User's
Manual

YEWSERIES 80

Model SDBS (Style R)
Distributor

IM 01B04T02-02E

YOKOGAWA
Yokogawa Electric Corporation

IM 01B04T02-02E
13th Edition

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Model SDBS (Style R)
Distributor

IM 01B04T02-02E 13th Edition

CONTENTS

1. INTRODUCTION

This manual describes the functions and operations of the SDBS 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 SDBS Distributorter. Read them as necessary. The codes enclosed in parentheses are the document numbers.

- Rack-Mounted Instruments (IM 1B4F2-01E)
  Describes mounting and wiring for the YS80 rack-mounted instruments.

- YEWSERIES 80 Installation Manual (TI 1B4A9-01E)
  Describes the installation conditions of YS80 instruments.

1.1 Inspection

The SDBS 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.

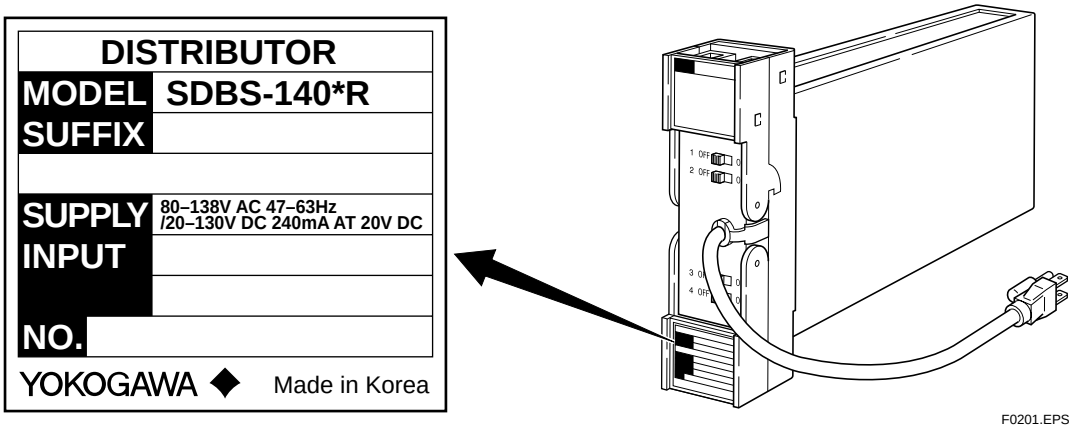

Figure 1-1 Name plate

■ 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.

- SDBS Distributor.....1
- Fuse (Parts No. : S9510VK)..... 1
- Instruction Manual (This manual)..... 1

1.2 Documentation Conventions

This manual uses the following notational conventions.

■ Symbols

The following symbols are used in this manual.

WARNING

Indicates that operating the hardware or software in a particular manner may damage it or result in a system failure.

NOTE

Draws attention to information that is essential for understanding the operation and/or features of the product.

TIP

Gives additional information to complement the present topic and/or describe terms specific to this document.

See Also

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.

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

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

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.

- Do not turn off the power of the product during adjustment.
- Be sure to confirm the parameters referring to “5.4 Parameter List” before installing the product in a system or plant. After confirming them, install the product in a system or plant and turn on the power.
- 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.
- When you replace the parts or consumables of the product, only use those specified by Yokogawa.
- 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.

2. GENERAL

SDBS distributor is both designed to supply operating power to two-wire type transmitters and convert 4 to 20 mA DC current signal from these transmitters into output signals.

SDBS distributor is designed for four inputs and is available in a loop isolation type.

SDBS distributor have built-in current limiters allowing normal operation even when a short-circuit occurs on the transmitter side.

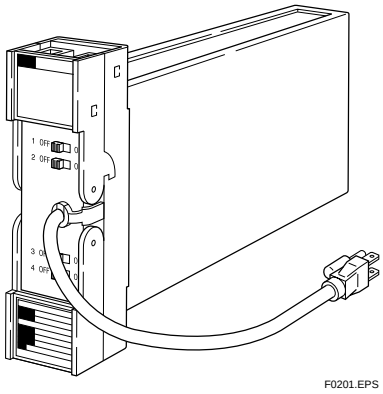

Figure 2-1 External View

2.1 Standard Specifications

Item	Description
Transmitter Used	Operates on 24 V DC, outputs 4 to 20 mA DC signal, 2-wire transmitter.
Number of Unit	4
Output Signal	1 to 5 V DC, resistive load: at least 2k Ω
Leadwire Resistance Between Transmitters	Calculate from the following equation. $\text{Leadwire Resistance } (\Omega) \leqq \frac{(20^{*1} - \text{Transmitter maximum on-load voltage drop}^{*2})\ \text{V}}{0.02\ \text{A}}$ *1 Minimum supply voltage(25 V) — Maximum on-load voltage drop(5 V) *2 UNI Δ, YEWFLO: 12 V DC E10 Series: 15 V DC
Type of Isolation	Loop isolation type • Input not isolated from output. • Input and output isolated from distributor power source. • Loop isolated from other loops.
Accuracy	±0.2% of span
Transmitter Supply	26.5±1.5 V DC
Supply Voltage	Power Supply: AC or DC(No change to instrument) DC Supply(polarity reversible): 20 to 130 V(100 V version), 120 to 340 V(220 V version). AC Supply(47 to 63 Hz): 80 to 138 V(100 V version), 138 to 264 V(220 V version).
Maximum Power Consumption	24 V DC: 210 mA, 100 V AC: 11.6 VA, 220 V AC: 14.6 VA
Ambient Temperature and Humidity	0 to 50°C, 5 to 90% R.H. (non-condensing)
Mounting	Rack mounting
Weight	1.7 kg

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2.2 Model and Suffix Codes

Model	Suffix Codes		Description
SDBS	.....		Distributor
Isolation, Inputs	-14		Loop isolation, four inputs
	0		Always 0
Style Code		*R	Style R
Option		/NHR	Without case
		/A2ER	220 V power supply
		/TB	Power supply terminal
		/FBP	Power supply fuse bypass
		/WSW	With spring washers
		/LOCK	With special lock

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2.3 Accessory

Fuse 1 A: One

NOTE

The fuse (S9510VK) is the dedicated fuse. Do not use it for other products.

