Topic: Setting MODBUS RS-485 Communication for Detla Products

Applicable model	AH500 series, DOP series, DVP series, IFD9506, RTU-EN01, TP series, AFE2000 series, APF2000 series, ASDA-A series, ASDA-B series, ASDA-AB, ASDA-S series, DMV series, CTA series, DT3 series, DTA series, DTB series, DTC series, DTE series, DTV series, DVW series, HES series, HMC series, IED series, REG2000 series, VFD series
Keyword	MODBUS RS-485, communication timeout, delay time

1. Description

The application note provides the information about setting a RS-485 communication timeout and a RS-485 delay time for a Delta industrial automatic product for users. In order to increase communication efficiency, and shorten the time for adjustment, the users can set a RS-485 communication timeout and a RS-485 delay time according to Table 1.

2. Setting the MODBUS RS-485 Parameters in a Delta Industrial Product

When a MODBUS master station is connected to slave stations, the MODBUS master station sends commands to the slave stations. The slave stations rely according to the commands they receive. Owing to the fact that there are difference in response time and character, communication errors may occur. To meet the time that each slave station needs, the communication timeouot and the delay time in the master station can be adjusted. If the time that the slave station need is different, the communicaiton timeout and the delay time in the master station will be the maximum communication timeout and the maximum delay among the slave stations.

2.1 Setting MODBUS RS-485 Parameters

This section provides the information about setting a communication timeout and a delay time for the Delta MODBUS master station which is connected to slave stations. Please refer to Table 1 for more information.

Table 1 Table of communication timeouts and delay times

Setting a communication timeout and delay for a master station (ms)											
		AH500 series		DVP series		DOP series		IFD9506/7		RTU-EN01	
		Timeout	*Delay	Timeout	*Delay	Timeout	Delay	Timeout	Delay	Timeout	Delay
Slave station	AH500	> ST	1	> ST	1	>ST	1	> ST	1	> ST	1
	AFE2000	15	20	15	20	15	20	15	20	15	20
	APF2000	15	20	15	20	15	20	15	20	15	20
	ASD-A2R	5	4	5	4	5	4	5	4	5	4
	ASDA-A	5	4	5	4	5	4	5	4	5	4
	ASDA-A+	5	4	5	4	5	4	5	4	5	4
	ASDA-A2	5	4	5	4	5	4	5	4	5	4
	ASDA-AB	5	4	5	4	5	4	5	4	5	4
	ASDA-B	5	4	5	4	5	4	5	4	5	4
	ASDA-B2	5	4	5	4	5	4	5	4	5	4
	ASDA-M	5	4	5	4	5	4	5	4	5	4
	ASD-S	5	4	5	4	5	4	5	4	5	4
	CTA	305	20	305	20	305	20	305	20	305	20
	DMV1000	2005	1	2005	1	2005	1	2005	1	2005	1
	DMV2000	10	1	10	1	10	1	10	1	10	1
	DOP-B	30	50	30	50	30	50	30	50	30	50
s	DPM-C530	1175	2000	1175	2000	1175	2000	1175	2000	1175	2000

