

DIGITAL TORQUE WRENCH “DATA TORK” MODEL CEM3-G

OPERATING INSTRUCTION

CEM3-G CEM3-G Model



CEM100N3X15D-G

CE




To use this product properly and safely, please read this manual carefully before use. If you have any question about the product and its operations, please contact your nearest distributor or TOHNICHI MFG. CO., LTD.

Cautions on Safety

To the user

Read these operating instructions carefully before use. For any questions, contact a Tohnichi authorized distributor or Tohnichi office. Keep these instructions for future use.


Safety symbol





This symbol indicates attention is required for your safety. When this symbol appears in these instructions, pay particular attention for your safety concerns. Take preventative measures according to the written message for appropriate operation and management.

Signal Words

A signal word accompanies the safety symbol, which indicates the level of cautions on safety of people and the appropriate use of the equipment. Signal words are classified into 3 levels: "danger", "warning " and "cautions" by the degree of risk.

 **Danger:** Imminent danger which may cause serious damage.

 **Warnings:** Potential danger which may cause serious damage.

 **Cautions:** Potential danger which may hinder ordinary operation but may not lead to serious damage.

 **Warnings**

(1) Use only the official Tohnichi charger and battery.

Do not use any other chargers or batteries not designated in this manual.

(2) Charge in the appropriate manner.

Use this charger only to the rated power source.

- Doing otherwise may cause abnormal generation of heat, which may result in fire.

Do not charge the battery in conditions outside of the 0-40 degree Celsius temperature range.

- Doing so may cause them to burst and cause a fire.

Do not wrap the charger or battery with a cloth,etc.

- Doing so may cause them to burst and cause a fire.

When it is not in use, remove the plug from the power source.

- Doing otherwise may cause an electric shock or a fire.

(3) Pay attention to the condition of your workplace.

Do not use the charger or storage battery in the rain or other wet conditions.

- Doing so may cause an electric shock and/or damage to the product.

Keep the workplace brightly lit.

- Working in dark place may cause an accident.

Do not use or charge the product in such place where flammable liquid or gas exist.

- It may cause explosion, fire and other accidents.

(4) Use only the authorized designated accessories and optional equipment.

Do not use any other accessories or optional equipment other than those designated in this manual.

- It may cause accident or injuries.

(5) Do not throw the battery into a fire.

- It may explode and/or generate hazardous substances.

(6) Do not disassemble or try to modify the product.

- Doing so may endanger safety of the product, damage the product performance, life, and/or cause product failure.

(7) Make sure to switch the ratchet lever completely in direction according to your usage requirements (QH interchangeable head).

- Failing to do so may cause accident, injuries and/or product failure.

(8) Do not extend the handle of the torque wrench with a pipe, etc.

- Doing so may cause product failure and accuracy error.

(9) When using it in high place, take appropriate measures to prevent the product from falling.

- Falling products or sockets may cause accidents, injuries and/or product failures.


Cautions

(1) Always keep the workplace clean and uncluttered.

- Untidy place or work stand may lead to accidents.

(2) Keep away from children.

Do not let young people touch the product or the cable of the charger.

- It may cause injuries.

Keep other people away from the workplace.

- It may cause injuries.

(3) When not in use, take proper care to store it.

Keep it in dry conditions and lock it so children cannot reach it.

- Failing to do so may lead to accidents.

Do not keep the product or the battery in such condition where the temperature may rise as high as 50 degrees Celsius.

- Doing so may damage the battery performance and cause smoke and/or fire.

(4) Do not use the product beyond its capacity.

In order to use the product safely and effectively, set the torque within the product capacity.

- Using the product beyond its capacity may cause accidents or product failure.

(5) Choose the product that fits the required operation.

Do not use the product for purposes other than those specifically designated in this manual.

- Doing so may cause injuries.

(6) Do not handle the charger cable roughly.

Do not carry tool by the charging cable. When pulling out the plug, do not pull from back along the cable.

Keep the cable away from heat, oil, and do not force it against sharp corners to avoid physical damage to the cable.

Carefully choose the place for charging so that the cable is not subject to any external damage.

- It may cause an electric shock and/or fire.

(7) Keep your posture in natural and firm position.

Keep your feet on the ground firmly and maintain your balance.

- Failing to do so may cause injuries.

(8) Take good care of the product.

To change accessories, follow the instruction manuals.

- Doing otherwise may cause injuries.

Check the cable of the charger periodically, and contact the nearest distributor or Tohnichi for repair.

- Doing otherwise may cause an electric shock and/or a fire.

When using an extension cord, conduct a periodic check and change with a new one if there is any damage.

- Otherwise it may cause an electric shock and/or a fire.

Keep the handle dry and clean, keep it from oil or grease.

- Otherwise it may cause injuries.

(9) Check if there is any damage to parts of the product.

Before use, check the case and other parts to make sure they are functioning properly.

Check everything that may affect the ordinary operation.

Do not use the charger with damaged plug or damaged cable or ones with any physical damage.

- Otherwise it may cause an electric shock, short-circuit and/or a fire.

Notes

- (1) Use only the accompanying charger for charging the battery.
- (2) Only use the battery designated in this manual.
- (3) Use the product only within the operating environment specified in this manual.
- (4) Do not disassemble the product.
- (5) Check the functions and settings before use.
- (6) Be careful not to expose the product to water or oil as it may cause malfunction.
- (7) Do not drop the product or hit it against other objects as it may cause product failures.
- (8) Do not use the product beyond its capacity specified in this manual.
- (9) Make sure to conduct daily inspection as well as periodic inspection.
- (10) Push clear and make sure the display shows zero (zero adjustment) before measuring.
- (11) For accurate measurement, hold the center of the effective length line and apply force in right angle against the handle.
- (12) Connect the torque wrench and the interchangeable head firmly.

If there is strange smell or fire on usage, stop use.

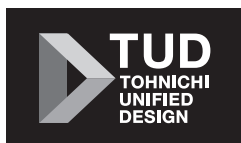
Move this instrument to a safety place, and contact Tohnichi.

*** For handling of used battery ***

Nickel metal hydrogen battery is used on this product.

We appreciate your utmost efforts to recycle it to save the resources.

Ask the distributors or Tohnichi Japan or overseas facility.



Contents

1. Outline	6
2. Features	6
3. Composition	6
4. Components	7
5. Explanation of each mode	9
(1) Memory mode	
• M-3 mode	
• M-2 mode (CEM2 compatible mode)	
(2) Display mode	
• Dual display mode	
• LCD display mode (Power saving mode)	
(3) Measurement mode	
• MODE-M (Inspection mode)	
• MODE-T (Tightening mode)	
(4) Data sampling mode	
6. Usage (Delivery condition from Tohnichi)	10
7. Explanation of functions	11
8. Operation examples	13
(1) Inspection mode measurement (Without judgment OK/NG)	13
(2) Inspection mode measurement (With judgment OK/NG)	14
(3) Tightening mode measurement	15
(4) Measurement data readout	16
(5) Calculation function	17
(6) Output data at a time (PC, printer output)	18
(7) Output data at a time (infrared output)	19
(8) Measurement data memory clear	20
9. External output format	21
10. Settings	22
11. How to transfer data to software through USB cable	27
12. Battery	27
13. Charging	28
14. Options	29
15. Specifications	30

1 Outline

CEM3-G series is the digital torque wrench designed for "Retightening torque measurement" "Loosening torque measurement" as well as for precision tightening.

