CHINO

# SE series FIELD SCANNER

# SE3000

# INSTRUCTION

Thank you for your purchase of SE3000 series field scanner.
This instruction manual describes settings of switches, mounting and connections that are fundamentally required to connect this scanner to our BR series graphic recorders as an extension input unit or to our data logging software package KIDS. For using the communications interface when this instrument is used alone, refer to a separate instruction manual (INE-301).

Other Instruction Manual to be consulted.
1. SE series Field Scanner ALARM sub unit(Manual No.INE-318)
2. AL3000/AH3000/BR1000/SE3000 Series Ethernet communication interface(Manual No.INE-322)

**Models**

| **Base unit** | **Sub unit** |
|---|---|
| **SE310□-000** | **SE3211-000** |

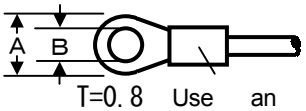
**Display**
**0: Not provided**
**1: Provided**

# 1 FOR SAFE USE

The instrument is a component type. Make sure to assemble it to an instrumentation panel or an equipment, and take a countermeasure not to be directly touched to power and other terminals by a user.

| | |
|---|---|
| **1. Mounting place** | • The instrument is not designed to protect against water drop nor dust. Make sure to use it by mounting on a DIN rail (35mm) inside an indoor panel board. |
| **2. Terminal cover** | • Make sure to attach a terminal cover after connections to prevent an electric shock accident. |
| **3. Termination treatment** | • For connection to terminals, use a cord with an O type crimp style terminal covered by an insulation sleeve. |

| Terminal name | Screw diameter | Tightening torque | A | B |
|---|---|---|---|---|
| Power/protective conductor terminals | M4 | 1.2 N•m | Less than 8.5 | More than 4.3 |
| Communication terminals | M3.5 | 0.8 N•m | Less than 8 | More than 3.7 |
| Other terminals | M3.5 | 0.6 N•m | Less than 7 | More than 3.7 |




T=0.8 Use an insulation sleeve.

| | |
|---|---|
| **4. Installation of a power supply circuit breaker** | • This instrument is not provided with any replaceable overcurrent protective device. Mount an overcurrent protective device for the power supply within 3m. Use the overcurrent protective device conforming to IEC947-1 and IEC947-3. |
| **5. Confirming power voltage and grounding** | • Before turn the power supply on, make sure the connections to terminals, the power supply voltage to the instrument and the grounding to earth. |
| **6. Prohibition in flammable gas** | • Running and storage in environment like as flammable gas or corrosive gas are prohibited. |
| **7. Repair or modification** | • When you need repair the instrument, contact your nearest agent of CHINO Corporation. Don't replace any parts, repair, or modify the instrument by any person other than our qualified servicemen. |

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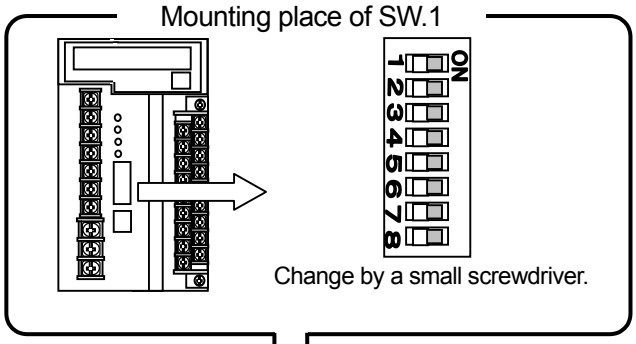
# 2 SETTINGS OF SWITCHES

Before mounting and connections, set the switch No. 1 (SW.1) at the front of instrument and the switch No. 2 (SW.2) up side. Make sure to confirm the settings even if you use the defaults.

