

## DB2000 SERIES

# DIGITAL INDICATING CONTROLLER



The DB2000 series is a 96X96mm digital indicating controller with the indicating accuracy of  $\pm 0.1\%$  and the control cycle of approximately 0.1 seconds. The configuration of highly functional system is enabled by various options including 2 transmission signal outputs, 2 communications ports and arbitrarily-allocation of digital inputs.



### ■ FEATURES

#### ● Large easy-to-view 5-digit display

Process value (PV) and set value (SV) are displayed by large easy-to-view 5-digit display indicators. The resolution of  $0.1^{\circ}\text{C}$  is enabled for more than  $1000^{\circ}\text{C}$ .

#### ● Highly-functional operation screen and settings screen

The controller inherits the operation screen and the settings screen adopting the LCD (liquid-crystal-display) which has been familiarized for long time. Furthermore, the screens have become high-definition and highly sophisticated.

#### ● Outstanding controllability

Two types of PID algorithms, the position-type PID algorithm and the speed-type PID algorithm, have been installed. You can select the optimum PID algorithm for an object controlled.

#### ● Versatile control functions provided

Versatile control functions, such as the automatic PID system, which executes control by PID parameters preset at every SV sections, and selection of the 2-output control system from PID system and split system for 2-output types, are available.

#### ● Communications 2-port type provided

Models with 2 communications ports are available. In addition, speeding up and highly-functionalization of communications have been realized. For example, you can use 1 port for high order communications with a personal computer and another port for the communications remote (digital remote) function. The communications protocol can be arbitrarily selected from [MODBUS] and [PRIVATE].

#### ● Transmission signal 2-output type available

2 types of transmission signal output, the high-precision type ( $0.1\%$  of full scale) and the general type ( $0.3\%$  of full scale), are available. Transmission signal 2-output types with these 2 transmission signal outputs and models with transmitter power supply are available.

#### ● READY function provided

Although the DB2000 series is the constant value controller, switching to the state (READY) that any control is not wanted is enabled.

In addition, the output value (MV) at READY can be set arbitrarily.

#### ● DI arbitrarily-allocation

When the digital input (DI) is added, arbitrarily-allocation for assigning functions to those DI's is enabled. It is the function enabling allocations such as [READY/RUN] to DI1 and [Manual output operation/Automatic output operation] to DI2.

#### ● Heater disconnection alarm

The heater disconnection alarm can be added to ON-OFF pulse types or SSR drive pulse types only.



By connecting the designed CT externally, the current value of heater is measured and can be indicated on the operation screen.

#### ● Other functions

Various functions including multiple auto-tuning, timer function using the digital input (DI), control loop abnormality alarm and user calibration are built-in.

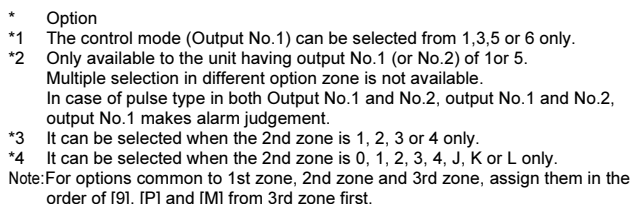
#### ● Conforming to international safety standards and European directives (CE)

The controller is in conformity with European directives (CE), and is UL and c-UL approved.

#### ● Conforming to RoHS

The controller is an environmental consideration product which does not contain directed hazardous substances such as lead, etc.

## DB2□□□□□□-□□□



- Universal inputs

●4-wire resistance thermometer

[Standards]  
K, E, J, T, R, S, B, N : IEC584 (1977,1982), JIS C 1602 -1995, JIS C 1605 -1995  
WRe5-WRe26, W-WRe26, NiMo-Ni, Platine II,  
CR-AuFe,PtRh40-PtRh20: ASTMVol.14.03  
U, L : DIN43710 - 1985  
Pt100 : IEC751 (1995), JIS C 1604 -1997  
OldPt100 : IEC751(1983), JIS C 1604 -1989, JIS C 1606 -1989  
JPt100 : JIS C 1604 -1981, JIS C 1606 - 1986  
JPt150 : JIS C 1604 -1981

## ■ NAMES OF VARIOUS PARTS



### Display

1. Operation status (RUN) indication  
Lights in operation.
2. Slope (SLOPE) indication  
Lights in slope operation of SV.
3. Ready state (READY) indication  
Lights during idling.
4. Alarm-standby (WAIT) indication  
Lights in alarm-standby status or when alarm is cancelled.
5. Remote (REM) indication
6. Executing set value number (NO.) indication
7. Error (ERR) indication  
Lights when sampling of input is abnormal.
8. Auto-tuning operation (AT) indication  
Lights in auto-tuning operation.
9. Manual operation (MAN1/MAN2) indication  
Lights when the output No.1 or No. 2 is in manual output operation.
16. Process value (PV) indication
17. Set value (SV) indication
18. Alarm activation (AL1 to 4) indication
19. LCD display

