API	Mnemonic	Operands	Function
150	MODRW	(S1) (S2) (S3) (S) (n)	Read/Write MODBUS Data

Type / OP	Bit Devices				Word Devices											Program Steps
	X	Y	M	S	K	H	KnX	KnY	KnM	KnS	T	C	D	E	F	
S_1					*	*							*			MODRW: 11 steps
S_2					*	*							*			
S_3					*	*							*			
S													*			
n					*	*							*			

PULSE									16-bit									32-bit								
ES	EX	SS	SA	SX	SC	EH	SV	EH3 SV2	ES	EX	SS	SA	SX	SC	EH	SV	EH3 SV2	ES	EX	SS	SA	SX	SC	EH	SV	EH3 SV2

Operands:

S_1: Address of communication device **S_2**: Function code **S_3**: Device address of data to be read/written

S: Register for storing read/written data (source or destination) **n**: Length of read/written data

Explanations:

1. The content of **S_2** shall only be: K3(H03), K6(H06), K16(H10). SA/SX V1.8, SC V1.6 and EH2/SV/EH3/SV2 V1.2 and later versions support K2(H02) and K15(H0F); EH2/SV/EH3/SV2 V1.4 and later versions support K5(H05).
2. ES/EX/SS V.4.9 (and above) support the continuous execution instruction (MODRW). Other versions do not support this instruction.
3. ES/EX/SS series MPU does not support E, F index register modification.
4. Flags: M1120 ~ M1131, M1140 ~ M1143. See remarks for more details.
5. Range of **S_1**: K0 ~ K254
6. **S_2**: Funcation code. Only these function codes are available currently; other function codes are still not executable. See program examples for more information.

Code	Function	Applicable models
H02	Read many bit devices	SA/SX V1.8, SC V1.6 and EH2/SV/EH3/SV2 V V1.2 and
H03	Read many word devices	ES/SA/EH series MPU
H05	Write single bit device	EH2/SV/EH3/SV2 V1.4 and later versions
H06	Write single word device	ES/SA/EH series MPU
H0F	Write many bit devices	SA/SX V1.8, SC V1.6 and EH2/SV/EH3/SV2 V1.2 and later
H10	Write many word devices	ES/SA/EH series MPU

7. **S_3**: Device address of data to be read/written. The device address inside the communication device. If the address is illegal to a designated communication device, the communication device will respond with an error message and PLC will store the error code in D1130 and M1141 = On. For example, if 8000H is illegal to VFD-S, M1141 will be On and D1130 = 2. See user manual of VFD-S for error codes.
8. **S**: Register for storing read/written data. The user sets up a register and stores the data to be written in the register in advance. The register can be register for storing the read data.
9. **n**: Length of read/written data.
   In Modbus function code H05 (force On/Off), n=0: Off, n=1: On.

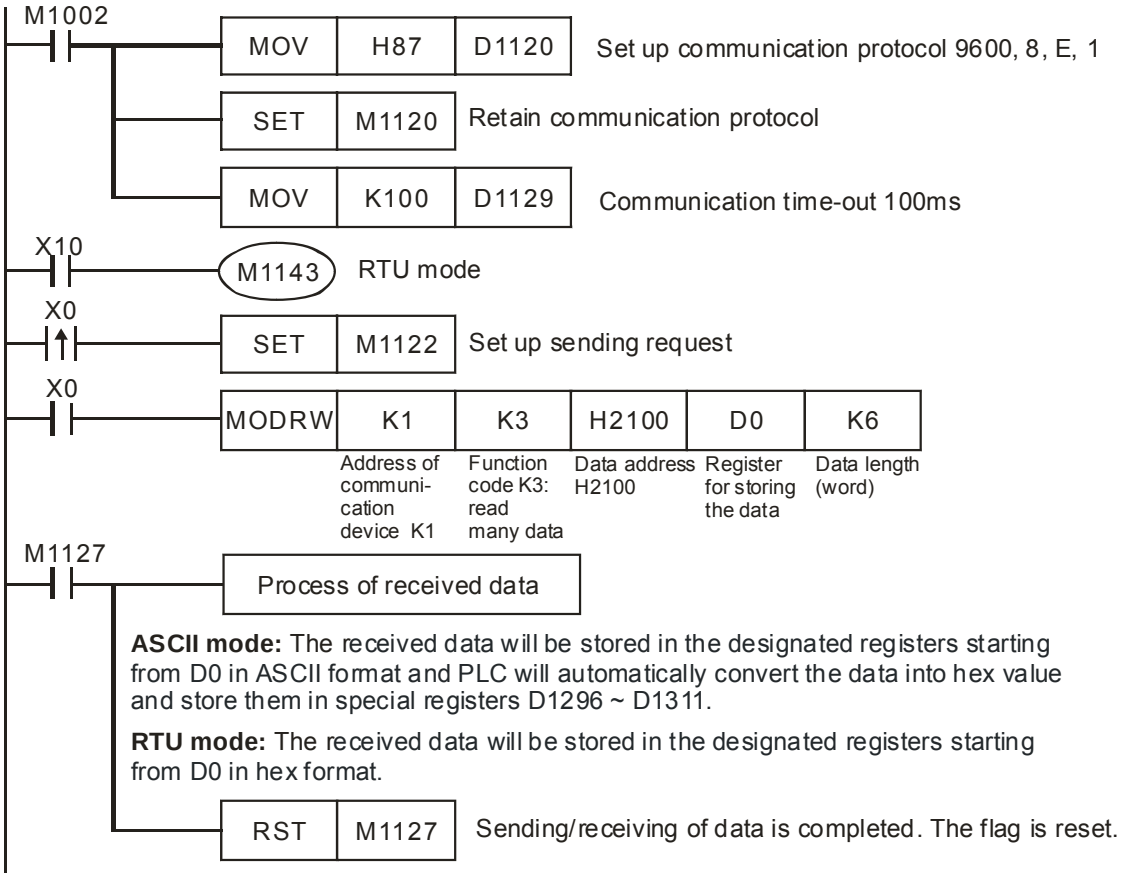
In Modbus function code H02, H03, H0F, H10 (data length), the range = K1 ~ Km. See the table below for m upon different models and communication modes, in which the unit of H02 and H0F is word, and bit for H03 and H10.

Communication mode	Model	H02	H03	H0F	H10
M1143 On (RTU Mode)	ES	Not available	K16	Not available	K16
	SA	K64	K16	K64	K16
	EH	K256	K16	K256	K16
M1143 Off (ASCII Mode)	ES	Not available	K8	Not available	K8
	SA	K64	K8	K64	K8
	EH	K256	K16	K256	K16

10. There is no limitation on the times of using this instruction. However, only one instruction can be executed at a time.

