![DOGA logo] **◆DOGA®**
ASSEMBLY
TECHNOLOGY

User manual

Process Controller

# ParaMon-Pro X V3



EN

# CONTENTS

# REMARKS ABOUT THE MANUAL

## Symbols

| | **Information** |
|---|---|
| (i) | This warning statement indicates important information (for example: damage to property), but no hazard. |

| | **Information** |
|---|---|
| (person icon) | Information to view in your customer area on the **www.doga.fr** web site. |

| | **Caution** |
|---|---|
| ⚠ | This warning statement indicates a low risk that may lead to minor or moderate injuries if not avoided. |

| | **Wear personal protection equipment.** |
|---|---|
| (glove icon) | This symbol indicates the need to wear protective gloves |

| | **Warning** |
|---|---|
| ⚠ | This warning statement indicates a moderate risk that may lead to severe or fatal injuries if not avoided. |

## Update history

| Ind. | Date | Description |
|---|---|---|
| 0 | 09/24 | Original - replace 60391 manual ParaMon-Pro X controller for BM screwdrivers |

# 1. INFORMATION

## 1.1 IMPORTANT

The product delivered with this manual may have been modified for specific needs.

If this is the case, when ordering a replacement or spare parts, please indicate the controller serial number written on our shipping note or contact **DOGA** at **+33 1 30 66 41 41.**

In this way, you will be sure to get the required controller and/or spare parts

## 1.2 Product reference

| Description | Process Controller ParaMon-Pro X |
|---|---|
| Type | V3 since serial no. SN 2306120001 |
| Software | from v1.40.0 (English) and v1.41.0 (multilingual) |
| Compatibility | MDCv2, MDTC, BM, BMT series screwdrivers and controllers with firmware from: v2.31.9(MDCv2), v1.33.0(MDTC), v1.33.0(BM), v1.43.0(BMT) |

## 1.3 Packing List



| | Quantity |
|---|---|
| ParaMon-Pro X controller | X 1 |
| Power cord | X 1 |
| USB Wi-Fi adapter | X 1 |
| Vesa wall bracket | X 1 |
| CE Declaration of Conformity | X 1 |

## 1.4 Product description

ParaMon-Pro X offers a range of features to guide users through the assembly process and ensure traceability:
The features of ParaMon-Pro X are as follows:

- **Simultaneous connection of up to 8 BM / BMT / MD / MDT series tools.**
- **Parameters and programs setup for all connected screwdrivers.**
- **Real-time monitoring (graphs and tightening results display).**
- **Job management: quality control of the assembly with fastening strategies, batch counting, assembly visualization for operator assistance and digital inputs/outputs management.**
- **Automatic backup of tightening data, with files sorted by date.**
- **Remote tool control.**
- **Communication gateway.**
- **External display extension**
- **Supports barcode scanner and bit sockets tray**

## 1.5 Specifications

| No. | Features | Description |
|---|---|---|
| 1 | Input Power | AC 100-240 V, 50/60Hz, 0,4A |
| 2 | Dimensions | 275(W) x 200(H) x 70(D) mm |
| 3 | Weight | 1,8 kg (including wall mount bracket) |
| 4 | Mounting | VESA 100 x 100 (included) |
| 5 | Display | 10,1" (1280 x 800 pixels) |
| 6 | Extended Display | HDMI x 1 (duplicate) |
| 7 | Processor & RAM | STM32MP1 – RAM 1GB – stockage eMMC 16GB |
| 8 | Ethernet | Gigabit ethernet x 1 |
| 9 | Wi-Fi | Wireless USB adapter included - 2.4GHz, 5GHz dual-band, IEEE 802.11 b/g/n/ac AP-mode only |
| 10 | Interface | USB 2.0 x 4<br>Digital I/O (input x 16, output x 16) – external 24V DC to be supplied.<br>Micro-SD slot (up to 32GB) |
| 11 | Multi-Language | English, French, German, Spanish, Czech, Italian |

**Information**

Do NOT use any similar adapter other than the included USB Wi-Fi adapter.

There is a possibility of signal interference while operating the equipment

## 1.6    Dimensions

### 1.6.1    Overall dimensions with mount bracket
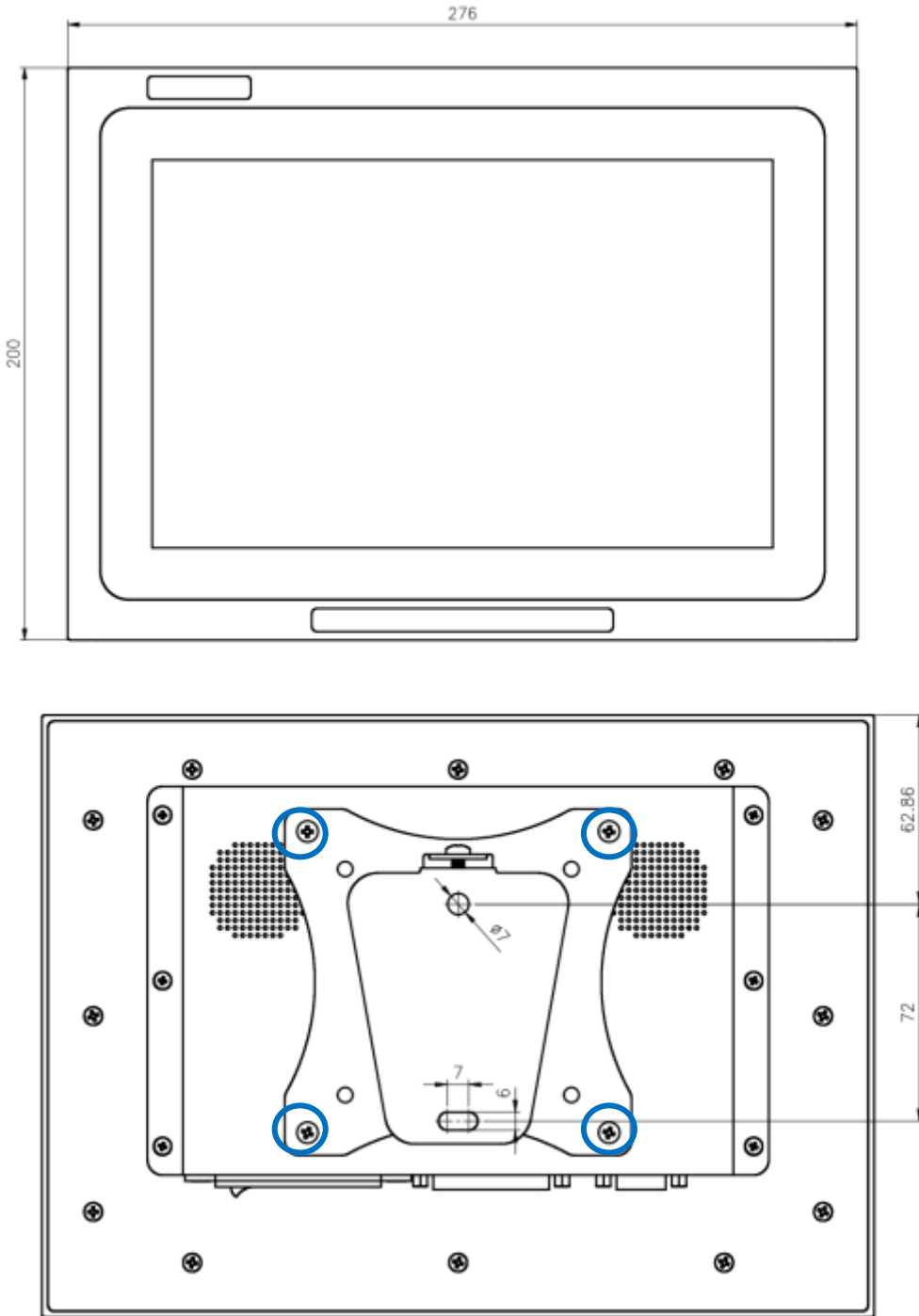




| ⚠ | **Caution** |
|---|---|
| | When replacing the VESA bracket, it is essential to use the 4 existing fixing screws. |
| | Too long screws may touch and damage the CPU board. |

## 1.6.2 Connections & side dimensions
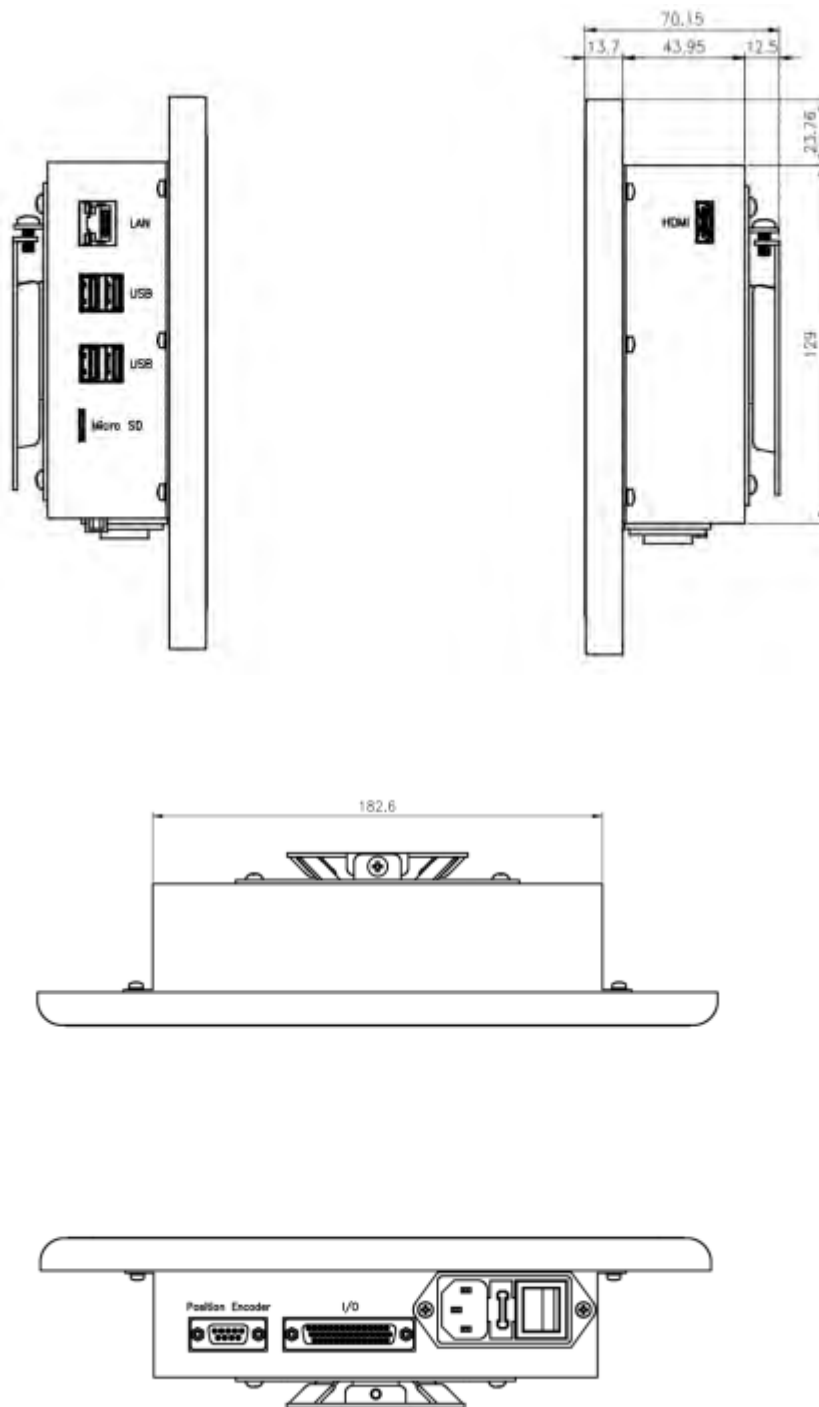
# 2. HOME

## 2.1   Operator mode

Operator can select one of 4 screen menu – Operation, Monitor, System and Login.

Login menu requires the password to move to Administrator mode

There is no setting available in Operator mode.
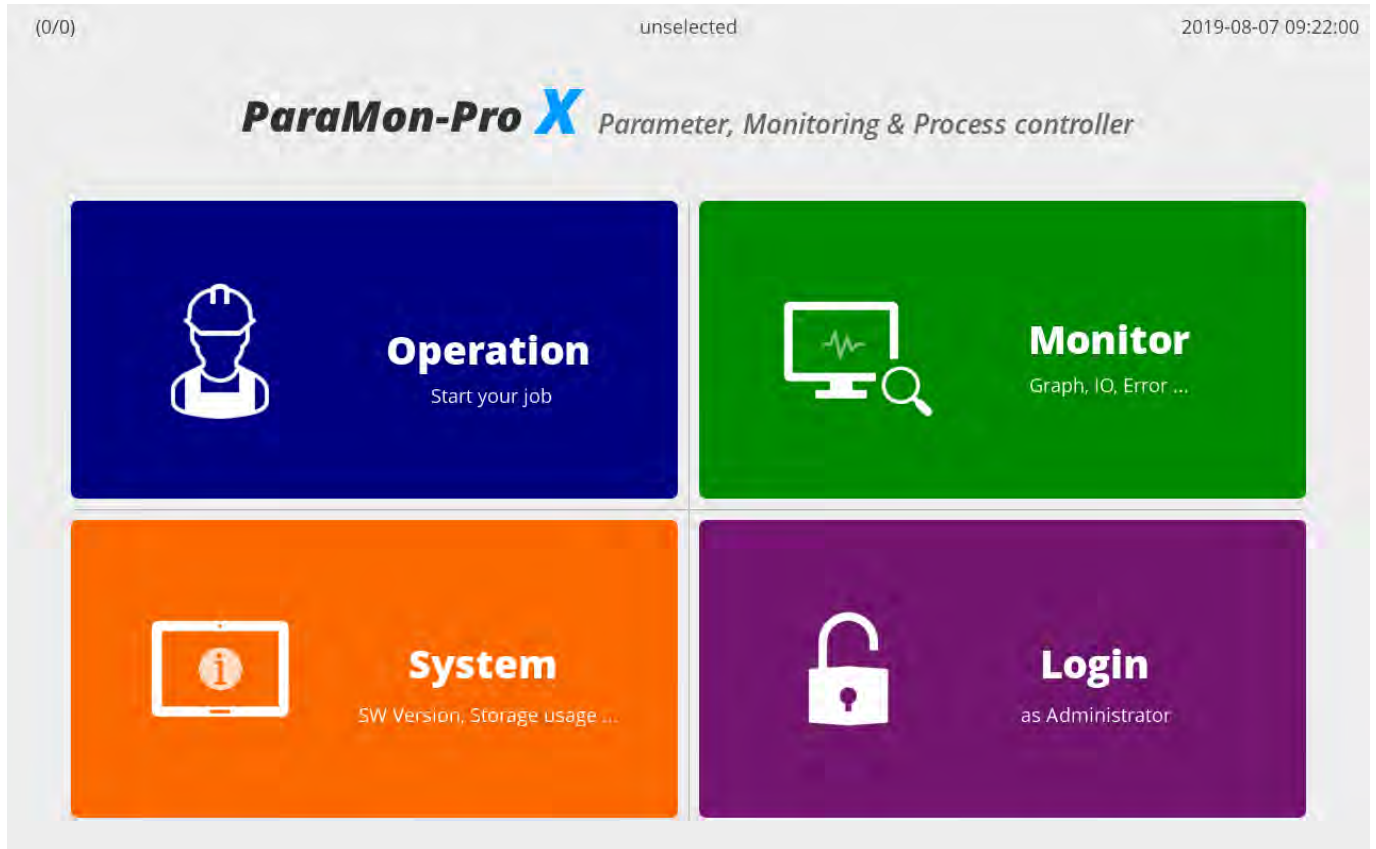


| No. | Category | Description |
|-----|----------|-------------|
| 1 | Operation | To go to Operation mode and start a job |
| 2 | Monitor | To view the fastening graph, I/O status in real time |
| 3 | System | To view software and hardware information |
| 4 | Login | Enter password and log into the Admin mode<br>The default password is "0". Password can be changed in Admin mode. |

## 2.2    Administrator Mode

All settings and job creation are available in Admin mode only.
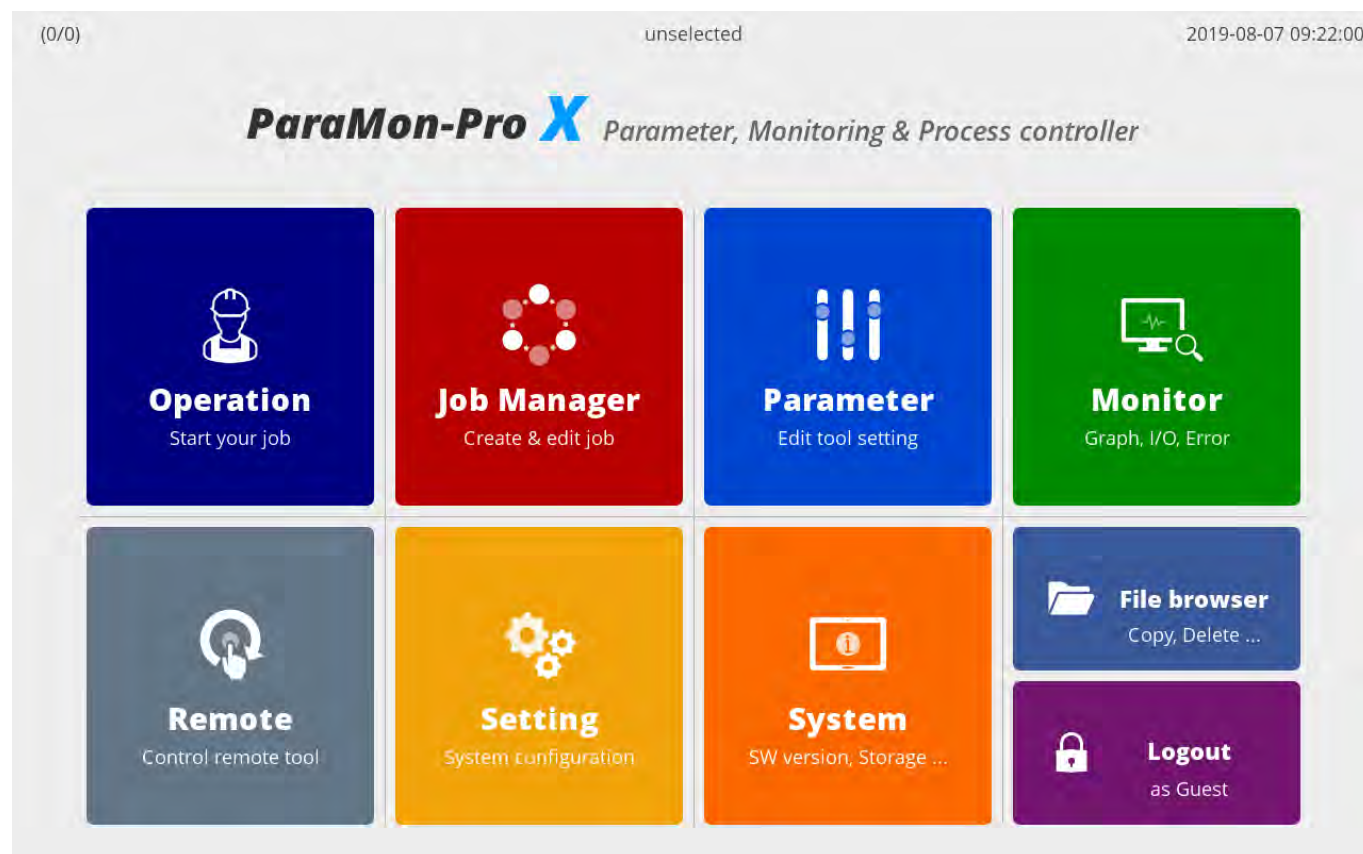


| No. | Category | Description |
|-----|----------|-------------|
| 1 | Operation | To go to Operation mode and start a job |
| 2 | Job Manager | To create and edit jobs |
| 3 | Parameter | To access to screwdrivers settings |
| 4 | Monitor | To view the fastening graph, I/O status in real time |
| 5 | Remote | Remote control of screwdrivers and outputs |
| 6 | Setting | To access ParaMon-Pro X parameters |
| 7 | System | To view software and hardware information |
| 8 | File Browser | To browse directories in the internal or external memory |
| 9 | Logout | Logs out from Administrator to Operator mode |

# 3. NETWORK CONFIGURATION

For connection between ParaMon-Pro X and BM tools, depending on the configuration of your network.

| Wi-Fi access point | Description |
|---|---|
| Using the USB Wi-Fi adapter supplied | You can use the USB Wi-Fi adapter supplied to set up a wireless network and connect BM and BMT series wireless tools to ParaMon-Pro X. This adapter delivers a Wi-Fi signal strength limited to a few meters on the workstation. |
| Using an external Wi-Fi Access Point (Option) | You can set up your network using a separate Wi-Fi Access Point in the following cases: A. When you need a more extensive and powerful Wi-Fi signal for the BM and BMT series cordless tools. B. When you want to connect one or more wired MD(T) series screwdrivers to the ParaMon-Pro X |

## 3.1    Connect through Internal AP



The most common type.

Through a Wi-Fi adapter in ParaMon-Pro X, ParaMon-Pro X is operated in AP mode and connected to BM.

The Wi-Fi module in ParaMon-Pro X is operated in AP mode only, not in Station mode.

A. Log into the system in Admin mode. The default password is "0".
B. Press [Setting].
C. Select the NETWORK tab on the left.
D. Set the SSID, password and band in Wi-Fi settings.

The default settings are as follows:

| Parameter | Default Settings |
|---|---|
| SSID | paramon |
| Password | 12345678 |
| Band | 5 GHz |
| Region | USA – Modify to Europe |
| Channel selection | Automatic |
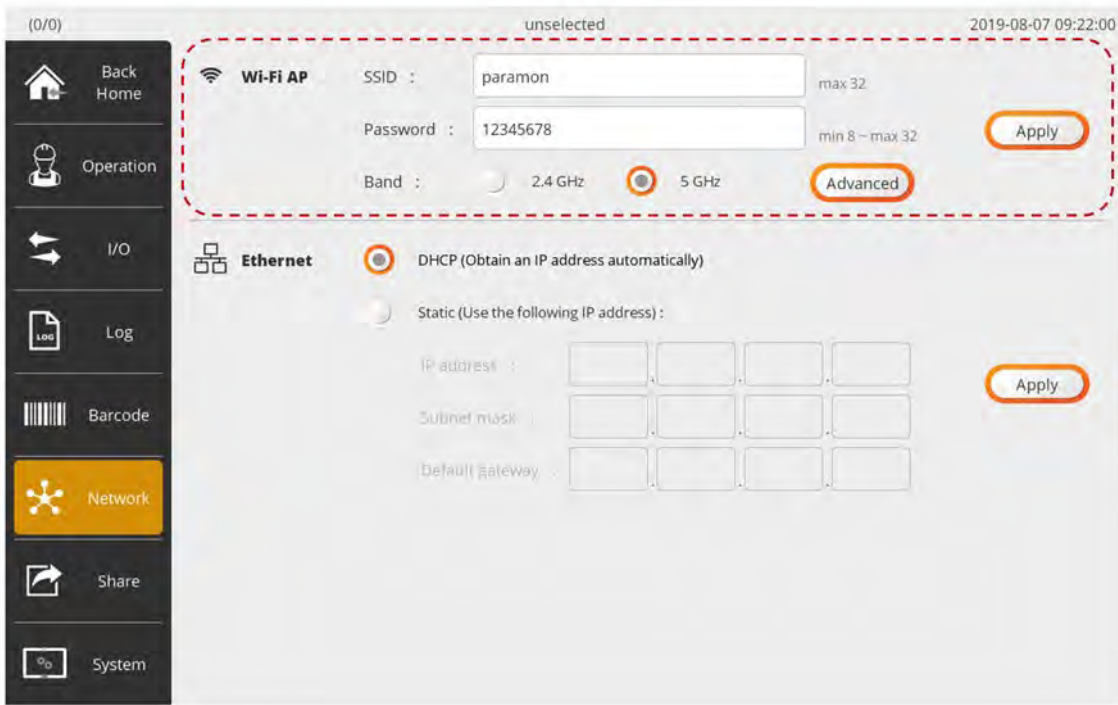
E. Press [Apply] if any changes have been made.

F. If the channel selection is set to 'Auto', Wi-Fi is activated after the searching for the best channel, as shown below.
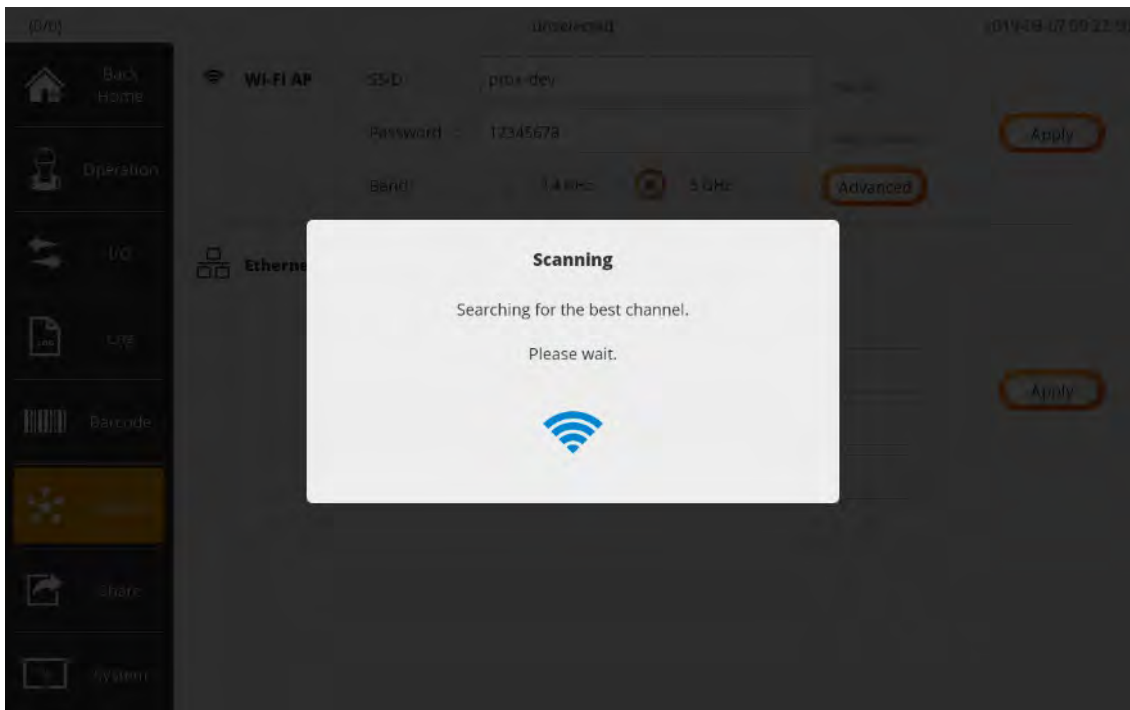


| (i) | **Information** |
| --- | --- |
| | It is essential to set the same Country or Region parameters between the access point and the screw-drivers, as this could lead to connection problems. (Due to different Wi-Fi frequencies used) |

## 3.2    Connection using External AP



You can use separate network devices to connect ParaMon-Pro X and tools in the following cases

-  When you need to connect to a wired tool, such as the MD or MDT series
-  When you need a wider and stronger Wi-Fi signal

**Information**

The USB Wi-Fi adapter must be removed from the ParaMon-Pro X.

The external Access Point must be connected to the Ethernet port on the Pro X.

A.  Log into to the system in Admin mode. The default password is "0".
B.  Press [Setup].
C.  Select the NETWORK tab on the left.
D.  Choose DHCP or STATIC in ETHERNET depending on the network configuration.
E.  Press [Apply].

**Information**

We advise you to use fixed IP addresses for external Access Point configuration.
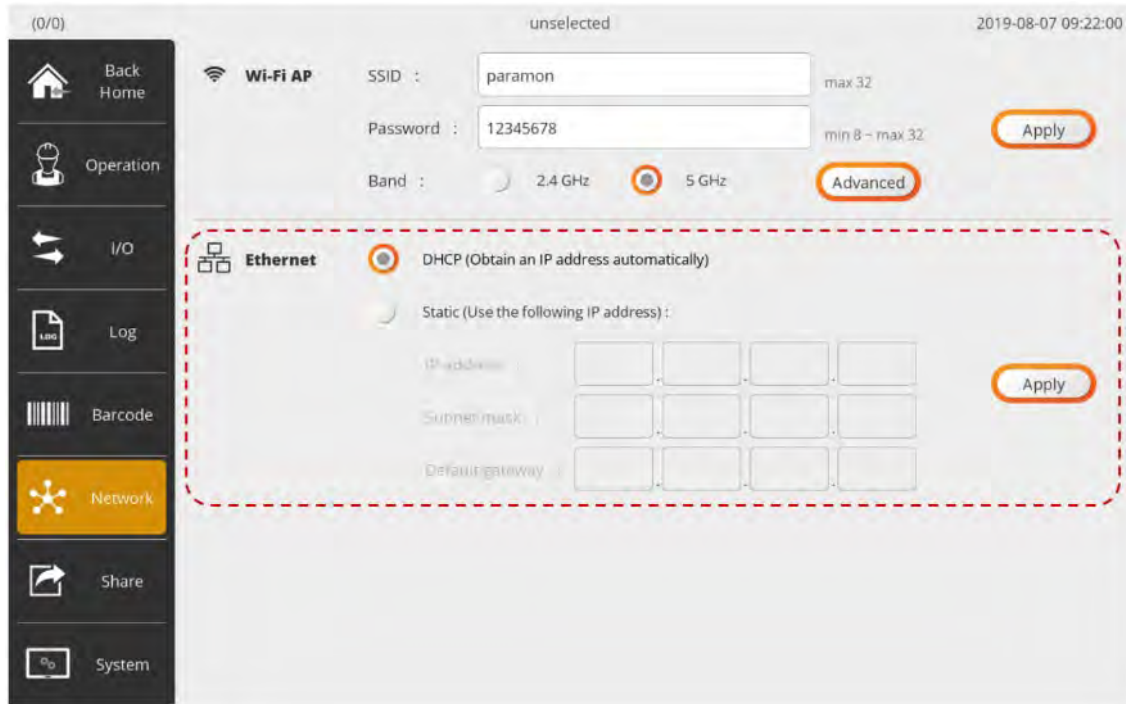
F.  Check the IP address by the DHCP server in the following menu: Home → System → Network.
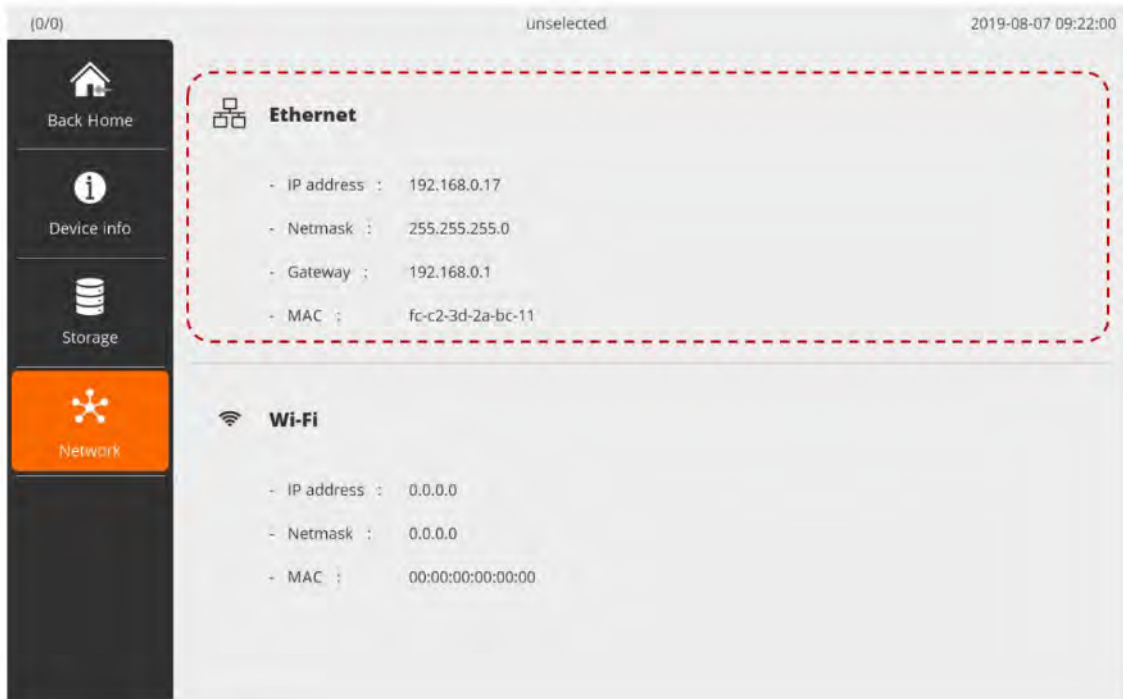
# 4. BM/BMT Wi-Fi SETUP



A. Switch on the tool and wait for it to start up completely.

B. Connect ParaMon-Pro X with the BM, using the accompanying USB cable.

C. If successfully connected, the NETWORK SETTNG page appears automatically.

> **Information**
> Connect the battery to switch on the BM. Ensure to connect the USB cable after the tool is successfully ON. If switched ON after the USB cable is connected, or the USB cable is connected while the BM is powered, the NETWORK SETTING page may not appear on the screen. If not, remove the battery and plug it back.
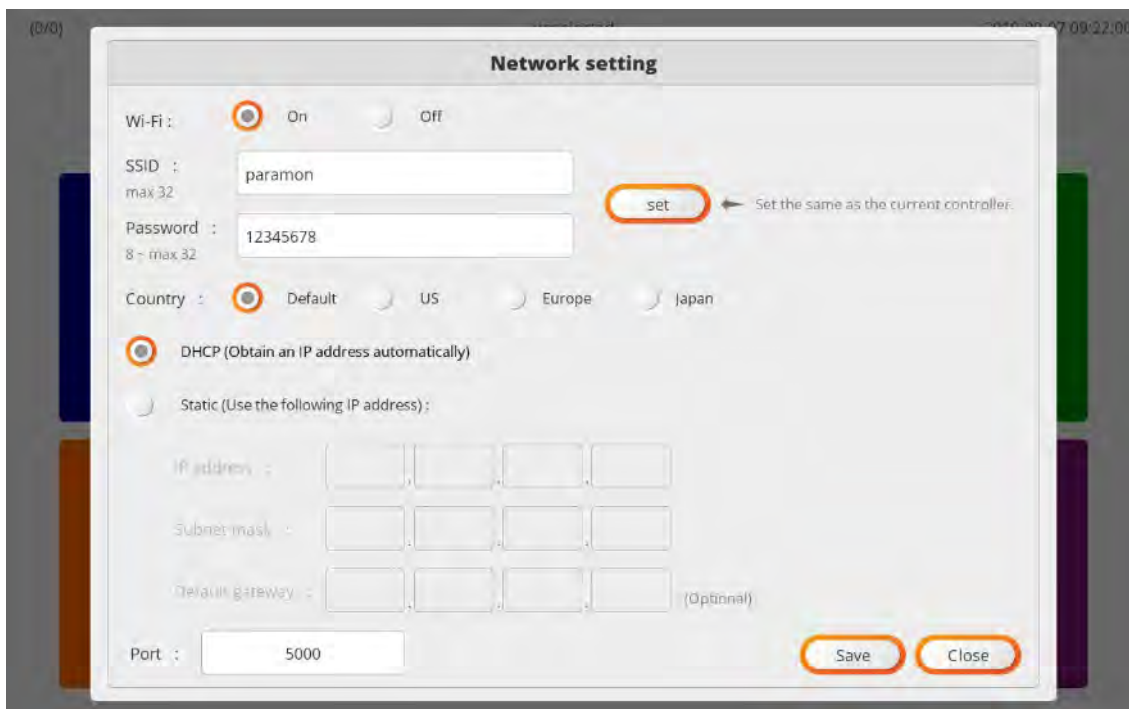


D. Enter the SSID and password:

If you are using a USB Wi-Fi adapter, the SSID and password are automatically entered when you press the [Set] button.