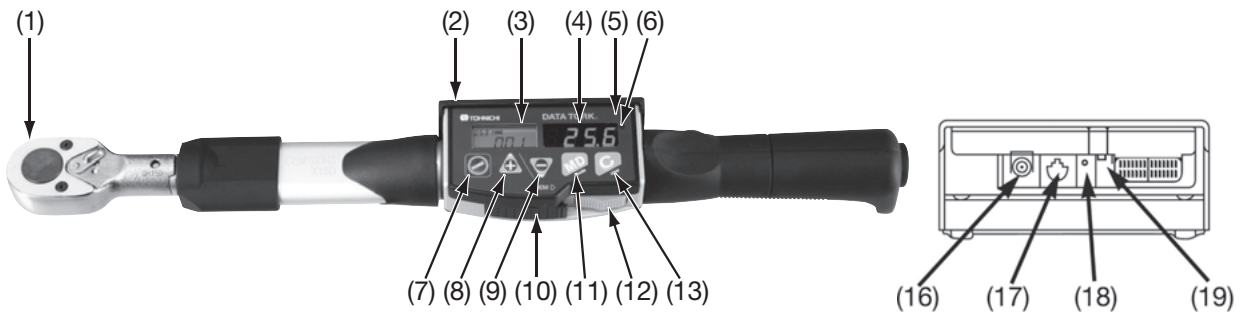
2 Features

- (1) **Manages measured value and data**
Can trace measured date and time.
- (2) **Dual display**
Dual display LED and LCD (liquid crystal) adopted.
Torque value is displayed on bright, easy-to-see 7 segment LED, and other function is displayed on LCD.
- (3) **Tightening completion alarm, judgment OK/NG function**
Tightening completion is informed by LED and buzzer.
Measured torque is judged OK/NG.
- (4) **Expanded data capacity**
Max 999 data can be saved.
- (5) **Solidity of the display unit**
Aluminum case applied to increase solidity.
- (6) **Nickel hydrogen battery**
Environment-friendly Nickel hydrogen battery is used.
- (7) **Extension of continuous usage time**
Max 30-hour continuous usage by LCD mode and 20 hour by dual mode.
(1 hour charge: 8 hour continuous use in dual mode.)
- (8) **Residual battery indicator**
4-step battery indicator help to see the remaining battery amount.
- (9) **Less possibility of over-torquing**
Designed to prevent over-torquing by adjusting the handle shape and effective length.
- (10) **Former data file system can be used without change.**
Former communication software can be used with CEM3-G in M-2 mode.

3 Composition

- 1) Body1pc.
- 2) Accessories
 Battery pack BP-51pc.
 Interchangeable head QH (Suitable ratchet head)1pc.
 Charger BC-3-G1pc.
- 3) Operating instructions.....1pc.

4 Components



(1) Interchangeable head

Picture above shows attached QH interchangeable head. Tohnichi head SH, RH, QH, RQH, DH, HH, FH are also available.

※ PH cannot be used.

(2) Protection cover

This cover protects from scratch and breakage.

(3) Liquid crystal display (LCD)

It shows clock, remaining battery, counter, and auto memory condition on dual display mode. It shows counter, auto memory, remaining battery, unit, and torque value on LCD display mode.

(4) 7segment LED display

It shows torque value on dual mode. LED will be off in LCD mode.

(5) Unit display

It shows torque unit.

(6) Tightening completion, judgment OK/NG LED

Green LED turns on for tightening completion (OK) and red LED turns on for NG.

(7) : Power button

Switch to power on and off. When power is on, do zero check on torque measurement.

(8) : Counter send key

Send a counter one by one or continuously to read out the measured data.

Keep pushing to fast-forward.

(9) : Counter return key

Reverse one counter or continuously to read out the measured.

Keep pushing to fast-forward.

(10) Terminal cover

This cover protects each terminal from dust and debris.

(11) : Mode key

When counter 000: Push it for 2 seconds to enter settings.

When counter 001-999: Push it to process the measured data (max, min, ave, etc).

(12)  : Memory key

Saves the measured data and proceed to the next counter. Transfers the data to external device.

(13)  : Clear key

Clear saved measurement data (measurement value,date). On run mode do auto zero adjustment.

(14) Grip

Battery pack (BP-5) is stored inside.

(15) Cap

Remove this cap when exchanging batteries (counter clockwise).

(16) Charge jack

Connect BC-3-G charger to this jack for charging.

(17) External output terminal

Connect USB cable (No. 584) to this terminal.

(18) Infrared output window

Terminal to transfer data to Tohnichi infrared data receiver R-DT999.

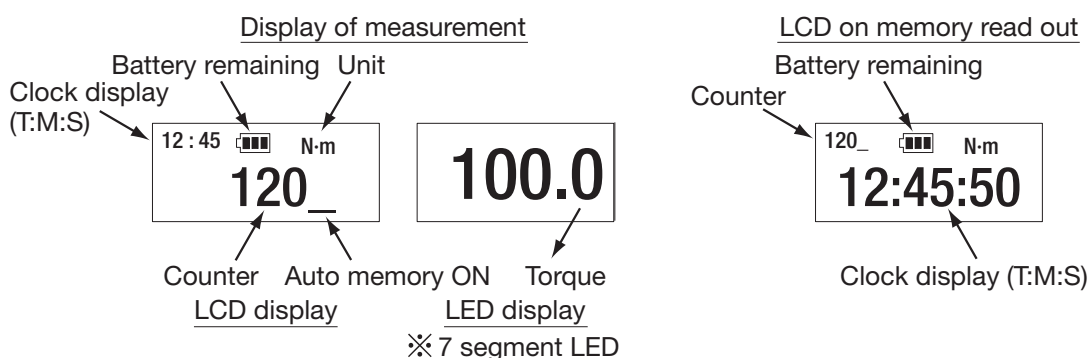
(19) Reset button

Push reset button display error or malfunction happens.

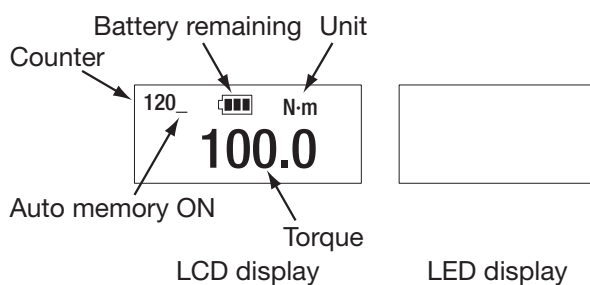
No need to push every time after charging.

[Display details]

- Dual display mode (Delivery condition)



- LCD display mode (Power saving mode)



5 Explanation of each mode

CEM3 basic functions are categorized in the following "MODE".

(1) Memory mode

M-3 mode: M-3 is set as delivery setting. M-3 mode can save max.999 pc of data and the measured time. However, M-3 mode is not compatible with Tohnichi data filing software (DFS).

M-2 mode: M-2 is compatible with the old CEM2 model. M-2 mode can save only 99pc of data (same as CEM2). However, M-2 mode is compatible with the same Tohnichi data filing software (DFS) which was used by CEM2.

(2) Display mode

Dual mode: Dual mode is set as delivery setting. It uses 2 displays (LCD and LED) to display torque value, counter, measured time, etc.

LCD mode (Power saving mode): Only LCD display is used and LED is turned off to save electricity.

(3) Measurement mode

MODE-M (Inspection mode): MODE-M is set as delivery condition. This mode is used for retightening and loosening inspection.

MODE-T (Tightening mode): This mode is used for tightening operation. When it reaches the lower limit torque value, green LED lamp turns on and the alarm goes off.

(4) Data sampling mode

Run mode: When the counter is 000(M-3 mode) or 00 (M-2 mode), it is in Run mode. In Run mode, the display shows the torque value being applied at the moment and returns to zero when torque is released.

Peak mode: When the counter is 001-999 (M-3 mode) or 01-99(M-2 mode), it is in Peak mode. In Peak mode, the maximum torque will be captured and the display hold this maximum torque value.

For detailed setting, refer to 10. Settings.

6 Usage (Delivery condition from Tohnichi)

This chapter explains simple usage on Tohnichi delivery condition (Dual display mode).

(1) Install attached interchangeable head QH and socket (options).

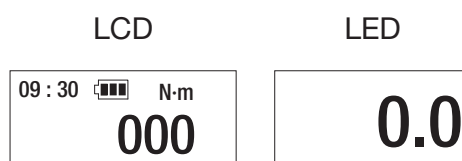
(2) Push  power button.


