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DIALink User Manual

www.deltaww.com



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DIALink User Manual

Revision History

Version	Revision	Date
1 st	The first version was published.	2018/11/16
2 nd	<ol style="list-style-type: none">1. Add information about PLC and rename “DIALink CNC User Manual” as “DIALink User Manual”.2. Delete the original Section 1.2-1.4 and replace with new content(Section 1.2 Product Information, 1.3 Software, 1.4 Hardware - Intel Core-I, 1.5 Hardware - Intel Celeron N3350).3. Update information in Chapter 2. New content concerning features newly added in UI Guide (Tool Management, Maintenance, Programs, Parameters and History Alarm). New content concerning devices, tags, PLC, OPCDA, Edge Computing, WriteTag, Schedules, Events, Queries, Alarms, Job Shift Management, LINE setting, WeChat setting and Modbus Slave Setting.4. Add Appendix A Modbus Slave Features.5. Add Appendix IFTTT Line and WeChat Official Accounts Setup.6. Add Appendix C Importing and Exporting Device Tags.7. Add Appendix D Time for Data Collection and Calculation.	2020/04/30
3 rd	Update figures of DIALink software interface in chapter 2.	2020/07/22
4 th	<ol style="list-style-type: none">1. Update product information of DIALink hardware and software in section 1.2. Also add information of software trials to section 1.3.2. Add information of activation to section 2.2.1.3. In section 2.2.2, add information of the devices supporting communication via COM Port and HTTP for Delta PC devices, connection settings of OPCUA, feature of read-write node values, as well as adding subpage button on the device list.4. Add Counter, Timer and Arithmetic to the tag types supported by Edge Computing type devices in section 2.2.3.5. In section 2.2.4 Event, multiple conditions can be chosen to move or delete, and more than one recipient can be set for Email action.6. Update the information concerning 3rd party data interface in section 2.8.17. Add Appendix E OPC UA Server Setting.8. Add Appendix F Dongle Key Combination User Guide.9. Add Appendix G SECS/GEM User Guide.	2021/02/26
5 th	<ol style="list-style-type: none">1. Update the installation process and description in section 1.3.1.	2022/1/10

Version	Revision	Date
	<ol style="list-style-type: none"> 2. In chapter 2.2, update the overview content. Update the table of supported leading brands of PLCs in section 2.2.2. Update content concerning tool management, alarms and reset in section 2.2.5. Add new content to section 2.2.6, 2.2.7, 2.2.8, 2.2.10, 2.4 and 2.8.1. Update figures in section 2.2.2, 2.2.3, 2.2.6, 2.4 and 2.8.1. 3. Add description of “Global Authentication” in chapter 3.3. 4. Add description of “CA certificates” in chapter 4.2. 5. Add section 5.1.8, 5.1.9, 5.1.10 in chapter 5. 6. Update pictures in appendix C. 7. In appendix G, add description in chapter G.1 and G.3.2.3. Update content of chapter G.2 and G.3. Add a new chapter G3.8. 8. Add Appendix H DIALink Global Authentication and HTTPS Setting. 	

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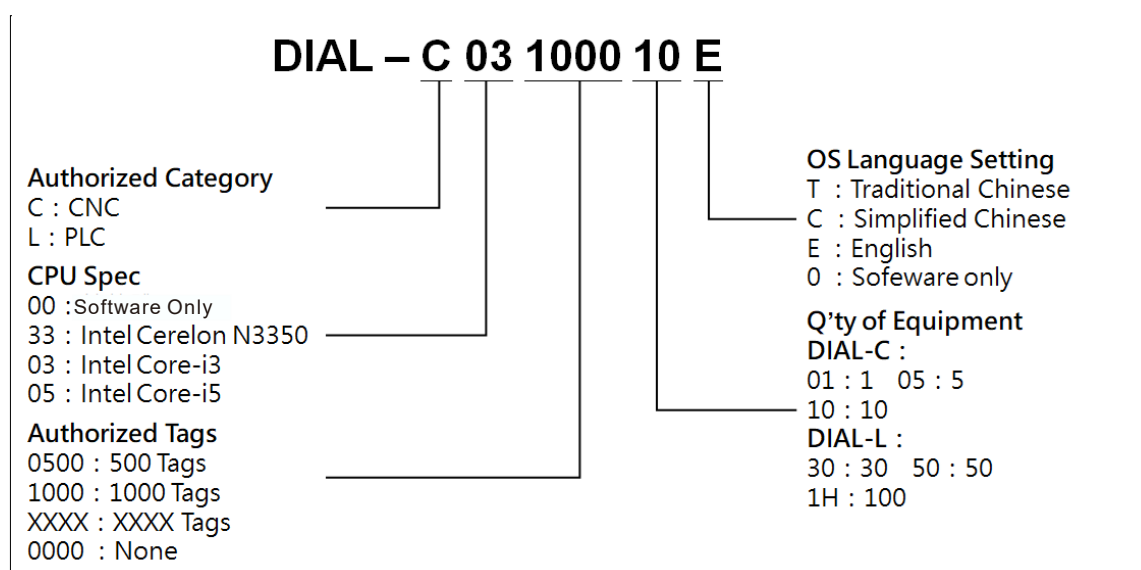
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1.1 Overview

1

DIALink is a data acquisition platform. The solution ensures better management with CNC processing machines and PLCs of all major brands by gathering data from field devices and providing a unified interface to the upper management systems, as well as achieving data visualization that efficiently reveals production parameters and operating status in real-time. In addition, DIALink CNC together with DIAView SCADA offers analysis and manages the processing speed, availability and yield rate to achieve optimal production scheduling, prevention of abnormal processing quality for enhanced Overall Equipment Effectiveness (OEE), while the application of Edge Computing implements the concept of IoT in industrial automation.

1.2 Products Information



DIALink products feature software and hardware with embedded PCs. Refer to Section 1.3 for more details of software installation and update procedure; hardware specification in Section 1.4 and 1.5.

The following table provides information regarding all models:

Ver.	Models	Authorized Quantity			Hardware	
		CNC	PLC	SECS/GEM	CPU	Operating System
Software	DIAL-C00050005	5	10		-	-
	DIAL-C00100010	10	20		-	-
	DIAL-L00100030	-	30		-	-
	DIAL-L00200050	-	50		-	-
	DIAL-L0050001H	-	100		-	-
Hardware	DIAL-C03050005C	5	10		Intel Core-i3	Win10 Pro Simplified Chinese version
	DIAL-C03050005T					Win10 Pro Traditional Chinese version
	DIAL-C03050005E					Win10 Pro English version

Ver.	Models	Authorized Quantity			Hardware	
		CNC	PLC	SECS/GEM	CPU	Operating System
	DIAL-C03100010C	10	20		Intel Core-i3	Win10 Pro Simplified Chinese version
	DIAL-C03100010T					Win10 Pro Traditional Chinese version
	DIAL-C03100010E					Win10 Pro English version
Hardware	DIAL-L03100030C	-	30		Intel Core-i3	Win10 Pro Simplified Chinese version
	DIAL-L03100030T					Win10 Pro Traditional Chinese version
	DIAL-L03100030E					Win10 Pro English version
	DIAL-L03200050C	-	50			Win10 Pro Simplified Chinese version
	DIAL-L03200050T					Win10 Pro Traditional Chinese version
	DIAL-L03200050E					Win10 Pro English version
	DIAL-L0550001HC	-	100		Intel Core-i5	Win10 Pro Simplified Chinese version
	DIAL-L0550001HT					Win10 Pro Traditional Chinese version
	DIAL-L0550001HE					Win10 Pro English version
	DIAL-C33010001E	1	2		Intel Celeron N3350	Win10 IoT English version
	DIAL-S33000001E	-	-	1		Win10 IoT English version

DIAL – OPC 001

Enabled Module Category
 OPCU : OPCUA
 SECS : SECS/GEM

Version	Models	Enabled Module Category	
		OPCUA	SECS/GEM
Software	DIAL-OPCU001	●	-
	DIAL-SECS001	-	●

1

DIAL -05 00 1 UP

Upgrade Authorized
Q'ty Equipment
01 : 1 unit
50 : 50 units
XX : XX units

Equipment Category
1 : CNC
2 : PLC
3 : SECS/GEM

Version	Models	Upgrade Authorized Quantity		
		CNC	PLC	SECS/GEM
Software	DIAL-05001UP	5	10	-
	DIAL-10001UP	10	20	-
	DIAL-30002UP	-	30	-
	DIAL-50002UP	-	50	-
	DIAL-01003UP	-	-	1
	DIAL-02003UP	-	-	2
	DIAL-03003UP	-	-	3
	DIAL-04003UP	-	-	4

1.3 Software

1

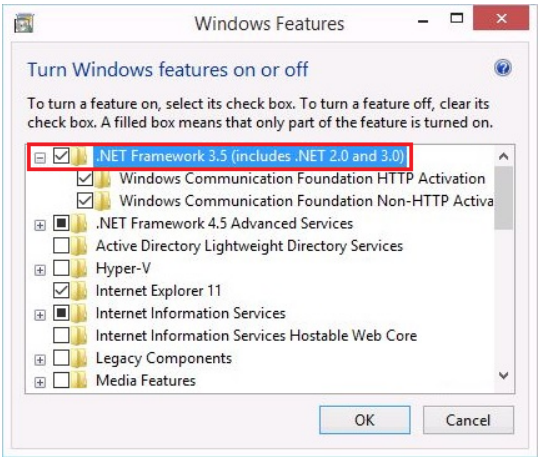
Applicable Models	● Model Type: CNC DIAL-C00050005, DIAL-C00100010
	● Model Type: PLC DIAL-L00100030, DIAL-L00200050 , DIAL-L0050001H
	● Authorized to upgrade from DIAL-P to DIAL-L (Model Type: PLC) DIAL-U00100030, DIAL-U00200050 , DIAL-U0050001H
	* DIAL-P represents DIALink Window AP version; DIAL-L is DIALink Web version

Download the installation file via the designated web address printed on the installation manual inside the software box.

- Important
 1. You must check if the software is compatible with computer and operating system before installation.
 2. Software shall be used properly and not be decrypted or used for any other purposes.
 3. System requirements as follows:

OS (Operating System)	Windows 7 x86 /x64 SP1 Windows 10 x86 /x64
Memory Requirement	4GB
Hard Drive Space Requirement	256GB

4. Avoid installing third-party software and DIALink software on the same PC so as not to affect compatibility.
5. Before installing DIALink software, the following procedure must be done on the PC:
Run “Control panel” → “Programs” → “Turn Windows features on or off”, select the Window built-in “.Net Framework 3.5” function. (Need internet connection.)



6. With the version of 10-days trial, there'll be limitations of one device and 10 tags reading on DIALink. We suggest you to purchase copyright software so as to utilize more devices and tags with longer usage period.

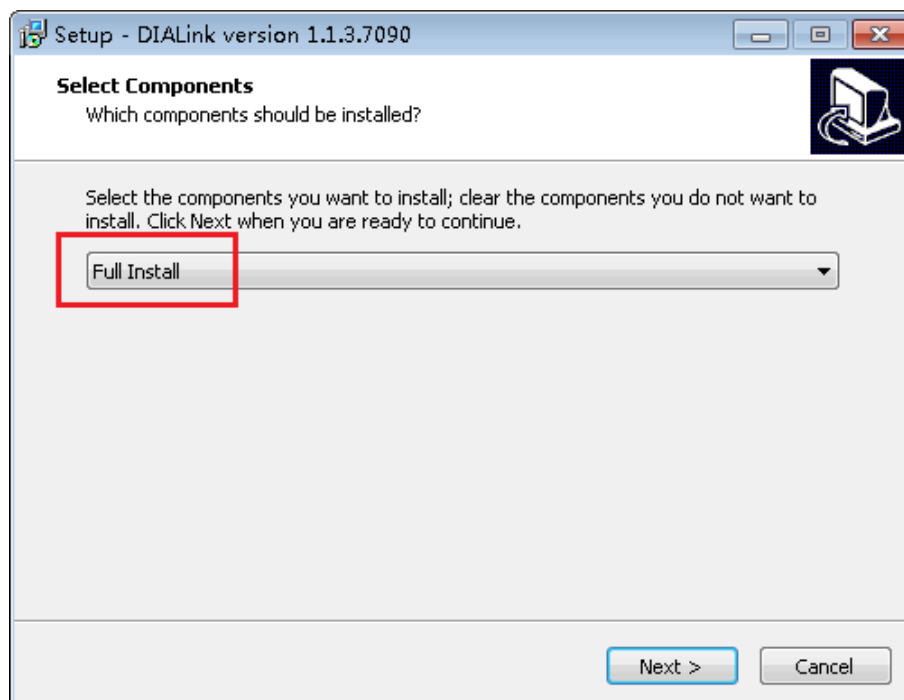
1.3.1 Install DIALink

1

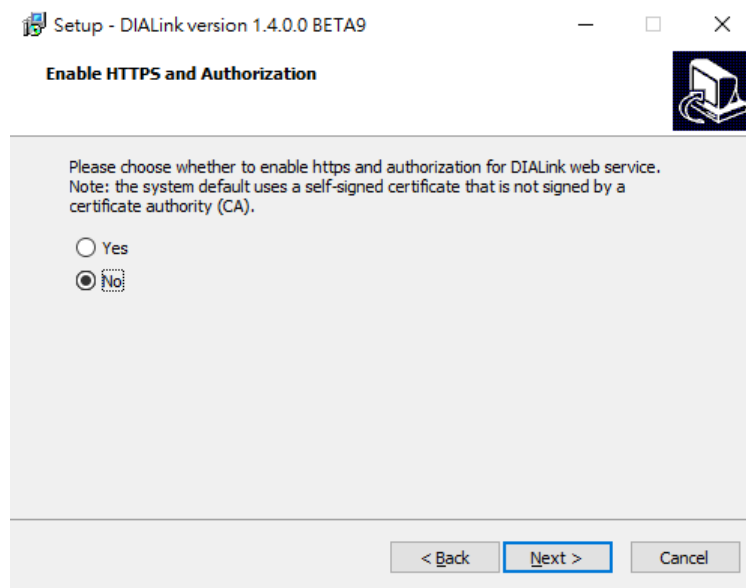
Step 1. Double-click on the downloaded file and launch the DIALink installation file.



Step 2. Choose Full Install from the drop-down list box.



Step 3. HTTPS and Authorization configuration page.



- Yes: (Enable)

DIALink Web service, including login and web API, default uses HTTP. The system default uses a self-signed certificate that is not signed by a certificate authority (CA); thus, we suggest you to install a legal and trusted certificate authority (CA). To perform manual update, please refer to Appendix H for more details. Token authentication must be required for calling third-party APIs.

Note:

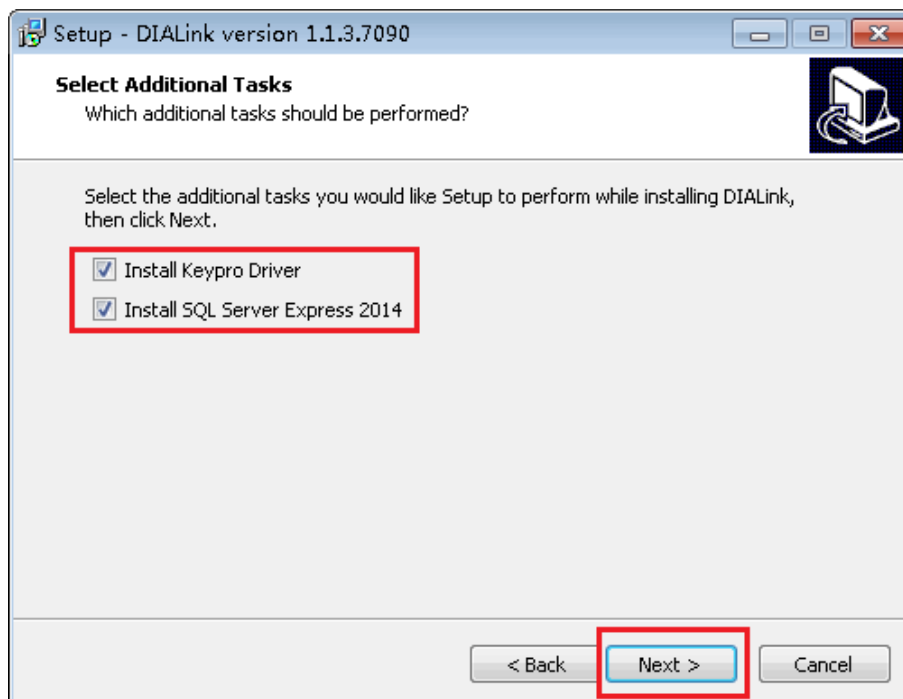
Both self-signed certificate and CA signed certificate can encrypt data. However a self-signed certificate is not signed by Public Key Infrastructure (PKI), the webpage cannot be accessed and a warning message saying this certificate is not trusted by the computer or web browser would be displayed in the browser using HTTPS before the advanced settings have been configured.

- No: (Disable)

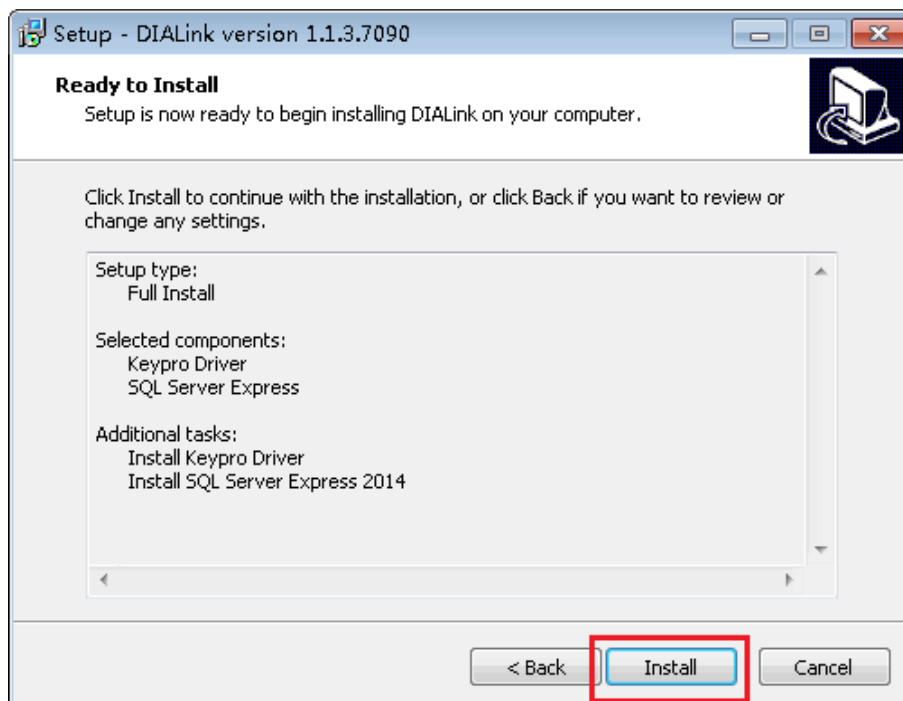
DIALink Web service, including login and web API, default uses HTTP. Except for GET method, token authentication must be required for calling third-party APIs.

1

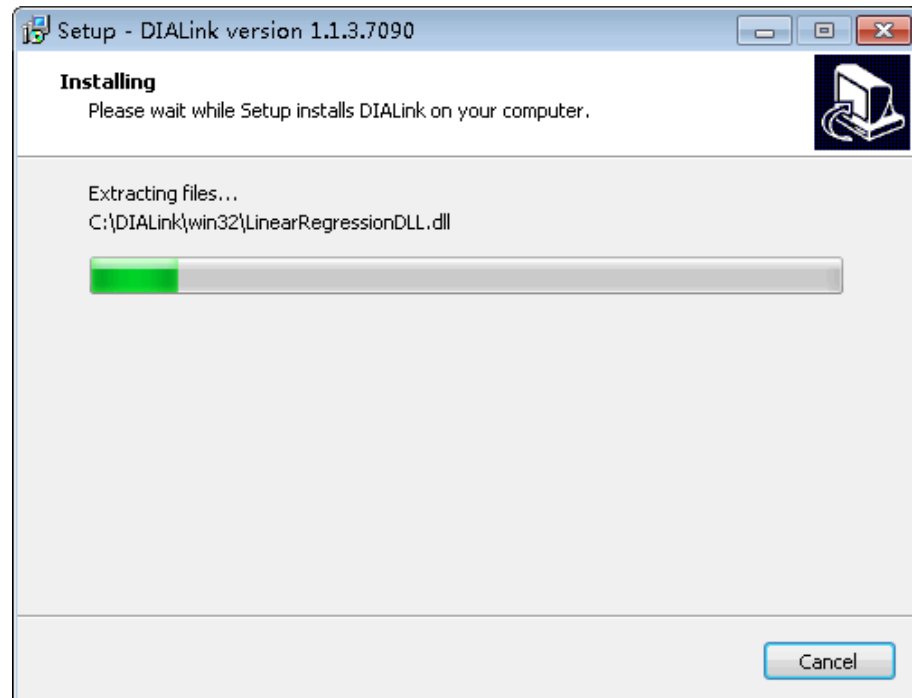
Step 4. Select the additional task for DIALink installation with two default options. You must select “Install Keypro Driver” for the first-time installation, which would store position data in SQL server. When a SQL Server has not been installed on the PC, it would be necessary to select “Install SQL Server Express 2014”. Click <Next> to proceed.



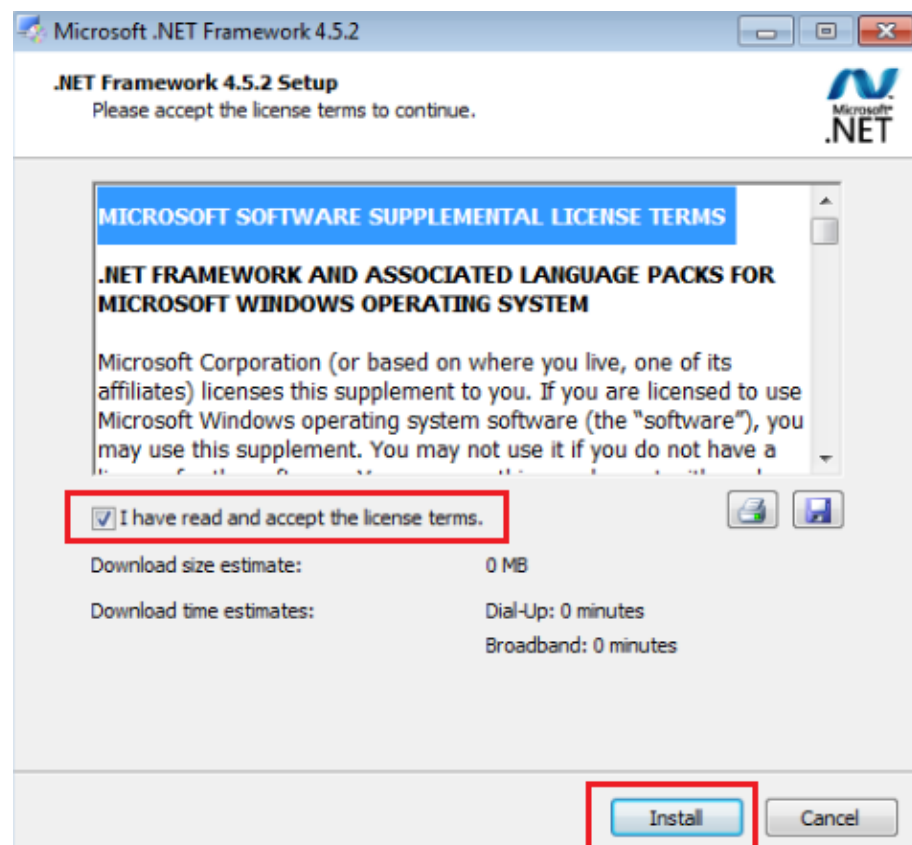
Step 4. One more confirmation is required to install DIALink, then click <Install> to proceed.



Step 5. When installing finish, it would automatically start the next step.

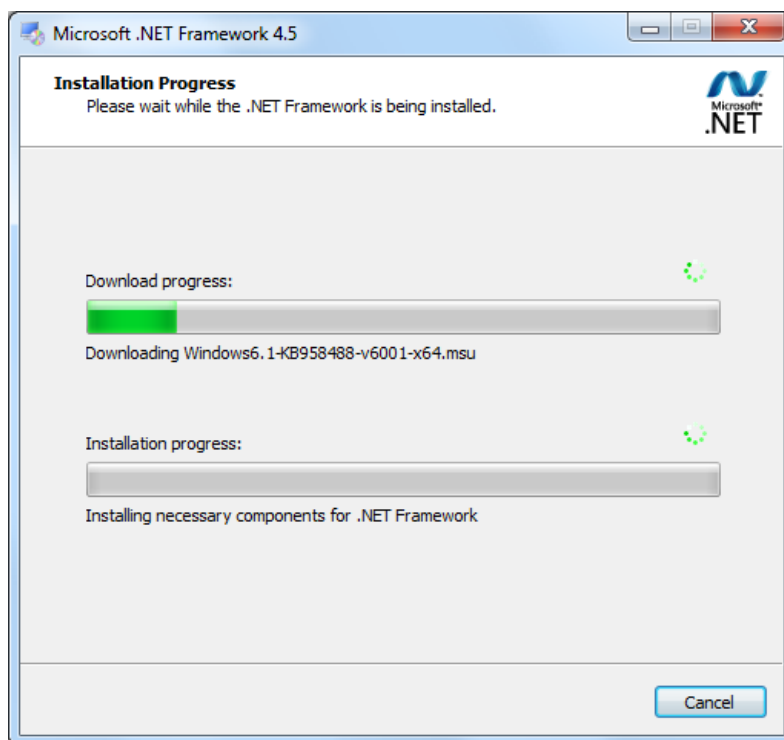


Step 6. If .Net Framework 4.5 has not been installed on the computer, the software would automatically run the setup program. Read and agree the license term, then click the check box. Continue to click <Install> to proceed.

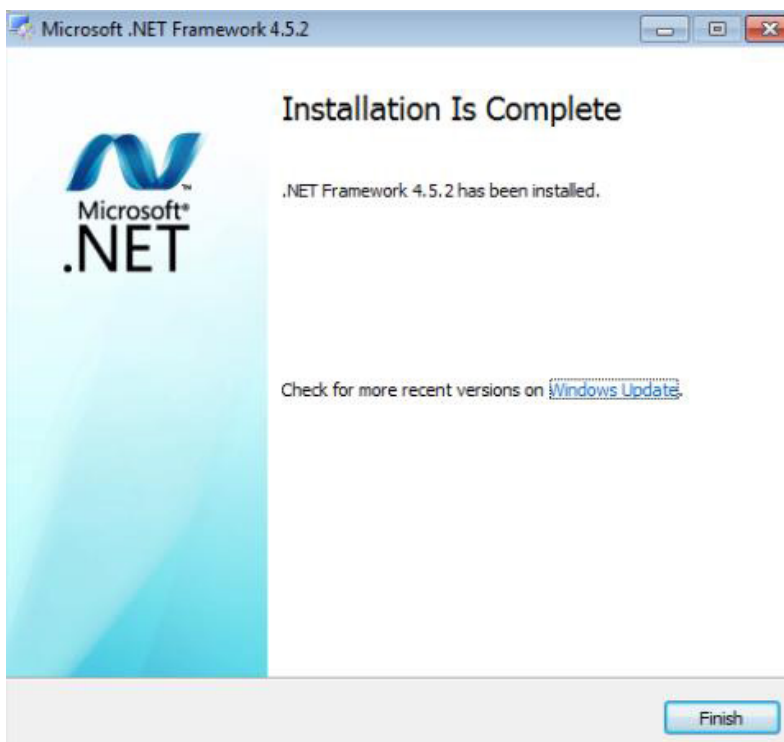


Step 7. Await installation for .Net Framework 4.5 suite.

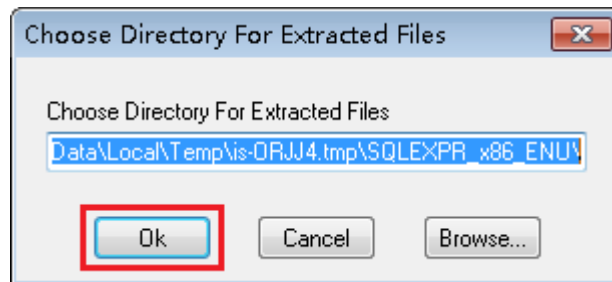
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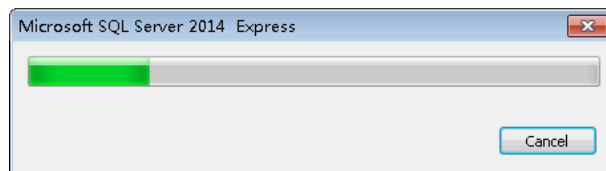
Step 8. Click <Finish> after the installation is completed.



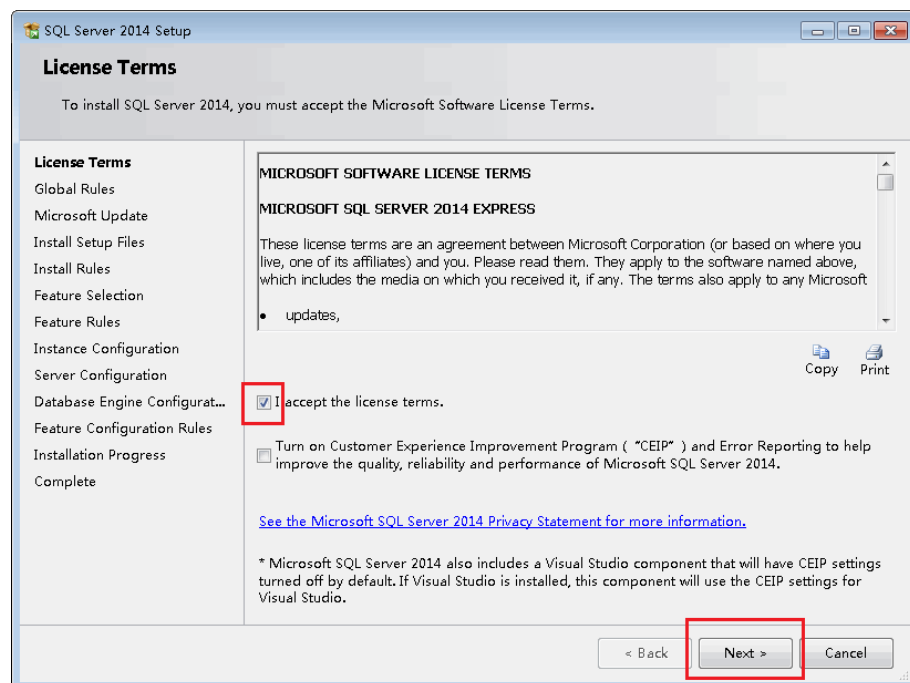
Step 9. If you do select to install SQL Server Express in step 3, the installation program will start automatically. The default setting of the directory is recommended to remain unchanged. Click directly on <OK> to proceed to the next step.



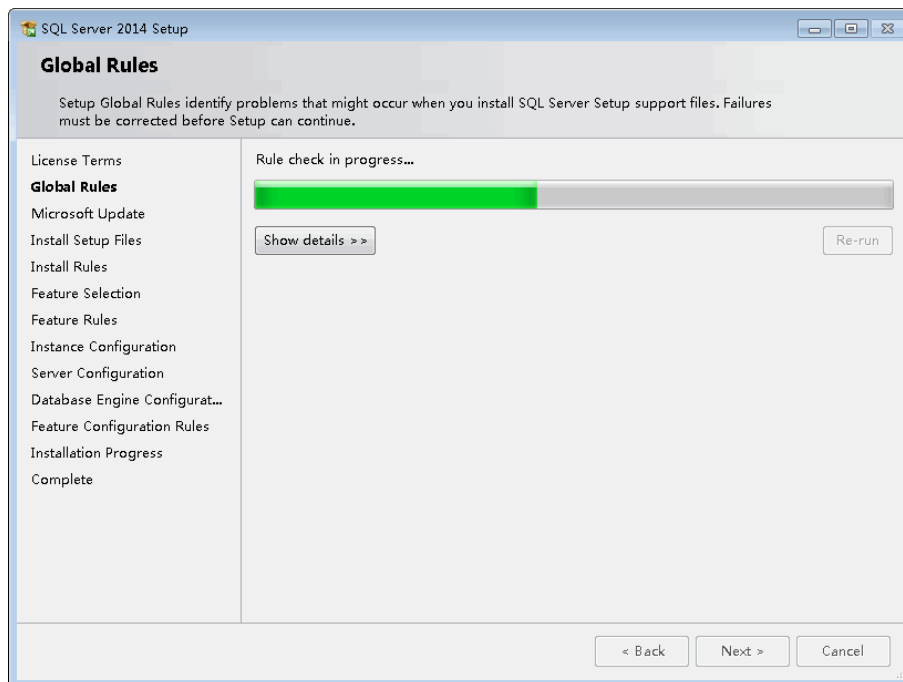
Step 10. Await for extracting files.



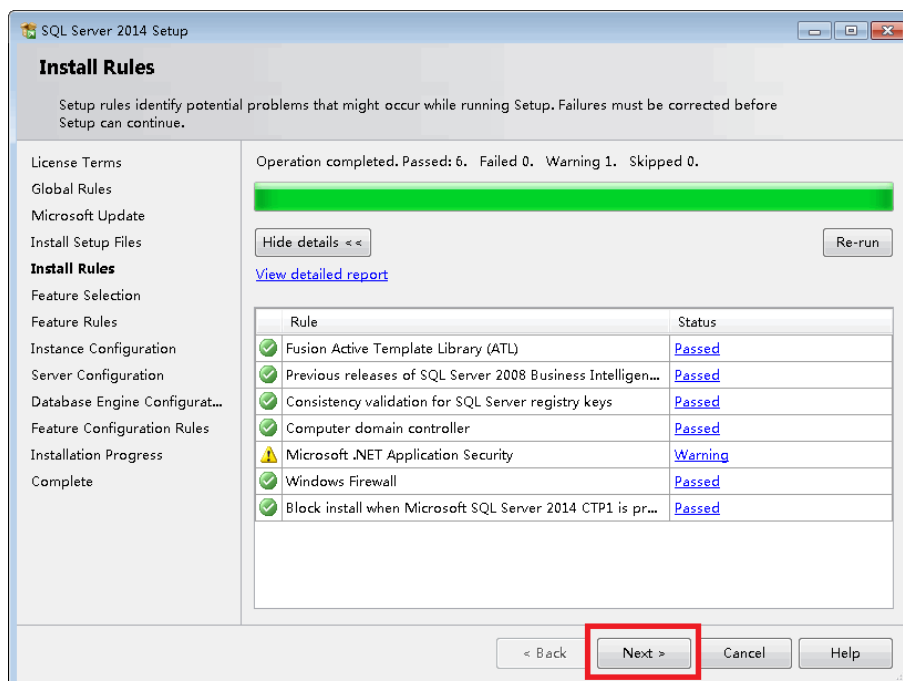
Step 11. Make sure you've read and agreed with all terms, then click the check box. Click <Next> to continue to the next step.



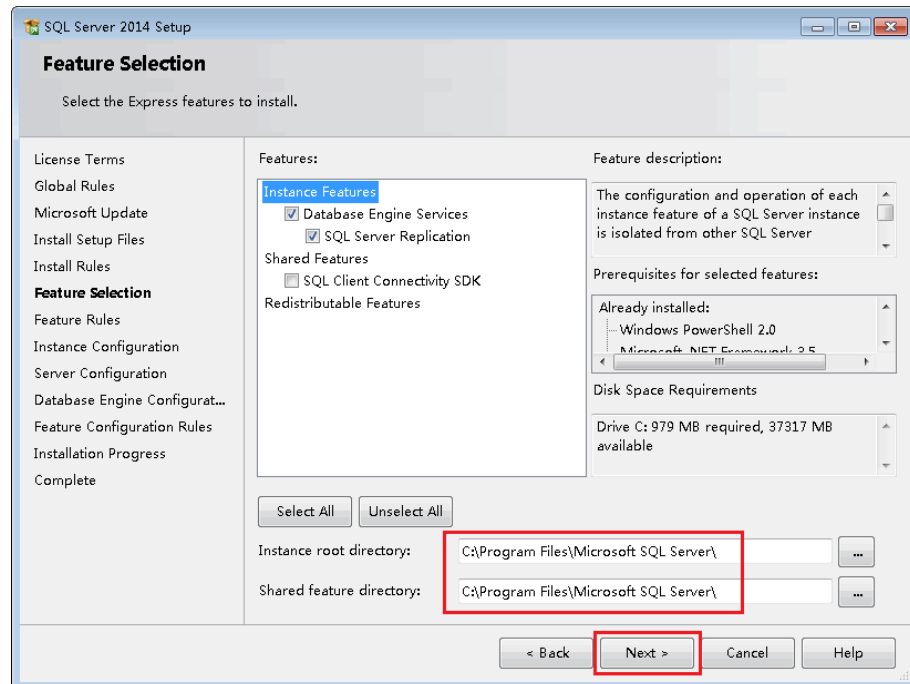
Step 12. Await for SQL setup.

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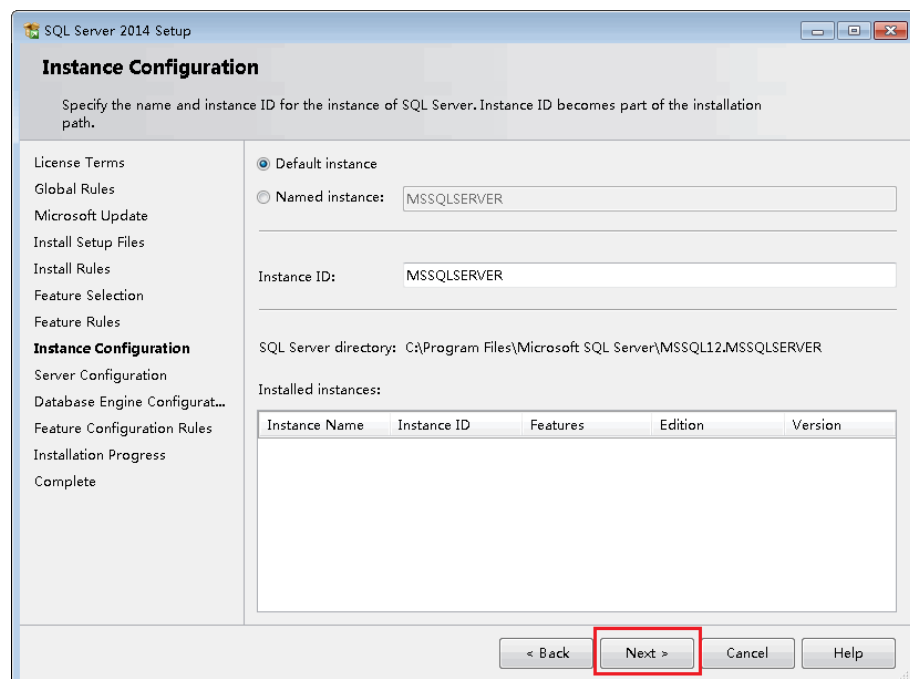
Step 13. Click <Next> to proceed.



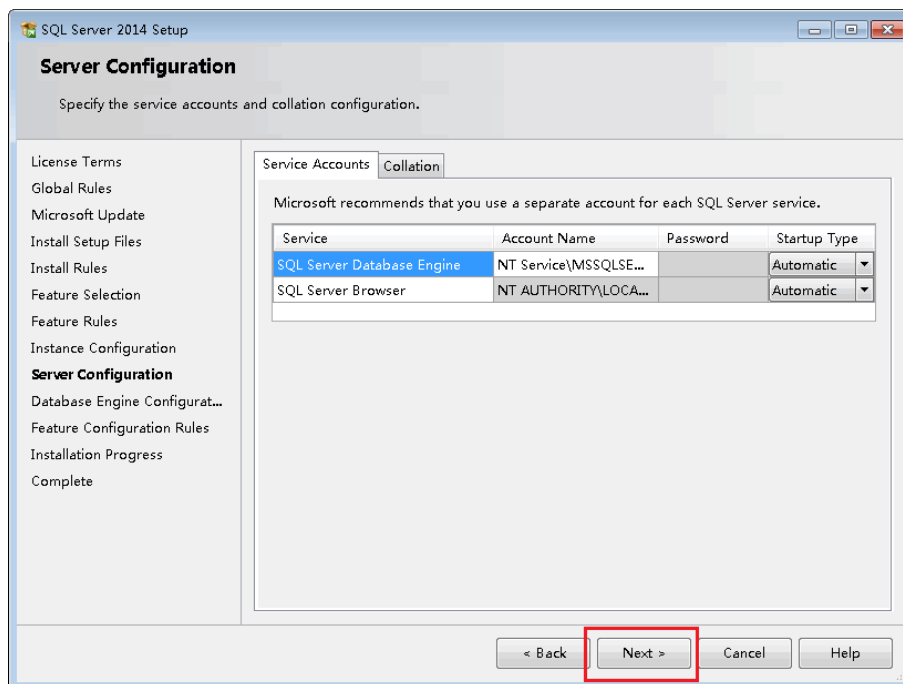
Step 14. Choose the installation path and make sure you have sufficient disk space for installing SQL. Then click <Next>.



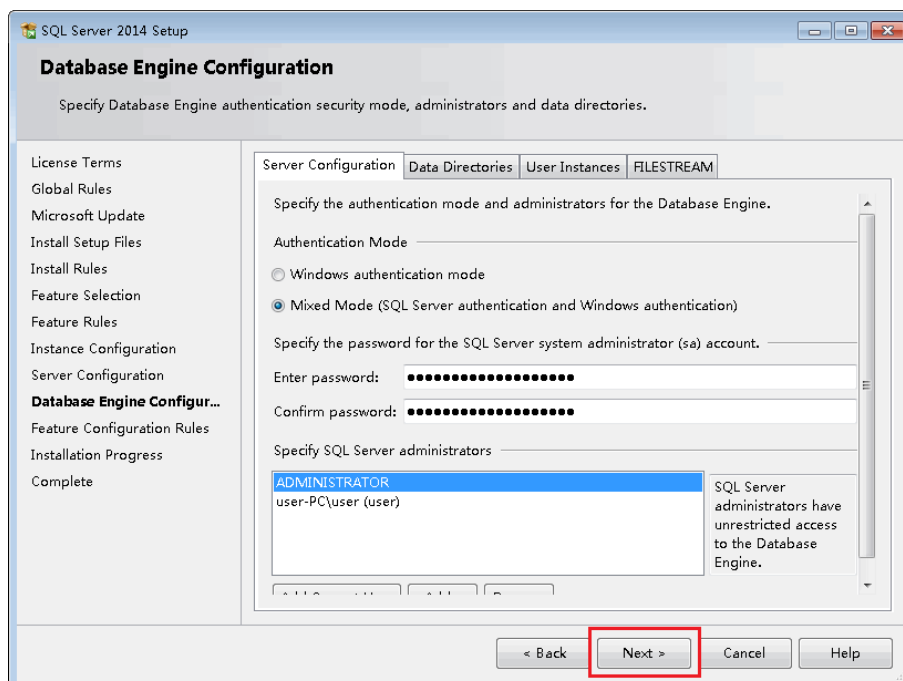
Step 15. Click <Next> on this default page.



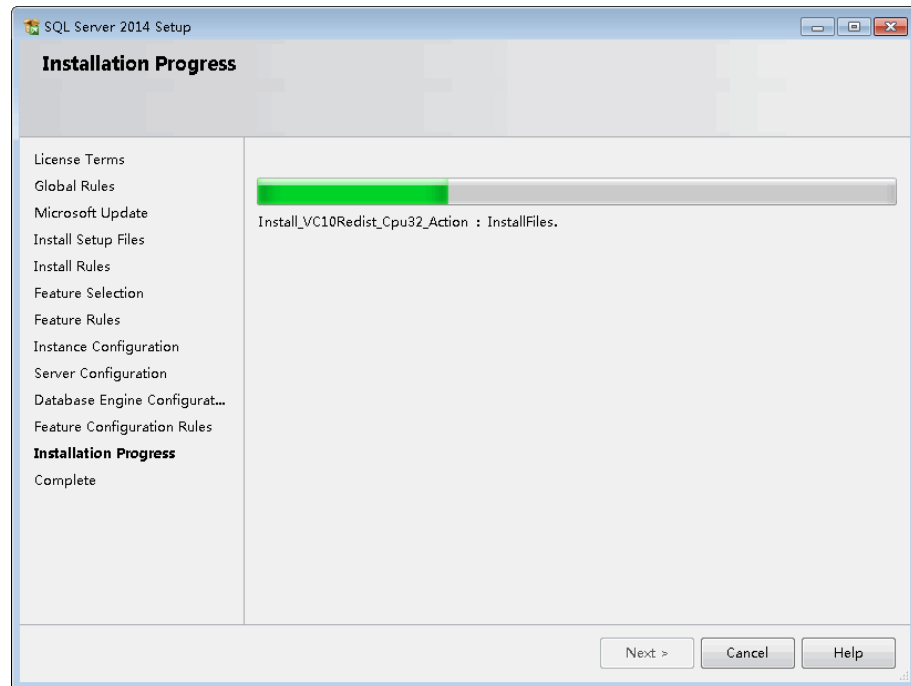
Step 16. Click <Next> on this default page.

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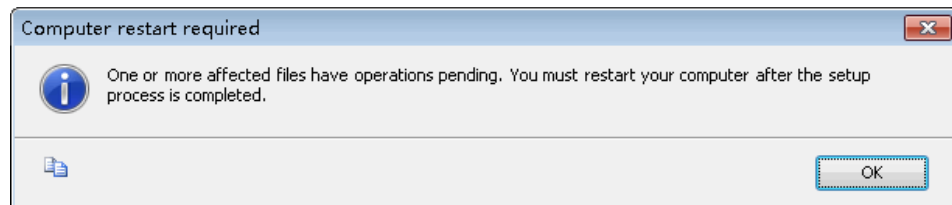
Step 17. Click <Next> on this default page.



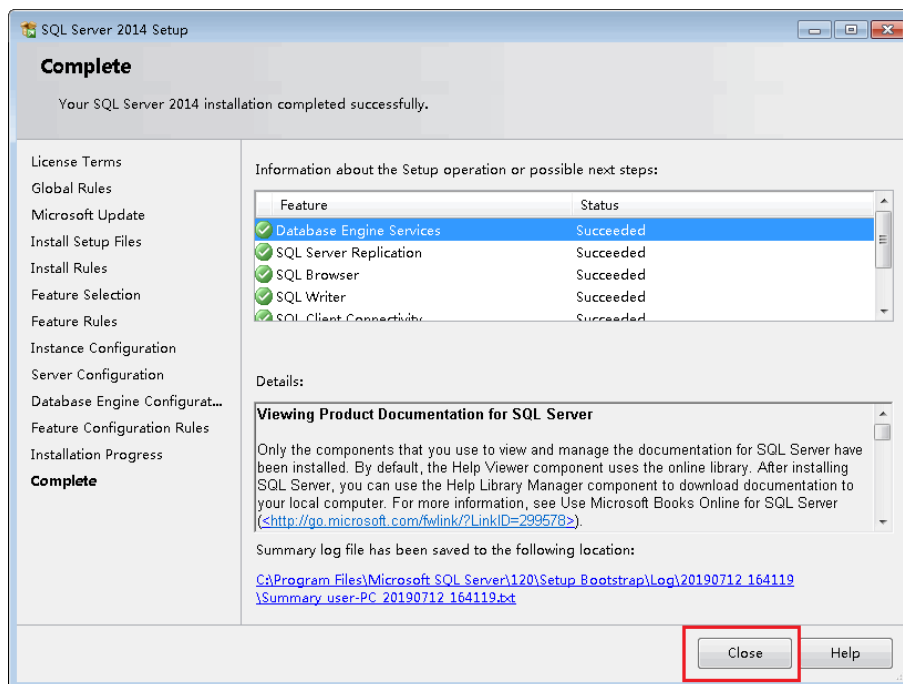
Step 18. Await for SQL Server installation completed.



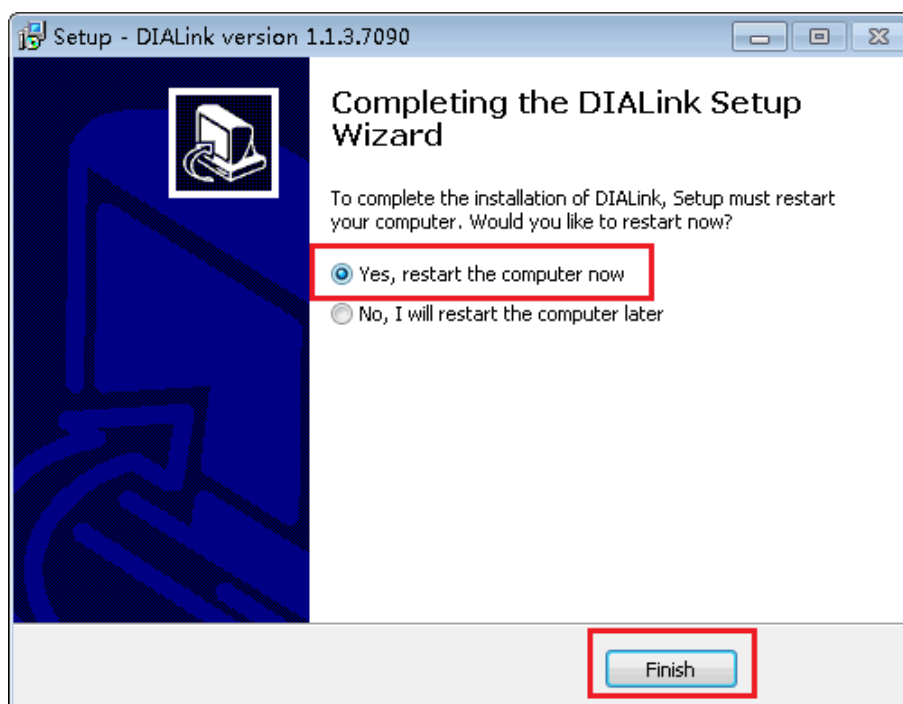
Step 19. A pop-up window may appear, asking you to restart the PC after the setup process is completed.



Step 20. After the installation has completed successfully, click <Close> to turn off the window.

1

Step 21. Click <Finish> to restart the computer so as to complete the setup. Then a shortcut named DIALink would appear on the Desktop



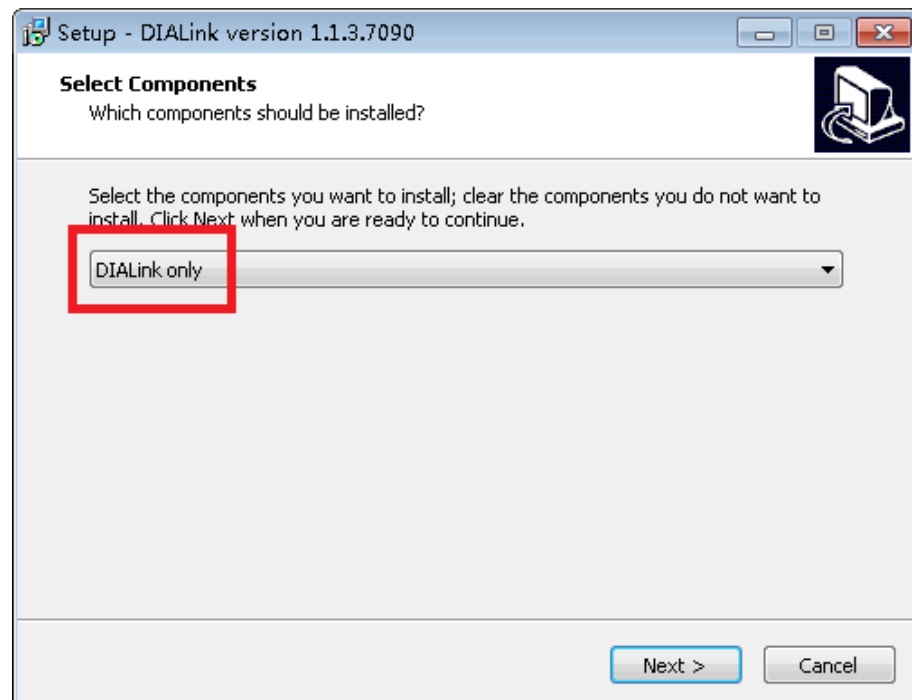
1.3.2 Update DIALink

1

Step 1. Double-click on the downloaded file and launch the DIALink installation file.

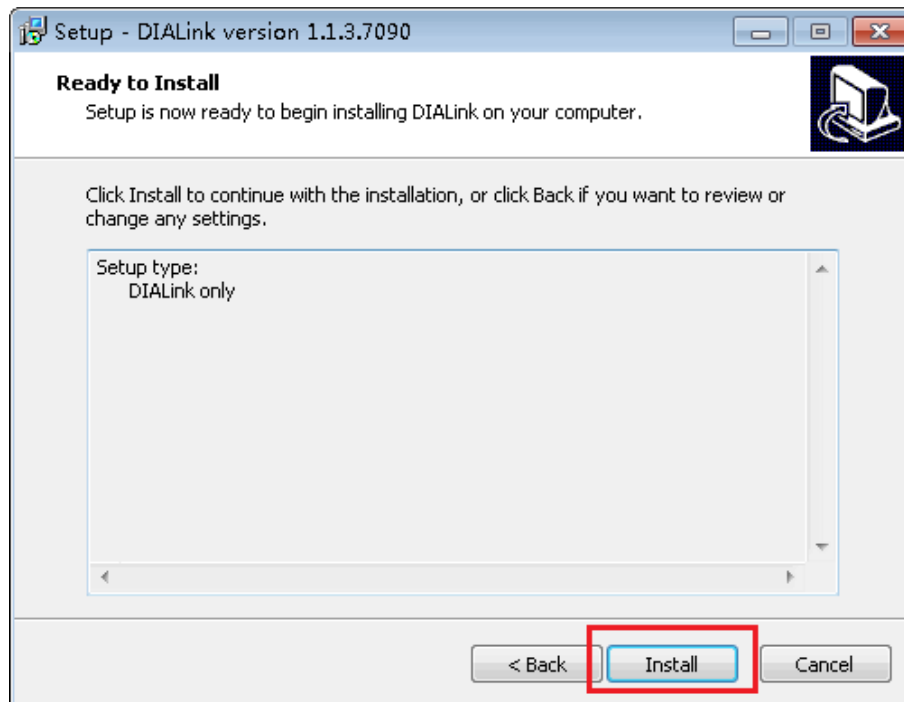


Step 2. Choose “DIALink Only” from the drop-down list box.

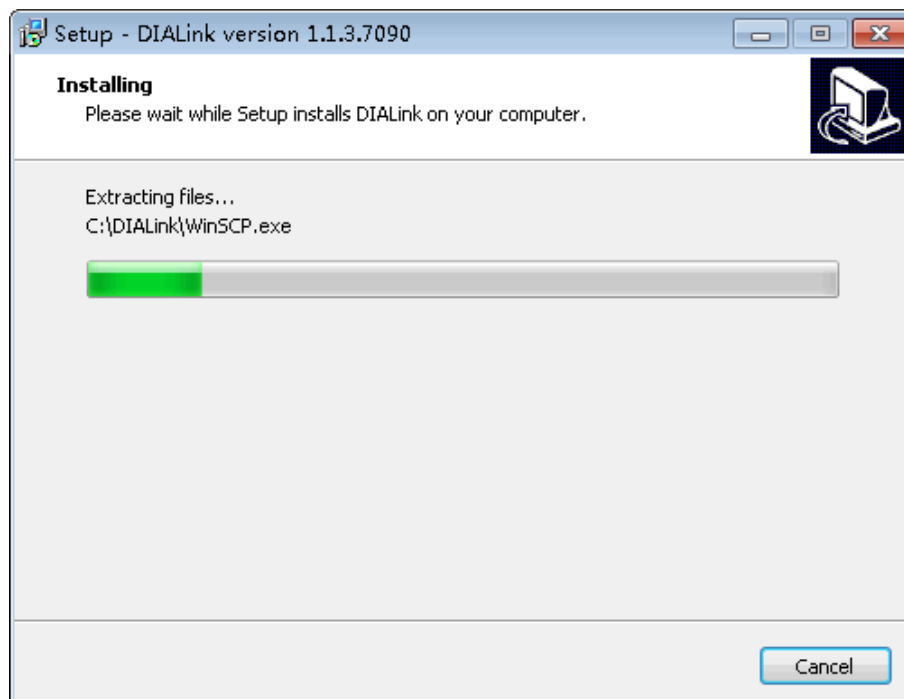


Step 3. Click <Install> on this default page to proceed.

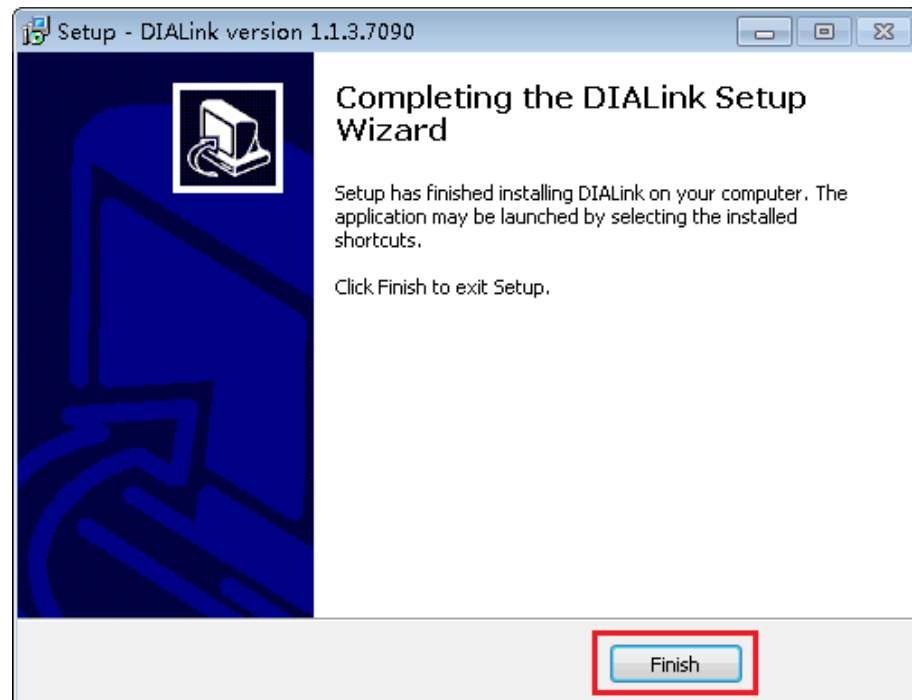
1



Step 4. Await for DIALink installation completed.



Step 5. Click <Finish> to exit the software update setup.

