

DIGITAL INDICATING TORQUE METER

MODEL **TME**

OPERATING INSTRUCTIONS



Your Torque Partner  **TOHNICHI**

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1. OUTLINE

The TME has been developed for a wide range of applications, including the measurement of rotational resistance, output torque, operating torque, tightening torque, strength of precision machinery, tightening and spring force of bottle and caps, and calibration of tightening torque, UNITORK torque screwdrivers, and small torque wrenches.

The TME has the following features.

- * Resolution up to 1/1000
- * Use of a large 7 seg. Fluorescent display tube which permits torque to be read in clearly displayed digits even in dark places.
- * 50 pieces of data are stored in the internal memory and can be referenced at any time.
- * Data output makes it possible to connect the TME to a printer and a personal computer.
- * Various built-in diagnostic functions

2. COMPONENT LIST

1. TME	1 set
2. AC adapter	1 set
3. Rubber claw	4 pieces
4. Fixing stopper	4 pieces (for 2-TME only)
5. Instruction manual	1 copy

3. SPECIFICATIONS

MODEL	CAPACITY		MEMORY DATA CAPACITY	DIMENSION mm	WEIGHT Approx. kg
	MIN.~MAX.	1 digit			
S.I.	cN.m	cN.m	50 Measurements	Overall Length 331 Overall Width 235 Overall Height 280	12
2TME180CN	36 ~ 180	0.2			
2TME450CN	90 ~ 450	0.5			
2TME900CN	180 ~ 900	1			
2TME1800CN	360 ~ 1800	2			
3TME9CN	cN.m 1.8 ~ 9.0	cN.m 0.01		Overall Length 220 Overall Width 235 Overall Height 153	3.5
3TME18CN	3.6 ~ 9.0	0.02			
3TME45CN	9 ~ 45	0.05			
3TME90CN	18 ~ 90	0.1			

MODEL	CAPACITY		MEMORY DATA CAPACITY	DIMENSION mm	WEIGHT Approx. kg
	MIN.~MAX.	1 digit			
Metric	kgf.cm	kgf.cm	50 Measurements	Overall Length 331 Overall Width 235 Overall Height 280	12
2-TME18	3.6 ~ 18	0.02			
2-TME45	9 ~ 45	0.05			
2-TME90	18 ~ 90	0.1			
2-TME180	36 ~ 180	0.2			
3-TME09	gf.cm 180 ~ 900	gf.cm 1		Overall Length 220 Overall Width 235 Overall Height 153	3.5
3-TME1.8	360 ~ 1800	2			
3-TME4.5	900 ~ 4500	5			
3-TME9	kgf.cm 1.8 ~ 9	kgf.cm 0.01			

MODEL	CAPACITY		MEMORY DATA CAPACITY	DIMENSION mm	WEIGHT Approx. lbs
	MIN.~MAX.	1 digit			
in.lbs TME15I	in.lbs 1.5 ~ 15	in.lbs 0.02	50 Measurements	Overall Length 331 Overall Width 235 Overall Height 280	26.1
TME40I	4 ~ 40	0.05			
TME80I	8 ~ 80	0.1			
TME150I	15 ~ 150	0.2			
TME12Z	in.OZ 1.2 ~ 12	in.OZ 0.01		Overall Length 220 Overall Width 235 Overall Height 153	7.61
TME24Z	2.4 ~ 24	0.02			
TME60Z	6 ~ 60	0.05			
TME120Z	12 ~ 120	0.1			