Setting a communication timeout and delay for a master station (ms)											
		AH500 series		DVP series		DOP series		IFD9506/7		RTU-EN01	
		Timeout	*Delay	Timeout	*Delay	Timeout	Delay	Timeout	Delay	Timeout	Delay
	DT3	305	20	305	20	305	20	305	20	305	20
	DTA	305	20	305	20	305	20	305	20	305	20
	DTB	305	20	305	20	305	20	305	20	305	20
	DTC	305	20	305	20	305	20	305	20	305	20
	DTE	305	20	305	20	305	20	305	20	305	20
	DTV	305	20	305	20	305	20	305	20	305	20
	DVP-10MC	> ST	> ST	>ST	>ST	>ST	>ST	>ST	>ST	>ST	>ST
	DVP-10PM	> ST	> ST	>ST	>ST	>ST	>ST	>ST	>ST	>ST	>ST
	DVP-20PM	> ST	> ST	>ST	>ST	>ST	>ST	>ST	>ST	>ST	>ST
	DVP-EC3	> ST	1	>ST	1	>ST	1	>ST	1	>ST	1
	DVP-EH2	> ST	1	>ST	1	>ST	1	>ST	1	>ST	1
	DVP-EH3	> ST	1	>ST	1	>ST	1	>ST	1	>ST	1
	DVP-ES	> ST	1	>ST	1	>ST	1	>ST	1	>ST	1
	DVP-ES2	> ST	1	>ST	1	>ST	1	>ST	1	>ST	1
	DVP-EX	> ST	1	>ST	1	>ST	1	>ST	1	>ST	1
	DVP-EX2	> ST	1	>ST	1	>ST	1	>ST	1	>ST	1
	DVP-SA2	> ST	1	>ST	1	>ST	1	>ST	1	>ST	1
	DVP-SE	> ST	1	>ST	1	>ST	1	>ST	1	>ST	1
	DVP-SS2	> ST	1	>ST	1	>ST	1	>ST	1	>ST	1
	DVP-SV	> ST	1	>ST	1	>ST	1	>ST	1	>ST	1
	DVP-SV2	> ST	1	>ST	1	>ST	1	>ST	1	>ST	1
	DVP-SX	> ST	1	>ST	1	>ST	1	>ST	1	>ST	1
	DVP-SX2	> ST	1	>ST	1	>ST	1	>ST	1	>ST	1
	DVW	5	2	5	2	5	2	5	2	5	2
	HES	5	6	5	6	5	6	5	6	5	6
	HMC	35	60	35	60	35	60	35	60	35	60
	IED	10	10	10	10	10	10	10	10	10	10
	IFD 9506	5	1	5	1	5	1	5	1	5	1
	REG2000	105	20	105	20	105	20	105	20	105	20
	REG2000 (V1.30 and above)		1		1		1		1		1
	TP02G-AL-C	5	2	5	2	5	2	5	2	5	2
	TP02G-AS1	5	2	5	2	5	2	5	2	5	2
	TP04G-AL2	5	2	5	2	5	2	5	2	5	2
	TP04G-AS2	5	2	5	2	5	2	5	2	5	2
	TP04G-BL-C	5	2	5	2	5	2	5	2	5	2
	TP04P	>ST	2	>ST	2	>ST	2	>ST	2	>ST	2
	TP07P	>ST	2	>ST	2	>ST	2	>ST	2	>ST	2
	TP08G-BT2	5	2	5	2	5	2	5	2	5	2
	VFD-B	5	6	5	6	5	6	5	6	5	6
	VFD-C200	105	200	105	200	105	200	105	200	105	200
	VFD-C200 (V1.06 and above)		1		1		1		1		1
	VFD-C2000	105	200	105	200	105	200	105	200	105	200
statio	VFD-C2000 (V1.30 and above)		1		1		1		1		1

Setting a communication timeout and delay for a master station (ms)										
		AH500 series		DVP series		DOP series		IFD9506/7		RTU-EN01	
		Timeout	*Delay	Timeout	*Delay	Timeout	Delay	Timeout	Delay	Timeout	Delay
	VFD-CH2000	105	200	105	200	105	200	105	200	105	200
	VFD-CH2000 (V1.30 and above)		1		1		1		1		1
	VFD-CP2000	105	200	105	200	105	200	105	200	105	200
	VFD-CP2000 (V1.30 and above)		1		1		1		1		1
	VFD-CT2000	105	200	105	200	105	200	105	200	105	200
	VFD-CT2000 (V1.31 and above)		1		1		1		1		1
	VFD-DD	10	10	10	10	10	10	10	10	10	10
	VFD-E	35	60	35	60	35	60	35	60	35	60
	VFD-EL	15	20	15	20	15	20	15	20	15	20
	VFD-L	10	8	10	8	10	8	10	8	10	8
	VFD-M	10	8	10	8	10	8	10	8	10	8
	VFD-S	25	40	25	40	25	40	25	40	25	40
	VFD-VE	10	16	10	16	10	16	10	16	10	16
	VFD-VJ	5	6	5	6	5	6	5	6	5	6

