# RT9
## Mini recorder

- Temperature record and temperature control
- Zoom function, graphic or characters recording
- Display accuracy 0.3 % of FS, Sampling time 250 ms
- Group PID auto-tuning
- Universal input/output
- Communication function(RS 485/422)

## Suffix code

| Model | Code | | | Description |
|---|---|---|---|---|
| RT9- | □ | □ | □ | Mini recorder<br>96(W) × 96(H) ㎜ |
| Control type | 0 | | | Exclusive for recorder |
| | 1 | | | Record and temperature control |
| Unit selection | | 0 | | (℃) Celsius(only) |
| | | 1 | | Etc |
| Optional | | | 0 | None |
| | | | 1 | Alarm output 1 contact (AL1) |
| | | | 2 | Alarm output 2 contact (AL1, AL2) |
| | | | 3 | Communication (RS485) |
| | | | 4 | Communication (RS485) / alarm 1 contact (AL1) |
| | | | 5 | Communication (RS485) / alarm 2 contact (AL1, AL2) |

## Specification

### Input

| | |
|---|---|
| Thermocouple | K, J, E, T, R, B, S, L, N, U, W, PL2 |
| RTD | Pt100 Ω, JPt100 Ω |
| DC voltage | 1 − 5 V DC, 0 − 10 V DC |
| | −10 − 20 ㎹, 0 − 100 ㎹ |
| DC current | 4 − 20 ㎃ (attach the external resistance 250 Ω) |
| Sampling time | 250 ㎳ |
| Input display resolving power | Less than the decimal point of measurement range chart |
| Input impedance | Thermocouple and DC voltage input(㎹) : 1 ㏁ min. DC voltage input(V) : approx. 1 ㏁. |
| Allowable signal resistance | Thermocouple (250 Ω max). DC voltage (2 KΩ max) |
| Allowable wiring resistance | RTD 10 Ω max. (but resistance among 3 wires must be same) |
| Allowable rated voltage | Within ±10 V(thermocouple, RTD, DC voltage(㎹)). within ± 20 V (V (DC voltage(V)). |
| Standard contact compensation error | ±1.5 ℃ (15 ~ 35 ℃), ±2.0 ℃ (0 ~ 50 ℃) |
| Input break detection | OFF, UP/DOWN scale selection (thermocouple), UP scale (RTD), detecting current(approx. 50 ㎃) |

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## Function

| | |
|---|---|
| Display accuracy<br>Recording accuracy | ±0.3 % of FS ±1 Digit. Thermocouple (K, J, E, T, R, B, S, L, U, W, PL2)<br>±1.0 % of FS ±1 Digit. Thermocouple (N)<br>±0.3 % of FS ±1 Digit. RTD (Pt100 Ω, JPt100 Ω), DC voltage |
| Insulation resistance | 20 MΩ max (500 V DC)<br>in between of 1st terminal-2nd terminal-earth terminal |
| Dielectric strength | 2,300 V AC 50/60 ㎐, 1 minute (1st terminal-2nd terminal-earth terminal)<br>1,500 V AC 50/60 ㎐, 1 minute (2nd terminal-F.G) |

※ For the detailed indicating accuracy, please refer to the range and input code range.

## Record specification

| | |
|---|---|
| Measurement channel number | 1 channel |
| Response time | Varies depending on the recording speed |
| Recording type | Thermal line |
| Letter type | 203 dpi (8 dots/㎜), 340 dot/Line |
| Recording paper check | When recording paper runs out, recording operation will be stopped and P-END indicating lamp which located on the front side will be lighted. |
| Recording paper width | 57.5 ㎜ (Approx. 16 m) |
| Other functions | Set the recording paper speed (24 ~ 900 ㎜/h), Zoom function |
| | Recording operation run / stop selectable, Feed recording paper |
| | Graphic / text recording selectable, parameter data list |
| | Time setting (set year, month, day, hour, minute and sec) |

## Main function

PID auto computation

Control by the zone selection

Ramp function

Zoom function

Fuzzy function

Output limit setting function

Set output in emergency

Alarm output (hold function)

