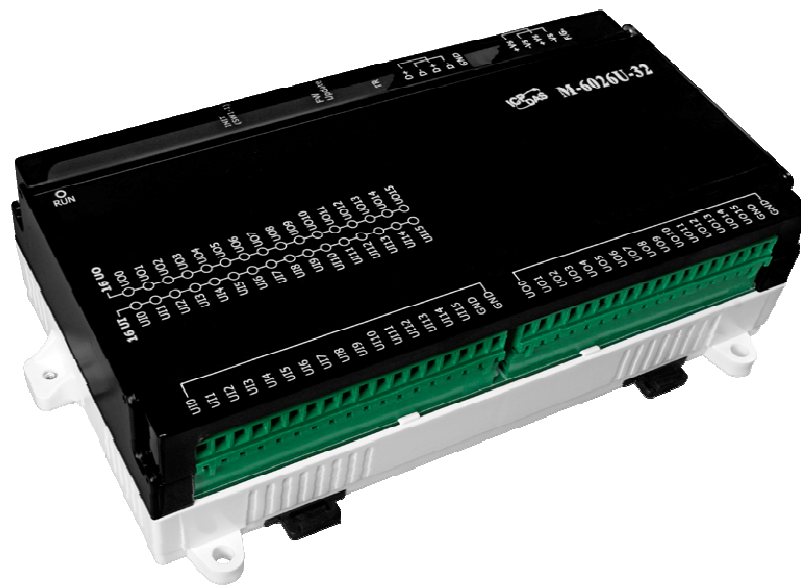


# M-6026U-32

## 16-channel Universal Input and 16-channel Universal Output



**Version: 1.0.0**

**Date: Dec. 2017**

Edited by Horse Chien

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## **Warranty**

All products manufactured by ICP DAS are warranted against defective materials for a period of one year from the date of delivery to the original purchaser.

## **Warning**

ICP DAS assumes no liability for damages consequent to the use of this product.

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# 1. Introduction

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The M-6026U-32 is a 16-channel Universal Input and 16-channel Universal Output distributed I/O module that provides a wide variety of input, output, and smart control solutions, all of which are based on a single universal hardware platform. The M-6026U-32 module combines both the input and the output on the same board, saving both time and space when both are at a premium, meaning the space requirements for I/O boards can be reduced by as much as 50%. Traditional I/O board schemes typically required separate input and output boards to be mounted within an enclosure, increasing the time to mount the boards and the cost of installation. The M-6000 I/O board series are communications devices that can be used to connect to facility management systems to enable control of refrigeration, HVAC, and lighting systems.

## Features

- 16-channel Universal Input and 16-channel Universal Output
- Status LED for each Universal Input and Output Channel
- Each Universal Input point can be configured as Analog Input, Digital Input or Counter Input
- 100 VDC Overvoltage Protection for each Universal Input Channel
- Open Wire Detection for +4 to +20 mA Output channels
- Supports the Modbus RTU Protocol
- DIN-Rail or Wall Mounting
- Space-saving Design
- Wide Operating Temperature Range: -25 to +75°C

