User Manual

WISE-4000 Series

IoT Ethernet I/O Module

ADVANTECH

Enabling an Intelligent Planet

Copyright

The documentation and the software included with this product are copyrighted 2015 by Advantech Co., Ltd. All rights are reserved. Advantech Co., Ltd. reserves the right to make improvements in the products described in this manual at any time without notice. No part of this manual may be reproduced, copied, translated or transmitted in any form or by any means without the prior written permission of Advantech Co., Ltd. Information provided in this manual is intended to be accurate and reliable. However, Advantech Co., Ltd. assumes no responsibility for its use, nor for any infringements of the rights of third parties, which may result from its use.

Acknowledgements

Intel and Pentium are trademarks of Intel Corporation.

Microsoft Windows and MS-DOS are registered trademarks of Microsoft Corp.

All other product names or trademarks are properties of their respective owners.

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.

Part No. 2003D40001 Edition 2

Printed in Taiwan July 2015

Declaration of Conformity

CE

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

.

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

1.1 Introduction 2
1.2 Feature Highlights 2
1.2.1 RESTful Web Service 2
1.2.2 Data Storage Function 3
1.2.3 IoT Cloud Function 3
1.3 Series Family and Specifications 4
1.3.1 Series Family 4
1.4 Mechanical Design and Dimensions 5
1.4.1 WISE-4000 Wireless Series Dimensions 5
1.4.2 WISE-4000/LAN Dimensions 5
1.5 Switch 6
1.6 LED Definition 6
1.7 Certification and Safety Standard 7
1.8 Package Information 8

Chapter 2 Product Specifications 9

2.1 General Specification 10
2.2 WISE-4010/LAN 12
2.2.1 I/O Specification 12
2.2.2 Application Wiring 13
Figure 2.1 WISE-4010/LAN Current Input Wiring Diagram 13
Figure 2.2 WISE-4010/LAN Digital Output Wiring Diagram 13
2.2.3 Pin Assignment 14
Figure 2.3 WISE-4010/LAN Pin Assignment 14
2.2.4 Block Diagram 14
Figure 2.4 WISE-4010/LAN Block Diagram 14
2.3 WISE-4050/LAN 14
2.3.1 I/O Specification 14
2.3.2 Application Wiring 15
Figure 2.5 WISE-4050/LAN Digital Input Wiring Diagram 15
Figure 2.6 WISE-4050/LAN Digital Output Wiring Diagram 15
2.3.3 Pin Assignment 16
Figure 2.7 WISE-4050/LAN Pin Assignment 16
2.3.4 Block Diagram 16
Figure 2.8 WISE-4050/LAN Block Diagram 16
2.4 WISE-4060/LAN 17
2.4.1 I/O Specification 17
2.4.2 Application Wiring 18
Figure 2.9 WISE-4060/LAN Digital Input Wiring Diagram 18
Figure 2.10 WISE-4060/LAN Relay Output Wiring Diagram 18
2.4.3 Pin Assignment 19
Figure 2.11 WISE-4060/LAN Pin Assignment 19
2.4.4 Block Diagram 19
Figure 2.12 WISE-4060/LAN Block Diagram 19
2.5 WISE-4012E 20
2.5.1 I/O Specification 20
2.5.2 Application Wiring 22
Figure 2.13 WISE-4012E Voltage Input Wiring Diagram 22

Figure 2.14WISE-4012E Digital Input Wiring Diagram 22
Figure 2.15WISE-4012E Relay Output Wiring Diagram 22
2.5.3 Pin Assignment 23
Figure 2.16WISE-4012E Pin Assignment 23
2.5.4 Block Diagram 23
Figure 2.17WISE-4012E Block Diagram 23
2.6 WISE-4050 24
2.6.1 I/O Specification 24
2.6.2 Application Wiring 25
Figure 2.18WISE-4050 Digital Input Wiring Diagram 25
Figure 2.19WISE-4050 Digital Output Wiring Diagram 25
2.6.3 Pin Assignment 25
Figure 2.20WISE-4050 Pin Assignment 25
2.6.4 Block Diagram 26
Figure 2.21WISE-4050 Block Diagram 26
2.7 WISE-4060 27
2.7.1 I/O Specification 27
2.7.2 Application Wiring 28
Figure 2.22WISE-4060 Digital Input Wiring Diagram 28
Figure 2.23WISE-4060 Relay Output Wiring Diagram 28
2.7.3 Pin Assignment 28
Figure 2.24WISE-4060 Pin Assignment 28
2.7.4 Block Diagram 29
Figure 2.25WISE-4060 Block Diagram 29

Chapter 3 Hardware Installation 31

3.1 Interface Introduction 32
3.2 Mounting 32
3.2.1 DIN-Rail Mounting 32
Figure 3.1 Mounting Kit Back View 32
Figure 3.2 Installing the Mounting Kit for a DIN-Rail 32
Figure 3.3 Mounting on the DIN-Rail 33
Figure 3.4 Rear View of DIN-Rail Mounting 33
3.2.2 Wall Mounting 34
Figure 3.5 Mounting Kit Dimensions 34
Figure 3.6 Wall Mounting 35
Figure 3.7 Wall Mounting Finished 35
3.2.3 Stack Mounting 36
Figure 3.8 Stack Mounting 36
Figure 3.9 Finished Stack Mounting 36
3.3 Wiring & Connections 37
3.3.1 Power Supply Wiring (Not for WISE-4012E) 37
Figure 3.10Power Supply Wiring 37
3.3.2 USB Power (WISE-4012E Only) 37
Figure 3.11USB Power Supply Wiring 38
3.3.3 I/O Units 38

Chapter 4 System Configuration 39

4.1 Connection 40
4.2 Configure WISE Using the Web Interface 40
4.2.1 System Requirements 40
4.2.2 List of WISE-4000 Default Ethernet Ports 41
4.2.3 Factory Default Settings 41

4.2.4 Module Authorization 41
4.2.5 Operation Mode 41
4.2.6 Using a Browser to Configure the Module 42
4.2.7 Configuring Cloud Server (WISE-4000 wireless series only)..... 58
4.3 Configure WISE-4000 with ADAM.NET Utility 61
4.3.1 Operation Framework 61
4.3.2 Configure WISE-4000 66
4.4 Site Survey Tool for WISE-4000 Wireless Series 69
4.4.1 Site Survey Architecture 69
4.4.2 Site Survey Mode 69
4.4.3 Site Survey Tool 70

Appendix A I/O Modbus Mapping Table 71

A.1 Modbus Function Code Introduction 72
A.2 WISE-4010/LAN Modbus Mapping Table 72
A.3 WISE-4050/LAN Modbus Mapping Table 76
A.4 WISE-4060/LAN Modbus Mapping Table 78
A.5 WISE-4012E Wireless Modbus Mapping Table 80
A.6 WISE-4050 Wireless Modbus Mapping Table 83
A.7 WISE-4060 Wireless Modbus Mapping Table 85

Appendix B REST for WISE-4000 Series 87

B.1 Introduction 88
B.2 REST Resources for WISE-4000 Series 89
B.2.1 Digital Input 89
B.2.2 Digital Output 94
B.2.3 Analog Input 99
B.2.4 Data Logger 105

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.

