

**Model SDBT (Style S)
Distributor**

Contents

Chapter 1 Introduction

| | | |
|-----|--------------------------------|-----|
| 1.1 | Inspection..... | 1-2 |
| 1.2 | Documentation Conventions..... | 1-3 |
| 1.3 | Notice | 1-4 |

Chapter 2 General

| | | |
|-----|-------------------------------|-----|
| 2.1 | Standard Specifications | 2-2 |
| 2.2 | Model and Suffix Codes | 2-3 |

Chapter 3 Installation

| | | |
|-----|----------------------|-----|
| 3.1 | External Wiring..... | 3-2 |
|-----|----------------------|-----|

Chapter 4 Principles of Operation

| | | |
|-----|---|-----|
| 4.1 | Loop Isolation Type (for SDBT-11 Type) | 4-1 |
| 4.2 | Field Isolation Type (for SDBT-21 Type) | 4-2 |

Chapter 5 Setting

| | | |
|-------|--|-----|
| 5.1 | Names of Components | 5-2 |
| 5.2 | Setting Jumper (for SDBT-21 Type)..... | 5-3 |
| 5.2.1 | Check of Setting Jumper and Its Position | 5-3 |
| 5.3 | Setting of Parameters (for SDBT-21 Type) | 5-4 |
| 5.3.1 | Configuration of Parameters | 5-5 |
| 5.3.2 | Description of Parameters..... | 5-5 |
| 5.4 | Parameter List (for SDBT-21 Type)..... | 5-6 |

Chapter 6 Maintenance

| | | |
|-----|-------------------------------------|-----|
| 6.1 | Test Equipment | 6-2 |
| 6.2 | Adjustment (for SDBT-21 Type) | 6-3 |
| 6.3 | List of Replaceable Parts | 6-5 |

Chapter 7 Troubleshooting

| | | |
|-----|--|-----|
| 7.1 | Action in Fault Condition (for SDBT-21 Type) | 7-2 |
|-----|--|-----|

Chapter 8 Power Supply Terminal Connections (Options /TB, /A2TB, and /REK)

| | | |
|-----|---|-----|
| 8.1 | External View and Names of Components | 8-2 |
| 8.2 | Power Supply and Ground Wiring..... | 8-3 |

General Specifications

1

2

3

4

5

6

7

8

Blank

Introduction

This manual describes the functions and operations of the SDBT Distributor.

• Intended Readers

This manual is intended for personnel in charge:

- Installation and wiring
- Instrumentation and setup of the function
- Operation and monitoring of the controller
- Maintenance of equipment

• Related Documents

The following documents all relate to the SDBT Distributor. Read them as necessary.

| Manual Title | Manual No. | Description |
|--|------------------|--|
| Rack-Mounted Instruments | IM 1B4F2-01E | Describes mounting and wiring for the YS80 rack-mounted instruments. |
| Model VJ77 PC-based Parameters Setting Tool | IM 77J01J77-01E | Describes operation for the VJ77 parameters setting tool.. |
| Model JHT200 Handy Terminal | IM 77J50H01-01EN | Describes operation of JHT200. |

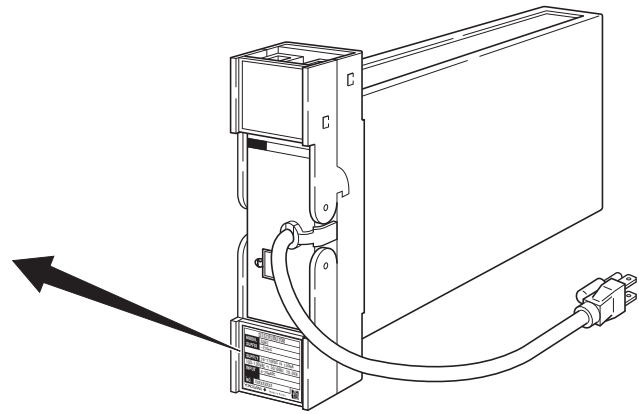
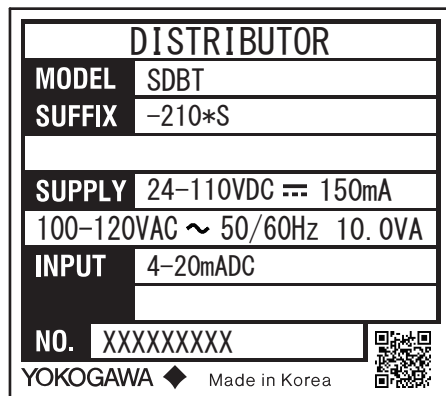
1.1 Inspection

The SDBT distributor is shipped only after stringent inspection at the factory. Visually inspect the product upon delivery to make sure it is not damaged in any way.

Store the box and inner packing material of the package in a safe place - they may be needed if there is a problem with the product and it needs to be sent back for repair.

Check of Model and Suffix Codes

The model and suffix codes are indicated on the Name plate attached to the front cover of the instrument. Crosscheck this information with the model and suffix codes of Section 2.2 to ensure that the product is as specified in the order.



F0101.ai

Figure 1-1 Name plate for Thermocouple Input (Description example)

Confirmation of the Package Contents

Check the package contents against the list below. If anything is missing or damaged, immediately contact the sales office from which you purchased the product or your nearest Yokogawa representative.

- SDBT Distributor.....1
- Precautions on the Use of the YS80 Series1

Downloadable Electronic Manuals

You can download the latest manuals from the following website:

To view the User's Manuals, use Adobe Acrobat Reader of Adobe Systems Incorporated.



<http://www.yokogawa.com/ns/ys/>

1.2 Documentation Conventions

This manual uses the following notational conventions.

Symbols

The following symbols are used in this manual.

| Markings | |
|---|---|
|  WARNING | Indicates that operating the hardware or software in a particular manner may damage it or result in a system failure. |
|  CAUTION | Draws attention to information that is essential for understanding the operation and/or features of the product. |
| <i>Note</i> | Gives additional information to complement the present topic and/or describe terms specific to this document. |
| ► | Gives reference locations for further information on the topic. |

Description of Displays

Some of the representations of product displays shown in this manual may be exaggerated, simplified, or partially omitted for reasons of convenience when explaining them.

QR Code

The product has a QR Code pasted for efficient plant maintenance work and asset information management. It enables confirming the specifications of purchased products and user's manuals.

For more details, please refer to the following URL.

<https://www.yokogawa.com/qr-code>

QR Code is a registered trademark of DENSO WAVE INCORPORATED.






1.3 Notice

This Instruction Manual

- This manual should be passed on to the end user. Keep at least one extra copy of the manual in a safe place.
- Read this manual carefully to gain a thorough understanding of how to operate this product before you start using it.
- This manual is intended to describe the functions of this product. Yokogawa Electric Corporation (hereinafter simply referred to as Yokogawa) does not guarantee that these functions are suited to the particular purpose of the user.
- Under absolutely no circumstances may the contents of this manual, in part or in whole, be transcribed or copied without permission.
- The contents of this manual are subject to change without prior notice.
- Every effort has been made to ensure accuracy in the preparation of this manual. Should any errors or omissions come to your attention however, please contact your nearest Yokogawa representative or sales office.

Protection, Safety, and Prohibition against Unauthorized Modification

- The following safety symbols are used on the product and in this manual.

| Markings | |
|---|--|
|  | If this symbol is indicated on the product, the operator should refer to the explanation given in the instruction manual in order to avoid personal injury or death to either themselves or other personnel, and/or damage to the instrument. The manual describes that the operator should exercise special care to avoid shock or other dangers that may result in injury or loss of life. |
|  | Protective ground terminal: This symbol indicates that the terminal must be connected to ground prior to operating the equipment. |
|  | Function ground terminal: This symbol indicates that the terminal must be connected to ground prior to operating the equipment. |
|  | AC voltage: This symbol indicates that AC voltage is present. |
|  | DC voltage: This symbol indicates that DC voltage is present. |

- In order to protect the product and the system controlled by it against damage and ensure its safe use, make certain that all of the instructions and precautions relating to safety contained in this document are strictly adhered to. Yokogawa does not guarantee safety if products are not handled according to these instructions.
- If protection/safety circuits are to be used for the product or the system controlled by it, they should be externally installed on the product.
- Do not turn off the power of the product during adjustment and parameter setting.
- When you replace the parts or consumables of the product, only use those specified by Yokogawa.
- If the product is to be used in systems with special requirements for human safety, such as nuclear power and radiation related equipment, railway facilities, aircraft facilities, and medical devices, please consult with your sales representative.
- Do not modify the product.

Force Majeure

- Yokogawa does not make any warranties regarding the product except those mentioned in the WARRANTY that is provided separately.
- Yokogawa assumes no liability to any party for any loss or damage, direct or indirect, caused by the use or any unpredictable defect of the product.

