FATEK®

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
v.0.3	2024/12/06	Eric Kuo	Add new frame sample

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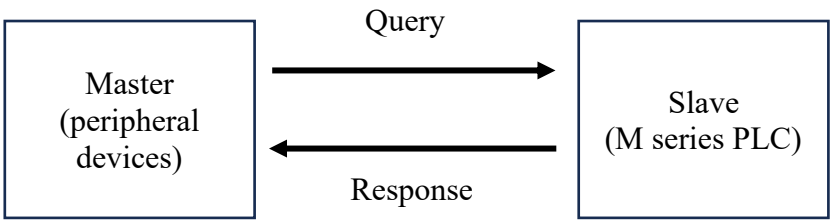
1.Message

M series PLC is defined as slaves in the communication with peripheral devices that are always defined as masters when communicate with M series PLC.

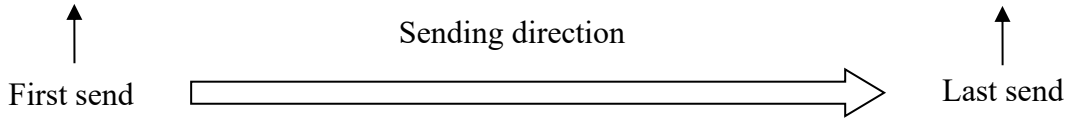
All the peripheral devices send the message when communicate with M series PLC and its respond when receive the message from masters.



M series PLC communication ports support Type C, COM1 and COM2, as well as TCP/IP communication.

The format of the command message sent by the master is as follows:

Command Message Segment	Headler	ID	Length	Payload	CRC		Terminator
Content	0x51	0x10 Fixed for use with the Binary communication protocol	N(Based on the message length.)	M(Based on the issued commands and their content.) The next section will explain the message structure.	CRC16-Modbus calculation of "Message Length" + "Message Content" producing High byte + Low byte		0x55+ 0xAA
					Hight byte	Low byte	
Message length (unit: Byte)	1	1	2	M	2		2



① **Headler**: The beginning of a message. The command and response messages have the same starting characters "0x51" (hexadecimal), which the M series PLC will use to identify the beginning of the transmitted data.

② **ID**: The number for the binary communication protocol is fixed at 0x10.

③ **Length**: Total bytes of payload.

④ **Payload**: The data comprises a command message or a response message.

⑤ **CRC**: The M series PLC uses CRC16-Modbus for verification. After calculating the CRC16-Modbus checksum on the "length" and "payload," a checksum is generated in the sequence of High byte + Low byte. The detailed algorithm is as follows:

(1) Set the CRC calculation output variable to an initial value of 0xFFFF (2 bytes).

(2) Perform an XOR operation between the 1-byte data to be calculated and the lower byte of the CRC output variable.

(3) Create a FOR loop and check the LSB (Least Significant Bit) of the CRC output variable a total of 8 times:

◎ If the rightmost LSB is 1, right-shift the CRC output variable by one bit and perform an XOR operation with 0xA001.

◎ If the rightmost LSB is 0, simply right-shift the CRC output variable by one bit.

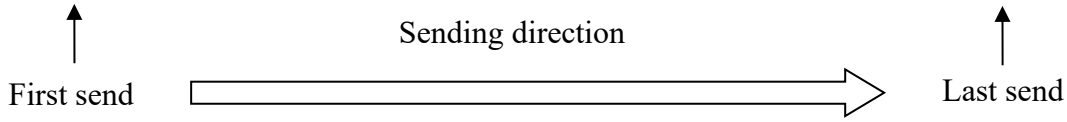
(4) After completing the CRC calculation for this byte, return to step 2 and retrieve the next data byte to continue the CRC calculation until all data bytes are processed.

(5) Swap the high and low bytes of the CRC output variable, which will then be the final checksum.

⑥ **Terminator**: The end of a message. The command and response messages have the same ending characters: "0x55" (hexadecimal) and "0xAA" (hexadecimal). The M PLC uses these characters to recognize the end of the transmitted data.

The format of the response message from the slave after receiving the command is as follows:

Reply Message Segment	Headler	ID	Length	Payload	CRC		Terminator
Content	0x52	0x10 Fixed for use with the Binary communication protocol	N(Based on the message length.)	M(Based on the issued commands and their content.) The next section will explain the message structure.	CRC16-Modbus calculation of "Message Length" + "Message Content" producing High byte + Low byte		0x55+ 0xAA
					Hight byte	Low byte	
Message length (unit: Byte)	1	1	2	M	2		2



① **Headler**: The beginning of a message. The command and response messages have the same starting characters "0x52" (hexadecimal), which the M series PLC will use to identify the beginning of the transmitted data.

② **ID**: The number for the binary communication protocol is fixed at 0x10.

③ **Length**: Total bytes of payload.

④ **Payload**: The data comprises a command message or a response message.

⑤ **CRC**: The M series PLC uses CRC16-Modbus for verification. After calculating the CRC16-Modbus checksum on the "length" and "payload," a checksum is generated in the sequence of High byte + Low byte. The detailed algorithm is as follows:

(1) Set the CRC calculation output variable to an initial value of 0xFFFF (2 bytes).

(2) Perform an XOR operation between the 1-byte data to be calculated and the lower byte of the CRC output variable.

(3) Create a FOR loop and check the LSB (Least Significant Bit) of the CRC output variable a total of 8 times:

◎If the rightmost LSB is 1, right-shift the CRC output variable by one bit and perform an XOR operation with 0xA001.

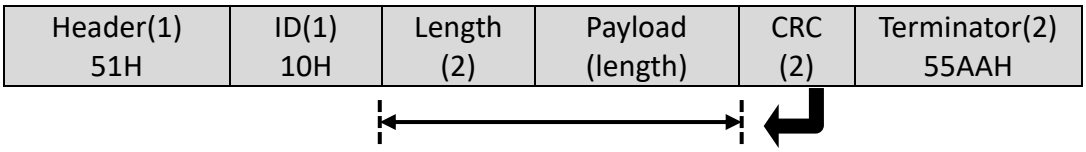
◎If the rightmost LSB is 0, simply right-shift the CRC output variable by one bit.

(4) After completing the CRC calculation for this byte, return to step 2 and retrieve the next data byte to continue the CRC calculation until all data bytes are processed.

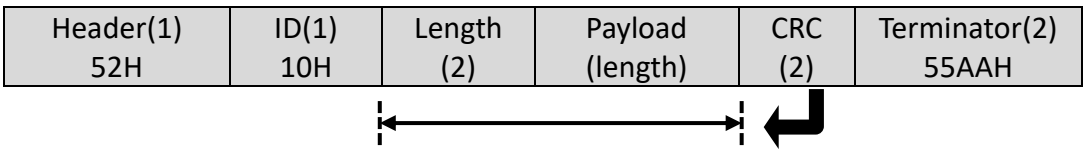
(5) Swap the high and low bytes of the CRC output variable, which will then be the final checksum.

⑥ **Terminator**: The end of a message. The command and response messages have the same ending characters: "0x55" (hexadecimal) and "0xAA" (hexadecimal). The M PLC uses these characters to recognize the end of the transmitted data.