Notes:
(1) *Delay: If a the scan time of a PLC is longer than the delay which can be set for the PLC in Table 1, users do not need to set a delay for the PLC (the delay set for the PLC is 0 milliseconds).
(2) ST: Scan time

2.2 Descriptions of MODBUS RS-485 Parameters

2.2.1 Communication Timeout (Master Station)

After a MODBUS RS-485 master station sends a command to a slave station, there is a period of time that is allowed to elapse before the slave station replies. If the slave station does not rely during the period of time, a communication timeout error will occur in the master station, and the master station will stop receiving the reply command sent by the slave station. The communication timeout set for a master station must be longer than the time it takes for a slave station to respond to communication.

2.2.2 RS-485 Delay Time (Master Station)

After a MODBUS RS-485 master station receives the reply sent by a slave station, there is a period of time that is allowed to elapse before the next command is sent. The delay time set for a master station must be greater than the time it takes for a slave to drop invalid packet.

3. Methods of Setting a Product

The communication timeouts and the delay times set for Delta control products are different. They can be modified in the ways shown in Table 2.

Table 2 Communication parameters in a MODBUS master station

	Communication timeout			Delay time		
Model	**Software**	**Program**	**Default value**	**Software**	**Program**	**Default value**
DOP series	√	None	1000	√	None	0
AH500 series	√	SR210 SR213	3000	None	SR1339	0
DVP series	√	D1129	0 (Scan time)	None	D1038	0
TP series	None	None	100	None	None	0
IFD9506/7	√	None	5000	√	None	0
RTU-EN01	√	None	5000	√	None	0

The following sections introduce the modification of the communication timeouts and the delay times set for products by means of software and programs.

3.1 AH500 Series

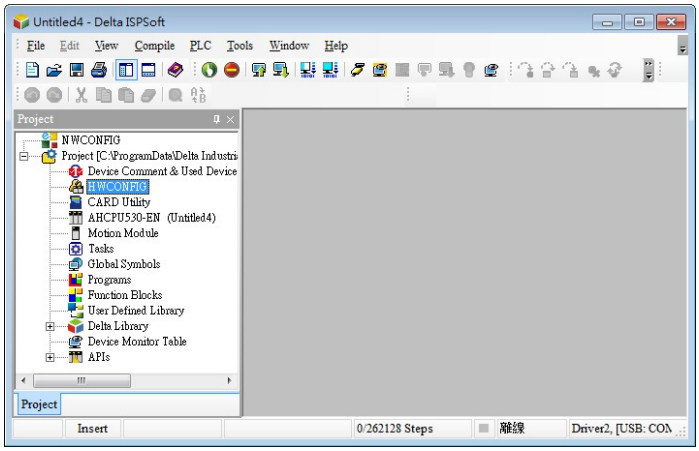
3.1.1 PLC

Users can set a communication timeout and a delay time for an AH500 series PLC by means of HWCONFIG in ISPSoft or writing a program in ISPSoft.

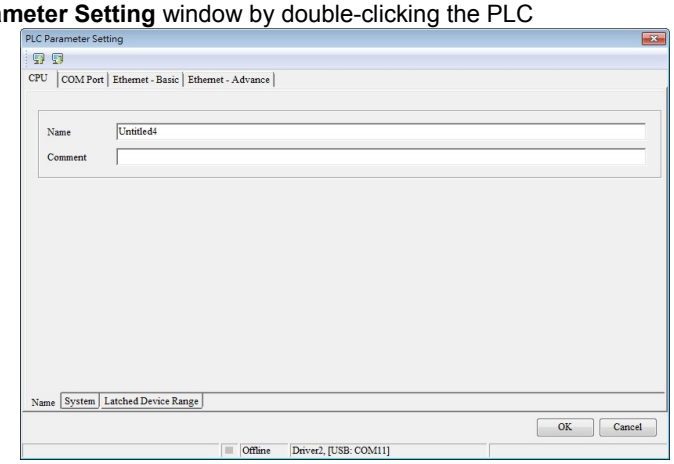
(1) Setting a communication timeout by means of ISPSoft

