



Fatek communication protocol

FATEK Binary Protocol

History

Version	Revision date	Author	Detail
v0.1	2023/11/02	Jeff Chang	Add Document from "FATEK M1 Protocol".
v.0.2	2024/07/05	Louis Yang	Add complete frame sample

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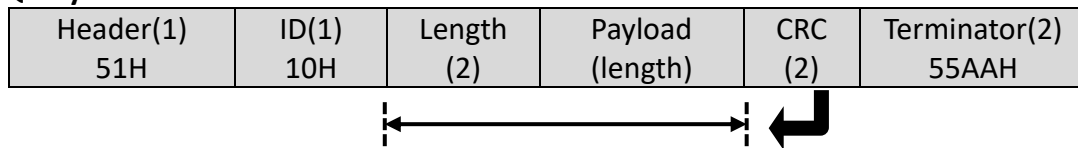
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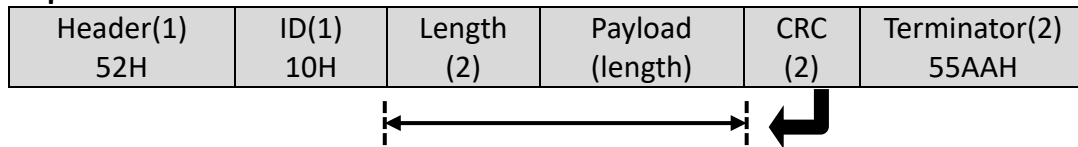
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1. Message

- **Query**



- **Response**



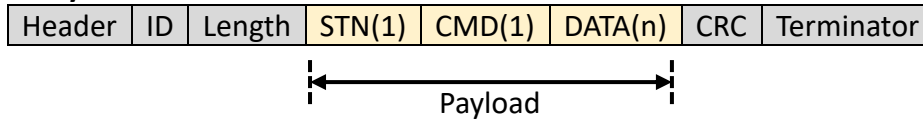
- **Parameter**

Item	Length	Description	Value
Header	1 byte	Indicates the beginning of a message.	51H: Query 52H: Respons
ID	1 byte	Specify the payload frame to be used	10H: default value
Length	2 bytes	Indicates total bytes of payload	
Payload	n bytes	Indicates that the data comprises a command message or a response message	Refer to 2.1
CRC	2 bytes	Use CRC-16 Modbus, calculating range include length and payload	
Terminator	2 bytes	Indicates the end of a message,	55AAH: default terminator

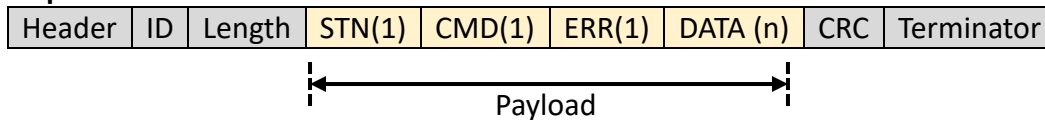
2. Payload

2.1. Format

- **Query**



- **Response**



- **Parameter**

Item	Description	Length	Value
STN	Indicates the station number of a device	1 byte	00H: broadcast 01H~FEH: slave station
CMD	Indicates the command to request device	1 byte	Refer to 2.2 Command code
ERR	Indicates the status of response message	1 bytes	Refer to 2.3 Error Code
DATA	Query data and response data varies with commands.	n bytes	

2.2. Command Code

Value	Description	Length
40H	The gist read the system status of PLC	-
41H	Control RUN/STOP of PLC	-
42H	Single discrete control	1 point
43H	The status reading of ENABLE/DISABLE of continuous discrete	1~256 points
44H	The status reading of continuous discrete	1~256 points
45H	Write the status to continuous discrete	1~256 points
46H	Read the data from continuous registers	1~64 words
47H	Write to continuous registers	1~64 words
48H	Mixed read the random discrete status of register data	1~64 points or words
49H	Mixed write the random discrete status of register data	1~32 points or words
4EH	Loop back testing	0~256 bytes
53H	The detail read the system status of PLC	-

2.3. Error Code

Value	Description
00H	No Error
02H	Illegal value

04H	Illegal format, or communication command cannot be executed
05H	Can not run (Ladder Checksum error when run PLC)
06H	Can not run (PLC ID ≠ Ladder ID when run PLC)
07H	Can not run (Sntax check error when run PLC)
09H	Can not run (Function not supported)
0AH	Illegal address

2.4. Component

Item	Symbol	Ascii Code	Length
Discrete	X	58H	1 byte
	Y	59H	1 byte
	M	4DH	1 byte
	S	53H	1 byte
	T	54H	1 byte
	C	43H	1 byte
16-Bit Register	WX	57H, 58H	2 bytes
	WY	57H, 59H	2 bytes
	WM	57H, 4DH	2 bytes
	WS	57H, 53H	2 bytes
	WT	57H, 54H	2 bytes
	WC	57H, 43H	2 bytes
	RT	52H, 54H	2 bytes
	RC	52H, 43H	2 bytes
	R	52H	1 byte
	D	44H	1 byte
	F	46H	1 byte
32-Bit Register	DWX	44H, 57H, 58H	3 bytes
	DWY	44H, 57H, 59H	3 bytes
	DWM	44H, 57H, 4DH	3 bytes
	DWS	44H, 57H, 53H	3 bytes
	DWT	44H, 57H, 54H	3 bytes
	DWC	44H, 57H, 43H	3 bytes
	DRT	44H, 52H, 54H	3 bytes
	DRC	44H, 52H, 43H	3 bytes
	DR	44H, 52H	2 bytes
	DD	44H, 44H	2 bytes
	DF	44H, 46H	2 bytes

2.5. Detail

2.5.1. Brief System Status Read [CMD:40H]

- Description

Read the system status of PLC

● **Payload**

(1) Query

STN(1)	CMD(1)
--------	--------

(2) Response

STN(1)	CMD(1)	ERR(1)	STATUS (3)
--------	--------	--------	------------

Parameter	Description	Value
STATUS [1]	PLC Status 1	B0: RUN/STOP B1: Battery low B2: Ladder checksum error/NORMAL B3: With Memory Card B4: WDT Timeout/NORMAL B5: SET ID/NOT SET ID B6: EMERGENCY STOP/NORMAL
STATUS [2]	PLC Status 2	Reserved
STATUS [3]	PLC Status 3	Reserved

● **Example**

If the PLC is equipped with Memory Card and ID is set and PLC status is “RUN” under normal condition, the system status of PLC which MASTER read will be as following: (B5,B3, and B0 are 1 and the other are all 0 that the STATUS is 29H) ◦