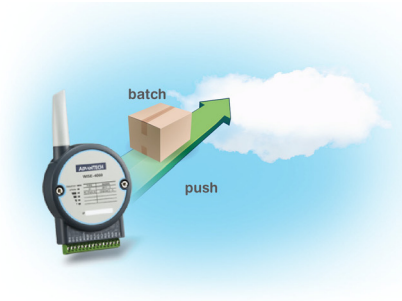
1.2.2 Data Storage Function

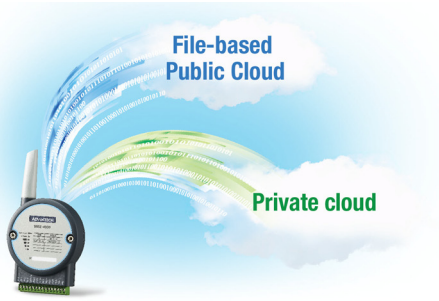
The internal flash of the WISE module can log up to 10,000 data samples with a time stamp. The I/O data can be logged periodically, and when the I/O status changes. Once the memory is full, users can choose to overwrite the old data to ring log or just stop the log function. When the module is powered-off,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





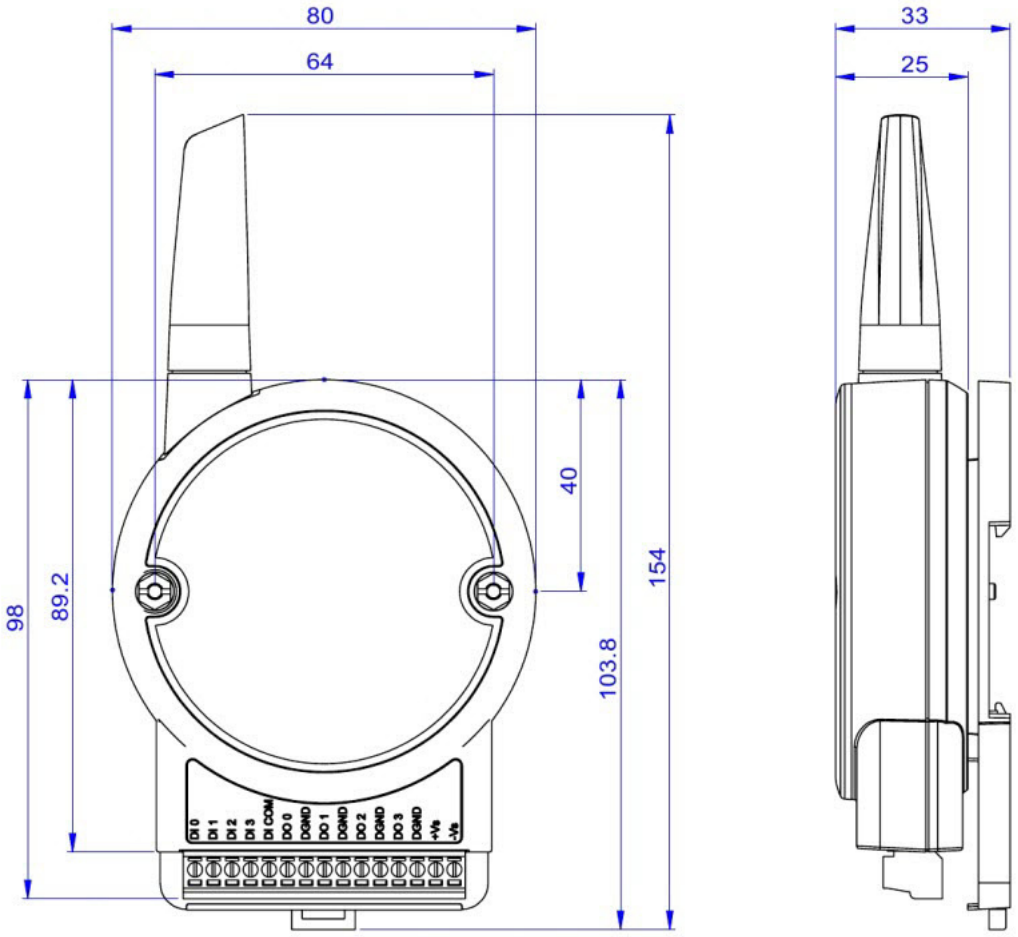
1.3 Series Family and Specifications

1.3.1 Series Family

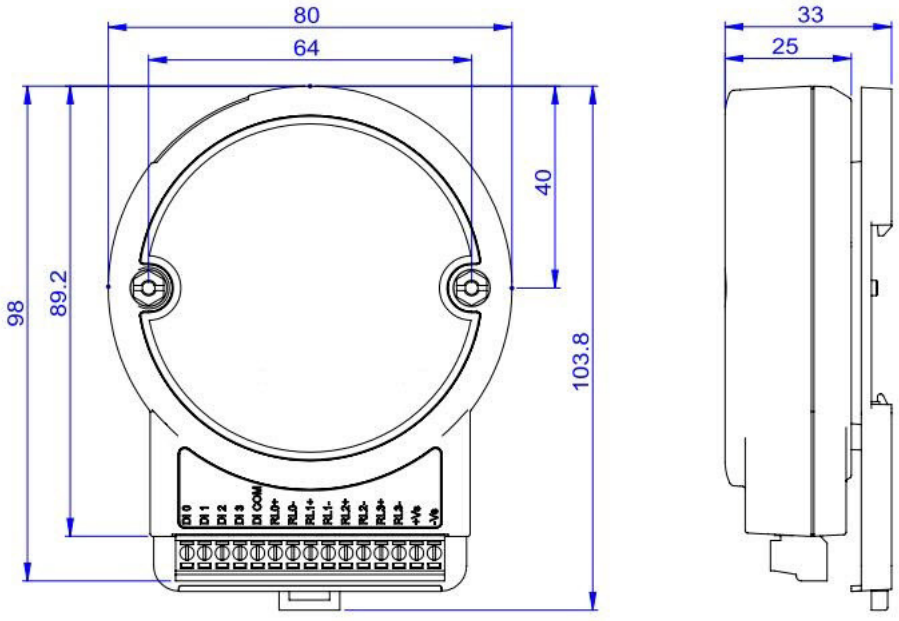
Interface	Model	Description
WLAN	WISE-4012E	6-ch Input/Output IoT Wireless I/O Module for IoT Developers
	WISE-4050	4-ch Digital Input and 4-ch Digital Output IoT Wireless I/O Module
	WISE-4060	4-ch Digital Input and 4-ch Relay Output IoT Wireless I/O Module
LAN	WISE-4010/LAN	4-ch Current Input and 4-ch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