- **Query**



- **Response**



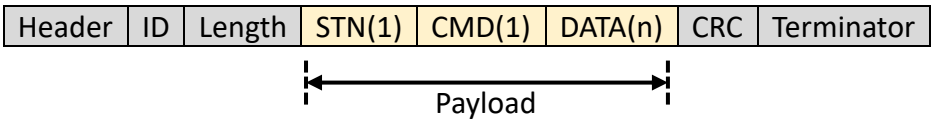
- **Parameter**

Item	Length	Description	Value
Header	1 byte	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	Total bytes of payload	
Payload	n bytes	The data comprises a query message or a response message.	Refer to 2
CRC	2 bytes	Use CRC-16 Modbus, calculating range include length and payload	
Terminator	2 bytes	The end of a message.	55AAH: default terminator

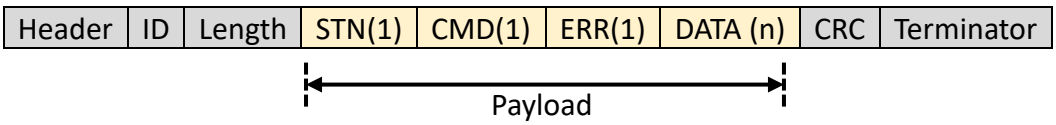
2.Payload

2.1. Format

- **Query**



- **Response**



- **Parameter**

Item	Description	Length	Value
STN	The station number of a device.	1 byte	00H: broadcast 01H~FEH: slave station
CMD	The command to request device.	1 byte	Refer to 2.2 Command code
ERR	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. The Description of Communication Command

- The description of communication command：

Command code	Function 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. The Communication Error Code of M series PLC

If the error happened in OS command, address, value area of software operation or hardware problem will cause the slave system can not process the command comes from master system. If there is error happened, slave system will respond the message to master system. No matter what command code or data the master system sends, the format of responding message is all the same. Including the required start code, end code and checksum value, the command code and station No. will be sent back to master system. The slave system will judge what kind of the error and respond the error code to master system.

- Following table is the response format of communication error of M series PLC：

Error code	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（Snytax check error when run PLC）
09H	Can not run（Function not supported）
0AH	Illegal address

2.4. The Classification and Assignment of Components

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**

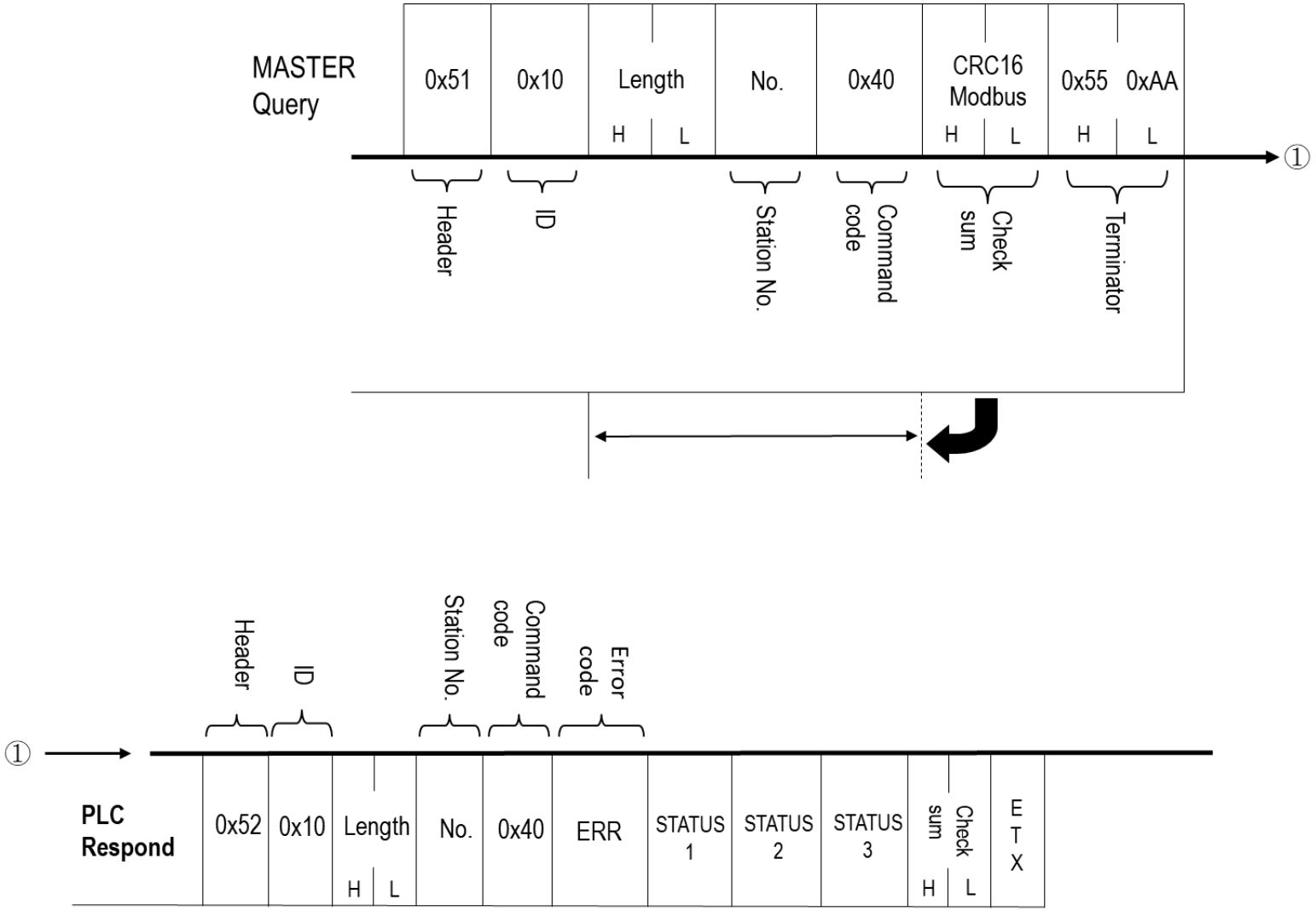
If the PLC is equipped with Memory Card and ID is set and PLC status is “RUN” under normal condition, the system status of PLC which MASTER read will be as following: （B5,B3, and B0 are 1 and the other are all 0 that the STATUS is 29H）。

(1) Query

01H	40H

(2) Response

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


MASTER
Query
0x51
0x10
Length
H
L
No.
0x40
CRC16
Modbus
H
L
0x55
0xAA
H
L
①
Header
ID
Station No.
Command code
Check sum
Terminator
①
Header
ID
Station No.
Command code
Error code
PLC
Respond
0x52
0x10
Length
H
L
No.
0x40
ERR
STATUS 1
STATUS 2
STATUS 3
Check sum
H
L
E T X

The command to be sent is as follows:

Command Message Segment	Header	ID	Message Length	Message Content		CRC Checksum	Terminator
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	Header	ID	Message Length	Message Content				CRC Checksum	Terminator
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 +x0x 00 +0x00	0xD5+0 x 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) Rsponse

