



IDS-M311

Industrial Modbus Gateway

User Manual

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www.oring-networking.com

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CONTACT INFORMATION

ORing Industrial Networking Corp.

3F., NO.542-2, Jhongjheng Rd., Sindian District, New Taipei City 231, Taiwan, R.O.C.

Tel: + 886 2 2218 1066 // Fax: + 886 2 2218 1014

Website: www.oring-networking.com

Technical Support

E-mail: support@oring-networking.com

Sales Contact

E-mail: sales@oring-networking.com (Headquarters)

sales@oring-networking.com.cn (China)

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Getting Started

1.1 About IDS-M311

IDS-M311 is a 1-port Modbus gateway which converts signals between Modbus TCP and Modbus RTU/ASCII devices. The device is able to support up to 31 RTU/ASCII devices with its serial port, thus can effectively connect a high density of Modbus nodes to the same network. You can use the Web configuration interface to configure multiple devices and set up IDS-M311 operation modes for different application requirements. IDS-M311 supports RS-232/422/485 and provides dual redundant power inputs guarantee a non-stop operation.

1.2 Software Features

- Operation modes includes RTU Master, RTU Slave, ASCII Master, ASCII Slave
- Supports up to 16 TCP connections and 32 requests simultaneously
- Convert between Modbus TCP and Modbus RTU/ASCII
- Internet communication: PPPoE
- Update DNS hostname: DDNS
- Event warning by Syslog, Email, SNMP trap, and beeper
- Configurable by Web Interface
- Various Windows O.S. supported: Windows NT/2000/ XP/ 2003/VISTA(32/64bit)/ Windows 7(32/64bit)

1.3 Hardware Specifications

- Dual DC power inputs
- 1xRS-232/422/485 software selectable serial port
- DIN-rail and Wall mount enabled
- Redundant DC power inputs
- Operating Temperature: -10 to 60oC
- Storage Temperature: -40 to 85oC
- Operating Humidity: 5% to 95%, non-condensing
- Casing: IP-30
- Dimensions: 72(W) x 29.4(D) x 123.4(H) mm (2.83x1.16x4.86 inch.)

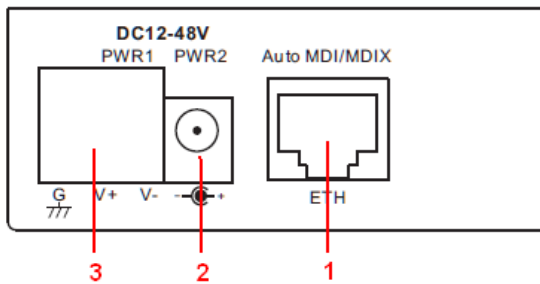
Hardware Overview

2.1 Top Panel

2.1.1 Ports and Connectors

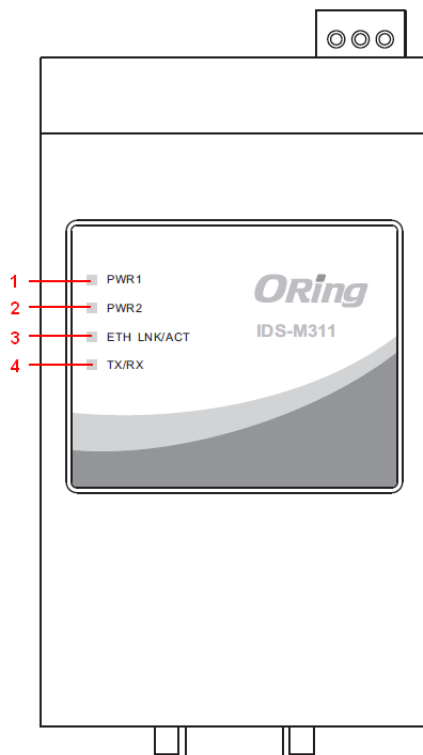
The device provides the following ports on the top panel. The Ethernet port on the device use RJ-45 connectors

Port	Description
Copper port	1 x 10/100Base-T(X) port
Power connector	1 three-pin dual power connector



