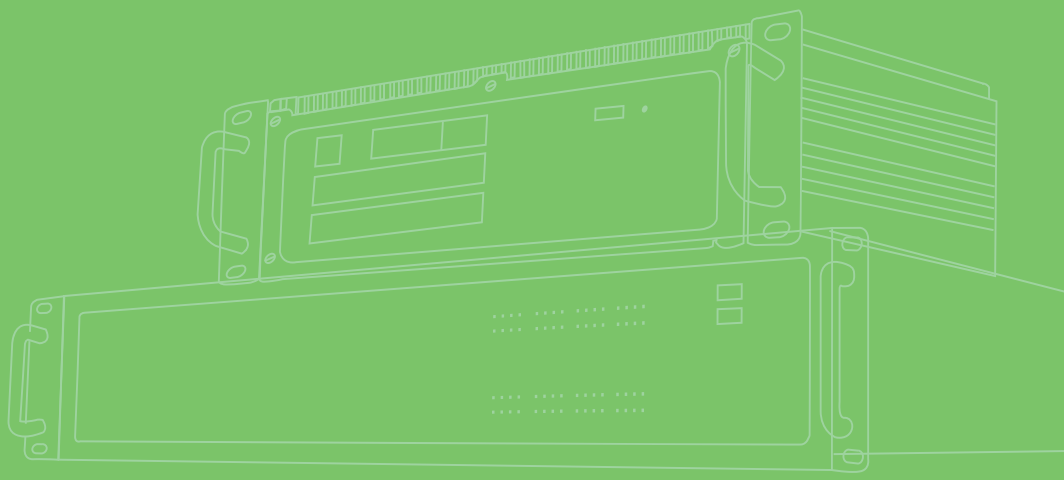


User Manual

DMU-5010

12-ch DI/O, 4-ch AI, 4-ch RTD Modbus TCP Module

ADVANTECH

Enabling an Intelligent Planet

Copyright

Acknowledgements

Intel and Pentium are trademarks of Intel Corporation.

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

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

Product Warranty (2 years)

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

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

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

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

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

Part No. 2003I01000 Edition 1

December 2012

Declaration of Conformity

CE

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This kind of cable is available from Advantech. Please contact your local supplier for ordering information.

CE

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

FCC Class A

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

FCC Class B

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FM

This equipment has passed the FM certification. According to the National Fire Protection Association, work sites are classified into different classes, divisions and groups, based on hazard considerations. This equipment is compliant with the specifications of Class I, Division 2, Groups A, B, C and D indoor hazards.

Technical Support and Assistance

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

Warnings, Cautions and Notes

Warning! *Warnings indicate conditions, which if not observed, can cause personal injury!*

Caution! *Cautions are included to help you avoid damaging hardware or losing data. e.g.*

There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Note! *Notes provide optional additional information.*

Document Feedback

To assist us in making improvements to this manual, we would welcome comments and constructive criticism. Please send all such - in writing to: support@advantech.com

Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

- To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.
- Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
    - The power cord or plug is damaged.
    - Liquid has penetrated into the equipment.
    - The equipment has been exposed to moisture.
    - The equipment does not work well, or you cannot get it to work according to the user's manual.
    - The equipment has been dropped and damaged.
    - The equipment has obvious signs of breakage.
15. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -20° C (-4° F) OR ABOVE 70° C (158° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.
16. CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER, DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
17. The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).

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

Contents

Chapter 1

System Overview

1.1 Introduction

DMU-5010 is an Ethernet I/O module that supports Modbus TCP protocol and Ethernet daisy chain. DMU-5010 delivers various onboard I/Os including analog input, digital input, and digital output, providing flexible options to satisfy versatile application requirements. With high anti-interference performance, DMU-5010 is suitable for harsh environment applications. You can easily configure the module by the Advantech Domain.

1.2 Features

- Ethernet-based I/O
- Mixed I/O in single module
- Active I/O message by data stream
- Industrial Modbus/TCP protocol
- Easily update firmware through Ethernet
- Support burn-out detection
- Support Ethernet Daisy Chain
- Wide operating temperature range
- High anti-interference performance

1.3 Specifications

1.3.1 Hardware Specifications

General

- **Enclosure:** SECC
- **Mounting:** DIN-rail
- **Dimensions (WxHxD):**43 x 125 x 105 mm (1.69" x 4.92" x 4.13")
- **LAN:**10/100Base-T
- **Connector:** 1x40 Plug-in screw terminal block (#14~22 AWG)(Power and I/O) 2 x RJ-45(LAN)
- **Watchdog System:** (1.6 second) and Communication (programmable)
- **Supported Protocols:** Modbus/TCP
- **Power Input:** Unregulated 12-24 V_{DC} ± 20% w/power reversal protection
- **Power Consumption:** 7 W @ 24V_{DC}

Analog Input

- **Channels:** 8
- **Input Type:** mV, V, mA(Ch0-Ch3), mV, V, mA, RTD(Ch4- Ch7)
- **Input Range:** 0~5V, 0~10V, 0~15V, ±5V, ±10V, ±15V, ±20mA, 0~20mA, 4~20mA
- **RTD Types & Temp Range:**
  - Pt 100 (2-wire and 3-wire): -50 ~150°C, 0 ~ 100°C, 0 ~ 200°C, 0 ~ 400°C, -200 ~ 200°C
  - Pt-1000(2-wire and 3-wire): -40°C ~160°C
  - IEC RTD 100 ohms (=0.0385)
  - JIS RTD 100 ohms (=0.0392)
- **Input Impedance:** Voltage: >10MΩ; Current:120Ω
- **Accuracy:** ±0.1% (Voltage), ±0.2% (Current); ±0.2°C (RTD); or better

- **Span Drift:** ±68 ppm/°C
- **Zero Drift:** ±6 μV/°C
- **Resolution:** 16-bit
- **Sampling Rate:** 10 samples/second
- **Burn-out Detection:** 4~20mA and RTD
- **Protection:** 50/60 Hz Noise rejection
  2,500 V_{DC} Isolation
  ±30V_{DC} Overvoltage

Digital Input /Output

- **Channels:** 8-ch DI
  4-ch DI/DO shared (DIO0~DIO3 can be set as DI/DO by Utility)

Digital Input

- **Channels:** 8
- **Dry Contact:**
  - Logic level 0: Open
  - Logic level 1: Close to Ground
- Supports 200 Hz pulse/accumulator input
- Isolation Protection 2500 V_{DC}
- **Input Level**
  Dry contact: Logic level 0 (Off): open Logic level 1 (On): close to GND
  Wet contact: Logic level 0 (Off): +10V to +30V Logic level 1(On): +3V max
  Note: The Digital Input Level 0 and 1 status can be inverted by utility
- **Supports 200 Hz Frequency/counter input:**
  2 channels max
  Counter (32 bit):200 Hz, Frequency, 0.1Hz~200Hz
- **Supports Digital Noise filter**
- **Isolation Protection:** 2500V_{DC}

Digital Output

- **Output:** Open Collector to 30V; 30mA max load.
- **Power Dissipation:** 300mW for each channel
- **PWM Period:** 2ms~3600sec
- **PWM Minimum Duty On:** 0.2ms
- **Isolation Protection:** 2500 VDC

1.3.2 Environment

- **Humidity:** 5 ~ 95% RH
- **Operation Temperature:** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Temperature:** -30 ~ 80°C (-22 ~ 176°F)

Note! *Static electricity will be generated if the relative humidity of environment is below 30%. Therefore, the user must take measures against static electricity, such as grounding.*

1.4 Dimensions

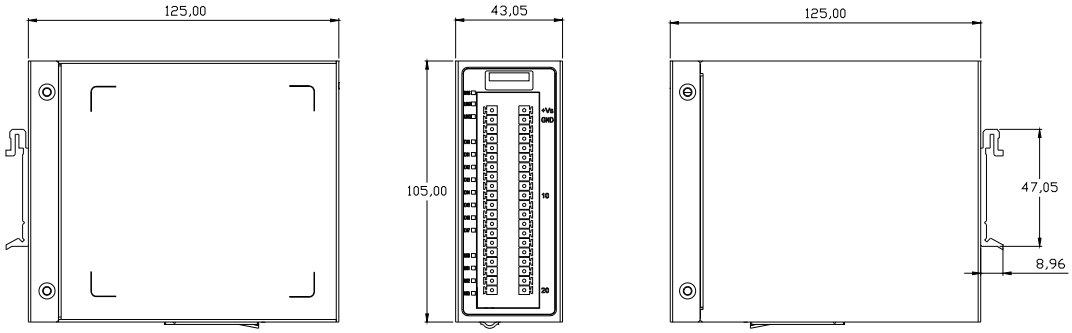
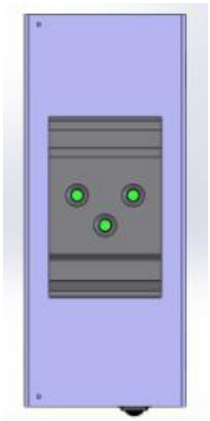


Figure 1.1 Dimensions

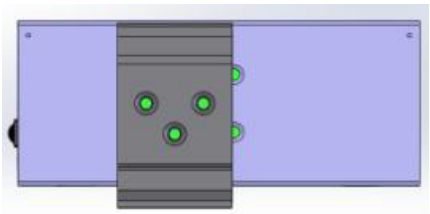
1.5 Mounting

DMU-5010 can be mounted as below:

1.Vertical DIN-rail mounting (default):



2. Horizontal DIN-rail mounting:



Chapter 2

Hardware Functionality

2.1 Introduction

Below is the appearance of DMU-5010. Each part will be introduced in the following sections.

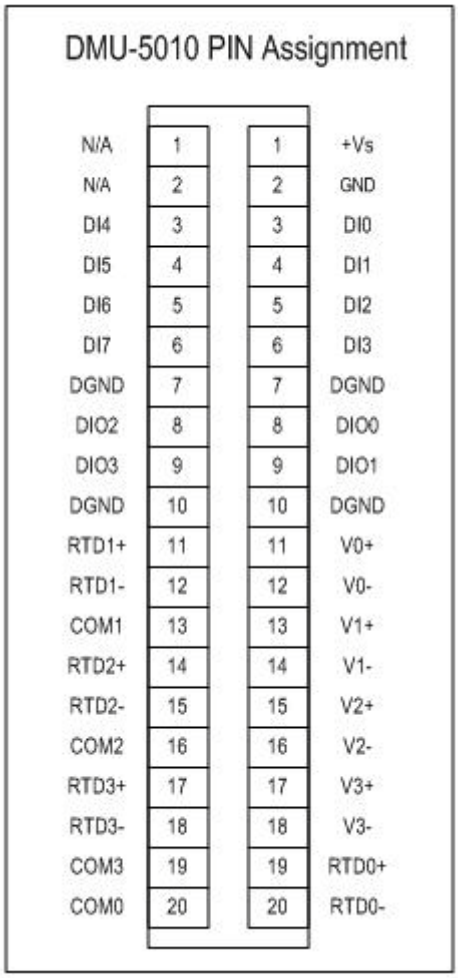
2.2 Indicators

There are system indicators on the front panel of DMU-5010 for indicating the running status:

No	Item	LED	Description
1	Status	on	module is power on
		flash	LAN1 or LAN2 data being received/transmitted
		off	module is power off; LAN1 or LAN2 no data being received/transmitted
2	Link1	on	LAN1 network link
		off	LAN1 no network link
2	Link2	on	LAN2 network link
		off	LAN2 no network link
3	DI0~DI7	on	Close to DGND
		off	Open to DGND
4	DIO0~DIO3	on	logic 1
		off	logic 0

2.3 Pin Assignment

There is Pin Assignment on left label of DMU-5010 as below:



Warning! *Due to the high density of pins, there is a risk of a short circuit, therefore it is advised to be very careful when wiring.*

Below is the mapping table of hardware pin and Domain Focused Configuration Tool.

