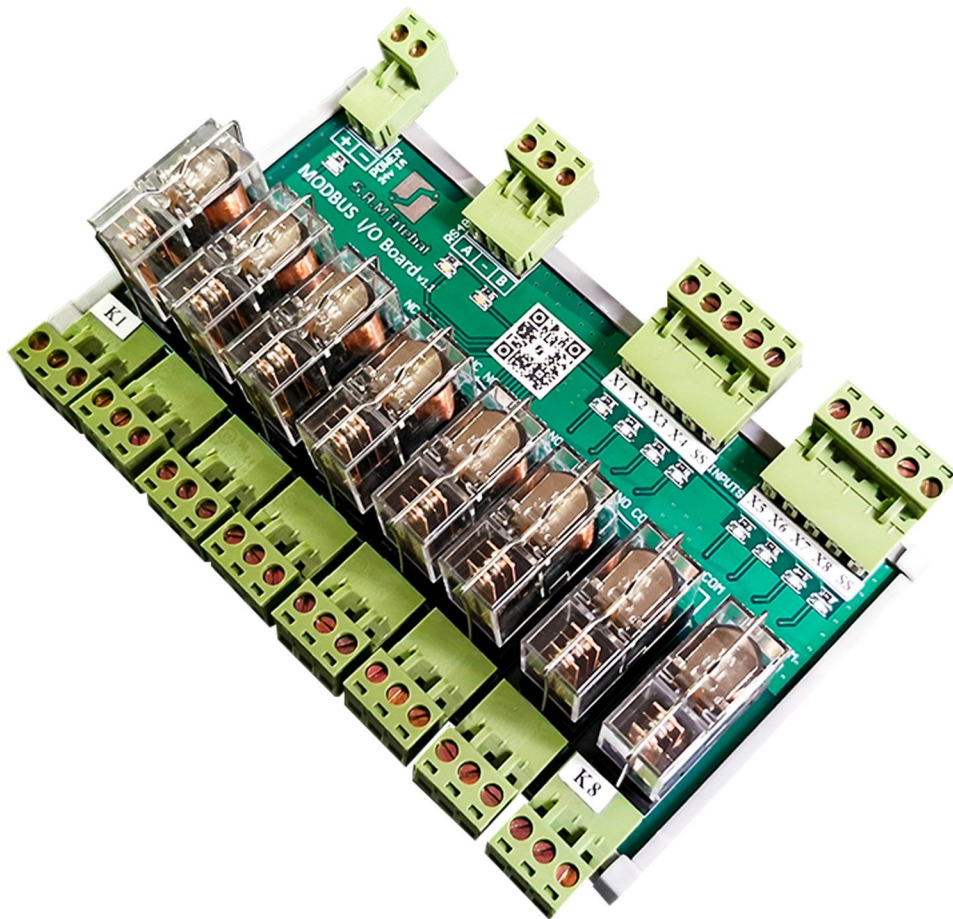


DATASHEET

Modbus RTU I/O Expansion Module



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1. General Description

This device is a Modbus RTU input/output module used in industrial automation systems. It allows users to read digital input signals and control relay outputs through Modbus communication.

8 Relay outputs can be turned ON or OFF remotely using Modbus commands. Each relay supports loads up to 16 A.

The 8 digital inputs are optically isolated and operate with 24 V DC signals. Inputs can work in Sink or Source mode, which is selected using the S/S terminal.

The module is designed for DIN-rail mounting and is suitable for installation inside control panels.

2. Electrical & Communication Specifications

Supply Voltage	24V DC
Protocol	Modbus RTU
Function Codes	02 (Read Discrete Inputs) 03 (Read Holding Registers) 05 (Write Single Coil) 06 (Write Single Register)
Physical Layer	RS 485
Output type	8 x SPDT (COM NC NO)
Input type	8 x Optocoupler PNP and NPN
Relay Current	16A
Mounting	DIN rail mount (72 mm)

3. Default Communication Setting

Parameter	Default Value
Station Address	5
Baud Rate	9600
Parity	None
Stop Bit	1

4. Modbus Register Map

Setting communication parameters (station address, baud rate, etc.) via function Code 03 (Read Holding Registers) and function Code 06 (Write Single Register)

Register 0	Station Address
Address	0
Description	Modbus slave address
Range	1 – 250
Access	R/W
<u>Default</u>	5

Register 1	Baud Rate
Address	1
Description	Communication baud rate
Values	0:115200, 1:57600, 2:38400, 3:19200, 4:9600, 5:4800
Access	R/W
<u>Default</u>	4 (9600)

Register 3	Stop Bit
Address	3
Description	UART stop bit configuration
Values	0:1 Stop, 1:1.5 Stop, 2:2 Stop
Access	R/W
Default	0

Read inputs

The device provides 8 digital inputs accessible via Function Code 02 (Read Discrete Inputs).

Input address	0-7
Data Representation	Each input is one bit, (0 = OFF , 1 = ON)
Access Type	Read Only

Write outputs

The device provides 8 digital outputs (coils) writable via Function Code 05 (Write Single Coil).

Input address	0-7
Data Representation	0xFF00 -> Output ON 0x0000 -> Output OFF
Access Type	Write Only

6. Modbus RTU Frame Examples

Example 1: Read Inputs 0 to 7

Request :

Slave Address : 0x05

Function Code : 0x02

Start Address : 0x0000

Quantity : 0x0008

Frame (Hex) : 05 02 00 00 00 08 CRC_L CRC_H

Response: assuming inputs : 11110011

Slave Address : 0x05

Function Code : 0x02

Byte Count = 01

Data Byte = F3

Frame (Hex) : 05 02 01 F3 CRC_L CRC_H

Example 2 : Set Output 0 ON

Request :

Slave Address : 0x05

Function Code : 0x05

Coil Address : 0x0000

Value : 0xFF00

Frame (Hex) : 05 05 00 00 FF 00 CRC_L CRC_H

Response :

Slave Address : 05

Function Code : 05

Coil Address High Byte : 0

Coil Address Low Byte : 00

Value High Byte : FF

Value Low Byte : 00

Frame (Hex): 05 05 00 00 FF 00 CRC_L CRC_H

Example 3 : Write Baud Rate = 9600

Request :

Slave Address : 0x05

Function Code : 0x06

Register Address : 0x0001

Value : 0x0004

Frame (Hex) : 05 06 00 01 00 04 CRC_L CRC_H

7. Important Notes

- Ensure correct Sink/Source selection using the S/S terminal before applying input signals.
- Relay output current must not exceed 16 A.
- Proper grounding and shielding are recommended for reliable RS-485 communication.
- Installation on DIN rail must be performed in a suitable electrical enclosure.