## 2.1 Instrument number




| SW1-1 | SW1-2 | SW1-3 | SW1-4 | SW1-5 | Number |
|---|---|---|---|---|---|
| OFF | OFF | OFF | OFF | OFF | 1 (default) |
| ON | OFF | OFF | OFF | OFF | 1 |
| OFF | ON | OFF | OFF | OFF | 2 |
| ON | ON | OFF | OFF | OFF | 3 |
| OFF | OFF | ON | OFF | OFF | 4 |
| ON | OFF | ON | OFF | OFF | 5 |
| OFF | ON | ON | OFF | OFF | 6 |
| ON | ON | ON | OFF | OFF | 7 |
| OFF | OFF | OFF | ON | OFF | 8 |
| ON | OFF | OFF | ON | OFF | 9 |
| OFF | ON | OFF | ON | OFF | 10 |
| ON | ON | OFF | ON | OFF | 11 |
| OFF | OFF | ON | ON | OFF | 12 |
| ON | OFF | ON | ON | OFF | 13 |
| OFF | ON | ON | ON | OFF | 14 |
| ON | ON | ON | ON | OFF | 15 |
| OFF | OFF | OFF | OFF | ON | 16 |
| ON | OFF | OFF | OFF | ON | 17 |
| OFF | ON | OFF | OFF | ON | 18 |
| ON | ON | OFF | OFF | ON | 19 |
| OFF | OFF | ON | OFF | ON | 20 |
| ON | OFF | ON | OFF | ON | 21 |
| OFF | ON | ON | OFF | ON | 22 |
| ON | ON | ON | OFF | ON | 23 |
| ON | OFF | OFF | ON | ON | 25 |
| OFF | ON | OFF | ON | ON | 26 |
| ON | ON | OFF | ON | ON | 27 |
| OFF | OFF | ON | ON | ON | 28 |
| ON | OFF | ON | ON | ON | 29 |
| OFF | ON | ON | ON | ON | 30 |
| ON | ON | ON | ON | ON | 31 |

Note) Don't duplicate the settings of each instrument.

## 2.2 Communications port

| SW1-6 | |
|---|---|
| OFF(default) | ON |
| COM (default) | ENG |

## 2.3 Fixed (Set to OFF)

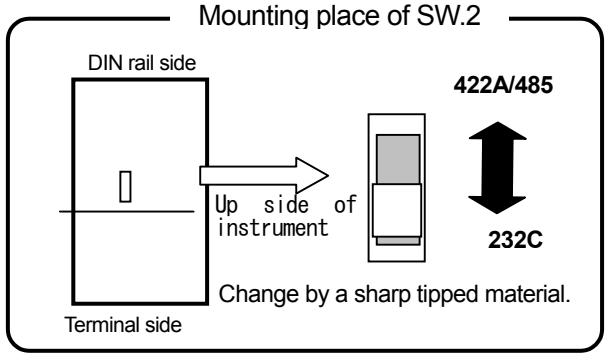
As the switch SW.1-7 is not used, the default is OFF. Don't to set it ON.

## 2.4 Initialization

| SW1-8 | |
|---|---|
| OFF (Default) | ON |
| Disable | Enable |

After setting the switch SW.1-8 ON, re-turn the power supply ON for initialization.
The running parameters including input parameters will return to the defaults.

## 2.5 Communications type



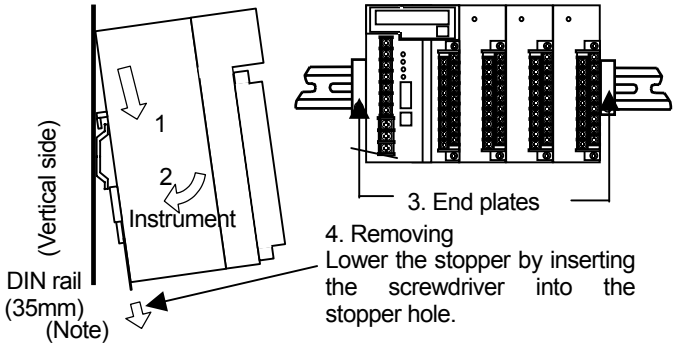

| SW2 | |
|---|---|
| Front side (Terminals side) | Back side (Default) (DIN rail side) |
| RS232C | RS422A/485 |

For the connection to the BR, change to RS422A/485.

# 3 Mounting on DIN rail (35mm)

After mounting the instrument on a DIN rail, fix it by end plates (available locally) not to move.

1. Hook the instrument to the upper side of the DIN rail.
2. By pushing the instrument, it is mounted with a snap.
3. Fix both sides by the end plates.
4. For removing the instrument from the DIN rail, loose the end plates to have a clearance to an instrument mounted beside. Then lower a stopper by inserting a screwdriver into the stopper hole.




(Note)
Mount the instrument with its bottom down to the vertical side of the rail. If not, it may cause an indication accuracy error.

# 4 CONNECTIONS

## 4.1 Cautions on connections

### 1. Feed source power supply

- Use a single-phase power having a stable voltage without any waveform distortion for the purpose of preventing wrong operations.

