

Remote I/O R3 Series

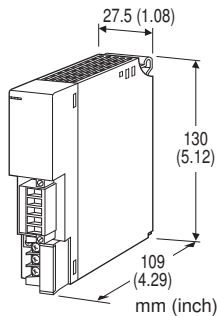
MODBUS INTERFACE MODULE

Functions & Features

- Enables other protocol interface modules to communicate with Modbus data (gateway).
- Recognized as an analog I/O mixed module by other protocol interface modules.
- Used as Modbus slave device like R3-NM1.

Typical Applications

- A gateway for CC-Link and Modbus.



MODEL: R3-GM1S[1]

ORDERING INFORMATION

- Code number: R3-GM1S[1]
- Specify a code from below for [1].
(e.g. R3-GM1S/CE/Q)
- Specify the specification for option code /Q
(e.g. /C01)

COMMUNICATION MODE

S: Single

[1] OPTIONS (multiple selections)

Standards & Approvals

blank: Without CE

/CE: CE marking

Other Options

blank: none

/Q: Option other than the above (specify the specification)

SPECIFICATIONS OF OPTION: Q

COATING (For the detail, refer to M-System's web site.)

/C01: Silicone coating

/C02: Polyurethane coating

/C03: Rubber coating

RELATED PRODUCTS

- Interface module (model: R3-NC1, NC3, NDx, NE1, NFL1, NM4)
Firmware version V2.00 or later
- Interface Module (model: R3-NML3)
Firmware version V1.00 or higher

PACKAGE INCLUDES...

- Terminating resistor (110 Ω, 0.25 W)

GENERAL SPECIFICATIONS

Connection

Network: Euro type connector terminal

Internal bus: Via the Installation Base
(model: R3-BSx)

Internal Power: Via the Installation Base
(model: R3-BSx)

RUN contact output: M3 separable screw terminal
(torque 0.5 N·m)

Screw terminal: Nickel-plated steel

Isolation: Modbus to internal bus or internal power to RUN contact output

RUN indicator: Bi-color (green/red) LED; green when Modbus communication and the field bus built-in R3 interface module are in normal; red when receiving data. Select with DIP switch.

ERR indicator: Bi-color (green/red) LED; the green ON/blinks in communication errors (OFF with wire breakdown; blinks with setting errors); red when transmitting data. Select with DIP switch.

Data allocation: Set with the side DIP switch.

RUN contact: Turns on while the green RUN LED is ON (only when Modbus communication and the field bus built-in the interface module are in normal).

■ RUN CONTACT OUTPUT

Rated load: 250 V AC @ 0.5 A (cos φ = 1)

30 V DC @ 0.5 A (resistive load)

(Max. 50 V AC to conform with EC Directive)

Maximum switching voltage: 250 V AC or 30 V DC

Maximum switching power: 250 VA or 150 W

Minimum load: 1 V DC @ 1 mA

Mechanical life: 2 × 10⁷ cycles (300 cycles/min.)

When driving an inductive load, external contact protection and noise quenching recommended.

MODBUS COMMUNICATION

Standard: Conforms to RS-485, EIA

Transmission distance: 500 meters max.

Transmission media: Shielded twisted-pair cable
(CPEV-S 0.9 dia.)

Transmission setting: DIP switch (front)



Data: RTU (Binary) or ASCII
Parity: None, even or odd
Baud rate: 4800, 9600, 19.2 k, 38.4 k (bps)
Node address: Rotary switch; 01 - F7

INSTALLATION

Operating temperature: -10 to +55°C (14 to 131°F)
Operating humidity: 30 to 90 %RH (non-condensing)
Atmosphere: No corrosive gas or heavy dust
Mounting: Installation Base (model: R3-BSx)
Weight: 200 g (0.44 lb)

