

# MBSL16DI16R0 digital input and output module

## An instruction manual

## Chapter 1 product introduction

### First, product overview

The MBSL16DI16RO module is the 16 digital isolating input, the 16 circuit digital relay isolation output module, and the output by isolating the RS485 interface. The module uses standard Modbus RTU communication, which can directly fit various configuration software of host computer, PLC, DCS and so on. The electrical signal of module power and RS485 communication is isolated from each other, effectively restraining all kinds of mode and common mode interference, and also ensuring the stable and reliable work of the module.

1. Using RS485 MODBUS RTU standard communication, it can be organized with the configuration software of the upper computer, PLC, industrial touch screen and so on.
2. signal control, power supply and RS485 communication electrical signals are isolated from each other.
3. The communication circuit adopts lightning protection, anti-jamming design and power polarity protection.
4. RS485 communication signal output interface adopts overvoltage over current double protection.

5. It can be widely used for signal acquisition and control of industrial field equipment.

6. The communication format can be set up by software.

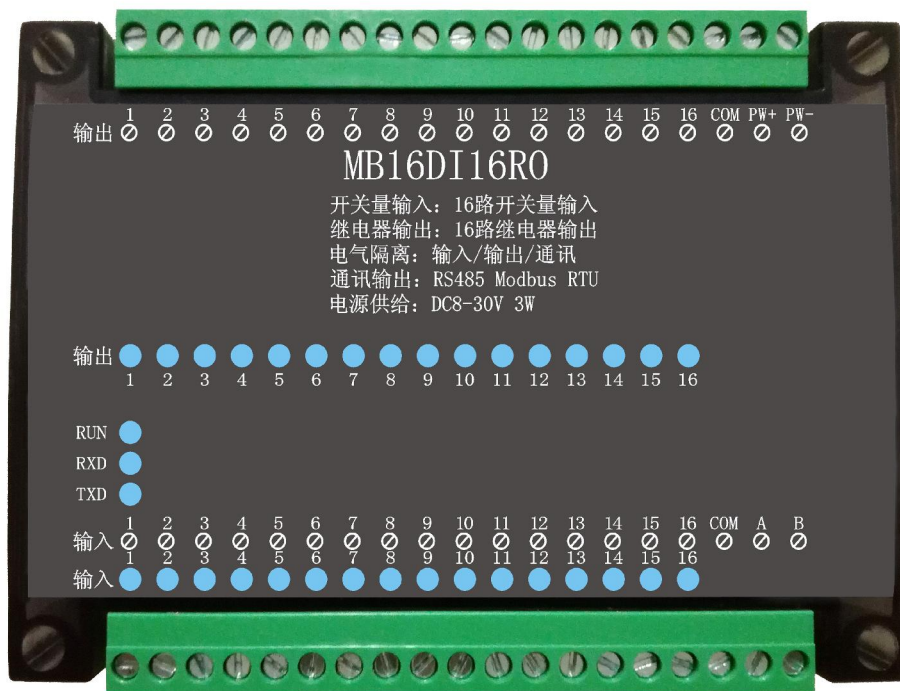
### Two, the main technical indicators

project	Technical indicators
Signal input / output	1. Input channel: 16 way digital input 2. output channel: 16 road relay output 3. load capacity: resistive load 5A/ channel
Communication output	1. communication protocol: MODBUS-RTU 2. interface type: isolation RS485 communication, output interface using overvoltage over current double protection 3. baud rates: 4800bps, 9600bps, 19200bps, 38400bps, 57600bps 4. checkout bit: no check, parity check, odd check 5. settings: module address, baud rate, check bit can be set up by software 6. communication distance: @9600bps 1200 meters
Module size and installation method	1、 1, installation way: Standard DIN guide installation or screw installation 2、 2. The shape size: 125 x 90 x 43mm
work environment	Temperature: -10 ~ +60 C humidity: 35 ~ 85% (non - condensation)
Working power supply	1. power supply voltage: 10V ~ 28V wide range power supply, polarity protection with power supply 2. power consumption: less than 5W

