Your Torque Partner
TOHNICHI

Digital Torque Wrench for Small Capacity Torque Control Model CES-G

Operating Instruction

To use this product properly and safely, please read this operating instruction carefully before use. If you have any question about the product and its operations, please contact your nearest distributor or Tohnichi Mfg. Co., Ltd.

Contents

Safety Precautions

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 "caution" by the degree of risk.

" ⚠ Danger" : Imminent danger acting as a serious obstacle.
" ⚠ Warning" : A potential risk of becoming a serious obstacle.
" ⚠ Cautions" : A potential risk of becoming an obstacle although it does not result seriously.

⚠ Warning

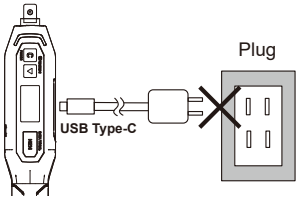
1. Use only a dedicated charger and storage battery referred in this manual.
   - Please do not use any other chargers or storage batteries not designated on this manual.
2. Charge correctly
   - Please use the charger only listed in this manual.
   It may generate heat unusually and there is fear of fire.
   -Do not charge a storage battery where temperature is less than 0 degree, and more than 40 degrees C.
   -Doing so may cause battery to burst or set on fire.
   -Please charge a storage in a well-ventilated place.
   -Please do not cover a charger or a storage battery with cloth etc.
   -Doing so may cause battery to burst or set on fire.
   -When not using charger, extract plug from outlet to avoid electric shock or fire.
3. Take the circumference situation of work place into consideration.
   - Please do not use main part, a charger, and a storage battery in rain, or in a place which became wet or got wet.
   - Doing so could cause electric shock, component failure or fire.
   - Keep work place well-lit to avoid any accidents.
   - Please do not use or charge in a place where inflammable liquid and gas exist.
   It may cause explosion or fire.

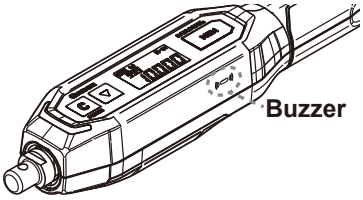
4. Surely use designated accessories and optional articles only.
   - Please do not use other accessories and optional articles not designated in this manual.
   - Doing so may cause an accident or injury.
5. Do not put a storage battery into fire.
   It may burst or a toxic substance may come out.
6. Do not disassemble or remodel the instrument.
   It may damage safety, or function, and cause lower durability, or failure.
7. Switch lever, ratchet firmly (Standard accessory interchangeable head : QH).
   Ratchet slip may cause accident, injury or failure.
8. Do not make connect a pipe to make handle longer.
   It may cause breakage of the body or be the reason of accuracy problem.
9. Take counter measures to use in a high place.
   Drop of body or socket may cause accident, injury and failure.

⚠ Cautions

1. Keep a work place always clean.
   Untidy place or work stand may cause an accident.
2. Do not bring a child to work place.
   A child could be accidentally injured.
3. When you do not use it, keep it in a right place.
   Keep work place when not using and always put all equipment and tools away to avoid any injuries.
   Do not keep main part or battery in a place where the temperature will go to 50 degrees C or more.
   Doing so may cause degradation to the battery.
   Battery can also start to smoke and/or start on fire.
4. Do not force tool to work.
   In order to work efficiently and safely, please work with the torque range of the tool and the part that the tool is being used on.
5. Use the tool to fit work.
   Always make sure that you use the proper size tool with the proper torque range for each part.
   Forcing tools can cause injury to one's self and damage to tool.
6. Do not handle the battery cord which is sold separately, roughly
   Do not carry a battery by its cord.
   Do not put cord by heat, gas, oil, or sharp corner.
   Doing any of above can cause electric shock and/or fire by short.

7. Always brace yourself and maintain balance.
   Not doing so may cause injury to one's self.
8. Maintain carefully
   Exchange of accessories should follow the manual.
   It may cause injury.
   Check cord periodically.
   If damaged cord can cause electric shock, fire, and /or other injuries.
   Keep grip area and in good condition.
   Keep out of oil and grease.
9. Check case and other parts for any damage before usage.
   Check all functions for any damage before usage.
   Do not use a charger if inlet plug and /or cord are damaged.
   Do not use charge if it is dropped and something is damaged.
   It may cause electric shock and fire by short.
   Ask distributors or Tohnichi for damaged case, other parts replacement, and repair.
10. Do not insert a foreign object such as a needle into the buzzer opening on the side of the case.
    It may cause malfunction of the buzzer and damage to the case.
    Ask distributors or Tohnichi for damaged case, other parts replacement, and repair.
11. The USB Type-C terminal on the side of CES is NOT a terminal for power supply.
    Do not connect the USB Type-C port to a power outlet. There is a risk of failure of the internal board.





Operating Precautions

For correct and safe use

(1) Charge only with the designated charger.
(2) Only use the battery model designated in this manual.
(3) Do not cause shock or vibration to this instrument.
(4) Only use this tool in the way that the manual states.
(5) Check starting inspection before usage, and confirm the setting.
(6) This instrument has a possibility of trouble or breakage if wet by water or oil.
(7) Do not drop or hit this instrument because it may cause trouble or breakage.
(8) Use this instrument within measuring range of the manual.
(9) Do periodical inspection for this instrument.
(10) Do zero adjustment before measurement.
(11) Surely hold effective line of the handle to do accurate measurement, and apply force at right angle to the torque wrench.
(12) Connect body and interchangeable head surely.

If there is strange smell or fire on usage, stop use.
Move this instrument to a safety place, and contact Tohnichi.

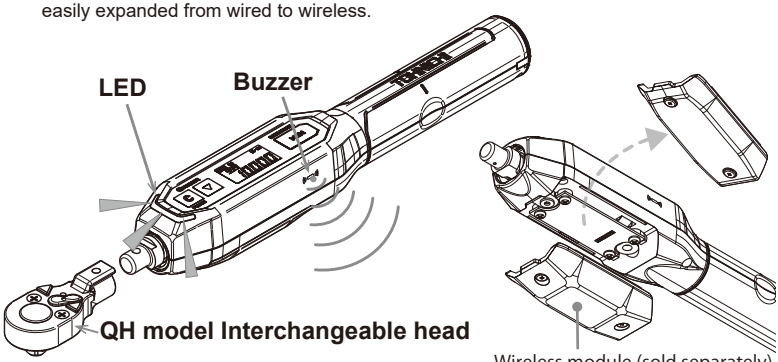
* For handling of used battery *
Nickel metal hydrogen battery is used on this product.
We appreciate your utmost efforts to recycle it to save the resources.
Ask the distributors or Tohnichi Japan or overseas facility.

1 Outline

The CES-G series is a small capacity type digital torque wrench for tightened bolt inspection and bolt tightening work.
The angle measurement function enables advanced tightening work based on torque and angle.
In addition, by installing an optional wireless module, measurement data and OK/NG judgment results can be transmitted wirelessly.

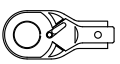
2 Features

- The miniaturization of the main body greatly reduces the tool interference area, making it possible to manage tightening data in narrow spaces that could not be used before.
- Since it is an interchangeable head type, you can choose the head that matches the work, so it can be used for various works.
- The ergonomically designed handle makes it easy to grip and the weight balance is optimized to reduce fatigue even after long hours of use.
- It has a wide range that can be measured from 10% of the maximum torque measurement range.
- Equipped with an LED and a buzzer that allow you to check the current tightening status and OK/NG judgment results from various angles.
- "Inspection mode" and "tightening mode" can be selected according to the work.
- By monitoring the angle in the tightening mode, it is possible to detect errors due to double tightening detection, detection of torque increases due to the insufficient rotation angle due to "galling (seizing)", and tightening abnormalities such as " forgetting to assemble the spring washer", can be detected.
- The torque wrench manufacturing number and tool management number (7-digit alphanumeric characters) can be added to the measurement data, enabling traceability to be established.
- By installing a wireless module (sold separately), the communication function can be easily expanded from wired to wireless.

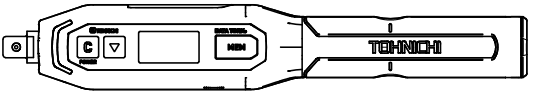


3 Composition

3-1. Packing contents



Interchangeable head QH 1 pc



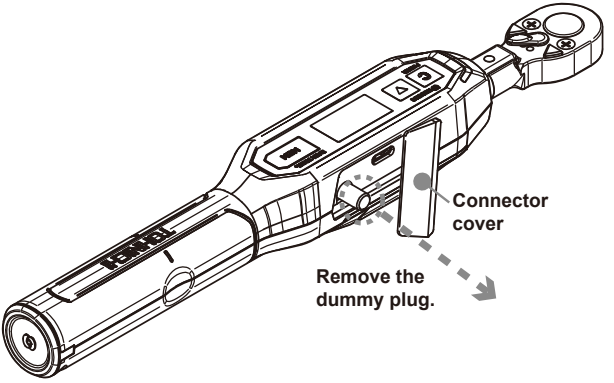
Body : 1pc

Dummy plug 1 pc

Operating instruction 1PC ····· 1 pc
Quick start manual ····· 1 pc
Calibration certificate ····· 1 pc
* Charger (BC-3-G) is sold separately.