E. Press the [Save] button to save the modified settings.

F. The changed Wi-Fi setting takes effect after the tool reboots.
   Please remove the battery and reassemble it.
G. You can double-check your Wi-Fi settings on the tool's LCD, as shown in the following left image.
   Press F2 (DISP) and use F3(DOWN) or F4(UP) to change page.
H. When Wi-Fi is successfully connecting to the AP, the signal strength is displayed in the upper left corner, as shown in the center image below. The signal strength is only displayed on the Operation page. To go back to the Operation page, press F1 (MODE).
I. You can also check the IP address as shown in the following right image.
   Press F2 (DISP) and use F3 (DOWN) or F4 (UP) to change page.

# 5. MEMBER TOOLS

To use tools in ParaMon-Pro X, tool registration is required.

To use tools in ParaMon-Pro X, they should be registered as 'Member Tools'.
This section describes how to manage member tools.

## 5.1 Register Member Tools

A.  Login as Admin. The default password is "0".
B.  Swipe from top to the bottom.
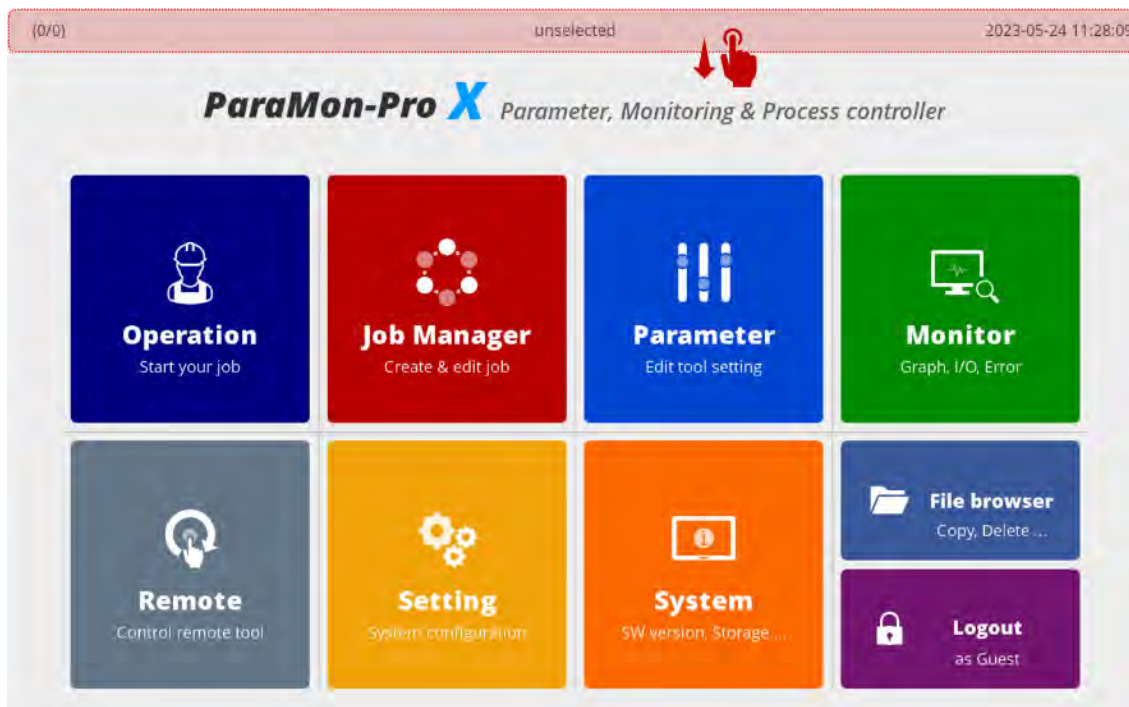


C.  Select the EDIT icon to register a member tool.

D. ParaMon-Pro X automatically searches for all the tools accessible on the Ethernet and Wi-Fi networks, then displays the detected tools in the table on the right.
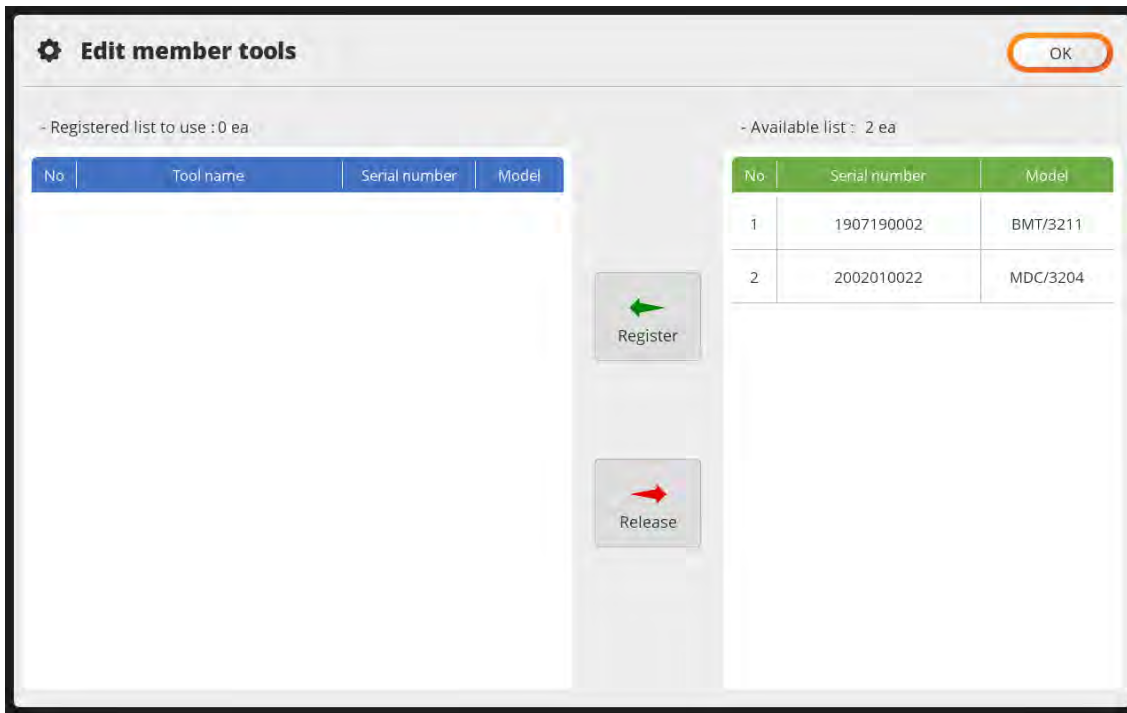


E. Check the model and serial number on the label or on the Driver Information page.
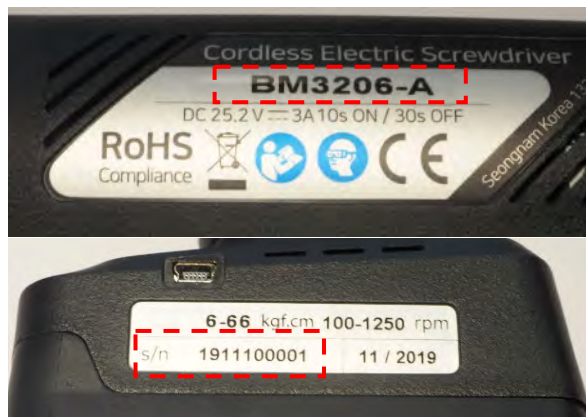
F.   Select the tool corresponding to the model number and serial number in the table on the right.

G.   Press [Register] to add the selected tool on the ParaMon-Pro X.
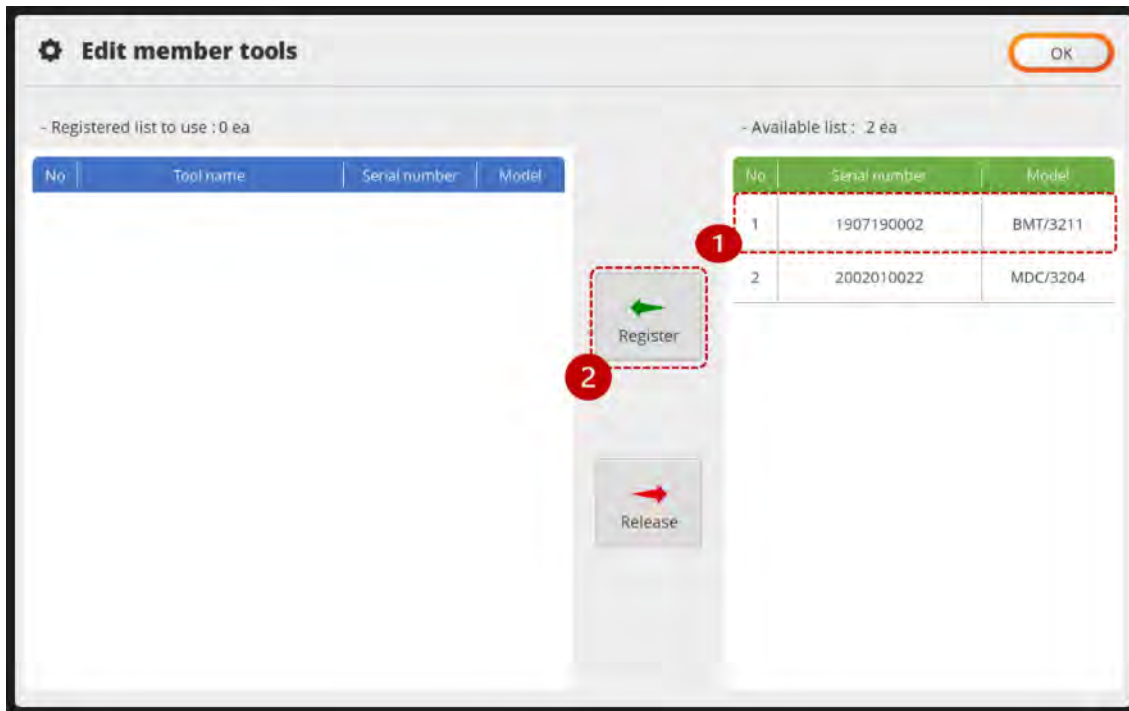


H.   The selected tool in the list on the right move to the left and the registration process is done.

I.   Press [OK] to complete the setting.
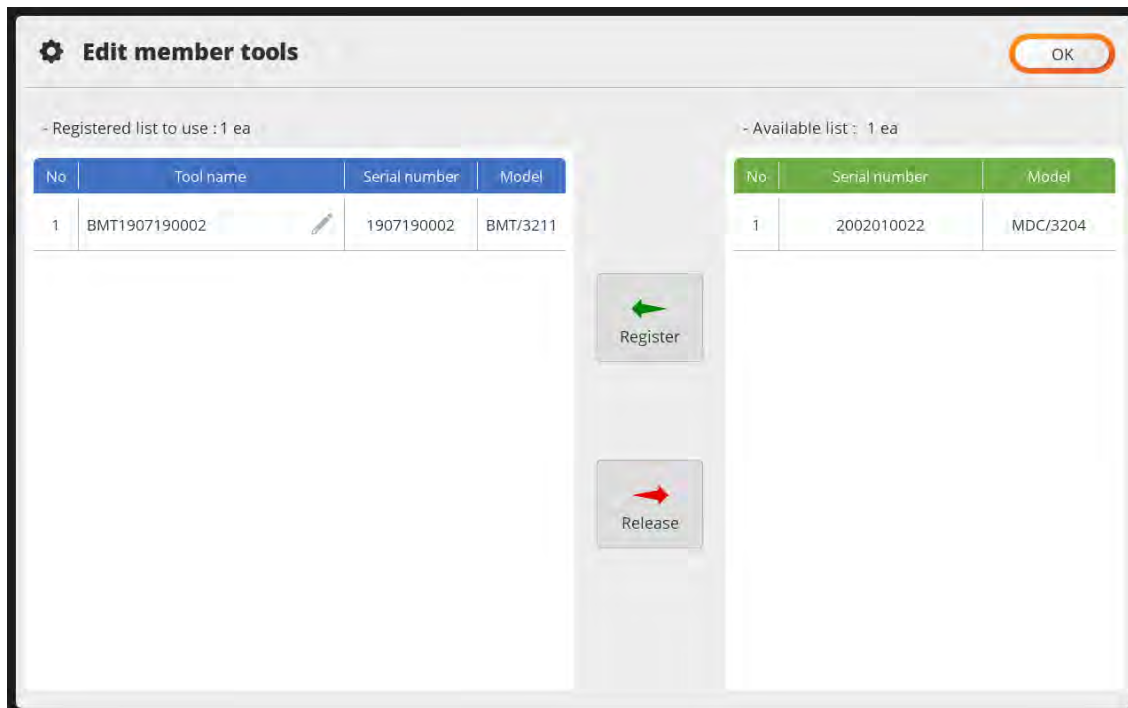
## 5.2    Release Member Tools

A. Repeat the steps in section 5.1 to access the tool list.
B. Select the tool you want to release.
C. Press [Release] button.
D. Once the confirmation pops up, press [OK].
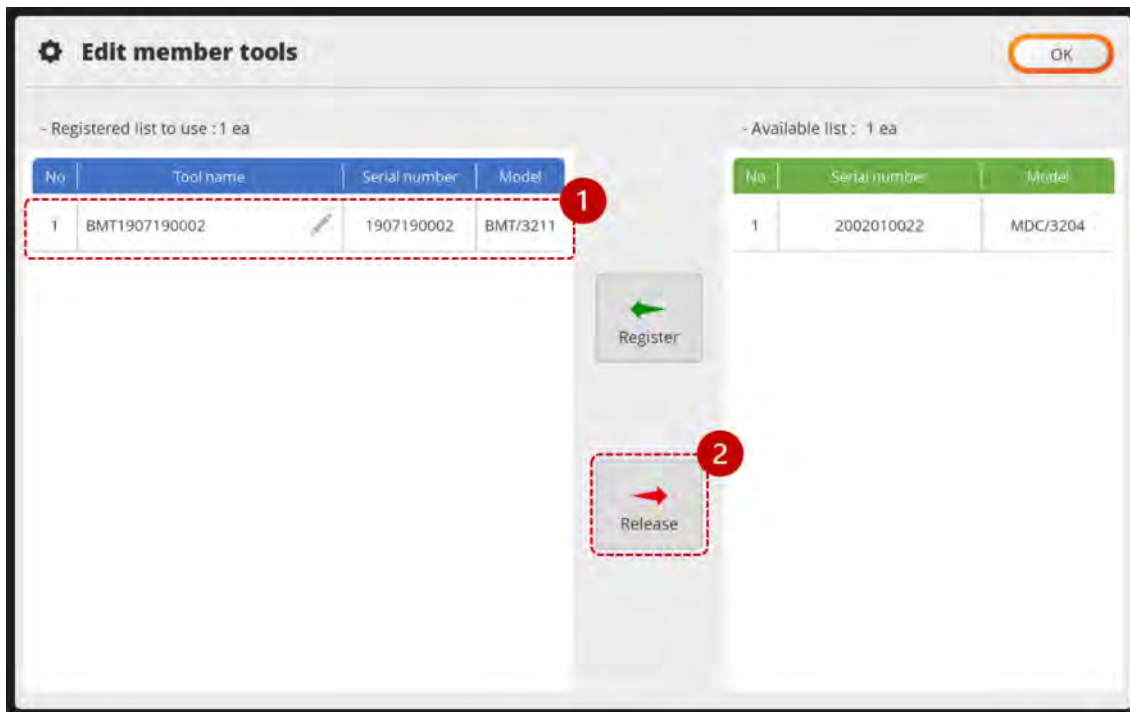


E. Press [OK] to end the settings.

## 5.3    Modify Member Tool Name

When registering a member tool, the name of the tool is generated by default in the form of Model + Serial Number. If necessary, you can rename the tool for easier tool identification.
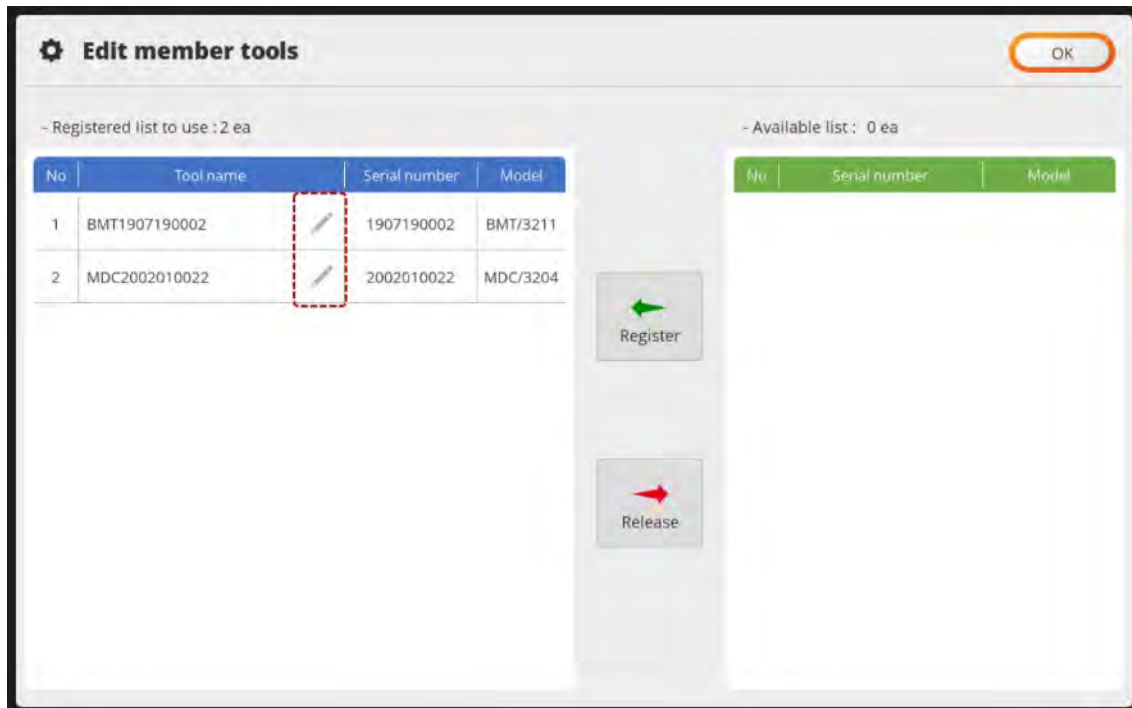


A. Select the EDIT icon.
B. Enter the tool name.
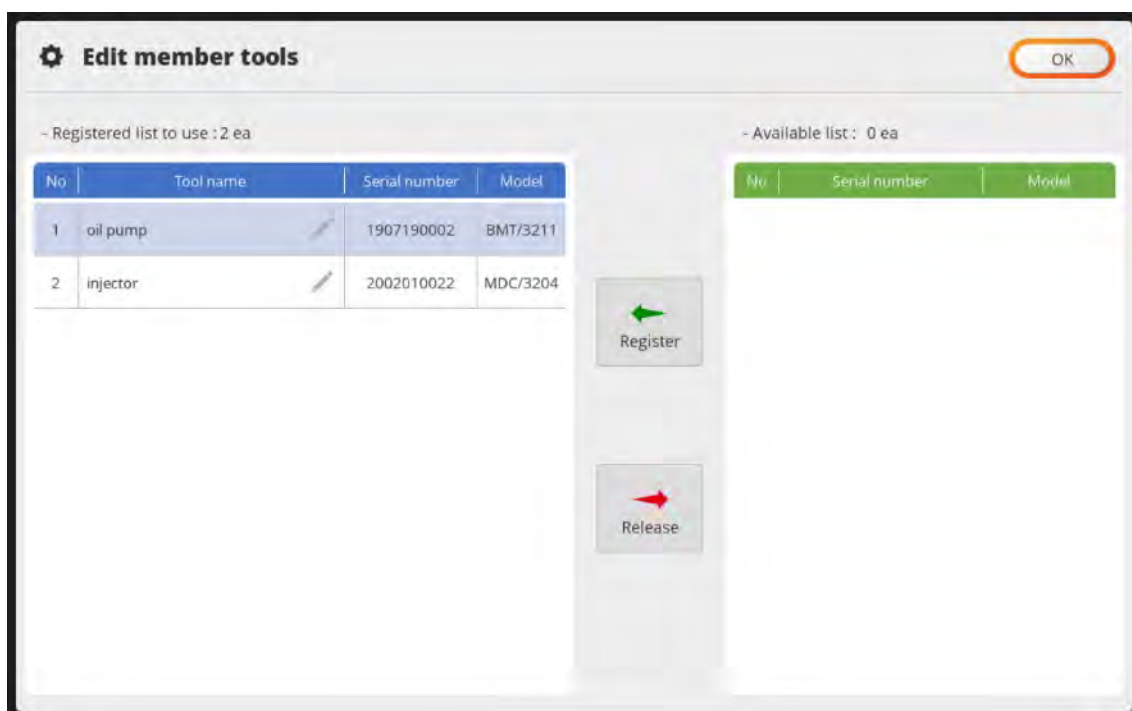
## 5.4    Check Member Tool Status

A.    Swipe from top to the bottom.
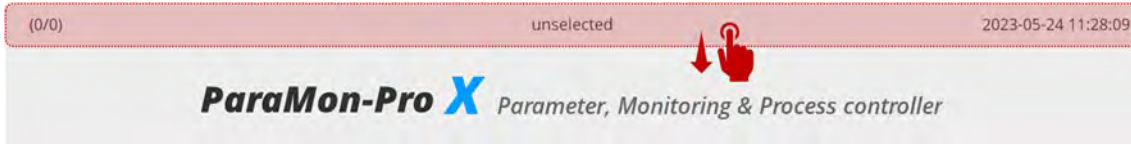


B.    A list of the member tools currently registered on ParaMon-Pro X appears.



C.    The member tool list includes the followings:

| No. | Category | Description | |
|---|---|---|---|
| 1 | Status |  | Not connected yet |
| | |  | Successfully connected |
| | |  | Connection failed; required to reset the tool |
| | |  | The tool occupied by the other ParaMon-Pro X |
| 2 | Name | Name | |
| 3 | S/N | Serial No. | |
| 4 | Model | Model No. | |
| 5 | F/W ver | Firmware version | |
| 6 | IP address | IP address | |
| 7 | Port | Modbus-TCP port number | |
| 8 | MAC address | MAC address | |
| 9 | Temperature | Realtime temperature | |
| 10 | Backup/Restore | Parameter backup & restore<br>For more information, refer to '16. Backup & Restore'. | |

# 6. STATUS BAR
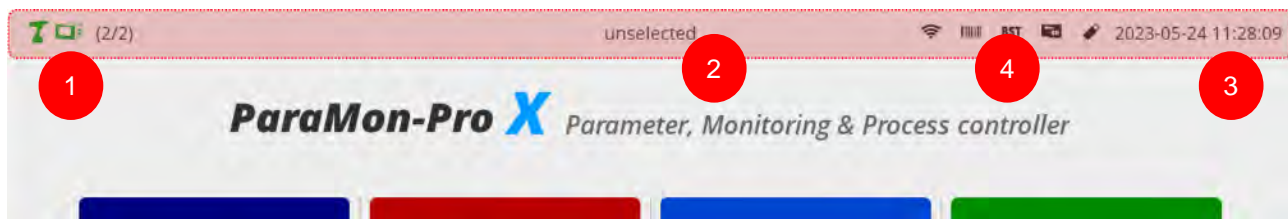


The Status Bar includes the followings:

| No. | Description | | |
|-----|-------------|---|---|
| 1 | Member tool connection (X/Y)<br>X: No. of tools connected<br>Y: Total number of member tools |  | Not connected yet |
| | |  | Successfully connected |
| | |  | Connection failed; required to reset the tool |
| | |  | The tool occupied by the other ParaMon-Pro X |
| 2 | Name of the target tool selected | | |
| 3 | Date and present time | | |
| 4 | Peripheral device status |  | Wi-Fi adapter |
| | |  | Barcode reader |
| | | BST | BST (Bit Socket Tray) communication is normal |
| | | BST | BST (Bit Socket Tray) communication fail |
| | | MicroSD | MicroSD card |
| | |  | USB Storage |

# 7.  SELECT TARGET TOOL

As ParaMon-Pro X registers and manages up to 8 member tools, it is required to specify a target tool to access dedicated screwdriver menus: Settings, Monitoring and Control.

This section describes how to select a member tool.

A.  Swipe from top to the bottom.
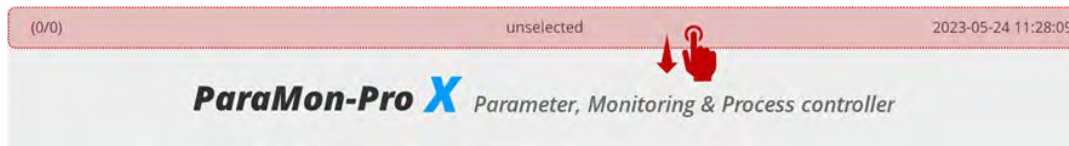


B.  A list of the member tools currently registered on ParaMon-Pro X appears.



C.  Select the target tool on the Member Tool List.

Note that target tool is selectable when the tool is normally connected. (  ).

D.   If the target tool is normally selected, its name appears on the Status Bar.
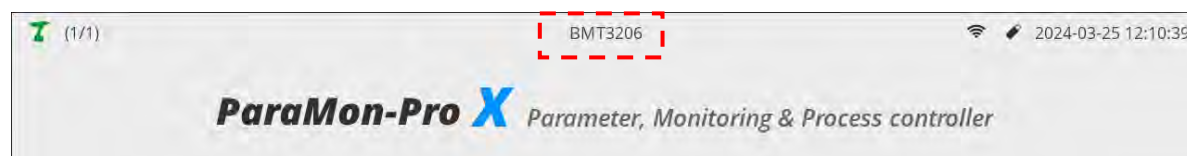
# 8. PARAMETERS

Able to manage the parameters of all member tools registered in ParaMon-Pro X.

This document is a ParaMon-Pro X user manual and does not cover tool parameters.

For more information on tool parameters, please refer to the tool user manual.

First you should select the tool in the member list.

Refer to [ SELECT TARGET TOOL ] to select a tool.

The name will be displayed in middle bottom.
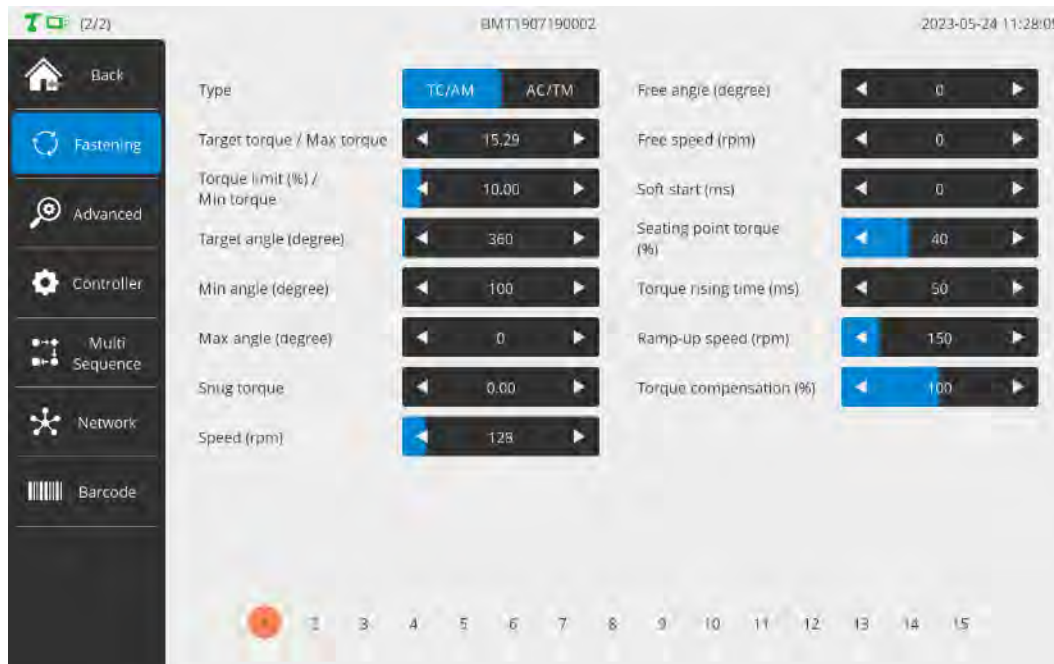


Unless a target tool is specified, the following page appears.
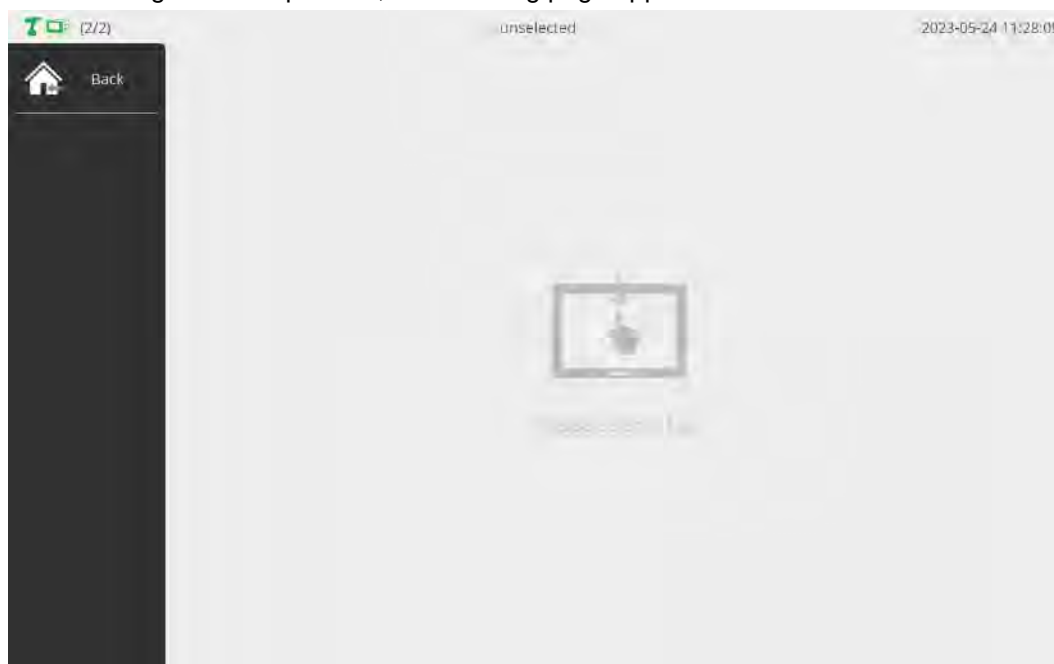
# 9. MONITOR

Select a tool as described in Chapter 7, then select the Monitoring menu.

## 9.1 Graph

Displays the target tool's fastening data and a 2-channel graph.
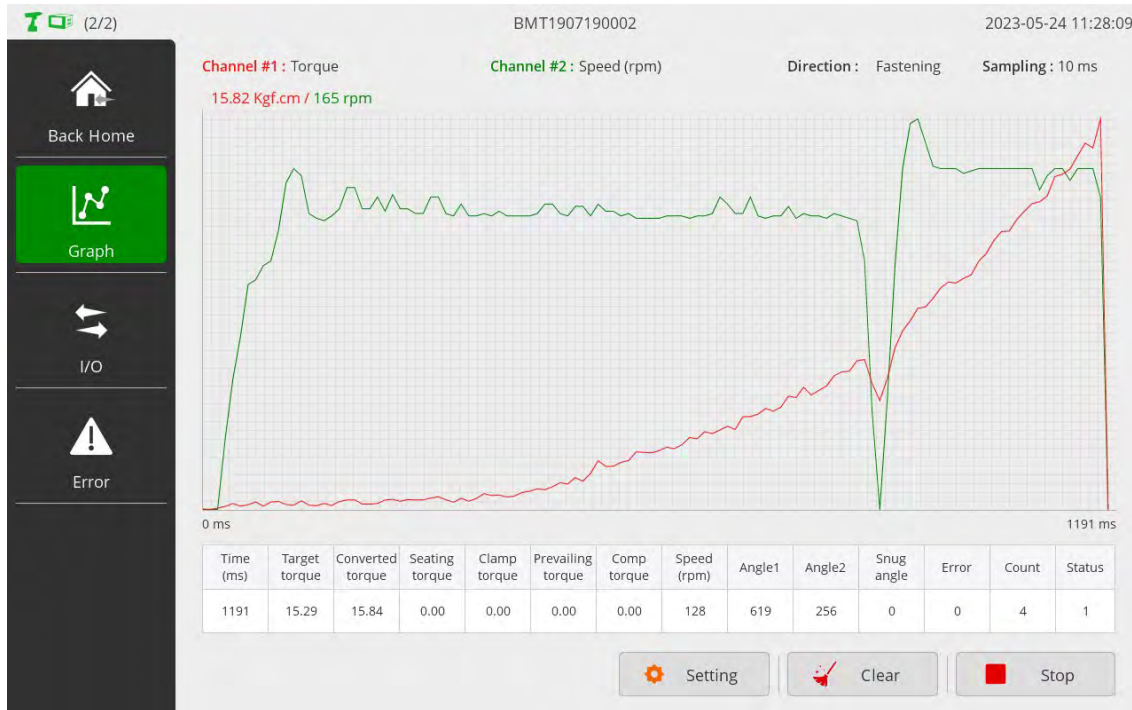


A. Press Setting and set the graph output.
B. Press Start and enable graph output.
C. Press Clear and reset data output.
D. Press Stop and disable graph output.

> **Information**
> Only the last graph data is displayed.

Below are the graph settings options:



| Settings | Description | |
| --- | --- | --- |
| Channel | Torque | Torque changes by time (ms) |
| | Current (mA) | Current changes by time (ms) |
| | Speed (RPM) | Speed changes by time (ms) |
| | Angle (degree) | Angle changes by time (ms) |
| | Speed Command (RPM) | While the above speed represents the actual revolving tool speed, speed command refers to control target speed. |
| | Current Command (mA) | While the above current represents the actual current consumption of the tool, current command refers to control target |
| | Snug Angle (degree) | Represents changes in snug angle by time (ms) |
| | Torque/Angle Applicable to Channel 1 only | In upper data sources, x-axis all represents time (ms). In torque and angle, x-axis is angle, representing torque changes by angle. |
| | Disable | Applicable to Channel 2 only; disables Channel 2 |
| Direction | Selection of rotation direction displayed | |
| Sampling | Sets the sampling interval of source data. Since a graph can represent up to 200 points per channel, precision increases as sampling interval decreases. However, time slot is reduced. The maximum time sloths by channel according to sampling settings are as follows: - 5ms x 200 = 1 000 ms (1 sec) - 10ms x 200 = 2 000 ms (2 sec) - 15ms x 200 = 3 000 ms (3 sec) - 30ms x 200 = 6 000 ms (6 sec) If operating time exceeds the above level, the latest data only appear.   . | |

## 9.2   I/O

Able to check the status of I/O port.

If system functions are allocated to the I/O port, function names also appear.

## 9.3    Error

The latest 8 errors from the target tool appear.

- Displays up to 8 recent errors.

**Back Home**

**Graph**

**I/O**

**Error**

| No | Code | Description |
|----|------|-------------|
| 1 | E123 | Wi-Fi connect fail with AP |
| 2 | E120 | Disconnect with AP |
| 3 | E123 | Wi-Fi connect fail with AP |
| 4 | E120 | Disconnect with AP |
| 5 | E120 | Disconnect with AP |
| 6 | E123 | Wi-Fi connect fail with AP |
| 7 | E123 | Wi-Fi connect fail with AP |
| 8 | E123 | Wi-Fi connect fail with AP |

# 10. REMOTE

## 10.1  Output

Able to control the level of output port manually.

If system functions are allocated to the output port, function names also appear.

Useful in checking if properly wired after I/O wiring.