(1) Query

01H	40H
-----	-----

(2) Response

01H	40H	00H	29H	00H	00H
-----	-----	-----	-----	-----	-----

The command to be sent is as follows:

Command Message Segment	Starting Character	Valid Packet Number	Message Length	Message Content			CRC Checksum	Ending Character
Content	0x51	0x10 Fixed for use with the Binary communication protocol	0x00 +0x02	Slave Station Number	Command Code: 0x40		CRC16-Modbus calculation of "Message Length" + "Message Content" producing High byte + Low byte	0x55+ 0xAA
Message Length (Unit: Byte)	1	1	2	1	1		2	2
Example: Slave Station Number: 01	0x51	0x10	0x00 +0x02	0x01	0x40		0xA1+0x84	0x55+ 0xAA

The received and replied message is as follows:

Reply Message Segment	Starting Character	Valid Packet Number	Message Length	Message Content				CRC Checksum	Ending Character
Content	0x52	0x10 Fixed for use with the Binary communication protocol	0x00 +0x06	Slave Station Number	Command Code: 0x40	Error Code	Status Code	CRC16-Modbus calculation of "Message Length" + "Message Content" producing High byte + Low byte	0x55+ 0xAA
Message Length (Unit: Byte)	1	1	2	1	1	1	3	2	2
Example: Slave Station Number: 01	0x52	0x10	0x00 +0x06	0x01	0x40	0x00	0x01 +x0x00 +0x00	0xD5+0x 55	0x55+ 0xAA

Error Code (1 Byte):

Value (Hexadecimal)	Description
0x00	No error occurred.
0x02	Illegal value.
0x04	Illegal format, or communication format cannot be executed.
0x05	Unable to RUN PLC, checksum error in ladder diagram when PLC is running.
0x06	Unable to RUN PLC, ladder ID and PLC ID do not match when PLC is running.
0x07	Unable to RUN PLC, syntax error in PLC program when PLC is running.
0x09	Unable to RUN PLC, function not supported.
0x0A	Illegal address.

PLC Status Code (3 Byte):

Reply Message Segment	Status Code 1	Status Code 2	Status Code 3
Content	B0: RUN 1; STOP: 0 B1: Battery Low B2: Ladder diagram checksum error 1; Normal: 0 B3: SD card inserted or not B4: Watchdog timeout 1; Normal: 0 B5: ID is default 1; ID is not default: 0 B6: Emergency stop 1; Normal: 0	Reserved	Reserved

2.5.2. Run/Stop PLC [CMD: 41H]

- **Description**

Control the PLC RUN/STOP

- **Payload**

(1) Query

STN(1)	CMD(1)	CTRL(1)
--------	--------	---------

(2) Rspose

STN(1)	CMD(1)	ERR(1)
--------	--------	--------

Parameter	Description	Value
CTRL	Control code	00H: Stop 01H: Run

- **Example**

Turn on PLC to "RUN"

(1) Query

01H	41H	01H
-----	-----	-----

(2) Rspose

01H	41H	00H
-----	-----	-----

2.5.3. Single Discrete Control [CMD: 42H]

- **Description**

This command can control the appointed discrete to do ENABLE, DISABLE, SET, RESET four activities.

- **Payload**

(1) Query

STN(1)	CMD(1)	CTRL(1)	TYPE(x)	ADDR(2)
--------	--------	---------	---------	---------

(2) Response

STN(1)	CMD(1)	ERR(1)
--------	--------	--------

Parameter	Description	Value
CTRL	Control code	01H: Disable 02H: Enable 03H: Set 04H: Reset
TYPE	The type of discrete	Please refer to 2.4 Component, x: byte count
ADDR	The address of discrete	

- **Example**

The following communication format is the example to DISABLE the discrete X16.

(1) Query

Fatek communication protocol

01H	42H	01H	58H	00H	10H
			↑ X16		

(2) Response

01H	42H	00H
-----	-----	-----

The command to be sent is as follows:

Command Message Segment	Starting Character	Valid Packet Number	Message Length	Message Content			CRC Checksum	Ending Character
				Slave Station Number	Command Code: 0x41	Control Code:		
Content	0x51	0x10 Fixed for use with the Binary communication protocol	0x00 +0x03	Slave Station Number	Command Code: 0x41	Control Code:	CRC16-Modbus calculation of "Message Length" + "Message Content" producing High byte + Low byte	0x55+ 0xAA
Message Length (Unit: Byte)	1	1	2	1	1	1	2	2
Example: Slave Station Number: 01, PLC STOP	0x51	0x10	0x00 +0x03	0x01	0x41	0x00	0x45+0x D4	0x55+ 0xAA

Control Code (1 Byte):

Reply Message Segment	Control Code
Content	0x00: STOP 0x01: RUN

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The received and replied message is as follows:

Reply Message Segment	Starting Character	Valid Packet Number	Message Length	Message Content			CRC Checksum	Ending Character
				Slave Station Number	Command Code: 0x41	Error Code		
Content	0x52	0x10 Fixed for use with the Binary communication protocol	0x00 +0x03	Slave Station Number	Command Code: 0x41	Error Code	CRC16-Modbus calculation of "Message Length" + "Message Content" producing High byte + Low byte	0x55+ 0xAA
Message Length (Unit: Byte)	1	1	2	1	1	1	2	2
Example: Slave Station Number: 01, PLC STOP	0x52	0x10	0x00 +0x03	0x01	0x41	0x00	0xD4+0x 55	0x55+ 0xAA

Error Code (1 Byte):

Value (Hexadecimal)	Description
0x00	No error occurred.
0x02	Illegal value.
0x04	Illegal format, or communication format cannot be executed.
0x05	Unable to RUN PLC, checksum error in ladder diagram when PLC is running.
0x06	Unable to RUN PLC, ladder ID and PLC ID do not match when PLC is running.
0x07	Unable to RUN PLC, syntax error in PLC program when PLC is running.
0x09	Unable to RUN PLC, function not supported.
0x0A	Illegal address.

2.5.4. Continuous Discrete Status Read [CMD: 43H]

- **Description**

Use this command to read the ENABLE/DISABLE status of the continuous discrete.

