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GB MODBUS® PROTOCOL COMMUNICATION MODULE

ADDENDUM

LRE P00



WARNING!

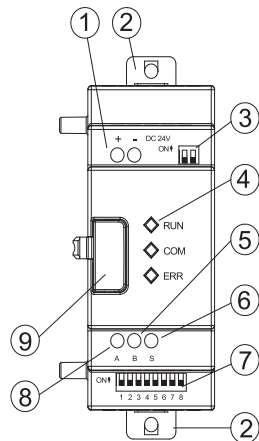
This equipment must be installed by qualified personnel, in compliance with regulations in force for electrical systems, to avoid damages and safety hazards.

The products described in this publication, are subject to be revised or improved at any moment.

Technical data and descriptions therefore do not have any contractual value.

The manufacturer cannot be held responsible for electrical safety in case of improper used of the equipment.

1.1 MODULE DESCRIPTION



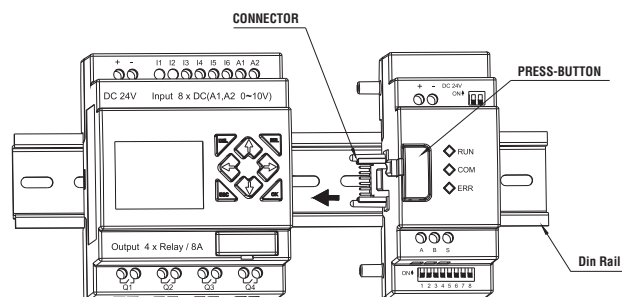
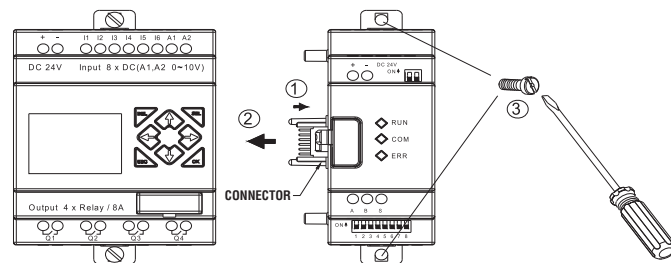
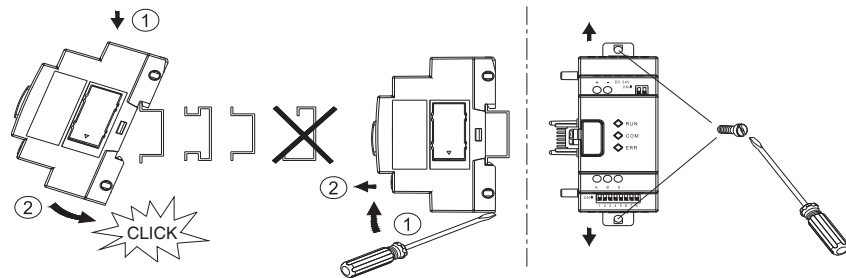
- 1 - Power supply terminals
- 2 - DIN rail mounting clips or for M4 15mm screw fixing
- 3 - Terminal impedance: Position both dip switches to ON to connect the impedance
- 4 - LRE P00 status indication LEDs
- 5 - RS485 serial port - Terminal B
- 6 - RS485 serial port - Shield
- 7 - Dip switches (SW1-1 to SW1-8) for LRE P00 configuration
- 8 - RS485 serial port - Terminal A.
- 9 - Release button, press to disconnect LRE P00 module from the other units.

1.2 MODULE MOUNTING

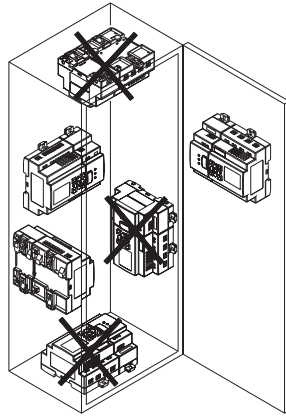


WARNING!

Remove power supply before each maintenance intervention to prevent the risk of electric shock for the operator.



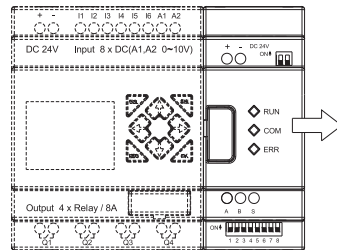
1.3 MOUNTING POSITION - CONDUCTOR CROSS-SECTION - TIGHTENING TORQUE OF THE MODULE TERMINALS



mm ²	0.14...1.5	0.14...0.75	0.14...2.5	0.14...2.5	0.14...1.5
AWG	26...16	26...18	26...14	26...14	26...16

 Ø3.5 (0.14in)	 C	Nm	0.6
		lb-in	5.4

1.4 MODULE LED STATUS



LED	LED STATUS	STATE DISPLAY
RUN	Green on (constant)	LRE P00 connected with LRD base module.
	Green – slow flashing (2Hz)	LRE P00 not connected to LRD base module.
ERR	Red on (constant)	LRE P00 connected to base module but I/O address setting error.
	Red – fast flashing (5Hz)	Communication error with base module (CRC setting or parity check error).
	Red – slow flashing (2Hz)	Communication error with Modbus [®] protocol (CRC setting, parity check or command error).
	Red off	Communication OK.
COM	Yellow on	Module receiving or sending data.
	Yellow off	The module is neither receiving nor sending data.

1.5 COMMUNICATION DATA FRAME

LRD series relays can be communication-controlled by the PC or other controller with the communication protocol, Modbus RTU Mode, RS485. Frame length maximum 64 bytes.

