Palm Technology Ltd.

P-485 series remote I/O moduel

User Manual

V1.2

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Palm technology's Modbus protocol for remote I / O modules Introduction, register address list, general use of I / O modules and communication with other devices.

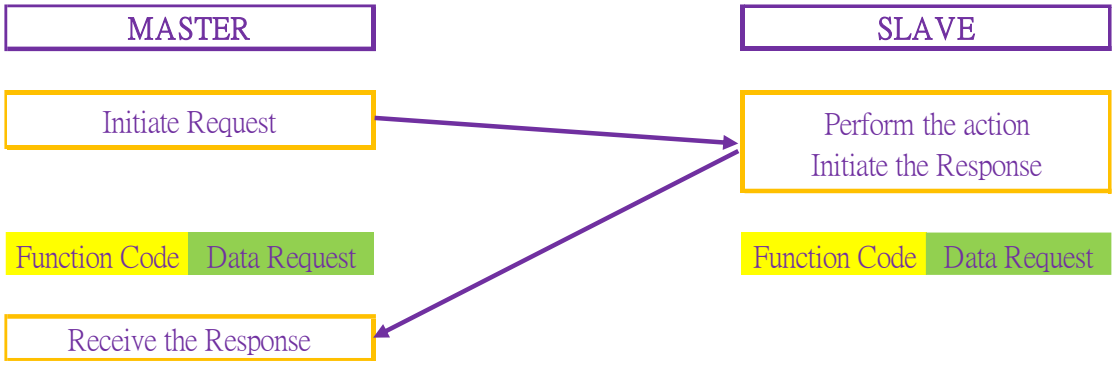
一、 Modbus protocol introduction

Modbus is now the most popular and widely available truly open, standard Internet protocol widely used in the industrial arena. This agreement supports the traditional RS-232, RS-422, RS-485 and Ethernet equipment.

Many industrial devices, including PLCs, DCSs, smart meters, I / O modules and others, are using the Modbus protocol as their communications standard.

1. Modbus protocol master-slave response process

Modbus protocol specifies the structure of the message, data, the command and response mode, data communication using Master / Slave way, namely: the communication between the two provisions of "master" (Master) and "slave" Data request message, the slave receives the correct message, respond to the request and respond to the data to the master station; the master station can also send a command message to modify the slave data. The master can send communication requests to multiple slaves, and each slave has a unique device address and identifies the message sent by the master according to the address. The command and communication process as shown below:



Master-slave command response process Description: The master as a command initiator, the initiative to the specified slave device to send command message frame, request Row register area data read or write, while the slave passive receiver master command, after receiving the master message frame, first determine the device address, if it is sent to the slave itself, according to the function code to make the relevant Response, and according to the function code different composition data frame or operation response frame, respond to the master station. If not the site bit address, then discard the message frame; continue to wait for the master command frame. After the master sends the command frame, the receiving response frame is correct, indicating that the communication response process is completed. If the master does not receive the response frame of the slave beyond the appointed time, the communication with the slave fails. If the command frame sent by the master is not recognized by the slave or if the slave cannot meet the command frame requirements of the master, for example, reading data beyond the address range of the slave register, the slave will respond with the message frame containing the error message, The main station can be based on error prompts to determine the cause of the error.

2. Modbus register area and commonly used function code

Modbus protocol definition, contains a total of 4 kinds of register area and a variety of function codes. Different function codes represent different operations on different register area data. Modbus register area and Palm technology support common code as follows:

01: Read the coil status

02: Read input status

03: Read Holding Register

04: Read Input Register

05: Forces a single coil

06: preset a single register

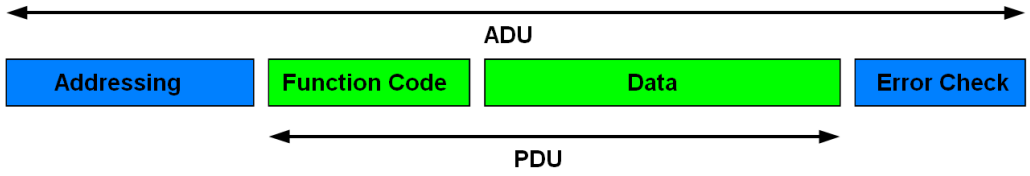
15: Forces multiple coils

16: Preset multiple registers

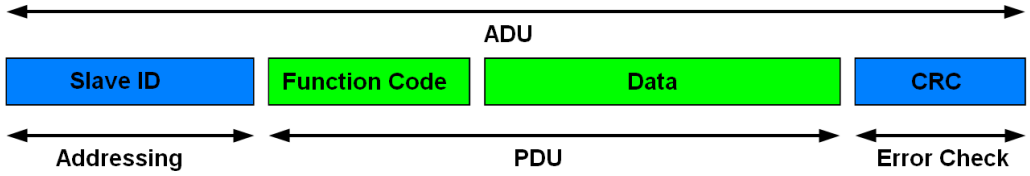
二、 Modbus protocol framework format

The Modbus protocol defines a simple protocol data unit (PDU) independent of the underlying communication layer. Modbus protocol mappings on a specific bus or network can introduce additional fields on the Application Data Unit (ADU). Modbus common frame format is as follows:

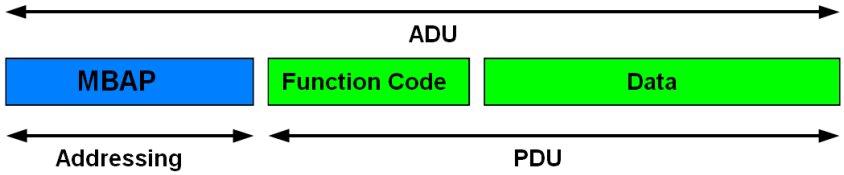
General MODBUS Frame



MODBUS/RTU Serial Frame



MODBUS/TCP Frame



三、 Basic use of I/O modules and parameter configuration method

1. Module's basic hardware connection

P series remote I / O module power interface and communication interface as follows:

(R) + VS: Positive operating power supply.

(B) GND: Negative operating power supply.

(Y) DATA +: RS485 +.

(G) DATA -: RS485-.

INIT :configure setting mode。

2. Module's parameter change

1) First connect the module INIT PIN to (B) GND, and then turn on the power of the module.

2) Connect to the computer through RS485 USB or network cable, and open the Utility software.

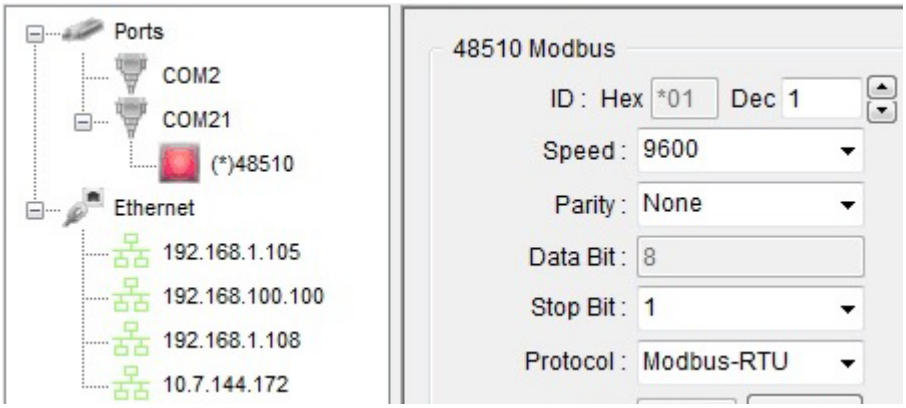
3) Click Scan Serial Port.

4) Click on the computer to grab the communication serial port and then click the search module.

5) Search out the connected module as shown in the figure, click the icon below and then the module's parameter configuration interface will appear.

6) Communication parameters configuration, as shown.

You can set the following parameters according to your needs and press Update when the setting is complete. Press to save the setting Station: 1 to 255 (decimal).