PERFORMANCE

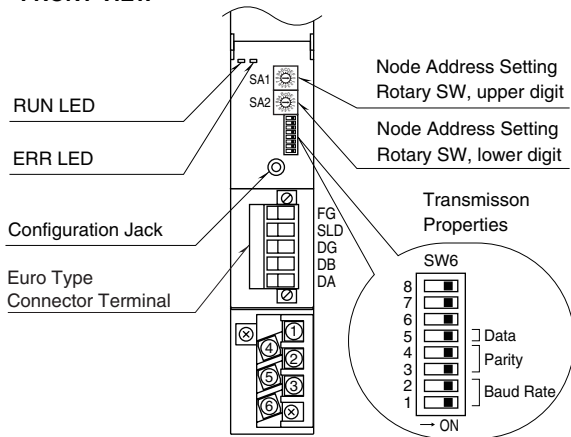
Data allocation: 16 × n (Module allocation: 1 to 8)
Current consumption: 100 mA
Insulation resistance: ≥ 100 MΩ with 500 V DC
Dielectric strength: 1500 V AC @ 1 minute
 (Modbus to internal bus or internal power to RUN contact output)

STANDARDS & APPROVALS

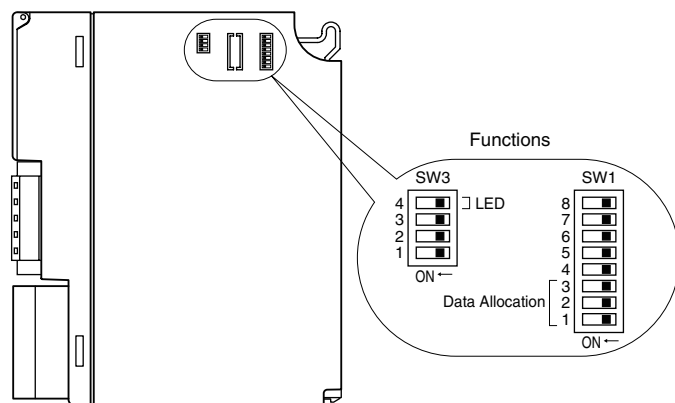
CE conformity:
 EMC Directive (2004/108/EC)
 EMI EN 61000-6-4: 2007/A1: 2011
 EMS EN 61000-6-2: 2005

EXTERNAL VIEW

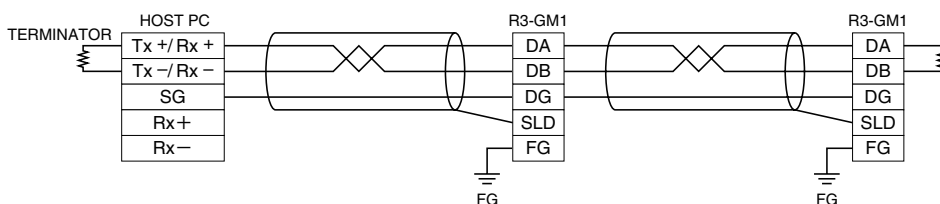
FRONT VIEW



SIDE VIEW



COMMUNICATION CABLE CONNECTIONS



MODBUS FUNCTION CODES & SUPPORTED CODES

■ Data and Control Functions

CODE	NAME		
01	Read Coil Status		Digital output from the slave
02	Read Input Status	X	Status of digital inputs to the slave
03	Read Holding Registers	X	General purpose register within the slave
04	Read Input Registers	X	Collected data from the field by the slave
05	Force Single Coil		Digital output from the slave
06	Preset Single Registers	X	General purpose register within the slave
07	Read Exception Status		
08	Diagnostics	X	
09	Program 484		
10	Poll 484		
11	Fetch Comm. Event Counter		Fetch a status word and an event counter
12	Fetch Comm. Event Log		A status word, an event counter, a message count and a field of event bytes
13	Program Controller		
14	Poll Controller		
15	Force Multiple Coils	X	Digital output from the slave
16	Preset Multiple Registers	X	General purpose register within the slave
17	Report Slave ID		Slave type / 'RUN' status
18	Program 884 / M84		
19	Reset Comm. Link		
20	Read General Reference		
21	Write General Reference		
22	Mask Write 4X Register		
23	Read / Write 4X Registers		
24	Read FIFO Queue		

■ Exception Codes

CODE	NAME		
01	Illegal Function	X	Function code is not allowable for the slave
02	Illegal Data Address	X	Address is not available within the slave
03	Illegal Data Value	X	Data is not valid for the function
04	Slave Device Failure	X	
05	Acknowledge	X	
06	Slave Device Busy	X	
07	Negative Acknowledge	X	
08	Memory Parity Error		