Steps: Start HWCONFIG.→Set the parameters in the PLC.→Click the **COM Port** tab.→Download the parameters to an AH500 series PLC.

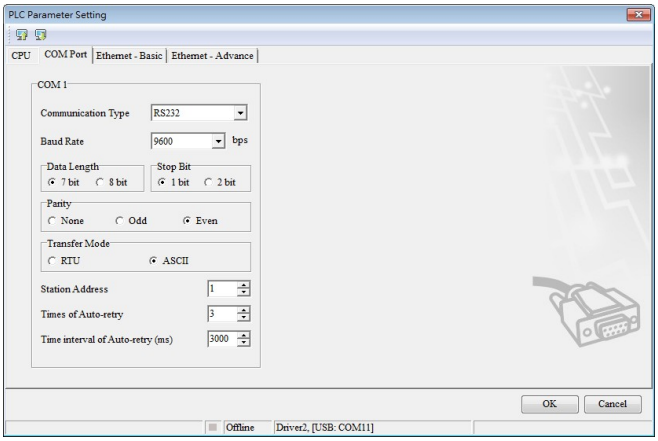
a. Start HWCONFIG in ISPSoft.



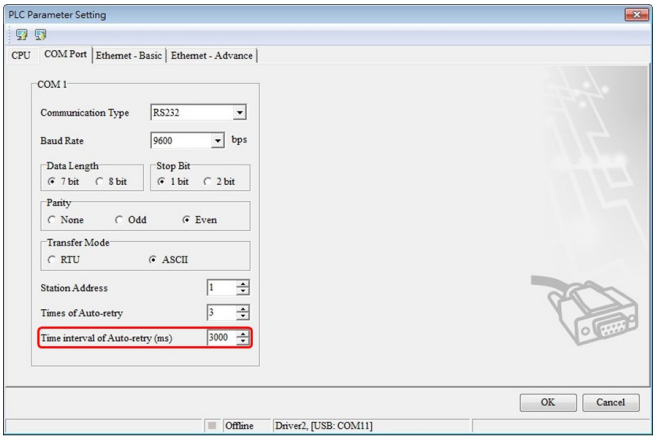
b. Open the **PLC Parameter Setting** window by double-clicking the PLC



c. Click the **COM Port** tab.



d. Modify the communication timeout.



(2) Setting a communication timeout and a delay time by means of a program
   a. Communication timeout: SR210→Set SM209 (COM1).
      (COM2: SR213→Set SM211.)
   b. Delay time: SR1339
   Example: The communication timeout set for COM1 on a PLC is changed to ten milliseconds, and the delay time set for the PLC is changed to five milliseconds.