Program Example 1:

1. Function code K3(H03): For reading many data in register
   When PLC is connected to VFD-S AC motor drive: M1143 = Off, in ASCII mode
   When PLC is connected to VFD-S AC motor drive: M1143 = On, in RTU mode
2. When in ASCII mode, the received data will be stored in the designated registers starting from D0 in ASCII format and PLC will automatically convert the data into hex value and store them in special registers D1296 ~ D1311. When the conversion into hex value starts, M1131 will be On and turn Off when the conversion is completed.
3. If necessary, the user can move the hex values stored in D1296 ~ D1131 to other general registers by using MOV, DMOV or BMOV instruction. Other instructions of ES/EX/SS do not function on the data in D1296 ~ D1311.
4. When in RTU mode, the received data will be stored in the designated registers starting from D0 in hex format.
5. When In ASCII mode or RTU mode, PLC will store the data to be sent in D1256 ~ D1295. If necessary, the user can move the data to other general registers by using MOV, DMOV or BMOV instruction. Other instructions of ES/EX/SS do not function on the data in D1256 ~ D1295.
6. The data sent back from AC motor drive are stored in the registers designated by the user. After the transmission is completed, PLC will auto-check if the received data are incorrect. M1140 will be On if there is an error.
7. If the device address is illegal to a designated communication device, the communication device will respond with an error message and PLC will store the error code in D1130 and M1141 = On. For example, if 8000H is illegal to VFD-S, M1141 will be On and D1130 = 2. See user manual of VFD-S for error codes.
8. After M1140 = On or M1141 = On, PLC will send another correct datum to AC motor drive. If the data sent back from AC motor drive is correct, M1140 and M1141 will be reset.



9. ASCII Mode: When PLC is connected to VFD-S AC motor drive.

PLC ⇨ VFD-S, PLC sends: **"01 03 2100 0006 D5"**

VFD-S ⇨ PLC, PLC receives: **"01 03 0C 0100 1766 0000 0000 0136 0000 3B"**

Registers for sent data (sending messages)

Register	DATA		Explanation	
D1256 Low	'0'	30 H	ADR 1	Address of AC motor drive: ADR (1,0)
D1256 High	'1'	31 H	ADR 0	
D1257 Low	'0'	30 H	CMD 1	Command code: CMD (1,0)
D1257 High	'3'	33 H	CMD 0	
D1258 Low	'2'	32 H	Starting Data Address	
D1258 High	'1'	31 H		
D1259 Low	'0'	30 H		
D1259 High	'0'	30 H		
D1260 Low	'0'	30 H	Number of Data (counted by words)	
D1260 High	'0'	30 H		
D1261 Low	'0'	30 H		
D1261 High	'6'	36 H		
D1262 Low	'D'	44 H	LRC CHK 1	Error checksum: LRC CHK (0,1)
D1262 High	'5'	35 H	LRC CHK 0	

Registers for received data D0 (responding messages)

Register	DATA		Explanation	
D0 Low	'0'	30 H	ADR 1	
D0 High	'1'	31 H	ADR 0	
D1 Low	'0'	30 H	CMD 1	
D1 High	'3'	33 H	CMD 0	
D2 Low	'0'	30 H	Number of Data (counted by byte)	
D2 High	'C'	43 H		
D3 Low	'0'	30 H	Content of address 2100H	PLC automatically convert ASCII codes to numerals and store the numeral in D1296 = H0100
D3 High	'1'	31 H		
D4 Low	'0'	30 H		
D4 High	'0'	30 H		
D5 Low	'1'	31 H	Content of address 2101H	PLC automatically convert ASCII codes to numerals and store the numeral in D1297 = H1766
D5 High	'7'	37 H		
D6 Low	'6'	36 H		
D6 High	'6'	36 H		
D7 Low	'0'	30 H	Content of address 2102H	PLC automatically convert ASCII codes to numerals and store the numeral in D1298 = H0000
D7 High	'0'	30 H		
D8 Low	'0'	30 H		
D8 High	'0'	30 H		
D9 Low	'0'	30 H	Content of address 2103H	PLC automatically convert ASCII codes to numerals and store the numeral in D1299 = H0000
D9 High	'0'	30 H		
D10 Low	'0'	30 H		
D10 High	'0'	30 H		
D11 Low	'0'	30 H	Content of address 2104H	PLC automatically convert ASCII codes to numerals and store the numeral in D1300 = H0136
D11 High	'1'	31 H		
D12 Low	'3'	33 H		
D12 High	'6'	36 H		
D13 Low	'0'	30 H	Content of address 2105H	PLC automatically convert ASCII codes to numerals and store the numeral in D1301 = H0000
D13 High	'0'	30 H		
D14 Low	'0'	30 H		
D14 High	'0'	30 H		
D15 Low	'3'	33 H	LRC CHK 1	
D15 High	'B'	42 H	LRC CHK 0	

10. RTU Mode: When PLC is connected to VFD-S AC motor drive

PLC ⇨ VFD-S, PLC sends: **"01 03 2100 0006 CF F4"**

VFD-S ⇨ PLC, PLC receives: **"01 03 0C 0000 0503 0BB8 0BB8 0000 012D 8E C5"**

Registers for sent data (sending messages)

Register	DATA	Explanation
D1256 Low	01 H	Address
D1257 Low	03 H	Function
D1258 Low	21 H	Starting Data Address
D1259 Low	00 H	
D1260 Low	00 H	Number of Data (counted by words)
D1261 Low	06 H	
D1262 Low	CF H	CRC CHK Low

Register	DATA	Explanation
D1263 Low	F4 H	CRC CHK High

Registers for received data D0 (responding messages)

Register	DATA	Explanation	
D0 Low	01 H	Address	
D1 Low	03 H	Function	
D2 Low	0C H	Number of Data (byte)	
D3 Low	00 H	Content of address 2100H	PLC automatically convert ASCII codes to numerals and store the numeral in D1296 = H0000
D4 Low	00 H		
D5 Low	05 H	Content of address 2101H	PLC automatically convert ASCII codes to numerals and store the numeral in D1297 = H0503
D6 Low	03 H		
D7 Low	0B H	Content of address 2102H	PLC automatically convert ASCII codes to numerals and store the numeral in D1298 = H0BB8
D8 Low	B8 H		
D9 Low	0B H	Content of address 2103H	PLC automatically convert ASCII codes to numerals and store the numeral in D1299 = H0BB8
D10 Low	B8 H		
D11 Low	00 H	Content of address 2104H	PLC automatically convert ASCII codes to numerals and store the numeral in D1300 = H0000
D12 Low	00 H		
D13 Low	01 H	Content of address 2105H	PLC automatically convert ASCII codes to numerals and store the numeral in D1301 = H012D
D14 Low	2D H		
D15 Low	8E H	CRC CHK Low	
D16 Low	C5 H	CRC CHK High	