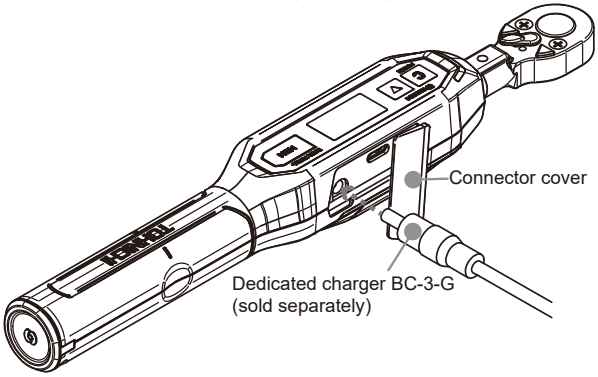
3-2. Before use

- Remove the dummy plug of the DC jack attached to the CES main unit before using.
- Connect the dedicated charger (BC-3-G sold separately) to the CES DC jack and charge the battery before use. (For details on charging, please refer to "13. Charging")
- If the battery will not be used for a long period of time, attach the included dummy plug to the CES DC jack and store it after charging.
- Even in that case, be sure to charge the CES main unit once every six months.



4 Charging

Refer to the diagram below, remove the CES connector cover and connect the dedicated charger (BC-3-G sold separately) plug to the CES charging jack.
Make sure the charger is connected to the power source.
Green lamp on charger turns on when charging is completed.
(It takes about 3.5 hours from the empty condition)

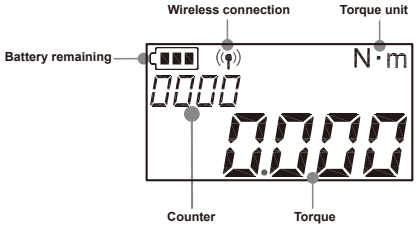


1. Check the voltage on the charger (BC-3-G) and use the appropriate power source.
2. Over charging may shorten the battery life. Stop charging as soon as fully charged.
3. CES is unavailable when it is connected to the charger.
4. If the blue lamp on the charger turns on and red lamp blinks, it indicates an error. Stop charging immediately, and contact Tohnichi or nearest Tohnichi distributor.
5. Temperature must be kept within 0 to 40 Celsius range when charging.
6. If detecting abnormal heat or smell from the product during use, stop using immediately and contact Tohnichi or nearest Tohnichi distributor.
7. When not in use for a long period, attach the dummy plug to the CES DC jack and store it after charging. It is recommended to charge at least once every half year.
   * CPU reset is automatically triggered when the charging plug is unplugged.

5 How to use

5-1. Run mode (counter value: 0000)

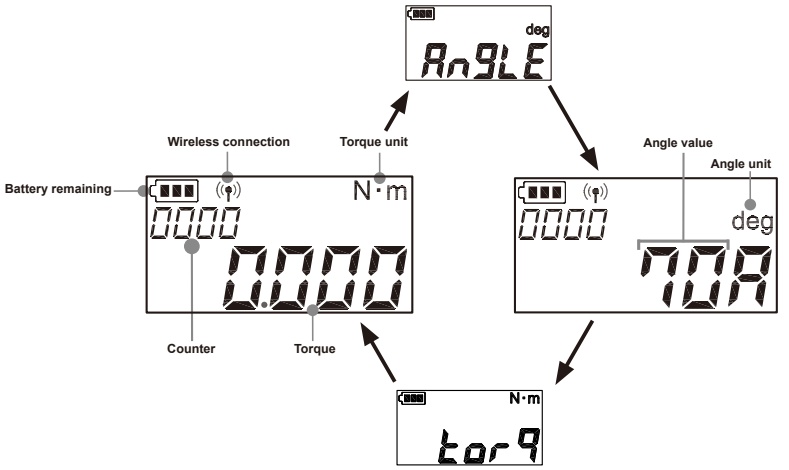
[Without angle setting]



[With angle setting]

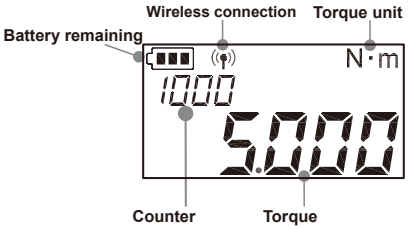
When the angle function is turned on,
it is possible to switch between the torque screen and the angle screen on the run mode screen.

* Torque display screen → Angle display screen
  Press and hold the MEM key for 2 seconds on the torque display screen to display "AngLE" on the screen.
  When you release the MEM key in that state, the angle display screen appears.
* Angle display screen → Torque display screen
  Press and hold the MEM key for 2 seconds on the angle display screen, and "torq" will be displayed on the screen.
  When the MEM key is released in this state, the torque display screen appears.



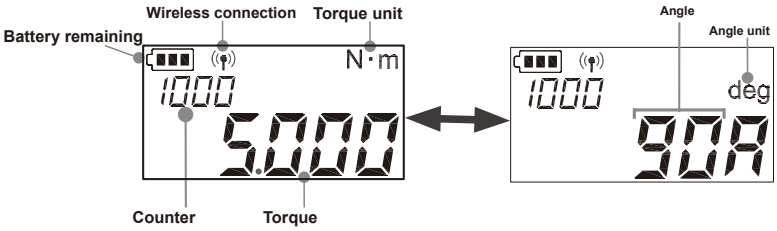
5-2. Peak mode (The counter : “0001” to “1000”)

[Without angle setting & with measurement data memory]



[With angle setting & with trigger torque and measurement data memory

When the angle function is ON, the trigger torque is set and there is measurement data memory, the memorized torque and angle are alternately displayed on the screen.



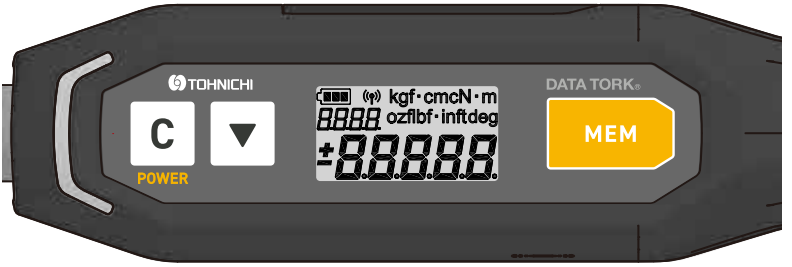
5-3. Calibration of Torque/Angle

Use the ▼ key to set the run mode (counter 0000).

Torque values are obtained using a torque wrench tester, and angles are obtained using an angle calibrator.

Please contact us for more information.

5-4. Key operation



C (Power) Key

- When the power is off, press to turn on the power. If the angle function is set to ON, the angular velocity will be checked when the power is turned on, so keep it stationary for 2 seconds.
- When power is ON, press and hold for 2 seconds to turn power OFF.
- During Bluetooth pairing, a long press for 2 seconds will display "bt-on", and the CPU will go to sleep while pairing. (Bluetooth module sold separately)
- Press and hold for 4 seconds to turn off Bluetooth.
- If pressing when there are measured values, the measured values will be cleared
- Autozero is taken when there is no measured value.

▼ Key

- Counter back.
- If the▼ key is pressed when the counter is 0000, the counter becomes 1000.
- Press and hold to go back by 10.
- When long pressed to go back by 10, the counter stops at 0000.

MEM Key

- Counter up.
  [RUN mode (counter 0000)]
- Press and hold the MEM key for 2 seconds when the angle function is set to ON.
- Then, the torque display and the angle display are switched.
- Press and hold the MEM key for 5 seconds to enter setting mode.
  [PEAK mode (counter 0001-1000)]
- Press and hold the MEM key for 2 seconds to enter calculation mode.
- When there is a measured value, OK/NGl judgment and data saving are performed.
  - Outputs data if communication with an external device is established.

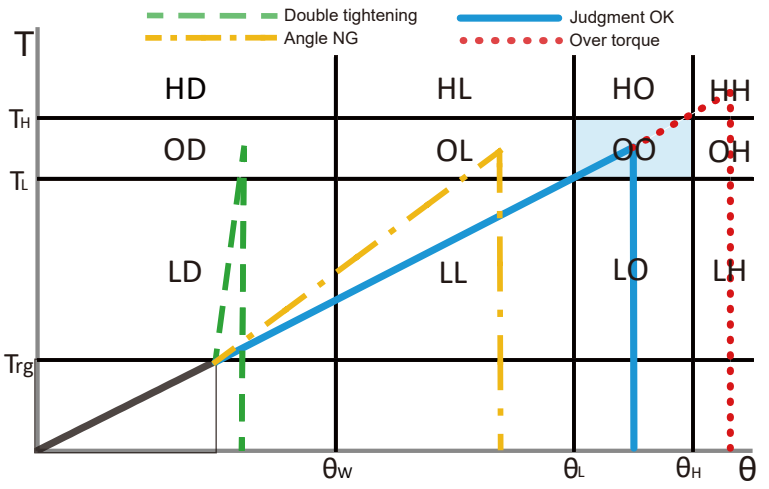
C(POWER) Key + MEM Key (when the power is off)

- When the display is off, pressing the C (POWER) key while holding down the MEM key will reset the CPU.

6 Judgment

6-1. Judgment

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



※ 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

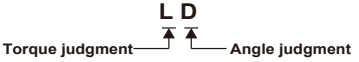
※ Notation in graph

※ D : Double tightening detection NG L : LoNG H : HiNG O : OK

※ Prioritize tightening the direction NG over the torque judgment.

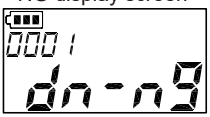
※ Prioritize tightening the double tightening detection NG over the angle judgment.