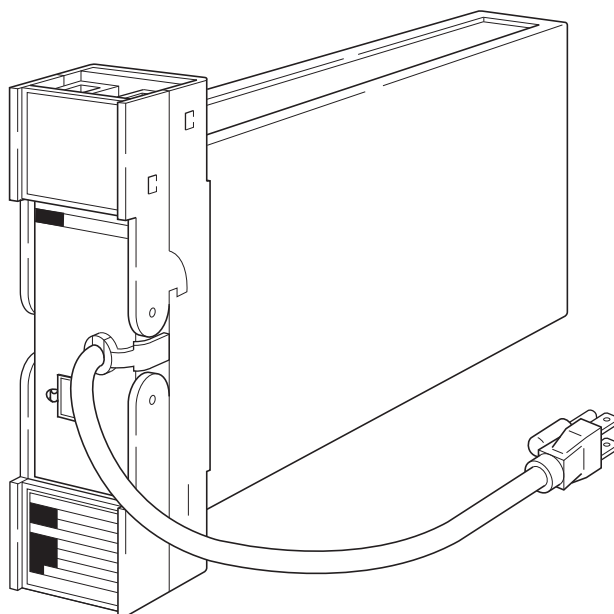
General

The SDBT distributor is designed to supply operating power to two-wire type transmitter and convert 4 to 20 mA DC current signals from this transmitter into output signals.

The SDBT distributor has Loop isolation type (SDBT-11 type) and Field isolation type (SDBT-21 type). The SDBT-11 prepares two 1 to 5 V DC output signals, and SDBT-21 prepares one 4 to 20 mA DC output signal in addition to two 1 to 5 V DC output signals. The SDBT-11 and SDBT-21 have built-in current limiters allowing normal operation even when a short-circuit occurs on the transmitter side.

With the VJ77 Parameter Setting Tool you can do the following:

- Read/write all parameters at once
 - Save read parameters to a file
 - Copy parameters to other devices
- For SDBT-21x with style code R or S.



F0201.ai

Figure 2-1 External View

2.1 Standard Specifications

Please see the General Specifications (GS 01B04T01-02E) at the end of this manual.

2.2 Model and Suffix Codes

| Model | Suffix Codes | Option Codes | Description |
|--|--------------|--|--|
| SDBT | | | Distributor |
| Isolation | -11 -21 | | Loop isolation only Field (plus loop) isolation |
| Square Root Function | 0 1 | | Not provided Provided (for SDBT-21) |
| Style Code | *S | | Style S |
| Option Codes ^(*1) ^(*2) | | /NHR /FBP /LOCK /WSW /REK /TB /A2TB /A2ER | Without rack case Power supply fuse bypass Power supply plug with lock With spring washer Mount to same line with EK series rack With power supply terminal 220V version with power supply terminal 220V version with power supply plug |

*1: /LOCK, /REK, /TB, /A2TB, and /A2ER cannot be specified together.

*2: /FBP, /A2TB, and /A2ER cannot be specified together.

Blank

Installation

For details of the installation procedure and wiring precautions, refer to the instruction manual “Installation of Rack-Mounted Instruments” (IM 1B4F2-01E).

3.1 External Wiring

- To prepare cables for connection to each terminal, install crimp-on solderless lugs for 4 mm screw on the end of each cable.
- Draw the internal unit out from the rack case.
- Connect the cables to the correct terminals referring to Table 3-1.
- Replace the internal unit into the rack case after completing the wiring.
- Always replace the terminal cover after completing the wiring.



The terminal cover cannot be replaced if the internal unit is not installed in the rack case. The terminal cover should be securely replaced because it has the function of locking the internal unit.

Terminal arrangement

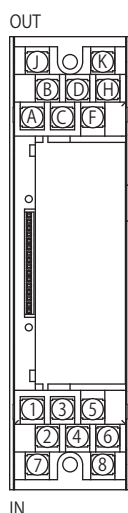


Figure 3-1 Terminal Layout

Table 3-1 Terminal Wiring

| Terminal Designation | Description |
|----------------------|--------------------------------|
| A | + > Output1(1 to 5 V DC) |
| B | - > Output1(1 to 5 V DC) |
| C | + > Output3(4 to 20 mA DC)(*1) |
| D | - > Output3(4 to 20 mA DC)(*1) |
| F | + > Output2(1 to 5 V DC) |
| H | - > Output2(1 to 5 V DC) |
| J | |
| K | |

Do not connect to the output terminal when the terminal is not in use.
Note1: For SDBT-21 type only.

| Terminal Designation | Description |
|----------------------|------------------------|
| 1 | + > Transmitter(Input) |
| 2 | - > Transmitter(Input) |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | COM(*2) |
| 8 | |

Note2: Common for connection of intrinsic safety barrier.

Applicable Cables

(1) Signal circuit wiring

- Cross-sectional area of the cable conductor: 0.5 to 0.75 mm²
- Examples of applicable cables: Single core PVC insulated flexible cable (VSF) stranded wires (JIS C 3306); heat-resistant vinyl-insulated cable (UL style 1007)

(2) Power supply wiring

- Cross-sectional area of the cable conductor: 1.25 to 2.00 mm²
- Examples of applicable cables: 600 V PVC insulated cable (1 V) stranded wires (JIS C 3307);PVC insulated cable for electrical apparatus (KIV) stranded wires (JIS C 3316)

4.1 Loop Isolation Type (for SDBT-11 Type)

The SDBT-11 supplies 25.0 to 25.5 V DC to two-wire transmitter through a current limiter, and receives 4 to 20 mA DC current signals. The current signals are converted into 1 to 5 V DC signals, then are output through output amplifier.

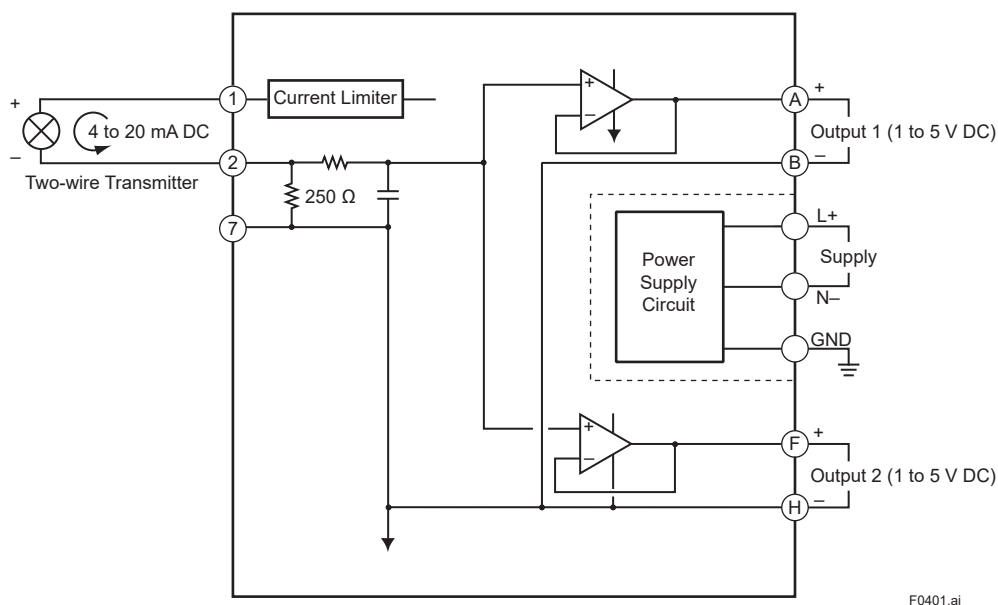
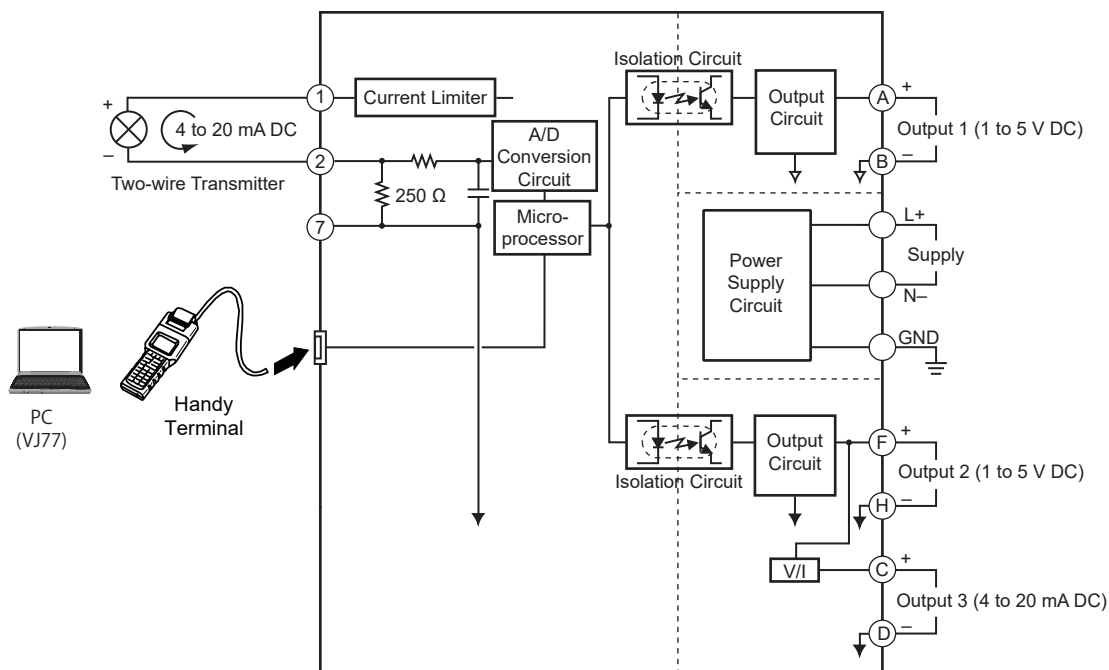


Figure 4-1 Functional Block Diagram for Loop Isolation Type

F0401.ai

4.2 Field Isolation Type (for SDBT-21 Type)

The SDBT-21 supplies 25.0 to 25.5 V DC to two-wire transmitter through a current limiter, and receives 4 to 20 mA DC current signals. The current signals are converted into 1 to 5 V DC signals, then are converted into digital data in A/D conversion circuit. The digital data has signal processing (square root characteristic etc.) in microprocessor to be Pulse Width Modulation (PWM), then is converted into 1 to 5 V DC or 4 to 20 mA DC signals in output circuit through optical-isolation circuit.