※ Do not apply force to the socket at this time.

(3) Display shows as left.

The counter is 000 (RUN mode).

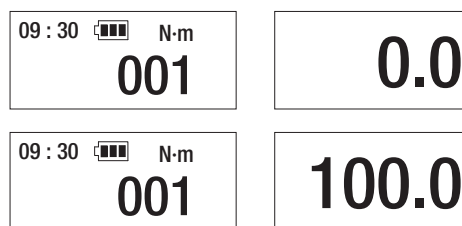
As you apply torque, torque value on LED increases and returns to zero as you release torque.



(4) Push  once and counter turns to 001.

Now it is in PEAK mode.

As you apply torque, the peak value will be kept on the LED display.




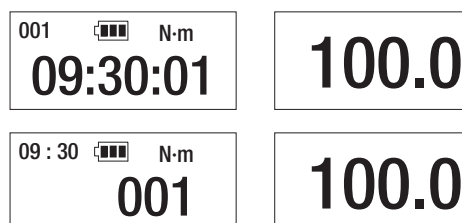
(5) Push  once and sounds "PI".



Measured value 100N.m on display is saved as 001 measurement.

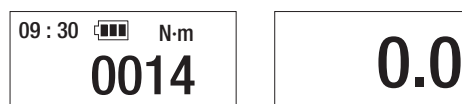


(6) Check 001 measured value.

Push  once, LCD display shows counter 001 at upper left corner and measured time 09:30:01 in center for 1 second before it returns to normal display.




(7) To delete data, use  to select the data to delete, and push  to delete.



7 Explanation of functions

CEM3 has several other functions in addition to "mode" functions.

(1) Auto zero function

In RUN mode, push  key, and auto zero adjustment works.

If the displayed torque is more than 7.5% of the max capacity torque, the display shows "Err9".

<Display shows Err9>

Push  key without torque.


If Err9 disappears, this instrument can be used normally.

If Err9 does not disappear, push reset key and push  key once again.

- If Err9 still remains, it may be a sensor or circuit problem.


(2) Error message


Key check and memory check will be conducted when you push  or the reset button.

<Err1: Condition  key is continuously pushed.>

<Err2: Condition  key is continuously pushed.>

<Err3: Condition  key is continuously pushed.>

<Err4: Condition  key is continuously pushed.>

<Err5: Condition  key is continuously pushed.>

<Err8: Malfunction of data memory.>

<Err9: Malfunction of the torque sensor or circuit board.>

Refer to the table on error message at 13. Charging.

(3) Auto memory/reset

Automatically saves the measured data after the set timing. To turn off auto memory function, set it to 00.

(4) Judgment function

Set the torque range and it judges whether the measured torque is within the range or not.

After measuring push  to give judgment.

- Green lamp: OK, Red lamp: NG

(5) Mute function

Set buzzer alarm "OFF". Mute buzzer sound on key operation.

However, the alarm sound on over-torquing, tightening completion and judgment cannot be cancelled.

(6) Power saving function

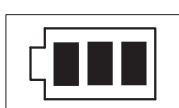
If not used for 1 minute, 7-segment LED darkens to save power. Touch any key then it returns.

(7) Auto power off function

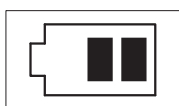
If not used for 3 minutes, it automatically turns off.

(8) Residual battery indication

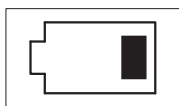
Battery condition is indicated on LDC by the following 4-step indicator.



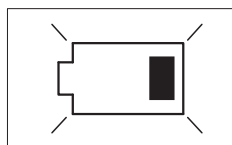
Enough battery remains.



About half the battery is gone.



It is time to charge battery.



"LoBATT" alarm condition
 No battery. Charge immediately.
 No key operation works, and it automatically turns off in 1 minute.
 (Saved data will not be deleted)

(9) Over torque alarm

If it exceeds 105% of max capacity torque, the display shows torque value and "- - -" alternately, and buzzer sounds.

(10) Table: Over torque alarm, peak hold starting torque table.

MODEL	TORQUE RANGE		1 digit	Over torque alarm (105% of max capacity torque)	Minimum Peak hold torque (7.5% of max capacity torque)	Auto zero adjustment workable torque
	MIN	MAX				
CEM10N3-G	2.00	10.00	0.01	10.50	0.75	0.75
CEM20N3-G	4.00	20.00	0.02	21.00	1.50	1.50
CEM50N3-G	10.00	50.00	0.05	52.50	3.75	3.75
CEM100N3-G	20.0	100.0	0.1	105.0	7.5	7.5
CEM200N3-G	40.0	200.0	0.2	210.0	15.0	15.0
CEM360N3-G	72.0	360.0	0.4	378.0	27.0	27.0
CEM500N3-G	100.0	500.0	0.5	525.0	37.5	37.5
CEM850N3-G	170	850	1	893	64	64

※ For the units other than N·m, calculate the torque value based on the unit conversion table on "Page 22".

8 Operation examples (Dual display mode)

This chapter shows operation examples on case-by-case basis.

LCD and LED displays are respectively shown. If you select LCD for display mode, LED display will be kept off (Refer to P24 (11) Display mode setting.). For detailed setting method, refer to 10. Settings on P22.

(1) Inspection mode (Without OK/NG judgement)

Setting


Measurement mode: MODE-M

Upper limit setting: 0


Lower limit setting: 0

1. Set the counter to 001-999 (M-3 mode) or 01-99 (M-2 mode).
2. As you apply torque, it captures the peak value.

Note) Peak hold function works only when it reaches over 7.5% of the max capacity torque.

3. Push  to save the peak value and the measured time and proceed to the next counter (If Auto memory/reset is set, it proceeds automatically.). When connected to PC or printer, it outputs the measured data.
4. Apply torque for the next counter in the same way.

Note) Old data may remain on the counter. In this case, the data will be renewed when the applied torque exceeds the old data.

5. Push  to save the peak value and the measured time and proceed to the next counter (If Auto memory/reset is set, it proceeds automatically.).

DUAL MODE		LCD MODE	
Set the counter to 001			
Time	Counter	Torque	Counter
09 : 30	001	0.0	001
Apply torque			
09 : 30	001	100.0	001
Proceed to the next counter			
09 : 30	002	0.0	002
Apply torque			
09 : 30	002	100.0	002
Proceed to the next counter			
09 : 30	003	0.0	003

(2) Inspection mode with OK/NG judgement

It judges whether the measured data is within the set range.


(OK: Upper limit \geq Measured torque \geq Lower limit)

Setting (example)

Measurement mode: MODE-M

Upper limit: 55 Nm

Lower limit: 50 Nm

1. Set the counter to 001-999 (M-3 mode) or 01-99 (M-2 mode).
2. Apply torque and push  to proceed to judgement.

Note) If you set Auto memory/reset, judgement will be given automatically after the set timing).

Note) When connected to PC or printer, the measured data will be output.


In case of OK judgement

Green LED turns on for 0.5 sec and proceeds to the next counter.