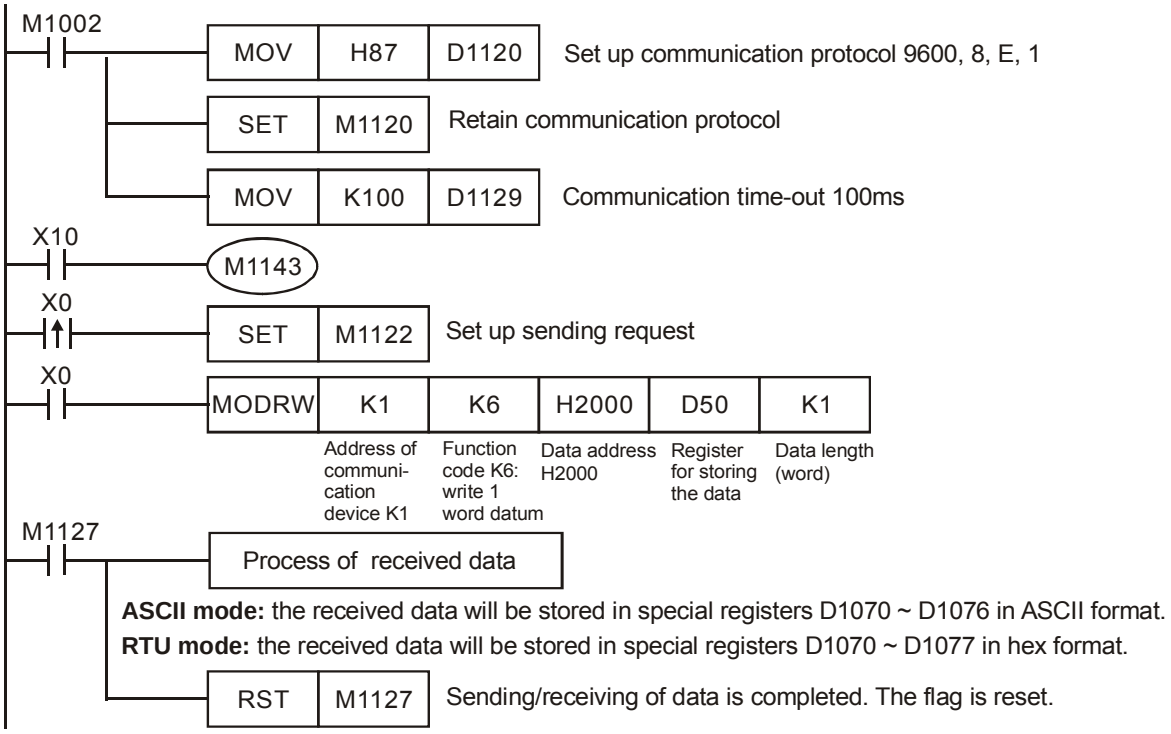
Program Example 2:

1. Function code K6(H6): For writing a word data to register

   When PLC is connected to VFD-S AC motor drive: M1143 = Off, in ASCII mode

   When PLC is connected to VFD-S AC motor drive: M1143 = On, in RTU mode

2. When in ASCII mode, the user stores the data to be written in the designated register D50 in hex format. The data sent back from AC motor drive are stored in D1070 ~ D1076.
3. When in RTU mode, the user stores the data to be written in the designated register D50 in hex format. The data sent back from AC motor drive are stored in D1070 ~ D1077.
4. When In ASCII mode or RTU mode, PLC will store the data to be sent in D1256 ~ D1295. If necessary, the user can move the data to other general registers by using MOV, DMOV or BMOV instruction. Other instructions of ES/EX/SS do not function on the data in D1256 ~ D1295.
5. After receiving the data sent back from AC motor drive is completed, PLC will auto-check if the received data are incorrect. M1140 will be On if there is an error.
6. If the device address is illegal to a designated communication device, the communication device will respond with an error message and PLC will store the error code in D1130 and M1141 = On. For example, if 8000H is illegal to VFD-S, M1141 will be On and D1130 = 2. See user manual of VFD-S for error codes.
7. After M1140 = On or M1141 = On, PLC will send another correct datum to AC motor drive. If the data sent back from AC motor drive is correct, M1140 and M1141 will be reset.



8. ASCII Mode: When PLC is connected to VFD-S AC motor drive.

PLC ⇨ VFD-S, PLC sends: **"01 06 0100 1770 71"**

VFD-S ⇨ PLC, PLC receives: **"01 06 0100 1770 71"**

Registers for sent data (sending messages)

Register	DATA		Explanation	
D1256 Low	'0'	30 H	ADR 1	Address of AC motor drive: ADR (1,0)
D1256 High	'1'	31 H	ADR 0	
D1257 Low	'0'	30 H	CMD 1	Command code: CMD (1,0)
D1257 High	'6'	36 H	CMD 0	
D1258 Low	'0'	30 H	Data Address	
D1258 High	'1'	31 H		
D1259 Low	'0'	30 H		
D1259 High	'0'	30 H		
D1260 Low	'1'	31 H	Data content	The content of register D50 (H1770 = K6,000)
D1260 High	'7'	37 H		
D1261 Low	'7'	37 H		
D1261 High	'0'	30 H		
D1262 Low	'7'	37 H	LRC CHK 1	LRC CHK (0,1) is error check
D1262 High	'1'	31 H	LRC CHK 0	

Registers for received data (responding messages)

Register	DATA		Explanation
D1070 Low	'0'	30 H	ADR 1
D1070 High	'1'	31 H	ADR 0
D1071 Low	'0'	30 H	CMD 1
D1071 High	'6'	36 H	CMD 0

Register	DATA		Explanation
D1072 Low	‘0’	30 H	Data Address
D1072 High	‘1’	31 H	
D1073 Low	‘0’	30 H	
D1073 High	‘0’	30 H	
D1074 Low	‘1’	31 H	Data content
D1074 High	‘7’	37 H	
D1075 Low	‘7’	37 H	
D1075 High	‘0’	30 H	
D1076 Low	‘7’	37 H	LRC CHK 1
D1076 High	‘1’	31 H	LRC CHK 0

9. RTU Mode: When PLC is connected to VFD-S AC motor drive

   PLC ⇨ VFD-S, PLC sends: **“01 06 2000 0012 02 07”**

   VFD-S ⇨ PLC, PLC receives: **“01 06 2000 0012 02 07”**

   Registers for sent data (sending message)

Register	DATA	Explanation	
D1256 Low	01 H	Address	
D1257 Low	06 H	Function	
D1258 Low	20 H	Data Address	
D1259 Low	00 H		
D1260 Low	00 H	Data content	The content of register D50 (H12)
D1261 Low	12 H		
D1262 Low	02 H	CRC CHK Low	
D1263 Low	07 H	CRC CHK High	

   Registers for received data (responding message)

Register	DATA	Explanation
D1070 Low	01 H	Address
D1071 Low	06 H	Function
D1072 Low	20 H	Data Address
D1073 Low	00 H	
D1074 Low	00 H	Data content
D1075 Low	12 H	
D1076 Low	02 H	CRC CHK Low
D1077 Low	07 H	CRC CHK High

