

PC Recorders *RZUS Series*

<p>PC RECORDER (universal input, 12 points; isolated; bus-powered USB)</p>	<p>MODEL RZUS-U9</p>
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MODEL & SUFFIX CODE SELECTION

	RZUS-U9T/MSR
MODEL _____	
PC INTERFACE Full Speed USB 2.0 (Modbus connection via virtual COM Port)	
INPUT SELECTION	
◆ DC Current & Voltage ±60mV, ±125mV, ±250mV, ±500mV ±1000mV, ±3V, ±6V, ±12V	
◆ Thermocouples (PR), K, E, J, T, B, R, S, C (WRe 5-26), N, U, L, P (Platinel II)	
◆ RTD (2- or 3-wire) Pt 100, Pt 200, Pt 300, Pt 400, Pt 500, Pt 1000, Ni 100, Ni 120, Ni 508.4, Ni-Fe 604, Cu 10 @25°C Pt 50Ω, JPt 100	
◆ Potentiometers Total resistance 200Ω, 500Ω, 5kΩ	
FIELD TERMINAL TYPE _____	
T : M3 screw terminals	
OPTIONS _____	
/MSR : PC Recorder software package	

ORDERING INFORMATION

Specify code number. (e.g. RZUS-U9T/MSR)

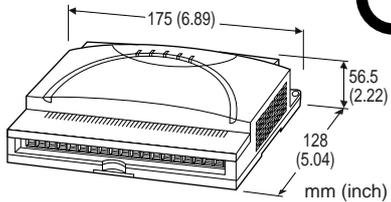
PACKAGE INCLUDES....

- PC Recorder Software CD (model: MSRPAC-2006)
- USB cable (1 m or 3.3 ft)

RELATED PRODUCTS

- RZXS configurator software (model: RZMSCFG)
Downloadable at M-System's web site:
<http://www.m-system.co.jp>
 - PC configurator cable (model: MCN-CON)
 - Resistor module (model: REM3-250)
- Though the REM3 is designed to be mounted directly to the RZUS, we recommend that it be attached to a separate terminal board in order to eliminate its heat conduction to affect the cold junction compensation and the overall measuring accuracy of the RZUS.





Functions & Features

- Industrial recorder on PC
- 12-point universal inputs
- Channel-to-channel isolation
- Trigger input and alarm contact output
- Filtering protection against 50/60 Hz noise
- USB and RS-485 interface
- No need of dedicated power source

GENERAL SPECIFICATIONS

- Connection**
- USB:** USB type B connector, female
 - RS-586:** Terminal block (wire size 0.14 – 1.5 mm² or AWG26 – 16 for both stranded and single-core cables)
 - I/O:** M3 screw terminals
 - Grounding:** M4 screw terminals
 - PC Configurator:** Miniature jack, RS-232C level
- 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 input 9 to input 10 to input 11 to input 12 to trigger input to alarm output to USB or RS-485 or configurator jack to ground
- Address setting:** Rotary switch; 1 – F
- Operating mode setting:** Rotary switch; burnout type, cold junction compensation, line noise frequency, software filter, A/D conversion mode, service channel numbers setting available
- Indicator LEDs:** Five (5) LEDs indicate the unit's operating conditions.
- Burnout for T/C and RTD input:** Upscale, Downscale or No burnout selectable
Select 'No Burnout' to minimize the measuring errors caused by the sensor/wire resistance and the burnout sensing current.
With RTD input, the signal may go transiently to the opposite direction from the burnout setting.
With DC/potentiometer input, the burnout setting is ignored and the burnout sensing current is cancelled.
In order to specify burnout actions to individual channels, use PC Configurator Software.

Cold junction compensation (CJC) for T/C input:

CJC can be enabled or disabled. Reference temperature is measured at the internal sensor by factory setting. In order to specify cold junction compensation to individual channels, use PC Configurator Software. Temperature measured at another channel of the RZUS can be specified as the reference point by using PC Configurator Software. This is beneficial to reduce compensation wires' cost when there are many temperature points in remote locations. Install a relaying terminal board near the sensors and use ordinary copper wires between the board and the RZUS, and assign one channel to measure temperature at the terminal board as the reference.

Line noise filter: NMNR ratio to the line frequency and its harmonic contents can be optimized. Factory set to 50/60 Hz mode for use with both frequencies. Select either frequency for the most effective result.

Programmable first order lag filter: Time constant selectable with PC Configurator Software. The use of this filter is disabled at the factory shipment. With the large time constant setting, measured signals during the warm-up immediately after the power is turned on may affect the signals for a long time period.

A/D conversion mode: Fast, Medium or Slow selectable with PC Configurator Software. With Slow setting, data fluctuations are minimized with limited sampling time (speed). With Fast setting, sampling times (speed) can be high through data fluctuations increase.

Service channel numbers: 12 channels (ch.1 thr. 12) or 6 channels (ch.1 thr. 6) are selectable with PC Configurator. Factory set to 12 channels.

Wire resistance compensation for RTD input: Field calibration for 3-wire (or 2-wire) RTD available with PC Configurator software.

Zero/span adjustments: Available with PC Configurator for all types of inputs.

COMMUNICATION SPECIFICATIONS

Baud rate: 38.4 kbps
Communication: Half-duplex, asynchronous, no procedure
Protocol: Modbus RTU

■USB

Standard: Full Speed USB 2.0 (usable with USB 1.1 port)
Transmission distance: 5 meters max.
Transfer mode: Bulk transfer
Power supply: Bus powered (high power device)

■RS-485

Standard: Conforms to RS-485, EIA
Transmission distance: 10 meters max.
Transmission media: Shielded twisted-pair cable (CPEV-S 0.9 dia.)