Graphic print/text print/list print

## Control function and output

| | |
|---|---|
| Input compensation | −100.0 % ~ 100.0 % of FS |
| Scaling | 0.0 % ~ 100.0 % of FS (SL−L ~ SL−H within the range) |
| Input filter | OFF, 1~120 sec |
| PID group | 3 kinds |
| Control type | Selecting control zone, fuzzy operation and RAMP operation |
| Control action | Temporal selection of reverse action (heating) / direct action (cooling) (due to the parameter setting) |
| Auto−tuning 2 type | Target value / low target value auto tuning selection |
| Proportional band | 0.1 ~ 999.9 % (heating / cooling type : 0.0 ~ 999.9 %) |
| Integral time | OFF, 1 ~ 6,000 sec |
| Differential time | OFF, 1 ~ 6,000 sec |
| A.R.W (Anti Reset Wind−up) | Auto, 50.0 ~ 200.0 % (proportional band) |
| ON/OFF control | Select the output type by the parameter |
| Hysteresis | 0.0 ~ 100.0 % of FS ON/OFF control |
| PID selection | Zone PID/AUTO 1, 2, 3 selection |
| Manual reset | Possible to set manual reset when integral time is OFF |
| Amount of output when input breaks | −5.0 ~ 105.0 |
| Fuzzy function | Selecting function by the parameter |
| Ramp function | Selecting slope of an output amount regarding the set temperature (set temperature / time (min)) |
| Alarm setting range | 0 ~ 100 % of range (absolute alarm), ±100 % (deviation alarm) |
| Alarm hysteresis | 0.0 ~ 100.0 % of range |
| Alarm type | Please refer to the "alarm type and code" such as high absolute, low absolute and etc |

● Output

| | | |
|---|---|---|
| Control output | Relay | Contact capacity : 1 c, 240 V AC, 3 A. 30 V DC 3 A (Resistive load) |
| | | Proportional time : 1 ~ 1,000 sec (PID, ON/OFF) |
| | | Output limitation : 0.0 ~ 100.0 % |
| | | Hysteresis : 0 ~ 100 % of FS |
| | | Time resolving power : smaller one of 0.1 % or 10 ㎳ |
| | SSR | Approximately more than 24 V ₫c (Resistive load min 600 Ω) and when disconnected, limits within approx. 30 ㎃ |
| | | Proportional time : 1 ~ 1,000 sec / Output limitation : 0.0 ~ 100.0 % |
| | | Time resolving power : smaller one of 0.1 % or 10 ㎳ |
| | SCR | 4 − 20 ㎃ DC (Resistive load min 600 Ω) |
| | | Accuracy : ±0.5 % of FS (4 − 20 ㎃), resolving power : approx 3,000 |
| | | Output limitation : 0.0 ~ 100.0 % |
| Alarm output | AL1 AL2 | 1a X 2 contact (AL1, AL2) |
| | | 240 V AC, 1 A. 30 V DC 1 A (Resistive load) |

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● Control output parameter selection

| Output selection | Control output (OUT) | |
|---|---|---|
| | Relay | SSR/SCR |
| 0 | Relay (ON/OFF) | – |
| 1 | – | SSR |
| 2 | – | SCR |
| 3 | Relay (PID) | – |

## General specification

| Power supply voltage | 100 – 240 V AC, 50 – 60 Hz |
|---|---|
| Voltage fluctuation | ±10 % of power supply voltage |
| Power consumption | 10 VA max |
| Ambient temperature | 0 ~ 50 ℃ |
| Ambient humidity | 35 ~ 85 % RH (dew condensation not allowed) |
| Storage temperature | −25 ~ 65 ℃ |
| Vibration resistance | 10 – 55 ㎐, peak amplitude 0.75 ㎜, for 2 hr each in 3 axis direction |
| Shock resistance | 300 m/s², 3 times each in 3 axes direction |
| Weight | 530 g |

## Range and input code

| Category | Code | Input | Range (℃) | Accuracy |
|---|---|---|---|---|
| Thermocouple | 1 | K | −200 ~ 1,370　*2 | ±0.3 % of FS, ±1 Digit |
| | 2 | K | −199.9 ~ 999.9　*2 | |
| | 3 | J | −199.9 ~ 999.9　*2 | |
| | 4 | E | −199.9 ~ 999.9　*2 | |
| | 5 | T | −199.9 ~ 400.0　*2 | |
| | 6 | R | 0 ~ 1700　*2 | |
| | 7 | B | 0 ~ 1800　*1 | ±0.3 % of FS, ±1 Digit |
| | 8 | S | 0 ~ 1700 | |
| | 9 | L | −199.9 ~ 900.0　*2 | |
| | 10 | N | −200 ~ 1300 | ±1.0 % of FS, ±1 Digit |
| | 11 | U | −199.9 ~ 400.0　*2 | ±0.3 % of FS, ±1 Digit |
| | 12 | W | 0 ~ 2300 | |
| | 13 | PL2 | 0 ~ 1390 | |
| RTD | 20 | KPt100 Ω | −199.9 ~ 500.0　*3 | ±0.3 % of FS, ±1 Digit |
| | 21 | Pt100 Ω | −199.9 ~ 640.0　*3 | |
| DC voltage | 30 | 1 – 5 V | 1 – 5 V | −1999 ~ 9999 (SL–L ~ SL–H) |
| | 31 | 0 – 10 V | 0 – 10 V | |
| | 32 | −10 – 20 ㎷ | −10 ~ 20 ㎷ | |
| | 33 | 0 – 100 ㎷ | 0 ~ 100 ㎷ | |
| DC current | 30※ | 4 – 20 ㎃ | ※ 250 Ω ±0.1 % external resistance attached at the input terminal | |

