TI-2300 / 3000 **VER 101**

WIDE INDICATOR

USER'S MANUAL

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INDEX

1. Introduction

This Service and Operation Manual are the specifications for our TI series.
The TI series is the product of years of design, development, and in-field testing.
This TI series has been designed with reliability, under rigid quality control and with outstanding performance.
This MANUAL included with basic technical information about composition of hardware and programmatic functions.

Precautions

Please be informed that we're not responsible for any incident or mishap caused by partial modification of this product. To avoid such situation, customers need to contact our customer service team or system installation staff in advance, and any modification should be conducted under our surveillance.

◆ Do not connect incompatible adaptor.
Use only adaptor approved by TMT for use with this particular model. The use of any other types may invalidate any approval or warranty, and may be dangerous. For availability of approved enhancements, please check with your dealer.

◆ Don't install the TI series in direct sunlight.
◆ Avoid sudden temperature changes, vibration, wind, water, or dirt.
◆ Avoid from the shock of excessive weight.
◆ Place the scale away from water.
◆ Use away from heavy R.F noise.
◆ Do not disassemble or modify this product.

2. Main Features

◆ High-precision indicator
◆ Water proof: IP65
◆ Touch key
◆ Standard remote control
◆ Tilt and swivel mount bracket

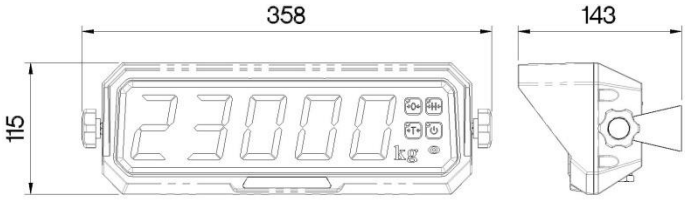
3. Technical Specifications

◆ **Specifications**

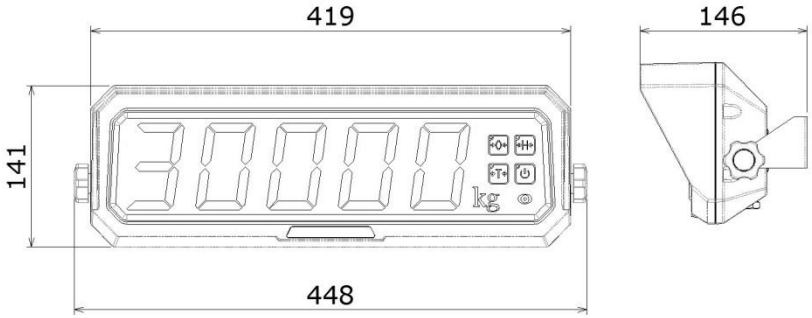
Display	TI-2300: 2.3inch 5 FND / TI-3000: 3inch 5 FND
Display lamp	Zero, Tare, Hold, Stable, Power
Touch key	Zero, Tare, Hold, On/Off
Case material	Engineering plastic
Load Cell Excitation	DC 5V, 300mA (up to 8 load cell)
Input sensitivity	0.2uV/D
Input signal range	0~39mV
Non linearity	<±0.0015% of FSR max
External resolution	Up to 100,000 counts
Output data rate	4.7 to 200 measurements per second
Temperature range	-20℃ ~ 60℃
Product weight	TI-2300: 1.2kg / TI-3000: 2.2kg
Power	12V⎓ 1A
Parts	Power adaptor, IR remote controller
OP-01	RS232C, RTC(Real time clock), 2solid state relays and 4inputs
OP-02	Use the vehicle power (12~24V⎓)
OP-03	ZigBee wireless

