

Wolf series Remote IO Modules User's Manual

advanio

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Advanio guarantee the safety and stability of all the applications. The series modules which have been tested under rigorous process conform to the criteria declared. There is little chance that customers will need any further after-services.

Nevertheless, within the period of the warranty, the defective product will be repaired or be replaced at no extra cost; while for out-of-warranty service, Advanio will repair or replace product at nominal cost to customer.

For product repair, please contact the dealer and have the following information ready:

1. Collect all the information about the problem encountered. (For example, CPU speed, ADVANIO model number, other hardware and software used, etc.)

Note anything abnormal and list any onscreen messages you got when the

problem occurred.

2. Have your manual ready, contact the dealer, describe the abnormality encountered or provide reliable information on the defective product.

3. Once defect is diagnosed, you may obtain an RMA number by filling out the attached form.

With the obtained number, you may return the product to our contact and trace the return process if required.

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 not eligible for warranty service.

Dear Customer,

Please fill out this form (blue color sections) and email it to a sales representative for confirmation within 3 days. Then, we will process your request referring to the information stated on this RMA Request Form. **Red color sections** will be filled in by our sales representative. We apologize for any inconvenience. Thank you for your cooperation!

Request Date:		RMA No.	
Company Name:		Contact person:	
Phone:		Fax:	
Return Address:			
Other information:			
Return Shipping Date:			

Item	Model No.	S/N No.:	Reason of Return	Received Qty.
1				
1				
2				
3				
4				
5				
6				
9				
10				

Certification Claims Technology

Wolf Series Product is developed and tested by Advanio, all tests certified by EMC including EMI and EMS are designed for module protection.

Hence, we strongly recommend pairing Wolf series modules with industrial chassis certified by CE.

Certification:



This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Table of Contents

Chapter 1. Introduction.....	1
1.1 Product Overview	1
1.2 System Specification.....	2
1.3 Set Up and Use.....	3
1.4 Watchdog	4
1.5 Power Requirements	5
1.5 RS-485 Network Connections	6
1.6 Environmental Safety.....	7
1.7 Dimension	8
Chapter 2. Installation.....	9
2.1 Basic Installation.....	9
2.1.1 Host PC Requirement	9
2.1.2 Wolf Module	9
2.1.3 Installation.....	11
2.1.4 Power Supply	16
2.1.5 Connecting Communication Interface	17
2.1.6 IO Connection.....	19
2.1.7 Indicators.....	21
2.1.9 Setup Utility	23
2.1.10 Communication Setup.....	23
2.1.11 Factory Reset.....	25
2.1.12 Isolated Type RS-232/RS-485 Converter (Optional).....	25
2.1.13 Repeater (Optional).....	26
2.2 Example: Single Module.....	26
2.3 Example: Multiple Modules	27
2.4 System Configuration	28
2.4.1 Daisy Chain.....	28
2.4.2 Star Topology	28

2.4.3 Random Topology	29
2.5 Module Replacement	30
Chapter 3. Analog Module Information	32
3.1 W-M1B101 (Coming Soon).....	32
3.2 W-M1B102 (Coming Soon).....	33
3.3 W-M1B103 8-channel Universal Analog Input Module with High Voltage Protection	34
3.3.1 Terminal Assignment	34
3.3.2 Block Diagram	35
3.3.3 Channel Connecting.....	36
3.3.4 IO Specifications.....	36
3.3.5 Related Reference	37
3.3.5.1 Input Signal Type Setup.....	37
3.3.5.2 CJC (Cold Junction Compensation).....	39
3.3.5.3 Hexadecimal / Engineering Unit.....	39
3.3.5.4 Signal Value	42
3.3.6 MODBUS Address.....	42
3.4 W-M1B104 16-channel Universal Analog Input Module with High Voltage Protection	45
3.4.1 Terminal Assignment	45
3.4.2 Block Diagram	46
3.4.3 Channel Connecting.....	47
3.4.4 IO Specifications.....	47
3.4.5 Related Reference	48
3.4.5.1 Input Signal Type Setup.....	48
3.4.5.2 CJC (Cold Junction Compensation).....	50
3.4.5.3 Hexadecimal / Engineering Unit.....	50
3.4.5.4 Signal Value	52
3.4.6 MODBUS Address.....	53

3.5 W-M1B105 8-channel Universal Analog Input Module.....	56
3.5.1 Terminal Assignment	56
3.5.2 Block Diagram	57
3.5.3 Channel Connecting.....	58
3.5.4 IO Specifications.....	58
3.5.5 Related Reference	59
3.5.5.1 Input Signal Type Setup.....	59
3.5.5.2 CJC (Cold Junction Compensation).....	61
3.5.5.3 Hexadecimal / Engineering Unit.....	61
3.5.5.4 Signal Value	64
3.5.6 MODBUS Address.....	64
3.6 W-M1B106 16-channel Universal Analog Input Module.....	67
3.6.1 Terminal Assignment	67
3.6.2 Block Diagram	68
3.6.3 Channel Connecting.....	69
3.6.4 IO Specifications.....	69
3.6.5 Related Reference	70
3.6.5.1 Input Signal Type Setup.....	70
3.6.5.2 CJC (Cold Junction Compensation).....	72
3.6.5.3 Hexadecimal / Engineering Unit.....	72
3.6.5.4 Signal Value	74
3.6.6 MODBUS Address.....	75
3.7 W-M1B107 8-Channel Thermocouple Input Module.....	78
3.7.1 Terminal Assignment	78
3.7.2 Block Diagram	79
3.7.3 Channel Connecting.....	80
3.7.4 IO Specifications.....	80
3.7.5 Related Reference	80
3.7.5.1 Input Signal Type Setup.....	80

3.7.5.2 CJC (Cold Junction Compensation).....	81
3.7.5.3 Hexadecimal / Engineering Unit.....	81
3.7.5.4 Signal Value	83
3.7.6 MODBUS Address.....	83
3.8 W-M1B108 16-Channel Thermocouple Input Module.....	86
3.8.1 Terminal Assignment	86
3.8.2 Block Diagram	87
3.8.3 Channel Connecting.....	88
3.8.4 IO Specifications.....	88
3.8.5 Related Reference	88
3.8.5.1 Input Signal Type Setup.....	88
3.8.5.2 CJC (Cold Junction Compensation).....	89
3.8.5.3 Hexadecimal / Engineering Unit.....	89
3.8.5.4 Signal Value	92
3.8.6 MODBUS Address.....	92
3.9 W-M1B109 8-Channel Current Input Module.....	95
3.9.1 Terminal Assignment	95
3.9.2 Block Diagram	96
3.9.3 Channel Connecting.....	97
3.9.4 IO Specifications.....	97
3.9.5 Related Reference	97
3.9.5.1 Input Signal Type Setup.....	97
3.9.5.2 Hexadecimal / Engineering Unit.....	98
3.9.5.3 Signal Value	99
3.9.6 MODBUS Address.....	99
3.10 W-M1B110 16-Channel Current Input Module.....	102
3.10.1 Terminal Assignment	102
3.10.2 Block Diagram	103
3.10.3 Channel Connecting.....	104

3.10.4 IO Specifications.....	104
3.10.5 Related Reference	104
3.10.5.1 Input Signal Type Setup.....	104
3.10.5.2 Hexadecimal / Engineering Unit.....	105
3.10.5.3 Signal Value	106
3.6.6 MODBUS Address.....	106
3.11 W-M1B111 8-Channel Voltage Input Module	109
3.11.1 Terminal Assignment	109
3.11.2 Block Diagram	110
3.11.3 Channel Connecting.....	111
3.11.4 IO Specifications.....	111
3.11.5 Related Reference	111
3.11.5.1 Input Signal Type Setup.....	111
3.11.5.2 Hexadecimal / Engineering Unit.....	112
3.11.5.3 Signal Value	113
3.11.6 MODBUS Address.....	113
3.12 W-M1B112 16-Channel Voltage Input Module	116
3.12.1 Terminal Assignment	116
3.12.2 Block Diagram.....	117
3.12.3 Channel Connecting.....	118
3.12.4 IO Specifications.....	118
3.12.5 Related Reference	118
3.12.5.1 Input Signal Type Setup.....	118
3.12.5.2 Hexadecimal / Engineering Unit.....	119
3.6.5.4 Signal Value	120
3.6.6 MODBUS Address.....	120
Chapter 4. Digital Module Information.....	123
4.1 W-M1B301 16-Channel Digital Input MOdule	123
4.1.1 Terminal Assignment	123

4.1.2 Block Diagram	124
1.3 Channel Connecting	124
4.1.4 IO Specifications	125
4.1.5 Related Reference	125
4.1.5.1 Digital Input Active State	125
4.1.5.2 Digital Input Status	126
4.1.5.3 Read/Clear the Digital Input Counter	126
4.1.5.4 Read/Clear Latch Status	127
4.1.6 MODBUS Address	128
4.2 W-M1B302 32-Channel Digital Input Module	131
4.2.1 Terminal Assignment	131
4.2.2 Block Diagram	132
4.2.3 Channel Connecting	133
4.2.4 IO Specifications	134
4.2.5 Related Reference	134
4.2.5.1 Digital Input Active State	134
4.2.5.2 Digital Input Status	135
4.2.5.3 Read/Clear the Digital Input Counter	135
4.2.5.4 Read/Clear Latch Status	136
4.2.6 MODBUS Address	137
4.3 W-M1B401 16-Channel Digital Output Module	140
4.3.1 Terminal Assignment	140
4.3.2 Block Diagram	141
4.3.3 Channel Connecting	141
4.3.4 IO Specifications	142
4.3.5 Related Reference	142
4.3.5.1 Digital Output Active State	142
4.3.5.2 Digital Output Status	143
4.3.5.3 Power-on Value	143

4.3.5.4 Host Watchdog Timer	143
4.3.6 MODBUS Address.....	143
4.4 W-M1B402 32-Channel Digital Output Module	146
4.4.2 Block Diagram	147
4.4.3 Channel Connecting.....	148
4.4.4 IO Specifications.....	148
4.4.5 Related Reference	148
4.4.5.1 Digital Output Active State	148
4.4.5.2 Digital Output Status.....	149
4.4.5.3 Power-on Value	149
4.4.5.4 Host Watchdog Timer	150
4.4.6 MODBUS Address.....	150
4.5 W-M1B403 8-Channel Relay Output Module	152
4.5.1 Terminal Assignment	152
4.5.2 Block Diagram	153
4.5.3 Channel Connecting.....	153
4.5.4 IO Specifications.....	154
4.5.5 Related Reference	154
4.5.5.1 Digital Output Active State	154
4.5.5.2 Digital Output Status.....	155
4.5.5.3 Power-on Value	155
4.5.5.4 Host Watchdog Timer	155
4.5.6 MODBUS Address.....	155
4.6 W-M1B404 16-Channel Relay Output Module	158
4.6.1 Terminal Assignment	158
4.6.2 Block Diagram	159
4.6.3 Channel Connecting.....	159
4.6.4 IO Specifications.....	160
4.6.5 Related Reference	160

4.6.5.1 Digital Output Active State	160
4.6.5.2 Digital Output Status.....	161
4.6.5.3 Power-on Value	161
4.6.5.4 Host Watchdog Timer	161
4.6.6 MODBUS Address.....	161
4.7 W-M1B501 16-Channel Digital Input/16-Channel Digital Output Module	164
4.7.1 Terminal Assignment	164
4.7.2 Block Diagram	165
4.7.3 Channel Connecting.....	166
4.7.4 IO Specifications.....	167
4.7.5 Related Reference	167
4.7.5.1 Digital Input Active State.....	167
4.7.5.2 Digital Input Status	168
4.7.5.3 Read/Clear the Digital Input Counter	168
4.7.5.4 Read/Clear Latch Status.....	169
4.7.5.5 Digital Output Active State	170
4.7.5.6 Digital Output Status.....	171
4.7.5.7 Power-on Value	171
4.7.5.8 Host Watchdog Timer	171
4.7.6 MODBUS Address.....	172
4.8 W-M1B502 16-Channel Digital Input/8-Channel Relay Output Module....	175
4.8.1 Terminal Assignment	175
4.8.2 Block Diagram	176
4.8.3 Channel Connecting.....	177
4.8.4 IO Specifications.....	177
4.8.5 Related Reference	178
4.8.5.1 Digital Input Active State.....	178
4.8.5.2 Digital Input Status	179
4.8.5.3 Read/Clear the Digital Input Counter	179

4.8.5.4 Read/Clear Latch Status.....	180
4.8.5.5 Digital Output Active State	181
4.8.5.6 Digital Output Status.....	182
4.7.5.7 Power-on Value	182
4.7.5.8 Host Watchdog Timer	182
4.7.6 MODBUS Address.....	183
Chapter 5. FAQ	186
5.1 Communication.....	186
5.2 Read data.....	187
Chapter 6. Technical support	188

Chapter 1. Introduction

1.1 Product Overview

Thank you for selecting Wolf series. Wolf series is a remote I/O module providing 7 kinds of control mode: analog input, output, analog input/output, digital input, output, digital input/output and relay, all are connected by RS-485. Each control mode in Wolf series also provides different number of input/output channels for user's choice- for instance, 8, 16 and 32.

Wolf series module is a kind of remote I/O Module which is host sends command to control it. After receiving commands sent by host, remote control modules start responding. The protocol used in-between host and modules is Modbus/RTU. Furthermore, to have a more efficient application, a great variety of baud rates for user's selection (1200, 2400, 4800, 9600, 19.2k, 38.4k, 57.6k and 115.2k) are also available.

Product packing is shown below:

Module	Base unit
	Housing base (fixed seat)
Accessories	Plastic tab of isolation
	Connecting PIN array (14PINs)

1.2 System Specification

Power Requirement	10 ~ 60 VDC
Watchdog Timer	System (1.6 second Fixed) Communication (Programmable)
Connector	Plug-in-terminal block (#16~30 AWG)
Temperature (Operating)	-25 ~ 70 °C
Humidity	5 ~ 95 %RH
Temperature (Storage)	-30 ~ 75 °C
Interface	RS-485
Isolation Protection	3000 VDC
Communication Protocol	Modbus/RTU
Communication Speed	Serial: From 1200 to 115.2k bps
Communication Distance	Serial: 1.2km

1.3 Set Up and Use

The rotary switch provided by Wolf series module is a handy gadget for user to facilitate the address setup during the installation Utility software is employed to set up the module configuration parameter. The factory default can be reset by pressing INIT for at least 3 second. Furthermore, EEPROM built in the modules is detachable and can be changed on new module to retain the setting.

For the module installation and system settings in details, please refer to Chapter 2,, for the module details information please refer to Chapter 3 & Chapter 4, for the frequently asked questions, please refer to Chapter 5 for the technical support, please refer to Chapter 6.

1.4 Watchdog

There are module watchdog and system watchdog in Wolf Series module. Module watchdog is a hardware monitoring the operation status of module, when working in a harsh/noisy environment and encountering interference, the module can automatically reset and reboot by itself. The system watchdog is software monitoring the operation status of system, its purpose is to provide immediate counter-measure when erroneous network, communication or breakdown occur. Once time-out occurs, the module will reset all outputs to SAFE mode to prevent any improper operations on the controlled target.

Watchdog of Modbus functions as following table~

Address	Function	R/W	Initial value
44108 (0x100B)	Timeout value(0.1s) Range: 0 ~ 0x00FF	R/W	0x0000
44109 (0x100C)	Function enable/disable 0x0001: Enable 0x0000: Disable	R/W	0x0000
44110 (0x100D)	Watchdog status 0x0001: Timeout 0x0000: Normal	R/W	0x0000

Module watchdog: If discontinuation exceeds 1.6 sec (default), the system would reset the signal and reboot.

System watchdog: System watchdog is time programmable. When system watchdog is enabled and module doesn't receive polling from the host at the time set, system watchdog time-out will automatically start. Outputs mode is configurable on certain modules. Please refer to Chapter 3 & Chapter4.

1.5 Power Requirements

DC ranged from +10V to 60V is applicable to Wolf Series Module; the reverse power protection is also available.

1.5 RS-485 Network Connections

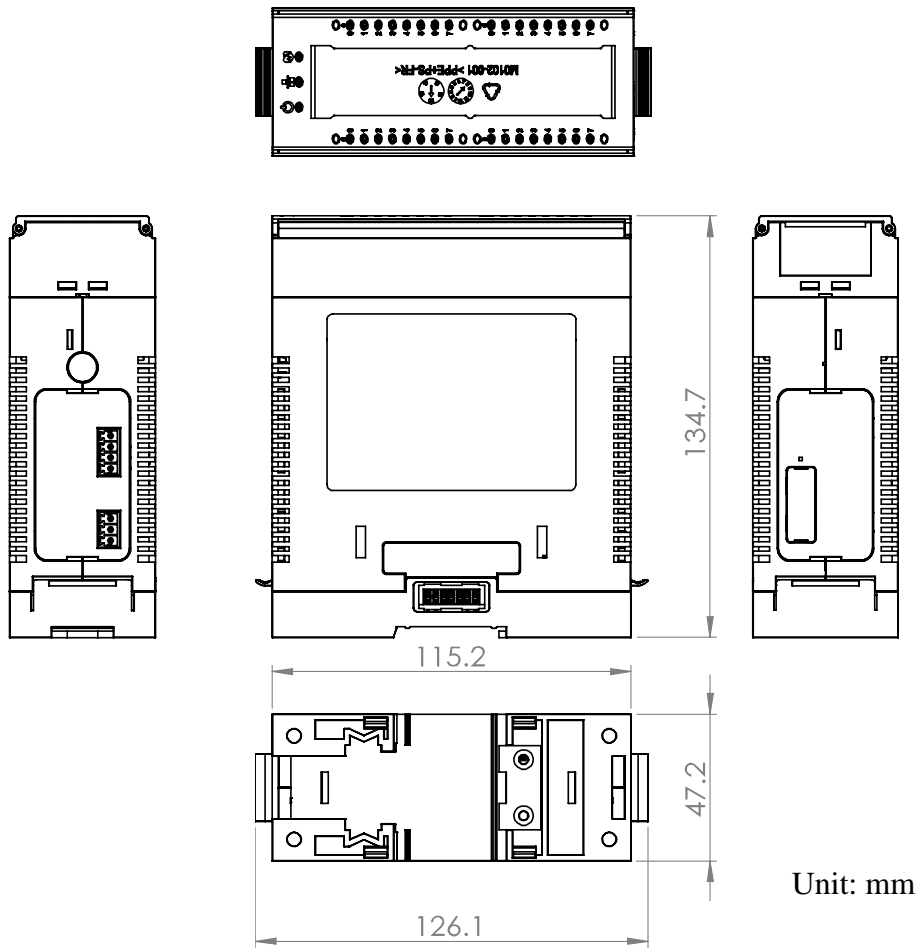
The most commonly used communication interface is adapted, co-called RS-485. It provides a remote transmitting and is applicable to all remote connect.

1.6 Environmental Safety

Wolf series modules are EMC certified in many countries. With EMI and EMS FREE to ensure the environmental quality of modules.

1.7 Dimension

Wolf series module dimension as following:



Chapter 2. Installation

2.1 Basic Installation

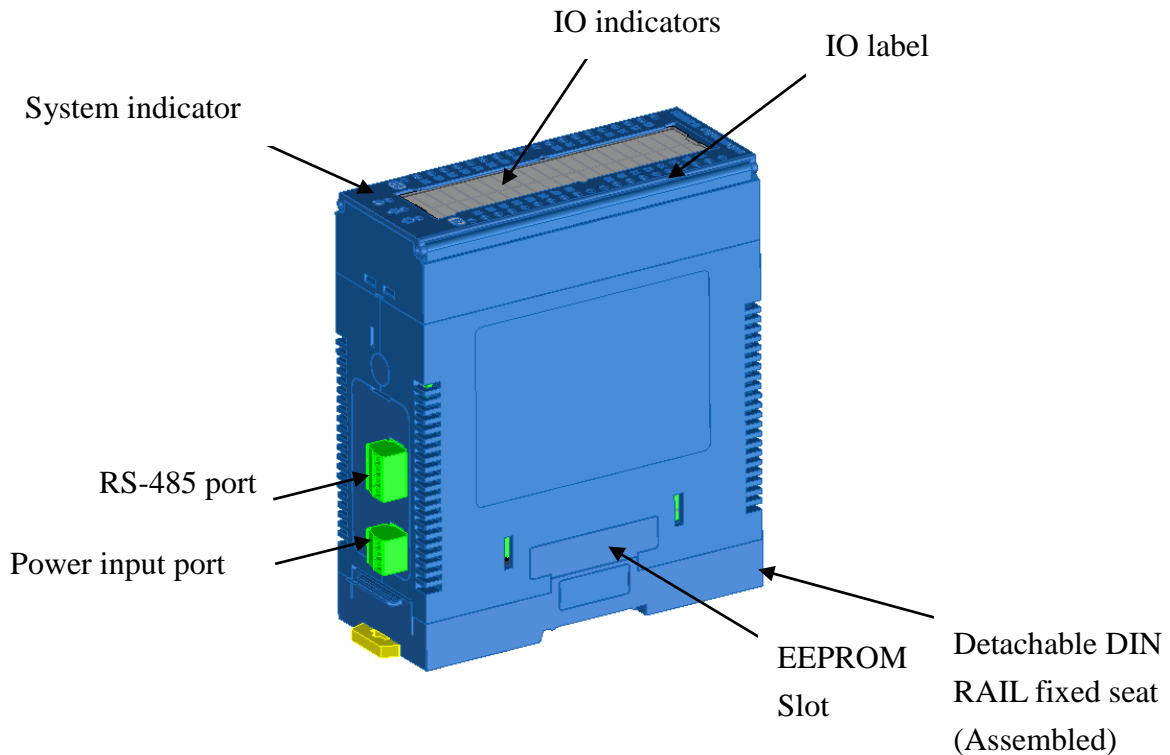
The following parts/devices are necessary when constructing Wolf Series module.

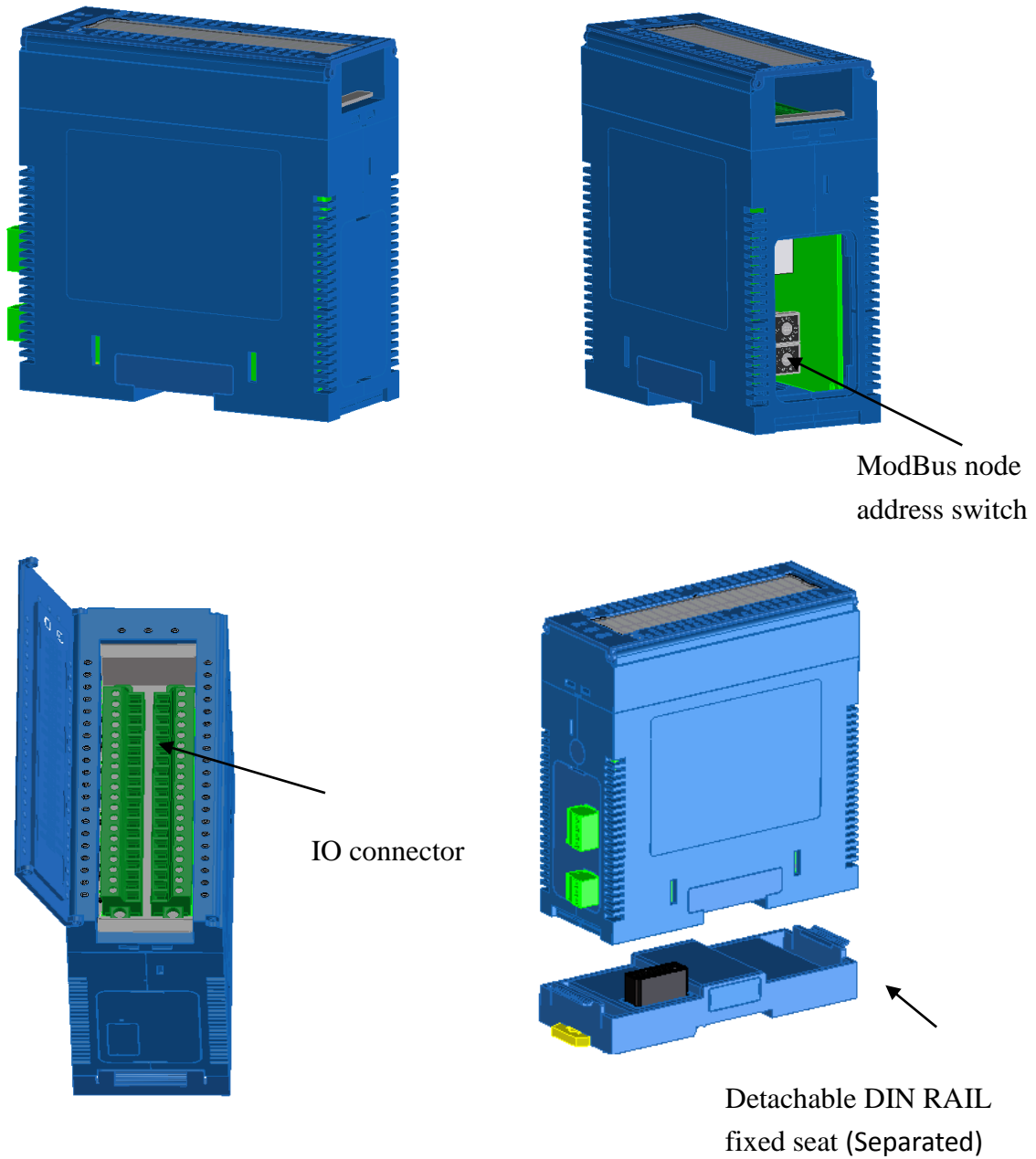
2.1.1 Host PC Requirement

A PC equipped RS-232 or RS-485 communication port. It would be connecting Wolf modules directly by RS-485 port. Or an isolated RS-232-to-RS-485 converter from our company is necessary if this PC workstation is equipped RS-232 port only. Also, a USB to RS-485 converter of our company is alternative solution. These isolated converters are based on photo couple to protect your PC workstation.

2.1.2 Wolf Module

Ports connection and setup of Wolf Series module is shown as figures below. The external connecting and construction will be described in the sequential chapters.





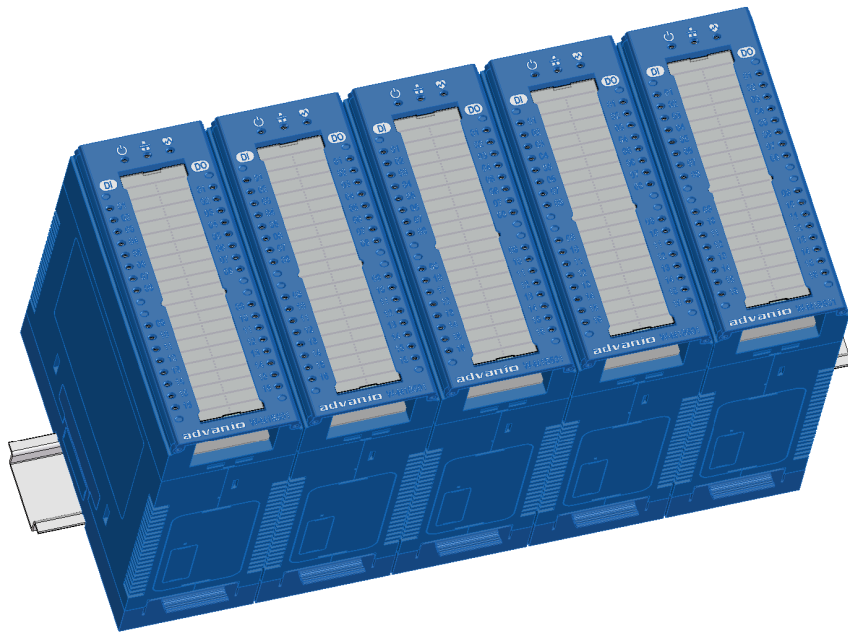
Item	Description
Detachable DIN RAIL fixed seat	Each modules connecting power and RS-485 via this fixed seat. It support attach/detach module rapidly and easy extendable.
IO connector	Wiring IO signals for your application.
RS-485 port	Major communication port

Power input power	For power input
System indicator	Represent system status.
IO indicator	Represent the status of each I/O channels
IO label	Note I/O function for after maintains.
EEPROM slot	Dedicate EEPROM to store system configuration.
ModBus node address switch	Setup Modbus node address by fastest way.
INIT switch (hole)	Restore module setting to factory default.

2.1.3 Installation

DIN rail mounting

Mounting the detachable DIN rail on standard DIN35 rail, therefore, more modules can be extended if required.



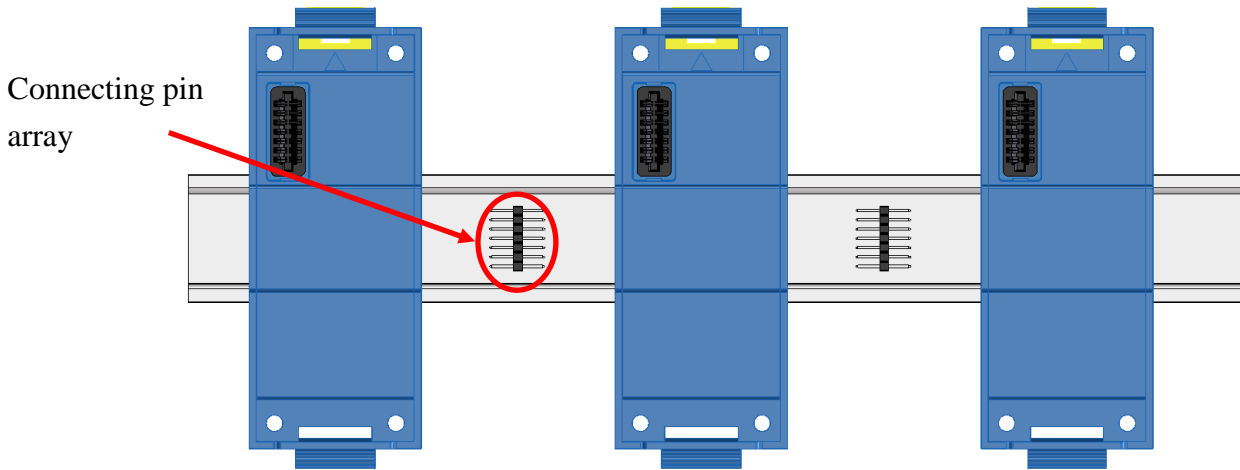
DIN rail module chain installation

Fixed seats been installed on DIN35 rail, also using connecting pin array to connect each fixed seats one by one as shown as following figure. The communication and power would be chain connected.

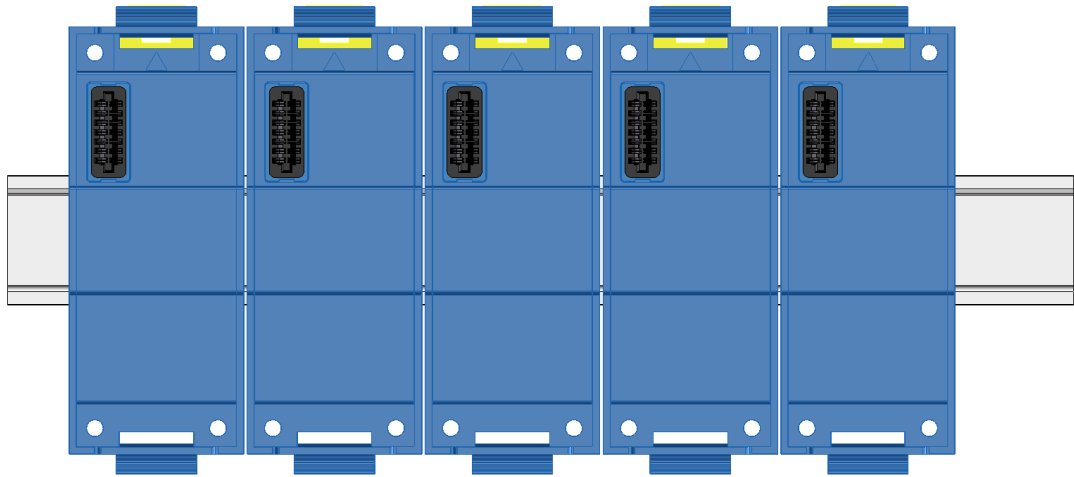
Chain connecting procedures as following:

Step 1: Use the connecting pin array which is in the accessory pack to connect

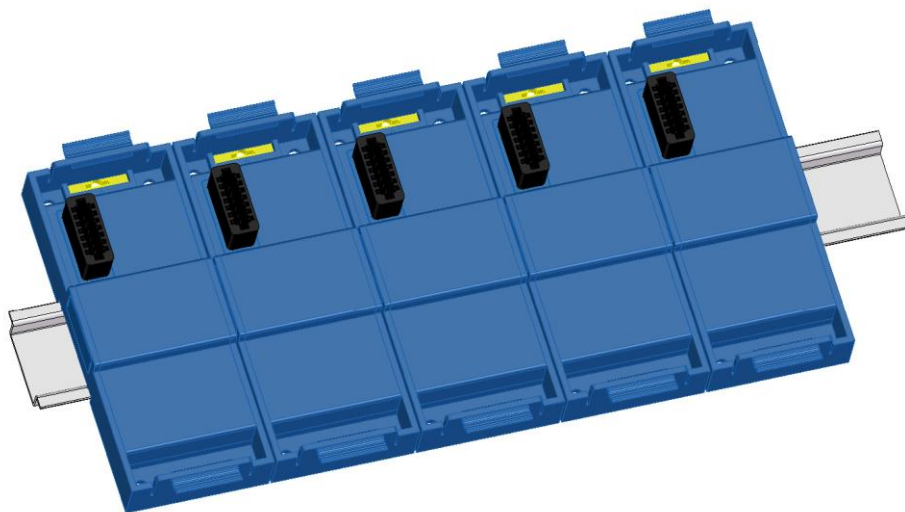
fixed seats as shown as following figure.



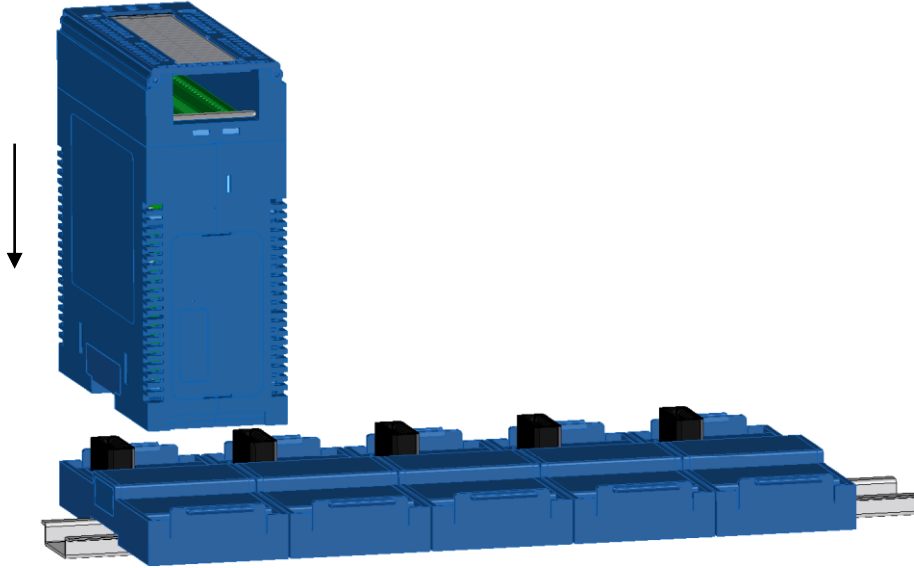
Step 2: Push modules together on DIN rail and connected by pin array.



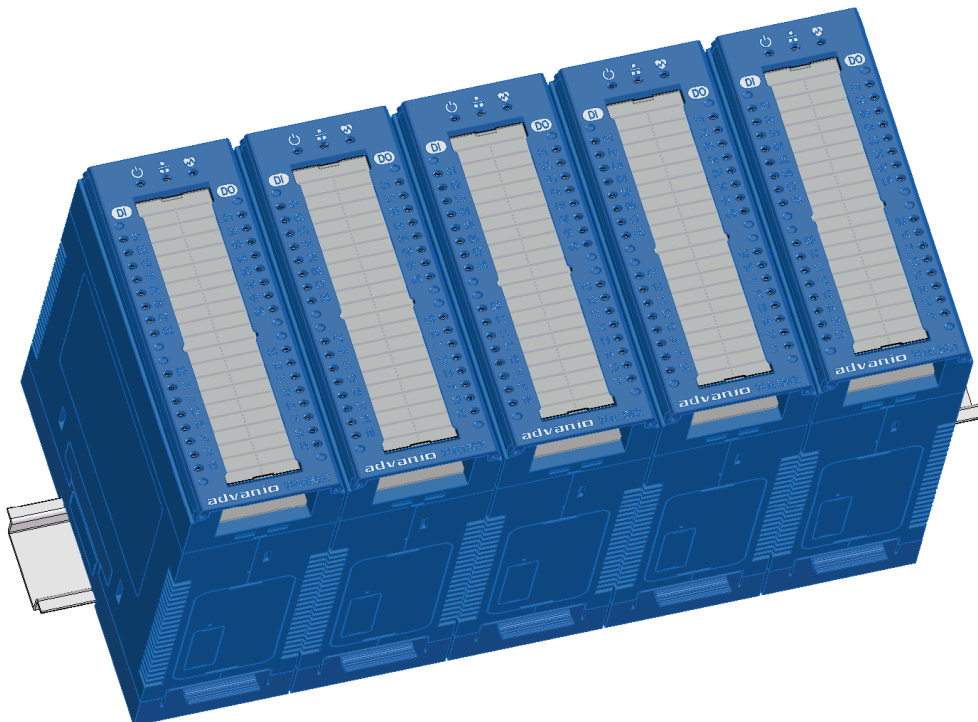
A chained fixed seat of module on DIN rail as shown as following figure:



Step 3: Insert each I/O modules to detachable fixed seats by vertical direction:



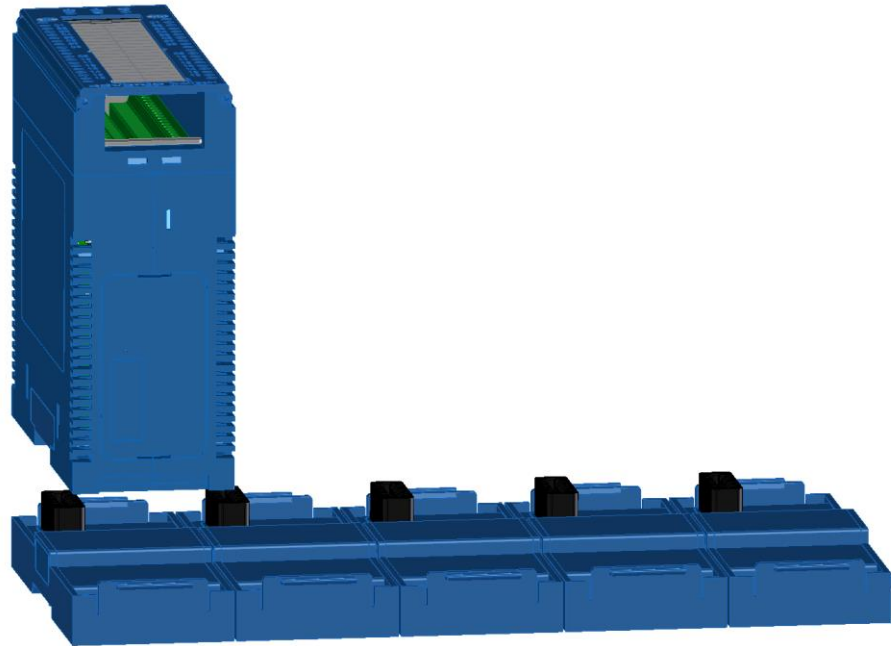
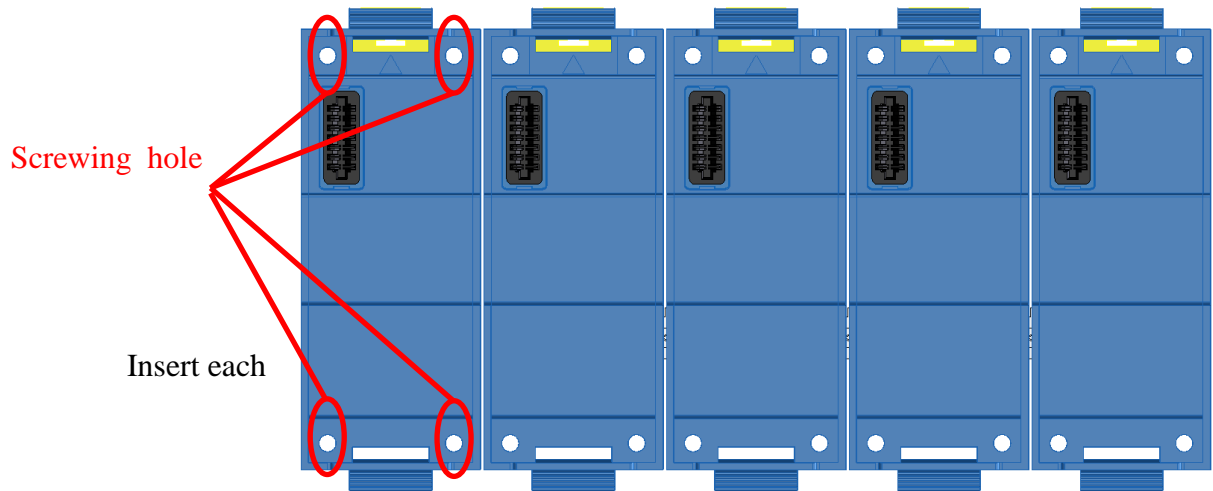
Step 4: A complete module chain on DIN rail as show as following figure:



Wall mounting

Wolf series modules also support wall mounting mechanism. Mounting fixed

seat on wall by screws first. The locations of screw hole as shown as following figure:

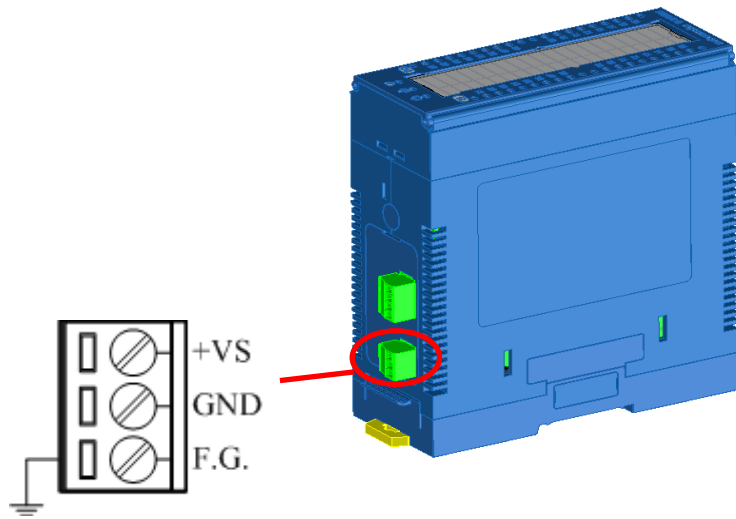


Module grounding

If Wolf series modules were installed on an aluminum DIN rail, then the module grounding would utilize aluminum rail for F.G. (Frame Ground), the grounding also could be connected by connector as shown as following figure:

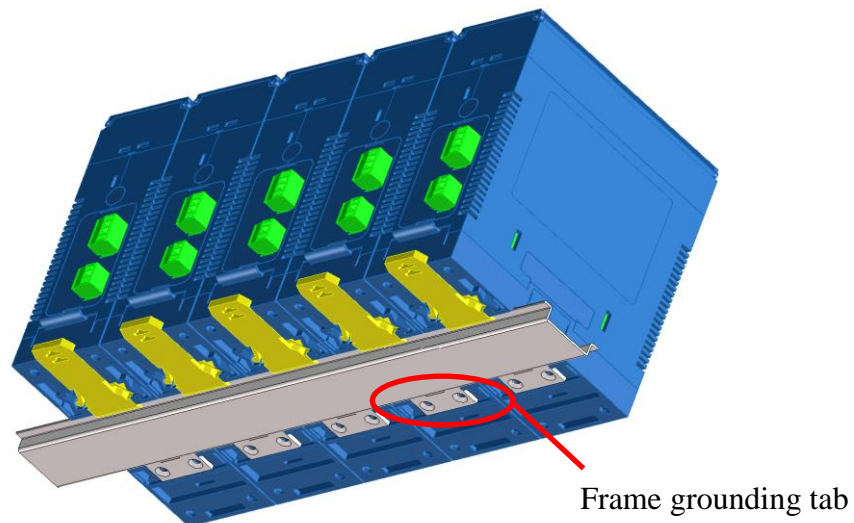
Module grounding by power connector

If not DIN rail typed installation, the grounding could be connected by power connector. The detail for the frame grounding installation as shown as following figure:

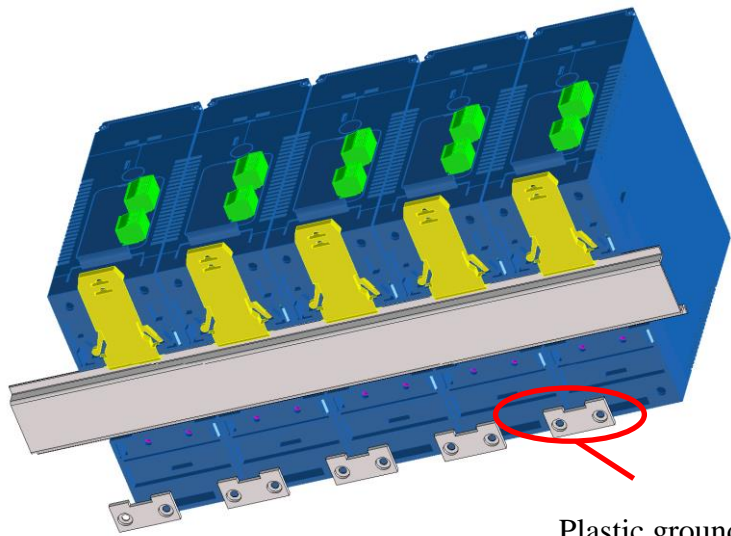


DIN rail grounding

When modules were installed on an aluminum DIN rail, A metal grounding tab could be installed between modules and rail. The install location of metal grounding tab as shown as following figure:



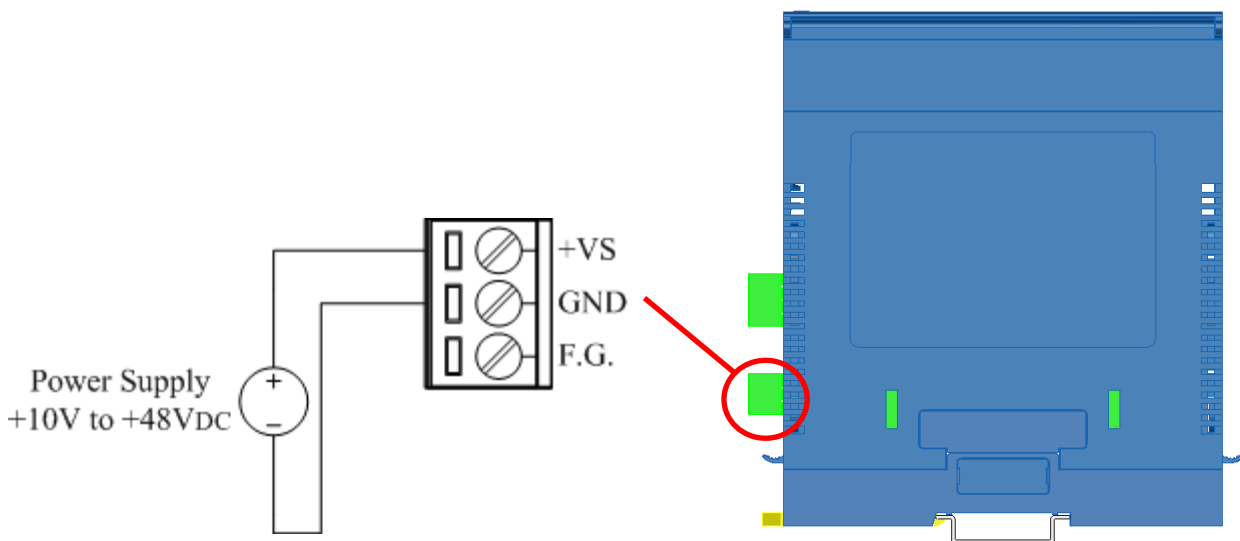
※ We strongly recommends a suitable Grounding (Frame Grounding) is necessary to ensure the system stability. If the grounding of power supply is poor or there have noise on frame grounding, then it need isolate frame grounding of module. Use a plastic grounding tab instead to isolate module frame ground and DIN rail as show as following figure.