### Function keys

10. It is used for switching between the operation screen and the mode screen of Mode 0, or for switching from the settings screen to the mode screen.
11. It is used to switch the operation screen or to switch the settings screen.
12. It is used for switching between the automatic output operation and the manual output operation.
13. It is used for moving the cursor and for selecting a parameter.
14. It is used for changing a setting value (or selecting a parameter) in descending or ascending order.
15. It is used for registering the settings.
20. Engineering port

## ■ INPUT SPECIFICATIONS

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input type:                                         | Thermocouple<br>B, R, S, K, E, J, T, N, WRe5-WRe26, W-WRe26,<br>NiMo-Ni, CR-AuFe, PR5-20, PtRh40-PtRh20,<br>Platinel II, U, L DC voltage<br>$\pm 10\text{mV}$ , $\pm 20\text{mV}$ , $\pm 50\text{mV}$ , $\pm 100\text{mV}$ , $\pm 5\text{V}$ , $\pm 10\text{V}$<br>DC current<br>0 to 20mA<br>Resistance thermometer<br>Pt100, JPt100, Old Pt100, JPt50, Pt-Co                                                                                               |
| Measuring range:                                    | Thermocouple 28 ranges<br>DC voltage 6 ranges,<br>Direct current 1 range<br>Resistance thermometer 14 ranges<br>*For details, refer to [Measuring ranges].                                                                                                                                                                                                                                                                                                   |
| Temperature unit:                                   | $^{\circ}\text{C}$ , K                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Accuracy rating:                                    | $\pm 0.1\%$ of measuring range $\pm 1$ digit<br>*For details, refer to [Detailed specifications of accuracy ratings].                                                                                                                                                                                                                                                                                                                                        |
| Reference junction compensation accuracy:           | K, E, J, T, N, Platinel II --- $\pm 0.5^{\circ}\text{C}$ or a value equivalent to $\pm 20\mu\text{V}$ , whichever is greater<br>(at ambient temperature of $23^{\circ}\text{C} \pm 10^{\circ}\text{C}$ )<br>Others --- $\pm 1.0^{\circ}\text{C}$ or a value equivalent to $\pm 40\mu\text{V}$ , whichever is greater                                                                                                                                         |
| Resolution:                                         | Approximately 1/30000                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Sampling rate:                                      | Approximately 0.1 seconds                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Burnout:                                            | Upscale burnout is only enabled in thermocouple, DC voltage ( $\pm 50\text{mV}$ or less) and resistance thermometer (3-wire type). For the burnout, the output value of Output No. 1 can be set arbitrarily, the output value of Output No. 2 is fixed at 0% and the high limit alarm is set at ON (for the upscale burnout).<br>*The burnout is disabled in DC voltage ( $\pm 100\text{mV}$ or more), direct current, resistance temperature (4-wire type). |
| Input impedance:                                    | Thermocouple 1M $\Omega$ or more<br>DC voltage 1M $\Omega$ or more<br>DC current Approximately 250 $\Omega$                                                                                                                                                                                                                                                                                                                                                  |
| Allowable signal source resistance:                 | Thermocouple 100 $\Omega$ or less<br>DC voltage (mV) 100 $\Omega$ or less<br>DC voltage (V) 300 $\Omega$ or less                                                                                                                                                                                                                                                                                                                                             |
| Allowable wire resistance (resistance thermometer): | 5 $\Omega$ or less (same resistance for all wires)                                                                                                                                                                                                                                                                                                                                                                                                           |
| Rated current (resistance thermometer):             | Approximately 1mA                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Maximum allowable input:                            | Thermocouple $\pm 20\text{V}$ , DC voltage $\pm 20\text{V}$<br>DC current $\pm 30\text{mA}$ , $\pm 7.5\text{V}$<br>Resistance thermometer 500 $\Omega$ , $\pm 5\text{V}$                                                                                                                                                                                                                                                                                     |
| Maximum common mode voltage:                        | 30VAC                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Common mode rejection ratio:                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

## ■ DISPLAY SPECIFICATIONS

|                  |                                                                                                                                |
|------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Display element: | Upper display LED<br>Lower display LCD (with back light) 108 x 24 dots                                                         |
| Display content: | Upper display<br>PV 5-digit, SV 5-digit, status indications, etc.<br>Lower display<br>MV, output status, setting screens, etc. |