Specifications subject to change without notice.

INPUT & OUTPUT

■DC VOLTAGE

Input resistance: 900kΩ minimum
 Excluding the case in which, with range setting other than ±12V, ±6V or ±3V, a voltage exceeding ±1.3V is applied.
Input range: See Table 1.

■THERMOCOUPLE

Input resistance: 900kΩ minimum
Input range: See Tables 2-1 and 2-2.
Burnout sensing
Upscale: ≤130nA
Downscale: ≤220nA
No burnout: ≤10nA
Burnout sensing time
K, E, J, N, L, P (upscale): ≤20 seconds
Others: ≤10 seconds

■RTD (3-wire)

Excitation: 1.25V / (1.25kΩ + load resistance across the terminals A – C); 1.00mA with 10Ω across A – C; 0.55mA with 1000Ω across A – C
Allowable leadwire resistance: 20Ω per wire
Input range: See Tables 3-1 and 3-2.
Burnout sensing
Upscale or Downscale: ≤130nA
No burnout: ≤10nA
Burnout sensing time: ≤10 seconds

■POTENTIOMETER

Excitation: 1.25V / (1.31kΩ + load resistance across the terminals A – C); 0.83mA with 200Ω across A – C; 0.20mA with 5kΩ across A – C
Allowable leadwire resistance: 20Ω per wire
Total resistance: See Table 4.

■SAMPLING TIME

LINE NOISE FILTER FREQ.	SERVICE CH. NO.	A/D CONVERSION (sec)		
		MEDIUM	SLOW	FAST
50 Hz	12 ch	0.68	0.94	0.43
	6 ch	0.38	0.53	0.26
50/60 Hz	12 ch	0.63	0.87	0.40
	6 ch	0.35	0.49	0.24
60 Hz	12 ch	0.59	0.80	0.38
	6 ch	0.33	0.45	0.22

Multplied by two (2) for RTD and potentiometer input.
■TRIGGER INPUT: Dry contact; detected ON at ≤0.8V
Voltage across the terminals: ≤2.5V
Current across the terminals: ≤4.0mA

■ALARM OUTPUT: PhotoMOSFET relay (no polarity); ≤50Ω at ON, ≥1MΩ at OFF; OFF when not powered
Peak load voltage: 50V max.
Continuous load current: 50mA max.
Peak load current: 300mA max. (≤0.1 sec.)

INSTALLATION

Power input: High power bus powered; 5V DC

Normal operating mode: Approx. 0.2A

Suspend mode: $\leq 0.5\text{mA}$

The USB high power port must be capable of 300mA power consumption. When connecting the RZUS to a USB hub, choose the self-powered configuration. Laptop PC's supply current may be limited by its battery power. Confirm the USB port's current capacity in advance.

Operating temperature: 0 to 60°C (32 to 140°F)

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

Mounting: Surface or DIN rail

Dimensions: W175×H128×D56.5 mm
(6.89"×5.04"×2.22")

Weight: 520 g (1.15 lbs)

PERFORMANCE

Accuracy: See Tables 1 through 4.

Applicable with the common mode voltage 0V between C terminals of all channels and between C terminal of each channel and the ground terminal. The effects by the following factors are excluded: Fast A/D conversion mode; temperature drift with the REM3 directly mounted to the I/O terminals; wire resistance; burnout sensing current with upscale/downscale settings.

Cold junction compensation error: (°C)

$\leq \pm [0.6 + |\text{Ambient Temp.} - 25| \times 0.04]$
(in stable ambient temperature; e.g. $\pm 1.0^\circ\text{C}$ at 15°C and 35°C)

Applicable with balanced terminal temperature. Error will increase by imbalances caused by direct mounting of the REM3 to the terminals.

Temp. coefficient: See Table 5.

Response time (Assuming the fastest reading on Modbus)

DC of $\pm 1000\text{mV}$ or narrower ranges or T/C:

$\leq [\text{Sampling Time} + 0.3 \text{ sec.}] (0 - 90\%)$

DC of $\pm 3\text{V}$ or wider ranges:

$\leq [\text{Sampling Time} + 0.5 \text{ sec.}] (0 - 90\%)$

RTD or potentiometer:

$\leq [\text{Sampling Time} + 0.3 \text{ sec.}] (0 - 90\%)$

Insulation resistance: $\geq 100\text{M}\Omega$ with 500V DC

(input 1 to input 2 to input 3 to input 4 to input 5 to input 6 to input 7 to input 8 to input 9 to input 10 to input 11 to input 12 to trigger input to alarm output to USB or RS-485 or configurator jack to ground)

Dielectric strength: 500V_{peak}* @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 input 9 to input 10 to input 11 to input 12 to trigger input to alarm output to USB or RS-485 or configurator jack to ground)

*Peak value including both AC and DC (e.g. 354V AC with 0V DC).

Line noise normal mode rejection: $\geq 100 \text{ dB}$

Magnitude of the effects of normal mode 50/60 Hz noise, with the most appropriate line noise filter frequency setting.

Each input circuit has a CR filter of sufficient large time constant so that there will be little effect of line noise such as 500mV AC superposed on a thermocouple or $\pm 60\text{mV}$ input.

Common mode noise rejection

Magnitude of the effects of voltages applied across the terminal C and the ground terminal when there is no potential difference among all the C terminals.

DC: N/A

AC, $\pm 3\text{V}$, $\pm 6\text{V}$, $\pm 12\text{V}$: Approx. 86 dB

AC, other ranges: Approx. 120 dB

Common mode noise rejection between channels

Magnitude of the effects of DC/50/60 Hz voltages applied across the terminals C of the present and the last scanned channels. (Data are scanned from ch 1 to ch 12 in turn and back to ch 1 again.)