### 2.Separate from a strong power circuit

- Don't place the input/output cables to be close to or in parallel with any strong power circuit including power line. Separate them more than 50cm from strong power circuits.

### 3.Separate from a heat source

- For the thermocouple inputs, separate the input terminals from a heat source for the purpose of reducing a reference junction compensation error. Don't expose the input terminals to the radiation of direct sunlight, etc.

### 4. Separate from noise source

- Separate all connection cables to the instrument from a noise source as far as possible, otherwise an unexpected trouble may occur. Take a remedial measure if the cables cannot be separated from a noise source due to unavoidable circumstances.

| | |
|---|---|
| Major noise sources | • Electromagnetic switch<br>• Power line having waveform distortion<br>• Inverter<br>• Thyristor regulator |
| Remedial measures | Insert noise filter between power terminals and input/output terminals.<br>A CR filter is used normally. |

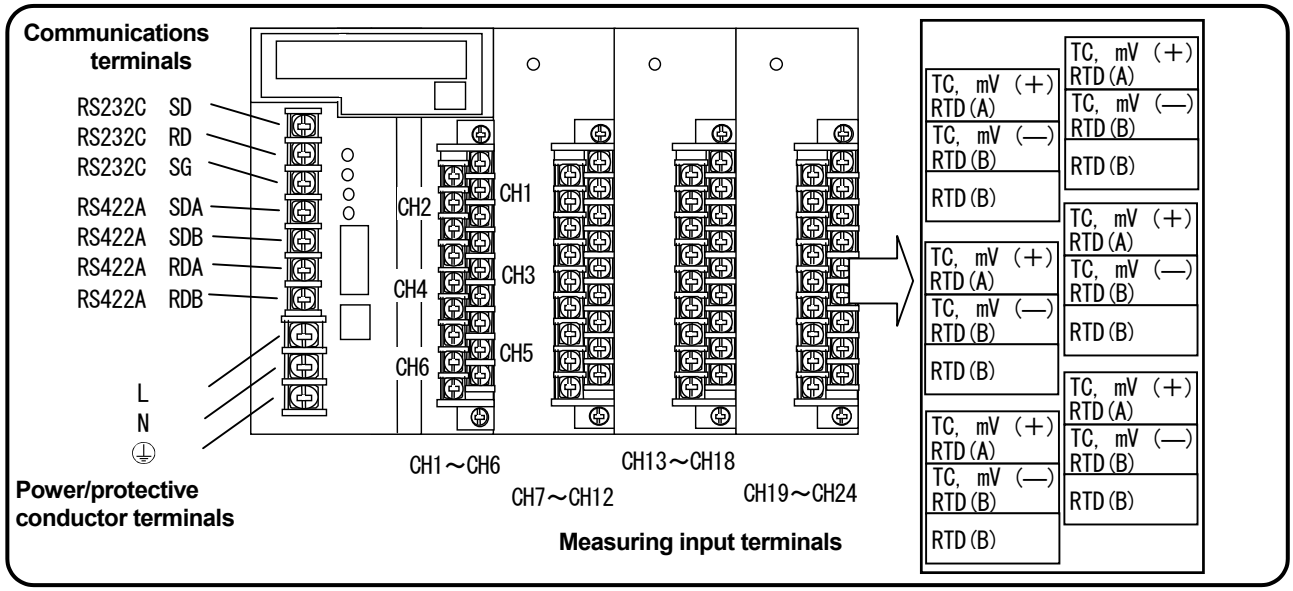
### 5. Use crimp style terminals

1. Mount crimp style terminals as connection cables' termination for preventing the looseness or disconnection of terminals and a short-circuit failure between terminals.
2. For crimp style terminals, use them with an insulation sleeve for preventing an electric shock accident.