Judgmentt example



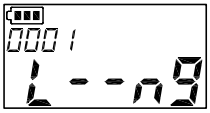
(Example)
Judgment : DN
Contents : Tightening direction NG
Display : dn-ng

NG display screen



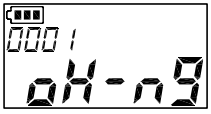
(Example)
Judgment : L-
Torque Judgment : LONG
Angle Judgment : (No angle setting)
Display : L--ng

NG display screen



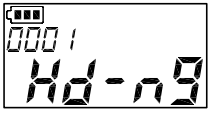
(Example)
Judgment : OH
Torque Judgment : OK
Angle Judgment : HING
Display : oH-ng

NG display screen



(Example)
Judgment : HD
Torque Judgment : HING
Angle Judgment : DT-NG
Double tightening detection and angle NG
Display : Hd-ng

NG display screen



- By setting the higher and lower limit torque, higher and lower limit angle, and double tightening detection angle, OK/NG judgment is made.
- When the communication format setting is set to "dF-1" or "dF-3", the 2-digit OK/NG judgment result shown in the table on the next page is output to the external device. (For details, please refer to "9-2. Measurement data output format".)
- Also, if the NG transmission setting is set to “ng-1”, the 2-digit OK/NG judgment result will be displayed on the LCD screen when the OK/NG judgment is NG.
- (For details, please refer to "8-2. Tightening mode operation example (measurement mode setting 2)" [If the judgment result is NG_NG transmission setting: ng-1].)

6-2. Judgment list

Settings	Judgment result	
	Judgment code	OK/NG
No torque judgment or not reach on minimum peak torque hold	-- (No judgment)	
With torque judgment settings and if used wrong tightening direction	D N (Tightening direction NG)	NG
With torque judgment settings and no angle judgment setting	O- (Torque OK)	OK
	L- (Torque LO-NG)	NG
	H- (トルク HI-NG)	NG
With torque judgment, double tightening detection angle and angle judgment settings	OO (Torque OK・Angle OK)	OK
	OD (Torque OK・Angle DT-NG)	NG
	OL (Torque OK・Angle LO-NG)	NG
	OH (Torque OK・Angle HI-NG)	NG
	LO (Torque LO-NG・Angle OK)	NG
	LD (Torque LO-NG・Angle DT-NG)	NG
	LL (Torque LO-NG・Angle LO-NG)	NG
	LH (Torque LO-NG・Angle HI-NG)	NG
	HO (Torque HI-NG・Angle OK)	NG
	HD (Torque HI-NG・Angle DT-NG)	NG
	HL (Torque HI-NG・Angle LO-NG)	NG
	HH (Torque HI-NG・Angle HI-NG)	NG

	Torque		Angle	
	Judgment	Conditions	Judgment	Conditions
	With torque setting			
	OK	TL ≦ T ≦ TH	No angle setting	
	LO-NG	T < TL	No angle setting	
	HI-NG	TH < T	No angle setting	
	OK	TL ≦ T ≦ TH	OK	θ L(θ w) ≦ θ ≦ θ H
	OK	TL ≦ T ≦ TH	DT-NG	θ < θ w
	OK	TL ≦ T ≦ TH	LO-NG	θ W ≦ θ < θ L
	OK	TL ≦ T ≦ TH	HI-NG	θ H < θ
	LO-NG	T < TL	OK	θ L(θ w) ≦ θ ≦ θ H
	LO-NG	T < TL	DT-NG	θ < θ w
	LO-NG	T < TL	LO-NG	θ W ≦ θ < θ L
	LO-NG	T < TL	HI-NG	θ H < θ
	HI-NG	TH < T	OK	θ L(θ w) ≦ θ ≦ θ H
	HI-NG	TH < T	DT-NG	θ < θ w
	HI-NG	TH < T	LO-NG	θ w ≦ θ < θ L
	HI-NG	TH < T	HI-NG	θ H < θ

7 Explanation of each mode

CES-G has a Measurement mode and a Display mode, each with different functions.

1. Measurement mode

Measurement mode 1 (Inspection mode)

- Measurement mode 1 is mainly used together with the higher and lower limit torque display mode (peak mode) for retightening and loosening torque inspections.
- By inputting and setting higher and lower limit torque values, higher and lower limit angle values, and tightening directions, OK/NG judgments can also be performed.
- (For measurement mode 1, the double tightening detection angle cannot be set.)

Measurement mode 2 (Tightening mode)

- Measurement mode 2 is mainly used with tightening.
- When you set higher and lower limit torque values, higher and lower limit angle values, and tightening directions, the tool gives the beep intermittent and blue LED if the torque value reaches about 80% of low limit torque. Once reaching on low limit torque value the tool gives beep continuous and blue LED to inform you of the completion of tightening.

2. Display mode

RUN mode [Counter: 0000]

- Setting the counter 0000, the display shows the torque value being applied at the moment and returns to zero when torque is released.
- When the angle function is set to ON, press the MEM key for about 2 seconds to display the angle.
- The angle value has positive when to rotate to CW and angle has negative when to CCW.

Peak mode [Counter: 0001 to 1000]

Setting the counter 0001~1000, when a torque load is applied, the displayed torque increases. The displayed torque retains the maximum value even if the load is released.

Angle measurement is performed while the trigger torque is exceeded.
(If the trigger torque is not set, the angle will not be counted.)

[Tightening in the right]
When tightening in the right direction, the angle is counted positive when the trigger torque is exceeded, and the torque is turned to the right.
(If the trigger torque is not set, the angle will not be counted.)

[Tightening in the left]
When tightening in the left direction, the angle is counted negative when the trigger torque is exceeded and the torque is rotated to the left, and
the maximum value is maintained even when the torque load is released, and the torque is rotated to the right.
(If the trigger torque is not set, the angle will not be counted.)

8 Explanation of functions

1. Angle measurement and output

With the angle setting ON, 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-1" or “dF-3”.

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.
* If the "Err9" display does not disappear, hold down the C (POWER) key for 2 seconds to turn off the display. When the display is off, pressing the C (POWER) key while holding down the MEM key will reset the CPU then press the C (POWER) key again.
* If the “Err9” display does not disappear, there may be an abnormality in the sensor or circuit board. Please contact your distributor or Tohnichi.

3. Angel speed check/zero adjustment

With the angle setting ON, 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 kept still for more than 2 seconds. In case of “Err0”, refer to next “13 Error message.

4. Auto memory/reset

The peak-held 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 at 0.0 seconds.

5. Judgment (Comparator function)

Set the torque, angle, double tightening detection angle and direction of tightening, these judges whether the measured result are within the range or not.

<<Tightening mode>>

The tool gives the beep intermittent and blue LED if the torque value reaches about 80% of low limit torque. Once reaching on low limit torque value the tool gives beep continuous and blue LED to inform you of the completion of tightening.

<<Inspection mode>>

After measurement, the tool makes OK/NG judgment by pressing the MEM key. The judgment result is notified with a blue or red LED. If the auto-reset timer is set, OK/NG judgment is automatically made.

6. Mute

By setting “Off” on the buzzer output setting, the buzzer sound on key operation will be turned off. However, an over-torque alarm remains effective.

7. 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.

8. Residual battery indicator

Residual battery amount is indicated on the display as follows:


Full


Half remaining


Time to charge battery

No battery. Please charge immediately.
In this condition, “LoBATT” appears on LCD screen and all keys, except for power key will be disabled, and it automatically turns off in 1 minute. Each settings remain unchanged even after “LoBATT” condition.

9. 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.

10. Over-torque/Peak-torque hold starting value

Model	Torque range [N·m]		1digit [N·m]	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.				
CES5NX6D-G	0.500 (0.100)	5.000	0.005	5.25	0.375	0.375
CES10NX8D-G	1.00 (0.20)	10.00	0.01	10.50	0.75	0.75

* The value in ( ) is the minimum trigger torque setting.
Trigger torque accuracy is not guaranteed below the minimum torque measurement range.

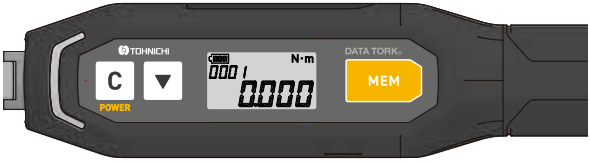
9 Operation examples

9-1. Operation examples

Shows example on the following settings:

Ang	Angle setting	oFF
SEL	Measurement mode setting	1
Lo_t	Lower limit torque setting	3.000 Nm
HI_t	Higher limit torque setting	4.500 Nm
trg	Trigger torque setting	
An_d	Double tightening detection angle setting	
An_L	Lower limit angle setting	
An_H	Higher limit angle setting	
Ar	Auto memory/reset timer setting	0.0 sec. (OFF)
ng	NG output setting	ng-2

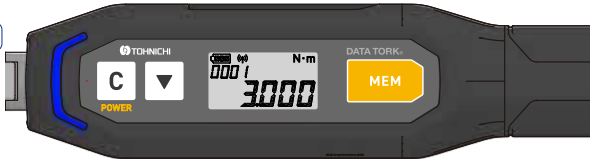
1. Set to Peak mode (counter between "0001" to "1000") and start measurement.



2. After releasing 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)

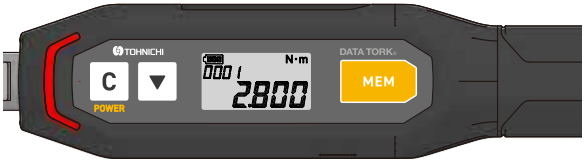
[When judgment is OK]
When judgment is OK, the blue LED lights for about 0.5 seconds.
The measurement data is automatically stored in memory.

Blue LED 0.5 sec.



[When judgment is NG_NG output setting "ng-2"]
When judgment is NG, the blue LED lights for about 0.5 seconds.
Since the NG processing is set to automatic count up (ng-2), the measured data is automatically stored in memory.

RED LED 0.5 sec.



3. A counter is sent when the MEM key is pressed.
The saved measurement data is displayed.
* If the counter is sent by the auto memory reset function (setting other than 0.0 sec.), the counter's measured value will be overwritten.

