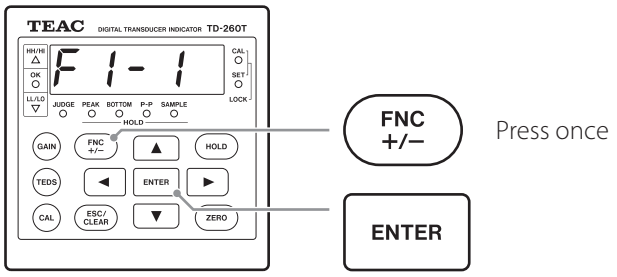
The operations of decision outputs vary depending on the setting for Comparative Output Pattern (F1-15).

7-1-1. Statuses of decision output LEDs

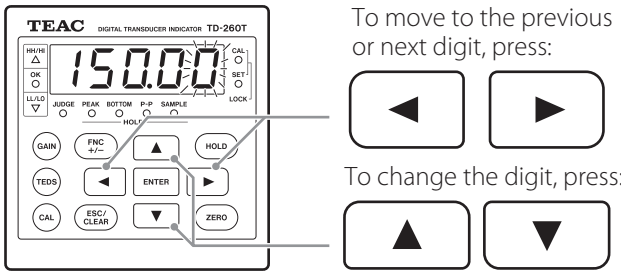
LED		Color	Description
HH/HI		Red	Lights if HH value < reading (with the setting for Enable HH and LL (F1-5) ON)
			Lights if HI value < reading (with the setting for Enable HH and LL (F1-5) OFF)
		Orange	Lights if HI value < reading < HH value (with the setting for Enable HH and LL (F1-5) ON)
OK		Green	Lights if HI value ≦ reading ≦ LO value
LL / LO		Red	Lights if reading < LL value (with the setting for Enable HH and LL (F1-5) OFF)
			Lights if reading < LO value (with the setting Enable HH and LL (F1-5) OFF)
		Orange	Lights if LL value < reading < LO value (with the setting for Enable HH and LL (F1-5) ON)
JUDGE		Green	Lights if JUDGE signal is ON (with the Enable Block Setting (F3-2) ON)
			Always lit (with the Enable Block Setting (F3-2) OFF)
HOLD	PEAK	Green	Peak hold is set
		Red	Operating in the Peak hold mode
		Orange	Operating in the Peak hold mode with block setting
	BOTTOM	Green	Bottom hold is set
		Red	Operating in the Bottom hold mode
		Orange	Operating in the Bottom hold mode with block setting
	P-P	Green	Peak-to-Peak hold is set
		Red	Operating in the Peak-to-Peak hold mode
		Orange	Operating in the Peak-to-Peak hold mode with block setting
	SAMPLE	Green	Sample hold is set
		Red	Operating in the Sample hold mode
LOCK	CAL	Orange	Lights with the setting for CAL Lock (F3-5) ON
	SET	Orange	Lights with the setting for SET Lock (F3-6) ON

7-1-2. HI value

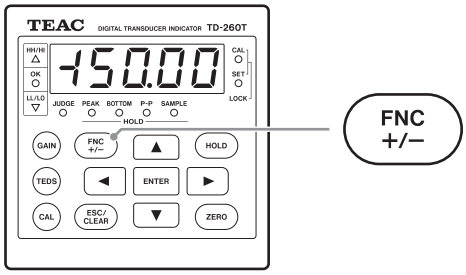
1. Enter the setup screen number F1-1.



2. To change the blinking digit of the value, press ▲ or ▼. To move to the previous or next digit, press ◄ or ►.



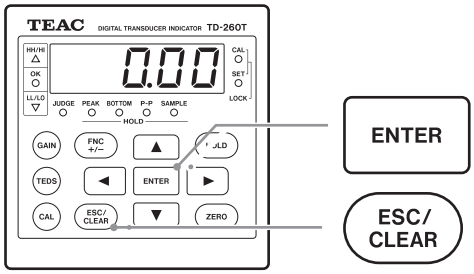
To put a minus sign in front of the set value, press FNC.



NOTE

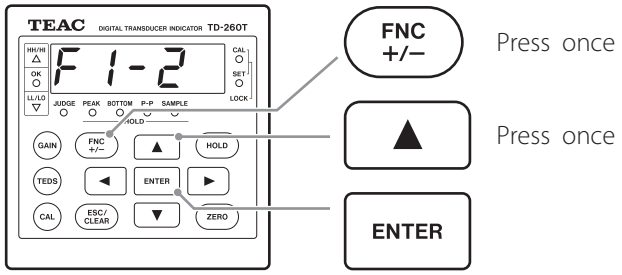
If you press FNC, regardless of the position of the blinking digit, the sign is added or removed.

3. To save the setting, press ENTER, and then to exit the setup mode, press ESC.

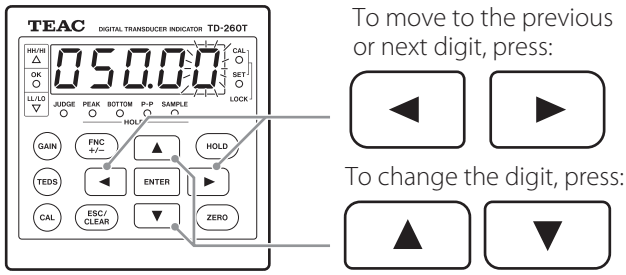


7-1-3. LO value

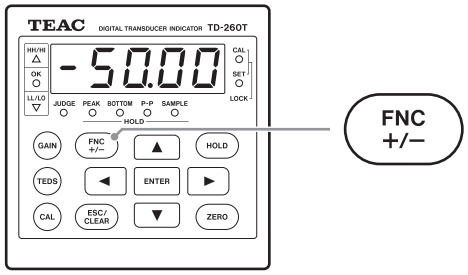
1. Enter the setup screen number F1-2.



2. To change the blinking digit of the value, press ▲ or ▼. To move to the previous or next digit, press ◄ or ►.



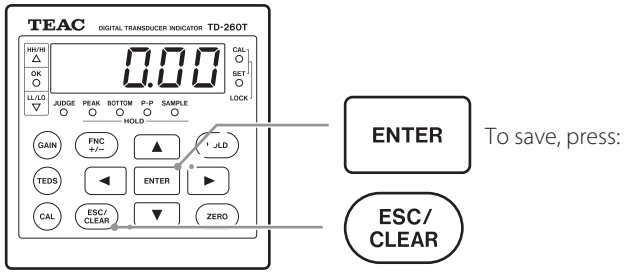
To put a minus sign in front of the set value, press FNC.



NOTE

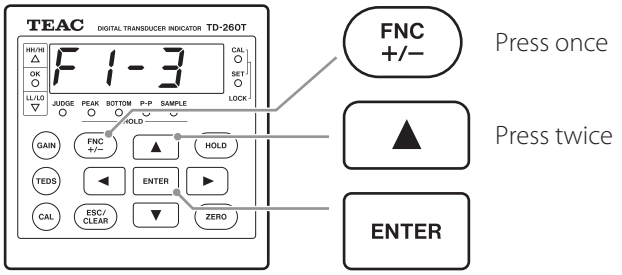
If you press FNC, regardless of the position of the blinking digit, the sign is added or removed.

3. To save the setting, press ENTER, and then to exit the setup mode, press ESC.

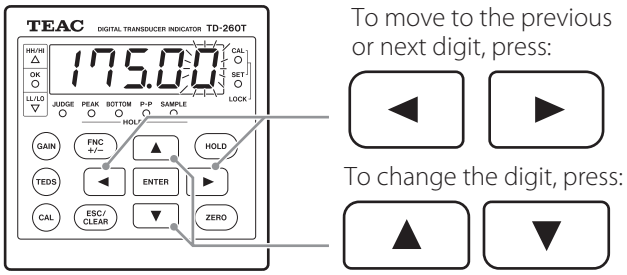


7-1-4. HH value

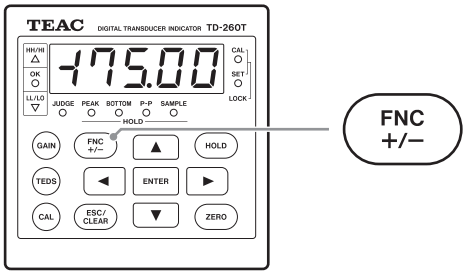
1. Enter the setup screen number F1-3.



2. To change the blinking digit of the value, press ▲ or ▼. To move to the previous or next digit, press ◄ or ►.



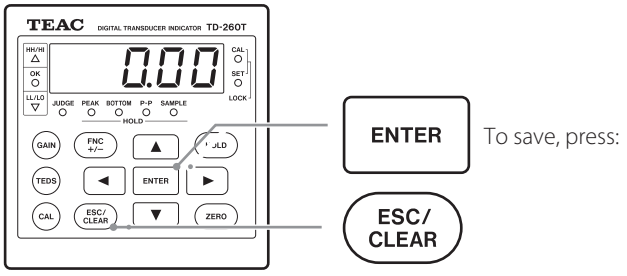
To put a minus sign in front of the set value, press FNC.



NOTE

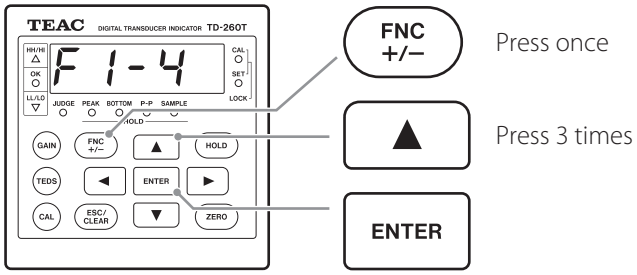
If you press FNC, regardless of the position of the blinking digit, the sign is added or removed.

3. To save the setting, press ENTER, and then to exit the setup mode, press ESC.

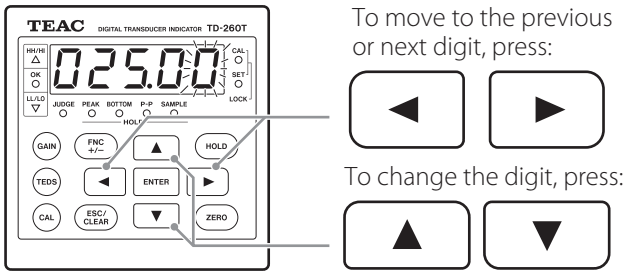


7-1-5. LL value

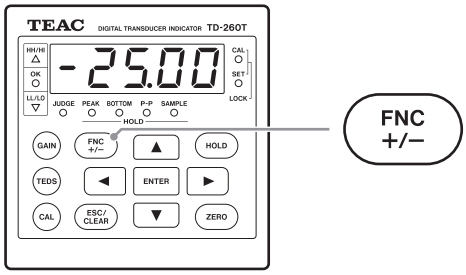
1. Enter the setup screen number F1-4.



2. To change the blinking digit of the value, press ▲ or ▼. To move to the previous or next digit, press ◄ or ►.



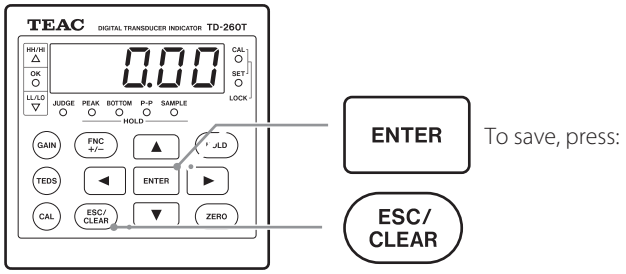
To put a minus sign in front of the set value, press FNC.



NOTE

If you press FNC, regardless of the position of the blinking digit, the sign is added or removed.

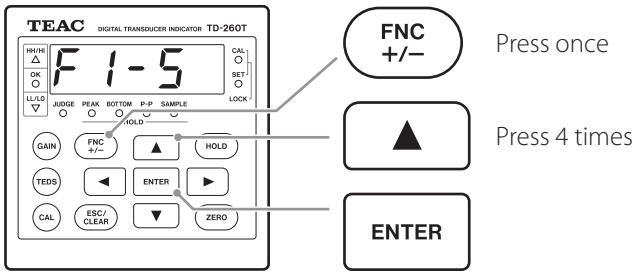
3. To save the setting, press ENTER, and then to exit the setup mode, press ESC.



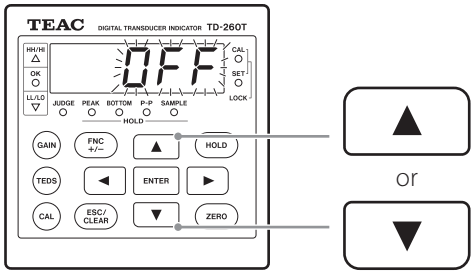
7-1-6. Enable HH and LL

You can enable or disable HH and LL decision outputs.
If you select OFF, the HH or LL or Low-Low limit decision output is not generated anymore, and the HH/HI or LL/LO LED display solid red instead to show that the HI or LO decision output is generated.

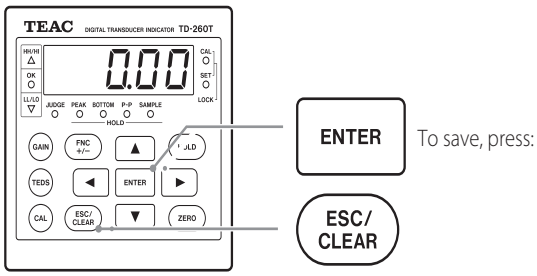
1. Enter the setup screen number F1-5.



2. To select OFF or ON, press ▲ or ▼.

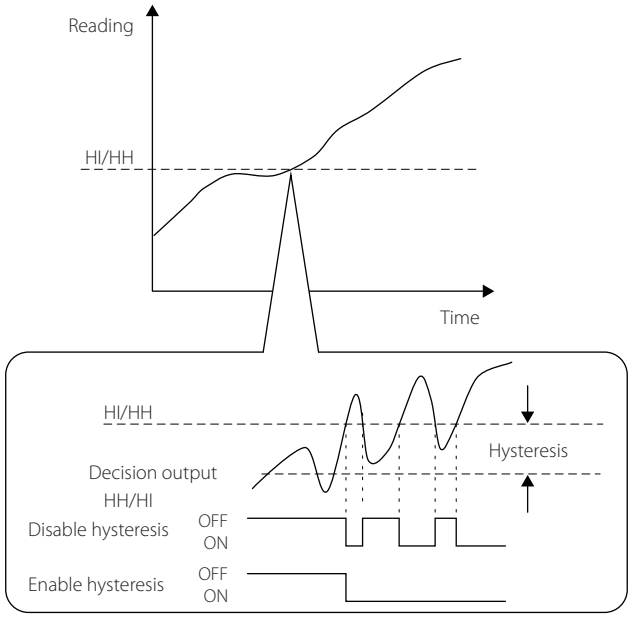


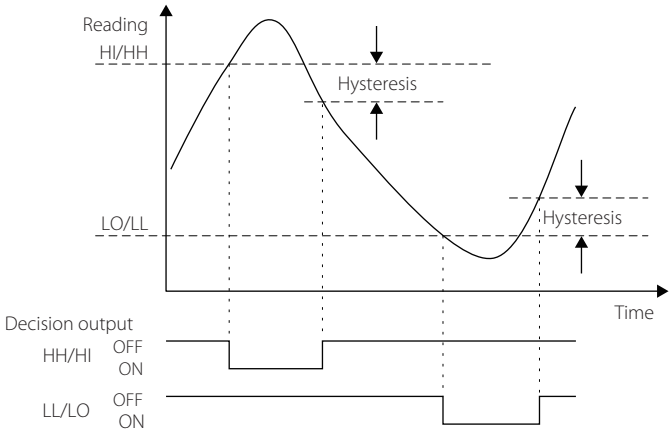
3. To save the selection, press ENTER, and then to exit the setup mode, press ESC.



7-2. Hysteresis

Using this function, You can buffer the set points at which the HH, HI, LO, and LL decision outputs switch off.
If fluctuations in the reading occur near each comparative point, the corresponding decision output switches on and off, which is a phenomenon called "chattering." You can prevent the output from chattering by setting a hysteresis value.
Hysteresis for the HH and HI values is enabled when the reading decreases, and hysteresis for the LL and LO values is enabled when the reading increases, as shown below.





Conditions for generating decision outputs (with "standard output" selected for Comparative Output Pattern)

Decision output	State	Condition
HH	OFF → ON	HH value < reading
	ON → OFF	Reading ≦ (HH value – hysteresis value)
HI	OFF → ON	HI value < reading
	ON → OFF	Reading ≦ (HI value – hysteresis value)
LO	OFF → ON	Reading < LO value
	ON → OFF	(LO value + hysteresis value) ≦ reading
LL	OFF → ON	Reading < LL value
	ON → OFF	(LL value + hysteresis value) ≦ reading

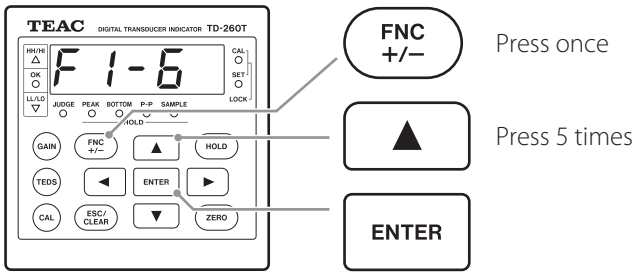
CAUTION

Set a hysteresis value to meet the following conditions.
HI value ≦ (HH value - hysteresis value)
LO value ≦ (HI value - hysteresis value)
LL value ≦ (LO value - hysteresis value)

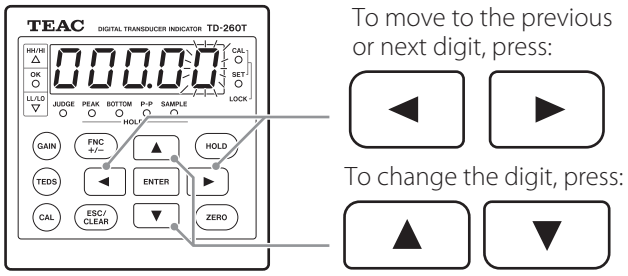
NOTE

- The same amount of hysteresis is set for HI, LO, HH, and LL values.
- If the setting is 0, hysteresis is disabled.

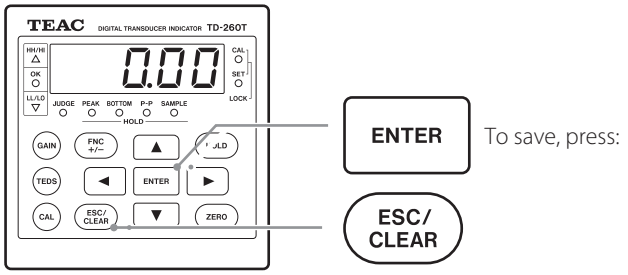
1. Enter the setup screen number F1-6.



2. To change the blinking digit of the value, press ▲ or ▼. To move to the previous or next digit, press ◄ or ►.



3. To save the value you entered, press ENTER, and then to exit the setup mode, press ESC.



NOTE

- The same amount of hysteresis is set for HI, LO, HH and LL values.
- If the setting is 0, hysteresis is disabled.

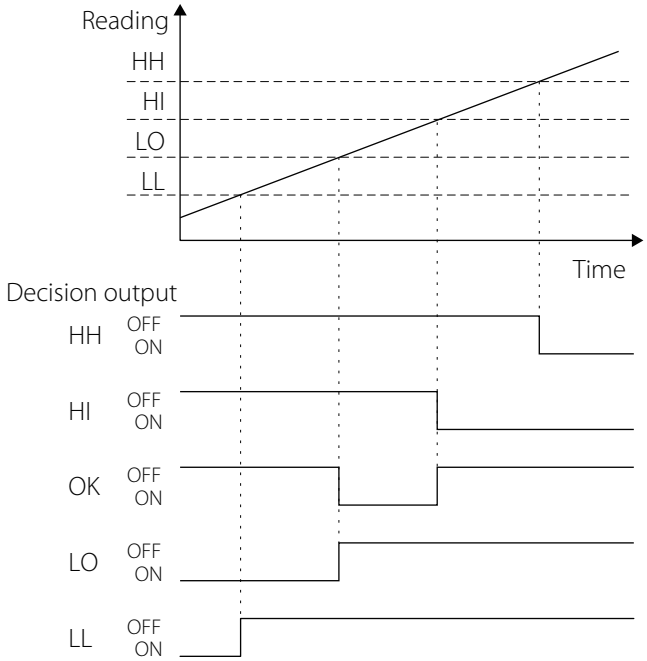
7-3. Comparative Output Pattern

The following two operating settings for decision outputs are available: standard output and area output.

7-3-1. Standard output

Each decision output switches on when the following conditions are met.
(with hysteresis set to 0)

HH: HH value < reading
HI: HI value < reading
LO: Reading < LO value
LL: Reading < LL value



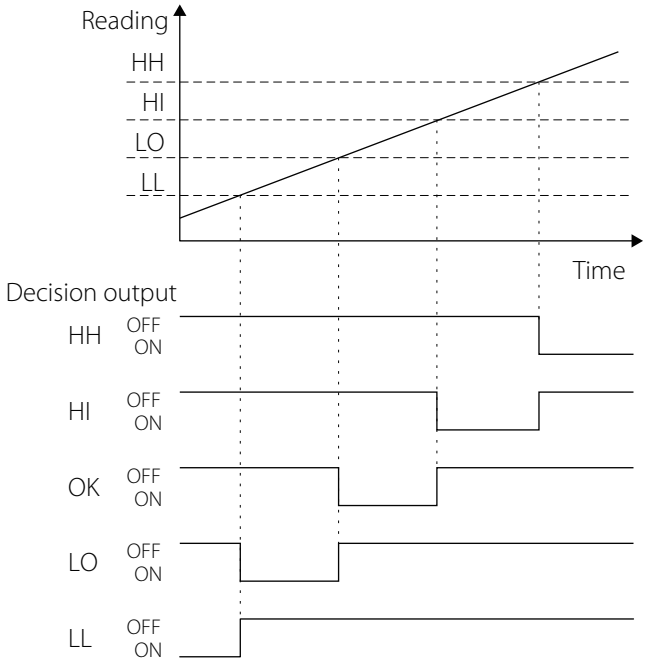
NOTE

The operations of decision outputs vary depending on the setting for Hysteresis (F1-6). For detailed information, see the section 7-2. "Hysteresis."

