User Manual

WISE-4000 Series

IoT Ethernet I/O Module

ADVANTECH

Enabling an Intelligent Planet

Copyright

Acknowledgements

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Product Warranty

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandize authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

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Declaration of Conformity

CE

This product has passed the CE test for environmental specifications. We recommend the use of shielded cables.

FCC Class A

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

Technical Support and Assistance

1. Visit the Advantech web site at www.advantech.com/support where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
   - Product name and serial number
   - Description of your peripheral attachments
   - Description of your software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wording of any error messages

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.

3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
    - The power cord or plug is damaged.
    - Liquid has penetrated into the equipment.
    - The equipment has been exposed to moisture.
    - The equipment does not work well, or you cannot get it to work according to the user's manual.
    - The equipment has been dropped and damaged.
    - The equipment has obvious signs of breakage.
15. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -20° C (-4° F) OR ABOVE 60° C (140° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.
16. CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER, DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
17. The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).

DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

Contents

Chapter 1

Product Overview

1.1 Introduction

WISE-4000 series is an Ethernet-based wired or wireless IoT device, which integrated with IoT data acquisition, processing, and publishing functions. Except various I/O type offering, WISE-4000 series provides data pre-scaling, data logic, and data logger functions. These data can be access via mobile devices and be published to cloud with security in anytime and anywhere.

1.2 Feature Highlights

1.2.1 RESTful Web Service

Representational State Transfer (REST) is a software architecture style widely used for creating scalable web services. With the advantage of scalability, simplicity and performance, it's already adopted in IoT applications. It is based on Hypertext Transfer Protocol (HTTP) and uses verbs, like GET, POST, PUT, DELETE, etc., for web browsers to get web pages or retrieve data with remote servers. The data can be retrieved by internet media like HTML, XML, or JSON. REST s a uniform resource identifier (URI) to identify the data. Like using “http://10.0.0.1/analoginput/ch0” to identify the analog input value of channel 0. Then the web server may retrieve a JSON file analog input value of channel 0.

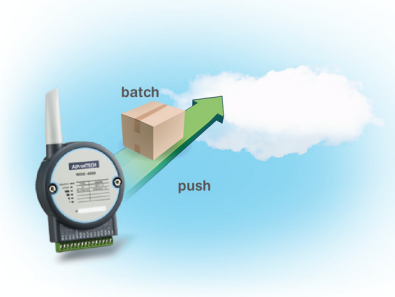
1.2.2 Data Storage Function

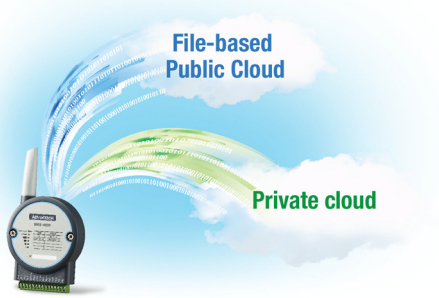
The internal flash of the WISE module can log up to 10,000 data samples with a time stamp. The I/O data can be logged periodically, and when the I/O status changes. Once the memory is full, users can choose to overwrite the old data to ring log or just stop the log function. When the module is powered-off, data can be kept in the module. When restarting, users can decide whether to clear all data or continue logging.

The definition of data in the IoT is not only the status of everything, but also includes time or location information. With a built-in Real Time Clock (RTC), WISE modules log data with a time stamp and the MAC address of the WISE module. The internal RTC can be calibrated by SNTP with time server. Once the module has been powered-off, the internal time can also be saved using the time backup battery. When users poll the data from the data logger, the time stamp will always be attached to the data.

1.2.3 IoT Cloud Function

Local storage data not only can be polled by the user, it can also be pushed to the cloud automatically. Once the logger reaches the upload criteria, Data Logger will push the data to public cloud services like Dropbox or Baidu. This data will be saved on the cloud using a *.csv file extension. Users can synchronize the data on the cloud using the application program provided by the cloud provider where it can be accessed from anywhere. With the provided RESTful API, users can configure their private cloud and push the data onto it. Cloud Logger provides a very flexible solution for cloud data storage. A WISE module is the only one stop from data acquisition to the cloud.





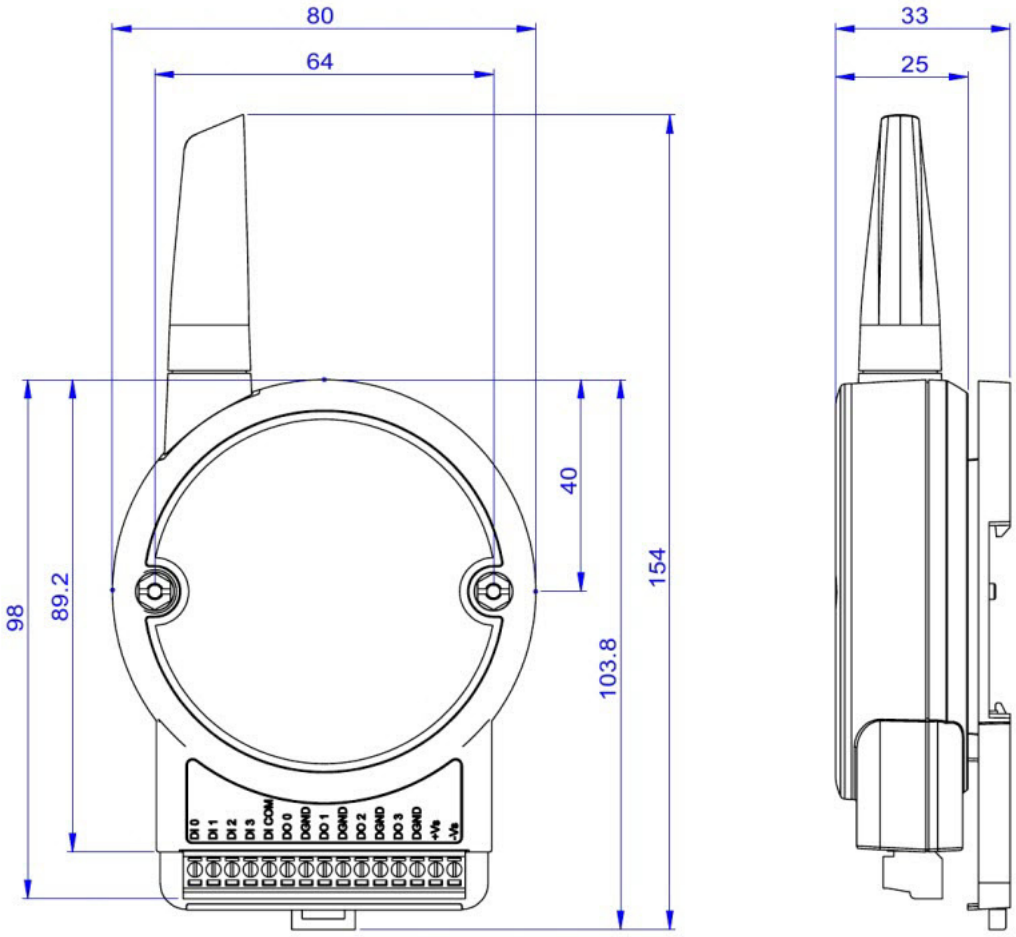
1.3 Series Family and Specifications

1.3.1 Series Family

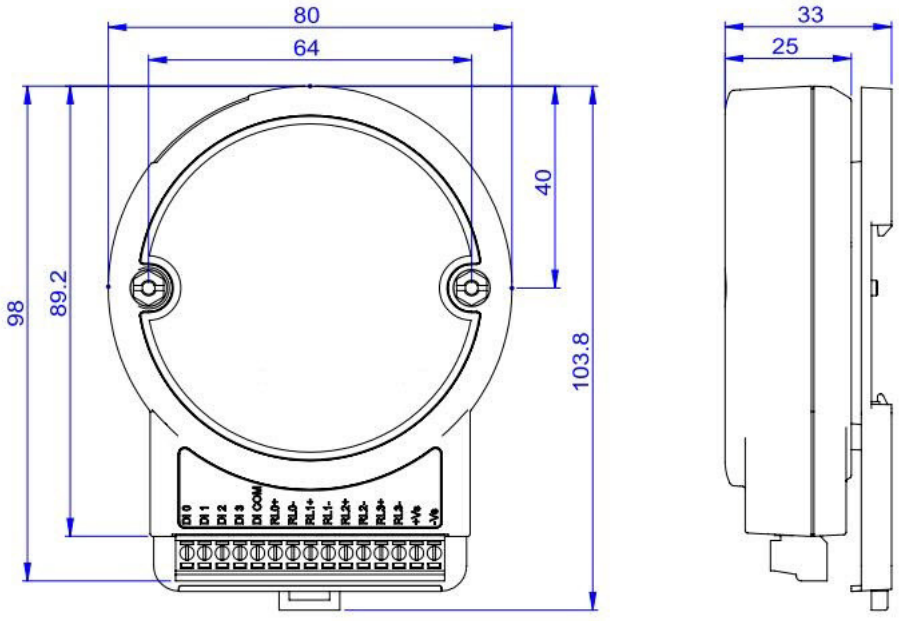
Interface	Model	Description
WLAN	WISE-4012E	6-ch Input/Output IoT Wireless I/O Module for IoT Developers
	WISE-4050	4-ch Digital Input and 4-ch Digital Output IoT Wireless I/O Module
	WISE-4060	4-ch Digital Input and 4-ch Relay Output IoT Wireless I/O Module
LAN	WISE-4010/LAN	4-ch Current Input and 4-ch Digital Output IoT Ethernet I/O Module
	WISE-4050/LAN	4-ch Digital Input and 4-ch Digital Output IoT Ethernet I/O Module
	WISE-4060/LAN	4-ch Digital Input and 4-ch Relay Output IoT Ethernet I/O Module

1.4 Mechanical Design and Dimensions

1.4.1 WISE-4000 Wireless Series Dimensions



1.4.2 WISE-4000/LAN Dimensions



1.5 Switch

Switch	Description	Position	ON (Default)	OFF
SW1	Operation Mode	P1	Normal Mode	Initial Mode
		P2	N/A	N/A
SW2	DI Type (all channels)	P1	Dry Contact	Wet Contact
		P2	Dry Contact	Wet Contact

Note 1 After the position 1 of SW1 been changed, user need to power on the module again to apply the operation mode

Note 2 SW2 in only for WISE-4050(/LAN) and WISE-4060(/LAN), all 4 channels have to be configured to dry contact or wet contact in the same time, and both P1 and P2 have to be changed together

1.6 LED Definition

■ WISE-4000 Wireless Series

LED	Color	Indication	Behavior
Status	Green	Blink	2Hz: Wait for connection 0.5Hz: Network Connected
		ON 30 Sec	When enable LOCATE function.
Com	Yellow	Blink	When TX/RX data in transmission
AP/Infra	Green	ON	Limited AP Mode
		OFF	Station Mode
Signal Strength	Green	ON *4	Full Signal
		ON *3	Good Signal
		ON *2	Okay Signal
		ON *1	Poor Signal
		All OFF	No Signal/ Limited AP Mode

■ WISE-4000/LAN Series

LED	Color	Indication	Behavior
Status	Green	Blink	Module is normally at work. (1Hz)
		ON 30 Sec	When enable LOCATE function.
Com	Yellow	Blink	When TX/RX data in transmission
Link	Green	ON	Both ends of devices are connected
Speed	Yellow	ON/OFF	ON: 100 Mbps OFF: Less than 10 Mbps

1.7 Certification and Safety Standard

WISE-4000/LAN Series

- FCC
  - FCC Part 15 Class A
  - IC ICES-003
- CE
  - EN 55011 (Group 1, CLASS A)
  - EN 55022
  - EN 61000-6-4
  - EN 61000-6-2
  - IEC 61000-4-2
  - IEC 61000-4-3
  - IEC 61000-4-4
  - IEC 61000-4-5
  - IEC 61000-4-6
  - IEC 61000-4-8
  - IEC 61000-4-11
  - RoHS
- China RoHS

WISE-4000 Wireless Series

- FCC
  - FCC Part 15 Class A
  - IC ICES-003
- CE
  - EN 55011 (Group 1, CLASS A)
  - EN 55022
  - EN 61000-6-4
  - EN 61000-6-2
  - IEC 61000-4-2
  - IEC 61000-4-3
  - IEC 61000-4-4
  - IEC 61000-4-5
  - IEC 61000-4-6
  - IEC 61000-4-8
  - IEC 61000-4-11
  - RoHS
- NCC
- SRRC
- China RoHS

1.8 Package Information

WISE-4000 Wireless Series

- WISE-4000 Module with bundle antenna and terminal connector x1
- Mounting bracket x1
- Quick startup manual with China RoHS declare

WISE-4000/LAN Series

- WISE-4000/LAN Module
- Mounting bracket x1
- Quick startup manual with China RoHS declare

WISE-4012E

- WISE-4012E Module with bundle antenna and terminal connector x1
- Quick startup manual with China RoHS declare
- USB drive with WebAccess (WISE-4012E-IDK only)
- USB power cable
- Extension board
- Screwdriver

Chapter 2

Product Specifications

2.1 General Specification

WLAN Interface

- Standard Conformance:
  - 802.11b
  - 802.11g
  - 802.11n (2.4GHz only)
- Network Modes:
  - Limited AP (Wireless Server)
  - Station/Infrastructure (Wireless Client)

LAN Interface

- Ethernet: IEEE 802.3u 10/100Base-T(X)
- Connector: 1-port RJ-45

General

- I/O Connector: 3.5mm spacing, 15-pole, plug-in screw terminal block
- Power Connector: Micro-B USB for WISE-4012E, other modules use same connector as I/O
- Watchdog Timer
  - System: 1.6 second
  - Communication
  - Programmable (FSV)
- RTC Accuracy: 3 min/month (WISE-4012E does not provide RTC)
- Enclosure: PC
- Mounting: DIN 35 rail, wall, and stack
- Dimensions (W x H x D)
  - With bundle antenna
  - Without bundled antenna: 80 x 89 x 25 mm
- Operation Temperature:
  - WISE-4000 Wireless Series: -25~70°C (-13~158°F)
  - WISE-4000/LAN Series: -40~70°C (-40~158°F)
- Cold Start Temperature
  - WISE-4000 Wireless Series: -20~70°C (-4~158°F)
  - WISE-4000/LAN Series: -40~70°C (-40~158°F)
- Storage Temperature: -40~85°C (-40~185°F)
- Operating Humidity: 20~ 95% RH (non-condensing)
- Storage Humidity: 0~95% RH (non-condensing)

Note! *Equipment will operate below 30% humidity. However, static electricity problems occur much more frequently at lower humidity levels. Make sure you take adequate precautions when you touch the equipment. Consider using ground straps, anti-static floor coverings, etc. if you use the equipment in low humidity environments.*

Power

- Power Input Voltage: 10~30 V_{DC} (24 V_{DC} Standard)
  - WISE-4050
  - WISE-4060
  - WISE-4010/LAN
  - WISE-4050/LAN
  - WISE-4060/LAN

  USB 5V_{DC}
  - WISE-4012E
- Power Consumption
  - WISE-4012E: 2.2 W @ 5 V_{DC}
  - WISE-4050: 2.2 W @ 24 V_{DC}
  - WISE-4060: 2.5 W @ 24 V_{DC}
  - WISE-4010/LAN: 1.2 W @ 24 V_{DC}
  - WISE-4050/LAN: 2.2 W @ 24 V_{DC}
  - WISE-4060/LAN: 2.5 W @ 24 V_{DC}
- Reverse Power Protection (not for WISE-4012E)

Software

- Configuration Interface: Web Interface, Windows Utility
- Utility: WISE-4000/Apax .NET Utility
- Driver: WISE-4000 .NET Class Library
- Industrial Protocol: Modbus/TCP
- Supported Protocols: TCP/IP, UDP, HTTP, HTTPS, DHCP, ARP, SNTP
- Supports RESTful Web API in JSON format
- Supports Web Server in HTML5 with JavaScript & CSS3

Note! *RTC Accuracy: 3 min/month (WISE-4012E does not provide RTC)*

2.2 WISE-4010/LAN

2.2.1 I/O Specification

- Current Input
  - Channel: 4
  - Resolution: 12-bit
  - Sampling Rate: 10/100 Hz/channel
  - Accuracy: ±0.2% of FSR @ 25°C
  - Input Range: 0~20 mA, 4~20 mA (Select by Web Configuration)
  - Input Impedance: 120 Ω
  - Burn-out Detection: Yes (4~20 mA only)
  - Supports Data Scaling and Averaging

- Digital Output
  - Channels: 4
    - Open collector to 30 V, 500 mA max. for resistance load
    - Inductive loads require an external diode to eliminate back-EMF when the DO is turned off
  - On Resistance ($R_{DS(ON)}$): 0.7 Ω (max.) @ 500mA, 25°C
  - Supports 1 kHz Pulse Output
  - Supports High-to-Low and Low-to-High Delay Output

2.2.2 Application Wiring

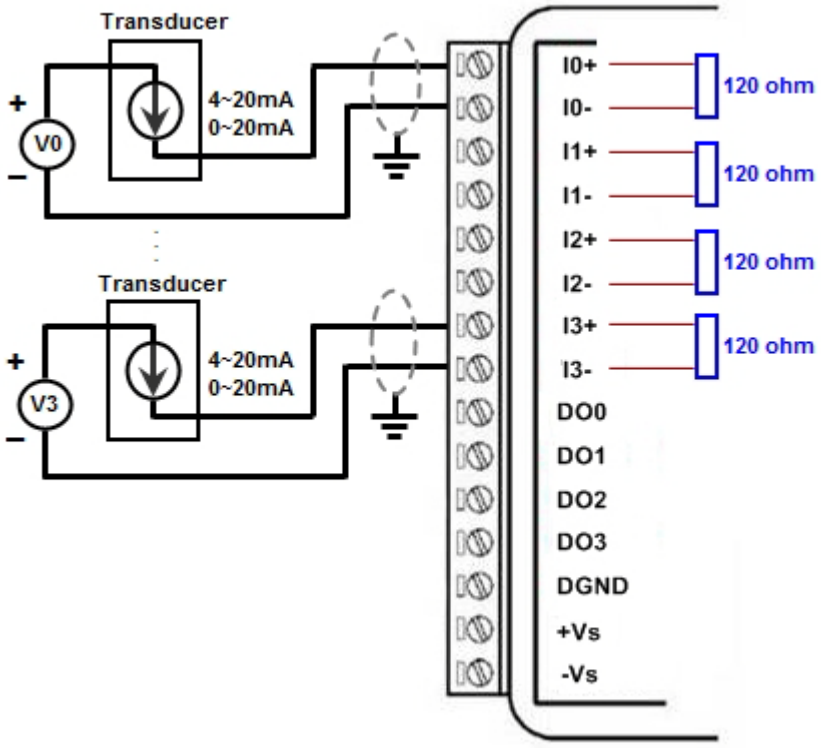


Figure 2.1 WISE-4010/LAN Current Input Wiring Diagram

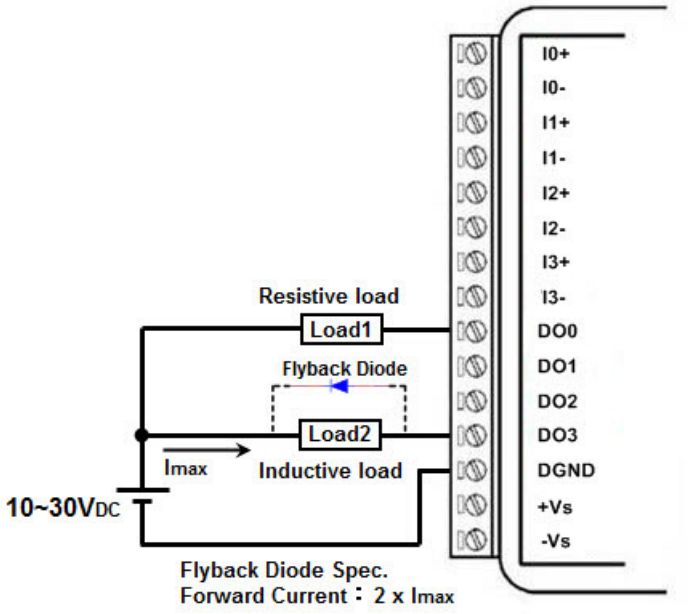


Figure 2.2 WISE-4010/LAN Digital Output Wiring Diagram

2.2.3 Pin Assignment

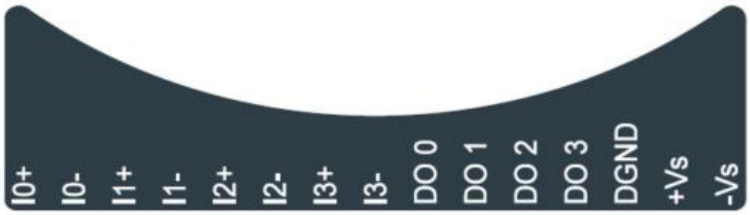


Figure 2.3 WISE-4010/LAN Pin Assignment

2.2.4 Block Diagram

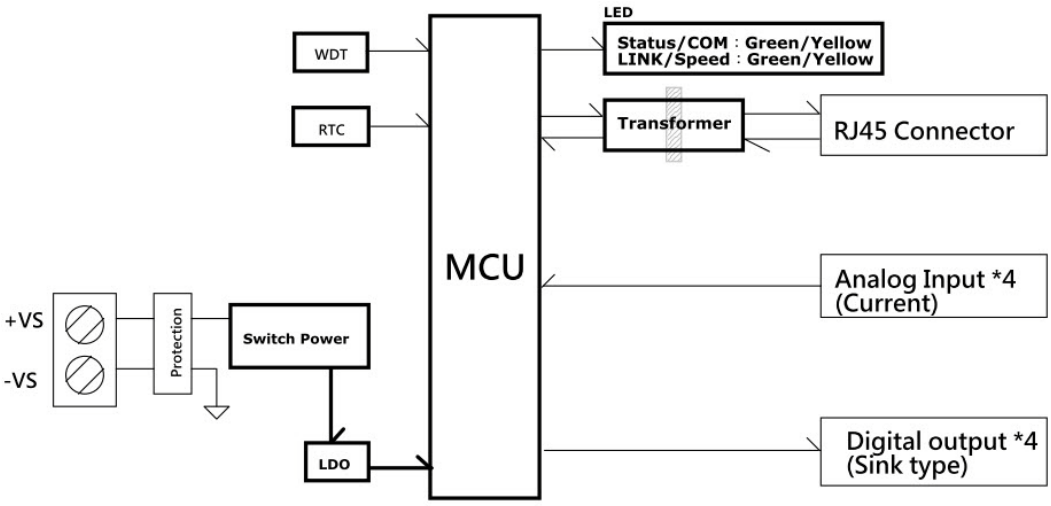


Figure 2.4 WISE-4010/LAN Block Diagram

2.3 WISE-4050/LAN

2.3.1 I/O Specification

- Digital Input
  - Channel: 4
  - Logic level
    - Dry Contact 0: Open
      1: Close to DI COM
    - Wet Contact 0: 0~3 V_{DC} or -3~0 V_{DC}
      1: 10~30 V_{DC} or -30~-10 V_{DC} (3 mA min.)
    - All 4 channels should be configured to dry contact or wet contact in the same time
  - Isolation: 3,000 V_{rms}
  - Supports 32-bit Counter Input Function (Maximum signal frequency 3 kHz)
  - Keep/Discard Counter Value when Power-off
  - Supports Frequency Input Function (Maximum frequency 3 kHz)
  - Supports Inverted DI Status