Plastic grounding tab

2.1.4 Power Supply

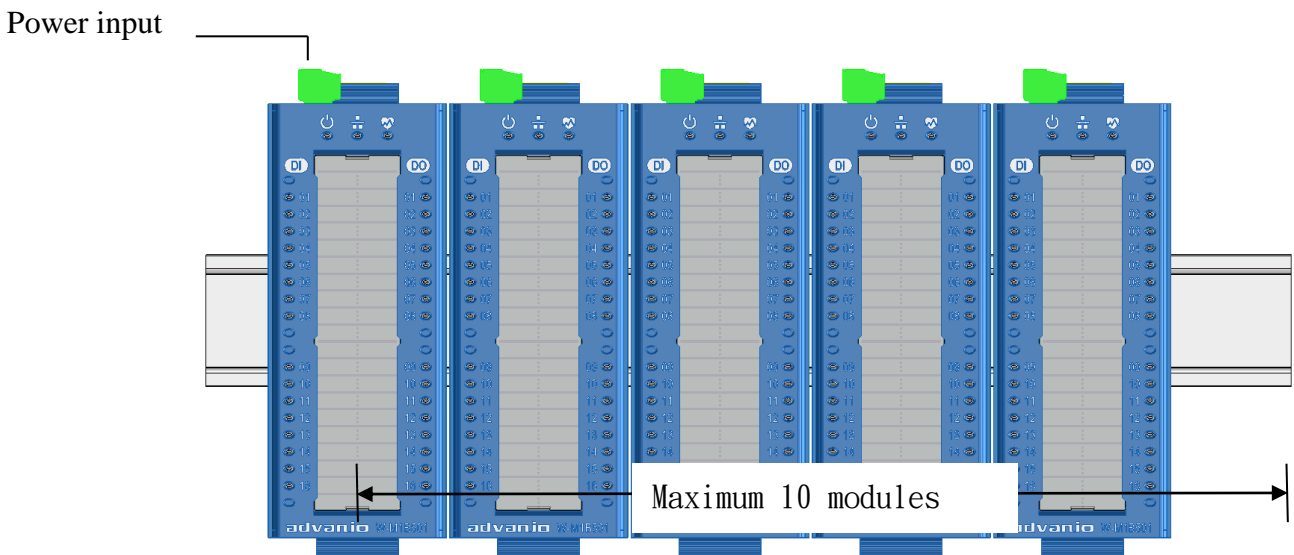
Wolf series modules support wide range DC power input, the voltage from +10V up to +60V to fit industrial application, there is power regulator inside for system power stabilization to supply high quality power if supplied power is within support rang. It is ideally on voltage and current in module are inversely proportional but the power ripple must be limited to 5V Vpp. How wire power connector as shown as following figure.



※ Power level would be drop low when connected power line is too long, so

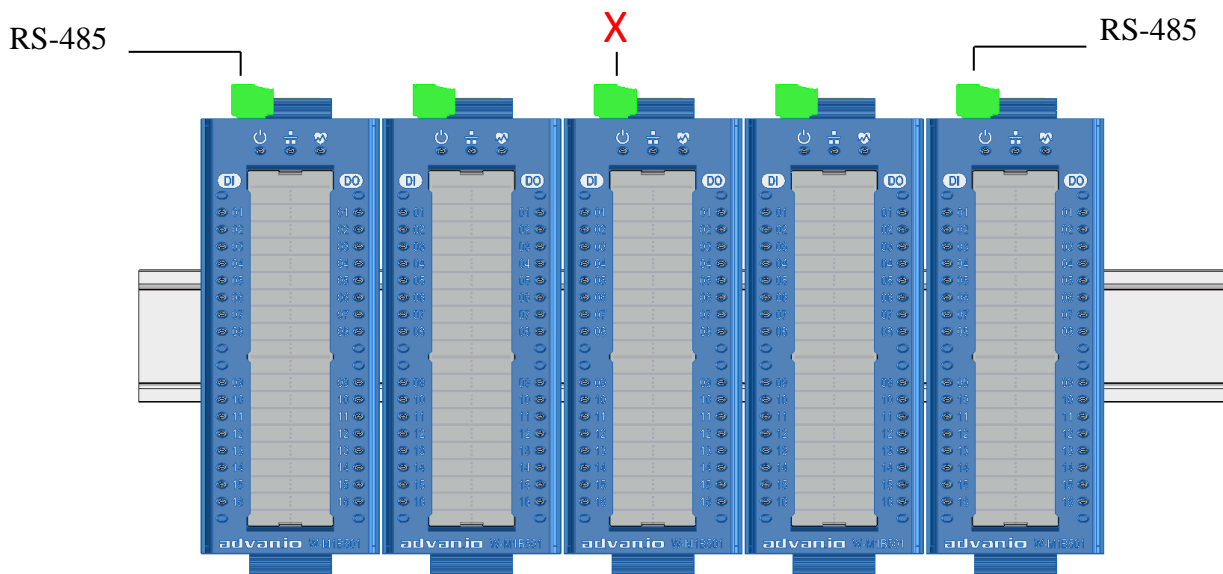
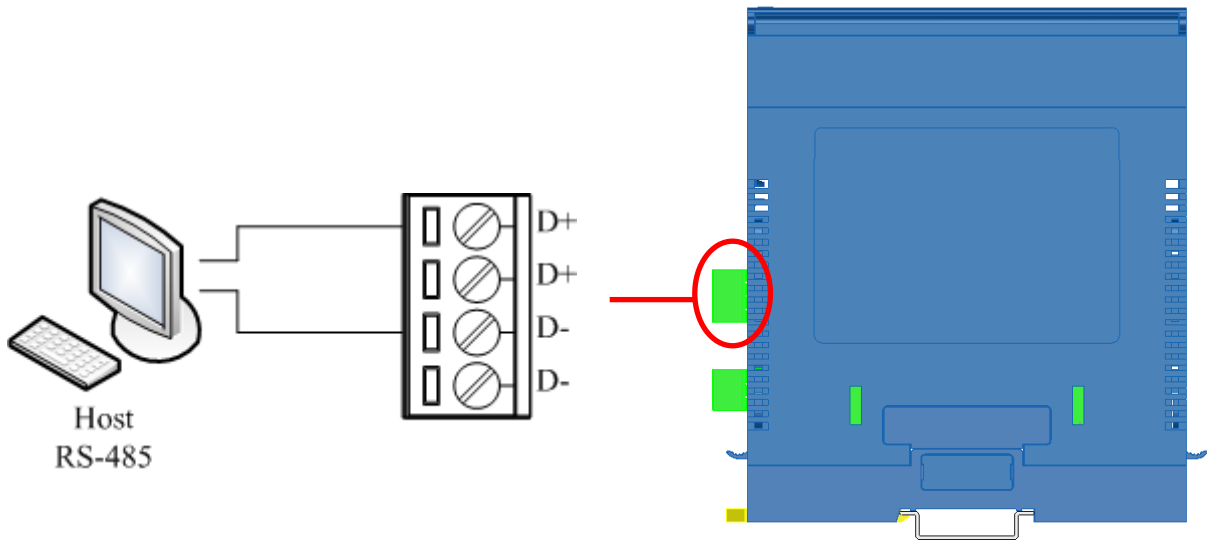
strongly recommend the distance between power and module should be as short as possible in order to prevent the system unstable.

- ※ Each module power would be parallel connected on DIN rail, so the power connector are on same situation. While connecting the power supply to one of them on the rail then the power would distribute to every module via rail. (Be careful! only one power source could be connecting to one set of modules on one rail.) The maximum number of modules on one rail is 10 modules and power consumption approximat 30W.
- ※ Using power connector to connect power source on every modules if not on rail.



2.1.5 Connecting Communication Interface

Wolf M1B series modules follow the standard RS-485 to support communication. The RS-485 port and placement as following figure Besides, the next figure is show the RS-485 connection..

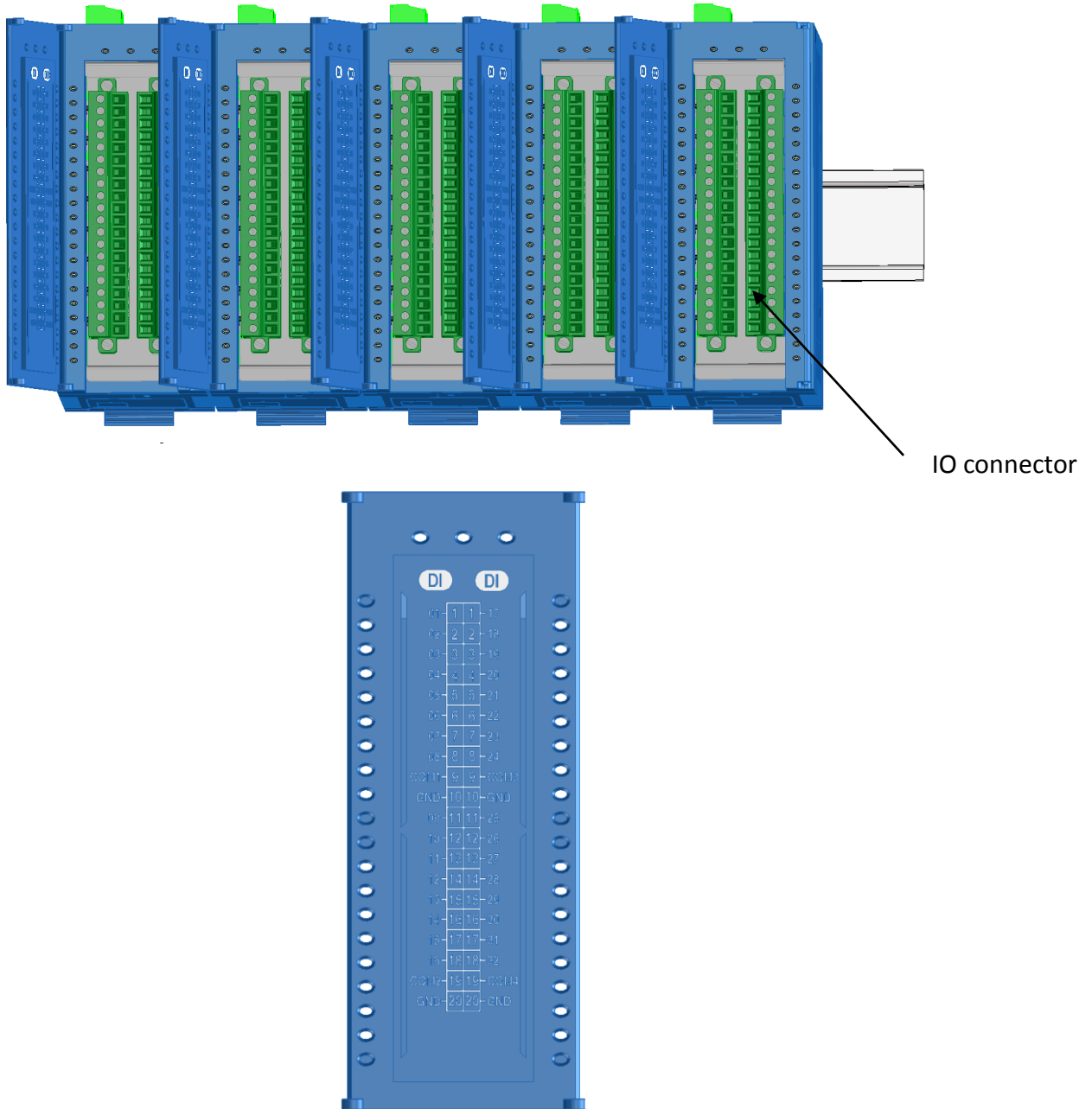


※ When DIN rail mounting with modules alongside and the mounting base are connected to the dock connector RS485 Signals can enter from the first module only and out from the last module only. It is prohibited to use the intermediate module for the pick out to avoid communication instability.

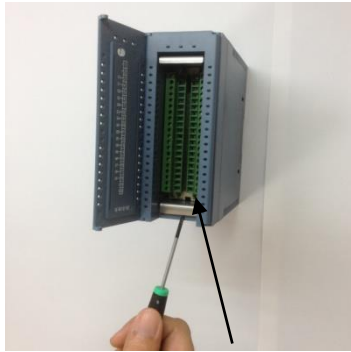
※ If the base is not connected to the dock connector, then every module need to be connected with input communication cables for communication.

2.1.6 IO Connection

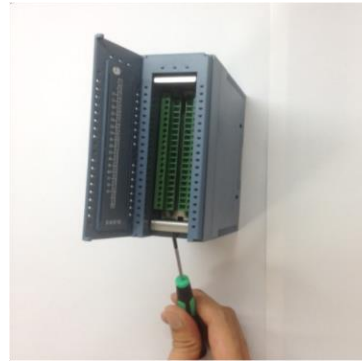
User can choose the suitable I/O feature on module to fit specified application. Please refer to the section of module information and check if each I/O channel has been assigned appropriately.



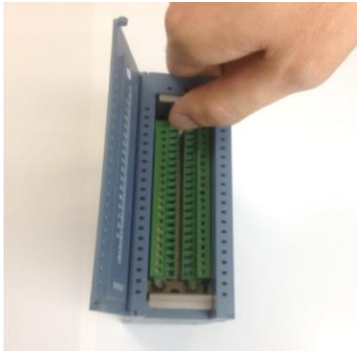
Procedures of removing I/O terminal



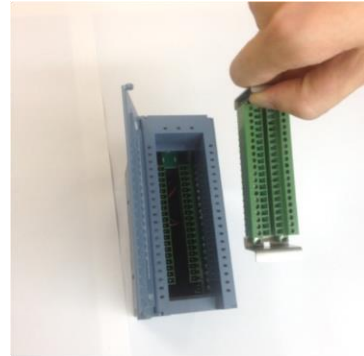
1. Insert the flathead screwdriver into the position as shown as above.



2. Push down the screwdriver



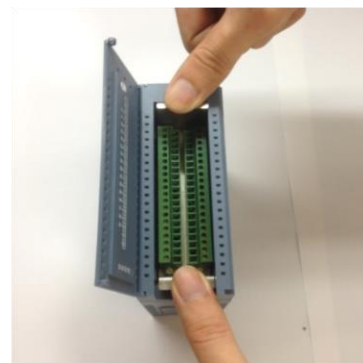
3. Remove the terminal by pulling the hook of up side.



4. Terminal removed



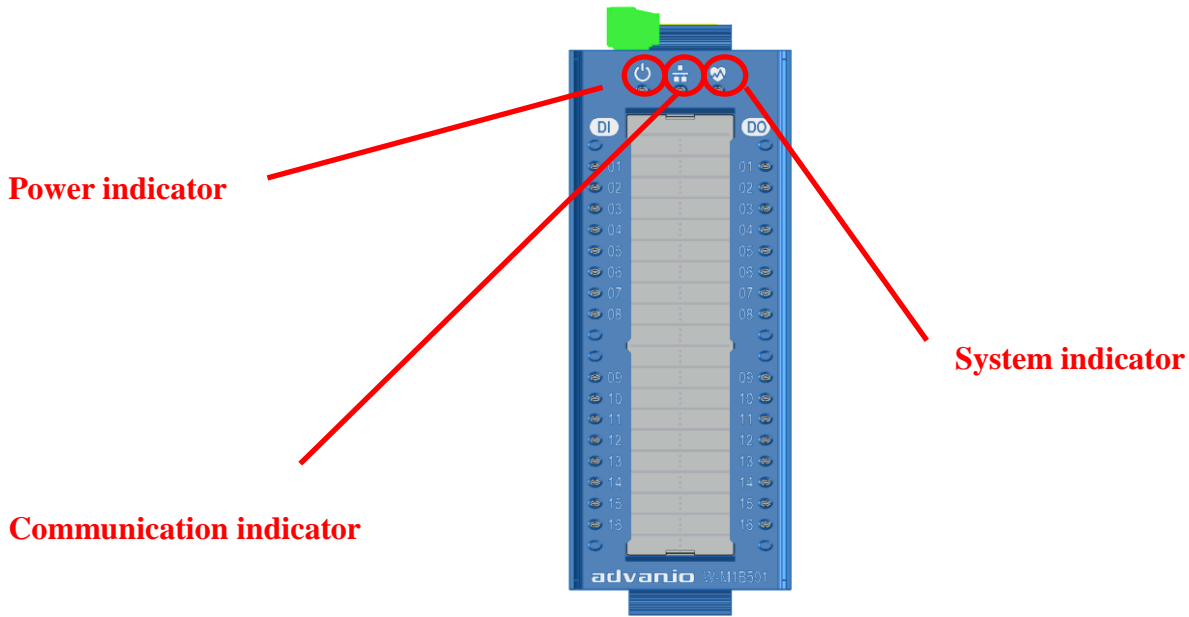
1. Put the terminal on module



2. Push the top side and bottom side by two hands then complete.

2.1.7 Indicators

The functions of each indicator are described in the attached table:

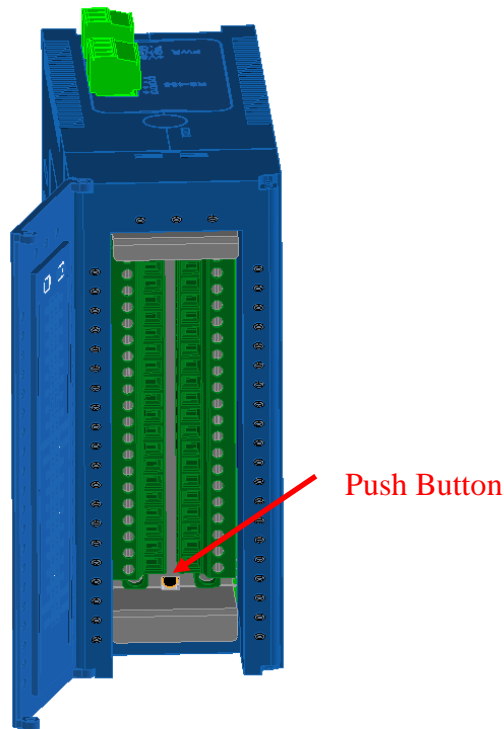


Power	COM.	SYS.	Indication	Status
⊙	⊙	⊙	Flash 3 times in 0.5 sec.	System initial completed.
⊙			Lighting	Power good and system ready.
	⊙		Flashing	Communication
	⊙		Lighting	Polling timeout
		⊙	Flashing every 0.5 sec	Normal
		⊙	Lighting	Abnormal
		⊙	A flash pattern as Lighting 2 sec · Off 1 sec · Lighting 0.5 sec · Off 1sec	EEPROM module accessing fail.
		⊙	Flash pattern as~ Lighting 2 sec. Off 1 sec.	EEPROM accessing failed. If it is new part or not be initialized, please perform EEPROM initial

			Lighting 0.5 sec. 2 times Off 1 sec	procedures as appendix section 1.
		◎	Flashing pattern as ~ Lighting 2 sec. Off 1 sec. Lighting 0.5 sec. 3 times Off 1 sec	The stored parameter in EEPROM not matched as system. Please re-initial it.

Remark 1:

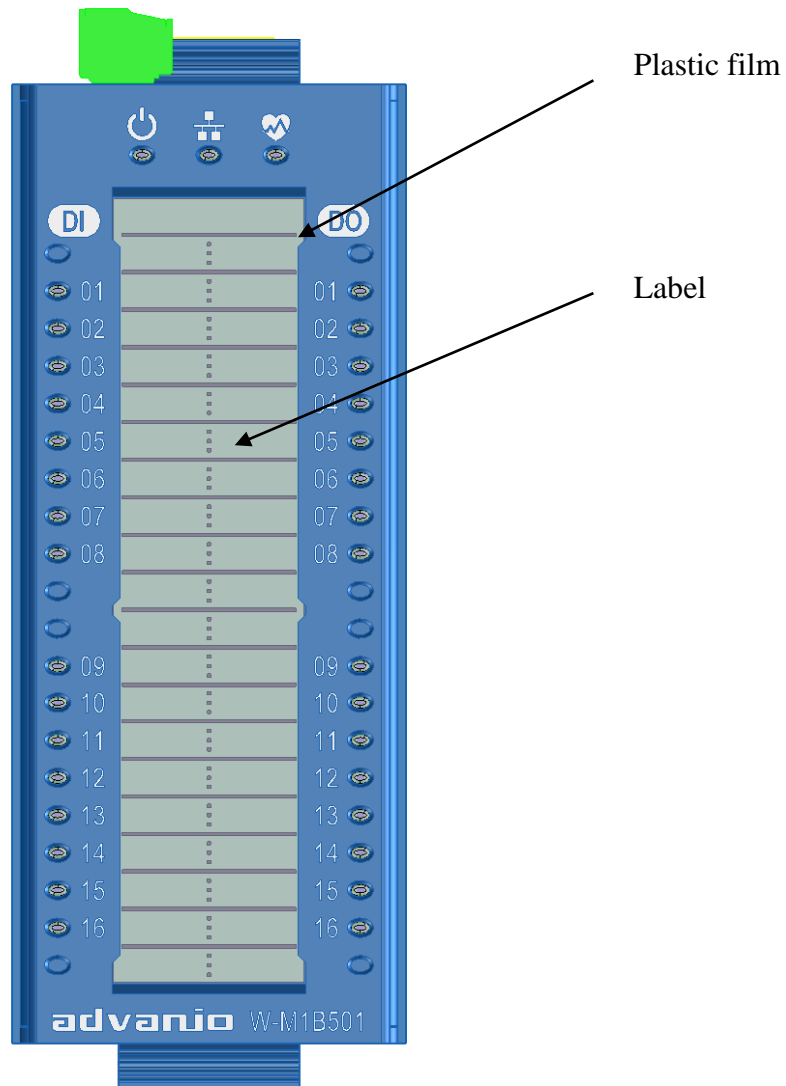
The re-initial procedure of change new EEPROM module is same as module initial procedure. Push the button on up side of connector board 3 sec then module would perform init procedure and store new parameter into EEPROM. Keeping the parameters which are in EEPROM same as system.



2.1.8 Channel Label

Tabs under the plastic film are accessible for user to record the assignment of each channel. If you want to change the tabs, please download Excel file via Advanio official website, print it and cut out the tabs. Remove the plastic film, insert the tab(s)

and put the plastic film back.



2.1.9 Setup Utility

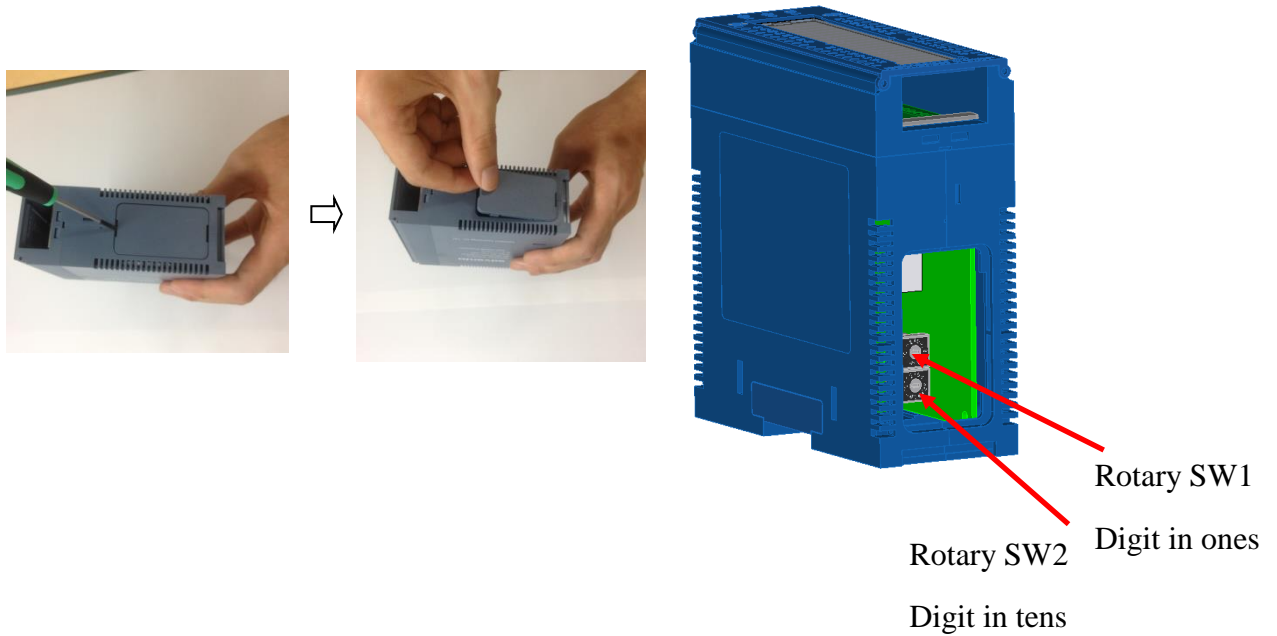
Wolf series module could be configured via setup utility directly on the PC workstation equipped with RS-485. Or, use a RS-232 port through RS-485 converter, USB to RS-485 converter. Utility and setup guideline could be obtained from Advanio website.

2.1.10 Communication Setup

To setup Wolf series module, MODBUS node address should be determined first.

The factory default to the node address of Wolf M1B series module is 01. The node address could be setup by two hexadecimal coded rotary switches. The range of node address is from 0x01 to 0xF7 (1 to 247).

This setup should turn off the power, then use a screwdriver to rotate the rotary switches, when complete the setup and power on module then the node address should be determined.



The factory default setting of RS-485 on Wolf series module is 9600bpsN,8,1.

The frame format and baud rate could be changed via utility or MODBUS command. The baud rate range is from 1200bps to 115.2Kbps. Even and Odd parity check. The setup utility could be downloaded via-Advanio official website, set up MODBUS command of RS-485 as the following:

Address	Function	R/W	Initial value
44107 (0x100A)	Com port parameter : 2 bytes High Byte Low Byte 0x00: 8-N-1 0x03:1.2K 0x01: 8-N-2 0x04:2.4K 0x02: 8-E-1 0x05:4.8K 0x03: 8-O-1 0x06:9.6K 0x07:19.2K	R/W	0x0006

		0x08:38.4K		
		0x09:57.6K		
		0x0A:115.2K		

2.1.11 Factory Reset

Use factory reset if modules failed to communicate. Press “Push Button” to complete INIT. “Push Button” functions are described as follows:

Push INIT and hold for 3 seconds, the LED indication of power, communication and system will flash 3 times at 0.5 second interval.

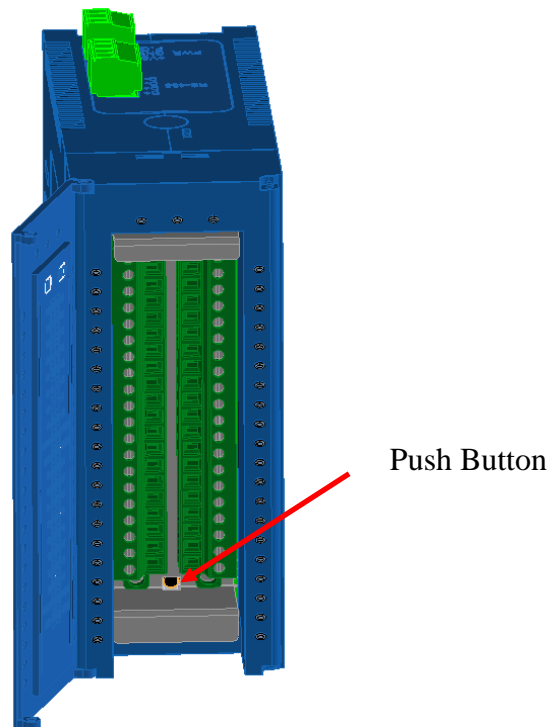
After initial operation:

Resume factory default and reset modules:

Baud rate: 9600bps

Data format: N,8,1

Refer to chapter 4 for factory default setting:



2.1.12 Isolated Type RS-232/RS-485 Converter (Optional)

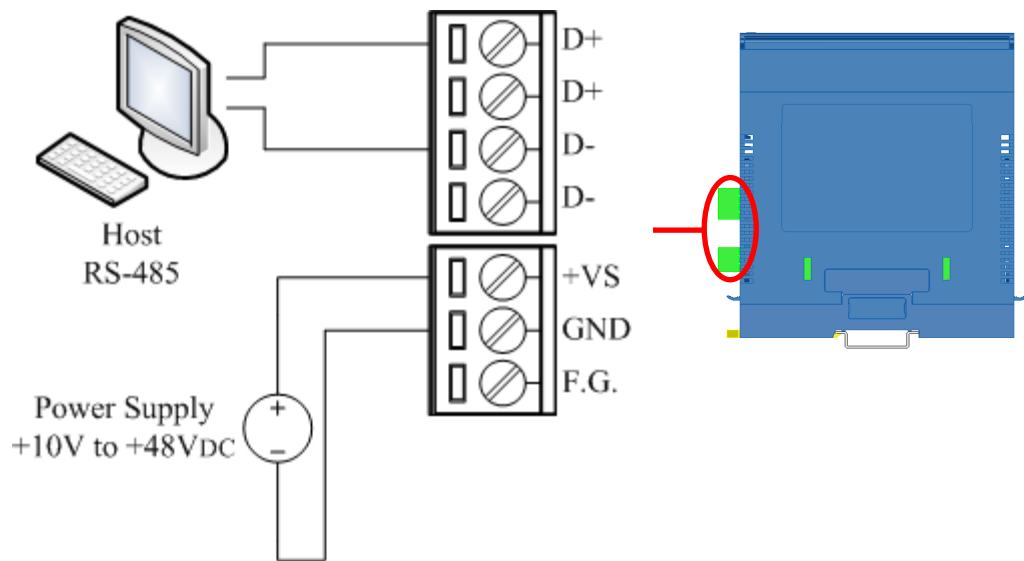
If only RS232 port is available, a converter to isolate RS232/RS485 will be needed. Setup of module address for the converter is not required.

2.1.13 Repeater (Optional)

With a communication distance surpasses 4000 feet (1200m) or more than 32 modules are used, expanding repeaters may be needed. Maximum number of modules is 247 by 8 repeaters.

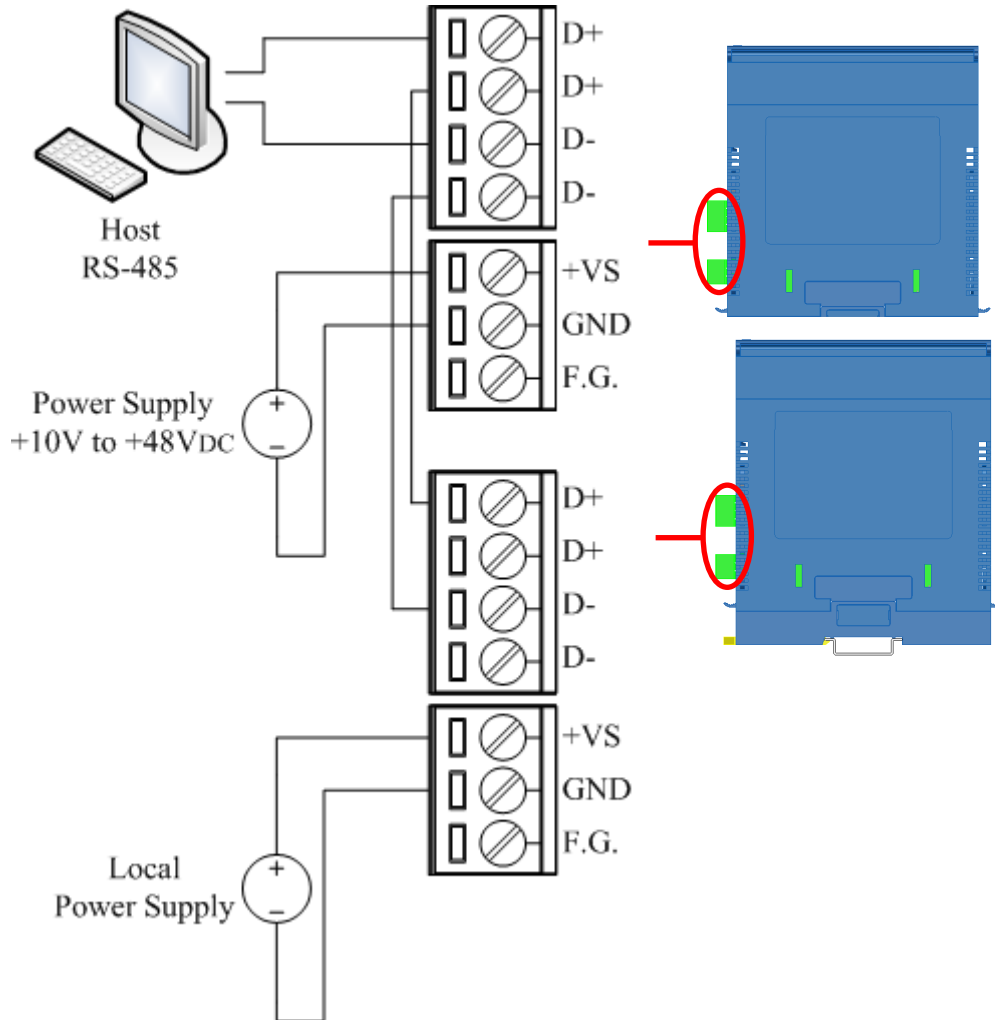
2.2 Example: Single Module

Construction of basic modules featuring network connecting of Wolf series module (single) is show as figures below.



2.3 Example: Multiple Modules

Construction of multiple modules featuring network connecting of Wolf series modules is show as figures below.

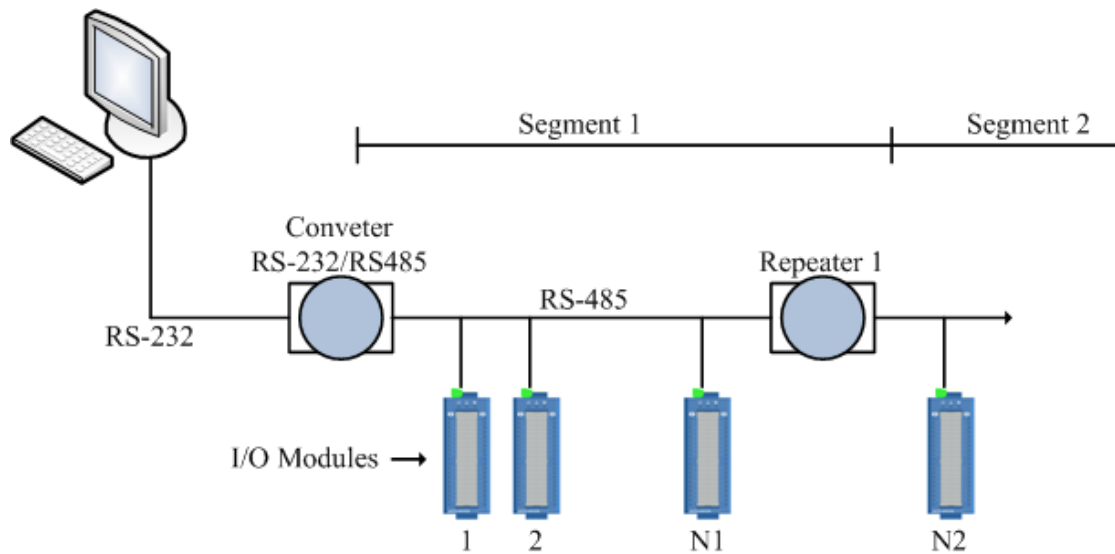


2.4 System Configuration

Wolf series modules are all connected in parallel by cables. Thus, failing of one segment does not affect the entire network system. The modules applied are based on RS485 interface and MODBUS protocol. When communicating via host or terminal is required, RS485 would be taken in consideration in term of different system architecture. Star topology, daisy chain and random topology will be briefed in the next sections.

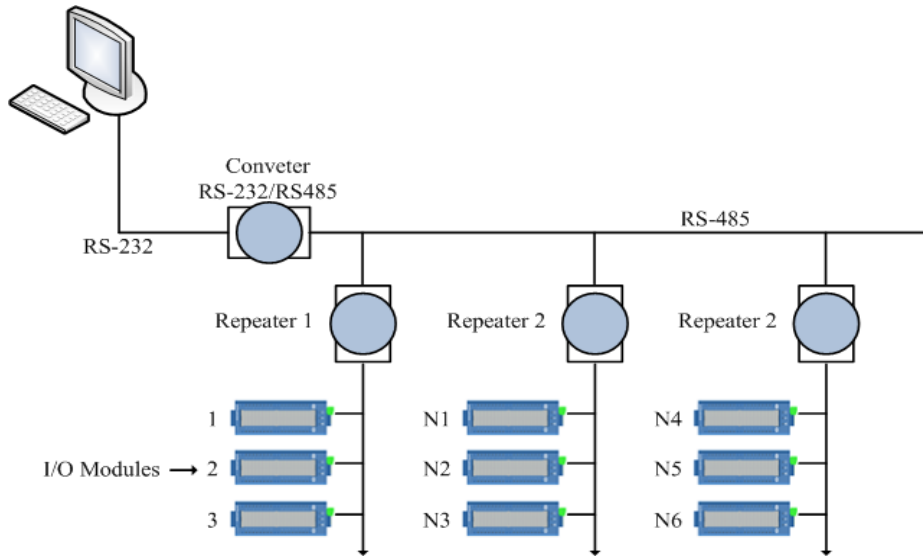
2.4.1 Daisy Chain

In each segment, the last node to connect modules must be repeater, with another end connected to the main cable, it served as an important medium. Each repeater can be connected by 32 modules at most, otherwise, the low current might result in communication error.



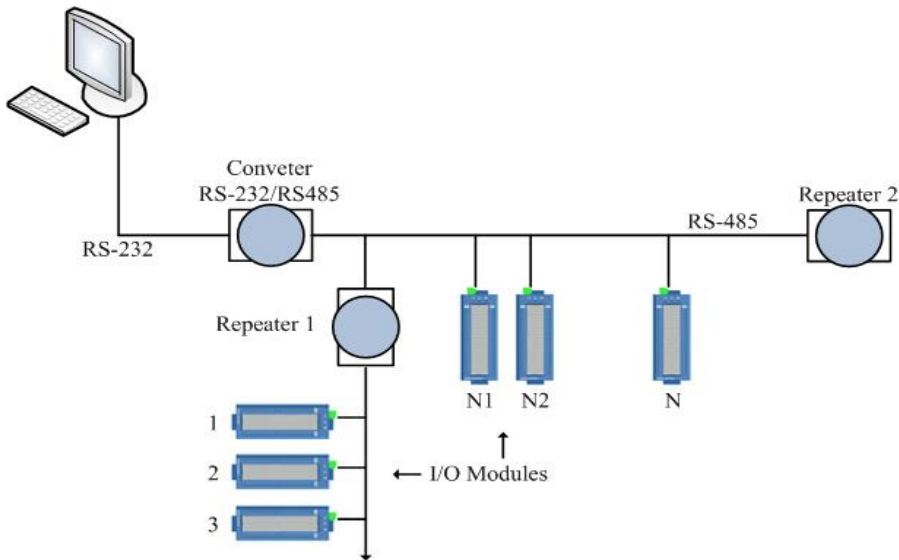
2.4.2 Star Topology

All the repeaters are connected to the main network through a cable and the modules are connected to the repeaters. It forms a tree.



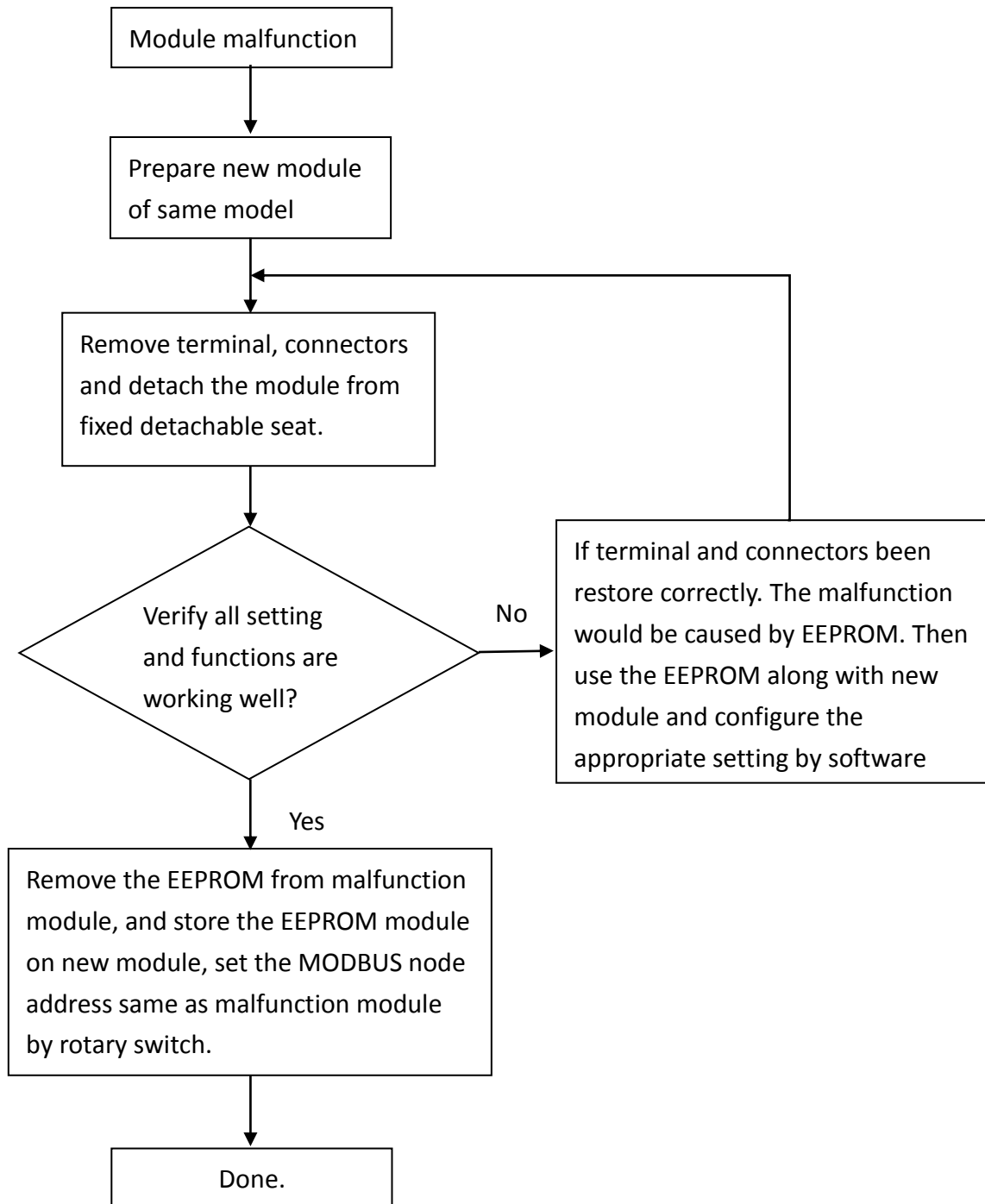
2.4.3 Random Topology

A combination of star and daisy chain topologies can be designated for every requirement.