F0402.ai

Figure 4-2 Functional Block Diagram for Field Isolation Type

Setting

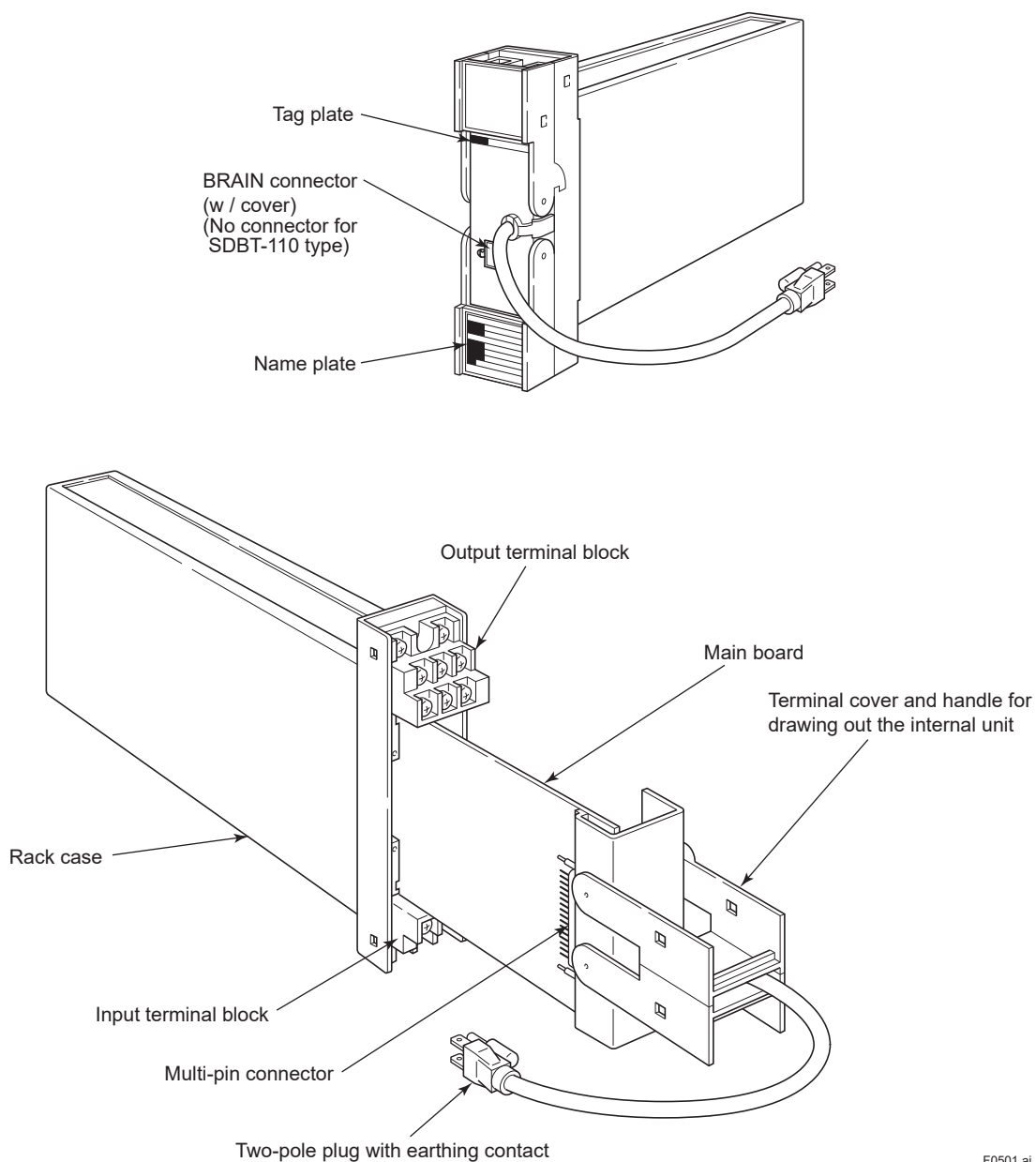
■ Items to Confirm before Start of Operation

Before you start operation, inspect and confirm the following items:

- (1) Draw out the internal unit from the rack case, and make sure that the specified fuses are properly mounted in the fuse holders at the rear of the internal unit.
- (2) When inserting the internal unit into the rack case, firmly connect the multi-pin connectors for connecting the internal unit and the case.
- (3) Make sure that power plugs are properly connected to the power outlet.
- (4) Make sure that external wiring to the terminal block is properly connected.

The SDBT distributor is made ready for operation by simply turning on the power once the installation and wiring are completed. The distributor does not require parameter settings and the like if there is no change in the specifications at order.

5.1 Names of Components



F0501.ai

Figure 5-1 Names of Components

5.2 Setting Jumper (for SDBT-21 Type)

This instrument has the following setting jumper:

- Parameter Write Protect (JP2): ON/OFF

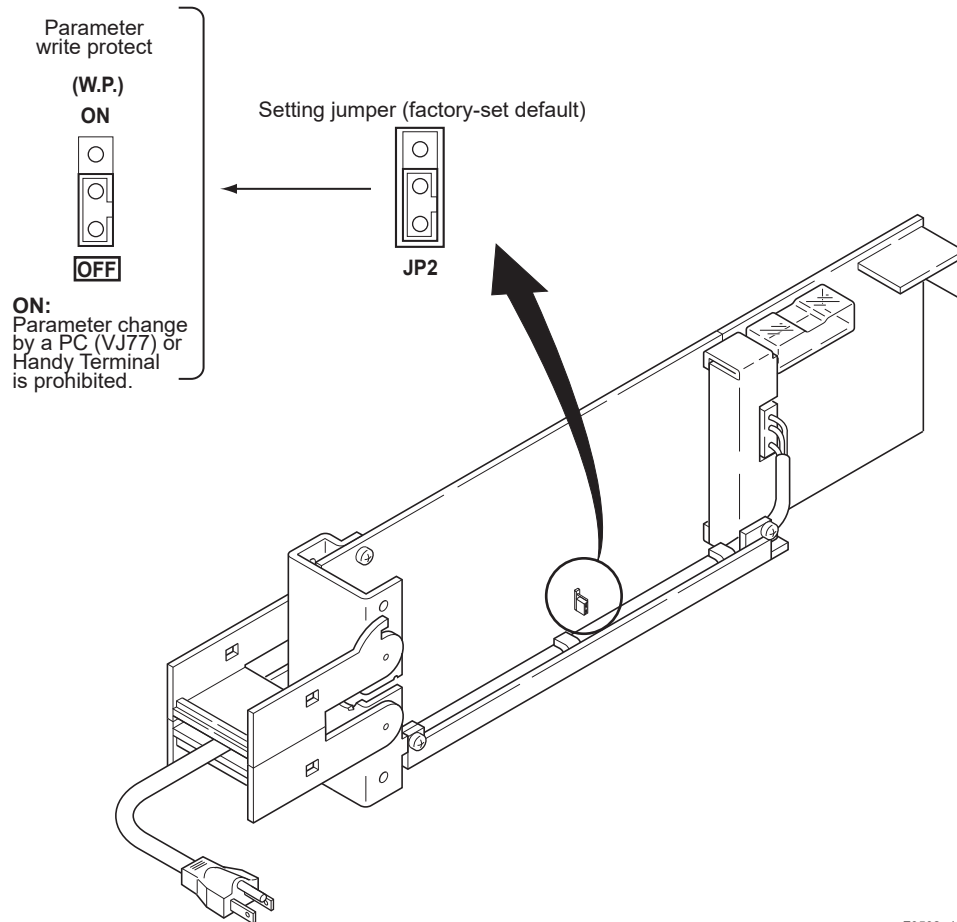
5.2.1 Check of Setting Jumper and Its Position

Setting jumper is on the main board of the internal unit.