7-3-2. Area output

Each decision output switches on when the following conditions are met.
(with hysteresis set to 0)

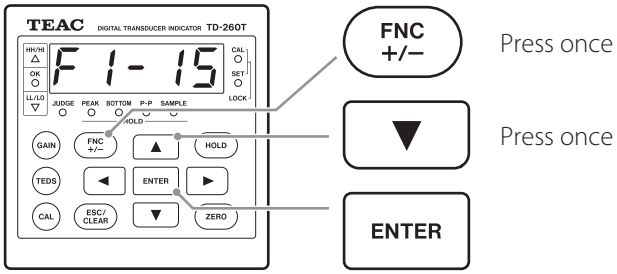
HH: HH value < reading
HI: HI value < reading < HH value
LO: LL value < reading < LO value
LL: Reading < LL value



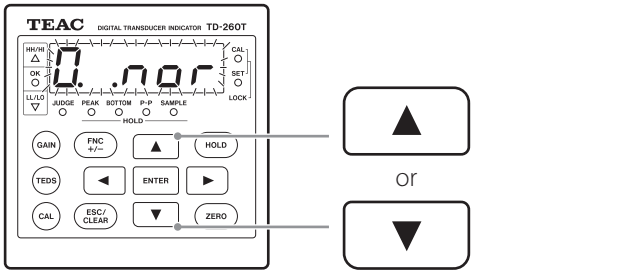
NOTE

The operations of decision outputs vary depending on the setting for Hysteresis (F1-6). For detailed information, see the section 7-2. "Hysteresis."

1. Enter the setup screen number F1-15.

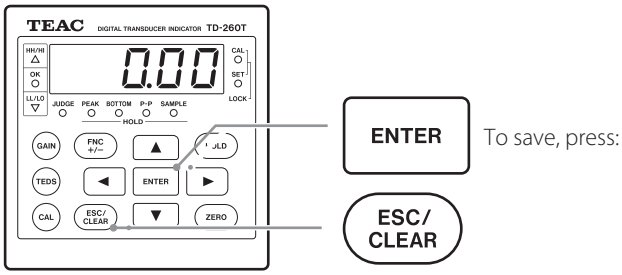


2. To select a comparative output pattern,press ▲ or ▼.



The following two settings are available.
0.nor: Standard output
1.ArE: Area output

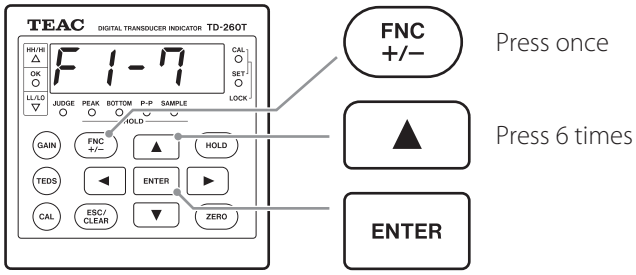
3. To save the selection, press ENTER, and then to exit the setup mode, press ESC.



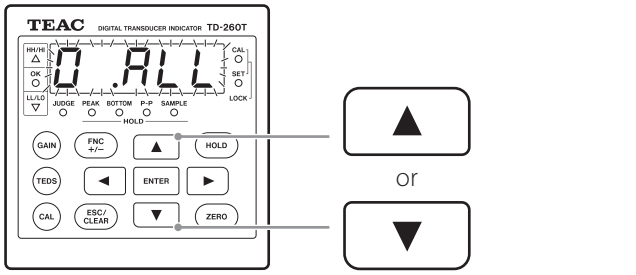
7-4. Comparison Mode

You can set a condition for comparing a reading with HI, LO, HH, and LL values and determining the comparison result.

1. Enter the setup screen number F1-7.



2. To change the setting, press ▲ or ▼.



The following six settings are available.

0.ALL: Always compare to generate decision outputs

1.Stb: Compare to generate decision outputs when stabilized

2.no0: Always compare to generate decision outputs except near zero

3.nOS: Compare to generate decision outputs when stabilized except near zero

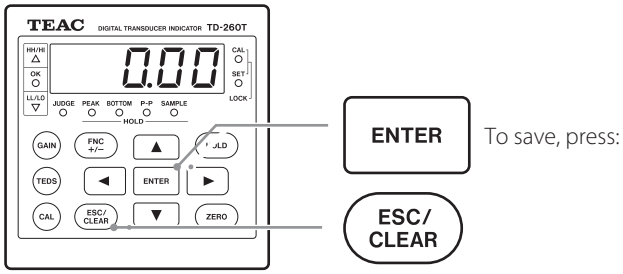
4.HLD: Compare to generate decision outputs when in hold mode

5.OFF: Do not compare

NOTE

The comparison mode settings 1.Stb, 2.no0, 3.nOS are closely related to the near-zero and motion detection settings.
For detailed information about the near-zero and motion detection settings, see the sections 7-5. "Near Zero" and 7-6. "Motion Detection."

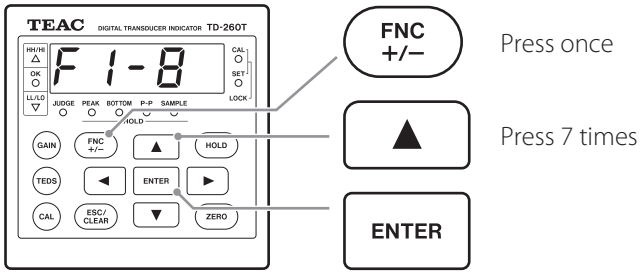
3. To save the selection, press ENTER, and then to exit the setup mode, press ESC.



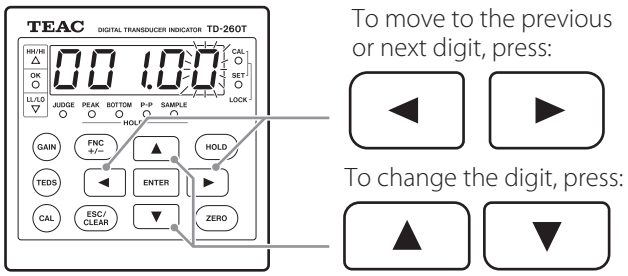
7-5. Near Zero

You can set a range to be considered near zero.

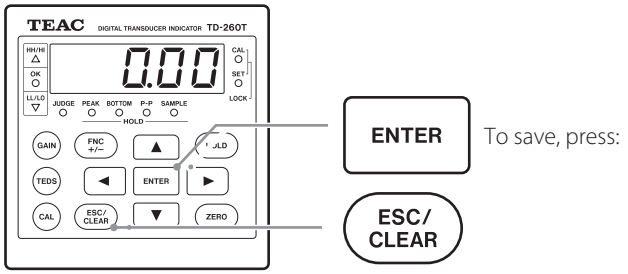
1. Enter the setup screen number F1-8.



2. To change the blinking digit of the value, press ▲ or ▼. To move to the previous or next digit, press ◄ or ►.



3. To save the value you entered, press ENTER, and then to exit the setup mode, press ESC.

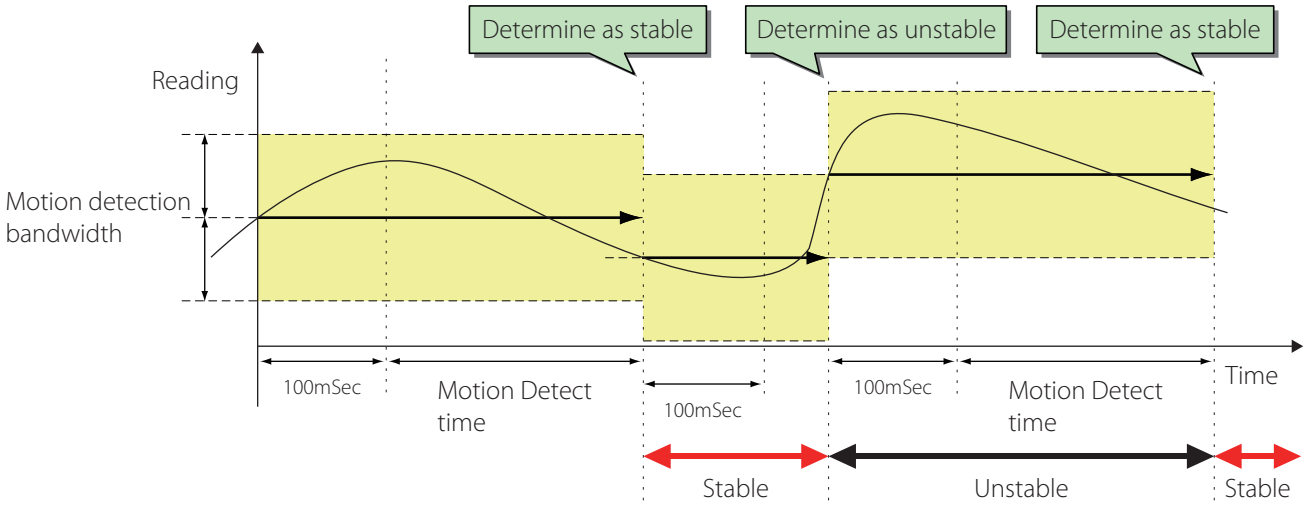


NOTE

The operations of decision outputs near zero are closely related to the condition you set for comparing a reading with HI, LO, HH, and LL values and determining the comparison result.
For detailed information about the comparison mode setting, see the section 7-4. "Comparison Mode."

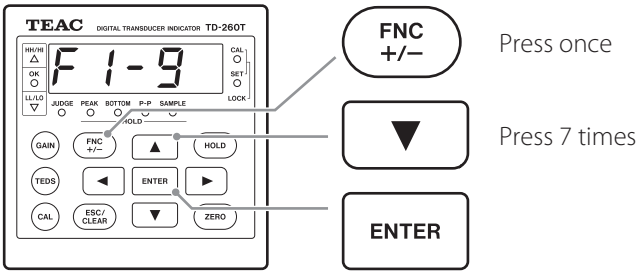
7-6. Motion detection

You can set parameters used for detecting stability.
If the difference between the currently displayed reading and the reading that was displayed 100 milliseconds ago is equal to or lower than the bandwidth you set, and then the state remains unchanged for more than the length of set time, the TD-260T determines that the currently displayed reading is stable.
The motion detection setting is closely related to the comparison mode setting. For detailed information, see the section 7-4. "Comparison Mode." If the displayed reading is determined as stable, the P.C. (stable) signal from the optional BCD output is turned on and the stable output for the RS-232C read status command is set to ON.

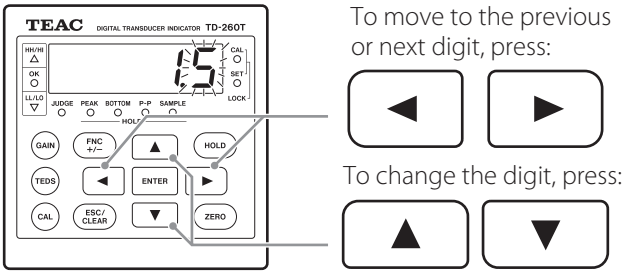


7-6-1. Motion Detection Time

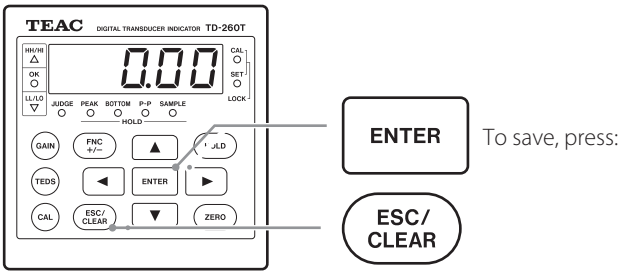
1. Enter the setup screen number F1-9.



2. To change the blinking digit of the value, press ▲ or ▼. To move to the previous or next digit, press ◀ or ▶.

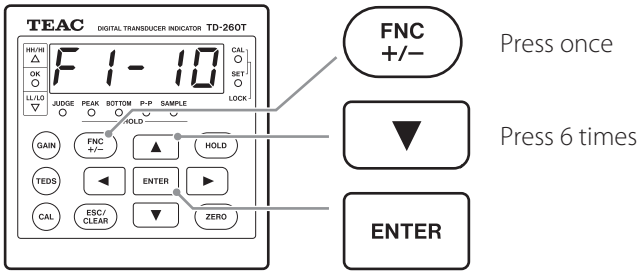


3. To save the setting, press ENTER, and then to exit the setup mode, press ESC.

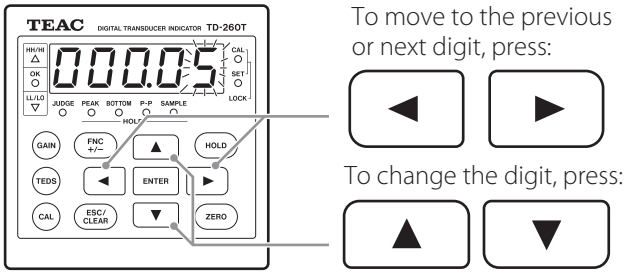


7-6-2. Motion Detection Bandwidth

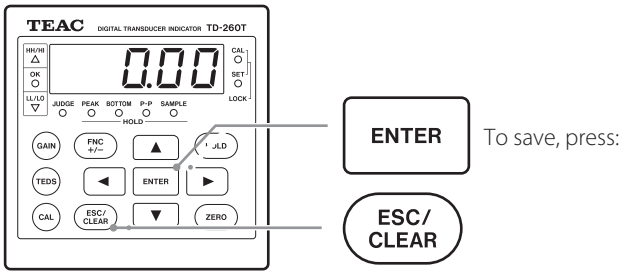
1. Enter the setup screen number F1-10.



2. To change the blinking digit of the value, press ▲ or ▼. To move to the previous or next digit, press ◀ or ▶.

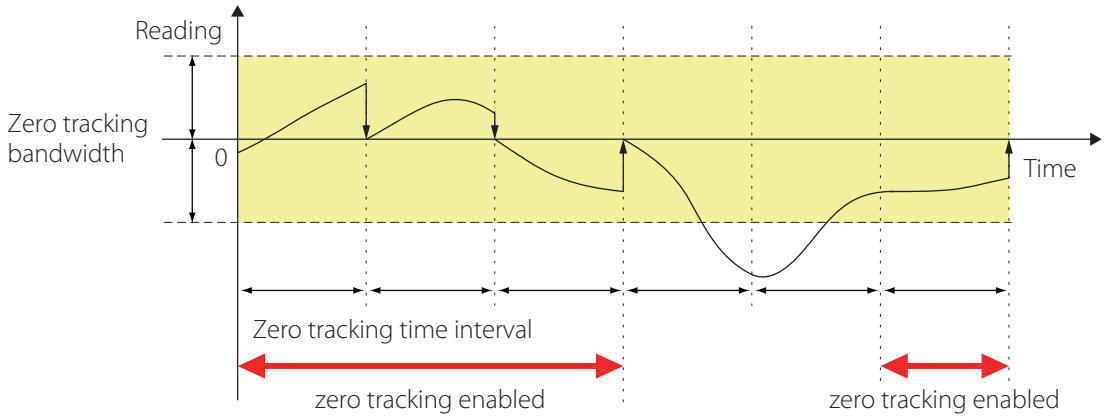


3. To save the setting, press ENTER, and then to exit the setup mode, press ESC.



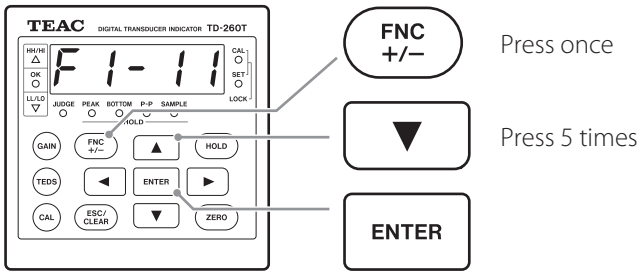
7-7. Zero tracking

Using zero tracking automatically tracks and corrects deviations from zero point, such as drift.
If a drift is within the bandwidth you set, the function automatically moves a drifted zero point to zero at each set time interval.
Zero tracking is enabled only while both CAL Lock (F3-5) and Enable Digital Zero (F3-1) are set to ON.
Zero tracking is disabled while its time interval and bandwidth are respectively set to 0.0 sec and 0.0.

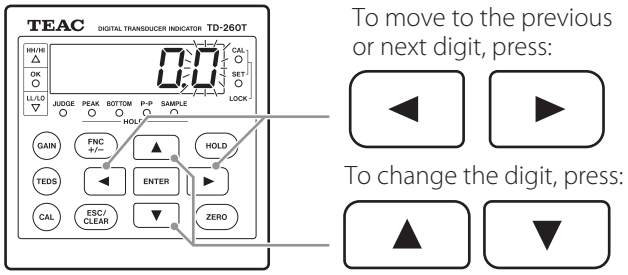


7-7-1. Zero Tracking Time Interval

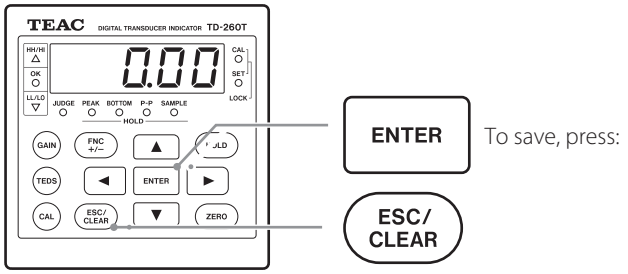
1. Enter the setup screen number F1-11.



2. To change the blinking digit of the value, press ▲ or ▼. To move to the previous or next digit, press ◄ or ►.



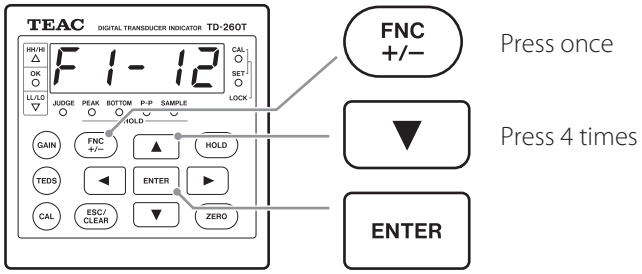
3. To save the setting, press ENTER, and then to exit the setup mode, press ESC.



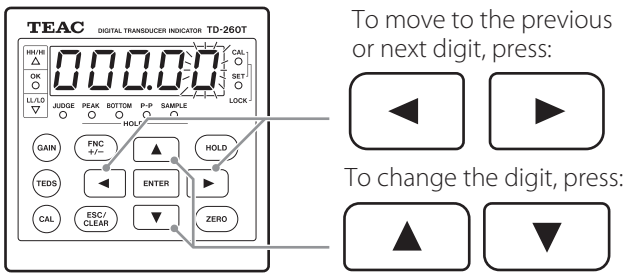
7-7-2. Zero Tracking Bandwidth

You can set a zero tracking bandwidth for the least three significant digits of a reading of your device.

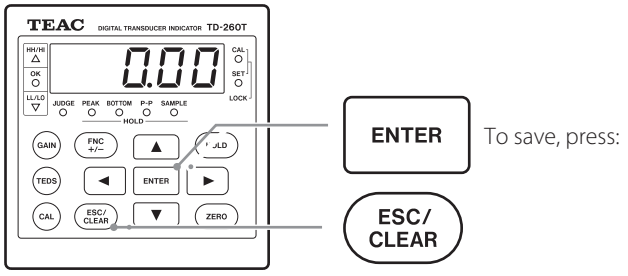
1. Enter the setup screen number F1-12.



2. To change the blinking digit of the value, press ▲ or ▼. To move to the previous or next digit, press ◄ or ►.



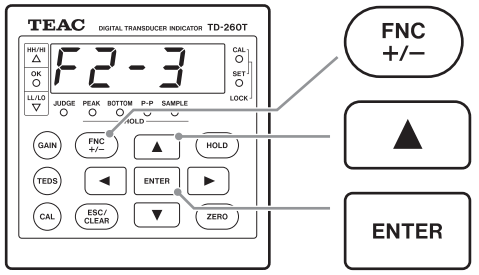
3. To save the setting, press ENTER, and then to exit the setup mode, press ESC.



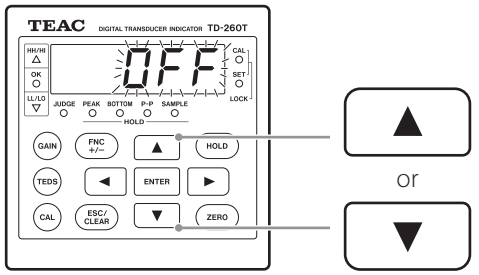
7-8. Digital Filter

You can select a number of measurements to be used for obtaining a moving average.

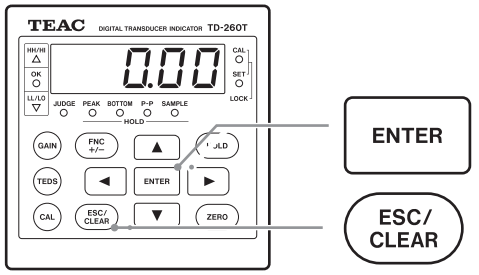
1. Enter the setup screen number F2-3.