1. Terminal block: PWR1 (12 ~ 48V DC)
2. Power jack: PWR2 (12 ~ 48V DC)
3. RJ45 Ethernet Connector

2.2 Front Panel

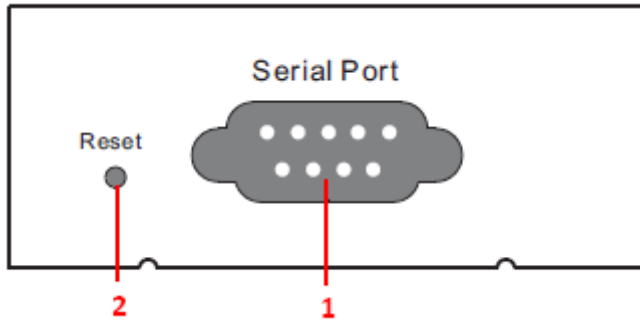


1. LED for PWR1.
2. LED for PWR2
3. LED for 10/100Base-T(X) Ethernet port
4. LED for serial port

2.2.1 LED

LED	Color	Status	Description
PW1/2	Red	On	Power module activated
		Blinking	DHCP servers do not respond properly
	Green	On	Power is on and function normally
ETH	Green	On	Port running at 100Mbps
LNK/ACT	Amber	On	Port running at 10Mbps.
TX / RX	Red	On	Receiving data
	Green	On	Transmitting data

