KEMP

USER MANUAL

kti

ETS Torque Monitoring Electric Screwdriver

2023/4 Version 1.0.6

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1.Safety Instructions

Thank you for purchasing the product of KEMP Tools Industrial, please read carefully before you use the product and place the instruction manual at a location which is easily accessible for the users.

1.1. Safety Instructions

Safety instructions must be strictly followed when using this product to avoid the risk of personal injury.

Please take caution of the following when inspecting, installing, connecting and operating the product.

	Take caution of the instructions, serious injury or damage to the product might occur.
	The action is strictly prohibited.
	The action is strictly enforced.

Warning	
	● This product is designed to be used in an indoor environment, outdoor use of the product might cause damage or malfunction of the product.
	● Please do not disassemble or modify the product in order to avoid the danger of fire and electrocution. ※Please contact your local dealer for product services.
	● Please do not bend, scrape, bind or exert other force on the wires and plugs of the product to avoid potential cause of fire, electrocution or damage to the product.
	● If you find damage on the wires or the plugs, please do not use the product.
	● Please do not use the product where water might come in contact with the product, or in an environment with high humidity, or extremely high or low temperature.
	● Please stop using the product if excessive heat or malfunction occurs, contact your local dealer for inspection, failure to do so might result in damage to the product or personal injury.
	● Please do not use the product where there is excessive vibration or force of impact, it might cause the damage to the product or personal injury.
	● Please do not cover the vents on the Control Unit to avoid overheating and potential cause of fire or malfunction of the product.
	● The power input range of the product is 100-240 Vac / 50-60Hz, failure to comply will result in damage of the product or personal injury.
	● Please check for any damages to the product and its accessories before use.
	● Please contact your local authorized dealer for maintenance and service of the product.
	● Please make sure the tool is grounded properly to avoid electrocution of the user.

2. Checking the Package

2.1. External Inspection

Upon receiving the product, please check for any damage to the product. If any damage is found on the product, please provide visual proof to your local authorized dealer for warranty service.

2.2. Initial System Check

1. Step One

Please refer to the diagram in 3.1 and connect the cords to the tool and the Control Unit accordingly. Turn on the power on both the Control Unit and the power supply.

Power On (Power Supply)

Power on (Control Unit)

2. Step Two

After hearing the beep from both the Control Unit and the tool, please turn the tool to clockwise mode as shown in the picture below and start the tool, keep the tool turning freely until there is a long beep sound, this confirms the initial system check is completed.

Clockwise Mode

System Beep Codes

	Description	Sound
1	System Starts	Short Beep Once
2	Calibration Mode	Short Beep Twice
3	System Restarts After Calibration	Long Beep Once
4	Torque Value is entered during calibration	Short Beep Twice
5	OK	Short Beep Once
6	NG (Fastening Error)	Long Beep Once
7	Screw Counting Completed	Short Beep Twice

2.3. Package Contents

Please use the following list to check if all the contents are in the package, due to our company policy of environmental protection, a paper copy of the instruction manual is not provided, please download the instruction manual from our company website

List of Contents

#	Item	Quantity
1	Screwdriver	1
2	Power Cord (Screwdriver)	1
3	Control Unit	1
4	Power Cord (Control Unit)	1
5	Power Supply	1
6	Power Cord (Power Supply)	1
7	User Manual (QR Code)	1

1. Screwdriver

5. Power Supply

3. Control Unit

4. Cord (Control Unit)

2. Cord (Screwdriver)

3. Product Specification

3.1. Specification

Specification of the Screwdriver

Description	Spec.
Model Number	ETS-LS06 / ETS-LS16 / ETS-LS20 / ETS-LS24
Torque Range	0.1~0.6 Nm / 0.1~1.6 Nm / 0.2~2.0 Nm / 0.4~2.4 Nm
Dimension	276 x 62 x 46 mm
Weight	570g ±10%
Max. RPM	1000 Rpm
Accuracy	±3%
Detection Accuracy	±3% Full Scale
Life	1,000,000 Fastening cycle
Bit Holder	HEX 6.35mm ø5mm

Specification of the Control Unit

Description	Spec.
AC Power Supply	110V
Dimension	173 x 96 x 54 mm
Weight	415g ±10%
Touch Screen	5” LCD
Communication	RS232、RS485、USB A-Type、Wi-Fi
IO Ports	8 point(input: 4，output: 4)

Specification of the Power Supply

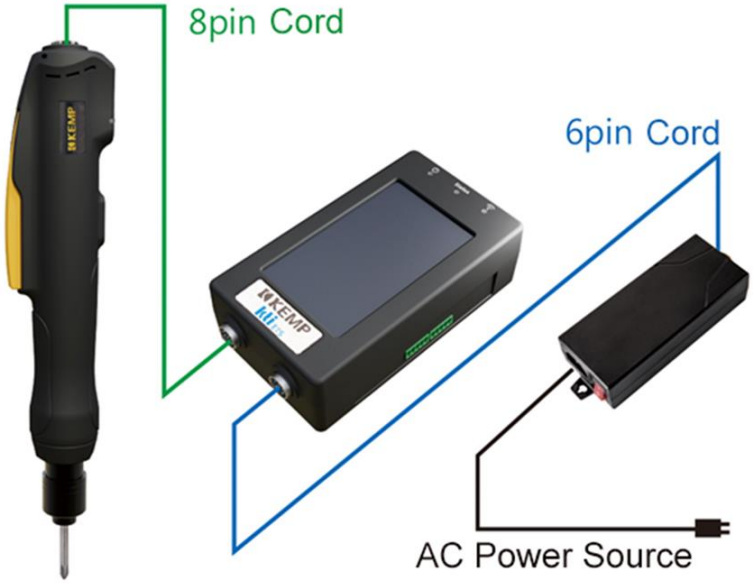
Description	Spec.
Dimension	164 x 61 x 39 mm
Weight	260g ±10%
Input Voltage	100 ~240V
Output Voltage	20 ~ 30V ±10%

Control Unit Cord

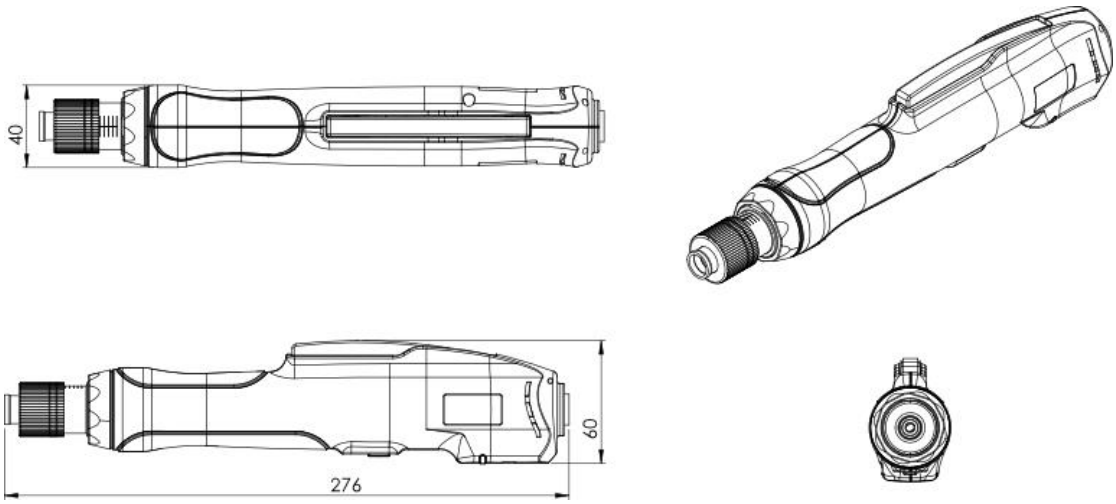
Description	Spec.
Length	2 m
Pin	6

Screwdriver Cord

Description	Spec.
Length	2 m
Pin	8



3.2. Screwdriver



Dimension (Unit: mm)

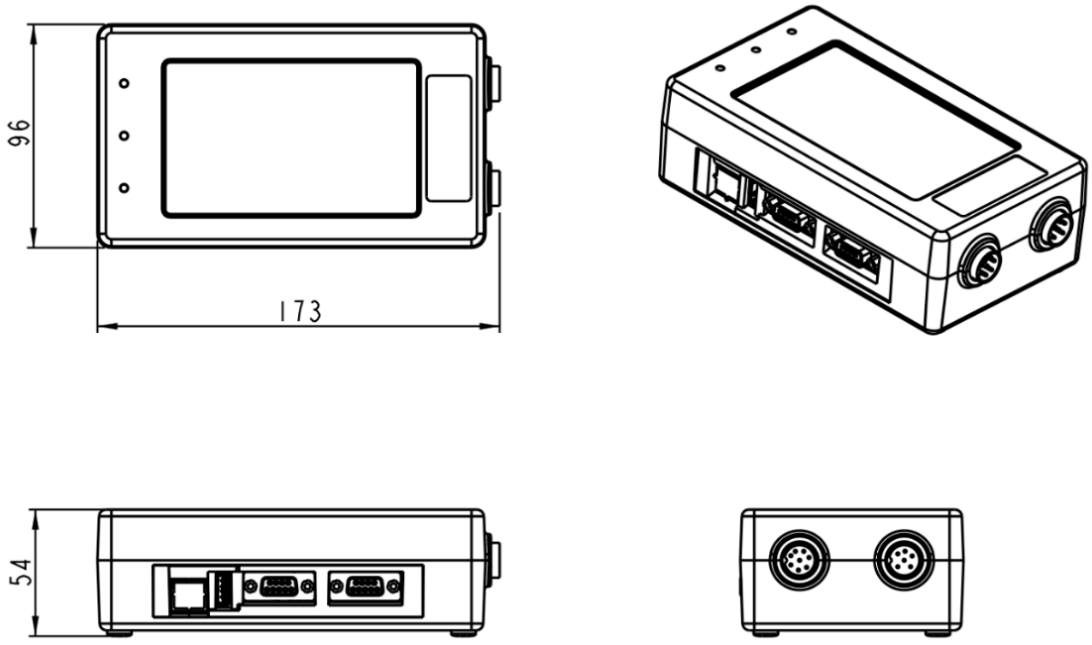
3.3. Control Unit, Wires and Connectors

Main Functions

I. Providing power to the screwdriver
II. Controlling the tools and managing data
III. Communication with automation system (such as the PLC)

Parameters setting through the Control Unit interface or the web-based interface:

- Target Torque
- Number of revolution (turns) per fastening cycle
- Time of each fastening cycle
- Tool Speed (RPM)
- Work cycle and related setting

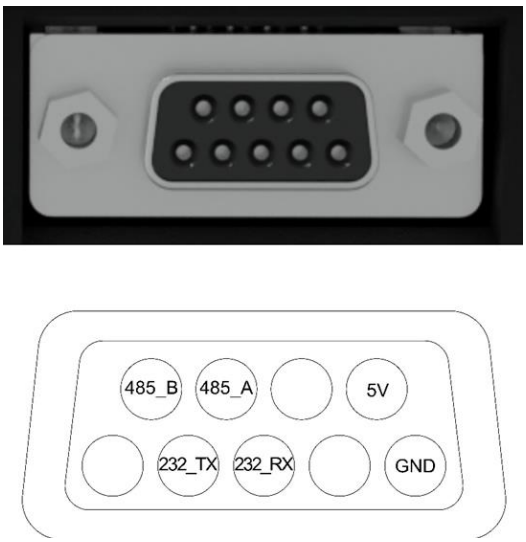


Control Unit Dimension (Unit: mm)

Ports on the Control Unit

Ports Definition on the Control Unit

Port	Description
CN1	Digital I/O
CN2	RS232/RS485 interface (cords are not included) Please refer to the diagram below for pin definition of DB9 Please refer to TESCG-01_ModbusTable for communication protocol
CN3	RS232/RS485 interface (wires are not included) Please refer to the diagram below for pin definition of DB9 Please refer to TESCG-01_ModbusTable for communication protocol
CN4	USB (can be used for external device such as scanner)
CN5	Ethernet Connection



DB9 Pin

DB9 Pin Definition

Pin	Notes
5V	Power
GND	Ground
232_TX	RS232 data transmission
232_RX	RS232 data reception
485_A	RS485+
485_B	RS485-

Control Unit I/O Ports

I/O Ports Definition

Port	Pin	Notes
COM-	1	GND
DO4	2	N/A
DO3	3	NG (Fastening error or error in setting)
DO2	4	OK(Correct fastening result)
DO1	5	Group OK (All screws in a work cycle)
DIN4	6	Lock
DIN3	7	CCW (Rotation)
DIN2	8	CW (Rotation)
DIN1	9	Enable
COM+	10	12V ~ 24V

4. The User Interface

4.1. The Touch Screen

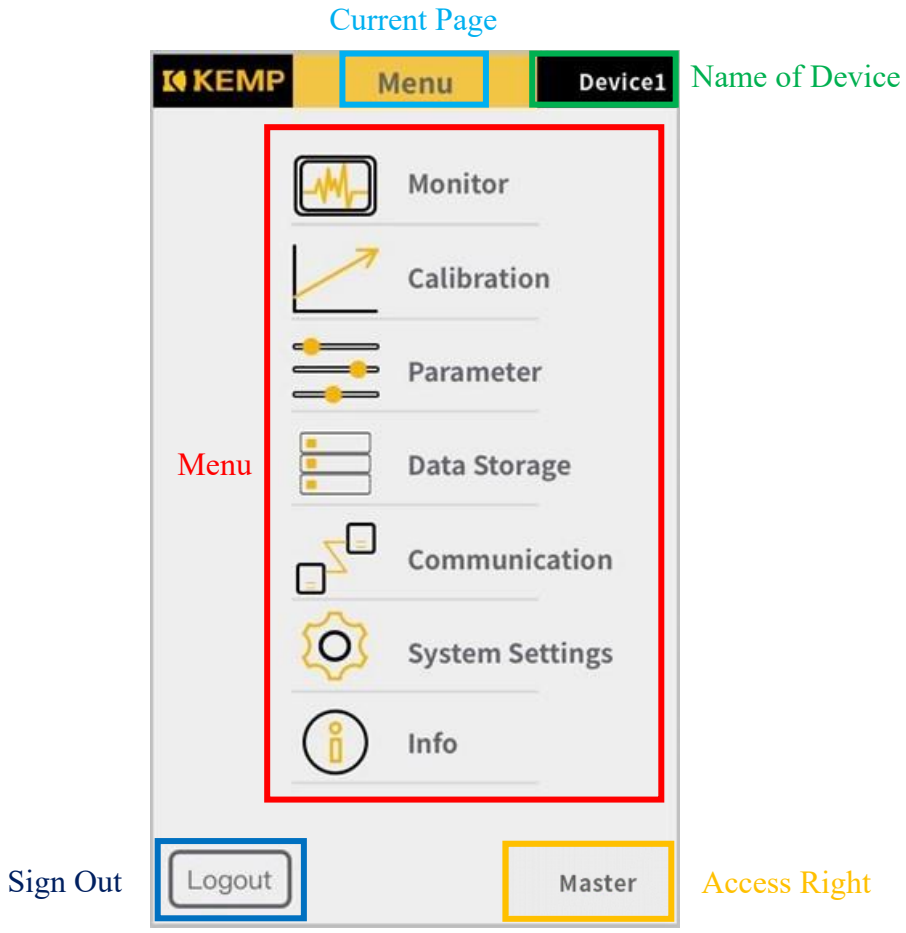
The touch screen on the Control Unit is used for setting up the tools, and we will explain in details in the following sections on how to set up the tools for your specific need

4.1.1. Introduction

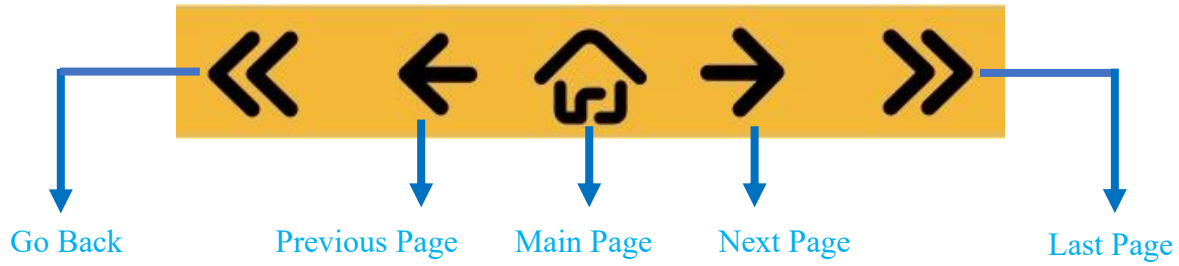
After the power is turned on, the welcome page will be shown as the following, the software version will also be displayed on the bottom right-hand side of the page

The Welcome Page

After the beep, the system finishes initialization and enters the main page:



The Main Page



The Basic Controls

Access Rights

This is for the management of accessing the control system on the tool, different levels of system access can be set up for personnel of different levels on the assembly line, in order to avoid unplanned changes to the system settings.