2.5 Module Replacement

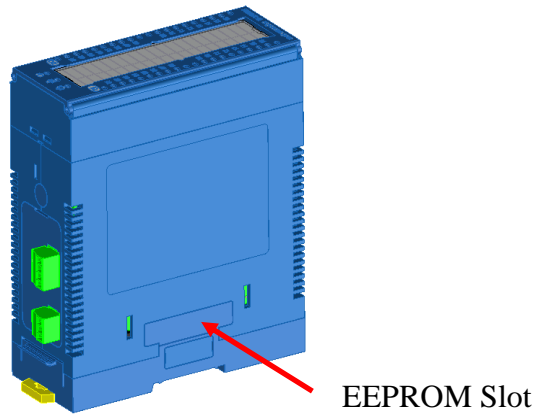
A quick replacement on site in case of module failure is indicated as follows:



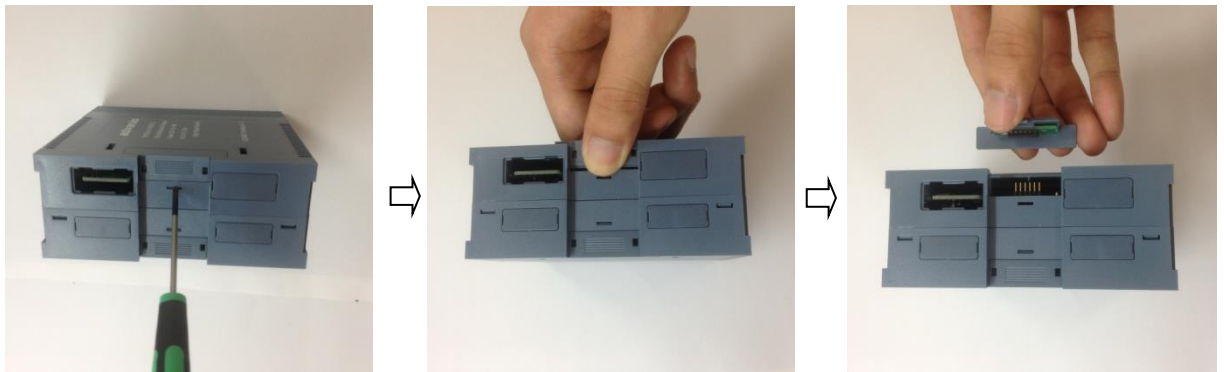
EEPROM Replacement:

EEPROM location is marked in the following figure.

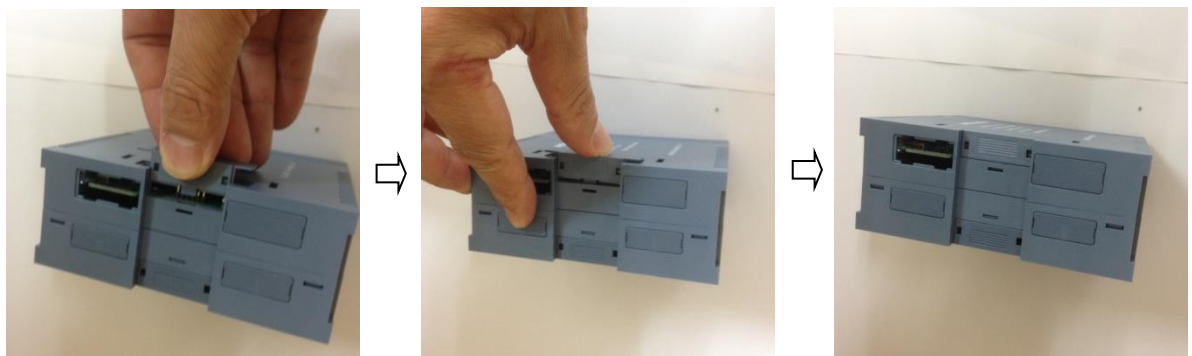
Wolf Series module is an isolated module, under certain circumstances, if I/O is damaged, the parameter stored in EEPROM will remain intact. You can simply replace EEPROM and resume the setting.



Procedures of remove EEPROM : To remove EEPROM, follow the steps below:



Procedures of restore EEPROM: To restore EEPROM, follow the steps below:



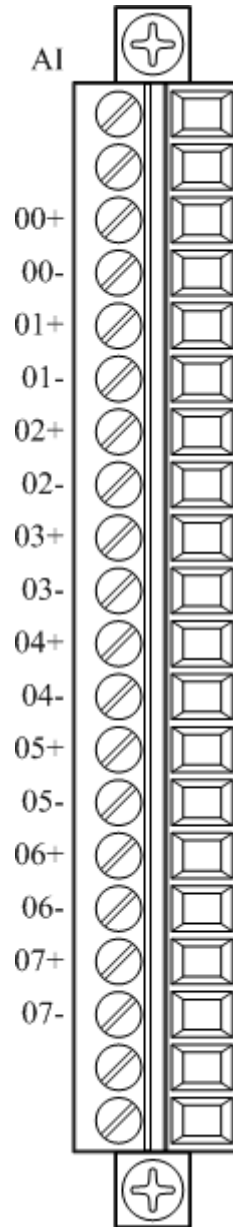
Chapter 3. Analog Module Information

3.1 W-M1B101 (Coming Soon)

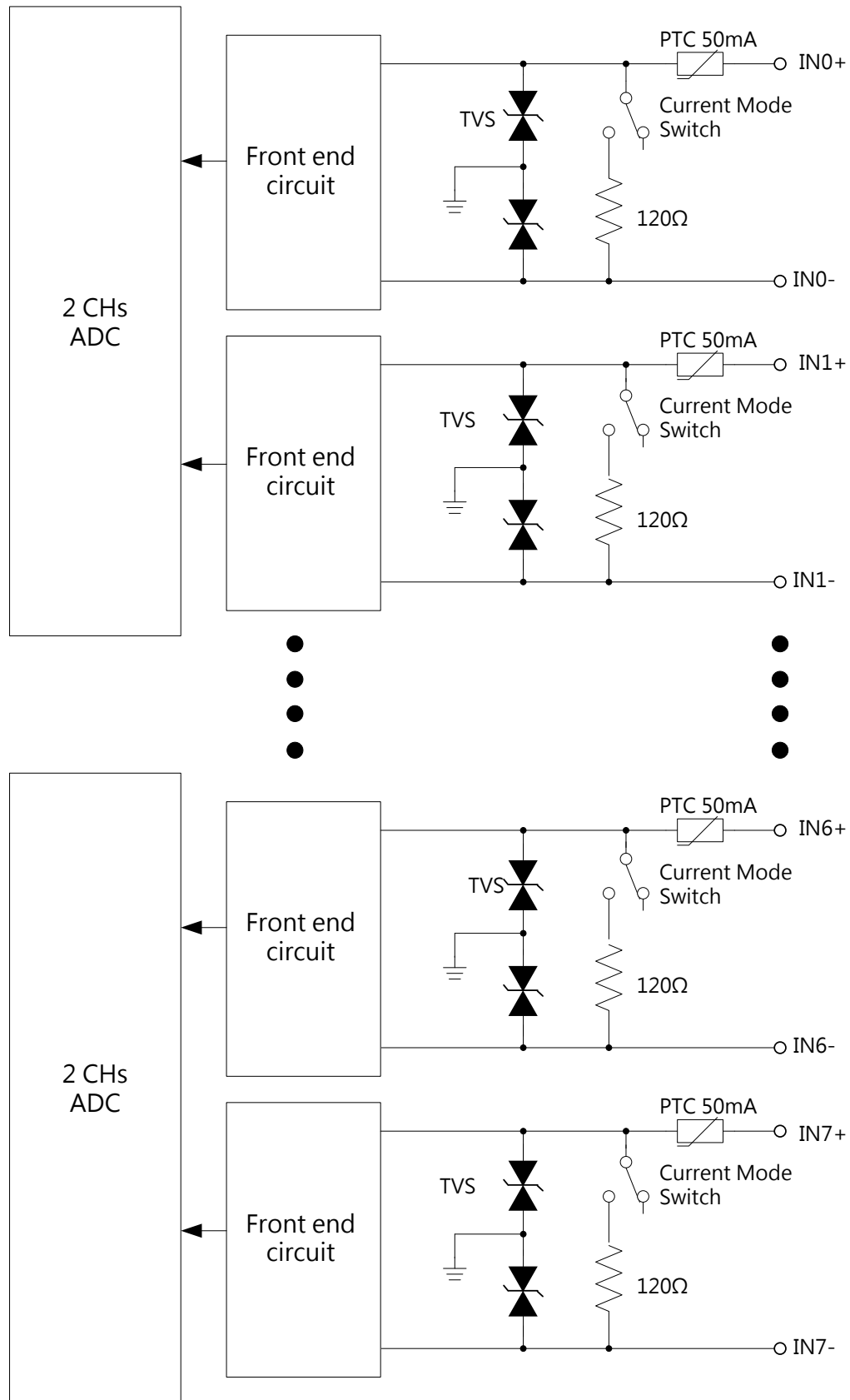
3.2 W-M1B102 (Coming Soon)

3.3 W-M1B103 8-channel Universal Analog Input Module with High Voltage Protection

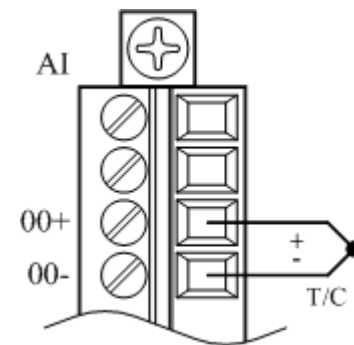
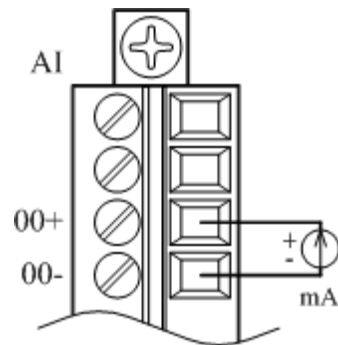
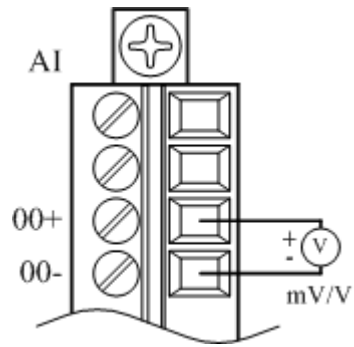
3.3.1 Terminal Assignment



3.3.2 Block Diagram



3.3.3 Channel Connecting



3.3.4 IO Specifications

Channels	8 channels
Voltage Range	$\pm 100\text{mV}$, $\pm 500\text{mV}$, $\pm 1\text{V}$, $\pm 5\text{V}$, $\pm 10\text{V}$, $0\sim 100\text{mV}$, $0\sim 500\text{mV}$, $0\sim 1\text{V}$, $0\sim 5\text{V}$, $0\sim 10\text{V}$
Current Input	$\pm 20\text{mA}$, $4\sim 20\text{mA}$, $0\sim 20\text{mA}$ (Slide switch select)
Direct Sensor Input	J, K, T, E, R, S, B, N
Burn-out Detection	Yes (all V, $4\sim 20\text{mA}$ & all T/C)
Channel Independent Configuration	Each channel

Sampling Rates	2.5 samples/second per channel
Resolution	16-bit
Accuracy	±0.1% FSR
Input Impedance	Voltage: 2MΩ Current: 120 Ω
Span Drift	±25 ppm/°C
Zero Drift	±6 μV/°C
CMR @ 50/60 Hz	120 dB
NMR @ 50/60 Hz	100 dB
Input Voltage Protection	±240V
Common Mode Voltage	240V
Power Consumption	1.6W @ 24V

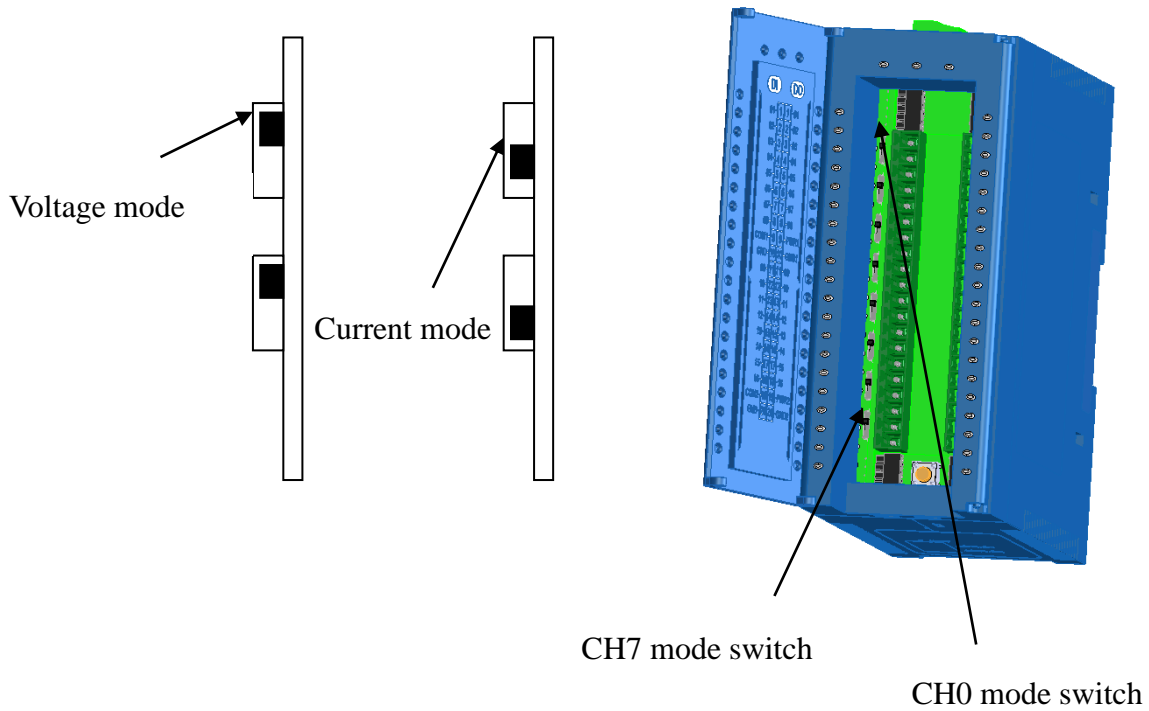
3.3.5 Related Reference

3.3.5.1 Input Signal Type Setup

Input ranges & type for each analog signal is adjustable. Modbus command is shown below.

Address	Function	R/W	Initial value
40705~40712 (0x02C0~0x02C7)	CH0~CH7 Input signal type setup	R/W	0x0106

※Caution: If “Current” input is selected, please turn the switch to “Current” Input by a flathead screwdriver. While switching to voltage and thermocouple, it is required to turn the switch to the appropriate mode. (See figure below)



Signals detect range:

Value	Input range	Initial value
Voltage Input		
0x0101	0~10 V	
0x0102	0~5 V	
0x0103	0~1 V	
0x0104	0-500mV	
0x0105	0-100mV	
0x0106	± 10 V	⊙
0x0107	± 5 V	
0x0108	± 1 V	
0x0109	± 500 mV	
0x010A	± 100 mV	
Current Input		

0x0201	4~20mA	
0x0202	0~20 mA	
0x0203	± 20 mA	
Thermocouple Input		
0x0301	Type J Thermocouple -210 ~ 1200 °C	
0x0302	Type K Thermocouple -270 ~ 1372 °C	
0x0303	Type T Thermocouple -270 ~ 400 °C	
0x0304	Type E Thermocouple -270 ~ 1000 °C	
0x0305	Type R Thermocouple -50 ~ 1768 °C	
0x0306	Type S Thermocouple -50 ~ 1768 °C	
0x0307	Type B Thermocouple 0 ~ 1820 °C	
0x0308	Type N Thermocouple -270 ~ 1300 °C	

3.3.5.2 CJC (Cold Junction Compensation)

There is thermal sensor built in the module, the purpose is cold junction compensation to thermocouple. Modbus command is shown below.

Address	Function	R/W	Initial value
00524 (0x020B)	CJC Enable 0: disable 1: enable	R/W	0
40577~40584 (0x0240~0x0247)	CH0~CH7 CJC Scale, Unit: 0.1 °C Range: -20.0 °C ~ 20.0 °C	R/W	All 0x0000
40641 (0x0280)	CJC Value, Unit 0.1 °C	R	-

3.3.5.3 Hexadecimal / Engineering Unit

Setup the output value on Hexadecimal, or customer scaling. Modbus command is shown below.

Address	Function	R/W	Initial value
40737 (0x02E0)	AI Value format 0x0000: Hex 0x0001: Engineering	R/W	0x0000

30513~30520	AI CH0 ~ CH7 Value	R	-
40513~40520			
(0x0200~0x0207)			

Hex Unit data range:

Value	Range	Min. value	Max. value
Voltage Input			
0x0101	0~10 V	0 (0)	FFFF (65535)
0x0102	0~5 V	0 (0)	FFFF (65535)
0x0103	0~1 V	0 (0)	FFFF (65535)
0x0104	0-500mV	0 (0)	FFFF (65535)
0x0105	0-100mV	0 (0)	FFFF (65535)
0x0106	± 10 V	8000 (-32768)	7FFF (32767)
0x0107	± 5 V	8000 (-32768)	7FFF (32767)
0x0108	± 1 V	8000 (-32768)	7FFF (32767)
0x0109	± 500 mV	8000 (-32768)	7FFF (32767)
0x010A	± 100 mV	8000 (-32768)	7FFF (32767)
Current Input			
0x0201	4~20mA	0 (0)	FFFF (65535)
0x0202	0~20 mA	0 (0)	FFFF (65535)
0x0203	± 20 mA	8000 (-32768)	7FFF (32767)
Thermocouple Input			
0x0301	Type J Thermocouple -210 ~ 1200 °C	E999 (-5735)	7FFF (32767)
0x0302	Type K Thermocouple -270 ~ 1372 °C	E6CF (-6449)	7FFF (32767)
0x0303	Type T Thermocouple -270 ~ 400 °C	A99A (-22118)	7FFF (32767)
0x0304	Type E Thermocouple -270 ~ 1000 °C	DD70 (-8848)	7FFF (32767)
0x0305	Type R Thermocouple -50 ~ 1768 °C	FC61 (-927)	7FFF (32767)
0x0306	Type S Thermocouple -50 ~ 1768 °C	FC61 (-927)	7FFF (32767)
0x0307	Type B Thermocouple 0 ~ 1820 °C	0 (0)	7FFF (32767)

0x0308	Type N Thermocouple -270 ~ 1300 °C	E56A (-6806)	7FFF (32767)
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Engineering Unit data range:

Value	Range	Min. value	Max. value
Voltage Input			
0x0101	0~10 V	0	10000
0x0102	0~5 V	0	50000
0x0103	0~1 V	0	10000
0x0104	0-500mV	0	50000
0x0105	0-100mV	0	10000
0x0106	± 10 V	-10000	10000
0x0107	± 5 V	-5000	5000
0x0108	± 1 V	-10000	10000
0x0109	± 500 mV	-5000	5000
0x010A	± 100 mV	-10000	10000
Current Input			
0x0201	4~20mA	4000	20000
0x0202	0~20 mA	0	20000
0x0203	± 20 mA	-20000	20000
Thermocouple Input			
0x0301	Type J Thermocouple -210 ~ 1200 °C	-2100	12000
0x0302	Type K Thermocouple -270 ~ 1372 °C	-2700	13720
0x0303	Type T Thermocouple -270 ~ 400 °C	-2700	4000
0x0304	Type E Thermocouple -270 ~ 1000 °C	-2700	10000
0x0305	Type R Thermocouple -50 ~ 1768 °C	-500	17680
0x0306	Type S Thermocouple -50 ~ 1768 °C	-500	17680
0x0307	Type B Thermocouple 0 ~ 1820 °C	0	18200
0x0308	Type N Thermocouple -270 ~ 1300 °C	-270	13000

3.3.5.4 Signal Value

Once completing the setup, please enter the measured value. This is to enable/disable the channel(s) and check if the value is out-of-range (voltage, 4~20mA or thermocouple contact loss is deemed to be “out of range”). Modbus command as following:

Address	Function	R/W	Initial Value
40737 (0x02E0)	AI Value format 0x0000: Hex 0x0001: Engineering	R/W	0x0000
00641~00648 (0x0280~0x0287)	CH0~CH7 Out of range 0: normal 1: out of range	R	0
30513~30520 40513~40520 (0x0200~0x0207)	AI CH0 ~ CH7 Value	R	-

3.3.6 MODBUS Address

Coil (0xxxx) / (1xxxx)

Address	Function	R/W	Initial Value
00524 (0x020B)	CJC Enable 0: Disable 1: Enable	R/W	0
00537 (0x0218)	Allow calibration 0: Disallow 1: Allow	R/W	0
00641~00648 (0x0280~0x0287)	CH0~CH7 Out of range 0: normal 1: out of range	R	0

Holding Register(4xxxx) / Input Register(3xxxx)

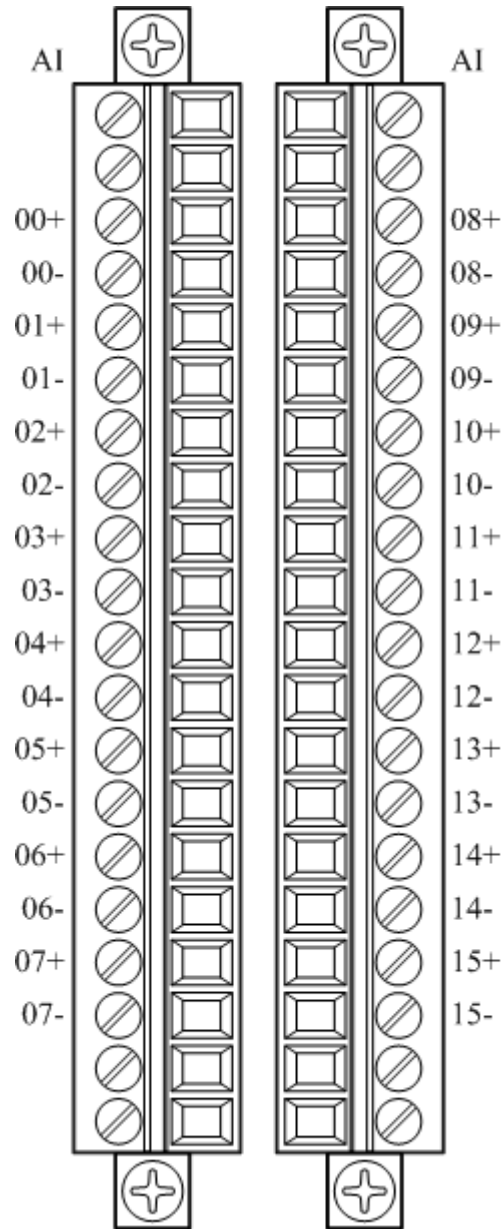
Address	Function	R/W	Initial Value
30513~30520	AI CH0 ~ CH7 Value	R	-

40513~40520 (0x0200~0x0207)							
40577~40584 (0x0240~0x0247)	CH0~CH7 CJC Compensation unit: 0.1°C, Range: -20.0°C ~ 20.0°C	R/W	All 0x0000				
40641 (0x0280)	CJC Value, Unit : 0.1°C	R	-				
40705~40712 (0x02C0~0x02C7)	CH0~CH7 Input signal type	R/W	0x0106				
40737 (0x02E0)	AI Result format of measurement 0x0000: Hex 0x0001: Engineering	R/W	0x0000				
40577 (0x02F4)	CH0~CH7 Calibrate maximum value to each channel. (Each bit map to corresponding channel) Ex. Bit 0 = 1, Calibrate CH0. Bit 1 = 1, Calibrate CH1.	W	0x0000				
40578 (0x02F5)	CH0~CH7 Calibrate 0 level to each channel. (Each bit map to corresponding channel)	W	0x0000				
40579 (0x02F6)	CH0~CH7 Perform internal calibration to each channel. (Each bit map to corresponding channel)	W	0x0000				
40580 (0x02F7)	CH0~CH7 Calibration in process (Each bit map to corresponding channel) 0: No operation 1: Calibration in process	R	-				
44097 0x1000	Firmware version 2 Bytes <table border="1" style="margin-left: 20px;"> <tr> <td>High Byte</td> <td>Low Byte</td> </tr> <tr> <td>Main version</td> <td>Sub-version</td> </tr> </table>	High Byte	Low Byte	Main version	Sub-version	R	-
High Byte	Low Byte						
Main version	Sub-version						

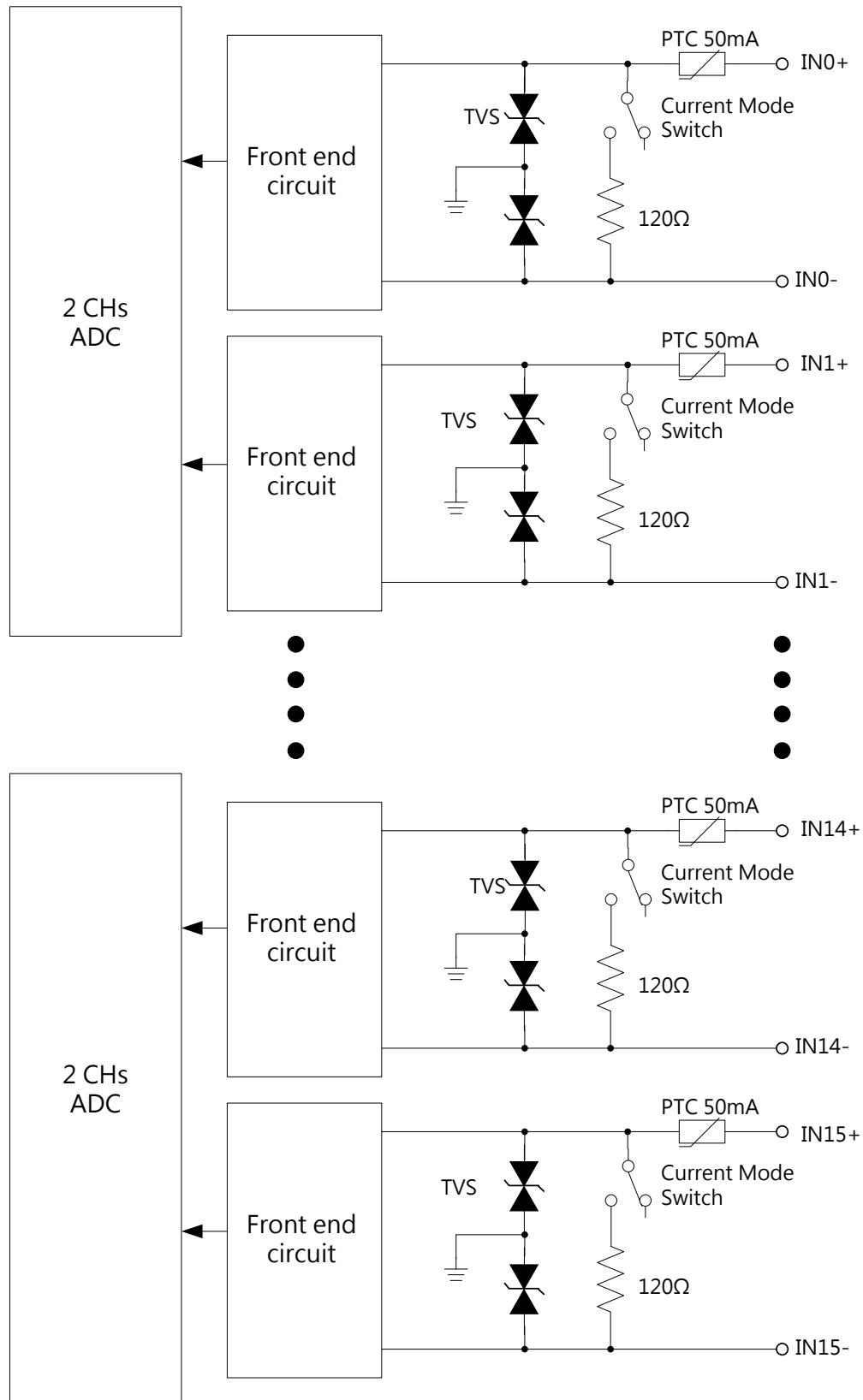
44098~44105 (0x1001~0x1008)	Module name 16 Bytes (16 ASCII char)	R	-
44106 (0x1009)	Modbus response delay time (unit: ms) Range: 0~30	R/W	0
44107 (0x100A)	COM port setting: 2bytes		R/W 0x0006
	High Byte	Low Byte	
	0x00: 8-N-1	0x03: 1.2K	
	0x01: 8-N-2	0x04: 2.4K	
	0x02: 8-E-1	0x05: 4.8K	
	0x03: 8-O-1	0x06: 9.6K 0x07: 19.2K 0x08: 38.4K 0x09: 57.6K 0x0A: 115.2K	
44108 (0x100B)	Watch dog timer (unit: 0.1s) Range: 0 ~ 0x00FF	R/W	0x0000
44109 (0x100C)	System watch dog 0x0001: Enable 0x0000: Disable	R/W	0x0000
44110 (0x100D)	Status of system watch dog 0x0001: Timeout 0x0000: Normal	R/W	-
44111 (0x100E)	Counter of communication frame	R	0x0000

3.4 W-M1B104 16-channel Universal Analog Input Module with High Voltage Protection

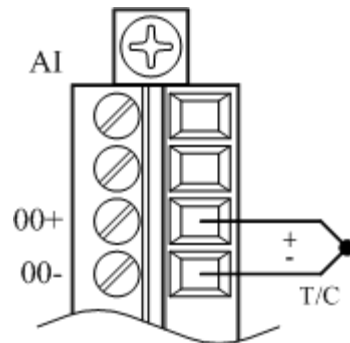
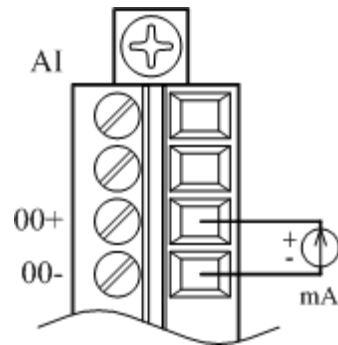
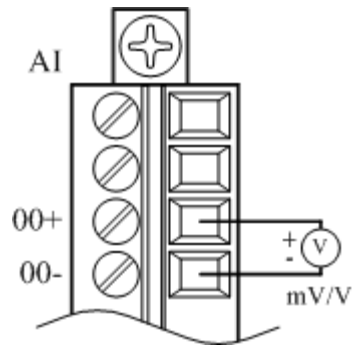
3.4.1 Terminal Assignment



3.4.2 Block Diagram



3.4.3 Channel Connecting



3.4.4 IO Specifications

Channels	16 channels
Voltage Range	$\pm 100\text{mV}$, $\pm 500\text{mV}$, $\pm 1\text{V}$, $\pm 5\text{V}$, $\pm 10\text{V}$, $0\sim 100\text{mV}$, $0\sim 500\text{mV}$, $0\sim 1\text{V}$, $0\sim 5\text{V}$, $0\sim 10\text{V}$
Current Input	$\pm 20\text{mA}$, $4\sim 20\text{mA}$, $0\sim 20\text{mA}$ (Slide switch select)
Direct Sensor Input	J, K, T, E, R, S, B, N
Burn-out Detection	Yes (all V, $4\sim 20\text{mA}$ & all T/C)
Channel Independent Configuration	Each channel

Sampling Rates	2.5 samples/second per channel
Resolution	16-bit
Accuracy	±0.1% FSR
Input Impedance	Voltage: 2MΩ Current: 120 Ω
Span Drift	±25 ppm/°C
Zero Drift	±6 μV/°C
CMR @ 50/60 Hz	120 dB
NMR @ 50/60 Hz	100 dB
Input Voltage Protection	±240V
Common Mode Voltage	240V
Power Consumption	2.8W @ 24V

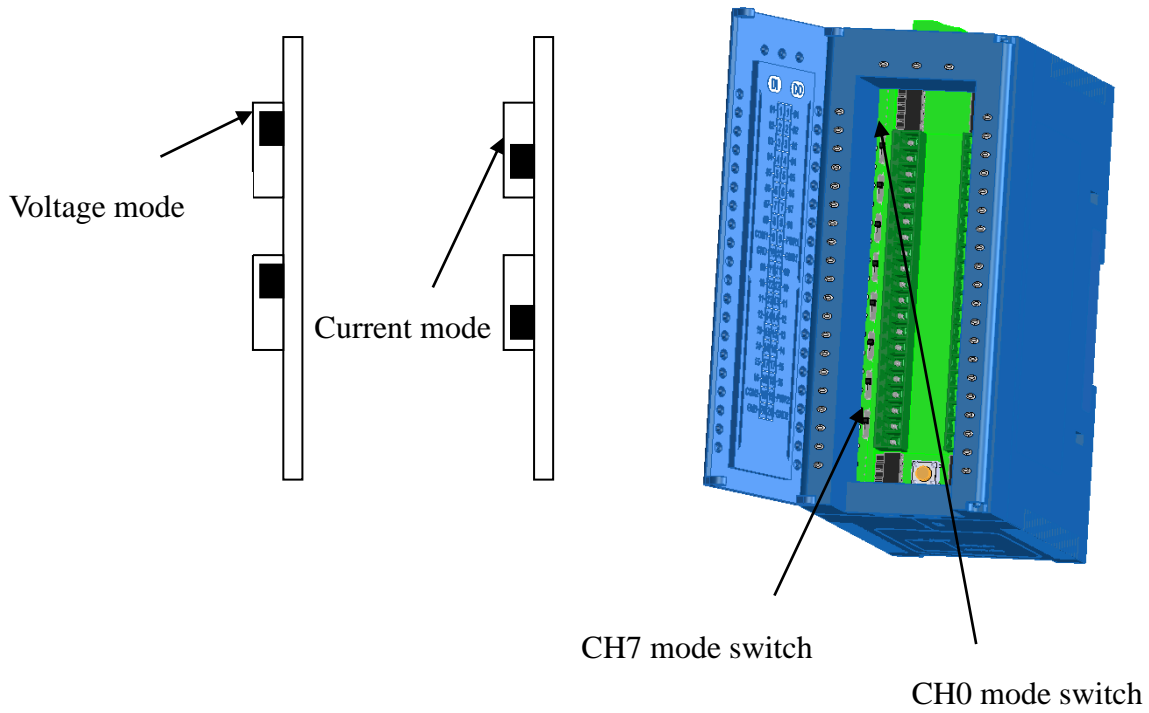
3.4.5 Related Reference

3.4.5.1 Input Signal Type Setup

Input ranges & type for each analog signal is adjustable. Modbus command is shown below.

Address	Function	R/W	Initial value
40705~40720 (0x02C0~0x02CF)	CH0~CH15 Input signal type setup	R/W	0x0106

※Caution: If “Current” input is selected, please turn the switch to “Current” Input by a flathead screwdriver. While switching to voltage and thermocouple, it is required to turn the switch to the appropriate mode. (See figure below)



Signals detect range:

Value	Input range	Initial value
Voltage Input		
0x0101	0~10 V	
0x0102	0~5 V	
0x0103	0~1 V	
0x0104	0-500mV	
0x0105	0-100mV	
0x0106	± 10 V	☉
0x0107	± 5 V	
0x0108	± 1 V	
0x0109	± 500 mV	
0x010A	± 100 mV	
Current Input		
0x0201	4~20mA	
0x0202	0~20 mA	

0x0203	± 20 mA	
Thermocouple Input		
0x0301	Type J Thermocouple -210 ~ 1200 °C	
0x0302	Type K Thermocouple -270 ~ 1372 °C	
0x0303	Type T Thermocouple -270 ~ 400 °C	
0x0304	Type E Thermocouple -270 ~ 1000 °C	
0x0305	Type R Thermocouple -50 ~ 1768 °C	
0x0306	Type S Thermocouple -50 ~ 1768 °C	
0x0307	Type B Thermocouple 0 ~ 1820 °C	
0x0308	Type N Thermocouple -270 ~ 1300 °C	

3.4.5.2 CJC (Cold Junction Compensation)

There is thermal sensor built in the module, the purpose is cold junction compensation to thermocouple. Modbus command is shown below.

Address	Function	R/W	Initial value
00524 (0x020B)	CJC Enable 0: disable 1: enable	R/W	0
40577~40592 (0x0240~0x024F)	CH0~CH15 CJC Scale, Unit: 0.1 °C Range: -20.0°C ~ 20.0°C	R/W	All 0x0000
40641 (0x0280)	CJC Value, Unit 0.1 °C	R	-

3.4.5.3 Hexadecimal / Engineering Unit

Setup the output value on Hexadecimal, or customer scaling. Modbus command is shown below.

Address	Function	R/W	Initial value
40737 (0x02E0)	AI Value format 0x0000: Hex 0x0001: Engineering	R/W	0x0000
30513~30528 40513~40528	AI CH0 ~ CH15 Value	R	-

(0x0200~0x020F)			
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Hex Unit data range:

Value	Range	Min. value	Max. value
Voltage Input			
0x0101	0~10 V	0 (0)	FFFF (65535)
0x0102	0~5 V	0 (0)	FFFF (65535)
0x0103	0~1 V	0 (0)	FFFF (65535)
0x0104	0-500mV	0 (0)	FFFF (65535)
0x0105	0-100mV	0 (0)	FFFF (65535)
0x0106	± 10 V	8000 (-32768)	7FFF (32767)
0x0107	± 5 V	8000 (-32768)	7FFF (32767)
0x0108	± 1 V	8000 (-32768)	7FFF (32767)
0x0109	± 500 mV	8000 (-32768)	7FFF (32767)
0x010A	± 100 mV	8000 (-32768)	7FFF (32767)
Current Input			
0x0201	4~20mA	0 (0)	FFFF (65535)
0x0202	0~20 mA	0 (0)	FFFF (65535)
0x0203	± 20 mA	8000 (-32768)	7FFF (32767)
Thermocouple Input			
0x0301	Type J Thermocouple -210 ~ 1200 °C	E999 (-5735)	7FFF (32767)
0x0302	Type K Thermocouple -270 ~ 1372 °C	E6CF (-6449)	7FFF (32767)
0x0303	Type T Thermocouple -270 ~ 400 °C	A99A (-22118)	7FFF (32767)
0x0304	Type E Thermocouple -270 ~ 1000 °C	DD70 (-8848)	7FFF (32767)
0x0305	Type R Thermocouple -50 ~ 1768 °C	FC61 (-927)	7FFF (32767)
0x0306	Type S Thermocouple -50 ~ 1768 °C	FC61 (-927)	7FFF (32767)
0x0307	Type B Thermocouple 0 ~ 1820 °C	0 (0)	7FFF (32767)
0x0308	Type N Thermocouple -270 ~ 1300 °C	E56A (-6806)	7FFF (32767)

Engineering Unit data range:

Value	Range	Min. value	Max. value
Voltage Input			
0x0101	0~10 V	0	10000
0x0102	0~5 V	0	50000
0x0103	0~1 V	0	10000
0x0104	0-500mV	0	50000
0x0105	0-100mV	0	10000
0x0106	± 10 V	-10000	10000
0x0107	± 5 V	-5000	5000
0x0108	± 1 V	-10000	10000
0x0109	± 500 mV	-5000	5000
0x010A	± 100 mV	-10000	10000
Current Input			
0x0201	4~20mA	4000	20000
0x0202	0~20 mA	0	20000
0x0203	± 20 mA	-20000	20000
Thermocouple Input			
0x0301	Type J Thermocouple -210 ~ 1200 °C	-2100	12000
0x0302	Type K Thermocouple -270 ~ 1372 °C	-2700	13720
0x0303	Type T Thermocouple -270 ~ 400 °C	-2700	4000
0x0304	Type E Thermocouple -270 ~ 1000 °C	-2700	10000
0x0305	Type R Thermocouple -50 ~ 1768 °C	-500	17680
0x0306	Type S Thermocouple -50 ~ 1768 °C	-500	17680
0x0307	Type B Thermocouple 0 ~ 1820 °C	0	18200
0x0308	Type N Thermocouple -270 ~ 1300 °C	-270	13000

3.4.5.4 Signal Value

Once completing the setup, please enter the measured value. This is to enable/disable the channel(s) and check if the value is out-of-range (voltage, 4~20mA or thermocouple contact loss is deemed to be “out of range”). Modbus command as Wolf series Remote IO Module User's Manual 52

following:

Address	Function	R/W	Initial Value
40737 (0x02E0)	AI Value format 0x0000: Hex 0x0001: Engineering	R/W	0x0000
00641~00656 (0x0280~0x028F)	CH0~CH15 Out of range 0: normal 1: out of range	R	0
30513~30528 40513~40528 (0x0200~0x020F)	AI CH0 ~ CH15 Value	R	-

3.4.6 MODBUS Address

Coil (0xxxx) / (1xxxx)

Address	Function	R/W	Initial Value
00524 (0x020B)	CJC Enable 0: Disable 1: Enable	R/W	0
00537 (0x0218)	Allow calibration 0: Disallow 1: Allow	R/W	0
00641~00656 (0x0280~0x028F)	CH0~CH15 Out of range 0: normal 1: out of range	R	0

Holding Register(4xxxx) / Input Register(3xxxx)

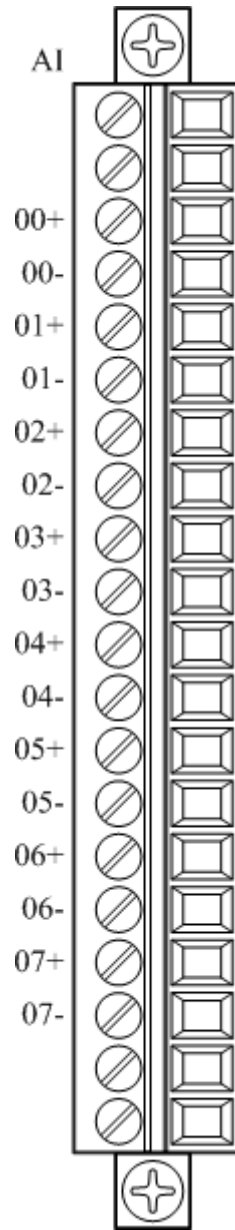
Address	Function	R/W	Initial Value
30513~30528 40513~40528 (0x0200~0x020F)	AI CH0 ~ CH15 Value	R	-
40577~40592 (0x0240~0x024F)	CH0~CH15 CJC Compensation unit: 0.1 °C, Range: -20.0 °C ~ 20.0 °C	R/W	All 0x0000
40641	CJC Value, Unit : 0.1 °C	R	-

(0x0280)							
40705~40720 (0x02C0~0x02CF)	CH0~CH15 Input signal type	R/W	0x0106				
40737 (0x02E0)	AI Result format of measurement 0x0000: Hex 0x0001: Engineering	R/W	0x0000				
40577 (0x02F4)	CH0~CH15 Calibrate maximum value to each channel. (Each bit map to corresponding channel) Ex. Bit 0 = 1, Calibrate CH0. Bit 1 = 1, Calibrate CH1.	W	0x0000				
40578 (0x02F5)	CH0~CH15 Calibrate 0 level to each channel. (Each bit map to corresponding channel)	W	0x0000				
40579 (0x02F6)	CH0~CH15 Perform internal calibration to each channel. (Each bit map to corresponding channel)	W	0x0000				
40580 (0x02F7)	CH0~CH15 Calibration in process (Each bit map to corresponding channel) 0: No operation 1: Calibration in process	R	-				
44097 0x1000	Firmware version 2 Bytes <table border="1" style="margin-left: 40px;"> <tr> <td>High Byte</td> <td>Low Byte</td> </tr> <tr> <td>Main version</td> <td>Sub-version</td> </tr> </table>	High Byte	Low Byte	Main version	Sub-version	R	-
High Byte	Low Byte						
Main version	Sub-version						
44098~44105 (0x1001~0x1008)	Module name 16 Bytes (16 ASCII char)	R	-				
44106 (0x1009)	Modbus response delay time (unit: ms) Range: 0~30	R/W	0				

