# General Specifications

Model STED (Style R)
mV, Temperature and Potentiometer/ Voltage Converter

YEW SERIES 80

GS 01B04J01-02E

## ■ GENERAL

*The Model STED Converter accepts a mV DC, thermocouple, RTD or potentiometer signal, converts and normalizes it, provides isolation, and outputs 1 to 5 V DC and 4 to 20 mA DC signals. Two types are prepared for the STED converter: fixed input type that is fixed to mV DC, thermocouple, RTD or potentiometer, and universal input type that can select input type from mV DC, thermocouple or RTD. Burnout function is provided as standard for each type.*

## ■ STANDARD SPECIFICATIONS

### Input Signals

| Input Signal Type and Specifications | mV DC Input | Thermocouple Input JIS/IEC/ANSI/BS Standards Types K, T, J, E, B, R, S and N (ITS-90,JIS'95) Types W3 (*4), W5 (*5) (ASTM E988) Types N, W3 and W5 are for STED-7 only. | RTD Input 3-wire Pt100 (JIS'97,DIN) (JIS'89) JPt100 (JIS'89) Pt50 (JIS'81) Current at 0.5 mA DC | Potentiometer Input 3-wire Voltage at 0.5 V DC |
|---|---|---|---|---|
| Minimum Span | 3 mV | 3 mV | 10°C (*1) | 80 Ω |
| Maximum Span | 100 mV | 62 mV | 650°C (PT50/Pt100) 500°C (JPt100) | 2000 Ω |
| Max. Zero Elevation | Whichever is the smaller, within three times the span or ±50 mV | ±25 mV | Within five times the span (temperature) | Up to 50 % of total resistance |
| Measuring Range | See table of Measuring Ranges shown on the right. | | | |
| Input Resistance | 1 MΩ (Power on) 4 kΩ (Power off) | | — | — |
| Source (leadwire) Resistance | Up to 500 Ω (*2) | | No greater than input span (°C) X 0.4 Ω or 10 Ω per wire, whichever is the smaller. Each leadwire resistance must be equal. (*3) | Maximum 10 Ω per wire Each leadwire resistance must be equal. |
| Input Overload | Up to ± 4 V DC | | — | — |

*1: When used with BARD-300 or BARD-700, the minimum span is 30°C (60°C for Pt50). The minimum span for Pt50 is 20°C. (BARD-300 and BARD-700 are safety barriers of YOKOGAWA.)
*2: When used with BARD-200 or BARD-600, the internal resistance of BARD (235 Ω ± 15 Ω) is not included. (BARD-200 and BARD-600 are safety barriers of YOKOGAWA.)
*3: When used with BARD-300 or BARD-700, the internal resistance of BARD (130 Ω ± 3 Ω) is not included. (BARD-300 and BARD-700 are safety barriers of YOKOGAWA.)
*4: ASTM E988 Standard: W97Re3-W75Re25 (tungsten97% rhenium3%-tungsten75% rhenium25%)
*5: ASTM E988 Standard: W95Re5-W74Re26 (tungsten95% rhenium5%-tungsten74% rhenium26%)

For universal input type, select one input type from mV DC, thermocouple or RTD.

### Measuring Ranges for Each Input

| Type | Measuring Ranges |
|---|---|
| mV | –50 to 150 mV |
| Type K (ITS-90, JIS'95) | –200 to 1200°C |
| Type T (ITS-90, JIS'95) | –200 to 350°C |
| Type J (ITS-90, JIS'95) | 0 to 750°C |
| Type E (ITS-90, JIS'95) | –200 to 800°C |
| Type B (ITS-90, JIS'95) | 600 to 1700°C |
| Type R (ITS-90, JIS'95) | 0 to 1600°C |
| Type S (ITS-90, JIS'95) | 0 to 1600°C |
| Type N (ITS-90, JIS'95)(*6) | –200 to 1200°C |
| Type W3 (ASTM E988)(*6) | 0 to 2000°C |
| Type W5 (ASTM E988)(*6) | 0 to 2000°C |
| JPt100 (JIS'89) | –200 to 510°C |
| Pt50 (JIS'81) | –200 to 649°C |
| Pt100 (ITS-90, JIS'97) | –200 to 850°C |
| Pt100 (IPTS-68, JIS'89)(*6) | –200 to 660°C |
| Potentiometer (*7) | 100 to 2000 Ω (*8) |

*6: For STED-7 type only
*7: For STED-4 type only
*8: Total resistance

### Output Signals

Output: 1 to 5 V DC (two outputs)
4 to 20 mA DC (one output)
Load Resistance:
2 kΩ or more (1 to 5 V DC output)
750 Ω or less (4 to 20 mA DC output)

### BRAIN Communication Function

Sets each parameter, monitors input/output values, and adjusts input/output using the JHT200 Handy Terminal (*9).

