

Remote I/O R1M Series

**CONTACT INPUT MODULE
(32 points)**

MODEL **R1M-A1**

MODEL & SUFFIX CODE SELECTION

MODEL _____ R1M-A1□□

Modbus protocol _____

I/O TYPE _____

A1 : Contact input, 32 points

FIELD TERMINAL TYPE _____

T : M3 screw terminals

C1 : FCN type connector*

POWER INPUT _____

M2: 100 – 240V AC

R : 24V DC

*No CE conformance

ORDERING INFORMATION

Specify code number. (e.g. R1M-A1T-M2)

RELATED PRODUCTS

- Special cable (model: FCN32)
- Connector-terminal block (model: CNT)
- R1X configurator software (model: R1CON)
Downloadable at M-System's web site:
<http://www.m-system.co.jp>
- PC configurator cable (model: MCN-CON)

GENERAL SPECIFICATIONS

Connection

Power input, transmission: terminal block

RS-232C: 9-pin D-sub connector (male)

I/O: M3 screw terminals or FCN type connector

Isolation: input to RS-232C or RS-485 to power

Address setting: rotary switch; 1 – F (15 nodes)

Count memory at power loss: Count value is not saved when the power supply is lost.

COMMUNICATION SPECIFICATIONS

Baud rate: 38.4 kbps

Communication: half-duplex, asynchronous, no procedure

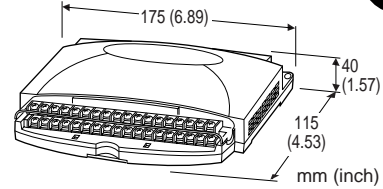
Protocol: Modbus RTU

Refer to Modbus Protocol Reference Guide (EM-5650) for supported functions.

■RS-232C

Standard: conforms to RS-232C, EIA

Transmission distance: 10 meters max.



Functions & Features

- 32-point dry contact inputs
- Easy system expansion via Modbus RTU

■RS-485

Standard: conforms to RS-485, EIA

Transmission distance: 500 meters max.

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

INPUT & OUTPUT

■INPUT: dry contact, 32 points

Commons: all negatives

Sensing: approx. 5V DC (pull-up resistance 22kΩ)
≤1.5V at ON
≥4V at OFF

Sampling rate: 50 millisecc.

•Totalizing Counter Function

Number of input channels: 16
(ch.1 thr. 16 available both with instantaneous status and totalized value)

Max. input frequency: 100 Hz

Minimum pulse width: 5 ms

Counter reset input: pulse rising (ch.32 assigned)

Max. counter value: 999,999,999 (reset to zero at overflow)

INSTALLATION

Power input

AC: operational voltage range 85 – 264V;
47 – 66 Hz, approx. 10VA

DC: operational voltage range 24V ±10%;
ripple 10% p-p max., approx. 7W

Operating temperature: -5 to +60°C (23 to +140°F)

Operating humidity: 30 to 90% RH (non-condensing)

Mounting: surface or DIN rail

Dimensions: W175×H115×D40 mm
(6.89"×4.53"×1.57")

Weight: 400 g (0.88 lbs)

PERFORMANCE

Multi-transmission time: 5 millisec.
Insulation resistance: ≥100MΩ with 500V DC
Dielectric strength: 2000V AC @1 minute (input to RS-232C or RS-485 to power to ground)

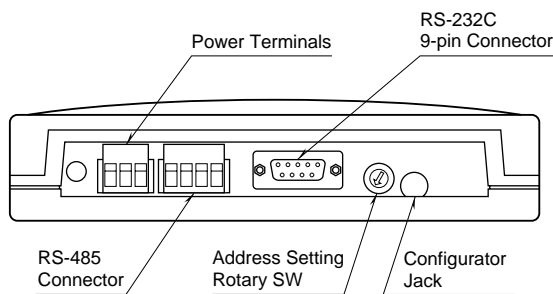
STANDARDS & APPROVALS

CE conformity: EMC Directive (89/336/EEC)
 EMI EN61000-6-4
 EMS EN61000-6-2
 Low Voltage Directive (73/23/EEC)
 Installation category II
 Pollution degree 2
 Max. operating voltage 300V
 Input or RS-232C/RS-485 to power
 – Reinforced insulation
 Input to RS-232C/RS-485
 – Basic insulation

DATA ADDRESS

	ADDRESS	FORMAT	NAME
Input Status (1X)	1 – 32	Bit (1 bit)	Contact Input
Input Registers (3X)	1 – 32	Unsigned Long (32 bits)	Totalized Value
Holding Registers (4X)	1 – 32	Unsigned Long (32 bits)	Counter Preset Value