**1**

1.4 Hardware- Intel Core-i Series

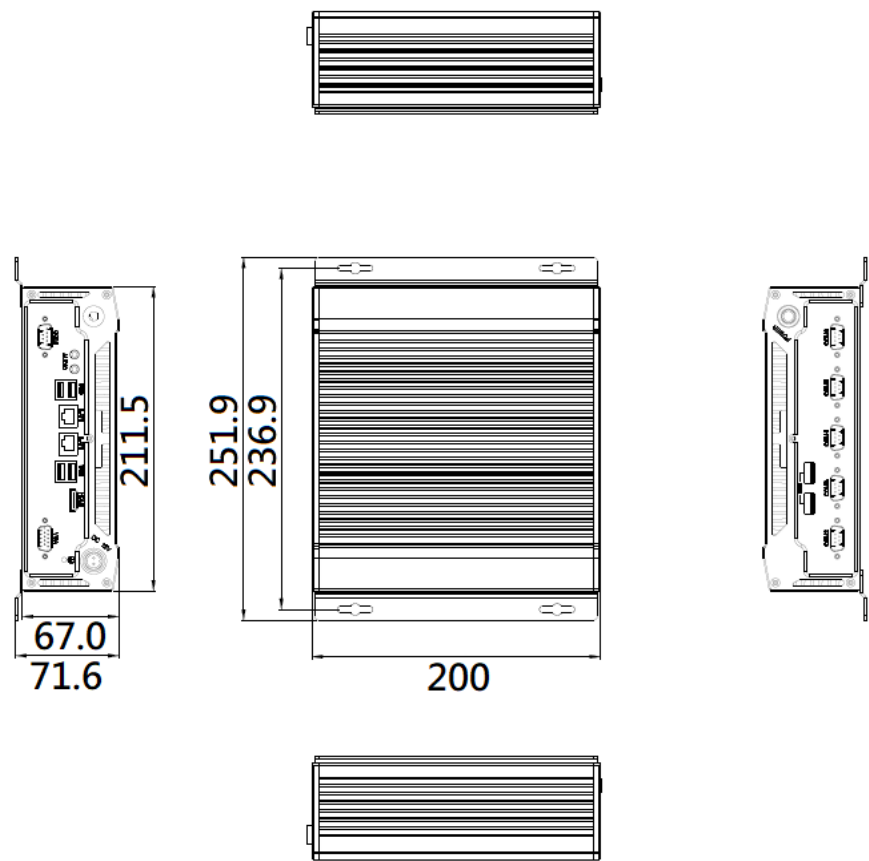
1

Applicable Models	<ul style="list-style-type: none"> Core-i3 Type (DIAPH-IPC00310xA) DIAL-C03050005C, DIAL-C03050005T, DIAL-C03050005E, DIAL-C03100010C, DIAL-C03100010T, DIAL-C03100010E, DIAL-L03100030C, DIAL-L03100030T, DIAL-L03100030E, DIAL-L03200050C, DIAL-L03200050T, DIAL-L03200050E
	<ul style="list-style-type: none"> Core-i5 Type (DIAPH-IPC00510xA) DIAL-L0550001HC, DIAL-L0550001HT, DIAL-L0550001HE

Item		Specification
Main Indicators	CPU	6 th Gen Intel ® Core i3-6100U / i5-6200U
	Memory	4GB DDR4-2133/2400, supporting up to 16GB
	Hard Drive	256GB mSata SSD
	Ethernet	2x Intel ® I211 Gigabit Ethernet Controller
	Audio	A set of standard audio input/output
	Expansion Slot	Support wireless (Wi-Fi) communication modules with mini PCIE expansion slot
	External I/O	<ul style="list-style-type: none"> Serial Port: COM 1~2 & 5~6(RS-232), COM 3~4(RS-485) USB 2.0 x2, USB 3.0(blue) x4 VGA output x1 HDMI output x1
Technical Performance Measures	Dimensions (L×W×H)	211.5mm(L) × 200mm(W) × 67mm(H) (no brackets); 251.9mm(L) × 200mm(W) × 71.6mm(H) (brackets)
	Composition	<ul style="list-style-type: none"> Chassis: High resistance and anodizing aluminum alloy Chassis Color: Black Thermal Conduction: Aluminum alloy chassis with heat conductivity design Material: Heat sinks made from high strength aluminum alloy
	Net/Gross Weight	2.8Kg / 3.5Kg
	Temperature	<ul style="list-style-type: none"> Operating Temperature: -20°C ~ 60°C (with airflow) Storage Temperature: -40°C ~ 70°C
	Humidity	95% @ 40°C (non-condensing)
	Electromagnetic Compatibility	<ul style="list-style-type: none"> Limit of wireless interference meets GB9254-1998 standard Class A Limit of immunity meets GB/T 17618
	Reliability	<ul style="list-style-type: none"> Mean Time Between Failures: MTBF≥5000h Mean Time To Repair: MTTR≤0.5h
	Safety	Meets CE, FCC, BSMI basic requirement

	Adaptability of Mechanical Environment	<ul style="list-style-type: none">● Anti-Vibration: 5-19Hz/1.0mm amplitude : 19-200Hz/1.0g acceleration● Anti-Shock: 10G acceleration peak to peak (11ms)
	Power Input	<ul style="list-style-type: none">● AC Adapter: Input Voltage/Frequency: 100~240VAC/50~60Hz Output Voltage/Current: 12VDC5A● Power Consumption: 7 W (standby mode)● Power Consumption: 16 W (Max Power 100%)

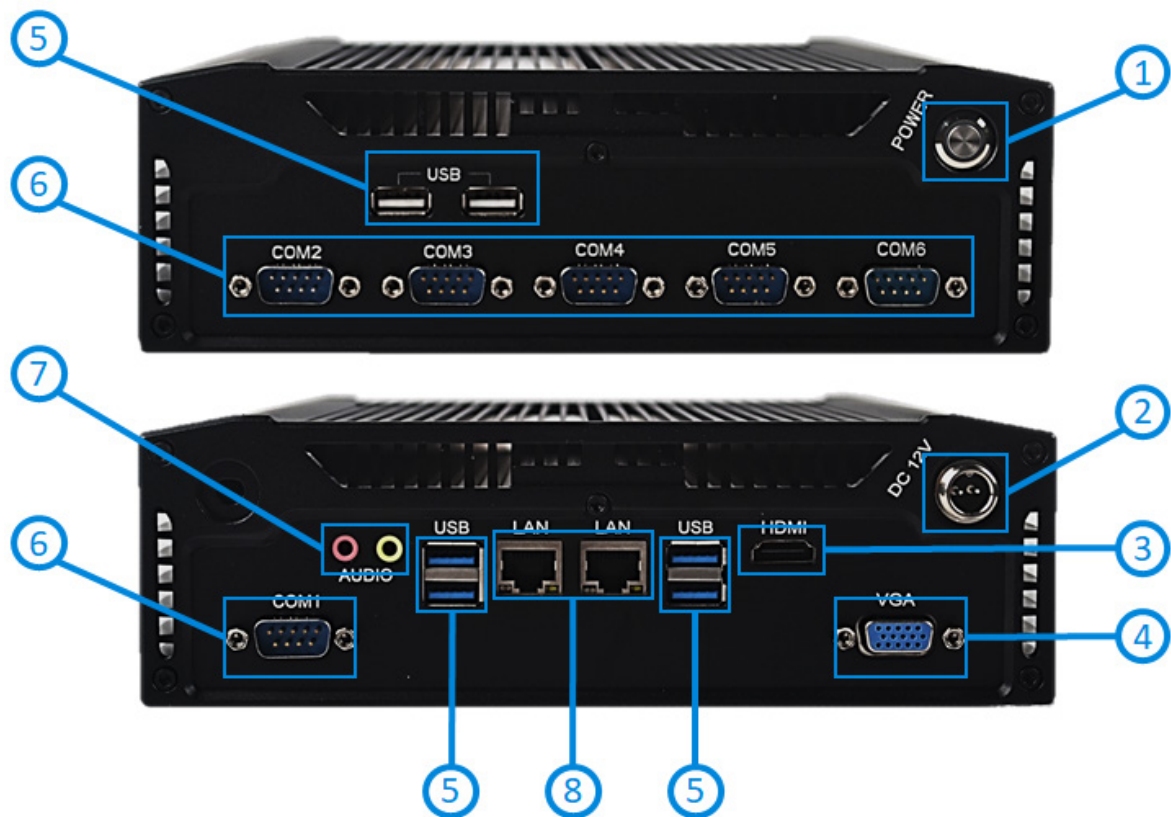
1.4.1 Dimensions



Unit: MM

1.4.2 Diagram of I/O Interface

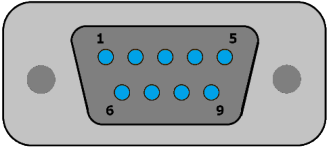
1



No.	Item	No.	Item
1	Power Switch	5	USB2.0 / USB3.0
2	Power Connector	6	RS-232 / RS-422 / RS-485
3	HDMI	7	MIC-In / Line-Out
4	VGA	8	Ethernet

1.4.3 DB9 Serial Port Definition

The product has six serial ports including COM1, COM2, COM3, COM4, COM5 for RS-232 serial communication protocol and COM6 for RS485/RS422 protocols. Definition regarding pins are shown as follows:

DB9 COM1-COM6	Pin	Communications Interface		
		RS-232	RS-485	RS-422
	1	DCD	DATA+	T+/R+
	2	RXD	DATA-	T+/R-
	3	TXD	-	RXD+
	4	DTR	-	RXD-
	5	GND	GND	GND
	6	DSR	VCC +5V (Standby power input)	VCC +5V (Standby power input)
	7	RTS	-	-
	8	CTS	-	-
	9	RI	-	-

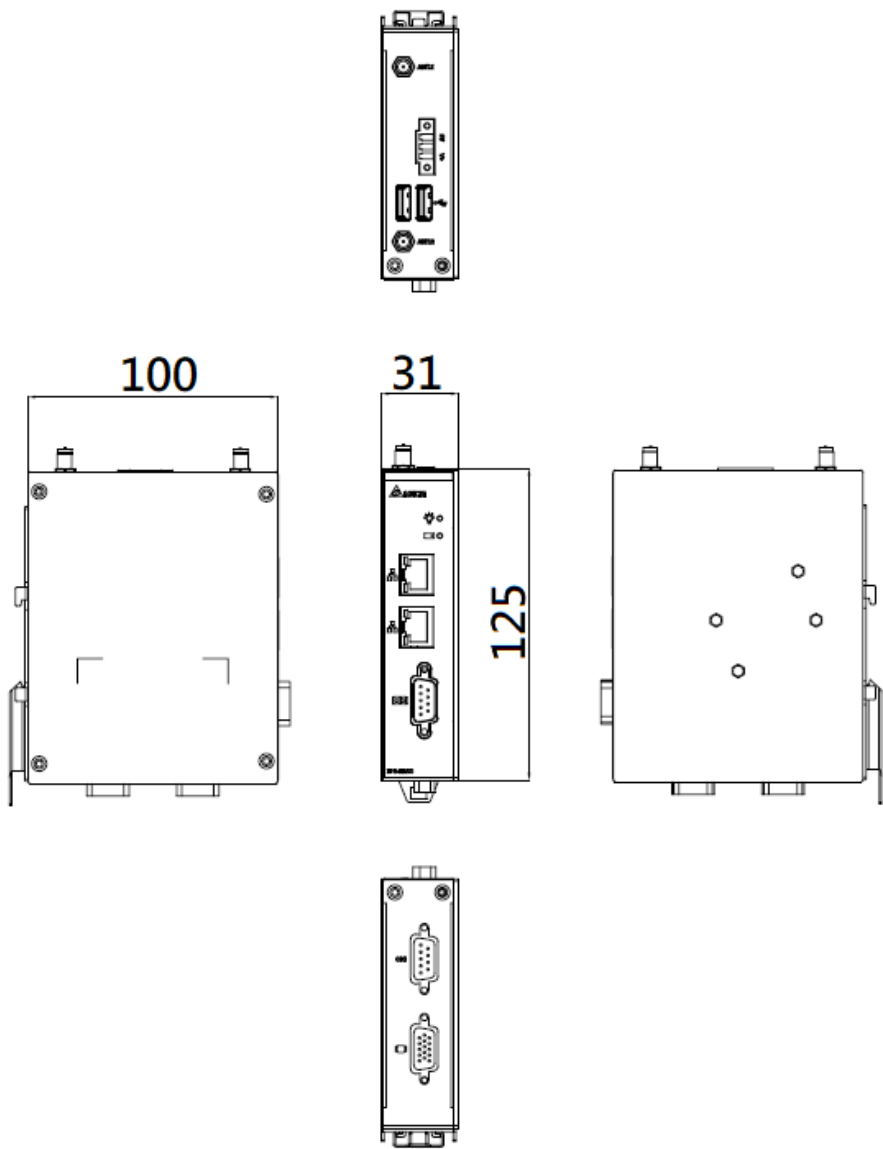
1.5 Hardware- Intel Celeron N3350

Applicable Models	<ul style="list-style-type: none"> ● Embedded System (IPC-E200-N31202E00) DIAL-C33010001E, DIAL-S33000001E
--------------------------	--

Item	Specifications
CPU	Intel® Celeron N3350
Memory	2GB DDR3L 1600MHz, supporting up to 8GB
Hard Drive	64GB mSata SSD
Ethernet	Intel® i211AT Gigabit Ethernet Controller x2
Expansion Slot	1×Full-size Mini PCIe for wireless module
External I/O	<ul style="list-style-type: none"> ● RS-232／RS-422／RS-485 x1, the default is RS-232. Selected by BIOS, referring to Section 1.5.4 for more details. ● USB 2.0 x2 ● VGA Output x1 ● DI/O x1 (8-bit , DB9 Connector) Default is DO for Pin 1~4, DI for Pin 5~8. Selected by BIOS, referring to Section 1.5.6 for more details.
Dimensions (L×W×H)	100mm (L) × 31mm (W) × 125mm (H)
Net/Gross Weight	Net Weight : 0.3Kg ; Gross Weight : 0.46Kg
Temperature	<ul style="list-style-type: none"> ● Operating Temperature : -20°C ~ 70°C (with air flow) ● Storing Temperature : -45°C ~ 85°C
Humidity	10% ~ 95% (non-condensing)
Reliability	<ul style="list-style-type: none"> ● Mean time between failures (MTBF): ≥ 69,000h ● Mean time to recovery (MTTR): ≤ 0.5h
Safety	CE, FCC
Adaptability of Mechanical Environment	<ul style="list-style-type: none"> ● Anti-vibration : 2.0G , 5~500Hz
Power Input	<ul style="list-style-type: none"> ● Input voltage/ frequency: : 12~24VDC , 17W

1.5.1 Dimensions

1



Unit: MM

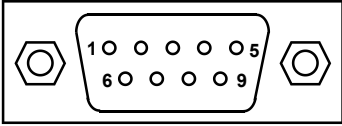
1.5.2 Diagram of I/O Interface

1



No.	Item	No.	Item
1	Power Connector	4	RS-232 / RS-422 / RS-485
2	VGA	5	Ethernet
3	USB 2.0	6	DIO

1.5.3 Com Port Definition (D89)

Serial Port	Pins	Communications Interface		
		RS-232	RS-485	RS-422
	1	DCD	Data-	TX-
	2	RXD	Data+	TX+
	3	TXD	-	RX+
	4	DTR	-	RX-
	5	GND	GND	GND
	6	DSR	-	-
	7	RTS	-	-
	8	CTS	-	-
	9	RI	-	-

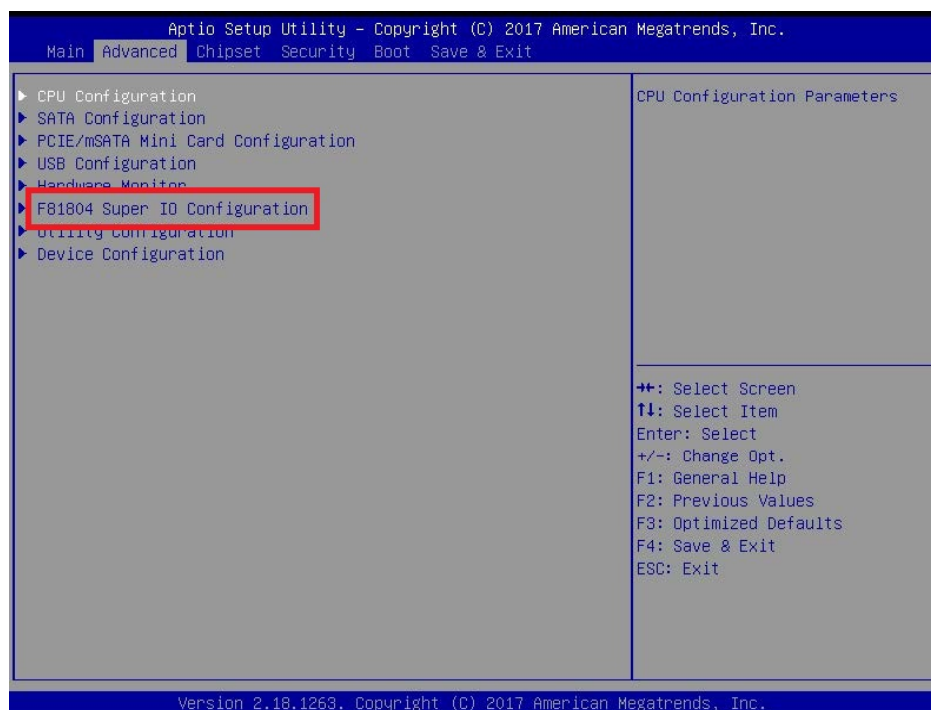
1.5.4 COM Port Settings

The default setting would be RS-232. Refer to the following process to configure the port type.

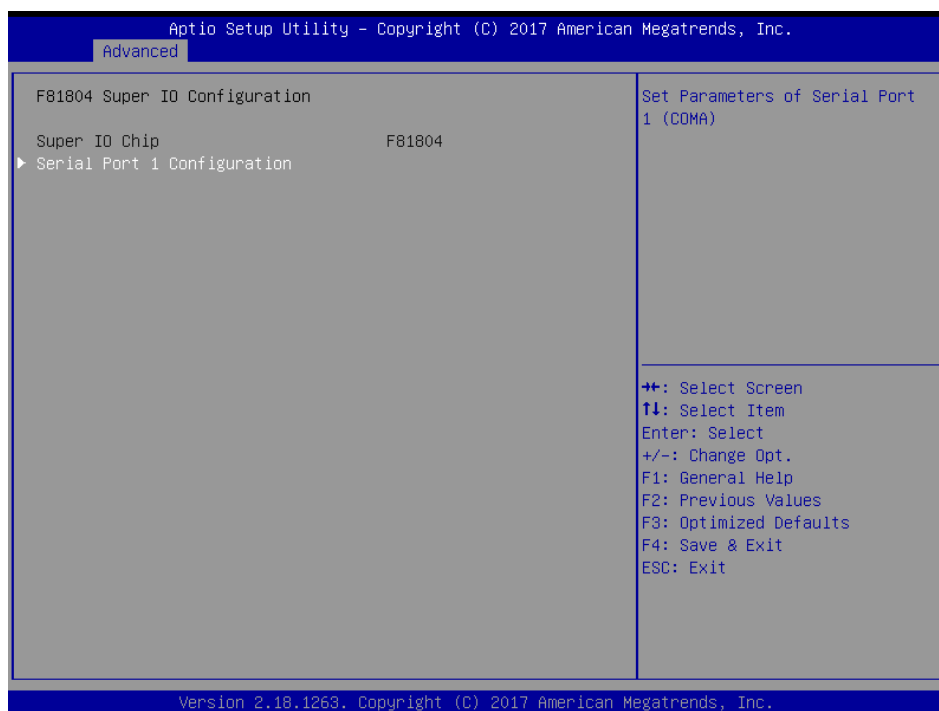
Step 1. Hold the "DEL" button right after you power on the computer so as to enter BIOS.

Step 2. When entering BIOS configuration page, you can access other settings such as Advanced and Chipset.

Step 3. Use the LEFT/RIGHT arrow keys to enter Advanced page and select "F81804 Super IO Configuration".



Step 4. Select "Serial Port 1 Configuration" to configure COM port type.

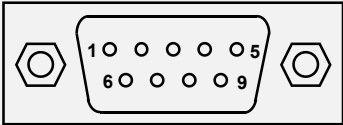


Step 5. Use the UP/DOWN arrow keys to choose "Select Mode" and set port type with options RS232, RS422, RS485.



Step 6. You must press F4 key to save the configuration before exiting BIOS.

1.5.5 DIO Port Definition (D89)



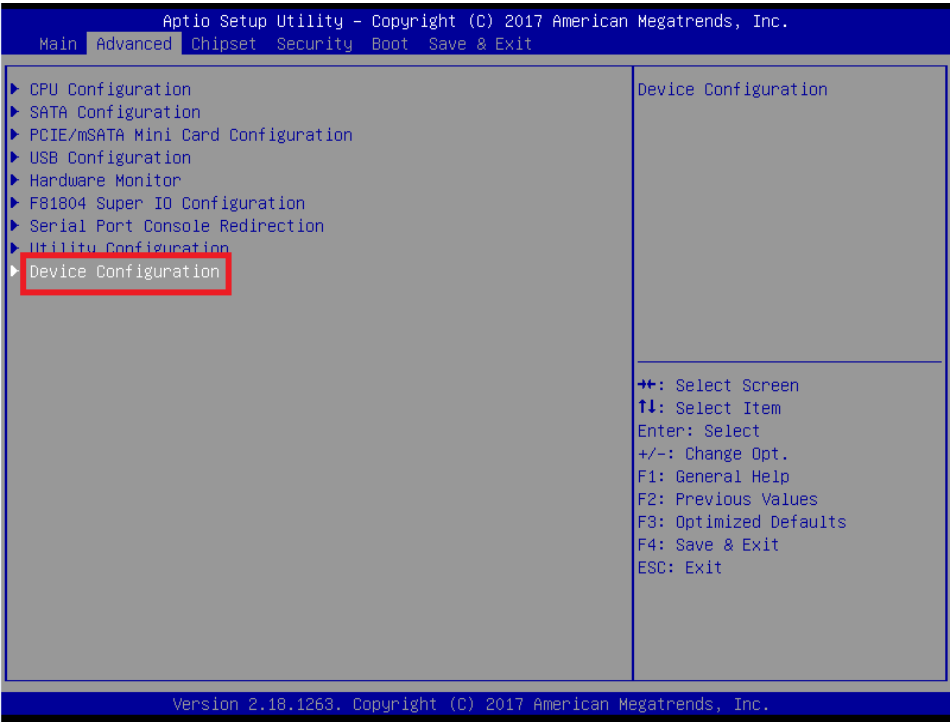
Pins	Signals
1	DIO 0
2	DIO 1
3	DIO 2
4	DIO 3
5	DIO 4
6	DIO 5
7	DIO 6
8	DIO 7
9	GND

1

1.5.6 DIO Port Settings

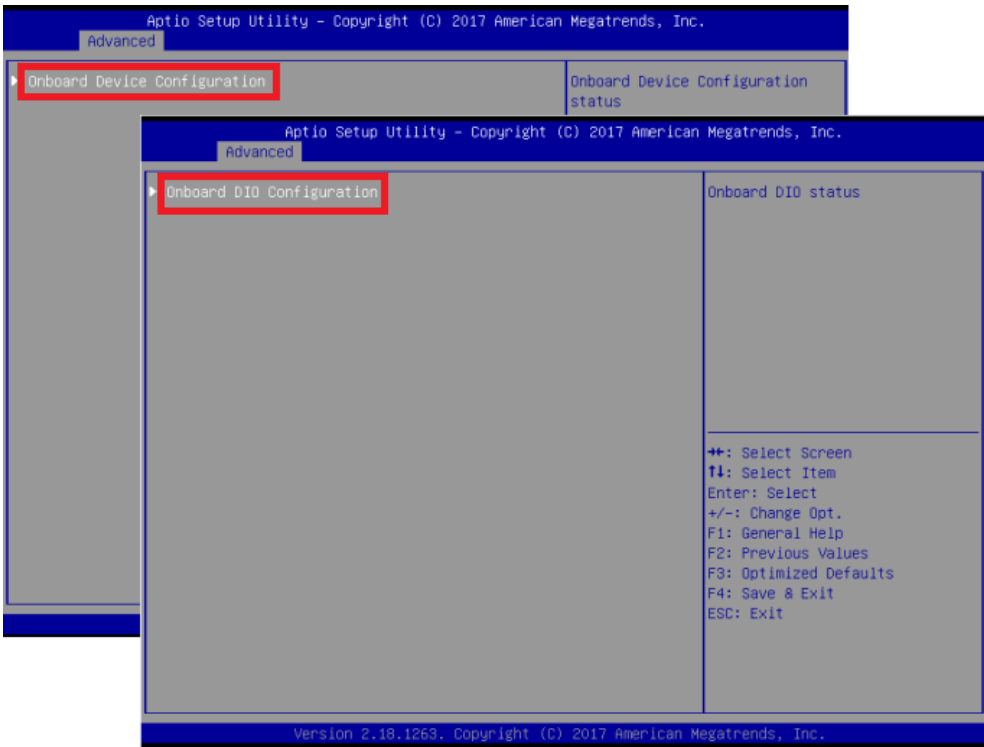
The default setting of DIO is enabled (Enable) with pin 1 to 4 as Out and pin 5 to 8 as In. To modify DIO parameters, please refer to the following steps:

- Step 1. Hold the “DEL” button right after you power on the computer so as to enter BIOS.
- Step 2. When entering BIOS configuration page, you can access other settings such as Advanced and Chipset.
- Step 3. Use the LEFT/RIGHT arrow keys to enter advanced page and select “Device Configuration”.

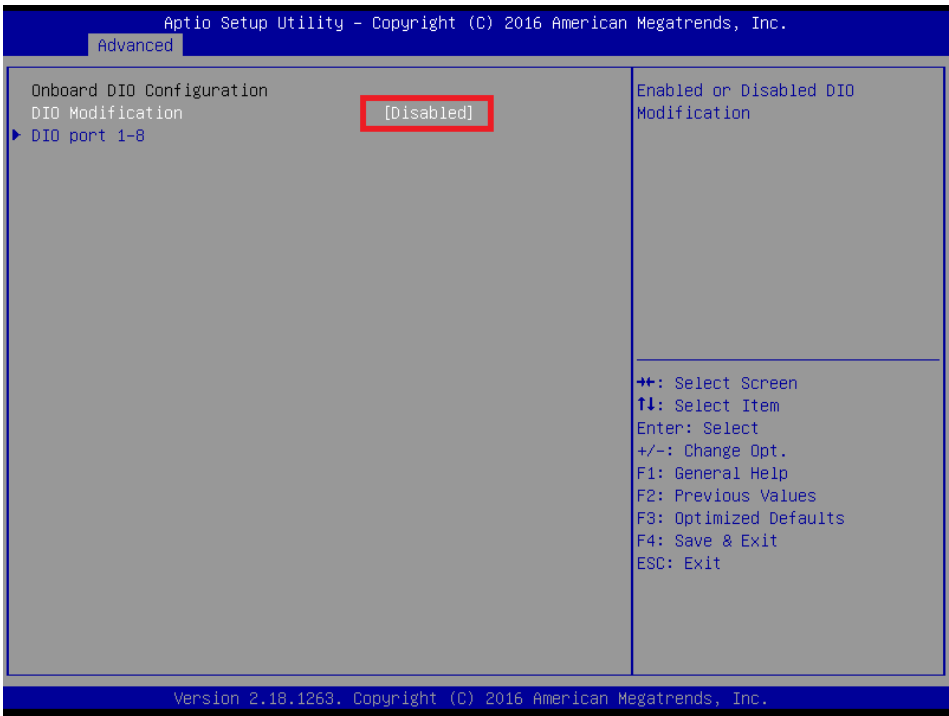


1

Step 4. Continue to select Onboard Device Configuration, Onboard DIO Configuration.

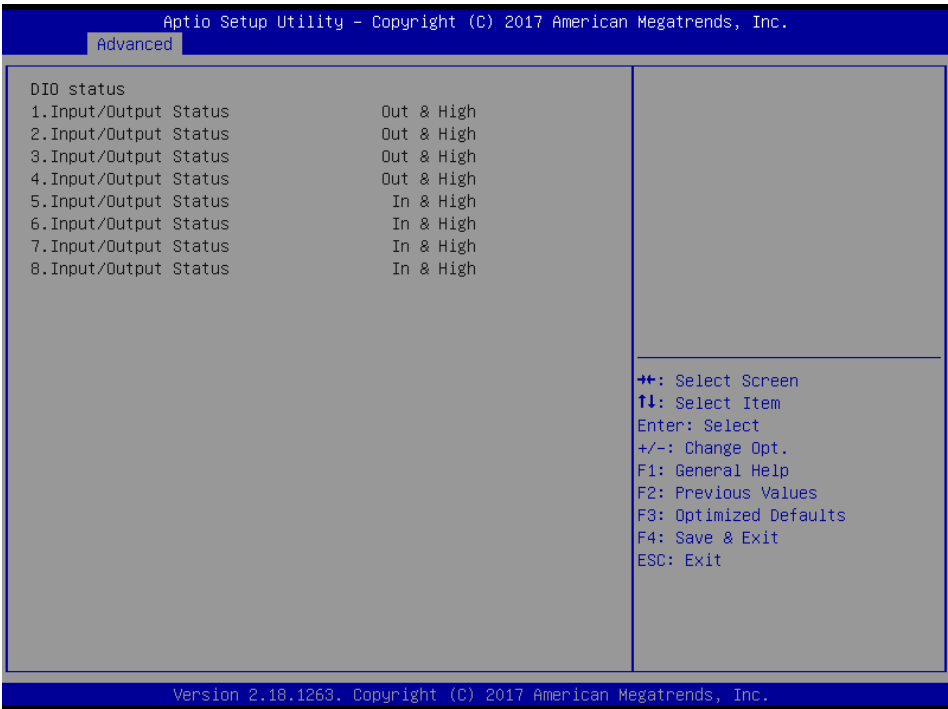


Step 5. When turning on the computer and DIO Modification is Disabled, this does NOT mean that the function is closed.

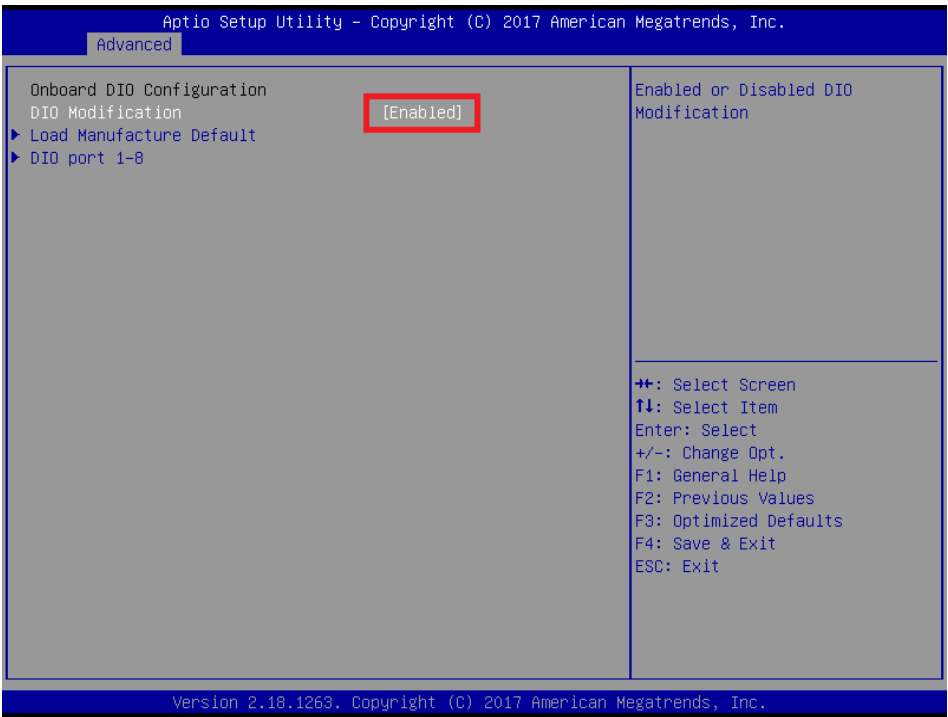


Step 6. Use the UP/DOWN arrow keys to select from DIO port 1 to 8 and view each pin status, with default status below.

1

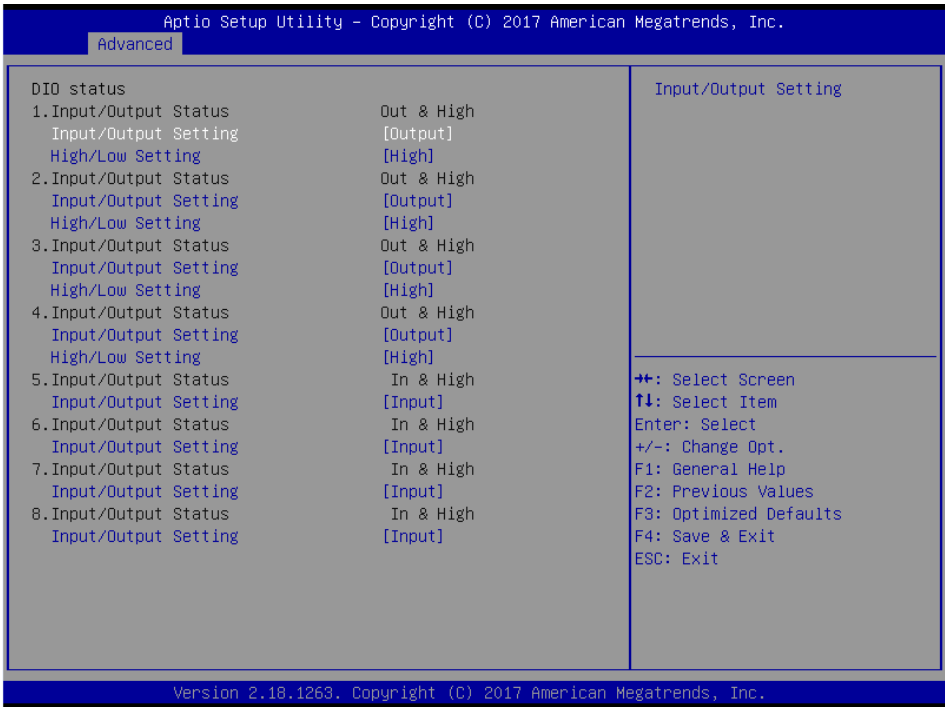


Step 7. To modify DIO configuration, first select Enable for DIO Modification.



1

Step8. Select “DIO port 1-8” for setting pin status.



Step 9. You must press F4 key to save the configuration before exiting BIOS.

Chapter 2 Getting Started

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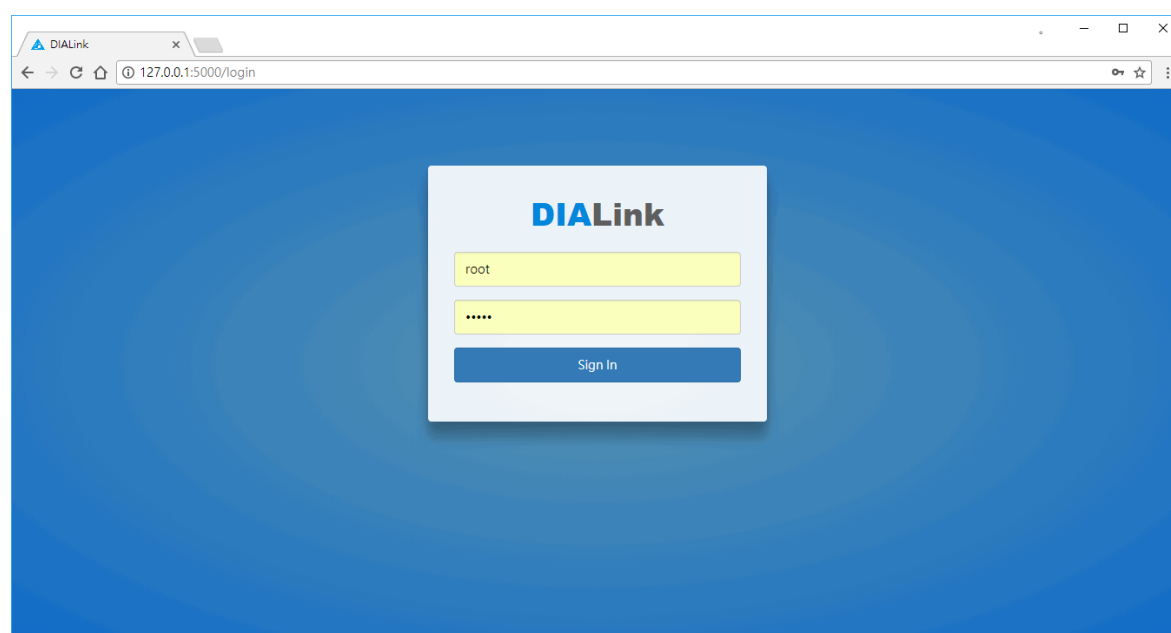
2.1	Sign In	2-2
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2.2.3	Tags Setting	2-15
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2.1 Sign In

Make sure to insert the USB encryption lock to the USB port on your PC so as to activate the authorized connection between DIALink and the corresponding devices.

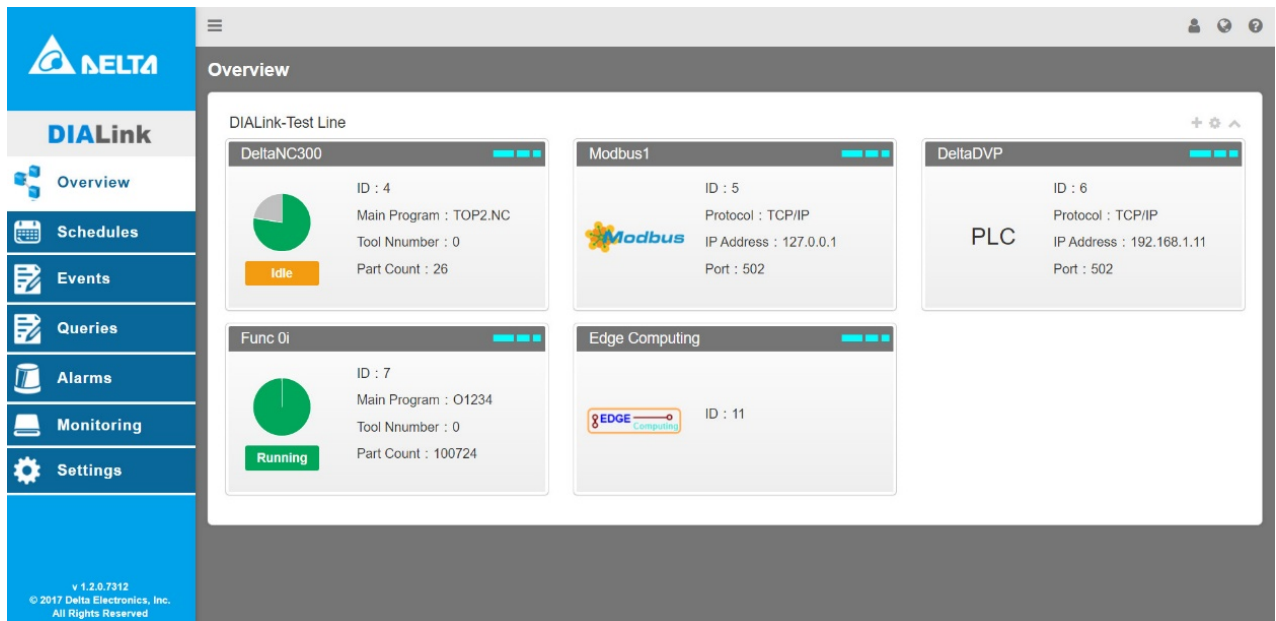
The DIALink uses HTML5 for structuring the website and executes setup as well as preview functions via browsers (including Chrome, Firefox, Internet Explorer 11.0 version or above). Default IP for network interface card (NIC) A is 192.168.10.1, while the IP for NIC B is 192.168.10.2. Users can modify the NIC IP by choosing Control Panel > Network and Internet > Connections” in Windows or System Setting > Internet in DIALink.

Type the server IP address (<http://localhost:5000>) and the default user / password - root/admin in the appropriate fields and click Sign In. When log on to the system, users can modify their user name and password via selecting Settings > General > User Setting.



2.2 UI Guide

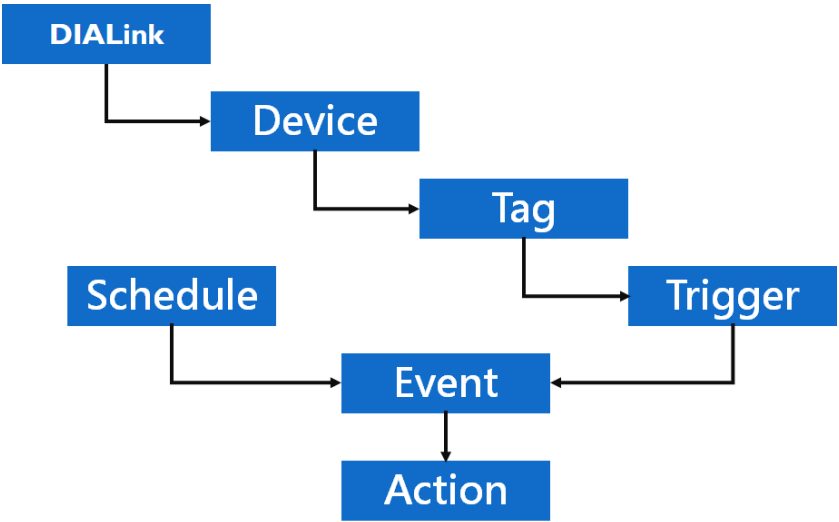
After logging, users are directed to an overview of all connected devices via IP address or serial ports. When green light (ON) is shown next to the device, the device is connected; if devices are disconnected, a red light (OFF) is shown. Users can select a device dialog box to execute settings including tags, triggers and maintenance. When CNC device dialog box is selected, the default Dashboard page is displayed; for Modbus device page, the default Tag page is displayed. To add new DIALink tags, please see section 2.2.2 for more details.



The seven major functions listed on the left of the webpage are **Overview**, **Schedules**, **Events**, **Inquiry Funtion**, **Alarms**, **Monitoring** and **Settings**, which are briefly described below.

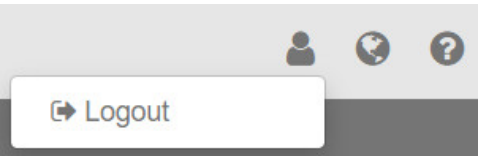
- **Overview:** Add different device types including CNC, Computing, Modbus, OPCDA, PC, PLC as well as Plastics and create tags as well as setup schedules for triggering events. When devices are connected, green light is displayed in the device dialog box; if not, red light will be seen in the dialog box. (The overview page display may be different for equipment using SECS standard.)
- **Schedules:** Setup fixed frequency or specific time and receive alerts via e-mail, SMS, LINE, WeChat, WriteTag or Webhook by checking tag data and conditions.
- **Events:** Add/ edit the conditions to enable events
- **Queries:** Provides status information of the device over a specified time period.
- **Alarms:** Provide alarm information including device, system and tag
- **Monitoring:** Displays CPU, memory and disk usage of DIALINK CNC
- **Settings:** Include MQTT Broke IP, user setting, e-mail and SMS notification settings.


The following is a structure diagram regarding DIALink CNC functions:




The Quick Menu is on the upper right corner of the page and has three major functions described below:

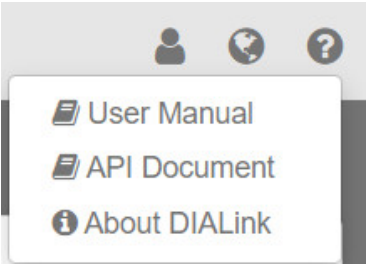
- **User Management:** Select  to logout.





- **Language:** Select  to switch languages including English/ Traditional Chinese/ Simplified Chinese.

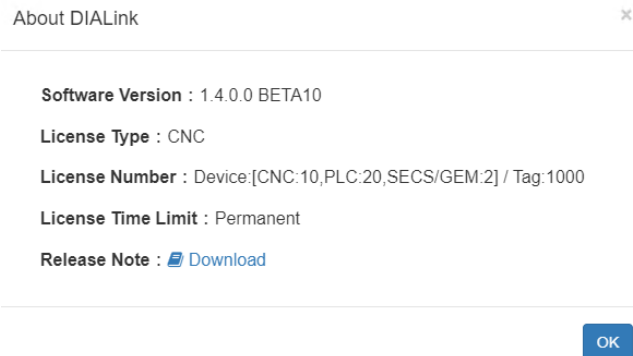


- **User Manual:** Select  to view DIALink CNC User Manual.



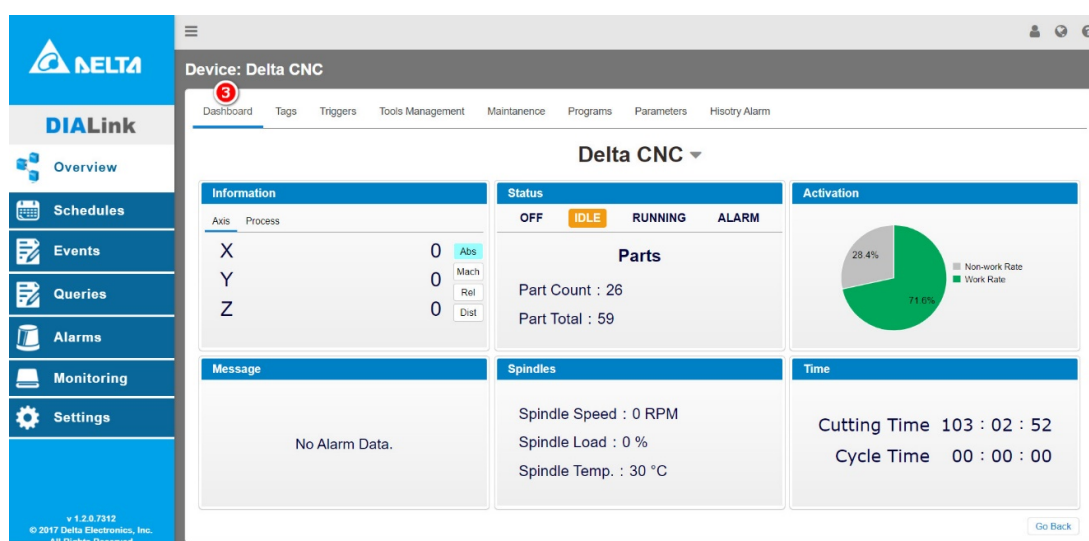
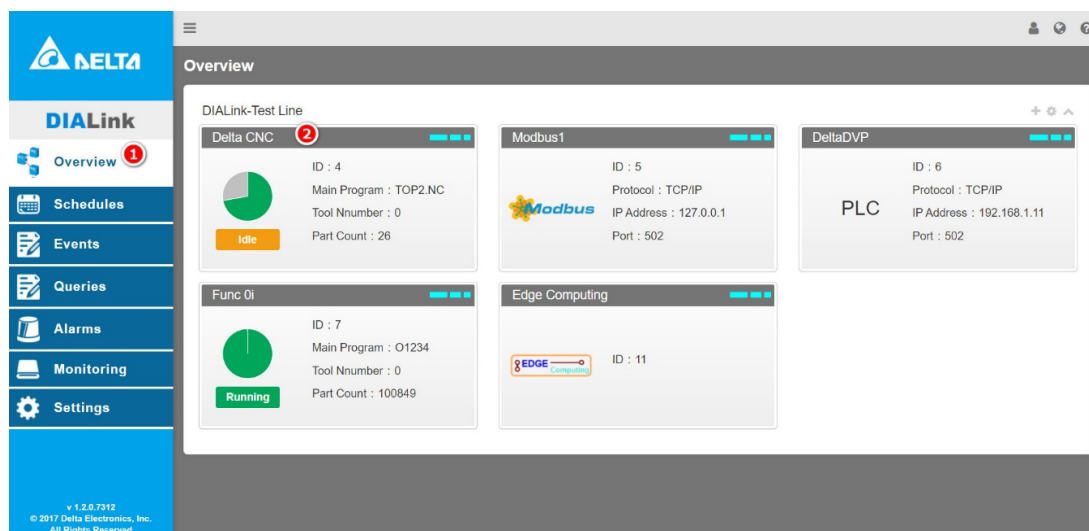
- **API Document:** Select  for API document query. To use this tool, please see Chapter 3 for more information.

- **DIALink Info:** Select  and choose About DIALink to view information regarding software version, license type and license number for device and tag. The graph below indicates the maximum number of devices or tags are authorized to be 10 (devices) / 1000 (tags.)



2.2.1 CNC Dashboard

By clicking the CNC device dialog box(with CNC and tags added), the default page displays six major related data including axes, CNC status, activation, alarm message, spindles and operation information.



The axis information contains coordinates, currents and manufacturing information. For coordinates, the page displays absolute, machine, relative coordinates, while remaining coordinates refers to the distance value between the current and target coordinates. The unit used in coordinates and currents can be added when modifying the tags for a more intuitive viewing.

2

Information			
Axis	Process		
X	0	Abs	
Y	0	Mach	
Z	0	Rel	
		Dist	

Information			
Axis	Process		
	MainProg	TOP2.NC	
	CurSeq	1	


Activation: Job shifts need to be scheduled first. The activation rate would start to be calculated after entering the time interval set in the job shift, starting from 100%, which would remain as long as the equipment is still running. If not, the activation rate would start decreasing, while the pie chart updating every few seconds. The calculation is shown as follows:

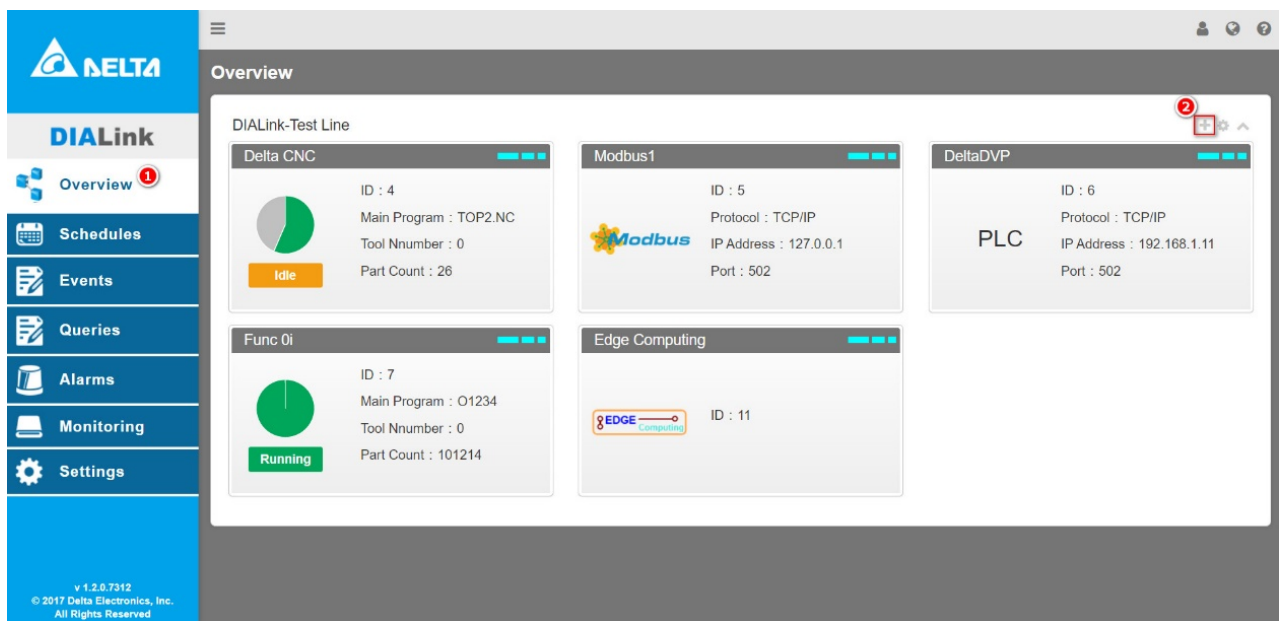
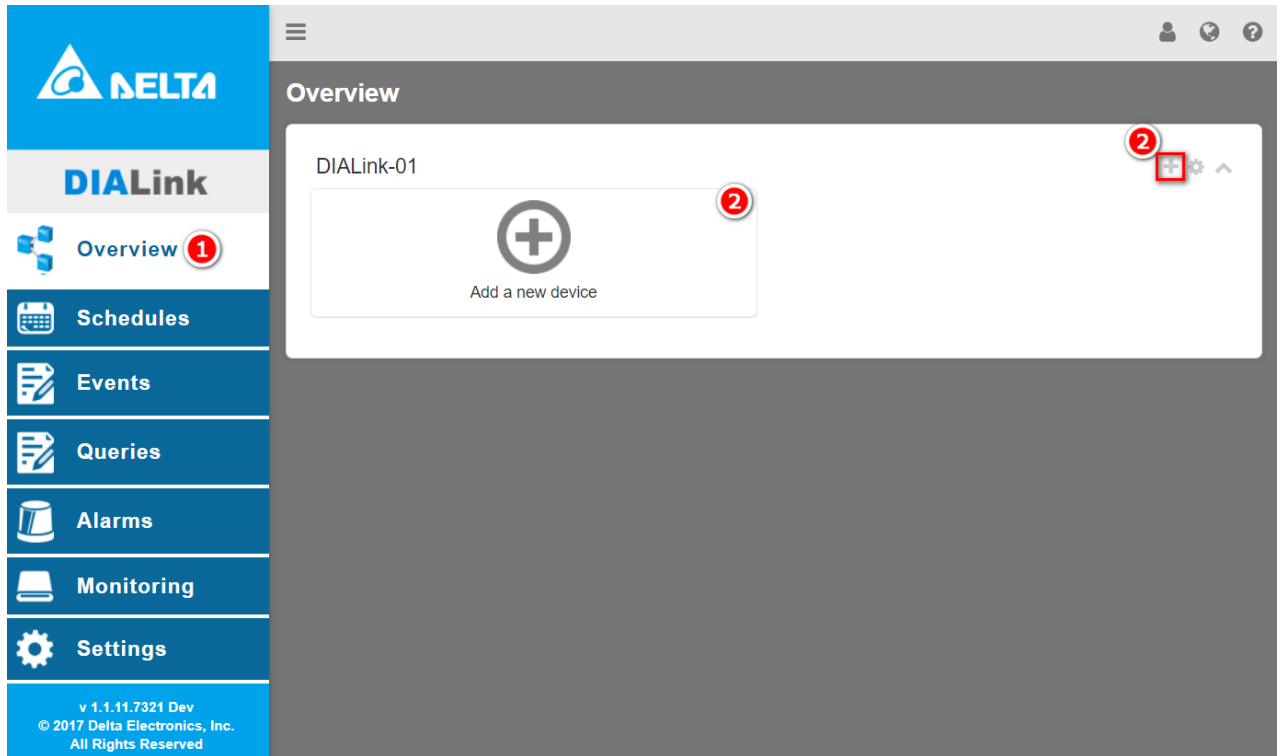
Total Time = Accumulation of (busy + alarm + idle + off) time

$$WorkBusyRate = \frac{Accumulation\ of\ busy\ time}{Total\ Time}$$
$$WorkAlarmRate = \frac{Accumulation\ of\ alarm\ time}{Total\ Time}$$
$$WorkIdleRate = \frac{Accumulation\ of\ idle\ time}{Total\ Time}$$
$$WorkOffRate = \frac{Accumulation\ of\ off\ time}{Total\ Time}$$
$$WorkBusyRate + WorkAlarmRate + WorkIdleRate + WorkOffRate = 100\%$$

Note: The above four types of WorkRate are accumulated within a day based on the current status code, which would be auto-zeroed at 0:00 every day and start recalculating.

2.2.2 Adding New Devices

If adding a device for the first time, choose “Overview” on the menu bar and then click “Add a new device” as the image below shows. Or users can also click  on the upper right corner to add new devices.



The parameter setting dialog box for device types including CNC, Computing, Modbus, OPCDA, PC, PLC as well as Plastics will appear on the right side of the page. For different device types, system presents suitable parameters for users to choose or input related parameters. The supported leading brands are shown in the following table.

DeviceType	Leading Brands/ Model Type	
CNC	1. CNC Simulator - Modbus TCP Protocol 2. DELTA -NC300 3. FANUC -0i/16i/18i/21i/30i/31i/32i 4. HEIDENHAIN -iTNC530 -iTNC640 5. MITSUBISHI -M70/M700 Series -M80 Series 6. SIEMENS -840D 7. Syntec -Syntec	
Computing	Edge Computing	
Modbus	Modbus	
PC	DELTA	DELTA
PLC	1. DELTA -Delta 15MC TCP (Ethernet) -Delta AH Series (COM Port) -Delta AH Series PLC (Modbus TCP)(Ethernet) -Delta AS Series (COM Port) -Delta AS Series PLC (Modbus TCP) -Delta DVP Series (COM Port) -Delta DVP TCP/IP (Ethernet) -Delta RTU-EN01 (Ethernet) 2. Keyence -KV Series TCP (Ethernet) 3. Mitsubishi -FX3U Ethernet (Ethernet) -Q Series Ethernet (Ethernet) -Q Series Ethernet 3E (Ethernet)	4. Omron -C Series TCP (Ethernet) -CJ2M TCP (Ethernet) -CP1 Series (COM Port) -CP1 Series TCP (Ethernet) -NJ Series FINS TCP (Ethernet) 5. Panasonic -FP Series TCP (Ethernet) -FP7 Series TCP (Ethernet) 6. SIEMENS -S7 1200 (Ethernet) -S7 1500 (Ethernet) -S7 200 (Ethernet) -S7 200 Smart (Ethernet)
Plastics	Plastics -OPC -PLC	

Note: Please make sure direct numerical control (DNC) information acquisition method has been authorized in CNC control devices, or the data may not be obtained whether if the connection is failed.

All items marked with an asterisk (*) need to be completed. When finished, click “Save changes” button at the bottom of the page. If the input value does not follow to the system rule, a red color frame will appear to indicate as an error.

For device connection, users can choose either On or Off. When parameters are added or edited, click “Save changes”.

- **Edge Computing Device Setup Page**

Add Device ✕

Connect
☒ ON

Name*

Type*

Computing

Brand*

Edge Computing

Model*

Edge Computing

Interface ID

Comment

Save changes

Cancel

- **CNC Device Setup Page**

Add Device ✕

Connect
☒ ON

Name*

Type*

CNC

Brand*

CNC Simulator

Model*

Modbus TCP Protocol

IP*

127.0.0.1

Port*

502

Station*

1

Interface ID

Comment

Save changes

Cancel

● Modbus Device Setup Page

Add Device

Connect

ON

Name*

Type*

Modbus

Brand*

Modbus

Model*

Modbus

Communication Interface*

TCP/IP

IP*

127.0.0.1

Port*

502

Station*

1

Interface ID

ConnectionTimeout

ReadTimeout

WriteTimeout

ModbusRetry

Comment

Save changes

Cancel

● OPCDA Device Setup Page

Add Device

Connect

ON

Name*

Type*

OPCDA

IP*

127.0.0.1

Server Name*

Enter OPC server name

Scan

Interface ID

Comment

Save changes

Cancel

● OPCUA Device Setup Page

Add Device

Connect

ON

Name*

Type*

OPCUA

IP*

127.0.0.1

Port*

4840

URL*

opc.tcp://

Server Name*

Enter OPC server name

▼

Search

Interface ID

Authentication

AnonymousUserCertificate

Browse Retry*

50

Browse Timeout*

200

● PC Device Setup Page

Add Device

Connect

ON

Name*

Type*

PC

Brand*

Delta

Model*

Delta

IP*

127.0.0.1

Interface ID*

Comment

Save changesCancel

● PLC Device Setup Page

Add Device

Connect
☒ ON

Name*

Type*

Brand*

Model*

IP*

Port*

Station*

Interface ID

Comment

Save changes

Ca

● Plastics Device Setup Page

Add Device

Connect
☒ ON

Name*

Type*

Brand*

Model*

IP*

Server Name*

Interface ID

Comment

Save changes


C





















To use OPC UA (OPC Unified Architecture) for connection and data exchange between clients and servers, the connection settings of DIALink OPC UA Client are shown as follows: (Please refer to the appendix for more details of OPCUA description.)

Item	Description
IP	OPC UA Server IP
Port	Port used by OPC UA server
URL	OPC UA Server URL
Server name	<p>All the names of OPC UA server endpoints</p> <p>Security policy:</p> <p>None: No security</p> <p>Basic128Rsa15: 128 bit encryption</p> <p>Basic256: 256 bit encryption</p> <p>Basic256Sha256: 256 bit encryption</p> <p>Security mode:</p> <p>None: No security</p> <p>Sign: Signed</p> <p>Sign & Encrypt: Signed and encrypted</p> <p>Select the target security policy and mode for connection:</p> <p>Using self-signed certificates by default</p> <p>Automatically trusting OPC UA server certificates</p> <p>Setting opc ua client certificate to be trusted</p>
Authentication	<p>Anonymous: Connect as anonymous user</p> <p>User: User name and password based authentication</p> <p>Certificate: Use certificates to authenticate.</p>
Browse Retry	The number of times of retry to browse OPC UA nodes.
Browse Timeout	The session timeout to browse OPC UA nodes. (Unit: msec.)





The supported data types for reading and writing node values are listed as below:




Item	Description
Supported data types for variables	SByte, Byte, Int16, UInt16, Int32, UInt32, Int64, UInt64, Float, Double, String, Boolean, Date Time
Supported variable types for one dimensional arrays	Supported data types: As shown above.
Special data type- String type	<p>Data types such as Boolean, Date Time, Array:</p> <p>Data type would be String type while performing external data communication (Web API, MQTT, Modbus Slave, OPC UA Server)</p> <p>Examples of output strings of values in arrays:</p> <p>Integer array: {1,2,3,4}</p> <p>Boolean array: {True,False,True,False}</p> <p>Date Time array:</p> <p>{2020-11-01T16:35:59.5848704Z,2020-11-02T16:35:59.5848704Z,2020-11-03T16:35:59.5848704Z}</p> <p>String array: {ABCD,EFGH,123456}</p>





















After adding the device, select  on the upper right side of the device nodes to view connection status of each device according to the icon shown in the following picture:

Devices Settings Registration								
Status	Name	Connection	Brand	Model	Alarm	Comment	Update Time	Action
	Delta_CNC	TCP 10.139.5.205	DELTA	NC300			2020-10-21 16:10:23	  
	DeltaDVP	TCP 192.168.1.11 502	Delta	Delta DVP TCP/IP			2020-10-21 16:10:23	  
	Edge computing		Edge Computing	Edge Computing			2020-10-21 16:10:23	  
	Func Oi	TCP 59.120.233.26 8193	FANUC	0i/16i/18i/21i/30i/31i/32i			2020-10-21 16:10:11	  
	Modbus 1	TCP 127.0.0.1 502	Modbus	Modbus			2020-10-21 16:10:22	  




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Icon	Definition
	Normal (Connecting)
	Error (Disconnection)
	Closed Communication (Disabled)
	Alert

Click  subpage icon to display the overview dashboard of the corresponding device. To modify the communication parameters, click  to edit and click “Save Changes” when finished. To delete the selected device, click .

Devices Settings Registration								
Status	Name	Connection	Brand	Model	Alarm	Comment	Update Time	Action
	Delta_CNC	TCP 10.139.5.205	DELTA	NC300			2020-10-21 16:10:23	  
	DeltaDVP	TCP 192.168.1.11 502	Delta	Delta DVP TCP/IP			2020-10-21 16:10:23	  
	Edge computing		Edge Computing	Edge Computing			2020-10-21 16:10:23	  
	Func Oi	TCP 59.120.233.26 8193	FANUC	0i/16i/18i/21i/30i/31i/32i			2020-10-21 16:10:11	  
	Modbus 1	TCP 127.0.0.1 502	Modbus	Modbus			2020-10-21 16:10:22	  

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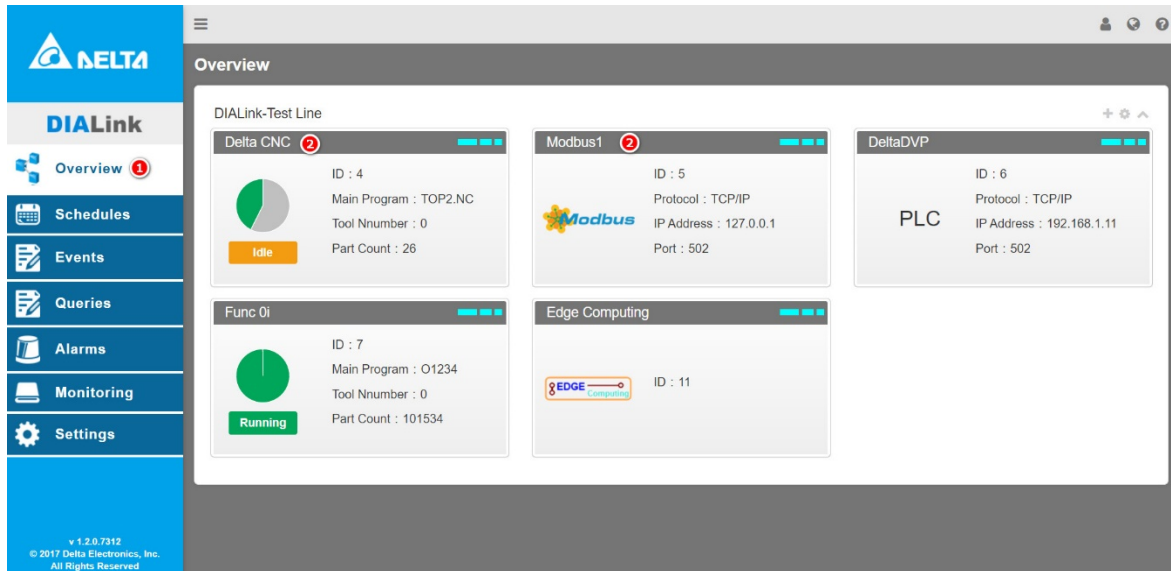
To delete multiple devices, click  edit button to  select the boxes in the left column regarding devices to be deleted and click  to complete the work.


