

WIRELESS DIGITAL TORQUE WRENCH with ANGLE DETECTION FUNCTION MODEL CEM3-G-BT

OPERATING INSTRUCTION



CEM20N3X10D-G-BT



CEM100N3X15D-G-BT



CEM500N3X22D-G-BT

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.

Contents

Cautions on Safety	1
Notes	4
1. Outline	6
1.1. Features	6
1.2. Judgment features	6
2. Method of operation	8
2.1. Continuous display	8
2.2. Maximum value display	8
2.3. Display	10
2.4. Bluetooth® power supply and connection	10
2.5. Explanation of various keys	11
2.6. Torque and angle calibration	11
3. Explanation of each mode	12
3.1. Measurement mode	12
3.2. Display mode	12
4. Explanation of functions	13
4.1. Angle measurement and output	13
4.2. Auto zero	13
4.3. Angle speed check/ zero adjustment	13
4.4. Error message	13
4.5. Auto memory/ reset	14
4.6. Judgment	14
4.7. Mute	15
4.8. Electric power saving	15
4.9. Auto power off	15
4.10. Residual battery indicator	15
4.11. Over-torque alarm	15
4.12. Over-torque alarm/ Peak torque hold starting value	15
5. Operation examples	16
5.1. Tightening mode operation: For BTA	16
5.2. Tightening mode operation: For BTD	18
5.3. Inspection mode operation: For BTA	19
5.4. Inspection mode operation: For BTS	21
6. External Output Specifications	23
6.1. USB communication specifications	23
6.2. Bluetooth® communication specifications	23
6.3. Bluetooth® pairing method	24
6.4. Communication format	24
6.5. Input commands	25
6.6. Example of communication	26
7. Various settings	27
7.1. Setting items	27
7.2. Setting method using keys	28
8. How to output all measurement data at once and clear memory	40
8.1. Batch output of measurement data	40
8.2. Calculation function	41
8.3. Clearing the measurement data memory	43
9. Common specifications	46
10. Battery	47
11. Charging	48
12. Specifications	49

1 Outline

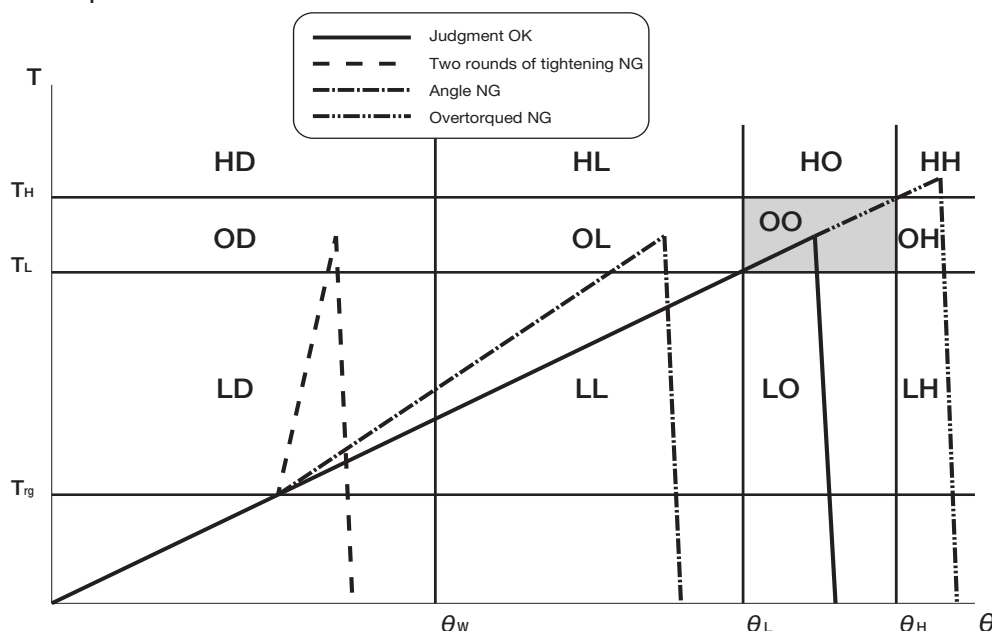
CEM3-G-BT is the digital torque & angle wrench. It can measure the torque and angle also does the judgments by the torque and angle. The Bluetooth® can output the data and judgment result wireless. Any other specifications and features are same as CEM3-G model. The conventional CEM3-BTA, BTS, and BTD can be switched between using the keys.

1.1. Features

- Records in memory and outputs torque and angle at final tightening.
- Capable of performing Pass/Fail judgments of tightening torque and angle.
- Uses torque and angle values to detect double tightening (human error).
- Built-in Bluetooth® module to transmit data wirelessly.
- The device supports dual Bluetooth® communication modes: Bluetooth Classic (SPP profile) and Bluetooth Low Energy (GATT profile), which can be switched via device settings.

1.2. Judgment features

By setting each threshold, pass/fail judgments are made for the tightening torque and final angle (for BTA settings). For BTS and BTD settings, pass/fail judgments are made for only the upper and lower torque limits.



Trg: Trigger torque, TL: Lower limit torque, TH: Higher limit torque,

θ_W : Double tightening detection angle, θ_L : Lower limit angle, θ_H : Higher limit angle

First digit alphabet describes torque judgment and second one does angle judgment.

First digit alphabet (Torque):

“O”: OK, “L”: Low NG, “H”: High NG

Second digit alphabet (Angle):

“D”: Double tightening detection NG, “O”: OK, “L”: Low NG, “H”: High NG

Example)

Torque judgment ———> ↑ ↑ ———> Angle judgment

“LD”: Low torque NG and Double tightening detection NG

CEM3-G-BT makes judgment due to lower, higher limit torque, lower, higher limit angle and double tightening detection angle if the tool is set. If you select the "M3 ID" output mode the output data string will have the 2 digit of judgment result with data. (Refer 7.5 Output format for details)

If you set the "NG_MAN" for NG judgment feature the left side display on the tool shows the 2 digits of judgment result. (Refer the 5.1 Tightening mode)

Settings	Judgment results		Torque		Angle	
	Judgment code	OK / NG	Judgment	Conditions	Judgment	Conditions
No torque judgment or not reach on minimum peak torque hold	-- (No judgment)					
With torque judgment settings and if used wrong tightening direction	DN (Tightening direction NG)	NG	With torque setting			
With torque judgment settings and no angle judgment setting	O- (Torque OK)	OK	OK	$TL \leq T \leq TH$	No Angle setting	
	L- (Torque LO-NG)	NG	LO-NG	$T < TL$	No Angle setting	
	H- (Torque HI-NG)	NG	HI-NG	$TH < T$	No Angle setting	
With torque judgment, double tightening detection angle and angle judgment settings	OO (Torque OK & Angle OK)	OK	OK	$TL \leq T \leq TH$	OK	$\theta_L(\theta_w) \leq \theta \leq \theta_H$
	OD (Torque OK & Angle DT-NG)	NG	OK	$TL \leq T \leq TH$	DT-NG	$\theta < \theta_w$
	OL (Torque OK & Angle LO-NG)	NG	OK	$TL \leq T \leq TH$	LO-NG	$\theta_w \leq \theta < \theta_L$
	OH (Torque OK & Angle HI-NG)	NG	OK	$TL \leq T \leq TH$	HI-NG	$\theta_H < \theta$
	LO (Torque LO-NG & Angle OK)	NG	LO-NG	$T < TL$	OK	$\theta_L(\theta_w) \leq \theta \leq \theta_H$
	LD (Torque LO-NG & Angle DT-NG)	NG	LO-NG	$T < TL$	DT-NG	$\theta < \theta_w$
	LL (Torque LO-NG & Angle LO-NG)	NG	LO-NG	$T < TL$	LO-NG	$\theta_w \leq \theta < \theta_L$
	LH (Torque LO-NG & Angle HI-NG)	NG	LO-NG	$T < TL$	HI-NG	$\theta_H < \theta$
	HO (Torque HI-NG & Angle OK)	NG	HI-NG	$TH < T$	OK	$\theta_L(\theta_w) \leq \theta \leq \theta_H$
	HD (Torque HI-NG & Angle DT-NG)	NG	HI-NG	$TH < T$	DT-NG	$\theta < \theta_w$
	HL (Torque HI-NG & Angle LO-NG)	NG	HI-NG	$TH < T$	LO-NG	$\theta_w \leq \theta < \theta_L$
	HH (Torque HI-NG & Angle HI-NG)	NG	HI-NG	$TH < T$	HI-NG	$\theta_H < \theta$

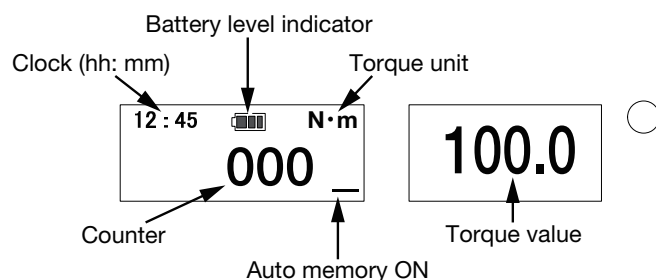
- Prioritize tightening the direction NG over the torque judgment
- Prioritize tightening the double tightening detection NG over the angle judgment

2 Method of operation

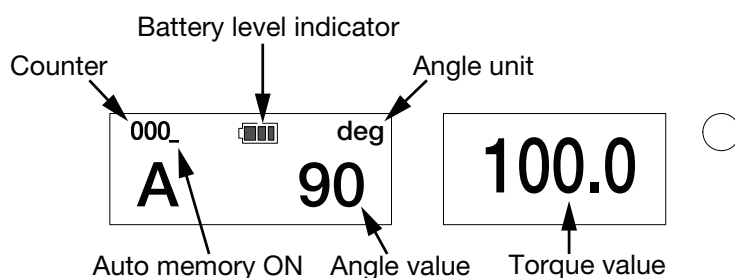
● For BTA setting

2.1. Continuous display (RUN mode) when the memory counter displays “000”

[Without angle setting]

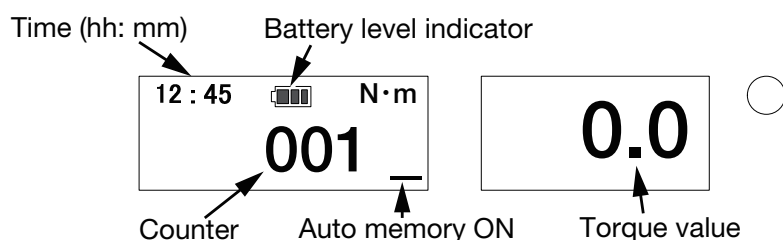


[With angle setting]

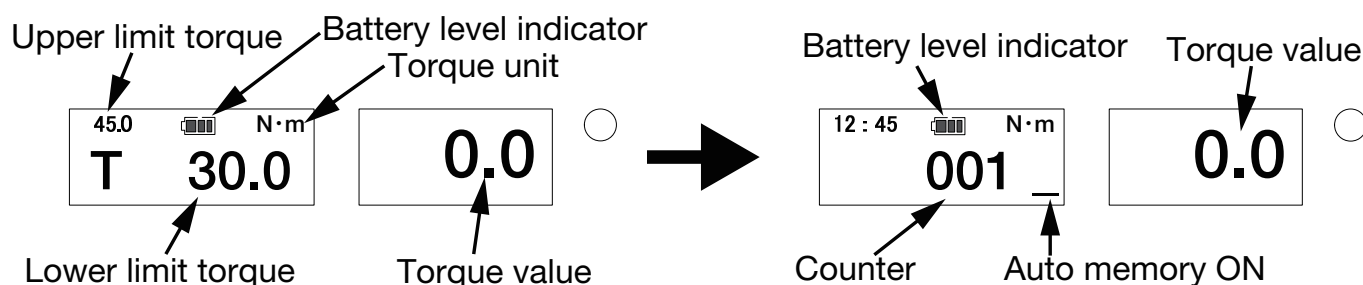


2.2. Maximum value display (PEAK mode) when the memory counter displays between “001” to “999”

[Without torque setting]

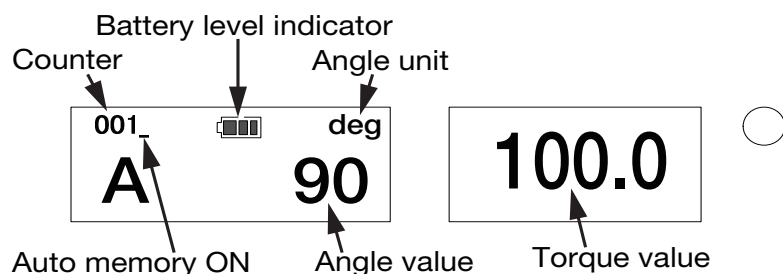


[With torque setting]



* When the left image is displayed, if you use the counter forward key or counter backward key to advance or rewind the counter value, the right image will be displayed for about 1 second, and then the left image will reappear.

