Your Torque Partner
TOHNICHI

DIGITAL TORQUE GAUGE
MODEL BTGE

OPERATING INSTRUCTION

BTGE **BTGE Model**

CE

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

Safety Precautions

To customers: Before using this product, please read this operating instruction carefully to use it properly. If you have any question, please contact your nearest distributor or TOHNICHI MFG. CO., LTD. This operating instruction should be stored in a safe place.

Safety Symbol

This symbol is used for drawing attention to "safety precautions". If you see this symbol in this operating instruction, attention should be paid to safety. Take preventative actions according to the description and conduct "safe operations and proper control".

Signal Words

The signal words are the headers which indicate the level of hazard that should be known for human safety and in handling devices. The signal words for safety are "Danger", "Warning" and "Caution" depending on the level of hazard to human. The signal words are used with the safety symbol to indicate the following situations.

"⚠ Danger": Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

"⚠ Warning": Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

"⚠ Caution": Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

⚠ Warning

- **Do not use this instrument in an atmosphere of flammable gas or steam.**
  · Use in such an atmosphere may cause a fire.
- **Disassembly or modification of the instrument is prohibited.**
  · It may result in loss of safety, degradation in functions, shortening of product life, or failure.
- **Do not heat or throw batteries into fire.**
  · Batteries may explode if they are heated or thrown into fire.
- **Consider the environment of the workplace.**
  · Do not use the instrument body and battery in the rain or in damp or wet places.
  Use in such a place may cause an electric shock or smoking.
  · Do not use the instrument in a place where inflammable liquid or combustible gas is present.
  Use in such a place may cause an explosion or fire, resulting in an accident.
- **Be sure to use the specified accessories or options.**
  · Do not use any accessory or option other than those specified in this operating instruction.
  Use of any unspecified accessory may result in accident or injury.

⚠ Caution

- **Be sure to use a coin shaped lithium battery CR2450 for power source.**
  · Do not use any other battery than that specified in this operating instruction.
- **When inserting the battery, be careful to ensure correct polarity.**
- **Do not use or store the instrument in places subject to high temperature, high humidity, dust, water which may enter the instrument, strong vibration or unstableness.**
  · Use or storage in such a place may cause a failure in the instrument body.
- **Store in an appropriate place when not in use.**
  · Store the instrument in a dry and lockable place. Otherwise, an injury or accident may be caused. Do not store the instrument body and batteries in a place where the temperature may exceed 50°C. Storage in such a place may degrade batteries, causing smoking or ignition.
- **For safe and efficient operation, conduct the work with a torque value suited to the capacity of the instrument.**
  · Work with a torque value beyond the capacity may cause an accident.
- **Do not use the instrument for any purpose other than that specified.**
  · Use for any purpose other than that specified may result in an injury.
- **Carefully perform maintenance of the instrument.**
  · For replacement of accessories, follow their operating instructions. If you don't follow the operating instruction, it may cause a failure.
- **Always keep the grip dry and clean and free of oil or grease.**
  · Otherwise, it may result in an injury.
- **Check the parts for damage.**
  · Before use, fully check the case and the other parts for damage and make sure that the instrument operates normally and fulfills the specified functions.
  · Check the parts and all other portions that may affect the operation for damage, abnormality and installation status.
  · For replacement or repair of a damaged case and other parts, contact your nearest distributor or TOHNICHI MFG. CO., LTD.

- **For proper and safe use**
  - · Do not use any battery other than that specified.
  - · Avoid shock or vibration to this instrument.
  - · Do not use this product in an environment other than that specified in the operating instruction.
  - · Before use, make a pre-operation inspection and check the settings.
  - · If this product gets wet with water or grease, it may break down or burn out. Be careful not to drop water or grease.
  - · Do not let this product fall or bump. It may result in damage or failure.
  - · Use this product within the measurement range specified in the operating instruction.
  - · Be sure to conduct a periodic inspection.
  - · Before make measurement, make sure that "zero" is displayed.
  - · Be sure to perform a daily inspection and calibration at intervals decided in your company.

    Should this product give out abnormal smell or catch fire during use, stop using it immediately. Then, move the line checker to a safe place and contact your nearest distributor or TOHNICHI MFG. CO., LTD.

Contents

1 Features

(1) Digital torque gauge integral with the digital display.

(2) Hand-held type microcapacity torque meter for measuring the clockwise and counterclockwise torque.

(3) The angle of the torque display can be adjusted according to the working posture.

(4) The integral-type display that has excellent ease of operation and workability.

(5) This torque gauge is best suited for measurement of small torque for precision machines, electronic instruments, etc. and for assembly work.

(6) It also can be used to check torque screwdrivers.

(7) Its tip forms a three-jaw chuck, which can clamp an object to be measured.

(8) It is equipped with a stopper against excessive load.

(9) Up to 999 measurement data can be stored. Data can be automatically counted by the auto memory function.

(10) For the counted data, the number of samples, maximum value, minimum value and mean value can be displayed.

(11) A coin shaped lithium battery (CR2450) is adopted for power source. Continuous operation time is 10 hours. The battery remaining indicator is provided.

(12) Data can be transmitted directly to PC through the USB interface.

(13) This instrument has CE marking for international use including EU.