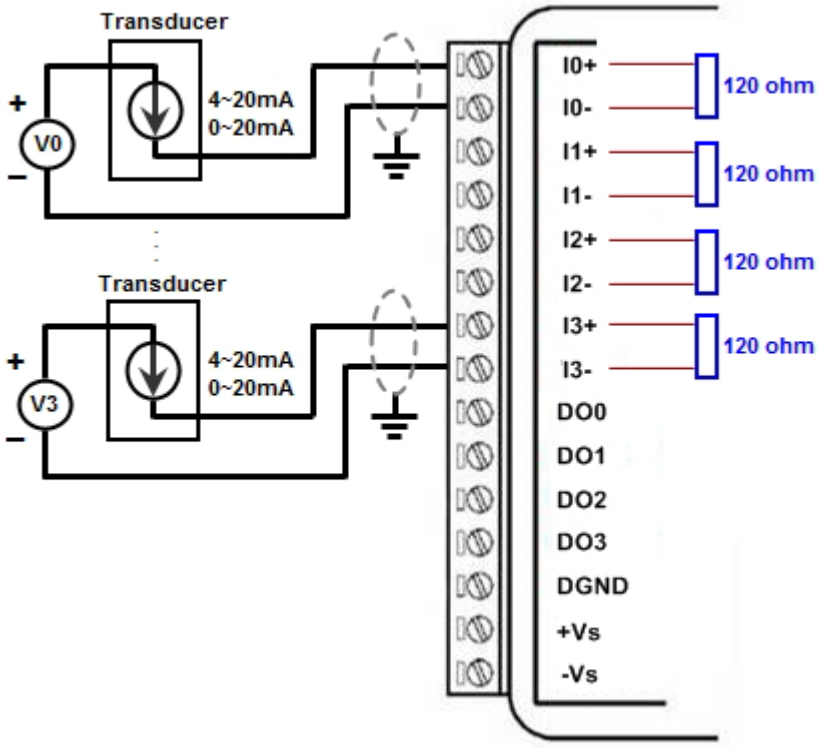


Figure 2.1 WISE-4010/LAN Current Input Wiring Diagram

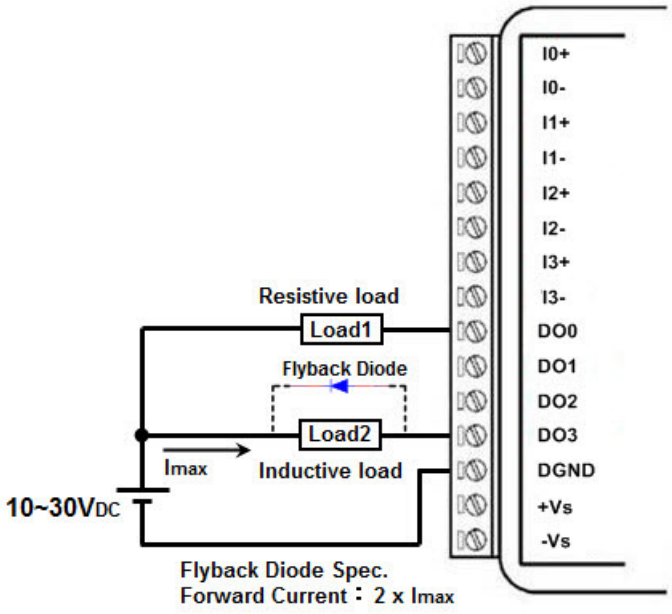


Figure 2.2 WISE-4010/LAN Digital Output Wiring Diagram

2.2.3 Pin Assignment

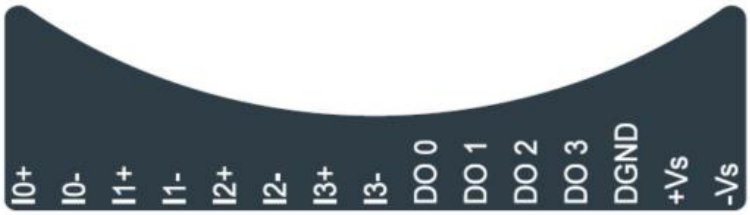


Figure 2.3 WISE-4010/LAN Pin Assignment

2.2.4 Block Diagram

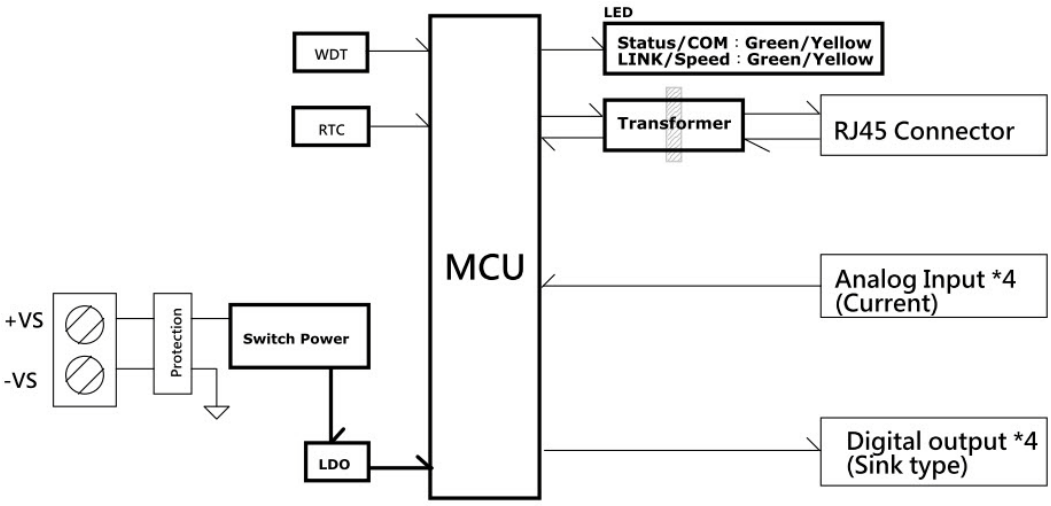


Figure 2.4 WISE-4010/LAN Block Diagram

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

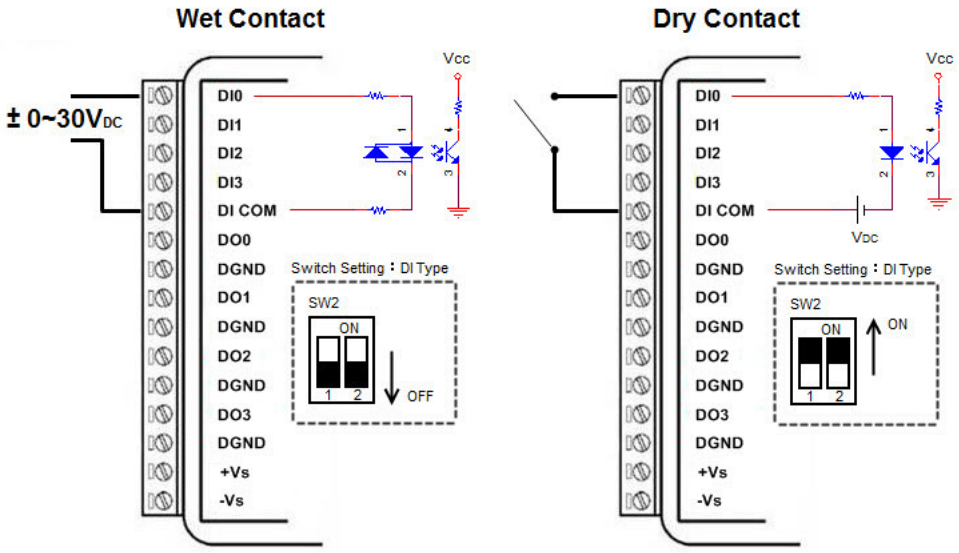


Figure 2.5 WISE-4050/LAN Digital Input Wiring Diagram

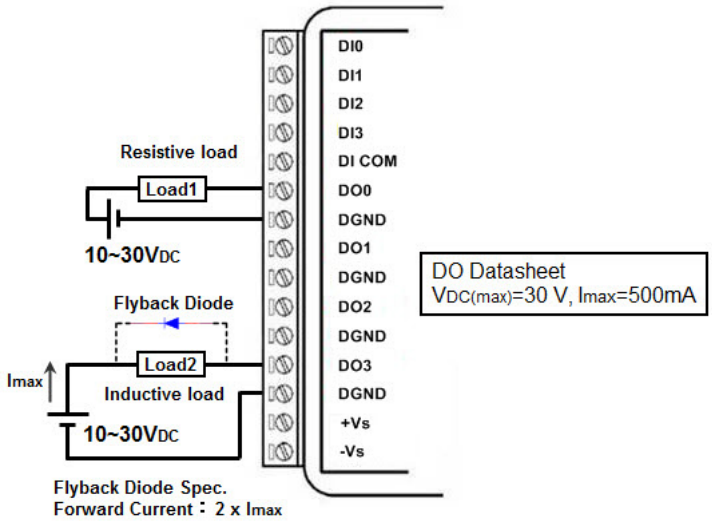


Figure 2.6 WISE-4050/LAN Digital Output Wiring Diagram

2.3.3 Pin Assignment

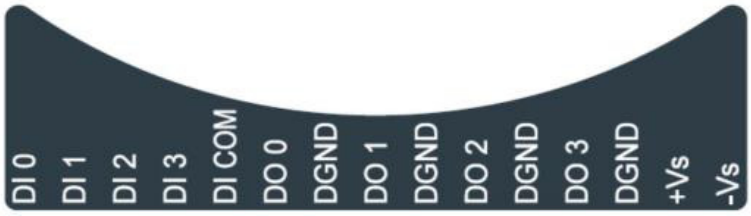