1.5.1 8-BIT DIP SWITCH (SW1) STATUS

Baud rate setting:

SW1-3~SW1-1, setting communication baud rate: 57.6K, 38.4K, 19.2K, 9.6K, 4.8K.

Meaning as follows:

SW1-3	SW1-2	SW1-1	Baud rate (Kbps)
OFF	OFF	OFF	4.8
OFF	OFF	ON	9.6
OFF	ON	OFF	19.2
OFF	ON	ON	38.4
ON	*	*	57.6

Parity bit and stop bit setting:

SW1-4, SW1-5, setting parity bit and stop bit.

SW1-6, Assemble setting.

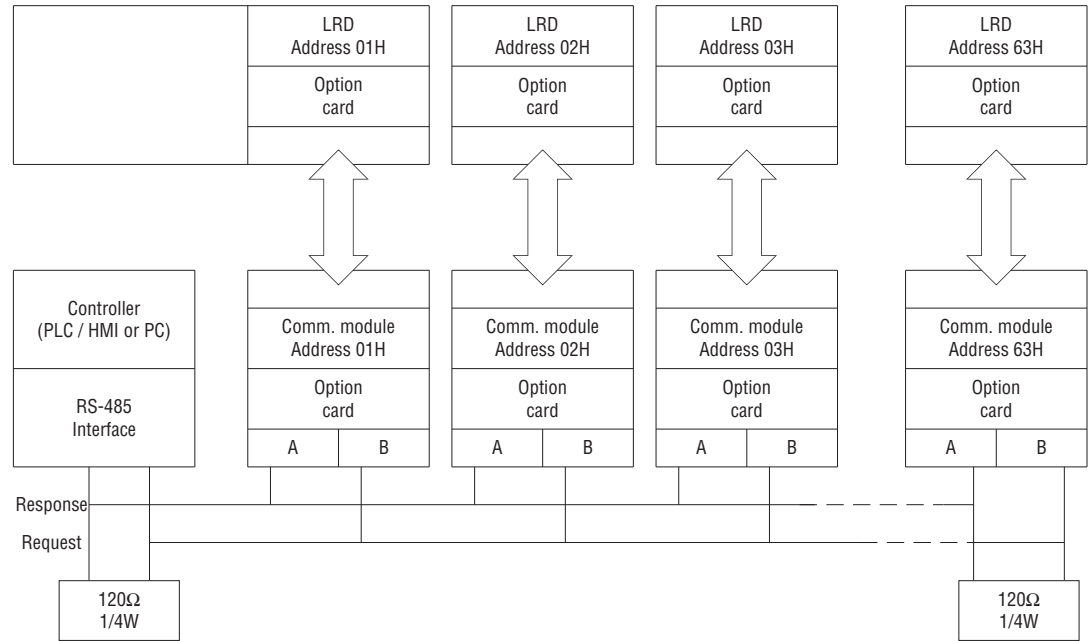
SW1-7~SW1-8, reserved.

Meaning as follows:

SW1-8	SW1-7	SW1-6	SW1-5	SW1-4	Stop bit and parity bit	Remark
*	*	OFF	OFF	OFF	2 stop bits, no parity bit	
*	*	OFF	ON	OFF	1 stop bit, no parity bit	V1.2 new function
*	*	OFF	OFF	ON	1 stop bit, 1 odd parity bit	
*	*	OFF	ON	ON	1 stop bit, 1 even parity bit	
*	*	ON	*	*	Assemble setting: Baud rate 38400 bps, 2 stop bit, no parity bit.	SW1-1~SW1-5 setting is invalid.

* Can be OFF or ON.

1.5.2 HARDWARE INSTALLATION



Note: It is necessary to connect the terminal impedance (120Ω, 1/4W) at both ends of the communication wire.

1.5.3 DATA FRAME FOR RTU MODE

MASTER (PLC etc.) send request to SLAVE, whereas SLAVE response to MASTER. The signal receiving is illustrated here.

The data length is varied with the command (Function).

Note: The interval should be maintained at 500ms between command signal and request. If command is write-function-preset-value, the interval should be maintained at 1000ms.

SLAVE Address	1byte
Function Code	1byte
DATA	nbyte
CRC16 CHECK	2byte
Signal Interval	Signal Interval

1.5.4 SLAVE ADDRESS

00H: Broadcast to all the drivers
 01H: to the No.01 Driver
 0FH: to the No.15 Driver
 10H: to the No.16 Driver
 And so on... max to No.99 (63H)

1.5.5 FUNCTION CODE

01H: Read coils status
 03H: Read registers
 05H: Write single coil
 06H: Write single register
 08H: Loop test
 10H: Write multiple registers

1.6 CMS (Checksum and time-out definition)

1.6.1. CRC CHECK:

CRC check code is from Slave Address to end of the data. The calculation method is illustrated as follows:

- (1) Load a 16-bit register with FFFF hex (all 1's). Call this the CRC register.
- (2) Exclusive OR the first 8-bit byte of the message with the low-order byte of the 16-bit CRC register, putting the result in the CRC register.
- (3) Shift the CRC register one bit to the right (toward the LSB), Zero-filling the MSB, Extract and examines the LSB.
- (4) (If the LSB was 0): Repeat Steps (3) (another shift)
(If the LSB was 1): Exclusive OR the CRC register with the polynomial value A001 hex (1010 0000 0000 0001).
- (5) Repeat Steps (3) and (4) until 8 shifts been performed. When this is done, a complete 8-bit byte will be processed.
- (6) Repeat Steps (2) through (5) for next 8-bit byte of the message, continue doing this until all bytes have been processed. The final content of the CRC register is the CRC value. Placing the CRC into the message: When the 16-bit CRC (2 8-bit bytes) is transmitted in the message, the low-order byte will be transmitted first, followed by the high-order byte, For example, if the CRC value is 1241 hex, the CRC-16 (Low) put the 41h, the CRC-16 (Hi) put the 12h.