## 10.2   Tool

Able to control a target tool remotely.
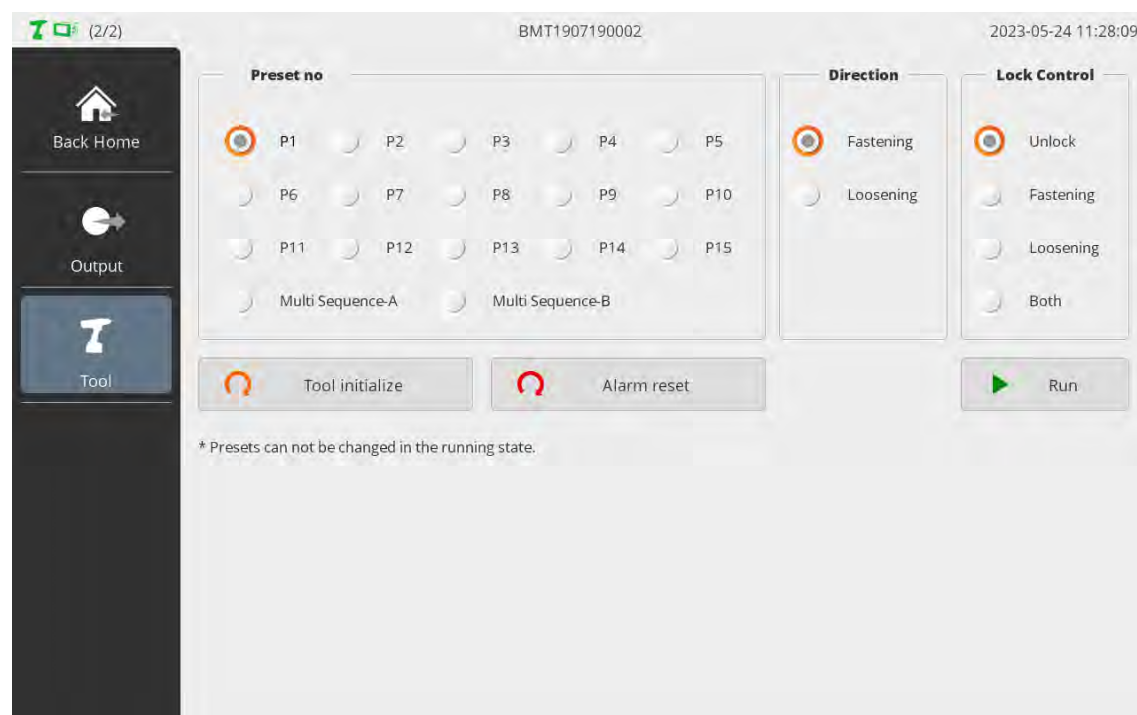


| Category | Description |
|---|---|
| Preset | Sets the preset of the target tool. |
| Direction | Sets a direction for remote control. |
| Lock Control | Able to set the lock by direction if necessary. |
| Tool Initialize | Resets all settings to a default state. |
| Alarm Reset | Able to clear alarm manually. |
| Run/Stop | Run/Stop a target tool according to conditions. |

# 11. PARAMON-PRO X SETTING

## 11.1 Operation

### 11.1.1 Page 1 – General setting
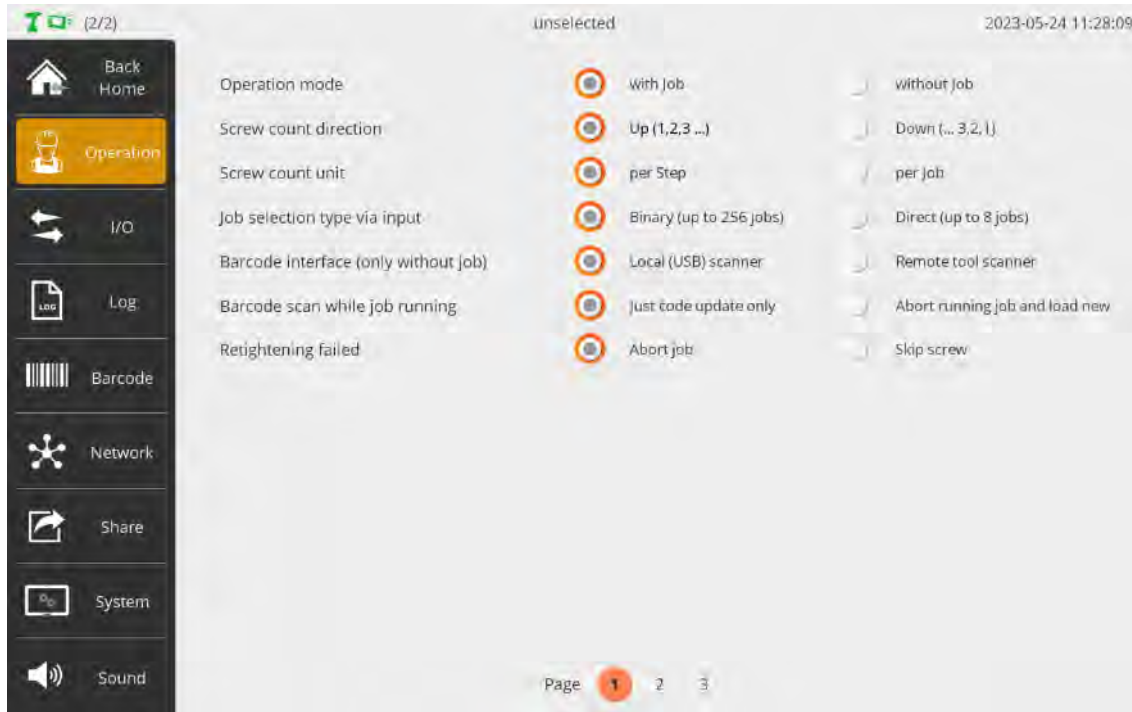


- **Operation mode**

With Job: sequencing an assembly process with logical steps- single station - one screwdriver enabled per fastening step.

Without Job: no sequencing - all screwdrivers enabled - simultaneous fastening operations on several workstations without management.
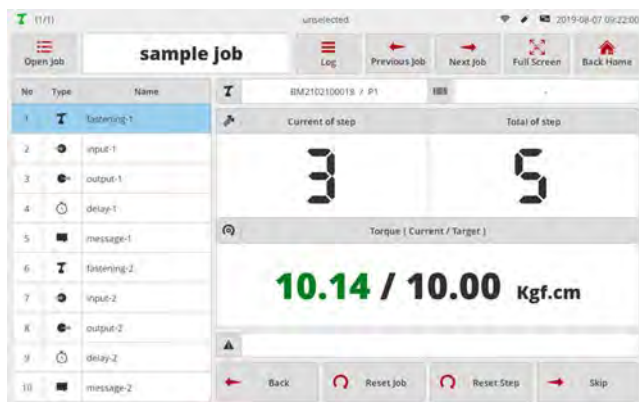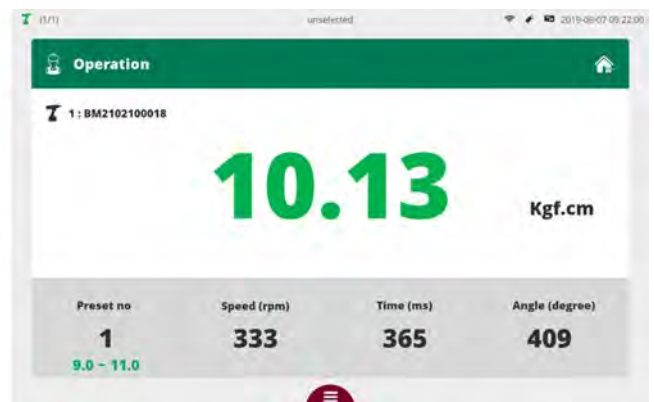


Operation display with Job                    Operation display without Job

Operation modes explained:

| | Operation mode | |
|---|---|---|
| | **With Job**<br>**Sequencing with job manager** | **Without Job**<br>**Simultaneous fastening w/o sequencing** |
| Features | - A job is a combination of sequential steps.<br>- 5 types of steps allow sequences to be setup as fastening / input / output / delay / message<br>- -Message to guide operators with added photos and overlay of fastening points.<br>- Up to 1,000 jobs.<br>- Fastening results are automatically saved in daily files.<br>- Job pause and resume modes.<br>- - Extended number of fastening programs with virtual presets incl. for each fastening step. | - No process control.<br>- Real-time display of fastening results transmitted by screwdriver.<br>- Fastening results are saved automatically in daily files. |
| Tools | - During a fastening step, only one screwdriver is assigned and active.<br>- The screwdrivers are locked outside the fastening steps.<br>- Two (or more) screwdrivers cannot operate simultaneously.<br>- Dedicated to a single workstation | - No restrictions on the use of all screwdrivers.<br>All tools can operate simultaneously.<br>- Suitable for a production line with several workstations and operators. |
| Barcode scanner | - To select a job by scanning a barcode.<br>- Process & fastening results traceability | - To select screwdrivers preset<br>- Fastening results traceability |

- **Screw Count Direction**

Used only in Job mode

| Up (1,2,3 …) | Displays number of tightened screws, increasing from 0. |
|---|---|
| Down (… 3,2,1) | Displays number of remaining screw, decreasing to zero. |

- **Screw count unit**

Used only in Job mode

| per Step | Counts the number of screws in step. |
|---|---|
| per Job | Counts the number of screws in job. |

- **Job Selection Type via Input**

This option determines how to handle job select 1 ~ 8 input signal.

| Binary (up to 256 jobs) | Using the binary scale for Job select 1~8 input signals.<br>Job select 1 is LSB (Least Significant Bit) and<br>Job select 8 is MSB (Most Significant Bit).<br>It ranges from 1 to 255 and support up to 255 jobs. |
|---|---|
| Direct (up to 8 jobs) | Using the direct mapping for Job Select 1-8 input signals.<br>It ranges from 1 to 8 and support up to 8 jobs. |

- **Barcode Interface**

Used only in Without Job mode.

| Pro X<br>USB scanner | Use a scanner directly connected to ParaMon-Pro X through USB<br>The screwdriver built-in scanner is not used. |
|---|---|
| BMT built-in<br>scanner | Use the tool built-in scanner<br>Ignores the USB scanner connected to the controller. |

- **Barcode scan while job running**

This option determines how to process if barcode scan occurs while job is already loaded and running.

| Just code update only | Keep the running job and just update scan code. |
|---|---|
| Abort running job and load new | Stop the running job and load new job. |

- **Retightening failed**

This option determines how to process if retightening failed.

| Abort job | Stop the running job. |
|---|---|
| Skip screw | Skip screw and continue running job. |

## 11.1.2 Page 2 – Global options



- **Operation mode on boot**

Enter Operation screen automatically after boot.
If operation mode option is set "with job", you can configure that specific job is loaded automatically.

- **Automatic data backup**

All tools have an internal memory to save tightening and event data in time order.
Therefore, for ParaMon-Pro X collect real-time data from tool, tool's internal memory must be cleared at first.
This option determines how to process data stored in tool's internal memory.

| Off | Tool's internal memory is cleared when ParaMon-Pro X start to collect real-time data. |
|-----|--------------------------------------------------------------------------------------|
| On  | When ParaMon-Pro X start to collect real-time data from tool, ParaMon-Pro X check how many data stored in tool's internal memory at first. if there is any data, ParaMon-Pro X collect all data and save log automatically. |

- **Enable BST (Bit Socket Tray)**

This option determines whether BST (Bit Socket Tray) is used or not.
If Yes, there are several types of interaction between ParaMon-Pro X and the BST:
    - In Job mode, the BST interacts according to the selected program of each fastening step.
    It can be used by all screwdrivers, as there is only one active screwdriver per fastening step.
    The BST must be set to 'Slave' mode.
    - In Without Job mode, the BST must be assigned to a screwdriver and only one BST can be used on a ParaMon-Pro X. The BST can be set to 'master' or 'slave' mode.



Refer to [ Connect and setup a BST-LCD in USB ]

| ⓘ | **Information** |
|---|---|
| | A BST cannot be used with VP virtual presets in Job mode. |

- **Load log of the day on boot**

If enabled, it will automatically read the day's LOG file at boot time and display the history on the Operation screen.
if disabled, the history on the Operation screen starts with a clean state when reboot.

This setting does not affect the fastening data saved in daily csv log file.

### 11.1.3 Page 3 – Options related to Job mode only
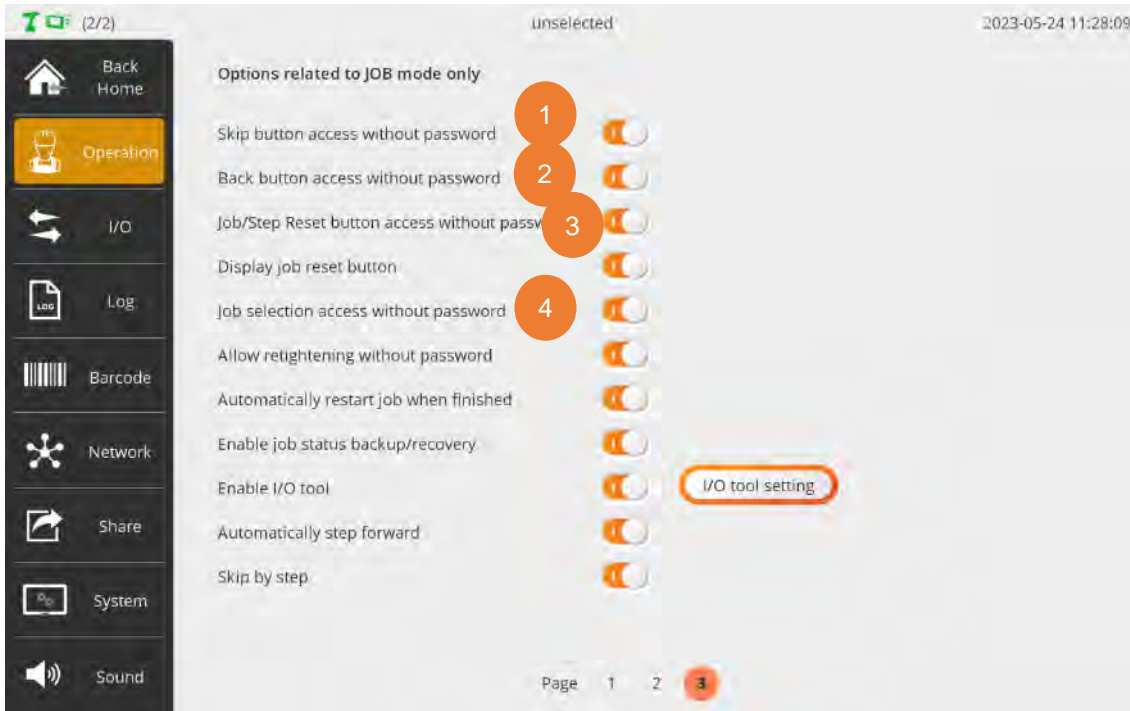


- **Buttons access without password: 1, 2, 3, 4**

This option determines whether a password is required when a 'corrective action' button is selected during job running.

| | |
|---|---|
| **On** | No password required |
| **Off** | Password required |

Concerns below buttons:
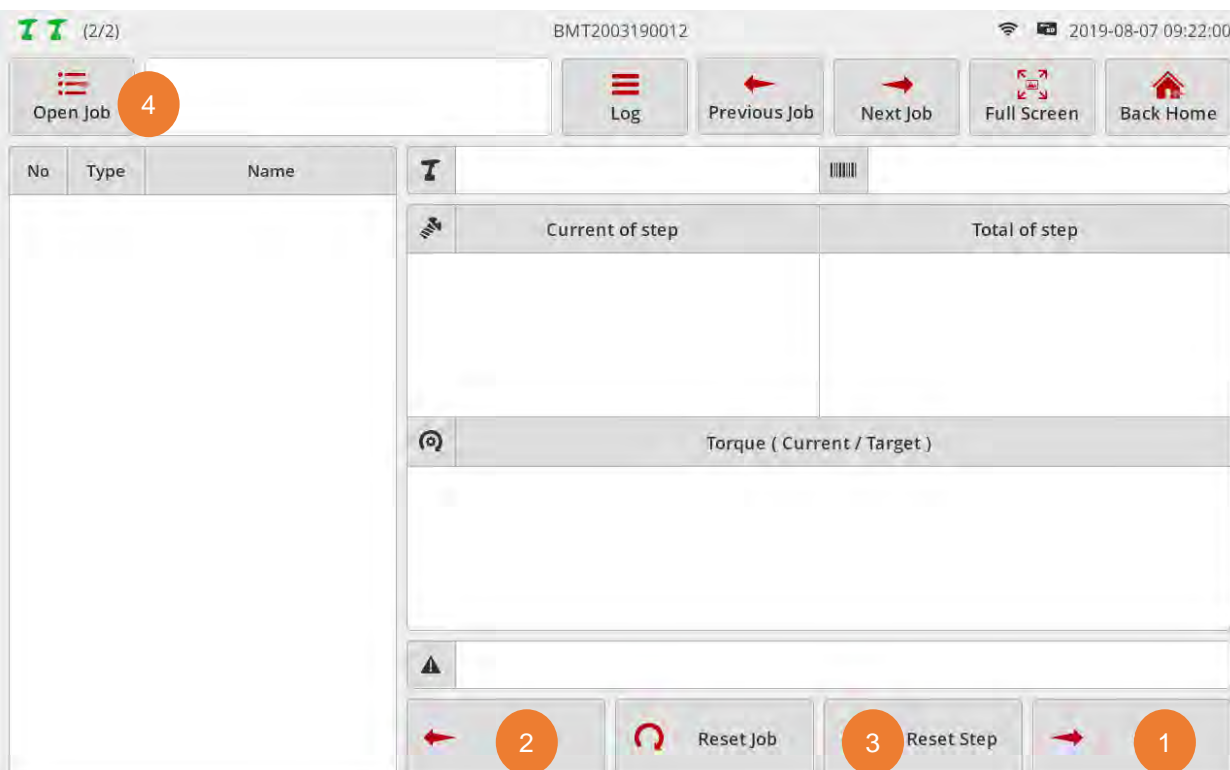
- **Job Selection access without password**

This option determines whether a password is required when select a job.

This is only the case when the user selects job by touching the screen. When select a job via external input (Input, Scanner, etc.), the password is not required regardless of whether the option is enabled or not.

- **Display Job Reset button**

This option determines whether the Reset Job button is displayed on the operation screen.

| On | Displays the RESET JOB button |
|---|---|
| Off | Not display the RESET JOB button |

- **Allow retightening without password**

This option determines whether a password is required when need to re-tighten after NG tightening.

| On | No password required |
|---|---|
| Off | Password required |

- **Automatically Restart Job when Finished**

This option determines whether automatically restart the job when finished or not.

| On | Automatically restart the job when finished. |
|---|---|
| Off | Enter idle state when the job is finished. |

- **Enable job status backup/recovery**

This option determines whether job backup/recovery feature is enabled.

| On | Enable the Job backup/recovery feature. |
|---|---|
| Off | Disable the Job backup/recovery feature. |

If enabled, job processing status is backup automatically whenever job processing status is changed.
You can stop the job and restore it if you need intentionally.

If the job is unintentionally interrupted, such as by a power outage, you can recover the job and run it again from aborted step.
Example of a pop-up displayed when an interrupted job is resumed:



| | **Information** |
|---|---|
| (i) | Only the last status of each interrupted job is saved. |
| | Restart the job at its beginning, initializes the saved progress status. |

- **Enable I/O tool**

This option determines whether I/O tool feature is enabled.

One tool can be connected to Pro X via the I/O ports, and you can program a job using it.

If enabled, the I/O tool setting button is enabled.
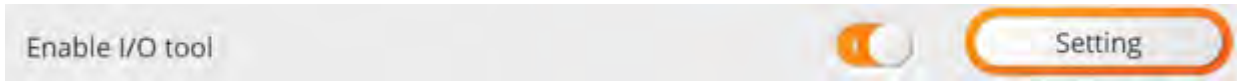


You can specify the name of I/O tool to use when save logs.

The following in/out signals are supported for interaction between Pro X and I/O tool.

| | | |
|---|---|---|
| **In** | Fastening OK | Input selection for fastening OK signal connection |
| | Fastening NG | Input selection for fastening NG signal connection |
| **Out** | Preset 1 | Output connection for preset selection to I/O tool controller |
| | Preset 2 | Using the binary scale for Preset 1~4 output signals. |
| | Preset 3 | Preset 1 is LSB (Least Significant Bit) and Preset 4 is MSB (Most Significant Bit). |
| | Preset 4 | It ranges from 1 to 15 and support up to 15 Presets. |
| | Lock | Output selection for lock signal provided to I/O tool controller |
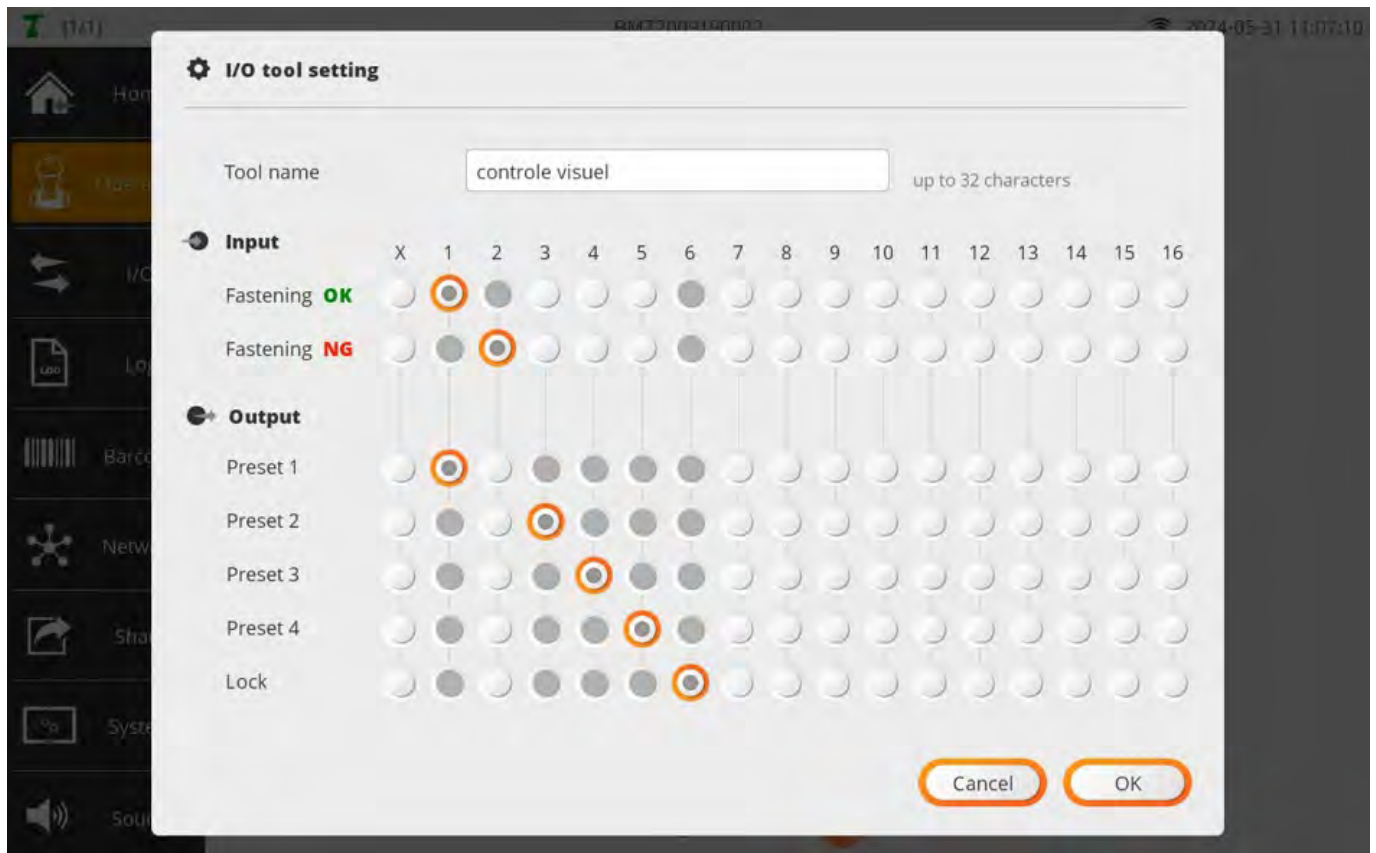
- **Automatically step forward**

This option determines the action of the step after the last screw is tightened.

| | |
|---|---|
| **1 à 60** | Move to next step occurs automatically when the last screw in the stage is tightened after the time delay has elapsed, adjustable from 1 to 60 sec. |
| **0** | After the last screw is tightened, you must press the Next step button to move to next step. So, you can use Back, Reset step after the last screw is tightened since you press Next. |

| | |
|---|---|
| ⓘ | **Information** <br> Please note that you cannot use Back, Reset step after current step is over. |

- **Skip by step**

This option determines the action of the Skip button.

| | |
|---|---|
| **On** | Skip by step |
| **Off** | Skip by screw |

## 11.2 I/O – Job mode only

ParaMon-Pro X provides total 32 I/O ports: Input x 16 and Output x 16.

This section describes how to assign predefined system functions to each in-out ports.

Ports assigned to system functions cannot be used in the Input, Output steps when programming a Job.

Ports assigned to IO Tool features are highlighted in grey and cannot be changed from this menu.



You can clear all assigned functions using the Clear All button.

## 11.2.1 Input functions for Job mode

Input system functions cannot be assigned duplicately.

Therefore, a system function that is already assigned to another port will be displayed in the disabled state.
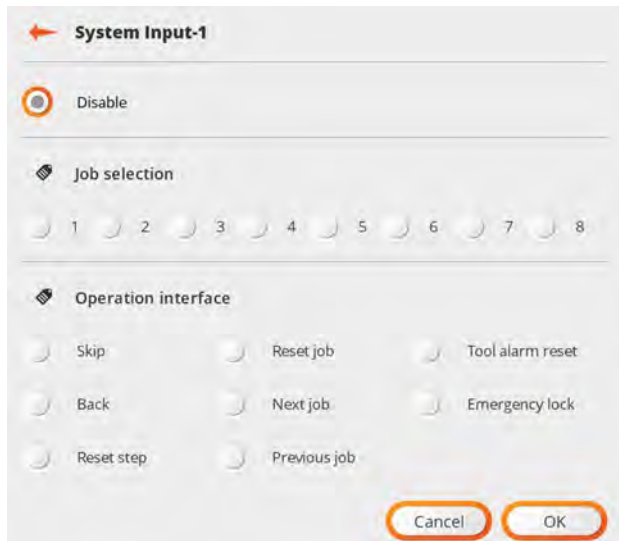


| Job Selection 1-8 | This input signal is used to load a specific Job. There are 8 signals in total, which can be set as Direct or Binary on the Operation tab. You can selectively load up to 8 jobs for Direct and up to 255 jobs for Binary. |
|---|---|
| Skip | Assign the Skip function of Job. |
| Back | Assign the Back function of Job. |
| Reset Step | Assign the Reset step function of Job. |
| Reset Job | Assign the Reset job function of Job. |
| Next Job | Load next Job in the Job table. |
| Previous Job | Load previous Job in the Job table. |
| Alarm Reset | Reset alarm state of Pro X. |
| Emergency lock | Lock all screwdrivers connected to the Pro X. This is a software function. |

### 11.2.1 Output functions for Job mode
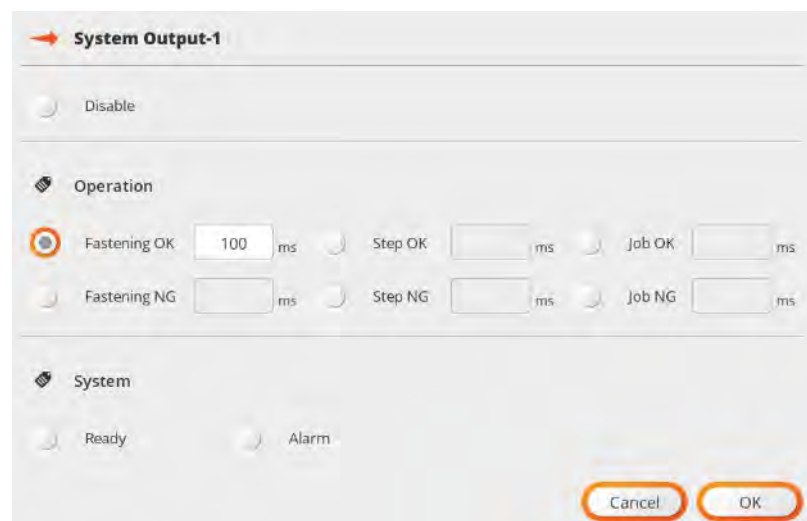


Output system functions can be assigned duplicately.

The output signals in the Operation group can be set to a duration from 100 to 10,000 ms.

| Fastening OK | Assign as Fastening OK output of the job. |
|---|---|
| Fastening NG | Assign as Fastening NG output of the job. |
| Step OK | Assign as Step OK output of the job. |
| Step NG | Assign as Step NG output of the job. |
| Job OK | Assign as Job OK output of the job. |
| Job NG | Assign as Job NG output of the job. |
| Ready | Output when a job is waiting to run on the Operation screen. |
| Alarm | Output when ParaMon-Pro X is in Alarm state. |

## 11.3 Log

Records tightening results for screwdrivers connected in Job or without Job mode in daily csv files that can be viewed and downloaded.
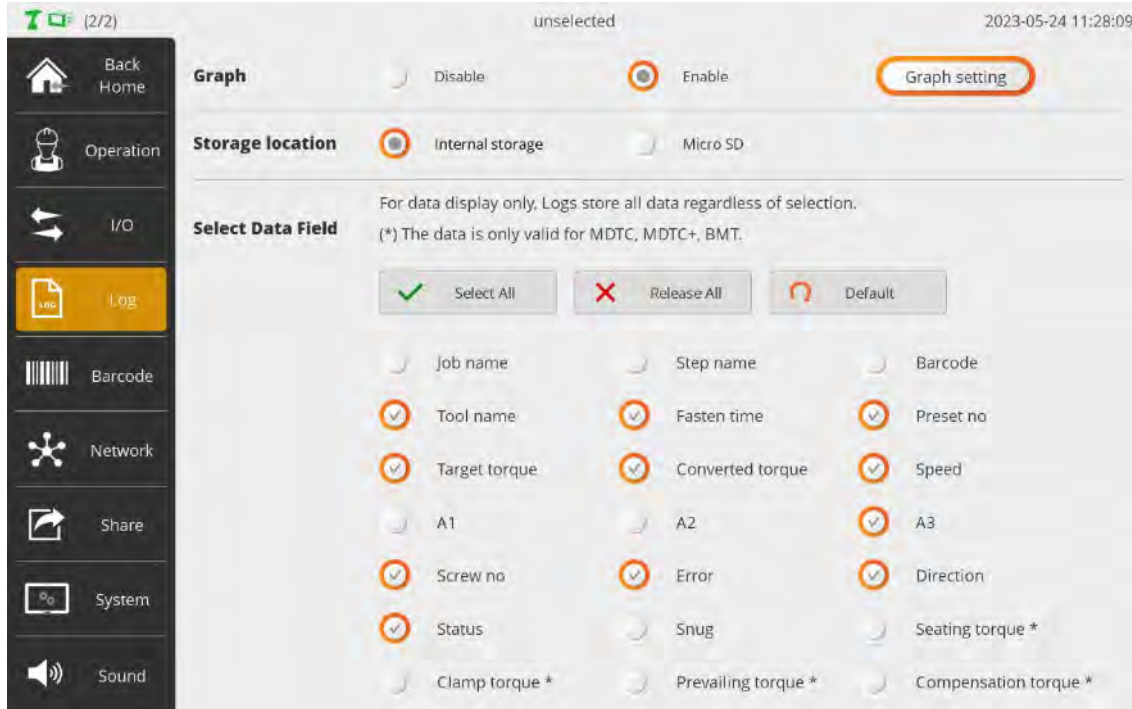


- **Graph**

This option determines whether collect the graph data or not.
If enabled, Graph setting button is enabled.
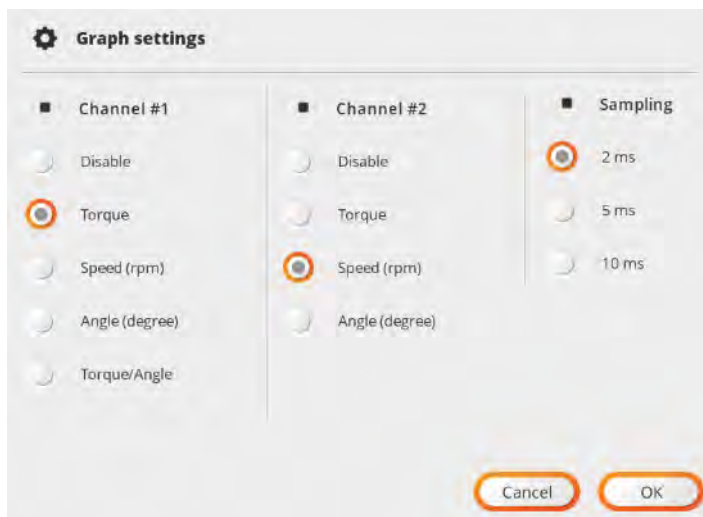


The graphs are only accessible on the ParaMon-Pro X and are stored in a database apart from the log files.

- **Storage location**

Sets a log file storage position.

.

- **Select data Fields**

Able to select data which appear on the screen
Saves all data in the log file regardless of settings
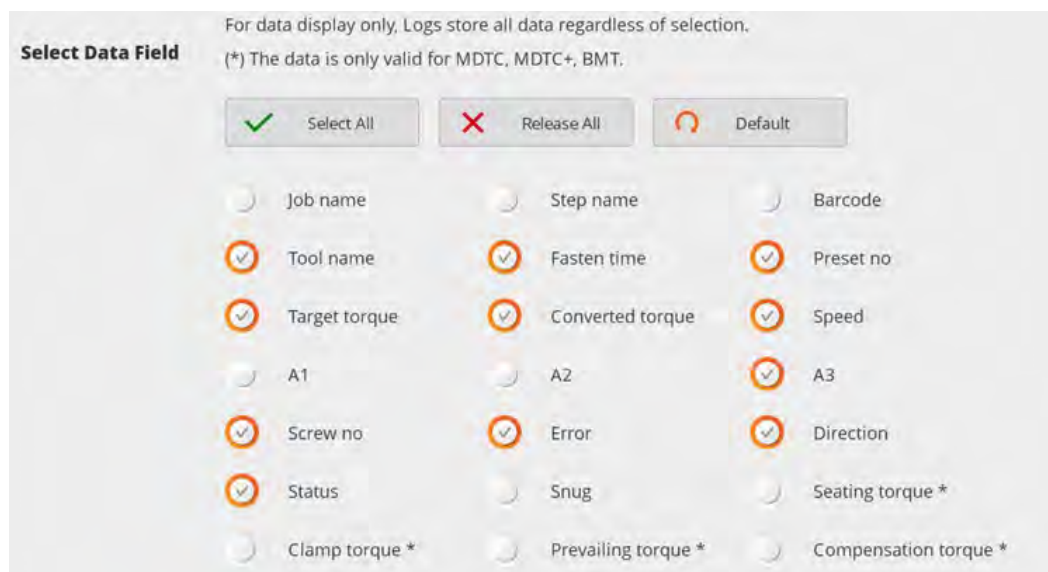


See examples below:

| No | Time | Barcode | Tool name | Fasten Time | Preset No | T/Torque | C/Torque | Speed | A1 | A2 | A3 | Screw No | Error | Direction | Status | Snug |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 2021-10-28 16:39:21 | 8806012810314 | BM2102100018 | 627 | 1 | 10.00 | 10.34 | 333 | 909 | 86 | 995 | 3 | 0 | F | OK | 0 |
| 2 | 2021-10-28 16:39:18 | 8806012810314 | BM2102100018 | 110 | 1 | 10.00 | 10.15 | 333 | 7 | 52 | 59 | 4 | 330 | F | NG | 0 |
| 1 | 2021-10-28 16:39:15 | 8806012810314 | BM2102100018 | 133 | 1 | 10.00 | 0.00 | 333 | 165 | 0 | 165 | 4 | 0 | F | Other | 0 |

| No | Time | Tool name | Fasten Time | Preset No | C/Torque | Speed | A3 | Error | Status |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 2021-10-28 16:39:21 | BM2102100018 | 627 | 1 | 10.34 | 333 | 995 | 0 | OK |
| 2 | 2021-10-28 16:39:18 | BM2102100018 | 110 | 1 | 10.15 | 333 | 59 | 330 | NG |
| 1 | 2021-10-28 16:39:15 | BM2102100018 | 133 | 1 | 0.00 | 333 | 165 | 0 | Other |

## 11.4    Barcode – without job mode & BM tools with integrated scanner

Register barcodes for automatic preset selection for each connected screwdriver.

Enabled under 'Without Job' mode only.