3. Analog input module configuration instructions (P-48519)

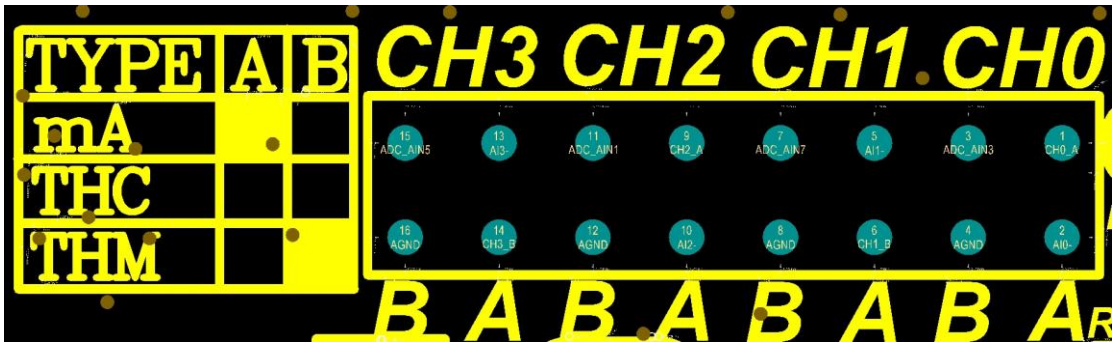
P-48519 analog data acquisition module supports a variety of different types.

Analog input:

When the analog input uses the thermocouple type, the temperature compensation setting can be performed by the 【Other】 option. After the modification is completed, click the button 【Update】 to save the setting.

After completing the above PC analog input setting, please loosen the product's shell screw and remove the internal circuit board, perform analog input jumper setting, each analog input channel has a corresponding PIN , the factory settings All A PIN short mA input (current type 0 / 4-20mA input), if you need to set the thermocouple input, A and B PINs are open, thermistor B PIN short.

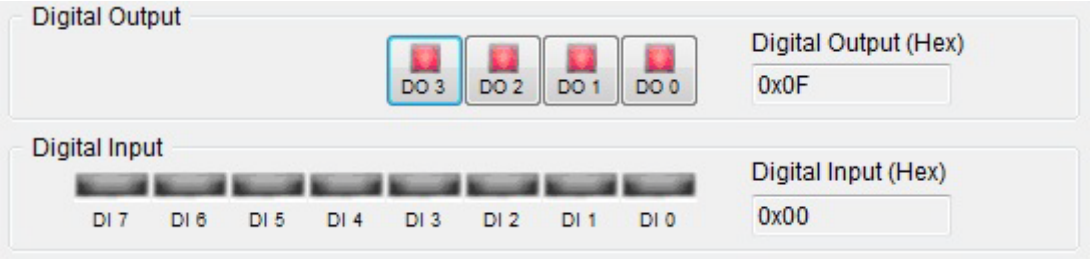
After completing the setting of the analog input channel jumper above, place the circuit board back into the product case and lock it, and then disconnect the module INIT PIN from (B) GND and re-energize the module to complete all set up.



四、 Test

1. Testdescription

Under the Utility software interface, there are input & output status indicator & button. If DI signal is input, the corresponding DI channel indicator of the software will be on. Click the DO button on the software interface and the corresponding DO channel indicator on the module will be on. The corresponding analog input channel can also see the current input parameters below.



五、 Modbus model address table

1. P-48551/P-48558S/P-48558SO/P-48560/P-48560S/P48560SO/P-48569 address table

Modbus command code **01/02/05/15 R/W -**

Address 0x explain Normal mode INIT* mode note

00001 ~ 00016 0 ~ 15 input channel input status R R

00017 ~ 00032 0 ~ 15 output channel output status R / W R / W

00033 ~ 00048 0 ~ 15 output channel power status R R / W

00049 ~ 00064 0 ~ 15 channel communication failure status R R / W

Modbus command code **03/04/06/16 R/W -**

Address 4x explain Normal mode INIT* mode note

40065 Communication timeout value R R / W 0 ~ 65535: 0.0 ~ 6553.5 sec

40211 Module Name 1 R R

40212 Module Name 2 R R

40213 Software Version 1 R R

40214 Software Version 2 R R

40215 Communication Security Enable R R

40216 Communication Safety Signs R R

40300 Module ID (station number) in Normal mode R R / W 1 ~ 255

40301 Module agreement in Normal mode R R / W 0: RTU 1: ASCII

40302 Module Serial Transmission Rate R R / W in Normal Mode

1. 2400 bps
2. 4800 bps
3. 9600 bps
4. 14400 bps
5. 19200 bps
6. 28800 bps
7. 38400 bps
8. 57600 bps
9. 115200 bps
10. 230400 bps
11. 460800 bps
12. 921600 bps

