



IFD9506

Ethernet Communication Module

RS485 <--> Ethernet

Operation Manual



<http://www.delta.com.tw/industrialautomation>



Warning

- ✓ Please read this instruction carefully before use and follow this instruction to operate the device in order to prevent damages on the device or injuries to staff.
- ✓ Switch off the power before wiring.
- ✓ IFD9506 is an OPEN TYPE device and therefore should be installed in an enclosure free of airborne dust, humidity, electric shock and vibration. The enclosure should prevent non-maintenance staff from operating the device (e.g. key or specific tools are required for operating the enclosure) in case danger and damage on the device may occur.
- ✓ IFD9506 is to be used for controlling the operating machine and equipment. In order not to damage it, only qualified professional staff familiar with the structure and operation of IFD9506 can install, operate, wire and maintain it.
- ✓ DO NOT connect input AC power supply to any of the I/O terminals; otherwise serious damage may occur. Check all the wirings again before switching on the power and DO NOT touch any terminal when the power is switched on. Make sure the ground terminal ⊕ is correctly grounded in order to prevent electromagnetic interference.



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1 Introduction

To ensure correct installation and operation of IFD9506, please read this manual carefully before using your IFD9506.

IFD9506 is an Ethernet communication module which can convert serial communication RS-232/RS-485 to Ethernet, and convert Ethernet to RS-232/RS-485, supporting communication protocols including Modbus, Modbus TCP, Ethernet/IP and User Define (UD Link). The setting software is Delta software DCISoft. Through RS-232 or Ethernet, IFD9506 can be set.

1.1 Features

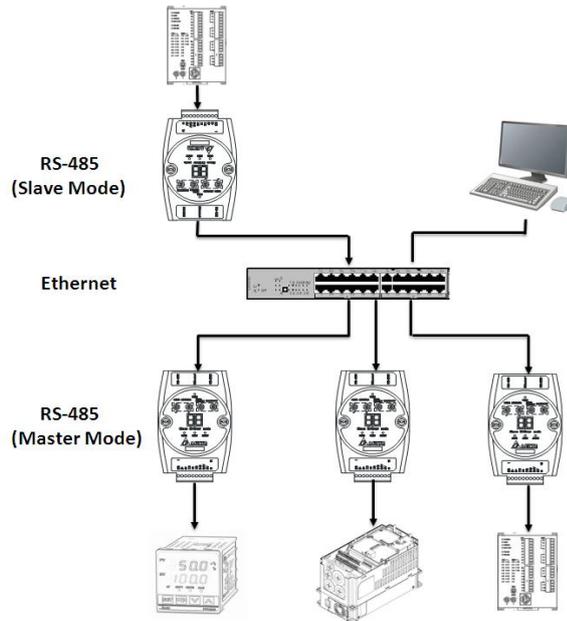
- It auto-detects Ethernet 10/100 Mbps transmission speed; MDI/MDI-X auto-detects the required cable connection type without jump wire.
- It supports Modbus TCP protocol and UD Link, which works in both serial master and slave modes.
- It supports the Ethernet / IP Adapter mode (see Note 1). In the serial master mode, the device monitoring tables of IFD9506 can be read through Implicit Message, and Modbus instructions can be transmitted through Explicit Message (via function codes: 0x03 and 0x06).
- In the serial device server mode, the two-way communication is supported, but only the UD link mode is available.
- The monitored data are stored via smart Monitor table so as to fast read the device data. The maximum number of data which can be temporarily stored is 100 (See Note 2).
- It is able to send out E-Mails when the external input point is triggered. (The account-password and encryption protocols, e.g. SSL/TLS are not supported)
- The communication and the power supply are isolated from each other, and the immunity against the noise is strong.
- The Modbus station address, communication format and the baud rate can be set by the external rotary switches.
- It has virtual serial COM ports.

Notes:

1. To run in the Ethernet/IP adapter mode, the module should be used with firmware V2.04 or above and EIP Builder V1.07 or above.
2. To store 100 registers of data, the module should be used with firmware V1.62 or above and DCISoft V1.20 or above.

1.2 Installation and Wiring

Connect the Ethernet port of IFD9506 to the Ethernet hub with the twisted pair cable CAT-5e. The mode setting for IFD9506 should be paid attention to.



1.3 Specifications

■ Network interface

Interface	RJ-45 with Auto MDI/MDIX
Number of ports	1 port
Transmission method	IEEE802.3, IEEE802.3u
Transmission cable	Category 5e
Transmission speed	10/100 Mbps Auto-Defect
Communication protocol	ICMP, IP, TCP, UDP, DHCP, SMTP, Modbus TCP, Ethernet/IP(Adapter)
Number of TCP connections	16 (Client), 8 (Server)

■ Serial communication interface (COM1)

Interface	Mini Dim
Number of ports	1 port
Transmission method	RS-232
Transmission cable	UC-PRG020-12A / UC-MS010-02A / UC-MS020-01A / UC-MS030-01A
Transmission speed	110, 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps
Communication protocol	Modbus, User Define

■ Serial communication interface (COM2)

Interface	RJ-11
Number of ports	1 port
Transmission method	RS-485
Transmission speed	110/150/300/600/1,200/2,400/4,800/9,600/19,200/38,400/57,600/115,200
Communication protocol	Modbus, User Define

■

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■ Terminal block (COM2)

Interface	Feed-through terminal 10PIN
Transmission method	RS-485
Transmission distance	1,200m
Transmission speed	110, 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps
Communication protocol	Modbus, User Define

■ Environment

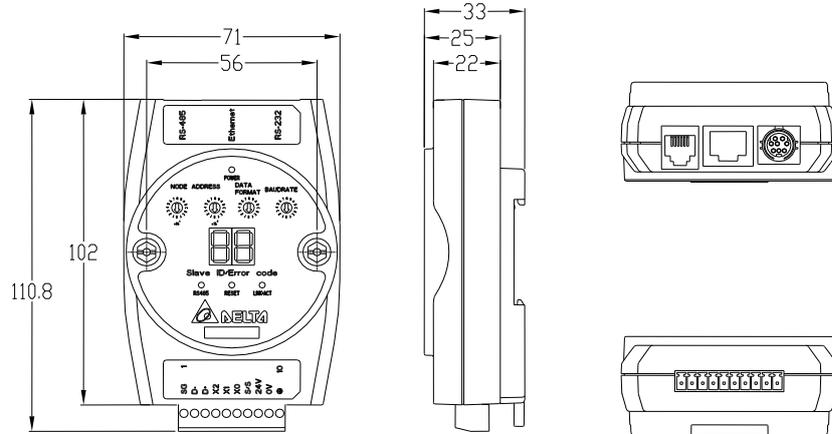
Noise immunity	ESD (IEC 61131-2, IEC 61000-4-2): 8KV Air Discharge EFT (IEC 61131-2, IEC 61000-4-4): Power Line: ± 2 KV, Digital Input: ± 2 KV, Communication I/O: ± 2 KV RS (IEC 61131-2, IEC 61000-4-3): 80MHz~1GHz, 10V/m. 1.4GHz ~ 2.0GHz, 10V/m Conducted Susceptibility Test (EN61000-4-6, IEC61131-2 9.10): 150kHz ~ 80MHz, 3V/m Surge Test (Biwave IEC61132-2, IEC61000-4-5): Power line 0.5KV DM, Ethernet 0.5KV CM, RS-485 0.5KV CM
Operation	0°C ~ 55 °C (temperature), 50% ~ 95% (humidity), pollution degree 2
Storage	-25°C ~ 70°C (temperature), 5% ~ 95% (humidity)
Vibration/shock immunity	Standard: IEC 61131-2, IEC 68-2-6 (TEST Fc)/IEC61131-2 & IEC 68-2-27 (TEST Ea)
Certificates	IEC 61131-2, UL508

■ Electrical specification

Power supply voltage	24VDC (-15% ~ 20%) supplied by the feed-through terminal block
Power consumption	3W
Insulation voltage	500V
Weight	140g

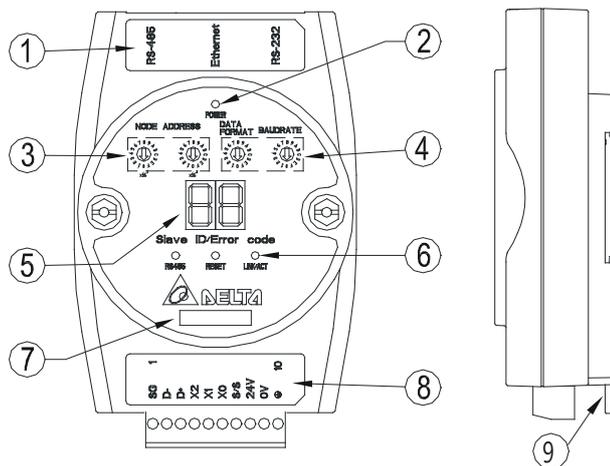
2 Product Profile & Outline

2.1 Dimension



Unit: mm

2.2 Product Profiles



- | | |
|---|--|
| ① Communication ports: RS-485, Ethernet, RS-232 | ⑥ RS-485 LED, Reset button, Ethernet LED |
| ② POWER LED | ⑦ Module name |
| ③ Address switch | ⑧ RS-485 connector, digital input points, power supply points, earth point |
| ④ Data format/baud rate switch | ⑨ DIN rail connector |
| ⑤ Digital display | |

2.3 LED Indicators

Name	Color	Function
POWER	Green	Power supply indication
RS-485	Green	Displaying the status of the serial communication port
LINK/ACT	Green	Displaying the status of network

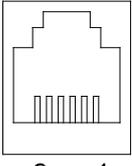
2.4 Indicator Display and Error Warning

Code	Indicator status	Indication	How to correct
01 ~ F7	Normally ON	Node address of the module (when operating normally)	--

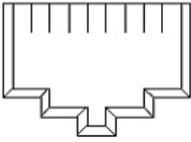
Ethernet Communication Module IFD9506

Code	Indicator status	Indication	How to correct
F0	Blinking	Returning to default setting	--
F1		IFD9506 being powered	--
F2		Power supply in low voltage	Check if the power supply of the module works normally.
F3		Internal memory detection error	<ol style="list-style-type: none"> 1. Re-power IFD9506. If the error still exists, try step 2. 2. Reset IFD9506. If the error still exists, send the module back to the manufacturer for repair.
F4		Internal error. Manufacturing error	<ol style="list-style-type: none"> 1. Re-power IFD9506. If the error still exists, try step 2. 2. Reset IFD9506. If the error still exists, send the module back to the manufacturer for repair.
F5		Network connection error	Check if IFD9506 is connected normally to the network.
F6		The number of network connections exceeds 16.	Make sure the number of connections is not more than 15.
F7		Communication data format setting error	<ol style="list-style-type: none"> 1. The data format setting via software is different from that via the rotary switch. 2. Communication format set by the rotary switch is incorrect. The data length should be 8 bits in Modbus RTU mode. 3. IFD9506 with firmware V2.06 or above can set its station address to 0x00 via the address switch and reset the station address and data format via DCISoft or webpage.
F8		IP conflict	Check if there is any device with the same IP as IFD9506 on the network or modify the IP address of IFD9506.

2.5 RJ-11 Pin Definition

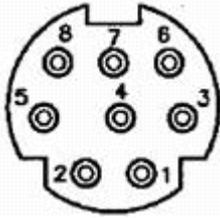
RJ-11 sketch	Pin	Signal	Definition
	1	--	N/C
	2	--	N/C
	3	D+	Positive pole for data
	4	D-	Negative pole for data
	5	GND	Ground
	6	--	N/C

2.6 RJ-45 Pin Definition

RJ-45 sketch	Pin	Signal	Definition
	1	Tx+	Positive pole for data transmission
	2	Tx-	Negative pole for data transmission
	3	Rx+	Positive pole for data receiving
	4	--	N/C
	5	--	N/C
	6	Rx-	Negative pole for data receiving
	7	--	N/C
	8	--	N/C

2.7 RS-232 Pin Definition

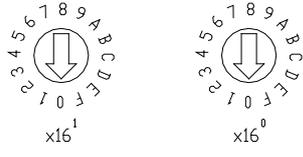
Pin	Signal	Definition
1	--	N/C
2	--	N/C
3	--	N/C
4	Rx	Reception data
5	Tx	Transmission
6	--	N/C
7	--	N/C
8	GND	Ground



2.8 Node Address

The node address setting here is the node address of IFD9506 itself. DO NOT duplicate it with the node address of the device connected to the RS-485 port. When IFD9506 is in normal operation, the node address will be displayed on the message display. It is suggested you use the rotary switches to set the node address of IFD9506. For the module with firmware V2.04 or earlier, the settings in the software are not latched when the power is off. If the setting in the software is inconsistent with the rotary switch setting, then the rotary switch setting will be applied after the power is on again.

For the module with firmware V2.06 or later, when the node address is set to 0x00 with the rotary switches, all the software settings can be used and all parameters will retain the last setting values in the software after the power is on again.

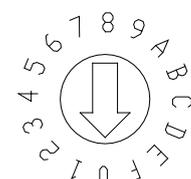
Switch setting	Content	
00	When the node address is set to 0x00, the settings in the software are available after power on again. The firmware V2.06 and above supports the function.	
01...F6	Valid Modbus communication address setting; DO NOT duplicate it with the node address of the equipment connected to the RS-485 port	

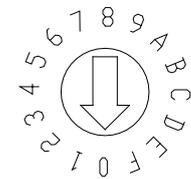
2.9 Data Format and Baud Rate

The data format and baud rate settings should keep the same as those of the equipment connected to the RS-232/RS-485 port. Using the rotary switches is recommended. Set up the data format and baud rate according to the manual instructions before the communication is carried out.

For the module with firmware V2.04 or earlier, the settings in the software are not latched when the power is off. If the settings in the software are inconsistent with the rotary switch settings, then the rotary switch settings will be applied after the power is on again.

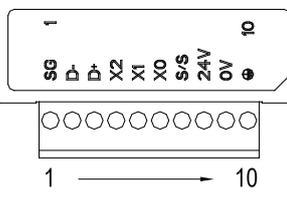
For the module with firmware V2.06 or later, when the node address is set to 0x00 with the rotary switch, all the software settings can be used and all parameters will retain the last setting values in the software after the power is on again.

Switch setting	Format	Switch setting	Format	
0	7-N-1	8	7-N-2	
1	8-N-1	9	8-N-2	
2	7-O-1	A	7-O-2	
3	8-O-1	B	8-O-2	
6	7-E-1	E	7-E-2	
7	8-E-1	F	8-E-2	

Switch setting	Baud rate	Switch setting	Baud rate	
1	110	7	4,800	
2	150	8	9,600	
3	300	9	19,200	
4	600	A	38,400	
5	1,200	B	57,600	
6	2,400	C	115,200	

2.10 Feed-through Terminal Pin Definition

Pin	Signal	Definition
1	SG	Reference ground of signal
2	D-	Data-
3	D+	Data-
4	X2	Digital input 2
5	X1	Digital input 1
6	X0	Digital input 0
7	S/S	Reference ground of digital input
8	24V	+24V input
9	0V	0V input
10		Earth ground



3 MODBUS Communication

3.1 Modbus Function Codes Supported

Function code	Explanation
0x01	Read Coils
0x02	Read Discrete Inputs
0x03	Read Holding Registers
0x04	Read Input Registers
0x05	Write a single Coil
0x06	Write a single Register
0x0F	Write multiple Coils
0x10	Write multiple registers
0x17	Read/Write multiple registers

3.2 Registers in IFD9506 and Modbus Addresses

Type	Name	MODBUS address (Hex)	Function code	Number
Discrete Input				
RX	Digital input	0x0400~0x0402	0x02	3
Holding Register				
BR	Basic register	0x0000~0x003F	0x03, 0x06, 0x10, 0x17	64
MB	Monitor bit register	0x2000~0x21FF	0x03, 0x06	512
MW	Monitor word register	0x2200~0x23FF	0x03, 0x06	512

3.3 Table of Basic Registers (BR)

Ethernet Communication Module: IFD9506					
BR No.	Attribute	Register name	Explanation	Default	Latched
0	R	Model name	Set by the system; read only. The model code of IFD9506 = 0x0200	0x0200	O
1	R	Firmware version	The current firmware version, displayed in hex, e.g. V1.2 → 0x0102		O
2~3	Reserved				
4	R/W	Communication format	Please refer to the table of communication format setting.		X
5	R/W	Baud rate	Please refer to the table of baud rate setting.		X
6	R/W	Address	For setting the station address		X
7~10	Reserved				
11	R/W	Communication time-out	For setting the communication time-out time in Modbus mode (Unit: ms)	5000	O
12	R/W	Communication delay time	For setting the minimum interval time between data communication.	0	O
13	R/W	TCP connection idle time	For setting idle time for TCP communication (Unit: second)	30	O
14~32	Reserved				
33	R/W	Returning to default setting		0	X

Ethernet Communication Module: IFD9506					
BR No.	Attribute	Register name	Explanation	Default	Latched
Symbol "R" refers to read only; "R/W" refers to read and write.					

3.4 Explanation of Basic Registers (BR)

BR0: Model Name

Explanations:

The model code of IFD9506 is 0x0200.

BR1: Firmware Version

Explanations:

The firmware version of IFD9506 is displayed in hex, e.g. 0x0100 indicates version V1.00.

