EX series

EXRM0808R/T USER'S GUIDE

☛ This manual contains text, diagrams and explanations which will guide the reader in the correct installation and operation of Remote I/O module EXRM0808R/T.

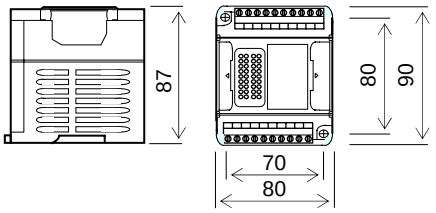
*** Introduction ***

EXRM0808R

- R: Relay output; T: Transistor output
- Output: 8 points
- Input: 8 points
- Remote I/O
- EX series

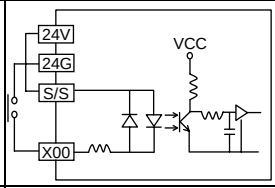
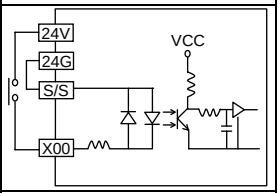
- This module converts data with PLC main unit by communication method.
- This module read X input status and store it to BFM#00, and output Y output status to external terminal.

*** External Dimensions ***

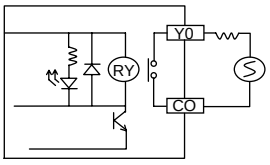
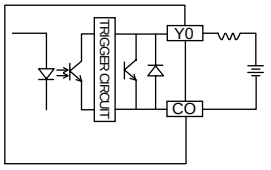


Unit: mm

*** Input Specifications ***

Item	DC input (Sink) NPN	DC input (Source) PNP
Circuit		
Input voltage	DC24V+10%, -15%	DC24V+10%, -15%
Input current	7mA / DC24V	7mA / DC24V
Impedance	3.3KΩ	3.3 KΩ
Response time	About 10 ms(X00~X07 High speed)	About 10 ms(X00~X07 High speed)
Input pattern	No voltage contact or NPN open collector	No voltage contact or PNP open collector
Circuit isolation	Photo coupler	Photo coupler

*** Output Specifications ***

Item	Relay output	Transistor output
Circuit		
Load voltage	Under AC250V DC30V	DC5V ~ 30V
Rated current	2A / 1 point	0.5A / 1 point
Rated capacity	100W	12W
Response time	About 10ms	Under 1 ms
Circuit isolation	Machine isolation	Photo coupler

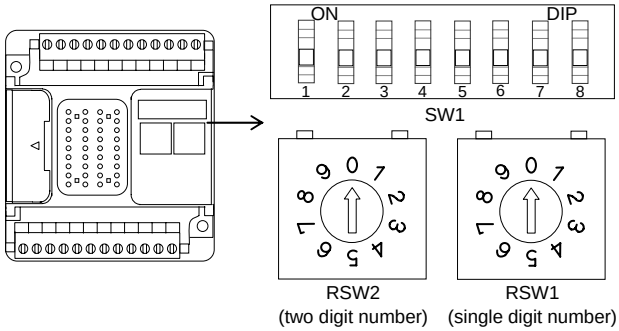
♦Note: Transistor output module is without high resistor 2.2K

*** Terminal Signals ***

24V	FG	24G	S/S	X00	X01	X02	X03	X04	X05	X06	X07	Input

D+	D-	C0	Y00	Y01	Y02	Y03	C1	Y04	Y05	Y06	Y07	Output

*** Switch Indication ***



Set station no. of RSW2, RSW1:01~99 (can't set to 00)
Bit0 (SW1-1: Data length) 0= 7bit ; 1= 8 bit
Bit1 (SW1-2) 0= no parity ; 1= with parity
Bit2 (SW1-3) 0= odd parity ; 1= even parity
Bit3 (SW1-4) 0= 1 stop bit ; 1= 2 stop bit
Bit5,4 (SW1-6,5) 00= 9600bps
01= 19200bps
10= 38400bps
11= 57600bps
Bit6 (SW1-7) 0= computer link ; 1= Modbus
When Bit6=0, Bit7=0 Computer Link Format 1
Bit7=1 Computer Link Format 4
When Bit6=1, Bit7=0 Modbus Ascii mode
Bit7=1 Modbus Rtu mode

*** BFM List ***

BFM No.	Content	Initial value
#0	X input relay status	
#1	Reserved	
#2	Reserved	
#3	Reserved	
#4	Y output relay status	
#5	Reserved	
#6	Detection of disconnection	0
#7	Reserved	

BFM#6: This value is defined by user (unit: ms). When value is 0, this function is disable.