Digital Output

- Channels: 4
  - Open collector to 30 V, 500 mA max. for resistance load
  - Inductive loads require an external diode to eliminate back-EMF when the DO is turned off
- Isolation: 3,000 V_{rms}
- On Resistance ($R_{DS(ON)}$): 0.7 Ω (max.) @ 500mA, 25°C
- Supports 1 kHz Pulse Output
- Supports High-to-Low and Low-to-High Delay Output

2.3.2 Application Wiring

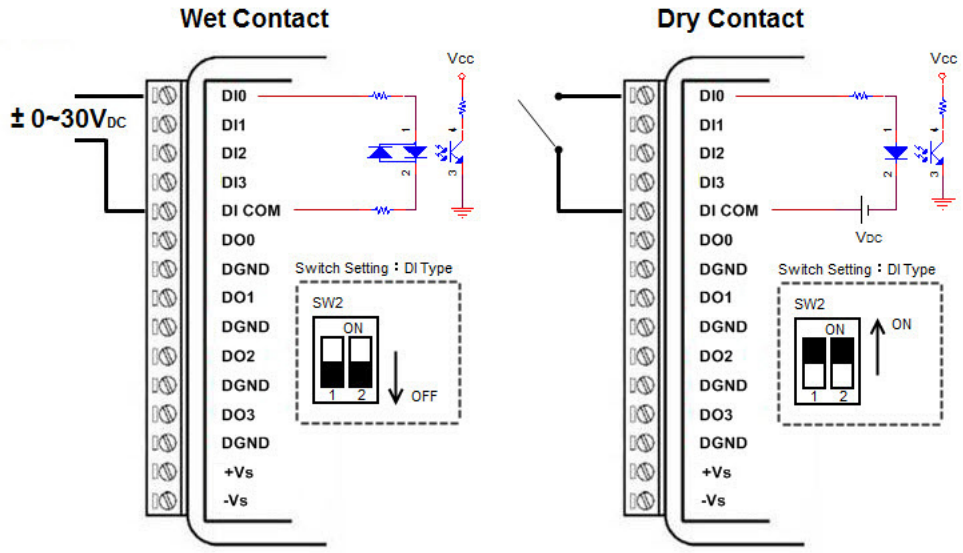


Figure 2.5 WISE-4050/LAN Digital Input Wiring Diagram

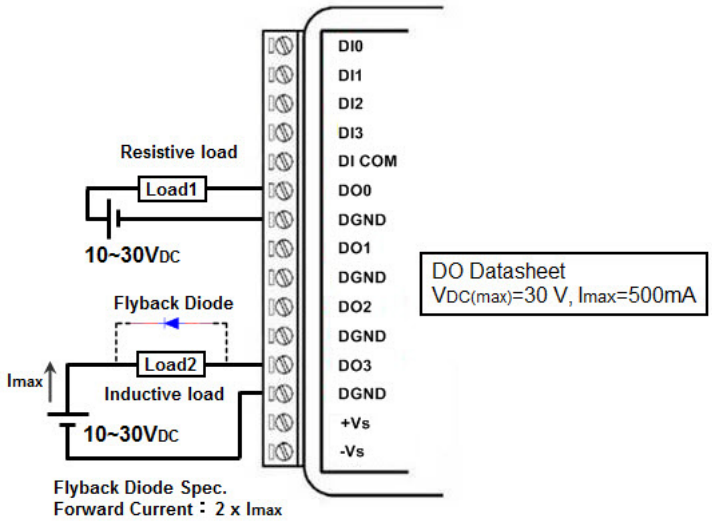


Figure 2.6 WISE-4050/LAN Digital Output Wiring Diagram

2.3.3 Pin Assignment

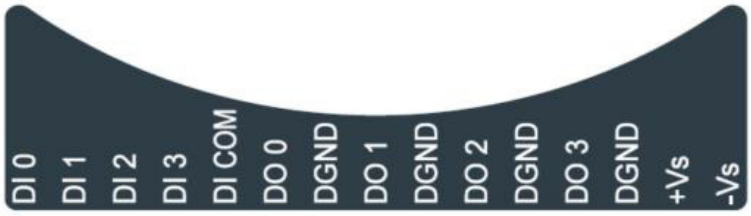


Figure 2.7 WISE-4050/LAN Pin Assignment

2.3.4 Block Diagram

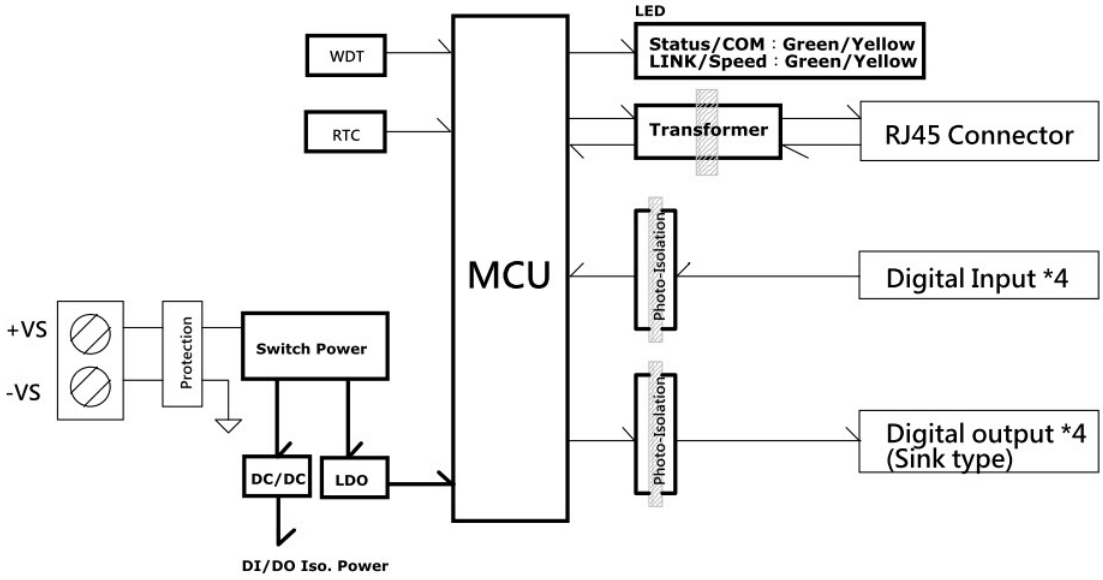


Figure 2.8 WISE-4050/LAN Block Diagram

2.4 WISE-4060/LAN

2.4.1 I/O Specification

- Digital Input
  - Channel: 4
  - Logic level
  - Dry Contact 0: Open
    1: Close to DI COM
  - Wet Contact 0: 0~3 V_{DC} or -3~0 V_{DC}
    1: 10~30 V_{DC} or -30~-10 V_{DC} (3 mA min.)
  - Isolation: 3,000 V_{rms}
  - Supports 32-bit Counter Input Function (Maximum signal frequency 3 kHz)
  - Keep/Discard Counter Value when Power-off
  - Supports Frequency Input Function (Maximum frequency 3 kHz)
  - Supports Inverted DI Status

Relay Output

- Channels: 4 (Form A)
- Contact Rating (Resistive Load)
  –250 V_{AC} @ 5 A
  –30 V_{DC} @ 3 A
- Relay On Time: 10 ms
- Relay Off Time: 5 ms
- Insulation Resistance: 1 GΩ min. @ 500 V_{DC}
- Dielectric Strength
  –Between Contacts: 1000 V_{AC} (1min)
  –Between Coil to Contact: 3000 V_{AC} (1min)
- Maximum Switching: 60 operations/minute
- Supports Pulse Output
- Supports High-to-Low and Low-to-High Delay Output

2.4.2 Application Wiring

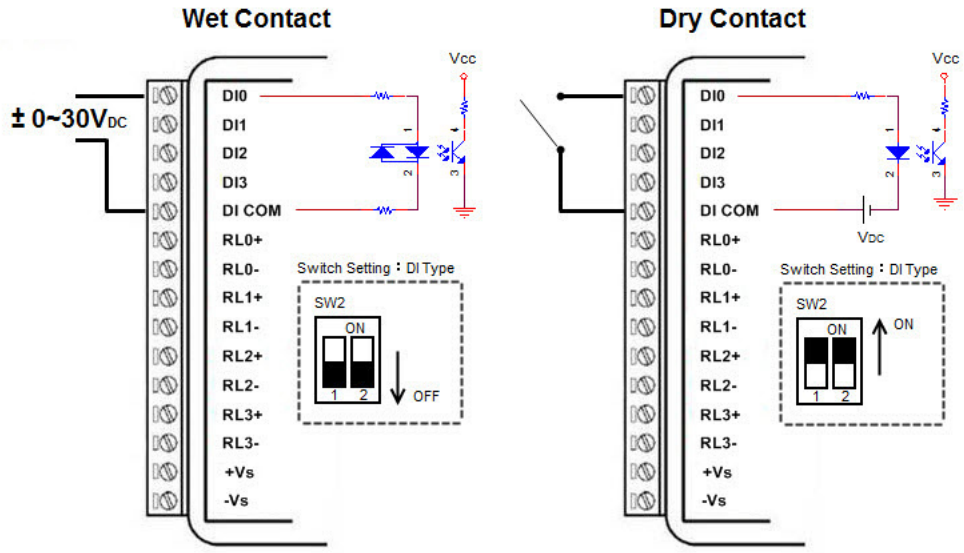


Figure 2.9 WISE-4060/LAN Digital Input Wiring Diagram

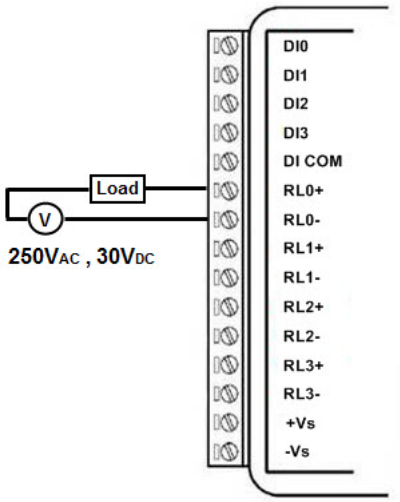


Figure 2.10 WISE-4060/LAN Relay Output Wiring Diagram

2.4.3 Pin Assignment

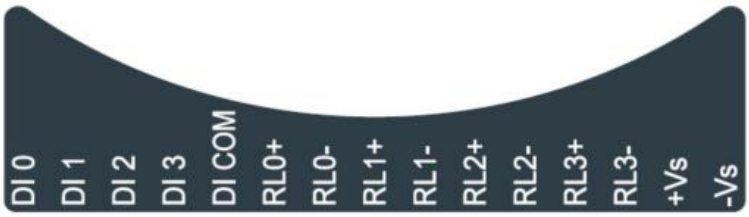


Figure 2.11 WISE-4060/LAN Pin Assignment

2.4.4 Block Diagram

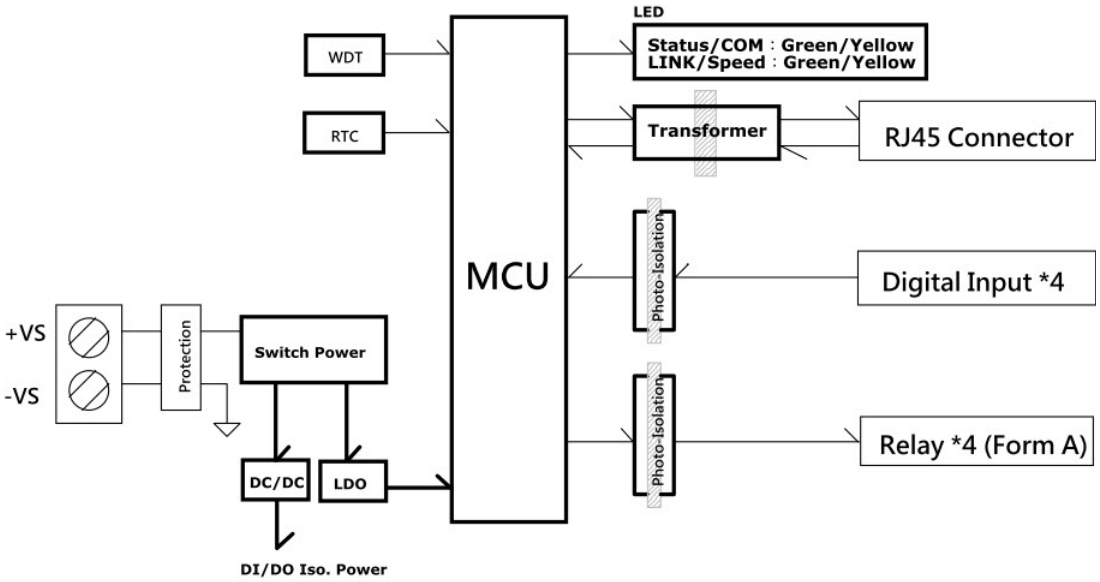


Figure 2.12 WISE-4060/LAN Block Diagram

2.5 WISE-4012E

2.5.1 I/O Specification

- Voltage Input
  - Channel: 2
  - Resolution: 12-bit
  - Sampling Rate: 10 Hz (Total)
  - Accuracy: ±0.1 V_{DC}
  - Input Range: 0~10 V_{DC}
  - Input Impedance: 100 kΩ
  - Supports Data Scaling and Averaging

- Digital Input
  - Channel: 2
  - Logic level
    - Dry Contact 0: Open
      1: Close to GND
  - Supports 32-bit Counter Input Function (Maximum signal frequency 3 kHz)
  - Keep/Discard Counter Value when Power-off
  - Supports Frequency Input Function (Maximum frequency 3 kHz)
  - Supports Inverted DI Status

- Relay Output
  - Channels: 2 (Form A)
  - Contact Rating
    - 120 V_{AC} @ 0.5 A
    - 30 V_{DC} @ 1A
  - Relay On Time: 5 ms
  - Relay Off Time: 6 ms
  - Insulation Resistance: 1 GΩ min. @ 500 V_{DC}
  - Dielectric Strength
    - Between Contacts: 1000 V_{AC} (1min)
    - Between Coil to Contact: 1500 V_{AC} (1min)
    - Maximum Switching: 60 operations/minute
  - Supports Pulse Output
  - Supports High-to-Low and Low-to-High Delay Output

Note! *The analog input channels of the WISE-4012E do not support 50/60 Hz noise rejection. The following methods can help to reduce noise:*

- Power up WISE-4012E by power bank
- Supply sensor power by battery
- Wiring V0- and V1- pin to GND pin

Note! *The analog input channel of the WISE-4012E does not support inverted voltage protection, note that the input voltage should within 0~10V_{DC}*

2.5.2 Application Wiring

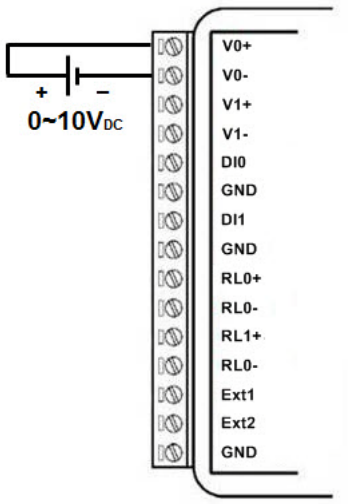


Figure 2.13 WISE-4012E Voltage Input Wiring Diagram

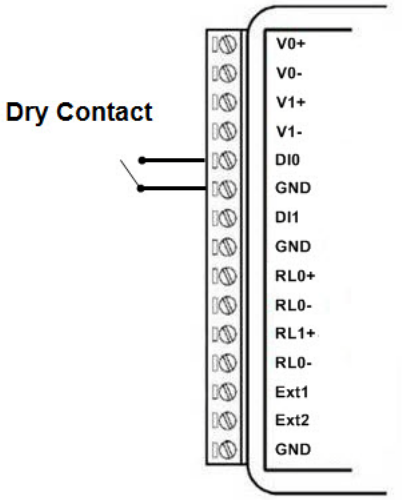


Figure 2.14 WISE-4012E Digital Input Wiring Diagram

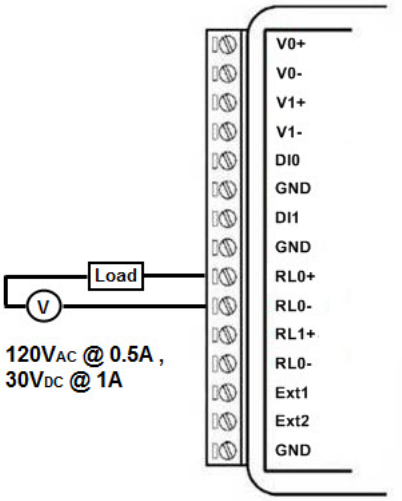


Figure 2.15 WISE-4012E Relay Output Wiring Diagram

2.5.3 Pin Assignment

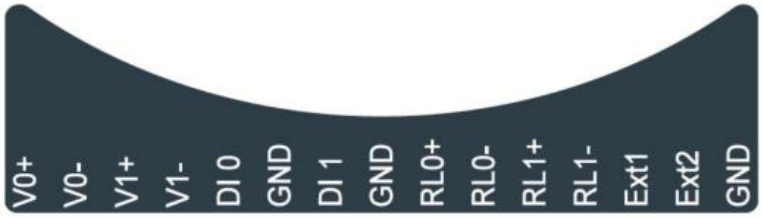


Figure 2.16 WISE-4012E Pin Assignment

2.5.4 Block Diagram

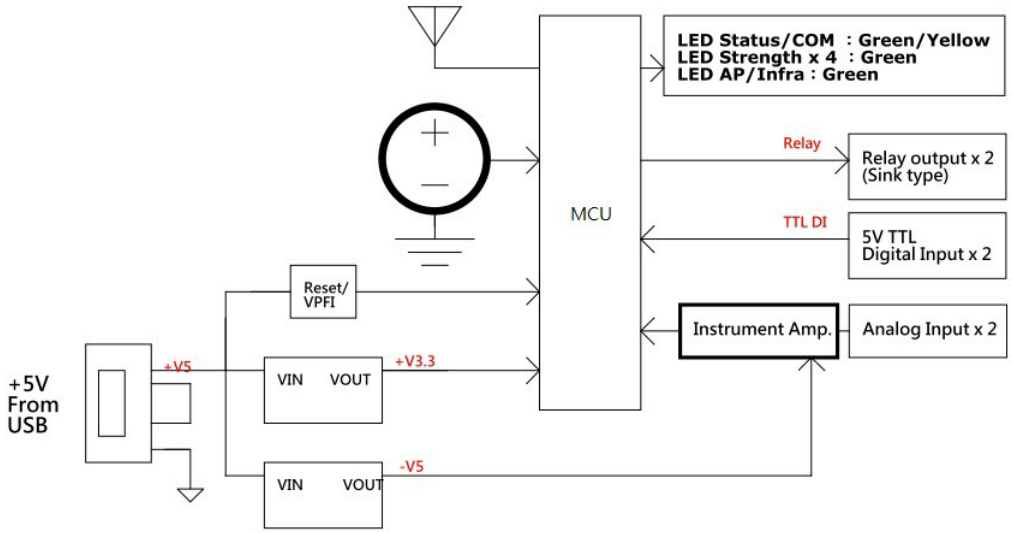


Figure 2.17 WISE-4012E Block Diagram

2.6 WISE-4050

2.6.1 I/O Specification

- Digital Input
  - Channel: 4
  - Logic level
    - Dry Contact 0: Open
      1: Close to DI COM
    - Wet Contact 0: 0~3 V_{DC}
      1: 10~30 V_{DC} (3 mA min.)
    - All 4 channels should be configured to dry contact or wet contact in the same time
  - Isolation: 3,000 V_{rms}
  - Supports 32-bit Counter Input Function (Maximum signal frequency 3 kHz)
  - Keep/Discard Counter Value when Power-off
  - Supports Frequency Input Function (Maximum frequency 3 kHz)
  - Supports Inverted DI Status

- Digital Output
  - Channels: 4
    - Open collector to 30 V, 500 mA max. for resistance load
    - Inductive loads require an external diode to eliminate back-EMF when the DO is turned off
  - Isolation: 3,000 V_{rms}
  - On Resistance ($R_{DS(ON)}$): 0.7 Ω (max.) @ 500mA, 25°C
  - Supports 5 kHz Pulse Output
  - Supports High-to-Low and Low-to-High Delay Output