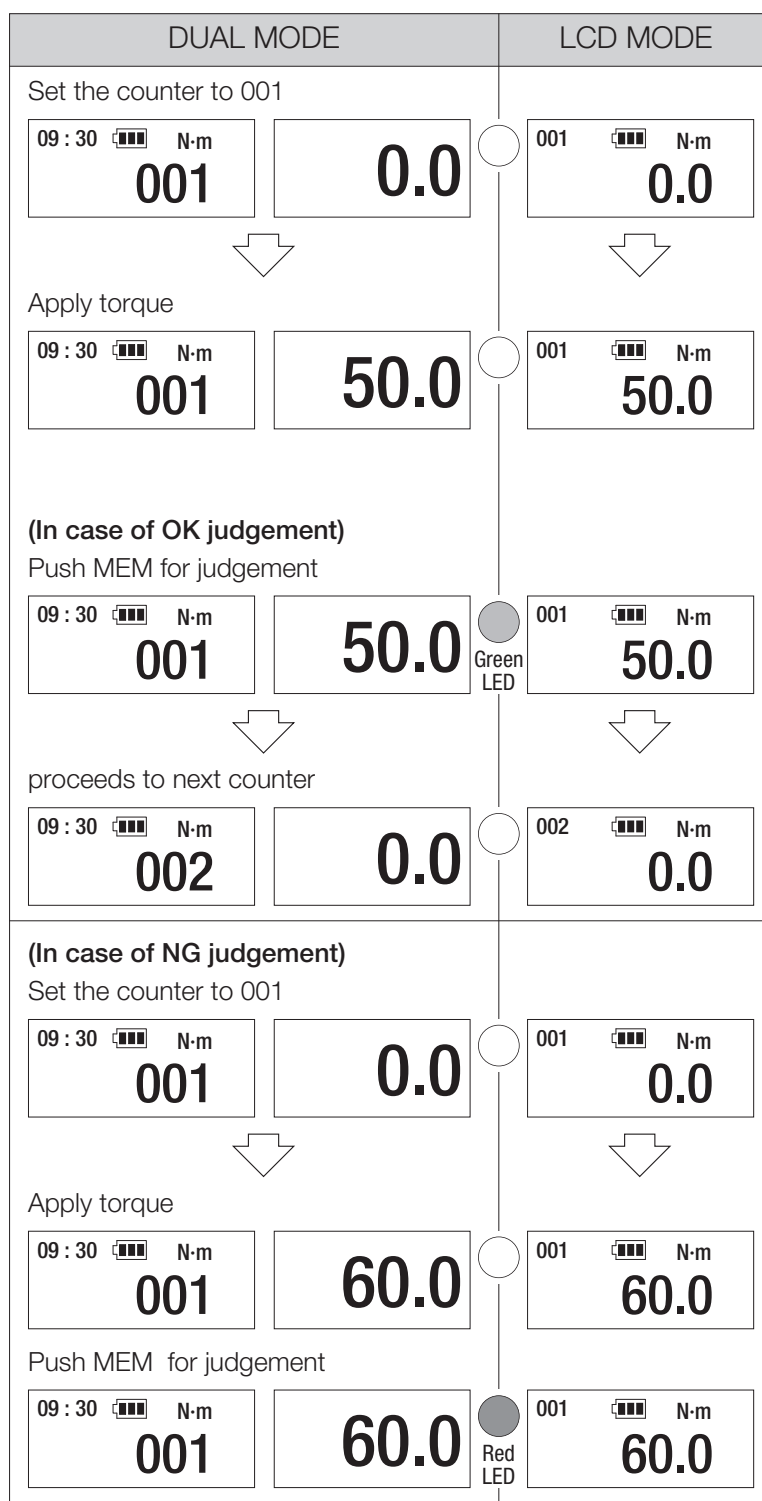
In case of NG judgement

Red LED turns on and the buzzer sounds.

Note) In case of NG, Auto memory/reset does not work.

To save the NG data, press .

To delete the NG data, press .



(3) Tightening mode measurement

It informs when torque reaches the target range by buzzer and LED, and alarms when it is out of the range by another buzzer.


(OK: Upper limit \geq Measured torque \geq Lower limit NG: Measured torque $>$ Upper limit, Lower limit $>$ Measured torque)

Setting (example):

Measurement mode: MODE-T

Upper limit: 55 N·m

Lower limit: 50 N·m

1. Set the counter to 001-999 (M-3 mode) or 01-99 (M-2 mode).
2. When the applied torque reaches the lower limit, the buzzer goes off and green LED turns on. Release torque before it reaches the upper limit and push .


In case of OK

Green LED turns on for 0.5 sec.

Note) If Auto memory/reset is set, judgement will be given automatically after the set timing.

Note) When connected to PC or printer, the measured data will be output.

In case of NG


When the applied torque reaches the lower limit, green LED turns on. As it exceeds the upper limit, red LED turns on to alarm the applied torque is out of range. As you push , buzzer goes off to give NG judgement.

To save the NG data, press .

To delete the NG data, press .

DUAL MODE		LCD MODE	
Apply torque			
09 : 30  N·m 001	0.0		001  N·m 0.0
When it reaches the lower limit (Buzzer sounds for 0.5 sec)			
09 : 30  N·m 001	50.0	 Blue LED	001  N·m 50.0
Release torque			
09 : 30  N·m 001	50.0		001  N·m 50.0
(In case of OK judgement)			
Push MEM for judgement			
09 : 30  N·m 001	50.0	 Blue LED	001  N·m 50.0
(In case of NG judgement)			
When it exceeds the upper limit			
09 : 30  N·m 001	60.0	 Red LED	001  N·m 60.0
Push MEM key to give judgement (Buzzer keeps sounding)			
09 : 30  N·m 001	60.0	 Red LED	001  N·m 60.0

(4) Checking the measured data

To check the measured data, use  key to move the counter where you wish to see the data.

: Send the counter forward

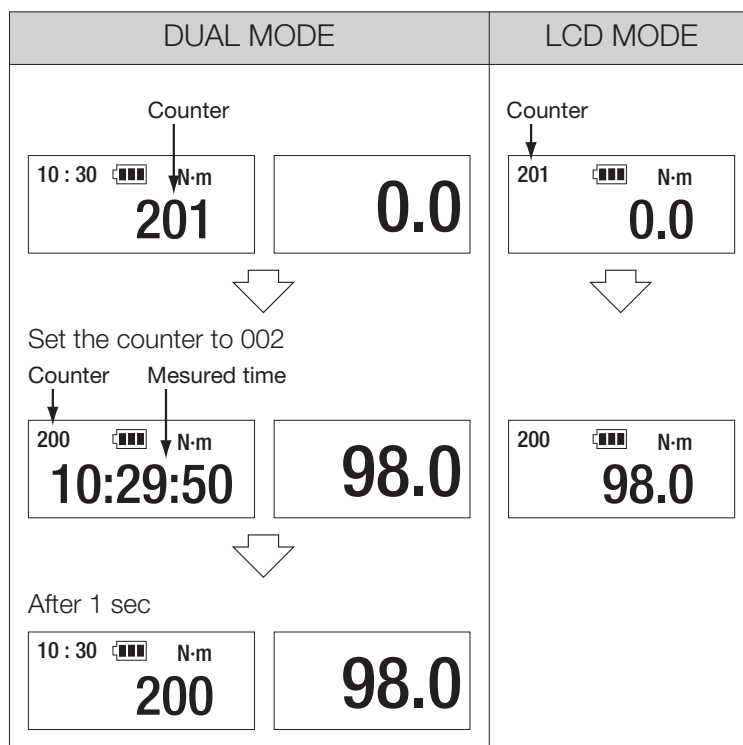
: Send the counter backward

(Keep it pushed to fast-forward)

In dual mode, LCD display shows the measured time for 1 second before it turns to the counter. In LCD display mode, measured time will not be shown.









Example) To check the data on counter 200.

Use  key till the counter shows 200.


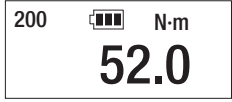




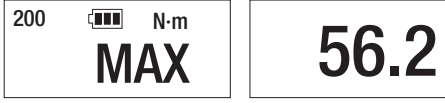
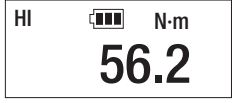
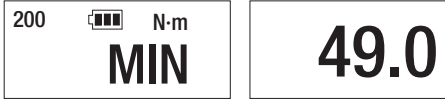
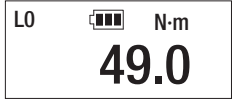

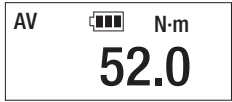

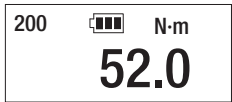


(5) Data processing function

It processes the measured data to calculate the data quantity, maximum/minimum/average torque of the selected data range.

