

# DIGITAL DISPLAY TORQUE WRENCH

## MODEL CEM2

### OPERATING INSTRUCTIONS

To operators

Read carefully before operating. If you have any questions, please contact Tohnichi deslers.



## Cautions on Safety

- Before operation, please use correctly after often reading "cautions on safety."
- Since the serious contents related safely are indicated, please follow notes shown here. The display and the meaning are as follows.

### Signal Words

Signal word is the title which shows the item which should be known on safe reservation of people and the handling of equipment. The signal word on safe has the classification of "danger", "warning" and "cautions" by the degree of a risk of doing to people. It uses with a safe cautions symbol and the following situation is shown, respectively.

- "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.
- The matter which is consulted is described as "Notes."

### "Warning"

- **Do not use it in atmosphere with inflammable gas and steam.**  
It may become the cause of a fire.
- **Use the charger and storage battery of exclusive use.**  
Please do not use except by any means.
- **Charge correctly.**  
Please do not use this charger except the power supply which has indicated by rated. It generates heat unusually and there is fear of a fire. Do not charge a storage battery in the case where temperature is less than 0 degree C, and temperature is 40 degrees C or more. There is fear of a burst or a fire. Please charge a storage battery in a well ventilated place. There is a possibility of a storage battery exploding or generating heat by fault charge. Please cover neither a charger nor a storage battery with cloth etc. There is fear of a burst or a fire. When you do not use it, please pull out a plug from a power supply. Fear of an electric shock or a fire.
- **Do not put a storage battery into fire.**  
It explodes or there is a possibility that a toxic substance may come out.
- **Disassembly of apparatus, prohibition of reconstruction.**  
Safety is spoiled or it becomes the cause of a function, a life fall, and failure.
- **Take the circumference situation of a work place into consideration.**  
Please do not use a main part, a charger, and a storage battery in rain, or do not use them in the place which became wet or got wet. There is a cause of an electric shock, emitting smoke or failure. Please make a work place bright enough. Work in a dark place causes an accident. Please do not carry out use or charge in the place which an inflammable liquid and gas generate. There is fear of explosion or a fire.
- **Do not use it for bolting work at a height.**  
If a main part and a socket are dropped, it will become the cause of the accident, an injury, or failure.
- **Be sure to use appointed accessories and an appointed option article.**  
Please do not use it except the accessories of the specification indicated by this handling description, or an option article. It becomes an accident and the cause of an injury.
- **Change a ratchet change lever certainly. Attached exchange head QH.**  
It becomes the cause of the accident, an injury, or failure by ratchet breakage.
- **Do not use a handle part using a pipe etc., lengthening it.**  
It becomes breakage of a main part and the cause of the abnormalities in accuracy.

## **“Cautions”**

- **For this torque wrench, the battery continues to supply power to the unit even when the power is off. After charging the battery fully, the unit's battery will drain within two weeks unless the jack plug is placed in the AC jack. When storing the unit for one week or more, please use the jack plug.**
- **Stop the use and storage in high temperature, a humid place, a dusty place, the place where a possibility of entering into apparatus has water, the intense place of vibration, an unstable place, etc.**  
It becomes the cause of causing failure of the main part of apparatus.
- **Don't insert in the inside of apparatus metal and the thing which is easy to burn. Moreover, don't push in.**  
It becomes the cause of causing failure of apparatus.
- **Do not ride on apparatus or do not put a thing on a top.**  
It becomes the cause of causing failure of apparatus.
- **Do not bring a child close.**  
Please do not approach a work place other than a worker. It becomes an injury and the cause of the accident.
- **When you do not use it, please keep it exactly.**  
Please keep it to the place where a child's hand does not reach, or the place which a key requires in the dry place. It becomes an injury and the cause of the accident. Please keep neither a main part nor storage battery in the place where may be gone up to the temperature of 50 degrees C or more. It becomes the cause of storage battery degradation and there is fear of emitting smoke and ignition.
- **Keep a work place always clean.**  
The untidy place and a work stand become the cause of causing the accident.
- **Do not use it, carrying out unreasonableness.**  
In order to work efficiently safely, please work with the torque value which suited the capability of a main part. The work beyond capability causes an accident.
- **Use the main part of a tool which suited work.**  
Please do not use it in addition to the specified use. It becomes the cause of an injury.
- **Do not work with an impossible posture.**  
Please always brace a step and maintain balance. It falls and becomes the cause of an injury.
- **Do not treat the code of a charger violently.**  
Conveyance with a code is not carried out. Moreover, do not pull a code to extract from a wall socket. There is a possibility of damaging. Do not bring a code close to the place where heat, oil, and the angle sharpened. Please charge in the place which is not damaged in response to power, such as a code not being stepped on and not being hooked. There are an electric shock and a possibility of short-circuiting and igniting.
- **Please maintain carefully.**  
Exchange of accessories should follow a handling description. It becomes the cause of failure. The code of a charger should request repair from the store of a purchase or Tohnichi, when you check periodically and it is damaged. There are an electric shock and a possibility of short-circuiting and igniting. Please always dry a grip part, maintain a clear state, and neither oil nor grease should reach.
- **Check whether there are any damaged parts.**  
Please check before use whether there is no damage in a case or other parts, or it operates normally, or a predetermined function is demonstrated. Please check whether it is normal in all the parts that affect breakage of parts, an attachment state, and other work. Please use neither the charger which the power supply plug and the code damaged, nor the charger which received certain damage. There are an electric shock and a possibility of short-circuiting and igniting. The damaged case, other part exchange, and repair should request repair from the store of a purchase or Tohnichi.