Devices Settings Registration								
Status	Name	Connection	Brand	Model	Alarm	Comment	Update Time	Action
<input checked="" type="checkbox"/>	Delta_CNC	TCP 10.139.5.205	DELTA	NC300			2020-10-21 16:10:23	  
<input type="checkbox"/>	DeltaDVP	TCP 192.168.1.11 502	Delta	Delta DVP TCP/IP			2020-10-21 16:10:23	  
<input type="checkbox"/>	Edge computing		Edge Computing	Edge Computing			2020-10-21 16:10:23	  
<input type="checkbox"/>	Func Oi	TCP 59.120.233.26 8193	FANUC	0i/16i/18i/21i/30i/31i/32i			2020-10-21 16:10:11	  
<input type="checkbox"/>	Modbus 1	TCP 127.0.0.1 502	Modbus	Modbus			2020-10-21 16:10:22	  

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2.2.3 Tags Setting

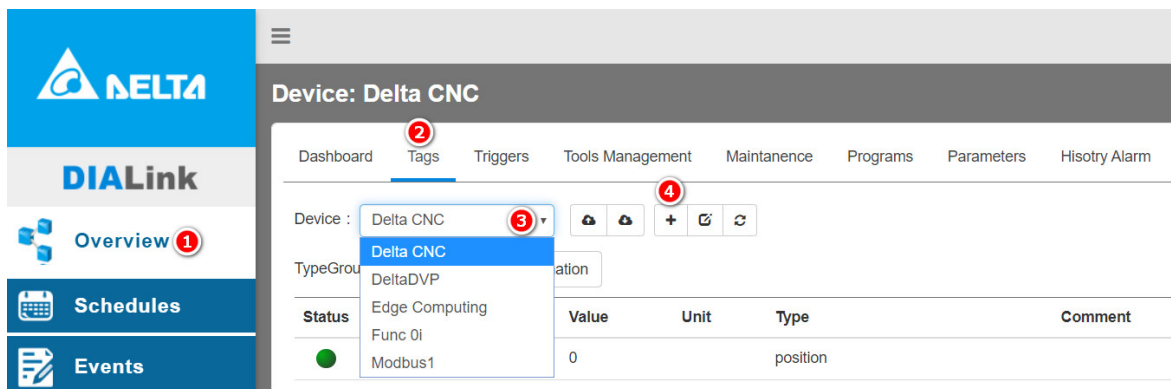
To enter the Tag setting page, choose ❶ Overview from the left function list and ❷ select the target device. When users select CNC device type, default tab pages including Dashboard, Tool Management, Maintenance, Programs, Parameters and History Alarm would be presented, while other device types only contain Tags and Triggers tabs.



Go to the Tags page ❷ and ❸ select the target device from the drop down list, then ❹ click  to create new tags. The “Add Tag” dialog box would be shown on the right for parameter setting. The default setting is for adding single tag, while the other is for batch adding. Select a device type and the system will present the appropriate parameters based on the selected type. Users can choose or input desired parameters.

All items marked with an asterisk (*) need to be completed. When finished, click “Save changes” button at the bottom of the page. If the input value does not follow to the system rule, a red color frame will appear to indicate as an error.

For device connection, users can choose either On or Off. When parameters are added or edited, click “Save changes”.



There are two ways to add tags, one is “Add Single” and the other is “Add Multiply”. Both options are available for all device types except for Edge Computing and can be selected from the top corner of the setting page.

For CNC device type, users can add the default tags of the system’s built-in DIALink controllers from the setting page.

● Modbus Device- Setup Single Tag

Add Tag

Custom

Connect

ON

Add Multiply

Name*

Type

Modbus

Register Type*

Output Register AO (4xxxx)

Logical Register*

Data Type*

UINT

Decimal Places*

0

Scale*

1

Offset*

0

Writable

OFF

Record

OFF

Cloud Transmission

None

Unit

Comment

Save changes

Cancel

● Modbus Device- Setup Multiple Tags

Add Tag

Custom

Connect

ON

Add Single

Name*

Type

Modbus

Register Type*

Output Register AO (4xxxx)

Batch name setting*

First Number

1

Numeric Places

3

Batch address setting (0 - 65535)*

First Address

1

Increment

1

Batch number of items (1 - 1000)*

10

Data Type*

UINT

Decimal Places*

0

Scale*

1

Offset*

0

Writable

OFF

Record

OFF

Cloud Transmission

None

Unit

Comment

Save changes

Cancel

● OPCDA / Plastics Device Single Tag

Add Tag

Custom

Default Tags

Connect [Add Multiply](#)

ON

Name*

Type

OPCDA

Logical Register*

Data Type*

UINT

Decimal Places*

0

Scale*

1

Offset*

0

Writable

OFF

Record

OFF

● OPCDA / Plastics Device Multiple Tag

Add Tag

Custom

Default Tags

Connect [Add Si](#)

ON

Name*

Type

OPCDA

Batch name setting*

First Number

1

Numeric Places

3

Batch address setting (0 - 65535)*

First Address

1

Increment

1

Batch number of items (1 - 1000)*

10

Data Type*

UINT

Decimal Places*

0

Scale*

1

Offset*

0

● PLC Device Single Tag

Add Tag

Custom

Connect

ON

Add Multiply

Name*

Type

PLC

Register Type*

X_Data(X0 - X377)

Register X(0 - 377)*

X

0

Logical Register*

X:0

Data Type*

UINT

Decimal Places*

0

Scale*

1

Offset*

0

Writable

OFF

● PLC Device Multiple Tag

Add Tag

Custom

Connect

ON

Add Single

Name*

Type

PLC

Register Type*

X_Data(X0 - X377)

Batch name setting*

First Number

1

Numeric Places

3

Batch address setting (0 - 377)*

First Address

1

Increment

1

Batch number of items (1 - 377)*

10

Data Type*

UINT

Decimal Places*

0

Scale*

1

Offset*

0

Writable

OFF

Record

OFF

Cloud Transmission

None

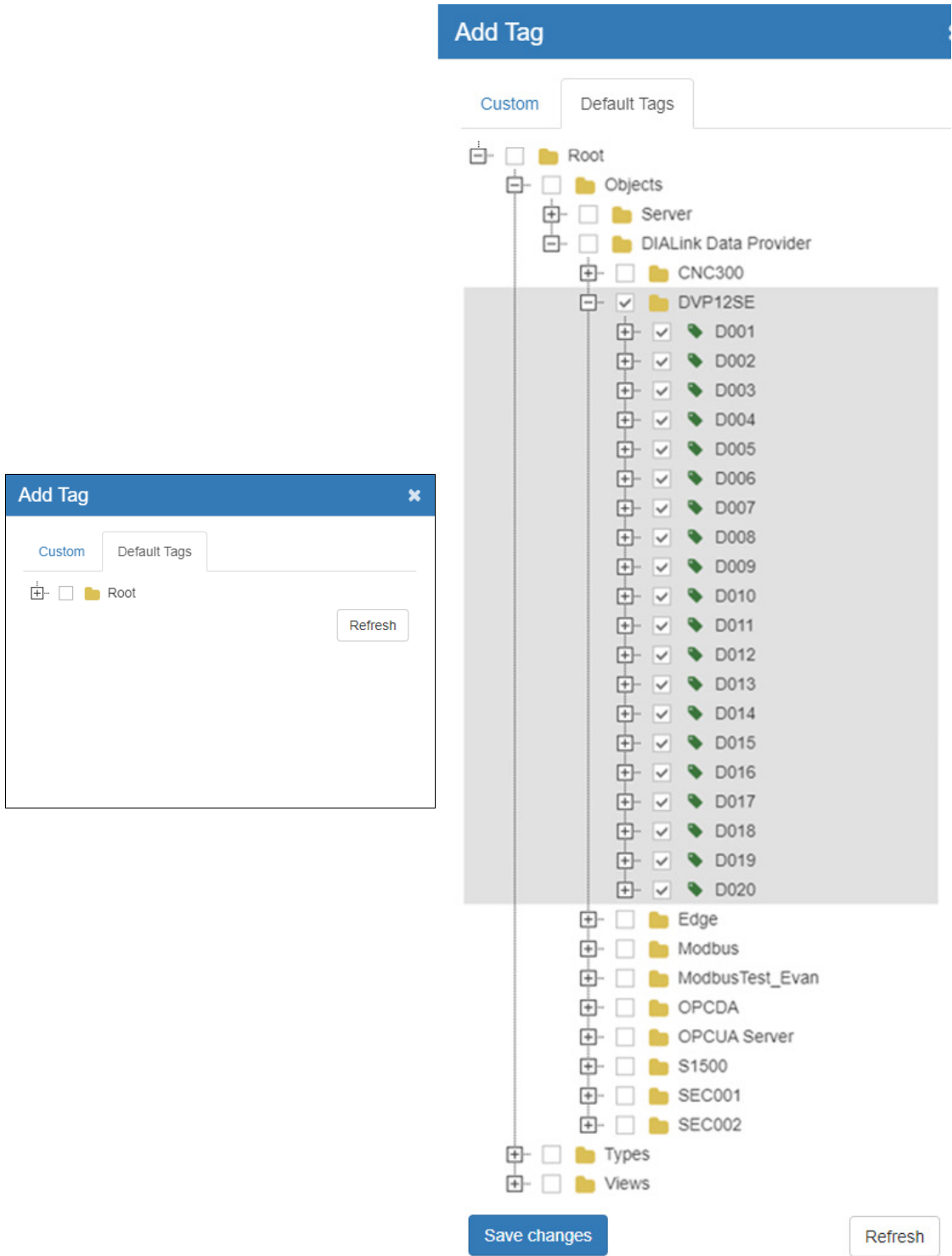
Unit

Comment

Save changes

Cancel

● Setup OPCUA Device Tag



● CNC Device- Setup Single Tag

Add Tag

Custom

Default Tags

Connect Add Multiply

ON

Name*

Type

Macro

Logical Register*

Data Type*

UINT

Decimal Places*

0

Scale*

1

Offset*

0

Writable

OFF

Record

OFF

Cloud Transmission

None

Unit

Comment

Save changes

Cancel

● CNC Device- Setup Multiple Tags

Add Tag

Custom

Default Tags

Connect Add Single

ON

Name*

Type

Macro

Batch name setting*

First Number

1

Numeric Places

3

Batch address setting (0 - 65535)*

First Address

1

Increment

1

Batch number of items (1 - 1000)*

10

Data Type*

UINT

Decimal Places*

0

Scale*

1

Offset*

0

Writable

OFF

Record

OFF

Cloud Transmission

None

Unit

Comment

Save changes

Cancel

● CNC Device- Setup Default Axis Tag

Add Tag ✕

Custom **Default Tags** ¹

2 Axis information Tool

☐ feed_spindle

- ☐ ActFeed
- ☐ ActSpindle
- ☐ OvFeed
- ☐ OvSpindle

☐ position

☐ servo_load

☐ servo_speed

☐ servo_temperature

☐ spindle_load

☐ spindle_speed

☐ spindle_temperature

Save changes **Re-Scan**

● CNC Device- Setup Default Information Tag

Add Tag ✕

Custom **Default Tags** ¹

Axis **2** information Tool

☐ othercode

☐ part

☐ status

☐ time

☐ work_rate

- ☐ WorkAlarmRate
- ☐ WorkBusyRate
- ☐ WorkIdleRate
- ☐ WorkOffRate
- ☐ WorkRate

Save changes **Re-Scan**

● Edge Computing Virtual Tag (Type: arithmetic, logic, counter, timer, move)

Add Tag ✕

Connect **ON**

Name*

Type* arithmetic

Condition*

Tag Value + - * / Log10 ^ v ^ Sin Cos Tan

Col Sec Csc **0 1 2**

Formula

Data Type* INT

Record **OFF**

Cloud Transmission None

Comment

Save changes **Cancel**

Add Tag ✕

Connect **ON**

Name*

Type* counter

Condition*

Tag Value == != > < >= <= AND OR

The Condition field is required.

Formula

Data Type* DOUBLE

Decimal Places* 0

First Number* 0

Increment Number* 1

Record **OFF**

Cloud Transmission None

Comment

Save changes **Cancel**

Add Tag ✕

Connect **ON**

Name*

Type* logic

Condition*

Tag Value == != > < >= <= AND OR

The Condition field is required.

Formula

Data Type* BIT

Record **OFF**

Cloud Transmission None

Comment

Save changes **Cancel**

The image displays two identical 'Add Tag' dialog boxes side-by-side. Each dialog has a blue header with the title 'Add Tag' and a close button. The fields are as follows:

- Connect:** A toggle switch set to 'ON'.
- Name*:** An empty text input field.
- Type*:** A dropdown menu. In the left dialog, it is set to 'move'; in the right, it is set to 'timer'.
- Condition*:** A section with a red error message 'The Condition field is required.' Below it is an empty text input field. Above the input are buttons for 'Tag' and 'Copy To'. In the right dialog, additional logical operators (==, !=, >, <, >=, <=, AND, OR) are visible.
- Formula:** A large, empty text area.
- Data Type*:** A dropdown menu. In the left dialog, it is set to 'BIT'; in the right, it is set to 'DOUBLE'.
- Record:** A toggle switch set to 'OFF'.
- Cloud Transmission:** A dropdown menu set to 'None'.
- Comment:** An empty text input field.
- Buttons:** 'Save changes' (blue) and 'Cancel' (grey) at the bottom.

To add or edit virtual tags, the Condition field is required, which users can add logical operators for statements from left to right for actions that require additional device tags definition or specific conditions to be met with values.

Arithmetic type

This function refers to arithmetic calculations, which users can do calculations by choosing tags and using arithmetic operators. Though there's no quantity limits of tags for calculation, the maximum length of UI texts should not be exceeded. Calculation results will become tag data, which users should notice not to divide the formula with zero, or the corresponding tag data would be disconnected and shown as NULL.

Logic type

This function is for comparing values, current supporting comparison between only two operators. The result might be different from your understanding, if using three or more operators which should be avoided. The result would be presented as values, 1= True and 0 = False.

Counter type

Virtual tags would count the frequency of TRUE outcomes determined by the formula. The situation would be count only when TRUE changes to FALSE, then changes to TRUE again.

Timer type

Virtual tags records the time duration (Unit: Sec.) of TRUE situation returned by the formula.

Move type



Users can copy the existing tags to other tags by using this function, while values cannot be copied to virtual tags. In addition, Move type should not be set for tags and devices not able to be written, such as CNC tags and some PLC tags. If such wrong configuration is set, the system still can run the ongoing operation. However, the performance, more or less, may be affected by the continuous writing error.

Icon	Description	Order of Precedence
	Device tag	0
	Constant	0
	Copy	1
	Small brackets	1
	Plus	3
	Minus	3
	Multiply	2
	Divide	2
	Equal	3
	Not equal	3
	Greater than	2
	Greater than or equal to	2
	Less than	2
	Less than or equal to	2
	Log10	
	Square root	
	Power	
	Trigonometric function	
	And	
	Or	

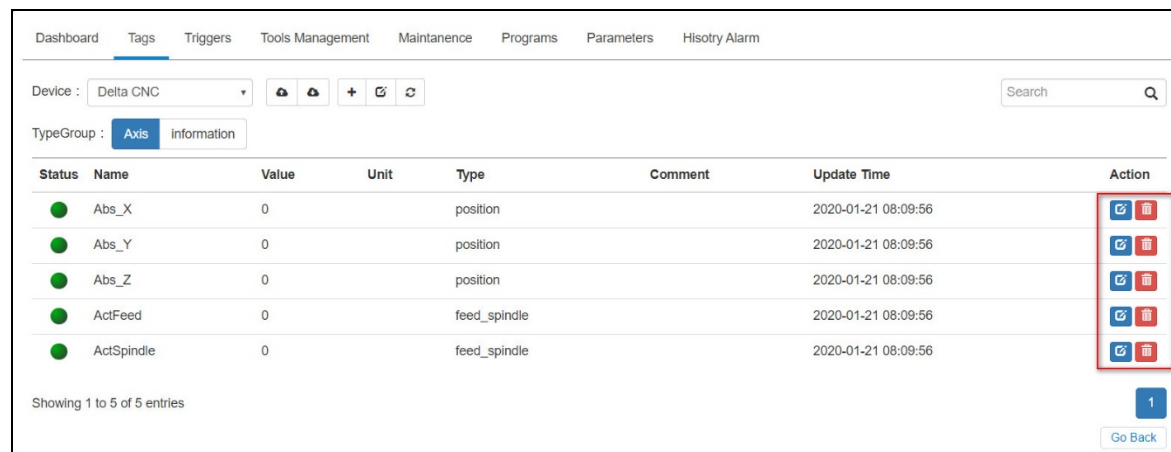
To pick tags for additional conditions, click on option and select desired statements for one or more added devices and then click OK to complete the setup.

After adding tags, choose the Tag tab and view the device connection status in the first column, the real-time value in the second column and tag name in the third column. The following figure is an example of CNC device.

Dashboard	Tags	Triggers	Tools Management	Maintenance	Programs	Parameters	History Alarm
Device : Delta CNC							
TypeGroup : Axis Information							
Status	Name	Value	Unit	Type	Comment	Update Time	Action
	Abs_X	0		position		2020-01-21 08:09:56	
	Abs_Y	0		position		2020-01-21 08:09:56	
	Abs_Z	0		position		2020-01-21 08:09:56	
	ActFeed	0		feed_spindle		2020-01-21 08:09:56	
	ActSpindle	0		feed_spindle		2020-01-21 08:09:56	
Showing 1 to 5 of 5 entries							1 Go Back

To edit the tags again, enter Tags tab and choose  to edit the parameters then click "Save Changes". To delete a single device tag, choose  to delete the corresponding item.



2

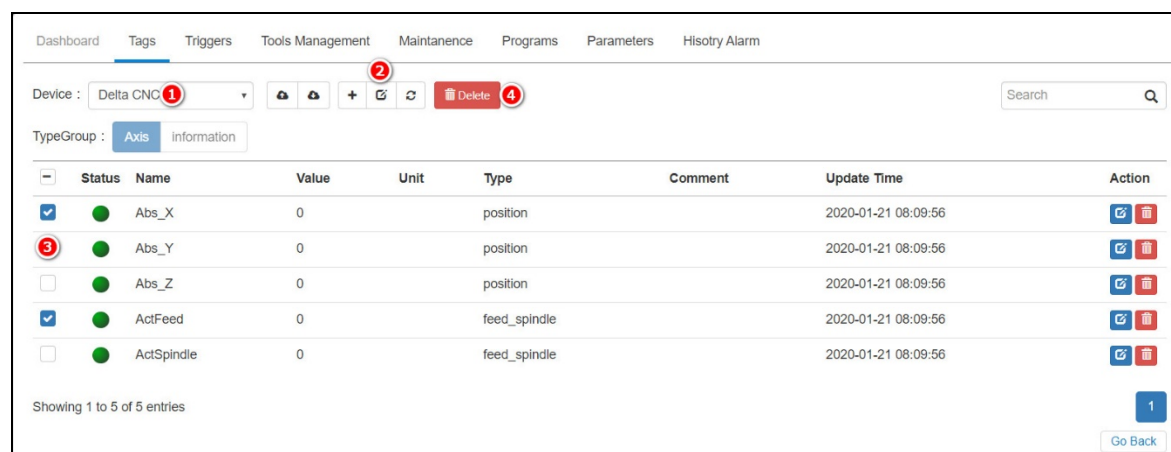


Status	Name	Value	Unit	Type	Comment	Update Time	Action
	Abs_X	0		position		2020-01-21 08:09:56	
	Abs_Y	0		position		2020-01-21 08:09:56	
	Abs_Z	0		position		2020-01-21 08:09:56	
	ActFeed	0		feed_spindle		2020-01-21 08:09:56	
	ActSpindle	0		feed_spindle		2020-01-21 08:09:56	

Showing 1 to 5 of 5 entries

1
Go Back


To delete multiple tags, ❶ choose the target device first, then ❷ click  to perform batch editing and ❸ check the boxes in the left column for items to delete. Finally ❹ click  to complete the task.

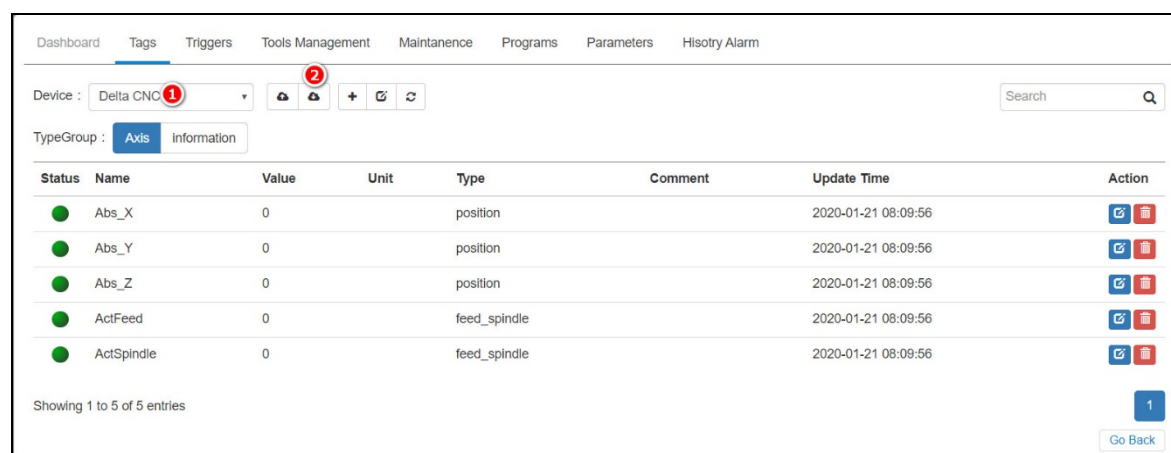


	Status	Name	Value	Unit	Type	Comment	Update Time	Action
<input checked="" type="checkbox"/>		Abs_X	0		position		2020-01-21 08:09:56	
<input checked="" type="checkbox"/>		Abs_Y	0		position		2020-01-21 08:09:56	
<input type="checkbox"/>		Abs_Z	0		position		2020-01-21 08:09:56	
<input checked="" type="checkbox"/>		ActFeed	0		feed_spindle		2020-01-21 08:09:56	
<input type="checkbox"/>		ActSpindle	0		feed_spindle		2020-01-21 08:09:56	

Showing 1 to 5 of 5 entries

1
Go Back


To export all tag data of the device, ❶ first choose the target device, then ❷ click  to run Export task.

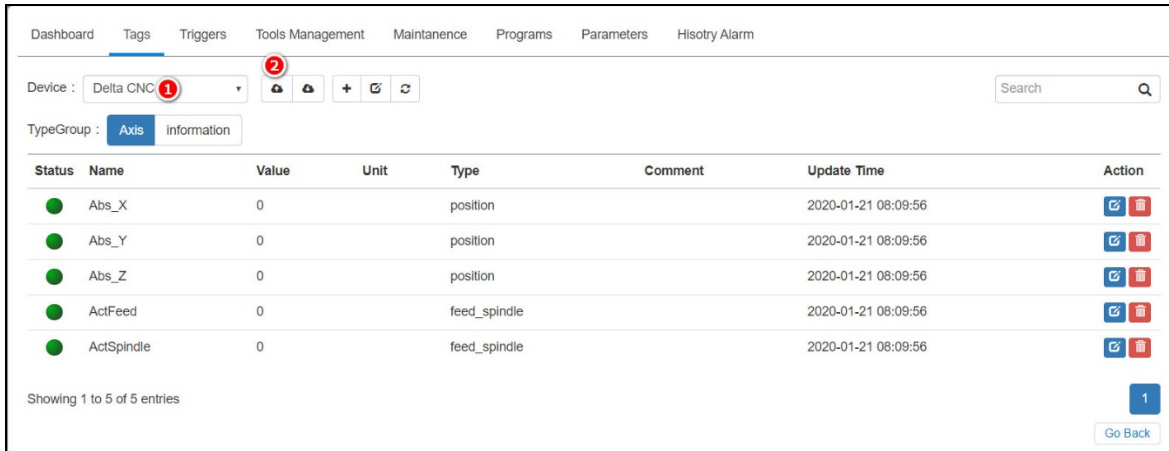


Status	Name	Value	Unit	Type	Comment	Update Time	Action
	Abs_X	0		position		2020-01-21 08:09:56	
	Abs_Y	0		position		2020-01-21 08:09:56	
	Abs_Z	0		position		2020-01-21 08:09:56	
	ActFeed	0		feed_spindle		2020-01-21 08:09:56	
	ActSpindle	0		feed_spindle		2020-01-21 08:09:56	

Showing 1 to 5 of 5 entries

1
Go Back











To import tag data, ❶ first choose the target device, then ❷ click  to select the Excel file you intend to import, which should be the sample template provided by the system. Refer to Appendix C for the details of importing file format.



Dashboard Tags Triggers Tools Management Maintenance Programs Parameters History Alarm

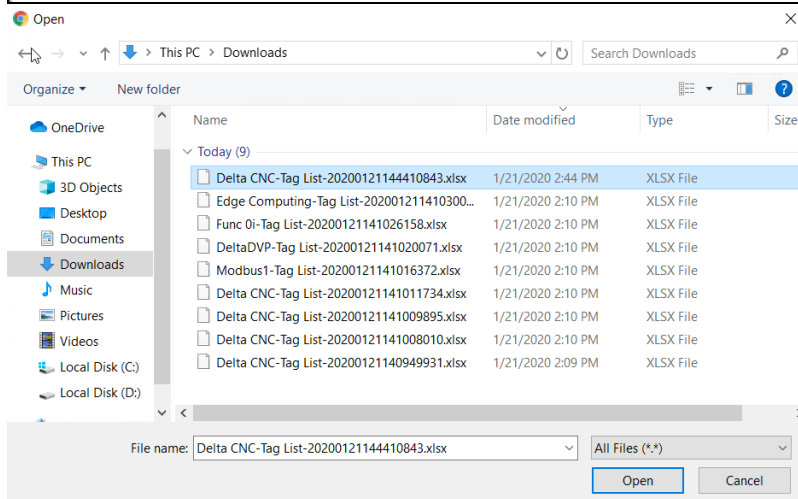
Device : Delta CNC ❶

TypeGroup : Axis Information


Status	Name	Value	Unit	Type	Comment	Update Time	Action
●	Abs_X	0		position		2020-01-21 08:09:56	 
●	Abs_Y	0		position		2020-01-21 08:09:56	 
●	Abs_Z	0		position		2020-01-21 08:09:56	 
●	ActFeed	0		feed_spindle		2020-01-21 08:09:56	 
●	ActSpindle	0		feed_spindle		2020-01-21 08:09:56	 

Showing 1 to 5 of 5 entries

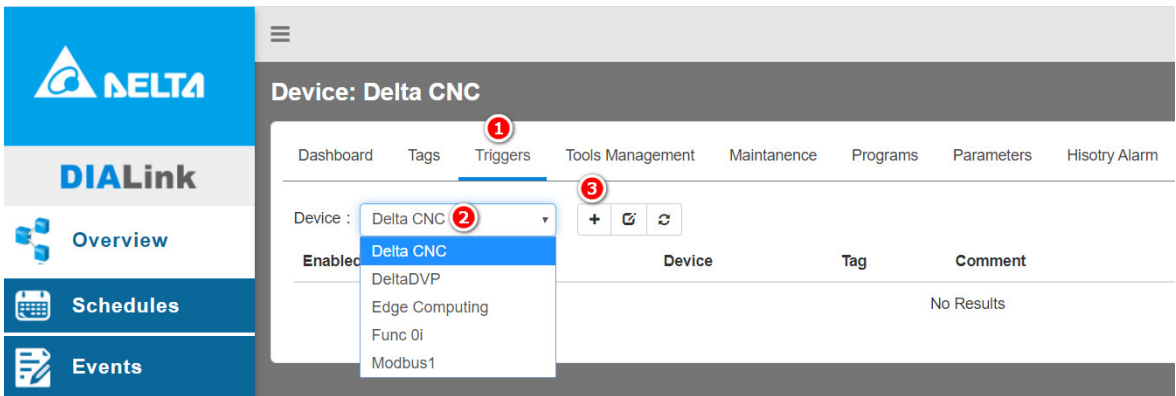
1 Go Back



2.2.4 Triggers Setting

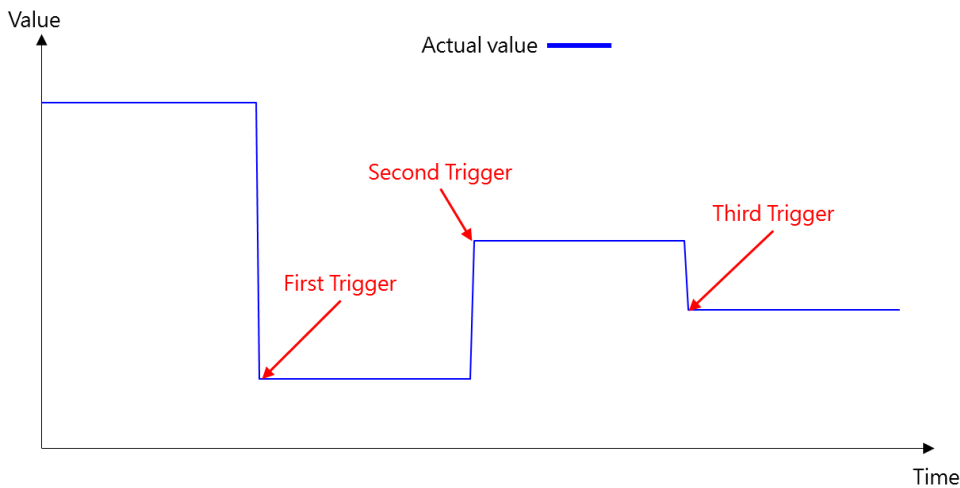
① Access “Triggers” tab and ② select the desired device from the drop-down list, then setup Triggers parameters via ③ clicking  on the setting page. Finally, an “Add Trigger” dialog box will appear on the right side of the screen. Select an added device and the system will present the corresponding tag based on the selected type. Users can choose or input desired parameters.

All items marked with an asterisk (*) need to be completed. When finished, click “Save changes”. If the input value does not follow the system rule, a red color frame will appear to indicate as an error.

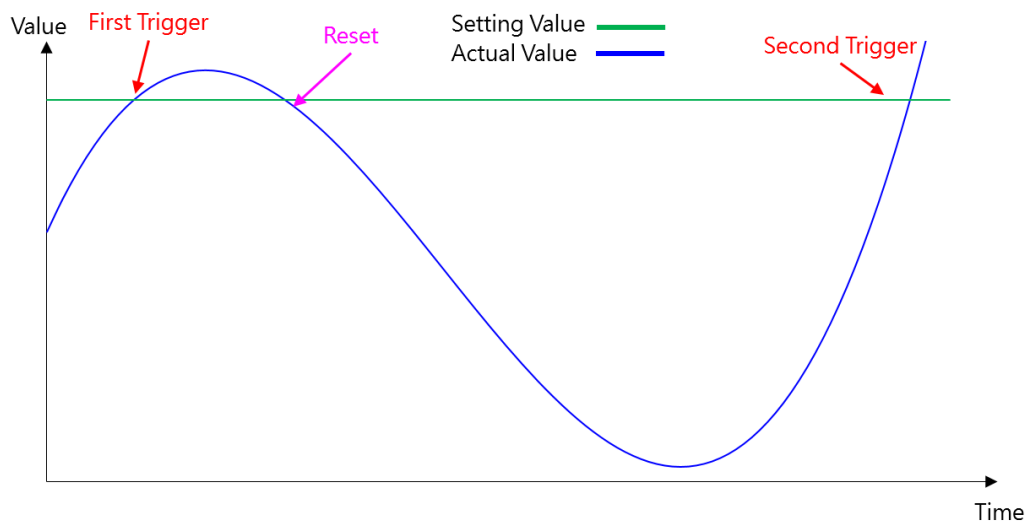


Users can define additional trigger conditions base on different device tag values. The DIALink CNC supports five trigger conditions including Change, Max, Min, Rising and Falling with the following brief explanation:

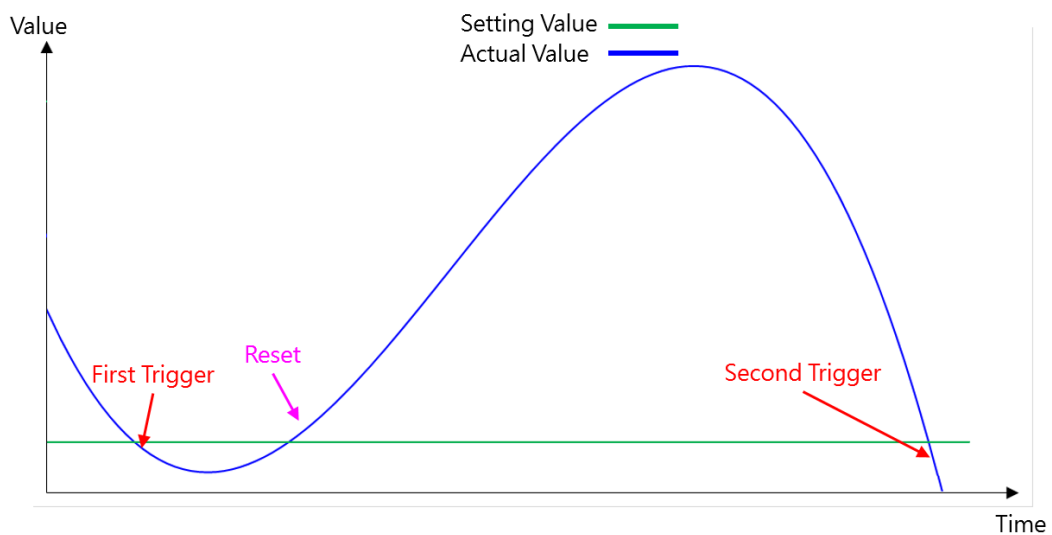
Change: The value is not equivalent to the previous scan value. Normally, the trigger condition is met when the state changes. For example, if the previous value shows 0 and the present value is 1, Change condition is fulfilled.



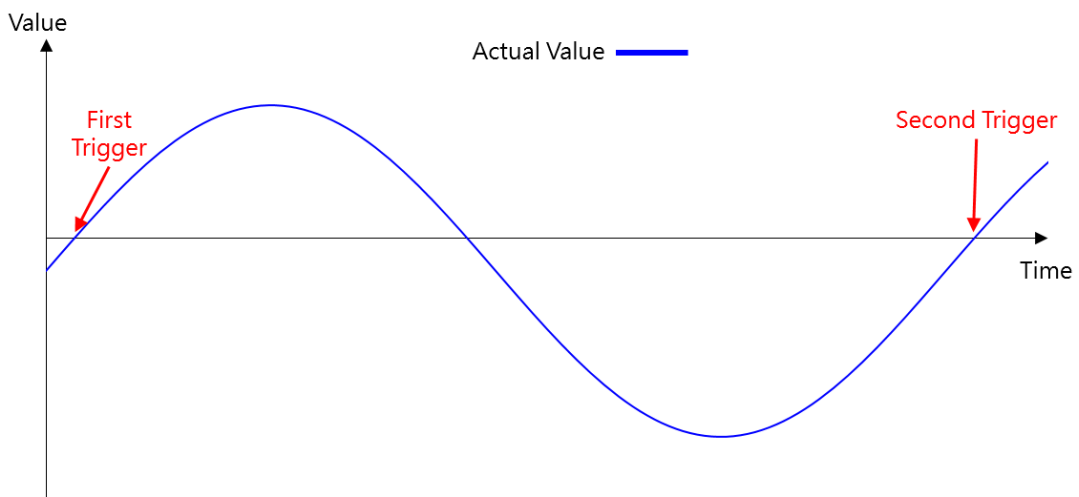
Max: The condition is triggered for the first time, when the value is greater than the setting value. Thereafter, if the value becomes less than the setting value, the condition will be reset. But if the value is greater than the setting value again, the condition will be re-triggered. For example, if the max value is set as 100 and the current value shows 101, the condition is fulfilled and would not be triggered again until the value becomes lower than 100 and exceeds the setting value.



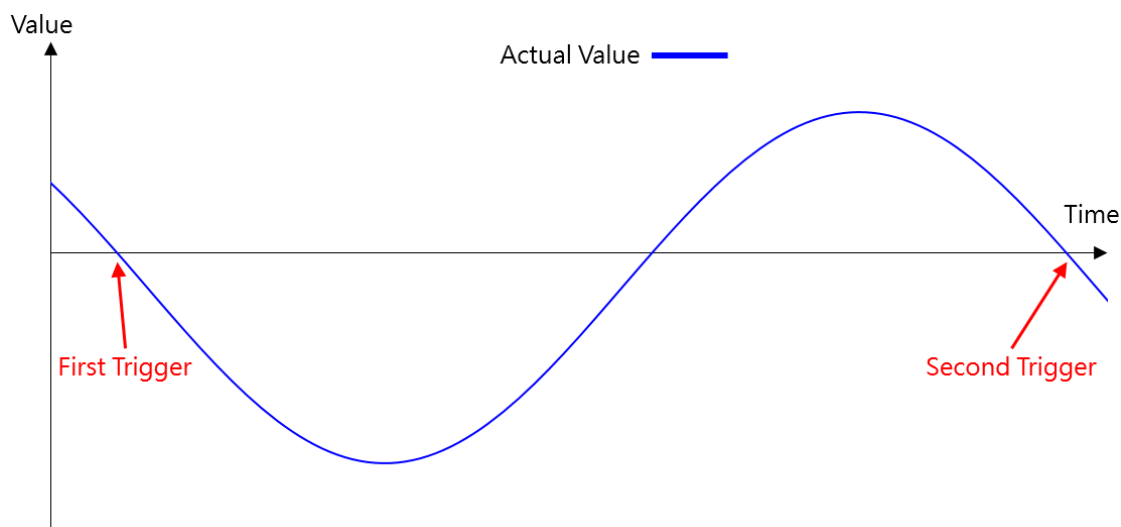
Min: When the value is lower than the setting value, the condition is triggered for the first time. If the value is greater than the setting value, the trigger condition needs to reset. But if the value is less than the setting value again, the trigger condition is re-triggered.



Rising: When the value is greater than 0, the condition is triggered.



Falling: When the value is less than 0, the condition is triggered.



● Add Trigger

Add Trigger
×

Enabled

ON

Tag*

Name*

Type*

Change
▼

Comment

Bind Events


+ From Existing
+ Add Event

Save changes

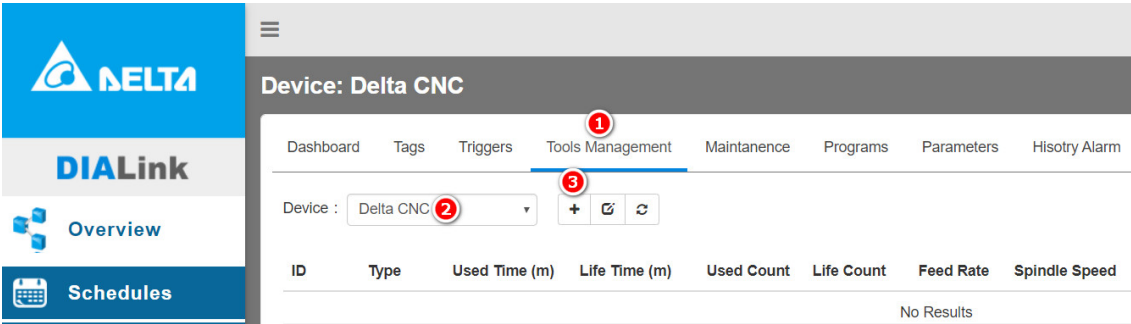
Each trigger tag must be bound to an event so the notifications can be sent to users via E-mail, SMS, LINE, WeChat, WriteTag or Webhook. For Bind Events, users can select either “+ From Existing” or “+ Add Events” (Section 2.4). To edit a trigger tag or delete multiple trigger tags, please view previous chapters introducing Overview and Tag Setting on the device.

Tags <u>Triggers</u> Maintenance						
Device : Modbus		+ ✎ ↺		<div style="border: 1px solid #ccc; padding: 2px; display: flex; align-items: center;"> Search Q </div>		
Enabled	Name	Device	Tag	Comment	Update Time	Action
✓	4x01Max5000	Modbus_TCP_Device	MTCP_4x01	4x01 Max > 5000	2018-03-01 10:27:01	✎ ✖
✓	4x02min1000	Modbus_TCP_Device	MTCP_4x02	4x02 Min < 1000	2018-03-01 10:27:01	✎ ✖
✓	4x03Change4000	Modbus_TCP_Device	MTCP_4x03	4x03 ≠ 4000	2018-03-01 10:27:01	✎ ✖
✓	4x04Max2500	Modbus_TCP_Device	MTCP_4x04	4x04 Max > 2500	2018-03-01 10:27:01	✎ ✖
						<div style="background-color: #0070c0; color: white; padding: 2px 10px; border-radius: 3px;">Go Back</div>

2.2.5 Tools Management

➊ Access “Tools Management” tab and ➋ select “Delta CNC” as the desired device from the drop-down list, then ➌ click on  to add tools. With the parameter setting shown “Add Tool” on the right of the page, users can choose or input desired parameters.

All items marked with an asterisk (*) need to be completed. When finished, click “Save changes”. If the input value does not follow the system rule, a red color frame will appear to indicate as an error.



● Add Tool

Add Tool

ID*

1

Type

Life Time (m)*

Life Count*

Feed Rate

Spindle Speed

Work Material

Material

Diameter

Length

Supplier


Contact

Phone

Comment

Save changes

Cancel

By clicking on , users can add tool alarm conditions, choosing desired alarm actions (send E-mails, SMS, Line or WeChat) according to different conditions. The account information of recipients must be configured on Line Setting and WeChat setting tab pages before you select the desired recipient from the drop-down list, while you are allowed to configure sending notification emails to multiple recipients.

For condition setting, you can choose whether the used time should be longer than the life time, or whether the used count is greater than the life count. No matter how long the tool has been used, it would be counted once for such period of used time. Also, you are allowed to configure sending notifications when a certain percentage of the useful life is reached so that maintenance and repair works can be undertaken in advance.

2

Tool Alarm Setting

Condition

☒ Used Time (m) > Life Time (m)
☐ (Used Time (m) / Life Time (m)) > %
☒ Used Count > Life Count
☐ (Used Count / Life Count) > %

Action

E-mail ☒ Enabled

E-mail

Select

SMS ☒ Enabled

Phone Number

Line ☒ Enabled

Name

WeChat ☒ Enabled

Name

Save changes

Cancel

● Reset used time and count to zero

To make the used time or the used count back to zero, go to ❶ Tool Management tab page and click on a blank area in the row of the desired tool ❷, then click ❸ Used Time (m) Reset or ❹ Used Count Reset.

Device: CNC0001

Dashboard

Tags

Triggers

Tools Management

Maintenance

Programs

Part

Device : CNC0001

+

ID	Type	Used Time (m)	Life Time (m)	Used Count	Life Count	Feed
1	A	2	3			
2		1	2			
4	BB	2	2			
3		2	2			

Tool Detail

ID

1

Type

A

Used Time (m)

2

Life Time (m)

3

Used Count

Life Count

3

Feed Rate

Spindle Speed

Work Material

Material

Diameter

Length

Supplier

Contact

Phone

Comment

Update Time

2021-10-12 15:25:24


Used Time (m) Reset

Used Count Reset

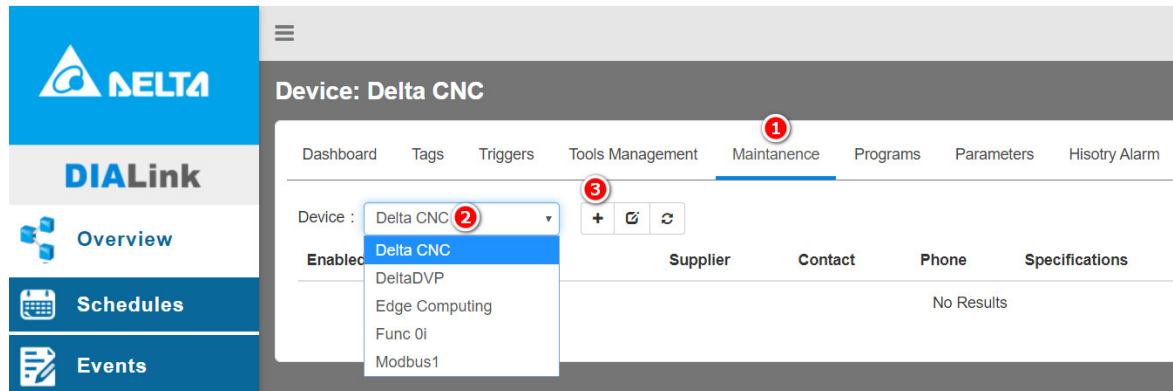
2-30

2.2.6 Maintenance

Users can specify the default frequency or a certain timing with which notification of equipment maintenance are sent to associated persons by emails or SMS. Refer to Section 2.3 for more details on frequencies.

① Access “Maintenance” tab and ② switch devices from the drop-down list, then ③ click  to add maintenance information. With the parameter setting shown “Add Maintenance” on the right of the page, users can choose or input desired parameters.

All items marked with an asterisk (*) need to be completed. When finished, click “Save changes”. If the input value does not follow the system rule, a red color frame will appear to indicate as an error.



● Add Maintenance

You can add information of new devices and decide whether to enable notification as well as configuring a certain frequency (second/ hour/ day) or timing (Weekday/ time) to send a notification via E-mail (Multiple email recipients can be set.), Line or WeChat.

Add Maintenance

Name*

Supplier

Contact

Phone

Specifications

Comment

Enable Notification

☐ OFF

Type

Frequency

Timing

Frequency*

Every 1 Second

☒ Recipient Mail

BILL-EMAIL

Andy-EMAIL

Content

☒ SMS Setting

Phone Number*

Content

☒ Line Setting

Name*

Content

☒ WeChat Setting

Name*

Content

Save changes

Add Maintenance

Type

Frequency

Timing

Day of Week*

Sun

Mon

Tue

Wed

Thu

Fri

Sat

Time*

12 : 00 PM

☒ Recipient Mail

BILL-EMAIL

Andy-EMAIL

Content

☒ SMS Setting

Phone Number*

Content

☒ Line Setting

Name*

Content





☒ WeChat Setting

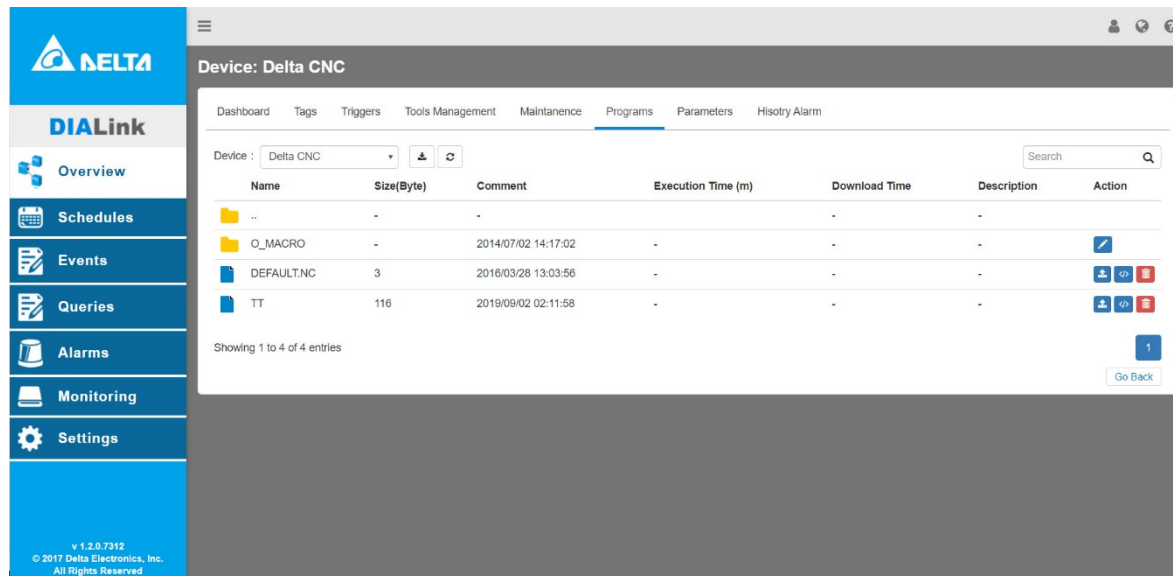
Name*


Content

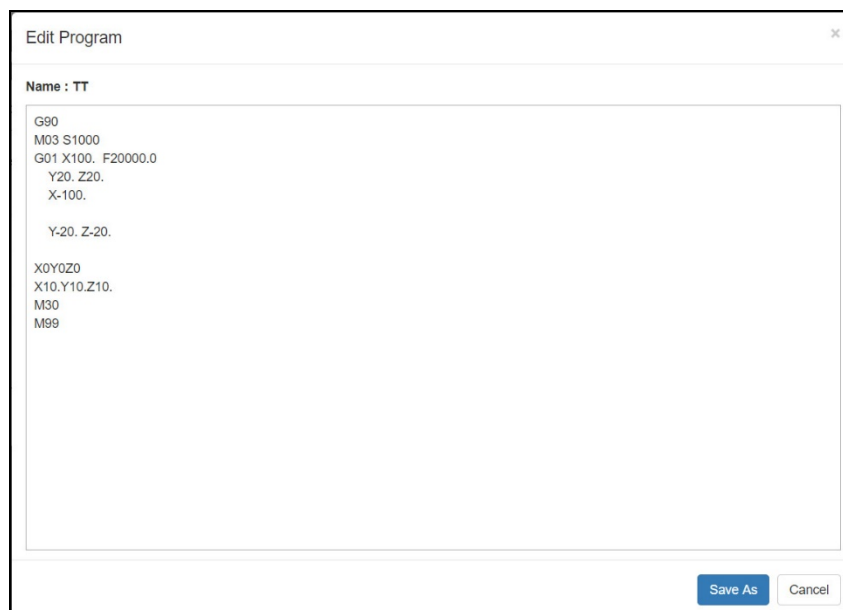
Save changes

2.2.7 Programs

After DIALink successfully connects to CNC controller, users can upload  (from the controller to your PC), download  (from your PC to the controller), edit  and delete  programs in the file list shown on the “Programs” tab.



Click  to edit programs on your PC, clicking “Save changes” to download programs from the PC to the controller. By clicking “Save As”, program files would be uploaded to your PC.



In case that there's an additional storage device in CNC system, NC program in the device may be possibly not able to be read. It is sure that the system could not read-write FANUC program, while DELTA CNC can be read-write successfully.

2.2.8 Parameters

Parameters managed on “Tools Management” tab can be displayed on this page and configured in DIALink.

❶ Access “Parameters” tab and ❷ select “Delta CNC” as the desired device from the drop-down list. Compensation parameters of cutter in the controller are displayed and able to be revised a single time after users finish editing and click on the “Write” button.

Dashboard
Tags
Triggers
Tools Management
Maintenance
Programs
Parameters ❶
Hisotry Alarm

Device :

Delta CNC ❷

↺
Write
🗑

Id	Length	Life	Radius	WearLength	WearRadius
1	3.4	3	2.2	1.1	5.5
2	1.2	2	3.2	4.2	5.2
3	-1.3	-3	-3.3	-4.3	-5.3
4	-1.4	-3	-3.4	-4.4	-5.4
5	5	0	0	0	0

2.2.9 History Alarm

❶ Access “History Alarm” tab and ❷ select “Delta CNC” as the desired device from the drop-down list. The alarm history of the equipments would be presented in a list. Up to 20 event messages can be shown on one page.

Dashboard
Tags
Triggers
Tools Management
Maintenance
Programs
Parameters
Hisotry Alarm ❶


Device :

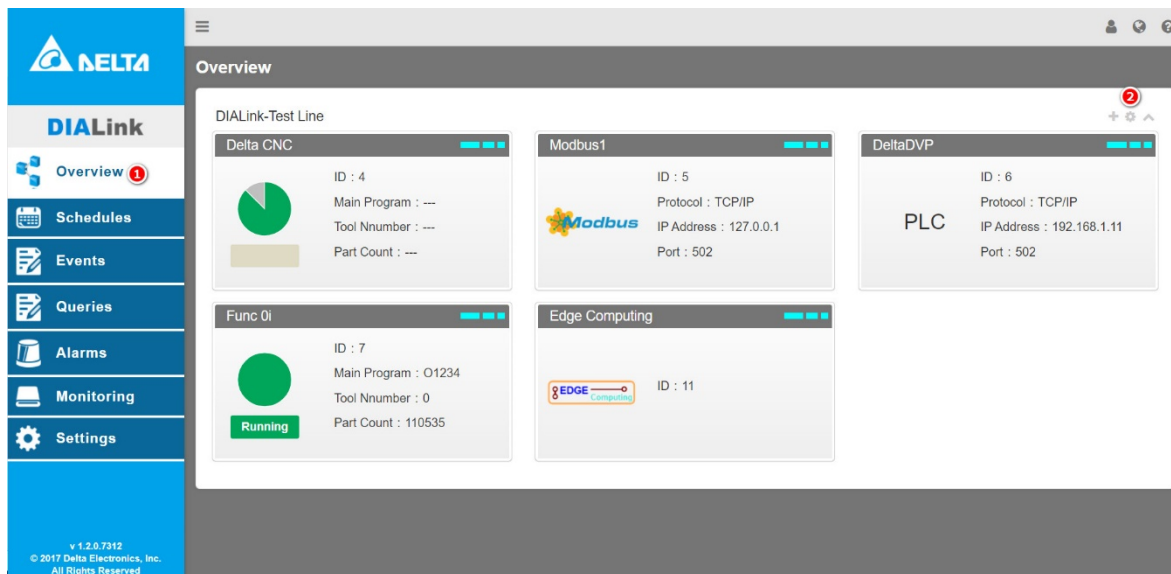
Delta CNC ❷

↺

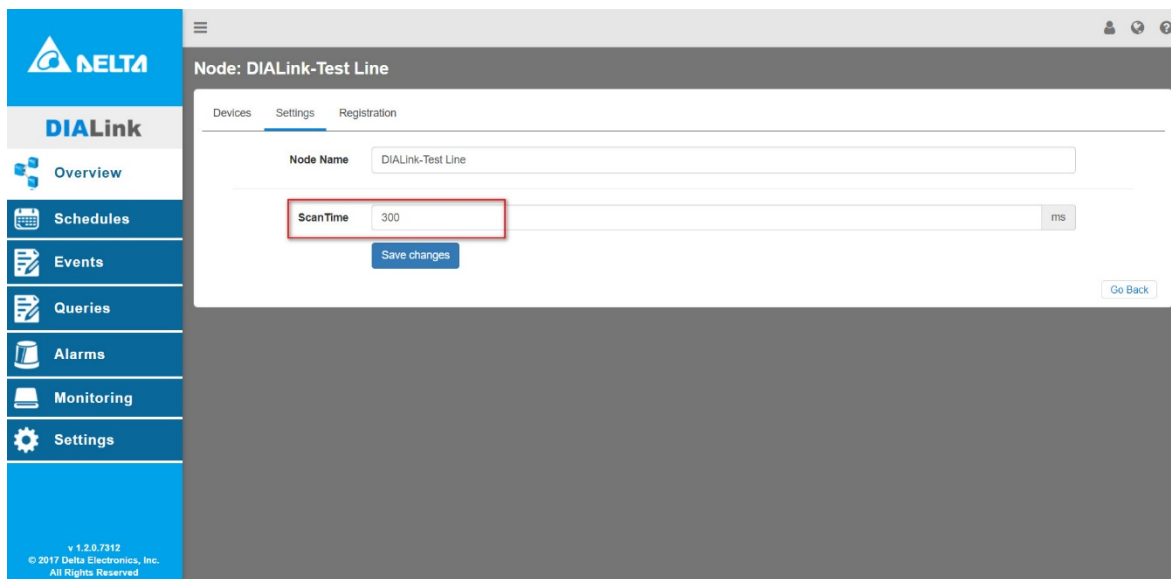
Alarm Time	Message
2019-12-19 21:57:42	User defined Alarm
2019-12-19 21:57:26	EXECUTE HOME RETURN
2019-12-19 21:57:18	User defined Alarm
2019-12-19 21:57:00	EXECUTE HOME RETURN
2019-12-05 21:50:57	EXECUTE HOME RETURN

2.2.10 Setting Device

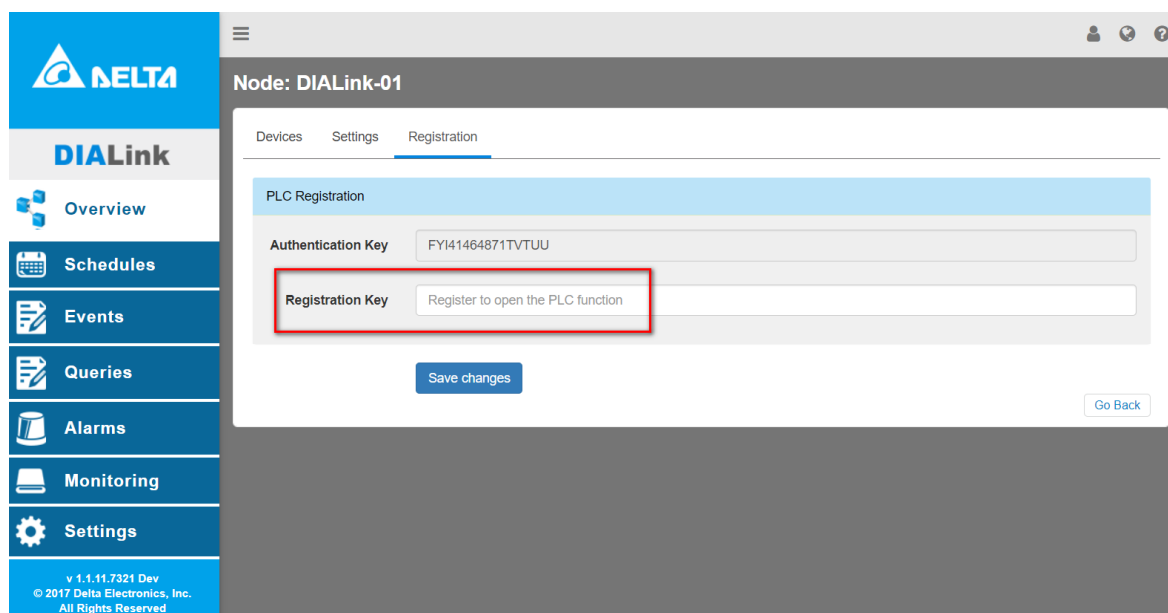
To access the device setting page, ❶ choose Overview function and ❷ click  on the upper right of the page.



Access “Settings” tab and you can modify node name and scan time. The default scan time is 300ms which refers to the time for collecting tag information via polling devices. The minimum setting value can be set to 100ms. However, some desired scan interval may not be able to be reached since the performance for read-write access would be affected by equipment efficiency, speed of the internet or the serial port.




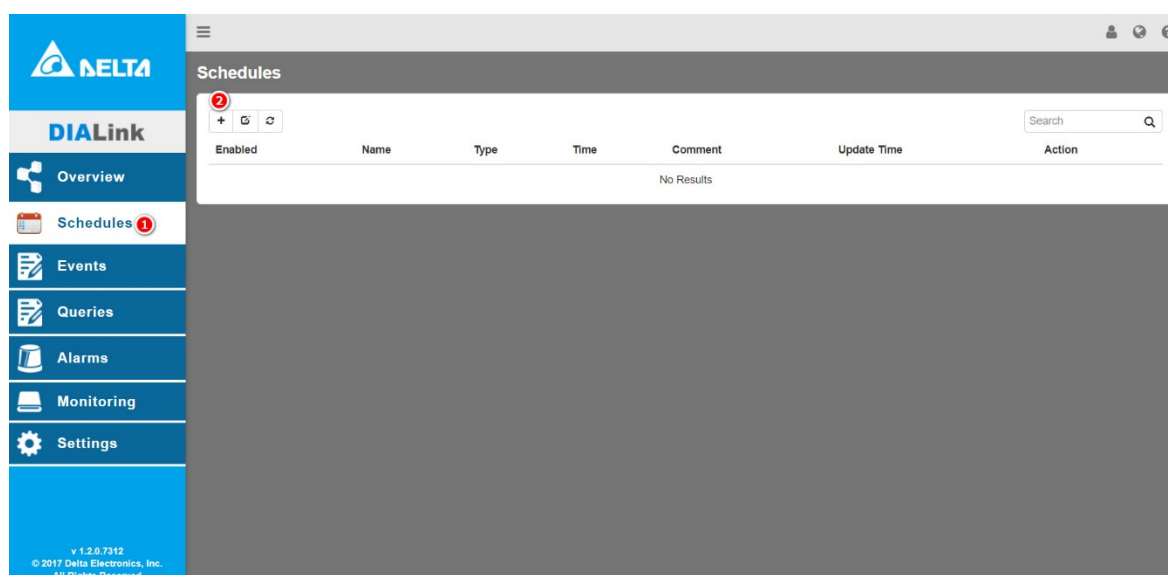
Click “Registration” tab and type in valid PLC Registration key to access data successfully.



2.3 Schedules

Users can select ❶ “Schedule” from the function list and choose either fixed Frequency or specific Timing types to alert users of scheduling setup via E-mail, SMS, LINE, WeChat, WriteTagor or Webhook.

To add schedules, ❷ click  and an “Add Schedule” dialog box will appear on the right side of the screen. Users can choose schedule types with fixed Frequency and specific Timing. For Bind Events, users can select either “+ From Existing” or “+ Add Events” to choose the specific action. See section 2.4 for more detail. To edit a trigger tag or delete multiple trigger tags, please refer to previous chapters introducing Overview and Tag Setting on the device.



Frequency: Choose a time interval among the following units: seconds, minutes, hours and days.

Timing: Choose one or multiple days of the week to trigger the timing schedule.

