AIS-S Smart Servo Screwdriver
Small Torque (0.15-20 kgf·cm)

VERSION 3.0 REV.A

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1. From The Manufacturer

1.1 Contact Information

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1.2 Representation

SAS POWER TOOLS INC is establishing a worldwide sales and distribution network that can provide local sales and after-sales support, please continue to look up the corporate website to look for the networked partner(s) in your area.

1.3 Copy Right & Publication

Publication: SAS AIS-S Smart Servo Screwdriver User Manual

1.4 Responsibility Disclaimer

SAS will not be responsible for any personal injuries and equipment damage due to inappropriate use of the product. It is strongly suggested that this user manual is carefully read, and instructions followed.

1.5 General Reminders

All TSC touch screen controller touch command buttons are illustrated by 【command】bracket, while all non-touch options are illustrated by single quotation mark 'options'.

- 【】 : the touch command button (letters, symbol, or icon)
- '' **:** options button (selections and switch options)
- ☛ : touch screen cursor

1.6 Attention & Safety Remarks

1.6.1 General Warning

1） Warning: please read through all warnings, reminders, and instructions.
2） Electric shock, fire hazards, and serious injuries can happen if warnings, reminders, and instructions are not followed.
3） Please keep all warnings, reminders, and instructions in a safe and easy-to-access place for future reference.

1.6.2 Safety in the Workplace

1） Keep the work environment bright and clean, poor visibility and an unorganized environment may cause an undesired accident.
2） Do not use the tools in a combustive environment (flammable fluid, gasoline, or combustive dust) or the sparks from using the tool may cause an explosion.
3） Keep children away while the tool is in operation, distraction can cause losing control of the tool.

1.6.3 Electrical Safety

1） Electrical plugs and sockets must be matched without being modified. Plug and socket from the original manufacturer without being modified can avoid the risk of getting an electric shock.

2） Try to reduce the chance of the human body in direct contact with the ground, including large transportation metal tubes, heat dissipators, and refrigerators to reduce the risk of getting an electric shock.

3） Do not expose the tool under rainy or high moisture environments increasing the risk of an electric shock. 4） Treat the electrical wires with care. Do not pull the wire to move, transport, or unplug the tool. Avoid high temperatures, gasoline, sharp objects, and objects in motion to reduce the risk of becoming tangled wires or damaging the wire and getting an electric shock.

5） Use an appropriate extension cord when using the tool outdoors (although strongly recommended not to) to reduce the risk of getting an electric shock.

6） To use the tool in an unavoidable wet environment, ensure a leakage circuit breaker (LCB) is connected to protect the power supply and reduce the risk of getting an electric shock.

1.6.4 Personal Safety

1） Always stay alerted with common sense when operating the tool following the standard operating procedures. Do not operate the tool under the influence of drugs, alcohol, and being extremely tired because any small misstep can cause serious harm to the operator.

2） To avoid unattended tool start, check the switch position before connecting the power, especially when holding the tool.

3） Remove all adjusting tools and accessories connected to the tool before turning on the tool or may cause unwanted consequences like injuries or damages.

4） Keep well-balanced postures when operating the tool.

5） No loose long hair, fuzzy clothes, or jewelry when operating the tools as they may be caught and cause unwanted injuries.

1.6.5 Use & Maintenance

1） Use appropriate tools and bits for the target fasteners to get the best tightening results.

2） Do not operate any tools with malfunctioning switches as it can be dangerous and cause injuries or damage. Please send the malfunctioning switch tool to be repaired before using it again.

3） Disconnect the power to the tool before any adjustment, changing parts, or storing the tool as it may cause accidents the if power is turned on by mistake.

4） Keep the unused tool away from children and forbid untrained users to operate the tool as it may cause danger. 5） Perform regular maintenance on the tool and inspect any factors that can affect the performance of the tool like not calibrated, fixing movable parts, broken parts…etc.

6） If the tool is broken, please repair it before using the tool again to avoid accidents from using the non-properly repaired tool.

7） Keep the tool clean and the edges of the bit sharp to ensure the best performance of the tool. 8） Follow instructions to operate the tools and use the accessories and bits to avoid any accidents.

1.6.6 Before Use

1） Check the voltage and grounding of the power source and use the specified operating power to operate the tool to avoid fire hazards due to incorrect power used. Make sure true ground is used to create an emergency path for electricity or unwanted static changes accumulated to travel through if a short circuit or fault happens.

2） Avoid using the tool at its highest torque specification to ensure a longer tool life.
3） Ensure the integrity of the tool when used. Disconnect and replace it with a new cord if cuts or breakage are

spotted to avoid any electric shock or fire hazards.

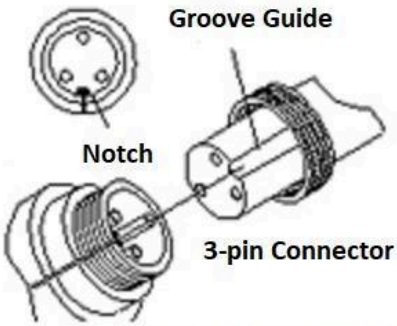
4） Ensure the operating environment is free from high temperature, moisture, or flammable substances. Keep the cords away from tools or equipment that can cut or damage the tool in use to avoid unwanted danger.

5） Pull the plug instead of the cable when unplugging the cord.

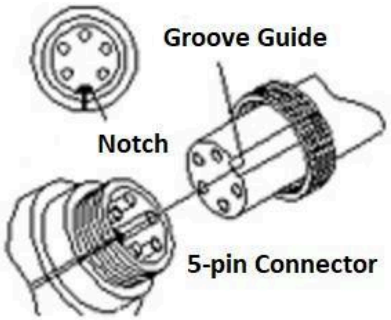
6） When operating the tool, ensure the tool is held on the insulated part to avoid when the tool is in touch with the hidden circuit or power circuit of the workpiece causing electric shock.

1.6.7 During Use

1） A unidirectional design is used in the cable connection between the power adapter and the controller as well as between the tool and the controller. Use the notch and groove to smoothly plug the cable into the connector without forcing to avoid breaking the connector pins if not following the notch and groove guidance as in the following illustration:



Power Adapter to Controller



Controller to Tool

Fix the workpiece: secure the workpiece and set up the appropriate torque according to the engineering specifications before tightening to prevent the unsecured workpiece from spinning and causing damage or injuries.

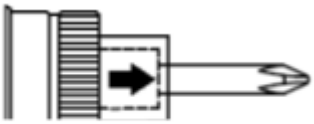
2） Tightening/Untightening: fix the bits into the fastener appropriately before tightening or untightening the fastener. By pressing both the forward and reverse buttons at the same time, the tool is locked and will not perform any action.

Note: do not switch between tightening and untightening while the bit is still spinning, wait until the bit stops completely before switching direction.

3） Bits Insertion: pull the bit socket cover outward (see Picture 1) and insert the bit into the socket while holding the socket cover (see Picture 2) and release the socket cover once the bit is inserted into the socket (see Picture 3). Try turning or pulling the bit to ensure the bit is inserted securely.

Picture 1

Picture 2



Picture 3

Secure the tool: it is best if the tool is hung and secured by a device (balancer for example) to avoid unwanted impact or jammed causing damage while the tool is placed in a crowded space.

Note: hold the tool tightly when operating to avoid the reaction force from causing damage or injuries during break-off when the target torque is reached.

4） Untightening the fastener: if the untightening setting is insufficient, the fastener cannot be untightening. Please check the untightening (reverse) torque setting then try untightening again.

5） The recommended operating cycle of this tool is 1-second tightening and 4-second break (ON/OFF), which is approximately 15000 fasteners per 24 hours. It is strongly recommended not to exceed this fastening speed to avoid overdriving the tool and causing early failure of the tool.

6） Overload operation: when the temperature increases abnormally and suddenly, or the set tightening speed drops ped very quickly, it may indicate the tool is in overloading mode and should stop and check the setting.
7） If the overloading condition is the desired fastening condition, then a higher torque specification tool is recommended or lower the tightening frequency.

1.6.8 After Use

Storage & Maintenance: disconnect and remove the bit, clean the tool, and store the tool in a dry, with no exposure to sunlight, and dust-free environment. Coat the preventive oil to the bit for long-term storage.

1.7 Troubleshooting

Follow the following suggestion to check why the tool is not functioning properly. If the issue cannot be resolved after following the steps recommended, please contact your agent/distributor ASAP. Do not try to disassemble the tool on your own and void the warranty.

1.7.1 Not Turning

1） Check the power source to make sure the power is connected properly 2
） Check the cables are connected properly
3） Check to see if the controller is turned on properly
4） Reboot the controller
5） Contact the dealer/distributor if the issue is not resolved

1.7.2 Turning Is Not Smooth

1） Wait until the bootup process is complete before turning the tool. When the bootup process is completed, the home screen on the touch panel controller will show up.
2） Do not insert the tip into any fastener or device when turning on the system. Reset the system while allowing the bit free to spin.
3） Reboot the controller
4） Contact the dealer/distributor if the issue is not resolved

1.7.3 Loose or Wobbling Bit

1） Check to make sure the correct bit (same as the included bit in the package when purchased) is used 2
） Follow the instructions to reinsert the bit (1.6.7-4)
3） For the wobbling bit, remove and reinsert at a different angle
4） Contact the dealer/distributor if the issue is not resolved

1.7.4 Tool Won’t Stop When Target Torque Is Reached

1） Turn off the power and turn it back on after at least 10 seconds, pay attention and make sure the boot-up process is normal
2） Check AIS priority settings, torque priority must be set to allow the tool to stop when the target torque is reached, or no other criteria are set to prevent the target torque from being reached
3） If torque priority is set but the tool still won’t stop, please check with your agent/distributor for further actions

1.8 Service

Please make sure all repairs and services are done by qualified personnel and under authorization

1.9 Warranty

The product is covered under the manufacturer's one-year or one million tightening cycles parts & labor warranty (free of charge by the manufacturer) based on the invoice date and serial numbers associated with the invoice with the exceptions of the following:

1） Inappropriate use of the tool that causes worn-out, breakage, and aging appearance 2