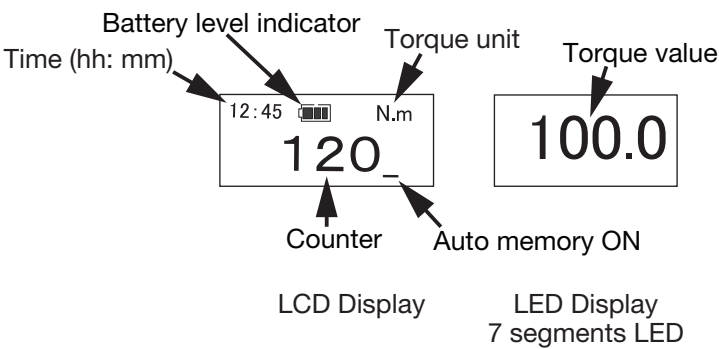
[With angle setting and data memory]



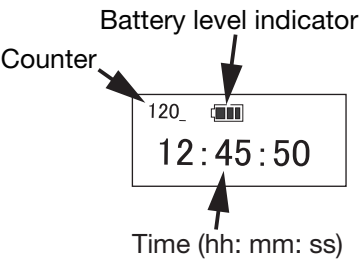
● For BTS setting

[Run mode and Peak mode]

Display during measurement

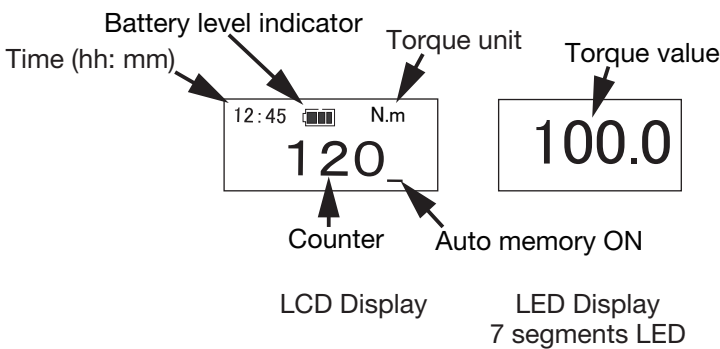


LCD display when reading memory

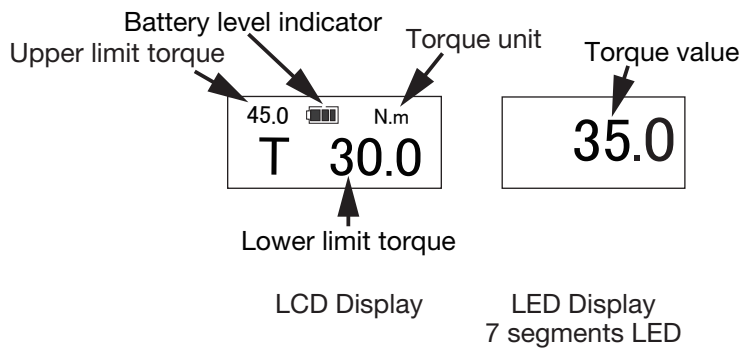


● For BTD setting

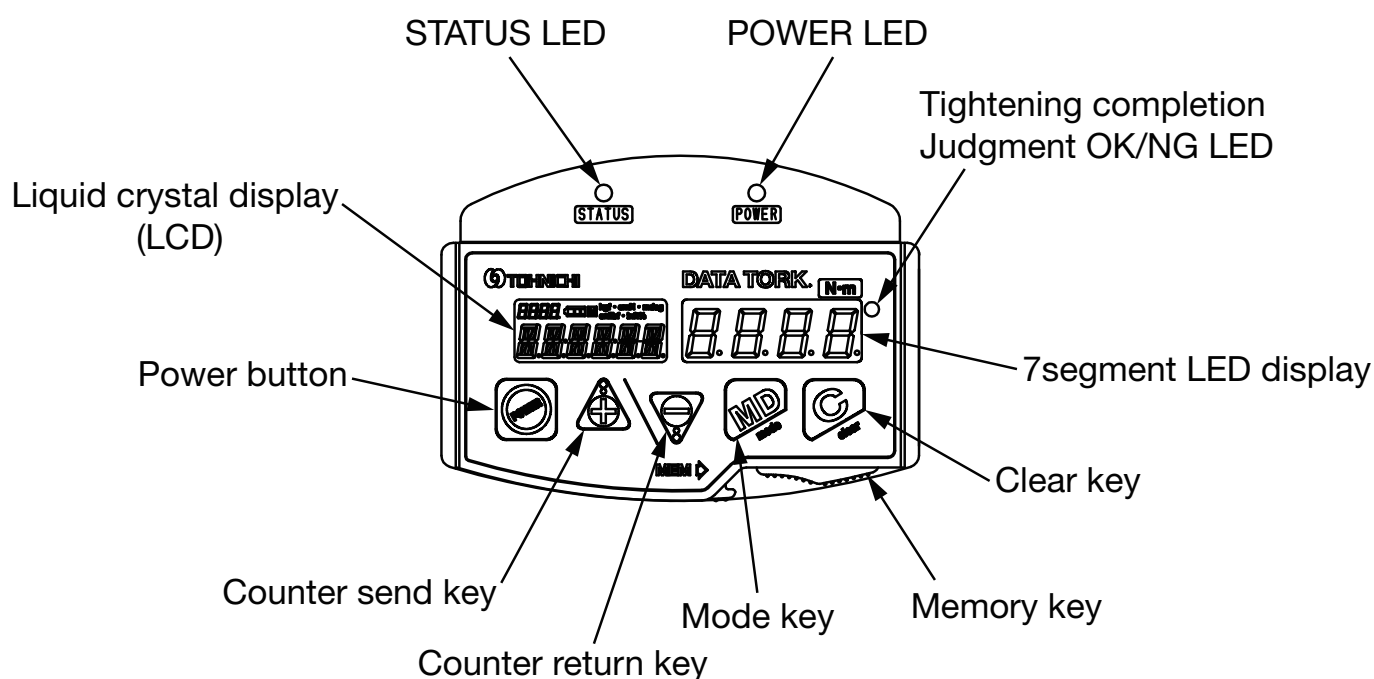
[Run mode]



[Peak mode]



2.3. Display



2.4. Bluetooth® power supply and connection

- When you press the POWER switch, the display lights up, the Bluetooth® power is turned on, and the POWER LED (red) lights up.
- To turn off the Bluetooth® power, press and hold the POWER switch for 2 seconds while the power is on. (If you press it normally, the display will turn off but the Bluetooth® power will remain on.)
- If no operation is performed within the set time, the auto power off function will be activated and the display will disappear. However, the Bluetooth® power will not be turned off. (When the battery runs out, the Bluetooth® power will also be turned off.)
- The STATUS LED (blue) lights up when Bluetooth® communication is connected, and turns off when the connection is lost.
- No data will be transmitted unless the STATUS LED (blue) is lit.

* Even if the display is turned off, if the Bluetooth® power is on, current will flow and the battery will deteriorate faster. Please also turn off the Bluetooth® power when not in use.

2.5. Explanation of various keys



: Counter send key

In the case of BTA and BTS settings, the memory counter is advanced and measurement data is read if available. Press and hold the button to advance the counter value by 10.



: Counter return key

In the case of BTA and BTS settings, resets the memory counter and reads out measurement data if available. Press and hold to reset the counter value by 10. For BTD settings, switches between run mode and peak mode.



: Mode key

In the case of BTA and BTS settings, pressing this button in peak mode (counter 001 to 999) will take you to the calculation start position screen. If you press it further after that, you will proceed to the sample number screen, maximum torque value screen, minimum torque value screen, and average torque value screen. There will be no change in BTD settings. If you press and hold this button in run mode (counter 000), the setting input selection screen will appear.



: Memory key

The tightening data is stored in memory and the counter is sent.



: Clear key

Clears the tightening data.



: Power button

Turns the power on/off. If the angle function is set to ON, an angular velocity check is performed when the power is turned on, so keep the device stationary for at least two seconds. The Bluetooth® power will also be turned on and the POWER LED (red) will light up.

To turn the Bluetooth® power off, press and hold the POWER switch for two seconds while the power is on. (If you press the switch normally, the display will turn off, but the Bluetooth® power will remain on.)

2.6. Torque and angle calibration

Use the counter send or return key to set the counter to run mode (counter value: 000). Use a torque wrench tester to measure the torque, and an angle calibrator to measure the angle. Please contact us for more information.

3 Explanation of each mode

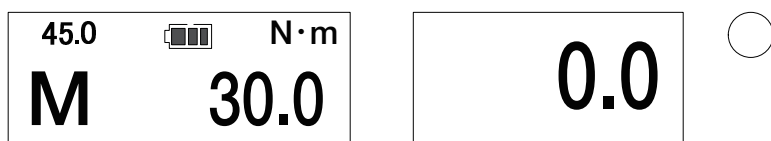
The CEM3-G-BT has two modes that are Measurement mode and Display mode.

3.1. Measurement mode

- Inspection mode (MODE-M)

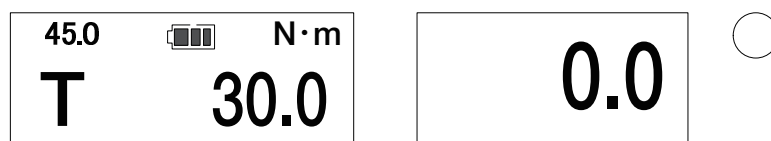
MODE-M is used for the re-tightening and breakaway inspections. If you set the high and low limit torque values the tool makes judgment the measured torque result.

The double tightening detection feature will be off while MODE-M. When you set the high and low torque values under MODE-M the display shows "M" on the left display as below.



- Tightening mode (MODE-T)

MODE-T is used for tightening process. When you set the high/ low torque and angle, double tightening detection angle, and direction of tightening, the tool gives the beep intermittent and blue LED if the torque value reaches about 80% of low limit torque. Once reaches on low limit torque value the tool give beep continuous and red LED. When you set high and low limit torque under MODE-T the left display shows "T" as below.



3.2. Display mode

- RUN mode (The counter is "000")

The display shows the torque value being applied at the moment and returns to zero when torque is released. When the angle setting is on, left display shows angle value as well as. When you rotate to CW the angle is positive and to CCW it is negative values.

- Peak mode (The counter is "001" to "999")

The maximum torque will be captured and the display holds it. When the low or high limit torque values are set, the low limit value is shown on left upper corner of left display, the high limit value on right of the left display.

When the trigger torque is set and torque reach on it the angle is measured. The angle value has positive when to rotate to CW and angle has negative when to CCW. The display holds maximum angle value even if the torque is released.

4 Explanation of functions

4.1. Angle measurement and output: For BTA settings

When the angles and trigger torque are set, the tool can measure the angle. The tool outputs the torque and angle data when the communication format setting is set to "DF-3".

4.2. Auto zero

In the RUN mode, press "C" key, and auto zero adjustment works.

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

<Display shows "Err9">

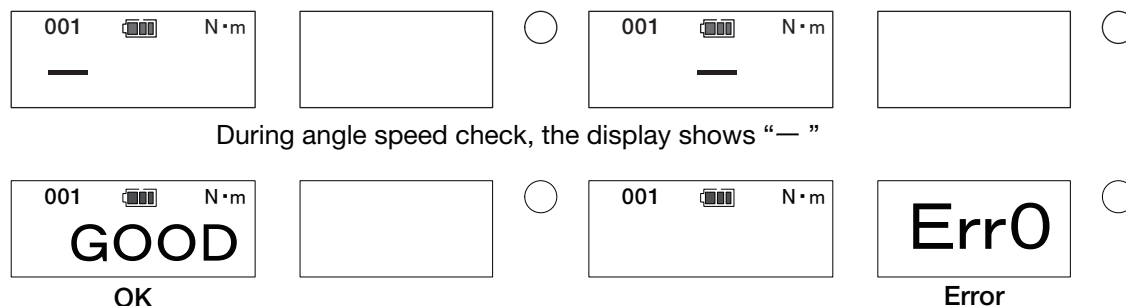
Press "C" key without torque load.

If "Err9" disappears, this instrument can be used normally.

If not, press reset key and "C" key once again.

4.3. Angle speed check/ zero adjustment: For BTA settings

When turning on the power, angle speed check will be automatically conducted to make zero adjustment. During zero adjustment, the tool should be put still (do not move) otherwise the display may show "Err0". The angle speed check will also be automatically processed when it is in still kept still for more than 2 seconds. In case of "Err0", refer to next "4.4 Error message".



4.4. Error message

Key check and memory check will be conducted when turn on, press reset button or leave setting mode after angle set is on.

<Err0>

Error in angle speed detection

- Turn off the power once. Keep the body still (no movement) and turn on the power again.

-If "Err0" disappears, then it operates normally.

-If not, contact TOHNICHI or the nearest distributor to ask for repair.

<Err 1 to 5>

Error in membrane switch

- Turn off the power once and turn it on again without touching any keys.
 - If error disappears, then it operates normally.
 - If not, contact TOHNICHI or the nearest distributor to ask for repair.

<Err 8>

Error in data memory

- Contact TOHNICHI or the nearest distributor to ask for repair.

<Err 9>

Error in the circuit board or the torque sensor

- At no load condition, press "C" key.
 - If "Err9" disappears, then it operates normally.
 - If not, contact TOHNICHI or the nearest distributor to ask for repair.

• Error Message List

Error Message	Indication	Solution
Err0	Error in angle speed detection	Turn off the power once. Keep the body still (no movement) and turn on the power again. -If Err0 disappears, then it operates normally. -If Err0 remains on the display, contact TOHNICHI or your nearest distributor to ask for repair.
Err1	Upper arrow key is continuously pressed	Turn off the power once and turn it on without touching any other keys. -If error message disappears, then it operates normally. -If error message remains on the display, contact TOHNICHI or your nearest distributor to ask for repair.
Err2	Down arrow key is continuously pressed	
Err3	"MEM" key is continuously pressed	
Err4	"C" key is continuously pressed	
Err5	"MD" key is continuously pressed	
Err8	Memory abnormality	It needs to be repaired. Please contact TOHNICHI or your nearest distributor to ask for repair.
Err9	Torque sensor abnormality	Press "C" key without load. -If Err9 disappears, then it operates normally. -If Err9 remains on the display, contact TOHNICHI or your nearest distributor to ask for repair.

4.5. Auto memory/ reset

After tightening or measuring, the values are automatically saved and forward to the counter to the next. Auto memory timing can be selected from 0.1 to 5 seconds.

If you do not want to use auto memory function, set it as 0.0 seconds.

4.6. Judgment

Set the torque, angle, double tightening detection angle and direction of tightening, these judge whether the measured result are within the range or not. Under the Tightening mode (MODE-T), when you set the high/ low torque and angle, double tightening detection angle, and direction of tightening, the tool gives the beep intermittent and blue LED if the torque value reaches about 80% of low limit torque. Once reaches on low limit torque value the tool give beep continuous and red LED.

Under the Inspection mode (MODE-M), if you set the high and low limit torque values the tool makes judgment the measured torque result. If you set the Auto memory/ reset, the judgment is made automatically.

4.7. Mute

By setting “Off” on buzzer output setting, the buzzer sound on key operation will be turned off.

However, over-torque alarm, tightening completion, NG judgment alarm remains effective.

4.8. Electric power saving

When it is left without any key operation of tightening operation for about 1 minute 7-segment LED darkens to save electricity. This mode is available when Auto power off is set ON.

4.9. Auto power off

When it is left without any key operation of tightening operation for a set time (default setting is 3 minutes) or unloading condition (loading torque is less than 7.5% of the max. torque range of the model), the power will automatically turn off.

If you prefer not to use Auto power off, set it to OFF.

At “LoBATT” alarm condition, power will turn off in 1 minute regardless of the above condition

4.10. Residual battery indicator

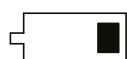
Residual battery amount is indicated on the display as follows:



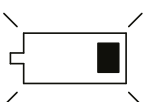
Full



Half remaining



Time to charge battery



No battery available. Recharge immediately.
No key operation works, and it automatically turns off in 1 minute.
Each settings and data remain unchanged even after “LoBATT” condition.

4.11. Over-torque alarm

When it exceeds 105% of the maximum measurable torque, the value on the display and “- - -” blinks alternatively and the buzzer does on.