3. INSTALLATION

For details of the installation procedure and wiring precautions, refer to the technical information "YEWSERIES 80 Installation Manual " (TI 1B4A9-01E) or the instruction manual "Installation of Rack-Mounted Instruments" (IM 1B4F2-01E).

3.1 External Wiring

(a) To prepare cables for connection to each terminal, install crimp-on solderless lugs for 4 mm screw on the end of each cable.

(b) Draw the internal unit out from the rack case.

(c) Connect the cables to the correct terminals by referring to Table 3-1.

(d) Replace the internal unit into the rack case after completing the wiring.

(e) Always replace the terminal cover after completing the wiring.

NOTE

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.

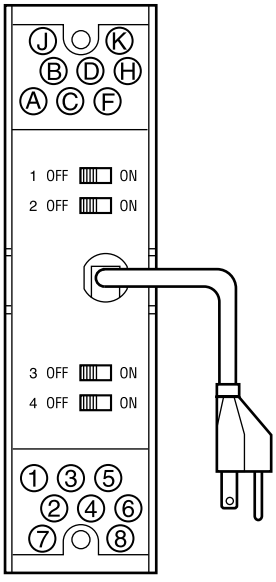

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Figure 3-1 Terminal Layout

Table 3-1 Terminal Connections

Terminal Designation	Description	Terminal Designation	Description
1	+	A	+
2	– To Transmitter 1	B	– Output Signal 1
3	+	C	+
4	– To Transmitter 3	D	– Output Signal 3
5	+	F	+
6	– To Transmitter 2	H	– Output Signal 2
7	+	J	+
8	– To Transmitter 4	K	– Output Signal 4

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3.2 Applicable Cables

(1) Signal circuit wiring

- Cross-sectional area of the cable conductor: 0.5 to 0.75 mm^2
- Examples of applicable cables: Signal core PVC insulated flexible cable (VSF) stranded wires (JIS C 3306); heat-resistant vinyl-insulated cable (UL style 1007)
- Solderless lugs: All cable ends must be furnished with crimp-on solderless lugs for 4 mm screw.

(2) Power supply wiring

- Cross-sectional area of the cable conductor: 1.25 to 2.00 mm^2
- 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)
- Solderless lugs: All cable ends must be furnished with crimp-on solderless lugs for 4 mm screw. The cable used should fulfill the amperage requirement of each instrument, and should also be small in voltage drop.

4. PRINCIPLE OF OPERATION

The SDBS supplies power to a two-wire type transmitter through the current limiter CL and converts a 4 to 20 mA output current signal from the transmitter into a 1 to 5 V DC signal. CL prevents excessibe current if a short-curcuit occurs in the field wiring.

Each of the four isolated loop distributor circuits in SDBS is provided with an ON/OFF switch for the transmitter.