） Malfunction or damages due to wrong input voltage

3） The warranty seal is broken, and repair or maintenance is performed without authorization

4） Fail to present purchasing records or show valid serial numbers

2. What's Included

The complete package includes the following items:

Item			Qty	Notes
1	Screwdriver (tool)		1	
2	Power adapter & AC/3P cord		1	AC cord for connection to AC outlet and 3P cord for connecting the adapter and the controller
3	Touch panel controller		1	
4	5P data/power DC cable		1	For connecting the controller and the tool
5	8-P terminal block connectors		2	I/O connectors for external
6	Φ4 bits		2	
7	User manual		1	Downloadable @ www.smt-mall.com
8	Base Plate (Desktop Version)		1	
9	Hook		1	
10	Screws + Allen wrench		1	For fixing the controller to the base

3. Product-Related Information

3.1 Applications

1) high precision torque control assemblies in manufacturing with assemblies requiring manufacturing data and traceability, programmable tightening process for automated production
2) smartphones, iWatch, notebooks, dedicated equipment, watches, glasses, automated assembly

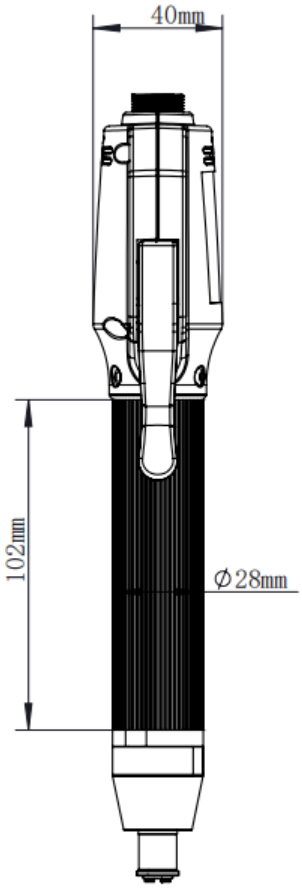
3.2 Characteristics

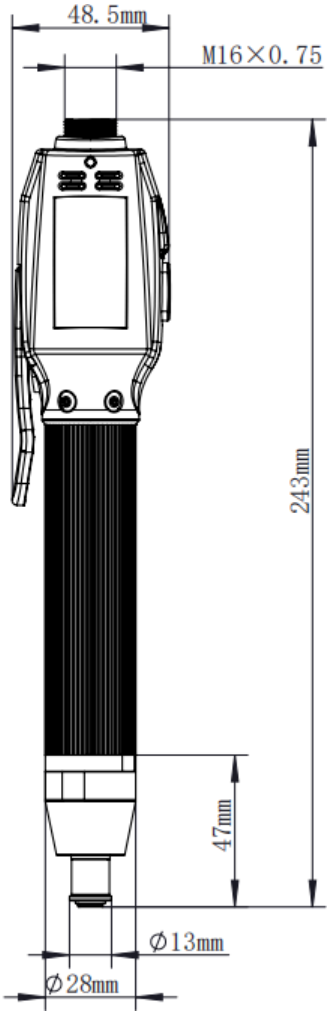
1） up to 8 steps per tightening task, 16 tightening tasks per tightening job, and up to 8 job programmability with independent judgment of torque and angles to reach high precision and repeatability in tightening
2） displayed tightening results with OK\NG\FL(floating)\SS(Stripped) workpiece_count\screw_count\motor_speed\motor_temperature monitor&display
3） wire or wireless cross platforms tightening status display and set up
4） touch panel display and set up of tightening torque, angle, time, and speed
5） instant display and automatic saves of tightening data and curve for up to 5 million records 6） uploadable data of tightening result, count, torque time, angle, serial number, …etc.
7） digital input and output, Modbus, and optional open protocol/barcode scanner connectivity

3.3 Specifications

Item	Unit	Item Description				
Tool Model			AIS(T)-S1.7Pro/Z	AIS(T)-S5.0Pro	AIS(T)-S10Pro	AIS(T)-S16Pro	AIS(T)-S20Pro
Torque Range	kgf·cm		0.3-1.7	1.0-5.0	2.5-10	4.0-16	5.0-20
	lbf·in		0.26 - 1.5	0.85-4.4	2.1-8.7	3.4-13.9	4.3-17.4
No Load Speed	rpm		60-1500	20-1000	20-1000	10-1000	10-800
Applicable Thread	mm		0.7-1.8	1.0-2.6	1.4-3.0	1.8-3.6	2.0-4.0
Available Bit Socket			Ø4▪SH¼▪½Moon	Ø4▪SH¼▪½Moon	Ø4▪SH¼	Ø5▪SH¼	Ø5▪SH¼
Actuation			Lever Start / Singal Start				
Motor Control			FOC				
Variation/Repeatability			< ±5%				
Gyro Sensor			Standard or Optional for Tilt Angle Management & Control				
Dimensions	mm		Ø28.6 x 216				
Tool Weight	g		320				
Touch Panel Controller Model			TSC-1.0				
Dimensions	mm		221 (L) x 113 (W) x 51 (D)				
Weight	g		Hanging Type: 365 / Automation Fixing Type: 365 / Desktop Type: 1190				
Communications			Wi-Fi / EtherNET / RS-232 / RS-485				
I/O			16 Points (Input: 7 & output: 5)				
Inputs			FORWARD/REVERSE/RESET/CONNECT_POWER/JOB_SELECT				
Outputs			OK/NG/FL/SS/WORKPIECE_COMPLETE/TASK_COMPLETE(SCREW_COMPLETE)				
Programmability			8 STEPS / 16 TASKS (SCREWS) / 8 JOBS (WORKPIECE)				
Power Adapter Model			APM-303A @ 75W / APL-403A @ 150W				
Vac In			100-240V @ 50/60 Hz				
Dimensions	mm		110 x 60 x 32		170 x 75 x 40		
Weight	g		230		620		

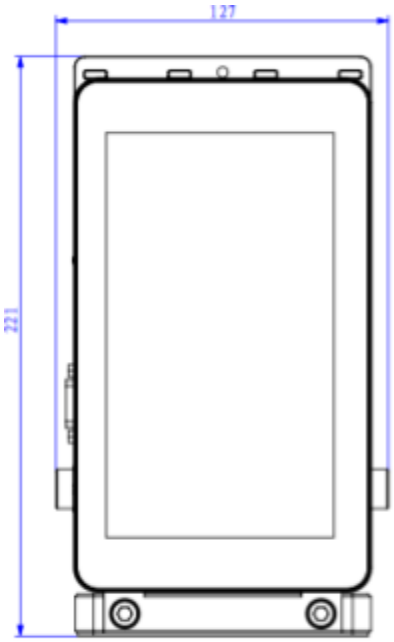
3.4 AI-S Tool Dimensions

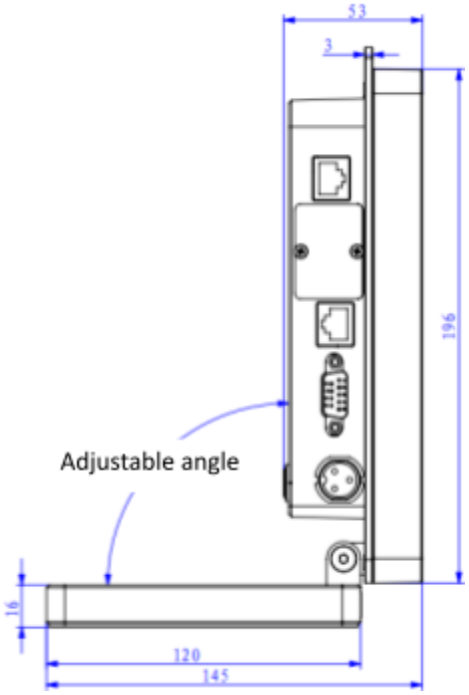




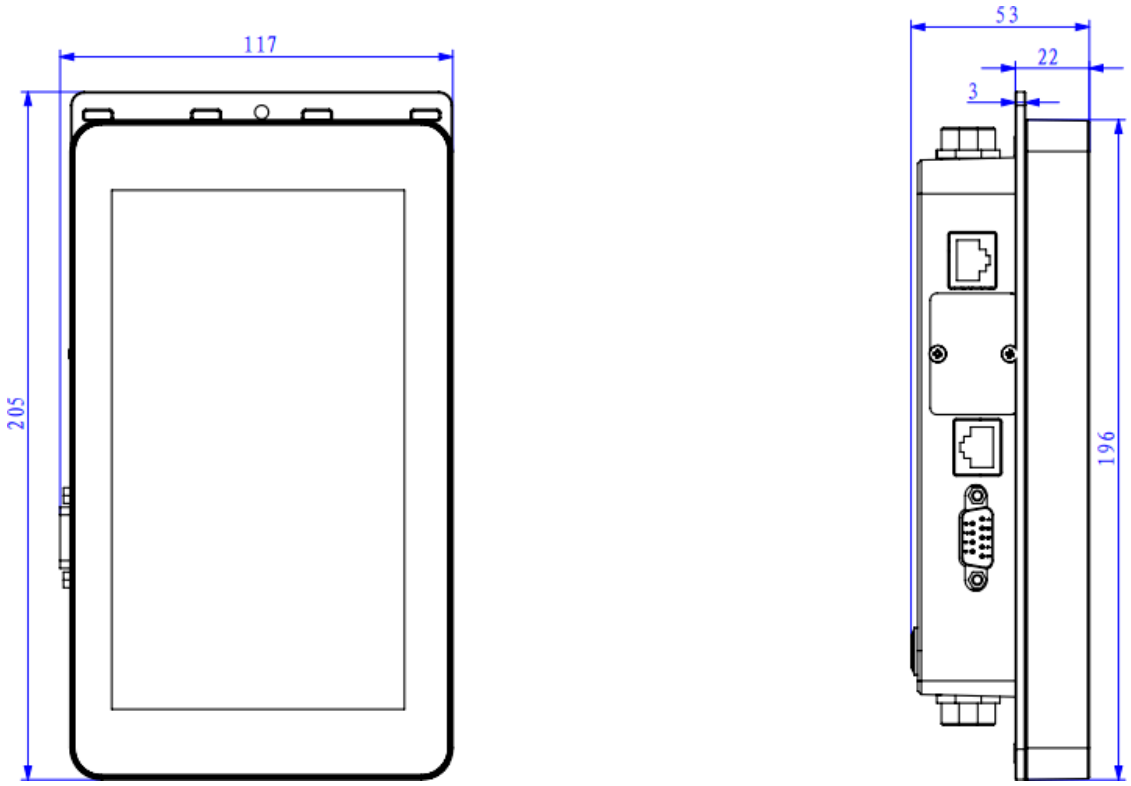
3.5 Touch Panel Controller TSC Dimensions