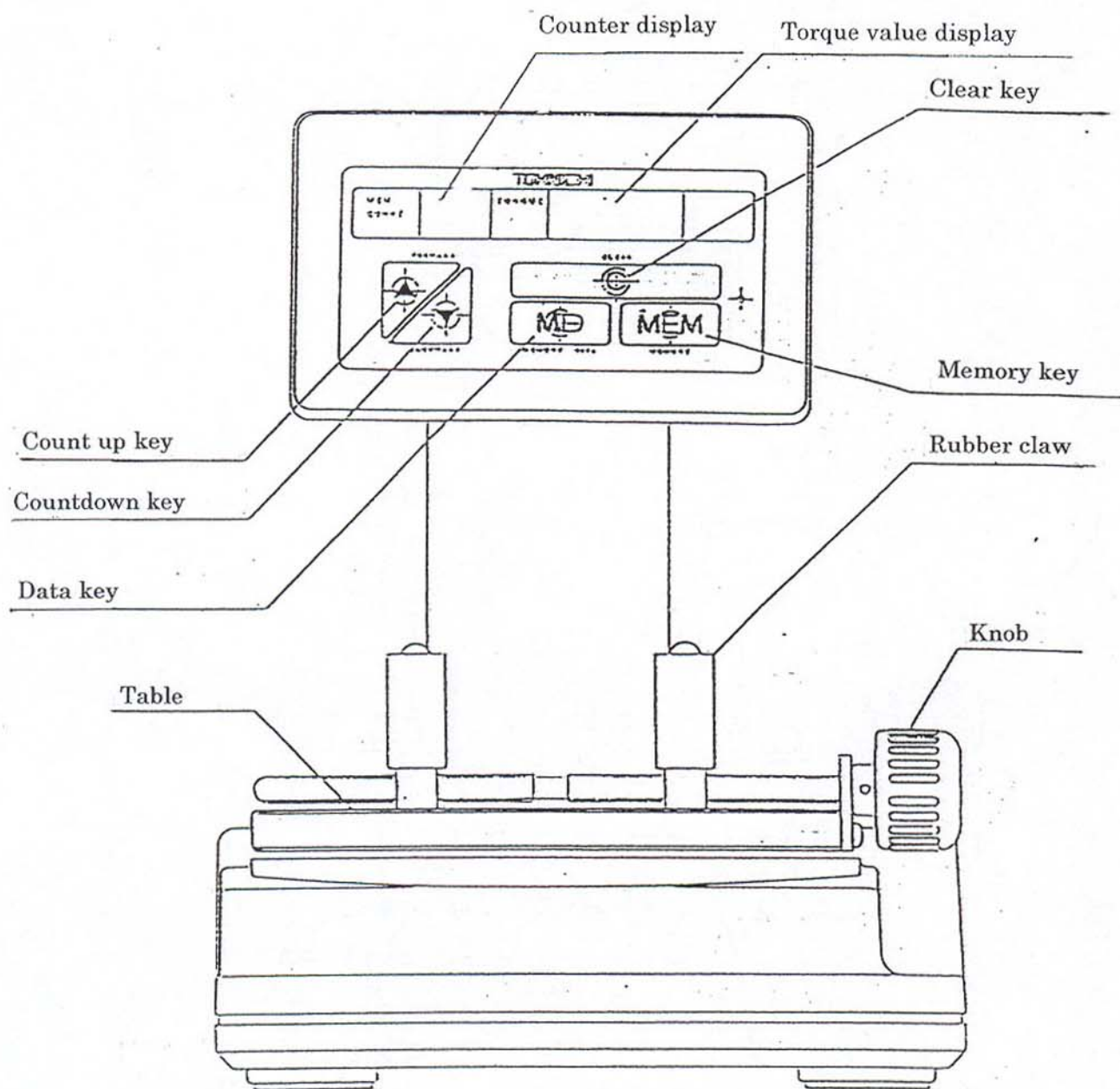
Common specifications

MODEL	3-TME	2-TME
DISPLAY	7 seg fluorescent display tube	
PRECISION	$\pm 1\% + 1\text{digit}$	
INTERNAL MEMORY	50 data points (data reference available at any time)	
DATA OUTPUT	Start-stop synchronizing, serial data output system	
TEMPERATURE	0 ~ 40°C (Holding temperature : -10 ~ 60°C)	
ACCESSORIES	AC adapter	