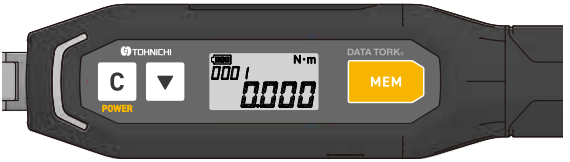
9-2. Tightening mode (Measurement mode 2) examples

Shows example on the following settings:

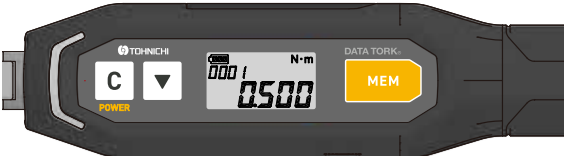
Ang	Angle setting	on
SEL	Measurement mode setting	2
Lo_t	Lower limit torque setting	3.000 N·m
HI_t	Higher limit torque setting	4.500 N·m
trg	Trigger torque setting	0.500 N·m
An_d	Double tightening detection angle setting	0 deg
An_L	Lower limit angle setting	20 deg
An_H	Higher limit angle setting	40 deg
Ar	Auto memory/reset timer setting	0.5
ng	NG output setting	ng−1

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

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

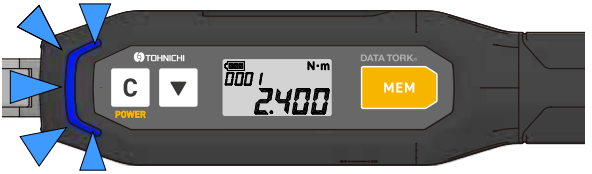


2. When torque load reaches on trigger torque, starts the angle measurement.



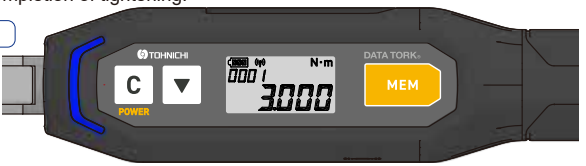
3. The tool gives the beep intermittent and blue LED if the torque value reaches about 80% of low limit torque to inform you that the lower limit torque is approaching.

Blue LED flashing



4. Once reaching on low limit torque value the tool gives beep continuous and blue LED to inform you of the completion of tightening.

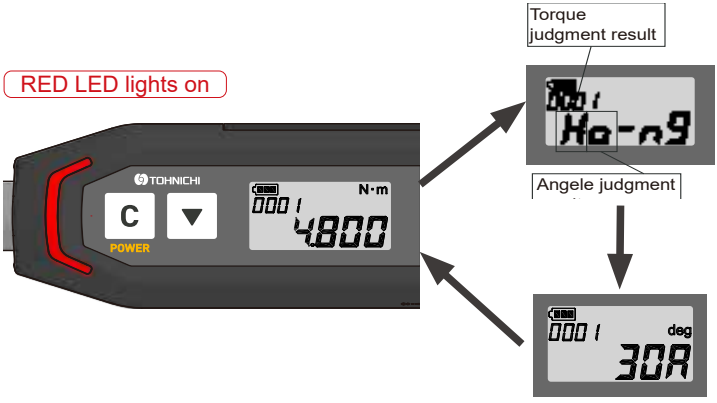
Blue LED lights on



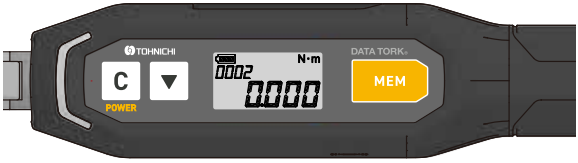
5. After measuring and releasing the torque load, the tool judges the measured data due to Auto reset timer setting. (If Auto reset timer is off, press "MEM" key to judge the result)

[When judgment is OK]
□When judgment is OK, the measurement data is stored in memory.

[When judgment is NG_NG output setting : ng-1]
When judgment is NG, the red LED lights.
Since the NG processing is set to "ng-1", the red LED turns on and buzzer sounds continuously, the display shows the NG judgment result and measured angle repeated alternatively each 1 second. Regarding the NG screen, the two digits before “-NG” will be the OK/NG judgment result. About NG judgment results, refer to "5-2. Judgment list". Press the "MEM" key to save. Press the "C" key to clear.



6. After a memory counter is sent, peak torque value is reset.
* In measurement mode 2 (tightening mode), the peak torque value is reset even when the counter is sent with the MEM key.



10 External output format

10-1. Communication conditions

Baud rate	Bluetooth® (Optional)	Depend on a host device
	USB	2400 / 4800 / 9600 / 19200 / 115200bps
Parity		None
Data length		8 bits
Stop bit		1 bit
Flow control		Hardware (RTS/CTS)

※ When using USB (serial output compatible with USB connector), Use the optional communication cables.

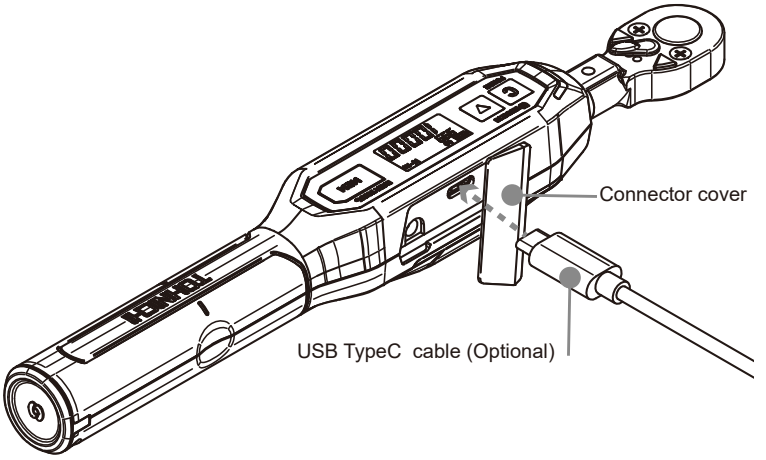
CES-G ◀▬▶ USB C type （No.586）

CES-G ◀▬▶ USB A type （No.587）

When using optional USB (USB connector corresponding serial output) cable, catalog #586 or #587, driver software is required to be installed on your PC from Tohnichi Website.
（https://www.tohnichi.co.jp/products/detail/280）

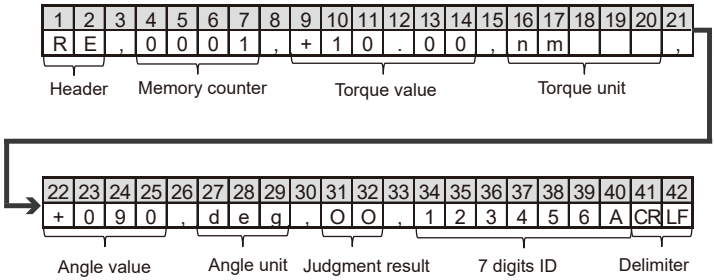
※ When outputting data via USB, remove the CES connector cover as shown below.

※ After that, insert the CES USB connector and USB cable terminal all the way.



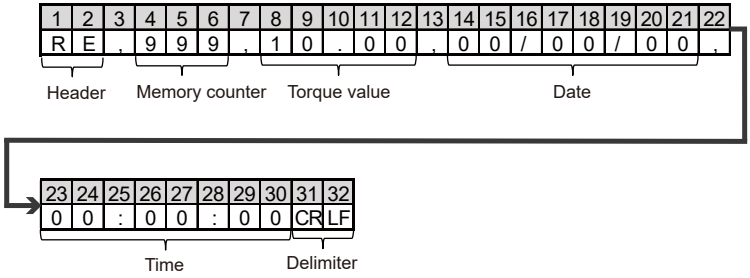
10-2. Communication format

● When set “dF-1” for communication format setting



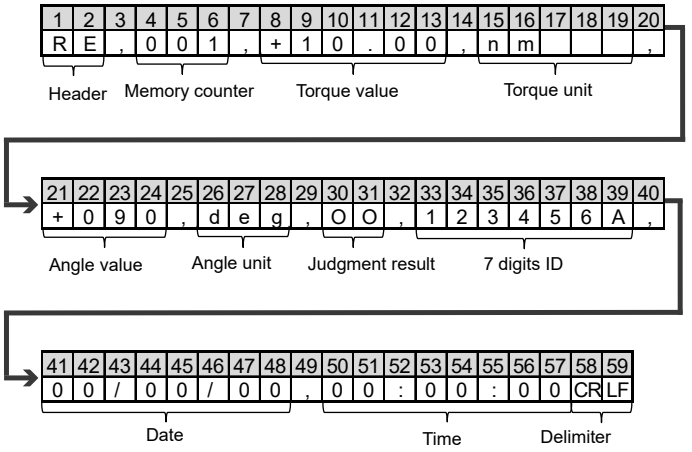
* The top of the torque/angle data is "+" for right load, and "-" for left load.
* The “7 digits ID” can be changed by the command from external device.
  (Default: Serial number of CES)

● When set “dF-2” for communication format setting (CEM3 compatible)



* When the memory counter is 1000, it becomes "000".
* "0" is written for all dates and times.

●When set “dF-3” for communication format setting (CEM3-BTA compatible)



* The top of the torque/angle data is "+" for right load, and "-" for left load.
* When the memory counter is 1000, it becomes "000".
* "0" is written for all dates and times.

10-3. Settings from external device

By entering a command from an external device, you can change the CES settings.
Be sure to change the settings by command communication when there is no torque load.
When changing two or more settings in succession, after receiving the response command, wait at least 200ms before sending the next command.
When CES receives a command, it executes it and sends a response command.