Program Example 3:

1. Function code K16(H10): For writing many word data into register.

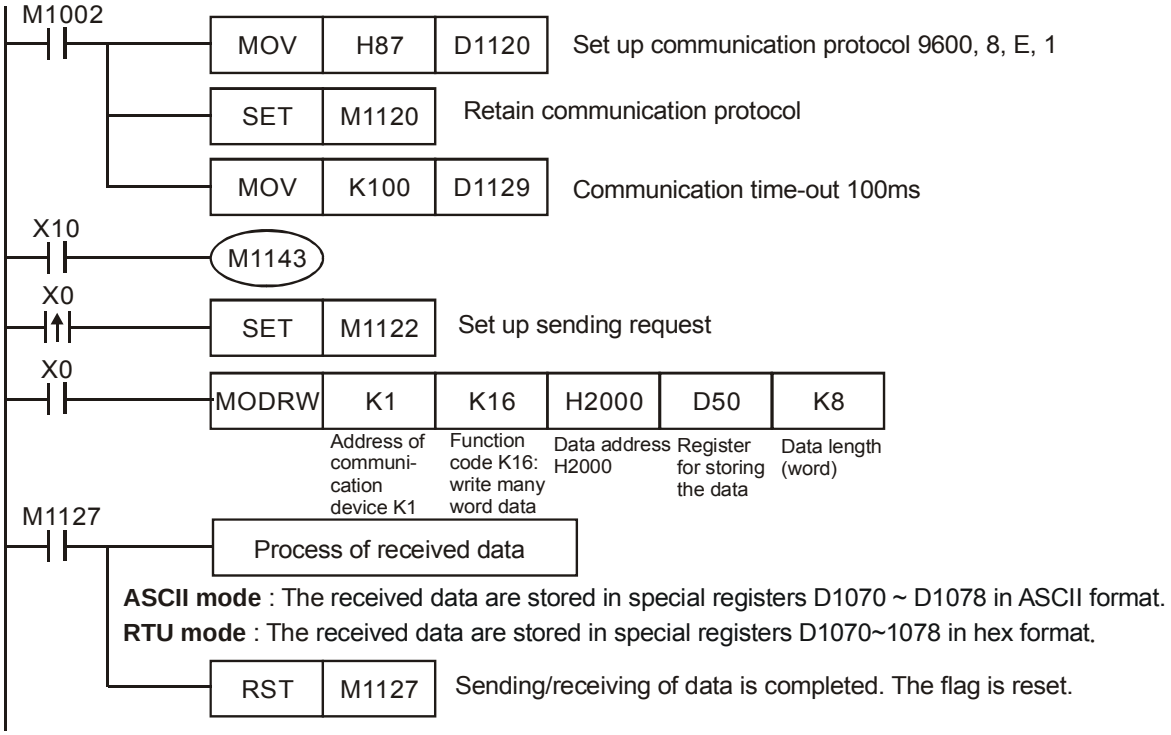
   When PLC is connected to VFD-S AC motor drive: M1143 = Off, in ASCII mode

   When PLC is connected to VFD-S AC motor drive: M1143 = On, in RTU mode

2. When in ASCII mode, the user stores the data to be written in the designated register D50 in hex format. The data sent back from AC motor drive are stored in D1070 ~ D1076.
3. When in RTU mode, the user stores the data to be written in the designated register D50 in hex format. The

data sent back from AC motor drive are stored in D1070 ~ D1077.

4. When In ASCII mode or RTU mode, PLC will store the data to be sent in D1256 ~ D1295. If necessary, the user can move the data to other general registers by using MOV, DMOV or BMOV instruction. Other instructions of ES/EX/SS do not function on the data in D1256 ~ D1295.
5. After receiving the data sent back from AC motor drive is completed, PLC will auto-check if the received data are incorrect. M1140 will be On if there is an error.
6. If the device address is illegal to a designated communication device, the communication device will respond with an error message and PLC will store the error code in D1130 and M1141 = On. For example, if 8000H is illegal to VFD-S, M1141 will be On and D1130 = 2. See user manual of VFD-S for error codes.
7. After M1140 = On or M1141 = On, PLC will send another correct datum to AC motor drive. If the data sent back from AC motor drive is correct, M1140 and M1141 will be reset.



8. ASCII Mode: When PLC is connected to VFD-S AC motor drive.

PLC ⇨ VFD-S, PLC sends: "**01 10 2000 0002 04 0012 1770 30**"

VFD-S ⇨ PLC, PLC receives: "**01 10 2000 0002 CD**"

Registers for sent data (sending messages)

Register	DATA		Explanation	
D1256 Low	'0'	30 H	ADR 1	Address of AC motor drive: ADR (1,0)
D1256 High	'1'	31 H	ADR 0	
D1257 Low	'1'	31 H	CMD 1	Command code: CMD (1,0)
D1257 High	'0'	30 H	CMD 0	
D1258 Low	'2'	32 H	Data Address	
D1258 High	'0'	30 H		
D1259 Low	'0'	30 H		
D1259 High	'0'	30 H		

Register	DATA		Explanation	
D1260 Low	‘0’	30 H	Number of Registers	
D1260 High	‘0’	30 H		
D1261 Low	‘0’	30 H		
D1261 High	‘2’	32 H		
D1262 Low	‘0’	30 H	Byte Count	
D1262 High	‘4’	34 H		
D1263 Low	‘0’	30 H	Data contents 1	The content of register D50 (H12)
D1263 High	‘0’	30 H		
D1264 Low	‘1’	31 H		
D1264 High	‘2’	32 H		
D1265 Low	‘1’	31 H	Data contents 2	The content of register D51 (H1770 = K6,000)
D1265 High	‘7’	37 H		
D1266 Low	‘7’	37 H		
D1266 High	‘0’	30 H		
D1267 Low	‘3’	33 H	LRC CHK 1	Error checksum: LRC CHK (0,1)
D1267 High	‘0’	30 H	LRC CHK 0	

Registers for received data (responding messages)

Register	DATA		Explanation
D1070 Low	‘0’	30 H	ADR 1
D1070 High	‘1’	31 H	ADR 0
D1071 Low	‘1’	31 H	CMD 1
D1071 High	‘0’	30 H	CMD 0
D1072 Low	‘2’	32 H	Data Address
D1072 High	‘0’	30 H	
D1073 Low	‘0’	30 H	
D1073 High	‘0’	30 H	
D1074 Low	‘0’	30 H	Number of Registers
D1074 High	‘0’	30 H	
D1075 Low	‘0’	30 H	
D1075 High	‘2’	32 H	
D1076 Low	‘C’	43 H	LRC CHK 1
D1076 High	‘D’	44 H	LRC CHK 0

9. RTU Mode: When PLC is connected to VFD-S AC motor drives

PLC ⇨ VFD-S, PLC sends: “**01 10 2000 0002 04 0012 1770 C4 7F**”