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

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

- **Example**

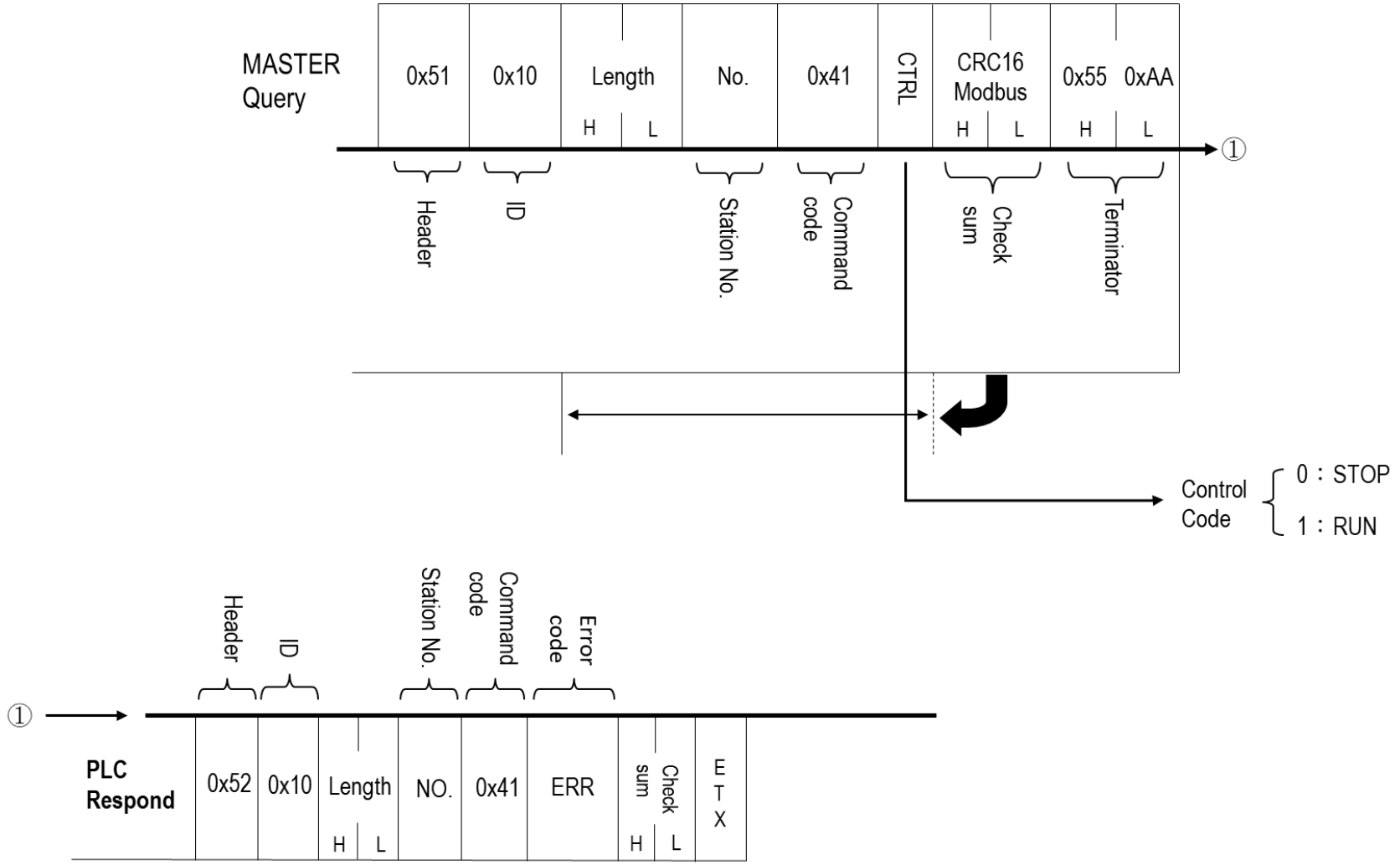
  Turn on PLC to “RUN”

  (1) Query

01H	41H	01H

  (2) Rsponse

01H	41H	00H


MASTER
Query
0x51
0x10
Length
H
L
No.
0x41
CTRL
CRC16
Modbus
H
L
0x55
0xAA
H
L
①
Header
ID
Station No.
Command
code
Check
sum
Terminator
Control
Code
0 : STOP
1 : RUN
Header
ID
Station No.
Command
code
Error
code
①
PLC
Respond
0x52
0x10
Length
H
L
NO.
0x41
ERR
Check
sum
H
L
E
T
X

The command to be sent is as follows:

Command Message Segment	Header	ID	Message Length	Message Content			CRC Checksum	Terminator
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+0xD4	0x55+ 0xAA

Control Code (1 Byte):

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

The received and replied message is as follows:

Reply Message Segment	Header	ID	Message Length	Message Content			CRC Checksum	Terminator
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+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.

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**

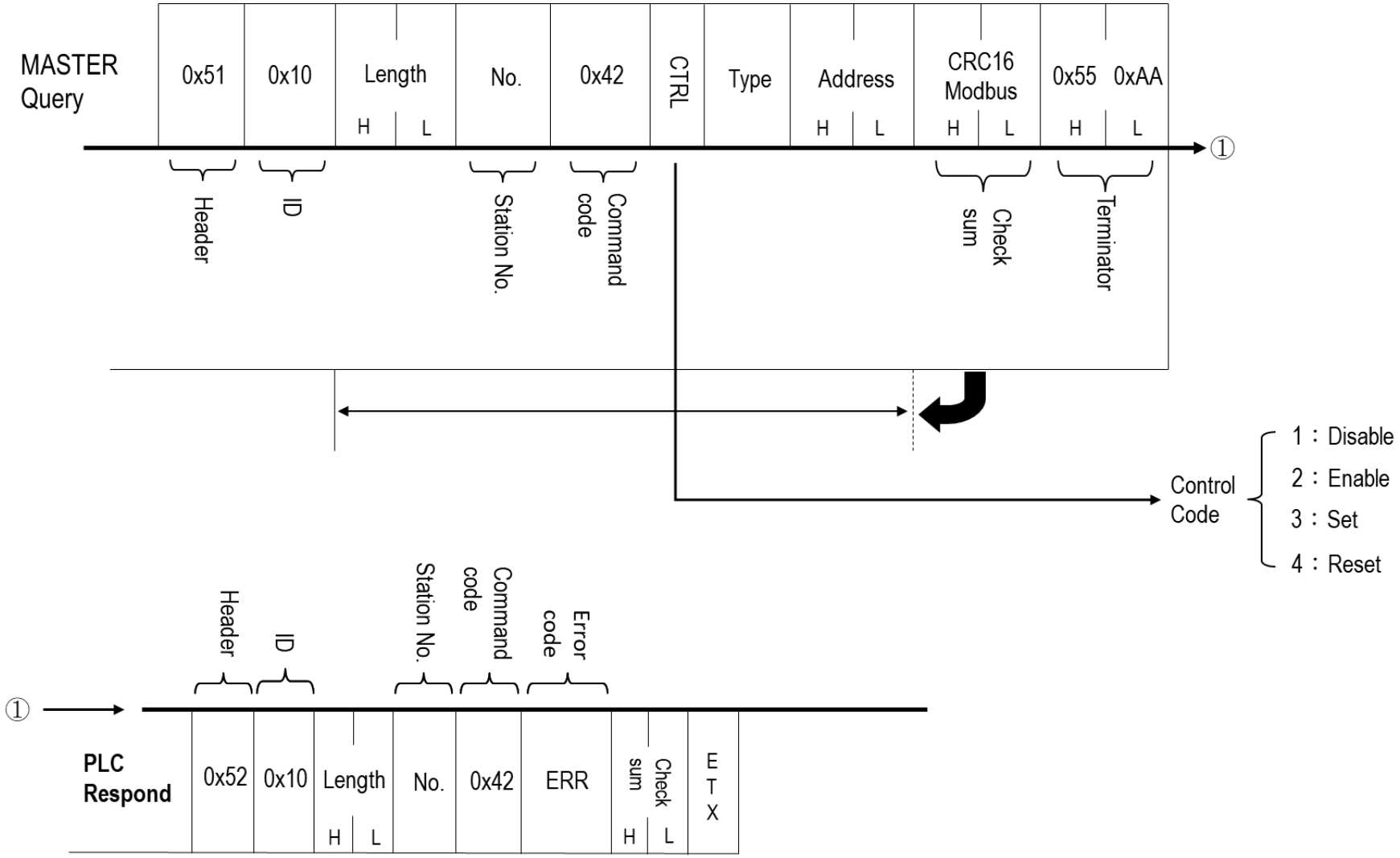
  The following communication format is the example to DISABLE the discrete X16.

  (1) Query

01H	42H	01H	58H	00H	10H
			↑ X16		

  (2) Response

01H	42H	00H


MASTER
Query
0x51
0x10
Length
H
L
No.
0x42
CTRL
Type
Address
H
L
CRC16
Modbus
H
L
0x55
0xAA
H
L
①
Header
ID
Station No.
Command code
Check sum
Terminator
Control Code
1：Disable
2：Enable
3：Set
4：Reset
①
Header
ID
Station No.
Command code
Error code
PLC
Respond
0x52
0x10
Length
H
L
No.
0x42
ERR
Check sum
H
L
E T X

The command to be sent is as follows:

Command Message Segment	Header	ID	Message Length	Message Content					CRC Checksum	Terminator
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	Control Code:	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	0x42	0x03	0x59	0x00+0x64	0x8E+0x69	0x55+ 0xAA

Control Code (1 Byte):

Reply Message Segment	Control Code
Content	0x00 : Disable 0x01 : Enable 0x02 : Set 0x03 : Reset

Type

Reply Message Segment	Type(single point)	Length
Content	0x58 : X	1
	0x59 : Y	1
	0x4D : M	1
	0x53 : S	1

	0x54 : T	1
	0x43 : C	1

The received and replied message is as follows:

Reply Message Segment	Header	ID	Message Length	Message Content			CRC Checksum	Terminator
Content	0x52	0x10 Fixed for use with the Binary communication protocol	0x00 +0x03	Slave Station Number	Command Code: 0x42	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	0x42	0x00	0x24+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.