3.5.1 **TSC-1.0 (Desktop) Dimensions (***Unit: mm)

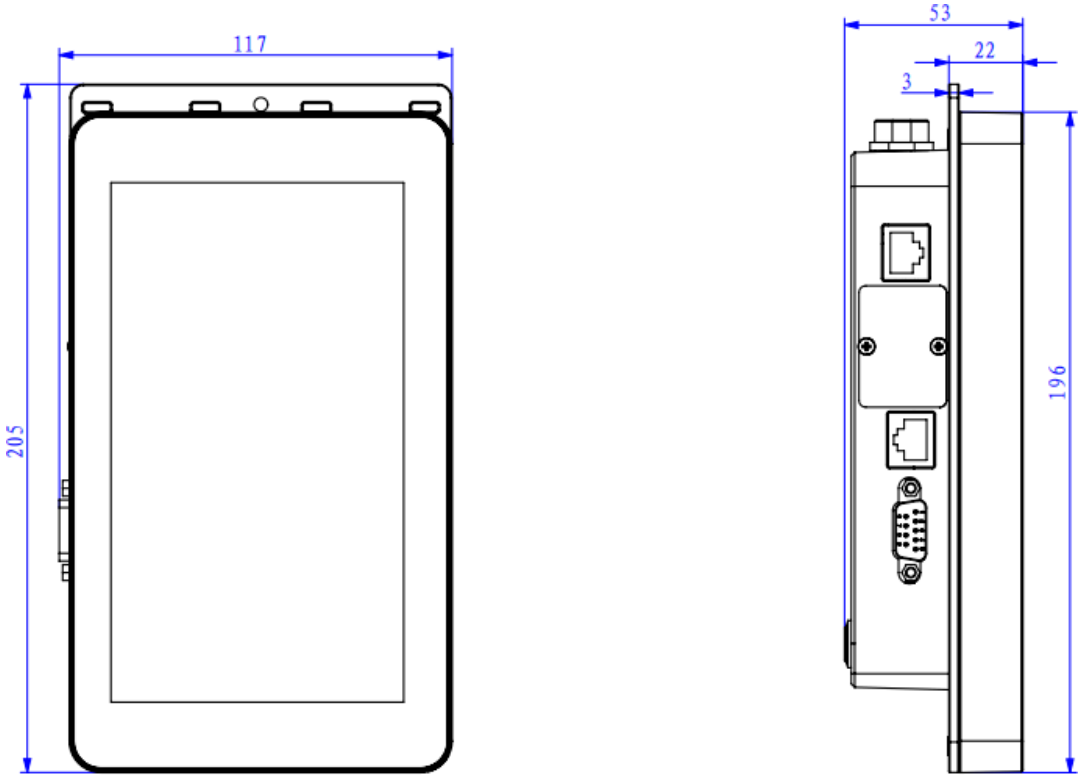




3.5.2 **TSC-1.1 (Hanger) Dimensions (***Unit: mm)



3.5.3 **TSC-1.2 (Automation) Dimensions (***Unit: mm)



4. TSC-1.0 Touch Panel Controller

4.1 Home Page: Everything you need to know can be found here

Main Manu
(to set up & access data)

Peak Torque
(peak torque recorded)

Workpiece Count
(completed workpiece count)

Motor Speed
(instant motor speed)

CLEAR
(reset screw count)

Tilt Angle
(standard tilted angle reporting)

RESET
(reset screw&workpiece counts)

Angle vs. Time Curve
(angle changes over time curve)

Tightening Status & Result
(process & result display)

Screw Count
(workpiece screw count)

Tightening Angle
(tightening complete angle)

Working Task
(active task with displayed results)

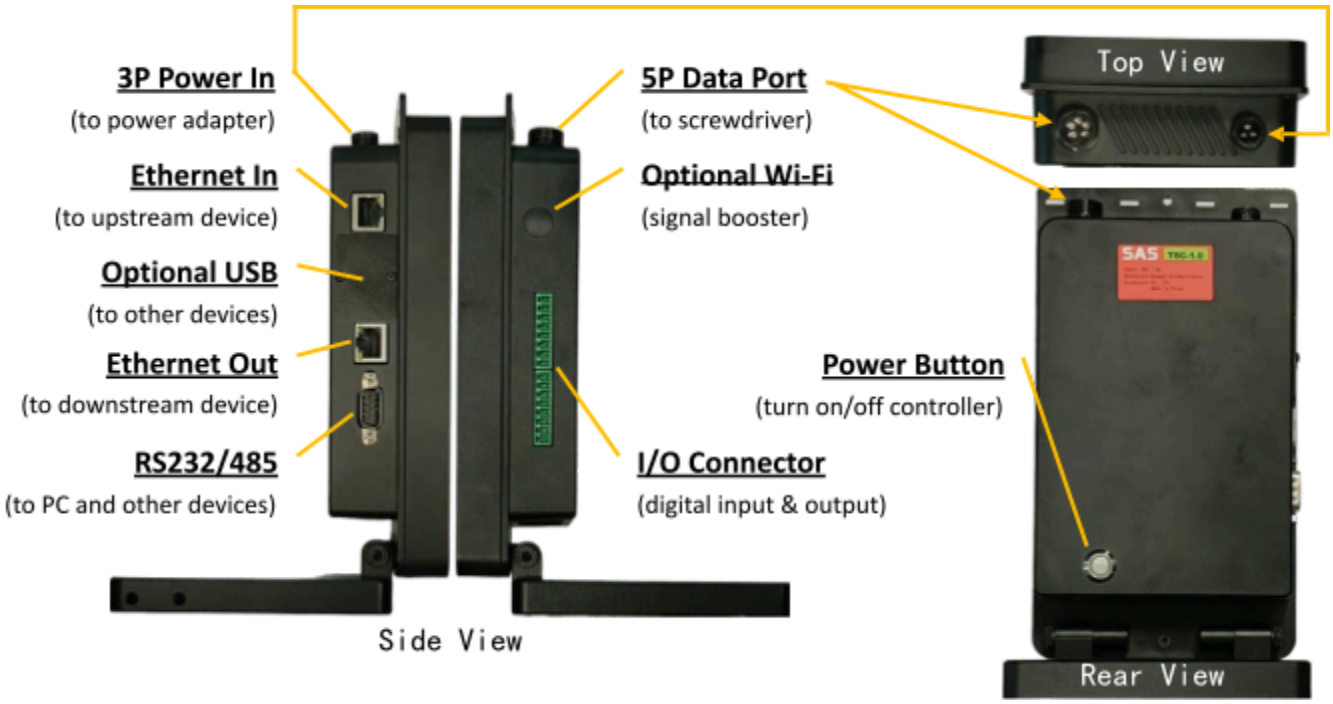
Temperature
(instant motor temperature)

Power-Down
(disconnect power to the tool)

Power-Up
(Connect power to the tool)

Torque vs. Time Curve
(torque changes over time curve)

4.2 Connections & Button



4.3 Power On & Off

Press down the power button on the back of the touch panel controller, the unit will go into a bootup process until the main page is loaded. Pressing down the button again will shut down the unit. All changes of settings will be saved when turning off the power on the main page while nothing will be saved when shutdown is done on other pages.

4.4 Main Menu

With a touch panel design, the main menu provides intuitive navigation guidance so that users do not need to always refer to the user manual. Most settings can be done via the drop-down or selection menu on the touch screen so the user can set up and make changes with the touch of a finger.

1) Main Menu
By tapping the upper left corner ☛【≡】symbol on the **Home Page** will bring up the **Main Menu** for setup

2) HOME
By tapping on the ☛【HOME】 word will bring up the main page for all information displayed during tightening including torque and angle curve

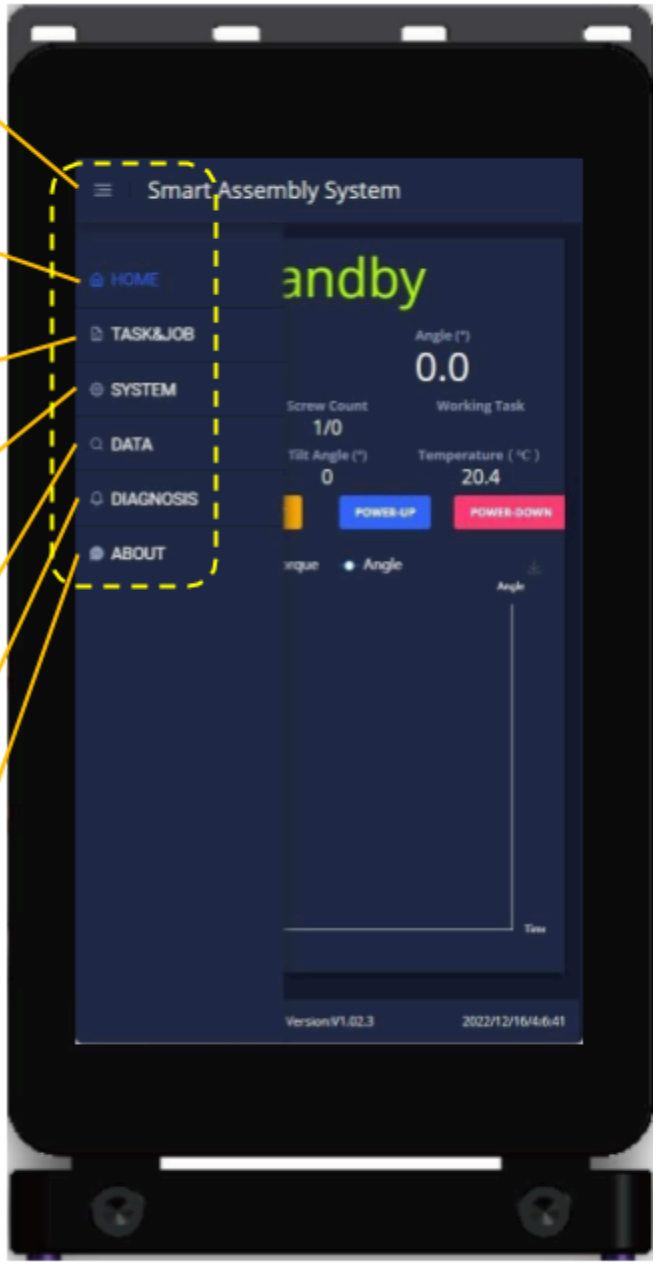
3) TASK&JOB
By tapping on the ☛【TASK&JOB】 word will bring up the tightening steps, tasks, and jobs set-up