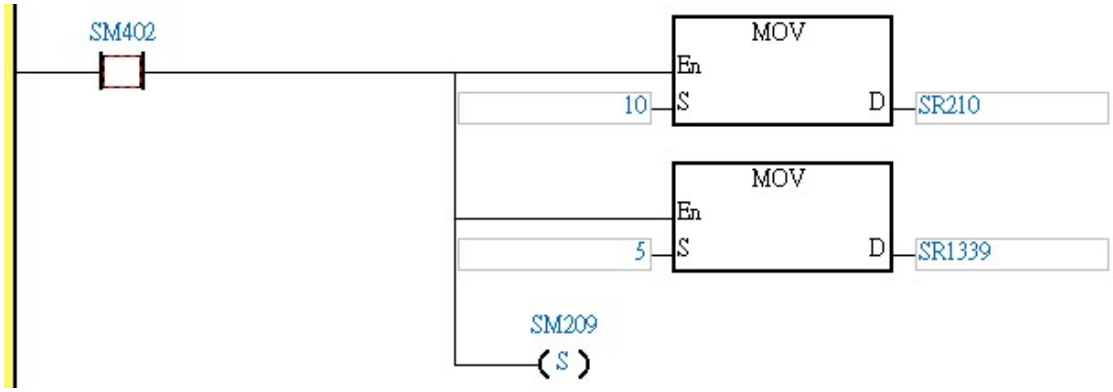
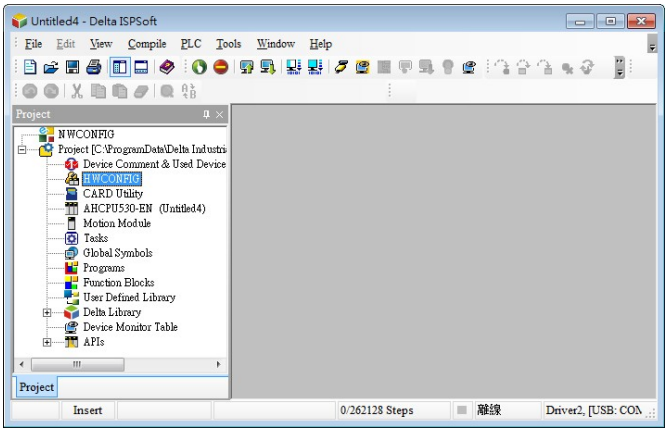


Figure 1 Program written for an AH500 series PLC

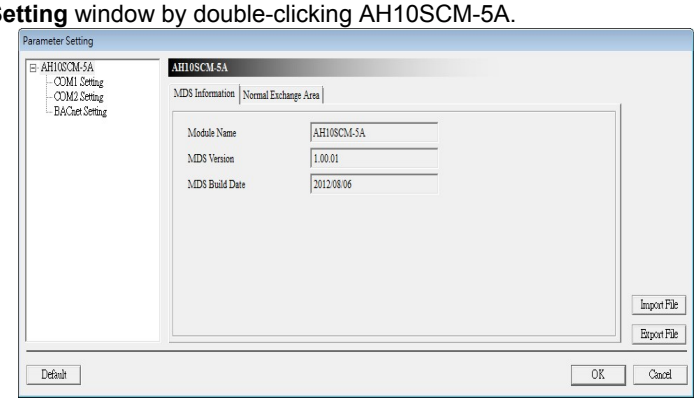
3.1.2 Network Module

Users can set the RS-485 parameters in the serial communication module AH10SCM-5A by means of ISPSoft. Steps: Start HWCONFIG.→Set the parameters in AH10SCM-5A. →Set COM 1.→Download the parameters to AH10SCM-5A.

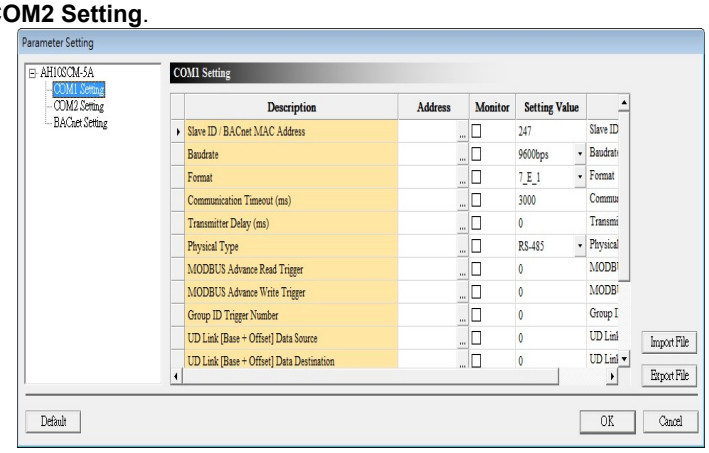
a. Start HWCONFIG in ISPSoft.



