

# Radio Frequency Torque Wrench with Double Tightening Detection MODEL **CSPFW**

## 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.

## 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 indicates attention is required for your safety. When this symbol appears in this instruction, 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 which may cause serious damage
- "  **Warning**": Potential danger which may cause serious damage
- "  **Caution**": Potential danger which hinder ordinary operation but may not lead to serious damage.



### Warning

- Do not drop water or oil on this instrument  
Do not use this instrument in an atmosphere of flammable gas and steam.  
Use in such an atmosphere may result in fire.
- Avoid shock or vibration to this instrument. It may cause a damage or failure.
- Before use, make a pre-operation inspection and check the settings.
- Be sure to conduct a periodic inspection of torque wrenches.
- Use a torque wrench within the measurement range specified in the operating instruction.
- Do not use other than the specific battery instructed in manual. The battery may overheat, leak, or explode.
- When discarding or storing the battery, insulate it with tape or something.

Should this instrument give out abnormal smell or catch fire during use, stop using it immediately and remove the AC adapter from the outlet. Then, move the instrument to a safe place and contact Tohnichi Mfg. Co., Ltd.

- Be sure to use an AAA alkaline battery for power supply to the transmitter T-FHW.
- Be sure to use a 9V alkaline battery for power supply to the Setting BOX.
- Remove the battery if the product will not be used for a long time.
- Avoid using the instrument in a place where there are metal structures around it.
- Do not install the antenna for the receiver close to any metal pole, electric wire, iron piping, etc.
- \* Especially, if the antenna and piping are positioned in parallel, the communication status may be worsened.
- Avoid using the instrument near welding machines, electric discharge machines or machines producing electromagnetic noise such as PC.
- If the receiver is placed adjacent to the transmitter, different groups must be set between the receiver and the transmitter.
  - \* If the receiver where the ID is set on a different channel in the same group is placed adjacent to the transmitter, in extremely rare cases when "simultaneous transmission" occurs, a communication error may be caused.
- Before wiring, check that the power of the device to be connected to the receiver is in the OFF position.
- Do not handle the torque wrench roughly.
- Do not disassemble or modify.
- Be sure to read the operating instruction of the torque wrench.
- Use a torque wrench within the measurement range specified in the operating instruction.
- Should this instrument give out abnormal smell or catch fire during use, stop using it immediately and remove the AC adapter from the outlet. Then, move the instrument to a safe place and contact Tohnichi Mfg. Co., Ltd.

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## 1. Outline

This remote signal torque wrench allows greater freedom of movement than a wired LS torque wrench.

The receiver can output a signal to Poka Patrol CNA-4mk3 (sold separately) or sends ID data from the transmitter to PC/PLC via RS232C to establish a missed tightening system.

Furthermore, this product is equipped with a gyro sensor, and it is possible to prevent the bolt from being tightened twice by monitoring the angle. Torque management is more reliable than Pokayoke, which only manages the number of tightening times.

## 2. Feature

- **FHSS (Frequency Hopping Spread Spectrum) enhances reliability.**

With the application of radio equipment technologies such as Bluetooth, radio signals are received or transmitted while the frequency is switched at a high speed. If noise or interference with other radio equipment occurs at a certain frequency, the frequency is automatically switched to make it possible to receive a high reliable tightening completion signal.

- **Simultaneous transmission of 256 transmitters**

With this model, adoption of FHSS realizes simultaneous transmission of 256 transmitters.

\* Only when 256 receiver groups are set without being overlapped.

A single receiver can control the almost infinite number of transmitters.

\* Only when simultaneous transmission in the same group does not occur.

*About groups and ID*

*[Group] The 5ch extracted from 78ch frequencies from 2.402GHz to 2.479GHz (1MHz interval) is set as 1 group, and there are 256 groups in total.*

*[ID] 000 to 999 and 7 alphanumeric characters can be set. With this ID, the receiver identifies the torque wrench.*

- **Easy transmitter/receiver setting**

Without removing the transmitter from the torque wrench or removing the receiver panel, the group and ID can be set and checked by wireless on the Setting BOX (option).

- **Traceability**

The serial or reference number of a torque wrench (7-digitalphanumeric characters) can be set as an ID and transmitted. The tightening bolt (portion) and the manufacturing number (reference number) are managed in combination, to ensure traceability: "Which torque wrench was used to tighten this bolt (portion)?" → "Which torque wrench tester was used to calibrate this torque wrench?" → "Which...was used to calibrate this torque wrench tester?" For 7-digit ID setting, consult to Tohnichi.

- **Answer back system**

The operator is enable to know the communication status by the LED mounted on the transmitter, without checking the receiver or the control device.

- **150,000 times of transmission**

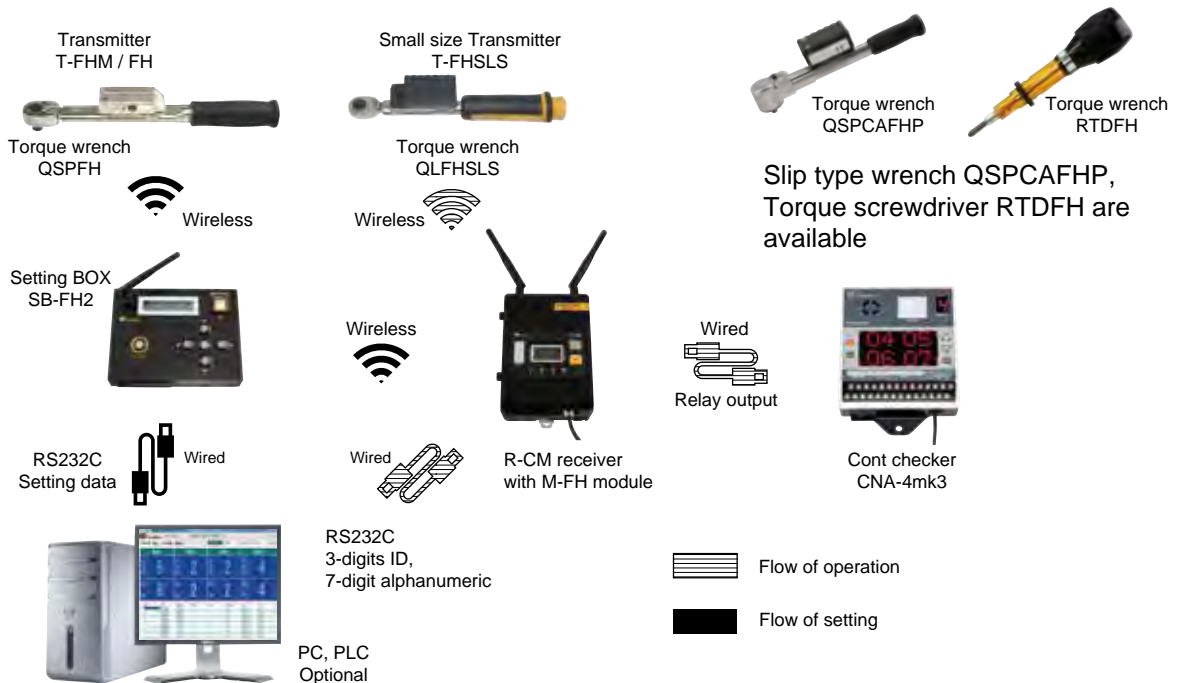
An AAA alkaline battery provides 3600 signals per day for 2 months or more.