① Manager (Master)
② Manager_1
③ Manager_2
④ User

	MANAGER	MANAGER_1	MANAGER_2	USER
REAL-TIME MONITORING	✓	✓	✓	✓
TORQUE CALIBRATION	✓	✓	✓	
PARAMETER SETTING	✓	✓	✓	
DATA STORAGE	✓	✓		
COMMUNICATION	✓			
SYSTEM SETTING	✓			
SYSTEM INFORMATION	✓	✓	✓	✓

4.1.2. Initial Settings

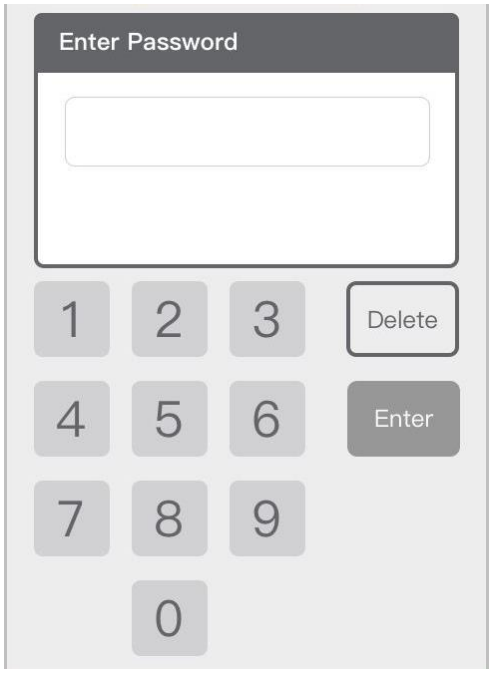
When the system is started for the first time or after it is being reset, the password for the system authorization must be set.

1. Step One

First, please click on any page other than the “Real- Time Monitoring” and “System Information” page in order to trigger the system authorization setting.

2. Step Two

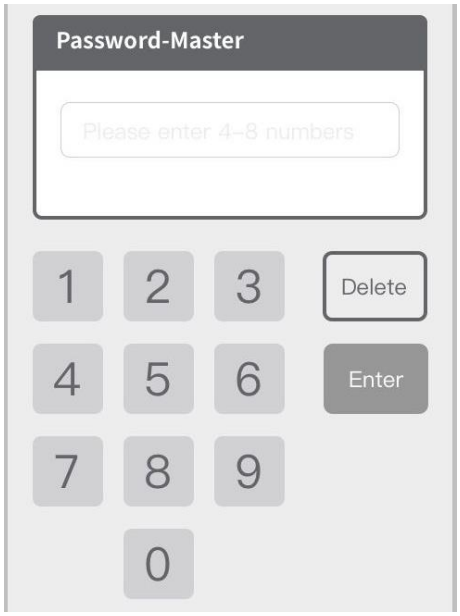
You will be asked to enter a password, and the default password of the system is 111111.



Password Entry

3. Step Three

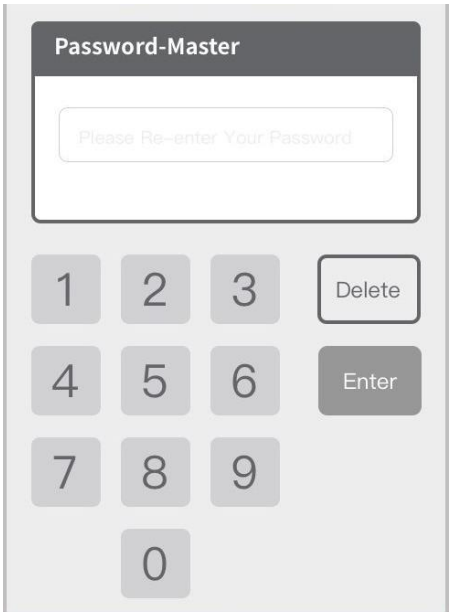
Please enter a 4-6 digit password



Reset Your Password

4. Step Four

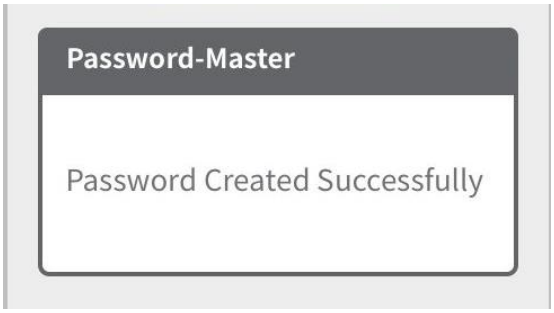
Please re-enter your password to confirm



Confirmation of Password

5. Step Five

After re-entering your password, the following page will confirm the password setting is successful



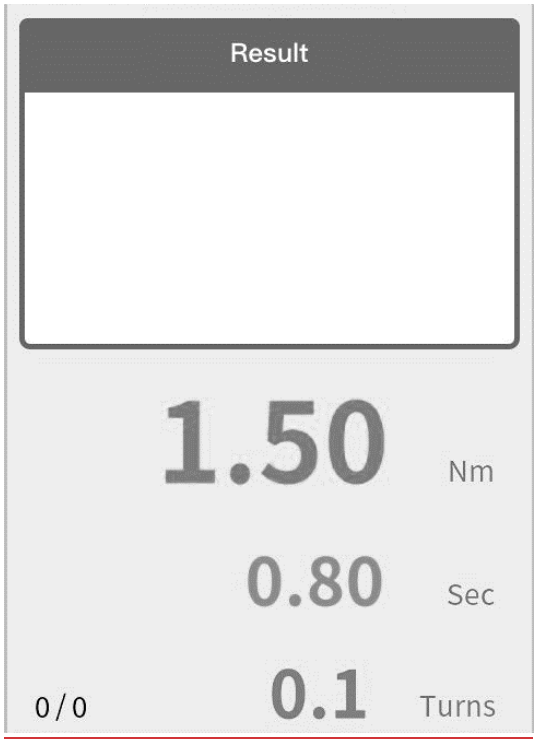
Password Confirmed

4.1.3. Real-Time Monitoring

Fastening torque, fastening time and turns (number of revolution) will always be displayed. Number of screws completed will also be displayed on the bottom left corner of the screen.

1. Fastening Result

Result will be displayed on this screen for **OK / NG / Incomplete Rundown(IR) / Stripped Screw(SS)**. LED lights with three colors will also light up to inform the user about the fastening results. Alert sound will go off for corresponding result, please refer to the following chart:



Fastening Result

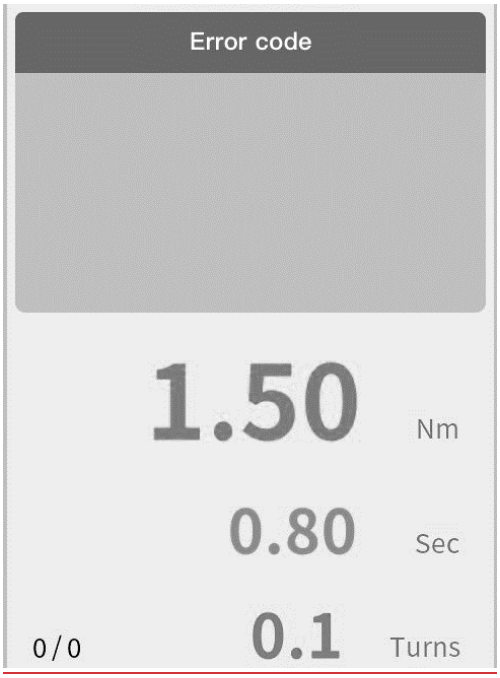
LED Signals On the Tool

System Beep Codes

	Description	Sound
1	System Starts	Short Beep Once
2	Calibration Mode	Short Beep Twice
3	System Restarts After Calibration	Long Beep Once
4	Torque Value is Entered During Calibration	Short Beep Twice
5	OK	Short Beep Once
6	NG (Fastening Error)	Long Beep Once
7	Screw Counting Completed	Short Beep Twice

2. Error Code

When errors occur, it will be displayed as shown in the following screen, and please refer to the following chart for description of the error codes.



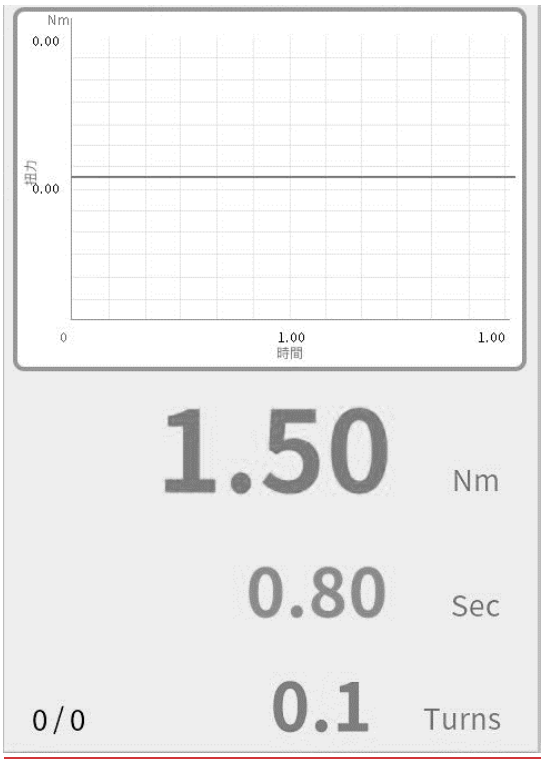
Error Code Display

Error Code	Description
EA-01	Exceeds Max. Torque
EA-02	Min. Torque not attained
EA-03	Exceeds maximum time
EA-04	Min. time not attained
EA-05	Exceeds maximum turns
EA-06	Min. turns not attained

Error Code Description

3. Torque Curve

A torque curve of the complete fastening process can be displayed as shown below



Torque Curve

4.1.4. Torque Calibration

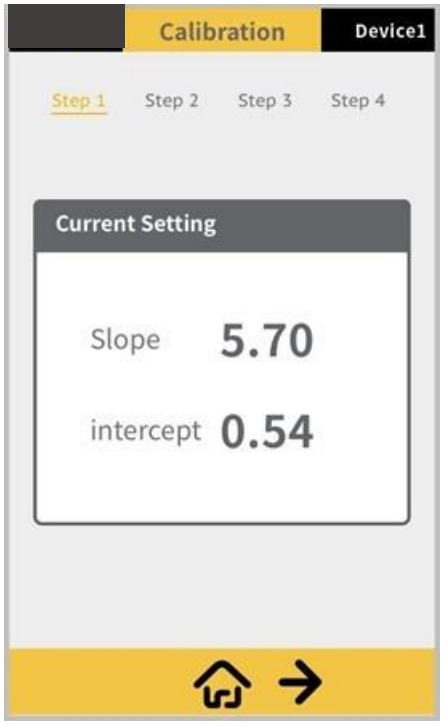
Please note that torque calibration must be performed at least once before using the product. **Torque calibration should be done every 200,000 fastening cycle (one screw per cycle) to maintain accuracy and consistency of the system.**

Please note that if the user activates the "Screw Seating Stability Control" function in "Parameter", torque calibration must also be done with the stability control turned on, the result of the calibration varies between activation and deactivation of the stability control (slow and high speed). When the user deactivates the stability control, the tool will be calibrated using normal speed.

1. Step One

Click on "Calibration" on the main page to enter, on the first page of the calibration process a slope-intercept value is shown, this is the initial setting of the torque calibration from the factory.

(The system uses y=mx+b formula to calculate each value on the torque curve, where m=slope b=intercept x=voltage output from the torque sensor y=torque value)



Initial Slop-intercept Values

2. Step Two

A. A digital torque meter (a digital torque meter used in the calibration process must be well maintained and calibrated periodically to ensure proper calibration of the tool) is needed for the calibration process. For step two we start with the lower limit of the torque calibration process, and a recommended torque value is shown on the upper right corner of the interface, if the user chooses to use the recommended torque value for the calibration, the result of the calibration will be suitable for 20%-80% of the entire torque range of the tool (the recommended torque value displayed will be different for different tool model). However, if the user chooses to be more accurate in calibrating the tool for a specific target torque value, and the recommended calculation of the lower limit is as followed:

   The highest torque output of the tool (full scale): 2.0 Nm (for example)

   10% of 2.0Nm=0.2Nm

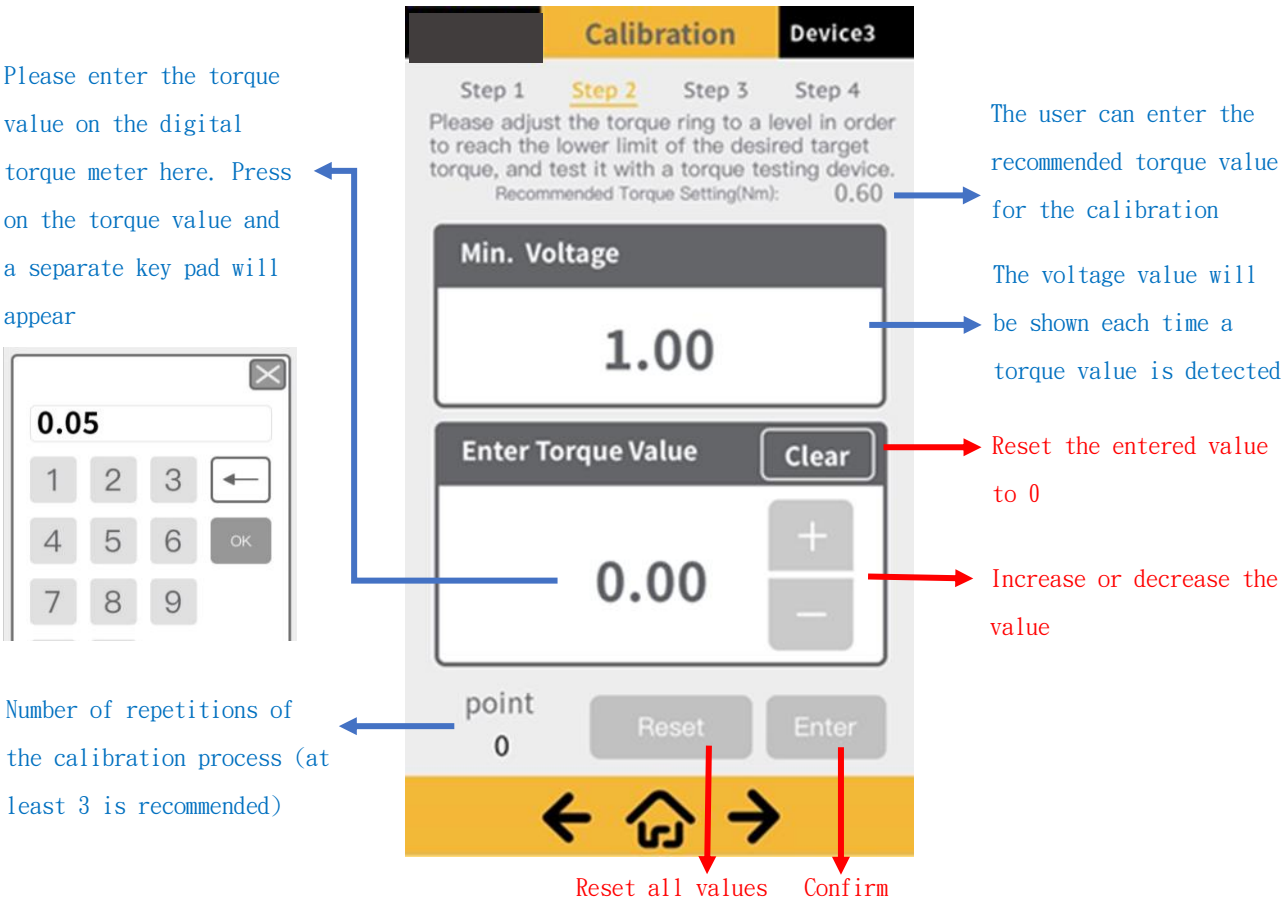
   Target torque the user intended to use the tool: 1 Nm

   Lower limit of the torque calibration value: 1 Nm – 0.2 Nm = 0.8 Nm

   Please adjust the torque ring so that the torque output shown on the torque meter is about 0.8Nm **(Please refer to P.85 for torque ring adjustment)**

B. A voltage value will be shown on the upper part of the page, and enter the torque value measured by the digital torque meter on the bottom, press the plus and minus sign to increase or decrease torque value to match that of the torque meter, or you can press delete to re-enter the value, press reset to start the process again, or press enter to confirm.

C. We strongly recommend the user to repeat the process at least three times to ensure accuracy.



Lower Limit Torque Value Input

3. Step Three

A. Start the process again when you enter the third step of the process, but the upper limit of the torque calibration process is needed, and a recommended torque value is shown on the upper right corner of the interface, if the user chooses to use the recommended torque value for the calibration, the result of the calibration will be suitable for 20%-80% of the entire torque range of the tool (the recommended torque value displayed will be different for different tool model). However, if the user chooses to be more accurate in calibrating the tool for a specific target torque value, and the recommended calculation of the upper limit is as followed:

The highest torque output of the tool (full scale): 2.0 Nm (for example)

10% of 2.0Nm=0.2Nm

Target torque the user intended to use the tool: 1 Nm

Upper limit of the torque calibration value: 1 Nm + 0.2 Nm = 1.2 Nm

Please adjust the torque ring so that the torque output shown on the torque meter is about 1.2 Nm **(Please refer to P.85 for torque ring adjustment)**

Upper Limit Torque Value input

4. Step Four

After the calibration process is completed, a set of slope-intercept value will be displayed on 4th page.

New Slope-intercept Value

4.1.5. Setting Parameters

This section explains how each parameter is set up in details. All settings in each page will be saved once “next page” button is pressed.

