4-Port I/O Gateway

SIG-5600 User Manual

Version 1.6

Sollae Systems

This symbol, found on your product or on its packaging, indicates that this product should not be treated as household waste when you wish to dispose of it. Instead, it should be handed over to an applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences to the environment and human health, which could otherwise be caused by inappropriate disposal of this product. The recycling of materials will help to conserve natural resources. For more detailed information about the recycling of this product, please contact your local city office, household waste disposal service or the retail store where you purchased this product.

Note:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Contents

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1   Overview

1.1 Introduction

SIG-5600 is an industrial I/O gateway equipped with 4 analog input ports, 4 digital input ports and 4 digital output ports. Users can remotely monitor the values of sensors connected to the digital and analog input ports of this product using Modbus/TCP. In addition, users can transmit ON/OFF signals to remote user devices using the digital output port of this product.

1.2 Features

- 4 analog input ports: voltage or current

- 4 digital input ports: Wet Contact or Dry Contact input

- 4 digital output ports (Relay): both NO and NC output

- Support pulse mode on digital output ports

- Support counter function on digital input ports

- Support Modbus/TCP

- Support multiple TCP connection (Max. 4 channels)

- Support a master mode for the *Internet Switch*

- Support a 1-bit ADC function for the *Internet Switch*

- Industrial temperature range (-40℃ ~ +85℃)

☞ *Internet Switch: A configuration that connects devices to each other without an HMI to transmit digital signals in both directions*

1.3 Specification

Digital Input	
Input Type	Dry Contact / Wet Contact / NPN / PNP
Input Voltage Range	4.5V ~ 25V
Number of Ports	4 ports
Digital Output	
Output Type	Relay (Type C - NO: Max DC 30V/5A with resistive load, NC: Max DC 30V/1A with resistive load)
Number of Ports	4 ports
Analog Input	
Input Type	Voltage (0V ~ 5V) or Current (4mA ~ 20mA / 0mA ~ 20mA)

Resolution	12 bits
Number of Ports	4 ports
Network Physical Interface	
Wired LAN	10Base-T/100Base-TX Ethernet (RJ45)
	Ethernet Speed Auto Sense
	1:1 or Cross-over Cable Auto Sense
Wireless LAN	IEEE802.11b/g Wireless LAN with a USB dongle
Software Functions	
Wireless LAN Mode	Infrastructure, Soft-AP
Protocols	IPv4/IPv6 Dual Stack
	TCP/UDP, ICMP, DHCP, mDNS, Modbus/TCP, SSL/TLS
	WPA-PSK / WPA2-PSK, WPA-Enterprise (TTLS / PEAP)
Indicators	
LED	PWR, RUN, STS, LINK, MTX, MRX, Di0~Di3, Do0~Do3
Management	
spFinder	Configuration and Monitoring Tool
Security	Password
Dimension	
Size	180mm x 110mm x 26mm
Weight	about 485g
Operating Environment	
Input Voltage	PWR1 - Terminal Block, DC8.5V~38V
	PWR2 - DC jack, DC5V±0.5V
	USB (Setup) - micro-USB, DC5V±0.5V
Protection	Reverse Voltage Protection / Surge Protection
Current Consumption	typically, 3.3W
Operating Temperature	-40℃ ~ +85℃ (with 5% ~ 85% RH, avoiding icing and condensation)
Storage Temperature	-40℃ ~ +85℃
Certificate	
KC	Registration (KN 32, KN 35)
CE	EMC 2014/30/EU, RoHS 2011/65/EU
FCC	FCC Part 15 Subpart B, Class A

Table 1-1 Specification

1.4 Interface
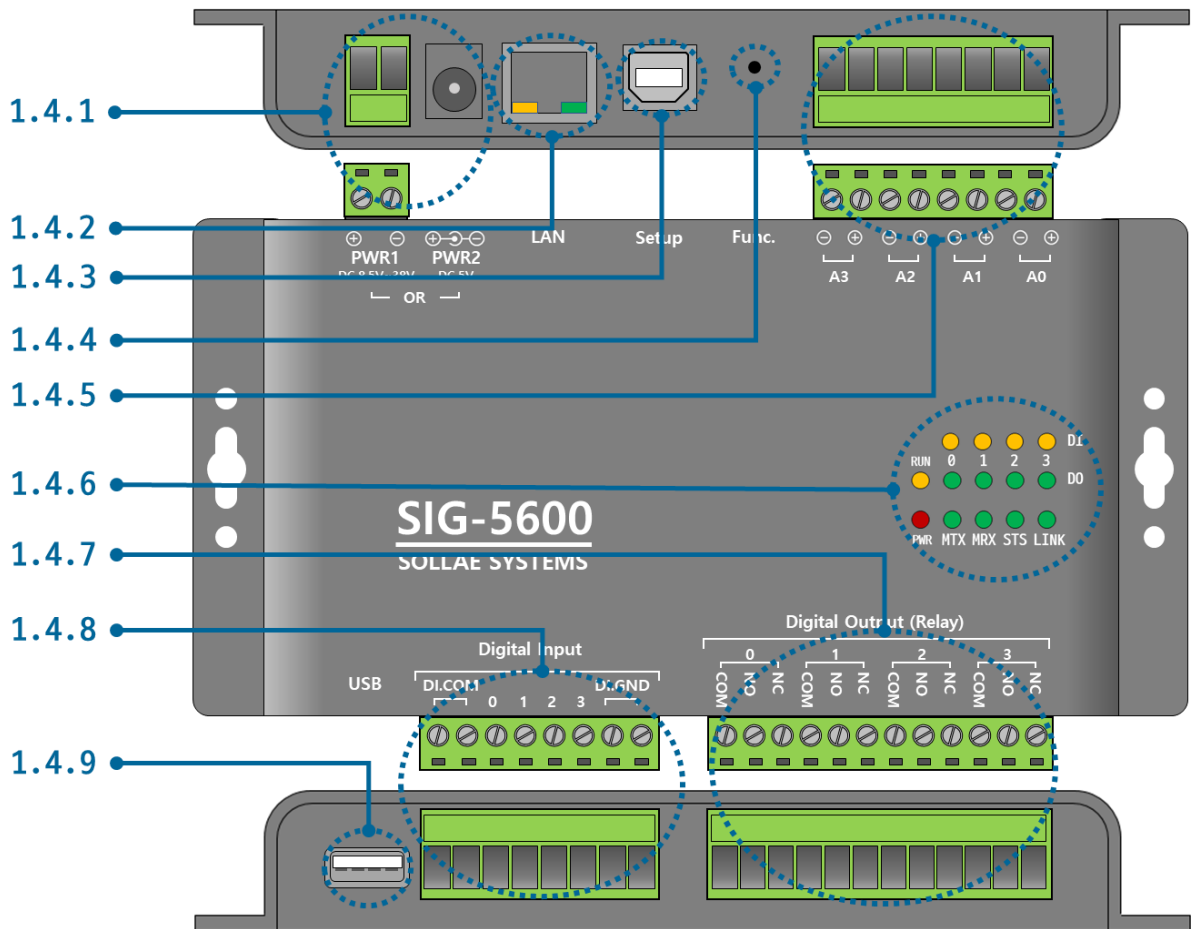
Figure 1-1 Interface

1.4.1 Power

- PWR1 Port

  This port is one of the main input ports for supplying power (DC 8.5V ~ 38V). This port is interfaced with a 2-pole terminal block.

- PWR2 Port

  This port is one of the main input ports for supplying power (DC 5 ± 0.5V). The specification is as follows:

Figure 1-2 Power

https://www.ezTCP.com
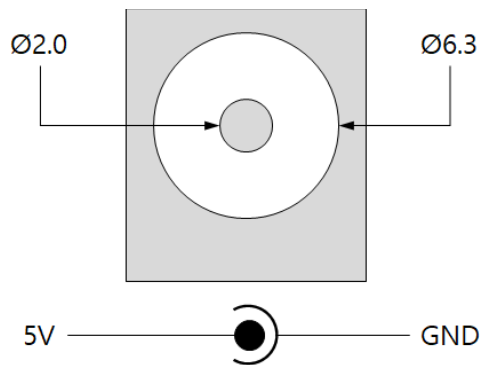
1.4.2 Ethernet

SIG-5600 provides 10/100Mbps Ethernet. The pin assignment is as follows:

#1 : Tx + (Out)
#2 : Tx − (Out)
#3 : Rx + (In)
#6 : Rx − (In)

#8 ··· #1
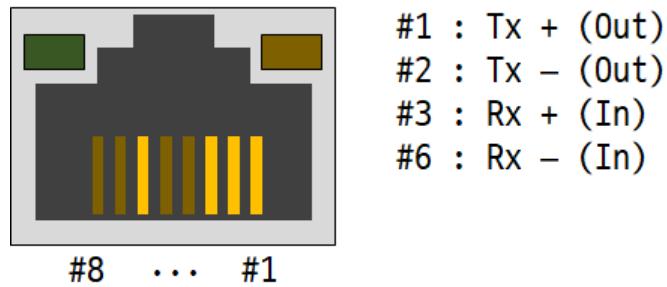
Figure 1-3 Ethernet

1.4.3 Setup Port

This port is used for making a connection with a PC via USB cable.

1.4.4 Function Button

This button is used to implement a factory reset.

1.4.5 Analog Input Port

This port is interfaced with a 5mm pitch 8-pole terminal block.