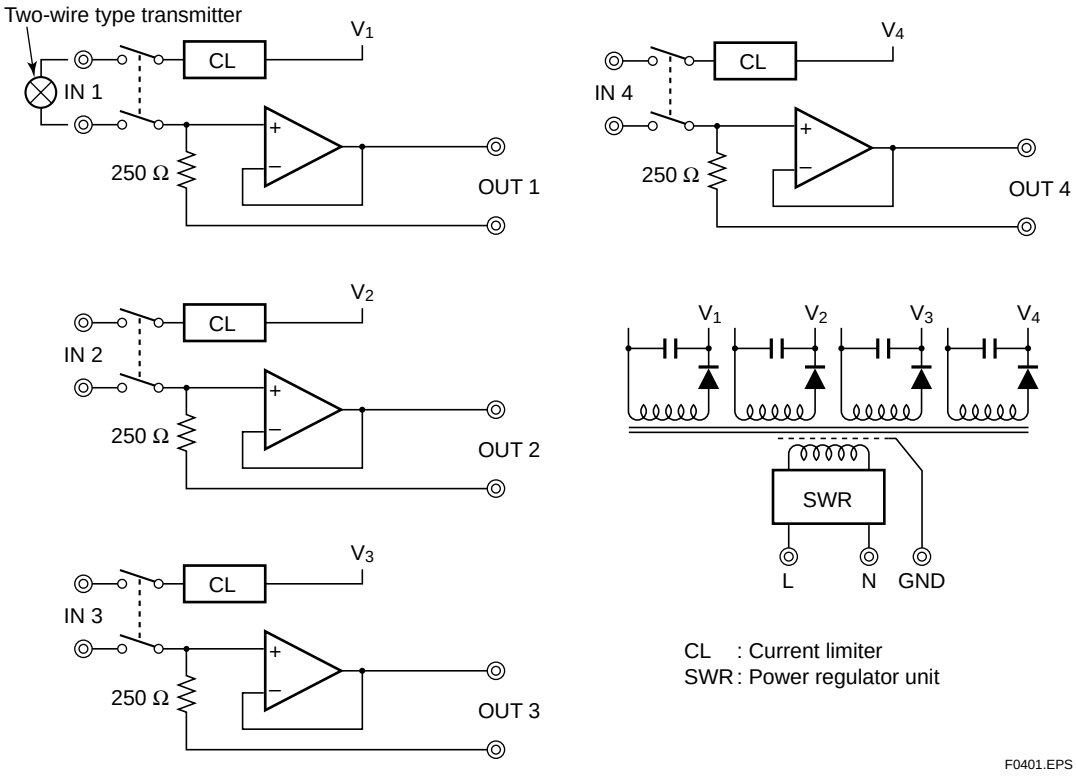

Figure 4-1. Functional Block Diagram

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5. OPERATION

Once the installation and wiring are completed, this distributor can be placed in operation by simply turning on the power switch. This distributor does not require any adjustments, but the inspection and checks described in Section 5-2 should be made before the unit is placed in operation.

5.1 Names of Components

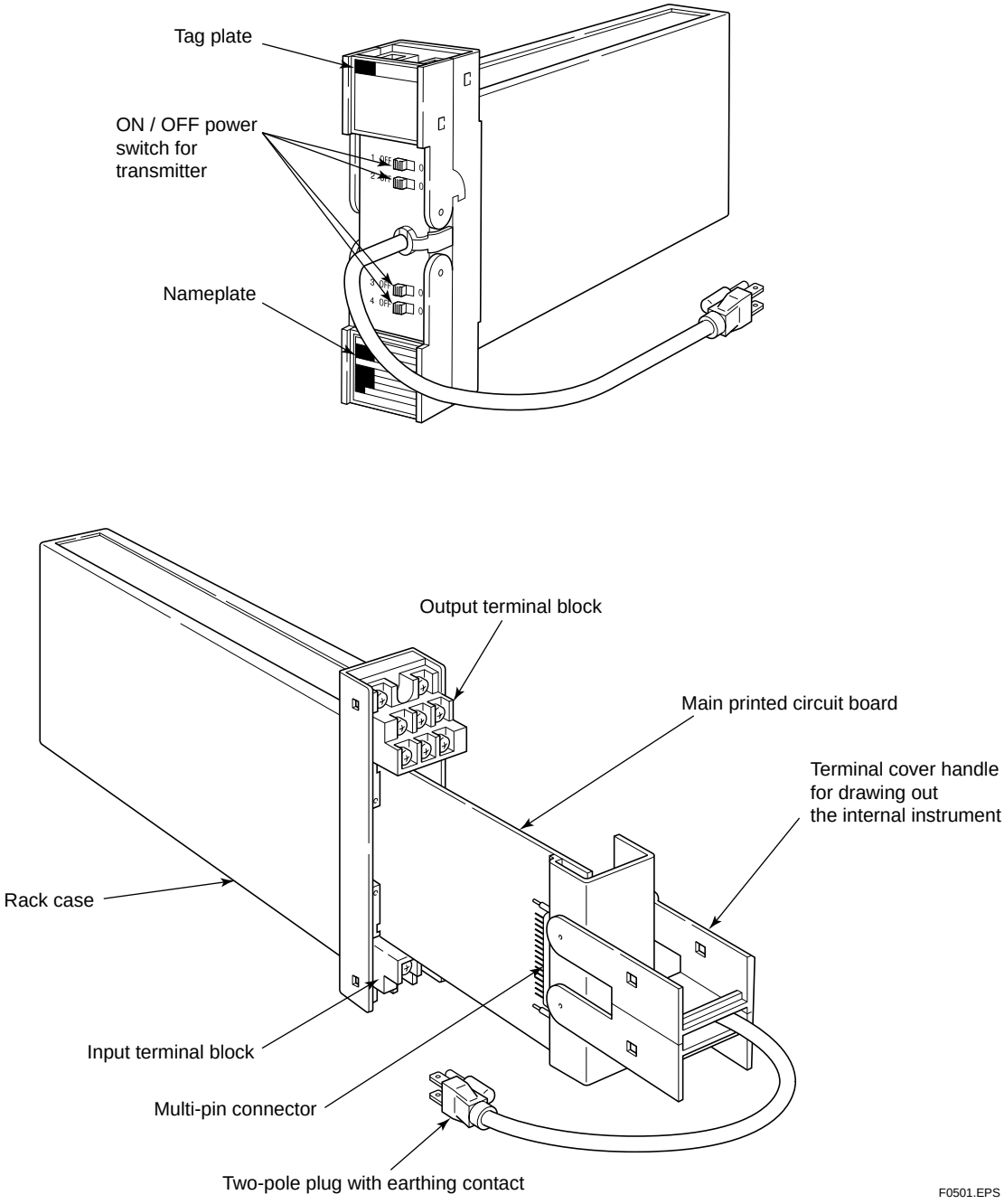

Figure 5-1. Names of Various Components

5.2 Pre-operational Checks

Inspect and check the following points before entering the unit into normal operation.

(1) Draw the internal unit out from the rack case and insure that the specified fuse is installed in the fuse holder at the back of the internal unit.

(2) Before sliding the internal unit back into the rack case, check that the rack case connector is securely connected to the internal unit.

(3) Check that the wires are securely connected to the correct terminals on the terminal block.

(4) Check that the power plug is securely connected in a power outlet with a grounding contact.

(5) For SDBS, set the switch at the front of the distributor to the ON position. If any distributor circuit is not used, set the corresponding switch to the OFF position.