2.6.2 Application Wiring

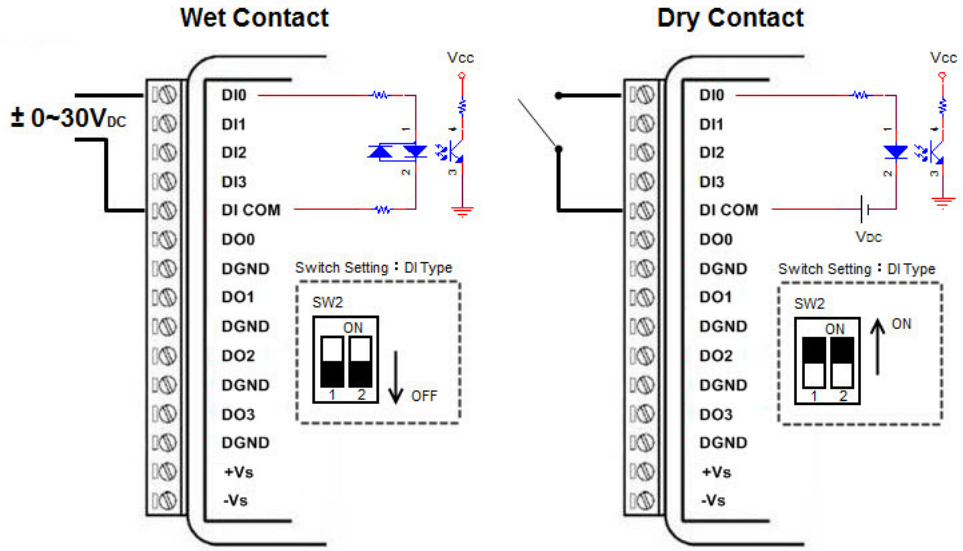


Figure 2.18 WISE-4050 Digital Input Wiring Diagram

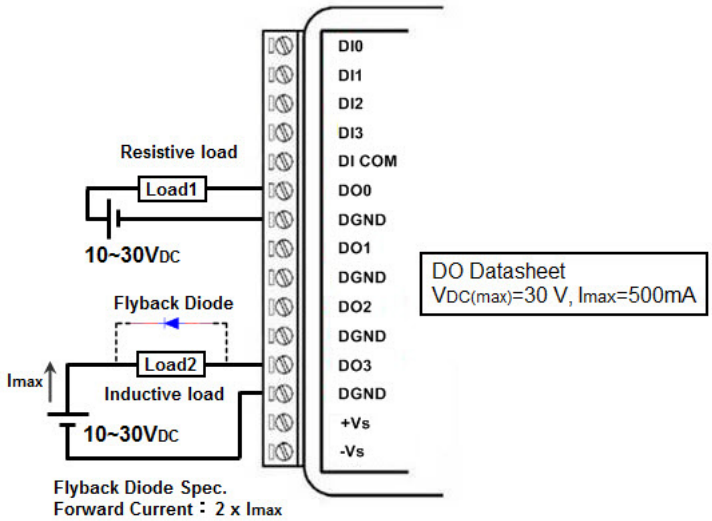


Figure 2.19 WISE-4050 Digital Output Wiring Diagram

2.6.3 Pin Assignment

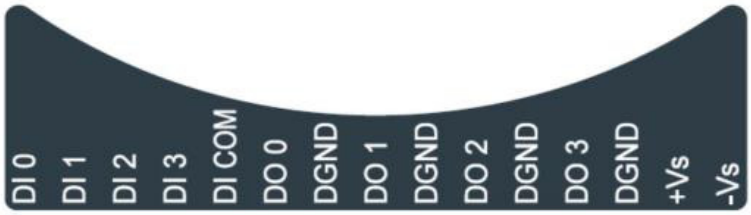


Figure 2.20 WISE-4050 Pin Assignment

2.6.4 Block Diagram

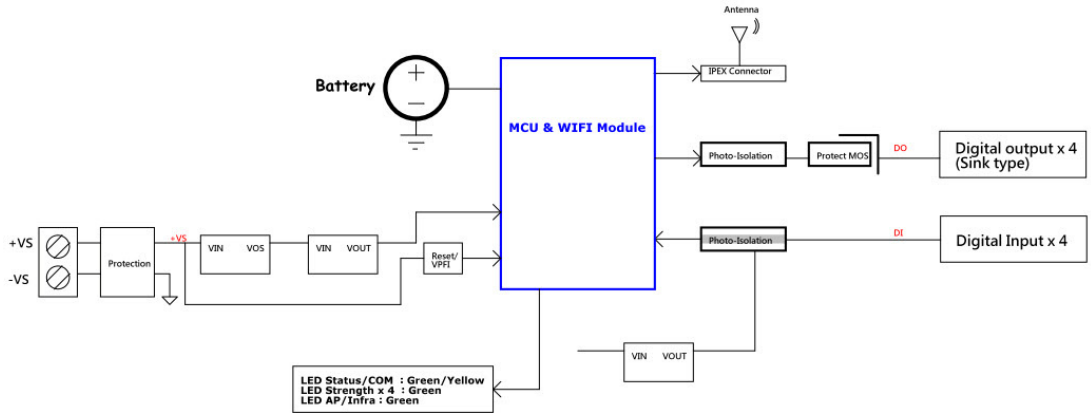


Figure 2.21 WISE-4050 Block Diagram

2.7 WISE-4060

2.7.1 I/O Specification

- Digital Input
  - Channel: 4
  - Logic level
    - Dry Contact 0: Open
      1: Close to DI COM
    - Wet Contact 0: 0~3 V_{DC} (0.8 mA max.)
      1: 10~30 V_{DC} (3 mA min.)
  - Isolation: 3,000 V_{rms}
  - Supports 32-bit Counter Input Function (Maximum signal frequency 3 kHz)
  - Keep/Discard Counter Value when Power-off
  - Supports Frequency Input Function (Maximum frequency 3 kHz)
  - Supports Inverted DI Status
- Relay Output
  - Channels: 4 (Form A)
  - Contact Rating (Resistive Load)
    - 250 V_{AC} @ 5 A
    - 30 V_{DC} @ 3 A
  - Relay On Time: 10 ms
  - Relay Off Time: 5 ms
  - Insulation Resistance: 1 GΩ min. @ 500 V_{DC}
  - Dielectric Strength
    - Between Contacts: 1000 V_{AC} (1min)
    - Between Coil to Contact: 3000 V_{AC} (1min)
  - Maximum Switching: 60 operations/minute
  - Supports Pulse Output
  - Supports High-to-Low and Low-to-High Delay Output

2.7.2 Application Wiring

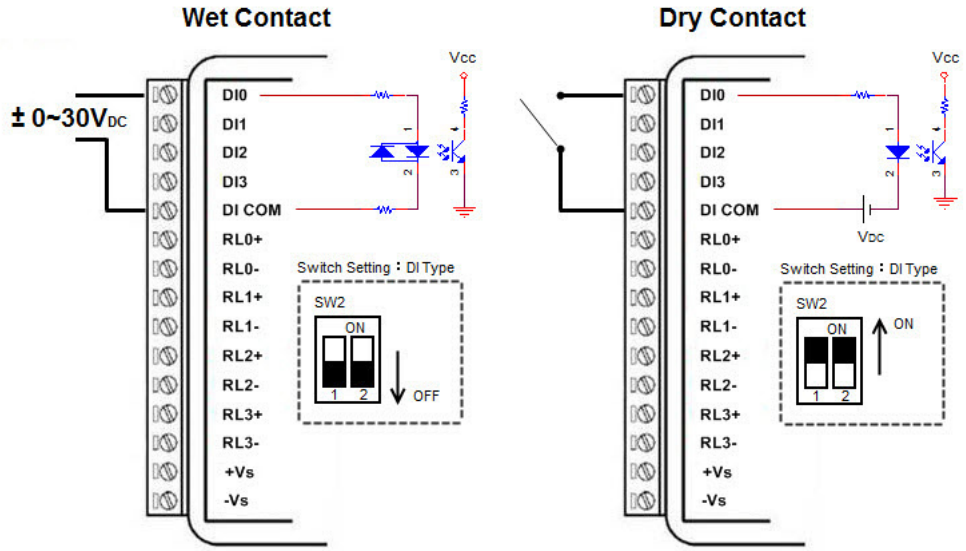


Figure 2.22 WISE-4060 Digital Input Wiring Diagram

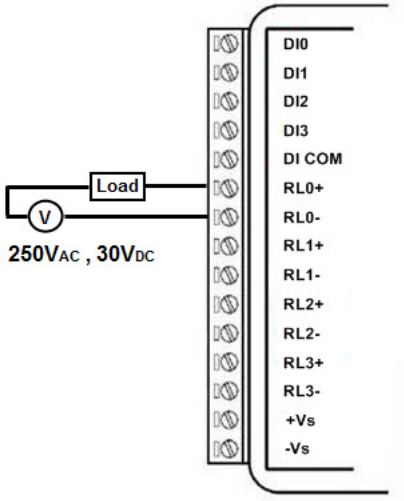


Figure 2.23 WISE-4060 Relay Output Wiring Diagram

2.7.3 Pin Assignment

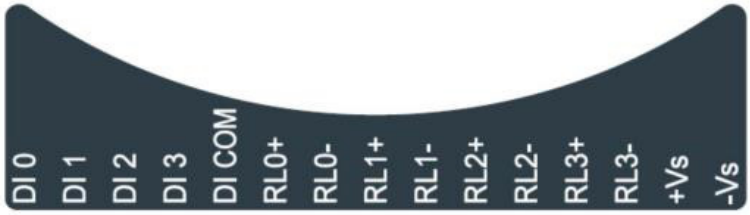


Figure 2.24 WISE-4060 Pin Assignment

2.7.4 Block Diagram

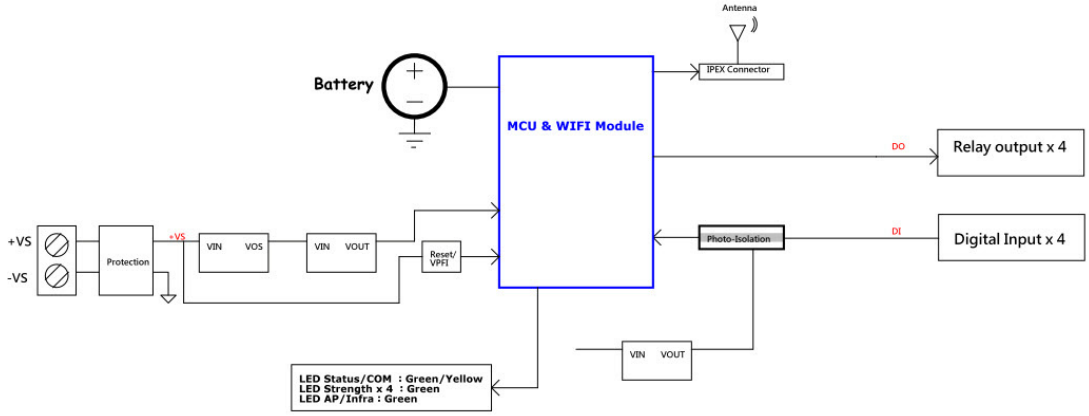


Figure 2.25 WISE-4060 Block Diagram

Chapter 3

Hardware Installation

3.1 Interface Introduction

3.2 Mounting

WISE-4000 modules are designed as compact units and are allowed to be installed in the field site under the following methods.

3.2.1 DIN-Rail Mounting

The WISE-4000 module can also be fixed to the cabinet by using mounting rails. You need to assemble the DIN rail adapter to WISE-4000 module with flathead screw driver as below. When the module is mounted on a rail, you may also consider using end brackets at each end of the rail to keep the module from sliding horizontally along the rail.

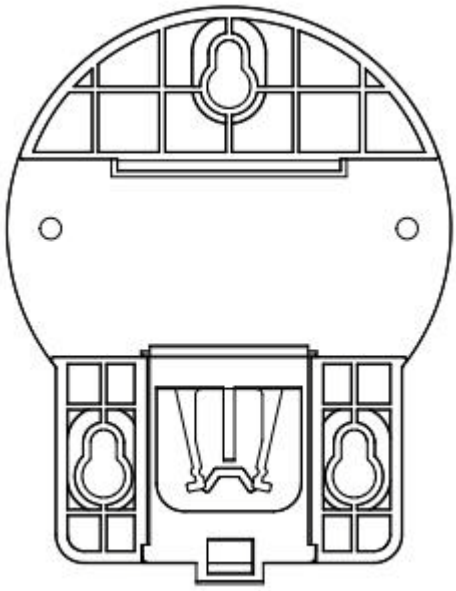


Figure 3.1 Mounting Kit Back View

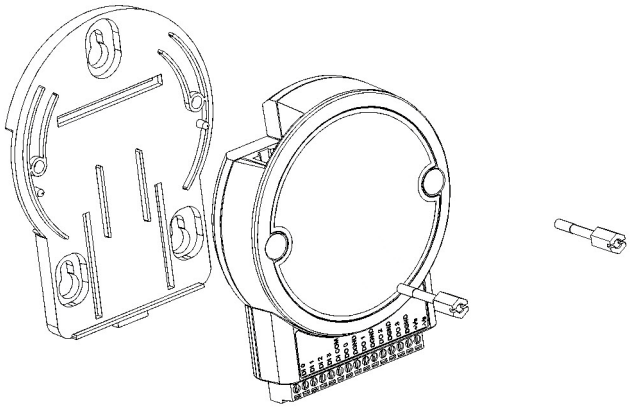


Figure 3.2 Installing the Mounting Kit for a DIN-Rail

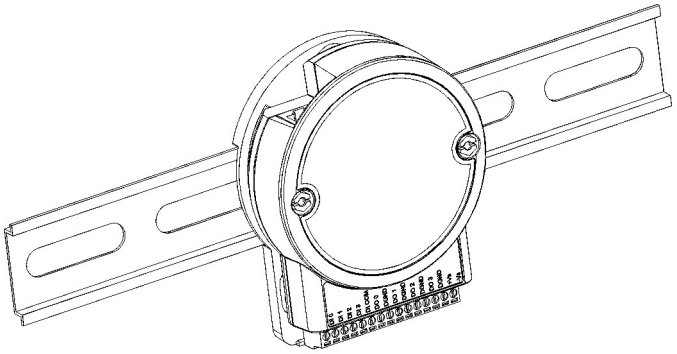


Figure 3.3 Mounting on the DIN-Rail

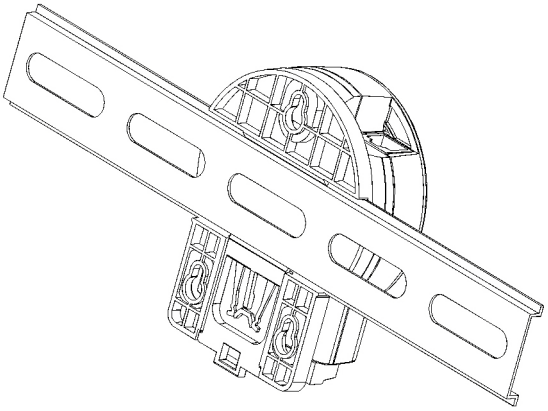


Figure 3.4 Rear View of DIN-Rail Mounting

3.2.2 Wall Mounting

Each WISE-4000 module is packed with a plastic wall mounting bracket. User can refer the bracket dimension and assembling figure to configure an optimal placement in a wall, panel, or cabinet.

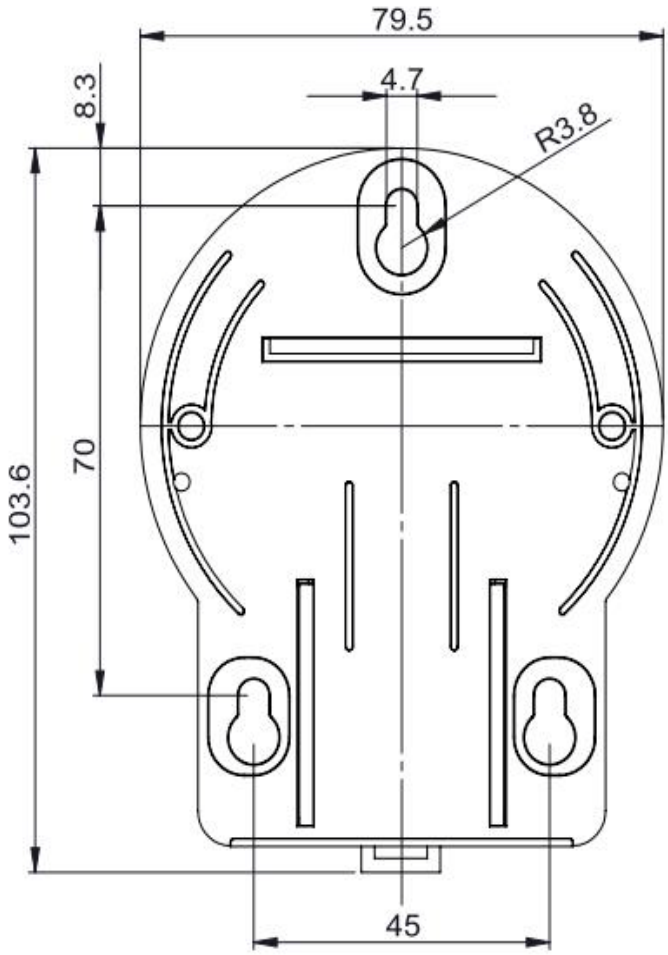


Figure 3.5 Mounting Kit Dimensions

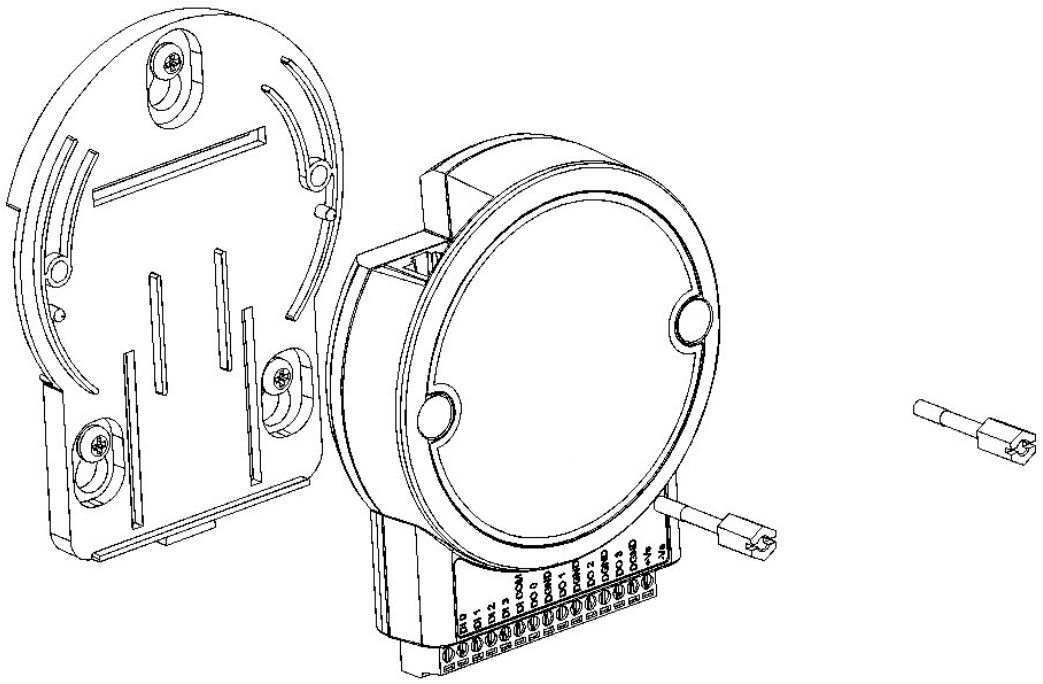


Figure 3.6 Wall Mounting

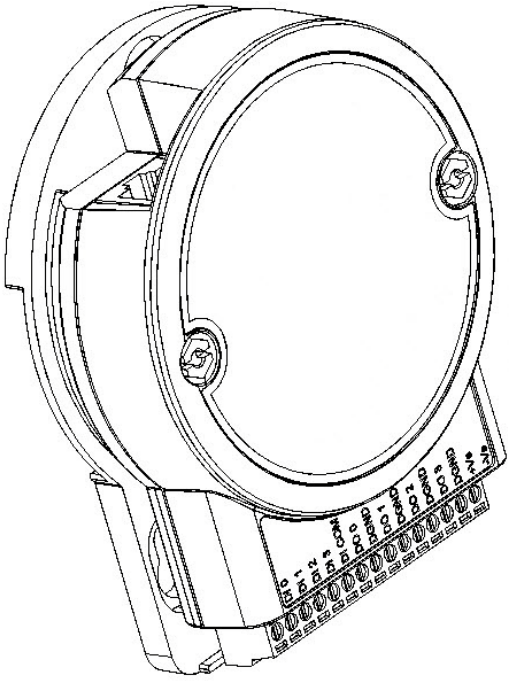


Figure 3.7 Wall Mounting Finished

3.2.3 Stack Mounting

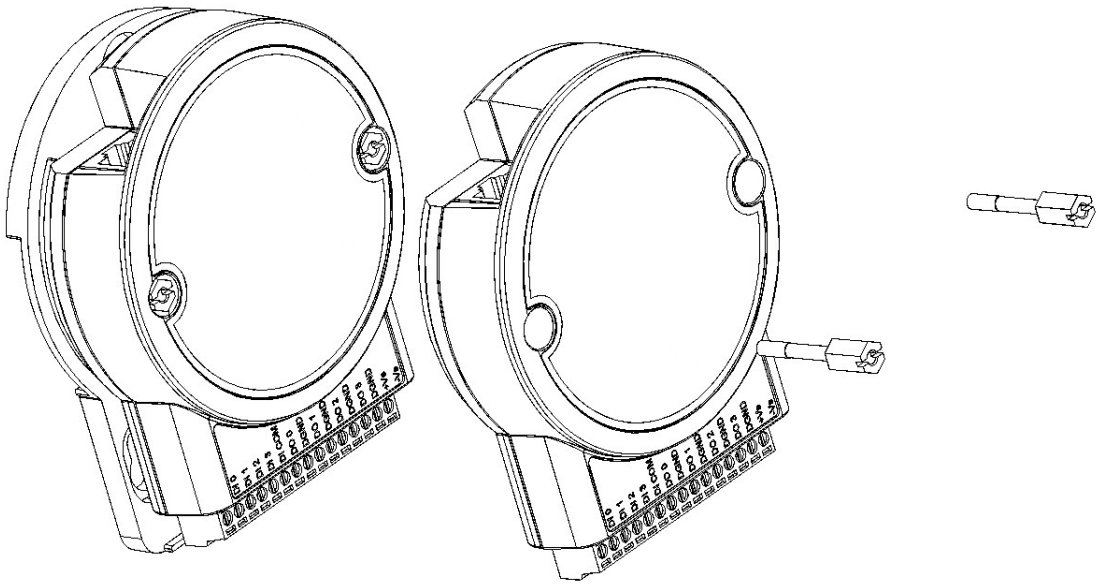


Figure 3.8 Stack Mounting

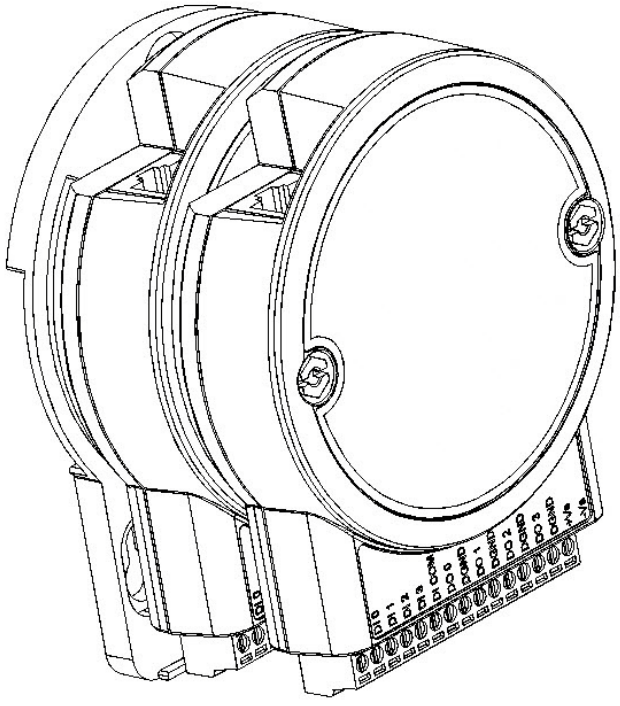


Figure 3.9 Finished Stack Mounting

3.3 Wiring & Connections

This section introduces basic information on wiring the power supply, I/O units, and Ethernet connection.