2. To select OFF, 4, 8, 16, 32, 64, 128, or 256, press ▲ or ▼.



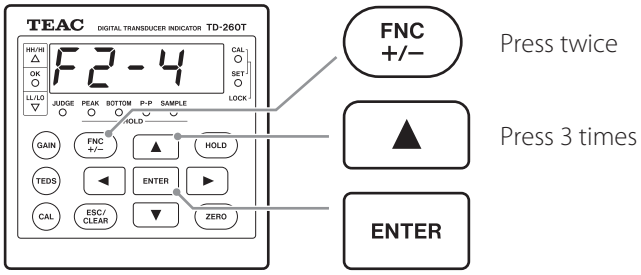
3. To save the selection, press ENTER, and then to exit the setup mode, press ESC.



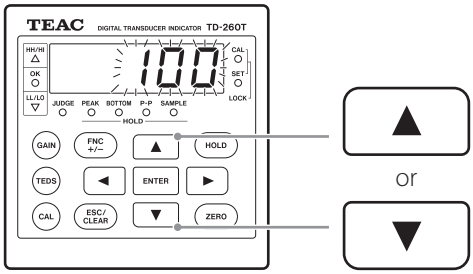
7-9. Analog Filter

You can select a cutoff frequency (Hz) of the low-pass filter.

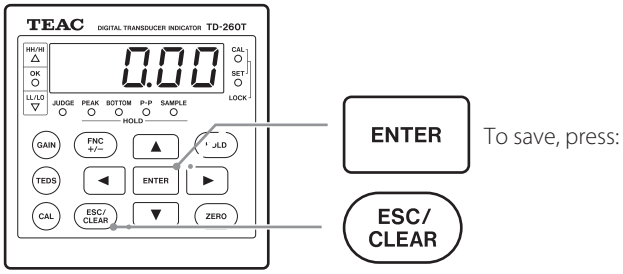
1. Enter the setup screen number F2-4.



2. To Select 3, 10, 30, 100, or 300 by pressing ▲ or ▼.



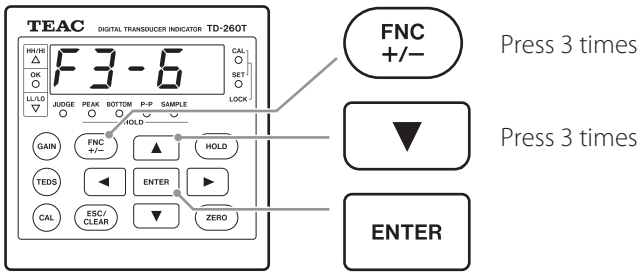
3. To save the selection, press ENTER, and then to exit the setup mode, press ESC.



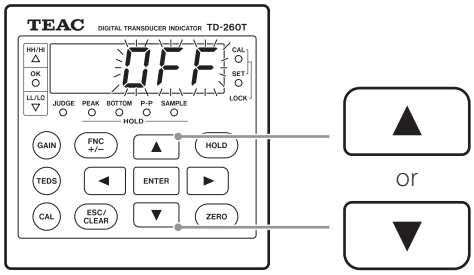
7-10. SET Lock

You can prevent changes to settings you have saved.
For detailed information about the applicable setup items, see the section 4-2. "List of setup items and settings."

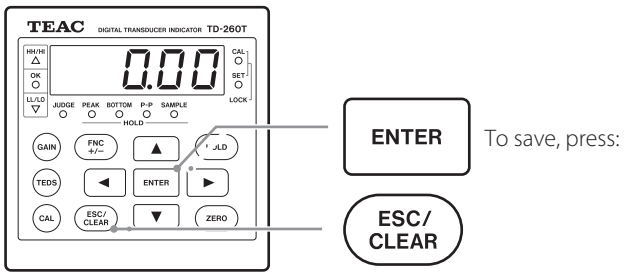
1. Enter the setup screen number F3-6.



2. To select OFF or ON, press ▲ or ▼.



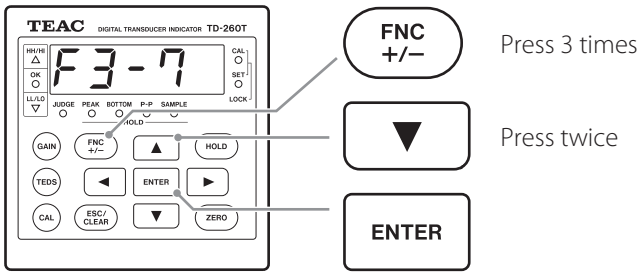
3. To save the selection, press ENTER, and then to exit the setup mode, press ESC.



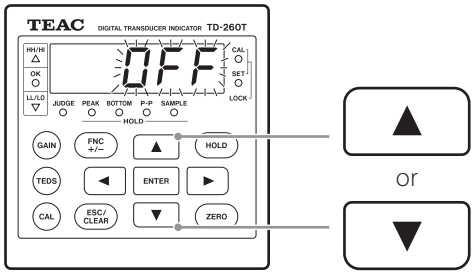
7-11. Static Strain Mode

You can display the input signal in microstrains.
By selecting this mode, you can check for sensor output or fluctuations in the reading and other erroneous phenomena caused by parts including sensor and cable.

1. Enter the setup screen number F3-7.

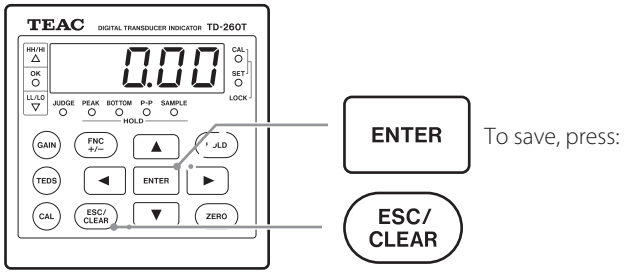


2. To select OFF or ON, press ▲ or ▼.



3. To save the selection, press ENTER, and then to exit the setup mode, press ESC.

With ON selected, the input signal is displayed in microstrains.



NOTE

- To exit the static strain mode, select OFF while the above screen is displayed, or shut off the power to the TD-260T, and then turn it on again.
- The TD-260T uses one strain gage with a gauge factor of 2.0 to display static strain.

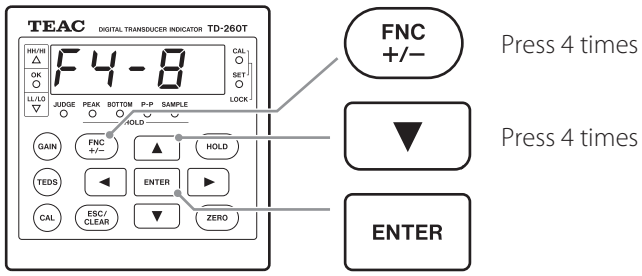
7-12. Decision-Output Check

You can turn on decision outputs, one by one.

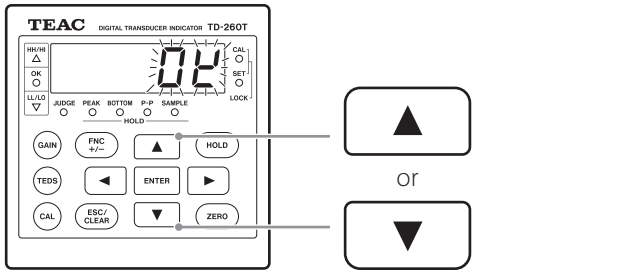
By using this function, you can check wiring of each decision output.

Note that the TD-260T does not work as an indicator while the function is enabled.

1. Enter the setup screen number F4-8.



2. The OK decision output is generated.



The TD-260T generates outputs, one by one, as shown in the image below; if you press ▼ while the display shows "OK," the LO decision output turns on next, or if you press ▲, the HI decision output turns on next.

With High-High decision output ON,
HH/HI LED lights solid red.

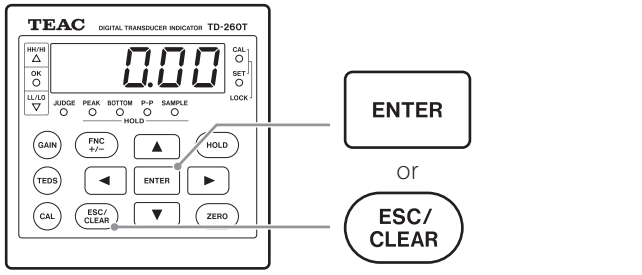
With High decision output ON,
HH/HI LED lights solid oragne.

With OK decision output ON,
OK LED lights solid green.

With Low decision output ON,
LL/LO LED lights solid orange.

With Low-Low decision output ON,
LL/LO LED lights solid red.

3. To finish checking the wiring, press ENTER or ESC.

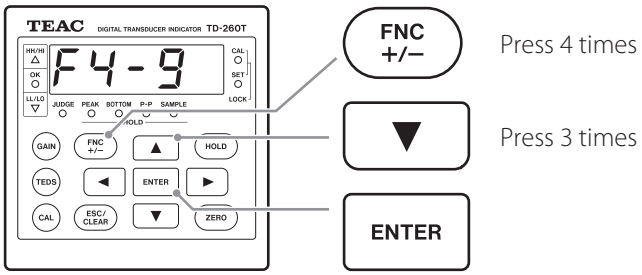


4. To exit the setup mode, press ESC.

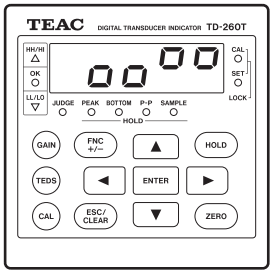
7-13. Control-Input Check

Using the alphanumeric display on the TD-260T, you can check the ON or OFF state of the following signals: D/Z, HOLD, JUDGE, and CLEAR signals.

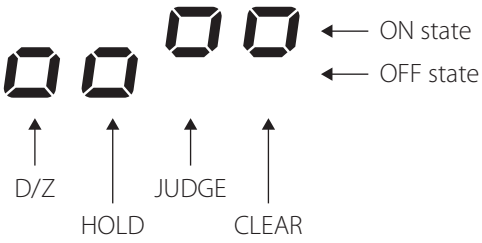
1. Enter the setup screen number F4-9.



2. The display changes, depending on the states of the input signals.



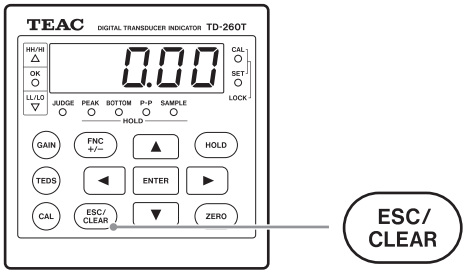
Below is an example of the display.



CAUTION

The display is refreshed about every 0.5 seconds.
If the duration of a signal input is 0.5 seconds or less, the display may not be refreshed.

3. To finish checking the ON/OFF states, press ESC.

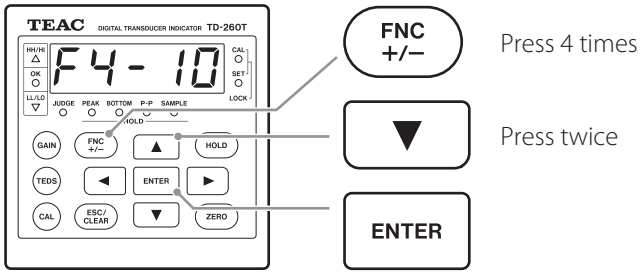


4. To exit the setup mode, press ESC.

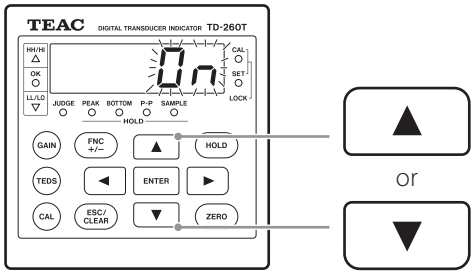
7-14. Beep

You can turn on or off the beep sound that you normally hear when you press a key on the TD-260T.

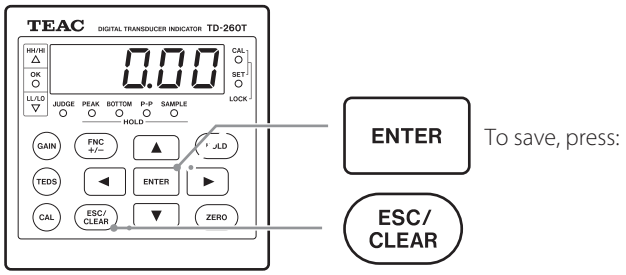
1. Enter the setup screen number F4-10.



2. To select ON or OFF, press ▲ or ▼.



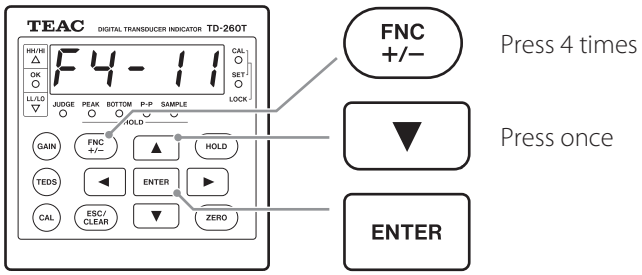
3. To save the selection, press ENTER, and then to exit the setup mode, press ESC.



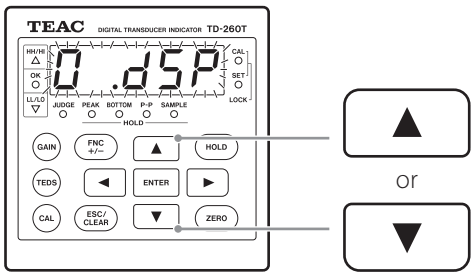
7-15. Select Data Output

You can select the data to be sent from the BCD parallel data output, the RS-232C serial data output, or the D/A converter, which can be installed in the option space.

1. Enter the setup screen number F4-11.



2. To change the data output setting, press ▲ or ▼.

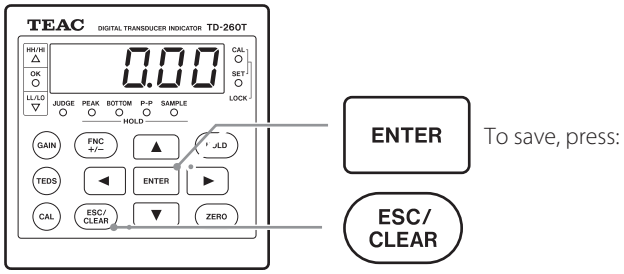


The following two data output settings are available.

0.diSP: Reference the display; hold value is sent in hold mode

1.InP: Reference the input; input value is sent in hold mode

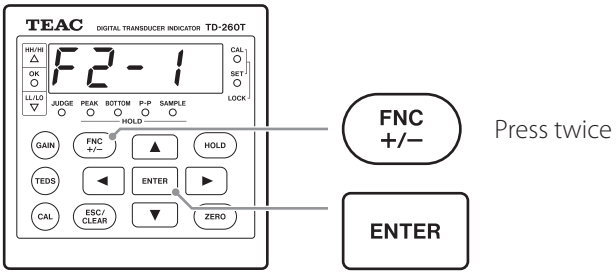
3. To save the selection, press ENTER, and then to exit the setup mode, press ESC.



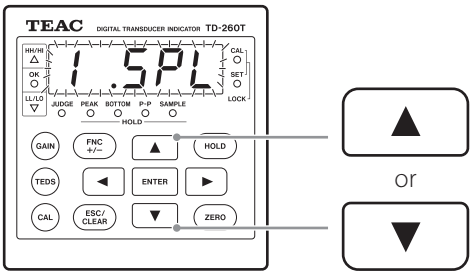
8-1. Hold Mode

The following hold modes are available: Sample, Peak, Bottom, and Peak-to-Peak.

1. Enter the setup screen number F2-1.



2. To select a hold mode setting, press ▲ or ▼.



The following five settings are available.

1.SPL: Sample hold

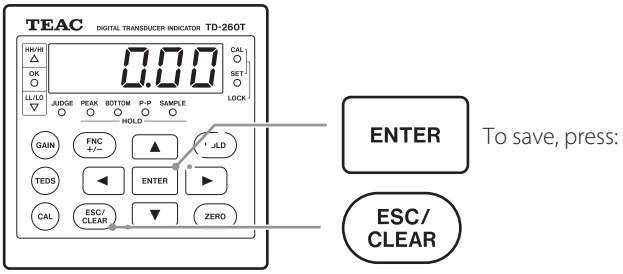
2.PEk: Peak hold

3.bot: Bottom hold

4.P2P: Peak-to-peak hold

0.OFF: Disable hold

3. To save the selection, press ENTER, and then to exit the setup mode, press ESC.



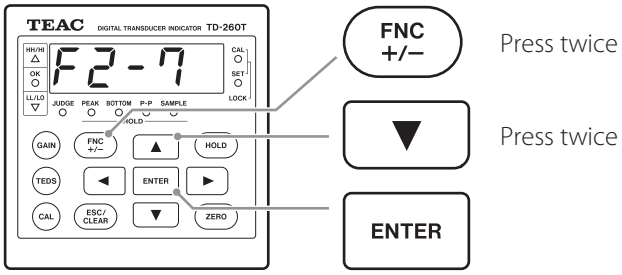
NOTE

You can specify a block to be held for Peak, Bottom, or Peak-to-Peak hold.

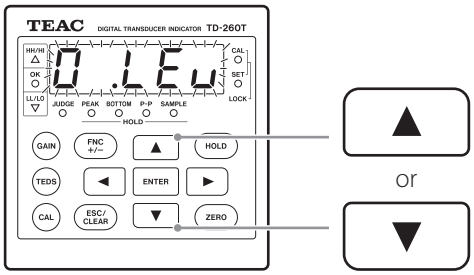
8-2. External Hold Mode

You can select a signal type for the HOLD signal from the control input/output terminal A7.

1. Enter the setup screen number F2-7.



2. To select an external hold mode setting, press ▲ or ▼.

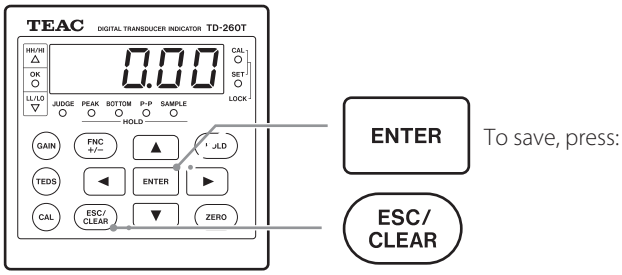


The following two settings are available.

0.LEv: Level response

1.PLS: Pulse response

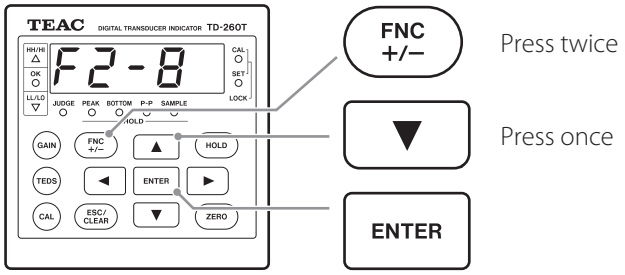
3. To save the selection, press ENTER, and then to exit the setup mode, press ESC.



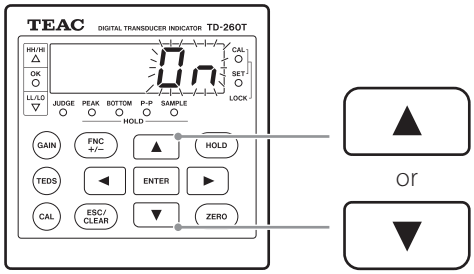
8-3. Enable CLEAR Signal

You can enable or disable the CLEAR signal from the control input/output terminal A5 and the ESC/CLEAR key.

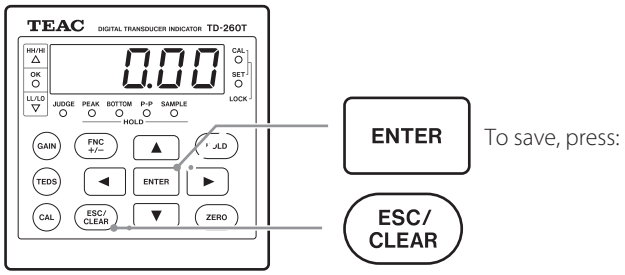
1. Enter the setup screen number F2-8.



2. To select ON or OFF, press ▲ or ▼.

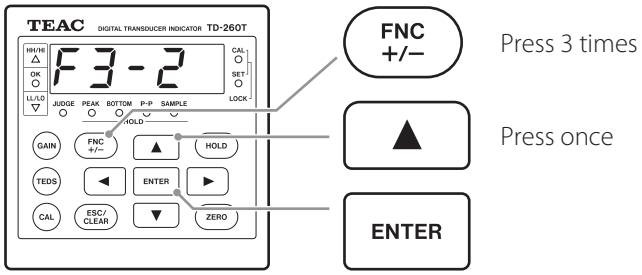


3. To save the selection, press ENTER, and then to exit the setup mode, press ESC.

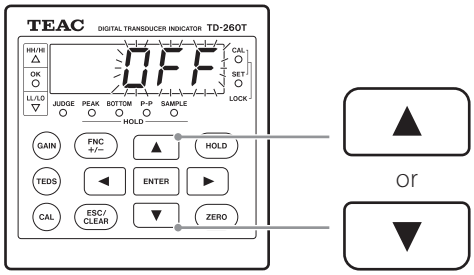


8-4. Enable Block Setting

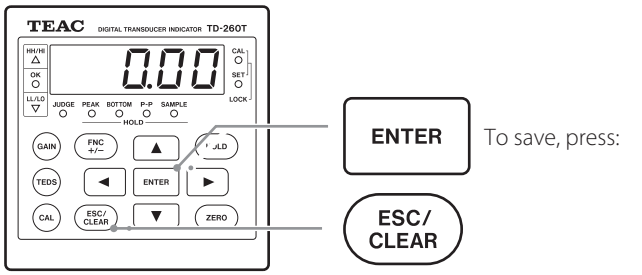
1. Enter the setup screen number F3-2.