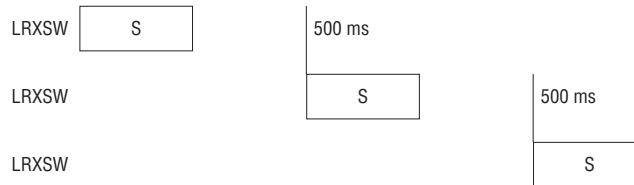
– CRC calculation application program

```

UWORD ch_sum (UBYTE long, UBYTE *rxdbuf) {
    BYTE i = 0;
    UWORD wkg = 0xFFFF;
    While ( long-- ) {
        wkg ^= rxdbuf++;
        for ( i = 0 ; i < 8; i++ ) {
            if ( wkg & 0x0001 ) {
                wkg = ( wkg >> 1 ) ^ 0xa001;
            }
            else {
                wkg = wkg >> 1;
            }
        }
    }
    return( wkg );
}

```

1.6.2. TIME-OUT (500 ms) & RETRY (max.: 2 times)



Attention! When writing LRD-Special-Function-Block preset value, the TIME-OUT value is 1000ms.
(When LRD time-out or detect checksum error, or LRD response error code = checksum error, LRXSW will retry maximum two times, and if two times after there is still error, then display "Communication error") displayed.

Note: When Modbus Communication module response is error information, it waits a resetting-time (Modbus transfer 64bytes data time):

- If baud rate is 4800bps, the time is 147ms
- If baud rate is 9600bps, the time is 73ms
- If baud rate is 19200bps, the time is 37ms
- If the baud rate is 38400bps, the time is 18ms
- If baud rate is 57600bps, the time is 12ms.

1.7 COMMAND

1.7.1 01H READ COILS

This function code is used to read from 1 to 464 contiguous statuses of coils in a remote device.

PC → PLC			PLC → PC (OK)			PLC → PC (ERROR)		
Slave Address		01H	Slave Address		01H	Slave Address		01H
Function Code		01H	Function Code		01H	Function Code		81H
Starting Address	High	05H	Byte count		02H	Exception Code		51H
	Low	40H	Outputs status M8~1		45H	CRC-16	Low	81H
Quantity of coils	High	00H	Outputs status MF~9		34H		High	ACH
	CRC-16	Low	3CH	CRC-16	Low	8AH		
High		DEH	High		BBH			

User sets the start address equal multiple of 10H and quantity of coils also equal multiple of 10H (read word coil status).

Sample: M8~1=45H (01000101B), coil M8~M1 status is OFF-ON-OFF-OFF, OFF-ON-OFF-ON.

1.7.2 03H READ REGISTER

PC → PLC			PLC → PC (OK)			PLC → PC (ERROR)		
Address		01H	Address		01H	Address		01H
Function Code		03H	Function Code		03H	Function Code		83H
Register Address	(High)	00H	Data (byte)		26H	Exception Code		52H
	(Low)	00H	*Send out the data			CRC-16 (Lo)		COH
Data Length (H1)		00H	CRC-16 (Lo)		?	CRC-16 (Hi)		CDH
Data Length (Lo)		13H	CRC-16 (Hi)		?			
CRC-16 (Lo)		04H						
CRC-16 (Hi)		07H						

1.7.3 05H WRITE SINGLE COIL

This function code is used to write a single output to either ON or OFF in a remote device.

PC → PLC			PLC → PC (OK)			PLC → PC (ERROR)		
Address		01H	Address		01H	Address		01H
Function Code		05H	Function Code		05H	Function Code		85H
Coil Address	High	05H	Coil Address	High	05H	Exception Code		52H
	Low	02H		Low	02H	CRC-16	Low	C3H
Coil Value	High	FFH	Coil Value	High	FFH		High	6DH
	Low	00H		Low	00H			
CRC-16	Low	2DH	CRC-16	Low	2DH			
	High	36H		High	36H			

A value of 0xFF00 requests the coil to be ON.
A value of 0x0000 requests the coil to be OFF.

1.7.4 06H WRITE SINGLE REGISTER

PC → PLC			PLC → PC (OK)			PLC → PC (ERROR)		
Address		01H	Address		01H	Address		01H
Function Code		06H	Function Code		06H	Function Code		86H
Register Address	High	01H	Register Address	High	01H	Exception Code		52H
	Low	02H		Low	02H	CRC-16 (Lo)		C3H
Write Data	High	17H	Write Data	High	17H	CRC-16 (Hi)		9DH
	Low	70H		Low	70H			
CRC-16 (Lo)		27H	CRC-16 (Lo)		27H			
CRC-16 (Hi)		E2H	CRC-16 (Hi)		E2H			

1.7.5 08H LOOP BACK CHECK

The check code checking the transmission of the signal between MASTER and SLAVE could be discretionary.