4.12. Over-torque alarm/ Peak torque hold starting value

(N.m case)

Model	Torque range		1 digit	Over-torque alarm (105% of Max. capacity torque)	Peak hold starting torque (7.5% of Max. capacity torque)	Auto zero range (7.5% of Max. capacity torque)
	Min.	Max.				
CEM10N3X8D-G-BT	(0.50)2.00	10.00	0.01	10.50	0.75	0.75
CEM20N3X10D-G-BT	(1.00)4.00	20.00	0.02	21.00	1.50	1.50
CEM50N3X12D-G-BT	(2.50)10.00	50.00	0.05	52.50	3.75	3.75
CEN100N3X15D-G-BT	(5.0)20.0	100.0	0.1	105.0	7.5	7.5
CEM200N3X19D-G-BT	(10.0)40.0	200.0	0.2	210.0	15.0	15.0
CEM360N3X22D-G-BT	(18.0)72.0	360.0	0.4	378.0	27.0	27.0
CEM500N3X22D-G-BT	(25.0)100.0	500.0	0.5	525.0	37.5	37.5
CEM850N3X32D-G-BT	(43)170	850	1	893	64	64

* Values in () is the minimum setting value of trigger torque

* Accuracy for the trigger torque set below the minimum torque value can't be guaranteed

5 Operation examples

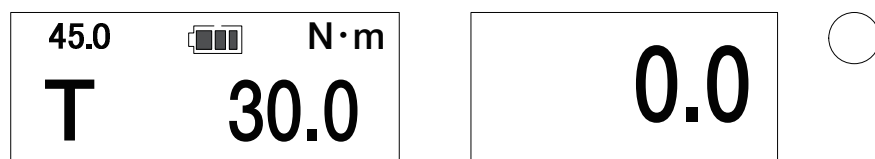
5.1. Tightening mode operation: For BTA settings

Shows example on the following settings:

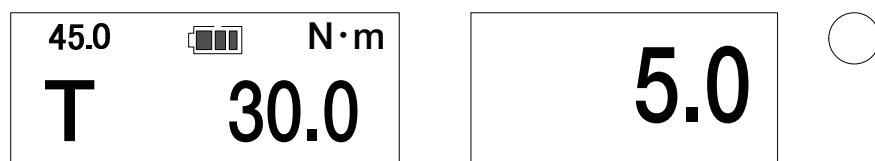
CEm3	Model setting	BTA
Ang	Angle setting	ON
SEL	Measurement mode setting	MODE-T
Lo	Lower limit torque setting	30N·m
HI	Higher limit torque setting	45N·m
trg	Trigger torque setting	5N·m
A_dt	Double tightening detection angle setting	5 deg
A_Lo	Lower limit angle setting	10 deg
A_HI	Higher limit angle setting	50 deg
Ar	Auto reset timer setting	0.5
ng_s	NG output setting	MAN
Fmt	Output format setting	DF-3

*Set both the angle setting and trigger torque setting to measure the angle.

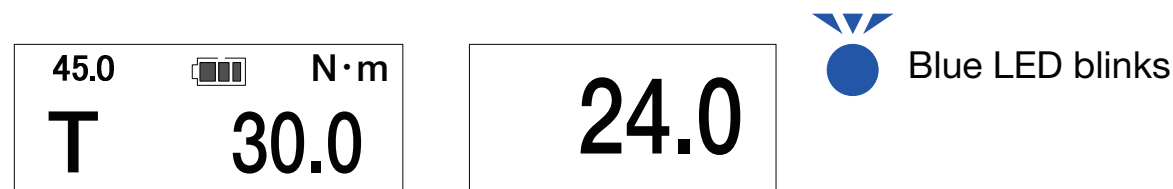
i. Set to Peak mode (counter between "001" to "999") and start measurement.



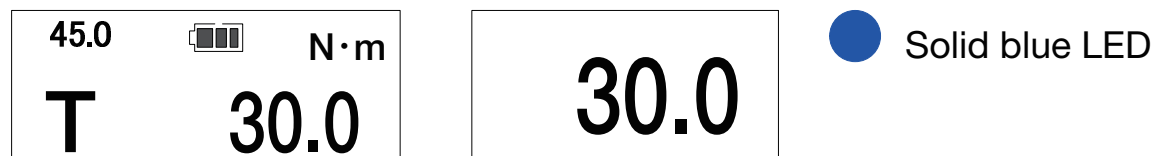
ii. When torque load reaches on trigger torque, starts the angle measurement.



iii. When the tightening torque reaches to the 80% of lower limit torque, the tool beeps intermittently while blue LED blinks to inform operator that the lower limit torque is approaching.



iv. When it reaches to the lower limit torque, continuous beep sound and solid blue LED inform the completion of tightening.



v. After release the torque load, the tool judges the measured data due to Auto reset timer setting. (If Auto reset timer is off, press "MEM" key to judge the result)

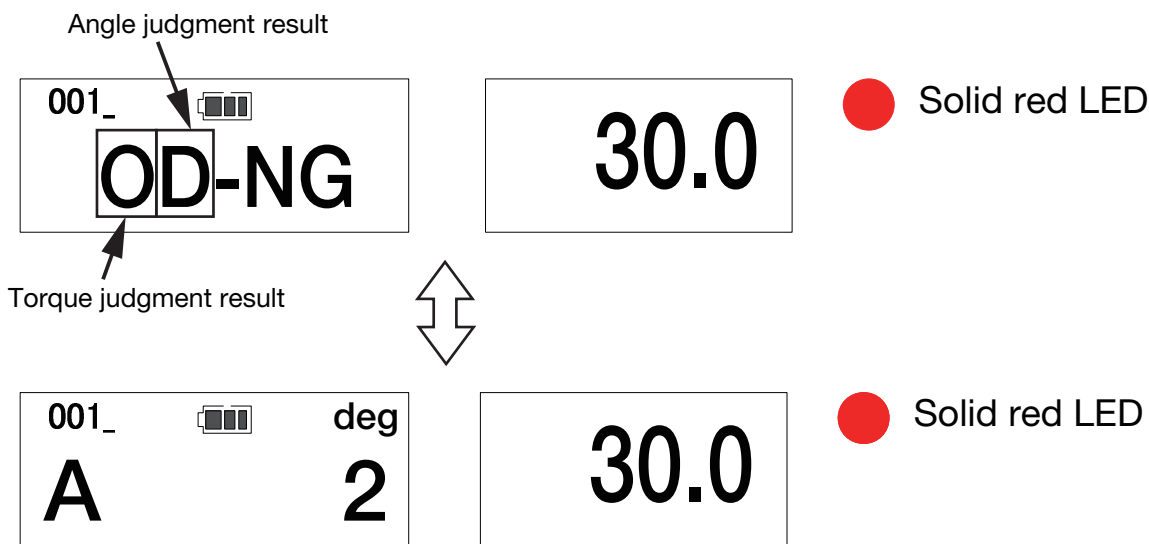
[When judgment is OK]

The blue LED turns on and the tool outputs the measured data to external device.

If the Output format is set to “DF-3”, it outputs the torque and angle data.

[When judgment is NG]

- If you select “AUTO” in NG setting, solid red LED inform NG result for one second and all measured data are automatically sent to external device.
- If you select “MAN”, the left display shows NG judgment result and measured angle repeated alternatively each 1 second. About NG judgment result, refer the "1.2. Judgment features".



vi. The tool saves data, send a counter to the next and reset the measured data.

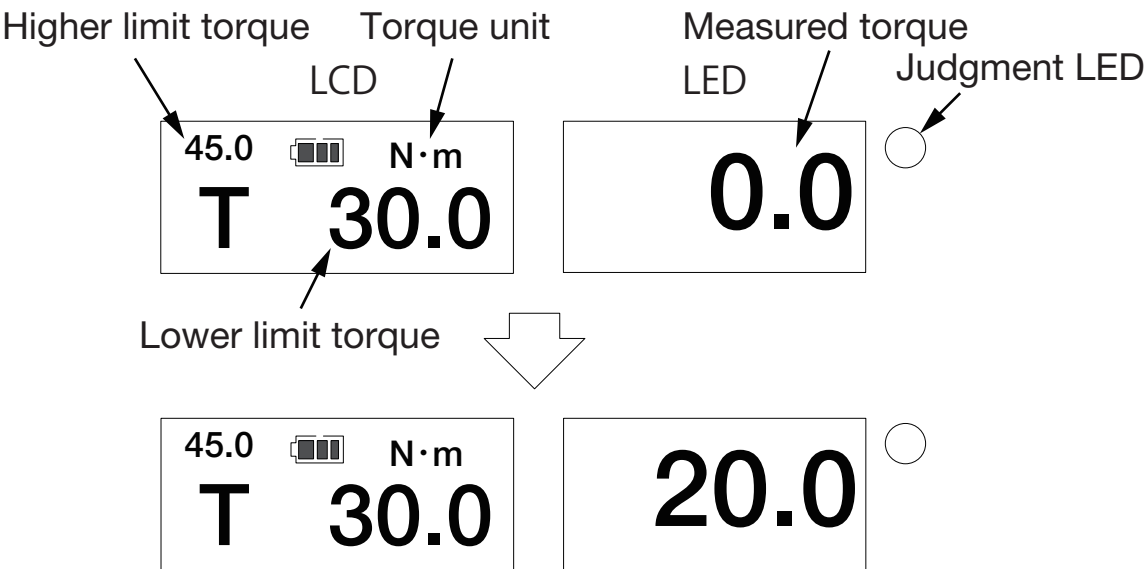


5.2. Tightening mode operation: For BTD settings

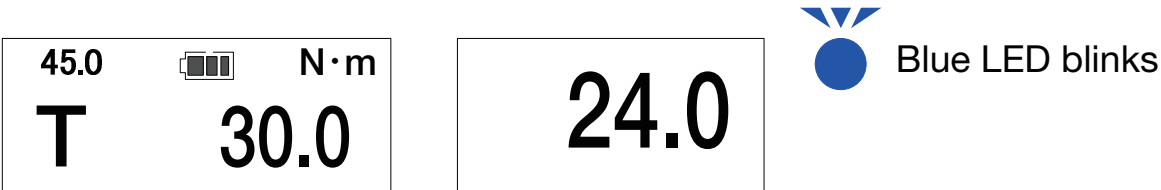
Shows example on the following settings:

CEm3	Model setting	BTD
SEL	Measurement mode setting	MODE-T
Lo	Lower limit torque setting	30N·m
Hi	Higher limit torque setting	45N·m
Ar	Auto reset timer setting	0.5
ng_s	NG output setting	MAN
Fmt	Output format setting	DF-3

i. Set to Peak mode (counter between "001" to "999") and start measurement.



ii. When the tightening torque reaches to the 80% of lower limit torque, the tool beeps intermittently while blue LED blinks to inform operator that the lower limit torque is approaching.



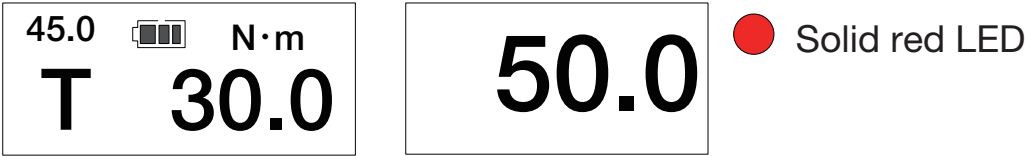
iii. When it reaches to the lower limit torque, continuous beep sound and solid blue LED inform the completion of tightening.

【OK】

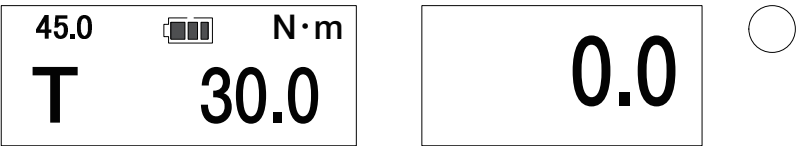


vi. Press key to send measured data to external device. If auto reset timer is on, measured data is automatically sent. If the judgment result is NG, red LED turns on. Press key to send the NG data, or press key to clear data. If you select "AUTO" in NG send setting, all measured data including NG results are automatically sent to external device.

【NG】



v. Peak torque will be reset.



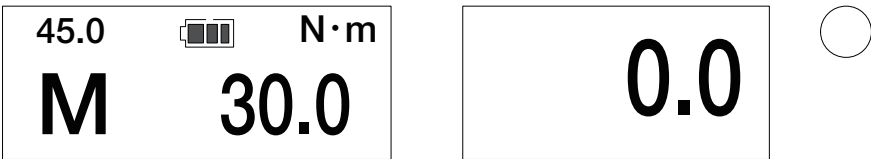
5.3. Inspection mode operation: For BTA settings

Shows example on the following settings:

CEm3	Model setting	BTA
Ang	Angle setting	ON
SEL	Measurement mode setting	MODE-M
Lo	Lower limit torque setting	30N·m
HI	Higher limit torque setting	45N·m
trg	Trigger torque setting	5N·m
A_dt	Double tightening detection angle setting	0 deg
A_Lo	Lower limit angle setting	10 deg
A_HI	Higher limit angle setting	50 deg
Ar	Auto reset timer setting	0.5
ng_s	NG output setting	MAN
Fmt	Output format setting	DF-3

*Set both the angle setting and trigger torque setting to measure the angle.

i. Set to Peak mode (counter between "001" to "999") and start measurement.



ii. When torque load reaches on trigger torque, starts the angle measurement.



- iii. After measure and release the torque load, the tool judges the measured data due to Auto reset timer setting. (If Auto reset timer is off, press "MEM" key to judge the result)

【When judgment is OK】

The blue LED turns on and the tool outputs the measured data to external device.

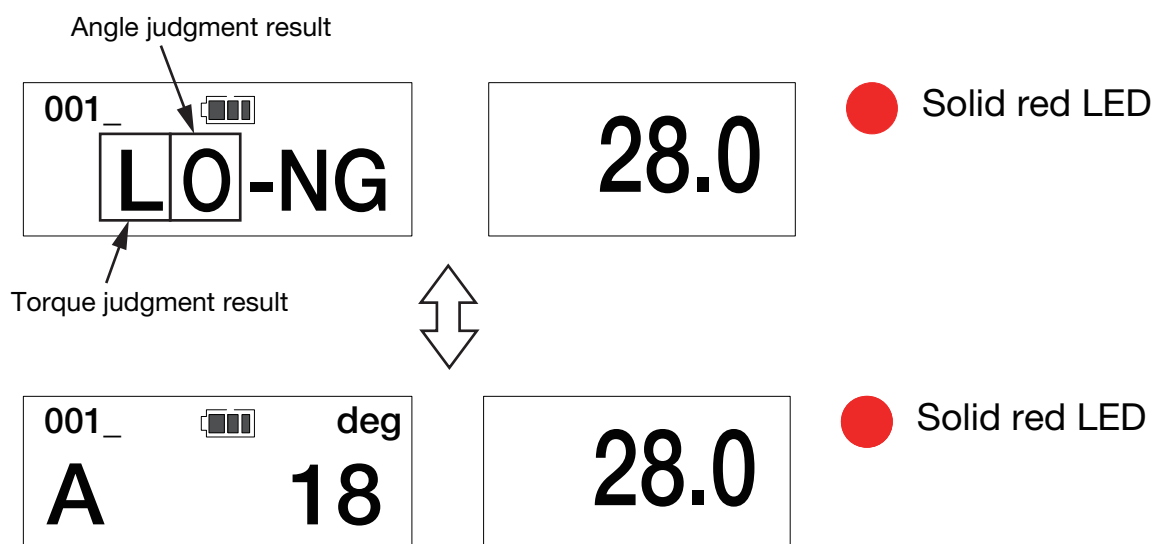
If the Output format is set to "DF-3", it outputs the torque and angle data.



【When judgment is NG】

- If you select "AUTO" in NG setting, solid red LED inform NG result for 1 second and all measured data are automatically sent to external device.
- If you select "MAN", the red LED turns on and buzzer sounds continuously, the left display shows the NG judgment result and measured angle repeated alternatively each 1 second. About NG judgment result, refer the "1.2. Judgment features".

Press "MEM" key to save and output the data, or press "C" key to clear.