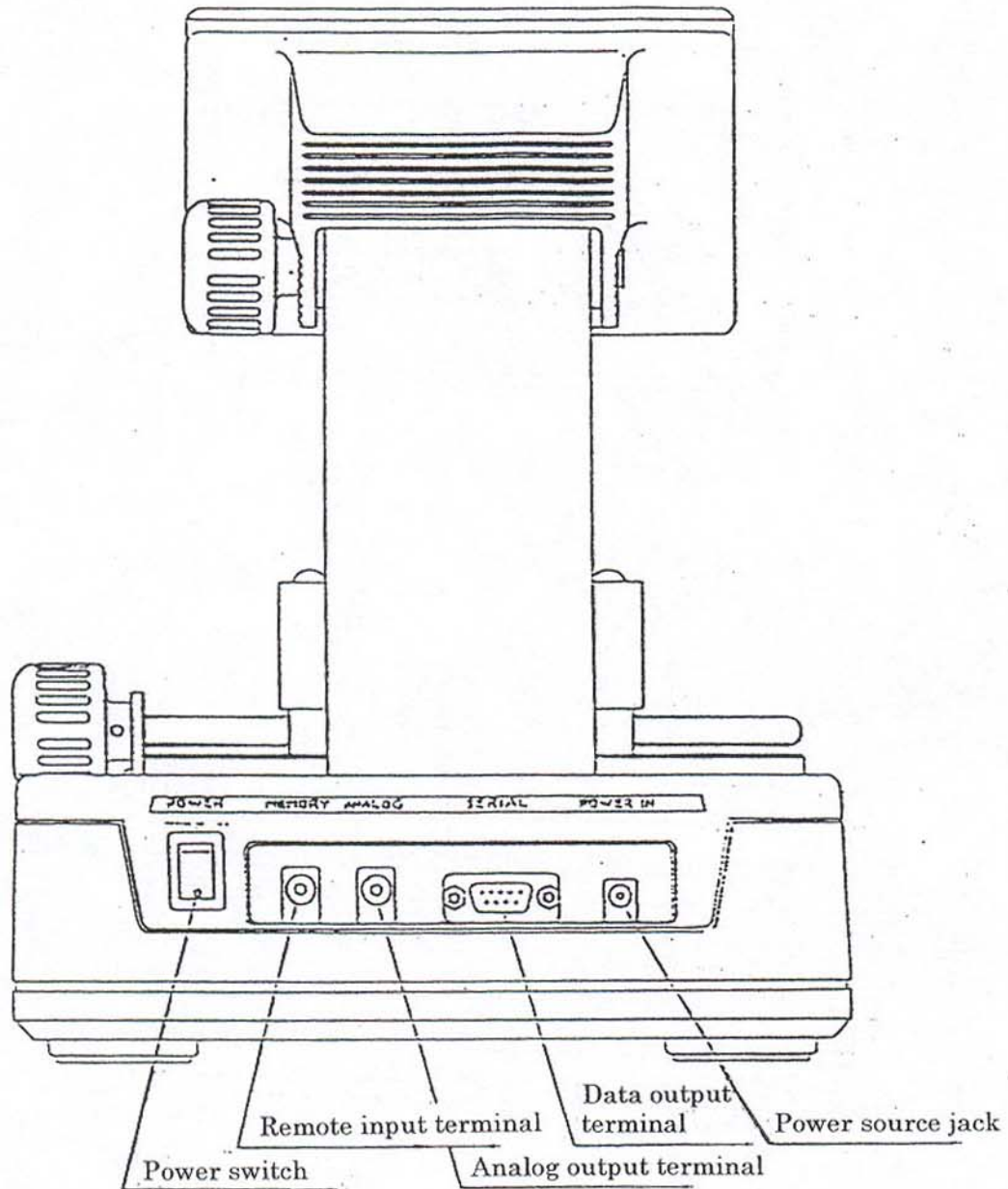
4. EXTERNAL VIEW AND FUNCTIONS



FRONT



REAR



FUNCTIONS

- * Counter display : Indicates counting in the internal memory
- * Torque value display : Indicates the input torque value.
- * Countdown key : Reduces the counted value in the internal memory by 1 and indicates the reduced value.
- * Count up key : Increase the counted value in the internal memory by 1 and indicates the increased value.
- * Data key : The maximum value, minimum value, mean value, dispersion value and standard deviation are displayed.
- * Memory key : Sends data to external unites ; at the same time, the data is stored in the memory and the counter increases its count by 1.
- * Clear key : Clears the currently displayed torque value.
- * Power switch : Turns the power on and off.
- * Data output terminal : Connect a printer to the computer.
- * Analog output terminal : An output of ± 4.5 is output. (max. 10mA)
- * Remote input terminal : Sends data to the external units ; at the same time the data is stored in the memory, and the counter increases its count by 1. Be sure to use a non voltage contact.
- * Power source jack : Used to connect an AC adapter.