● Add Frequency Schedule

Add Schedule ✕

Enabled
☒

Name*

Type
☒ Frequency ☐ Timing

Frequency*
Every Second ▼

Comment

Bind Events

[+ From Existing](#) [+ Add Event](#)

Save changes

● Add Timing Schedule

Add Schedule ✕

Enabled
☒

Name*

Type
☐ Frequency ☒ Timing

Day of Week*
☐ Sun ☐ Mon ☐ Tue ☐ Wed ☐ Thu ☐ Fri ☐ Sat

Time*

Comment


Bind Events

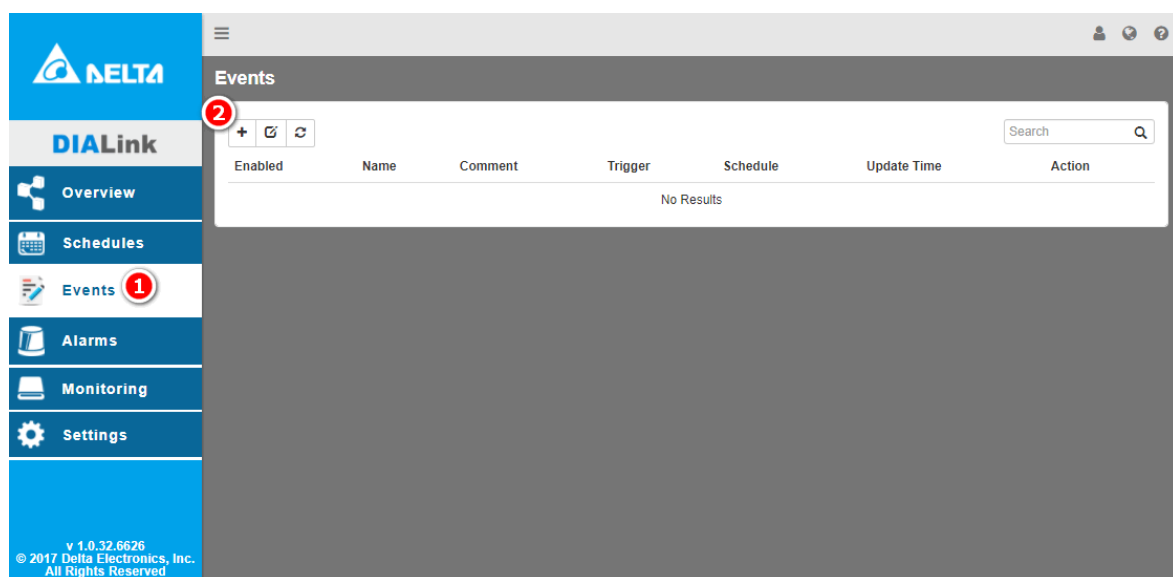
[+ From Existing](#) [+ Add Event](#)

Save changes

2.4 Events

Users can ❶ select “Events” from the function list and choose to alert users with certain conditions via E-mail, SMS, LINE, WeChat, WriteTagor or Webhook. Before using E-mail, SMS, LINE and WeChat, please complete parameter inputs by selecting **Settings > Notification > E-mail Setting/ SMS Setting** as well as activating LINE/ WeChat Setting by selecting **Settings > Notification > Line Setting/ WeChat Setting**.

To add events, ❷ click  and an “Add Events” dialog box will appear on the right side of the screen. All items marked with an asterisk (*) need to be completed. When finished, click “Save changes” button at the bottom of the page. If the input value does not follow to the system rule, a red color frame will appear to indicate as an error. To edit an event or delete multiple events, please refer to previous chapters introducing Overview and Tag Setting on the device.



● Add Event and Action

Add Event

Event

Enabled

ON

Name*

Comment

Condition

Tag

Value

==

!=

>

≥

<

≤

AND

OR

(

)

Action List

+ Add Action

Save changes

The settings for Condition is not crucial, but users can add operators and statements from left to right in the dialog box to setup additional tags or constants in order to meet specific conditions.

Icon	Description	Order of Precedence
Tag	Device tag	0
Value	Constant	0
==	Equal to	3
!=	Not equal to	3
>	Greater than	2
≥	Greater than or equal to	2
<	Less than	2
≤	Less than or equal to	2
AND	AND (logical operator)	4
OR	OR (logical operator)	4
()	Small brackets	1

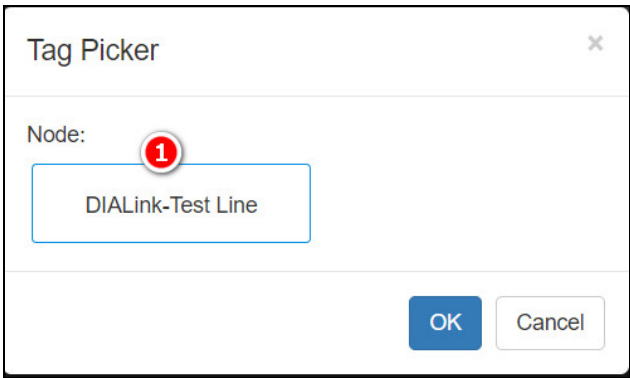
To pick tags for additional conditions, click the Condition checkbox and choose

Tag

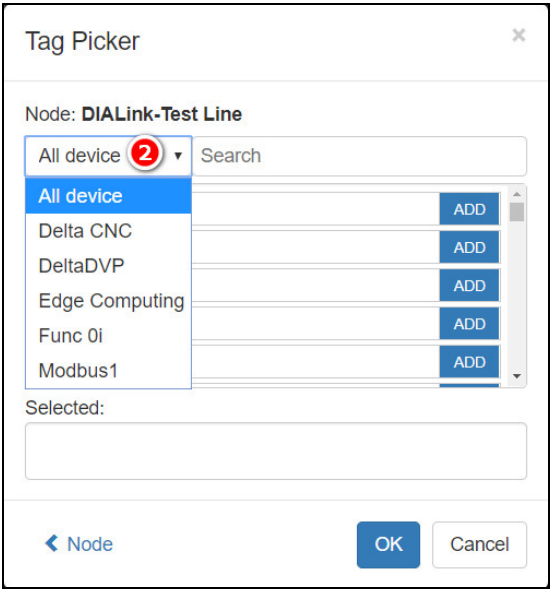
 option and select desired statements for one or more added devices and then click OK to complete the setup.

2-38

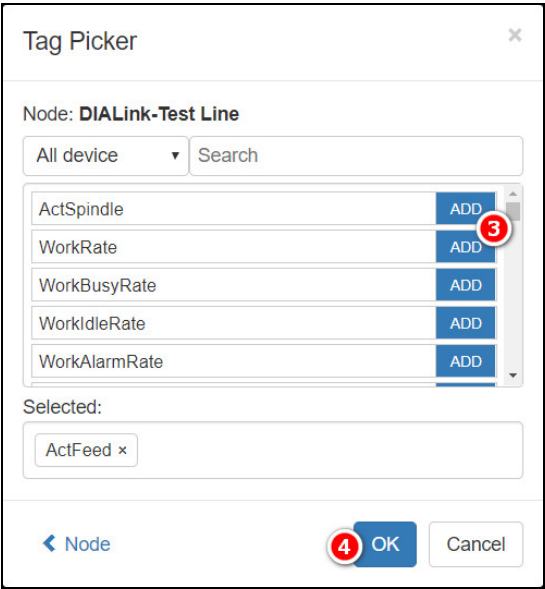
● **Event Tag Picker – Select Device Node**



● **Event Tag Picker – Select Device**

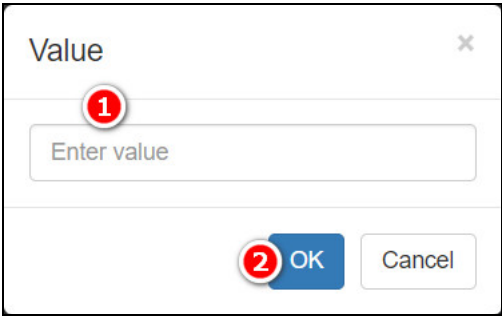


● **Event Tag Picker – Add Selected Tag**



Enter a constant by choosing Value option and click OK when complete.

● **Enter Constant Value**



The selected items in the Conditions dialog box cannot be typed or deleted via keyboard, but can be deleted via a single click of mouse. Left-click the mouse to drag the selected item to the desired position as shown in the image below: An

event is triggered when MRTU_4x01 tag value is greater than 1000 and MTCP_4x02 tag value is less than 500. Furthermore, you are allowed to move or delete multiple condition items.

● Example of Add Conditions

2

Condition ☒

Tag

Value

==

!=

>

≥

<

≤

AND

OR

(

)

MRTU_4x01 > 1000 AND MTCP_4x02 < 500

Click “+Add Action” and a dialog box will appear on the right side of the screen for users to choose actions including E–mail, SMS, LINE, WeChat, WriteTagor or Webhook. Multiple actions can be selected in the Action List, while multiple recipients can only be set for E-mail type action. After completed the settings on Event and Action, click “Save Changes” accordingly.

The Device ID and Tag ID programming language `{{deviceID|tagID}}` can be used in the Action content, To find the Device and Tag ID, users can choose the added Device/Tag box from the Overview page and view the selected device/tag information, i.e. Device/Tag ID to appear on the right side of the screen.

Note:

Refer to 2.8.5 and Appendix B.1 for the setting of LINE and creating account for Notify.

Refer to 2.8.6 and Appendix B.2 for the setting of WeChat and WeChat official account application.

● Device Detail

Device Detail

ID4

Interface ID

NameDelta CNC

TypeCNC

● Tag Detail

Tag Detail

ID1657

NameAbs_X

Typeposition

● Add Action- E-mail

Action

Enabled

☒ ON

Name*

EVT_MAIL

Comment

000

Type

E-mail*

Bill-EMAIL Andy-EMAIL

Content

Change Notify

● Add Action- SMS

Action

Enabled

☒ ON

Name*

sent SMS

Comment

sent SMS

Type

Phone Number*

0988000111

Content

MTCP 4x01:{{1|141}}
MTCP 4x01:{{1|142}}

● Add Action- Webhook

Action

Enabled

☒ ON

Name*

sent Webhook

Comment

sent Webhook

Type

URL*

POST <https://api.github.com/repos/octocat/Hell>

Content

MTCP 4x01:{{1|141}}
MTCP 4x01:{{1|142}}

● Add Action- WeChat

Action

Enabled

☒ ON

Name*

wechat

Comment

Type

Name*

wechat

Content

wechat message

● Add Action- Line

Action

Enabled

☐ ON

Name*

sent LINE

Comment

sent LINE

Type

E-mail SMS Webhook **LINE** WriteTag

WeChat

Name*

DIALink

Content

MTCP_4x01:{{1|141}}
MTCP_4x01:{{1|142}}

Save changes Cancel

● Add Action- WriteTag

Action

Enabled

☐ ON

Name*

sent WriteTag

Comment

sent WriteTag

Type

E-mail SMS Webhook **LINE** **WriteTag**

WeChat

Device*

MODBUS TCP

Tag*

MTCP_4x01

Value*

999

Save changes Cancel

● Add Events and Multiple Tasks

Add Event

Event

Enabled

☐ ON

Name*

sent event

Comment

Condition ☒

Tag Value == != > >= < <= AND OR { }

Action List

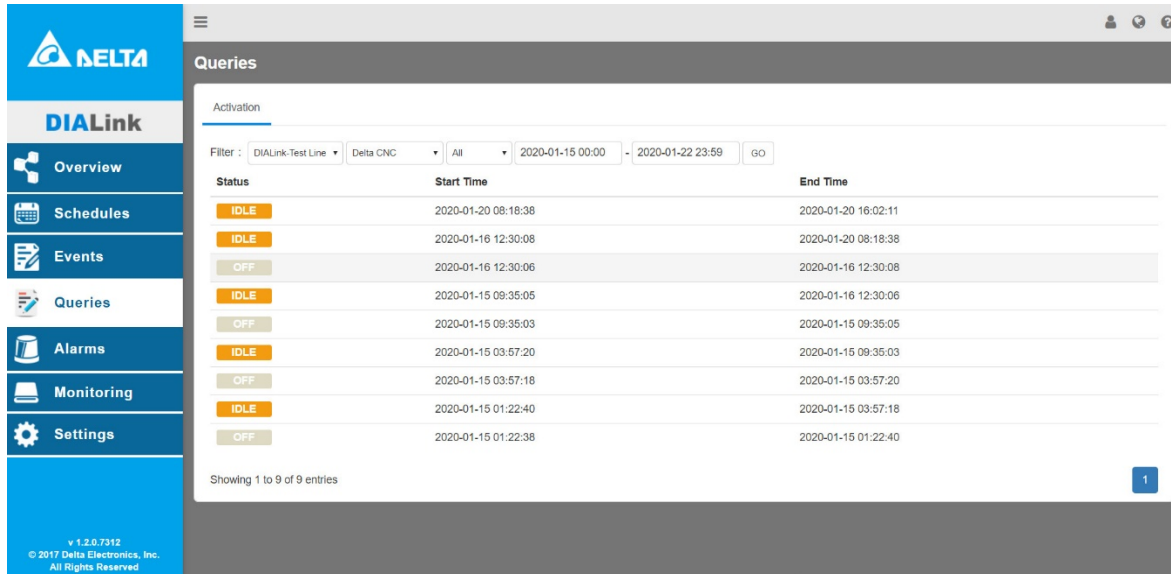
[E-mail] sent mail
[SMS] sent SMS
[Webhook] sent Webhook

+ Add Action

Save changes

2.5 Queries

Displays the records of devices' status in different time periods according to the filter selection. With real-time updates, a new record would be created when the status changes.

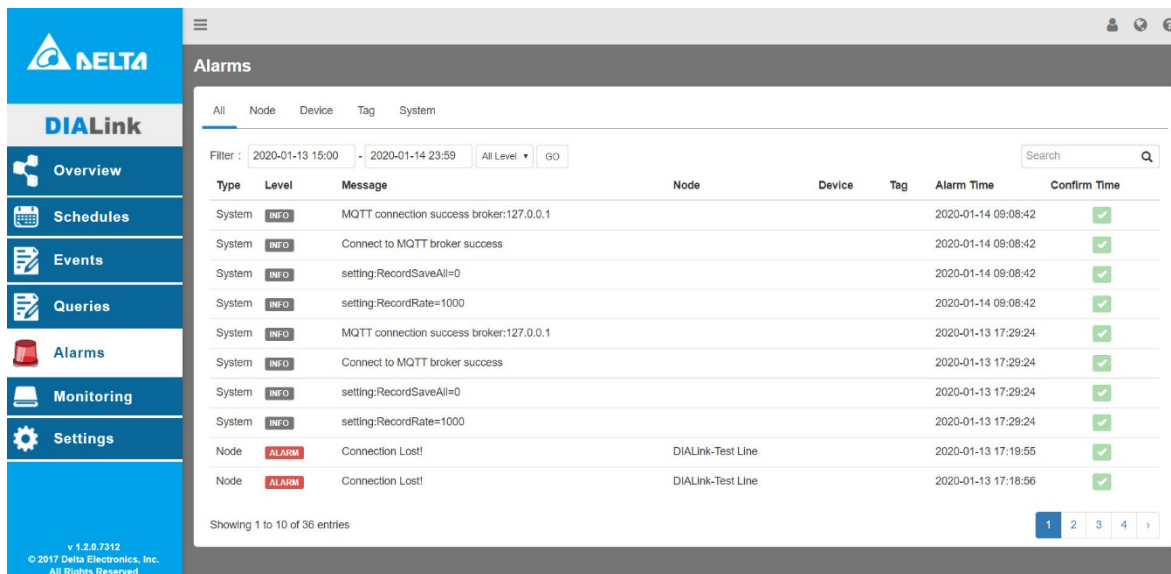


The screenshot shows the DIALink web interface with the 'Queries' tab selected. The left sidebar contains navigation links: Overview, Schedules, Events, Queries, Alarms, Monitoring, and Settings. The main content area displays a table of device status records. The table has columns for Status, Start Time, and End Time. The status values are IDLE, OFF, and ON. The start and end times are in YYYY-MM-DD HH:MM:SS format. The table shows 9 entries, with the first entry being IDLE from 2020-01-20 08:18:38 to 2020-01-20 16:02:11. A filter bar at the top allows selection of Filter (DIALink-Test Line), Delta CNC, All, and a date range from 2020-01-15 00:00 to 2020-01-22 23:59. A 'GO' button is present. The bottom of the table indicates 'Showing 1 to 9 of 9 entries'.

Status	Start Time	End Time
IDLE	2020-01-20 08:18:38	2020-01-20 16:02:11
IDLE	2020-01-16 12:30:08	2020-01-20 08:18:38
OFF	2020-01-16 12:30:06	2020-01-16 12:30:08
IDLE	2020-01-15 09:35:05	2020-01-16 12:30:06
OFF	2020-01-15 09:35:03	2020-01-15 09:35:05
IDLE	2020-01-15 03:57:20	2020-01-15 09:35:03
OFF	2020-01-15 03:57:18	2020-01-15 03:57:20
IDLE	2020-01-15 01:22:40	2020-01-15 03:57:18
OFF	2020-01-15 01:22:38	2020-01-15 01:22:40

2.6 Alarms

The Alarm page lists out all the events occurred in the DIALink system, which are categorized into four types including Node, Device, Tag and System. Users can screen alarm messages via time and level while a page can display up to 10 alarm messages.

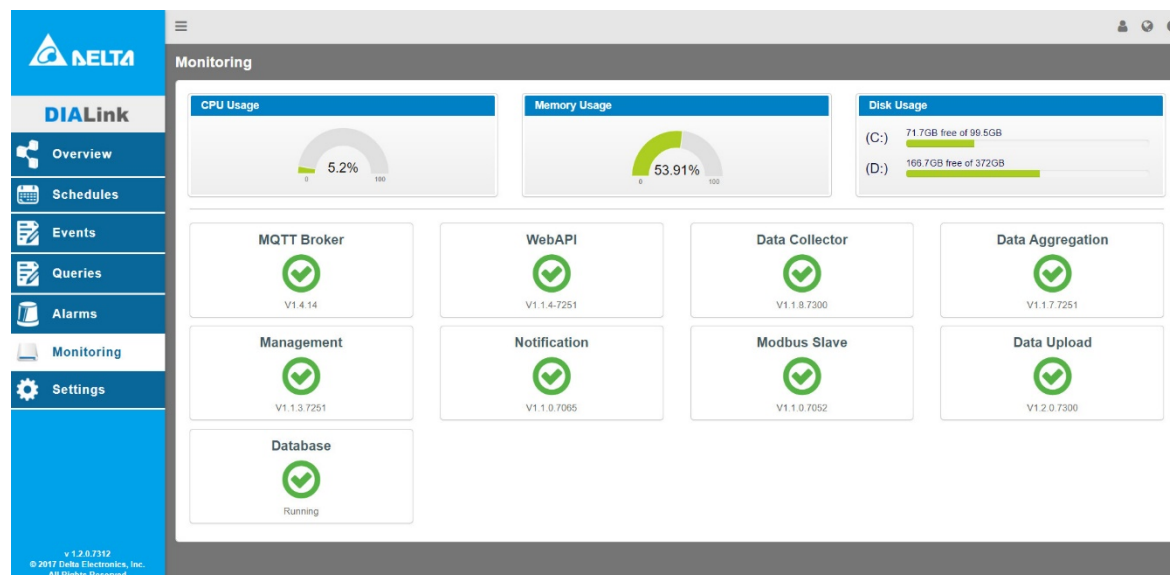


The screenshot shows the DIALink web interface with the 'Alarms' tab selected. The left sidebar contains navigation links: Overview, Schedules, Events, Queries, Alarms, Monitoring, and Settings. The main content area displays a table of alarm messages. The table has columns for Type, Level, Message, Node, Device, Tag, Alarm Time, and Confirm Time. The messages are categorized by Type (System, Node) and Level (INFO, ALARM). The messages include MQTT connection success, Connect to MQTT broker success, setting:RecordSaveAll=0, setting:RecordRate=1000, and Connection Lost!. The alarm times are in YYYY-MM-DD HH:MM:SS format. The confirm times are in YYYY-MM-DD HH:MM:SS format. The table shows 10 entries, with the first entry being System INFO MQTT connection success broker:127.0.0.1 at 2020-01-14 09:08:42. A filter bar at the top allows selection of Filter (2020-01-13 15:00 - 2020-01-14 23:59), All Level, and a 'GO' button. A search bar is also present. The bottom of the table indicates 'Showing 1 to 10 of 36 entries'.

Type	Level	Message	Node	Device	Tag	Alarm Time	Confirm Time
System	INFO	MQTT connection success broker:127.0.0.1				2020-01-14 09:08:42	✓
System	INFO	Connect to MQTT broker success				2020-01-14 09:08:42	✓
System	INFO	setting:RecordSaveAll=0				2020-01-14 09:08:42	✓
System	INFO	setting:RecordRate=1000				2020-01-14 09:08:42	✓
System	INFO	MQTT connection success broker:127.0.0.1				2020-01-13 17:29:24	✓
System	INFO	Connect to MQTT broker success				2020-01-13 17:29:24	✓
System	INFO	setting:RecordSaveAll=0				2020-01-13 17:29:24	✓
System	INFO	setting:RecordRate=1000				2020-01-13 17:29:24	✓
Node	ALARM	Connection Lost!	DIALink-Test Line			2020-01-13 17:19:55	✓
Node	ALARM	Connection Lost!	DIALink-Test Line			2020-01-13 17:18:56	✓

2.7 Monitoring

The page displays the system's CPU, memory and disk usage. Also, DIALink services status are provided for users to identify any service error. Under normal operation, a green tick icon is displayed for the service with the service version underneath. For inactivated services, a red cross icon is displayed with status as "Not Started" shown below. When the service is running, a gray cycle diagram appears with status as "Checking" shown below. If all services are inactivated, please re-activate DIALink Service by following the route: Windows > Tool Manager> Service page.



If service item, i.e. Data Collector status shows "Not Started" as above and is identified by the system to be illegally authorized, users can check if the usb dongle is properly attached to the host computer. As for Database, if "not started", check SQL Server to ensure the service is properly executed.

2.8 Settings

The Settings contain seven tabs including General, Notification, Network settings, Job Shift Management, LINE Setting, WeChat Setting, E-mail Setting and Modbus Slave for users to setup required parameters.

The screenshot displays the DIALink Settings interface. On the left is a sidebar with navigation options: Overview, Schedules, Events, Queries, Alarms, Monitoring, and Settings (highlighted). The main content area is titled 'Settings' and contains several tabs: General, Notification, Network, Job Shift Management, Line Setting, WeChat Setting, E-mail Setting, and Modbus Slave. The 'General' tab is active, showing three sections: 'Collection Setting', '3rd Party Data Interface', and 'Edge Computing Setting'. The 'Collection Setting' section includes fields for MQTT Broker IP (127.0.0.1), Store Historical Data (Archive by Monthly), Keep Historical Data (days) (6), Record Rate (ms) (5000), and Record Type (Change). The '3rd Party Data Interface' section has a Type dropdown (Cloud IoT, Webhook, MQTT, PC) and an Enable Data Upload toggle (OFF). The 'Edge Computing Setting' section includes a Missing Value dropdown (Null) and a Move Frequency field (3). At the bottom left of the sidebar, version information is displayed: v 1.4.0.0 BETA8, © 2017 Delta Electronics, Inc., All Rights Reserved.

2.8.1 General Setting

On General Setting page, users can setup MQTT Broker IP, historical data storage, its record rate (ms) and record type, then click “Save Changes” when completed.

Note:

By default, historical data save would be set as disabled. Users should make sure there is enough disc space before enable archiving. You can choose between many options to archive historical data- “Archive by Daily”, “Archive by Monthly”, “Archive all”. The previous two options are for users who need to develop software and want data to be archived by days or months, while others can directly choose “Archive all” to store data.

Tag data can be stored based on customer’s need with different record types: choose “Change” to store data when tag values change, while “interval” is used for storing data according to record rate. “Keep Historical Data (Days)” determines data deletion period which would be enabled only if “Store Historical Data” is not set to No Save.

Collection Setting

MQTT Broker IP 127.0.0.1

Store Historical Data Archive by Monthly

Keep Historical Data (days) 6

Record Rate (ms) 5000

Record Type Change

With the additional module “Data Upload” which can be seen on the “Monitoring” Page, collected data from devices can be shared with third-party system via posting Json data to Web API, as long as the data streaming function is enabled on 3rd Party Data Interface setting page under General Setting. Cloud IoT, Webhook, MQTT and PC types are currently supported.

- 【Cloud IoT】

Go to “Cloud IoT” tab page and click the upload button to open the parameter settings. Currently, only Azure cloud service is supported. Tags would be uploaded to Azure cloud after entering information from IoT Hub and collection interval (ms). Also, if “Transmission Log” is checked, you can view the upload history via DIAL_ IoT Hub Log file, which contains information of all the tags uploaded in every minute. In case that the collection interval is set to 20000ms, three records would be made in every minute and the time interval would be 20 seconds between records. The record data would be kept only for five days. Any failure of data transmission to Azure would be recorded in the database as well. When transmission is back to normal, the data transmission would be ongoing and continue the upload from where it stopped last time.

A guide to Microsoft Azure IoT connection:

Enter Microsoft Azure and go to IoT Hub from homepage and you can see the list of all available IoT hubs. Then choose the target IoT Hub to use.

The screenshot shows the Microsoft Azure portal interface for IoT Hub. The top navigation bar includes the Microsoft Azure logo and a search bar. Below the navigation bar, the 'IoT Hub' section is displayed, showing the name 'Delta Electronics, Inc. (DeltaO365.onmicrosoft.com)'. The main content area shows a list of IoT Hubs with columns for Name, Type, Resource group, Location, and Subscription. The first entry, 'sgmsaaciothub', is highlighted with a red box. The table shows the following data:

Name	Type	Resource group	Location	Subscription
sgmsaaciothub	IoT Hub	RG-IT-TEST-EnergyCloud	Southeast Asia	Corp IT

The hostname on the right side of the IoT Hub screen is the URL to upload.

Home > IoT Hub > sgmsaeciiohub

Search (Ctrl+/)

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Events

Pricing and scale

Device management

Devices

IoT Edge

Configurations

Updates

Queries

Hub settings

Built-in endpoints

Essentials

Resource group (Move) : RG-IT-TEST-EnergyCloud

Status : Active

Current location : Southeast Asia

Subscription (Move) : Corp IT

Subscription ID : b14cff6a-38c4-4aec-9335-b453f4d03339

Tags (Edit) : Main_Owner_User : IVAN.LAI Service : IABG DIAEnergie Main_Owner_Department : 00200000 CostCenter : 00200000 More (4)

Hostname : sgmsaeciiohub.azure-devices.net

Pricing and scale tier : S1 - Standard

Number of IoT Hub units : 1

Device streams (preview) : https://sg-001.southeastasia-001.streams.azure-de... Device streams documentation

Usage

Get started

Show data for last: 1 Hour 6 Hours 12 Hours 1 Day 7 Days 30 Days

IoT Hub Usage

Messages used today: 0

Daily messages quota: 400000

Number of messages used

100

90

80

70

60

Add devices to create a connection and receive data. The authentication type of the newly-added device should be set to corresponding key so as to enable the device.

Home > IoT Hub > sgmsaeciiohub

sgmsaeciiohub | Devices

Search (Ctrl+/)

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Events

Pricing and scale

Device management

Devices

IoT Edge

Configurations

Updates

Queries

Hub settings

View, create, delete, and update devices in your IoT Hub.

Device name

enter device ID

Find devices

Find using a query

+ Add Device

Refresh

Delete

Device ID	Status	Last Status Update	Authentication Type	Cloud to Devi...
test509	Enabled	--	CertificateAuthority	0
devLink	Enabled	--	Sas	0
test3	Enabled	--	CertificateAuthority	0
test2	Enabled	--	CertificateAuthority	0
dev01	Enabled	--	Sas	0

Home > IoT Hub > sgmsaaciothub >

Create a device ...

×

Find Certified for Azure IoT devices in the Device Catalog

Device ID * ⓘ
The ID of the new device

Authentication type ⓘ
Symmetric key X.509 Self-Signed X.509 CA Signed

Auto-generate keys ⓘ
☒

Connect this device to an IoT hub ⓘ
Enable Disable

Parent device ⓘ
No parent device
[Set a parent device](#)

Save

Device ID and Primary Key here are same as the settings for data upload.

Microsoft Azure

Search resources, services, and docs (G+)

@delta...
DELTA ELECTRONICS, INC. (DELT...

Home > sgmsaaciothub >

devLink ⓘ ...

sgmsaaciothub

Save Message to Device Direct Method Add Module Identity Device twin Manage keys Refresh

Device ID ⓘ

devLink

Primary Key ⓘ

.....

Secondary Key ⓘ

.....

Primary Connection String ⓘ

.....

Secondary Connection String ⓘ

.....

Enable connection to IoT Hub ⓘ

☒ Enable ☐ Disable

Parent device ⓘ

No parent device

Distributed Tracing (preview) ⓘ

[Learn more](#)
Not configured

Module Identities Configurations

3rd Party Data Interface

Type

Cloud IoT

Webhook

MQTT

PC

Enable Data Upload

ON

Transmission Log

☒

Collection Interval(ms)

20000

Platform

☒ Azure IoT Hub

Device ID

devLink

Primary Key

.....

IoT Hub URL

sgmsaaciothub.azure-devices.net

Upload data format:

Parameter	Data Type	Description
nodeId	String	Node ID: the only ID number for each DIALink product.
deviceId	Integer	Device ID
deviceName	String	Device name
tagId	Integer	Tag ID
tagName	String	Tag name
result	String	Tag value
updateTime	Datetime (UTC)	When to obtain values

```
{
  "nodeId": "cbbe7470100940d4877c9e37359d6036",
  "deviceId": 360,
  "deviceName": "DVP",
  "tagId": 55287,
  "tagName": "1003",
  "result": "55",
  "updateTime": "2021-12-10T04:28:08.3492087Z"
},
{
  "nodeId": "cbbe7470100940d4877c9e37359d6036",
  "deviceId": 360,
  "deviceName": "DVP",
  "tagId": 55289,
  "tagName": "1005",
  "result": "66",
  "updateTime": "2021-12-10T04:28:08.3492087Z"
},
{
  "nodeId": "cbbe7470100940d4877c9e37359d6036",
  "deviceId": 360,
  "deviceName": "DVP",
  "tagId": 55291,
  "tagName": "1007",
  "result": "77",
  "updateTime": "2021-12-10T04:28:08.3492087Z"
}
```

***** SSMS 中 SelectTopNRows 命令的指令碼 *****

```
SELECT TOP (1000) [id]
, [data]
, [status]
, [message]
, [updateTime]
FROM [DIALinkDataCenter].[dbo].[DIAL_ IoT HubLog]
```

100 %

結果 訊息

	id	data	status	message	updateTime
29	29	[{"nodeId": "cbbe7470100940d4877c9e37359d6036", "d...	1		2021-12-10 12:05:01.327
30	30	[{"nodeId": "cbbe7470100940d4877c9e37359d6036", "d...	1		2021-12-10 12:06:01.337
31	31	[{"nodeId": "cbbe7470100940d4877c9e37359d6036", "d...	1		2021-12-10 12:07:01.347
32	32	[{"nodeId": "cbbe7470100940d4877c9e37359d6036", "d...	1		2021-12-10 12:08:01.360
33	33	[{"nodeId": "cbbe7470100940d4877c9e37359d6036", "d...	1		2021-12-10 12:09:01.363
34	34	[{"nodeId": "cbbe7470100940d4877c9e37359d6036", "d...	1		2021-12-10 12:10:01.380
35	35	[{"nodeId": "cbbe7470100940d4877c9e37359d6036", "d...	1		2021-12-10 12:11:01.383
36	36	[{"nodeId": "cbbe7470100940d4877c9e37359d6036", "d...	1		2021-12-10 12:12:01.383
37	37	[{"nodeId": "cbbe7470100940d4877c9e37359d6036", "d...	1		2021-12-10 12:13:01.393
38	38	[{"nodeId": "cbbe7470100940d4877c9e37359d6036", "d...	1		2021-12-10 12:14:01.407

● 【Webhook】

Set the Webhook URL to auto-upload device data to the third-party program via POST method and click “Save Changes”. Users can also manually upload all the device data at one time with the Manual Synchronization button after the third party fully understand the corresponding device of each tag which can be identified with Interface ID and the numerical meaning of tags can be understood via DIALink webpage as well. With the real-time updates for value changes, the third party must have sufficient capacity to deal with Web API being called constantly to avoid delaying processing, along with the illusion of delayed data update.

3rd Party Data Interface

Type: Cloud IoT **Webhook** MQTT PC

Enable Data Upload: ☐ OFF

Webhook URL: POST [Manual Synchronization](#)

No.	Name	Description
1	InterfaceId	A kind of unique identifier to identify which devices does a specific Tag belongs to.
2	tagId	Tag's ID, not repeatable with a single DIALink while a repeated ID may exist with multiple DIALink platforms.
3	name	Tag's name
4	value	Tag's value
5	updateTime	The required time for accessing a value.

Example:

```
[
  {
    "interfaceId": "cbb74701009404877c9e37359d603641",
    "tagId": 6812,
    "name": "Axis_X",
    "value": "34",
    "updateTime": "2020-01-08T09:06:31.3952689+08:00"
  },
  {
    "interfaceId": "cbb74701009404877c9e37359d603641",
    "tagId": 6813,
    "name": "Axis_Y",
    "value": "134",
    "updateTime": "2020-01-08T09:06:31.3982186+08:00"
  }
]
```

● 【MQTT】

Set MQTT Broker IP (Third-party PC's IP address), port, user name and password, then the updated data would be uploaded automatically via MQTT in Publish method, clicking “Save Changes” when finish configuration.

Use MQTT packets to send data, same in JSON format. Each packet is divided into two parts and contains topic, which the format would be v1/client/GUID/tags/Device ID.

Example: v1/client/cbb7470100940d4877c9e37359d6036/tags/41

No.	Name	Description
1	GUID	A GUID for communication is used to identify resources of a specific DIALink.
2	tagId	Tag's ID, not repeatable with a single DIALink while a repeated ID may exist with multiple DIALink platforms.
3	Device ID	Device number

Subscribe to the following topic for tag subscription.

v1/client/GUID/tags/+

Example: v1/client/cbbe7470100940d4877c9e37359d6036/tags/+

The content in the packet would also be in JSON format.

No.	Name	Description
1	InterfaceId	A kind of unique identifier to identify which devices does a specific Tag belongs to.
2	tagId	Tag's ID, not repeatable with a single DIALink while a repeated ID may exist with multiple DIALink platforms.
3	name	Tag's name
4	value	Tag's value
5	updateTime	The required time for accessing a value.

Example:

```
[
  {
    "interfaceId": "cbbe7470100940d4877c9e37359d603641",
    "tagId": 6812,
    "name": "Axis_X",
    "value": "34",
    "updateTime": "2020-01-08T09:06:31.3952689+08:00"
  },
  {
    "interfaceId": "cbbe7470100940d4877c9e37359d603641",
    "tagId": 6813,
    "name": "Axis_Y",
    "value": "134",
    "updateTime": "2020-01-08T09:06:31.3982186+08:00"
  }
]
```

Since only tags with changeable variable values would be updated by DIALink, the following topic must be published to MQTT broker, which is a one-off instruction, for external system to obtain all tag information. After the system received the topic with correct content, all the tag information would be sent.

v1/client/**GUID**/rpc/request

Example: v1/client/cbbe7470100940d4877c9e37359d6036/rpc/request

Packet Topic

No.	Name	Description
1	InterfaceId	A kind of unique identifier to identify which devices does a specific Tag belongs to.

Packet content

{"type":16}

The content in the packet would also be in JSON format.

No.	Name	Description
1	type	The value must be written as 16 for system to recognize this special instruction.

3rd Party Data Interface

Type

Cloud IoT Webhook **MQTT** PC

Enable Data Upload

OFF

Broker IP

Port

1883

Username

root

Password

•••••

● Edge Computing Setting:

Missing Value: Conditions for reading Tags failed can be set as “Null” and “Previous Value” (Refer to Appendix D for more details.)

Move Frequency: Move would be performed only when value changes under the condition that the virtual tag is set to Move type. The move frequency is set for ensuring that values would be correctly moved after performing a specified number of times of Move action. If the setting is 3, values would no longer be moved after being moved for 3 times. Not until values change will the move action be performed again.

Edge Computing Setting

Missing Value

Null

Move Frequency

3

● Modbus Slave Setting:

Enable or disable Modbus Slave feature and the Port. Click “Save Changes” when finish updating.

Modbus Slave Setting

Enabled

OFF

Port

505

● User Setting:

Change a password (case-sensitive) on behalf of a user under the condition that it's the only user account, which can be logged in by several admins at the same time. Click “Save Changes” when finish configuration.

User Setting

Username

root

Change Password

Change Password

Confirm Password

Confirm Password

2.8.2 Notification

On notification page, E-mail, text message (SMS), Line and WeChat settings are included. When the notification is enabled, users will receive data regarding trigger points, schedules and events or action. For SMS, users can choose either GSM or HiNet for network setup. When setting is completed, click“Save changes”.

E-mail Setting

Enabled

☐ OFF

Host

localhost

Port

25

SSL

☐

Username

Password

Sender Mail

example@email.com

SMS Setting

Enabled

☐ OFF

Type

GSM

HiNet

COM Port

COM5

SIM PIN

0000

International

☐

Try to Init

☐

Line Setting

Enabled

☐ OFF

WeChat Setting

Enabled

☐ OFF

2.8.3 Network

Users can setup the IP address for LAN 1 & 2. Users can select the current network connected to the host, the network name [MAC Address] is displayed with default IP as 192.168.1.1 and 192.168.2.1 for products with IPC devices. When setting is completed, click “Save changes”.

LAN 1 Setting

Interface: Ethernet [MAC Address]

Type: Static IP

IP Address: 10.139.5.80

Subnet Mask: 255.255.255.0

Default Gateway:

LAN 2 Setting

Interface: Ethernet [MAC Address]




Type: Static IP

IP Address: 10.139.5.80

Subnet Mask: 255.255.255.0




Default Gateway:

2.8.4 Job Shift Management







① On Job Shift Management tab, you can add multiple shift schedules by ② clicking the  icon on the above of the page. To edit information of a line, ③ click  on the sidebar. Click on  to delete a particular line. Activation information generated based on job shift schedules would be displayed on CNC dashboard with circle chart illustrating present work rate/ non-work rate. Please refer to section 2.2.1 for more details.

Settings

General Notification Network **Job Shift Management** Line Setting WeChat Setting Modbus Slave

②   

Search


Name	First Shift of day	Start Time	End Time	Action
Shift1	false	08:00	14:00	③  
Shift2	false	14:00	20:00	 
Shift3	true	20:00	08:00	 

Showing 1 to 3 of 3 entries

1

● Add/ Edit Shift Schedules:

All items marked with an asterisk (*) need to be completed. When finished, click “Save changes” button at the bottom of the page. If the input value does not meet the requirement, a red color frame will appear to indicate as an error. In addition, Night-shift setting is only allowed when there's no overlap of time slot between each shift.

Edit Shift 

Job Shift Management




Name*

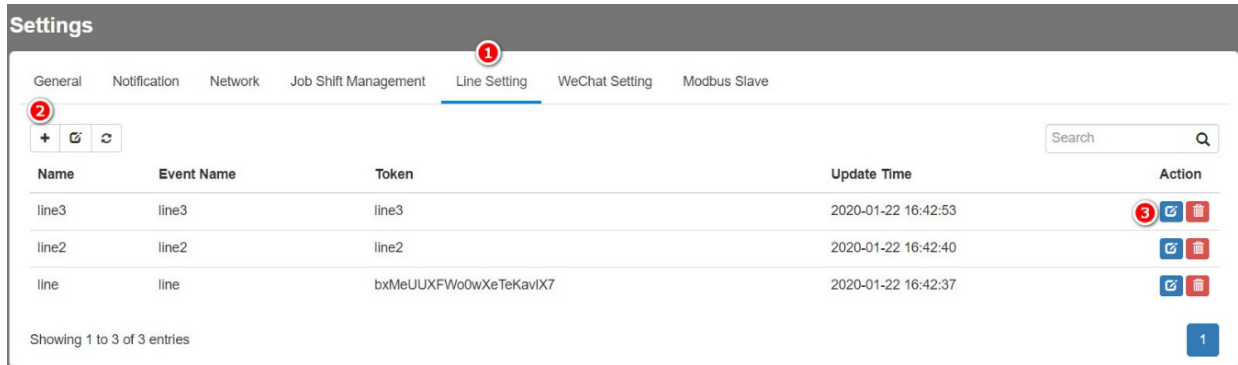
Start Time* :










End Time* :

Save changes

2.8.5 LINE Setting

① On Line Setting tab, you can add multiple notification settings by ② clicking the  icon on the above of the page. To edit information of a line, ③ click  on the sidebar. Click on  to delete a particular line. If the line token has already been used in event settings, the deletion would not be allowed.



Name	Event Name	Token	Update Time	Action
line3	line3	line3	2020-01-22 16:42:53	  
line2	line2	line2	2020-01-22 16:42:40	  
line	line	bxMeUUXFWo0wXeTeKavIX7	2020-01-22 16:42:37	  

Showing 1 to 3 of 3 entries

- **Add/ Edit Line Setting:**

All items marked with an asterisk (*) need to be completed. When finished, click “Save changes” button at the bottom of the page. If the input value does not follow to the system rule, a red color frame will appear to indicate as an error. “Name” must be same as “Event Name” for applying IFTTT. Token is the key of IFTTT Webhooks which should be updated synchronously if the key being replaced. The application method for IFTTT is in Appendix B.1.

Edit Line Setting
✕

Line Setting (IFTTT)




Name*

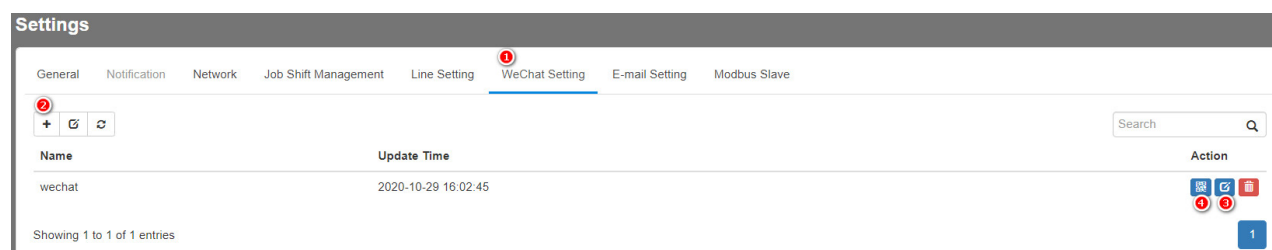
Event Name*

Token*

Save changes

2.8.6 WeChat Setting

① On WeChat Setting tab, you can add multiple notification settings by ② clicking the  icon on the above of the page. To edit information of a WeChat, ③ click  on the sidebar. To be added in the notification list, you can ④ click the QR code icon to scan with mobile devices. Click on  to delete a particular WeChat. If the WeChat you intend to delete has already been used in event settings, the deletion would not be allowed.



● Add/ Edit WeChat Information:

All items marked with an asterisk (*) need to be completed. When finished, click “Save changes” button at the bottom of the page. If the input value does not follow to the system rule, a red color frame will appear to indicate as an error. “AppID”, “Secret”, “Template ID” must be same as the information generated when applying for an official account. The system will verify the inputted information when saving changes. The application guide is in Appendix B.2.

Edit WeChat Setting
✕

WeChat Setting




Name*

AppID*

Secret*

Template ID*

2.8.7 E-mail Setting

① On E-mail Setting tab, you can add multiple notification settings by ② clicking the  icon on the above of the page. To edit information of an e-mail, ③ click  on the sidebar. Click on  to delete a particular e-mail. If the E-mail recipient you intend to delete has already been used in event settings, the deletion would not be allowed.

Settings

General

Notification

Network

Job Shift Management

Line Setting

WeChat Setting

E-mail Setting

Modbus Slave

2

+

Search

Name	Recipient Mail	Update Time	Action
Test1	test@gmail.com	2020-10-29 16:11:53	<div><div>3</div><div></div><div></div></div>
Test2	deleteMe@gmail.com	2020-10-21 10:54:37	<div><div></div><div></div></div>

Showing 1 to 2 of 2 entries

1

- **Add/ Edit Line Setting:**

All items marked with an asterisk (*) need to be completed. When finished, click “Save changes” button at the bottom of the page. If the input value does not follow to the system rule, a red color frame will appear to indicate as an error.

Edit E-mail Setting

E-mail Setting

Name*

Test1

Recipient Mail*

test@gmail.com

Save changes

2.8.8 Modbus Slave Setting

Go to “General” page and enable the feature, then configure Modbus Slave IP address and port.

2

Settings

General

Notification

Network

Job Shift Management

Line Setting

WeChat Setting

E-mail Setting

Modbus Slave

Collection Setting

MQTT Broker IP

127.0.0.1

Store Historical Data

No Save

Record Rate (ms)

1000

Record Type

Interval

3rd Party Data Interface

Type

Webhook

MQTT

PC

Enable Data Upload

OFF

Webhook URL

POST

http://example.URL/webhook

Manual Synchronization

Edge Computing Setting

Missing Value

Null




Modbus Slave Setting

Enabled

ON

Port

505

① On Modbus Slave page, users can add/ edit the register where the tags locate and the data length. ② You can add information by clicking the  icon on the above of the page, ③ clicking  on the sidebar to edit. Click on  to delete a particular line.

Settings

General

Notification

Network

Job Shift Management


Line Setting


WeChat Setting

E-mail Setting


① Modbus Slave







② +





Search





Devices	Name	Register	Data Type	Data Length	Action
Delta_CNC	Spindle_load	4x1	FLOAT	2	③  
Delta_CNC	Spindle_temperature	4x3	FLOAT	2	 
Delta_CNC	OvSpindle	4x5	FLOAT	2	 

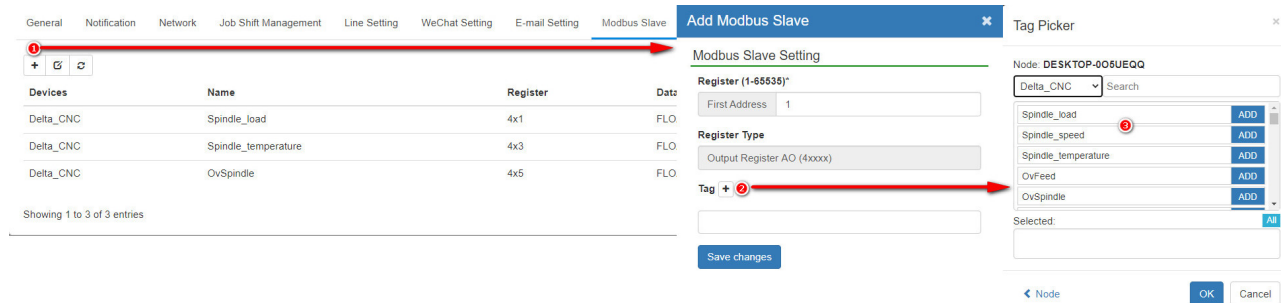
Showing 1 to 3 of 3 entries

1

● Add/ Edit Modbus Slave Information:

- ① Click  to add one or more lines.
- ② Input register address (1~65535) and data length. Then click  next to **Tag**.
- ③ Click “ADD” to create one or more lines. When finished, click “Save changes” button.

All items marked with an asterisk (*) need to be completed. When finished, click “Save changes” button at the bottom of the page. If the input value does not follow to the system rule, a red color frame will appear to indicate as an error. For more details of higher-level systems (MES, SCADA...), please refer to appendix A.



The screenshot shows the 'Add Modbus Slave' dialog box and the 'Tag Picker' window. The 'Add Modbus Slave' dialog has a 'Modbus Slave Setting' section with fields for 'Register (1-65535)*', 'First Address', 'Register Type', and 'Tag'. The 'Tag' field has a plus icon next to it. The 'Tag Picker' window shows a list of tags with 'Spindle_load' selected. Red arrows and circles highlight the steps: clicking the plus icon in the table, clicking the plus icon next to the Tag field, and selecting a tag from the picker.


Devices	Name	Register	Data
Delta_CNC	Spindle_load	4x1	FLO
Delta_CNC	Spindle_temperature	4x3	FLO
Delta_CNC	OvSpindle	4x5	FLO

Showing 1 to 3 of 3 entries

Modbus Slave Setting

Register (1-65535)*
First Address: 1

Register Type
Output Register AO (4xxxx)

Tag + 

Save changes

Tag Picker

Node: DESKTOP-005UEQQ

Delta_CNC Search

Spindle_load ADD

Spindle_speed ADD

Spindle_temperature ADD

OvFeed ADD

OvSpindle ADD

Selected: All

Node OK Cancel

MEMO

2

Chapter 3 Create Web API

Table of Contents

3.1 Overview	3-2
3.2 API Document	3-4
3.3 Programming Models	3-7

3.1 Overview

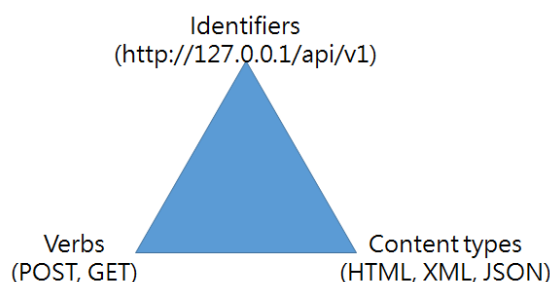
An API (Application Programming Interface) features certain definitions, communication protocols and ports for building software and applications. To put it in simple terms, the API provides programmers access to specific methods or functions.

The Web API is created over the web by using different languages such as Java, .Net etc that can retrieve information via HTTP protocol. Most commonly-used Web API for example, Google APIs, Facebook APIs provide users the to achieve the same log in function as Google Map or Facebook for their own programs or webpage.

DIALINK Web API follows the REST web API structure. The REST is a web method used to transfer data between servers and computers. Unlike using complicated services like CORBA, SOAP and WPF, the method adopts a simple transmission mechanism using HTTP that fulfills the structure and five RESTful Web API characteristics.

- Uniform Interface: A function of REST API is known as a resource. Every resource has a set of independent URI that can execute data exchange and communication via standard HTTP interface.
- Stateless: Client transaction and information are not stored in the server, meaning no sessions are recorded. Therefore, each resource is independent and not mutually connected or influenced.
- Cacheable: The REST API defines whether a resource response content for clients are cacheable, or not, to optimize overall performance.
- Client-Server: The uniform interface separates client from servers. Data storage remains to each server, so clients are not concerned with data storage. In addition, servers are not concerned about the user interface or screen images, so clients and servers can be more scalable and easy to maintain.
- Layered System: With different layers of control, a client cannot tell whether it is directly connected to the end server, or to an intermediary server. But, it can identify whether or not an API resource is obtained.

The use of REST resources define the interface (verbs and content types) and identifiers (nouns).




The above triangle diagram shows that the REST resource contains these three major items. It is important to know these items regarding the resource before implementing any data exchange.

DIALink Web API uses four verbs; the first one is “GET” which is to retrieve or read data, next is “PUT” which is to update or replace data, the third one is “POST” which is to create new resource or records and the last one is “DELETE” which is to delete records.

DIALink provides DIALink Web API. Users only need to follow the required parameters on API to obtain their desired data, so that they can produce a report or data analysis to meet their own demands. Therefore, the following chapters will introduce the use of DIALink Web API and provide important examples.

3.2 API Document

After logging in DIALink, click  on the upper right corner and choose API Document as shown below.

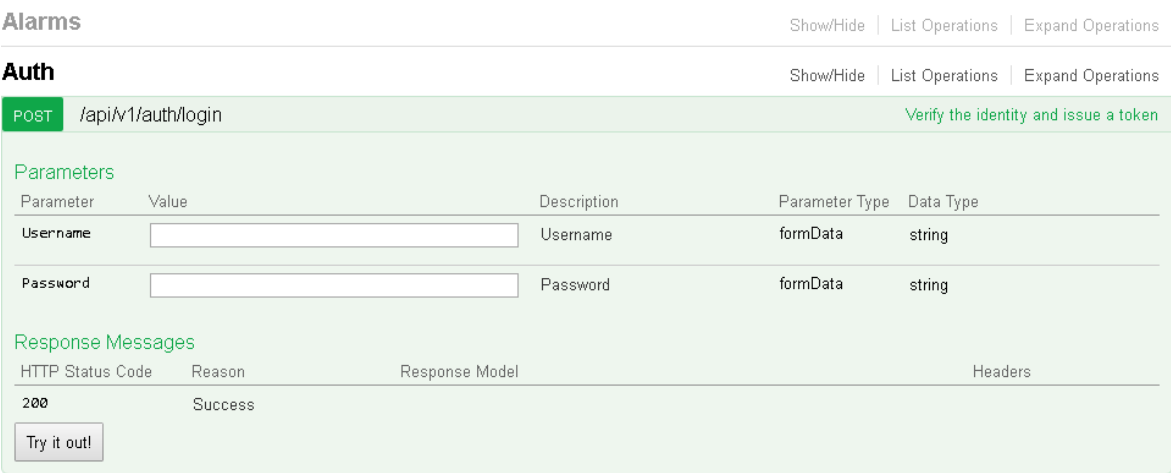


3

After that you can see the Swagger page. Click any item on the page, for example Auth \ POST to have more information shown.



More information appears as shown below.



POST /api/v1/auth/login shown on the left corner indicates the HTTP method used in the API. The POST here is used as a verb and the noun follows the verb is the URI address. A complete URI requires an IP address or Domain to save an API. The section contains two parameter settings, parameter types is formData and data type is string.

Parameters				
Parameter	Value	Description	Parameter Type	Data Type
Username	<input type="text"/>	User Name	formData	string
Password	<input type="password"/>	Password	formData	string

The Response Message section displays HTTP status code and other information. The Username and Password are setup to log in DIALink. Click “Try it out!” and more information is shown.

POST

/api/v1/auth/login

Verify the identity and issue a token

Parameters

Parameter	Value	Description	Parameter Type	Data Type
Username	root	Username	formData	string
Password	admin	Password	formData	string

Response Messages

HTTP Status Code	Reason	Response Model	Headers
200	Success		

Try it out!

Hide Response

Curl

```
curl -X POST --header 'Content-Type: application/x-www-form-urlencoded' --header 'Accept: application/json' -d 'Username=root&Password=admin'
```

Request URL

```
http://127.0.0.1/api/v1/auth/login
```

Request Headers

```
{}
```

Response Body

```
{  "access_token": "eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJzdWIiOiJyb290IiwianRpIjoiZWVhYyJmNTAyYxNTAzNDdmZWlxdQZnYyYjNwZGE2Mjc1LnR5cCI6IkpXVCJ9.eyJleSI6MTk0MDAwfQ",  "expires_in": 43200}
```

Response Code

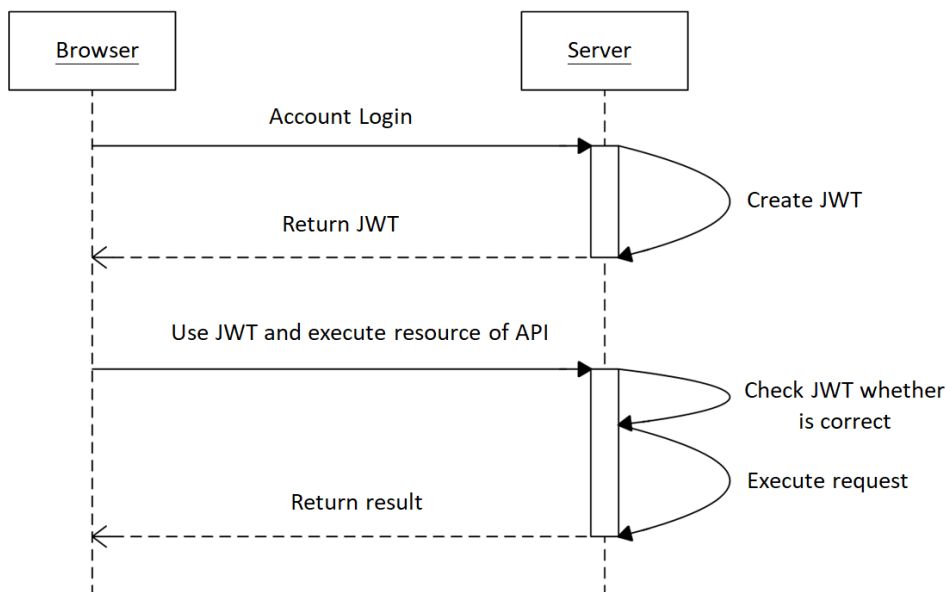
```
200
```

Response Headers

```
{  "access-control-allow-origin": "http://127.0.0.1",  "date": "Fri, 22 Dec 2017 06:37:54 GMT",  "access-control-allow-credentials": "true",  "server": "Kestrel",  "vary": "Origin",  "transfer-encoding": "chunked",  "content-type": "application/json; charset=utf-8"}
```

When a resource of DIALink Web API is identified as 2xx in the Response Code, the execution is a success. In addition, JSON data type is used to deliver the content shown in the Response Body.

Since RESTful API has a stateless characteristic, authentication/authorization is a problem. Among all the current solutions, one simple and secure way is called the JWT. What is JWT? The JWT stands for JSON Web Token. Information are digitally signed and verified via using the JSON objects, therefore JWT can be viewed as signed tokens for verification and securely transmitting information between two clients. Below is a successful sequence diagram for JWT verification:



First, log in by using the username and account. Then, the server will create a set of JWT object to send back to the browser. After obtaining the JWT, use the JWT to execute resource of API and place it in the HTTP Header for verification. However, if verification fails, the requested resource is restricted (Status Code: 401).

On the Swagger page, when there is an asterisk (*) mark next to an API description (see below) means authentication is required. Please refer to section 3.3 example. After the token is obtained from the auth / login resource, save it in the HTTP header " Authorization " column.

GET	/api/v1/devices	Get all the device list
POST	/api/v1/devices	Add a new device *
DELETE	/api/v1/devices/{deviceId}	Delete one or multiple devices *
GET	/api/v1/devices/{deviceId}	Get one or multiple device data
PUT	/api/v1/devices/{deviceId}	Update a device data *

3.3 Programming Models

The section introduces on how to use the DIALink Web API resource and use C# programming as an example. The first example is a commonly used Get method.

Devices

[Show/Hide](#) | [List Operations](#) | [Expand Operations](#)

GET
/api/v1/devices
Get all the device list

Response Class (Status 200)
Success

Model Example Value

```
[
  {
    "deviceId": 0,
    "guid": "string",
    "did": 0,
    "name": "string",
    "ip": "string",
    "port": 0,
    "station": "string",
    "serverName": "string",
  }
]
```

Response Content Type text/plain

Parameters

Parameter	Value	Description	Parameter Type	Data Type
guid	<input type="text"/>	[Optional] Specific guid	query	string

Try it out!

The screen image above shows the Get method used in the API resource: the URI is “/api/v1/devices”, the success status code is 200 and the response content is in JSON format. For complete data access, please install “Newtonsoft.Json” via NuGet to obtain the following programming codes (.NET Framework 4.5 or above):

```
string sURL = "http://127.0.0.1/api/v1/devices";
using (var client = new HttpClient())
{
    HttpResponseMessage response = client.GetAsync(sURL).Result; // use GET method
    if (response.IsSuccessStatusCode) // determine success status code as 2xx
    {
        string strjson = response.Content.ReadAsStringAsync().Result; // read response content
        dynamic items = JsonConvert.DeserializeObject(strjson); // convert JSON to object
        foreach (var item in items)
        {
            string guid = item["guid"]; // get guid
            // get other column
        }
    }
}
```

HTTP methods including POST, PUT and DELETE in most of DIALink Web APIs need to be authorized before use. Thus, it is crucial to obtain authorization first. However, if global authentication is enabled (See appendix H), all the Web APIs would require authorization before any action. See the image of the Web API resource login below.

Auth Show/Hide List Operations Expand Operations

POST /api/v1/auth/login Verify the identity and issue a token

Parameters

Parameter	Value	Description	Parameter Type	Data Type
Username	<input type="text"/>	User Name	formData	string
Password	<input type="password"/>	Password	formData	string

Response Messages

HTTP Status Code	Reason	Response Model	Headers
200	Success		

[Try it out!](#)

The API resource image above shows the POST method, URI, two query strings and the success status code is 200. By gathering these information, authorized codes can be achieved through the programming codes shown below:

```
string authorizationToke = "";

string sURL = "http://127.0.0.1/api/v1/auth/login";

using (var client = new HttpClient())

{
    var formContent = new FormUrlEncodedContent(new[] { new KeyValuePair<string, string>("Username", "root"),
new KeyValuePair<string, string>("Password", "admin") }); // username and password

    HttpResponseMessage response = client.PostAsync(sURL, formContent).Result; // use POST method

    if (response.IsSuccessStatusCode)

    {

        string strjson = response.Content.ReadAsStringAsync().Result;

        dynamic item = JsonConvert.DeserializeObject(strjson);

        authorizationToke = item["access_token"]; // get access_token

        int expired = Convert.ToInt32(item["expires_in"]); // expiration time

    }

}
```

The item in the programming code can obtain “access_token” and the token is regarded as a required authorization code for Web API. When an access_token is obtained, an expiration time (expires_in, unit: sec) is also obtained. However, if a token exceeds the expiration time, it become invalid automatically. Therefore, please obtain a new access_token before the token expires if your programs need to continue saving DIALink data. The next example explains how to place an access_token in the HTTP header.

Below is a screen image of an API resource that requires authorization. The URL is “ / api / v1 / devices” (an asterisk mark * next to the description means the API needs verification.)

POST

/api/v1/devices

Add a new device *

Parameters

Parameter	Value	Description	Parameter Type	Data Type
model	<div></div> <div>Parameter content type: application/json</div>	Device data	body	<div>Model</div> <div>Example Value</div> <pre>{ "deviceId": 0, "guid": "string", "did": 0, "name": "string", "ip": "string", "port": 0, "station": "string", "serverName": "string", "comPort": "string", "baudRate": 0, }</pre>

Response Messages

HTTP Status Code	Reason	Response Model	Headers
200	Success		
201	The device has added successfully		
400	Bad request		

Try it out!