6. MAINTENANCE

This chapter deals with simple maintenance procedures and parts replacements.

6.1 Test Equipment

For efficient maintenance of this distributor, the user is advised to have the following test equipment manufactured by YOKOGAWA or its equivalents before the need for maintenance arises.

- Voltage/current standard Type 7562 ..... 1 set
- Digital voltmeter Type 7651 ..... 1 set
- Calibration booster Type E9712SK:

  include Model SSKD Service Kit ..... 1 set

6.2 Calibration

(1) Connect the instruments as illustrated in Figure 6-1 and turn on the power switch. Allow the instruments to warm up for about 5 minutes.

(2) Apply inputs corresponding to 0, 25, 50, 75 and 100% of the input range and confirm that the input/output relationships shown in Table 6-1 are satisfied by reading the output at each of these points with a digital voltmeter. In the case of 4 to 20 mA DC output test, put a parallel resistance (250Ω±0.05%) into terminal C-D and read in voltage number.

(3) Since the SDBS distributor has four built-in distributor circuits, calibrate each of these circuits by using the procedure described in (2) above.

Table 6-1. Input/Output Characteristics

%	Input	Output
0	4 mA	1 ± 0.008 V
25	8 mA	2 ± 0.008 V
50	12 mA	3 ± 0.008 V
75	16 mA	4 ± 0.008 V
100	20 mA	5 ± 0.008 V

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Circuit Number	Booster Terminal 3 – 4 – 5	Voltmeter Terminal + –
1	1 – 2 – B	A – B
2	5 – 6 – H	F – H
3	3 – 4 – D	C – D
4	7 – 8 – K	J – K

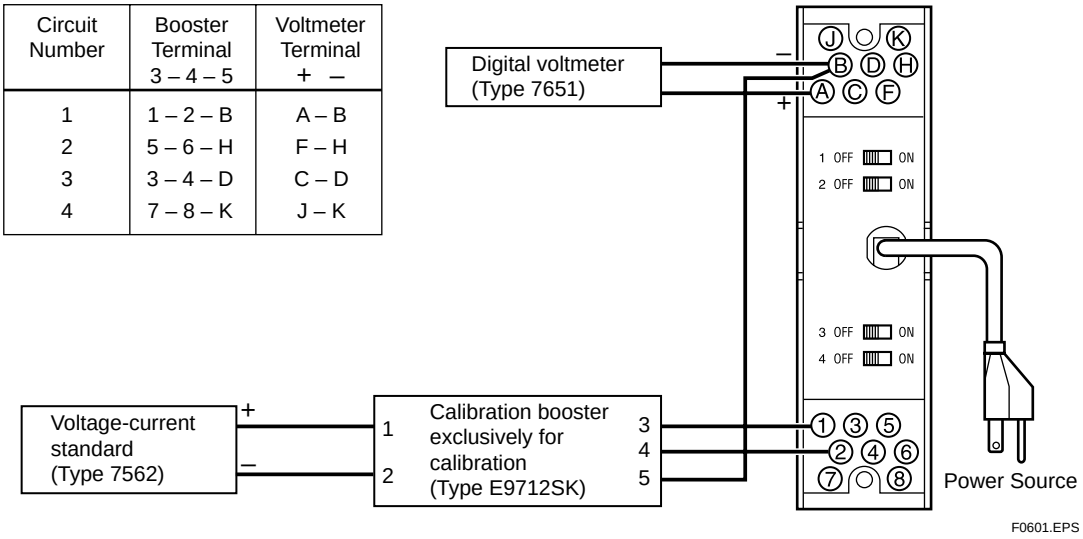

Figure 6-1. Calibration

6.3 Replacement of Fuse

When the fuse blows or requires replacement, replace it according to the following procedure. Recommended replacement interval: About 3 years.

NOTE

- When the fuse below, first check for the case because the fuse itself may not be responsible for the problem. Then change the fuse.
- Use the dedicatd fuse (S9510VK). Do not use a fuse for other products.

(1) Remove the fuse holder cap, then pull the fuse out in the direction shown in Figure 6-2.

(2) When installing a new fuse, use a fuse with the correct rating. Fasten the cap securely.

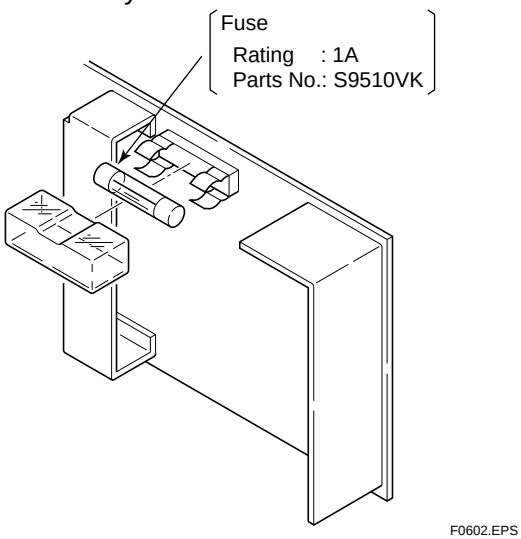

Figure 6-2. Changing the Fuse

6.4 Replacement of Capacitor

Degradation of the aluminum electrolytic capacitor in the power supply unit depends on operating temperature condition or operating environment.
Recommended replacement interval: 5 to 10 years.

NOTE

Ask your nearest Yokogawa sales staff for replacing the capacitor.
Do not replace the capacitor by yourself, because the parts number of power supply unit (refer to CMPL 01B04T02-02E) and capacitor to be used are different according to the power supply specifications.