VFD-S ⇨ PLC, PLC receives: “**01 10 2000 0002 4A 08**”

Registers for sent data (sending messages)

Register	DATA	Explanation
D1256 Low	01 H	Address
D1257 Low	10 H	Function
D1258 Low	20 H	Data Address
D1259 Low	00 H	
D1260 Low	00 H	Number of Registers
D1261 Low	02 H	
D1262 Low	04 H	Byte Count

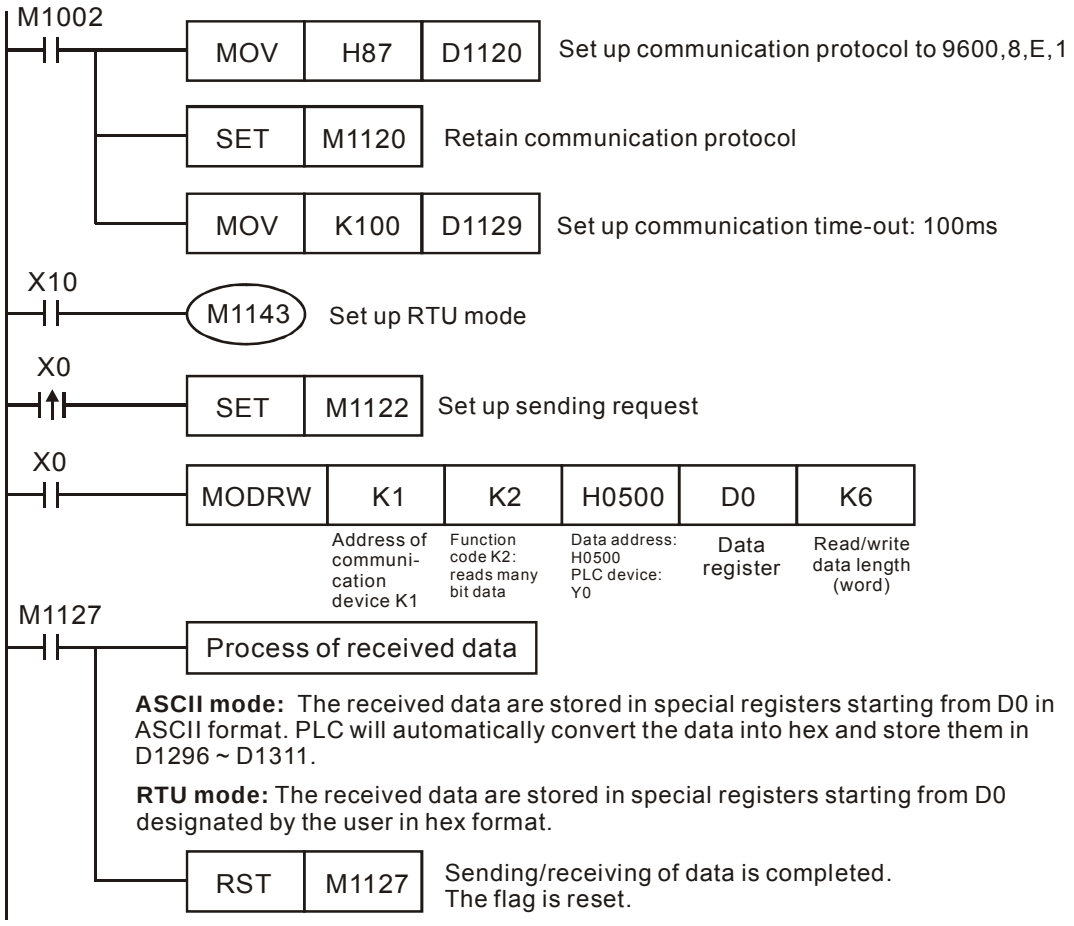
Register	DATA	Explanation	
D1263 Low	00 H	Data content 1	The content of register D50 (H12)
D1264 Low	12 H		
D1265 Low	17 H	Data content 2	The content of register D51 (H1770 = K6,000)
D1266 Low	70 H		
D1267 Low	C4 H	CRC CHK Low	
D1268 Low	7F H	CRC CHK High	

Registers for received data (responding messages)

Register	DATA	Explanation
D1070 Low	01 H	Address
D1071 Low	10 H	Function
D1072 Low	20 H	Data Address
D1073 Low	00 H	
D1074 Low	00 H	Number of Registers
D1075 Low	02 H	
D1076 Low	4A H	CRC CHK Low
D1077 Low	08 H	CRC CHK High

Program Example 4:

1. Function code K2(H02): Read many bit devices. The read communication code will be placed in the register designated by the 4th operand of the instruction. In the example below, K6 refers to the data length (bit). Assume Y2=Y4=Y5=Y11=Y14=On for Y0 ~ Y16 status.



2. ASCII Mode: When PLC1 is connected to PLC2

When X0 = On, function code 02 of MODRW instrruction will start to be executed.

PLC1⇨ PLC2, PLC1 sends: "**01 02 0500 0010 E8**"

PLC2 ⇨ PLC1, PLC1 receives: "**01 02 02 34 12 B5**"

Registers for PLC1 sent data (sending messages)

Register	DATA		Explanation	
D1256 Low	'0'	30 H	ADR 1	Address of connected device: ADR (1,0)
D1256 High	'1'	31 H	ADR 0	
D1257 Low	'0'	30 H	CMD 1	Command code: CMD (1,0)
D1257 High	'2'	32 H	CMD 0	
D1258 Low	'0'	30 H	Starting Data Address	
D1258 High	'5'	35 H		
D1259 Low	'0'	30 H		
D1259 High	'0'	30 H		
D1260 Low	'0'	30 H	Number of Data (counted by bits)	
D1260 High	'0'	30 H		
D1261 Low	'1'	31 H		
D1261 High	'0'	30 H		
D1262 Low	'E'	45 H	LRC CHK 1	Error checksum: LRC CHK (0,1)
D1262 High	'8'	38 H	LRC CHK 0	

Register (D0) for PLC1 received data (responding messages):

Register	DATA		Explanation	
D0 Low	'0'	30 H	ADR 1	
D0 High	'1'	31 H	ADR 0	
D1 Low	'0'	30 H	CMD 1	
D1 High	'2'	33 H	CMD 0	
D2 Low	'0'	30 H	Number of data (counted by bytes)	
D2 High	'2'	32 H		
D3 Low	'3'	33 H	Content in address 0500 ~ 0505	PLC automatically convert ASCII words and store the result in D1296 = H1234 (b0 ~ b5 are valid)
D3 High	'4'	34 H		
D4 Low	'1'	31H		
D4 High	'2'	32H		
D5 Low	'B'	52H	LRC CHK 1	
D5 High	'5'	35 H	LRC CHK 0	

3. RTU Mode: When PLC1 is connected to PLC2

When X10 = On, function code 02 of MODRW instruction will start to be executed.