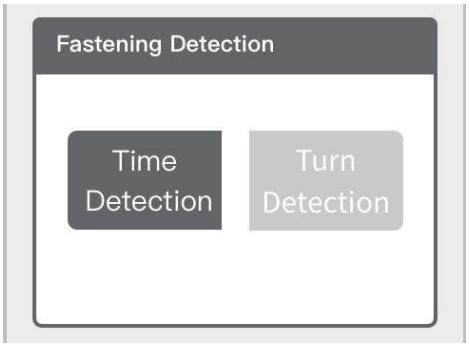
1. Torque Related Parameters
   A. Target Torque: The target fastening torque
   B. Maximum Torque: The upper limit of the torque specification. For example: if the target torque is 1Nm and the required accuracy is ±10%, the upper limit should be 1.1Nm
   C. Minimum Torque: The lower limit of the torque specification. For example: if the target torque is 1Nm and the accuracy is ±10%, the lower limit should be 0.9Nm

Press on the numerical value to activate keypad

Torque Related Parameters

2. Fastening Detection

Choosing the one of two methods of detection (fastening duration (time) or number of turns), from start to seating of the screw



Methods of Fastening Detection

3. Detection Method: Time

When “Time” is chosen, the following set up page will appear

A. Target Time: the time it takes for the screw to reach seating position. Range: 0-4 Seconds
B. Maximum Time: Upper limit of the time. Range: 0-4 Seconds
C. Minimum Time: Lower limit of the time. Range: 0-4 Seconds

Press on the numerical value to activate keypad

Setting of “Time”

4. Detection Method: Number of Turn

When “Turns” is chosen, the following page will appear

A. Target Turns: the number of turns (revolution)for the screw to reach seating position. Range: 0-99 turns
B. Maximum Turns: Upper limit of the number of turns. Range: Target number of turn to 99 turns.
C. Minimum Turns: Lower limit of the number of turns. Range: 0 turn to target number of turn.

Press on the numerical value to activate keypad

Number of Turns

5. Number of Screws

The user can choose to set up the number of screws in one complete assembly process (or one work piece), when all the screws are fastened correctly in a complete assembly process, “all ok” will be shown, this is to prevent accidental omission of screws.

Press on the numerical value to activate keypad.

6. Screw Counter

When the screw counter is activated (press Yes), and when error occurs during the fastening process, a lock on the system will be activated, and the lock needs to be deactivated before continuing.

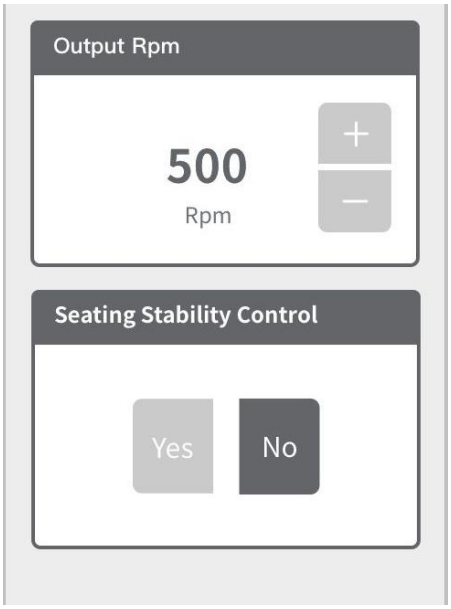
Number of Screws and Screw Counter Lock

7. RPM Setting

The fastening speed or RPM can be adjusted from 200rpm to 1000rpm. Press on the numerical value to activate keypad.

8. Screw Seating Stability Control

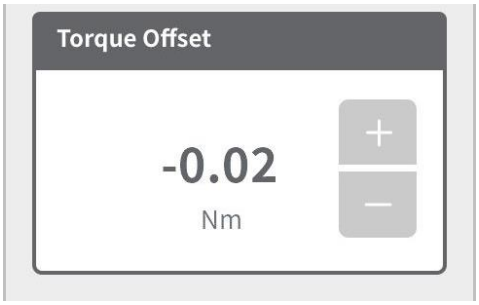
Press YES to activate seating stability control, this function will stabilize the fastening process right before the seating of the screw to enhance fastening torque accuracy. When this function is activated, the screwdriver will slow down (rpm) when it reaches either the minimum turns or the minimum time, depending on which mode the user has selected (please refer to the previous pages for detection method). Please note that the stability control should be activated only when the target torque is **lower or equal to 80% of the highest torque setting** on the tool, if the target torque exceeds 80% of the highest torque value the clutch might not perform properly. **Please note that if the user activates the stability control, torque calibration must also be done with the stability control turned on, in order to attain the optimal consistency of torque detection. The result of the calibration varies between activation and deactivation of the stability control due to the difference in speed during fastening (slow and high speed).**



RPM Setting and Seating Stability Control

9. Target Torque Offset

Displayed torque offset setting is for the user to manually adjust the displayed torque on the system (Control Unit) when there is a constant amount of disparity between the torque value displayed on the system and the value displayed on a benchmark such as the torque tester.



Torque Value Offset

10. System Lock Settings

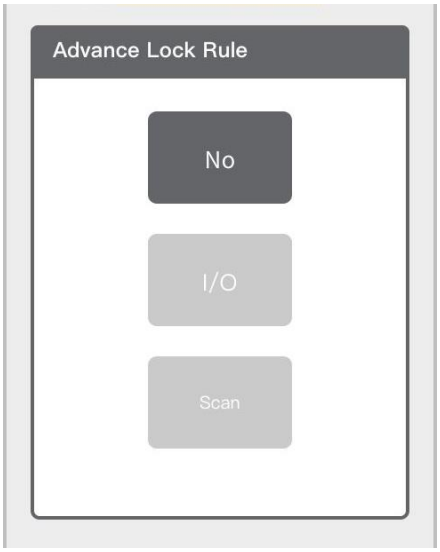
When any errors occur during fastening, the user can choose to lock the system to avoid further use of the tool. Press Yes to activate system lock and choose from the following six conditions of which the system should be locked. Press no to skip this setting. Please note that between “time” and “turn” method of detection, the user can only choose one for the system lock.

System Lock

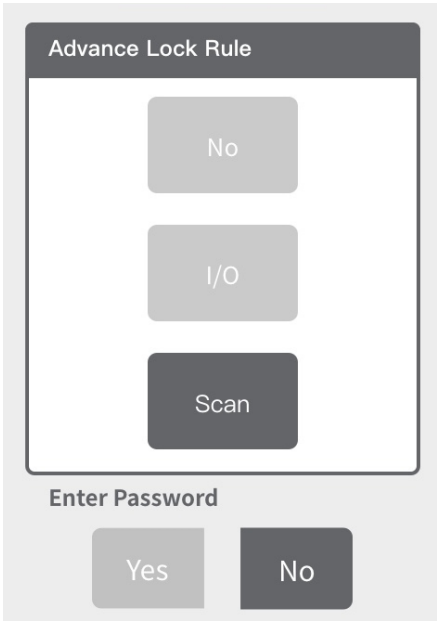
Description	Function
Exceeds Max. Torque	System lock activated when torque exceeds the upper limit of torque setting
Min. Torque Not Attained	System lock activated when torque attained is less than the lower limit of torque setting
Exceeds Max. Time	System lock activated when the fastening process takes longer than the upper limit of the time setting
Min. Time Not Attained	System lock activated when the duration of the fastening process is shorter than the lower limit of the time setting
Exceeds Max. Turns	System lock activated when the number of turns (revolution) exceeds the upper limit
Min. Turns Not Attained	System lock activated when the number of turns is lower than the lower limit

11. Advanced System Lock Settings

The user can choose to deactivate the system lock through I/O or external scanners, press no to skip the setting. This function is useful when a scanner is used on the work piece before fastening process begins (if the scanner detects a wrong work piece on the assembly line), or an I/O signal is sent from an automation system to begin fastening. If I/O or Scan is chosen, the user can also choose whether a password is needed to unlock the system.



Advanced System Lock Settings

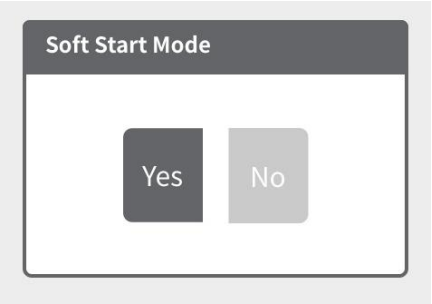


Password Setting for Advance Lock

	Sign	Unlocking Procedure
NG		Click on the sign to enter password
I/O		Unlock the system through I/O signal or click on the sign to enter password
Scanner		Unlock the system using a scanner or click on the sign to enter password

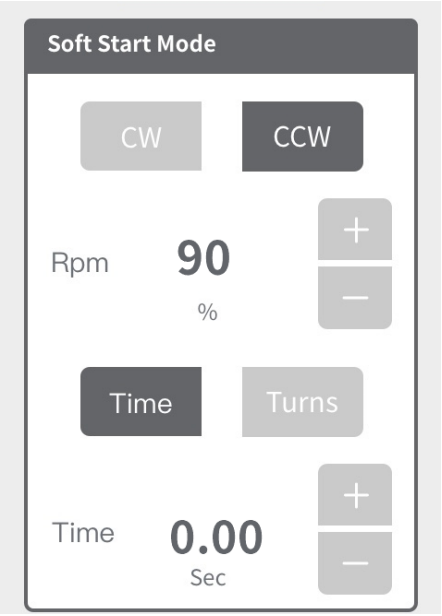
12. Soft Start

Press Yes to activate the soft start function, and the system will go into the next page for related settings.



Activating Soft Start Mode

A. CW/CCW: Direction of turn for the soft start
B. Speed: Can be set between 20-90% of RPM setting
C. Time/Turn: To choose the duration of the soft start. Time: 0-4 seconds, Turn: 0-99 turn.

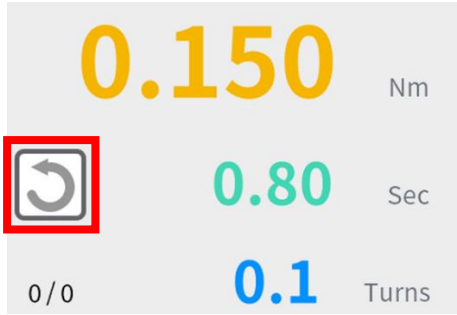


Soft Start Settings

13. Screw Counter Reset

A reset icon will appear on the real time monitoring screen if “single” or “all” is selected, if “none” is selected the reset icon will not appear on the real time monitoring screen. When “single” is selected, and the user click on the reset icon on the real time monitoring screen after a fastening cycle, only the previous fastening cycle will be reset. When “all” is selected the screw counter will be reset to 0.

Screw Counter Reset Options



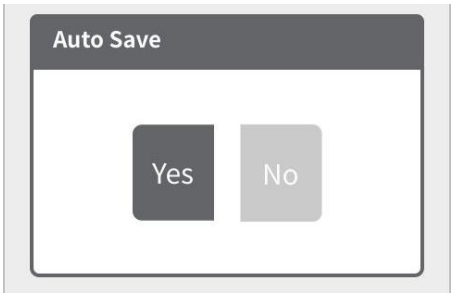
Screw Counter Reset Button

4.1.6. Data Storage

In this section, data storage related functions and settings will be explained in details

1. Automatic Storage (internal storage)

Press Yes to activate automatic internal storage of fastening data



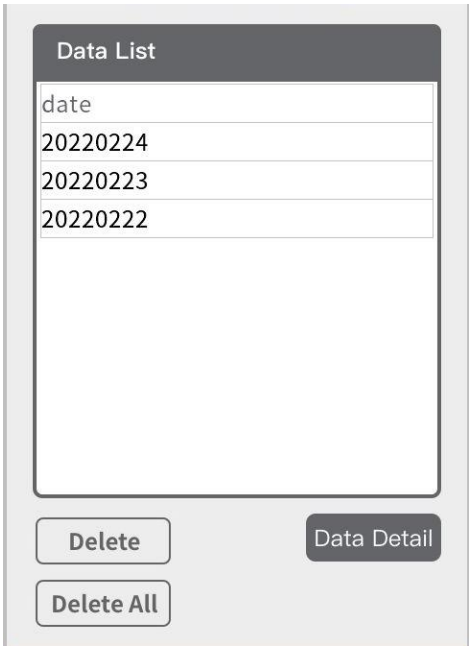
Automatic Storage

2. Saved Data

A. Step One

Data is saved in each file by the date of which the fastening is performed

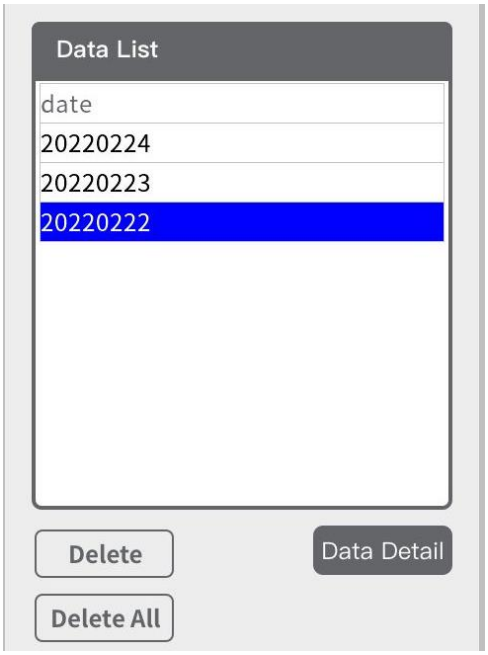
Loading Data



File Name By Date

B. Step Two

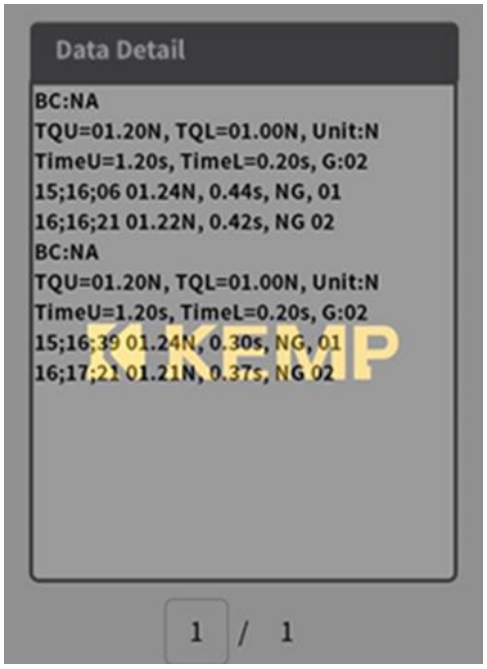
Press on the file date and it will be highlighted in blue, and press the following button to either delete the file, delete all the files or open the file.



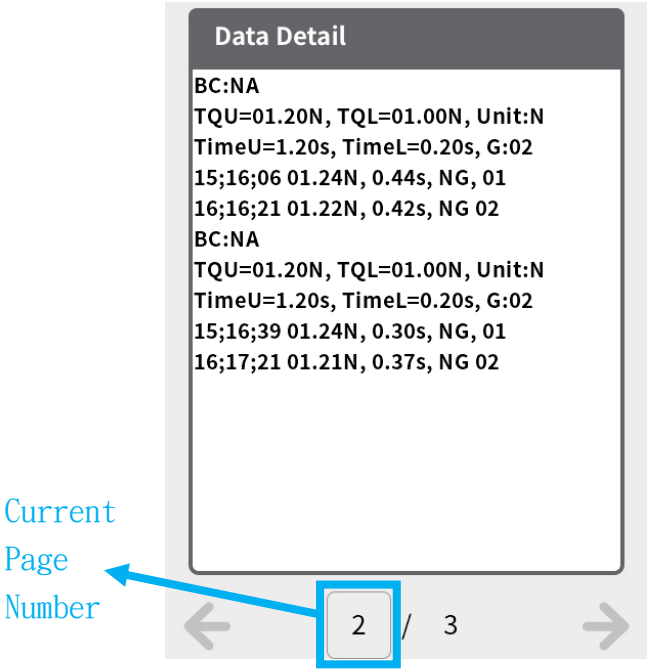
File Selection

C. Step Three

When a data file is opened, you can select to view pages of the file by pressing on the next and previous button, or pressing on the number of pages until a keypad appears on the screen, and you can enter the page number you would like to view.



File Reading In Progress



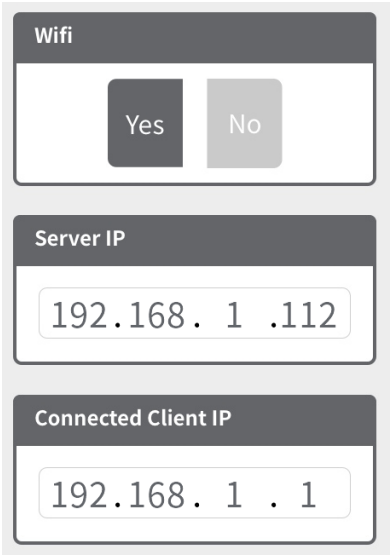
Current Page

4.1.7. Communication Settings

In this section we will explain how to use WIFI connection to communicate with your devices.

1. Step One

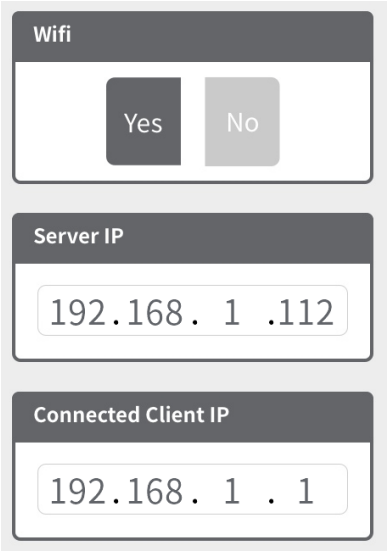
The user can choose to turn on or off the Wifi connection by clicking “Yes” or “No”.



WIFI On/Off Switch

2. Step Two

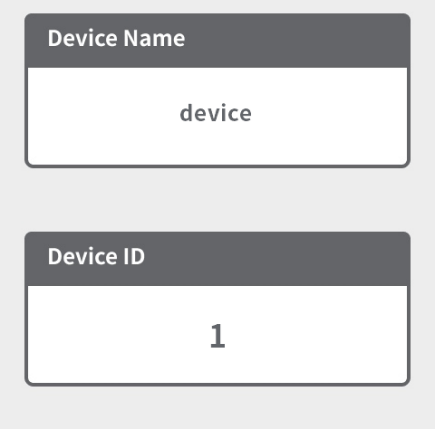
“ON” will be displayed once a connection is established and a client IP will also be displayed.



