## PC Recorders R1M Series

PC RECORDER

(thermocouple or DC input, 8 points; isolated)

Functions & Features

• Industrial recorder on PC
• 8-point thermocouple or DC inputs
• Complete channel-to-channel isolation
• Trigger input and alarm contact output
• Filtering protection against 50/60 Hz noise
• Modbus RS-485 and RS-232-C interface
• Easy system expansion via Modbus RTU
• Recorded data exportable to spreadsheet applications

175 [6.89]
40 [1.57]
115 [4.53]
mm [inch]
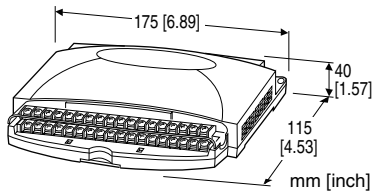
MODEL: R1MS-GH3T-[1][2]

ORDERING INFORMATION

• Code number: R1MS-GH3T-[1][2]
Specify a code from below for each of [1] and [2].
 (e.g. R1MS-GH3T-M2/MSR/Q)
• Specify the specification for option code /Q
 (e.g. /C01)

FIELD TERMINAL TYPE

T: M3 screw terminals

[1] POWER INPUT

AC Power
M2: 100 – 240 V AC (Operational voltage range 85 – 264 V,
 47 – 66 Hz)
DC Power
R: 24 V DC
(Operational voltage range 24 V ±10 %, ripple 10 %p-p max.)

[2] OPTIONS (multiple selections)

PC Recorder Software Package (must be specified)
/MSR: With
Other Options
blank: none
/Q: Option other than the above (specify the specification)

SPECIFICATIONS OF OPTION: Q

COATING (For the detail, refer to our web site.)
/C01: Silicone coating
/C02: Polyurethane coating
/C03: Rubber coating

RELATED PRODUCTS

• Resistor module (model: REM3-250)

PACKAGE INCLUDES...

• PC Recorder Software CD
• 9-pin D-sub connector, straight type (1 m or 3.3 ft)

GENERAL SPECIFICATIONS

Connection
 Power input, transmission: Euro type connector terminal
 (Applicable wire size: 0.2 – 2.5 mm^2 (AWG24 – 12), stripped
 length 7 mm)
 RS-232-C: 9-pin D-sub connector (male)
 (Lock screw No. 4-40 UNC)
 I/O: M3 screw terminals (torque: 0.6N·m)
 PC Configurator: Miniature jack, RS-232-C level
Screw terminal: Nickel-plated steel
Housing material: Flame-resistant resin (gray)
Isolation: Input 1 to input 2 to input 3 to input 4 to input 5 to
input 6 to input 7 to input 8 to trigger input to alarm output
to RS-232-C or RS-485 or configurator jack to power to FG
Burnout: Upscale, downscale or no burnout selectable with
the operating mode setting rotary switch (default: No). Set
to 'No Burnout' when other devices are connected in
parallel to the R1MS.
Operating mode setting: Rotary switch; burnout type and
line noise frequency setting
Line noise filtering: Specifying line frequency to 50 Hz or 60
Hz in order to increase normal mode noise rejection ratio.
(default: 50/60 Hz for use with both frequencies)
Node address setting: Rotary switch; 1 – F (15 nodes)
RUN indicator LED: Green light blinks in normal conditions.

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COMMUNICATION

Baud rate: 38.4 kbps

Communication: Half-duplex, asynchronous, no procedure

Protocol: Modbus RTU

■ **RS-232-C**

Standard: Conforms to RS-232-C, EIA

Transmission distance: 10 meters max.

■ **RS-485**

Standard: Conforms to TIA/EIA-485-A

Transmission distance: 500 meters max.

