

MODEL CEM3-G-BTA

Instruction Manual



1. Outline

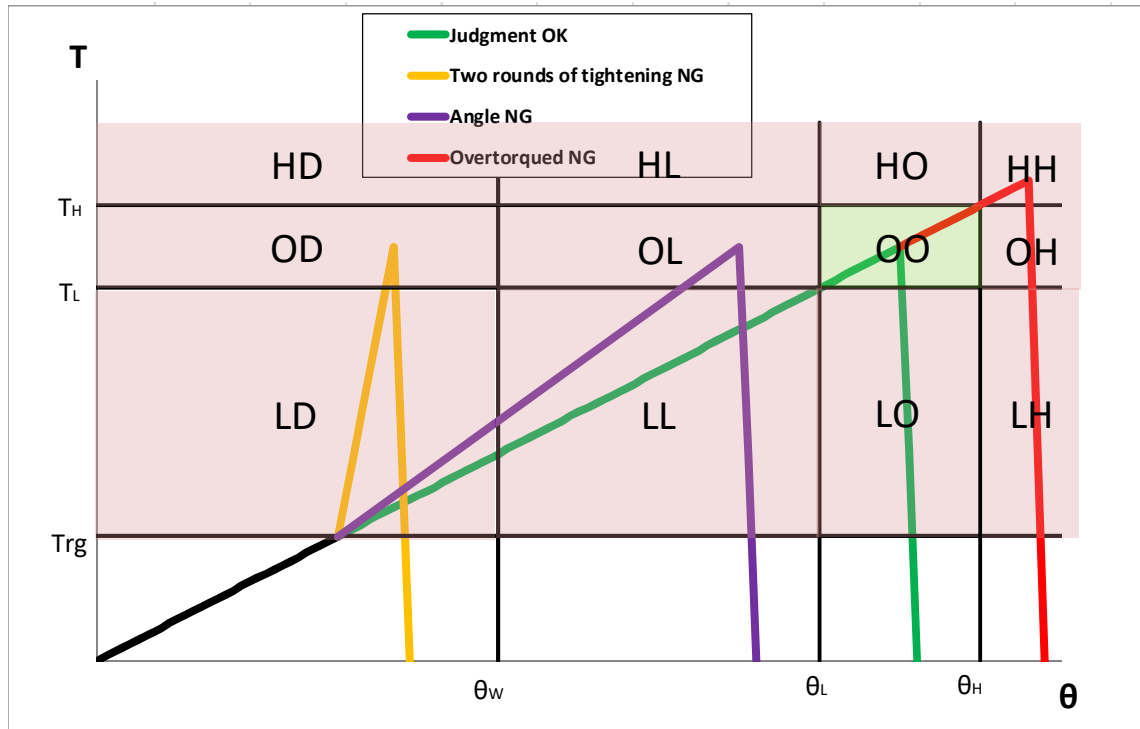
CEM3-G-BTA is the digital torque & angle wrench. It can measure the torque and angle also does the judgments by the torque and angle. The Bluetooth® can output the data and judgment result wireless. Any other specifications and features are same as CEM3-G model.

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.

1.2. Judgment features

You can set the threshold for torque and angle, the tool judge the result by your settings.



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

θw: Double tightening detection angle, θL: Lower limit angle, θH: 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 $\begin{matrix} \uparrow \\ \text{L} \end{matrix}$ $\begin{matrix} \uparrow \\ \text{D} \end{matrix}$ Angle judgment “LD”: Low torque NG and Double tightening detection NG

CEM3-G-BTA 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 has 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)

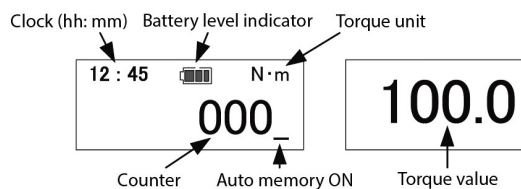
Settings	Judgment results		Torque		Angle	
	Judgment code	OK / NG	Judgment	Conditions	Judgment	Conditions
No torque judgment or not reach on minimum peak torque hold	-- (No judgment)					
With torque judgment settings and if used wrong tightening direction	DN (Tightening direction NG)	NG	With torque setting			
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

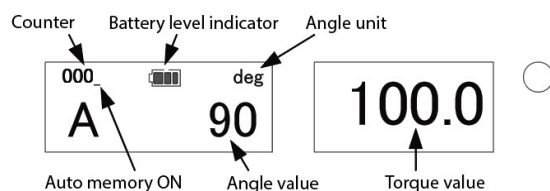
2. Method of operation

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

[Without angle setting]

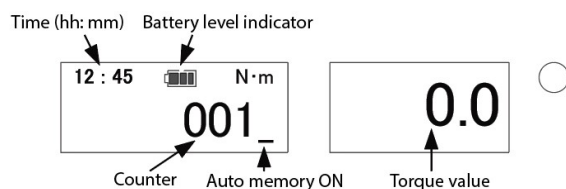


[With angle setting]

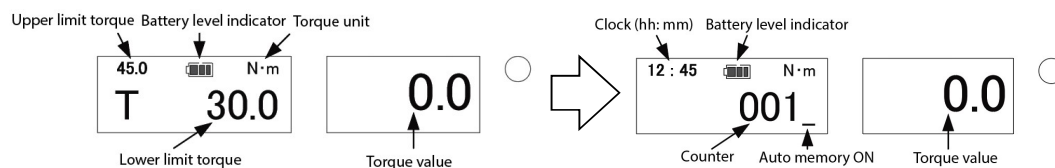


2.2. Maximum value display (PEAK mode) when the memory counter displays between “001” to “999”

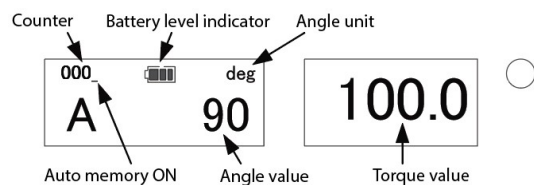
[Without torque setting]



[With torque setting]



[With angle setting and data memory]



2.3. Button operations

▲: Upper arrow key

Send a counter one by one or continuously to read out the measured data.
Keep pushing to fast-forward.