Battery is easily replaceable by simply sliding the battery cover.

- **Equipped gyro sensor detects double tightening**

This product uses a gyro sensor to monitor the rotation angle of the torque wrench, and if the tightening angle did not reach the double tightening judgment angle, wrench judges as NG. The angle can be set on the actual tightening work or using dedicated setting software and setting box.

### 3. Configuration



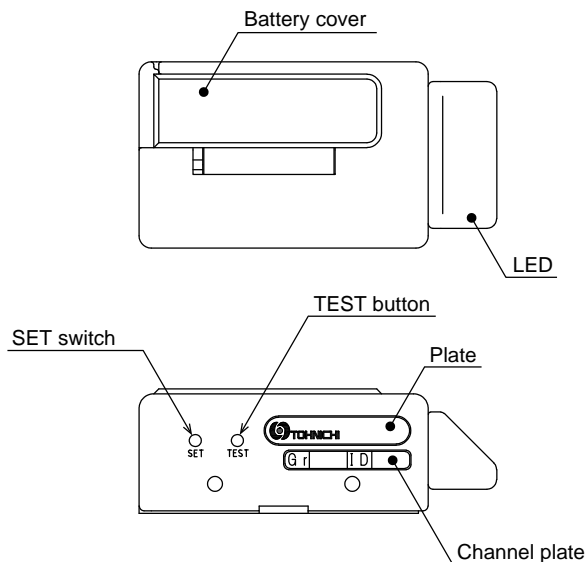
### 4. Specifications

	Transmitter	Receiver	Setting BOX
Model	T-FHW	R-CM with M-FH module	SB-FH2
Frequency	2.4GHz band 2.402GHz - 2.479GHz, 1MHz interval, 78 kinds		
Communication Method	FHSS (Frequency Hopping Spread Spectrum)		
Modulation	GFSK		
Communication Speed	1Mbps/255bps		
Group	Gr000 to 255		
ID	3-digits 000 - 999, 7-digits alphanumeric		
Input/Output		Non voltage relay output 1a RS232C output	RS232C input
Power Source	DC1.5V AAA alkaline x 1	AC100V - 240V 47 - 63Hz 0.3A	DC9V Alkaline x 1
Antenna	Chip antenna	Dipole antenna	
Display	LED	Power LED, Receiv LED	Power LED, LCD
Operation Temperature	0 - 50°C		
Communication Distance	M-FH mode: 10-30m, R-FH mode: 10 - 20m		

#### Note.

- Transmitting/receiving distance varies depending on surrounding radio environment.  
Radio frequency communication errors may be caused by noise or a shield placed between the transmitter and the receiver. In addition, radio waves reflected by metal, concrete, etc. may interfere with radio waves directly sent to the antenna of the receiver and a dead point occurs, resulting in communication error.
- For the battery life of the transmitter T-FHW, tightening operation can be performed about 150,000 times with a new alkaline battery. The battery life varies depends on the length of tightening time due to angler detection by gyro sensor.
- Refer to each manual for receiver and setting box for details.

## 5. External View and Each Part Name



### • Battery cover

Slide it to open the battery case for battery change.

### • LED

Blue light in 1 sec. : Communication OK

Red blinks 3 time : Communication error

Red light up : Double tightening, it continues until the TEST button or SET switch is pressed or conduct correct tightening operation.

### • TEST button

By pressing shortly, send a signal for communication check between transmitter and receiver or press.

Press and hold it to check battery level.

Blue light up: Battery is enough to use.

Red light up: It is time to replace.

### • SET switch

Press it for 1 sec. to move to setting mode for checking or changing the group/judgment code/ID.

Press it for 2 sec. to move to double tightening judgment angle setting mode.

Press it shortly to return to standard mode.

### • Channel plate

If channels are specified when you order to Tohnichi, the group and ID will be marked on the plate.

### • Plate

If torque set are specified when you order to Tohnichi, the setting torque value and unit will be marked on the plate.

## 6. Precaution for Use

### 6-1. Caution for correct use

1. Do not handle torque wrench roughly.
2. Read the operating instruction of torque wrench body before use.
3. In order to detect angular rotation from the trigger torque to the final torque, there is 2 steps of click motion.  
The 1st light click feeling occurs when it reaches trigger torque (A position).  
The 2nd strong click feeling appears when reached set torque (B position).  
Must be tighten by torque wrench until reaching set torque.
4. Refer to setting of Group, judgment code, ID for manual of setting box.



## Double Tightening Judgment Function

\* About the double tightening judgment function

This product uses a gyro sensor to monitor the rotation angle of the torque wrench, and if the tightening angle does not reach the double tightening judgment angle, it will be judged as NG. The angle setting can be changed at setting mode.

The initial setting angle is set at 999 ° for the double tightening judgment angle. Be sure to set it according to the tightening work. If tightening is performed without setting the double-tightening judgment angle, the double-tightening judgment will always be NG.

Refer to 7-10 or 8-2 for the setting method.

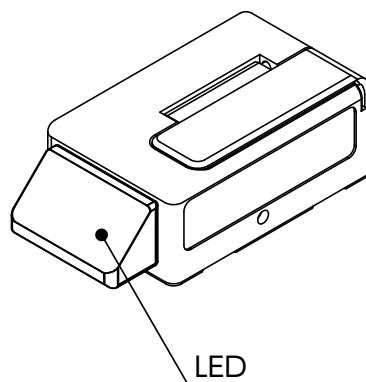
If you intend to check torque value of body and communication status of the transmitter and receiver at once by a torque wrench tester, set the angle on zero to shut down the double tightening judgment function.