5. HANDLING

5-1. Precaution

- ①Place the torque meter on a horizontal surface.
- ②Insert four rubber claws into the prepared holes.
- ③Connect the power plug of the AC adapter to the attachment of the rear side of the torque meter.
- ④Connect the AC adapter to the AC 100V socket.
(Disconnect the AC adapter from the socket when it is not used.)
- ⑤Set a measurement object or jigs at the center of the table and fix them by rotating the knob.
- ⑥Turn the power switch on.
- ⑦Adjust the display to an easily visible angle.

5-2. Measurement

The peak holding state will appear once power is supplied. Press the “▼” (COUNTDOWN) key when the TME is used in the run state (continuous display on which the maximum value is not held).

If the MEM COUNT shows “00”, the torque value display is in the run state. If there is no load, pressing the “C” (CLEAR) key activates the auto-zero function and reduces the display to zero.

Pressing the count up (FORWARD) key “▲” in the run state (MEM COUNT shows 0) reduces the counter display to “01”. From this state, the torque display holds the peak and starts data sampling.

In the peak holding state (in which MEM COUNT is between 1 to 50), pressing the MEM (MEMORY) key after completing the measurement will store data via MEM COUNT.

The torque display area holds the maximum torque value. To clear this value, press the clear switch “C” (CLEAR).

The memory has a one-to-one correspondence with the counter display. Any value can be input to the counter memory by operating the count up key “▲” or the countdown key “▼”.

A maximum of 50 data items are available in the counter. If the counter displays 50, pressing the count up key “▲” reduces the counter to “00” and enters the run state.

5-3. Clear / Memory Clear / Memory All Clear

When clearing a data sample, press the clear key “C” and no further operations are necessary.

When clearing stored data, recall the data with the count up key “▲” and the countdown key “▼”, then press the clear key “C”.

When clearing all the stored data, press the data key “MD” to make sure of “n”, then press the clear key “C”. All data that is stored in the counter will be cleared, thus reducing the counter value to “01”. Another operation can begin now.

5-4. Maximum Value / Minimum Value / Mean Value / Standard Deviation

When referring to the maximum data, minimum data and mean values of a data sample, press the data key “MD” (MEMORY DATA) key. If the data key “MD” is pressed and the counter value is 30, the maximum value, minimum value and standard deviation will be displayed from 1 through 30.

If contents, the data will be ignored. If the counter displays zero, data from 1 through 50 will be retrieved.

Press the data key “MD”, and a sample number will be displayed.

Example “n” 48 pieces

Press the data key “MD” again, and a maximum value will be displayed.

Example “HI” 29.8 cN.m

Press the data key “MD” again, and a minimum value will be displayed.

Example “Lo” 18 cN.m

Press the data key “MD” again, and a minimum value will be displayed.

Example “—” 20.5 cN.m

Press the data key “MD” again, and dispersion width will be displayed.

Example “r” 11.3 cN.m

Press the data key “MD” again, and the standard deviation will be displayed.

Example “S” 2.2 cN.m

Press the data key “MD” again, and the initial counter value will be displayed.

5-5. Automatic Resetting Function

When using the automatic reset function, press the data key “MD” to set the display to “n”, then press the memory key “MEM”. “Ar on” is displayed and the automatic reset mode is ready. This function is determined with a dip switch on the display. Pressing the data key “MD” and the memory key “MEM” simultaneously releases the “Ar on” display, then “Ar OFF” is displayed. If the dip switch setting is changed, turn on the power again.

SW 8	OFF	Automatic resetting is usually not used.
	ON	Automatic resetting is usually used.
SW 9	OFF	Set the automatic reset timer to 0.5S.
	ON	Set the automatic reset timer to 0.05S
SW10	OFF	Count is not performed until the load is removed
	ON	Count is not performed without removing the load.

Settings marked with shade is finished at the time of shipping from factory.