2.3 Bottom Panel

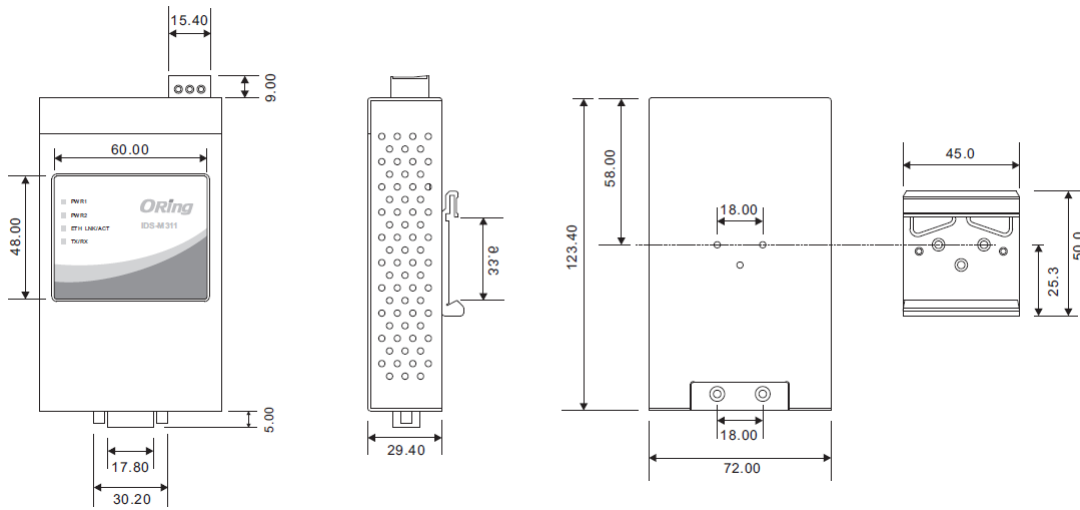


- 1. Serial port
- 2. Reset button

Hardware Installation

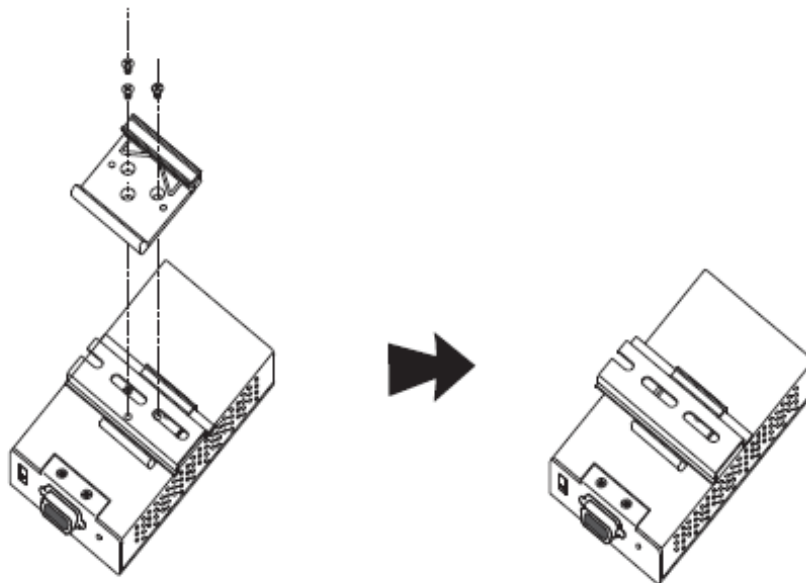
2.4 DIN-rail Installation

The device comes with a DIN-rail kit to allow you to fasten the device to a DIN-rail in any environments.



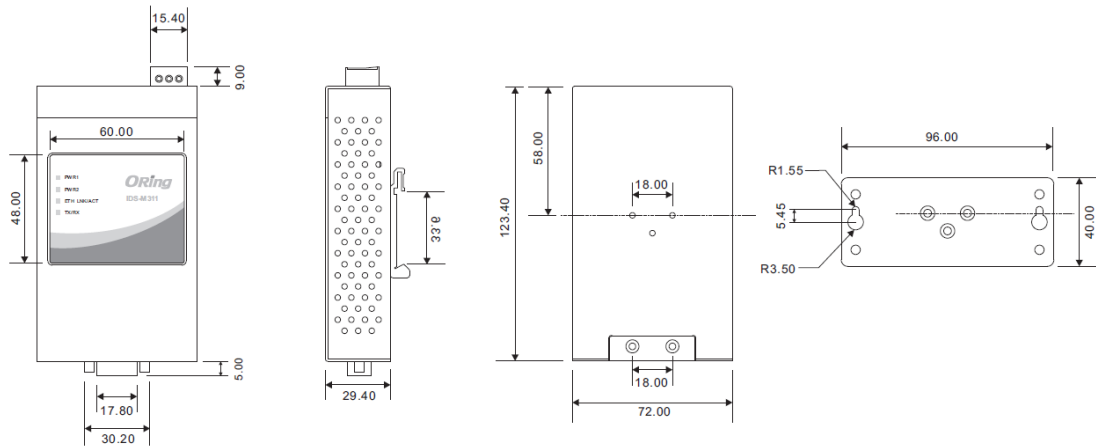
DIN-rail Kit Measurement (unit = mm)

Installing the device on the DIN-rail is easy. First, screw the Din-rail kit onto the back of the device, right in the middle of the back panel. Then slide the device onto a DIN-rail from the Din-rail kit and make sure the device clicks into the rail firmly.



3.2 Wall Mounting

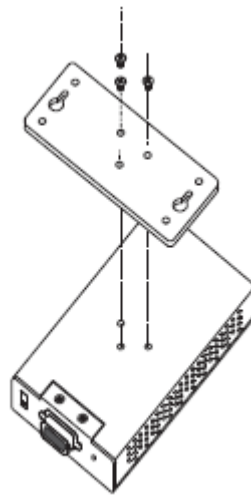
Besides Din-rail, the device can be fixed to the wall via a wall mount panel, which can be found in the package.



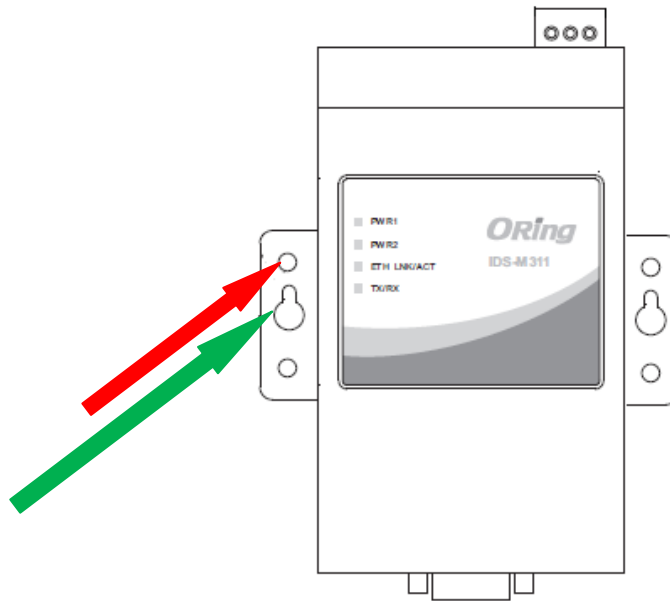
Wall-Mount Kit Measurement (unit = mm)