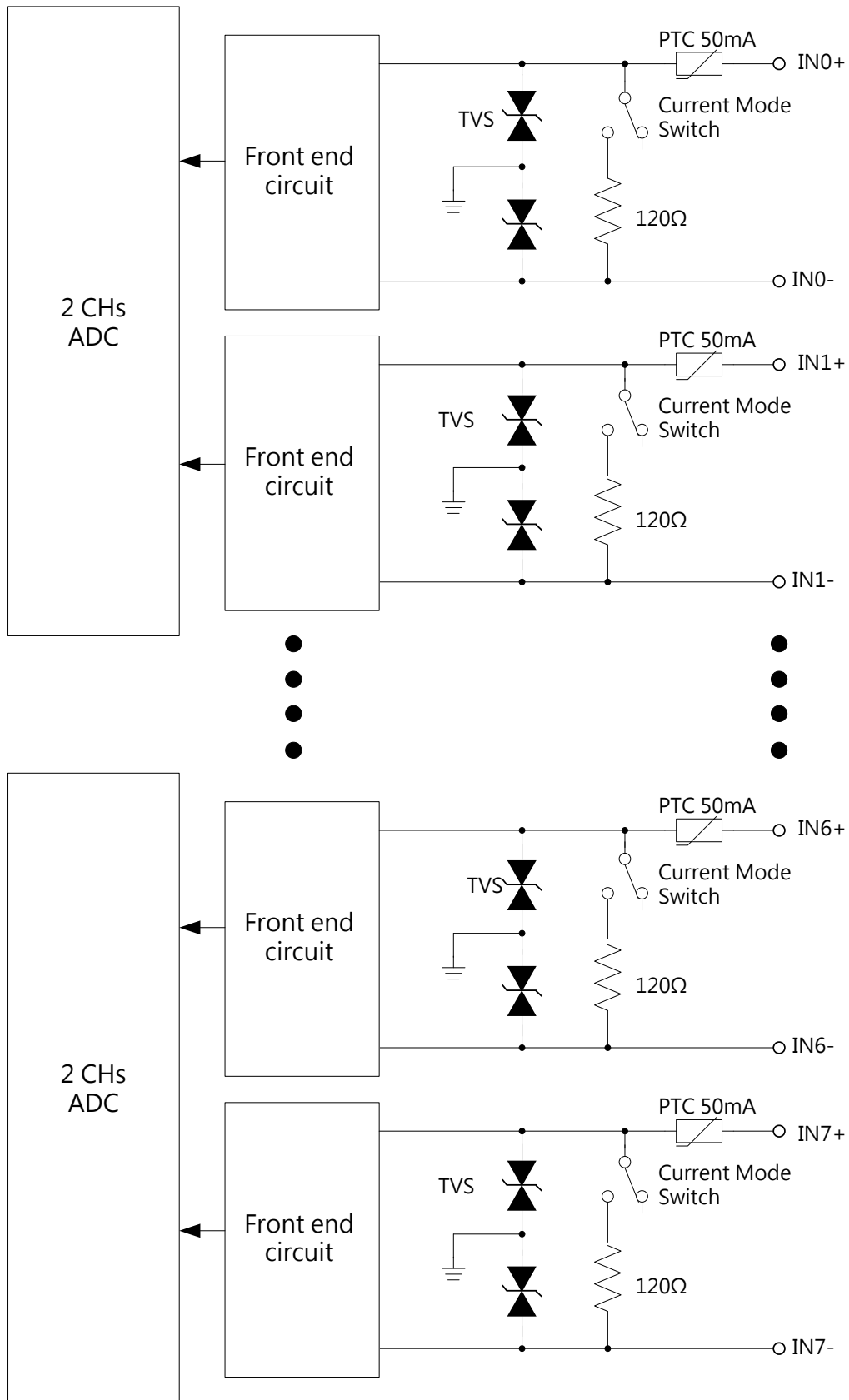
44107 (0x100A)	COM port setting: 2bytes		R/W	0x0006
	High Byte	Low Byte		
	0x00: 8-N-1	0x03: 1.2K		
	0x01: 8-N-2	0x04: 2.4K		
	0x02: 8-E-1	0x05: 4.8K		
0x03: 8-O-1	0x06: 9.6K			
		0x07: 19.2K		
		0x08: 38.4K		
		0x09: 57.6K		
		0x0A: 115.2K		
44108 (0x100B)	Watch dog timer (unit: 0.1s) Range: 0 ~ 0x00FF		R/W	0x0000
44109 (0x100C)	System watch dog 0x0001: Enable 0x0000: Disable		R/W	0x0000
44110 (0x100D)	Status of system watch dog 0x0001: Timeout 0x0000: Normal		R/W	-
44111 (0x100E)	Counter of communication frame		R	0x0000

3.5 W-M1B105 8-channel Universal Analog Input Module

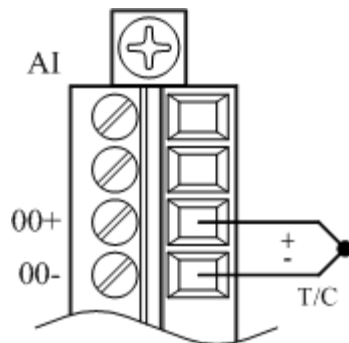
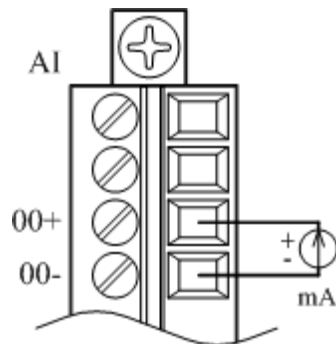
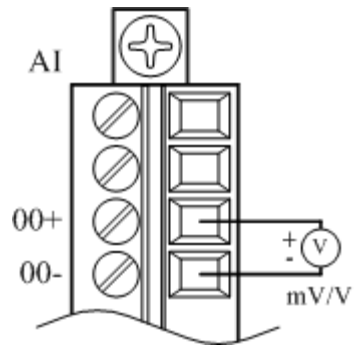
3.5.1 Terminal Assignment



3.5.2 Block Diagram



3.5.3 Channel Connecting



3.5.4 IO Specifications

Channels	8 channels
Voltage Range	$\pm 100\text{mV}$, $\pm 500\text{mV}$, $\pm 1\text{V}$, $\pm 5\text{V}$, $\pm 10\text{V}$, $0\sim 100\text{mV}$, $0\sim 500\text{mV}$, $0\sim 1\text{V}$, $0\sim 5\text{V}$, $0\sim 10\text{V}$
Current Input	$\pm 20\text{mA}$, $4\sim 20\text{mA}$, $0\sim 20\text{mA}$ (Slide switch select)
Direct Sensor Input	J, K, T, E, R, S, B, N

Burn-out Detection	Yes (all V, 4 ~ 20 mA & all T/C)
Channel Independent Configuration	Each channel
Sampling Rates	2.5 samples/second per channel
Resolution	16-bit
Accuracy	±0.1% FSR
Input Impedance	Voltage: 2MΩ Current: 120 Ω
Span Drift	±25 ppm/°C
Zero Drift	±6 μV/°C
CMR @ 50/60 Hz	120 dB
NMR @ 50/60 Hz	100 dB
Input Voltage Protection	±35V
Common Mode Voltage	35V
Power Consumption	1.6W @ 24V

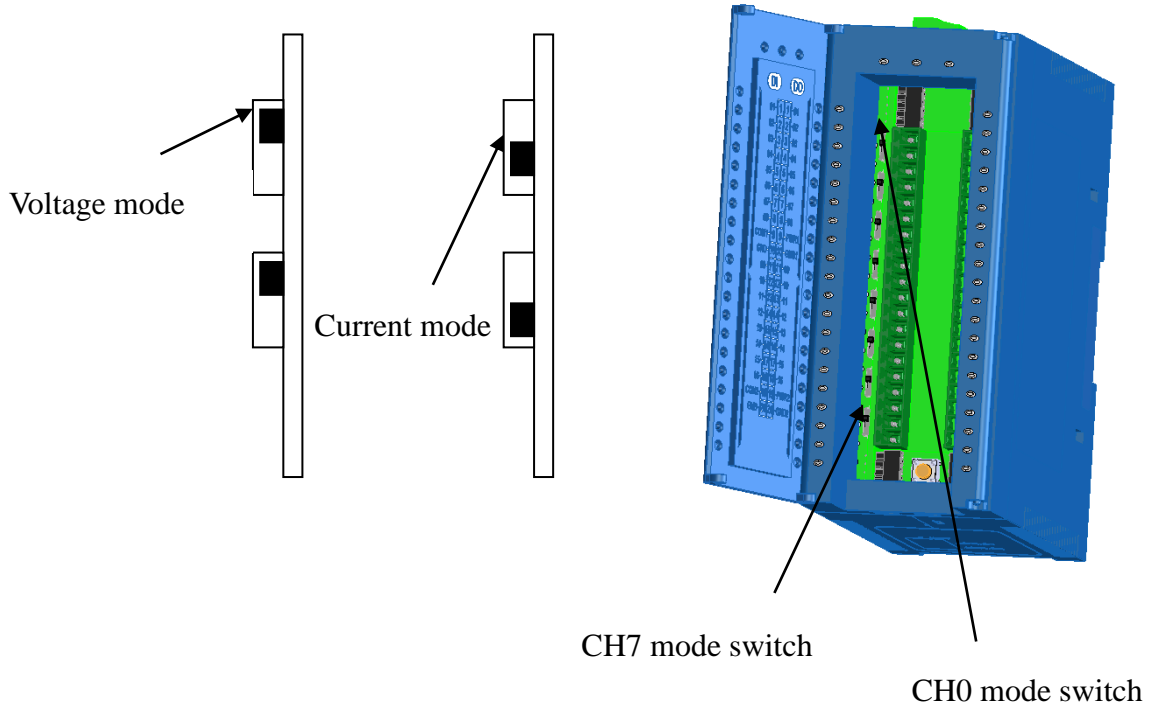
3.5.5 Related Reference

3.5.5.1 Input Signal Type Setup

Input ranges & type for each analog signal is adjustable. Modbus command is shown below.

Address	Function	R/W	Initial value
40705~40712 (0x02C0~0x02C7)	CH0~CH7 Input signal type setup	R/W	0x0106

※Caution: If “Current” input is selected, please turn the switch to “Current” Input by a flathead screwdriver. While switching to voltage and thermocouple, it is required to turn the switch to the appropriate mode. (See figure below)



Signals detect range:

Value	Input range	Initial value
Voltage Input		
0x0101	0~10 V	
0x0102	0~5 V	
0x0103	0~1 V	
0x0104	0-500mV	
0x0105	0-100mV	
0x0106	± 10 V	⊙
0x0107	± 5 V	
0x0108	± 1 V	
0x0109	± 500 mV	
0x010A	± 100 mV	
Current Input		

0x0201	4~20mA	
0x0202	0~20 mA	
0x0203	± 20 mA	
Thermocouple Input		
0x0301	Type J Thermocouple -210 ~ 1200 °C	
0x0302	Type K Thermocouple -270 ~ 1372 °C	
0x0303	Type T Thermocouple -270 ~ 400 °C	
0x0304	Type E Thermocouple -270 ~ 1000 °C	
0x0305	Type R Thermocouple -50 ~ 1768 °C	
0x0306	Type S Thermocouple -50 ~ 1768 °C	
0x0307	Type B Thermocouple 0 ~ 1820 °C	
0x0308	Type N Thermocouple -270 ~ 1300 °C	

3.5.5.2 CJC (Cold Junction Compensation)

There is thermal sensor built in the module, the purpose is cold junction compensation to thermocouple. Modbus command is shown below.

Address	Function	R/W	Initial value
00524 (0x020B)	CJC Enable 0: disable 1: enable	R/W	0
40577~40584 (0x0240~0x0247)	CH0~CH7 CJC Scale, Unit: 0.1 °C Range: -20.0 °C ~ 20.0 °C	R/W	All 0x0000
40641 (0x0280)	CJC Value, Unit 0.1 °C	R	-

3.5.5.3 Hexadecimal / Engineering Unit

Setup the output value on Hexadecimal, or customer scaling. Modbus command is shown below.

Address	Function	R/W	Initial value
40737 (0x02E0)	AI Value format 0x0000: Hex 0x0001: Engineering	R/W	0x0000

30513~30520	AI CH0 ~ CH7 Value	R	-
40513~40520			
(0x0200~0x0207)			

Hex Unit data range:

Value	Range	Min. value	Max. value
Voltage Input			
0x0101	0~10 V	0 (0)	FFFF (65535)
0x0102	0~5 V	0 (0)	FFFF (65535)
0x0103	0~1 V	0 (0)	FFFF (65535)
0x0104	0-500mV	0 (0)	FFFF (65535)
0x0105	0-100mV	0 (0)	FFFF (65535)
0x0106	± 10 V	8000 (-32768)	7FFF (32767)
0x0107	± 5 V	8000 (-32768)	7FFF (32767)
0x0108	± 1 V	8000 (-32768)	7FFF (32767)
0x0109	± 500 mV	8000 (-32768)	7FFF (32767)
0x010A	± 100 mV	8000 (-32768)	7FFF (32767)
Current Input			
0x0201	4~20mA	0 (0)	FFFF (65535)
0x0202	0~20 mA	0 (0)	FFFF (65535)
0x0203	± 20 mA	8000 (-32768)	7FFF (32767)
Thermocouple Input			
0x0301	Type J Thermocouple -210 ~ 1200 °C	E999 (-5735)	7FFF (32767)
0x0302	Type K Thermocouple -270 ~ 1372 °C	E6CF (-6449)	7FFF (32767)
0x0303	Type T Thermocouple -270 ~ 400 °C	A99A (-22118)	7FFF (32767)
0x0304	Type E Thermocouple -270 ~ 1000 °C	DD70 (-8848)	7FFF (32767)
0x0305	Type R Thermocouple -50 ~ 1768 °C	FC61 (-927)	7FFF (32767)
0x0306	Type S Thermocouple -50 ~ 1768 °C	FC61 (-927)	7FFF (32767)
0x0307	Type B Thermocouple 0 ~ 1820 °C	0 (0)	7FFF (32767)

0x0308	Type N Thermocouple -270 ~ 1300 °C	E56A (-6806)	7FFF (32767)
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Engineering Unit data range:

Value	Range	Min. value	Max. value
Voltage Input			
0x0101	0~10 V	0	10000
0x0102	0~5 V	0	50000
0x0103	0~1 V	0	10000
0x0104	0-500mV	0	50000
0x0105	0-100mV	0	10000
0x0106	± 10 V	-10000	10000
0x0107	± 5 V	-5000	5000
0x0108	± 1 V	-10000	10000
0x0109	± 500 mV	-5000	5000
0x010A	± 100 mV	-10000	10000
Current Input			
0x0201	4~20mA	4000	20000
0x0202	0~20 mA	0	20000
0x0203	± 20 mA	-20000	20000
Thermocouple Input			
0x0301	Type J Thermocouple -210 ~ 1200 °C	-2100	12000
0x0302	Type K Thermocouple -270 ~ 1372 °C	-2700	13720
0x0303	Type T Thermocouple -270 ~ 400 °C	-2700	4000
0x0304	Type E Thermocouple -270 ~ 1000 °C	-2700	10000
0x0305	Type R Thermocouple -50 ~ 1768 °C	-500	17680
0x0306	Type S Thermocouple -50 ~ 1768 °C	-500	17680
0x0307	Type B Thermocouple 0 ~ 1820 °C	0	18200
0x0308	Type N Thermocouple -270 ~ 1300 °C	-270	13000

3.5.5.4 Signal Value

Once completing the setup, please enter the measured value. This is to enable/disable the channel(s) and check if the value is out-of-range (voltage, 4~20mA or thermocouple contact loss is deemed to be “out of range”). Modbus command as following:

Address	Function	R/W	Initial Value
40737 (0x02E0)	AI Value format 0x0000: Hex 0x0001: Engineering	R/W	0x0000
00641~00648 (0x0280~0x0287)	CH0~CH7 Out of range 0: normal 1: out of range	R	0
30513~30520 40513~40520 (0x0200~0x0207)	AI CH0 ~ CH7 Value	R	-

3.5.6 MODBUS Address

Coil (0xxxx) / (1xxxx)

Address	Function	R/W	Initial Value
00524 (0x020B)	CJC Enable 0: Disable 1: Enable	R/W	0
00537 (0x0218)	Allow calibration 0: Disallow 1: Allow	R/W	0
00641~00648 (0x0280~0x0287)	CH0~CH7 Out of range 0: normal 1: out of range	R	0

Holding Register(4xxxx) / Input Register(3xxxx)

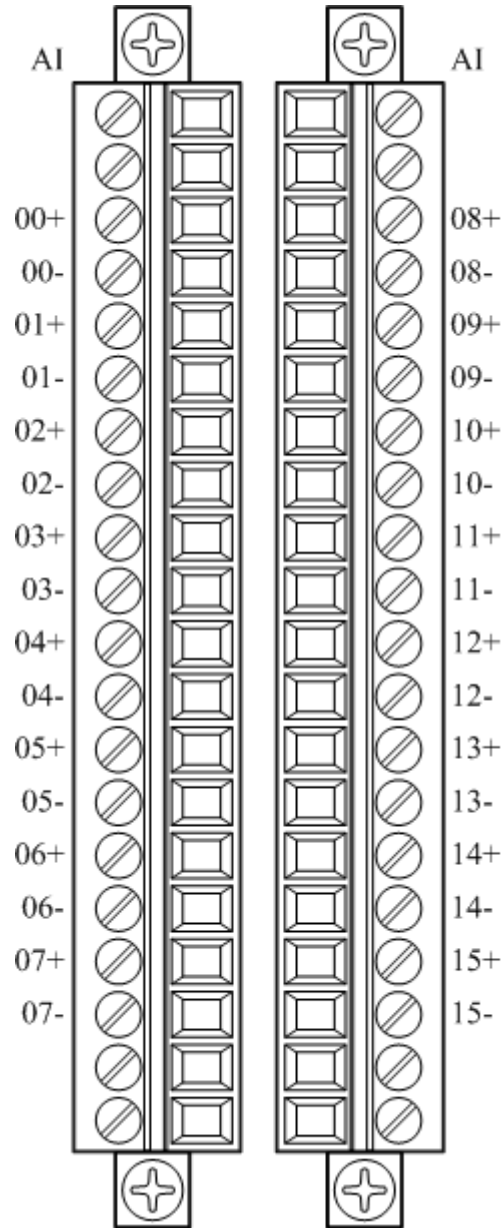
Address	Function	R/W	Initial Value
30513~30520	AI CH0 ~ CH7 Value	R	-

40513~40520 (0x0200~0x0207)							
40577~40584 (0x0240~0x0247)	CH0~CH7 CJC Compensation unit: 0.1°C, Range: -20.0°C ~ 20.0°C	R/W	All 0x0000				
40641 (0x0280)	CJC Value, Unit : 0.1°C	R	-				
40705~40712 (0x02C0~0x02C7)	CH0~CH7 Input signal type	R/W	0x0106				
40737 (0x02E0)	AI Result format of measurement 0x0000: Hex 0x0001: Engineering	R/W	0x0000				
40577 (0x02F4)	CH0~CH7 Calibrate maximum value to each channel. (Each bit map to corresponding channel) Ex. Bit 0 = 1, Calibrate CH0. Bit 1 = 1, Calibrate CH1.	W	0x0000				
40578 (0x02F5)	CH0~CH7 Calibrate 0 level to each channel. (Each bit map to corresponding channel)	W	0x0000				
40579 (0x02F6)	CH0~CH7 Perform internal calibration to each channel. (Each bit map to corresponding channel)	W	0x0000				
40580 (0x02F7)	CH0~CH7 Calibration in process (Each bit map to corresponding channel) 0: No operation 1: Calibration in process	R	-				
44097 0x1000	Firmware version 2 Bytes <table border="1" style="margin-left: 20px;"> <tr> <td>High Byte</td> <td>Low Byte</td> </tr> <tr> <td>Main version</td> <td>Sub-version</td> </tr> </table>	High Byte	Low Byte	Main version	Sub-version	R	-
High Byte	Low Byte						
Main version	Sub-version						

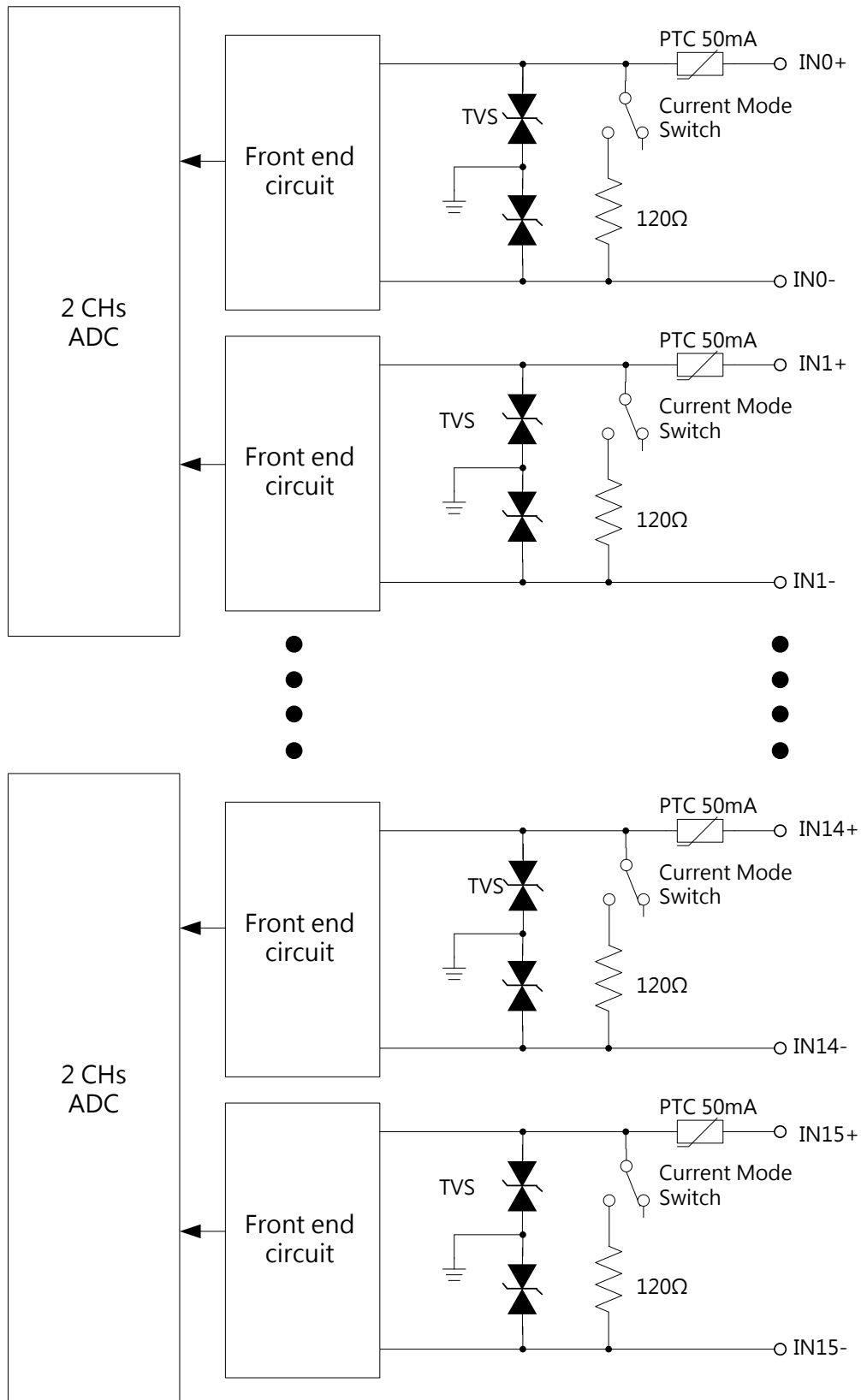
44098~44105 (0x1001~0x1008)	Module name 16 Bytes (16 ASCII char)	R	-
44106 (0x1009)	Modbus response delay time (unit: ms) Range: 0~30	R/W	0
44107 (0x100A)	COM port setting: 2bytes		R/W 0x0006
	High Byte	Low Byte	
	0x00: 8-N-1	0x03: 1.2K	
	0x01: 8-N-2	0x04: 2.4K	
	0x02: 8-E-1	0x05: 4.8K	
	0x03: 8-O-1	0x06: 9.6K 0x07: 19.2K 0x08: 38.4K 0x09: 57.6K 0x0A: 115.2K	
44108 (0x100B)	Watch dog timer (unit: 0.1s) Range: 0 ~ 0x00FF	R/W	0x0000
44109 (0x100C)	System watch dog 0x0001: Enable 0x0000: Disable	R/W	0x0000
44110 (0x100D)	Status of system watch dog 0x0001: Timeout 0x0000: Normal	R/W	-
44111 (0x100E)	Counter of communication frame	R	0x0000

3.6 W-M1B106 16-channel Universal Analog Input Module

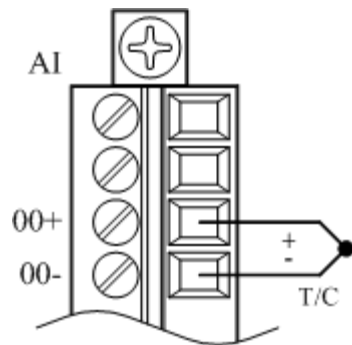
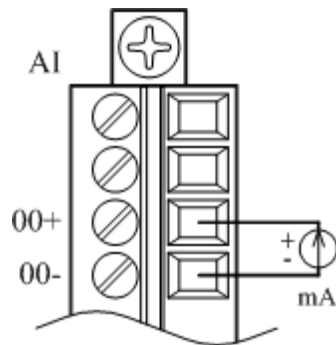
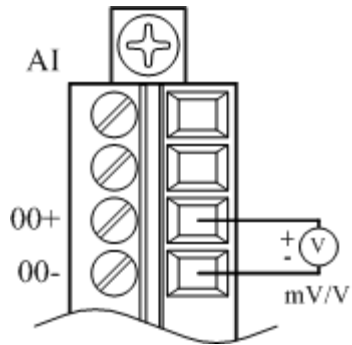
3.6.1 Terminal Assignment



3.6.2 Block Diagram



3.6.3 Channel Connecting



3.6.4 IO Specifications

Channels	16 channels
Voltage Range	$\pm 100\text{mV}$, $\pm 500\text{mV}$, $\pm 1\text{V}$, $\pm 5\text{V}$, $\pm 10\text{V}$, 0~100mV, 0~500mV, 0 ~ 1V, 0 ~ 5V, 0 ~ 10V
Current Input	$\pm 20\text{mA}$, 4~20mA, 0~20mA (Slide switch select)
Direct Sensor Input	J, K, T, E, R, S, B, N
Burn-out Detection	Yes (all V, 4 ~ 20 mA & all T/C)
Channel Independent Configuration	Each channel
Sampling Rates	2.5 samples/second per channel

Resolution	16-bit
Accuracy	±0.1% FSR
Input Impedance	Voltage: 2MΩ Current: 120 Ω
Span Drift	±25 ppm/°C
Zero Drift	±6 μV/°C
CMR @ 50/60 Hz	120 dB
NMR @ 50/60 Hz	100 dB
Input Voltage Protection	±35V
Common Mode Voltage	35V
Power Consumption	2.8W @ 24V

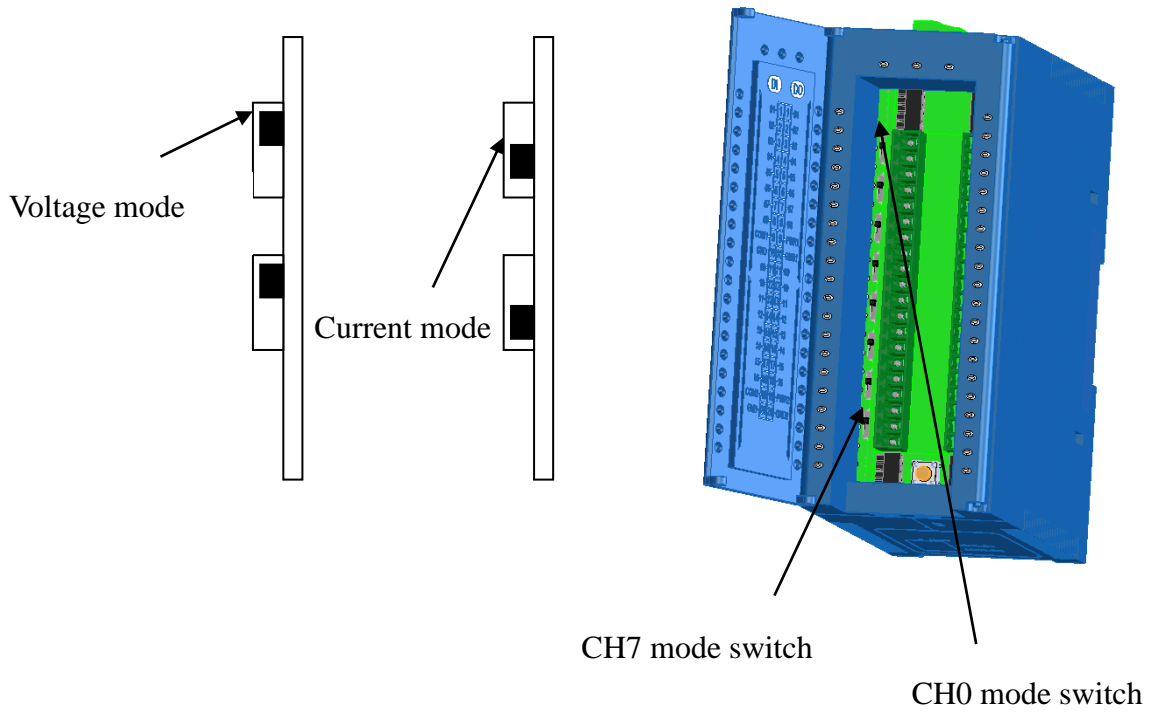
3.6.5 Related Reference

3.6.5.1 Input Signal Type Setup

Input ranges & type for each analog signal is adjustable. Modbus command is shown below.

Address	Function	R/W	Initial value
40705~40720 (0x02C0~0x02CF)	CH0~CH15 Input signal type setup	R/W	0x0106

※Caution: If “Current” input is selected, please turn the switch to “Current” Input by a flathead screwdriver. While switching to voltage and thermocouple, it is required to turn the switch to the appropriate mode. (See figure below)



Signals detect range:

Value	Input range	Initial value
Voltage Input		
0x0101	0~10 V	
0x0102	0~5 V	
0x0103	0~1 V	
0x0104	0-500mV	
0x0105	0-100mV	
0x0106	± 10 V	☉
0x0107	± 5 V	
0x0108	± 1 V	
0x0109	± 500 mV	
0x010A	± 100 mV	
Current Input		
0x0201	4~20mA	
0x0202	0~20 mA	

0x0203	± 20 mA	
Thermocouple Input		
0x0301	Type J Thermocouple -210 ~ 1200 °C	
0x0302	Type K Thermocouple -270 ~ 1372 °C	
0x0303	Type T Thermocouple -270 ~ 400 °C	
0x0304	Type E Thermocouple -270 ~ 1000 °C	
0x0305	Type R Thermocouple -50 ~ 1768 °C	
0x0306	Type S Thermocouple -50 ~ 1768 °C	
0x0307	Type B Thermocouple 0 ~ 1820 °C	
0x0308	Type N Thermocouple -270 ~ 1300 °C	

3.6.5.2 CJC (Cold Junction Compensation)

There is thermal sensor built in the module, the purpose is cold junction compensation to thermocouple. Modbus command is shown below.

Address	Function	R/W	Initial value
00524 (0x020B)	CJC Enable 0: disable 1: enable	R/W	0
40577~40592 (0x0240~0x024F)	CH0~CH15 CJC Scale, Unit: 0.1 °C Range: -20.0°C ~ 20.0°C	R/W	All 0x0000
40641 (0x0280)	CJC Value, Unit 0.1 °C	R	-

3.6.5.3 Hexadecimal / Engineering Unit

Setup the output value on Hexadecimal, or customer scaling. Modbus command is shown below.

Address	Function	R/W	Initial value
40737 (0x02E0)	AI Value format 0x0000: Hex 0x0001: Engineering	R/W	0x0000
30513~30528 40513~40528	AI CH0 ~ CH15 Value	R	-

(0x0200~0x020F)			
-----------------	--	--	--

Hex Unit data range:

Value	Range	Min. value	Max. value
Voltage Input			
0x0101	0~10 V	0 (0)	FFFF (65535)
0x0102	0~5 V	0 (0)	FFFF (65535)
0x0103	0~1 V	0 (0)	FFFF (65535)
0x0104	0-500mV	0 (0)	FFFF (65535)
0x0105	0-100mV	0 (0)	FFFF (65535)
0x0106	± 10 V	8000 (-32768)	7FFF (32767)
0x0107	± 5 V	8000 (-32768)	7FFF (32767)
0x0108	± 1 V	8000 (-32768)	7FFF (32767)
0x0109	± 500 mV	8000 (-32768)	7FFF (32767)
0x010A	± 100 mV	8000 (-32768)	7FFF (32767)
Current Input			
0x0201	4~20mA	0 (0)	FFFF (65535)
0x0202	0~20 mA	0 (0)	FFFF (65535)
0x0203	± 20 mA	8000 (-32768)	7FFF (32767)
Thermocouple Input			
0x0301	Type J Thermocouple -210 ~ 1200 °C	E999 (-5735)	7FFF (32767)
0x0302	Type K Thermocouple -270 ~ 1372 °C	E6CF (-6449)	7FFF (32767)
0x0303	Type T Thermocouple -270 ~ 400 °C	A99A (-22118)	7FFF (32767)
0x0304	Type E Thermocouple -270 ~ 1000 °C	DD70 (-8848)	7FFF (32767)
0x0305	Type R Thermocouple -50 ~ 1768 °C	FC61 (-927)	7FFF (32767)
0x0306	Type S Thermocouple -50 ~ 1768 °C	FC61 (-927)	7FFF (32767)
0x0307	Type B Thermocouple 0 ~ 1820 °C	0 (0)	7FFF (32767)
0x0308	Type N Thermocouple -270 ~ 1300 °C	E56A (-6806)	7FFF (32767)

Engineering Unit data range:

Value	Range	Min. value	Max. value
Voltage Input			
0x0101	0~10 V	0	10000
0x0102	0~5 V	0	50000
0x0103	0~1 V	0	10000
0x0104	0-500mV	0	50000
0x0105	0-100mV	0	10000
0x0106	± 10 V	-10000	10000
0x0107	± 5 V	-5000	5000
0x0108	± 1 V	-10000	10000
0x0109	± 500 mV	-5000	5000
0x010A	± 100 mV	-10000	10000
Current Input			
0x0201	4~20mA	4000	20000
0x0202	0~20 mA	0	20000
0x0203	± 20 mA	-20000	20000
Thermocouple Input			
0x0301	Type J Thermocouple -210 ~ 1200 °C	-2100	12000
0x0302	Type K Thermocouple -270 ~ 1372 °C	-2700	13720
0x0303	Type T Thermocouple -270 ~ 400 °C	-2700	4000
0x0304	Type E Thermocouple -270 ~ 1000 °C	-2700	10000
0x0305	Type R Thermocouple -50 ~ 1768 °C	-500	17680
0x0306	Type S Thermocouple -50 ~ 1768 °C	-500	17680
0x0307	Type B Thermocouple 0 ~ 1820 °C	0	18200
0x0308	Type N Thermocouple -270 ~ 1300 °C	-270	13000

3.6.5.4 Signal Value

Once completing the setup, please enter the measured value. This is to enable/disable the channel(s) and check if the value is out-of-range (voltage, 4~20mA or thermocouple contact loss is deemed to be “out of range”). Modbus command as Wolf series Remote IO Module User's Manual 74

following:

Address	Function	R/W	Initial Value
40737 (0x02E0)	AI Value format 0x0000: Hex 0x0001: Engineering	R/W	0x0000
00641~00656 (0x0280~0x028F)	CH0~CH15 Out of range 0: normal 1: out of range	R	0
30513~30528 40513~40528 (0x0200~0x020F)	AI CH0 ~ CH15 Value	R	-

3.6.6 MODBUS Address

Coil (0xxxx) / (1xxxx)

Address	Function	R/W	Initial Value
00524 (0x020B)	CJC Enable 0: Disable 1: Enable	R/W	0
00537 (0x0218)	Allow calibration 0: Disallow 1: Allow	R/W	0
00641~00656 (0x0280~0x028F)	CH0~CH15 Out of range 0: normal 1: out of range	R	0

Holding Register(4xxxx) / Input Register(3xxxx)

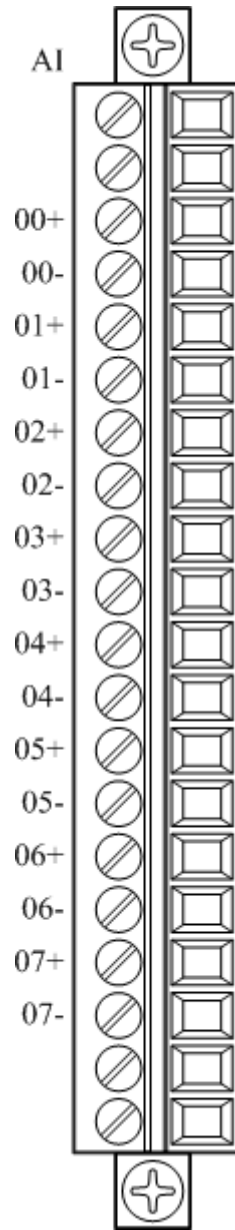
Address	Function	R/W	Initial Value
30513~30528 40513~40528 (0x0200~0x020F)	AI CH0 ~ CH15 Value	R	-
40577~40592 (0x0240~0x024F)	CH0~CH15 CJC Compensation unit: 0.1°C, Range: -20.0°C ~ 20.0°C	R/W	All 0x0000
40641	CJC Value, Unit : 0.1°C	R	-

(0x0280)							
40705~40720 (0x02C0~0x02CF)	CH0~CH15 Input signal type	R/W	0x0106				
40737 (0x02E0)	AI Result format of measurement 0x0000: Hex 0x0001: Engineering	R/W	0x0000				
40577 (0x02F4)	CH0~CH15 Calibrate maximum value to each channel. (Each bit map to corresponding channel) Ex. Bit 0 = 1, Calibrate CH0. Bit 1 = 1, Calibrate CH1.	W	0x0000				
40578 (0x02F5)	CH0~CH15 Calibrate 0 level to each channel. (Each bit map to corresponding channel)	W	0x0000				
40579 (0x02F6)	CH0~CH15 Perform internal calibration to each channel. (Each bit map to corresponding channel)	W	0x0000				
40580 (0x02F7)	CH0~CH15 Calibration in process (Each bit map to corresponding channel) 0: No operation 1: Calibration in process	R	-				
44097 0x1000	Firmware version 2 Bytes <table border="1" style="margin-left: 40px;"> <tr> <td>High Byte</td> <td>Low Byte</td> </tr> <tr> <td>Main version</td> <td>Sub-version</td> </tr> </table>	High Byte	Low Byte	Main version	Sub-version	R	-
High Byte	Low Byte						
Main version	Sub-version						
44098~44105 (0x1001~0x1008)	Module name 16 Bytes (16 ASCII char)	R	-				
44106 (0x1009)	Modbus response delay time (unit: ms) Range: 0~30	R/W	0				

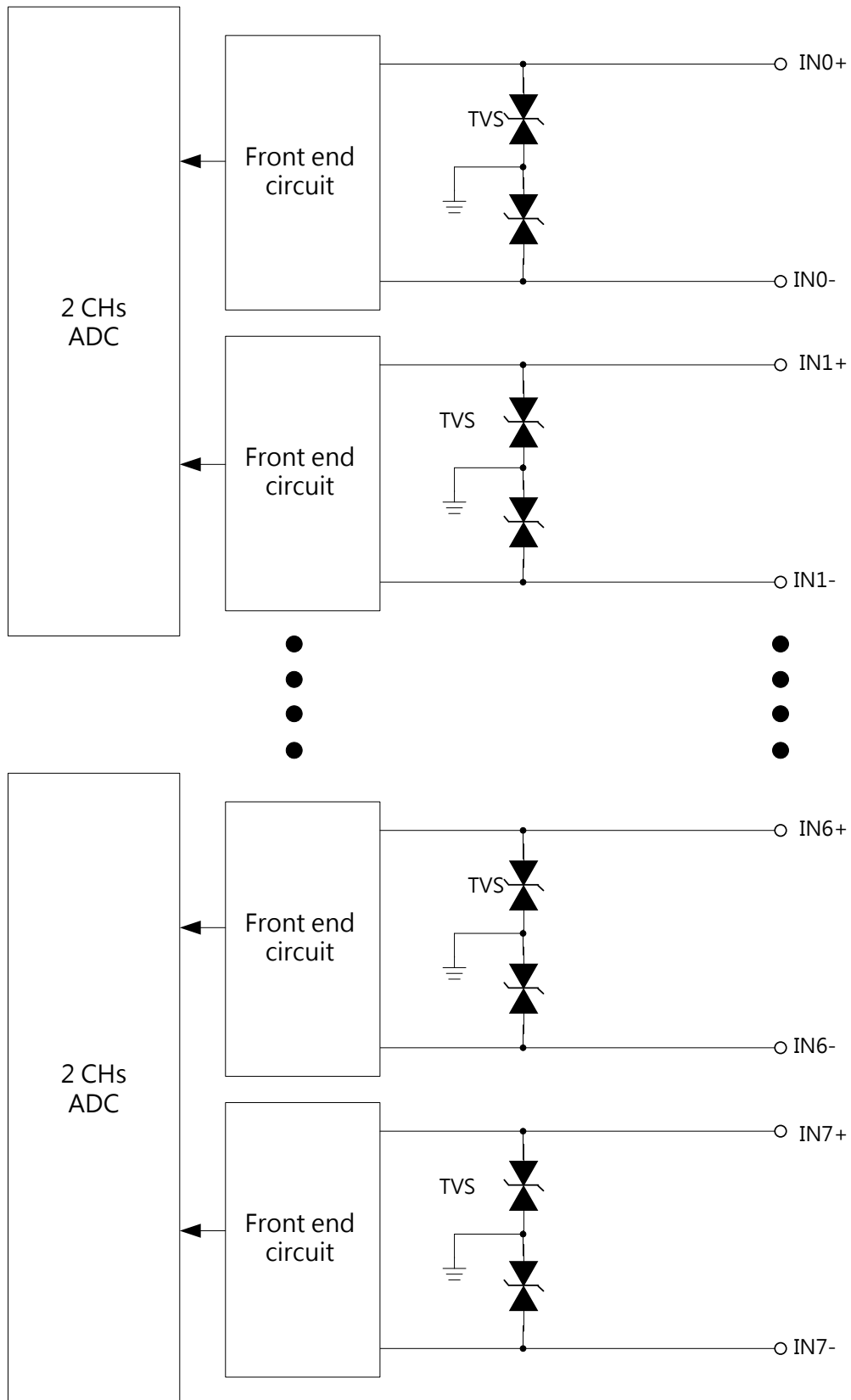
44107 (0x100A)	COM port setting: 2bytes	R/W	0x0006															
	<table border="1"> <thead> <tr> <th>High Byte</th> <th>Low Byte</th> </tr> </thead> <tbody> <tr> <td>0x00: 8-N-1</td> <td>0x03: 1.2K</td> </tr> <tr> <td>0x01: 8-N-2</td> <td>0x04: 2.4K</td> </tr> <tr> <td>0x02: 8-E-1</td> <td>0x05: 4.8K</td> </tr> <tr> <td>0x03: 8-O-1</td> <td>0x06: 9.6K</td> </tr> <tr> <td></td> <td>0x07: 19.2K</td> </tr> <tr> <td></td> <td>0x08: 38.4K</td> </tr> <tr> <td></td> <td>0x09: 57.6K</td> </tr> <tr> <td></td> <td>0x0A: 115.2K</td> </tr> </tbody> </table>			High Byte	Low Byte	0x00: 8-N-1	0x03: 1.2K	0x01: 8-N-2	0x04: 2.4K	0x02: 8-E-1	0x05: 4.8K	0x03: 8-O-1	0x06: 9.6K		0x07: 19.2K		0x08: 38.4K	
High Byte	Low Byte																	
0x00: 8-N-1	0x03: 1.2K																	
0x01: 8-N-2	0x04: 2.4K																	
0x02: 8-E-1	0x05: 4.8K																	
0x03: 8-O-1	0x06: 9.6K																	
	0x07: 19.2K																	
	0x08: 38.4K																	
	0x09: 57.6K																	
	0x0A: 115.2K																	
44108 (0x100B)	Watch dog timer (unit: 0.1s) Range: 0 ~ 0x00FF	R/W	0x0000															
44109 (0x100C)	System watch dog 0x0001: Enable 0x0000: Disable	R/W	0x0000															
44110 (0x100D)	Status of system watch dog 0x0001: Timeout 0x0000: Normal	R/W	-															
44111 (0x100E)	Counter of communication frame	R	0x0000															

3.7 W-M1B107 8-Channel Thermocouple Input Module

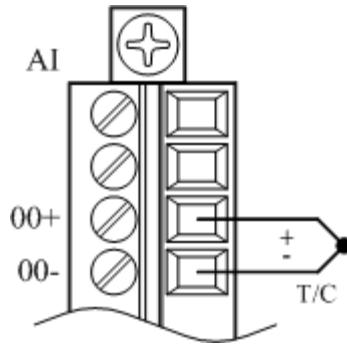
3.7.1 Terminal Assignment



3.7.2 Block Diagram



3.7.3 Channel Connecting



3.7.4 IO Specifications

Channels	8 channels
Direct Sensor Input	J, K, T, E, R, S, B, N
Burn-out Detection	Yes
Channel Independent Configuration	Each channel
Sampling Rates	2.5 samples/second per channel
Resolution	16-bit
Accuracy	±0.1% FSR
Input Impedance	2MΩ
Span Drift	±25 ppm/°C
Zero Drift	±6 μV/°C
CMR @ 50/60 Hz	120 dB
NMR @ 50/60 Hz	100 dB
Input Voltage Protection	±35V
Common Mode Voltage	2.5V
Power Consumption	1.6W @ 24V

3.7.5 Related Reference

3.7.5.1 Input Signal Type Setup

Input ranges & type for each analog signal is adjustable. Modbus command is shown below.

Address	Function	R/W	Initial value
40705~40712 (0x02C0~0x02C7)	CH0~CH7 Input signal type setup	R/W	0x0301

Signals detect range:

Value	Input range	Initial value
Thermocouple Input		
0x0301	Type J Thermocouple -210 ~ 1200 °C	☉
0x0302	Type K Thermocouple -270 ~ 1372 °C	
0x0303	Type T Thermocouple -270 ~ 400 °C	
0x0304	Type E Thermocouple -270 ~ 1000 °C	
0x0305	Type R Thermocouple -50 ~ 1768 °C	
0x0306	Type S Thermocouple -50 ~ 1768 °C	
0x0307	Type B Thermocouple 0 ~ 1820 °C	
0x0308	Type N Thermocouple -270 ~ 1300 °C	

3.7.5.2 CJC (Cold Junction Compensation)

There is thermal sensor built in the module, the purpose is cold junction compensation to thermocouple. Modbus command is shown below.

Address	Function	R/W	Initial value
00524 (0x020B)	CJC Enable 0: disable 1: enable	R/W	0
40577~40584 (0x0240~0x0247)	CH0~CH7 CJC Scale, Unit: 0.1 °C Range: -20.0 °C ~ 20.0 °C	R/W	All 0x0000
40641 (0x0280)	CJC Value, Unit 0.1 °C	R	-

3.7.5.3 Hexadecimal / Engineering Unit

Setup the output value on Hexadecimal, or customer scaling. Modbus command is shown below.