BR4: Communication Format

Explanations:

BR4 Low byte								
Description	The data format is defined, which is the same as that set by the rotary switch							
Content	Data	Format	Data	Format	Data	Format	Data	Format
	0x00	7-N-1	0x03	8-O-1	0x08	7-N-2	0x0B	8-O-2
	0x01	8-N-1	0x06	7-E-1	0x09	8-N-2	0x0E	7-E-2
	0x02	7-O-1	0x07	8-E-1	0x0A	7-O-2	0x0F	8-E-2

BR4 High byte						
	B7	B6~B4	B3	B2	B1	B0
Description	RS-485 User Define 0: Disable 1: Enable	Reserved	RS-232 User Define 0: Disable 1: Enable	Mode setting 0: Serial Master Ethernet Server 1: Serial Slave Ethernet Client	RS-232 function 0: Delta configuration 1: Modbus	Mode 0: ASCII 1: RTU
Content	00000000 (0)	Disable	Disable	Serial Master	Delta configuration	ASCII
	00000001 (1)	Disable	Disable	Serial Master	Delta configuration	RTU
	00000010 (2)	Disable	Disable	Serial Master	Modbus	ASCII
	00000011 (3)	Disable	Disable	Serial Master	Modbus	RTU
	00000100 (4)	Disable	Disable	Serial Slave	Delta configuration	ASCII
	00000101 (5)	Disable	Disable	Serial Slave	Delta configuration	RTU
	00000110 (6)	Disable	Disable	Serial Slave	Modbus	ASCII
	00000111 (7)	Disable	Disable	Serial Slave	Modbus	RTU
	00001000 (8)	Disable	Enable	Serial Master	Delta configuration	ASCII
	10000111 (135)	Enable	Disable	Serial Slave	Modbus	RTU
	10001000 (136)	Enable	Enable	Serial Master	Delta configuration	ASCII
	10001001 (137)	Enable	Enable	Serial Master	Delta configuration	RTU
	10001010	Enable	Enable	Serial Master	Modbus	ASCII

BR4 High byte						
	B7	B6~B4	B3	B2	B1	B0
	(138)					
	10001011 (139)	Enable	Enable	Serial Master	Modbus	RTU
	10001100 (140)	Enable	Enable	Serial Slave	Delta configuration	ASCII
	10001101 (141)	Enable	Enable	Serial Slave	Delta configuration	RTU
	10001110 (142)	Enable	Enable	Serial Slave	Modbus	ASCII
	10001111 (143)	Enable	Enable	Serial Slave	Modbus	RTU

BR5: Baud Rate

Explanations:

BR5 Low byte						
Description	The baud rate is defined, which is the same as that set by the rotary switch					
	Data	Baud rate	Data	Baud rate	Data	Baud rate
Content	0x01	110	0x06	2,400	0x0B	57,600
	0x02	150	0x07	4,800	0x0C	115,200
	0x03	300	0x08	9,600		
	0x04	600	0x09	19,200		
	0x05	1,200	0x0A	38,400		
BR5 High byte						
Content	Same as Low byte					

BR6: Node Address

Explanations:

For filling in or reading the Modbus address. The address will be displayed in the message display after being set.

BR11: Communication Time-out (ms)

Explanations:

For setting the communication time-out. Default = 5,000ms. For example, if you wish to set the communication time-out to 7 seconds manually, write 7000 into BR11.

BR12: Communication Delay Time (ms)

Explanations:

For setting the minimum interval time between every Modbus communication datum. Default = 0ms. For example, if you wish to set the communication delay time to 100ms manually, write 100 into BR12.

BR13: TCP Connection Idle Time (s)

Explanations:

For setting the TCP Connection Idle time. Default = 30s. For example, if you wish to set the idle time to 7 seconds manually, write 7 into BR13.

BR33: Returning to Default Setting

Explanations:

IFD9506 will return to default setting when "1" is written into BR33. BR33 will be cleared to "0" automatically after the restoration.

3.5 Modbus Exception Codes Supported

When a communication error occurs, IFD9506 responds with the message: Node address of the master + (function code sent by the master +0x80) + Exception Code

The exception codes are supported as below.

Exception code	Explanation
0x01	Illegal function
0x02	Illegal data address
0x03	Illegal data value
0x04	The connection to the slave failed
0x0A	Gateway path unavailable
0x0b	Gateway destination device failed to respond

For example, IFD9506 receives a message: "03 03 10 00 00 01", but the equipment of node address 03 does not exist or does not make any response. IFD9506 will respond with "03 83 0b" which indicates there is no response in the target station after the timeout set by DCISoft is exceeded.

4 Monitoring Functions

The values in the device monitoring tables and monitored statuses can be read by monitor registers.
The monitored-device tables are set in DCISoft.

4.1 Monitor Bit Registers (MB)

Ethernet Communication Module: IFD9506					
MB No.	Attribute	Register name	Explanation	Default	Latched
0~250			Reserved		
251~263	R	Monitored value	Every MB records the value in the 16-bit device.	0	No
264~270	R	Monitored status	Every MB records the status in the 16-bit device. 1: normal; 0: abnormal	0	No
Symbol "R" refer to read only; "R/W" refers to read and write.					

MB251: Monitored Value

Explanations:

Every MB records the values in the 16-bit device.

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Device 16	Device 15	Device 14	Device 13	Device 12	Device 11	Device 10	Device 9	Device 8	Device 7	Device 6	Device 5	Device 4	Device 3	Device 2	Device 1

MB264: Monitored Status

Explanations:

Every MB records the status in the 16-bit device. 1: normal; 0: abnormal.

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Device 16	Device 15	Device 14	Device 13	Device 12	Device 11	Device 10	Device 9	Device 8	Device 7	Device 6	Device 5	Device 4	Device 3	Device 2	Device 1

4.2 Monitor Word Registers (MW)

Ethernet Communication Module: IFD9506					
MW No.	Attribute	Register name	Explanation	Default	Latched
0-250			Reserved		
251~350	R	Monitored value	Every MW records the monitored value in 1 register.	0	No
351~357	R	Monitored status	Every MW records the status in a 16-bit register. 1: normal; 0: abnormal	0	No
Symbol "R" refer to read only; "R/W" refers to read and write.					

MW251~ MW350: Monitored Value

Explanations:

Every MW records the values in 1 register.

MW251	MW252	MW253	MW254	MW255	MW256	MW257	MW258	MW259	MW260
Device 1	Device 2	Device 3	Device 4	Device 5	Device 6	Device 7	Device 8	Device 9	Device 10

MW341	MW342	MW343	MW344	MW345	MW346	MW347	MW348	MW349	MW350
Device 91	Device 92	Device 93	Device 94	Device 95	Device 96	Device 97	Device 98	Device 99	Device 100

MW351: Monitored Status

Explanations:

Every MW records the status in a 16-bit register. 1: normal; 0: abnormal.

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Device 16	Device 15	Device 14	Device 13	Device 12	Device 11	Device 10	Device 9	Device 8	Device 7	Device 6	Device 5	Device 4	Device 3	Device 2	Device 1

5 Setting Software

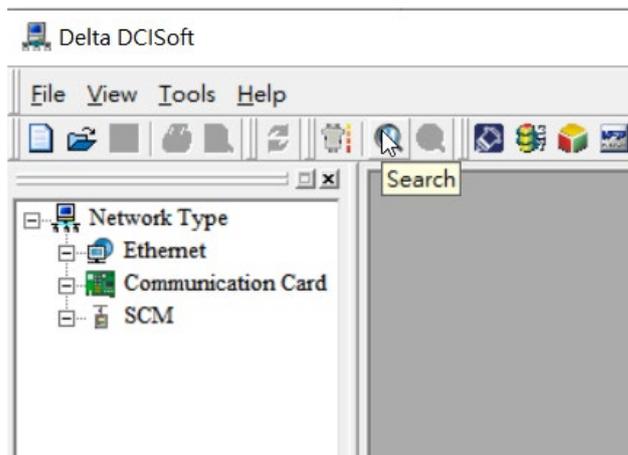
This section gives instructions on how to set IFD9506 by DCISoft and explanations on each setup page.

IFD9506 is set by UDP port 20006; therefore, you have to be aware of the relevant settings of the firewall. See the explanations below on the software.

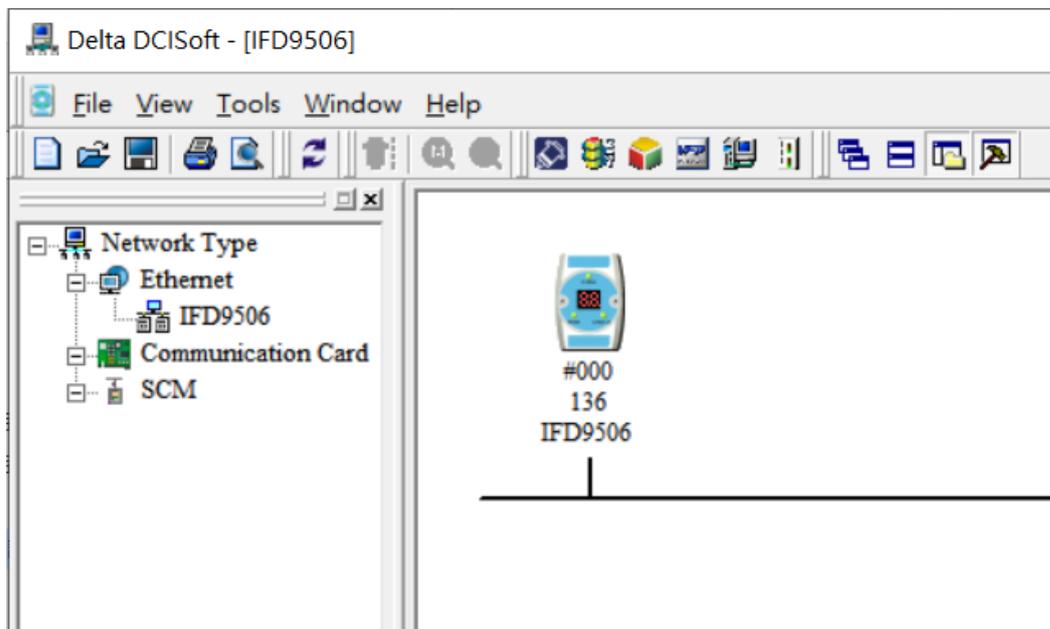
5.1 Setting Communication & Searching for Modules in DCISoft

- Broadcast search

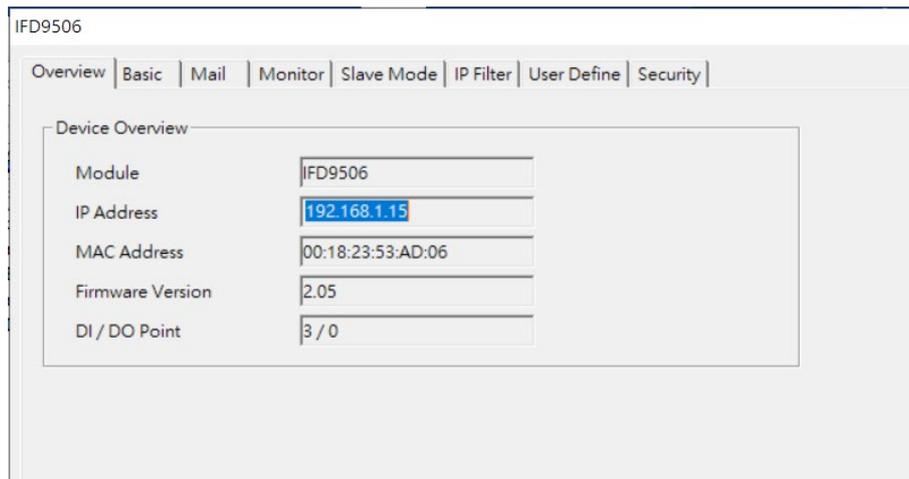
1. Open DCISoft on the PC and click the “IP Search” icon.



2. You will see the network modules found.

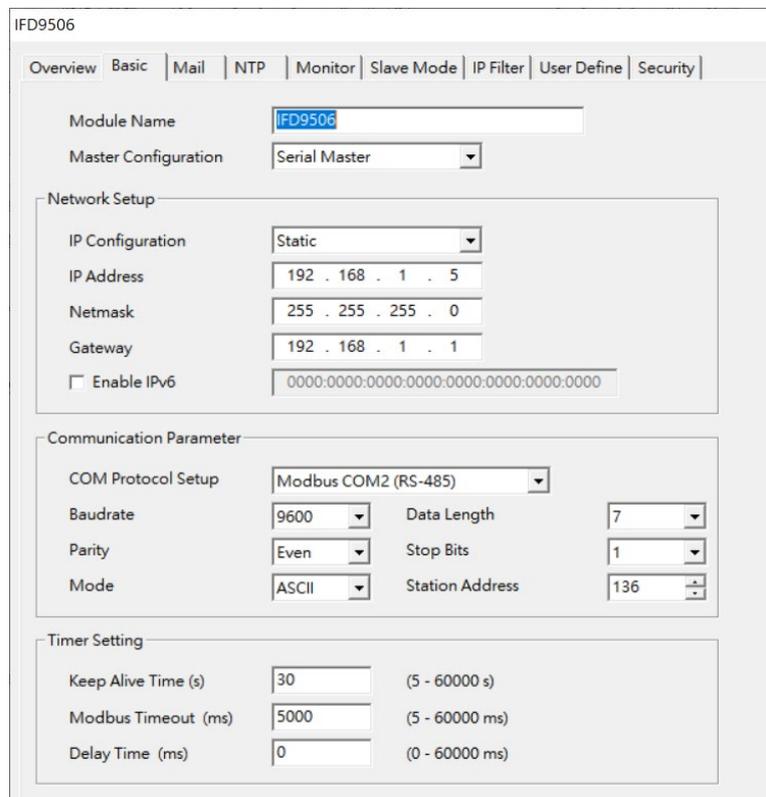


3. Double-click the module to be set to enter the setup page. The first page Overview is the basic status of the module.



5.2 Basic Settings

The basic settings include parameters such as module name, network settings and serial communication.



1. Module name:

There can be many IFD9506 modules on the network. Thus, you can set a module name for each module to identify the module when you need to use them.

2. Master configuration:

You can choose “Serial Master” mode or “Serial Slave” mode or “Serial Device Server” mode here. Refer to Chapter 6 for the explanation of modes.

3. Network setup:

Enable DHCP or static IP. Consult your ISP for other relevant settings.

a) IP configuration:

Ethernet Communication Module IFD9506

There are 2 types of IP, static IP and DHCP.

Static IP: Preset or manually modified by the user.

DHCP: Automatically updated by the server. There has to be a server in the LAN.

IP	Explanation
Static	The user enters the IP address, subnet mask and gateway.
DHCP	DHCP server offers the IP address, subnet mask and gateway.

b) IP address:

IP address of the location of the equipment on the network. Every equipment connected to the network has to have an IP address. Incorrect IP address will result in connection failure. Consult your ISP for how to set IP address. The default IP for IFD9506 is 192.168.1.5.

c) Subnet mask:

Subnet mask is an important parameter for setting the subnet, used for seeing if the destination IP and the local equipment are in the same subnet. If not, the equipment will send the packet to the gateway, and the gateway will send the packet to another subnet. Incorrect setting may cause the destination equipment unable to communicate to IFD9506. To see if your setting is correct, conduct bitwise AND operations between your IP and subnet mask and destination IP and subnet mask. If the two values obtained are the same, the two IPs are in the same subnet. The default subnet mask of IFD9506 is 255.255.255.0.

d) Gateway:

Gateway is the window for two different subnets, allowing the two ends in different subnets to communicate. For example, if the LAN has to be connected to WAN, it will need a gateway to bridge the communication. The IP of the gateway has to be in the same subnet as IFD9506. The default gateway of IFD9506 is 192.168.1.1.

4. Communication parameter setting:

(1) COM Protocol Setup: switch the COM port and communication protocol including RS-485 (Modbus/User Define) and RS-232 (Modbus/User Define)

- IFD9506 is set only with the Ethernet when RS-232 works as the COM port.
- If the "Serial Device Slave" mode is selected in Master configuration, only the RS-232 and User Define mode (UD Link) can be used.

(2) Mode: Select ASCII or RTU mode for the serial data

(3) Communication format and Station Address: set the communication format and station address for the serial communication.

For the module with firmware V2.04 or earlier, the settings in the software are not latched when the power is off. If the setting in the software is inconsistent with the rotary switch setting, then the rotary switch setting will be applied after the power is on again.

For the module with firmware V2.06 or later, when the node address is set to 0x00 with the rotary switches, all the software settings can be used and all parameters will retain the last setting values in the software after the power is on again.

5. Timer setting:

TCP connection idle time, Modbus timeout and minimum communication delay time for every communication data are set here.

5.3 E-Mails Setting

E-Mail is the abbreviation of electronic mail which transmits mails through the network. IFD9506 has E-Mail functions for the user to pre-save a segment of text message, which can be a descriptive message or error message, into the subject of the E-Mail. When the E-Mail is triggered, IFD9506 will send the messages to the user by E-Mail.

1. Mail alarm setup:

There are 3 mail alarms to be set. Check the boxes to enable the alarms. The alarm can be triggered by "low" and "high".

2. SMTP server:

When Alarm 1 is triggered, the E-Mail will first be sent to SMTP server, and SMTP server will send it to the designated address. For example, assume there is an E-Mail to be sent to Test@delta.com.tw, and SMTP server is 192.168.0.1, the E-Mail will be sent to SMTP server first, and the server will further send it to the recipient Test1@delta.com.tw.

3. E-Mail of sender:

The email source to let the recipient know the sender of the email; maximum 63 English characters allowed.

4. Subject of E-Mail:

You can enter the text message in the column, and the message will be placed in the subject of the E-Mail and sent to the recipient. IFD9506 is able to contain 1~3 E-Mail subjects. Max. 63 English characters are allowed for each subject.