- **Payload**

(1) Query

STN(1)	CMD(1)	NUM(1)	TYPE(x)	ADDR(2)
--------	--------	--------	---------	---------

(2) Response

STN(1)	CMD(1)	ERR(1)	STATUS 1(1)	STATUS 2(1)	...	STATUS n(1)
--------	--------	--------	-------------	-------------	-----	-------------

Parameter	Description	Value
NUM	The reading count of discrete	00H: 256 01H~FFH: 1~255
TYPE	The type of discrete	Please refer to 2.4 Component, x: byte count
ADDR	The address of discrete	
STATUS	ENABLE/DISABLE status	n: the reading count of discrete, 00H: ENABLE 01H: DISABLE

- **Example**

If Y10~Y16 of the continuous 7 discrete, Y10 · Y12 · Y16 are DISABLE and the others are all ENABLE, the PLC status of this command reading is as following.

(1) Query

01H	43H	07H	59H	00H	0AH
-----	-----	-----	-----	-----	-----

(2) Response

01H	43H	00H	01H	00H	01H	00H	00H	00H	01H
			↑	↑	↑	↑	↑	↑	↑
			Y10	Y11	Y12	Y13	Y14	Y15	Y16

Sending the command:

Command Message Segment	Starting Character	Valid Packet Number	Message Length	Message Content					CRC Checksum	Ending Character
				Slave Station Number	Command Code: 0x43	Quantity	Type	Address of the single point		
Content	0x51	0x10 Fixed for use with the Binary communication protocol	1+1+1+n+2, where n depends on the length of Type	Slave Station Number	Command Code: 0x43	Quantity	Type	Address of the single point	CRC16-Modbus calculation of "Message Length" + "Message Content" producing High byte + Low byte	0x55+ 0xAA
Message Length (Unit: Byte)	1	1	2	1	1	1	Referring Table	2	2	2
Example: Slave Station Number: 01, Y100: SET	0x51	0x10	0x00+0x06	0x01	0x43	0x04	0x58	0x00+0x00	0xE2+0xF6	0x55+ 0xAA

Quantity (1 Byte):

Reply Message Segment	Quantity
Content	0x00 :256 0x01~0xFF :1~255

Type Code (n Byte):

Reply Message Segment	Type Code (Single Point)	Length
Content	0x58 : X	1
	0x59 : Y	1
	0x4D : M	1
	0x53 : S	1
	0x54 : T	1
	0x43 : C	1

Address (2 Byte):

Reply Message Segment	Address
Content	0x00+0x00~0xFF+0xFF :1~65535

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The received and replied messages are as follows:

Reply Message Segment	Starting Character	Valid Packet Number	Message Length	Message Content				CRC Checksum	Ending Character
				Slave Station Number	Command Code: 0x43	Error code: 1 byte (refer to the table below for values)	Disable/Enable status code * n		
Content	0x52	0x10 Fixed for use with the Binary communication protocol	1+1+1+n	Slave Station Number	Command Code: 0x43	Error code: 1 byte (refer to the table below for values)	Disable/Enable status code * n	CRC16-Modbus calculation of "Message Length" + "Message Content" producing High byte + Low byte	0x55+ 0xAA
Message Length (Unit: Byte)	1	1	2	1	1	1	1*n	2	2
Example: Station number: 01, Y0~Y3 are in Enable status	0x52	0x10	0x00 +0x07	0x01	0x43	0x00	0x01+0x01+0x01+0x01	0x49+0x 55	0x55+ 0xAA

Error Code (1 Byte):

Value (Hexadecimal)	Description
0x00	No error occurred.
0x02	Illegal value.
0x04	Illegal format, or communication format cannot be executed.
0x05	Unable to RUN PLC, checksum error in ladder diagram when PLC is running.
0x06	Unable to RUN PLC, ladder ID and PLC ID do not match when PLC is running.
0x07	Unable to RUN PLC, syntax error in PLC program when PLC is running.
0x09	Unable to RUN PLC, function not supported.
0x0A	Illegal address.

Disable/Enable status code * n: (1*n Byte):

Status of indicated single point	Description
STATUS1	0x00: Enable 0x01: Disable
STATUS2	0x00: Enable 0x01: Disable
STATUS3	0x00: Enable 0x01: Disable
	.
	.
	.
STATUSn	0x00: Enable 0x01: Disable

2.5.5. Continuous Discrete Data Read [CMD: 44H]

- **Description**

Use this command to read the Set/Reset status of the continuous discrete.

- **Payload**

(1) Query

STN(1)	CMD(1)	NUM(1)	TYPE(x)	ADDR(2)
--------	--------	--------	---------	---------

(2) Response

STN(1)	CMD(1)	ERR(1)	DATA 1(1)	DATA 2(1)	...	DATA n(1)
--------	--------	--------	-----------	-----------	-----	-----------

Parameter	Description	Value
NUM	The reading count of discrete	00H: 256 01H~FFH: 1~255
TYPE	The type of discrete	Please refer to 2.4 Component, x: byte count
ADDR	The address of discrete	
DATA	Set/Reset status	n: the reading count of discrete, 00H: Reset 01H: Set

- **Example**

If the status of X50, X52, X55 are all 0 and X51, X53, X54 are all 1, following is the status of reading the continuous 6 inputs (X50~X55)

(1) Query

01H	44H	06H	58H	00H	32H
-----	-----	-----	-----	-----	-----

(2) Response

01H	44H	00H	00H	01H	00H	01H	01H	00H
			↑	↑	↑	↑	↑	↑
			X50	X51	X52	X53	X54	X55

This command reads the status of specified single points.

Command Message Segment	Starting Character	Valid Packet Number	Message Length	Message Content					CRC Checksum	Ending Character
				Slave Station Number	Command Code:0x44	Quantity	Type	Address of Single Point		
Content	0x51	0x10 Fixed for use with the Binary communication protocol	1+1+1+n+2, where n depends on the length of Type	Slave Station Number	Command Code:0x44	Quantity	Type	Address of Single Point	CRC16-Modbus calculation of "Message Length" + "Message Content" producing High byte + Low byte	0x55+0xAA
Message Length (Unit: Byte)	1	1	2	1	1	1	Referring Table	2	2	2
Example: Station number: 01, Y0~Y14	0x51	0x10	0x00+0x06	0x01	0x44	0x0F	0x59	0x00+0x00	0x04+0xD2	0x55+0xA A

Quantity (1 Byte):

Reply Message Segment	Quantity
Content	0x00 :256 0x01~0xFF :1~255

Type Code (n Byte):

Reply Message Segment	Type Code (Single Point)	Length
Content	0x58 : X	1
	0x59 : Y	1
	0x4D : M	1
	0x53 : S	1
	0x54 : T	1
	0x43 : C	1

Address (2 Byte):

Reply Message Segment	Address
Content	0x00+0x00~0xFF+0xFF :1~65535

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The received and replied message is as follows:

Reply Message Segment	Starting Character	Valid Packet Number	Message Length	Message Content				CRC Checksum	Ending Character
				Slave Station Number	Command Code:0x44	Error code: Refer to the table below	Status Code*n		
Content	0x52	0x10 Fixed for use with the Binary communication protocol	1+1+1+n should respond with the total length of the status code	Slave Station Number	Command Code:0x44	Error code: Refer to the table below	Status Code*n	CRC16-Modbus calculation of "Message Length" + "Message Content" producing High byte + Low byte	0x55+ 0xAA
Message Length (Unit: Byte)	1	1	2	1	1	1	1*n	2	2
Example: Station number: 01, Y0~Y14: Reset	0x52	0x10	0x00 +0x012	0x01	0x44	0x00	(0x00)*15	0x89+0x 55	0x55+ 0xAA

Error Code (1 Byte):

Value (Hexadecimal)	Description
0x00	No error occurred.
0x02	Illegal value.
0x04	Illegal format, or communication format cannot be executed.
0x05	Unable to RUN PLC, checksum error in ladder diagram when PLC is running.
0x06	Unable to RUN PLC, ladder ID and PLC ID do not match when PLC is running.
0x07	Unable to RUN PLC, syntax error in PLC program when PLC is running.
0x09	Unable to RUN PLC, function not supported.
0x0A	Illegal address.

Status Code (1*n Byte):

Status of indicated single point	Description	Length (Byte)
STATUS1	0x00:Reset 0x01:Set	1
STATUS2	0x00:Reset 0x01:Set	1
STATUS3	0x00:Reset 0x01:Set	1
	.	
	.	
	.	
STATUSn	0x00:Reset 0x01:Set	1

2.5.6. Continuous Discrete Data Write [CMD: 45H]

- **Description**

Use this command to write the Set/Reset status of the continuous discrete.

- **Payload**

(1) Query

STN(1)	CMD(1)	NUM(1)	TYPE(x)	ADDR(2)	DATA 1(1)	DATA 2(1)	...	DATA n(1)
--------	--------	--------	---------	---------	-----------	-----------	-----	-----------

(2) Receive

STN(1)	CMD(1)	ERR(1)
--------	--------	--------

Parameter	Description	Value
NUM	The writing count of discrete	00H: 256 01H~FFH: 1~255
TYPE	The type of discrete	Please refer to 2.4 Component, x: byte count
ADDR	The address of discrete	
DATA	Set/Reset status	n: the writing count of discrete, 00H: Reset 01H: Set

- **Example**

Write the status to continuous 4 outputs (Y0~Y3) , Y0 and Y3 are 1, Y1 and Y2 are 0

(1) Query

01H	45H	04H	59H	00H	00H	01H	00H	00H	01H
						↑	↑	↑	↑
						Y0	Y1	Y2	Y3

(2) Receive

01H	45H	00H
-----	-----	-----

Sending Command as Follows:

Command Message Segment	Starting Character	Valid Packet Number	Message Length	Message Content						CRC Checksum	Ending Character
				Slave Station Number	Command Code:0x45	Quantity	Type	Single Point Address	Write in status*Quantity		
Content	0x51	0x10 Fixed for use with the Binary communication protocol	1+1+1+n+2+m, where n depends on the length of Type, and m depends on the length of the status to be written.	Slave Station Number	Command Code:0x45	Quantity	Type	Single Point Address	Write in status*Quantity	CRC16-Modbus calculation of "Message Length" + "Message Content" producing High byte + Low byte	0x55+0xAA
Message Length (Unit: Byte)	1	1	2	1	1	1	N referring table	2	m	2	2
Example : Station number: 01, Y0, Y2: Reset Y1: SET	0x51	0x10	0x00+0x09	0x01	0x45	0x03	0x59	0x00+0x00	0x00+0x01+0x00	0x21+0x0D	0x55+0xAA

Quantity (1 Byte):

Reply Message Segment	Quantity
Content	0x00 :256 0x01~0xFF :1~255

Type Code (n Byte):

Reply Message Segment	Type Code (Single Point)	Length (Byte)
Content	0x58 : X	1
	0x59 : Y	1
	0x4D : M	1
	0x53 : S	1
	0x54 : T	1
	0x43 : C	1

Address (2 Byte):

Reply Message Segment	Address	Length
Content	0x00+0x00~0xFF+0xFF :1~65535 個	2

Write in Status Code (1*n Byte):

Status of indicated single point	Description	Length
STATUS1	0x00:Reset	1
	0x01:Set	
STATUS2	0x00:Reset	1
	0x01:Set	
STATUS3	0x00:Reset	1
	0x01:Set	
⋮		
⋮		
⋮		
STATUSn	0x00:Reset 0x01:Set	1

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The received and replied message is as follows:

Reply Message Segment	Starting Character	Valid Packet Number	Message Length	Message Content			CRC Checksum	Ending Character
				Slave Station Number	Command Code:0x45	Error code: Refer to the table below		
Content	0x52	0x10 Fixed for use with the Binary communication protocol	0x00 +0x03	Slave Station Number	Command Code:0x45	Error code: Refer to the table below	CRC16-Modbus calculation of "Message Length" + "Message Content" producing High byte + Low byte	0x55+ 0xAA
Message Length (Unit: Byte)	1	1	2	1	1	1	2	2
Example: Slave Station Number 01	0x52	0x10	0x00 +0x03	0x01	0x45	0x00	0x14+0x 55	0x55+ 0xAA

Error Code (1 Byte):

Value (Hexadecimal)	Description
0x00	No error occurred.
0x02	Illegal value.
0x04	Illegal format, or communication format cannot be executed.
0x05	Unable to RUN PLC, checksum error in ladder diagram when PLC is running.
0x06	Unable to RUN PLC, ladder ID and PLC ID do not match when PLC is running.
0x07	Unable to RUN PLC, syntax error in PLC program when PLC is running.
0x09	Unable to RUN PLC, function not supported.
0x0A	Illegal address.

2.5.7. Continuous Register Data Read [CMD: 46H]

- **Description**

Use this command to read data from the continuous register.