2 Components

1) Main unit.....1 set

2) Coin shaped lithium battery (CR2450), which is inserted into the body before shipment .....1 pc

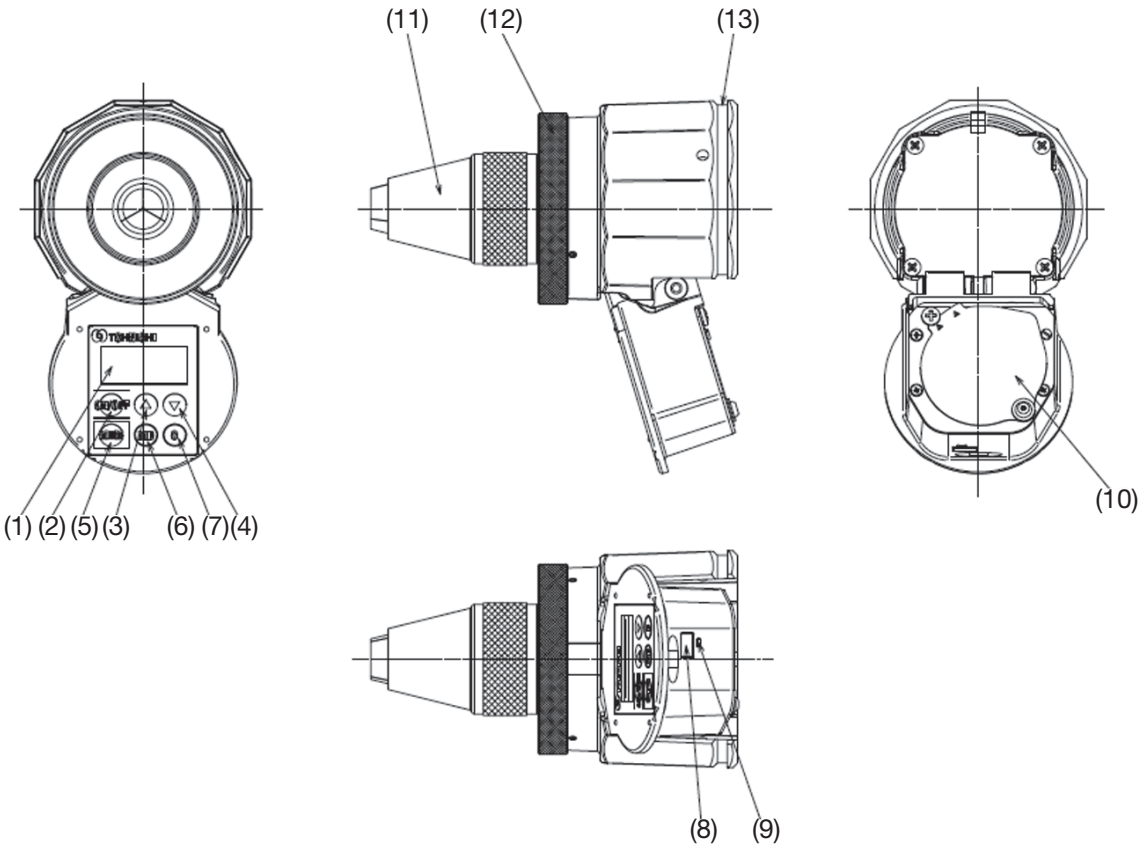
3) Operating instruction .....1 pc

4) Carrying case .....1 pc

3 Specifications

Model				BTGE10CN	BTGE20CN	BTGE50CN	BTGE100CN	BTGE200CN
Newton	Torque measurement range	Min. to Max.	cN·m	2 to 10	4 to 20	10 to 50	20 to 100	40 to 200
		1 digit	cN·m	0.01	0.02	0.05	0.1	0.2
Model				BTGE1KM	BTGE2KM	BTGE5KM	BTGE10KM	BTGE20KM
Metric	Torque measurement range	Min. to Max.	kgf·cm	0.2 to 1	0.4 to 2	1 to 5	2 to 10	4 to 20
		1 digit	kgf·cm	0.001	0.002	0.005	0.01	0.02
Model				BTGE09I	BTGE1.8I	BTGE4.4I	BTGE9I	BTGE18I
American	Torque measurement range	Min. to Max.	lbf·in	0.2 to 0.9	0.4 to 1.8	1 to 4.4	2 to 9	4 to 18
		1 digit	lbf·in	0.001	0.002	0.005	0.01	0.02
Chuck Diameter Range				ø1 to 8.5				
Dimension	Overall length		mm	130				
	Outside diameter		mm	75				
Weight Approx.			kg	0.65				
Dicrection				Clockwise and counterclockwise				
Accuracy				± 2 % + 1 digit				
Display				7 segment LCD display Counter value: 3 digits (character height 3 mm) Torque value: 4 digits (character height 7 mm) Unit, Battery remaining, measuring direction				
Measurement Mode				PEAK/RUN				
Data Memory				999 data				
Statistical Processing				Number of samples, maximum value, minimum value, mean value				
Data Output				USB output (USB mini B terminal)				
Power				Coin shaped lithium battery (CR2450)				
Continuous Operating Hours				Approx. 10 hours when using coin battery, Approx. 50 hours when using battery pack BP-C1				
Other Functions				Auto power off (3 min), Auto Memory/Reset 0.5 to 5 seconds variable, Auto Zero adjustment, Battery remaining indicator (in 4 steps)				
Operating Temperature Range				0 to 40°C Non condensing				
Display Turning Range				0 to 163 degrees				

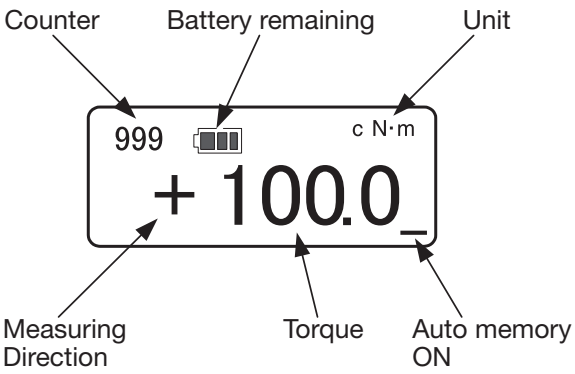
4 Names of Parts and Descriptions



(1) Liquid Crystal Display

Displays the counter, auto memory, battery remaining indicator, unit and torque value.

[Details of Display]



(2) ON/OFF Power Switch

Turns the power to ON/OFF. When the power is turned ON, key checks are conducted.

(3) ▲ Count Forward Key

Moves the counter forward by one or continuously to read out a measured data. After the count forward key is pressed long by 15 consecutive data, the counter can be moved forward by +10 data.