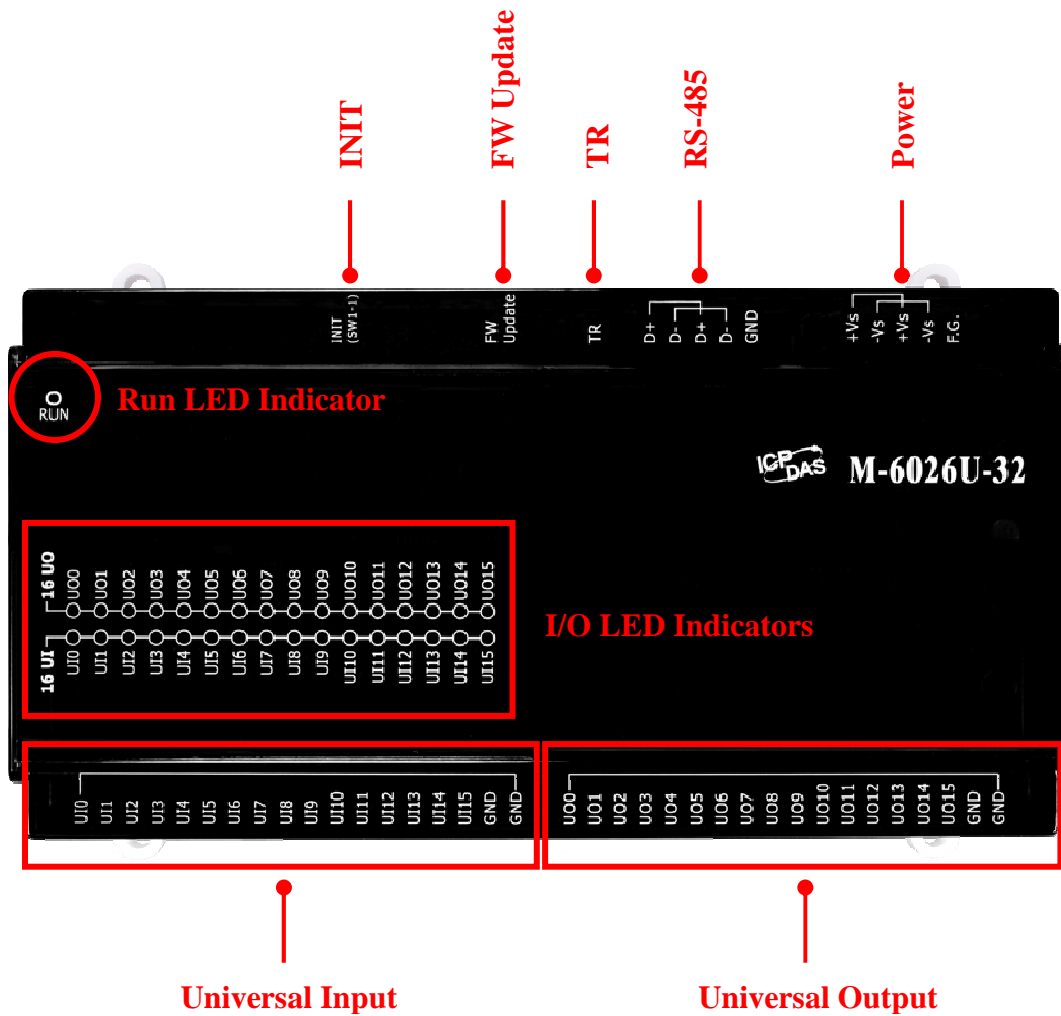
## 2. Hardware

### 2.1 Specifications

Model		M-6026U-32
<b>Universal Input</b>		
Channels	16	
Type	0 to +2.5 V, 0 to +5 V, 0 to +10 V, 0 to +20 mA, +4 to +20 mA, Pt1000, Dry Contact Digital Input	
Resolution	16-bit	
Accuracy	±0.1% of FSR	
Digital Input	ON Level	Close to GND
	OFF Level	OPEN
Overvoltage Protection	100 V <sub>DC</sub>	
<b>Universal Output</b>		
Channels	16	
Type	0 to +20 mA, +4 to +20 mA, 0 to +10V	
Resolution	12-bit	
Accuracy	±0.2% of FSR	
Voltage Output Capability	10 V @ 20 mA	
Open Wire Detection for Current Output	Yes, Only +4 to +20 mA	
<b>RS-485</b>		
Interface	RS-485 x 1	
Format	N, 8, 1	
Baud Rate	1200 to 115200 bps	
Protocol	Modbus/RTU	
Dual Watchdog	Yes, Module(2.3 seconds), Communication (Programmable)	
<b>EMS Protection</b>		
ESD (IEC 61000-4-2)	±4 kV Contact for each Terminal	
	±8 kV Air for Random Point	
<b>Power Requirements</b>		

Power from Terminal Block	24 V <sub>AC</sub> or 24 V <sub>DC</sub>
Fuse Protection	1 A
Power Consumption	14 W Max.
<b>Mechanical</b>	
Dimensions (W x L x H)	240 mm x 135 mm x 65 mm
<b>Environment</b>	
Operating Temperature	-25 to +75°C
Storage Temperature	-40 to +80°C
Humidity	10 to 95% RH, Non-condensing

## 2.2 Appearance



### LED Indicators

- ▶ RUN : Red for normal operation.
- ▶ UI0 to UI15 : Green for Voltage Input, Red for RTD Input
- ▶ UO0 to UO15 : Green for Voltage Output, Red for Digital Input

### INIT Switch

Used to activate INIT mode .

## FW Update Switch

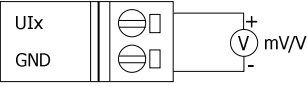
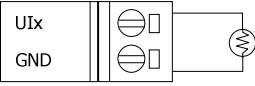
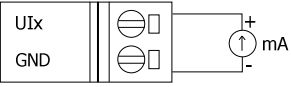
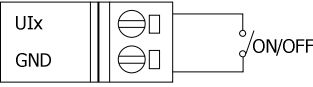
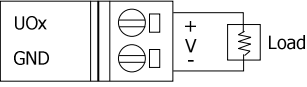
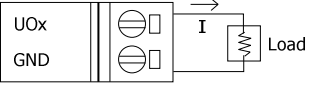
Used to update the firmware .

## TR Switch

Activates Terminal Resistor. The M-6026U-32 module includes a 120-Ohm terminal resistor for use with the RS-485 interface

## 2.3 Wire Connections

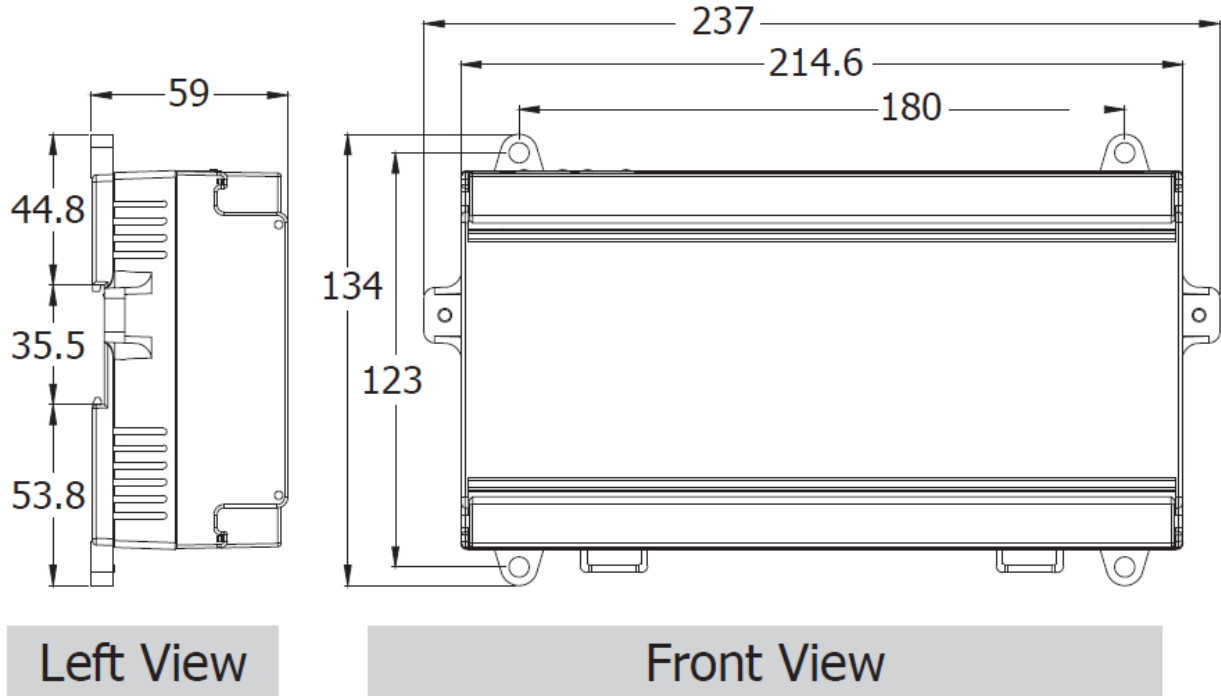
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Voltage Input	RTD Input
	
Current Input	Digital Input
	
Voltage Output	Current Output
	



## 2.4 Dimensions (units: mm)

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### 3. Configuration via RS-485

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- The factory default settings for RS-485 communication are:
  - Address: 1
  - Protocol: Modbus/RTU
  - Baud Rate: 9600
  - Parity: N,8,1
  - Response Delay (ms): 0