1. Sending Command list

Sending Command	AT023, * * * * * * *
Action/Content	Register a 7-digit alphanumeric code. The * part is an uppercase alphabet and a 7-digit number. Adds the registered character part to the measurement data.
Remarks	Only be registered from 1 to 9 and from A to Z.

Sending Command	AT037,* * * * *, * * * * *
Action/Content	Register the upper limit torque and lower limit torque at the same time. The * part is the torque value of 5 digits including the decimal point. Send in the order of upper limit torque and lower limit torque.
Remarks	Send a value that is within the measurement range and that the upper limit torque is larger than the lower limit torque. (0 can be set)

Sending Command	AT045, * * * * *
Action/Content	Register the trigger torque value. The * part is 5 digits including the decimal point of the torque value.
Remarks	Send a value between 5% of maximum torque and maximum torque. (0 can be set) * Send after manually turning on the angle function setting.

Sending Command	AT046, * * * , * * *, * * *
Action/Content	Register the double tightening judgment angle, lower limit angle, and upper limit angle at the same time. Send in the order of double tightening judgment angle, lower limit angle, and upper limit angle. The * part is a three-digit angle value from 000 to 999.
Remarks	● Double tightening judgment angle: This mode cannot be set when the measurement mode is "1". If you want to change only the lower limit angle and upper limit angle with the mode "1", send "000" for the double tightening judgment angle. ● Lower limit angle Send a value that is equal to or greater than the double tightening judgment angle. (000 can be set). ● Upper limit angle Send a value that is equal to or greater than the lower limit angle and equal to or greater than the double tightening judgment angle. (000 can be set). * The angle threshold cannot be set unless the trigger torque is set.

* All commands are ASCII codes.
* Add CRLF to the end of the command.

2. Response Command lists

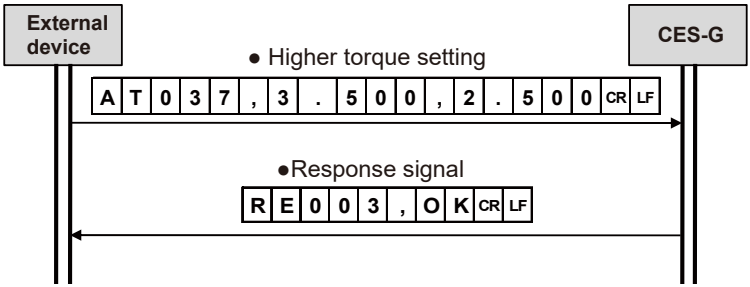
Response Command	RE003,OK
Action/Content	Receipt complete

Response Command	RE004,ERROR
Action/Content	Receipt error Setting value error

Response Command	E10
Action/Content	Receipt error Setting value error *Error when "AT" is not added to the beginning of the Sending Command.

3. Example

●When setting the higher limit torque to 3.500 and the lower limit torque to 2.500.

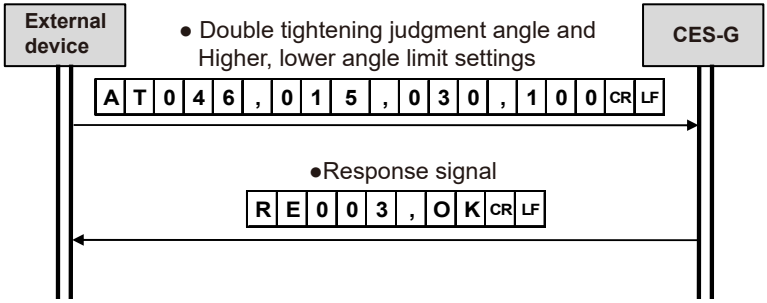


＊ Send the torque value with the decimal point aligned so that it matches the CES display.
If the decimal point position is not aligned, an incorrect value may be set.

Example 1) When sending an higher limit value of 7N･m and a lower limit value of 5N･m to CES10NX8D-G
Send "AT037, 07.00, 05. 00CRLF" since the decimal point position is the second digit.

Example 2) When sending an higher limit value of 3N･m and a lower limit value of 2.5N･m to CES5NX6D-G
Send "AT037,3.000,2.500CRLF" since the decimal point position is the first digit.

●When setting 15° for double tightening judgment angle, 30°for lower limit angle, and 100°for higher limit angle



11 Various settings

11-1. Setting items

Setting items	Display	Default	Selectable from	Note
Angle function	Ang	oFF	oFF / on	
Measurement Mode	SEL	1	1 / 2	
Lower limit torque	Lo_t	0	0 / within the torque range	
Higher limit torque	Hl_t	0	0 / within the torque range	More than lower limit torque (0 can be set)
Trigger torque	trg	0	0 / 2% to 100% of the capacity	Enable when set on the trigger torque
Double tightening detection angle	An_d	0	0 to 999	Measurement mode “2” with trigger torque setting
Lower limit angle	An_L	0	0 to 999	Enable when set on the trigger torque. More than double tightening detection angle (0 can be set)
Higher limit angle	An_H	0	0 to 999	Enable when set on the trigger torque. More than double tightening detection angle and lower limit angle (0 can be set)
Tightening directions	tUrn	rigHt	rigHt / LEFt / botH	
Auto memory/ reset timer	Ar	0.0	0.0 (OFF) / 0.1 to 5.0	
NG output	ng	ng-1	ng-1 / ng-2	
Buzzer	bU	on	on / oFF	
Auto power off	PoFF	3	3 / 10 / 30 / oFF	
Communication mode	do	USb	USb / bc / bLE	
Baud rate	bps	9.6k	2.4k / 4.8k / 9.6k / 19.2k / 115.2k	Communication mode setting
Data length	dL	8bit	8bit / 7bit	Communication mode setting
Parity	Prt	None	None / odd / Even	Communication mode setting
Communication format	dAtA	dF-1	dF-1 / dF-2 / dF-3	
Setting default	dFLt	dFt-n	dFt-n / dFt-Y	

11-2. Setting by key operation

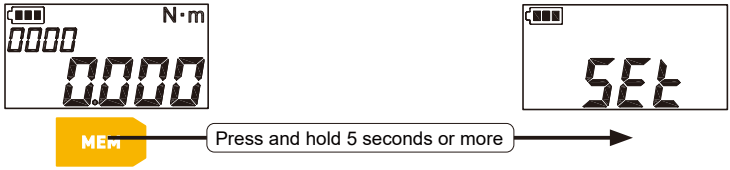
Transition to setting screen (run mode_counter 0000)

Press the ▼ key to set the counter to 0000 and enter the run mode.

{Display when angle feature is OFF}

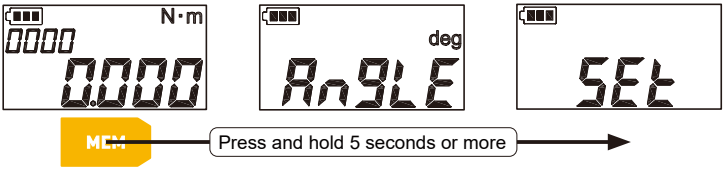
If pressing the MEM key for 5 seconds or more, "SEt" is displayed.

When you release the MEM key, the angle feature setting screen will appear.



[Display when angle feature is ON]

When the angle function is ON, pressing the MEM key for 2 seconds displays "Angle" (or "torq"). If you keep pressing the MEM key for more than 3 seconds, "SEt" is displayed, so when you release the MEM key, the angle feature setting screen will appear.

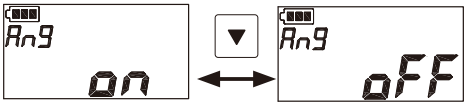


● Angle feature setting (Default : OFF)

Set the angle feature ON/OFF

[When the angle feature is ON]

- The angular velocity is checked at "at reset", "at power on", and "when to exit the setting mode when the angle feature setting is changed from OFF to ON". (Refer to in 7. Functions.)
- In RUN mode, switch torque and angle displays.
- Trigger torque can be set.



C	Go back to RUN mode	▼	Select	MEM	Save and go to next

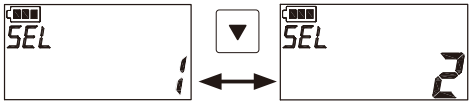
∗ If the angle feature is OFF, the trigger torque setting is skipped (trigger torque cannot be set).

∗ Use ▼ to select, and push the MEM key to save and proceed to the next.

∗ Press the “C” key to go back to RUN mode (measurement mode).

● Measurement mode setting (Default : 1)

Set measurement mode 1 (inspection mode) or measurement mode 2 (tightening mode).



C	Go back to RUN mode	▼	Select	MEM	Save and go to next

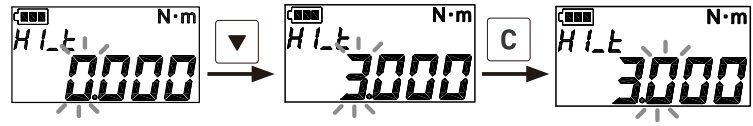
* If measurement mode 1 is set while the double tightening detection angle is set, the value of the double tightening detection angle automatically becomes 0.
* In the case of measurement mode 1, the setting of the double tightening detection angle is skipped. (Double tightening detection angle cannot be set).
* Use ▼ key to select and press MEM key to save and proceed to the next.
  Press the C (POWER) key to go back to RUN mode.

● Lower limit setting (Default : 0)

C	Select digit	▼	Select	MEM	Save and go to next

* “S-Err” is displayed outside the setting range.
* Use C (POWER) key to select digits, ▼ key to select values and MEM key to save and proceed to the next.