To mount the device onto the wall, follow the steps:

1. Attach the wall-mount kit to the back of the device using the three DIN-rail screw holes.



2. Use the device, with wall mount plates attached, as a guide to mark the correct locations of the four screws.
3. Insert screws through the round screw holes (the red arrow as below) on the sides or through the key hole-shaped aperture (the green arrow as below) in the middle of the plate and fasten the screw to the wall with a screwdriver.
4. If the screw goes through the key hole-shaped aperture, slide the device down before tightening the screw.



Note: Instead of screwing the screws in all the way, leave about 2 mm to allow room for sliding the wall mount panel between the wall and the screws.

3.3 Wiring



WARNING

Do not disconnect modules or wires unless power has been switched off or the area is known to be non-hazardous. The devices may only be connected to the supply voltage shown on the type plate.



ATTENTION

1. Be sure to disconnect the power cord before installing and/or wiring your devices.
2. Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowable for each wire size.
3. If the current goes above the maximum ratings, the wiring could overheat, causing serious damage to your equipment.
4. Use separate paths to route wiring for power and devices. If power wiring and device wiring paths must cross, make sure the wires are perpendicular at the intersection point.
5. Do not run signal or communications wiring and power wiring through the same wire conduit. To avoid interference, wires with different signal characteristics should be routed separately.
6. You can use the type of signal transmitted through a wire to determine which wires should be kept separate. The rule of thumb is that wiring sharing similar electrical characteristics can be bundled together.
7. You should separate input wiring from output wiring.
8. It is advised to label the wiring to all devices in the system.

3.3.1 Grounding

Grounding and wire routing help limit the effects of noise due to electromagnetic interference (EMI). Run the ground connection from the ground pin on the power module to the grounding surface prior to connecting devices.

3.3.2 Redundant Power Inputs

The device has two sets of power inputs in the form of DC power jack and terminal. The power input connectors are located on the top panel alongside the Ethernet port. Follow the steps below to wire the power input on the terminal block.

Step 1: insert the negative/positive wires into the V-/V+ terminals, respectively.

Step 2: to keep the wires from pulling loose, use a small flat-blade screwdriver to tighten the wire-clamp screws on the front of the terminal block connector.

3.4 Connection

3.4.1 Cables

10/100BASE-T(X) Pin Assignments

The device has a standard Ethernet port. According to the link type, the device uses CAT 3, 4, 5,5e UTP cables to connect to any other network devices (PCs, servers, switches, routers, or hubs). Please refer to the following table for cable specifications.

Cable Types and Specifications:

Cable	Type	Max. Length	Connector
10BASE-T	Cat. 3, 4, 5 100-ohm	UTP 100 m (328 ft)	RJ-45
100BASE-TX	Cat. 5 100-ohm UTP	UTP 100 m (328 ft)	RJ-45

With 10/100Base-T(X) cables, pins 1 and 2 are used for transmitting data, and pins 3 and 6 are used for receiving data.

10/100 Base-T(X) RJ-45 Pin Assignments :

Pin Number	Assignment
1	TD+
2	TD-
3	RD+
4	Not used
5	Not used

6	RD-
7	Not used
8	Not used

The device also supports auto MDI/MDI-X operation. You can use a cable to connect the device to a PC. The table below shows the 10/100Base-T(X) MDI and MDI-X port pin outs.

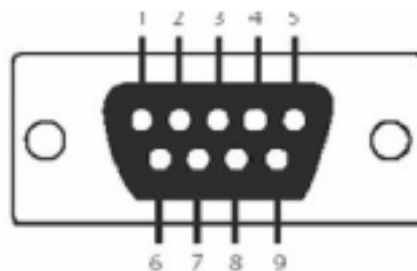
10/100 Base-T(X) MDI/MDI-X Pin Assignments:

Pin Number	MDI port	MDI-X port
1	TD+(transmit)	RD+(receive)
2	TD-(transmit)	RD-(receive)
3	RD+(receive)	TD+(transmit)
4	Not used	Not used
5	Not used	Not used
6	RD-(receive)	TD-(transmit)
7	Not used	Not used
8	Not used	Not used

Note: “+” and “-” signs represent the polarity of the wires that make up each wire pair.