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**

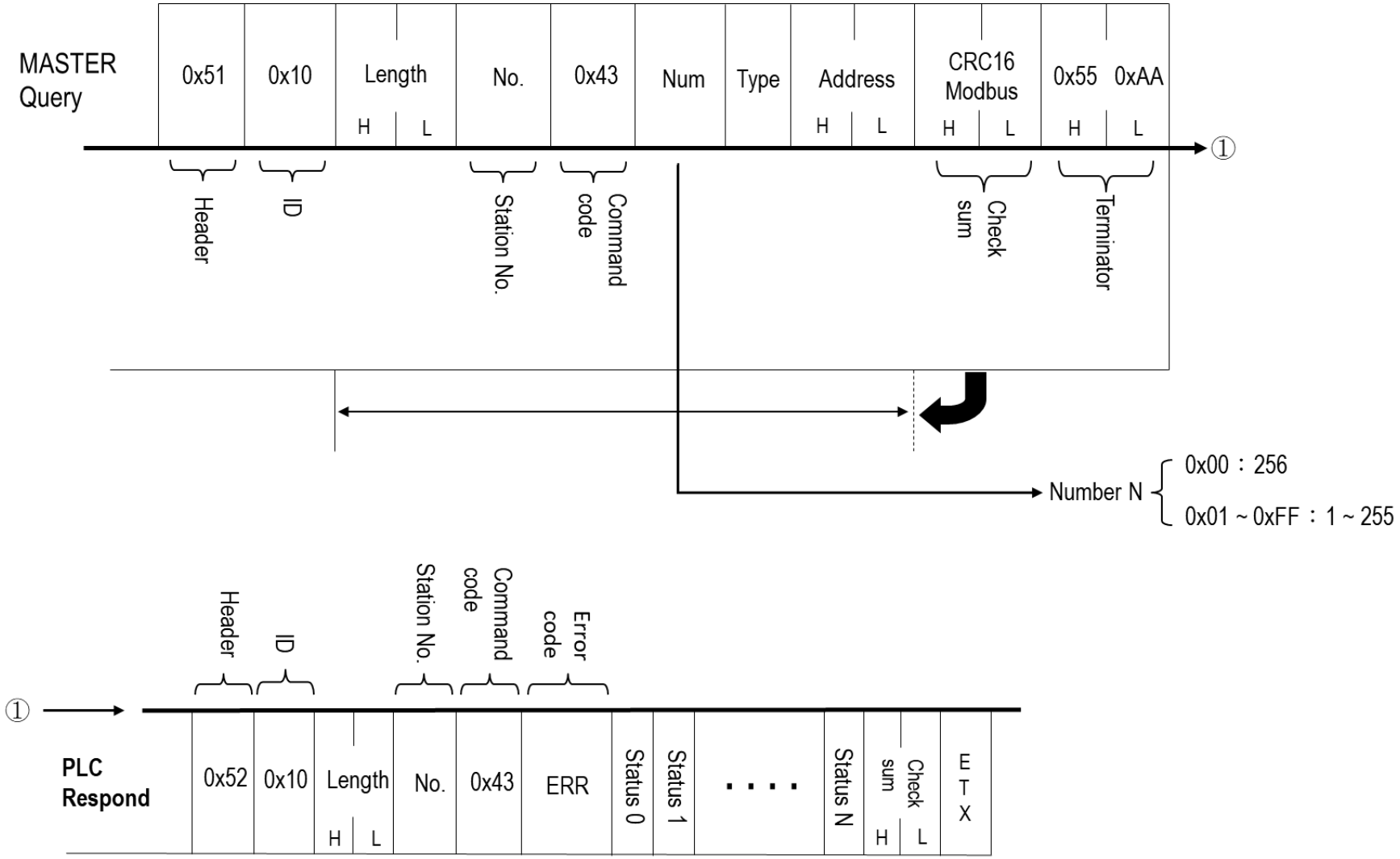
If Y10～Y16 of the continuous 7 discrete, Y10，Y12，Y16 are DISABLE and the others are all ENABLE, the PLC status of this command reading is as following.

(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


MASTER
Query
0x51
0x10
Length
H
L
No.
0x43
Num
Type
Address
H
L
CRC16
Modbus
H
L
0x55
0xAA
H
L
①
Header
ID
Station No.
Command code
Check sum
Terminator
Number N
0x00 : 256
0x01 ~ 0xFF : 1 ~ 255
Header
ID
Station No.
Command code
Error code
①
PLC
Respond
0x52
0x10
Length
H
L
No.
0x43
ERR
Status 0
Status 1
. . . .
Status N
Check sum
H
L
E T X

Sending the command:

Command Message Segment	Header	ID	Message Length	Message Content					CRC Checksum	Terminator
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

The received and replied messages are as follows:

Reply Message Segment	Header	ID	Message Length	Message Content				CRC Checksum	Terminator
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+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.

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**

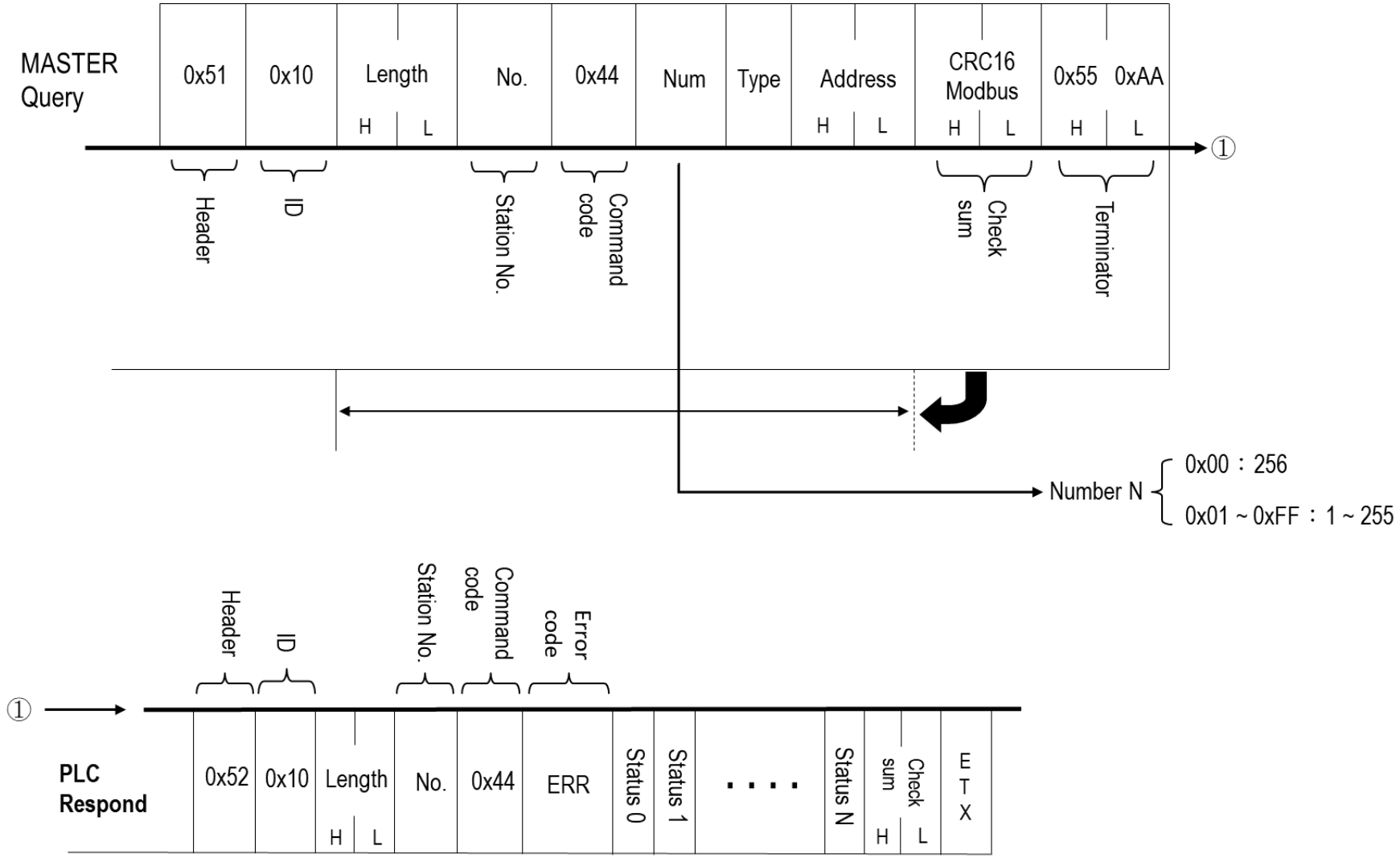
If the status of X50, X52, X55 are all 0 and X51, X53, X54 are all 1, following is the status of reading the continuous 6 inputs（X50～X55）