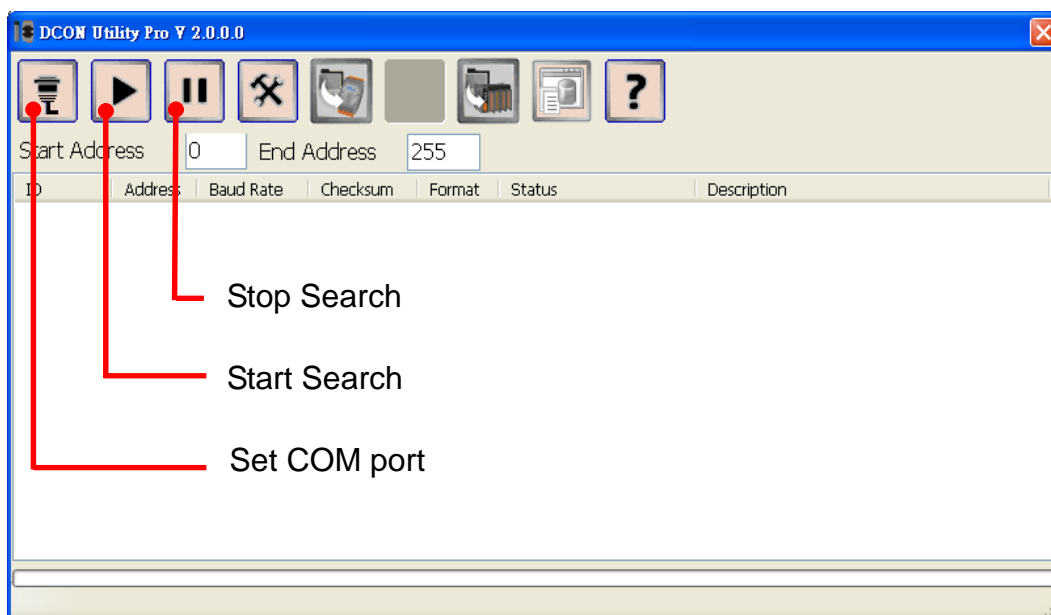
#### Note


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If multiple M-6026U-32 are connected to the same RS-485 network, each module needs be set with a unique RS-485 address. More than one module having the same address will cause communication failure

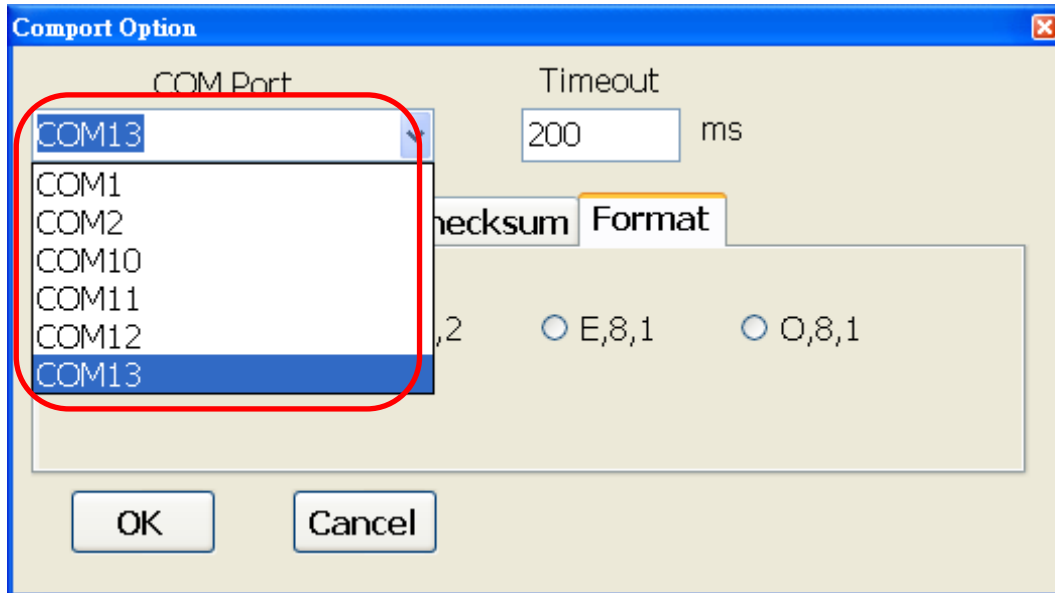
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- Testing RS-485 Communication
  1. Install the DCON Utility Pro, which can be downloaded from [http://ftp.icpdas.com/pub/cd/8000cd/napdos/driver/dcon\\_utility/](http://ftp.icpdas.com/pub/cd/8000cd/napdos/driver/dcon_utility/)
  2. Double-click the desktop icon to launch the DCON\_Utility\_Pro.