▼: Down arrow key

Reverse one counter or continuously to read out the measured. Keep pushing to fast-forward.

MD: 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.)

MEM: Memory key

Saves the measured data and proceed to the next counter. Transfers the data to external device via Bluetooth® or cable.

C: Clear key

Clear saved measurement data. On RUN mode to auto zero adjust.

POWER: Power button

When angle setting is on and turning on the power, angle speed check will be automatically conducted to make zero adjustment. During zero adjustment, the tool should be put still for more than 2 seconds (do not move) otherwise the display may show "Err0".

When power is on, the Bluetooth is turned on and the red LED on. To power off the tool only press Power key one time. To turn off the tool and Bluetooth press and hold it for 2 seconds.

2.4. Torque and angle calibration

Set the counter to "000" using the ▲ upper and ▼ down arrow keys. Calibrate the tool with the torque wrench tester for torque and the angle calibrator for angle.

3. Explanation of each mode

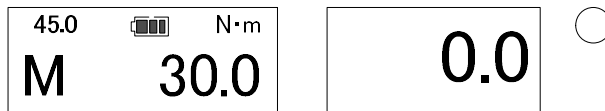
The CEM3-G-BTA has two modes that are Measurement mode and Display mode

3.1. Measurement mode

- **Inspection mode (MODE-M)**

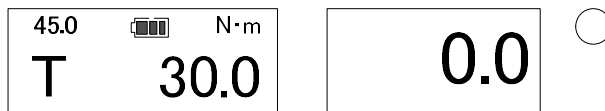
MODE-M is used for the re-tightening and breakaway inspections. If you set the high and low limit torque values the tool makes judgment the measured torque result.

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

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 "M3+ID".

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.

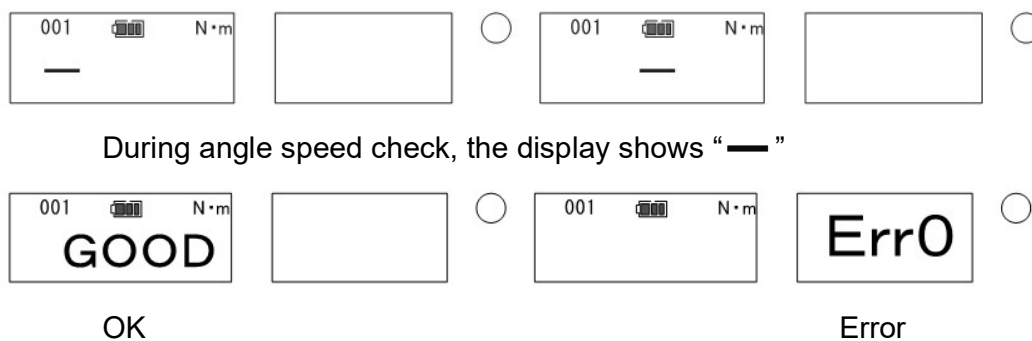
If "Err9" disappears, this instrument can be used normally.

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

4.3. Angle speed check/ zero adjustment

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.

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

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-BTA	(0.50)2.00	10.00	0.01	10.50	0.75	0.75
CEM20N3X10D-G-BTA	(1.00)4.00	20.00	0.02	21.00	1.50	1.50
CEM50N3X12D-G-BTA	(2.50)10.00	50.00	0.05	52.50	3.75	3.75
CEN100N3X15D-G-BTA	(5.0)20.0	100.0	0.1	105.0	7.5	7.5
CEM200N3X19D-G-BTA	(10.0)40.0	200.0	0.2	210.0	15.0	15.0
CEM360N3X22D-G-BTA	(18.0)72.0	360.0	0.4	378.0	27.0	27.0
CEM500N3X22D-G-BTA	(25.0)100.0	500.0	0.5	525.0	37.5	37.5
CEM850N3X32D-G-BTA	(43)170	850	1	893	64	64

(N.m case)

- ※ 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

Shows example on the following settings:

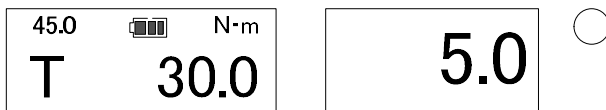
Ang	Angle setting	ON
SEL	Measurement mode setting	MODE-T
Lo	Lower limit torque setting	30N·m
HI	Higher limit torque setting	45N·m
Trg	Trigger torque setting	5N·m
An_d	Double tightening detection angle setting	5 deg
An_L	Lower limit angle setting	10 deg
An_h	Higher limit angle setting	50 deg
Ar	Auto reset timer setting	0.5
ng	NG output setting	NG_MAN
dCn	Output format setting	M3+ID

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

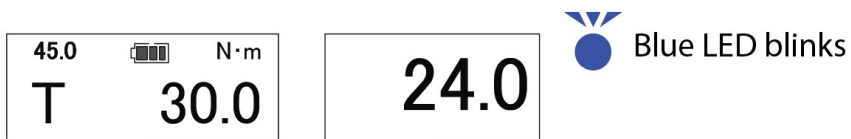
- i. Set to Peak mode (counter between "001" to "999") and start measurement.



- 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 "M3-ID", it outputs the torque and angle data.

[When judgment is NG]

- If you select "NGAUTO" 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 "NG_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.**



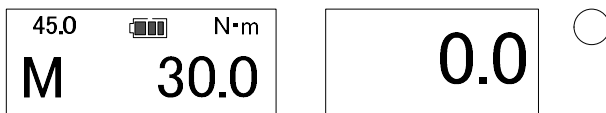
5.2. Inspection mode operation

Shows example on the following settings:

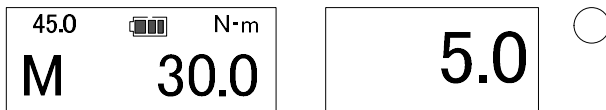
Ang	Angle setting	ON
SEL	Measurement mode setting	MODE-M
Lo	Lower limit torque setting	35N·m
HI	Higher limit torque setting	45N·m
Trg	Trigger torque setting	5N·m
An_d	Double tightening detection angle setting	0 deg
An_L	Lower limit angle setting	10 deg
An_h	Higher limit angle setting	50 deg
Ar	Auto reset timer setting	0.5
ng	NG output setting	NG_MAN
dCn	Output format setting	M3+ID