## ■ CONTROL SPECIFICATIONS

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Control cycle:                     | Approx. 0.1 seconds                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Output type:                       | ON-OFF pulse type, ON-OFF servo type, Current output type, SSR drive pulse type, Voltage output type                                                                                                                                                                                                                                                                                                                                                                                                       |
| ON-OFF pulse type:                 | Output signal ON-OFF pulse conductive signal<br>Contact capacity<br>Resistive load 100 to 240VAC 30VDC 5A or less<br>Inductive load 100 to 240VAC 30VDC 2.5A or less<br>Smallest load 5VDC 10mA or more<br>Contact protection<br>Small CR element built-in<br>ON-OFF pulse cycle 1 to 180 seconds                                                                                                                                                                                                          |
| ON-OFF servo type:                 | Output signal ON-OFF servo conductive signal<br>Contact capacity of standard load<br>Resistive load 100 to 240VAC 30VDC 5A or less<br>Inductive load 100 to 240VAC 30VDC 2.5A or less<br>Smallest load 5VDC 10mA or more<br>Contact capacity of very light load<br>Resistive load 100 to 240VAC 30VDC 20mA or less<br>Inductive load 100 to 240VAC 30VDC 20mA or less<br>Smallest load 5VDC 1mA or more<br>Feedback resistance 100 $\Omega$ to 2k $\Omega$<br>Contact protection Small CR element built-in |
| Current output type:               | Output signal 4 to 20mA<br>Load resistance 750 $\Omega$ or less                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| SSR drive pulse type:              | Output signal ON-OFF pulse voltage signal<br>Output voltage ON voltage 12VDC $\pm 20\%$<br>OFF voltage 0.8VDC or less<br>Load current 20mA or less<br>Pulse cycle 1 to 180 seconds                                                                                                                                                                                                                                                                                                                         |
| Voltage output type:               | Output signal 0 to 10V<br>Output impedance Approx. 10 $\Omega$<br>Load resistance 50k $\Omega$ or more                                                                                                                                                                                                                                                                                                                                                                                                     |
| Output limiter:                    | -5.0 to 105.0%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Rate-of-change limiter for output: | 0.1 to 100.0%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Output preset:                     | With P action (Settings of I and D = 0),<br>Output at PV = SV -100.0 to 100.0%                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Output deadband:                   | In case of 2-position control (Setting of P = 0),<br>Setting range 0.1 to 9.9%                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Control action:                    | With direct/reverse selection                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Output at PV abnormality:          | Over-range, under-range, abnormal internal data                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Manual output operation:           | Output by manual setting -5.0 to 105.0%<br>MAN $\rightarrow$ AUTO Balanceless bumpless<br>AUTO $\rightarrow$ MAN Keeping output at AUTO                                                                                                                                                                                                                                                                                                                                                                    |

## ■ SETTING SPECIFICATIONS

|                    |                                                                                                                                                                              |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SV relations:      | SV 8 types (maximum 5 digits setting)<br>SV range, SV rate-of-change                                                                                                         |
| Control relations: | PID 8 types P 0 to 999.9%<br>I $\infty$ , 1 to 9999 seconds<br>D 0 to 9999 seconds<br>A.R.W. (Anti reset windup)<br>High limit --- 0 to 100.0%<br>Low limit --- -100 to 0.0% |
| Output relations:  | Output deadband<br>Output preset<br>Output limiter 8 types<br>Rate-of-change limiter for output 8 types                                                                      |
| Alarm relations:   | Alarm value 4 points 8 types, alarm types, alarm deadband                                                                                                                    |

## ■ ALARM SPECIFICATIONS

|                         |                                                                                                                                                             |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Number of alarm points: | 4 points                                                                                                                                                    |
| Alarm types:            | Absolute value alarm, deviation alarm, absolute value deviation alarm, setting value alarm, output value alarm, control loop abnormality alarm, FAIL, timer |
| Output signal:          | Relay output signal (a contact)<br>1 common terminal for AL1 and AL2, 1 common terminal for AL3 and AL4                                                     |
| Contact capacity        | Resistive load 100 to 240VAC 30VDC 3A or less<br>Inductive load 100 to 240VAC 30VDC 1.5A or less<br>Smallest load 5VDC 10mA or more                         |