A0+ A0− A1+ A1− A2+ A2− A3+ A3−
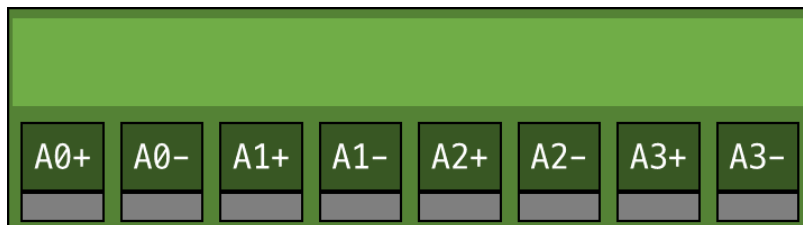
Figure 1-4 Analog Input Port

● Port Specification

Division	Value
Number of ports	4
Input mode	Voltage (0 ~ 5V) or Current (4 ~ 20mA / 0 ~ 20mA)
Resolution	12-bit (0 ~ 4,095)

Table 1-2 Port Specification

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1.4.6 LED

LED operations according to each state are as follows:

When the supplied power is stable: PWR

PWR

When the supplied power is NOT stable: PWR

PWR

When the script is running: RUN

RUN

When the script is NOT running: RUN

RUN

When a network is NOT connected: LINK

LINK

When a network is connected: LINK

LINK

When an IP address is NOT assigned: LINK

LINK

When a TCP connection is NOT established: STS

STS

When a TCP connection is established: STS

STS

When sending data to the TCP: MTX

MTX

When receiving data from the TCP: MRX

MRX

When the input/output port is OFF: Di0 ~ Di3, Do0 ~ Do3

Di0/1/2/3, Do0/1/2/3

When the input/output port is ON: Di0 ~ Di3, Do0 ~ Do3

Di0/1/2/3, Do0/1/2/3

1.4.7 Digital Output Port

This port is interfaced with a 5mm pitch 12-pole terminal block.
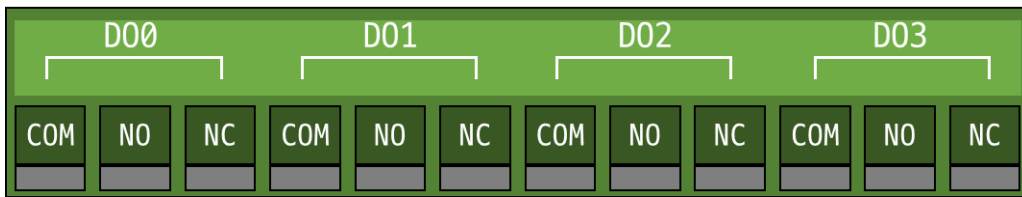
Figure 1-5 Digital output port

● Port Specification

Division		Value
Number of ports		4
Max. Allowed Current at DC 30V	Normal Open	5A
	Normal Close	1A

Table 1-3 Port Specification

☞ *The port specifications are for resistive loads. It is recommended to design about 10 ~ 20% of the maximum allowable current for capacitive loads such as SMPS and inductive loads such as motors.*

● Port Operation

Division	NO Operation	NC Operation
OFF	NOT connected to COM	Connected to COM
ON	Connected to COM	NOT connected to COM

Table 1-4 Port Operation

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1.4.8 Digital Input Port

This port is interfaced with a 5mm pitch 8-pole terminal block.
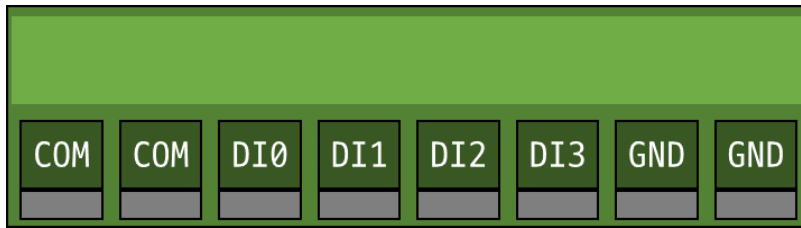
Figure 1-6 Digital Input Port

● Port Specification

Division	Value
Number of ports	4
Maximum Input Voltage	DC 25V
Voltage Required for ON decision	higher than DC 4.5V
Voltage for OFF decision	lower than DC 1V

Table 1-5 Port Specification

● Circuit Diagram of Digital Input
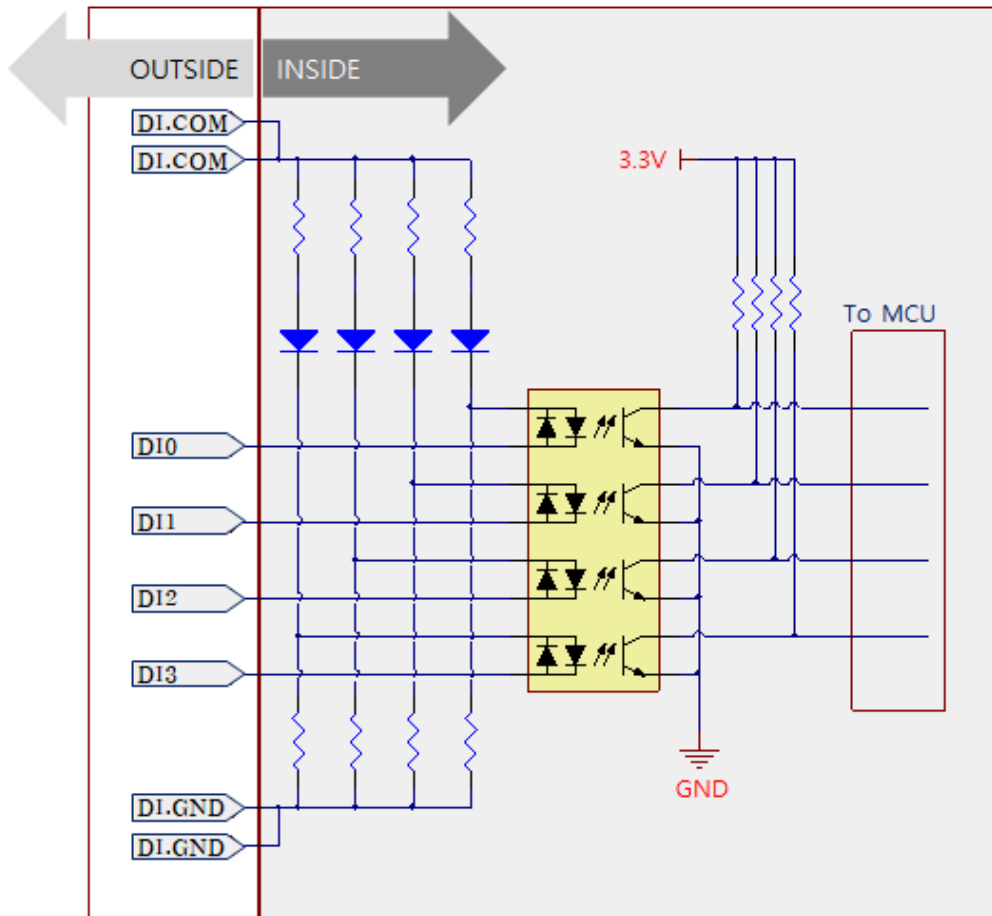
Figure 1-7 Circuit Diagram of Digital Input