4) SYSTEM
By tapping the ☛【SYSTEM】 word will bring up the communications settings (IP\Modbus\Hotspot\Wi-Fi\Permissions) and other settings (I/O\Reverse\Clock\Target\Buzzer)

5) DATA
By tapping on the ☛【DATA】 word will bring up the tightening data view page and data is stored

6) DIAGNOSIS
By tapping on the ☛【DIAGNOSIS】 page can diagnose the defined functions like \FORWARD\REVERSE\POWER-UP\OK\NG

7) ABOUT
By tapping on the ☛【ABOUT】 word will bring up the system information page where the theme and language can also be changed here



5. Tightening Process

A complete tightening process is defined by the terms **'STEP'**, **'TASK'**, and **'JOB'**. A tightening **'STEP'** is used to define how a tightening **'TASK'** is done. It is a single action like a forward turn of a bit, using conditions of torque, angle, speed, and/or time to define how a **'STEP'** is completed. Use a series of **'STEP'** to define how a **'TASK'** is completed, up to 8 **'STEPS'**. For example: **'TASK 1'** is defined by 3 steps: **'STEP 1'**: reverse turning 720 with 500 rpm speed; **'STEP 2'**: forward turning until a torque of 0.2 kgf·cm is reached with 500 rpm speed; **'STEP 3'**: forward turning until a torque of 0.65 kgf·cm is reached with 150 rpm speed

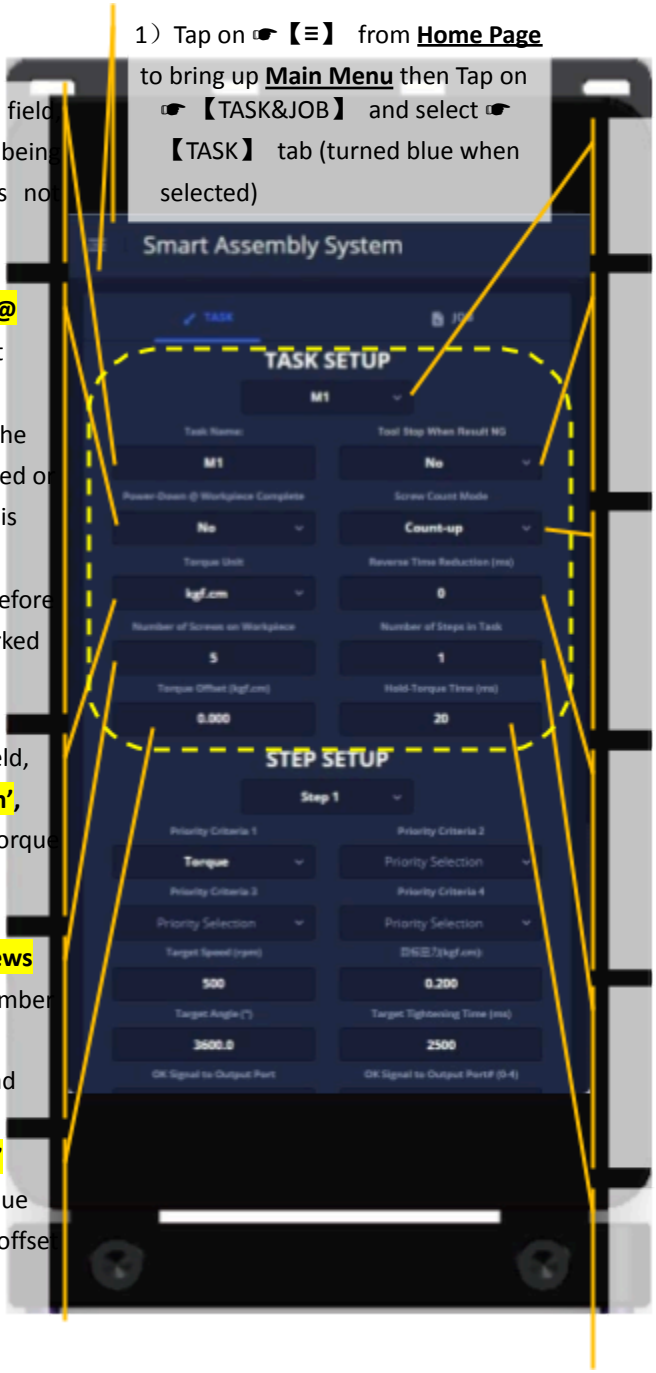
Define up to 16 **'TASK'** and save for later use to define a **'JOB'**, which is a series of **'TASK'**, define up to 8 **'JOB'**.

5.1 TASK&JOB

5.1.1 TASK SETUP

Defining a **'TASK'** is like defining how a screw or how many screws (workpiece or **'JOB'**) are to be tightened.

1）Tap on ☛【≡】 from **Main Page** to bring up **Main Menu** then Tap on ☛【TASK&JOB】 and select ☛【TASK】 tab (turned blue when selected)



2）Under **'TASK SETUP'** field, select from the drop-down **'M1'**-**'M16'** as the task to be set up

3) Under ☛ **'Task Name'** field enter the new name for the task being set up if the default name is not appropriate

4）Under ☛ **'Tool Stop When Result NG'** field, select from the drop-down **'yes'** if tool stop @ NG is desired or **'no'** if not (the tool will continue to work @ NG)

5）Under ☛ **'Disconnect Power @ Workpiece Complete'** field, select from the drop-down **'yes'** if it is required to disconnect power to the tool when a workpiece is completed or **'no'** if no such need (usually **'yes'** is selected so that there will be no accidental activation of the tool before next workpiece is ready to be worked on)

6）Under the ☛ **'Screw Count Mode'** field, select from the drop- down **'Count-Up'** (to full count) or **'Count-Down'** (to zero) as the counting method

7）Under the ☛ **'Torque Unit'** field, select from the drop-down **'mN·m'**, **'kgf·cm'**, **'lbf·in'**, or **'N·m'** as the torque unit to be used

8）Under ☛ **'Reverse Time Reduction (ms)'** field, enter the amount of time from the pop-up keypad to be deducted from the reverse action time

9）Under the ☛ **'Number of Screws on Workpiece'** field, enter the number of screws to be counted on a workpiece from the pop-up keypad

10）Under the ☛ **'Number of Steps in Task'** field, enter the number of steps (1-8) for the selected task to complete from the pop-up keypad

11）Under the ☛ **'Torque Offset'** field, enter the compensated torque value from the pop-up keypad to offset the systematic deviation

12 ） Under the ☛ **'Hold Torque Time (ms)'** field, enter

the amount of time to hold the torque when it reaches the target

5.1.2 STEP SETUP

Define each **'STEP'** of the number of **'STEP'** that are entered when a **'TASK'** is set up. Each **'STEP'** must be clearly defined or the tightening will not be completed properly.

1) Tap on ☛【≡】 from Main Page to bring up Main Menu. Tap on ☛【TASK&JOB】 and select ☛【TASK】 tab (turned blue when selected), scroll down screen until **'STEP SETUP'** is fully visible as shown

2) Under the ☛ **'STEP SETUP'** field, select from the drop-down table the step to be set up (the drop-down table came from the task set up field of how many steps were entered)

3) Under the ☛ **'Priority Criteria 1'** field, select from the drop-down table which criteria (torque\ angle\speed\time) to be used as the 1st priority to judge whether the step is completed

4) Under the ☛ **'Priority Criteria 2'** field, select from the drop-down table (torque\angle\speed\time) which criteria to be used as the 2nd priority to judge whether the step is completed

5) Under the ☛ **'Priority Criteria 3'** field, select from the drop-down table (torque\angle\speed\time) which criteria to be used as the 3rd priority to judge whether the step is completed

6) Under the ☛ **'Priority Criteria 4'** field, select from the drop-down table (torque\angle\speed\time) which criteria to be used as the 4th priority to judge whether the step is completed

7) Under the ☛ **'Target Speed (rpm)'** field, enter the suitable motor speed from the pop-up keypad

8) Under the ☛ **'Target Torque (kgf.cm)'** field, enter the target torque from the pop-up keypad

9) Under the ☛ **'Target Angle (°)'** field, enter the maximum tightening angle from the pop-up keypad

10) Under the ☛ **'Target Tightening Time (ms)'** field, enter the maximum tightening time from the pop-up keypad

11) Under the ☛ **'OK Signal to Output Port'** field, select from the drop-down **'ON'** or **'OFF'** to output the OK signal

12) Under the ☛ **'OK Signal to Output Port#'** field, select from the drop-down available port# (0-4)

13) Under the ☛ **'OK Signal Output Duration (ms)'** field, enter the OK signal duration time from the pop-up keypad when sent to port

14) Under the ☛ **'NG Signal to Output Port'** field, select from the drop-down **'ON'** or **'OFF'** to output the NG signal