## ■ GENERAL SPECIFICATIONS

|                                |                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rated power voltage:           | General power supply specifications 100 to 240VAC<br>24V Power supply specifications 24VAC/24VDC                                                                                                                                                                                                                                     |
| Rated power supply frequency:  | General power supply specifications 50/60Hz<br>24V Power supply specification 50/60Hz (24VAC)                                                                                                                                                                                                                                        |
| Maximum power consumption:     | General power supply specifications<br>Without options 100VAC 10VA<br>240VAC 15VA<br>With options 100VAC 15VA<br>240VAC 20VA<br>24V power supply specifications<br>Without options 24VAC 10VA<br>24VDC 5W<br>With options 24VAC 15VA<br>24VDC 10W                                                                                    |
| Working temperature range:     | -10 to 50°C                                                                                                                                                                                                                                                                                                                          |
| Working humidity range:        | 10 to 90%RH                                                                                                                                                                                                                                                                                                                          |
| Power failure countermeasures: | Settings stored in EEPROM<br>(Rewrite count: One million times or less)                                                                                                                                                                                                                                                              |
| Terminal screws:               | M3.5                                                                                                                                                                                                                                                                                                                                 |
| Insulation resistance:         | Between primary terminals and secondary terminals<br>20MΩ or more (500VDC)<br>Between primary terminals and ground terminal<br>20MΩ or more (500VDC)<br>Between secondary terminals and ground terminal<br>20MΩ or more (500VDC)<br>*Primary terminal: Terminals for power supply (100 to 240VAC), control output and alarm output   |
| Withstand voltage:             | Between primary terminals and secondary terminals<br>1500VAC (for 1 minute)<br>Between primary terminals and ground terminal<br>1500VAC (for 1 minute)<br>Between secondary terminals and ground terminal<br>500VAC (for 1 minute)<br>*Primary terminal: Terminals for power supply (100 to 240VAC), control output and alarm output |
| Casing:                        | Fire-retardant polycarbonate                                                                                                                                                                                                                                                                                                         |
| Color:                         | Gray or black                                                                                                                                                                                                                                                                                                                        |
| Mounting:                      | Panel mounting                                                                                                                                                                                                                                                                                                                       |
| External dimensions:           | 96 (H) x 96 (W) x 127 (D)<br>*The depth from the front panel is 120mm.                                                                                                                                                                                                                                                               |
| Weight:                        | Without options Approx. 450g<br>With options Approx. 580g                                                                                                                                                                                                                                                                            |

## ■ SAFTY STANDARD

|       |                                                                                                                                                                                                                                                                                     |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CE:   | EN61326: 1997 +A1+A2+A3<br>EN61010-1: 2001 (Overvoltage category II, pollution degree 2)<br>*Under the test conditions of EMC directives, there may be variation of indication value or output value which is equivalent to maximum $\pm 10\%$ or maximum 2mV whichever is greater. |
| UL:   | UL61010-1 2nd edition                                                                                                                                                                                                                                                               |
| c-UL: | CAN/CSA C22.2 No.61010-1-04                                                                                                                                                                                                                                                         |

## ■ REFERENCE OPERATING CONDITIONS

|                         |                                                                                                               |
|-------------------------|---------------------------------------------------------------------------------------------------------------|
| Ambient temperature:    | 23°C $\pm 2^\circ\text{C}$                                                                                    |
| Ambient humidity:       | 55%RH $\pm 5\%$ (no dew condensation)                                                                         |
| Power voltage:          | General power supply specifications<br>100VAC $\pm 1\%$<br>24V power supply specifications<br>24VDC $\pm 1\%$ |
| Power supply frequency: | General power supply specifications<br>50/60Hz $\pm 0.5\%$<br>24V power supply specifications<br>DC           |
| Mounting angle:         | Forward or backward $\pm 3^\circ$ , lateral $\pm 3^\circ$                                                     |
| Installation height:    | Altitude 2000m or below                                                                                       |
| Vibration:              | 0m/s <sup>2</sup>                                                                                             |
| Shock:                  | 0m/s <sup>2</sup>                                                                                             |
| Mounting condition:     | Single-unit panel mounting (Space above, below, right and left of the unit is needed.)                        |
| Wind:                   | None                                                                                                          |
| External noise:         | None                                                                                                          |
| Warm up time:           | 30 min. or longer                                                                                             |

## ■ NORMAL OPERATING CONDITIONS

|                                     |                                                                                                                |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Ambient temperature:                | -10°C to 50°C (-10°C to 40°C for closed mounting)                                                              |
| Ambient humidity:                   | 10 to 90%RH (no dew condensation)                                                                              |
| Power voltage:                      | General power supply specifications 90 to 264VAC<br>24V Power supply specifications 21.6 to 26.4VDC/AC         |
| Power supply frequency:             | General power supply specifications 50/60Hz $\pm 2\%$<br>24V Power supply specifications DC, 50/60Hz $\pm 2\%$ |
| Mounting angle:                     | Forward or backward $\pm 10^\circ$ , lateral $\pm 10^\circ$                                                    |
| Installation height:                | Altitude 2000m or below                                                                                        |
| Vibration:                          | 2m/s <sup>2</sup>                                                                                              |
| Shock:                              | 0m/s <sup>2</sup>                                                                                              |
| Mounting condition:                 | Single-unit panel mounting (Space above and below of the unit is needed.)                                      |
| External noise:                     | None                                                                                                           |
| Rate of ambient temperature change: | 10°C/hour or less                                                                                              |