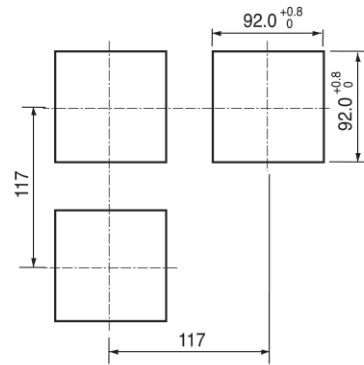- 1 : 0 ~ 400 ℃ Range : ±10 % of FS, ±1 Digit　　• 2 : 0 ℃ max : ±1.0 % of FS, ±1 Digit
- 3 : −150.0 ~ 150.0 ℃ max : ±1.0 % of FS, ±1 Digit

## Dimension and panel cutout (unit : ㎜)
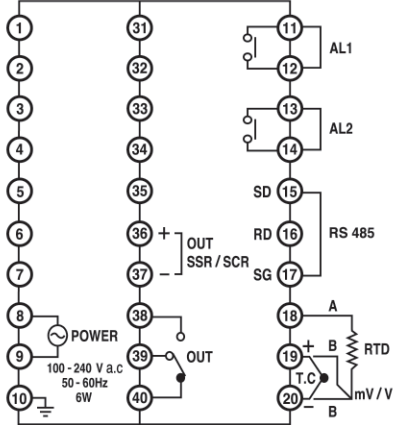
● Dimension
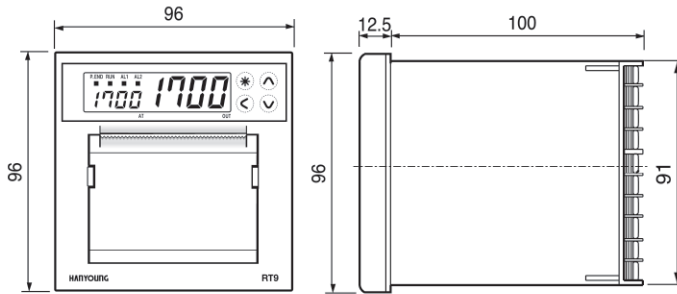
● Panel cutout



## Connection diagram



## Terminal composition

| List | Description |
|---|---|
| Control output(OUT) | Relay output terminal number (38)-(39)-(40) |
| | SSR/4 ~ 20 ㎃ DC output. terminal number (36)-(37) |
| Power supply voltage | 100 - 240 V AC 50 - 60 ㎐. terminal number (8)-(9) |
| Input signal (sensor) | Multi inputs |
| | Thermocouple input terminal number (19, +) - (20, -) |
| | RTD input terminal number (18, A) - (19, B) - (20, B') |
| Alarm output (AL1, AL2) | Alarm 1 output terminal number (11) - (12) |
| | Alarm 2 output terminal number (13) - (14) |
| Communication interface | Transmitting terminal number (15) |
| | Receiving terminal number (16) |
| | Terminal number of the earth (earth for signal) (17) |

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## ⚬ Alarm type and code

（Ｃａｕｔｉｏｕｓ）： When selecting a reverse connection, output will be operated as an OFF state only when indicating lamp is ON so users must be careful regarding this fact.

Hysteresis

( △ : Set value, −▲ : Negative alarm set value, ▲ : Alarm set value )

| Code number | Alarm type | Operation diagram |
|---|---|---|
| 1 | high absolute (direct contact) | |
| 2 | low absolute (direct contact) | |
| ※ 3 | high deviation (direct contact) | |
| ※ 4 | low deviation (direct contact) | |
| ※ 5 | high deviation (reverse contact) | |
| ※ 6 | low deviation (reverse contact) | |
| ※ 7 | high/low deviation | |
| ※ 8 | within the high/low deviation | |
| 9 | high absolute (reverse contact) | |
| 10 | low absolute (reverse contact) | |
| 11 | high absolute (direct contact, hold function) | |
| 12 | low absolute (direct contact, hold function) | |
| ※ 13 | high deviation (direct contact, hold function) | |
| ※ 14 | low deviation (direct contact, hold function) | |
| ※ 15 | high deviation (reverse contact, hold function) | |
| ※ 16 | low deviation (reverse contact, hold function) | |
| ※ 17 | high/low deviation (hold function) | |
| ※ 18 | within the high/low deviation range (hold function) | |
| 19 | high absolute (reverse contact, hold function) | |
| 20 | low absolute (reverse contact, hold function) | |

※ Displaying alarm type cannot be used with the models which are only for the recording purpose (RT9−0)