Address	Function	R/W	Initial value
40737 (0x02E0)	AI Value format 0x0000: Hex 0x0001: Engineering	R/W	0x0000
30513~30520 40513~40520 (0x0200~0x0207)	AI CH0 ~ CH7 Value	R	-

Hex Unit data range:

Value	Range	Min. value	Max. value
Thermocouple Input			
0x0301	Type J Thermocouple -210 ~ 1200 °C	E999 (-5735)	7FFF (32767)
0x0302	Type K Thermocouple -270 ~ 1372 °C	E6CF (-6449)	7FFF (32767)
0x0303	Type T Thermocouple -270 ~ 400 °C	A99A (-22118)	7FFF (32767)
0x0304	Type E Thermocouple -270 ~ 1000 °C	DD70 (-8848)	7FFF (32767)
0x0305	Type R Thermocouple -50 ~ 1768 °C	FC61 (-927)	7FFF (32767)
0x0306	Type S Thermocouple -50 ~ 1768 °C	FC61 (-927)	7FFF (32767)
0x0307	Type B Thermocouple 0 ~ 1820 °C	0 (0)	7FFF (32767)
0x0308	Type N Thermocouple -270 ~ 1300 °C	E56A (-6806)	7FFF (32767)

Engineering Unit data range:

Value	Range	Min. value	Max. value
Thermocouple Input			
0x0301	Type J Thermocouple -210 ~ 1200 °C	-2100	12000
0x0302	Type K Thermocouple -270 ~ 1372 °C	-2700	13720
0x0303	Type T Thermocouple -270 ~ 400 °C	-2700	4000
0x0304	Type E Thermocouple -270 ~ 1000 °C	-2700	10000
0x0305	Type R Thermocouple -50 ~ 1768 °C	-500	17680
0x0306	Type S Thermocouple -50 ~ 1768 °C	-500	17680
0x0307	Type B Thermocouple 0 ~ 1820 °C	0	18200
0x0308	Type N Thermocouple -270 ~ 1300 °C	-270	13000

3.7.5.4 Signal Value

Once completing the setup, please enter the measured value. This is to enable/disable the channel(s) and check if the value is out-of-range (voltage, 4~20mA or thermocouple contact loss is deemed to be “out of range”). Modbus command as following:

Address	Function	R/W	Initial Value
40737 (0x02E0)	AI Value format 0x0000: Hex 0x0001: Engineering	R/W	0x0000
00641~00648 (0x0280~0x0287)	CH0~CH7 Out of range 0: normal 1: out of range	R	0
30513~30520 40513~40520 (0x0200~0x0207)	AI CH0 ~ CH7 Value	R	-

3.7.6 MODBUS Address

Coil (0xxxx) / (1xxxx)

Address	Function	R/W	Initial Value
00524 (0x020B)	CJC Enable 0: Disable 1: Enable	R/W	0
00537 (0x0218)	Allow calibration 0: Disallow 1: Allow	R/W	0
00641~00648 (0x0280~0x0287)	CH0~CH7 Out of range 0: normal 1: out of range	R	0

Holding Register(4xxxx) / Input Register(3xxxx)

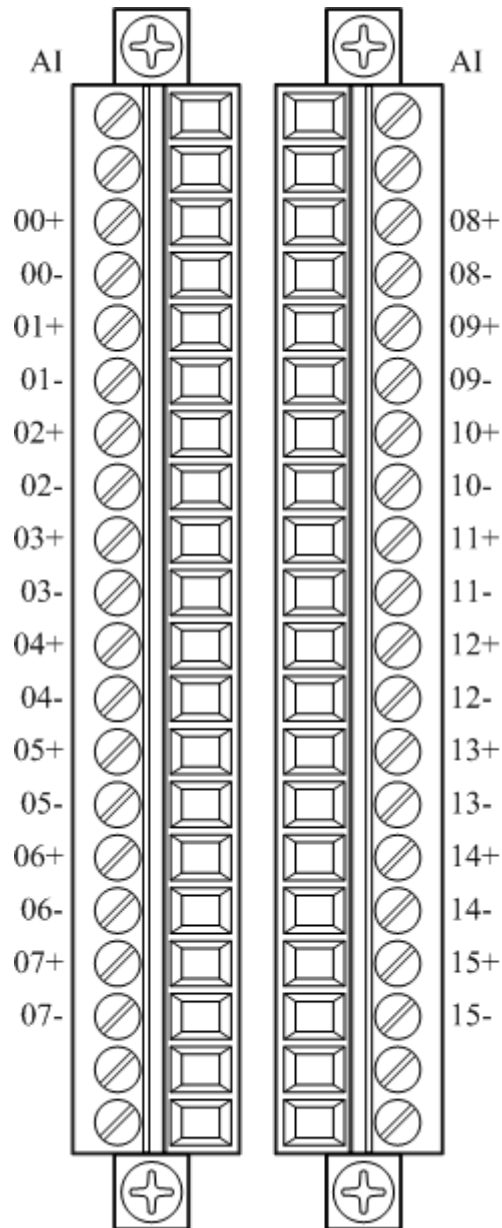
Address	Function	R/W	Initial Value
30513~30520 40513~40520	AI CH0 ~ CH7 Value	R	-

(0x0200~0x0207)							
40577~40584 (0x0240~0x0247)	CH0~CH7 CJC Compensation unit: 0.1°C, Range: -20.0°C ~ 20.0°C	R/W	All 0x0000				
40641 (0x0280)	CJC Value, Unit : 0.1°C	R	-				
40705~40712 (0x02C0~0x02C7)	CH0~CH7 Input signal type	R/W	0x0301				
40737 (0x02E0)	AI Result format of measurement 0x0000: Hex 0x0001: Engineering	R/W	0x0000				
40577 (0x02F4)	CH0~CH7 Calibrate maximum value to each channel. (Each bit map to corresponding channel) Ex. Bit 0 = 1, Calibrate CH0. Bit 1 = 1, Calibrate CH1.	W	0x0000				
40578 (0x02F5)	CH0~CH7 Calibrate 0 level to each channel. (Each bit map to corresponding channel)	W	0x0000				
40579 (0x02F6)	CH0~CH7 Perform internal calibration to each channel. (Each bit map to corresponding channel)	W	0x0000				
40580 (0x02F7)	CH0~CH7 Calibration in process (Each bit map to corresponding channel) 0: No operation 1: Calibration in process	R	-				
44097 0x1000	Firmware version 2 Bytes <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>High Byte</td> <td>Low Byte</td> </tr> <tr> <td>Main version</td> <td>Sub-version</td> </tr> </table>	High Byte	Low Byte	Main version	Sub-version	R	-
High Byte	Low Byte						
Main version	Sub-version						
44098~44105 (0x1001~0x1008)	Module name 16 Bytes (16 ASCII char)	R	-				

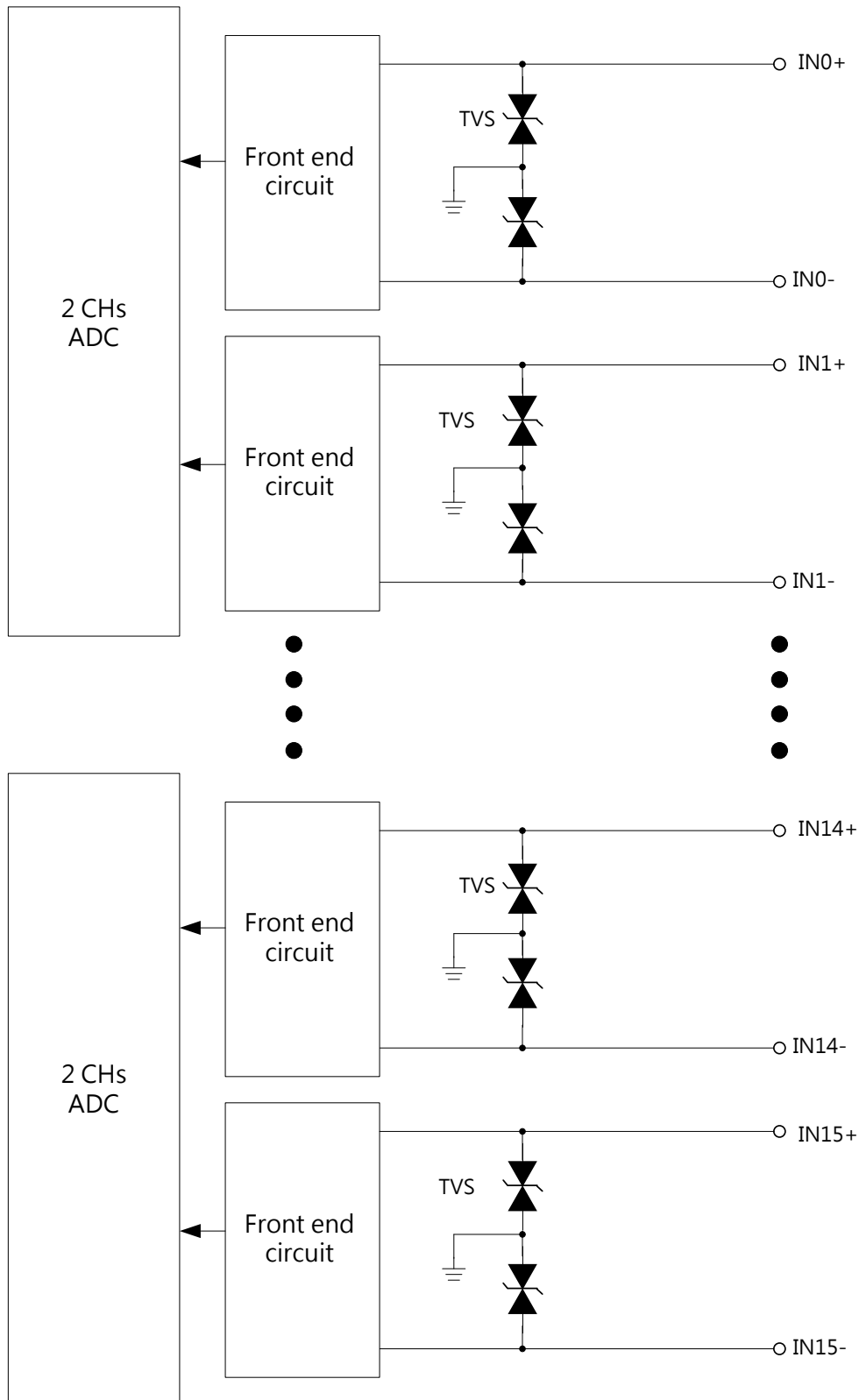
44106 (0x1009)	Modbus response delay time (unit: ms) Range: 0~30	R/W	0
44107 (0x100A)	COM port setting: 2bytes		R/W 0x0006
	High Byte	Low Byte	
	0x00: 8-N-1	0x03: 1.2K	
	0x01: 8-N-2	0x04: 2.4K	
	0x02: 8-E-1	0x05: 4.8K	
	0x03: 8-O-1	0x06: 9.6K 0x07: 19.2K 0x08: 38.4K 0x09: 57.6K 0x0A: 115.2K	
44108 (0x100B)	Watch dog timer (unit: 0.1s) Range: 0 ~ 0x00FF	R/W	0x0000
44109 (0x100C)	System watch dog 0x0001: Enable 0x0000: Disable	R/W	0x0000
44110 (0x100D)	Status of system watch dog 0x0001: Timeout 0x0000: Normal	R/W	-
44111 (0x100E)	Counter of communication frame	R	0x0000

3.8 W-M1B108 16-Channel Thermocouple Input Module

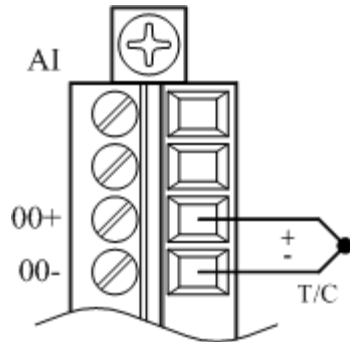
3.8.1 Terminal Assignment



3.8.2 Block Diagram



3.8.3 Channel Connecting



3.8.4 IO Specifications

Channels	16 channels
Direct Sensor Input	J, K, T, E, R, S, B, N
Burn-out Detection	Yes
Channel Independent Configuration	Each channel
Sampling Rates	2.5 samples/second per channel
Resolution	16-bit
Accuracy	±0.1% FSR
Input Impedance	2MΩ
Span Drift	±25 ppm/°C
Zero Drift	±6 μV/°C
CMR @ 50/60 Hz	120 dB
NMR @ 50/60 Hz	100 dB
Input Voltage Protection	±35V
Common Mode Voltage	2.5V
Power Consumption	2.8W @ 24V

3.8.5 Related Reference

3.8.5.1 Input Signal Type Setup

Input ranges & type for each analog signal is adjustable. Modbus command is shown below.

Address	Function	R/W	Initial value
40705~40720 (0x02C0~0x02CF)	CH0~CH15 Input signal type setup	R/W	0x0301

Signals detect range:

Value	Input range	Initial value
Thermocouple Input		
0x0301	Type J Thermocouple -210 ~ 1200 °C	☉
0x0302	Type K Thermocouple -270 ~ 1372 °C	
0x0303	Type T Thermocouple -270 ~ 400 °C	
0x0304	Type E Thermocouple -270 ~ 1000 °C	
0x0305	Type R Thermocouple -50 ~ 1768 °C	
0x0306	Type S Thermocouple -50 ~ 1768 °C	
0x0307	Type B Thermocouple 0 ~ 1820 °C	
0x0308	Type N Thermocouple -270 ~ 1300 °C	

3.8.5.2 CJC (Cold Junction Compensation)

There is thermal sensor built in the module, the purpose is cold junction compensation to thermocouple. Modbus command is shown below.

Address	Function	R/W	Initial value
00524 (0x020B)	CJC Enable 0: disable 1: enable	R/W	0
40577~40592 (0x0240~0x024F)	CH0~CH15 CJC Scale, Unit: 0.1 °C Range: -20.0°C ~ 20.0°C	R/W	All 0x0000
40641 (0x0280)	CJC Value, Unit 0.1 °C	R	-

3.8.5.3 Hexadecimal / Engineering Unit

Setup the output value on Hexadecimal, or customer scaling. Modbus command is shown below.

Address	Function	R/W	Initial value
40737 (0x02E0)	AI Value format 0x0000: Hex 0x0001: Engineering	R/W	0x0000
30513~30528 40513~40528 (0x0200~0x020F)	AI CH0 ~ CH15 Value	R	-

Hex Unit data range:

Value	Range	Min. value	Max. value
Voltage Input			
0x0101	0~10 V	0 (0)	FFFF (65535)
0x0102	0~5 V	0 (0)	FFFF (65535)
0x0103	0~1 V	0 (0)	FFFF (65535)
0x0104	0-500mV	0 (0)	FFFF (65535)
0x0105	0-100mV	0 (0)	FFFF (65535)
0x0106	± 10 V	8000 (-32768)	7FFF (32767)
0x0107	± 5 V	8000 (-32768)	7FFF (32767)
0x0108	± 1 V	8000 (-32768)	7FFF (32767)
0x0109	± 500 mV	8000 (-32768)	7FFF (32767)
0x010A	± 100 mV	8000 (-32768)	7FFF (32767)
Current Input			
0x0201	4~20mA	0 (0)	FFFF (65535)
0x0202	0~20 mA	0 (0)	FFFF (65535)
0x0203	± 20 mA	8000 (-32768)	7FFF (32767)
Thermocouple Input			
0x0301	Type J Thermocouple -210 ~ 1200 °C	E999 (-5735)	7FFF (32767)
0x0302	Type K Thermocouple -270 ~ 1372 °C	E6CF (-6449)	7FFF (32767)
0x0303	Type T Thermocouple -270 ~ 400 °C	A99A (-22118)	7FFF (32767)
0x0304	Type E Thermocouple -270 ~ 1000 °C	DD70 (-8848)	7FFF (32767)

0x0305	Type R Thermocouple -50 ~ 1768 °C	FC61 (-927)	7FFF (32767)
0x0306	Type S Thermocouple -50 ~ 1768 °C	FC61 (-927)	7FFF (32767)
0x0307	Type B Thermocouple 0 ~ 1820 °C	0 (0)	7FFF (32767)
0x0308	Type N Thermocouple -270 ~ 1300 °C	E56A (-6806)	7FFF (32767)

Engineering Unit data range:

Value	Range	Min. value	Max. value
Voltage Input			
0x0101	0~10 V	0	10000
0x0102	0~5 V	0	50000
0x0103	0~1 V	0	10000
0x0104	0-500mV	0	50000
0x0105	0-100mV	0	10000
0x0106	± 10 V	-10000	10000
0x0107	± 5 V	-5000	5000
0x0108	± 1 V	-10000	10000
0x0109	± 500 mV	-5000	5000
0x010A	± 100 mV	-10000	10000
Current Input			
0x0201	4~20mA	4000	20000
0x0202	0~20 mA	0	20000
0x0203	± 20 mA	-20000	20000
Thermocouple Input			
0x0301	Type J Thermocouple -210 ~ 1200 °C	-2100	12000
0x0302	Type K Thermocouple -270 ~ 1372 °C	-2700	13720
0x0303	Type T Thermocouple -270 ~ 400 °C	-2700	4000
0x0304	Type E Thermocouple -270 ~ 1000 °C	-2700	10000
0x0305	Type R Thermocouple -50 ~ 1768 °C	-500	17680
0x0306	Type S Thermocouple -50 ~ 1768 °C	-500	17680

0x0307	Type B Thermocouple 0 ~ 1820 °C	0	18200
0x0308	Type N Thermocouple -270 ~ 1300 °C	-270	13000

3.8.5.4 Signal Value

Once completing the setup, please enter the measured value. This is to enable/disable the channel(s) and check if the value is out-of-range (voltage, 4~20mA or thermocouple contact loss is deemed to be “out of range”). Modbus command as following:

Address	Function	R/W	Initial Value
40737 (0x02E0)	AI Value format 0x0000: Hex 0x0001: Engineering	R/W	0x0000
00641~00656 (0x0280~0x028F)	CH0~CH15 Out of range 0: normal 1: out of range	R	0
30513~30528 40513~40528 (0x0200~0x020F)	AI CH0 ~ CH15 Value	R	-

3.8.6 MODBUS Address

Coil (0xxxx) / (1xxxx)

Address	Function	R/W	Initial Value
00524 (0x020B)	CJC Enable 0: Disable 1: Enable	R/W	0
00537 (0x0218)	Allow calibration 0: Disallow 1: Allow	R/W	0
00641~00656 (0x0280~0x028F)	CH0~CH15 Out of range 0: normal 1: out of range	R	0

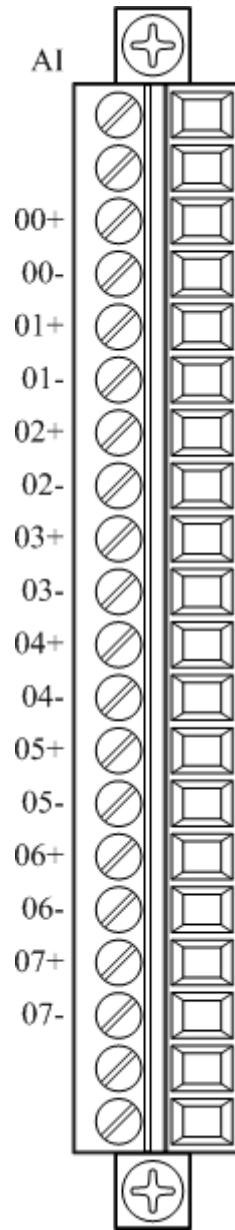
Holding Register(4xxxx) / Input Register(3xxxx)

Address	Function	R/W	Initial Value
30513~30528 40513~40528 (0x0200~0x020F)	AI CH0 ~ CH15 Value	R	-
40577~40592 (0x0240~0x024F)	CH0~CH15 CJC Compensation unit: 0.1°C, Range: -20.0°C ~ 20.0°C	R/W	All 0x0000
40641 (0x0280)	CJC Value, Unit : 0.1°C	R	-
40705~40720 (0x02C0~0x02CF)	CH0~CH15 Input signal type	R/W	0x0301
40737 (0x02E0)	AI Result format of measurement 0x0000: Hex 0x0001: Engineering	R/W	0x0000
40577 (0x02F4)	CH0~CH15 Calibrate maximum value to each channel. (Each bit map to corresponding channel) Ex. Bit 0 = 1, Calibrate CH0. Bit 1 = 1, Calibrate CH1.	W	0x0000
40578 (0x02F5)	CH0~CH15 Calibrate 0 level to each channel. (Each bit map to corresponding channel)	W	0x0000
40579 (0x02F6)	CH0~CH15 Perform internal calibration to each channel. (Each bit map to corresponding channel)	W	0x0000
40580 (0x02F7)	CH0~CH15 Calibration in process (Each bit map to corresponding channel) 0: No operation 1: Calibration in process	R	-

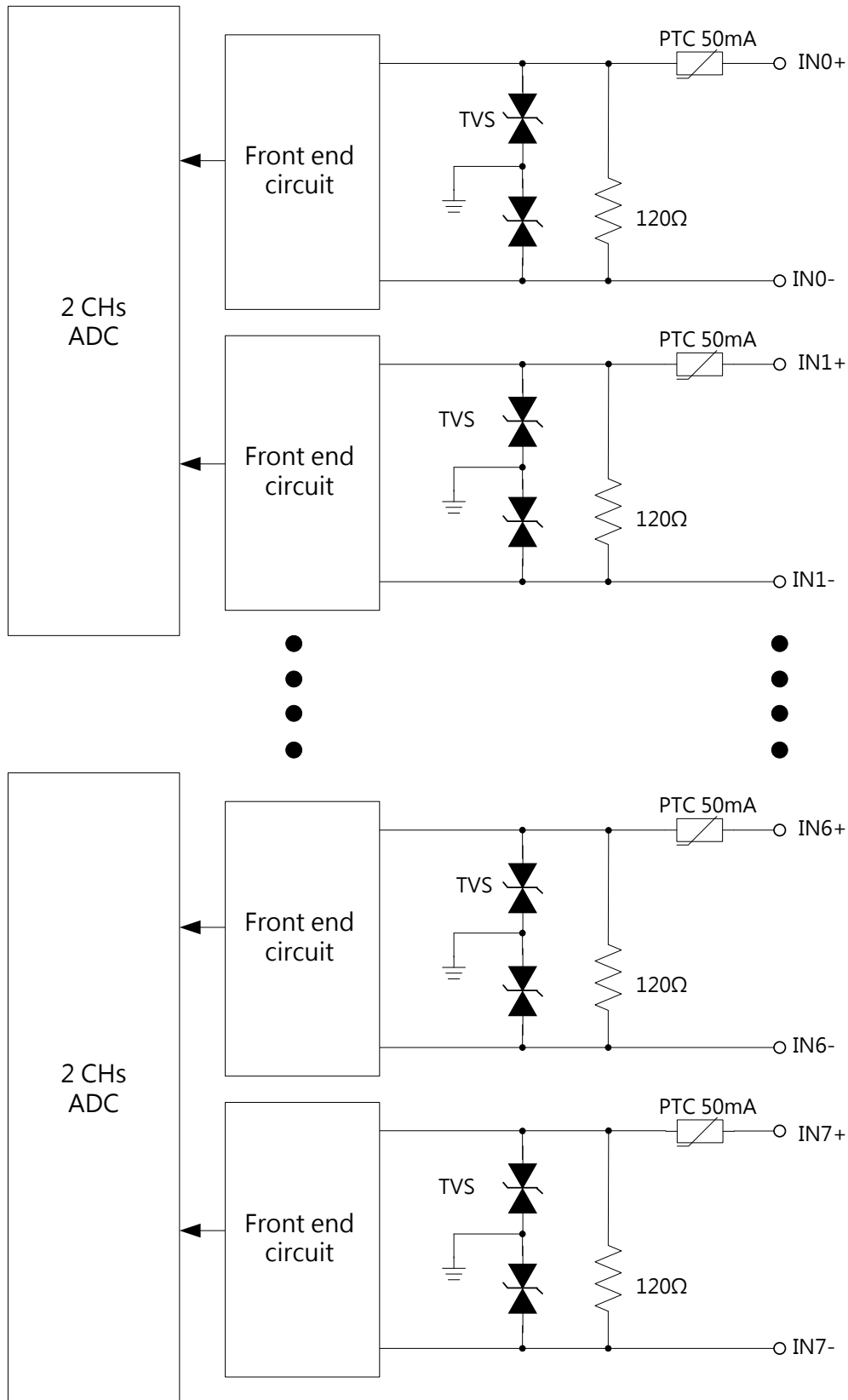
44097 0x1000	Firmware version 2 Bytes		R	-
	High Byte	Low Byte		
	Main version	Sub-version		
44098~44105 (0x1001~0x1008)	Module name 16 Bytes (16 ASCII char)		R	-
44106 (0x1009)	Modbus response delay time (unit: ms) Range: 0~30		R/W	0
44107 (0x100A)	COM port setting: 2bytes		R/W	0x0006
	High Byte	Low Byte		
	0x00: 8-N-1	0x03: 1.2K		
	0x01: 8-N-2	0x04: 2.4K		
	0x02: 8-E-1	0x05: 4.8K		
	0x03: 8-O-1	0x06: 9.6K		
	0x07: 19.2K			
	0x08: 38.4K			
	0x09: 57.6K			
	0x0A: 115.2K			
44108 (0x100B)	Watch dog timer (unit: 0.1s) Range: 0 ~ 0x00FF		R/W	0x0000
44109 (0x100C)	System watch dog 0x0001: Enable 0x0000: Disable		R/W	0x0000
44110 (0x100D)	Status of system watch dog 0x0001: Timeout 0x0000: Normal		R/W	-
44111 (0x100E)	Counter of communication frame		R	0x0000

3.9 W-M1B109 8-Channel Current Input Module

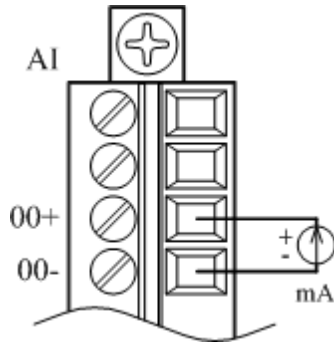
3.9.1 Terminal Assignment



3.9.2 Block Diagram



3.9.3 Channel Connecting



3.9.4 IO Specifications

Channels	8 channels
Current Input	$\pm 20\text{mA}$, $4\sim 20\text{mA}$, $0\sim 20\text{mA}$
Burn-out Detection	$4\sim 20\text{mA}$
Channel Independent Configuration	Each channel
Sampling Rates	2.5 samples/second per channel
Resolution	16-bit
Accuracy	$\pm 0.1\%$ FSR
Input Impedance	120Ω
Span Drift	± 25 ppm/ $^{\circ}\text{C}$
Zero Drift	± 6 $\mu\text{V}/^{\circ}\text{C}$
CMR @ 50/60 Hz	120 dB
NMR @ 50/60 Hz	100 dB
Input Voltage Protection	$\pm 35\text{V}$
Common Mode Voltage	35V
Power Consumption	1.6W @ 24V

3.9.5 Related Reference

3.9.5.1 Input Signal Type Setup

Input ranges & type for each analog signal is adjustable. Modbus command is shown below.

Address	Function	R/W	Initial value
40705~40712 (0x02C0~0x02C7)	CH0~CH7 Input signal type setup	R/W	0x0201

Signals detect range:

Value	Input range	Initial value
Current Input		
0x0201	4~20mA	☉
0x0202	0~20 mA	
0x0203	± 20 mA	

3.9.5.2 Hexadecimal / Engineering Unit

Setup the output value on Hexadecimal, or customer scaling. Modbus command is shown below.

Address	Function	R/W	Initial value
40737 (0x02E0)	AI Value format 0x0000: Hex 0x0001: Engineering	R/W	0x0000
30513~30520 40513~40520 (0x0200~0x0207)	AI CH0 ~ CH7 Value	R	-

Hex Unit data range:

Value	Range	Min. value	Max. value
Current Input			
0x0201	4~20mA	0 (0)	FFFF (65535)
0x0202	0~20 mA	0 (0)	FFFF (65535)
0x0203	± 20 mA	8000 (-32768)	7FFF (32767)

Engineering Unit data range:

Value	Range	Min. value	Max. value
Current Input			
0x0201	4~20mA	4000	20000
0x0202	0~20 mA	0	20000
0x0203	± 20 mA	-20000	20000

3.9.5.3 Signal Value

Once completing the setup, please enter the measured value. This is to enable/disable the channel(s) and check if the value is out-of-range (voltage, 4~20mA or thermocouple contact loss is deemed to be “out of range”). Modbus command as following:

Address	Function	R/W	Initial Value
40737 (0x02E0)	AI Value format 0x0000: Hex 0x0001: Engineering	R/W	0x0000
00641~00648 (0x0280~0x0287)	CH0~CH7 Out of range 0: normal 1: out of range	R	0
30513~30520 40513~40520 (0x0200~0x0207)	AI CH0 ~ CH7 Value	R	-

3.9.6 MODBUS Address

Coil (0xxxx) / (1xxxx)

Address	Function	R/W	Initial Value
00537 (0x0218)	Allow calibration 0: Disallow 1: Allow	R/W	0
00641~00648 (0x0280~0x0287)	CH0~CH7 Out of range 0: normal 1: out of range	R	0

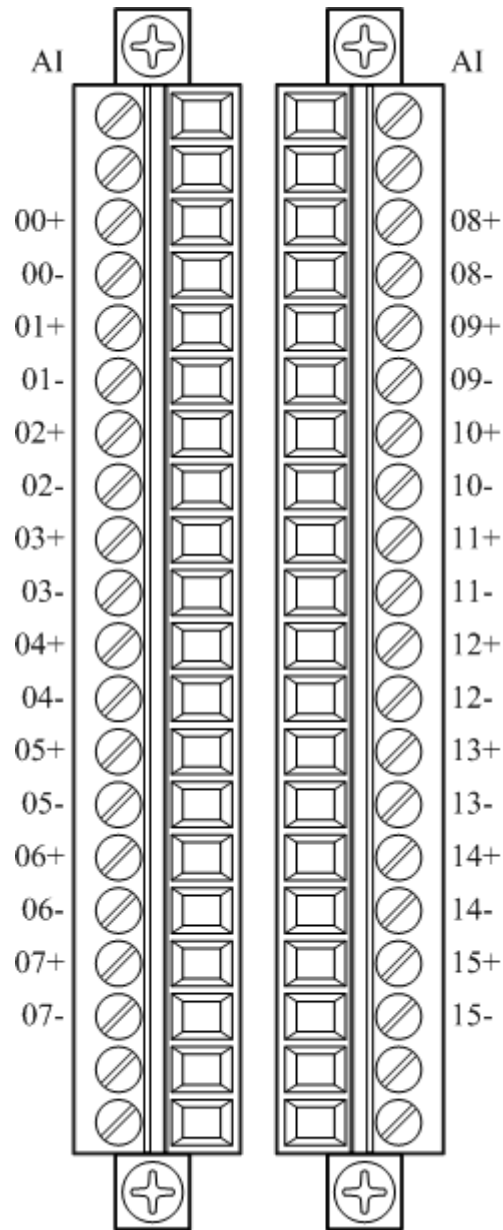
Holding Register(4xxxx) / Input Register(3xxxx)

Address	Function	R/W	Initial Value				
30513~30520 40513~40520 (0x0200~0x0207)	AI CH0 ~ CH7 Value	R	-				
40705~40712 (0x02C0~0x02C7)	CH0~CH7 Input signal type	R/W	0x0201				
40737 (0x02E0)	AI Result format of measurement 0x0000: Hex 0x0001: Engineering	R/W	0x0000				
40577 (0x02F4)	CH0~CH7 Calibrate maximum value to each channel. (Each bit map to corresponding channel) Ex. Bit 0 = 1, Calibrate CH0. Bit 1 = 1, Calibrate CH1.	W	0x0000				
40578 (0x02F5)	CH0~CH7 Calibrate 0 level to each channel. (Each bit map to corresponding channel)	W	0x0000				
40579 (0x02F6)	CH0~CH7 Perform internal calibration to each channel. (Each bit map to corresponding channel)	W	0x0000				
40580 (0x02F7)	CH0~CH7 Calibration in process (Each bit map to corresponding channel) 0: No operation 1: Calibration in process	R	-				
44097 0x1000	Firmware version 2 Bytes <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>High Byte</td> <td>Low Byte</td> </tr> <tr> <td>Main version</td> <td>Sub-version</td> </tr> </table>	High Byte	Low Byte	Main version	Sub-version	R	-
High Byte	Low Byte						
Main version	Sub-version						

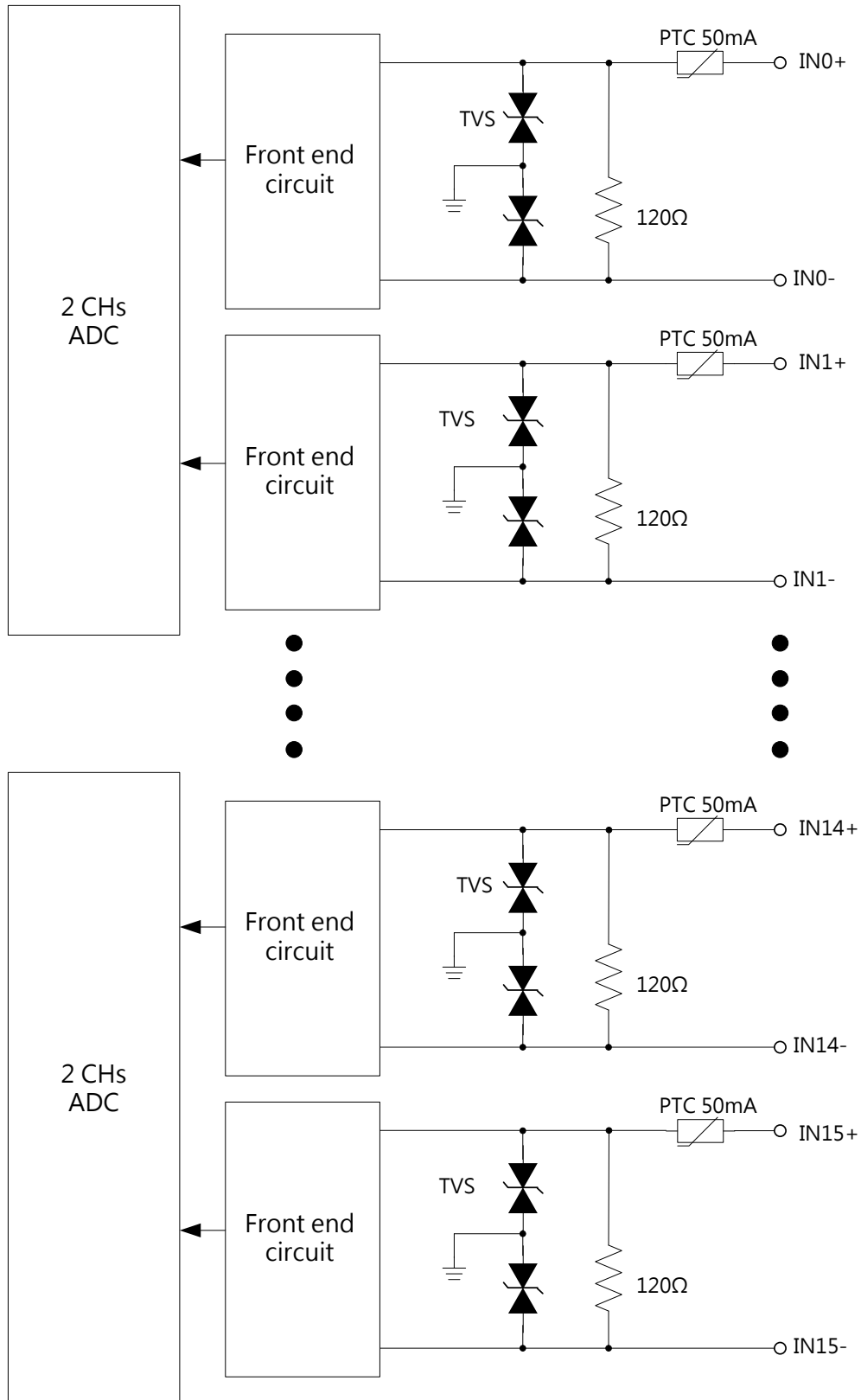
44098~44105 (0x1001~0x1008)	Module name 16 Bytes (16 ASCII char)	R	-
44106 (0x1009)	Modbus response delay time (unit: ms) Range: 0~30	R/W	0
44107 (0x100A)	COM port setting: 2bytes		R/W 0x0006
	High Byte	Low Byte	
	0x00: 8-N-1	0x03: 1.2K	
	0x01: 8-N-2	0x04: 2.4K	
	0x02: 8-E-1	0x05: 4.8K	
	0x03: 8-O-1	0x06: 9.6K 0x07: 19.2K 0x08: 38.4K 0x09: 57.6K 0x0A: 115.2K	
44108 (0x100B)	Watch dog timer (unit: 0.1s) Range: 0 ~ 0x00FF	R/W	0x0000
44109 (0x100C)	System watch dog 0x0001: Enable 0x0000: Disable	R/W	0x0000
44110 (0x100D)	Status of system watch dog 0x0001: Timeout 0x0000: Normal	R/W	-
44111 (0x100E)	Counter of communication frame	R	0x0000

3.10 W-M1B110 16-Channel Current Input Module

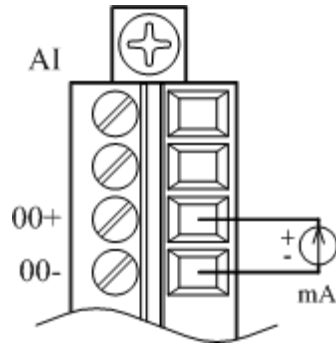
3.10.1 Terminal Assignment



3.10.2 Block Diagram



3.10.3 Channel Connecting



3.10.4 IO Specifications

Channels	16 channels
Current Input	$\pm 20\text{mA}$, 4~20mA, 0~20mA
Burn-out Detection	4~20mA
Channel Independent Configuration	Each channel
Sampling Rates	2.5 samples/second per channel
Resolution	16-bit
Accuracy	$\pm 0.1\%$ FSR
Input Impedance	120 Ω
Span Drift	± 25 ppm/ $^{\circ}\text{C}$
Zero Drift	± 6 $\mu\text{V}/^{\circ}\text{C}$
CMR @ 50/60 Hz	120 dB
NMR @ 50/60 Hz	100 dB
Input Voltage Protection	$\pm 35\text{V}$
Common Mode Voltage	35V
Power Consumption	2.8W @ 24V

3.10.5 Related Reference

3.10.5.1 Input Signal Type Setup

Input ranges & type for each analog signal is adjustable. Modbus command is shown below.

Address	Function	R/W	Initial value
40705~40720 (0x02C0~0x02CF)	CH0~CH15 Input signal type setup	R/W	0x0201

Signals detect range:

Value	Input range	Initial value
Current Input		
0x0201	4~20mA	☉
0x0202	0~20 mA	
0x0203	± 20 mA	

3.10.5.2 Hexadecimal / Engineering Unit

Setup the output value on Hexadecimal, or customer scaling. Modbus command is shown below.

Address	Function	R/W	Initial value
40737 (0x02E0)	AI Value format 0x0000: Hex 0x0001: Engineering	R/W	0x0000
30513~30528 40513~40528 (0x0200~0x020F)	AI CH0 ~ CH15 Value	R	-

Hex Unit data range:

Value	Range	Min. value	Max. value
Current Input			
0x0201	4~20mA	0 (0)	FFFF (65535)
0x0202	0~20 mA	0 (0)	FFFF (65535)
0x0203	± 20 mA	8000 (-32768)	7FFF (32767)

Engineering Unit data range:

Value	Range	Min. value	Max. value
Current Input			
0x0201	4~20mA	4000	20000
0x0202	0~20 mA	0	20000
0x0203	± 20 mA	-20000	20000

3.10.5.3 Signal Value

Once completing the setup, please enter the measured value. This is to enable/disable the channel(s) and check if the value is out-of-range (voltage, 4~20mA or thermocouple contact loss is deemed to be “out of range”). Modbus command as following:

Address	Function	R/W	Initial Value
40737 (0x02E0)	AI Value format 0x0000: Hex 0x0001: Engineering	R/W	0x0000
00641~00656 (0x0280~0x028F)	CH0~CH15 Out of range 0: normal 1: out of range	R	0
30513~30528 40513~40528 (0x0200~0x020F)	AI CH0 ~ CH15 Value	R	-

3.6.6 MODBUS Address

Coil (0xxxx) / (1xxxx)

Address	Function	R/W	Initial Value
00537 (0x0218)	Allow calibration 0: Disallow 1: Allow	R/W	0
00641~00656 (0x0280~0x028F)	CH0~CH15 Out of range 0: normal 1: out of range	R	0

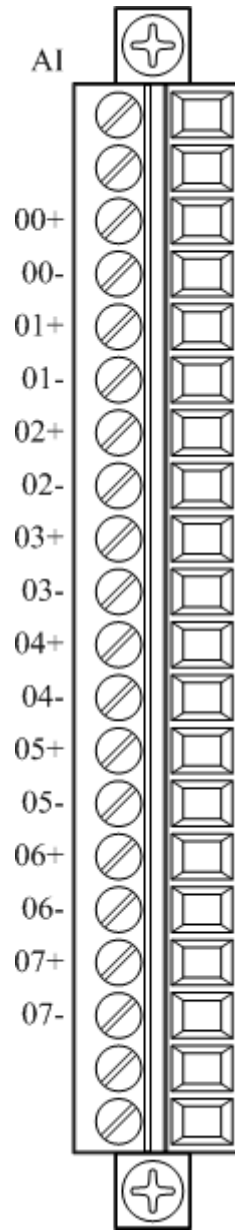
Holding Register(4xxxx) / Input Register(3xxxx)

Address	Function	R/W	Initial Value				
30513~30528 40513~40528 (0x0200~0x020F)	AI CH0 ~ CH15 Value	R	-				
40705~40720 (0x02C0~0x02CF)	CH0~CH15 Input signal type	R/W	0x0201				
40737 (0x02E0)	AI Result format of measurement 0x0000: Hex 0x0001: Engineering	R/W	0x0000				
40577 (0x02F4)	CH0~CH15 Calibrate maximum value to each channel. (Each bit map to corresponding channel) Ex. Bit 0 = 1, Calibrate CH0. Bit 1 = 1, Calibrate CH1.	W	0x0000				
40578 (0x02F5)	CH0~CH15 Calibrate 0 level to each channel. (Each bit map to corresponding channel)	W	0x0000				
40579 (0x02F6)	CH0~CH15 Perform internal calibration to each channel. (Each bit map to corresponding channel)	W	0x0000				
40580 (0x02F7)	CH0~CH15 Calibration in process (Each bit map to corresponding channel) 0: No operation 1: Calibration in process	R	-				
44097 0x1000	Firmware version 2 Bytes <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>High Byte</td> <td>Low Byte</td> </tr> <tr> <td>Main version</td> <td>Sub-version</td> </tr> </table>	High Byte	Low Byte	Main version	Sub-version	R	-
High Byte	Low Byte						
Main version	Sub-version						

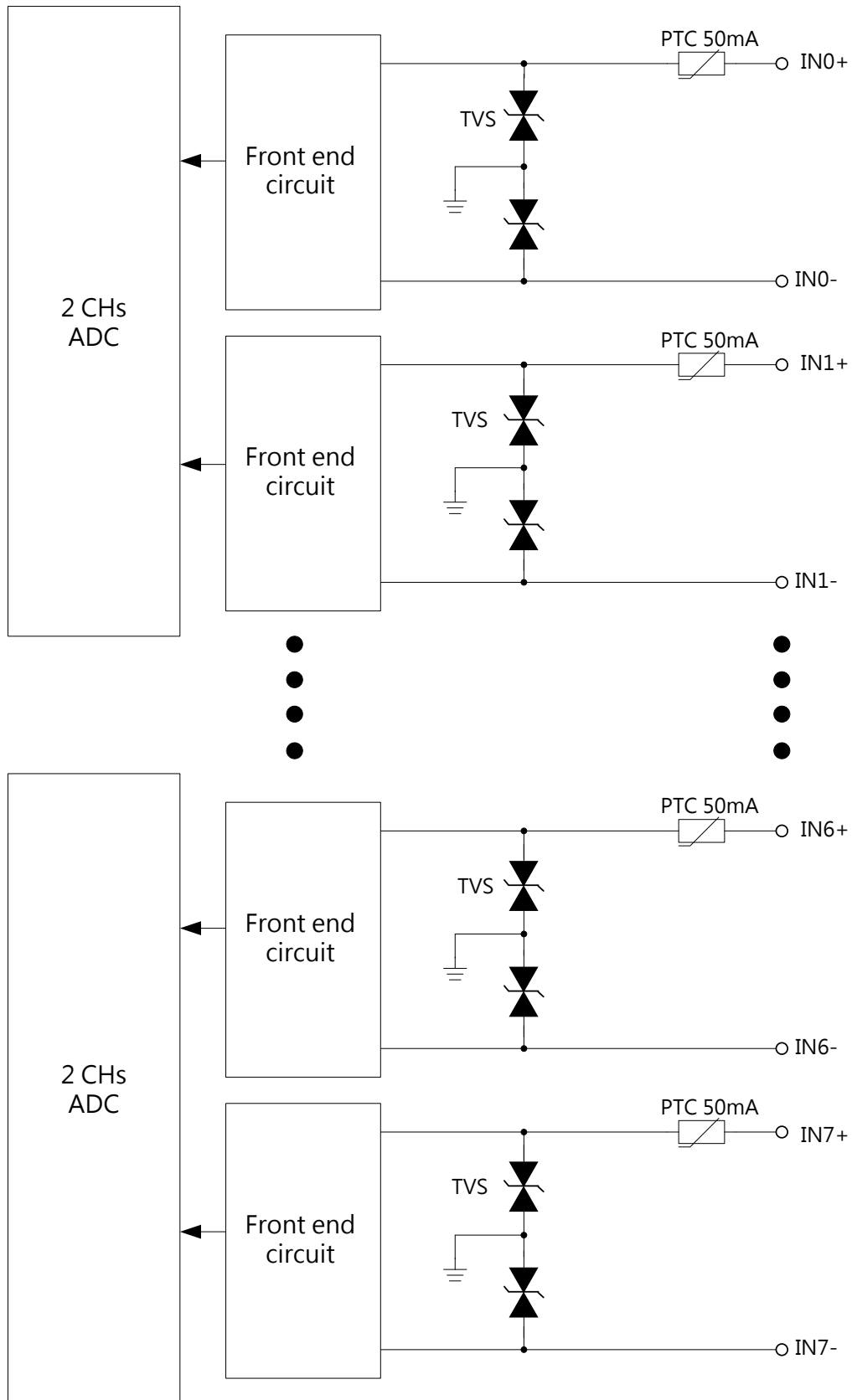
44098~44105 (0x1001~0x1008)	Module name 16 Bytes (16 ASCII char)	R	-
44106 (0x1009)	Modbus response delay time (unit: ms) Range: 0~30	R/W	0
44107 (0x100A)	COM port setting: 2bytes		R/W 0x0006
	High Byte	Low Byte	
	0x00: 8-N-1	0x03: 1.2K	
	0x01: 8-N-2	0x04: 2.4K	
	0x02: 8-E-1	0x05: 4.8K	
	0x03: 8-O-1	0x06: 9.6K 0x07: 19.2K 0x08: 38.4K 0x09: 57.6K 0x0A: 115.2K	
44108 (0x100B)	Watch dog timer (unit: 0.1s) Range: 0 ~ 0x00FF	R/W	0x0000
44109 (0x100C)	System watch dog 0x0001: Enable 0x0000: Disable	R/W	0x0000
44110 (0x100D)	Status of system watch dog 0x0001: Timeout 0x0000: Normal	R/W	-
44111 (0x100E)	Counter of communication frame	R	0x0000

3.11 W-M1B111 8-Channel Voltage Input Module

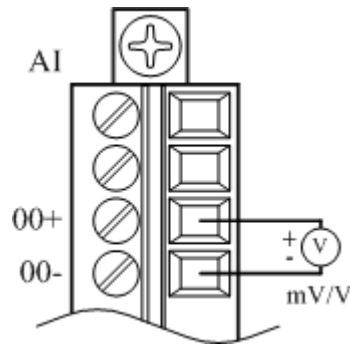
3.11.1 Terminal Assignment



3.11.2 Block Diagram



3.11.3 Channel Connecting



3.11.4 IO Specifications

Channels	8 channels
Voltage Range	$\pm 1V$, $\pm 5V$, $\pm 10V$, $0 \sim 1V$, $0 \sim 5V$, $0 \sim 10V$
Burn-out Detection	Yes
Channel Independent Configuration	Each channel
Sampling Rates	2.5 samples/second per channel
Resolution	16-bit
Accuracy	$\pm 0.1\%$ FSR
Input Impedance	$2M\Omega$
Span Drift	± 25 ppm/ $^{\circ}C$
Zero Drift	± 6 $\mu V/^{\circ}C$
CMR @ 50/60 Hz	120 dB
NMR @ 50/60 Hz	100 dB
Input Voltage Protection	$\pm 35V$
Common Mode Voltage	35V
Power Consumption	1.6W @ 24V

3.11.5 Related Reference

3.11.5.1 Input Signal Type Setup

Input ranges & type for each analog signal is adjustable. Modbus command is shown below.