(4) ▼ Count Backward Key

Moves the counter backward by one or continuously to read out a measured data. After the count backward key is pressed long by 15 consecutive data, the counter can be moved backward by -10 data.

(5) MEM Memory Key

Stores the measured data and moves the counter forward by one. The displayed measurement data is output to the external output device. When auto memory (0.1 to 5 sec.) is effective, Memory key cannot be used.

(6) MD Mode Key

This is a key for selecting the computing start position when the counter indicates a number other than 000, the number of samples, maximum value, minimum value or mean value. Keep pressing the key for 2 seconds to make various settings (auto memory/reset, communication baud rate).

(7) C Clear Key

In the PEAK mode, this key is used to reset the peak value or to delete the stored data.
In the RUN mode, auto zero adjustment is performed.

(8) External Output Terminal

This is the terminal for connecting the USB connection cable (option).

(9) Reset Switch

If any display error or malfunction occurs, press the reset switch.

(10) Battery Cover

A coin shaped lithium battery (CR2450) is contained inside the cover.

(11) Three-jaw Chuck

Clamps the object to be measured.

(12) Chuck Holder

This is a holder which clamps the object to be measured with the three-jaw chuck and tightens the chuck.

(13) Fixing Groove

This is a groove which is used to fix the torque gauge body to a jig, etc.

5 Detailed Descriptions of Various Functions

(1) Continuous display (RUN mode)

When the counter is set at 000, the torque increases as torque load is applied, and if the load is released, the torque display is returned to 0.

(2) Maximum value display (PEAK mode)

When the counter is set at any value in the range of 001 - 999, the torque increases as load is applied, and even if the load is released, the display holds the maximum torque value (PEAK HOLD).

However, if the torque is about 7.5% or less of the maximum measurement torque, the display goes into the RUN mode.

(3) Auto Zero function

In the continuous display (RUN mode), press the clear key to activate the auto zero function. (However, the torque load must be within about 10% of the maximum value.)

<<When "Err 9" is displayed>>

- Under no load condition, press the power switch and the clear key.
  - · If the "Err 9" message disappears, the torque gauge functions properly.
  - · If the "Err 9" message remains displayed, press the reset switch, and then press the power switch and the clear key again.
  - · If the "Err 9" message still remains displayed, the sensor or the plated circuit may have a problem. Contact TOHNICHI MFG. CO., LTD.

(4) Error message

When the power is OFF, press the power switch to ON. Then, the key check function will activate. If there is anything wrong with the key functions, the following error message appears.

<<Err 1: The Count Forward Key is left depressed>>

<<Err 2: The Count Backward Key is left depressed>>

<<Err 3: The Memory Key is left depressed>>

<<Err 4: The Clear Key is left depressed>>

<<Err 5: The Mode Key is left depressed>>

<<Err 8: There is something wrong with the internal memory.>>

Err 1 to 5, or 8 is displayed

- Turn off the power switch. Then, without touching any key, turn on the power again.
  - · If the "Err" message disappears, the torque gauge functions properly.
- If the "Err" message remains displayed, turn off the power, and then press the power switch and the clear key at the same time.
  - · If the "Err" message still remains displayed, the membrane switch, the plated circuit or the internal memory may have any problem. Contact TOHNICHI MFG. CO., LTD.

(5) Auto Memory/Reset function

The measurement value held as the maximum value (PEAK HOLD) is automatically stored within a given setting range (0.1 to 5 sec. later) and the counter moves forward by one.

If the Auto Memory/Reset function is not used, set the time at 0.0 sec.

(6) Auto Power OFF function

If no key operation is conducted or no torque load (10% or less of the maximum measurement value) is applied for 3 minutes, the power is turned off.

When the battery alarm "- - - -" occurs, regardless of the above condition, the power will be turned off within one minute.

(7) Remaining battery indicating function

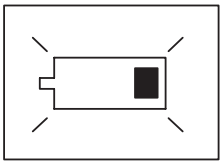
The LCD indicates the remaining battery status in 4 steps.

· There is enough battery remaining.

· The remaining battery amount is not enough. The battery life is half of the full operating time.

· It is almost time to replace the battery.

Battery alarm



There is no battery remaining. Immediately charge the battery. "----" is displayed on the LCD, and any switch other than the power switch cannot be operated. In one minute after this battery alarm occurs, the power will be turned off.

* Stored data and various settings are not deleted even if the battery is dead.

(8) Over torque alarm

If the torque exceeds about 105% of the maximum measurement torque, the torque value and "- - - -" are displayed by turns repeatedly and a buzzer sounds.

(9) Over torque alarm and peak hold start torque

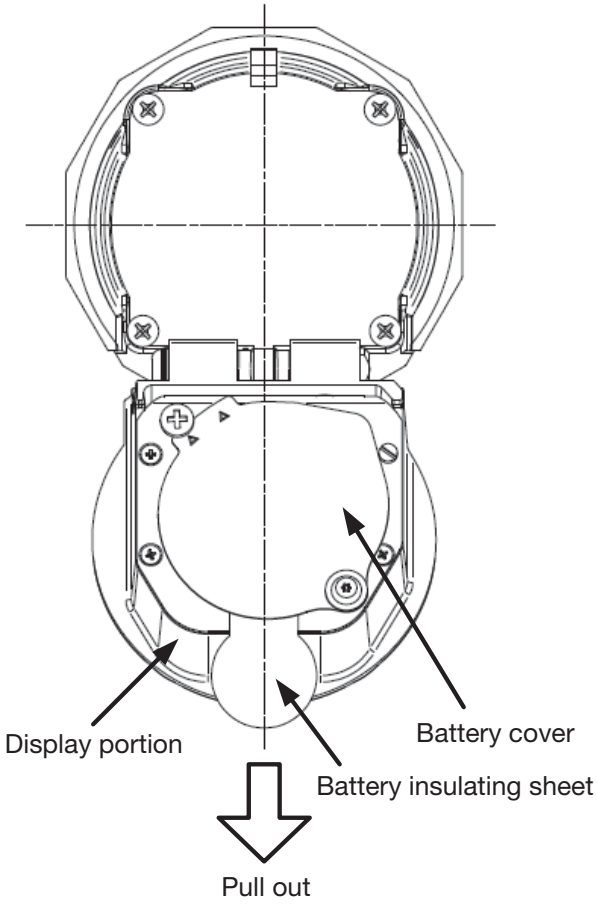
Unit (cN·m)