3.3.1 Power Supply Wiring (Not for WISE-4012E)

The system of WISE-4000 is designed for a standard industrial unregulated 24 V_{DC} power supply. For further application, it can also accept +10 to +30 V_{DC} of power input, 200mV peak to peak of power ripple, and the immediate ripple voltage should be maintained between +10 and +30 V_{DC}.

Screw terminals +Vs and -Vs are for power supply wiring

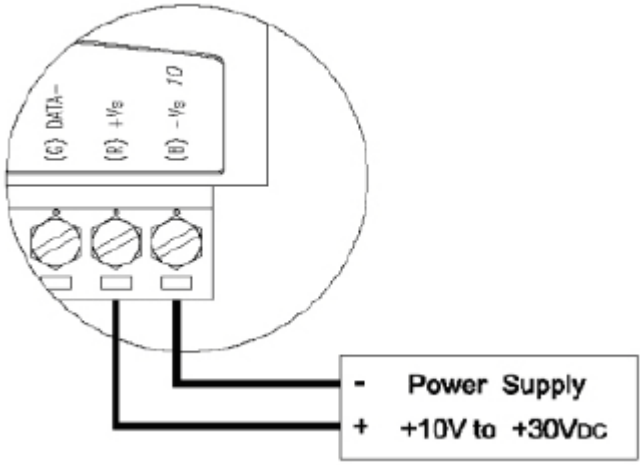


Figure 3.10 Power Supply Wiring

Note! *The wires used should be at least 2 mm.*

3.3.2 USB Power (WISE-4012E Only)

The system of WISE-4012E IoT Developer Kit is designed for a standard Micro-B USB 5V_{DC} power supply. Use the provided USB power cable to power up the module. Insert the Micro-B USB end to the USB port on the side of the module, and insert another end to Type-A 5V_{DC} USB port such as a PC, notebook, USB power adapter, USB power bank.

Note! The wider or flared part of the USB Micro-B connector is at the front side of the module, please make sure the direction of the cable before inserting it into the module to prevent the damage to the USB port.

Some USB power banks will automatically switch off, in this case, use a standard USB power instead.

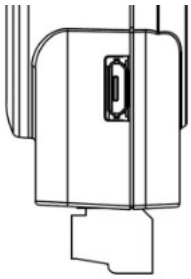


Figure 3.11 USB Power Supply Wiring

3.3.3 I/O Units

The system uses a plug-in screw terminal block for the interface between I/O modules and field devices. The following information must be considered when connecting electrical devices to I/O modules.

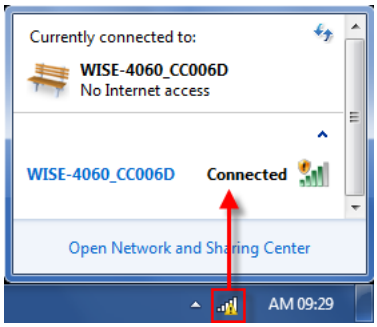
1. The terminal block accepts wires from 0.5 mm to 2.5 mm.
2. Always use a continuous length of wire. Do not combine wires.
3. Use the shortest possible wire length.
4. Use wire trays for routing where possible.
5. Avoid running wires near high-energy wiring.
6. Avoid running input wiring in close proximity to output wiring.
7. Avoid creating sharp bends in the wires.

Chapter 4

System Configuration

4.1 Connection

1. Plug a DC power source into the +Vs, -Vs pin of WISE module to turn the power on, or plug in the USB power cable for the WISE-4012E.
2. For WISE-4000/LAN Series, connect your computer to Ethernet port of WISE module with RJ-45 cross-over Ethernet cable, and configure the IP address of your computer as same IP domain as default IP address of module: 10.0.0.1. Or the wireless router can be used for configure the WISE-4000/LAN Series by mobile devices or computer with wireless adapter.
3. For WISE-4000 Wireless Series, the default operation mode in normal mode is AP Mode, or you can change position 1 of SW1 to OFF as in Section 1.5, to setting the module as Initial Mode, then module must be AP Mode. Now the module can be searched by mobile devices or wireless adapter of computer with SSID: WISE-4xxx_MACAddress. Click the SSID to connect the module in AP Mode, WISE module will auto assign the IP address for mobile devices or computer.



4.2 Configure WISE Using the Web Interface

4.2.1 System Requirements

WISE-4000 module is developed by public HTML 5 base, but for detailed indication and data transmission mode may be different on Web page of the operating system.

For mobile devices, the minimum requirement of web browsers as below:

- Safari 6 in Apple iOS
- Web Browser in Google Android 4.0 (Ice Cream Sandwich)
- Chrome in Google Android 4.0 (Ice Cream Sandwich)

Mobile Browse	Chrome	Android	Safari
Configuration	Y	Y	Y
File Upload	N	N	N
Data Log Chart	Y	Y	Y
Data Log Export	N	N	N

For PC platforms, the minimum requirement of web browsers as below:

- Internet Explorer (version 11)
- Google Chrome (version 30)
- Mozilla Firefox (version 25)

Mobile Browse	Chrome	Firefox	Safari	IE11	IE10	IE9
Configuration	Y	Y	Y	Y	Y	Y
File Upload	Y	Y	N	Y	N	N
Data Log Chart	Y	Y	Y	Y	Y	N
Data Log Export	Y	Y	N	N	N	N

4.2.2 List of WISE-4000 Default Ethernet Ports

Application	Protocol	Port	Note
WebServer	TCP	80	Configurable
Modbus Server	TCP	502	-
Search Engine	UDP	5048	-
SNTP Client	UDP	-	Randomly

4.2.3 Factory Default Settings

WISE-4000/LAN Series

- Operation Mode: Normal Mode
- IP Mode: Static IP Address
- Default IP: 10.0.0.1
- Subnet Mask: 255.0.0.0
- Default Gateway: 0.0.0.0
- Default Connection Timeout: 720 second
- HTTP Port: 80

WISE-4000 Wireless Series

- Operation Mode: Normal Mode
- Wireless Mode: AP Mode
- IP Mode: Static IP Address
- Default IP: 192.168.1.1
- Subnet Mask: 255.255.255.0
- Default Gateway: 192.168.1.1
- DHCP Server: Enabled
- Default Connection Timeout: 720 second
- HTTP Port: 80

4.2.4 Module Authorization

Account	Default Password	Access Ability
root	00000000	All the privileges
admin	00000000	All the privileges except access control configuration
user	00000000	View module status only, not allow to do configuration

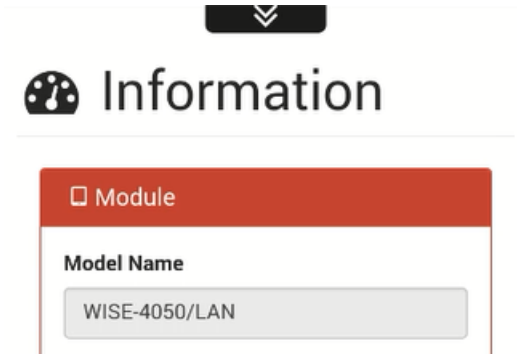
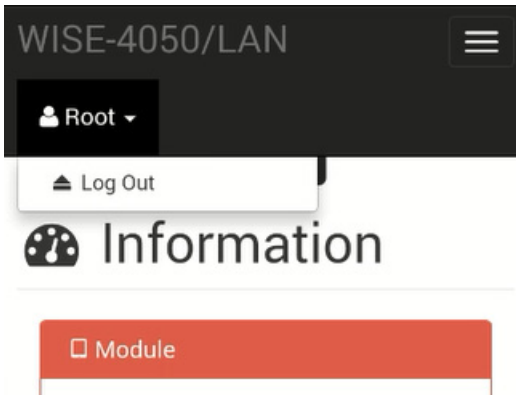
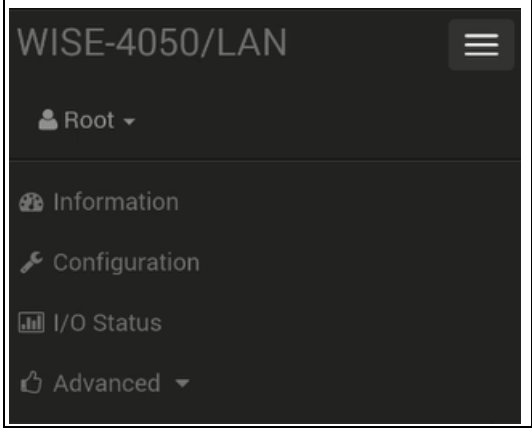
4.2.5 Operation Mode

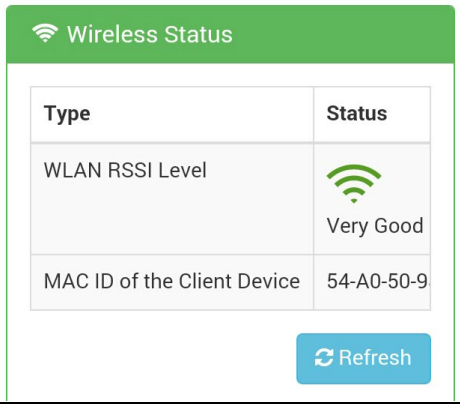
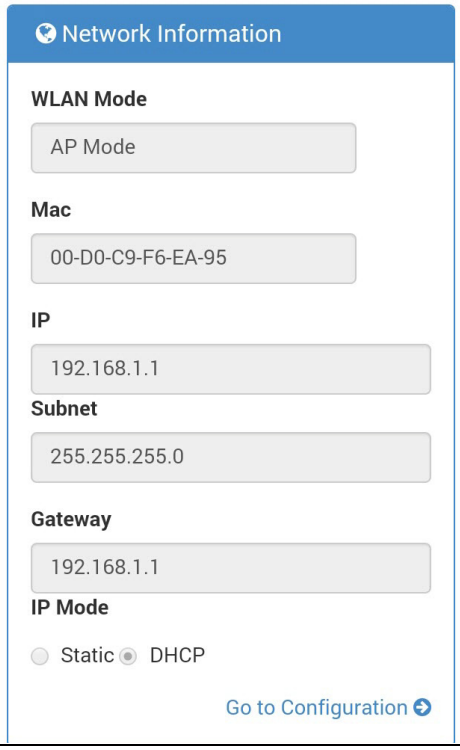
The operation mode can be configured by switch SW1 on the back of module. Please refer to previous chapter for the detail of configuring SW1.

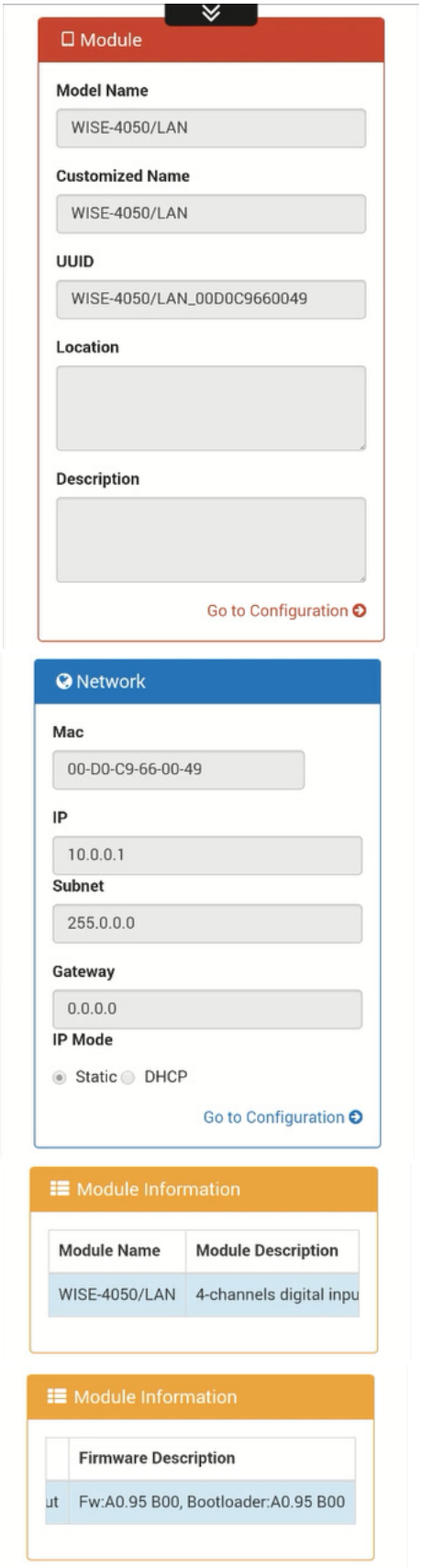
Mode	WISE-4000/LAN Series	WISE-4000 Wireless Series
Initial Mode	Fixed IP address: 10.0.0.1	Fixed IP address: 192.168.1.1 Fixed Wi-Fi Mode: AP Mode
Normal Mode	Default IP address: 10.0.0.1	Default IP address: 192.168.1.1 Default Wi-Fi Mode: AP Mode

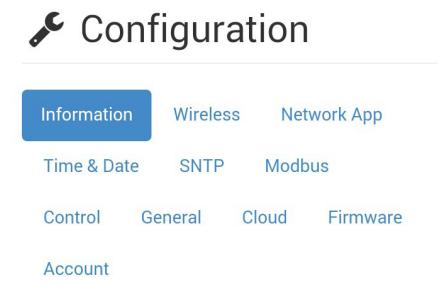
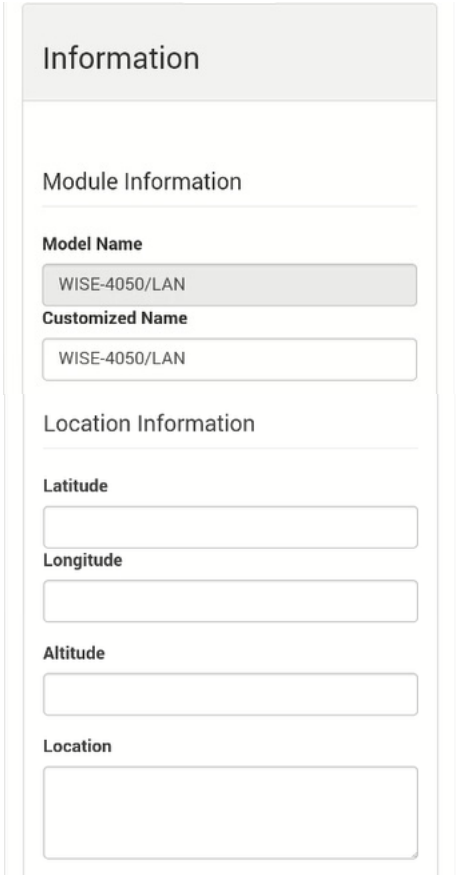
4.2.6 Using a Browser to Configure the Module

- Configure URL: http://IP_address/config
- Default URL:
  WISE-4000/LAN Series: http://10.0.0.1/config
  WISE-4000 Wireless Series: http://192.168.1.1/config
- Configuration Steps

Login Web Configuration Page	
	1. Wirelessly connect your smart phone to your local Ethernet network and open the browser of your smart phone. 2. Enter IP address of module with "/config", for example, the default URL: http://10.0.0.1/config or http://192.168.1.1/config 3. Then you will see the login page, please enter the account and password, then click Login button
	4. After login you will see the configuration web page
	5. Scroll down the tab, you can change the login user here
	6. Click the button on the top, you can switch to other pages

Wireless Module Information	
	For WISE-4000 Wireless Series, user can check WLAN RSSI Level to know the signal quality in Wireless Status part. And it also shows the MAC ID of the client device. If the module is working in AP Mode, WLAN RSSI Level and Refresh button will not been shown
	WLAN Mode will be shown in Network Information

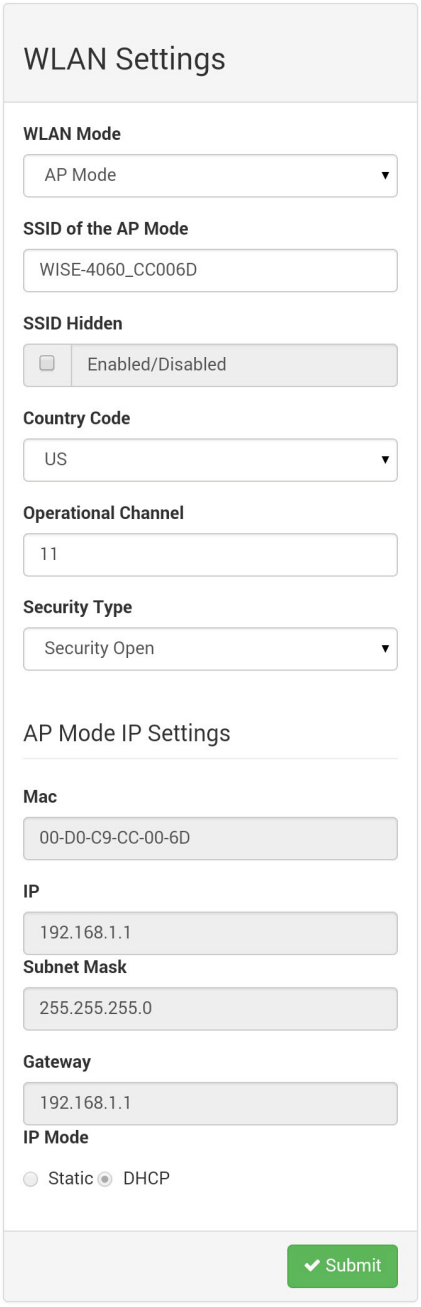
Module Information	
	1. In the information page, you can see the dashboard: module detail, network setting, and module information, including the firmware version. 2. Click "Go to Configuration" to perform the configuration.

<table>
<tr><th colspan="2">Module Configuration</th></tr>
<tr><td> 
</td><td>You can click different tab to switch the item you are going to configure</td></tr>
<tr><td> 
</td><td>[Information]

Customized Name / UUID
Means model name and UUID of the module. You also can rename it for recognition if required.

Description
You can add comments on this module for recognition.

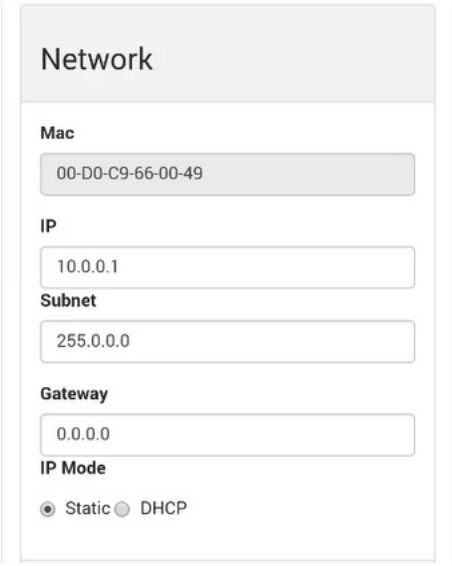
Location Information
You can note the location information for the module</td></tr>
</table>

Wireless (WISE-4000 Wireless module only)	
	[AP Mode] When using the module in AP mode, users can configure the SSID and also decide how the WISE module works as an AP, including the security. The AP-Network is fixed and does not allow user to make their own changes.