HW Pin	Utility	HW Pin	Utility
DI0	DI Group:CH0	V0+/V0-	AI Group:CH0
DI1	DI Group:CH1	V1+/V1-	AI Group:CH1
DI2	DI Group:CH2	V2+/V2-	AI Group:CH2
DI3	DI Group:CH3	V3+/V3-	AI Group:CH3
DI4	DI Group:CH4	RTD0+/RTD0-	AI Group:CH4
DI5	DI Group:CH5	RTD1+/RTD1-	AI Group:CH5
DI6	DI Group:CH6	RTD2+/RTD2-	AI Group:CH6
DI7	DI Group:CH7	RTD3+/RTD3-	AI Group:CH7

When DIO0~DIO3 chooses different current, the utility channel will change accordingly. There are totally 16 combinations:

Table1:

HW Pin	Utility	Note
DIO0	DI Group:CH8	Set as DI
DIO1	DI Group:CH9	Set as DI
DIO2	DI Group:CH10	Set as DI
DIO3	DI Group:CH11	Set as DI

Table2:

HW Pin	Utility	Note
DIO0	DO Group:CH0	Set as DO
DIO1	DI Group:CH8	Set as DI
DIO2	DI Group:CH9	Set as DI
DIO3	DI Group:CH10	Set as DI

Table3:

HW Pin	Utility	Note
DIO0	DI Group:CH8	Set as DI
DIO1	DO Group:CH0	Set as DO
DIO2	DI Group:CH9	Set as DI
DIO3	DI Group:CH10	Set as DI

Table4:

HW Pin	Utility	Note
DIO0	DO Group:CH0	Set as DO
DIO1	DO Group:CH1	Set as DO
DIO2	DI Group:CH8	Set as DI
DIO3	DI Group:CH9	Set as DI

Table5:

HW Pin	Utility	Note
DIO0	D1 Group:CH8	Set as DI
DIO1	D1 Group:CH9	Set as DI
DIO2	DO Group:CH0	Set as DO
DIO3	DI Group:CH10	Set as DI

Table6:

HW Pin	Utility	Note
DIO0	DO Group:CH0	Set as DO
DIO1	D1 Group:CH8	Set as DI
DIO2	DO Group:CH1	Set as DO
DIO3	DI Group: CH9	Set as DI

Table7:

HW Pin	Utility	Note
DIO0	DI Group:CH8	Set as DI
DIO1	DO Group:CH0	Set as DO
DIO2	DO Group:CH1	Set as DO
DIO3	DI Group: CH9	Set as DI

Table8:

HW Pin	Utility	Note
DIO0	DO Group:CH0	Set as DO
DIO1	DO Group:CH1	Set as DO
DIO2	DO Group:CH2	Set as DO
DIO3	DI Group: CH8	Set as DI

Table9:

HW Pin	Utility	Note
DIO0	DI Group:CH8	Set as DI
DIO1	DI Group:CH9	Set as DI
DIO2	DI Group:CH10	Set as DI
DIO3	DO Group: CH0	Set as DO

Table10:

HW Pin	Utility	Note
DIO0	DO Group:CH0	Set as DO
DIO1	DI Group:CH8	Set as DI
DIO2	DI Group:CH9	Set as DI
DIO3	DO Group: CH1	Set as DO

Table11:

HW Pin	Utility	Note
DIO0	DI Group:CH8	Set as DI
DIO1	DO Group:CH0	Set as DO
DIO2	DI Group:CH9	Set as DI
DIO3	DO Group: CH1	Set as DO

Table12:

HW Pin	Utility	Note
DIO0	DO Group:CH0	Set as DO
DIO1	DO Group:CH1	Set as DO
DIO2	DI Group:CH8	Set as DI
DIO3	DO Group: CH2	Set as DO

Table13:

HW Pin	Utility	Note
DIO0	DI Group:CH8	Set as DI
DIO1	DI Group:CH9	Set as DI
DIO2	DO Group:CH0	Set as DO
DIO3	DO Group: CH1	Set as DO

Table14:

HW Pin	Utility	Note
DIO0	DO Group:CH0	Set as DO
DIO1	DI Group:CH8	Set as DI
DIO2	DO Group:CH1	Set as DO
DIO3	DO Group: CH2	Set as DO

Table15:

HW Pin	Utility	Note
DIO0	DI Group:CH8	Set as DI
DIO1	DO Group:CH0	Set as DO
DIO2	DO Group:CH1	Set as DO
DIO3	DO Group: CH2	Set as DO

Table16:

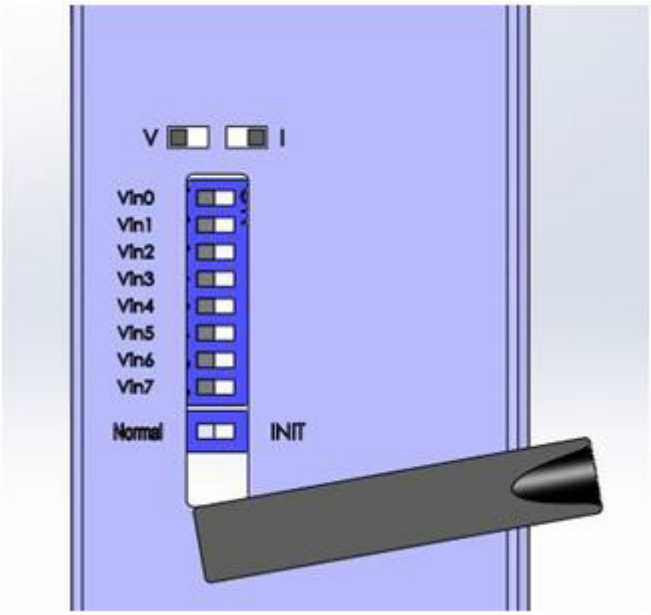
HW Pin	Utility	Note
DIO0	DO Group:CH0	Set as DO
DIO1	DO Group:CH1	Set as DO
DIO2	DO Group:CH2	Set as DO
DIO3	DO Group: CH3	Set as DO

2.4 LAN

DMU-5010 supports Ethernet Daisy Chain, it is equipped with two RJ-45 Ethernet LAN connectors on its top, the LED indicators show its status: Link (Green LED) and Active (Yellow LED).

2.5 Switch

There is a switch on the bottom of DMU-5010:



Switch	HW Pin	Utility	Description
Vin0	V0+/V0-	AI Group:CH0	V: Voltage(Switch is OFF) (Default) ; I:Current (Switch is ON)
Vin1	V1+/V1-	AI Group:CH1	
Vin2	V2+/V2-	AI Group:CH2	
Vin3	V3+/V3-	AI Group:CH3	
Vin4	RTD0+/RTD0-	AI Group:CH4	
Vin5	RTD1+/RTD1-	AI Group:CH5	
Vin6	RTD2+/RTD2-	AI Group:CH6	
Vin7	RTD3+/RTD3-	AI Group:CH7	
Normal / INIT	N/A	N/A	reserved

DMU-5010 8 channels AI all support current and voltage, and CH4~CH7 also support RTD.

Refer to below steps to set AI channel. For example, set input of CH0 to 0~20 mA:

Step1: Switch DIP switch Vin0 to the '"ON" location.

Step2: Set CH0 to 0~20 mA via Utility.

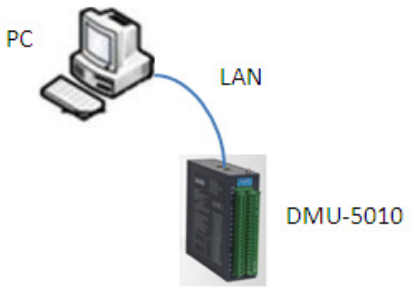
If Ch4~CH7 chooses RTD input, then DIP switch should select voltage.

Chapter 3

Domain Focused Configuration Tool

3.1 Pre-Installation Considerations

The Domain Focused Configuration Tool is a powerful utility, which can be used to configure Advantech BAS-3000BC, DMU-5010 and other I/O modules. This chapter will introduce how to configure DMU-5010 with Domain Focused Configuration Tool. The hardware connection is as follows:



Requirements:

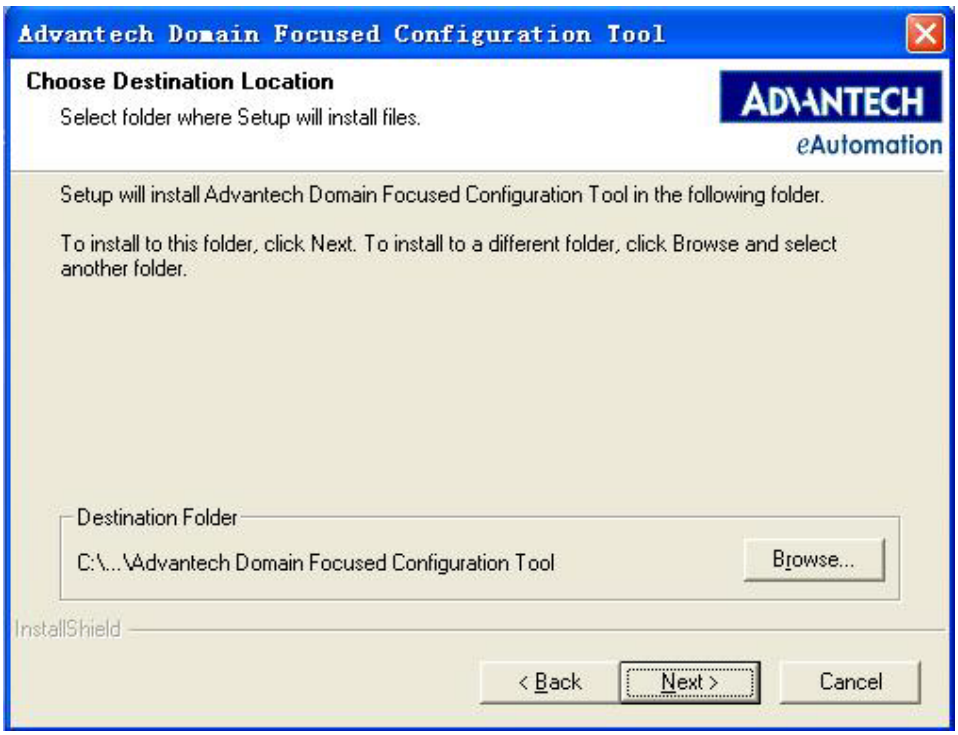
- **Module:** DMU-5010
- **Power Supply:** 12-24 V_{DC} ± 20%
- **OS:** Microsoft Windows XP
- **Network:** Ethernet

3.2 Installation Procedures

First, insert the CD into your CD-ROM Drive, the Advantech Domain Focused Configuration Tool path is: CD\Energy IO DVD\DMU-5010\Utility, then run it on your CD to start install Shield Wizard. It will guide you through the installation.

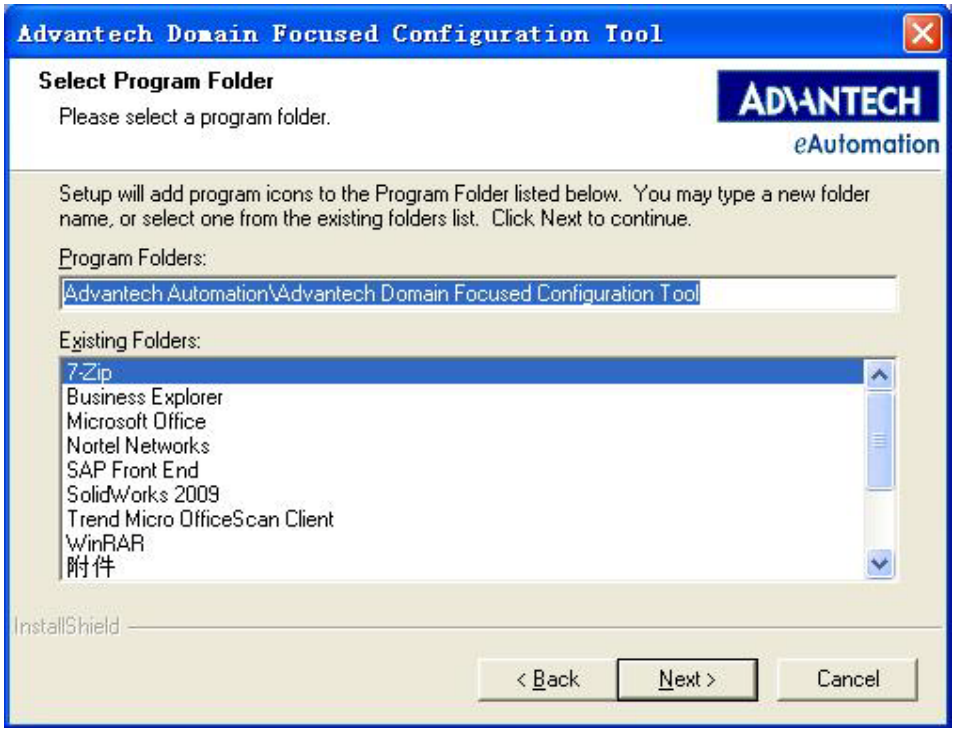
1. Run Advantech Domain Focused Configuration Tool Setup.exe, and the following message appears:

2. Click "**Next**" and the following message appears:

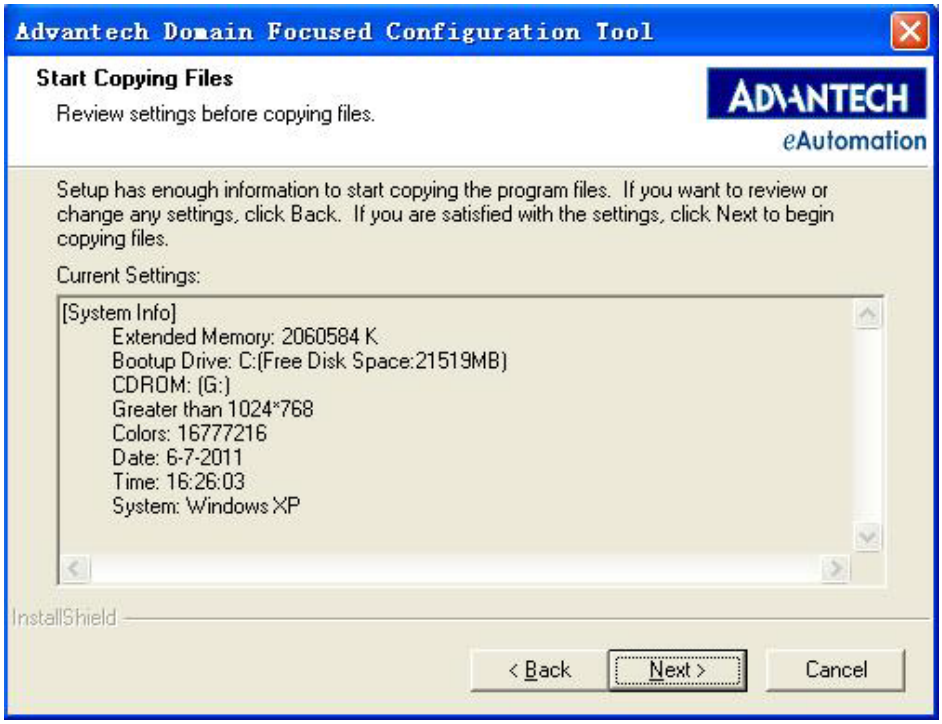


The default installation path is: C:\Program Files\Advantech\Advantech Domain Focused Configuration Tool Utility. You can click "**Browse**" to change the installation path.