## In order to use it safely and correctly

Please do not use it by any means other than an attached charger.

Please use the power supply of a charger on the surely indicated voltage.

Please do not open a display part by any means.

Be sure to use within the limits of a torque wrench.

Please equip with CEM2 main part and an exchange head certainly.

Please use it after checking that there is no crack in a socket or an exchange head.

Please fit a socket or an exchange head on a socket certainly.

Keep in mind that there is fear of failure or damage by fire if it gets wet to water or oil.

Please be sure to proofread at dairy check or in the period decided by your company.

Keep in mind that it will become the cause of breakage and failure if CEM2 main part is dropped or it throws.

While in use, a nasty smell and when it ignites, use should be stopped immediately, and a main part should be moved in a safe place. Please contact Tohnichi.

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It may change without a preliminary announcement about the contents of this book in the future.

Thank you very much for purchasing "Digital Torque Wrench CEM2 series". Read this handling description well and please use it correctly, before using this apparatus. This book is drawn up so that an operator can understand how to deal with CEM2 series as easily as possible. Please keep it in the place which can always be taken out carefully after reading. Keep in mind that it will become failure and the cause of the accident if it performs that it is contrary to a description matter. Since the important matter required for safe reservation is indicated by cautions of "cautions on safety", be sure to read to them.

## Outline

The digital torque wrench CEM2 of microcomputer loading developed as an object for inspection of retightening torque and return torque has the following features.

The torque of RUN/PEAK is displayed in digital.

- \* Measurement data carries out the memory of up to 99.

- \* Even if it turns OFF a power supply, the memorized data is saved. Moreover, when a power supply is turned on, it can refer to at any time. Display the number of samples, the maximum value, the minimum value, and meaning value.

- \* An auto zero function, and a power-saving functional (Auto-Power-Off) function.

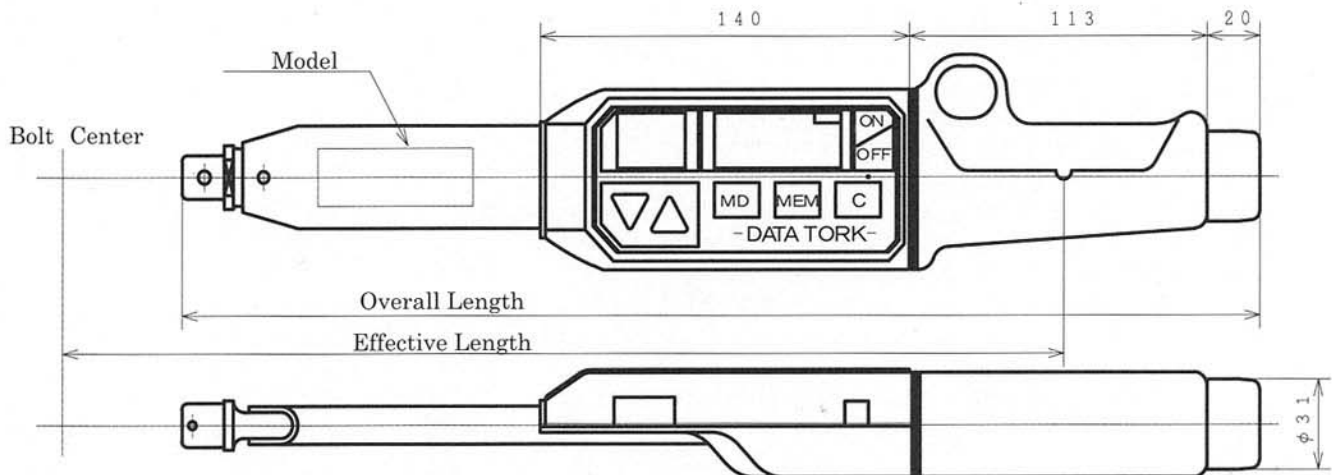
- \* Memorized data can be easily outputted to a personal computer or an exclusive printer with a RS232C output terminal. There is also an output system by infrared rays by option specification.