Figure 2.7 WISE-4050/LAN Pin Assignment

2.3.4 Block Diagram

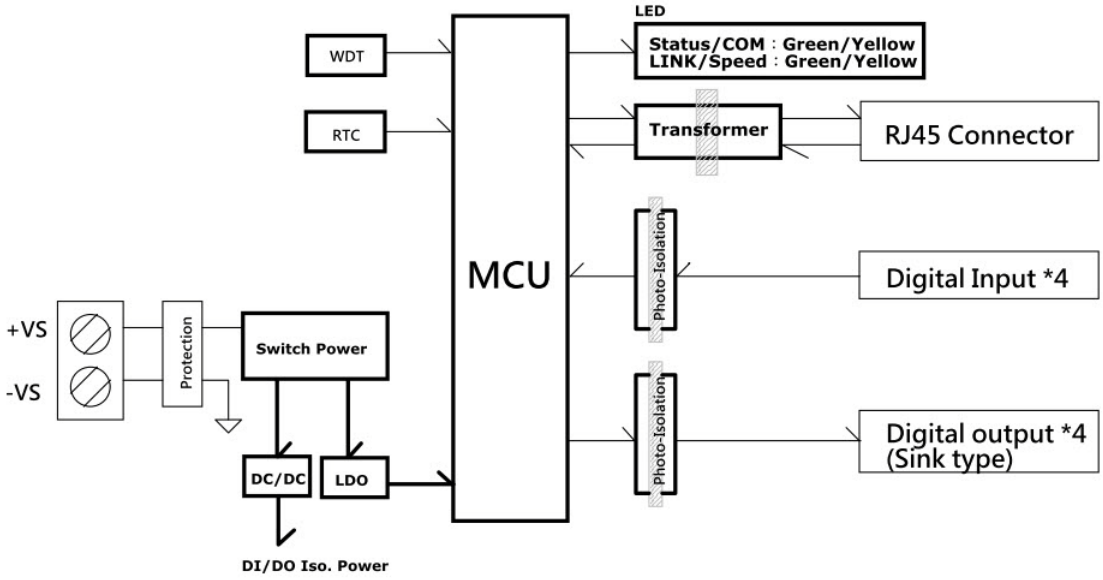


Figure 2.8 WISE-4050/LAN Block Diagram

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

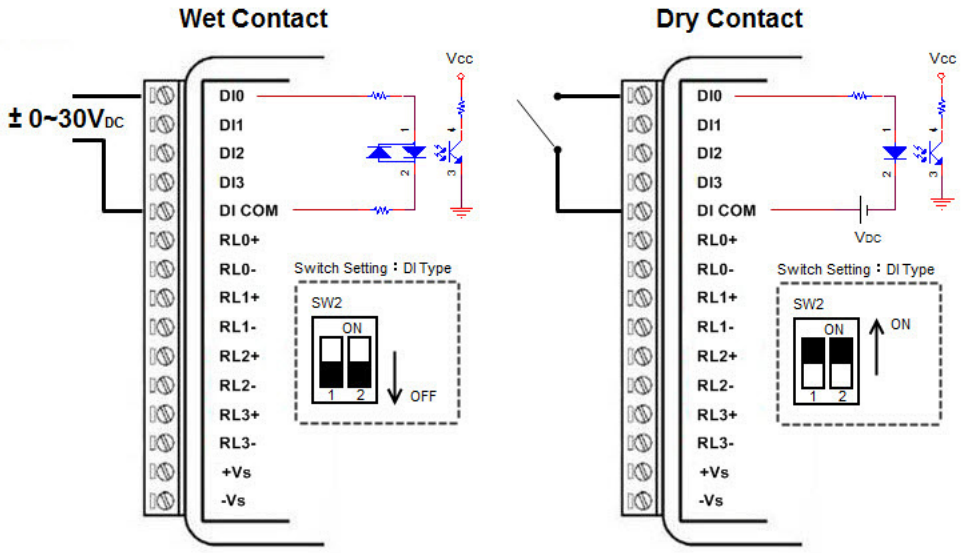


Figure 2.9 WISE-4060/LAN Digital Input Wiring Diagram

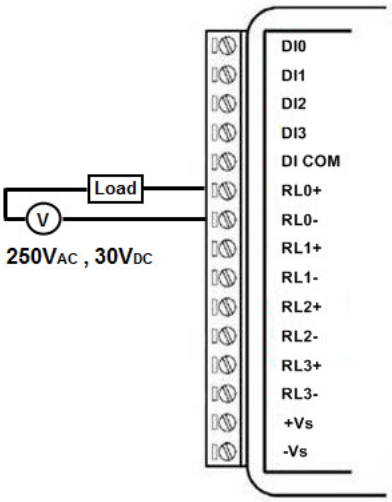


Figure 2.10 WISE-4060/LAN Relay Output Wiring Diagram

2.4.3 Pin Assignment

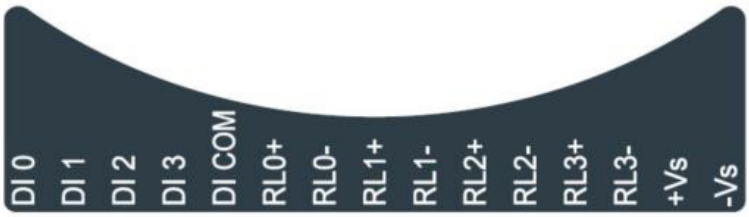


Figure 2.11 WISE-4060/LAN Pin Assignment

2.4.4 Block Diagram

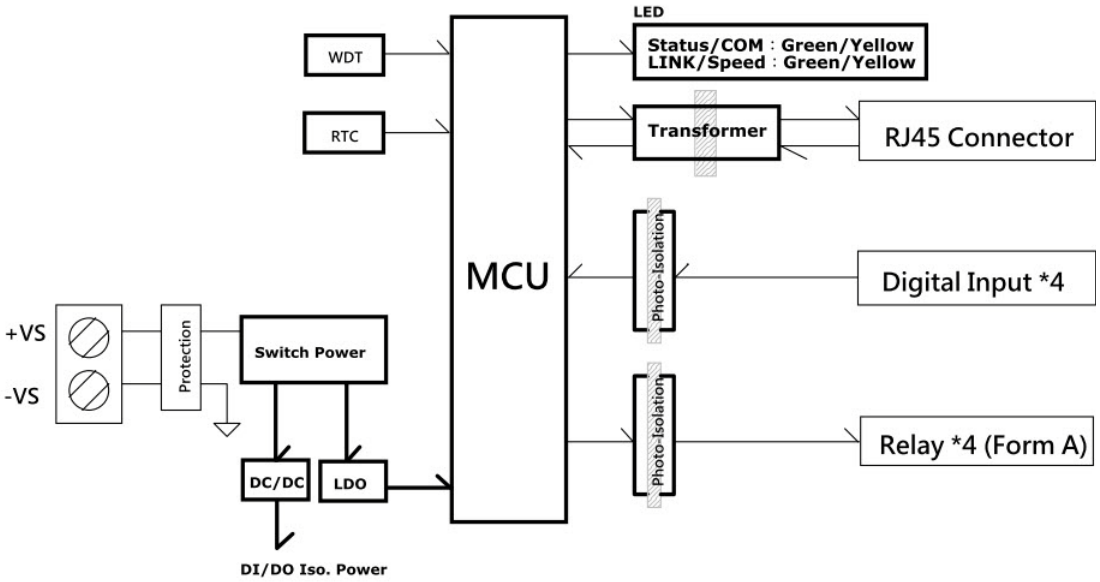


Figure 2.12 WISE-4060/LAN Block Diagram

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

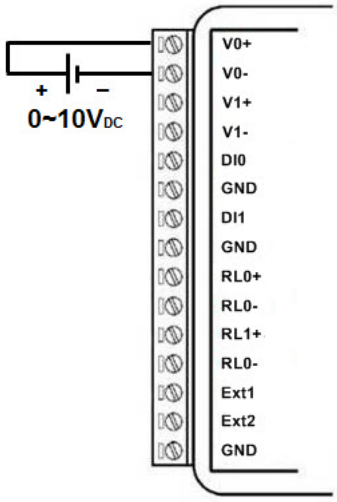