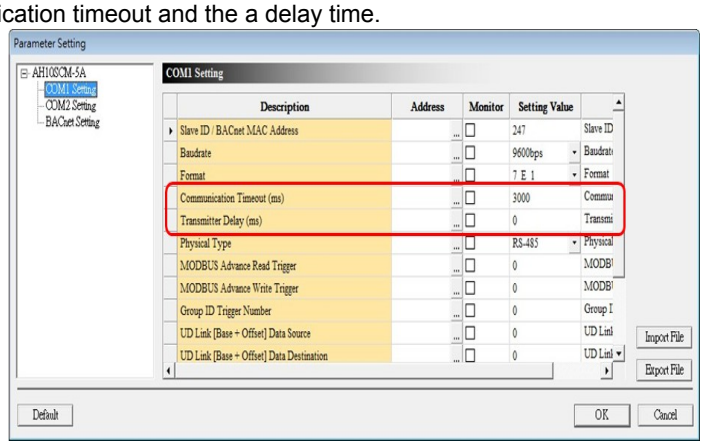
b. Open the **Parameter Setting** window by double-clicking AH10SCM-5A.



c. Click **COM1 Setting/COM2 Setting**.



d. Modifying the communication timeout and the a delay time.



3.2 DVP Series

3.2.1 PLC

Users can set a communication timeout and a delay time for a DVP series PLC by means of writing a program in WPLSoft or ISPSoft. They can modify a communication timeout by means of D1129. A millisecond is a unit for measuring a communication timeout. The users can modify a delay time by means of D1038. The unit for measuring a delay time is 0.1 milliseconds.
Example: The communication timeout set for a PLC is changed to ten milliseconds, and the delay time set for the PLC is changed to five milliseconds.

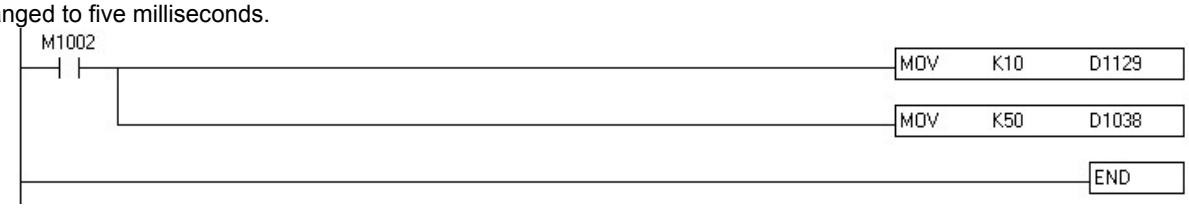
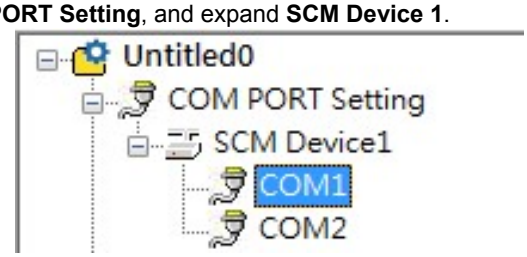


Figure 2 Program written for a DVP series PLC

3.2.2 Network Module

Users can set the RS-485 parameters in the serial communication module DVPSCM12-SL by means of SCMSoft.
Steps: Opening an editing page in SCMSoft.→Expand **COM PORT Setting**.→Expand **SCM Device 1**.→Click **COM1**/**COM2**.→Download the communication parameters set for COM1/COM2 to DVPSCM12-SL.

a. Start SCMSoft, expand **COM PORT Setting**, and expand **SCM Device 1**.