◆ **Dimensions**

1) TI-2300



2) TI-3000



4. Description of Panels and Symbols

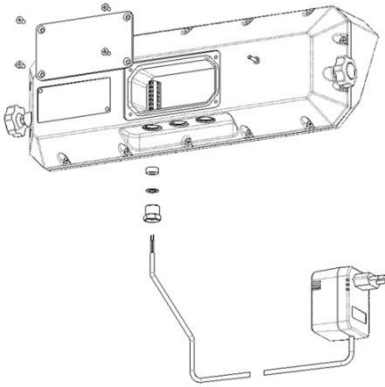
◆ **Display**

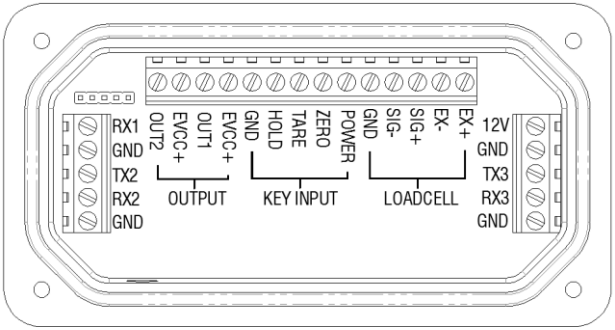
	Displays weight or messages
STABLE	Indicates that the weight to be in stable condition
ZERO	Indicates that scale is stable and at zero
TARE	Indicates that scale is currently using a tare
HOLD	Indicates that the HOLD feature has been activated

◆ **Keys**

	**Power**	Use to turn on/off.
	**Zero**	Return the display to 0.
	**Tare**	Use to weigh with tare weight.
	**Hold**	Use to weigh unstable things.

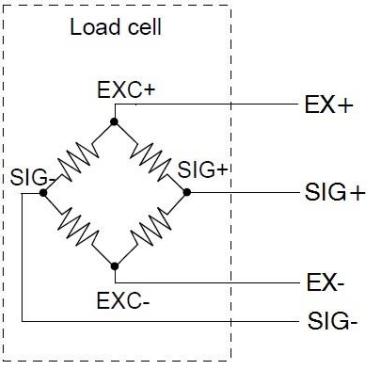
5. Installation



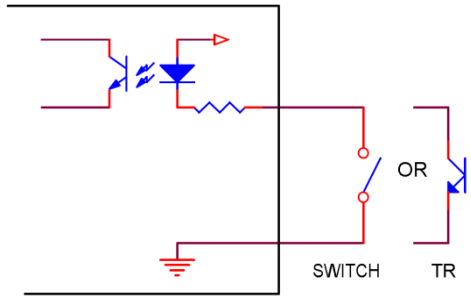


12V	Power adaptor + (RED)
GND	Power adaptor – (BLACK)
TX3	Extra RS232C TXD
RX3	Extra RS232C RXD
GND	Extra RS232C GND

RX1	Not used
GND	
TX2	RS232C TXD (OP-01)
RX2	RS232C RXD (OP-01)
GND	RS232C GND (OP-01)

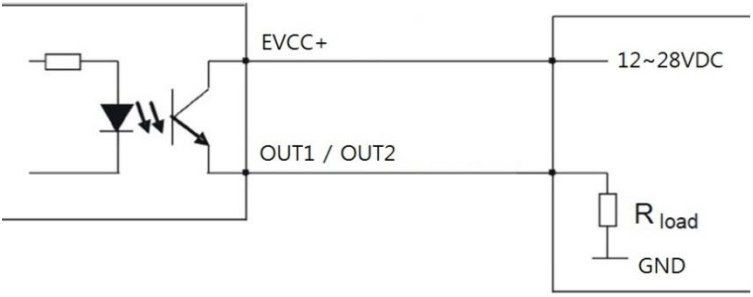
EX+	
EX-	
SIG+	
SIG-	
GND	
POWER	External key 4 contact / 4inputs (OP-01)
ZERO	
TARE	
HOLD	
GND	
EVCC+	2 solid state relays contact (OP-01)
OUT1	
EVCC+	
OUT2	

1) External input circuit



※ External inputs are interlocked with the touch keys.