## ■ TRANSPORT CONDITIONS

|                      |                                                                                                |
|----------------------|------------------------------------------------------------------------------------------------|
| Ambient temperature: | -20°C to 60°C                                                                                  |
| Ambient humidity:    | 5 to 90%RH (no dew condensation)                                                               |
| Vibration:           | 4.9m/s <sup>2</sup> (10 - 60Hz)                                                                |
| Shock:               | 392m/s <sup>2</sup><br>Under the condition that the unit is packed for shipment by the factory |

## ■ STORAGE CONDITIONS

|                      |                                                                                              |
|----------------------|----------------------------------------------------------------------------------------------|
| Ambient temperature: | -20°C to 60°C<br>For long term storage, the temperature should be 10°C to 30°C.              |
| Ambient humidity:    | 5 to 90%RH (no dew condensation)                                                             |
| Vibration:           | 0m/s <sup>2</sup>                                                                            |
| Shock:               | 0m/s <sup>2</sup><br>Under the condition that the unit is packed for shipment by the factory |

## ■ OPTIONS

### ●Transmission signal output

Output a signal corresponding to set value (SV), process value (PV), manipulated value (MV), etc.

Number of output: 1 point  
 Output signal: 4 - 20mA (Load resistance 400Ω or less)  
 0 - 1V (Output resistance Approx. 10Ω, Load resistance 50kΩ or more)  
 0 - 10V (Output resistance Approx. 10Ω, Load resistance 50kΩ or more)  
 Output accuracy: High-precision type ±0.1% of full scale  
 General type ±0.3% of full scale

### ●Transmitter power supply

Power voltage: 24VDC ± 10%  
 Maximum current capacity: 30mA

### ●Remote signal input

By using external contacts, switching of remote mode and local mode is enabled. With the remote mode, the setting of SV is enabled by remote signal.

Number of inputs: 1 point  
 Input signal: 4 - 20mA (Input impedance Approx. 50Ω)  
 0 - 1V (Input impedance Approx. 500kΩ)  
 0 - 10V (Input impedance Approx. 100kΩ)  
 Input accuracy: ±0.1% ± 1digit  
 Remote signal input: R/L (Remote/Local)

### ●Communications interface

With RS232C, RS422A or RS485, the setting and measured values of the controller can be transmitted to a master CPU and various parameters can be set by the master CPU.

Number of communications points: 1 point  
 Communications speed: 2400/4800/9600/19200/38400 bps  
 Communications type: RS232C, RS422A, RS485  
 Protocol: MODBUS (RTU), MODBUS (ASCII), PRIVATE

### ●Heater disconnection alarm

It is the function for detecting heater disconnection by CT input.

Measurement range: 10 to 100A AC (50/60Hz)  
 Accuracy rating: ±5.0% of full scale ± 1 digit  
 Designed CT: Use [CTL-12-S36-8] made by URD Co., Ltd.

### ●2-output type

2 kinds of output with direct and reverse actions are outputted and simultaneous control of heating/cooling is enabled.  
 Control cycle: Approx. 0.1 seconds  
 Output type: ON-OFF pulse type, Current output type, Voltage output type, SSR drive pulse type  
 Any combinations of these types are enabled.  
 Control system: PID system

### ●Digital input (DI)

The following switching is enabled by digital input signal.

Input signal: No-voltage contact, open-collector signal  
 External contact capacity: 5VDC 2mA  
 Functions:  
 1. Selection of executing No. (4 points)  
 2. Manual output operation/automatic output operation (2 points)  
 3. READY/RUN switching  
 4. Holding of PV  
 5. Holding of SV slope operation  
 6. Resetting of SV slope operation  
 7. Start/reset of timer (4 points)  
 8. Alarm output cancellation  
 9. Preset manual/Automatic output operation

### ●Panel sealing

By mounting the controller to a panel, it has the panel sealing equivalent to [IP54 compliance].

### ●Terminal cover

It covers the terminals for safe. The cover is transparent.