5. E-Mail of recipient:

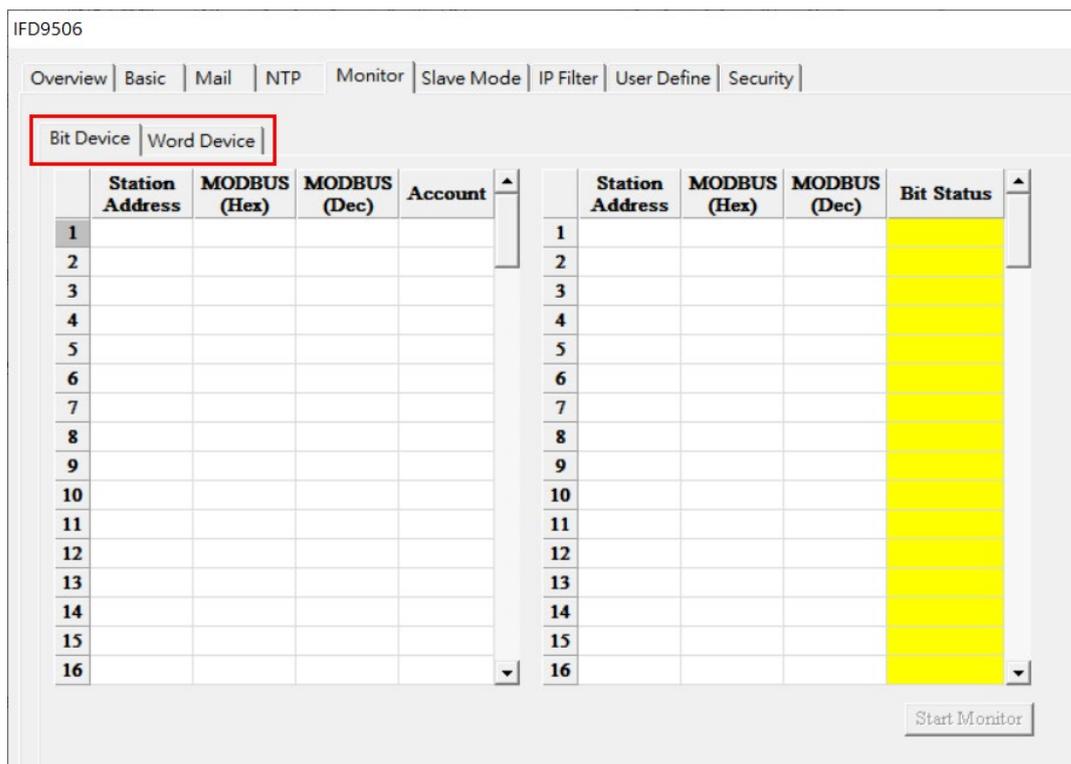
One mail can be sent to 10 addresses according to the alarm setting. Every address allows Max. 63 English characters. For example, when Alarm 1 is triggered, the E-Mail will be sent to Test1@delta.com.tw. When Alarm 2 is triggered, the E-Mail will be sent to Test2@delta.com.tw.

Notes:

- (1) To correctly send out E-Mails, there has to be a SMTP server in the network. When we send out an E-Mail, the mail will be sent to SMTP server first, and the server will further send the mail to the designated address.
- (2) The mail function of IFD9506 does not support the mail server that requires an account and password, nor support encryption protocols like SSL, TLS.

5.4 Monitoring Settings

You can read data in designated addresses via a serial port only by using the Modbus protocol in the serial master mode. The data can be temporarily stored in IFD9506 for the purpose of fast storing and acquisition.



1. Bit Device:

Provides bit-device addresses of serial slaves; able to read the content in the corresponding addresses of the designated slave.

- Station Address: Enter the slave address of the Modbus device to which IFD9506 connects.
- Modbus (Hex): Enter the absolute address of the slave in 4 hexadecimal digits. For example, the address of M0 in the Delta PLC is 0x0800.
- Modbus (Dec): Enter the absolute address of the slave in 6 decimal digits. For example, the address of M0 in the Delta PLC is 002049.
- Amount: The number of devices starting from the entered Modbus address to be read

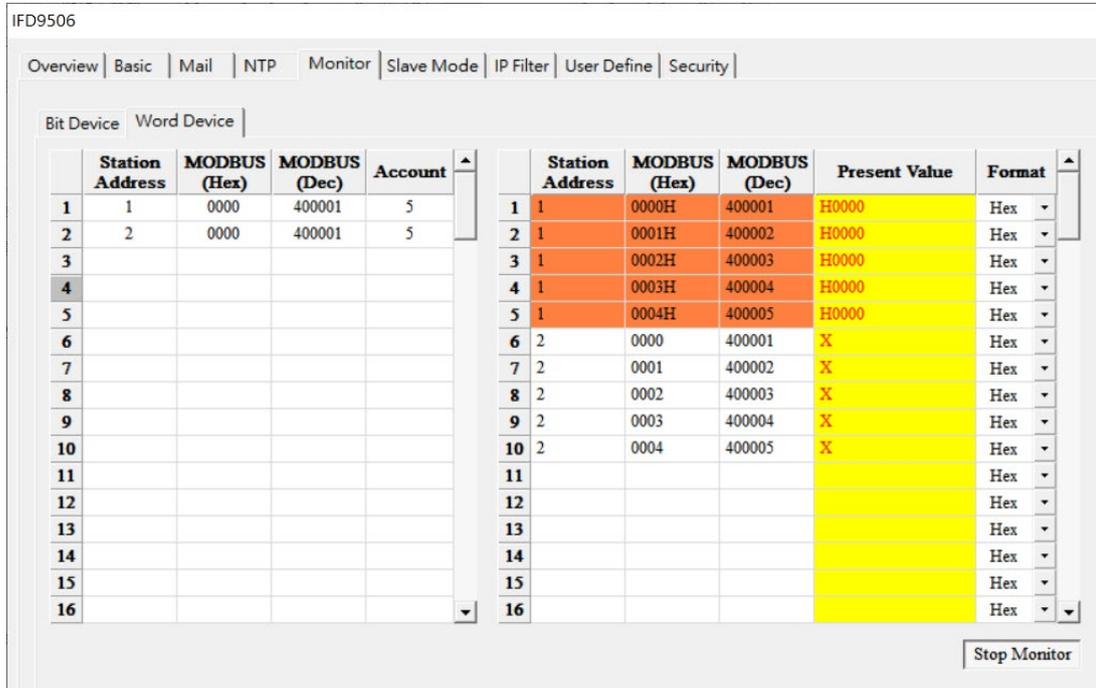
2. Word Device:

Provides word-device addresses of serial slaves; able to read the content in the corresponding address of the designated slave. The operation of word devices is the same as bit devices.

3. Starting to monitor:

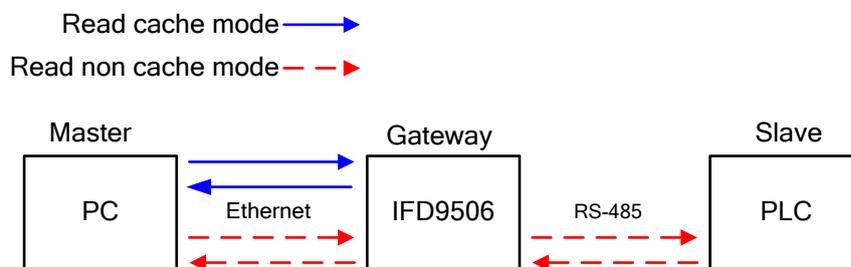
After the data related to the slave is entered, please click “Apply” and DCISoft will automatically execute the online monitoring function. The monitoring function is available only for the connection through Ethernet port.

- When X appears in Present Value column, reading a serial slave failed by IFD9506. Check if the data format and baud rate settings are correct and the communication cable is connected properly.



Notes:

- Cache mode normally is enabled, and Max. 100 sets of data in slaves can be monitored. When the cache mode is enabled, the data you would like to read will be sent back directly from the register in IFD9506, which expedites the sending back of the data.
- When device addresses are entered in the MODBUS (Hex) column, they are read by the function codes 0x02 for bit devices and 0x03 for word devices by default. If 0x01 and 0x04 function codes are to be used to read data, please modify the values in MODBUS (Dec) column as the data with the start of 0 (e.g. 000001) and the start of 3 (e.g. 300001)



- Be aware that both of the monitoring tables should contain station addresses or keep empty when unused. Communication errors may occur when IFD9506 finds no monitored device.

5.5 Serial Slave Mode

The instruction sent from the Modbus terminal is received and transferred to the network. Please designate the station address and relay IP address in the column.

Ethernet Communication Module IFD9506

Device address: Address of the slave PLC, which is different from that of Gateway

Relay IP address: IP address of the receiving terminal

5.6 IP Filter

The IP filter is used for restricting the connection of the network in case some uncertain IP will cause errors. Only the IP set within a certain range can establish a connection. Other IPs will be rejected.

1. Enable IP filter function:

Check the box to enable IP filter.

2. IP address:

IP addresses that are allowed to establish connections. Max. 8 IPs are allowed.

3. Subnet mask:

Subnet mask of the IP that is allowed to establish a connection. To see whether the subnet mask is allowed, conduct bitwise AND operation between the allowed IP and subnet mask and destination IP and subnet mask. If the two values obtained are the same, the subnet mask is allowed by the network. For example, assume the IP is 192.168.0.1 and subnet mask 255.255.255.255, the IP allowed to establish a connection is 192.168.0.1 only. If the subnet mask is 255.255.255.0, the IPs allowed to establish connections are 192.168.0.0 ~ 192.168.0.255.

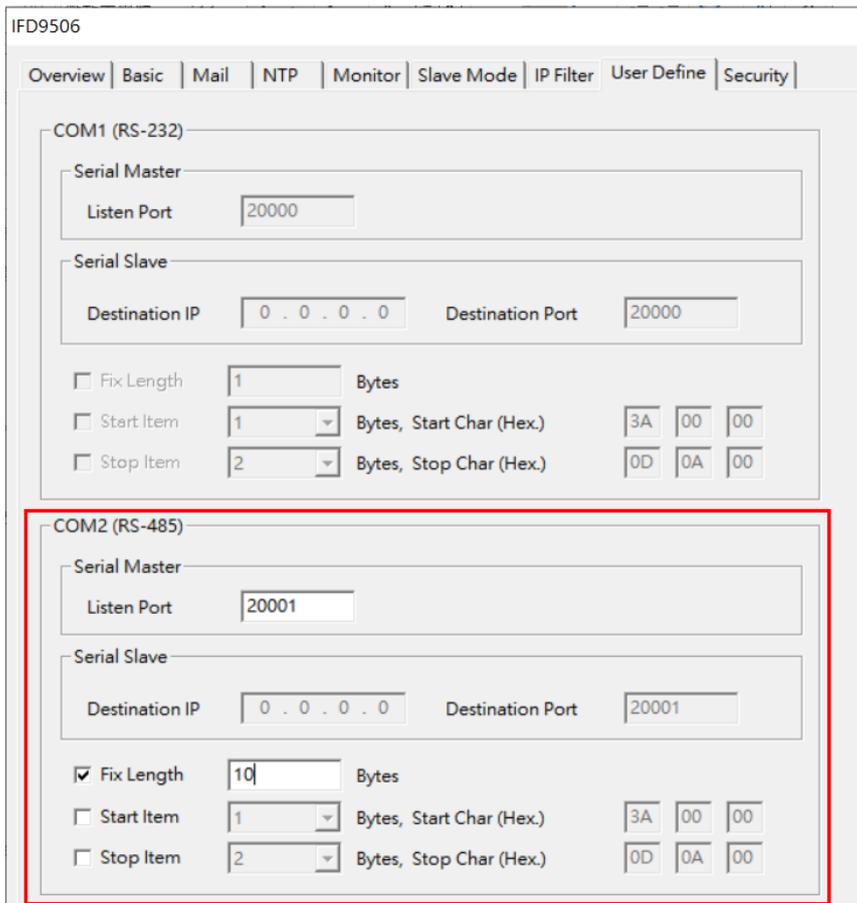
5.7 User Defined Format

You can define your own format for the data to be transmitted. The items to be defined include the fixed length, start item and stop item.

- Select RS-232 (User Define COM1) or RS-485 (User Define COM2) to connect the device.

Communication Parameter			
COM Protocol Setup	User Define COM2 (RS-485)		
Baudrate	9600	Data Length	8
Parity	Even	Stop Bits	1
Mode	RTU	Station Address	136

- After clicking "Apply", switch to "User Define" page to set the "Fix Length", "Start Item" and "Stop Item" and etc.



1. Listen Port/Destination Port:

Range: 1024 ~ 65535.

If IFD9506 works in serial master mode, you should set its own listening port number which is used by Ethernet client/master to make the connection.

If IFD9506 works in serial slave mode, you should set the IP address of Ethernet service /slave and the destination port number which is open to make the connection.

2. Refer to Section 6.4 for packet condition setup.

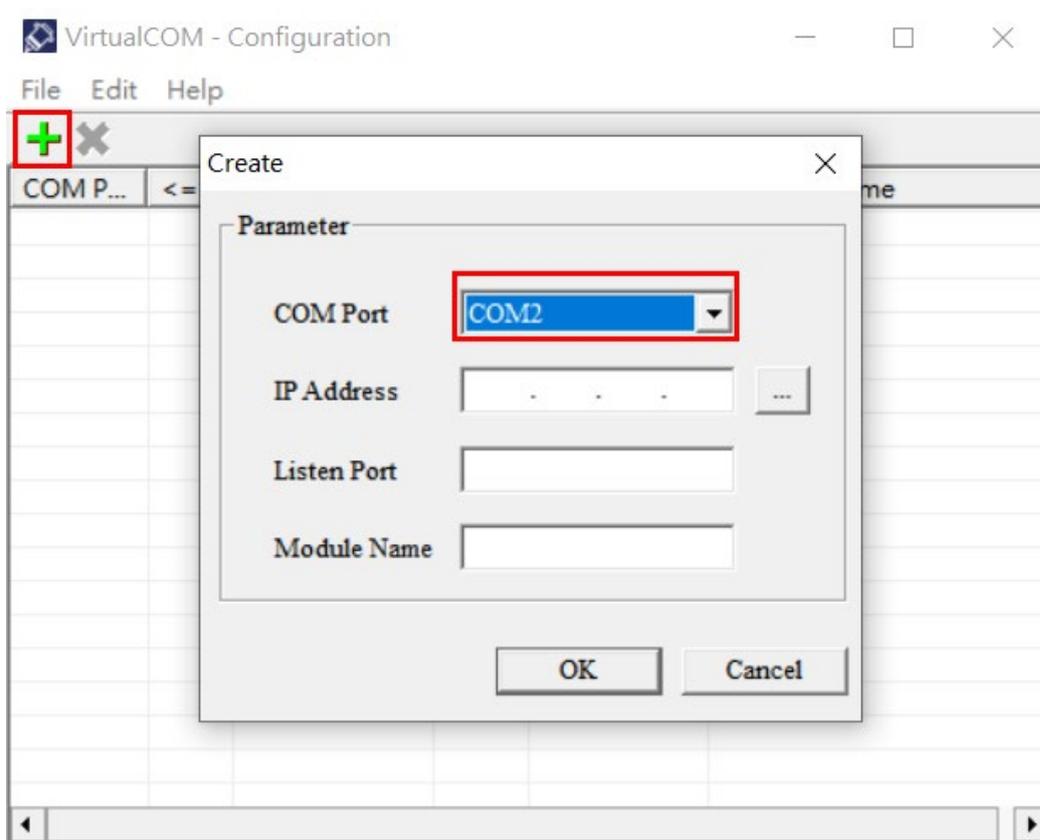
5.8 Virtual COM Port

Virtual COM port converts the data transmitted to the serial port (RS-232/RS-485) to Ethernet.

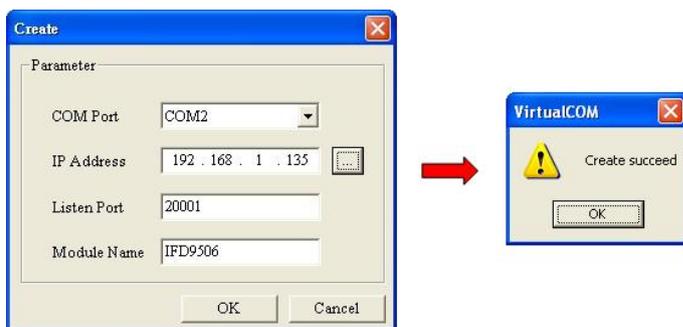
1. Select "User Define COM1/2" in COM Protocol Setup field.
2. Switch to "User Define" page to set listen port number.
3. Open Virtual COM setup page.



Ethernet Communication Module IFD9506



4. Set the COM port of PC, IP address of IFD9506, listen port number and module name.
5. Select the module you need and press "OK". Relevant information of the device will be imported automatically. Press "OK" to complete the setup.



6. Once the setup is successful, you can see the virtual COM you set in the Device Manager.

5.9 Security Settings

To prevent the set values in IFD9506 from being modified, you can set passwords to lock the settings in IFD9506.

IFD9506

The screenshot shows the 'Security' tab of the IFD9506 web interface. It contains three main sections: 'Login' with a 'Password' input field and a 'Confirm' button; 'Password Setup' with a checked 'Modify' checkbox, a 'Password' input field, and a 'Confirm Password' input field; and 'Load Factory Default' with an unchecked 'Factory Setting' checkbox.

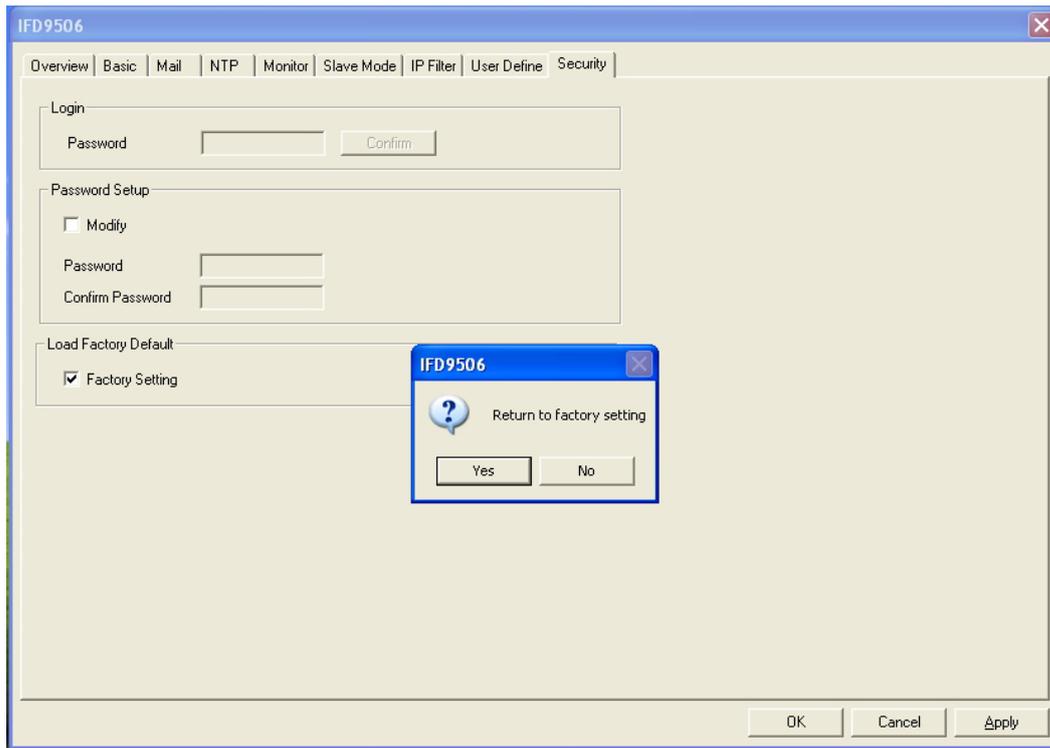
1. Password setup:
Check the "Modify" box to set the password.
2. Password:
Max. 4 characters.
3. Confirm password:
Enter the new password again.