DB9 console port wiring

The device can be connected to a serial device using a DB9 cable. The DB9 connector supports RS232 / RS422 / RS485 operation modes. Please refer to the following table for the pin assignments of the DB9 connector.



DB9 connector

Pin #	RS 232	RS 422	RS 485 (4 wire)	RS 485 (2 wire)
1	DCD	RXD -	RXD -	
2	RXD	RXD +	RXD +	
3	TXD	TXD +	TXD +	DATA +
4	DTR	TXD -	TXD -	DATA -
5	GND	GND	GND	GND
6	DSR			
7	RTS			
8	CTS			
9	RI			
RS 232 mod act as DTE				

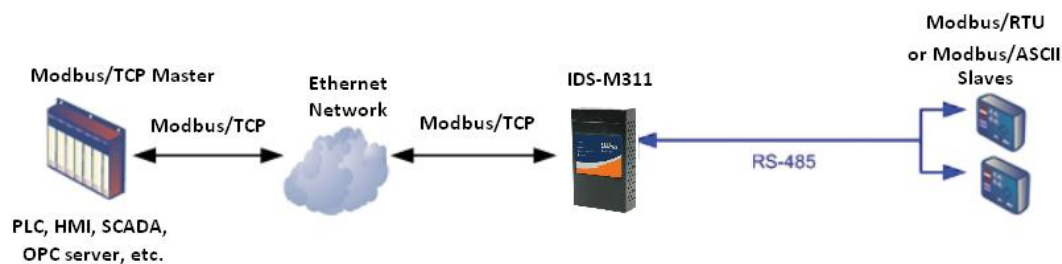
Applications

IDS-M311 enables Modbus serial slaves to be integrated with existing Modbus TCP networks and serial masters to access Modbus TCP slaves.

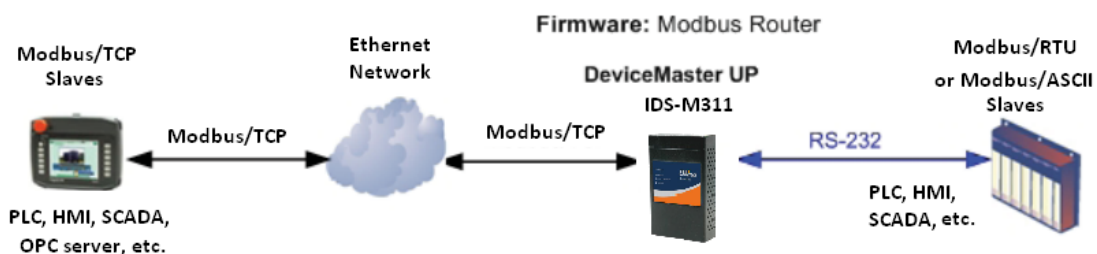
Since most modern PLCs and host computers support Modbus TCP over Ethernet, you can use the IDS-M311 to access discrete Modbus RTU/ASCII devices for data collection and control. The IDS-M311 supports Modbus TCP with up to 16 simultaneous connections. Supported serial interfaces include RS-232 and RS-422/485, selectable through software. The serial port can be connected to one RS-232 or RS-422 serial device, or to 32 RS-485 serial devices.

The IDS-M311 can be used in several applications, including linking Ethernet masters with multiple serial slaves, serial masters with multiple Ethernet slaves, Modbus TCP masters with ASCII and RTU slaves, and serial master with serial slaves over Internet.

Connect Modbus/TCP Master to Serial Modbus/RTU or Modbus/ASCII Slaves



Connect Modbus Serial Masters to Modbus/TCP Slaves



Management

The device can be managed via a built-in web server which supports Internet Explorer (Internet Explorer 5.0 or above versions) and other Web browsers such as Chrome. Therefore, you can manage and configure the device easily and remotely. You can also upgrade firmware via a Web browser. The Web management function not only reduces network bandwidth consumption, but also enhances access speed and provides a user-friendly viewing screen.