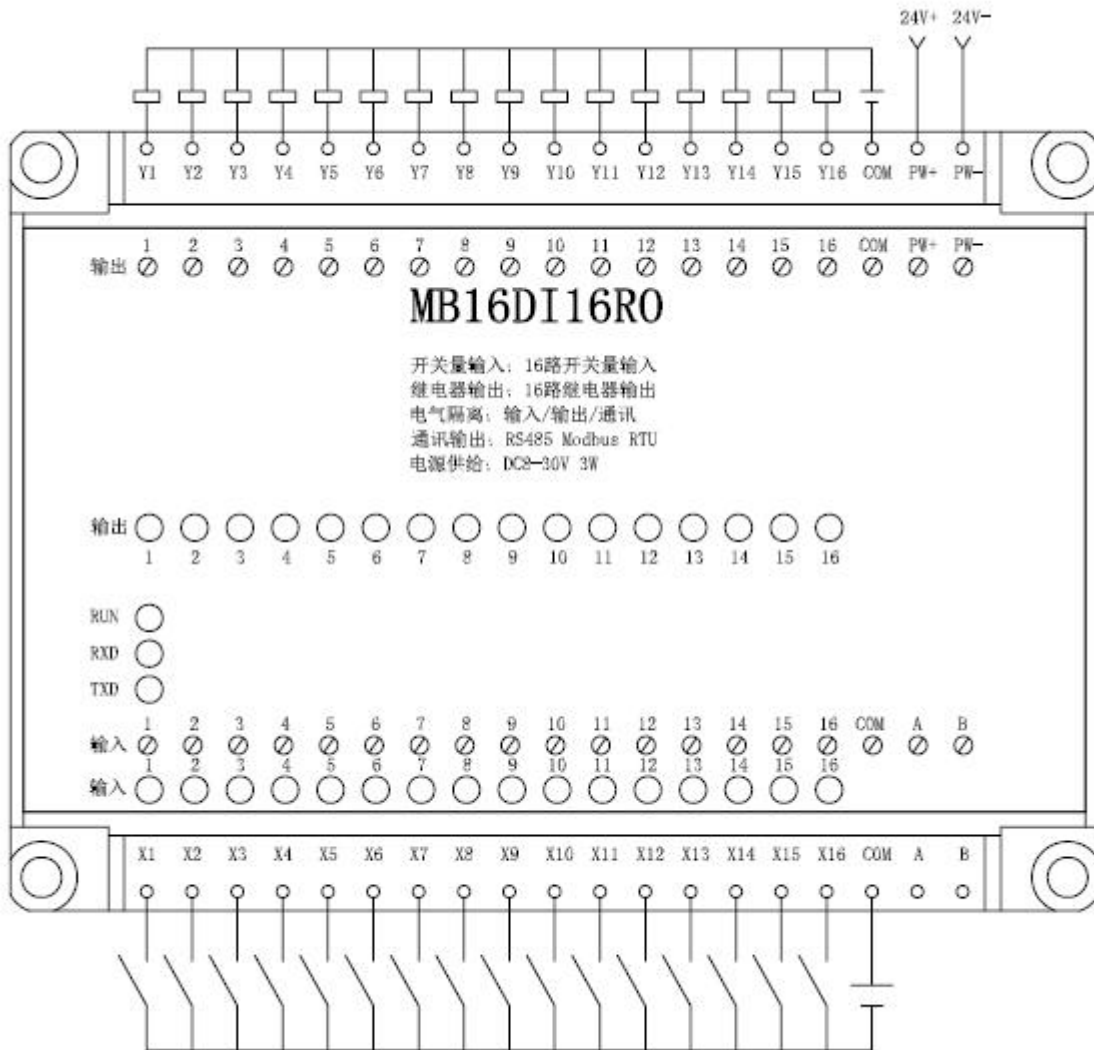
### Three. Interface definition

Terminal name	Description	Terminal name	Description
PW+	External power input positive end	485A	RS485 signal A+
PW-	External power input negative end	485B	RS485 signal B-
DI1	Digital input channel 1	D01	Digital output channel 1
DI2	Digital input channel 2	D02	Digital output channel 2
DI3	Digital input channel 3	D03	Digital output channel 3
DI4	Digital input channel 4	D04	Digital output channel 4
DI5	Digital input channel 5	D05	Digital output channel 5
DI6	Digital input channel 6	D06	Digital output channel 6
DI7	Digital input channel 7	D07	Digital output channel 7
DI8	Digital input channel 8	D08	Digital output channel 8
DI9	Digital input channel 9	D09	Digital output channel 9
DI10	Digital input channel 10	D10	Digital output channel 10
DI11	Digital input channel 11	D11	Digital output channel 11
DI12	Digital input channel 12	D12	Digital output channel 12

DI13	Digital input channel 13	D13	Digital output channel 13
DI14	Digital input channel 14	D14	Digital output channel 14
DI15	Digital input channel 15	D15	Digital output channel 15
DI16	Digital input channel 16	D16	Digital output channel 16
COM	输入公共端	COM	输出公共端



#### Four. Schematic diagram of module connection



## Five. Communication instructions

### 1. Communication parameters (factory value):9600, N, 8, 1

Parameter	description