- **Payload**

(1) Query

STN(1)	CMD(1)	NUM(1)	TYPE(x)	ADDR(2)
--------	--------	--------	---------	---------

(2) Response

STN(1)	CMD(1)	ERR(1)	DATA 1(y)	DATA 2(y)	...	DATA n(y)
--------	--------	--------	-----------	-----------	-----	-----------

Parameter	Description	Value
NUM	The reading count of register	01H~40H: 1~64
TYPE	The type of register	Please refer to 2.4 Component, x: byte count
ADDR	The address of register	
DATA	The value of register	n: the reading count of register y: byte count y = 2, 16-bit register y = 4, 32-bit register

- **Example**

Read the data of continuous 3 16-bit registers and start with R12. (R12 , R13 , R14)

(1) Query

01H	46H	03H	52H	00H	0CH
-----	-----	-----	-----	-----	-----

(2) Response

01H	46H	00H	10H	A5H	7FH	C4H	00H	01H
			↑	↑	↑			
			R12	R13	R14			

This command allows continuous reading of a specified quantity of data starting from designated registers.

Command Message Segment	Starting Character	Valid Packet Number	Message Length	Message Content					CRC Checksum	Ending Character
				Slave Station Number	Command Code: 0x46	Quantity	Type	Address of the Register		
Content	0x51	0x10 Fixed for use with the Binary communication protocol	1+1+1+n+2, where n depends on the length of Type	Slave Station Number	Command Code: 0x46	Quantity	Type	Address of the Register	CRC16-Modbus calculation of "Message Length" + "Message Content" producing High byte + Low byte	0x55+0xAA
Message Length (Unit: Byte)	1	1	2	1	1	1	N referring table	2	2	2
Example: Slave Station Number 01, R0~R1	0x51	0x10	0x00+0x06	0x01	0x46	0x02	0x52	0x00+0x00	0x0E+0x7C	0x55+0xAA

Quantity (1 Byte):

Reply Message Segment	Quantity
Content	0x01~0x40 :1~64

Type Code (2 Byte/4 Byte):

Reply Message Segment	Type Code (Single Point)	Length (Byte)
16 bit Register	0x57+0x58 : WX	2
	0x57+0x59 : WY	2
	0x57+0x4D : WM	2
	0x57+0x53 : WS	2
	0x57+0x54 : WT	2
	0x57+0x43 : WC	2
	0x52+0x54 : RT	2
	0x52+0x43 : RC	2
	0x52 : R	1
	0x44 : D	1
	0x46 : F	1
32 bit Register	0x44+0x57+0x58 : DWX	3
	0x44+0x57+0x59 : DWY	3
	0x44+0x57+0x4D : DWM	3
	0x44+0x57+0x53 : DWS	3
	0x44+0x57+0x54 : DWT	3
	0x44+0x57+0x43 : DWC	3
	0x44+0x52 : DR	2
	0x44+0x44 : DD	2
	0x44+0x46 : DF	2

Address (2 Byte):

Reply Message Segment	Address	Length
Content	0x00+0x00~0xFF+0xFF :1~65535	2

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The received and replied message is as follows:

Reply Message Segment	Starting Character	Valid Packet Number	Message Length	Message Content				CRC Checksum	Ending Character
				Slave Station Number	Command Code:	Error code: Refer to the table below	Values in the register		
Content	0x52	0x10 Fixed for use with the Binary communication protocol	1+1+1+n, where n depends on the number of registers to be read		0x46			CRC16-Modbus calculation of "Message Length" + "Message Content" producing High byte + Low byte	0x55+0xAA
Message Length (Unit: Byte)	1	1	2	1	1	1	1+1+1+N, where N varies depending on the number of registers set	2	2
Example: Slave Station Number 01, R0=0xFF+0x55, R1=0xFF+0x4B	0x52	0x10	0x00+0x07	0x01	0x46	0x00	0xFF+0x55+0xFF+0x4B	0xB3+0x55	0x55+0xAA

Error Code (1 Byte):

Value (Hexadecimal)	Description
0x00	No error occurred.
0x02	Illegal value.
0x04	Illegal format, or communication format cannot be executed.
0x05	Unable to RUN PLC, checksum error in ladder diagram when PLC is running.
0x06	Unable to RUN PLC, ladder ID and PLC ID do not match when PLC is running.
0x07	Unable to RUN PLC, syntax error in PLC program when PLC is running.
0x09	Unable to RUN PLC, function not supported.
0x0A	Illegal address.

Register Value (2*n/4*n Byte):

Status of indicated single point	Description (16 Bit)	Description (32 Bit)
DATA1	0x00+0x00~ 0xFF+0xFF	0x00+0x00+0x00+0x00~ 0xFF+0xFF+0xFF+0xFF
DATA 2	0x00+0x00~ 0xFF+0xFF	0x00+0x00+0x00+0x00~ 0xFF+0xFF+0xFF+0xFF
DATA 3	0x00+0x00~ 0xFF+0xFF	0x00+0x00+0x00+0x00~ 0xFF+0xFF+0xFF+0xFF
	.	
	.	
	.	
DATA n	0x00+0x00~ 0xFF+0xFF	0x00+0x00+0x00+0x00~ 0xFF+0xFF+0xFF+0xFF

2.5.8. Continuous Register Data Write [CMD: 47H]

- **Description**
Use this command to write data to continuous registers.

- **Payload**

(1) Query

STN(1)	CMD(1)	NUM(1)	TYPE(x)	ADDR(2)	DATA 1(y)	DATA 2(y)	...	DATA n(y)
--------	--------	--------	---------	---------	-----------	-----------	-----	-----------

(2) Response

STN(1)	CMD(1)	ERR(1)
--------	--------	--------

Parameter	Description	Value
NUM	The writing count of register	01H~40H: 1~64
TYPE	The type of register	Please refer to 2.4 Component, x: byte count
ADDR	The address of register	
DATA	The value of register	n: the reading count of register y: byte count y = 2, 16-bit register y = 4, 32-bit register

- **Example**

Input AAAAH to the 16-bit register WY16 and input 5555H to WY32. This is the format of input data to continuous register because WY16 and WY32 are continuous.