1. Use  key to select the upper end of the counter to calculate and push .
2. Use  key to select the lower end of the counter to calculate and push .
3. It shows the quantity of the selected data range. Push .
4. It shows the max value of the selected data range. Push .
5. It shows the minimum value of the selected data range. Push .
6. It shows the average value of the selected data range. Push .
7. It returns to the original display.

Note) To cancel, press Clear key at any timing of the above and it returns to the original display.

DUAL MODE	LCD MODE
Set the upper end 	
↓	↓
Set the lower end 	
↓	↓
Displays the quantity of data 	
Maximum value 	
Minimum value 	
Average value 	
Returns to the original display 	

(6) Output data at a time (PC, Printer)

Outputs the selected range of measured data (measured value/measured time) to an external device at a time. According to the external device, select the communication settings as follows (Refer to P23 (8) Communication mode setting).

To PC through RS232C (No.575): select "PC"

To use USB cable (No.584): select "USB"

To printer (EPP16M2): select "PRN"

Note) Make sure to set the output baud rate in advance (Refer to P24 (9) Communication baud rate setting).

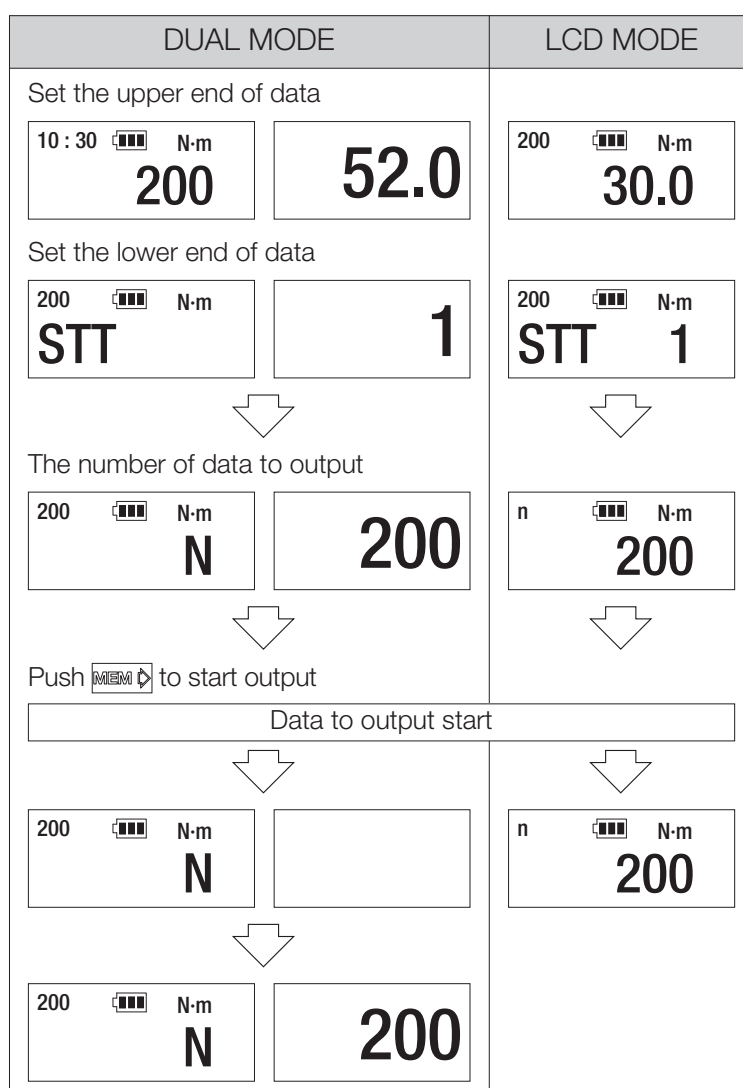
1. Use key to set to the upper end of the data to output and push .
2. Use key to set to the lower end of the data to output and push .

Example 1) To output the data 001-200:
Set the counter to 200 and push . Check STT shows 1 and push to confirm.

Example 2) To output the data 101-200:
Set the counter to 200 and push . Then set STT to 101 and push to confirm.

3. Push to output the measured data to the external device.

Note) To cancel the operation, push key during the above process. (You cannot cancel when the data is being output.)



Printing Sample

```

1: 100.0 N·m
10/30 12:46:12
2: 101.2 N·m
10/30 12:47:13
3: 102.3 N·m
10/30 12:47:14
-----
N = 3
MAX: 102.3 N·m
MIN: 100.0 N·m
AVE: 101.2 N·m
    
```

(7) Output data at a time (Infrared output)

Transfer the selected range of measured data to R-DT999 Data Tank.

Set the communication setting to "IFR" (Refer to P23 (8) Communication setting).

1. Use key to set to the upper end of the counter to output and push .

The example shows the counter 200.

2. Use key to set to the lower end of the counter to output and push .

Note) In M-2 mode, lower end can only be set to 1 (STT1).

Example 1) To output the data 001-200:

Set the counter to 200 and push . Check STT shows 1 and push to confirm.

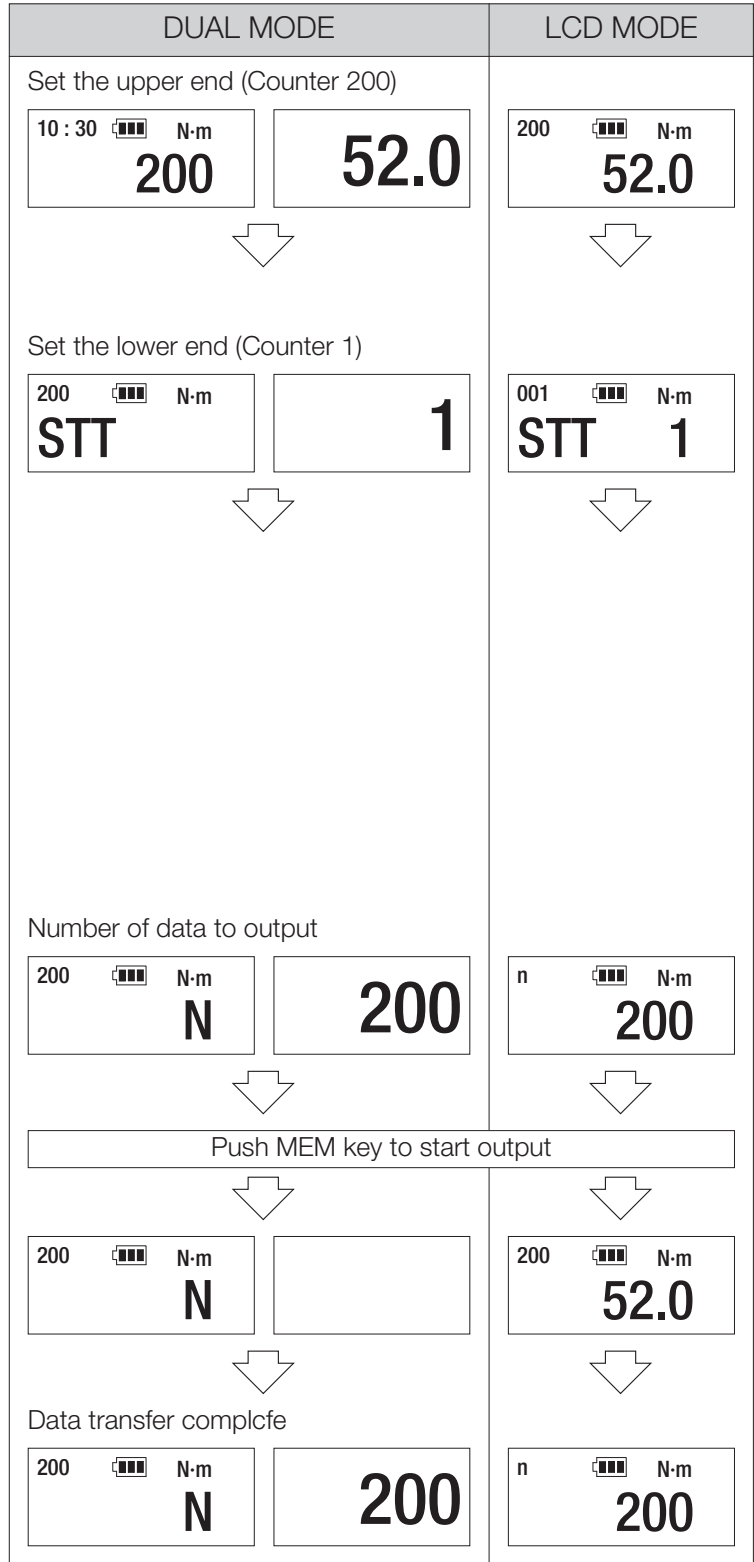
Example 2) To output the data 101-200:

Set the counter to 200 and push . Then set STT to 101 and push MD to confirm.