PLC1⇨ PLC2, PLC1 sends: "**01 02 0500 0010 79 0A**"

PLC2 ⇨ PLC1, PLC1 receives: "**01 02 02 34 12 2F 75**"

Registers for PLC sent data (sending messages):

Register	DATA	Explanation
D1256 low	1 H	Address
D1257 low	2 H	Function

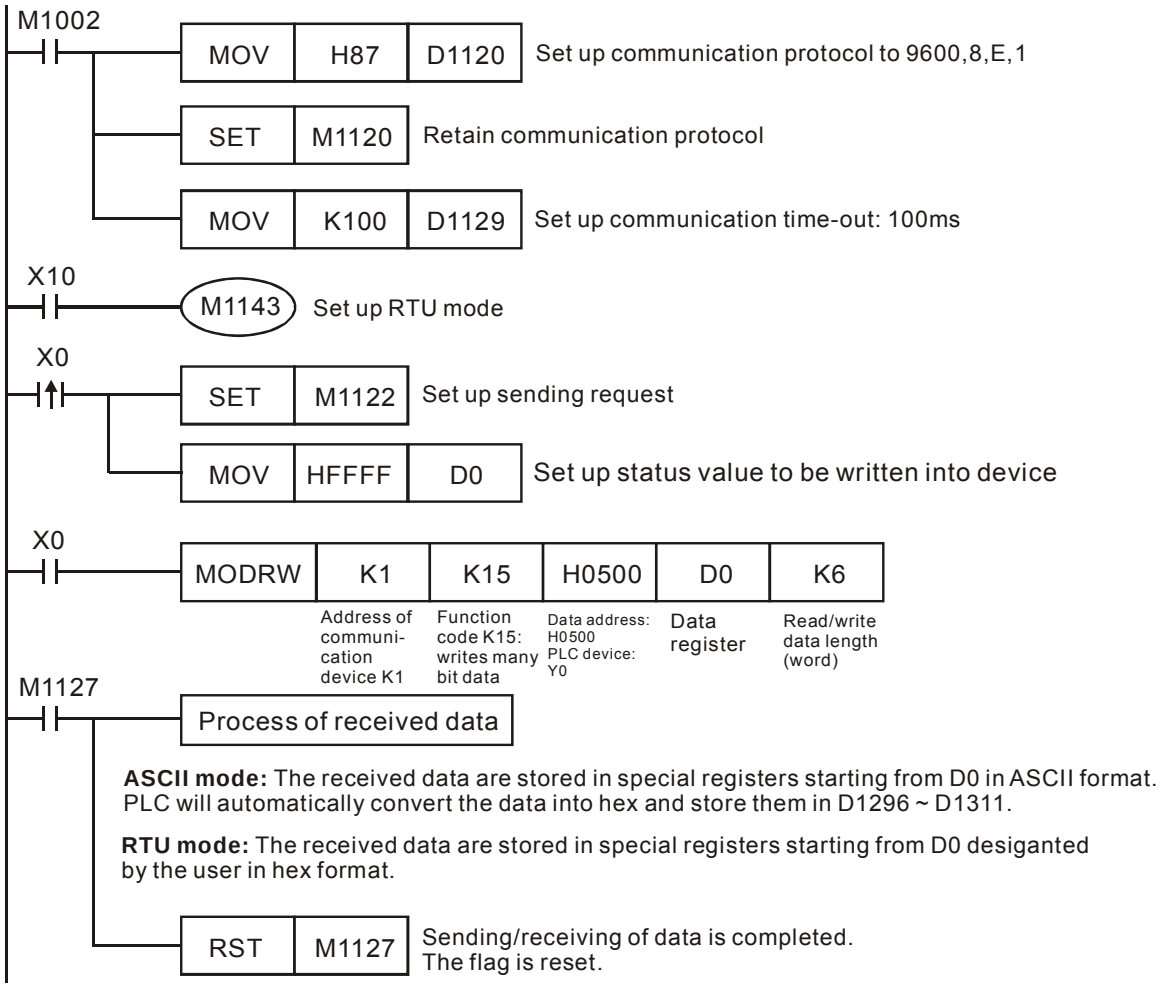
Register	DATA	Explanation
D1258 low	5 H	Starting data address
D1259 low	0 H	
D1260 low	0 H	Number of data (counted by words)
D1261 low	10 H	
D1262 low	79 H	CRC CHK Low
D1263 low	0A H	CRC CHK High

Register (D0) for PLC received data (responding messages):

Register	DATA	Explanation	
D0 low	01 H	Address	
D1 low	02 H	Function	
D2 low	02 H	Number of data (byte)	
D3 low	34 H	Content in address 0500H	PLC automatically stores the value in D1296=H1234 (b0 ~ b5 are valid)
D4 low	12 H		
D5 low	2F H	CRC CHK Low	
D6 low	75 H	CRC CHK High	

Program Example 5:

1. Function code K15(H0F): Write many bit devices. The preset bit status has to be placed in the register designated by the 4th operand of the instruction in b0 ~ b5 order. 1 word is able to contain 16 bit status data.



2. ASCII Mode: When PLC1 is connected to PLC2

When X0 = On, function code 0F of MODRW instruction will start to be executed.

PLC1 ⇨ PLC2, PLC sends: " **1 0F 0500 0006 01 3F A5**"

PLC2 ⇨ PLC1, PLC receives: " **1 0F 0500 0006 E5**"

Registers for PLC1 sent data (sending messages):

Register	DATA		Explanation	
D1256 low	'0'	30 H	ADR 1	Address of connected device: ADR (1,0)
D1256 high	'1'	31 H	ADR 0	
D1257 low	'0'	30 H	CMD 1	Command code: CMD (1,0)
D1257 high	'F'	46 H	CMD 0	
D1258 low	'0'	30 H	Data address	
D1258 high	'5'	35 H		
D1259 low	'0'	30 H		
D1259 high	'0'	30 H		
D1260 low	'0'	30 H	Number of data (counted by bits)	
D1260 high	'0'	30 H		
D1261 low	'0'	30H		
D1261 high	'6'	36 H		
D1262 low	'0'	30 H	Byte Count	
D1262 high	'1'	31 H		
D1263 low	'3'	33 H	Data content 1	Content in D0 register (H3F)
D1263 high	'F'	46 H		
D1264 low	'A'	41 H	LRC CHK 1	Error checksum: LRC CHK (0,1)
D1264 high	'5'	35 H	LRC CHK 0	

Registers for PLC1 received data (responding messages):

Register	DATA		Explanation
D1070 low	'0'	30 H	ADR 1
D1070 high	'1'	31 H	ADR 0
D1071 low	'0'	31 H	CMD 1
D1071 high	'F'	46 H	CMD 0
D1072 low	'0'	30 H	Data address
D1072 high	'5'	35 H	
D1073 low	'0'	30 H	
D1073 high	'0'	30 H	
D1074 low	'0'	30 H	Number of registers
D1074 high	'0'	30 H	
D1075 low	'0'	30 H	
D1075 high	'6'	36 H	
D1076 low	'E'	45 H	LRC CHK 1
D1076 high	'5'	35 H	LRC CHK 0

3. RTU Mode: When PLC1 is connected to PLC2

When X10 = On, function code 15 of MODRW instruction will start to be executed.