● WET contact
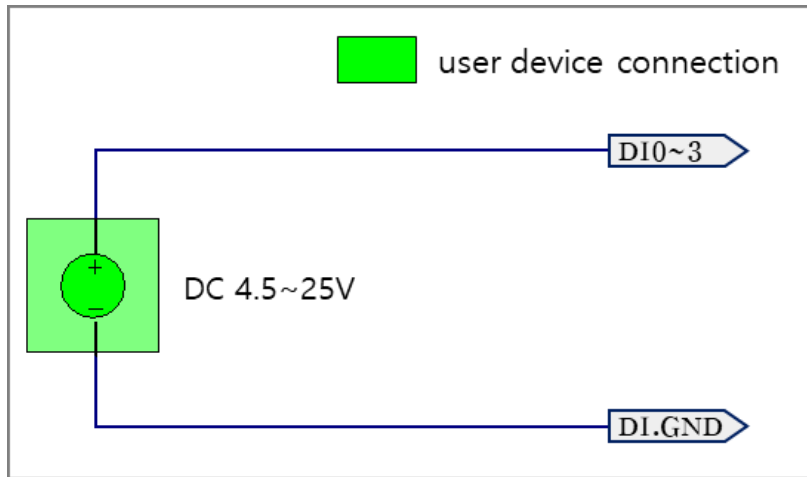
Figure 1-8 WET contact

● DRY contact
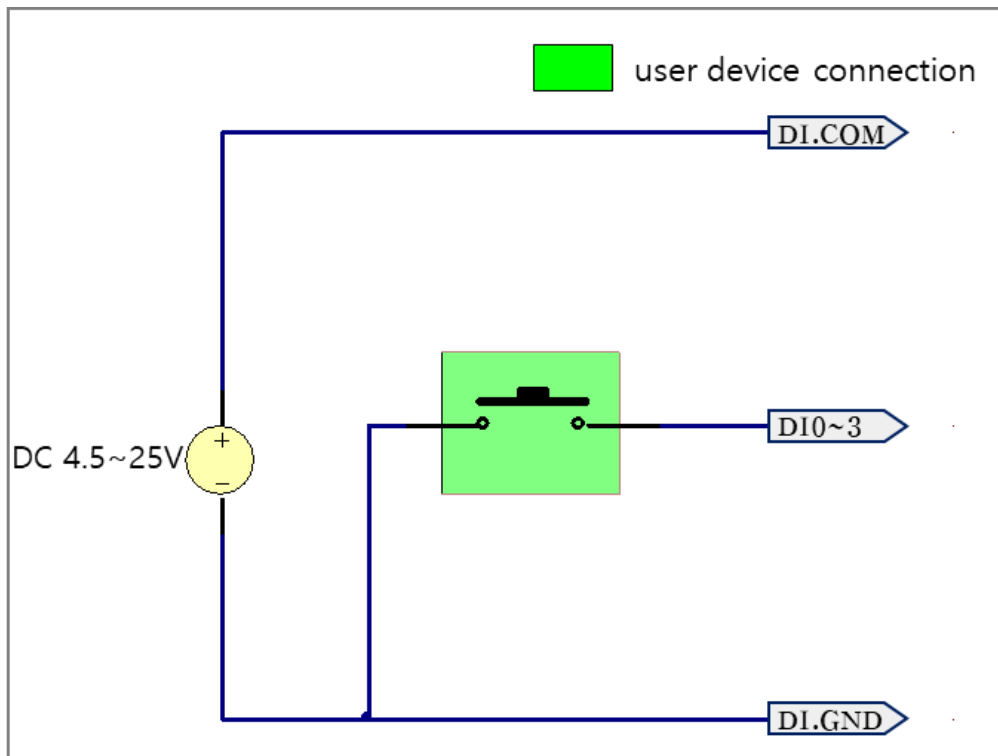
Figure 1-9 DRY contact

● NPN transistor
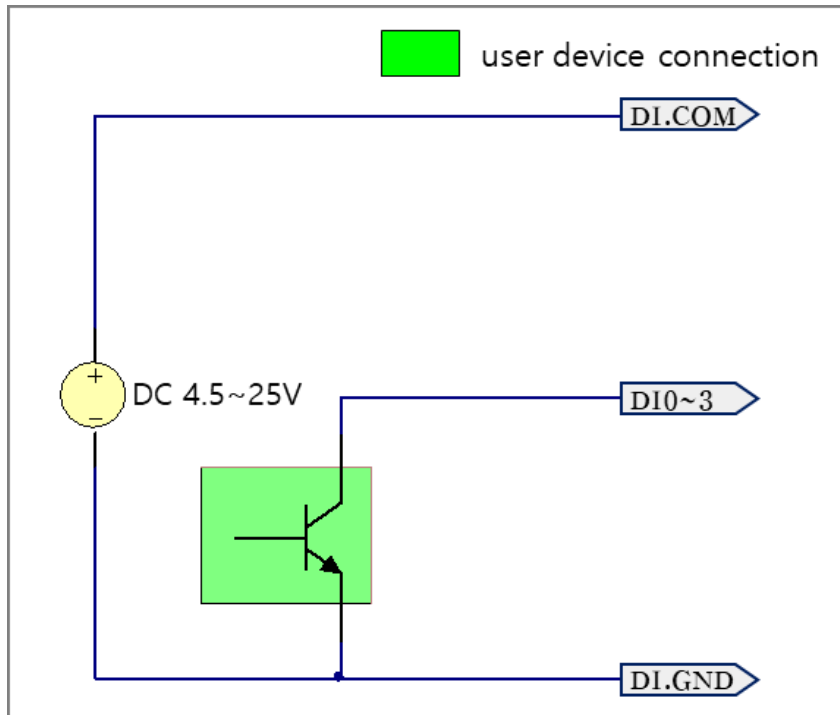
Figure 1-10 NPN transistor

● PNP transistor
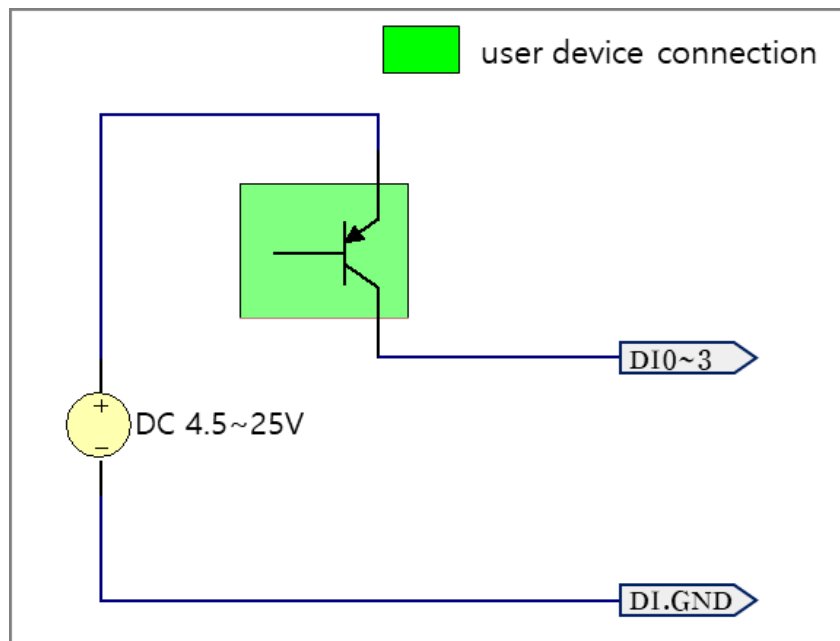
Figure 1-11 PNP transistor

1.4.9 USB Host Port

This port is for connecting a USB wireless LAN adapter. You can connect your product to IEEE802.11b/g wireless LAN with connecting a USB wireless LAN adapter to this port.

☞ *Caution: Only adapters using Ralink RT3070/5370 chipsets are available.*

2   Preparation

2.1 Installing the Setting Tool

You need a program which is called spFinder to use this product. Download the program on our web site and install it on your PC.

Functions of the spFinder are as follows:

● Searching products connected via network and USB

● Setting products

● Monitoring status of products

2.2 Connecting a Product

Connect a product with your PC via a LAN cable or a USB cable. In the case of using a LAN cable, note that your PC and the product should be on the same local area network.

2.3 Searching Devices

Run spFinder on your PC and press the search button. If you select the product found, the setup menu appears on the right.

2.4 Logging in

Before accessing the searched product, you need to log in first. The default ID and password are as follows:

Division	Default Values
ID	sig-5600
Password	sig-5600

Table 2-1 The default values of ID and password

☞ *If you search the product via network and it has the default value for a password, spFinder automatically processes the login.*

3 Settings

3.1 Network

3.1.1 Obtain an IP address automatically

This product can automatically obtain an IP address by DHCP. A DHCP server is required to use this.
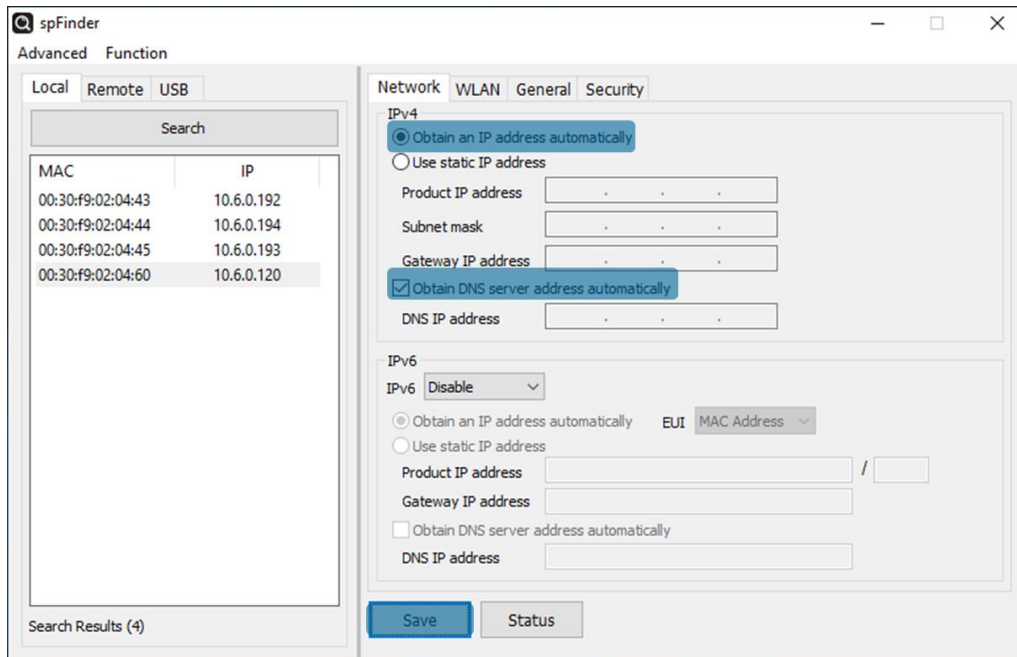
Figure 3-1 Obtain an IP address automatically

- Select the [Obtain an IP address automatically].

- Check the [Obtain DNS server address automatically] and click the [Save] button.

3.1.2 Use a Static IP address

You can set a static IP address to this product.
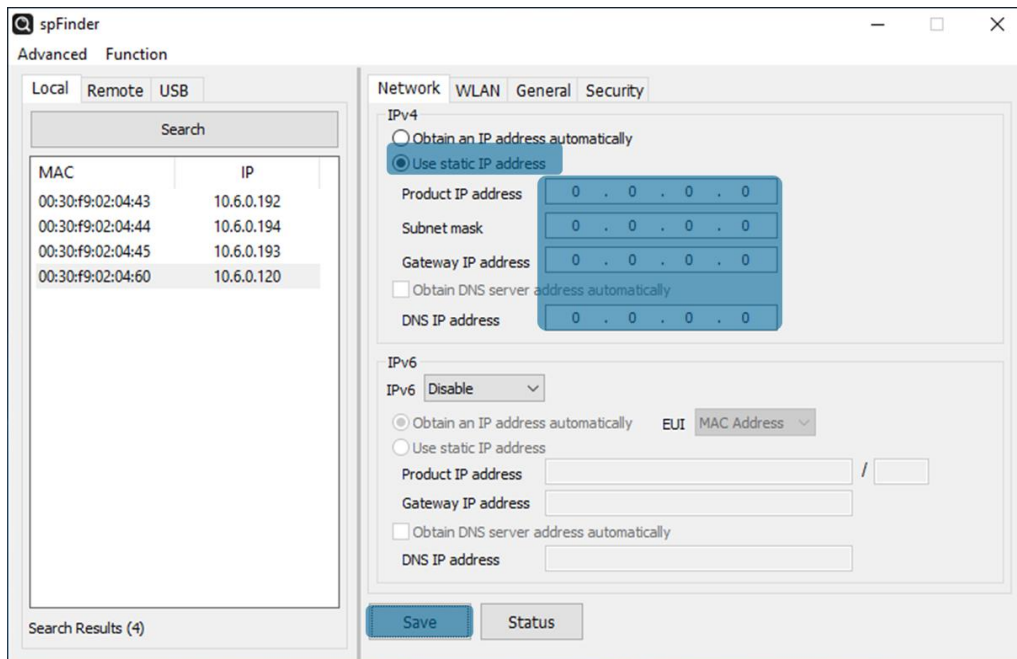
Figure 3-2 Use a static IP address

● Select the [Use static IP address].