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

INPUT SPECIFICATIONS

Input: Thermocouple or DC input within ±10 V, 8 points

• **Input resistance**

Thermocouple: ≥ 1 MΩ when powered;

≥ 200 kΩ when not powered

DC: ≥ 800 kΩ when powered;

≥ 700 kΩ when not powered

Thermocouple types: PR, K, E, J, T, B, R, S, C, N, U, L, P

Sampling rate: 50 millisec./8 points

• **Trigger input**: Dry contact; ON detected at ≤ 1.5 V

Sensing: Approx. 3 V DC @ 0.8 mA

• **Burnout detecting**: ≤ 45 nA for upscale or downscale;

≤ 5 nA with no burnout (when measuring 0°C)

Burnout response: ≤ 10 seconds

OUTPUT SPECIFICATIONS

■ **Alarm Output**: Photo MOSFET relay (no polarity);

≤ 50 Ω at ON, ≥ 1 MΩ at OFF; OFF when not powered

Peak load voltage: 50 V max.

Continuous load current: 50 mA max.

Peak load current: 300 mA max. (≤ 0.1 sec.)

INSTALLATION

Power consumption

•**AC**: Approx. 9 VA

•**DC**: Approx. 3.5 W

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

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

Mounting: Surface or DIN rail

Weight: 450 g (0.99 lb)

PERFORMANCE (% of measuring range)

Accuracy

 DC input: ±0.05 % (±10 mV)

 Thermocouple input: See the table below.

Cold junction compensation error: (°C)

≤ ±(1.0 + [Ambient Temp. – 20] × 0.04) in stable ambient temperature (e.g. ±1.4°C at 10°C and 30°C)

Sudden ambient temperature change affects the cold junction compensation. Be sure to place the R1MS in stable ambient.

Temp. coefficient: ≤ (Accuracy / 4) / °C

(e.g. DC: ±0.0125 %/°C or ±2.5 mV/°C,

 TC: ±12.5 µV/°C, ±0.2°C/°C with type E)

Response time: Approx. 0.55 sec. (0 – 90 %)

Insulation resistance: ≥ 100 MΩ with 500 V DC

Dielectric strength: 1500 V AC @ 1 minute

(input 1 to input 2 to input 3 to input 4 to input 5 to input 6 to input 7 to input 8 to trigger input to alarm output to RS-232-C or RS-485 or configurator jack)

2000 V AC @ 1 minute (input or alarm output or RS-232-C or RS-485 or configurator jack to power to FG)

Normal mode noise rejection: ≥ 85 dB (50/60 Hz) with the filtering set to a specific frequency; ≥ 35 dB with 50/60 Hz setting

Common mode noise rejection: ≥ 120 dB (50/60 Hz)

Accuracy (T/C)

T/C	USABLE RANGE (°C)	CONFORMANCE RANGE (°C)	ACCURACY (°C)
(PR)	0 to 1770	400 to 1770	±4.6
K (CA)	-270 to +1370	0 to 1370	±1.5
E (CRC)	-270 to +1000	0 to 1000	±0.8
J (IC)	-210 to +1200	0 to 1200	±1.0
T (CC)	-270 to +400	0 to 400	±1.3
B (RH)	100 to 1820	700 to 1820	±7.2
R	-50 to +1760	400 to 1760	±4.8
S	-50 to +1760	400 to 1760	±5.3
C (WRe 5-26)	0 to 2320	0 to 2320	±4.9
N	-270 to +1300	0 to 1300	±1.9
U	-200 to +600	0 to 600	±1.3
L	-200 to +900	0 to 900	±1.0
P (Platinel II)	0 to 1395	0 to 1395	±1.7

| T/C	USABLE RANGE (°F)	CONFORMANCE RANGE (°F)	ACCURACY (°F)
(PR)	32 to 3218	752 to 3218	±8.28
K (CA)	-454 to +2498	32 to 2498	±2.7
E (CRC)	-454 to +1832	32 to 1832	±1.44
J (IC)	-346 to +2192	32 to 2192	±1.8
T (CC)	-454 to +752	32 to 752	±2.34
B (RH)	212 to 3308	1292 to 3308	±13.0
R	-58 to +3200	752 to 3200	±8.64
S	-58 to +3200	752 to 3200	±9.54
C (WRe 5-26)	32 to 4208	32 to 4208	±8.82
N	-454 to +2372	32 to 2372	±3.42
U	-328 to +1112	32 to 1112	±2.34
L	-328 to +1652	32 to 1652	±1.8
P (Platinel II)	32 to 2543	32 to 2543	±3.06

Note 1: Measuring accuracy at 50µV emf.
Note 2: CJC error is not included.