※ 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)**



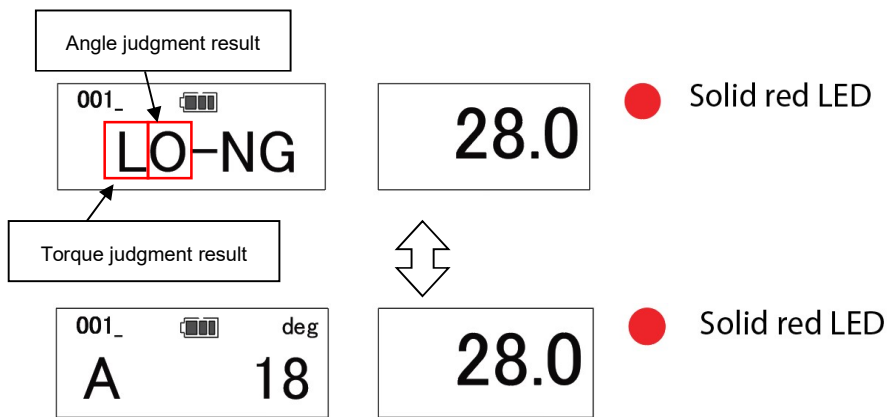
[When judgment is OK]

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

If the Output format is set to “M3-ID”, it outputs the torque and angle data.

[When judgment is NG]

- If you select “NGAUTO” 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 “NG_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.



6. **Power operation and connection for Bluetooth®**

- When press "Power" switch to turn on the tool the Bluetooth® powers on and the red power LED turns on.
- To turn off the Bluetooth® power, press and hold the "Power" switch more than 2 seconds during the tool power is on. (If press a "Power" switch the tool display only turns off)
Please turn off the Bluetooth® power while not in use to save the battery.
- When the Auto power off feature works the display turns but the Bluetooth® power is on.
- When the Bluetooth® is connected the blue STATUS LED turns on. It turns off after disconnect.

7. **External output format**

7.1. **Bluetooth® communication specifications**

Bluetooth® version	Ver. 3.0
Communication method	AFH
Modulation system	GFSK
Radio output power	4 dBm
Transmission power class	Class 2
Profile	SPP
Communication distance	Approx. 10 m*
Acquisition condition	TELEC, FCC, IC, CE, SRRC, NTC, NCC, ANATEL, KC, WPC

*Communication distance varies depending on the performance of the radio wave environment and communication connection partner device.

7.2. **Communication conditions**

Baud rate	Bluetooth®	Depend on a host device
	PC/ USB	2400, 4800, 9600, 19200 bps
Parity		None
Data length		8 bit
Stop bit		1 bit
Flow control		Hardware (RTS/CTS)

- ※ Bluetooth® may be required to enter PIN code or passcode by the connecting device. In this case, enter "0000".
- ※ When using optional USB (USB connector corresponding serial output) cable, catalog #584, driver software is required to be installed on your PC.

7.3. Communication format

- When set "M3+ID" 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	.	0	0	.				
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	6	/	1	2	/	3	1	.	1	2	:	5	9	:	5	9	C	R	L	F
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-BTA)

- When set "M-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	.	9	9	9	.	1	0	0	.	0	.	1	6	/	1	2	/	3	1	.	1	2	:	5	9	:	5	9	C	R	L	F
Header		3 digits counter				torque with decimal point						Date (yy/mm/dd)				Time (hh/mm/ss)				Delimiter													

7.4. 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.

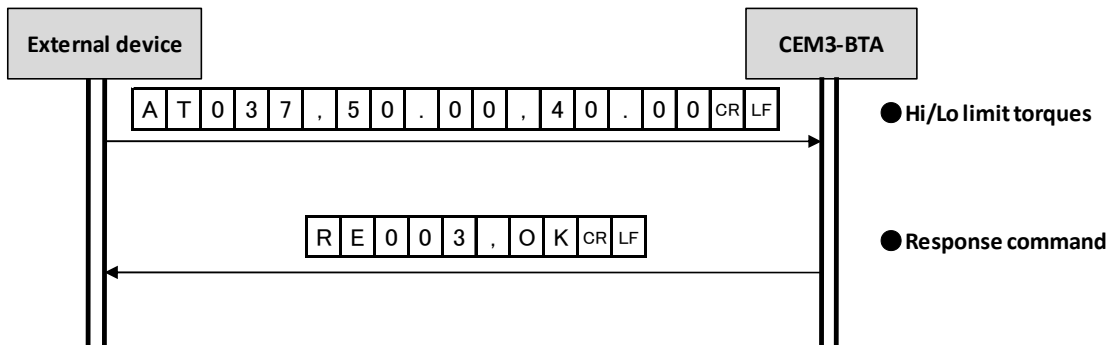
Input command	Action/ Discription	Note
AT008,**	Change the torque unit. Send numbers instead of "****".	N·m: 06, kgf·cm: 02, kgf·m: 03, lbf·in: 08, lbf·ft: 09
AT037,****,****	Set the higher and lower limit torque values. Send torque value with decimal point. Send the higher limit torque first then lower limit torque.	The higher limit torque value has to be more than lower limit torque value. ("0" can be set)
AT045,****	Set the trigger torque value. Send torque value with decimal point.	It has to be from 5% to 100% of maximum capacity torque. ("0" can be set) Turn on the angle setting on the tool first by manual.
AT046,***,***,***	Set the double tightening detection judgment angle, lower limit and higher limit angle settings in this order. The value is valid between "000" to "999" degrees.	●Double tightening detection judgment angle: It can't be set under "MODE-M". In this case, send "000" for it. ●Lower limit angle: It has to be more than double tightening detection judgment angle value. (Can be set "000") ●Higher limit angle: It has to be more than double tightening detection judgment angle and lower limit angle values. (Can be set "000") ※The trigger torque setting is required to accept above angle settings.
AT023,*****	Set the 7 digits ID number. Send the capital alphabet or number.	The tool outputs data include this ID.

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)

- ※ Commands are ASCII code.
- ※ Add the "CRLF" to the end of command.