Item	Trigger Torque	Double Tightening Judgment Angle
Description	Starting torque value for angle measurement. Angle detection starts only while the trigger torque is exceeded.	Threshold angle for comparison with tightening angle and double tightening judgment angle. If the tightening angle is greater than or equal to the judgment angle, it will be judged as standard tightening operation, and if it is less than the judgment angle, judged as double tightening.
Default		999°
Range		0° to 999°



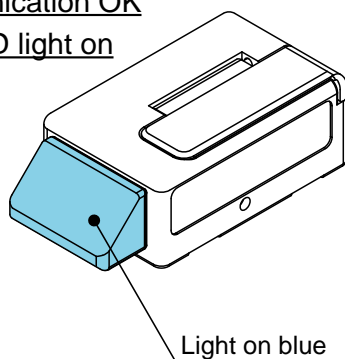
## 6-2. Instruction for use

1. Inset a battery then power on the transmitter and start to angular velocity check and zero adjustment, so stabilize the wrench during the LED blinks in blue and red alternately.
2. If it passed the check, LED blinks twice and turns off. If shock or vibration are given during angle checking, the LED keeps flashing in red. In above case, on/off the power by remove and insert the battery and stabilize the wrench quickly.

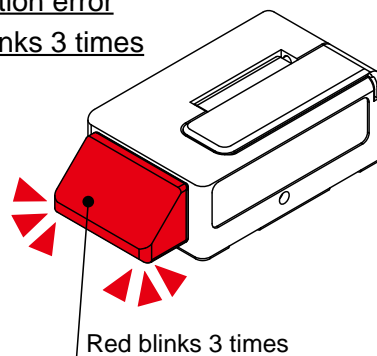


3. When the rotated angle at the set torque beyond double tightening judgment angle, transmitter sends a tightening completion signal to receiver. In case the angle is less than judgment angle and double tightening NG signal is OFF, transmitter does not emit signal and if it set at ON, send a 3-digits ID signal for NG. Refer to 8-2. Setting procedure of setting software.
4. According to the tightening result, the LED lights and blinks as shown below.

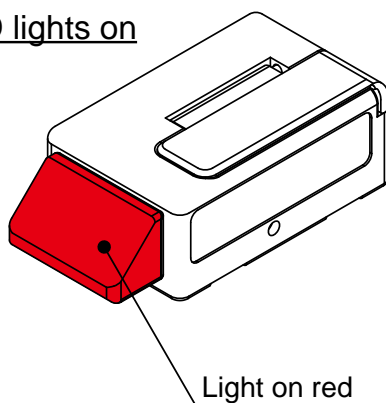
Communication OK  
Blue LED light on



Communication error  
Red LED blinks 3 times



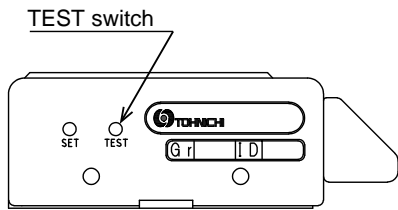
Double Tightening was detected  
Red LED lights on



\* In case double tightening judgment was NG, LED keeps lighting on red until pressing TEST button or SET switch or conduct correct tightening.

### 6-3. Transmitter battery and communication check

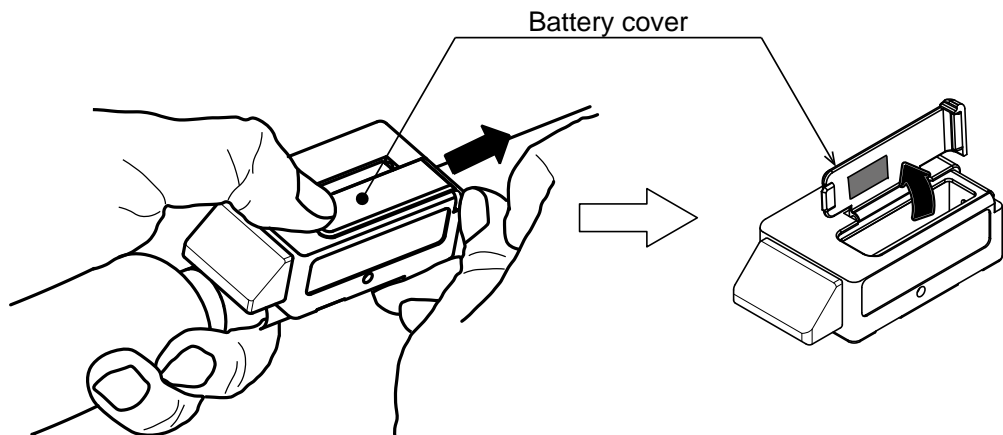
1. Press TEST button on the side of transmitter



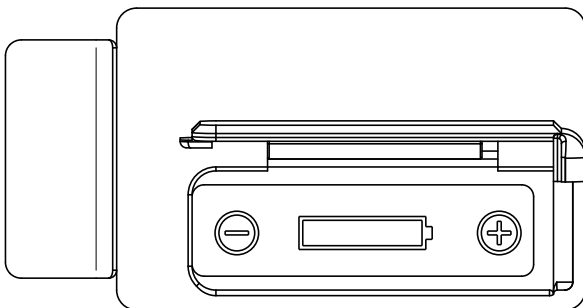
2. During pressing the TEST button, LED lights on blue when the battery is enough remain to use. In case LED lights on red, replace the battery to new one, refer to 7-4. Battery replacement.
3. Communication check will be conducted after releasing the TEST switch and completed battery level check consecutively.
  - \* Power on the receiver that you are going to conduct communication check.
4. If the communication has been established normally, LED lights in blue and blinks in red 3 times if the result is error.

### 6-4. Battery replacement.

1. Slide the battery cover to open.



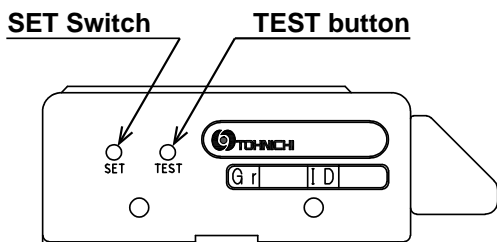
2. Remove the existing battery and set a brand new battery with care of its polarity.
  - \* Should be use an AAA alkaline battery.