3. Set R-DT999 ready for receiving data, and place its input in line with CEM3 output.

Push to output the measured data to R-DT999.

Note) To cancel the operation, push key. (You cannot cancel when the data is being output.)



(8) Data clearance

Delete the measured data.

1) Delete 1 data

1. Use key to select the data to delete.
2. Push C key to delete.

2) Delete the selected range of data

1. Use key to set to counter to the upper end of data to delete and push .
2. Use key to set the counter to the lower end of data to delete and push .

Note) In M-2 mode, lower end can only be set to 1 (STT1).

3. Push key and key at the same time, then the screen shows "CLEAR" and blinks. It returns to the original display and deletion is complete.

DUAL MODE	LCD MODE
(Delete 1 data)	
Select the data to delete and push	
↓	
Data clearance complete	
(Delete range of data)	
Set the upper end of data	
↓	
Set the lower end of data	
↓	
It shows the number of data to delete. Push and at the same time	
↓	
Data clearance complete	

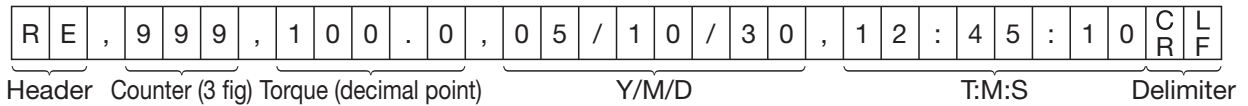
Note) Data clearance (key + key) is effective when the screen shows either "N" (number of data), "MAX" (maximum value), "MIN" (minimum value) or "AVE" (average value).

9 External output format

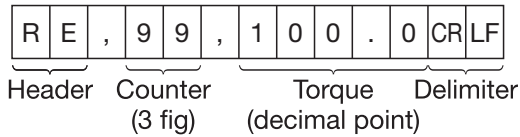
(1) PC output form

Communication spec.	RS232C compliant
Synchronous method	Start-stop synchronization
Baud Rate	Select from 2400, 4800, 9600, 19200 bps
Data Length	7bit (PC Output) 8bit (USB Serial Output)
Stop Bit	1bit
Parity	None

• M-3 Mode



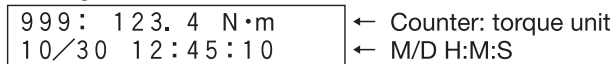
• M-2 Mode



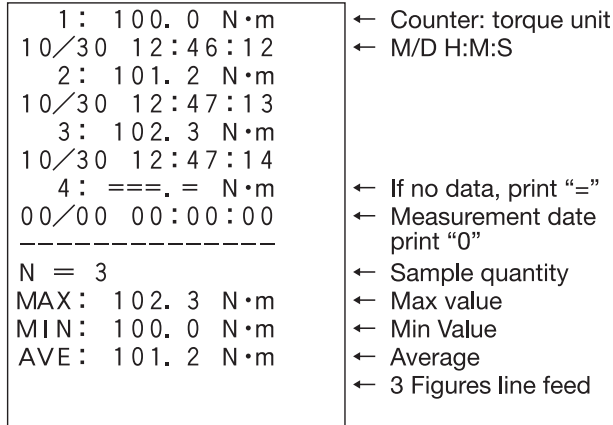
(2) Printer output format (Exclusive printer EPP16M3)

• M-3 Mode

Printing 1 data



Printing a range of data

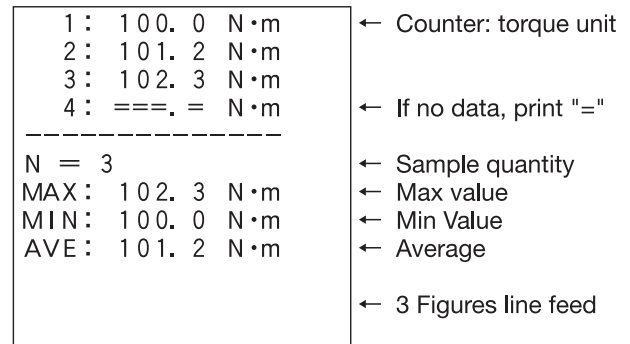


• M-2 Mode

1 Data print



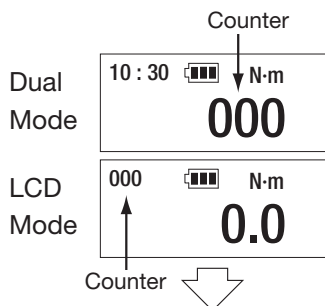
Print at a unit



10 Settings

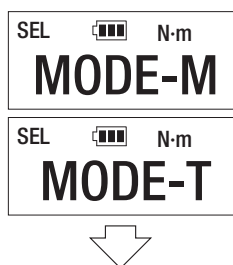
This chapter explains settings of various types of modes and functions.

(Sample displays shown below are all LCD (left) display.)



1. Set the counter to 000 (M-3 mode) or 00 (M-2 mode).
2. Push for 2 seconds till it enters measurement mode.

(1) Measurement mode setting

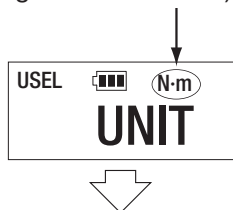


Use key to select "MODE-M" for inspection mode and "MODE-T" for tightening mode.

Push to confirm.

(2) Measurement unit setting (Default: N·m)

Selected torque unit blinks (N·m / kgf·cm / kgf·m / lbf·in / lbf·ft)



Select the torque unit (N·m / kgf·cm / kgf·m / lbf·in / lbf·ft).

The measured torque and the set torque will be converted into the selected torque unit.

Use key to select the torque unit and press key to save and proceed to the next.

Note) "kgf·cm" and "lbf·in" units are not included in CEM850N3X32D-G.

Unit conversion table

	Conversion factors
N·m → kgf·cm	10.1972
N·m → kgf·m	0.101972
N·m → lbf·in	8.8508
N·m → lbf·ft	0.73756

Rounding of the converted figures

$$100.0 \text{ [N·m]} \times 0.73756 = 73.756 \approx 73.8 \text{ [lbf·ft]}$$

$$73.8 \text{ [lbf·ft]} \div 0.73756 = 100.05 \approx 100.1 \text{ [N·m]}$$

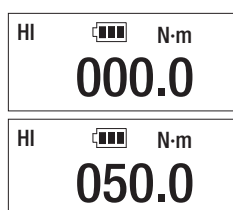
※ Converted figures are rounded as above.

Accordingly, the resulted figures may have a margin of errors.

※ Unit conversion is made based on N·m values with the above conversion factors.

※ All the saved data and torque setting values will be converted when making a unit change.

(3) Upper limit setting



Use key to set the upper limit value and push to confirm.

Next setting

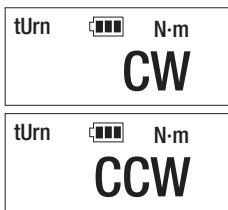
(4) Lower limit setting



Use key to set the lower limit value and push to confirm.