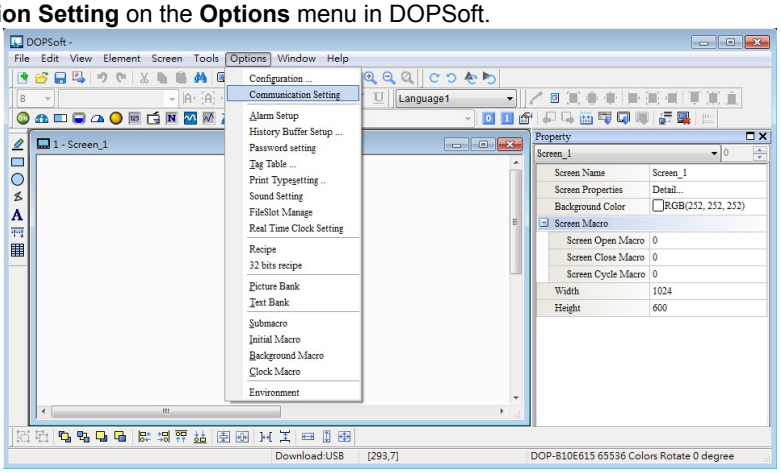
b. Set parameters for COM1/COM2.

Communication Parameters	COM1
Slave ID (1-247)	247
Baudrate	9600
Format (Data Length, Parity, Stop Bits)	7, Even, 1
Physical Type	RS-485
Communication Timeout (1-65535 ms)	3000
Transmitter Delay (0-65535 ms)	0
Transfer Mode	ASCII
Communication Retry Times (0-255)	3

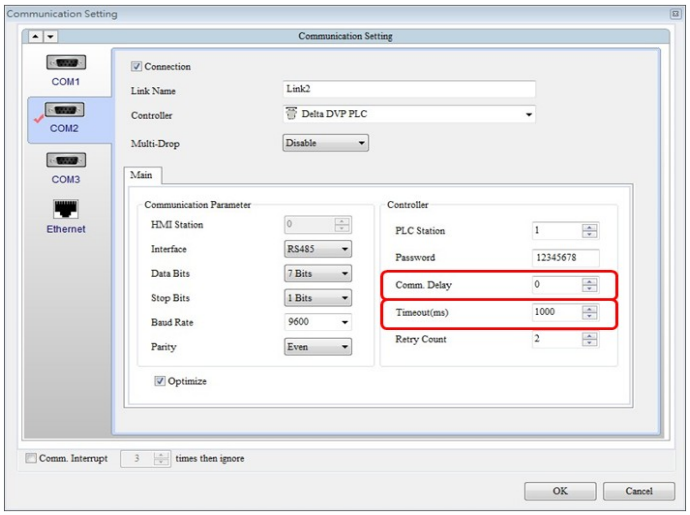
3.3 DOP Series

Users can set the parameters in a DOP series HMI by means of DOPSoft.
Steps: Opening an editing page in1 DOPSoft.→Click **Communication Setting** on the **Options** menu.→Set communication parameters.→Download the parameters to an HMI.

a. Click **Communication Setting** on the **Options** menu in DOPSoft.



b. Click a COM port, and modify parameters.



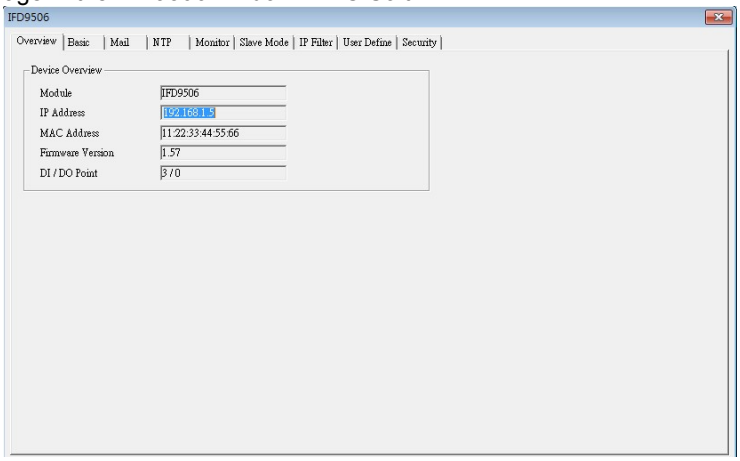
Please refer to section 2-2-8-2 in DOPSoft User Manual for more information.