### Burnout Function (UP/DOWN/OFF)

Fixed input type: Selection by the jumper switch.
Universal input type: Selection by the parameter.



GS 01B04J01-02E

9th Edition Sep. 2004(KP)

### Calibration

mV DC Input:
Linearity for mV DC and output
Thermocouple Input/RTD Input:
Linearity for temperature and output
Potentiometer Input:
Linearity for resistance value and output

### Adjustment Range for Zero and Span

mV DC Input/Thermocouple Input/RTD Input:
±5% of span
Potentiometer Input:
±10% of span
How to Adjust
Fixed input type:
Adjustment by push switch on the front.
Universal input type:
Adjustment using the JHT200 Handy Terminal (*9).

*9: When connecting the JHT200 Handy Terminal, the adapter for modular-jack (model E9786WH) is required. When using the BT200 BRAIN Terminal of YOKOGAWA Electric Corporation, the communication cable of 5-pin connector type (model F9182EE) and the adapter for modular-jack (model E9786WH) are required.

## ■ MOUNTING AND APPEARNCE

Mounting: Indoor rack mounting
Wiring
Signal wiring: ISO M4 size (4mm) screws on terminal block
Power and Ground wiring
100 V version: JIS C 8303 two-pole plug with earthing contact (IEC A5-15, UL458)
220 V version: CEE 7 VII (CENELEC standard) plug
Cable length: 300 mm
External Dimensions:
(Height×Width×Depth from the mounting face)
180×48×300 (mm)
Weight: 1.7 kg (including rack case)

## ■ STANDARD PERFORMANCE

Accuracy: ± 0.5% of span
Note that for thermocouple input, add the reference junction compensation accuracy to the accuracy above.
Reference Junction Compensation Accuracy
For temperatures 0°C and over:
± 0.5°C (except for Types R and S)
± 1°C (for Types R and S)
For temperatures below 0°C:
Multiply accuracy for temperatures over 0°C by K, where

$$K = \frac{\text{(Thermocouple output change/°C near 0°C)}}{\text{(Thermocouple output change/°C at measurement temperature)}}$$

Burnout Time: 1 minute or less

Maximum Power Consuumption
DC voltage: 24 V DC, 110 mA
AC voltage: 100 V AC, 7.7 VA
220 V AC, 10.5 VA
Insulation Resistance
Between I/O terminals and Ground:
100 MΩ/ 500 V DC
Between Power and Ground:
100 MΩ/500 V DC
Dielectric Strength
Between I/O terminals and Ground:
500 V AC for 1 minute.
Between Power and Ground:
1000 V AC for 1 minute (100 V version)
1500 V AC for 1 minute (220 V version)

## ■ NORMAL OPERATING CONDITIONS

Ambient Temperature: 0 to 50°C
Ambient Humidity: 5 to 90% relative humidity (non-condensing)
Power Supply: AC/DC both usage
100 V version: DC drive 20 to 130 V, no polarity
AC drive 80 to 138 V, 47 to 63 Hz
220 V version: DC drive 120 to 340 V, no polarity
AC drive 138 to 264 V, 47 to 63 Hz

## ■ OPTIONS

/A2ER : 220 V power supply (plug connection)
/NHR : No rack case (internal unit only)
/TB : Power supply terminal type

## ■ ACCESSORIES

Fuse (1A ): 1

## ■ TERMINAL CONNECTIONS

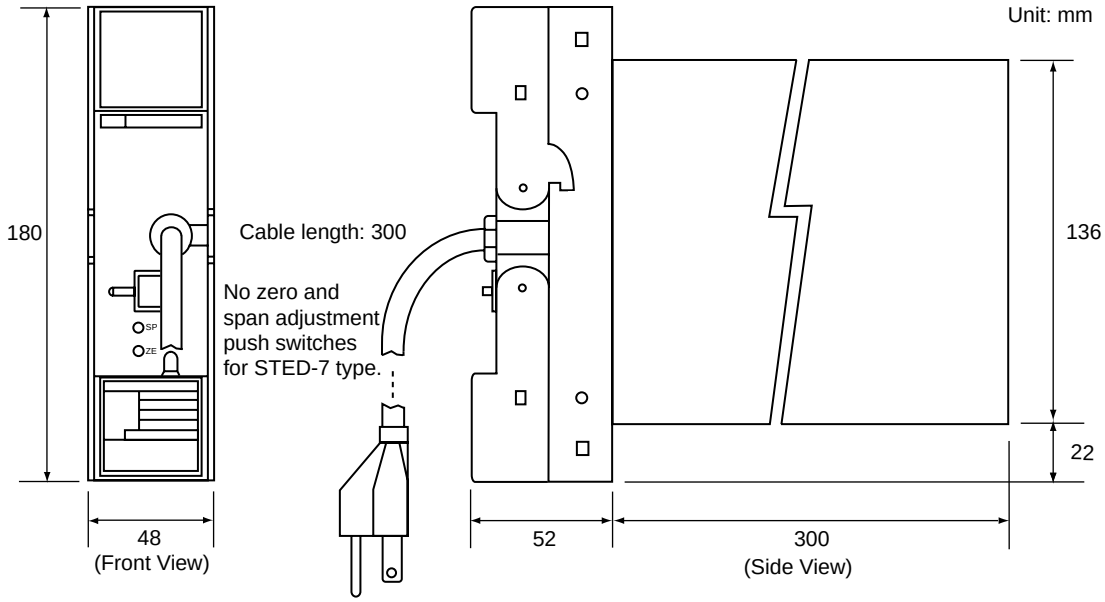
| Terminal Designation | Description | | |
|---|---|---|---|
| Model | STED-1 and STED-2 | STED-3 | STED-4 |
| 1 | + – mV DC input or thermo-couple input | A | 0% |
| 2 | | B | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| ⑥ | (RJC block installation terminal) | | |
| 7 | | B RTD input | 100% Potentiometer input |
| 8 | | | |