After Connection is Established

3. Step Three

The user can change the device name and ID (number) for the system, device name and ID will be shown when the user searches for the device via WiFi connection. Press on the “Device Name” and “Device ID” to activate key pad for input. Please note that a maximum of 20 letters/numbers can be entered for the device name, and number 0-239 can be entered for device ID.

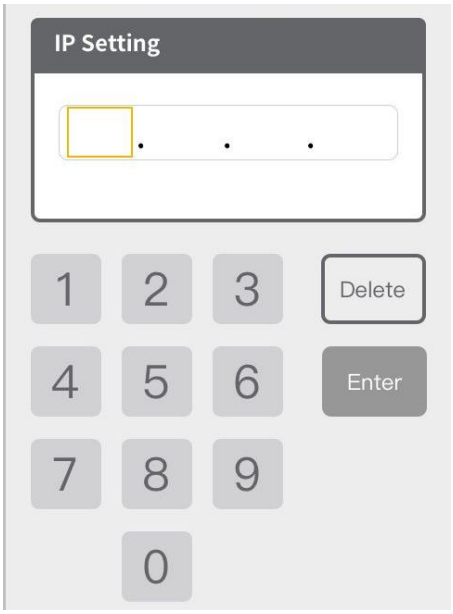


Device Name and Device ID

Key Pad for Input

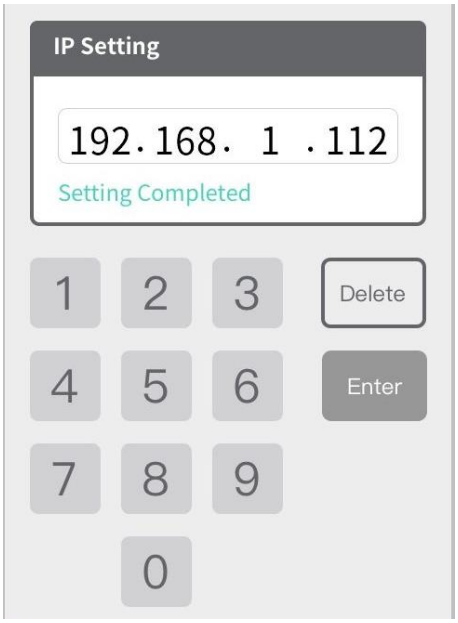
4.1.8. Changing the IP

Click on “Next Page” and the user can enter a set of IP manually, in each column the user is allowed to enter numerical value 1-255, press “confirm” after each entry to go to the next column.



Changing the IP

Press “Confirm” again after the IP is filled in all four columns to complete the process.



Confirming New IP

4.1.9. System Settings

In this section we will explain some of the basic settings of the system

1. System Language

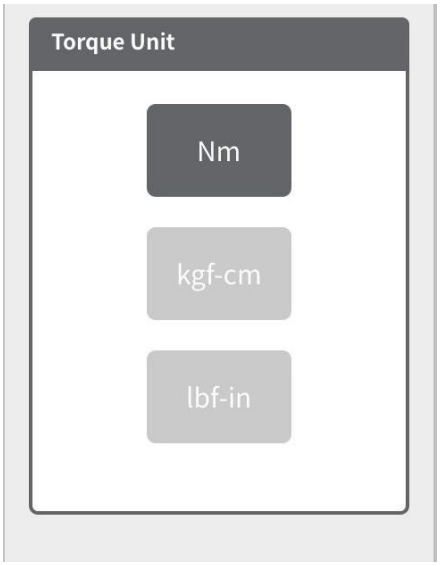
The users can choose from the following list of language.

System Language

2. Torque Unit

A. Step One

Selecting the torque unit and click next page to confirm the selection.



Torque Unit

B. Step Two

Confirming the selection of torque unit, the system will restart after clicking on “Confirm”.

System restart

3. Other Settings

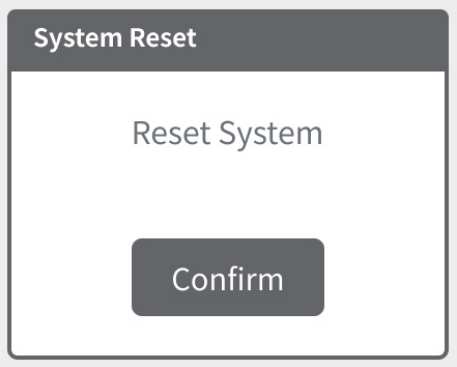
A. Incorrect Time/Date can be adjusted when the system is connected to user interface on the web page through WIFI.

Password Setting

B. Press enter on the “password setting” page (above), in the password setting page allows the user to change the passwords for each level of access, and the process is the same as initial password setting.

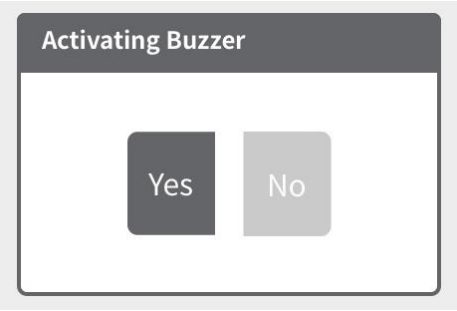
Password Setting

C. If the user selects “System Reset” on the “Password Setting” page, the user will enter the following page, click “Confirm” and the system will be reset to its factory default settings.



Confirmation for System Reset

D. Press Yes to activate the buzzer inside the tool and the control unit, if the buzzer is not activated, only the LED light and the touch screen on the control unit will notify the user about the fastening status.



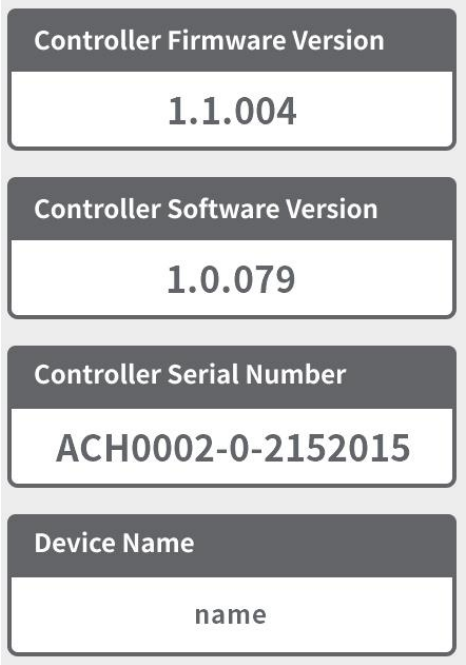
Activating Buzzer

E..I/O signal holding time can be set from 0-4 seconds, if 0 second is selected, the I/O signal will be sent continuously.

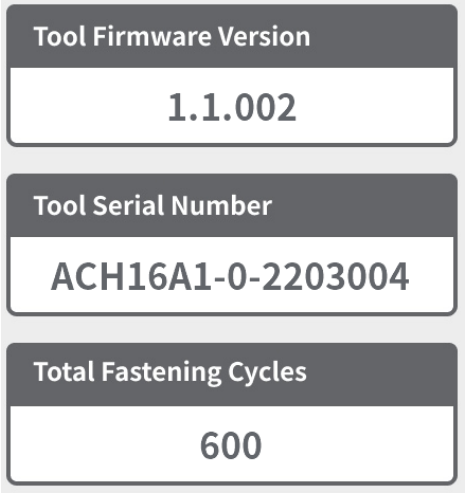
I/O Signal Holding

4.1.10. System Information

Information about the system such as the firmware and software version and the serial number of the tool and the Control Unit are shown on the system information page (below). Total fastening cycles (one screw per cycle) performed with the tool is also displayed on the bottom.



System Information

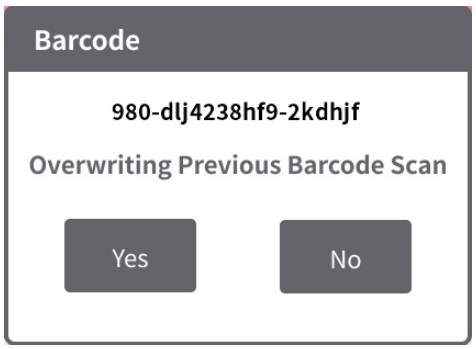


Total Number of Fastening Cycles Performed

4.1.11. System Notification

1. Barcode Scanning Overwrite

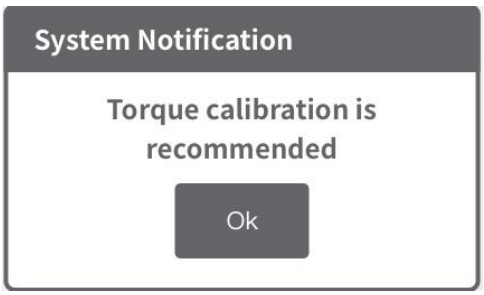
If the same barcode is scanned more than once, a notification will appear to prompt the user for overwriting the previous scan. Please click Yes to overwrite the previous scan record or click No continue without overwriting.



Barcode Record Overwrite

2. Notification for Calibration

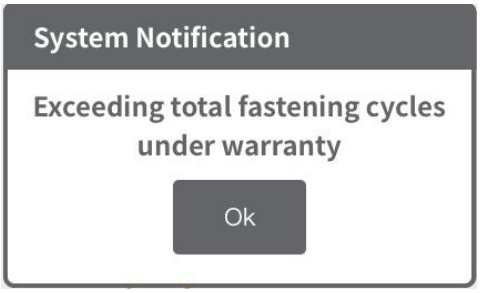
When the number of fastening cycle exceeds 200,000 cycles after the last calibration process, the system will prompt the user to perform calibration when the system is restarted. Press Ok and perform the calibration process, after it is done the counter will automatically reset for the next calibration.



System Prompt for Calibration

3. Warranty Expiration

When the number of fastening cycle exceeds 1,000,000 cycles, the system will notify the user it has exceeded the number of fastening cycles covered under product warranty.



Notification for Product Warranty

4.2. The Web Interface

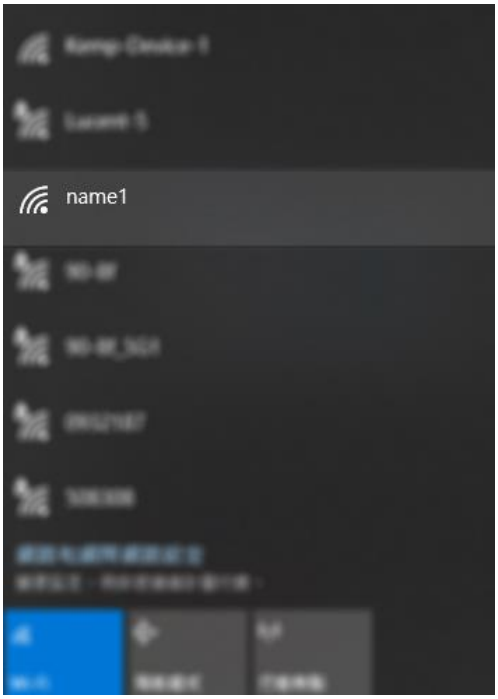
In this section, we will focus on the operating process of the web interface of the system.

4.2.1. Getting Started

1. Step One

In order to use the web interface, the user must connect the Control Unit to a device through WIFI. Please turn on the Control Unit, and on a WIFI equipped device such as a smart phone, tablet, PC or laptop, go to the WIFI setting and find the control unit to connect with.

The WIFI name of the Control Unit: Device Name-Device Number
(The user is allowed to change the device name and number)



Connecting with the Control Unit

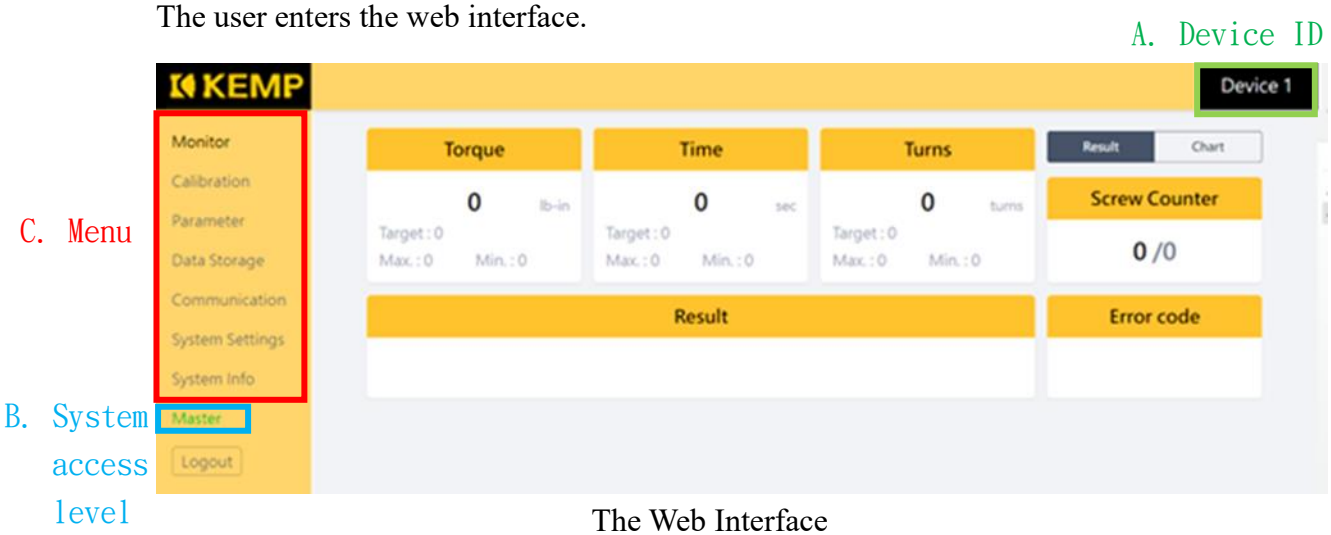
2. Step Two

Check for the IP on the user interface of the Control Unit, and enter the IP on a web browser (Chrome is preferred), and type in ":8000" at the end of the IP and press enter.

IP Address

3. Step Three

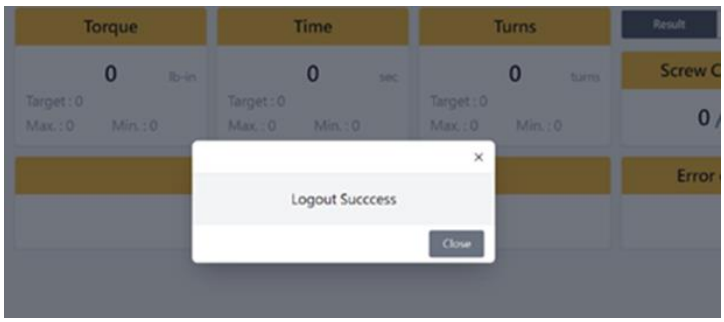
The user enters the web interface.



The Web Interface

A. Device ID is shown in A and it can be changed in "System Setting" in B (only the device number can be changed)

B. Current level of system access is shown in C, the user needs the required level of system access to access various pages for settings, and will be asked to enter passwords when entering. When logging out of the system, a pop-up window will notify that the user has logged out successfully, please click to close the pop-up window.



Pop-up Window

4.2.2. Initial Setting

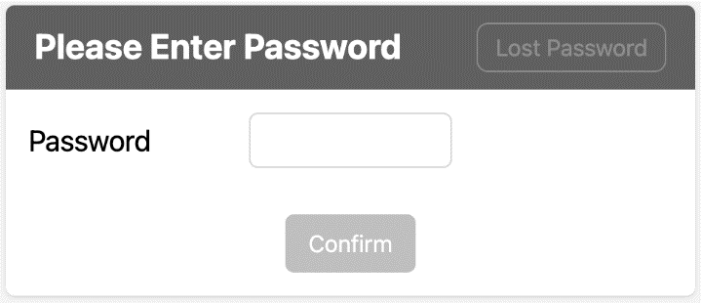
When the system is activated for the first time or after the system is reset to default setting, the password of the system manager (highest level of access) needs to be set, the user can do this either on the user interface of the Control Unit or on the web interface.

1. Step One

Click on any page that requires a level of system access right.

2. Step Two

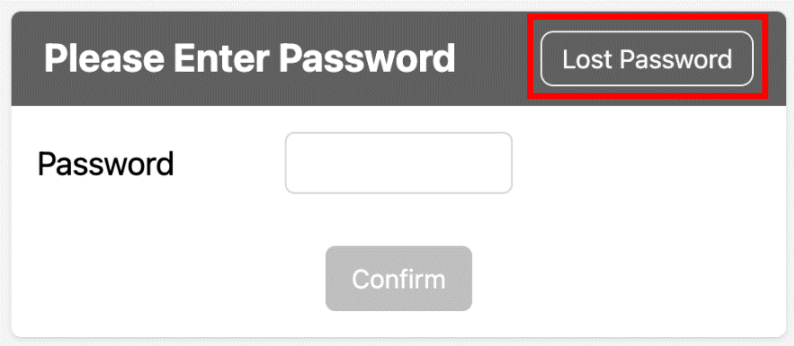
A pop-up window will prompt the user for password, please enter 111111 and click confirm.