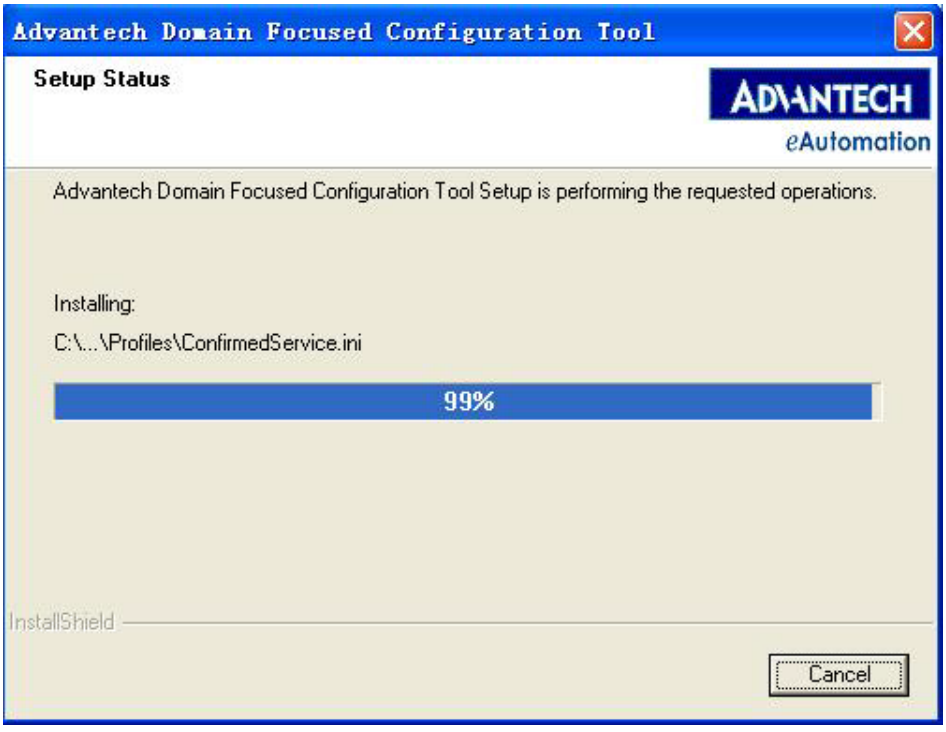
3. Click "**Next**" and the following message appears:



4. Click "**Next**" and the following message will appear:



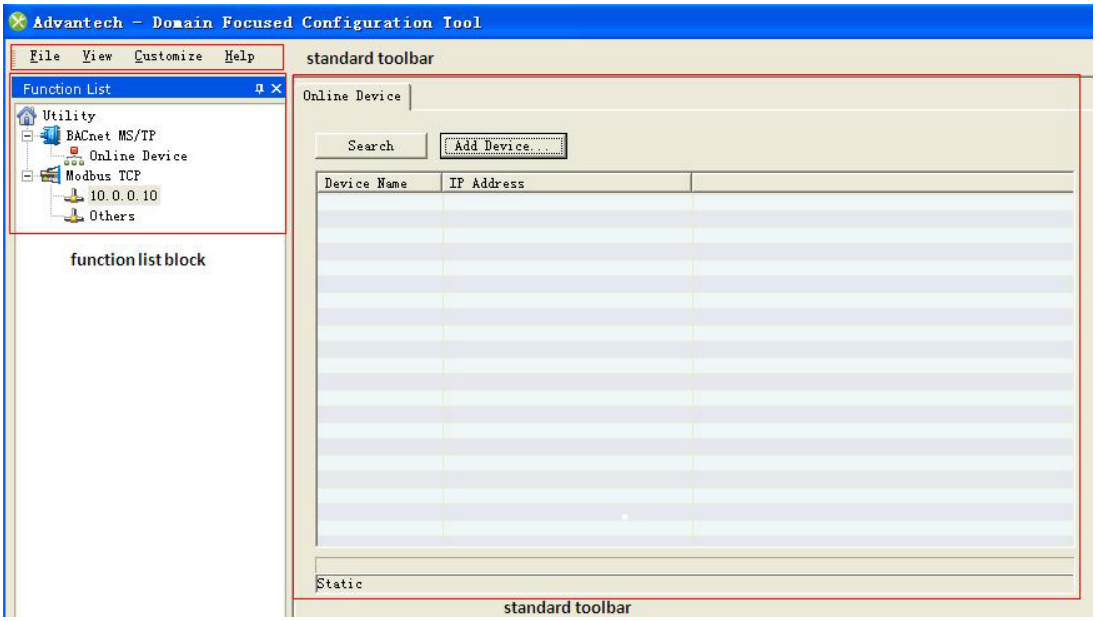
5. Click "**Next**" and the software will automatically finish the installation.



After you have installed the software properly, it will appear in the start menu show as below.

3.3 Software Usage

Advantech Domain Focused Configuration Tool consists of the following parts: standard toolbar, function list block and workspace block.



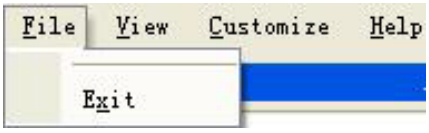
- Standard toolbar area: menu bar selection
- Function list area: device and object tree
- Workspace area: configure the property of DMU series modules.

To start Advantech Domain Focused Configuration Tool, double-click the Advantech Domain Focused Configuration Tool icon on the desktop or from the Windows Program Group.

3.3.1 Standard Toolbar

File:

To exit program, click **File** > **Exit**.



View:

No. Sub Items Description

1. Status Bar Show or hide the Status Bar in the program window.
2. Function List Show or hide the function list zone in the program window.

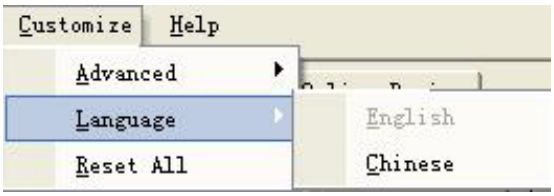
Customize:

The Customize menu includes three sub items:

Advanced:

From here users can change general user settings of the advance user settings of the Advantech Domain Focused Configuration Tool, default is general user setting. (This option is different for the BAS-3000BC configuration. For DMU series, “Advance User” and “General User” are the same).

Language:

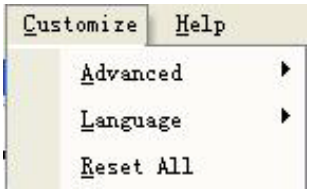


No. Sub Items Description

1. English - Displays Advantech Domain Focused Configuration Tool user interface in English.
2. Chinese - Displays Advantech Domain Focused Configuration Tool user interface in Chinese.

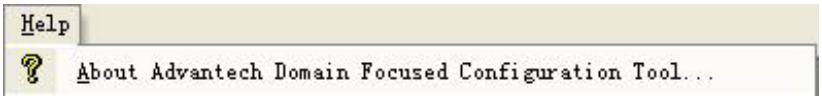
Reset All:

It restores default settings when pressed.

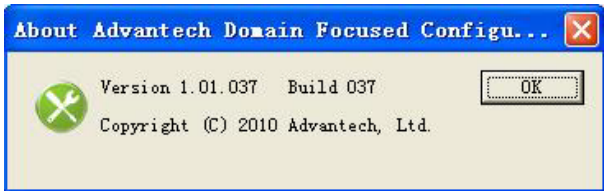


Help:

The Help menu has one sub item: About Advantech Domain Focused Configuration Tool.



When the user clicks “About Advantech Domain Focused Configuration Tool”, the software edition appears.

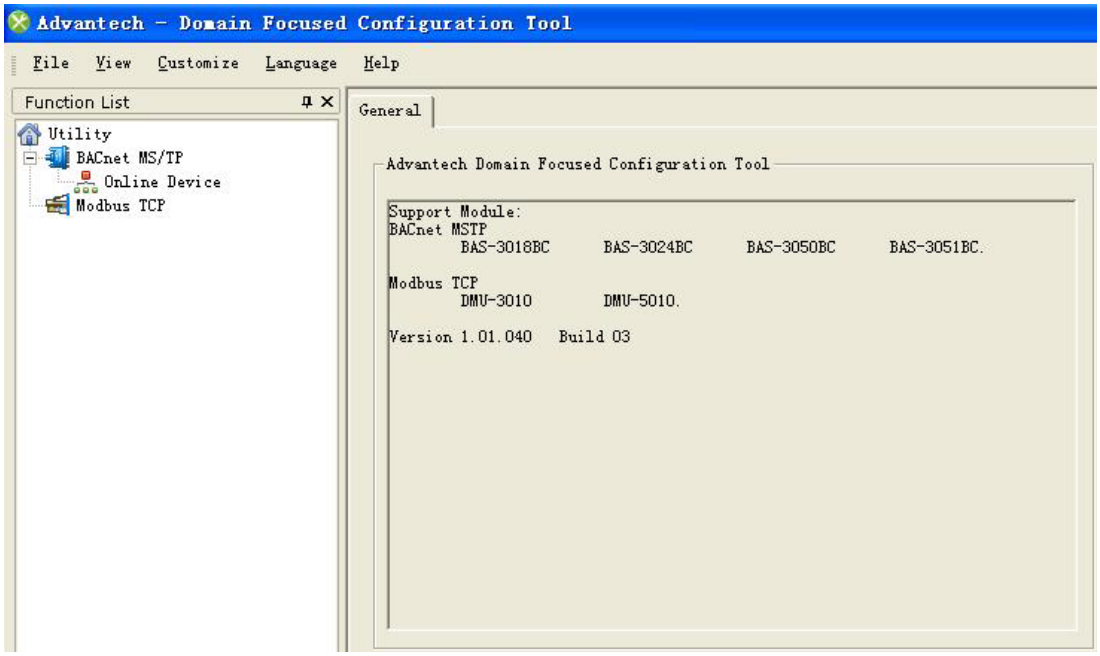


3.4 System Configuration

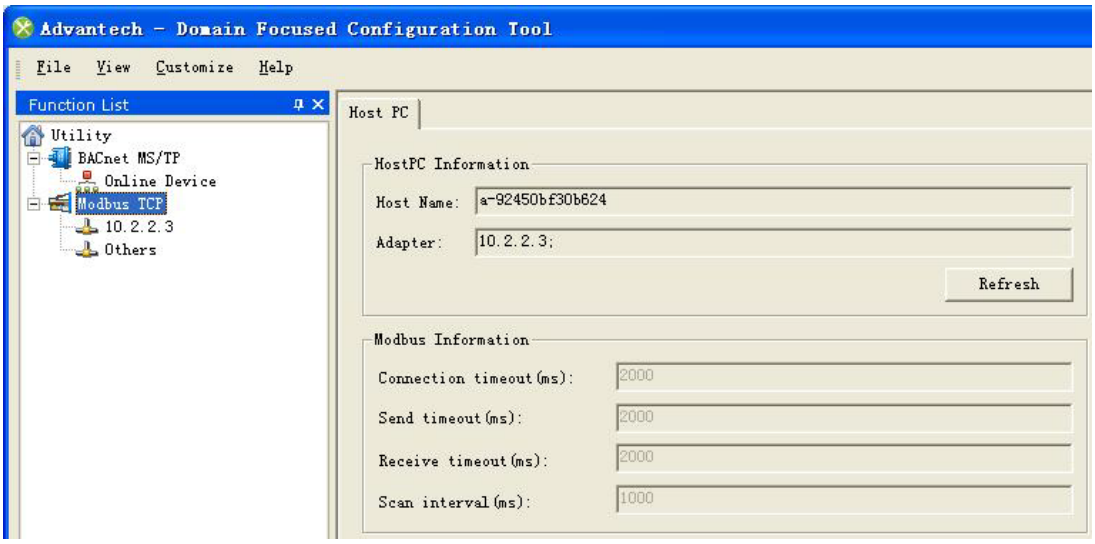
The Advantech Domain Focused Configuration Tool can be used to configure the BAS-3000BC BACnet series I/O module, and also the DMU series I/O module. This chapter mainly describes the configuration of the DMU-5010.