For STED-7 type, select one input from mV DC, thermocouple or RTD.

| Terminal Designation | Description |
|---|---|
| A | + – Output 1 (1 to 5 V DC) |
| B | |
| C | + – Output 3 (4 to 20 mA DC) |
| D | |
| F | + – Output 2 (1 to 5 V DC) |
| H | |
| J | |
| K | |

When outputs are not used, the terminals are opened.

## ■ EXTERNAL DIMENSIONS



## ■ MODEL AND SUFFIX CODES

| Model | Suffix Codes | Auxiliary Codes | Style | Optional Suffix Codes | Description |
|---|---|---|---|---|---|
| STED | | | | | mV, Temperature and Potentiometer/ Voltage Converter |
| Input Signal | -1<br>-2<br>-3<br>-4<br>-7 | | | | mV DC input<br>Thermocouple input<br>RTD input<br>Potentiometer input<br>Universal input |
| Number of Inputs | 1 | | | | One input |
| | 0 | | | | Always 0 |
| Auxiliary Codes<br>STED-110: "-MV"<br>STED-210: "-TK" to "-TS"<br>STED-310: "-PA" to "-PD"<br>STED-410: "-RS"<br>STED-710: "-UN" | | -MV<br>-TK<br>-TT<br>-TJ<br>-TE<br>-TB<br>-TR<br>-TS<br>-PA<br>-PB<br>-PD<br>-RS<br>-UN | | | mV DC<br>Type K (ITS90, JIS'95)<br>Type T (ITS90, JIS'95)<br>Type J (ITS90, JIS'95)<br>Type E (ITS90, JIS'95)<br>Type B (ITS90, JIS'95)<br>Type R (ITS90, JIS'95)<br>Type S (ITS90, JIS'95)<br>JPt100 (JIS'89)<br>Pt50 (JIS'81)<br>Pt100 (ITS-90, JIS'97)<br>Potentiometer<br>Universal |
| Style Code | | | *R | | Style R |
| Option | | | | /A2ER<br>/NHR<br>/TB | 220 V power supply<br>No rack case<br>Power supply terminal type |

## ■ ORDERING INSTRUCTIONS

Specify the following when ordering:

1. Model, suffix code and auxiliary code, and optional suffix code, if necessary.
2. Specification of input

(1) Fixed-to-mV DC input type (Default measuring range: 0 to 10 mV DC)
Measuring range

(2) Fixed-to-Thermocouple input type (except for Types N, W3 and W5)
Measuring range and unit (°C or °F)
(Default measuring range for Types K, T, J and E: 0 to 300°C)
(Default measuring range for Type B: 600 to 1500°C)
(Default measuring range for Types R and S: 0 to 1000°C)

(3) Fixed-to-RTD input type (Default measuring range: 0 to 100°C )
Measuring range and unit (°C or °F)

(4) Fixed-to-Potentiometer input type (Default measuring range: 0 to 1000 Ω)
• Total resistance ($R_T$ Ω) (Default: 1000 Ω)
• Resistance at 0% point ($R_0$ Ω)
• Resistance at 100% point ($R_{100}$ Ω)
Example— Resistance of Potentiometer $R_T$ = 500 Ω, $R_0$ = 50 Ω, $R_{100}$ = 450 Ω

(5) Universal input type (Default input type and measuring range: Pt100 (ITS-90), 0 to 100°C)
• Input type:
Select input type from mV DC, thermocouple or RTD.
• When mV DC input is selected:
Measuring range
• When thermocouple input is selected (see table of Measuring Ranges on page 1):
Thermocouple type (Types K to W5)
Measuring range and unit (°C or °F).
• When RTD input is seleccted (see table of Measuring Ranges on page 1):
RTD type (JPt100 to Pt100)
Measuring range and unit (°C or °F).

3. Burnout selection (for universal input type only)
Default:OFF
Select from UP, DOWN or OFF.