DC, $\pm 3\text{V}$, $\pm 6\text{V}$, $\pm 12\text{V}$: Approx. 100 dB

DC, other ranges: Approx. 120 dB

AC, $\pm 3\text{V}$, $\pm 6\text{V}$, $\pm 12\text{V}$: Approx. 86 dB

AC, other ranges: Approx. 106 dB

Large common mode noise between channels may compromise the accuracies in low millivolts measuring including thermocouple input. We recommend that C terminals of each channel be cross-wired and then connected to the ground terminal to ensure the measurement of the highest accuracy.

If such configuration is not possible, take special consideration to minimize the channel-to-channel common mode noise and the potential against the ground terminal.

The potential of the open terminal C against the ground terminal equals to that of the last scanned channel. If ch 2 and ch 3 are not connected, the accuracy of ch 4 measurement is affected by potential difference between the C terminals of ch 1 and ch 4.

PC RECORDER SOFTWARE

PC Recorder Software Package (model: MSRPAC-2006) is included with purchases of the RZUS modules.

Refer to the MSRPAC-2006 data sheet for the contents of the package and the requirements for the PC to be prepared by the user.

The RZUS is usable with the following programs included in the MSRPAC-2006: MSR128, MSR128LS and MSR128LV.

The MSRPAC-2006 CD includes the driver to interface with these programs and the PC Configurator Software via USB.

The PC Configurator Software can be connected either via USB or via Special Configurator Cable.

STANDARDS & APPROVALS

CE conformity: EMC Directive (89/336/EEC)

EMI EN61000-6-4

EMS EN61000-6-2

INPUT TYPE & RANGE, ACCURACY & TEMPERATURE COEFFICIENT

Table 1. DC Voltage Input

INPUT RANGE	ACCURACY (mV)
±60mV	±0.05
±125mV	±0.07
±250mV	±0.13
±500mV	±0.25
±1000mV	±0.5
±3V	±2.5
±6V	±5
±12V	±10

Table 2-1. Thermocouple Input, Celcius

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

Table 2-2. Thermocouple Input, Fahrenheit

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

Remark 1) Measuring accuracy at 50µV emf.

Remark 2) CJC error is not included.

Table 3-1. RTD Input, Celcius

RTD	USABLE RANGE (°C)	ACCURACY	
		at ≤ 0°C	at ≥ 0°C
Pt 100 (JIS '97, DIN, IEC)	-200 to +850	±0.4°C	±[0.4°C + Measured Value × 0.1%] (±1.3°C at 850°C)
Pt 200	-200 to +850	±0.3°C	±[0.3°C + Measured Value × 0.17%] (±1.8°C at 850°C)
Pt 300	-200 to +850	±[0.4°C + Measured Value × 0.08%] (±0.24°C at -200°C)	±[0.4°C + Measured Value × 0.21%] (±2.2°C at 850°C)
Pt 400	-200 to +850	±[0.4°C + Measured Value × 0.11%] (±0.18°C at -200°C)	±[0.4°C + Measured Value × 0.21%] (±2.2°C at 850°C)
Pt 500	-200 to +850	±[0.4°C + Measured Value × 0.13%] (±0.14°C at -200°C)	±[0.4°C + Measured Value × 0.26%] (±2.6°C at 850°C)
Pt 1000	-200 to +850	±[0.4°C + Measured Value × 0.1%] (±0.10°C at -200°C)	±[0.4°C + Measured Value × 0.4%] (±3.8°C at 850°C)
Pt 100 (JIS '89)	-200 to +660	±0.4°C	±[0.4°C + Measured Value × 0.1%] (±1.1°C at 650°C)
JPt 100 (JIS '89)	-200 to +510	±0.4°C	±[0.4°C + Measured Value × 0.1%] (±0.91°C at 510°C)
Pt 50Ω (JIS '81)	-200 to +649	±0.5°C at ≤160°C, ±[0.4°C + Measured Value × 0.1%] at ≥160°C (±1.049°C at 649°C)	
Ni 100	-80 to +260	±0.3°C	
Ni 120	-80 to +260	±0.3°C	
Ni 508.4Ω	-50 to +280	±[0.25°C + Measured Value × 0.06%] (±0.22°C at -50°C, ±0.42°C at 280°C)	
Ni-Fe 604	-200 to +200	±0.9°C at -200°C, ±0.6°C at -150°C, ±0.5°C at ±100°C, ±0.7°C at 200°C	
Cu 10 @25°C	-50 to +250	±1.2°C (only after the field calibrations)	

Remark 1) The lower the temperature range, the better the accuracy is for Pt 300, Pt 400, Pt 500, Pt 1000 and Ni 508.4Ω. 'Measured Value' in the equations is not an absolute value. Include the minus sign when calculating accuracies.

Remark 2) For Cu 10 @25°C, be sure to perform the field calibrations of wire imbalance and zero/span by using the PC Configurator Software.