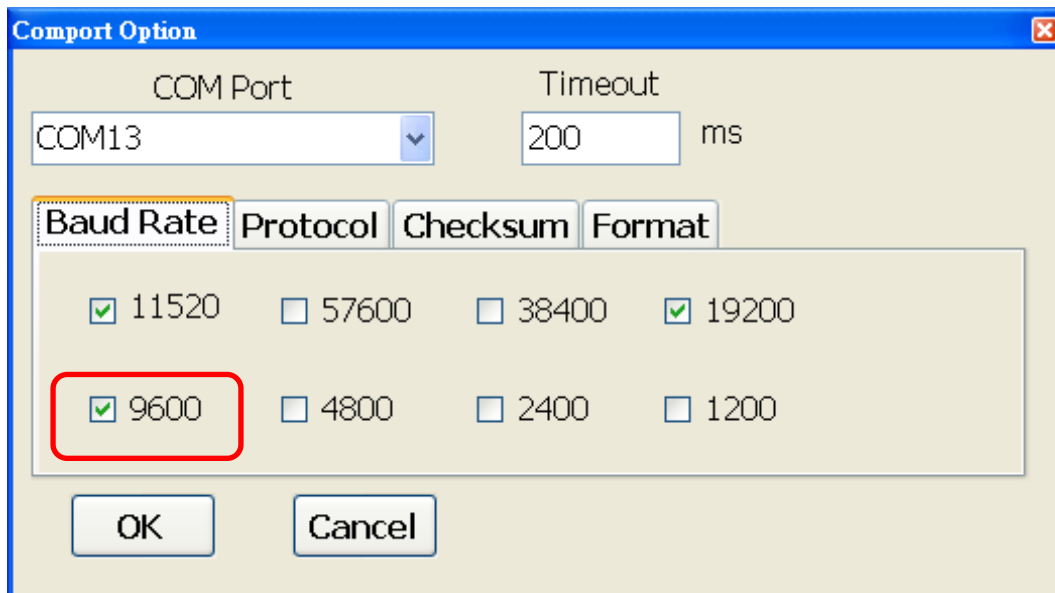


3. Click the icon  to open the COM Port options dialog and configure the COM port.

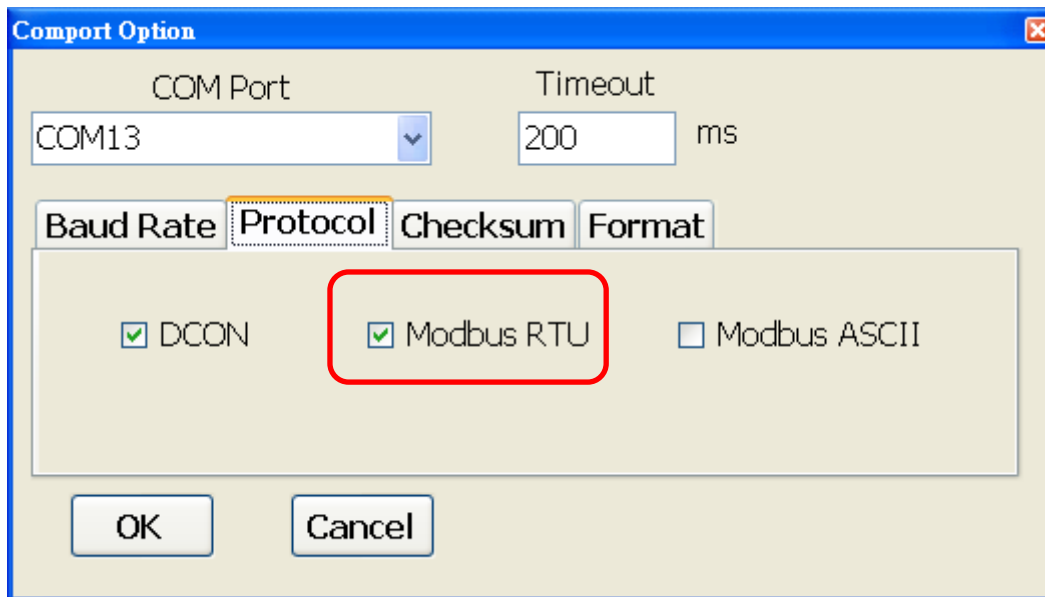
4. Select the number of COM Port used to connect to the module.



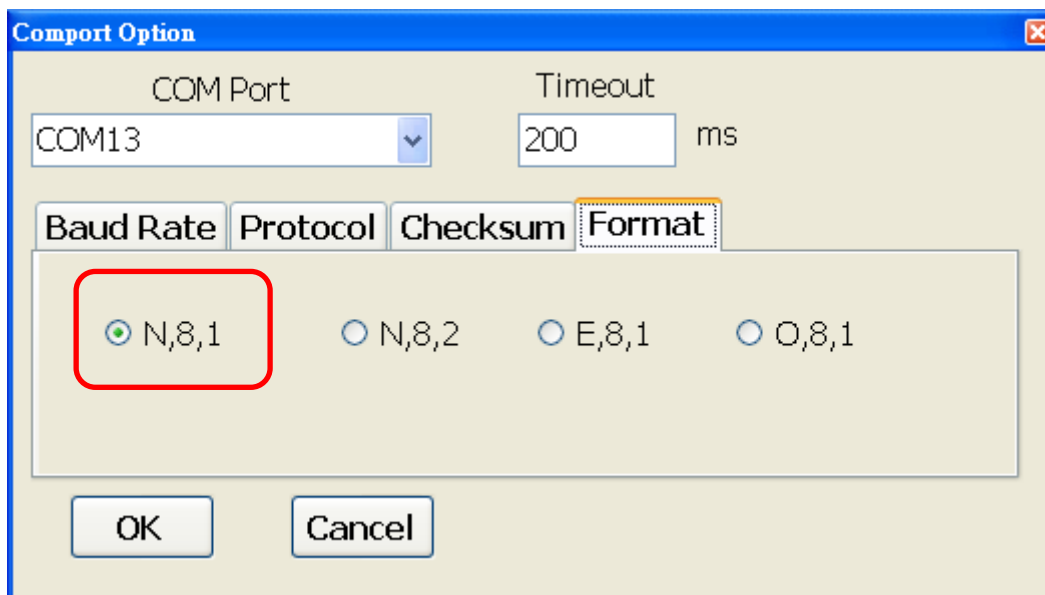
5. The factory default value for the Baud Rate is 9600 bps.