PLC1⇨ PLC2, PLC1 sends: "**01 0F 0500 0006 01 3F**"

PLC2 ⇨ PLC1, PLC1 receives: "**01 0F 0500 0006 D5 05**"

Registers for PLC sent data (sending messages):

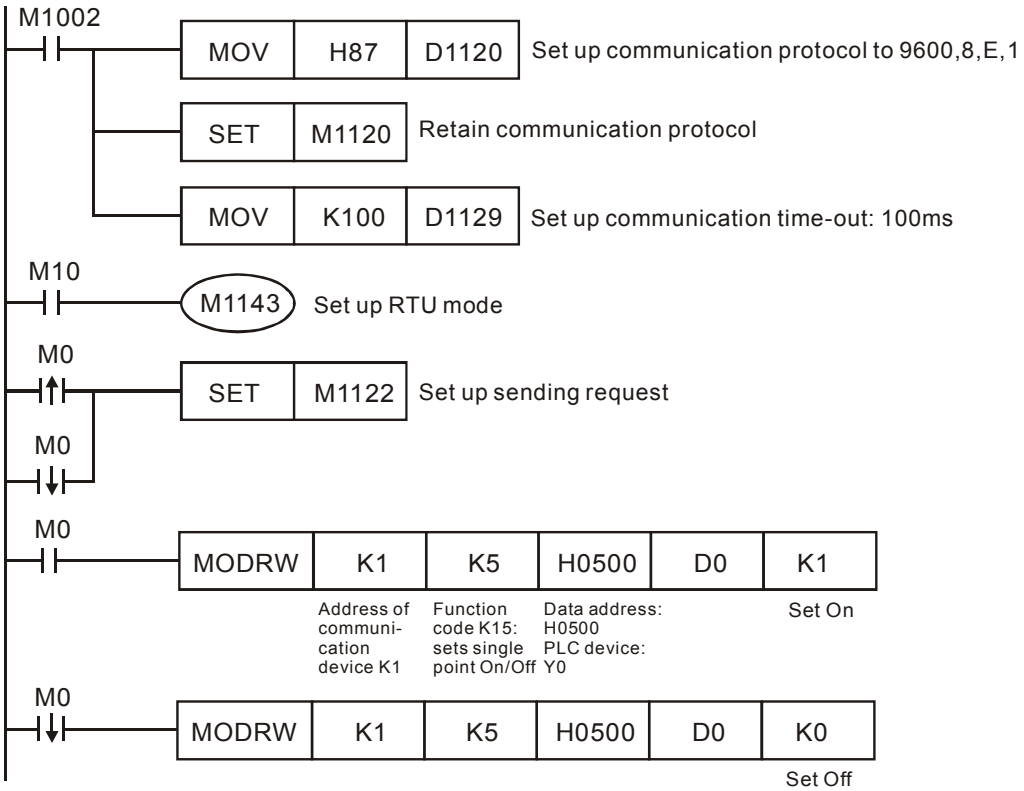
Register	DATA	Explanation	
D1256 low	01 H	Address	
D1257 low	0F H	Function	
D1258 low	05 H	Data address	
D1259 low	00 H		
D1260 low	00 H	Data content	Content in D0 register (H3F)
D1261 low	06 H		
D1262 low	01 H	CRC CHK Low	
D1263 low	3F H	CRC CHK High	

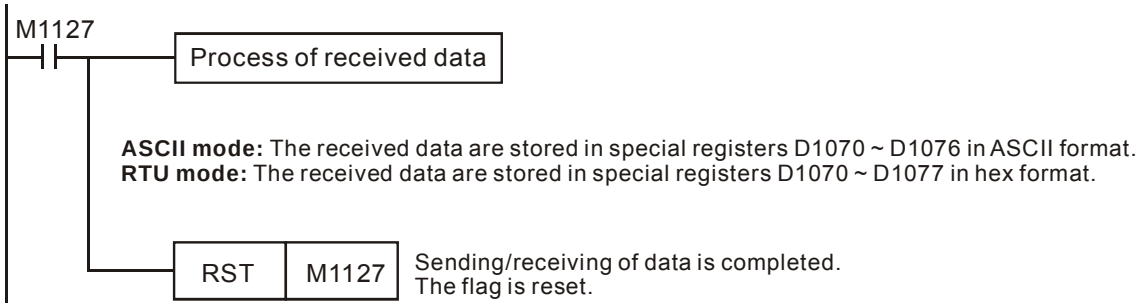
Registers for PLC received data (responding messages):

Register	DATA	Explanation
D1070 low	01 H	Address
D1071 low	0F H	Function
D1072 low	05 H	Data address
D1073 low	00 H	
D1074 low	00 H	Data content
D1075 low	06H	
D1076 low	D5H	CRC CHK Low
D1077 low	05 H	CRC CHK High

Program Example 6:

1. Function code K5(H5): Write status of single bit device. In the example below, Set K1 to bit On, K0 to bit Off.





2. ASCII Mode: When PLC1 is connected to PLC2

When M0 = On, function code 05 (bit On) of MODRW instruction will start to be executed.

PLC1⇨ PLC2, PLC1 sends: "**01 05 0500 FF00 F6**"

PLC2 ⇨ PLC1, PLC1 receives: "**01 05 0500 FF00 F6**"

Registers for PLC1 sent data (sending messages):

Register	DATA		Explanation	
D1256 low	'0'	30 H	ADR 1	Address of connected device: ADR (1,0)
D1256 high	'1'	31 H	ADR 0	
D1257 low	'0'	30 H	CMD 1	Command code: CMD (1,0)
D1257 high	'5'	35 H	CMD 0	
D1258 low	'0'	30 H	Starting data address	
D1258 high	'5'	35 H		
D1259 low	'0'	30 H		
D1259 high	'0'	30 H		
D1260 low	'F'	46 H	Request bit On/Off	
D1260 high	'F'	46 H		
D1261 low	'0'	30 H		
D1261 high	'0'	30 H		
D1262 low	'F'	46 H	LRC CHK 1	Error checksum: LRC CHK (0,1)
D1262 high	'6'	36 H	LRC CHK 0	

Registers (D0) for PLC1 received data (responding messages):

Register	DATA		Explanation	
D1070 low	'0'	30 H	ADR 1	Address of connected device: ADR (1,0)
D1070 high	'1'	31 H	ADR 0	
D1071 low	'0'	30 H	CMD 1	Command code: CMD (1,0)
D1071 high	'5'	35 H	CMD 0	
D1072 low	'0'	30 H	Starting data address	
D1072 high	'5'	35 H		
D1073 low	'0'	30 H		
D1073 high	'0'	30 H		
D1074 low	'F'	46 H	Request bit On/Off	
D1074 high	'F'	46 H		
D1075 low	'0'	30 H		
D1075 high	'0'	30 H		
D1076 low	'F'	46 H	LRC CHK 1	Error checksum: LRC CHK (0,1)
D1076 high	'6'	36 H	LRC CHK 0	

When M0 = Off, function code 05 (bit Off) will start to be executed.