2. To select OFF or ON, press ▲ or ▼.



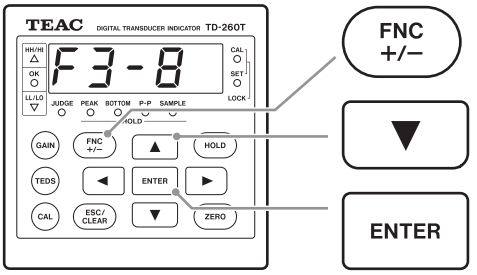
3. To save the selection, press ENTER, and then to exit the setup mode, press ESC.



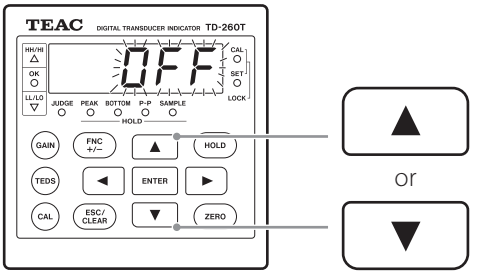
8-5. Enable JUDGE Signal

You can disable or enable the signal that controls the decision outputs.

1. Enter the setup screen number F3-8.



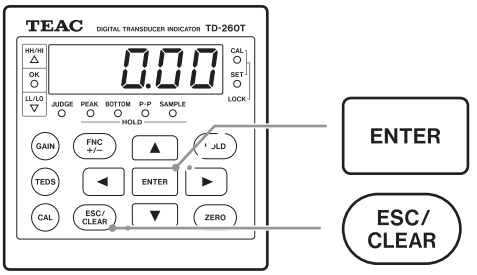
2. To select OFF or ON, press ▲ or ▼.



OFF: Always enable decision outputs

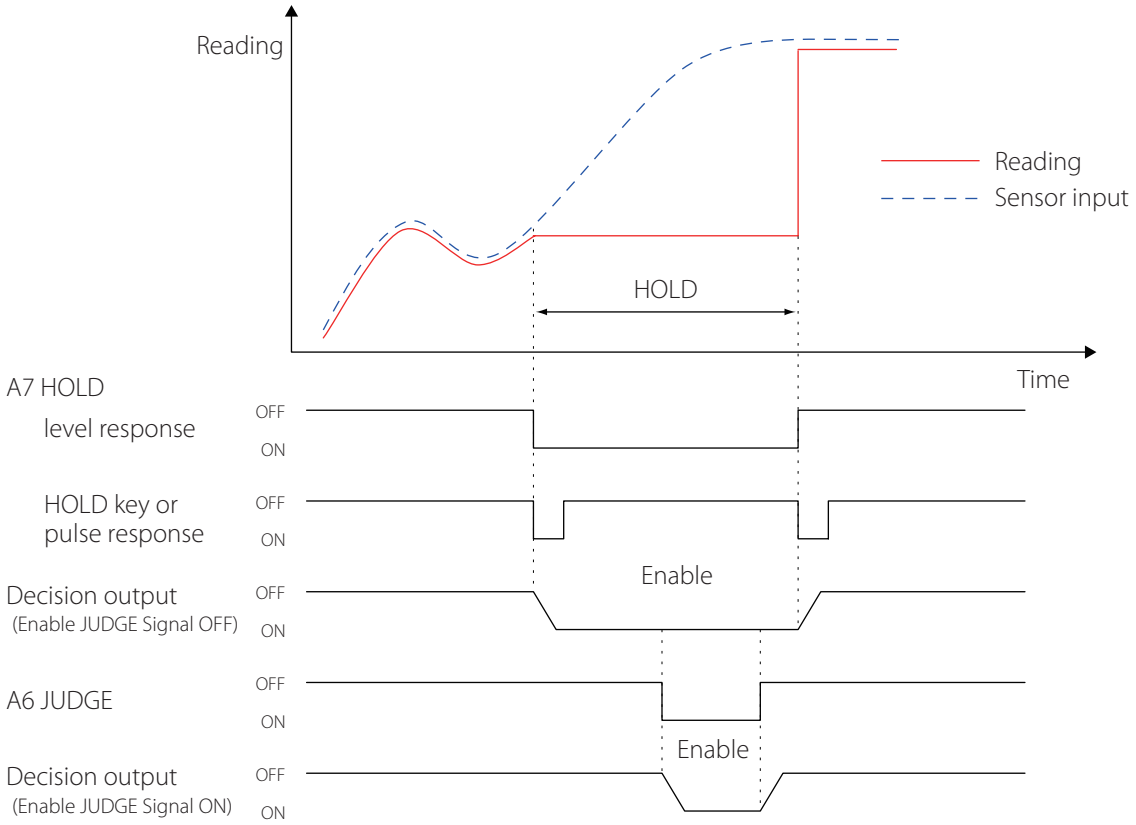
ON: Enable decision outputs while the JUDGE signal is ON

3. To save the selection, press ENTER, and then to exit the setup mode, press ESC.



8-6. Sample hold

You can put the TD-260T into the Sample hold mode by using the HOLD key or setting the HOLD signal from the control input/output terminal A7 to ON.
If the HOLD key is pressed, the TD-260T starts holding the displayed reading, and then if the HOLD key is pressed again, the TD-260T exits the hold mode.

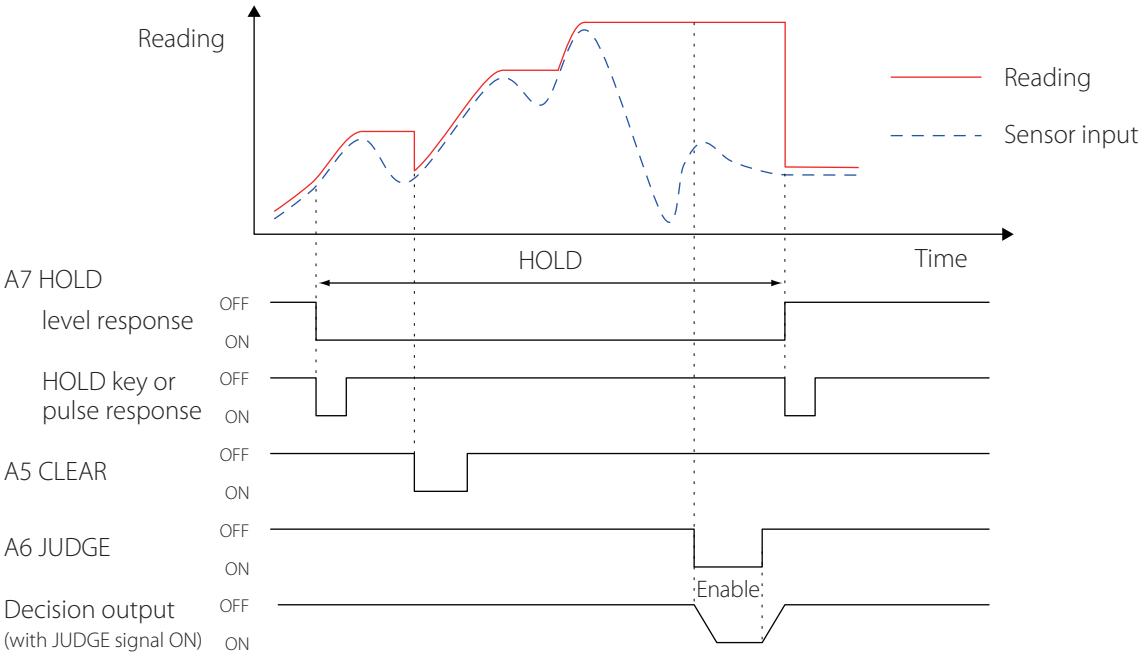


- You can choose between level response and pulse response for the HOLD signal from the control input/output terminal A7 by changing the setting for External Hold Mode (F2-7).
- The operations of decision outputs vary depending on the setting for Comparison Mode (F1-7). The mode 4.HLd is selected in the above example.
- The operations of decision outputs vary depending on the setting for Enable JUDGE Signal (F3-8).
  With the setting OFF selected, a decision output can always be generated, depending on the input signal.
  With the setting ON selected, a decision output can be generated, depending on the input signal, only while the JUDGE signal from the A6 is ON, so that you can avoid unnecessary switching of decision output relays.
- Block setting is unavailable for the Sample hold mode.
- You cannot use either the CLEAR key or the CLEAR signal from the control input/output terminal A5 while the TD-260T is operating in the Sample hold mode.

8-7. Peak hold

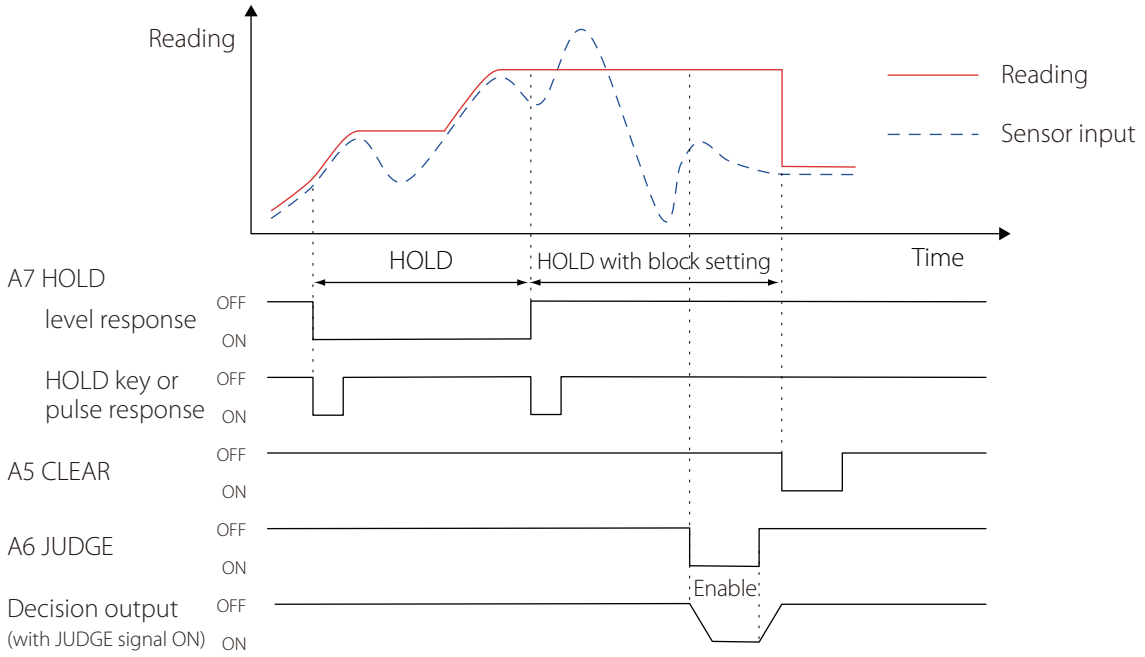
8-7-1. Operation without block setting

If the HOLD key is pressed or the HOLD signal from the control input/output terminal A7 is set to ON, the TD-260T starts holding and displaying the maximum reading (peak value). If the HOLD key is pressed again or the HOLD signal from the control input/output terminal A7 is set to OFF, the TD-260T exits the Peak hold mode, and then starts measuring the input signal again.
If the CLEAR key is pressed or the CLEAR signal from the control input/output terminal A5 is set to ON while the TD-260T is in the hold mode, the TD-260T resets the peak value.



8-7-2. Operation with block setting

The TD-260T continues to display the reading that has been displayed when a Peak hold operation is terminated.
If the CLEAR key is pressed or the CLEAR signal from the control input/output terminal A5 is set to ON, the TD-260T resets the display.

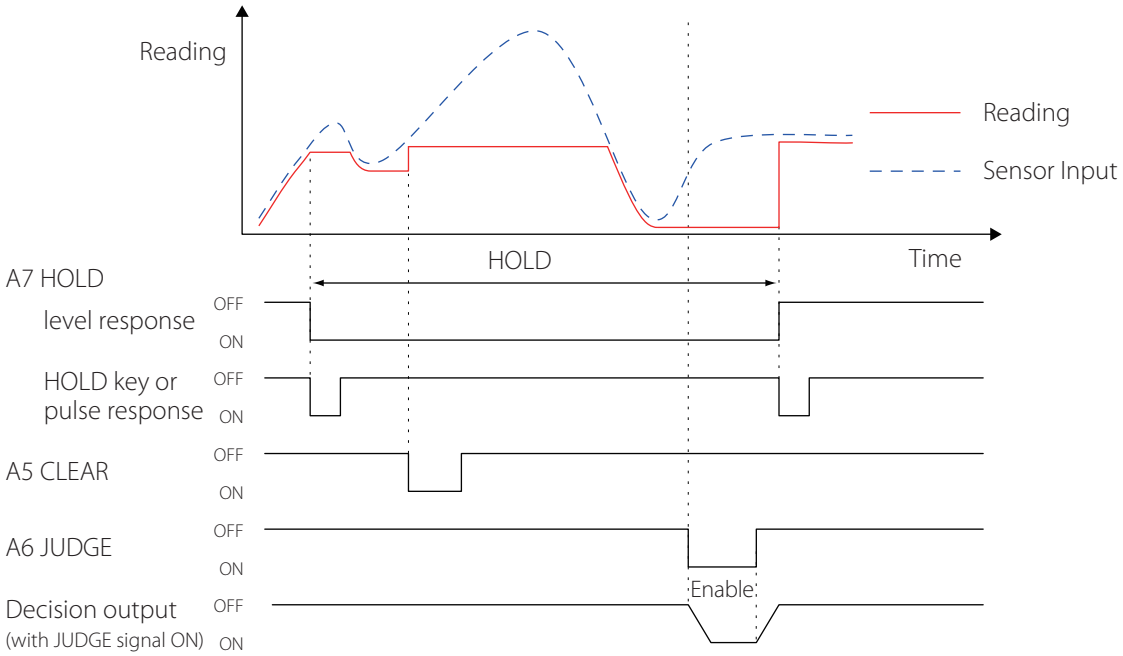


If the CLEAR key is pressed or the CLEAR signal from the control input/output terminal A5 is set to ON while the TD-260T is in the hold mode, the TD-260T resets the peak value.

8-8. Bottom hold

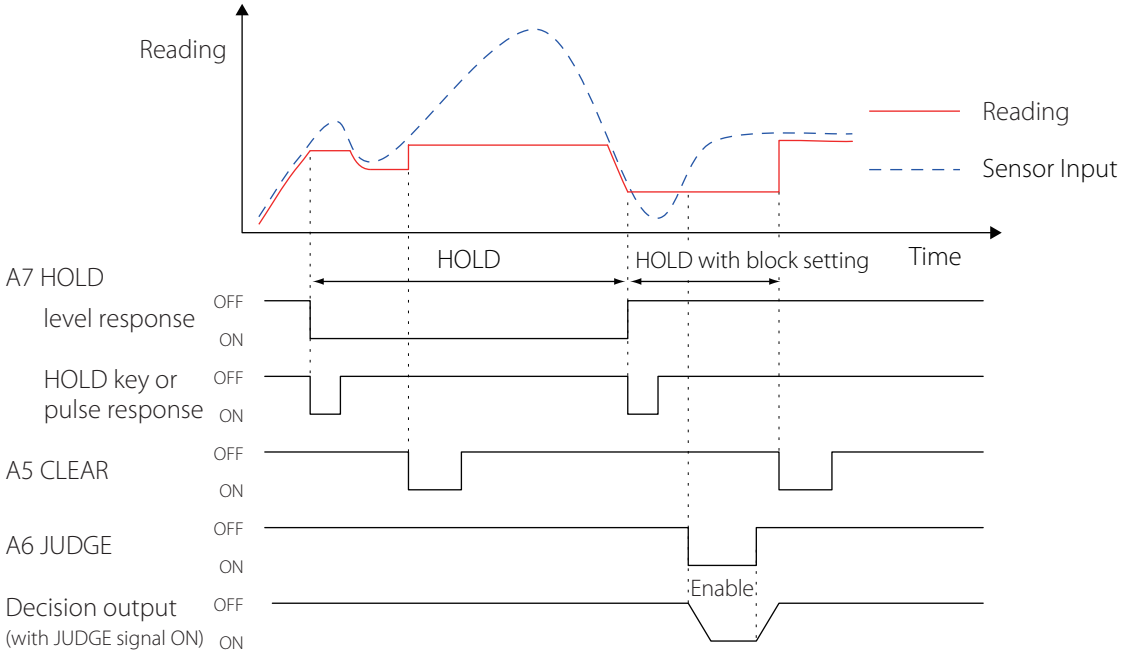
8-8-1. Operation without block setting

If the HOLD key is pressed or the HOLD signal from the control input/output terminal A7 is set to ON, the TD-260T starts holding and displaying the minimum reading (bottom value). If the HOLD key is pressed again or the HOLD signal from the control input/output terminal A7 is set to OFF, the TD-260T exits the Bottom hold mode, and then starts measuring the input signal again.
If the CLEAR key is pressed or the CLEAR signal from the control input/output terminal A5 is set to ON while the TD-260T is in the hold mode, the TD-260T resets the bottom value.



8-8-2. Operation with block setting

The TD-260T continues to display the reading that has been displayed when a Bottom hold operation is terminated. If the CLEAR key is pressed or the CLEAR signal from the control input/output terminal A5 is set to ON, the TD-260T resets the display.

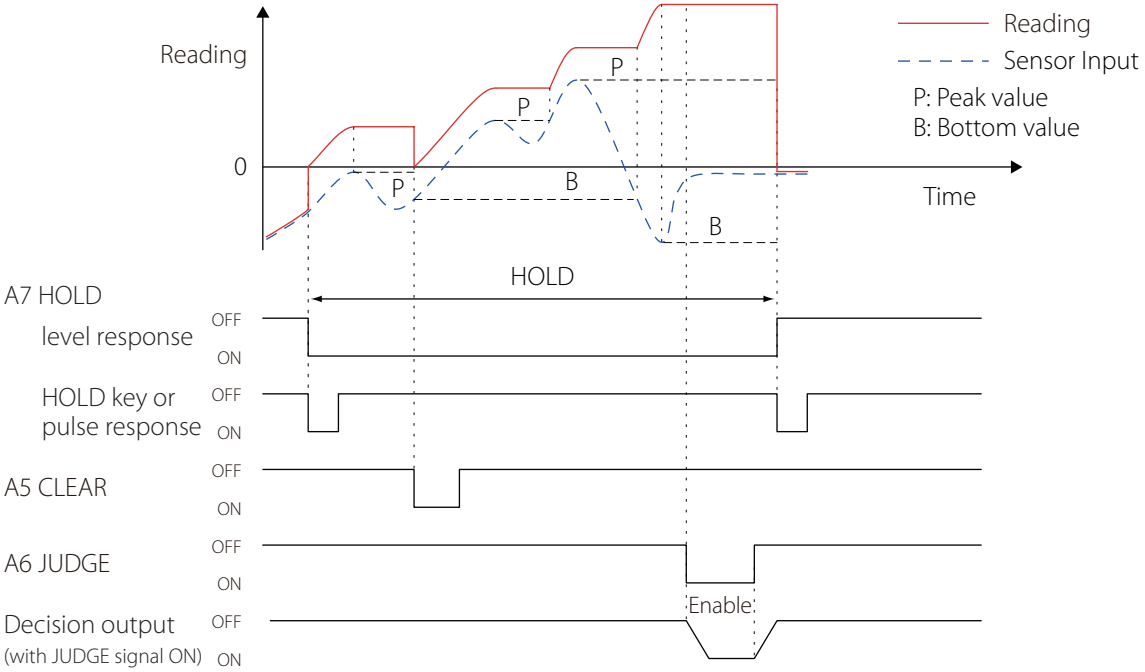


If the CLEAR key is pressed or the CLEAR signal from the control input/output terminal A5 is set to ON while the TD-260T is in the hold mode, the TD-260T resets the bottom value.

8-9. Peak-to-Peak hold

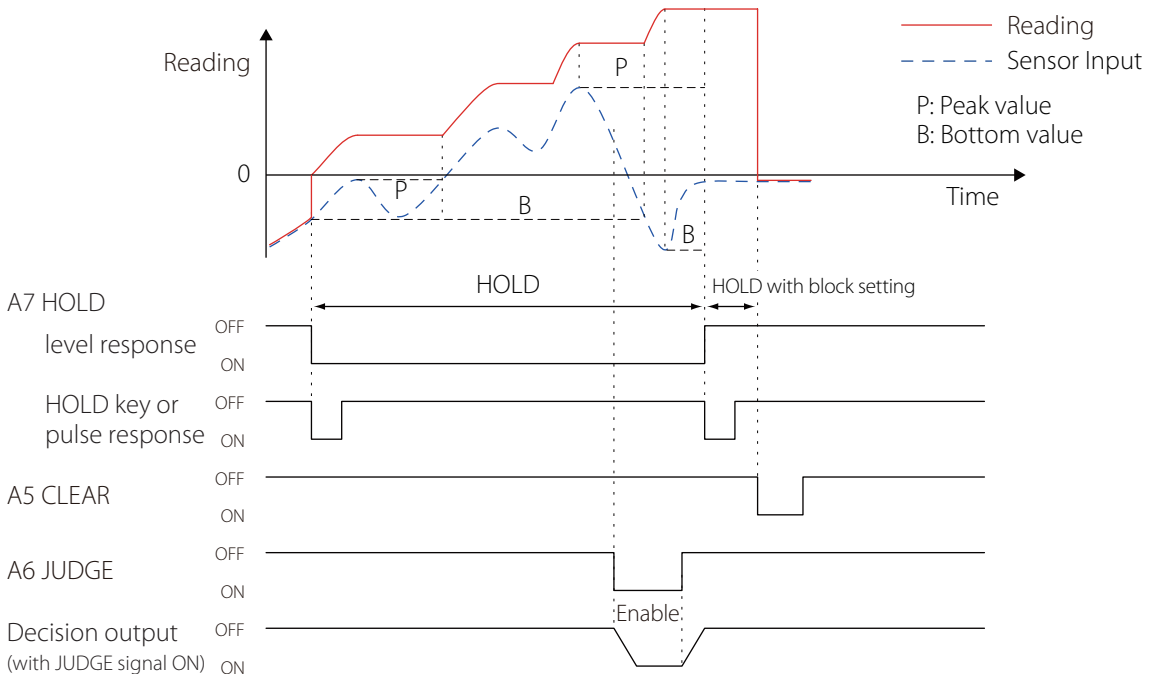
8-9-1. Operation without block setting

If the HOLD key is pressed or the HOLD signal from the control input/output terminal A7 is set to ON, the TD-260T starts holding the maximum reading (peak value) and the minimum reading (bottom value) for each sampling. Then, the TD-260T starts holding and displaying the maximum difference between those two values. If the HOLD key is pressed again or the HOLD signal from the control input/output terminal A7 is set to OFF, the TD-260T exits the Peak-to-Peak hold mode, and then starts measuring the input signal again.
If the CLEAR key is pressed or the CLEAR signal from the control input/output terminal A5 is set to ON while the TD-260T is in the hold mode, the TD-260T resets the peak-to-peak value.