REAR VIEW

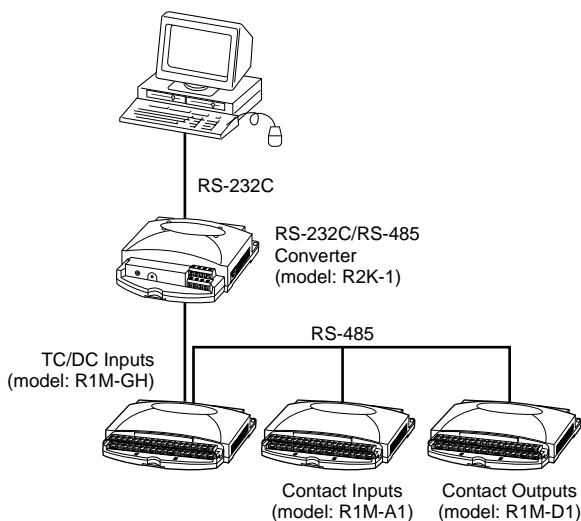


RS-232C INTERFACE



ABBR.	PIN NO.	EXPLANATION OF FUNCTION
BA (SD)	2	Transmitted Data
BB (RD)	3	Received Data
AB (SG)	5	Signal Common
CB (CS)	7	Clear to Send
CA (RS)	8	Request to Send
	1	Not Used.
	4	DO NOT connect. Connecting may cause malfunctions.
	6	
	9	

SYSTEM CONFIGURATION EXAMPLE

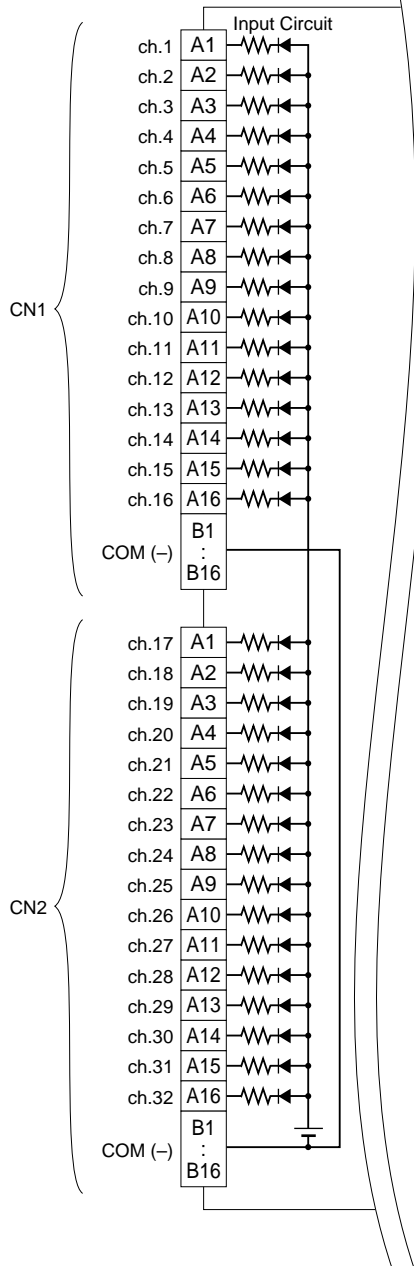


When the cable distance between the PC and the R1Ms is long, insert an RS-232C/RS-485 Converter for isolation.