6. Click the Protocol tab and check the checkbox for the protocol that is set for the module.

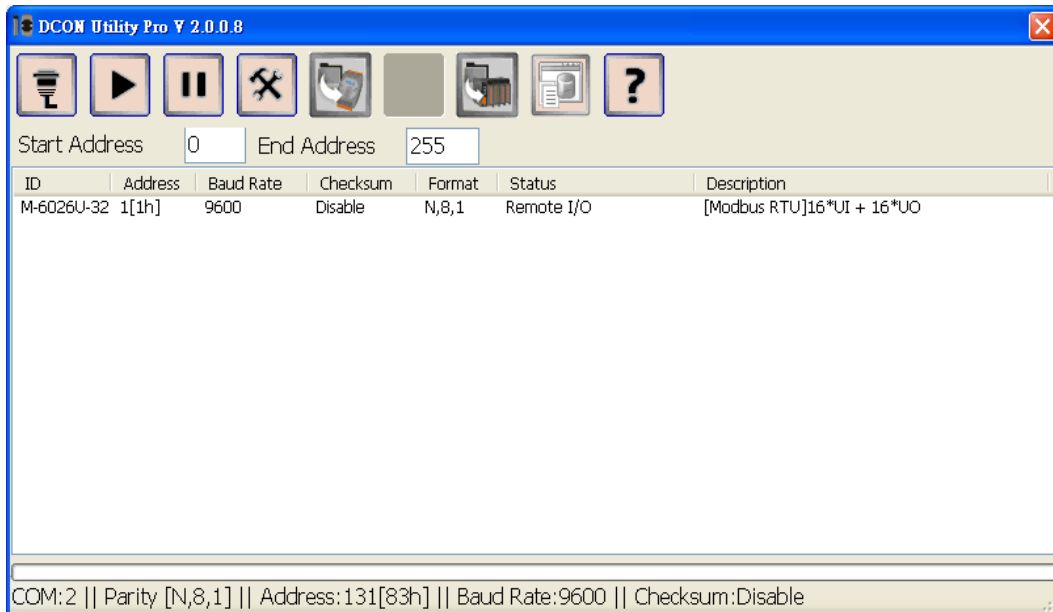


7. Click the Format tab and select the Parity that is set for the module.

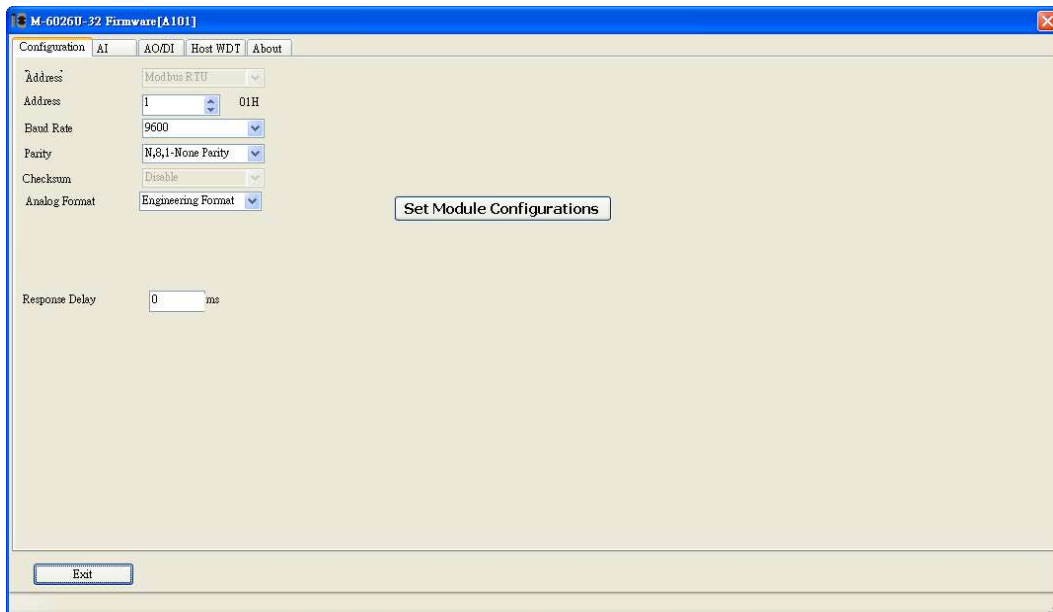


8. Click the Start Search icon.  To begin searching for devices connected to the network.

9. Once the search has been completed, the M-6026U-32 module will be listed, as illustrated below.



10. Click the name of the module to open the Configuration dialog box and configure the module.



**Note**

When modifying any of the Protocol, Baud Rate, Parity, and Checksum items denoted as "(INIT\*)", the SW1 switch must be set to the ON position, and then the module must be restarted, then the item can be modified. After adjusting the settings, return the SW1 switch to the OFF position and then restart the module to enable the new settings to take effect.

## Appendix A: Modbus Master Tool for Windows

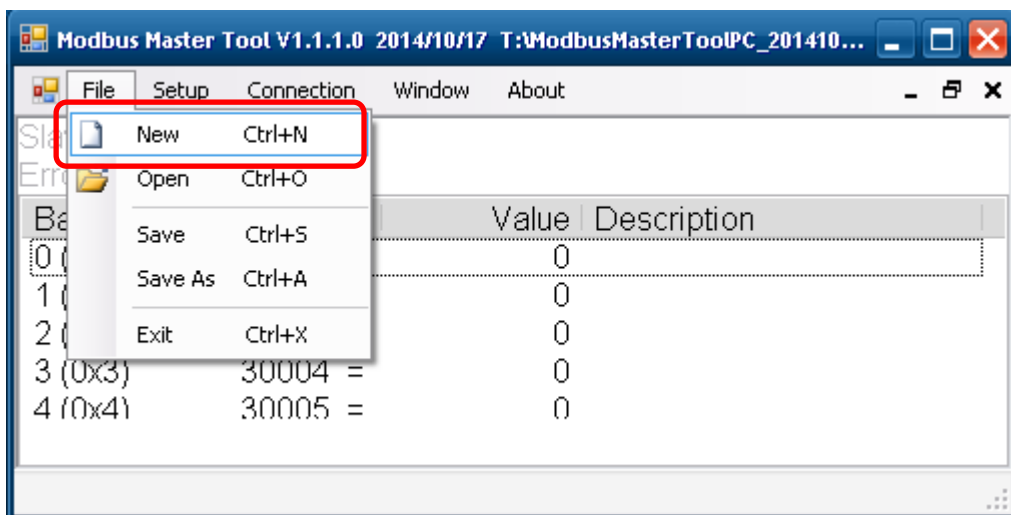
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The Modbus Master Tool is a free, easy-to-use tool that can be used to configure the Modbus communication and diagnose any problems with the wiring setup. The tool can be downloaded from:

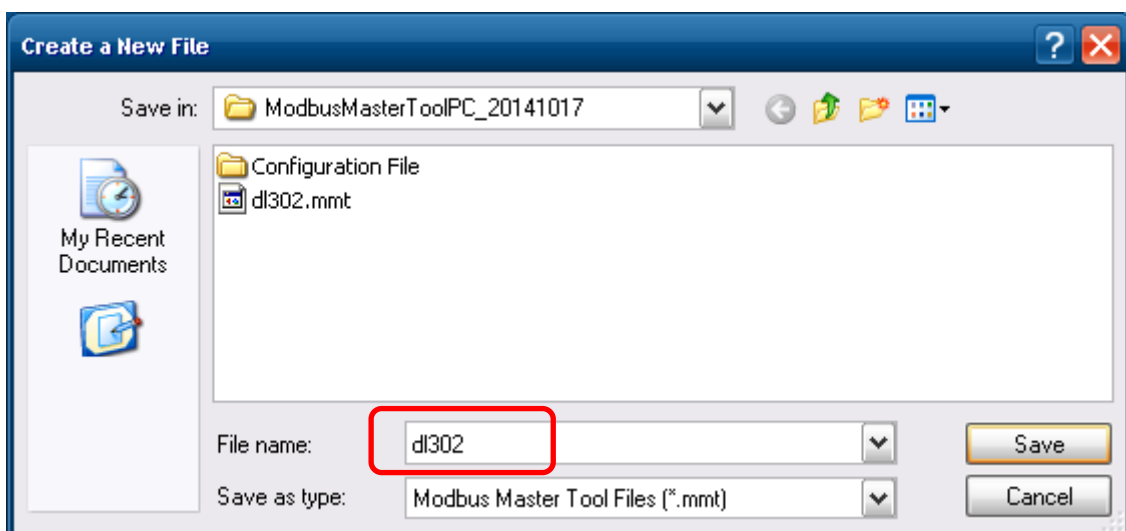
[http://ftp.icpdas.com/pub/cd/8000cd/napdos/modbus/modbus\\_master\\_tool/](http://ftp.icpdas.com/pub/cd/8000cd/napdos/modbus/modbus_master_tool/)

This following provides a detailed explanation of the process required for establishing the communication with the M-6026U-32 module via the Modbus protocol.