Programming codes:

```
string sURL = "http://127.0.0.1/api/v1/devices";

var device = new // create and fill in the object according to the actual circumstance
{
    deviceId = 0, // when adding, the deviceId is automatically added, so enter 0( or no setup) is allowed
    guid = "968644f3a1294c2f9da03b4af1a473ac", // the only identifier added to a DIALink device
    name = "Modbus_Test2",
    ip = "127.0.0.1",
    port = 502,
    station = "1",
    commType = 0, // TCP connection type
    type = "Modbus",
    brand = "Modbus",
    model = "Modbus",
    connectEnabled = true,
    comment = "API test"
};

var strjson = JsonConvert.SerializeObject(device); // convert object to JSON
using (var client = new HttpClient())
{
    client.DefaultRequestHeaders.Add("Authorization", "Bearer " + authorizationToken);
    var content = new StringContent(strjson, Encoding.UTF8, "application/json");
    HttpResponseMessage response = client.PostAsync(sURL, content).Result; // use POST method
    if (response.IsSuccessStatusCode)
    {
        Console.WriteLine("create success");
    }
    else
    {
        Console.WriteLine(response.ReasonPhrase);
    }
}
```

The guid represents as the only DIALink identifier that can gather additional devices. This is an example of adding a new device. First, please take note the HTTP authorization header adopts bearer token to obtain permission, while the authorization token value is obtained in the previous example. Users need to take note if authorization is required for use of API resources, especially when for POST, PUT, DELETE resources. Next, the content type need to follow the API requirements. Last, the system adopts JSON parameter format and the JSON content is found in the parameters section of Web API.

Now, modify the added information and click “Try it out”. For instance, if the new device ID is 5, use PUT method to update the device content.

PUT

/api/v1/devices/{deviceId}

Update a device data *

Parameters

Parameter	Value	Description	Parameter Type	Data Type
deviceId	(required)	Device ID	path	integer
model	<div></div> <div>Parameter content type: application/json</div>	Device data	body	<div>Model</div> <div>Example Value</div> <pre>{ "deviceId": 0, "guid": "string", "did": 0, "name": "string", "ip": "string", "port": 0, "station": "string", "serverName": "string", "comPort": "string", "baudRate": 0, }</pre>

Response Messages

HTTP Status Code	Reason	Response Model	Headers
200	Success		
204	The device has updated		
400	Bad request		
404	The device not found		

Try it out!

From the screen image above, this API resource contains a new device ID parameter that was not included in the PUT method. If the device ID is 5 and the number is used to replace the big bracket {deviceId}, the model content is sent by continuing the use of POST method for modification, the programming codes are as follows:


```
string sURL = "http://127.0.0.1/api/v1/devices/{deviceId}";
sURL = sURL.Replace("{deviceId}", "5");
var device = new
{
    guid = "968644f3a1294c2f9da03b4af1a473ac",
    name = "Modbus_Test3", // modify the name
    commType = 1, // modify communication type to Serial Port
    comPort = 4, // COM4
    baudRate = 115200,
    dataBits = 8,
    parity = "N",
    stopBits = 1,
    mode = 0,
    type = "Modbus",
    brand = "Modbus",
    model = "Modbus",
    connectEnabled = true,
    comment = "API modify test"
};

var strjson = JsonConvert.SerializeObject(device);
var content = new StringContent(strjson, Encoding.UTF8, "application/json");
using (var client = new HttpClient())
{
    client.DefaultRequestHeaders.Add("Authorization", "Bearer " + authorizationToken);
    HttpResponseMessage response = client.PutAsync(sURL, content).Result; // use PUT method
    if (response.IsSuccessStatusCode)
    {
        Console.WriteLine("modify success");
    }
    else
    {
        Console.WriteLine(response.ReasonPhrase);
    }
}
```

Then, delete the added device by clicking “Try it out”. Please view the following DELETE method in Web API for more detail.

DELETE /api/v1/devices/{deviceIDs} Delete one or multiple devices *

Parameters

Parameter	Value	Description	Parameter Type	Data Type
deviceIDs	(required)	Device IDs (split by comma ',')	path	string

Response Messages

HTTP Status Code	Reason	Response Model	Headers
200	Delete successfully		
400	Bad request		
404	There're some devices not found		
500	An error occurred		

Try it out!

In this API resource, the device ID is a required parameter. When the big bracket “{deviceID}” is replaced by a number, click “Try it out” to delete the information. The programming codes are as follows:

```
string sURL = "http://127.0.0.1/api/v1/devices/{deviceID}";

sURL = sURL.Replace("{deviceID}", "5");

using (var client = new HttpClient())

{

    client.DefaultRequestHeaders.Add("Authorization", "Bearer " + authorizationToken);

    HttpResponseMessage response = client.DeleteAsync(sURL).Result; // use Delete method

    if (response.IsSuccessStatusCode)

    {

        Console.WriteLine("delete success");

    }

    else

    {

        Console.WriteLine(response.ReasonPhrase);

    }

}
```

Next, we look at the query parameter used in Get resource of DIALink Web API.

Alarms

Show/Hide | List Operations | Expand Operations

GET

/api/v1/alarms

Get alarm list

Response Class (Status 200)
Success

Model

Example Value

```
[
  {
    "alarmId": 0,
    "type": 0,
    "level": 0,
    "guid": "string",
    "equipName": "string",
    "did": 0,
    "deviceName": "string",
    "tid": 0,
    "typeName": "string"
  }
]
```

Response Content Type

text/plain

Parameters

Parameter	Value	Description	Parameter Type	Data Type
type	<input type="text"/>	Alarm type	query	string
level	<input type="text"/>	Alarm level	query	string
guid	<input type="text"/>	Equipment guid	query	string

Unlike the path component used in URI, the query refers to an URI followed by a question mark, parameter name or value and is optional. The following example of programming codes uses the query parameters including level, startTime, endTime parameters for specific time alarm setting.

```
string sURL = "http://127.0.0.1/api/v1/alarms?level=all&startTime=2017-12-22 00:00:00&endTime=2017-12-23 23:59:59";

using (var client = new HttpClient())

{

    HttpResponseMessage response = client.GetAsync(sURL).Result; // use GET method

    if (response.IsSuccessStatusCode)

    {

        string strjson = response.Content.ReadAsStringAsync().Result;

        dynamic items = JsonConvert.DeserializeObject(strjson);

        foreach (var item in items)

        {

            string message = item["message"]; // receive alarm message

        }

    }

}
```

Chapter 4 Establish MQTT Connection

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4.2	Documentation	4-3
4.3	Programming Examples	4-7

4.1 Overview

MQ Telemetry Transport (MQTT) is an IBM messaging protocol for solving low-bandwidth and high-latency or unreliable network issues. The design principles are to minimize network bandwidth and device resource requirements as well as offering reliability and some degree of assurance in delivery. This also led the MQTT to become the ideal protocol for machine-to-machine (M2M) or Internet of Things applications and constrained devices and low-bandwidth. Currently, there are many competing IIoT technology and protocols in action, but MQTT is extremely lightweight (2 byte header) and features publish, subscribe as well as bi-directional functions. In addition, the protocol meets the unique requirements of industrial control system via supporting constrained measuring or monitoring devices and for long distance or unstable environment data transfer.

In 2013, the IBM proposed the MQTT to be an open protocol and underwent standardization at OASIS. Since then, all kinds of IIoT devices can easily apply the MQTT and many application software uses extensions via MQTT client to realize MQTT connectivity.

4.2 Documentation

Before applying the protocol, users need to understand some commonly used MQTT terms.

QoS: Different levels of Quality of Service (QoS) specifies every MQTT message delivery. There are three kinds of QoS in MQTT:

QoS 0 (At most once delivery) - The message is dependent on the network connectivity, so losing message occasionally is acceptable.

QoS 1 (At least once delivery) - This quality of service ensure the message arrives, but may receive the same message many times.

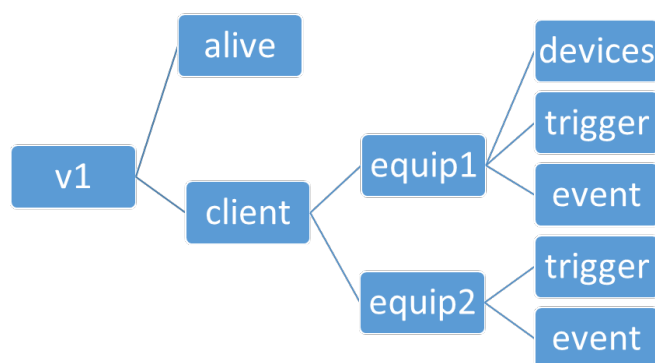
QoS 2 (Exactly once delivery) - The QoS2 delivers the message only once with no loss or duplication of messages.

The QoS has a characteristic that while the quality of service may be the most reliable, it is also the slowest. Every MQTT is associated with a reliable QoS based on the environment and functions to achieve excellent efficiency and stability.

Broker: In simple terms, the Broker is the server-side of MQTT. It deals with the heart of any publish or subscribe protocol. A broker can manage up to thousands of concurrently connected MQTT clients. The broker is responsible for receiving and filtering messages, determining who subscribes to each message and sending to the messages to all the subscribers. It also holds subscriptions and missed messages of all clients. Another responsibility of the broker is the authentication and authorization of clients.

Client: The client is any computer or micro and resource-constrained device that has TCP/IP communication capability and runs the MQTT protocol as well as connects to an MQTT Broker over a network. The straightforward and simple implementation of the MQTT protocol is why it is ideally suited for small devices. Currently, the MQTT client libraries contains all kinds of programming languages. For example, Android, C, C++, C#, iOS, Java, JavaScript and .NET. Both publishers and subscribers can be MQTT clients.

Topics: The topic refers to the message content for clients to publish or subscribe to it. In MQTT protocol, topics is a hierarchically structured string that can be used to filter messages to present clear topics. The naming of topics contains characters and is not restricted to any format. But, topics that start with “/”, “+” and “#” symbols have different purpose and are reserved for special usage.



Above is a hierarchical diagram with specific topic displayed in the box. If users want to subscribe the topic-alive today, the complete topic is "v1 / alive", the "/" is used to separate each topic level. As mentioned earlier, the "+" symbol represents a single-level wildcard in a topic, while the "#" symbol represents the multi-level wildcard in the topic. For single-level wildcard, when subscribe to the topic "v1 / +", the following results ("v1 / alive" and "v1 / client") matches the topic, while if the topic "v1 / client" is followed by other topic levels do not match the topic.

- ☒v1/alive
- ☒v1/client
- ☐v1/client/equip1
- ☐v1/client/equip2/device

For multi-level wildcard, when subscribe to the topic "v1 / #", a client receives all messages of a topic that begins with "v1".

- ☒v1/alive
- ☒v1/client
- ☒v1/client/equip1
- ☒v1/client/equip2/device

CA Certificate:

In case that you install DIALink with a certificate authority (CA) or need to perform manual update, please refer to Appendix H for more details. Under the condition of using CA certificates, you must make sure there's a file path configured in mosquitto.conf file inside config file under the installation path (The default is C:\DIALink) and check there're associated files under the file path.

```
# wss: Web Socket with TLS
# wss listener port-number [ip address/host name]
# CA certificate
cafile C:/DIALink/Web/CA/mqtt/DIALink_CA.crt

# Path to the PEM encoded server certificate.
certfile C:/DIALink/Web/CA/mqtt/DIALink.crt

# Path to the PEM encoded keyfile.
keyfile C:/DIALink/Web/CA/mqtt/DIALink.key
```

The system provides user name and password (Enter: **user / dialuser**) for authentication and authorization when using the MQTT for data transmission. Please refer to the following programming language and examples in section 4.3 for more detail:

```
mqttClient.Connect("client_id", "user", "dialuser", false, 60);
```

Below are the MQTT topics for DIALink

Topic	QoS	Description	Sample	Note
v1/alive	0	DIALink heartbeat and information	{ "id": "13a17c0cc2f4497fb5d6ff473865bdf", "equipmentType": "CNC", "tagLicence": 1000, "deviceLicence": 5, "status": 1 }	id: DIALink guid deviceLicence: amount of device licence tagLicence: amount of tag licence status: 0:disconnect, 1:connected
v1/client/{guid} devices	1	All device status	[{ "did": 1, "status": 1, "almcode": 0, "almmsg": "", "ts": "2017-07-04T09:22:15.785" }, { "did": 2, "status": 0, "almcode": 1, "almmsg": "Alarm", "ts": "2017-07-04T09:23:15.001" }]	did: device id status: 0:disconnect, 1:connected almcode: alarm code (if alarm occurred) almmsg: alarm message (if alarm occurred)
v1/client/{guid}/tags/{deviceID}	1	All tag status and value by device	[{ "tid": 1, "status": 1, "result": "17046", "ts": "2017-07-04T09:48:02.552", "record": 1 }	tid: tag id status: 0:disconnect, 1:connected result: tag value record: when 1, the tag valve will save historical data

			<pre> }, { "tid": 2, "status": 1, "result": "9884", "ts": "2017-07-04T09:48:02.552", "record": 0 }] </pre>	
v1/client/{guid}/lost	2	DIALink lost (disconnect)		(Using "Last Will and Testament")
v1/notification/rpc/request/email	2	Send an E-mail notification	<pre> { "requestId": "fb68281b-a95c-458e-8788-d006e32879cd", "from": "KK", "sendTo": "KUAN.KW.LEE@DELTAWWW.COM", "subject": "Test", "content": "TEST EMAIL" } </pre>	requestId: Generate a unique ID for check the response result
v1/notification/rpc/request/sms	2	Send a SMS notification	<pre> { "requestId": "fb68281b-a95c-458e-8788-d007e31873cd", "from": "KK", "sendTo": "0912345678", "content": "TEST SMS" } </pre>	requestId: Generate a unique ID for check the response result.
v1/notification/rpc/request/webhook	2	Send a Webhook notification	<pre> { "requestId": "fb68281b-a95c-458e-8788-d000e31073cd", "from": "kuan", </pre>	requestId: Generate a unique ID for check the response result. uri: entry your API method: post/get/etc.. depend

			<pre>"uri":"http://172.16.152.79:5000/api/v1/equipment", "method":"get", "content":"TEST Webhook" }</pre>	on your API
V1/notification/rpc/response	1	Notification response result	<pre>{ "requestId":"as317c0cc2f4497fb5d6ff473865bfd", "status":1, "msg":"result message" }</pre>	requestId: Generated ID status: 1:successful, 2:fail msg: result message

4.3 Programming Examples

The MQTT Client in the examples are objects of M2Mqtt.Net. Users can search M2Mqtt in NuGet and install Newtonsoft.Json to view the following examples.

Connect to MQTT Broker:

```
MqttClient mqttClient = new MqttClient("127.0.0.1"); // MQTT Broker IP

string clientId = Guid.NewGuid().ToString(); // produce random id, prevent repeated id
byte retcode = mqttClient.Connect(clientId, "user", "dialuser", false, 60); // use the username and password for connection
if (retcode == MqttMsgConnack.CONN_ACCEPTED)
{
    Console.WriteLine("Connect to MQTT broker success"); // connection successful
}
else
{
    Console.WriteLine("Connect to MQTT broker fail"); // connection failed
}
```

Register Topic (Subscribe):

```
MqttClient mqttClient = new MqttClient("127.0.0.1");
mqttClient.MqttMsgPublishReceived += Client_MqttMsgPublishReceived; // method for receiving topic of a message

string clientId = Guid.NewGuid().ToString();
```

```
byte retcode = mqttClient.Connect(clientId, "user", "dialuser", false, 60);
if (retcode == MqttMsgConnack.CONN_ACCEPTED)
{
    // connection successful, subscribe topic
    mqttClient.Subscribe(
        new string[] { "v1/alive", "v1/client/+/devices" }, // topic list
        new byte[] { 0, 1 } // QoS list
    );
}
else
{
    Console.WriteLine("Connect to MQTT broker fail"); // connection failed
}
```

Receive Message:

```
private void Client_MqttMsgPublishReceived(object sender, MqttMsgPublishEventArgs e)
{
    Console.WriteLine(e.Topic); // receives the topic of a message
    string payload = Encoding.UTF8.GetString(e.Message); // receives message content
    // handles JSON data (requires Newtonsoft.Json)
    dynamic data = JsonConvert.DeserializeObject(payload);
    // ...
}
```

Publish Message (Publish):

Send E-mail notification (complete E-mail server settings first)

```
MqttClient mqttClient = new MqttClient("127.0.0.1");

string clientId = Guid.NewGuid().ToString();

byte retcode = mqttClient.Connect(clientId, "user", "dialuser", false, 60);
if (retcode == MqttMsgConnack.CONN_ACCEPTED)
{
    string topic = "v1/notification/rpc/request/email";
    var dataObject = new
    {
        requestId = Guid.NewGuid(),
        sendTo = "test@example.com",
        subject = "TEST MQTT SEND EMAIL",
    };
}
```

```
        content = "TEST 123 456 789"

    };

    string json = JsonConvert.SerializeObject(dataObject); // convert object to JSON
    mqttClient.Publish(topic, Encoding.UTF8.GetBytes(json), 2, false); // publish message
}

else
{
    Console.WriteLine("Connect to MQTT broker fail"); // connection failed
}
```

MEMO

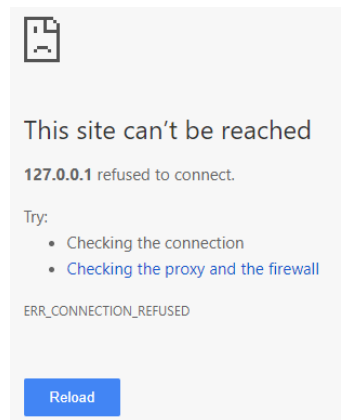
Chapter 5 Troubleshooting

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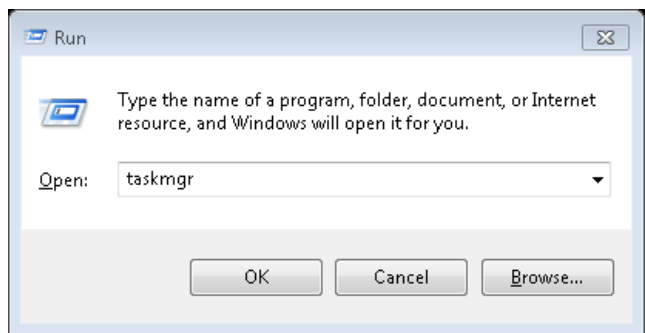
5.1 Software Troubleshooting

5.1.1 DIALink Web API Can't Be Reached

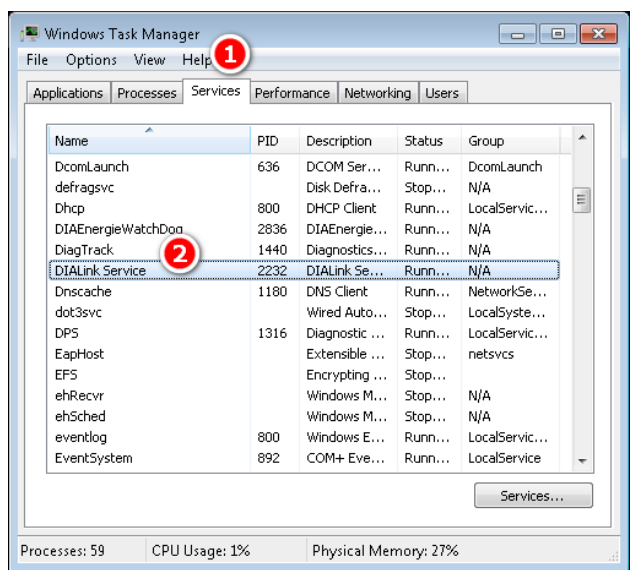


- **Process: Check if the DIALink service is enabled in Windows Task Manager**

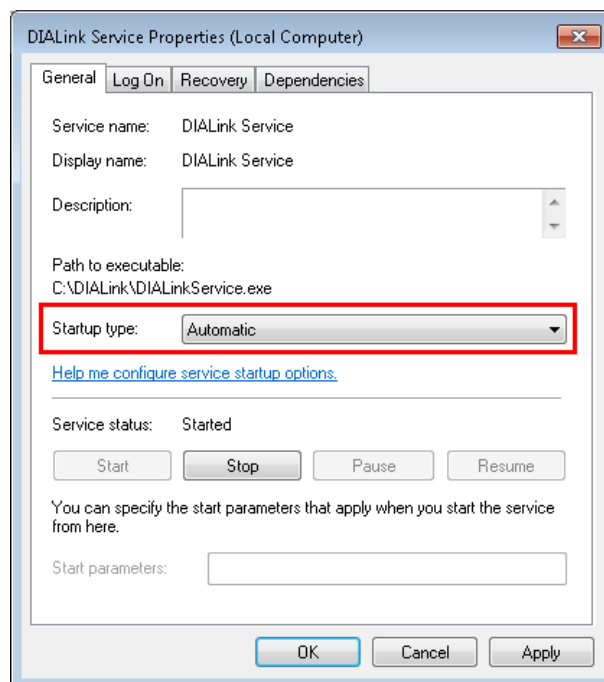
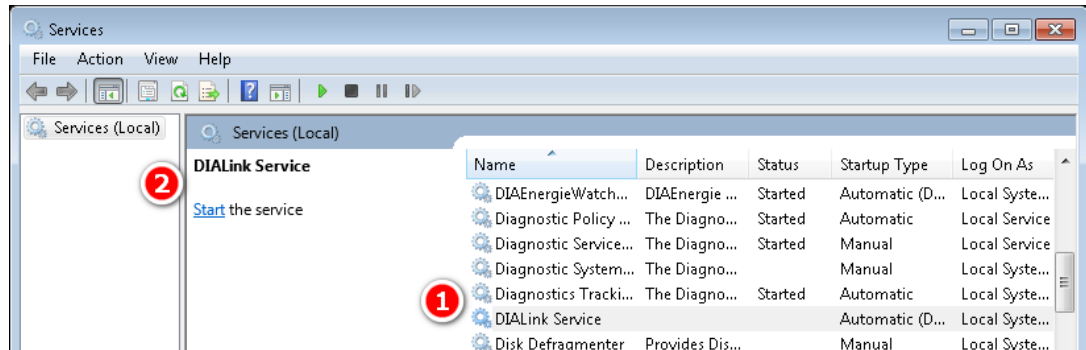
- 1 Type windows+R or Start \ Run and “taskmgr” to enter Windows Task Manager.



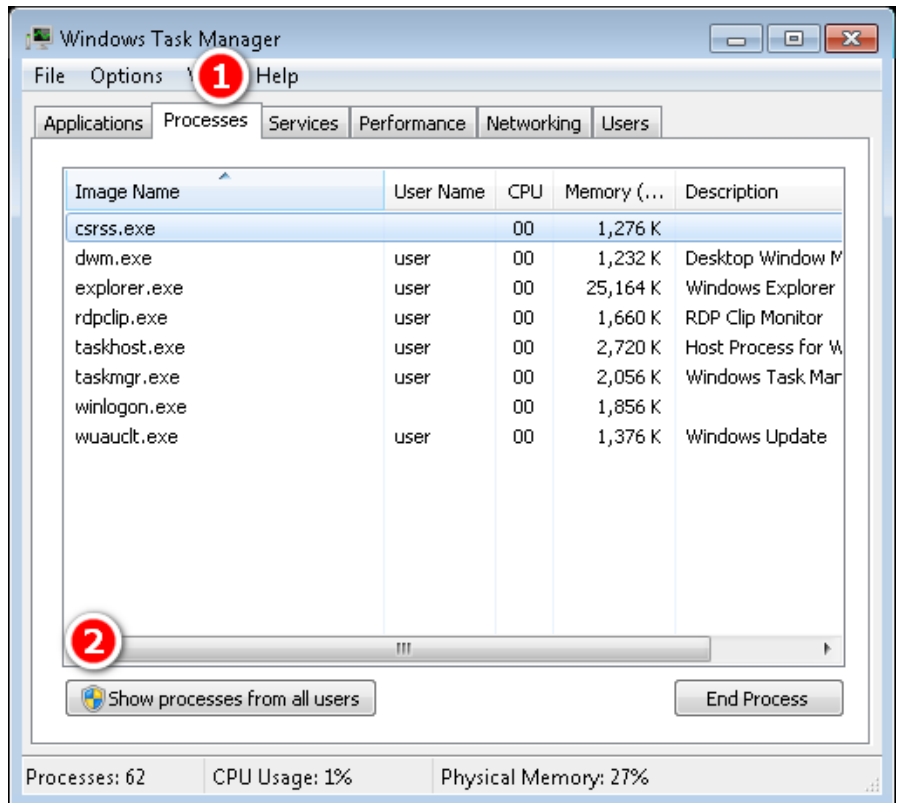
- 2 Choose “Service” tab and find “DIALink Service”.



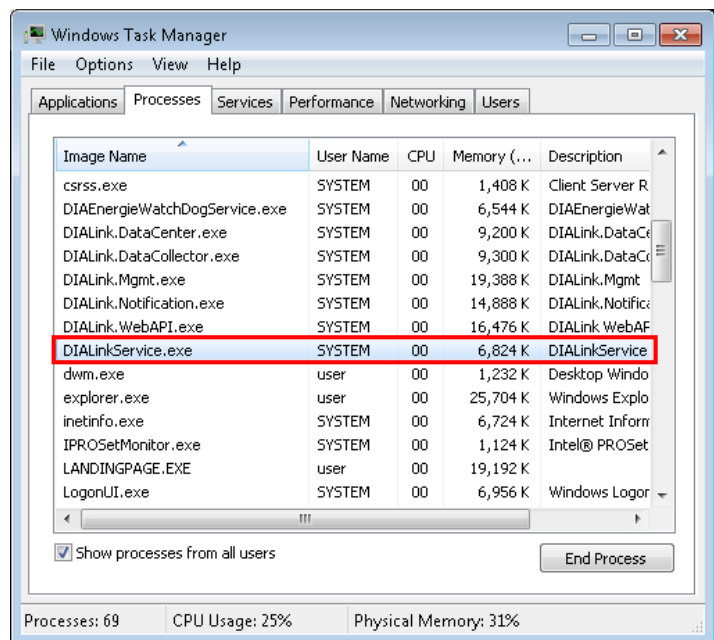
- 3 If the status shows “Stop”, click the “Service” button on the bottom right corner and select “DIALink Service” to start (See above). Check the startup type to be “Automatic”, if not, right-click the mouse and choose General > Startup type and select “Automatic” > OK to complete the setting (See below).



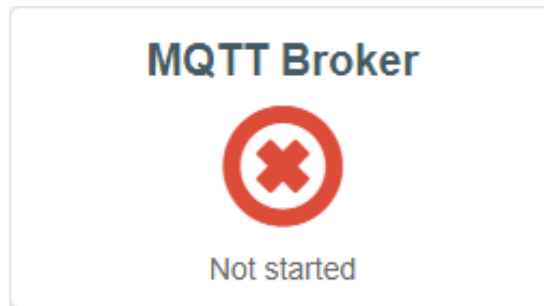
- 4 Return to Windows Task Manager, choose “Process” tab and select “Show process from all users”.



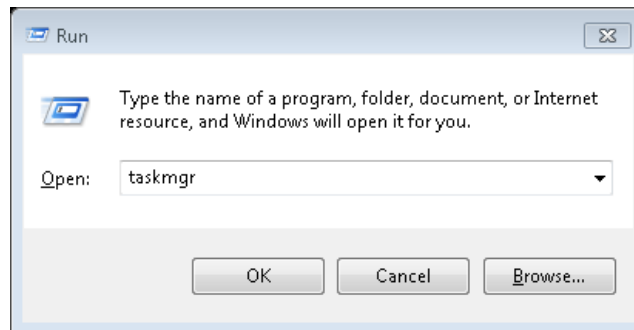
- 5 Check for “DIALinkService.exe”, if the file does not exists, restart the server.



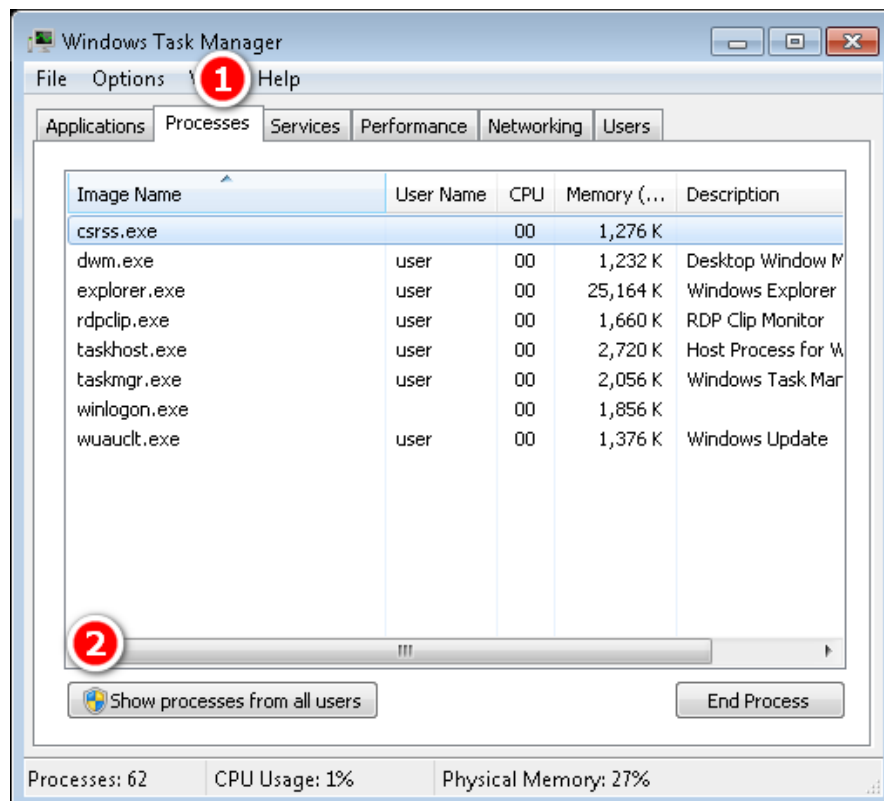
5.1.2 MQTT Not Started



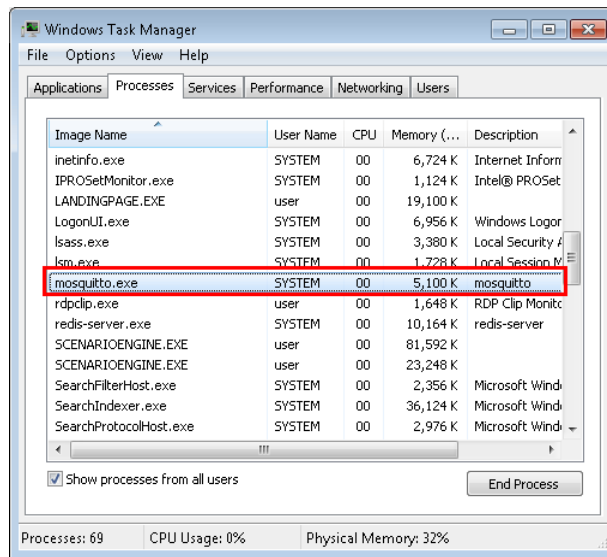
- **Process: Check if the MQTT is enabled in Windows Task Manager**
- ❶ Type windows+R or Start \ Run and "taskmgr" to enter Windows Task Manager.



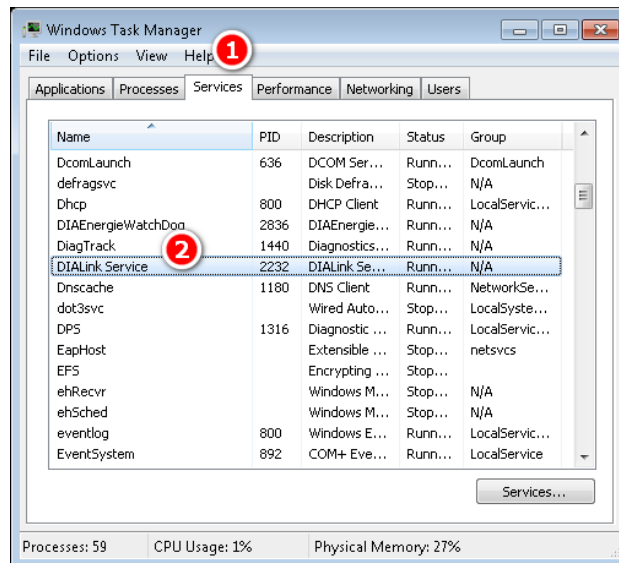
- ❷ Choose "Processes" tab and select "Show process from all users".



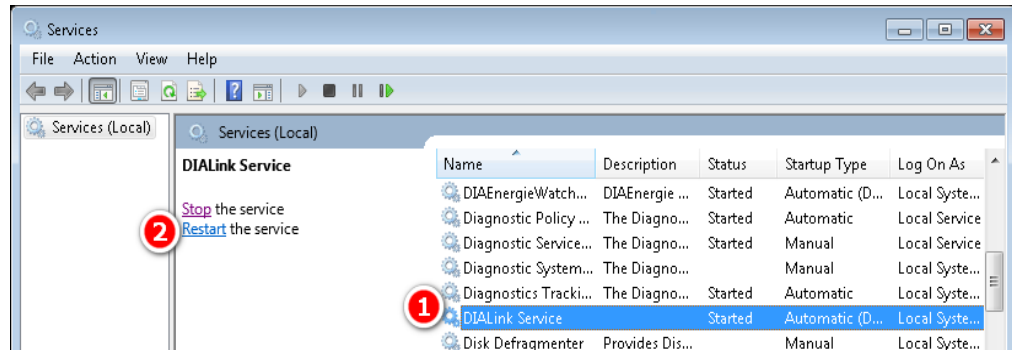
- 3 Check for “mosquito.exe”, if the file does not exists, restart the DIALink Service.



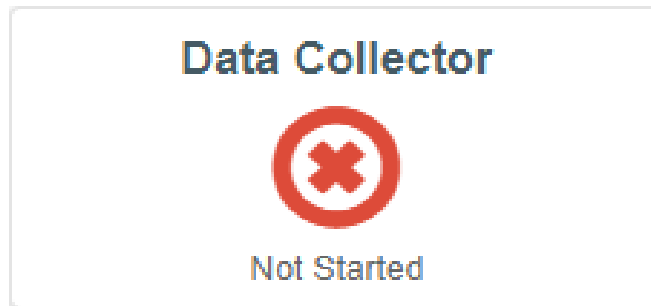
- 4 Choose “Services” tab and find “DIALink Service”.



- 5 Choose “Service” from the right corner of the window and select “DIALink Service” to restart and check for “mosquito.exe”.

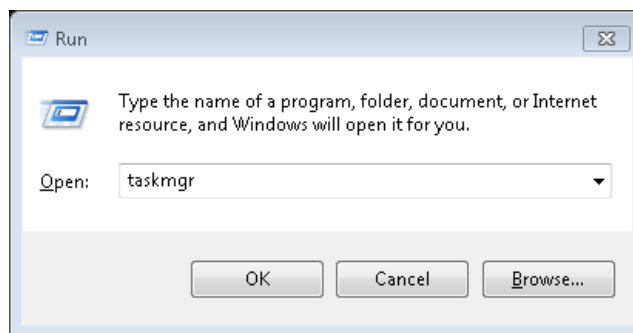


5.1.3 Data Collector Not Started

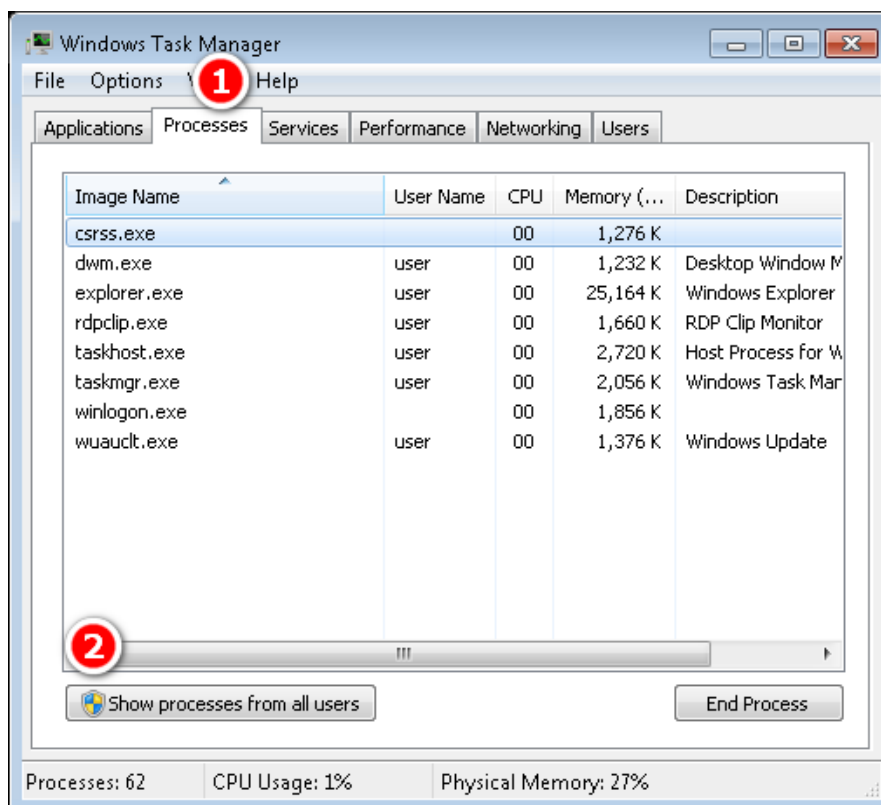


- **Process 1: Check if the Data Collector is enabled in Windows Task Manager**

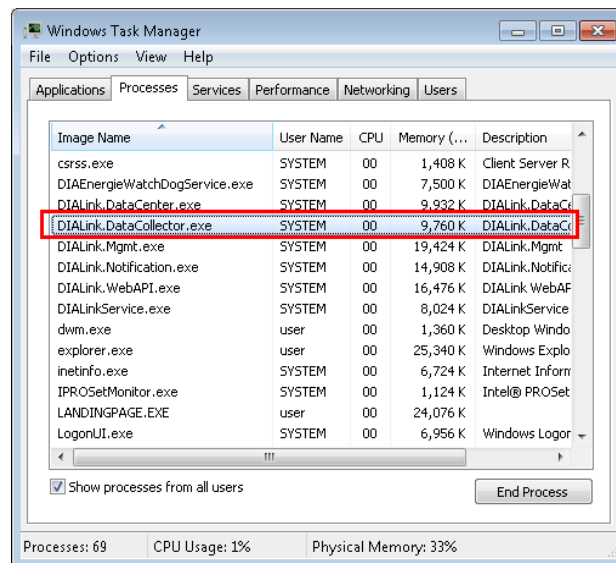
- 1 Type windows+R or Start \ Run and "taskmgr" to enter Windows Task Manager.



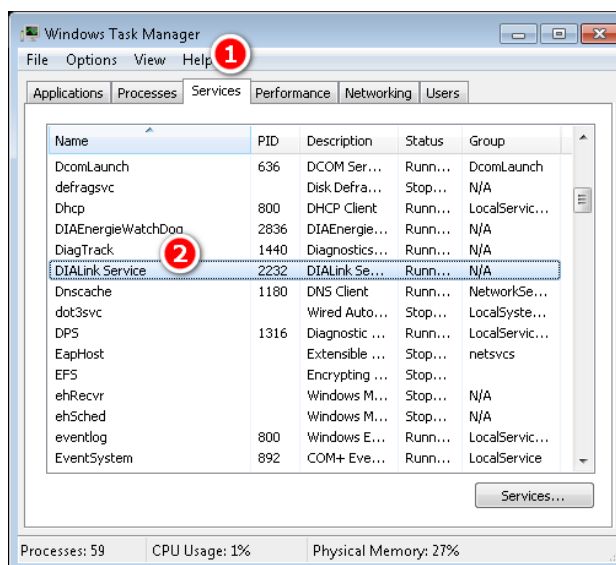
- 2 Choose "Processes" tab and select "Show processes from all users".



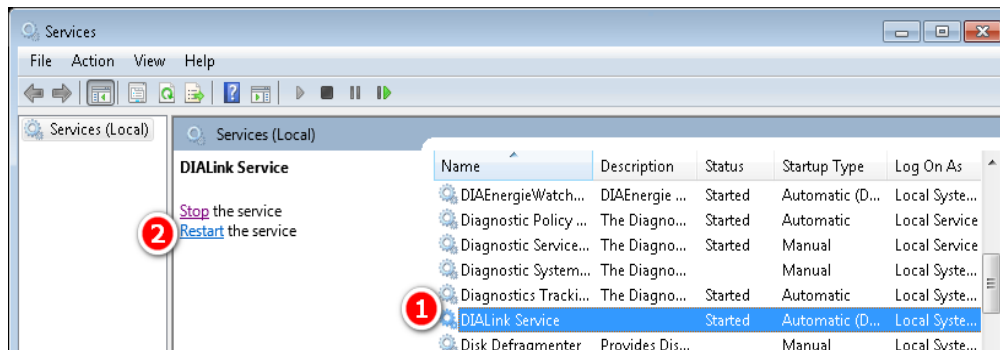
- 3 Check for "DIALink.DataCollector.exe", if the file does not exist, restart the DIALink Service.



- 4 Choose "Services" tab and find "DIALink Service".

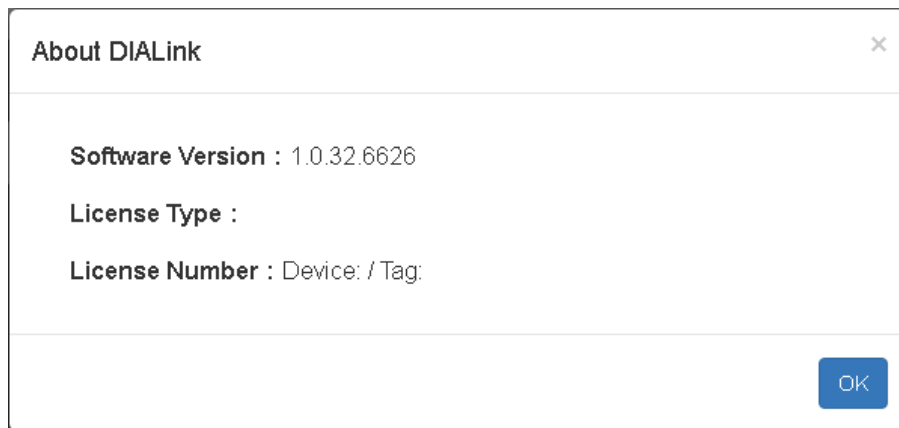


- 5 Choose "Service" from the right bottom corner of the window and select "DIALink Service" to restart and check for "DIALink.DataCollector.exe". If Data Collector status still shows Not Started, execute Process 2.



● **Process 2 : Check DIALink License**

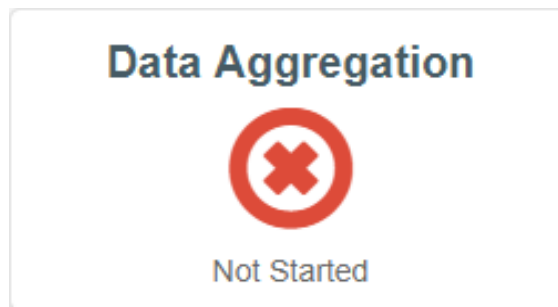
- 1 Look for 【DIALink Information】 by log in DIALink and click ? on the upper right side of the window and choose "About DIALink" for license status and display of device/tag license number.



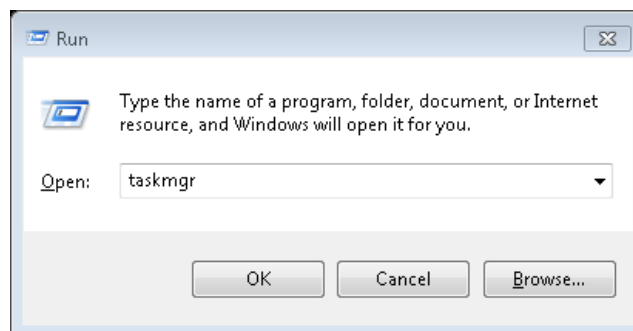
- 2 If the device/tag license number is not displayed, please check that the encrypted USB is properly connected to the server with red light ON.



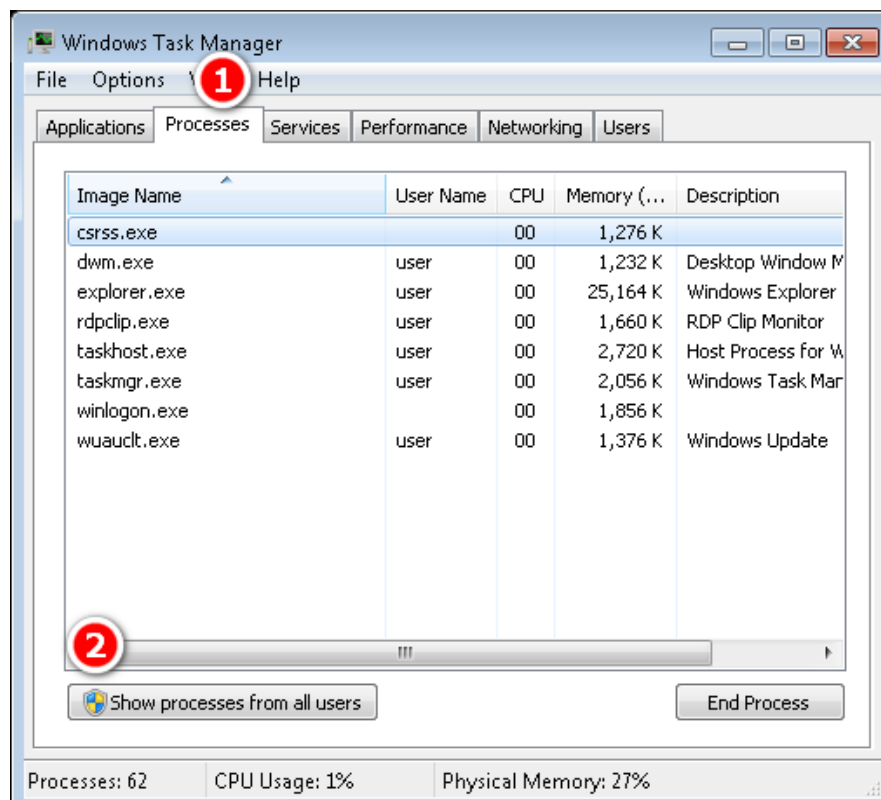
5.1.4 Data Aggregation Not Started



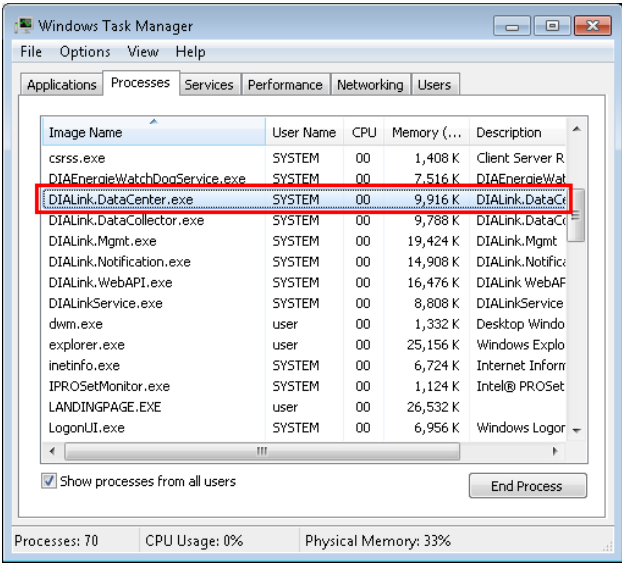
- **Process:** Check if the Data Center is enabled in Windows Task Manager
- 1 Type windows+R or Start \ Run and "taskmgr" to enter Windows Task Manager.



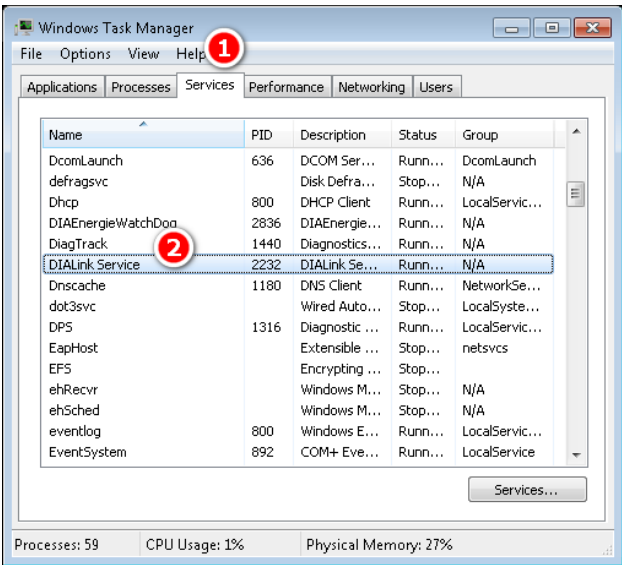
- 2 Choose "Processes" tab and select "Show processes from all users".



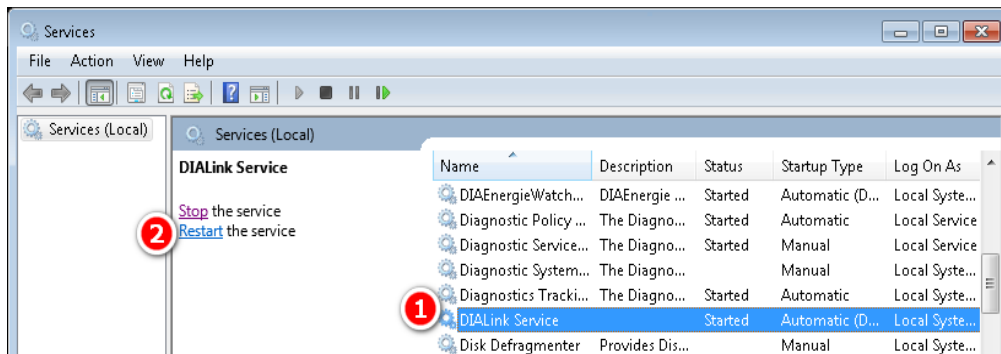
- 3 Check for “DIALink.DataCenter.exe, if the file does not exists, restart the DIALink Service.



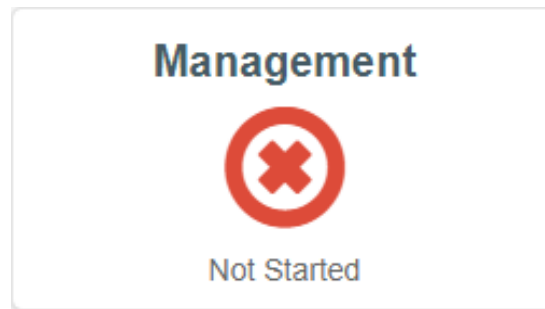
- 4 Choose “Services” tab and find “DIALink Service”.



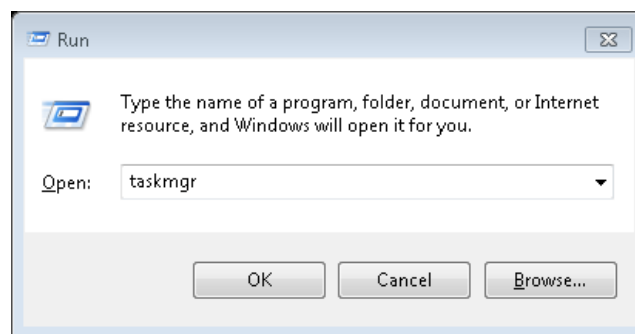
- 5 Choose “Service” from the right bottom corner of the window and select “DIALink Service” to restart and check for “DIALink.DataCollector.exe”.



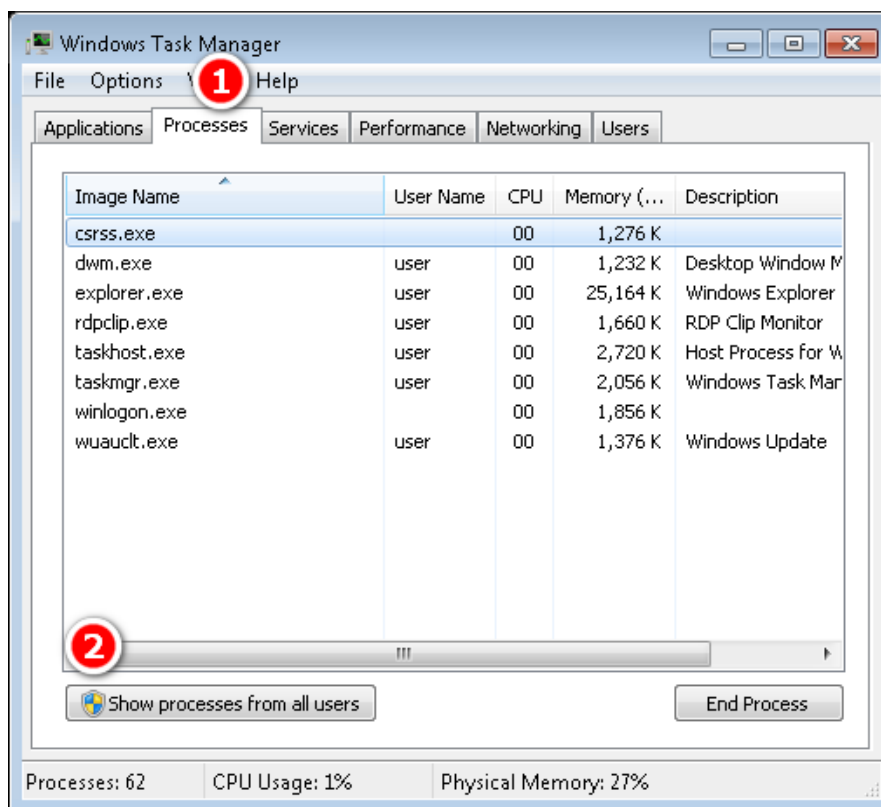
5.1.5 Management Not Started



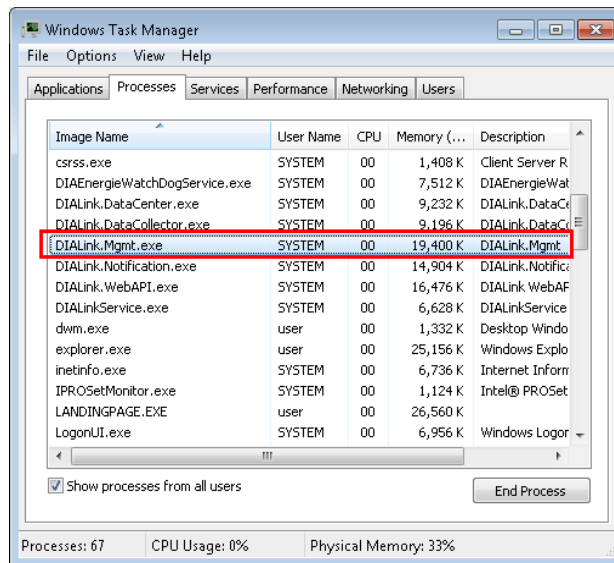
- **Process:** Check if the Data Center is enabled in Windows Task Manager
- 1 Type windows+R or Start \ Run and "taskmgr" to enter Windows Task Manager.



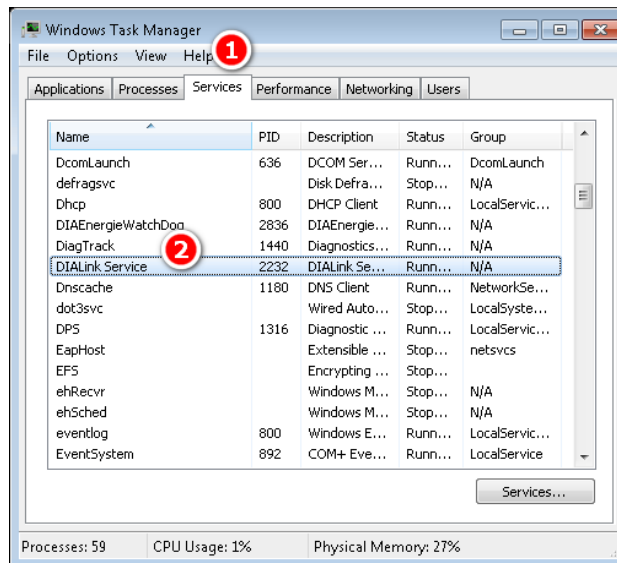
- 2 Choose "Processes" tab and select "Show processes from all users".



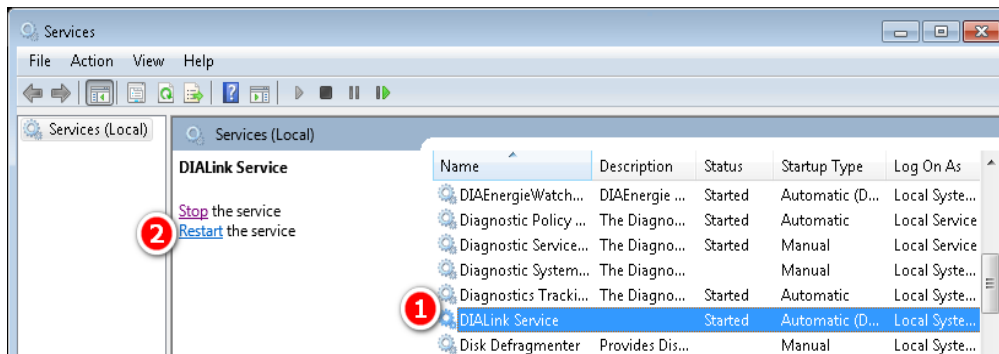
- 3 Check for “DIALink.Mgmt.exe”, if the file does not exists, restart the DIALink Service.



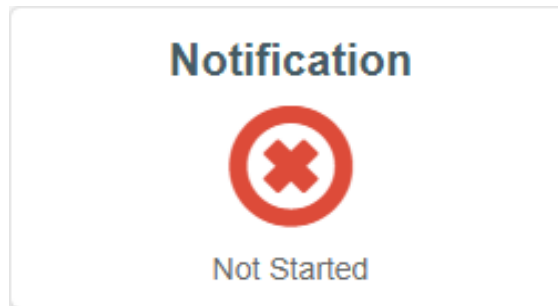
- 4 Choose “Services” tab and find “DIALink Service”.



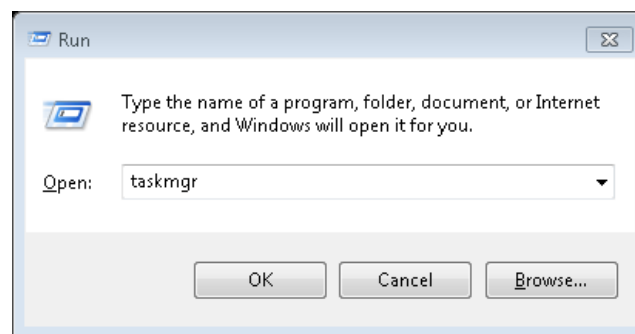
- 5 Choose “Service” from the right bottom corner of the window and select “DIALink Service” to restart and check for “DIALink.Mgmt.exe”.



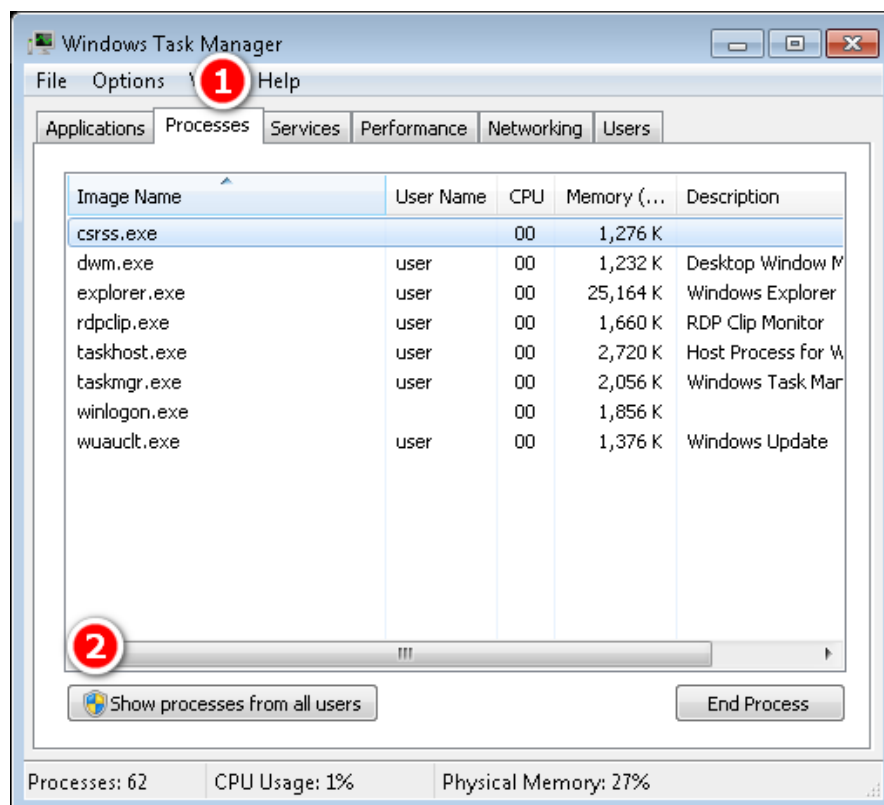
5.1.6 Notification Not Started



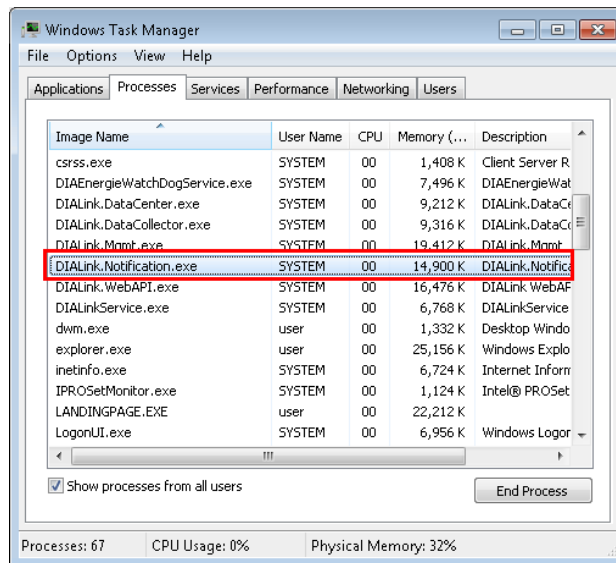
- **Process: Check if the Notification is enabled in Windows Task Manager**
- ❶ Type windows+R or Start \ Run and "taskmgr" to enter Windows Task Manager.