- iv. The tool saves data, send a counter to the next.

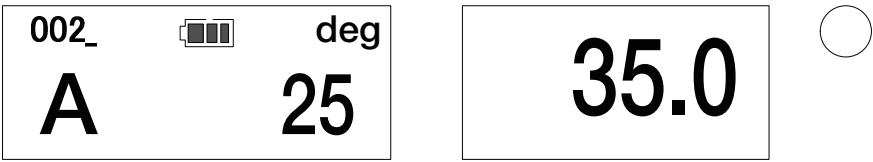
【When judgment is OK or use Auto reset】

The counter goes to next and reset the measured data automatically.



【When judgment is NG and use “MEM” key to save the data】

The counter goes to next and display shows the memory data on that counter if there is data.

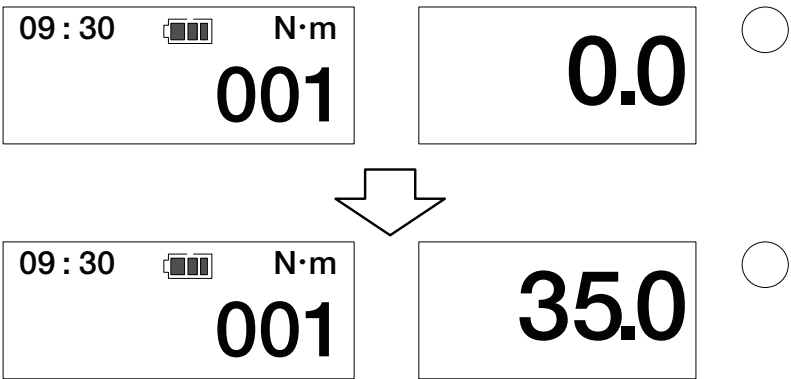


5.4. Inspection mode operation: For BTS settings

Shows example on the following settings:

CEm3	Model setting	BTS
SEL	Measurement mode setting	MODE-M
Lo	Lower limit torque setting	30N•m
HI	Higher limit torque setting	45N•m
Ar	Auto reset timer setting	0
ng_s	NG output setting	MAN
Fmt	Output format setting	DF-3

i. Set to Peak mode (counter between "001" to "999") and start measurement.



ii. After measurement, pressing the MEM key will determine whether the measurement was successful. (If the auto-reset timer is enabled, the determination will be automatic.)

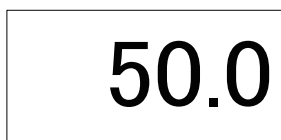
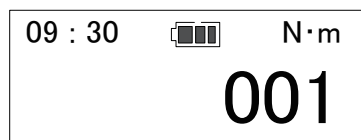
【OK】

When the measurement is successful, the blue LED will light up for approximately 0.5 seconds, and the measurement data will be sent to the external device.



【NG】

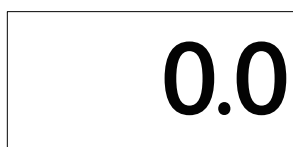
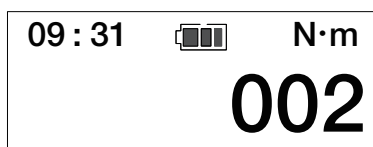
If the test is NG, the red LED will light up and the buzzer will continue to sound. To send the measurement data as is, press the MEM key, or to clear the measurement data, press the "C" key. If the NG transmission setting is set to "AUTO", the measurement data will be automatically sent to the externally connected device after the judgment is made, just as if the test was passed, even if the test was NG.



Solid red LED

iii. The peak torque value will be reset and counted up.

*If there is previously stored measurement data in counter 002 data, that data will be displayed. If you apply a load again and the displayed torque is exceeded, the peak value will be updated. (If the auto-reset timer is activated, counter 002 will be automatically reset even if there is previously stored measurement data.)



6

External Output Specifications

6.1. USB communication specifications

Baud rate	Select from 2400, 4800, 9600, or 19200 bps
Parity	None
Data length	8 bit
Stop bit	1 bit
Flow control	Hardware (RTS/CTS)

*If you use USB (USB connector compatible serial output), please use the separately sold connection cord "CEM3 ⇄ PC (USB A type) Catalog No. 584." To use this, you will need to install a driver on your PC, which can be downloaded from the TOHNICHI website.

6.2. Bluetooth® communication specifications

Bluetooth® version		V5.0
Modulation system		GFSK
Wireless output		8dBm
Transmission power class		Class 1
Profile	Classic	SPP *1
	BLE	GATT custom profile *2
Communication distance		Approx. 10m expected *3

*1. SPP

This is a profile for serial communication in the Bluetooth Classic standard. CEM3 operates as a slave and is recognized as a COM port by the PC. It is primarily used for communication with Windows® PC.

*2. GATT custom profile

In the BLE (Bluetooth Low Energy) profile, CEM3 operates as a peripheral, enabling data transmission and reception via a separate application. This is used to communicate with iPad® and Windows® PC.

UUID

Service :55DF0001-A9B0-11E3-A5E2-000190F08F1E

Receive characteristic :55DF0003-A9B0-11E3-A5E2-000190F08F1E

Transmit characteristic :55DF0002-A9B0-11E3-A5E2-000190F08F1E

*3. The communication distance varies depending on the radio wave environment and the performance of the connected device.

*4. Depending on the device you are using, you may be asked to enter a pairing code (PIN). If so, enter "1234".

*5. The baud rate, data length, stop bit, and parity all depend on the host device.

- Bluetooth® is a registered trademark of Bluetooth SIG, Inc.
- Windows® is a registered trademark or trademark of Microsoft Corporation in the United States and/or other countries.
- iPad® is a trademark of Apple Inc., registered in the U.S. and other countries.

6.3. Bluetooth® pairing method

For instructions on how to pair with a Bluetooth® device, please refer to the instruction manual for the host device. This section explains how to pair using Windows® 11.

- Set the CEM3-BT's data output setting to "BC" or "BLE" and confirm that the CEM3-BT's Bluetooth® connection status indicator is flashing.
- When you search for Bluetooth® devices from your Windows® PC, the device name will be displayed as shown below. Proceed with pairing. (□□□□□□□ is the CEM3-BT's serial number.)

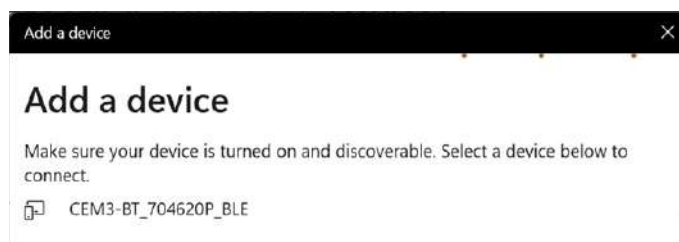
• Data output setting "bC"

Device name: CEM3-G-BT_□□□□□□□_BC



• Data output setting "bLE"

Device name: CEM3-G-BT_□□□□□□□_BLE



- When you connect from the application software on your Windows® PC, the connection will be displayed in Windows® 11, and the STATUS LED on the CEM3-BT will light up.

*The method for connecting devices will vary depending on the application software you are using, so please refer to the application software's instruction manual.

6.4. Communication format

- When set "DF-3" for communication format setting.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
R	E	,	0	0	1	,	+	1	0	0	.	0	,	n	m				,	+	0	9	0	,	d	e	g	,	O	O	,
Header		3 digits counter				torque with decimal point							Unit of torque					Angle				Unit of angle				Judgment result					

33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
1	2	3	4	5	6	A	,	1	8	/	1	2	/	3	1	,	1	2	:	5	9	:	5	9	CR	LF
7 digits ID							Date (yy/mm/dd)										Time (hh/mm/ss)					Delimiter				

*The "7 digits ID" can be changed by the command from external device.
(Default: Serial number of CEM3-G-BT)

- When set "DF-1" for communication format setting.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
R	E	,	9	9	9	,	1	0	0	.	0	,	1	8	/	1	2	/	3	1	,	1	2	:	5	9	:	5	9	CR	LF
Header		3 digits counter				torque with decimal point							Date (vv/mm/dd)										Time (hh/mm/ss)					Delimiter			

*If the communication mode is set to "BLE", the communication format will be "DF-3".

*In the case of BTd setting, the memory counter is fixed to "001".

6.5. Input commands

The settings can be changed from external if send the commands. The tool has to be no torque loaded when changing the setting. When send more than 2 commands continuously put the interval more than 200 [ms]. The tool respond external device the response command after process the action.

i. Command List

Input command	Action/ Discription	Note
AT008,**	Registers the measurement unit. If registration is not possible due to the model, an error will be returned.	N·m : 06, kgf·cm : 02, kgf·m : 03, lbf·in : 08, lbf·ft : 09
AT037,****,****	The upper and lower limit torques are registered at the same time. "*" indicates a 5-digit torque value including a decimal point. The upper limit torque and the lower limit torque are sent in that order.	Please send a value that is within the measurement range and the upper limit torque is equal to or greater than the lower limit torque (0 can be set).
AT045,****	Registers the trigger torque. "*" indicates a 5-digit torque value including a decimal point. *Only valid for BTA settings.	Please send a torque value between 5% of the maximum torque and the maximum torque. (0 is a setting.) *Please manually turn on the angle function before sending.
AT046,***,***,***	Register the double tightening judgment angle, lower limit angle, and upper limit angle. The data will be sent in the order of double tightening judgment angle, lower limit angle, and upper limit angle. The * indicates a three-digit angle value between 000 and 999. *Only valid for BTA settings.	• Double-Tightening Criterion Angle: Cannot be set when the measurement mode is "MODE-M." If you want to change only the lower and upper limit angles in "MODE-M," send "000" for the double-tightening judgment angle. • Lower Limit Angle Send a value equal to or greater than the double-tightening judgment angle. (000 is configurable.) • Upper Limit Angle Send a value equal to or greater than the lower limit angle and the double-tightening judgment angle. (000 is configurable.) *The angle threshold cannot be set unless the trigger torque is set.
AT023,*****	Register a 7-digit alphanumeric string. The * part consists of uppercase letters and 7 digits. The registered text will be added to the measurement data. *If the default settings are made using the keys on the main unit, the 7-digit alphanumeric string set with this command will be initialized to the serial number.	

Response command	Discription
RE003,OK	Received successfully
RE004,ERROR	Received error, settings error
E10	Received error, commands error (Missing the "AT" on the top of command)

*All commands are in ASCII code.

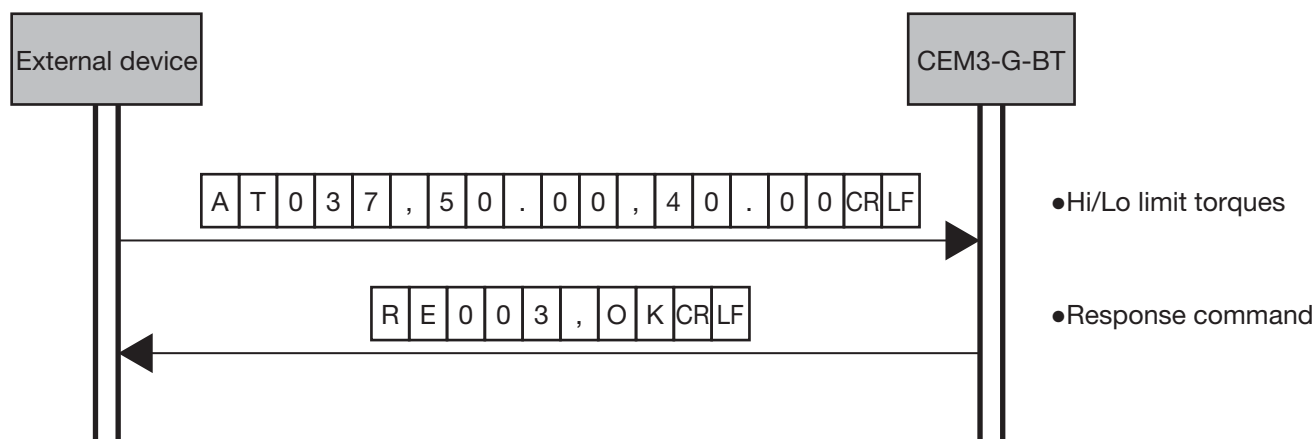
*Please add CRLF to the end of the command.

*The CEM3-BT also supports the (upper and lower torque limit) setting commands of the CEM3-BTD model.

Once the setting command has been received, it will reply with "E00CRLF", just like the CEM3-BTD.

6.6. Example of communication

- When set to the 50.00 for Higher and 40.00 for lower limit torques



* Adjust the decimal point depend on the model and unit of measure.

Example 1) Set to 20 Nm for higher and 15 Nm for lower limit for CEM20N3X10D-G-BT

Send a command the “AT037,20.00,15.00CR LF”

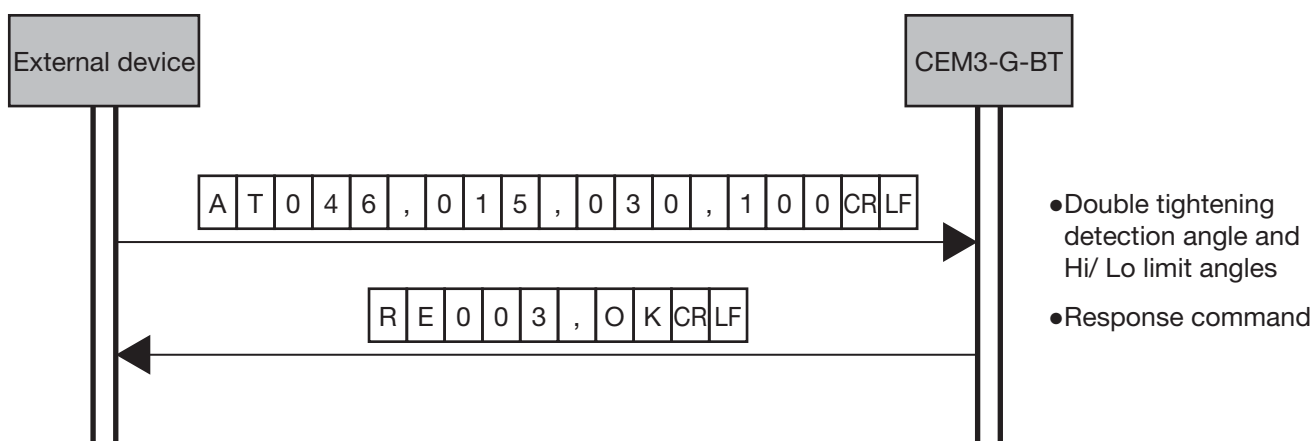
Example 2) Set to 90 Nm for higher, 80 Nm for lower limit for CEM100N3X15D-G-BT

Send a command the “AT037,090.0,080.0CR LF”

Example 3) Set to 600 Nm for higher, 500 Nm for lower limit for CEM850N3X32D-G-BT

Send a command the “AT037,0600.,0500.CR LF”

- When set to the 15 degrees for double tightening detection, 30 degrees for lower and 100 degrees for higher limit angles: For BTA settings



7 Various settings

7.1. Setting items

Setting items	Display	Default	Selectable from	Note
Model	CEm3	BTA	BTA/ BTS/ BTd	
Angle feature	Ang	OFF	OFF/ ON	For BTA settings
Measurement mode	SEL	MODE-M	MODE-M/ MODE-T	
Unit of torque	USEL	N·m	N·m/ kgf·cm/ kgf·m/ lbf·in/ lbf·ft	
Lower limit torque	Lo	0	0 ~ Maximum capacity	
Higher limit torque	HI	0	0 ~ Maximum capacity	More than lower limit torque
Trigger torque	trg	0	0 ~ Maximum capacity	When the angle function is ON in the BTA setting
Double tightening detection angle	A_dt	0	0 ~ 999	Enable when set on the "MODE-T" and trigger torque
Lower limit angle	A_Lo	0	0 ~ 999	Enable when set on the trigger torque. More than double tightening detection angle. (0 can be set)
Higher limit angle	A_HI	0	0 ~ 999	Enable when set on the trigger torque. More than double tightening detection angle and lower limit angle. (0 can be set)
Tightening direction	dlr	CW	CW/ CCW/ BOTH	
Auto reset timer	Ar	0.0	0.0/ 0.1 ~ 5.0	
NG data processing	ng_S	MAN	MAN/ AUTO	
Buzzer	bU	ON	ON/ OFF	
Auto power off	PoFF	3MIN	3MIN/ 10MIN/ 30MIN/ NONE	
Communication mode	dout	BC	BC/ BLE/ PC	
Baud rate	bPS	9600	2400/ 4800/ 9600/ 19200	For "PC" communication mode
Data length	dLEn	8bit	7bit/ 8bit	For "PC" communication mode
Parity	Prty	NONE	NONE/ ODD/ EVEN	For "PC" communication mode
Communication format	Fmt	DF-1	DF-1/ DF-3	
Default setting	dFLt	NO	NO/ YES	
Time	tImE	—	—	
Date	dAtE	—	—	

*The default operation does not initialize the model.