Table 3-2. RTD Input, Fahrenheit

RTD	USABLE RANGE (°F)	ACCURACY	
		at $\leq 32^{\circ}\text{F}$	at $\geq 32^{\circ}\text{F}$
Pt 100 (JIS '97, DIN, IEC)	-328 to +1562	$\pm 0.72^{\circ}\text{F}$	$\pm[0.72^{\circ}\text{F} + \text{Measured Value} \times 0.1\%]$ ($\pm 2.34^{\circ}\text{F}$ at 1562°F)
Pt 200	-328 to +1562	$\pm 0.54^{\circ}\text{F}$	$\pm[0.54^{\circ}\text{F} + \text{Measured Value} \times 0.17\%]$ ($\pm 3.24^{\circ}\text{F}$ at 1562°F)
Pt 300	-328 to +1562	$\pm[0.72^{\circ}\text{F} + \text{Measured Value} \times 0.08\%]$ ($\pm 0.44^{\circ}\text{F}$ at -328°F)	$\pm[0.72^{\circ}\text{F} + \text{Measured Value} \times 0.21\%]$ ($\pm 4.0^{\circ}\text{F}$ at 1562°F)
Pt 400	-328 to +1562	$\pm[0.72^{\circ}\text{F} + \text{Measured Value} \times 0.11\%]$ ($\pm 0.33^{\circ}\text{F}$ at -328°F)	$\pm[0.72^{\circ}\text{F} + \text{Measured Value} \times 0.21\%]$ ($\pm 3.96^{\circ}\text{F}$ at 1562°F)
Pt 500	-328 to +1562	$\pm[0.72^{\circ}\text{F} + \text{Measured Value} \times 0.13\%]$ ($\pm 0.26^{\circ}\text{F}$ at -328°F)	$\pm[0.72^{\circ}\text{F} + \text{Measured Value} \times 0.26\%]$ ($\pm 4.68^{\circ}\text{F}$ at 1562°F)
Pt 1000	-328 to +1562	$\pm[0.72^{\circ}\text{F} + \text{Measured Value} \times 0.1\%]$ ($\pm 0.18^{\circ}\text{F}$ at -328°F)	$\pm[0.72^{\circ}\text{F} + \text{Measured Value} \times 0.4\%]$ ($\pm 6.84^{\circ}\text{F}$ at 1562°F)
Pt 100 (JIS '89)	-328 to +1220	$\pm 0.72^{\circ}\text{F}$	$\pm[0.72^{\circ}\text{F} + \text{Measured Value} \times 0.1\%]$ ($\pm 1.98^{\circ}\text{F}$ at 1202°F)
JPt 100 (JIS '89)	-328 to +950	$\pm 0.72^{\circ}\text{F}$	$\pm[0.72^{\circ}\text{F} + \text{Measured Value} \times 0.1\%]$ ($\pm 1.64^{\circ}\text{F}$ at 950°F)
Pt 50 Ω (JIS '81)	-328 to +1200	$\pm 0.9^{\circ}\text{F}$ at $\leq 320^{\circ}\text{F}$, $\pm[0.72^{\circ}\text{F} + \text{Measured Value} \times 0.1\%]$ at $\geq 320^{\circ}\text{F}$ ($\pm 1.888^{\circ}\text{F}$ at 1200°F)	
Ni 100	-112 to +500	$\pm 0.54^{\circ}\text{F}$	
Ni 120	-112 to +500	$\pm 0.54^{\circ}\text{F}$	
Ni 508.4 Ω	-58 to +536	$\pm[0.45^{\circ}\text{F} + \text{Measured Value} \times 0.06\%]$ ($\pm 0.40^{\circ}\text{F}$ at -58°F , $\pm 0.76^{\circ}\text{F}$ at 536°F)	
Ni-Fe 604	-328 to +392	$\pm 1.62^{\circ}\text{F}$ at -328°F , $\pm 1.08^{\circ}\text{F}$ at -238°F , $\pm 0.9^{\circ}\text{F}$ at $\pm 212^{\circ}\text{F}$, $\pm 1.26^{\circ}\text{F}$ at 392°F	
Cu 10 @25°C	-58 to +482	$\pm 2.16^{\circ}\text{F}$ (only after the field calibrations)	

Remark 1) The lower the temperature range, the better the accuracy is for Pt 300, Pt 400, Pt 500, Pt 1000 and Ni 508.4 Ω . 'Measured Value' in the equations is not an absolute value. Include the minus sign when calculating accuracies.

Remark 2) For Cu 10 @25°C, be sure to perform the field calibrations of wire imbalance and zero/span by using the PC Configurator software.

Table 4. Potentiometer Input

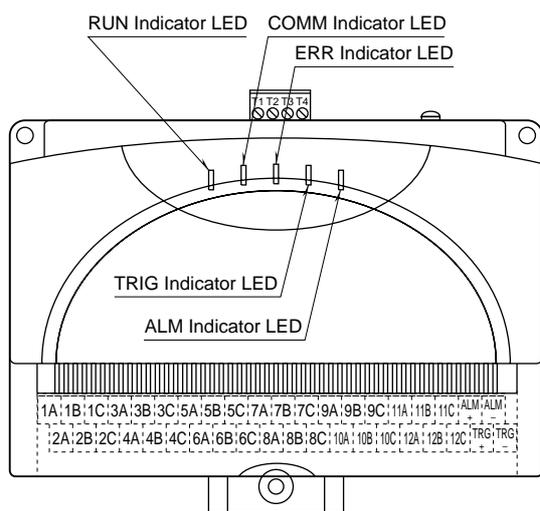
TOTAL RESISTANCE	ACCURACY
Up to 200 Ω	$\pm 0.12\%$ at 200 Ω
Up to 500 Ω	$\pm 0.14\%$ at 500 Ω
Up to 5k Ω	$\pm 0.14\%$ at 1k Ω $\pm 0.10\%$ at 2k Ω or 5k Ω