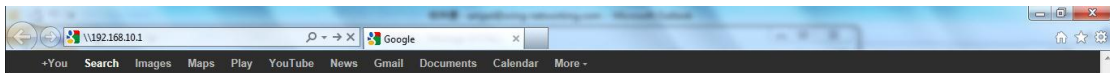
Note: By default, IE5.0 or later version do not allow Java applets to open sockets. You need to modify the browser setting separately in order to enable Java applets for network ports.

Management via Web Browser

Follow the steps below to manage your device via a Web browser

System Login

1. Launch an Internet Explorer.
2. Type `http://` and the IP address of the device. Press **Enter**.



3. A login screen appears.
4. Type in the username and password. The default username and password is **admin**.
5. Press **Enter** or click **OK**, the management page appears.



Note: you can use the following default values:

IP Address: **192.168.10.1**

Subnet Mask: **255.255.255.0**

Default Gateway: **192.168.10.254**

User Name: **admin**

Password: **admin**

After logging in, you will see the information of the device as below.

System Information	
LAN IP Address	192.168.10.3
LAN MAC Address	00:1E:94:5D:00:4D
Firmware Version	1.00

On the left hand side of the management interface shows links to various settings. Clicking on the links will bring you to individual configuration pages.

5.1 Network Configuration

This page allows you to configure the network functions of the device.

5.1.1 IP Configuration

This page shows the general information of the device. You can assign an IP for the device manually or have the DHCP server assign the IP automatically. Select “Static IP” if you are using a fixed IP address. Click **Apply** after you complete configuration.

IP Configuration	
IP Configuration	Static ▾ Static
IP Address	DHCP 192.168.10.3
Netmask	255.255.255.0
Gateway	192.168.10.1
DNS Server 1	192.168.10.1
DNS Server 2	

Label	Description
IP Configuration	Choose to use a static or DHCP-assigned IP. If you choose

	DHCP, the following fields will gray out.
IP Address	Enter the IP address that identifies the server on the TCP/IP network
Netmask	Enter a subnet mask for the device.
Gateway	Enter the IP address of the router that provides network access outside the server's LAN
DNS Server 1/2	Enter the IP address of the primary and secondary domain name server

5.2 Port Serial Setting

5.2.1 Serial Configuration

This page allows you to configure serial port parameters.

Serial Configuration

	Port1
Port Alias	<input type="text" value="port0"/>
Interface	<input type="text" value="RS232"/>
Baud Rate	<input type="text" value="38400"/>
Data Bits	<input type="text" value="8"/>
Stop Bits	<input type="text" value="1"/>
Parity	<input type="text" value="None"/>
Flow Control	<input type="text" value="None"/>

Label	Description
Port Alias	Enter the COM port number that modem is connected to
Interface	Choose an interface for your serial device. Available interfaces include RS-232, RS-422, RS-485-2W, and RS-485-4W.
Baud Rate	Choose a baud rate in the range between 110 bps and 11520 bps
Data Bits	Choose the number of data bits to transmit. You can configure data bits to be 5, 6, 7, or 8. Data is transmitted as a series of five, six, seven, or eight bits (five and six bit data formats are used rarely for specialized communications equipment).
Stop Bits	Choose the number of bits used to indicate the end of a byte. You can configure stop bits to be 1 or 1.5(2). If Stop Bits is 1.5, the

	stop bit is transferred for 150% of the normal time used to transfer one bit. Both the computer and the peripheral device must be configured to transmit the same number of stop bits.
Parity	<p>Choose the method of detecting errors in transmission. Parity control bit modes include None, Odd, Even, Mark, and Space.</p> <p>None means parity checking is not performed and the parity bit is not transmitted.</p> <p>Odd means the number of mark bits in the data is counted, and the parity bit is asserted or unasserted to obtain an odd number of mark bits.</p> <p>Even means the number of mark bits in the data is counted, and the parity bit is asserted or unasserted to obtain an even number of mark bits.</p>
Flow Control	Choose XOFF to tell the computer to stop sending data or XON to tell the computer to begin sending data again

5.2.2 Service Mode

This page allows you to configure the parameters for individual operation modes.