■ Diagnostic Subfunctions

CODE	NAME		
00	Return Query Data	X	Loop back test
01	Restart Comm. Option	X	Reset the slave and clear all counters
02	Return Diagnostic Register	X	Contents of the diagnostic data (2 bytes)
03	Change ASCII Input Delimiter	X	Delimiter character of ASCII message
04	Force Listen Only Mode	X	Force the slave into Listen Only Mode



MODBUS I/O ASSIGNMENTS

	ADDRESS	DATA TYPE	DATA	MODULE POSITION
Input (1X)	1025 – 1032		Module Status	
Input Registers (3X)	1 – 16	I	Analog Input	1
	17 – 32			2
	33 – 48			3
	49 – 64			4
	65 – 80			5
	81 – 96			6
	97 – 112			7
	113 – 128			8
	257 – 272	F	Analog Input	1
	273 – 288			2
	289 – 304			3
	305 – 320			4
	321 – 336			5
	337 – 352			6
	353 – 368			7
	369 – 384			8
Holding Registers (4X)	1 – 16	I	Analog Output	1
	17 – 32			2
	33 – 48			3
	49 – 64			4
	65 – 80			5
	81 – 96			6
	97 – 112			7
	113 – 128			8
	257 – 272	F	Analog Output	1
	273 – 288			2
	289 – 304			3
	305 – 320			4
	321 – 336			5
	337 – 352			6
	353 – 368			7
	369 – 384			8

■ DATA TYPE

I: Integer, 0 – 10000 (0 – 100%)

F: Floating (32-bit data cannot be accessed via floating addresses.)

Note: DO NOT access addresses other than the ones mentioned above. Such access may cause problems such as malfunction.

• Module Status

Module Status indicates whether individual I/O module is mounted or not. The bit corresponding to the mounted slots turns to "1," and the unmounted slots to "0."



TRANSMISSION DATA DESCRIPTIONS

Use the DIP SW located at the side of the module to specify module allocation.

1 module is equivalent to 1 I/O module with 16 words analog input and 16 words analog output. Max. 8 modules (128 words input, 128 words output) transmission is available. R3-GM1 seems as if max. 8 I/O modules are mounted to 8 slots via Modbus. The input of the module is processed as follows.

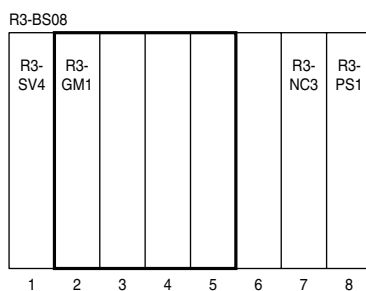
Modbus Communication --> R3-GM1 Module --> R3 Base --> R3 Communication Module

In responding to the input, the output (Holding Register) command becomes valid via Modbus communication, and the input (Input Register) command is valid in the output.

Note: Do not mount any modules in the slots which are occupied by virtual modules. If a real I/O module is mounted in the slot, an internal bus error occurs and the ERR LED turns on. Max. 16 real I/O modules and virtual modules are available. The interface module can not read the data for more than 16 modules.

■ MOUNTED TO SLOT 2 (4 modules)

In practice, I/O modules are mounted to slot 1 and slot 2. The R3-NC3 in slot 7 recognizes the R3-SV4 in slot 1 directly. However, the R3-NC3 recognizes this module in slot 2 as if 4 modules are mounted to from slot 2 to 5.

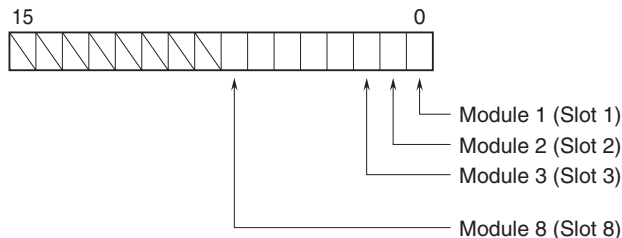


SLOT	REAL MODULE	VIRTUAL MODULE	DATA
Slot 1	R3-SV4	R3-SV4	4 Words
Slot 2	R3-GM1	R3-GM1 (1/4)	16 Words
Slot 3	No module	R3-GM1 (2/4)	16 Words
Slot 4	No module	R3-GM1 (3/4)	16 Words
Slot 5	No module	R3-GM1 (4/4)	16 Words
Slot 6	No module	No module	-
Slot 7	R3-NC3	R3-NC3	-
Slot 8	R3-PS1	R3-PS1	-

I/O DATA DESCRIPTIONS

■ MODULE STATUS, DATA ERROR STATUS

Shows each module's availability and error status.