9600	baud rate
N (no check)	Checkout bit
8	Data bit
1	Stop position

Modbus Poll - [Mbpoll\_16DIO\_03]

Tx = 1729: Err = 0: ID = 1: F = 03: SR = 60ms

	Alias	00000	Alias	00010
0	保持寄存器数字量输入地址1	0		0
1	保持寄存器数字量输入地址2	0		0
2	地址站	1		0
3	波特率	2		0
4	校验位	1		0
5	能功码选择控制位	0		0
6	品产版本号	16126		
7		0		
8	保持寄存器数字量输出地址1	0		
9	保持寄存器数字量输出地址2	0		

ModScan32 - [ModScan32\_16DIO\_03]

起始地址: 0001 设备ID: 1 查询次数:   
 MODBUS点样式: 0000 有效设备响应:   
 长度: 16 03:保存输入信号 复位控制

```

40001: < 0>
40002: < 0>
40003: < 1>
40004: < 2>
40005: < 1>
40006: < 0>
40007: <16126>
40008: < 0>
40009: < 0>
40010: < 0>
40011: < 0>
40012: < 0>
40013: < 0>
40014: < 0>
40015: < 0>
40016: < 0>

```

Modbus Poll - [Mbpoll\_16DIO\_02]

Tx = 1355: Err = 0: ID = 1: F = 02: SR = 200ms

	Alias	00000	Alias	00010
0	数字量输入通道1	0	数字量输入通道11	0
1	数字量输入通道2	0	数字量输入通道12	0
2	数字量输入通道3	0	数字量输入通道13	0
3	数字量输入通道4	0	数字量输入通道14	0
4	数字量输入通道5	0	数字量输入通道15	0
5	数字量输入通道6	0	数字量输入通道16	0
6	数字量输入通道7	0		
7	数字量输入通道8	0		
8	数字量输入通道9	0		
9	数字量输入通道10	0		

ModScan32 - [ModScan32\_16DIO\_02]

起始地址: 0001 设备ID: 1 查询次数:   
 MODBUS点样式: 0000 有效设备响应:   
 长度: 16 02:输入诊断 复位控制

```

10001: <0>
10002: <0>
10003: <0>
10004: <0>
10005: <0>
10006: <0>
10007: <0>
10008: <0>
10009: <0>
10010: <0>
10011: <0>
10012: <0>
10013: <0>
10014: <0>
10015: <0>
10016: <0>

```

Modbus Poll - [Mbpoll\_16DIO\_01]