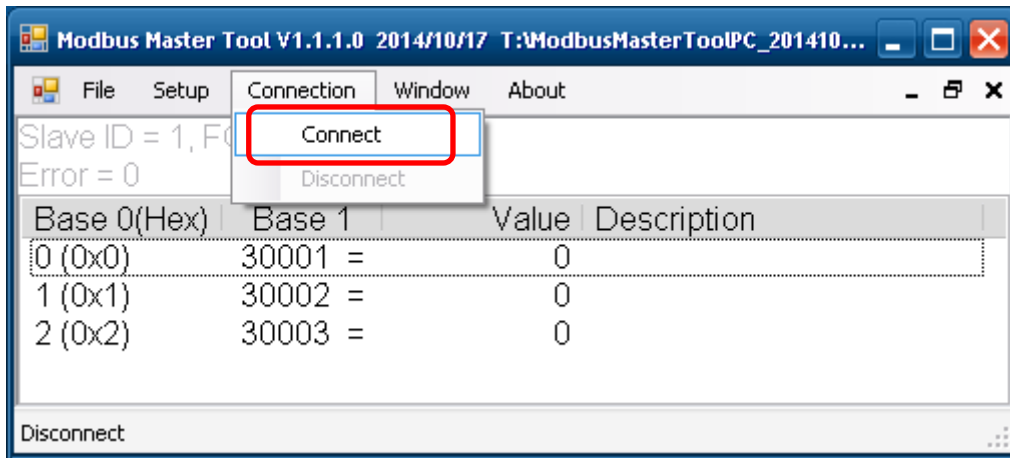
1. Launch the Modbus Master Tool by double-clicking the icon for ModbusMasterToolPC.exe.
2. Select the **New** option from the File menu to create a new Modbus Master Tool configuration file.



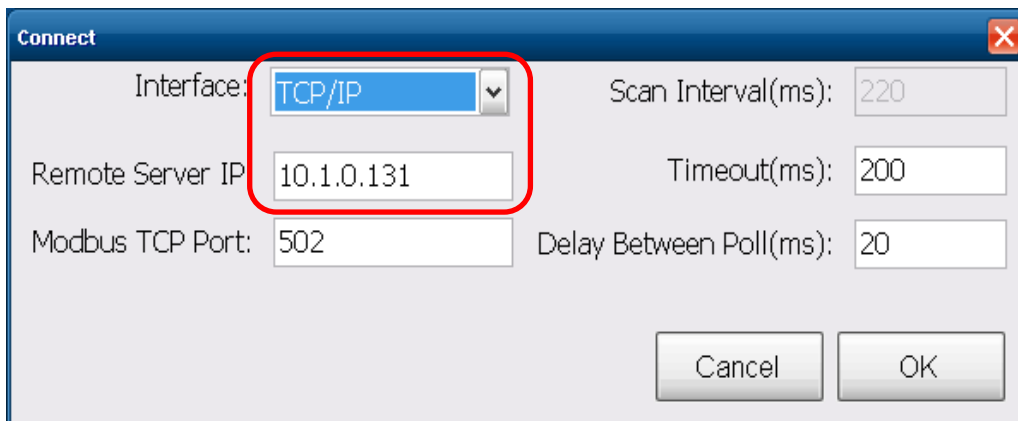
3. Enter a name for the file and then click the **Save** button to create the new file.



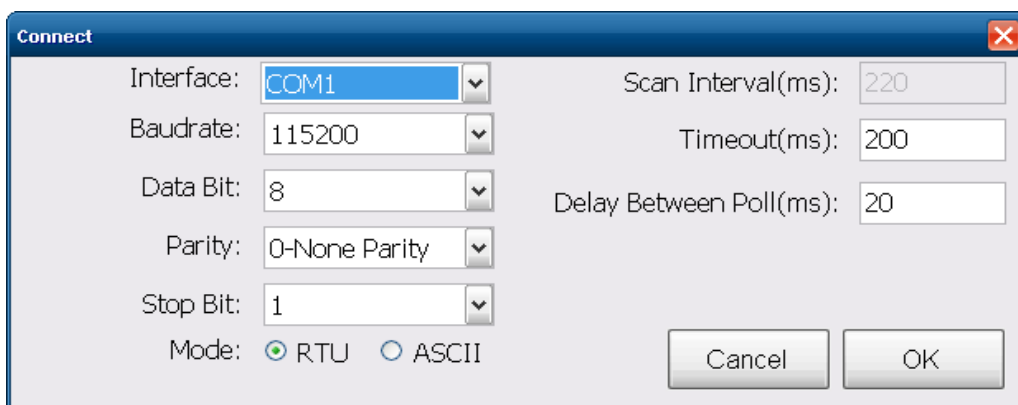
4. Select the **Connect** option from the Connection menu to open the Connect dialog box.



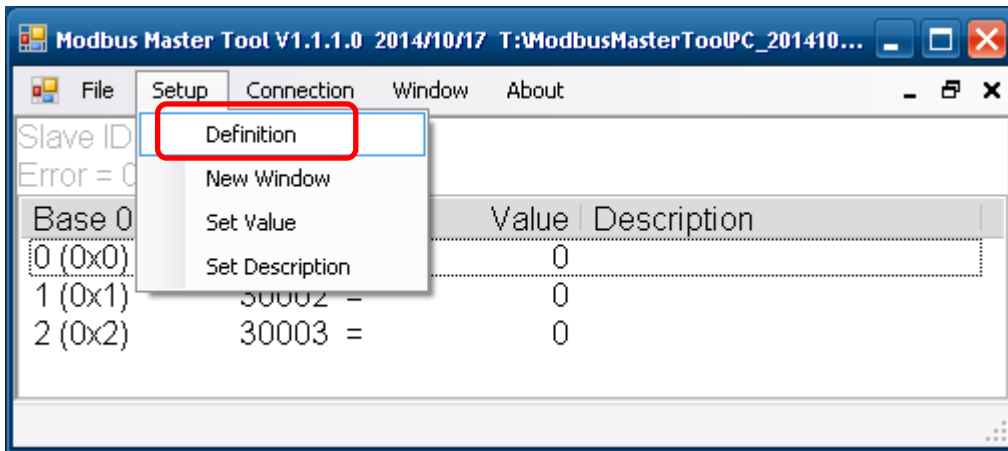
5. Select the required communication interface from the interface drop-down menu. If **TCP/IP** is used as the interface, also enter the IP for your M-6026U-32 module and click the **OK** button to save the new interface configuration.