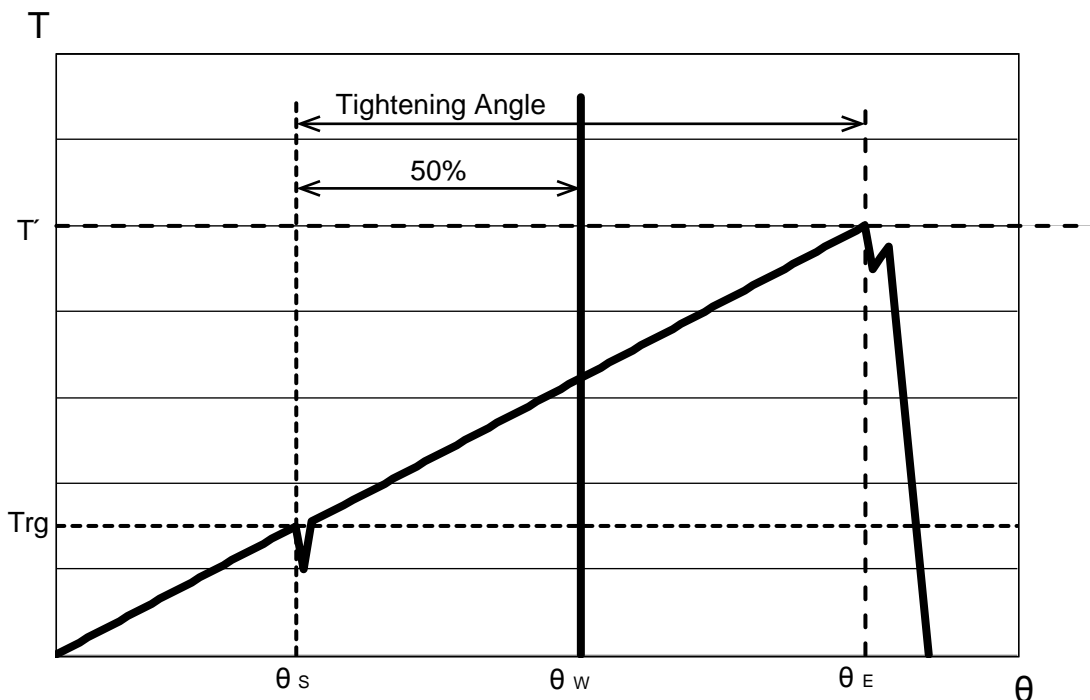
3. Close the battery cover

### 6-5. Double tightening judgment angle setting

1. Press SET switch for 3 seconds to enter to double tightening judgment angle setting mode. When it changed to setting mode LED blinks in blue and red alternately.



2. Angular velocity check and zero adjusting is being conducted, so stabilize the wrench while the LED is blinking in blue and red alternately.
3. If there is no problem, LED blinks in blue twice briefly and it shift to setting mode. If shock or vibration are given during angle checking, the LED keeps flashing in red. In above case, on/off the power by remove and insert the battery and restart from the beginning.
4. At the settin mode, the LED keeps blinking blue. Tighten the actual bolt by FHW during LED flashing in blue, the double tightening judgment angle will be set at 50% value of the tightening rotation angle.



Trg: Trigger torque, T': Set torque,  $\theta_S$ : Start point of angle detection,  $\theta_W$ : Double tightening judgment angle,  $\theta_E$ : End of angle detection

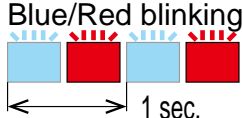
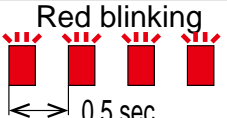
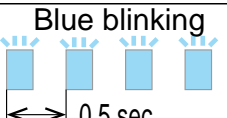
If you want to off double tightening judgment angle function, pressing TEST button while the LED is blinking in blue, angle value will be set at zero.

5. When LED blinks blue twice, angle setting has been completed


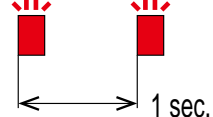
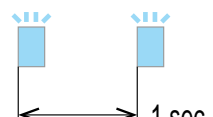
## 7. LED Display Messages

The LED on the transmitter T-FHW shows current setting status or describes error contents. If an error occurs, refer to the error message table to solve the matter.

### [Setting Mode Messages]

LED Disply	Mode	Reason
① Blue/Red blinking 	Angle velocity check	Conducting zero correction of the gyro sensor
② Red blinking 	Setting mode	Communicating with the setting box
③ Blue blinking 	Double tightening judgment angle setting mode	Setting of judgment angle by tightening

### [Error Messages]

LED Disply	Mode	Reason
① Red light on 	Double tightening judgment error	The wrench detected double tightening because the tightening rotated angle has been lower than the setting angle. In this case, wrench does not send signal once set at double tightening signal OFF. Conduct correct tightening or reduce the setting angle to release this error.
② Red blinking 	Gyro sensor zero correction error	Insert and remove the battery to reboot the transmitter and immediately stand still it. It can be used once the error is released. If not, the gyro sensor may have problem, ask to repair.
③ Blue blinking 	Micro switch error	Defection of micro switch or tightening is not completed. To release this error, complete the tightening until reaches set torque or stand still the wrench for 1 minute. Try tightening and if the error shows again, ask to repair.

## 8. Settings with Setting Software

T-FHW can be change setting items through dedicated setting software which Tohnichi provides.  
Prepare setting box SB-FH2 and RS232C straight cable and install the setting software to your PC.

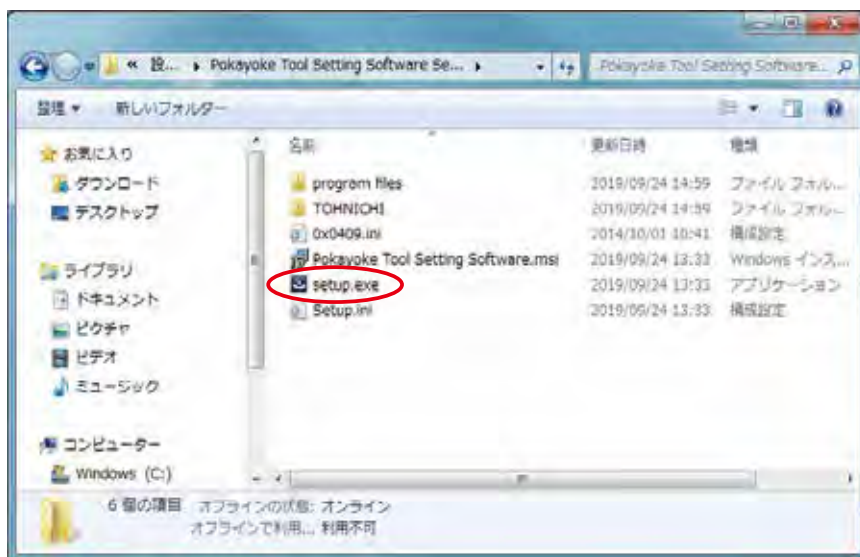
### \* System requirements

- a. OS: Windows 7 or later version
- b. Microsoft.NET Framework 4.0 or later version.