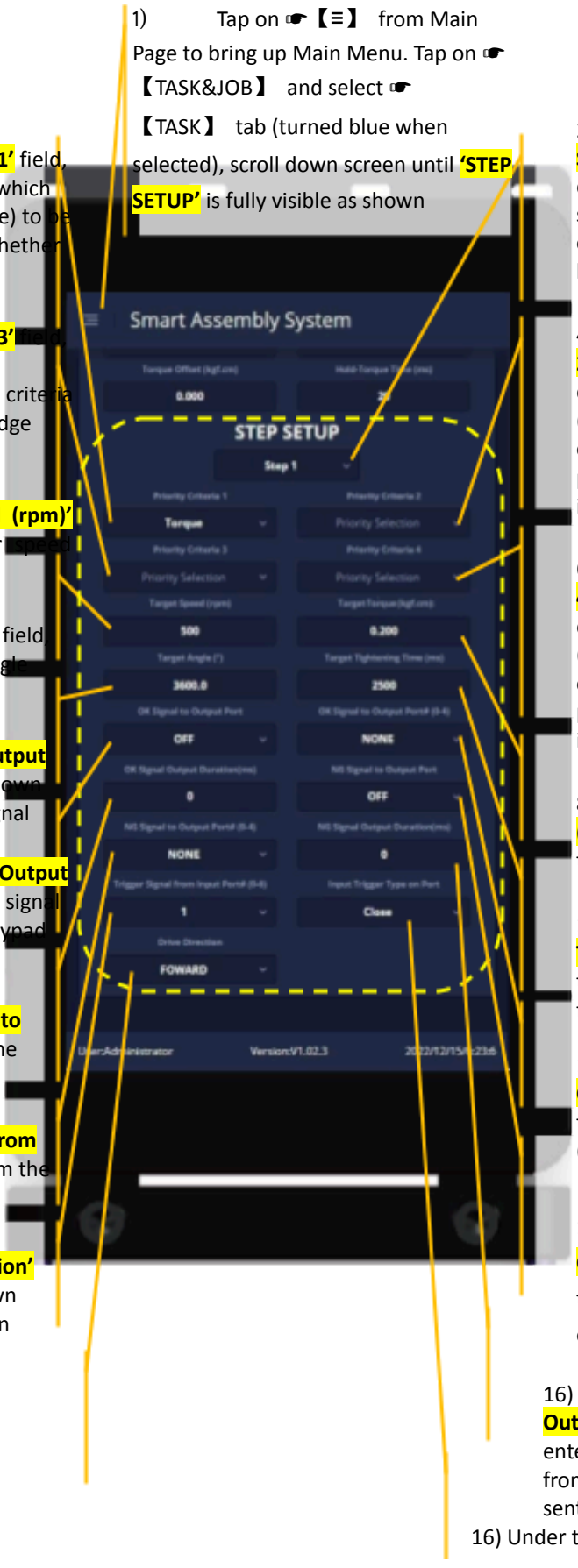
14) Under the ☛ **'NG Signal to Output Port#'** field, select from the drop-down available port# (0-4)

16) Under the ☛ **'NG Signal Output Duration (ms)'** field, enter the OK signal duration time from the pop-up keypad when sent to port

16) Under the ☛ **'Trigger Signal from Input Port# (0-6)'** field, select from the drop-down available port# (0-6)

16) Under the ☛ **'Input Trigger Type**

16) Under the ☛ **'Drive Direction'** field, select from the drop-down **'FORWARD'** or **'REVERSE'** when triggered



on Port' field, select from the drop-down **'Open'** or **'Close'** to trigger

5.1.3 JOB SETUP

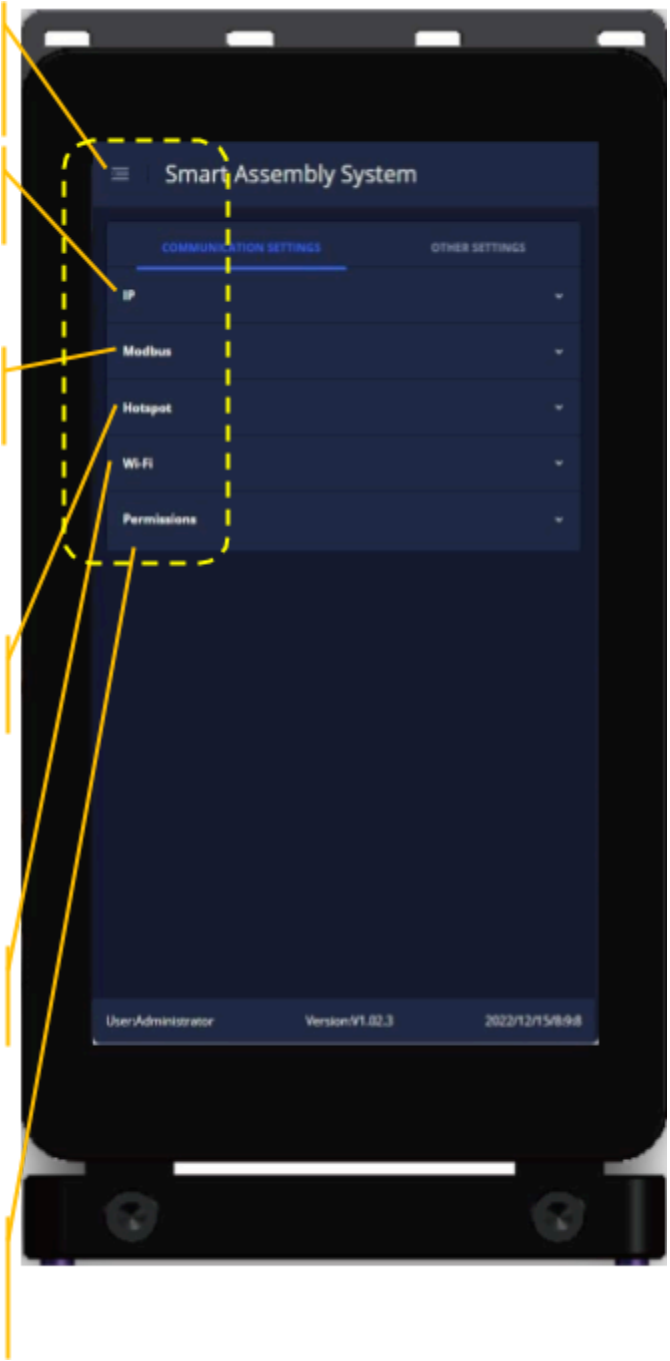
Select up to 16 **'TASK'** when setting up a **'JOB'**, up to 8 **'JOB'** can be programmed and saved.

6. SYSTEM SETUP

'SYSTEM SETUP' is where communications and other settings are set

6.1 COMMUNICATION SETTINGS

Tap on ☛【≡】 from **Home Page** to bring up **Main Menu** then Tap on ☛ 【SYSTEM】 and select ☛【COMMUNICATION SETTINGS】 tab (turned blue when selected)



6.1.1 IP

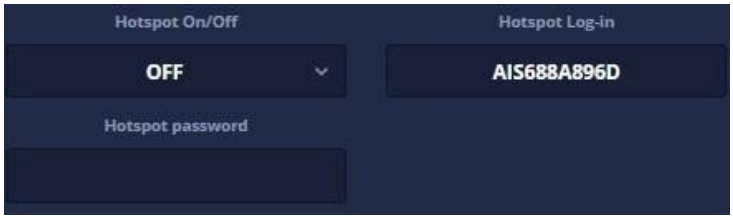
Default Ethernet IP is set as the following

6.1.2 Modbus

Default Modbus settings is set as the following

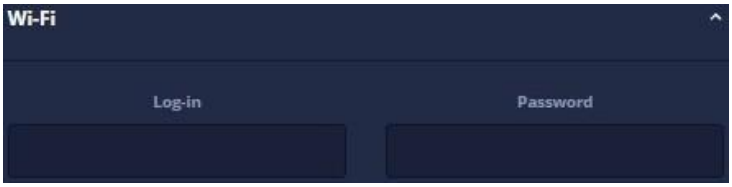
6.1.3 Hotspot

Default Hotspot is disabled



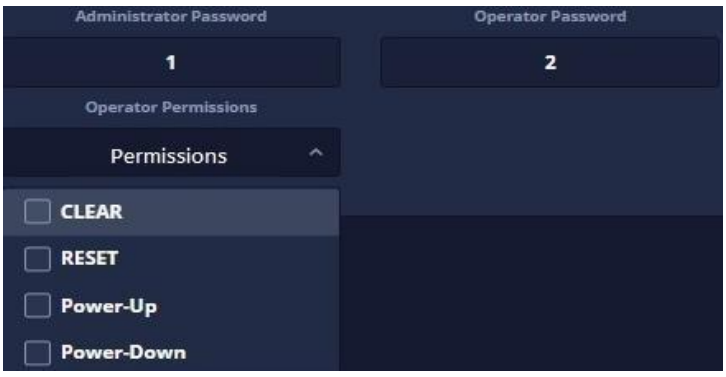
6.1.4 Wi-Fi

Default Wi-Fi is set with no log-in and password



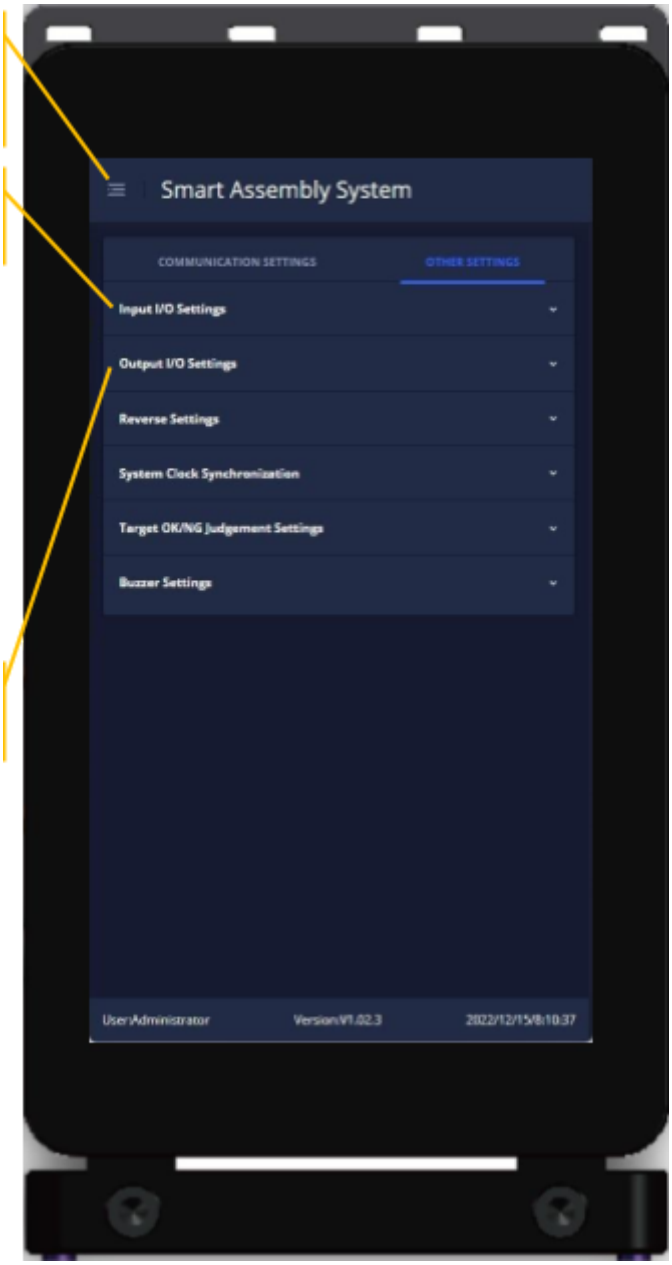
6.1.5 Permissions

The default password for Administrator is '1' and '2' for Operator while operator permissions are set to none