8-9-2. Operation with block setting

The TD-260T continues to display the reading that has been displayed when a hold operation is terminated.
If the CLEAR key is pressed or the CLEAR signal from the control input/output terminal A5 is set to ON, the TD-260T resets the display.



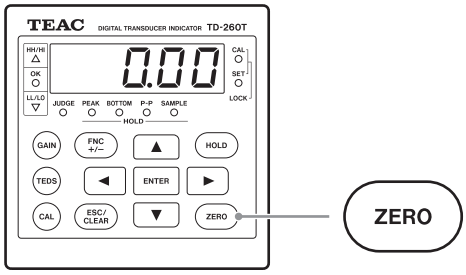
If the CLEAR key is pressed or the CLEAR signal from the control input/output terminal A5 is set to ON while the TD-260T is in the hold mode, the TD-260T resets the peak-to-peak value.

9. Digital Zero Function

9-1. Digital Zero

You can set the currently displayed reading to zero.

1. Press ZERO or short-circuit the control input/output terminals A8 for D/Z and A9 for COM.



- To set a range that can be digitally zeroed, use Digital Zero Limit (F1-13).
- To clear the digitally set zero, shut off the power to the TD-260T or perform Clear Digital Zero (F1-14).

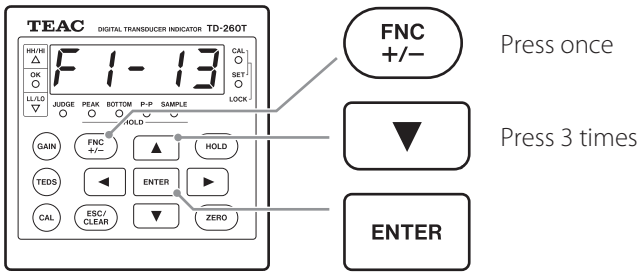
CAUTION

- The Digital zero function is available only with both CAL Lock (F3-5) and Enable Digital Zero (F3-5) set to ON.
- If you press ZERO with the CAL Lock (F3-5) set to OFF, zero-point calibration is performed instead.

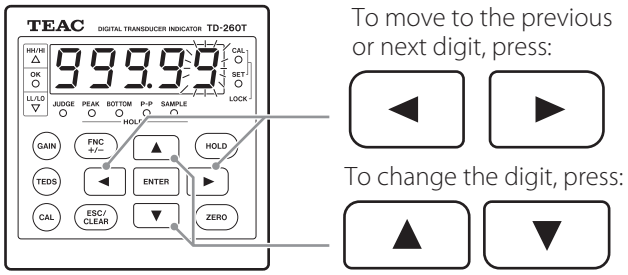
9-2. Digital Zero Limit

You can set a range that can be digitally zeroed. (Note that a value that is set for Digital Zero Limit does not use mV/V as the unit of measure.)

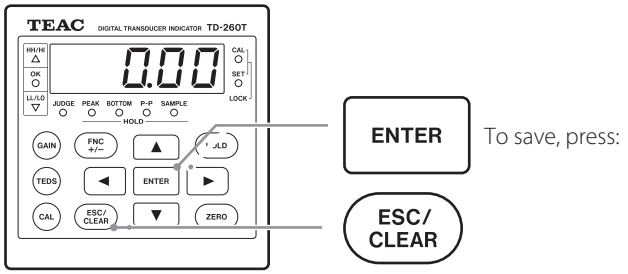
1. Enter the setup screen number F1-13.



2. To change the blinking digit of the value, press ▲ or ▼. To move to the previous or next digit, press ◄ or ►.



3. To save the value you set, press ENTER, and then to exit the setup mode, press ESC.



CAUTION

If the current sensor input exceeds the digital zero limit setting, the TD-260T, which regards as zero the sensor input that was obtained when the zero-point calibration was performed, shows Err14, meaning digital zero limit error, and cannot set the displayed reading to zero.

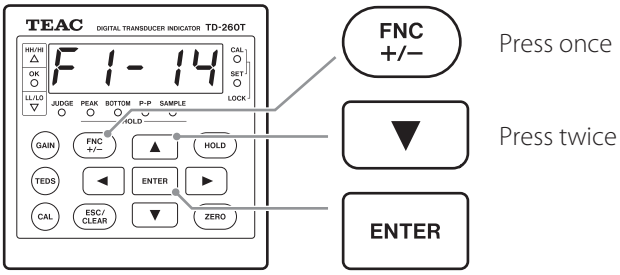
NOTE

If you perform the function explained in the section 9-3. "Clear Digital Zero," the TD-260T displays the current sensor input value, regarding as zero the sensor input that was observed when the zero-point calibration was performed.

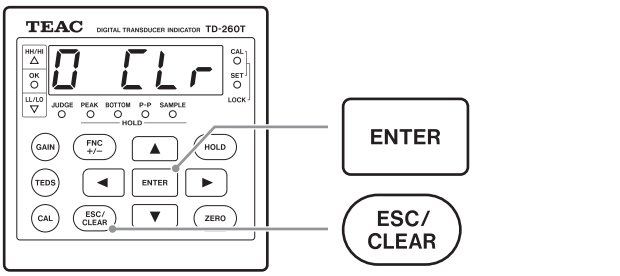
9-3. Clear Digital Zero

You can restore the zero setting that has been used before Digital Zero was performed.
After this function is performed, the TD-260T displays the current sensor input value, regarding as zero the sensor input that was observed when the zero-point calibration was performed.

1. Enter the setup screen number F1-14.



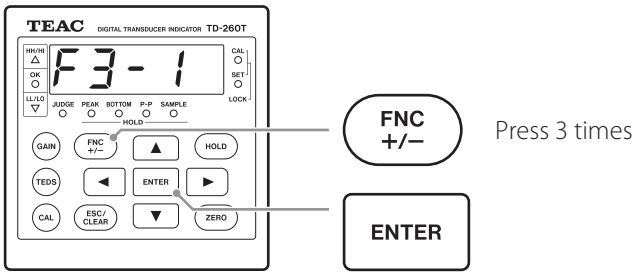
2. To clear the digitally set zero, press ENTER. To exit the setup mode, press ESC.



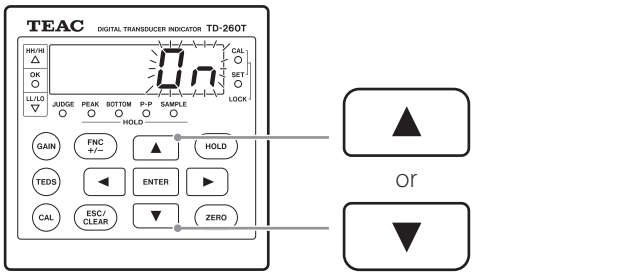
9-4. Enable Digital Zero

With Enable Digital Zero set to OFF, a reading cannot be digitally set to zero if you press ZERO or short-circuit the control input/output terminals A8 for D/Z and A9 for COM.

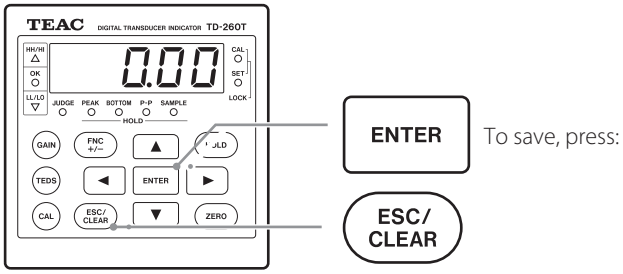
1. Enter the setup screen number F3-1.



2. To select ON or OFF, press ▲ or ▼.



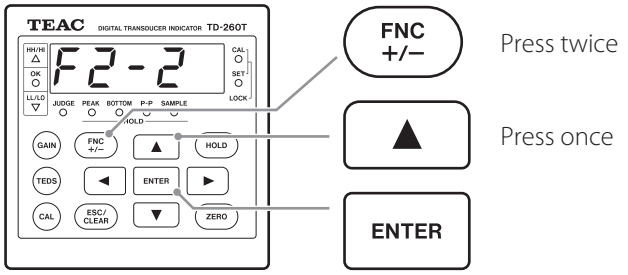
3. To save the selection, press ENTER, and then to exit the setup mode, press ESC.



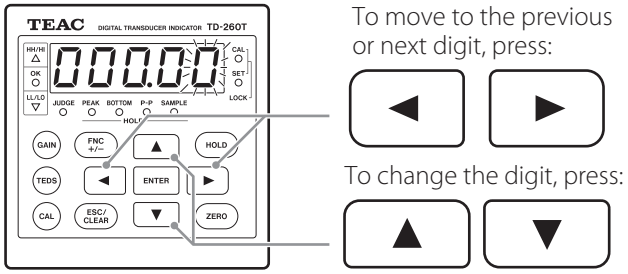
9-5. Digital Offset

You can set a value that is automatically subtracted from a measured value. (Tare)

1. Enter the setup screen number F2-2.



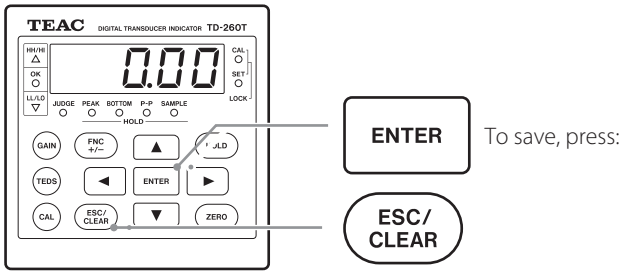
2. To change the blinking digit of the value, press ▲ or ▼. To move to the previous or next digit, press ◄ or ►.



NOTE

If you press FNC, regardless of the position of the blinking digit, a minus sign is added or removed.

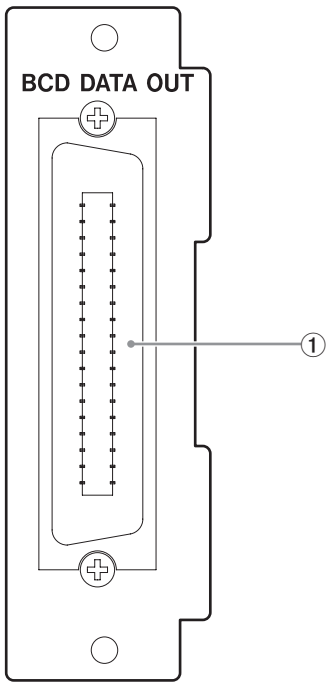
3. To save the vale you set, press ENTER, and then to exit the setup mode, press ESC.



10. BCD Data Output (TD-260T AC(BCD) / TD-260T DC(BCD))

The BCD data output is an interface for sending the TD-260T displayed readings as BCD-coded data. The interface connects the TD-260T to a computer, process controller, sequencer or equivalent, for controlling, summarizing, recording or any other processing purposes. The TD-260T internal circuit and external connection circuit are electrically isolated with a photocoupler.

10-1. Panel



① BCD connector

No.	I/O	Signal name	No.	I/O	Signal name
1		COM	19		COM
2	Output	1	20		NC
3		2	21		
4		4	22	Output	Near Zero
5		8	23		Negative (polarity)
6		10	24		OVER
7		20	25		P.C (stable)
8		40	26		STROBE
9		80	27	Input	Hold BCD Data
10		100	28		Switch Data Logic
11		200	29		NC
12		400	30		
13		800	31		
14		1000	32		
15		2000	33		
16		4000	34	Output	80000
17		8000	35		40000
18		10000	36		20000

Applicable connector: DDK 57-30360 or equivalent

NOTE

To reduce the unnecessary radio frequency emission, be sure to install the provided ferrite core on the output cable (for voltage or current).

10-2. Changing logic

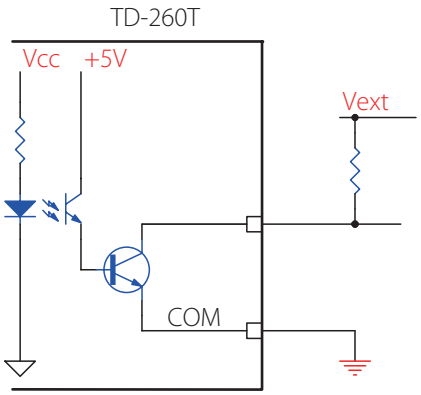
You can change the logic setting for all output signals except for the STROBE signal.

If a COM terminal and the pin 28 are open, the signals are set to negative logic. If they are short-circuited, the signals are set to positive logic.

Pin 28	Logic
Open	Negative
Shorted	Positive

10-3. Equivalent circuit

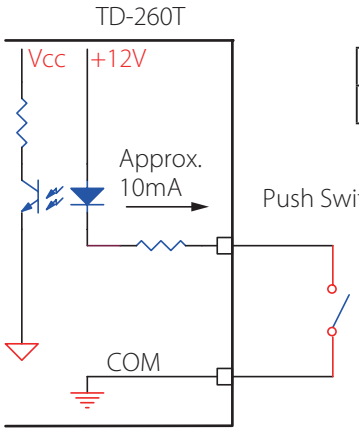
Output equivalent circuit



Output data		Negative logic	Positive logic
0	Output transistor (Output pin level)	OFF (H)	ON (L)
1	Output transistor (Output pin level)	ON (L)	OFF (H)

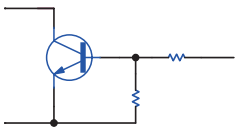
Vce = 30V(max), Ic = 50mA(max)

Input equivalent circuit



Open	OFF
Shorted	ON

When transistor is connected



When open collector is connected

ON when IN is high

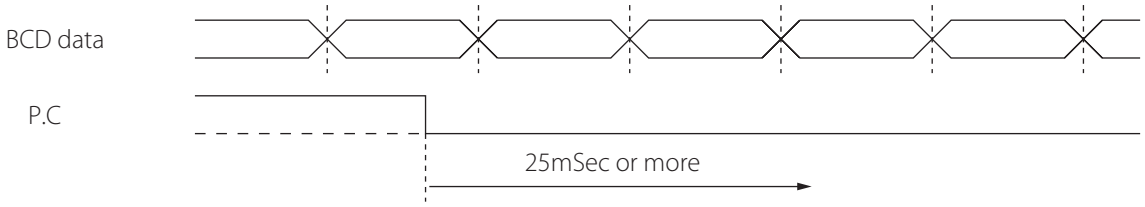
CAUTION

- Do not apply external voltages to the signal input circuit.
- Use a contact device with 20 mA or more capacity.

10-4. Signal timing

P.C (stable)

The P.C signal is turned on when the input signal is stable. To load the BCD data in synchronization with the STROBE signal, be sure to wait 25 milliseconds or more after the falling edge of the P.C signal.

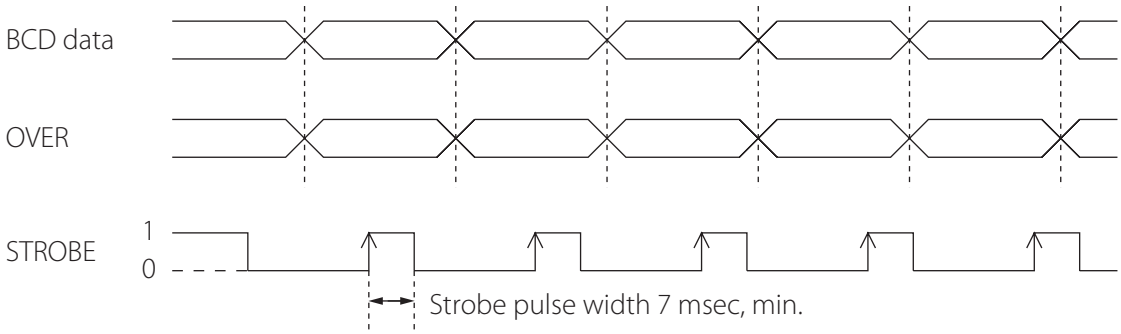


OVER

The OVER signal is generated when the message -LOAD or LOAD, or -Full or Full is displayed.

STROBE

The STROBE pulse is generated in synchronization with the BCD data.
To load the data, use the leading edge of the pulse.
Using BCD Data Refresh Rate (F4-1), you can change the BCD data refresh rate.



CAUTION

If you have set the data refresh rate to 100 times per second, be sure to load the data within 5 milliseconds.

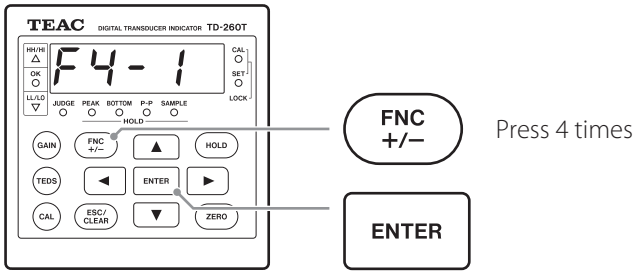
NOTE

For detailed information about the P.C (stable) signal, see the section 7-6. “Motion Detection.”

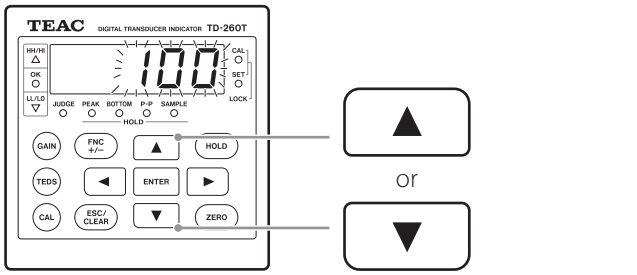
10-5. BCD Data Refresh Rate

You can change the BCD data refresh rate (times per second).

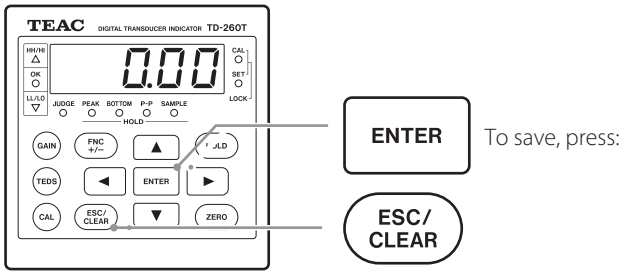
1. Enter the setup screen number F4-1.



2. To select 100, 50, 20, 10, 5, 2, or 1, press ▲ or ▼.



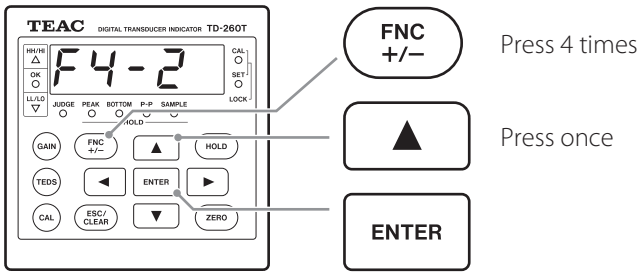
3. To save the selection, press ENTER, and then to exit the setup mode, press ESC.



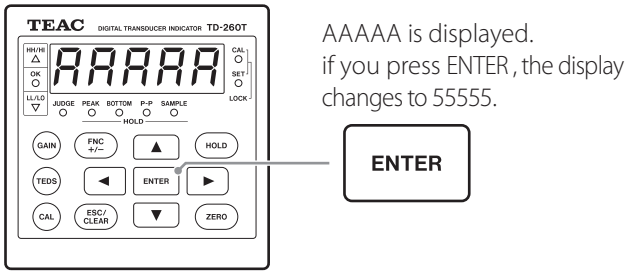
10-6. BCD Output Check

By changing the BCD output from AAAAA to 55555 in this order, you can check the BCD data wiring to an external device for correct connection.

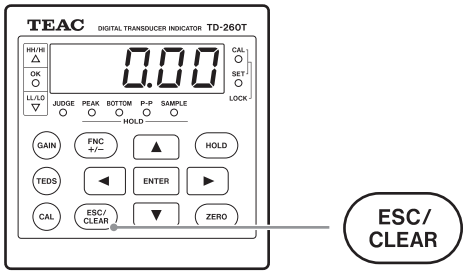
1. Enter the setup screen number F4-2.



2. The TD-260T goes into check mode, with AAAAA being both displayed on the TD-260T and sent from the BCD data output.
To display 55555 and send it from the BCD output, press ENTER.
Then, to put the TD-260T into setup mode, press ENTER again. The display shows "F4-2."



3. To exit the setup mode, press ESC.



NOTE

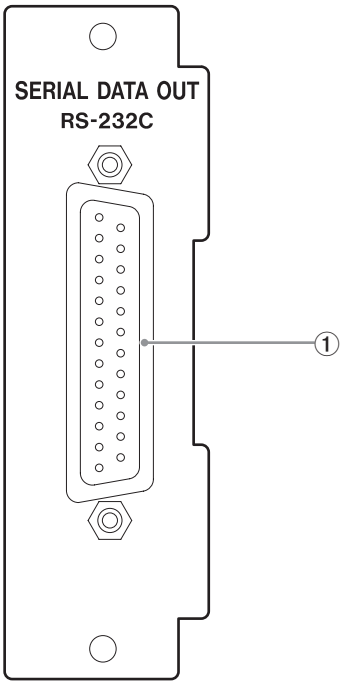
- While "F4-2" is displayed, a reading displayed on the TD-260T is generated from the BCD data output.
- Each time you press ENTER after "F4-2" is displayed, the BCD data output cycles through the following.