- \* Easy statistics processing can use a data file system. Moreover, an advanced data filing system can be built by using a handy terminal.

- \* A power supply can adopt a charge formula and can use it continuously by full charge for 8 hours.

- \* By adoption of a rapid charger, it is full charge in about 1 hour.

- \* Since it is a head exchange formula, a spanner, a ring spanner, etc. can be used according to the purpose.



Accuracy  $\pm 1\% + 1\text{digit}$

Model	Capacity N.m		Model	Capacity Kgf.cm / Kgf.m		Model	Capacity lbf.in / lbf.ft		Head Size
	Min. to Max.	1 digit		Min. to Max.	1 digit		Min. to Max.	1 digit	
CEM9N2x8D	1.8-9	0.01	90CEM2	18-90	0.1	90CEM2-A	16-80	0.1	8D
CEM18N2x10D	3.6-18	0.02	180CEM2	36-180	0.2	180CEM2-A	30-150	0.2	10D
CEM45N2x12D	9-45	0.05	450CEM2	9-45	0.5	450CEM2-A	80-400	0.5	12D
CEM90N2x15D	18-90	0.1	900CEM2	180-900	1	900CEM2-A	160-800	1	15D
						900CEM2-A lbf.ft	13-65	0.1	
CEM180N2X19D	36-180	0.2	1800CEM2	360-1800	2	1800CEM2-A lbf.ft	26-130	0.2	19D
CEM360N2x22D	72-360	0.4	3600CEM2	720-3600	4	3600CEM2-A lbf.ft	52-260	0.4	22D
CEM500N2x22D	100-550	1	5000CEM2 Kgf.m	10-50	0.1	5000CEM2-A lbf.ft	72-360	1	
CEM850N2x32D	170-850		8500CEM2 Kgf.m	17-85		8500CEM2-A lbf.ft	124-620		

Each model indicates one unit scale.

Group	Max Hand Power N	Dimension mm		Weight Kg	Accessory	Interchangeable Head
		Effective	Overall			
CEM9N2x8D	37	243	294	0.67	QH8D	8D ( SH, RH, QH, HH )
CEM18N2x10D	71	252	296		QH10D	10D (SH, RH, QH, DH, HH)
CEM45N2x12D	150	300	337	0.74	QH12D	12D (SH, RH, QH, RQH, DH, HH)
CEM90N2x15D	237	380	410	0.84	QH15D	15D (SH, RH, QH, RQH, DH, HH, FH)
CEM180N2x19D	391	460	477	1.1	QH19D	19D (SH, RH, QH, RQH, DH, HH, FH)
CEM360N2x22D	500	720	720	1.6	QH22D	22D (SH, RH, QH, RQH, DH, HH, FH)
CEM500N2x22D	550	910	907	4.0		
CEM850N2x32D	608	1398	1377	5.5	QH32D	32D (SH, RH, QH)

## Composition

Main Unit	1
Battery Pack, BP-3	1
Interchangeable Head, QH	1
Battery Charger, QC-1 or QC-2	1
Operating Manual	1
Certificate of Calibration	1

## Specification

Measuring Direction	Clockwise and Counter-Clockwise
Accuracy	+/-1%+1digit
Data Memory	99
Arithmetic Function	Sampling Number, Maximum, Minimum and means
Measurement Method	Peak / Run
Data Output	RS232C, Infrared Ray
Zero Adjustment	Auto Zero
Other Function	Auto Power Off, 3minutes
Power Source	Ni-Cd battery
Continuous Use	8 hours
Battery Charge	1 hour
Operating Condition	0 ~ 40 degree C