PC → PLC			PLC → PC (OK)			PLC → PC (ERROR)		
SLAVE Address		01H	SLAVE Address		01H	SLAVE Address		01H
Function Code		08H	Function Code		08H	Function Code		88H
Check code	High	00H	Check Code	High	00H	Exception Code		20H
	Low	00H		DATA	Low	00H	CRC-16	Low
DATA	High	A5H	DATA		High	A5H		CRC-16
	Low	37H		CRC-16	Low	37H	CRC-16	
CRC-16	Low	DAH	CRC-16		High	8DH		CRC-16
	High	8DH		CRC-16	Low	DAH	CRC-16	

1.7.6 10H WRITE MULTIPLE REGISTERS

PC → PLC			PLC → PC (OK)			PLC → PC (ERROR)		
Address		01H	Address		01H	Address		01H
Function Code		10H	Function Code		10H	Function Code		90H
Register Address	High	00H	Register Address	High	00H	Exception Code		52H
	Low	00H		DATA Length (Hi)	Low	00H	CRC-16 (Lo)	
Data Length (Hi)		00H	Data Length (Hi)		00H	CRC-16 (Hi)		3DH
Data Length (Lo)		13H	Data Length (Lo)		13H			
Byte counters		26H	CRC-16 (Lo)		81H			
Send out the data			CRC-16 (Hi)		C4H			
CRC-16 (Lo)		?						
CRC-16 (Hi)		?						

1.7.7 EXCEPTION CODE

Under communication linking, the controller responds the Exception Code and sends Function Code OR 80H to main system if an error happened.

Exception Code	Description
51	Frame error (Function Code error, Register Encoding error, Data Quantity Error)
52	Reserved
53	Reserved
54	Data value over rang
55	LRD set error (I/O NUMBER set error)
56	EXT communication module --LRD don't connected
57	Reserved
58	Reserved
59	EXT communication module --LRD communication data error

1.8 REGISTER ADDRESS

1.8.1 (00xxH) COIL STATUS ADDRESS

Register address	Data length	Usable Comm.	Content															
			F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
0001H	1	03H 06H 10H	-	RF	RE	RD	RC	RB	RA	R9	R8	R7	R6	R5	R4	R3	R2	R1
0002H	1		-	GF	GE	GD	GC	GB	GA	G9	G8	G7	G6	G5	G4	G3	G2	G1
0003H	1		-	TF	TE	TD	TC	TB	TA	T9	T8	T7	T6	T5	T4	T3	T2	T1
0004H	1		-	CF	CE	CD	CC	CB	CA	C9	C8	C7	C6	C5	C4	C3	C2	C1
0005H	1		-	MF	ME	MD	MC	MB	MA	M9	M8	M7	M6	M5	M4	M3	M2	M1
0006H	1		Z4	Z3	Z2	Z1	IC	IB	IA	I9	I8	I7	I6	I5	I4	I3	I2	I1
0007H	1		-	-	-	-	XC	XB	XA	X9	X8	X7	X6	X5	X4	X3	X2	X1
0008H	1		-	-	-	-	-	-	-	Q8	Q7	Q6	Q5	Q4	Q3	Q2	Q1	
0009H	1		-	-	-	-	YC	YB	YA	Y9	Y8	Y7	Y6	Y5	Y4	Y3	Y2	Y1
000AH	1		-	NF	NE	ND	NC	NB	NA	N9	N8	N7	N6	N5	N4	N3	N2	N1
Attention: Command writing I1 ~ IC, Z1~Z4 or X1 ~XC is invalid.																		

1.8.2 (01xxH) CONTROL REGISTER ADDRESS

Register address	Data length	Usable Comm.	Content		
			High Byte	Low Byte	
0101H	1	03K 06H 10H	N. ID Run/ Stop	0	S1
				S=0 STOP S=1 RUN	

1.8.3 (02xxH) CURRENT VALUE ADDRESS

Register address	Data length	Usable Comm.	Content	Remark
Timer current value				
0201H	1H	03H	Timer 1	
0202H	1H		Timer 2	
0203H	1H		Timer 3	
...	
020FH	1H		Timer F	
Counter current value				
0211H	2H	03H	Counter 1	①
0212H	2H		Counter 2	
....	
021EH	2H		Counter E	
021FH	2H		Counter F	

continued on page 8

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RTC current value					
0221H	1H	03H 10H	CURRENT_YEAR	CURRENT_MOON	If address=0220H, length=4H, can write RTC current value.
0222H	1H		CURRENT_DAY	CURRENT_WEEK	
0223H	1H		CURRENT_HOUR	CURRENT_MINUTE	
0224H	1H		CURRENT_SECOND	00	
0225H	1H	03H	00	CURRENT_YEAR	V1.1
0226H	1H		00	CURRENT_MOON	
0227H	1H		00	CURRENT_DAY	
0228H	1H		00	CURRENT_WEEK	
0229H	1H		00	CURRENT_HOUR	
022AH	1H		00	CURRENT_MINUTE	
022BH	1H		00	CURRENT_SECOND	
Analog					
0231H	1H	03H	A1_VALUE_H	A1_VALUE_L	
0232H	1H		A2_VALUE_H	A2_VALUE_L	
0233H	1H		A3_VALUE_H	A3_VALUE_L	
0234H	1H		A4_VALUE_H	A4_VALUE_L	
0235H	1H		A5_VALUE_H	A5_VALUE_L	
0236H	1H		A6_VALUE_H	A6_VALUE_L	
0237H	1H		A7_VALUE_H	A7_VALUE_L	
0238H	1H		A8_VALUE_H	A8_VALUE_L	
PWM					
0261H	3H	03H	00	PWM_RUN_NUM	
			PW_H	PW_L	
			PT_H	PT_L	

i Counter current value

High bytes	Low bytes
C_current_V_M	C_current_V_L
00	C_current_V_H

1.8.4 (04xxH) PRESET VALUE ADDRESS

Register Address	Data Length	Usable Comm.	Content	Remark
TMR				
0401H	1H	03H 10H	Timer 1	
0402H	1H		Timer 2	
...	
040FH	1H		Timer F	
COUNTER				
0411H	2H/5H	03H 10H	CNT1	②
0412H	2H/5H		CNT2	
....	
041FH	2H/5H		CNTF	
RTC				
0421H	3H	03H 10H	RTC1	③
0422H	3H		RTC2	
...	
042FH	3H		RTCF	
ANALOG				
0431H	1H	03H 10H	ANALOG 1	
0432H	1H		ANALOG 2	
...	
043FH	1H		ANALOG F	
PWM				
0461H	10H	03H 10H	PWM	④