AAAAA → 55555 → reading →

11. RS-232C Interface (TD-260T AC(232C) / TD-260T DC(232C))

The RS-232C interface loads readings and states from and also saves set values into the TD-260T. It connects the TD-260T to a computer, process controller, sequencer, or equivalent, for controlling, summarizing, recording, or any other processing purposes.
The TD-260T internal circuit and external connection circuit are electrically isolated with a photocoupler.

11-1. Panel



① RS-232C connector

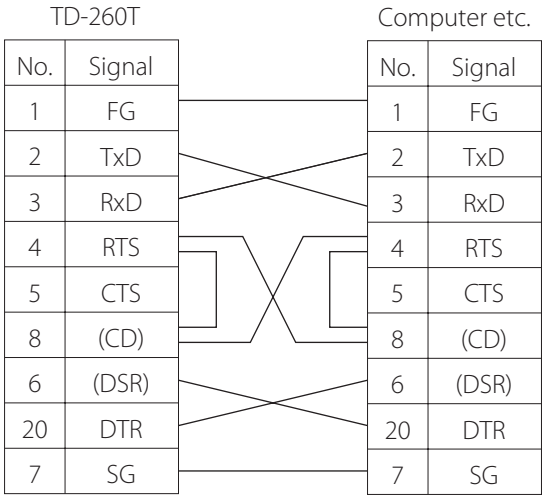
No.	I/O	Signal name	No.	I/O	Signal name
1		FG	14		
2	Output	TxD	15		
3	Input	RxD	16		
4	Output	RTS	17		
5	Input	CTS	18		
6			19		
7		SG	20	Output	DTR
8			21		
9			22		
10			23		
11			24		
12			25		
13					

Applicable plug: 25-pin D-SUB connector
(JAE's DB-25P-NR or equivalent)

11-2. Standard

Signal level:	RS-232C
Transmission distance:	Approx. 15 m
Transfer method:	Full duplex, asynchronous communication
Transfer rate:	1200, 2400, 4800, 9600, 19200 bps
Bit configuration:	Start bit: 1
Data bits:	7 or 8 bits
Stop bits:	1 or 2 bits
Parity bits:	None, odd, or even
Flow control:	None
Code:	ASCII

11-3. Cable wiring example



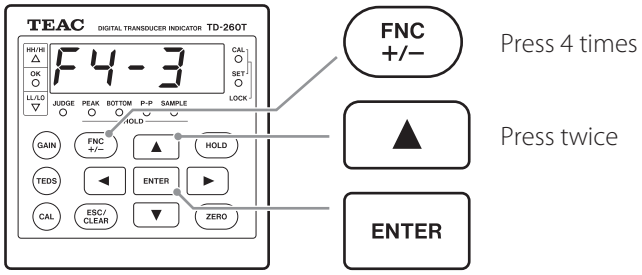
No.	Signal
1	FG
2	TxD
3	RxD
4	RTS
5	CTS
8	(CD)
6	(DSR)
20	DTR
7	SG

No.	Signal
1	FG
2	TxD
3	RxD
4	RTS
5	CTS
8	(CD)
6	(DSR)
20	DTR
7	SG

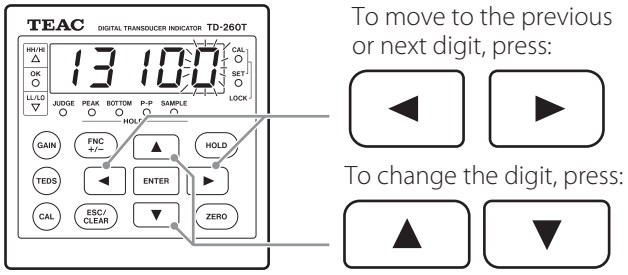
11-4. RS-232C Interface Setting

You can change the RS-232C transmission conditions:

1. Enter the setup screen number F4-3.



2. To change the blinking digit of the value, press ▲ or ▼. To move to the previous or next digit, press ◄ or ►.



The number for each digit represents a transmission setting as shown below.

1 3 1 0 0
a b c d e

a Transmission mode
0: Transmission mode 0
1: Transmission mode 1

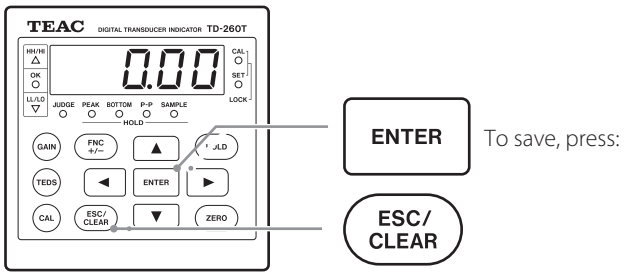
b Baud rate
0: 1200 bps 1: 2400 bps 2: 4800 bps
3: 9600 bps 4: 19200 bps

c Data bits
0: 7 bits 1: 8 bits

d Parity bits
0: None 1: Odd 2: Even

e Stop bits
0: 1 bit 1: 2 bits

3. To save the settings, press ENTER, and then to exit the setup mode, press ESC.



11-5. List of Commands

11-5-1. Read commands

Command	Function	Page
RA	Load displayed readings	60
RS	Load statuses	60
RD	Load statuses	60

11-5-2. Set commands

Command	Setup item	Page	SET Lock	CAL Lock	Unit
W01	HI Valuet	61	x		
W02	LO Value	61	x		
W03	Comparison Mode	61	x		
W04	Hysteresis	61	x		
W05	Digital Offset	61	x		
W06	Near Zero	61	x		
W07	HH value	61	x		
W08	LL value	61	x		
W09	Enable HH and LL	61	x		
W11	Digital Filter	61	x		# of times
W12	Analog Filter	61	x		Hz
W13	Motion Detection Time	61	x		Sec
W14	Motion Detection Bandwidth	61	x		
W15	Zero Tracking Time Interval	61	x		Sec
W16	Zero Tracking Bandwidth	62	x		
W17	Hold Mode	62	x		
W18	Digital Zero Limit	62	x		
W19	Comparative Output Pattern	62	x		

x: Applicable

Command	Setup item	Page	SET Lock	CAL Lock	Unit
W21	CAL Lock	62			
	SET Lock	62			
W22	Minimum Scale	62		x	
W23	Display Refresh Rate	62		x	# of times
W24	Bridge Voltage	62		x	V
W25	External Hold Mode	62	x		
W26	Remote Sense/TEDS	62		x	
W27	Enable CLEAR Signal	62	x		
W28	Enable Block Setting	62	x		
W29	Enable JUDGE Signal	62	x		
W31	BCD Data Refresh Rate	62	x		# of times/Sec
W32	RS-232C Interface Setting	62	x		
W33	D/A Zero	63	x		
W34	D/A Full Scale	63	x		
W35	Beep	63	x		
W36	Select Data Output	63	x		

x: Applicable

11-5-3. Set-value retrieving set value

Command	Function	Page
Wxx	Set value for set command Wxx	63

11-5-4. Control

Command	Function	Page
CE	Hold ON	64
CF	Hold OFF	64
CG	Digital zero	64
CH	Reset digital zero	64
CI	Reset hold	64
CJ	JUDGE contact input ON	64
CK	JUDGE contact input OFF	64

11-6. Transmission Mode

You can switch between the transmission mode 0 and the transmission mode 1 by changing the transmission mode setting explained in the section 11-4. "Setting RS-232C interface."

11-6-1. Transmission mode 0

In the transmission mode 0, a computer or similar device sends a command to load a reading, statuses, and set values from or to save set values into the TD-260T.

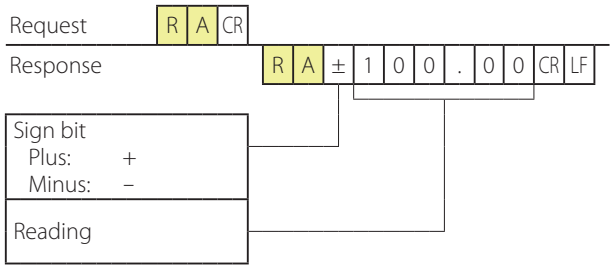
11-6-2. Transmission mode 1

In the transmission mode 1, the TD-260T continuously transmits readings and statuses.

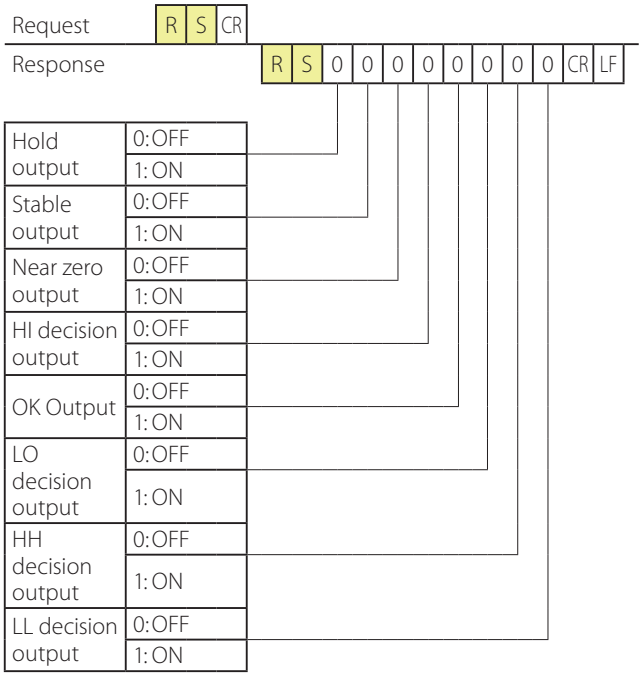
11-7. Format for transmission mode 0

A host computer sends data called Request to the TD-260T, and then the TD-260T sends data called Response back to the host computer. Request and Response use ASCII characters except for CR and LF.
(CR: Carriage Return (0x0D), LF: Line Field (0x0A))

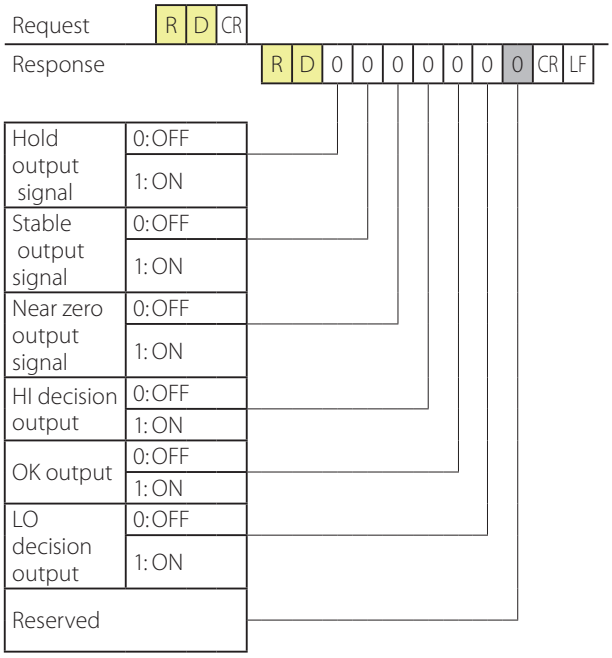
11-7-1. Read displayed-reading command (RA)



11-7-2. Read status command (RS)

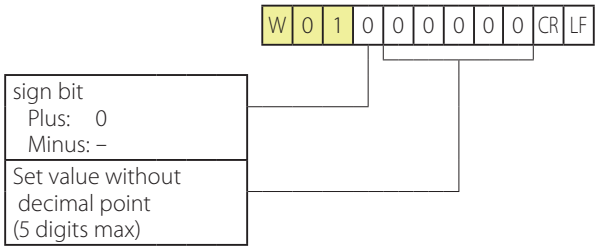


TD-250T compatible command (RD)

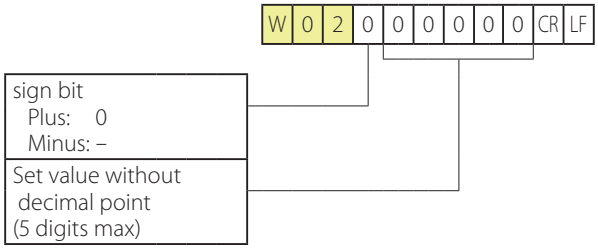


11-8. Set commands

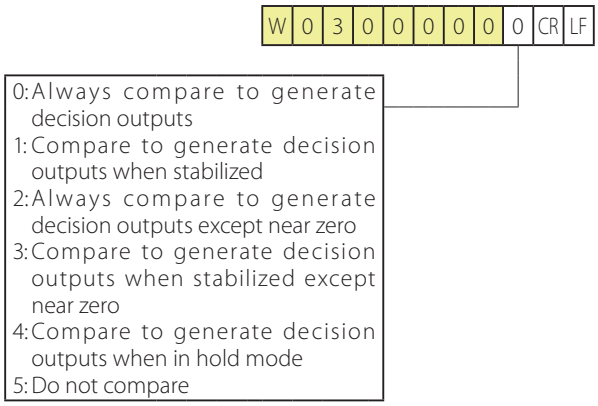
HI Value (W01)



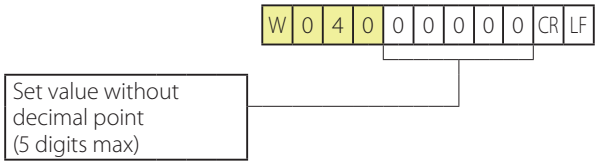
LO Value (W02)



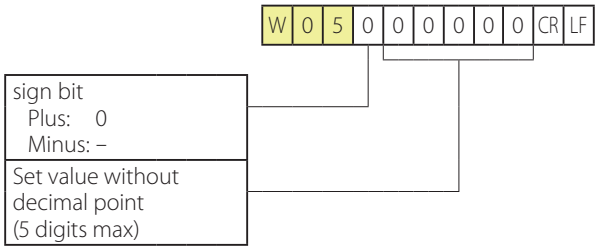
Compairson Mode (W03)



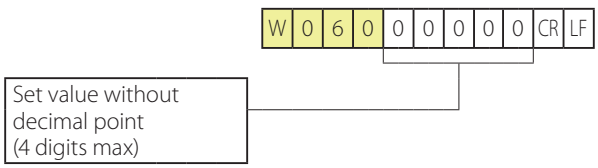
Hysteresis (W04)



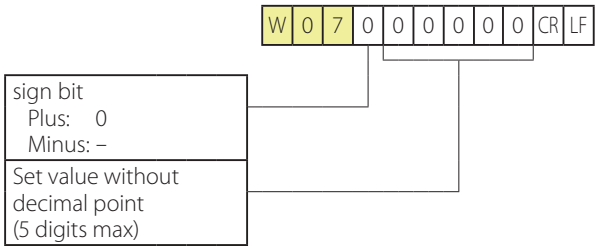
Digital Offset (W05)



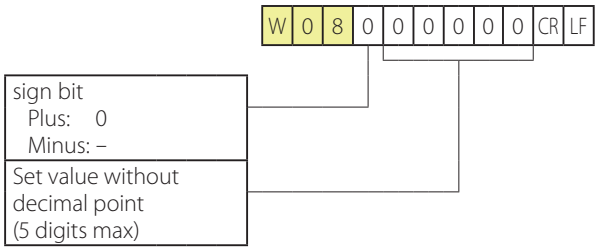
Near Zero (W06)



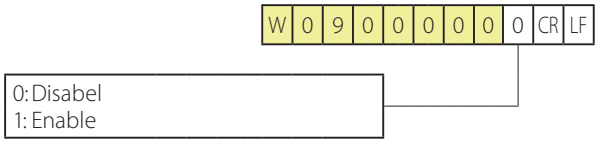
HH Value (W07)



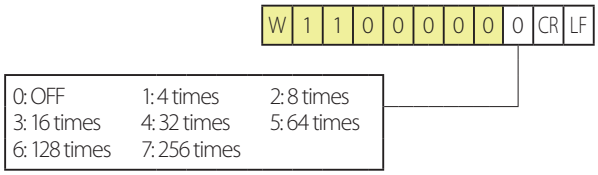
LL Value (W08)



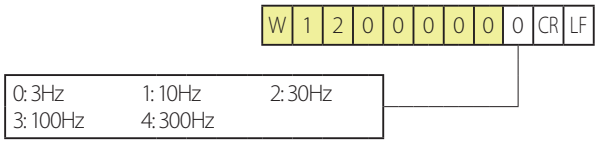
Enable HH and LL (W09)



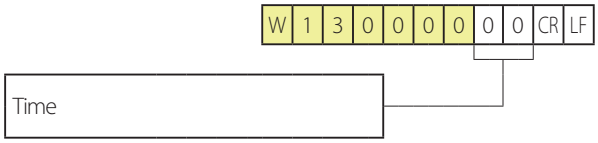
Digital Filter (W11)



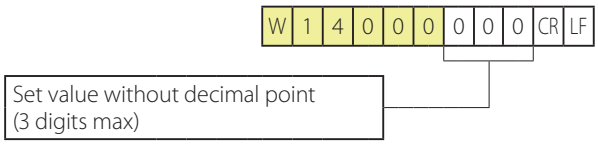
Analog Filter (W12)



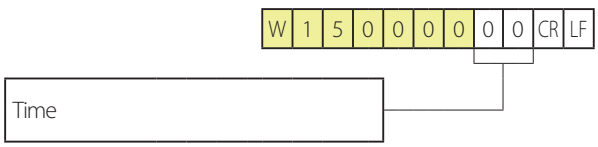
Motion Detection Time (W13)



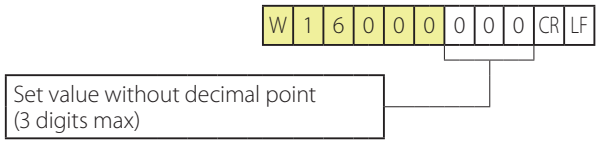
Motion Detection Bandwidth (W14)



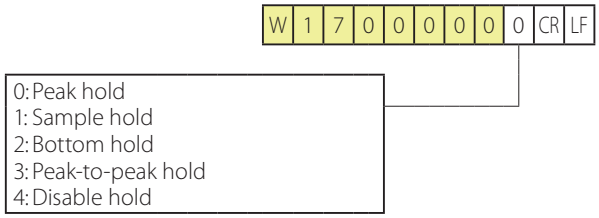
Zero Tracking Time Interval (W15)



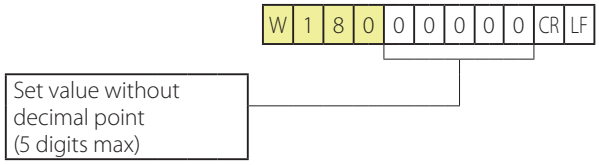
Zero Tracking Bandwidth (W16)



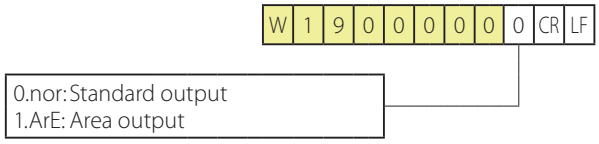
Hold Mode (W17)



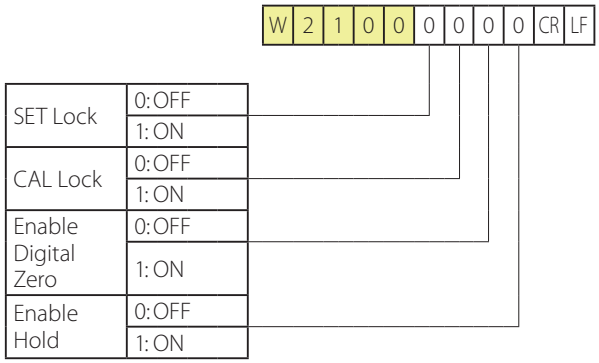
Digital Zero Limit (W18)



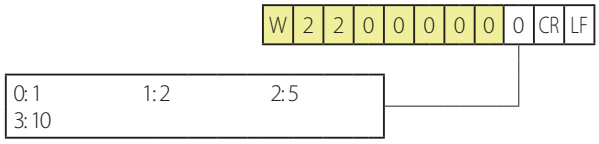
Comparative Output Pattern (W19)



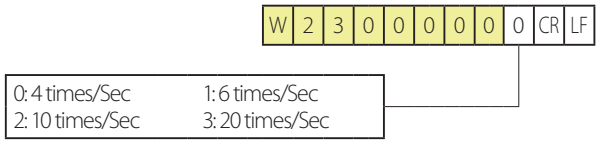
Lock (W21)



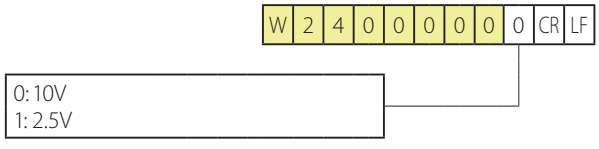
Minimum Scale (W22)



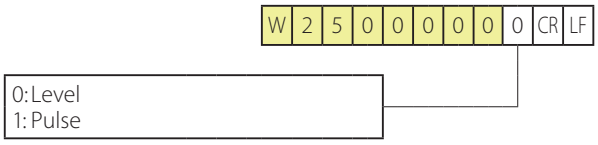
Display Refresh Rate (W23)



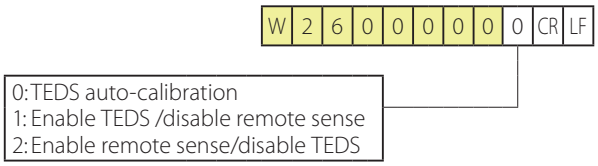
Bridge Voltage (W24)
(Write-protected, read only)