3.4.1 IP Configuration

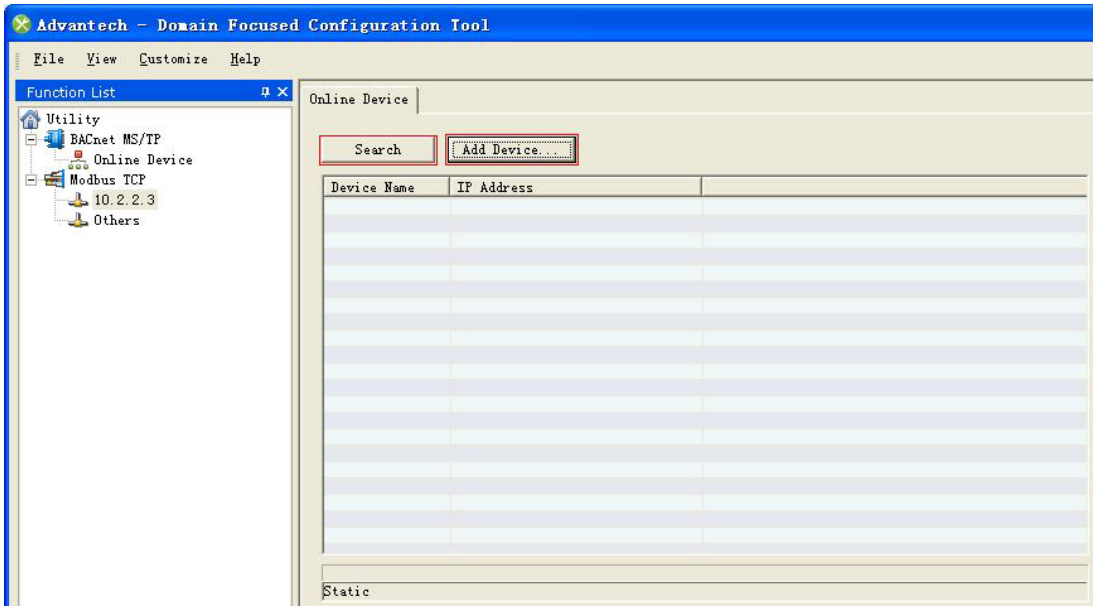
Open “Advantech Domain Focused Configuration Tool”, and it will appear as below:



The DMU-5010 is located under Modbus TCP list, click “**Modbus TCP**”, and the host username and IP information will be shown in the right hand screen:



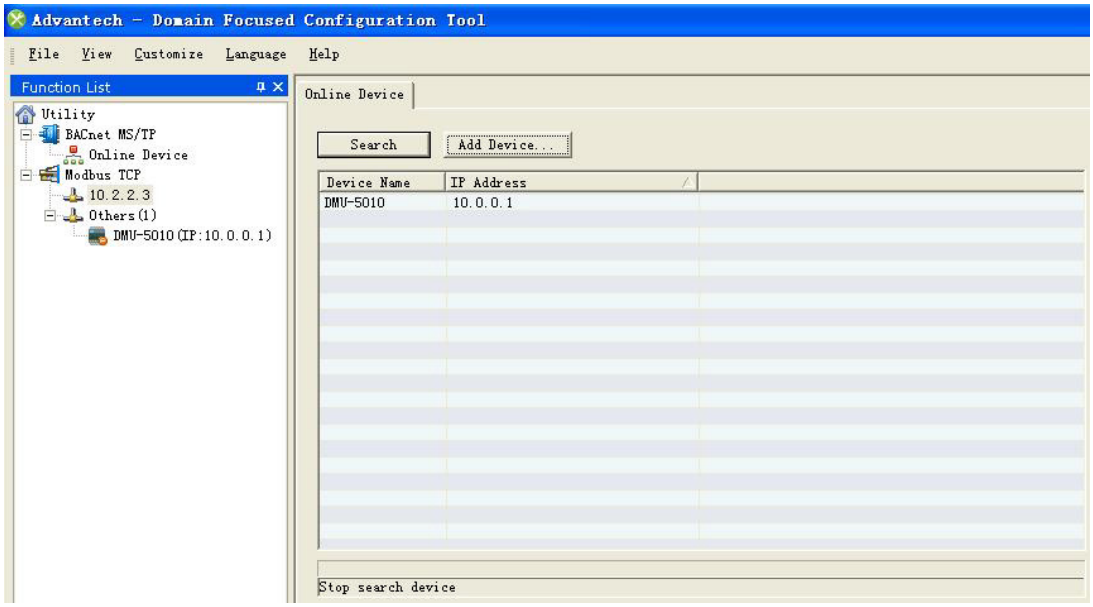
Click the host IP in the left function list, then the right workspace will show two buttons: “Add Device...” and “Search”:



The Advantech Domain Focused Configuration Tool provides scan functionality:

1. Manual scan: Click “**Add Device...**” to manually input the IP address of the device to be scanned.
2. Auto scan: Click “**Search**” and the system will automatically scan all online devices.

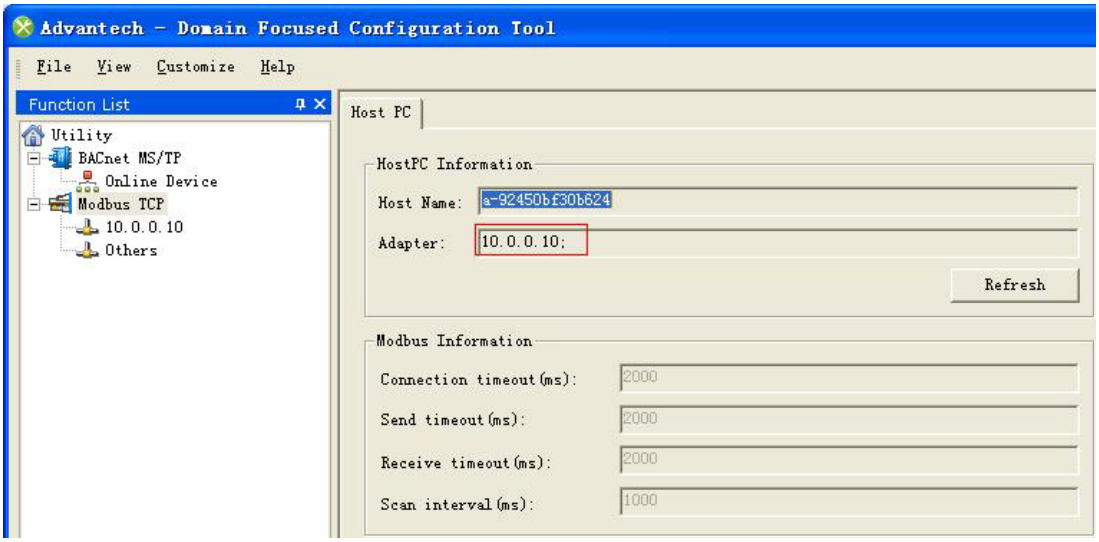
Use auto scan when starting the device for the first time. When scanning DMU-5010, “DMU-5010 (IP: 10.0.0.1)” will appear in the left hand function list, and the right hand workspace will show the default IP address of DMU-5010: 10.0.0.1:



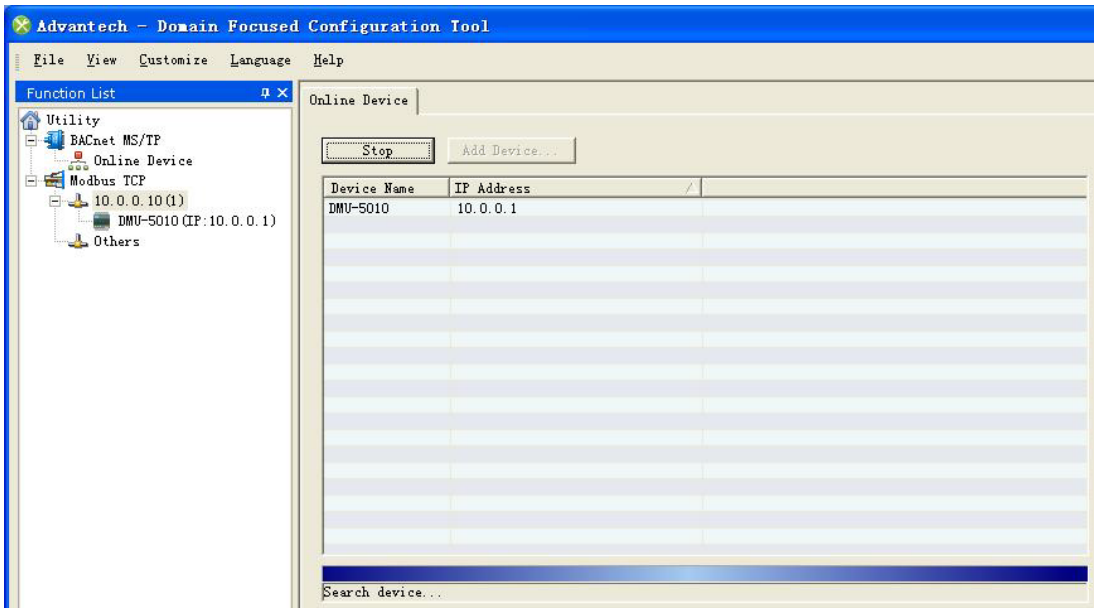
Note: the default IP address of DMU-5010 is not within the same network segment as the host, so users can only modify the device IP. Only when the network segment is the same, can users enter the parameter configuration screen. So the IPs of the host and DMU-5010 have to be changed to be within the same segment.

Method 1: Change the IP of the host, eg. change it from 10.2.2.3 to 10.0.0.10.

After resetting the host IP to 10.0.0.10, click "**Modbus TCP**" on the left and return to the screen showing the host username and IP. Click "**Refresh**" and the software will adjust the new address of the host to 10.0.0.10:

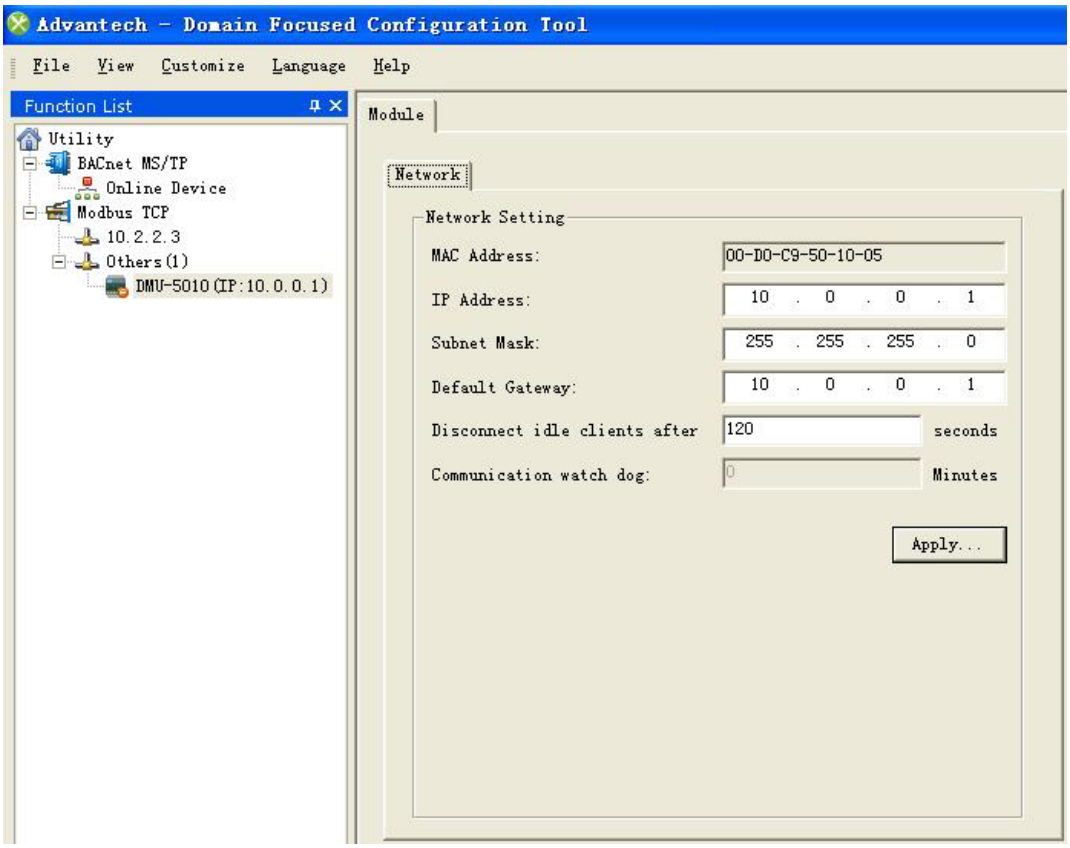


Then perform an auto scan of DMU-5010, "DMU-5010 (IP: 10.0.0.1)" will appear under the host IP in the left hand function list.

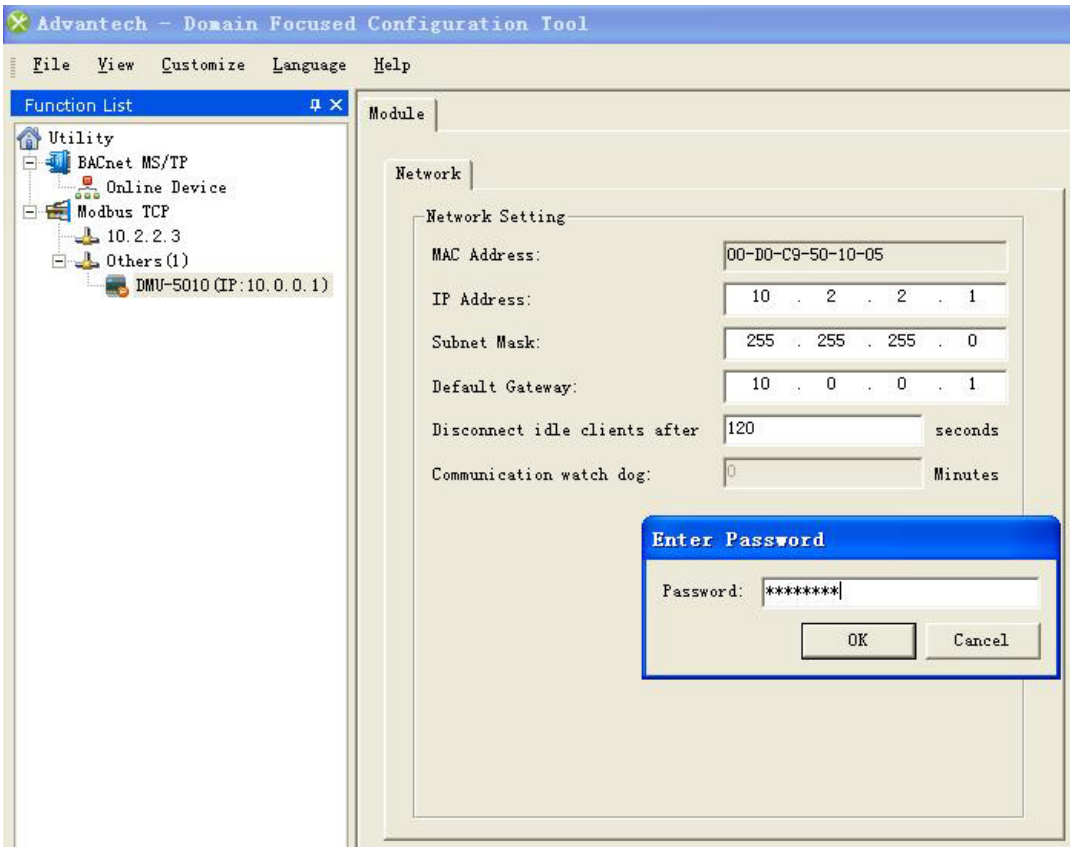


Method 2: Change the IP address of the DMU-5010 IP, eg. change it from 10.0.0.1 to 10.2.2.1.