7.5. 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-BTA

Send a command the **"AT037,20.00,15.00CRLF"**

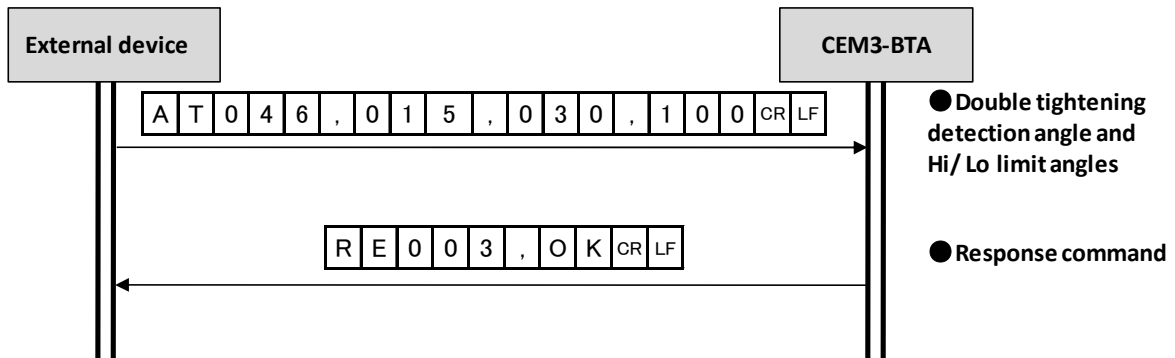
Example 2) Set to 90 Nm for higher, 80 Nm for lower limit for CEM100N3X15D-G-BTA

Send a command the **"AT037,090.0,080.0CRLF"**

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

Send a command the **"AT037,0600.,0500.CRLF"**

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



8. Various settings

8.1. Setting items

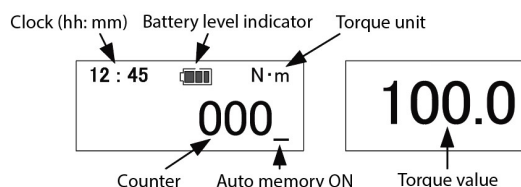
Setting items	Display	Default	Selectable from	Note
Angle feature	Ang	OFF	OFF/ ON	
Measurement mode	SEL	MODE-M	MODE-M/ MODE-T	
Unit of torque	USEL	N·m	N·m/ kgf·cm/ kgf·m/ lbf·in/ lbf·ft	
Lower limit torque	Lo	0	0 ~ Maximum capacity	
Higher limit torque	HI	0	0 ~ Maximum capacity	More than lower limit torque
Trigger torque	Trg	0	0/ 5% ~ 100% of capacity	
Double tightening detection angle	An_d	0	0 ~ 999	Enable when set on the "MODE-T" and trigger torque
Lower limit angle	An_L	0	0 ~ 999	Enable when set on the trigger torque. More than double tightening detection angle
Higher limit angle	An_H	0	0 ~ 999	Enable when set on the trigger torque. More than double tightening detection angle and lower limit angle
Tightening direction	tUrn	CW	CW/ CCW/ Both	
Auto reset timer	Ar	0.0	0.0/ 0.1~5.0	
NG data processing	ng	NG_MAN	NG_MAN/ NGAUTO	
Buzzer	bU	ON	ON/ OFF	
Auto power off	PoFF	3MIN	3MIN/ 10MIN/ 30MIN/ OFF	
Communication mode	do	BT	BT/ PC	
Baud rate	bps	9600	2400/ 4800/ 9600/ 19200	For "PC" communication mode
Data length	dL	8bit	7bit/ 8bit	For "PC" communication mode
Parity	Prt	None	None/ Odd/ Even	For "PC" communication mode
Communication format	dCn	M-3	M-3/ M3+ID	
Default setting	dFLt	DFT-N	DFT-N/ DFT-Y	
Time	rtC1	-	-	
Date	rtC2	-	-	

※ The time and date are held even if processed to default (factory reset).

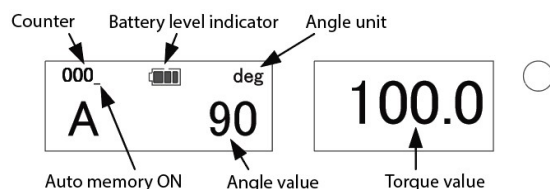
8.2. Setting procedure by key operation

- Set the counter to “000” using upper or down arrow keys. The following displays are shown depend on the angle feature is on or off.

[Without angle setting]



[With angle setting]



- Press and hold the “MD” key more than 2 seconds to move setting mode

i. **Angle feature setting (Default: OFF)**

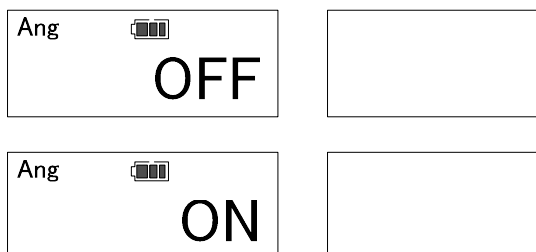
Turn on or off the angle feature setting

[When turn on the angle feature]

- At reset, power on or leaving setting mode after change the angle feature setting from OFF to ON, an angle speed check will be automatically conducted.
- At RUN mode, left display shows angle.
- Enable to set the trigger torque

[When turn off the angle feature setting]

- Trigger torque setting will be skipped



Select angle feature is ON or OFF using upper or down arrow keys. Press “MEM” key to save setting and go to next. Press “MD” key to skip setting and go to next. Press “C” key to go back to RUN mode (measurement mode).

ii. Measurement mode (Default: MODE-M)

Select the mode from “MODE-T” (Tightening mode) or “MODE-M” (Inspection mode).

SEL  MODE-T	
SEL  MODE-M	

- ※ When set to “MODE-M” the double tightening detection angle setting will be skipped. If there is double tightening detection angle setting and change to “MODE-M” the double tightening detection angle will be set to “0”.

Select the mode using upper or down arrow keys. Press “MEM” key to save setting and go to next. Press “MD” key to skip setting and go to next. Press “C” key to go back to RUN mode (measurement mode).

iii. Unit of torque (Default: N.m)

Select the unit of torque measurement from N.m, kgf.cm, kgf.m, lbf.in or lbf.ft.