2) Solid state relay circuit



※ EVCC+ range: DC12~28V

※ R_{load} range: > 2KΩ

※ Output conditions

Output	Conditions
OUT2 ON (low limit)	Low limit< Measured value ≤ High limit
OUT1 ON (high limit)	High limit < Measured value
OUT1,2 OFF	Measured value ≤ Low limit

6. General Function

(1) Zero Function

Use to correct drifted zero value when the scale is unloaded, and motion is not detected. This function works when **ZERO KEY** is pressed, and the **ZERO LAMP** is on.

(2) Setting Tare Weight Function

Press the **TARE KEY**. Then, the scale will memorize the weight of the tare and will display zero value “0”kg. The **TARE LAMP** will be on.

To escape this function, remove everything from the scale, and press the **TARE KEY**. Then, the **TARE LAMP** will be off and this function is terminated.

* Note : The sum weight of the tare and any item on a scale cannot exceed maximum capacity.

(3) Hold Function

Automatic Hold Function

(This function works whenever the scale weighs moving things.)

■ Press **HOLD KEY** when the scale is empty (Initial Zero State).

■ The weight display will indicate Ah on. **HOLD LAMP** is on.

■ After loading a thing, if the weight turns stable then, a display shows ----- and average weight will appear.

■ The weight of a loaded thing is displayed.

■ To escape the automatic hold mode, when zero point is on, press **HOLD KEY**. Then, the message of AhoFF is displayed and **HOLD LAMP** is off and normal weighing mode is reverted.

Manual Hold Function

(Only this function operates when you press a **HOLD KEY**)

■ Press **HOLD KEY** loading a thing.

■ This message of hoLd is displayed and sequentially the message of ----- is shown with appearing the average weight.

■ The weight of a loaded thing is displayed.

■ To escape the manual hold mode, remove everything from a hook, or press the **HOLD KEY**. Then, **HOLD LAMP** will be off and the scale changes from a hold mode to a normal mode.

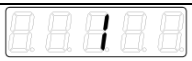
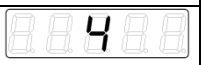
7. Test Mode

(1) How to enter this mode

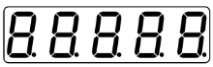
Press the **ON KEY** to power on and immediately press **ZERO KEY** to enter test mode.

(2) Testing Menu (TEST 1 – TEST4)

■ TEST 1 : Keyboard Test

Key	Remote Control	Display	Description
→O←	ZERO		Press a keyboard that you want to test, and then the display message will be shown. If press a TARE KEY, move on TEST 2.
→T←	TARE		
→H←	HOLD		
	SUM		
	*		

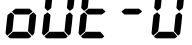
■ TEST 2 : Display Test

Display	Description
	TEST 2 runs off automatically and a display is on. If press the TARE KEY, move on TEST 3.

■ TEST 3 : Load Cell Test

Display	Description
	The value is the conversion constant for A/D converter. The value may be different according to scale's condition. Check whether digital value is changing. If the digital value is fixed or '0', please check the connection of load cell. If press the TARE KEY, move on TEST 4.

■ **TEST 4 : Solid state relay output test**

Display	Description
	ZERO KEY: All outputs are turned off. HOLD KEY: Increase the output number & this output is turned on. If press the TARE KEY, move on weighing mode.

8. Setting Mode

(1) How to enter this mode

Press the **ON KEY** to power on and immediately press **TARE KEY** to enter setting mode.

(2) Keyboard

- ■ ZERO KEY : Use to set up an initial zero value (0).
  (F4,F18,F19: Used to move the input value to the left or right by one place)
- ■ HOLD KEY : Use to add a value of "1" from existing value.
- ■ TARE KEY : Use to save an inputting value and to move on next menu.

(3) Menus

F01 : Assignment of weight variation rate (1~9)

Settings	Meaning
F01-1	Indicating rate of weight is fast.
F01-5	Indicating rate of weight is moderate.
F01-9	Indicating rate of weight is very slow.

F02 : Weight backup (0,1)

Settings	Meaning
F02-0	Not used
F02-1	Used

F03 : Assignment of Stabilization speed (1~9)

Value	Description
F03-1	Recognized as stable for change under half graduation for 0.5 sec.
F03-5	Recognized as stable for change under half graduation for 2.5 sec.
F03-9	Recognized as stable for change under half graduation for 4.5 sec.