[Infrastructure Mode]

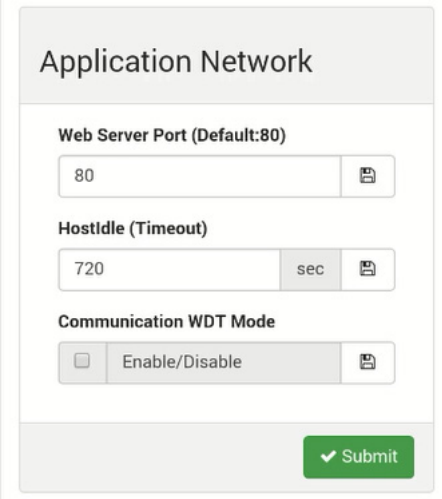
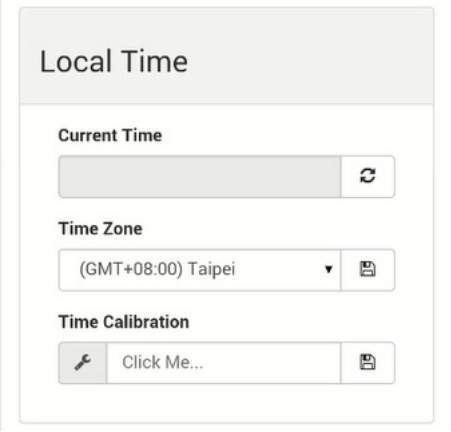
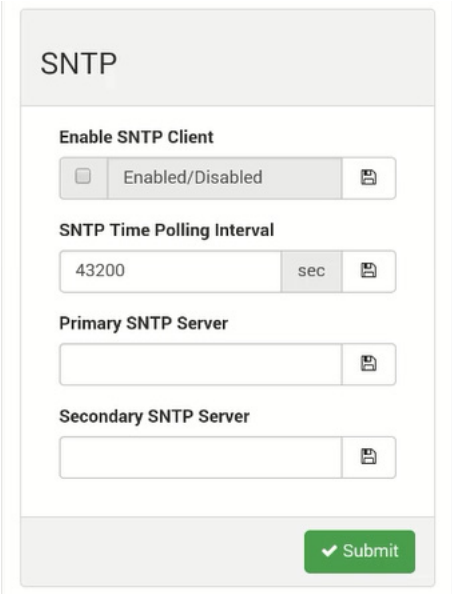
When using the module in Infrastructure mode, users need to enter the SSID of the AP that WISE going to access, and configure the security from here.

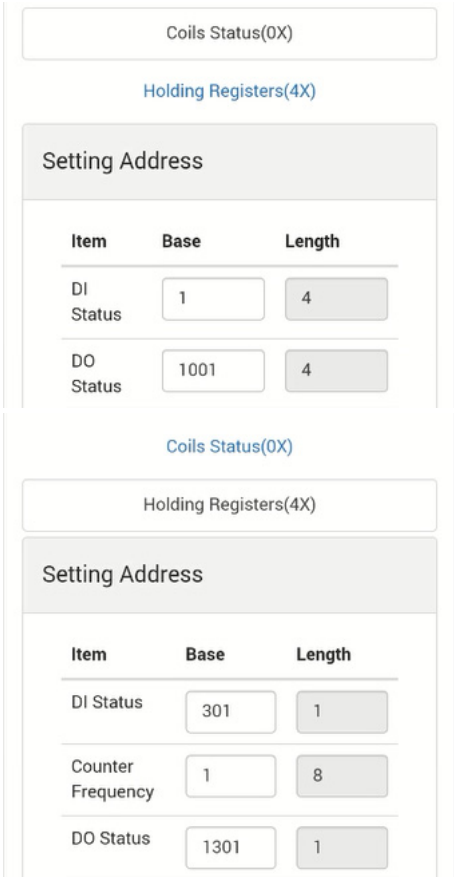
After configuring the AP the WISE module going to access, the network configuration also needs to be defined in the Infrastructure-Network.



[Network]

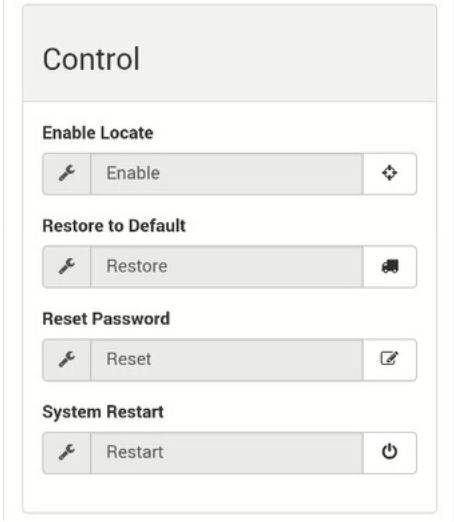
For WISE-4000/LAN wired module, you can select the Connection mode as DHCP or Static IP and configure the IP address, Subnet address, and Default gateway.

	[Network App] You configure the web server port, Host Idle (timeout), and decide whether to enable communication WDT here
	[Time & Date] You can see the current time here, decide which time zone for your local time, and also do the time calibration by read the time from host devices
	[SNTP] You can enable the SNTP function, so the module can act as a SNTP client to do time synchronization from assigned SNTP server.



[Modbus]

In order to provide user with more flexible and scalable in deploying module, this module remove the limitation of Modbus address setting and make it configurable as user's actual need. Basically, there're two kinds of Modbus address section (0X and 4X) for you to configure each function item.



[Control]

Enable Locate

It can help user search module with light sign. (Status LED will be constantly on for 30 sec when it enabled.)

Restore to Default

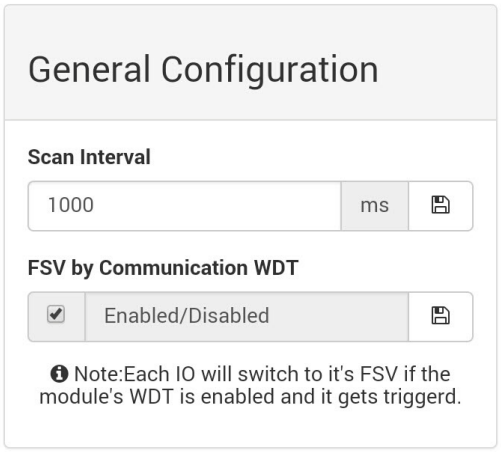
The system configuration of module will be clear and restored to factory default when it enabled.

Reset Password

You can reset the password here

System Restart

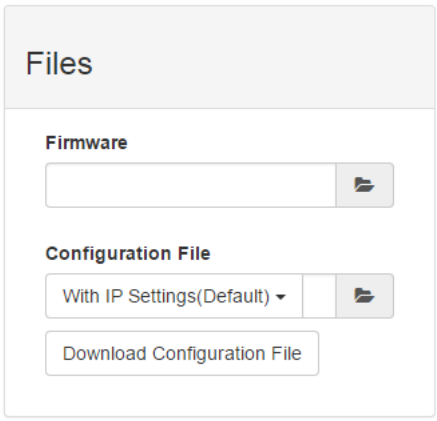
The system of this module will reboot when it enabled.



[General]

After Communication WDT been enabled in "Network App" tab, you can enable the IO FSV triggered by communication WDT

The Scan Interval here decides the I/O polling interval in the next part of the “I/O Status”. This value will not be saved into the module, so it is valid until the power is switched off.

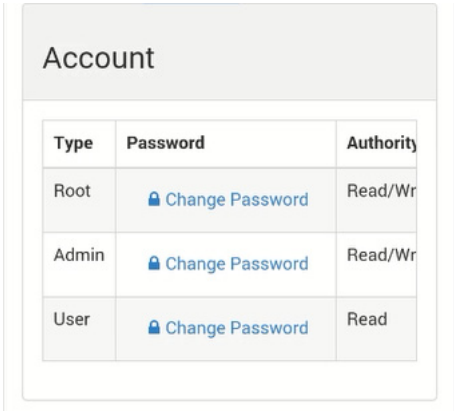


[Firmware]

User can upgrade the firmware file here. Or Upload/Download the configuration file from WISE-4000 wireless module.

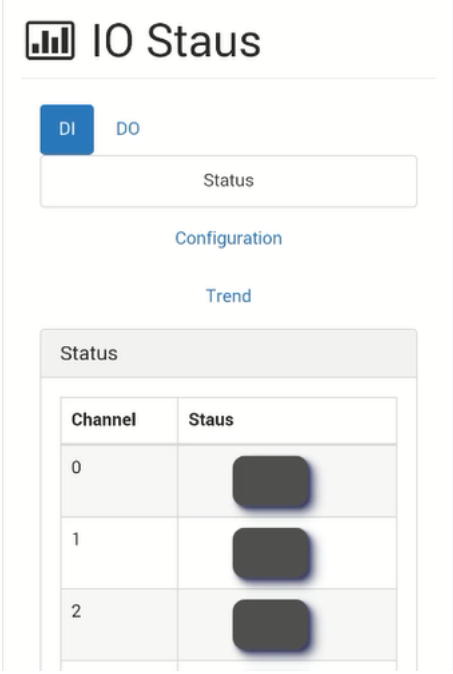
The following items will be saved in the configuration file:

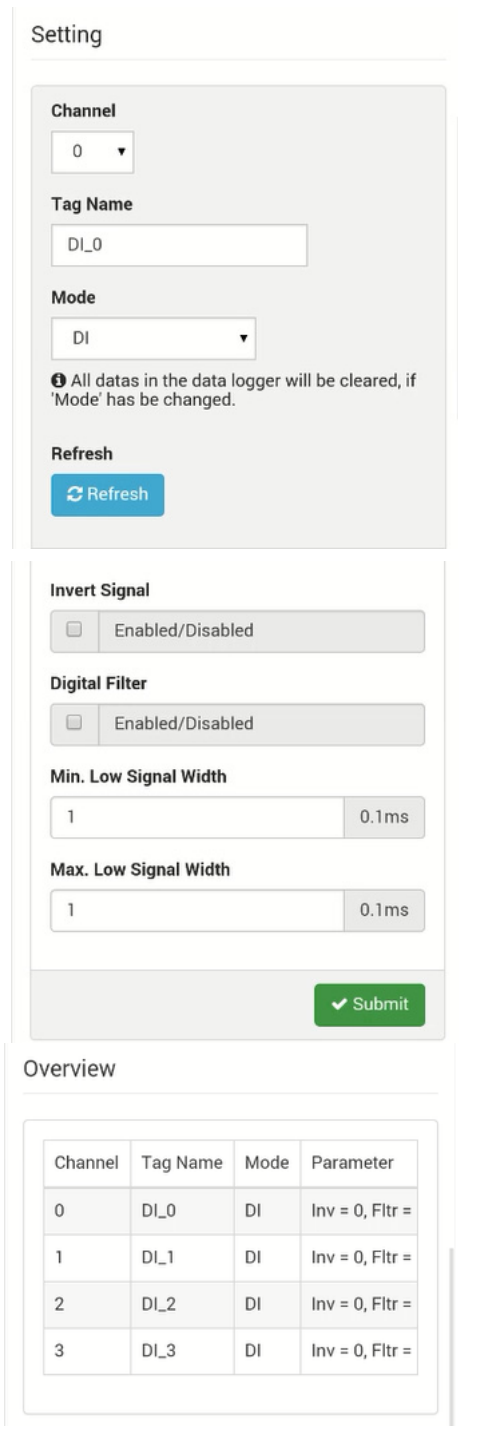
Configuration	Information, Wireless, Network App, Time & Data, SNTP, Modbus, General Cloud, Account
I/O Status	I/O Configuration
Advanced	Access Control, Data Logger (Data log and Cloud upload)



[Account]

You can change the passwords of each account here.

I/O Status	
	[Status] The I/O statuses are shown here, for the output status, you can also change the I/O status here.



[Configuration]

Setting

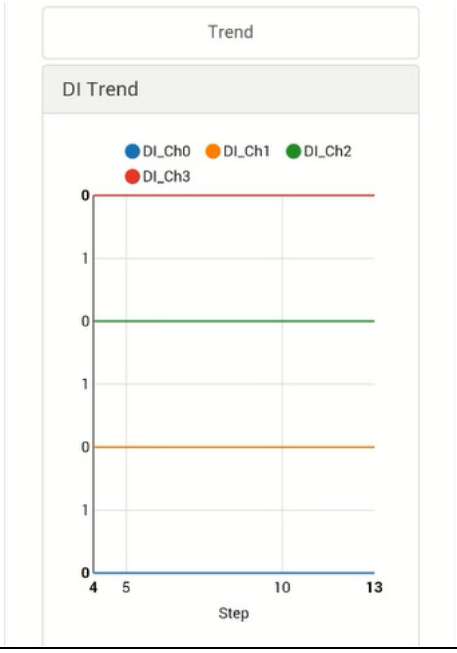
User can do detail I/O setting in the tab, include the Tag Name, range type, filter, and also the working mode.

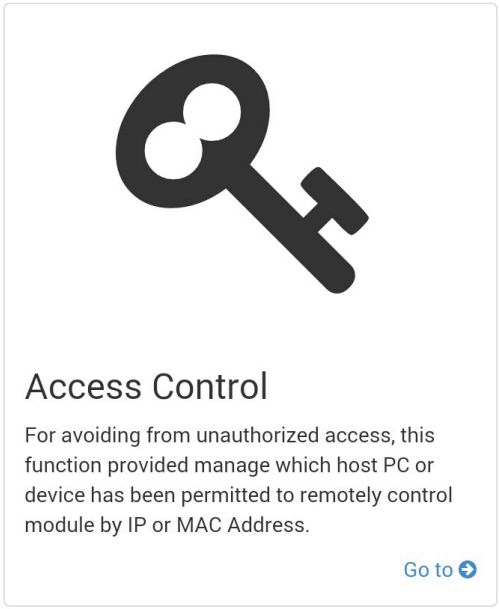
Calibration

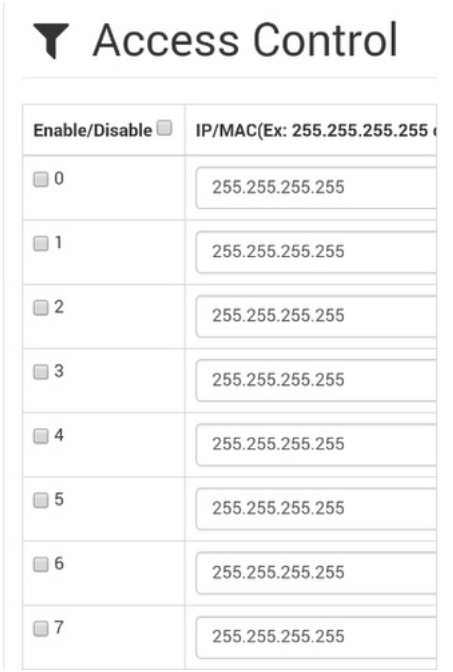
For the analog module, after login root account, user can click calibration button to restore the factory calibration value.

Overview

In the end, there is an overview table for the configuration summary of each channel

	[Trend] The status trend of I/O will be shown here.

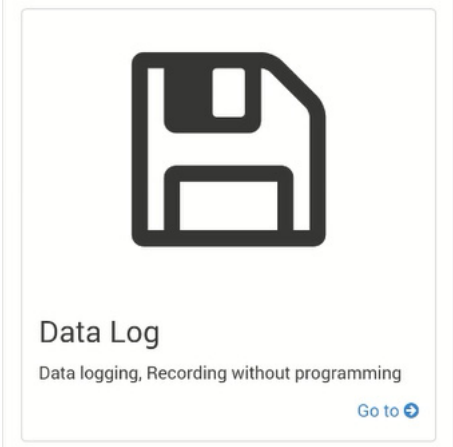
Advanced Function - Access Control	
	To avoid unauthorized access, you can manage which host PC or device can remotely control the WISE-4000 module by IP or MAC Address.



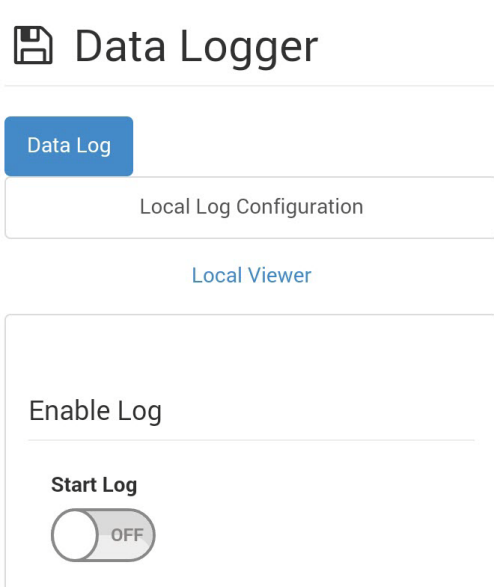
Enable one of the rows and enter the IP address or MAC address which allows to access the WISE-4000 device.

For WISE-4000 wireless modules, users can only configure access control by the IP address, not the MAC address

Advance Function - Data Log



The WISE-4000 series supports data log functions, the I/O status can be logged in the module and also be queried from the module .

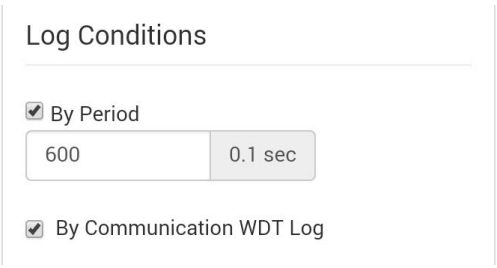
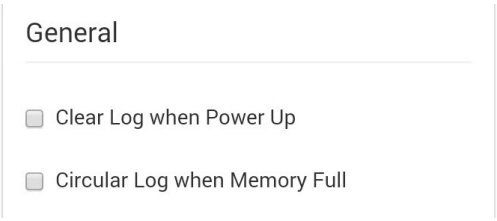
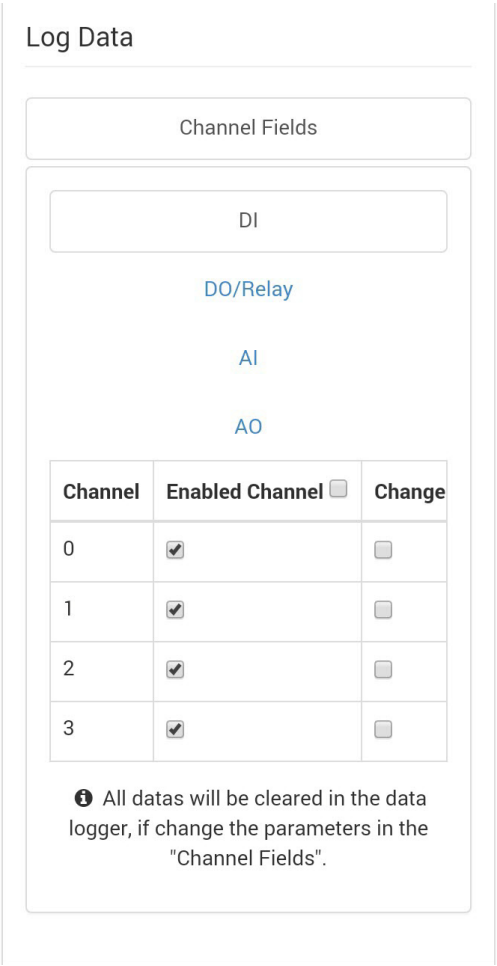


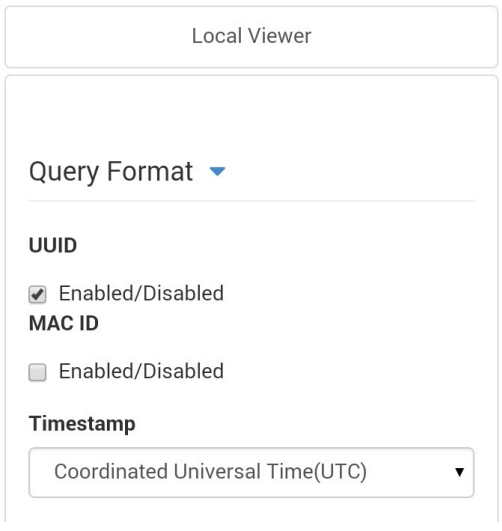
Local Log Configuration

[Enable Log]

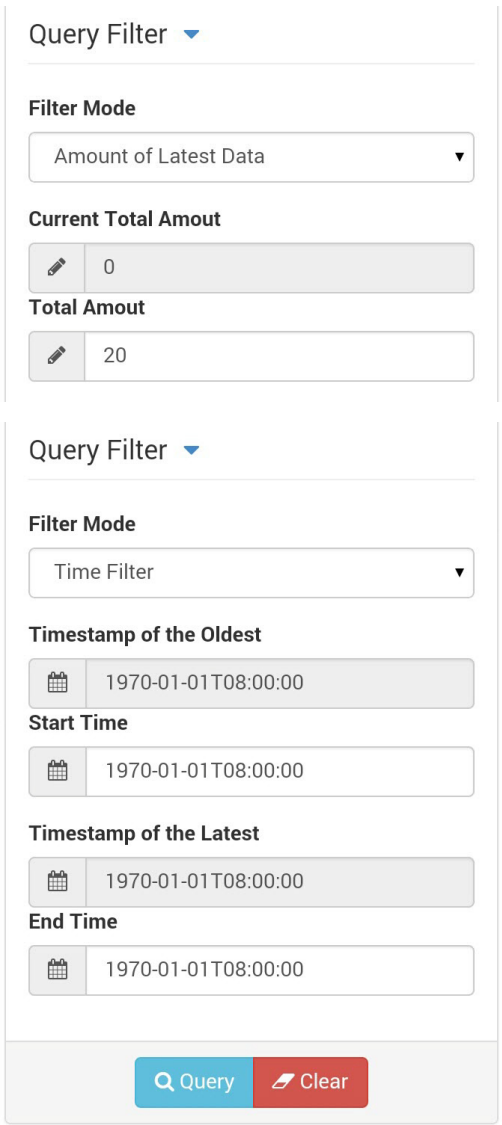
Start Log

Users can enable the data logger here

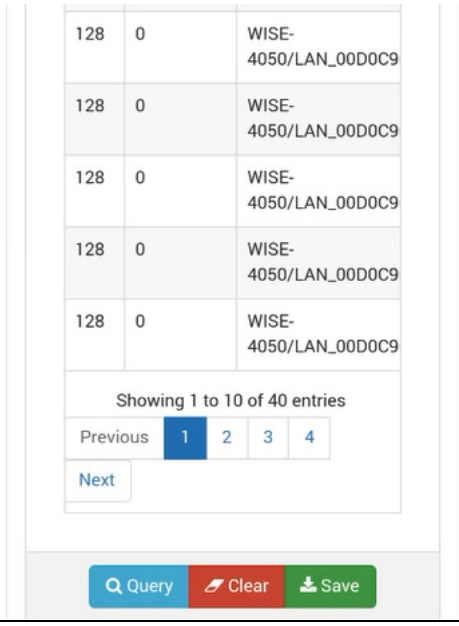
	[Log Conditions]. **By Period** Check the box to enable periodically logging, and the log period can be decided in following box. Pleased been noted that the period is increased by 0.1 sec, it means if user configure "600" here, the status of the I/O will be logged each minute. **By Communication WDT** If the communication WDT has been enabled, once the condition of the WDT has been met, the status of the I/O will be logged
	[General] **Clear Log when Power Up** Decided whether to keep last value when the logger had been restarted. **Circular Log when Memory Full** Once the box been check, the data will been circular log when memory was full. Otherwise, the logger will stop.
	[Channel Setting] Users can configure which channel of the module will be logged and decide whether to log the data when the status is changed by checking the “Change of Status” box.