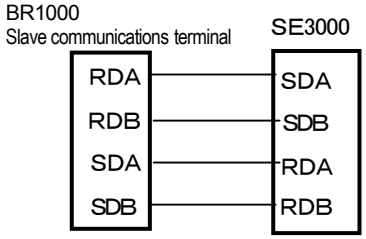
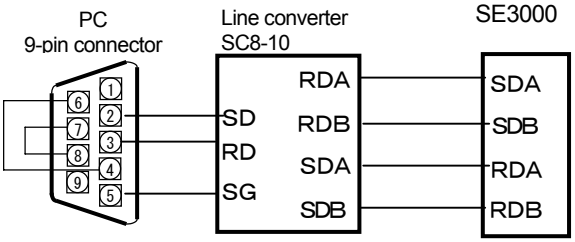
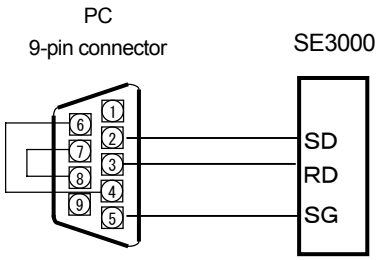
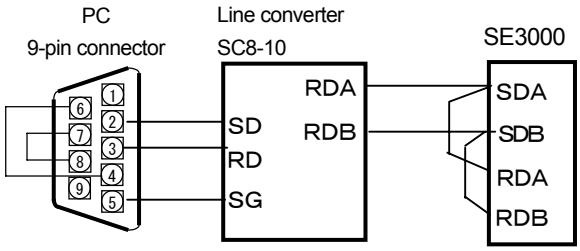
### 6.Unused terminals

- Don't use any unused terminals for relaying, otherwise electric circuits may be damaged.
  In addition, short unused terminals (+ and - terminals) for preventing influence by an external noise.

## 4.2 Terminal board diagram



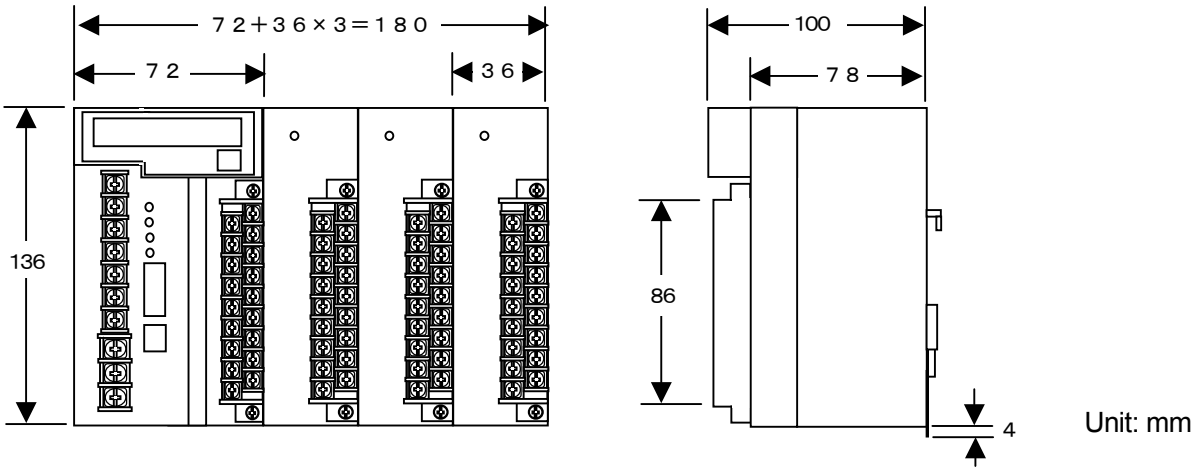
## 4.3 Communications connection

| Connection to the BR (For RS422A) | Connection to a PC (For RS422A) |
|---|---|
|  <br>The settings of BR are shown in the instruction manual for BR. |  |
| **Connection to a PC (For RS232C)** | **Connection to a PC (For RS485)** |
|  |  <br>For RS485, short SDA and RDA, and short SDB and RDB. |

Set the input parameters of SE3000 through the BR or a parameter programming software package (PASS - Separate purchase is required.)

# 5 External dimensions

Measuring point: 24, With a display




Unit: mm

# 6 Specifications

## ■ General Specifications

Rated power voltage: 100 to 240 V AC, 50/60 Hz (Universal power supply)
Power consumption: Maximum 10 VA
Environmental conditions:

- Reference operating condition
  Ambient temperature/humidity range: 21 to 25°C, 45 to 65%RH
  Power voltage: 100 V AC ±1%
  Power frequency: 50/60 Hz ±0.5%
  Attitude: Left/right 0°, forward tilting 0°, backward tilting 0°
  Warm-up time: Longer than 1 hour
- Normal operation condition
  Ambient temperature/humidity range: 0 to 50°C, 20 to 80%RH
  Power voltage: 90 to 264 V AC
  Power frequency: 50/60 Hz ±2%
- Transportation condition (in the packed condition on shipment from the factory)
  Ambient temperature/humidity range: -20 to +60°C, 5 to 90%RH (no dew condensation)
  Vibrations: 10 to 60 Hz, less than 0.5 G
  Impact: Less than 40 G
- Storage condition
  Ambient temperature/humidity range: -20 to +60°C, 5 to 90%RH (no dew condensation)

Power failure protection:
An EEPROM stores the programmed parameters.
Insulation resistance:
Between secondary and protective conductor terminals: More than 20 MΩ at 500 VDC
Between primary and protective conductor terminals: More than 20 MΩ at 500 VDC
Between primary and secondary terminals: More than 20MΩ at 500 VDC
Primary terminals: Power terminals (L, N)
Secondary terminals: Input terminals, communications terminals
Dielectric strength:
Between secondary and protective conductor terminals: 1 minute at 500 VAC
Between primary and protective conductor terminals: 1 minute at 1500 VAC
Between primary and secondary terminals: 1 minute at 2300 VAC
Primary terminals: Power terminals (L, N)
Secondary terminals: Input terminals, communications terminals
Exterior material: ABS resin (frame)
Color: Gray (equivalent to Munsell 5Y 8/1)
Weight: Approx. 0.6 kg(6points), 1.4kg(48 points)
Mounting: DIN rail (35mm) mounting
Terminal screws:

| | |
|---|---|
| Power terminal | M4.0 |
| Protective conductor terminal | M4.0 |
| Input terminals | M3.5 |
| Communications terminals | M3.5 |

## ■ International Standards

CE marking: EN61326 A1 Class A.
EN61010-1 A2

## ■ Input Specifications

Number of measuring points:
Basic unit 6 points, Sub unit 6 points/unit
* Up to seven sub units can be connected to one basic unit.

Input signals: Universal input
DC voltage
±13.8 mV, ±27.6 mV, ±69.0 mV, ±200 mV, ±500 mV, ±2 V, ±5 V*, ±10 V*, ±20 V*, ±50 V*
(*: With built-in voltage dividing resistors)
DC current
Available by adding an external shunt resistor
T/C
B, R, S, K, E, J, T, N, NiMo-Ni, CR - AuFe, PtRh40-PtRh20, W-WRe26,WRe5-WRe26, Platinel Ⅱ, U, L
RTD
Pt100 (1), Pt100 (2), JPt100, Pt50, Pt-Co.
Range setup:
Programming of input types and ranges by communication
Scale setup:
Programming of minimum values and maximum values by communications
Accuracy rating:
See the table of inputs.
Temperature drift:
±0.01% of full scale/°C [Other input types than the resistance thermometer inputs are converted into the reference range. (See the table of inputs.)]
Measuring interval /cycle:
Approx. 1 sec./6-point

Reference junction (RJ) compensation accuracy:

K, E, J, T, N, Platinel Ⅱ Maximum ±0.5°C

R, S, NiMo-Ni, CR-AuFe, W- WRe26,

WRe5- WRe26, U, L Maximum ±1.0°C

(The above errors are added to the accuracy ratings for the internal reference junction compensation. )

Input resolution:

Approx. 1/56,000 (converted into reference range)

Burnout:

Signal disconnection detection for thermocouple and resistance thermometer inputs

Up-scale burnout, down-scale burnout or burnout disabled can be selected for each input.

Allowable signal source resistance:

Thermocouple inputs (burnout disabled), DC voltage inputs (max. ±2 V)

Maximum 1 kΩ

DC voltage inputs (±5 to 50 V)

Maximum 100 Ω

Resistance thermometer inputs [Pt100(1), Pt100(2), JPt100] Maximum 10 Ω per wire – Same for 3 wires

Input resistance:

Thermocouple inputs

Approx. 8 MΩ

DC voltage inputs Approx. 8 MΩ

at less than ±2 V

Approx. 1 MΩ at ±5 to 50 V

Maximum input voltage:

Thermocouple inputs (burnout disabled), DC voltage inputs (max. ±2 V)

Maximum ±10 VDC

DC voltage inputs (±5 to 50 V)

Maximum ±60 VDC

Thermocouple inputs (burnout enabled), resistance thermometer inputs Maximum ±6 VDC

Maximum common mode voltage:

30 VAC

Common mode rejection ratio(CMRR):

Minimum 120 dB

(50 or 60 Hz)

Series mode rejection ratio(SMRR):

Minimum 50 dB

(50 or 60 Hz)

* In the condition that the peak value of the noise including signal is equal to or less than 1.5 times of the reference range

## ■ Display Specifications (Basic unit)

Status display:

Display device LED (red 3pcs,green 1pc)

Display contents

Running condition

Red blinks in normal condition.