F04 : Assignment of Automatic zero calibration (0~99)

Settings	Meaning
F4-00	Automatic zero calibration is not carried out.
F4-23	Automatic zero is calibrated for change under 1 gradation for 3 sec.
F4-99	Automatic zero is calibrated for change under 4.5 gradation for 9 sec.

F05 : Assignment of Hold speed (1~9)

Settings	Meaning
F05-1	Very fast
F05-5	Normal
F05-9	Very slow

F06 : Auto hold function (0,1)

Settings	Meaning
F06-0	Manual
F06-1	Automatic

F07 : Initialization of hold value (1~9)

Settings	Meaning
F07-1	In the zero weight
F07-5	In the 5 division weight
F07-9	In the 9 division weight

F08 : PC/Printer connection (0~2)

Settings	Meaning
F08-0	Wireless
F08-1	RS232C
F08-2	Wireless & RS232C

F09 : Function * key of remote controller (0~2)

Settings	Meaning
F09-0	Operation is equal to the * key of the master
F09-1	Send data command key (Print format)
F09-2	Send data command key (18bytes format)

F10 : Hold key function (0,1)

Settings	Meaning
F10-0	Hold key
F10-1	* key (Remote controller)

F11 : Item number (Identification number of each Item) (0~9)

Settings	Meaning
F11-0	Item No.0 (0x01)
F11-5	Item No.5 (0x05)
F11-9	Item No.9 (0x09)

F12 : Print line feed (0~9)

Settings	Meaning
F12-0	1 line feed
F12-5	6 line feed
F12-9	10 line feed

F13 : Print form (0~2)

Settings	Meaning
F13-0	Form 0 (weigh No., Item No., weight)
F13-1	Form 1 (Serial No., Item No., weight)

ⓘ When the F09-1 is selected, this form is printed.
ⓘ The weigh No. is not saved.

[FORM 0]

2013.10.13 12:00
001, ID_9, 25 kg

[FORM 1]

2013.10.13 12:00
SN_02, ID_9, 25 kg

F14 : : Initialization of serial number (0,1)

Settings	Meaning
F14-0	Maintain current number
F14-1	Initialization (starting from No.1)

F15 : Auto transmit at stable (0~2)

Settings	Meaning
F15-0	Not used
F15-1	Send data command key (Print format)
F15-2	Send data command key (18bytes format)

F16 : Auto transmit at data hold (0,1)

Settings	Meaning
F16-0	Not used
F16-1	Used

ℹ The hold data will be sent by according to set in F08.

F17 : Stream mode (0~2)

Settings	Meaning
F17-0	Not used
F17-1	Stream mode for RS232C
F17-2	Stream mode for TF200

F18 : Setting low limit (not included weighing points)

Settings	Meaning
200	20.0kg (In case of one decimal point)
Select a digit place to be inputted with ZERO KEY. Input a figure with HOLD KEY. Press TARE KEY to enter the value.	

F19 : Setting high limit (not included weighing points)

Settings	Meaning
500	50.0kg (In case of one decimal point)
Select a digit place to be inputted with ZERO KEY. Input a figure with HOLD KEY. Press TARE KEY to enter the value.	

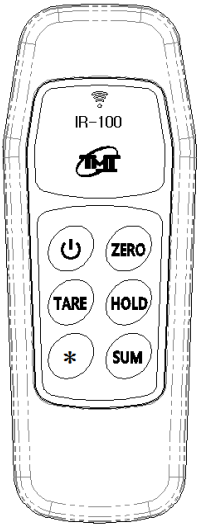
9. Calibration

Press the **ON KEY** to power on and immediately press **HOLDE KEY** until '- - - - -' is displayed and press ZERO KEY. And then '**G-CAL**' is displayed and press TARE KEY to enter calibration mode.