<table>
<tr>
<td> 
</td>
<td>Local Viewer

[Query Format]

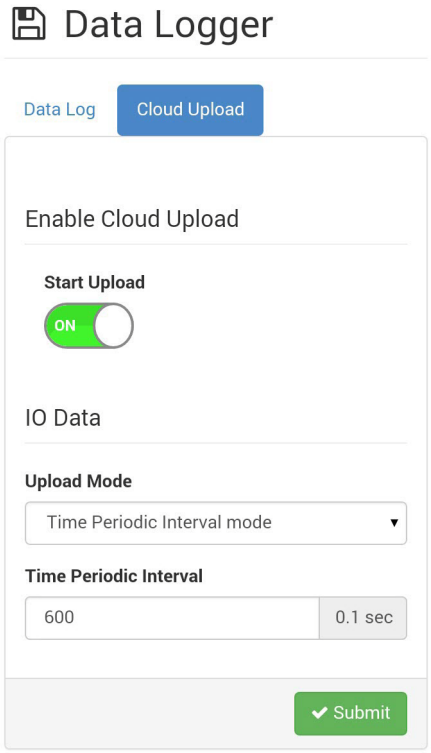
Users can decide which type of data has been queried.</td>
</tr>
<tr>
<td> 
</td>
<td>[Query Filter]

Filter Mode
■ Amount of Latest Data: User can query the latest amount of data by this mode
■ Time Filter: User can query the data from and to the time by configured here</td>
</tr>
</table>



After "Query" has been clicked, the data will be shown in the dashboard and also in the list. Users can click the "Save" button to save the logged data.

Refer to B.2.4 for a detailed definition of each column. For example: Log Type 128 means periodical logging, I/O Type 1 means DI status



Cloud Upload

(WISE-4000 wireless series only)

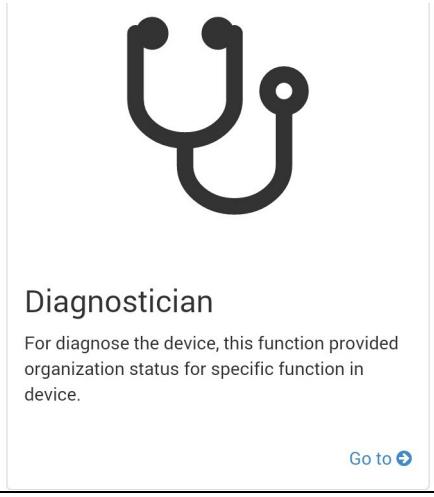
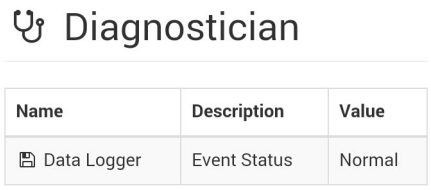
[Enable Cloud Upload]

Start Upload

After configuring the cloud server as described below, users can start automatically upload functions here.

[Upload Mode]

- Time Periodic Interval mode: Data can be upload be configured period
- Item Periodic Interval mode: Data can be upload once it reaches the configured of sample data

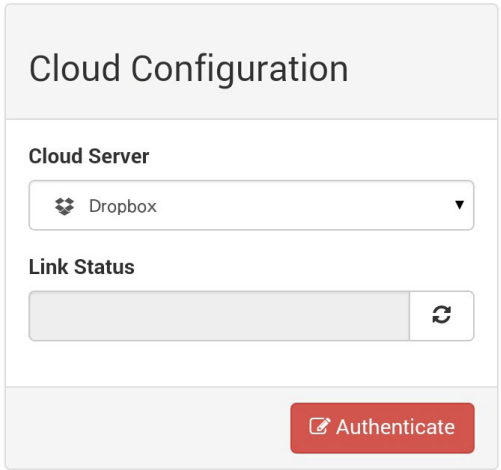
Advance Function - Diagnostician	
	WISE-4000 wireless modules provide Diagnostician page for indicating the operating status of WISE module. The status of each function will be shown here for troubleshooting.
	For Data Logger, the value will indicate the event status ie: normal, memory full, or cloud upload fail.

4.2.7 Configuring Cloud Server (WISE-4000 wireless series only)

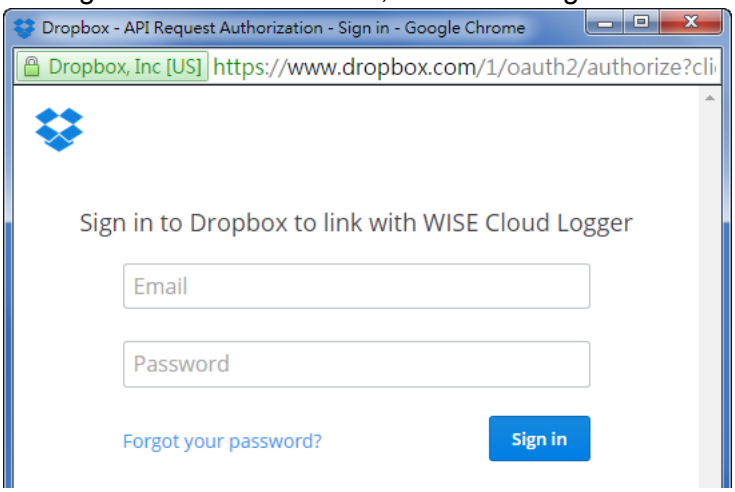
1. Make sure the WISE-4000 module is able to access the Internet, and the device that's going to configure the WISE-4000 module is within the same IP domain as the WISE-4000 module
2. Go to the Cloud tab of Configuration.

Note! *The following instructions use Dropbox.* Make sure Dropbox provide their service in your region or find an alternative public cloud service.

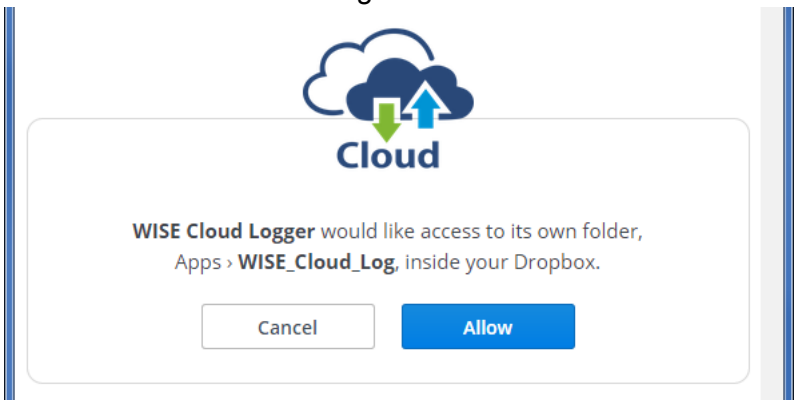
3. Select Dropbox as the cloud server.



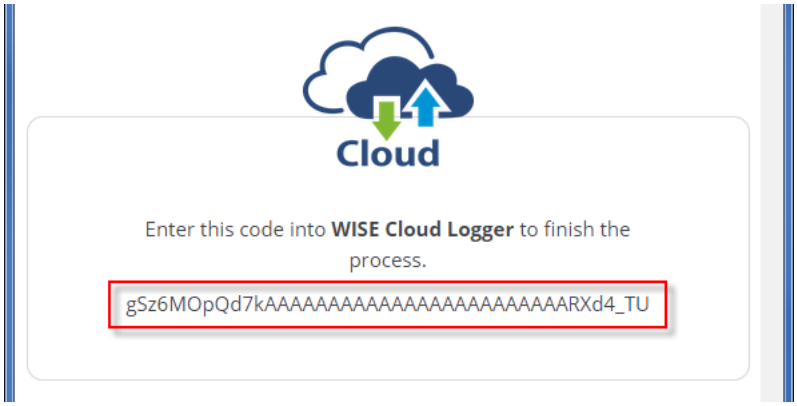
4. The browser will open a new window for Dropbox. Enter your Dropbox account information including E-mail and Password, then click “Sign in”.



5. After logging in, click "Allow" to allow WISE Cloud Logger Apps to access your Dropbox account to store the data log file.



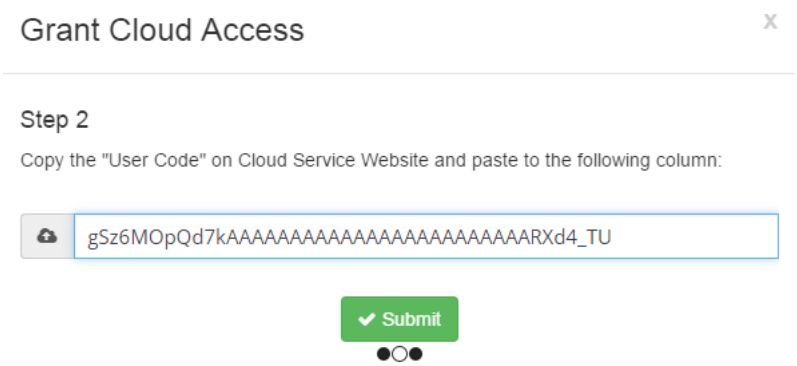
6. Dropbox will then provide a code, copy this code and return to the configuration web page of the WISE module.



7. Click "Next" to enter the code.

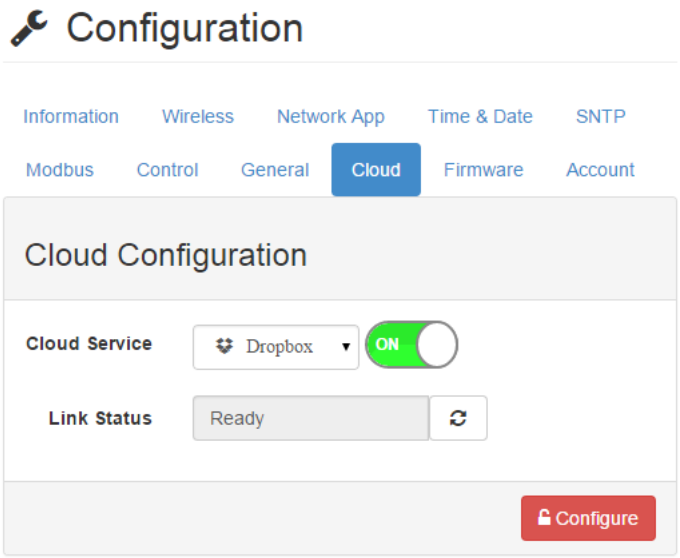
IMAGE NOT SUPPLIED BY PM!

8. Paste the code provided by WISE Cloud Logger, then click "Submit".



9. If your WISE-4000 module is correctly connected to the Internet, you will be able to set the functions successfully. Click "Close" to return to Configuration.

10. You will then be able to see the “Link Status” shows “Ready”.



4.3 Configure WISE-4000 with ADAM.NET Utility

ADAM.NET Utility, which is designed with graphical operation interface, is aimed to offer users directly configure, control WISE-4000 module, and monitor the real-time status of remote WISE-4000 module via Ethernet or Wireless connection.

To keep you informed with latest update, you also can check it from the following download link on Advantech website.
http://support.advantech.com.tw/Support/DownloadSRDetail.aspx?SR_ID=1-2AKUDB

Note!

- *Before installing ADAM.NET Utility, you need to install .NET Framework 2.0 or higher version.*
- *System requirement*
  - *Microsoft Windows XP/7*
  - *At least 32 MB RAM*
  - *20 MB of hard disk space available*
  - *VGA color or higher resolution monitor*
  - *Mouse or other pointing devices*
  - *10/100 Mbps or higher Ethernet Card*

1. Install ADAM.NET Utility in your computer.
   (After successfully installation, there will be a shortcut generated on the screen)

2. Double click the shortcut icon, and then you will see the main operation window.
3. Click Search Module icon in Toolbar. You will see all online modules in the left Module Tree screen and an unconfigured new module, whose default password is 00000000, will appear on the Others section as below. Now you can define the network mode of the module in the beginning. After that, you will be able to perform other settings.

Note! *The default password is 00000000*

4.3.1 Operation Framework

The operation window mainly contains 4 areas, including Menu, Toolbar, Module Tree screen and Main Operation screen.

4.3.1.1 Menu

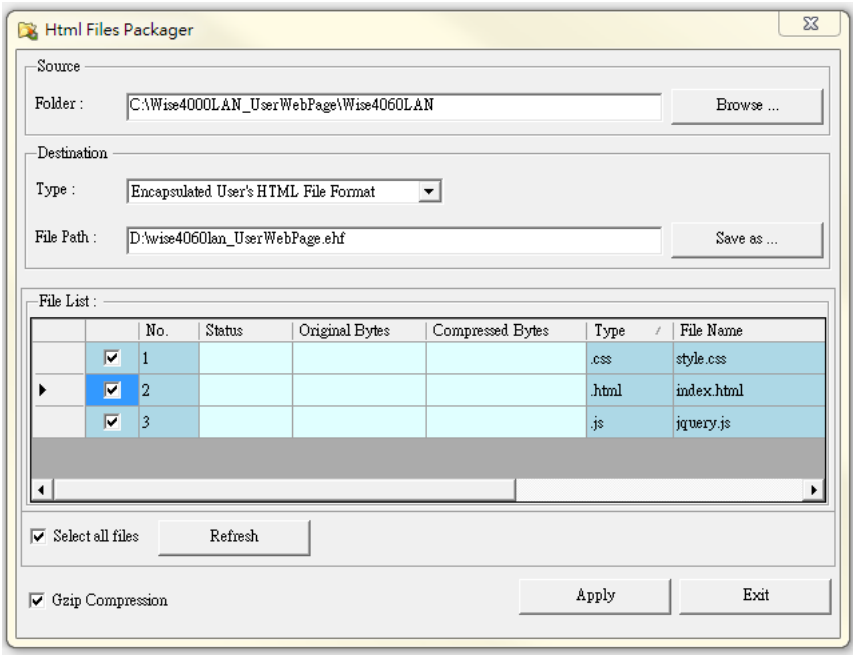
a. File

- **Open Favorite Group**
  You can import the favorite configuration group file (.XML) from your computer.

- **Save Favorite Group**
  You can save the favorite group configuration group as XML file to your computer.
- **Auto-Initial Group**
  If you want to have the same favorite group configuration when you exit ADAM.NET utility and launch it again, you need to check this option.
- **Exit**
  Exit ADAM.NET Utility.

b. Tools

- **Search Device**
  Search all the WISE-4000 modules you connected in local Ethernet.
- **Add Devices to Group**
  It's used to add WISE-4000 modules to your favorite group. After activating search function, all online modules will show on Module Tree Screen area. Now you can enable this function to select the device you want to add in the Module Tree Screen.
- **Group Configuration**
  Group Configuration is on WISE-4000 series module. It can help you efficiently configure or maintain massive WISE-4000 modules with the same configuration file or firmware upgrade at one time in the local network. The following steps will instruct you how to operate it.
- **Terminal for Command Testing**
  WISE-4000 series module Modbus/TCP as communication protocol, so you can launch the terminal to directly communicate with WISE-4000 series module by these two protocols.
- **Print Screen**
  You can save current ADAM.NET Utility screen into an image file by this option.
- **HTML File Packager**
  You can pack your user web page by this tool:
  1. Put all the files that going to pack in same folder, and “Browse…” the folder
  2. Press “Save as…” and give a file name after package
  3. Check all the files had been selected in “File List”
  4. Check “Gzip Compression” to reduce the file size
  5. After press the “Apply” button, your user web page will be compressed as “*.ehf” file, then you can download the file into your WISE module



c. Setup

- **Favorite Group**
  You can configure your favorite group including add one new device, modify or delete one current device, sort current devices and diagnose connection to one device.
- **Refresh Serial and Ethernet**
  ADAM.NET utility will refresh the serial and LAN network connection situation.
- **Add COM Ports**
  This option is used to add serial COM ports in ADAM.NET Utility. You won't need to use this option for WISE-4000 modules.
- **Show TreeView**
  Check this option to display the Module Tree Screen area.
- **Allow Calibration**
  Check this option to allow calibration function enabled on AI/O module.

d. Help

- **Check Up-to-Date on the Web**
  It will automatically connect to support and download page of Advantech web-site when it enabled. You can find and download the latest version of WISE-4000 utility there.
- **About ADAM.NET Utility**
  The current version of ADAM.NET Utility is installed on your computer.

4.3.1.2 Toolbar

There are 8 graphical icons for common used options of Menu on the toolbar.

Definition (from left to right)

1. Open favorite group
2. Save favorite group
3. Search Modules
4. Add Devices to Group
5. Terminal for Command Testing
6. Group Configuration
7. Monitor Data Stream/Event
8. Print Screen

4.3.1.3 Module Tree Screen

The Module Tree Screen locates on the left part of ADAM.NET utility operation window. There are four categories in this area:

Serial

All serial I/O Modules (ADAM-4000 and ADAM-5000 RS-485 serial modules) connected to the host PC will be listed in this category.

Ethernet

All Ethernet I/O Modules (WISE-4000, ADAM-6000, ADAM-6100,and ADAM-5000 TCP modules) connected to the host PC will be listed in this category.

Favorite Group

You can define which devices listed in the three categories above into your personal favorite group. This will make you easier to find your interested modules. Right click on the WISE-4000 device item under the Favorite Group item and you can select Add New Group to create a new group. After you create your own group, right click on your group and Add New Device into your group. You can also select Diagnose connection to check the communication.

ADAM-4500_5510 Series

This is a DOS interface utility for remote controllers such as ADAM-4500 and ADAM-5510 series.

Wireless Sensor Networks

All wireless I/O Modules (ADAM-2000 modules) connected to the host PC, through wireless gateway, will be listed in this category.

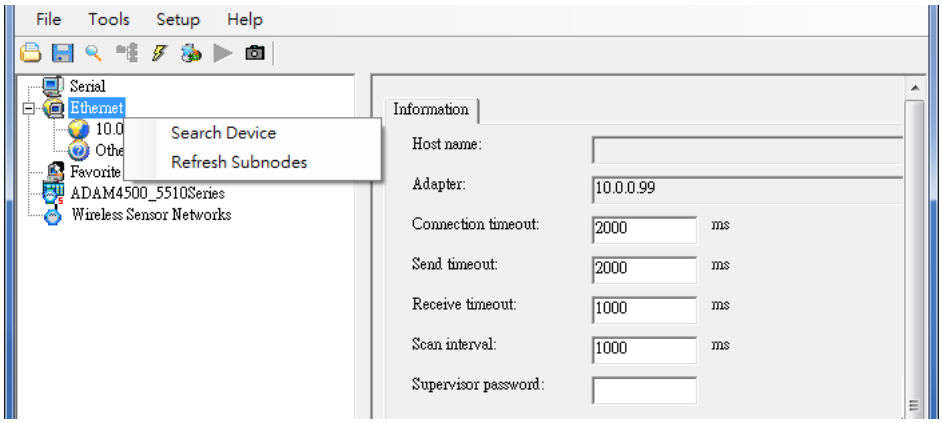
4.3.1.4 Main Operation Screen

Main Operation Screen located on the right side of utility includes I/O status display and function setting. You can select different items in Module Tree Screen, and then Main Operation Screen will change dependently. You can do all configurations and test in this area.

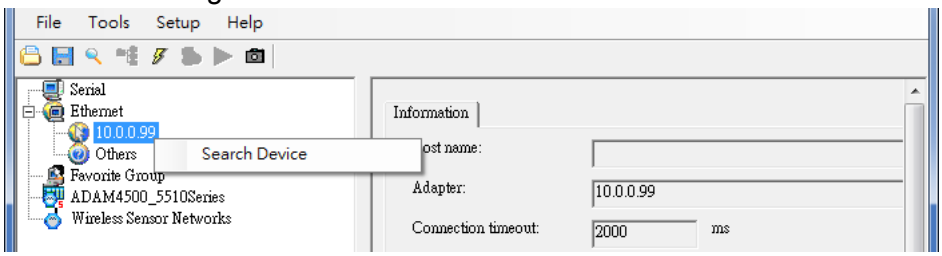
In Information page (after clicking Ethernet), you can configure Connection/Send/Receive/Scan Timeout. The supervisor password is a shortcut to let you enter a password at one time which's applied for certain modules, so you don't need to enter the same password for each module when you check it.

4.3.2 Configure WISE-4000

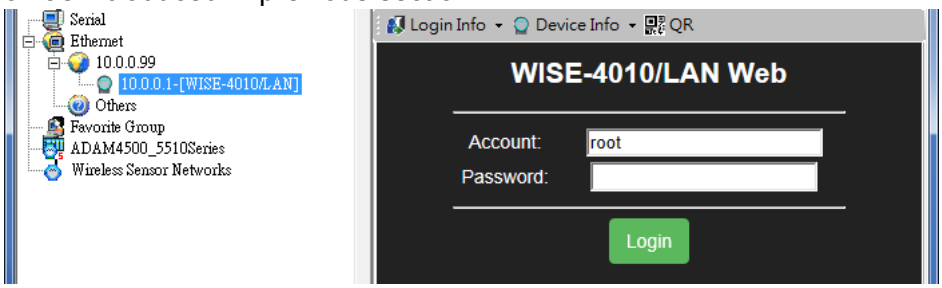
1. Configure the computer's IP address as the same domain as WISE-4000 module. For the new WISE-4000/LAN Series which default IP address is 10.0.0.1, the IP address of computer can be configured as 10.0.0.99 for example as following.
2. Open the Adam/Apax .NET Utility then you can see the IP address of computer been shown under "Ethernet" tree. You can right click to refresh the subnodes of this tree. Or click "Search Device" to find WISE-4000 module.