Available in the scanner-integrated BM only.
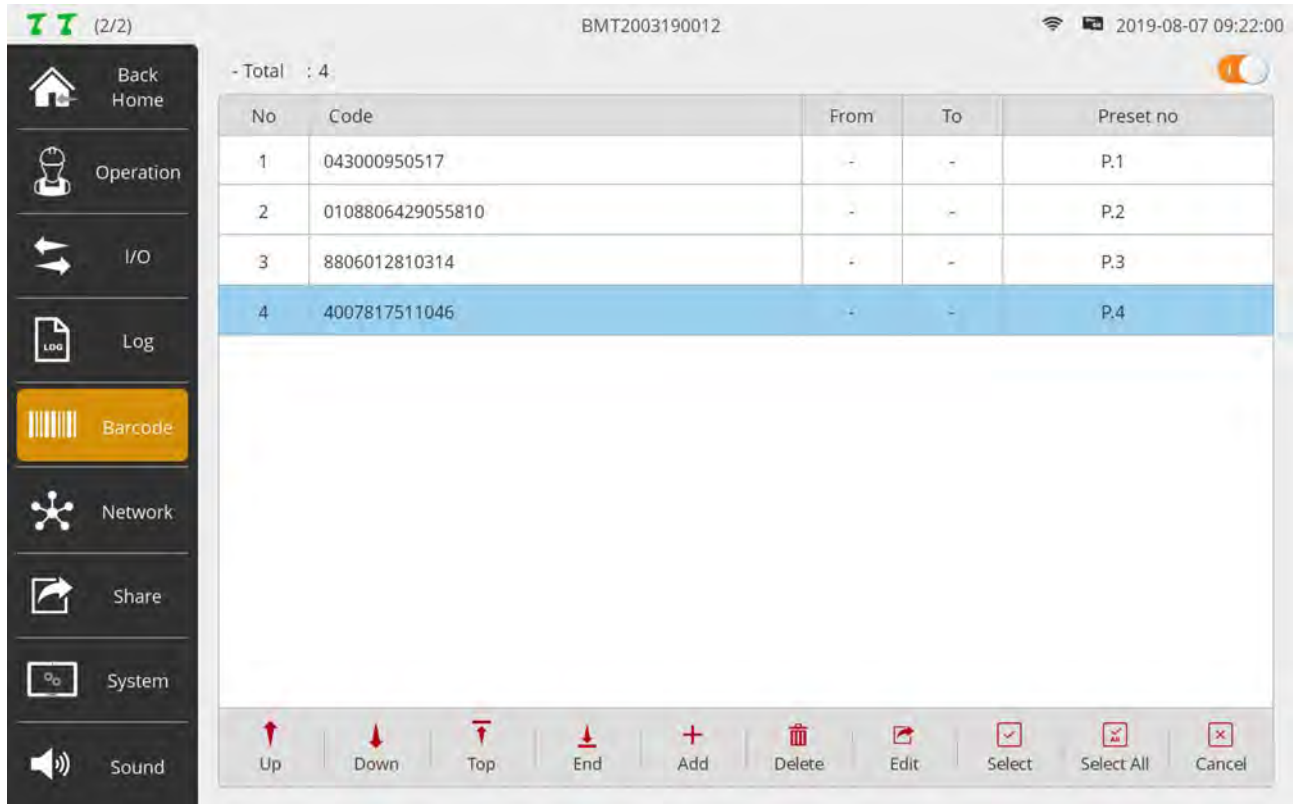


The function is classified into two types according to the location where the scanned code is searched.

| Where to search the code  → | BM(T) Internal memory | Paramon-Pro X |
|---|---|---|
| Max length of code | 32 chars | 32 chars |
| Num of codes can be registered | Up to 30 | unlimited |
| Dependency | No need Pro X | Pro X is required |
| Menu | Parameter  →  Controller | Setting  →  Barcode |

If both above functions are enabled, code search is performed in the following order:

- first in BM(T) internal memory,

- then in Pro X settings.

Therefore, up to 2 preset value changes can occur.


This section describes how to save code in the Pro X.

Refer to BM(T) manuals for how to save code in BM(T) internal memory.

- **Code input**

Select target tools for registration.

A scanner is enabled if the trigger is executed twice in a row.

If a code is scanned, the registration page along with the scanned code pops up.

If necessary, press [Add] and enter the code with virtual keyboard.
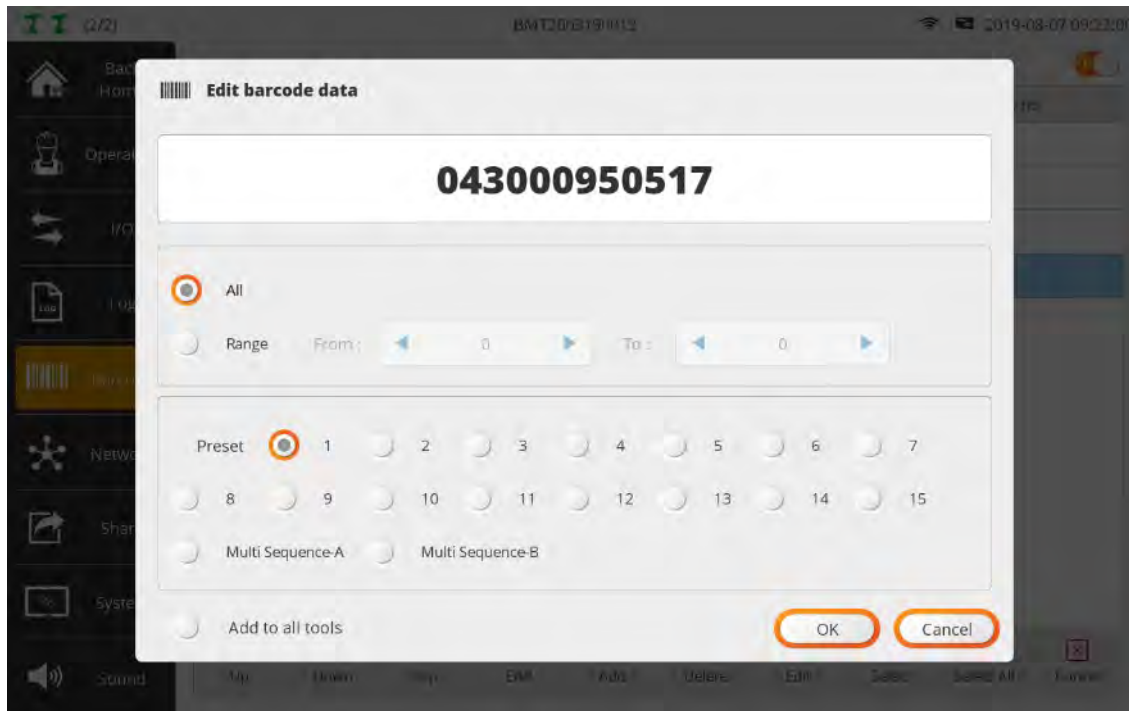


- **Selection mask: use part of the barcode**

If 'All' is chosen, the code should be perfectly matched for Preset selection.

If 'Range' is selected, the selection mask appears in red on the code.

Therefore, in the RANGE setting, even though the registered code and scanned code are not matched in terms of total length, it selects the Preset if the digit of the selection mask is matched with the code.

- **Preset settings**

Selects target preset in which the valid regions of registered and scanned codes are matched.

- **Add to All Tools (Optional)**

Check the ADD TO ALL TOOLS checkbox and register a code to all tools in ParaMon-Pro X.

## 11.5    Network

ParaMon-Pro X network connection setup menu.
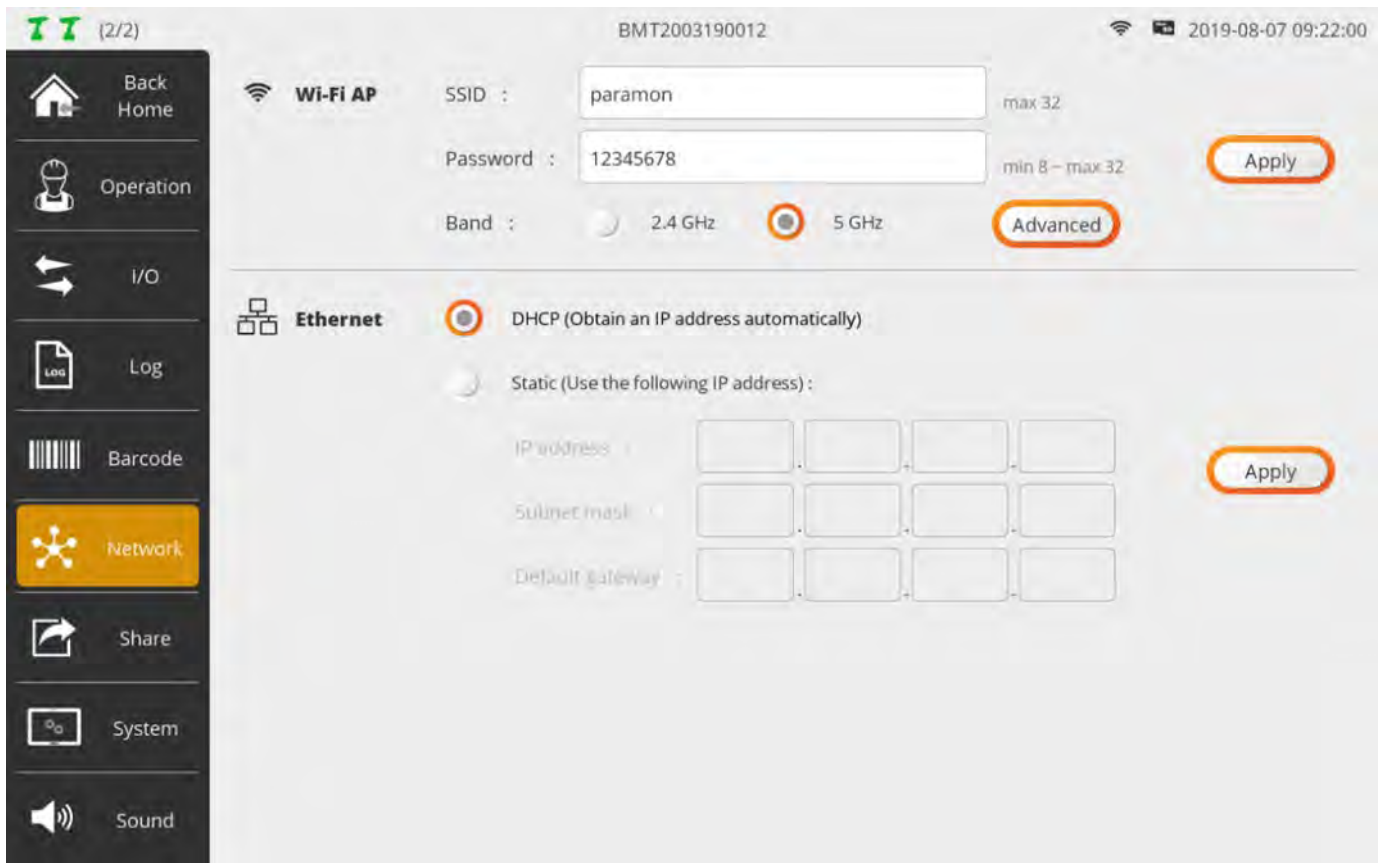


**- Wi-Fi Access Point setting using supplied USB dongle**

Setting to run Wi-Fi AP in ParaMon-Pro X

After editing the settings, press [Apply].

The IP address of the Access Point cannot be modified: default 192.168.131.1

| | |
|---|---|
| **SSID** | Enters the AP's SSID Up to 32 letters – default SSID is paramon<br>Differentiate network names if several Pro X are installed in the same location |
| **Password** | Enters the password of AP. At least 8 characters long; able to enter up to 32 characters<br>Default password is 12345678. |
| **Band** | Selects the operating frequency of AP: 2,4Ghz or 5Ghz |
| **Advanced** | Country setting activates authorized frequencies according to world region.<br>Able to set manually the AP frequency channels |

Country:

Must be set to Europe. To be checked on both ParaMon-Pro X and each screwdriver.

Channel select:

Selectable automatic or manual for each band
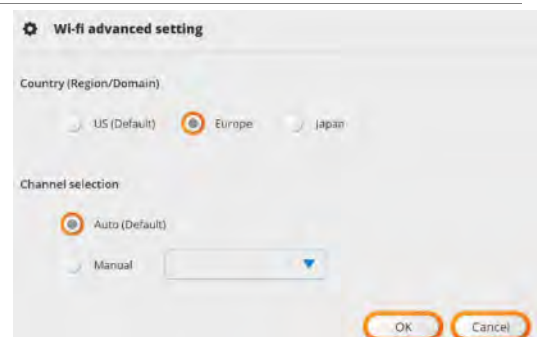
- **Ethernet port**

Access to ParaMon-Pro X Ethernet port settings.

After editing settings, press [Apply].

| | |
|---|---|
| **DHCP** | Automatically obtains an IP address from the DHCP server. |
| | Works only if there is a DHCP server on the LAN. |
| **Static** | Manually sets IP address |
| | Reckless address settings cause network failure including abnormal operation. |
| | Ensure to contact the network manager before setting. |

**Information on active networks is available on the System/Network page.**
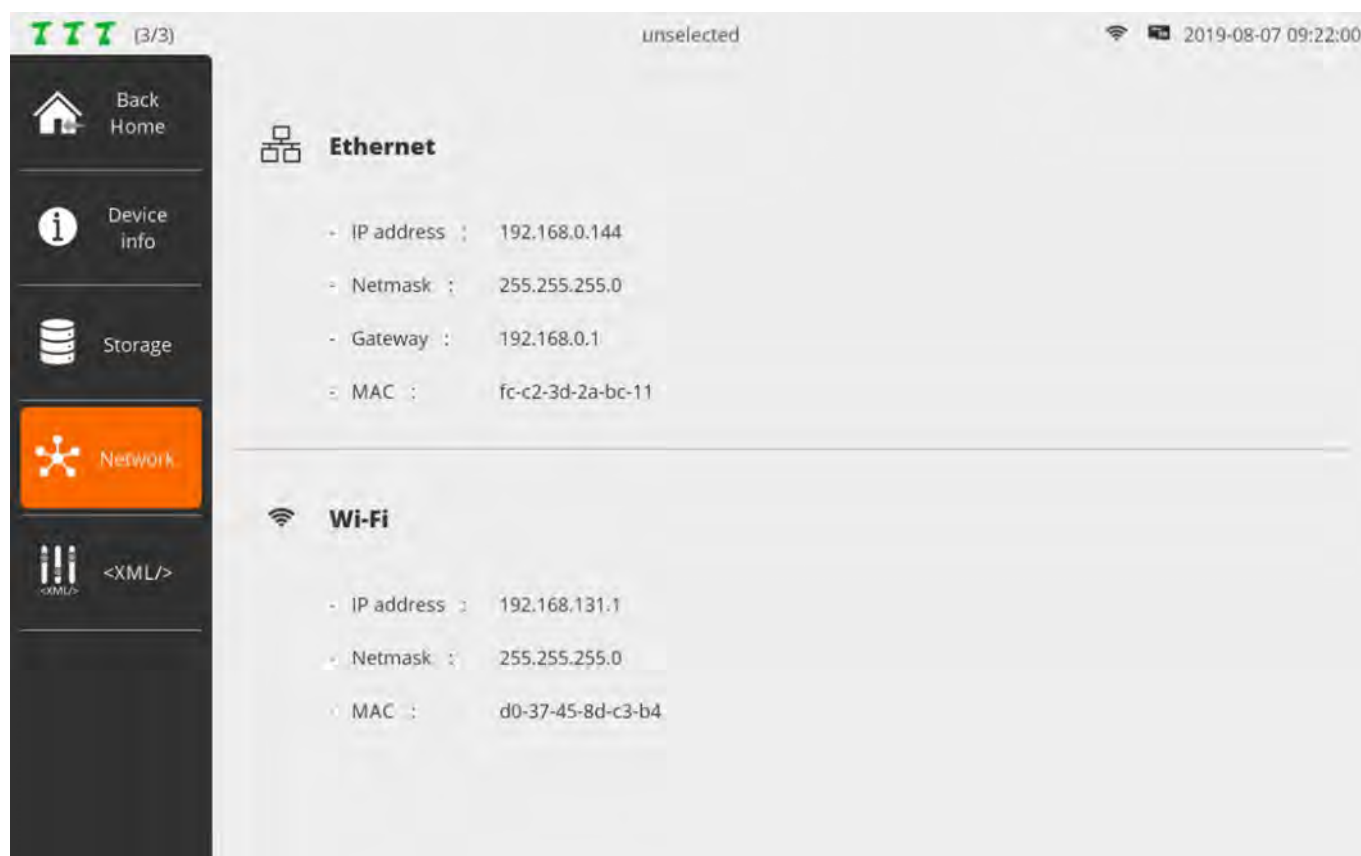
## 11.6    Share
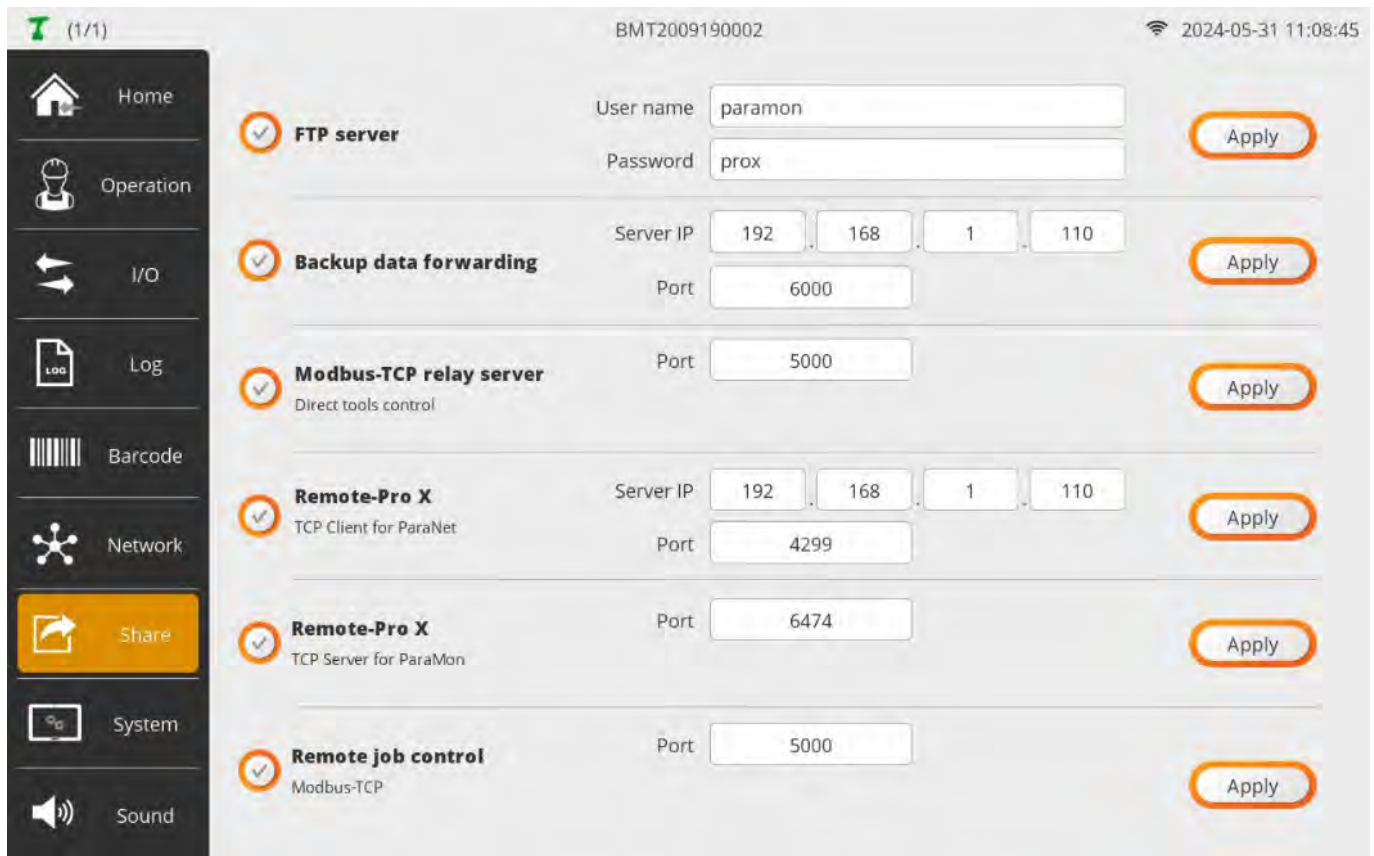


- **FTP Server**

The FTP server provides access via the Ethernet net-
work to shared directories in the ParaMon-Pro X's
internal memory.
See shared folders on the right.

After editing settings, press [Apply].
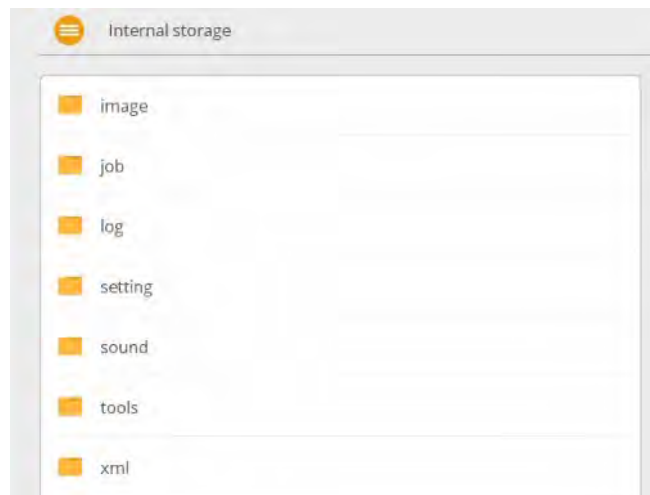


| Enable/Disable | Sets if the FTP server is enabled or disabled |
|---|---|
| Username | Sets the username to be used in logging into the FTP server |
| Password | Sets the password to be used in logging into the FTP server |

Able to check the IP address needed to get access to the FTP server in 'System → Network'
For a method to log into the FTP server, refer to [ FTP SERVER ]

- **Backup data forwarding**

The backup data received from the member tool is forwarded to an external server connected via ethernet.

Changed settings are reflected only when you click the [Apply] button.

| Enable | Tick the orange box on the left |
|---|---|
| Server IP address | IP address of external server to receive backup data. |
| Port | TCP port of external server to receive backup data. |

For details, refer to [ Backup data forwarding ] for the forward data format.

- **Modbus TCP relay server – direct tools control**

The relay server is a server application that acts as a gateway between customer requests and the servers (screwdrivers) providing the service.
Activating the Modbus TCP relay server enables direct access to tools connected to Pro X using the Modbus-TCP protocol from external equipment such as industrial PLCs.

Changed settings are reflected only when you click the [Apply] button.

| Enable | Tick the orange box on the left |
|---|---|
| Port | TCP port of proxy server. |

For details, refer to [ Modbus TCP relay server ]

- **Remote-Pro X – TCP client for ParaNet**

To be enabled for communication with ParaNet software

Changed settings are reflected only when you click the [Apply] button.

| Enable | Tick the orange box on the left |
|---|---|
| Server IP address | Set the IP address of the server on which ParaNet is installed. |
| Port | Set the TCP port for communication with ParaNet - default port is 4299. |

- **Remote-Pro X – TCP server for ParaMon III**

To be enabled for communication with ParaMon III software.

Changed settings are reflected only when you click the [Apply] button.

| Enable | Tick the orange box on the left. |
|--------|----------------------------------|
| Port   | Set the TCP port for communication with ParaMon III- default port is 6474. |

- **Remote Job control – Modbus TCP**

To be enabled for Jobs remote control via Modbus.

Changed settings are reflected only when you click the [Apply] button.

| Enable | Tick the orange box on the left. |
|--------|----------------------------------|
| Port   | Set TCP port for communication with remote client<br>Port must be different from the Modbus relay server port. |

For details refer to [ Job remote control ]

## 11.7   System
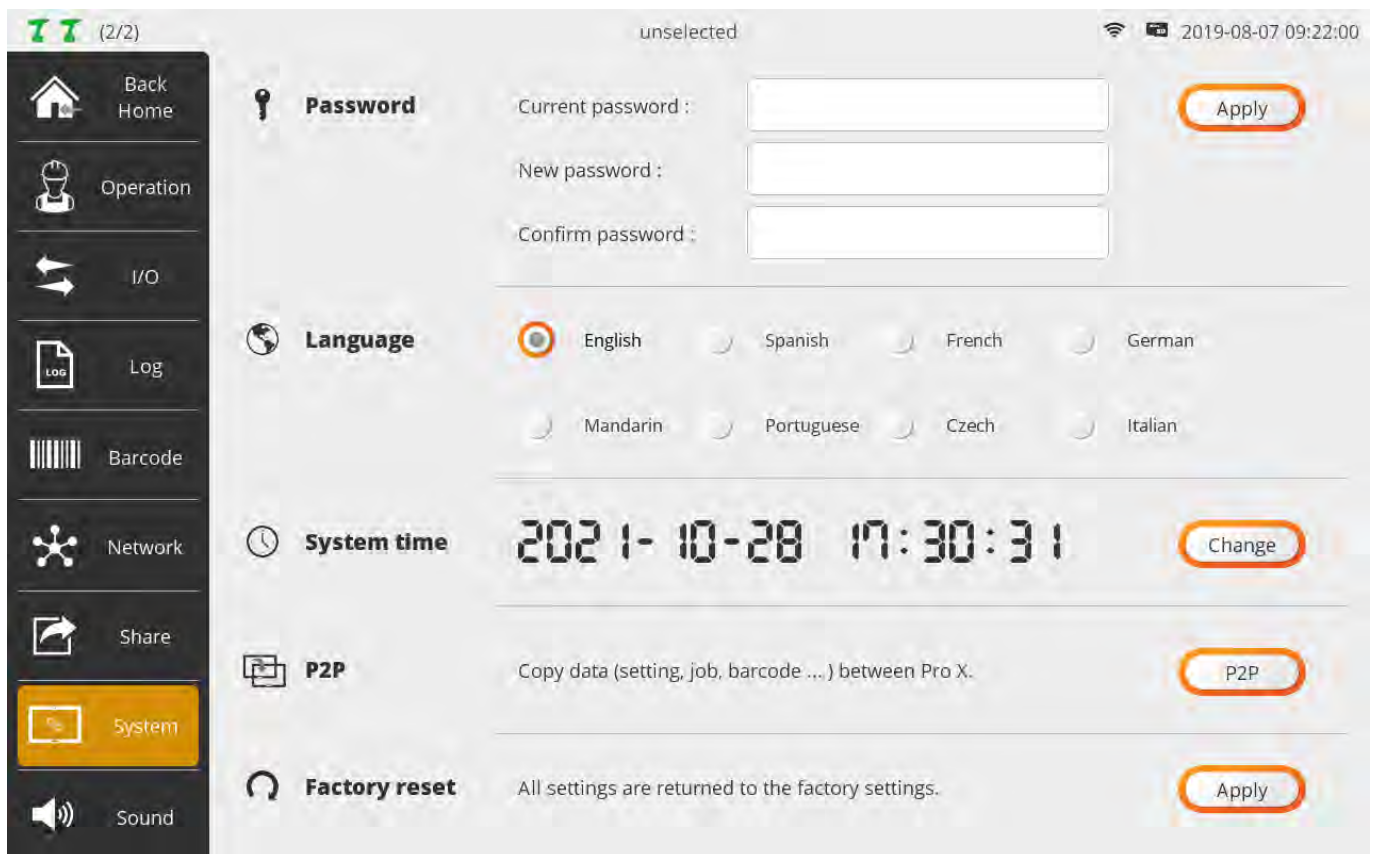


- **Password**

Sets a password for ADMIN mode; the default setting is '0'.

This unique password is used to access the Setup menus.

and to lock access to certain buttons in the Operation menu.


- **Language**

Select menu languages currently supports English, Spanish, French, German; Czech and Italian.


- **System time**

Sets system time; able to set 'min'; 'sec' is set to '0'.


- **P2P (Pro X to Pro X)**

Able to create a backup file of ParaMon-Pro X parameters, a file with .p2p extension containing Pro X settings, jobs and job selection barcodes.

This backup does not include Log files, screwdriver settings or the list of connected screwdrivers.


Back up can be applied to another ParaMon-Pro X.

Able to return to the former settings, if necessary, after backing up all current settings.

For more information, refer to [ BACKUP & RESTORE ].


- **Factory reset**

Reset to a default state after all files in the repository are deleted including data log files.

.

## 11.8   Sound

**Play this sound when ...**

| | | | |
|---|---|---|---|
| **OK** | ok.wav | ... | ▶ |
| **NG** | ng.wav | ... | ▶ |
| **Etc** | ok.wav | ... | ▶ |
| **Tap** | tap.wav | ... | ▶ |

Sidebar menu:
- Back Home
- Operation
- I/O
- Log
- Barcode
- Network
- Share
- System
- Sound
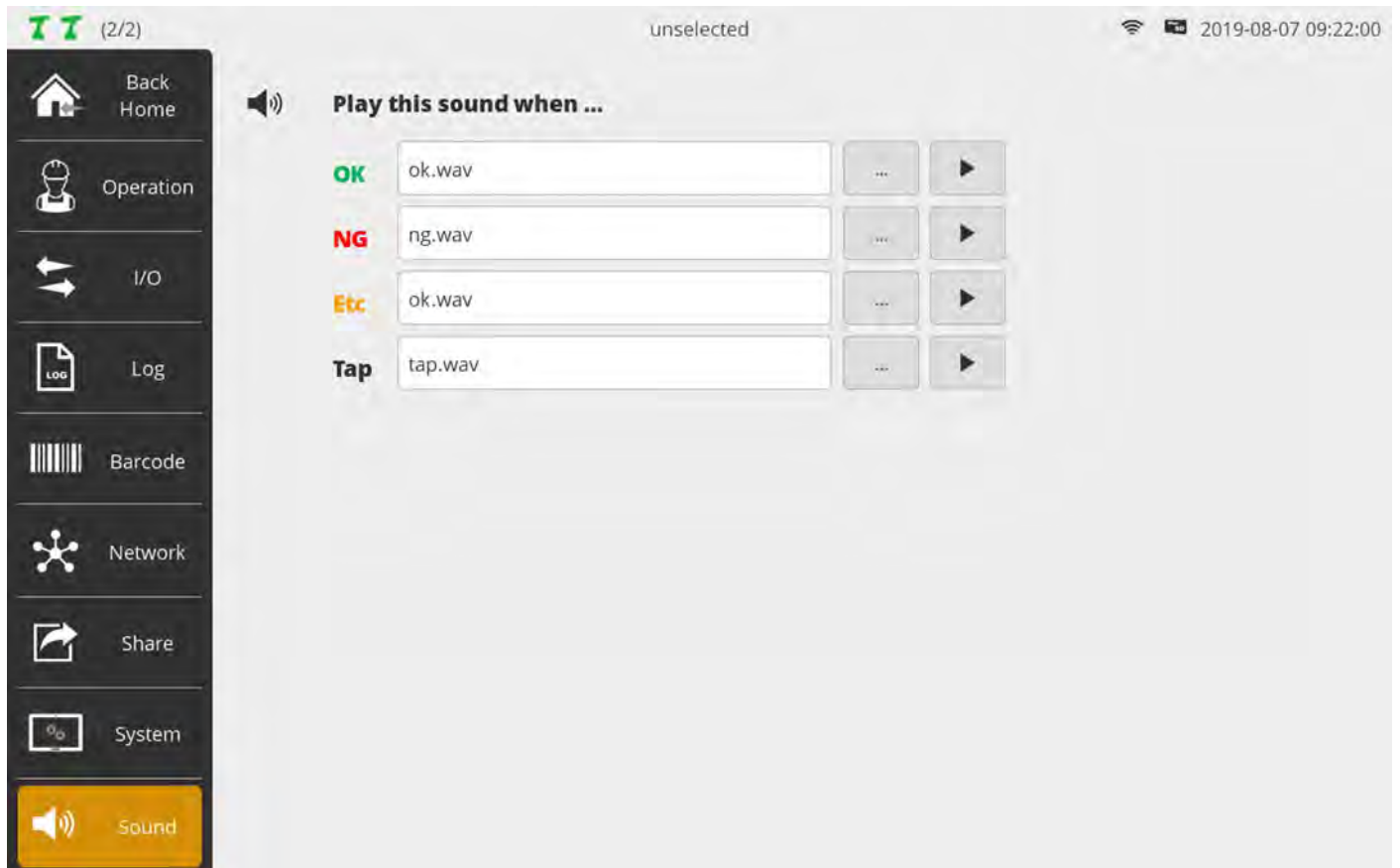
You can set sound effects according to the event type and supports .wav files.

| **OK** | Fastening OK |
|---|---|
| **NG** | Fastening NG, Error |
| **Etc.** | Fastening↔Loosening change, Barcode scanning, Preset change, and so on |
| **Tap** | Screen touch |

# 12. SYSTEM

## 12.1 Device Info



- **Able to check brief information of ParaMon-Pro X**

Such as serial number, software version, CPU model, RAM memory and storage capacity.

- **Upgrade:**

Access is password protected.

A window opens, inviting you to select the update file with the .mp1 extension.
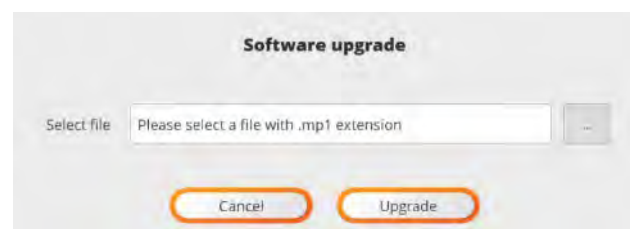


The update file can be copied from a USB key

Click on the file to highlight it.
(do not use the select button)

Then press [Ok].