(1) Query

01H	47H	02H	57H	59H	00H	10H	AAH	AAH	55H	55H
							↑	↑		
							WY16	WY32		

(2) Receive

01H	47H	00H
-----	-----	-----

Sending command as follows:

Command Message Segment	Starting Character	Valid Packet Number	Message Length	Message Content						CRC Checksum	Ending Character
				Slave Station Number	Command Code: 0x47	Quantity	Type	Addresses of the Register	The data to be written into the registers		
Content	0x51	0x10 Fixed for use with the Binary communication protocol	1+1+1+n+m , where n depends on the length of the Type and m depends on the length of the data to be written	Slave Station Number	Command Code: 0x47	Quantity	Type	Addresses of the Register	The data to be written into the registers	CRC16-Modbus calculation of "Message Length" + "Message Content" producing High byte + Low byte	0x55+0xAA
Message Length (Unit: Byte)	1	1	2	1	1	1	Referring Table	2	m	2	2
Example: Slave Station Number 01, R0~R2 Write (0xFF+0x55, 0xFF+0x4B, 0xFF+0x41)	0x51	0x10	0x00+0x0C	0x01	0x47	0x03	0x52	0x00+0x00	0xFF+0x55 、 0xFF+0x4B 、 0xFF+0x41	0xC4+0x16	0x55+0xAA

Quantity (1 Byte):

Reply Message Segment	Quantity
Content	0x01~0x40 :1~64

Type Code (2 Byte/4 Byte):

Reply Message Segment	Type Code (Single Point)	Length (Byte)
16 bit Register	0x57+0x58 : WX	2
	0x57+0x59 : WY	2
	0x57+0x4D : WM	2
	0x57+0x53 : WS	2
	0x57+0x54 : WT	2
	0x57+0x43 : WC	2
	0x52+0x54 : RT	2
	0x52+0x43 : RC	2
	0x52 : R	1
	0x44 : D	1
	0x46 : F	1
32 bit Register	0x44+0x57+0x58 : DWX	3
	0x44+0x57+0x59 : DWY	3
	0x44+0x57+0x4D : DWM	3
	0x44+0x57+0x53 : DWS	3
	0x44+0x57+0x54 : DWT	3
	0x44+0x57+0x43 : DWC	3
	0x44+0x52 : DR	2
	0x44+0x44 : DD	2
	0x44+0x46 : DF	2

Address (2 Byte):

Reply Message Segment	Address	Length
Content	0x00+0x00~0xFF+0xFF :1~65535 個	2

Register Value (2*n/4*n Byte):

Status of indicated single point	Description (16 Bit)	Description (32 Bit)
DATA1	0x00+0x00~ 0xFF+0xFF	0x00+0x00+0x00+0x00~ 0xFF+0xFF+0xFF+0xFF
DATA 2	0x00+0x00~ 0xFF+0xFF	0x00+0x00+0x00+0x00~ 0xFF+0xFF+0xFF+0xFF
DATA 3	0x00+0x00~ 0xFF+0xFF	0x00+0x00+0x00+0x00~ 0xFF+0xFF+0xFF+0xFF
⋮		
DATA n	0x00+0x00~ 0xFF+0xFF	0x00+0x00+0x00+0x00~ 0xFF+0xFF+0xFF+0xFF

The received and replied message is as follows:

Reply Message Segment	Starting Character	Valid Packet Number	Message Length	Message Content			CRC Checksum	Ending Character
				Salve Station Number	Command Code: 0x47	Error code: Refer to the table below		
Content	0x52	0x10 Fixed for use with the Binary communication protocol	0x00+0x03	Salve Station Number	Command Code: 0x47	Error code: Refer to the table below	CRC16-Modbus calculation of "Message Length" + "Message Content" producing High byte + Low byte	0x55+0xAA
Message Length (Unit: Byte)	1	1	2	1	1	1	2	2
Example: Slave Station Number 01, PLC	0x52	0x10	0x00+0x03	0x01	0x47	0x00	0x46+0x74	0x55+0xAA

Error Code (1 Byte):

Value (Hexadecimal)	Description
0x00	No error occurred.
0x02	Illegal value.
0x04	Illegal format, or communication format cannot be executed.
0x05	Unable to RUN PLC, checksum error in ladder diagram when PLC is running.
0x06	Unable to RUN PLC, ladder ID and PLC ID do not match when PLC is running.
0x07	Unable to RUN PLC, syntax error in PLC program when PLC is running.
0x09	Unable to RUN PLC, function not supported.
0x0A	Illegal address.

2.5.9. Random Mixed Read [CMD: 48H]

- **Description**
Mixed read the random discrete status or register data.

- **Payload**

(1) Query

STN(1)	CMD(1)	NUM(1)	TYPE 1(x)	ADDR 1(2)	TYPE 2(x)	ADDR 2(2)
			TYPE n-1(x)	ADDR n-1(2)	TYPE n(x)	ADDR n(2)		

(2) Response

STN(1)	CMD(1)	ERR(1)	DATA 1(y)	DATA 2(y)	...	DATA n(y)
--------	--------	--------	-----------	-----------	-----	-----------

Parameter	Description	Value
NUM	The reading count of discrete or register	01H~40H: 1~64
TYPE	The type of register	Please refer to 2.4 Component, x: byte count
ADDR	The address of register	
DATA	The value of register	n: the reading count of discrete or register y: byte count y = 1, discrete y = 2, 16-bit register y = 4, 32-bit register

- **Example**

Read the status and data of R1 , Y9 and DWM0 (i.e. M31~M0)

(1) Query

01H	48H	03H	52H	00H	01H	59H	00H	09H	44H	57H	4DH	00H	00H
			↑		↑		↑						
			R1		Y9		DWM0						

(2) Receive

01H	48H	00H	5CH	34H	01H	00H	35H	47H	BAH
			↑	↑	↑				
			R1	Y9	DWM0				

Sending command as follows:

Command Message Segment	Starting Character	Valid Packet Number	Message Length	Message Content								CRC Checksum	Ending Character	
				Slave Station Number	Command Code: 0x48	Quantity	Type n	Address n of register	...	Type m	Address m of register			
Content	0x51	0x10 Fixed for use with the Binary communication protocol	1+1+1+(n+2+...+m+2) , where n and m depend on the length of the Type, and n can differ from m in type.									CRC16-Modbus calculation of "Message Length" + "Message Content" producing High byte + Low byte	0x55+0xAA	
Message Length (Unit: Byte)	1	1	2	1	1	1	Referring Table	2			Referring Table	2	2	2
Example: Slave Station Number 01, DR15, D1	0x51	0x10	0x00+0x0A	0x01	0x48	0x02	0x44+0x52+0x00+0x0F+0x44+0x00+0x01					0x48+0xB2	0x55+0xAA	

Quantity (1 Byte):

Reply Message Segment	Quantity
Content	0x01~0x40 :1~64

Type Code (1-Byte/2 Byte/4 Byte):