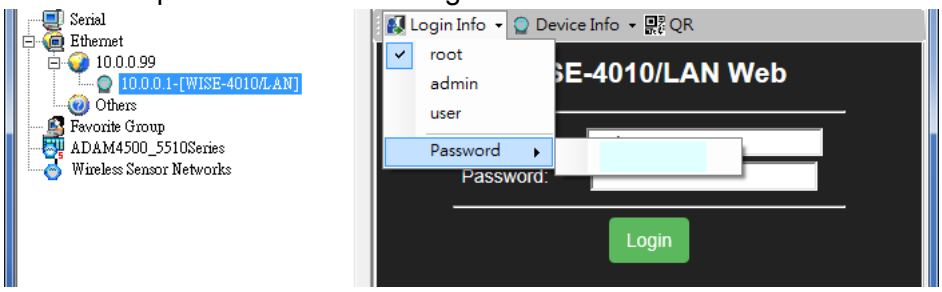
3. Users can also right click the IP address to find WISE-4000 module.



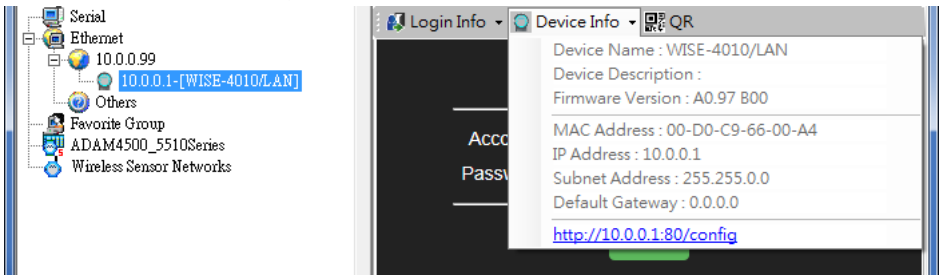
4. After the module been found, it will be listed under IP address in same domain, you can login the embedded web configuration web page for further configuration as introduced in previous section



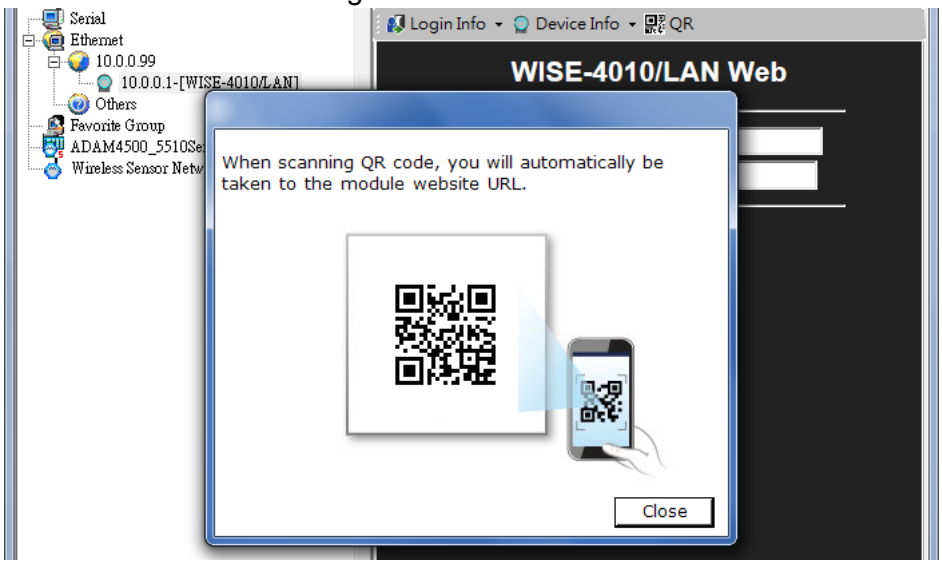
5. There are some function provide in same pages in utility, first you can enter the account and password faster in "Login Info" tab.



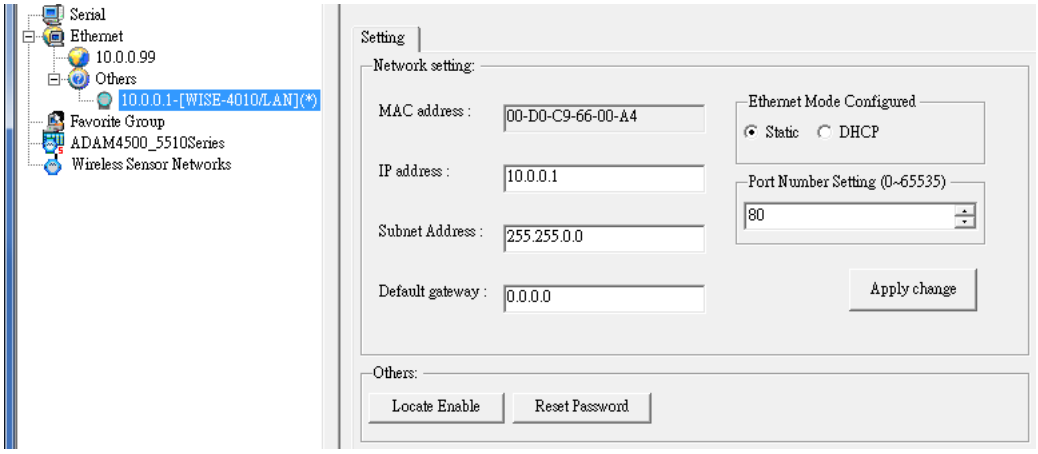
6. In the "Device Info" tab, the detail information of this module will been shown



7. The "QR" tab will generate the QR code of the web configuration web page for mobile device to access the module. User can also click the QR code to open the browser for further configuration.



Note! *If you are not able to search the module, you can configure the SW1 behind the module to initial mode. After power up and search the module in utility, user can find the module with default IP address, and the device name will been shown in "Others" tree with (*) sign. So user can change the device network setting in this page. Or try to locate the device and also reset the password with same page. After the new network setting been apply, please configure the SW1 back to normal mode and power up again to reboot in new network setting.*

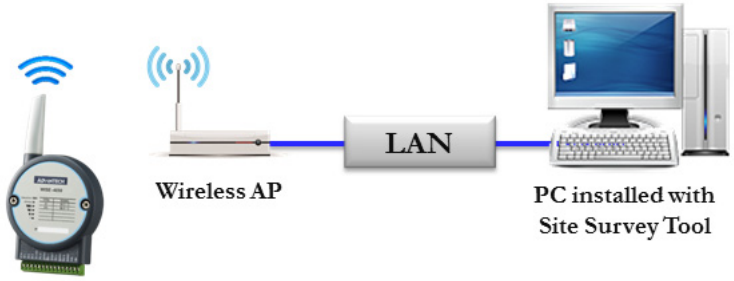


4.4 Site Survey Tool for WISE-4000 Wireless Series

WISE-4000 Wireless Series provides Site Survey Tool for testing the communication quality between WISE-4000 wireless module with wireless access point or wireless router.

4.4.1 Site Survey Architecture

Wiring the wireless AP with the PC installed with Site Survey Tool (Utility), if possible, the network should only have PC, AP, and WISE-4000 only.



4.4.2 Site Survey Mode

WISE module will go to site survey mode operation for testing communication quality. Most of the functions of WISE module will temporally stop to doing site survey operation. And the LED status will work as following:

LED	Color	Indication	Behavior
Status	Green	OFF	Site Survey mode
Com	Yellow	Blink	Site Survey data packet TX/RX
AP/Infra	Green	OFF	Site Survey mode (Station Mode)
Signal Strength	Green	Blink	Site Survey mode

4.4.3 Site Survey Tool

Search WISE-4000 module as described in the last section, after click the module shown in Ethernet tree. There is a “Site Survey” icon as following. Click the "Site Survey" icon to open site survey tool windows as following. Click "Start" to set the module in site survey mode and start the site survey tool. User can click "Restart" to restart the testing result, or click "Stop" to stop the testing and set the module back to normal operation.

Connection

Network Name (SSID): Show which wireless AP is connected.

Client IP Address: Show the IP address of the wireless adapter of PC

Signal Quality

Show the signal strength by bar chart

Testing Results

Signal Strength: The average result of the signal strength during testing

Good Package: The percentage of passed packets during testing

Current Activity

Detail information of each testing packets

Port

User can configure which UDP port of PC is assigned for site survey testing

Appendix A

I/O Modbus Mapping Table

A.1 Modbus Function Code Introduction

To full-fill the programming requirement, there is a series of function code standard for user's reference.

Code (Hex)	Name	Usage
01	Read Coil Status	Read Discrete Output Bit
02	Read Input Status	Read Discrete Input Bit
03	Read Holding Registers	Read 16-bit register. Used to read integer or floating point process data.
04	Read Input Registers	
05	Force Single Coil	Write data to force coil ON/OFF
06	Preset Single Register	Write data in 16-bit integer format
08	Loopback Diagnosis	Diagnostic testing of the communication port
0F	Force Multiple Coils	Write multiple data to force coil ON/OFF
10	Preset Multiple Registers	Write multiple data in 16-bit integer format

A.2 WISE-4010/LAN Modbus Mapping Table

Address (0X):

Address (0X)	Channel	Description	Attribute
00017	0	DO Value	Read/Write
00018	1		Read/Write
00019	2		Read/Write
00020	3		Read/Write
00101	0	Reset Historical Maximum AI Value	Write
00102	1		Write
00103	2		Write
00104	3		Write
00105	Average Ch 0~3		Write
00111	0	Reset Historical Min. AI Value	Write
00112	1		Write
00113	2		Write
00114	3		Write
00115	Average Ch 0~3		Write
00121	0	Open-Circuit Flag (Burnout)	Read
00122	1		Read
00123	2		Read
00124	3		Read

00131	0	High Alarm Flag	Read
00132	1		Read
00133	2		Read
00134	3		Read
00135	Average Ch 0~3		Read

00141	0	Low Alarm Flag	Read
00142	1		Read
00143	2		Read
00144	3		Read
00145	Average Ch 0~3		Read

Address (4X):

Address (4X)	Channel	Description	Attribute
40211		Module Name 1	Read
40212		Module Name 2	Read
40221	All AI	AI Channel Enabled	Read/Write
40303	All DO	DO Value	Read/Write
40001	0	AI Value	Read
40002	1		Read
40003	2		Read
40004	3		Read
40005	Average Ch 0~3		Read
40009-40010	0	Pulse Output Low Level Width	Read/Write
40011~40012	1		Read/Write
40013~40014	2		Read/Write
40015~40016	3		Read/Write
40017-40018	0	Pulse Output High Level Width	Read/Write
40019~40020	1		Read/Write
40021~40022	2		Read/Write
40023~40024	3		Read/Write
40025-40026	0	Set Absolute Pule	Read/Write
40027~40028	1		Read/Write
40029~40030	2		Read/Write
40031~40032	3		Read/Write

40033~40034	0	Set Incremental Pulse	Read/Write
40035~40035	1		Read/Write
40037~40038	2		Read/Write
40037~40040	3		Read/Write

40101~40102	0	AI Status*	Read
40103~40104	1		Read
40105~40106	2		Read
40107~40108	3		Read

40111	0	Historical Maximum AI Value	Read
40112	1		Read
40113	2		Read
40114	3		Read
40115	Average Ch 0~3		Read

40121	0	Historical Minimum AI Value	Read
40122	1		Read
40123	2		Read
40124	3		Read
40125	Average Ch 0~3		Read

40131~40132	0	AI Floating Value (IEEE754)	Read
40133~40134	1		Read
40135~40136	2		Read
40137~40138	3		Read
40139~40140	Average Ch 0~3		Read

40151~40152	0	Historical Maximum AI Floating Value (IEEE754)	Read
40153~40154	1		Read
40155~40156	2		Read
40157~40158	3		Read
40159~40160	Average Ch 0~3		Read

40171~40172	0	Historical Minimum AI Floating Value (IEEE754)	Read
40173~40174	1		Read
40175~40176	2		Read
40177~40178	3		Read
40179~40180	Average Ch 0~3		Read

40191	0	AI Value After Scaling	Read
40192	1		Read
40193	2		Read
40194	3		Read
40195	Average Ch 0~3		Read

40201	0	AI Type Code** (The type codes of channels for average value can't be changed.)	Read/Write
40202	1		Read/Write
40203	2		Read/Write
40204	3		Read/Write
40205	Average Ch 0~3		Read

* AI Status (2 Registers)

Lower Register		Higher Register	
Bit	Description	Bit	Description
0	Fail to Provide AI Value	0	DI triggered to Safety Value
1	Over Range	1	DI triggered to Startup Value
2	Under Range	2	Reserved
3	Open Circuit / Burnout	3	Reserved
4	Reserved	4	Reserved
5	Reserved	5	Reserved
6	Reserved	6	Reserved
7	ADC Initializing/Error	7	Reserved
8	Reserved	8	Reserved
9	Zero/Span Calibration Error	9	Reserved
10	Reserved	10	Reserved
11	Reserved	11	Reserved
12	Reserved	12	Reserved
13	Reserved	13	Reserved
14	Reserved	14	Reserved
15	Reserved	15	Reserved

** AI Type Code (2 Registers)

Type Code	Input Range
0x1080	4~20 mA
0x1082	0~20 mA

A.3 WISE-4050/LAN Modbus Mapping Table

Address 0X	Channel	Description	Attribute
00001	0	DI Value	Read
00002	1		Read
00003	2		Read
00004	3		Read
00017	0	DO Value	Read/Write
00018	1		Read/Write
00019	2		Read/Write
00020	3		Read/Write
00033	0	Counter Status (0: stop 1: start)	Read/Write
00034	1		Read/Write
00035	2		Read/Write
00036	3		Read/Write
00037	0	Clear Counter (1: write to clear value)	Write
00038	1		Write
00039	2		Write
00040	3		Write
00041	0	Clear Overflow (1: counter overflow, auto set to 0 after read)	Read/Write
00042	1		Read/Write
00043	2		Read/Write
00044	3		Read/Write
00045	0	DI Latch Status (1: DI latched, 0: write to clear latch)	Read/Write
00046	1		Read/Write
00047	2		Read/Write
00048	3		Read/Write

Address 4X	Channel	Description	Attribute
40211	-	Module Name 1	Read
40212	-	Module Name 2	Read
40301	All DI	DI Value	Read
40303	All DO	DO Value	Read/Write
40001~40002	0	Counter/Frequency Value	Read
40003~40004	1		Read
40005~40006	2		Read
40007~40008	3		Read

40009~40010	0	Pulse Output Low Level Width	Read/Write
40011~40012	1		Read/Write
40013~40014	2		Read/Write
40015~40016	3		Read/Write

40017~40018	0	Pulse Output High Level Width	Read/Write
40019~40020	1		Read/Write
40021~40022	2		Read/Write
40023~40024	3		Read/Write

40025~40026	0	Set Absolute Pulse Output Number	Read/Write
40027~40028	1		Read/Write
40029~40030	2		Read/Write
40031~40032	3		Read/Write

40033~40034	0	Set Incremental Pulse Output Number	Read/Write
40035~40036	1		Read/Write
40037~40038	2		Read/Write
40039~40040	3		Read/Write

A.4 WISE-4060/LAN Modbus Mapping Table

Address 0X	Channel	Description	Attribute
00001	0	DI Value	Read
00002	1		Read
00003	2		Read
00004	3		Read
00017	0	DO Value	Read/Write
00018	1		Read/Write
00019	2		Read/Write
00020	3		Read/Write
00033	0	Counter Status (0: stop 1: start)	Read/Write
00034	1		Read/Write
00035	2		Read/Write
00036	3		Read/Write
00037	0	Clear Counter (1: write to clear value)	Write
00038	1		Write
00039	2		Write
00040	3		Write
00041	0	Clear Overflow (1: counter overflow, auto set to 0 after read)	Read/Write
00042	1		Read/Write
00043	2		Read/Write
00044	3		Read/Write
00045	0	DI Latch Status (1: DI latched, 0: write to clear latch)	Read/Write
00046	1		Read/Write
00047	2		Read/Write
00048	3		Read/Write

Address 4X	Channel	Description	Attribute
40211	-	Module Name 1	Read
40212	-	Module Name 2	Read
40301	All DI	DI Value	Read
40303	All DO	DO Value	Read/Write
40001~40002	0	Counter/Frequency Value	Read
40003~40004	1		Read
40005~40006	2		Read
40007~40008	3		Read

40009~40010	0	Pulse Output Low Level Width	Read/Write
40011~40012	1		Read/Write
40013~40014	2		Read/Write
40015~40016	3		Read/Write

40017~40018	0	Pulse Output High Level Width	Read/Write
40019~40020	1		Read/Write
40021~40022	2		Read/Write
40023~40024	3		Read/Write

40025~40026	0	Set Absolute Pulse Output Number	Read/Write
40027~40028	1		Read/Write
40029~40030	2		Read/Write
40031~40032	3		Read/Write

40033~40034	0	Set Incremental Pulse Output Number	Read/Write
40035~40036	1		Read/Write
40037~40038	2		Read/Write
40039~40040	3		Read/Write

A.5 WISE-4012E Wireless Modbus Mapping Table

Address 0X	Channel	Description	Attribute
00001	0	DI Value	Read
00002	1		Read
00017	0	DO Value	R/W
00018	1		R/W
00033	0	Counter Status (0: stop 1: start)	R/W
00034	1		R/W
00035	0	Clear Counter (1: write to clear value)	Write
00036	1		Write
00037	0	Clear Overflow (1: counter overflow, auto set to 0 after read)	R/W
00038	1		R/W
00039	0	DI Latch Status (1: DI latched, 0: write to clear latch)	R/W
00040	1		R/W
00101	0	Reset Historical Maximum AI Value	Write
00102	1		Write
00103	Average Channel 0~1		Write
00111	0	Reset Historical Minimum AI Value	Write
00112	1		Write
00113	Average Channel 0~1		Write
00131	0	High Alarm Flag	Read
00132	1		Read
00133	Average Channel 0~1		Read
00141	0	Low Alarm Flag	Read
00142	1		Read
00143	Average Channel 0~1		Read

Address 4X	Channel	Description	Attribute
40211		Module Name 1	Read
40212		Module Name 2	Read
40221	All AI	AI Channel Enable	R/W

40301	All DI	DI Value	Read
40303	All DO	DO Value	R/W
40001	0	AI Value (Value Range: 0~10000, Value Unit: mV)	Read
40002	1		Read
40003	Average Channel 0~1		Read
40017~40018	0	Counter/Frequency Value	R/W
40019~40020	1		R/W
40021~40022	0	Pulse Output Low Level Width	R/W
40023~40024	1		R/W
40025~40026	0	Pulse Output High Level Width	R/W
40027~40028	1		R/W
40029~40030	0	Set Absolute Pulse	R/W
40031~40032	1		R/W
40033~40034	0	Set Incremental Pulse	R/W
40035~40036	1		R/W
40101~40102	0	AI Status*	Read
40103~40104	1		Read
40111	0	Historical Maximum AI Value	Read
40112	1		Read
40113	Average Channel 0~1		Read
40121	0	Historical Minimum AI Value	Read
40122	1		Read
40123	Average Channel 0~1		Read
40131~40132	0	AI Floating Value (IEEE754)	Read
40133~40134	1		Read
40135~40136	Average Channel 0~1		Read
40151~40152	0	Historical Maximum AI Floating Value (IEEE754)	Read
40153~40154	1		Read
40155~40156	Average Channel 0~1		Read

40171~40172	0	Historical Minimum AI Floating Value (IEEE754)	Read
40173~40174	1		Read
40175~40176	Average Channel 0~1		Read

40191	0	AI Value After Scaling	Read
40192	1		Read
40193	Average Channel 0~1		Read

40201	0	AI Type Code** (The type codes of channels for average value can't be changed.)	R/W
40202	1		R/W
40203	Average Channel 0~1		R

*** AI Status (2 Registers)**

Lower Register		Higher Register	
Bit	**Description**	**Bit**	**Description**
0	Fail to Provide AI Value	0	DI triggered to Safety Value
1	Over Range	1	DI triggered to Startup Value
2	Under Range	2	Reserved
3	Open Circuit / Burnout	3	Reserved
4	Reserved	4	Reserved
5	Reserved	5	Reserved
6	Reserved	6	Reserved
7	ADC Initializing/Error	7	Reserved
8	Reserved	8	Reserved
9	Zero/Span Calibration Error	9	Reserved
10	Reserved	10	Reserved
11	Reserved	11	Reserved
12	Reserved	12	Reserved
13	Reserved	13	Reserved
14	Reserved	14	Reserved
15	Reserved	15	Reserved

**** AI Type Code (2 Registers)**

Type Code	Input Range
0x0148	0~10 V

A.6 WISE-4050 Wireless Modbus Mapping Table

Address 0X	Channel	Description	Attribute
00001	0	DI Value	Read
00002	1		Read
00003	2		Read
00004	3		Read
00017	0	DO Value	R/W
00018	1		R/W
00019	2		R/W
00020	3		R/W
00033	0	Counter Status (0: stop 1: start)	R/W
00034	1		R/W
00035	2		R/W
00036	3		R/W
00037	0	Clear Counter (1: write to clear value)	Write
00038	1		Write
00039	2		Write
00040	3		Write
00041	0	Clear Overflow (1: counter overflow, auto set to 0 after read)	R/W
00042	1		R/W
00043	2		R/W
00044	3		R/W
00045	0	DI Latch Status (1: DI latched, 0: write to clear latch)	R/W
00046	1		R/W
00047	2		R/W
00048	3		R/W

Address 4X	Channel	Description	Attribute
40211	-	Module Name 1	Read
40212	-	Module Name 2	Read
40301	All DI	DI Value	Read
40303	All DO	DO Value	R/W
40001~40002	0	Counter/Frequency Value	Read
40003~40004	1		Read
40005~40006	2		Read
40007~40008	3		Read

40009~40010	0	Pulse Output Low Level Width	R/W
40011~40012	1		R/W
40013~40014	2		R/W
40015~40016	3		R/W

40017~40018	0	Pulse Output High Level Width	R/W
40019~40020	1		R/W
40021~40022	2		R/W
40023~40024	3		R/W

40025~40026	0	Set Absolute Pulse Output Number	R/W
40027~40028	1		R/W
40029~40030	2		R/W
40031~40032	3		R/W

40033~40034	0	Set Incremental Pulse Output Number	R/W
40035~40036	1		R/W
40037~40038	2		R/W
40039~40040	3		R/W

A.7 WISE-4060 Wireless Modbus Mapping Table

Address 0X	Channel	Description	Attribute
00001	0	DI Value	Read
00002	1		Read
00003	2		Read
00004	3		Read
00017	0	DO Value	R/W
00018	1		R/W
00019	2		R/W
00020	3		R/W
00033	0	Counter Status (0: stop 1: start)	R/W
00034	1		R/W
00035	2		R/W
00036	3		R/W
00037	0	Clear Counter (1: write to clear value)	Write
00038	1		Write
00039	2		Write
00040	3		Write
00041	0	Clear Overflow (1: counter overflow, auto set to 0 after read)	R/W
00042	1		R/W
00043	2		R/W
00044	3		R/W
00045	0	DI Latch Status (1: DI latched, 0: write to clear latch)	R/W
00046	1		R/W
00047	2		R/W
00048	3		R/W

Address 4X	Channel	Description	Attribute
40211	-	Module Name 1	Read
40212	-	Module Name 2	Read
40301	All DI	DI Value	Read
40303	All DO	DO Value	R/W
40001~40002	0	Counter/Frequency Value	Read
40003~40004	1		Read
40005~40006	2		Read
40007~40008	3		Read

40009~40010	0	Pulse Output Low Level Width	R/W
40011~40012	1		R/W
40013~40014	2		R/W
40015~40016	3		R/W

40017~40018	0	Pulse Output High Level Width	R/W
40019~40020	1		R/W
40021~40022	2		R/W
40023~40024	3		R/W

40025~40026	0	Set Absolute Pulse Output Number	R/W
40027~40028	1		R/W
40029~40030	2		R/W
40031~40032	3		R/W

40033~40034	0	Set Incremental Pulse Output Number	R/W
40035~40036	1		R/W
40037~40038	2		R/W
40039~40040	3		R/W

Appendix B

REST for WISE-4000 Series

B.1 Introduction

REpresentational State Transfer (REST) is a design style of software architecture for Web application behaves and services including image indication, resource request and response and message delivery. It can be developed compatible with popular protocols or standards like HTTP, URI, JSON, HTML. With the advantage of scalability, simplicity and performance, it's already adopted in Web service by Amazon, Yahoo. The Web service of is developed based on HTML5 language, if user need to integrate this into other Web services, the following information/command list should be referred for implementation.