40303 Module Parity bit in Normal mode R R / W 0: None 1: Odd 2: Even

40304 Module stop bit in Normal mode R R / W 0: 1bit 1: 2bit

2. P-48510 address table

Modbus command code 01/02/05/15 R/W -

Address 0x explain Normal mode INIT* mode note

00001 ~ 00008 0 ~ 7 Input channel input status R R

00017 ~ 00020 0 ~ 3 Output channel output status R / W R / W

00033 ~ 00036 0 ~ 3 Output channel power status R R / W

00049 ~ 00052 0 ~ 3 Output channel communication failure status R R / W

04097 ~ 06144 0 ~ 2047 Auxiliary Register (M Flag) R / W R / W

06145 ~ 06400 0 ~ 255 Retentive auxiliary register (KM flag) R / W R / W

Modbus command code 03/04/06/16 R/W -

Address 4x explain Normal mode INIT* mode note

40001 ~ 40008 0 ~ 7 analog input R R 0 ~ 1000: 0-10V

40017 ~ 40018 0 ~ 1 analog output value R / W R / W 0 ~ 1000: 0-10V

40033 ~ 40034 0 ~ 1 power on analog output R R / W 0 ~ 1000: 0-10V

40049 ~ 40050 0 ~ 1 communication failure analog quantity output value R R / W 0 ~ 1000: 0-10V

40065 Communication timeout value R R / W 0 ~ 65535: 0.0 ~ 6553.5 sec

40211 Module Name 1 R R

40212 Module Name 2 R R

40213 Software Version 1 R R

40214 software version 2 R R

40215 Communication Security Enable R R

40216 Communication Safety Signs R R

40217 ~ 40222 1 ~ 6 Mac address number R R

40223 Mac Internal Temperature (° C) R R

40224 The Lowest temperature (℃) R R

40225 The Highest temperature (℃) R R

40300 Module ID (station number) in Normal mode R R / W 1 ~ 255

40301 Module agreement in Normal mode R R / W 0: RTU 1: ASCII

40302 Module Serial Transmission Rate R R / W in Normal Mode

1. 2400 bps
2. 4800 bps
3. 9600 bps
4. 14400 bps
5. 19200 bps
6. 28800 bps
7. 38400 bps
8. 57600 bps

9. 115200 bps

10.230400 bps

11.460800 bps

12.921600 bps

40303 Module Parity bit in Normal mode R R / W 0: None 1: Odd 2: Even

40304 Module stop bit in Normal mode R R / W 0: 1bit 1: 2bit

40305 Normal mode timeout setting R R / W 0 ~ 65535: 0.0 ~ 6553.5 sec

40409 to 40416 0 to 7 Input signal count value (16-bit) R / W R / W 0 to 0xFFFF

40425 to 40439 0 to 7 Input signal count value (32-bit) R / W R / W 0 to 0xFFFFFFFF

40457 to 40485 0 to 7 Input signal count value (64-bit) R / W R / W 0 to 0xFFFFFFFFFFF FFFFF

40521 ~ 40528 0 ~ 7 analog input highest - lowest difference R R / W 0 ~ 1000: (ex: 350 = 3.5V), default

44001 ~ 46048 0 ~ 2047 Analog Auxiliary Register (AM) R / W R / W 0 ~ 65535

46409 ~ 46112 0 ~ 63 Retentive Analog Auxiliary Register (KAM) R / W R / W 0 ~ 65535

3. P-48512 address table

1. Modbus command code01/02/05/15 R/W -

Address 0x explain Normal mode INIT* mode note

00001 ~ 00002 0 ~ 2 input channel input status R R

00017 ~ 00018 0 ~ 1 output channel output status R / W R / W

00033 ~ 00034 0 ~ 1 output channel power status R R / W

00049 ~ 00050 0 ~ 1 channel communication failure status R R / W

00065 ~ 00066 0 ~ 1 disconnection signal R R 1: disconnection (only 4 ~ 20mA)