## External View

### Refer page 11.

1. Interchangeable Head  
Tohnichi interchangeable head, SH, RH, QH, RQH, DH and HH can be used.
2. Count Display  
Internal count memory is displayed, 0 to 99.
3. Infrared Ray Output, Optional  
In combination with Tohnichi DATA TANK model R-DT100-3, stored data can be transmitted by infrared ray.
4. Torque Display  
Screen indicates torque value
5. Unit  
Scale unit is shown
6. RS232C output connector
7. Power ON/OFF key
8. Count Backward key  
Internal memory counter is moved back one digit and the torque value is displayed.
9. Count Forward key  
Internal memory counter is moved forward one digit and the torque value is displayed.
10. Mode "MD" key  
Mode key displays the number of sampling, maximum value, minimum value and mean value of the reading.
11. Memory "MEM" key  
Measured Data is store and count number moves forward.
12. Clear "C" key  
Current displayed torque value is deleted.
13. Charging jack  
Connect to battery charger.
14. Reset Button  
When the display is abnormal, reset button with a pin to bring the microprocessor to initial condition.
15. Handle  
Battery pack BP-3, inside.
16. Cap

## Function and Operation

### ● Charging

When charging, insert the plug of battery charger, QC-1 or QC-2 into the jack of the CEM2 and the source plug into an AC supply receptacle. Charging will be completed in approximately one hour. As soon as the battery is fully charged, the completion green lamp will be lit.

#### **Caution:**

At the time of purchase a new battery will be discharged. Recharge the battery with the attached standard battery charge QC-1 or QC-2. Not attempt to use any other battery charger for charging. Repeat charging and discharging alternately two or three times if the battery is fully discharged, a charging time is short and the battery does not hold the required voltage for 8 hours.

Use the battery charger with the specified voltage as indicated on the specification label.

Do not overcharge. It will shorten the battery life. Stop charging as soon as the green lamp on the battery charger is lit.

Charge the battery after the digital display starts flashing.

After recharging, press the "Reset Button" during power on.

Stop charging when the completion green lamp and the charging red lamp are lit at the same time.

Contact Tohnichi sales office or Tohnichi distributor.

Charge the battery at a temperature between 10 - 30°C.

### ● Power ON/OFF

When ON/OFF key is pressed, power is turned on or off.

### ● Auto Power Off

When the CEM2 model is not used more than three minutes, the power will go off automatically to save the battery life.

Press ON/OFF key to re-start operation.

Data remains stored even if the power is turned off.

### ● Data Sampling

1. Continuous Display, RUN Mode

When it is loaded in count "0", torque value increases, and released, value goes back to 0.

2. Maximum Value Display, PEAK Mode

When it is loaded in count value between 1 and 99, torque value increases. When the load is released, maximum torque applied remains in the display.

#### **Cautions:**

The CEM2 models can be measured both clockwise and counter clockwise direction.

For correct measurement apply hand force to the effective length mark on the handle and pull the wrench gradually.

### ● Date Deletion

1. Delete one data

Display a data to be deleted by pressing forward key or backward key and press "C" key to delete the data.

2. Delete data in count values from 1 to certain number

Display the last count value to delete, press MD key until "n", "HI", "Lo" or "- -" appears in the display and press "C" key to delete.

3. Delete all stored data

Turn power off. Turn power on while pressing "C" key. All stored data will be deleted.

#### **Caution:**

Before deleting data, verify whether or not the data should be deleted.

### ● MEM key function

When MEM key is pressed, one data is stored and one count number moves forward.

## ● MD key function

By pressing MD key the following data processing is possible.

First pressing, the sampling number "n" is displayed.

Second pressing, the maximum value "HI" among stored data is displayed.

Third pressing, the minimum value "Lo" among stored data is displayed.

Fourth pressing, the mean value "- -" among stored data is displayed.

Pressing one more time, the display comes back to the original condition.

### Caution:

In the state of the first to forth, keep in mind that the data to the counter value currently displayed will be eliminated if a key "C" is pressed.

When torque value is low, although it is displayed on CEM2, it is excluded from the object of data processing. Please see the following table.