② Counter Preset Value

	High bytes	Low bytes
COUNTER MOD 1~7 (Data Length=2H)	C_PRESET_V_M	C_PRESET_V_L
	00	C_PRESET_V_H
COUNTER MOD8 (Data Length=5H)	FIX_TIM_H	FIX_TIM_L
	C_ON_PRESET_V_M	C_ON_PRESET_V_L
	00	C_ON_PRESET_V_H
	C_OFF_PRESET_V_M	C_OFF_PRESET_V_L
	00	C_OFF_PRESET_V_H

Counter value: 0~999999 (0~0F423FH)

③ RTC Preset Value

	High bytes	Low bytes
RTC MOD1 RTC MOD2	Turn on week	Turn off week
	Turn on time (hour)	Turn on time (min)
	Turn off time (hour)	Turn off time (min)
RTC MOD3	Turn on year	Turn off year
	Turn on month	Turn on day
	Turn off month	Turn off day

Year: 00~99; Month: 01~12; Day: 01~31; Day of the week: 00~06.
Hour: 00~23; Minutes: 00~59; Seconds: 00~59.

④ PWM Preset Value

	High bytes	Low bytes
1	PW1_H	PW1_L
2	PT1_H	PT1_L
...
15	PW8_H	PW8_L
16	PT8_H	PT8_L

PW: Pulse Width Value (00000~32767)

PT: Period Value (00001~32767)

1.8.5 (05xxH) COILS ADDRESS (bit)

Register Address	Data Length	Usable Comm.	Content	Remark
0501H~0510H	10H (Read)	01H 05H	R1~RF	050FH, reserved
0511H~0520H			G1~GF	051FH, reserved
0521H~0530H			T1~TF	052FH, reserved
0531H~0540H			C1~CF	053FH, reserved
0541H~0550H			M1~MF	054FH, reserved
0551H~0560H			I1~IC,Z1~Z4	Z1~Z4 cannot be written
0561H~0570H			X1~XC	056CH~056FH, reserved
0571H~0580H			Q1~Q8	0578H~057FH, reserved
0581H~0590H			Y1~YC	058CH~058FH, reserved
0591H~05A0H			N1~NF	059FH, reserved

01H: User set the start address equal multiple of 10H, and quantity of coils also equal multiple of 10H (01H: read word coil status).

Z cannot be written. Reserved address cannot be written.

Command writing I1~IC, or X1~XC is invalid.

1.8.6 (06xxH) COIL STATUS ADDRESS (WORD) FOR V3.x TYPE ONLY

The address of the same function must be read/written in one command. The address of different functions cannot be read/written continuously.

Register Address	Data Length	Usable Comm.	Content															
			F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
0601H	2	03H 06H 10H	R10	R0F	R0E	R0D	R0C	R0B	R0A	R09	R08	R07	R06	R05	R04	R03	R02	R01
0602H			R1F	R1E	R1D	R1C	R1B	R1A	R19	R18	R17	R16	R15	R14	R13	R12	R11	
0603H	2		G10	G0F	G0E	G0D	G0C	G0B	G0A	G09	G08	G07	G06	G05	G04	G03	G02	G01
0604H			G1F	G1E	G1D	G1C	G1B	G1A	G19	G18	G17	G16	G15	G14	G13	G12	G11	
0605H	2		T10	T0F	T0E	T0D	T0C	T0B	T0A	T09	T08	T07	T06	T05	T04	T03	T02	T01
0606H			T1F	T1E	T1D	T1C	T1B	T1A	T19	T18	T17	T16	T15	T14	T13	T12	T11	
0607H	2		C10	C0F	C0E	C0D	C0C	C0B	C0A	C09	C08	C07	C06	C05	C04	C03	C02	C01
0608H			C1F	C1E	C1D	C1C	C1B	C1A	C19	C18	C17	C16	C15	C14	C13	C12	C11	
0609H	4		M10	M0F	M0E	M0D	M0C	M0B	M0A	M09	M08	M07	M06	M05	M04	M03	M02	M01
060AH			M20	M1F	M1E	M1D	M1C	M1B	M1A	M19	M18	M17	M16	M15	M14	M13	M12	M11
060BH			M30	M2F	M2E	M2D	M2C	M2B	M2A	M29	M28	M27	M26	M25	M24	M23	M22	M21
060DH			M3F	M3E	M3D	M3C	M3B	M3A	M39	M38	M37	M36	M35	M34	M33	M32	M31	
060EH	4		N10	N0F	N0E	N0D	N0C	N0B	N0A	N09	N08	N07	N06	N05	N04	N03	N02	N01
060FH			N20	N1F	N1E	N1D	N1C	N1B	N1A	N19	N18	N17	N16	N15	N14	N13	N12	N11
0610H			N30	N2F	N2E	N2D	N2C	N2B	N2A	N29	N28	N27	N26	N25	N24	N23	N22	N21
0611H			-	N3F	N3E	N3D	N3C	N3B	N3A	N39	N38	N37	N36	N35	N34	N33	N32	N31
0612H	1	-	-	-	-	IC	IB	IA	I9	I8	I7	I6	I5	I4	I3	I02	I1	
0613H	1	-	-	-	-	XC	XB	XA	X9	X8	X7	X6	X5	X4	X3	X02	X01	
0614H	1	-	-	-	-	YC	YB	YA	Y9	Y8	Y7	Y6	Y5	Y4	Y3	Y02	Y1	
0615H	1	-	-	-	-	-	-	-	Q8	Q7	Q6	Q5	Q4	Q3	Q02	Q01		
0616H	1	-	-	-	-	-	-	-	-	-	-	-	-	Z04	Z03	Z02	Z01	