(5) Tightening direction setting



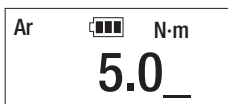
Use key to select the tightening direction and push to confirm.

CW: clockwise

CCW: counter-clockwise



(6) Auto memory/reset setting



Use key to select time for Auto memory/reset and push to confirm.

※ Measured torque value is automatically saved after the set timing.



(7) Buzzer setting



Use key to select buzzer "ON" or "OFF". Push to confirm.



(8) Communication mode setting



Use key to select communication mode as below and push to confirm.



HT: Handy Terminal output

PC: RS232C output



PRN: printer output

USB: USB connector output



IFR: Infrared output

Note) If select PRN, communication baud rate is fixed as 2400bps.

Note) If select USB, data length is fixed as 8 bit.

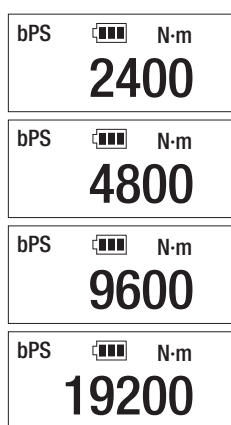


Note) If select PRN or IFR communication baud rate is skipped.



Next setting

(9) Communication baud rate setting



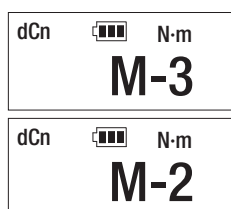
Use key to select the communication baud rate and push to confirm.

Note) If select PRN, communication baud rate is fixed as 2400 bps.

Note) In M-2 mode (CEM2 compatible mode), baud rate must be set to 2400 bps.



(10) Memory mode setting



Use key to select "M-3" or "M-2" mode.

M-3: Data memory 999 pc

M-2: Data memory 99 pc

(M-2 is compatible with CEM2 data format.)

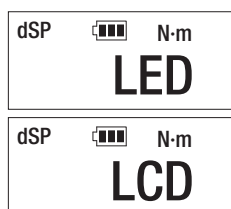
Note) If you change the memory mode, previous data will be deleted. Press to confirm.



Clears the saved data



(11) Display mode setting



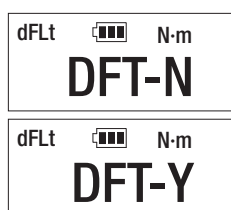
Use key to select display mode.

LED: LCD + LED display mode (Dual mode)

LCD: LCD display mode (LCD only)



(12) Setting default



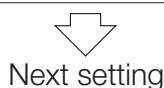
Choose whether or not to reset to the delivery condition.

DFT-N: do not reset

DFT-Y: reset to the delivery conditions.

Push to confirm.

Note) If you chose DFT-Y, each setting goes back to delivery condition, and saved data will be cleared.



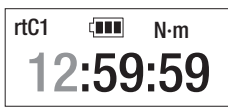
(13) Clock display



Push or to save settings and goes to measurement mode.
Push to save and go on to the next setting.

(14) Clock setting

Setting of Hour



Use key to select hour and push to confirm.

Setting of Minute



Use key to select minute and push to confirm.

Setting of Second



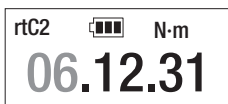
Use key to select second and push to confirm.

Clock display



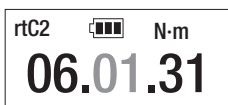
Push to proceed to date setting, or push to cancel.

Setting of Year



Use key to select year and push to confirm.

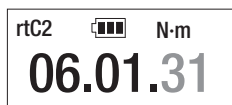
Setting of Month





Use key to select month and push to confirm.

To Date setting

Setting of Date



Use  key to select data and push  to confirm.



Measurement display



Settings complete.

11 How to transfer data to software through USB cable

- Setting on PC
 - (1) Install the driver accompanying No.584 USB cable.
 - (2) Set the communication port and baud rate.
- Setting on CEM3-G
 - (3) Set "USB" on communication mode setting, and select the baud rate in line with PC setting.
- Communication
 - (4) Connect No.584 USB cable to CEM3-G and PC.
 - (5) Start the software on PC.

Note) No.584 USB cable must be connected before starting the software. Otherwise, communication error may occur.

Note) CEM3-G can be connected to PC on 1-on-1 basis only.
- Data output

After measuring (tightening), press MEM key to output the data to the software.

To output a range of data at one time, refer to 8. (6) on P18.

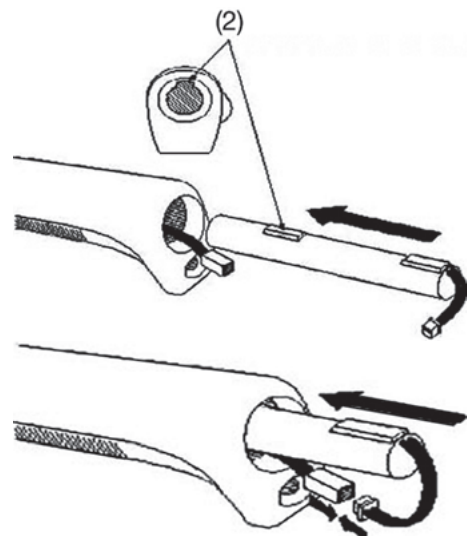
12 Battery

Battery life

BP-5 battery can be recharged about 500 times depending on conditions before it dies. When it is old, replace it with a new one (BP-5). At the delivery condition, BP-5 battery is empty. Make sure to charge it before use.

How to install the battery

- (1) Turn the cap clockwise to remove it.
 - (2) Set the battery in line with the hole as shown below and slide it in.
 - (3) Connect the cable.
 - (4) Push in the battery to the end.
 - (5) Push in the cable and the connector carefully.
 - (6) Put the cap back on by turning it counter-clockwise.
- Note) Be careful not to pinch the cable and the connector when putting the cap on.



13 Charging








Connect the BC-3-G charger to the CEM3 charge jack. Make sure BC-3-G charger is connected to the power source. Green lamp on BC-3-G turns on when charging is complete (it takes about 3.5 hours from the empty condition).

Warnings

- (1) Check the voltage on the charger and use the appropriate power source.
- (2) Stop charging as soon as the green lamp on the charger turns on. Excessive charging may shorten the battery life.
- (3) The product cannot operate when it is connected to the charger.
- (4) If the green lamp on the charger turns on and the red lamp starts to blink, it indicates an error. Stop using it immediately, and contact Tohnichi or nearest Tohnichi distributor.
- (5) Temperature must be kept within 0-40 degree Celsius range when charging.
- (6) If it should emit some abnormal smell or generates abnormal heat, stop using it immediately and move it to a safe place. Contact Tohnichi or nearest Tohnichi distributor.
- (7) When not in use for a long time, charge it to full, and remove the battery to keep it. It is recommended that it should be charged at least once every half a year.

※ After charging, there is no need to push the reset button.

Error Message

Error Message	Indication	Solution
Err1	 key is continuously pushed.	Turn off the  once and turn it on without touching any other keys. If Err disappears, it should work properly. If Error does not disappear, it needs to be repaired. Please contact TOHNICHI or your nearest distributor.
Err2	 key is continuously pushed.	
Err3	 key is continuously pushed.	
Err4	 key is continuously pushed.	
Err5	 key is continuously pushed.	
Err8		It needs to be repaired. Please contact TOHNICHI or your nearest distributor.
Err9		Malfunction of the torque sensor or circuit board. Push  key at no loading condition. If Err 9 disappears, it should work properly. If Err 9 remains, it needs to be repaired. Please contact TOHNICHI or your nearest distributors.