00067 ~ 00068 2 ~ 3 Disconnection signal R R 1: Disconnected

00129 ~ 01152 0 ~ 1023 Auxiliary register (M flag bit) R / W R / W

2. Modbus command code 03/04/06/16 R/W -

Address 4x explain Normal mode INIT* mode note

40001 ~ 40002 0 ~ 1 current input value R R 0 ~ 20000: 0 / 4-20mA

40003 ~ 40004 2 ~ 3 current input value R R 0 ~ 8000: -200 ~ + 600 ℃

40017 ~ 40018 0 ~ 1 current output value R / W R / W 0 ~ 4000: 0 / 4-20mA

40033 ~ 40034 0 ~ 1 power on analog output R R / W 0 ~ 4000: 0 / 4-20mA

40049 ~ 40050 0 ~ 1 communication failure analog output R R / W 0 ~ 4000: 0 / 4-20mA

40065 ~ 40066 0 ~ 1 Input type code R R / W 0: 4-20mA 1: 0-20mA

40067 ~ 40068 2 ~ 3 Input type code R R / W0: PT-100@=0.00385

1: PT-100@=0.003916

2: PT-1000@=0.00385

3: PT-1000@=0.003916

40081 ~ 40082 0 ~ 1 output type code R R / W 0: 4-20mA 1: 0-20mA

40097 ~ 40098 0 ~ 1 current input value R R 4 / 0-20: 4 / 0-20mA

40099 ~ 40100 2 ~ 3 current input value R R -200 ~ +600: -200 ~ + 600 ℃

40113 ~ 40114 0 ~ 1 current input value R R 4 / 0-20: 4 / 0-20mA

40115 ~ 40116 2 ~ 3 current input value R R -328 ~ +1112: -328 ~ + 1112 ℉

40129 ~ 40130 0 ~ 1 current input value R R 40 / 0-200: 4.0 / 0-20.0mA

40131 ~ 40132 2 ~ 3 current input value R R -2000 ~ +6000: -200.0 ~ + 600.0 ℃

40145 ~ 40146 0 ~ 1 current input value R R 400 / 0-2000: 4.00 / 0-20.00mA

40147 ~ 40148 2 ~ 3 current input value R R -3280 ~ +11120: -328.0 ~ +1112.0 ℉

40161 ~ 40164 0 ~ 3 current input value R R 0 ~ 10000: 0.00 ~ 100.00% FSR

40177 Communication failure safety time setting R R / W 0 to 65535: Disable to 65535 msec

40178 All digital inputs R R

40211 Module Name 1 R R 0x12

40212 Module Name 2 R R

40213 Software Version 1 R R 0x30

40214 Software Version 2 R R

40217 ~ 40222 1 ~ 6 Mac address number R R

40300 Module ID (station number) in Normal mode R R / W 1 ~ 255

40301 Module agreement in Normal mode R R / W 0: RTU 1: ASCII

40302 Module Serial Transmission Rate R R / W in Normal Mode

1. 2400 bps
2. 4800 bps
3. 9600 bps
4. 14400 bps
5. 19200 bps
6. 28800 bps
7. 38400 bps
8. 57600 bps
9. 115200 bps
10. 230400 bps
11. 460800 bps
12. 921600 bps

40303 Module Parity bit in Normal mode R R / W 0: None 1: Odd 2: Even

40304 Module stop bit in Normal mode R R / W 0: 1bit 1: 2bit

40305 Normal mode timeout setting R R / W 0 ~ 65535msec

40609 ~ 40616 0 ~ 3 current inputs value R R 32-bit Floating Value (IEEE754) (Float CD AB)

40641 ~ 40648 0 ~ 3 current inputs R R 32-bit Deg.C Floating (IEEE754) (Float CD AB)

40673 ~ 40680 0 ~ 3 current inputs R R 32-bit Deg.F Floating (IEEE754) (Float CD AB)

40705 ~ 40712 0 ~ 3 current inputs value R R 32-bit Floating Value (IEEE754) (Float AB CD)

40737 ~ 40744 0 ~ 3 current inputs R R 32-bit Deg.C Floating (IEEE754) (Float AB CD)

40769 ~ 40776 0 ~ 3 current inputs R R 32-bit Deg.F Floating (IEEE754) (Float AB CD)

40801 ~ 40808 0 ~ 3 current inputs value R R 32-bit Floating Value (IEEE754) (Float BA DC)

40833 ~ 40840 0 ~ 3 current inputs R R 32-bit Deg.C Floating (IEEE754) (Float BA DC)

40865 ~ 40872 0 ~ 3 current inputs R R 32-bit Deg.F Floating (IEEE754) (Float BA DC)