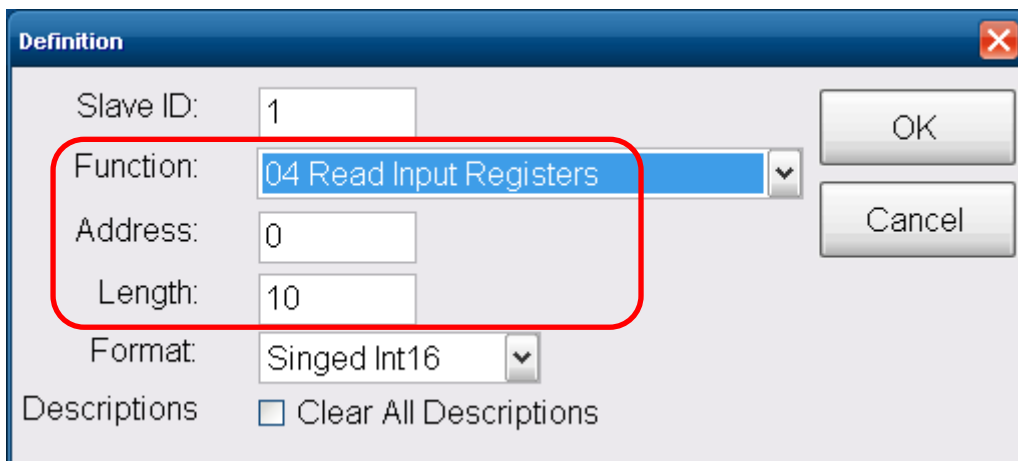
If the RS-485 interface is used, select the relevant COM port from the interface drop-down menu, click RTU from the Mode options and then click the **OK** button to save the new interface configuration.



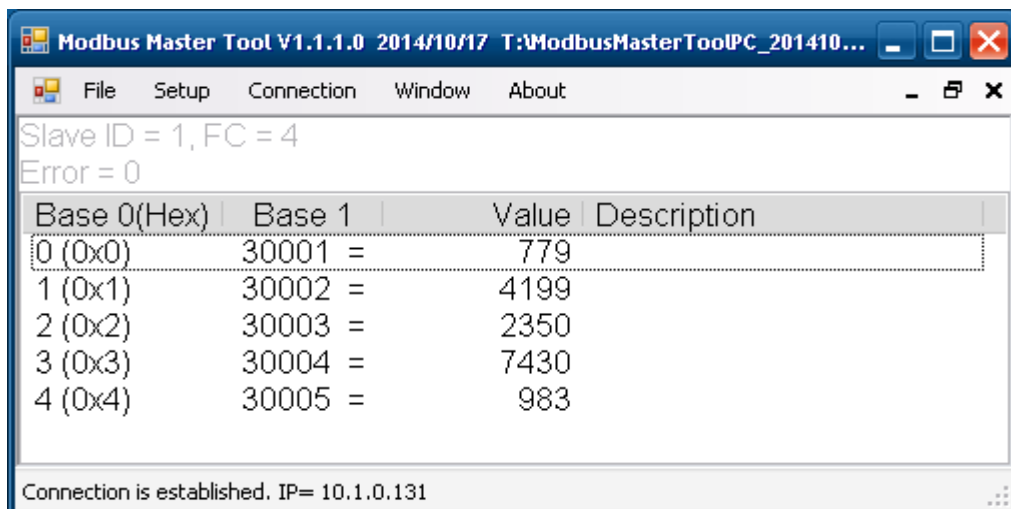
6. Select the **Definition** option from the Setup menu to open the Definition dialog box.



7. Select the Modbus function code from the Function drop-down menu, enter the starting address and the length in the respective text fields, and then click the **OK** button to save the new definition.



8. Read the data.



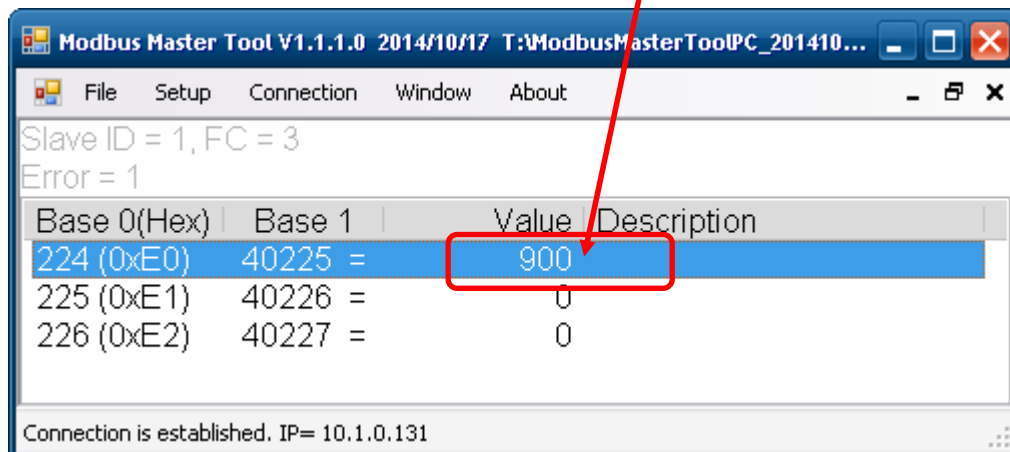
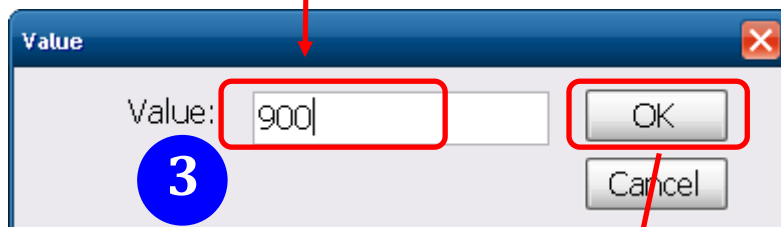
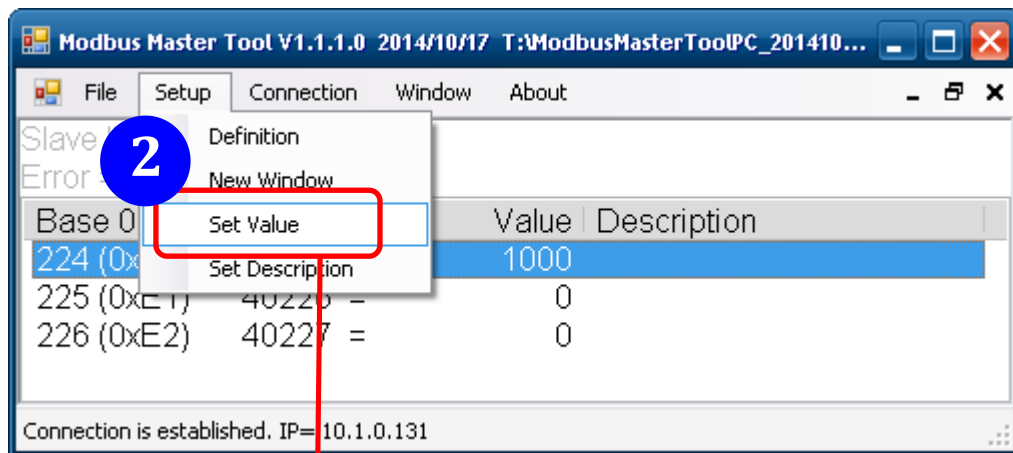


9. Follow the procedure described below to write the data to the Holding Register or Coil Status

(1). Click the Modbus address in the Holding Register or Coil Status list to highlight it.