*The clock and date will not be initialized even if you perform the default operation.

*When using the default settings for BTd, the measurement mode will be "MODE-T" and the auto-reset timer will be "0.5".

7.2. Setting method using keys

Press the counter forward/counter backward key to set the counter value to "000" and enter run measurement. During run measurement, press the MD key for 2 seconds or more to display the setting screen.

●Model Selection Screen

Select a model.

BTA: CEM3-BTA compatible. BTS: CEM3-BTS compatible. BTM: CEM3-BTM compatible.

If you are using the CEM3-BTA, CEM3-BTS, or CEM3-BTM, select the appropriate compatible model.



Use the Counter Forward/ Counter Backward keys to select, then press the MEM key to display the data clear confirmation screen. Press the MEM key again to clear the measurement data, switch the model, and proceed to the next step. Press the MD key to proceed without saving the data, and press the Clear key to return to the run measurement display.

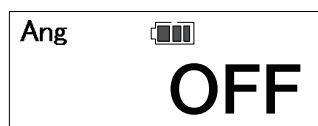
* When you switch models, other settings will return to their factory settings.

●Angle Function Setting (Default: OFF, For BTA settings)

Turns the angle function ON/OFF.

【When the angle function is ON】

- Angular velocity checks are performed at reset, power-on, and when exiting setting mode if the angle function setting is changed from OFF to ON. (See 4. Various Functions, 4.3 and 4.4.)
- The LCD display in run mode is now in degrees.
- Trigger torque can be set.



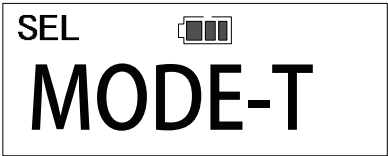
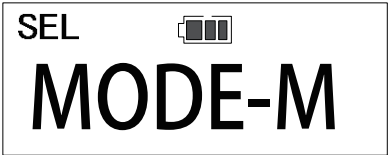
* When OFF, trigger torque setting is skipped (trigger torque setting is not possible). When OFF, the trigger torque, double tightening judgment angle, lower limit angle, and upper limit angle settings are automatically set to "0."

Use the counter forward/backward keys to make your selection, and the MEM key to save and proceed to the next step.

Press the MD key to proceed without saving, or the clear key to return to the run measurement display.

●Measurement mode setting (Default: MODE-M, BTd setting: MODE-T)

Sets MODE-M (inspection mode) or MODE-T (tightening mode).



Use the counter forward/backward keys to select, and the MEM key to save and move on to the next step. Press the MD key to move on without saving, and press the Clear key to return to the run measurement display.

●Measurement unit setting (Default: N·m)

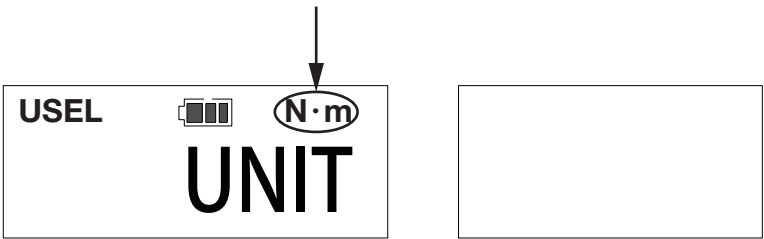
Select the torque unit (N·m / kgf·cm / kgf·m / lbf·in / lbf·ft).

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

Use the counter forward/backward keys to select the torque unit and press MEN key to save and proceed to the next.

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

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



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 [N·m] x 0.73756 = 73.756 ≈ 73.8 [lbf·ft]

73.8 [lbf·ft] ÷ 0.73756 = 100.05 ≈ 100.1 [N·m]

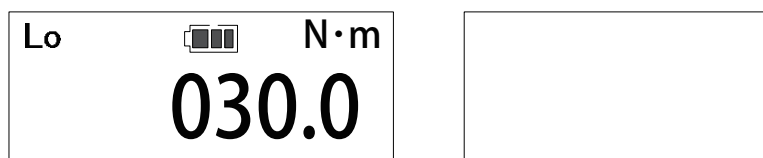
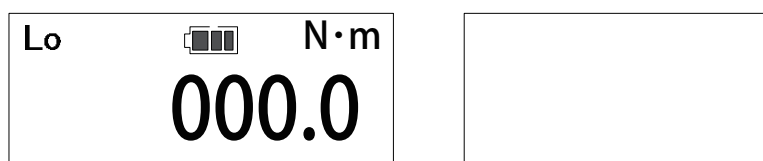
*Converted figures are rounded as above.

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.

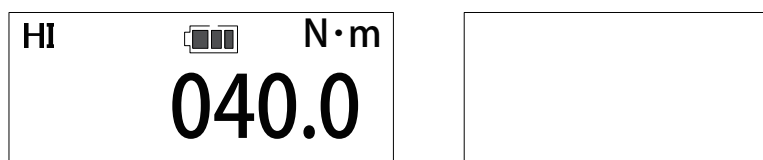
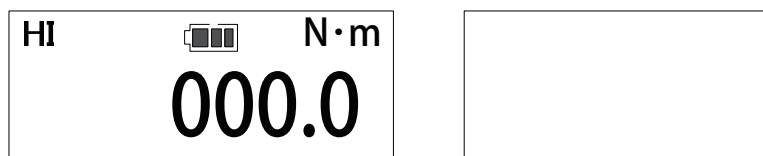
● Lower limit torque setting (Default: 0)



* If the value is outside the setting range, "SETERR" will be displayed.

Use the counter forward/backward keys to select a digit, the counter return key to adjust the value, and the MEM key to store the value and proceed to the next step. Press the MD key to proceed to the next step without storing the value, or press the clear key to return to the run measurement display.

● Upper limit torque setting (Default: 0)



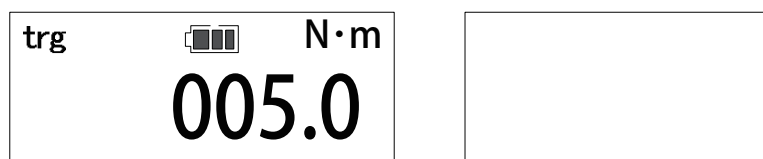
* If the set value is lower than the lower limit torque value or is outside the setting range, "SETERR" will be displayed.

Use the counter forward/backward keys to select the digit, the counter return key to adjust the value, and the MEM key to store the value and proceed to the next step. Press the MD key to proceed to the next step without storing the value, or press the clear key to return to the run measurement display.

●Trigger torque setting (Default: 0, For BTA setting)

Sets the trigger torque. This is the starting torque for angle measurement.

Cannot be set if the angle function setting is OFF.



* If the value is outside the setting range, "SETERR" will be displayed.

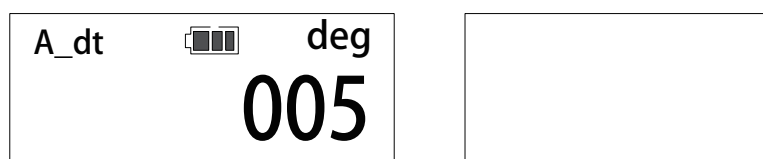
* If trigger torque is not set (set to 0), set the double tightening judgment angle, lower limit angle, and upper limit angle to zero and proceed to tightening direction setting.

* If trigger torque is set, proceed to the second tightening judgment angle setting if the measurement mode is set to MODE-T, or to the lower limit angle setting if the measurement mode is set to MODE-M.

Use the counter forward/backward keys to select the digit, the counter return key to adjust the value, and the MEM key to store the value and proceed to the next step. Press the MD key to proceed to the next step without storing the value, or press the clear key to return to the run measurement display.

●Double tightening judgment angle setting (Default: 0, For BTA setting)

Set the angle that will be the pass/fail criteria for double tightening.



* If the measurement mode is MODE-M, this cannot be set.

Use the counter forward/backward keys to select the digit, the counter return key to adjust the value, and the MEM key to store the value and proceed to the next step. Press the MD key to proceed to the next step without storing the value, or press the clear key to return to the run measurement display.

●Lower limit angle setting (Default: 0, For BTA setting)

Set the lower limit angle from the angle starting point.



* If the set value is lower than the double tightening judgment angle, "SETERR" will be displayed.

Use the counter forward/backward keys to select the digit, the counter return key to adjust the value, and the MEM key to store the value and proceed to the next step. Press the MD key to proceed to the next step without storing the value, or press the clear key to return to the run measurement display.

●Upper limit angle setting (Default: 0, For BTA setting)

Set the upper limit angle from the angle starting point.

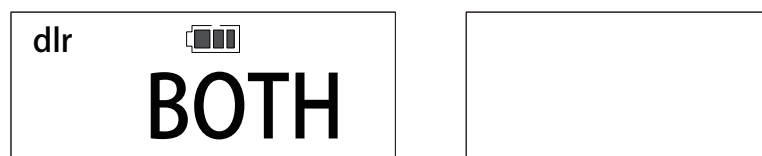


* If the set value is lower than the double tightening judgment angle or the lower limit angle, "SETERR" will be displayed.

Use the counter forward/backward keys to select the digit, the counter return key to adjust the value, and the MEM key to store the value and proceed to the next step. Press the MD key to proceed to the next step without storing the value, or press the clear key to return to the run measurement display.

●Tightening direction setting (Default: CW)

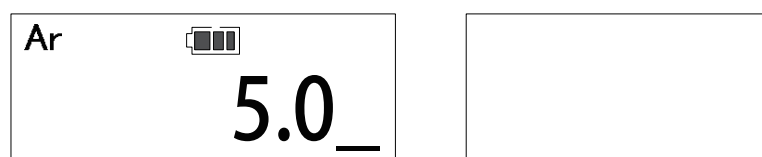
Set the tightening direction to CW (right), CCW (left) or BOTH (both directions).



Use the counter forward/backward keys to select the digit, the counter return key to adjust the value, and the MEM key to store the value and proceed to the next step. Press the MD key to proceed to the next step without storing the value, or press the clear key to return to the run measurement display.

●Auto memory reset timer setting (Default: 0.0, BTD setting: 0.5)

Set the auto memory reset timer. If no setting is required, set this to 0.0.



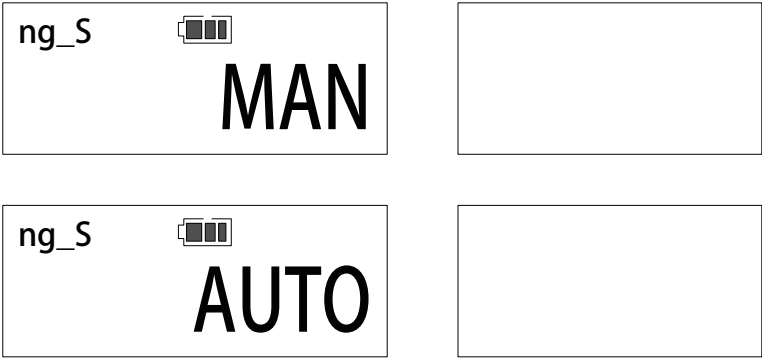
Auto reset timer setting time

0.0 ⇔ 0.1 ⇔ 0.2 ⇔ 0.3 ⇔ 0.4 ⇔ 0.5 ⇔ 1.0 ⇔ 2.0 ⇔ 3.0 ⇔ 4.0 ⇔ 5.0 sec.

Use the counter forward/backward keys to select the digit, the counter return key to adjust the value, and the MEM key to store the value and proceed to the next step. Press the MD key to proceed to the next step without storing the value, or press the clear key to return to the run measurement display.

●NG processing setting (Default: MAN)

Select MAN (manual transmission) or AUTO (automatic transmission).



NG processing setting

- MAN (Manual Transmission)

The auto-reset function will not function if the pass/fail result is NG. To transmit measurement data, press the MEM key.

- AUTO (Automatic Transmission)

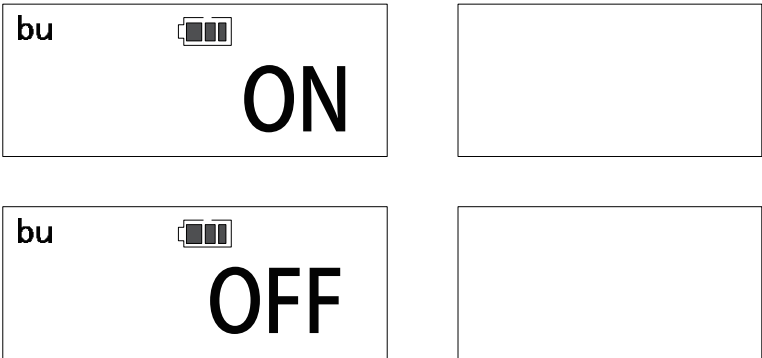
Even if the pass/fail result is NG, measurement data will be transmitted after the auto-reset timer has elapsed.

Use the counter forward/backward keys to select the digit, the counter return key to adjust the value, and the MEM key to store the value and proceed to the next step. Press the MD key to proceed to the next step without storing the value, or press the clear key to return to the run measurement display.

●Buzzer sound setting (Default: ON)

Set whether or not the buzzer sounds when a key is pressed.

However, the buzzer that sounds when tightening is complete cannot be turned off.