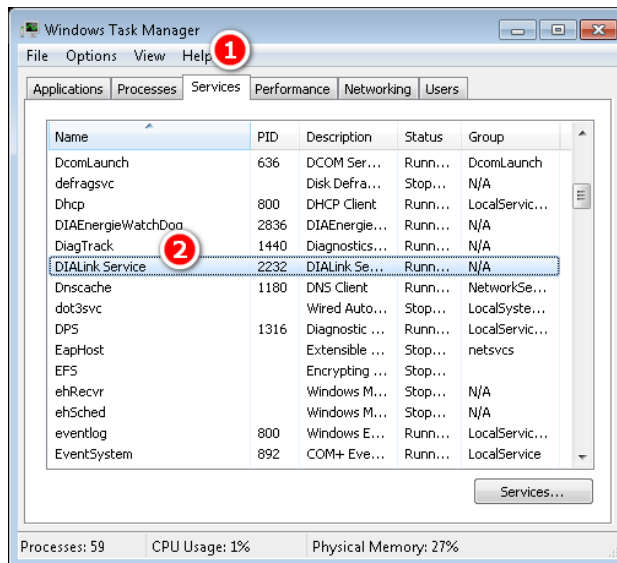
- ❷ Choose "Processes" tab and select "Show processes from all users".



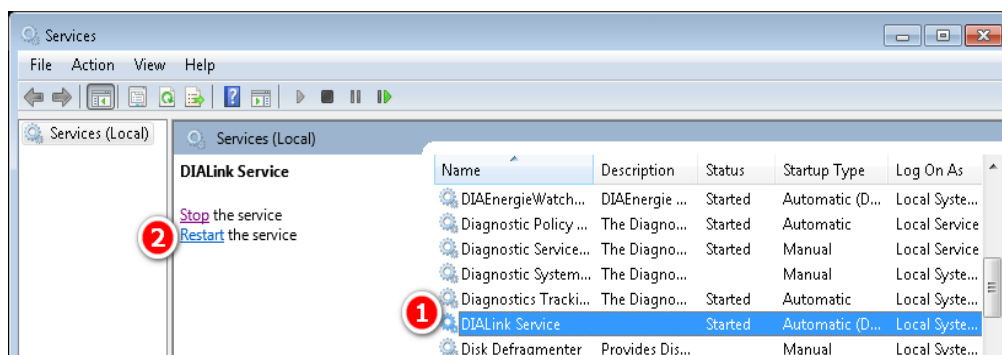
- 3 Check for “DIALink.Notification.exe”, if the file does not exists, restart the DIALink Service.



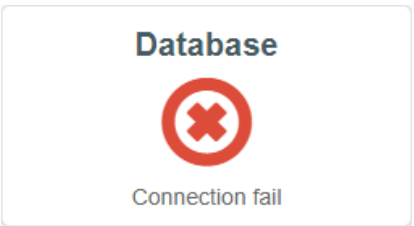
- 4 Choose “Services” tab and find “DIALink Service”.



- 5 Choose “Service” from the right bottom corner of the window and select “DIALink Service” to restart and check for “DIALink.Notification.exe”.

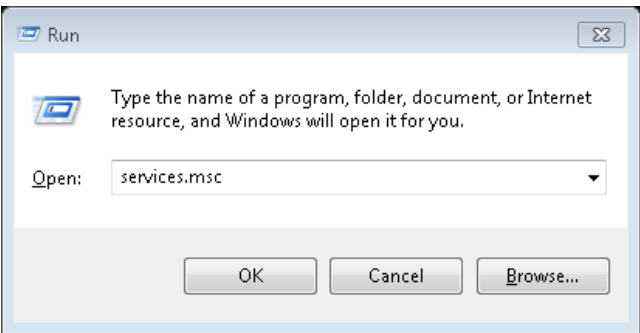


5.1.7 Database Not Started

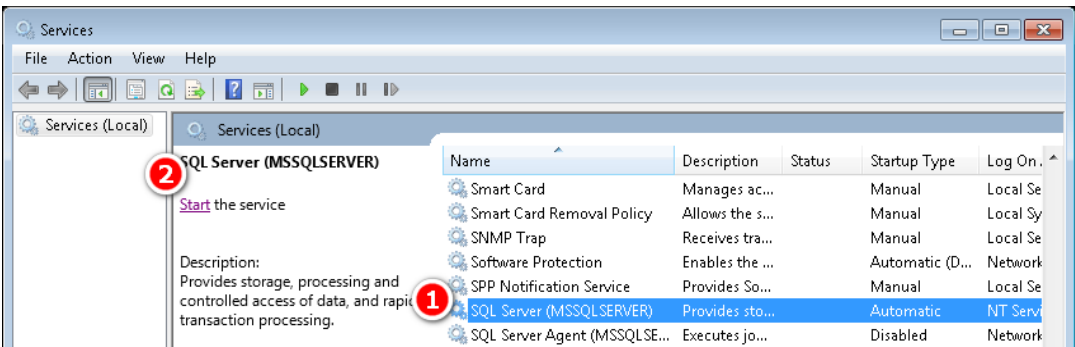


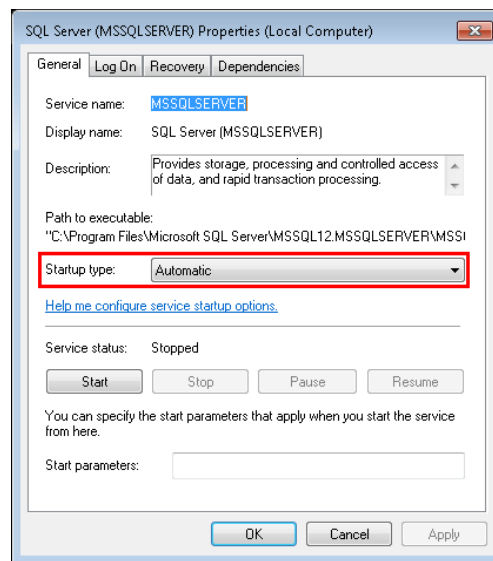
- **Process1: Check if SQL is enabled in Windows Task Manager**

❶ Type windows+R or Start \ Run and “taskmgr” to enter Windows Task Manager.



❷ Search “SQL Server (MSSQLSERVER)”, if the status shows not “enabled”, click “Start” (See above) and check the startup type to be “Automatic”. If not, right-click the mouse and choose General > Startup type and select “Automatic” > OK to complete the setting (See below).





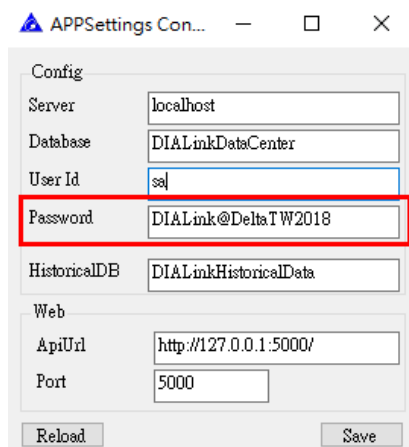
- **Process 2 : Check if the hard drive has enough memory for SQL data storage**



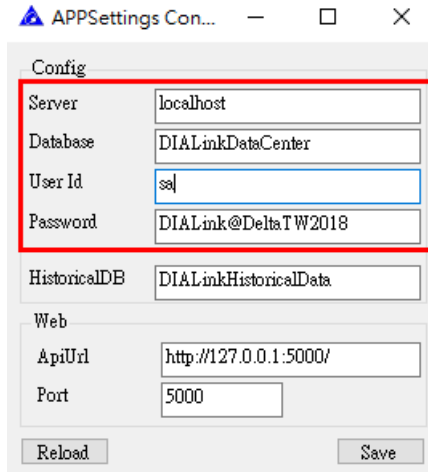
5.1.8 Database Errors

The followings are common causes of database errors:

1. Insufficient disk space. At least 1G would be required for the hard disk space so as to ensure normal operation of the database.
2. SA account password has been changed. Change the password back to its default created for the SA account after DIALink being installed on a new IPC, then the database connection would be able to operate normally. In case that the password cannot be reset due to exceptional circumstances, you would need to input the password of 'sa' user to the password field in DIALink parameter setting via APPSetting. Taking such action is to notify that the connection parameter of DIALink database has been changed which would not have a direct or indirect impact on the SA password.

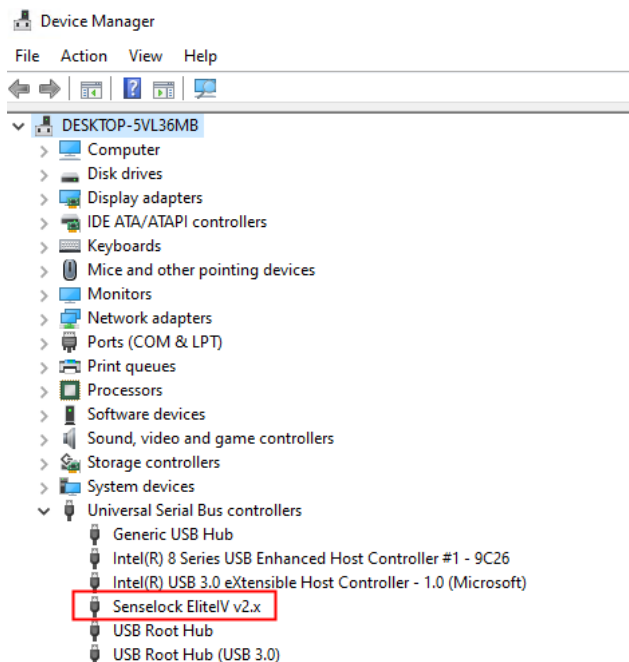


3. A duplicate SQL database with the same name (DIALinkDataCenter) would be created if you uninstall and reinstall SQL server. Enter the database to change its name or simply delete it.
4. In case that customers use their own SQL server, DIALink parameter setting needs to be configured via APPSetting including the settings of server location, database account and password.



5.1.9 Can't Find Hardware Key (Only Trial Version Can Be Used)

1. This situation happens mostly because the USB port is not working. Please Try another USB devices such as a mouse or keyboard to see whether it is the USB port issue. If yes, just use another USB port.
2. The hardware license key may be damaged during conveyance process. Therefore, data in the hardware key can't be read though the device named Senselock can still be seen in Device Manager. Please contact our distributors and we will assist you with your exchange as soon as possible



5.1.10 CNC Machine Connection Error

1. The most frequent problem is that customers do not activate direct numerical control of CNC machines (DNC license). The way to activate DNC license may differ from CNC manufacturers. Take Heidenhain for example, option 18 needs to be activated and you would need to set a password for the connection of your Heidenhain 640. For FANUS, DNC license needs to be activated after purchasing and installing FOCAS module.
2. Network setting error is also a common cause of failed connection. Please refer to this user manual and the requirements of the IT department in your company. Then use PING and Telnet to get device IP and Port accordingly. (Port may differ between different brands of CNC machines.)

MEMO



Appendix A Modbus Slave Features

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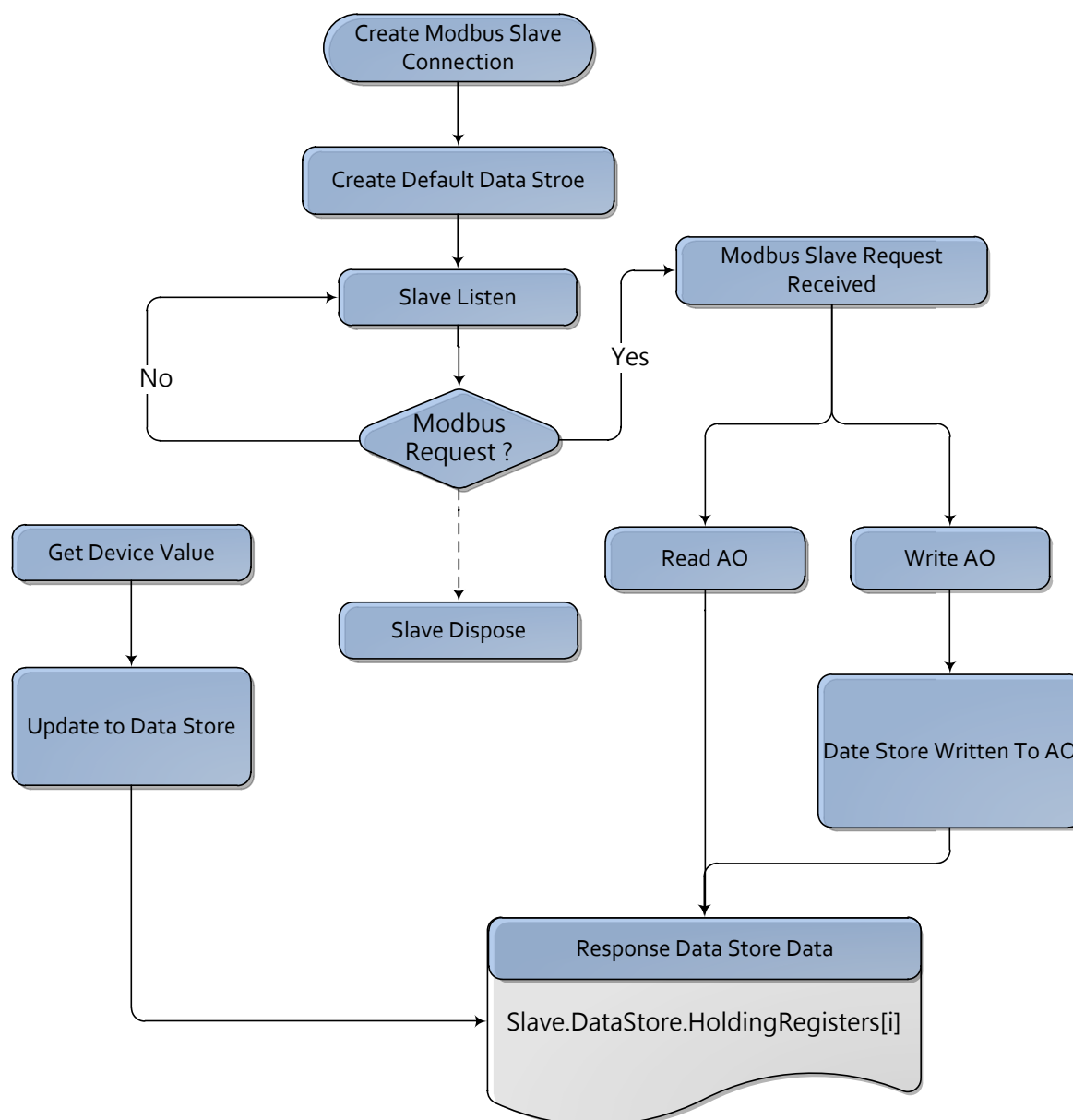
A.1 Overview 2

A.2 Specification..... 3

A.1 Overview

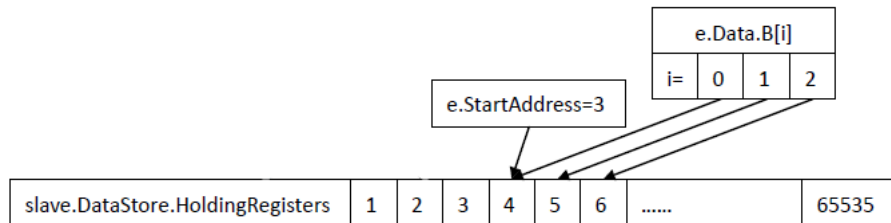
Modbus is a request-response protocol implemented using a master-slave relationship. In a master-slave relationship, communication always occurs in pairs. One device must initiate a request and then wait for a response, while the initiating device (the master) is responsible for initiating every interaction. Typically, the master is a human machine interface (HMI) or Supervisory Control and Data Acquisition (SCADA) system and the slave is a sensor, programmable logic controller (PLC), or programmable automation controller (PAC).

DIALink Modbus Slave is an application layer messaging protocol for communication between TCP/IP over Ethernet and AO (Holding Register), providing device data from system to a third-party platforms. Function of writing data into register is not available now.



A.2 Specification

DIALink Modbus Slave can input valid sizes of device data between 1 and 65,536 with a holding register array. The max number of registers that can be read in a single query is 127.



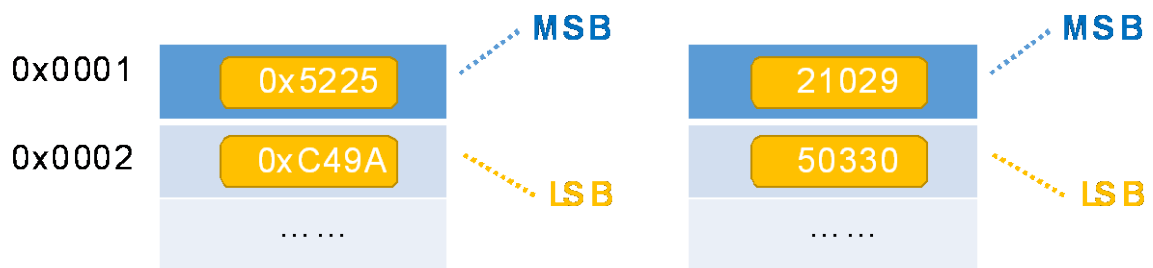
Data Type: Only support numeric values and ASCII strings.

Numeric Values: Always be stored with float data type, using Little-endian format. (Occupying two arrays of register.)

Strings: Only support ASCII characters ranging from X20 to X7F, stored in little-endian format.

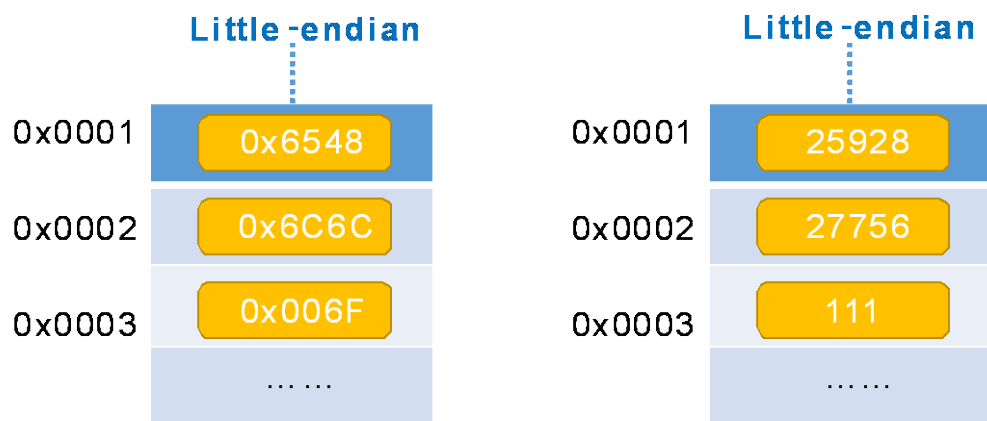
Take the floating point number-1234.567 for example, :

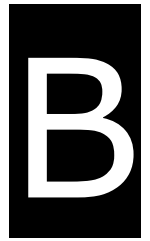
1. Convert to hexadecimal format. (Add a leading zero for numbers less than 8 digits) The string would be shown as "C49A5225".
2. Convert to Uint16 value type with Little-endian format to store in registers.
3. Floating point numbers accessed from registers may contain errors because decimal places cannot be presented accurately.



Take the string “Hello” for example:

1. Convert to hexadecimal format. (add zero for numbers with digits less than multiples of 4) The string would be shown as “48656C6C6F00”.
2. Convert to Uint16 type in Little-endian format for a single array according to the source type and store in the register.





Appendix B IFTTT Line and WeChat Official Accounts Setup

Table of Contents

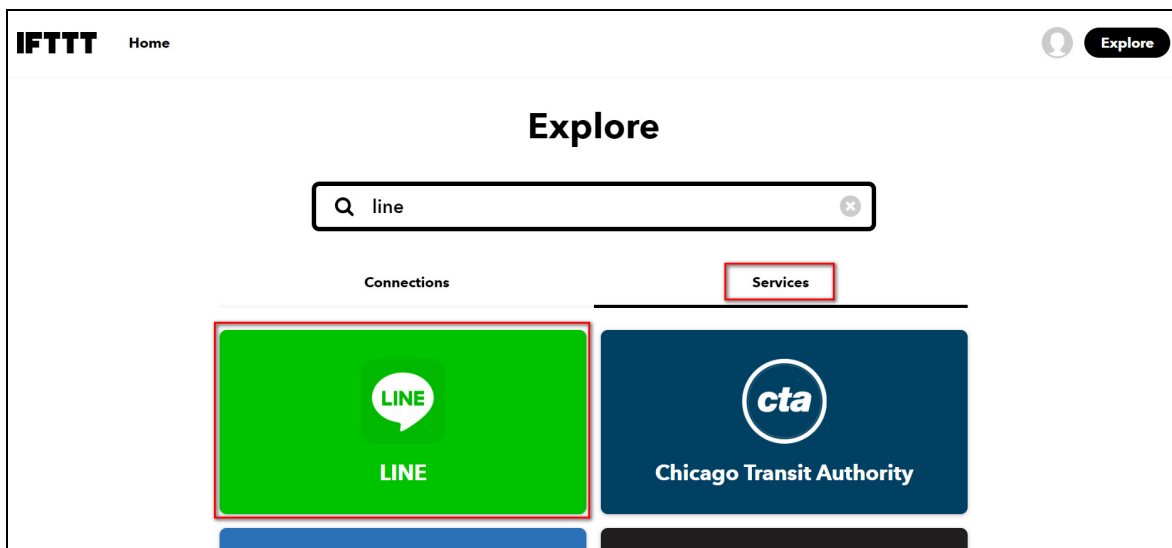
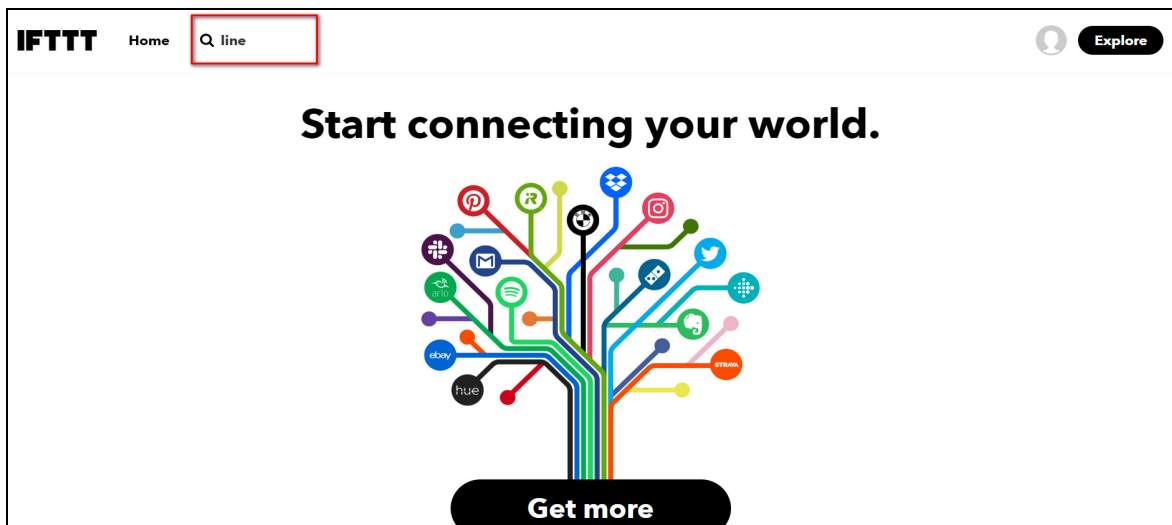
B.1 IFTTT Line Setup	B-2
B.2 WeChat Official Account Setup	B-10

B.1 IFTTT Line Setup

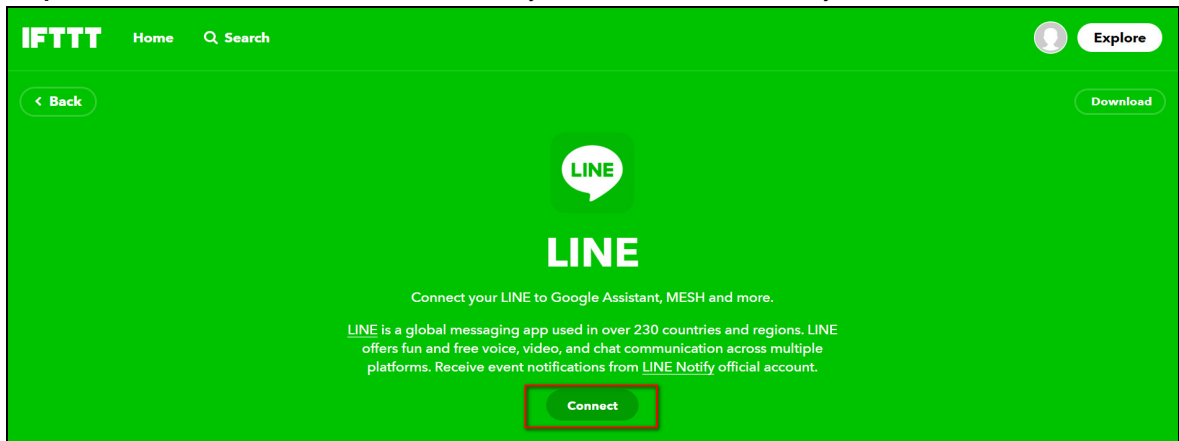
IFTTT is a freeware web-based service, also known as “If This Then That”, which reflects that IFTTT gets all your apps and devices talking to each other.

Follow the setup procedure to receive event notifications from LINE Notify with IFTTT:

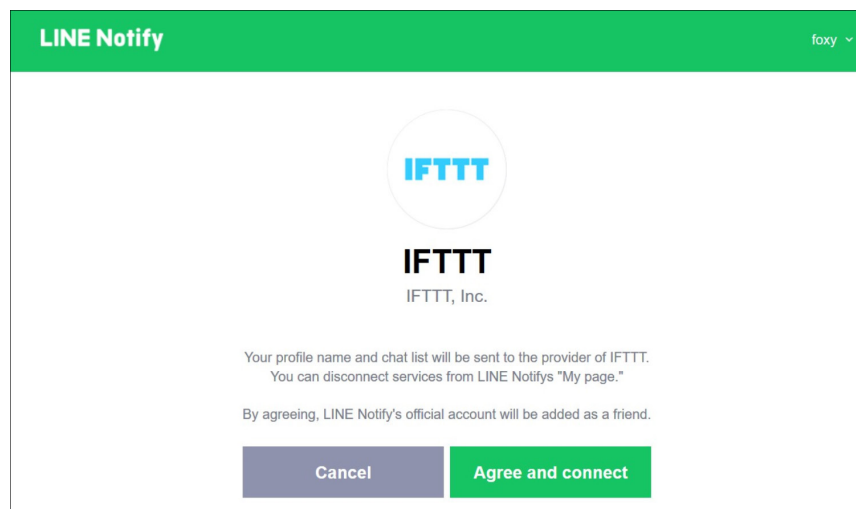
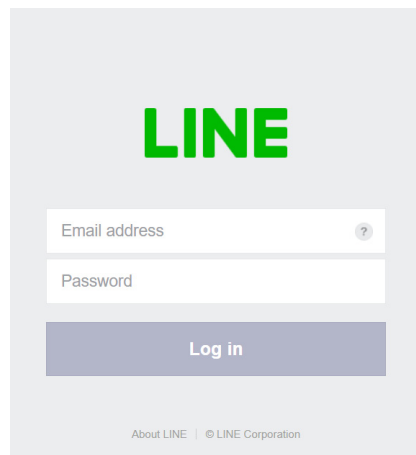
Step 1: Click on the link (<https://ifttt.com>) to enter IFTTT official website. Select “Sign Up” to create a new account and sign in. Search for “LINE”, then clicking “LINE” in “Services”.



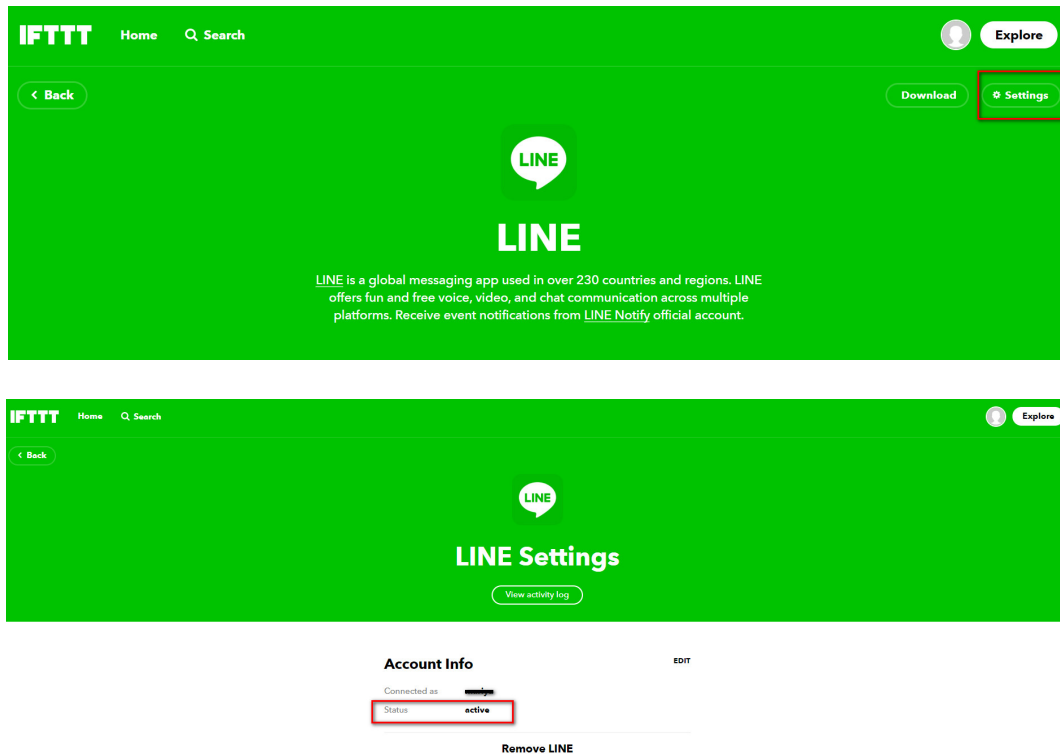
Step 2: Click on the “Connect” button to connect your service with LINE Notify service.




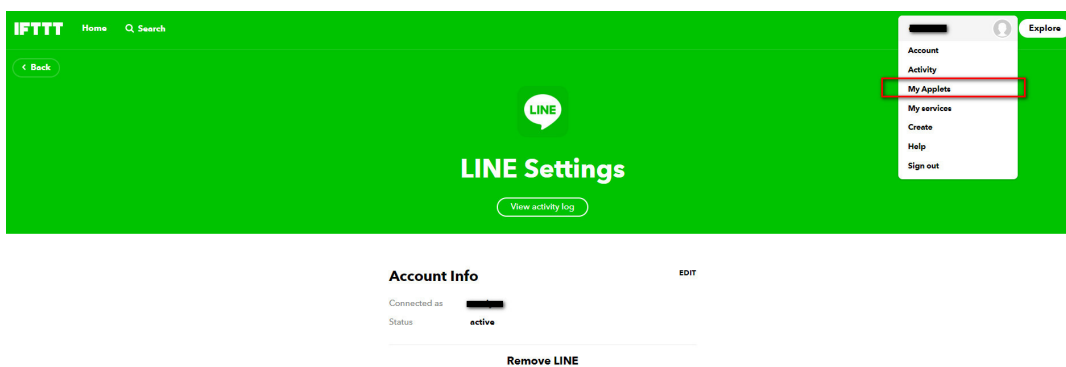
Step 3: Click to display the login screen. By logging in your own LINE account and then clicking “Agree and connect”, “LINE Notify” is added as your friend at the same time **and** will send you web service notifications in the future.

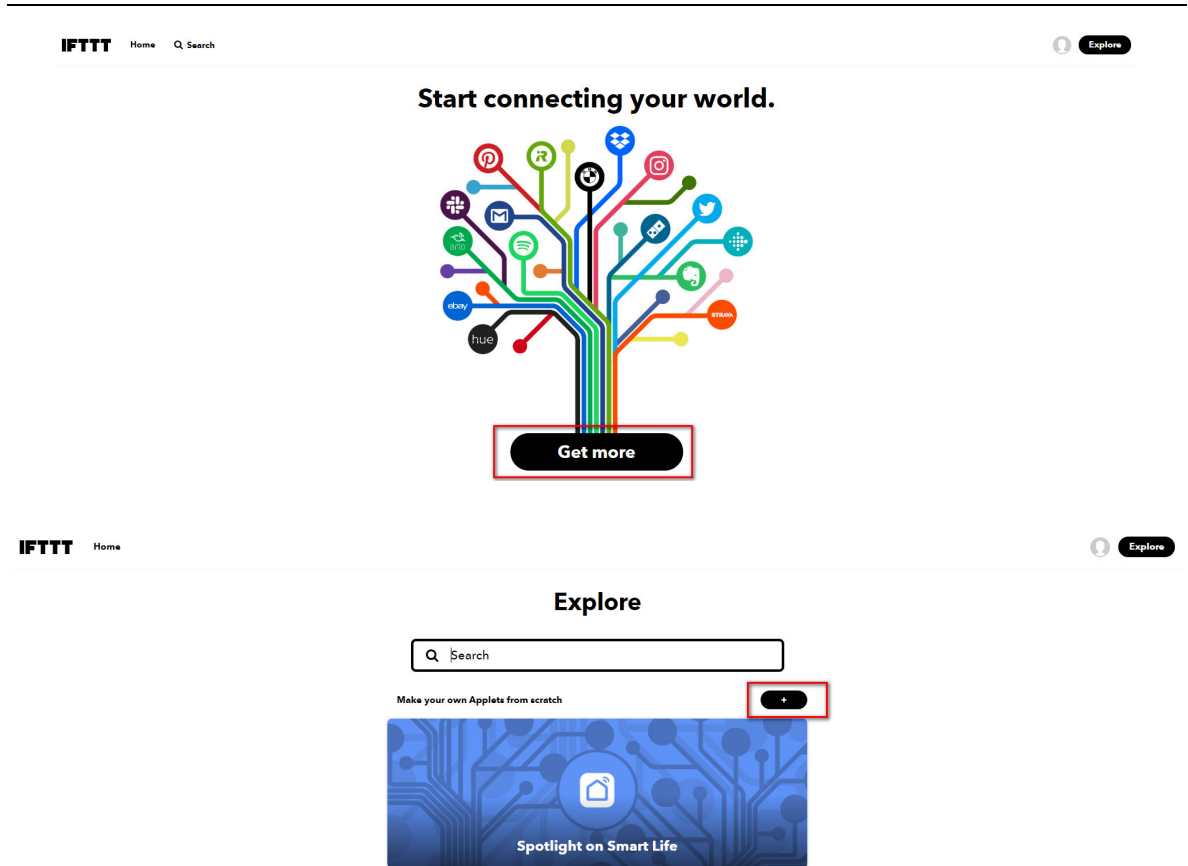


Step 4: Once the connection completes, the screen will automatically return to IFTTT page. Click “Settings” on the upper right of the screen to make sure the status shows “Active”, indicating the activation is completed successfully. When in doubt, you can click “Remove LINE” to disconnect at any time.



Step 5: After connected to LINE Notify, click the profile photo on the upper right and select “My Applets” , then “Get More”. Finally click on  to create a new Applet.

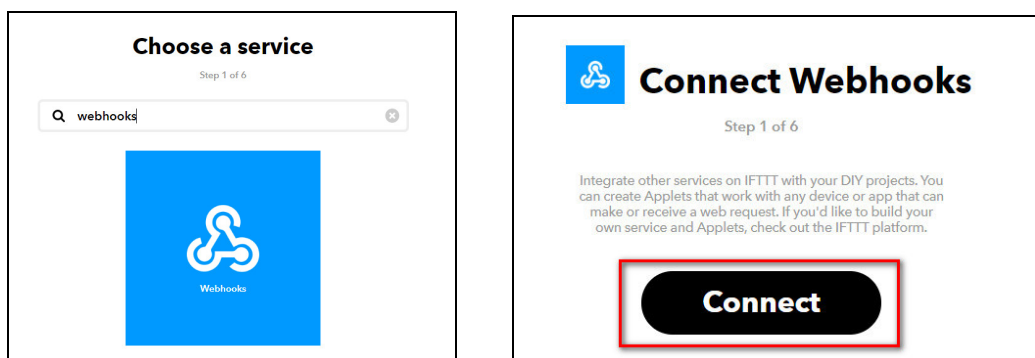




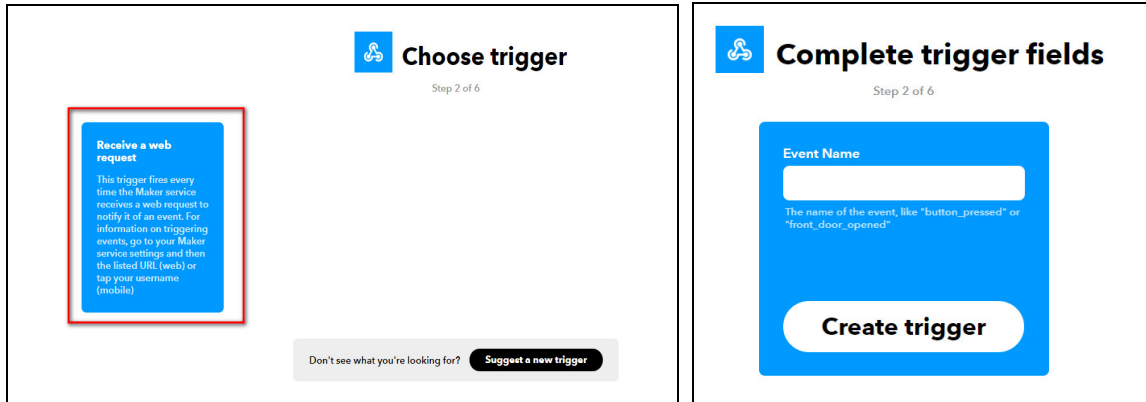
Step 6: A paragraph “If + This Then That” is displayed. Click “+ This” circled in red as below shows.



Step 7: Click to search for desired services. Enter “Webhook” into the search field, then click on the Webhook icon and click “Connect”.



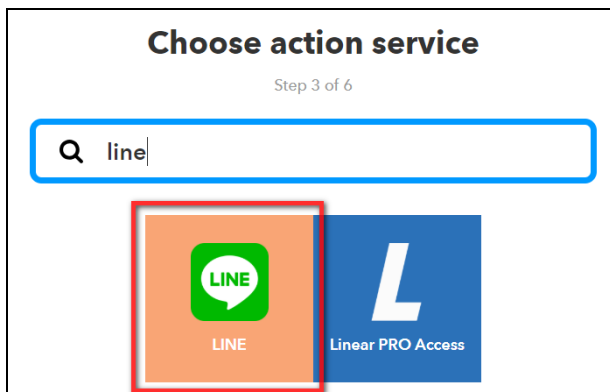
Step 8: Continue to click “Receive a web request”. An event name would be required to enter the field, then click “Create trigger”. The screen would return to the previous page.



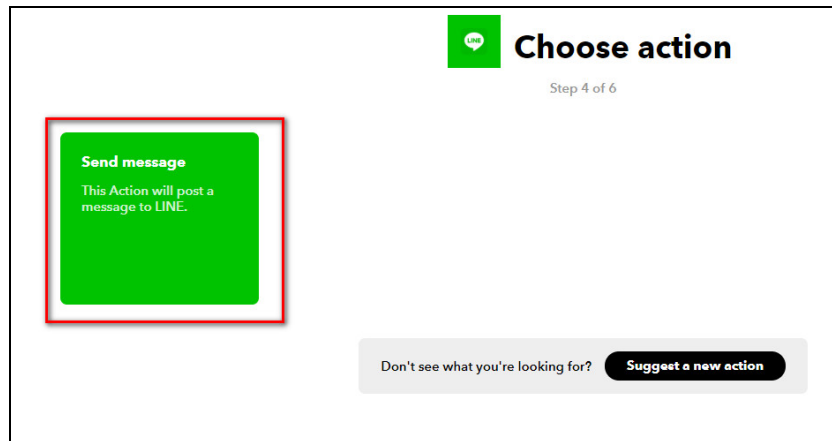
Step 9: Click “+ That” on the previous page.



Step 10: Enter “LINE” into the search field. Then select the LINE icon to add the service.



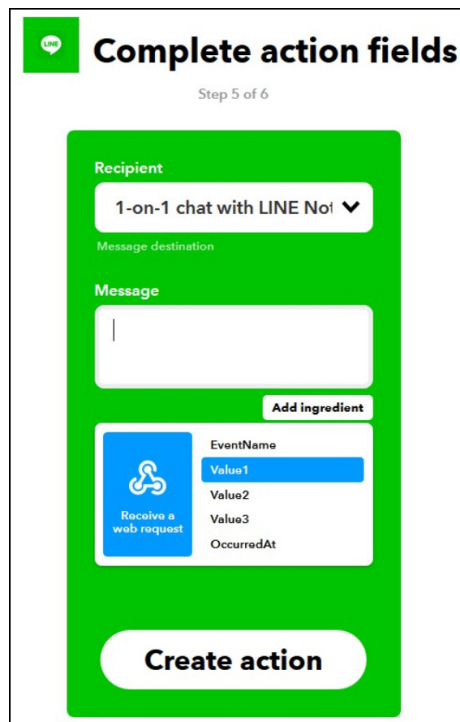
Step 11: Choose “Send message” action.



Step 11-1: Enter the setting page of sending messages.

Step 11-2: Choose Recipient from the drop-down list, which also includes groups in the list. Messages can be sent to the designated LINE group as well. The default setting is “1-on-1 chat with Line Notification”.

Step 11-3: Leave Message field blank and click “Add ingredient”, then choose “Value 1”.



B

Step 11-4: Click “Create action” to proceed.

Complete action fields
Step 5 of 6

Recipient
1-on-1 chat with LINE No ▼
Message destination

Message
{{Value1}}
Add ingredient

Photo URL
Add ingredient

Create action

Step 11-5: Enter “Review and finish” page and click “Finish” to complete the setting.

Review and finish
Step 6 of 6

If Maker Event "line", then Send message
by [progress bar] 40/140

Receive notifications when this Applet runs ☒

Finish

Connected

Step 12: Click the Profile picture on the upper right of the screen and choose “My Services”. Then choose “Webhook” on next page.

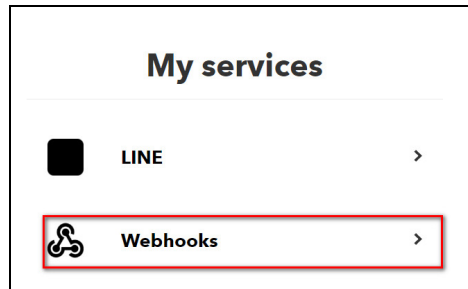
IFTTT Home Search

Back

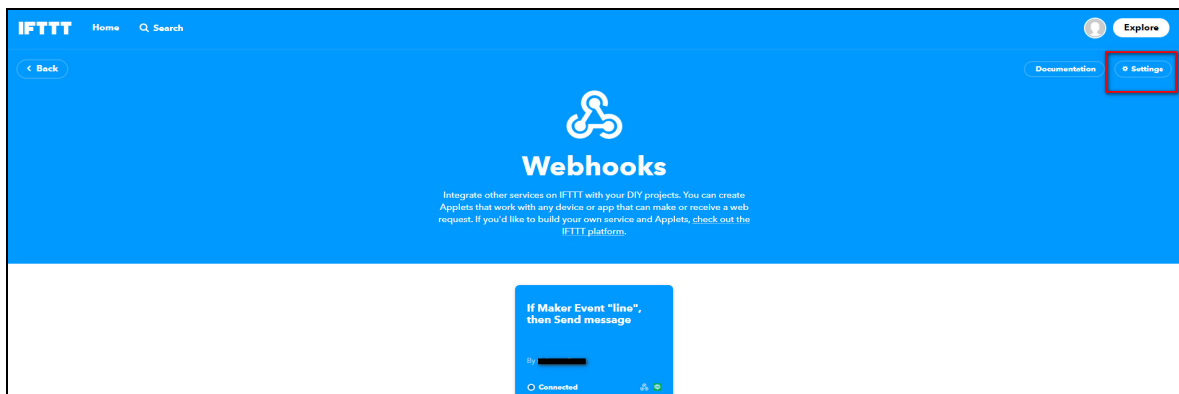
If Maker Event "line", then Send message
By deltatestline

Connected

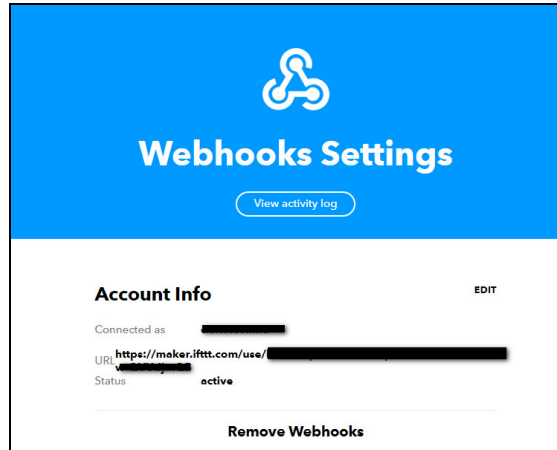
deltate... Explore
Account
Activity
My Applets
My services
Create
Help
Sign out




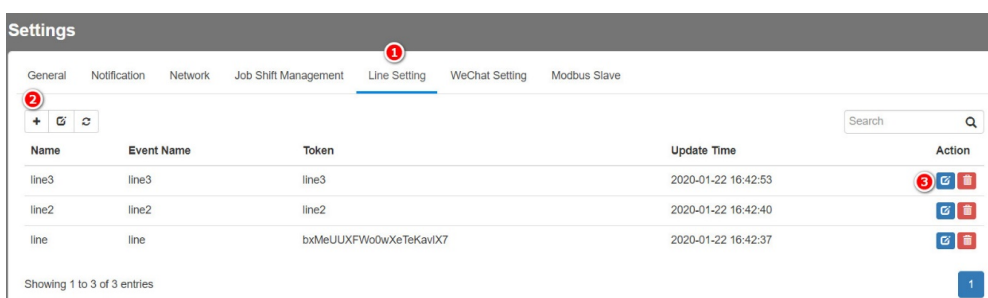
Step 13: Entering Webhook, click “Setting” on the upper right. Unreadable characters behind the URL are the key. (Please make sure the key is not leaked to others)



Note: A new key would be generated by clicking “Edit connection”, which would need resynchronization with the system.



Step 14: Open DIALink webpage, then choose “Line Setting” from “Settings” on the left-side menu bar. Click on  icon on the upper left of the Line Setting page.



Step 15: By following the above procedure and entering the event name and Webhooks Token, Line setting can be completed.

Event name : Must be same as the one applied for IFTTT.

Token : Key for IFTTT Webhooks, which would need to update once the key has been replaced.

Edit Line Setting

Line Setting (IFTTT)

Name*

line

Event Name*

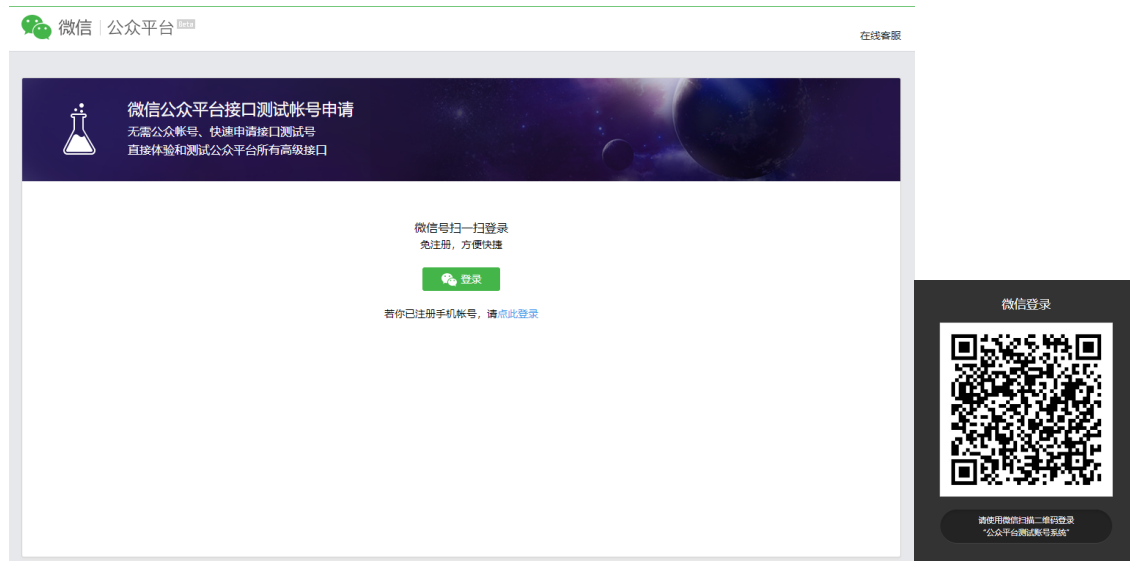
line

Token*

Save changes

B.2 WeChat Official Account Setup

Step 1: Access the [user registration page](#) and click the login button to process QR codes.



Step 2: After logging in, the screen is displayed as below. With limited page lengths, information below the menu of experience interface is removed, while the main focus is on the fields with red borders.

Step 3: As shown above, the first red border includes information of testing signals, which appID and appsecret are generated automatically and required to the input columns of WeChat information on DIALink webpage.

Step 4: The second red border circles templates information. A new module is required by clicking on **新增测试模板** and input the following information. The content needs to be same as below shown, or WeChat messages may not able to be sent successfully.

Module Name : DIALink-通知

Content :

通知類型: {{type.DATA}}

訊息內容: {{message.DATA}}

新增测试模板

请注意：

- 1、测试模板的模板ID仅用于测试，不能用来给正式帐号发送模板消息
- 2、为方便测试，测试模板可任意指定内容，但实际上正式帐号的模板消息，只能从模板库中获得
- 3、需为正式帐号申请新增符合要求的模板，需使用正式号登录公众平台，按指引申请
- 4、模板内容可设置参数(模板标题不可)，供接口调用时使用，参数需以{{开头，以DATA}}结尾

模板标题

DIALink-通知


模板内容

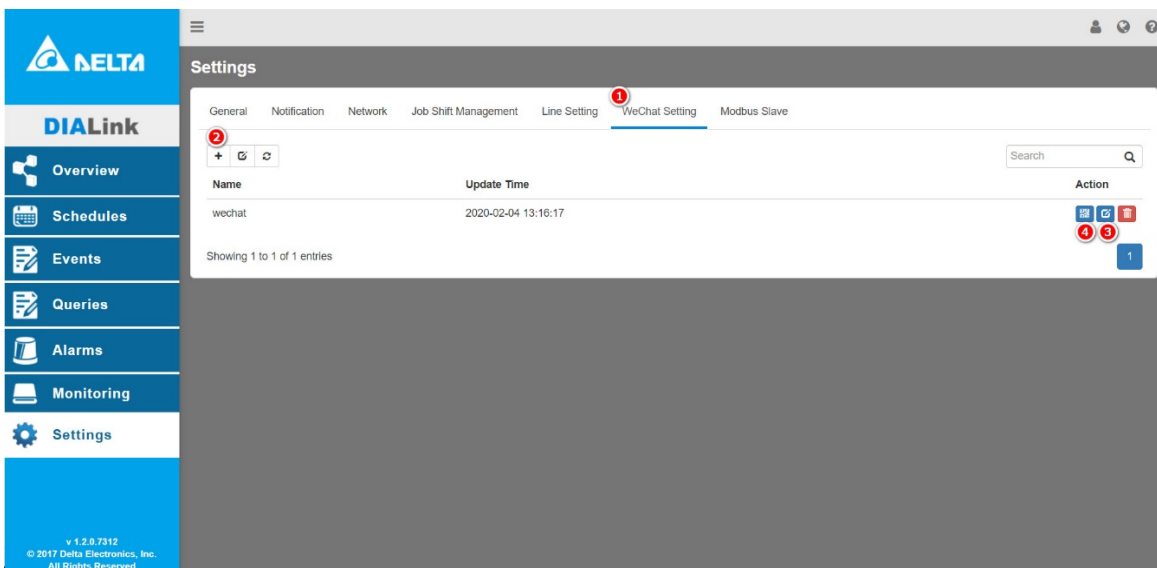
通知类型: {{type.DATA}}
消息内容: {{message.DATA}}

提交 取消

Step 5: After created, a record is shown on the table. The template ID circled by a red box is required to be added in the WeChat setting column on DIALink webpage.

模板消息接口				
新增测试模板 最多10个，接受模板消息需要关注测试号				
序号	模板ID(用于接口调用)	模板标题	模板内容	操作
1	4cYe[REDACTED]nxcqc kEk_3Q8o Zcr9sWs4l	DIALink-通知	通知类型: {{ type.DATA}} 消息内容: {{ message.DATA}}	删除




Step 6: Open DIALink webpage > Choose “Settings” from the menu > ❶ “WeChat Setting”: Display the setting records. ❷ Click the cross icon  on the upper-left of the screen.



Settings

General Notification Network Job Shift Management Line Setting **WeChat Setting** Modbus Slave

Search

Name	Update Time	Action
wechat	2020-02-04 13:16:17	  

Showing 1 to 1 of 1 entries

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Step 7: Fill in the required information with Appid/ Secret in step 3 and Template ID in step 5. Click “Save Changes” after finished editing.

Edit WeChat Setting

WeChat Setting

Name*

wechat

AppID*

Secret*

Template ID*

Save changes



Appendix C Importing and Exporting Device Tags

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C.2 Exporting Tags C-2

C.3 Importing Tags C-3


C.1 Overview

























This feature is to allow users to export all device tags data in the recognized Excel format for the purpose of modifying or adding tags data of target devices, then import the revised file back to the system.

Exporting Tags: Export data of all device tags as an Excel file and the template is approved by the system.

Importing Tags: The file revision must be the approved template. Or the system would prompts error message for validation failed to notify users to upload it again after corrected.

C.2 Exporting Tags

To export data: ❶ Choose the target device from the drop-down list. ❷ Click  to proceed on exporting.
Up to ten thousands of records can be exported for one single device.


Dashboard	Tags	Triggers	Tools Management	Maintenance	Programs	Parameters	Hisotry Alarm
Device :	DELTA-300						Search 
TypeGroup :	Axis	information					
Status	Name	Value	Unit	Type	Comment	Update Time	Action
	Abs_X	0		position		2020-02-04 15:07:53	 
	Abs_Y	0		position		2020-02-04 15:07:53	 
	Abs_Z	0		position		2020-02-04 15:07:53	 
	ActFeed	0		feed_spindle		2020-02-04 16:10:10	 
	ActSpindle	0		feed_spindle		2020-02-04 16:10:10	 
	AxisTemp_X	32	°C	servo_temperature		2020-02-04 16:20:58	 

Four worksheets included in the exported Excel file:













- ❶ Tag List : Data of tags.
- ❷ Type : Reference of types. Types of tags differ from devices(CNC · PLC · Modbus...) and models.
- ❸ Register Type : Reference of logical registers. Register types differ from devices(CNC, PLC, Modbus...) and models.
- ❹ Data Type : Reference of data types. Data types would be shown as STRING or others like INT and FLOAT.

Validation	Device	Type	Device Brand	Device Model	Tag Name	Tag Type	Register	Type Name	Logical Register	Data Type	Decimal Places	Scale	Offset	Writable	Record	Is Real Time	Cloud	Transmission	First Number	Increment Number	Formula	Unit	Comment	Output
3	PLC	Delta	Delta DVP TCP/IP	1001	PLC	D_Register(D0 - D11999)	D01	UINT		0	1	0	TRUE	FALSE	TRUE	None								
4	PLC	Delta	Delta DVP TCP/IP	1002	PLC	D_Register(D0 - D11999)	D02	UINT		0	1	0	TRUE	FALSE	TRUE	None								
5	PLC	Delta	Delta DVP TCP/IP	1003	PLC	D_Register(D0 - D11999)	D03	UINT		0	1	0	TRUE	FALSE	TRUE	None								
6	PLC	Delta	Delta DVP TCP/IP	1004	PLC	D_Register(D0 - D11999)	D04	UINT		0	1	0	TRUE	FALSE	TRUE	None								
7	PLC	Delta	Delta DVP TCP/IP	1005	PLC	D_Register(D0 - D11999)	D05	UINT		0	1	0	TRUE	FALSE	TRUE	None								
8	PLC	Delta	Delta DVP TCP/IP	1006	PLC	D_Register(D0 - D11999)	D06	UINT		0	1	0	TRUE	FALSE	TRUE	None								
9	PLC	Delta	Delta DVP TCP/IP	1007	PLC	D_Register(D0 - D11999)	D07	UINT		0	1	0	TRUE	FALSE	TRUE	None								
10	PLC	Delta	Delta DVP TCP/IP	1008	PLC	D_Register(D0 - D11999)	D08	UINT		0	1	0	TRUE	FALSE	TRUE	None								
11	PLC	Delta	Delta DVP TCP/IP	1009	PLC	D_Register(D0 - D11999)	D09	UINT		0	1	0	TRUE	FALSE	TRUE	None								
12	PLC	Delta	Delta DVP TCP/IP	1010	PLC	D_Register(D0 - D11999)	D010	UINT		0	1	0	TRUE	FALSE	TRUE	None								

C.3 Importing Tags

To import data: ❶ Choose the target device from the drop-down list. ❷ Click  to proceed on importing.

Up to ten thousands of records can be exported for one single device.

Dashboard	Tags	Triggers	Tools Management	Maintenance	Programs	Parameters	History Alarm
Device :	DELTA-300						
TypeGroup :	Axis	information					
Status	Name	Value	Unit	Type	Comment	Update Time	Action
●	Abs_X	0		position		2020-02-04 15:07:53	 
●	Abs_Y	0		position		2020-02-04 15:07:53	 
●	Abs_Z	0		position		2020-02-04 15:07:53	 
●	ActFeed	0		feed_spindle		2020-02-04 16:10:10	 
●	ActSpindle	0		feed_spindle		2020-02-04 16:10:10	 
●	AxisTemp_X	32	°C	servo_temperature		2020-02-04 16:20:58	 

Instruction for template filling and the content:

- Worksheet titles cannot be modified: “Tag List”, “Type Type”, “Register Type”, “Data Type”
- Heading color:
 - “Red”: Required fields; “Green”: Non-required fields;
 - “Yellow”: Validating results for all required fields.

● Descriptions of columns :

- Validation : Validating results. Display “Fail” if validation fails. Fields would be left blank if result is success.
- Category : With a drop-down combo box: Tag Type (CNC, PLC, Modbus...)/ Device Brand/ Device Model. **Category of the imported data should be the same. You cannot import tags with different device brands and models.** Your choice from the drop-down list would affect the content shown in “Register Type Name” column. Please refer to worksheet “Register Type” for more details.
- Tag Name : **Names cannot be duplicated. A record can be recognized as modified or newly added according to the tag name.**
- Type: Differ from device types (CNC, PLC, Modbus...) and models. Please refer to worksheet “Type” for more details.
- Register Type Name : Differ from device types (CNC, PLC, Modbus...) and models. Please refer to worksheet “Register Type” for more details.
- Register : Tag address.
- Data Type : Types of tag data, such as STRING, FLOAT, INT....
- Decimal Place : Decimal places in a tag value.
- Scale : Magnified tag values.
- Offset : Displacement of tag bits.
- Record : See if the tag data is in the database. TRUE: Recorded; FALSE: Record not found °
- Read Only: See if the tag is readable and writable. TRUE : Read Only; FALSE : Read and Write Only

- If the uploaded file contains incorrect data or has formatting issues, an import error message would be prompted or the file would be passed back to users, reminding users to upload the file again after corrected.

DELTA

DIALink

Overview

Schedules

Events

Queries

Alarms

Monitoring

Settings

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Device: DELTA-300

Dashboard Tags Triggers Tools Management Maintenance Programs Parameters History Alarm

Device : DELTA-300

TypeGroup : Axis Information

Status	Name	Value	Unit	Type	Comment	Update Time	Action
●	Abs_X	0		position		2020-02-04 15:07:53	
●	Abs_Y	0		position		2020-02-04 15:07:53	
●	Abs_Z	0		position		2020-02-04 15:07:53	
●	ActFeed	0		feed_spindle		2020-02-04 16:38:52	
●	ActSpindle	0		feed_spindle		2020-02-04 16:38:52	
●	AxisTemp_X	32	°C	servo_temperature		2020-02-04 16:41:39	
●	AxisTemp_Y	34	°C	servo_temperature		2020-02-04 16:41:39	
●	AxisTemp_Z	34	°C	servo_temperature		2020-02-04 16:41:39	
●	Dist_X	0		position		2020-02-04 15:07:53	

Tags Import Fail
TagService - Import Exception: The excel file is not illegal template

MEMO

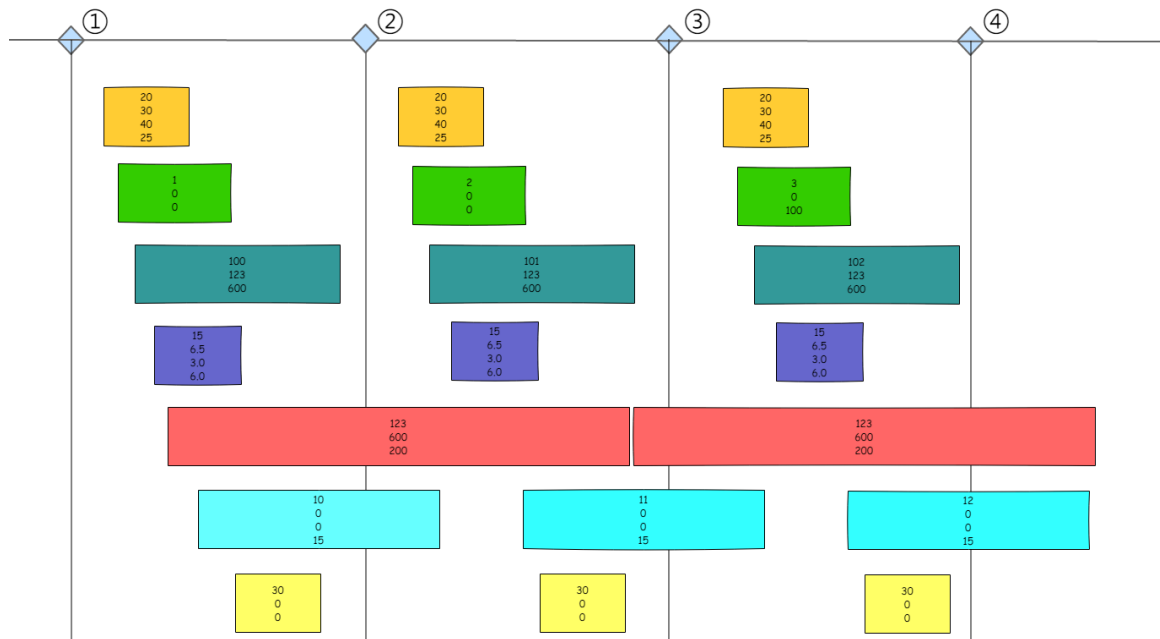


Appendix D Time for Data Collection and Calculation

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D.1 Overview



Time intervals of data collection also called “interval scanning” can be defined with nodes by users. Response time of collecting data differs from device to device. Considering of the situation that time for data acquisition takes longer than interval scanning, users need to save the result as null or recalculate with data collected in the previous time period.