Model	Torque Range		1digit	105% of max torque	10% of max torque	Max. auto zero value
	Min.	Max.		Over torque alarm	Peak hold start torque	
BTGE10CN	2.00	10.00	0.01	10.50	1.00	1.00
BTGE20CN	4.00	20.00	0.02	21.00	2.00	2.00
BTGE50CN	10.00	50.00	0.05	52.50	5.00	5.00
BTGE100CN	20.0	100.0	0.1	105.0	10.00	10.00
BTGE200CN	40.0	200.0	0.2	210.0	20.00	20.00

6 How to Use

6-1. Before use

· Before using the torque gauge, open the display portion and remove the battery insulating sheet.



· Turn on the power of the torque gauge and make sure that there is enough battery remaining.

· If the battery indicator is flashing, change the battery.

6-2. Method 1 Rotating measuring object to measure

· Using the fixing groove, fix the torque gauge to the jig table.

· Holding the chuck holder fixed, open the three-jaw chuck and put the object to be measured in the chuck.

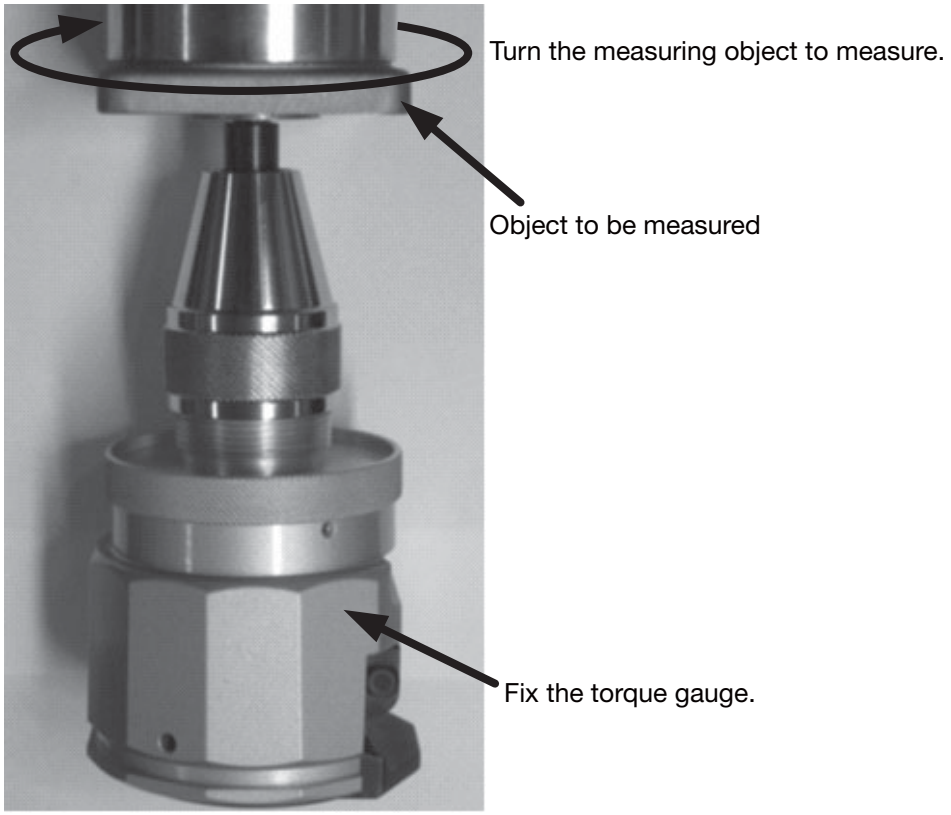
· Place the object to be measured in the center of three-jaw chuck, and while holding the chuck holder fixed, tighten the chuck.

· Turn on the power of the torque gauge.

· If the counter is 000, the continuous display (RUN mode) is set. If the counter is 001-999, the maximum value hold (PEAK mode) is set. It works bi-directionally.

· Before measurement, make sure that the torque display shows 0.

· Turn the object to be measured in a predetermined direction and measure the torque.



Precautions on measurement

* If the object to be measured is not chucked in the center, an accurate torque cannot be measured. Before measurement, make sure that the object is chucked in the center.

* If the three-jaw chuck is turned without fixing the chuck holder, the twisting force may be conveyed directly to the instrument body, resulting in damage to the body. Fix the chuck holder securely before measuring.

6-3. Method 2 Rotating BTGE to measure

· Holding the chuck holder fixed, open the three-jaw chuck and put the object to be measured inside.

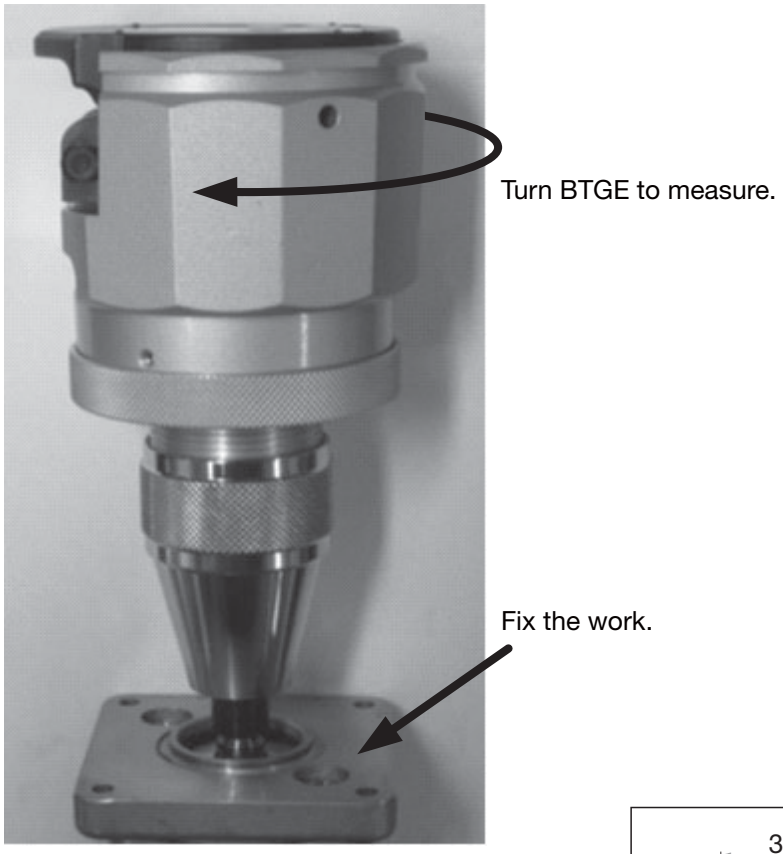
· Place the object to be measured in the center of three-jaw chuck, and while holding the chuck holder fixed, tighten the chuck.