Check the setting jumper in the following procedure.

- Pull forward the terminal cover, and draw the internal unit out from the rack case.
- Check that the jumper on the main board of the internal unit is set to obtain the desired action.
- Use the tweezers to change the position of jumper.
- Put the internal unit back into the rack case.
- Replace the terminal cover.

Position and function of setting jumper



F0502.ai

Figure 5-2 Function and Set Point of Jumper



Operation is not guaranteed if the jumper is not set.

5.3 Setting of Parameters (for SDBT-21 Type)

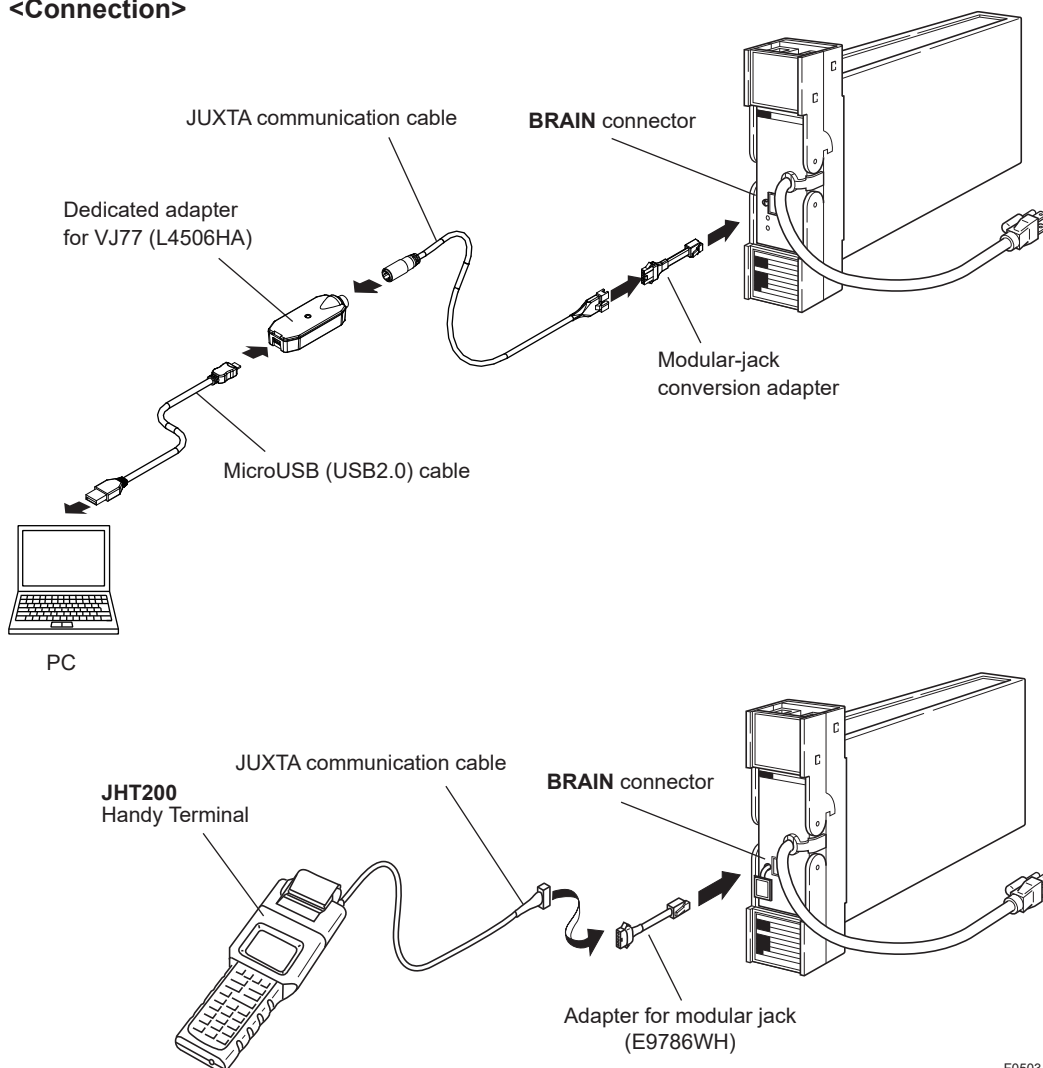
This instrument has BRAIN communication parameters for specifying functions and adjusting input. Connect a PC (VJ77) or the JHT200 Handy Terminal (Note1) to the instrument to display or set parameters.

Note 1: BT200 BRAIN Terminal of Yokogawa Electric Corporation can also be used.
When connecting a PC (VJ77) or 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 modularjack (model E9786WH) are required.



- For details of operation and adjusting procedures of VJ77 Parameters Setting Tool, refer to the instruction manual “Model VJ77 PC-based Parameters Setting Tool” (IM 77J01J77-01E).
- For details of operation and adjusting procedures of JHT200 Handy Terminal, refer to the instruction manual “JHT200 Handy Terminal” (IM 77J50H01-01EN).

<Connection>



F0503.ai

Figure 5-3 Connection

5.3.1 Configuration of Parameters

BRAIN communication parameters consist of the following parameters.

- Display (A & B parameters)
- Settings of Input and output (D parameters)
- Adjustment (P parameters)
- Test (Q parameters)

5.3.2 Description of Parameters

The description of main parameters is as follows.

- Input/output-related parameters

(1) D21: LINEARIZE1 (for SDBT-211 Type)

Sets the available/unavailable of square-root characteristic.

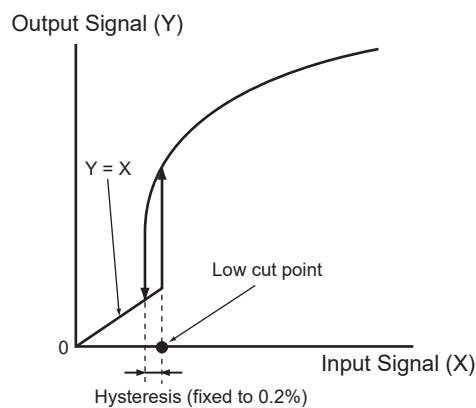
(2) D23: LOW CUT1 (for SDBT-211 Type)

Sets the low cut point.

The input signal and output signal are shown in the figure below.

If there are square roots, perform square root calculation. You can set a low cut point (LOW CUT1) for square root calculations. The operation in the vicinity of the low cut point is shown in the figure below.

A 0.2% hysteresis is used for the low cut point.



(3) D33: OUT1 DR and D34: OUT2 DR

Sets the action direction for output 1 and output 2.

If you set REVERSE, outputs 5 V (or 20 mA) for 0% and 1 V (or 4 mA) for 100%.

- Adjustment-related parameters

(1) P03: ZERO ADJ1

Performs Zero adjustment of input.

(2) P04: SPAN ADJ1

Performs Span adjustment of input.

(3) P13: OUT1 0% (Note1)

Adjusts 0% of output 1.

(4) P14: OUT1 100% (Note1)

Adjusts 100% of output 1.

(5) P15: OUT2 0% (Note1)

Adjusts 0% of output 2.

(6) P16: OUT2 100% (Note1)

Adjusts 100% of output 2.

- Test-related parameters

(1) Q02: OUT1 TEST (Note1)

Outputs the set value forcibly regardless of input condition.

Q03 has the same function.

Note1: After completing adjustment and test, press the [F4] (OK) key of the Handy Terminal to return to normal condition (release of forced output).

5.4 Parameter List (for SDBT-21 Type)

BRAIN communication parameters for SDBT-21 type are as follows.