File Edit Connection Setup Functions Display View Window Help

Tx = 909: Err = 0: ID = 1: F = 01: SR = 100ms

	Alias	00000	Alias	00010
0	数字量输出通道1	1	数字量输出通道11	0
1	数字量输出通道2	1	数字量输出通道12	0
2	数字量输出通道3	1	数字量输出通道13	0
3	数字量输出通道4	1	数字量输出通道14	0
4	数字量输出通道5	1	数字量输出通道15	0
5	数字量输出通道6	1	数字量输出通道16	0
6	数字量输出通道7	1		
7	数字量输出通道8	1		
8	数字量输出通道9	1		
9	数字量输出通道10	0		

ModScan32 - [ModScan32\_16DIO\_01]

文件(F) 连接(C) 配置(S) 视图(V) 窗口(W) 帮助(H)

设备ID: 1

起始地址: 0001

MODBUS点样式: 0001

长度: 16

01:开关状态

查询次数: 有效设备响应:

复位控制

```

00001: <1>
00002: <1>
00003: <1>
00004: <1>
00005: <1>
00006: <1>
00007: <1>
00008: <1>
00009: <1>
00010: <0>
00011: <0>
00012: <0>
00013: <0>
00014: <0>
00015: <0>
00016: <0>

```



## Second chapter Modbus register and communication protocol description

### Module supported MODBUS function code and address range

#### MODBUS function code supported by 1. modules

Register type	Address range	Function code	Function code	operation
Output coil register	00001-000016	0x01H	Read multiple coil registers	Read the values of one or more coil registers
		0x05H	Write a coil register	Write the value of a coil register
		0x0FH	Write one or more coil registers	Write the value of one or more coil registers
Hold register	40001-40016	0x03H	Read multiple hold registers	Read the values of one or more hold registers
		0x 06H	Write a single hold register	Write a data to the hold register
		0x 10H	Write multiple hold registers	Write one or more data to the hold register
输入数字量	10001-100016	0x02H	Read input discrete quantity	Discrete-time input register

## Two. Register definition description

### 1. output coil registers (function code: 0x01H, 0x05H, 0x0FH)

address	parameter	length	Read / write	MIN	MAX	Explain
<b>00001</b>	DO1	1	Read/write	0	1	The state of the digital output bit 1
<b>00002</b>	DO2	1	Read/write	0	1	The state of the digital output bit 2
<b>00003</b>	DO3	1	Read/write	0	1	The state of the digital output bit 3
<b>00004</b>	DO4	1	Read/write	0	1	The state of the digital output bit 4
<b>00005</b>	DO5	1	Read/write	0	1	The state of the digital output bit 5
<b>00006</b>	DO6	1	Read/write	0	1	The state of the digital output bit 6
<b>00007</b>	DO7	1	Read/write	0	1	The state of the digital output bit 7
<b>00008</b>	DO8	1	Read/write	0	1	The state of the digital output bit 8
<b>00009</b>	DO9	1	Read/write	0	1	The state of the digital output bit 9
<b>00010</b>	DO10	1	Read/write	0	1	The state of the digital output bit 10
<b>00011</b>	DO11	1	Read/write	0	1	The state of the digital output bit 11
<b>00012</b>	DO12	1	Read/write	0	1	The state of the digital output bit 12
<b>00013</b>	DO13	1	Read/write	0	1	The state of the digital output bit 13

<b>000014</b>	DO14	1	Read/write	0	1	The state of the digital output bit 14
<b>000015</b>	DO15	1	Read/write	0	1	The state of the digital output bit 15
<b>000016</b>	DO16	1	Read/write	0	1	The state of the digital output bit 16