Address	Function	R/W	Initial value
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40705~40712 (0x02C0~0x02C7)	CH0~CH7 Input signal type setup	R/W	0x0106
--------------------------------	---------------------------------	-----	--------

Signals detect range:

Value	Input range	Initial value
Voltage Input		
0x0101	0~10 V	
0x0102	0~5 V	
0x0103	0~1 V	
0x0106	± 10 V	⊙
0x0107	± 5 V	
0x0108	± 1 V	

3.11.5.2 Hexadecimal / Engineering Unit

Setup the output value on Hexadecimal, or customer scaling. Modbus command is shown below.

Address	Function	R/W	Initial value
40737 (0x02E0)	AI Value format 0x0000: Hex 0x0001: Engineering	R/W	0x0000
30513~30520 40513~40520 (0x0200~0x0207)	AI CH0 ~ CH7 Value	R	-

Hex Unit data range:

Value	Range	Min. value	Max. value
Voltage Input			
0x0101	0~10 V	0 (0)	FFFF (65535)
0x0102	0~5 V	0 (0)	FFFF (65535)
0x0103	0~1 V	0 (0)	FFFF (65535)
0x0106	± 10 V	8000 (-32768)	7FFF (32767)

0x0107	± 5 V	8000 (-32768)	7FFF (32767)
0x0108	± 1 V	8000 (-32768)	7FFF (32767)

Engineering Unit data range:

Value	Range	Min. value	Max. value
Voltage Input			
0x0101	0~10 V	0	10000
0x0102	0~5 V	0	50000
0x0103	0~1 V	0	10000
0x0106	± 10 V	-10000	10000
0x0107	± 5 V	-5000	5000
0x0108	± 1 V	-10000	10000

3.11.5.3 Signal Value

Once completing the setup, please enter the measured value. This is to enable/disable the channel(s) and check if the value is out-of-range (voltage contact loss is deemed to be “out of range”). Modbus command as following:

Address	Function	R/W	Initial Value
40737 (0x02E0)	AI Value format 0x0000: Hex 0x0001: Engineering	R/W	0x0000
00641~00648 (0x0280~0x0287)	CH0~CH7 Out of range 0: normal 1: out of range	R	0
30513~30520 40513~40520 (0x0200~0x0207)	AI CH0 ~ CH7 Value	R	-

3.11.6 MODBUS Address

Coil (0xxxx) / (1xxxx)

Address	Function	R/W	Initial Value
00537 (0x0218)	Allow calibration 0: Disallow 1: Allow	R/W	0
00641~00648 (0x0280~0x0287)	CH0~CH7 Out of range 0: normal 1: out of range	R	0

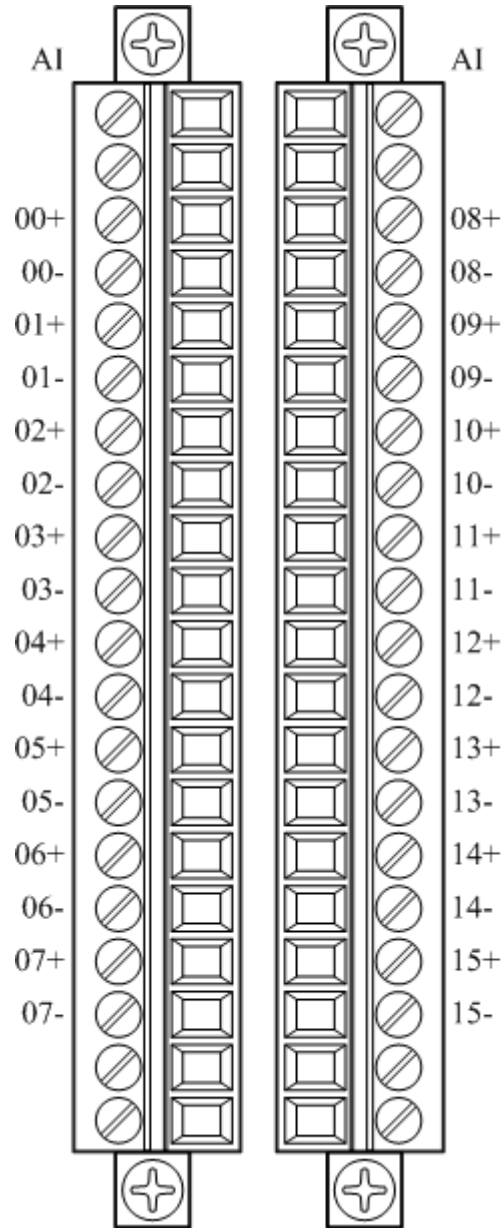
Holding Register(4xxxx) / Input Register(3xxxx)

Address	Function	R/W	Initial Value
30513~30520 40513~40520 (0x0200~0x0207)	AI CH0 ~ CH7 Value	R	-
40705~40712 (0x02C0~0x02C7)	CH0~CH7 Input signal type	R/W	0x0106
40737 (0x02E0)	AI Result format of measurement 0x0000: Hex 0x0001: Engineering	R/W	0x0000
40577 (0x02F4)	CH0~CH7 Calibrate maximum value to each channel. (Each bit map to corresponding channel) Ex. Bit 0 = 1, Calibrate CH0. Bit 1 = 1, Calibrate CH1.	W	0x0000
40578 (0x02F5)	CH0~CH7 Calibrate 0 level to each channel. (Each bit map to corresponding channel)	W	0x0000
40579 (0x02F6)	CH0~CH7 Perform internal calibration to each channel. (Each bit map to corresponding channel)	W	0x0000

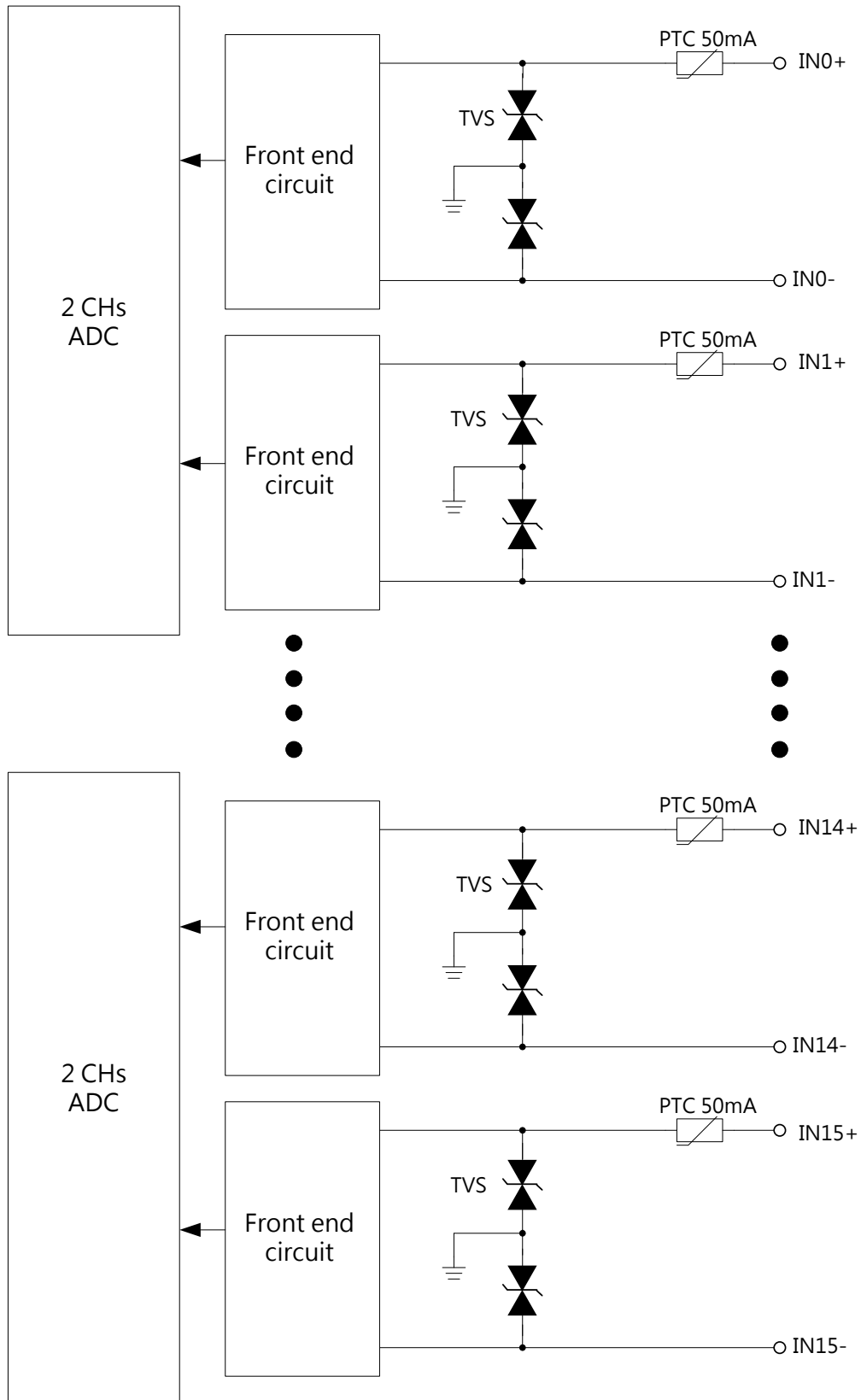
40580 (0x02F7)	CH0~CH7 Calibration in process (Each bit map to corresponding channel) 0: No operation 1: Calibration in process	R	-																		
44097 0x1000	Firmware version 2 Bytes <table border="1" style="margin-left: 20px;"> <tr> <td>High Byte</td> <td>Low Byte</td> </tr> <tr> <td>Main version</td> <td>Sub-version</td> </tr> </table>	High Byte	Low Byte	Main version	Sub-version	R	-														
High Byte	Low Byte																				
Main version	Sub-version																				
44098~44105 (0x1001~0x1008)	Module name 16 Bytes (16 ASCII char)	R	-																		
44106 (0x1009)	Modbus response delay time (unit: ms) Range: 0~30	R/W	0																		
44107 (0x100A)	COM port setting: 2bytes <table border="1" style="margin-left: 20px;"> <tr> <td>High Byte</td> <td>Low Byte</td> </tr> <tr> <td>0x00: 8-N-1</td> <td>0x03: 1.2K</td> </tr> <tr> <td>0x01: 8-N-2</td> <td>0x04: 2.4K</td> </tr> <tr> <td>0x02: 8-E-1</td> <td>0x05: 4.8K</td> </tr> <tr> <td>0x03: 8-O-1</td> <td>0x06: 9.6K</td> </tr> <tr> <td></td> <td>0x07: 19.2K</td> </tr> <tr> <td></td> <td>0x08: 38.4K</td> </tr> <tr> <td></td> <td>0x09: 57.6K</td> </tr> <tr> <td></td> <td>0x0A: 115.2K</td> </tr> </table>	High Byte	Low Byte	0x00: 8-N-1	0x03: 1.2K	0x01: 8-N-2	0x04: 2.4K	0x02: 8-E-1	0x05: 4.8K	0x03: 8-O-1	0x06: 9.6K		0x07: 19.2K		0x08: 38.4K		0x09: 57.6K		0x0A: 115.2K	R/W	0x0006
High Byte	Low Byte																				
0x00: 8-N-1	0x03: 1.2K																				
0x01: 8-N-2	0x04: 2.4K																				
0x02: 8-E-1	0x05: 4.8K																				
0x03: 8-O-1	0x06: 9.6K																				
	0x07: 19.2K																				
	0x08: 38.4K																				
	0x09: 57.6K																				
	0x0A: 115.2K																				
44108 (0x100B)	Watch dog timer (unit: 0.1s) Range: 0 ~ 0x00FF	R/W	0x0000																		
44109 (0x100C)	System watch dog 0x0001: Enable 0x0000: Disable	R/W	0x0000																		
44110 (0x100D)	Status of system watch dog 0x0001: Timeout 0x0000: Normal	R/W	-																		
44111 (0x100E)	Counter of communication frame	R	0x0000																		

3.12 W-M1B112 16-Channel Voltage Input Module

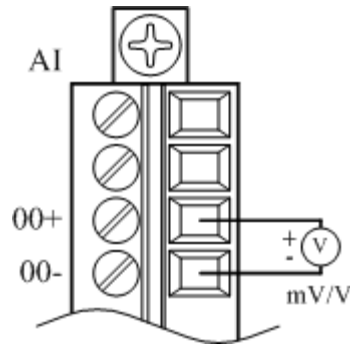
3.12.1 Terminal Assignment



3.12.2 Block Diagram



3.12.3 Channel Connecting



3.12.4 IO Specifications

Channels	16 channels
Voltage Range	$\pm 1V$, $\pm 5V$, $\pm 10V$, $0 \sim 1V$, $0 \sim 5V$, $0 \sim 10V$
Burn-out Detection	Yes
Channel Independent Configuration	Each channel
Sampling Rates	2.5 samples/second per channel
Resolution	16-bit
Accuracy	$\pm 0.1\%$ FSR
Input Impedance	$2M\Omega$
Span Drift	± 25 ppm/ $^{\circ}C$
Zero Drift	± 6 μV / $^{\circ}C$
CMR @ 50/60 Hz	120 dB
NMR @ 50/60 Hz	100 dB
Input Voltage Protection	$\pm 35V$
Common Mode Voltage	35V
Power Consumption	2.8W @ 24V

3.12.5 Related Reference

3.12.5.1 Input Signal Type Setup

Input ranges & type for each analog signal is adjustable. Modbus command is shown below.

Address	Function	R/W	Initial value
40705~40720 (0x02C0~0x02CF)	CH0~CH15 Input signal type setup	R/W	0x0106

Signals detect range:

Value	Input range	Initial value
Voltage Input		
0x0101	0~10 V	
0x0102	0~5 V	
0x0103	0~1 V	
0x0106	± 10 V	⊙
0x0107	± 5 V	
0x0108	± 1 V	

3.12.5.2 Hexadecimal / Engineering Unit

Setup the output value on Hexadecimal, or customer scaling. Modbus command is shown below.

Address	Function	R/W	Initial value
40737 (0x02E0)	AI Value format 0x0000: Hex 0x0001: Engineering	R/W	0x0000
30513~30528 40513~40528 (0x0200~0x020F)	AI CH0 ~ CH15 Value	R	-

Hex Unit data range:

Value	Range	Min. value	Max. value
Voltage Input			
0x0101	0~10 V	0 (0)	FFFF (65535)
0x0102	0~5 V	0 (0)	FFFF (65535)
0x0103	0~1 V	0 (0)	FFFF (65535)

0x0106	± 10 V	8000 (-32768)	7FFF (32767)
0x0107	± 5 V	8000 (-32768)	7FFF (32767)
0x0108	± 1 V	8000 (-32768)	7FFF (32767)

Engineering Unit data range:

Value	Range	Min. value	Max. value
Voltage Input			
0x0101	0~10 V	0	10000
0x0102	0~5 V	0	50000
0x0103	0~1 V	0	10000
0x0106	± 10 V	-10000	10000
0x0107	± 5 V	-5000	5000
0x0108	± 1 V	-10000	10000

3.6.5.4 Signal Value

Once completing the setup, please enter the measured value. This is to enable/disable the channel(s) and check if the value is out-of-range (voltage, 4~20mA or thermocouple contact loss is deemed to be “out of range”). Modbus command as following:

Address	Function	R/W	Initial Value
40737 (0x02E0)	AI Value format 0x0000: Hex 0x0001: Engineering	R/W	0x0000
00641~00656 (0x0280~0x028F)	CH0~CH15 Out of range 0: normal 1: out of range	R	0
30513~30528 40513~40528 (0x0200~0x020F)	AI CH0 ~ CH15 Value	R	-

3.6.6 MODBUS Address

Coil (0xxxx) / (1xxxx)

Address	Function	R/W	Initial Value
00537 (0x0218)	Allow calibration 0: Disallow 1: Allow	R/W	0
00641~00656 (0x0280~0x028F)	CH0~CH15 Out of range 0: normal 1: out of range	R	0

Holding Register(4xxxx) / Input Register(3xxxx)

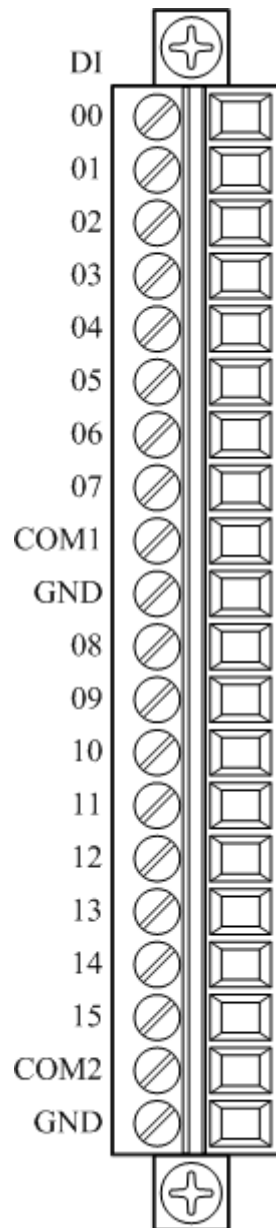
Address	Function	R/W	Initial Value
30513~30528 40513~40528 (0x0200~0x020F)	AI CH0 ~ CH15 Value	R	-
40705~40720 (0x02C0~0x02CF)	CH0~CH15 Input signal type	R/W	0x0106
40737 (0x02E0)	AI Result format of measurement 0x0000: Hex 0x0001: Engineering	R/W	0x0000
40577 (0x02F4)	CH0~CH15 Calibrate maximum value to each channel. (Each bit map to corresponding channel) Ex. Bit 0 = 1, Calibrate CH0. Bit 1 = 1, Calibrate CH1.	W	0x0000
40578 (0x02F5)	CH0~CH15 Calibrate 0 level to each channel. (Each bit map to corresponding channel)	W	0x0000
40579 (0x02F6)	CH0~CH15 Perform internal calibration to each channel. (Each bit map to corresponding channel)	W	0x0000

40580 (0x02F7)	CH0~CH15 Calibration in process (Each bit map to corresponding channel) 0: No operation 1: Calibration in process	R	-																		
44097 0x1000	Firmware version 2 Bytes <table border="1" style="margin-left: 20px;"> <tr> <td>High Byte</td> <td>Low Byte</td> </tr> <tr> <td>Main version</td> <td>Sub-version</td> </tr> </table>	High Byte	Low Byte	Main version	Sub-version	R	-														
High Byte	Low Byte																				
Main version	Sub-version																				
44098~44105 (0x1001~0x1008)	Module name 16 Bytes (16 ASCII char)	R	-																		
44106 (0x1009)	Modbus response delay time (unit: ms) Range: 0~30	R/W	0																		
44107 (0x100A)	COM port setting: 2bytes <table border="1" style="margin-left: 20px;"> <tr> <td>High Byte</td> <td>Low Byte</td> </tr> <tr> <td>0x00: 8-N-1</td> <td>0x03: 1.2K</td> </tr> <tr> <td>0x01: 8-N-2</td> <td>0x04: 2.4K</td> </tr> <tr> <td>0x02: 8-E-1</td> <td>0x05: 4.8K</td> </tr> <tr> <td>0x03: 8-O-1</td> <td>0x06: 9.6K</td> </tr> <tr> <td></td> <td>0x07: 19.2K</td> </tr> <tr> <td></td> <td>0x08: 38.4K</td> </tr> <tr> <td></td> <td>0x09: 57.6K</td> </tr> <tr> <td></td> <td>0x0A: 115.2K</td> </tr> </table>	High Byte	Low Byte	0x00: 8-N-1	0x03: 1.2K	0x01: 8-N-2	0x04: 2.4K	0x02: 8-E-1	0x05: 4.8K	0x03: 8-O-1	0x06: 9.6K		0x07: 19.2K		0x08: 38.4K		0x09: 57.6K		0x0A: 115.2K	R/W	0x0006
High Byte	Low Byte																				
0x00: 8-N-1	0x03: 1.2K																				
0x01: 8-N-2	0x04: 2.4K																				
0x02: 8-E-1	0x05: 4.8K																				
0x03: 8-O-1	0x06: 9.6K																				
	0x07: 19.2K																				
	0x08: 38.4K																				
	0x09: 57.6K																				
	0x0A: 115.2K																				
44108 (0x100B)	Watch dog timer (unit: 0.1s) Range: 0 ~ 0x00FF	R/W	0x0000																		
44109 (0x100C)	System watch dog 0x0001: Enable 0x0000: Disable	R/W	0x0000																		
44110 (0x100D)	Status of system watch dog 0x0001: Timeout 0x0000: Normal	R/W	-																		
44111 (0x100E)	Counter of communication frame	R	0x0000																		

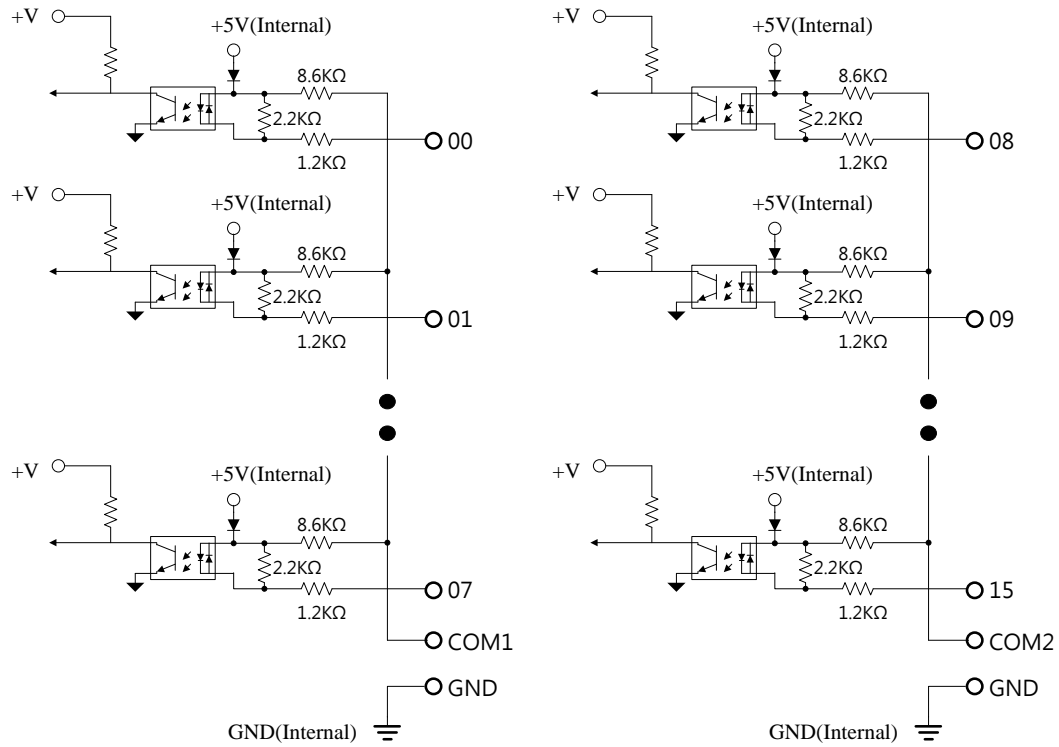
Chapter 4. Digital Module Information

4.1 W-M1B301 16-Channel Digital Input Module

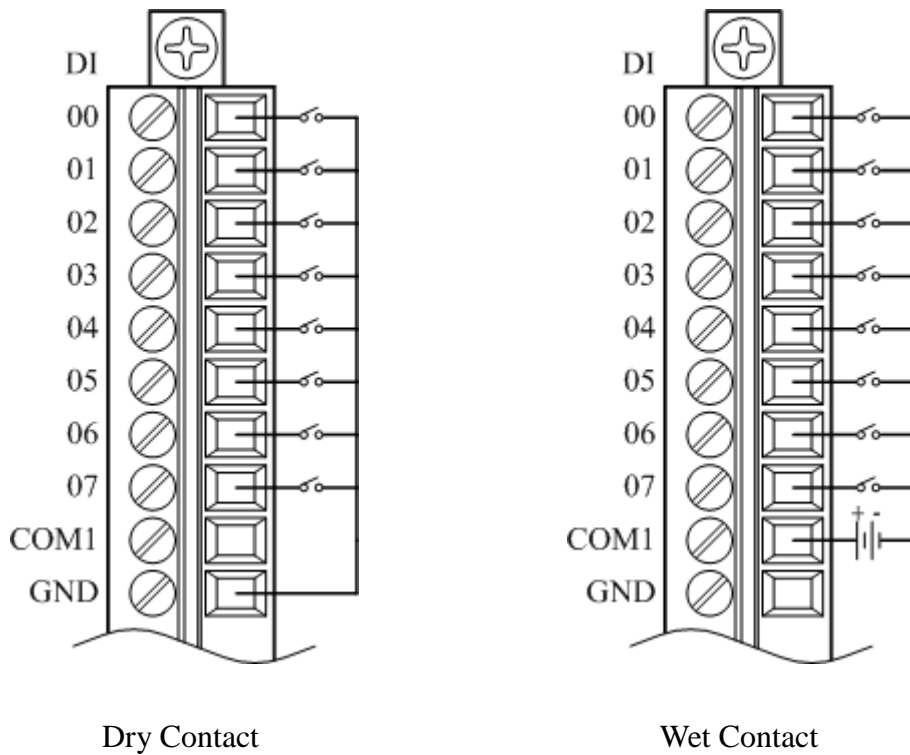
4.1.1 Terminal Assignment



4.1.2 Block Diagram



1.3 Channel Connecting



4.1.4 IO Specifications

Digital Input		
Digital Input Channels		16
Dry Contact	Logic Level 0	Open
	Logic Level 1	Close to GND
Wet Contact	Logic Level 0	+3V maximum
	Logic Level 1	+10 to 50V
Input resistance		10kΩ
Isolation voltage		2500Vdc
Over-voltage Protection		70 VDC
Counter Input Range		Max.100Hz (16 bit)
Latch Value Read		Yes
Power Consumption		1.6W @ 24V

4.1.5 Related Reference

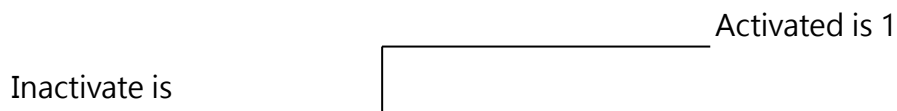
4.1.5.1 Digital Input Active State

Wolf series digital module supports invert DI status, when setting is 0x0000, if the external signal is logic level high, the DI status is 1, if the external signal is logic level low, the reading value is 0; when setting is 0x0001, if the external signal s logic level high, the reading value is 0, if the external signal s logic level low, the DI status is 1. The Modbus setting address is as below:

Address	Function	R/W	Initial Value
40129 (0x0080)	DI CH0~CH15 Input Active Value Define 0x0000: input value 0 for non-signal; 0x0001: input value 1 for non-signal;	R/W	0x0000

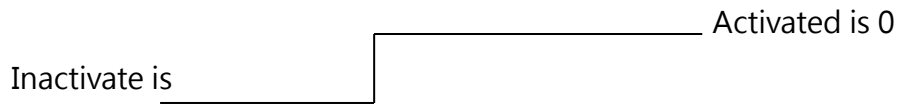
When Input Active Value Define as 0 :

External signal:



When Input Active Value Define as 1:

External signal:



4.1.5.2 Digital Input Status

Following Modbus address can be used to read digital input channel status:

Address	Function	R/W	Initial Value
00001~00016 10001~10016 (0x0000~0x000F)	DI CH0~CH15 Input Status	R	All 0

4.1.5.3 Read/Clear the Digital Input Counter

Module has the function of counting the external pulse number of the digital signal. The maximum frequency must be less than 100Hz. Following Modbus address can be used to read or clear current counter.

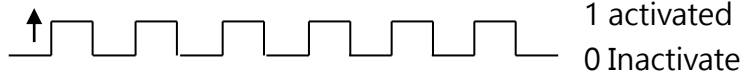
Address	Function	R/W	Initial Value
000145~000160 (0x0090~0x009F)	DI CH0~CH15 Counter Clear	W	All 0
30001~30016 40001~40016 (0x0000~0x000F)	DI CH0~CH15 DI Counter Value	R	All 0x0000
40137 (0x0088)	DI CH0~CH15 Counter Edge Define (Each bit map to corresponding channel) 1=rising edge 0=falling edge	R/W	0x0000

Refer following description for how counter works:

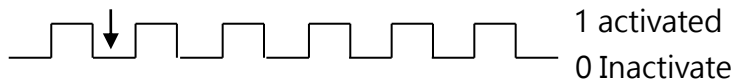
When Input Active Value Define is 0:

External signal :

Rising edge counter:



Falling edge counter:



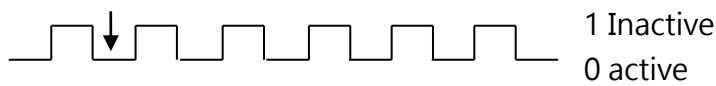
When Input Active Value Define is 1:

External signal :

Rising edge counter:



Falling edge counter:



4.1.5.4 Read/Clear Latch Status

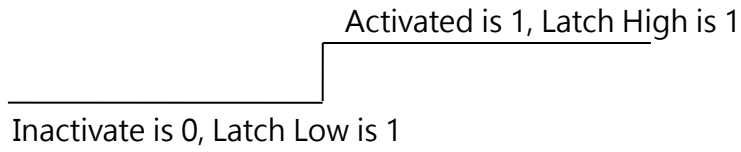
Module has the function of latch the external pulse of the digital signal.

Following Modbus address can be used to read or clear current latch status:

Address	Function	R/W	Initial Value
00033~00048 (0x0020~0x002F)	DI CH0~CH15 Latch High Value	R	All 0
00065~00080 (0x0040~0x004F)	DI CH0~C15 Latch Low Value	R	All 0
000129 (0x0080)	DI CH0~CH15 Latch Clear	W	0

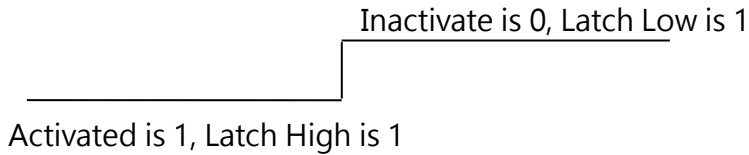
When Input Active Value Define is 0:

External signal:



When Input Active Value Define is 1:

External signal



4.1.6 MODBUS Address

Coil (0xxxx) / (1xxxx)

Address	Function	R/W	Initial Value
00001~00016 10001~10016 (0x0000~0x000F)	DI CH0~CH15 Input Status	R	All 0
00033~00048 (0x0020~0x002F)	DI CH0~CH15 Latch High Value	R	All 0
00065~00080 (0x0040~0x004F)	DI CH0~C15 Latch Low Value	R	All 0
000129 (0x0080)	DI CH0~CH15 Latch Clear	W	0
000145~000160 (0x0090~0x009F)	DI CH0~CH15 Counter Clear	W	All 0

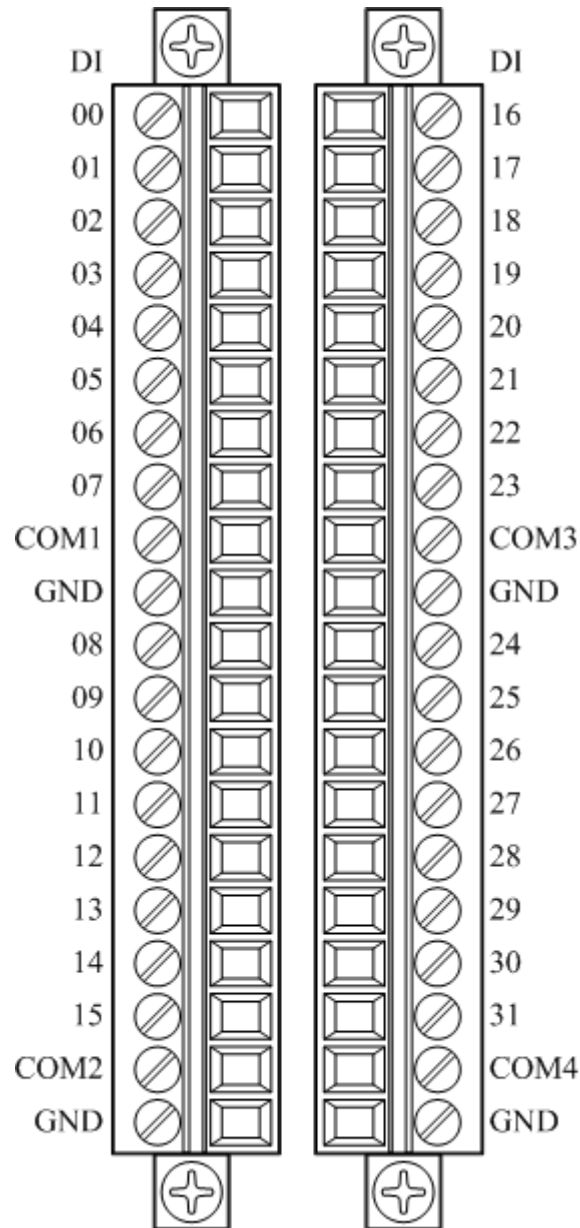
Holding Register (4xxxx) / Input Register (3xxxx)

Address	Function	R/W	Initial Value				
30001~30016 40001~40016 (0x0000~0x000F)	DI CH0~CH15 DI Counter Value	R	All 0x0000				
40129 (0x0080)	DI CH0~CH15 Input Active Value Define 0x0000: input value 0 for non-signal; 0x0001: input value 1 for non-signal;	R/W	0x0000				
40137 (0x0088)	DI CH0~CH15 Counter Edge Define (Each bit map to corresponding channel) 1=rising edge 0=falling edge	R/W	0x0000				
44097 0x1000	Firmware version 2 Bytes <table border="1" style="margin-left: 40px;"> <tr> <td>High Byte</td> <td>Low Byte</td> </tr> <tr> <td>Main version</td> <td>Sub-version</td> </tr> </table>	High Byte	Low Byte	Main version	Sub-version	R	-
High Byte	Low Byte						
Main version	Sub-version						
44098~44105 (0x1001~0x1008)	Module name 16 Bytes (16 ASCII char)	R	-				
44106 (0x1009)	Modbus response delay time (unit: ms) Range: 0~30	R/W	0				

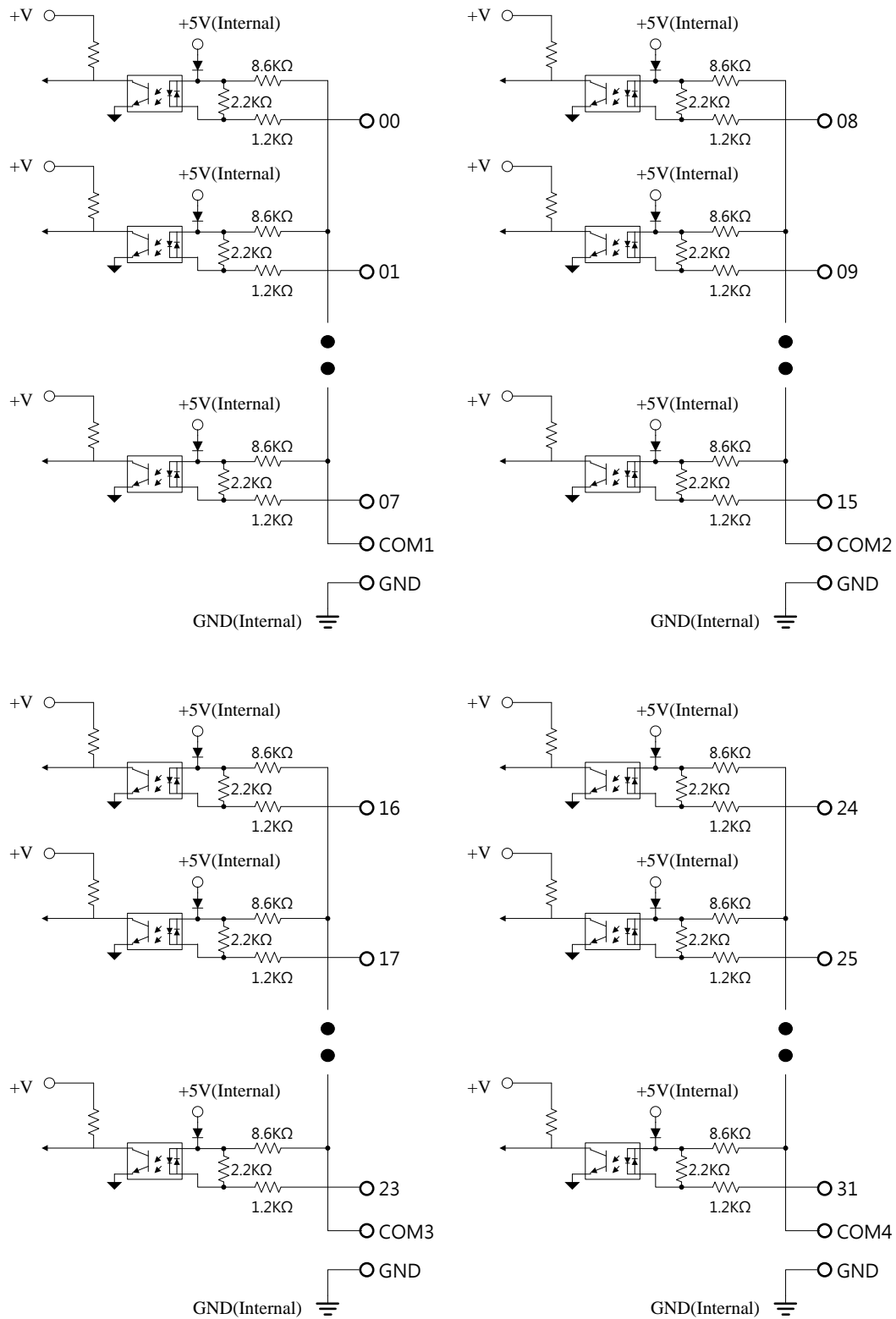
<p>44107 (0x100A)</p>	<p>COM port setting : 2bytes</p> <table border="1" data-bbox="620 253 1023 815"> <thead> <tr> <th data-bbox="620 253 818 320">High Byte</th> <th data-bbox="818 253 1023 320">Low Byte</th> </tr> </thead> <tbody> <tr> <td data-bbox="620 320 818 387">0x00: 8-N-1</td> <td data-bbox="818 320 1023 387">0x03:1.2K</td> </tr> <tr> <td data-bbox="620 387 818 454">0x01: 8-N-2</td> <td data-bbox="818 387 1023 454">0x04:2.4K</td> </tr> <tr> <td data-bbox="620 454 818 521">0x02: 8-E-1</td> <td data-bbox="818 454 1023 521">0x05:4.8K</td> </tr> <tr> <td data-bbox="620 521 818 589">0x03: 8-O-1</td> <td data-bbox="818 521 1023 589">0x06:9.6K</td> </tr> <tr> <td></td> <td data-bbox="818 589 1023 656">0x07:19.2K</td> </tr> <tr> <td></td> <td data-bbox="818 656 1023 723">0x08:38.4K</td> </tr> <tr> <td></td> <td data-bbox="818 723 1023 790">0x09:57.6K</td> </tr> <tr> <td></td> <td data-bbox="818 790 1023 815">0x0A:115.2K</td> </tr> </tbody> </table>	High Byte	Low Byte	0x00: 8-N-1	0x03:1.2K	0x01: 8-N-2	0x04:2.4K	0x02: 8-E-1	0x05:4.8K	0x03: 8-O-1	0x06:9.6K		0x07:19.2K		0x08:38.4K		0x09:57.6K		0x0A:115.2K	<p>R/W</p>	<p>0x0006</p>
High Byte	Low Byte																				
0x00: 8-N-1	0x03:1.2K																				
0x01: 8-N-2	0x04:2.4K																				
0x02: 8-E-1	0x05:4.8K																				
0x03: 8-O-1	0x06:9.6K																				
	0x07:19.2K																				
	0x08:38.4K																				
	0x09:57.6K																				
	0x0A:115.2K																				
<p>44108 (0x100B)</p>	<p>Watch dog timer (unit : 0.1s) Range: 0 ~ 0x00FF</p>	<p>R/W</p>	<p>0x0000</p>																		
<p>44109 (0x100C)</p>	<p>System watch dog 0x0001: Enable 0x0000: Disable</p>	<p>R/W</p>	<p>0x0000</p>																		
<p>44110 (0x100D)</p>	<p>Status of system watch dog 0x0001: Timeout 0x0000: Normal</p>	<p>R/W</p>	<p>-</p>																		
<p>44111 (0x100E)</p>	<p>Counter of communication frame</p>	<p>R</p>	<p>0x0000</p>																		

4.2 W-M1B302 32-Channel Digital Input Module

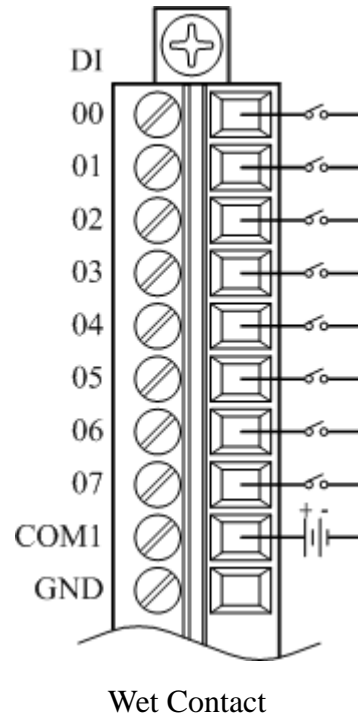
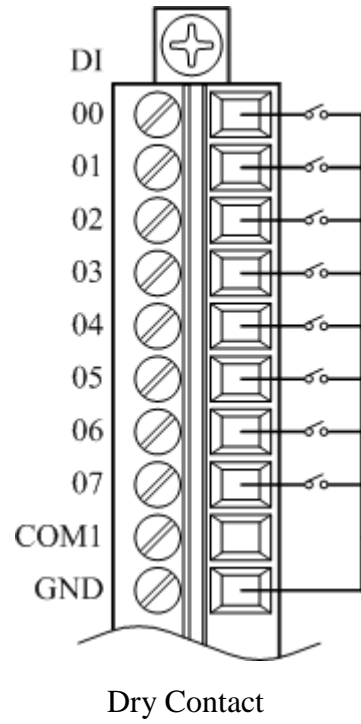
4.2.1 Terminal Assignment



4.2.2 Block Diagram



4.2.3 Channel Connecting



4.2.4 IO Specifications

Digital Input		
Digital Input Channels		32
Dry Contact	Logic Level 0	Open
	Logic Level 1	Close to GND
Wet Contact	Logic Level 0	+3V maximum
	Logic Level 1	+10 to 50V
Input resistance		10kΩ
Isolation voltage		2500Vdc
Over-voltage Protection		70 VDC
Counter Input Range		Max.100Hz (16 bit)
Latch Value Read		Yes
Power Consumption		2W @ 24V

4.2.5 Related Reference

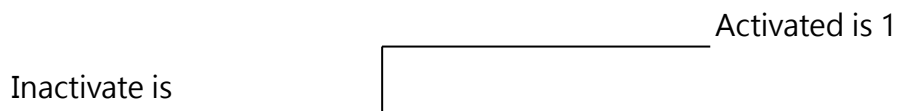
4.2.5.1 Digital Input Active State

Wolf series digital module supports invert DI status, when setting is 0x0000, if the external signal is logic level high, the DI status is 1, if the external signal is logic level low, the reading value is 0; when setting is 0x0001, if the external signal s logic level high, the reading value is 0, if the external signal s logic level low, the DI status is 1. The Modbus setting address is as below:

Address	Function	R/W	Initial Value
40129 (0x0080)	DI CH0~CH31 Input Active Value Define 0x0000: input value 0 for non-signal; 0x0001: input value 1 for non-signal;	R/W	0x0000

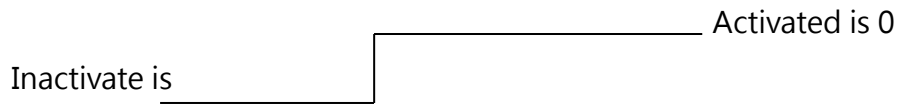
When Input Active Value Define as 0 :

External signal:



When Input Active Value Define as 1:

External signal:



4.2.5.2 Digital Input Status

Following Modbus address can be used to read digital input channel status:

Address	Function	R/W	Initial Value
00001~00032 10001~10032 (0x0000~0x001F)	DI CH0~CH31 Input Status	R	All 0

4.2.5.3 Read/Clear the Digital Input Counter

Module has the function of counting the external pulse number of the digital signal. The maximum frequency must be less than 100Hz. Following Modbus address can be used to read or clear current counter.