14 Options

- (1) Battery pack (BP-5)
- (2) Charger (100-240V) (BC-3-G)
- (3) Interchangeable head (SH, RH, QH, RQH, DH, HH, FH)
 - ※ PH of interchangeable head can not be used.
- (4) Communication cord
 - CEM3-PC (D-SUB 9 pin female) (Catalogue No.575)
 - CEM3-PC (USB A type) (Catalogue No.584)
- (5) Exclusive printer (EPP16M3)
- (6) Infrared DATA TANK (R-DT999)
- (7) Handy DATA FILE SYSTEM (DFS)
- (8) Handy Terminal (HT-10)
 - Comparison Table with CEM option

CEM3-G

○: Usable

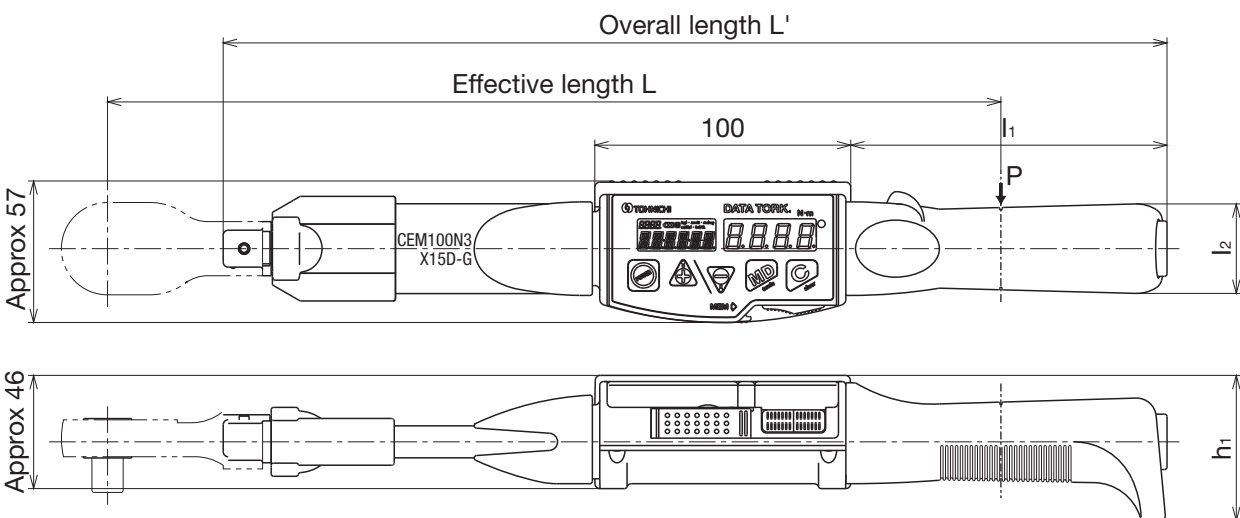
×: Not usable

△: Usable in M-2 mode

Name	Model	CEM3-G	CEM2
Battery pack	BP-5	○	×
Battery pack	BP-3	×	○
Charger (100-240V)	BC-3-G	○	×
Charger (100V)	QC-1	×	○
Charger (200V)	QC-2	×	○
Interchangeable Head	SH,RH,QH,RQH,DH,HH,FH	○	○
Exclusive printer	EPP16M3	○	○
PC connection cord	No.572	○	○
	No.573	○	○
	No.574	○	○
	No.575	○	○
PC connection cord (USB)	NI.584	○	×
Infrared data receiver	R-DT999	○	○
Infrared data receiver	R-DT100-3	×	○
Handy data file system	DFS	△	○
Handy terminal	HT-10	○	○
Handy terminal	HT-9000	△	○

		display	delivery condition	select
1	Measurement Mode	SEL	MODE-M	MODE-T
2	Torque Unit	USEL	N·m	kgf·cm/kgf·m/lbf·in/lbf·ft
3	Upper limit	HI	0	0
4	Lower limit	Lo	0	0
5	Tightening direction	tUrN	CW	CCW
6	Auto memory reset	Ar	0.0	0.1-5.0
7	Buzzer output	bU	ON	OFF
8	Communication mode	do	HT	PC/PRN/USB/IFR
9	Baud rate	bPS	2400	4800/9600/19200
10	Memory mode	dCn	M-3	M-2
11	Display mode	dSP	LED	LCD
12	Setting default	dFLt	DFT-N	DFT-Y
13	H:M:S	rtC1	NON	-
14	Y:M:D	rtC2	NON	-

15 Specifications



Torque Range

	Capacity						Max Hand Power P [N]
	Newton		Metric		American		
	Min.	Max.	1 digit	Min.	Max.	1 digit	
	[N·m]	[N·m]	[kgf·cm]	[kgf·cm]	[lbf·in]	[lbf·in]	
CEM10N3X8D-G	2-10	0.01	20-100	0.1	20-90	0.1	48.1
CEM20N3X10D-G	4-20	0.02	40-200	0.2	36-180	0.2	92.2
CEM50N3X12D-G	10-50	0.05	100-500	0.5	100-450	0.5	196.9
CEM100N3X15D-G	20-100	0.1	200-1000	1	200-900	1	275.5
CEM200N3X19D-G	40-200	0.2	400-2000	2	[lbf·ft]	[lbf·ft]	428.3
					30-150	0.2	
CEM360N3X22D-G	72-360	0.4	720-3600	4	52-260	0.4	498.6
CEM500N3X22D-G	100-500	0.5	[kgf·m]	[kgf·m]	72-360	0.5	549.5
			10-50	0.05			
CEM850N3X32D-G	170-850	1	17-87	0.1	124-620	1	608

Dimensions

	Dimension					Weight [kg]	Accessory Provided	Interchangeable Heads
	Effective	Overall	Handle Length	Handle Width	Height			
	L [mm]	L' [mm]	l ₁ [mm]	l ₂ [mm]	h ₁ [mm]			
CEM10N3X8D-G	208	212	63.5	35.6	49.5	0.46	Battery pack (BP-5) CHARGER	(SH,RH,QH,HH) 8D
CEM20N3X10D-G	217	214	63.5	35.6	49.5	0.47		(SH,RH,QH,DH,HH) 10D
CEM50N3X12D-G	254	282	130	36.4	59	0.58		(SH,RH,QH,RQH,DH,HH) 12D
CEM100N3X15D-G	363	384	130	36.4	59	0.63		(SH,RH,QH,RQH,DH,HH) 15D
CEM200N3X19D-G	467	475	130	36.4	59	0.78		(SH,RH,QH,RQH,DH,HH) 19D
CEM360N3X22D-G	722	713	130	36.4	59	1.13		(SH,RH,QH,RQH,DH,HH) 22D
CEM500N3X22D-G	910	949	230	30	46	4		
CEM850N3X32D-G	1398	1387	230	30	46	5.14		(SH,RH,QH) 32D

Specifications

TORQUE ACCURACY	±1%
DISPLAY	7 SEGMENTS LED 4 FIGURES
	14 SEGMENTS LCD 6 FIGURES
	7 SEGMENTS LCD 4 FIGURES
	BLUE/RED LED
CHARACTER HEIGHT	10mm / 7 SEGMENTS LED 10mm
	7mm / 14 SEGMENTS LCD 7mm
	3mm / 7 SEGMENTS LCD 3mm
DATA MEMORY	999 (99 in M-2 mode)
BASIC FUNCTIONS	PEAK HOLD
	MEASUREMENT TIME MEMORY
	AUTO MEMORY/RESET
	TIGHTENING COMPLETION ALARM
	JUDGEMENT
	AUTO ZERO
	AUTO OFF (3 MINUTES)
	OVER TORQUE ALARM
COMMUNICATION	CLOCK
	RS232C COMPLIANT (2400-19200bps)
BATTERY DISPLAY	USB CONNECTOR SERIAL OUTPUT
POWER	4 STEPS
CONTINUOUS OPERATION	NICKEL HYDROGEN BATTERY EXCLUSIVE PACK
CHARGING TIME	APPROX 20 HOURS
COMMUNICATION MODE	APPROX 3.5 HOURS
OPERATING TEMPERATURE RANGE	OPERATION
	0-40 DEGREES CELSIUS (NO CONDENSATION)

Designs and specifications are subject to change without notice.



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