Table 5. Temperature Coefficient

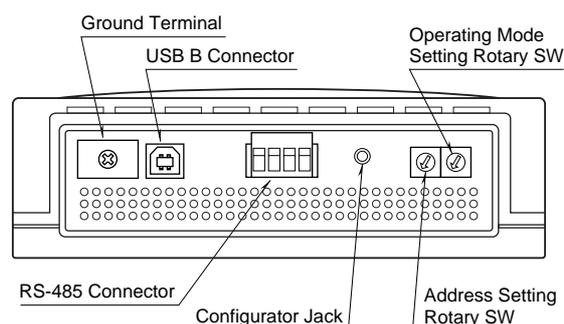
INPUT TYPE	TEMPERATURE COEFFICIENT	
DC Voltage	$\pm[\text{Nominal Input Range} \times 0.015\%]/^{\circ}\text{C}$ or $\pm[\text{Nominal Input Range} \times 0.008\%]/^{\circ}\text{F}$ (e.g. $\pm 0.018\text{mV}/^{\circ}\text{C}$ with $\pm 60\text{mV}$ range)	
Thermocouple	$\pm[\text{Accuracy} / 3]^{\circ}\text{C}/^{\circ}\text{C}$ or $\pm[\text{Accuracy} / 3]^{\circ}\text{F}/^{\circ}\text{F}$ (e.g. $\pm 0.27^{\circ}\text{C}/^{\circ}\text{C}$ with E thermocouple)	
RTD	at $\leq 0^{\circ}\text{C}$ or 32°F	at $\geq 0^{\circ}\text{C}$ or 32°F
Pt 100 (JIS '97, DIN, IEC)	$\pm 0.041^{\circ}\text{C}/^{\circ}\text{C}$ $\pm 0.041^{\circ}\text{F}/^{\circ}\text{F}$	$\pm[0.041^{\circ}\text{C} + \text{Measured Value} \times 0.026\%]/^{\circ}\text{C}$ $\pm[0.041^{\circ}\text{F} + \text{Measured Value} \times 0.026\%]/^{\circ}\text{F}$
Pt 200	$\pm 0.044^{\circ}\text{C}/^{\circ}\text{C}$ $\pm 0.044^{\circ}\text{F}/^{\circ}\text{F}$	$\pm[0.044^{\circ}\text{C} + \text{Measured Value} \times 0.033\%]/^{\circ}\text{C}$ $\pm[0.044^{\circ}\text{F} + \text{Measured Value} \times 0.033\%]/^{\circ}\text{F}$
Pt 300	$\pm 0.047^{\circ}\text{C}/^{\circ}\text{C}$ $\pm 0.047^{\circ}\text{F}/^{\circ}\text{F}$	$\pm[0.047^{\circ}\text{C} + \text{Measured Value} \times 0.04\%]/^{\circ}\text{C}$ $\pm[0.047^{\circ}\text{F} + \text{Measured Value} \times 0.04\%]/^{\circ}\text{F}$
Pt 400	$\pm 0.05^{\circ}\text{C}/^{\circ}\text{C}$ $\pm 0.05^{\circ}\text{F}/^{\circ}\text{F}$	$\pm[0.05^{\circ}\text{C} + \text{Measured Value} \times 0.052\%]/^{\circ}\text{C}$ $\pm[0.05^{\circ}\text{F} + \text{Measured Value} \times 0.052\%]/^{\circ}\text{F}$
Pt 500	$\pm 0.053^{\circ}\text{C}/^{\circ}\text{C}$ $\pm 0.053^{\circ}\text{F}/^{\circ}\text{F}$	$\pm[0.053^{\circ}\text{C} + \text{Measured Value} \times 0.053\%]/^{\circ}\text{C}$ $\pm[0.053^{\circ}\text{F} + \text{Measured Value} \times 0.053\%]/^{\circ}\text{F}$
Pt 1000	$\pm[0.068^{\circ}\text{C} + \text{Measured Value} \times 0.025\%]/^{\circ}\text{C}$ $\pm[0.068^{\circ}\text{F} + \text{Measured Value} \times 0.025\%]/^{\circ}\text{F}$	$\pm[0.068^{\circ}\text{C} + \text{Measured Value} \times 0.087\%]/^{\circ}\text{C}$ $\pm[0.068^{\circ}\text{F} + \text{Measured Value} \times 0.087\%]/^{\circ}\text{F}$
Pt 100 (JIS '89)	$\pm 0.041^{\circ}\text{C}/^{\circ}\text{C}$ $\pm 0.041^{\circ}\text{F}/^{\circ}\text{F}$	$\pm[0.041^{\circ}\text{C} + \text{Measured Value} \times 0.024\%]/^{\circ}\text{C}$ $\pm[0.041^{\circ}\text{F} + \text{Measured Value} \times 0.024\%]/^{\circ}\text{F}$
JPt 100 (JIS '89)	$\pm 0.041^{\circ}\text{C}/^{\circ}\text{C}$ $\pm 0.041^{\circ}\text{F}/^{\circ}\text{F}$	$\pm[0.041^{\circ}\text{C} + \text{Measured Value} \times 0.023\%]/^{\circ}\text{C}$ $\pm[0.041^{\circ}\text{F} + \text{Measured Value} \times 0.023\%]/^{\circ}\text{F}$
Pt 50 (JIS '81)	$\pm 0.039^{\circ}\text{C}/^{\circ}\text{C}$ $\pm 0.039^{\circ}\text{F}/^{\circ}\text{F}$	$\pm[0.039^{\circ}\text{C} + \text{Measured Value} \times 0.021\%]/^{\circ}\text{C}$ $\pm[0.039^{\circ}\text{F} + \text{Measured Value} \times 0.021\%]/^{\circ}\text{F}$
Ni 100	$\pm 0.028^{\circ}\text{C}/^{\circ}\text{C}$ $\pm 0.028^{\circ}\text{F}/^{\circ}\text{F}$	$\pm[0.028^{\circ}\text{C} + \text{Measured Value} \times 0.01\%]/^{\circ}\text{C}$ $\pm[0.028^{\circ}\text{F} + \text{Measured Value} \times 0.01\%]/^{\circ}\text{F}$
Ni 120	$\pm 0.028^{\circ}\text{C}/^{\circ}\text{C}$ $\pm 0.028^{\circ}\text{F}/^{\circ}\text{F}$	$\pm[0.028^{\circ}\text{C} + \text{Measured Value} \times 0.01\%]/^{\circ}\text{C}$ $\pm[0.028^{\circ}\text{F} + \text{Measured Value} \times 0.01\%]/^{\circ}\text{F}$
Ni 508.4 Ω	$\pm 0.046^{\circ}\text{C}/^{\circ}\text{C}$ $\pm 0.046^{\circ}\text{F}/^{\circ}\text{F}$	$\pm[0.046^{\circ}\text{C} + \text{Measured Value} \times 0.018\%]/^{\circ}\text{C}$ $\pm[0.046^{\circ}\text{F} + \text{Measured Value} \times 0.018\%]/^{\circ}\text{F}$
Ni-Fe 604	$\pm 0.058^{\circ}\text{C}/^{\circ}\text{C}$ at $\leq -200^{\circ}\text{C}$, $\pm 0.043^{\circ}\text{C}/^{\circ}\text{C}$ at -150°C , $\pm 0.04^{\circ}\text{C}/^{\circ}\text{C}$ at -100°C , $\pm[0.047^{\circ}\text{C} + \text{Measured Value} \times 0.023\%]/^{\circ}\text{C}$ at $\geq 0^{\circ}\text{C}$ $\pm 0.058^{\circ}\text{F}/^{\circ}\text{F}$ at $\leq -328^{\circ}\text{C}$, $\pm 0.043^{\circ}\text{F}/^{\circ}\text{F}$ at -238°C , $\pm 0.04^{\circ}\text{F}/^{\circ}\text{F}$ at -148°C , $\pm[0.047^{\circ}\text{F} + \text{Measured Value} \times 0.023\%]/^{\circ}\text{F}$ at $\geq 32^{\circ}\text{C}$	
Cu 10 @25°C	$\pm 0.07^{\circ}\text{C}/^{\circ}\text{C}$ or $\pm 0.07^{\circ}\text{F}/^{\circ}\text{F}$	
Potentiometer	$\pm 0.005\%/^{\circ}\text{C}$ or $\pm 0.003\%/^{\circ}\text{F}$	