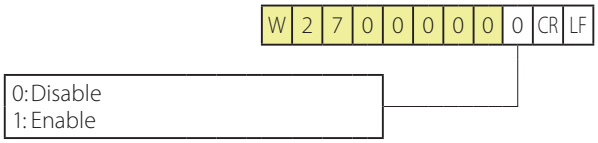
External Hold Mode (W25)



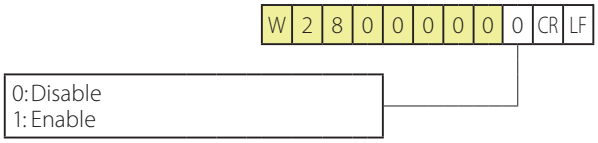
Remote Sense/TEDS (W26)
(Write-protected, read only)



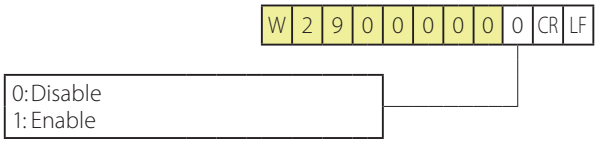
Enable CLEAR Signal (W27)



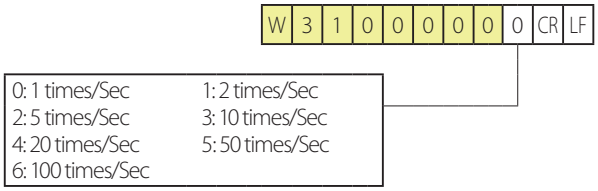
Enable Block Setting (W28)



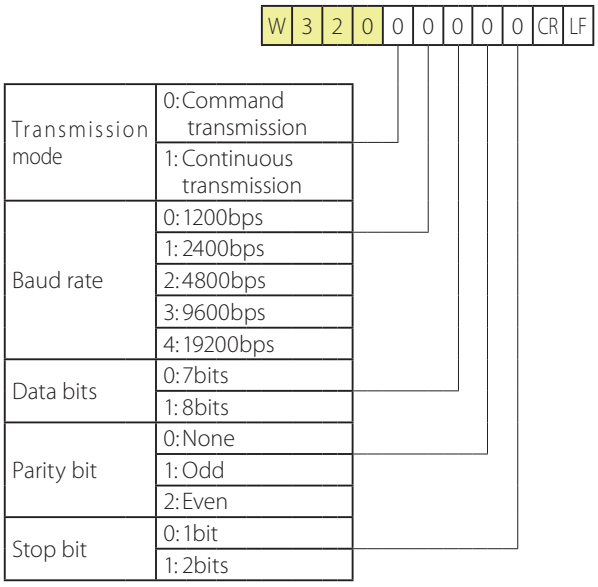
Enable JUDGE Signal (W29)



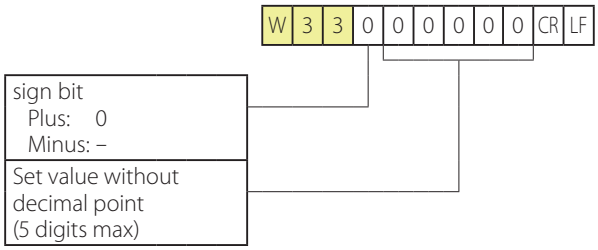
BCD Data Refresh Rate (W31)



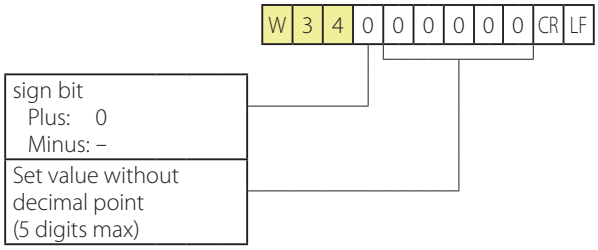
RS-232C Interface Setting (W32)



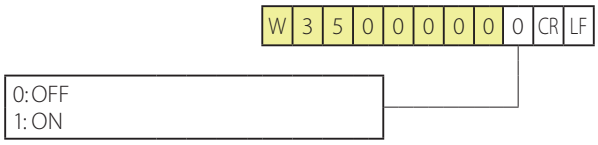
D/A Zero Setting (W33)



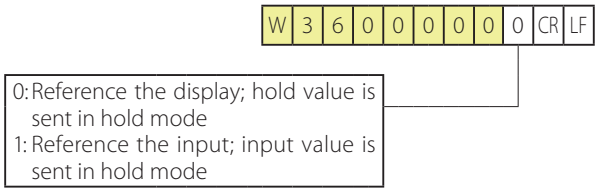
D/A Full-Scale Settings (W34)
(Write-protected, read only)



BEEP (W35)

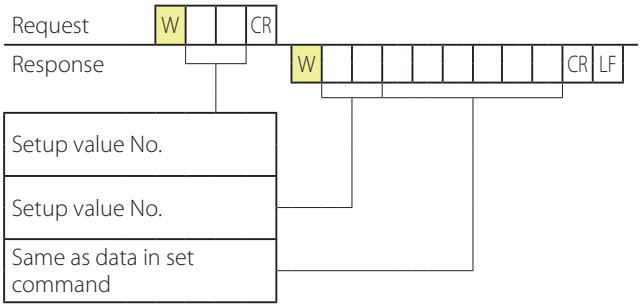


Select Data Output (W36)



11-9. Set-value retrieval command

You can retrieve a set value by using the following command.



11-10. Control Commands

Hold ON (CE)

C	E	CR

(Only with a hold mode setting other than 0.OFF enabled)

Hold OFF (CF)

C	F	CR

(Only with a hold mode setting other than 0.OFF enabled)

Digital Zero (CG)

C	G	CR

(Only with both Enable Digital Zero and CAL Lock ON)

Reset digital zero (CH)

C	H	CR

(With Enable Digital Zero ON)

Reset Hold (CI)

C	I	CR

(Only in hold mode)

JUDGE contact input ON (CJ)

C	J	CR

(With Enable JUDGE Signal ON)

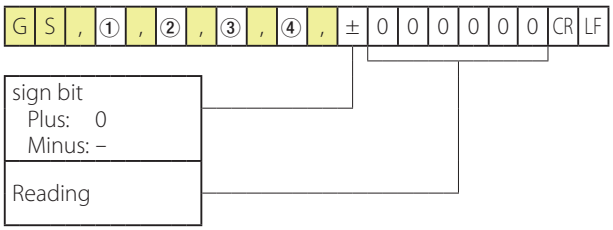
JUDGE contact input OFF (CK)

C	K	CR

(With Enable JUDGE Signal ON)

11-11. Format for transmission mode 1

The TD-260T continuously transmits 20-byte data in the following format.



① Displayed status
O: Overflow (±LOAD,±Full)
S: Stable
M: Unstable
H: Hold

Status notification priority if more than one status observed
H > O > (S or M)

② Zero tracking
A: OFF
T: ON

③ Decision output
H: Hi decision output ON
L: LO decision output ON
O: HH decision output ON
U: LL decision output ON
G: OK decision output ON
(HI, LO, HH, and LL decision outputs OFF)
F: All decision outputs OFF

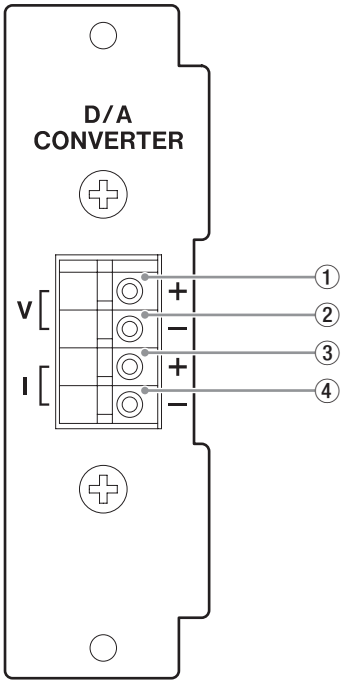
Output notification priority if more than one output observed
(O or U) > (H or L or G) > F

④ Near zero
N: OFF
Z: ON

12. D/A Converter (TD-260T AC(D/A) / TD-260T DC(D/A))

The D/A output circuit is isolated from the TD-260T internal circuit.
The analog output ranges are 0 to ± 10 V in voltage and 4 to 20 mA in current.
Using the D/A zero and D/A full-scale functions, you can respectively obtain analog output zero (0 V, 4 mA) and full scale (±10 V, 20 mA) for any digital value you set.
Notice that the output current for the output voltage 0 V is 4 mA and the output current for the output voltage 10 V is 20 mA.
You cannot set a value for the output current and output voltage separately when you change the zero point or full scale setting.
Resolution is ±1 per 10000 for 0 to ±10 V, and the conversion rate is 100 times per second.
The D/A converter has an overrange capability of about ±10 % on the output.

12-1. Panel



① Voltage output V +

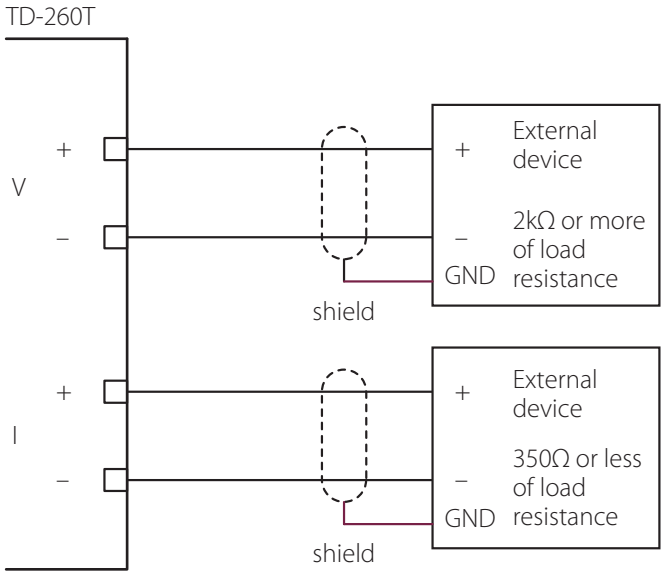
② Voltage output V -

③ Current output I +

④ Current output I -

12-2. Connections

Connect an external device with a load resistance of 2 kΩ or more to the voltage outputs V + and V -.
Connect an external device with a load resistance of 350 Ω or less, including a cable resistance, to the current outputs I + and I -.



12-2-1. Connecting to screwless terminal block

To connect wires to the terminal block, use the provided flathead micro screwdriver or equivalent.

1. **Strip off about 10-12 mm of the insulation from an end of each wire you connect, and then gently twist each bare end.**
   Use wires 0.4-1.2 mm^2 in cross-sectional area.
2. **Press the button next to the corresponding wire insertion hole by using the screwdriver.**
3. **While keeping each wire end twisted, insert it into the corresponding wire insertion hole.**
4. **Release each button.**
5. **Lightly pull each wire and make sure that they are securely clamped.**

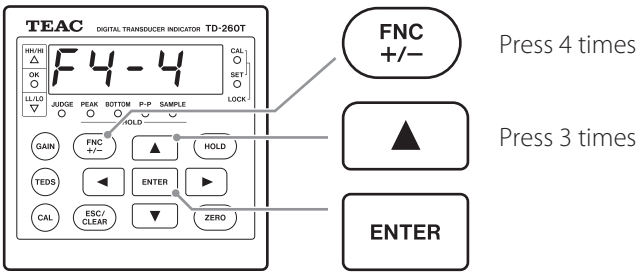
NOTE

To reduce the unnecessary radio frequency emission, be sure to install the provided ferrite core on the output cable (voltage or current).

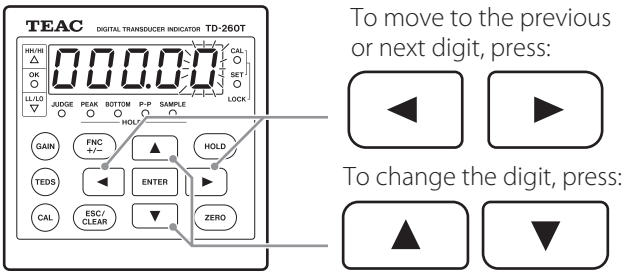
12-3. D/A Zero

You can set a value so that the TD-260T generates a D/A zero output (voltage 0 V and current 4 mA) when it displays the same reading as the value you set.

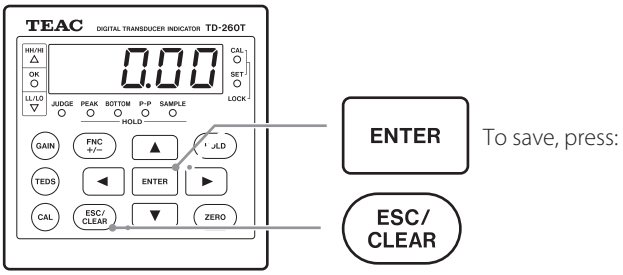
1. Enter the setup screen number F4-4.



2. To change the blinking digit of the value, press ▲ or ▼. To move to the previous or next digit, press ◄ or ►.



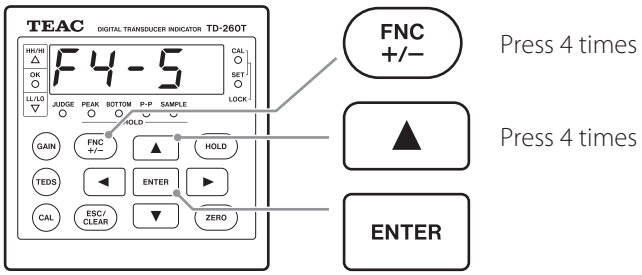
3. To save the setting, press ENTER, and then to exit the setup mode, press ESC.



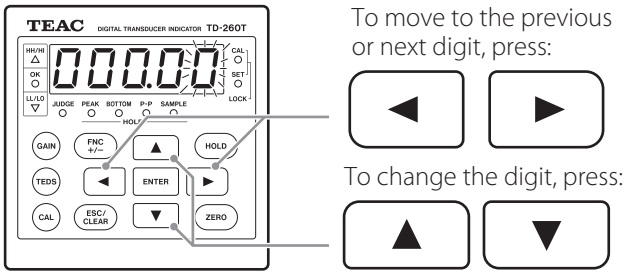
12-4. D/A Full Scale

You can set a value so that the TD-260T generates a D/A full scale output (voltage 10 V and current 20 mA) when it displays the same reading as the value you set.

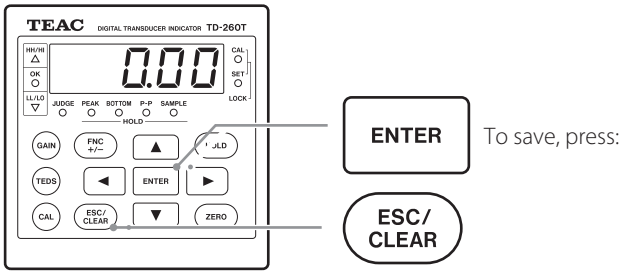
1. Enter the setup screen number F4-5.



2. To change the blinking digit of the value, press ▲ or ▼. To move to the previous or next digit, press ◄ or ►.



3. To save the setting, press ENTER, and then to exit the setup mode, press ESC.

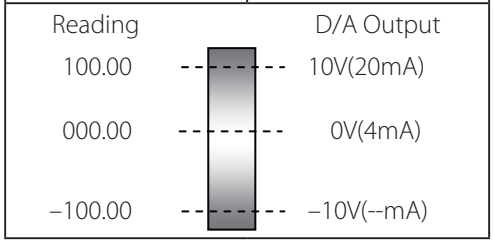


CAUTION

The rated capacity is set as the D/A full-scale value when you save the rated capacity during calibration.

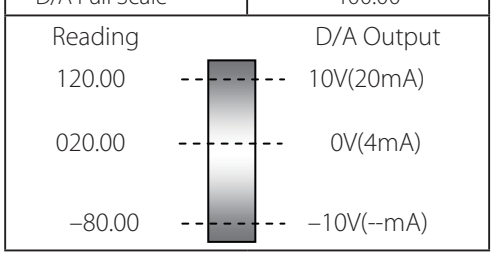
Setting example 1

D/A Zero	000.00
D/A Full Scale	100.00



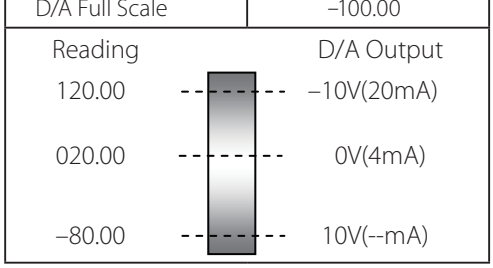
Setting example 2

D/A Zero	020.00
D/A Full Scale	100.00



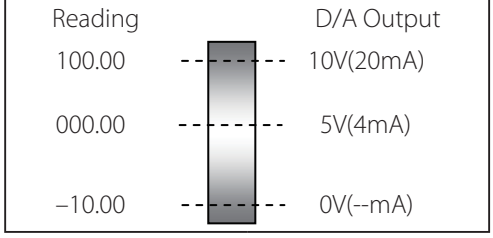
Setting example 3

D/A Zero	020.00
D/A Full Scale	–100.00



Setting example 4

D/A Zero	–10.00
D/A Full Scale	20.00



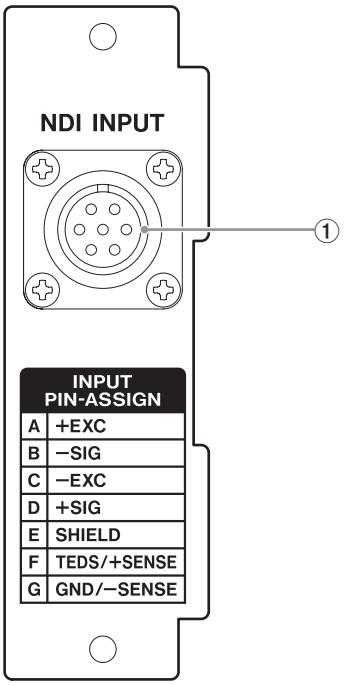
12-5. D/A output error

Below are the messages that are displayed when errors are caused by the D/A option.

dErr: the D/A output is higher than +10.9 V.

-dErr: the D/A output is lower than -10.9 V.

The NDIS panel is an input connector panel that conforms to the Non-Destructive Inspection Standard (NDIS) (established by the Japanese Society for Non-Destructive Inspection).
You can connect a sensor with an NDIS connector to the panel.



① NDIS connector

Pin assignmentment	Signal name
A	+EXC
B	-SIG
C	-EXC
D	+SIG
E	SHIELD(FG)
F	TEDS/+SENS
G	GND/-SENS

Applicable plug: PRC03-12A10-7M10.5 manufactured by Tajimi Electronics Co., Ltd.

CAUTION

- The terminals F and G are used as either remote sense terminals or TEDS sensor data terminals. Before connecting a sensor, you need to set Remote Sense/TEDS (F2-6) to match the function you are going to use.
  The initial setting is 0.Aut: TEDS auto-calibration (disable remote sense).
- If you use a 4-wire connection, but you do not connect a TEDS sensor, do not connect any device to the terminal F or G.
- If you connect a sensor to the NDIS connector on the panel, do not connect any sensor to the signal input/output terminal block on the TD-260T.

14. About TEDS

Connecting a sensor that conforms to IEEE1451.4 (Transducer Electronic Data Sheet (TEDS)) to the TD-260T, you can load the rated output values that are saved on the sensor into the TD-260T and use the values for calibration with the TD-260T.
You can also use the TD-260T to save on your TEDS sensor values that are used for calibration with the TD-260T or to restore the TEDS sensor's factory settings.
TEDS memory is available in 1-kilobit and 4-kilobit sizes. Note that the TD-260T supports the 4-kilobit memory only.

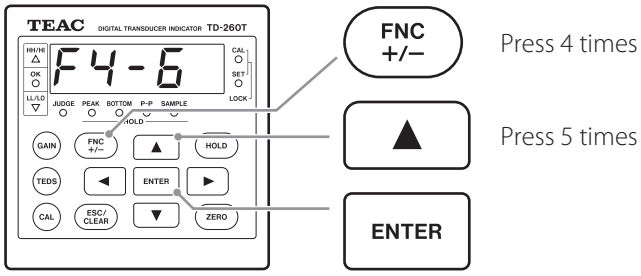
TEDS standard			
IEEE 1451.4 (V0.9)	IEEE1451.4(V1.0)		
	Template ID		
	Bridge Sensors (33)	Strain gage (35)	Others
×	◎	○	×

◎: TEDS calibration, Save TEDS Data (F4-6), and Restore TEDS Data (F4-7) all supported
○: TEDS calibration supported
×: None of the above functions supported

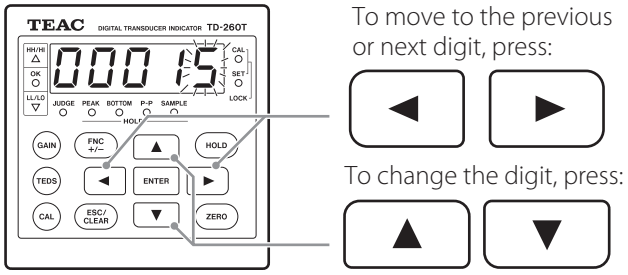
14-1. Save TEDS Data

You can save the current calibration values into the TEDS memory.

1. Enter the setup screen number F4-6.



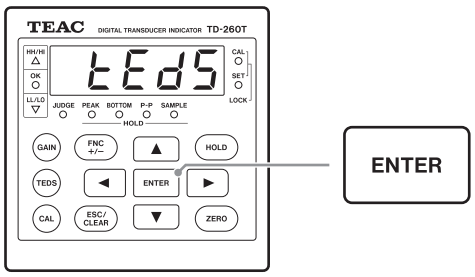
2. To enter 00015, change the blinking digit of the value, press ▲ or ▼. To move to the previous or next digit, press ◄ or ►.