Communications condition

Green LED lights in receiving data.

Red LED lights in transmitting data.

Alarming condition

Red LED lights in alarm activation.

Data display(Option)

## ■ Setting Specifications (Basic unit)

Communications parameters settings:

Setting by DIP switches and slide switches

Setting contents –

Instrument number, Communication port, Comminications type (RS232C/RS422A, 485)

Channel parameters settings:

Setting by the parameter programming software package (PASS – Separate purchase is required.)

(In case of the connection to the BR, the channel parameters can be set by the BR.)

Setting contents –

Input parameters (input range and other parameters), mathematic parameters, alarm parameters, communication parameters

## ■ Alarm Specifications(Basic unit)

Number of programmable alarms:

Maximum 4 levels/channel

Alarm types:

High alarm

Low alarm

Differential high alarm

Differential low alarm

Rate-of-change increase alarm

Rate-of-change decrease alarm

Alarm output (optional):

Not provide

## ■ Safety Standards

CE: EN61236 A1 Class A

EN61010-1 A2

## ■Table of inputs

Note) Accuracy under the reference operation condition. For thermocouple inputs (internal RJ), the reference junction compensation accuracy is not included.

| Input type | | Measuring range | Reference range | Accuracy ratings | Display Resolution |
|---|---|---|---|---|---|
| Thermocouple | K | -200 to 300 °C | ±13.8 mV | ±0.1% ±1 digit | 0.1 °C |
| | | -200 to 600 °C | ±27.6 mV | | 0.1 °C |
| | | -200 to 1370 °C | ±69.0 mV | | 1 °C |
| | E | -200 to 200 °C | ±13.8 mV | | 0.1 °C |
| | | -200 to 350 °C | ±27.6 mV | | 0.1 °C |
| | | -200 to 900 °C | ±69.0 mV | | 1 °C |
| | J | -200 to 250 °C | ±13.8 mV | | 0.1 °C |
| | | -200 to 500 °C | ±27.6 mV | | 0.1 °C |
| | | -200 to 1200 °C | ±69.0 mV | | 1 °C |
| | T | -200 to 250 °C | ±13.8 mV | | 0.1 °C |
| | | -200 to 400 °C | ±27.6 mV | | 0.1 °C |
| | R | 0 to 1200 °C | ±13.8 mV | | 1 °C |
| | | 0 to 1760 °C | ±27.6 mV | | 1 °C |
| | S | 0 to 1300 °C | ±13.8 mV | | 1 °C |
| | | 0 to 1760 °C | ±27.6 mV | | 1 °C |
| | B | 0 to 1820 °C | ±13.8 mV | | 1 °C |
| | N | 0 to 400 °C | ±13.8 mV | ±0.15% ±1 digit | 0.1 °C |
| | | 0 to 750 °C | ±27.6 mV | | 0.1 °C |
| | | 0 to 1300 °C | ±69.0 mV | | 1 °C |
| | W-WRe26 | 0 to 2315 °C | ±69.0 mV | | 1 °C |
| | WRe5-WRe26 | 0 to 2315 °C | ±69.0 mV | ±0.2% ±1 digit | 1 °C |
| | PtRh40-PtRh20 | 0 to 1888 °C | 3.8 mV | | 1 °C |
| | NiMo-Ni | -50 to 290 °C | ±13.8 mV | | 0.1 °C |
| | | -50 to 600 °C | ±27.6 mV | | 0.1 °C |
| | | -50 to 1310 °C | ±69.0 mV | | 1 °C |
| | CR-AuFe | 0 to 280 K | ±13.8 mV | | 0.1 K |
| | Platinel II | 0 to 350 °C | ±13.8 mV | ±0.15% ±1 digit | 0.1 °C |
| | | 0 to 650 °C | ±27.6 mV | | 0.1 °C |
| | | 0 to 1395 °C | ±69.0 mV | | 1 °C |
| | U | -200 to 250 °C | ±13.8 mV | | 0.1 °C |
| | | -200 to 500 °C | ±27.6 mV | | 0.1 °C |
| | | -100 to 600 °C | ±69.0 mV | | 0.1 °C |
| | L | -200 to 250 °C | ±13.8 mV | ±0.1% ±1 digit | 0.1 °C |
| | | -200 to 500 °C | ±27.6 mV | | 0.1 °C |
| | | -100 to 900 °C | ±69.0 mV | | 1 °C |

* Under the test environment requested by EMC directive, indications equivalent to max. 25 °C or 2 mV may fluctuate.