After scanning the DMU-5010, click “DMU-5010 (IP: 10.0.0.1)” in the left hand panel and device IP address information will show in the right hand panel:

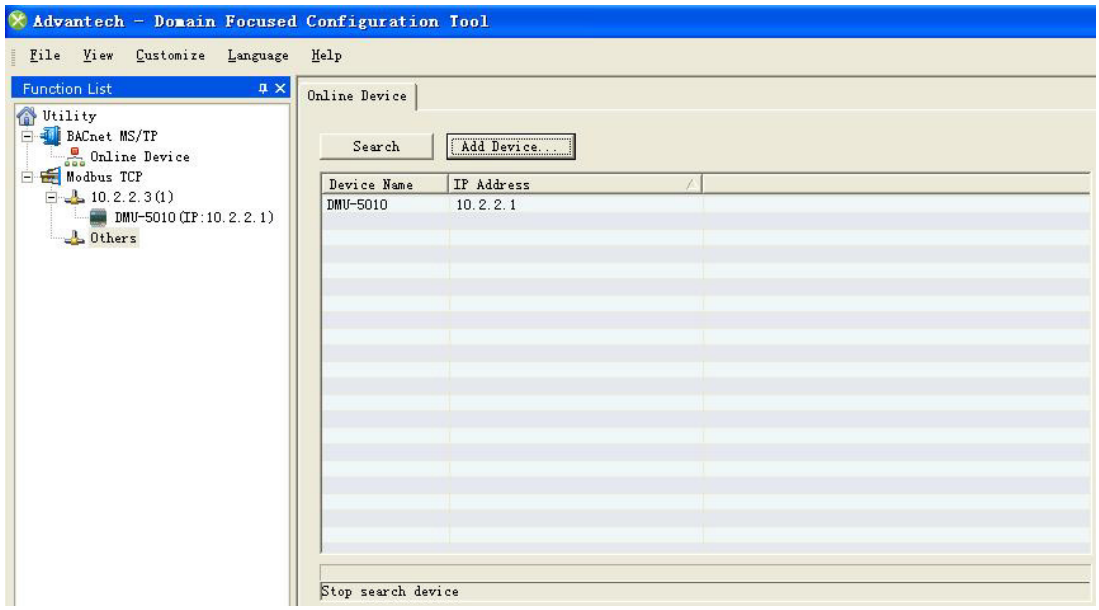


Then input the new IP in the “IP Address” column: 10.2.2.1, and click “**Apply**”, you’ll be reminded to input the password, the initial password is 00000000:



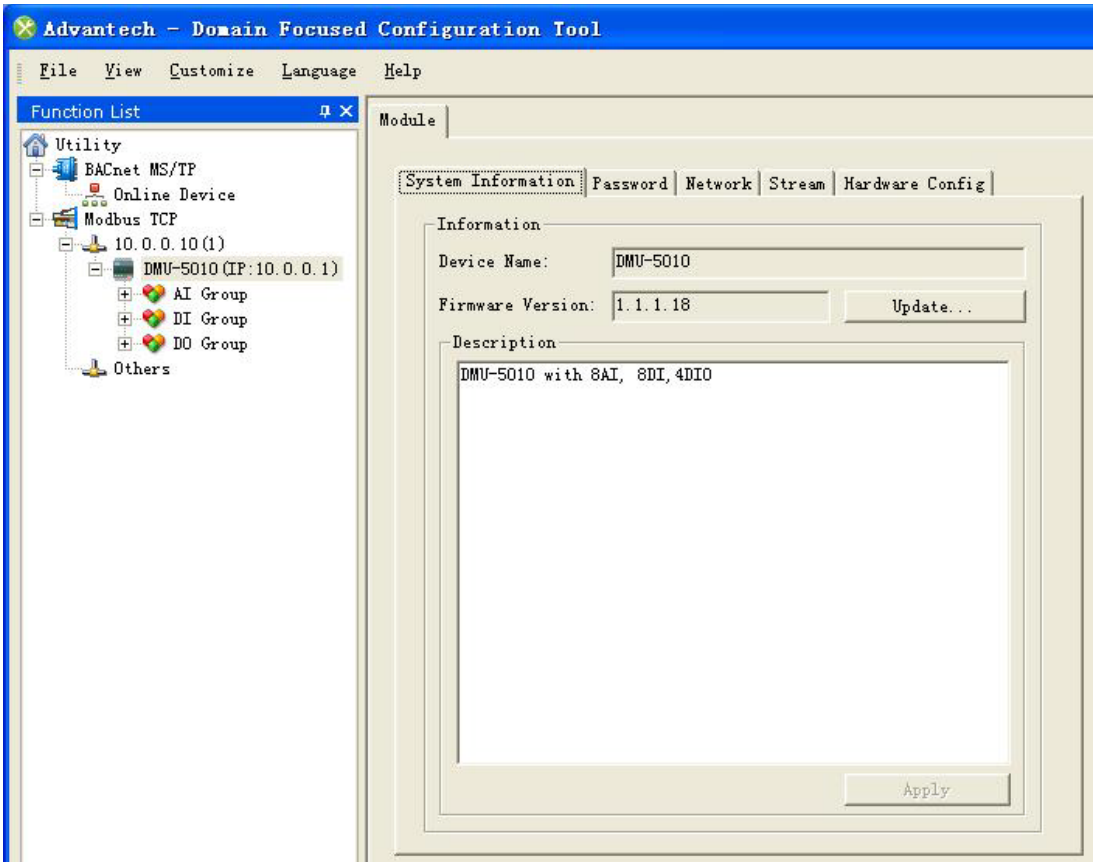
Click “**OK**”,

After the IP address of the DMU-5010 has been updated, “DMU-5010(IP:10.2.2.1)” will appear under the host IP in the left hand function list.



3.4.2 Device Management

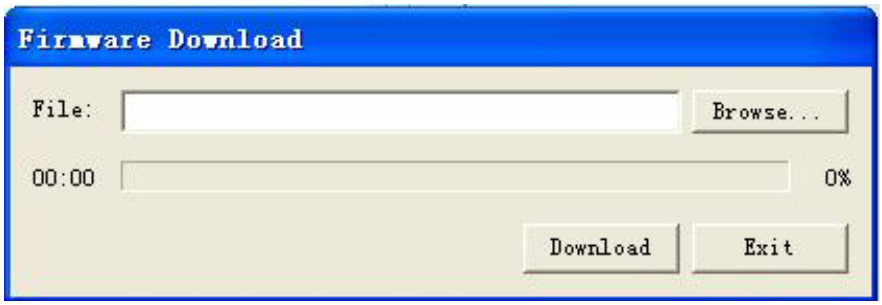
When the IP adresses of the host and DMU-5010 are within the same network segment, click “DMU-5010 (IP: 10.x.x.x)” and the following screen will appear, the left hand column shows AI/DI/DO list, and the right hand workspace is available for configuring relevant system information, password, network connection and active uploading: System Information, Password, Network, Stream and Hardware config:



System Information:

Display the current F/W version information and description of the module.

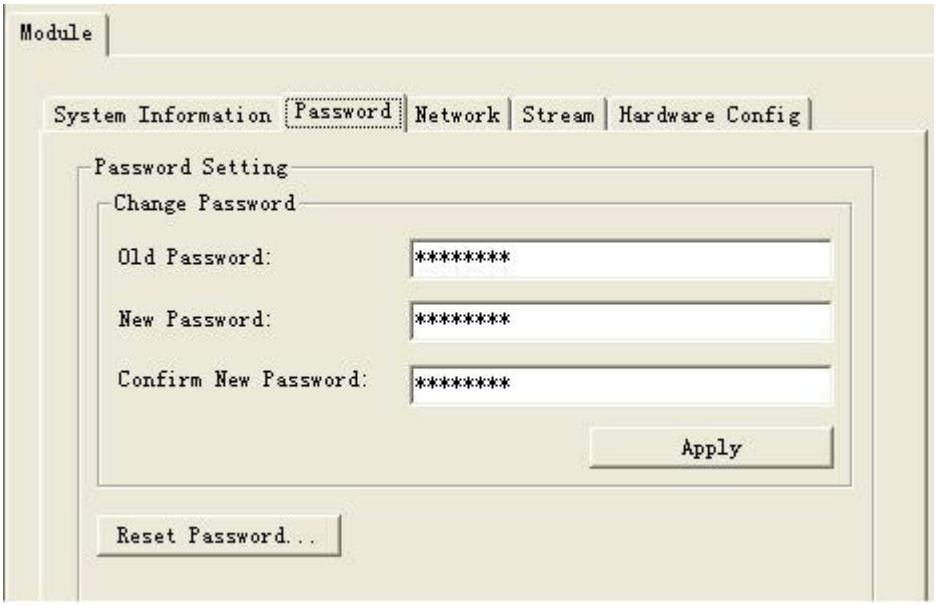
If you need to update the F/W version, click “**Update...**”.



If you need to change the description of the module, input the relevant content in “Description field, and then click “**Apply**” to save it.

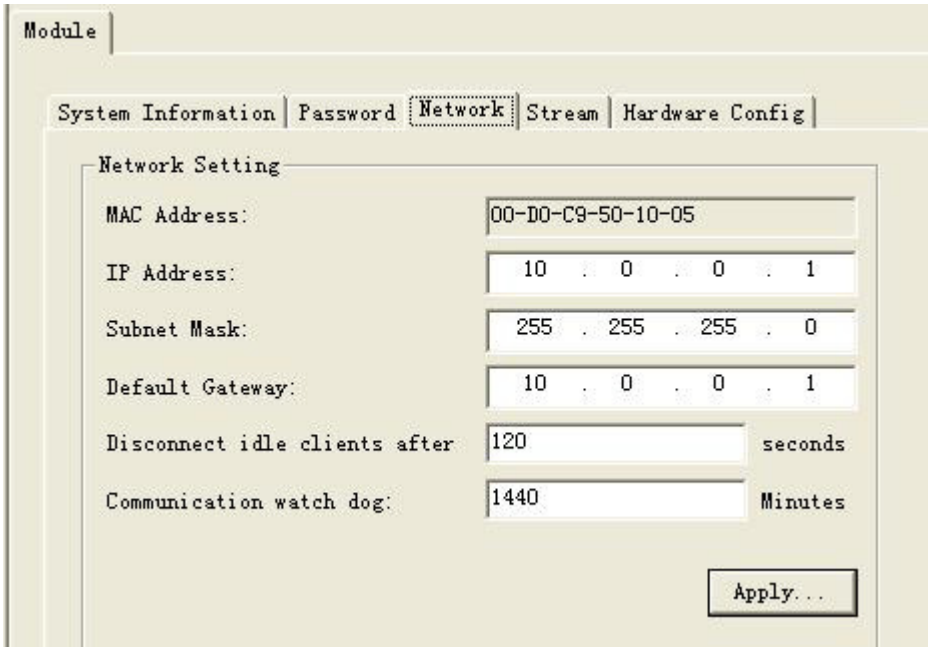
Password:

To protect the device, users need to input the password when entering I/O channel configuration, or changing device IP. The password can be reset, which defaults to "00000000". After setting a new password, click "**Apply**" to save it; if you need to restore the factory setting, click "**Reset Password**".