5-6. Automatic Zero Function

Zero adjustment can be performed by pressing the CLEAR “C” button when the torque indicator shows a value between 0 and 45. Use this function if a load is not applied. If “Err9” is displayed in a no-load state, a sensor may be malfunctioning. In this case, please contact Tohnichi.

5-7. Over-torque Alarm

The over-torque alarm is a sensor protective function. If the torque load exceeds the maximum value by more than 50 digits, the display will flicker to indicate an overtorque. If this should happen, release the load immediately.

5-8. Unit Changeover

Various units can be set by changing the dip switches on the display. After the dip switches have been set, turn on the power again. Refer to the table below of

SW 5	SW 6	Unit
OFF	OFF	gf.cm (3-TME09-45), kfg.cm (3-TME9, 2-TME all)
OFF	ON	N.cm (3-TME all, 2-TME18-90), N.m (2-TME180)
ON	OFF	ozf.in (3-TME all, 2-TME18,45), lbf.ft (2-TME90,18)
ON	ON	lbf.in (3-TME all, 2-TME all)

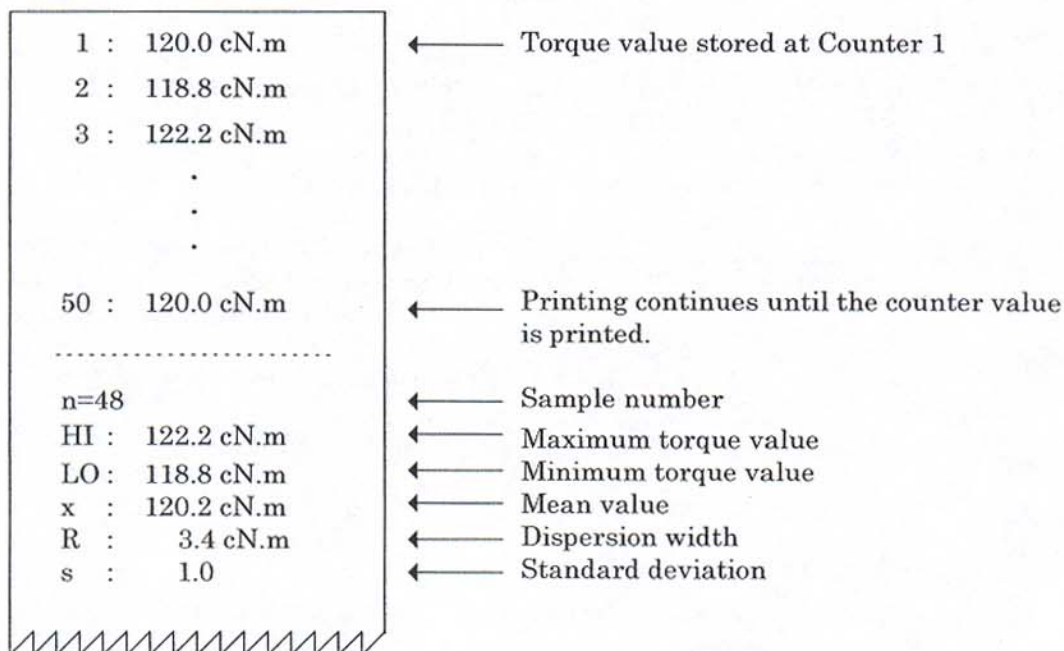
Setting marked with shade is finished at the time of shipping from factory.

6. EXTERNAL INPUT / OUTPUT FUNCITONS

6-1. Printer Output

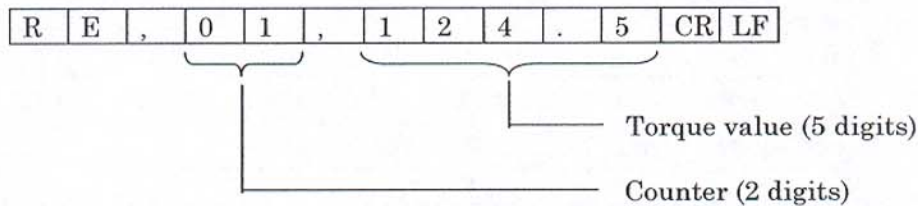
Printing becomes available if the slave printer EPP16M2 and the private cord 380 are connected. The printing format are shown below. Press the "MD" key.