· Turn on the power of the torque gauge.

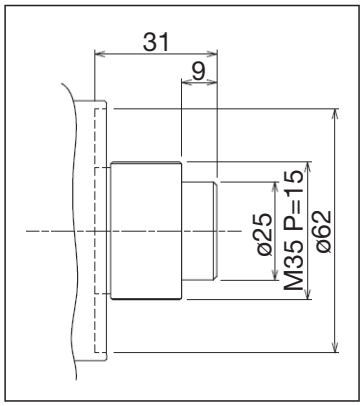
· If the counter is 000, the continuous display (RUN mode) is set. If the counter is 001-999, the maximum value hold (PEAK mode) is set. Both clockwise and counterclockwise torque can be measured.

· Before measurement, make sure that the torque display shows 0.

· Turn the torque gauge in a predetermined direction and measure the torque.



* If the shaft diameter of the object to be measured is too large to clamp with the three-jaw chuck, remove the three-jaw chuck and prepare a special adapter.



6-4. Method 3 How to measure torque screwdriver

· Open the display portion to the fullest extent, and put the instrument body on the worktable with the three-jaw chuck facing upward. (See below picture)

· Holding the chuck holder fixed, open the three-jaw chuck and put the torque screwdriver bit in it.

· Place the torque screwdriver bit in the center of three-jaw chuck. While holding the chuck holder fixed, tighten the chuck, and ensure that the bit is set completely.

· Turn on the power of the torque gauge.

· Set the counter at the maximum value hold (PEAK mode) in the range of 001-999.

· Before measurement, make sure that the torque display shows 0.

· While holding the torque gauge fixed, turn the torque screwdriver and measure the torque.

* Do not set torque of the screwdriver which exceeds the maximum capacity of the torque gauge.

7 Operating Examples

7-1. Calculation function

The number of data, maximum value, minimum value and mean value of the measurement data in the specified range are calculated.

Using ▲ ▼, set the counter at the upper limit value in the range of data to be calculated.

Press MD.

Using ▲ ▼, set the counter at the lower limit value in the range of data to be calculated.

Press MD.

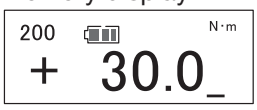
(Press C to cancel.)

Ex.1) To calculate in the range of 001-200:
Set the counter at 200, press the MD key, and set Stt at 001.

Ex.2) To calculate in the range of 101-200:
Set the counter at 200, press the MD key, and set Stt at 10.

As you press MD, the display shows the number of data, maximum value, minimum value and mean value in order.

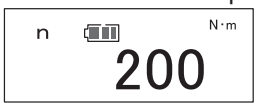
Memory display



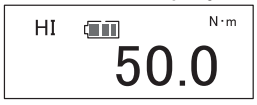
Calculation start number display

Flashing

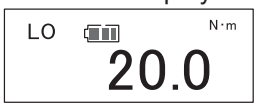
Number of data display



Max. value display

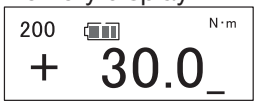


Min. value display



Mean value display

Memory display



To display the number of data

Press MD.

(Press C to cancel.)

To display maximum value

Press MD.

(Press C to cancel.)

To display minimum value

Press MD.

(Press C to cancel.)

To display mean value

Press MD.

(Press C to cancel.)

* Calculation is performed for the PEAK HOLD measurement data.
* The maximum, minimum and mean values are calculated with absolute value.

7-2. All measurement data output at a time

All measurement data in the specified range is output at a time to an external device according to the following procedure. Make sure output baud rate is set (See P20) and USB Cable (Part No. 384) is connected in advance.

Using ▲ ▼, set the counter at the upper limit value in the range of data to be output.

Press MD.

Using ▲ ▼, set the counter at the lower limit value in the range of data to be output.

Press MD to proceed to next.

(Press C to cancel.)

Ex.1) To output data in the range of 001-200:
Set the counter at 200, press the MD key, and set Stt at 001.

Ex.2) To output data in the range of 101-200:
Set the counter at 200, press the MD key, and set Stt at 101.

Ex.3) To output all measurement data:
Set the counter at 999, press the MD key, and set Stt at 001.

When the display shows the number of data, press ▲ to output all measurement data.

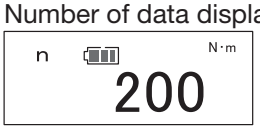
(Press C to cancel.)

* To stop data output, press the Clear key.
While data is output, any other key cannot be operated.

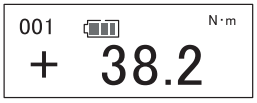
Memory display

Output start number display

Number of data display



Data output start



Data output completion

Number of data display

7-3. Delete measurement data

Measurement data can be deleted according to the following procedure.

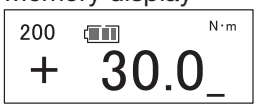
(1) Delete 1 data

Display the counter number of data to be deleted.