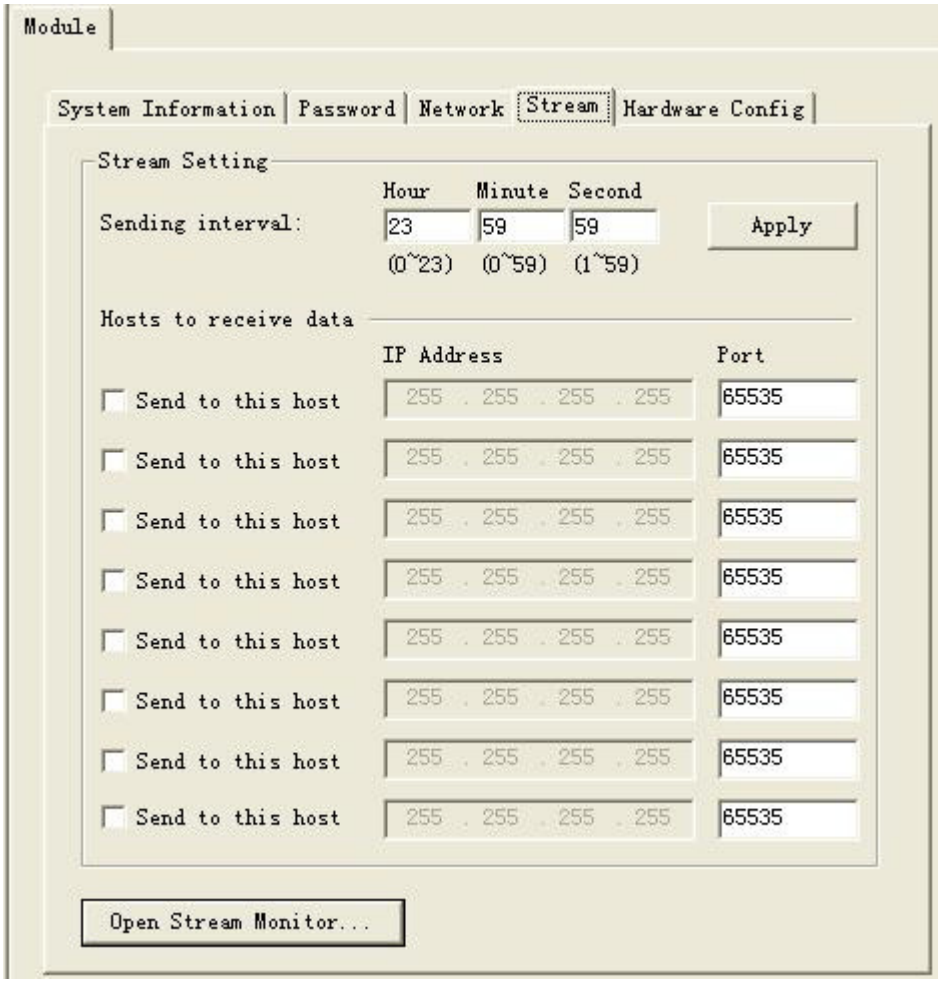
Network:

Display the device IP address and network connection information. If you need to change the configuration, input the modifications and then click "**Apply**" to save them.



Stream:

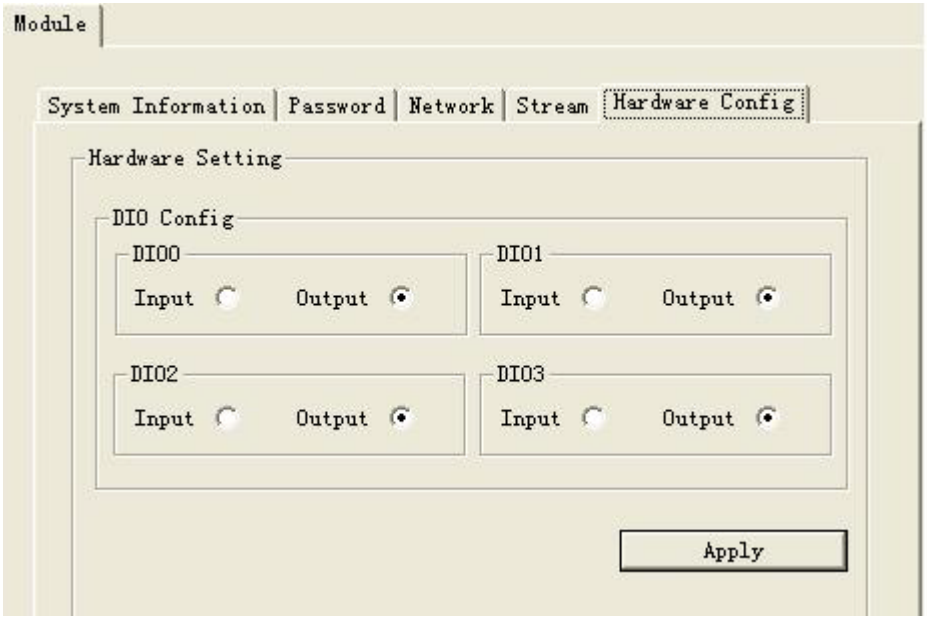
The DMU-5010 supports active data uploads. This field displays the host IP address receiving the data. It supports a maximum of 8 hosts to receive data simultaneously and the data upload frequency can be freely configured.



If you need to monitor the upload state, click "**Open Stream Monitor...**" and the uploaded state of the data flow will be displayed.

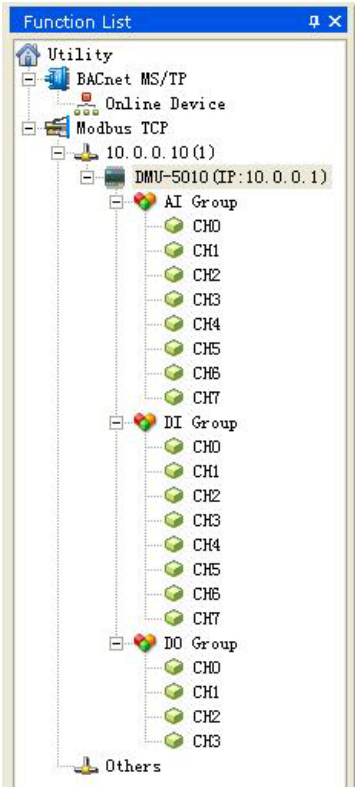
Hardware config

DMU-5010 DIO0~DIO3 support 4 channels DI/DO shared. The user can choose either DI or DO here. The default setting is 4-CH DO, and CH0~CH3 is displayed in DO Group. When you choose DI for a certain channel, there will be a new channel in DI Group. When you choose DI for all the four channels, “CH8~Ch11” will be added to DI Group.



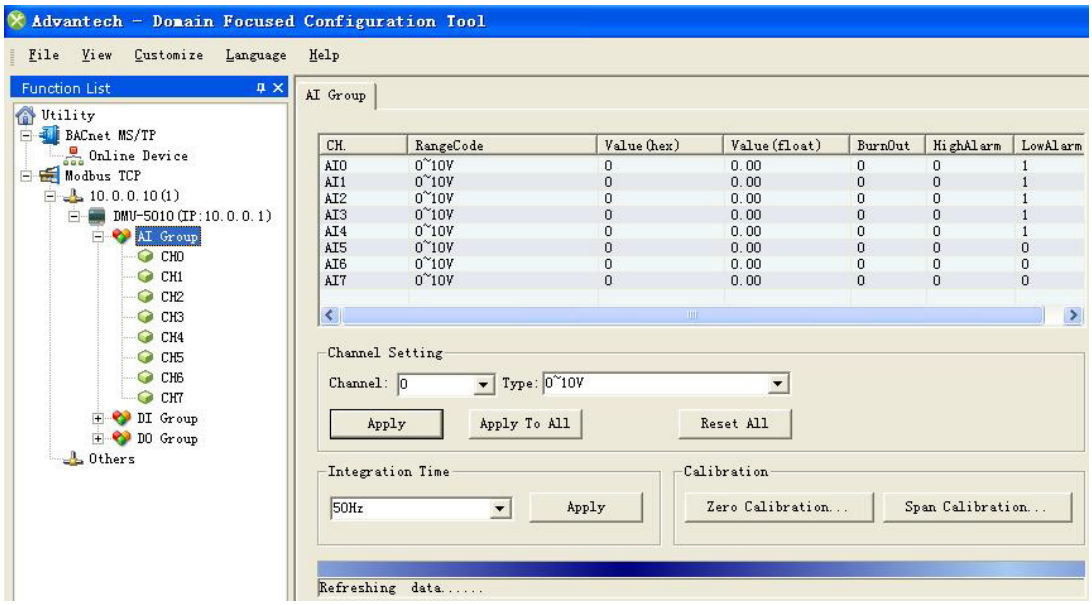
3.5 Hardware Parameter Configuration

After scanning the DMU-5010, you’ll see the I/O listed under “DMU-5010 (IP: ...)” function list in the left configuration utility: AI Group, DI Group and DO Group. This section gives a detailed introduction on how to configure the DMU-5010.



3.5.1 AI Group

The DMU-5010 has 8 analog input channels, click "**AI Group**" and you'll see every AI channel's input state:



- CH: Channel numbers.
- RangeCode: Input type of every channel.
- Value (hex): Input value is displayed as real-time data, hex = (float-analymin)/(analymax-analymin)*65535.
- Value (float): Input value is displayed as float type.
- BurnOut: Flag display during the burnout detection.
  1: the input will produce burnout;
  0: normal input.
- HighAlarm: High alarm flag display.
  1: the input value is greater than or equal to the set upper limit (abnormal);
  0: the input value is less than the set upper limit (normal).
- LowAlarm: Low alarm flag display.
  1: the input value is less than or equal to the set lower limit (abnormal);
  0: the input value is greater than the set upper limit (normal).

3.5.1.1 Input Type and Alarm Configuration

AI Group has 8 channels, AI0 ~ AI7 all support 0 ~ 20 mA, 4 ~ 20 mA, -20~20mA, 0~5V,0~10V, 0~15V, -5~5V, -10~10V, -15~15V, 0~5V, 0~10V, 0~15V, ±5V, ±10V, ±15V, ±20mA, and 0~10 V input, and AI4 ~ AI7 also support the following RTD input signals:

PT100 (385): -50 ~ 150°C

PT100 (392): -50 ~ 150°C

PT100 (385): 0 ~ 100°C

PT100 (392): 0 ~ 100°C

PT100 (385): 0 ~ 200°C

PT100 (392): 0 ~ 200°C

PT100 (385): 0 ~ 400°C

PT100 (392): 0 ~ 400°C

PT100 (385): -200 ~ 200°C

PT100 (392): -200 ~ 200°C

PT1000: -40 ~ 160°C

Users can configure the input types of channels by the following two ways in the utility:

1. Perform all the configurations of channels in “AI Group”.

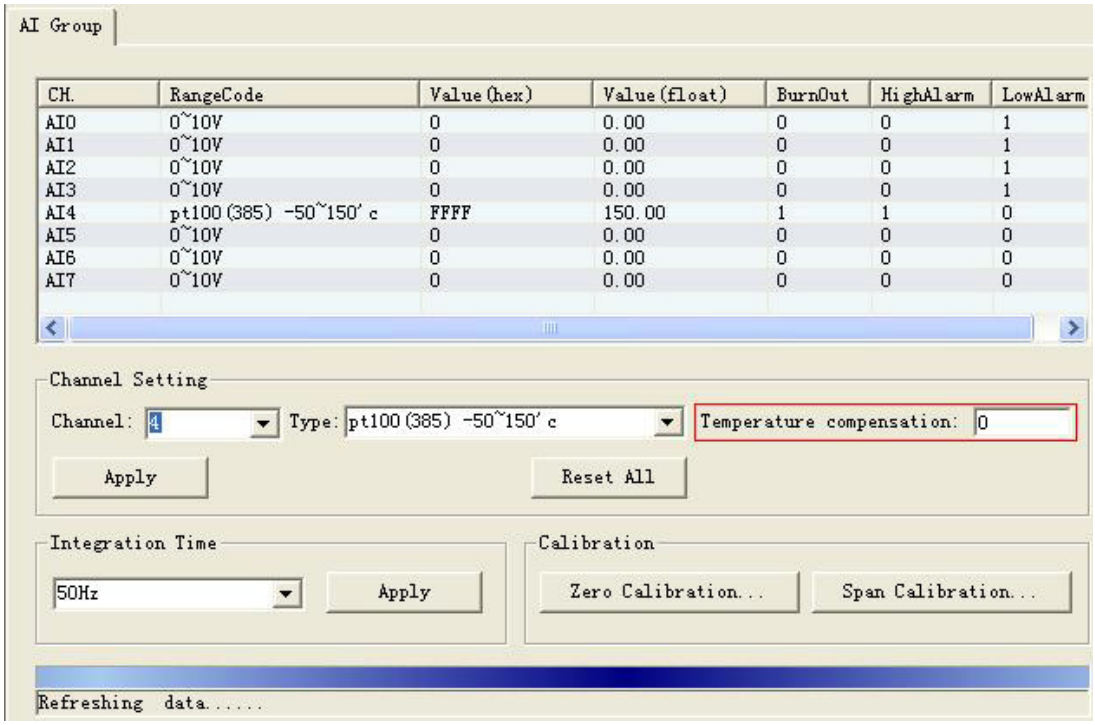
For example, select CH1 and input “0 ~ 10 V”, and click “**Apply**” to save it, then CH1’s input configuration will be 0 ~ 10 V.

If AI0 ~ AI7 need to be configured as the same input type, then set the "Channel" columns to "0",, and select the input type, click “**Apply To All**” to quickly finish the configuration.

If selecting input type eg. 0 ~ 20 mA, click “**Apply To All**” and all channels will be set to 0 ~ 20 mA.

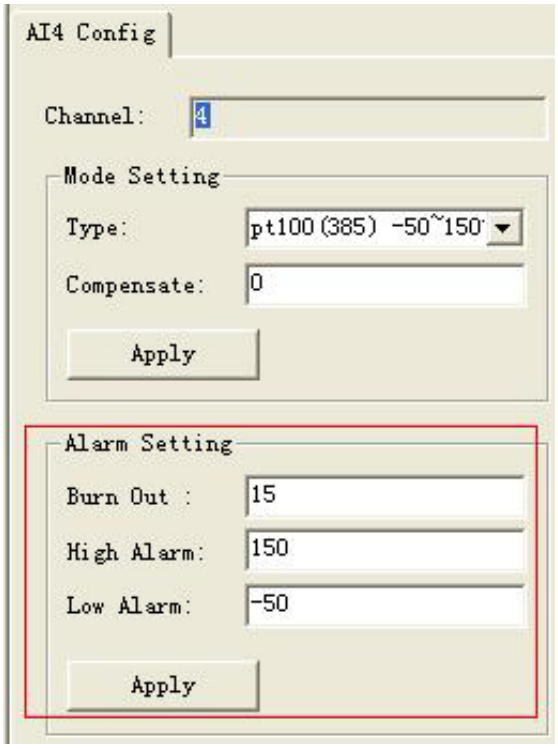
Click “**Reset All**”, and all AI channels will restore to the factory configurations.