## 2. hold register (function code: 0x03H, 0x06H, 0x10H)

address	parameter	length	Read / write	MIN	MAX	Explain
40001	DI (1~8)	2	read-only	0	0xff	Read the state of 8 bits digital input
40002	DI (9~16)	2	read-only	0	0xff	Read the state of 8 bits digital input
40003	Device address	2	Read/ write	1	247	1 (default)
40004	baud rate	2	Read/ write	1	5	1(4800) 2(9600) default 3(19200) 4(38400) 5(57600)
40005	Checkout bit	2	Read/ write	1	3	1 (no check.) default 2 (odd check) 3 (parity check)
40006	Function code selection	2	Read/ write	0	1	If set to 1, the output port is controlled from the hold register, and the set to 0 is controlled by the 0x register.
40007	product version	2	read-only	0	--	Year + month + day
40009	DO (1~8)	2	Read/ write	0	0xff	State the state of writing 8 bits of

						digital output
400010	D0 (9~16)	2	Read/ write	0	0xff	State the state of writing 8 bits of digital output

### 3. discrete input register (function code: 0x02H)

address	parameter	length	Read/ write	MIN	MAX	Explain
10001	DI1	1	read-only	0	1	The state of the digital input bit 1
10002	DI2	1	read-only	0	1	The state of the digital input bit 2
10003	DI3	1	read-only	0	1	The state of the digital input bit 3
10004	DI4	1	read-only	0	1	The state of the digital input bit 4
10005	DI5	1	read-only	0	1	The state of the digital input bit 5
10006	DI6	1	read-only	0	1	The state of the digital input bit 6
10007	DI7	1	read-only	0	1	The state of the digital input bit 7
10008	DI8	1	read-only	0	1	The state of the digital input bit 8
10009	DI9	1	read-only	0	1	The state of the digital input bit 9
100010	DI10	1	read-only	0	1	The state of the digital input bit 10

100011	DI11	1	read-only	0	1	The state of the digital input bit 11
100012	DI12	1	read-only	0	1	The state of the digital input bit 12
100013	DI13	1	read-only	0	1	The state of the digital input bit 13
100014	DI14	1	read-only	0	1	The state of the digital input bit 14
100015	DI15	1	read-only	0	1	The state of the digital input bit 15
100016	DI16	1	read-only	0	1	The state of the digital input bit 16

### Third chapter product configuration

#### First. Communication settings

##### 1. communication parameters of default out of factory

project	Register address	Explain	Default value
address	40003	1 (default)	1
baud rate	40004	1(4800) 2(9600) default 3(19200) 4(38400) 5(57600)	2
Checkout bit	40005	1 (no check.) default 2 (odd check) 3 (parity check)	1
Data bit	---	Non adjustable	8 position

Stop position	---	Non adjustable	1 position
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## 2. reset communication parameters

1. In order to prevent the user from forgetting the set of communication parameters, it can not communicate with the module. The recovery initialization function is specially designed.

2. use toothpicks to hold the button behind the module for 3 seconds or more until the module "RUN" red indicator lights flicker and release the button pressed, and the RUN lamp flashes 3 times, then it will return to normal (running state), that is, restore the factory settings. After cutting off the module power, the communication parameters have been reset to the default value.

### Two. Communication indicator light

1. after the module is on power, the module red work indicator "RUN" is often lit, and when the reset button is pressed, it will flicker at three times at 1 second interval.

2. In module communication, the communication indicator flashes according to the received data "RXD", and the "TXD" flicker of the data is flickered after the CPU processing. When the communication is not

normal, the flicker will scintillation so as to judge the cause of the communication failure.

### Three. The debugging instructions of the upper computer

This module provides a standard MODBUS debugging software to implement the function debugging and parameter setting of the module. Please follow the following steps:

Using RS485 converter to connect computers and modules

The 24V external power supply is connected to the module and energized to avoid unnecessary damage. Please check whether the positive and negative side of the power supply is connected before the power is connected.

Open the files that the debugging software has edited, set the correct communication parameters, open the communication port, and enter the function debugging or parameter setting interface

Select the appropriate settings, collection, and control options

Note: in the connection to the module terminal, it is suggested that the terminals be removed first and then then inserted. The wiring diagram and the connection symbols on the module are checked well, and then the electricity is determined after the error is unmistakable.