| No. | Symbol | Parameter Name | Setting Range | Unit | Factory-set Value | Setting Type |
|-------------------------|-------------|-------------------------|---------------------|-------|-------------------|--------------|
| 01 | MODEL | Model Name | | — | | Display |
| 02 | TAG NO | Tag Number | | — | | Display |
| 03 | SELF CHK | Self Check | GOOD/ERROR | — | | Display |
| <Display Parameters> | | | | | | |
| A | DISPLAY1 | Menu Name | | | | |
| A01 | INPUT1 | Input Display | | mA | | Display |
| A09 | OUTPUT1 | Output1 Display | | % | | Display |
| A10 | OUTPUT2 | Output2 Display | | % | | Display |
| A54 | STATUS | Status Display (Note1) | 0000 to FFFF | — | | Display |
| A55 | WRT PROTECT | Parameter Write Protect | ON/OFF | — | OFF | Display |
| A56 | REV NO. | Revision number | | — | | Display |
| A58 | MENU REV | Menu Revision number | | — | | Display |
| A60 | SELF CHK | Self Check | GOOD/ERROR | — | | Display |
| | | | | | | |
| B | DISPLAY2 | Menu Name | | | | |
| B01 | INPUT1 | Input Display | | mA | | Display |
| B09 | OUTPUT1 | Output1 Display | | % | | Display |
| B10 | OUTPUT2 | Output2 Display | | % | | Display |
| B60 | SELF CHK | Self Check | GOOD/ERROR | — | | Display |
| <Setting Parameters> | | | | | | |
| D | SET(I/O) | Menu Name | | | | |
| D01 | TAG NO.1 | Tag Number1 | Up to 8-single-byte | — | | Alphanumeric |
| D02 | TAG NO.2 | Tag Number2 | Up to 8-single-byte | — | | Alphanumeric |
| D03 | COMMENT1 | Comment1 | Up to 8-single-byte | — | | Alphanumeric |
| D04 | COMMENT2 | Comment2 | Up to 8-single-byte | — | | Alphanumeric |
| D21 | LINEARIZE1 | Linearize (Note2) | OFF/SQR | — | SQR | Selection |
| D22 | LOW CUT1 | Low Cut (Note2) | 0.3 to 100.0 | % | 1.0 | Real Number |
| D33 | OUT1 DR | Output1 Direction | DIRECT/REVERSE | — | DIRECT | Selection |
| D34 | OUT2 DR | Output2 Direction | DIRECT/REVERSE | — | DIRECT | Selection |
| D60 | SELF CHK | Self Check | GOOD/ERROR | — | | Display |
| <Adjustment Parameters> | | | | | | |
| P | ADJUST | Menu Name | | | | |
| P03 | ZERO ADJ1 | Zero Adjustment | | Note3 | | Selection |
| P04 | SPAN ADJ1 | Span Adjustment | | Note3 | | Selection |
| P13 | OUT1 0% | Output1 0% | -20.00 to 20.00 | % | 0.00 | Real Number |
| P14 | OUT1 100% | Output1 100% | -20.00 to 20.00 | % | 0.00 | Real Number |
| P15 | OUT2 0% | Output2 0% | -20.00 to 20.00 | % | 0.00 | Real Number |
| P16 | OUT2 100% | Output2 100% | -20.00 to 20.00 | % | 0.00 | Real Number |
| P60 | SELF CHK | Self Check | GOOD/ERROR | — | | Display |
| <Test Parameters> | | | | | | |
| Q | TEST | Menu Name | | | | |
| Q02 | OUT1 TEST | Output1 Test | -25.0 to 125.0 | % | 0.0 | Real Number |
| Q03 | OUT2 TEST | Output2 Test | -25.0 to 125.0 | % | 0.0 | Real Number |
| Q60 | SELF CHK | Self Check | GOOD/ERROR | — | | Display |

Note 1: The condition of the instrument is displayed.

Note 2: Not displayed for SDBT-210 type.

Note 3: mA RST/mA INC/mA HINC/mA HDEC/mA DEC

Maintenance

This chapter describes the calibration procedures that can be done in the instrument room or service shop.

6.1 Test Equipment

For efficient maintenance of this distributor, it is recommended that the user have the following test equipment manufactured by Yokogawa or their equivalent.

- DC Voltage/Current Standard, Yokogawa GS200 or the equivalent. 1 set
- Digital Voltmeter, Yokogawa DM7560 or the equivalent 1 set
- Precision Resistor ($250\Omega \pm 0.05\%$ for current check)..... 1 unit
- PC, VJ77 Parameters Setting Tool 1 set
- Handy Terminal, JHT200 (BT200) 1 set
- Modular jack conversion adapter, Part No. E9786WH 1 set

6.2 Adjustment (for SDBT-21 Type)



- For details of operation and adjusting procedures of VJ77 Parameters Setting Tool, refer to the instruction manual “Model VJ77 PC-based Parameters Setting Tool” (IM 77J01J77-01E).
- For details of operation and adjusting procedures of JHT200 Handy Terminal, refer to the instruction manual “JHT200 Handy Terminal” (IM 77J50H01-01EN).
- Do not turn off the power of the instrument during adjustment.

Use a PC (VJ77) or the JHT200 Handy Terminal for adjustment.
The procedure is shown below using the JHT200 Handy Terminal as an example.

Adjust SDBT-21 type using JHT200 Handy Terminal.

- (a) Connect the equipment as illustrated in Figure 6-1.
- (b) Set the Parameter Write Protect (W.P.) of setting jumper to OFF. (Refer to “5.2 Setting Jumper”.)
- (c) Turn on the power, and allow the equipment to warm up for about 5 minutes under this condition.
- (d) Connect JHT200 Handy Terminal.

<Connection>

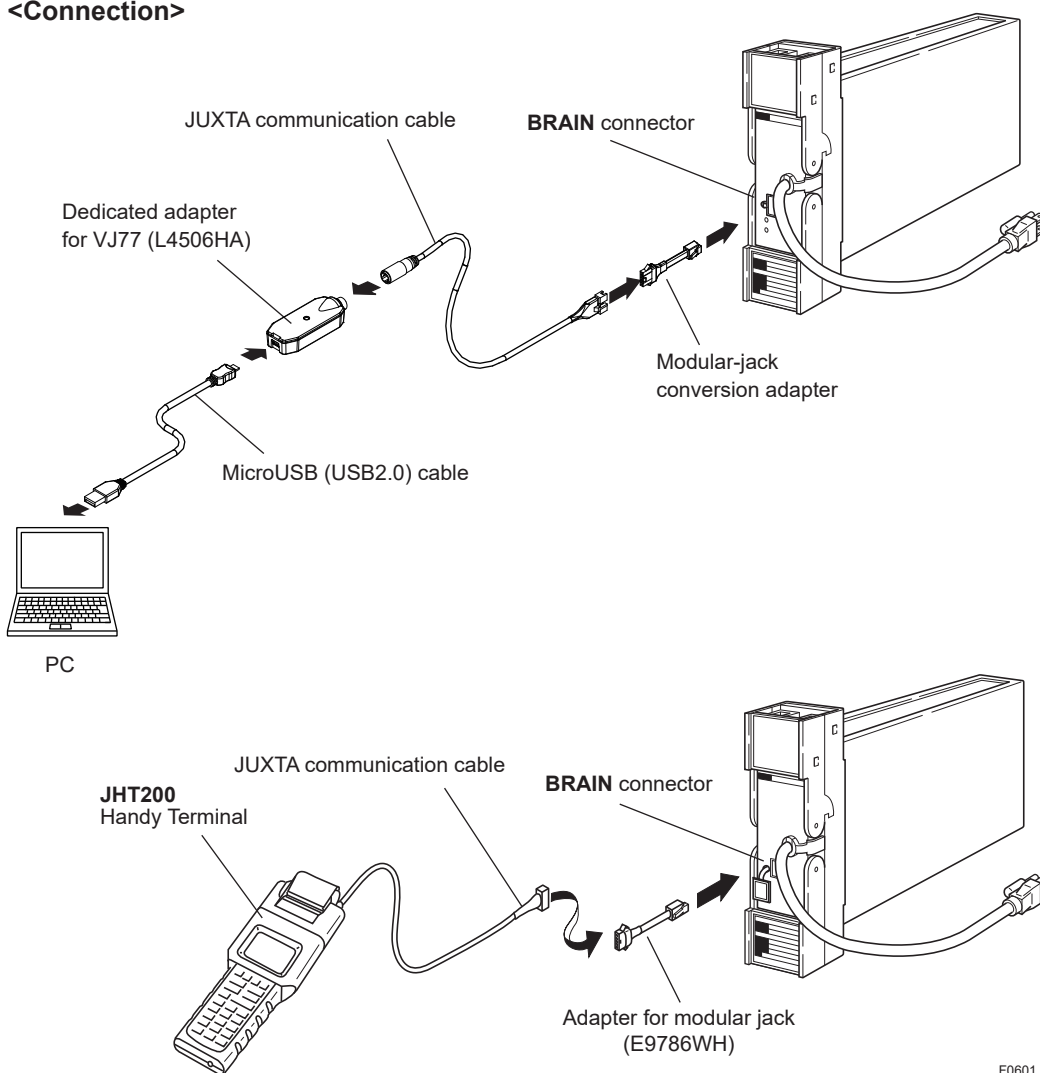


Figure 6-1 Connection

F0601.ai

6.2 Adjustment (for SDBT-21 Type)

- (e) Call the adjustment item (P: ADJUST) .
- (f) P03: ZERO ADJ1 is displayed.
- (g) Apply an input equivalent to 0% of the input range. Check the input value and the input display of P03: ZERO ADJ1. If the input value does not correspond to the display value, select P03: ZERO ADJ1 to enter the adjustment mode. Mainly select INC (addition) or DEC (subtraction) for adjustment. (Selecting RST resets the adjusted value and retrieves the factory-set default.) Selecting HINC or HDEC performs adjustment using a value ten times as large as INC or DEC.
- (h) Apply an input equivalent to 100% of the input range. Check the input value and the input display of P04: SPAN ADJ1. If the input value does not correspond to the display value, select P04: SPAN ADJ1 to enter the adjustment mode. Mainly select INC (addition) or DEC (subtraction) for adjustment. (Selecting RST resets the adjusted value and retrieves the factory-set default.) Selecting HINC or HDEC performs adjustment using a value ten times as large as INC or DEC.
- (i) After completing the adjustment, set the parameter write protect (W.P.) of setting jumper to ON. (Refer to “5.2 Setting Jumper”.)