For AI4 ~ AI7, when selecting RTD input, the system will provide “Temperature Compensation” column, users can input the compensation value according to the actual requirements, and click “**Apply**” to save it.



2. Click one channel in the function list to separately configure it.

You can not only configure the input type here, but also complete the alarm configuration: Burn Out, High Alarm and Low Alarm. Click “**Apply**” to save the configurations.

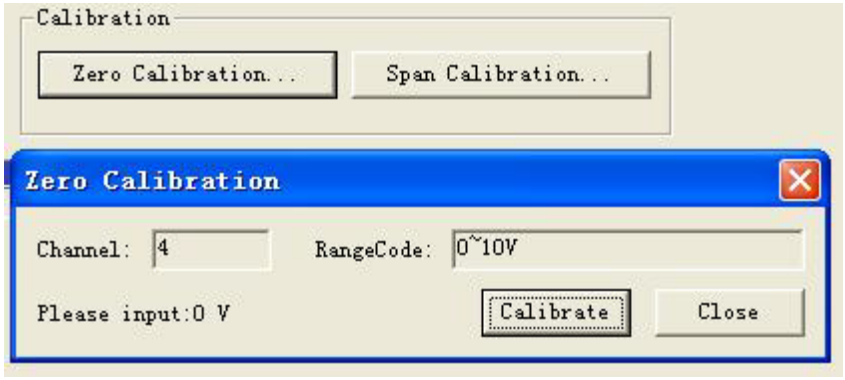


3.5.1.2 Frequency Selection

According to the grid frequency, the selections are 50 Hz or 60 Hz. Click “**Apply**” to save the configuration.

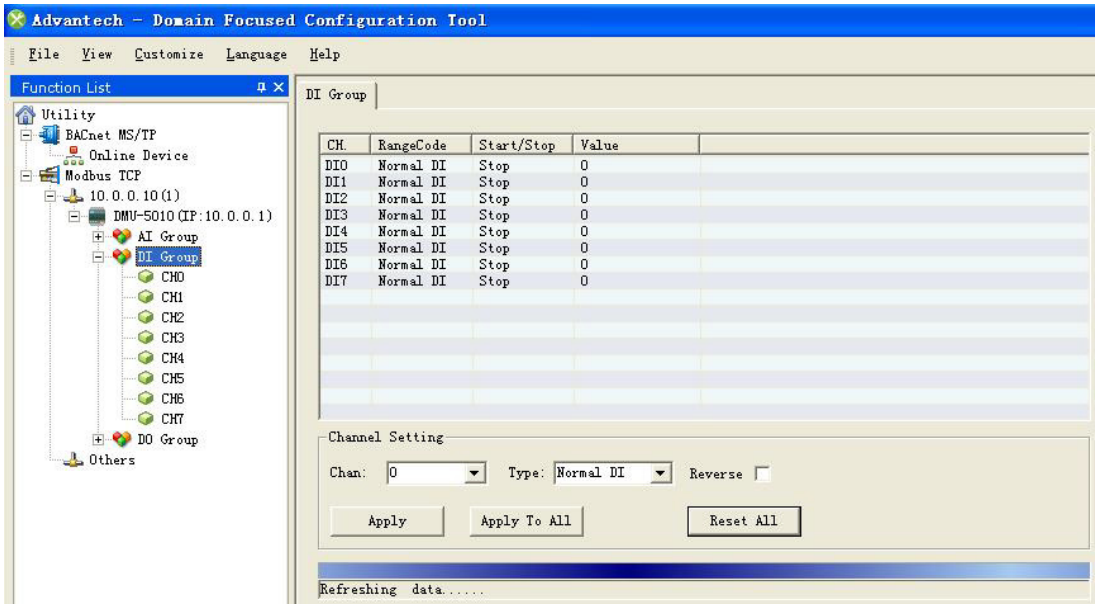
3.5.1.3 Calibration

When executing zero calibration or span calibration operations, click "**Zero Calibration...**" or "**Span Calibration...**". Users can calibrate according to the instructions of the popup window.



3.5.2 DI Group

DMU-5010 is configured with 8 digital input channels and 4 DI/DO shared channels. Click "**DI Group**" and you'll see the input state of every DI channel.



- CH: Channel numbers.
- RangeCode: Input type of every channel.
- Start/Stop: When selecting frequency or accumulator input, you can start or stop inputting manually by double click this button..

Value:

- When the input type is “Normal DI”:

	Value	Description	Note
Dry contact	0	open	The Digital Input Value 0 and 1 status can be inverted by click the “Reverse” button.
	1	close to GND	
Wet contact	0	+10V to +30V	
	1	+3V max	

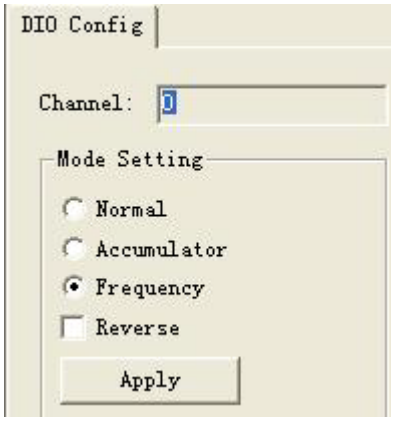
- When the input type is “Frequency”: displaying the input signals’ frequency.
- When the input type is “Accumulator”: displaying the input signals’ pulses.

3.5.2.1 Input Type Configuration

DMU-5010 support 12 channels DI at most, the DI input type is: Normal DI, frequency and accumulator. There are two ways to set the input type:

1. Perform all the configurations in “DI Group” interface.

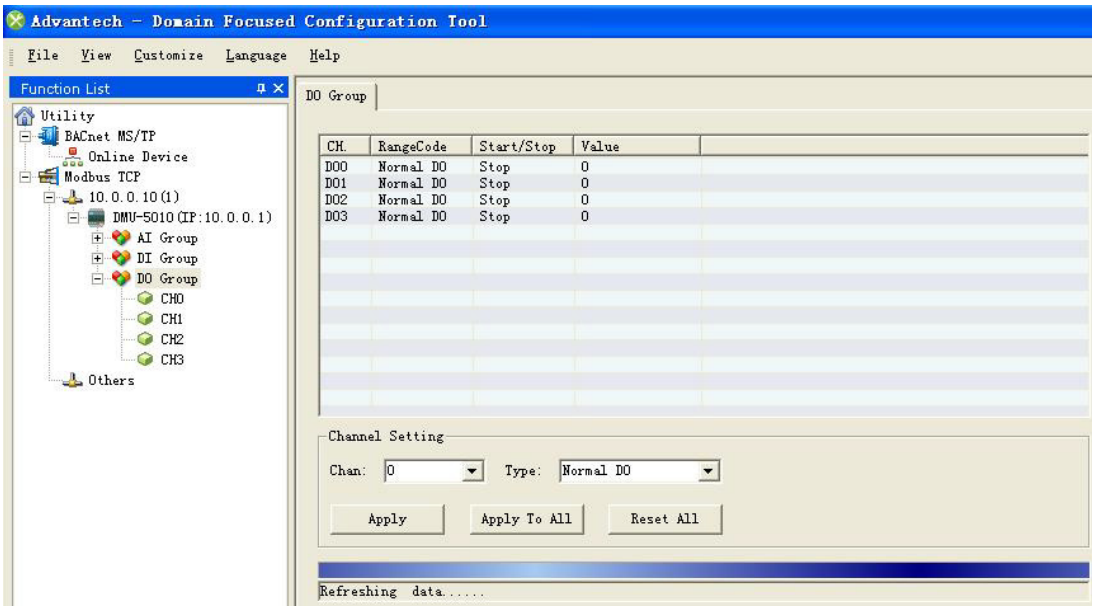
2. Perform configurations separately by clicking a channel in the function list.



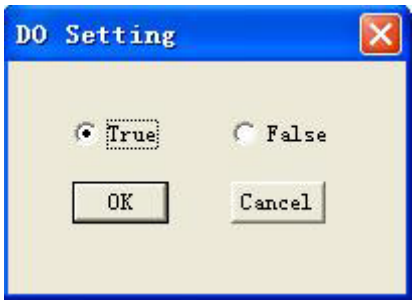
Note! *DMU-5010 support 2channels frequency and accumulator at most.*

3.5.3 DO Group

DMU-5010 support 4 channels DI/DO shared. Click “**DO Group**” and you’ll see the output state of every DO channel.



- CH: Channel numbers.
- RangeCode: Output type of every channel.
- Star/Stop: When it is PWM output, double click and you can start or stop the output manually.
- Value: 1: high level; 0: low level.
  When it is “Normal DO”, double click and you can start or stop the output manually.

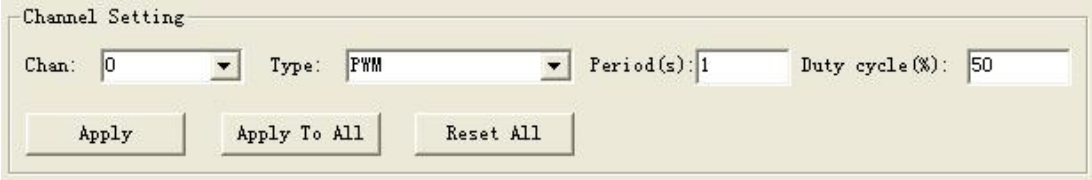


3.5.3.1 Output Type Configuration

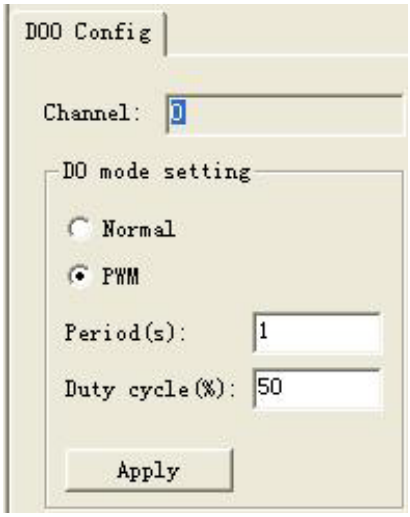
DMU-5010 support 4 channels DO at most, the DO input type is: Normal DO, PWM. There are two ways to set the input type:

1. Perform all configurations intensively in “DO Group”.

When selecting PWM output, you need to set PWM period to 0.02 ~ 3600’s and duty cycle to 10% ~ 100%, and click “**Apply**” to save the configuration.



2. Perform configurations separately by clicking a channel in the function list.



Note! *DMU-5010 support 2 channels PWM at most.*

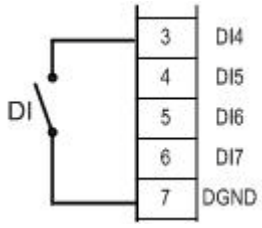
Appendix A

I/O Wiring

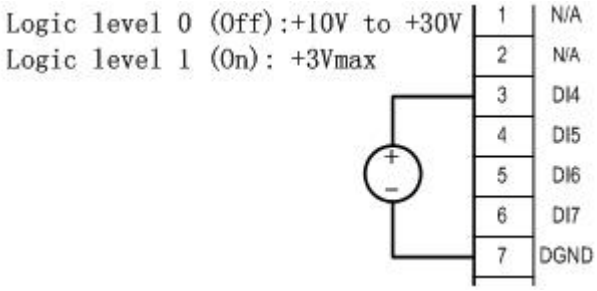
A.1 I/O Wiring Diagrams

1. DI (DI0~DI7)

(1) DI Dry contact:

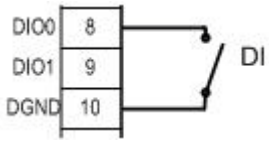


(2) DI Wet contact:

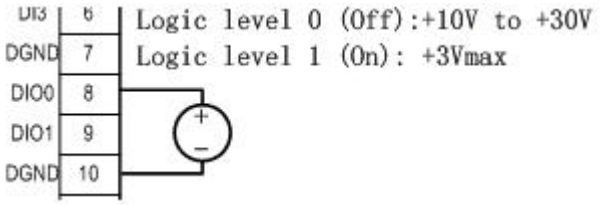


2. DIO (DIO0~DIO4)

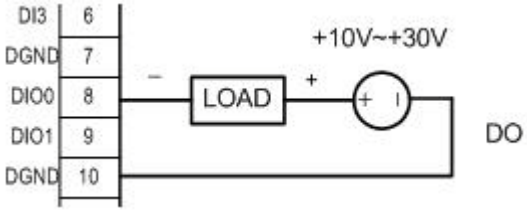
(1) DI Dry contact:



(2) DI Wet contact:

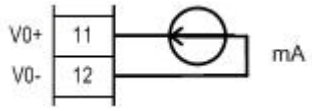


(3) DO:

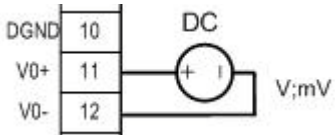


3. AI (CH0~CH4)

(1) Current (±20mA, 0~20mA, 4~20mA)

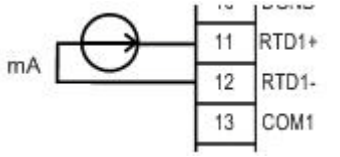


(2) Voltage (0-5V, 0~10V, 0~15V, ±5V, ±10V, ±15V)