(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


MASTER
Query
0x51
0x10
Length
H
L
No.
0x44
Num
Type
Address
H
L
CRC16
Modbus
H
L
0x55
0xAA
H
L
①
Header
ID
Station No.
Command code
Check sum
Terminator
Number N
0x00 : 256
0x01 ~ 0xFF : 1 ~ 255
Header
ID
Station No.
Command code
Error code
①
PLC
Respond
0x52
0x10
Length
H
L
No.
0x44
ERR
Status 0
Status 1
. . . .
Status N
Check sum
H
L
E T X

This command reads the status of specified single points.

Command Message Segment	Header	ID	Message Length	Message Content					CRC Checksum	Terminator
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+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

The received and replied message is as follows:

Reply Message Segment	Header	ID	Message Length	Message Content				CRC Checksum	Terminator
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**

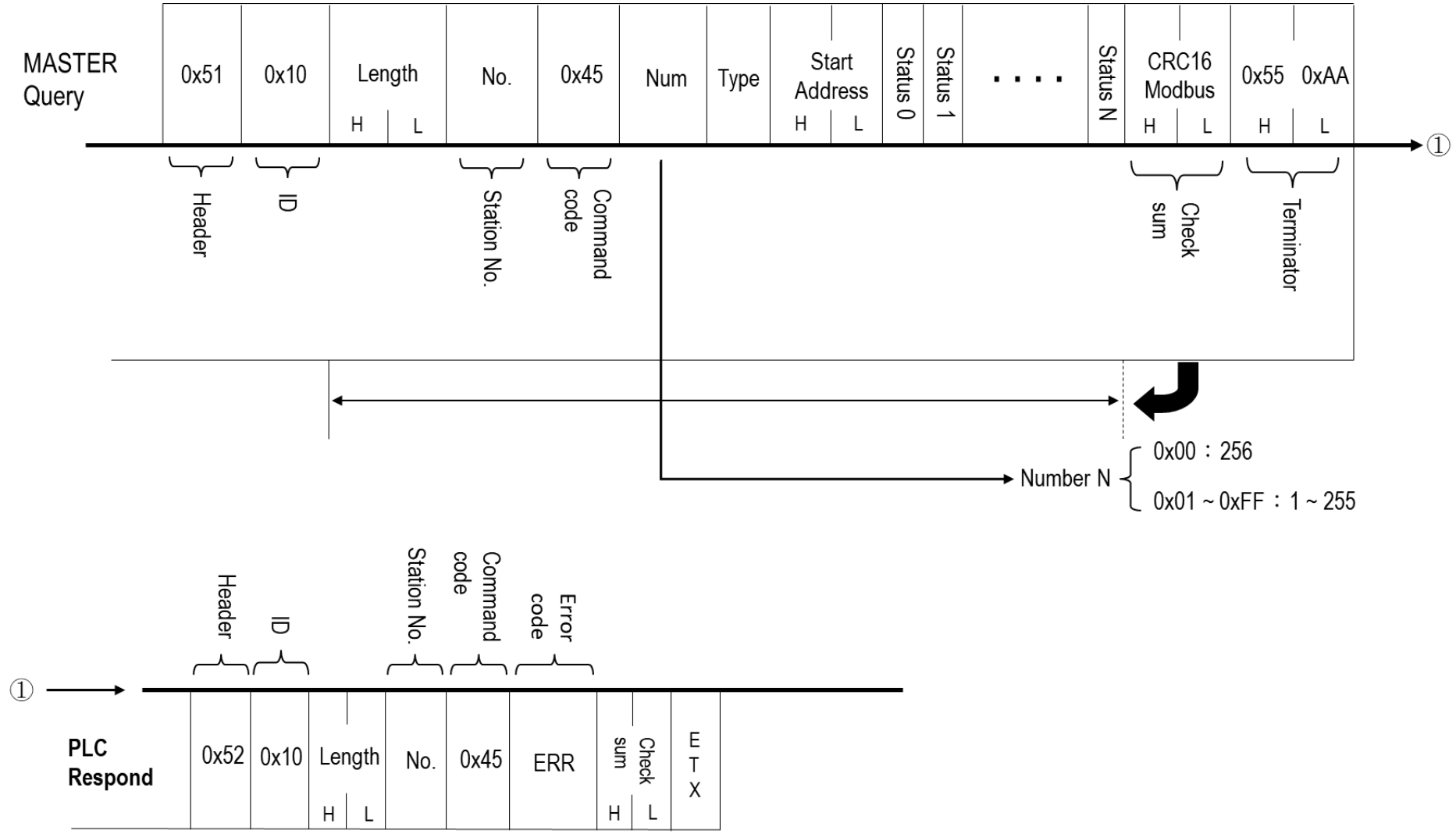
Write the status to continuous 4 outputs（Y0～Y3）, Y0 and Y3 are 1, Y1 and Y2 are 0

(1) Query

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

(2) Receive

01H	45H	00H


MASTER Query
0x51
0x10
Length
H
L
No.
0x45
Num
Type
Start Address
H
L
Status 0
Status 1
. . . .
Status N
CRC16 Modbus
H
L
0x55
0xAA
H
L
①
Header
ID
Station No.
Command code
Check sum
Terminator
Number N
0x00 : 256
0x01 ~ 0xFF : 1 ~ 255
Header
ID
Station No.
Command code
Error code
①
PLC Respond
0x52
0x10
Length
H
L
No.
0x45
ERR
Check sum
H
L
E T X

Sending Command as Follows:

Command Message Segment	Header	ID	Message Length	Message Content						CRC Checksum	Terminator
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	CRC 16-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 0x01:Set	1
STATUS2	0x00:Reset 0x01:Set	1
STATUS3	0x00:Reset 0x01:Set	1

.
.
.

STATUSn	0x00:Reset 0x01:Set	1

The received and replied message is as follows:

Reply Message Segment	Header	ID	Message Length	Message Content			CRC Checksum	Terminator
Content	0x52	0x10 Fixed for use with the Binary communicati	0x00 +0x03	Slave Station Number	Command Code:0x45	Error code: Refer to	CRC16-Modbus calculation of	0x55+ 0xAA

		on protocol				the table below	"Message Length" + "Message Content" producing High byte + Low byte	
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+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.