PC RECORDER SOFTWARE

PC Recorder Software Package (model: MSRPAC-2010) is included with purchases of this model.

Refer to the MSRPAC-2010 data sheet for the contents of the package and the requirements for the PC to be prepared by the user.

## EXTERNAL VIEW
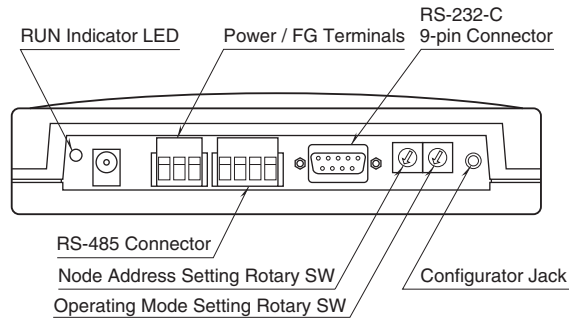
■ RS-232-C INTERFACE

| 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
	6	cause malfunctions.
	9	

■ RS-232-C CABLE

• Use a 'Straight' cable to connect this model to a PC if not with the cable included in the product package.

• For connecting this model to the R1M or the R2K-1 via RS-232-C, the RS-232-C cable must satisfy the following conditions:

(1) Includes the connections shown with solid lines in the figure below.

(2) Pins No. 8 are not connected between each other. (May cause breakdowns.)

'Interlink' or 'Reverse' cables are usually applicable.
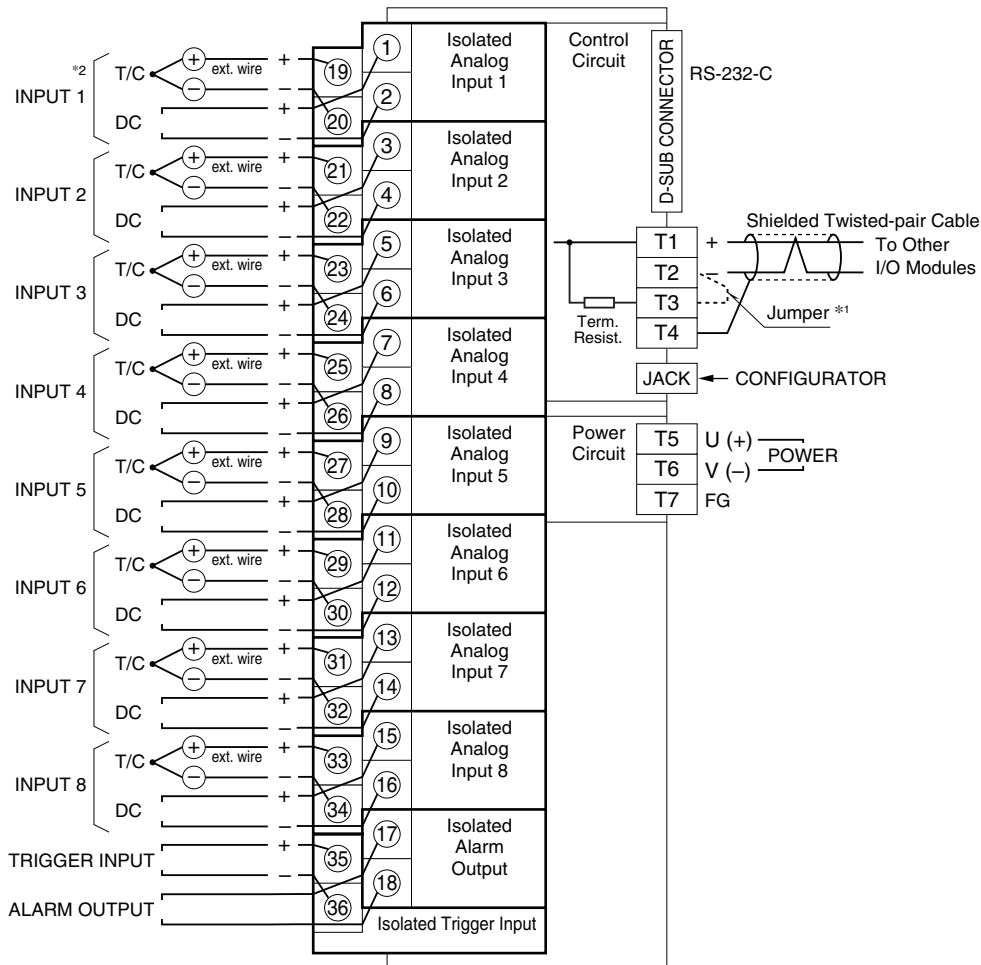
• **Pin Assignments**
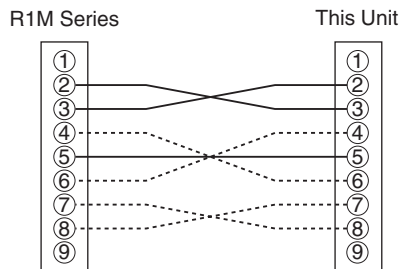
The above connection including solid and broken lines is an example of 'Interlink' cable.