● Set the [Local IP address], [Subnet mask], [Gateway IP address] and [DNS IP address].

● Click the [Save] button.

3.2 WLAN

WLAN setting is only for connecting your product to a wireless LAN. Make sure to connect a USB wireless LAN adapter before you set it.

☞ *Note: This product cannot use wireless LAN and Ethernet at the same time.*

3.2.1 Infrastructure
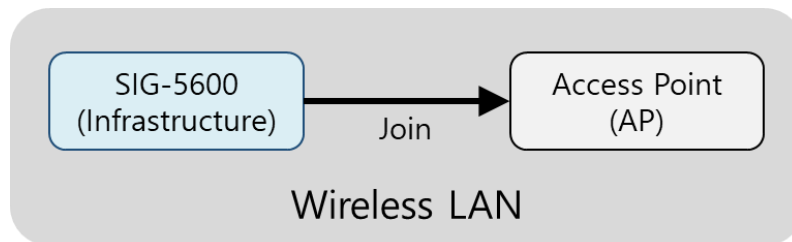
Figure 3-3 Infrastructure mode

The wireless network includes an Access Point (AP) in the infrastructure mode. Related information of the AP (SSID, shared key and etc.) is required to be set on your product to connect the product to the AP.
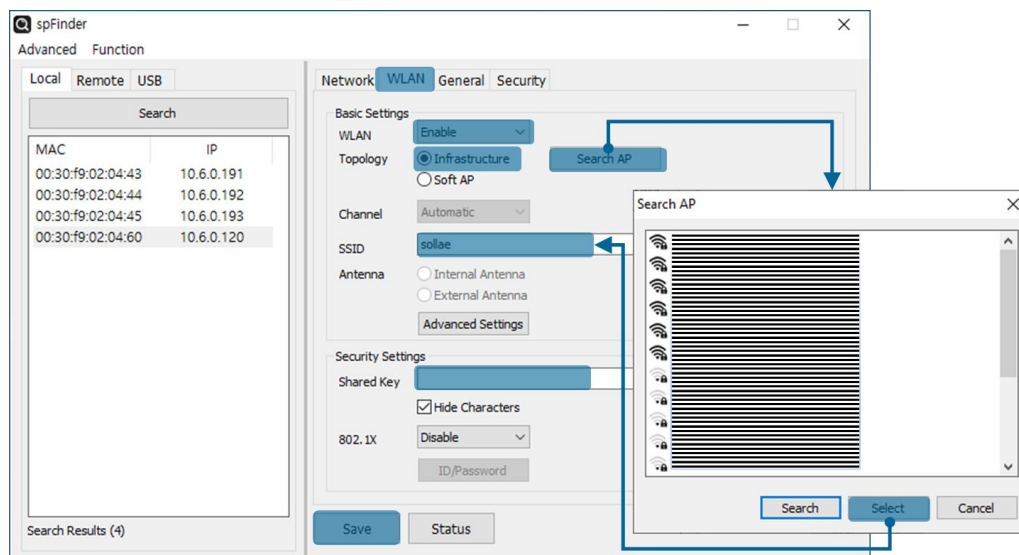
Figure 3-4 Settings of infrastructure

- Select the [WLAN] to [Enable] on the [WLAN] tab.

- Select the [WLAN Topology] to the [Infrastructure].

- Choose an AP by clicking the [Search AP] button or input an SSID in the [SSID] input box.

- Input a password to the [Shared Key] input box if the AP requires a password.

- If you are using WPA-Enterprise, first select the EAP type in the [802.1X] section, and then click on the [ID/Password] button to set your ID and password.

- Click the [Save] button.

3.2.2 Soft AP
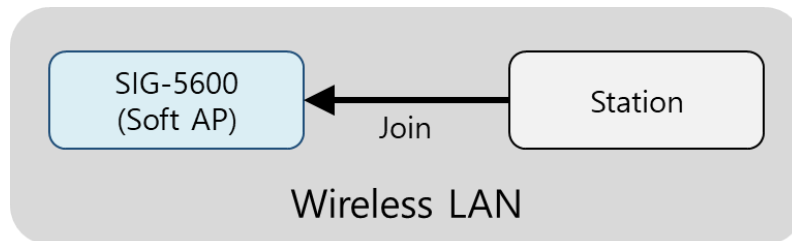
Figure 3-5 Soft AP mode

In this mode, SIG-5600 operates like an AP in order to make a connection with a wireless LAN client. The IP address of this product is fixed to 192.168.0.1 and it is not allowed to be changed. Each wireless LAN client is randomly assigned to an IP address among 192.168.0.3 to 192.168.255.254. Each client is not allowed to communicate with another client but communicates with SIG-5600.

Use this mode when there is no AP on the network or it is not possible to install an AP.
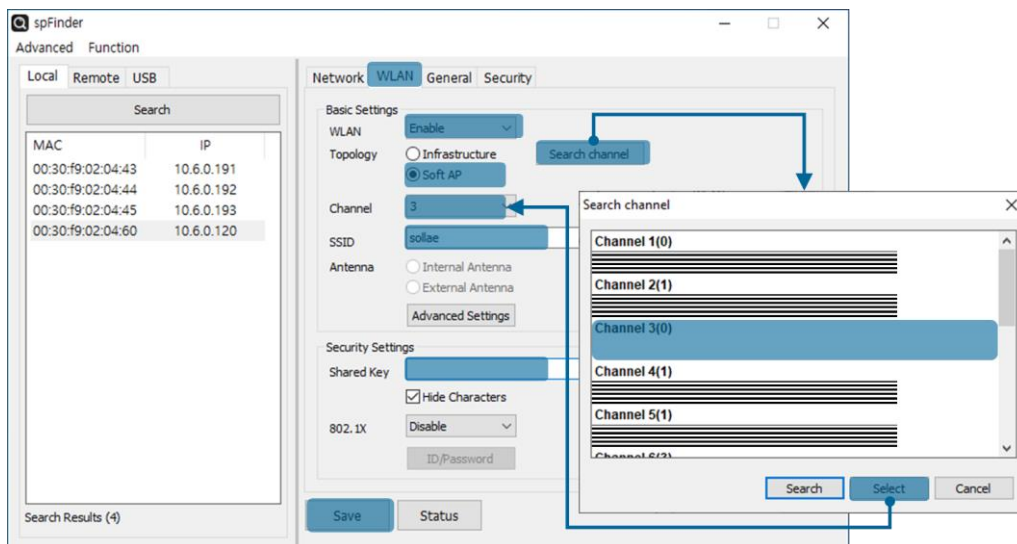
Figure 3-6 Settings of Soft AP

● Select the [WLAN] to [Enable] on the [WLAN] tab.

● Select the [WLAN Topology] to the [Soft AP].

● Choose a channel which is not busy by clicking the [Search channel] button.

● Input a network name in the [SSID] box.

● Input a password in the [Shared Key] if you want to enhance the security.

● Click the [Save] button.

3.2.3 Advanced Settings

You can configure advanced settings for WLAN by clicking the [Advanced Settings] button. We recommend using the default values if you do not have any problem with it.

- PHY Mode

  You have three options for PHY mode and those are [802.11], [802.11b] and [802.11b/g] mode.

- Short Preamble

  Under good condition of WLAN environment, you can expect a slight improvement by enabling this option. Otherwise, you had batter to disable this option.

- Short Slot

  Using this option, you can expect some improvement in WLAN performances. If you are in bad condition of WLAN environment, you had batter to disable this option.

- CTS Protection

  Using this option, you can expect some improvement in WLAN performances under WLAN environment that both 802.11b and 11g devices are.

3.3 General
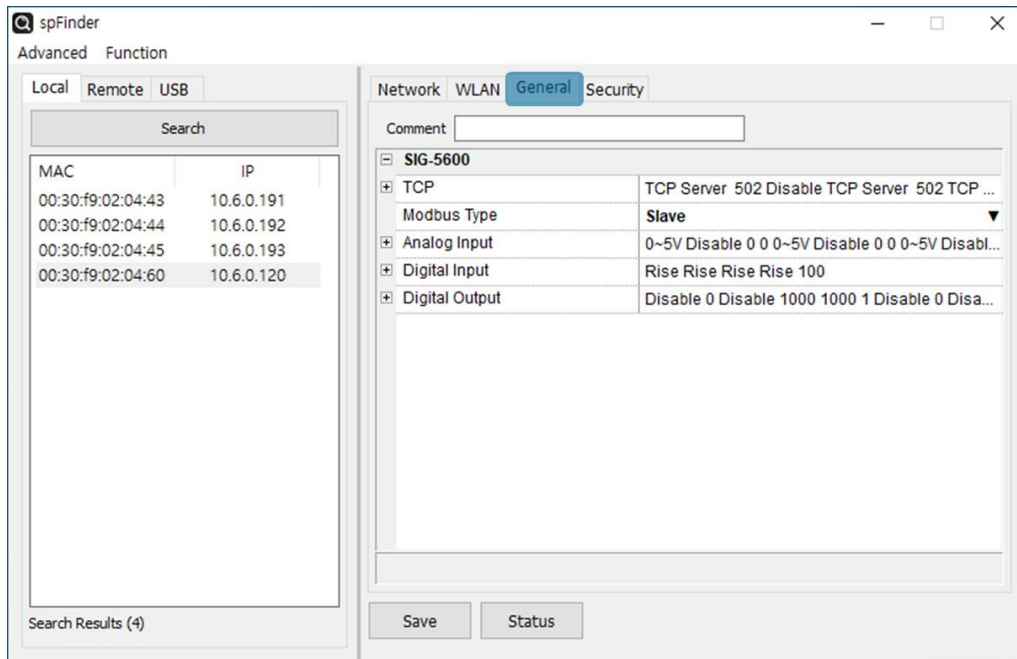
Figure 3-7 General

3.3.1 Comment

This setting is for storing the product description. The maximum setting size of this item is 32 bytes.