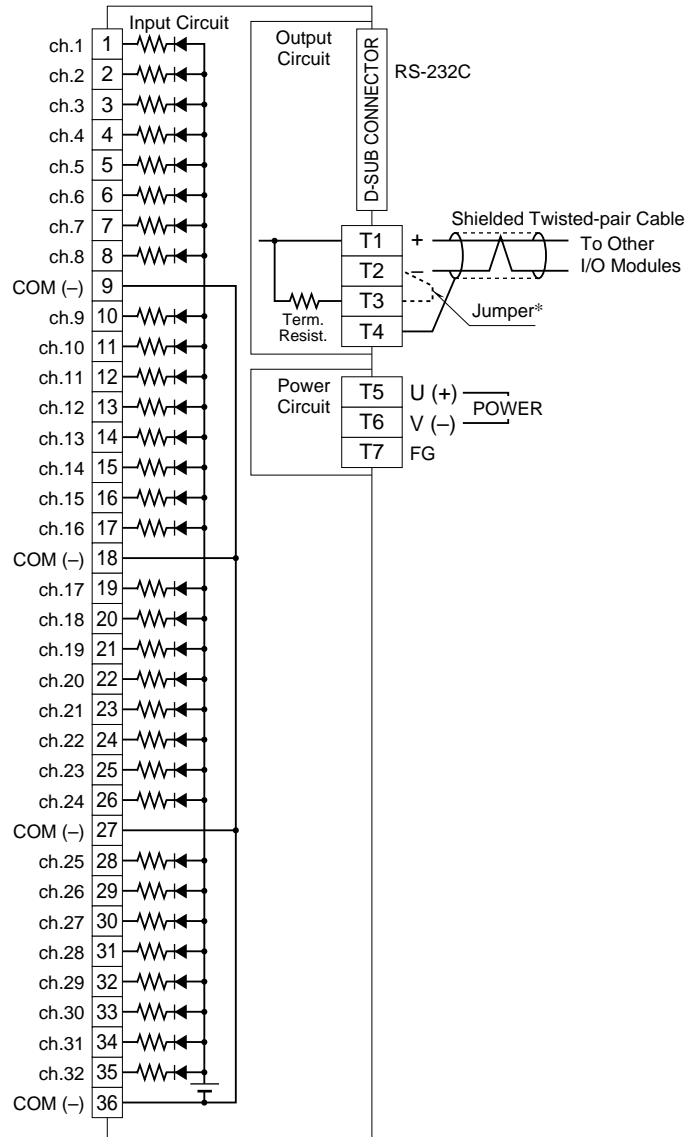
Specifications subject to change without notice.