(2). Select the **Set Value** option from the *Setup* menu.

(3). Enter the data in the Value box text field in the Value dialog box and then click the **OK** button to save the data.



## Appendix B: Modbus Address Table

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### M-6026U-32 Modbus Address Mappings (Base 1)

Address	Description	Attributes
30001 ~ 30016 40001 ~ 40016	The Analog Input value for channels 0 to 15	R
30065 ~ 30080 40065 ~ 40080	The Analog Output read back value from channels 0 to 15	R
30129 ~ 30160 40129 ~ 40160	The Counter value for Digital Input channels 0 to 15, two registers are used for each channel	R
30865 ~ 30896 40865 ~ 40896	The Resistance input value for channels 0 to 15 in increments 0.01 ohms, two registers are used for each channel	R
40033 ~ 40048	The Analog Output value for channels 0 to 15	R/W
40097 ~ 40112	The Safe Analog Output value for channels 0 to 15	R/W
40193 ~ 40208	The Power-on Analog Output value for channels 0 to 15	R/W
40257 ~ 40272	The Analog Input Type code for channels 0 to 15	R/W
40289 ~ 40304	The Analog Output Slew Rate for channels 0 to 15	R/W
40417 ~ 40432	The Analog Output Type Code for channels 0 to 15	R/W
40385 ~ 40400	The Resistance offset for input channels 0 to 15 in increments of 0.1 ohms.	R/W
40449 ~ 40464	The Temperature offset for input channels 0 to 15 in increments of 0.1°C, from -128 to 127	R/W

Address	Description	Attributes																				
40481	The Firmware version (low word)	R																				
40482	The Firmware version (high word)	R																				
40483	The name of the Module(low word), 0x6026	R																				
40484	The name of the Module(high word), 0x4444	R																				
40485	The Module address	R/W																				
40486	Bits 5:0 Baud Rate, 0x03 ~ 0x0A <table border="1" data-bbox="347 584 1015 779"> <tbody> <tr> <td>Code</td> <td>0x03</td> <td>0x04</td> <td>0x05</td> <td>0x06</td> </tr> <tr> <td>Baud</td> <td>1200</td> <td>2400</td> <td>4800</td> <td>9600</td> </tr> <tr> <td>Code</td> <td>0x07</td> <td>0x08</td> <td>0x09</td> <td>0x0A</td> </tr> <tr> <td>Baud</td> <td>19200</td> <td>38400</td> <td>57600</td> <td>115200</td> </tr> </tbody> </table> Bits 7:6 00: no parity, 1 stop bit 01: no parity, 2 stop bits 10: even parity, 1 stop bit 11: odd parity, 1 stop bit	Code	0x03	0x04	0x05	0x06	Baud	1200	2400	4800	9600	Code	0x07	0x08	0x09	0x0A	Baud	19200	38400	57600	115200	R/W
Code	0x03	0x04	0x05	0x06																		
Baud	1200	2400	4800	9600																		
Code	0x07	0x08	0x09	0x0A																		
Baud	19200	38400	57600	115200																		
40488	The Modbus response delay time in ms, valid range 0 to 30	R/W																				
40489	The Host watchdog timeout value in 0.1 second intervals, valid range is 0 to 255 (25.6 seconds)	R/W																				
40490	Enable or Disable the Channel, 0000h to FFFFh	R/W																				
40492	The Host watchdog timeout count, Write 0 to clear	R/W																				
40498	The Digital Input filter time in ms	R/W																				
00033 ~ 00048 10033 ~ 10048	The Digital Input value for channels 0 to 15. Note: The Analog Output Type Code for the channel should be set to F.	R																				
00065 ~ 00080 10065 ~ 10080	High latched value for Digital Input	R																				

<b>Address</b>	<b>Description</b>	<b>Attributes</b>
00097 ~ 00112 10097 ~ 10112	Low latched value for the Digital Input	R
00129 ~ 00144 10129 ~ 10244	Over/under range status of analog input channel 0 to 15	R
00193 ~ 00208	The Counter update trigger edge for Digital Input channels 0 to 15	R/W
00225 ~ 00240	The Current output open wire detection for Analog Output channels 0 to 15	R
00257	Protocol, 0:DCON 1: Modbus RTU	R
00260	Modbus Host Watchdog mode 0: same as I-7000 1: AO and DO commands can be used clear the status of the host watchdog timeout	R/W
00261	Enables or disables the host wathcdog 1: Enabled 0: Disabled	R/W
00264	Write 1 to clear latched DIO states	W
00265	Reads DI active state	R/W
00269	Specifies the Modbus data format, 0: Hexadecimal 1: Engineering	R/W
00270	Host watch dog timeout status, write 1 to clear status of the host watch dog timeout	R/W
00273	Reset status, 1: This is the first time that the register has been read since the module was powered on, 0: This is not the first time that the register has been read since the module was powered on	R
00513 ~ 00528	Write 1 to clear the Counter value for Digital Input channels 0 to 15	W

## Analog Input

Type Code	Range	Data Format	Minimum	Maximum
05	+/-2.5 V	Engineering	-25000	+25000
		Hexadecimal	8000h	7FFFh
06	+/-20 mA	Engineering	-20000	+20000
		Hexadecimal	8000h	7FFFh
07	+4 mA ~ +20 mA	Engineering	+4000	+20000
		Hexadecimal	0000h	FFFFh
08	+/-10 V	Engineering	-10000	+10000
		Hexadecimal	8000h	7FFFh
09	+/-5 V	Engineering	-5000	+5000
		Hexadecimal	8000h	7FFFh
0D	+/-20 mA	Engineering	-20000	+20000
		Hexadecimal	8000h	7FFFh
1A	0 mA ~ +20 mA	Engineering	0	+20000
		Hexadecimal	0000h	FFFFh
2A	Pt1000	Engineering	-2000	+6000
		Hexadecimal	D556h	7FFFh

## Analog Output

Type Code	Range	Data Format	Minimum	Maximum
0	0 mA ~ +20 mA	Engineering	0	+20000
		Hexadecimal	0000h	FFFFh
1	+4 mA ~+20 mA	Engineering	+4000	+20000
		Hexadecimal	0000h	FFFFh
2	0V ~ +10 V	Engineering	0	+10000
		Hexadecimal	0000h	FFFFh
F	Digital Input			

## Revision History

Revision	Date	Description
1.0.0	2017/12.	First releas