TOP & REAR VIEWS

■TOP VIEW



■REAR VIEW



Specifications subject to change without notice.

■INDICATOR LED

- RUN:** Green LED flashes when the internal micro-processor is operating normally.
- COMM:** Communication LED. Amber light turns on when the RZUS is receiving normal data query frames from Modbus and sending responses out.
- ERR:** Error LED. Red light turns on with internal errors and flashes when the RZUS is receiving abnormal data query frames from Modbus.
- TRG:** Trigger LED. Amber light turns on when the trigger contact input turns on.
- ALM:** Alarm LED. Amber light turns on when the alarm contact output turns on.

■USB INTERFACE



ID	PIN NO.	EXPLANATION OF FUNCTION
V _{BUS}	1	USB Bus Power
D -	2	Differential Signal Line
D +	3	Differential Signal Line
GND	4	Shield

■ADDRESS SETTING ROTARY SW

- 1 through F:** Setting at the power startup is recognized as the unit's node address.
- 0:** Setting with PC Configurator Software is enabled. Software settings are deleted if the RZUS is started up with a setting other than zero (0).

■OPERATING MODE SETTING ROTARY SW

A/D conversion mode, service channel numbers, cold junction compensation, line noise filter frequency and burnout action for T/C and RTD input can be specified using this switch. Setting with PC Configurator Software is enabled when the switch is set to zero (0), except that the cold junction compensation can be enabled/disabled for individual channels on the PC Recorder Software programs: MSR128LS and MSR128LV. In order to protect the software setting before the power is turned off, be sure to turn the power supply on with '0' setting.