Note:

Once the password is locked, all the pages cannot be set unless you unlock the password. If you have locked IFD9506 but forget the password, you can return IFD9506 to factory setting by RS-232 port, and all the settings will return to factory ones.

5.10 Returning to Factory Settings

If you need to clear all the settings and return to factory settings after many modifications are done, check the "Factory Setting" box on the Load Factory Default area.



■ Returning to default settings

Check “Factory Setting” box and click “Yes” to return all parameters to the factory settings.

Notes:

- You can return settings to factory default ones by RS-232 port whether the password is locked or not. It will take approximately 10 seconds to return to default settings, so DO NOT switch off the power within the 10 seconds. Besides, you can also press “Reset” button for 2 seconds to return to default settings.
- Please power IFD9506 on again after returning to factory settings is done.

6 Setting Operation Mode

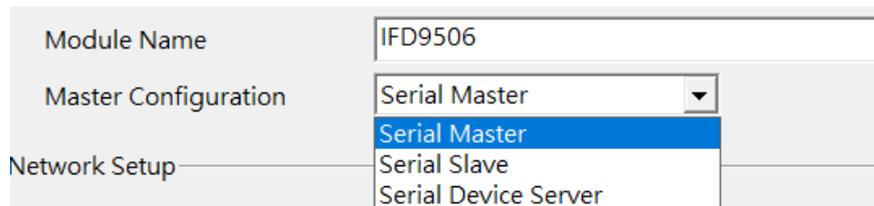
6.1 Setup Prior to Operation

Before the power is on, set up the rotary switches according to Section 2.8 Node Address and Section 2.9 Data Format and Baud Rate. For the module with firmware V2.04 or earlier, the settings in the software are not latched when the power is off. If the setting in the software is inconsistent with the rotary switch setting, then the rotary switch setting will be applied after the power is on again.

For the module with firmware V2.06 or later, when the node address is set to 0x00 with the rotary switches, all the software settings can be used and all parameters will retain the last setting values in the software after the power is on again.

The node address setting for IFD9506 must be different from any equipment of serial ports. And the data format and baud rate settings must keep the same as those of the equipment connected to the serial port RS-232 or RS-485.

You must choose one of the following operation modes: Serial Master, Serial Slave and Serial Device Server for IFD9506 in DCISoft.



Serial Master and Serial Slave modes:

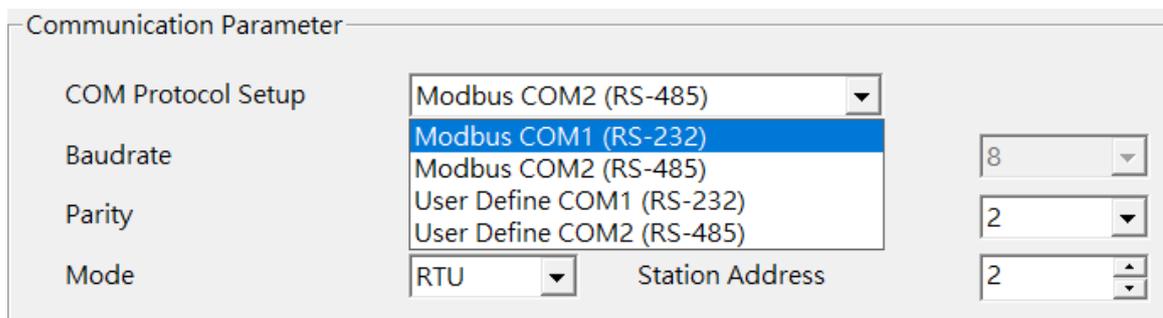
For the request-response communication. The upper computer must have received the response or the set timeout time is exceeded before the next communication starts.

Serial Device Server mode:

For the two-way communication, the connection must be established by the Ethernet terminal at first and afterward the communication is not limited to the request -response mode, e.g., the master can conduct one request, multiple receptions, or just receptions without any request .

For both Serial Master and Serial Slave modes, you can choose RS-485 or RS-232 as the serial communication port in DCISoft and the communication protocol can be Modbus or User Define communication (UD link).

For the Serial Device Server mode, you can only select UD link.



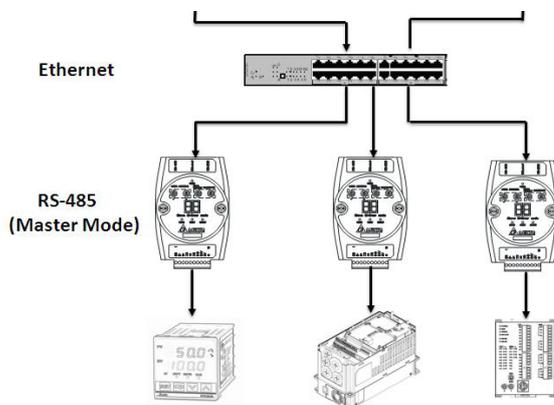
6.2 Serial Master Mode

As a serial communication master, IFD9506 transfers the communication instruction from the Ethernet client /

Ethernet Communication Module IFD9506

master to the serial slave (by RS-485 or RS232), then waits for the response from the serial slave, and finally sends the response received back to the Ethernet client / master.

- Network Architecture



- Operation Procedure

Select Serial Master for Master Configuration field, Modbus or User Define as COM protocol and RS-485 or RS-232 as the communication port.

The Modbus mode operation is described in the following section. For User Define mode operation, refer to the description in Section 6.4.

- Modbus Master

When IFD9506 works as the Modbus serial master with the Ethernet port used as the Ethernet server/ slave, it converts the Modbus TCP instruction from the Ethernet client/ master into Modbus instruction and forwards it to the serial terminal. Therefore, the Modbus TCP instruction needs to correspond to the right node address of the equipment of the serial port.

For example, if the station address of IFD9506 is 2 and the serial equipment is 3, IFD9506 may receive the following Modbus TCP instructions.

1. "00 00 00 00 00 06 **02** 03 10 00 00 01"

If the station address is 2, IFD9506 will respond automatically.

2. "00 00 00 00 00 06 **03** 03 10 00 00 01"

If the station address is not 2, IFD9506 will convert the Modbus TCP instruction into the Modbus instruction and then transmit it to the serial equipment based on the selected communication format (ASCII or RTU). And then the serial equipment will receive this instruction.

The communication status of the serial slave can be watched through the device monitoring tables. Refer to Section 5.4 Monitoring Settings for details. IFD9506 automatically sends the Modbus instruction to the set devices via function code 0x03.

IFD9506 stores the data from the device monitoring tables in the internal registers beforehand, so the efficiency of the upper computer is improved. When the "Present Value" column is displayed as X, it indicates that the current communication is abnormal.

Notes:

- The number of connections to IFD9506 made by Modbus TCP master cannot exceed the upper limit of 16. If the limit is exceeded, IFD9506 will directly abandon the connections. Pay attention to the number of connections at the Ethernet client / master, or shorten the connection-alive time in DCISoft so as to avoid too many idle connections.

For timer parameter setting, please refer to Section 6.6 Timer Setting.

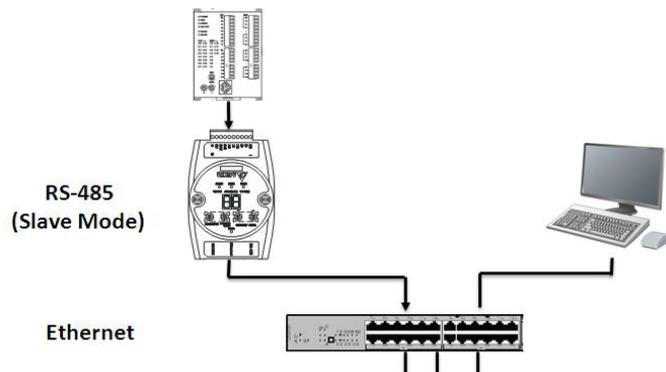
- The Modbus TCP master is allowed to send multiple requests at the same time. However, due to the serial data transmission restriction: one register of data per time, the data received by the Ethernet terminal will queue up in the internal temporary storage area of IFD9506 and will be processed successively by the serial terminal. When the traffic is too busy, please consider to lengthen the wait time of timeout.

6.3 Serial Slave Mode

As a serial slave, IFD9506 is connected to the serial master by RS-232 or RS-485 port and is connected to the Ethernet server/ slave by Ethernet port.

The communication instruction is sent by the serial master and is transferred to the Ethernet by IFD9506. And then IFD9506 will be waiting for the response from the Ethernet server/ slave, and eventually send the response back to the serial master.

● Network Architecture



● Operation Procedure

Select Serial Slave for Master Configuration field, Modbus or User Define as COM protocol and RS-485 or RS-232 as the communication port.

The Modbus mode operation is described in the following section. For User Define mode operation, refer to the description in Section 6.4.

● Modbus Slave

The equipment of the serial terminal works as a Modbus master. IFD9506 converts the Modbus instruction received from the serial port into a Modbus TCP instruction and sends it to the Ethernet server/ slave. The device monitoring table cannot be used in this mode. The Serial Slave Mode table should be set beforehand, and the station address which corresponds to the destination IP address needs to be included in the Modbus instruction.

Ethernet Communication Module IFD9506

For example, if the station address of IFD9506 is 2, the IP address that station address 5 corresponds to in the Serial Slave Mode table is 192.168.1.58, as shown in the following figure:

	Station Address	Relay IP Address
1	5	192.168.1.58
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		

The following Modbus instructions are received in RTU mode.

1. “**02** 03 10 00 00 01 (80 F9)”
If the station address is 2, IFD9506 will respond to the instruction automatically.
2. “**05** 03 10 00 00 01 (81 4E)”
If the station address is 5, IFD9506 will convert the instruction into the Modbus TCP instruction and then transmit it to the Ethernet equipment at the IP address 192.168.1.58.

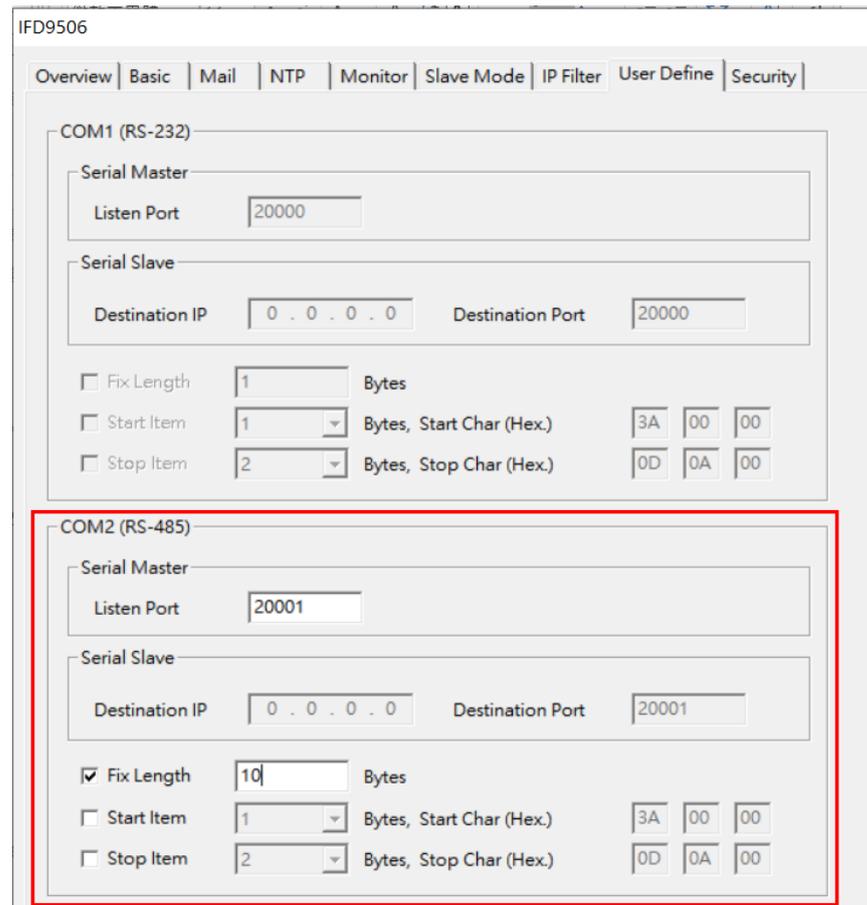
Note:

The number of connections to the Ethernet server/ slave, which is established by IFD9506 cannot exceed the upper limit of 16. If the limit is exceeded, IFD9506 will reject the connections. Therefore, it is necessary to be aware of the number of connections to Ethernet server/ slave, and shorten the connection-alive time (Keep Alive Time) in DCISoft to avoid too many idle connections. For timer parameter setting, please refer to Section 6.6 Timer Setting.

6.4 User Define Mode

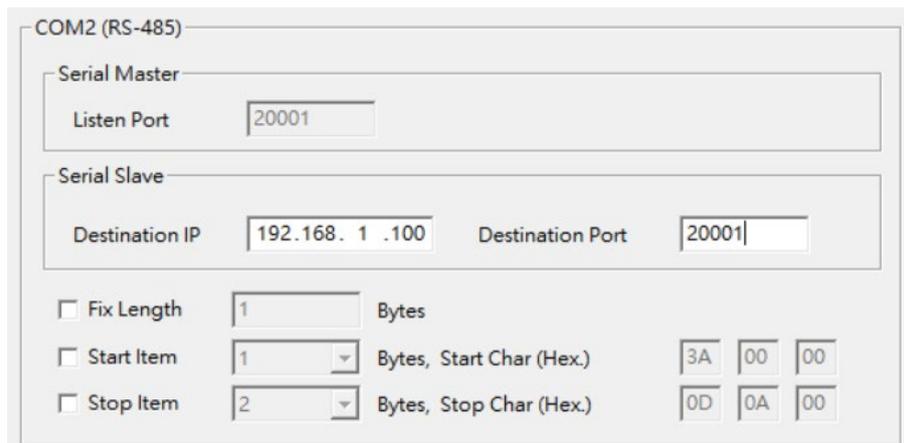
The User Define mode can be used for all of the three configuration modes:

1. In serial master mode:
Specify the listen port number for IFD9506 in the communication port (RS-232 or RS-485) field on the User Define page of DCISoft. IFD9506 is Ethernet Server (slave) and the Ethernet equipment is Ethernet Client (master). The Ethernet equipment needs to actively establish the connection to IFD9506 through the port number.



2. In serial slave mode:

Specify the destination IP address and destination port number in the communication port (RS-232 or RS-485) field on the User-Define page of DCISoft. IFD9506 is Ethernet client/ master, and the Ethernet equipment is Ethernet server/ slave. When the serial port of IFD9506 receives data, it will actively establish the connection to the Ethernet equipment through the port number.



You can set the packet judgment conditions on the lower part of the setting page. When the data received by IFD9506 meets the conditions, it is judged as a single packet. There are three modes for you to choose from.

1. No condition is specified: if no condition box is checked, IFD9506 will make the judgement of the end of the packet based on the packet interval (1.5 characters of time).
2. Fix Length: after the box of Fix Length is checked, the start and stop items cannot be set. And IFD9506

makes the judgement of the end of the packet based on the packet length with the unit of byte. If the data is too long in size, it will be truncated till the corresponding length. If it is too short, the packet will be discarded without being forwarded or sent back.

3. Start Item or Stop Item: The boxes of Start Item and Stop Item can be checked at the same time, but they cannot be used together with Fix Length. After Start Item or Stop Item box is checked, you can specify 1 to 3 characters as the judgment condition.

6.5 Serial Device Server Mode (P2P Mode)

In Serial Device Server mode, IFD9506 supports the two-way communication, but not limited to the request-response way. It supports the User Define communication protocol only, but does not support the settings on the User Define page. IFD9506 transfers all data received, which equals no condition is specified and makes the judgment of the packet end based on 1.5 characters of time. At the beginning of communication, the Ethernet equipment must first establish the connection to IFD9506, and then IFD9506 uses the connection to forward the data received from the serial port.

When using RS-485, please be aware that the full-duplex communication cannot be made via the RS-485 port. If the Ethernet port and serial port transmit instructions at the same time, the serial equipment will not be able to receive data properly, which will result in a communication error. Therefore, please make sure that only one device can transmit the request or response at a time.

6.6 Timer Setting

There are three important time parameters for IFD9506.

Timer Setting		
Keep Alive Time (s)	<input type="text" value="30"/>	(5 - 60000 s)
Modbus Timeout (ms)	<input type="text" value="5000"/>	(5 - 60000 ms)
Delay Time (ms)	<input type="text" value="0"/>	(0 - 60000 ms)

- Keep Alive time

Applicable modes: Serial Master, Serial Slave and Serial Device Server

When the communication is idle, IFD9506 closes the connection to the Ethernet client/ master or Ethernet server/ slave based on the set time so as to avoid the idle connections occupying connection numbers (the upper limit of connection number is 16, and the connection will be rejected once the upper limit is reached).

In general use, the setting value does not exceed the default value to avoid an excessively long idle connection. When Ethernet client/ master has no reconnection mechanism, or Ethernet server/ slave has only a single connection, the setting value is increased to prevent disconnection. The setting value must be greater than the Modbus timeout setting in order to prevent disconnection before Modbus timeout occurs.

- Modbus Timeout

Applicable modes: Serial Master and Serial Slave

When the serial slave or Ethernet server/ slave does not respond to the Modbus or Modbus TCP instruction and the timeout setting is exceeded, IFD9506 responds to Ethernet client/ master or serial

master with the error code 0x0B.

For example, if station address 1 does not respond to Modbus function code 0x03 within the timeout time, IFD9506 will respond to the master with "01 83 0B".

Please modify this parameter value according to the response time of the used product. The parameter value should be less than the timeout setting of the upper computer.

- Delay Time

Applicable mode: Serial Master

In general, Delay Time is used in RS-485 communication architecture. When RS-485 communication fails frequently, you can increase this parameter value slightly. Since RS-485 communication is the half duplex communication, it is not allowed to read and write data at the same time and the equipment repeats the switch between transmission mode and reception mode during communication.