In the above picture, each color box represents a single device. The number on it shows the quantity of tags needs to be collected. Instead of performing data acquisition after the program being operated, devices must receive messages from MQTT first. As a result, the start time of data acquisition would not be the same but similar between devices. In addition, the time gap between the devices would be greater if some tags being changed or newly added during the process of data acquisition.

Each Device would send all data read from tags to MQTT at one time to enable modules to access required data via MQTT. Actions would be repeated after the time interval, which means all the tags in one device would be read at the same time to avoid time difference of accessing completion between each tag.

While data collection is triggered passively, time for data acquisition is different between devices which is hard to know the exact timing for DataCollector to access the data of each device. As illustrated in the figure above, assuming there's a formula designed to total the value of the first tag in each color box (device), the red box (device) will contain a missing value from the time point ② till ③. Therefore, if data collection goes too slow on a device, it may lead to the result of NULL for all the value of tags on it. If the operational efficiency of this device cannot be improved, users will need to lengthen the time of interval scanning manually through

configuration.

Two modes are provided for users to choose on DIALink webpage, which are “Use previous value” and “Appear offline”. Whether the result of the formula is determined to be NULL or not, users’ need can always be fulfilled. A new setting is added on the interface of the present DIALink version to allow users to choose between these two modes. “Appear offline” would be set as “NULL”, while “Use previous value” would be saved as “Previous Value”.

The screenshot displays the DIALink web interface with the 'Settings' menu item highlighted in the left sidebar. The 'General' tab is active in the top navigation bar. The main content area is divided into several sections:

- Collection Setting:**
 - MQTT Broker IP: 192.168.1.1
 - Store Historical Data: Archive by Daily
 - Record Rate (ms): 60000
 - Record Type: Interval
- 3rd Party Data Interface:**
 - Type: Webhook (selected), MQTT
 - Enable Data Upload: OFF
 - Webhook URL: POST http://example.URL/webhook
- Edge Computing Setting:**
 - Missing Value: Null (selected), Previous Value
- Modbus Slave Setting:**
 - Enabled: OFF

At the bottom left of the sidebar, the version information is listed: v 1.3.0.0 BETA4, © 2017 Delta Electronics, Inc.

MEMO



Appendix E OPC UA Server Setting

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E.3 Install UAExpert.....	E-8

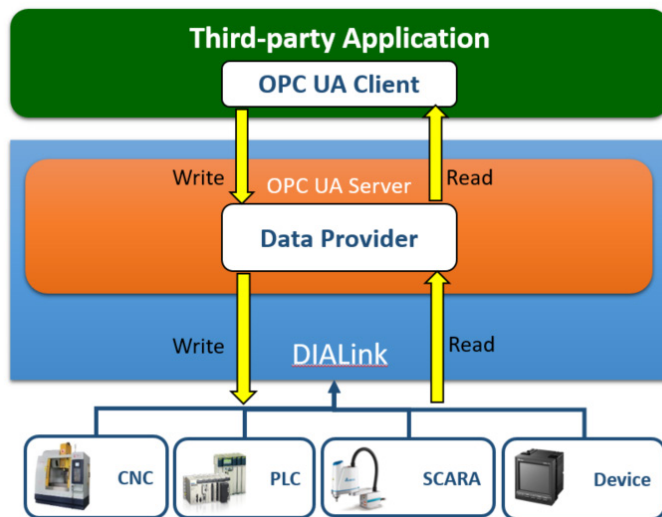
E.1 Requirement and Environment

DIALink supports OPC UA for communication, while OPC UA Provider as the intermediate layer is mainly responsible for the following behaviors (as shown in the chart):

- Handles providing access to data requested by different OPC UA services like read and write to devices in under layer.
- Provides third-party application in upper layer with access to read and write data indirectly to devices via OPC UA.

The updated records of data would also be provided in DIALink.

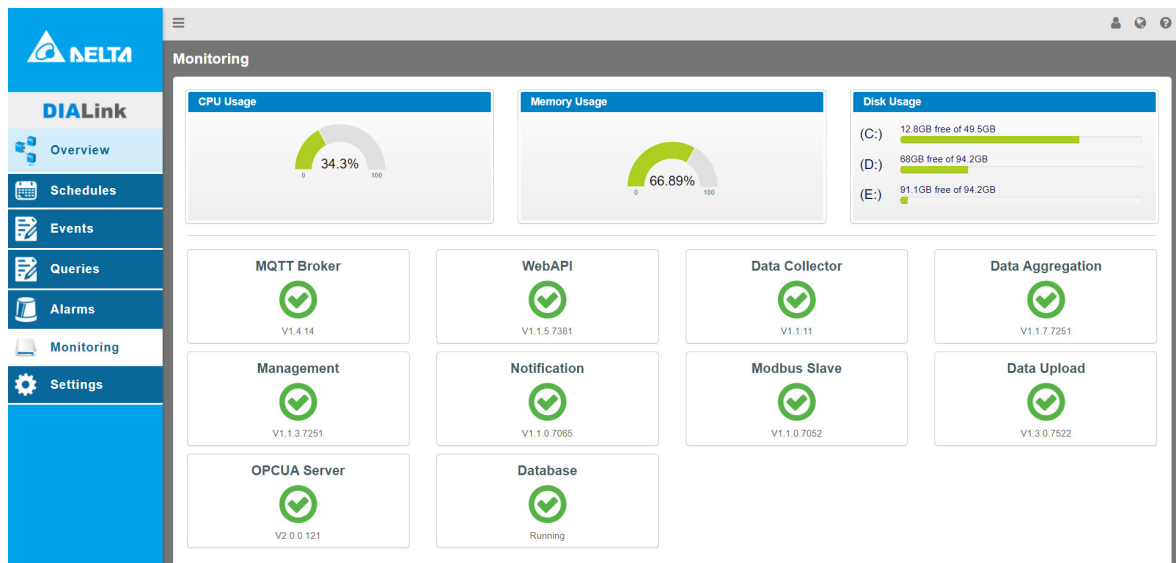
Note: Allows Third-party application to read and write only device data.



E.2 OPC UA Server Services and Settings

E.2.1 OPC UA Server Status

OPCUA Server shown on Monitoring page is a module providing the third-party software (e.g., MES, SCADA...) with OPC UA services such as reading and writing data from devices as it requested. All functions would show the green check mark with version number displayed under the mark when the system operates normally. If not activated, the red cross mark would be shown with NOT STARTED displayed under the mark.



E.2.2 System Setting

Go to “Settings” then “General” to configure related parameters according to user needs, which allows you to change the username, password and port. The default username, password and port are respectively **root**, **admin** and **4840**.

The screenshot shows the 'OPCUA Server Setting' configuration window. It contains three input fields: 'Username' with the value 'root', 'Password' with masked characters '*****', and 'Port' with the value '4840'. A blue 'Restart' button is located to the right of the Port field.

OPC UA Server limits:

Once nodes are added or removed, or properties are updated, you would need to click “Restart” to restart OPC UA Server before connecting third-party application and OPC UA Client to OPC UA Server. So the updated data can be viewed by the client. A restart would not be required for changes on tag values.

Security settings for OPC UA Server:

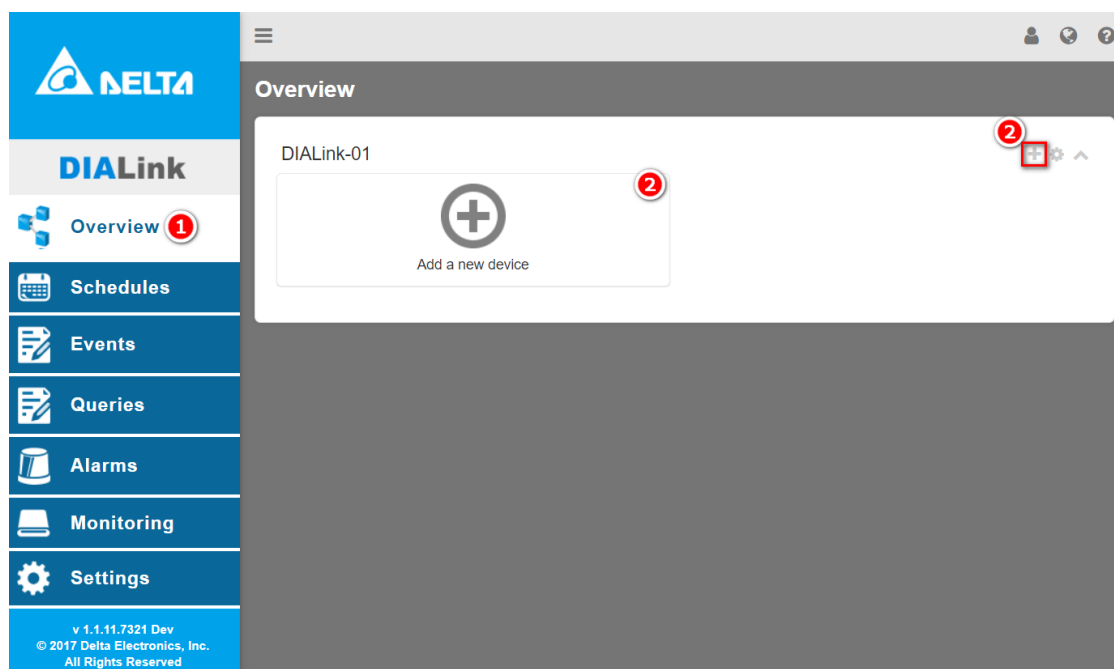
User Verified	Support	+	Security Policy		Support
Anonymous	✗		None	None	✓
Account/PW	✓		Basic128Rsa15	Sign	✓
Certification	✗			Sign & Encrypt	
			Basic256	Sign	✓
				Sign & Encrypt	
			Basic256Sha256	Sign	✓
				Sign & Encrypt	

- Communication Protocol: Only supports UA TCP (opc.tcp://), while UA HTTP/HTTPS is not allowed to use.
- User Authentication: Check the permissions before the client is allowed to login and access data information.
- Safety strategy: Encrypts data with specified algorithm.
- Only supports the read and write functions.
- The maximum number of clients that can connect simultaneously to the OPC UA server is 5.
- At one subscription with 1000 tags/ nodes, the CPU usage is about 15~20%.

E.2.3 Add New Devices and Tags

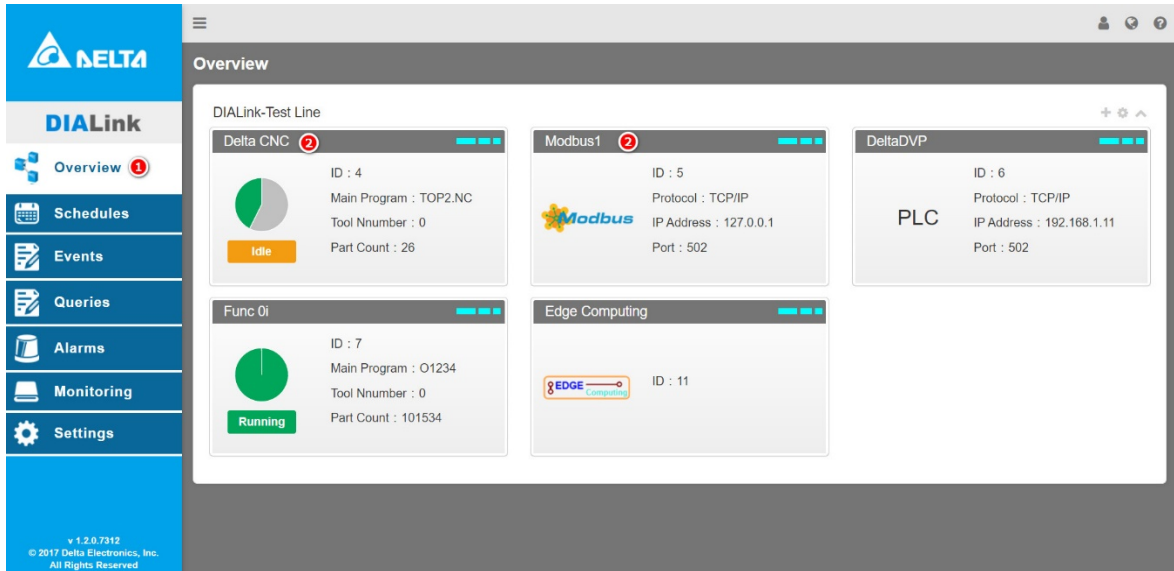
- Add a new device


After logging in DIALink, ❶ go to the "Overview" page and ❷ click "Add a new device". If the device has been created, click the add button + at the upper right of the page.



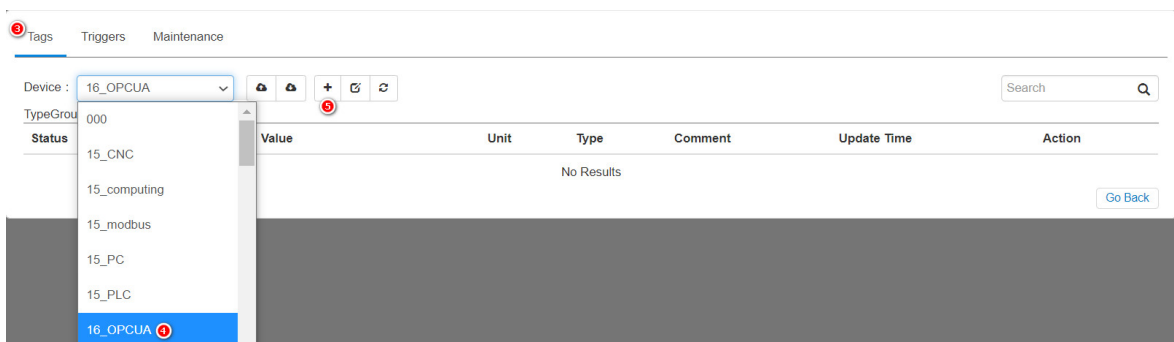
- Add tags

① Go to the “Overview” page and ② click on the target device that has been added to the device nodes so as to enter the tag configuration page.



② Enter the “Tag” tab and ③ select the target device from the drop-down list, then ④ click  to add tags. Relevant parameter setting is shown on the right side of the page. The default would be adding single tag, while you can also choose to add multiple tags at a time. Based on the device type of the target device, the relevant parameters would be displayed for you to choose or enter related device parameters according to user needs.

All items marked with an asterisk (*) need to be completed. When finished, click “Save Changes” at the bottom of the page. If the input value does not follow to the system rule, a red color frame will appear to indicate as an error.



Custom

Default Tags

Connect

ON

Add Multiply

Name*

Type

OPCUA

Logical Register*

Data Type*

UINT

Decimal Places*

0

Scale*

1

Offset*

0

Writable

OFF

Record

OFF

Unit

Comment

Save changes

Cancel

Custom

Default Tags

Connect

ON

Add Single

Name*

Type

OPCUA

Batch name setting*

First Number

1

Numeric Places

3

Batch address setting (0 - 65535)*

First Address

1

Increment

1

Batch number of items (1 - 1000)*

10

Data Type*

UINT

Decimal Places*

0

Scale*

1

Offset*

0

Writable

OFF

Record

OFF

Unit

Comment

Save changes

Cancel

Custom

Default Tags

Root

Objects



Types

Views

Refresh

After successfully adding tags, enter the Tag tab and you can view the device connection status at the first column, while the second is the name of the tag and the third shows real-time data. The example of Delta CNC is shown in the follows.

Dashboard	Tags	Triggers	Tools Management	Maintenance	Programs	Parameters	Hisotry Alarm
Device : Delta CNC + 🔍 🔄							
TypeGroup : Axis information							
Status	Name	Value	Unit	Type	Comment	Update Time	Action
●	Abs_X	0		position		2020-01-21 08:09:56	🔍 🗑️
●	Abs_Y	0		position		2020-01-21 08:09:56	🔍 🗑️
●	Abs_Z	0		position		2020-01-21 08:09:56	🔍 🗑️
●	ActFeed	0		feed_spindle		2020-01-21 08:09:56	🔍 🗑️
●	ActSpindle	0		feed_spindle		2020-01-21 08:09:56	🔍 🗑️
Showing 1 to 5 of 5 entries							1 Go Back

In case that you want to reedit the tag parameters, click the edit button  in the action column on the tag tab, then click “Save” at the bottom of the page after finishing editing. To delete a tag, you can click the delete button  in the action column.

Dashboard	Tags	Triggers	Tools Management	Maintenance	Programs	Parameters	Hisotry Alarm
Device : Delta CNC + 🔍 🔄							
TypeGroup : Axis information							
Status	Name	Value	Unit	Type	Comment	Update Time	Action
●	Abs_X	0		position		2020-01-21 08:09:56	🔍 🗑️
●	Abs_Y	0		position		2020-01-21 08:09:56	🔍 🗑️
●	Abs_Z	0		position		2020-01-21 08:09:56	🔍 🗑️
●	ActFeed	0		feed_spindle		2020-01-21 08:09:56	🔍 🗑️
●	ActSpindle	0		feed_spindle		2020-01-21 08:09:56	🔍 🗑️
Showing 1 to 5 of 5 entries							1 Go Back

To delete multiple tags, ❶ first to choose the target device and ❷ click  to perform batch editing, then ❸ check the checkbox of the tags to delete before click  to delete tags in batches.

Dashboard	Tags	Triggers	Tools Management	Maintenance	Programs	Parameters	Hisotry Alarm
Device : Delta CNC + 🔍 🔄 🗑️							
TypeGroup : Axis information							
<input type="checkbox"/>	Status	Name	Value	Unit	Type	Comment	Action
<input checked="" type="checkbox"/>	●	Abs_X	0		position		🔍 🗑️
<input checked="" type="checkbox"/>	●	Abs_Y	0		position		🔍 🗑️
<input type="checkbox"/>	●	Abs_Z	0		position		🔍 🗑️
<input checked="" type="checkbox"/>	●	ActFeed	0		feed_spindle		🔍 🗑️
<input type="checkbox"/>	●	ActSpindle	0		feed_spindle		🔍 🗑️
Showing 1 to 5 of 5 entries							1 Go Back

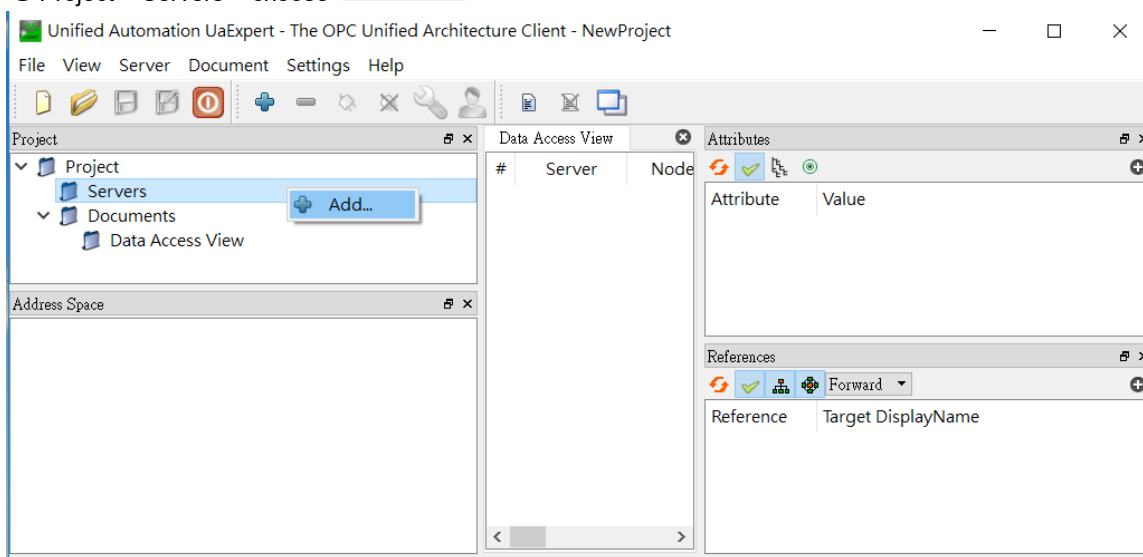
E.3 Install UAExpert

UAExpert is a 3rd party OPC UA Client software.

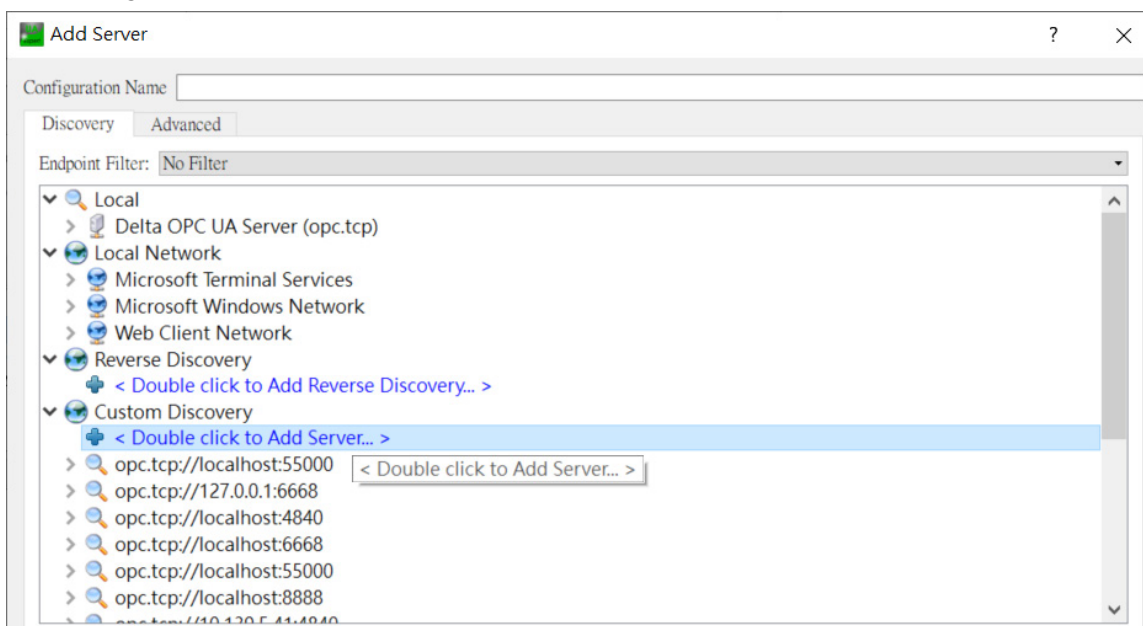
- The current version is 1.5.1.
- The software can be installed on Windows 10 with Intel Core i3 dual core 1.90GHz, 4GB RAM.
- Download the software at: <https://www.unified-automation.com/downloads/opc-ua-clients.html>
- Configure the Server connection information after login with the username and password, which the default setting is root/ admin.

The operation for UAExpert is shown in the following demonstration:

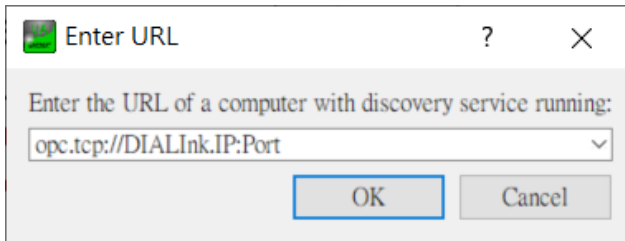
① Project > Servers > choose Add...



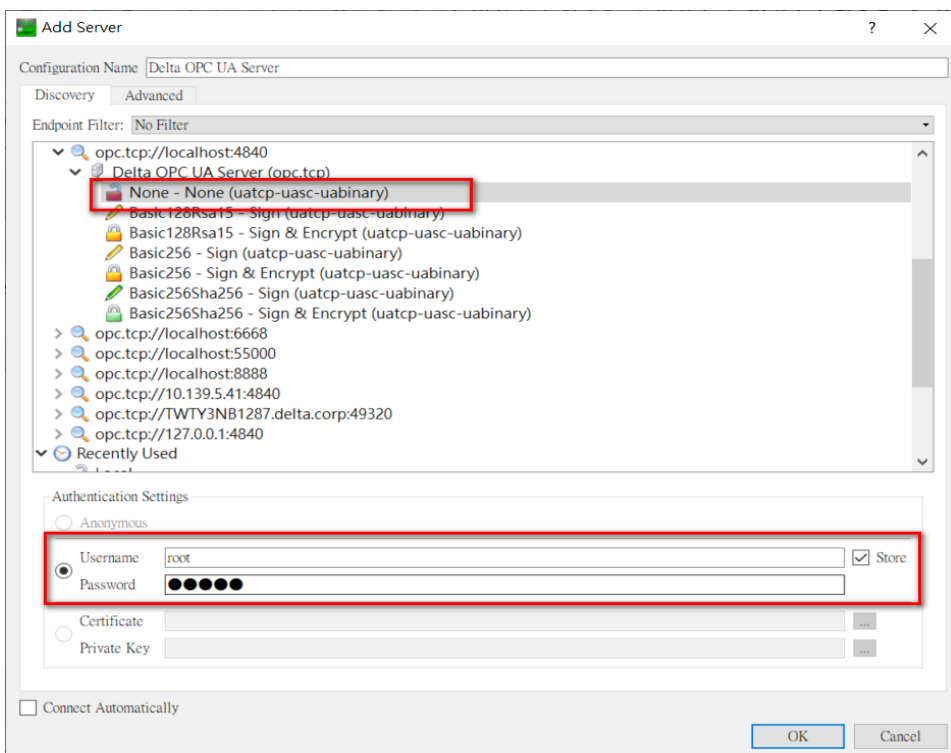
② Double Click to add Server



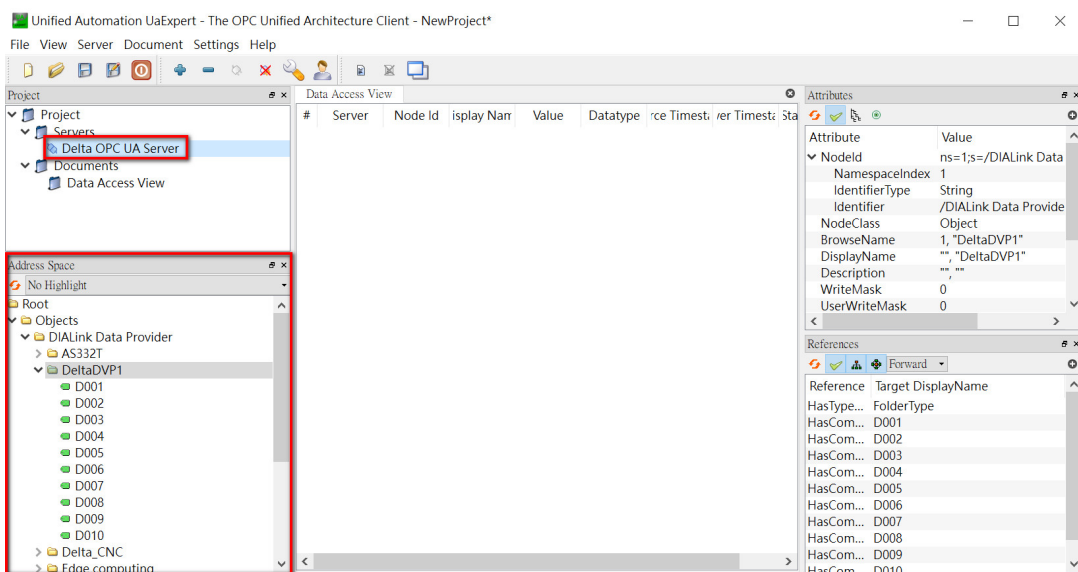
③ Enter URL: `opc.tcp://DIALink.IP:Port`



④ Choose a login method: Please choose None as default and log in with username and password.



⑤ OPC UA server and nodes would be displayed after connected successfully.



6 Drag nodes to Data Access View area in the center of the page so as to monitor on node value changes.

The screenshot shows the Unified Automation UaExpert interface. The central pane displays the 'Data Access View' table, which lists nodes and their values. A red box highlights this table. The left pane shows the 'Address Space' tree, where the 'DeltaDVP1' folder is selected. A red arrow points from this folder to the 'Data Access View' table. The right pane shows the 'Attributes' and 'References' for the selected node.

#	Server	Node Id	Display Name	Value	Datatype	Refresh Time	Last Refresh Time	Status
1	Delta OP...	NS1Strin...	D001	13900	UInt16	PM 02:57...	PM 02:57...	Go
2	Delta OP...	NS1Strin...	D002	2	UInt16	PM 02:57...	PM 02:57...	Go
3	Delta OP...	NS1Strin...	D003	3	UInt16	PM 02:57...	PM 02:57...	Go
4	Delta OP...	NS1Strin...	D004	4	UInt16	PM 02:57...	PM 02:57...	Go
5	Delta OP...	NS1Strin...	D005	0	UInt16	PM 02:59...	PM 02:59...	Go
6	Delta OP...	NS1Strin...	D006	0	UInt16	PM 02:57...	PM 02:57...	Go
7	Delta OP...	NS1Strin...	D007	0	UInt16	PM 02:57...	PM 02:57...	Go
8	Delta OP...	NS1Strin...	D008	0	UInt16	PM 02:57...	PM 02:57...	Go
9	Delta OP...	NS1Strin...	D009	0	UInt16	PM 02:57...	PM 02:57...	Go
10	Delta OP...	NS1Strin...	D010	0	UInt16	PM 02:57...	PM 02:57...	Go


7 Node values are changeable if the tag property is set to Read/ Write.

(Modify the value of D005 to 5 in the example below.)

The screenshot shows the Unified Automation UaExpert interface. The central pane displays the 'Data Access View' table, which lists nodes and their values. A red box highlights this table. The left pane shows the 'Address Space' tree, where the 'DeltaDVP1' folder is selected. A red arrow points from this folder to the 'Data Access View' table. The right pane shows the 'Attributes' and 'References' for the selected node.

#	Server	Node Id	Display Name	Value	Datatype	Refresh Time	Last Refresh Time	Status
1	Delta OP...	NS1Strin...	D001	13900	UInt16	PM 02:57...	PM 02:57...	Go
2	Delta OP...	NS1Strin...	D002	2	UInt16	PM 02:57...	PM 02:57...	Go
3	Delta OP...	NS1Strin...	D003	3	UInt16	PM 02:57...	PM 02:57...	Go
4	Delta OP...	NS1Strin...	D004	4	UInt16	PM 02:57...	PM 02:57...	Go
5	Delta OP...	NS1Strin...	D005	5	UInt16	PM 03:00...	PM 03:00...	Go
6	Delta OP...	NS1Strin...	D006	0	UInt16	PM 02:57...	PM 02:57...	Go
7	Delta OP...	NS1Strin...	D007	0	UInt16	PM 02:57...	PM 02:57...	Go
8	Delta OP...	NS1Strin...	D008	0	UInt16	PM 02:57...	PM 02:57...	Go
9	Delta OP...	NS1Strin...	D009	0	UInt16	PM 02:57...	PM 02:57...	Go
10	Delta OP...	NS1Strin...	D010	0	UInt16	PM 02:57...	PM 02:57...	Go

8 Check if the node value has also been updated on DIALink webpage.

**DELTA**

DIALink

Overview

Schedules

Events

Queries

Alarms

Monitoring

Settings

Device: DeltaDVP1

TagsTriggersMaintenance

Device: DeltaDVP1

TypeGroup: D X

Status	Name	Value	Unit	Type	Comment	Update Time	Action
	D001	13900		PLC		2020-10-30 14:42:43	
	D002	2		PLC		2020-10-30 14:42:37	
	D003	3		PLC		2020-10-30 14:42:47	
	D004	4		PLC		2020-10-30 14:42:52	
	D005	5		PLC		2020-10-30 14:42:57	
	D006	0		PLC		2020-10-30 14:42:28	
	D007	0		PLC		2020-10-30 14:42:28	
	D008	0		PLC		2020-10-30 14:42:28	
	D009	0		PLC		2020-10-30 14:42:28	
	D010	0		PLC		2020-10-30 14:42:28	

Showing 1 to 10 of 10 entries

1
Go Back



Appendix F Dongle Key Combination User Guide

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F.2.1 Scan Dongle Keys	F-2
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F.1 Requirement

A dongle key (primary key) would be provided to customers, who purchase DIALink, to enable functions in a certain number of physical devices (E.g, CNC, PLC...). A corresponding upgrade key would be required when the number or function of devices needs to be expanded.

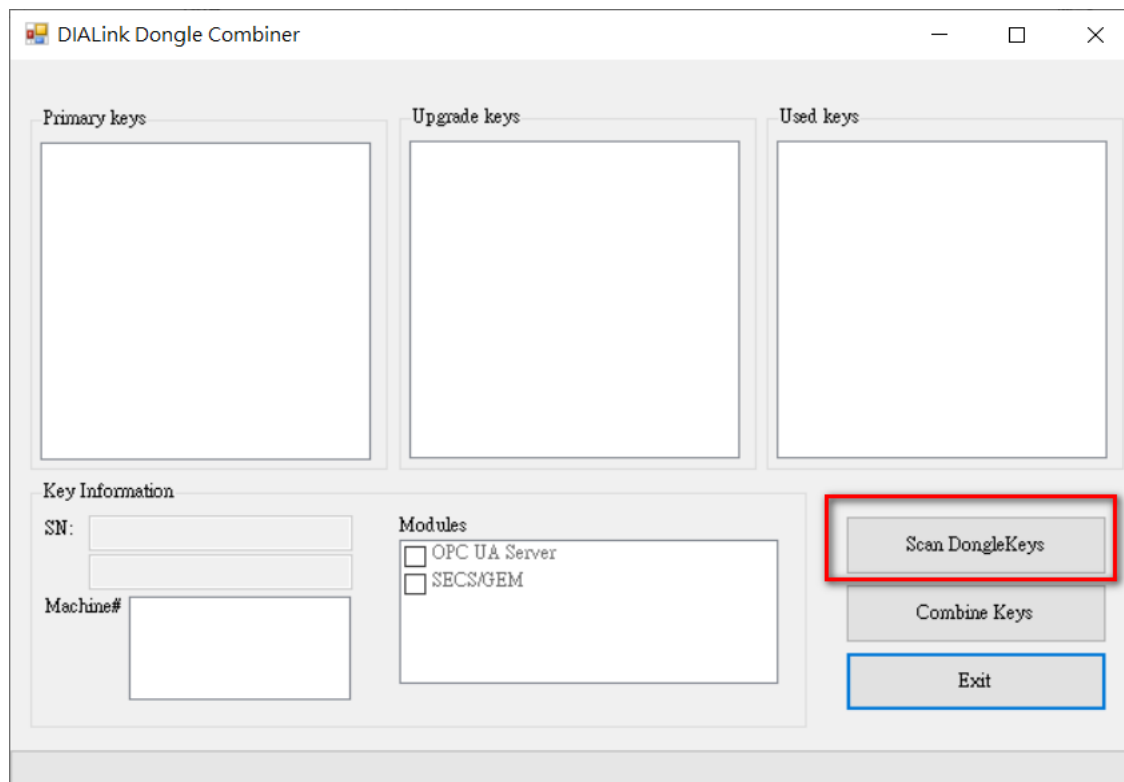
With the utility program (DIALinkCombinDongleKeysForm.exe), customers can merge the primary key with the upgrade key, so the upgraded device number or functions would be contained in the primary key after being combined, as well as changing the upgrade key to the used key which cannot be used again.

F.2 Combining Tool (DIALinkCombinDongleKeysForm)

F.2.1 Scan Dongle Keys

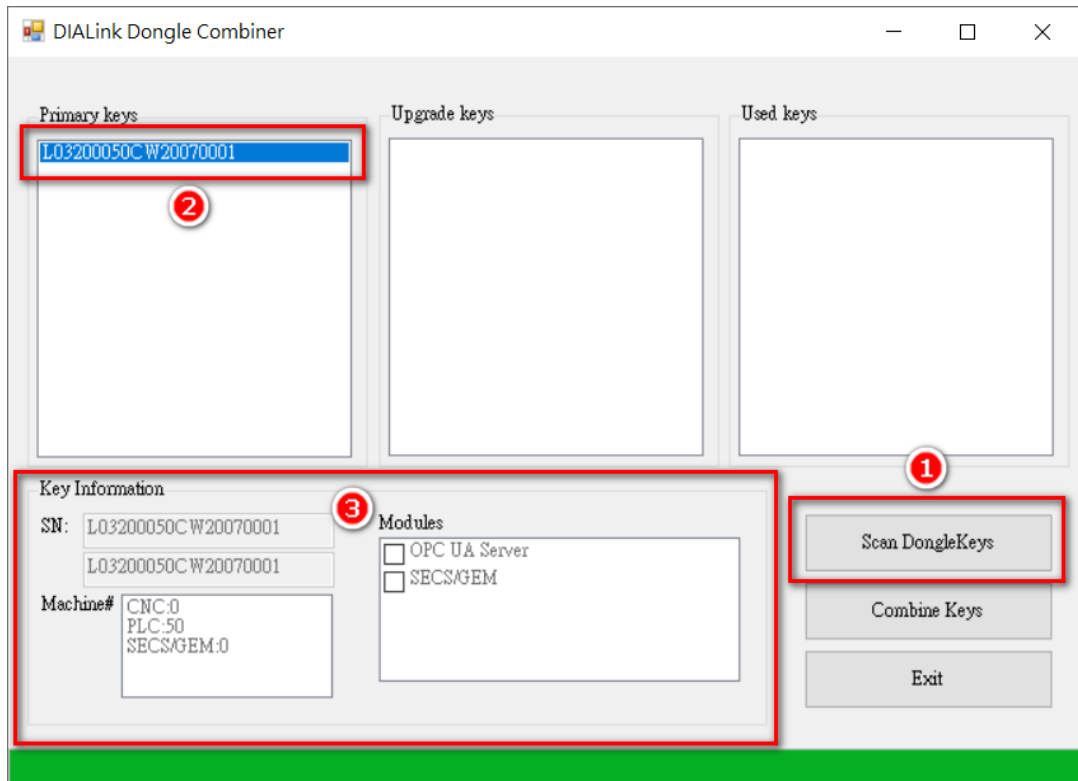
Step 1: Run the utility program for scanning.

After running the utility, click “Scan DongleKeys” and the existing Dongle would be categorized into the following three key groups: Primary keys /Upgrade keys /Used keys.



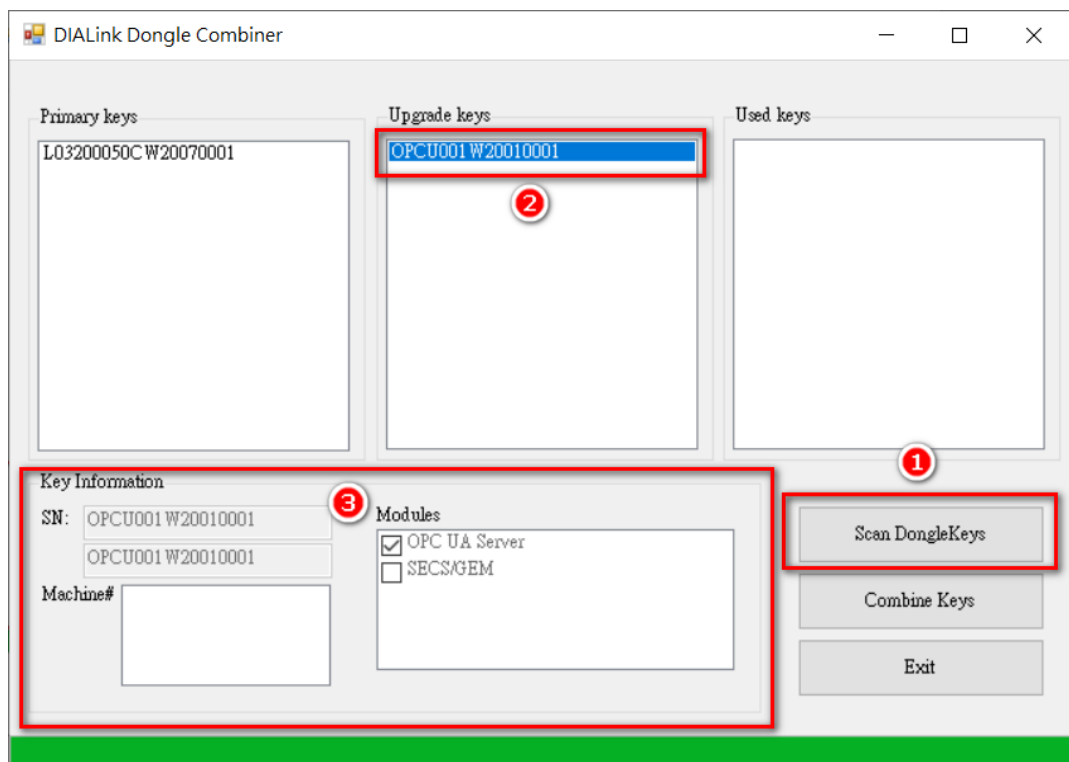
Step 2: Insert the Dongle key attached to the purchase of DIALink as primary key.

❶ Click “Scan DongleKeys” and the Dongle key would be displayed in the area of ❷ “Primary Keys”, then the corresponding device quantities as well as the module information would also be shown in the area of ❸ “Key Information”.



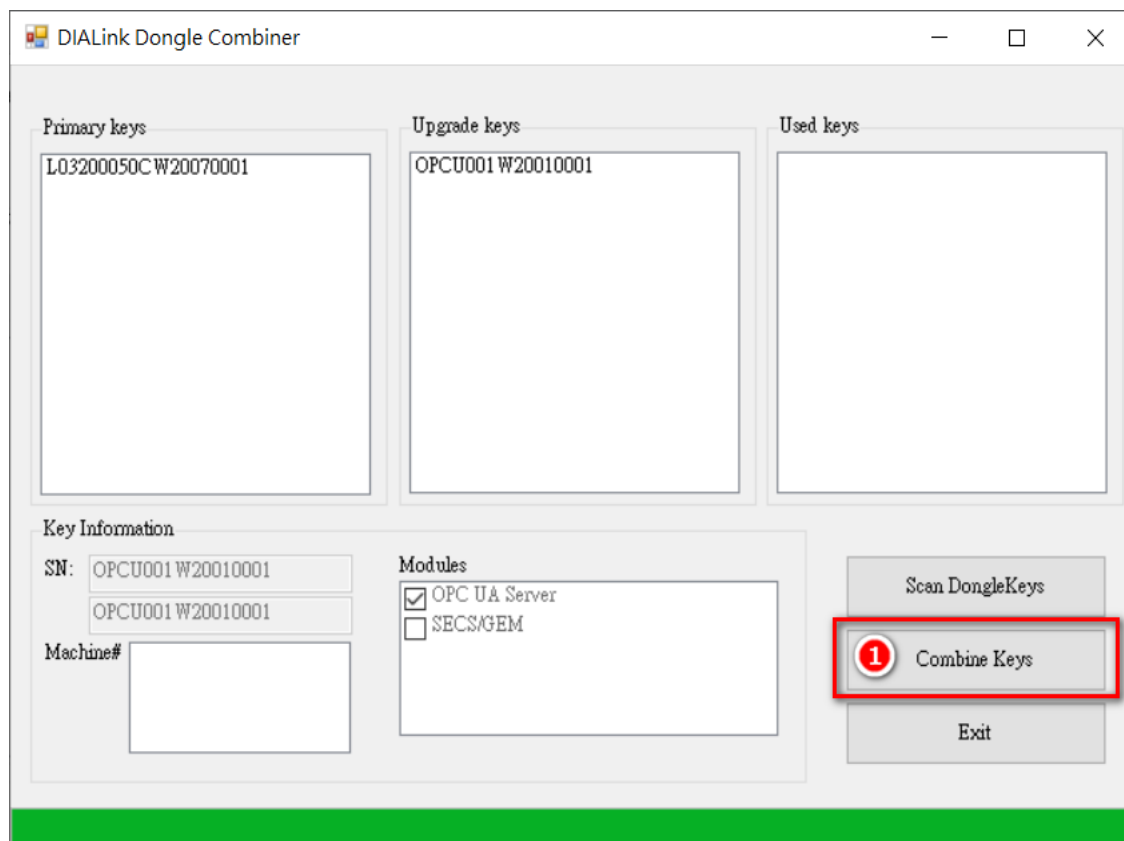
Step 3: Insert the upgrade key.

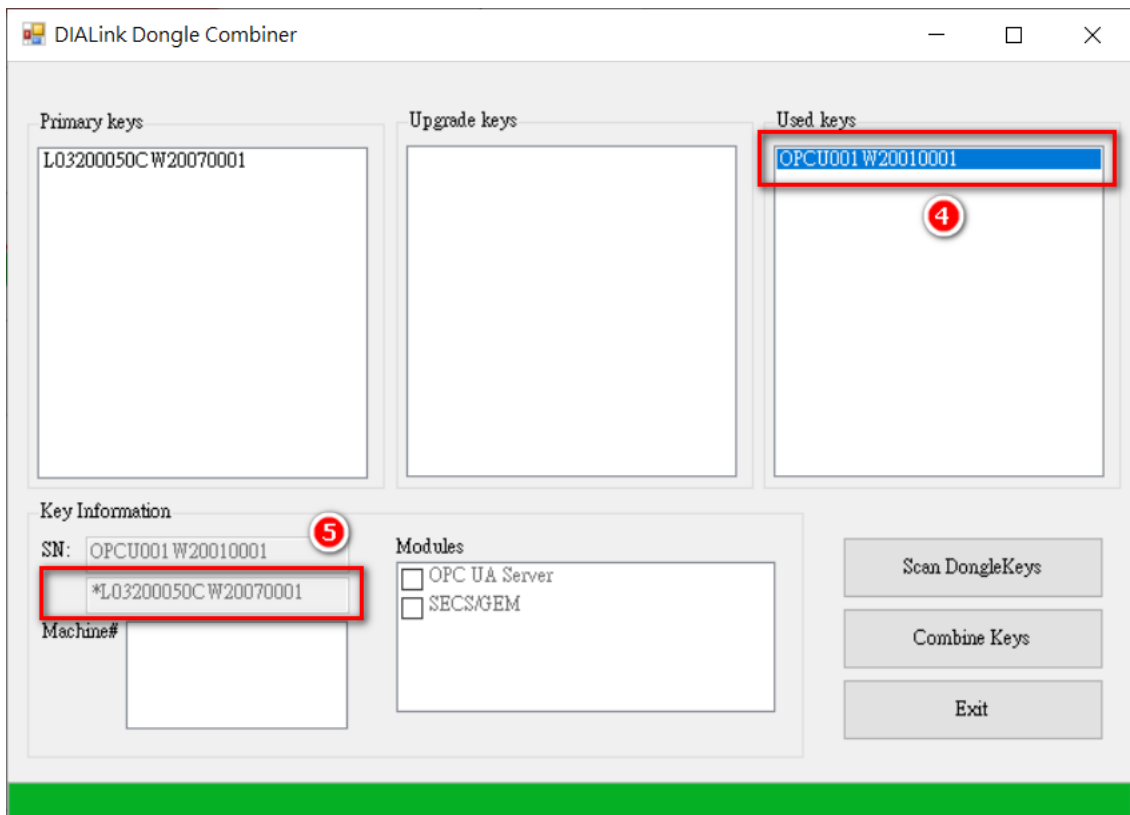
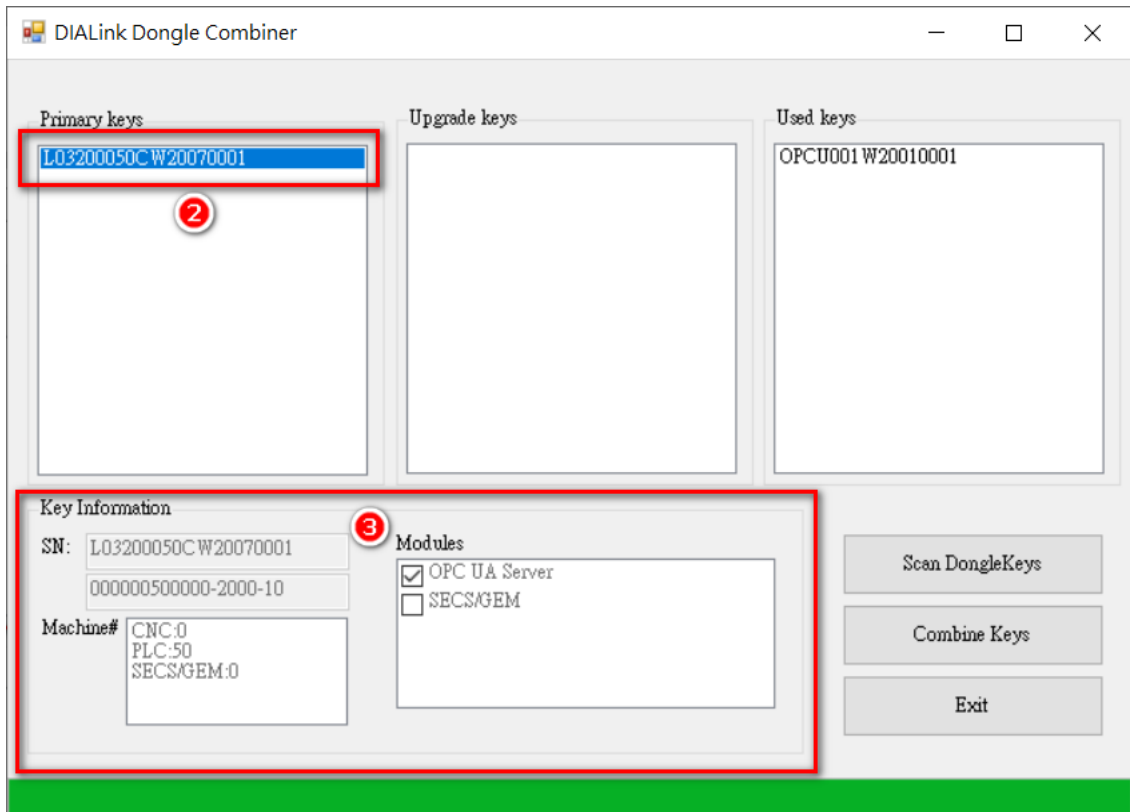
① Click “Scan DongleKeys” and the upgrade key would be displayed in the area of ② “Upgrade Keys”, then the corresponding device quantities as well as the module information would also be shown in the area of ③ “Key Information”.



F.2.2 Combine Dongle Key

- Run the utility program, then scan the current primary key and the upgrade key. After checking all the key information, click **①** “Combine Keys” to perform the combined action. When finished, **②** click the primary key to display the combined information in the area of **③** “Key Information”.
- After the keys being combined, the upgrade key would change to be used key **④** as well as being displayed in the **⑤** key information.
- A system restart is not required to use DIALink services with the updated device number and functions.





MEMO

F



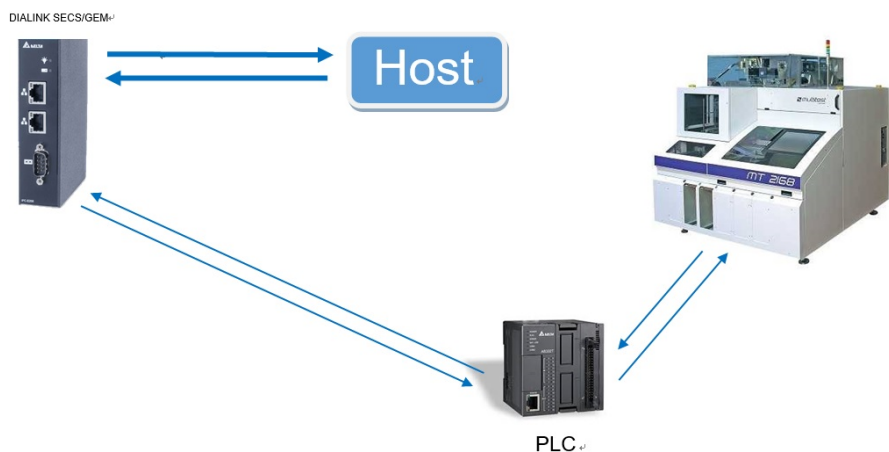
Appendix G SECS/GEM User Guide

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G.1 Structure Overview

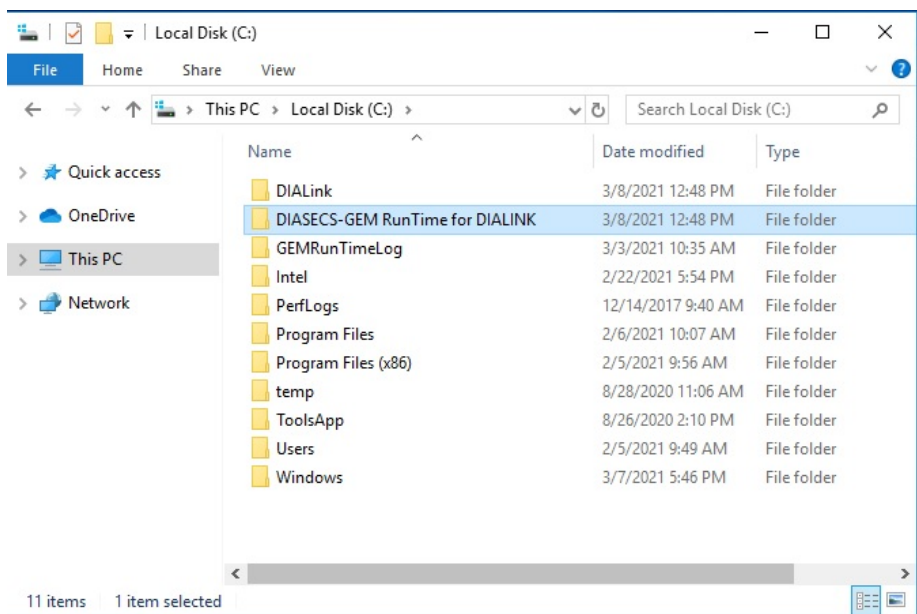
The main function of DIALINK SECS/GEM module is to send device data of old equipment, which is not compliant with GEM/SECS, to hosts so that equipment can be monitored and controlled by hosts. The communication framework of DIALink SECS/GEM module is shown below. The DIALINK SECS/GEM module is able to communicate with Non-SECS equipment via PLCs so as to send all kinds of device data, such as information of commands and Recipe, to SECS/GEM compliant hosts, which hosts could be Manufacturing Execution System (MES).



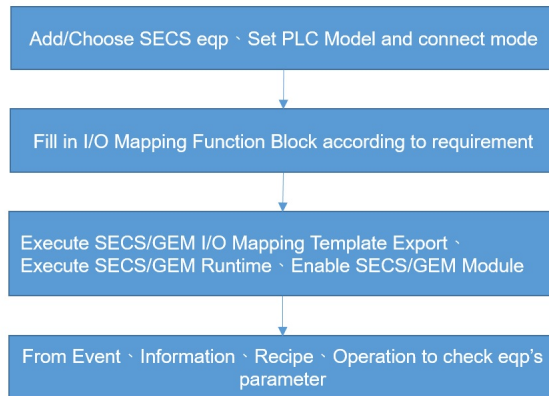
G.2 Installation and Setup

Once the version 1.4 or above of DIALink software is installed, the SECS/GEM module would be installed in the system either choosing “Full install” or “DIALink only”. However, only users who have purchased SECS/GEM module for DIALink can add new SECS/GEM capable devices

SECS/GEM module would be added during installation which the profile and the program file would be stored in the folder named DIASECS-GEM RunTime for DIALink in local disk C.



- Follow below procedures to start with SECS features:



Step 1: 【Overview】: Add new SECS equipment > **【PLC Connection Parameters Configuration】**: Select the target PLC model and set the IP address as well as the port.

Step 2: 【I/O Mapping Function Block】: Set the type and address of registers for each function accordingly which should be corresponded to the actual communication between devices, or the data would be disorganized.


Step 3: 【SECS/GEM Application】: Execute SECS/GEM I/O Mapping Template Export and SECS/GEM Runtime (the main program).

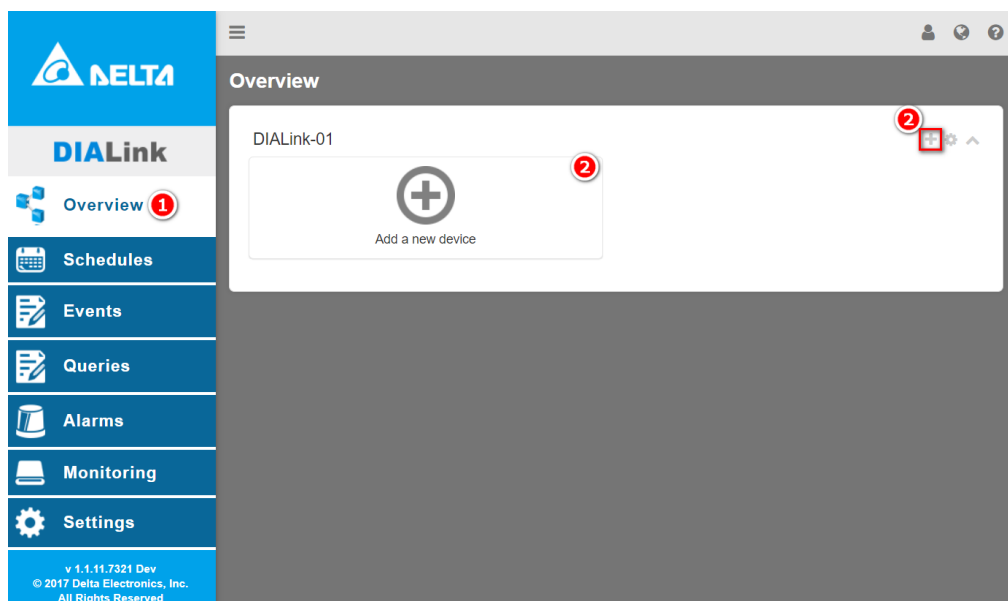
Step 4: After connected, you can view device parameters via Events, Information, Recipe and Operation.

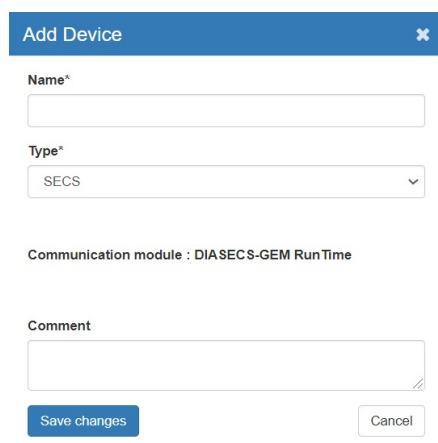
G.3 Description of SECS/GEM Setting

G.3.1 Add SECS/GEM Equipment

- Add a new device

After logging in DIALink, go to ❶ **【Overview】** on the left side of the page > ❷ **【Add a new device】**, or directly click the add button  at the upper-right corner.





Add Device [X]

Name*

Type*
 SECS ▾

Communication module : DIASECS-GEM RunTime

Comment

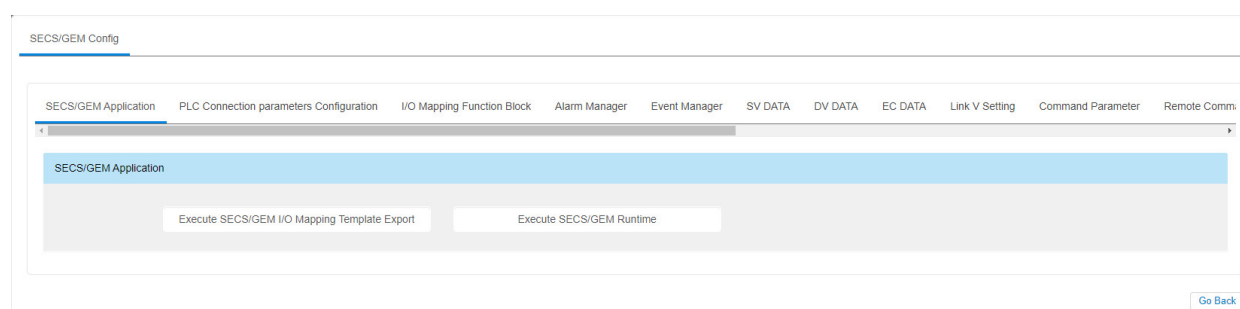
Save changes Cancel

Note: Only authorized SECS equipment can be added, which the desired device quantity must not exceed the number of authorization.

Note: Different from other equipment, SECS devices cannot directly communicate with other devices, such as CNC and PLC devices, via DIALink. Instead, an intermediate SECS/ GEM Runtime would be required for SECS/GEM communication with HOSTs as well as equipment via PLCs. Hence, devices on the page would not be connected and acquire tags automatically after SECS equipment being added, even though the parameters for connection are correct. Which in turn, you would need to manually enable SECS/GEM Runtime for equipment-to-host data communications.

G.3.2 SECS/GEM Configuration

G.3.2.1 SECS/GEM Application



SECS/GEM Config

SECS/GEM Application | PLC Connection parameters Configuration | I/O Mapping Function Block | Alarm Manager | Event Manager | SV DATA | DV DATA | EC DATA | Link V Setting | Command Parameter | Remote Comm.

SECS/GEM Application

Execute SECS/GEM I/O Mapping Template Export Execute SECS/GEM Runtime

Go Back

- **Execute SECS/GEM I/O Mapping Template Export:** After performing add, delete, edit action on pages including I/O Mapping Function Block, Alarm Manager, Event Manager, SV DATA, DV DATA, EC DATA, Link V Setting, Command Parameter, Remote Command, Spool Allow, Parameter Manager, PPID Mapping Manager, Formatted Process Parameter, Formatted Command Code, and Unformatted Process Parameter, click on “Execute SECS/GEM I/O Mapping Template Export” to ensure the configuration has been written to the Config file.
- **Execute SECS/GEM Runtime:** After executing Runtime, devices would be connected. Please refer to chapter G.3.3 Connect for more details.