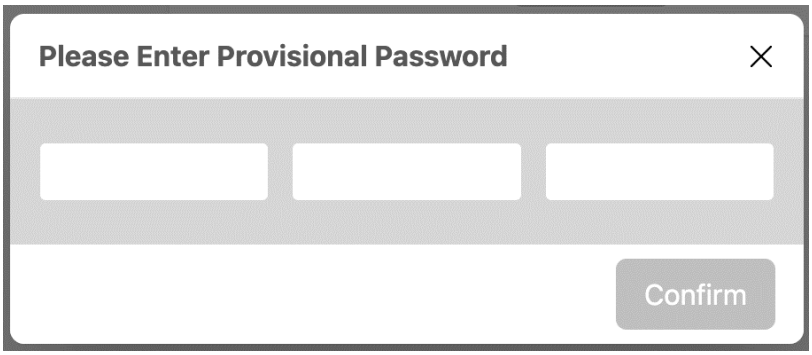
Entering the Password

If the password is lost, please click on “Lost Password” on the top right hand side corner, the user will see another pop-up window that prompts the user to enter a set of provisional password, which can be obtained through customer service provider, and the user needs to provide the serial number of the Control Unit (this process can only be performed on the web interface).

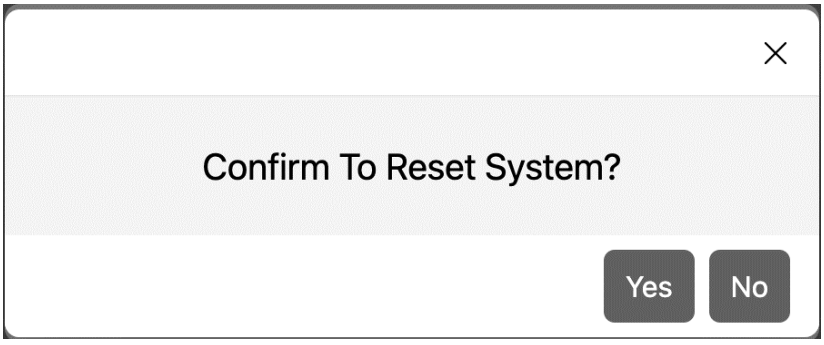
When the provisional password is entered, please click yes to reset the system and the system will return to its default setting, and the user can begin the initial setting process again.



Lost Password



Entering the Provisional Password

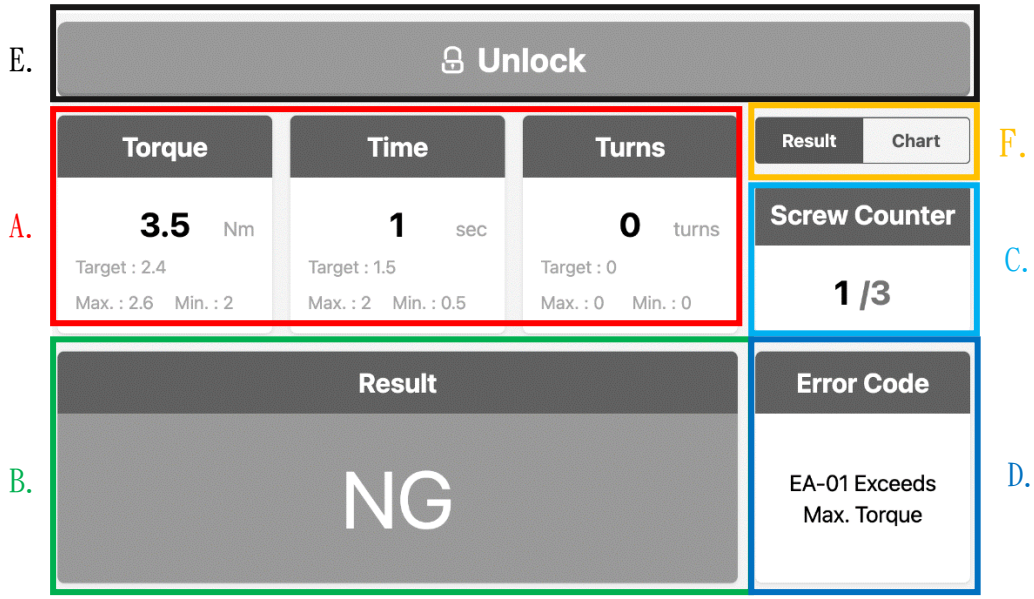


Reset System

4.2.3. Real Time Monitoring

1. Fastening Results

When "Result" is selected in A, **OK / NG / IR (Incomplete Rundown) / SS (Stripped Screw)** will be displayed after a fastening cycle (Please refer to the following).



A. Real time monitoring: Real time data of torque, fastening duration (time) and number of revolution (turn)
B. Result: Shows type of results such as OK/NG/IR/SS
C. Screw Number: Shows the current number of screws completed and total number of screws
D. Error Code: Types of error occur during fastening

Error Code	Description
EA-01	Exceeds Max. Torque
EA-02	Min. Torque not attained
EA-03	Exceeds maximum time
EA-04	Min. time not attained
EA-05	Exceeds maximum number of revolution
EA-06	Min. revolution not attained

E. Unlock: When any types of error occur during a fastening cycle, the tool will be locked to prevent further use, to unlock please click on “Unlock” and enter the password of tool manager (master, the highest level of system access)

F. The “Result” display option (result or torque curve display)

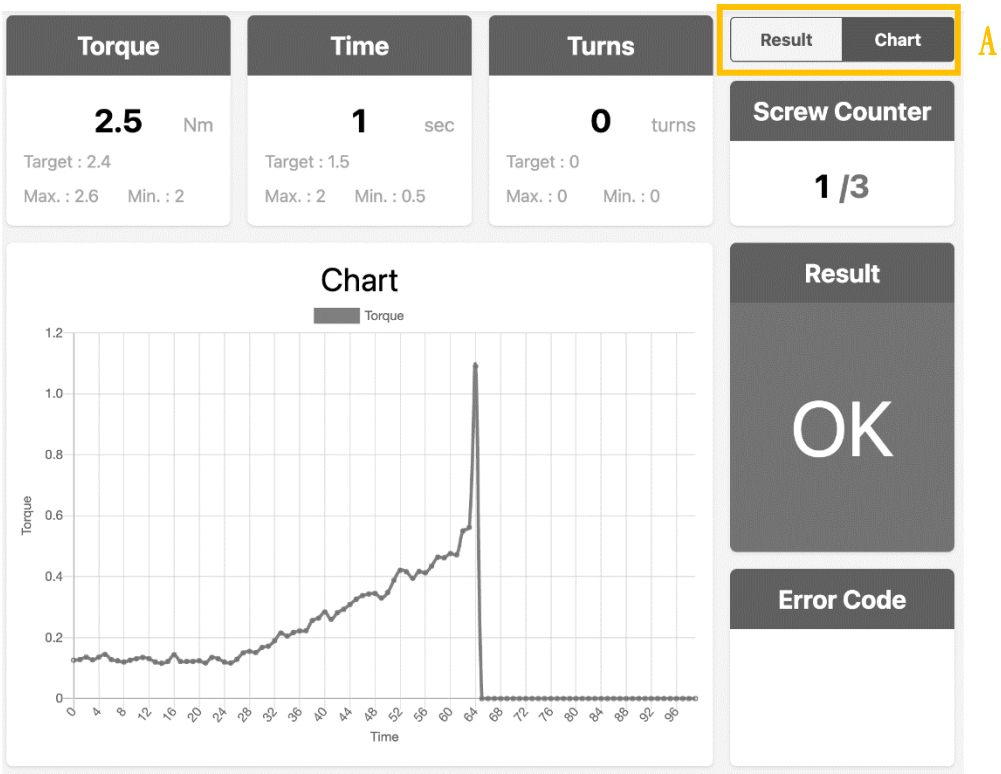
The instruction above regarding the unlocking of the tool may apply to the following conditions:

(1) Fastening errors of any types.

(2) When the screw counter lock function is activated, the user can also use a scanner or I/O to unlock.

2. The Torque Curve

When “Torque Curve” is selected in A, torque curve will be displayed after each fastening cycle.



Torque Curve

4.2.4. Torque Calibration

Before using the tool for the first time, please perform torque calibration process at least once. **Torque calibration should be done every 200,000 fastening cycle (one screw per cycle) to maintain accuracy and consistency of the system.**

Please note that if the user activates the stability control, torque calibration must also be done with the stability control turned on, the result of the calibration varies between activation and deactivation of the stability control (slow and high speed).

1. Step One

Click on “Calibration” on the menu and the first page that appears will show the slope/intercept value of current setting. Click on “Next Page” to begin the torque calibration process.

Torque Calibration (1st Step)

2. Step Two

   A. For step two we start with the lower limit of the torque calibration process, and a recommended torque value is shown, if the user chooses to use the recommended torque value for the calibration, the result of the calibration will be suitable for 20%-80% of the entire torque range of the tool (the recommended torque value displayed will be different for different tool model). However, if the user chooses to be more accurate in calibrating the tool for a specific target torque value, and the recommended calculation of the lower limit is as followed:

      The highest torque output of the tool (full scale): 2.0 Nm (for example)

      10% of 2.0Nm=0.2Nm

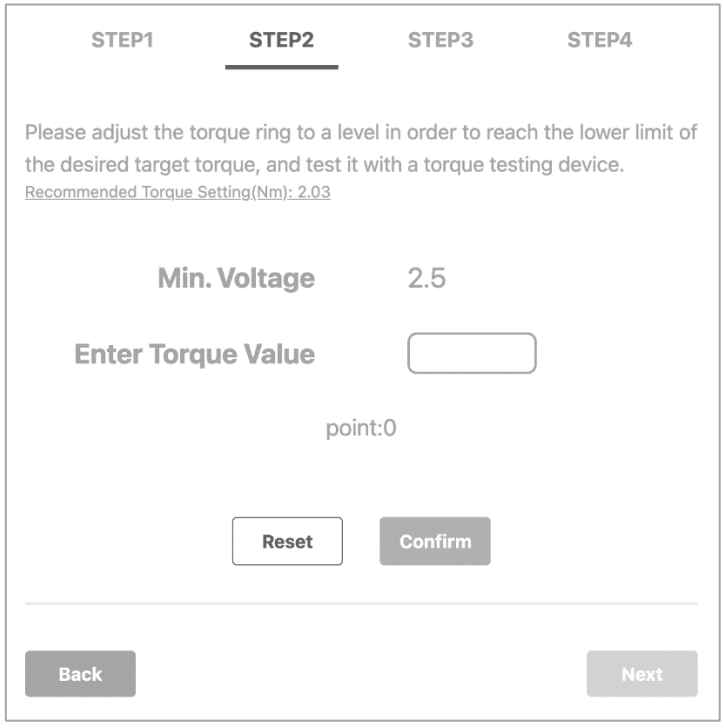
      Target torque the user intended to use the tool: 1 Nm

      Lower limit of the torque calibration value: 1 Nm – 0.2 Nm = 0.8 Nm

      Please adjust the torque ring so that the torque output shown on the torque meter is about 0.8Nm **(Please refer to P.85 for torque ring adjustment)**

   B. Enter the torque value and click on “Confirm” to go into the next step or click on “Reset” to start the process again.

   C. Please repeat the process at least three times before going into the next step (entering three torque values)



Torque Calibration (2nd Step)

3. Step Three

A. The upper limit of the torque calibration process is needed, and a recommended torque value is shown, if the user chooses to use the recommended torque value for the calibration, the result of the calibration will be suitable for 20%-80% of the entire torque range of the tool (the recommended torque value will be different for different tool model). However, if the user chooses to be more accurate in calibrating the tool for a specific target torque value, and the recommended calculation of the upper limit is as followed:

The highest torque output of the tool (full scale): 2.0 Nm (for example)

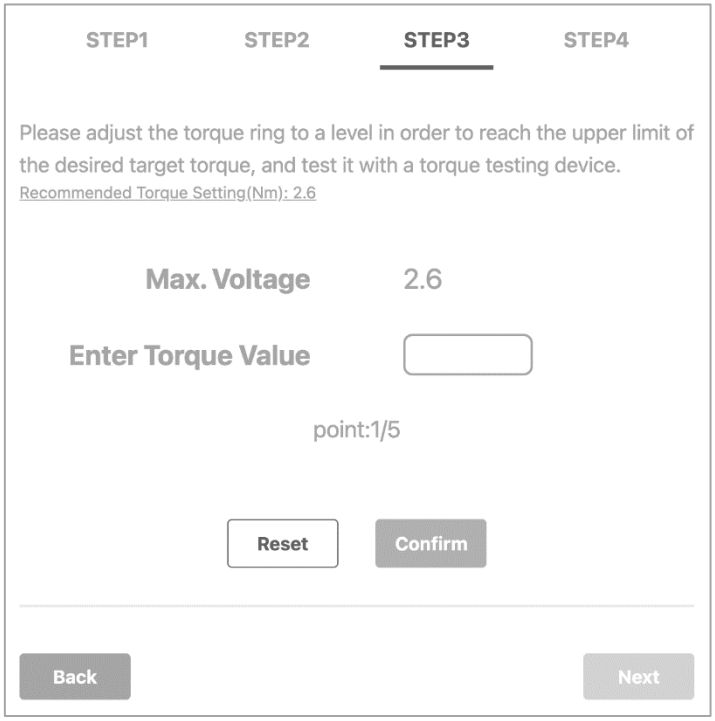
10% of 2.0Nm=0.2Nm

Target torque the user intended to use the tool: 1 Nm

Upper limit of the torque calibration value: 1 Nm + 0.2 Nm = 1.2 Nm

Please adjust the torque ring so that the torque output shown on the torque meter is about 1.2 Nm **(Please refer to P.85 for torque ring adjustment)**

B. Repeat the process at least three times and click confirm to go into the next step



Torque Calibration (3rd Step)

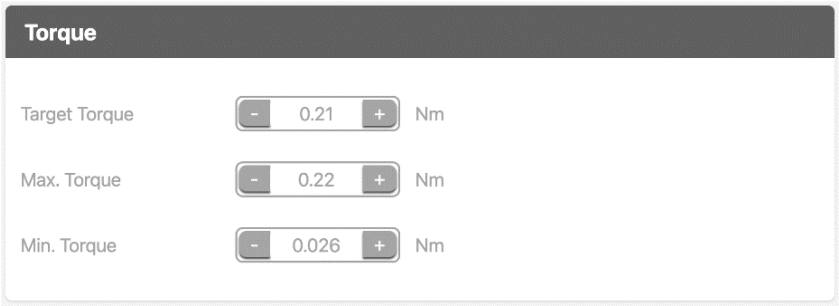
4. Step Four

Slope/Intercept values will be shown on the page and the calibration process has been completed, if the user decides to repeat the process all over again, please click on "Return".

Torque Calibration (4th Step)

4.2.5. Setting Parameters

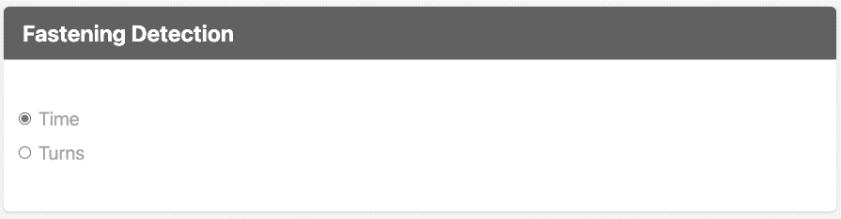
1. Torque Setting
   A. Target Torque: The target fastening torque
   B. Maximum Torque: The upper limit of the torque specification. For example: if the target torque is 1Nm and the required accuracy is ±10%, the upper limit should be 1.1Nm
   C. Minimum Torque: The lower limit of the torque specification. For example: if the target torque is 1Nm and the accuracy is ±10%, the lower limit should be 0.9Nm



Target Torque, Max./Min. Torque Limit Settings

2. Detection Mode

Please choose either time (fastening duration) or turn (number of revolution in the fastening process) for the detection mode.

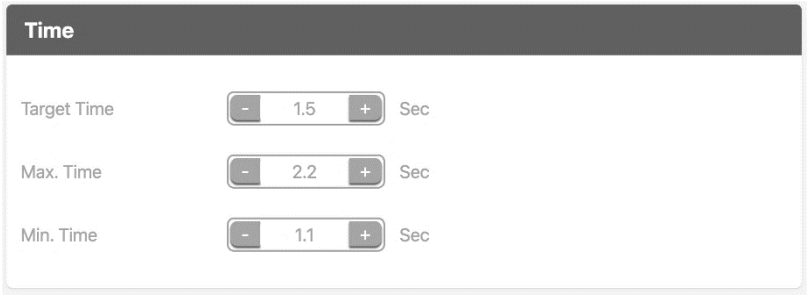


Detection Mode Setting

3. Detection Mode: Time

When “Time” is chosen, the following set up page will appear

A. Target Time: the time it takes for the screw to reach seating position. Range: 0-4 Seconds
B. Maximum Time: Upper limit of the time. Range: 0-4 Seconds
C. Minimum Time: Lower limit of the time. Range: 0-4 Seconds

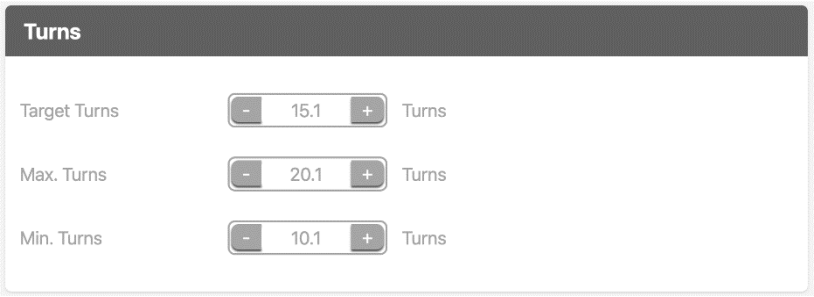


Time, Max./Min. Fastening Duration Setting

4. Detection Mode: Turn

When “Turns” is chosen, the following page will appear

A. Target Turns: the number of turns (revolution)for the screw to reach seating position. Range: 0-99 turns
B. Maximum Turns: Upper limit of the number of turns. Range: Target number of turn to 99 turns.
C. Minimum Turns: Lower limit of the number of turns. Range: 0 turn to target number of turn.