Press (C) to delete.

The measurement data is deleted.

Memory display

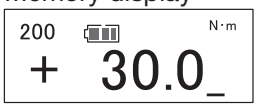


(2) Delete data in the specified range

Using (▲) (▼), set the counter at the upper limit value in the range of data to be deleted.

Press (MD).

Memory display



Using (▲) (▼), set the counter at the lower limit value in the range of data to be deleted.

Press (MD).

(Press (C) to cancel.)

Clear start number display

Flashing

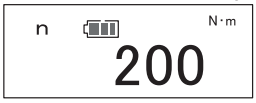
Ex.1) To delete data in the range of 001-200:
Set the counter at 200, press the MD key, and set Stt at 001.

Ex.2) To delete data in the range of 101-200:
Set the counter at 200, press the MD key, and set Stt at 101.

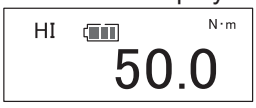
Ex.3) To delete all measurement data:
Set the counter at 999, press the MD key, and set Stt at 001.

While any of the displays shown in the right box appears, holding the MD key down, press the C key. Then, release both keys.

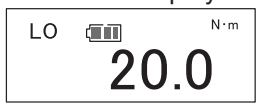
Number of data display



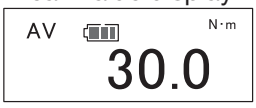
Max. value display



Min. value display



Mean value display



Measurement data memory is deleted.

After deleting, the counter returns to the start counter number and goes back to measurement display.

8 External Output Specifications

USB Interface		USB1.1 compliant (USB-serial conversion chip used)
Connector		USB mini B
Serial Interface	Baud rate	2400/4800/9600/19200 bps (selectable)
	Data length	8 bits
	Stop bit	1 bit
	Parity	None
	Flow control	None

• USB Output Method

The USB connection cable and communication driver are optionally available (Catalog No.384).

· Preparation (PC)

(1) Install the communication driver to a USB-compliant PC.
(The communication driver is contained in the CD-ROM supplied with the product.)

(2) Make settings of the PC port and communication format.
(For the installation procedure and communication settings, see the instruction manual in the CD-ROM.)

· Preparation (BTGE)

(3) Turn on the power of BTGE.

(4) Select the communication baud rate. (2400/4800/9600/19200 bps)

· Communication

(5) Connect the USB connection cable (option) to the PC and BTGE.

(6) Start up the communication software. (The communication software is not included with the product.)

· Data output

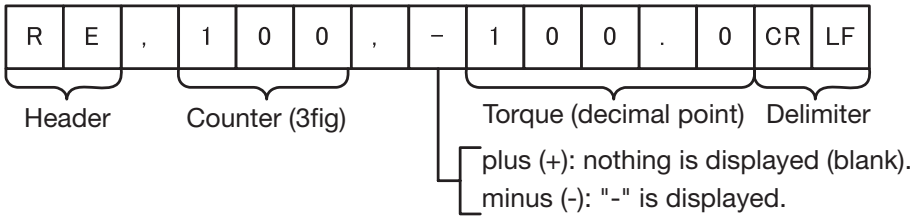
(7) Data Output Method (See the "All measurement data output at a time".)

* Use the optionally available USB connection cable to connect to a PC.

* Connect the cables to PC before starting up the sofrware. Otherwise, communication may not be established.

* If the BTGE and multiple Tohnichi's USB serial output devices (CEM3, R-DT999, ST2) are connected to a PC at the same time, communication cannot be established.

• Output Format



9 Procedures of Various Settings

This chapter explains various settings.

* Before making settings, make sure that the counter shows 000 (RUN mode).

Press (MD) for over 2 seconds till the mode setting display appears. Then, release the MD key.

Measurement display

9-1. Auto Memory/Reset setting

Using (▲) (▼), change the setting for the Auto Memory/Reset timer.

(0.0 ⇔ 0.1 ⇔ 0.2 ⇔ 0.3 ⇔ 0.4 ⇔ 0.5 ⇔ 1.0 ⇔ 2.0 ⇔3.0 ⇔ 4.0 ⇔ 5.0 ⇔ 0.0 sec.) If you prefer manual memory (Auto Memory is not used.), set it as 0.0.

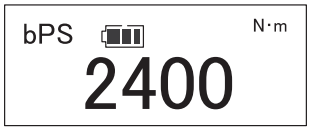
Press (MD) to proceed to next without saving.

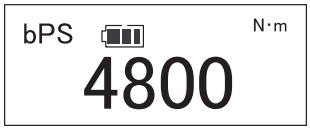
Press [MEM] to save the setting and proceed to next.

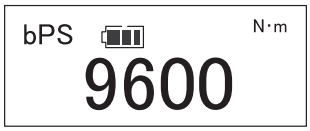
Press (C) to cancel. The display returns to the measurement display.

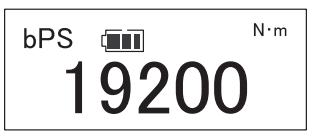
(1) Auto Memory/Reset setting

(2) Communication baud rate setting









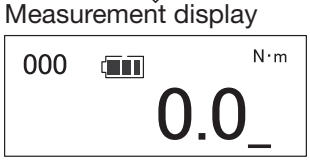
9-2. Communication baud rate setting

Using (▲) (▼), change the setting for the communication baud rate. (2400 ⇔ 4800 ⇔ 9600 ⇔ 19200 ⇔ 2400)

(Press (MD) to return to the measurement display without saving.)

Press [MEM] to save the setting and return to the measurement display. (Press (C) to cancel. The display returns to the measurement display.)