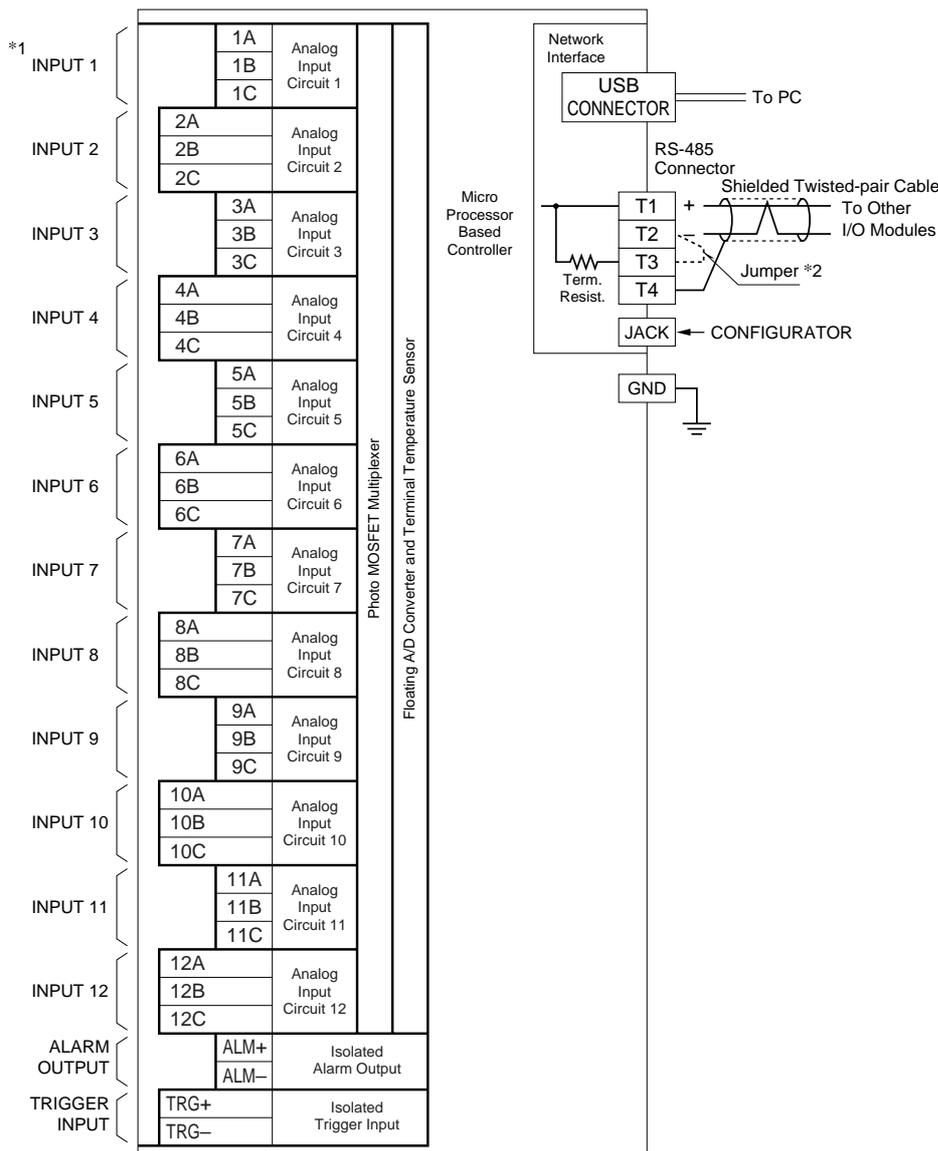
1 through F: Combination of settings as shown in the table below.

0: Last software setting before the power is turned off is enabled.

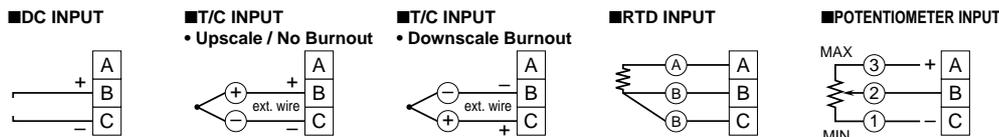
A/D CONVERSION MODE	SERVICE CHANNEL NUMBERS	COLD JUNCTION COMPENSATION (T/C)	LINE NOISE FILTER FREQUENCY	BURNOUT (T/C and RTD)			
				All Channels			Individual Channels
				NONE	UP	DOWN	
Medium	12	With	50/60 Hz	1	2	3	
			50 Hz	4	5	6	
			60 Hz	7	8	9	
		Without	50 Hz	A	B	C	
			60 Hz	D	E	F	
Software setting for all channels (Fast, Medium, Slow)	Software setting (12 or 6)	Software setting for individual channels	Software setting for all channels (50, 60, 50/60 Hz)				0 Software setting

Remark 1: Specifying the exact frequency (50 Hz and 60 Hz) provides better protection than 50/60 Hz setting.
 Remark 2: Factory setting is '1.'

CONNECTION DIAGRAM



***1 Input Connection Examples**

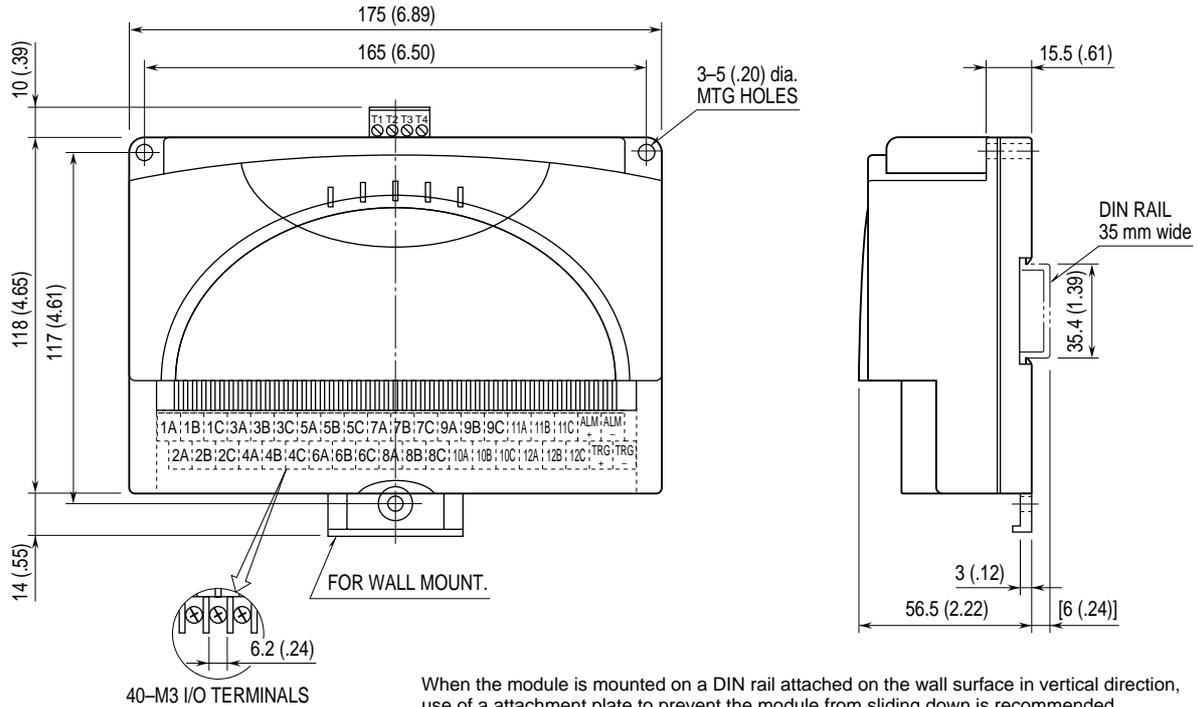


*2 When the device is located at the end of a transmission line via twisted-pair cable, (when there is no cross-wiring), close across the terminal T2 – T3 with the attached jumper pin (or with a leadwire).
When the device is not at the end, remove the jumper pin.