Address	Function	R/W	Initial Value
000145~000176 (0x0090~0x00AF)	DI CH0~CH31 Counter Clear	W	All 0
30001~30032 40001~40032 (0x0000~0x001F)	DI CH0~CH31 DI Counter Value	R	All 0x0000
40137 (0x0088)	DI CH0~CH31 Counter Edge Define (Each bit map to corresponding channel) 1=rising edge 0=falling edge	R/W	0x0000

Refer following description for how counter works:

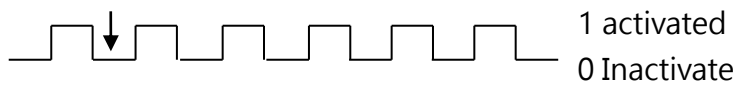
When Input Active Value Define is 0:

External signal :

Rising edge counter:



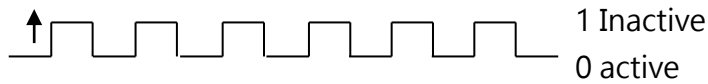
Falling edge counter:



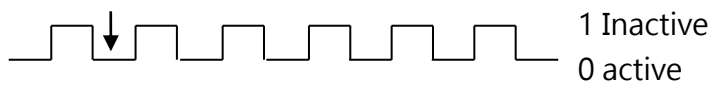
When Input Active Value Define is 1:

External signal :

Rising edge counter:



Falling edge counter:



4.2.5.4 Read/Clear Latch Status

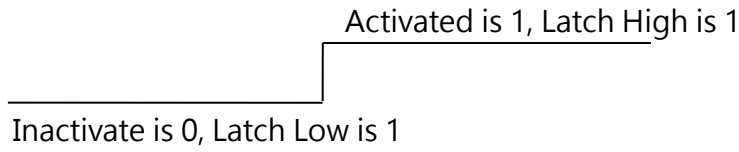
Module has the function of latch the external pulse of the digital signal.

Following Modbus address can be used to read or clear current latch status:

Address	Function	R/W	Initial Value
00033~00064 (0x0020~0x003F)	DI CH0~CH31 Latch High Value	R	All 0
00065~00096 (0x0040~0x005F)	DI CH0~C31 Latch Low Value	R	All 0
000129 (0x0080)	DI CH0~CH31 Latch Clear	W	0

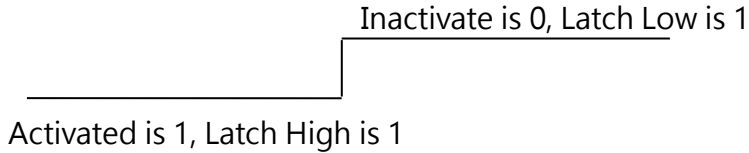
When Input Active Value Define is 0:

External signal:



When Input Active Value Define is 1:

External signal



4.2.6 MODBUS Address

Coil (0xxxx) / (1xxxx)

Address	Function	R/W	Initial Value
00001~00032 10001~10032 (0x0000~0x001F)	DI CH0~CH31 Input Status	R	All 0
00033~00064 (0x0020~0x003F)	DI CH0~CH31 Latch High Value	R	All 0
00065~00096 (0x0040~0x005F)	DI CH0~C31 Latch Low Value	R	All 0
000129 (0x0080)	DI CH0~CH31 Latch Clear	W	0
000145~000176 (0x0090~0x00AF)	DI CH0~CH31 Counter Clear	W	All 0

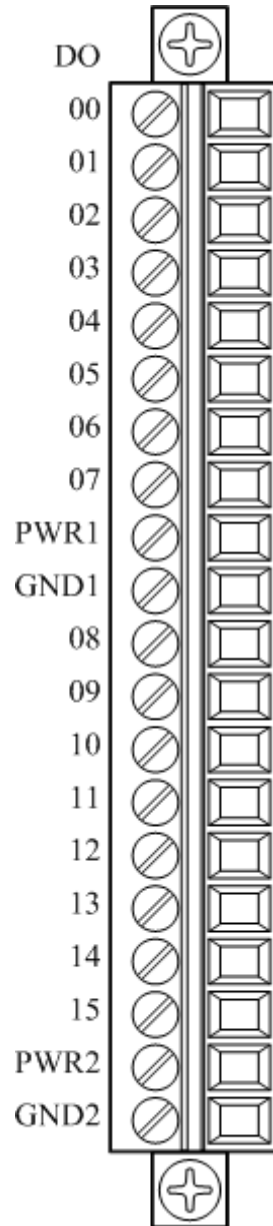
Holding Register (4xxxx) / Input Register (3xxxx)

Address	Function	R/W	Initial Value				
30001~30032 40001~40032 (0x0000~0x000F)	DI CH0~CH31 DI Counter Value	R	All 0x0000				
40129 (0x0080)	DI CH0~CH31 Input Active Value Define 0x0000: input value 0 for non-signal; 0x0001: input value 1 for non-signal;	R/W	0x0000				
40137 (0x0088)	DI CH0~CH31 Counter Edge Define (Each bit map to corresponding channel) 1=rising edge 0=falling edge	R/W	0x0000				
44097 0x1000	Firmware version 2 Bytes <table border="1" style="margin-left: 40px;"> <tr> <td>High Byte</td> <td>Low Byte</td> </tr> <tr> <td>Main version</td> <td>Sub-version</td> </tr> </table>	High Byte	Low Byte	Main version	Sub-version	R	-
High Byte	Low Byte						
Main version	Sub-version						
44098~44105 (0x1001~0x1008)	Module name 16 Bytes (16 ASCII char)	R	-				
44106 (0x1009)	Modbus response delay time (unit: ms) Range: 0~30	R/W	0				

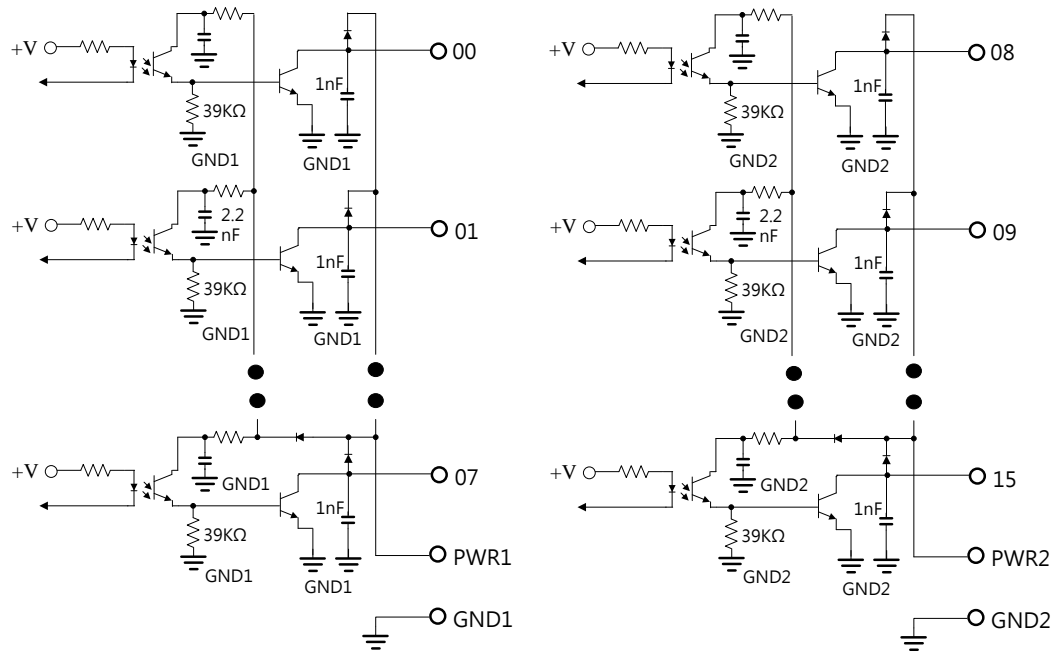
<p>44107 (0x100A)</p>	<p>COM port setting : 2bytes</p> <table border="1" data-bbox="620 253 1023 815"> <thead> <tr> <th data-bbox="620 253 818 320">High Byte</th> <th data-bbox="818 253 1023 320">Low Byte</th> </tr> </thead> <tbody> <tr> <td data-bbox="620 320 818 387">0x00: 8-N-1</td> <td data-bbox="818 320 1023 387">0x03:1.2K</td> </tr> <tr> <td data-bbox="620 387 818 454">0x01: 8-N-2</td> <td data-bbox="818 387 1023 454">0x04:2.4K</td> </tr> <tr> <td data-bbox="620 454 818 521">0x02: 8-E-1</td> <td data-bbox="818 454 1023 521">0x05:4.8K</td> </tr> <tr> <td data-bbox="620 521 818 589">0x03: 8-O-1</td> <td data-bbox="818 521 1023 589">0x06:9.6K</td> </tr> <tr> <td></td> <td data-bbox="818 589 1023 656">0x07:19.2K</td> </tr> <tr> <td></td> <td data-bbox="818 656 1023 723">0x08:38.4K</td> </tr> <tr> <td></td> <td data-bbox="818 723 1023 790">0x09:57.6K</td> </tr> <tr> <td></td> <td data-bbox="818 790 1023 815">0x0A:115.2K</td> </tr> </tbody> </table>	High Byte	Low Byte	0x00: 8-N-1	0x03:1.2K	0x01: 8-N-2	0x04:2.4K	0x02: 8-E-1	0x05:4.8K	0x03: 8-O-1	0x06:9.6K		0x07:19.2K		0x08:38.4K		0x09:57.6K		0x0A:115.2K	<p>R/W</p>	<p>0x0006</p>
High Byte	Low Byte																				
0x00: 8-N-1	0x03:1.2K																				
0x01: 8-N-2	0x04:2.4K																				
0x02: 8-E-1	0x05:4.8K																				
0x03: 8-O-1	0x06:9.6K																				
	0x07:19.2K																				
	0x08:38.4K																				
	0x09:57.6K																				
	0x0A:115.2K																				
<p>44108 (0x100B)</p>	<p>Watch dog timer (unit : 0.1s) Range: 0 ~ 0x00FF</p>	<p>R/W</p>	<p>0x0000</p>																		
<p>44109 (0x100C)</p>	<p>System watch dog 0x0001: Enable 0x0000: Disable</p>	<p>R/W</p>	<p>0x0000</p>																		
<p>44110 (0x100D)</p>	<p>Status of system watch dog 0x0001: Timeout 0x0000: Normal</p>	<p>R/W</p>	<p>-</p>																		
<p>44111 (0x100E)</p>	<p>Counter of communication frame</p>	<p>R</p>	<p>0x0000</p>																		

4.3 W-M1B401 16-Channel Digital Output Module

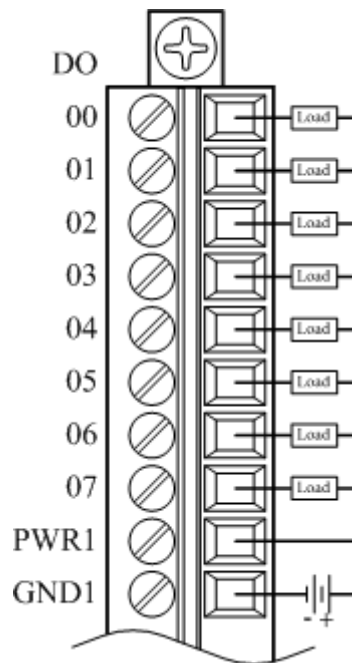
4.3.1 Terminal Assignment



4.3.2 Block Diagram



4.3.3 Channel Connecting



4.3.4 IO Specifications

Digital Output	
Digital Output Channels	16
Output Type	NPN
Output Voltage Range	3.5~30V
Normal Output Current	500mA
Startup Value Setting	Yes
Communication Safety Value Setting	Yes
Power Consumption	0.5W @ 24V

4.3.5 Related Reference

4.3.5.1 Digital Output Active State

Digital Output module supports invert digital output status, when the state is 0x0000, if the output channel is configured as 1, the digital output will be activated, if the output channel is configured as 0, the digital output will be inactivate; when setting is 0x0001, if the output channel is configured as 0, the digital output will be activated, if the output channel is configured as 1, the digital output will be inactivated. The Modbus address setting is as below:

Address	Function	R/W	Initial Value
40385 (0x0180)	DO CH0~CH15 Output Active Value 0x0000: output value 1 for relay active; 0x0001: output value 0 for relay active;	R/W	All 0x0000

When Output Active Value Define is 0:

Digital output

Inactivate when DO is _____ Activated when DO _____

When Output Active Value Define is 1

Digital output

Activated when DO is



4.3.5.2 Digital Output Status

Following Modbus address can be used to read digital output status:

Address	Function	R/W	Initial Value
00257~00272 (0x0100~0x010F)	DO CH0~CH15 Output Status	R/W	-

4.3.5.3 Power-on Value

Module has the function of power-on value. Following Modbus address can be used to configure the power-on value for all channel:

Address	Function	R/W	Initial Value
40257 (0x0100)	DO CH0~CH15 Power On Value Bit 0 is CH0	R/W	All 0x0000

4.3.5.4 Host Watchdog Timer

When the host watchdog function is enabled and timeout occurs, the module will reset all outputs to a safe state in order to ensure the safety of system or device.

Following Modbus address can be used to configure the safe value of digital output:

Address	Function	R/W	Initial Value
40259 (0x0102)	DO CH0~CH15 Safety Output Value Bit 0 is CH0	R/W	All 0x0000

4.3.6 MODBUS Address

Coil (0xxxx) / (1xxxx)

Address	Function	R/W	Initial Value
00257~00272 (0x0100~0x010F)	DO CH0~CH15 Output Status	R/W	-

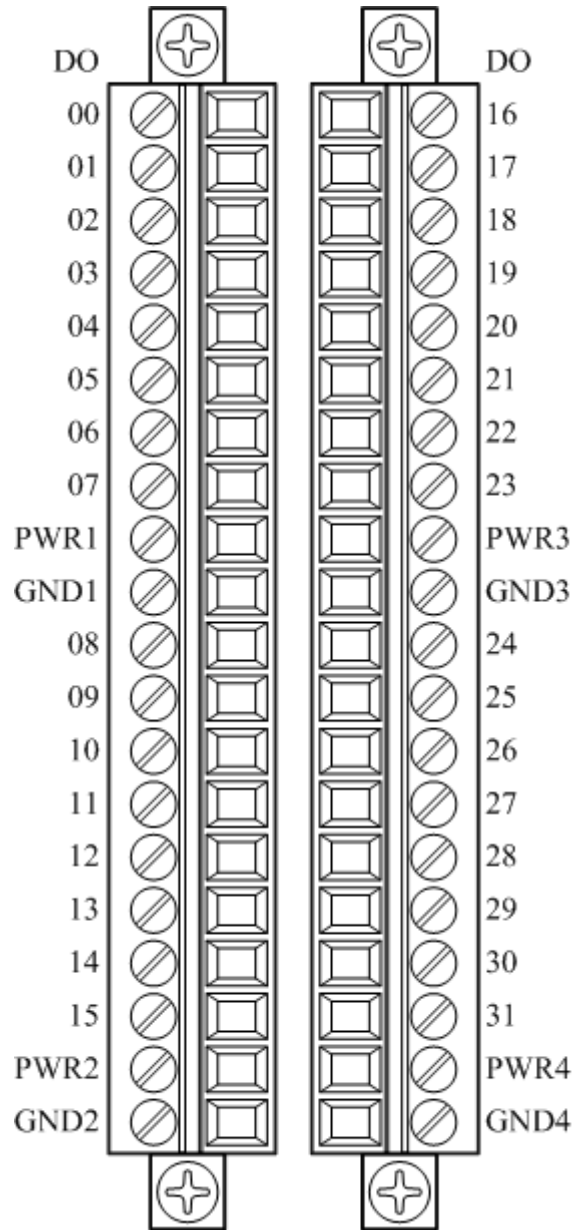
Holding Register(4xxxx) / Input Register(3xxxx)

Address	Function	R/W	Initial Value																		
40257 (0x0100)	DO CH0~CH15 Power On Value (Each bit map to corresponding channel)	R/W	All 0x0000																		
40259 (0x0102)	DO CH0~CH15 Safety Output Value (Each bit map to corresponding channel)	R/W	All 0x0000																		
40385 (0x0180)	DO CH0~CH15 Output Active Value 0x0000: output value 1 for relay active; 0x0001: output value 0 for relay active;	R/W	All 0x0000																		
44097 0x1000	Firmware version 2 Bytes <table border="1" style="margin-left: 40px;"> <tr> <td>High Byte</td> <td>Low Byte</td> </tr> <tr> <td>Main version</td> <td>Sub-version</td> </tr> </table>	High Byte	Low Byte	Main version	Sub-version	R	-														
High Byte	Low Byte																				
Main version	Sub-version																				
44098~44105 (0x1001~0x1008)	Module name 16 Bytes (16 ASCII char)	R	-																		
44106 (0x1009)	Modbus response delay time (unit: ms) Range: 0~30	R/W	0																		
44107 (0x100A)	COM port setting : 2bytes <table border="1" style="margin-left: 40px;"> <tr> <td>High Byte</td> <td>Low Byte</td> </tr> <tr> <td>0x00: 8-N-1</td> <td>0x03:1.2K</td> </tr> <tr> <td>0x01: 8-N-2</td> <td>0x04:2.4K</td> </tr> <tr> <td>0x02: 8-E-1</td> <td>0x05:4.8K</td> </tr> <tr> <td>0x03: 8-O-1</td> <td>0x06:9.6K</td> </tr> <tr> <td></td> <td>0x07:19.2K</td> </tr> <tr> <td></td> <td>0x08:38.4K</td> </tr> <tr> <td></td> <td>0x09:57.6K</td> </tr> <tr> <td></td> <td>0x0A:115.2K</td> </tr> </table>	High Byte	Low Byte	0x00: 8-N-1	0x03:1.2K	0x01: 8-N-2	0x04:2.4K	0x02: 8-E-1	0x05:4.8K	0x03: 8-O-1	0x06:9.6K		0x07:19.2K		0x08:38.4K		0x09:57.6K		0x0A:115.2K	R/W	0x0006
High Byte	Low Byte																				
0x00: 8-N-1	0x03:1.2K																				
0x01: 8-N-2	0x04:2.4K																				
0x02: 8-E-1	0x05:4.8K																				
0x03: 8-O-1	0x06:9.6K																				
	0x07:19.2K																				
	0x08:38.4K																				
	0x09:57.6K																				
	0x0A:115.2K																				
44108 (0x100B)	Watch dog timer (unit : 0.1s) Range: 0 ~ 0x00FF	R/W	0x0000																		

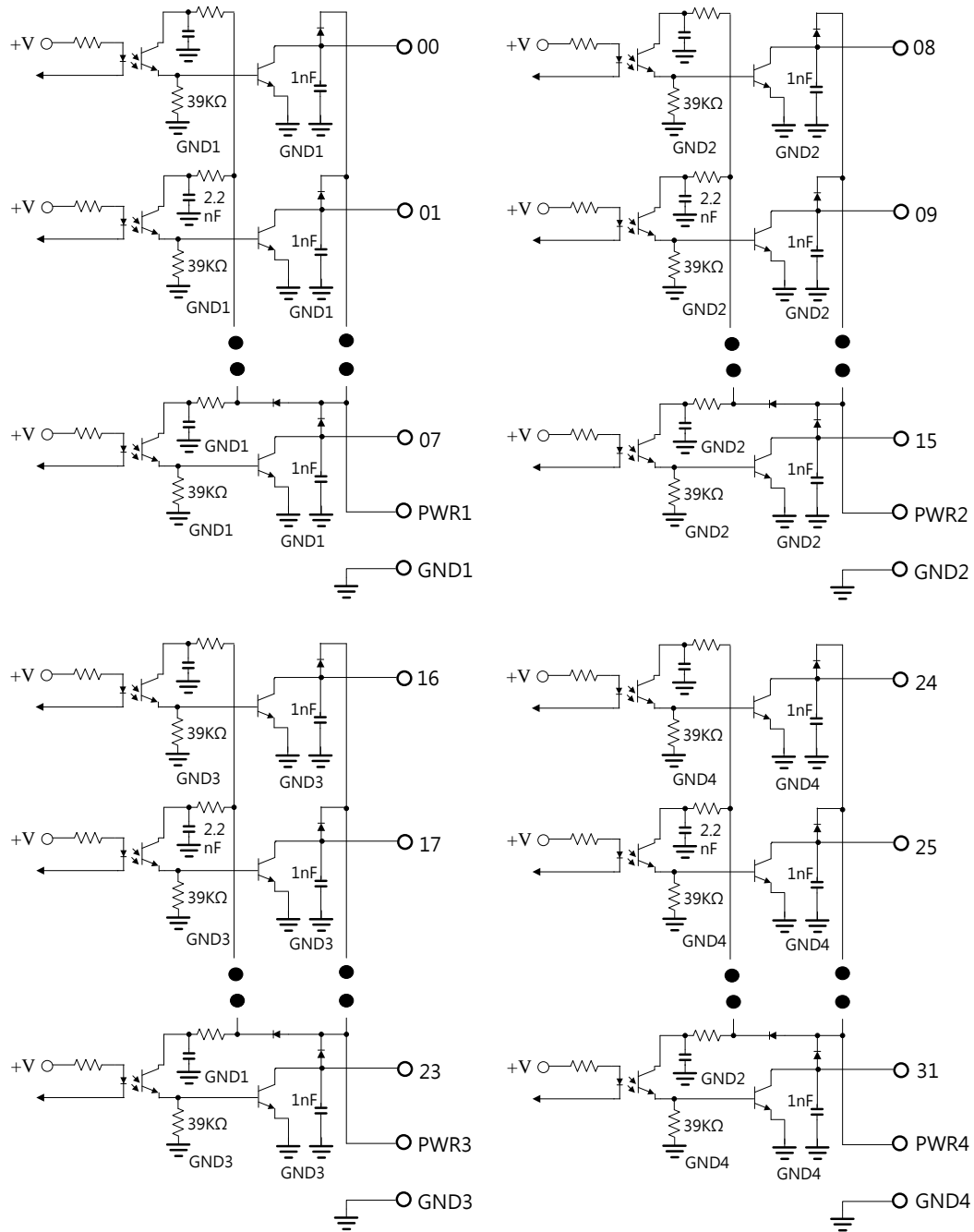
44109 (0x100C)	System watch dog 0x0001: Enable 0x0000: Disable	R/W	0x0000
44110 (0x100D)	Status of system watch dog 0x0001: Timeout 0x0000: Normal	R/W	-
44111 (0x100E)	Counter of communication frame	R	0x0000

4.4 W-M1B402 32-Channel Digital Output Module

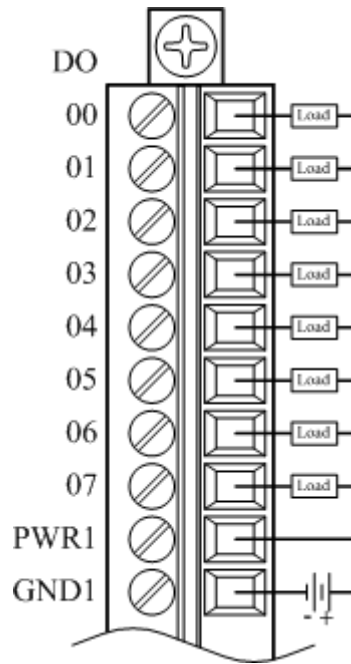
4.4.1 Terminal Assignment



4.4.2 Block Diagram



4.4.3 Channel Connecting



4.4.4 IO Specifications

Digital Output	
Digital Output Channels	32
Output Type	NPN
Output Voltage Range	3.5~30V
Normal Output Current	500mA
Startup Value Setting	Yes
Communication Safety Value Setting	Yes
Power Consumption	0.7W @ 24V

4.4.5 Related Reference

4.4.5.1 Digital Output Active State

Digital Output module supports invert digital output status, when the state is 0x0000, if the output channel is configured as 1, the digital output will be activated, if the output channel is configured as 0, the digital output will be inactivate; when setting is 0x0001, if the output channel is configured as 0, the digital output will be

activated, if the output channel is configured as 1, the digital output will be inactivated. The Modbus address setting is as below:

Address	Function	R/W	Initial Value
40385 (0x0180)	DO CH0~CH31 Output Active Value 0x0000: output value 1 for relay active; 0x0001: output value 0 for relay active;	R/W	All 0x0000

When Output Active Value Define is 0:

Digital output

Inactivate when DO is _____ Activated when DO

When Output Active Value Define is 1

Digital output

Inactivate when DO is _____ Activated when DO is

4.4.5.2 Digital Output Status

Following Modbus address can be used to read digital output status:

Address	Function	R/W	Initial Value
00257~00288 (0x0100~0x011F)	DO CH0~CH31 Output Status	R/W	-

4.4.5.3 Power-on Value

Module has the function of power-on value. Following Modbus address can be used to configure the power-on value for all channel:

Address	Function	R/W	Initial Value
40257	DO CH0~CH31 Power On Value	R/W	All 0x0000

(0x0100)	Bit 0 is CH0		
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4.4.5.4 Host Watchdog Timer

When the host watchdog function is enabled and timeout occurs, the module will reset all outputs to a safe state in order to ensure the safety of system or device.

Following Modbus address can be used to configure the safe value of digital output:

Address	Function	R/W	Initial Value
40259	DO CH0~CH31 Safety Output Value	R/W	All 0x0000
(0x0102)	Bit 0 is CH0		

4.4.6 MODBUS Address

Coil (0xxxx) / (1xxxx)

Address	Function	R/W	Initial Value
00257~00288 (0x0100~0x010F)	DO CH0~CH31 Output Status	R/W	-

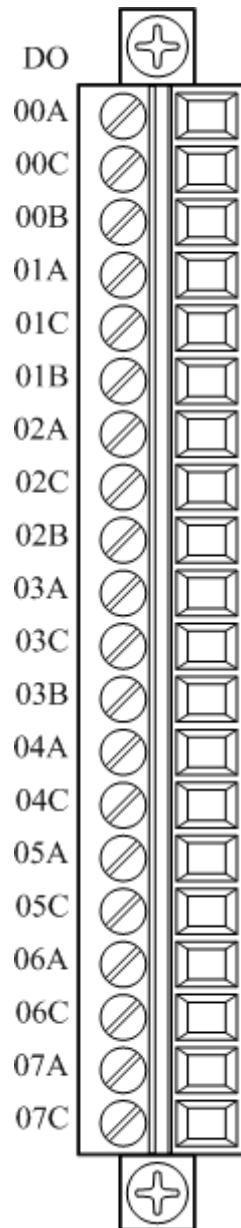
Holding Register(4xxxx) / Input Register(3xxxx)

Address	Function	R/W	Initial Value				
40257 (0x0100)	DO CH0~CH31 Power On Value (Each bit map to corresponding channel)	R/W	All 0x0000				
40259 (0x0102)	DO CH0~CH31 Safety Output Value (Each bit map to corresponding channel)	R/W	All 0x0000				
40385 (0x0180)	DO CH0~CH31 Output Active Value 0x0000: output value 1 for relay active; 0x0001: output value 0 for relay active;	R/W	All 0x0000				
44097 0x1000	Firmware version 2 Bytes <table border="1" style="margin-left: 20px;"> <tr> <td>High Byte</td> <td>Low Byte</td> </tr> <tr> <td>Main version</td> <td>Sub-version</td> </tr> </table>	High Byte	Low Byte	Main version	Sub-version	R	-
High Byte	Low Byte						
Main version	Sub-version						

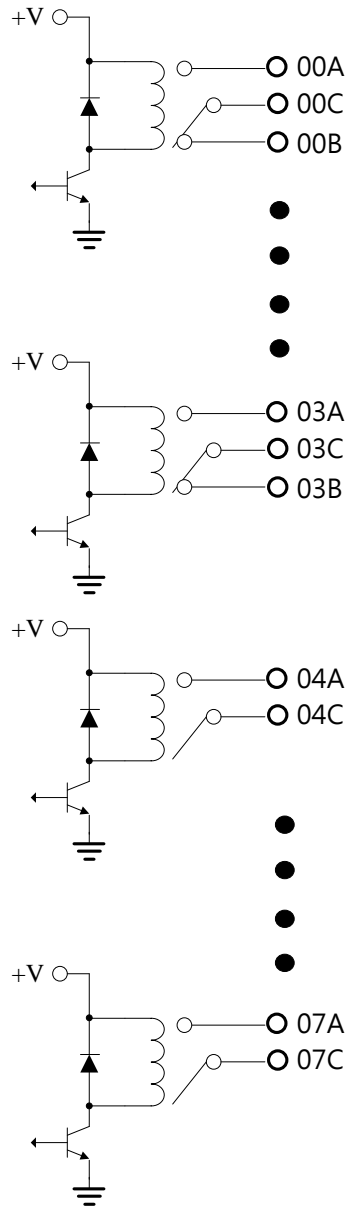
44098~44105 (0x1001~0x1008)	Module name 16 Bytes (16 ASCII char)	R	-																		
44106 (0x1009)	Modbus response delay time (unit: ms) Range: 0~30	R/W	0																		
44107 (0x100A)	COM port setting : 2bytes <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>High Byte</th> <th>Low Byte</th> </tr> </thead> <tbody> <tr> <td>0x00: 8-N-1</td> <td>0x03:1.2K</td> </tr> <tr> <td>0x01: 8-N-2</td> <td>0x04:2.4K</td> </tr> <tr> <td>0x02: 8-E-1</td> <td>0x05:4.8K</td> </tr> <tr> <td>0x03: 8-O-1</td> <td>0x06:9.6K</td> </tr> <tr> <td></td> <td>0x07:19.2K</td> </tr> <tr> <td></td> <td>0x08:38.4K</td> </tr> <tr> <td></td> <td>0x09:57.6K</td> </tr> <tr> <td></td> <td>0x0A:115.2K</td> </tr> </tbody> </table>	High Byte	Low Byte	0x00: 8-N-1	0x03:1.2K	0x01: 8-N-2	0x04:2.4K	0x02: 8-E-1	0x05:4.8K	0x03: 8-O-1	0x06:9.6K		0x07:19.2K		0x08:38.4K		0x09:57.6K		0x0A:115.2K	R/W	0x0006
High Byte	Low Byte																				
0x00: 8-N-1	0x03:1.2K																				
0x01: 8-N-2	0x04:2.4K																				
0x02: 8-E-1	0x05:4.8K																				
0x03: 8-O-1	0x06:9.6K																				
	0x07:19.2K																				
	0x08:38.4K																				
	0x09:57.6K																				
	0x0A:115.2K																				
44108 (0x100B)	Watch dog timer (unit : 0.1s) Range: 0 ~ 0x00FF	R/W	0x0000																		
44109 (0x100C)	System watch dog 0x0001: Enable 0x0000: Disable	R/W	0x0000																		
44110 (0x100D)	Status of system watch dog 0x0001: Timeout 0x0000: Normal	R/W	-																		
44111 (0x100E)	Counter of communication frame	R	0x0000																		

4.5 W-M1B403 8-Channel Relay Output Module

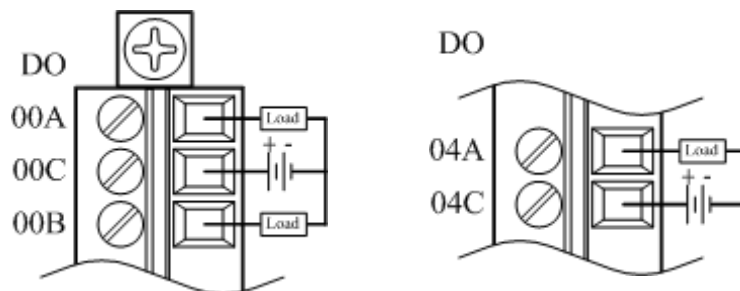
4.5.1 Terminal Assignment



4.5.2 Block Diagram



4.5.3 Channel Connecting



4.5.4 IO Specifications

Digital Output	
Relay Output Channels	4 Form A, 4 Form C
Contact Rating	5A 250VAC/30VDC
Dielectric Strength	3KV
Operate Time	10ms Max.
Release Time	5ms Max.
Electrical Endurance	1x10 ⁵ ops@3A 250VAC/30VDC
Power Consumption	2.4W @ 24V

4.5.5 Related Reference

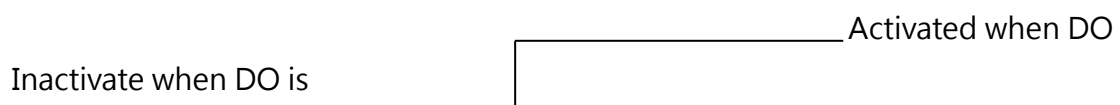
4.5.5.1 Digital Output Active State

Digital Output module supports invert digital output status, when the state is 0x0000, if the output channel is configured as 1, the digital output will be activated, if the output channel is configured as 0, the digital output will be inactivate; when setting is 0x0001, if the output channel is configured as 0, the digital output will be activated, if the output channel is configured as 1, the digital output will be inactivated. The Modbus address setting is as below:

Address	Function	R/W	Initial Value
40385 (0x0180)	DO CH0~CH7 Output Active Value 0x0000: output value 1 for relay active; 0x0001: output value 0 for relay active;	R/W	All 0x0000

When Output Active Value Define is 0:

Digital output



When Output Active Value Define is 1

Digital output

Activated when DO is

Inactivate when DO is

4.5.5.2 Digital Output Status

Following Modbus address can be used to read digital output status:

Address	Function	R/W	Initial Value
00257~00264 (0x0100~0x0107)	DO CH0~CH7 Output Status	R/W	-

4.5.5.3 Power-on Value

Module has the function of power-on value. Following Modbus address can be used to configure the power-on value for all channel:

Address	Function	R/W	Initial Value
40257 (0x0100)	DO CH0~CH7 Power On Value Bit 0 is CH0	R/W	All 0x0000

4.5.5.4 Host Watchdog Timer

When the host watchdog function is enabled and timeout occurs, the module will reset all outputs to a safe state in order to ensure the safety of system or device.

Following Modbus address can be used to configure the safe value of digital output:

Address	Function	R/W	Initial Value
40259 (0x0102)	DO CH0~CH7 Safety Output Value Bit 0 is CH0	R/W	All 0x0000

4.5.6 MODBUS Address

Coil (0xxxx) / (1xxxx)

Address	Function	R/W	Initial Value
---------	----------	-----	---------------

00257~00264 (0x0100~0x0107)	DO CH0~CH7 Output Status	R/W	-
--------------------------------	--------------------------	-----	---

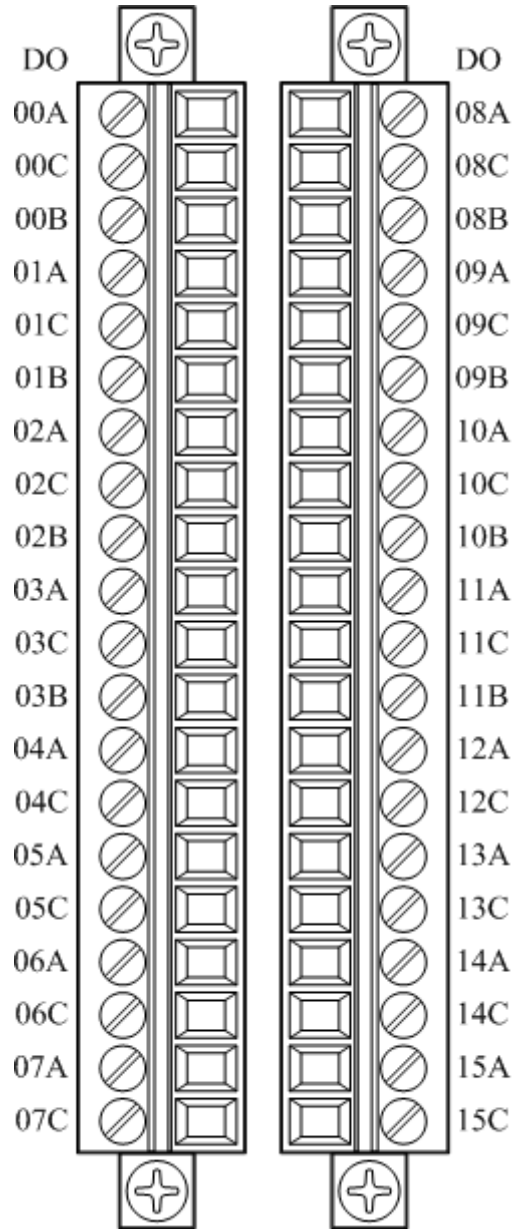
Holding Register(4xxxx) / Input Register(3xxxx)

Address	Function	R/W	Initial Value				
40257 (0x0100)	DO CH0~CH7 Power On Value (Each bit map to corresponding channel)	R/W	All 0x0000				
40259 (0x0102)	DO CH0~CH7 Safety Output Value (Each bit map to corresponding channel)	R/W	All 0x0000				
40385 (0x0180)	DO CH0~CH7 Output Active Value 0x0000: output value 1 for relay active; 0x0001: output value 0 for relay active;	R/W	All 0x0000				
44097 0x1000	Firmware version 2 Bytes <table border="1" style="margin-left: 20px;"> <tr> <td>High Byte</td> <td>Low Byte</td> </tr> <tr> <td>Main version</td> <td>Sub-version</td> </tr> </table>	High Byte	Low Byte	Main version	Sub-version	R	-
High Byte	Low Byte						
Main version	Sub-version						
44098~44105 (0x1001~0x1008)	Module name 16 Bytes (16 ASCII char)	R	-				
44106 (0x1009)	Modbus response delay time (unit: ms) Range: 0~30	R/W	0				

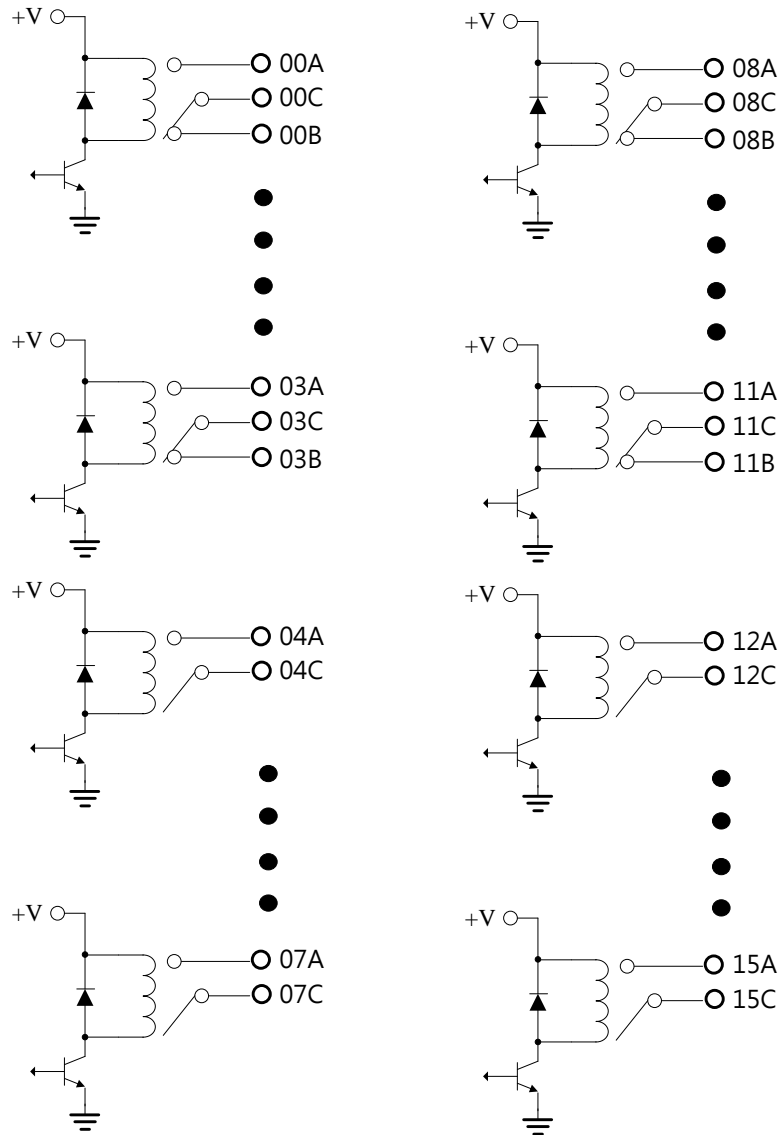
<p>44107 (0x100A)</p>	<p>COM port setting : 2bytes</p> <table border="1" data-bbox="619 253 1059 817"> <thead> <tr> <th data-bbox="619 253 847 315">High Byte</th> <th data-bbox="847 253 1059 315">Low Byte</th> </tr> </thead> <tbody> <tr> <td data-bbox="619 315 847 378">0x00: 8-N-1</td> <td data-bbox="847 315 1059 378">0x03:1.2K</td> </tr> <tr> <td data-bbox="619 378 847 441">0x01: 8-N-2</td> <td data-bbox="847 378 1059 441">0x04:2.4K</td> </tr> <tr> <td data-bbox="619 441 847 504">0x02: 8-E-1</td> <td data-bbox="847 441 1059 504">0x05:4.8K</td> </tr> <tr> <td data-bbox="619 504 847 566">0x03: 8-O-1</td> <td data-bbox="847 504 1059 566">0x06:9.6K</td> </tr> <tr> <td></td> <td data-bbox="847 566 1059 629">0x07:19.2K</td> </tr> <tr> <td></td> <td data-bbox="847 629 1059 692">0x08:38.4K</td> </tr> <tr> <td></td> <td data-bbox="847 692 1059 754">0x09:57.6K</td> </tr> <tr> <td></td> <td data-bbox="847 754 1059 817">0x0A:115.2K</td> </tr> </tbody> </table>	High Byte	Low Byte	0x00: 8-N-1	0x03:1.2K	0x01: 8-N-2	0x04:2.4K	0x02: 8-E-1	0x05:4.8K	0x03: 8-O-1	0x06:9.6K		0x07:19.2K		0x08:38.4K		0x09:57.6K		0x0A:115.2K	<p>R/W</p>	<p>0x0006</p>
High Byte	Low Byte																				
0x00: 8-N-1	0x03:1.2K																				
0x01: 8-N-2	0x04:2.4K																				
0x02: 8-E-1	0x05:4.8K																				
0x03: 8-O-1	0x06:9.6K																				
	0x07:19.2K																				
	0x08:38.4K																				
	0x09:57.6K																				
	0x0A:115.2K																				
<p>44108 (0x100B)</p>	<p>Watch dog timer (unit : 0.1s) Range: 0 ~ 0x00FF</p>	<p>R/W</p>	<p>0x0000</p>																		
<p>44109 (0x100C)</p>	<p>System watch dog 0x0001: Enable 0x0000: Disable</p>	<p>R/W</p>	<p>0x0000</p>																		
<p>44110 (0x100D)</p>	<p>Status of system watch dog 0x0001: Timeout 0x0000: Normal</p>	<p>R/W</p>	<p>-</p>																		
<p>44111 (0x100E)</p>	<p>Counter of communication frame</p>	<p>R</p>	<p>0x0000</p>																		

4.6 W-M1B404 16-Channel Relay Output Module

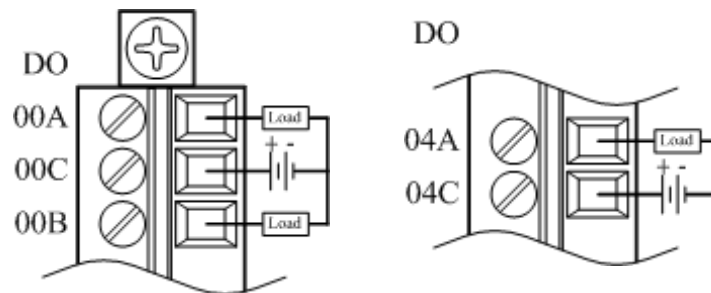
4.6.1 Terminal Assignment



4.6.2 Block Diagram



4.6.3 Channel Connecting



4.6.4 IO Specifications

Digital Output	
Relay Output Channels	8 Form A, 8 Form C
Contact Rating	5A 250VAC/30VDC
Dielectric Strength	3KV
Operate Time	10ms Max.
Release Time	5ms Max.
Electrical Endurance	1x10 ⁵ ops@3A 250VAC/30VDC
Power Consumption	4.8W @ 24V

4.6.5 Related Reference

4.6.5.1 Digital Output Active State

Digital Output module supports invert digital output status, when the state is 0x0000, if the output channel is configured as 1, the digital output will be activated, if the output channel is configured as 0, the digital output will be inactivate; when setting is 0x0001, if the output channel is configured as 0, the digital output will be activated, if the output channel is configured as 1, the digital output will be inactivated. The Modbus address setting is as below:

Address	Function	R/W	Initial Value
40385 (0x0180)	DO CH0~CH15 Output Active Value 0x0000: output value 1 for relay active; 0x0001: output value 0 for relay active;	R/W	All 0x0000

When Output Active Value Define is 0:

Digital output

Inactivate when DO is _____ Activated when DO _____

When Output Active Value Define is 1

Digital output

Activated when DO is



4.6.5.2 Digital Output Status

Following Modbus address can be used to read digital output status:

Address	Function	R/W	Initial Value
00257~00272 (0x0100~0x010F)	DO CH0~CH15 Output Status	R/W	-

4.6.5.3 Power-on Value

Module has the function of power-on value. Following Modbus address can be used to configure the power-on value for all channel:

Address	Function	R/W	Initial Value
40257 (0x0100)	DO CH0~CH15 Power On Value Bit 0 is CH0	R/W	All 0x0000

4.6.5.4 Host Watchdog Timer

When the host watchdog function is enabled and timeout occurs, the module will reset all outputs to a safe state in order to ensure the safety of system or device.