Figure 2.13 WISE-4012E Voltage Input Wiring Diagram

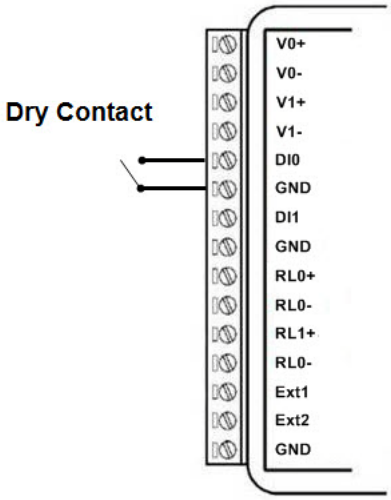


Figure 2.14 WISE-4012E Digital Input Wiring Diagram

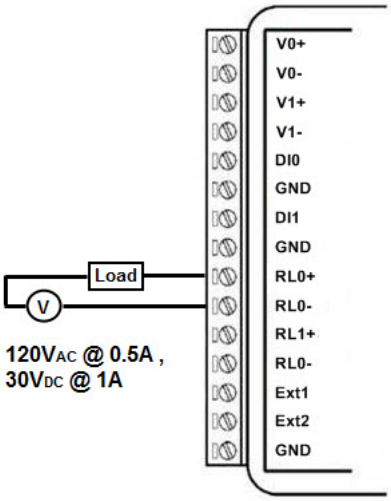


Figure 2.15 WISE-4012E Relay Output Wiring Diagram

2.5.3 Pin Assignment

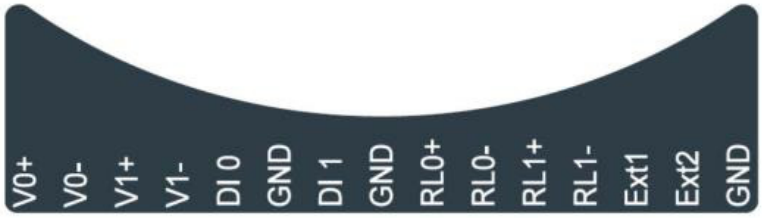


Figure 2.16 WISE-4012E Pin Assignment

2.5.4 Block Diagram

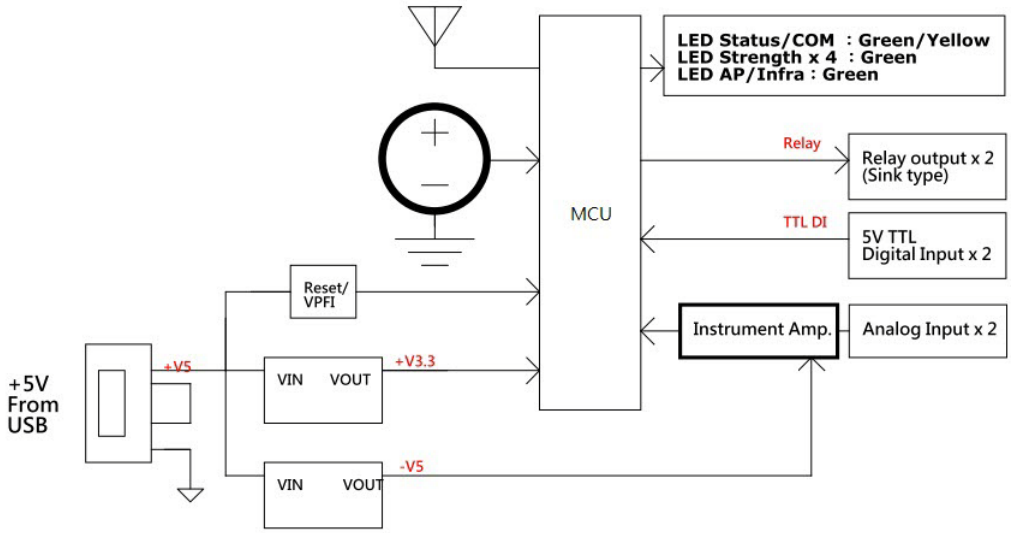


Figure 2.17 WISE-4012E Block Diagram

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

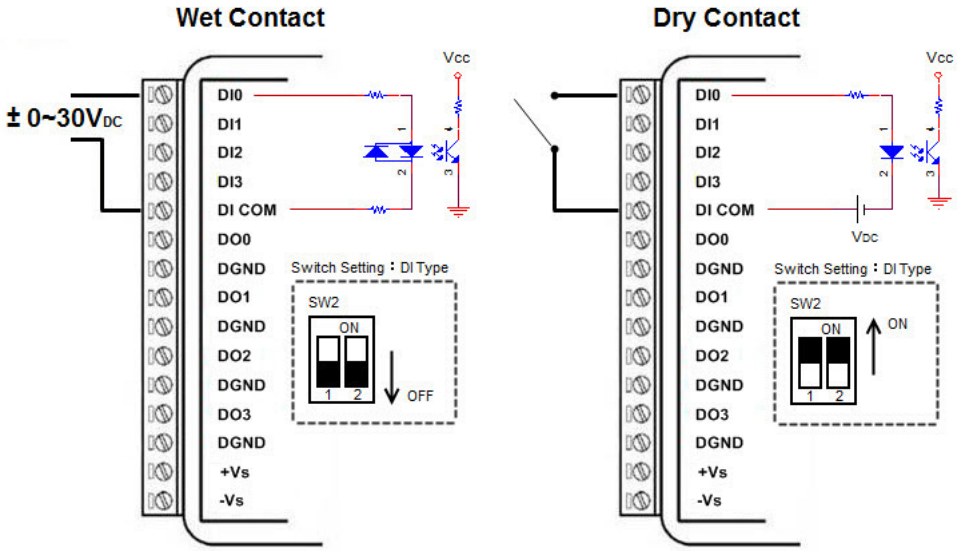


Figure 2.18 WISE-4050 Digital Input Wiring Diagram

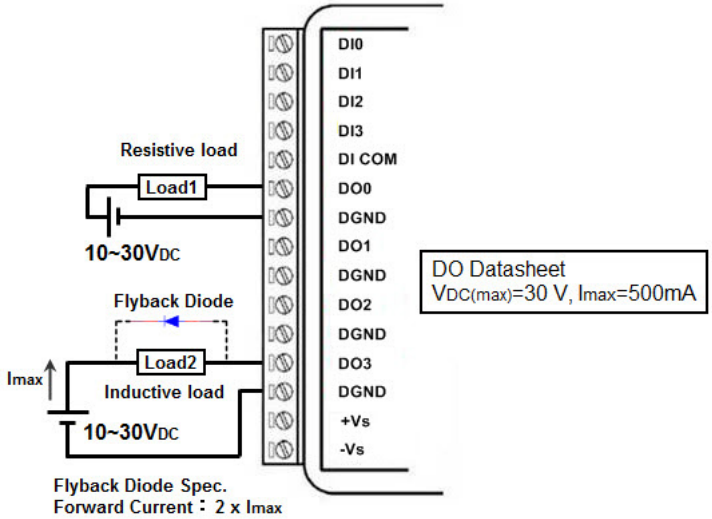


Figure 2.19 WISE-4050 Digital Output Wiring Diagram