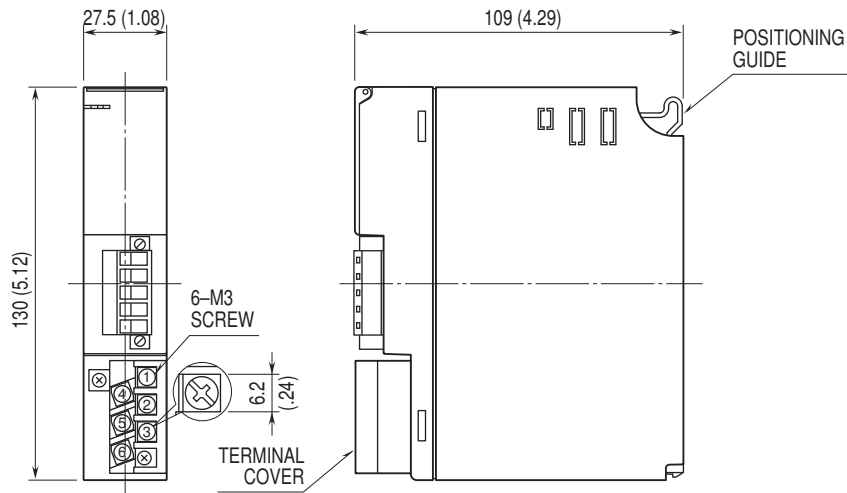


■ ANALOG DATA

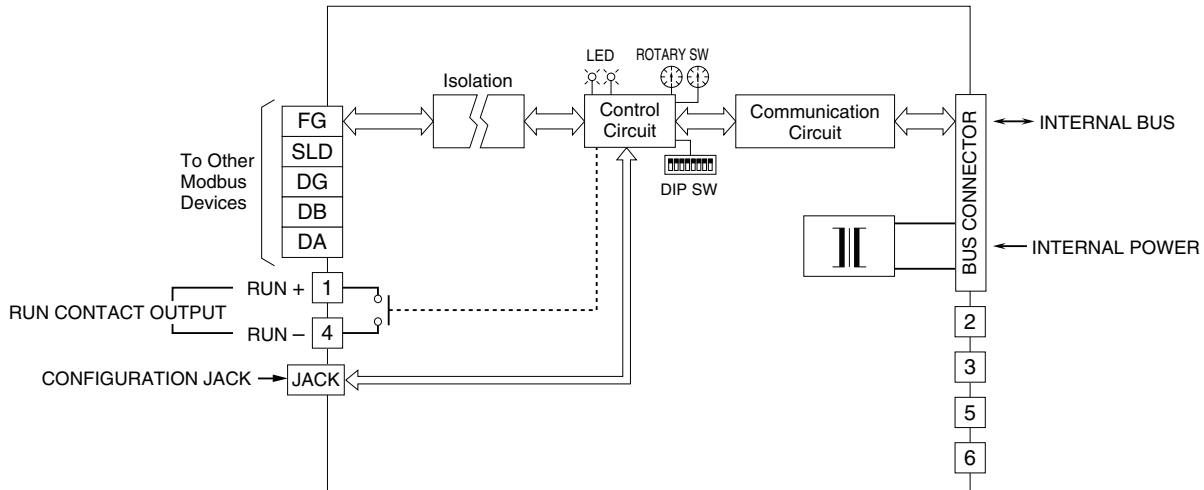
16-bit binary data.



EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)

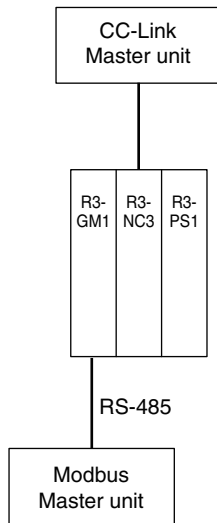


SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



SYSTEM CONFIGURATION EXAMPLES

In the following system configuration, Modbus data is converted to CC-Link data via this unit which is used as a gateway.



Specifications are subject to change without notice.