3.3.2 TCP

- Connection Mode

  This item selects the TCP connection method. You can choose between TCP Server and TCP Client. The default is TCP Server.

- Peer Address

  This item is to enter an IP address or a hostname of the host to connect to. It is valid only when the Connection Mode is set to TCP Client.

- Port

  This item is to set the port number for the TCP connection. It can be set between 0 and 65,535. The default is 502.

- Multiple Connection

  This item enables multiple TCP connections. When this item is set to Disable, only one TCP session (TCP0) can be used. If this item is set to Enable, the rest of TCP sessions (TCP1 to 3) are activated. It means you can use 4 sessions at the same time.

- Connection Timeout (Unit: sec)

  This item is to set a timeout for terminating a TCP connection. If there is no valid Modbus/TCP data communication during the time set in this item, the TCP

connection is terminated. The unit is seconds and can be set between 0 and 3,600. Default value is 0.

3.3.3 Modbus

● Modbus Type

This item is to set the Modbus type. Set it to Slave when using this product with an HMI program including ModMap. It can be set to Master only when it is used an Internet Switch. The default value is Slave.

3.3.4 Analog Input

● Mode

This item selects the analog input type. The setting value can be selected among [0 ~ 5V], [4 ~ 20mA] and [0 ~ 20mA]. The default value is [0 ~ 5V].

● 1-bit ADC

This function converts analog input value into 1-bit digital value. This function is only used in Internet switch.

● High Ref.

This is the reference value for judging HIGH in 1-bit ADC. Analog input value greater than this value is judged as HIGH. The setting unit follows the setting of Mode and allows setting up to 5 decimal places.

● Low Ref.

This is the reference value for judging LOW in 1-bit ADC. Analog input value smaller than this value is judged as LOW. The setting unit follows the setting of Mode and allows setting up to 5 decimal places.

3.3.5 Digital Input

● Counter Trigger Type

This item is to set the counter trigger type of each port. You can choose one among three options: Rise (rising edge), Fall (falling edge) and Both (rising edge or falling edge). The default value is Rise.

● Valid Time (Unit: ms)

This item is to set the valid time of input signal. In order for the input signal to be judged as a valid signal, it must last longer than the time set in this item. The setting unit is milliseconds; The range is 100 to 30,000. The default value is 100.

3.3.6 Digital Output

● Fail Safe Mode

This item is to set whether to enable the Fail-Safe function. If you enable the Fail-Safe function to a specific output port, the state of the port is

initialized when the TCP connection with the counterpart is lost. If there are multiple sessions connected, Fail Safe Mode is run only if all sessions are disconnected.

● Delay (Unit: ms)

This item is to set the output delay time. When the product receives an output control frame from the master, it delays the output by the time set in this item. The setting unit is milliseconds. The range is 0 to 30,000 and the default value is 0.

● Pulse Mode

This item selects whether to use the pulse output mode. If this value is set to Enable, output in the form of a pulse or a pulse train is available.

● Pulse Mode: Width (Unit: ms)

This item is to set the time to output ON signal in pulse output mode. The setting unit is milliseconds. The range is 100 to 30,000 and the default value is 1,000.

● Pulse Mode: Interval (Unit: ms)

This item is to set the time interval between two pulse signals when the Number is set to a value more than 2. The setting unit is milliseconds. The range is 100 to 30,000 and the default value is 1,000.

● Pulse Mode: Repeat Count

This item sets the number of pulses to be output in pulse output mode. The range is 1 to 32 and the default value is 1.

3.4 Security
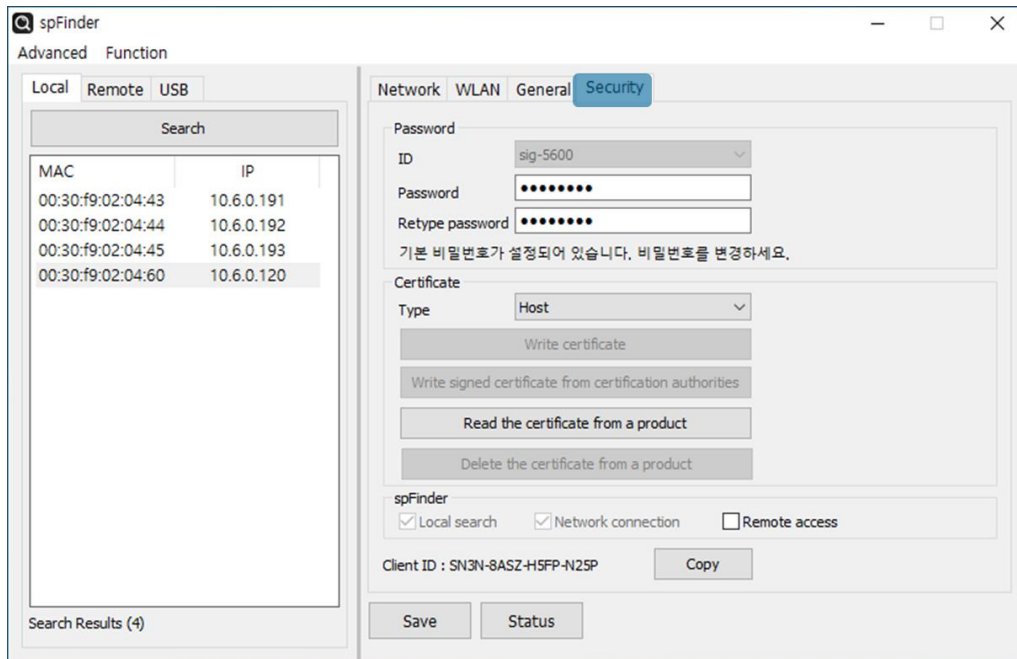
Figure 3-8 Security

3.4.1 Password

Both ID and password are required to access this product. Note that changing the default password to another is highly recommended for security. The password should be longer than 8 characters.

- Input a password to use to [Password] and [Confirm password].
- Click the [Save] button.

3.4.2 Certificate

This is NOT available for this product.

3.4.3 spFinder

These items are related to spFinder use.

- Local search

  If this item is not checked, you will not be able to search for or connect to the product on your local network. This item can be set only when the product is connected via USB.

- Network connection

  If this item is not checked, the product cannot be searched on the local network and the product cannot be connected on the local or remote network. This item can be set only when the product is connected via USB.

● Remote access

If this item is checked, the product can be connected from the remote network. For security, this item is unchecked by default.

3.4.4 Client ID

This is NOT available for this product.

4 Management

4.1 Checking Status

This is a function to view the current status of the product. Information in the [Status] window is automatically updated every second. After searching and connecting the product with spFinder, press the [Status] button to display this window. When you open this window, the spFinder connects to the product and keeps the connection until you close the window or time out. While the connection is maintained, other hosts cannot access the product using the spFinder.

4.1.1 Product Information

● Product Information Window

This area shows some major information of your product.
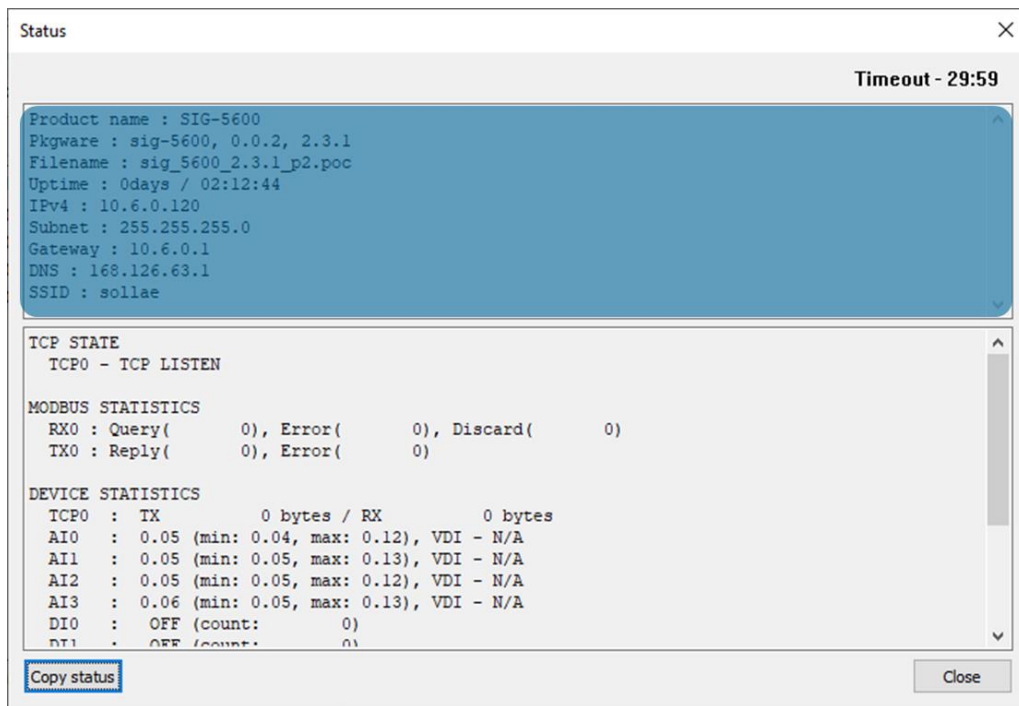
Figure 4-1 Product Information Window