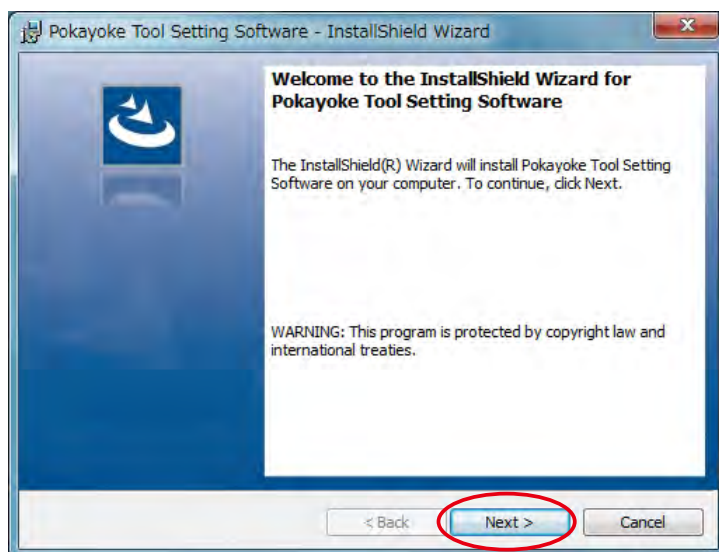
If Microsoft.NET Framework4.0 or higher is not installed on your PC, refer to the Microsoft Download Center and install Microsoft.NET Framework4.0.

### 8-1. Installation (for Windows 7)

1. Download "Pokayoke Tool Parameter Setting Software" from Tohnichi Website.
2. Open "Setup" folder and click "PKYKTLSTS" icon.

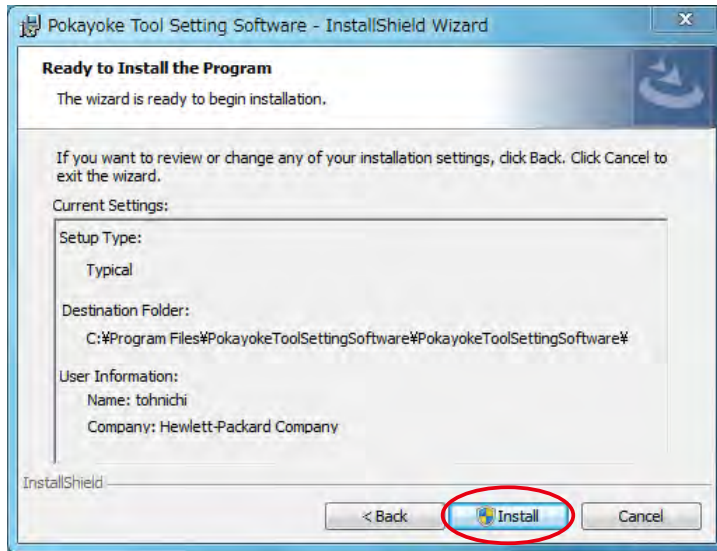


3. Click "Next" to proceed the setup.

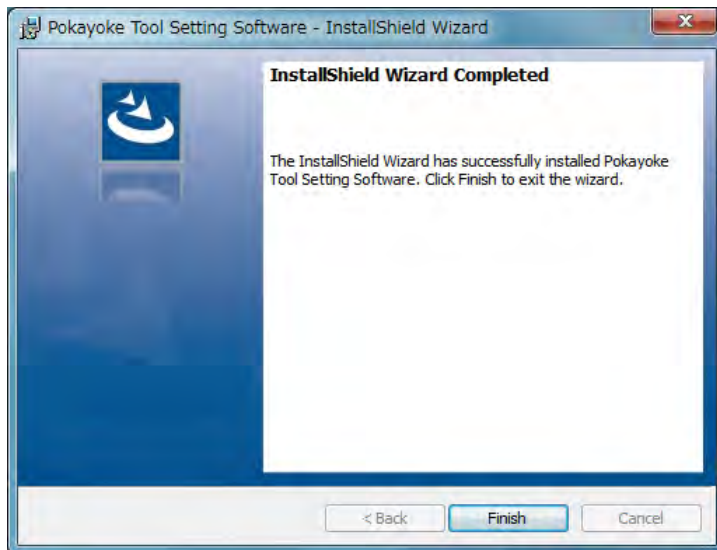


4. Click "Install".

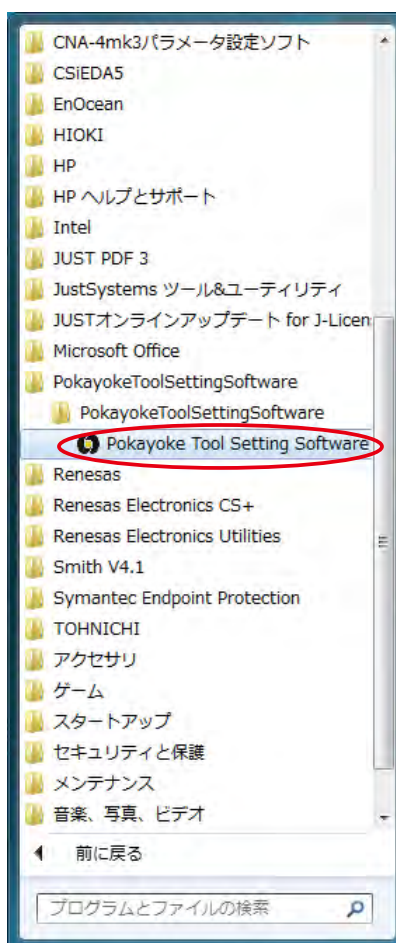
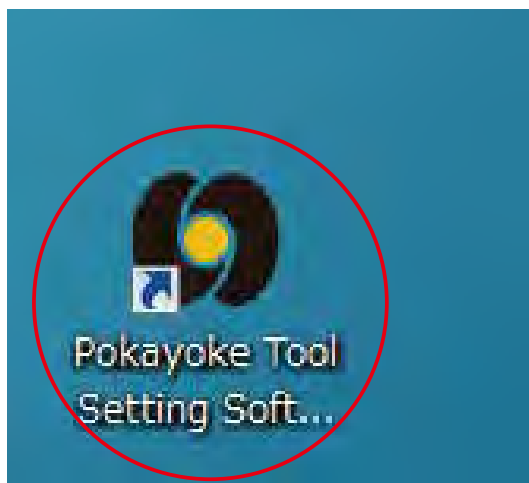
Depending on OS system, the message "Do you want to allow the following program from an unknown publisher to make changes to this computer?" is displayed. Click the [Install] to proceed with installation.