After update, all settings, jobs and log files are retained.
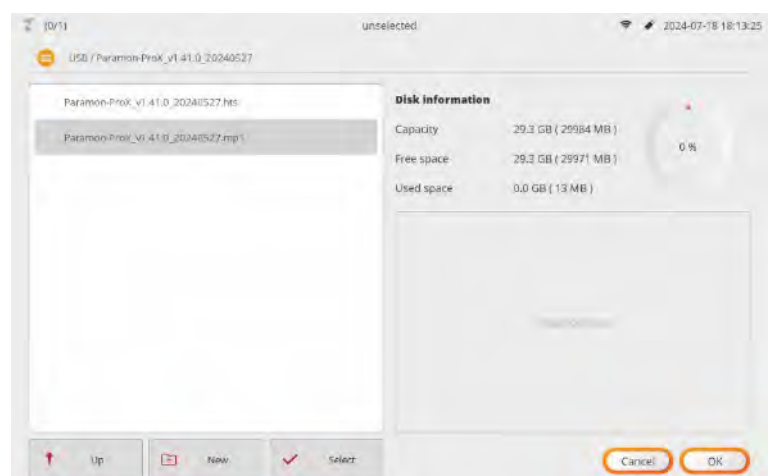
## 12.2 Storage



| Internal Storage | Able to check the space used and free space |
|---|---|
| Micro SD | Able to examine if MicroSD card is inserted and check the space used and free space |

## 12.3   Network
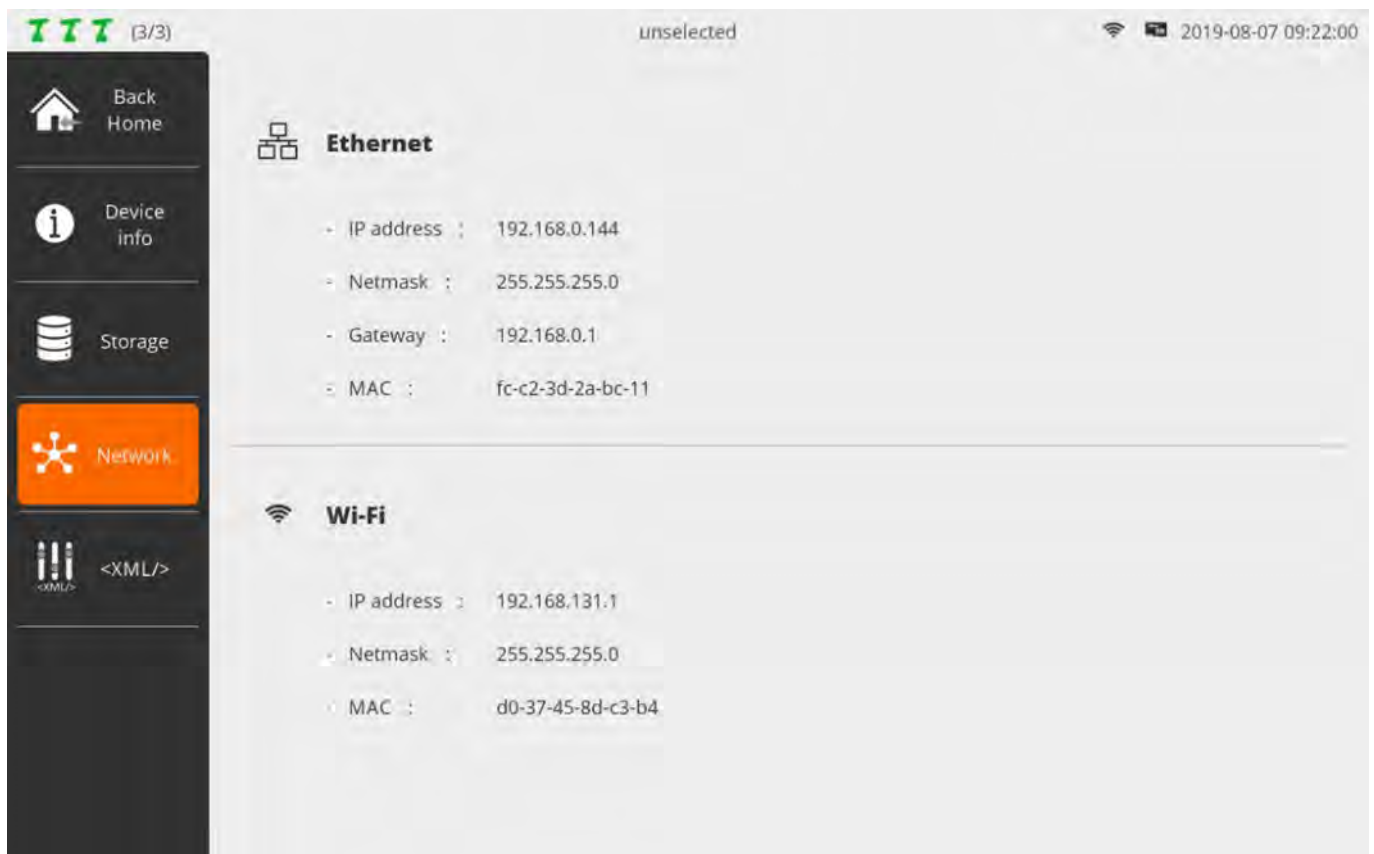


| | |
|---|---|
| **Ethernet** | Display current IP address of Pro X ethernet port.<br>If IP address is 0.0.0.0 means no ethernet connection is open. |
| **Wi-Fi** | Displays Wi-Fi Access Point network information of USB Wi-Fi dongle. |

> ⓘ **Information**
> If network information is not displayed, check that the USB Wi-Fi adapter and/or Ethernet cable are correctly connected.

## 12.4 XML

XML files are configuration modules for communication between ParaMon-Pro X and each tool series.

This means that firmware updates will not affect the ParaMon-Pro X software but will only require the XML files to be updated to match with tool or controller firmware.

Please refer to document 60205 for firmware <> XML correlation.



To update the XML files, copy them with a USB memory on internal memory.
Then load them by the [Update] button.

The XML files selected for connected screwdrivers are those displayed in the XML menu table.

> **Information**
> All screwdrivers of the same model connected to a Pro X must be running the same firmware version.
> Compatible with the selected XML.

# 13. JOB MANAGER



| N° | Button | Description |
|---|---|---|
| 1 | Down | Moves the selected job to the bottom by one column |
| 2 | Up | Moves the selected job to the top by one column |
| 3 | New | Creates a new job |
| 4 | Delete | Deletes the selected job |
| 5 | Copy | Copes the selected job and adds it as a new job |
| 6 | Edit | Edits the selected job |
| 7 | Rename | Renames the selected job |
| 8 | Barcode | Moves to the barcode registration page for job interlocking |
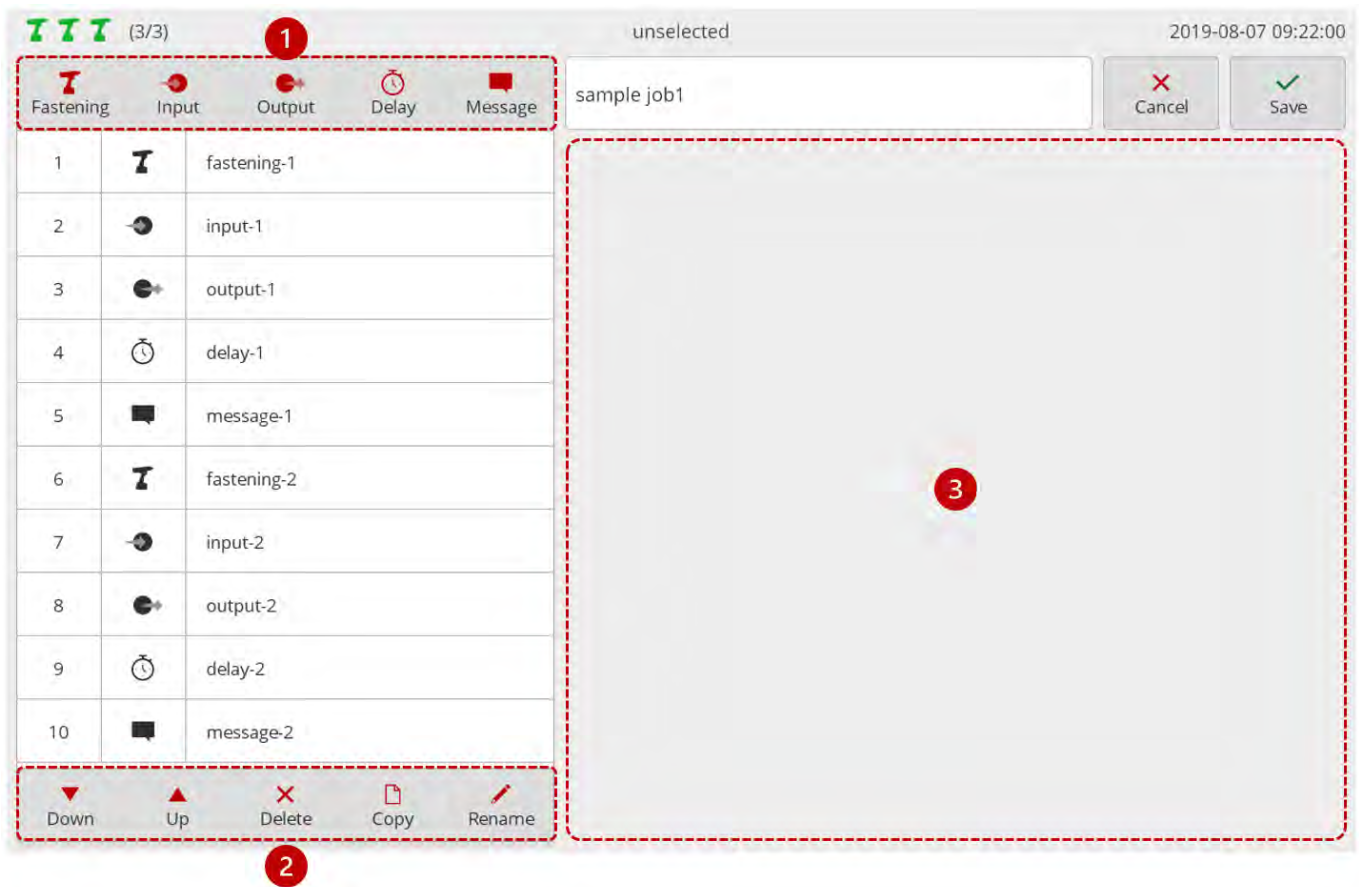
A Job is a sequence of tasks constituting the assembly process control.

It is expressed by multiple sequential steps.

.

ParaMon-Pro X supports up to 1,000 jobs and able to add up to 255 steps per job.

**1.   Add Step**

| Steps  functions | Description |
|---|---|
| Fastening | Adds a fastening sequence, using a member tool or an IO tool. |
| Input | Transition step after a defined process input state. |
| Output | Activation or deactivation of process outputs. |
| Delay | Transition step with several choices: delay time, text message validation or barcode reading. |
| Message | Instruction display (photo or text) to be followed by a delay step defining the display duration. |

**2.** **Edit Step List**

| Button | Description |
|---|---|
| Down | Moves the selected step to the bottom by one column |
| Up | Moves the selected step to the top by one column |
| Delete | Deletes the selected step |
| Copy | Copies the selected step and adds it as a new step |
| Rename | Renames the selected step |

**3.** **Edit Step Data**

Displays the setting page according to the type of the selected step on the step list

### 13.1.1  Fastening Step
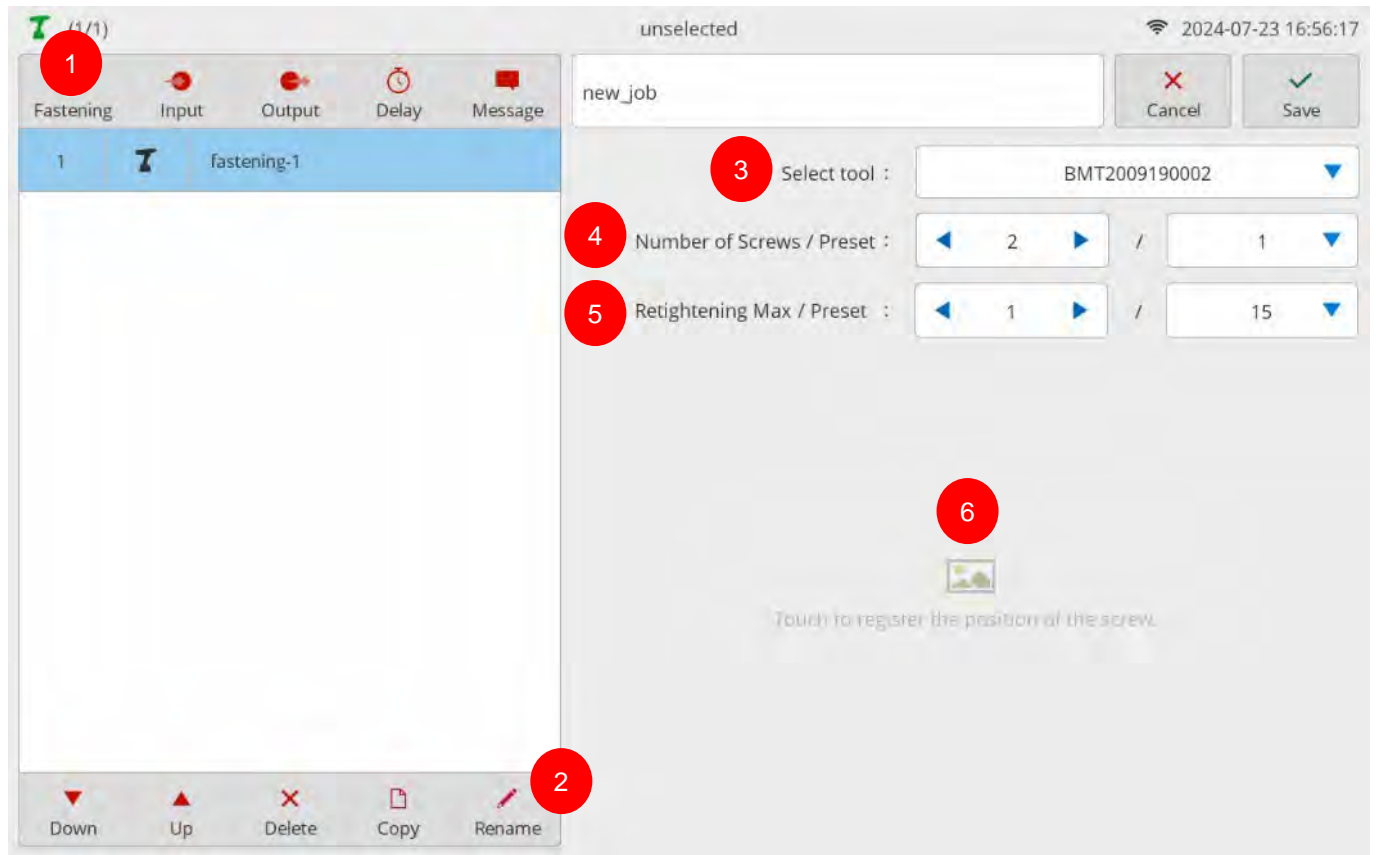


Only 1 screwdriver is enabled in a fastening step. All other connected screwdrivers are locked
A fastening step can count up to 99 screws.

Only OK tightenings are counted.

1.  **Press [Fastening]. Then, a fastening step is added to the bottom of the Step List. Then, a setup page appears on the right.**
2.  **If necessary, press [Rename] and edit the step name.**
3.  **Select a tool for fastening among the member tools.**
4.  **Enter the number of screws to be fastened.**
5.  **Select the Preset to be used for fastening.**
6.  **If necessary, register an image and specify the position of the screw.**
    **If the area is touched, a screw-positioning page pops up as follows:**

To count NG tightening, rework must be selected, with a max number of retightening and a specific retightening preset if necessary.
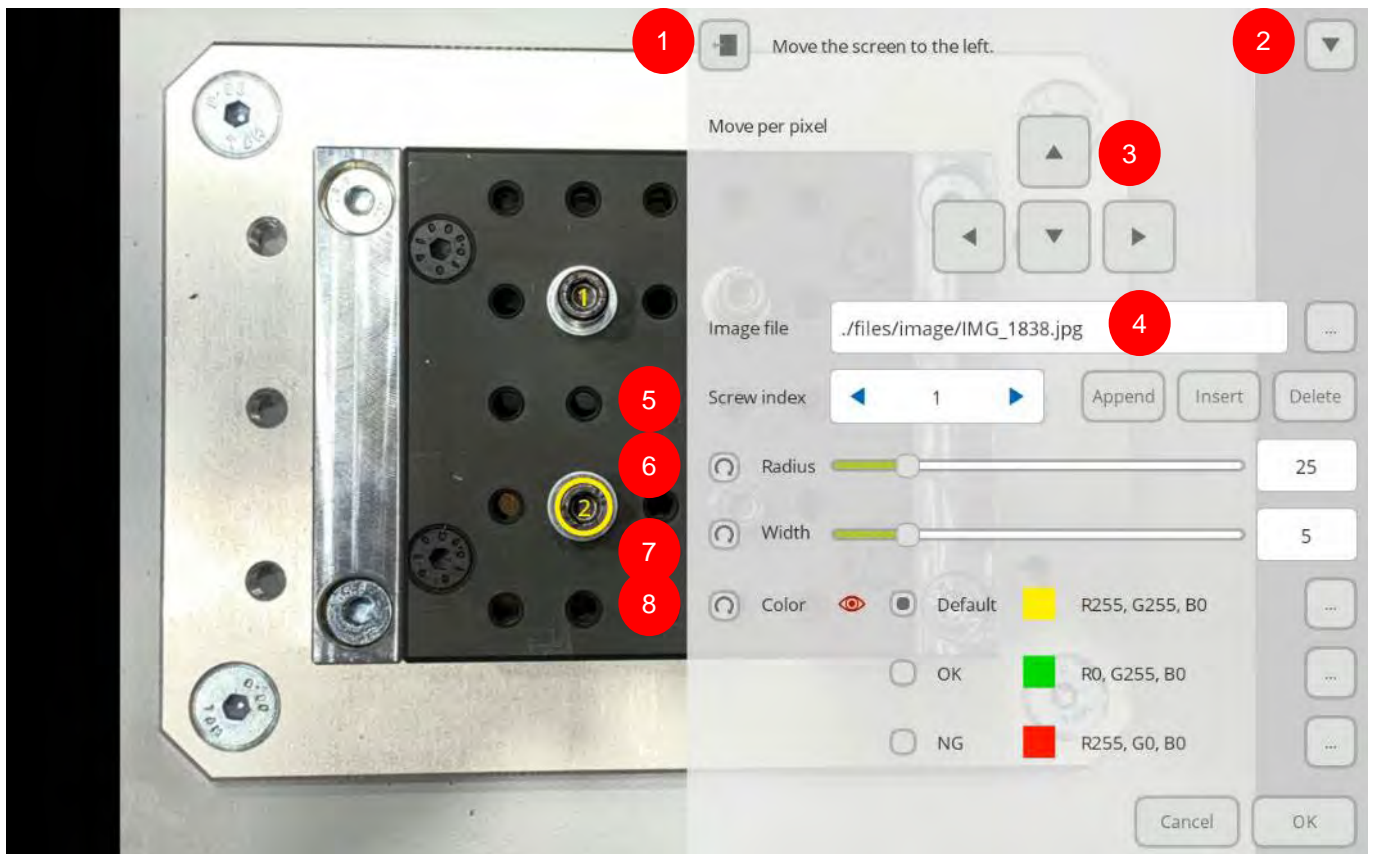
| No. | Description |
|---|---|
| 1 | If necessary, moves the screen to the left or right |
| 2 | Hides the screen to the bottom and views the entire image |
| 3 | Able to adjust a pixel unit at registration of screw position |
| 4 | Loads an image to be used in screw positioning |
| 5 | Sets the index number of the screws to be positioned<br>+Append: Adds a new screw to the end<br>+Insert: Adds a new screw to the current index position<br>-Delete: Deletes a screw in a current index position |
| 6 | Able to adjust the size of a circle which shows a screw position |
| 7 | Able to adjust the thickness of a circle which reveals a screw position |
| 8 | Able to change the color of a circle which shows a screw position<br>Default: Sets the color which is displayed in a hold state<br>OK: Sets the color which appears when normally fastened<br>NG: Sets the color which appears when abnormally fastened |

**Preset selection in Job step**

Fastening:

Rework:



In the program section, you can select one of the 15 presets or one of the 2 multi-sequences for the selected screw-driver

If 15 presets are not enough, each fastening step can manage specific parameters with Virtual Preset selection.

Virtual Preset parameters will be downloaded temporary in the screwdriver memory.

Virtual Preset can be setup with different parameters between fastening and retightening.



**Virtual Preset**

A Virtual Preset (VP named on the screwdriver or controller) includes all parameters of a fastening preset plus the advanced functions.
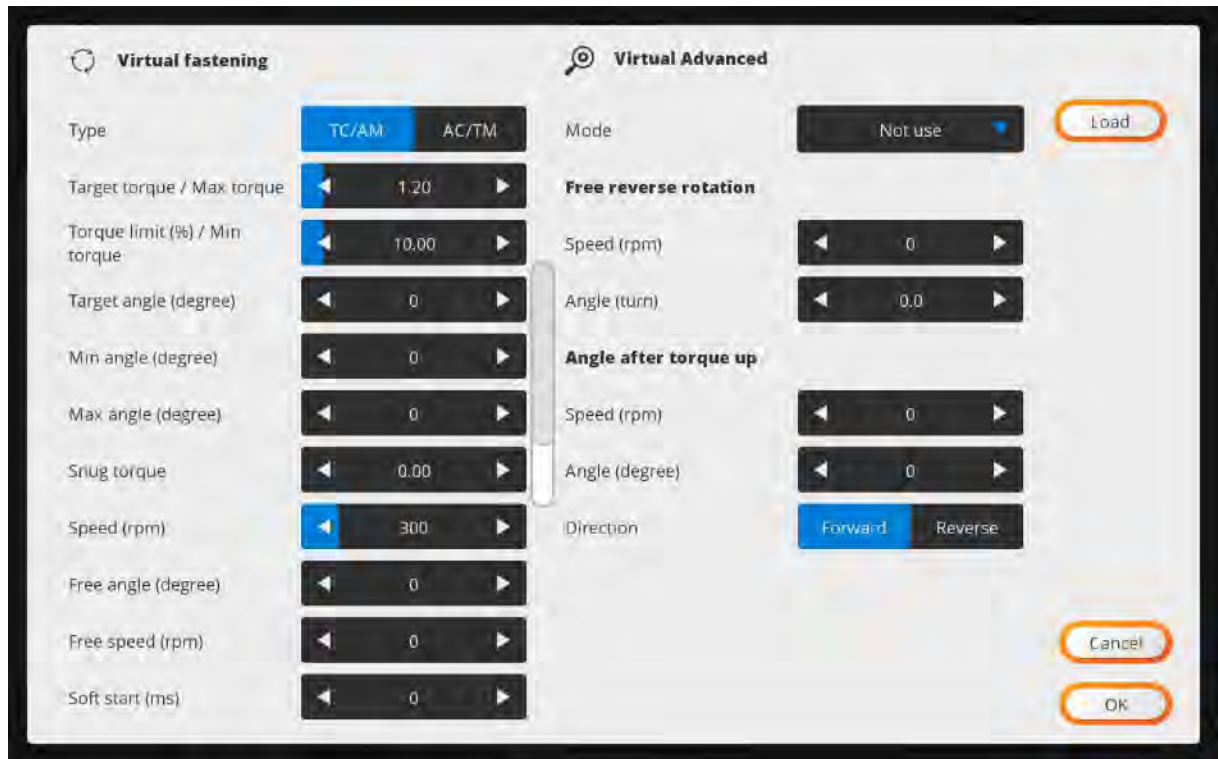


The [Load] button is used to import parameters from one of the 15 presets P1 to P15.

## 13.1.2 Input Step
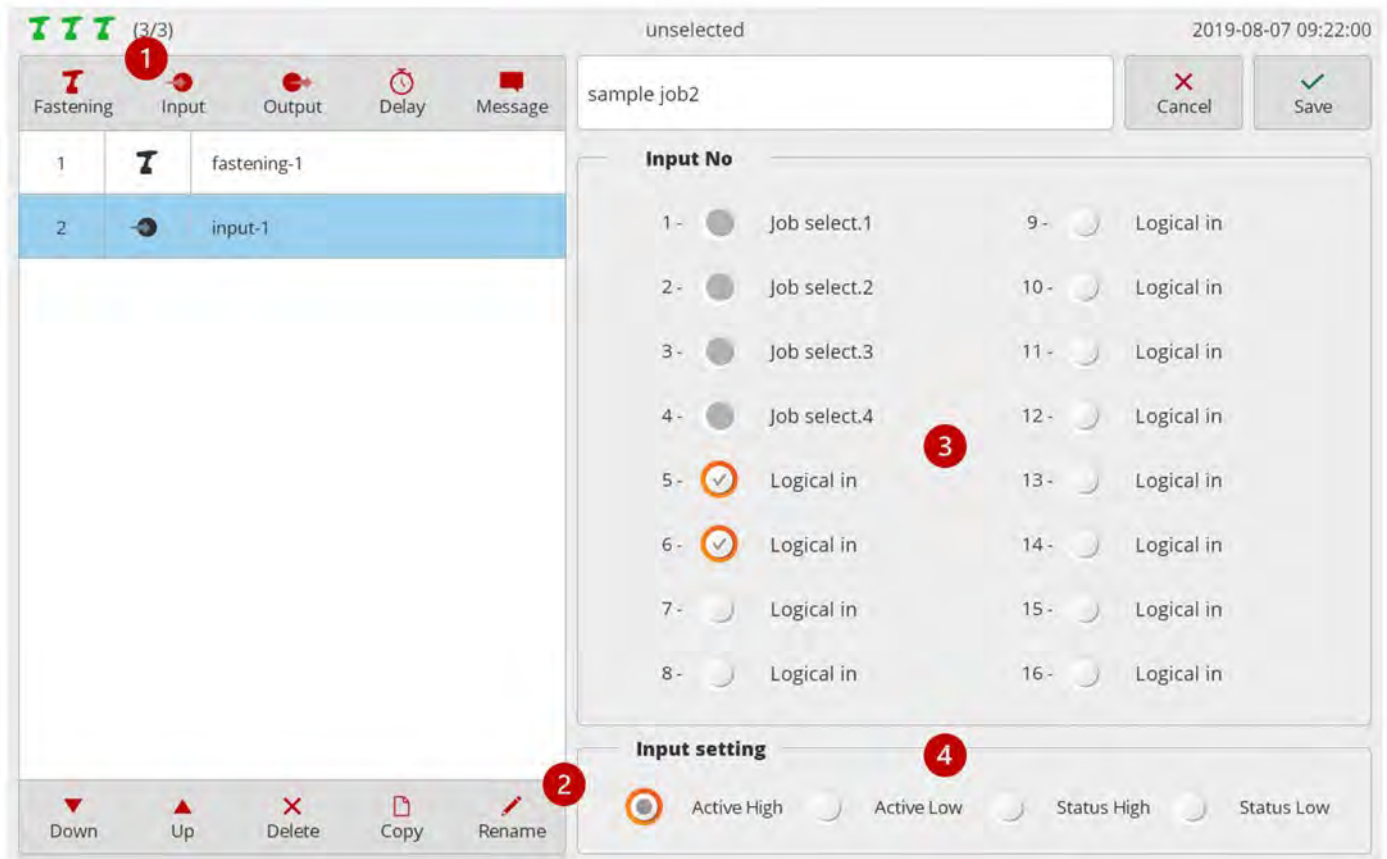


1. **Press [Input]. Then, an input step is added to the bottom of the Step List.**
   **Then, a setup page appears on the right.**
2. **If necessary, press [Rename] and edit the step name.**
3. **Select the port to get signals. The ports with system functions are disabled and not selectable.**
   **If multiple ports are chosen, AND conditions apply.**
4. **Sets changes in input signal levels. Level change settings commonly apply to all ports.**
   **Settings by port are not supported.**

| Input level | Description |
|---|---|
| Active High | Detects a level change from '0 (low)' to '1 (high)' |
| Active Low | Detects a level change from '1 (high)' to '0 (low)' |
| Status High | Checks 'level 1 (high)' |
| Status Low | Checks 'level 0 (low)' |
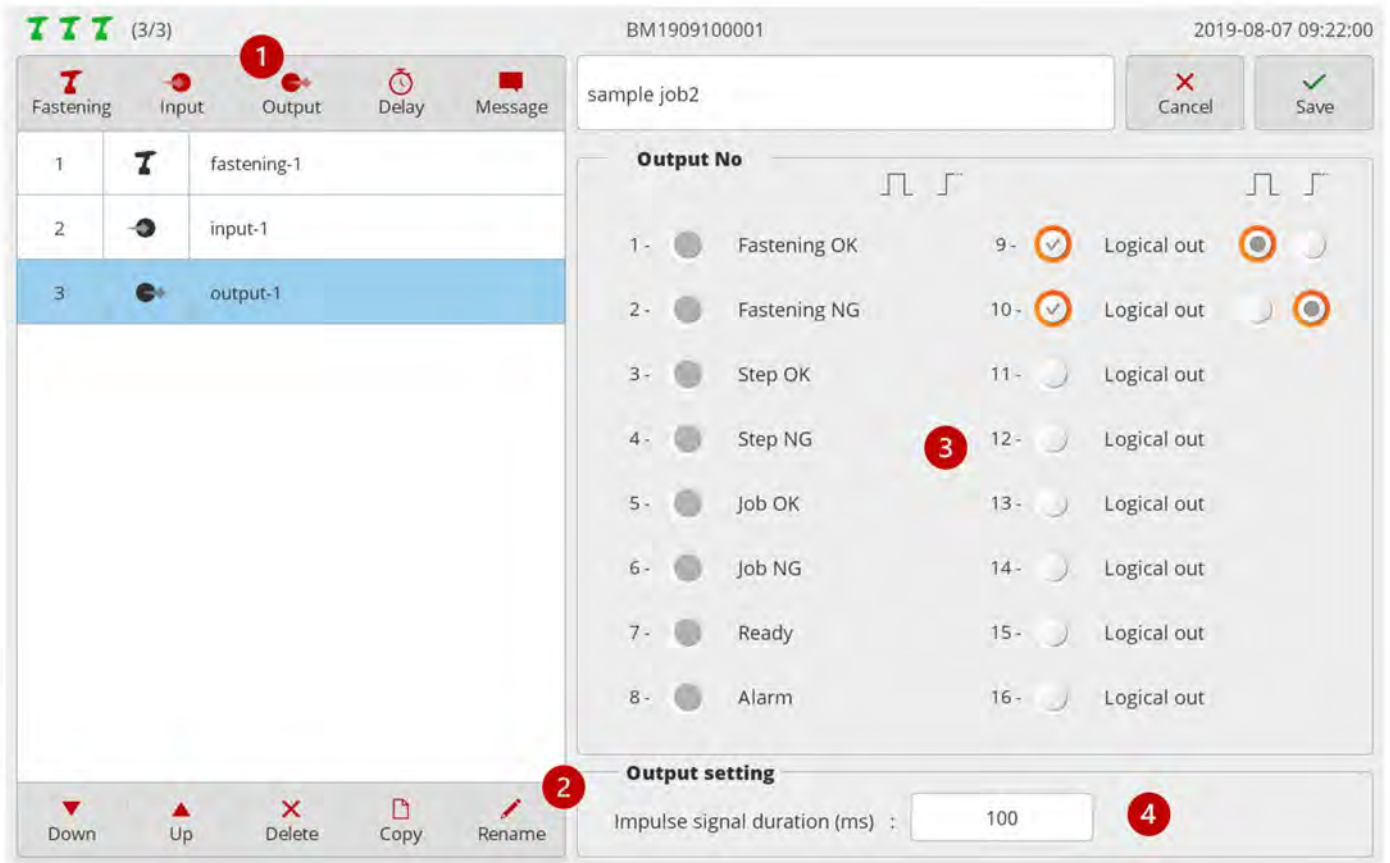
1.   **Press [Output]. Then, an output step is added to the bottom of the Step List. Then, a setup page appears on the right.**

2.   **If necessary, press [Rename] and edit the step name.**

3.   **Select the port to generate signals. The ports with system functions are disabled and not selectable. Then select the output type of the signal by port.**

| Output state | Description |
| --- | --- |
| Impulse | Generates pulse signals up to the time preset in (4) |
| Continuous ON | Displays level 1 (high) signal<br>Adds a separate output step and disables the port to alter the output to '0 (low)' |

4.   **Set 'pulse signal duration' at level 1 (high) from 0 to 5,000ms.**
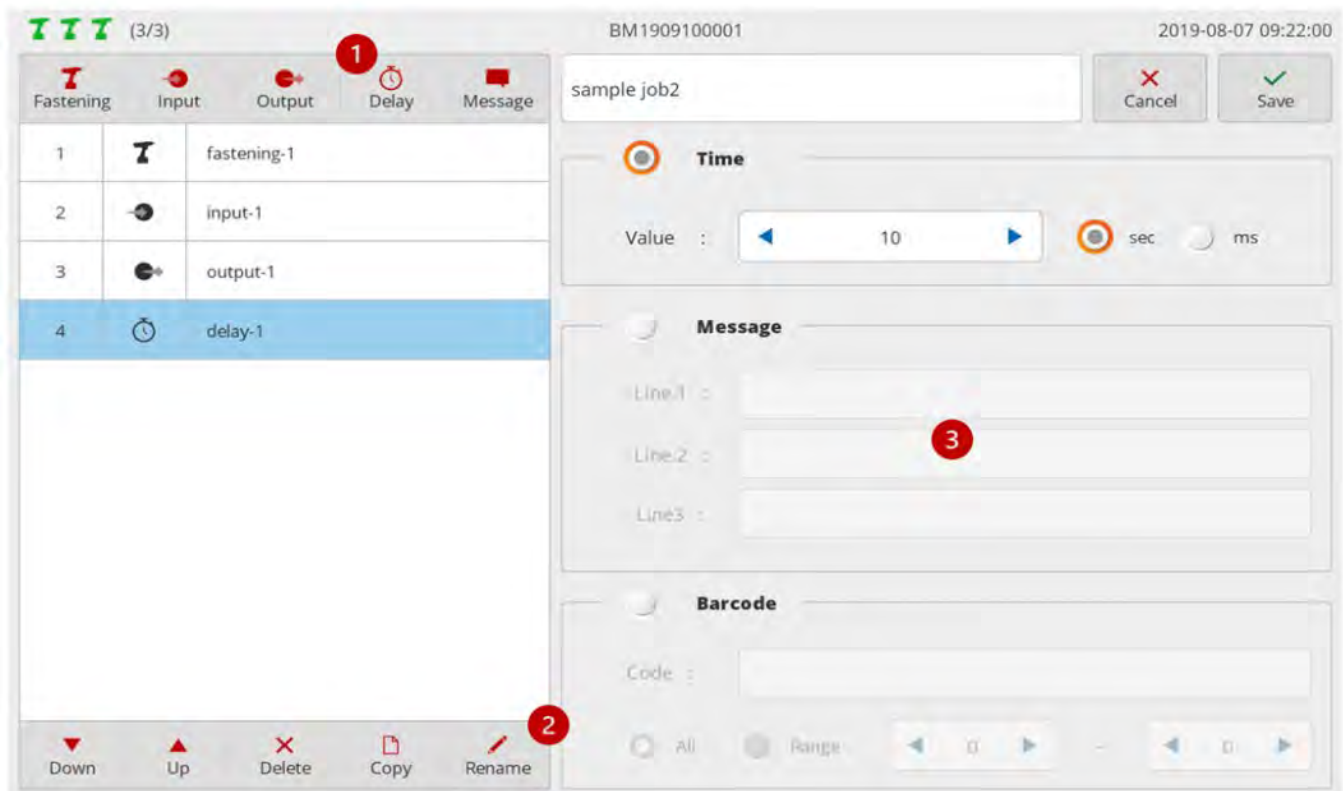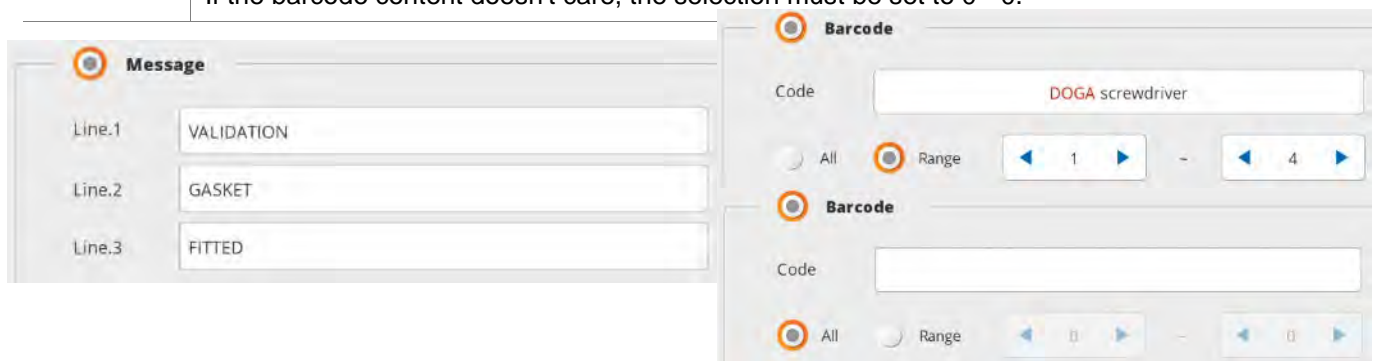
### 13.1.4 Delay Step



1.   **Press [Delay]. Then, a delay step is added to the bottom of the Step List. Then, a setup page appears on the right.**
2.   **If necessary, press [Rename] and edit the step name.**
3.   **Select a delay type.**

| Action | Description |
|---|---|
| Time | Stops the step process for a certain period of time; able to set up to 999 sec. |
| Message | Able to deliver a simple message to an operator<br>Moves to the next step if the operator reads the message and presses the OK button |
| Barcode | Able to scan the barcode and move to the next step<br>Select and scan the barcode. Then, it automatically appears on the top code.<br>If necessary, select a text box and enter by virtual keyboard.<br>Moves to the next step when the code is perfectly matched if 'All' is chosen<br>Moves to the next step when the mask (From – To) is matched if 'Range' is selected<br>Moves to the next step if the number of digits and code values in a valid area are matched even through registered and scanned codes differ in terms of total length<br>If the barcode content doesn't care, the selection must be set to 0 - 0. |

## 13.1.5  Message Step
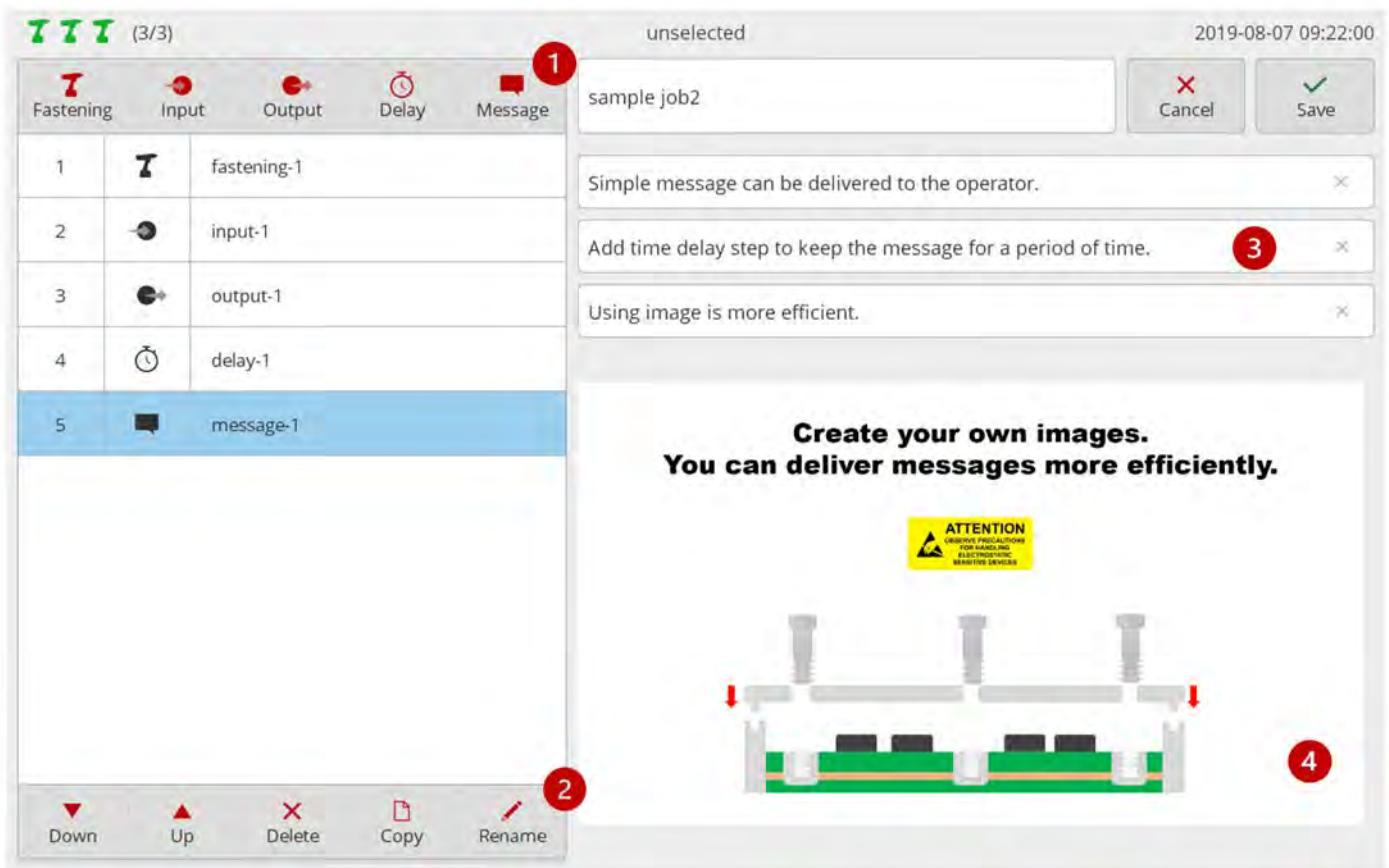


1. **Press [Message]. Then, a message step is added to the bottom of the Step List. Then, a setup page appears on the right.**
2. **If necessary, press [Rename] and edit the step name.**
3. **If necessary, enter texts and send a simple message to an operator.**
4. **Able to register an image and send a more efficient message if necessary**
   **If both image and text are registered, the image appears in full screen while the text is not visible.**
   **In terms of an image format, JPG and PNG are supported. It supports resolutions up to 4096 x 4096. For optimization, however, '1280 x 800 (16:10)' or '1280 x 720 (16:9)' is recommended.**

In general, the message step should be programmed to display a message for a certain period by adding a barcode or timer delay step. Without such step, the message appears very shortly.