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7. TROUBLESHOOTING

If any fault occurs in the instrument, note the symptoms. To find the fault, first wire the instruments according to Figure 6-1, apply an input signal, and follow the section 7-1 Troubleshooting flowchart.

If the fault is difficult to find, contact your nearest Yokogawa sales staff.

7.1 Troubleshooting Flowchart

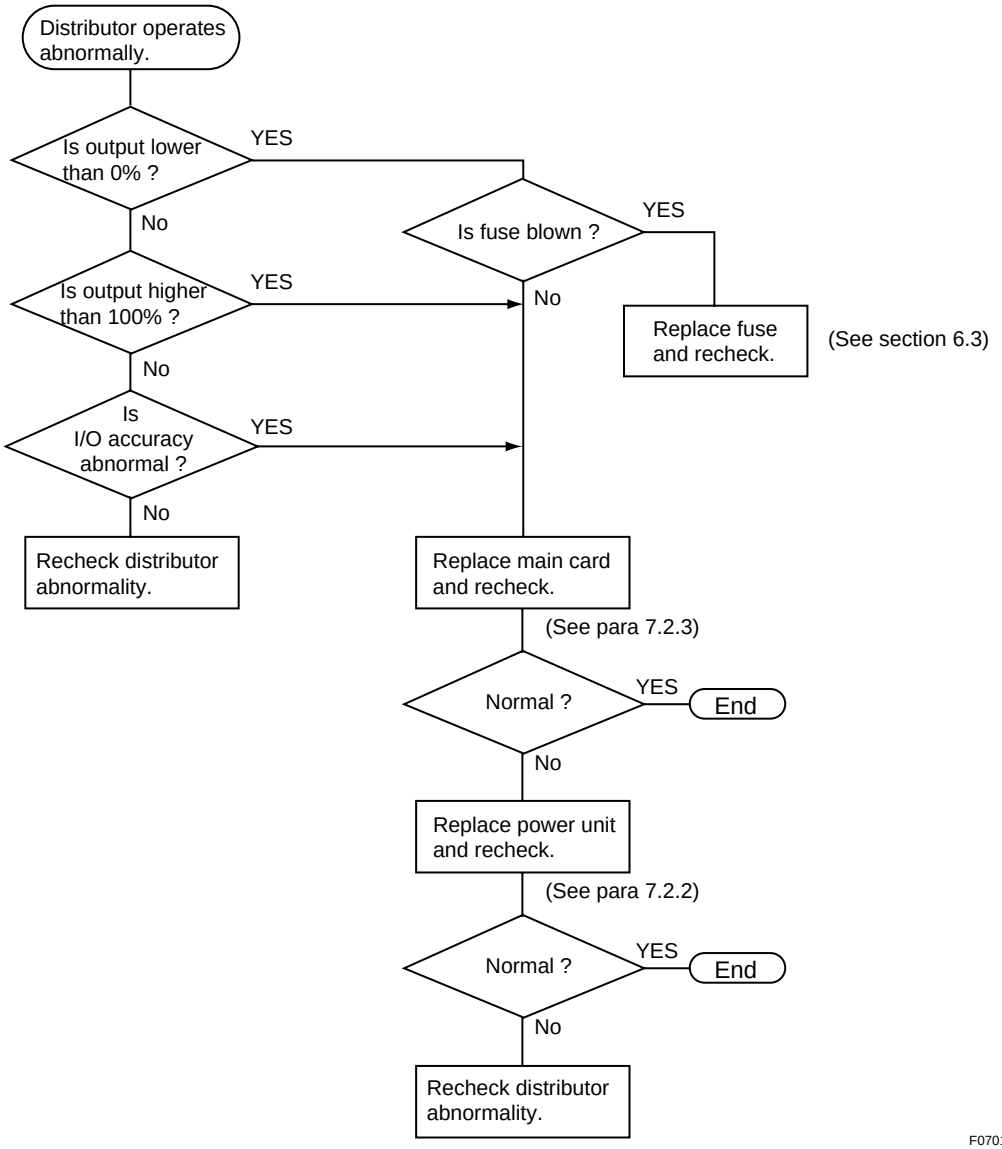

Figure 7-1 Troubleshooting Flowchart

7.2 Replacement of Parts

WARNING

Nobody except members of Yokogawa service staff is allowed to replace the parts.
Never replace the parts by yourself because there is a possibility of damage to the instrument or of danger.

7.2.1 Replacement Procedure

(1) Replacement of Power Supply Unit

(2) Replacement of Main Board

NOTE

- Disassemble only those parts that disassembly is required at parts replacement.
- Disassemble the instrument carefully.

7.2.2 Replacement of Power Supply Unit

(a) Pull the terminal cover (13) outward to draw the internal unit out from the rack case.

(b) Unplug the connector (1) from the power supply unit (2).

(c) Remove two screws (3) to separate the power supply unit (2) from the bracket (10).

NOTE

- Use the power supply unit for style R for replacement (refer to CMPL).
- The power supply unit of former style without compatibility can not be used.

7.2.3 Replacement of Main Board

(a) Remove the power supply unit (2).
(Refer to Subsection 7.2.2 for operating procedure.)

(b) Remove two screws (8) to separate the bracket (9).

(c) Remove four screws (4) to separate the bracket (10) and the front bracket (5) from the main board (6).