Use the counter forward/backward keys to select the digit, the counter return key to adjust the value, and the MEM key to store the value and proceed to the next step. Press the MD key to proceed to the next step without storing the value, or press the clear key to return to the run measurement display.

●Auto power off timer setting (Default: 3 MIN)

Set the auto power-off time.

(3MIN: 3 minutes / 10MIN: 10 minutes / 30MIN: 30 minutes / NONE: None)

The power will automatically turn off if there is no key operation or torque load for the set time.

The Bluetooth® module will not turn off. If you select NONE, the power will not turn off until you turn it off with the POWER switch or the battery is depleted.

PoFF  3MIN	
PoFF  10MIN	
PoFF  30MIN	
PoFF  NONE	

Use the counter forward/backward keys to select the digit, the counter return key to adjust the value, and the MEM key to store the value and proceed to the next step. Press the MD key to proceed to the next step without storing the value, or press the clear key to return to the run measurement display.

●External output communication mode setting (Default: BC)

Select the external output format.

(BC: Bluetooth® Classic (SPP) / BLE: BLE (GATT proprietary profile) / PC: PC output)

dOut  BC	
dOut  BLE	
dOut  PC	

When set to "BC" or "BLE", wired communication is not possible.

- * If BC is selected, proceed to communication format setting.
- * If BLE is selected, proceed to setting value default screen.
- * If PC is selected, proceed to baud rate setting.

Use the counter forward/backward keys to select the digit, the counter return key to adjust the value, and the MEM key to store the value and proceed to the next step. Press the MD key to proceed to the next step without storing the value, or press the clear key to return to the run measurement display.

●External output baud rate setting (Default: 9600 bps)

Set the communication baud rate for external output. (2400bps/4800bps/9600bps/19200bps)

- * When outputting data to a PC, please match the setting to the PC software.

bPS  2400	
bPS  4800	
bPS  9600	
bPS  19200	

Use the counter forward/backward keys to select the digit, the counter return key to adjust the value, and the MEM key to store the value and proceed to the next step. Press the MD key to proceed to the next step without storing the value, or press the clear key to return to the run measurement display.

●External output data length setting (Default: 8 bit)

Sets the communication data length for external output (7 bit/8 bit).

* When outputting data to a PC, please match this to the PC software.

dLEn  7 BIT	
--	--

dLEn  8 BIT	
--	--

Use the counter forward/backward keys to select the digit, the counter return key to adjust the value, and the MEM key to store the value and proceed to the next step. Press the MD key to proceed to the next step without storing the value, or press the clear key to return to the run measurement display.

●External output parity setting (Default: NONE)

Sets the communication parity for external output.

(EVEN: even number/ ODD: odd number/ NONE: none)

* When outputting data to a PC, please match it with the software on the PC.

Prty  NONE	
---	--

Prty  ODD	
--	--

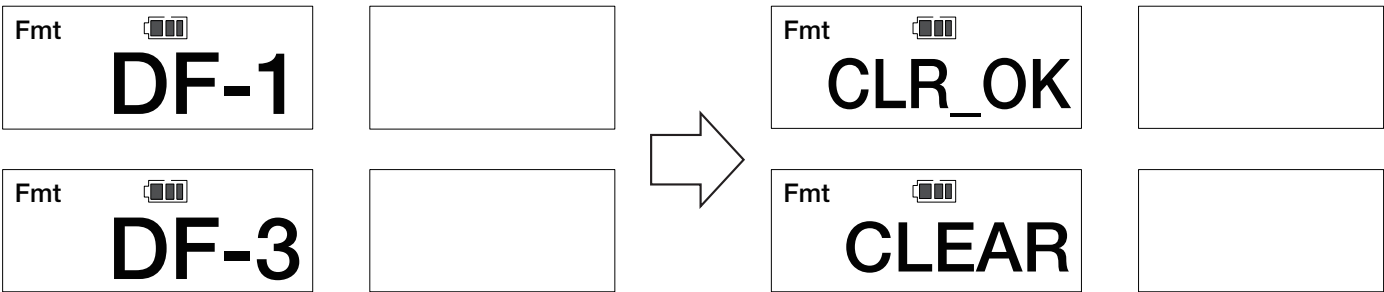
Prty  EVEN	
---	--

Use the counter forward/backward keys to select the digit, the counter return key to adjust the value, and the MEM key to store the value and proceed to the next step. Press the MD key to proceed to the next step without storing the value, or press the clear key to return to the run measurement display.

●Communication format setting (Default: DF-1)

Change the communication format. For details, refer to "6-4. Communication format."

(DF-1: CEM3 format / DF-3: Tohnichi standard format)

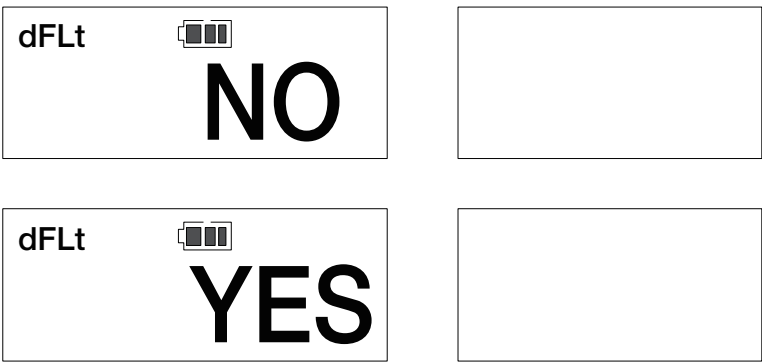


* When you switch the communication format, all the measurement data stored in memory will be cleared.

Use the counter forward/backward keys to select the digit, the counter return key to adjust the value, and the MEM key to store the value and proceed to the next step. Press the MD key to proceed to the next step without storing the value, or press the clear key to return to the run measurement display.

●Setting value default

Resets all settings except for the clock, date, and model to their factory settings.



Select YES with the counter forward/backward key and press the MEM key to return all settings to their factory defaults. If you press the MEM key or MD key when in NO mode, you will proceed to the next step without changing the defaults, and if you press the Clear key, you will return to the run measurement display.

- Clock and date setting

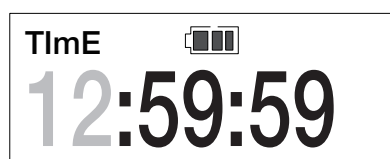


Use the counter forward/backward keys to switch between time and date.

Press the MEM key to set the clock.

Press the MD key or clear key to return to the run measurement display.

- Clock (time) setting



Use the counter forward/backward keys to select the digit, the counter return key to adjust the value, and the MEM key to store the value and proceed to the next step. Press the MD key to proceed to the next step without storing the value, or press the clear key to return to the run measurement display.

- Clock (minutes) setting



Use the counter forward/backward keys to select the digit, the counter return key to adjust the value, and the MEM key to store the value and proceed to the next step. Press the MD key to proceed to the next step without storing the value, or press the clear key to return to the run measurement display.

- Clock (seconds) setting



Pressing the MEM key will reset the time to 00 seconds and start the clock.

Pressing the MD key will move on to the next step without saving the data, and pressing the Clear key will return to the run measurement display.

- Clock display



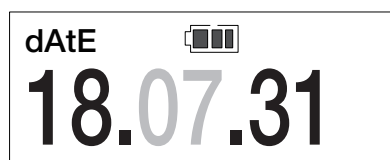
Pressing the MD key will move on to the next step without saving the data, and pressing the Clear key will return to the run measurement display.

- Setting the date (year)



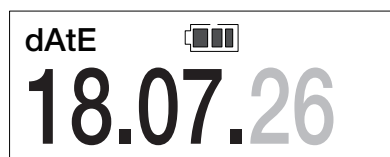
Use the counter forward/backward keys to select the digit, the counter return key to adjust the value, and the MEM key to store the value and proceed to the next step. Press the MD key to proceed to the next step without storing the value, or press the clear key to return to the run measurement display.

- Setting the date (month)



Use the counter forward/backward keys to select the digit, the counter return key to adjust the value, and the MEM key to store the value and proceed to the next step. Press the MD key to proceed to the next step without storing the value, or press the clear key to return to the run measurement display.

- Setting the date (day)



Pressing the MEM key will reset the time to 00 seconds and start the clock.

Pressing the MD key will move on to the next step without saving the data, and pressing the Clear key will return to the run measurement display.

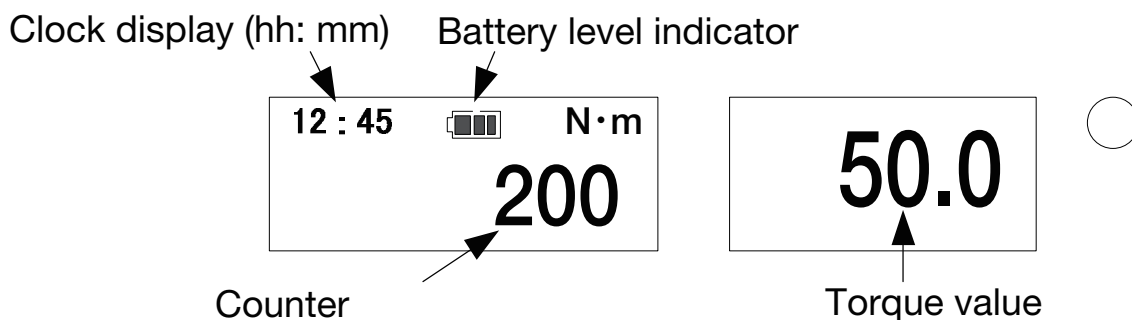
8

How to output all measurement data at once and clear memory

8.1. Batch output of measurement data (For BTA and BTS settings)

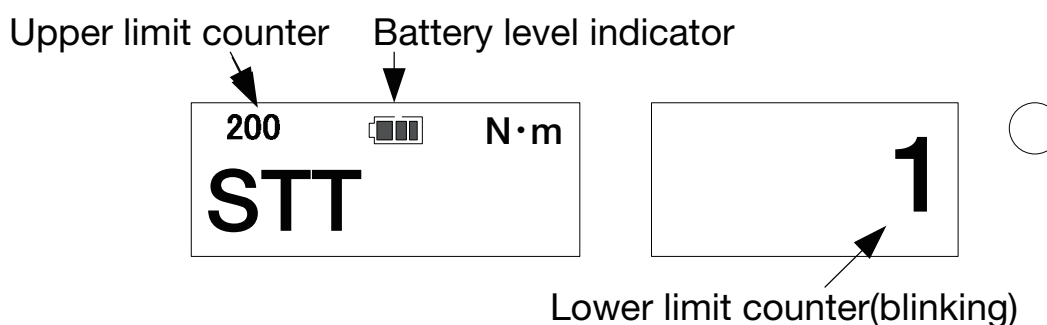
Outputs all data to an external device in the format set in the communication format settings.

- i. Use the counter forward/backward keys to set the counter to the upper limit of the data range you want to output.



- ii. Press the MD key.

- iii. Use the counter forward/backward keys to set the counter to the lower limit of the data range you want to output.



Example 1) To output data between 001 and 200:

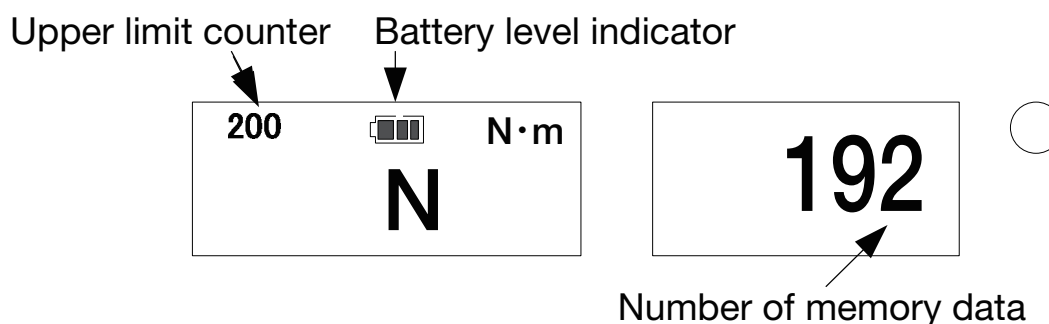
Set the counter to 200, press the MD key, and set STT to 1.

Example 2) To output data between 101 and 200:

Set the counter to 200, press the MD key, and set STT to 101.

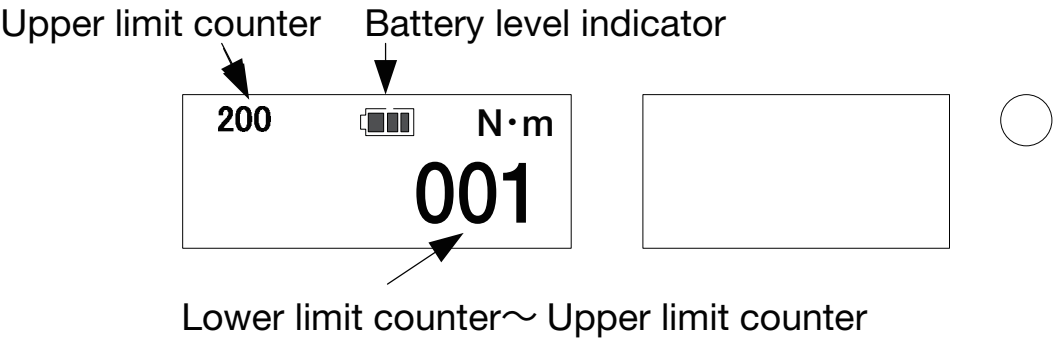
- iv. After setting the lower limit counter, press the MD key. To return to the measurement screen, press the Clear key.

Memory data count display



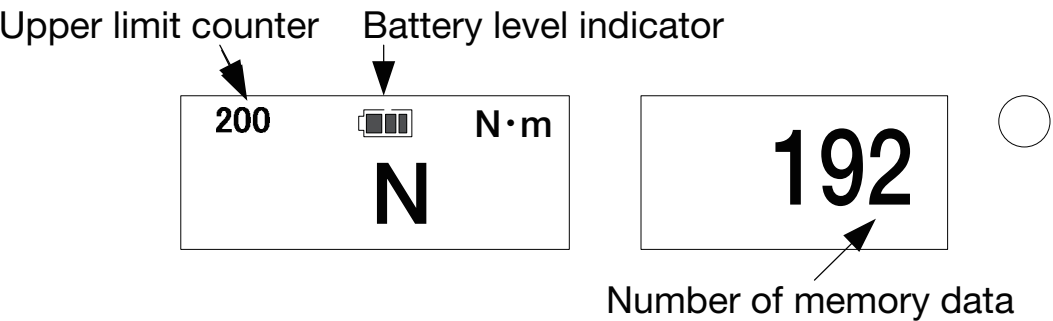
- v. Pressing the MEM key will output all the measurement data from the lower limit counter to the upper limit counter all at once. To return to the measurement screen, press the CLEAR key.

If an external device is connected, the LED will turn off during data output and the LCD will continuously display the lower limit counter to the upper limit counter.



* To stop data output, press the C key. During data output, no other operations can be performed except with the C key.