## ■ DETAILED SPECIFICATIONS OF ACCURACY RATINGS

| Input type             |                         | Accuracy rating | Exceptional specifications                                                                      |
|------------------------|-------------------------|-----------------|-------------------------------------------------------------------------------------------------|
| Thermocouple           | B                       | ±0.1% ± 1digit  | Less than 400°C: Not specified / 400°C to less than 800°C: ±0.2% ± 1 digit                      |
|                        | R, S                    |                 | 0°C to less than 400°C: ±0.2% ± 1 digit                                                         |
|                        | N                       |                 |                                                                                                 |
|                        | K                       |                 | -200°C to less than 0°C: ±0.2% ± 1digit or the value equivalent to ±60 μV, whichever is greater |
|                        | E                       |                 | -270°C to less than 0°C: ±0.2% ± 1digit or the value equivalent to ±80 μV, whichever is greater |
|                        | J                       |                 | -200°C to less than 0°C: ±0.2% ± 1digit or the value equivalent to ±80 μV, whichever is greater |
|                        | T                       |                 | -270°C to less than 0°C: ±0.2% ± 1digit or the value equivalent to ±40 μV, whichever is greater |
|                        | U                       |                 | -200°C to less than 0°C: ±0.2% ± 1digit or the value equivalent to ±40 μV, whichever is greater |
|                        | L                       |                 | -200°C to less than 0°C: ±0.2% ± 1digit                                                         |
|                        | WRe5-WRe26              | ±0.2% ± 1digit  |                                                                                                 |
|                        | W-WRe26                 |                 | 0°C to less than 400°C ±0.3% ± 1 digit                                                          |
|                        | NiMo-Ni                 |                 |                                                                                                 |
|                        | Platinel II             |                 |                                                                                                 |
|                        | CR-AuFe                 |                 | 0K to less than 200K: ±0.5% ± 1 digit / 20K to less than 50K: ±0.3% ± 1 digit                   |
| Resistance thermometer | PR5-20                  | ±0.1% ± 1digit  | 0°C to less than 100°C: Not specified / 100°C to less than 200°C: ±0.5% ± 1 digit               |
|                        | PtRh40-PtRh20           |                 | 0°C to less than 400°C: ±1.5% ± 1 digit / 400°C to less than 800°C: ±0.8% ± 1 digit             |
|                        | DC voltage / DC current | ±0.1% ± 1digit  |                                                                                                 |
|                        | Pt100                   | ±0.1% ± 1digit  | For the measuring range of [-100°C to 100°C] only: ±0.15% ± 1digit                              |
| Resistance thermometer | Old Pt100               |                 |                                                                                                 |
|                        | JPt100                  |                 |                                                                                                 |
| Resistance thermometer | JPt50                   | ±0.15% ± 1digit | 4K to less than 20K : ±0.5% ± 1digit / 20K to less than 50K : ±0.3% ± 1digit                    |
|                        | Pt-Co                   |                 |                                                                                                 |

\* The above ratings are the measurement range conversion accuracies under the reference operating conditions.

For thermocouple inputs, the reference junction compensation accuracy is added.

\* K, E, J, T, R, S, B, N : IEC584 (1977 - 1982), JIS C 1602 - 1995, JIS C 1605 - 1995  
 WRe5-WRe26, W-WRe26, NiMo-Ni, Platinel II, CR-AuFe, PtRh40-PtRh20 : ASTM Vol.14.03

U, L : DIN43710 - 1985

Pt100 : IEC751 (1995), JIS C 1604 - 1997

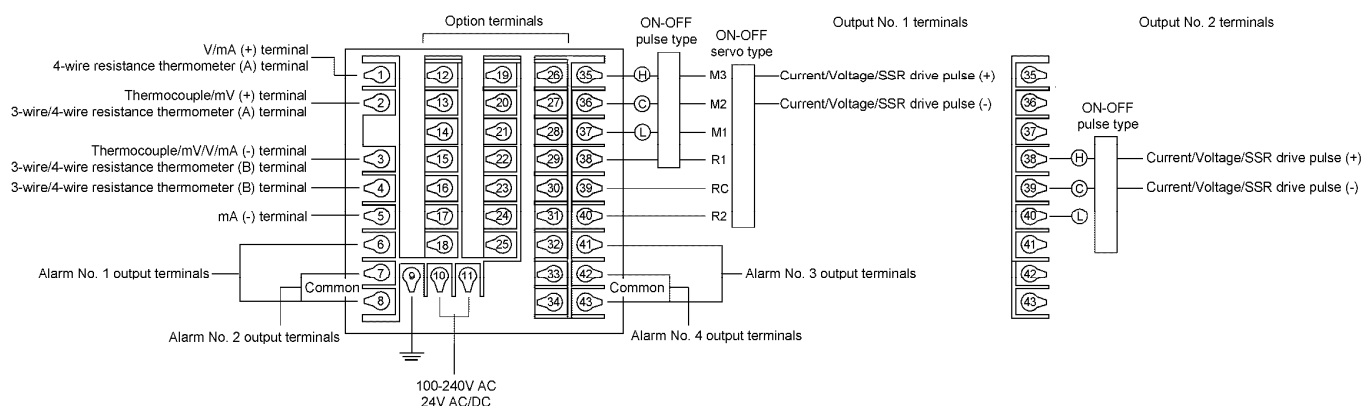
Old dPt100 : IEC751 (1983), JIS C 1604 - 1989, JIS C 1606 - 1989