Measurement display



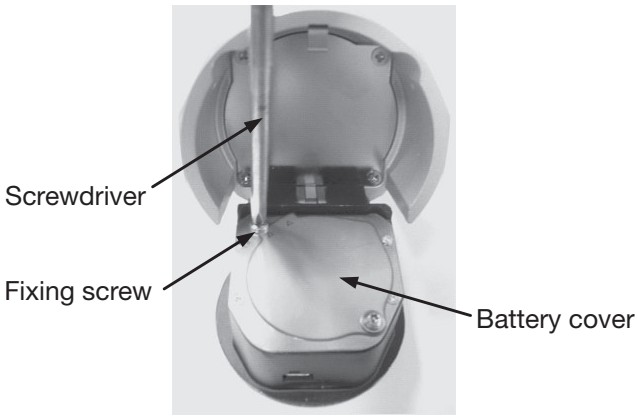
10 Change of Battery

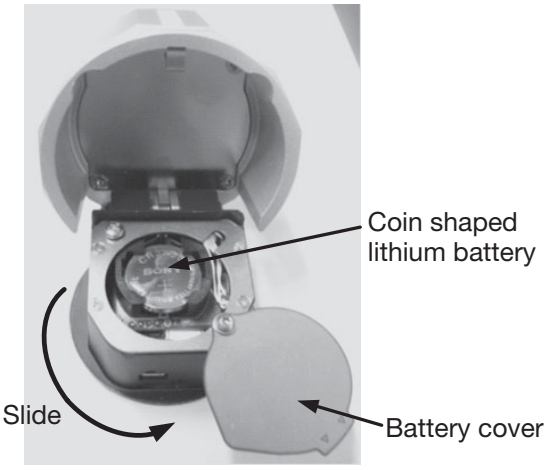
(1) If the battery alarm is displayed, the battery needs replacement.

(2) Open the display part, and loosen the fixing screw on the rear of the display with a screwdriver. (See below left)

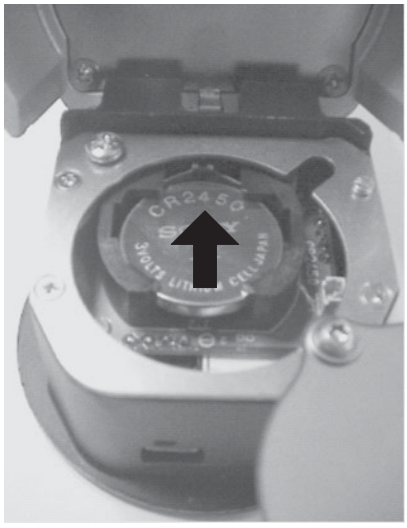
(3) Slide open the battery cover, remove the battery from the holder, and replace it with a new battery.

(4) After replacement of battery, close the battery cover and tighten the fixing screw fully with a screwdriver.

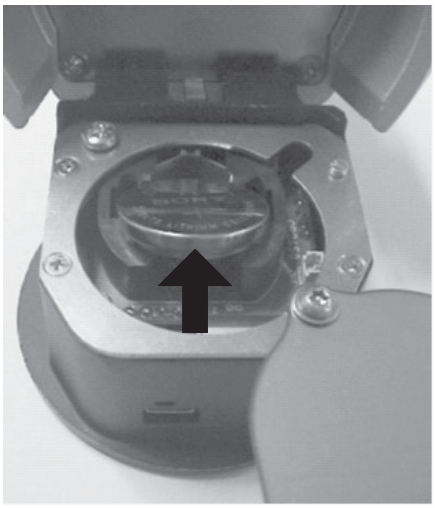




(5) Slide the battery forward.



(6) Keeping the battery forward, pull it up.



Precautions for replacement of battery

(1) Use the specified battery: Coin shaped lithium battery (CR2450).

(2) Make sure to slide the battery sideways and replace the battery. Otherwise, the circuit board may be damaged.

(3) Put the battery in the specified direction. Setting it in wrong direction may cause a failure.

(4) The coin shaped lithium battery has the positive and negative terminals. Before setting the battery, be sure to check the direction of terminals.

11 Optional Accessories

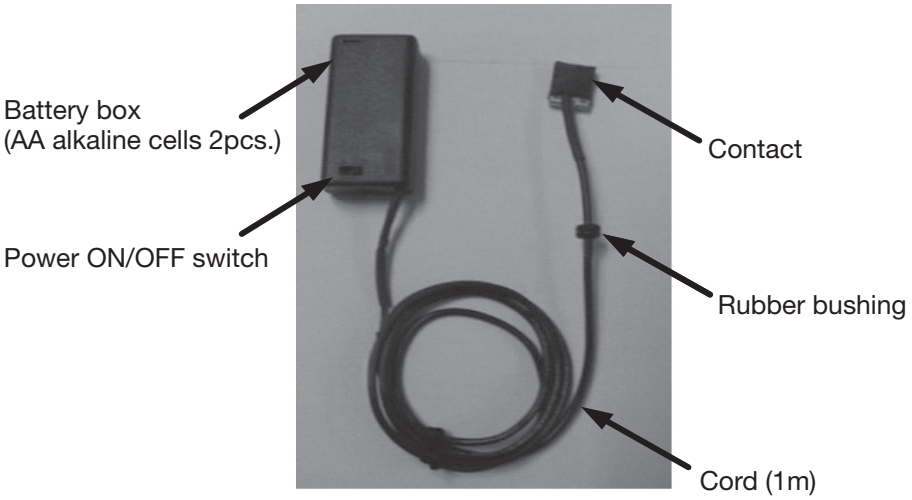
(1) Connection cable
· BTGE → PC Part No. 384

(2) Torque gauge calibration device
· BTGTCL150CN Components: Device body, calibration pulley x 2, calibration wire x 3, scale pan (5g, 100g)
Combination weights are sold separately. (WS-TCL2)