2.6.3 Pin Assignment

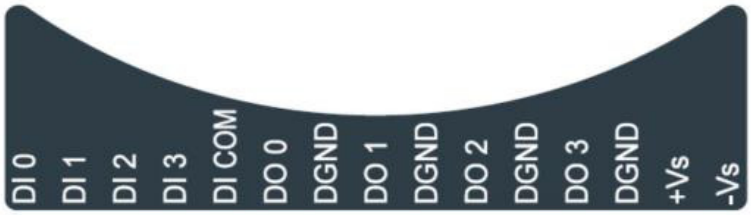


Figure 2.20 WISE-4050 Pin Assignment

2.6.4 Block Diagram

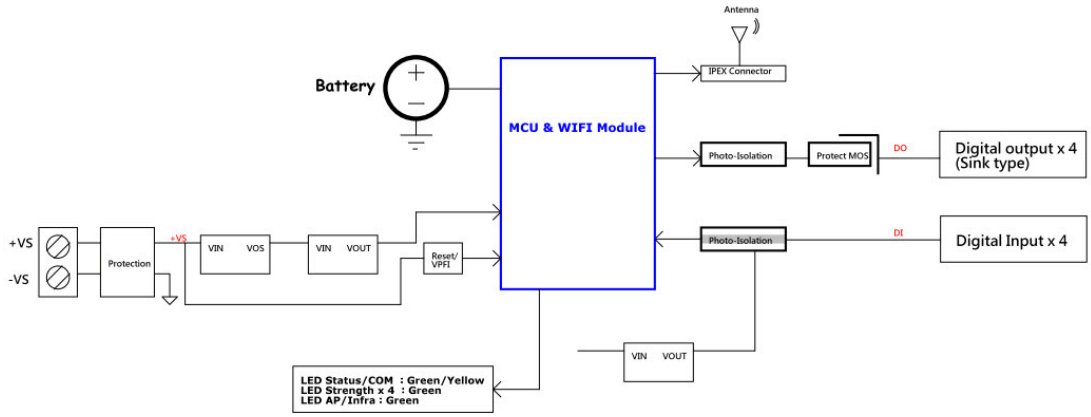


Figure 2.21 WISE-4050 Block Diagram

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

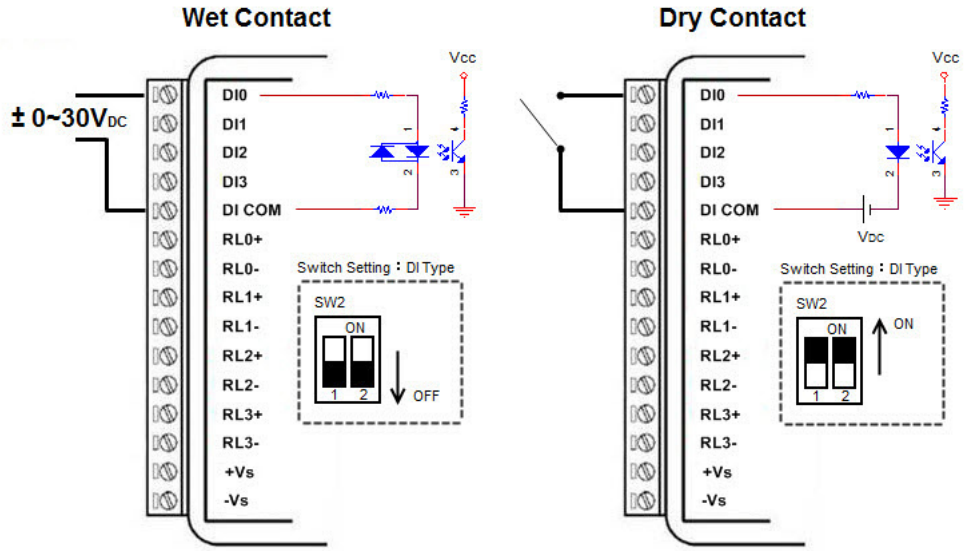


Figure 2.22 WISE-4060 Digital Input Wiring Diagram

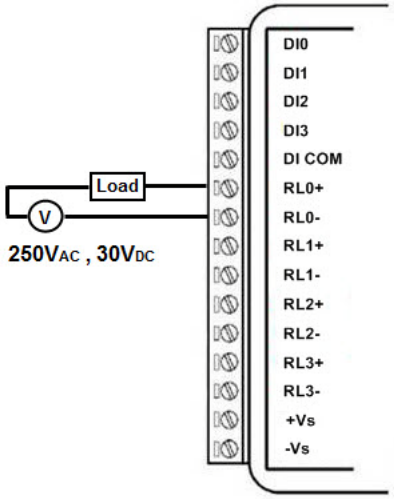


Figure 2.23 WISE-4060 Relay Output Wiring Diagram

2.7.3 Pin Assignment

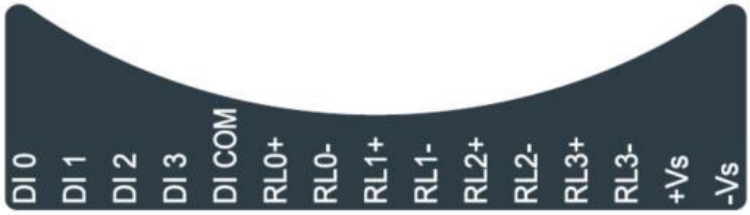


Figure 2.24 WISE-4060 Pin Assignment

2.7.4 Block Diagram

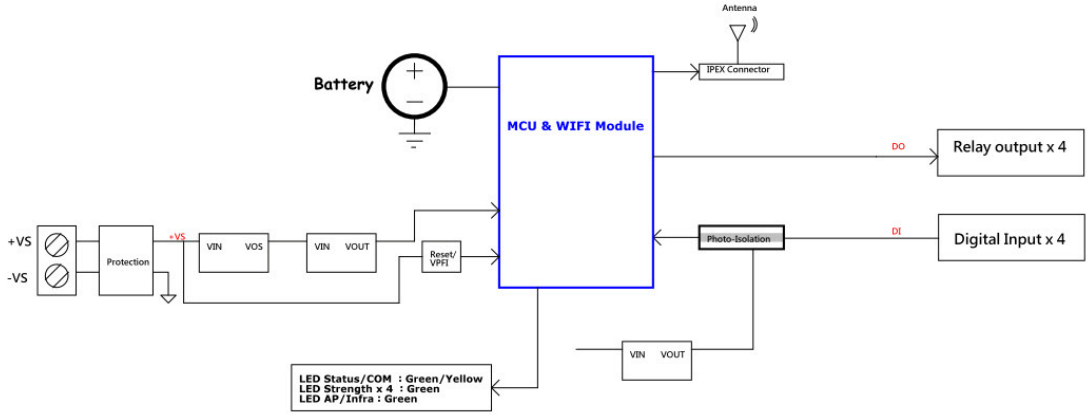


Figure 2.25 WISE-4060 Block Diagram

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.