Table 6-1 Input/Output Characteristic Table

| % | Input | Output | |
|-----|-------|-------------------------------------|----------------------------------|
| | | Without square root characterisitic | With square root characterisitic |
| 0 | 4 mA | $1 \pm 0.008 \text{ V}$ | $1.000 \pm 0.02 \text{ V}$ |
| 25 | 8 mA | $2 \pm 0.008 \text{ V}$ | $3.000 \pm 0.02 \text{ V}$ |
| 50 | 12 mA | $3 \pm 0.008 \text{ V}$ | $3.828 \pm 0.02 \text{ V}$ |
| 75 | 16 mA | $4 \pm 0.008 \text{ V}$ | $4.464 \pm 0.02 \text{ V}$ |
| 100 | 20 mA | $5 \pm 0.008 \text{ V}$ | $5.000 \pm 0.02 \text{ V}$ |

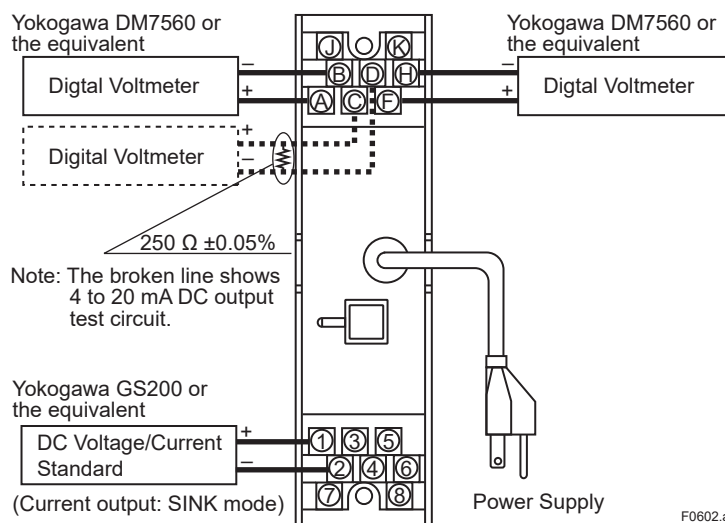


Figure 6-2 Adjustment

6.3 List of Replaceable Parts



Contact YOKOGAWA's sales office or sales representative when replacing the spare parts.

| Part Name | Part Number | Recommended replacement period | Reference |
|-------------------|--|--------------------------------|--|
| Fuse | S9510VK | Approx. 3 years | If the fuse breaks or if the replacement period elapses, please have the item replaced. |
| Power supply unit | For SDBT-11x L3510YB: Standard L3510YG: Option codes /TB, /FBP, or /REK L3510YU: Option code /A2TB L3510YS: Option code /A2ER For SDBT-21x L3510YA: Standard L3510YF: Option codes /TB, /FBP, or /REK L3510YT: Option code /A2TB L3510YR: Option code /A2ER | 5-10 years | As the aluminum electrolytic capacitors used in the power supply unit are subject to deterioration from temperature and other operating conditions, we recommend the replacement period on the left. |

Blank

Troubleshooting

If any fault occurs in the instrument, note the symptoms and follow Section 7.1.

7.1 Action in Fault Condition (for SDBT-21 Type)

The output condition and error codes (BRAIN communication parameters) in fault condition are shown in the table below.



- **STATUS** is displayed in A54 of A: DISPLAY (display), and **SELF CHK** is displayed in 60 of each item.
- **STATUS** error code is to be the addition display (hexadecimal number) when two errors or more occur.

| BRAIN Communication Parameter Display | | | Output Condition | Description of Error | Remedy |
|---------------------------------------|----------|------------------------|---|---|--|
| STATUS | SELF CHK | Error Information (*1) | | | |
| | | | Same state as power off Output: 0% or less Communication: Stopped | Hardware failure Power failure, Fuse broken | Contact YOKOGAWA's sales office or sales representative. |
| 0001 | ERROR | EEPROM ERROR | Output: 0% or less Communication: Undefined | EEPROM error | |
| 0002 | ERROR | EEPROM SUM ERROR | Output: 0% or less Communication: Undefined | Parameter error | |
| 1000 | ERROR | AD ERROR | Output: 0% or less Communication: Normal action | A/D conversion error | |
| 0008 | ERROR | INPUT OVER RANGE | Output: Normal action Communication: Normal action | Excessive input, out of -25 to 125% | Set the input within the range. (*2) |
| 0004 | GOOD | LOW_CUT | Output: Normal action Communication: Normal action | Input below the square root characteristic with low-cut | Apply the input greater than the low-cut point. |
| 0040 | GOOD | None | Output: Normal action Communication: Normal action | Check power failure during operation | Write "0000" at the STATUS display of BRAIN communication parameter. |
| 0000 | GOOD | None | Output: Normal action Communication: Normal action | - | - |

*1: Displayed when calling ■60: **SELF CHK**.

*2: If errors continue even when the input is within the range, the input circuit is broken. Contact YOKOGAWA's sales office or sales representative.

Power Supply Terminal Connections (Options /TB, /A2TB, and /REK)

If you specify the terminal block to which the power source is directly connected (option codes: /TB, /A2TB, and /REK), the external wiring to the terminal block is necessary; therefore, drawing out of the internal unit requires previous turning off of the power source and disconnection of the wiring from the terminal block.

8.1 External View and Names of Components

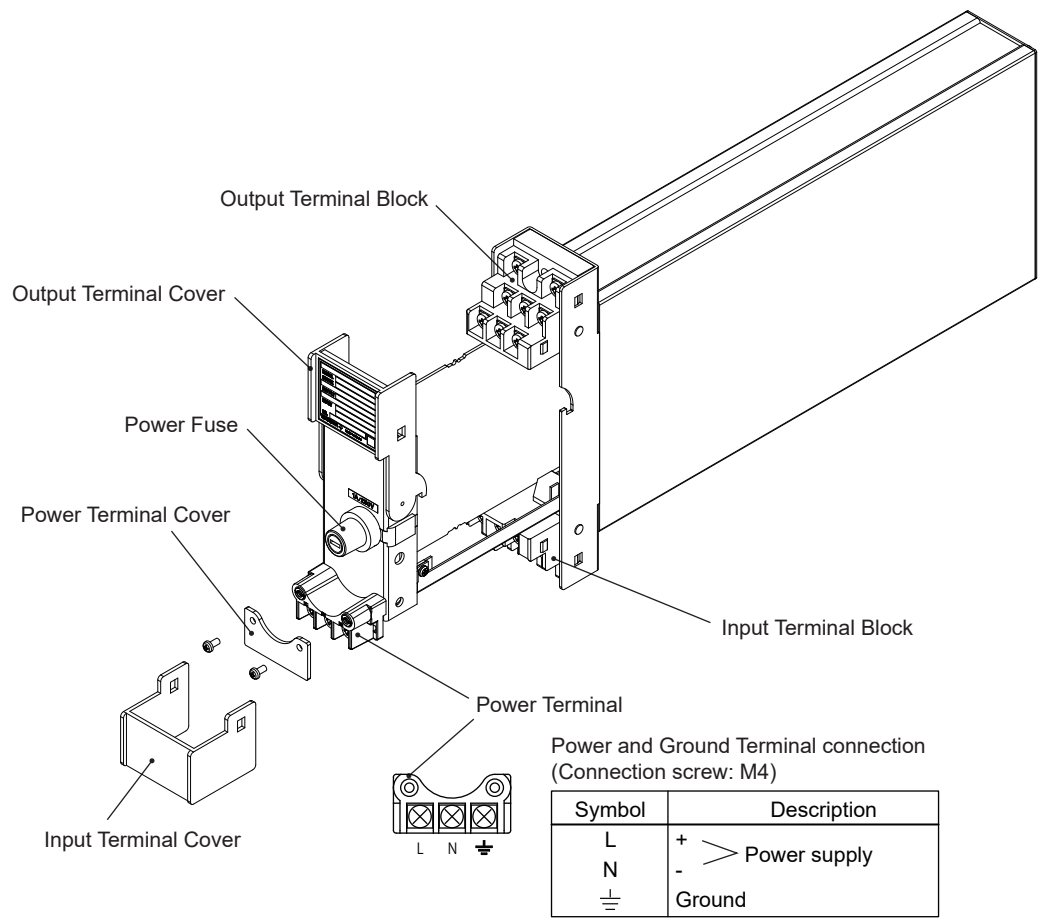


Figure 8-1 External View and Names of Components

8.2 Power Supply and Ground Wiring

- (1) All cable ends must be furnished with crimp-on type solderless lugs (for 4 mm screw).
- (2) Examples of applicable cables:
 - Cross-sectional area of the cable conductor: 2.0 mm². *
 - Applicable cable: 600 V vinyl insulated cable (IV) stranded wires, conforming to JIS C3307.
Vinyle sheathed cables for electric appliances (KIV) stranded wires, conforming to JIS C3316.
- Note *: Power supply cables should be determined from the instrument power consumption-they must have conductors with cross-sectional area of at least 1.25mm².
- (3) Wirings to power supply and ground terminals should be made after completion of signal terminal wirings. (To facilitate connecting input signal, pull the internal unit approximately half way out of the housing. Do not remove the power terminal block.)
- (4) After completing the power supply and ground wiring, mount the power terminal cover.