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MODBUS WIRING CONNECTION
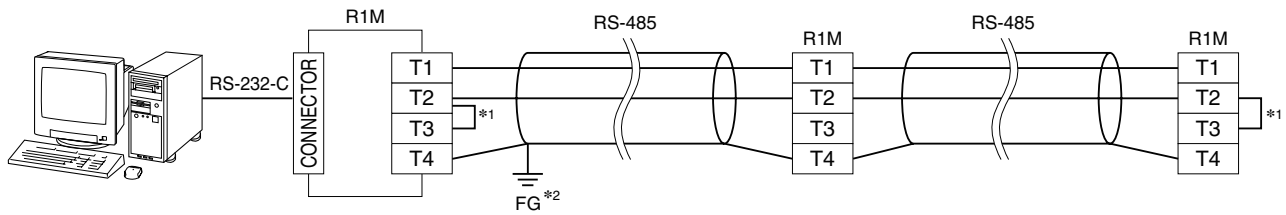
*1. Internal terminating resistor is used when the device is at the end of a transmission line.
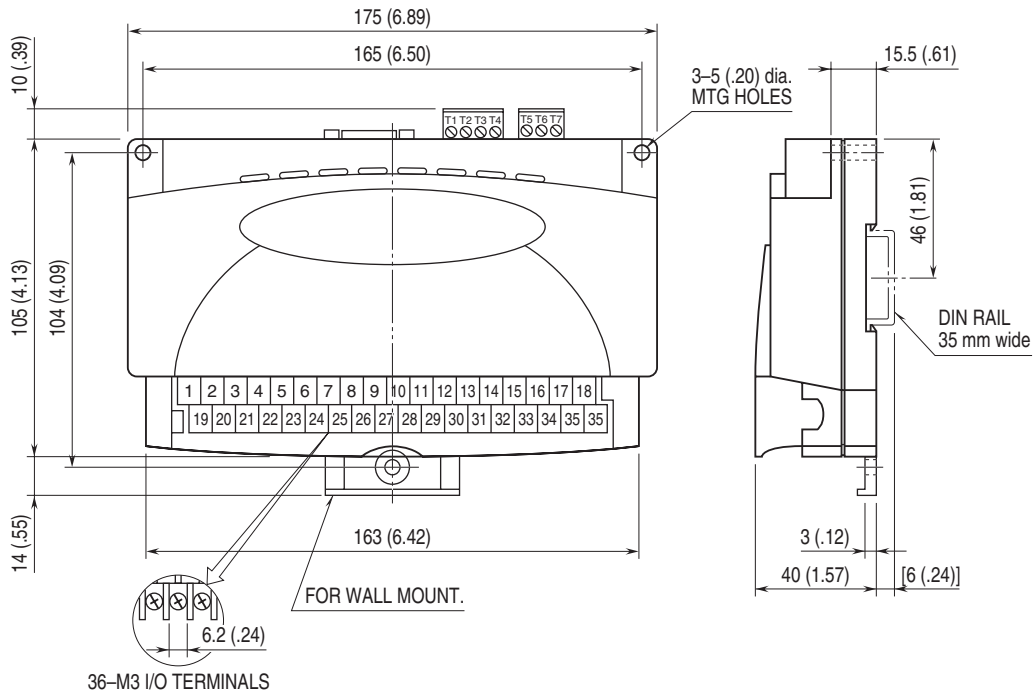*2. Install shielded cables to all sections and ground them at single point.
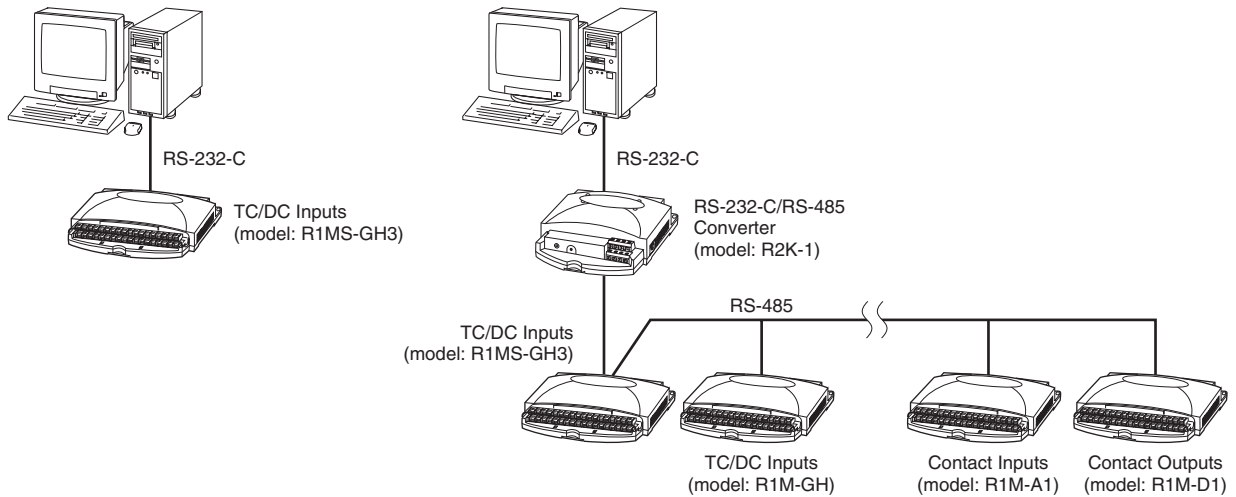
CONNECTION DIAGRAM