Reply Message Segment	Type Code (Single Point)	Length (Byte)
Single Point	0x58 : X	1
	0x59 : Y	1
	0x4D : M	1
	0x53 : S	1
	0x54 : T	1
	0x43 : C	1
16 bit Register	0x57+0x58 : WX	2
	0x57+0x59 : WY	2
	0x57+0x4D : WM	2
	0x57+0x53 : WS	2
	0x57+0x54 : WT	2
	0x57+0x43 : WC	2
	0x52+0x54 : RT	2
	0x52+0x43 : RC	2
	0x52 : R	1
	0x44 : D	1
	0x46 : F	1
32 bit Register	0x44+0x57+0x58 : DWX	3
	0x44+0x57+0x59 : DWY	3
	0x44+0x57+0x4D : DWM	3
	0x44+0x57+0x53 : DWS	3
	0x44+0x57+0x54 : DWT	3
	0x44+0x57+0x43 : DWC	3
	0x44+0x52 : DR	2
	0x44+0x44 : DD	2
	0x44+0x46 : DF	2

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Address (2 Byte):

Reply Message Segment	Address	Length
Content	0x00+0x00~0xFF+0xFF :1~65535	2

The received and replied message is as follows:

Reply Message Segment	Starting Character	Valid Packet Number	Message Length	Message Content						CRC Checksum	Ending Character
				Slave Station Number	Command Code: 0x48	Error code: Refer to the table below	Value n in register	...	Value m in register		
Content	0x52	0x10 Fixed for use with the Binary communication protocol	1+1+1+(n+...+m)	Slave Station Number	Command Code: 0x48	Error code: Refer to the table below	Value n in register	...	Value m in register	CRC16-Modbus calculation of "Message Length" + "Message Content" producing High byte + Low byte	0x55+0xAA
Message Length (Unit: Byte)	1	1	2	1	1	1	Referring table for the Type Length	...	Referring table for the Type Length	2	2
Example: Slave Station Number 01, DR15=6, D1=0	0x52	0x10	0x00+0x09	0x01	0x48	0x00+(0x99+0x99+0x00+0x00)+(0x00+0x00)				0xDF+0x18	0x55+0xAA

Error Code (1 Byte):

Value (Hexadecimal)	Description
0x00	No error occurred.
0x02	Illegal value.
0x04	Illegal format, or communication format cannot be executed.
0x05	Unable to RUN PLC, checksum error in ladder diagram when PLC is running.
0x06	Unable to RUN PLC, ladder ID and PLC ID do not match when PLC is running.
0x07	Unable to RUN PLC, syntax error in PLC program when PLC is running.
0x09	Unable to RUN PLC, function not supported.
0x0A	Illegal address.

Register Value (1*n/2*n/4*n Byte):

Status of indicated single point	Description (Single Point)	Description (16 Bit)	Description (32 Bit)
DATA1	0x00 : OFF 0x01 : ON	0x00+0x00~ 0xFF+0xFF	0x00+0x00+0x00+0x00~ 0xFF+0xFF+0xFF+0xFF
DATA 2	0x00 : OFF 0x01 : ON	0x00+0x00~ 0xFF+0xFF	0x00+0x00+0x00+0x00~ 0xFF+0xFF+0xFF+0xFF
DATA 3	0x00 : OFF 0x01 : ON	0x00+0x00~ 0xFF+0xFF	0x00+0x00+0x00+0x00~ 0xFF+0xFF+0xFF+0xFF
		⋮	
DATA n	0x00 : OFF 0x01 : ON	0x00+0x00~ 0xFF+0xFF	0x00+0x00+0x00+0x00~ 0xFF+0xFF+0xFF+0xFF

2.5.10. Random Mixed Write [CMD: 49H]

- **Description**

Mixed write the random discrete status or register data.

- **Payload**

(1) Query

STN(1)	CMD(1)	NUM(1)	TYPE 1(x)	ADDR 1(2)	DATA 1(y)
--------	--------	--------	-----------	-----------	-----------

TYPE 2(x)	ADDR 2(2)	DATA 2(y)	TYPE n(x)	ADDR n(2)	DATA n(y)
-----------	-----------	-----------	-----	-----	-----	-----------	-----------	-----------

(2) Response

STN(1)	CMD(1)	ERR(1)
--------	--------	--------

Parameter	Description	Value
NUM	The writing count of discrete or register	01H~20H: 1~32
TYPE	The type of register	Please refer to 2.4 Component, x: byte count
ADDR	The address of register	
DATA	The value of register	n: the writing count of discrete or register y: byte count y = 1, discrete y = 2, 16-bit register y = 4, 32-bit register

- **Example**

Set the status of Y0 at 1, Y1 at 0, 16-bit register WM8 at 5555H, 32-bit register DR2 at FFH.

(1) Query

01H	49H	04H	59H	00H	00H	01H	59H	00H	01H	00H
			↑ Y0			↑ Y1				

57H	4DH	00H	08H	55H	55H	44H	52H	00H	02H	00H	00H	00H	FFH
↑ WM8						↑ DR2							

(2) Receive

01H	49H	00H
-----	-----	-----

Sending command as follows:

Command Message Segment	Starting Character	Valid Packet Number	Message Length	Message Content										CRC Checksum	Ending Character	
				Slave Station Number	Command Code: 0x49	Quantity	Type 1	Address of register 1	Data to be written into Register 1	...	Type n	Register Address n	Data to be written into Register n			
Content	0x51	0x10 Fixed for use with the Binary communication protocol	1+1+1+(2+Type Length+Register Data Length), where n depends on the Type Length												CRC16-Modbus calculation of "Message Length" + "Message Content" producing High byte + Low byte	0x55 + 0xAA
Message Length (Unit: Byte)	1	1	2	1	1	1	Referring Table	2	Referring table for the Type Length	...	Referring Table	2	Referring table for the Type Length	2	2	

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									h				h		
Example: Slave Station Number 01, WR0=15, R15=255	0x51	0x10	0x00 +0x10	0x01	0x49	0x02	0x44+0x52+0x00+0x00+0x00+0x00+0x00+0x00+0x52+0x00+0x0F+0x00+0x0F					0x37 +0x89	0x55 + 0xAA		

Quantity (1 Byte):

Reply Message Segment	Quantity
Content	0x01~0x40 :1~64

Type Code (1-Byte/2 Byte/4 Byte):

Reply Message Segment	Type Code (Single Point)	Length (Byte)
Single Point	0x58 : X	1
	0x59 : Y	1
	0x4D : M	1
	0x53 : S	1
	0x54 : T	1
	0x43 : C	1
16 bit Register	0x57+0x58 : WX	2
	0x57+0x59 : WY	2
	0x57+0x4D : WM	2
	0x57+0x53 : WS	2
	0x57+0x54 : WT	2
	0x57+0x43 : WC	2
	0x52+0x54 : RT	2
	0x52+0x43 : RC	2
	0x52 : R	1
	0x44 : D	1
	0x46 : F	1
	32 bit Register	0x44+0x57+0x58 : DWX
0x44+0x57+0x59 : DWY		3
0x44+0x57+0x4D : DWM		3
0x44+0x57+0x53 : DWS		3
0x44+0x57+0x54 : DWT		3
0x44+0x57+0x43 : DWC		3
0x44+0x52 : DR		2
0x44+0x44 : DD		2
0x44+0x46 : DF		2