● Product Information List

Item	Description
Product name	Product name
Pkgware	Model name, package version, Firmware version
File name	File name
Uptime	Elapsed time since it boots up (day / hour:min:sec)
IPv4	Assigned IPv4 address
Subnet	Assigned subnet mask
Gateway	Assigned gateway IP address
DNS	Assigned DNS server IP address
SSID	The SSID of WLAN

Table 4-1 Product Information List

4.1.2 Communication Status

● Communication Status Window

This area shows some communication status of your product. This area is refreshed every second.
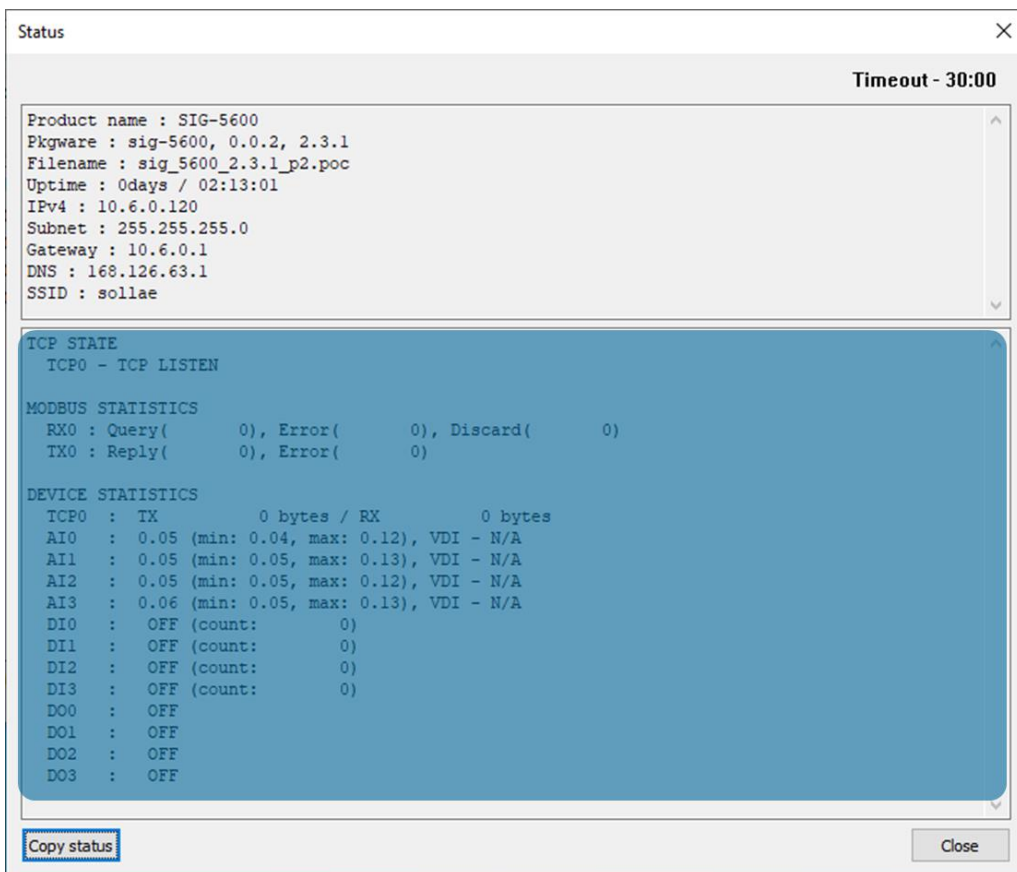
Figure 4-2 Communication Status Window

● TCP STATE

Status	Description
LISTEN	Listen
CLOSED	Disconnected
CONNECTED	Connected (IP and port of the connected host will be shown)
CONNECTING	Connecting
DISCONNECTING	Disconnecting

Table 4-2 TCP STATE

● MODBUS STATISTICS

Item	Description
RX0~3	Statistics of incoming data from TCP
TX0~3	Statistics of outgoing data to TCP
Query	The number of query frames sent/received by the master
Error	The number of invalid frames among sent/received frames
Discard	The number of discarded frames not meet the protocol
Reply	The number of response frames sent/received by the slave

Table 4-3 MODBUS STATISTICS

● DEVICE STATISTICS

Item	Description
TCP0~3	The byte count of TCP data: TX, RX
TX	The byte count of outgoing TCP data
RX	The byte count of incoming TCP data
AI0~3	Current value of each analog input port (min, max)
VDI	Current 1-bit ADC value of each analog input port
DI0~3	Current status of each digital input port (counter value)
DO0~3	Current status of each digital output port

Table 4-4 DEVICE STATISTICS

4.1.3 Timeout

This is the timeout display function that appears in the upper right of the status window. When this time reaches zero, the connection between spFinder and the product is lost. The initial value is 30 minutes. If you move the mouse pointer in the internal area of the status window, the timer is reset to the initial value again.

4.1.4 Copy status

Clicking this button copies all information displayed in the current status window to the clipboard.

4.2 Changing Firmware

New firmware can be released when adding functions or fixing bugs. If you are using old firmware, you can upgrade it to the latest version. Firmware can be upgraded online or manually via spFinder.

4.2.1 Online Upgrade

If you can access to the Internet by your PC, the Firmware can be upgraded online.
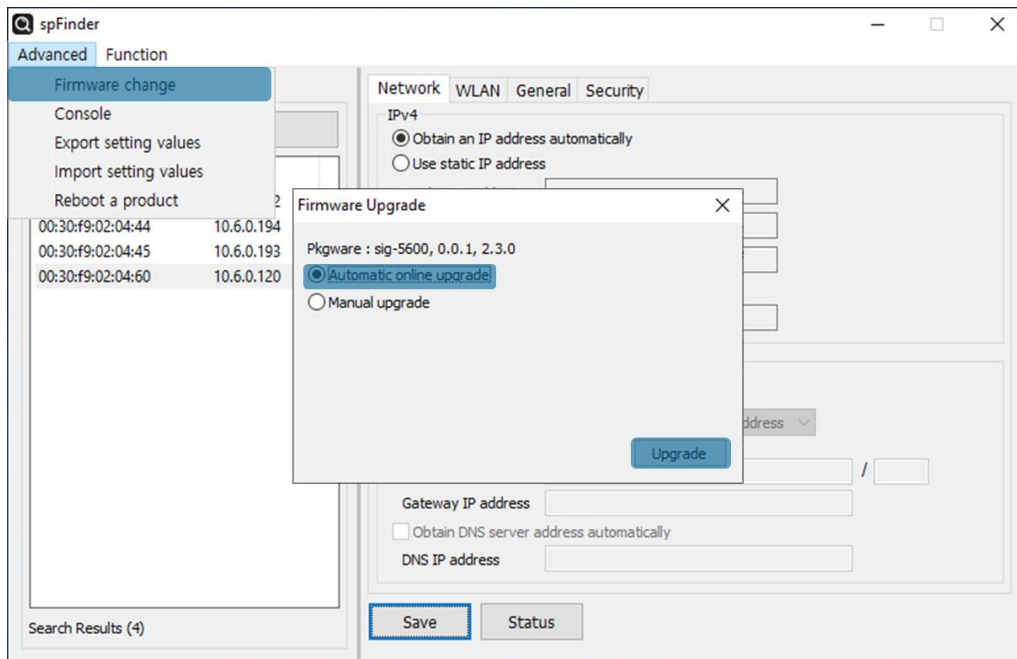
Figure 4-3 Online Upgrade

● Search and Connect to your product by spFinder.

● Click [Advanced] > [Firmware change] menu.

● Click [Upgrade] button selecting [Automatic online upgrade] menu.

4.2.2 Manual Upgrade
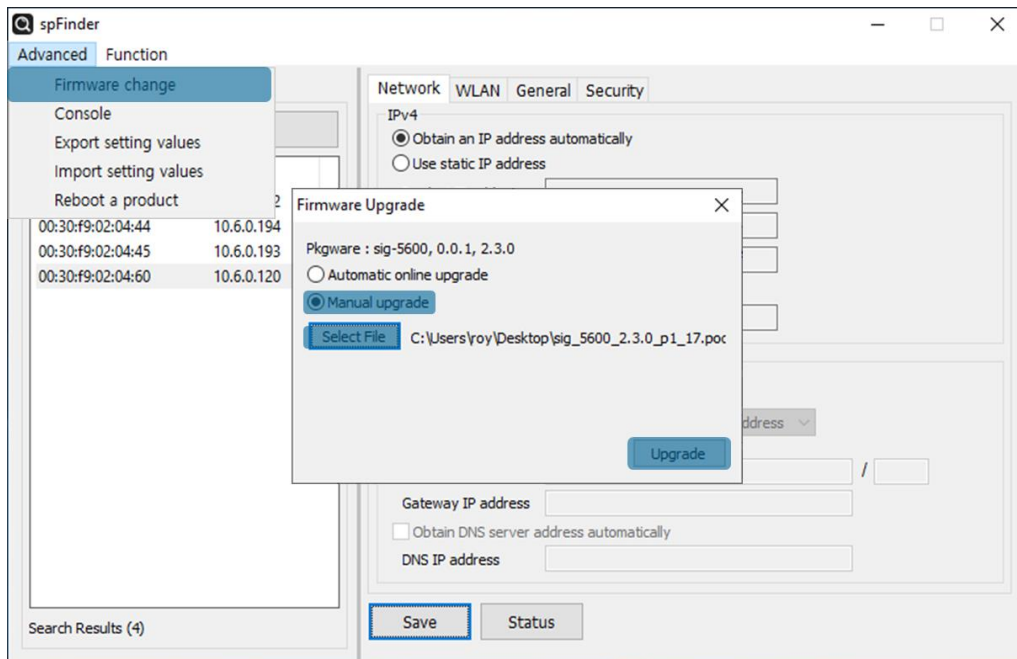
Figure 4-4 Manual Upgrade

- Download a Firmware file to your PC.