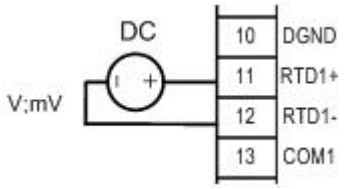


4. AI (CH5~CH7)

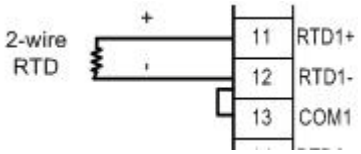
(1) Current (±20mA, 0~20mA, 4~20mA)



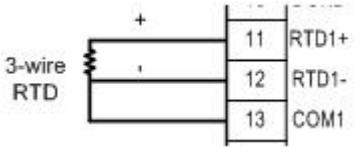
(2) Voltage (0-5V, 0~10V, 0~15V, ±5V, ±10V, ±15V)



(3) 2- wire RTD:



(4) 3-wire RTD:



Appendix B

Modbus Address

B.1 Modbus TCP Address (0x)

Address 0x	Channel	Description	Attribute	Remarks
00001	0	DI0 Value	Read	
00002	1	DI1 Value	Read	
00003	2	DI2 Value	Read	
00004	3	DI3 Value	Read	
00005	4	DI4 Value	Read	
00006	5	DI5 Value	Read	
00007	6	DI6 Value	Read	
00008	7	DI7 Value	Read	
00009	UDI0	UI4 as DI Value	Read	UI range code should be set to RTD mode to be used in this function
00010	UDI1	UI5 as DI Value	Read	
00011	UDI2	UI6 as DI Value	Read	
00012	UDI3	UI7 as DI Value	Read	
00013	GPIO-DI0	GPIO0 as DI Value	Read	The read back data will be valid when GPIO is set to DI
00014	GPIO-DI1	GPIO1 as DI Value	Read	
00015	GPIO-DI2	GPIO2 as DI Value	Read	
00016	GPIO-DI3	GPIO3 as DI Value	Read	
00401	GPIO-DO0	GPIO0 as DO Value	R/W	The read back data will be valid when GPIO is set to DI
00402	GPIO-DO1	GPIO1 as DO Value	R/W	
00403	GPIO-DO2	GPIO2 as DO Value	R/W	
00404	GPIO-DO3	GPIO3 as DO Value	R/W	
?	?	?	?	
00501	0	UI0 High Alarm Flag	Read	
00502	1	UI1 High Alarm Flag	Read	
00503	2	UI2 High Alarm Flag	Read	
00504	3	UI3 High Alarm Flag	Read	
00505	4	UI4 High Alarm Flag	Read	
00506	5	UI5 High Alarm Flag	Read	
00507	6	UI6 High Alarm Flag	Read	
00508	7	UI7 High Alarm Flag	Read	
?	?	?	?	
00601	0	UI0 Low Alarm Flag	Read	
00602	1	UI1 Low Alarm Flag	Read	
00603	2	UI2 Low Alarm Flag	Read	
00604	3	UI3 Low Alarm Flag	Read	
00605	4	UI4 Low Alarm Flag	Read	
00606	5	UI5 Low Alarm Flag	Read	
00607	6	UI6 Low Alarm Flag	Read	
00608	7	UI7 Low Alarm Flag	Read	

00701	0	UI0 Burn Out	Read	
00702	1	UI1 Burn Out	Read	
00703	2	UI2 Burn Out	Read	
00704	3	UI3 Burn Out	Read	
00705	4	UI4 Burn Out	Read	
00706	5	UI5 Burn Out	Read	
00707	6	UI6 Burn Out	Read	
00708	7	UI7 Burn Out	Read	

B.2 ModbusTCP Address(4x)

1. AI float

Address 4x	Channel	Description	Attribute	Length (2bytes)	Remarks
40001	0	UI0 Float Value	Read	2	
40003	1	UI1 Float Value	Read	2	
40005	2	UI2 Float Value	Read	2	
40007	3	UI3 Float Value	Read	2	
40009	4	UI4 Float Value	Read	2	
40011	5	UI5 Float Value	Read	2	
40013	6	UI6 Float Value	Read	2	
40015	7	UI7 Float Value	Read	2	

2. AI hex

Address 4x	Channel	Description	Attribute	Length (2bytes)	Remarks
40101	0	UI0 Hex Value	Read	1	
40102	1	UI1 Hex Value	Read	1	
40103	2	UI2 Hex Value	Read	1	
40104	3	UI3 Hex Value	Read	1	
40105	4	UI4 Hex Value	Read	1	
40106	5	UI5 Hex Value	Read	1	
40107	6	UI6 Hex Value	Read	1	
40108	7	UI7 Hex Value	Read	1	

3. System Information

Address 4x	Channel	Description	Attribute	Length (2bytes)	Remarks
41201~41218		System Infor	Read	18	Module name:10 version:2 AIO channel number:1 DIO channel number:1 Super user:1 AI Calibration:1 AO Calibration:1 reserved:1
41241		support AI range code	Read	16	bit0: UV , bit1:UI, bit3:PT100, bit4:PT1000, bit5:Ther3K, bit6:Ther10K
41273		support DI range code	Read	16	bit0:NorDI, bit1:Accumu, bit2: Freq,
41289		support DO range code	Read	16	bit0: Nor DO, bit1:PWM

4. UI function code

Address 4x	Channel	Description	Attribute	Length (2bytes)	Remarks
41601	0	UI0 Range Code	R/W	1	
41602	1	UI1 Range Code	R/W	1	
41603	2	UI2 Range Code	R/W	1	
41604	3	UI3 Range Code	R/W	1	
41605	4	UI4 Range Code	R/W	1	
41606	5	UI5 Range Code	R/W	1	
41607	6	UI6 Range Code	R/W	1	
41608	7	UI7 Range Code	R/W	1	

5. UI Tem.Com.

Address 4x	Channel	Description	Attribute	Length (2bytes)	Remarks
42001	0	UI0 Temperature	R/W	2	data type float
42003	1	UI1 Temperature	R/W	2	data type float
42005	2	UI2 Temperature	R/W	2	data type float
42007	3	UI3 Temperature	R/W	2	data type float
42009	4	UI4 Temperature	R/W	2	data type float
42011	5	UI5 Temperature	R/W	2	data type float
42013	6	UI6 Temperature	R/W	2	data type float
42015	7	UI7 Temperature	R/W	2	data type float

6. UI high alarm

Address 4x	Channel	Description	Attribute	Length (2bytes)	Remarks
42101	0	High Alarm Value	R/W	1	set value x 10
42102	1	High Alarm Value	R/W	1	set value x 10
42103	2	High Alarm Value	R/W	1	set value x 10
42104	3	High Alarm Value	R/W	1	set value x 10
42105	4	High Alarm Value	R/W	1	set value x 10
42106	5	High Alarm Value	R/W	1	set value x 10
42107	6	High Alarm Value	R/W	1	set value x 10
42108	7	High Alarm Value	R/W	1	set value x 10

7. UI low alarm

Address 4x	Channel	Description	Attribute	Length (2bytes)	Remarks
42201	0	Low Alarm Value	R/W	1	set value x 10
42202	1	Low Alarm Value	R/W	1	set value x 10
42203	2	Low Alarm Value	R/W	1	set value x 10
42204	3	Low Alarm Value	R/W	1	set value x 10
42205	4	Low Alarm Value	R/W	1	set value x 10
42206	5	Low Alarm Value	R/W	1	set value x 10
42207	6	Low Alarm Value	R/W	1	set value x 10
42208	7	Low Alarm Value	R/W	1	set value x 10
42301	0	Burn Out Value	R/W	1	set value x 10
42302	1	Burn Out Value	R/W	1	set value x 10
42303	2	Burn Out Value	R/W	1	set value x 10
42304	3	Burn Out Value	R/W	1	set value x 10
42305	4	Burn Out Value	R/W	1	set value x 10
42306	5	Burn Out Value	R/W	1	set value x 10
42307	6	Burn Out Value	R/W	1	set value x 10
42308	7	Burn Out Value	R/W	1	set value x 10

8. DI function code

Address 4x	Channel	Description	Attribute	Length (2bytes)	Remarks
43001	ch0~ch3	GPIO CONFIG	R/W	1	0 -> DI, 1 ->DO

9. DO function code

Address 4x	Channel	Description	Address 4x	Channel	Description
43201	0	DI Range Code	R/W	1	
43202	1	DI Range Code	R/W	1	
43203	2	DI Range Code	R/W	1	
43204	3	DI Range Code	R/W	1	
43205	4	DI Range Code	R/W	1	
43206	5	DI Range Code	R/W	1	
43207	6	DI Range Code	R/W	1	
43208	7	DI Range Code	R/W	1	
43209	0	GPIO0 DI Range Code	R/W	1	
43210	1	GPIO1 DI Range Code	R/W	1	
43211	2	GPIO2 DI Range Code	R/W	1	
43212	3	GPIO3 DI Range Code	R/W	1	

10. DO function code

Address 4x	Channel	Description	Address 4x	Channel	Description
44001	0	GPIO0 DO Range Code	R/W	3	
44004	1	GPIO1 DO Range Code	R/W	3	
44007	2	GPIO2 DO Range Code	R/W	3	
44010	3	GPIO3 DO Range Code	R/W	3	

11. DI Counter frequency value

Address 4x	Channel	Description	Attribute	Length (2bytes)	Remarks
44801	0	DI Counter/Freq	R	2	data type Float or DWORD
44803	1	DI Counter/Freq	R	2	data type Float or DWORD
44805	2	DI Counter/Freq	R	2	data type Float or DWORD
44807	3	DI Counter/Freq	R	2	data type Float or DWORD
44809	4	DI Counter/Freq	R	2	data type Float or DWORD
44811	5	DI Counter/Freq	R	2	data type Float or DWORD
44813	6	DI Counter/Freq	R	2	data type Float or DWORD
44815	7	DI Counter/Freq	R	2	data type Float or DWORD
44817	GPIO0	GPIO0 Counter/ Freq	R	2	data type Float or DWORD
44819	GPIO1	GPIO1 Counter/ Freq	R	2	data type Float or DWORD
44821	GPIO2	GPIO2 Counter/ Freq	R	2	data type Float or DWORD
44823	GPIO3	GPIO3 Counter/ Freq	R	2	data type Float or DWORD

B.3 Range Code Index

1. AI Range code

Address	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	High Byte								Low Byte							
41601	Range Code								50 or 60 HZ							

AI type

Description	Function code
±150mV	0x0C
±500mV	0x03
±1V	0x04
±10V	0x08
±15V	0x15
0~10V	0x48
0~20mA	0x4D
4~20mA	0x07
Platinum 100 -50~150°C (IEC)	0x20
Platinum 100 0~100°C (IEC)	0x21
Platinum 100 0~200°C (IEC)	0x22
Platinum 100 0~400°C (IEC)	0x23
Platinum 100 -200~200°C (IEC)	0x24
Platinum 100 -50~150°C (JIS)	0x25
Platinum 100 0~100°C (JIS	0x26
Platinum 100 0~200°C (JIS	0x27
Platinum 100 0~400°C (JIS	0x28
Platinum 100 -200~200°C (JIS	0x29

2. DI Range code

Address	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	High Byte							Low Byte								
43201	Range Code														reverse	on/off

DI type

Description	Function code
Normal DI	0
counter	1
frequency	2

3. Do Range code

Address	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	High Byte								Low Byte							
44001	Range code			on/off	If DO as PWM to record Duty cycle											
44002	If DO as PWM to record Duty Period															
44003																

DO type

Description	Function code
Normal DO	0
PWM	1

B.4 AdvTCP address

ADDR Order	Length (2bytes)	ITEMS	Attribute	Remarks	Note
48121	40	Description	R/W		
48161	8	Verify Password	W		
48181	?	Modify Password	W		
48201	12	Net Set	R/W	IP->2 , Idle Time->2, sub mask->2, Gateway->2 Mac Address->4	
48231		CONFIG_FLAG	W		When writing 0x55aa, the modified network information will be stored in flash
48232		CONFIG_RESET	W		When writing 0x55aa, the module will be reset.
48233		PASS_WORD_RESET	W		When writing 0x5a, and disconnect 10s, password will changes to the default value (eight 0)
8301	4	stream config0	R/W	IP->2, Port Num->1 Set Flag->1	
8305	4	stream config1	R/W		
8309	4	stream config2	R/W		
8313	4	stream config3	R/W		
8317	4	stream config4	R/W		
8321	4	stream config5	R/W		
8325	4	stream config6	R/W		
8329	4	stream config7	R/W		
8333	4	stream interval period	R/W		Unit: s
8337					

Appendix C

Stream Data Format

C.1 Stream Data Format

DMU-5010 support data active upload. The following table lists the packet formats sent by data active upload.

Byte Order	Byte Length	Item	Examples	Remarks
0	1	Header	0x23 ('#')	
1	1	Header	0x47 ('G')	
2	1	Header	0x45 ('E')	
3	1	Header	0x41 ('B')	
4	1	Header	0x58 ('A')	
5	1	Header	0x4d ('M')	
6	1	Header	0x53 ('S')	
7	1	Header	0x47 ('G')	
8	1	Header	0x55	
9	1	Header	0xaa	
10	2	Sequence number	0x0001	
12	1	Message code	0x10	
15	2	Device type	0x0408	
13	2	Data length		
17	2	Firmware version major (wFWVMajor)		
19	2	Firmware version minor (wFWVMinor)		
21	2	Hardware version (wHWVersion)		
23	4	Reserved1		Reserved for future
27	4	Reserved2		Reserved for future
31	160	data		
191				

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