Address (2 Byte):

Reply Message Segment	Address	Length
Content	0x00+0x00~0xFF+0xFF :1~65535	2

Register Value (1*n/2*n/4*n Byte):

Status of indicated single point	Description (Single Point)	Description (16 Bit)	Description (32 Bit)
DATA1	0x00 : OFF 0x01 : ON	0x00+0x00~ 0xFF+0xFF	0x00+0x00+0x00+0x00~ 0xFF+0xFF+0xFF+0xFF
DATA 2	0x00 : OFF 0x01 : ON	0x00+0x00~ 0xFF+0xFF	0x00+0x00+0x00+0x00~ 0xFF+0xFF+0xFF+0xFF
DATA 3	0x00 : OFF 0x01 : ON	0x00+0x00~ 0xFF+0xFF	0x00+0x00+0x00+0x00~ 0xFF+0xFF+0xFF+0xFF
		.	
		.	
		.	
DATA n	0x00 : OFF 0x01 : ON	0x00+0x00~ 0xFF+0xFF	0x00+0x00+0x00+0x00~ 0xFF+0xFF+0xFF+0xFF

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The received and replied message is as follows:

Reply Message Segment	Starting Character	Valid Packet Number	Message Length	Message Content			CRC Checksum	Ending Character
				Salve Station Number	Command Code:	Error code:		
Content	0x52	0x10 Fixed for use with the Binary communication protocol	0x00 +0x03		0x49	Refer to the table below	CRC16-Modbus calculation of "Message Length" + "Message Content" producing High byte + Low byte	0x55+ 0xAA
Message Length (Unit: Byte)	1	1	2	1	1	1	2	2
Example: Slave Station Number 01	0x52	0x10	0x00 +0x03	0x01	0x49	0x00	0x42+0x 14	0x55+ 0xAA

Error Code (1 Byte):

Value (Hexadecimal)	Description
0x00	No error occurred.
0x02	Illegal value.
0x04	Illegal format, or communication format cannot be executed.
0x05	Unable to RUN PLC, checksum error in ladder diagram when PLC is running.
0x06	Unable to RUN PLC, ladder ID and PLC ID do not match when PLC is running.
0x07	Unable to RUN PLC, syntax error in PLC program when PLC is running.
0x09	Unable to RUN PLC, function not supported.
0x0A	Illegal address.

2.5.11. Loop Back [CMD: 4EH]

- **Description**

This command makes PLC respond all test data back to Master. It is only for testing the communication condition between Master and PLC and it will not influence the PLC function.

- **Payload**

(1) Query

STN(1)	CMD(1)	DATA(n)
--------	--------	---------

(2) Rspnse

STN(1)	CMD(1)	DATA(n)
--------	--------	---------

Parameter	Description	Value
DATA	Testing data	n: data length (bytes)

- **Example**

Use this command to send the data "ABCDEFGG" from Master to PLC to rest weather the PLC respond normally.

(1) Query

01H	4EH	41H	42H	43H	44H	45H	46H	47H
-----	-----	-----	-----	-----	-----	-----	-----	-----

(2) Rspnse

01H	4EH	41H	42H	43H	44H	45H	46H	47H
-----	-----	-----	-----	-----	-----	-----	-----	-----

Sending command as follows:

Message Section	Start Character	Valid Packet Number	Message Length	Message Content			CRC Check	End Character
Content	0x51	0x10 Fixed for Binary communication protocol	1 + 1 + n, where n depends on the length of test data	Slave Station Number	Command Code: 0x4E	Test Data	CRC16-Modbus calculation of "Message Length" + "Message Content" producing High byte + Low byte	0x55+ 0xAA
Message Length (Bytes)	1	1	2	1	1	Test Data Length	2	2
Example: Slave Station Number: 01, Test Code 0xFF + 0xFF	0x51	0x10	0x00 + 0x04	0x01	0x4E	0xFF+0xFF	0x91 + 0x80	0x55+ 0xAA

Register Value (n Byte):

Status of the indicated single point	Description (Single Point)
DATA	Test Data

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The received and replied message is as follows:

Reply Message Section	Start Character	Valid Packet Number	Message Length	Message Content			CRC Check	End Character
				Slave Station Number	Command Code: 0x4E	Test Data Resend		
Content	0x52	0x10 Fixed for Binary communication protocol	0x00 +0x03	Slave Station Number	Command Code: 0x4E	Test Data Resend	CRC16-Modbus calculation of "Message Length" + "Message Content" producing High byte + Low byte	0x55+ 0xAA
Message Length (Bytes)	1	1	2	1	1	Testing data length	2	2
Example: Slave Station Number: 01, Test Code 0xFF + 0xFF	0x52	0x10	0x00 +0x04	0x01	0x4E	0xFF+0xFF	0x91 +0x80	0x55+ 0xAA

Register Value (n Byte):

Status of the indicated single point	Description (Single Point)
DATA	Test Data

Error Code (1 Byte):

Value (Hexadecimal)	Description
0x00	No error occurred.
0x02	Illegal value.
0x04	Illegal format, or communication format cannot be executed.
0x05	Unable to RUN PLC, checksum error in ladder diagram when PLC is running.
0x06	Unable to RUN PLC, ladder ID and PLC ID do not match when PLC is running.
0x07	Unable to RUN PLC, syntax error in PLC program when PLC is running.
0x09	Unable to RUN PLC, function not supported.

Command Code (1 Byte):

Value (Hexadecimal)	Description	Command Length	Control Data Length
0x40	PLC Status Inquiry	1	-
0x41	PLC RUN/STOP Ctrol	1	-
0x42	Single Point Operation Control	1	1
0x43	Read Enable/Disable Status of Multiple Consecutive Points	1	1~256
0x44	Read Status of Multiple Consecutive Points	1	1~256
0x45	Write Status to Multiple Consecutive Points	1	1~256
0x46	Read Data from Multiple Consecutive Registers	1	1~64
0x47	Write Data to Multiple Consecutive Registers	1	1~64
0x48	Read Mixed Data of Multiple Arbitrary Points or Registers	1	1~64
0x49	Write Mixed Data of Multiple Arbitrary Points or Registers	1	1~32
0x4E	Test Return	1	0~256