USEL  N·m UNIT	
---	--

Select the unit using upper or down arrow keys. Press “MEM” key to save setting and go to next. Press “MD” key to skip setting and go to next. Press “C” key to go back to RUN mode (measurement mode).

iv. Lower limit torque (Default: 0)

Lo  N·m 000.0	
Lo  N·m 030.0	

- ※ If the value is set out of tool range the display shows an error "SETERR".

Set the number using down arrow key and move the digit using upper arrow key. Press “MEM” key to save setting and go to next. Press “MD” key to skip setting and go to next. Press “C” key to go back to RUN mode (measurement mode).

v. Higher limit torque (Default: 0)

HI  N·m	
000.0	

HI  N·m	
040.0	

※ If the value is set less than lower limit torque the display shows an error "SETERR".

Set the number using down arrow key and move the digit using upper arrow key. Press "MEM" key to save setting and go to next. Press "MD" key to skip setting and go to next. Press "C" key to go back to RUN mode (measurement mode).

vi. Trigger torque (Default: 0)

It is the setting for starting angle measurement. If angle feature is OFF, this setting is skipped.

trg  N·m	
005.0	

※ If the value is set out of tool range the display shows an error "SETERR".

※ If it is set to "0", the double tightening detection angle, Hi/ Lo limit angle settings are skipped and changed to "0". Then the display goes to tightening direction setting.

Set the number using down arrow key and move the digit using upper arrow key. Press "MEM" key to save setting and go to next. Press "MD" key to skip setting and go to next. Press "C" key to go back to RUN mode (measurement mode).

vii. Double tightening detection angle (Default: 0)

Set the angle for double tightening detection angle judgment.

An_d  deg	
005	

※ If measurement mode was set to "MODE-M", this setting is skipped.

Set the number using down arrow key and move the digit using upper arrow key. Press "MEM" key to save setting and go to next. Press "MD" key to skip setting and go to next. Press "C" key to go back to RUN mode (measurement mode).

viii. Lower limit angle (Default: 0)

Set the lower limit angle from trigger torque

An_L  deg	
010	

※ If the value is set less than double tightening detection angle the display shows an error "SETERR".

Set the number using down arrow key and move the digit using upper arrow key. Press "MEM" key to save setting and go to next. Press "MD" key to skip setting and go to next. Press "C" key to go back to RUN mode (measurement mode).

ix. Higher limit angle (Default: 0)

Set the higher limit angle from trigger torque

An_H  deg	
050	

※ If the value is set less than double tightening detection angle or lower limit angle, the display shows an error "SETERR".

Set the number using down arrow key and move the digit using upper arrow key. Press "MEM" key to save setting and go to next. Press "MD" key to skip setting and go to next. Press "C" key to go back to RUN mode (measurement mode).

x. Tightening direction (Default: CW)

Set the tightening direction from CW, CCW or both

tUrn 	
CW	

tUrn 	
CCW	

tUrn 	
BOTH	

Select the direction using upper or down arrow keys. Press "MEM" key to save setting and go to next. Press "MD" key to skip setting and go to next. Press "C" key to go back to RUN mode (measurement mode).

xi. Auto reset timer (Default: 0.0)

Set reset timer from 0.0⇄0.1⇄0.2⇄0.3⇄0.4⇄0.5⇄1.0⇄2.0⇄3.0⇄4.0⇄5.0 sec.

To inactivate auto reset function, select 0.0 sec.

Ar  5.0_	
---	--

Select the reset timer using upper or down arrow keys. Press “MEM” key to save setting and go to next. Press “MD” key to skip setting and go to next. Press “C” key to go back to RUN mode (measurement mode).

xii. NG data processing (Default: NG_MAN)

Select “NG_MAN” (Manual output) or “NGAUTO” (Auto output)

ng  NG_MAN	
---	--

ng  NGAUTO	
---	--

- NG_MAN (Manual output):
When judgment result is NG the auto reset feature is declined. Press “MEM” key to output data or “C” key to clear.
- NGAUTO (Auto output):
Auto reset feature is applied even if though the judgment result is NG.

Select the mode using upper or down arrow keys. Press “MEM” key to save setting and go to next. Press “MD” key to skip setting and go to next. Press “C” key to go back to RUN mode (measurement mode).

xiii. Buzzer (Default: ON)

Select the buzzer turns ON or OFF for the key operations. However, over-torque alarm, tightening completion, NG judgment alarm remains effective.

bu  ON	
---	--

bu  OFF	
--	--

Select the buzzed is turned ON or OFF using upper or down arrow keys. Press “MEM” key to save setting and go to next. Press “MD” key to skip setting and go to next. Press “C” key to go back to RUN mode (measurement mode).

xiv. Auto power off (Default: 3MIN)

Select an auto power off timer from 3 minutes, 10 minutes, 30 minutes or NONE.

The tool turns off after time that is set, however the Bluetooth® is not turned off.

If it is set to NONE, requires the “Power” key is pressed to turn off or the tool will work until the battery is gone.

PoFF  3MIN	
PoFF  10MIN	
PoFF  30MIN	
PoFF  NONE	

Select the timer using upper or down arrow keys. Press “MEM” key to save setting and go to next. Press “MD” key to skip setting and go to next. Press “C” key to go back to RUN mode (measurement mode).

xv. Communication mode (Default: BT)

Select the communication mode setting from BT (Bluetooth®) or PC (Cable).

dO  BT	
dO  PC	

※ If it is set to “BT” skip the Baud rate, Data length and Parity settings

Select the communication mode using upper or down arrow keys. Press “MEM” key to save setting and go to next. Press “MD” key to skip setting and go to next. Press “C” key to go back to RUN mode (measurement mode).

xvi. Baud rate (Default: 9600bps)

Select the baud rate from 2400, 4800, 9600 or 19200 bps. Match it with your PC setting.

bPS  2400	
bPS  4800	
bPS  9600	
bPS  19200	

Select the baud rate using upper or down arrow keys. Press “MEM” key to save setting and go to next. Press “MD” key to skip setting and go to next. Press “C” key to go back to RUN mode (measurement mode).

xvii. Data length (Default: 8bit)

Select the data length from 7 bit or 8 bit. Set to 8 bit when use #584 USB connection cable.

dL  7BIT	
dL  8BIT	

Select the data length upper or down arrow keys. Press “MEM” key to save setting and go to next. Press “MD” key to skip setting and go to next. Press “C” key to go back to RUN mode (measurement mode).

xviii. **Parity (Default: NONE)**

Select the parity from EVEN, ODD or NONE. Match it with your PC setting.