Transfer completed

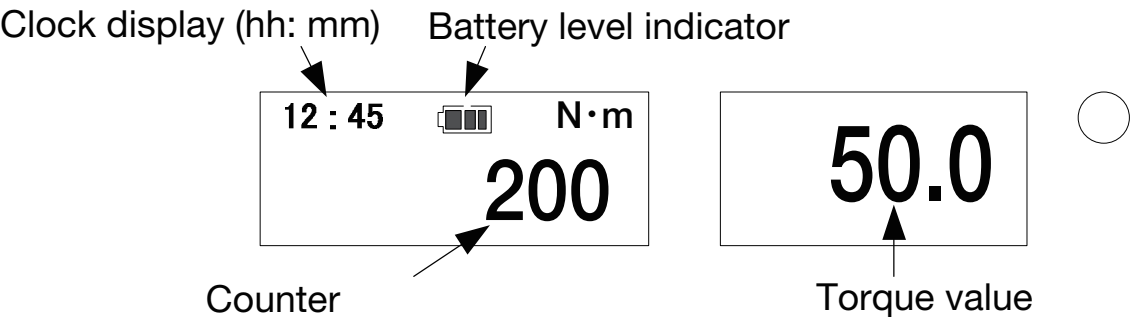


vi. Once the transfer is complete, press the clear key to return to the measurement screen.

8.2. Calculation function (For BTA and BTS settings)

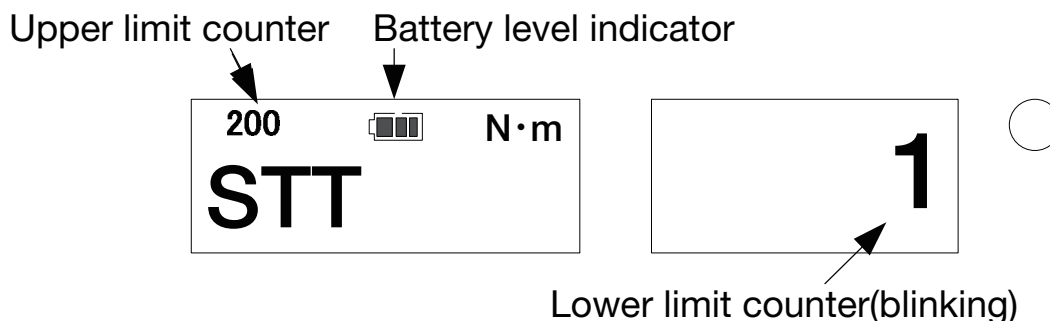
Calculates the number of data points, maximum torque value, minimum torque value, and average torque value for the measurement value in the specified range.

i. Use the counter forward/backward keys to set the counter to the upper limit of the data range you want to calculate.



ii. Press the MD key.

- iii. Use the counter forward/backward keys to set the counter to the lower limit of the data range you want to output.



Example 1) To output data between 001 and 200:

Set the counter to 200, press the MD key, and set STT to 1.

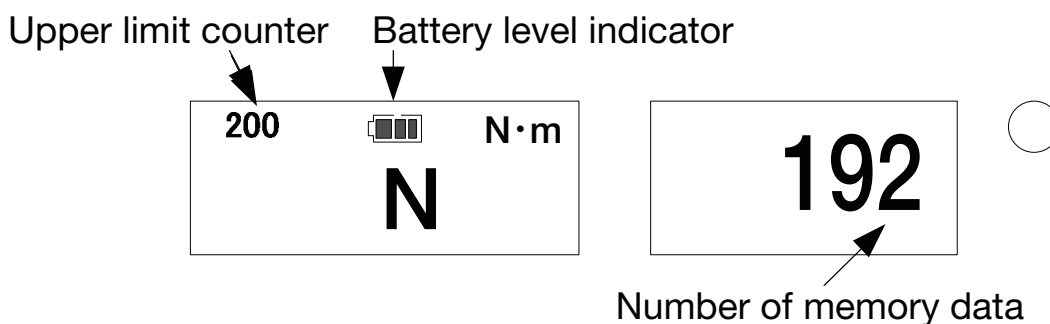
Example 2) To output data between 101 and 200:

Set the counter to 200, press the MD key, and set STT to 101.

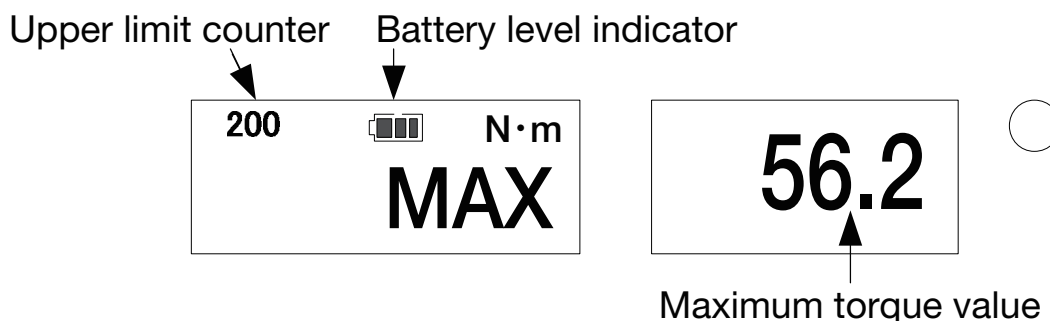
Note: The calculated data is based on peak-held measured values.

- iv. After setting the lower limit counter, press the MD key. To return to the measurement screen, press the Clear key.

Memory data count display

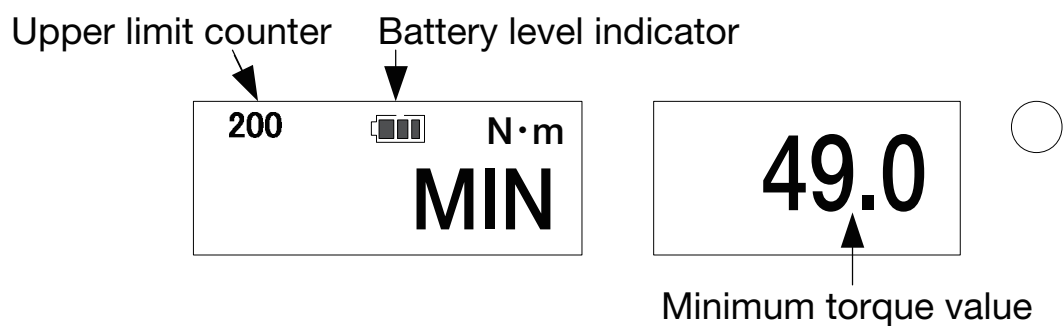


- v. Press the MD key. If you want to return to the measurement screen, press the Clear key.
- vi. Displays the maximum torque value in the specified range of measurements.



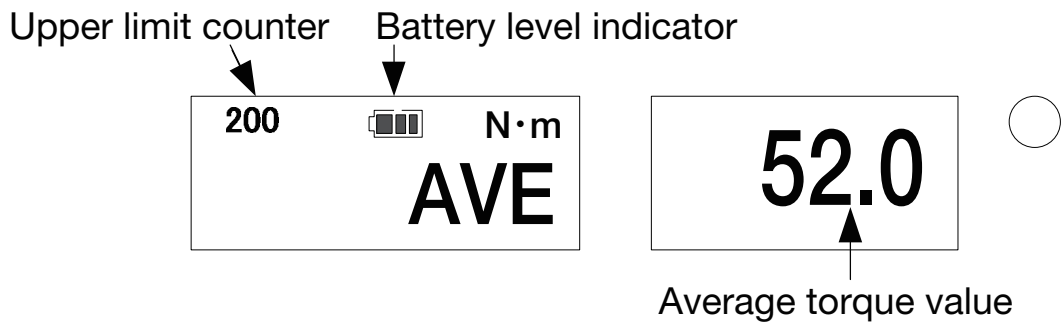
- vii. Press the MD key. If you want to return to the measurement screen, press the Clear key.

viii. Displays the minimum torque value of the measurement value in the specified range.



ix. Press the MD key. If you want to return to the measurement screen, press the Clear key.

x. Displays the average torque value of the measurement value in the specified range.

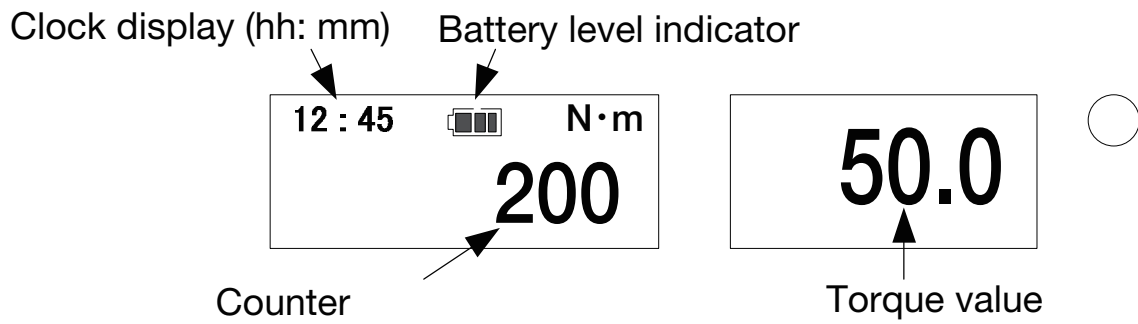


xi. Press the MD key or the clear key to return to the measurement screen.

8.3. Clearing the measurement data memory (For BTA and BTS settings)

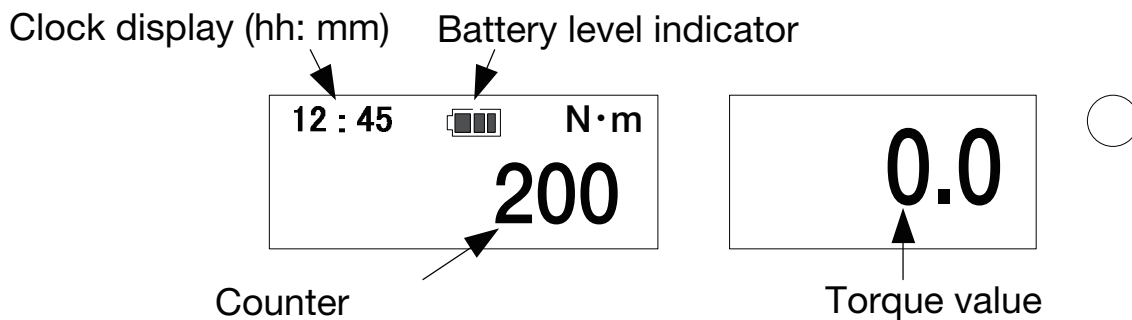
8.3.1. Clearing one data

i. Display the data for the counter you want to clear.

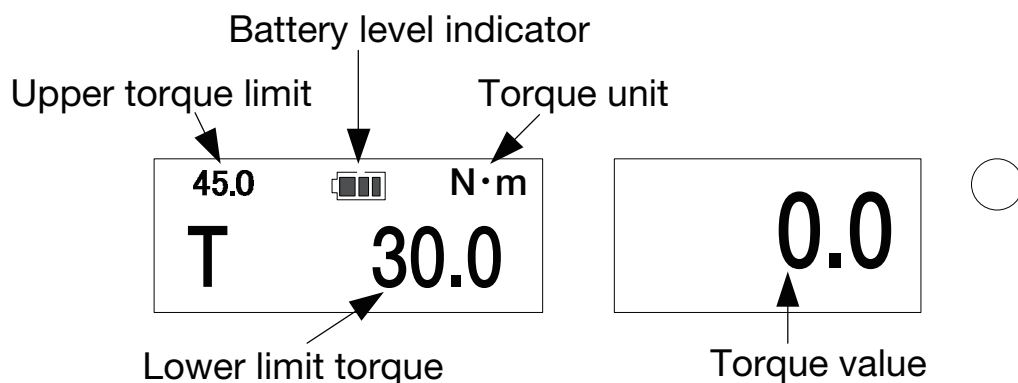


ii. Press the clear key to clear the memory.

- If there are no upper or lower torque limits set.

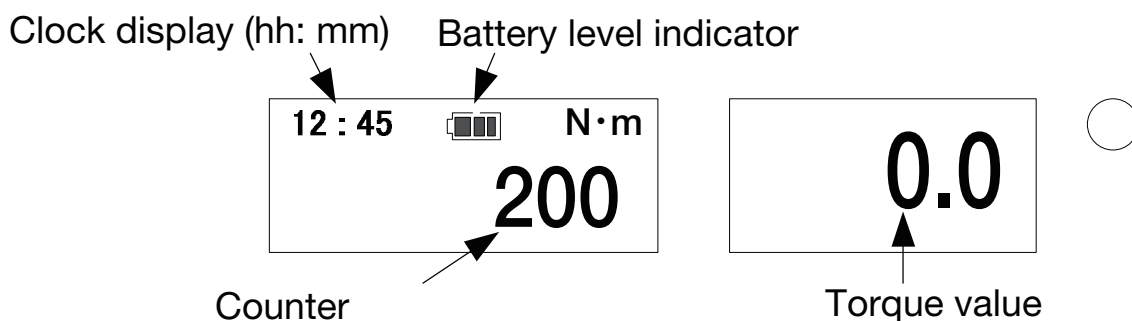


- When there is a minimum or maximum torque setting



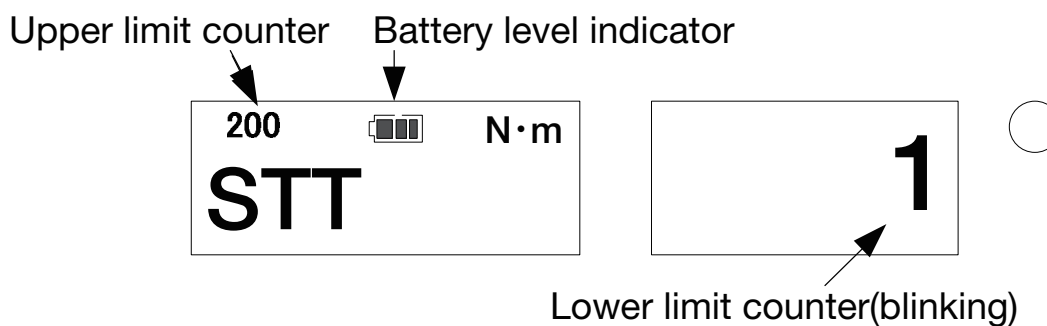
8.3.2. Clear range specification

- i. Use the counter forward/backward keys to set the counter to the upper limit of the data range you want to clear.



- ii. Press the MD key.

- iii. Use the counter forward/backward keys to set the counter to the lower limit of the data range you want to clear.



Example 1) To output data between 001 and 200:

Set the counter to 200, press the MD key, and set STT to 1.