## 13.2   Job selection by barcode

Combines barcode scanning with automatic job selection.

Able to register the same code redundantly but executes items with smallest common determinant according to priority.

The barcode used to select a job will be included in all results saved in the Log file until a new barcode is scanned.

When code scanning is done during job execution, it changes code information recorded in the log.
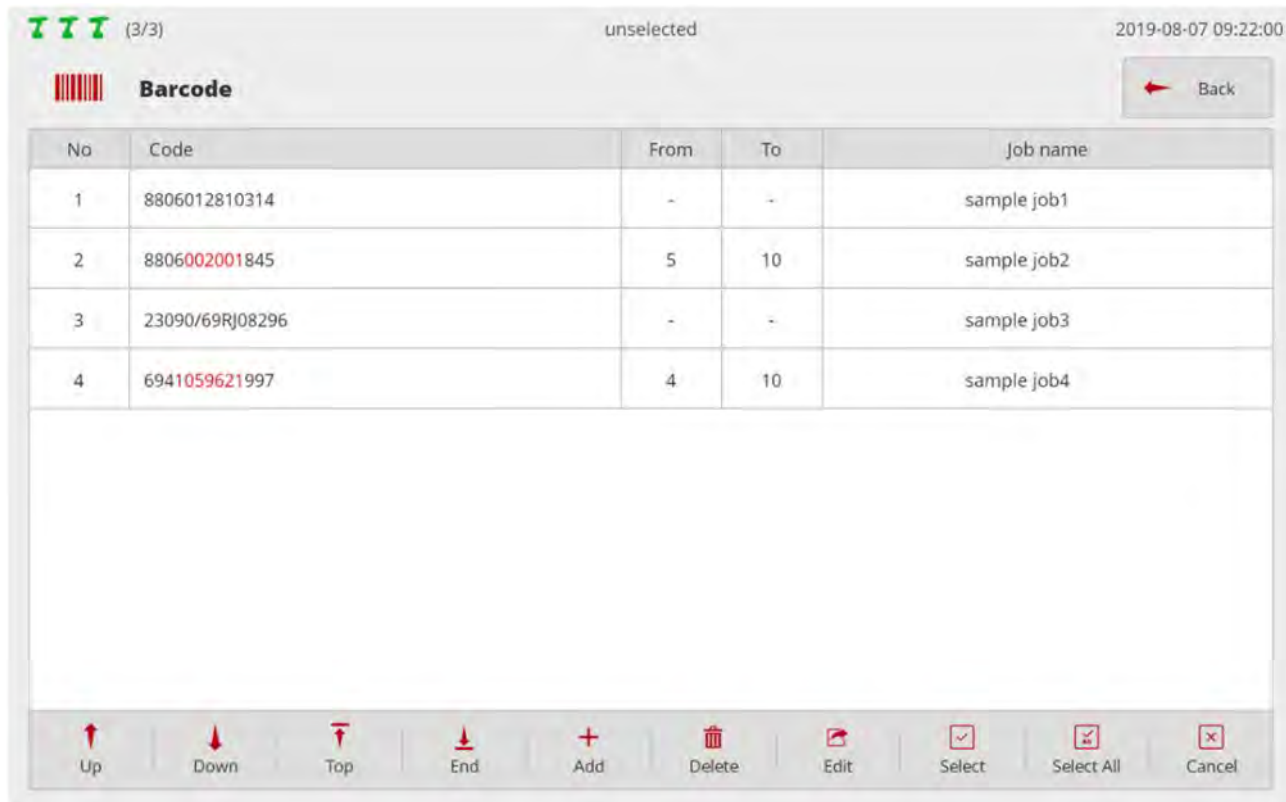


| Up | Moves the selected item to the top by one column |
| --- | --- |
| Down | Moves the selected item to the bottom by one column |
| Top | Moves the selected item to the top |
| End | Moves the selected item to the bottom |
| Add | Registers a new code |
| Delete | Deletes selected items |
| Edit | Edits selected items |
| Select | Changes a mode to select multiple items |
| Select All | Selects all items |
| Cancel | Ends a multiple item selection mode |

1.  If a code is scanned through USB Scanner or BM Built-In Scanner, the EDIT page appears as shown in the figure.
    If necessary, press the ADD button, select text box and enter code manually via touch screen virtual keyboard.
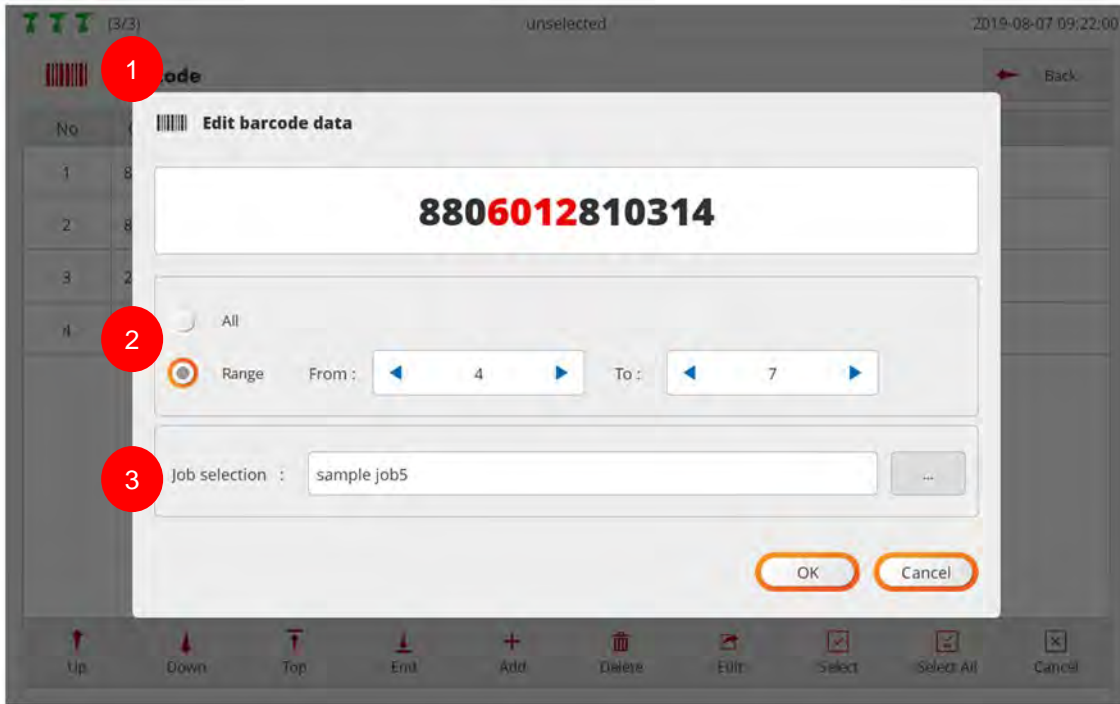


2.  If 'All' is selected, jobs are loaded when codes are perfectly matched.
    If 'Range' is chosen, jobs are loaded when the mask (From – To) is matched.
    Jobs are loaded if the number of digits and code values in a valid area are matched even through registered and scanned codes differ in terms of total length.
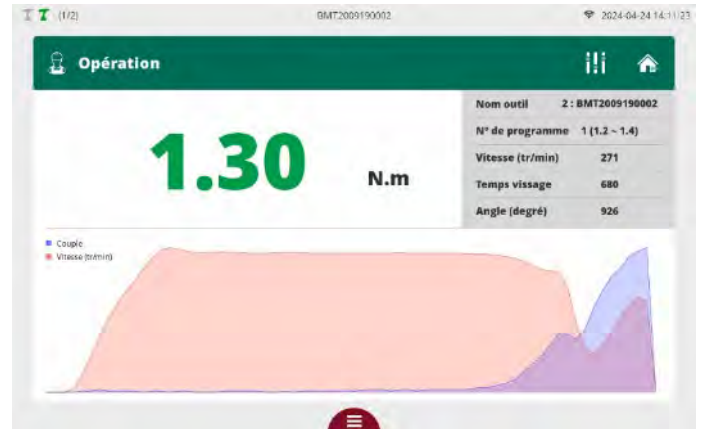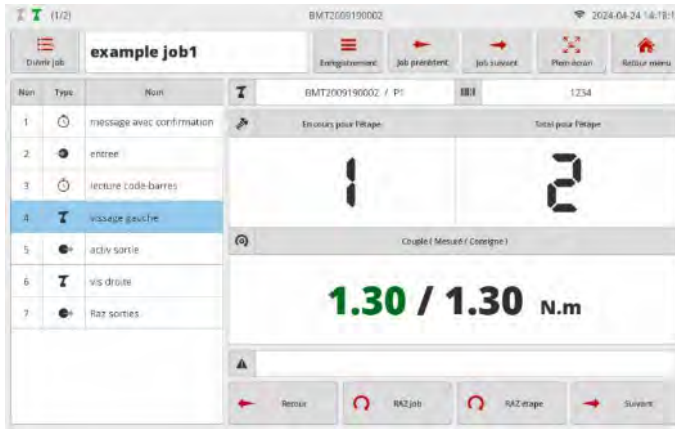
3.  Able to set a job to be loaded when a code is scanned at 'Job Selection'

# 14. OPERATION

The operation page appears differently depending on Operation Mode settings

| **With Job** | **Without Job** |
| --- | --- |



| Operation mode | With Job | Without Job |
| --- | --- | --- |
| Feature | Uses Process Control on single workstation and is operated according to the procedures programmed to a job.<br>Used for the purpose of minimizing an assembly error by visualizing the complicated assembly procedures of diverse products | Does not use Process Control and is able to utilize all tools randomly on several workstations.<br>Mostly used to save fastening data |
| Toolss | Operates the tools selected in the Fastening Step only; locked in all other tools; unable to use multiple tools simultaneously | No restriction in using tools<br>Able to use all tools randomly at the same time |
| Barcode Scanner | Able to register a code and select jobs<br>Loads jobs automatically if the registered code is scanned. | Able to register a code and select a Preset when a scanner-integrated BM is used<br>Automatically altered into the Preset if the registered code is scanned |

## 14.1   Operation display 'With Job Mode'
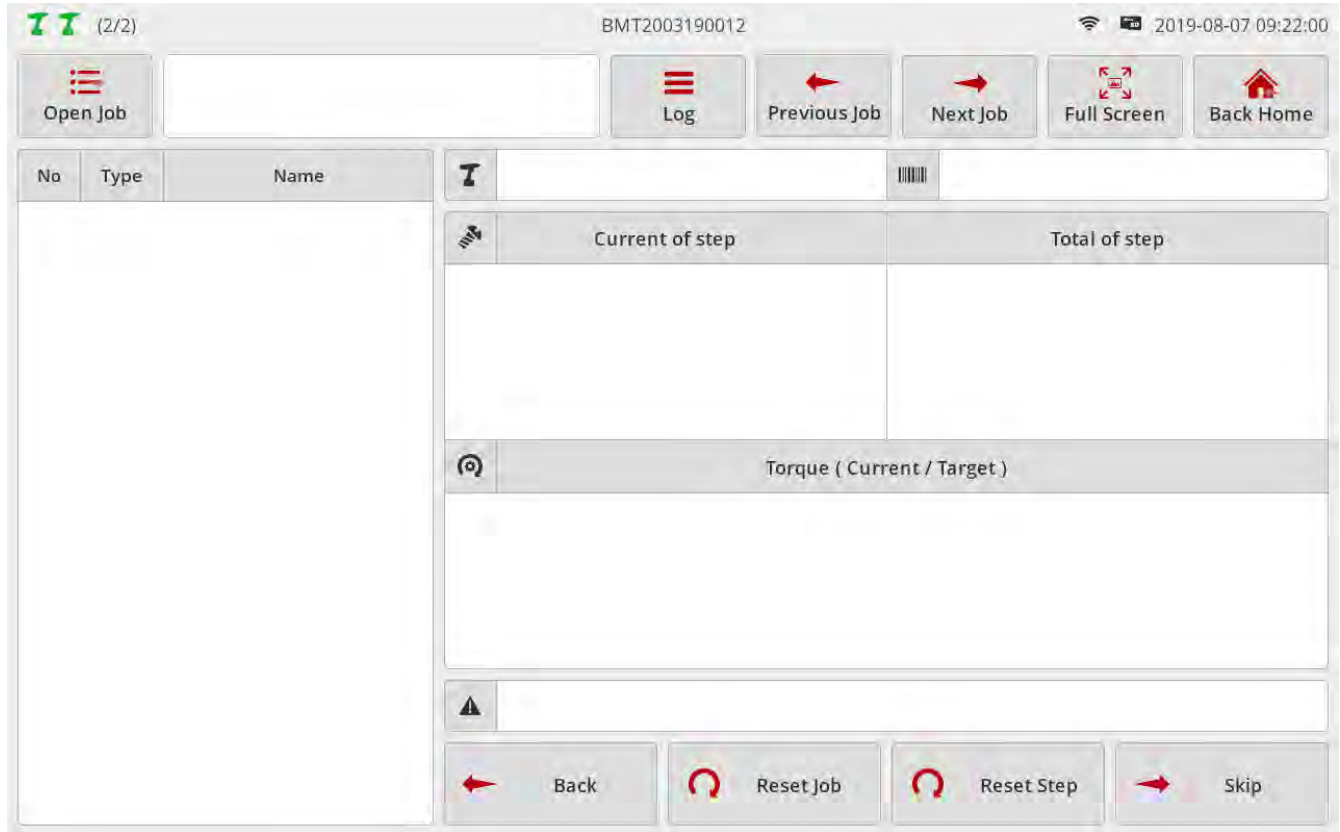


| Button | Description |
|---|---|
| Open Job | Selects a job from the Job List and loads |
| Log | You can check job history |
| Previous Job | Loads the previous job according to the sequence of the Job List No. |
| Next Job | Loads the next job according to the sequence of the Job List No. |
| Full Screen | Enables the Full Screen mode in the Fastening or Message Step |
| Back Home | Moves back to HOME |
| Back | Return to the previous screw in the Fastening Step; does not support the movement of the step |
| Reset Job | Resets current jobs |
| Skip (screw or step) | Depends on setting chap 11.3.1 item 'Skip to step' (page 43) Moves to the next screw in the Fastening Step or to next Job Step. Press the SKIP button on the last screw and move to the next step. |

### 14.1.1 Fastening Step
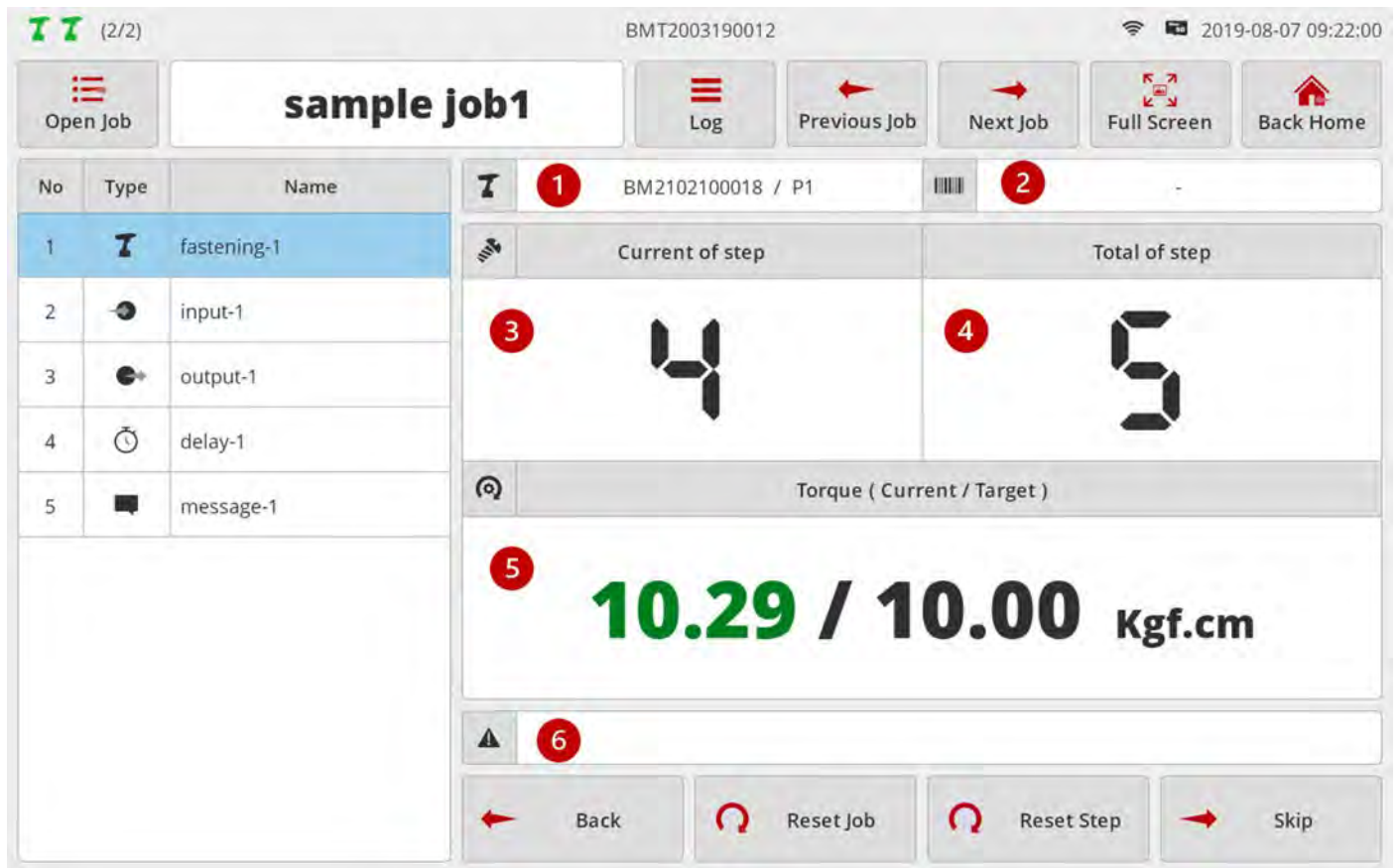


| Field | Description |
|-------|-------------|
| 1 | Displays the tool name and preset information in the Fastening Step |
| 2 | Reveals the last scanned code information; the code is recorded in the log |
| 3 | Shows a screw count according to the Screw Count Direction settings |
| 4 | Reveals a total number of screws according to the Screw Count Unit settings |
| 5 | Shows torque in 'actual torque' or 'target torque' format |
| 6 | Displays an error code and error details in the event of 'NG' |

If an image is registered in the Fastening Step, it is generated in full screen.

In terms of a fastening state, 'OK' or 'NG' is displayed by color depending on settings.

If touched in the Full Screen mode, it is turned off temporarily and switched to the Count page.

To return to the Full Screen mode, press the FULL SCREEN button.
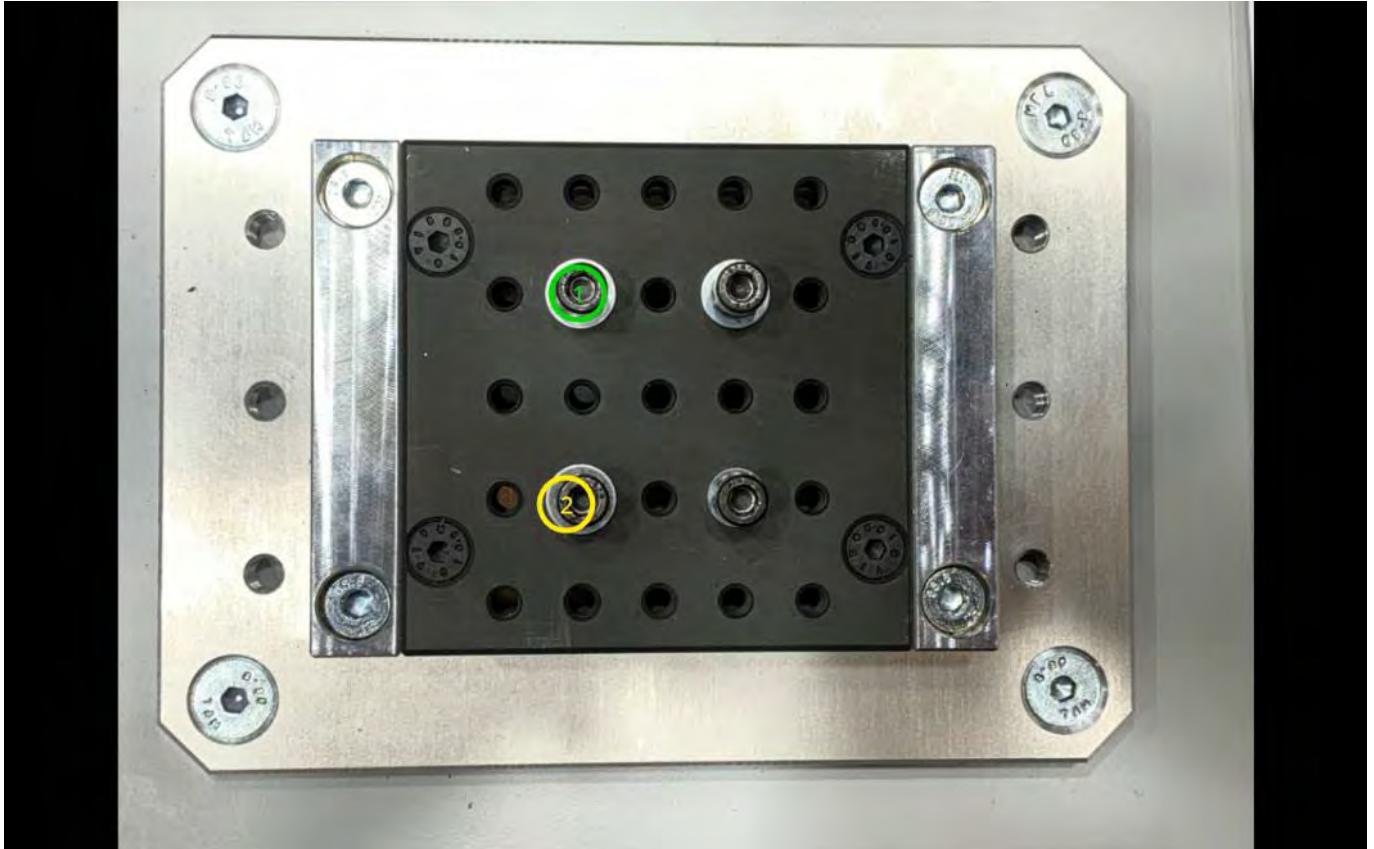
## 14.1.2  Input Step
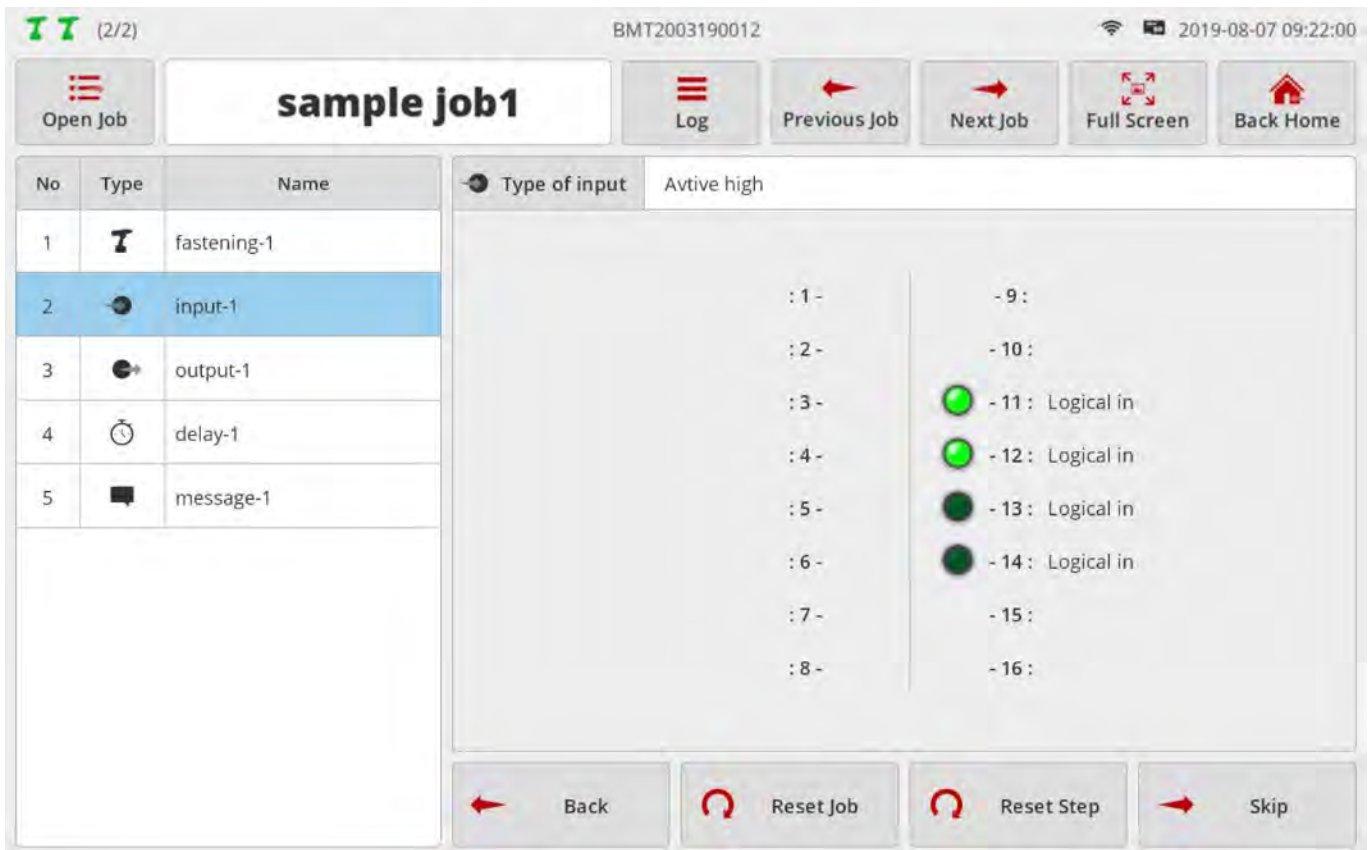


The above page appears when four inputs were programmed to 'Active High' in the Input Step.

LED light is turned on four enabled ports only.

LED light is turned on in input-sensed ports such as No.11 and No.12.

LED light is off in non-input ports such as No.13 and No.14.

### 14.1.3 Output Step



The above page appears when four inputs were programmed to 'Impulse' in the Output Step.

LED light is turned on four enabled ports only.

## 14.1.4   Delay step
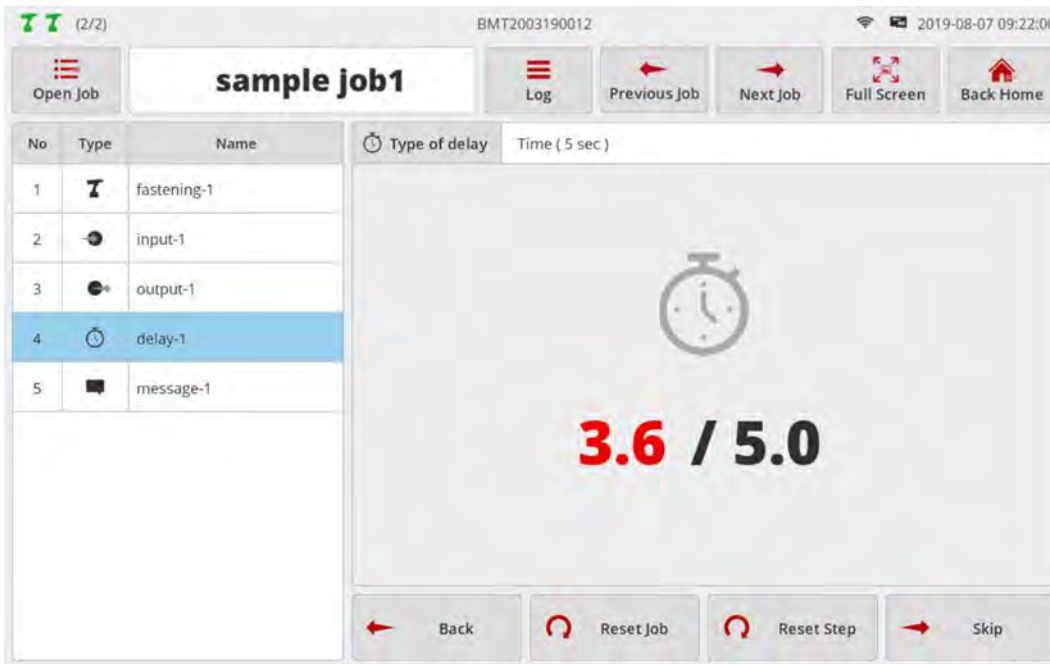


The above page reveals the Delay Step set by the timer (5 sec.).

It is displayed in 'elapsed / set time' format. Once the timer reaches the set time, the page moves to the next step.

If the previous step is 'Message Step', the timer is executed in the background, and the screen keeps displaying a message.
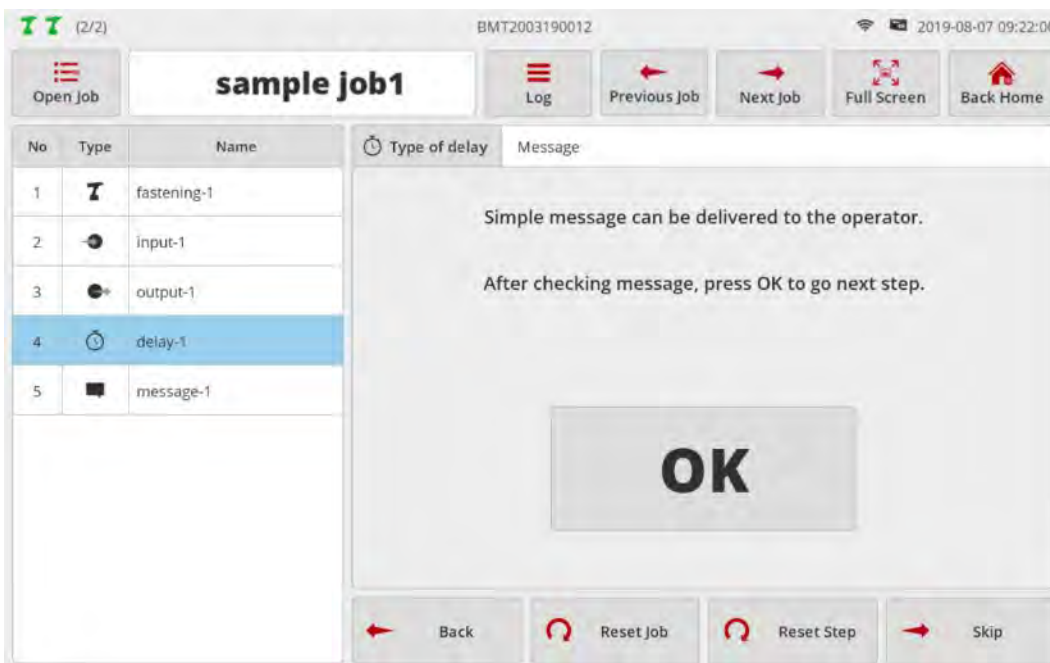


The above page shows the Delay Step set by the message.