Prt  NONE	
Prt  ODD	
Prt  EVEN	

Select the parity using upper or down arrow keys. Press “MEM” key to save setting and go to next. Press “MD” key to skip setting and go to next. Press “C” key to go back to RUN mode (measurement mode).

xix. **Communication format (Default: M-3)**

Select the communication format. It affects the data strings for communication. Refer the “7.3. Communication format” for details.

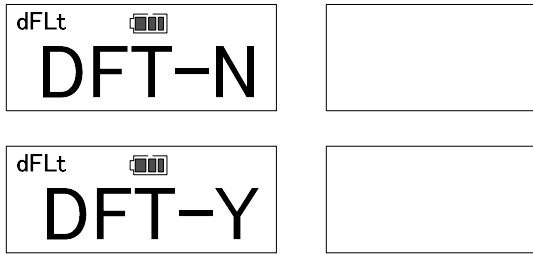
dCn  M-3			dCn  CLR_OK	
dCn  M3+ID			dCn  CLEAR	

※ When change the communication format setting the measured data would be cleared.

Select the communication format using upper or down arrow keys. Press “MEM” key to save setting and go to next. Press “MD” key to skip setting and go to next. Press “C” key to go back to RUN mode (measurement mode).

xx. Default setting

All data would be cleared and settings back to default when select "DFT-Y" except for the time and date settings.



Select the "DFT-Y" or "DFT-N" using upper or down arrow keys. When display shows "DFT-Y" and press "MEM" key, the tool is factory reset. to save setting and go to next. Press "MEM" key on "DFT-N" or press "MD" key to skip setting and go to next. Press "C" key to go back to RUN mode (measurement mode).

xxi. Time (Clock)



Press "MEM" key to next. Press "MD" or "C" keys to go back to RUN mode (measurement mode).

- Hour setting



Set hour using upper or down arrow keys. Press "MEM" key to save setting and go to next. Press "MD" key to skip setting and go to next. Press "C" key to go back to RUN mode (measurement mode).

- Minute setting



Set minute using upper or down arrow keys. Press "MEM" key to save setting and go to next. Press "MD" key to skip setting and go to next. Press "C" key to go back to RUN mode (measurement mode).

- Second setting



Press "MEM" key reset to "00" seconds and save setting. Press "MD" key to skip setting and go to next. Press "C" key to go back to RUN mode (measurement mode).

- Clock display



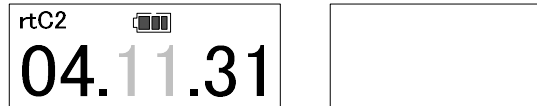
Press "MEM" or "MD" keys go to next. Press "C" key to go back to RUN mode (measurement mode).

- Year setting



Set year using upper or down arrow keys. Press “MEM” key to save setting and go to next. Press “MD” key to skip setting and go to next. Press “C” key to go back to RUN mode (measurement mode).

- Month setting



Set month using upper or down arrow keys. Press “MEM” key to save setting and go to next. Press “MD” key to skip setting and go to next. Press “C” key to go back to RUN mode (measurement mode).

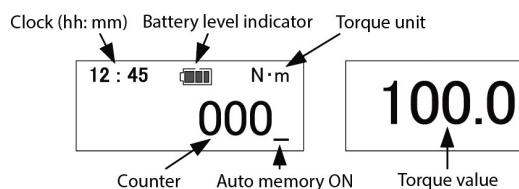
- Date setting



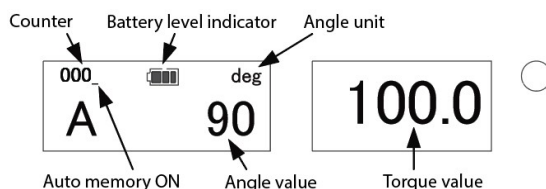
Set year using upper or down arrow keys. Press “MEM” key to save setting and complete settings. Press “MD” key to skip setting and go to next. Press “C” key to go back to RUN mode (measurement mode).

- End of settings and go back to measurement display

[Without angle setting]



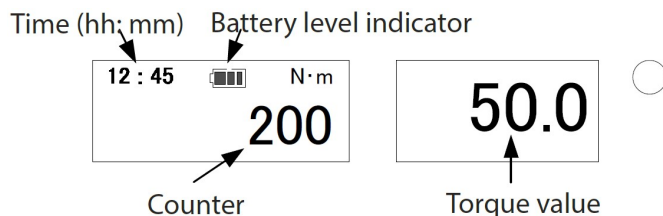
[With angle setting]



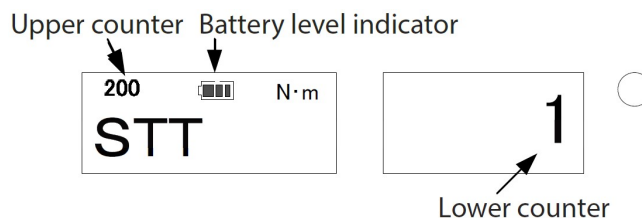
9. Data output and clear

9.1. Batch measurement data output

- i. Set the counter number to the upper end that you need using ▲▼ keys, then press “MD” key to the next



- ii. Set the number on right display to the lower end that you need using ▲▼ keys then press “MD” key to the next



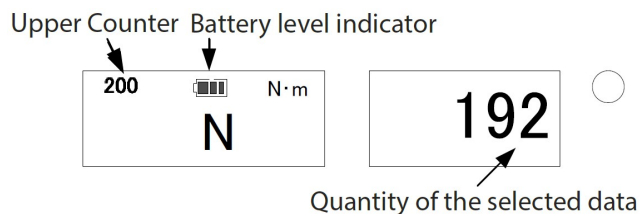
Example 1) To output data 001 to 200

Set counter to 200 and press “MD” key. Confirm STT shows 1 and press “MD” to the next