Example: value=1000. If there is no communication data written in after 1000ms, I/O status will be cleared automatically.

EXRM0808R/T-edoc0610v100

LIYAN ELECTRIC INDUSTRIAL LTD.

TEL: 886-4-25613700 FAX: 886-4-25613408

WEBSITE: http://www.liyanplc.com

E-MAIL: twliyan@ms16.hinet.net

✱✱✱ Modbus Ascii mode ✱✱✱

♦Command code 03H, read N word

EX.: Read 2 word from BFM#00 of station no. 01H continuously.

< command message >

3Ah	01h		03h		00h		00h		00h		02h		FAh		0Dh	0Ah
':'	'0'	'1'	'0'	'3'	'0'	'0'	'0'	'0'	'0'	'0'	'0'	'2'	'F'	'A'	CR	LF
STX	ADR1	ADR0	CMD1	CMD0	Start Address				Word Count				LRC CHK1	LRC CHK0	END1	END0

Note: calculation of command message of CHK(check sum)

01H+03H+00H+00H+00H+02H=06H

2's complement of 06H : FFH-06H+1=FAH

< response message >

STX	ADR1	ADR0	CMD1	CMD0	Byte Count		Data BFM#00				Data BFM#01				LRC CHK1	LRC CHK0	END1	END0
':'	'0'	'1'	'0'	'3'	'0'	'4'	'0'	'0'	'0'	'0'	'0'	'0'	'0'	'0'	'F'	'8'	CR (0D)	LF (0A)
3Ah	01h		03h		04h		00h		00h		00h		00h		F8h		0Dh	0Ah

Note: calculation of response message of CHK(check sum)

01H+03H+04H+00H+00H+00H+00H=08H

2's complement of 08H : FFH-08H+1=F8H

♦ Command code 06H write one word

EX.: Write data 0084H to BFM#04 of station no. 01H.

< command message >

3Ah	01h		06h		00h		04h		00h		84h		71h		0Dh	0Ah
':'	'0'	'1'	'0'	'6'	'0'	'0'	'0'	'4'	'0'	'0'	'8'	'4'	'7'	'1'	CR	LF
STX	ADR1	ADR0	CMD1	CMD0	Data Address				Data Content				LRC CHK1	LRC CHK0	END1	END0

< response message >

STX	ADR1	ADR0	CMD1	CMD0	Data Address				Data Content				LRC CHK1	LRC CHK0	END1	END0
':'	'0'	'1'	'0'	'6'	'0'	'0'	'0'	'4'	'0'	'0'	'8'	'4'	'7'	'1'	CR	LF
3Ah	01h		06h		00h		04h		00h		84h		71h		0Dh	0Ah

♦ CHK (check sum) description

Ascii mode use LRC (Longitudinal Redundancy Check) check sum. The calculation method of LRC check sum is that add up ADR to content of last data (only get binary from result), and get 2's complement result, then it is LRC check sum.

♦ Command code 10H write N word

EX.: Write data 8765H and 4321H to BFM#05 and BFM#04 of station no. 01H

< command message >

3Ah	01h		10h		00h		04h		00h		02h		04h		43h		21h	
':'	'0'	'1'	'1'	'0'	'0'	'0'	'0'	'4'	'0'	'0'	'0'	'2'	'0'	'4'	'4'	'3'	'2'	'1'
STX	ADR1	ADR0	CMD1	CMD0	Start Address				Quantity				Byte Count		The content of BFM#04			

87h		65h		95h		0Dh	0Ah
'8'	'7'	'6'	'5'	'9'	'5'	CR	LF
The content of BFM#05				LRC CHK1	LRC CHK0	END1	END0

< response message >

STX	ADR1	ADR0	CMD1	CMD0	Start Address				Quantity				LRC CHK1	LRC CHK0	END1	END0
':'	'0'	'1'	'1'	'0'	'0'	'0'	'0'	'4'	'0'	'0'	'0'	'2'	'E'	'9'	CR	LF
3Ah	01h		10h		00h		04h		00h		02h		E9h		0Dh	0Ah

♦Exception response

In normal situation, Remote I/O device receive command message from Master Device, and send back a normal response message (exclude broadcast message). If because of communication error, Remote I/O is unable to receive correct message, or receive correct message but is unable to handle it, then it will send back an exception response to Master Device. (In the exception response, the most significant bit of the original command code is set to 1).
Following is communication command 06H and response of exception code 02H