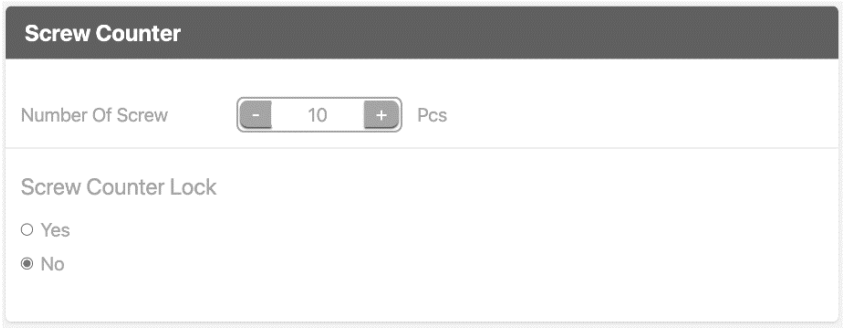
Turn, Max./Min. Fastening Turns Setting

5. Number of Screws

The user can choose to set up the number of screws in one complete assembly process (one work piece), when all the screws are fastened correctly in a complete assembly process, “all ok” will be shown.

6. Screw Counter

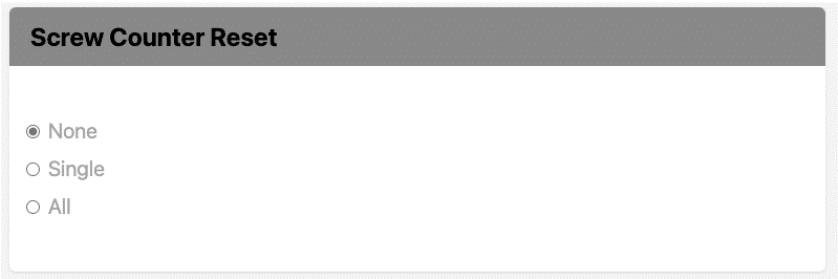
When the screw counter is activated (click Yes), and when error occurs during the fastening process, a lock on the system will be activated, and the lock needs to be deactivated before continuing.



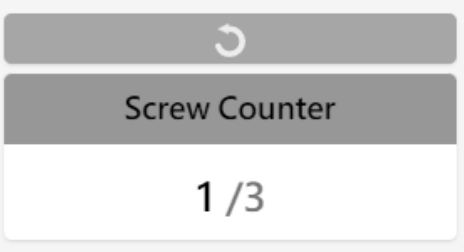
Screw Counter Settings

7. Screw Counter Reset

A reset icon will appear on the real time monitoring screen if “single” or “all” is selected, if “none” is selected the reset icon will not appear on the real time monitoring screen. When “single” is selected, and the user click on the reset icon on the real time monitoring screen after a fastening cycle, only the previous fastening cycle will be reset. When “all” is selected the screw counter will be reset to 0.



Screw Counter Reset Options



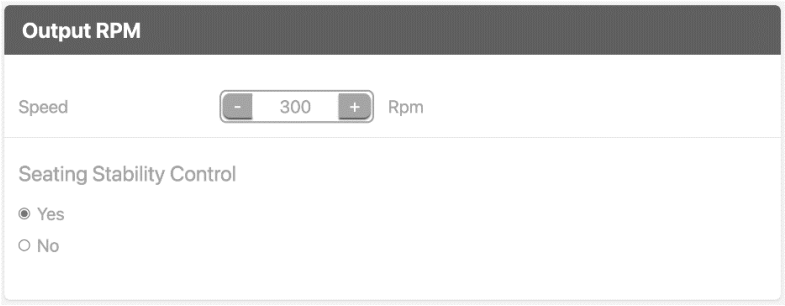
Screw Counter Reset Icon on Monitoring Screen

8. RPM Setting

The fastening speed or RPM can be adjusted from 200rpm to 1000rpm. Press on the numerical value to activate keypad.

9. Screw Seating Stability Control

Press YES to activate seating stability control, this function will stabilize the fastening process right before the seating of the screw to enhance fastening torque accuracy. When this function is activated, the screwdriver will slow down to the RPM of which can be adjusted below, when it reaches either the minimum turns or the minimum time, depending on which mode the user has selected (please refer to the previous pages for detection method)



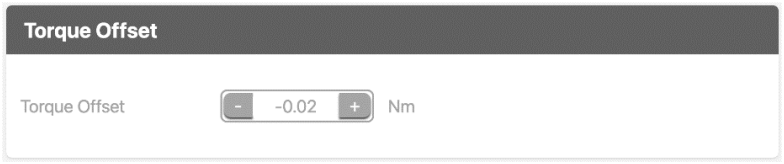
RPM Setting for Stability Control

Please note that if the user activates the stability control, torque calibration must also be done with the stability control turned on, the result of the calibration varies between activation and deactivation of the stability control (slow and high speed).

10. Target Torque Offset

Displayed torque offset setting is for the user to manually adjust the displayed torque on the system (Control Unit) when there is a constant amount of disparity between the torque value displayed on the system and the value displayed on a benchmark such as

the torque tester.



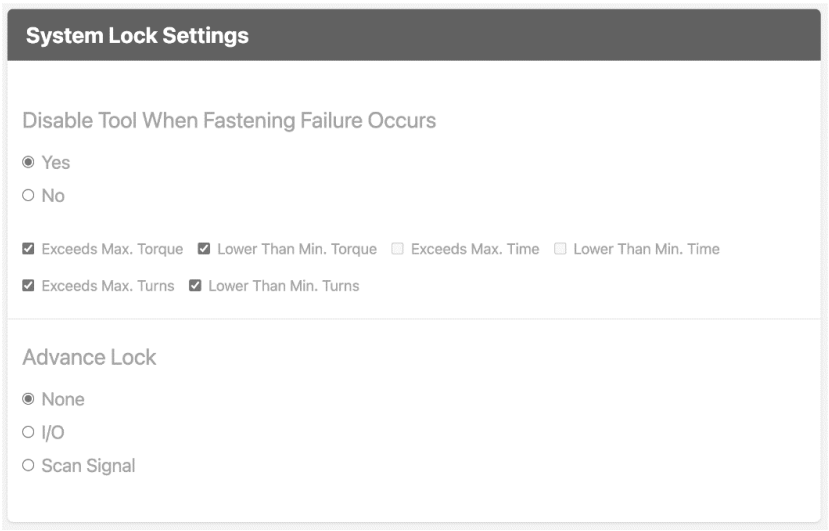
Displayed Torque Offset Setting

11. System Lock Settings

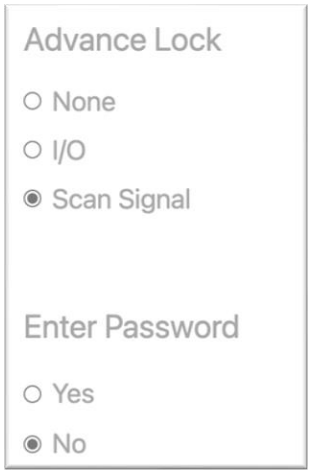
When any errors occur during fastening, the user can choose to lock the system to avoid further use of the tool. Click Yes to activate system lock and choose from the following six conditions of which the system should be locked. Click no to skip this setting. Please note that between “time” and “turn” method of detection, the user can only choose one for the system lock.

12. Advanced System Lock Settings

The user can choose to deactivate the system lock through I/O or external scanners, press no to skip the setting. This function is useful when a scanner is used on the work piece before fastening process begins (if the scanner detects a wrong work piece on the assembly line), or an I/O signal is sent from an automation system to begin fastening



System Lock Settings



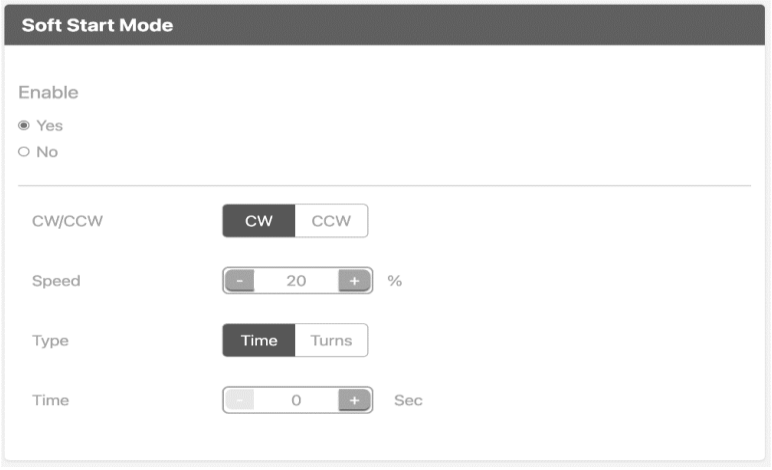
If I/O or Scan Signal is chosen, the user can choose whether password is needed to unlock the system or not.

13. Soft Start Mode

Press Yes to activate the soft start function, and the system will go into the next page for related settings.

Soft Start

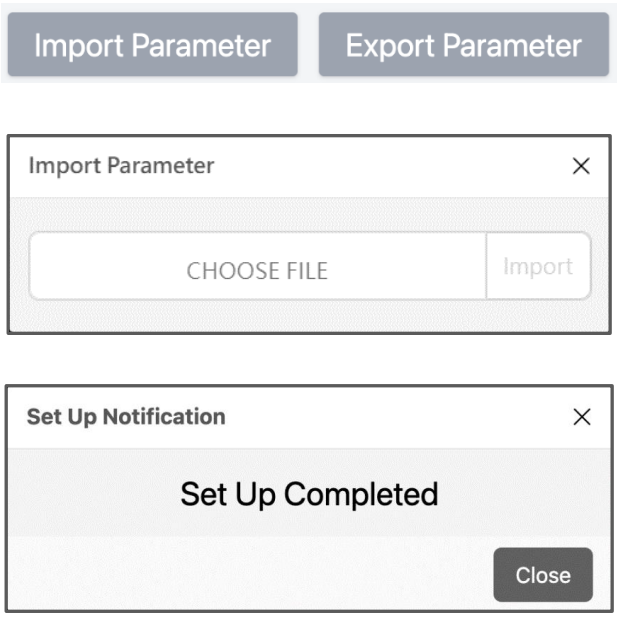
A. CW/CCW: Direction of turn for the soft start
B. Speed: Can be set between 20-90% of RPM setting
C. Time/Turn: To choose the duration of the soft start. Time: 0-4 seconds, Turn: 0-99 turn.



Soft Start Mode Settings

14. After all settings are completed, please click on “Save Settings” to complete the process

A. The user can export the settings as a saved file for future application, just click on “Export”.
B. When a set of saved settings is needed, the user can import the saved file by clicking “Import” and after choosing the file click “Import” again, the system will notify the user that the process is completed.



Importing and Exporting Parameters

4.2.6. Data Storage

In this section, data storage related functions and settings will be explained in details

1. Automatic Storage (internal storage)
Click Yes to activate automatic internal storage of fastening data

Data Selection and Storage

A. Click on “Delete All” to permanently remove all files
B. Click on each file and click “Delete” to remove the file
C. Click on the file and click “download” to download the file to your device
D. Click on the file and click “content” a pop-up window will appear for the content of the file

2. Searching Data by Date
Enter date and click “Search” to select files from a specific time period

3. Multiple File Selection
Click on “Select Multiple Files” for multiple file selection

A. Click on “Select All” to include all files for selection
B. Click on “Cancel All” to deselect all files selected
C. Click “Cancel” to deactivate multiple file selection
D. Click on “Download” to download files selected

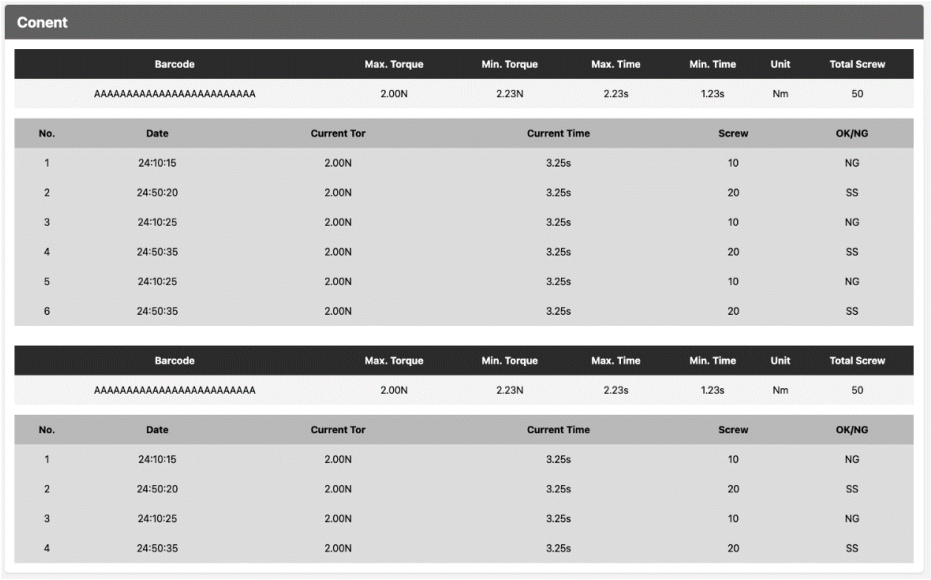
Multiple File Selection

```
BC:NA
TQU=12.22K, TQL=10.19K, Unit:K
TurnU=12.0t, TurnL= 4.0t, G:00
14:56:26 10.14K,  5.1t, NG, 00
14:56:40 10.33K,  5.3t, OK, 00
14:56:56 09.89K, 12.1t, SS, 00
14:57:12 09.73K,  7.3t, NG, 00
14:57:21 10.43K,  0.5t, IR, 00
BC:NA
TQU=12.22K, TQL=10.19K, Unit:K
TimeU=1.20s, TimeL=0.20s, G:00
14:58:04 09.65K, 2.56s, SS, 00
14:58:11 09.88K, 0.00s, NG, 00
14:58:15 09.77K, 1.02s, NG, 00
14:58:19 09.70K, 1.03s, NG, 00
14:58:23 09.61K, 0.41s, NG, 00
```

Downloaded txt. File Format

Code	**Description**	**Note**
BC	Barcode Number (NA = no barcode)	
TQU	Upper Limit of Target Torque	
TQL	Lower Limit of Target Torque	
Unit	Torque Unit	N:Nm K:Kgf-cm L:lb-ft
TimeU	Upper Limit of Time	When “time”is selected
TimeL	Lower Limit of Time	
TurnU	Upper Limit of Turn	When “turn” is selected
TurnL	Lower Limit of Turn	
G	Number of Screw Count	

Description of File Codes



Conent

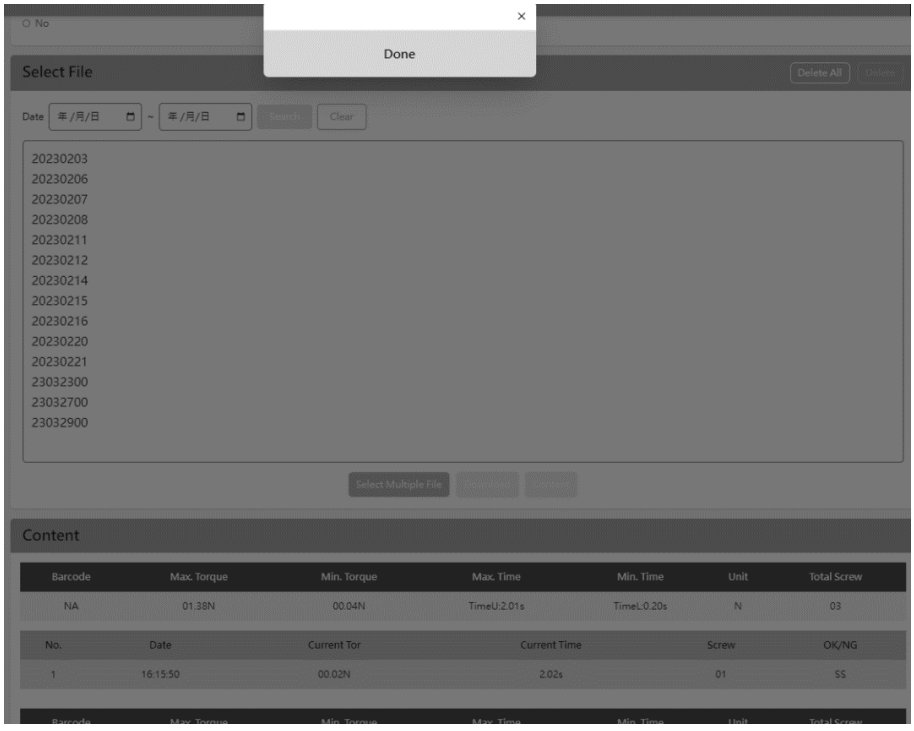
Barcode	Max. Torque	Min. Torque	Max. Time	Min. Time	Unit	Total Screw
AAAAAAAAAAAAAAAAAAAAAAAA	2.00N	2.23N	2.23s	1.23s	Nm	50

No.	Date	Current Tor	Current Time	Screw	OK/NG
1	24:10:15	2.00N	3.25s	10	NG
2	24:50:20	2.00N	3.25s	20	SS
3	24:10:25	2.00N	3.25s	10	NG
4	24:50:35	2.00N	3.25s	20	SS
5	24:10:25	2.00N	3.25s	10	NG
6	24:50:35	2.00N	3.25s	20	SS

Barcode	Max. Torque	Min. Torque	Max. Time	Min. Time	Unit	Total Screw
AAAAAAAAAAAAAAAAAAAAAAAA	2.00N	2.23N	2.23s	1.23s	Nm	50

No.	Date	Current Tor	Current Time	Screw	OK/NG
1	24:10:15	2.00N	3.25s	10	NG
2	24:50:20	2.00N	3.25s	20	SS
3	24:10:25	2.00N	3.25s	10	NG
4	24:50:35	2.00N	3.25s	20	SS

File Format



Click “Done” to Close the Screen

4.2.7. Communication Setting

In this section we will explain how to use WIFI connection to communicate with your devices

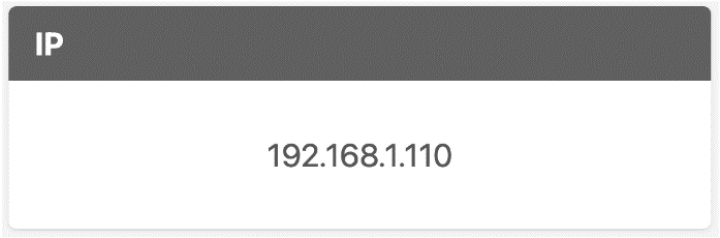
1. Device Name
The user can change the device name, please click confirm after entering a new name and restart the system (both the control unit and the web interface).