● Higher limit setting (Default : 0)

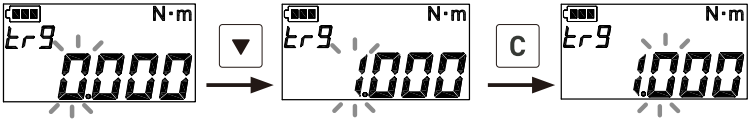


C	Select digit	▼	Select	MEM	Save and go to next

- If the set value is lower than the lower limit torque value or outside the setting range, "S-Err" is displayed.
- Use C (POWER) key to select digits, ▼ key to select values and MEM key to save and proceed to the next.

● Trigger torque setting (Default : 0)

Set the trigger torque. This is the starting torque for angle measurement.
Cannot be set if the angle function setting is OFF.

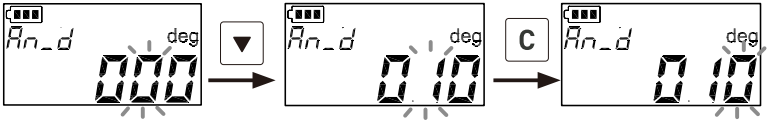


C	Select digit	▼	Select value	MEM	Save and go to next

- "S-Err" is displayed outside the setting range.
- When trigger torque is not set (set to 0), set the double tightening detection angle, lower limit angle, and higher limit angle to 0 and proceed to tightening direction setting.
- When the trigger torque is set, if the measurement mode setting is measurement mode 1, proceed to lower limit angle setting, and if measurement mode 2, proceed to double tightening detection angle setting.
- Use C (POWER) key to select digits, ▼ key to select values and MEM key to save and proceed to the next.

● Double tightening detection angle setting (Default : 0)

Set the angle that is OK/NG judgment criteria for double tightening.

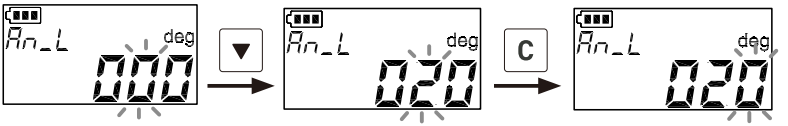


C	Select digit	▼	Select value	MEM	Save and go to next

- With measurement mode 1, angle cannot be set.
- Use C (POWER) key to select digits, ▼ key to select values and MEM key to save and proceed to the next.

● Lower angle limit setting (Default : 0)

角度起点からの下限角度を設定します。

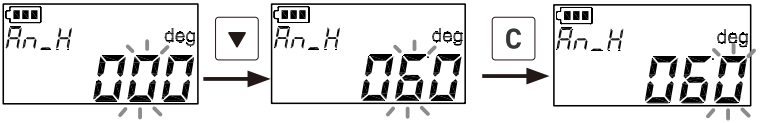


C	Select digit	▼	Select value	MEM	Save and go to next

- If the set value is lower than the double tightening detection angle, "S-Err" is displayed.
- Use C (POWER) key to select digits, ▼ key to select values and MEM key to save and proceed to the next.

● Higher angle setting (Default : 0)

Sets the upper angle limit from the angle starting point.

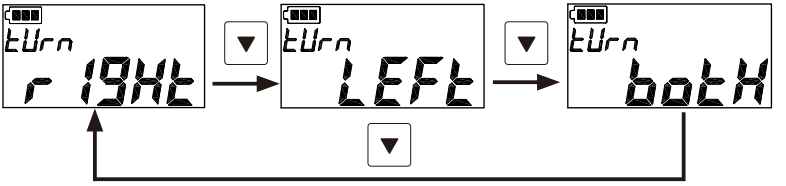


C	Select digit	▼	Select value	MEM	Save and go to next

- If the set value is lower than the double tightening detection angle or the lower limit angle, "S-Err" is displayed.
- Use C (POWER) key to select digits, ▼ key to select values and MEM key to save and proceed to the next.

● Tightening direction setting (Default : rigHt)

Set the tightening direction rigHt (right direction), LEFt (left direction), and botH (both directions).



C	Go back to RUN mode	▼	Select	MEM	Save and go to next

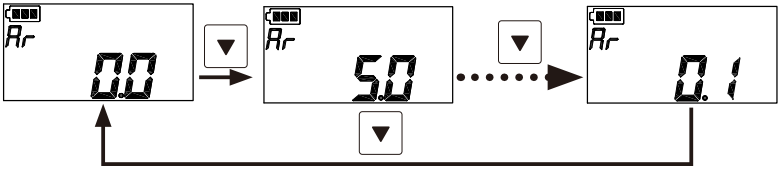
- Use ▼ key to select and press MEM key to save and proceed to the next.

Press the C (POWER) key to go back to RUN mode.

• Auto memory/Reset timer setting (Default: 0.0)

Set the Auto memory/Reset timer.

If no setting, set it to 0.0.



C	Go back to RUN mode	▼	Select	MEM	Save and go to next

• Auto reset timer setting

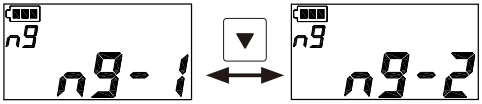
0.0 (OFF) → 5.0 → 4.0 → 3.0 → 2.0 → 1.0 → 0.5 → 0.4 → 0.3 → 0.2 → 0.1 sec.

• Use ▼ key to select and press MEM key to save and proceed to the next.

• Press the C (POWER) key to go back RUN mode.

• NG process setting (Default : ng-1)

Select ng-1 (manual count-up) or ng-2 (automatic count-up).



C	Go back to RUN mode	▼	Select	MEM	Save and go to next

* NG process settings

• ng-1 (manual count)

If the OK/NG judgment is NG, the auto-reset function will not work. Press the MEM key to send the measurement data.

• ng-2 (automatic count)

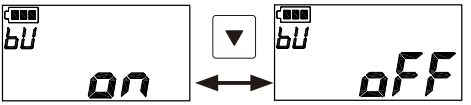
Even if OK/NG judgment is NG, measurement data will be sent after the set time of the auto-reset timer elapsed.

• Use ▼ key to select and press MEM key to save and proceed to the next.

* Press the C (POWER) key to go back RUN mode.

● Buzzer setting (Default : on)

Sets the buzzer on or off for the key operation, tightening completion signal, and pass/fail alarm sound.
However, an over-torque alarm cannot be turned off.

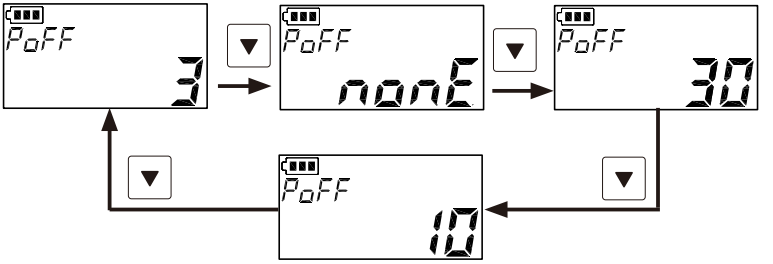


C	Go back to RUN mode	▼	Select	MEM	Save and go to next

* Use ▼ key to select and press MEM key to save and proceed to the next.
Press the C (POWER) key to go back RUN mode.

● Auto power off timer setting (Default : 3)

Set the auto power off time.



C	Go back to RUN mode	▼	Select	MEM	Save and go to next

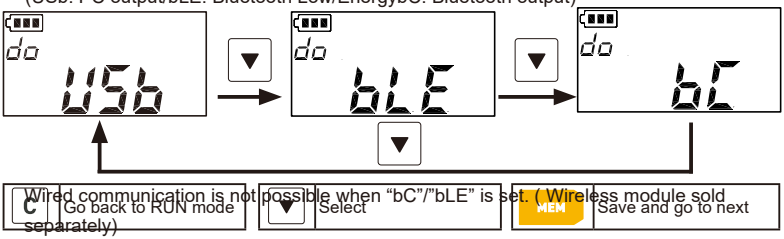
• Auto power off setting time (3: 3 minutes / 10: 10 minutes / 30: 30 minutes / nonE: None)
• If there is no key operation or torque load for the set time, the power automatically turns off.
• If pairing after attaching an optional wireless module to CES, the power of the wireless module will not be turned off during pairing.
• If you select nonE, the power does not turn off until you turn it off with the C (POWER) key or until the battery runs out.

* Use ▼ key to select and press MEM key to save and proceed to the next.
Press the C (POWER) key to go back RUN mode.

● External output communication mode setting (Default: USB)

Select an external output format.

(USb: PC output/bLE: Bluetooth Low/EnergybC: Bluetooth output)



C	Go back to RUN mode	▼	Select	MEM	Save and go to next

Wired communication is not possible when “bC”/”bLE” is set. (Wireless module sold separately)

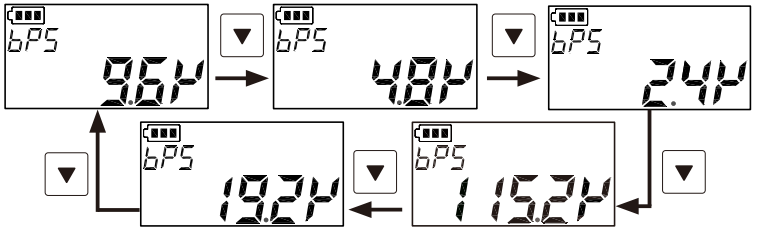
* When bC/bLE is selected, proceed to communication format setting.
* When USB is selected, proceed to baud rate setting.
* Use ▼ key to select and press MEM key to save and proceed to the next.
  Press the C (POWER) key to go back to RUN mode.

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

Set the communication baud rate for external output.

{2400(2.4k)bps / 4800(4.8k)bps / 9600(9.6k)bps / 19200(19.2k)bps / 115200(115.2k)bps}

* When outputting data to a PC, match the baud rate of the software on the PC side.