6.2 OTHER SETTINGS

Tap on ☛【≡】 from **Home Page** to bring up **Main Menu** then Tap on ☛ 【SYSTEM】 and select ☛【OTHER SETTINGS】 tab (turned blue when selected)

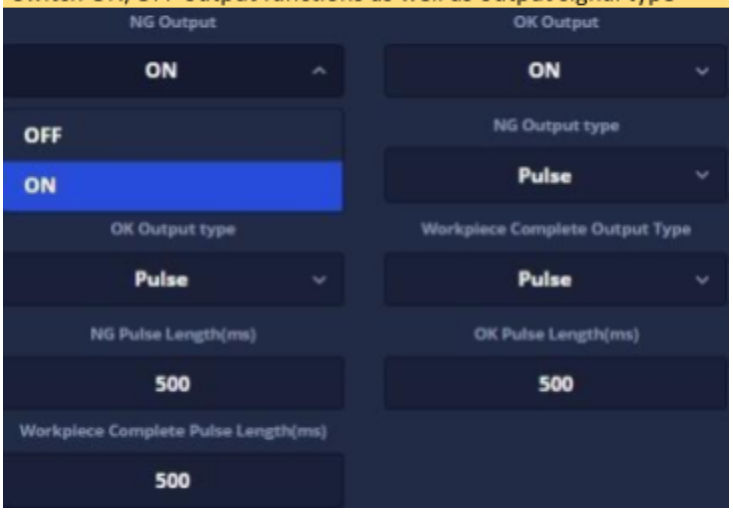


- **Input I/O Settings**

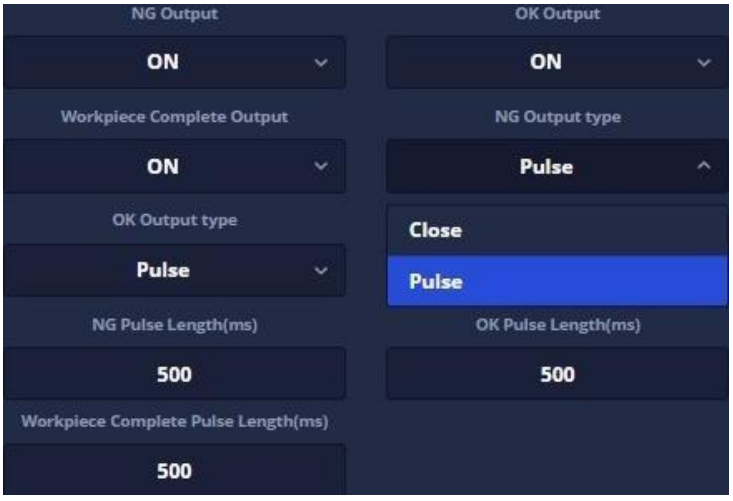
Switch ON/OFF input functions

- **Output I/O Settings**

Switch ON/OFF output functions as well as output signal type

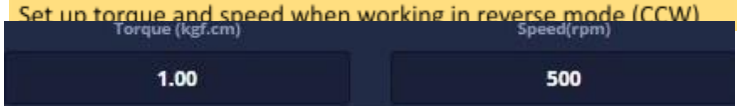


The output signal type can be either ‘CLOSE’ or ‘PULSE’



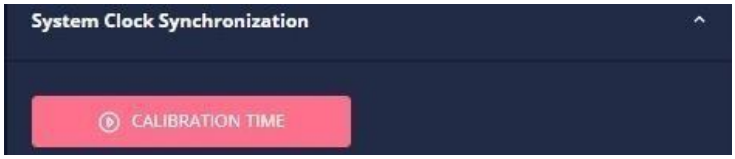
Reverse Settings

Set up torque and speed when working in reverse mode (CCW)



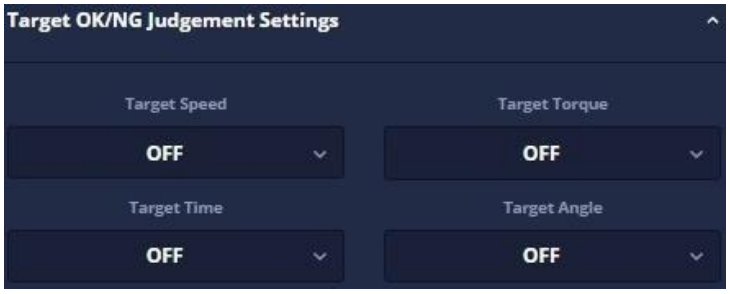
System Clock Synchronization

Synchronize system clock with connected external devices



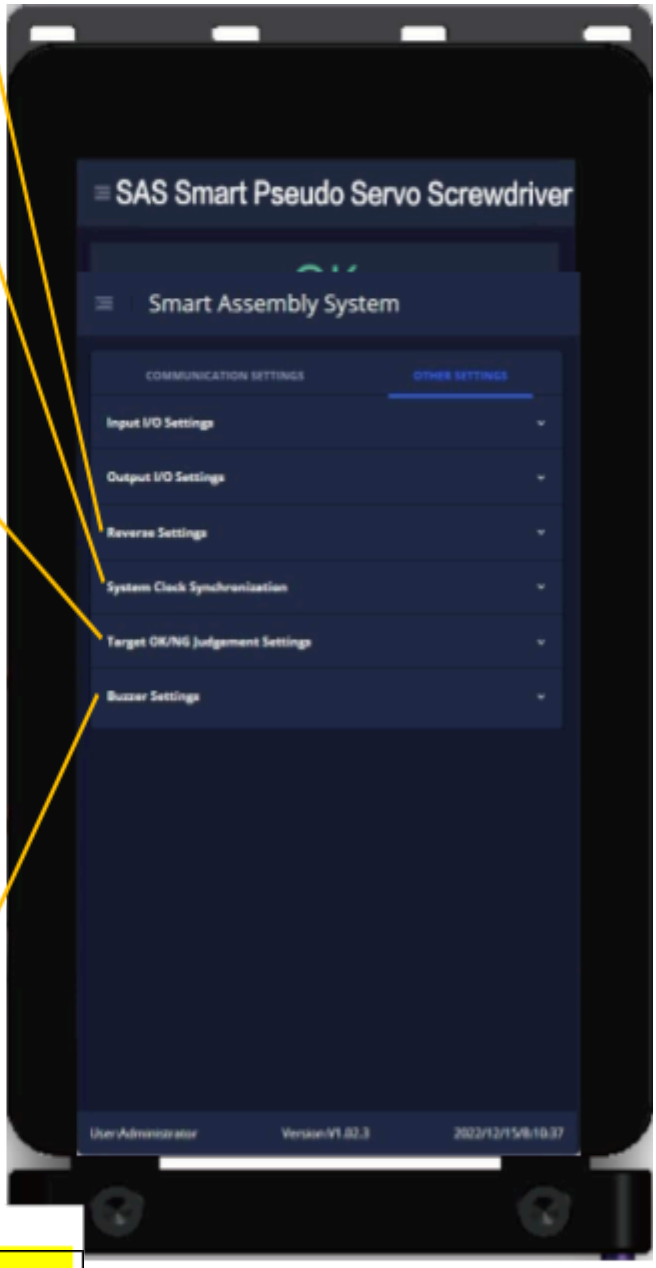
6.2.5 Target OK/NG Judgment Settings

Switch ON/OFF Torque\Angle\Speed\Time OK/NG judgment

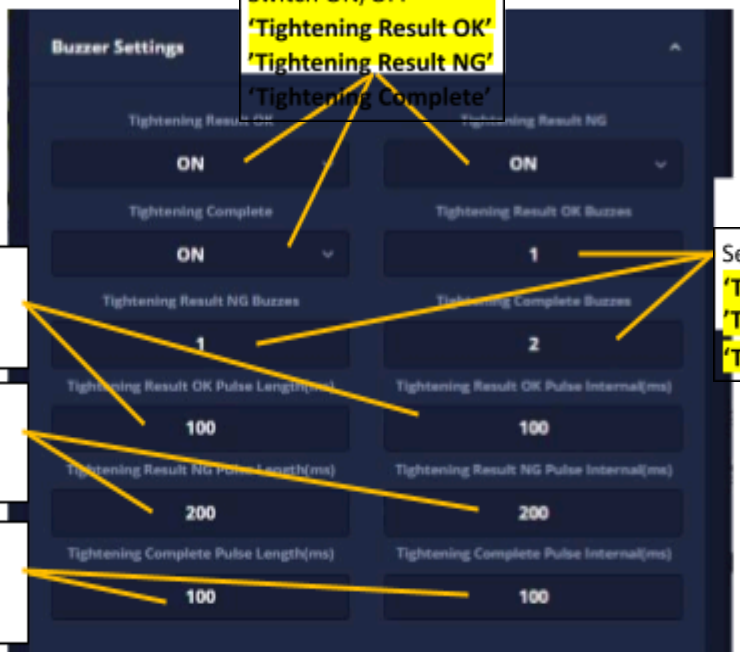


6.2.6 Buzzer Settings

Switch ON/OFF Torque\Angle\Speed\Time OK/NG judgment



Switch ON/OFF
'Tightening Result OK'
'Tightening Result NG'
'Tightening Complete'