### Note:

Below table shows the minimum torque value which is the object of data processing.

value	N.m	value	Metric	value	English
0.45	CEM9N2x8D	4.5	90CEM2	4.5	90CEM2-A
0.9	CEM18N2x10D	9	180CEM2	9	180CEM2-A
2.25	CEM45N2x12D	22.5	450CEM2	22.5	450CEM2-A
4.5	CEM90N2x15D	45	900CEM2	45	900CEM2-A
				4.5	900CEM2-A, lbf.ft
9	CEM180N2x19D	90	1800CEM2	9	1800CEM2-A, lbf.ft
18	CEM360N2x22D	180	3600CEM2	18	3600CEM2-A, lbf.ft
45	CEM500N2x22D	4.5	5000CEM2, kgf.m	45	5000CEM2-A, lbf.ft
45	CEN850N2x32D	4.5	8500CEM2, kgf.m	45	8500CEM2-A, lbf.ft

## ● Up / Down Key Function

1. The torque data value can be retrieved by pressing up or down key.

2. When key is held pressing, memory counter moves forward or backward quickly.

3. Each key is like "MEM", stores a data value and moves the memory counter forward or backward.

## ● Battery Pack

### Battery life

After charging the battery approximately 300 times, replace the old battery with a new one.

How to replace the battery pack

1. Loosen the gold colored cap, left threaded at the end of the handle.

2. Disconnect cable from the battery pack.

3. Take out the battery pack from the handle.

4. Insert the new battery pack into the handle and connect. Tighten the cap counter-clockwise.

### Battery alarm

The entire display will start flashing when the battery needs recharging. If the battery is not charged within one minute while flashing, the display will disappear and all data may be lost.

### Cautions:

The end cap is left threaded. New battery pack is not charged when supplied. Please charge at your side before operating. The data by which the memory was carried out will disappear about one week after the residual quantity of a battery is lost. If residual quantity alarm comes out, please charge promptly.

## ● Reset Switch

When the abnormalities in a display and an incorrect operation occur, press a reset switch, inside hole which are below ON/OFF key. However, unless a reset switch is in a power supply ON state, it does not operate.

## ● Self Test Function

The self test function CEM2 has equipped the self-diagnostic function, sets a counter value to "0", and pushes "MD" key.

1. Indicating Program Version
2. Indicating maximum value
3. Inside data memory check
4. AD converter check
5. Light Emitting Diode display check, count 00 0000 to 99 9999.
6. End of testing

## ● Auto Zero Function

By pushing "C" key, it becomes "0" or the minimum display value compulsorily.

Even if it pushes the key, when not becoming "0" or the minimum display value, please contact Tohnichi (Please look at the contact of the end of a book.)

## Option

### ● Options

Battery Pack	BP-3
Battery Charge	QC-1 (100V) or QC-2 (220V)
Interchangeable Head	SH, RH, QH, RQH, DH, HH, FH
Tohnichi Printer	EPP16M2
Connecting Cable to printer	#379,
Connecting Cable to P/C	#572, 25pins Male #573, 25pins Female #574, 9pins Male #575, 9pins Female
Infrared Ray Data Receiver	R-DT100-3
Data Filing System	DFS
Handy Terminal	HT-777

### ● Print Out

Connect CEM2 and EPP16M2, printer in connection cable #379.

#### **Progressive Printing**

When you print out the data one by one, push "MEM" key. The number of samples, maximum, the minimum value, and average value are not printed.

#### **Continuation printing**

Display the last counter value of the printing range by up/down key, and push "MD" key to indicate "n" with number of samples. Then push "MEM" key. The data below the set-up counter value, the number of samples, the maximum value, the minimum value, and average value are printed.

#### **Note:**

If measuring data is low, it is excepted from data processing even display show data, and printing is not carried out, either.

In order to output and print to a printer, an internal DIP switch needs to be setting changed. Please contact Tohnichi.

### ● Data Transmission by Infrared Ray

Connect Infrared Ray Data Receiver, R-DT100-3 and printer, EPP16M2 or your personal computer in each exclusive connection cable. Unite a direction with the infrared receiving part of R-DT100-3 for the infrared output part of CEM2. Display the last counter value by Up/down key, and push "MD" key to indicate "n" with number of samples. Then push "MEM" key. The data below the set-up counter value, the number of samples, the maximum value, the minimum value, and average value are transmitted.