If the switching speed of RS-485 slave is not fast enough, the data packets transmitted by IFD9506 may be lost or the slave may not receive full data.

It is suggested you properly increase the setting value of Delay Time in milliseconds from the minimum value so as to make the communication smooth. The setting value is an empirical parameter value, which need be tested and adjusted on site for a long time based on the efficiency of the equipment used together.

7 Ethernet/IP Communication

7.1 Versions Supported

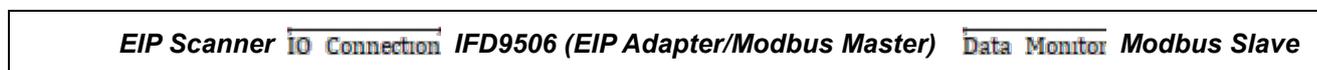
Module/ software	Version Number
IFD9506	V2.04 and above
DCISoft	V1.21 and above
EIP Builder	V1.07 and above

7.2 Functions Supported

Only the serial master mode is supported and Ethernet/IP master (Scanner) can communicate with the serial equipment through the Implicit Message or Explicit Message.

(1) Implicit Message

The Ethernet/ IP master can conduct data exchange with IFD9506 to read the contents of the device monitoring tables of IFD9506 (only the read action is allowed).



Data storage area in IFD9506	Explanation
OUTPUT [0 - 127]	System-reserved area
INPUT [0 - 127]	
INPUT [128 - 227]	The area where the contents of Word device monitoring table are stored
INPUT [228 - 234]	The area where the contents of Bit device monitoring table are stored

(2) Explicit Message

The Ethernet/ IP master can transmit the Modbus instruction to IFD9506 by placing it in an explicit message. Reading multiple devices and writing to a single device are supported.

IFD9506 forwards the Modbus instruction to the serial slave and sends the response from the serial slave back to the Ethernet/ IP master.



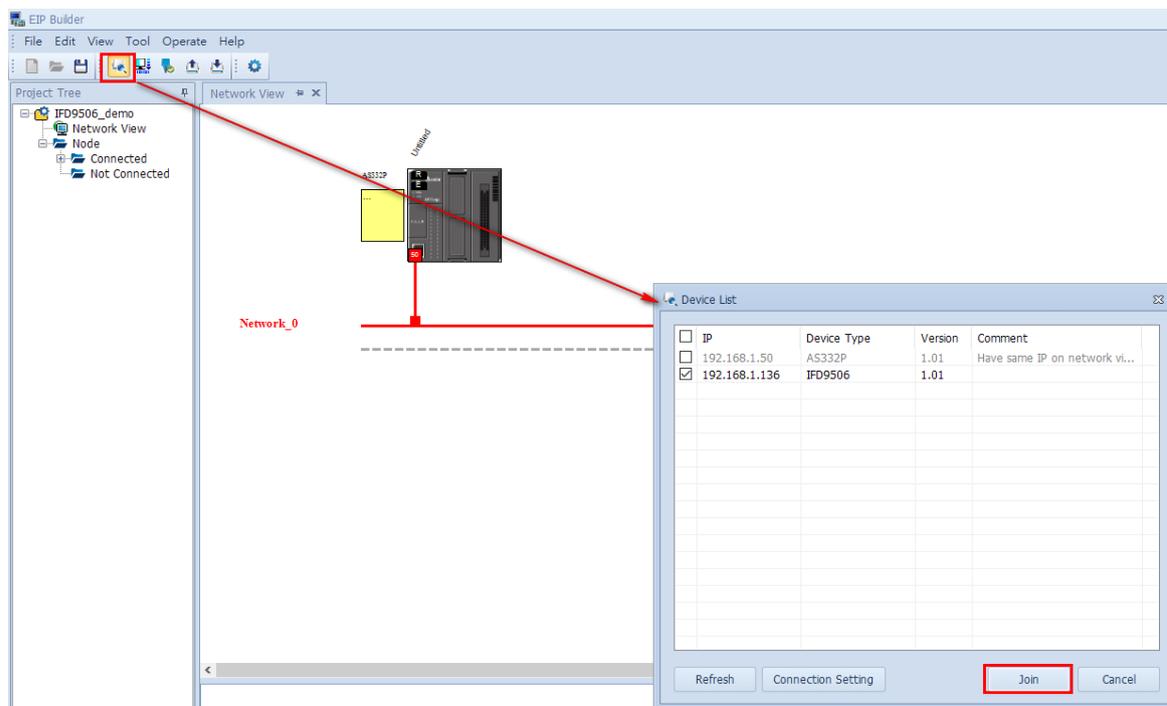
Ethernet/IP parameters setting	
Service Code	0x32
Class Code	0x64
Instance	0x01
Attribute	0x03

Ethernet/IP parameters setting	
Service data	Modbus instruction (High and Low bytes inverted)
Function codes supported	0x03 Read holding registers 0x06 Write a single holding register

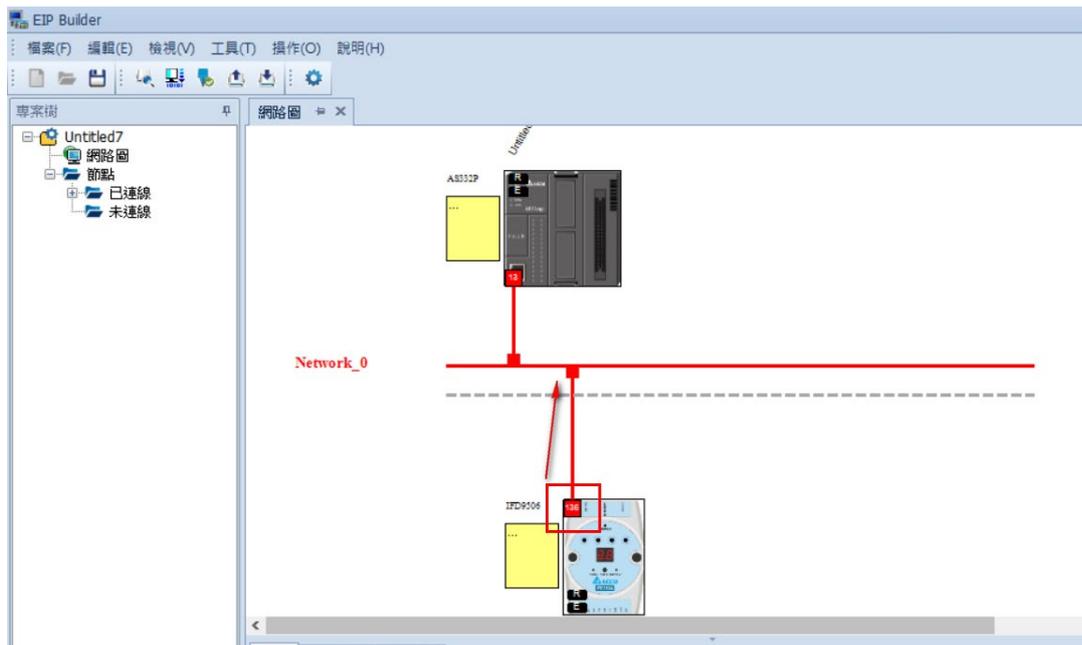
7.3 Ethernet/IP Operation through Implicit Message

Description	As Ethernet/IP master, AS300 reads the serial slave data through device mapping.
Steps	<ol style="list-style-type: none"> 1. Set up the rotary switches of IFD9506; 2. Set the device monitoring tables in DCISoft; 3. Start the project in ISPSOft; 4. Start EIP Builder and add IFD9506 to the network.

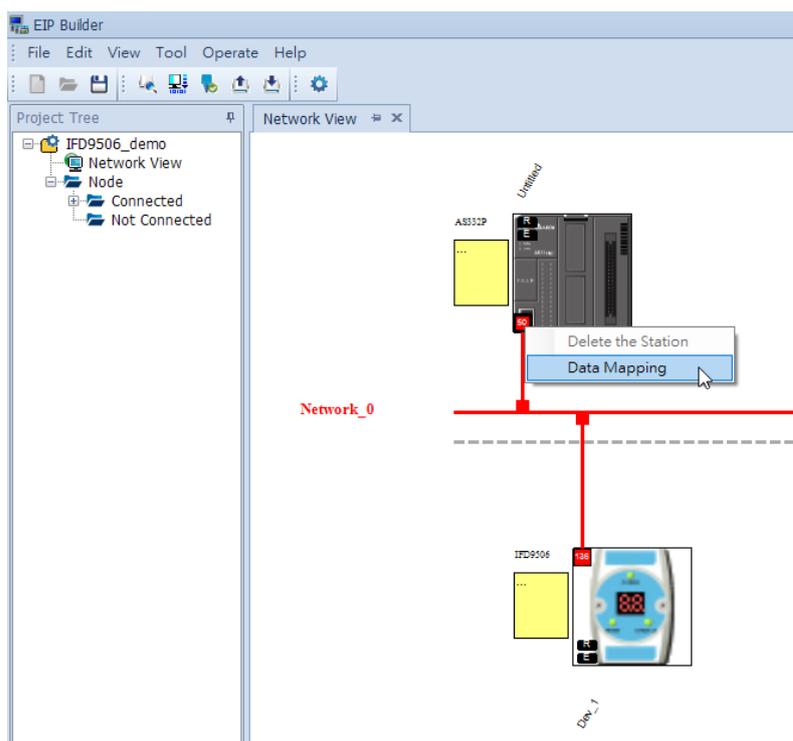
1. Set the parameters of IFD9506 with the rotary switches. Ensure that the data format and baud rate of IFD9506 are the same as those of the serial slave and the station address is different from that of the serial slave.
2. Connect IFD9506 to the Modbus slave of the serial terminal, start DCISoft, and ensure that IFD9506 has been set to the serial master mode.
3. Refer to Section 5.4 Monitoring Settings, open the device monitoring table page Monitor, select Bit device or Word device page, and fill in the correct station address of the slave, Modbus start address and data length to be read. With a click on “Apply” button, the software will start monitoring devices automatically.
4. Start ISPSOft, enter EIP Builder (refer to AS Series Operation Manual for details on operation), scan the network, and add IFD9506 to the network. Press the red dot on the device icon and meanwhile drag it to the network location to make the connection.



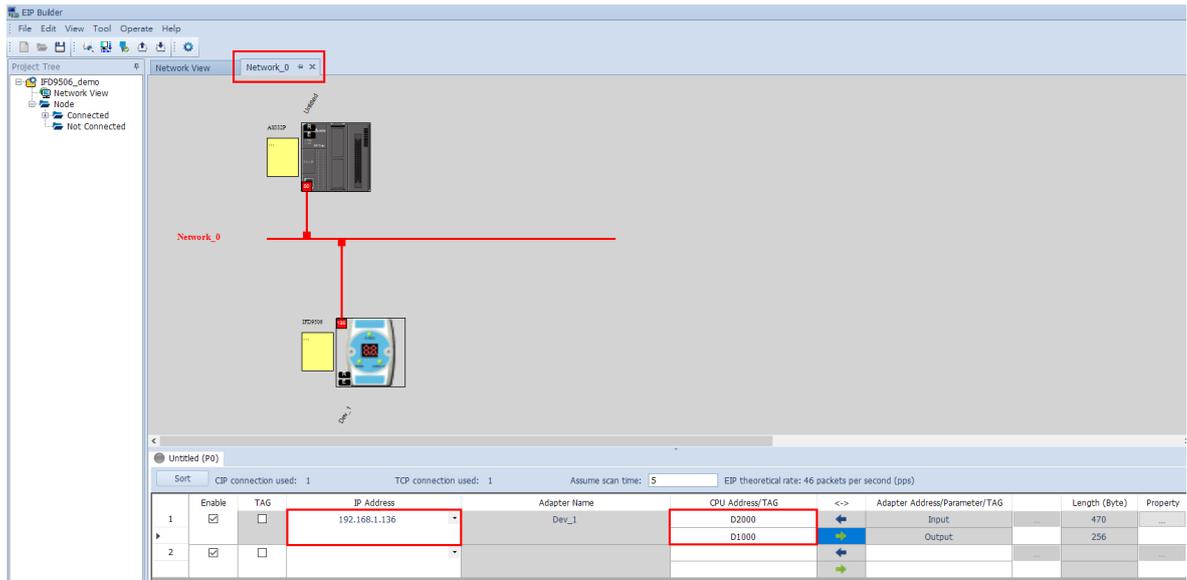
Ethernet Communication Module IFD9506



5. Right click the red dot on the AS300 module icon and then select “Data Mapping” to open the data mapping table.



6. The data register address mapping between IFD9506 and AS300 can be set in the data mapping table.



Data mapping area in AS300	Data storage area in IFD9506	Description
D1000 – D1127	OUTPUT [0 - 127]	System reserved area
D2000 - D2127	INPUT [0 - 127]	
D2128 - D2227	INPUT [128 - 227]	The area where the contents of Word device monitoring table are
D2228 - D2234	INPUT [228 - 234]	The area where the contents of Bit device monitoring table are

- The device monitoring tables can be opened to verify the result in ISPSOft. The data in D2128 of AS300 should be the same as the data in the first device on the Word device monitoring table of IFD9506, and so on. The registers after D2228 correspond to those on the Bit device monitoring table.

Notes:

- When the device monitoring table reading fails, the data received by the Ethernet/ IP master maintains the last-received value.
- When using a non-Delta Ethernet/ IP master, please download the latest version of IFD9506 EDS file (Electronic Data Sheet) from Delta official website.
- When using a non-Delta Ethernet/ IP master, please set the data unit to INT (2 bytes) for easy identification of data.

7.4 Ethernet/IP Operation through Explicit Message

Description	The explicit message is sent with the AS300 EIPRW instruction and the Modbus instruction is sent to the serial slave.
Steps	<ol style="list-style-type: none"> Set up the rotary switches of IFD9506; Start the project in ISPSOft; Edit EIPRW instruction.

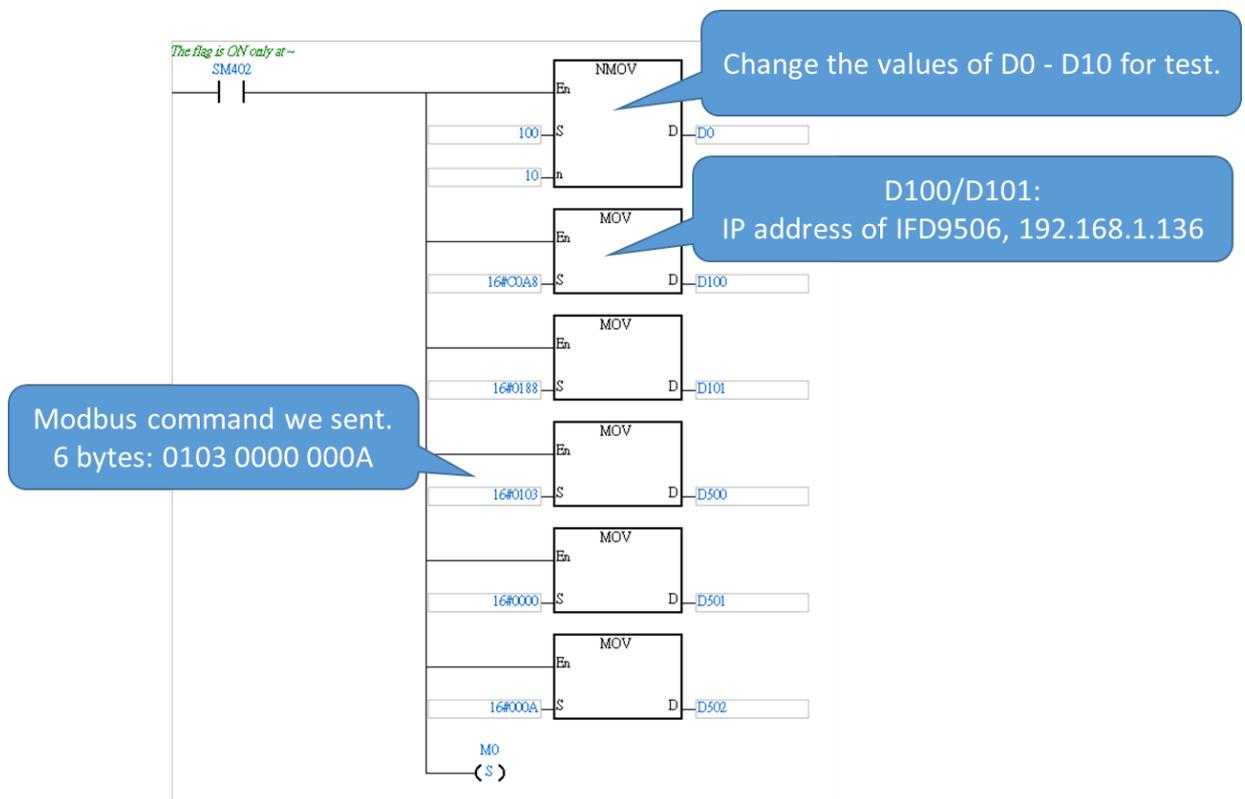
- If Ethernet/ IP master is to write data into a serial slave, only the explicit message can be used.
- Use API2208 EIPRW for AS300.