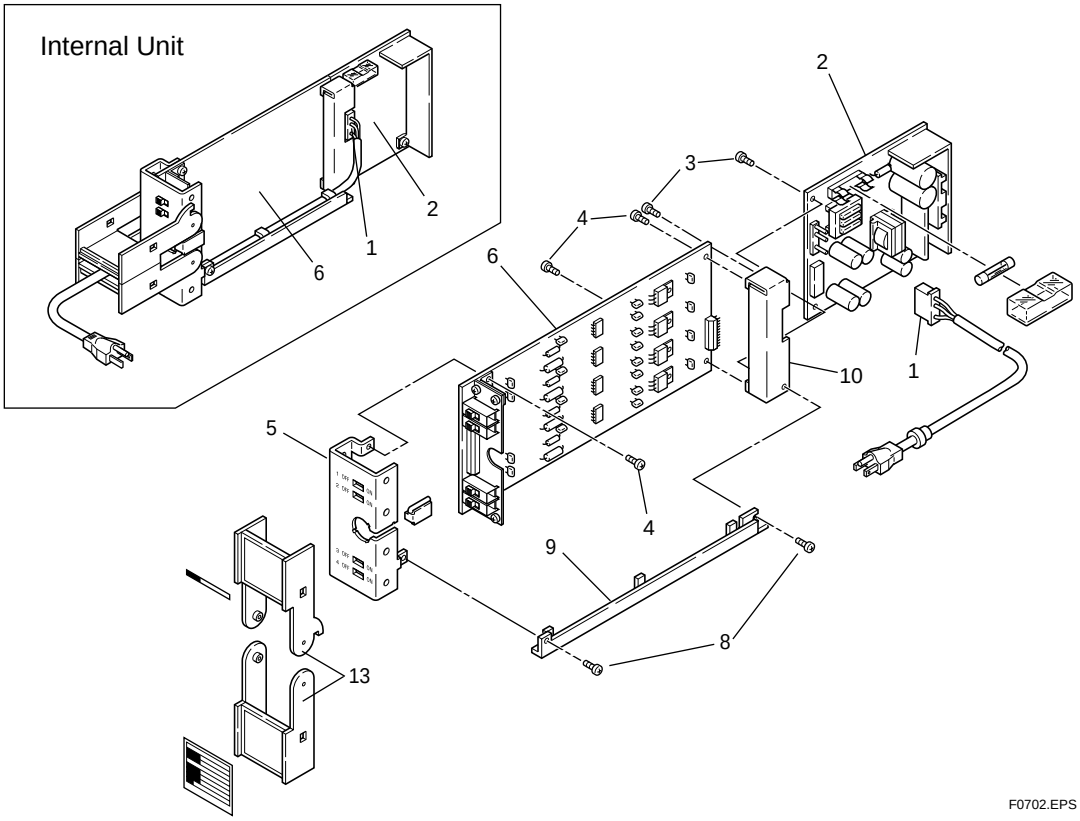

Figure 7-2 Disassembled View

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Appendix / TB Power Supply Terminal Connections for Rack-mounted Instruments (Option)

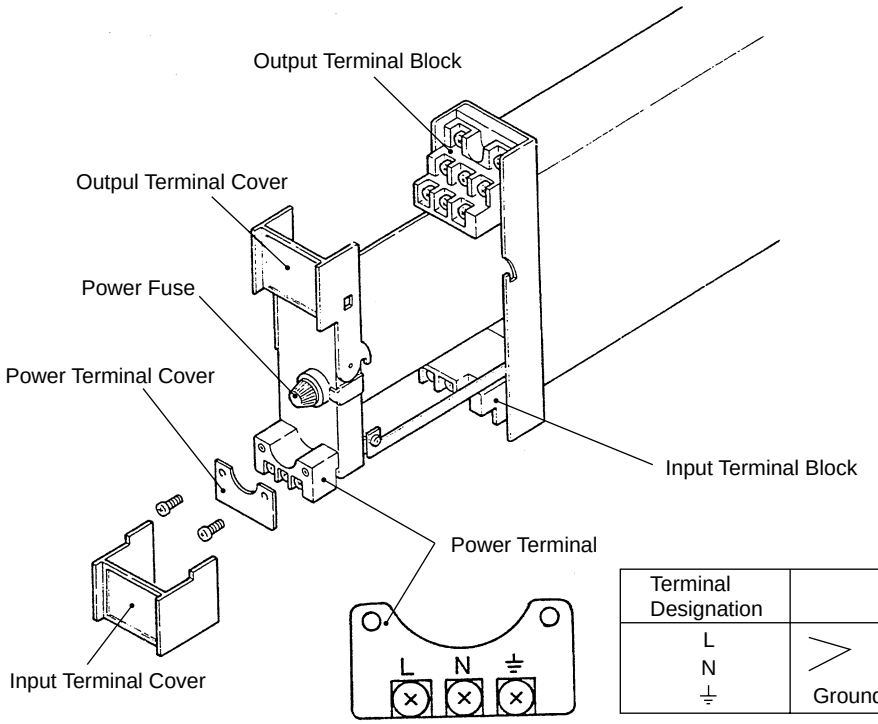
Appendix-1 GENERAL

If you specify the terminal block to which the power source is directly connected (suffix code /TB), 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.

Appendix-2 APPLICABLE INSTRUMENTS

Model	Description
STED	mV, Temperature and Potentiometer/Voltage Converters
SKYD	Alarm Unit
SALD	Emf- and RTS- input Alarm Unit
SPLR	Programmable Computing Unit
SIND	Integrator
SISD	Isolator
SDBT	Distributor (for 1 point)
SDBS	Distributor (for 4 points)
SDBU-21	Distributor (for single loop)

Appendix-3 EXTERNAL VIEW AND NAMES OF COMPONENTS



Terminal Designation	Description
L N ⏚	AC or DC Power Supply (DC: polarity reversible) Ground

Appendix-4 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 mm^2. *
Applicable cable: 600 V vinyle 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 1.25mm^2.