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**

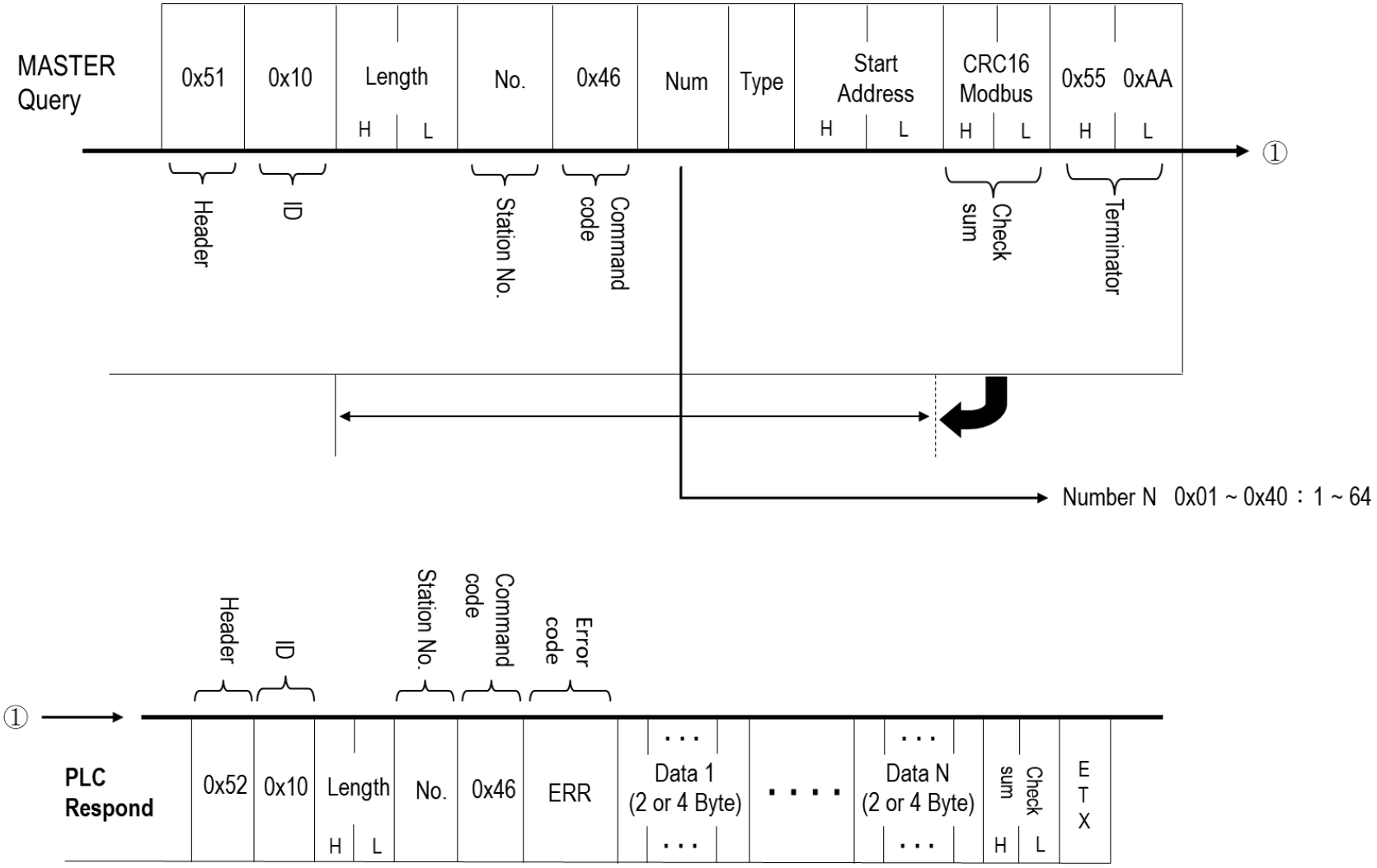
  Read the data of continuous 3 16-bit registers and start with R12.（R12，R13，R14）

  (1) Query

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

  (2) Response

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


MASTER Query
0x51
0x10
Length
H
L
No.
0x46
Num
Type
Start Address
H
L
CRC16 Modbus
H
L
0x55
0xAA
H
L
①
Header
ID
Station No.
Command code
Check sum
Terminator
Number N 0x01 ~ 0x40 : 1 ~ 64
Header
ID
Station No.
Command code
Error code
①
PLC Respond
0x52
0x10
Length
H
L
No.
0x46
ERR
Data 1 (2 or 4 Byte)
Data N (2 or 4 Byte)
Check sum
H
L
E T X

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

Command Message Segment	Header	ID	Message Length	Message Content					CRC Checksum	Terminator
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

The received and replied message is as follows:

Reply Message Segment	Header	ID	Message Lengt	Message Content	CRC Checksum	Terminator

			h						
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	Slave Station Number	Command Code: 0x46	Error code: Refer to the table below	Values in 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	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+0x 4B	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**

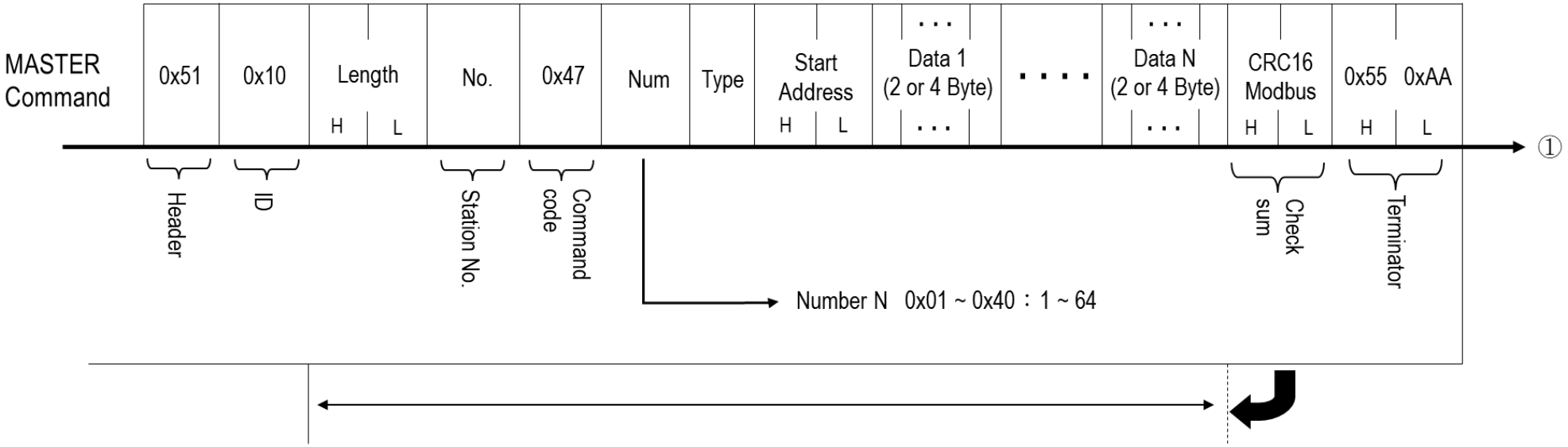
Input AAAAH to the 16-bit register WY16 and input 5555H to WY32. This is the format of input data to continuous register because WY16 and WY32 are continuous.

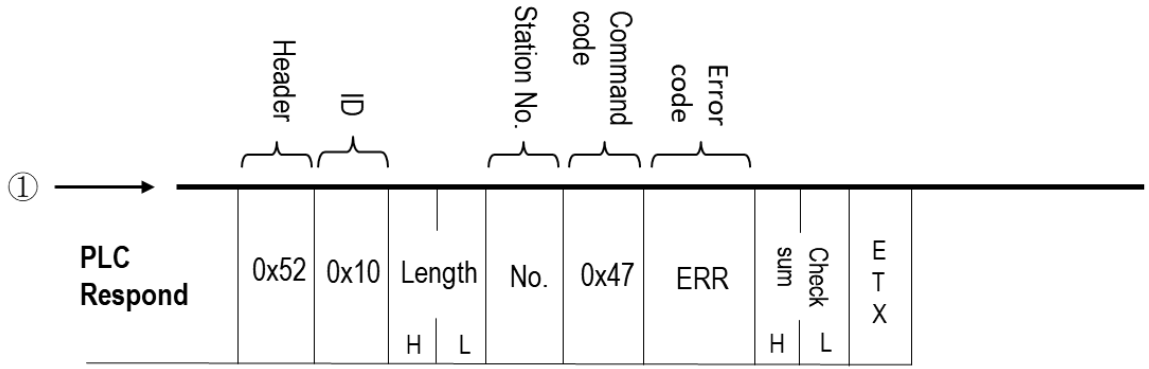
(1) Query

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

(2) Receive

01H	47H	00H


MASTER Command
0x51
0x10
Length
H
L
No.
0x47
Num
Type
Start Address
H
L
Data 1 (2 or 4 Byte)
Data N (2 or 4 Byte)
CRC16 Modbus
H
L
0x55
0xAA
H
L
①
Header
ID
Station No.
Command code
Check sum
Terminator
Number N 0x01 ~ 0x40 : 1 ~ 64