Blank

General Specifications

Model SDBT(Style S)
Distributor

YEW SERIES 80

GS 01B04T01-02E

■ GENERAL

The Model SDBT Distributor supplies power to a two-wire transmitter and converts the 4 to 20 mA DC transmitter signal current to two 1 to 5 V DC and one 4 to 20 mA DC (for SDBT-21 type only) output signals.

Isolation between input/output and distributor power supply is provided ("loop isolation"); isolation between input and output ("field isolation"); is specification.

Current limiting (to protect against transmitter wiring short circuits) is provided, and a square root characteristic is optional.

With the VJ77 Parameter Setting Tool you can do the following:

- Read/write all parameters at once
 - Save read parameters to a file
 - Copy parameters to other devices
- For SDBT-21x with style code R or S.

■ STANDARD SPECIFICATIONS

Input Signal

Input: Used with 24 V DC, 4 to 20 mA, 2-wire transmitter (one point)

Lead-wire Resistance (between transmitter and distributor):

$$\text{Maximum}(\Omega) = \frac{(20^* - E_T - E_B) V}{0.02 A}$$

Note*: Distributor minimum(no-load) output voltage – Maximum no-load voltage drop.

E_T : Transmitter maximum on-load voltage drop

E_B : Maximum on-load voltage drop of safety barrier.

Square Root Characteristic

Computation: $E_0 = 2\sqrt{E_1 - 1} + 1$

E_0 : Output Signal from computation function, E_1 : Input Signal

Low-cut Function: At E_1 is less than 1 %, the output is proportional to input.

Output Signals

Output: 1 to 5V DC (two points),
4 to 20 mA DC (one point, SDBT-21 type only)

Load Resistance: At least 2k Ω (1 to 5 V DC output),
up to 750 Ω (4 to 20 mA DC output)

Isolation

Loop Isolation Type: Input signal is not isolated from output signals. Input signal and output signals are isolated from distributor power source.

Field Isolation Type: Input signal is isolated from output signals. Input signal and output signals are isolated from distributor power source.



BRAIN Communication Function

Only field isolation type can be used.

Monitoring of input/output value, adjustment of input/output and configuration by a PC (VJ77), JHT200 Handy Terminal* or BT200 BRAIN Terminal*.

- *: When connecting a PC (VJ77) or 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 APPEARANCE

Mounting: Rack mounting.

Wiring

Signal Wiring: ISO M4 size (4mm) screws on terminal block.

Power and Ground Wiring

100 V version: JIS C 8303 two-pin plug with earthing contact (IEC A5-15, UL458)

Cable length: 300 mm

Power supply terminal type (option code /TB)

220 V version: CEE 7 VII (CENELEC standard) plug (option code /A2ER).

Cable length: 300 mm

Power supply terminal type (option code /A2TB)

External Dimensions: 180 (H)× 48 (W)× 300 (D)
Depth behind panel (mm)

Weight: 1.7 kg (including rack-mounting case)

■ STANDARD PERFORMANCE

Accuracy: ± 0.2 % of span (± 0.5 % of span for version with square root characteristic)

Transmitter Supply Voltage(from distributor):
25.0 V DC to 25.5 V DC (provided with a current limiter to keep the current between 25 and 35 mA).

Maximum Power Consumption:

| Model and Suffix Code | 24 V DC | 100 V AC | 220 V AC |
|-----------------------|---------|----------|----------|
| SDBT-11 type | 60 mA | 5.4 VA | 8.4 VA |
| SDBT-21 type | 115 mA | 7.5 VA | 9.0 VA |

■ POWER SUPPLY AND ISOLATION

Power Supply Rated Voltage:

100 V version:

24-110 VDC \approx , -10 % , +10 % , 150 mA

100-120 VAC \sim , -10 % , +10 % , 50/60 Hz, 10.0 VA

220 V version:

135-300 VDC \approx , -10 % , +10 % , 25 mA

200-240 VAC \sim , -10 % , +10 % , 50/60 Hz, 12.0 VA

Power Supply Input Voltage: 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

Insulation Resistance

Between I/O terminals and Ground:

100 M Ω / 500 V DC

Between Power and Ground:

100 M Ω /500 V DC

Dielectric Strength

Between I/O terminals and Ground:

500 V AC for 1 minute

Between Input terminal and Output terminal:

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)

Operating environment: Area free of hydrogen sulfide gas and other corrosive gases and dust and where the device is not exposed to sea breeze or direct sunlight.

Continuous vibration: (at 5 to 9 Hz) Half amplitude of 1.5 mm or less
(at 9 to 150 Hz) 4.9m/s² or less,
1 oct/min for 90 minutes each
in the three axis directions

Impact: 49 m/s² or less, 11 ms, 3 axes, 6 directions, 3 times each

Installation altitude: 2,000 m or less above sea level

Warm-up time: 15 minutes or more after the power is turned on

■ TRANSPORT AND STORAGE CONDITIONS

Temperature: -25 to 70°C

Temperature change rate: 20°C per hour or less

Humidity: 5 to 95%RH (no condensation)

■ OPTIONS

/NHR: Without rack case (internal unit only)

/FBP: Power supply fuse bypass

/LOCK: Power supply plug with lock

/WSW: With spring washer

/REK: Mount to same line with EK series rack

/TB: With power supply terminal

/A2TB: 220V version with power supply terminal

/A2ER: 220V version with power supply plug

■ TERMINAL CONNECTIONS

Terminal arrangement



| Terminal Designation | Description |
|----------------------|--------------------------------|
| A | + > Output1(1 to 5 V DC) |
| B | - > Output1(1 to 5 V DC) |
| C | + > Output3(4 to 20 mA DC)(*1) |
| D | - > Output3(4 to 20 mA DC)(*1) |
| F | + > Output2(1 to 5 V DC) |
| H | - > Output2(1 to 5 V DC) |
| J | |
| K | |

Do not connect to the output terminal when the terminal is not in use.

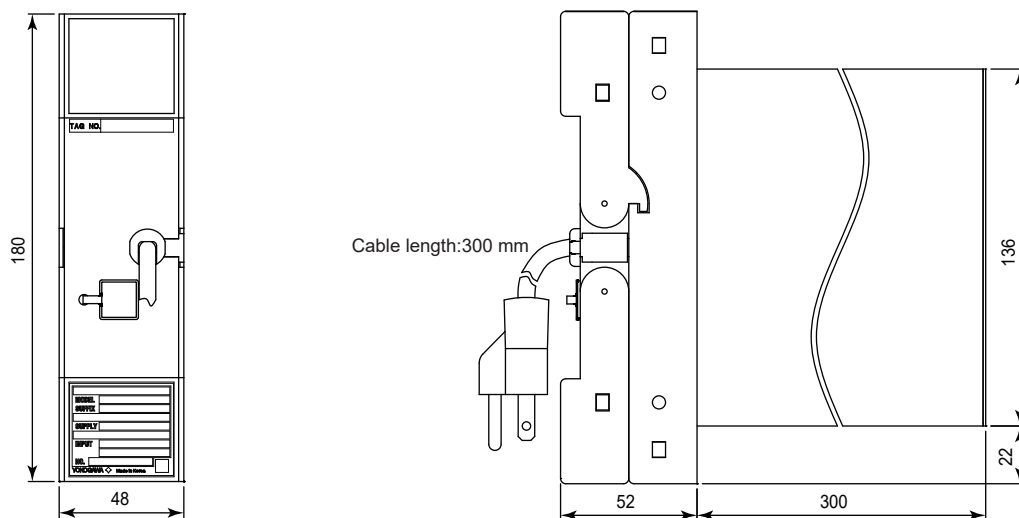
Note1: For SDBT-21 type only.

| Terminal Designation | Description |
|----------------------|------------------------|
| 1 | + > Transmitter(Input) |
| 2 | - > Transmitter(Input) |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | COM(*2) |
| 8 | |

Note2: Common for connection of intrinsic safety barrier.