CONNECTION DIAGRAM

■FCN TYPE CONNECTOR



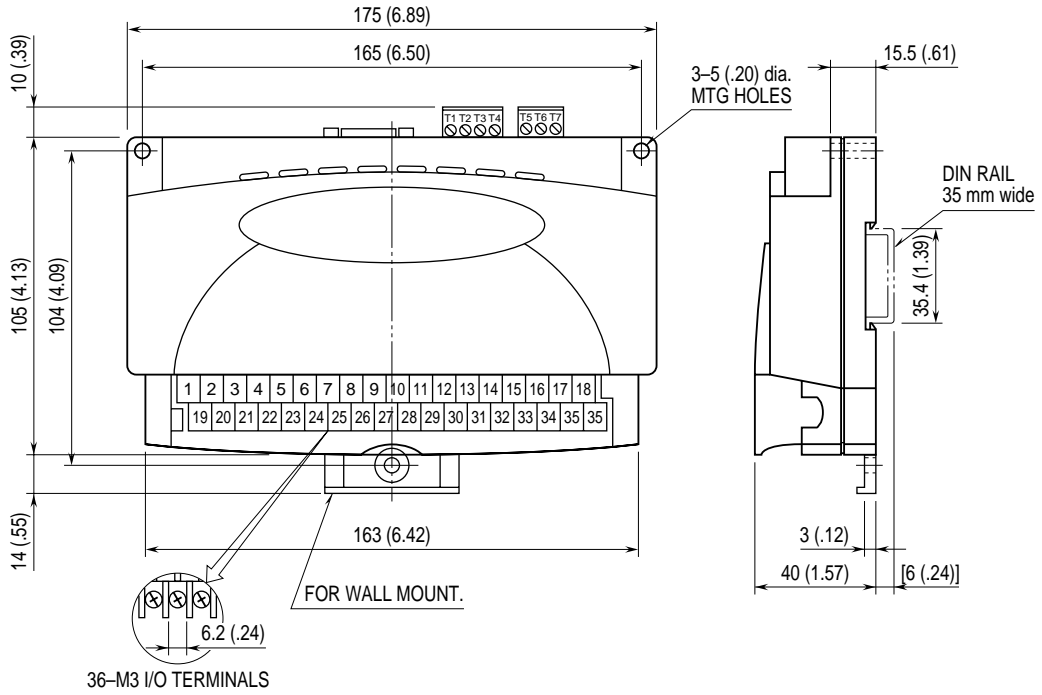
■M3 SCREW TERMINALS



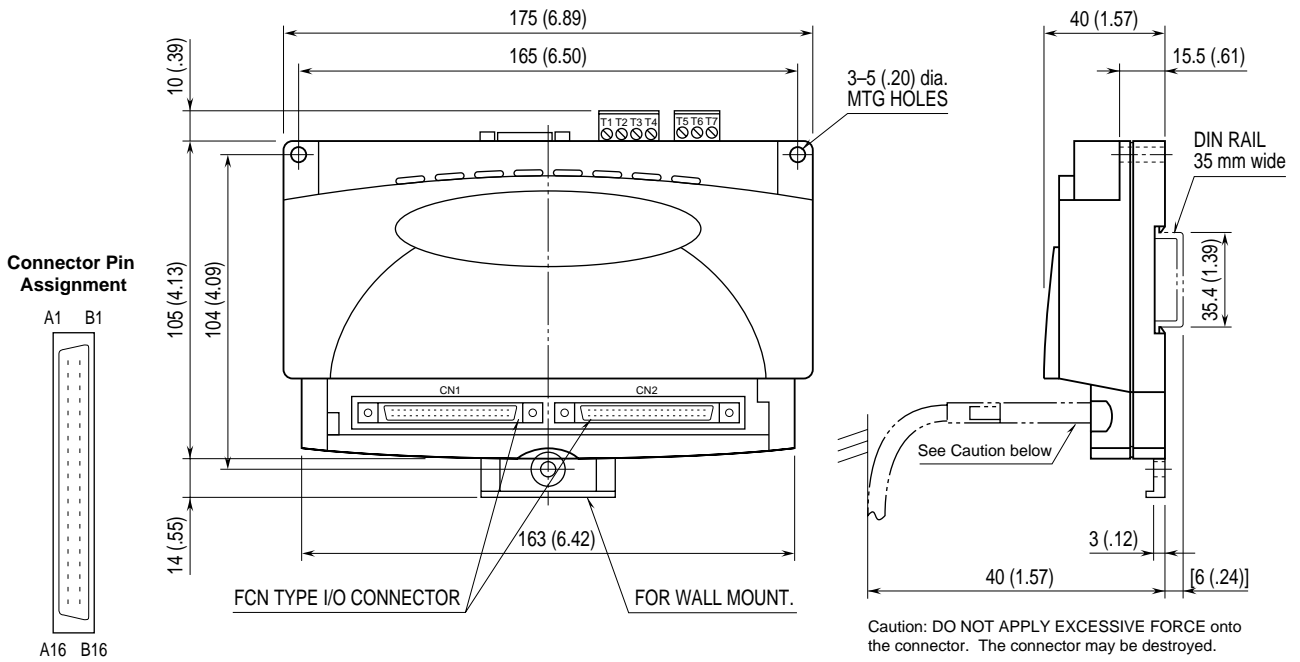
* When the device is located at the end of a transmission line via twisted-pair cable, (when there is no cross-wiring), close across the terminal T2 – T3 with the attached jumper pin (or with a leadwire).
When the device is not at the end, remove the jumper pin.

EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS mm (inch)

■SCREW TERMINALS



■FCN TYPE CONNECTOR



MODBUS COMMUNICATION

■COMMUNICATION PARAMETERS

PARAMETER	R1M SERIES	R2M SERIES
Data Mode	RTU	RTU
Baud Rate	9600 / 19200 / 38400 (*) bps	9600 / 19200 / 38400 (*) bps
Parity	None / Odd (*) / Even	None / Odd (*) / Even
Bit Length	8	8
Stop Bit	1 (*) / 2	1
Node Address	1 (*) to 15	1 (*) to 15
Floating Point Data	N/A	Normal (*) / Swapped
Interface	RS-232C / RS-485	RS-232C

(*) Ex-factory setting

■FUNCTION CODES & SUPPORTED CODES

CODE	NAME	RxM	
01	Read Coil Status	X	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	X	Digital output from the slave
06	Preset Single Registers	X	General purpose register within the slave
07	Read Exception Status		
08	Diagnostics		
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 Register		
24	Read FIFO Queue		

DATA ADDRESSES

	ADDRESS	TYPE				DATA FORMAT	NAME	
		GH2	J3	A1	D1			
Coil (0X)	1 – 32	---	---	---	Y	bit	DO *1	
	33 – 48	Y	---	---	---	bit	Cold junction compensation SW (0: Disable, 1: Enable) *2	
Input Status (1X)	1 – 32	Y	Y	Y	---	bit	DI *3	
	33 – 48	Y	Y	---	---	bit	ADC overrange	
Input Register (3X)	1 – 16	Y	---	---	---	I	AI in %	
	17 – 48	Y	Y	---	---	F	AI per channel in engineering unit	
	49 – 50	Y	---	---	---	F	Cold junction temperature *2	
	81 – 96	Y	Y	---	---	I	Channel status	
	513	Y	Y	Y	Y	I	System status	
							Bit	System Status
							0 to 5	Reserved for system use
							6	E ² PROM diagnostics (0: Normal, 1: Error)
							7	ADC error (0: Normal, 1: Error)
	8 to 15	Reserved for system use						
514 – 521	Y	Y	Y	Y	B16	Model No. ("R1M-x")		
522 – 529	Y	Y	Y	Y	B16	Serial No.		
530 – 537	Y	Y	Y	Y	B16	Hardware version No.		
538 – 545	Y	Y	Y	Y	B16	Firmware version No.		
Holding Register (4X)	1 – 16	---	---	---	---	I	(Reserved for AO in %)	
	17 – 48	---	---	---	---	F	(Reserved for AO in engineering unit)	
	145 – 160	Y	Y	---	---	I	I/O type No.	
	161 – 176	Y	---	---	---	I	Burnout type *4 (0: No burnout, 1: Upscale, 2: Downscale) *4	

I = 16-bit integer, F = 32-bit floating, B16 = 16-byte character

*1. Discrete output only.