Service Mode

	Port1
Service Mode	RTU Slave Mode ▾
TCP Server Port	502
Max Connection	10 (1~32)Connection
Serial Addition Wait	100 (1~10000) msec
Connection Timeout	10 (1~10000)seconds

Label	Description
Service Mode	<p>Choose an operation mode for the serial port. You can configure a serial port as Modbus Master or Modbus Slave mode. Available options include RTU Slave Mode, RTU Master Mode, ASCII Slave Mode, and ASCII Master Mode.</p> <p>RTU Slave Mode: Modbus TCP masters will control Modbus RTU</p>

	<p>Slaves</p> <p>RTU Master Mode: Modbus RTU masters will control Modbus TCP slaves</p> <p>ASCII Slave Mode: Modbus TCP master will control Modbus ASCII Slaves</p> <p>ASCII Master Mode: Modbus RTU masters will control Modbus TCP slaves</p>
TCP Server Port	Enter the TCP server port number
Max Connection	The maximum number of simultaneous connections supported. The maximum is 32.
Connection Timeout	Set a value for connection timeout. The unit is in seconds.

5.3 System Tools

This link allows you to set up system parameters, including system time and authentication data.

5.3.1 SNTP Configuration

SNTP (Simple Network Time Protocol) is a protocol able to synchronize the time on your system to the clock on the Internet. It will synchronize your computer system time with a server that has already been synchronized by a source such as a radio, satellite receiver or modem.

SNTP Configuration

Device Name	<input type="text" value="IDS-M311"/>
Device Description	<input type="text" value="IDS-M311"/>
Time	
SNTP	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
Time Zone	<input type="text" value="(GMT+08:00)Taipei"/>
Local Time	<input type="text" value="Fri Jan 01 2010 09:55:10"/>
Time Server	<input type="text" value="pool.ntp.org"/>

Label	Description
Device Name	Enter the model name of the device
Device Description	Enter the description for the device

SNTP	Enable or disable SNTP function
Time Zone	Choose the time zone according to the location of the device
Local Time	Set up the local time
Time Server	Enter the address of the time server

The following table lists different location time zones for your reference.

Local Time Zone	Conversion from UTC	Time at 12:00 UTC
November Time Zone	- 1 hour	11 am
Oscar Time Zone	-2 hours	10 am
ADT - Atlantic Daylight	-3 hours	9 am
AST - Atlantic Standard EDT - Eastern Daylight	-4 hours	8 am
EST - Eastern Standard CDT - Central Daylight	-5 hours	7 am
CST - Central Standard MDT - Mountain Daylight	-6 hours	6 am
MST - Mountain Standard PDT - Pacific Daylight	-7 hours	5 am
PST - Pacific Standard ADT - Alaskan Daylight	-8 hours	4 am
ALA - Alaskan Standard	-9 hours	3 am
HAW - Hawaiian Standard	-10 hours	2 am
Nome, Alaska	-11 hours	1 am
CET - Central European FWT - French Winter MET - Middle European MEWT - Middle European Winter SWT - Swedish Winter	+1 hour	1 pm
EET - Eastern European, USSR Zone 1	+2 hours	2 pm
BT - Baghdad, USSR Zone 2	+3 hours	3 pm
ZP4 - USSR Zone 3	+4 hours	4 pm
ZP5 - USSR Zone 4	+5 hours	5 pm
ZP6 - USSR Zone 5	+6 hours	6 pm
WAST - West Australian Standard	+7 hours	7 pm
CCT - China Coast, USSR Zone 7	+8 hours	8 pm
JST - Japan Standard, USSR Zone 8	+9 hours	9 pm

EAST - East Australian	+10 hours	10 pm
Standard GST Guam Standard, USSR Zone 9		
IDLE - International Date Line NZST - New Zealand Standard NZT - New Zealand	+12 hours	Midnight

5.3.2 Login Setting

This page allows you to set up login account and password. You can also change your password in this page.