5. Installation has been completed.



6. When installation has been completed, a shortcut icon of "Pokayoke Tool Parameter Setting Software" will appear on the desktop screen and startup menu.



\* Trademarks

Microsoft and Windows are registered trademarks of the Microsoft Corporation.

## 8-2. How to use Setting Software

1. Connect the setting box SB-FH2 to PC on which the Pokayoke Tool Parameter Setting Software has been installed with an RS232C straight cable, and turn on the setting box.
- \* Be sure to set one unit at a time. If multiple transmitters and receivers are set to the setting mode at the same time, they cannot be set correctly.



PC

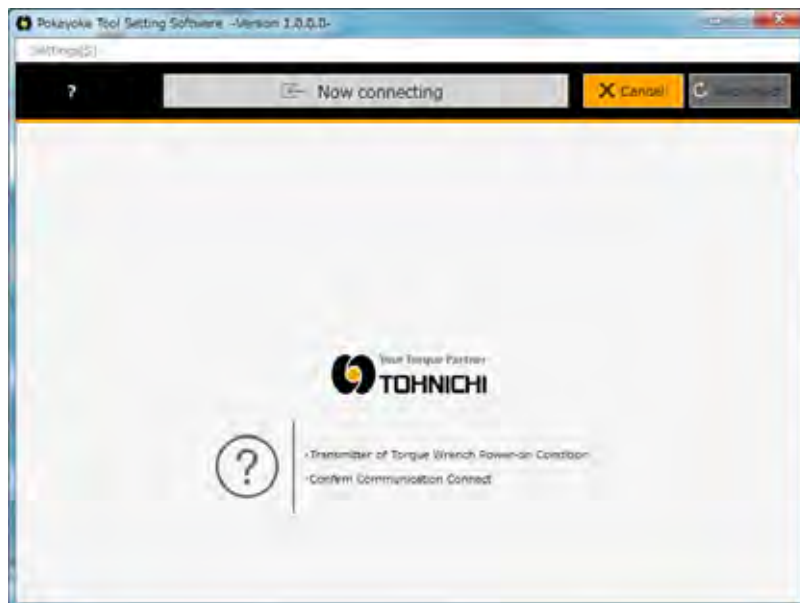


RS232C  
Straight Cable



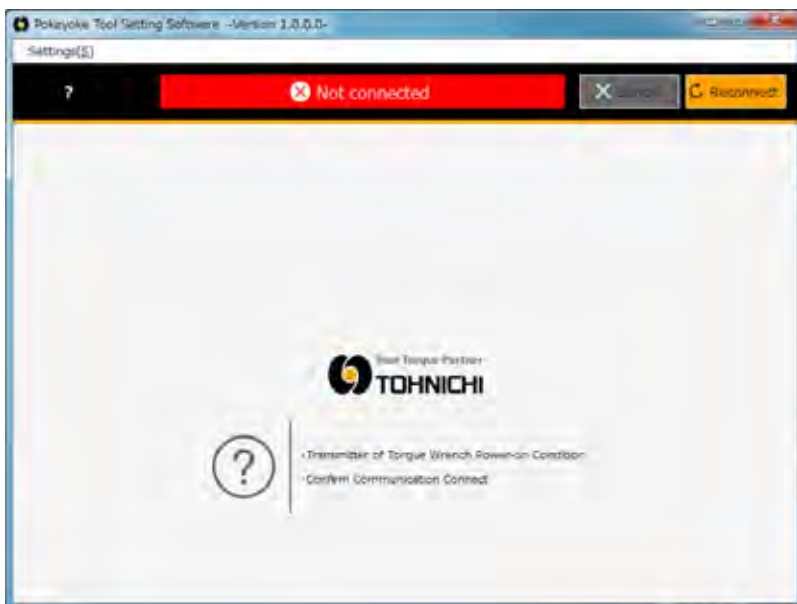
SB-FH2

2. Press SET switch on the T-FHW transmitter for 1 sec. to enter to setting mode.  
When it has been set mode successfully, LED keep blinking in red.
3. Boot Pokayoke Tool Parameter Software setting software.  
If the PC has been connecting to SB-FH2 with RS232C straight cable and T-FHW is in the setting mode, it will automatically connect to T-FHW.

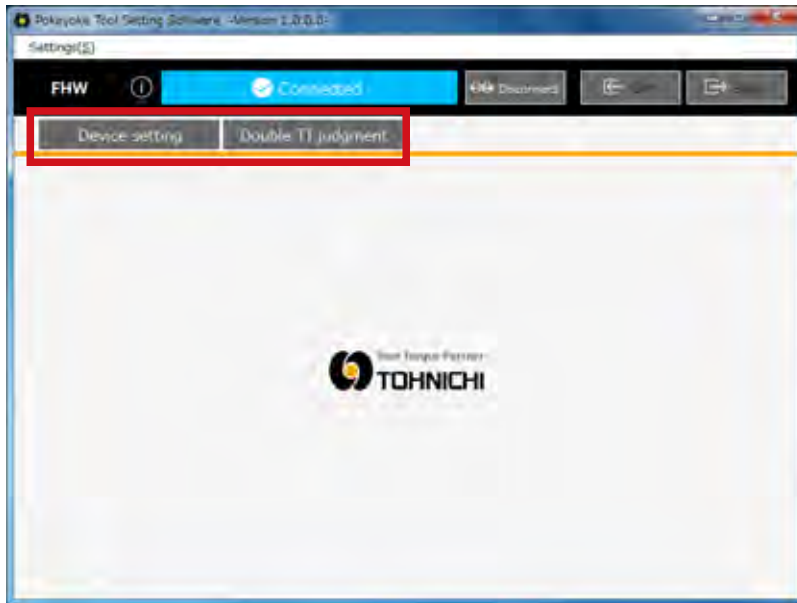




4. If it is not connected automatically, make sure that the setting box is power on, RS232C cable has been connecting firmly, and T-FHW is in the setting mode, and then click "Reconnecting".