Set up number of buzzes when
'Tightening Result OK'
'Tightening Result NG'
'Tightening Complete'

Set up buzz sound-on length and sound-off length when tightening result is OK

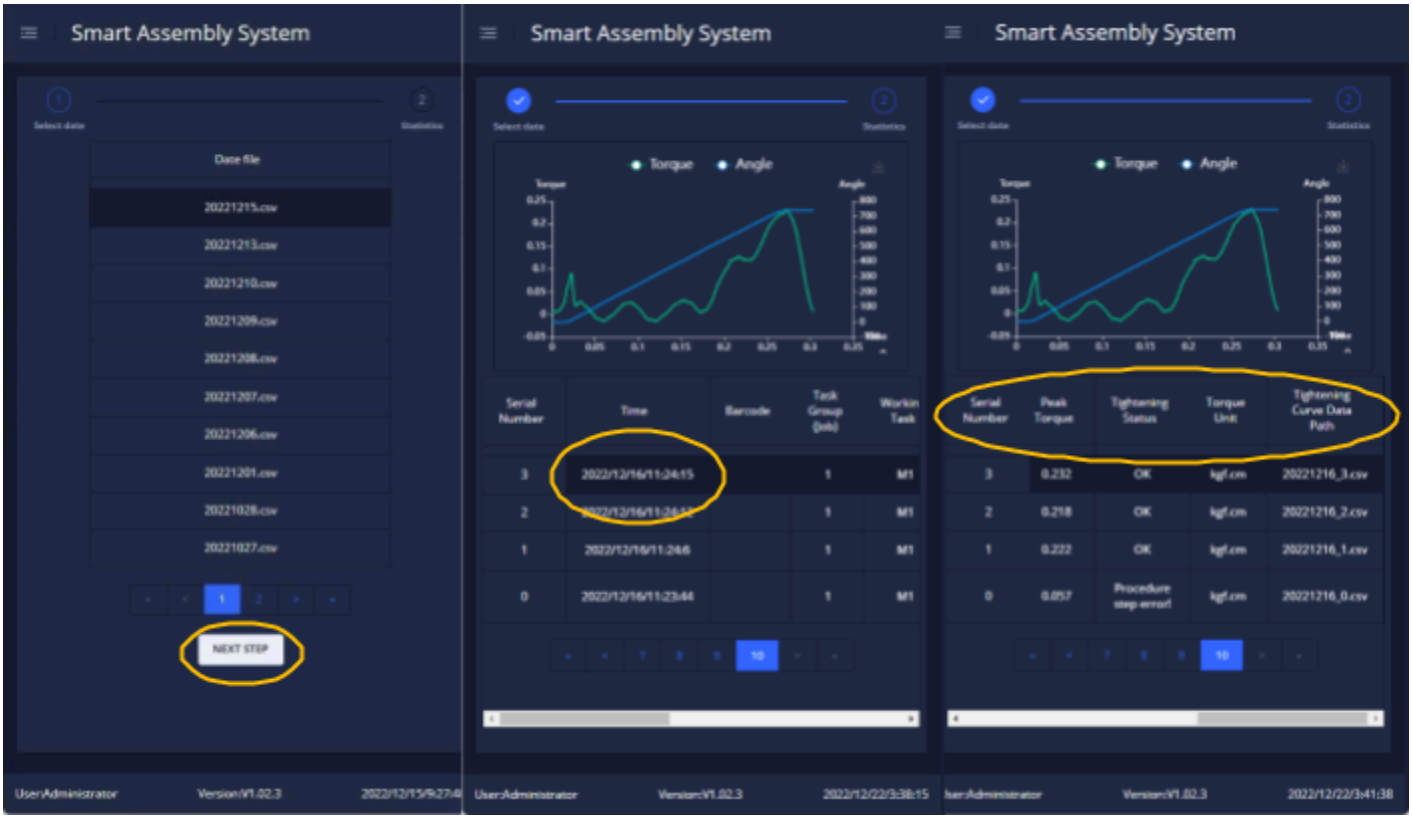
Set up buzz sound-on length and sound-off length when tightening result is NG

Set up buzz sound-on length and sound-off length when

tightening is completed

7. DATA

Tap on ☛【≡】 from **Home Page** to bring up **Main Menu** then Tap on ☛ 【**DATA**】 will enter the tightening data retrieval page. All tightening data is saved into a file per calendar day. By tapping on the specific date will bring up the list of data associated with the time when data was recorded. Click on the specific time stamp and **'Next Step'** will then bring up the associated data and use scroll bar to view the complete data.



8. DIAGNOSIS

Tap on ☛【≡】 from **Home Page** to bring up **Main Menu** then Tap on ☛ 【**DIAGNOSIS**】 will enter the self-diagnose page to check some defined functions to see if these functions are working properly. The left pink column is for the input function while the right blue column is for the output.

Checking the ☛ **'FORWARD'** input function

Checking the ☛ **'REVERSE'** input function

Checking the ☛ **'CONNECT POWER'** (POWER-ON) input function

☛ **'RESERVE'** for the future undefined input function

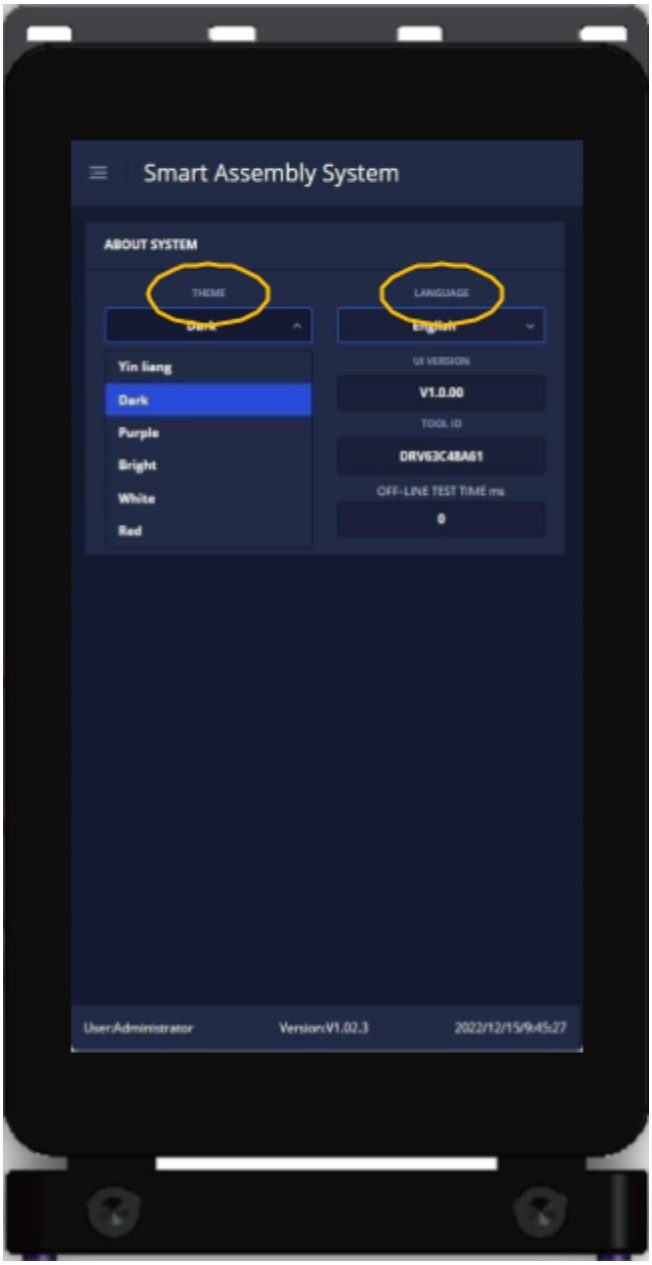
Checking the ☛ **'Tightening OK'** output function

Checking the ☛ **'Tightening NG'** output function

☛ **'RESERVE'** for the future undefined output function

9. ABOUT

Set up a theme and choose a language from the drop-down menu for the system in display while accessing other system information.



10. Connecting To Other Devices

10.1 via Ethernet

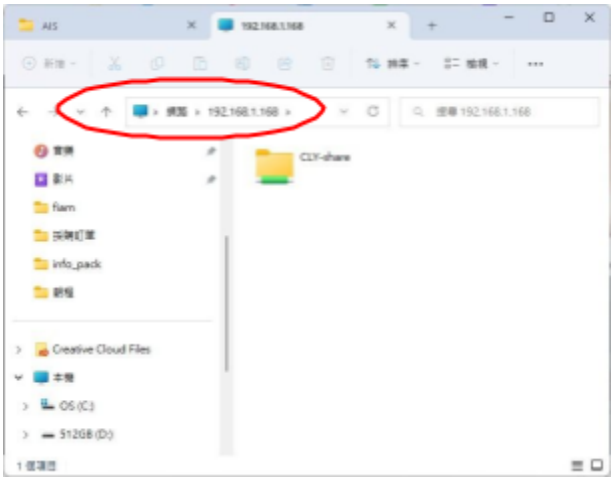
1）connect to other devices under the same local area network 2
）default IP of the device is set at 192.168.1.xxx
3）once join the local area network, use a web browser of a PC or laptop to access the device control panel by entering https://192.168.1.168 in the URL address line without having to install any software
4）when connecting successfully, the browser will display the same Home Page of the touch panel controller as shown and have full concurrent control of the controller

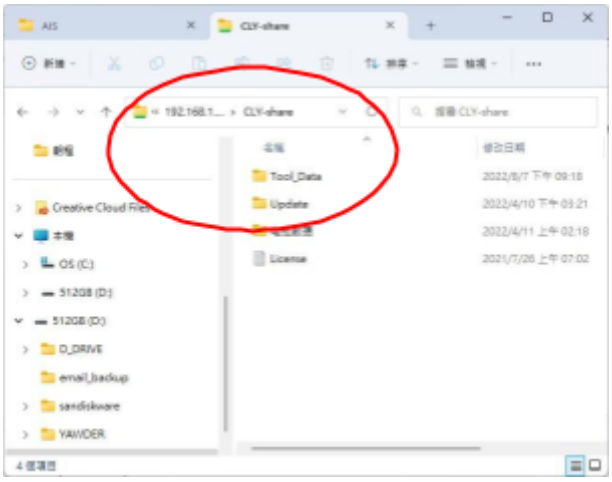
10.2 via Wi-Fi

1） Accessing the touch panel controller via Wi-Fi is similar to the Ethernet. When the device is connected to the same local area network under the same subnet mask, a browser on the Wi-Fi-connected device can connect and have full concurrent control of the system as shown.
2） Wi-Fi can be set up with a login and password for a more secure connection (see SYSTEM set up **6.1.4 Wi-Fi**)
3） AIS-S can also be accessed via Hotspot settings
4） Current Wi-Fi connections are only applicable to iOS mobile devices or PC (laptop)

10.3 Data Access via External Device

When accessing the touch panel controller becomes successful, tightening data can be accessed via File Manager by typing **'\\192.168.1.168'** into the address line and opening the data folder **'\\192.168.1.168\cly-share\Tool_Data'** to access the tightening data or torque curve data file by dates stamps.