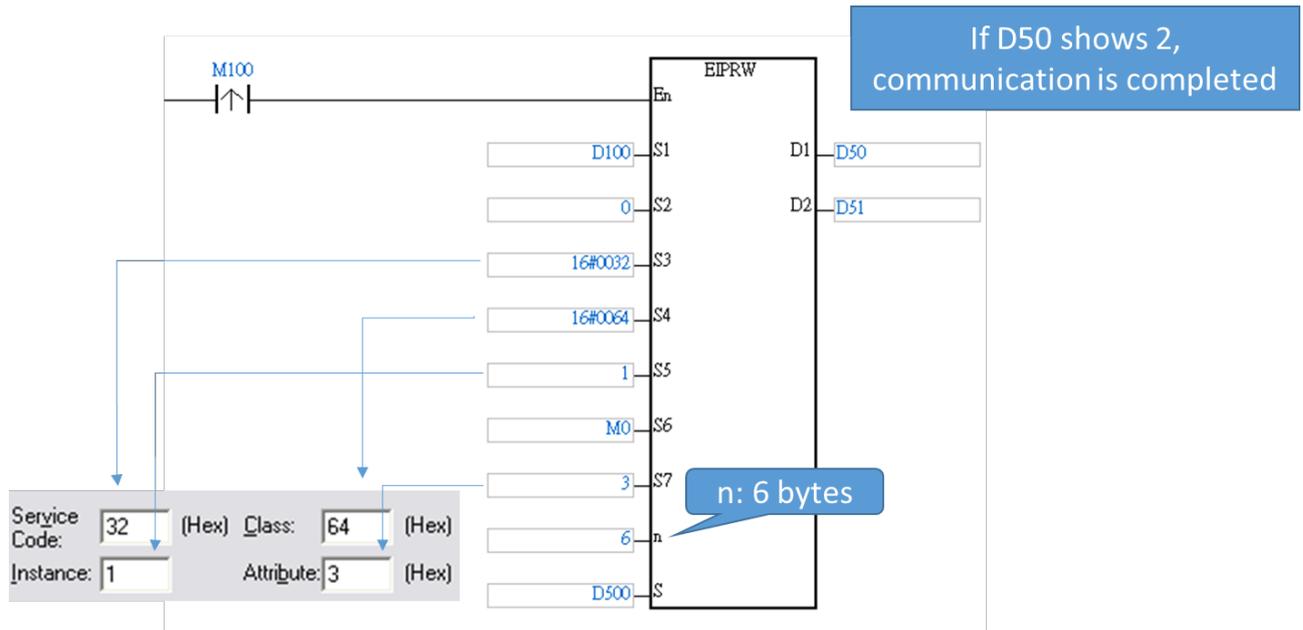
(Refer to AS Series Operation Manual for the explanation of the instruction.)

Operand	Name	Description	Data type
S ₁	IP address	The first two sections of the IP address occupy the first word and the remaining two sections of the IP address occupy the second word. For example: If the IP address is 192.168.1.5, S ₁ =16#C0A8 and S ₁ +1=16#0105.	WORD[2]
S ₂	Connection mode	0: UCMM	WORD
S ₃	Function code (Service Code)	Range: 16#0000~00FF. If the function code exceeds the range, the instruction will not be executed.	WORD
S ₄	Class ID	Refer to Ethernet/IP protocol.	WORD
S ₅	Instance ID	Refer to Ethernet/IP protocol.	WORD
S ₆	Attribute ID switch	ON: Enable; OFF: Disable	BOOL
S ₇	Attribute ID	Refer to Ethernet/IP protocol.	WORD
N	The length of read and written data	The size of the data which are written or read. Maximum: 100 words.	WORD
S	The register involved with the read/ written data	The register where the sent data comes from or the register where the received data are stored	WORD[n]
D ₁	Communication status	0 : Communication is not triggered to execute. 1: Communication is being performed. 2: Communication is completed and no error occurs. 3: A communication error occurs. 4: An error occurs in the parameter setting.	WORD
D ₂	Error code	The major error code and extended error code	WORD[2]

EIPRW	
En	
S1	D1
S2	D2
S3	
S4	
S5	
S6	
S7	
n	
S	

3. See the programming example as below.





4. The Modbus instruction of 6 bytes: 01 03 00 00 00 0A is written into D500 ~ D502 in the example.

Device Name	Status	Value (16bits)
D500		0103
D501		0000
D502		000A
D503		0000
D504		0000
D505		0000
D506		0000
D507		0000
D508		0000
D509		0000
M100		
D50		0000
D51		0000
D52		0000

5. After the EIPRW instruction is triggered by setting M100 to ON, the data are transmitted to IFD9506, then IFD9506 forwards the instruction data to the serial slave of station address 1 and meanwhile reads 10 registers of data. Eventually, IFD9506 sends back the response data from the serial slave to AS300.

After the communication is completed (the value in completion flag D50 is 2), EIPRW will store the received data in the 10 consecutive devices starting from D500 as shown in the figure below.

Device Name	Status	Value (16bits)
D500		0064
D501		0064
D502		0064
D503		0064
D504		0064
D505		0064
D506		0064
D507		0064
D508		0064
D509		0064
M100		
D50		0002
D51		0000
D52		0000

8 Network Security

For Ethernet communication, it is suggested you use the product in the closed network or local area network with firewall, so as to prevent network attacks which result in the abnormal operation of the product.

9 Webpage Settings

IFD9605 with the firmware V2.06 or above supports the functions of diagnosis and setup through the webpage.

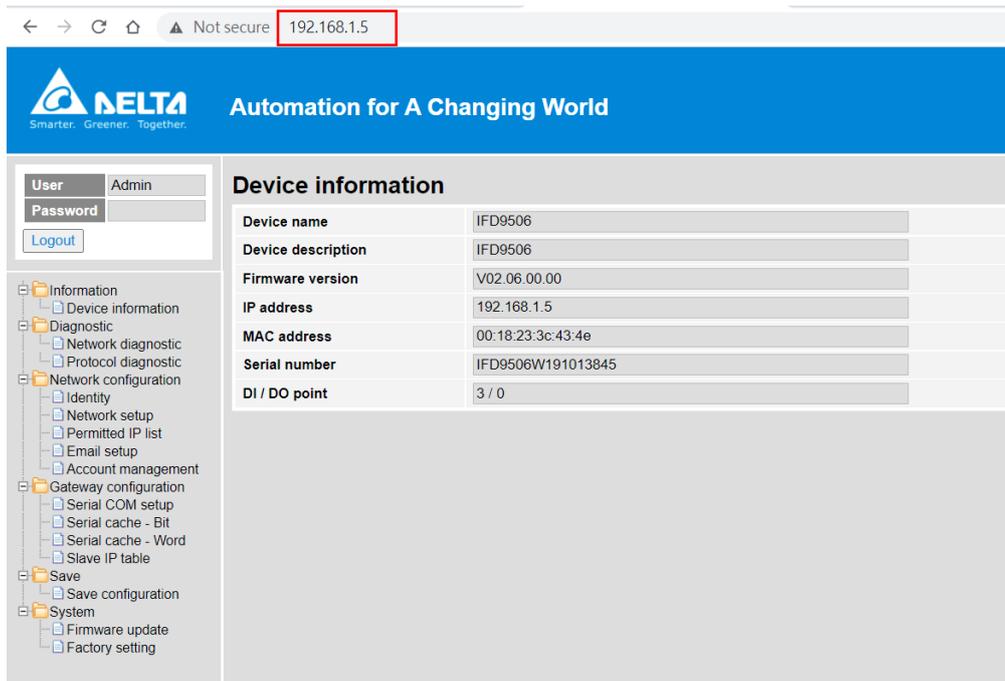
9.1 Webpage System Environment

You can enter the IP address of IFD9506 on the webpage to connect to the device, obtain diagnostic data and conduct basic setup.

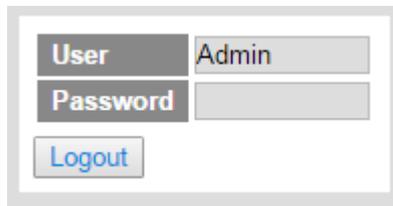
The webpage function supports common browsers as listed in the table below.

Vendor name	Browser	Version No.
Microsoft	Internet Explorer	V10.0 and above
Microsoft	Edge	V20 and above
Google	Chrome	V14 and above
Apple	Safari	V5.1 and above

After opening the browser, enter the IP address of the module in the website bar.



After entering the page, log in to the default account "Admin" without any password. Set the password for "Admin" account after login. The webpage function of IFD9506 does not support user adding, user name change and login permission setup. After successful login, the user name is displayed in User field in read-only mode. Afterward, press Logout to log out of the webpage.



Field	Description
User	The account name for login; it is read only after login.
Password	The password for login; it is read only after login.
"Login"/"Logout" button	Login: Sign in to an account Logout: Sign out of an account

9.2 Information Display

The page displays the basic information of the product. You can open this page without logging in to any account. (Modification is not allowed on this page.)

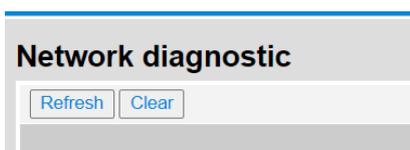
Field	Description
Device name	The product name; read-only.
Device description	The user-set product description; read-only
Firmware version	The firmware version; read-only

Ethernet Communication Module IFD9506

IP address	The IP address of the product; read-only
MAC address	The Mac address of the product, read-only
Serial number	The serial number of the product production; read-only
DI / DO point	The digital input and output points of the product; read-only

9.3 Diagnostic Information

The Network diagnostic page will update the information automatically. Click "Refresh" to manually update the page information, and click "Clear" to clear the current data.



9.3.1 Network Diagnostic

The Network diagnostic page displays network-related diagnostic data.

Network diagnostic	
Refresh	Clear
Ethernet Information	
Ethernet link up	1
Modbus TCP and User Define TCP Information	
Number of connections (from client, max.= 16)	0
Count of disconnections (from client)	0
Number of connections (to server, max.= 8)	0
Count of disconnections (to server)	0
EtherNet/IP Information	
Number of TCP connections for EtherNet/IP (max.= 8)	0
Number of EtherNet/IP IO connections (implicit message)	0
Serial Information	
RS232 Frame Received	0
RS232 Frame Sent	0
RS232 Frame Received (Byte)	0
RS232 Frame Sent (Byte)	0
RS232 Last Frame Received (Byte)	0
RS232 Last Frame Sent (Byte)	0
RS485 Frame Received	0
RS485 Frame Sent	0
RS485 Frame Received (Byte)	0
RS485 Frame Sent (Byte)	0
RS485 Last Frame Received (Byte)	0
RS485 Last Frame Sent (Byte)	0

Field	Description
Ethernet Information	
Ethernet Link Up	The total number of successful connections via physical network port
Modbus TCP and User Define TCP Information	
Number of connections (from client, max.= 16)	The number of connections to IFD9506 made by remote TCP Client at present
Count of disconnections (from client)	The total number of disconnections from remote TCP Client

Field	Description
Number of connections (to server, max.= 8)	The number of connections to remote TCP Server made by IFD9506 at present
Count of disconnections (to server)	Total number of failures of connection to remote TCP server
<i>Ethernet/IP Information</i>	
Number of TCP connections for EtherNet/IP (max.= 8)	The number of TCP connections for EIP communication
Number of EtherNet/IP IO connections (implicit message)	The number of implicit-message connections which are in use
<i>Serial Information</i>	
RS232 Frame Received	The total number of packets received by RS232 port
RS232 Frame Sent	The total number of packets transmitted by RS232 port
RS232 Frame Received (Byte)	The total length of packets received by RS232 port
RS232 Frame Sent (Byte)	The total length of packets transmitted by RS232 port
RS232 Last Frame Received (Byte)	The length of the last packet received by RS232 port
RS232 Last Frame Sent (Byte)	The length of the last packet transmitted by RS232 port
RS485 Frame Received	The total number of packets received by RS485 port
RS485 Frame Sent	The total number of packets transmitted by RS485 port
RS485 Frame Received (Byte)	The total length of packets received by RS485 port
RS485 Frame Sent (Byte)	The total length of packets transmitted by RS485 port
RS485 Last Frame Received (Byte)	The length of the last packet received by RS485 port
RS485 Last Frame Sent (Byte)	The length of the last packet transmitted by RS485 port

9.3.2 Protocol Diagnostic

The Protocol diagnostic page displays the diagnostic data related to the communication protocol.

Protocol diagnostic

Modbus Serial Master Information	
Ethernet total received requests	0
Ethernet total sent responses	0
Ethernet requests to IFD9506 (not forwarded)	0
Ethernet responses from IFD9506	0
Serial sent requests	0
Serial received valid responses	0
Serial timeout	0
Serial received checksum errors	0
Serial received exceptions	0
Modbus Serial Slave Information	
Serial total received requests	0
Serial total sent responses	0
Serial requests to IFD9506 (not forwarded)	0
Serial responses from IFD9506	0
Ethernet sent requests	0
Ethernet received valid responses	0
Ethernet timeout	0
Ethernet received header/length errors	0
Ethernet received exceptions	0
User Define Information	
Serial Received	0
Serial Sent	0
Serial Timeout	0
Ethernet Received	0
Ethernet Sent	0
Ethernet Timeout	0

Field	Description
<i>Modbus Serial Master Information</i>	
Ethernet total received requests	The total number of Modbus TCP requests received by the Ethernet terminal
Ethernet total sent responses	The total number of Modbus TCP responses sent by the Ethernet terminal
Ethernet requests to IFD9506 (not forwarded)	The number of Modbus TCP requests to IFD9506 itself sent by the Ethernet master, which are not forwarded to the serial terminal
Ethernet responses from IFD9506	The number of Modbus TCP responses to the Ethernet master sent by IFD9506 itself
Serial sent requests	The number of Modbus requests forwarded by the serial terminal
Serial received valid responses	The number of legal Modbus responses received by the serial terminal
Serial timeout	The number of timeouts judged by the serial terminal
Serial received checksum errors	The number of responses containing error checksum received by the serial terminal
Serial received exceptions	The number of exception code responses received by the serial terminal
<i>Modbus Serial Slave Information</i>	
Serial total received requests	The number of Modbus requests received by the serial terminal

Field	Description
Serial total sent responses	The number of Modbus responses sent by the serial terminal
Serial requests to IFD9506 (not forwarded)	The number of Modbus requests to IFD9506 itself sent by the serial master, which are not forwarded to the Ethernet terminal
Serial responses from IFD9506	The number of Modbus responses to the serial master sent by IFD9506 itself.
Ethernet sent requests	The number of Modbus TCP requests forwarded by the Ethernet terminal
Ethernet received valid responses	The number of legal Modbus TCP responses received by the Ethernet terminal
Ethernet timeout	The number of timeouts judged by the Ethernet terminal
Ethernet received header/length errors	The number of responses containing header and length errors received by the Ethernet terminal
Ethernet received exceptions	The number of exception code responses received by the Ethernet terminal
<i>User Define Information</i>	
Serial Received	The number of packets received by the serial terminal
Serial Sent	The number of packets sent by the serial terminal
Serial Timeout	The number of timeouts judged by the serial terminal
Ethernet Received	The number of packets received by the Ethernet terminal
Ethernet Sent	The number of packets sent by the Ethernet terminal
Ethernet Timeout	The number of timeouts judged by the Ethernet terminal

9.4 Network Configuration

The equipment and network parameters of IFD9506 can be set here, and the parameters and functions are the same as those on DCISoft. For details, please refer to previous sections. After modifying parameters on the web page, you must press “Apply” button and save the settings on the Save page. Otherwise, the modifications will not take effect.

9.4.1 Identity

On this page, the product description can be modified in Device description field. After modification is over, press “Apply” and save the setting on the Save page. The setting corresponds to the name of the product displayed in the network structure diagram in DCISoft.



9.4.2 Network Setup

On this page, the network interface parameters can be set. After modification is over, press “Apply” and save the settings on the Save page.

Ethernet Communication Module IFD9506

Network setup

IP mode	Static
IP address	192.168.1.5
Subnet mask	255.255.255.0
Gateway	192.168.1.1
Keep alive time (5s ~ 65535s)	30 s
IPv6	Disable
	0:0:0:0:0:0:0:0

Apply

9.4.3 Permitted IP List

On this page, IP filter parameters can be set. After modification is over, press “Apply” and save the settings on the Save page.

Permitted IP list

IP filter enable: Disable

No.	IP address	Subnet mask
1	0.0.0.0	0.0.0.0
2	0.0.0.0	0.0.0.0
3	0.0.0.0	0.0.0.0
4	0.0.0.0	0.0.0.0
5	0.0.0.0	0.0.0.0
6	0.0.0.0	0.0.0.0
7	0.0.0.0	0.0.0.0
8	0.0.0.0	0.0.0.0

Apply

9.4.4 Email Setup

On this page, the mail function parameters can be modified. After modification is over, press “Apply” and save the settings on the Save page.

Email setup

Email server

SMTP server: 192.168.1.1

Local email address: Message@deltaww.com

Email alarm setup

Trigger	Subject of alarm	Trigger mode
Alarm-1, X0	MAIL ALARM0	Disable Falling
Alarm-2, X1	MAIL ALARM0	Disable Falling
Alarm-3, X2	MAIL ALARM0	Disable Falling

Recipient email address

Email	Email address	Alarm-1	Alarm-2	Alarm-3
1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9.4.5 Account Management

On this page, the user password can be modified. After modification is over, press “Apply” and save the setting on the Save page. If you forget the password, please start DCISoft to connect IFD9506 via RS-232 port, and restore IFD9506 to the factory settings. Then all setting values will return to the factory default values.

Account management

No.	User ID	Password	Access type	Delete
1	Admin		Administrator	Delete

Apply

9.5 Gateway Configuration

The gateway-related functions of IFD9506 can be set here, and the parameters and functions are the same as those on DCISoft. For details, please refer to previous sections. After modifying any parameters on the web page, you must press “Apply” and save the settings on the Save page. Otherwise, the settings will not take effect.

9.5.1 Serial Communication Setup

On this page, the gateway communication direction, serial communication parameters and communication time related parameters can be set. After modification is over, press “Apply” and save the settings on the Save page. If the station address is set to 0x00 with rotary switches, the webpage setting can be completely used. After the power is on again, all parameters will keep the last webpage setting values.

Serial communication setup

Master configuration	Serial master (Ethernet → RS-232/485) ▾
COM protocol setup	MODBUS COM2 (RS-485) ▾
Station address	- 136 +
Baud rate	9600 ▾ bps
Data length	7 ▾
Parity	None ▾
Stop bits	2 ▾ bit
MODBUS mode	ASCII ▾
Delay time to reply (0ms ~ 65535ms)	5 ms
MODBUS timeout (5ms ~ 65535ms)	1000 ms

Apply

9.5.2 Serial Cache: Bit Monitor

In the serial data bit monitor, you must press “Apply” and save the settings on the Save page after setting the station address of the serial slave, Modbus address and data length is over. After saving setting values, review and enter the page to click “Start Monitor” for real-time monitoring.

The webpage only supports adding new items to be monitored and does not support the removal of items. To remove existing items, please open DCISoft for removal action. When you enter the communication addresses in Modbus (Hex) column, the function code 0x02 (bit) is used to read data by default. If you want to use 0x01 function code to read data, please modify the settings in the Modbus (Dec) column as the values starting with 0 (e.g. 00000 1).