Changing Device Name

2. Device ID
Device ID can be changed from number 0-239, please restart the system after entering a new device number (both the control unit and the web interface)

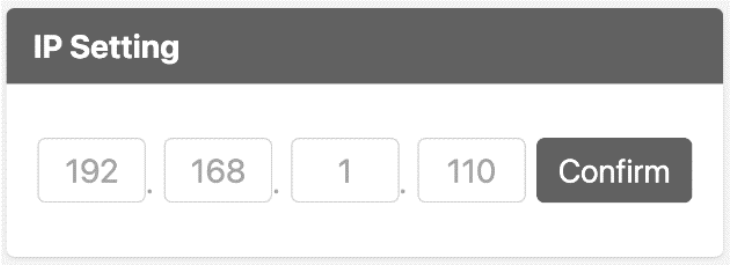
Changing Device Number

3. The current IP is displayed:

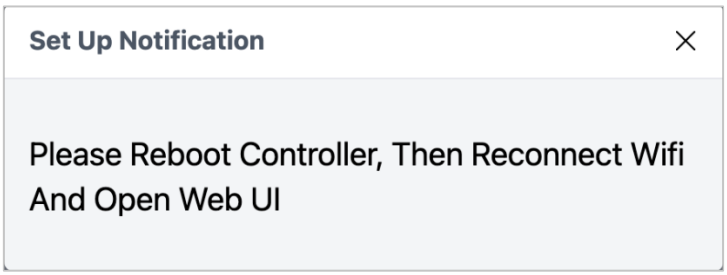


IP Address

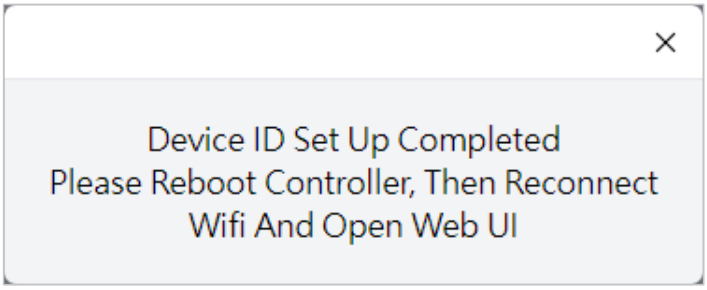
4. The user can enter a set of IP manually, in each column the user is allowed to enter numerical value 1-255, press “confirm” at the end and restart the system to implement the new IP.



IP Setting



Rebooting the Control Unit



Rebooting the System After Changing the Device Name and ID

4.2.8. System Setting

In this section we will explain how to perform system settings

1. Language

Selecting the system language

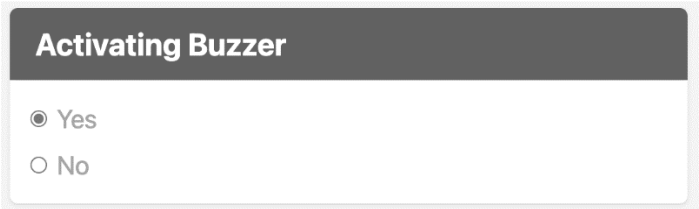
2. Unit of Torque

Selecting the unit of torque

Language and Torque Unit

3. Buzzer

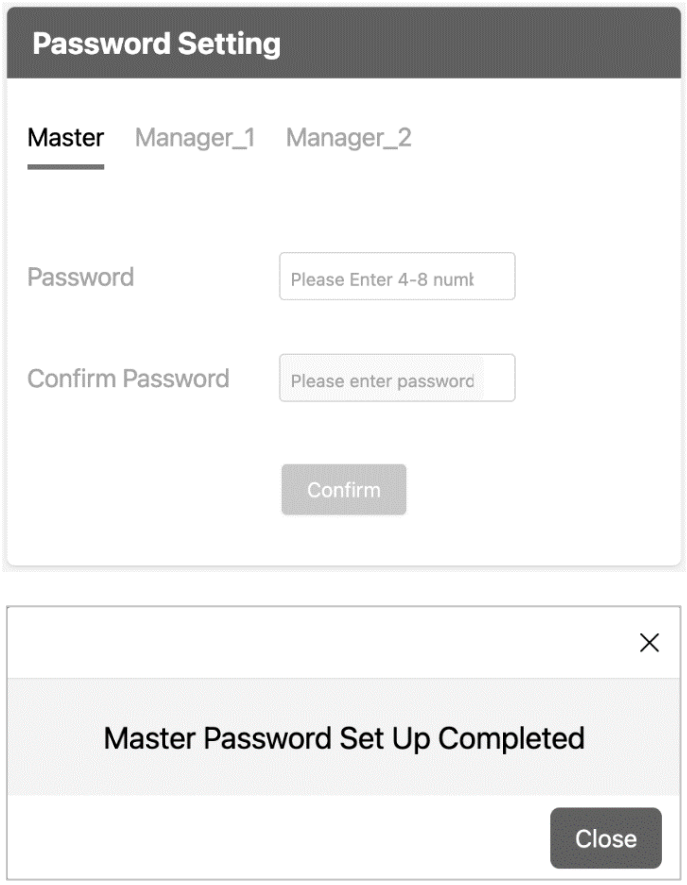
Press Yes to activate the buzzer inside the tool and the control unit, if the buzzer is not activated, only the LED light and the touch screen on the control unit will notify the user about the fastening status.



Activating Buzzer

4. Password

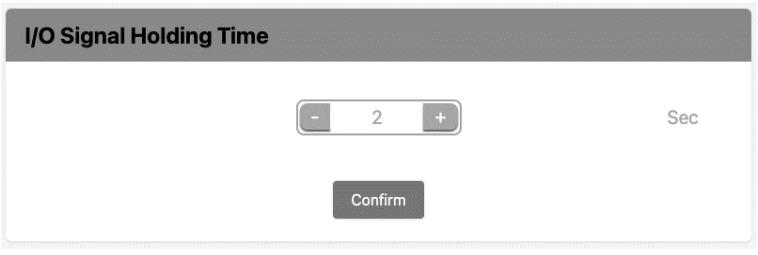
Click on tab on top to choose the correct level of system access, enter user's password and reenter again to confirm. Close the pop-up window after confirmation.



Password Setting

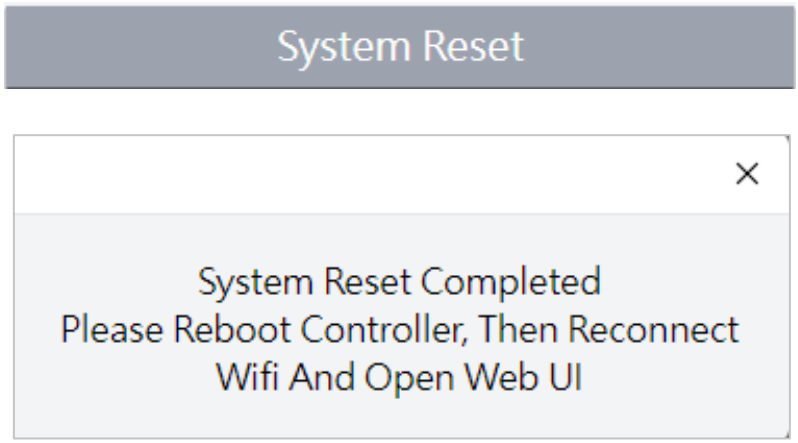
5. I/O Signal Holding Time

I/O signal holding time can be set from 0-4 seconds, if 0 second is selected, the I/O signal will be sent continuously.



6. System Reset

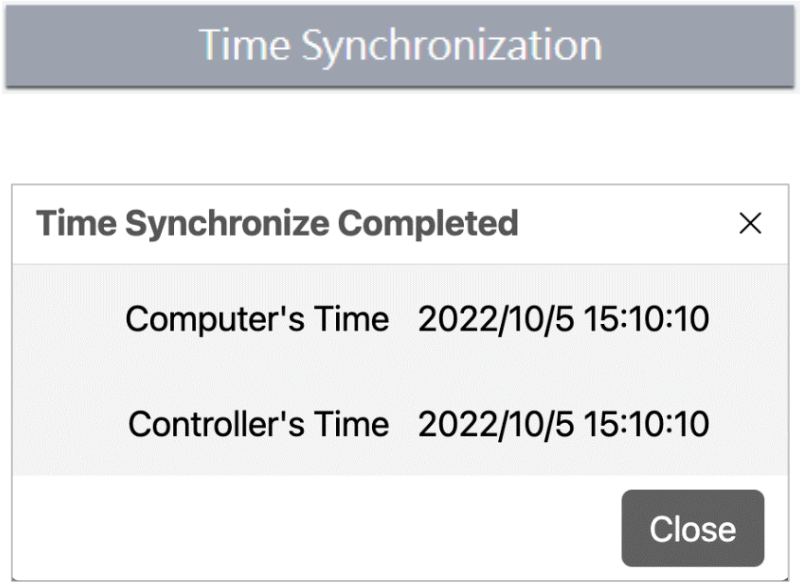
Click on “System Reset” and close the pop-up window after confirmation.



Resetting the System

7. Time Synchronization

Click on “Time Synchronization” to synchronize with your device. Close the pop-up window after confirmation.

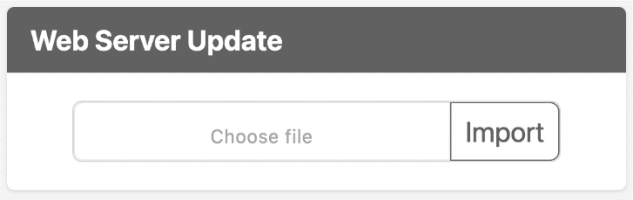


Time Adjustment

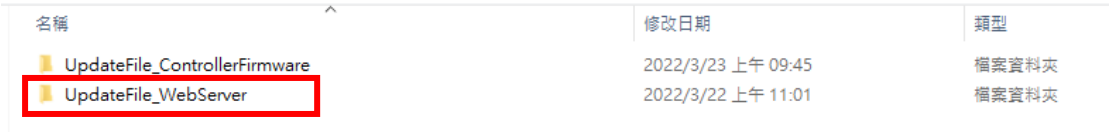
8. System Update

A. Click on “System Update” and click on “Choose file” to locate the file on your device (the file would be provided by your local service provider), choose the file ending with esp32.bin to update the firmware of WIFI module, and spiffs.bin to update the web interface.

Click on “Update” and the system will start updating process, please do not close the program or shut down the power of the system before the process is completed.

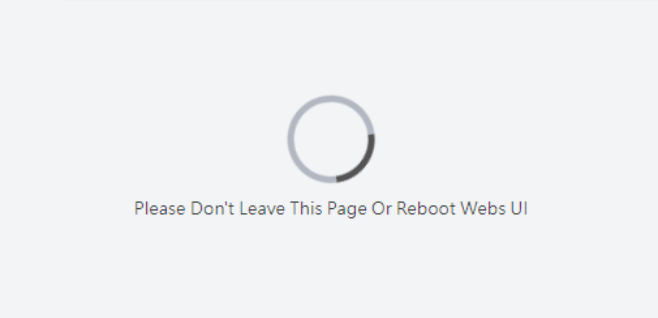


Web Server Update

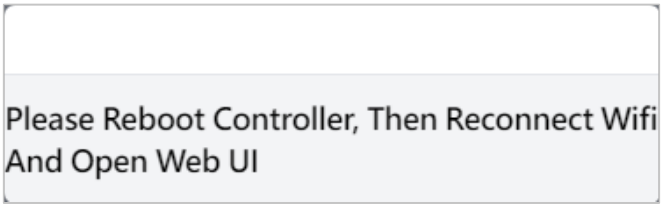


Locate Web Server Update File

Choosing the File for Update

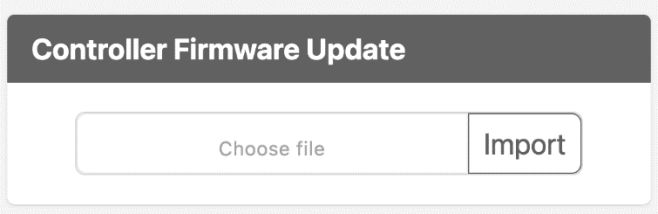


Status of System Updat



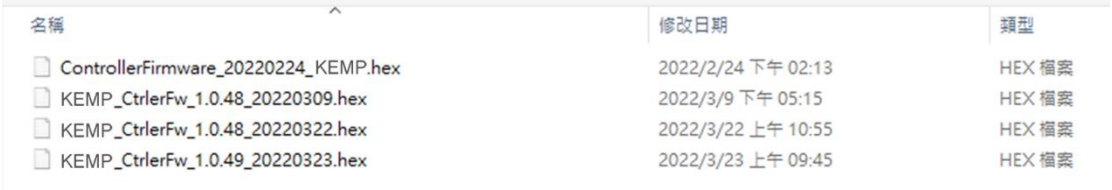
Restart the System

B. Choose “Control Unit Firmware Update” to update the firmware in the control unit, and click on update. A beep will go off on the control unit and the status of the update will be displayed on the web interface. Please do not close the program or shut down the power on the system until the process is completed.

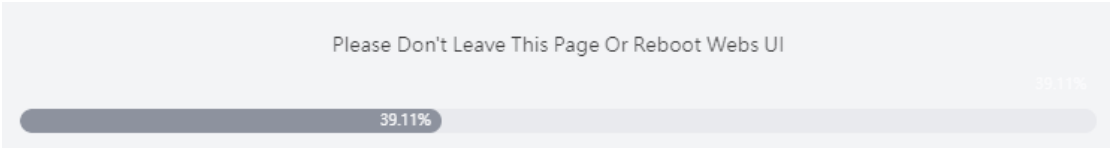


Control Unit Firmware Update

Locate Controller Firmware Update File



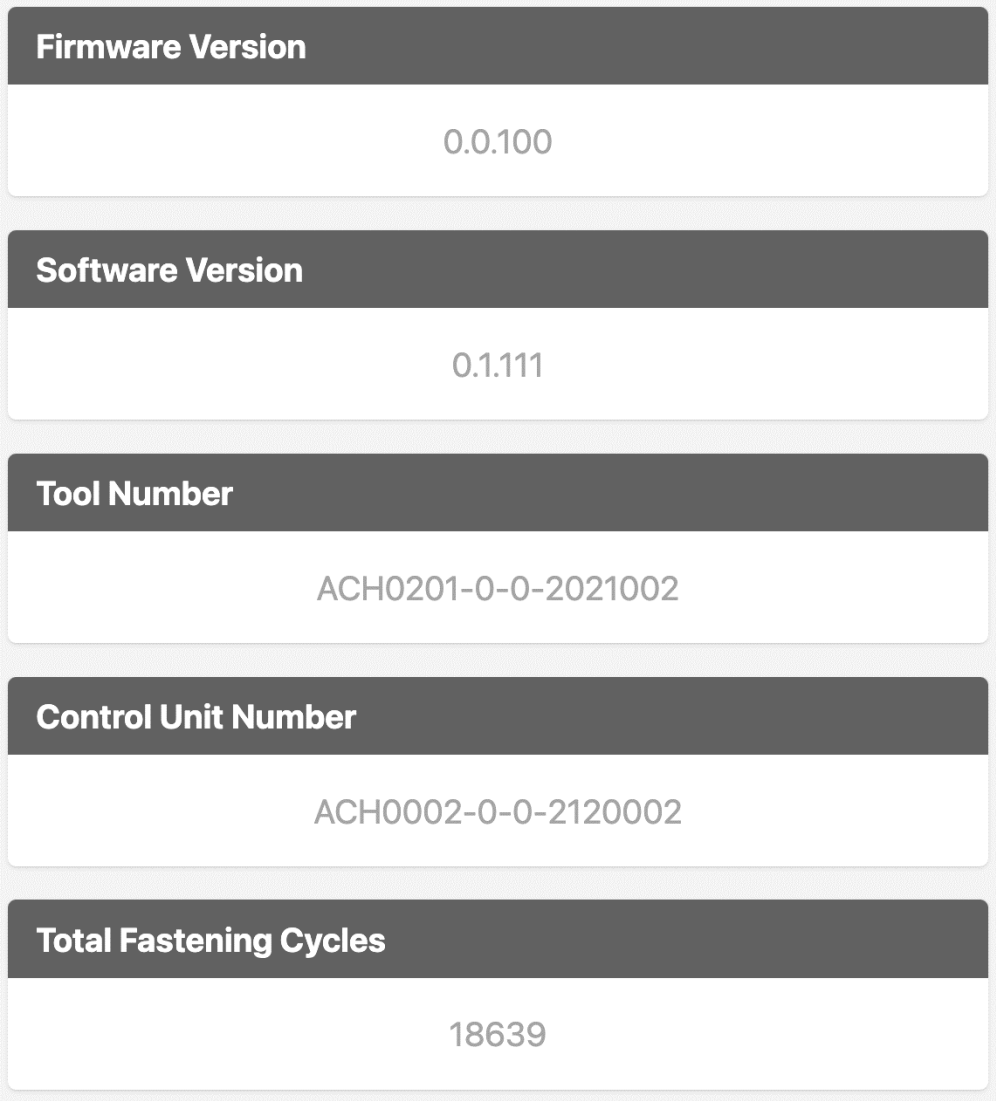
Choosing the File



Status of Update

4.2.9. System Information

Information regarding the system including firmware version, software version, control unit serial number and tool serial number. The total number of fastening cycles (one screw per cycle) performed with the tool is also displayed on the bottom.

