

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 communication 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.

		Setting	a comm	unication	timeout a	nd delay f	or a mas	ter station	(ms)		
		AH500	series	DVP s	series	DOP s	series	IFD95	506/7	RTU-	EN01
		Timeout	*Delay	Timeout	*Delay	Timeout	Delay	Timeout	Delay	Timeout	Delay
	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
lio	ASDA-A2	5	4	5	4	5	4	5	4	5	4
stal	ASDA-AB	5	4	5	4	5	4	5	4	5	4
ě	ASDA-B	5	4	5	4	5	4	5	4	5	4
Slay	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
	СТА	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

Table 1 Table of communication timeouts and delay times



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		Setting	a comm	unication	timeout a	nd delay f	or a mas	ter station	(ms)		
		AH500	series	DVP s	eries	DOP s	series	IFD95	506/7	RTU-I	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
	НМС	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		20		20		20		20		20
	REG2000	105		105		105		105		105	
	(V1.30 and	105	1	105	1	105	1	105	1	105	1
	above)										
	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		200		200		200		200		200
	VFD-C200	105		105		105		105		105	
	(V1.06 and		1		1		1		1		1
	above)										
	VFD-C2000		200		200		200		200		200
ţ;	VFD-C2000	105		105		105		105		105	
stat	(V1.30 and		1		1		1		1		1
	above)										



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	AH500	series	DVP s	series	DOP s	series	IFD95	506/7	RTU-I	EN01
	Timeout	*Delay	Timeout	*Delay	Timeout	Delay	Timeout	Delay	Timeout	Delay
VFD-CH2000		200		200		200		200		200
VFD-CH2000	105		105		105		105		105	
(V1.30 and	105	1	105	1	105	1	105	1	105	1
above)										
VFD-CP2000		200	_	200		200		200		200
VFD-CP2000	105		105		105	105 105		105	105	
(V1.30 and	100	1	100	1		1		1		1
above)										
VFD-CT2000	_	200	-	200		200	_	200		200
VFD-CT2000	105		105		105		105		105	
(V1.31 and		1		1		1		1		1
above)										
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.



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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 Com	munication p	arameters in a l	MODBUS ma	ster station		
	Comm	nunication	timeout	Delay time	time		
Model	Software	Program	Default value	Software	Program	Default value	
DOP series		None	1000	\checkmark	None	0	
AH500 series	√	SR210 SR213	3000	None	SR1339	0	
DVP series	\checkmark	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. \rightarrow Set the parameters in the PLC. \rightarrow Click the **COM Port** tab. \rightarrow 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

		····· ··· · · · · · · · · · · · · · ·		.9	
PLC Parameter Set	tting				×
9 9					
CPU COM Port	Ethernet - Basic Etherne	et - Advance			
Name	Untitled4				
Comment					
	1				
Name System	Latched Device Range				
					OK Cancel
		Offline	Driver2, [USB: COM11]		

c. Click the COM Port tab.

PLC Parameter Setting	X
9 9	
CPU COM Port Ethemet - Basic Ethemet - Advance	
COM 1 Communication Type PS322 Baud Rate 9600 bps Data Length Stop Bit G 7 bit Stop Bit G 7 bit Stop Bit Communication G 1 bit C bit Panty Conne Odd G Even Transfer Mode C RTU G ASCII Station Address 1	
	OK Cancel
Offline Driver2, [USB: COM11]	

d. Modify the communication timeout.

PLC Parameter Setting	
99	
CPU COM Port Ethemet - Basic Ethemet - Advance COM 1 Communication Type R5232 Baud Rate 9600 Data Length Stop Bit C Tota C Shit C Shit C 2 bit	
Parity C Odd G Even Transfer Mode G RTU G ASCII	
Station Address I 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
Offline [Driver2, [USB: COM11]	OK Cancel



(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. \rightarrow Set the parameters in AH10SCM-5A. \rightarrow Set COM 1. \rightarrow Download the parameters to AH10SCM-5A.

a. Start HWCONFIG in ISPSoft.



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

Parameter Setting				
E-AH10SCM-5A	AH10SCM-5A			
- COM1 Setting - COM2 Setting - BACnet Setting	MDS Information Normal Ex	change Area		
	Module Name	AH10SCM-5A	_	
	MDS Version	1.00.01	_	
	MDS Build Date	2012/08/06		
				1
				import rue
l				Export File
Default				OK Cancel



c. Click COM1 Setting/COM2 Setting.

ng	Description	Address		Monitor	Setting Val	ue	-
ing Slave ID /	BACnet MAC Address				247		Slave ID
Baudrate					9600bps	•	Baudrate
Format					7_E_1	•	Format
Communi	cation Timeout (ms)				3000		Commu
Transmitt	er Delay (ms)				0		Transmi
Physical 7	ype				RS-485	•	Physical
MODBU	Advance Read Trigger				0		MODB
MODBU	Advance Write Trigger				0		MODB
Group ID	Trigger Number				0		Group I
UD Link	Base + Offset] Data Source				0		UD Lini
UD Link	Base + Offset] Data Destination				0		UD Lini 🔻

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

2 Setting		Description	Address	Monitor	Setting Valu	le	<u>^</u>
net Setting	•	Slave ID / BACnet MAC Address			247		Slave ID
		Baudrate			9600bps	•	Baudrate
		Format			7 E 1		Format
	ſ	Communication Timeout (ms)			3000		Commu
		Transmitter Delay (ms)			0		Transmi
		Physical Type			RS-485	٠	Physical
		MODBUS Advance Read Trigger			0		MODB
		MODBUS Advance Write Trigger			0		MODBI
		Group ID Trigger Number			0		Group I
		UD Link [Base + Offset] Data Source			0		UD Link
		UD Link [Base + Offset] Data Destination			0		UD Link -

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.