Serial cache - Bit

No.	Station address	MODBUS (Hex.)	MODBUS (Dec.)	Account
1	1	0000	100001	1
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				

Apply

Monitor status:		Update cycle (1s ~ 60s):		
No.	Station address	MODBUS (Hex.)	MODBUS (Dec.)	Bit status
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				

Start monitor

9.5.3 Serial Cache: Word Monitor

In the serial data word monitor, you must press “Apply” and save the settings on the Save page after setting the station address of the serial slave, Modbus address and data length is over. After saving setting values, review and enter the page to click “Start Monitor” for real-time monitoring.

The webpage only supports adding new items to be monitored and does not support the removal of items. To remove existing items, please open DCISoft for removal action. When you enter the communication addresses in Modbus (Hex) column, the function code 0x03 (word) is used to read data by default. If you want to use 0x04 function code to read data, please modify the settings in the Modbus (Dec) column as the values starting with 3 (e.g. 300001).

Serial cache - Word

No.	Station address	MODBUS (Hex.)	MODBUS (Dec.)	Account
1	1	0000	400001	1
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				

Apply

Monitor status:		Update cycle (1s ~ 60s):			
No.	Station address	MODBUS (Hex.)	MODBUS (Dec.)	Value	Radix
1					Hexadecimal
2					Hexadecimal
3					Hexadecimal
4					Hexadecimal
5					Hexadecimal
6					Hexadecimal
7					Hexadecimal
8					Hexadecimal
9					Hexadecimal
10					Hexadecimal
11					Hexadecimal
12					Hexadecimal
13					Hexadecimal
14					Hexadecimal
15					Hexadecimal
16					Hexadecimal

Start monitor

9.5.4 Serial IP Table

You must set the page when IFD9506 works in serial slave mode. IFD9506 receives the requests received from the serial port and then sends them to the IP address specified in the table according to the Modbus station address in the instruction. After setting is over, press “Apply” and save the settings on the Save page.

Serial communication setup

Master configuration
Serial slave (RS-232/485 → Ethernet) ▼

Slave IP table

No.	Station address	Reply IP address
1	<input type="text" value="1"/>	<input type="text" value="192.168.1.1"/>
2	<input type="text"/>	<input type="text"/>
3	<input type="text"/>	<input type="text"/>
4	<input type="text"/>	<input type="text"/>
5	<input type="text"/>	<input type="text"/>
6	<input type="text"/>	<input type="text"/>
7	<input type="text"/>	<input type="text"/>
8	<input type="text"/>	<input type="text"/>
9	<input type="text"/>	<input type="text"/>
10	<input type="text"/>	<input type="text"/>
11	<input type="text"/>	<input type="text"/>
12	<input type="text"/>	<input type="text"/>
13	<input type="text"/>	<input type="text"/>
14	<input type="text"/>	<input type="text"/>
15	<input type="text"/>	<input type="text"/>
16	<input type="text"/>	<input type="text"/>
17	<input type="text"/>	<input type="text"/>

9.6 Save Configuration

After modification of setting values is made, you must press “Apply” and save the settings by click “Save” on this page.

Save configuration

Save configuration

Saving all applied changes will cause all changes to configuration panels that were applied, but not saved, to be saved, thus retaining their new values.

9.7 System Setup

9.7.1 Firmware Update

Click “Switch” to automatically switch to the engineering mode. DO NOT update the firmware by yourself. If you need update the firmware, please contact Delta factory or agent for confirmation and further operation.

Firmware update

Enter firmware update mode

9.7.2 Factory Setting

After restoring the parameters to the factory values, please power the module on again before use. Be aware that some of the parameters will keep the values set by rotary switches after the power is on again.

Factory setting

Factory setting

Reset PLC memory, load factory setting.

Ethernet Communication Module IFD9506

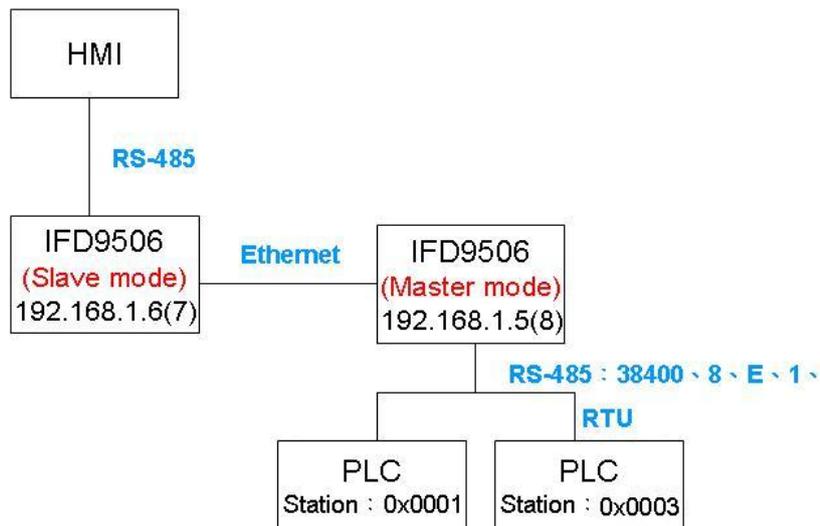
IFD9506 supports the webpage function. It can be set and monitored through the browser. IFD9506 is set up by UDP port 20006. Please be aware of the relevant settings for the firewall. The webpage settings are the same as those in DCISoft. Please refer to chapter 7 for more related information.

10 Application Examples

10.1 Application of Modbus Slave

Application	HMI controls the remote Ethernet device through IFD9506.
Steps	<p>(1) HMI sends out the instruction.</p> <p>(2) Set the IP of slave IFD9506 to "192.168.1.6", station address to "7" and communication format to "38400, 8, E, 1, RTU".</p> <p>(3) In the IFD9506 serial slave mode table, set the station addresses of the two devices to "1" and "3", both of their relay IP addresses to "192.168.1.5".</p> <p>(4) Set the IP of IFD9506 in master mode to "192.168.1.5", station address to "8" and communication format to "38400, 8, E, 1, RTU".</p> <p>(5) HMI master and IFD9506 slave transmit data through RS-485.</p> <p>(6) IFD9506 slave and IFD9506 master transmit data through Ethernet.</p> <p>(7) The RS-485 terminal on IFD9506 master is connected to two devices, which are PLC at station address 0x0001 and PLC at station address 0x0003. Assume the communication format is "38400, 8, E, 1, RTU".</p>

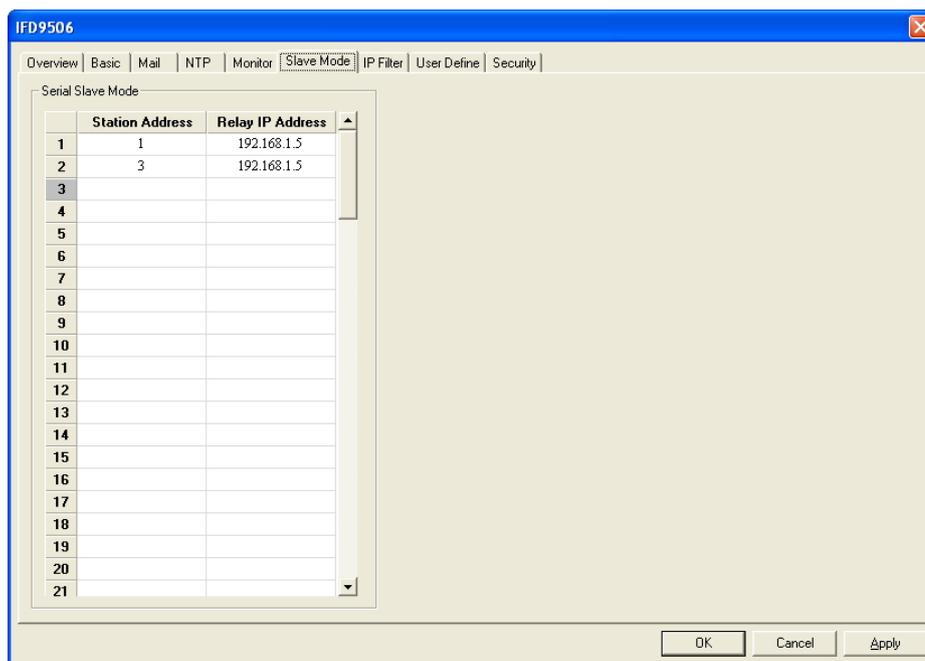
1. The wiring:



2. Setting IFD9506 slave

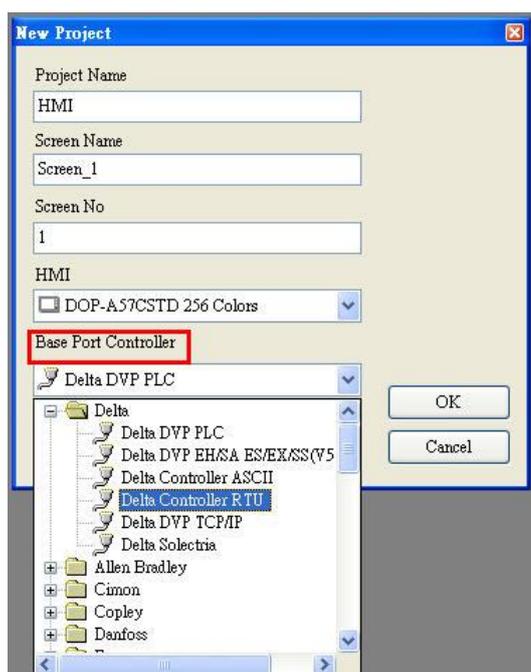
Step 1: Open "Basic" page, and select "Serial slave" in "Master configuration".

Step 2: Enter the device addresses and the relay IP addresses on "Serial Slave Mode" page.

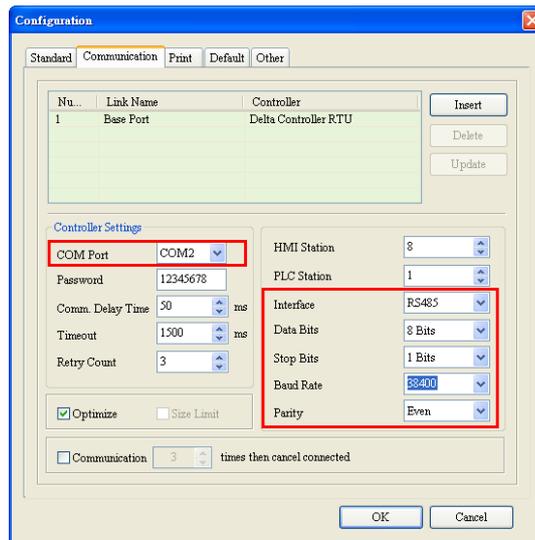


3. Setting HMI editing software, Screen Editor:

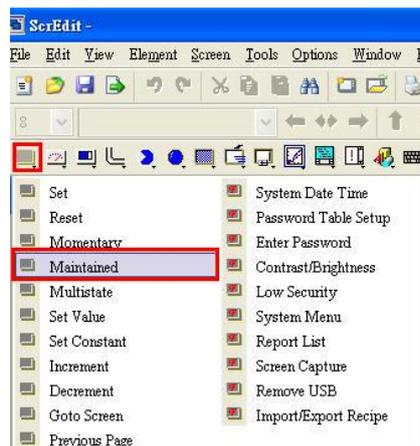
Step 1: Open Screen Editor, "File" → "New". In the "Base Port Controller" column, select "Delta Controller RTU".



Step 2: Click "Option" → "Configuration". Set up the communication format on "Communication" page. As below, set it to RS-485 communication mode.



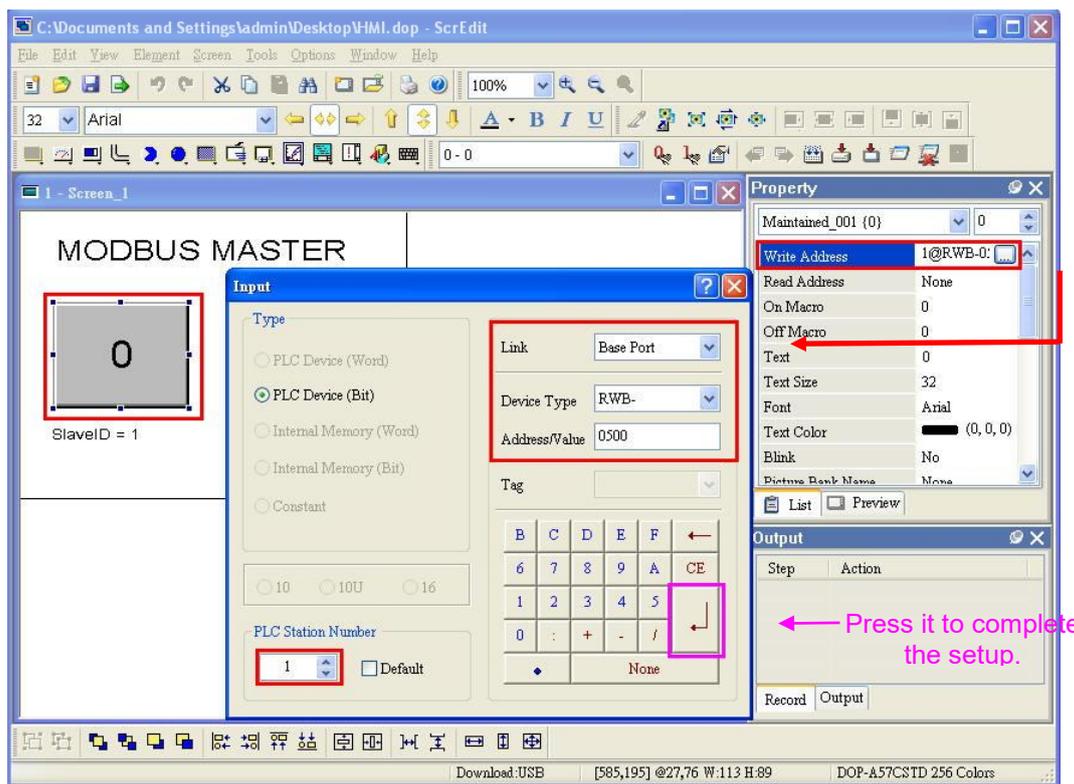
Step 3: If you want to control the On/Off of Y0 (Y0 address: 0500) of the PLC at station address 0x0001 and On/Off of Y0 (Y0 address: 0500) of the PLC at station address 0x0003, select “Maintained” button and create the button on the screen.



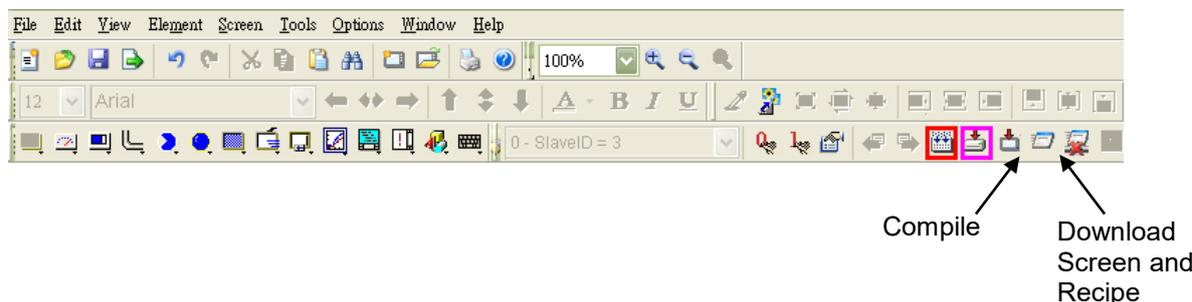
Step 4: Create two “Maintained” buttons.

- (a) Click the **button on the left hand side** first. You will see the information of the button in the “Property” window on the right hand side of the screen. Click “Write Address” to set up the address of Y0 (0500) and the station address of the PLC (1). Select “Base Port” in “Link” field and “RWB” in “Device Type” field.
- (b) Next, set up the **button on the right hand side** in the same way as step (a) to modify the station address of the PLC as “3”.

Ethernet Communication Module IFD9506



Step 5: Click “Compile” first and then “Download Screen and Recipe” to complete the setups in the HMI.