3.4 IFD Series

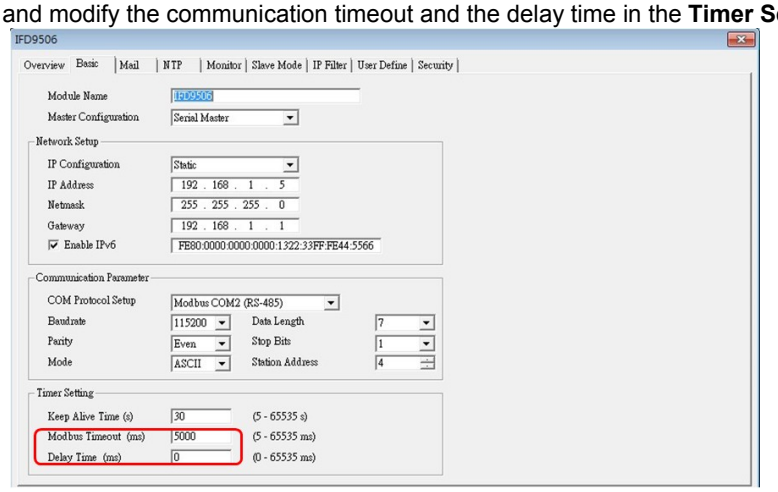
3.4.1 IFD9506/IFD9507

IFD9506 is a Delta converter which change MODBUS TCP into RS-485.
Steps: Open the **Overview** page in the **IFD9506** window in DCISoft.→Click the **Basic** tab. →Modify the communication timeout and the delay time in the **Timer Setting** section.

a. Open the **Overview** page in the **IFD9506** window in DCISoft.



b. Click the **Basic** tab, and modify the communication timeout and the delay time in the **Timer Setting** section.

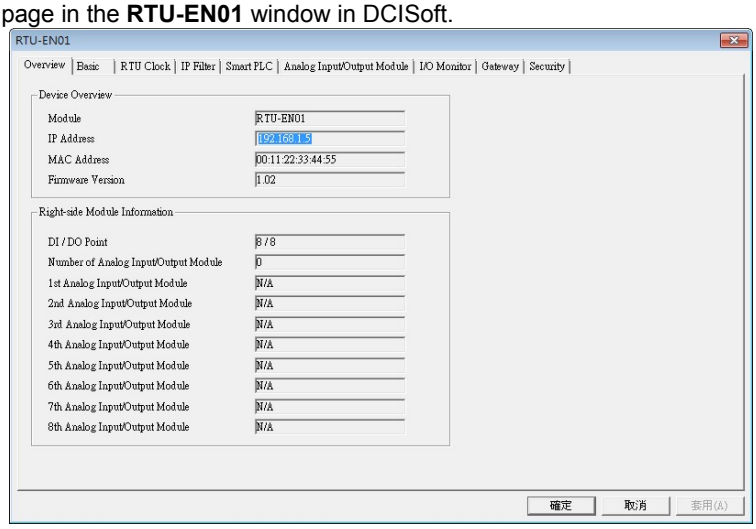


3.5 RTU Series

3.5.1 RTU-EN01

RTU-EN01 is a Delta MODBUS TCP Remote I/O communication module. It can convert MODBUS TCP into RS-485.
Steps: Open the **Overview** page in the **RTU-EN01** window in DCISoft.→Click the **Basic** tab. →Modify the communication timeout and the delay time in the **RS-485 Time Setting** section.

a. Open the **Overview** page in the **RTU-EN01** window in DCISoft.



b. Click the **Basic** tab, and modify the communication timeout and the delay time in the **RS-485 Timer Setting** section.