Following Modbus address can be used to configure the safe value of digital output:

Address	Function	R/W	Initial Value
40259 (0x0102)	DO CH0~CH15 Safety Output Value Bit 0 is CH0	R/W	All 0x0000

4.6.6 MODBUS Address

Coil (0xxxx) / (1xxxx)

Address	Function	R/W	Initial Value
00257~00272 (0x0100~0x010F)	DO CH0~CH15 Output Status	R/W	-

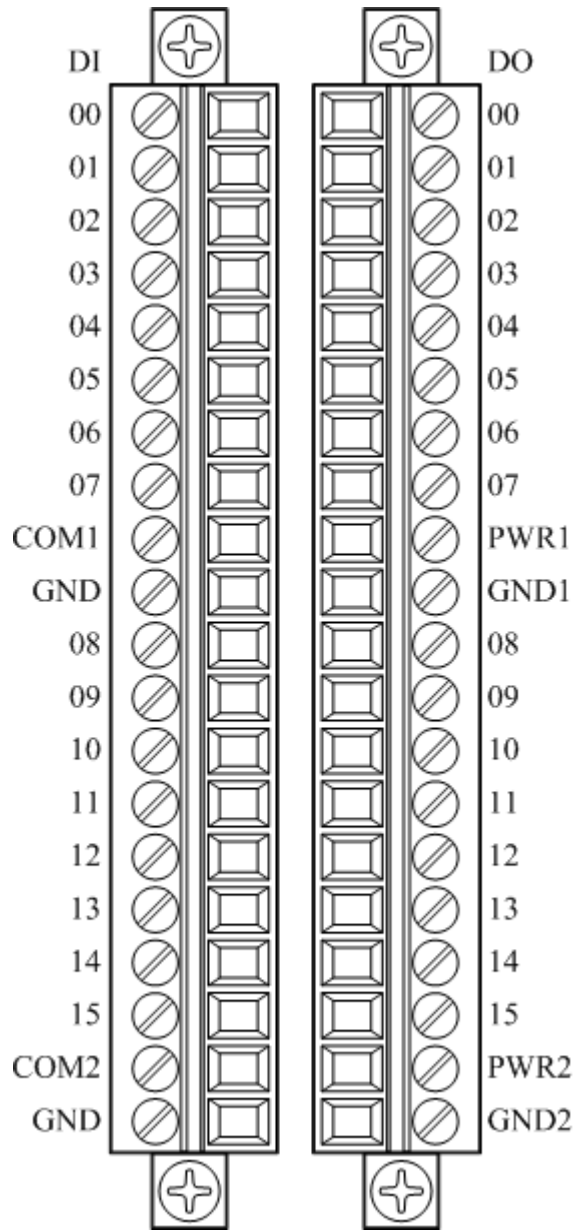
Holding Register(4xxxx) / Input Register(3xxxx)

Address	Function	R/W	Initial Value																		
40257 (0x0100)	DO CH0~CH15 Power On Value (Each bit map to corresponding channel)	R/W	All 0x0000																		
40259 (0x0102)	DO CH0~CH15 Safety Output Value (Each bit map to corresponding channel)	R/W	All 0x0000																		
40385 (0x0180)	DO CH0~CH15 Output Active Value 0x0000: output value 1 for relay active; 0x0001: output value 0 for relay active;	R/W	All 0x0000																		
44097 0x1000	Firmware version 2 Bytes <table border="1" style="margin-left: 40px;"> <tr> <td>High Byte</td> <td>Low Byte</td> </tr> <tr> <td>Main version</td> <td>Sub-version</td> </tr> </table>	High Byte	Low Byte	Main version	Sub-version	R	-														
High Byte	Low Byte																				
Main version	Sub-version																				
44098~44105 (0x1001~0x1008)	Module name 16 Bytes (16 ASCII char)	R	-																		
44106 (0x1009)	Modbus response delay time (unit: ms) Range: 0~30	R/W	0																		
44107 (0x100A)	COM port setting : 2bytes <table border="1" style="margin-left: 40px;"> <tr> <td>High Byte</td> <td>Low Byte</td> </tr> <tr> <td>0x00: 8-N-1</td> <td>0x03:1.2K</td> </tr> <tr> <td>0x01: 8-N-2</td> <td>0x04:2.4K</td> </tr> <tr> <td>0x02: 8-E-1</td> <td>0x05:4.8K</td> </tr> <tr> <td>0x03: 8-O-1</td> <td>0x06:9.6K</td> </tr> <tr> <td></td> <td>0x07:19.2K</td> </tr> <tr> <td></td> <td>0x08:38.4K</td> </tr> <tr> <td></td> <td>0x09:57.6K</td> </tr> <tr> <td></td> <td>0x0A:115.2K</td> </tr> </table>	High Byte	Low Byte	0x00: 8-N-1	0x03:1.2K	0x01: 8-N-2	0x04:2.4K	0x02: 8-E-1	0x05:4.8K	0x03: 8-O-1	0x06:9.6K		0x07:19.2K		0x08:38.4K		0x09:57.6K		0x0A:115.2K	R/W	0x0006
High Byte	Low Byte																				
0x00: 8-N-1	0x03:1.2K																				
0x01: 8-N-2	0x04:2.4K																				
0x02: 8-E-1	0x05:4.8K																				
0x03: 8-O-1	0x06:9.6K																				
	0x07:19.2K																				
	0x08:38.4K																				
	0x09:57.6K																				
	0x0A:115.2K																				
44108 (0x100B)	Watch dog timer (unit : 0.1s) Range: 0 ~ 0x00FF	R/W	0x0000																		

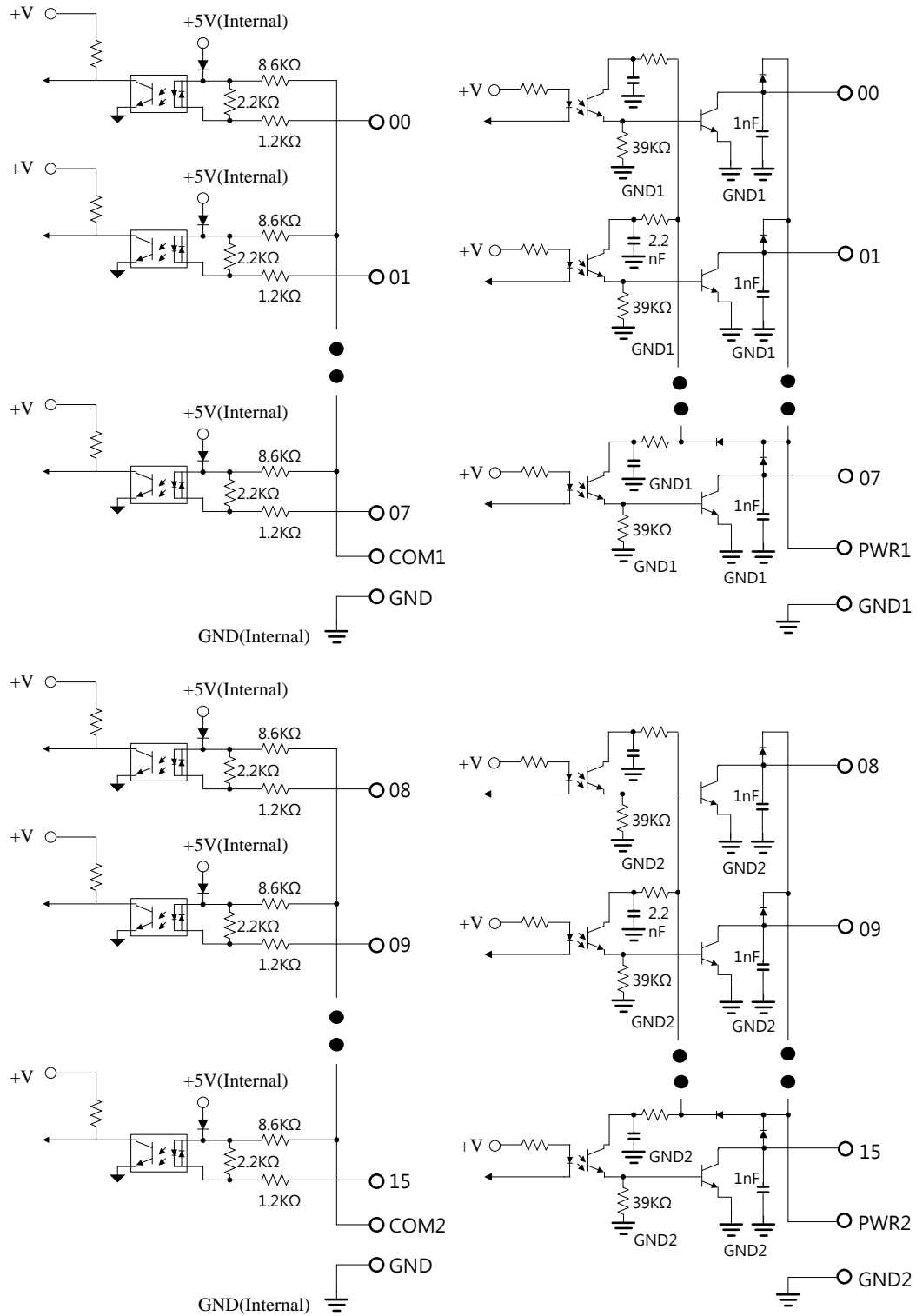
44109 (0x100C)	System watch dog 0x0001: Enable 0x0000: Disable	R/W	0x0000
44110 (0x100D)	Status of system watch dog 0x0001: Timeout 0x0000: Normal	R/W	-
44111 (0x100E)	Counter of communication frame	R	0x0000

4.7 W-M1B501 16-Channel Digital Input/16-Channel Digital Output Module

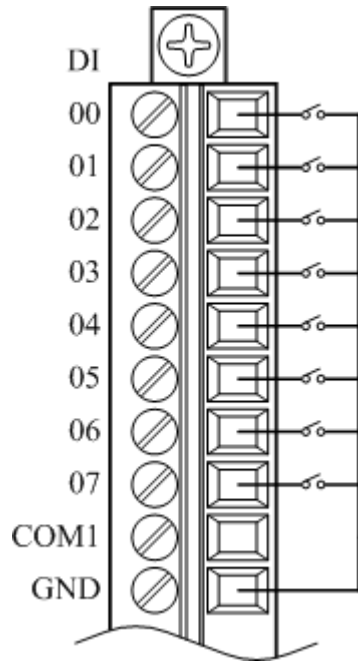
4.7.1 Terminal Assignment



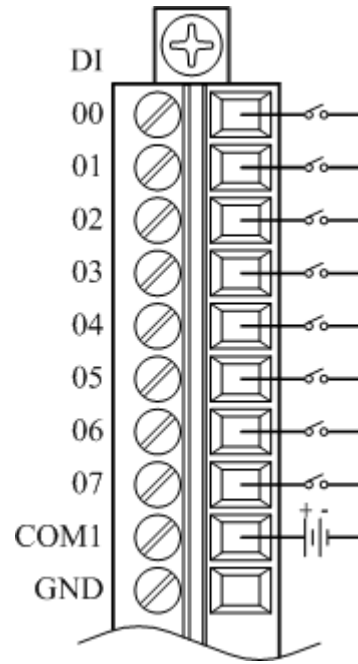
4.7.2 Block Diagram



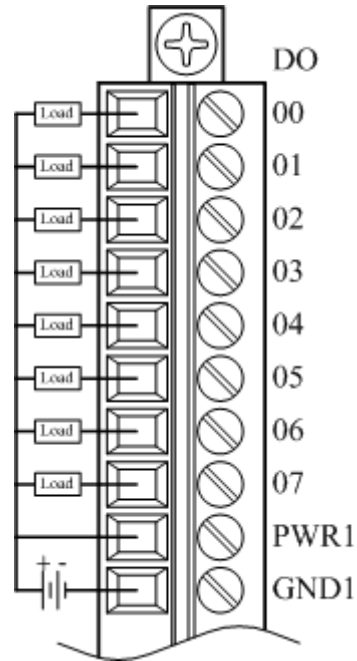
4.7.3 Channel Connecting



Dry Contact



Wet Contact



4.7.4 IO Specifications

Digital Input		
Digital Input Channels		16
Dry Contact	Logic Level 0	Open
	Logic Level 1	Close to GND
Wet Contact	Logic Level 0	+3V maximum
	Logic Level 1	+10 to 50V
Input resistance		10k Ω
Isolation voltage		2500Vdc
Over-voltage Protection		70 VDC
Counter Input Range		Max.100Hz(16 bit)
Latch Value Read		Yes
Digital Output		
Digital Output Channels		16
Output Type		NPN
Output Voltage Range		3.5~30V
Normal Output Current		500mA
Startup Value Setting		Yes
Communication Safety Value Setting		Yes
Power Consumption		2.8W @ 24V

4.7.5 Related Reference

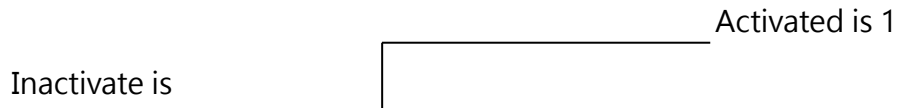
4.7.5.1 Digital Input Active State

Wolf series digital module supports invert DI status, when setting is 0x0000, if the external signal is logic level high, the DI status is 1, if the external signal is logic level low, the reading value is 0; when setting is 0x0001, if the external signal s logic level high, the reading value is 0, if the external signal s logic level low, the DI status is 1. The Modbus setting address is as below:

Address	Function	R/W	Initial Value
40129 (0x0080)	DI CH0~CH15 Input Active Value Define 0x0000: input value 0 for non-signal; 0x0001: input value 1 for non-signal;	R/W	0x0000

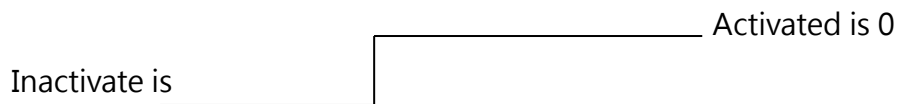
When Input Active Value Define as 0 :

External signal:



When Input Active Value Define as 1:

External signal:



4.7.5.2 Digital Input Status

Following Modbus address can be used to read digital input channel status:

Address	Function	R/W	Initial Value
00001~00016 10001~10016 (0x0000~0x000F)	DI CH0~CH15 Input Status	R	All 0

4.7.5.3 Read/Clear the Digital Input Counter

Module has the function of counting the external pulse number of the digital signal. The maximum frequency must be less than 100Hz. Following Modbus address can be used to read or clear current counter.

Address	Function	R/W	Initial Value
000145~000160 (0x0090~0x009F)	DI CH0~CH15 Counter Clear	W	All 0
30001~30016 40001~40016	DI CH0~CH15 DI Counter Value	R	All 0x0000

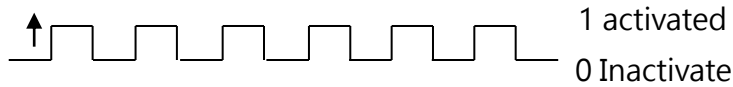
(0x0000~0x000F)			
40137 (0x0088)	DI CH0~CH15 Counter Edge Define (Each bit map to corresponding channel) 1=rising edge 0=falling edge	R/W	0x0000

Refer following description for how counter works:

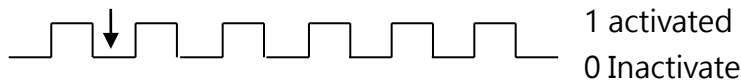
When Input Active Value Define is 0:

External signal :

Rising edge counter:



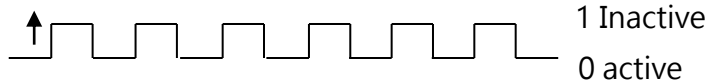
Falling edge counter:



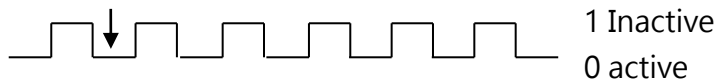
When Input Active Value Define is 1:

External signal :

Rising edge counter:



Falling edge counter:



4.7.5.4 Read/Clear Latch Status

Module has the function of latch the external pulse of the digital signal.

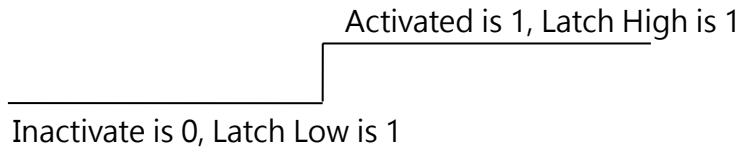
Following Modbus address can be used to read or clear current latch status:

Address	Function	R/W	Initial Value
00033~00048	DI CH0~CH15 Latch High Value	R	All 0

(0x0020~0x002F)			
00065~00080 (0x0040~0x004F)	DI CH0~C15 Latch Low Value	R	All 0
000129 (0x0080)	DI CH0~CH15 Latch Clear	W	0

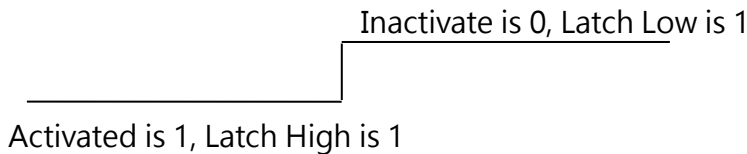
When Input Active Value Define is 0:

External signal:



When Input Active Value Define is 1:

External signal



4.7.5.5 Digital Output Active State

Digital Output module supports invert digital output status, when the state is 0x0000, if the output channel is configured as 1, the digital output will be activated, if the output channel is configured as 0, the digital output will be inactivate; when setting is 0x0001, if the output channel is configured as 0, the digital output will be activated, if the output channel is configured as 1, the digital output will be inactivated. The Modbus address setting is as below:

Address	Function	R/W	Initial Value
40385 (0x0180)	DO CH0~CH15 Output Active Value 0x0000: output value 1 for relay active; 0x0001: output value 0 for relay active;	R/W	All 0x0000

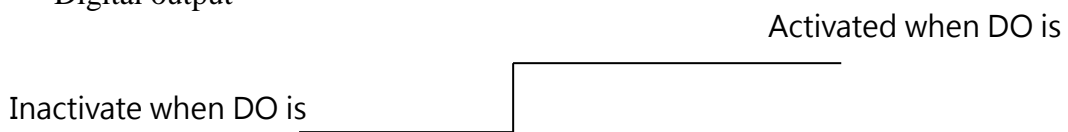
When Output Active Value Define is 0:

Digital output



When Output Active Value Define is 1

Digital output



4.7.5.6 Digital Output Status

Following Modbus address can be used to read digital output status:

Address	Function	R/W	Initial Value
00257~00272 (0x0100~0x010F)	DO CH0~CH15 Output Status	R/W	-

4.7.5.7 Power-on Value

Module has the function of power-on value. Following Modbus address can be used to configure the power-on value for all channel:

Address	Function	R/W	Initial Value
40257 (0x0100)	DO CH0~CH15 Power On Value Bit 0 is CH0	R/W	All 0x0000

4.7.5.8 Host Watchdog Timer

When the host watchdog function is enabled and timeout occurs, the module will reset all outputs to a safe state in order to ensure the safety of system or device.

Following Modbus address can be used to configure the safe value of digital output:

Address	Function	R/W	Initial Value
40259 (0x0102)	DO CH0~CH15 Safety Output Value Bit 0 is CH0	R/W	All 0x0000

4.7.6 MODBUS Address

Coil (0xxxx) / (1xxxx)

Address	Function	R/W	Initial Value
00001~00016 10001~10016 (0x0000~0x000F)	DI CH0~CH15 Input Status	R	All 0
00033~00048 (0x0020~0x002F)	DI CH0~CH15 Latch High Value	R	All 0
00065~00080 (0x0040~0x004F)	DI CH0~C15 Latch Low Value	R	All 0
000129 (0x0080)	DI CH0~CH15 Latch Clear	W	0
000145~000160 (0x0090~0x009F)	DI CH0~CH15 Counter Clear	W	All 0
00257~00272 (0x0100~0x010F)	DO CH0~CH15 Output Status	R/W	-

Holding Register (4xxxx) / Input Register (3xxxx)

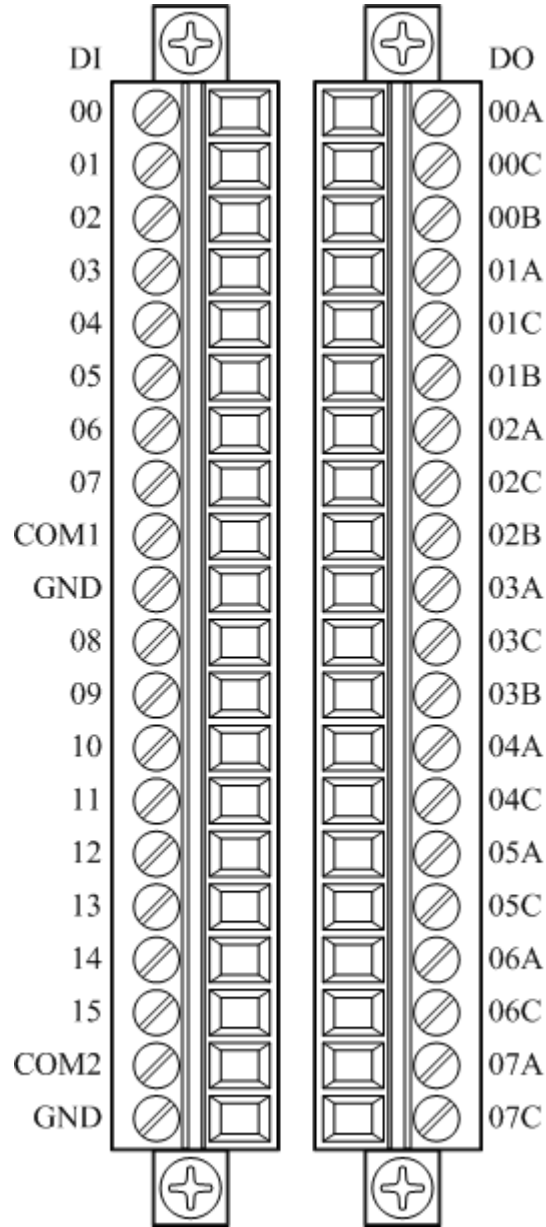
Address	Function	R/W	Initial Value
30001~30016 40001~40016 (0x0000~0x000F)	DI CH0~CH15 DI Counter Value	R	All 0x0000
40129 (0x0080)	DI CH0~CH15 Input Active Value Define 0x0000: input value 0 for non-signal; 0x0001: input value 1 for non-signal;	R/W	0x0000

40137 (0x0088)	DI CH0~CH15 Counter Edge Define (Each bit map to corresponding channel) 1=rising edge 0=falling edge	R/W	0x0000																		
40257 (0x0100)	DO CH0~CH15 Power On Value (Each bit map to corresponding channel)	R/W	All 0x0000																		
40259 (0x0102)	DO CH0~CH15 Safety Output Value (Each bit map to corresponding channel)	R/W	All 0x0000																		
40385 (0x0180)	DO CH0~CH15 Output Active Value 0x0000: output value 1 for relay active; 0x0001: output value 0 for relay active;	R/W	All 0x0000																		
44097 0x1000	Firmware version 2 Bytes <table border="1" style="margin-left: 40px;"> <tr> <td>High Byte</td> <td>Low Byte</td> </tr> <tr> <td>Main version</td> <td>Sub-version</td> </tr> </table>	High Byte	Low Byte	Main version	Sub-version	R	-														
High Byte	Low Byte																				
Main version	Sub-version																				
44098~44105 (0x1001~0x1008)	Module name 16 Bytes (16 ASCII char)	R	-																		
44106 (0x1009)	Modbus response delay time (unit: ms) Range: 0~30	R/W	0																		
44107 (0x100A)	COM port setting : 2bytes <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>High Byte</th> <th>Low Byte</th> </tr> </thead> <tbody> <tr> <td>0x00: 8-N-1</td> <td>0x03:1.2K</td> </tr> <tr> <td>0x01: 8-N-2</td> <td>0x04:2.4K</td> </tr> <tr> <td>0x02: 8-E-1</td> <td>0x05:4.8K</td> </tr> <tr> <td>0x03: 8-O-1</td> <td>0x06:9.6K</td> </tr> <tr> <td></td> <td>0x07:19.2K</td> </tr> <tr> <td></td> <td>0x08:38.4K</td> </tr> <tr> <td></td> <td>0x09:57.6K</td> </tr> <tr> <td></td> <td>0x0A:115.2K</td> </tr> </tbody> </table>	High Byte	Low Byte	0x00: 8-N-1	0x03:1.2K	0x01: 8-N-2	0x04:2.4K	0x02: 8-E-1	0x05:4.8K	0x03: 8-O-1	0x06:9.6K		0x07:19.2K		0x08:38.4K		0x09:57.6K		0x0A:115.2K	R/W	0x0006
High Byte	Low Byte																				
0x00: 8-N-1	0x03:1.2K																				
0x01: 8-N-2	0x04:2.4K																				
0x02: 8-E-1	0x05:4.8K																				
0x03: 8-O-1	0x06:9.6K																				
	0x07:19.2K																				
	0x08:38.4K																				
	0x09:57.6K																				
	0x0A:115.2K																				
44108 (0x100B)	Watch dog timer (unit : 0.1s) Range: 0 ~ 0x00FF	R/W	0x0000																		

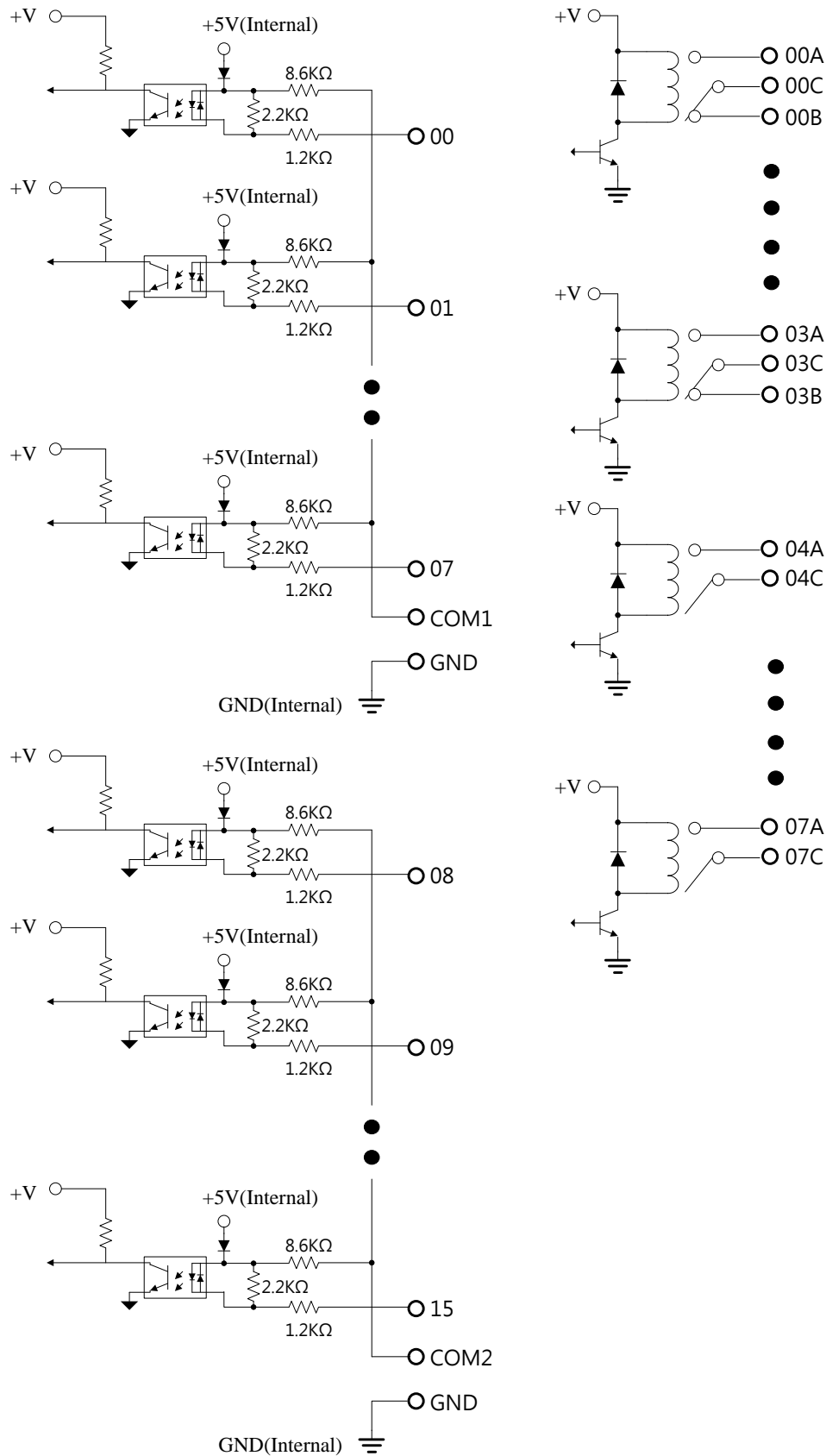
44109 (0x100C)	System watch dog 0x0001: Enable 0x0000: Disable	R/W	0x0000
44110 (0x100D)	Status of system watch dog 0x0001: Timeout 0x0000: Normal	R/W	-
44111 (0x100E)	Counter of communication frame	R	0x0000

4.8 W-M1B502 16-Channel Digital Input/8-Channel Relay Output Module

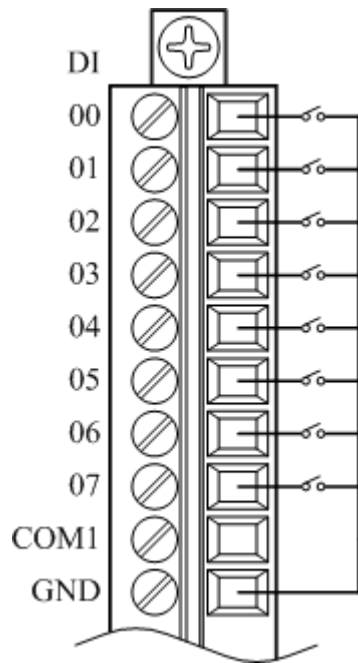
4.8.1 Terminal Assignment



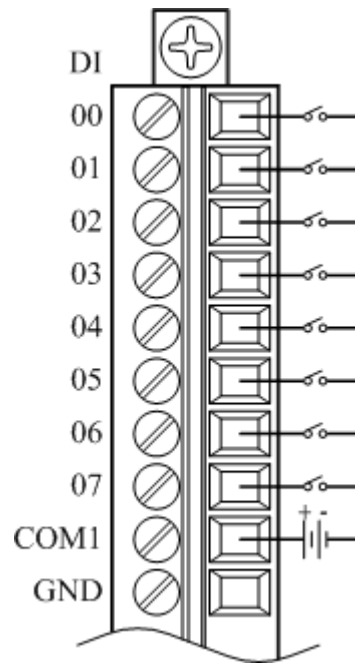
4.8.2 Block Diagram



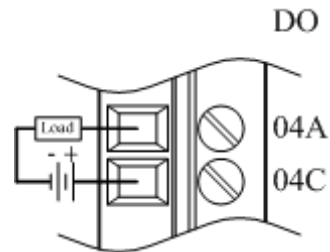
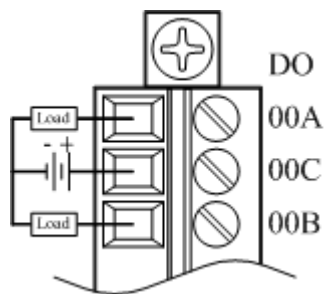
4.8.3 Channel Connecting



Dry Contact



Wet Contact



4.8.4 IO Specifications

Digital Input		
Digital Input Channels		16
Dry Contact	Logic Level 0	Open
	Logic Level 1	Close to GND
Wet Contact	Logic Level 0	+3V maximum
	Logic Level 1	+10 to 50V
Input resistance		10kΩ
Isolation voltage		2500Vdc

Over-voltage Protection	70 VDC
Counter Input Range	Max.100Hz(16 bit)
Latch Value Read	Yes
Digital Output	
Relay Output Channels	4 Form A, 4 Form C
Contact Rating	5A 250VAC/30VDC
Dielectric Strength	3KV
Operate Time	10ms Max.
Release Time	5ms Max.
Electrical Endurance	1x10 ⁵ ops@3A 250VAC/30VDC
Power Consumption	3W @ 24V

4.8.5 Related Reference

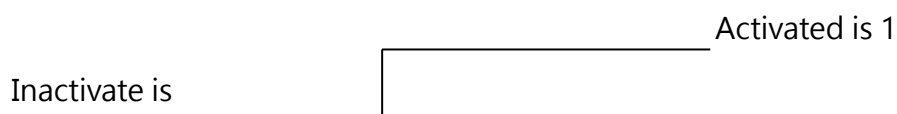
4.8.5.1 Digital Input Active State

Wolf series digital module supports invert DI status, when setting is 0x0000, if the external signal is logic level high, the DI status is 1, if the external signal is logic level low, the reading value is 0; when setting is 0x0001, if the external signal s logic level high, the reading value is 0, if the external signal s logic level low, the DI status is 1. The Modbus setting address is as below:

Address	Function	R/W	Initial Value
40129 (0x0080)	DI CH0~CH15 Input Active Value Define 0x0000: input value 0 for non-signal; 0x0001: input value 1 for non-signal;	R/W	0x0000

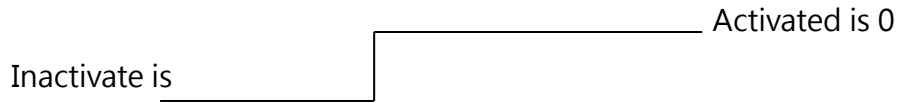
When Input Active Value Define as 0 :

External signal:



When Input Active Value Define as 1:

External signal:



4.8.5.2 Digital Input Status

Following Modbus address can be used to read digital input channel status:

Address	Function	R/W	Initial Value
00001~00016 10001~10016 (0x0000~0x000F)	DI CH0~CH15 Input Status	R	All 0

4.8.5.3 Read/Clear the Digital Input Counter

Module has the function of counting the external pulse number of the digital signal. The maximum frequency must be less than 100Hz. Following Modbus address can be used to read or clear current counter.

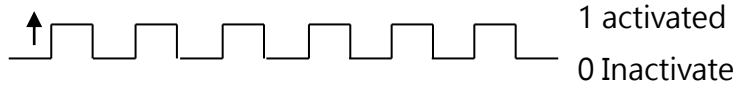
Address	Function	R/W	Initial Value
000145~000160 (0x0090~0x009F)	DI CH0~CH15 Counter Clear	W	All 0
30001~30016 40001~40016 (0x0000~0x000F)	DI CH0~CH15 DI Counter Value	R	All 0x0000
40137 (0x0088)	DI CH0~CH15 Counter Edge Define (Each bit map to corresponding channel) 1=rising edge 0=falling edge	R/W	0x0000

Refer following description for how counter works:

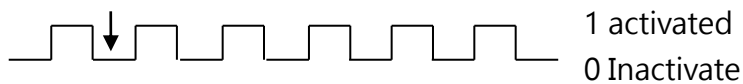
When Input Active Value Define is 0:

External signal :

Rising edge counter:



Falling edge counter:



When Input Active Value Define is 1:

External signal :

Rising edge counter:



Falling edge counter:



4.8.5.4 Read/Clear Latch Status

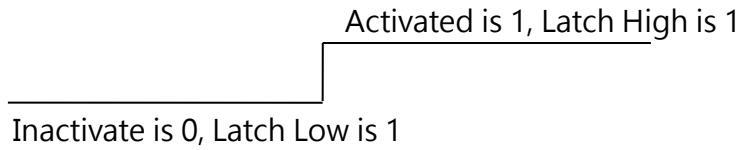
Module has the function of latch the external pulse of the digital signal.

Following Modbus address can be used to read or clear current latch status:

Address	Function	R/W	Initial Value
00033~00048 (0x0020~0x002F)	DI CH0~CH15 Latch High Value	R	All 0
00065~00080 (0x0040~0x004F)	DI CH0~C15 Latch Low Value	R	All 0
000129 (0x0080)	DI CH0~CH15 Latch Clear	W	0

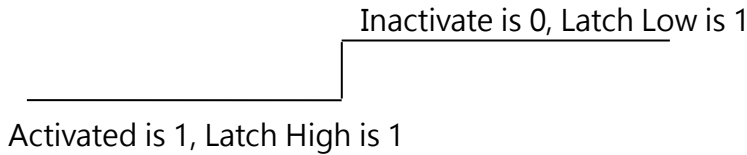
When Input Active Value Define is 0:

External signal:



When Input Active Value Define is 1:

External signal



4.8.5.5 Digital Output Active State

Digital Output module supports invert digital output status, when the state is 0x0000, if the output channel is configured as 1, the digital output will be activated, if the output channel is configured as 0, the digital output will be inactivate; when setting is 0x0001, if the output channel is configured as 0, the digital output will be activated, if the output channel is configured as 1, the digital output will be inactivated. The Modbus address setting is as below:

Address	Function	R/W	Initial Value
40385 (0x0180)	DO CH0~CH7 Output Active Value 0x0000: output value 1 for relay active; 0x0001: output value 0 for relay active;	R/W	All 0x0000

When Output Active Value Define is 0:

Digital output



When Output Active Value Define is 1

Digital output

Activated when DO is



4.8.5.6 Digital Output Status

Following Modbus address can be used to read digital output status:

Address	Function	R/W	Initial Value
00257~00264 (0x0100~0x0107)	DO CH0~CH7 Output Status	R/W	-

4.7.5.7 Power-on Value

Module has the function of power-on value. Following Modbus address can be used to configure the power-on value for all channel:

Address	Function	R/W	Initial Value
40257 (0x0100)	DO CH0~CH7 Power On Value Bit 0 is CH0	R/W	All 0x0000

4.7.5.8 Host Watchdog Timer

When the host watchdog function is enabled and timeout occurs, the module will reset all outputs to a safe state in order to ensure the safety of system or device.

Following Modbus address can be used to configure the safe value of digital output:

Address	Function	R/W	Initial Value
40259 (0x0102)	DO CH0~CH7 Safety Output Value Bit 0 is CH0	R/W	All 0x0000

4.7.6 MODBUS Address

Coil (0xxxx) / (1xxxx)

Address	Function	R/W	Initial Value
00001~00016 10001~10016 (0x0000~0x000F)	DI CH0~CH15 Input Status	R	All 0
00033~00048 (0x0020~0x002F)	DI CH0~CH15 Latch High Value	R	All 0
00065~00080 (0x0040~0x004F)	DI CH0~C15 Latch Low Value	R	All 0
000129 (0x0080)	DI CH0~CH15 Latch Clear	W	0
000145~000160 (0x0090~0x009F)	DI CH0~CH15 Counter Clear	W	All 0
00257~00264 (0x0100~0x0107)	DO CH0~CH7 Output Status	R/W	-

Holding Register (4xxxx) / Input Register (3xxxx)

Address	Function	R/W	Initial Value
30001~30016 40001~40016 (0x0000~0x000F)	DI CH0~CH15 DI Counter Value	R	All 0x0000
40129 (0x0080)	DI CH0~CH15 Input Active Value Define 0x0000: input value 0 for non-signal; 0x0001: input value 1 for non-signal;	R/W	0x0000
40137 (0x0088)	DI CH0~CH15 Counter Edge Define (Each bit map to corresponding channel) 1=rising edge 0=falling edge	R/W	0x0000

40257 (0x0100)	DO CH0~CH7 Power On Value (Each bit map to corresponding channel)	R/W	All 0x0000																		
40259 (0x0102)	DO CH0~CH7 Safety Output Value (Each bit map to corresponding channel)	R/W	All 0x0000																		
40385 (0x0180)	DO CH0~CH7 Output Active Value 0x0000: output value 1 for relay active; 0x0001: output value 0 for relay active;	R/W	All 0x0000																		
44097 0x1000	Firmware version 2 Bytes <table border="1" style="margin-left: 40px;"> <tr> <td>High Byte</td> <td>Low Byte</td> </tr> <tr> <td>Main version</td> <td>Sub-version</td> </tr> </table>	High Byte	Low Byte	Main version	Sub-version	R	-														
High Byte	Low Byte																				
Main version	Sub-version																				
44098~44105 (0x1001~0x1008)	Module name 16 Bytes (16 ASCII char)	R	-																		
44106 (0x1009)	Modbus response delay time (unit: ms) Range: 0~30	R/W	0																		
44107 (0x100A)	COM port setting : 2bytes <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>High Byte</th> <th>Low Byte</th> </tr> </thead> <tbody> <tr> <td>0x00: 8-N-1</td> <td>0x03:1.2K</td> </tr> <tr> <td>0x01: 8-N-2</td> <td>0x04:2.4K</td> </tr> <tr> <td>0x02: 8-E-1</td> <td>0x05:4.8K</td> </tr> <tr> <td>0x03: 8-O-1</td> <td>0x06:9.6K</td> </tr> <tr> <td></td> <td>0x07:19.2K</td> </tr> <tr> <td></td> <td>0x08:38.4K</td> </tr> <tr> <td></td> <td>0x09:57.6K</td> </tr> <tr> <td></td> <td>0x0A:115.2K</td> </tr> </tbody> </table>	High Byte	Low Byte	0x00: 8-N-1	0x03:1.2K	0x01: 8-N-2	0x04:2.4K	0x02: 8-E-1	0x05:4.8K	0x03: 8-O-1	0x06:9.6K		0x07:19.2K		0x08:38.4K		0x09:57.6K		0x0A:115.2K	R/W	0x0006
High Byte	Low Byte																				
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	0x09:57.6K																				
	0x0A:115.2K																				
44108 (0x100B)	Watch dog timer (unit : 0.1s) Range: 0 ~ 0x00FF	R/W	0x0000																		
44109 (0x100C)	System watch dog 0x0001: Enable 0x0000: Disable	R/W	0x0000																		

<p>44110 (0x100D)</p>	<p>Status of system watch dog 0x0001: Timeout 0x0000: Normal</p>	<p>R/W</p>	<p>-</p>
<p>44111 (0x100E)</p>	<p>Counter of communication frame</p>	<p>R</p>	<p>0x0000</p>

Chapter 5. FAQ

If you have difficulty in using Wolf Series module, please look up the related information in this manual. Shall you have any unsolved issues, comment or suggestion, please visit our website and contact us. With the greatest enthusiasm and endeavor, we will be always ready to serve you.

Email: service@advanio.com.tw

Website: <http://www.advanio.com.tw>

5.1 Communication

If you failed in communicating with the module, please proceed with the following steps:

1. Confirm the power supply voltage range is set at +10 to + 60V DC, otherwise, make sure the power LED indicators on the module is normal.
2. Upon receiving the command, the Power LED will flash once. Follow this procedure to check if the module receives command from the host.
3. Under permissive conditions, other equipment may also be used to detect whether the host PC can be communicate with a normal communication protocol which based on RS485 communication network equipment.
4. If the host is a PC with Windows Operation System installed,-user can execute Utility software to check the availability of I/O module. (please download the software via Advanio official site. <http://www.advanio.com>) .
5. Setup the module into INIT mode, and have it communicate with the following parameters: address number **01**, serial transmission rate is 9600bps, no parity bit and the communication protocol is Modbus.

5.2 Read data

If data collected from I/O module are abnormal, perform the following steps to check it:

Abnormal data read may be resulted from the abnormal parameter storage in Memory, please use Utility software to check it or reset it to INIT mode.

Please refer to 2.1.11 (Factory Reset) to solve I/O module abnormality.

Chapter 6. Technical support

If any problem encountered during the application, please look up the user manual or contact us via Advanio website.

Email: service@advanio.com

Website: <http://www.advanio.com>

Before Contacting our Technical Support, please prepare information as follows:

1. Serial number can be found on the bar code labeled on the cover of module.
2. Firmware version: For more details, please refer to MODBUS command about read firmware version command.
3. Host configuration (type and operating system).
4. If the problem is repeated, please provide full problem description and related applications.
5. For particular error messages display, please provide full content in Dialog Box including title and original text.
6. Any problem with program and hardware device concerned, please fully describe the details.
7. Your comments and suggestions will be highly appreciated.

You will have your feedback via Email within 2 working days.