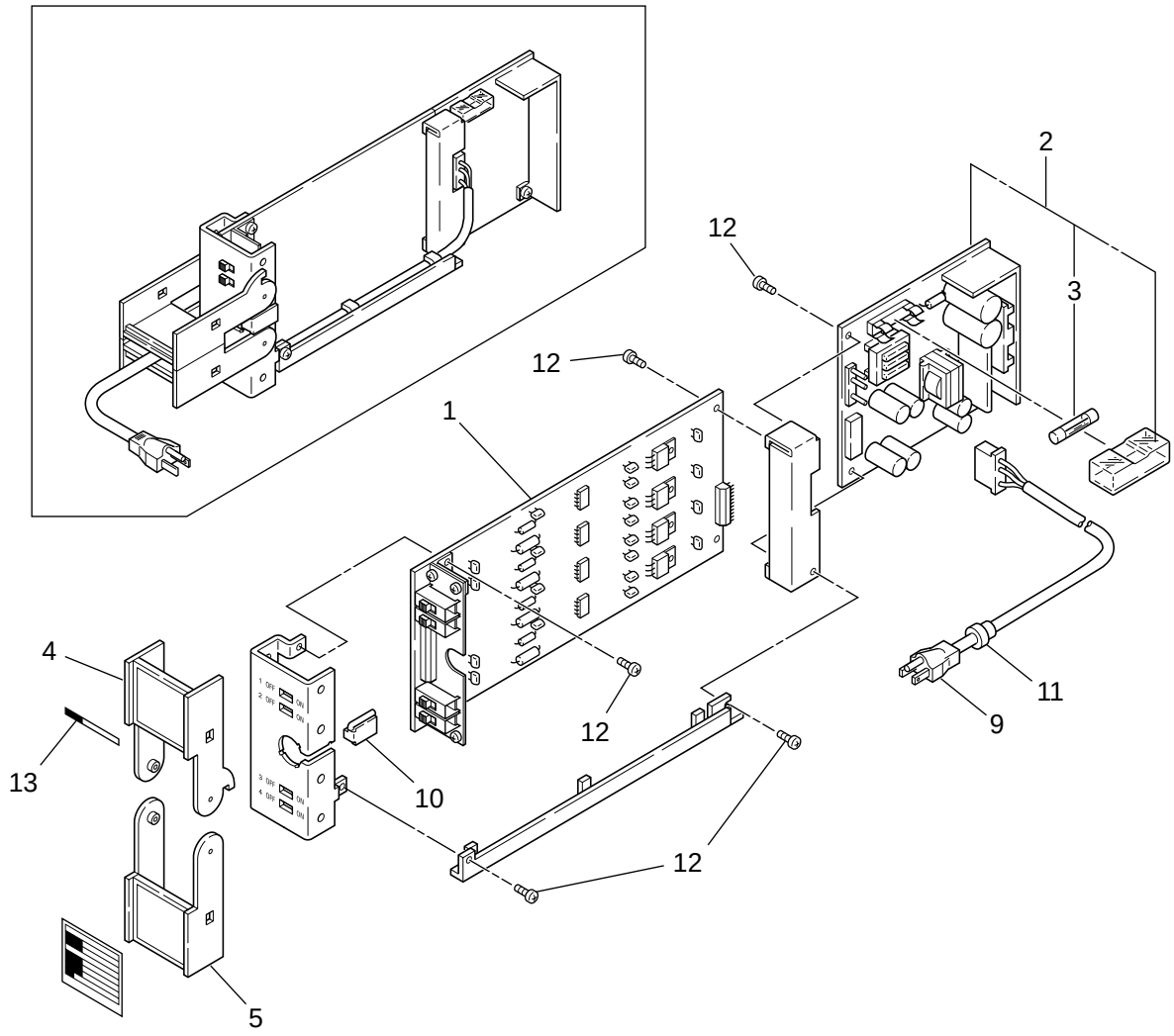
(3) Wirings to power supply and ground terminals should be made after completion of signal terminal wirings. (To facilitate connecting input signal, pull the internal unit approximately half way out of the housing. Do not remove the power terminal block.)

(4) After completing the power supply and ground wiring, mount the power terminal cover.

Customer Maintenance Parts List

Model SDBS
Distributor (For 4 Points)

YEWSERIES 80



Item	Part No.	Qty	Descripion
1	E9715KA	1	Main Card
2	E9715YC	1	Power Supply Unit (for 100 V Version)
	E9715YT	1	Power Supply Unit (for 100 V Version)
3	S9510VK	1	Fuse – 1A
4	E9713CK	1	Cover
5	E9713CA	1	Cover
9	E9713EG	1	Cable Assembly (for 100 V Version)
	E9713FS	1	Cable Assembly (for 100 V Version)
10	E9713CE	1	Cover
11	S9079PB	1	Bushing
12	Y9306JB	8	Pan H. Screw, M3 × 6
13	Y9422NP	1-4	Tag No. Label (blank)

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Customer Maintenance Parts List

/TB
Power Supply Terminals
For Rack-Mounted Instruments
(Option)