JPt100 : JIS C 1604-1981, JIS C 1606 - 1986

JPt50 : JIS C 1604 - 1981

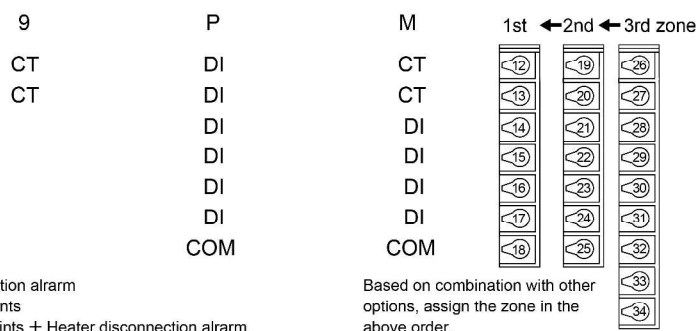
WRe5-WRe26, W-WRe26, NiMo-Ni, Platinel II, CR-AuFe, PtRh40-PtRh20 : ASTM Vol.14.03

## ■ TERMINAL ARRANGEMENT



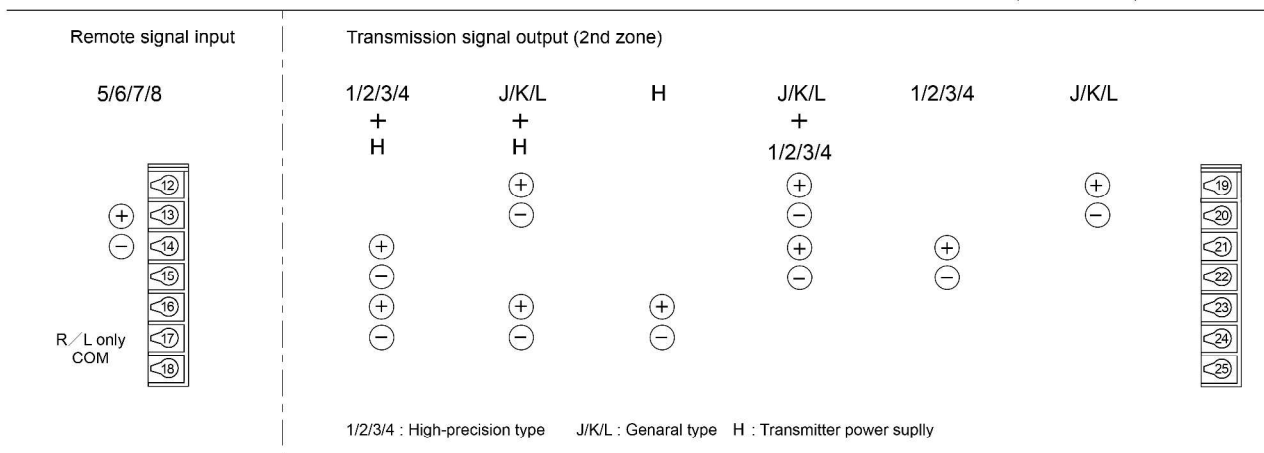
## ● Option terminals

Option common to each zone



[Note] There is no isolation between external signal input and communication.

[Note] There are not isolated between communication 2 ports (COM1-COM2).



3rd zone

| Terminals | R        | A        | S        | B        | C        | D        | E        | F        | G        | U   | V   |
|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----|-----|
| 26        | RD       | RDA      | SA       | RD1      | RD1      | RD1      | SA1      | SA1      | SA1      | DI  | CT  |
| 27        | SD       | RDB      | SB       | SD1      | SD1      | SD1      | SB1      | SB1      | SB1      | DI  | CT  |
| 28        | SG       | SDA      | SG       | SG1      | SG1      | SG1      | SG1      | SG1      | SG1      | DI  | DI  |
| 29        | DI       | SDB      | DI       | RD2      | RDA2     | SA2      | RD2      | RDA2     | SA2      | DI  | DI  |
| 30        | DI       | SG       | DI       | SD2      | RDB2     | SB2      | SD2      | SDB2     | SB2      | DI  | DI  |
| 31        | R/L only | R/L only | R/L only | SG2      | SDA2     | SG2      | SG2      | SDA2     | SG2      | DI  | DI  |
| 32        | COM      | COM      | COM      |          | SDB2     |          |          | SDB2     |          | DI  | DI  |
| 33        |          |          |          | R/L only | R/L only | R/L only | R/L only | R/L only | R/L only | DI  | DI  |
| 34        |          |          |          | COM      | COM      | COM      | COM      | COM      | COM      | COM | COM |