①
Header
ID
Station No.
Command code
Error code
PLC Respond
0x52
0x10
Length
H
L
No.
0x47
ERR
Check sum
H
L
E T X

Sending command as follows:

Command Message Segment	Header	ID	Message Length	Message Content						CRC Checksum	Terminator
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	Address of the Register	The data to be written into the registers	CRC 16-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	Header	ID	Message Length	Message Content			CRC Checksum	Terminator
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**

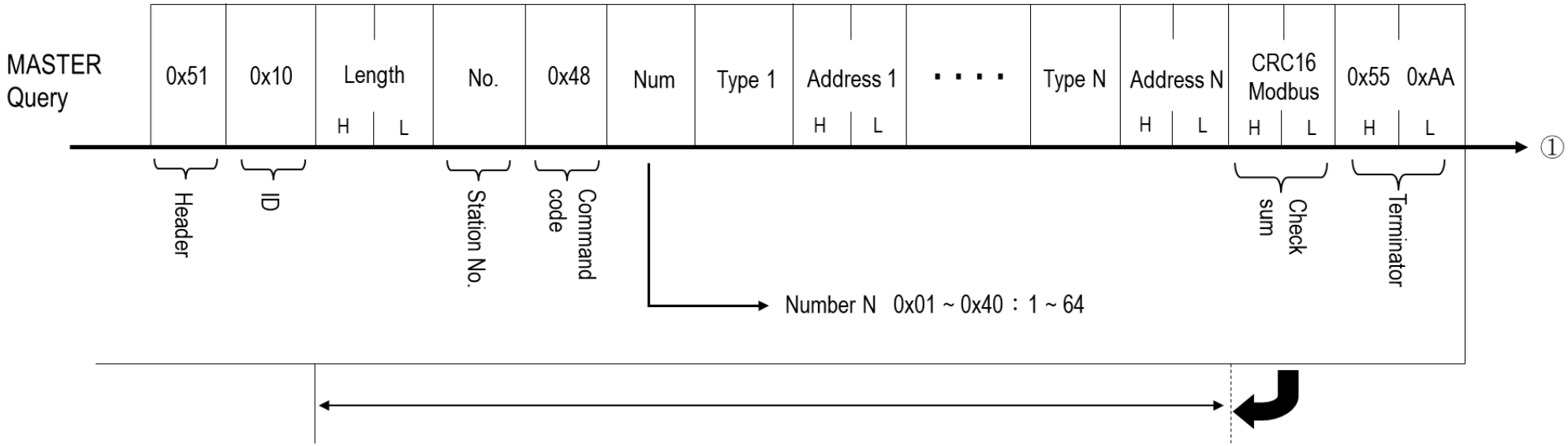
  Read the status and data of R1，Y9 and DWM0（i.e. M31～M0）

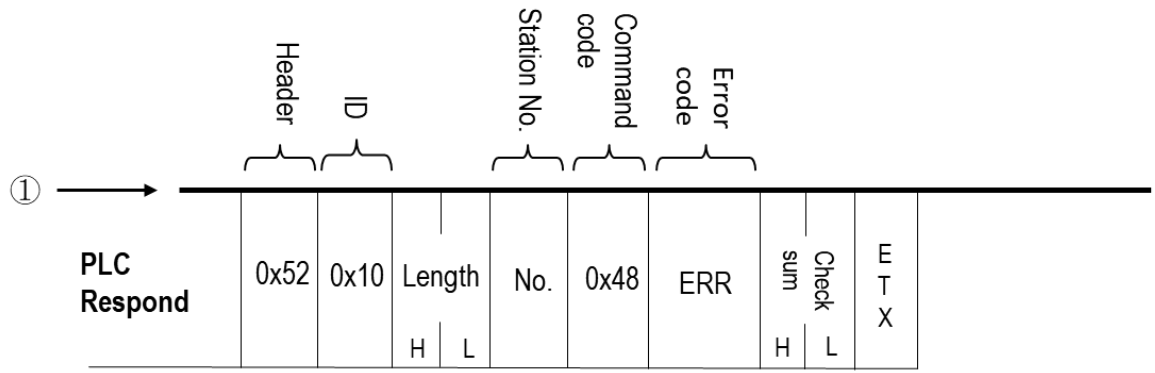
  (1) Query

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			


MASTER Query
0x51
0x10
Length
H
L
No.
0x48
Num
Type 1
Address 1
H
L
· · · ·
Type N
Address N
H
L
CRC16 Modbus
H
L
0x55
0xAA
H
L
①
Header
ID
Station No.
Command code
Check sum
Terminator
Number N 0x01 ~ 0x40 : 1 ~ 64


①
Header
ID
Station No.
Command code
Error code
PLC Respond
0x52
0x10
Length
H
L
No.
0x48
ERR
Check sum
H
L
E T X

Sending command as follows:

Command Message Segment	Header	ID	Message Length	Message Content								CRC Checksum	Terminator
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.	Salve Station Number	Command Code: 0x48	Quantity	Typen	Address n of register	…	Typem	Address m of register	CRC 16-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, DR1	0x51	0x10	0x00 +0x0A	0x01	0x48	0x02	0x44+0x52+0x00+0x0F+0x44+0x00+0x01					0x48 +0xB2	0x55 + 0xAA

5, D1									

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

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	Hea	ID	Message	Message Content	CRC	Ter

Message Segment	der		Length							Checksum	minator
Content	0x52	0x10 Fixed for use with the Binary communication protocol	1+1+1+(n+…+m)	Salve 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.