- Search and connect to your product by spFinder.

- Click [Advanced] > [Firmware Change] menu.

- Select to [Manual upgrade] on the [Firmware Upgrade] window.

- Click [Select File] button and select the Firmware file on you PC

- Click [Upgrade] button.

4.3 Console

The console function analyzes and displays the Modbus frames sent and received by the product.

After searching and connecting the product with spFinder, click [Console] in the [Advanced] menu to display the console window. When you open this window, the spFinder connects to the product and keeps the connection until you close the window or time out. While the connection is maintained, other hosts cannot access the product using the spFinder.
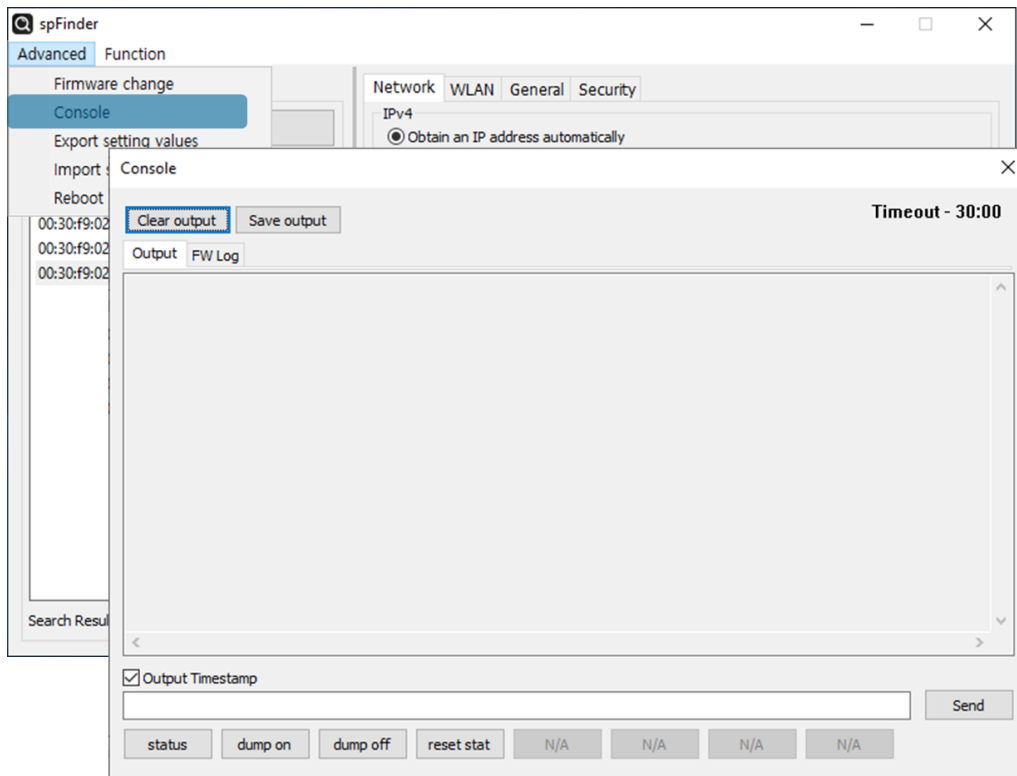
Figure 4-5 Console

4.3.1 Output Tab

This tab displays console messages.

- Clear output

    Pressing this button clears all output messages on the Output tab.

- Save output

    Press this button to save the message to be output to the Output tab as a file. While saving the message as a file, the size of the saved file is displayed, and the Timeout function does not work.

- status

    Pressing this button outputs product status information on the Output tab

- dump on

    Pressing this button starts printing communication data out on the network to

the Output tab

- dump off

  Pressing this button stops printing communication data out on the network to the Output tab

- reset stat

  Press this button to reset all the communication status information statistics of the product.

4.3.2 FW Log Tab

This tab displays the log message from Firmware.

4.3.3 Timeout

This is the timeout display function that appears in the upper right of the console window. When this time reaches zero, the connection between spFinder and the product is lost. The initial value is 30 minutes. If you move the mouse pointer in the internal area of the console window, the timer is reset to the initial value again. This function does not work while using the [Save output] function.

4.4 Export/Import Setting Values

The [Export setting values] menu saves all setting values of the product as a file except for the password. The [Import setting values] menu loads setting values from a file which is saved by the [Export setting values] menu. Note that you need to click the [Save] button to apply the setting to your product. Find these functions at the [Advanced] menu.
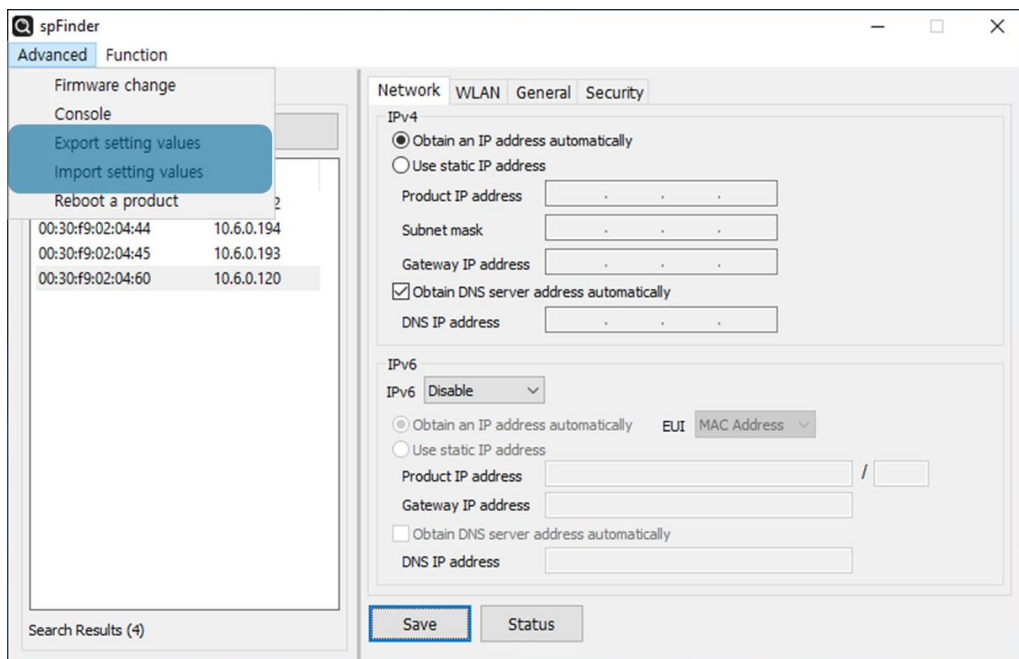
Figure 4-6 Export/Import Setting Values

4.5 Reboot a Product

This function is for rebooting a product.
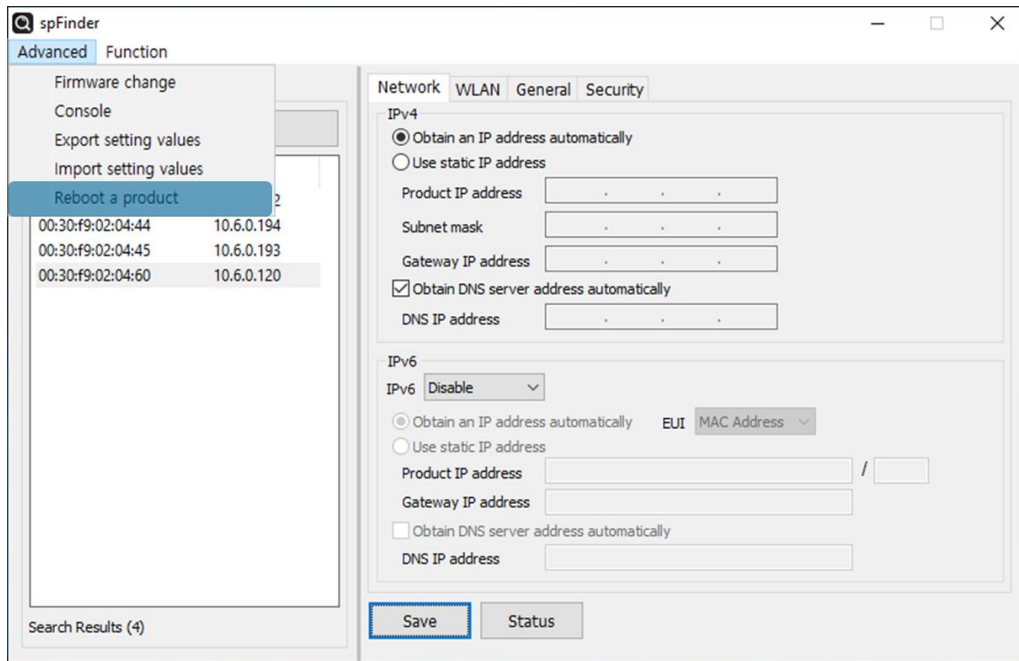
Figure 4-7 Reboot a Product

4.6 Factory Reset

Performing the Factory Reset, you can restore all the settings to the default including the password. Follow the procedure below by checking the status of RUN LED.

1. Press and immediately release the function button.

2. Press the function button and keep the state more than 5 seconds.

3. Once the RUN led is turned off, release the button within 2 seconds.

4. The factory reset is started when you release the button. After that, your product will reboot.

5 Register Map

5.1 Read Only

5.1.1 Analog Input Value Register

This register is for storing the most recently stored analog input value. The range of values is 0 to 4,095.

Division	Address	Word Count	Type	Function Code	HMI Addressing Example
Port 0	0	1	Integer	04	30001
Port 1	1	1	Integer	04	30002
Port 2	2	1	Integer	04	30003
Port 3	3	1	Integer	04	30004

Table 5-1 Analog Input Value Register

5.1.2 Minimum Analog Input Value Register

This register is for storing the minimum value among analog input values. The range of values is 0 to 4,095.