R : Communication RS232C + Digital input 2 points

A : Communication RS422A

S : Communication RS485 + Digital input 2 points

B : Communication RS232C + Communication RS232C

C : Communication RS232C + Communication RS485

D : Communication RS232C + Communication RS485

E : Communication RS485 + Communication RS232C

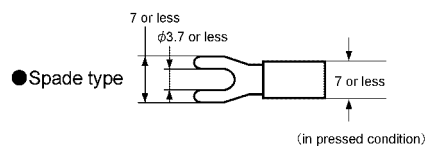
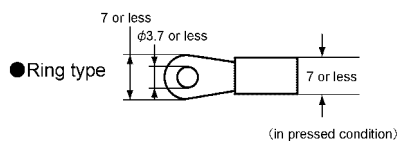
F : Communication RS485 + Communication RS422A

G : Communication RS485 + Communication RS485

U : Digital input 8 points

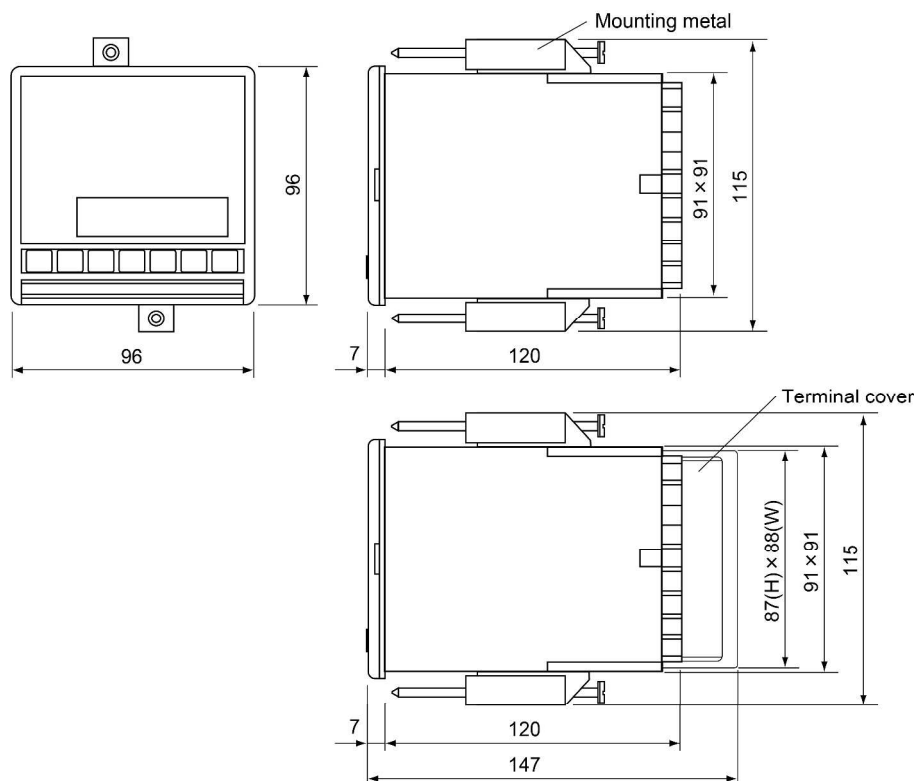
V : Digital input 2 points + Heater disconnection alarm

## ● ABOUT CRIMP STYLE TERMINALS

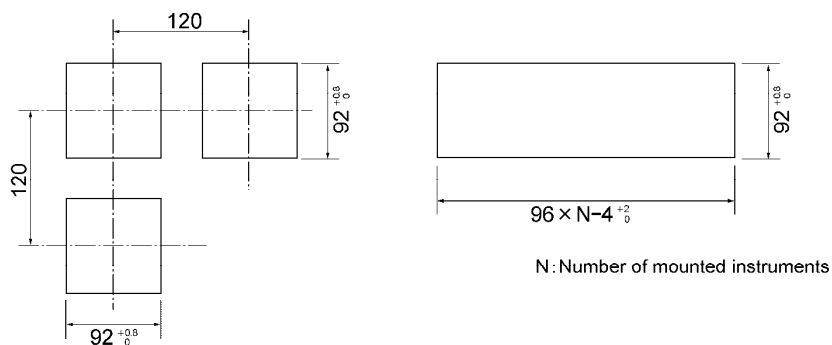


\*Use terminal with insulation

## ■ EXTENAL DIMENSIONES



## ● PANEL CUTOUT



Unit: mm

Specifications subject to change without notice. Printed in Japan (I) 2026.4

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