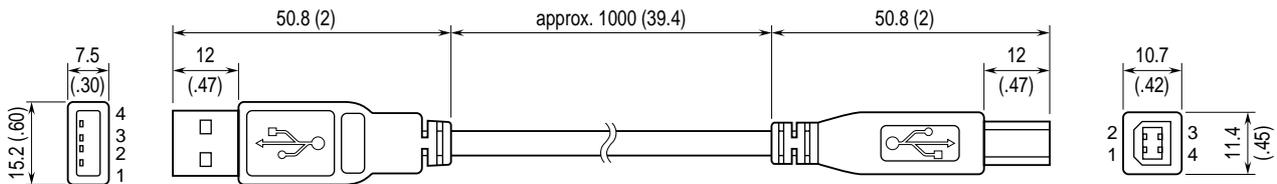
- Remark 1: In order to prevent instability in measured values caused by noise entering through the I/O terminals or RS-485 connector, to protect the unit from malfunction and failure, to protect the operator from electrical shock, grounding the RZUS-U9's GND terminal to a most stable earth point in the environment is recommended. If the PC is equipped with an earth terminal, grounding it to the same point is also recommended.
- Remark 2: Be careful to eliminate noise as much as possible by e.g. using shielded cables. Ground the signal shield to a most stable earth point in the environment.
- Remark 3: Separate USB and RS-485 cables as far from power supply or other field wiring which may be a noise source.
- Remark 4: The smaller is common mode voltage (DC and AC) between C terminals and between C and GND, the better is measuring accuracy. Connecting between C terminals and if possible to GND will yield the best accuracy.
- Remark 5: Resistor modules (model: REM3-250) can be connected to 1A through 12C terminals to convert current inputs into voltage. However, it is not recommended when TC inputs are mixed because the heat developed on and around the REM3 affects the cold junction compensation performance. We recommend that REM3 be connected on a separate terminal board.
- Remark 6: When the internal temperature sensors are used for CJC, temperature imbalance around the terminal block affects greatly the CJC accuracy. In order to minimize such imbalance, do not use wires of large diameter which has large heat dissipation. Be sure to close the terminal cover. Do not expose the module directly in the line of wind from a cooling fan.
- Remark 7: Two-wire RTD can be used by closing across B and C terminals. Be sure to compensate wire resistance by Configurator Software.

Specifications subject to change without notice.

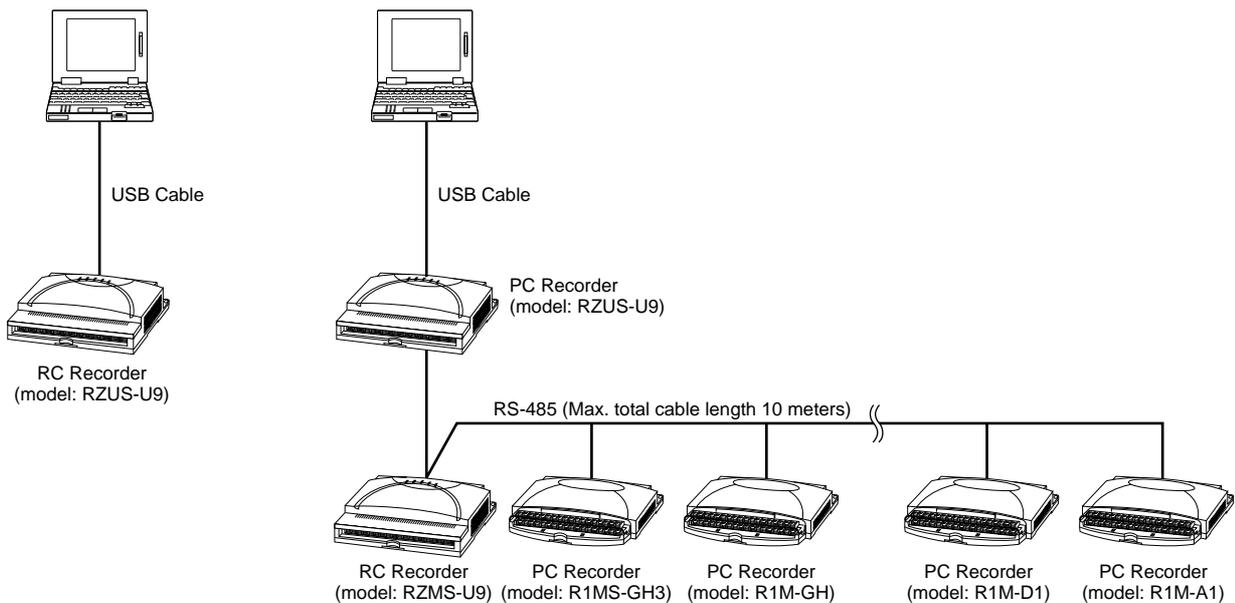
EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS mm (inch)



■ USB CABLE



SYSTEM CONFIGURATION EXAMPLE



Non-isolated between USB and RS-485. RS-485 cable length is limited within 10 meters.