B.2 REST Resources for WISE-4000 Series

B.2.1 Digital Input

B.2.1.1 /di_value/slot_index/ch_num

Description	Retrieves information about the digital input value resource on specific slot.
URL Structure	http://10.0.0.1/di_value/slot_index http://10.0.0.1/di_value/slot_index/ch_num
HTTP Method	GET:Returns the representation of all of digital input value resource. PUT:Replace all of digital input value resource PATCH:Apply partial modifications to digital input value resource.

GET	Multiple Channel Request:
	GET /di_value/slot_index
	Single Channel Request:
	GET /di_value/slot_index/ch_num
	
	[Example]
	
	Request: **GET /di_value/slot_0**
	
	Content-type: application/json
	Response: 200 OK
	{
	"DIVal": [
	{
	"Ch":0,
	"Md":0,
	"Stat":1,
	"Val":1,
	"Cnting":0,
	"ClrCnt":0,
	"OvLch": 0
	},
	{
	"Ch":1,
	"Md":0,
	"Stat":0,
	"Val":0,
	"Cnting":0,
	"ClrCnt":0,
	"OvLch": 0
	},
	{
	"Ch":2,
	"Md":1,
	"Stat":0,
	"Val":3378,
	"Cnting":1,
	"ClrCnt":0,
	"OvLch": 0
	},
	{
	"Ch":3,
	"Md":3,
	"Stat":0,
	"Val":1,
	"Cnting":0,
	"ClrCnt":0,
	"OvLch": 0
	}
	]
	}
	
	Request : **GET /di_value/slot_0/ch_2**
	
	Content-type: application/json
	Response: 200 OK
	{
	"Ch":2,
	"Md":0,
	"Stat":1,
	"Val":1,
	"Cnting":0,
	"ClrCnt":0,
	"OvLch": 0
	}

PUT	Single/Multiple Channel Request:
	PUT /di_value/slot_index
	Single Channel Request:
	PUT /di_value/slot_index/ch_num
	
	[Example]
	
	Request: **PUT /di_value/slot_0**
	
	Content-type: application/json
	{
	"DIVal": [
	
	{
	"Ch":0,
	"Md":0,
	"Stat":0,
	"Val":0,
	"Cnting":0,
	"ClrCnt":0,
	"OvLch": 0
	},
	{
	"Ch":1,
	"Md":0,
	"Stat":0,
	"Val":0,
	"Cnting":0,
	"ClrCnt":0,
	"OvLch": 0
	},
	{
	"Ch":2,
	"Md":1,
	"Stat":0,
	"Val":3378,
	"Cnting":0,
	"ClrCnt":1,
	"OvLch": 0
	},
	{
	"Ch":3,
	"Md":3,
	"Stat":0,
	"Val":0,
	"Cnting":0,
	"ClrCnt":0,
	"OvLch": 0
	}
	]
	}
	
	Response: 200 OK
	
	Request: **PUT /di_value/slot_0/ch_2**
	
	Content-type: application/json
	{
	"Ch":2,
	"Md":1,
	"Stat":0,
	"Val":3378,
	"Cnting":0,
	"ClrCnt":1,
	"OvLch": 0
	}
	
	Response: 200 OK

PATCH	Single/Multiple Channel Request:
	PATCH /di_value/slot_index
	Single Channel Request:
	PATCH /di_value/slot_index/ch_num
	
	[Example]
	
	Request: **PATCH /di_value/slot_0**
	
	Content-type: application/json
	{
	"DIVal": [
	{
	"Ch":2,
	"Cnting": 1
	},
	{
	"Ch":3,
	"OvLch":0
	}
	]
	}
	
	Response: 200 OK
	
	Request: **PATCH /di_value/slot_0/ch_3**
	Content-type: application/json
	{
	"Ch":3,
	"ClrCnt":1
	}
	
	Response: 200 OK

- JSON array name definition:

Field	Abbreviation	Data Type
Array of Digital input configurations	DIVal	Array

- Resource value definitions:

Field	Abbreviation	Data Type	Property	Description
Channel Number	Ch	Number	R	0, 1, …: Digital input channel number.
Mode	Md	Number	R	Digital input mode. 0 DI 1 Counter 2 LowToHighLatch 3 HighToLowLatch 4 Frequency
Signal Logic Status	Stat	Number	R	1, 0: Input signal is Logic High or Low.
Channel Value	Val	Number	R	DI measurement data **Input Mode** / **Value Description** **DI** / **Logic Status of DI** **Counter** / **Counter Value** **LowToHighLatch** / **Logic status of DI** **HighToLowLatch** / **Logic status of DI** **Frequency** / **Frequency(unity 0.1 Hz**
Start Counter	Cnting	Number	RW	Start/Stop counter counting Read 1 : counter is counting 0 : not counting Write 1 : start counting 0 : stop counting
Clear Counter	ClrCnt	Number	W	1 : Clear the counter value
Get/Clear Counter Overflow or Latch Status	OvLch	Number	RW	counter overflow or latch status Read 1 : overflow/latch occurred. 0 : no overflow or latch Write 0 : clear the overflow or latch status

B.2.2 Digital Output

B.2.2.1 /do_value/slot_index/ch_num

Description	Retrieves information about the digital output value resource on specific slot.
URL Structure	http://10.0.0.1/do_value/slot_index http://10.0.0.1/do_value/slot_index/ch_num
HTTP Method	GET:Returns the representation of all of digital output value resource. PUT:Replace all of digital output value resource PATCH:Apply partial modifications to digital output value resource.

GET	Multiple Channel Request:
	GET /do_value/slot_index
	Single Channel Request:
	GET /do_value/slot_index/ch_num
	
	[Example]
	
	Request: **GET /do_value/slot_0**
	
	Content-type: application/json
	Response: 200 OK
	{
	"DOVal": [
	{
	"Ch":0,
	"Md":0,
	"Stat":1,
	"Val":1,
	"PsCtn":0,
	"PsStop":0,
	"PsIV": 0
	},
	{
	"Ch":1,
	"Md":0,
	"Stat":0,
	"Val":0,
	"PsCtn":0,
	"PsStop":0,
	"PsIV": 0
	},
	{
	"Ch":2,
	"Md":1,
	"Stat":1,
	"Val":3378,
	"PsCtn":0,
	"PsStop":0,
	"PsIV": 0
	},
	{
	"Ch":3,
	"Md":3,
	"Stat":1,
	"Val":1,
	"PsCtn":0,
	"PsStop":0,
	"PsIV": 0
	}
	]
	}
	
	Request : **GET /do_value/slot_0/ch_2**
	
	Content-type: application/json
	Response: 200 OK
	{
	"Ch":2,
	"Md":0,
	"Stat":1,
	"Val":1,
	"PsCtn":0,
	"PsStop":0,
	"PsIV": 0
	}

PUT	Single/Multiple Channel Request:
	PUT /do_value/slot_index
	Single Channel Request:
	PUT /do_value/slot_index/ch_num
	
	[Example]
	
	Request: **PUT /do_value/slot_0**
	
	Content-type: application/json
	{
	"DOVal": [
	{
	"Ch":0,
	"Md":0,
	"Stat":1,
	"Val":1,
	"PsCtn":0,
	"PsStop":0,
	"PsIV": 0
	},
	{
	"Ch":1,
	"Md":0,
	"Stat":0,
	"Val":0,
	"PsCtn":0,
	"PsStop":0,
	"PsIV": 0
	},
	{
	"Ch":2,
	"Md":1,
	"Stat":1,
	"Val":3378,
	"PsCtn":0,
	"PsStop":0,
	"PsIV": 0
	},
	{
	"Ch":3,
	"Md":3,
	"Stat":1,
	"Val":1,
	"PsCtn":0,
	"PsStop":0,
	"PsIV": 0
	}
	]
	}
	
	Response: 200 OK
	
	Request: **PUT /do_value/slot_0/ch_2**
	
	Content-type: application/json
	{
	"Ch":2,
	"Md":2,
	"Stat":0,
	"Val":0,
	"PsCtn":0,
	"PsStop":0,
	"PsIV": 0
	}
	
	Response: 200 OK

PATCH	Single/Multiple Channel Request:
	PATCH /do_value/slot_index
	Single Channel Request:
	PATCH /do_value/slot_index/ch_num
	
	[Example]
	
	Request: **PATCH /do_value/slot_0**
	
	Content-type: application/json
	{
	"DOVal": [
	{
	"Ch":2,
	"Md": 2
	},
	{
	"Ch":3,
	"PsStop":1
	}
	]
	}
	
	Response: 200 OK
	
	Request: **PATCH /do_value/slot_0/ch_3**
	
	Content-type: application/json
	{
	"Ch":3,
	"PsCtn":1
	}
	
	Response: 200 OK

■ JSON array name definition:

Field	Abbreviation	Data Type
Array of Digital input configurations	DOVal	Array

Resource value definitions:

Field	Abbreviation	Data Type	Property	Description
Channel Number	Ch	Number	R	0, 1, …: Digital output channel number.
Mode	Md	Number	R	Digital output mode. 0 DO 1 Pulse Output 2 LowToHighDelay 3 HighToLowDelay
Signal Logic Status	Stat	Number	R	1, 0: Output signal is Logic High or Low.
Channel Value	Val	Number	RW	DO measurement data Output Mode Value Description DO Get the current signal status or set its status Pulse Output Get or set the absolute pulse count value LowToHighDelay Get the current signal status or set its status HighToLowDelay Get the current signal status or set its status
Pulse Output Continue State	PsCtn	Number	RW	1 / 0: Pulse outputting is continuous or not.
Stop Pulse Output	PsStop	Number	W	1: Stop the pulse outputting. (Continue is disabled, Absolute and incremental values are reset to zero. DO signal status is set to logic low.)
Incremental Pulse Output Value	PsIV	Number	RW	Incremental Pulse Output Value

B.2.3 Analog Input

B.2.3.1 /ai_value/slot_index/ch_num

Description	Retrieves information about the analog input value resource on specific slot.
URL Structure	http://10.0.0.1/ai_value/slot_index http://10.0.0.1/ai_value/slot_index/ch_num
HTTP Method	GET:Returns the representation of all of analog input value resource. PUT:None PATCH:Apply partial modifications to analog input value resource.

GET	Multiple Channel Request: **GET /ai_value/slot_index** Single Channel Request: GET /ai_value/slot_index/ch_num [Example] Request : **GET /ai_value/slot_0** Content-type: application/json Response: 200 OK { "AIVal": [{ "Ch":0, "En":1, "Rng":328, "Val":148, "Eg":650, "Evt":0, "LoA": 0, "HiA": 0, "HVal":190, "HEg":1250, "LVal":15, "LEg":500, "SVal":148, "ClrH": 0, "ClrL": 0 }, { "Ch":1, "En":1, "Rng":328, "Val":0, "Eg":0, "Evt":0, "LoA":0, "HiA":0, "HVal":0, "HEg":0, "LVal":0, "LEg":0, "SVal":0, "ClrH": 0, "ClrL": 0 }, { "Ch":2, "En":1,

	"Rng":328,
	"Val":0,
	"Eg":0,
	"Evt":8,
	"LoA":0,
	"HiA":0,
	"HVal":0,
	"HEg":0,
	"LVal":0,
	"LEg":0,
	"SVal":0,
	"ClrH": 0,
	"ClrL": 0
	},
	{
	"Ch":3,
	"En":1,
	"Rng":328,
	"Val":0,
	"Eg":0,
	"Evt":0,
	"LoA":0,
	"HiA":0,
	"HVal":0,
	"HEg":0,
	"LVal":0,
	"LEg":0,
	"SVal":0,
	"ClrH": 0,
	"ClrL": 0
	},
	{
	"Ch":4,
	"En":1,
	"Rng":328,
	"Val":0,
	"Eg":0,
	"Evt":0,
	"LoA":0,
	"HiA":0,
	"HVal":0,
	"HEg":0,
	"LVal":0,
	"LEg":0,
	"SVal":0,
	"ClrH": 0,
	"ClrL": 0
	}
	]
	}
	
	Request : **GET /ai_value/slot_0/ch_2**
	
	Content-type: application/json
	Response: 200 OK
	{
	"Ch":2,
	"En":1,
	"Rng":328,
	"Val":0,
	"Eg":0,
	"Evt":8,
	"LoA":0,
	"HiA":0,
	"HVal":0,
	"HEg":0,
	"LVal":0,
	"LEg":0,
	"SVal":0,
	"ClrH": 0,
	"ClrL": 0
	}

PUT	None

PATCH	Single/Multi Channel Request:
	PATCH /ai_value/slot_index
	Single Channel Request:
	PATCH /ai_value/slot_index/ch_num
	
	[Example]
	
	Request: **PATCH /ai_value/slot_0**
	
	Content-type: application/json
	{
	"AIVal": [
	{
	"Ch":2,
	"LoA": 0
	},
	{
	"Ch":3,
	"HiA":0
	}
	]
	}
	
	Response: 200 OK
	
	Request: **PATCH /ai_value/slot_0/ch_3**
	
	Content-type: application/json
	{
	"LoA":0
	}
	
	Response: 200 OK

- JSON array name definition:

Field	Abbreviation	Data Type
Array of Analog input configurations	AIVal	Array

■ Resource value definitions (Total channels = AI channel number + 1 average channel):

Field	Abbreviation	Data Type	Property	Description
Channel Number	Ch	Number	R	0, 1, …: Analog input channel number. Note for the average channel: The average channel number for a 4-ch AI module is 4.
Input Range	Rng	Number	R	Analog input range. Range code 328 (0x0148) 0 – 10 V 259 (0x0103) +/- 150 m 260 (0x0104) +/- 500 m 320 (0x0140) +/- 1 V 321 (0x0141) +/- 2.5 V 322 (0x0142) +/- 5 V 323 (0x0143) +/- 10 V 327 (0x0147) 0 ~ 5 V 384 (0x0180) 4 ~ 20 mA 385 (0x0181) +/- 20 mA 386 (0x0182) 0 ~ 20 mA 65535 Invalid range, if ave channel is disable
Channel Enable	En	Number	R	1 / 0: Enable / Disable AI conversion Notice: Average channel is read only. When channel mask of average is not 0, the value is 1.
Channel Raw Value	Val	Number	R	0 ~ 65535:AI measurement data (Raw data)
Channel Engi-neering data	Eg	Number	R	AI engineering data, the value is 1/1000 scale. For example, 1630 → 1.63
Channel Event Status	Evt	Number	R	AI statuses
Low Alarm Status	LoA	Number	RW	Low alarm status Read 1 : low alarm occurred. 0 : not occurred Write 0 : clear the low alarm status
High Alarm Status	HiA	Number	RW	High alarm status Read 1 : high alarm occurred. 0 : not occurred Write 0 : clear the high alarm status
Maximum AI Raw Value	HVal	Number	R	AI max. measurement data (Raw data)

Maximum AI Engineering data	HEg	Number	R	AI max. engineering data, the value is 1/1000 scale For example, 10200→10.2
Minimum AI Raw Value	LVal	Number	R	AI min. measurement data (Raw data)
Minimum AI Engineering data	LEg	Number	R	AI min. engineering data, the value is 1/1000 scale For example, 250 → 0.25
Channel Raw Value After Scaling	SVal	Number	R	0 ~ 65535 : AI measurement data (Raw data) after scaling
Clear Maximum AI Value	ClrH	Number	W	1 : Clear the Maximum AI value
Clear Minimum AI Value	ClrL	Number	W	1 : Clear the Minimum AI value

*** AI Status (2 Registers)**			
Lower Register		**Higher Register**	
Bit	**Description**	**Bit**	**Description**
0	Fail to Provide AI Value	0	DI triggered to Safety Value
1	Over Range	1	DI triggered to Startup Value
2	Under Range	2	Reserved
3	Open Circuit / Burnout	3	Reserved
4	Reserved	4	Reserved
5	Reserved	5	Reserved
6	Reserved	6	Reserved
7	ADC Initializing/Error	7	Reserved
8	Reserved	8	Reserved
9	Zero/Span Calibration Error	9	Reserved
10	Reserved	10	Reserved
11	Reserved	11	Reserved
12	Reserved	12	Reserved
13	Reserved	13	Reserved
14	Reserved	14	Reserved
15	Reserved	15	Reserved

B.2.4 Data Logger

B.2.4.1 /log_message

Description	Retrieves the log data in system memory.
URL Structure	http://10.0.0.1/log_message
HTTP Method	GET: According to the setting of filtering, server returns the all/partial of logged data.

GET	Request:
	GET /log_message
	
	[Example]:
	Request: **GET /log_message** for WISE-4060/LAN module
	
	Content-type: application/json
	Response: 200 OK
	{
	"LogMsg": [
	{
	"PE":128,
	"TIM":"2014-11-11T15:48:32+08:00",
	"UID":"ADAM-T160_00D0C9FE1601",
	"MAC":"00-D0-C9-FE-16-01",
	"Record" :
	[
	[0,3,3,1],
	[0,2,4,150],
	[0,5,5,250]
	]
	},
	{
	"PE":128,
	"TIM":"2014-11-11T15:49:44+08:00",
	"UID":"ADAM-T160_00D0C9FE1601",
	"MAC":"00-D0-C9-FE-16-01",
	"Record" :
	[
	[0,3,3,0],
	[0,2,4,140],
	[0,5,5,240]
	]
	},
	{
	"PE":128,
	"TIM":"2014-11-11T15:51:02+08:00",
	"UID":"ADAM-T160_00D0C9FE1601",
	"MAC":"00-D0-C9-FE-16-01",
	"Record" :
	[
	[0,3,3,0],
	[0,2,4,130],
	[0,5,5,230]
	]
	}
	]
	}

JSON array name definition:

Field	Abbreviation	Data Type
Array of log messages	LogMsg	Array
Array of I/O records	Record	Array

Resource value definitions:

Field	Abbreviations	Data type	Property	Description
Periodic/Event	128	Number	R	Recording mode of storage 1 Event from DI 2 DO 4 AI 8 AO 16 WDT 128 Periodic
Timestamp	TIM	String	R	Timestamp of the storage “Coordinated Universal Time (UTC) Ex. “1415757750” corresponds to November 12, 2014, 2:02:30 am, Standard Time. (meanwhile, 2014, 10:02:30 am, Taipei Time.) “Local Date/Time according GMT time zone (ISO 8601) Ex. “1994-11-05T08:15:30-05:00” corresponds to November 5, 1994, 8:15:30 am, US Eastern Standard Time.
UUID	UID	String	R	Universally Unique Identifier (UUID) Max. 32 characters
MAC ID	MAC	String	R	MAC address. (12+5) characters, ex, “00-D0-C9-F0-63-F7
Recording message	Record	Array	R	* The information in array is as follows. [Slot-index, Channel-index, I/O-type-index, I/O-value] * The data type in array is as follows. [Number, Number, Number, Number] Notice: When the I/O-type-index is engineering type (12, 13, 14, 18), the I/O value is 1/1000 scale. Index Recording I/O-type of the storage 0 Invalid 1 DI Logic Status 2 DI Counter value 3 DI Frequency value 4 DO Logic Status 5 DO Absolute Pulse Output value 6 DO Incremental Pulse Output Value 7 AI value 8 Historical Maximum AI value 9 Historical Minimum AI value 10 AI value after scaling 11 AI status flags 12 AI engineering value 13 Historical Maximum AI engineering value 14 Historical Minimum AI engineering value 15 AO value 16 AO value after scaling 17 AO status flags 18 AO engineering value

Remarks	

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