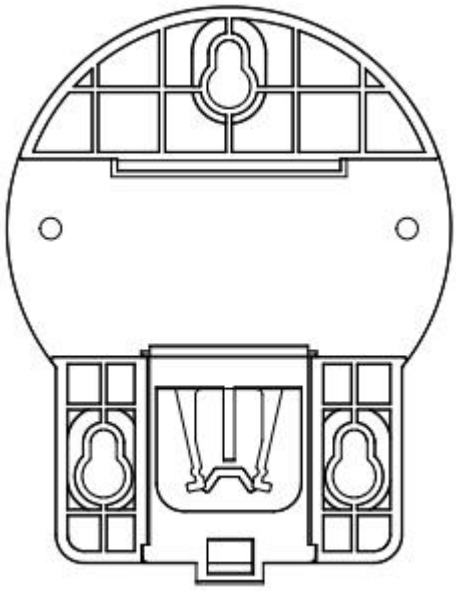


Figure 3.1 Mounting Kit Back View

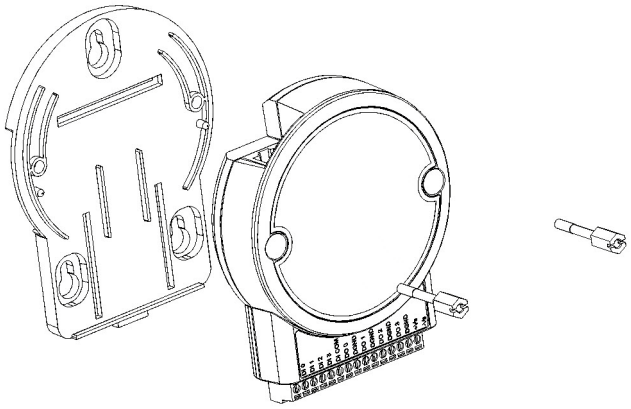


Figure 3.2 Installing the Mounting Kit for a DIN-Rail

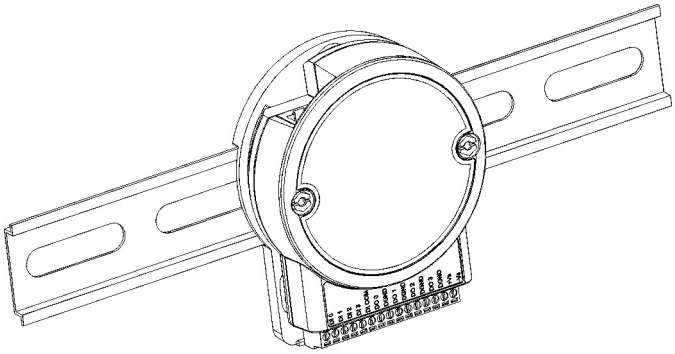


Figure 3.3 Mounting on the DIN-Rail

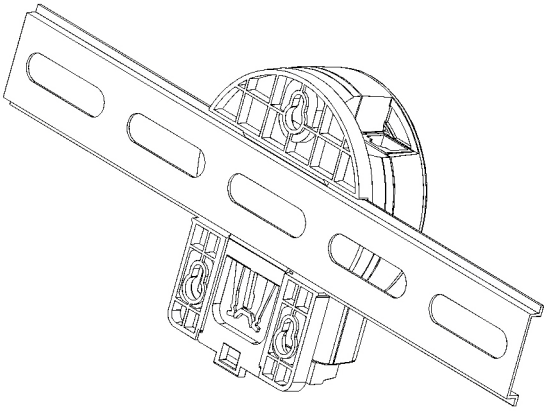


Figure 3.4 Rear View of DIN-Rail Mounting

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.