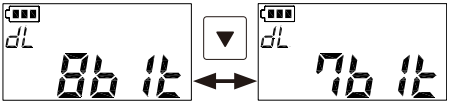


C	Go back to RUN mode	▼	Select	MEM	Save and go to next

* Use ▼ key to select and press MEM key to save and proceed to the next.
  Press the C (POWER) key to go back to RUN mode.

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

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



C	Go back to RUN mode	▼	Select	MEM	Save and go to next

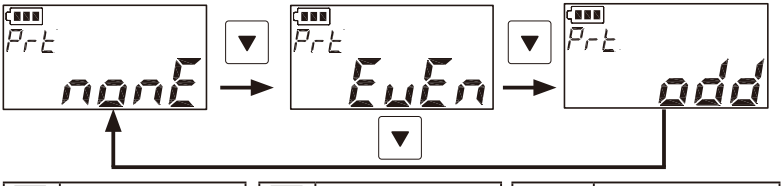
* Use ▼ key to select and press MEM key to save and proceed to the next.
  Press the C (POWER) key to go back to RUN mode.

● External output parity setting (Default: NONE)

Sets the communication parity for external output.

(NONE: None/EVEN: Even number/ODD: Odd number)

* When outputting data to a PC, match the software on the PC side.



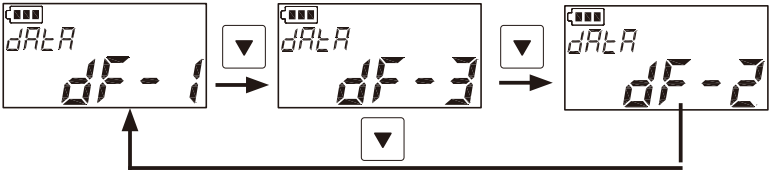
C	Go back to RUN mode	▼	Select	MEM	Save and go to next

* Use ▼ key to select and press MEM key to save and proceed to the next.
  Press the C (POWER) key to go back to RUN mode.

● Communication format setting (Default: dF-1)

Change the communication format. (dF-1/dF-2/dF- 3)

For details, see “9-2. Measured data output format”.

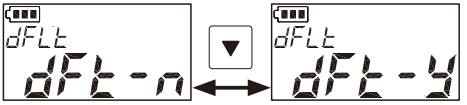


C	Go back to RUN mode	▼	Select	MEM	Save and go to next

* Use ▼ key to select and press MEM key to save and proceed to the next.
  Press the C (POWER) key to go back to RUN mode.

● Setting default

Restores all settings to factory defaults. (dFt-n/dFt- Y)



C	Go back to RUN mode	▼	Select	MEM	dFLt-Y: Default dFLt-n: RUN mode

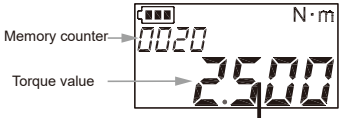
* Select "dFt-Y" with the ▼ key and press the MEM key to reset all settings to the defaults.
* Press the MEM key or press the C (POWER) key in the "dFt-n" state to go back to the RUN mode.

12 Data output and clear

12-1. Batch measurement data output

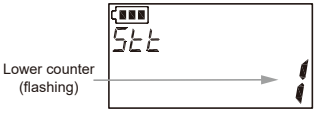
Batch output to the external in the format set in the communication format setting.

1. Set the counter to the upper limit of the data range you want to output with the ▼ key.
2. If you press and hold the MEM key for 2 seconds or more, "Stt" will be displayed, and if you release the MEM key, the screen will change to the range setting screen.



MEM Press and hold for 2 seconds

3. Set the counter to the lower limit of the data range to be calculated using the ▼ key.

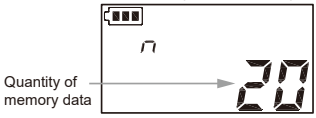


Example 1
When outputting data between 0001 and 0200,
set counter to 0200, press and hold the MEM key, and set STT to 1

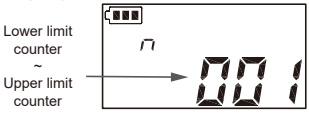
Example 2
When outputting data between 0101-0200,
set counter to 0200, press and hold the MEM key, and set STT to 101 with the ▼ key.

4. After setting the lower limit counter, press the MEM key. To return to the measurement screen, press the C key.

Memory data display



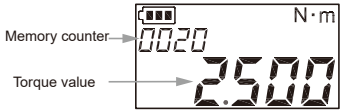
5. Press the ▼ key to output the measured data from the lower limit counter to the upper limit counter all at once. To return to the measurement screen, press the C (POWER) key.



* If you want to stop the data output, press the C (POWER) key.
During data output, only the C (POWER) key can be operated.

Batch data output completed

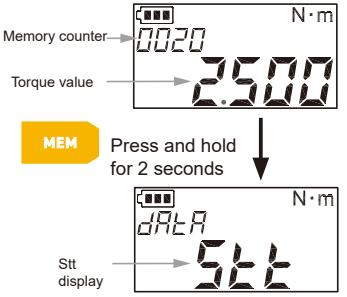
6. After output completes, press the C (POWER) key to go back to the measurement screen.



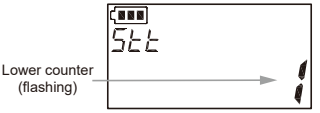
12-2. Data processing function

Performs statistical processing of the measured values in the specified range.

1. Set the counter to the upper limit of the data range you want to output with the ▼ key.
2. If you press and hold the MEM key for 2 seconds or more, "Stt" will be displayed, and if you release the MEM key, the screen will change to the range setting screen.



3. Set the counter to the lower limit of the data range to be calculated using the ▼ key.

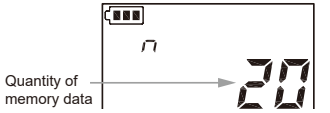


Example 1
When outputting data between 0001 and 0200, set counter to 0200, press and hold the MEM key, and set STT to 1

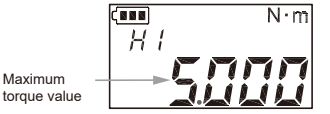
Example 2
When outputting data between 0101-0200, set counter to 0200, press and hold the MEM key, and set STT to 101 with the ▼ key.

Note) Processed data is for peak-held measured values.

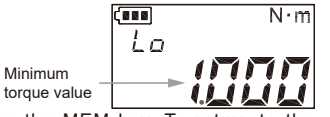
4. Set the counter to the lower limit of the data range using the ▼ key and press the MEM key. To return to the measurement screen, press the C(POWER) key.



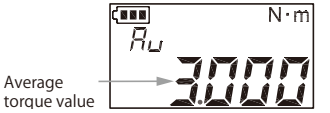
5. Press the MEM key. To return to the measurement screen, press the C (POWER) key.
6. Displays the maximum torque value in the specified range.



7. Press the MEM key. To return to the measurement screen, press the C (POWER) key.
8. Displays the minimum torque value in the specified range of measurements.



9. Press the MEM key. To return to the measurement screen, press the C (POWER) key.
10. Displays the average torque value in the specified range.

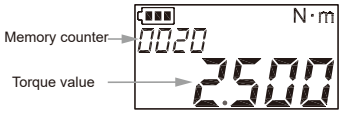


11. Press the MEM key or C (POWER) key to return to the measurement screen.

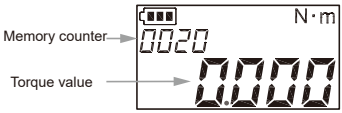
12-3. Data clearance

11-3-1.1 Delete a single data

1. Set the counter number to be deleted.

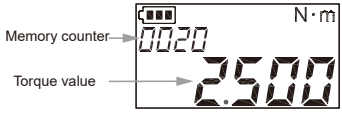


2. Press "C" key to delete.

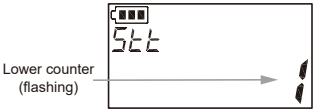


11-3-2. Delete the selected range of data.

1. Set the counter number to the upper end that you delete using ▼ key.



2. Press the MEM key.
3. Set the counter number to the lower end that you delete using ▼ key.

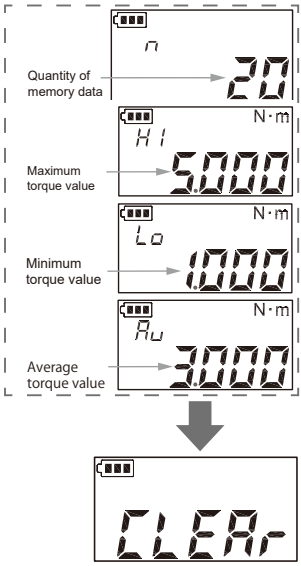


Example 1
To clear data between 0001 and 0200, set counter to 0200, press and hold the MEM key, and set STT to 1

Example 2
To clear data between 0101-0200, set counter to 0200, press and hold the MEM key, and set STT to 101 with the ▼ key.

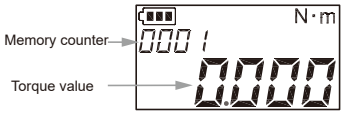
4. After setting the lower limit counter, press the MEM key. To return to the measurement screen, press the C key.

5. Press the C (POWER) key while holding down the MEM key in one of the displays below, and then release the two keys.



The selected data deletion completed

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



13 Error messages

●Error Messages table

Error Messages	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 with C(POWER) key.
Err2	▼ 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.
Err3	MEM key is continuously pressed	
Err8 Err81 Err82 Err83	Memory abnormality	It needs to be repaired. Please contact TOHNICHI or your nearest distributor to ask for repair.
Err9	Torque sensor abnormality	Press the "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.
Err11	Communication setting and communication error with wireless module	Unable to connect the CES main unit and the wireless module. ◎ When using in communication mode "USb" ● Press the MEM key and select the communication mode setting "USb". ◎ When using in communication mode "bC" or "bLE" After turning off the power with the C (POWER) key, check the following items. After that, turn the power off and on with the C (POWER) key. ● Check if the contact protection tape on the CES main board has been removed. ● Check that the CES main unit and wireless module (sold separately) are firmly connected, and that the screws on the wireless module are not loosen. ● Check if the USB cable is connected to the CES main unit. ● If the error is not cleared, there is a problem with the circuit board or wireless module. Contact TOHNICHI or your nearest distributor to ask for repair.