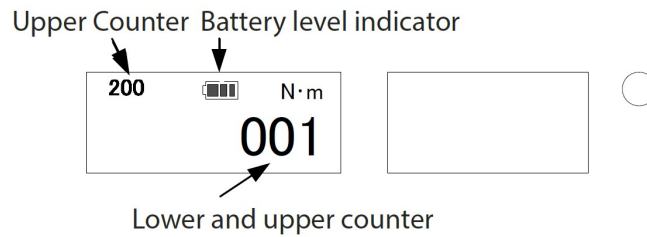
Example 2) To output data 101 to 200

Set counter to 200 and press “MD” key. Set STT number to 101 and press “MD” to the next

- iii. The right display shows the number of data to output. Press “MD” key to output batch data or press “C” key to go back to measurement mode

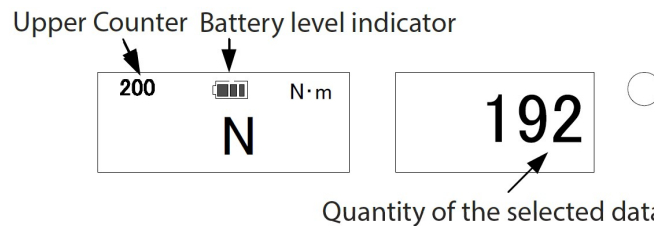


If the tool is connected with external equipment via Bluetooth, right display turns off and left display shows numbers from lower to upper end during batch data output



NOTE: Press "C" key to cancel data output. Other keys won't work during data output

Batch data output completed

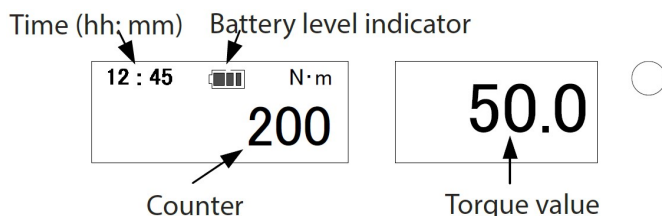


- iv. Press "MD" or "C" key to go back to measurement mode

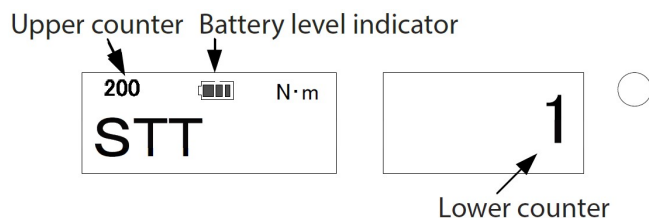
9.2. Data processing function

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

- i. Set the counter number to the upper end that you need using ▲▼ keys, then press “MD” key to the next



- ii. Set the number on right display to the lower end that you need using ▲▼ keys then press “MD” key to the next



Example 1) To process data 001 to 200

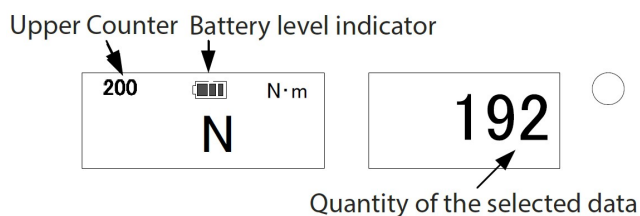
Set counter to 200 and press “MD” key. Confirm STT shows 1 and press “MD” to the next

Example 2) To process data 101 to 200

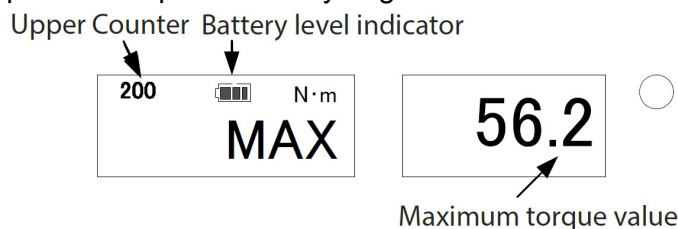
Set counter to 200 and press “MD” key. Set STT number to 101 and press “MD” to the next

NOTE: Only peak hold and saved data will be processed

- iii. The right display shows the number of data to process. Press “MD” key to proceed or press “C” key to go back to measurement mode

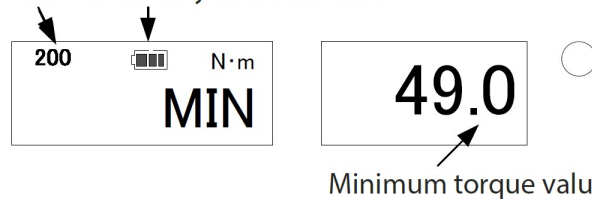


- iv. The display shows maximum value of the selected data range. Press “MD” key to proceed or press “C” key to go back to measurement mode



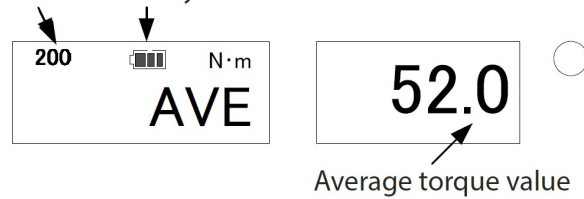
- v. The display shows minimum value of the selected data range. Press “MD” key to proceed or press “C” key to go back to measurement mode

Upper Counter Battery level indicator



- vi. The display shows minimum value of the selected data range. Press “MD” or “C” key to go back to measurement mode

Upper Counter Battery level indicator



9.3. Data clearance

9.3.1. Delete a single data

- i. Set the counter number to be deleted

Time (hh:mm) Battery level indicator



Counter

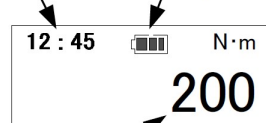


Torque value

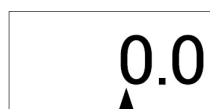
- ii. Press "C" key to delete

- The example display if there is no Hi/ Lo limit torque setting

Time (hh:mm) Battery level indicator



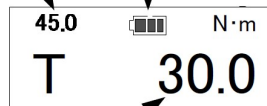
Counter



Torque value

- The example display if there are Hi/ Lo limit torque settings

Upper limit torque Battery level indicator



Lower limit torque

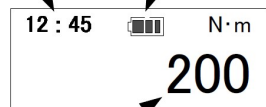


Torque value

9.3.2. Delete the selected range of data

- i. Set the counter number to the upper end that you delete using ▲ ▼ keys, then press "MD" key to the next