Check the message and press [OK]. Then, it moves to the next step.
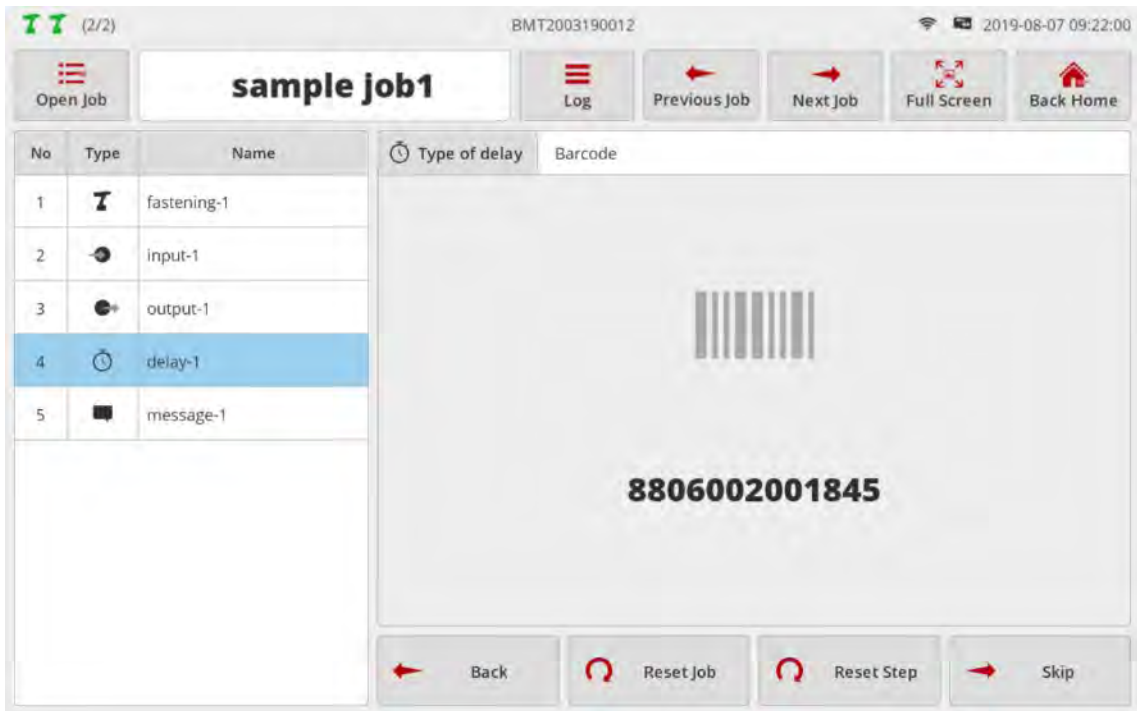
The above page reveals the Delay Step set by the barcode.

Once the code is scanned in USB Scanner or BM Built-In Scanner, the page moves to the next step.

If the previous step is 'Message Step', the delay is executed in the background, and the screen keeps displaying a message.

**14.1.5   Message Step**
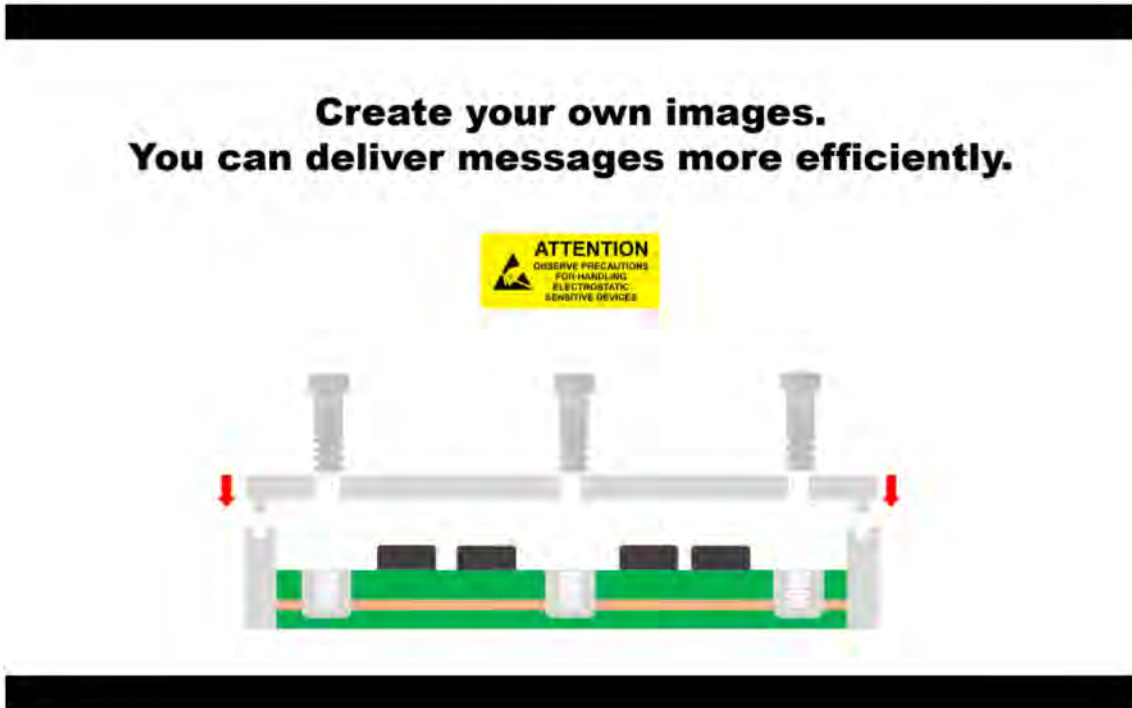


When setting the Message Step, if an image is already registered, it is displayed in full screen.
If touched in the Full Screen mode, it is turned off temporarily.
To return to the Full Screen mode, press the FULL SCREEN button.
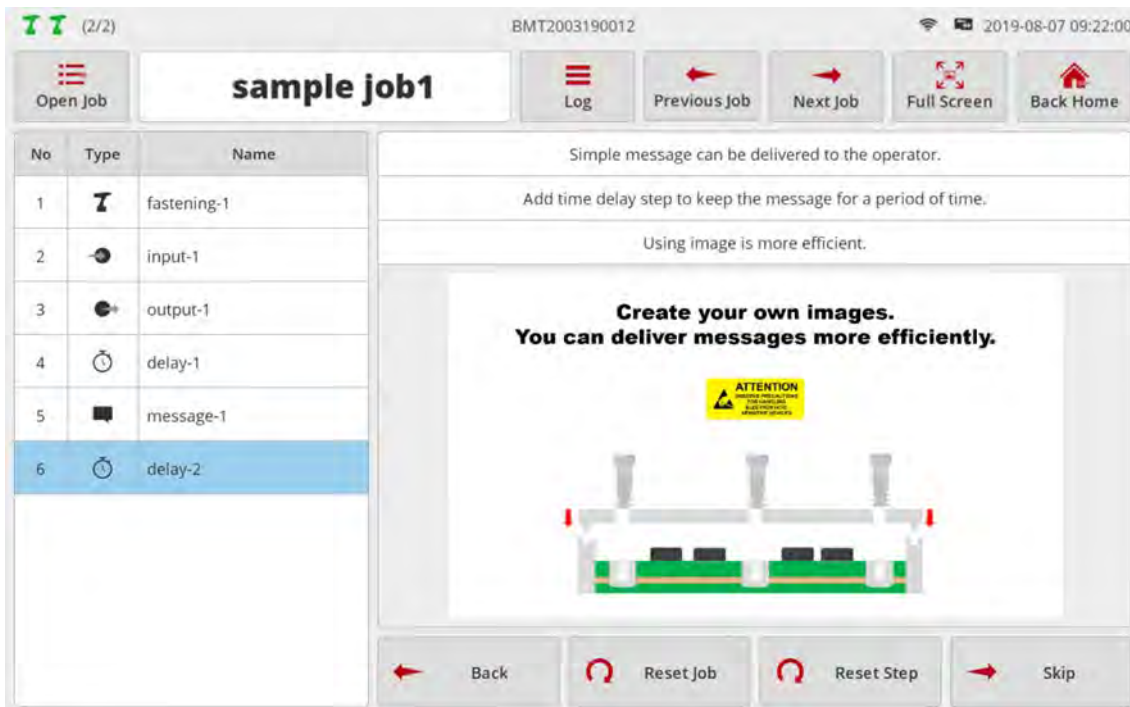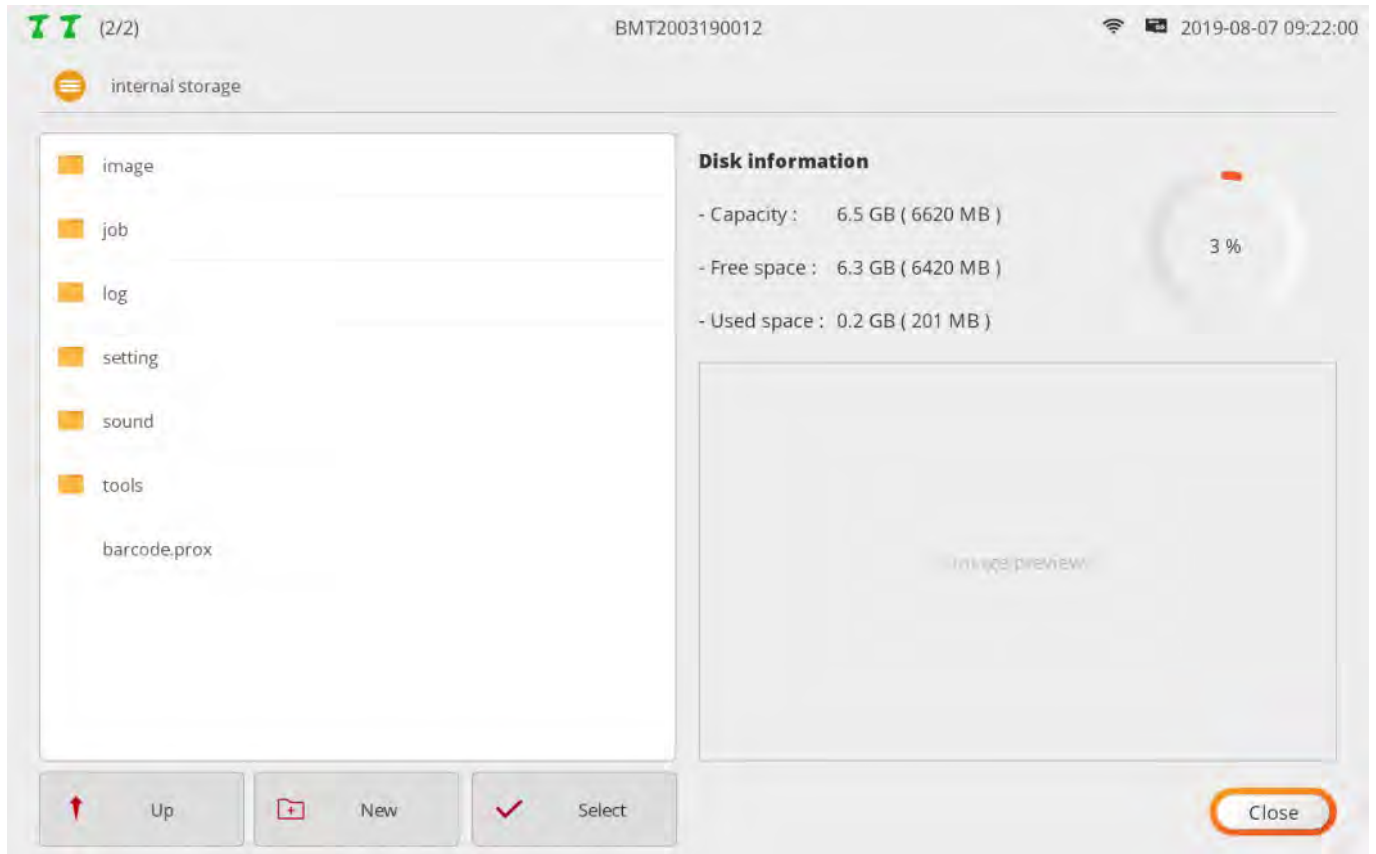
Offers simple file browser features.

Available in various situations such as log file backup image file insertion and file move.

Supports external storage devices (FAT32 file system) such as USB memory and MicroSD and able to sele ct a storage device if the arrow is pressed.

Offers a preview feature at the right bottom if a JPG or PNG image file is selected.
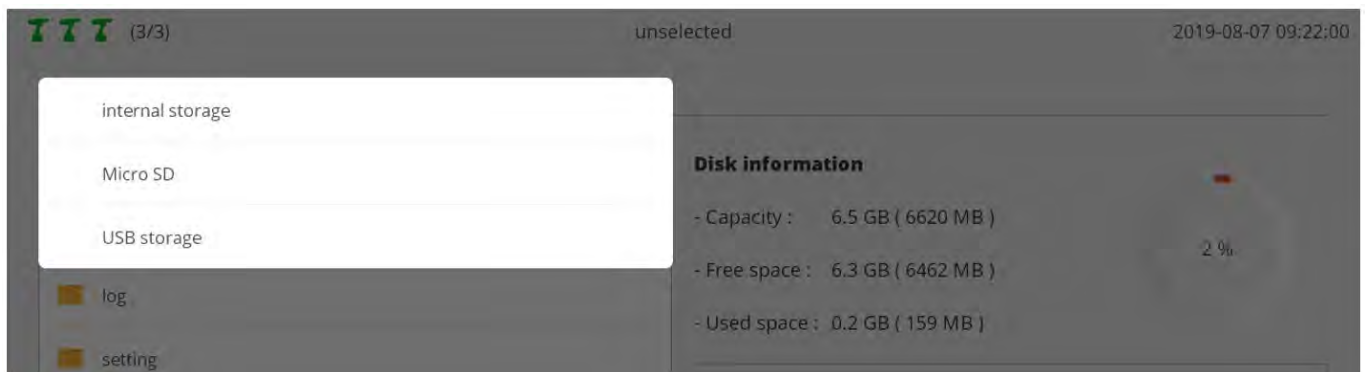
The structure and purposes of the top-level internal storage folder are as follows:

| Folders | Description |
| --- | --- |
| Image | Stores image files used in Fastening and Message Step. |
| Job | Stores job files programmed by a user. |
| Log | A directory where log files are stored; owns a sub folder in order of year, another by month and daily named files. |
| Setting | Stores ParaMon-Pro X settings. |
| Sound | Stores sound messages. |
| Tools | A folder is created by the name of the registered tool; stores related information. |
| XML | To be created for XML updates files own a sub folder by tool series. |

The menu provided by the file browser is as follows:

| Buttons | Description |
| --- | --- |
| Up | Moves to the upper folder. |
| New | Creates a new folder in current position. |
| Select | Switches to the SELECT FILE mode. |
| Select All | Selects all files and folders in current position. |
| Cancel | Closes the SELECT FILE mode. |
| Delete | Deletes the selected files and folders. |
| Copy | Copies the selected files and folders. |
| Move | Moves the selected files and folders. |
| Rename | Renames the selected files and folders. Disabled if multiple files and folders are selected. |
| Paste | Pastes the files and folders chosen in Copy/Move. |

This section describes how to get access to the FTP server.

For the FTP client needed to get access to the FTP server, there are various types of programs.

This section uses the most widely used freeware 'Filezilla Client'.

http://filezilla-project.org/



FTP server is activated in ParaMon-Pro X→Settings→Share menu. Refer to [Share]
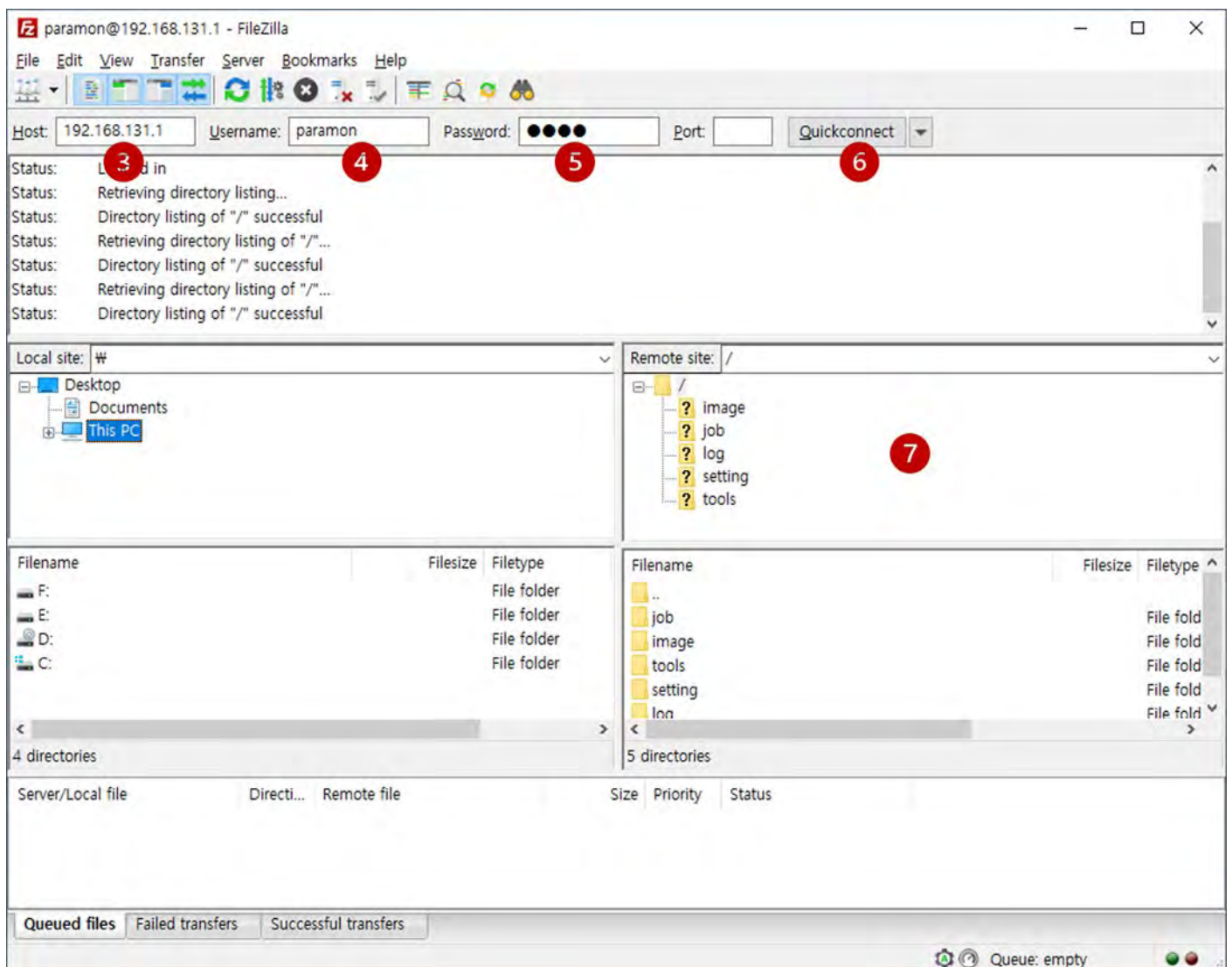
1. Connect to ParaMon-Pro X AP in Wi-Fi.
2. Start the Filezilla Client.
3. Enter the Wi-Fi IP address into the host.
   ParaMon-Pro X's Wi-Fi always has '192.168.131.1' for address.
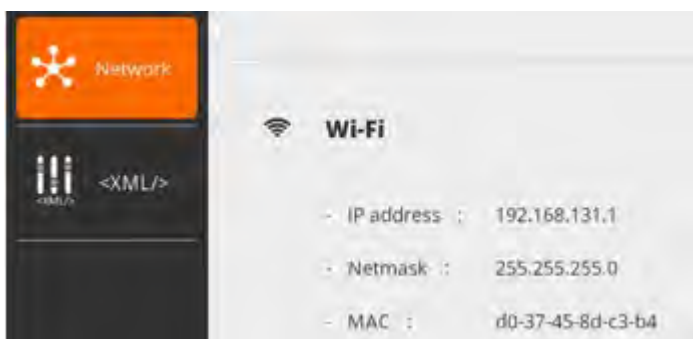


4. Enter the FTP server's username from 'Setting → Network'. The default value is 'paramon'.
5. Enter the FTP server's password from 'Setting → Network'. The default value is 'prox'.
6. Press [Quickconnect] and log into the FTP server.
7. **Check ParaMon-Pro X's file system.**

## 16.2    Connection via Ethernet
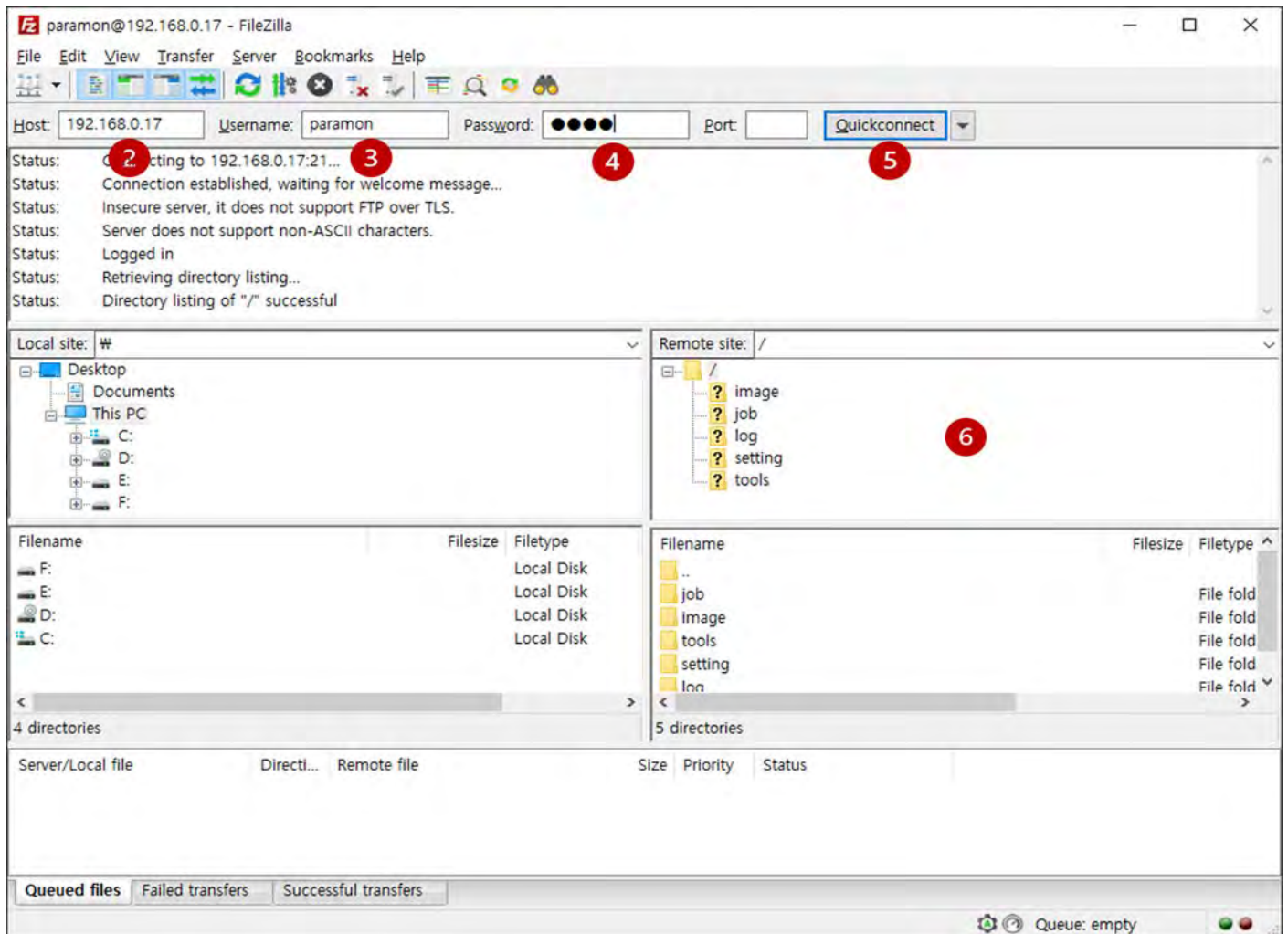


1. Start the Filezilla Client.
2. Enter the Ethernet IP address into the host.
   Check the Ethernet IP address in 'System → Network'.



3. Enter the FTP server's username from 'Setting → Network'. The default value is 'paramon'.
4. Enter the FTP server's password from 'Setting → Network'. The default value is 'prox'.
5. Press [Quickconnect] and log into the FTP server.
6. Check ParaMon-Pro X's file system.

# 17. BACKUP & RESTORE

This section describes the different backup/restore procedures for ParaMon-Pro X and connected tools.

## 17.1 ParaMon-Pro X settings

ParaMon-Pro X's backup and restore functions enable:

A. After backing up ParaMon-Pro X's current settings, the system can be restored to the current state if necessary. At restoration, the file system is overwritten. If a backup file is in the internal repository, it is also deleted. Therefore, copy the backup to a separate external storage device.

B. After backing up ParaMon-Pro X's current settings, they can be applied to the other ParaMon-Pro X with the same configuration. Since member tools registered in ParaMon-Pro X are managed with their own ID (MAC address), however, they are not automatically registered despite restoration.
Therefore, member tools should be registered separately.

C. At job programming, the tools specified during the Fastening Step are identified by the tool name.
To execute the restored jobs without changes, therefore, member tools should be set under the same tool names at their registration. If different ParaMon-Pro X units need to be backed up or restored, it is recommended to specify an easy-to-identify name in person instead of using the default tool name when registering a member tool.
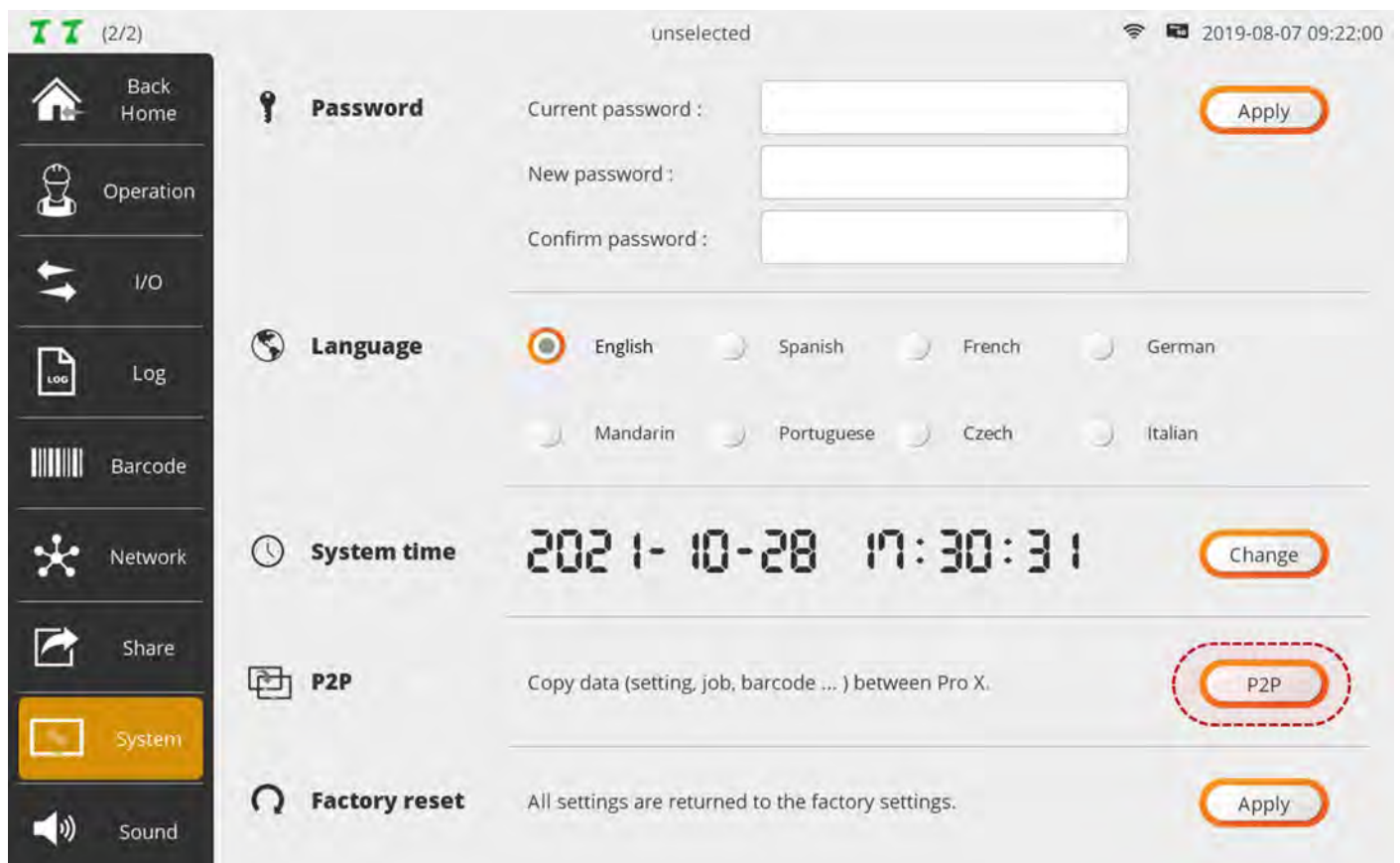
### 17.1.1  Backup

A.  Press [P2P] in 'Setting → System'.

B.  Select "Save …" and press [OK].
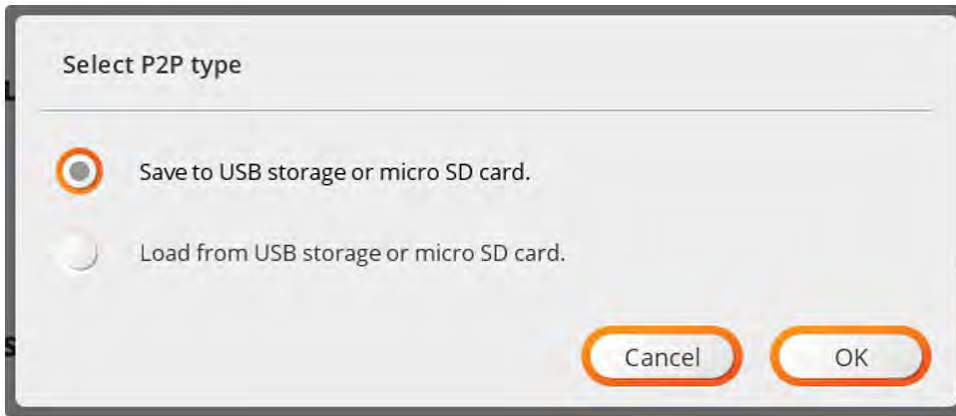


C.  Set the backup storage position and filename and press [OK] for backup.
    The filename is automatically created in 'ProX_YYYYMMDD.p2p' format. It can be edited if necessary.

D.  If stored by specifying an external storage device folder, it would take a relatively long time for backup. It is recommended to store the backup in the internal memory and copy/move it to an external storage device.



E.  Wait until the backup processing is finished.

F.  If the backup is stored in the internal memory as recommended, copy/move it to an external storage device, using [ FILE BROWSER ].

**17.1.2 Restore**

A. Press [P2P] in 'Setting → System'.

B. Select "Load …" and press [OK].

Select P2P type

○ Save to USB storage or micro SD card.

⦿ Load from USB storage or micro SD card.

Cancel    OK

C. Select the file and press [OK].

Select file

File : /media/sda1/ProX_20200603.p2p    ...

Cancel    OK

D. Press [OK] and restart the system.

**Success**

Press OK to restart the system.

OK
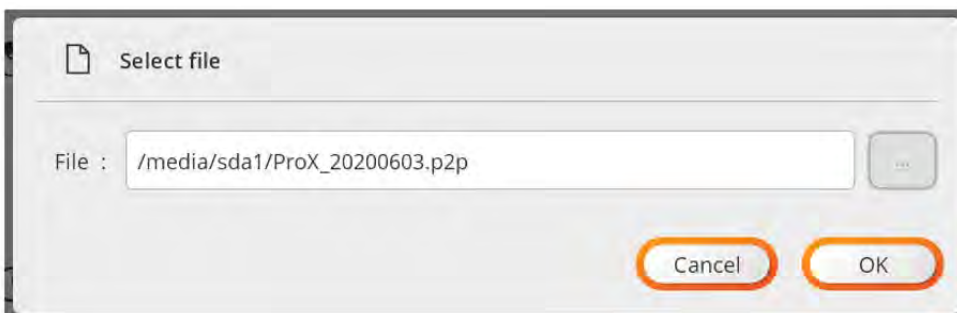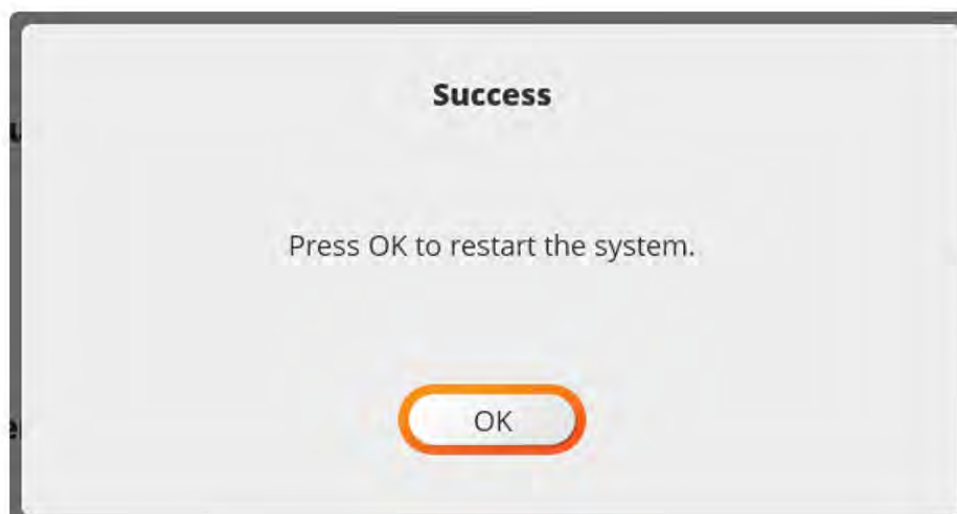
## 17.2 Tools settings BM(T) & MD(T)

The features for backup and restore tools settings allow:

A. After backup tools parameter settings, the system can be restored to the current state if necessary.
   If tools parameter settings are frequently edited according to operating environments, it is able to edit them collectively, using Backup/Restore features.

B. If used together with ParaMon-Pro X's Backup/Restore features, it is possible to copy all system settings including multiple tools and ParaMon-Pro X units.

### 17.2.1 Backup

A. Press the [BACKUP] icon of the target tool on the Member Tool List.
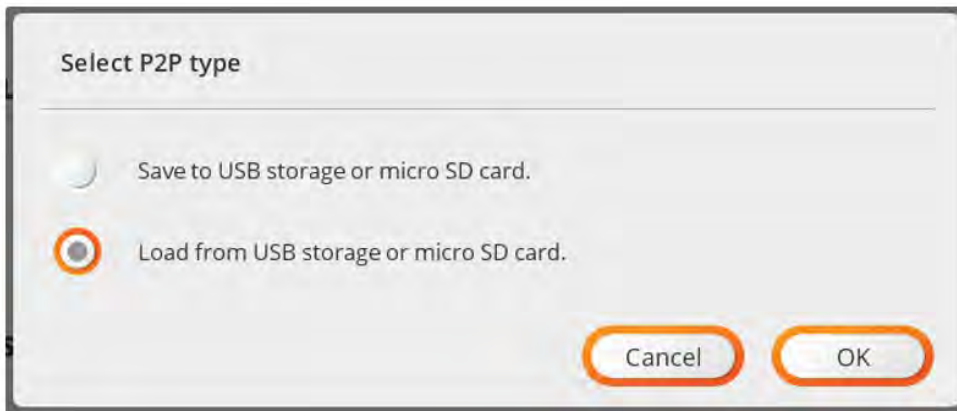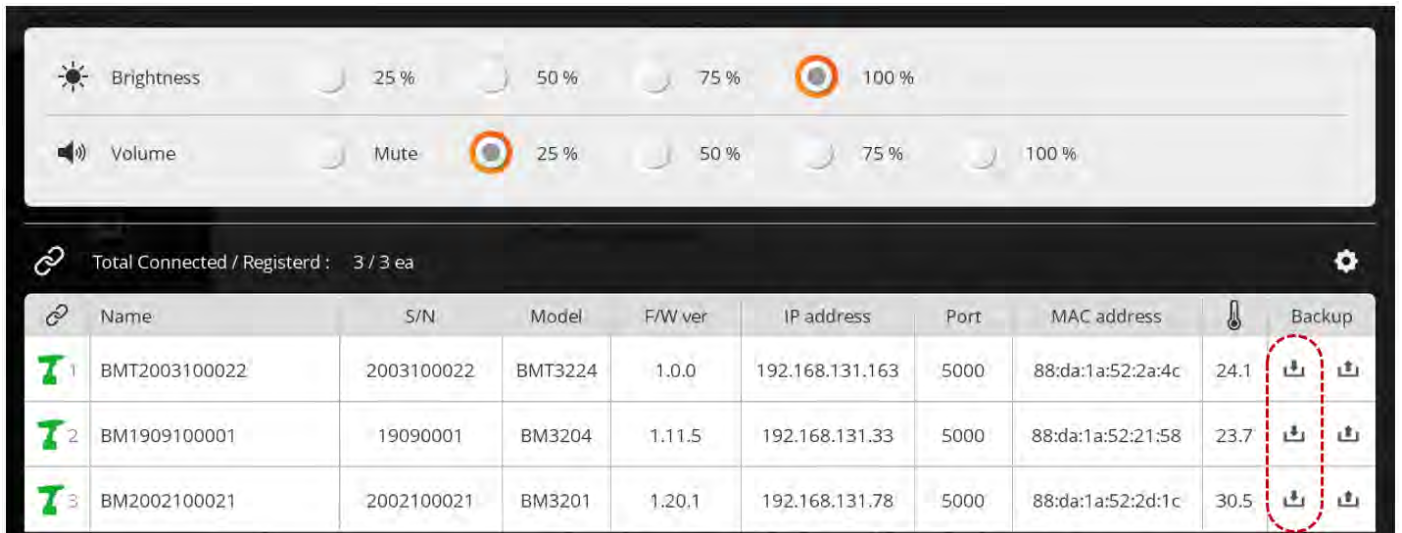


B. Set the backup storage position and filename and press [OK] for backup. The filename is automatically created in 'Toolname_Model_Fwver.csv' format. It can be edited if necessary.