PLC1⇨ PLC2, PLC1 sends: "**01 05 0500 FF00 F6**"

PLC2 ⇨ PLC1, PLC1 receives: "**01 05 0500 FF00 F6**"

Registers for PLC1 sent data (sending messages):

Register	DATA		Explanation	
D1256 low	'0'	30 H	ADR 1	Address of connected device: ADR (1,0)
D1256 high	'1'	31 H	ADR 0	
D1257 low	'0'	30 H	CMD 1	Command code: CMD (1,0)
D1257 high	'5'	35 H	CMD 0	
D1258 low	'0'	30 H	Starting data address	
D1258 high	'5'	35 H		
D1259 low	'0'	30 H		
D1259 high	'0'	30 H		
D1260 low	'0'	30 H	Request bit On/Off	
D1260 high	'0'	30 H		
D1261 low	'0'	30 H		
D1261 high	'0'	30 H		
D1262 low	'F'	46 H	LRC CHK 1	Error checksum: LRC CHK (0,1)
D1262 high	'5'	35 H	LRC CHK 0	

Registers (D0) for PLC1 received data (responding messages):

Register	DATA		Explanation	
D1070 low	'0'	30 H	ADR 1	Address of connected device: ADR (1,0)
D1070 high	'1'	31 H	ADR 0	
D1071 low	'0'	30 H	CMD 1	Command code: CMD (1,0)
D1071 high	'5'	35 H	CMD 0	
D1072 low	'0'	30 H	Starting data address	
D1072 high	'5'	35 H		
D1073 low	'0'	30 H		
D1073 high	'0'	30 H		
D1074 low	'0'	30 H	Request bit On/Off	
D1074 high	'0'	30 H		
D1075 low	'0'	30 H		
D1075 high	'0'	30 H		
D1076 low	'F'	46 H	LRC CHK 1	Error checksum: LRC CHK (0,1)
D1076 high	'5'	35 H	LRC CHK 0	

3. RTU Mode: When PLC1 is connected to PLC2

When M0 = On, function code 05 (bit On) of MODRW instruction will start to be executed.

PLC1⇨ PLC2, PLC1 sends: "**01 05 0500 FF00 8C F6**"

PLC2 ⇨ PLC1, PLC1 receives: "**01 05 0500 FF00 8C F6**"

Registers for PLC sent data (sending messages):

Register	DATA	Explanation
D1256 low	01 H	Address
D1257 low	05 H	Function

Register	DATA	Explanation
D1258 low	05 H	Starting data address
D1259 low	00 H	
D1260 low	FF H	Set bit On/Off Request bit ON/OFF
D1261 low	00 H	
D1262 low	8C H	CRC CHK Low
D1263 low	F6 H	CRC CHK High

Registers (D0) for PLC received data (responding messages):

Register	DATA	Explanation
D1070 low	01 H	Address
D1071 low	05 H	Function
D1072 low	05 H	Starting data address
D1073 low	00 H	
D1074 low	FF H	Set bit On/Off Request bit ON/OFF
D1075 low	00 H	
D1076 low	8C H	CRC CHK Low
D1077 low	F6 H	CRC CHK High

When M10 = Off, function code 05 (bit Off) of MODRW instruction will start to be executed.

PLC1⇨ PLC2, PLC1 sends: "**01 05 0500 0000 CD 06**"

PLC2 ⇨ PLC1, PLC1 receives: "**01 05 0500 0000 CD 06**"

Registers for PLC sent data (sending messages):

Register	DATA	Explanation
D1256 low	01 H	Address
D1257 low	05 H	Function
D1258 low	05 H	Starting data address
D1259 low	00 H	
D1260 low	00 H	Set bit On/Off Request bit ON/OFF
D1261 low	00 H	
D1262 low	CD H	CRC CHK Low
D1263 low	06 H	CRC CHK High

Registers (D0) for PLC received data (responding messages):

Register	DATA	Explanation
D1070 low	01 H	Address
D1071 low	05 H	Function
D1072 low	05 H	Starting data address
D1073 low	00 H	
D1074 low	00 H	Set bit On/Off Request bit ON/OFF
D1075 low	00 H	
D1076 low	CD H	CRC CHK Low
D1077 low	06 H	CRC CHK High

Remarks:

1. The activation condition placed before MODRD, RDST and MODRW instructions cannot use rising-edge or

falling-edge contacts; otherwise the data stored in the registers for received data will encounter errors.

2. Flags and special registers for MODRW instruction in RS-485 communication. (For details, see API 80 RS).

Flags	Function
M1120	For retaining communication setups. After the setup is made, changes in D1120 will be invalid.
M1121	When Off, RS-485 is sending data.
M1122	Sending request
M1123	Receiving is completed
M1124	Waiting for receiving data
M1125	Disable receiving status
M1126	Selecting STX/ETX system
M1127	Sending/receiving data through MODRD / RDST / MODRW instructions is completed.
M1128	Sending data…/receiving data…
M1129	Receiving data time-out
M1130	User/system defined STX/ETX
M1131	On when MODRD / MODWR / MODRW is converting data to hex
M1140	MODRD / MODWR / MODRW data receiving error
M1141	MODRD / MODWR / MODRW parameter error
M1142	VFD-A handy instruction data receiving error
M1143	ASCII/RTU mode selection (used with MODRD/MODWR/MODRW) (Off = ASCII mode; On = RTU mode)
D1070 ~ D1085	When the built-in RS-485 communication instruction is executed and sends out data, the receiving end will respond with a message and the message will be stored in D1070 ~ D1085. The user can check the registers for the messages.
D1120	RS-485 communication protocol
D1121	PLC communication address (saving PLC communication address; latched)
D1122	Remaining words of the sent data
D1123	Remaining words of the received data
D1124	Start text definition (STX)
D1125	Definition of end text 1 (ETX1)
D1126	Definition of end text 2 (ETX2)
D1129	Abnormal communication time-out. Unit: ms
D1130	Records of error codes sent back from MODBUS
D1256 ~ D1295	When the built-in RS-485 communication instruction MODRW is executed, the sent out data will be stored in D1256 ~ D1295. The user can check whether the instruction is correct by the contents in the registers.
D1296 ~ D1311	PLC will automatically convert the ASCII data stored in the register designated by the user into hex format.