40897 ~ 40904 0 ~ 3 current inputs value R R 32-bit Floating Value (IEEE754) (Float DC BA)

40929 ~ 40936 0 ~ 3 current inputs value R R 32-bit Deg.C Floating (IEEE754) (Float DC BA)

40961 ~ 40968 0 ~ 3 current inputs value R R 32-bit Deg.F Floating (IEEE754) (Float DC BA)

41281 ~ 41408 0 ~ 127 Analog Auxiliary Register (AM) R / W R / W 0 ~ 65535

3. P-48519

Modbus command code 01/02/05/15 R/W -

Address 0x explain Normal mode INIT* mode note

00001 ~ 00004 0 ~ 3 input channel input status R R

00065 ~ 00072 0 ~ 7 disconnection signal R R 1: disconnection

00129 ~ 01152 0 ~ 1023 Auxiliary register (M flag bit) R / W R / W

Modbus command code 03/04/06/16 R/W -

Address 4x explain Normal mode INIT* mode note

40001 ~ 40008 0 ~ 7 current input value R R 0 ~ 20000: 0 / 4-20mA 0 ~ 20700: -270 ~ + 1800 ℃

40065 ~ 40072 0 ~ 7 Input Type Code R R / W0: 4~20mA

1: 0~20mA

2: J(-210~760℃)

3: K(-270~1370℃)

4: T(-270~400℃)

5: E(-270~1000℃)

6: R(0~1750℃)

7: S(0~1750℃)

8: B(0~1800℃)

9: 10K-2 Thermistor(0~+100℃)

10: 10K-3 Thermistor(0~+100℃)

11: 6.8K Thermistor(-10~+100℃)

12: 4.7K Thermistor(-10~+100℃)

13: 3.3K Thermistor(-20~+100℃)

14: 3K Thermistor(-20~+100℃)

15: 2.7K Thermistor(-20~+100℃)

16: 2.2.25K Thermistor(-20~+100℃)

17: 2.1K Thermistor(-30~+100℃)

18: 2K Thermistor(-30~+100℃)

19: 1.5K Thermistor(-40~+100℃)

20: 1K Thermistor(-40~+100℃)

40097 ~ 40104 0 ~ 7 current input value R R

4 / 0-20: 4 / 0-20mA -270 ~ + 1800: -270 ~ + 1800 ℃

40113 ~ 40120 0 ~ 7 current input value R R 4 / 0-20: 4 / 0-20mA -168 ~ + 3272: -168 ~ + 3272 ° F

40129 ~ 40136 0 ~ 7 current input value R R

40/0-200:

4.0/0-20.0mA

-2700~+18000：

-270.0~+1800.0℃

40145 ~ 40152 0 ~ 7 current input value R R

40 / 0-200:

4.0 / 0-20.0mA

-1680 ~ + 32720:

-168.0 ~ + 3272.0 ℉

40177 Communication failure safety time setting R R / W 0 to 65535: Disable to 65535 msec

40178 All digital inputs R R

40211 Module Name 1 R R 0x19

40212 Module Name 2 R R

40213 Software Version 1 R R 0x30

40214 software version 2 R R

40217 ~ 40222 1 ~ 6 Mac address number R R

40300 Module ID (station number) in Normal mode R R / W 1 ~ 255

40301 Module agreement in Normal mode R R / W 0: RTU 1: ASCII

40302 Module Serial Transmission Rate R R / W in Normal Mode

1. 2400 bps
2. 4800 bps
3. 9600 bps
4. 14400 bps
5. 19200 bps
6. 28800 bps
7. 38400 bps
8. 57600 bps
9. 115200 bps
10. 230400 bps
11. 460800 bps
12. 921600 bps

40303 Module Parity bit in Normal mode R R / W 0: None 1: Odd 2: Even

40304 Module stop bit in Normal mode R R / W 0: 1bit 1: 2bit

40305 Normal mode timeout setting R R / W 0 ~ 65535msec

40609 ~ 40624 0 ~ 7 current input value R R 32-bit Floating Value (IEEE754) (Float CD AB)

40641 ~ 40656 0 ~ 7 current input R R 32-bit Deg.C Floating (IEEE754) (Float CD AB)

40673 ~ 40688 0 ~ 7 current input value R R 32-bit Deg.F Floating (IEEE754) (Float CD AB)