When "n" appears, the maximum and minimum values can be printed by pressing the "MD" key.



6-2. RS232C Input / Output

Using the private cord 552 (optional) enables connection to the computer. The transfer format is shown below. The format can be output by pressing the "MEM" key.



Baud rate	2400 bps
Data bit	7bits
Stop bit	1 bit
Parity	None

Sample program (N88-BASIC)

```

10 OPEN "COM:" AS #1
20 INPT #1, DUMMY$,C$,D$
30 C=VAL(C$)
40 D=VAL(D$)
50 PRINT "COUNTER:";C
60 PRINT "TORQUE:";D;"cN · m"
70 CLOSE:END

```

The following outputs enable data output setting:

M	0	CR	LF	If stored data is "0", data is output endlessly. When stored data is up to 50, data is output continuously until counter value is output.
M	1	CR	LF	One piece of data is sent back.
M	2	CR	LF	Continuous data output is released.

6-3. Changing the Output System

The output system can be changed by resetting the dip switches on the display.

SW 7	OFF	Output to the Printer (EPP16M2)
	ON	Output to the Computer (RS232C)

Setting marked with shade is finished at the time of shipping form factory.

* When the SW7 is turned off, do not supply power as long as the “MEM” key is being pressed because contents other than the data are printed out and paper will be wasted

6-4. Analog Output

The TEM allows the output of $\pm 4.5V$ from the analog output terminal. Use a high impedance cord to make a connection. When the zero adjustment is used, pay careful attention since the output may be disturbed by a shift in the zero point.

Terminal : RCA connector

7. OTHER FUNCTIONS

7-1. Brightness Adjustment

When “n” appears after pressing the “MD” key, the brightness of the fluorescent display tube may be changed by pressing the “▲” and “▼” keys. The brightness is normally set to the maximum level, but you can change the brightness as required. An 8-step adjustment is possible.

7-2. Self-Test Function

When power is supplied, the TME checks the hardware. If “ErrX” is displayed, there may be an abnormality in the hardware. In this case, contact Tohnichi.

ERR1 to ERR7	:	Abnormality in the display switch.
ERR8	:	Defective internal RAM.
ERR9	:	Abnormality in the A/D converter
		Sensor abnormality
		Zero adjustment abnormality