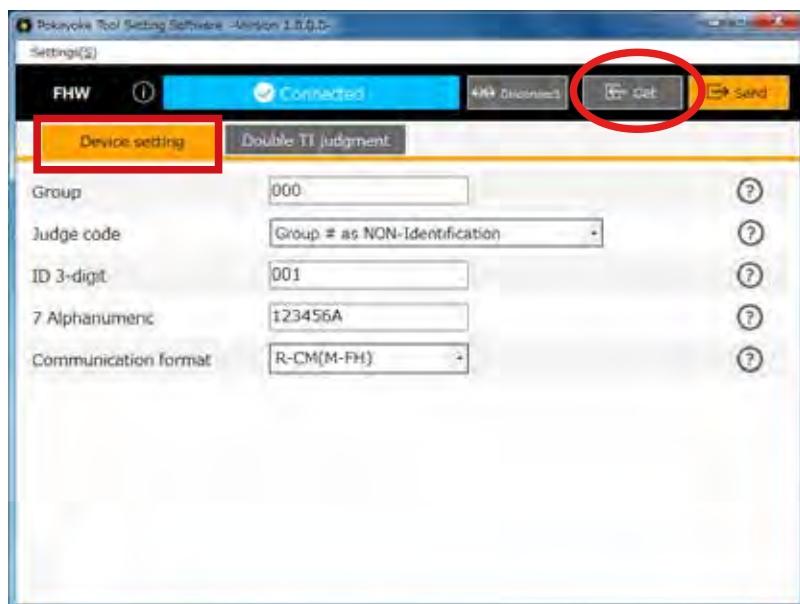


5. When "Connected" appears on the screen, select a tab of setting items.



6. By clicking "GET", the software receives current setting of T-FHW and displays it on the screen.

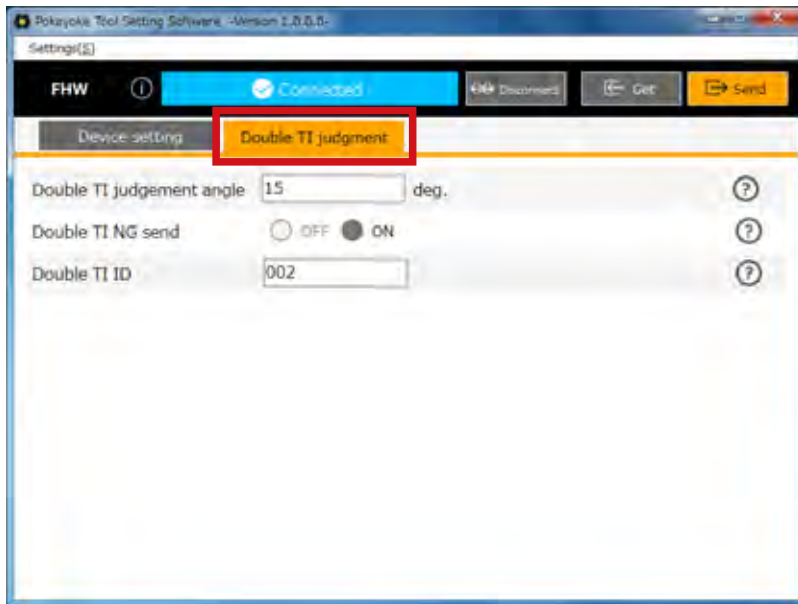
### Settings of Wrench body



### [Description of various settings]

- **Group** Groups from 000 to 255 can be set.
- **Judgment code** 0: 3-digit ID, 7-digit alphanumeric characters without identification.  
→When multiple torque wrenches are used with one receiver (applicable only when simultaneous transmission is not performed).  
1: 3-digit ID with identification (factory setting).  
2: 7-digit alphanumeric characters with identification.  
3: 3-digit ID, 7-digit alphanumeric characters with identification.
- **3-digits ID** IDs from 000 to 999 can be set.
- **7-digits ID** Input S/N of wrench or unique tool management number.
- **Communication format** Select format from R-CM(M-FH)/R-FH  
R-CM(M-FH): Advance new transmitter mode  
R-FH: Previous FH series compatible mode

## Settings for Double Tightening Judgment

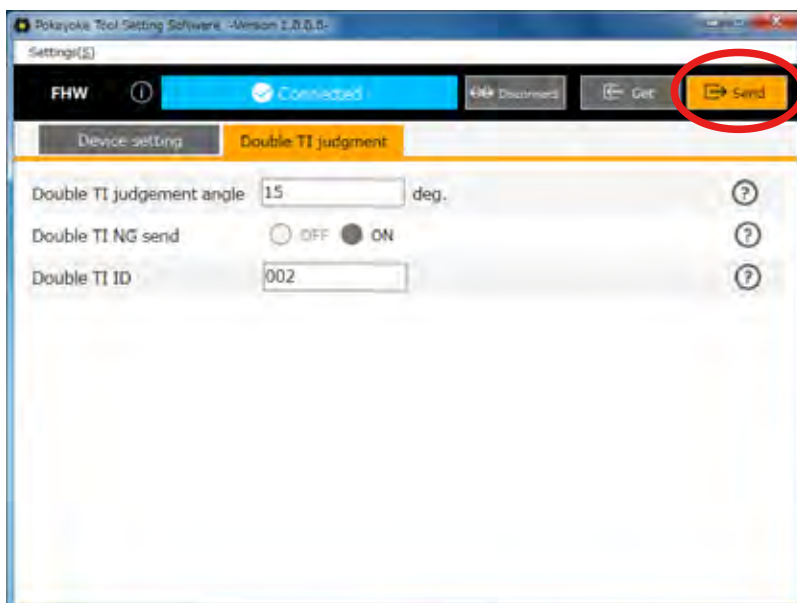


### [Description of various settings]

- **Double tightening detection angle degree**      Input double tightening judgment point of angle degree
- **Double tightening NG signal**      Select ON or OFF this function  
 ON: Wrench sends signal with 3-digits of double tightening NG ID.  
 OFF: Wrench indicates error message on LED only, signal will not be emitted to receiver.
- **Double tightening 3-digits ID**      3-digits signal when the double tightening has been occurred.  
 \* Available when double tightening NG signal setting is ON.  
  
 \* By setting the double tightening NG ID to the surplus relay output ports of a receiver, it is available to send a NG relay signal to an external device.  
  
 \* If the same number is set as 3-digits ID and double tightening ID, the receiver cannot identify the signal is double tightening NG signal or not.

7. After changing setting items and click "Send", the updated settings will be sent to T-FHW via SB-FH2 wirelessly.

Press "Get" and receive setting to confirm the settings have been changed.



8. Setting has been completed

Press SET switch of T-FHW to return to normal mode and conduct communication test with receiver.