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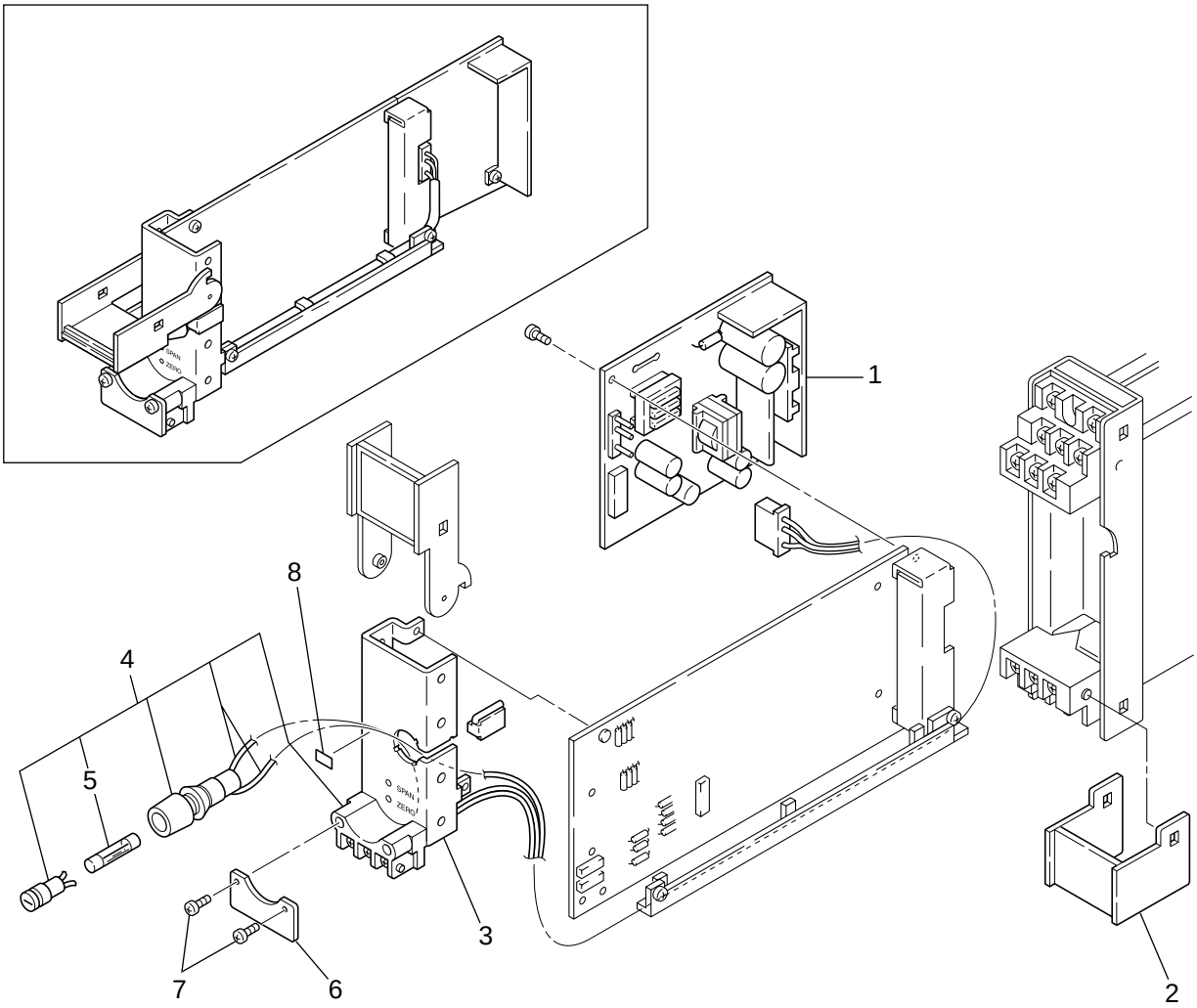

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Item	Part No.	Qty	Descripion
1	—	1	Power Supply Unit (see Table 1)
2	E9713CJ	1	Cover
3	—	1	Bracket (see Table 2)
4	E9713ET	1	Terminal Assembly
5	S9510VK	1	Fuse (1A)
6	E9713CV	1	Cover
7	Y9306JB	2	Pan H. Screw, M3 × 6
8	E9714DM	1	Label (1A/250V)

Table 1. Power Supply Unit Part Number.

Applicable Instruments	Power Supply Unit Part No.	
Model	100 V Version	200 V Version
SPLR	E9715YH	
STED, SISD, SDBT	L3040YH	
SALD, SKYD, SIND, SDAU	L3040YJ	
SDBS, SDBU-21	E9715YK	
SPCM	E9715YL	

Table 2. Bracket Part Number.

Applicable Instruments Model	Bracket Part No.
STED-110/310/410	L4040CA
STED-210	L4040CB
STED-710	L4040CC
SISD,SIND-100/200, SDBT-21	L4040CE
SKYD-200/201/302	L4040CG
SKYD-100/101,SALD-110/310	L4040CH
SKYD-204/304	L4040CL
SKYD-104	L4040CM
SALD-210/710	L4040CQ
SALD-724	L4040CS
SALD-214/714	L4040CT
SIND-104/204	L4040CX
SDBS	E9713DR
SDBT-11	E9713DL
SDAU-xxx/TB	L4040DA
SDAU-100/RLY4/TB	L4040DB
SDAU-270/RLY4/TB	
SDAU-xxx/TB/COM	L4040DE
SDAU-100/RLY4/TB/COM	L4040DF
SDAU-270/RLY4/TB/COM	

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● Manual No. : IM 01B04T02-02E

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