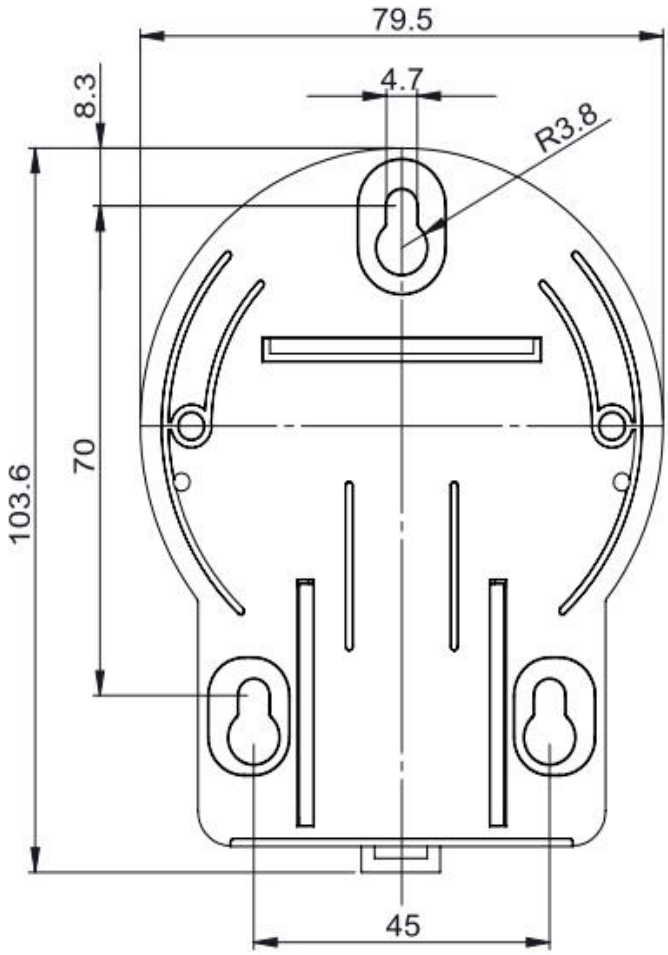


Figure 3.5 Mounting Kit Dimensions

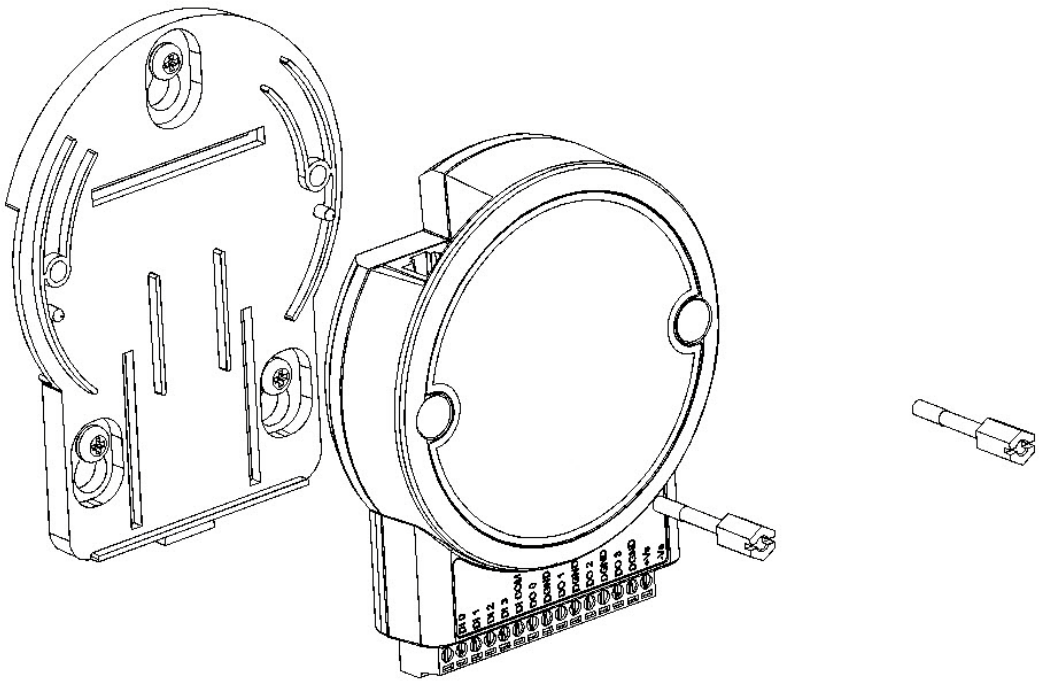


Figure 3.6 Wall Mounting

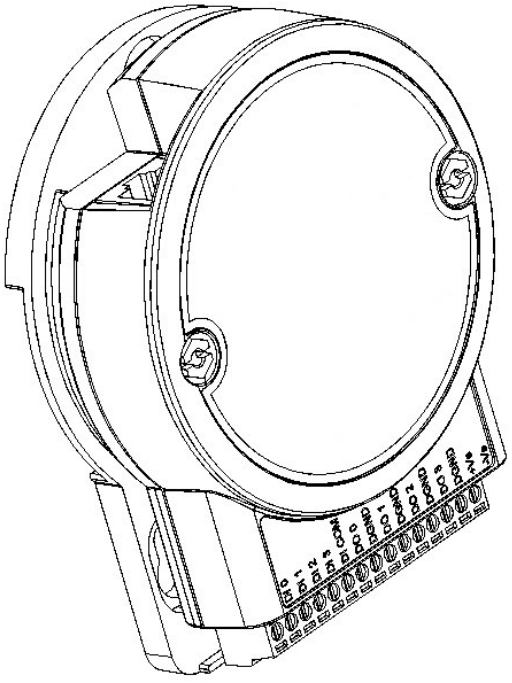


Figure 3.7 Wall Mounting Finished

3.2.3 Stack Mounting

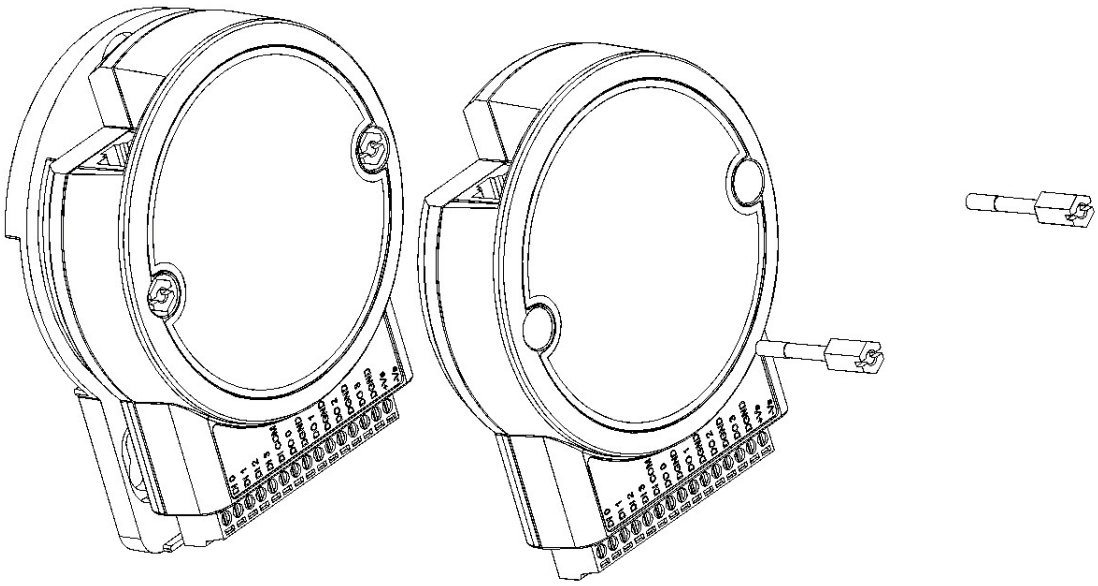


Figure 3.8 Stack Mounting

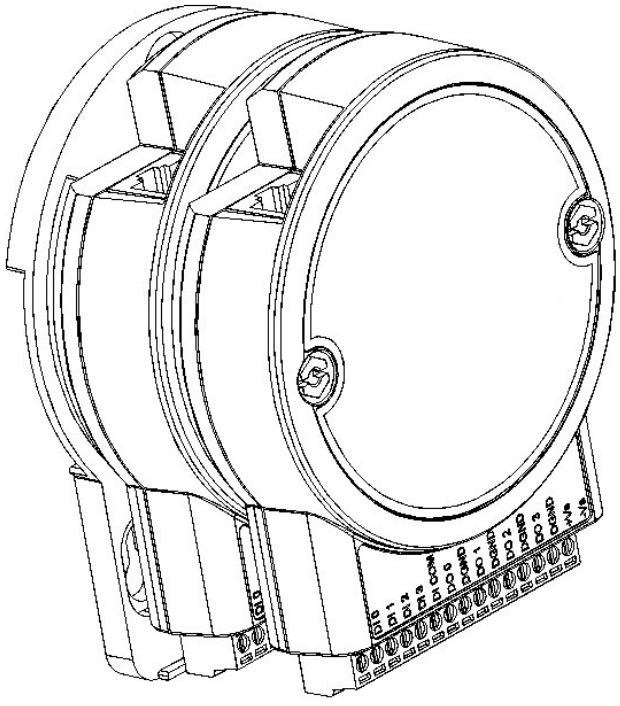


Figure 3.9 Finished Stack Mounting

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

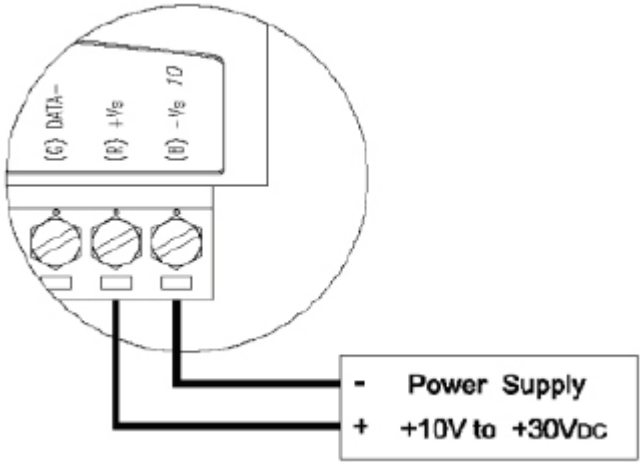


Figure 3.10 Power Supply Wiring

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.

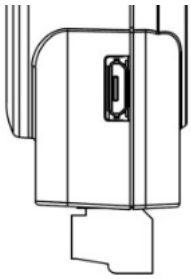


Figure 3.11 USB Power Supply Wiring

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.

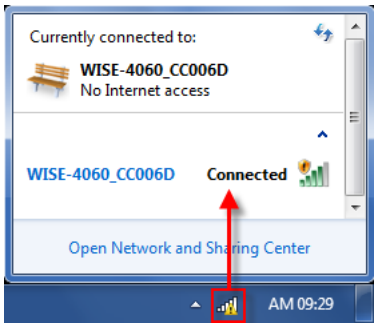
1. The terminal block accepts wires from 0.5 mm to 2.5 mm.
2. Always use a continuous length of wire. Do not combine wires.
3. Use the shortest possible wire length.
4. Use wire trays for routing where possible.
5. Avoid running wires near high-energy wiring.
6. Avoid running input wiring in close proximity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

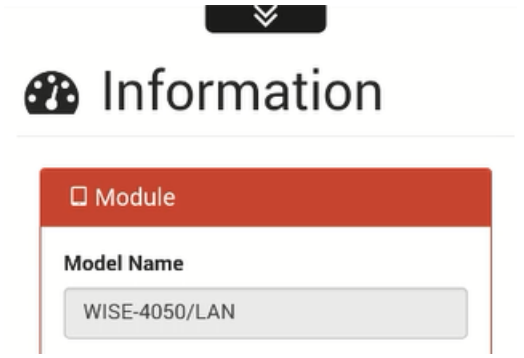
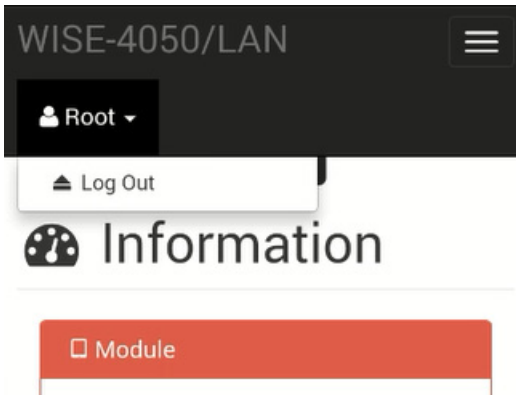
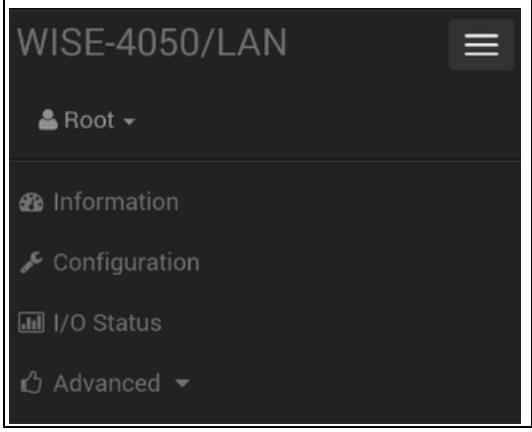
4.2.5 Operation Mode

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