Note: Since it may take approximately 10 to 50 seconds for executing Export or Runtime according to different settings and system resources, please wait patiently after clicking the execution button. A green dialog box would be displayed after executed successfully. If the execution failed, the message would be displayed in a red dialog box, which the display would return to the original page and show “TimeOut” if the wait time exceeds 50 seconds.

Note: If you press F5 to refresh the current wait page and re-execute Runtime during Runtime execution, system errors would be caused and an error message would pop up. To restore, go back to “Overview” page; meanwhile, the SECS devices may be successfully connected. If not, execute Runtime again to reconnect.

G.3.2.2 PLC Connection Parameters Configuration

SECS/GEM Config

SECS/GEM Application PLC Connection parameters Configuration I/O Mapping Function Block Alarm Manager Event Manager SV DATA DV DATA EC DATA Link V

PLC Connection parameters Configuration

Model: Delta_AS_Series_PLG_TCP(Standard_Modbus) ▼

Connect Mode: TCP

Delay: 0

Retry: 3

Timeout: 1000

TCP Config

IP: 192.168.1.6

Port: 502

Serial Config

Baud Rate: 9600 ▼

Com Port: 1

Parity: None ▼

DataBits: 8 ▼

StopBits: 1 ▼

PortType: RS232 ▼

FlowControl: NO ▼

[Update PLC connection profile](#)

- **PLC Connection Parameters Configuration:** Choose the desired model (mandatory) and input other fields based on your needs.
- **TCP Config:** Set the IP and the port (mandatory).

- **Serial Config:** Input related fields based on your needs.



















































Note: If one of the mandatory fields is not configured, Runtime would not be able to execute successfully and an error message showing “PLC driver initial failure” would be displayed.

G.3.2.3 I/O Mapping Function Block

SECS/GEM Config

SECS/GEM Application | PLC Connection parameters Configuration | **I/O Mapping Function Block** | Alarm Manager | Event Manager | SV DATA | DV DATA | EC DATA | Link V Setting | Command Parameter | Remote Command | Spool Allow | Paran

1 Block = 1 Word
This page delete function is to clear your settings, not to delete the data

I/O Function Name	Block Length	Remaining Length	Device Code	Start Address	End Address	Slave ID	File No	Base No	Slot No	Bank No	Action
EqpPLCAlive	1		T	55	55						 
SECSGEMAlive	1		T	54	54						 
AlarmReportSend	64		X	0	63						 
EventReportSend	32		D	20000	20031						 
ProcessProgramStateChange	43		T	0	42						 
ProcessStateChange	3		T	43	45						 
ProcessProgramCurrentlySelected	2		T	46	47						 
EQCurrentInfo	6		T	48	53						 
UpdateSV	200		D	0	199						 
UpdateDV	200		D	200	399						 
UpdateEC	100		D	400	499						 
NewEqpConstantDownload	20		D	500	519						 
TerminalDisplay	85		D	520	604						 
DateTimeSyncCommand	9		D	620	628						 
RemoteCommand	30		D	630	659						 
ProcessProgramRequestUnformatted	50		SR	0	49						 
ProcessProgramRequestFormatted	100		SR	200	299						 
ProcessProgramSendUnformatted	10		SR	400	409						 
ProcessProgramSendFormatted	20		SR	600	619						 
ProcessProgramVerificationSend	50		SR	800	849						 
ProcessProgramUploadRequestUnformatted	20		SR	900	919						 
ProcessProgramUploadRequestFormatted	20		SR	1100	1119						 
ProcessProgramDownloadUnformatted	20		SR	1300	1319						 
ProcessProgramDownloadFormatted	20		SR	1500	1519						 
ProcessProgramDelete	35		SR	1700	1734						 

Go Back

Only WORD registers can be used by I/O Mapping Function Block. Others such as Bit and Double word registers are incompatible with SECS. Different PLCs have different ranges and characteristics of registers, which you should refer to documents and manuals of corresponding PLC brand. For example, Delta DVP series PLCs only support T, C and D type registers, while Delta AS series PLCs use X, Y, D, SR, E, T and C type registers. Register ranges cannot be exceeded while configuring Address.

In addition, all the available registers of the PLC you are currently using would be listed when setting Device Code. Start Address represents the start point of the segment and the End address should be configured based on the default Block (Word) setting of the segment. For example, if the start address is set to 0 and the default Block (Word) setting is 200, the addresses to be used would be D0 ~ D199. Please pay particular attention that device code (Range) is determined by the selected PLC device. In case that the address exceeds the limit, you can re-define the block length and set the start address again.

Functions can be divided into two categories according to whether the block length can be modified or not. If not, the remaining length would be shown as 0. On the other hand, for functions which allow you to modify the block length, the available and remaining numbers of blocks would be shown for remaining length. If the amount of equipment usage data exceeds the default value of Length, the block length can be modified. Since certain functions may retain some blocks for system, it's normal if the block amount of Remaining length is less than the calculated number

Note: Before performing add, delete and edit action to features such as Alarm Manager, Event Manager, SV DATA, DV DATA, EC DATA, Remote Command, PPID Mapping Manager, Formatted Command Code and Unformatted Process Parameter, you must complete the relative configuration on I/O Mapping Function Block page, which you would also be reminded of the required configurations on each feature's page. For example, if selecting Alarm Manager, a popup message would remind you to configure "I/O Mapping Function Block: AlarmReportSend" first.

G.3.2.4 Alarm Manager

SECS/GEM Config

SECS/GEM ApplicationPLC Connection parameters ConfigurationI/O Mapping Function BlockAlarm ManagerEvent ManagerSV DATA DV DATA EC DATA Link V Se

Action : +

Bit No	AlarmID	AlarmName	AlarmEnable	AlarmText	Action
No Results					

Go Back

The back end of the webpage would read the file for the front end to configure, which the results would be saved in the file for you to add, delete or edit.

Note: Please configure the settings of device code and start address on the I/O Mapping Function Block page before enabling the function of this page.

● Add new Alarm Manager

Click the add button **+** , then the add new window would pop up for you to configure the input values and characters of the related fields. (All the required fields must not be blank or the new setting would not be successfully added.)

Add New

BitNo*

AlarmID*

AlarmName*

AlarmEnable*

True

AlarmText*



Finish



























Cancel

G.3.2.5 Event Manager

SECS/GEM Config

SECS/GEM Application PLC Connection parameters Configuration I/O Mapping Function Block Alarm Manager **Event Manager** SV DATA DV DATA EC DATA Link V

Action :  


CEID	Name	Remark	Data Type	Action
1	Equipment_Off_Line	ON-LINE->OFF-LINE	System	 
2	Control_State_Local	REMOTE->LOCAL or OFF-LINE->LOCAL	System	 
3	Control_State_Remote	LOCAL->REMOTE or OFF-LINE->REMOTE	System	 
4	Processing_State_Change	Any processing state transition(Send by AP)	System	 
5	Alarmn_Detected	ALARM CLEAR->ALARM SET	System	 
6	Alarmn_Cleared	ALARM SET->ALARM CLEAR	System	 
7	Operator_Equipment_Constant_Change	Operator activity changed equipment constant	System	 
8	Process_Program_Change	Operator activity creation/modification/deletion of ...	System	 
9	Process_Program_Selected	Operator/Host activity Selected Process Program...	System	 
10	Spooling_Activated	SPOOL INACTIVE->SPOOL ACTIVE	System	 
11	Spooling_Deactivated	SPOOL OUTPUT->SPOOL INACTIVE	System	 
12	Spool_Transmit_Failure	TRANSMIT SPOOL->NO SPOOL OUTPUT	System	 
13	Message_Recognition	Indicating the operator has viewed the text of a h...	System	 


[Go Back](#)

Event Manager is categorized into System and Eqp. The former is read from files and only CEID fields can be modified, while the action delete is not allowed. The latter allows users to add, delete and edit data.

Note: Please configure the settings of device code and start address on the I/O Mapping Function Block page before enabling the function of this page.

- Add new Event Manager

Click the add button  , then the add new window would pop up for you to configure the input values and characters of the related fields. (All the required fields must not be blank or the new setting would not be successfully added.)

Add New


CEID*

Name*

Remark*

G.3.2.6 SV DATA

SECS/GEM Config

Alarm Manager	Event Manager	SV DATA	DV DATA	EC DATA	Link V Setting	Command Parameter	Remote Command	Spool Allow	Parameter Manager	PPI
---------------	---------------	---------	---------	---------	----------------	-------------------	----------------	-------------	-------------------	-----

Action : + ✎

SVID	Name	Format	Length	Unit	Remark	Data Type	Action
1	SYS_LICENSE_CODE	ASCII			License code	System	✎ ✖
2	SYS_LICENSE_STATUS	UINT_1			License status	System	✎ ✖
3	SYS_CLOCK	ASCII			System Clock	System	✎ ✖
4	SYS_SECS_COMM_MODE	UINT_1			SECS Communication Mode(...	System	✎ ✖
5	SYS_PREVIOUS_CONTROL...	UINT_1			1:EquipmentOffLine; 2:Attemp...	System	✎ ✖
6	SYS_CONTROL_STATE	UINT_1			1:EquipmentOffLine; 2:Attemp...	System	✎ ✖
7	SYS_PREVIOUS_PROCESS...	UINT_1			Previous process state(Set by...	System	✎ ✖
8	SYS_PROCESS_STATE	UINT_1			Process state(Set by AP)	System	✎ ✖
9	SYS_MDLN	ASCII			Equipment Model Type (Set b...	System	✎ ✖
10	SYS_SOFTREV	ASCII			Equipment Software Revision...	System	✎ ✖
11	SYS_ALARM_ENABLED	LIST			Current Enable Alarms	System	✎ ✖
12	SYS_ALARM_SET	LIST			Current Set Alarms	System	✎ ✖
13	SYS_EVENT_ENABLED	LIST			Current Enable Events	System	✎ ✖
14	SYS_PP_EXEC_NAME	ASCII			Currently selected process pr...	System	✎ ✖
15	SYS_PP_FORMAT	UINT_1			1:Unformatted process progra...	System	✎ ✖
16	SYS_SPOOL_STATE	UINT_1			1:Inactive; 2:Active	System	✎ ✖
17	SYS_SPOOL_LOAD_SUBST...	UINT_1			0:Not Full; 1:Full	System	✎ ✖
18	SYS_SPOOL_UNLOAD_SUB...	UINT_1			0:No Spool Out; 1:transmit; 2:...	System	✎ ✖
19	SYS_SPOOL_START_TIME	ASCII	16		Spooling Start Time	System	✎ ✖
20	SYS_SPOOL_FULL_TIME	ASCII	16		Spooling Each Full Time	System	✎ ✖
21	SYS_SPOOL_COUNT_ACTU...	UINT_4			Spooling Current Actual Mess...	System	✎ ✖
22	SYS_SPOOL_COUNT_TOTAL	UINT_4			Spooling accumulation messa...	System	✎ ✖
23	SYS_MAX_SPOOL_SIZE	UINT_4			Spooling Max Message Count	System	✎ ✖
24	SYS_SOFTWARE_REVISION	ASCII			DIAGEM Software Revision	System	✎ ✖

Go Back

SV DATA is categorized into System and Eqp. The former is read from files and the SVID field can only be modified, while the action delete is not allowed. The latter allows users to add, delete and edit data. In addition, the setting of SVID cannot be duplicated with DVID and ECID, or the new setting would not be successfully added and the execution of Runtime would fail as well.

Note: Please configure the settings of device code and start address on the I/O Mapping Function Block page before enabling the function of this page.

- Add new SV DATA

Click the add button +, then the add new window would pop up for you to configure the input values and characters of the related fields. (All the required fields must not be blank or the new setting would not be successfully added.)

Add New

SVID*

SV Name*

Format*

BOOLEAN

Length*

1

Unit

Remark*

Finish

Cancel

G.3.2.7 DV DATA

SECS/GEM Config

Alarm Manager

Event Manager

SV DATA

DV DATA

EC DATA

Link V Setting

Command Parameter

Remote Command

Spool Allow

Parameter Manager

PPI

Action : +

DVID	Name	Format	Length	Unit	Remark	Data Type	Action
41	SYS_PP_CHANGE_NAME	ASCII			The PPID which was affected ...	System	<div></div> <div></div>
42	SYS_PP_CHANGE_STATUS	UINT_1			The Process Program take ac...	System	<div></div> <div></div>
43	SYS_UNFORMATTED_PP_...	BINARY			Unformatted PPChange Cont...	System	<div></div> <div></div>
44	SYS_FORMATTED_PP_CHA...	LIST			Formatted PPChange Conten...	System	<div></div> <div></div>
45	SYS_PP_ERROR	ASCII	256		Information about a failure to ...	System	<div></div> <div></div>
46	SYS_ALARM_ID	UINT_4			The current setting/clearing al...	System	<div></div> <div></div>
47	SYS_ECID_CHANGED	UINT_4			Latest operator changed equi...	System	<div></div> <div></div>
48	SYS_PREVIOUS_EC_VALUE	ASCII			Previous operator changed e...	System	<div></div> <div></div>
49	SYS_EC_VALUE_CHANGED	ASCII			Latest operator changed equi...	System	<div></div> <div></div>

Go Back

DV DATA is categorized into System and Eqp. The former is read from files and the DVID field can only be modified, while the action delete is not allowed. The latter allows users to add, delete and edit data. In addition, the setting of DVID cannot be duplicated with SVID and ECID, or the new setting would not be successfully added and the execution of Runtime would fail as well.

Note: Please configure the settings of device code and start address on the I/O Mapping Function Block page before enabling the function of this page.

● Add new DV DATA

Click the add button **+** , then the add new window would pop up for you to configure the input values and characters of the related fields. (All the required fields must not be blank or the new setting would not be successfully added.)

Add New

DVID*

DV Name*

Format*

BOOLEAN

Length

1

Unit

Remark*

Finish

Cancel

G.3.2.8 EC DATA

SECS/GEM Config

Alarm Manager

Event Manager

SV DATA

DV DATA

EC DATA

Link V Setting

Command Parameter

Remote Command

Spool Allow

Parameter Manager

PI

Action :

+

ECID	Name	Format	MinValue	MaxValue	DefaultValue	Length	Unit	Remark	Data Type	CanUpdate	Action
71	SYS_INIT_CO...	UINT_1	0	1	0			Initial Communi...	System	1	<div><div></div><div></div></div>
72	SYS_INIT_CO...	UINT_1	1	2	1			Initial Control S...	System	1	<div><div></div><div></div></div>
73	SYS_ESTAB_...	UINT_2	1	10000	5		Sec	Interval betwee...	System	1	<div><div></div><div></div></div>
74	SYS_OFF_LIN...	UINT_1	1	3	1			The default entr...	System	1	<div><div></div><div></div></div>
75	SYS_ON_LINE...	UINT_1	1	3	1			The default offli...	System	1	<div><div></div><div></div></div>
76	SYS_ON_LINE...	UINT_1	4	5	4			The default entr...	System	1	<div><div></div><div></div></div>
77	SYS_CONFIG...	BOOLEAN	False	True	False			Spool function ...	System	1	<div><div></div><div></div></div>
78	SYS_MAX_SP...	UINT_4	0	10000	100			The maximum t...	System	1	<div><div></div><div></div></div>
79	SYS_OVER_W...	BOOLEAN	False	True	False			Indicate to the ...	System	1	<div><div></div><div></div></div>
80	SYS_TIME_FO...	UINT_1	0	3	1			(SV)Clock For...	System	1	<div><div></div><div></div></div>
81	SYS_ONE_HA...	UINT_1	5	20	10			SECSGEM On...	System	1	<div><div></div><div></div></div>
82	SYS_ONE_HA...	UINT_1	5	20	5			SECSGEM On...	System	1	<div><div></div><div></div></div>
83	SYS_LOG_LE...	UINT_1	0	4	2			Debug Out Log...	System	1	<div><div></div><div></div></div>

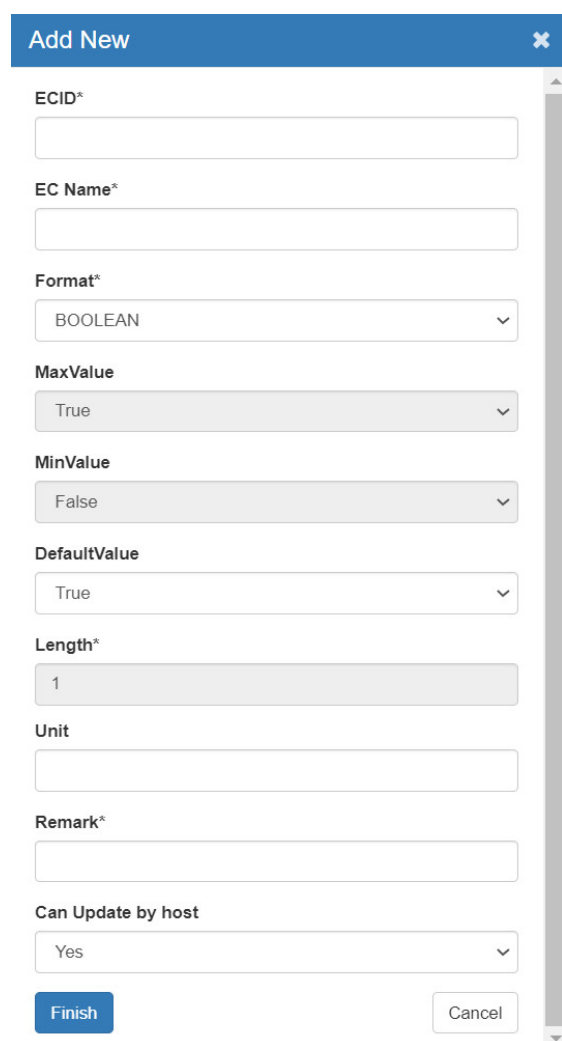
Go Back

EC DATA is categorized into System and Eqp. The former is read from files and the ECID field can only be modified, while the action delete is not allowed. The latter allows users to add, delete and edit data. In addition, the setting of ECID cannot be duplicated with SVID and DVID, or the new setting would not be successfully added and the execution of Runtime would fail as well. Furthermore, the DefaultValue of EC Data must be set between MaxValue and MinValue.

Note: Please configure the settings of device code and start address on the I/O Mapping Function Block page before enabling the function of this page.

● Add new EC DATA

Click the add button **+** , then the add new window would pop up for you to configure the input values and characters of the related fields. (All the required fields must not be blank or the new setting would not be successfully added.)



The 'Add New' dialog box is a modal window with a blue header bar containing the title 'Add New' and a close button (X). The dialog contains several input fields and dropdown menus for configuring EC DATA. The fields are: 'ECID*' (text input), 'EC Name*' (text input), 'Format*' (dropdown menu with 'BOOLEAN' selected), 'MaxValue' (dropdown menu with 'True' selected), 'MinValue' (dropdown menu with 'False' selected), 'DefaultValue' (dropdown menu with 'True' selected), 'Length*' (text input with '1' selected), 'Unit' (text input), 'Remark*' (text input), and 'Can Update by host' (dropdown menu with 'Yes' selected). At the bottom left is a blue 'Finish' button, and at the bottom right is a grey 'Cancel' button. A vertical scrollbar is visible on the right side of the dialog.

Field	Value
ECID*	
EC Name*	
Format*	BOOLEAN
MaxValue	True
MinValue	False
DefaultValue	True
Length*	1
Unit	
Remark*	
Can Update by host	Yes

G.3.2.9 Link V Setting

The back end of the webpage would read the file for the front end to configure, which the results would be saved in the file for you to add, delete or edit. This page is for grouping SV, DV and EC type VIDs and binding them to a source VID, which the format of SV and DV type VID should be set to Link so it can be the source to bind with other data. If the bound SV, DV or EC type VIDs have been edited or deleted, the binding group would no longer exist, which you will need to rebind the target VIDs and do the add action again.

Note: VIDs cannot be bound by each other (e.g. source A binds with target B while source B binding with target A.), or an error would be reported while executing Export and Runtime.

- Add new Link V Setting

Click the add button **+**, then the add new window would pop up for you to choose the source VID as well as the target VIDs to bind. Finally click “Finish” to complete. (Up to 200 VIDs can be bound with a source VID.)

<input type="checkbox"/>	VID	Name	Format	Data Type	Type
<input type="checkbox"/>	1	SYS_LICENSE_C...	ASCII	System	SV
<input type="checkbox"/>	2	SYS_LICENSE_S...	UINT_1	System	SV
<input type="checkbox"/>	3	SYS_CLOCK	ASCII	System	SV
<input type="checkbox"/>	4	SYS_SECS_COM...	UINT_1	System	SV
<input type="checkbox"/>	5	SYS_PREVIOUS_...	UINT_1	System	SV
<input type="checkbox"/>	6	SYS_CONTROL_...	UINT_1	System	SV
<input type="checkbox"/>	7	SYS_PREVIOUS_...	UINT_1	System	SV
<input type="checkbox"/>	8	SYS_PROCESS_...	UINT_1	System	SV
<input type="checkbox"/>	9	SYS_MDLN	ASCII	System	SV
<input type="checkbox"/>	10	SYS_SOFTREV	ASCII	System	SV

G.3.2.10 Command Parameter

SECS/GEM Config

EC DATA Link V Setting **Command Parameter** Remote Command Spool Allow Parameter Manager PPID Mapping Manager Formatted Process Parameter Formatted

Action : + ✎

ID	Name	Format	Length	Comment	Action
No Results					

[Go Back](#)

The back end of the webpage would read the file for the front end to configure, which the results would be saved in the file for you to add, delete or edit.

- Add new Command Parameter

Click the add button + , then the add new window would pop up for you to configure the input values and characters of the related fields. (All the required fields must not be blank or the new setting would not be successfully added.)

Add New ✕

Name*

Format*

BOOLEAN ▼

Length*

Comment*

Finish

Cancel

G.3.2.11 Remote Command

SECS/GEM Config

EC DATALink V SettingCommand ParameterRemote CommandSpool AllowParameter ManagerPPID Mapping ManagerFormatted Process ParameterFormatted C

Action : +

Remote Command Name	Remote Command Comment	Bind Command Parameters	Action
No Results			

Go Back

The back end of the webpage would read the file for the front end to configure, which the results would be saved in the file for you to add, delete or edit. If the name of a bind command parameter has been changed, the binding record would be removed, which you would need to rebind the target parameters and do the add action again.

Note: Please configure the settings of device code and start address on the I/O Mapping Function Block page before enabling the function of this page.

● Add new Remote Command

Click the add button + , then the add new window would pop up for you to configure the input values and characters of the related fields. (All the required fields must not be blank or the new setting would not be successfully added.) (Multiple command parameters can be bound together.)

Note: Command parameters need to be added first so you would be able to select the target Bind Command Parameters while adding new Remote Commands.

Add New

Remote Command Name*

Remote Command Comment*

FinishCancel

Select Bind Command Parameters

☐

Command Name

Format

Length

Comment

No Results

G.3.2.12 Spool Allow

SECS/GEM Config

EC DATA

Link V Setting

Command Parameter

Remote Command

Spool Allow

Parameter Manager

PPID Mapping Manager

Formatted Process Parameter

Format

<input type="checkbox"/>	Stream	Function	Caption
<input type="checkbox"/>	1	1	Are You There Request
<input type="checkbox"/>	1	13	Establish Communications Request (E to H)
<input type="checkbox"/>	2	17	Date and Time Request
<input type="checkbox"/>	5	1	Alarm Report Send
<input type="checkbox"/>	6	1	Trace Data Send
<input type="checkbox"/>	6	5	Multiblock Data Send Inquire
<input type="checkbox"/>	6	11	Event Report Send
<input type="checkbox"/>	7	1	Process Program Load Inquire
<input type="checkbox"/>	7	3	Process Program Send
<input type="checkbox"/>	7	23	Formatted Process Program Send
<input type="checkbox"/>	7	25	Formatted Process Program Request
<input type="checkbox"/>	7	27	Process Program Verification Send
<input type="checkbox"/>	7	29	Process Program Verification Inquire
<input type="checkbox"/>	9	1	Unrecognized Device ID
<input type="checkbox"/>	9	3	Unrecognized Stream Type
<input type="checkbox"/>	9	5	Unrecognized Function Type
<input type="checkbox"/>	9	7	Illegal Data
<input type="checkbox"/>	9	9	Transaction Timer Timeout
<input type="checkbox"/>	9	11	Data Too Long
<input type="checkbox"/>	9	13	Conversation Timeout
<input type="checkbox"/>	10	1	Terminal Request
<input type="checkbox"/>	10	7	Multiblock Not Allowed

Update Config

Go Back

The back end of the webpage would read the file for the front end to configure. Click “Update Config” after selecting the target configurations and the results would be saved in the file. (Spoon Allow setting is optional.)

G.3.2.13 Parameter Manager

SECS/GEM Config

terRemote CommandSpool AllowParameter ManagerPPID Mapping ManagerFormatted Process ParameterFormatted Command CodeUnformatted Process Paramete

GEM Message Scenario Config

Support Process Program Load Inquire (S7F1)

No

Support Process Program Load Inquire (S7F29)

No

GEM Item Format Config

ALID

UINT_4

CEID

UINT_4

DATAID

UINT_4

DATALENGTH

UINT_4

ECID

UINT_4

LENGTH

UINT_4

REPGSZ

UINT_4

RPTID

UINT_4

SMPLN

UINT_4

SVID

UINT_4

TRID

UINT_4

TOTSMP

UINT_4

VID

UINT_4

Update Config

Go Back

The back end of the webpage would read the file for the front end to configure. Click “Update Config” after the modification and the configuration results would be saved in the file. Different GEM Item Format Configs would be given according to the max. ID value set in Alarm, Event, SV DATA, DV DATA and EC DATA. SVID on the current config page represents SVID and DVID setting, which the rules of ID card numbers are listed as follows:

- UINT_1: Card ID number range 1~255
- UINT_2: Card ID number range 1~65535
- UINT_4: Card ID number range 1~4294967295
- UINT_8: Card ID number range 1~18446744073709551615

For example, in case that ALID is set to UINT_2, Alarm ID could only be set between 1~65535 while adding or editing data on Alarm Manager page. If set ALID to UINT_1, Alarm ID could only be set between 1~255. When SVID is set to UINT_2, ID number for adding or editing data on SV DATA and DV DATA page would be allowed to be in the range of 1~ 65535.

Furthermore, ID card rules for VID setting are listed as follows:

The minimum range setting for VID must be greater than the range settings for SVID and ECID.

Example 1: SVID (UINT_1), ECID (UINT_2), VID can only be set to UINT_2, UINT_4 and UINT_8.

Example 2: SVID (UINT_1), ECID (UINT_4), VID can only be set to UINT_4 and UINT_8.

Example 3: SVID (UINT_8), ECID (UINT_4), VID can only be set to UINT_8.

G.3.2.14 PPID Mapping Manager

Bit No	PPID
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

There are special rules for PPID to be read by Runtime. A total number of data must be 512 stored in the file, which the unused fields can be left blank. The back end of the webpage would read the file for users to configure. After modifying the configuration, the results would be saved in the file.

Note: Please configure the settings of device code and start address on the I/O Mapping Function Block page before enabling the function of this page.

- Modify PPID Mapping Manager

Directly click on the desired PPID to modify, then the edit window would pop up for you to configure the input values and characters of the related fields.

Modify

BitNo*

0

PPID

Finish

Cancel

G

G.3.2.15 Formatted Process Parameter

SECS/GEM Config

Command ParameterRemote CommandSpool AllowParameter ManagerPPID Mapping ManagerFormatted Process ParameterFormatted Command CodeUnformatte

Action : +

Name	Format	Length	Comment	Action
No Results				

Go Back

The back end of the webpage would read the file for the front end to configure, which the results would be saved in the file for you to add, delete or edit.

- Add new Formatted Process Parameter

Click the add button + , then the add new window would pop up for you to configure the input values and characters of the related fields. (All the required fields must not be blank or the new setting would not be successfully added.)

Add New

Name*

Length*

1

Comment*

Format*

BINARY(0 ~ 255)

Finish

Cancel

G.3.2.16 Formatted Command Code

SECS/GEM Config

Command ParameterRemote CommandSpool AllowParameter ManagerPPID Mapping ManagerFormatted Process ParameterFormatted Command CodeUnformatte

Action : + ✕

CCODE	CCODE Name	CCODE Comment	Formatted Process Parameter Name	Action
No Results				

Go Back

The back end of the webpage would read the file for the front end to configure, which the results would be saved in the file for you to add, delete or edit. If the name of a bind Formatted Process Parameter has been changed, the binding record would be removed, which you would need to rebind the target parameters and do the add action again.

Note: Please configure the settings of device code and start address on the I/O Mapping Function Block page before enabling the function of this page.

● Add new Formatted Command Code

Click the add button + , then the add new window would pop up for you to configure the input values and characters of the related fields. (All the required fields must not be blank or the new setting would not be successfully added.)

Note: Formatted Process Parameters need to be added first so you would be able to select the target Bind Formatted Process Parameters on the add new window.

Add New ✕

CCODE*

CCODE Name*

CCODE Comment*

FinishCancel

Select Bind Formatted Process Parameter

☐ Command Name

Format

Length

Comment

No Results

G.3.2.17 Unformatted Process Parameter

SECS/GEM設定

ter Remote Command Spool Allow Parameter Manager PPID Mapping Manager Formatted Process Parameter Formatted Command Code Unformatted Process Parameter

Unformatted PPBody Format*

BINARY(0 ~ 255)

動作: +

Name	Format	Length	Comment	動作
沒有結果				

返回

The back end of the webpage would read the file for the front end to configure, which the results would be saved in the file for you to add, delete or edit. Unformatted PPBody Format is configurable to regulate the format for transmitting SECS-II Item (PPBODY). (Used for check the SECS-II Item: 1. Whether HOST Download and the configuration are consistent. 2. Whether the format of PLC data uploaded by Eqp is consistent with the format setting.)

Note: Please configure the settings of device code and start address on the I/O Mapping Function Block page before enabling the function of this page.

● Add new Unformatted Process Parameter

Click the add button + , then the add new window would pop up for you to configure the input values and characters of the related fields. (All the required fields must not be blank or the new setting would not be successfully added.)

Add New

Name*

Format*

BOOLEAN

Length*

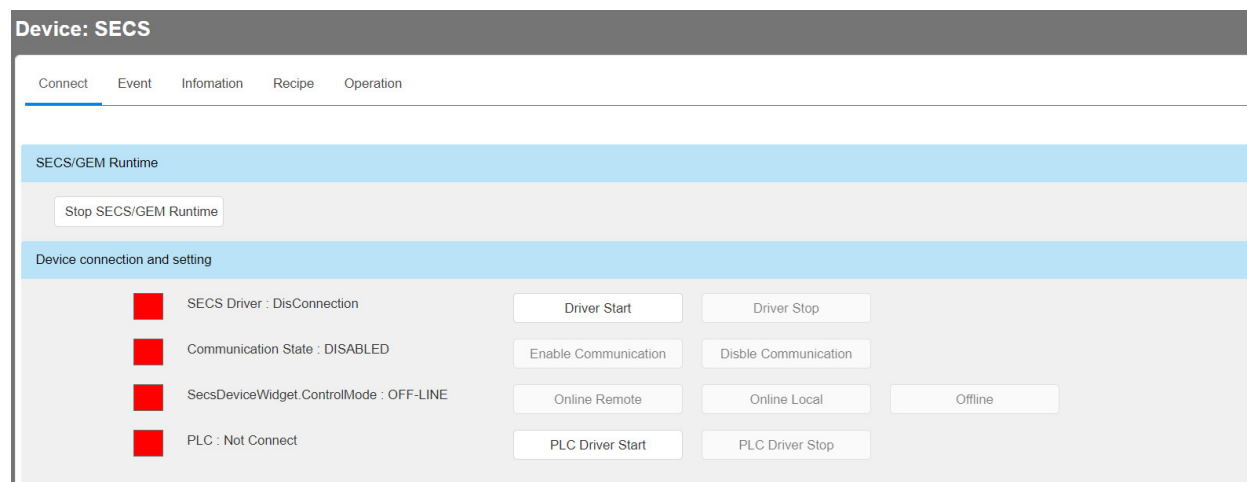
1

Comment*

Finish Cancel

G.3.3 Connect

Click to enable “Execute SECS/GEM Runtime” on “SECS/GEM Application” page, then the following page would be displayed.



- SECS/GEM Runtime: To disconnect Runtime, click “Stop SECS/GEM Runtime”.
- Device connection and setting: Start SECS driver first. Communication could be enabled after the driver connection is created, then select the desired Control mode. For PLC, it can be activated independently.

Note: You would be allowed to enable Communication only after SECS Driver is connected (light green). Once SECS driver stopped, Communication would be disconnected as well, which Control Mode can only be switched freely from one to another after Communication being enabled. In addition, suppose that Control Mode is set to Remote or Local, it would not change to Offline and still can switch between Remote and Local mode after you disable Communication. Only if you switch the mode to Offline (light red), Control mode would not be able to switch back to Remote and Local.

Note: After executing PLC Driver Stop, you would need to wait until the reminder window disappear before execute PLC Driver Start. So as to avoid errors being caused when equipment being re-activated before it has not yet been completely shut off.

Connection parameters Configuration

SECS Mode

HSMS

HSMS Connection parameters

Connect Mode

Passive

IP

127.0.0.1

Port

7000

Device ID

0

Link Test Period

60

Max Message Len(MB)

10

T3

45

T5

10

T6

5

T7

10

T8

5

SECS I Connection parameters

Role

Equipment

Baud Rate

9600

RTY

3

Com Port

1

Device ID

0

T1

0.5

T2

10

T3

45

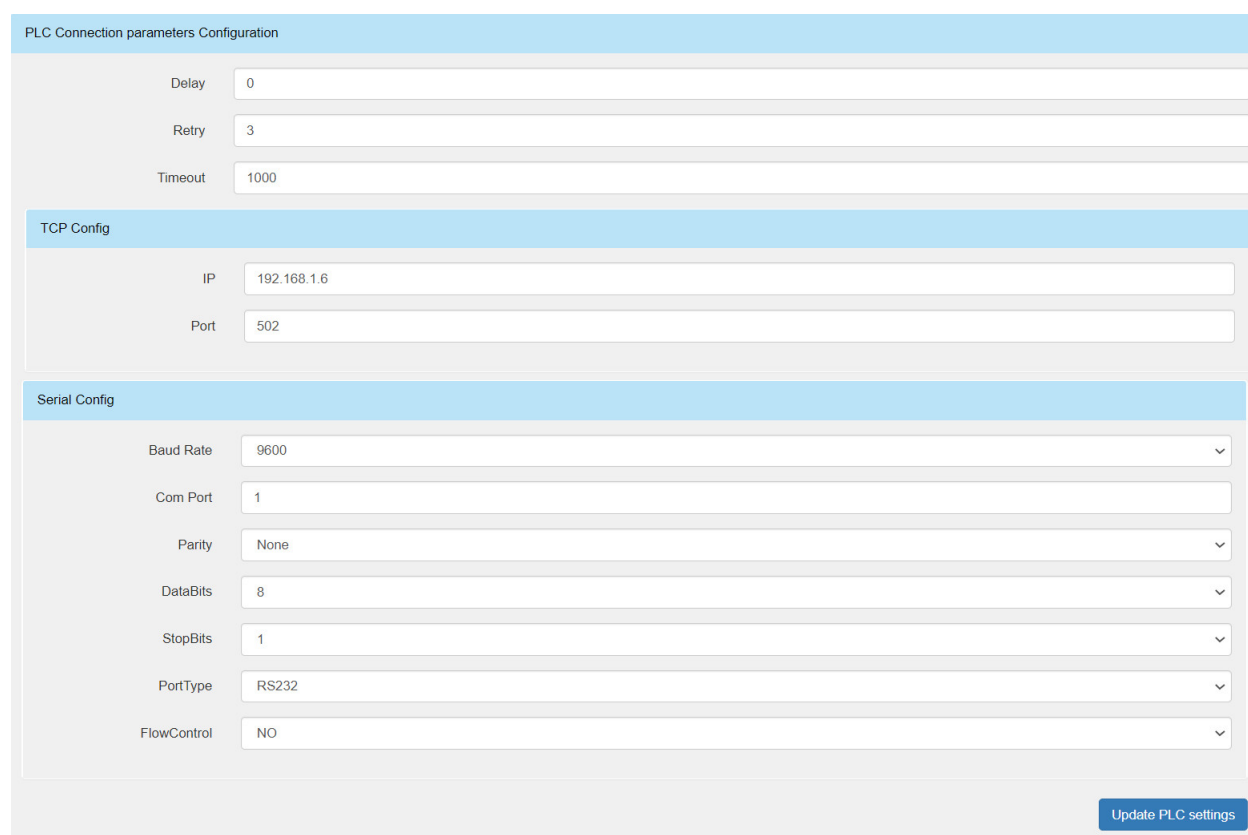
T4

45

Update Host settings

- SECS connection parameters configuration: Configure the related settings based on your needs. If there're two or more SECS devices, please note that the port settings cannot be duplicated, or you may not be able to execute Runtime. SECS mode: need to be same as the setting for Host. Connect mode: need to be the opposite status of Host. (For example, if Host is set to Passive, Connect Mode should be set to Active.)

Note: You would not be able to configure SECS connection parameters when Driver is connected. To configure, Diver needs to be stopped.



PLC Connection parameters Configuration

Delay

Retry

Timeout

TCP Config

IP

Port

Serial Config

Baud Rate

Com Port

Parity

DataBits

StopBits

PortType

FlowControl

Update PLC settings

- PLC connection parameters configuration: Configure the related settings based on your needs.

Note: You would not be able to configure PLC connection parameters when the PLC is connected. To configure, you'll have to disconnect the PLC.

G.3.4 Event

Events can be categorized into four event types: System, DIAGEM Lib, DIASECS Lib and SECS SML. Up to a maximum of 50 most recent events, created while executing RunTime, would be displayed according to the chosen event type.

Device: SEC2

ConnectEventInformationRecipeOperation

Please select event type :

SystemSystemDIAGEM LibDIASECS LibSECS SML

	Message
	2021/02/09 14:20:15:341 : [RunTimeHandler] [UI_SECSDriverStart()] [202102091420153232] Msg=> SECS driver(...
	2021/02/09 14:20:15:438 : [RunTimeHandler] [UI_SECSDriverStart()] [202102091420154259] Msg=> SECS driver(...
	2021/02/09 14:20:15:450 : [RunTimeHandler] [RecoverTaskProc()] [202102091420154389] Msg=> Recover SECS ...
	2021/02/09 14:20:15:463 : [RunTimeHandler] [MQTT_SysInfoSecsStateCmdSettingReq()] [202102091420154538] ...
4	2021/02/09 14:20:16:524 : [RunTimeHandler] [UI_EnableComm()] [202102091420164661] Msg=> EnableComm Fi...
5	2021/02/09 14:20:16:560 : [RunTimeHandler] [RecoverTaskProc()] [202102091420165280] Msg=> EnableComm F...
6	2021/02/09 14:20:16:655 : [RunTimeHandler] [GemControler_InitialCompleted()] [202102091420166247] Msg=> (fi...
7	2021/02/09 14:20:16:685 : [RunTimeHandler] [GemControler_InitialCompleted()] [202102091420166676] Msg=> (fi...
8	2021/02/09 14:20:16:705 : [RunTimeHandler] [GemControler_InitialCompleted()] [202102091420166875] Msg=> (fi...
9	2021/02/09 14:20:16:725 : [RunTimeHandler] [GemControler_InitialCompleted()] [202102091420167085] Msg=> (fi...
10	2021/02/09 14:20:16:747 : [RunTimeHandler] [GemControler_InitialCompleted()] [202102091420167264] Msg=> (fi...

G.3.5 Information

With three types of information: Status Variable Information, Data Variable Information and Equipment Constant Information, you can configure the information types in the profile and store the settings in the PLC. To view the desired information records, the PLC needs to be connected first. Before verifying values in Value column, you'll have to check whether the addresses in Address column are correct. For SV and Data Variable information, when the data format of SV DATA and DV DATA is set to Link with no binding to others, the information shown in Format column would be LIST and Length is 0. If binding with one VID, the format and the length of the bound data would be displayed in Format and Length column accordingly. With two or more bound VIDs, Format would display as LIST, while the number of the bound VIDs would be shown in Length.

Device: SEC2

ConnectEventInformationRecipeOperation

Please select information type :

Status Variable InformationStatus Variable InformationData Variable InformationEquipment Constant Information

		Name	Format	Length	Address	Value
		51	LIST	0		
		name61	UINT_1	1	D123	0
2	91	91 name	UINT_8	1	D124	0
3	31	31 word	BOOLEAN	1	D128	False
4	103	103	LIST	0		
5	333	333	BOOLEAN	1	D129	False
6	750	101	LIST	0		
7	311	041	BOOLEAN	1	D130	False
8	411	041 042	UINT_1	1	D131	0
9	511	511	FT_4	1	D132	0
10	121	121	UINT_8	1	D134	0

G.3.6 Recipe

Recipe can be categorized into three types: PPIDMapping, UnformattedPP and FormattedPP, which recipe data can be viewed on this page after you configured the profile and the devices have been connected. Of these, if selecting FormattedPP recipe type, the display would show the information of individual FormattedPP according to the bind setting of Formatted Command Code.

Device: SEC2

Connect Event Information **Recipe** Operation

Please select Recipe type : PPIDMapping

Bit No	PPID
0	04
1	TEST
2	2.2
4	PPID_4
5	PPID 5
6	1234567890123456789012345678901234567890123456789012345678901234567890
7	
8	
9	
10	

G.3.7 Operation

On this page, you can find features such as sending messages, time synchronization and System EC.

Device: SEC2

Connect Event Information Recipe **Operation**

Command and Message

Terminal Message

Clock

System EC

EC ID	Name	Format	Length	Current Value	Min Value	Max Value	Default Value	Remark
71	SYS_INIT_COMM_S...	UINT_1	1	0	0	1	0	Initial Communicatio...
72	SYS_INIT_CONTRO...	UINT_1	1	1	1	2	1	Initial Control State (...)
73	SYS_ESTAB_COM...	UINT_2	1	5	1	10000	5	Interval between atte...
74	SYS_OFF_LINE_SU...	UINT_1	1	1	1	3	1	The default entry of o...
75	SYS_ON_LINE_FAIL...	UINT_1	1	1	1	3	1	The default offline su...
76	SYS_ON_LINE_SUB...	UINT_1	1	4	4	5	4	The default entry of o...
77	SYS_CONFIG_SPOOL	BOOLEAN	1	False	False	True	False	Spool function switch...

- **Send Message:** The command of sending Terminal Message is given by Host, which the message can be viewed at HOST.

- Time Sync: Click "Time Sync" to change the system time of PC with Runtime installed to the correct time sent from HOST.
- SystemEC: Display the information of EC configured in the system.

Note: Clocks on the HOST and the PC with DIALink installed must match, or effectiveness of tokens might be affected.

G.3.8 Modify Advanced Setting of LOG

We suggest you use the default configuration. But if you need to change the storage period of LOG file, please modify the following parts from the C:\DIASECS-GEM RunTime from DIALINK\Config\GemRunTimeConfig.xml file (must act as administrator):

```
<item LogFileToZipDate="10" />
```

```
<item LogDeleteDate="20" />
```

If a log file is older than the specified period (LogFileToZipDate), the file would be compressed into a ZIP file.

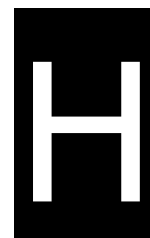
LogDeleteDate is set to delete log file older than a specified period.

Moreover, users who are capable of debugging are allowed to change log levels by modifying C:\DIASECS-GEM RunTime for DIALINK\DIASECS-GEM RunTimeForDIALINK.exe.config (must act as administrator). You can add more detailed information of logs, such as Info and Trace. Please be noticed that the occupied disk space would be larger as the information being more detailed and specific. We suggest you change it back to the default settings after finish debugging.

```
<rules>
  <logger name="System" levels="Error,Warn" writeTo="WriteTo" />
  <logger name="System" levels="" writeTo="WriteToInfo" final="true" />
  <logger name="DIAGEM_Lib" levels="Error,Warn" writeTo="WriteToGEM_Lib" />
  <logger name="DIAGEM_Lib" levels="" writeTo="WriteToInfoGEM_Lib" final="true" />
  <logger name="DIASECS_Lib" levels="Error,Warn" writeTo="WriteTo" />
  <logger name="DIASECS_Lib" levels="" writeTo="WriteToInfo" final="true" />
  <logger name="SECS_SML" levels="Error,Warn" writeTo="WriteTo" />
  <logger name="SECS_SML" levels="" writeTo="WriteToInfo" final="true" />
  <logger name="CommonPLC_Lib" levels="Error,Warn" writeTo="WriteTo" />
  <logger name="CommonPLC_Lib" levels="" writeTo="WriteToInfo" final="true" />
  <logger name="MQTT_Lib" levels="Error,Warn" writeTo="WriteTo" />
  <logger name="MQTT_Lib" levels="" writeTo="WriteToInfo" final="true" />
</rules>
```

G.4 Trouble Shooting

Item	Symptom	Corrective action
1	Errors, such as Timeout or unable to activate Runtime, may occur if pressing F5 key during operations on webpage.	Click Overview and enter the desired configuration page to resume normal.
2	If set to SECS-I mode without physical connection, communication errors may occur when connecting to HOST, which SECS Driver would be disconnected after being connected.	Please check the connection settings if Driver turns out to be disconnected after being connected.
3	A message showing "Failed to inspect authorization, incapable to apply the current data or features." pops up during the operation.	The symptom shows that authentication does not exist. Please check if the authorized Dongle key has been removed and insert again to resume normal operation.
4	After remove Dongle key while staying on "Connect", "Event", "Information" or "Recipe" page with SECS equipment being connected, the connection status would still be shown as connected on Connect page. For Event, Information, Recipe and Operation page, there will be no results to be displayed.	Please insert Dongle key again to resume normal operation of SECS equipment.
5	The software cannot be installed on the personal computer after 30 seconds waiting.	Before the installation starts, it may take 30 to 120 seconds waiting for closing services and file checks. Please wait patiently.
6	Could not find LOG files of SECS/GEM module.	A zipped collection of daily log data within any 10-day period would be stored in: (Default) C : \GEMRunTimeLog, which files would be deleted 20 days after.



Appendix H DIALink Global Authentication and HTTPS Setting

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H.1 Setup Description

Intranet application environment is mainly used in our DIALink system. If choosing to run the system in internet environment, you must consider of problems of data encryption. Both “Global Authentication” and “HTTPS” can be enabled and configured on DIALink user interface.

- Global Authentication: You would need an account and password for authorization before accessing all web APIs provided by DIALink.
- Manual configuration of HTTPS: Enable HTTPS protocol and use legal digital certificates issued by CAs.

H.1.1 Enable Global Authentication

Step 1: After logging in DIALink, enable “Global authentication via user setting on “Settings” page and then click “Save Changes”.

The screenshot displays the DIALink web interface. On the left is a blue sidebar with the Delta logo and a menu containing: Overview, Schedules, Events, Queries, Alarms, Monitoring, and Settings (highlighted with a gear icon). At the bottom of the sidebar, it says 'v 1.4.0.0 BETA8 © 2017 Delta Electronics, Inc. All Rights Reserved'. The main content area has a light gray background and contains three settings sections: 1. 'Modbus Slave Setting' with an 'Enabled' toggle set to 'OFF' and a 'Port' input field containing '502'. 2. 'OPCUA Server Setting' with 'Username' (root), 'Password' (masked with dots), 'Port' (4840), and a 'Restart' button. 3. 'User Setting' with 'Global Authentication' toggle set to 'OFF', 'Username' (root), 'Change Password' (masked with dots), and 'Confirm Password' (labeled 'Confirm Password'). A 'Save changes' button is at the bottom right of the settings area.

Step 2: Open Web API Swagger and use a GET type web API ([GET](#) /api/v1/devices/{deviceIDs}) to test if the authentication proceeds successfully by calling authentication. Hit “Try it out” after entering a device ID of an existing device in DIALink system.

Step 3: Confirm 【Global Authorization】 is enabled: If Response code is displayed to be 401 as shown below, the authentication mechanism is confirmed to be enabled.

Parameters

Parameter	Value	Description	Parameter Type	Data Type
deviceIDs	360	Device IDs (split by comma ,)	path	string

Try it out!

Hide Response

Curl

```
curl -X GET --header 'Accept: application/json' 'http://127.0.0.1:5000/api/v1/devices/360'
```

Request URL

```
http://127.0.0.1:5000/api/v1/devices/360
```

Request Headers

```
{
  "Accept": "application/json"
}
```

Response Body

no content

Response Code

401

Response Headers

```
{
  "content-length": "0",
  "date": "Mon, 06 Dec 2021 03:20:50 GMT",
  "server": "Kestrel",
  "www-authenticate": "Bearer",
  "content-type": null
}
```

Step 4: Disable 【Global Authorization】 and click “Save Changes”. Use the GET type web API (GET /api/v1/devices/{deviceIDs}) to test again. Enter a device ID of an existing device in DIALink system and hit “Try it out”. With authentication mechanism being disabled, the web API can be called directly to get detailed information of the target device.

swagger

http://127.0.0.1:5000/swagger/v1/swagger.json

Authorize

DIALink WebAPI v1

DIALink WebAPI v1

Activation

Show/Hide

List Operations

Expand Operations

Alarms

Show/Hide

List Operations

Expand Operations

Auth

Show/Hide

List Operations

Expand Operations

Devices

Show/Hide

List Operations

Expand Operations

GET

/api/v1/devices

Get all devices list

POST

/api/v1/devices

Add a new device *

DELETE

/api/v1/devices/{deviceIDs}

Delete one or multiple devices *

GET

/api/v1/devices/{deviceIDs}

Get one or multiple device data

Response Class (Status 200)

Success

Model

Example Value

```
{
  {
    "deviceId": 0,
    "guid": "string",
    "did": 0,
    "name": "string",
    "interfaceId": "string",
    "ip": "string",
    "port": 0,
    "station": "string",
  }
}
```

Response Content Type

text/plain

Parameters

Parameter	Value	Description	Parameter Type	Data Type
deviceIDs	360	Device IDs (split by comma ,)	path	string

Try it out!

Response

[Try it out!](#) [Hide Response](#)

Curl

```
curl -X GET --header 'Accept: application/json' 'http://127.0.0.1:5000/api/v1/devices/360'
```

Request URL

```
http://127.0.0.1:5000/api/v1/devices/360
```

Request Headers

```
{
  "Accept": "application/json"
}
```

Response Body

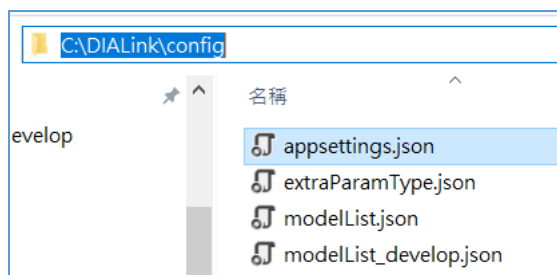
```
[
  {
    "deviceId": 360,
    "guid": "cbbe7470100940d4877c9e37359d6036",
    "did": 11,
    "name": "DVP",
    "interfaceId": "",
    "ip": "192.168.1.66",
    "port": 502,
    "station": 1,
    "discoveryURL": null,
    "serverName": null,
    "comPort": null,
    "baudRate": null,
    "dataBits": null,
    "parity": null,
    "stopBits": null,
    "mode": null,
    "commType": 0,
    "commSpeed": 115200
  }
]
```

Response Code

```
200
```

H.1.2 Enable HTTPS

Step 1: Open the file appsettings.json in config file folder under the installation path (Default: C:\DIALink) with text editor (require administrative privileges).



Step 2: Change the value of EnableHttps to TRUE in the field of WebAPI and modify the value "http" of ApiUri to "https".

Step 3: Configure the file path of CA files (legal digital certificates signed by CAs) required for modifying Https: Configure Path (File path for certificates) and password (certificate password) in the field of SSLCertificate. The password would be stored in an encrypted format after rebooting DIALink services.

```

12  "WebAPI": {
13    "GlobalAuthorize": false,
14    "EnableHttps": true,
15    "ApiUri": "https://127.0.0.1:5000/",
16    "Urls": "http://*",
17    "Port": 5000,
18    "SSLCertificate": {
19      "Path": "C:\\DIALink\\CA\\web\\DIALink.pfx",
20      "Password": "1234"
21    }
  },

```

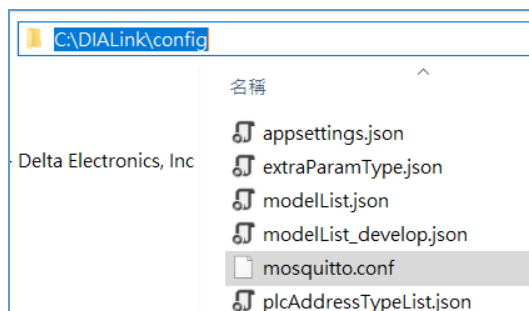
```

"SSLCertificate": {
  "Path": "C:\\DIALink\\Web\\CA\\web\\DIALink.pfx",
  "Password": "sPapyNQ5tOKBikN6RCwO8w=="
},

```

Step 4: MQTT Web Socket setup:

Open the file mosquitto.conf in config file folder under the installation path (Default: C:\DIALink) with text editor (require administrative privileges).



Step 5: Enable and modify the file path for certificates.

Cafile: CA files

Certfile: Server certificates

Keyfile: Server key files

```

# wss: Web Socket with TLS
# wss listener port-number [ip address/host name]
# CA certificate
cafile C:/DIALink/Web/CA/mqtt/DIALink_CA.crt

# Path to the PEM encoded server certificate.
certfile C:/DIALink/Web/CA/mqtt/DIALink.crt

# Path to the PEM encoded keyfile.
keyfile C:/DIALink/Web/CA/mqtt/DIALink.key

```

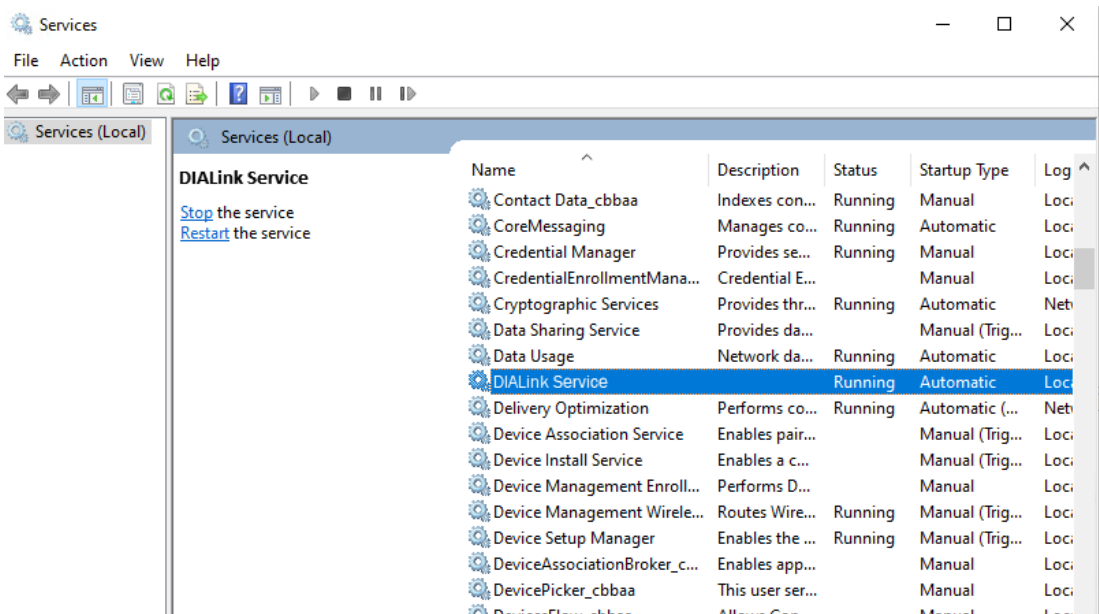
Step 6: Open the file config.json in web\wwwroot\config file folder under the installation path (Default: C:\DIALink) with text editor (require administrative privileges).



Step 7: Change the value of websocketEncrypt to TRUE.

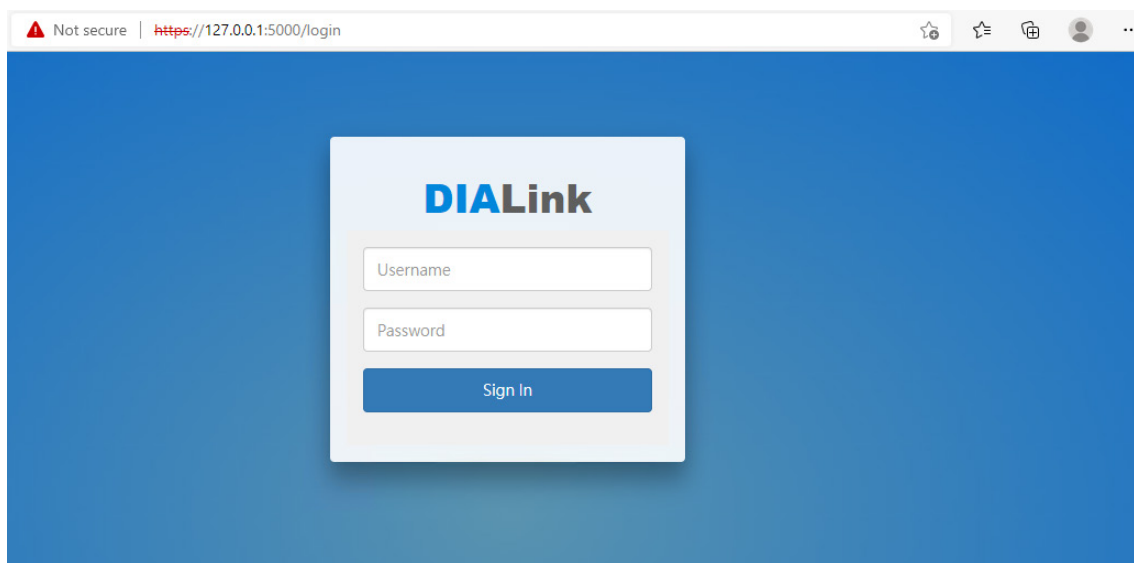
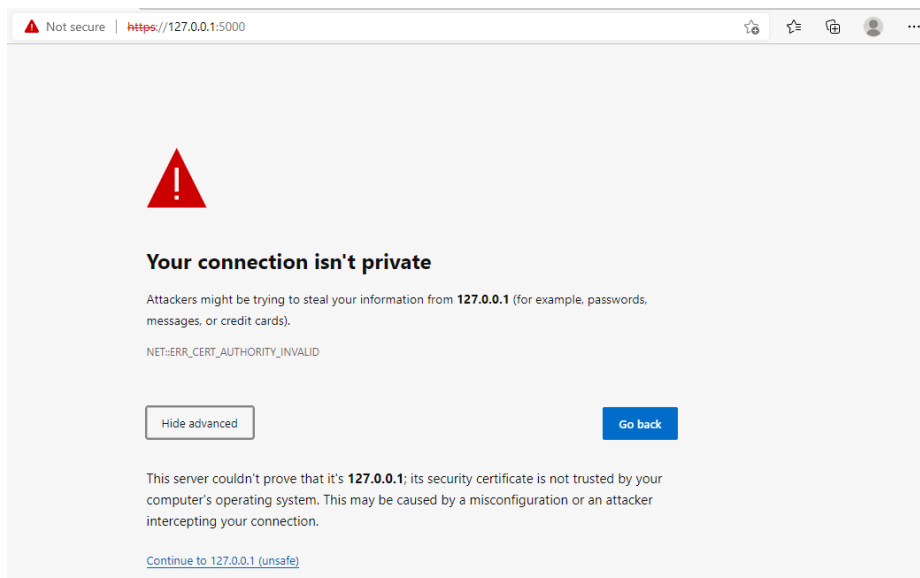
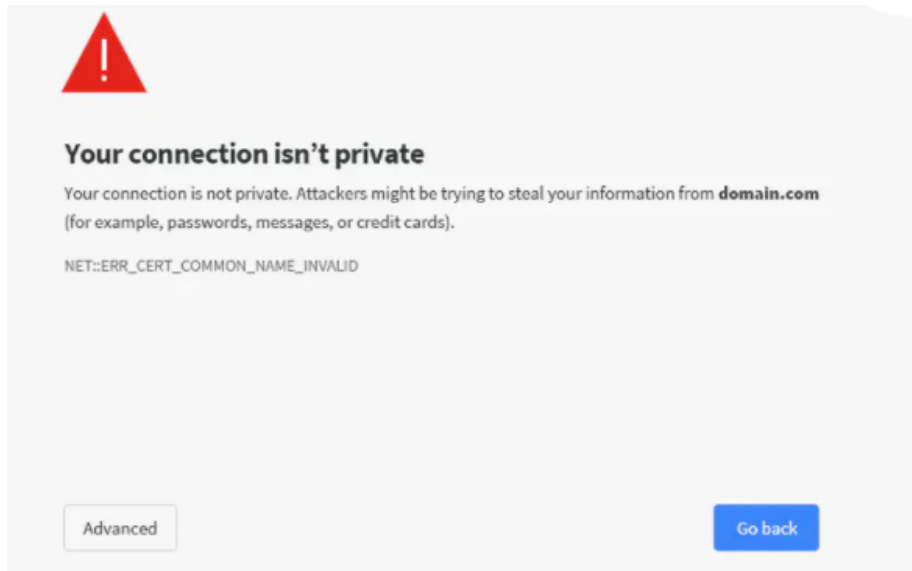
```
{
  "apiUri": "/api/v1/",
  "mqttHost": null,
  "mqttPort": "8081",
  "websocketEncrypt": true
}
```

Step 8: Restart DIALink services.



You can check if the website supports HTTPS protocol via <https://127.0.0.1:Port>.
(The default setting of this port is 5000)

Note 1: If using a self-signed certificate (e.g. Test CA files under the default file path), the following inquiry page would be displayed and the normal operation of the system will be affected, such as MQTT Web Socket communication and web APIs called by third parties. Please choose “Continue to the site” after choosing “Advanced”, then you’ll be allowed to use DIALink with the browser.



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