(3) Calibration adapter for BTGE Catalog No. 807

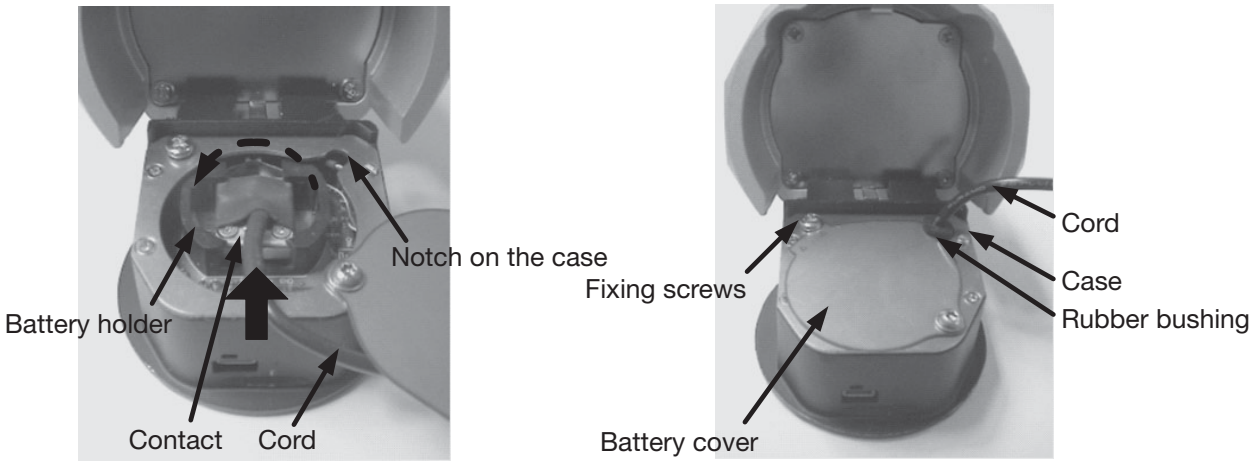
Note) For calibration of BTGE, the calibration device (BTGTCL150CN) and the calibration adapter (Catalog No. 807) are needed.

(4) Battery pack Catalog No. BP-C1
Batteries are not supplied with the product. Prepare ones separately.
(AA alkaline cells LR03 2 pcs.)

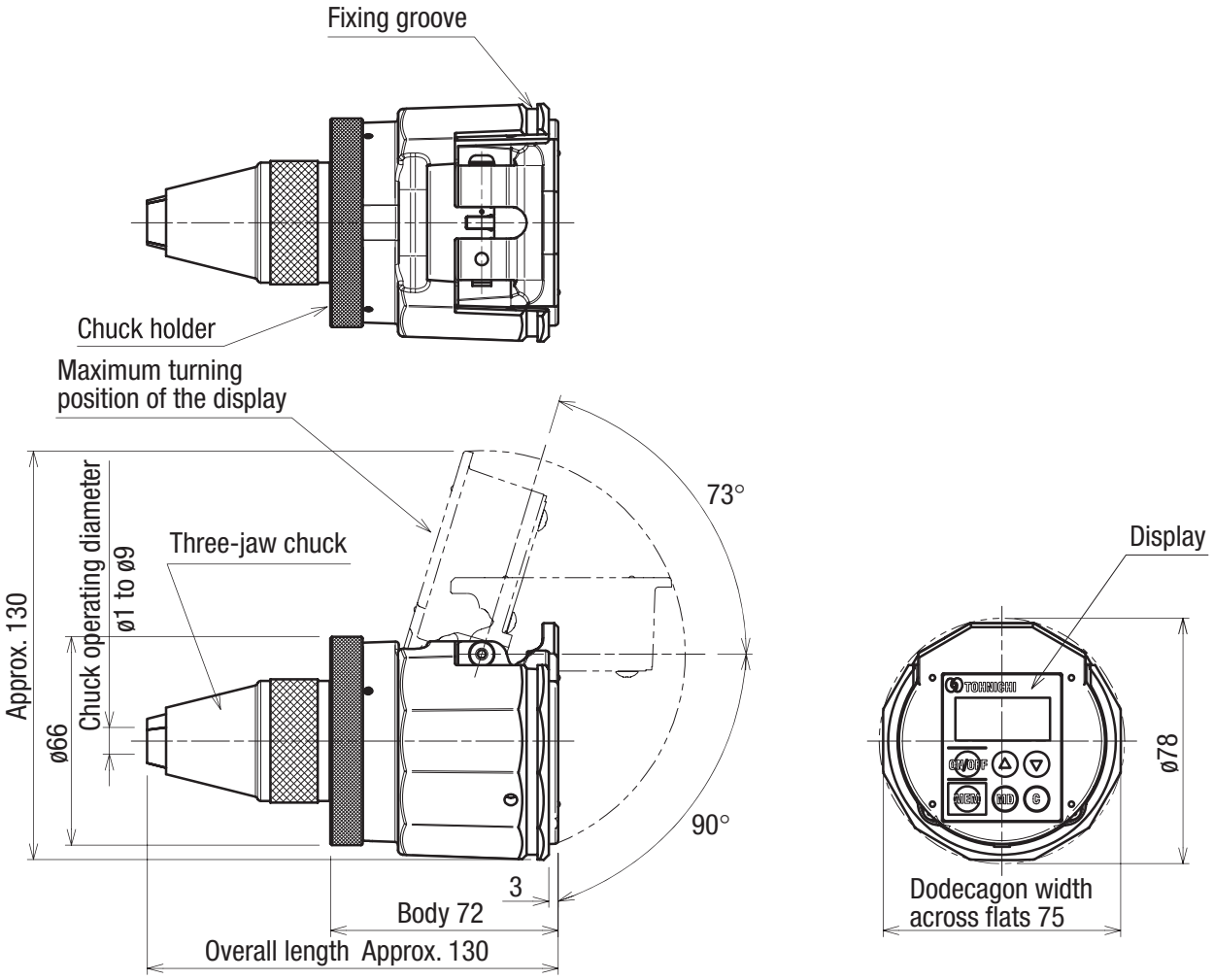


How to use the battery pack

(1) Open the battery cover on the back side of the display of the torque gauge and attach the contact of battery pack to the holder.
(2) Fit the rubber bushing into the notch on the case.
(3) Close the battery cover and tighten the fixing screw.
(4) To remove the contact part, gently rotate it in the battery holder. (See indication below)



■ Dimensions



Designs and specifications are subject to change without notice.

Your Torque Partner
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