Terminal	Function
I8	Common Ground (0 V)
I7	1. Self-defined function 2. JOB Selection (see 11.1)
I6	
I5	
I4	RESET
I3	POWER-ON
I2	REVERSE
I1	FORWARD
O8	+30V
O7	0V
O6	Common Ground (0 V)
O5	Under-Torque (<Lower Limit)
O4	Over-Torque (>Upper Limit)
O3	Screw Complete NG
O2	Screw Complete OK
O1	Workpiece Complete

I8
I7
I6
I5
I4
I3
I2
I1
O8
O7
O6
O5
O4
O3
O2
O1

11. I/O Terminals

Input: I1-I8

*Note that the physical number location is
bottom-up from 1 to 8

11.1 I/O Input Terminal Connections

1）I1 **‘FORWARD’** Terminal: in use with I8 (Common Ground 0V) to trigger **‘FORWARD’** turn

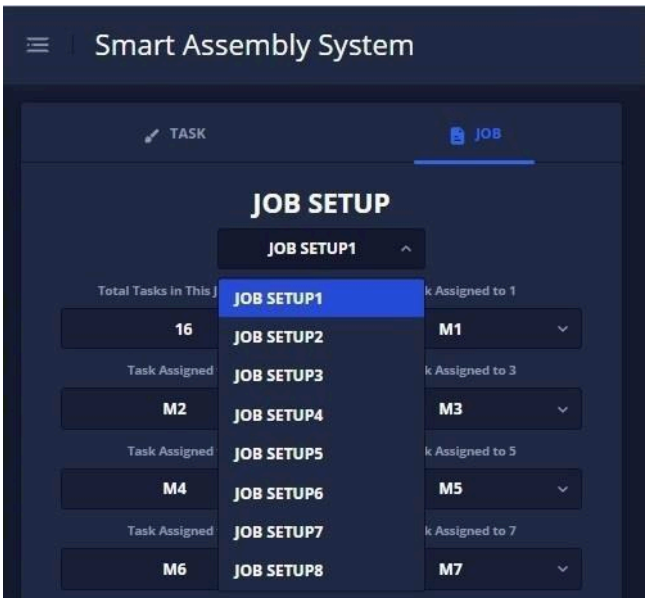
2）I2 **‘REVERSE’** Terminal: in use with I8 (Common Ground 0V) to trigger **‘REVERSE’** turn

3） I3 **‘POWER-UP’** Terminal: in use with I8 (Common Ground 0V) to **‘POWER-UP’** the tool (this function is only active when I/O Input **‘Connect To Power’** function is enabled (see 6.2.1

4） I4 **‘RESET’** Terminal: in use with I8 (Common Ground 0V) to reset screw count and if the I4+I8 closed time is greater than 3 seconds the system will reset both screw count and workpiece count.

5）I5/I6/I7 **‘JOB’** Selection (close with I8):

Terminal	I5	I6	I7	Selected JOB
0: Open 1: Close	0	0	0	JOB 1
	1	0	0	JOB 2
	0	1	0	JOB 3
	1	1	0	JOB 4
	0	0	1	JOB 5
	1	0	1	JOB 6
	0	1	1	JOB 7
	1	1	1	JOB 8



6） I8: 0V Common Ground Terminal for Input Function

(I1-I4) Shorting 5+6+7+8 will be pulling Job 8

Shorting 6+7+8 will be pulling Job 7

Shorting 5+7+8 will be pulling Job 6

Shorting 7+8 will be pulling Job 5

Shorting 5+6+8 will be pulling Job 4

Shorting 6+8 will be pulling Job 3

Shorting 5+8 will be pulling Job 2

11.2 I/O Output Terminal Connections

1） O1 **‘Workpiece Complete’** Terminal: in use with O6 (Common Ground 0V) to send a **‘Workpiece Complete’** signal with a user-defined signal duration

2） O2 **‘Screw Complete OK’** Terminal: in use with O6 (Common Ground 0V) to send a **‘Screw Complete OK’** signal with a user-defined signal duration

3） O3 **‘Screw Complete NG’** Terminal: in use with O6 (Common Ground 0V) to send a **‘Screw Complete NG’** signal with a user-defined signal duration

4） O4 **‘Over-Torque’** Terminal: in use with O6 (Common Ground 0V) to send an **‘Over-Torque’** (peak torque is higher than upper limit) signal with a user-defined signal duration

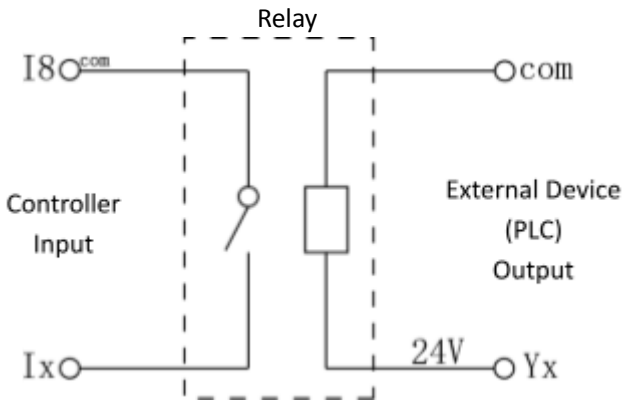
5） O5 **‘Under-Torque’** Terminal: in use with O6 (Common Ground 0V) to send an **‘Under-Torque’** (peak torque is lower than lower limit) signal with a user-defined signal duration

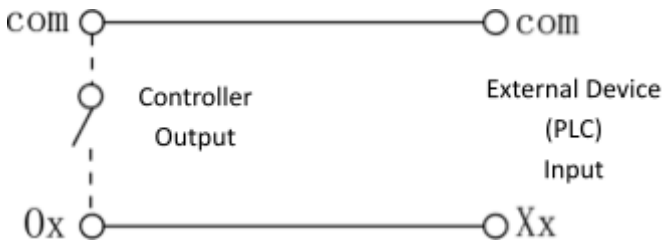
6）O6 Terminal: 0V Common Ground Terminal for Input Function (O1-O5)

7）O7 Terminal: for 0V output

8）O8 Terminal: for 30V output

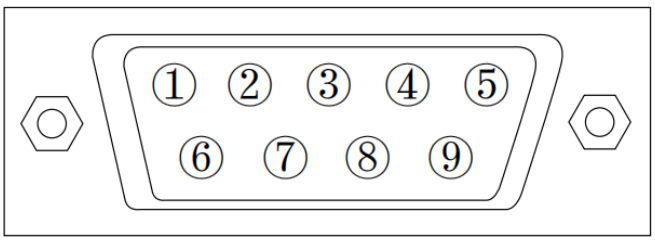
11.2 I/O Terminal Connections Illustration





12. RS232

RS232 Pin Definition



Pin No.	Remarks
①	n/c
②	RX
③	TX
④	n/c
⑤	0V
⑥	n/c
⑦	n/c
⑧	n/c
⑨	5V

13. Communication Protocols (To Be Available)

Modbus Protocol

Item	Modbus Address	Format	Length	Data Type	Remarks
Trigger	0x1064	16 Positive Integer	1	Read Only	0: Not Allowed 1: Allowed
Data Upload	0x1114	16 Positive Integer	1	Write Only	1: data upload enabled
Tool ID Length	0x1115	16 Positive Integer	1	Write Only	Support 0x10 function code
Control Box ID Length	0x1116	16 Positive Integer	1	Write Only	
Tool ID	0x1118-0x1121	Composite Data	ASCII, 20 Characters Max	Write Only	
Control Box ID	0x1122-0x112B	Composite Data	ASCII, 20 Characters Max	Write Only	
Tool Data	0x112C-0x113B	Composite Data	32 ASCII Characters	Write Only	

【Tool Data】: 32 Digits string (HEX Format)

Digit 1: JOB number

Digit 2-4: Peak Torque (2 Integer + 1 decimal)

Digit 5-7: Torque Upper Limit (2 Integer + 1 decimal)

Digit 8-10: Torque Lower Limit (2 Integer + 1 decimal)

Digit 11-12: Motor Speed (2 digits)

Digit 13-14: Lowest Motor Limit (2 digits)

Digit 15-17: Actual Tightening Angles (2 Integer + 1 decimal)

Digit 18-20: Target Tightening Angles (2 Integer + 1 decimal)

Digit 21-23: Actual Tightening Time (2 Integer + 1 decimal)

Digit 24-26: Target Tightening Time (2 Integer + 1 decimal)

Digit 27: Tightening Status (1 digit)

Digit 28-29: Tilt Angle (2 digits)

【Decimal Point】Example

The Peak torque to be reported is 12.34 kgf·cm, the numerical value is 1234 with two decimal points. Therefore the first

2 digits representing the 1234 value are **04 D2** and the 3rd digit **02** for 2 decimal points.