K,E,J,T,R,S,B,N :IEC584,JIS C1602-1995
W-WRe26,WRe5-WRe26, PtPh40-PtPh20,
NiMo-Ni,CR-AuFe,Platinel Ⅱ :ATSM
U,L :DIN43710

| Input type | | Measuring range | Reference range | Accuracy ratings | Display Resolution |
|---|---|---|---|---|---|
| DC voltage | | -13.8 to 13.8 mV | ±13.8 mV | ±0.1% ±1 digit | 10 μV |
| | | -27.6 to 27.6 mV | ±27.6 mV | | 10 μV |
| | | -69.0 to 69.0 mV | ±69.0 mV | | 10 μV |
| | | -200 to 200 mV | ±200.0 mV | | 100 μV |
| | | -500 to 500 mV | ±500.0 mV | | 100 μV |
| | | -2 to 2 V | ±2 V | | 1 mV |
| | | -5 to 5 V | ±5 V | | 1 mV |
| | | -10 to 10 V | ±10 V | | 10 mV |
| | | -20 to 20 V | ±20 V | | 10 mV |
| | | -50 to 50 V | ±50 V | | |
| Resistance thermometer | Pt100 (1) | -140 to 150 °C | 160 Ω | ±0.15% ±1 digit | 0.1 °C |
| | | -200 to 300 °C | 220 Ω | | |
| | | -200 to 850 °C | 400 Ω | | |
| | | | | ±0.1% ±1 digit | 0.1 °C |
| | | | | | 0.1 °C |
| | Pt100 (2) | -140 to 150 °C | 160 Ω | ±0.15% ±1 digit | 0.1 °C |
| | | -200 to 300 °C | 220 Ω | | |
| | | -200 to 649 °C | 400 Ω | | |
| | | | | ±0.1% ±1 digit | 0.1 °C |
| | | | | | 0.1 °C |
| | JPt100 | -140 to 150 °C | 160 Ω | ±0.15% ±1 digit | 0.1 °C |
| | | -200 to 300 °C | 220 Ω | | |
| | | -200 to 649 °C | 400 Ω | | |
| | | | | ±0.1% ±1 digit | 0.1 °C |
| | | | | | 0.1 °C |
| | Pt50 | -200 to 649 °C | 220 Ω | ±0.1% ±1 digit | 0.1 °C |
| | Pt-Co | 4 to 374 K | 220 Ω | ±0.15% ±1 digit | 0.1 K |

Pt100(1): IEC751(1995), JIS C1604-1997
Pt100(2): IEC751(1983), JIS C1604-1989
JIS C1606-1989
JPt100 JIS C1604-1981, JIS C1606-1986
Pt50 JIS C1604-1981

## ■ Exception of accuracy rating

| Input type | Measuring range | Accuracy rating |
|---|---|---|
| K, E, J, T, L | -200 to 0 °C | ±0.1% ±1 digit |
| R, S | 0 to 400 °C | ±0.2 % ±1 digit |
| B | 0 to 400 °C | Not specified |
| | 400 to 800 °C | ±0.15 % ±1 digit |
| N, U | -200 to 0 °C | ±0.3 % ±1 digit |
| W-WRe26 | 0 to 100 °C | ±4 % ±1 digit |
| | 100 to 300 °C | ±0.5 % ±1 digit |
| PtRh 40-PtRh 20 | 0 to 300 °C | ±1.5 % ±1 digit |
| | 300 to 800 °C | ±0.8 % ±1 digit |
| CR - AuFe | 0 to 20 K | ±0.5 % ±1 digit |
| | 20 to 50 K | ±0.3 % ±1 digit |
| Pt100 | 700 to 850 °C | ±0.15 % ±1 digit |
| Pt-Co | 4 to 50 K | ±0.3 % ±1 digit |

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