1.8.7 (07xxH) CONTROL REGISTER ADDRESS FOR V3.x TYPE ONLY

Register Address	Data Length	Usable Comm.	Content															
				F	E	D	C	B	A	9	8	7	6	5	4	3	2	1
0701H	1	03K 06H 10H	ID NO.	-													S1	
				S=0 STOP S=1 RUN														

1.8.8 (08xxH-11xxH) CURRENT VALUE ADDRESS FOR V3.x TYPE ONLY

Register Address	Data Length	Usable Comm.	Content		Remark			
(08xxH) Timer Current value								
0801H	1H	03H	Timer 1		Scale: 00000-09999			
0802H	1H		Timer 2					
0803H	1H		Timer 3					
...					
080FH	1H		Timer F					
0810H	1H		Timer 10					
...					
08FA	1H		Timer FA					
(09xxH-0AxxH) Counter Current value								
0901H	2H	03H	CNT 1		Scale: 000000-999999			
0902H								
0903H	2H		CNT 2					
0904H								
....					
0AF1H	2H		CNT F9					
0AF2H								
0AF3H	2H		CNT FA					
04F3H								
(0BxxH) RTC,A,PWM,AG,AT,AQ Current value								
(0B0xH) RTC Current value								
0B01H	1	03H 10H	CURRENT_YEAR	CURRENT_MOON	Scale: Year: 00-99 Month: 01-12 Day: 01-31 Day of the week: 00-06 Hour: 00-23 Minute: 00-59 Second: 00-59			
0B02H	1		CURRENT_DAY	CURRENT_WEEK				
0B03H	1		CURRENT_HOUR	CURRENT_MINUTE				
0B04H	1		CURRENT_SECOND	00				
0B05H	1		00	CURRENT_YEAR				
0B06H	1		00	CURRENT_MOON				
0B07H	1		00	CURRENT_DAY				
0B08H	1		00	CURRENT_WEEK				
0B09H	1		00	CURRENT_HOUR				
0B0AH	1		00	CURRENT_MINUTE				
0B0BH	1		00	CURRENT_SECOND				
(0B1xH) ANALOG Current value								
0B11H	1H	03H	A1_VALUE_H	A1_VALUE_L	Scale: 0000-0999			
0B12H	1H		A2_VALUE_H	A2_VALUE_L				
0B13H	1H		A3_VALUE_H	A3_VALUE_L				
0B14H	1H		A4_VALUE_H	A4_VALUE_L				
0B15H	1H		A5_VALUE_H	A5_VALUE_L				
0B16H	1H		A6_VALUE_H	A6_VALUE_L				
0B17H	1H		A7_VALUE_H	A7_VALUE_L				
0B18H	1H		A8_VALUE_H	A8_VALUE_L				
(0B2xH) PWM Current value								
0B21H	3H	03H	Mode 1		Mode 2		Scale: PWM_PW: 0-32767 PWM_PT: 1-32767 PLSY_FREQ: 0001-1000 PLSY_PLSN: 00000-32767	
0B22H			00H	PWM1_Bobina	00H	00H		
0B23H			PW1_H	PW1_L	PLSY1_FREQ_H	PLSY1_FREQ_L		
0B24H	PT1_H		PT1_L	PLSY1_PLSN_H	PLSY1_PLSN_L			
0B25H	3H		P2	00H	PWM2_Coil	-		
0B26H				PW2_H	PW2_L			
			PT2_H	PT2_L				

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(0B3xH) AT(Analog Temperature) Current value				
0B31	1H	03H	AT01	Scale: -1000-6000
0B32	1H		AT02	
0B33	1H		AT03	
0B34	1H		AT04	
(0B4xH) AQ(Analog Output) Current value				
0B41	1H	03H	AQ01	Scale: Voltage: 0~1000 Current: 0~500
0B42	1H		AQ02	
0B43	1H		AQ03	
0B44	1H		AQ04	
(0CxxH) AS(ADD-Subtract) Current value				
0C01H	1H	03H	AS 1	Scale: -32768-32767
0C02H	1H		AS 2	
...	
0CFAH			AS FA	
(0DxxH) MD(Multiply-Divide) Current value				
0D01H	1H	03H	MD 1	Scale: -32768-32767
0D02H	1H		MD 2	
...	
0DFAH	1H		MD FA	
(0ExxH) PID(PI,PID) Current value				
0E01H	1H	03H	PID 1	Scale: -32768-32767
0E02H	1H		PID 2	
...	
0E1EH	1H		PID 1E	
(0FxxH) MX (Data multiplexer) Current value				
0F01H	1H	03H	MX 1	Scale: -32768-32767
0F02H	1H		MX 2	
...	
0FFAH	1H		MX FA	
(10xxH) AR(Analog ram control) Current value				
1001H	1H	03H	AR 1	Scale: 0-32767
1002H	1H		AR 2	
...	
101EH	1H		AR 1E	
(11xxH) DR(Data register)Current value				
1101H	1H	03H	DR 1	Scale: Signed: -32768-32767 Unsigned: 0-65535
1102H	1H		DR 2	
...	
11F0H	1H		DR F0	