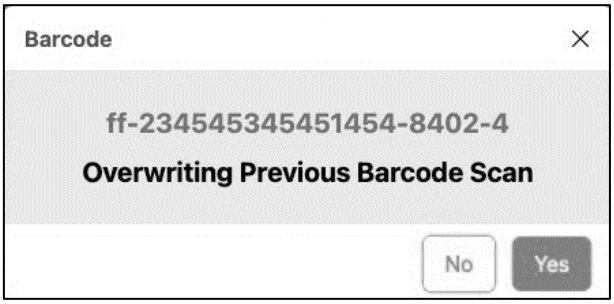


System Information

4.2.10. System Notification

1. Barcode Scanning Overwrite

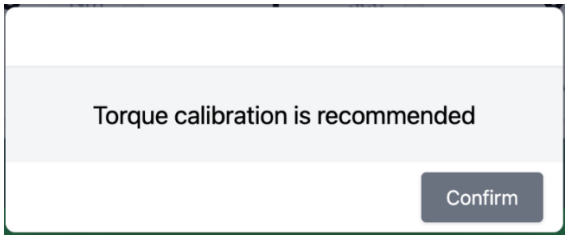
If the same barcode is scanned more than once, a notification will appear to prompt the user for overwriting the previous scan. Please click Yes to overwrite the previous scan record or click No continue without overwriting.



Barcode Record Overwrite

2. Notification for Calibration

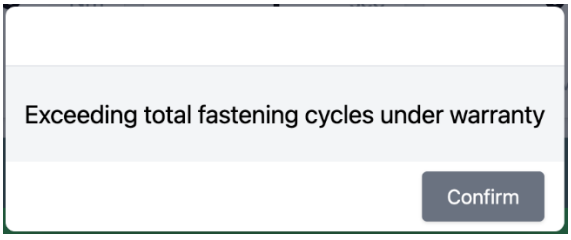
When the number of fastening cycle exceeds 200,000 cycles after the last calibration process, the system will prompt the user to perform calibration when the system is restarted. Press Ok and perform the calibration process, after it is done the counter will automatically reset for the next calibration.



Notification for Calibration

3. Warranty Expiration

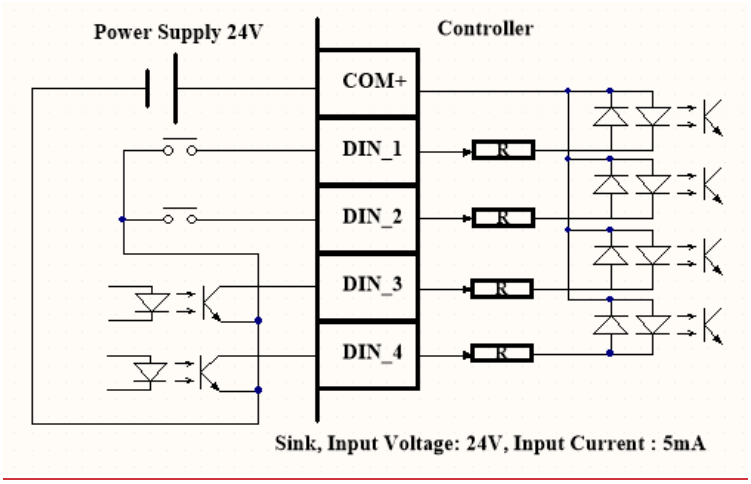
When the number of fastening cycle exceeds 1,000,000 cycles, the system will notify the user it has exceeded the number of fastening cycles covered under product warranty.



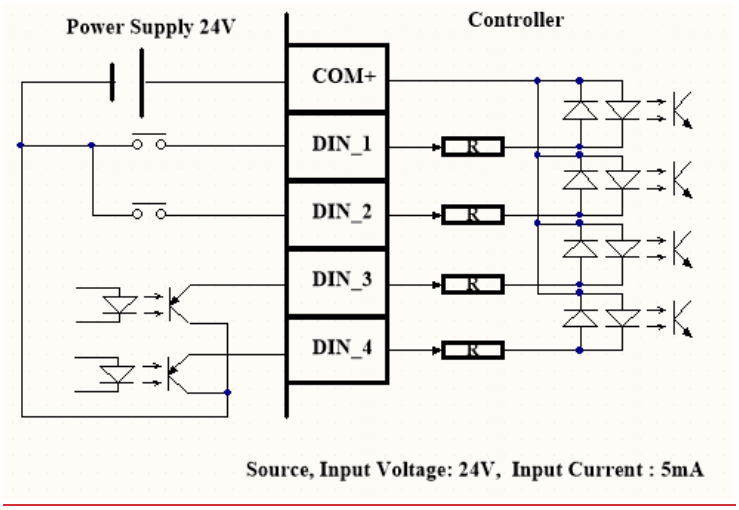
Exceeding

5. I/O Connection

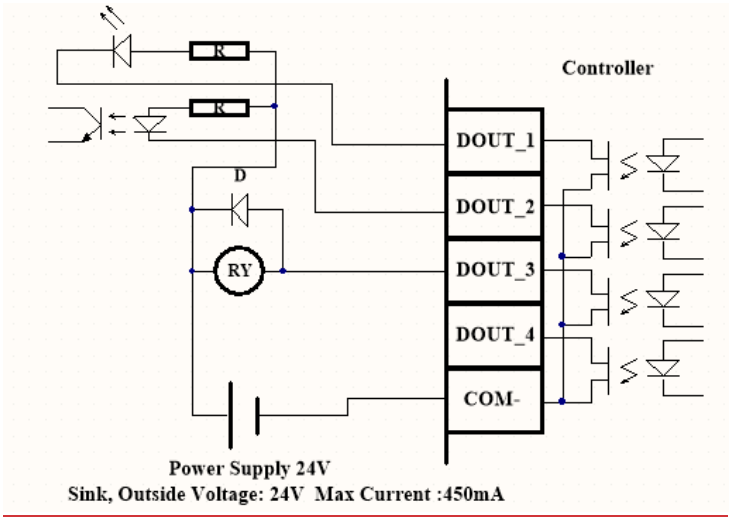
5.1. Sinking and Sourcing Digital I/O



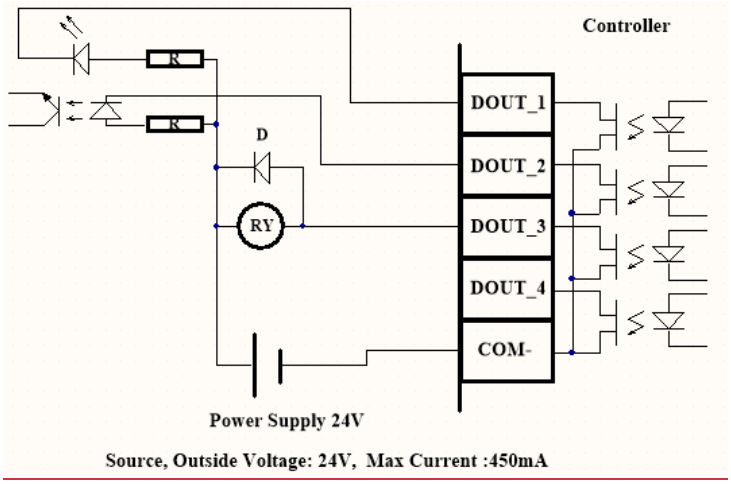
Sinking Digital I/O Connection (DIN)



Sourcing Digital I/O (DIN)

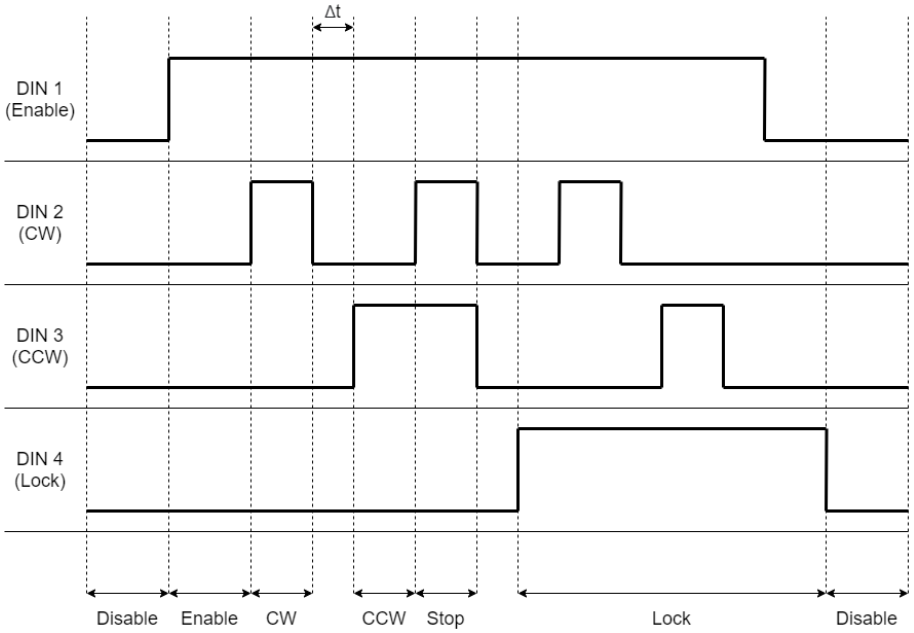


Sinking Digital I/O (DOUT)



Sourcing Digital I/O (DOUT)

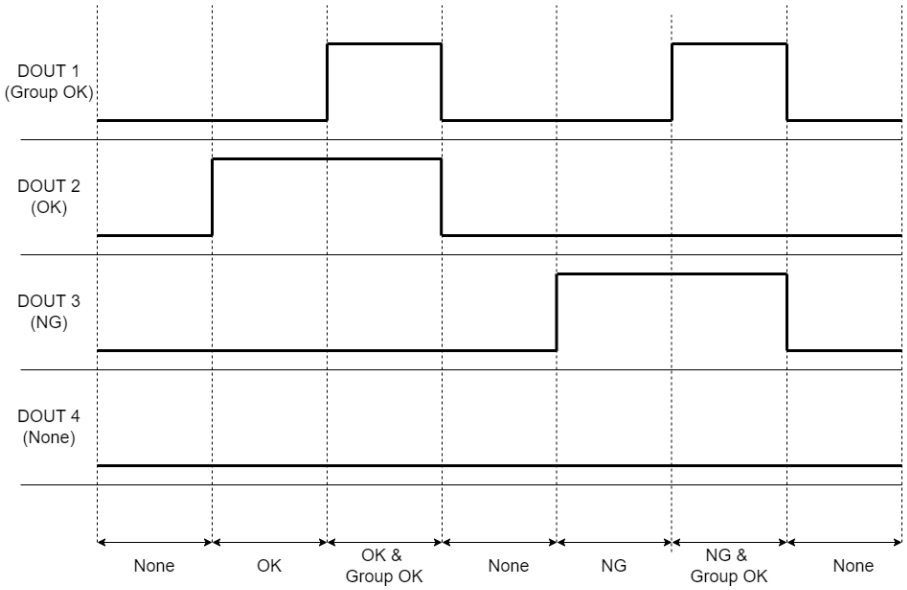
5.2. I/O Pin Definition



I/O-DIN

Definition:

1. DIN1 (Enable): High voltage level (I/O Control Mode)
2. DIN2 (CW): High voltage level (I/O Control Mode)
3. DIN3 (CCW): High voltage level (I/O Control Mode)
4. DIN4 (Lock) : High voltage level (I/O Control Mode), motor locked.
5. Δt: Minimum time interval (100ms)



I/O-DOUT

Definition:

1. DOUT1 (Group OK): High voltage level, Group OK (screw counter OK, fastening result of individual screw might be OK or NG)
2. DOUT2 (OK): High voltage level, fastening result OK
3. DOUT3 (NG): High voltage level, fastening result NG
4. DOUT4 (None) : Not in use

6. Trouble Shooting

6.1. Hardware

1. If the touch screen does not turn on after the system power is on, please turn off the power first and then restart.
2. If the tool does not start, please make sure the system is not in the “system lock” mode, please unlock before using the tool again.

6.2. The Web Interface

1. Web Interface cannot be opened

Please make sure that the system is connected to WIFI.

2. The content in the web interface will not refresh

Please try to refresh the page, or try to reconnect the system to WIFI again.

3. System update failure

Please update the system again after restarting the control unit

Please contact your local service provider for more information.

7. Product Service

Warranty: one year or one million fastening cycle, whichever comes first.

- The warranty only applies to the product of KEMP Tools Industrial, which includes the tool (screwdriver), control unit, the cords and the power supply. Depending on the condition of the product and the defect.
- We will provide either an exchange of the product, or changing parts that causes the defects.

Disclaimer: the warranty does not apply under the following conditions

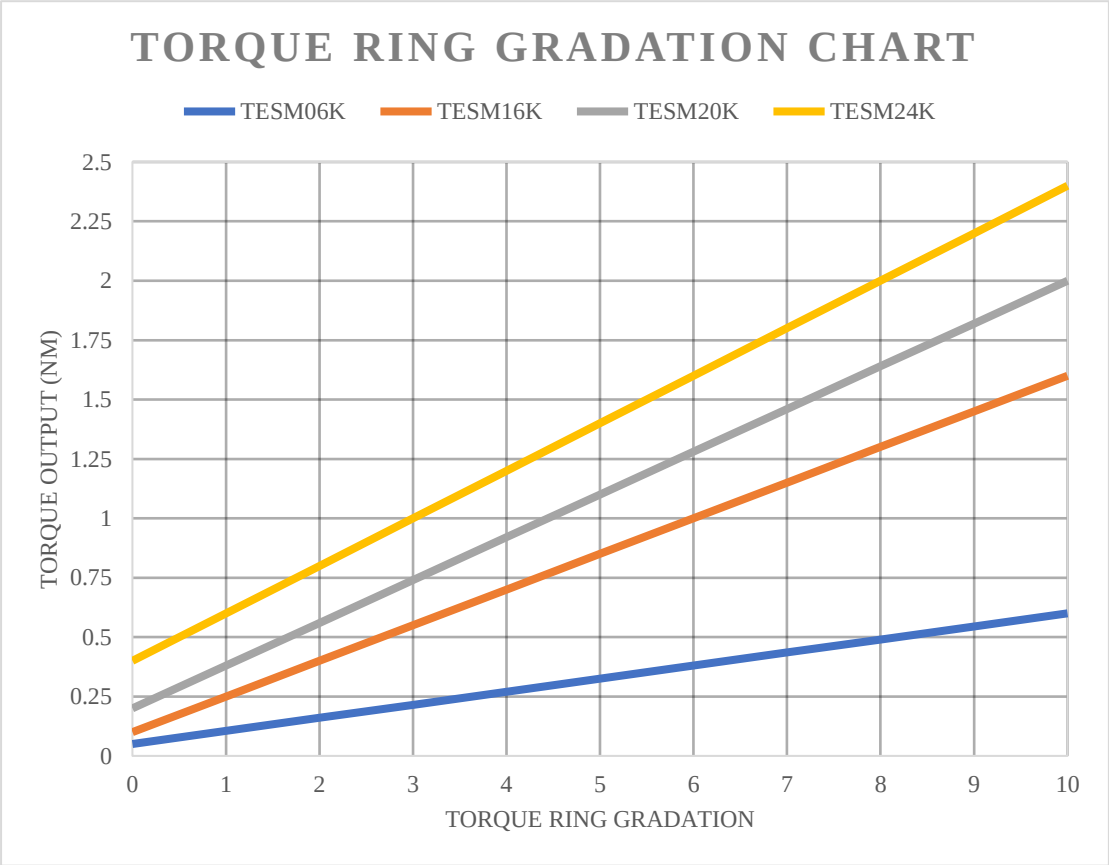
- Any damage or error occur as a result of modification or addition to the product.
- User negligence or using the product for purposes other than intended.
- Malicious or accidental damage to the product.
- Connection to incompatible equipment.
- Using parts, software or firmware not supplied by KEMP Tools Industrial Co., Ltd.

Please contact your local service provider for more information, or contact us directly:

KEMP Tools Industrial Co., Ltd.

8. Torque Ring Adjustment

The following chart shows the torque output of the tool in relation to the position of the torque adjustment ring (gradation), please note that the actual output might varies.



9. Control Unit Lights Signal

LED	Description	Note
Power	Power On = Red	
Status	Green=OK Red=NG Blue=All Ok	
WIFI	Blue=Connected	Off when not connected