MOV	K10	D1129
MOV	K50	D1038
		END

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	
3	Slave ID (1-247)	247	
3	Baudrate	9600	
3	Format (Data Length, Parity, Stop Bits)	7, Even, 1	
3	Physical Type	RS-485	
3	Communication Timeout (1-65535 ms)	3000]
3	Transmitter Delay (0-65535 ms)	0	
3	Transfer Mode	ASCII	
3	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. \rightarrow Click **Communication Setting** on the **Options** menu. \rightarrow Set communication parameters. \rightarrow Download the parameters to an HMI.

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

DOPSoft -				
File Edit View Element Screen Tools	ptions Window Help			
💽 😂 🖓 🕫 🗶 🐘 🛤 🗖	Configuration	Q Q Q C 2 & D		
8 A - (A) -	Communication Setting	U Language1 -	/ 🛛 🛈 🔶 🖬 🔤	
💿 🕰 💷 🥃 🕰 🔵 🔤 🔂 🕅 🖉	Alarm Setup	- 0 1 🖆	· 🖓 🖓 🛗 🛱 🖬 💷	🖅 🖳 📖
A 1. Screen 1	History Buffer Setup		Property	
No had 1 - Screen 1	Password setting		Screen_1	• 0 🐥
	lag lable	Â	Screen Name	Screen_1
	Print Typesetting		Screen Properties	Detail
2	FilaSlot Manage		Background Color	RGB(252, 252, 252)
A	Real Time Clock Setting	E	Screen Macro	
	n :		Screen Open Macro	0
	Recipe		Screen Close Macro	0
	32 bits recipe		Screen Cycle Macro	0
	Picture Bank		Width	1024
	Text Bank		Height	600
	Submacro			
	Initial Macro			
	Background Macro			
	Clock Macro			
	Environment			
•		r ►		
][[[[[]]]] [[]] [[]] [[]] [[]] [[]] [[● 11 = 1 H H			
	Download:USB	[293,7]	DOP-B10E615 65536 Cold	ors Rotate 0 degree



b. Click a COM port, and modify parameters.

•		Communicati	on Setting		
	Connection				
COM1	Link Name	Link2			
	Controller	📅 Delta DVP I	PLC	•	
COMZ	Multi-Drop	Disable	•		
COM3	Main				
	Communication Parameter	r	Controller		
thernet	HMI Station	0	PLC Station	1	*
	Interface	R\$485 -	Password	12345678	
	Data Bits	7 Bits 💌	Comm. Delay	0	*
	Baud Rate	9600 -	Timeout(ms)	1000	-
	Parity	Even -	Retry Count	2	-
	☑ Optimize				
	Ľ				
mm. Interrupt	3 times then ignore				

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. \rightarrow Click the **Basic** tab. \rightarrow Modify the communication timeout and the delay time in the **Timer Setting** section.

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

IFD9506		X
Overview Basic Mail	NTP Monitor Slave Mode IP Filter User Define Security	
Device Overview		
Module	IFD9506	
IP Address	192.168.1.5	
MAC Address	11:22:33:44:55:66	
Firmware Version	1.57	
DI / DO Point	370	



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

506		
erview Basic Mail	NTP Monitor Slave Mode IP Filter User Define Security	
Module Name	1809505	
Master Configuration	Suid Marker -	
Masier Configuration	Serial Plaster	
letwork Setup		
IP Configuration	Static	
IP Address	192 . 168 . 1 . 5	
Netmask	255 . 255 . 255 . 0	
Gateway	192.168.1.1	
✓ Enable IP∨6	FE80:0000:0000:1322:33FF:FE44:5566	
Communication Parameter - COM Protocol Setup	Modbus COM2 (RS-485)	
Baudrate	115200 V Data Length 7 V	
Parity	Even V Stop Bits	
Mode	ASCII - Station Address 4	
limer Setting		
Keep Alive Time (s)	30 (5 - 65535 s)	
Modbus Timeout (ms)	5000 (5 - 65535 ms)	
Dalay Time (mc)	(0 - 65535 m)	

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. \rightarrow Click the **Basic** tab. \rightarrow 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.

Sevele Coleivew				
Module	RTU-EN01	_		
IP Address	192.168.1.5			
MAC Address	00:11:22:33:44:55			
Firmware Version	1.02			
light-side Module Information				
DL/DO Point	8/8	_		
Number of Analog Input/Output Module	p	_		
1st Analog Input/Output Module	N/A			
2nd Analog Input/Output Module	N/A			
3rd Analog Input/Output Module	N/A			
4th Analog Input/Output Module	N/A			
5th Analog Input/Output Module	N/A			
6th Analog Input/Output Module	N/A			
7th Analog Input/Output Module	N/A	_		
8th Analog Input/Output Module	N/A			



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

dress 192 ask 255 ay 192	. 168 . 1 . 5 . 255 . 255 . 0 . 168 . 1 . 1			
ask 255 'ay 192	. 255 . 255 . 0			
ray 192	. 168 . 1 . 1			
Timer Setting				
out (ms) 5000	(5 - 65535 ms)			
Time (ms) 0	(0 - 65535 ms)	J		