EXTERNAL DIMENSIONS

Power supply plug type



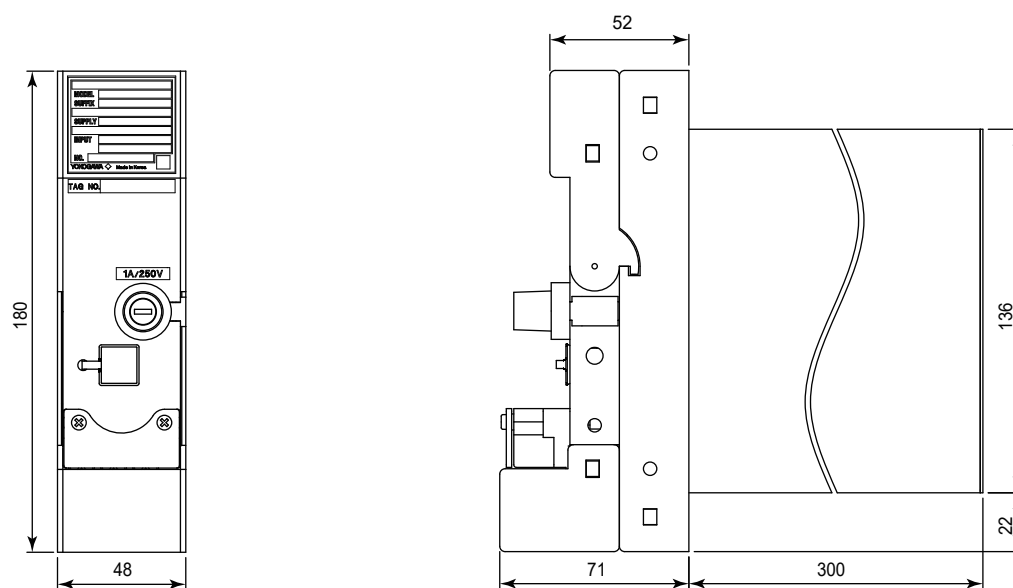
Trigonometry

Unit: mm

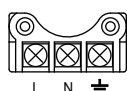
General tolerance = \pm (value of tolerance class IT18 based on JIS B 0401-2016) / 2

F01.ai

Power supply terminal type(option /TB or /A2TB)



Power supply
terminal block



Power and Ground Terminal connection
(Connection screw: M4)

| Symbol | Description |
|---------|------------------|
| L | + > Power supply |
| N | |
| \perp | Ground |

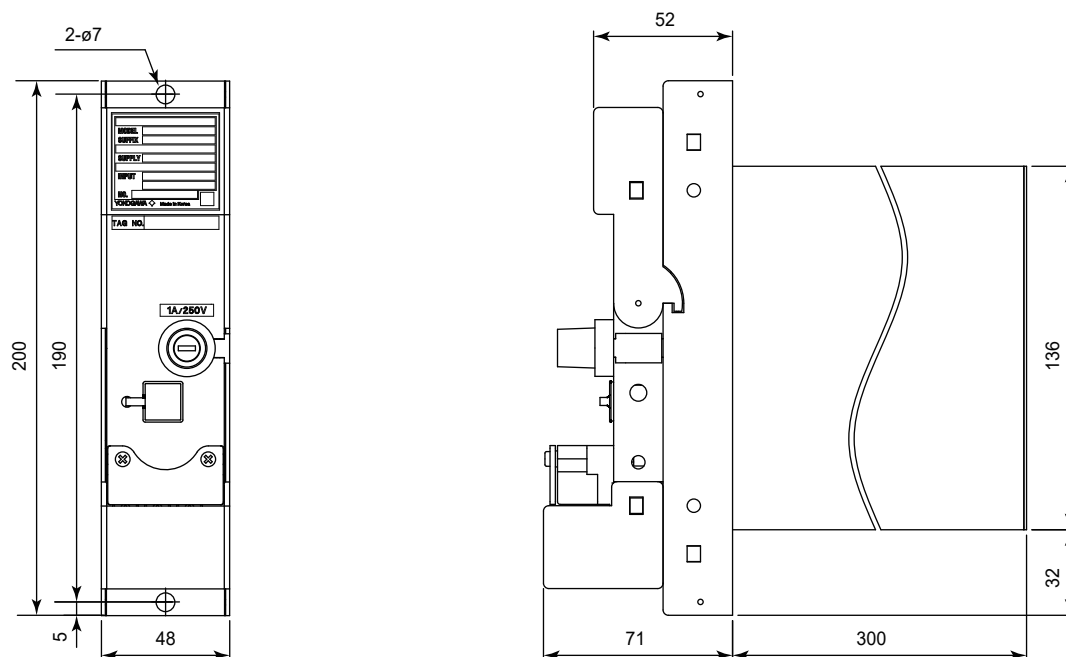
Trigonometry

Unit: mm

General tolerance = \pm (value of tolerance class IT18 based on JIS B 0401-2016) / 2

F02.ai

Power supply terminal type(option /REK)



Power supply
terminal block



Power and Ground Terminal connection
(Connection screw: M4)

| Symbol | Description |
|--------|------------------|
| L | + > Power supply |
| N | |
| ⏏ | |
| ⏏ | Ground |

Trigonometry

Unit: mm

General tolerance = $\pm(\text{value of tolerance class IT18 based on JIS B 0401-2016}) / 2$

F03.ai

■ MODEL AND SUFFIX CODES

| Model | Suffix Codes | Option Codes | Descriptions |
|--|--------------|--|--|
| SDBT | | | Distributor |
| Isolation | -11 -21 | | Loop isolation only Field (plus loop) isolation |
| Square Root Function | 0 1 | | Not provided Provided (for SDBT-21) |
| Style Code | *S | | Style S |
| Option Codes ^(*) ⁽²⁾ | | /NHR /FBP /LOCK /WSW /REK /TB /A2TB /A2ER | Without rack case Power supply fuse bypass Power supply plug with lock With spring washer Mount to same line with EK series rack With power supply terminal 220V version with power supply terminal 220V version with power supply plug |

*1: /LOCK, /REK, /TB, /A2TB, and /A2ER cannot be specified together.

*2: /FBP, /A2TB, and /A2ER cannot be specified together.

■ ORDERING INSTRUCTIONS

Specify the following when ordering:

Model and suffix codes and option codes, if necessary.

Revision Information

- Title : Model SDBT (Style S) Distributor
- Manual No. : IM 01B04T01-02E

12th Edition/May 2004

Change of the company name.

13th Edition/Oct. 2019

Change of the style number.

14th Edition/Jan. 2021

VJ77 parameter setting tool (R3.01 or later) support

| | |
|----------------|--|
| ■ Written by | Yokogawa Electric Corporation |
| ■ Published by | Yokogawa Electric Corporation |
| | 2-9-32 Nakacho, Musashino-shi, Tokyo 180-8750, JAPAN |



YOKOGAWA ELECTRIC CORPORATION

Headquarters

9-32, Nakacho, 2-chome, Musashino-shi, Tokyo, 180-8750 JAPAN
Phone : 81-422-52-5555

Branch Sales Offices

Osaka, Nagoya, Kurashiki, Hiroshima, Fukuoka, Kitakyusyu

YOKOGAWA CORPORATION OF AMERICA

Head Office

12530 West Airport Blvd, Sugar Land, Texas 77478, USA
Phone : 1-281-340-3800 Fax : 1-281-340-3838

Georgia Office

2 Dart Road, Newnan, Georgia 30265, USA
Phone : 1-800-888-6400 Fax : 1-770-254-0928

YOKOGAWA AMERICA DO SUL LTDA.

Praca Acapulco, 31 - Santo Amaro, São Paulo/SP, BRAZIL, CEP-04675-190
Phone : 55-11-5681-2400 Fax : 55-11-5681-4434

YOKOGAWA EUROPE B. V.

Euroweg 2, 3825 HD Amersfoort, THE NETHERLANDS
Phone : 31-88-4641000 Fax : 31-88-4641111

YOKOGAWA ELECTRIC CIS LTD.

Grokholsky per 13 Building 2, 4th Floor 129090, Moscow, RUSSIA
Phone : 7-495-737-7868 Fax : 7-495-737-7869

YOKOGAWA CHINA CO., LTD.

3F Tower D Cartelo Crocodile Building, No.568 West Tianshan Road,
Shanghai 200335, CHINA
Phone : 86-21-62396262 Fax : 86-21-62387866

YOKOGAWA ELECTRIC KOREA CO., LTD.

(Yokogawa B/D, Yangpyeong-dong 4-Ga), 21, Seonyu-ro 45-gil, Yeongdeungpo-gu,
Seoul, 07209, KOREA
Phone : 82-2-2628-6000 Fax : 82-2-2628-6400

YOKOGAWA ENGINEERING ASIA PTE. LTD.

5 Bedok South Road, Singapore 469270, SINGAPORE
Phone : 65-6241-9933 Fax : 65-6241-2606

YOKOGAWA INDIA LTD.

Plot No.96, Electronic City Complex, Hosur Road, Bangalore - 560 100, INDIA
Phone : 91-80-4158-6000 Fax : 91-80-2852-0625

YOKOGAWA AUSTRALIA PTY. LTD.

Tower A, 112-118 Talavera Road, Macquarie Park NSW 2113, AUSTRALIA
Phone : 61-2-8870-1100 Fax : 61-2-8870-1111

YOKOGAWA MIDDLE EAST & AFRICA B.S.C.(C)

P.O. Box 10070, Manama, Building 577, Road 2516, Busaiteen 225, Muharraq,
BAHRAIN
Phone : 973-17-358100 Fax : 973-17-336100