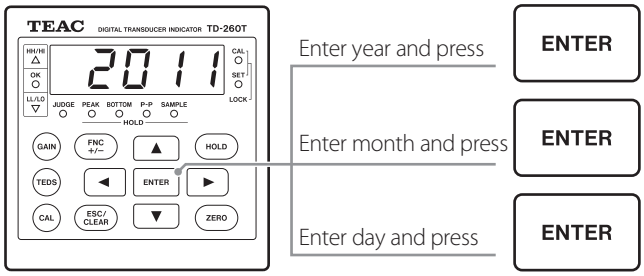
NOTE

- Be sure to enter this value to prevent the original TEDS data from being overwritten by mistake.
- If you press ESC while "tEdS" is not displayed, the setting is interrupted, and then the TD-260T exits the setup mode.

3. Press ENTER. The TD-260T displays "tEdS" and starts verifying data in the TEDS memory,



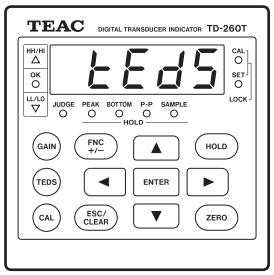
4. To enter a calibration date;
enter a year by pressing ◄, ►, ▲, or ▼, and then press ENTER. For month and day settings, too, press ENTER after you enter values.
When the date setting is completed, the TD-260T starts saving the calibration values.



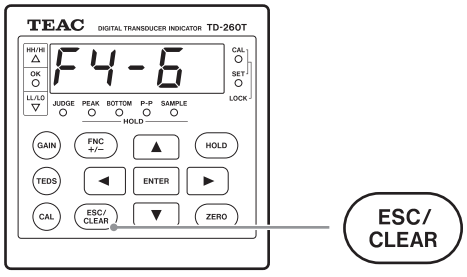
NOTE

If you press ESC while "tEdS" is not displayed, the setting is interrupted, and then the TD-260T exits the setup mode.

5. The display shows "tEdS" during the save process.



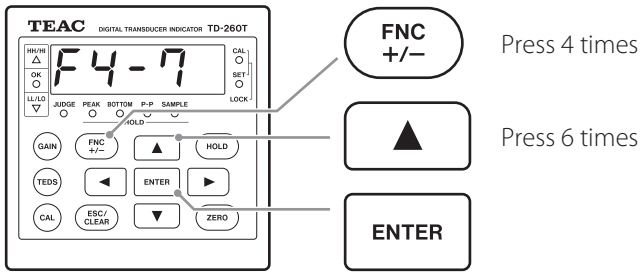
6. The TD-260T displays "F4-6," showing that the save process is completed, and then waits for a key to be pressed.
To exit the setup mode, press ESC.



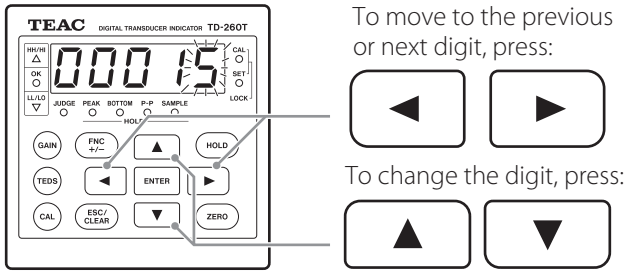
14-2. Restore TEDS Data

You can restore the factory calibration setting ("original TEDS data") into the TEDS memory after saving data by using the function explained in the previous section 14-1. "Save TEDS Data."

1. Enter the setup screen number F4-7.



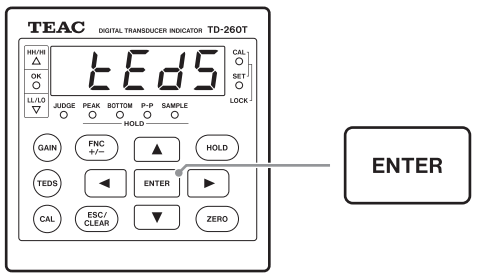
2. To enter 00015, change the blinking digit of the value, by pressing ▲ or ▼. To move to the previous or next digit, press ◄ or ►.



NOTE

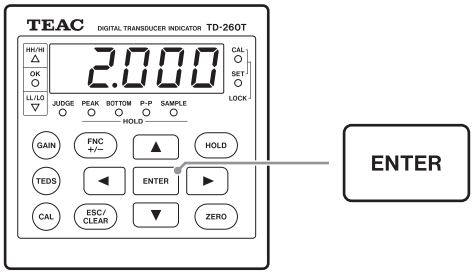
- Be sure to enter this value to prevent the original TEDS data from being overwritten by mistake.
- If you press ESC while "tEdS" is not displayed, the setting is interrupted, and then the TD-260T exits the setup mode.

3. Press ENTER. The TD-260T displays "tEdS" and starts loading the oritinal TEDS data from the TEDS memory.



4. The TD-260T displays the rated output (mV/V), showing that the load operation is completed.

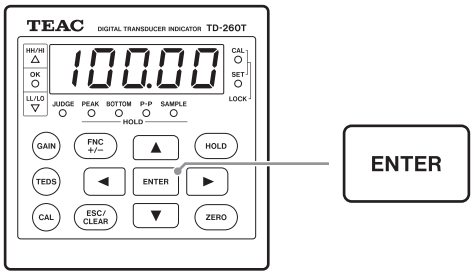
Check the values, and then press ENTER.



NOTE

If you press ESC while "tEdS" is not displayed, the setting is interrupted, and then the TD-260T exits the setup mode.

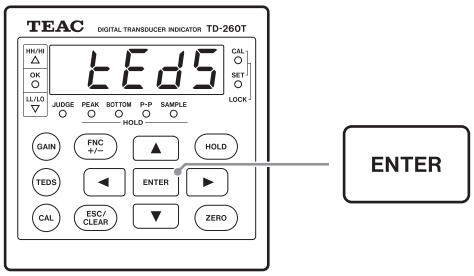
5. The rated capacity is displayed. Check the value, and then press ENTER.



NOTE

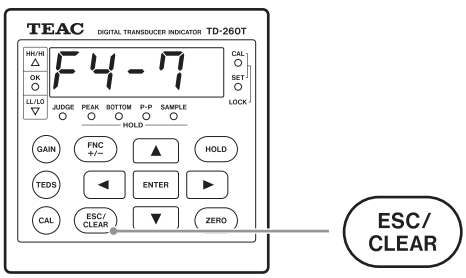
If you press ESC while "tEdS" is not displayed, the setting is interrupted, and then the TD-260T exits the setup mode.

6. Press ENTER. The TD-260T displays "tEdS" and starts saving the data into another area of the TEDS memory.



7. The TD-260T displays "F4-7," showing that the save process is completed, and then waits for a key to be pressed.

To exit the setup mode, press ESC.



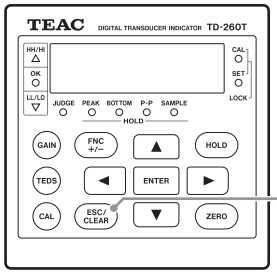
15. Available functions at turn-on

You can check operations of the TD-260T when turning it on.

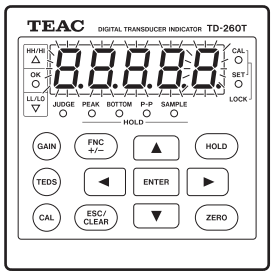
15-1. Performing self-check

This function allows the TD-260T to perform a self-diagnostic check of LEDs, RAM, SRAM, EEPROM, and TEDS, in this order.

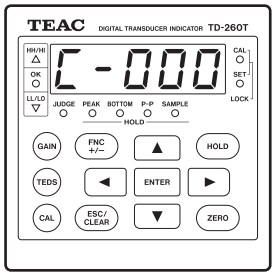
1. While pressing and holding ESC, turn the TD-260T on.



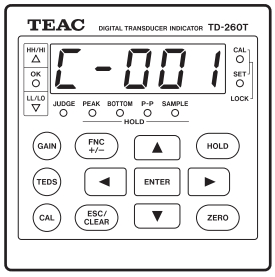
2. The TD-260T displays sets of the same numbers, such as 88888, to check LEDs, one after another.



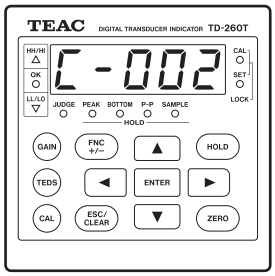
3. The TD-260T displays the following message during the internal RAM check process.



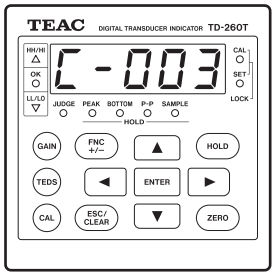
4. The TD-260T displays the following message during the external SRAM check process.



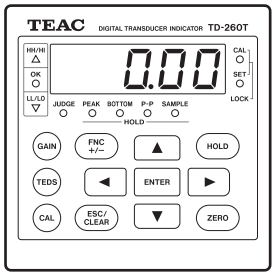
5. The TD-260T displays the following message during the EEPROM check process.



6. The TD-260T displays the following message during the TEDS check process.



7. The TD-260T displays a reading after all the check processes are completed.



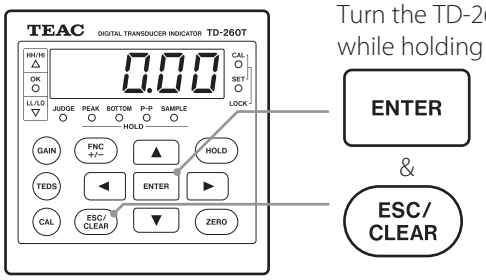
NOTE

The TD-260T displays one of the following messages when an error is detected: cErr0, cErr1, cErr2, and cErr3.
If you encounter any one of the errors, shut off the power to the TD-260T, and then, while pressing and holding ESC, turn it on again to perform a self-check. If the error continues to occur, see the last page of this document and contact us.

15-2. Initializing settings

You can initialize settings all at once to restore the factory preset values.

1. While pressing and holding ESC and ENTER, turn the TD-260T on.



After the settings have been initialized, a self-check starts.

NOTE

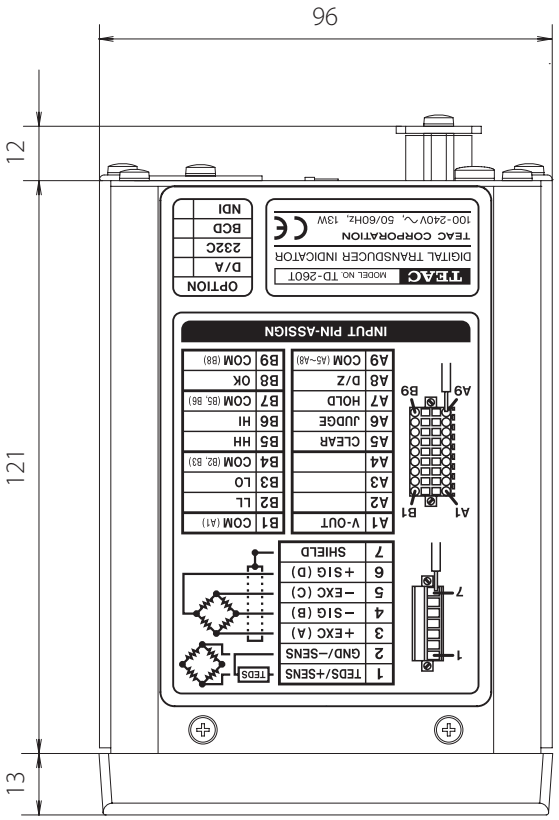
Calibration values are not initialized.

Bridge voltage (BV)		10 V DC, 2.5 V ±10 % (Current: 60mA max. Remote sensing available)
Singal input range		±3.2 mV/V
Equivalent input/ TEDS	Calibration range	0.3 mV/V to 3.2 mV/V
	Calibration accuracy	Within 0.1% FS (at 10V for BV and 0.5mV/V or more for sensor sensitivity)
Zero adjustment range		±2.0 mV/V
Accuracy	Linearity	Within 0.01% FS + and 1 digit (at an input of 1m V/V or more)
	Zero drift	0.5 μV/˚C or less (RTI)
	Gain drift	Within ±0.005% FS/˚C
A/D conversion rate		100 times/sec
Analog filter		Selectable from 3, 10, 30, 100, 300 Hz (–12 dB/oct)
Analog voltage output	Voltage	Approx. 2 V for 1 mV/V
	Load register	2 kΩ or more
TEDS function		IEEE1451.4 Class 2 Mixed-mode interface Note that the TEDS function cannot be used when remote sensing of excitation power supply is used.
Display	Characters	14.6mm high alphanumeric, shown by 7-segment green LED display
	Range	–19999 to 99999
	Decimal point	Position to be selectable
	Refresh rate	4, 6, 10, 20 times/sec
Displayable items	Calibration setting	Zero CAL/Span CAL (TEDS CAL, Actual load CAL, Equiv. input CAL)
	Function settings	HI value, LO value, HH value, LL value, Comparison mode, Hysteresis, Near-zero, Digital filter, Analog filter, Motion detection, Zero tracking, Static strain, Digital zero, Zero offset, Hold mode, Key lock, Minimum scale, Refresh rate, Bridge voltage, B.C.D data refresh rate, RS232C, D/A converter
Hold functions		Sample hold, Peak hold, Bottom hold, Peak-to-Peak hold, block-specified hold (Peak, Bottom, Peak-to-Peak)
External input/ output signal	Input:	Hold, Decision, Clear, Digital zero
	Output:	1a contact for each relay: HH, HI, OK, LO, LL, analog voltage
Power supply	AC power rating:	100 to 240 V ±10% 50–60 Hz AC, 13 W
	DC power rating:	10 to 28 V DC, 8 W
Operating temperature range		–10˚C to 40˚C
Storing temperature range		–20˚C to 60˚C
Operating humidity range		85% RH or less (no condensation)
Standard	Safety standard	Installation class I, EN61010-1 Pollution degree 2 Overvoltage category II, CE marking
	EMC	VCCI (Class A), EN61326 (Class A), EN61000-3-2, EN61000-3-3
External dimensions (W x H x D)		Approx. 96 mm x 96 mm x 146 mm (protrusions not included)
Weight		Approx. 950 g

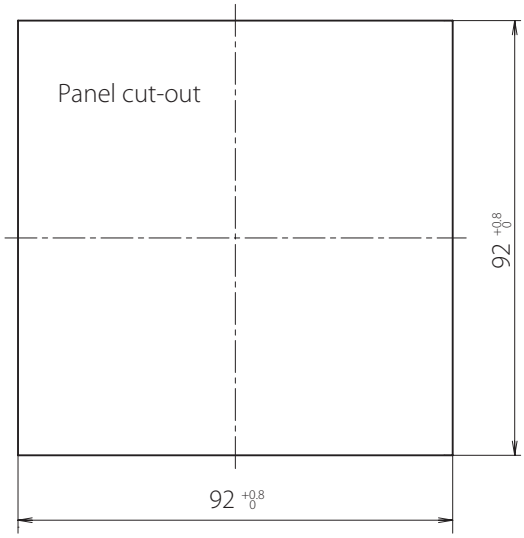
Option (Not used for option-installed models)
NDIS panel (PN-260ND)

Option-installed models
TD-260T AC(BCD) / TD-260T DC(BCD)
TD-260T AC(232C) / TD-260T DC(232C)
TD-260T AC(D/A) / TD-260T DC(D/A)

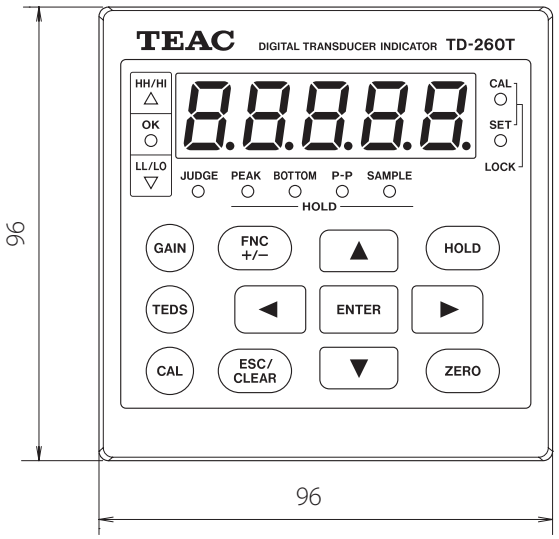
17. Outline drawings

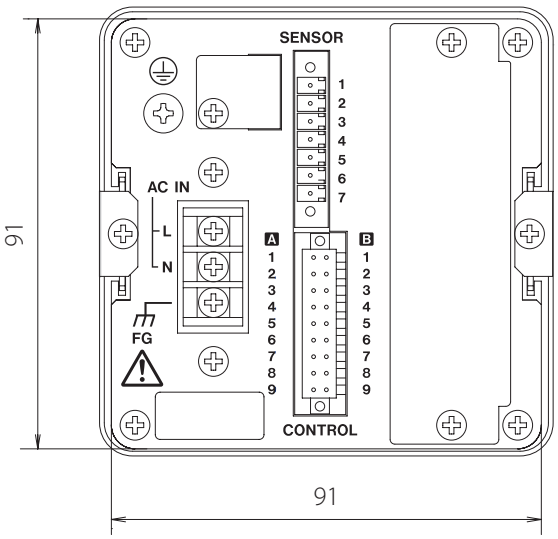


Dimensional drawing of panel cut-out
(recommended panel thickness: 1.6-3.0 mm)



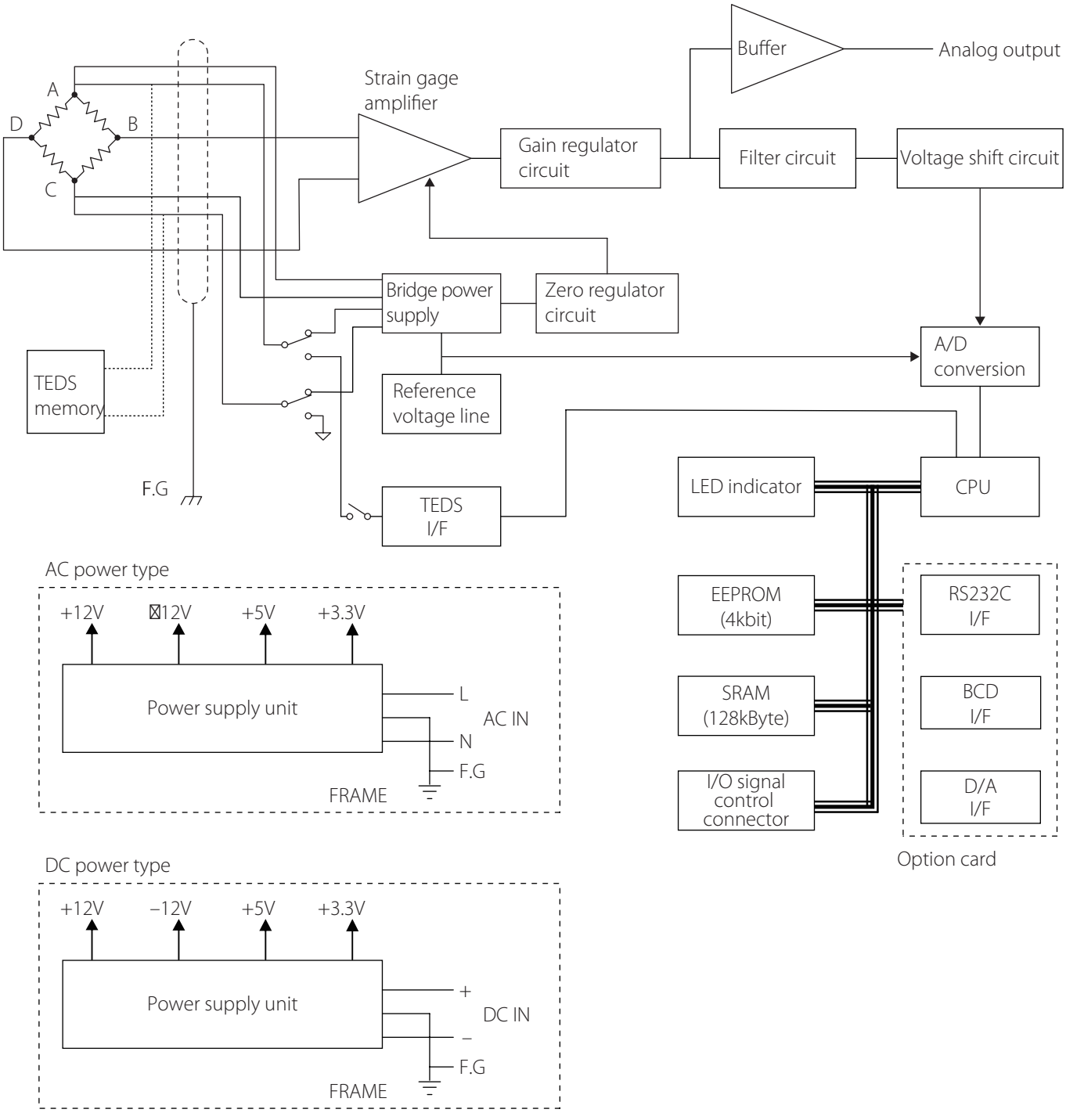
Standard: DIN IEC61554, published in 2002





- Specifications and appearance are subject to change for improvement without notice.
- Some of the images shown in this document may differ from the actual product for product improvement.

18. Block Diagram



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TEAC SALES & TRADING (ShenZhen) CO., LTD.	Room 817, Xinian Center A, Tairan Nine Road West, Shennan Road, Futian District, Shenzhen, Guangdong Province 518040, China	Phone: +86-755-88311561-2

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