## 9. Trouble Shooting

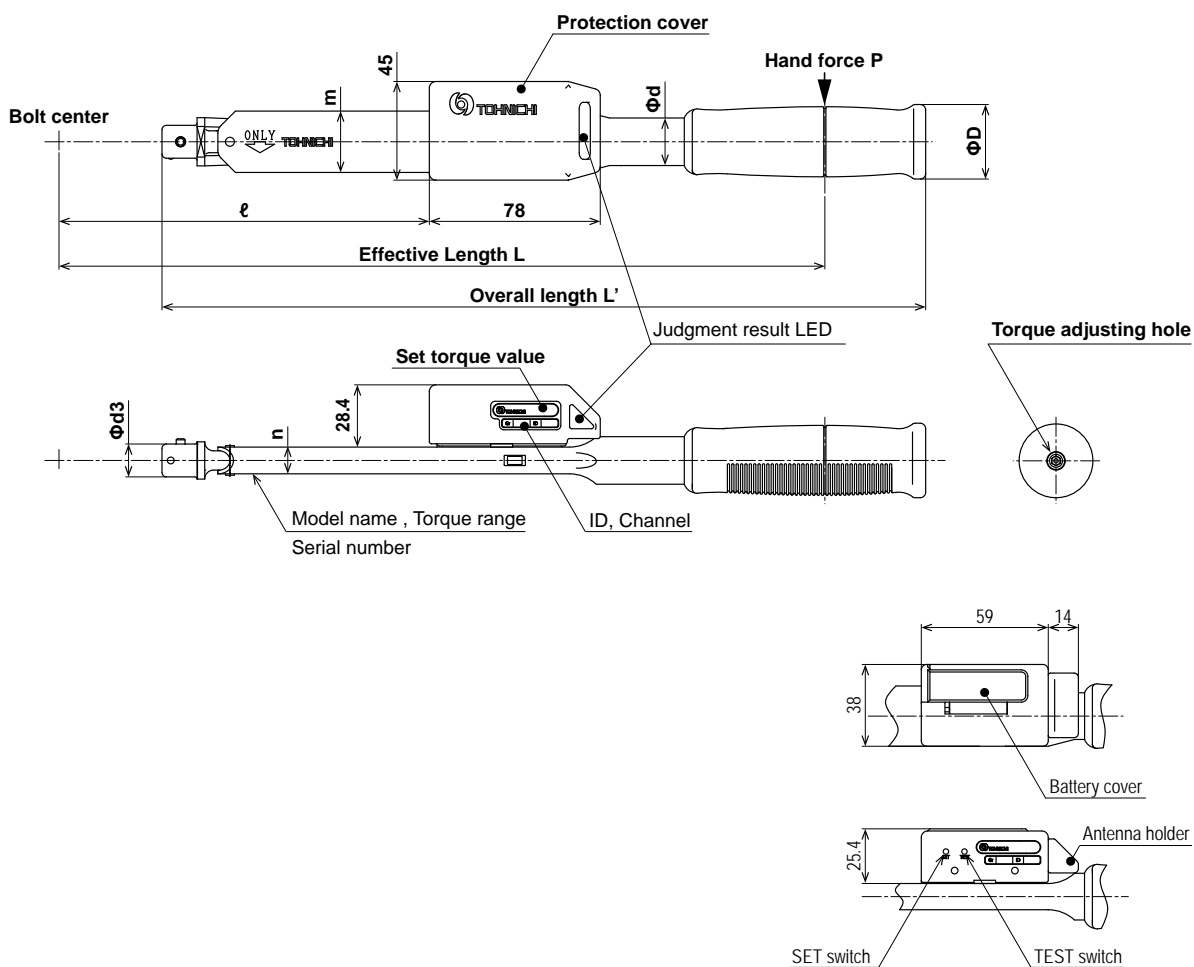
Check the items in the table below and 7-11. LED display messages before judging that the device has a breakdown. After checking the items, if the device still has a trouble, contact your nearest distributor or Tohnichi Mfg. Co., Ltd.

Symptoms	Causes	Corrective actions
The communication status check LED does not light up both blue or red after the torque wrench is activated.	The battery is dead.	Check the remaining battery life. If the communication status check LED is red, replace the battery with a new one.
	No battery is put in the case.	Place a battery.
	The switch function is abnormal.	Check the remaining battery life. If the communication status check LED is blue, there is a trouble in the switch function. Send it for repair.
After the torque wrench is activated, the communication status check LED flashes on and off in red 3 times.	The set group is wrong.	Check the settings on the setting BOX. If there is any wrong setting, reset it.
	The set ID is wrong.	
	The judgment code is wrong.	
	The Receiver is not powered on.	Turn the Power switch of the Receiver to ON.
	Radio wave environment problem	Change the group.
The receiving distance is short.	There is a poor connection of the antenna for the receiver.	Ensure that the antenna for the receiver is installed to the connector.
	The installation location of the receiver is improper.	If there is a metal pole or iron piping close to the antenna for the receiver, move the receiver to a different place.
	There is a shield between the transmitter and the receiver.	Move the shield or the receiver to a different place.
	Radio wave environment problem	Change the group.
The receiving status is not stable.	The setting of the double tightening prevention timer is not proper.	Readjust the double tightening prevention timer.
	Radio wave environment problem	Change the group.
The settings cannot be changed.	The unit is not in the setting mode.	Press the SET switch for 1 sec. to enter to setting mode.
	Multiple models are set in the setting mode.	Set only one model to the setting mode.
LED lights or flashes even if wrench is not activated. * Except display status of 7-11. LED Display Messages	The battery is low for use..	Replace the battery to a new one.

\* Periodically check the transmitting and receiving status.

\* If you have any question, contact your nearest distributor or Tohnichi Mfg. Co., Ltd.

## 10. Dimensions and Specifications


 Accuracy  $\pm 3\%$ 

Tohnichi Head Size	Model	Torque Range Min. - Max. [N·m]	Max. Hand Force [N]	Dimensions [m]								Weight [kg]
				L	L'	d3	m	n	d	D	ℓ	
10D	CSPFW25N3X10D	5 - 25	135	186	193	10	19	9.2	15	29	62	0.32
12D	CSPFW50N3X12D	10 - 50	241	208	214	12	25.5	11.2	20	34	83.5	0.46
	230		218	217	93.5							
15D	CSPFW100N3X15D	20 - 00	344	291	290	15	28	12.2	21.7	27	147.5	0.65
	CSPFW140N3X15D	30 - 40	401	349.5	348.5	169					0.75	
19D	CSPFW200N3X19D	60 - 200	450	445	429	19	35	15	27.2	27	251.5	1.24
22D	CSPFW280N3X22D	100 - 280	425	660	627	22					336	

Designs and specifications are subject to change without notice.

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