< command message >

3Ah	01h		06h		00h		00h		00h		00h		F9h		0Dh	0Ah
':'	'0'	'1'	'0'	'6'	'0'	'0'	'0'	'0'	'0'	'0'	'0'	'0'	'F'	'9'	CR	LF
STX	ADR1	ADR0	CMD1	CMD0	Start Address				The content of data				LRC CHK1	LRC CHK0	END1	END0

< response message >

STX	ADR1	ADR0	CMD1	CMD0	Exception code		LRC CHK1	LRC CHK0	END1	END0
':'	'0'	'1'	'8'	'6'	'0'	'2'	'7'	'7'	CR	LF
3Ah	01h		86h		02h		77h		0Dh	0Ah

♦ Exception code list

Exception code	content
01	False command code
02	False data address
03	False data value
09	Check sum Error
13	Receive buffer overflow
14	Defective receive character (Ascii only)
15	Parity error; overrun error, framing error

✱✱✱ Modbus Rtu mode ✱✱✱

♦ Command code 03H; read N word

EX.: Read 2 word from BFM#00 of station no. 01H continuously.

< command message >

	01h	03h	00h	00h	00h	02h	XXh	XXh
STOP above 10ms	ADR	CMD	Start Address		Word Count		CRC CHK Low	CRC CHK High	STOP above 10ms

< response message >

STOP above 10ms	ADR	CMD	Byte Count	Data BFM#00		Data BFM#01		CRC CHK Low	CRC CHK High	STOP above 10ms
	01h	03h	04h	00h	00h	00h	00h	XXh	XXh	

Note : Calculation of CRC check sum

Rtu mode use CRC (Cyclical Redundancy Check) check sum. Calculation method as follows,

(1) Input content is 16bit register of FFFFH(CRC register)。

(2) Use first byte of command message and lower byte of 16bit to do Exclusive OR operation, and store result to CRC register.

(3) Move content of CRC register 1bit to the right. Maximum bit is filled 0.

(4) Check value of CRC register's lowest bit. If it is 0, then repeat (3). If it is not 0, then use CRC register and A001H to do Exclusive OR operation, and store result to CRC register.

(5) Repeat (3) and (4) until content of CRC register is moved 8 bit to the right. At this time, this byte is finished.

(6) Repeat (2) to (5) to byte of next command message until all bytes are finished. Content of CRC register is check sum.

(7) When sending CRC value, send lower bit first and then send high bit.

♦ Command code 06H write one word

EX.: Write data 0084H to BFM#04 of station no. 01H.

< command message >

	01h	06h	00h	04h	00h	84h	XXh	XXh
STOP above 10ms	ADR	CMD	Start Address		Data Content		CRC CHK Low	CRC CHK High	STOP above 10ms

< response message >

STOP above 10ms	ADR	CMD	Start Address		Data Content		CRC CHK Low	CRC CHK High	STOP above 10ms
	01h	06h	00h	04h	00h	84h	XXh	XXh	

♦ Command code 10H write N word

EX.: Write data 8765H and 4321H to BFM#05 and BFM#04 of station no. 01H

< command message >

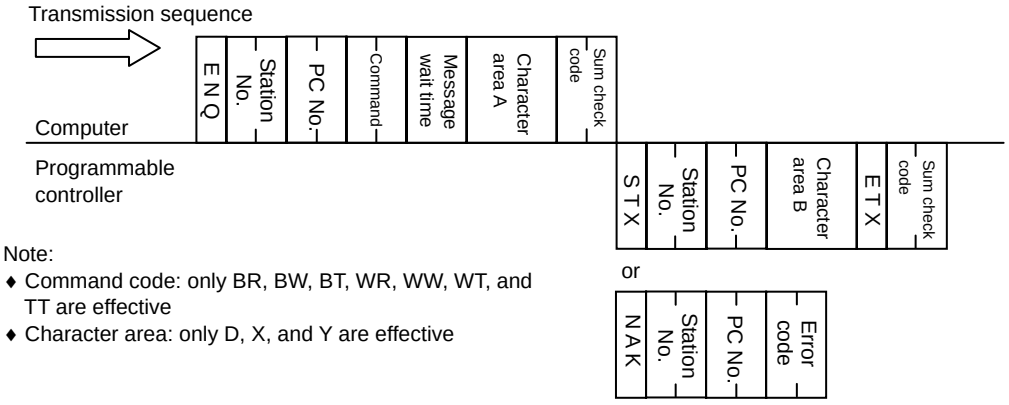
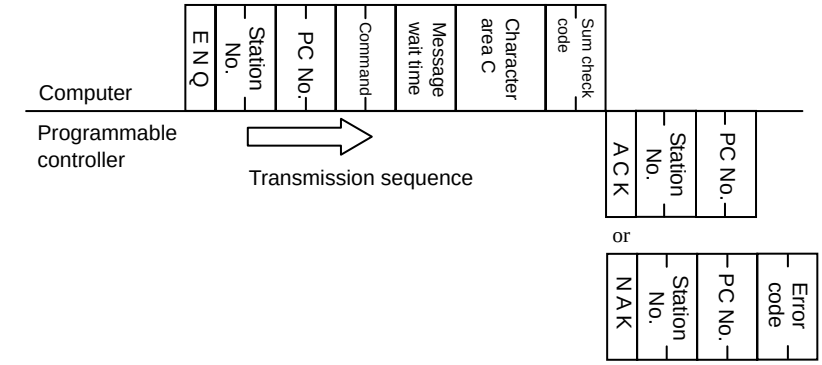
	01h	10h	00h	04h	00h	02h	04h	43h	21h
STOP above 10ms	ADR	CMD	Start Address		Quantity		Byte Count	Content of BFM#04	