i Counter current value

High bytes	Low bytes
C_current_V_M	C_current_V_L
00	C_current_V_H

1.8.9 (12xxH-27xxH) PRESET VALUE ADDRESS FOR V3.x TYPE ONLY

Register Address	Data Length	Usable Comm.	Content	Remark	
(12xxH) TIMER Preset value					
1201H	1H	03H 06H 10H	Timer 1	Scale: 00000-09999	
1202H	1H		Timer 2		
1203H	1H		Timer 3		
...		
12F4H	1H		Timer FA		
(13xxH-14xxH) COUNTER Preset value					
1301H	2H	03H 10H	CNT 1	② Counter cannot be read or written continuously. Scale: 000000-999999	
1302H			CNT 2		
1303H	2H			
1304H				
....		
14F3H	2H		CNT FA		
14F4H			CNT FA		
(15xxH-17xxH) RTC Preset value					
1501H	3H	03H 06H 10H	RTC 1	③	
1502H			RTC 1		
1503H			RTC 1		
1504H	3H		RTC 2		
1505H			RTC 2		
1506H			RTC 2		
...		
17ECH	3H		RTC FA		
17EDH			RTC FA		
17EEH		RTC FA			
(18xxH) ANALOG Preset value					
1801H	1H	03H 06H 10H	ANALOG 1	Scale: 00000-09999	
1802H	1H		ANALOG 2		
...		
18FAH	1H		ANALOG FA		
(19xxH) Valore impostato PWM					
1901H	2H	03H 06H 10H	PWM1_PW1/ PLSY1_FREQ1	PWM1 Preset value 1-8	Scale: PWM_PW: 0-32767 PWM_PT: 1-32767 PLSY_FREQ: 0001-1000 PLSY_PLSN: 00000-32767
1902H			PWM1_PT 1/ PLSY1_PLSN1		
1903H	2H		PWM1_PW2 / PLSY1_FREQ2		
1904H			PWM1_PT2 / PLSY1_PLSN2		
...		
190FH	2H		PWM1_PW8/ PLSY1_FREQ8		
1910H			PWM1_PT8 / PLSY1_PLSN8		
1911H	2H		PWM2_PW1/ PLSY2_FREQ1		
1912H			PWM2_PT 1/ PLSY2_PLSN1		
1913H	2H		PWM2_PW2 / PLSY2_FREQ2		
1914H			PWM2_PT2 / PLSY2_PLSN2		
...		
191FH	2H		PWM2_PW8/ PLSY2_FREQ8		
1920H			PWM2_PT8 / PLSY2_PLSN8		

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(1AxxH-1CxxH) AS(ADD-Subtract) Preset value						
1A01H	3H	03H 06H 10H	AS_01_V1	Scale: V1: -32768-32767 V2: -32768-32767 V3: -32768-32767		
1A02H			AS_01_V2			
1A03H			AS_01_V3			
1A04H	3H		AS_02_V1			
1A05H			AS_02_V2			
1A06H			AS_02_V3			
...			
1CECH	3H		AS_FA_V1			
1CEDH			AS_FA_V2			
1CEEH			AS_FA_V3			
(1DxxH-1FxxH) MD(Multiply-Divide) Preset value						
1D01H	3H		03H 06H 10H		MD_01_V1	Scale: V1: -32768-32767 V2: -32768-32767 V3: -32768-32767
1D02H		MD_01_V2				
1D03H		MD_01_V3				
1D04H	3H	MD_02_V1				
1D05H		MD_02_V2				
1D06H		MD_02_V3				
...				
1FECH	3H	MD_FA_V1				
1FEDH		MD_FA_V2				
1FEEH		MD_FA_V3				
(20xx) PID Preset value						
2001H	6H	03H 06H 10H		PI_1_TARG	Scale: TARG: -32768-32767 MEAG: -32768-32767 SAMP: 1-32767 PV: 1-32767 IV: 1-32767 DV: 1-32767	
2002H			PI_1_MEAG			
2003H			PI_1_SAMP			
2004H			PI_1_PV			
2005H			PI_1_IV			
2006H			PI_1_DV			
2007H	6H		PI_2_TARG			
2008H			PI_2_MEAG			
2009H			PI_2_SAMP			
200AH			PI_2_PV			
200BH			PI_2_IV			
200CH			PI_2_DV			
...			
20AFH	6H		PI_1E_TARG			
20BOH			PI_1E_MEAG			
20B1H			PI_1E_SAMP			
20B2H			PI_1E_PV			
20B3H			PI_1E_IV			
20B4H		PI_1E_DV				

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(21xxH~24xxH) MX (Data multiplexer) Preset value					
2101H	4H	03H 06H 10H	MX_1_V1	Scale: V1: -32768~32767 V2: -32768~32767 V3: -32768~32767 V4: -32768~32767	
2102H			MX_1_V2		
2103H			MX_1_V3		
2104H			MX_1_V4		
2105H	4H		MX_2_V1		
2106H			MX_2_V2		
2107H			MX_2_V3		
2108H			MX_2_V4		
...		
24E5H	4H	MX_FA_V1			
24E6H		MX_FA_V2			
24E7H		MX_FA_V3			
24E8H		MX_FA_V4			
(25xxH) AR(Analog ram control)Preset value					
2501H	7H	03H 06H 10H	AR_01_LEVEL1		Scale: LEVEL1: -10000~20000 LEVEL2: -10000~20000 MAXL: -10000~20000 StSp: 0~20000 Rate: 0~10000 A: 0~01000 B: -10000~10000
2502H			AR_01_LEVEL2		
2503H			AR_01_MAXL		
2504H			AR_01_Setpt		
2505H			AR_01_Rate		
2506H			AR_01_A		
2507H			AR_01_B		
2508H	7H		AR_02_LEVEL1		
2509H			AR_02_LEVEL2		
250AH			AR_02_MAXL		
250BH			AR_02_Setpt		
250CH			AR_02_Rate		
250DH			AR_02_A		
250EH			AR_02_B		
...		
25CCH	7H	AR_1E_LEVEL1			
25CDH		AR_1E_LEVEL2			
25CEH		AR_1E_MAXL			
25CFH		AR_1E_Setpt			
25DOH		AR_1E_Rate			
25D1H		AR_1E_A			
25D2H		AR_1E_B			
(26xxH) DR(Data register) Preset value					
2601H	1H	03H 06H 10H	DR_1	Scale: Signed: -32768~32767 Unsigned: 0~65535	
2602H	1H		DR_2		
...		
26F0H	1H		DR_F0		
(27xxH) AQ(Analog Output)Preset value					
2701H	1H	03H 06H 10H	AQ_1	Scale: Voltage: 0~1000 Current: 0~500	
2702H	1H		AQ_2		
2703H	1H		AQ_3		
2704H	1H		AQ_4		