## 17.2.2  Restore

Between tools with different models, only barcode information can be restored according to the settings. Check out the backup/restore example below.

| Backup tool | Restore tool | Fastening Advanced Controller Multi Sequence | Barcode |
|---|---|---|---|
| BM3201 | BM3201 | O | O |
| BM3201 | BMT3201 | X | O |
| BM3201 | BM3204 | X | O |

A.  Press the [RESTORE] icon of the target tool on the Member Tool List.
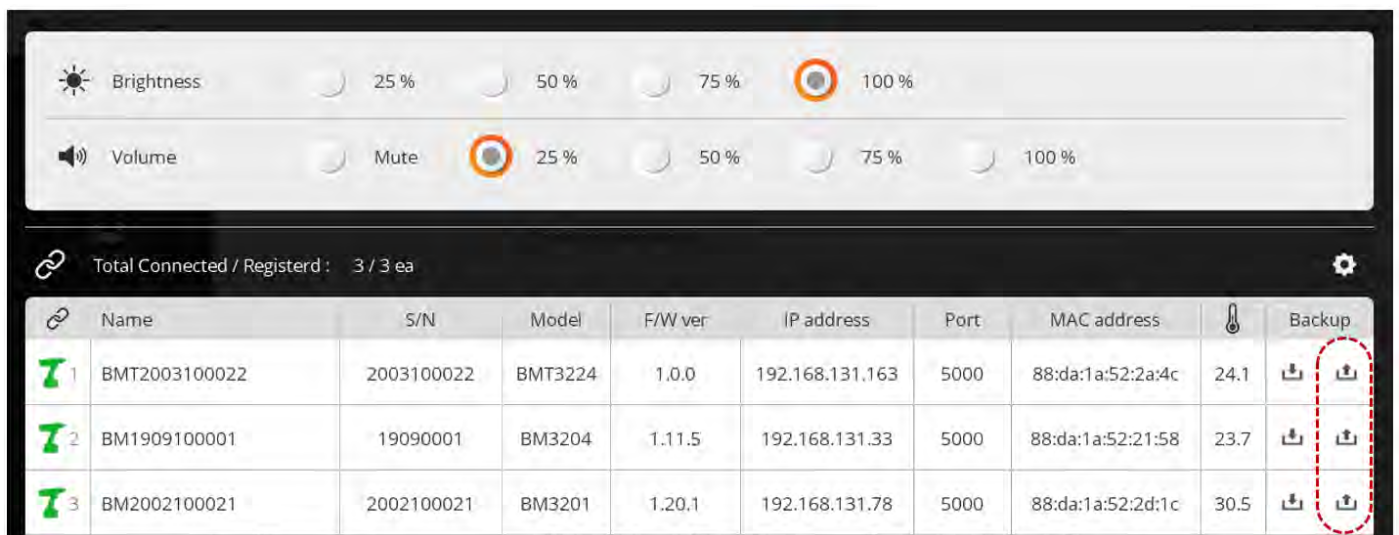


B.  Select the file to be restored.
C.  If you need to restore only the barcode parameters between different models, check the "Download only barcode parameter" checkbox.
D.  Click the [OK] button to start the restore.
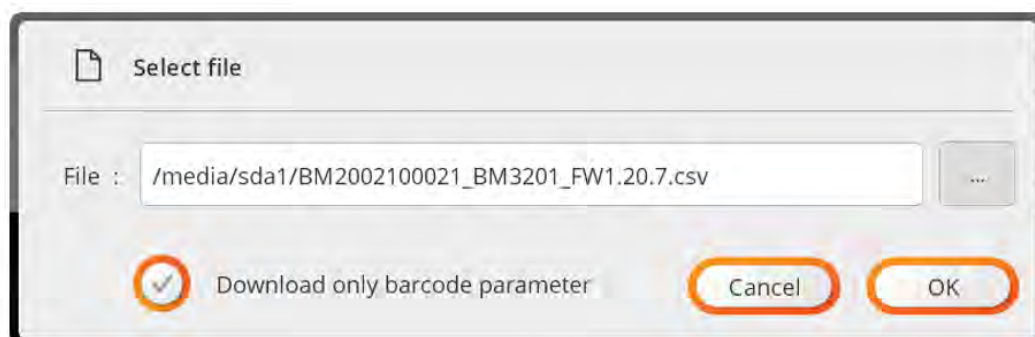
# 18. SOFTWARE UPGRADE

A. Log into the system in ADMIN mode.
B. Select 'System' in the ADMIN menu.
C. Choose 'Device Info' on the left.



D. Check the current Software Version and press [Upgrade].
E. Enter the password again.
F. Select the target file and press [Upgrade].
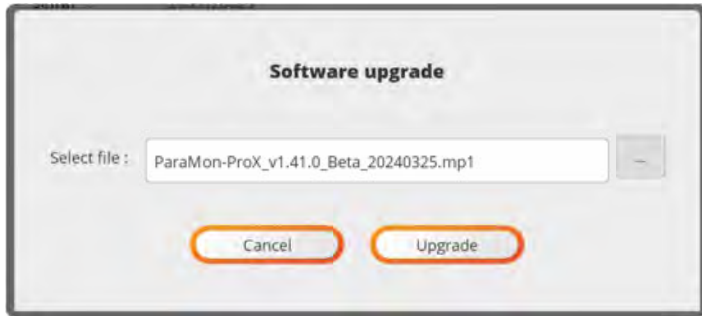


G. Once the Confirmation page pops up, check the target file again and press [OK].
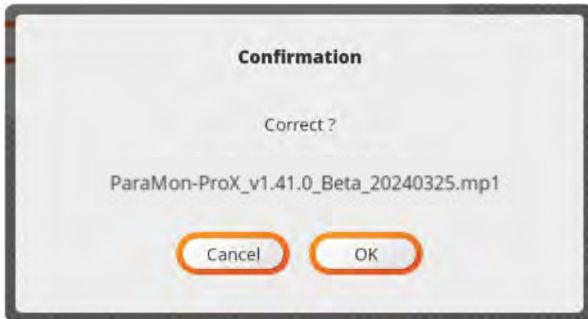


H. Wait until the process is completed.
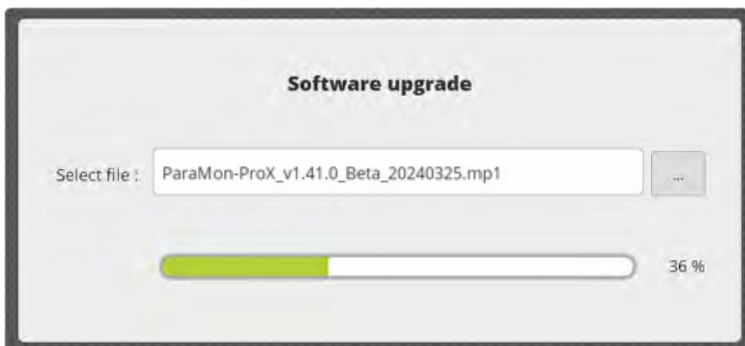
I.   Once the upgrade is successfully completed, the Restart System message pops up.
     Press [OK] and restart the system.

**Success**

Press OK to restart the system.

OK

J.   Once successfully reset, log into the system in ADMIN mode again.

K.   Select 'System' in the ADMIN menu.

L.   Choose 'Device Info' on the left.

M.   Check if successfully upgraded by checking the Software Version.

# 19. MAINTENANCE

## 19.1  Maintenance

Periodic cleaning of the screen should be carried out regularly with a clean, soft, dry and lint-free cloth.

## 19.2  Troubleshooting

During manufacturing the proper functioning of the unit is checked multiple times. However, if the unit malfunctions, troubleshoot it using this list:

> ⚠️ **Warning**
> All troubleshooting tasks requiring the opening of the box must be performed by DOGA or a company authorized by DOGA.

| Problem | Solution |
|---|---|
| Controller is not booting (black screen) | Turn off and on the controller. |
| USB memory stick or micro-SD card not listed | Please check that memory format is FAT32. |
| Wi-Fi network interrupted | Check that Wi-Fi adapter is well plugged on USB port<br>Eventually reboot controller. |
| Password is lost or forgotten | Please contact the DOGA After-Sales Dept |
| Screwdriver disconnected | Please check that tool is powered on and is within Wi-Fi signal range |
| Even after verification, the controller doesn't work correctly. | Please contact the DOGA After-Sales Dept. |

If you cannot resolve a problem despite reading this manual, please contact
the DOGA After-Sales Department.

> 👤 **My client area on www.doga.fr**
> Go to your client area on www.doga.fr, click "Your contacts", then select your specific **After-sales department contact** depending on the device type.

## 19.3  Spare parts

For any spare parts order, contact your DOGA technical sales representative.

> 👤 **My client area on www.doga.fr**
> Go to your client area on www.doga.fr,, click "Your contacts", then select your specific **Technical Sales-people** depending on the device type.

## 19.4    Hotline

### 19.4.1   For any questions about the use of the device

Please contact your DOGA technical Sales representative.

| | **My client area on www.doga.fr** |
|---|---|
| | Go to your client area on [www.doga.fr](www.doga.fr),, click "Your contacts", then select your **Technical Salespeople** depending on the device type. |

### 19.4.2   For any questions regarding troubleshooting

Please contact your After-Sales contact.

| | **My client area on www.doga.fr** |
|---|---|
| | Go to your client area on [www.doga.fr](www.doga.fr),, click "Your contacts", then select your specific **After-sales department contact** depending on the device type. |

If our technician can remotely determine the origin of the fault, he will tell you what to do for repair it by yourself as much as possible.

## 19.5    After sales Returns

All material must be returned with an after-sales service return form, that you must complete and attach to your package.
The repair, maintenance or adjustment service can only start at the receipt of this form.

| | **Information** |
|---|---|
| | Following this procedure allows you to quickly take charge of your request and reduces the troubleshooting costs. |
| | DOGA reserve the right to apply a trade-in discount and to invoice, if applicable, the costs of repairing and packaging. |

### 19.5.1   Download the after-sales return form

You can download the return form by following this link:
[http://service.doga.fr/syst/dogatech.nsf/liste/00184](http://service.doga.fr/syst/dogatech.nsf/liste/00184)

| | **Information** |
|---|---|
| | You can use your own after-sales service return form as long as it contains all the information necessary to take care of your equipment. |

### 19.5.2 Send your equipment

The returned package must be postage paid to the following addresses depending on your transport mode:

| Postal packages | Carrier packages |
|---|---|
| DOGA - Service SAV | DOGA - Service SAV |
| 8, avenue Gutenberg - CS 50510 | 11, rue Lavoisier |
| 78317 Maurepas Cedex | 78310 MAUREPAS |
| FRANCE | FRANCE |

## 19.6 On site repair

Even though it seems convenient, on-site repair is seldom the best solution for transportable equipment. The conditions in which the technician will work are worse than in our workshops and technician travel expenses are costly.

If you require an on-site intervention, please contact the After-sales department.

**My client area on www.doga.fr**
Go to your client area on www.doga.fr,, click "Your contacts", then select your specific **After-sales contact** depending on the device type.

Our services will organize the intervention.

## 19.7 Warranty

DOGA guarantee all his products against any defect in parts or fabrication for a period of **12 months**.

To benefit from the parts and labor warranty, the following conditions must be respected:

- The ParaMon-Pro X must have been used in a professional use and in accordance with the normal conditions of use described in the instruction manual.
- The ParaMon-Pro X must not have suffered any damage from storage, maintenance or improper handling.
- The ParaMon-Pro X must not have been modified or repaired by unqualified persons.

# 20. SAFETY

## 20.1  General Provisions

| | The instruction manual must be carefully stored in a known place and easily accessible to the potential users of the product. |
|---|---|

| | **Attention** Read this manual and have each operator read it carefully before installing, using or repairing. |
|---|---|

Make absolutely sure that the operator has fully understood the rules of use and the meaning of any symbols affixed to the product.

Most accidents can be avoided by following the instruction manual.

These rules have been drafted with reference to the European Directives and their various amendments as well as standard rules product.

In each case, respect and comply the National Safety Standards.

Do not remove or damage the labels and annotations affixed to the product, more particularly those imposed by the law.

## 20.2  Contra-indications

Do not cover.

Do not immerse.

Do not expose to splashing liquids.

Do not use near to a heat source.

.

# 21. STANDARDS

## 21.1 Manufacturer details

**Importer:** DOGA

**Address:** ZA Pariwest

8 avenue Gutenberg CS 50510

78317 MAUREPAS CEDEX - FRANCE

## 21.2 Marking

| Process Controller | Description |
|---|---|
| ParaMon-Pro X | Type |
| S/N MM/YYYY XXXX | Serial Number Month/Year of production |
| ⬡DOGA® | Name of the equipment manufacturer |
| 100-230V 0.4A | Power Input |
| CE | Equipment designed and manufactured in accordance with the requirements of European Directives 2014/35/UE and 2014/30/UE. |
|  | Every security rule and instruction must be read |

## 21.3 Transport et storage

**Information**

Your equipment can be damage if you store it or transport it improperly. Observe the transport and storage information for your equipment.

### 21.3.1 Transport

Use a suitable container to transport the unit and protect it during shipment.

### 21.3.2 Storage

Respect the following guidelines before each storage:

- Turn off the ParaMon-Pro X.
- Unplug the power cable.
- Clean the tool according to the instruction manual (Maintenance Chapter).
- Store it in a suitable container to protect it from dust and direct sunlight.
- Store it in a dry place at an ambient temperature, below 40°C.

## 21.4   WEEE recycling and end of service life

**The symbol showing a crossed-out trash container, when placed on an electric or electronic device, means that it should not be disposed of with household trash.**

Collection solutions are as follows:

### 21.4.1   Collection and recycling scheme

In compliance with the French Environmental Code covering professional Waste Electric and Electronic Equipment (WEEE) (art. R543-195 et seq.),
DOGA is a member of ECOSYSTEM, an eco-organization approved by public authorities under the conditions defined by art R543-197.
You can also benefit from collection and recycling system proposed by ECOSYSTEM for WEEE originating from the professional equipment marketed by DOGA. Further information on www.ecosystem.eco.
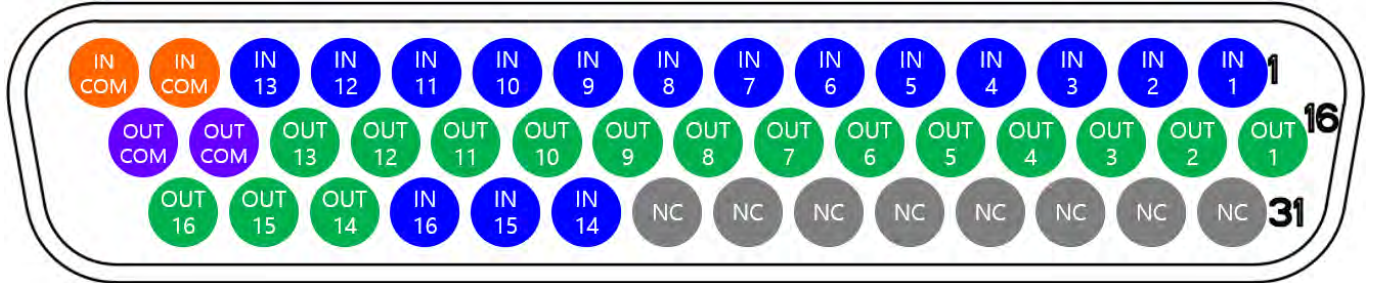
### 21.4.2   Collection points
Free collection points for used electric or electronic devices are available near your company.
Your local authorities can provide their addresses.

# 22. APPENDICES

## 22.1 Interface port DB44 pin out



| ROW 1 (1~15) | | ROW 2 (16~30) | | ROW 3 (31~44) | |
|---|---|---|---|---|---|
| Pin no | Desc | Pin no | Desc | Pin no | Desc |
| 1 | Input 1 | 16 | Output 1 | 31 | NC |
| 2 | Input 2 | 17 | Output 2 | 32 | NC |
| 3 | Input 3 | 18 | Output 3 | 33 | NC |
| 4 | Input 4 | 19 | Output 4 | 34 | NC |
| 5 | Input 5 | 20 | Output 5 | 35 | NC |
| 6 | Input 6 | 21 | Output 6 | 36 | NC |
| 7 | Input 7 | 22 | Output 7 | 37 | NC |
| 8 | Input 8 | 23 | Output 8 | 38 | NC |
| 9 | Input 9 | 24 | Output 9 | 39 | Input 14 |
| 10 | Input 10 | 25 | Output 10 | 40 | Input 15 |
| 11 | Input 11 | 26 | Output 11 | 41 | Input 16 |
| 12 | Input 12 | 27 | Output 12 | 42 | Output 14 |
| 13 | Input 13 | 28 | Output 13 | 43 | Output 15 |
| 14 | Input COM | 29 | Output COM | 44 | Output 16 |
| 15 | Input COM | 30 | Output COM | | |

> **Warning**
>
> An external power supply of 24VDC 1A max. is required to power the I/O commons.
>
> The voltage is not distributed by the ParaMon-Pro X controller.

## 22.2 Backup data forwarding

This section describes the format of backup data transmitted to an external server.

Refer to Share for enable the "Backup data forwarding" function.

When the function is enabled, backup data received from the member tool is forwarded to external server connected via ethernet. The data format is based on Modbus-TCP.

Generally, Modbus-TCP consists of a request/response frame.

However, the backup data is transmitted asynchronously without any request.

| Num of byte | Data | Description | | | |
|---|---|---|---|---|---|
| 2 | Transaction ID | MBAP (Modbus Application Header) | | | |
| 2 | Protocol ID | | | | |
| 2 | Length | Unit ID: Member tool index number (1~8) | | | |
| 1 | Unit ID | | | | |
| 1 | Function Code | Fixed (0x04) | | | |
| 1 | Length | Counted from tool index to the end of the message. | | | |
| 2 | Tool index | Member tool index number (0~7) | | | |
| 2 | Event count no | Increased +1 per tool. | | | |
| 2 | Fasten time | Fastening time | | | |
| 2 | Preset no | Preset number | | | |
| 2 | Target torque | Target torque (e.g. 1,000 = 10.00) | | | |
| 2 | Converted torque | Converted torque (e.g. 997 = 9.97) | | | |
| 2 | Speed | Speed (rpm) | | | |
| 2 | A1 | Angle before the seating point. | | | |
| 2 | A2 | Angle after the seating point. | | | |
| 2 | A3 | Total angle (A1+A2) | | | |
| 2 | Screw no | Screw number | | | |
| 2 | Error | Error code | | | |
| 2 | Direction | 0 | Fastening | | |
| | | 1 | Loosening | | |
| 2 | Status | Code | BM(T) | | MD(T) |
| | | 0x00 | Other | | |
| | | 0x01 | Fastening OK | | |
| | | 0x02 | Fastening NG (E330,332,333,334,335,336,337,338,339) | | |
| | | 0x03 | Fastening/Loosening change | | |
| | | 0x04 | Preset change | | |
| | | 0x05 | Alarm reset | | |
| | | 0x06 | Error (except fastening NG) | | |
| | | 0x07 | Barcode scan | | - |
| | | 0x08 | Screw count -1 | | - |
| 2 | Snug | Snug torque | | | |
| n (0~32) | Barcode | Barcode | | | |

## 22.3    Modbus TCP relay server

In general, a proxy server is a server application that acts as an intermediary for requests from clients from servers that provide service. Enabling the proxy server allows direct access to Pro X's member tools using the Modbus-TCP protocol from external devices. The operation of the proxy server is divided into two types depending on the network configuration.

- **Using the USB Wi-Fi Adapter**

In the figure below, the Pro X and the tool are connected using a USB Wi-Fi Adapter.
In this case, the PC and the tool are different networks and cannot communicate directly.
PC can access the tool through Pro X proxy server.
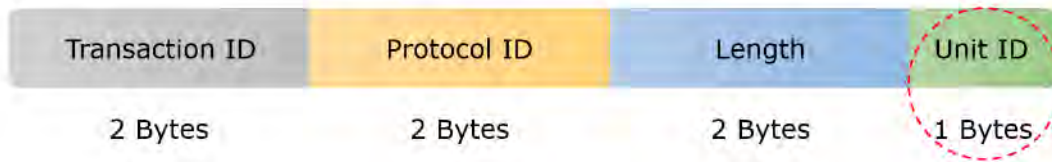


- **Using an external wireless AP**

In the figure below, the Pro X and the tool are connected via an external wireless AP.
Tools, Pro X and PC are on the same network. Thus, direct communication between all devices is possible. However, the tool only supports one connection. Pro X and PC cannot access the tool at the same time. In this case, the tool connects to Pro X and the PC can access the tool through Pro X's proxy server.
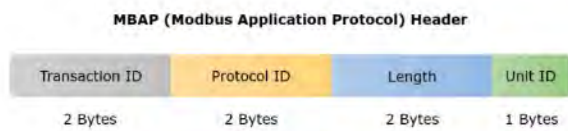
- **How to identify Pro X member tools**

Pro X allows up to 8 member tools. Therefore, in order to directly access the Pro X member tool, the ID of the member tool is required. Below is the Modbus Application Protocol (MBAP) header structure of Modbus-TCP. Pro X uses "Unit ID" field to identify tools.



Unit ID matches Pro X's member tool list.



- **Modbus-TCP Timeout setting**

In general, Modbus-TCP timeout is 500ms, but when using Pro X proxy server, a timeout of 1,000ms (1s) or more is recommended.

## 22.4  Job remote control

Please refer to the remote job control settings described in section [Share].to activate this function.

Below is the list of remote-control Modbus registers.

| Address | Description | Function Code |
|:---:|---|:---:|
| 0 | Reset job | |
| 1 | Reset step | |
| 2 | Skip | 0x06 (Write Single Register) |
| 3 | Back | |
| 4 | Select job | |

There is no event monitoring to keep track of the progress of jobs.

## 22.5   Connect and setup a BST-LCD in USB

Only one BST-LCD can be connected to each ParaMon-Pro X.

Pro X uses a USB-RS-422 converter to connect to a BST-LCD.
Wiring for the USB-RS-422 converter and RJ-45 connector (BST side) is as follows.
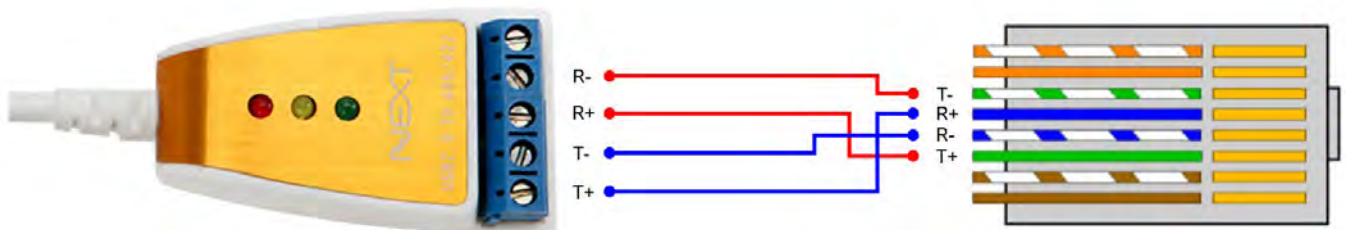


| USB to RS422 Converter | | RJ-45 is RS422 port (BST side) | |
|---|---|---|---|
| GND (NC) | 1 | | |
| RX- | 2 | 3 | TX- |
| RX+ | 3 | 6 | TX+ |
| TX- | 4 | 5 | RX- |
| TX+ | 5 | 4 | RX+ |

The BST RS-422 port (RJ45 connector) is located on the rear of the product and can be connected to any port, left or right.
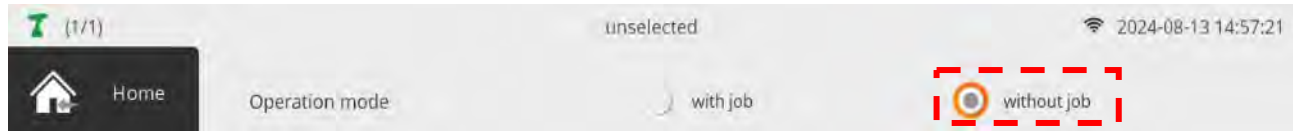
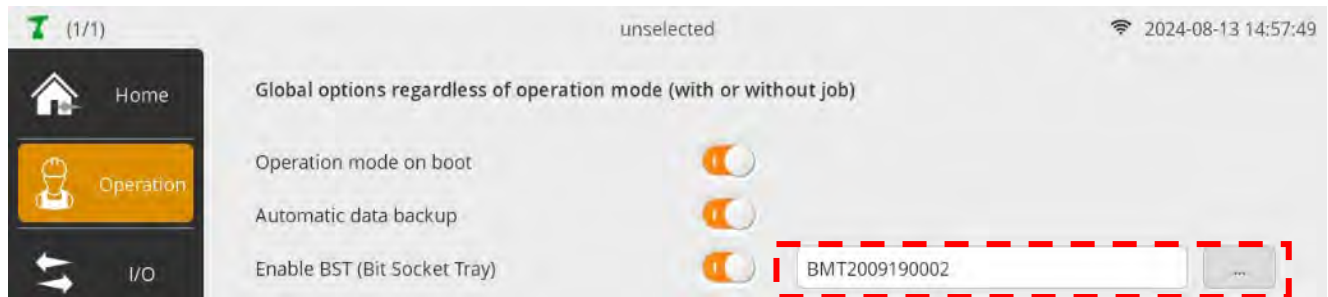The BST-LCD must be set to SERIAL for the Protocol parameter.

BST operates in different ways, depending on the Pro X operating mode setting.

- **BST in "Without Job" mode ".**



It is necessary to specify which of the connected tools is assigned to the BST.

A field to select the tool to be assigned to the BST appears.



Select one tool from the list to be assign to BST.

- **BST in 'Master' (preferred) mode**

When the Pro X operating mode is 'without Job', the BST should preferably be set to 'Master'.

To set the BST operating mode, please refer to the BST user manual.

Picking up a bit automatically selects the preset on the linked screwdriver.
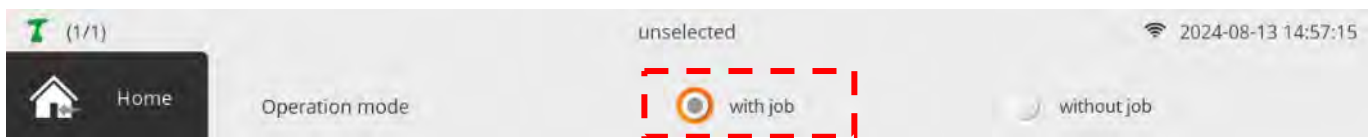
Tool lock/unlock depends on BST alarm status

- **BST in 'Slave' mode**

In the event list of the screwdriver controller menu, select 'preset change'.

Selecting a preset on the screwdriver specifies the bit to be pick up.

Tool lock/unlock depends on BST alarm status.
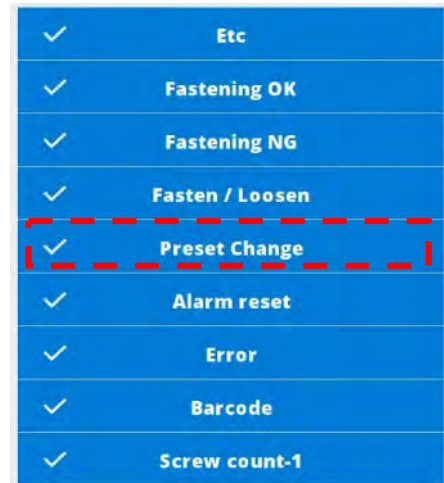
- **BST operation in "With Job" mode "**



When the operating mode of Pro X is 'With Job', the BST must be set to 'Slave' mode.

To set the BST operating mode, refer to the BST user manual.

If the BST is set to 'Master' mode, a warning message appears.

BST operation in "With Job" mode does not require to assign a tool, unlike in "Without Job" mode.

When a tightening step is executed in a job, whatever tool is activated, the selected program number is transmitted to the BST.

The BST then flashes the LED on the bit to be used with the preset.

When the bit or socket is removed, the BST alarm is deactivated, and the tool is unlocked.

If the preset number of the fastening step is greater than the number of bits on the BST, the BST will remain in alarm and the tool will be locked.
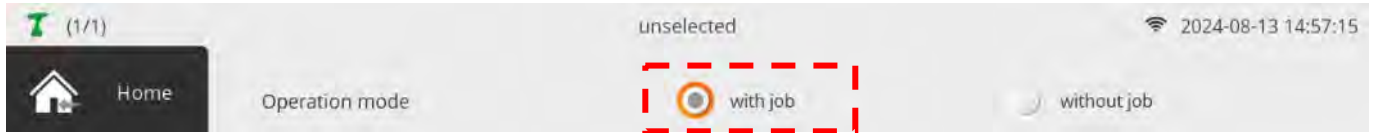
| | **Information** |
|---|---|
| (i) | The use of Virtual Preset in the fastening steps is not possible with a BST. |
| | Only presets P1 to P15 can be selected. |

## 22.6 Connect and set up a BS-5C via the I/O's

The use of a BS-5C color bit tray with a ParaMon-Pro X is only possible via the digital IO's and exclusively in 'Job' mode.



The BS-5C must be set to 'slave' mode.
The routing table will be direct for binary bit selection.
Please refer to the BS-5C manual for parameter setting.

The BS-5C will be connected to the ParaMon-Pro X via the digital I/O on the DB 44 connector.
- either with the dedicated cable if there are no other I/O connections.
- or via the IO box interface to use the first 12 inputs and outputs.

- **ParaMon-Pro X IO's wiring**

| DB44 (male) ParaMon Pro X | Assigned signals | DB25 (male) 3m BIT SOCKET TRAY | Assigned signals |
|---|---|---|---|
| 1 | Input 1 | 9 | Output 9:   select 1 |
| 2 | Input 2 | 10 | Output 10: select 2 |
| 3 | Input 3 | 11 | Output 11: select 3 |
| 4 | Input 4 | 12 | Output 12: select 4 |
|  |  |  |  |
| 6 | Input 6 | 19 | *Output: Driver lock* |
|  |  |  |  |
|  |  |  |  |
| 16 | Output1 | 1 | Input 1: select 1 |
| 17 | Output2 | 2 | Input 2: select 2 |
| 18 | Output3 | 3 | Input 3: select 3 |
| 19 | Output 4 | 4 | Input 4: select 4 |
|  |  |  |  |
|  |  |  |  |
| 29 | Out Com | 21 | 24V |
|  |  | 24 | Out Com |
|  |  |  |  |
|  |  |  |  |
| 14 | In Com | 23 | In Com |
|  |  | 20 | GND |

- **ParaMon-Pro X I/O setting**
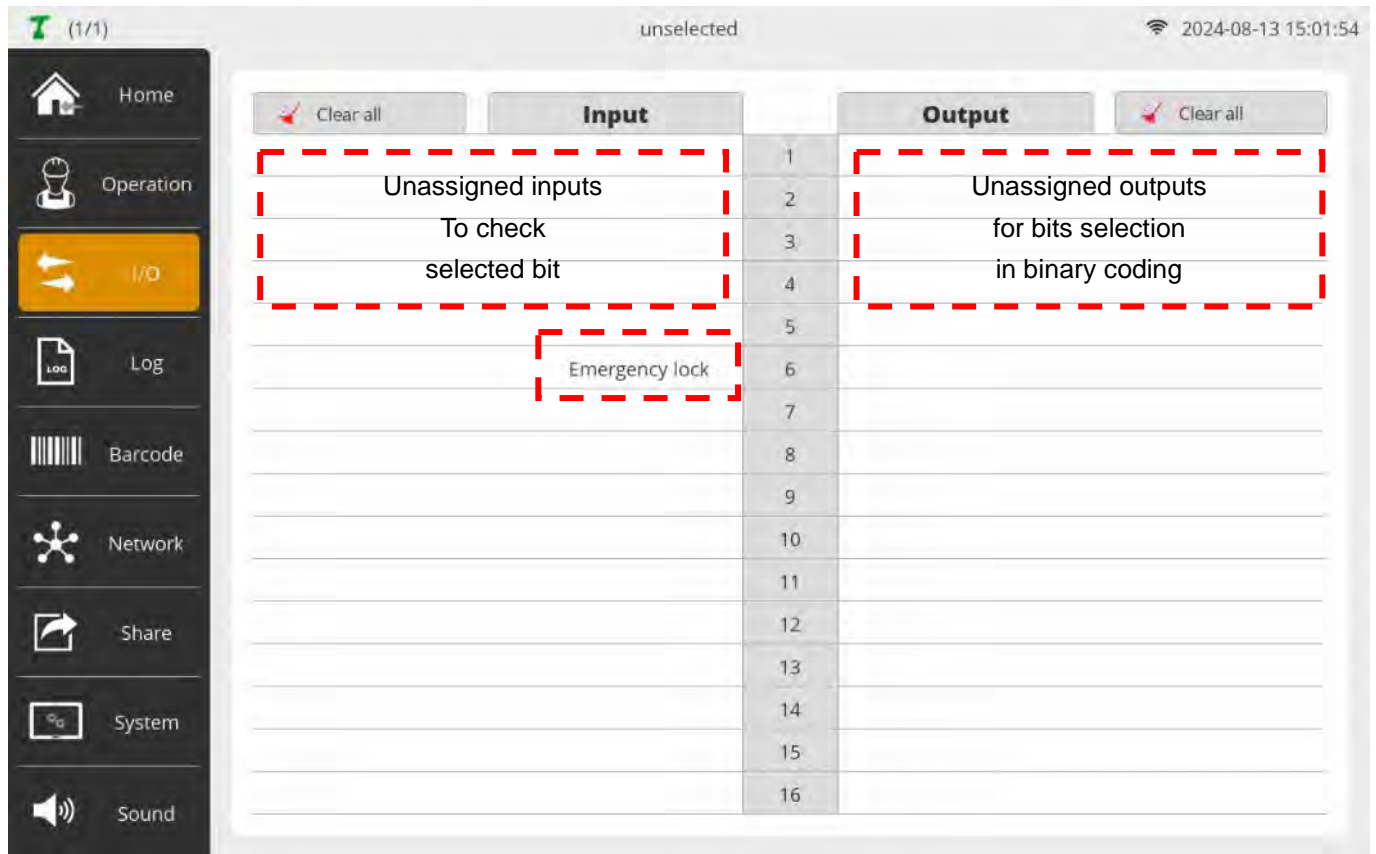


Inputs 1 to 4 and outputs 1 to 4 should remain unassigned.

Input 6 enables the bit tray to lock the active screwdriver in the event of incorrect bit selection.

- **Job setup for bit selection**

A. Before each fastening step, add an output step to select the bit to be used.

   Binary coding

| Bit | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Output 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| Output 2 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 |
| Output 3 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 |
| Output 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |

B. An input step can be added as a transition so that the fastening step only proceeds if the specified bit has been selected. This step is optional, as the bit tray can lock the screwdriver at any time if it detects a bit selection fault (via input 6).