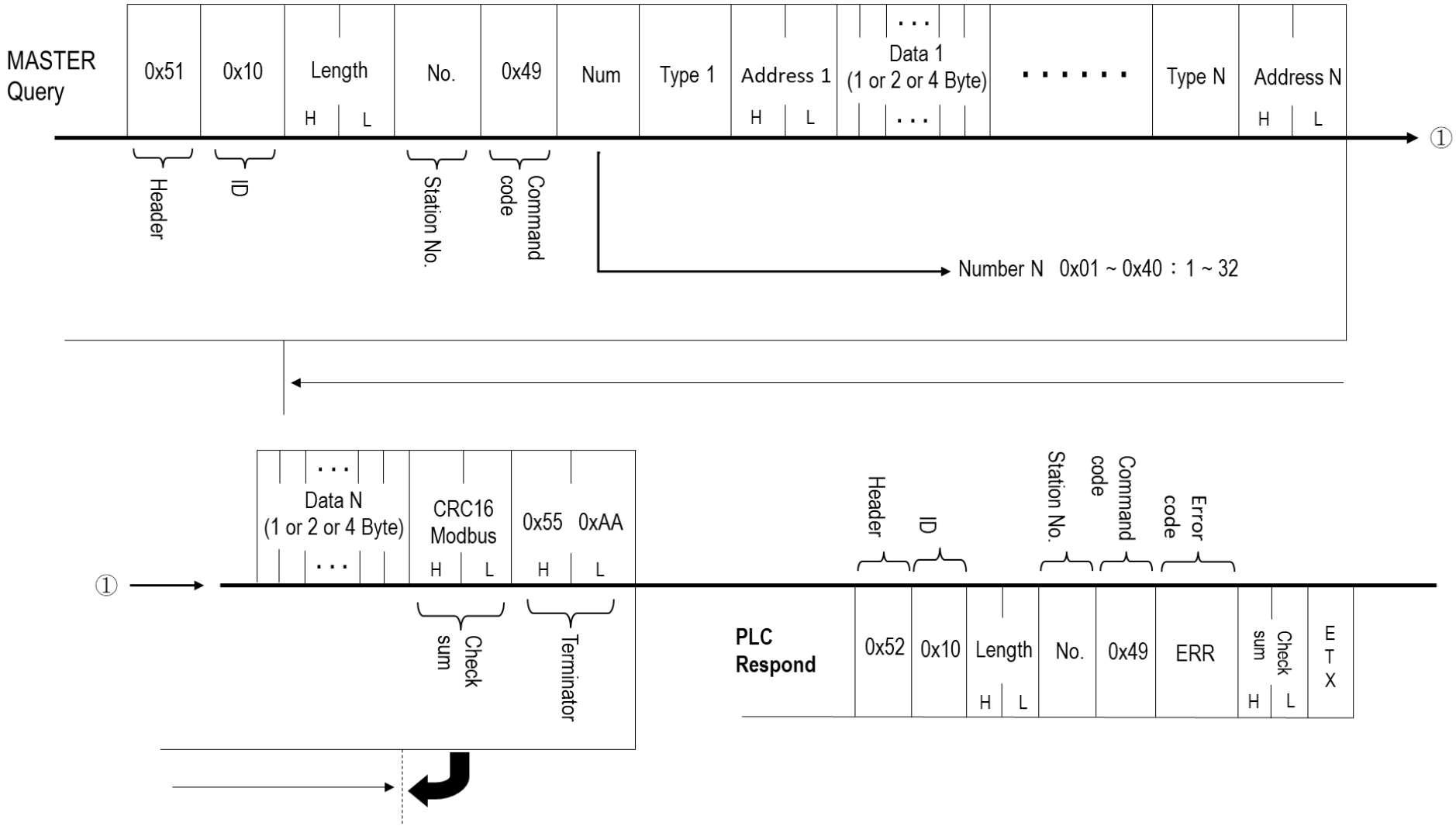
  (1) Query

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


MASTER Query
0x51
0x10
Length
H
L
No.
0x49
Num
Type 1
Address 1
H
L
Data 1 (1 or 2 or 4 Byte)
Type N
Address N
H
L
①
Header
ID
Station No.
Command code
Number N 0x01 ~ 0x40 : 1 ~ 32
Data N (1 or 2 or 4 Byte)
CRC16 Modbus
H
L
0x55
0xAA
①
Check sum
Terminator
PLC Respond
Header
ID
Station No.
Command code
Error code
0x52
0x10
Length
No.
0x49
ERR
Check sum
E T X

Sending command as follows:

Command Message Segment	Header	ID	Message Length	Message Content										CRC Checksum	Terminator
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	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	CRC16 - Modbus calculation of "Message Length" + "Message Content" producing High byte + Low byte	0x55+0xAA
Message Length (Un	1	1	2	1	1	1	Referring Table	2	Referring table for	…	Referring Table	2	Referring table for	2	2

it: Byte)									the Type Length				the Type Length		
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	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

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

The received and replied message is as follows:

Reply Message Segment	Header	ID	Message Length	Message Content			CRC Checksum	Terminator
Content	0x52	0x10 Fixed for use with the Binary communication protocol	0x00 +0x03	Salve Station Number	Command Code: 0x49	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	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) Rsponse

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

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

- **Example**

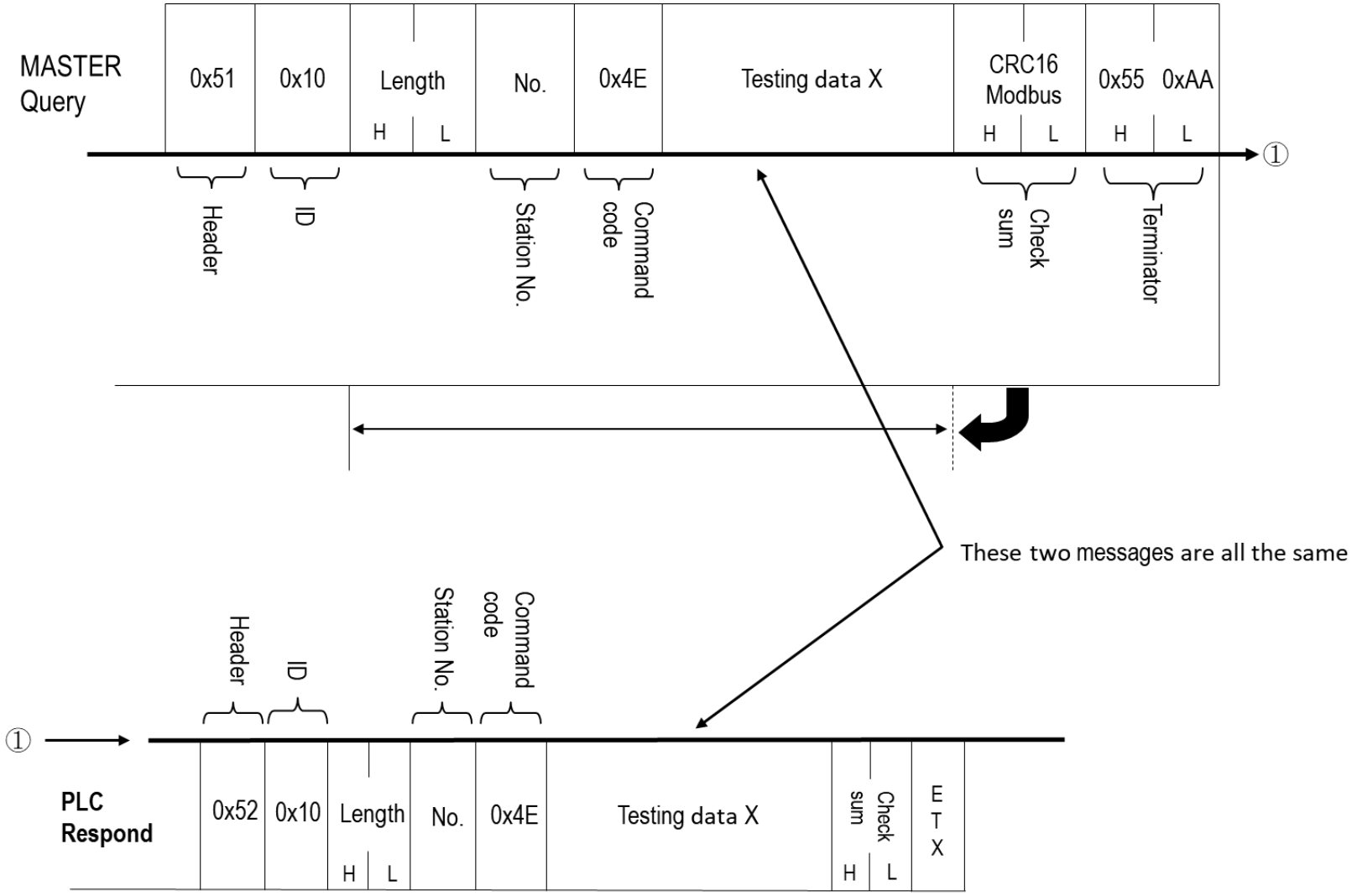
  Use this command to send the data〝ABCDEFG〞from Master to PLC to rest weather the PLC respond normally.

  (1) Query

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

  (2) Rsponse

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


MASTER
Query
0x51
0x10
Length
H
L
No.
0x4E
Testing data X
CRC16
Modbus
H
L
0x55
0xAA
H
L
①
Header
ID
Station No.
Command code
Check sum
Terminator
These two messages are all the same
Header
ID
Station No.
Command code
①
PLC
Respond
0x52
0x10
Length
H
L
No.
0x4E
Testing data X
Check sum
H
L
E T X

Sending command as follows:

Message Section	Start Character	ID	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

The received and replied message is as follows:

Reply Message Section	Start Character	ID	Message Length	Message Content			CRC Check	End Character
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