Time (hh:mm) Battery level indicator



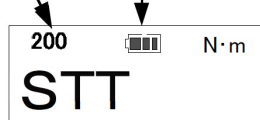
Counter



Torque value

- ii. Set the number on right display to the lower end that you delete using ▲ ▼ keys then press "MD" key to the next

Upper counter Battery level indicator



Lower counter

Example 1) To delete data 001 to 200

Set counter to 200 and press "MD" key. Confirm STT shows 1 and press "MD" to the next

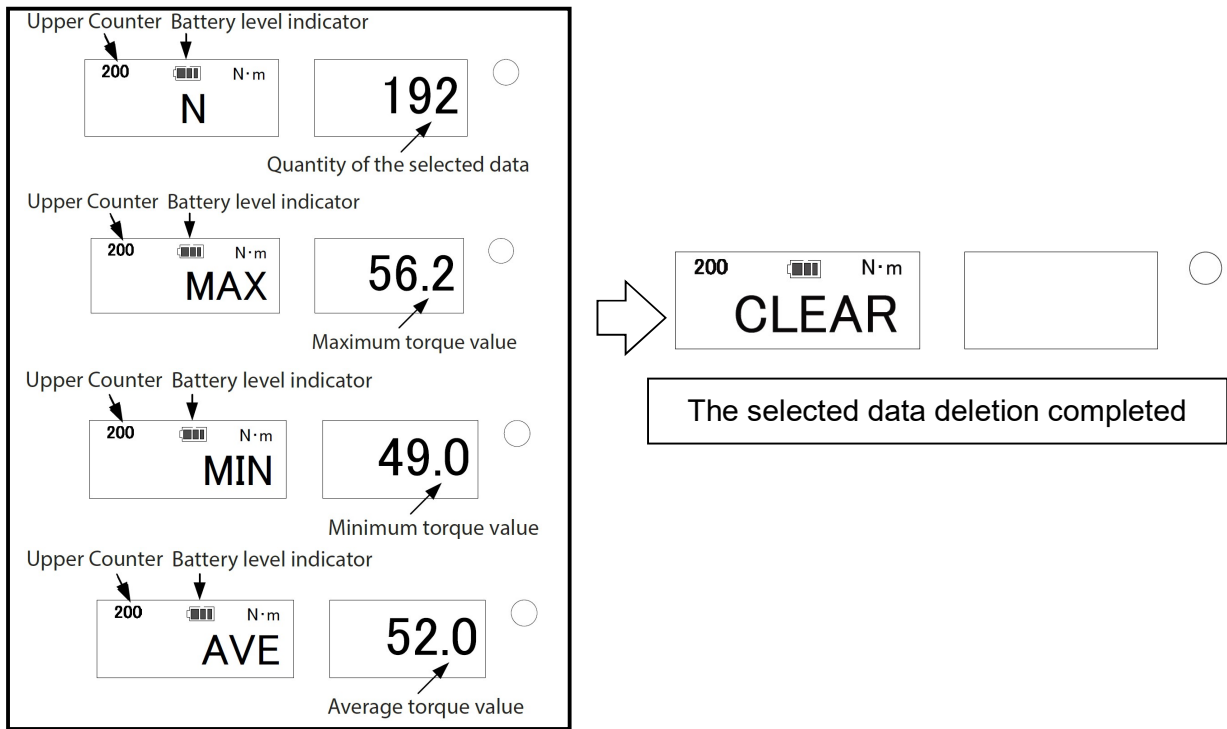
Example 2) To delete data 101 to 200

Set counter to 200 and press "MD" key. Set STT number to 101 and press "MD" to the next

Example 3) To delete all data

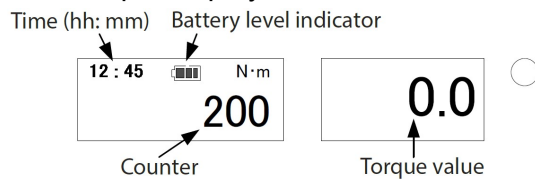
Set counter to 999 and press "MD" key. Confirm STT shows 1 and press "MD" to the next

- iii. Press "MD" key and "C" key at the same time when the left display shows either "N", "MAX", "MIN" or "AVE" such as the following example displays. Then release both keys.

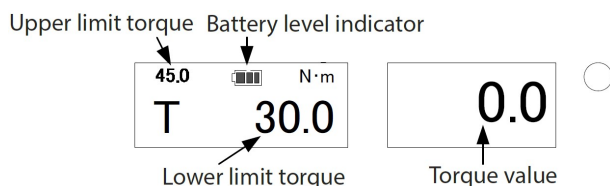


- iv. After deletion completed display back to the lower end counter and back to measurement mode

- The example display if there is no Hi/ Lo limit torque setting



- The example display if there are Hi/ Lo limit torque settings



10. Error messages

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.

11. Common specifications

Torque accuracy	±1%
Angle accuracy	±2° + 1digit (rotating 90 degrees at speed of 30~180°/sec)
Display	7 segments LED 4 digits 14 segments LCD 6 digits 7 segments LCD 4digits OK/ NG judgment LED Blue·Red Bluetooth® power LED Red Bluetooth®connection status LED Blue Battery level indicator 4 steps
Data quantity	999 readings (Tightening torque, final angle, judgment result and time)
Basic functions	Peak hold Measured data transmission Auto reset (Torque and angle) Tightening completion alarm OK/ NG judgment Auto zero Auto power off Over torque alarm Clock
Communication	Bluetooth® V3.0 (Profile: SPP) RS232C compliant (2400-19200 bps) USB connector corresponding serial output
Power	Nickel hydrogen battery (BP-5)
Continuous operation	Aprox. 8 hours
Charging time	Aprox. 3.5 hours
Communication mode change	Key operation
Operating temperature	0~40 degrees Celsius (no condensation)