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② Counter Preset Value

	Byte alti	Byte bassi
COUNTER MOD 1~7 (Data Length=2H)	C_PRESET_V_M	C_PRESET_V_L
	00	C_PRESET_V_H
COUNTER MOD8 (Data Length=5H)	FIX_TIM_H	FIX_TIM_L
	C_ON_PRESET_V_M	C_ON_PRESET_V_L
	00	C_ON_PRESET_V_H
	C_OFF_PRESET_V_M	C_OFF_PRESET_V_L
	00	C_OFF_PRESET_V_H

Counter value:0~999999 (0~0F423FH)

③ RTC Preset Value

	High bytes	Low bytes
RTC MOD1 RTC MOD2	Turn on week	Turn off week
	Turn on time (hour)	Turn on time (min)
	Turn off time (hour)	Turn off time (min)
RTC MOD3	Turn on year	Turn off year
	Turn on month	Turn on day
	Turn off month	Turn off day

Year: 00~99; Month: 01~12; Day: 01~31; Day of the week: 00~06.
 Hour: 00~23; Minutes: 00~59; Seconds: 00~59.

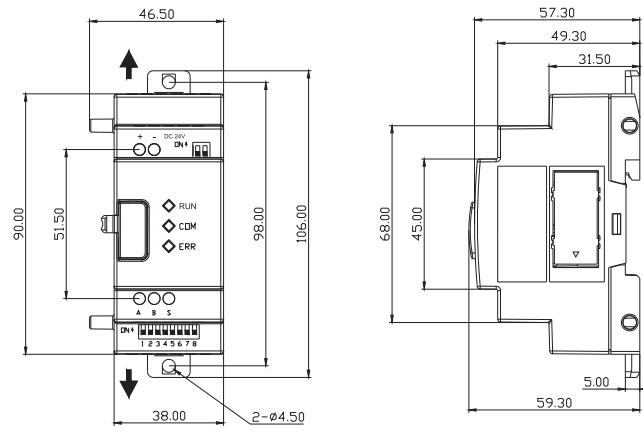
1.8.10 2BxxH~2DxxH): COILS ADDRESS (BIT) FOR V3.x TYPE ONLY

The address of the same function must be read/written in one command.
 The address of different functions cannot be read/written continuously.

Register Address	Data Length	Usable Comm.	Content	Remark
2B01H~2B20H	10H (Read)	01H 05H	R01~R1F	2B1FH, reserved
2B21H~2B40H			G01~G1F	2B3FH, reserved
2B41H~2B60H			T01~T1F	2B5FH, reserved
2B61H~2B80H			C01~C1F	2B7FH, reserved
2B81H~2BC0H			M01~M3F	2BBFH, reserved
2BC1H~2C00H			N1~N3F	2BFFH, reserved
2C00H~2C10H			I1~IC	2C0CH~2C0FH, reserved
2C11H~2C20H			X1~XC	2C1CH~2C1FH reserved
2C21H~2C30H			Y1~YC	2C2CH~2C2FH, reserved
2C31H~2C40H			Q1~Q8	2C38H~2C3FH, reserved
2C41H~2C50H			Z1~Z4	Z1~Z4 can't be written; 2C44H~2C4FH, reserved

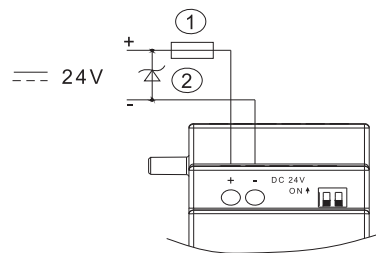
NOTA: 01H: user set the start address equal multiple of 10H, and quantity of coils also equal multiple of 10H (01H: read word coil status).
 I,X,Z cannot be written. Reserved address cannot be written.

1.9 MODULE OVERALL DIMENSIONS [mm]

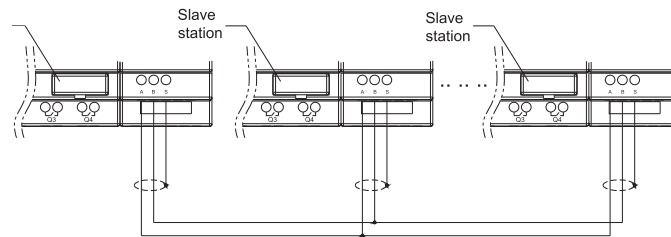


1.10 WIRING DIAGRAM FOR MODULE

– 24VDC power supply



– Connection of LRE P00 modules through RS485 interface



1 - 1A quick-blow fuse, automatic circuit breaker and circuit protections.
2 - Surge suppressor.