*2. Thermocouple input only.

*3. Trigger contact input for Types GH2 and J3. (Only Address 10001 is enabled.)

*4. Same setting for all channels.

INPUT REGISTERS DESCRIPTION

(1) ANALOG INPUT IN % (30001 to 30016)

Indicates analog input values in percentage for each channel (1 – 16).

INPUT TYPE & RANGE	A/D DATA (Decimal)
±20V	±20000
±5V	±5000
±1V	±10000
±0.8V	±8000
±0.2V	±20000
±50mV	±5000
±10mV	±10000
Thermocouple	Temperature x 10

(2) ANALOG INPUT IN ENGINEERING UNIT (30017 to 30048)

Indicates analog input values in engineering unit for each channel (1 – 16). The unit is specific to each input type: °C for temperature, Volts for voltage, and % for potentiometer. The data are 32-bit floating values, which requires two consecutive registers for one module.

(3) CHANNEL STATUS (30081 to 30096)

Indicates the current status of analog inputs (1 – 16 for GH2 type, 1 – 8 for J3 type). The following list shows the names and descriptions of each bit.

BIT	NAME	DESCRIPTION
6	Input Overrange	Indicates the designated analog input is in overrange, defined as one or more of the following condition: <ul style="list-style-type: none"> • ADC input value 0X0000 or 0XFFFF • Burnout status for thermocouple input • Out of range defined in the temperature table (thermocouple and RTD) • ADC error 0 : Normal 1 : Overrange
7	ADC Error	Indicates the status of ADC. 0 : Normal 1 : Error
11	Cold Junction Compensation SW	Indicates whether the cold junction compensation is enabled or disabled, for thermocouple input. 0 : Disable 1 : Enable
Others	Reserved	For system's use

■INPUT REGISTERS DESCRIPTION

Indicates I/O type for each channel (1 – 16). The data are 16-bit integer values.

MODEL	I/O	I/O TYPE	SELECTION	USABLE RANGE	NOTES
R1MS-GH3 R2M-2G3	DC input	0X00	-10 to 10V	-10 to 10V	
R1M-GH2	DC input	0X00	-20 to 20 V	-22.7 to 22.7 V	ATT SW ON
		0X01	-5 to 5 V	-5.6 to 5.6 V	ATT SW ON
		0X02	-1 to 1 V	-1.4 to 1.4 V	ATT SW ON
		0X03	-800 to 800 mV	-860 to 860 mV	
		0X04	-200 to 200 mV	-215 to 215 mV	
		0X05	-50 to 50 mV	-53 to 53 mV	
R1M-GH2 R1MS-GH3 R2M-2H3	T/C input	0X06	-10 to 10 mV	-13.4 to 13.4 mV	
		0X10	(PR)	0 to 1770 °C	
		0X11	K (CA)	-270 to 1370 °C	
		0X12	E (CRC)	-270 to 1000 °C	
		0X13	J (IC)	-210 to 1200 °C	
		0X14	T (CC)	-270 to 400 °C	
		0X15	B (RH)	100 to 1820 °C	
		0X16	R	-50 to 1760 °C	
		0X17	S	-50 to 1760 °C	
		0X18	C (WRe 5-26)	0 to 2320 °C	
		0X19	N	-270 to 1300 °C	
		0X1A	U	-200 to 600 °C	
R1M-J3	RTD input	0X1B	L	-200 to 900 °C	
		0X1C	P (Platinel II)	0 to 1395 °C	
		0X30	JPt 100 (JIS '89)	-200 to 500 °C	
		0X31	Pt 100 (JIS '89)	-200 to 660 °C	
		0X32	Pt 100 (JIS '97/DIN/IEC)	-200 to 850 °C	
		0X33	Pt 50Ω (JIS '81)	-200 to 649 °C	
	POT input	0X34	Ni 508.4Ω	-50 to 280 °C	
		0X35	Pt 1000	-200 to 850 °C	
		0X40	0 to 100 ohms	0 to 100 %	
		0X41	0 to 500 ohms	0 to 100%	
R1M-D1	DI	0X60			
R1M-A1	DO	0X70			