Data transmitting distance	: 1m
Data Transmitting Angle	: 60 degree
Data Transfer method	: Continuous

- **Data filing system**

- Simple data file system**

- A simple data file system is the software for carrying out statistics processing of the data measured by CEM2 simply with a personal computer.

- Data filing system**

- Custom software is supplied on request

- **Additional Note**

- Data out put format from CEM2 to Personal Computer.

- Data Form : RS232C

- Transmission System : Start-stop Synchronization Serial

- Baud Rate : 2400bps

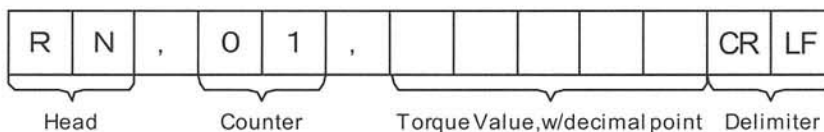
- Data Length : 7bits

- Stop Bit : 1bit

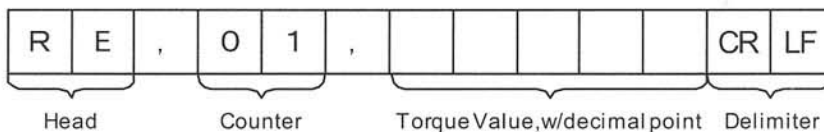
- Parity : None

- Format**

- Continuous



- Progressive



- Note:**

- Without request, CEM2 is supplied as a personal computer output setup.

- Please contact Tohnichi, when the internal dip switch needs to be setting changed.

## <<Additional Error warning note>>

Err9 -----> 0 setting error

In case of Err9 comes up on display,

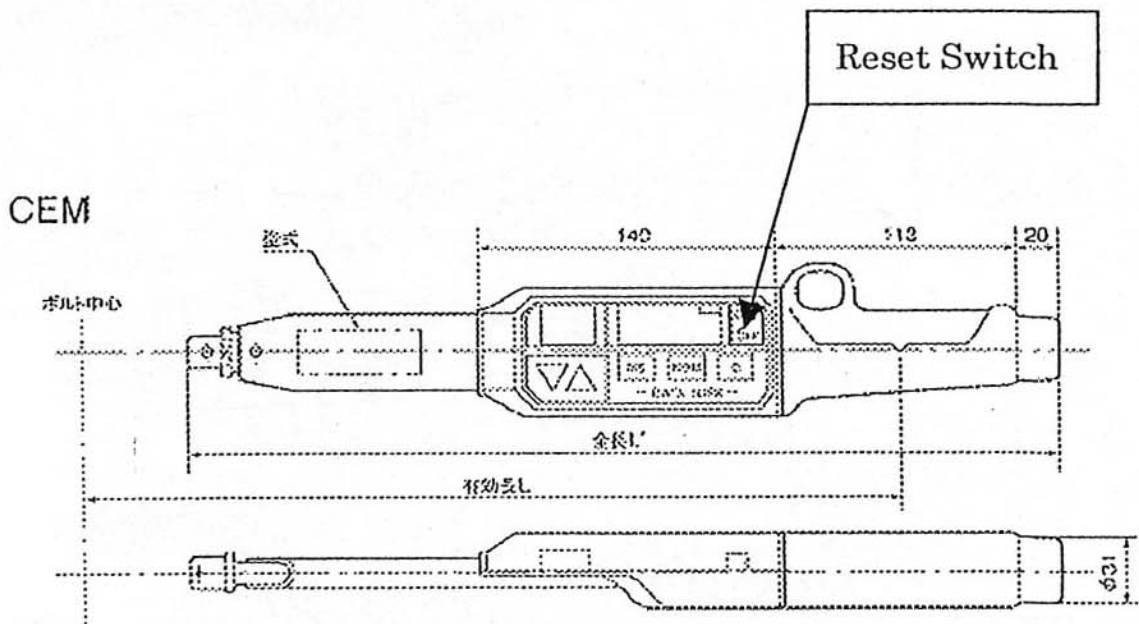
1. Press C key button without loading

If the Err9 is disappeared, resetting is completed. Tool can be used normally.

2. If the Err9 is remaining on the display

Please press Reset Switch, and press C button again without loading.

If the Err9 is disappeared, resetting is completed. Tool can be used normally.



If the Err9 is still remained on display after trying the above instruction, please contact Sales agency or TOHNICHI MFG. CO., LTD.

**Tohnichi Mfg. Co., Ltd.**

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