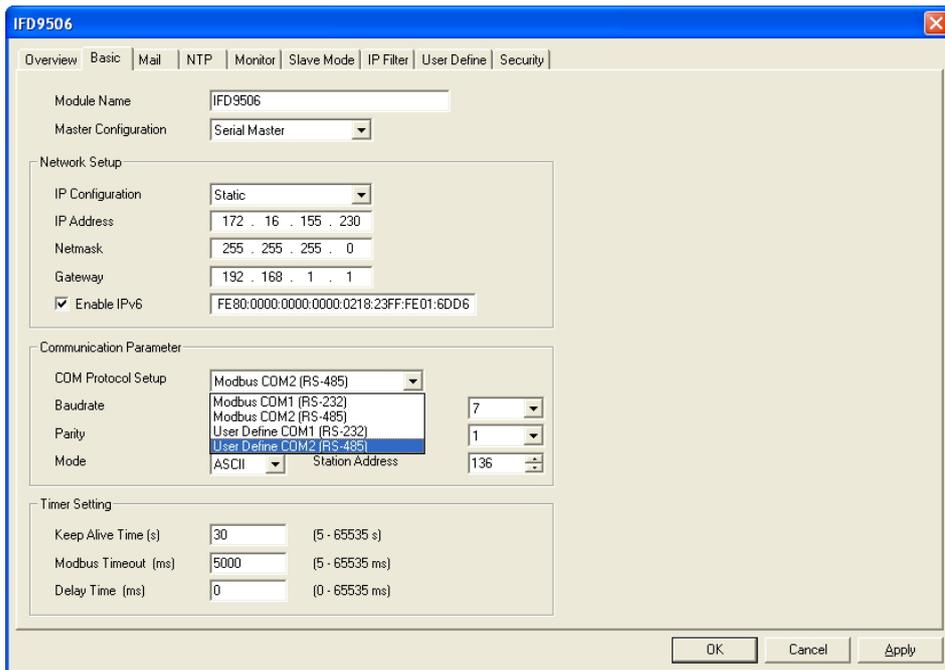


10.2 Application of Virtual COM Port

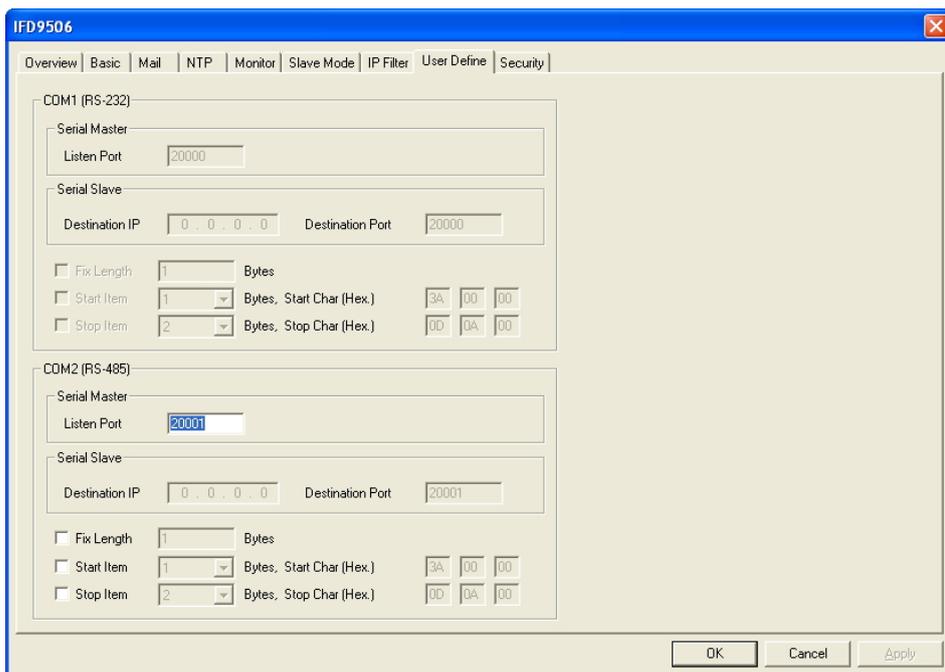
Application	Through the virtual COM port, IFD9506 is able to transmit the data sent to RS-232 to the Ethernet by connecting to the software supporting serial ports, e.g. Delta’s WPLSoft, VFDSOft and ASDA-Soft. See the example below for how to connect IFD9506 to VFD-E AC motor drive through the virtual COM port by VFDSOft.
Steps	<ol style="list-style-type: none"> (1) Select “User Define” protocol and set the parameters in the serial master and serial slave to the ones consistent with those in VFD-E. (2) Set up a virtual serial port. (3) Open Delta VFDSOft, set up the communication format (COM Setup) and establish the connection.

■ Setting Virtual COM Port

1. For the COM setting, select “User Define” and set the communication parameters to the ones consistent with those in VFD-E.

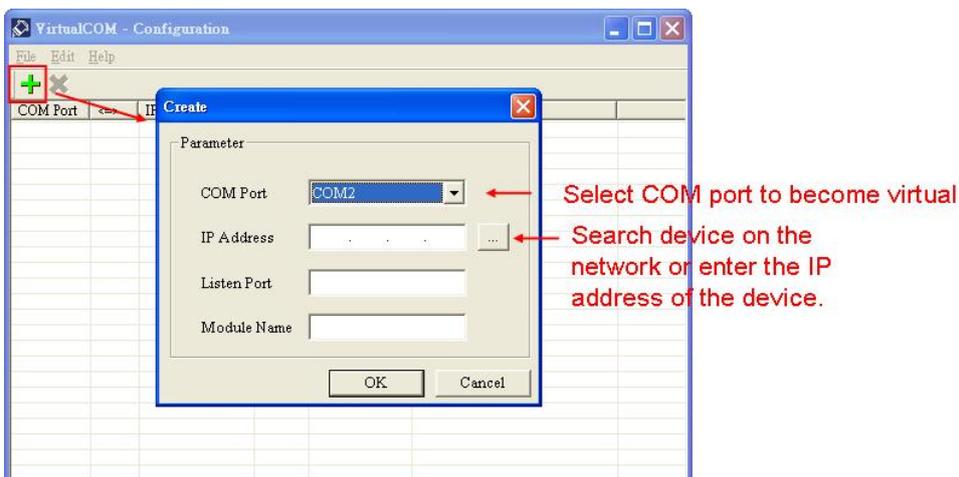
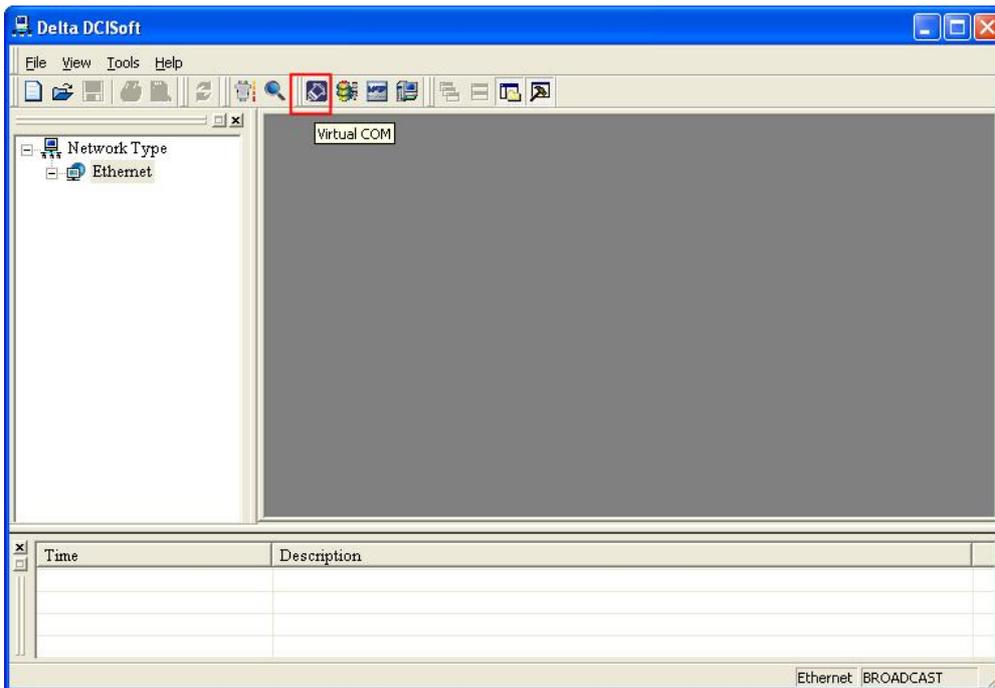


2. Switch to “User Define” page and select “Listen Port”.

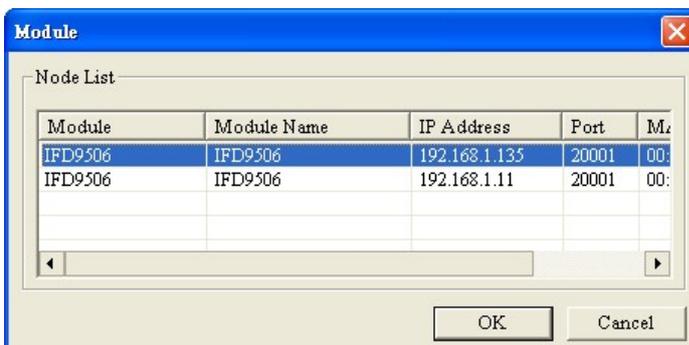


3. Open Virtual COM setup page

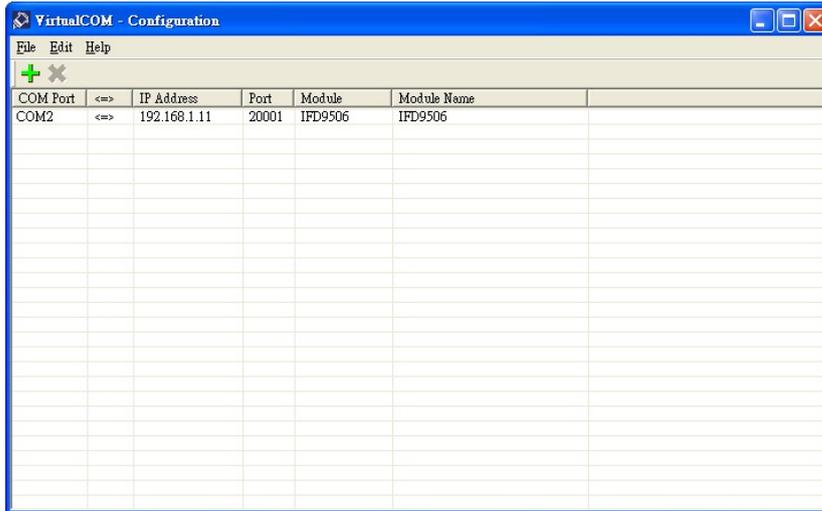
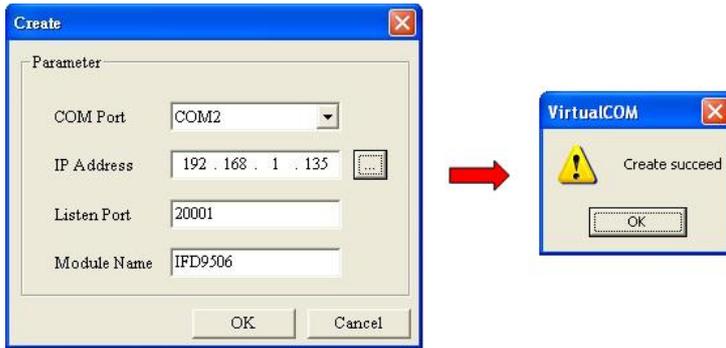
Ethernet Communication Module IFD9506



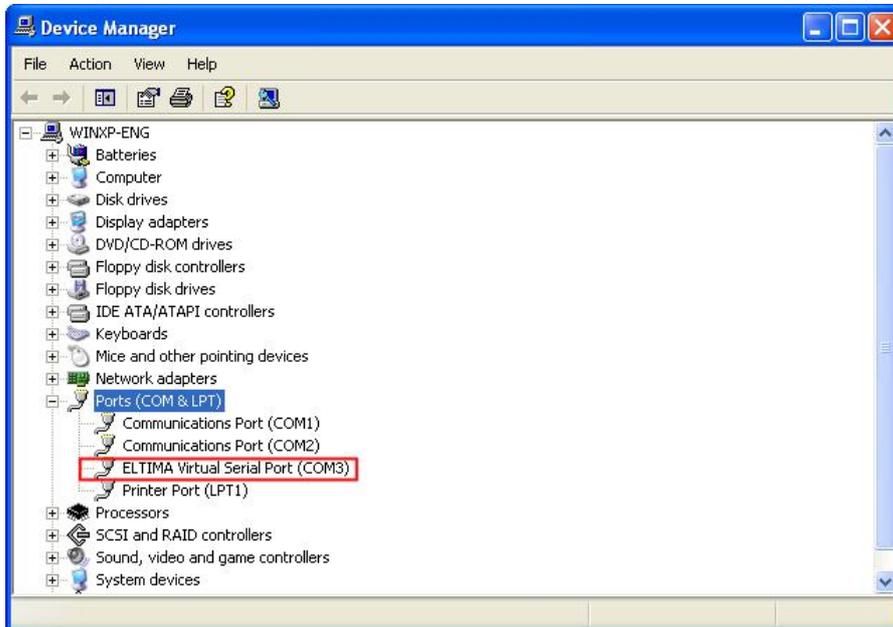
4. Press "OK", and you will see all the devices connected on the network.



5. Select the module you need and press "OK". Relevant information of the device will be imported automatically. Press "OK" to complete the setup.

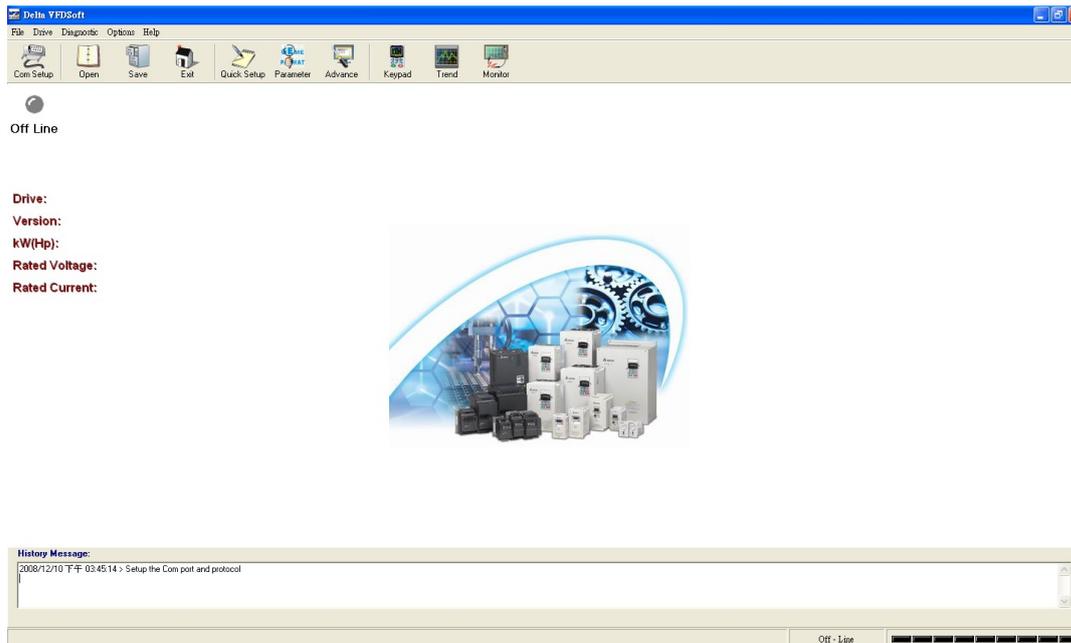


6. Once the setup is successful, you can see the virtual COM you set in the Device Manger.



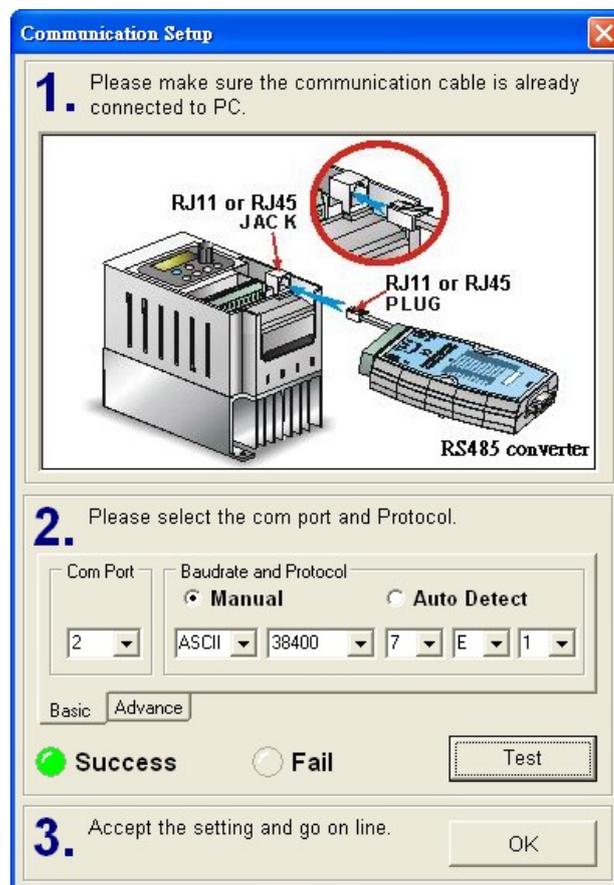
- Using Virtual COM in Delta VFDSOft
 1. Open Delta VFDSOft.

Ethernet Communication Module IFD9506

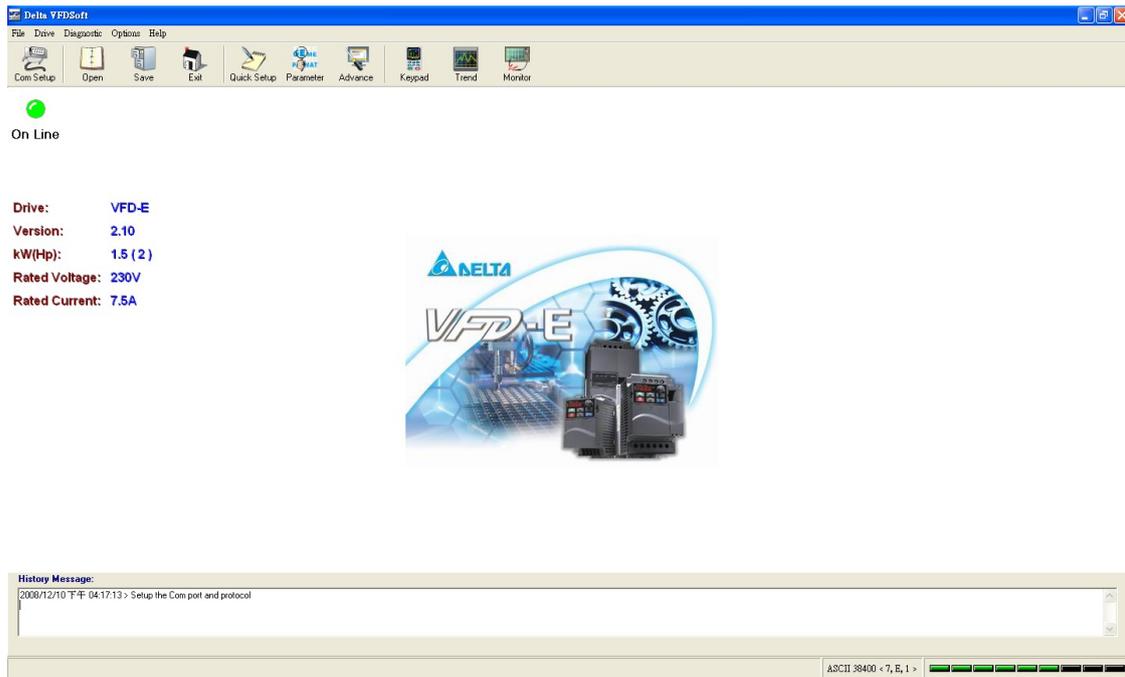


2. Set up communication format (COM Setup)

Enter the virtual COM port (COM2) set in the previous steps to “Com Port” field. Next, enter the communication format of VFD-E (38400, 7, E, 1) and press “Test” button. Once the “Success” light is ON, the communication test is regarded successful.



3. Press “OK”, and IFD9506 will be able to communicate with VFD-E by VFDSOFT.



MEMO