About error messages

An error is displayed if there is an abnormality during torque auto-zeroing with the C (POWER) key.

- Also, if the C (POWER) key is pressed while the power is off, or if the CPU is reset, if the key check and angle functions are ON, the angular velocity zero correction function works.
- If the angle function setting is changed from OFF to ON, the angular velocity zero correction function works even when exiting the setting mode.
- If there is an error, it is displayed.

<<Err 0>>

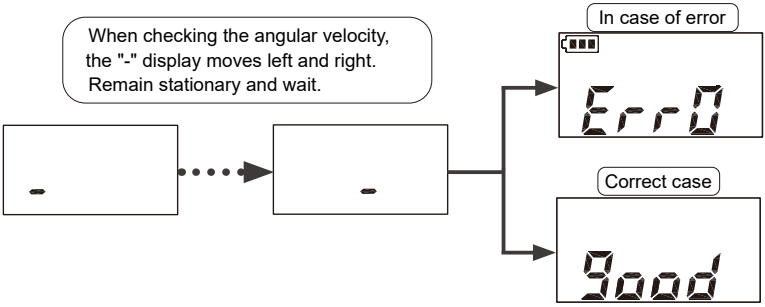
There is a problem with the angular velocity detector.

◎ Turn off the power, keep it still, and then turn it back on with the C (POWER) key.

If the Err display disappears, it can be used normally.

If the Err display does not disappear, repair is required.

Contact TOHNICHI or your nearest distributor to ask for repair.



<<Err 2, Err 3>>

There is a problem with the switch.

◎ Turn off the power, and then turn it back on with the C (POWER) key without touching any keys.

If the Err display disappears, it can be used normally.

If the Err display does not disappear, repair is required.

Contact TOHNICHI or your nearest distributor to ask for repair.

<<When Err8, Err81, Err82, Err83 is displayed>>

There is a problem with data memory error.

Contact TOHNICHI or your nearest distributor to ask for repair.

<<When Err9 is displayed>>

There is a problem with the torque sensor or circuit board.

◎Press the C (POWER) key in a no-load state.

If "Err9" disappears, it can be used normally.

If "Err9" does not disappear, repair is required.

Contact TOHNICHI or your nearest distributor to ask for repair.

<<Err11>>

Unable to communicate with a wireless module (sold separately)

◎ When using in communication mode "USb"

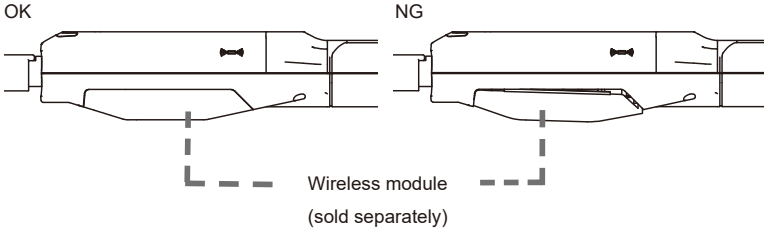
Press the MEM key to move to the "SEt screen" → "Communication mode selection screen".

Select the communication mode setting "USb" and press the MEM key.

- ◎ When using in communication mode "bC" or "bLE"
- After turning off the power with the C (POWER) key, check the following items. after that,
- Turn the power OFF → ON with the C (POWER) key.
- • Check if the contact protection tape on the CES main board has been removed. If not removed, remove the contact protection tape.
- • Check that the CES main unit and wireless module (sold separately) are firmly connected, and that the screws on the wireless module are not loose. If not connected,
- Reconnect and re-tighten the screws on the wireless module. (T=18cNm)
- • Check if the USB cable is connected to the CES unit. If so, remove the USB cable from the CES main unit.
-

□ If the "Err11" display does not disappear, contact your dealer or Tohnichi for repair.

Example of CES main unit and wireless module connection



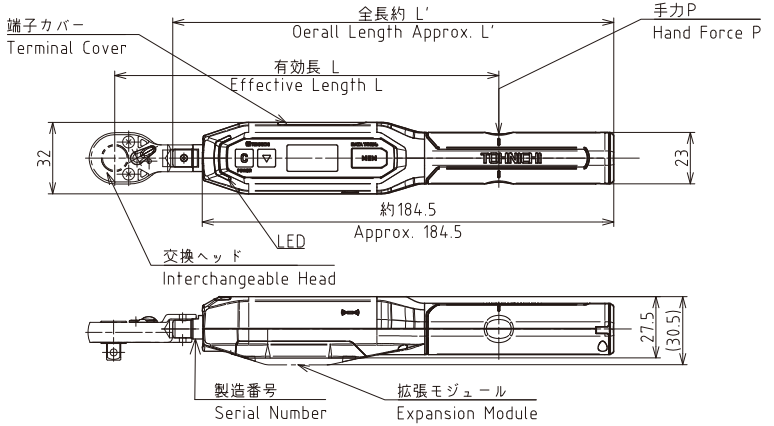
14 Optional accessories

1. Charger (for 100V~240V)		BC-3-G
2. Interchangeable heads	CES5NX6D-G	SH, QH
	CES10NX8D-G	SH, RH, QHRQH, DH, HH, FH
3. Communication code	* The interchangeable head PH (pipe wrench head) cannot be used.	
	CES-G ◄► USB C type	No.586
	CES-G ◄► USB A type	No.587
4. Battery pack		BP-5

15 Common specifications

Angle accuracy		±2°+1digit (when rotated 90° at 30 to 180 ° /s)
Display	LCD	Measurement (Torque, Angle, Unit)
		Counter : 4 digits
		Battery level indicator: 4 steps
		Wireless connection icon (Wireless module is sold separately)
	LED	Judgment result
Data memory		1,000 data (Torque, final angle, judgment result and time)
Data output		USB Type-C compatible serial output
		Bluetooth (Optional) Communication mode: Classic (SPP), BLE
Basic functions		Peak hold
		Measured data memory
		Auto memory/reset
		Inspection/Tightening mode
		Tightening completion alarm
		OK/NG judgment
		Double tightening detection
		Auto zero
		Auto power off
		Over torque alarm
Power		Nickel hydrogen battery
Continuous operation		Approx. 20 hours (Connected with Bluetooth : Approx. 8 hours)
Charging time		Approx. 3.5 hour
Operating temperature		0 to 40 degrees Celsius (no condensation)

16 Dimensions



Model	Torque Accuracy	Torque Capacity [Nm]	
		Min. - Max.	1digit
CES5NX6D-G	±2%	0.500-0.995	0.005
	±1%	1.00-5.00	
CES10NX8D-G	±2%	1.00-1.99	0.01
	±1%	2.00-10.00	

Model	Hand Force P [N]	Length [mm]		Weight [kg]	Accessories
		L'	L		
CES5NX6D-G	30.9	194.5	162	0.17	QH6D
CES10NX8D-G	58.1	197.5	172	0.17	QH8D

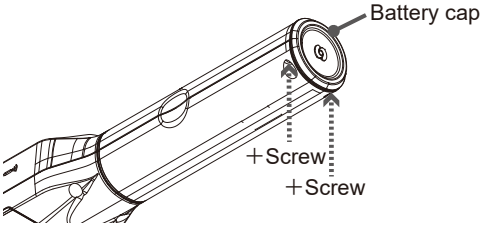
17 Battery

Battery life

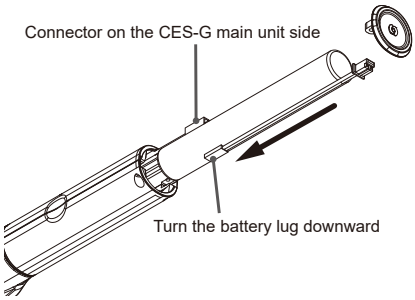
- Rechargeable approx. 500 times depending on using condition.
- When the battery ends, replace to a new battery pack, BP-5.
- Battery is empty at the time of delivery. Make sure to charge battery before use.

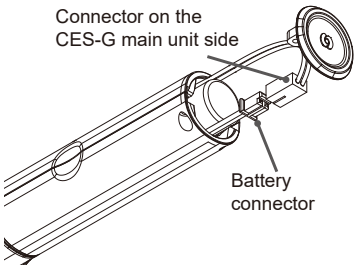
How to install battery

1. Turn off the power of CES.
2. Loosen the + screw at the bottom of CES and remove the battery cap.



3. Push the battery into the CES main unit with the protrusion facing downward.
4. Push in the battery to the end.
5. Connect the connector on the CES main unit side and the connector on the battery side.





6. Attach the battery cap and tighten + screw (T=36 cNm).

*Be careful not to pinch the cable and connector when recapping.

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: http://www.global-tohnichi.com
■**N.V. Tohnichi Europe S.A.**
TEL.+32 16 60 66 61 FAX.+32 16 60 66 75
Industrieweg 27 Boortmeerbeek, B-3190 Belgium
E-mail: europe@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.**
东仁扭矩仪器（上海）有限公司
Tel.+86 21 3407 4008 Fax.+86 21 3407 4135
RM.5 No.99 Nong1919, Du Hui Road, Minhang,
Shanghai, P.R.China
E-mail: sales@tohnichi-sh.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

Your Torque Partner
TOHNICHI

10.23.EN