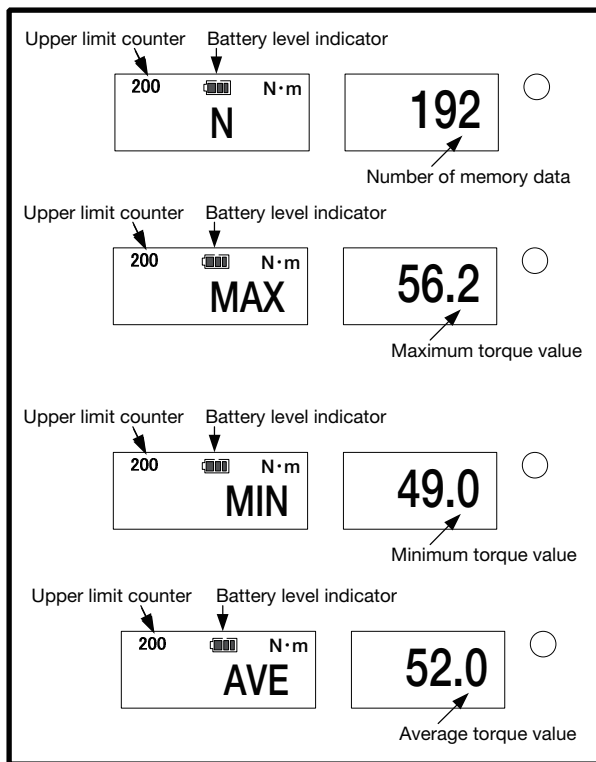
Example 2) To output data between 101 and 200:

Set the counter to 200, press the MD key, and set STT to 101.

Example 3) To clear all measurement data from memory:

Set the counter to 999, press the MD key, and set STT to 1.

- iv. After setting the lower limit counter, press the MD key. To return to the measurement screen, press the Clear key.
- v. With any of the display states shown in the box below displayed, press and hold the MD key and then press the Clear key, then release both keys.



Measurement data memory cleared

- vi. After clearing, the counter returns to the lower limit and the measurement state resumes.

9 Common specifications

Torque accuracy	±1%
Angle accuracy	± 2°+1digit (30 - 180°/ s When the bolt turned 90°)
Display	7 segments LED 4 digits (character height 10mm) 14 segments LED 6 digits (character height 7mm) 7 segments LED 4 digits (character height 3mm) OK/NG judgment LED 2 color (blue/red) Bluetooth®power supply LED: red Bluetooth®connection LED: blue Bluetooth®remain indication: 4 stages
Data memory	999 data(tightening torque, final angle, OK/NG judgment, measured date and time)
Basic function	Peak hold Transfer measured data Auto reset (Torque/ Angle) Tightening completion alert OK/NG judgment Auto zero Auto power off Auto torque alert Timer
Communication function	Bluetooth® RS232C compliant (2400-19200bps) Output serial number with USB connector
Power supply	Ni-MH rechargeable battery pack
Continuous use	Approx. 8 hours
Charging time	Approx. 3.5 hours
Communication mode	Key operation
Usage environment	0 - 40°C (No condensation)

10 Battery

Battery life

BP-5 battery can be recharged about 500 times depending on conditions before it dies.

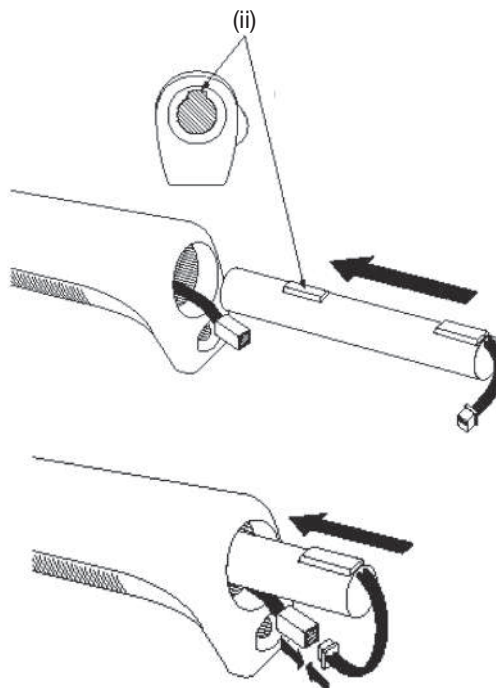
When it is old, replace it with a new one (BP-5).

At the delivery condition, BP-5 battery is empty. Make sure to charge it before use.

How to install the battery

- i. Turn the cap clockwise to remove it.
- ii. Set the battery in line with the hole as shown below and slide it in.
- iii. Connect the cable.
- iv. Push in the battery to the end.
- v. Push in the cable and the connector carefully.
- vi. 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.



11 Charging

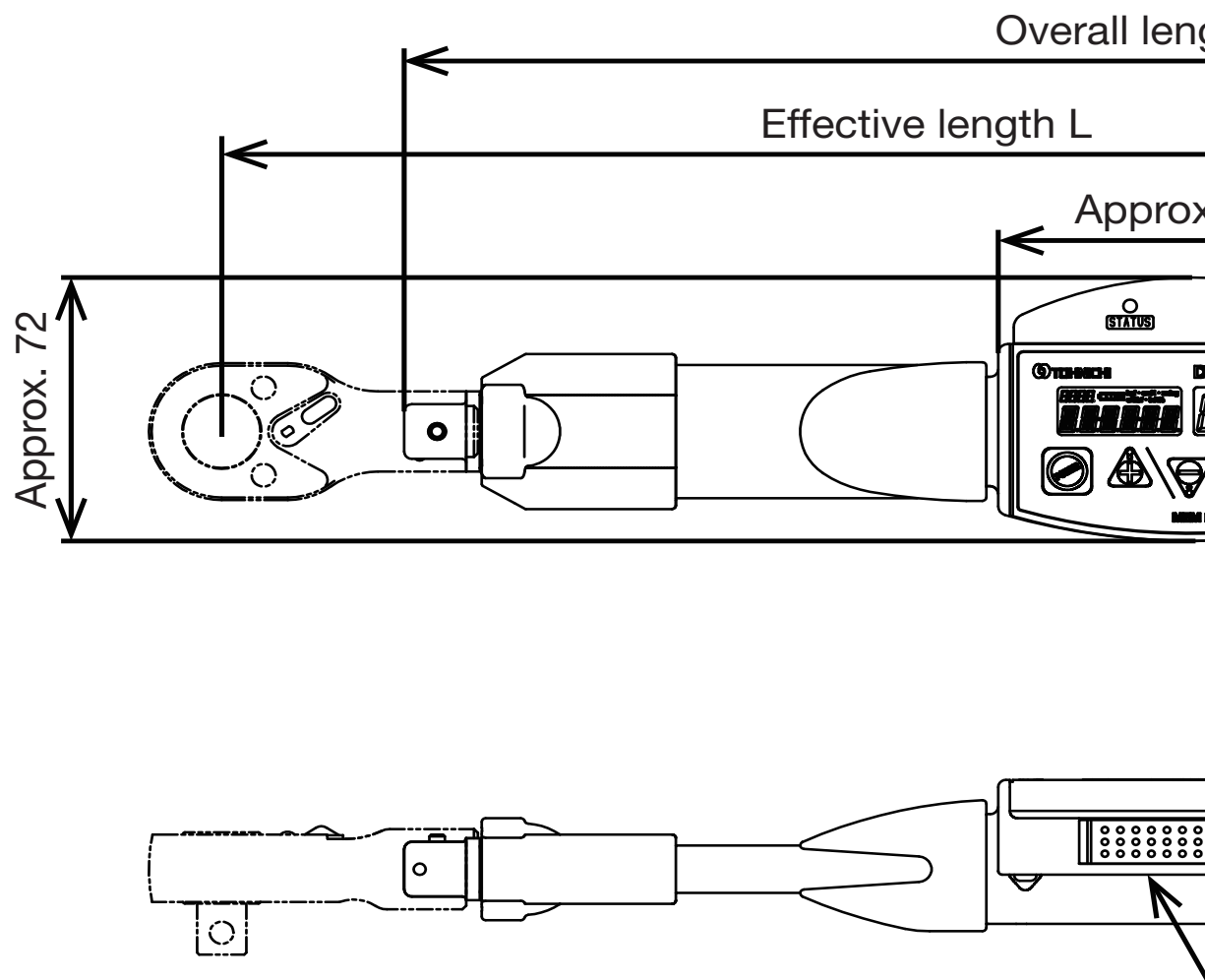
Connect the BC-3-G charger to the CEM3 charge jack. Make sure BC-3-G charger is connected to the power source. Green lamp on BC-3-G turns on when charging is complete (it takes about 3.5 hours from the empty condition).

Warnings

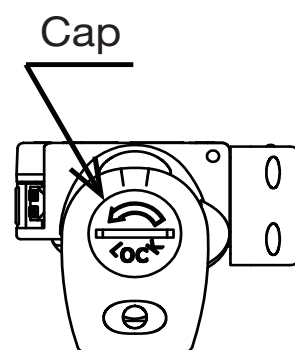
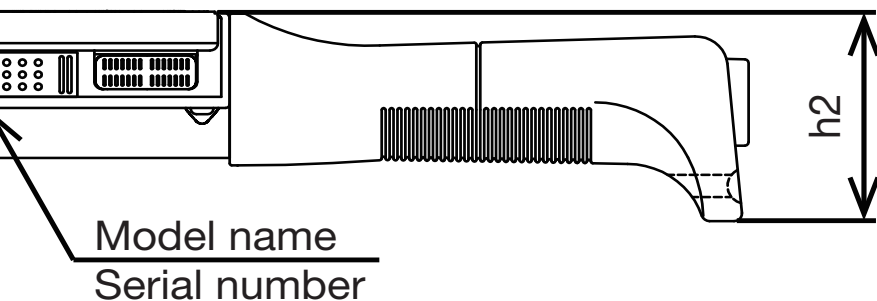
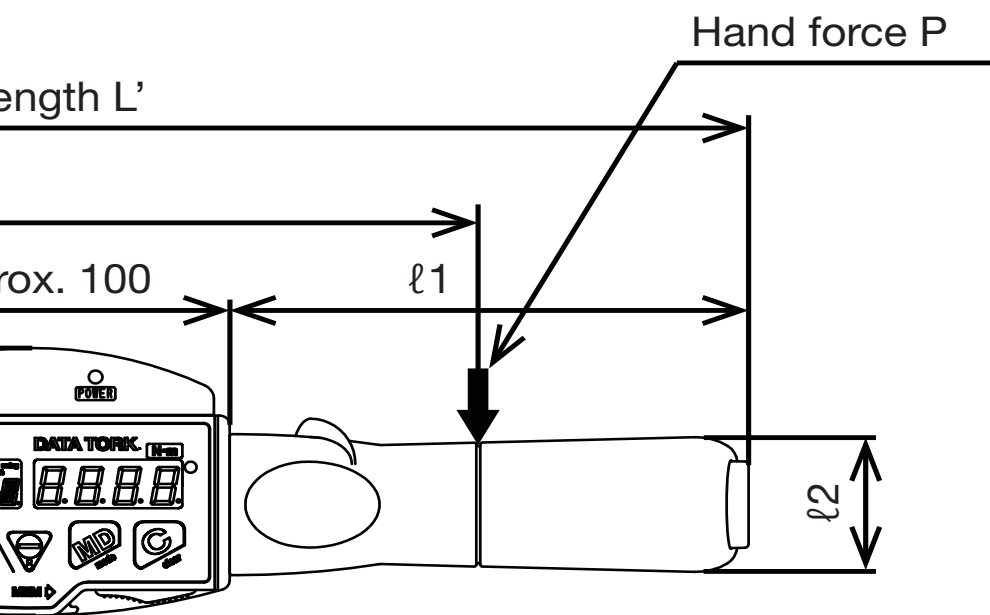
- i. Check the voltage on the charger and use the appropriate power source.
- ii. Stop charging as soon as the green lamp on the charger turns on. Excessive charging may shorten the battery life.
- iii. The product cannot operate when it is connected to the charger.
- iv. If the green lamp on the charger turns on and the red lamp starts to blink, it indicates an error. Stop using it immediately, and contact Tohnichi or nearest Tohnichi distributor.
- v. Temperature must be kept within 0-40 degree Celsius range when charging.
- vi. 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.
- vii. 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.

12 Specifications



Model	Torque range						Max. hand force P [N]
	N·m		kgf·cm/kgf·m		lbf·in/lbf·ft		
	MIN.-MAX.	1 digit	MIN.-MAX.	1 digit	MIN.-MAX.	1 digit	
CEM10N3X8D-G-BT	2-10	0.01	20-100	0.1	20-90	0.1	48.1
CEM20N3X10D-G-BT	4-20	0.02	40-200	0.2	36-180	0.2	92.2
CEM50N3X12D-G-BT	10-50	0.05	100-500	0.5	100-440	0.5	196.9
CEM100N3X15D-G-BT	20-100	0.1	200-1000	1	200-880	1	275.5
CEM200N3X19D-G-BT	40-200	0.2	400-2000	2	lbf·ft		428.3
CEM360N3X22D-G-BT	72-360	0.4	720-3600	4	30-150	0.2	
CEM500N3X22D-G-BT	100-500	0.5	kgf·m		73-360	0.5	549.5
CEM850N3X32D-G-BT	170-850	1	10-50	0.05			
			17-85	0.1	124-620	1	608



and P	Dimensions [mm]					Weight [kg]	Standard accessories		Applicable interchangeable head
	L	L'	$\ell 1$	$\ell 2$	h2				
1	208	212	65	35.5	46	0.54	QH8D		(SH,RH,QH,HH)8D
2	217	214				0.55	QH10D		(SH,RH,QH,DH,HH)10D
9	254	282				0.66	QH12D		(SH,RH,QH,RQH,DH,HH)12D
5	363	384	130	36.4	56.5	0.71	QH15D	Battery pack (BP-5)	(SH,RH,QH,RQH,DH,HH)15D
3	467	475				0.86	QH19D		(SH,RH,QH,RQH,DH,HH)19D
6	722	713				1.21		Charger	
5	910	949	230	30	43.5	4.08	QH22D		(SH,RH,QH,RQH,DH,HH)22D
3	1398	1387				5.22	QH32D		(SH,RH,QH)32D

Designs and specifications are subject to change without notice.

■ **Tohnichi Mfg. Co., Ltd.**

TEL.+81 3 3762 2455

2-12, Omori-Kita, 2-Chome Ota-ku, Tokyo JAPAN

E-mail: overseas@tohnichi.co.jp

Website: <https://www.global-tohnichi.com>

■ **Tohnichi America Corp.**

TEL.+1 847 947 8560

1303 Barclay Blvd. Buffalo Grove, IL 60089 USA

E-mail: inquiry@tohnichi.com

Website: <http://tohnichi.com>

■ **Tohnichi Shanghai Mfg. Co., Ltd.**

TEL.+86 21 3407 4008 FAX.+86 21 3407 4135

RM.5 No.99 Nong 1919, Du Hui Road, Minhang,
Shanghai, P.R.China

E-mail: sales@tohnichi-sh.com

东仁扭矩仪器（上海）有限公司

■ **Tohnichi Europe Technical Support Office (TETSO)**

TEL.+49 2131 7514753

Hellersbergstrasse 12A 41460 Neuss, Germany

E-mail: europe@tohnichi.com

■ **Tohnichi Asia Technical Support Office (TATSO)**

TEL.+66 33 002307 FAX.+66 33 002337

271/184 Moo 6, Tambon Borwin, Amphur Sriracha,
Chonburi 20230 Thailand

E-mail: tatso@tohnichi.com