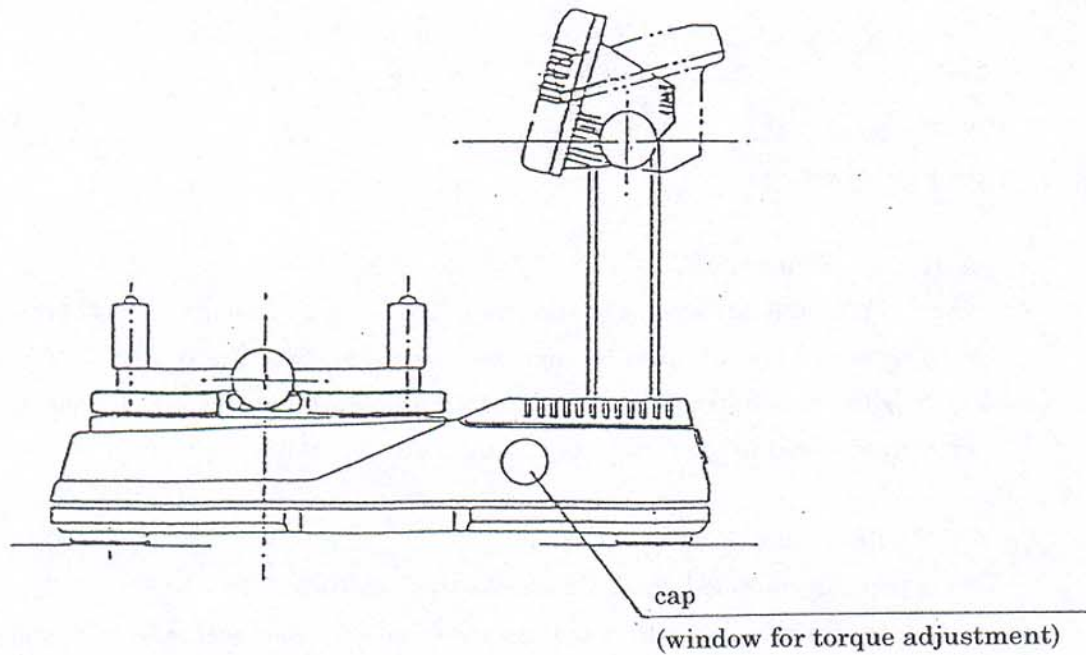
7-3. Dip Switch Printing Functions

It is possible to make the EPP16M2 print the status of the internal dip switches by supplying power while pressing the CLEAR “C” switch.

8. INSPECTION

Inspection of TME is possible, by using optional Inspection Equipment.

Do not take out the cap of the body side except inspection.



9. HANDLING PRECAUTIONS

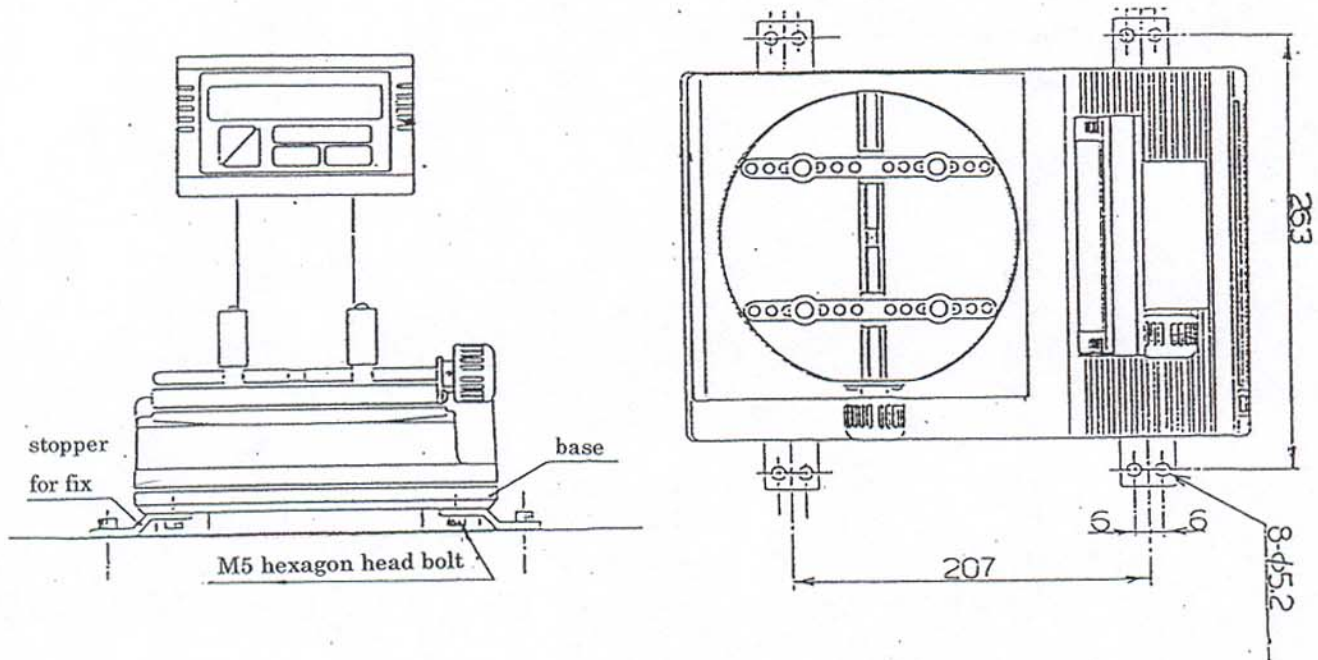
Always place the torque meter horizontally.

If a torque measurement exceeds 10 N.m (85 lbs.in), attach the provided fixing stopper and directly fix the base on a sufficiently strong horizontal table.

Using a power supply device other than the AC adapter is strictly prohibited .

Handle the torque meter with care, as it is a sensitive measuring device.

Avoid impacts to the torque meter when using it, otherwise the sensor will be adversely affected.



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