40705 ~ 40720 0 ~ 7 current input value R R 32-bit Floating Value (IEEE754) (Float AB CD)

40737 ~ 40752 0 ~ 7 current inputs R R 32-bit Deg.C Floating (IEEE754) (Float AB CD)

40769 ~ 40784 0 ~ 7 current input value R R 32-bit Deg.F Floating (IEEE754) (Float AB CD)

40801 ~ 40832 0 ~ 7 current input value R R 32-bit Floating Value (IEEE754) (Float BA DC)

40833 ~ 40864 0 ~ 7 current inputs R R 32-bit Deg.C Floating (IEEE754) (Float BA DC)

40865 ~ 40896 0 ~ 7 current input value R R 32-bit Deg.F Floating (IEEE754) (Float BA DC)

40897 ~ 40928 0 ~ 7 current input value R R 32-bit Floating Value (IEEE754) (Float DC BA)

40929 ~ 40960 0 ~ 7 current input value R R 32-bit Deg.C Floating (IEEE754) (Float DC BA)

40961 ~ 40992 0 ~ 7 current input value R R 32-bit Deg.F Floating (IEEE754) (Float DC BA)

41089 ~ 41104 0 ~ 7 current count value R / W R / W 16-bit 0 ~ 0xFFFF

41105 ~ 41136 0 ~ 7 current count value R / W R / W 32-bit 0 ~ 0XFFFFFFFF

41281 ~ 41408 0 ~ 127 Analog Auxiliary Register (AM) R / W R / W 0 ~ 65535

40222 CJC value R R / W -32767 ~ +32767: -327.67 ~ +327.67 Deg.C

40225 Set CJC offset value R R / W -32767 ~ +32767: -327.67 ~ +327.67 Deg.C Default: 0

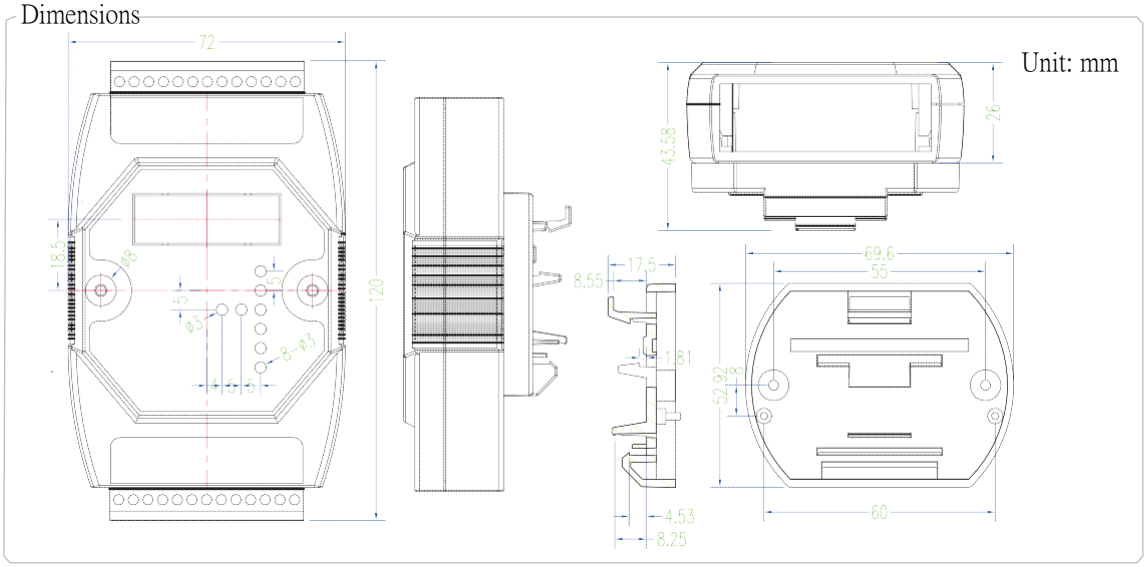
40226 ~ 40233 Set AI0 ~ 7 offset value (thermocouple / thermistor) R R / W

-32767 ~ +32767: -327.67 ~ +327.67

Deg.C default: 0

六、 Dimensions and Wiring Diagrams & Pin Out

Dimensions



Wiring Diagrams & Pin Out