*1. 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.

*2. Separate sets of terminals for DC and TC are assigned to each channel, however, DO NOT connect to both sets of terminals at once. Duplicate connection may affect measuring accuracies. DC and TC can be mixed among eight channels.

Note 1: Be careful to eliminate noise as much as possible by e.g. using shielded cables.

Note 2: Be sure to earth the FG terminal and the cable shielding to a most stable earth point in the environment.

Note 3: Resistor modules (model: REM3-250) can be used to convert current inputs into voltage. However, use of REM3 is not recommended when TC inputs are mixed because the heat developed on and around the REM3 affects the cold junction compensation performance.

Caution: FG terminal is NOT a protective conductor terminal.

EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS   unit: mm [inch]

FOR WALL MOUNT.

36–M3 I/O TERMINALS

DIN RAIL 35 mm wide

SYSTEM CONFIGURATION EXAMPLES

RS-232-C

TC/DC Inputs
(model: R1MS-GH3)

RS-232-C

RS-232-C/RS-485
Converter
(model: R2K-1)

RS-485

TC/DC Inputs
(model: R1MS-GH3)

TC/DC Inputs
(model: R1M-GH)

Contact Inputs
(model: R1M-A1)

Contact Outputs
(model: R1M-D1)

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

⚠ Specifications are subject to change without notice.