User Authentication

Login Name:	<input type="text" value="admin"/>
Old Password	<input type="password"/>
New Password	<input type="password"/>
Confirm New Password	<input type="password"/>

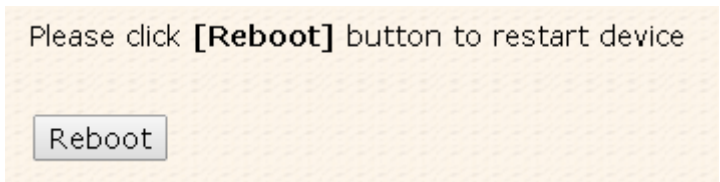
Label	Description
Login Name	Enter a user name for login
Old Password	Enter the existing password that is used to log in
New Password	Enter a new password that will be used to log in
Confirm New Password	Retype the new password to confirm

5.3.3 Load Default

You can reset the system to its factory settings. Simply click on Reset which will bring you to the Reboot button. Once the device is restarted, it will be restore to factory default settings.

Factory Default

Reset to default configuration.
Click Reset button to reset all configurations to the default value.



5.3.4 Save/Restore Config

You can save current values from the device as a backup file or restore the device to previous settings by downloading a configuration file. Simply browse to the configuration file you want to use and click **Restore**.



Label	Description
Restore	Click to restore the configurations.
Backup	Click to back up the configurations.

5.3.5 Firmware Upgrade

This page allows you to update the firmware of the device. To upgrade, you need a firmware files correspond to this Device model. It will take several minutes to upload and upgrade firmware. Do not turn of the power during firmware upgrade. After upgrade is completed, the device will reboot and be revalidated.



5.3.6 Restart Device

You can reboot the device by click **Reboot** button.

Please click **[Reboot]** button to restart device

Reboot

Technical Specifications

ORing Device Server Model	IDS-M311
Physical Ports	
10/100 Base-T(X) Ports in RJ45 Auto MDI/MDIX	1
Serial Ports	
Connector	DB9(male) x 1
Operation Mode	RS232 / RS422 / 4(2)-Wire RS485. Which can be configured by Web interface
Serial Baud Rate	110 bps to 460.8 Kbps
Data Bits	5, 6, 7, 8
Parity	odd, even, none, mark, space
Stop Bits	1, 1.5, 2
RS-232	TxD, Rx D, RTS, CTS, DTR, DSR, DCD, RI, GND
RS-422	Tx+,Tx-, Rx+, Rx-,GND
RS-485 (4-wire)	Tx+,Tx-, Rx+, Rx-,GND
RS-485 (2-wire)	Data+, Data-,GND
Flow Control	XON/XOFF, RTS/CTS, DTR/DSR
Network Protocol	
Protocol	ICMP, IP, TCP, UDP, DHCP, BOOTP, DNS, SNMP V1/V2c, HTTPS, SMTP, DDNS, PPPoE, Modbus TCP
LED indicators	
Power indicator	PWR 1(2) / Ready: Red On: Power is on and booting up. Red Blinking: Indicates an IP conflict, or DHCP or BOOTP server did not respond properly. Green On: Power is on and functioning Normally. Green Blinking: Located by Administrator.
10/100TX RJ45 port indicator	Green for port Link/Act at 100Mbps. Amber for port Link/Act at 10Mbps.
Serial TX / RX LEDs:	Red: Serial port is receiving data Green: Serial port is transmitting data
Power	
Redundant Input power	Dual DC inputs. 12-48VDC on 3-pin terminal block and power jack
Power consumption (Typ.)	4 Watts
Overload current protection	Present
Reverse polarity protection	Present on terminal block
Physical Characteristic	
Enclosure	IP-30
Dimension (W x D x H)	72(W)x29.4(D)x123.4(H) mm (2.83x1.16x4.86 inch.)
Weight (g)	294
Environmental	
Storage Temperature	-40 to 85°C (-40 to 185°F)
Operating Temperature	-10 to 60°C (14 to 140°F)
Operating Humidity	5% to 95% Non-condensing
Regulatory approvals	
EMI	FCC Part 15, CISPR (EN55022) class A
EMS	EN61000-4-2 (ESD), EN61000-4-3 (RS), EN61000-4-4 (EFT), EN61000-4-5 (Surge), EN61000-4-6 (CS), EN61000-4-8, EN61000-4-11

Shock	IEC60068-2-27
Free Fall	IEC60068-2-32
Vibration	IEC60068-2-6
Safety	EN60950-1
Warranty	5 years