87h	65h	XXh	XXh	
Content of BFM#05		CRC CHK Low	CRC CHK High	STOP above 10ms

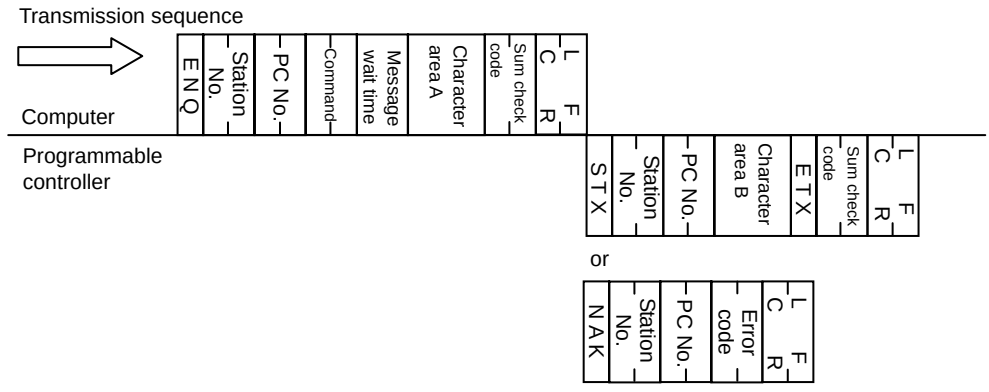
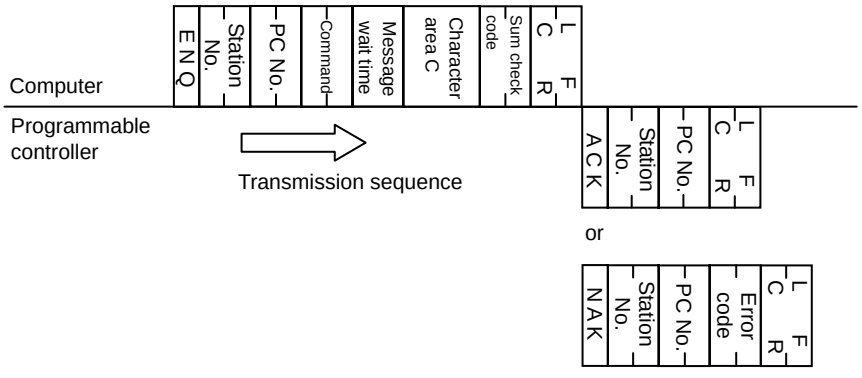
< response message >

STOP above 10ms	ADR	CMD	Start Address		Quantity		CRC CHK Low	CRC CHK High	STOP above 10ms
	01h	10h	00h	04h	00h	02h	XXh	XXh	

<< Protocol format of Computer link >> Format 1

Description	Control protocol
To read data from the programmable controller to the computer	 Note: ♦ Command code: only BR, BW, BT, WR, WW, WT, and TT are effective ♦ Character area: only D, X, and Y are effective
To write data from the computer to the programmable controller	

<< Protocol format of Computer link >> Format 4

Description	Control protocol
To read data from the programmable controller to the computer	
To write data from the computer to the programmable controller	

Note: About more detailed information, please refer to user's manual of Computer Link.