No	Title	Display	Operation & Description
1	Show version		(ON) (H) ☞ (O) ☞ (T)
2	Maximum capacity		(H) increment of input value (O) increment of digit (T) shift next menu
3	Minimum division		(H) increase / (O) decrease (T) shift next menu
4	Balance weight		(H) increment of input value (O) increment of digit (T) shift next menu
It is recommendable to calibrate using a balance weight which weights 50% of the maximum capacity or more in terms of linearity.			
5	Zero calibration		Check unload the tray and press (T) key
6	Span calibration		Load the weight which was set in point 4 and press (T) key
7	Calibration finish		Unload the tray and press (T) key

10. Infrared Remote Controller

(1) How to use



■ OFF KEY : Use to power on/off the TI series
■ ZERO KEY : Same as keyboard of TI series
■ TARE KEY : Same as keyboard of TI series
■ HOLD KEY : Same as keyboard of TI series
■ * KEY (CLEAR) : Refer to F09.
■ SUM KEY : Use to add weights.

If press a SUM KEY, the sum of weights is displayed. After that, about 2 sec later, a weighing mode is reverted.

Weight of less than 5 digits is not summed.

Maximum of sum weights is 99999, and if it exceeds the weights is initialized to 0.

(2) Specification

List	Description
Available Distance	6 m ~ 10 m
Available Angle	60°
Power	3V (1.5V AA 2pcs)

11. Wireless Specifications

RF frequency range	2400 ~ 2483.5 MHz
Output power	Max. 4dBm
Channel width	2 MHz
Frequency offset	< ±30ppm
Transmit data rate	250Kbps,500Kbps
Receiver sensitivity	-99dBm (PER <1%)
Maximum input level	0dBm
RF In/out impedance	50 ohm (TXRF, RXRF)
Spurious(2nd harmonics)	< -30dBm
Radio link effective range	Approx. 100M (Open space)

12. RS232C Format

1) Type : EIA-RS-232C

2) Method : Full-duplex, asynchronous transmission Format

① Baud rate : 9600 bps

② Data bit: 8, Stop bit: 1, Parity bit: None

③ Code : ASCII

3) Format (18byte)

Start Code			Blank	Lamp Status		Weighing data		Unit		Stop code	
S U	T S	,			,	+/-	7byte	k	g	CR	LF

※ Start code : ST (Stable) / US (Unstable)

※ Lamp status byte

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
One Decimal Place	Two Decimal Place	Three Decimal Place	Stable		Zero	Tare	Hold

※ Weighing data (8byte)

13.5 kg = '+', ' ', ' ', ' ', '1', '3', '.', '5'

-135 kg = '-', ' ', ' ', ' ', ' ', '1', '3', '5'

※ CR: 0x0D / LF: 0x0A

13. Real Time Clock

(1) How to enter this mode

Press the **ON KEY** to power on and immediately press **HOLD KEY**. And press the **TARE KEY** again.

(2) Keyboard

: Used to increase the setting constant one by one.

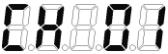
: Used to move the input value to the left or right by one place.

: Used to save the value and to move next menu.

(3) Menu

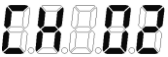
No	Display	Description
1	YEAr 2013	Modify the year
2	dAtE 10 13	Modify the date
3	t inE 18 00	Modify the time
4	End	The end

14. Check Message



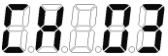
Data in an internal storage allocation are erased owing to any electronic impact.

☞ Please contact us to resolve this technical problem.



Something wrong in a Load cell connection or in an serial connection.

☞ Please contact us to resolve this technical problem.



Load cell output is too small (large) at SPAN calibration.

☞ Setting of current resolution is not possible due to the error in load cell.

Proceed calibration again with less resolution.

The weight for span calibration is set to be exceeded 10%~100% of the maximum capacity of the scale.

☞ Set the weight for span calibration in CAL3 to be within the 10%~100% of the maximum capacity.

When a thing is over-weighed within the maximum weight value, the error message is displayed.

☞ Do not weigh the thing whose the limit of a maximum weight value is exceeded. If a load cell is broken, then the load cell has to be replaced.

MEMO