Division	Address	Word Count	Type	Function Code	HMI Addressing Example
Port 0	16	1	Integer	04	30017
Port 1	17	1	Integer	04	30018
Port 2	18	1	Integer	04	30019
Port 3	19	1	Integer	04	30020

Table 5-2 Minimum Analog Input Value Register

5.1.3 Maximum Analog Input Value Register

This register is for storing the maximum value among analog input values. The range of values is 0 to 4,095.

Division	Address	Word Count	Type	Function Code	HMI Addressing Example
Port 0	32	1	Integer	04	30033
Port 1	33	1	Integer	04	30034
Port 2	34	1	Integer	04	30035
Port 3	35	1	Integer	04	30036

Table 5-3 Maximum Analog Input Value Register

☞ *The minimum and maximum values of analog input can be initialized using the Reset Analog Input Min/Max Value Register.*

5.1.4 Digital Input Status Register

This is the most recently stored digital input value. The range of values is 0 to 4,095.

Division	Address	Bit Count	Type	Function Code	HMI Addressing Example
Port 0	0	1	Boolean	02	10001
Port 1	1	1	Boolean	02	10002
Port 2	2	1	Boolean	02	10003
Port 3	3	1	Boolean	02	10004

Table 5-4 Digital Input Status Register

5.1.5 Inverted Digital Input Status Register

Stores the minimum value among digital input values. The range of values is 0 to 4,095.

Division	Address	Bit Count	Type	Function Code	HMI Addressing Example
Port 0	80	1	Boolean	02	10081
Port 1	81	1	Boolean	02	10082
Port 2	82	1	Boolean	02	10083
Port 3	83	1	Boolean	02	10084

Table 5-5 Inverted Digital Input Status Register

5.1.6 Digital Input Counter Register

Stores the maximum value among digital input values. The range of values is 0 to 4,095.

Division	Address	Word Count	Type	Function Code	HMI Addressing Example
Port 0	160	2	Integer	04	30161
Port 1	162	2	Integer	04	30163
Port 2	164	2	Integer	04	30165
Port 3	166	2	Integer	04	30167

Table 5-6 Digital Input Counter Register

☞ *The counter values of digital input can be initialized using the Reset Digital Input Counter Register.*

5.1.7 Device Information Register

Division	Address	Word Count	Type	Function Code	HMI Addressing Example
Vendor Name	400	7	ASCII	03	40401
Product Code	407	4	ASCII	03	40408
Version	411	5	ASCII	03	40412
Comment	416	16	ASCII	03	40417
Uptime	432	10	ASCII	03	40433
MAC Address	442	9	ASCII	03	40443
IP Address	451	8	ASCII	03	40452

Table 5-7 Device Information Register

- Vendor Name

    This is the Vendor Name

- Product Code

    This is the product code

- Version: Major, Minor, Revision

    This is the software version of the product

- Comment

    This is a comment of the product. This value can be set via spFinder.

- Uptime

    This is an uptime of the product. This value is recorded in the form of "day / hour:minute:second."

- MAC Address

    This is the MAC address of the product

- IPv4 Address

    This is the IP address of the product

5.2 Read/Write

5.2.1 Digital Output Control Register

If the bit corresponding to each port of this register is set to 1, the status of the output port is turned ON. Conversely, if the bit is set to 0, the status of the output port is turned OFF. This register is only allowed to write when the port's Pulse Mode is set to Disable.

Division	Address	Bit Count	Type	Function Code	HMI Addressing Example
Port 0	0	1	Boolean	01, 05 or 15	00001
Port 1	1	1	Boolean	01, 05 or 15	00002
Port 2	2	1	Boolean	01, 05 or 15	00003
Port 3	3	1	Boolean	01, 05 or 15	00004

Table 5-8 Digital Output Control Register

5.2.2 Digital Output Pulse Control Register

If the bit corresponding to each port of this register is set to 1, pulses are output. When the pulse output ends, the corresponding bit is automatically set to 0. This register is allowed to write only when the port's Pulse Mode is set to Enable.

Division	Address	Bit Count	Type	Function Code	HMI Addressing Example
Port 0	80	1	Boolean	01, 05 or 15	00081
Port 1	81	1	Boolean	01, 05 or 15	00082
Port 2	82	1	Boolean	01, 05 or 15	00083
Port 3	83	1	Boolean	01, 05 or 15	00084

Table 5-9 Digital Output Pulse Control Register

5.2.3 Reset Digital Input Counter Register

This register initializes the values of Digital Input Counter Register. When the value of the bit corresponding to each port is stored as 1, the counter value of the port is initialized and the bit is set to 0 again.

Division	Address	Bit Count	Type	Function Code	HMI Addressing Example
Port 0	240	1	Boolean	01, 05 or 15	00241
Port 1	241	1	Boolean	01, 05 or 15	00242
Port 2	242	1	Boolean	01, 05 or 15	00243
Port 3	243	1	Boolean	01, 05 or 15	00244

Table 5-10 Reset Digital Input Counter Register

5.2.4 Reset Analog Input Min/Max Value Register

This register initializes the minimum and maximum values of analog input. When the value of the bit corresponding to each port is stored as 1, the minimum and maximum values of the port are initialized and the bit is set to 0 again.

Division	Address	Bit Count	Type	Function Code	HMI Addressing Example
Port 0	160	1	Boolean	01, 05 or 15	00161
Port 1	161	1	Boolean	01, 05 or 15	00162
Port 2	162	1	Boolean	01, 05 or 15	00163
Port 3	163	1	Boolean	01, 05 or 15	00164

Table 5-11 Reset Analog Input Min/Max Value Register

5.2.5 Activating DI/DO Status Change Notification Register

This register is for activating digital input/output status change notification. When the value of the bit corresponding to the connected session ID is stored as 1, the product sends a response frame through the session whenever the digital input/output port status is changed. Therefore, by using this register, HMI can monitor the status of the digital input/output port of the product without sending queries.

Division	Address	Bit Count	Type	Function Code	HMI Addressing Example
TCP0 session	1200	1	Boolean	05	01201
TCP1 session	1201	1	Boolean	05	01202
TCP2 session	1202	1	Boolean	05	01203
TCP3 session	1203	1	Boolean	05	01204

Table 5-12 Activating DI/DO Status Change Notification Register

6 Technical Support and Warranty

6.1 Technical Support

If you have any question regarding operation of the product, visit Customer Support FAQ corner and the message board on Sollae Systems' web site or send us an email at the following address:

- E-mail: support@eztcp.com

- Q & A board: https://www.eztcp.com/en/support/qna.php

6.2 Warranty

6.2.1 Free Repair Services

For product failures occurring within 2 years after purchase, Sollae Systems provides free repair services or exchange the product. However, if the product failure is due to user's fault, repair service fees will be charged or the product will be replaced at user's expense.

6.2.2 Charged Repair Services

For product failures occurring after the warranty period (2 years) or resulting from user's fault, repair service fees will be charged and the product will be replaced at user's expense.

7 Precaution and Exemption from Liability

7.1 Precaution

- Sollae Systems is not responsible for product failures occurring due to user's alternation of the product.

- Specifications of the product are subject to change without prior notice for performance improvement.

- Sollae Systems does not guarantee successful operation of the product if the product was used under conditions deviating from the product specifications.

- Reverse engineering of firmware and applications provided by Sollae Systems is prohibited.

- Use of firmware and applications provided by Sollae Systems for purposes other than those for which they were designed is prohibited.

- Do not use the product in an extremely cold or hot place or in a place where vibration is severe.

- Do not use the product in an environment in which humidity is high or a lot of oil exists.

- Do not use the product where there is caustic or combustible gas.

- Sollae Systems does not guarantee normal operation of the product under the conditions a lot of noise exists.

- Do not use the product for a purpose that requires exceptional quality and reliability relating to user's injuries or accidents – aerospace, aviation, health care, nuclear power, transportation, and safety purposes.

- Sollae Systems is not responsible for any accident or damage occurring while using the product.

7.2 Exemption from Liability

7.2.1 English version

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7.2.2 French version

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Le symbole de la poubelle barré présent sur le boîtier SIG-5600 indique que vous ne pouvez pas vous débarrasser de ce dernier de la même façon que vos déchets courants. Au contraire, vous êtes responsable de l'évacuation du boîtier SIG-5600 lorsqu'il arrive en fin de vie (ou qu'il est hors d'usage) et à cet effet, vous êtes tenu de le remettre à un point de collecte agréé pour le recyclage des équipements électriques et électroniques usagés. Le tri, l'évacuation et le recyclage séparés de vos équipements usagés permettent de préserver les ressources naturelles et de s'assurer que ces équipements sont recyclés dans le respect de la santé humaine et de l'environnement. Pour plus d'informations sur les lieux de collecte des équipements électroniques usagés, contacter votre mairie ou votre service local de traitement des déchets.

8 Revision History

Date	Version	Description	Author
2020.09.08.	1.0	1. Created	Roy Lee
2021.01.15.	1.1	1. Corrects an error of the figure 1-1, 1-8~11 2. Corrects an error of supported protocol list 3. Corrects an error of input voltage range 4. Corrects an error of the number of DO port	Roy Lee
2021.09.01.	1.2	1. Improve the 1.2. Features 2. Change condition of digital input volt range 3. Apply changes of general settings 4. Apply changes of status function 5. Add a register - Activating DI/DO Change Notification Register 6. Apply changes of register map 7. Corrects some errors and improve some expressions	Roy Lee
2021.12.02.	1.3	1. Add a condition about operating temperature	Roy Lee
2022.07.28.	1.4	1. Add a notification about FCC	Roy Lee
2023.07.11.	1.5	1. Add information about WPA-Enterprise configurations 2. Corrects some errors	Roy Lee
2023.09.26.	1.6	1. Apply changes of software: v2.1.0	Roy Lee