User's
Manual

YEWSERIES 80

Model SIHK
Indicator (with Alarm)

IM 1B4B8-01E

YOKOGAWA ◆
Yokogawa Electric Corporation

IM 1B4B8-01E
4th Edition

Notices

■ Regarding This User's Manual

(1) This manual should be passed on the end user. Keep at least one extra copy of the manual in a safe place.

(2) Read this manual carefully and fully understand how to operate this product before you start operation.

(3) This manual is intended to describe the functions of this product. Yokogawa Electric Corporation (hereinafter simply referred to as Yokogawa) does not guarantee that the functions will suit a particular purpose of the user.

(4) Under absolutely no circumstances may the contents of this manual in part or in whole be transcribed or copied without permission.

(5) The contents of this manual are subject to change without prior notice.

(6) Every effort has been made to ensure accuracy in the preparation of this manual. Should any error or omissions come to your attention however, please contact your nearest Yokogawa representative or our sales office.

■ Regarding Protection, Safety, and Prohibition against Unauthorized Modification

(1) 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 manual are strictly adhered to. Yokogawa does not guarantee safety if products are not handled according to these instructions.

(2) Be sure to use the spare parts approved by Yokogawa when replacing parts or consumables.

(3) Modification of the product is strictly prohibited.

(4) Reverse engineering such as the disassembly or decompilation of software is strictly prohibited.

(5) No portion of the software supplied by Yokogawa may be transferred, exchanged, leased or sublet for use by any third party without the prior permission of Yokogawa.

■ Force Majeure

(1) Yokogawa does not make any warranties regarding the product except those mentioned in the WARRANTY that is provided separately.

(2) Yokogawa assumes no liability to any party for any loss or damage, direct or indirect, caused by the user or any unpredictable defect of the product.

CONTENTS

1. INSPECTION.

This instrument was thoroughly tested at the factory before shipment. However, when you receive this instrument, visually check for damage and the following items:

(1) Model and specifications

Confirm that the model and suffix codes shown on the nameplate at the upper part of the instrument are the same as those on your order sheet.

(2) Accessories

Confirm that a fuse is supplied with the instrument.

If you have any questions about this instrument, please contact either your nearest Yokogawa Sales/Service Office or Yokogawa Electric Corporation, Tokyo, Japan.

2. GENERAL.

The Model SIHK Indicator displays the value of a normalized 1 to 5 V DC input signal (e.g. from a converter) on a moving-coil meter. There are two independent alarms; direct or reverse action may be selected and both normally-open and normally-closed alarm contact output is provided, so these may be used as high- or low-limit alarms. Two knobs on the front panel vary the alarm set points and move setpoint indexes on the indicator scale.

2-1. Standard Specifications.

Input Signal

Input Signal: 1 to 5 V DC.

Input Resistance: 1 MΩ.

Indicator

Indicator Type: Moving-coil meter.

Indicator Accuracy: ±0.5% of span.

Scale Marking: Single scale, marked 0 to 100%. Scale may be changed.

Scale Length: 100 mm.

Alarm Functions

Alarm Setpoints: Two independent alarm set points, each may be varied in the range 0 to 100%. Pressing and turning the "SET" knobs on the front panel varies the alarm set points and moves corresponding setpoint indexes on the indicator scale.

Setpoint Indicating Accuracy: ±0.5% of span.

Alarm Hysteresis: Up to 2% of span.

Alarm Action: High- or low-limit alarm action is selectable for each setpoint – direct (DIR) or reverse (RVS) action can be selected using side-panel switches.

Switch Setting	Input Signal < Set Point	Set Point < Input Signal
Direct	Output relay releases	Output relay operates
Reverse	Output relay operates	Output relay releases

Number of Outputs: Two alarm outputs, each with both normally-open (NO) and normally-closed (NC) alarm contacts.

Contact Rating:

AC: 100 V 1 A or 220 V 0.5 A (resistive load).

DC: 30 V 1 A or 110 V 0.1 A (resistive load).

Status Lamps: Two lamps for indicating alarm status are on the front panel. The lamps can be lit by connecting two terminals on the rear panel of the indicator (internal power supply is used).

Normal Operating Conditions

Ambient Temperature: 0 to 50°C.

Ambient Humidity: 5 to 90% relative humidity (non-condensing).

Power Supply: Two versions, for "100 V" (standard) or "220 V" (option /A2ER). For each version, AC or DC may be used, without change to the instrument.

100 V Version:

DC supply: 20 to 130 V, polarity reversible.
AC supply: 80 to 138 V, 47 to 63 Hz.

220 V Version:

DC supply: 120 to 340 V, polarity reversible.
AC supply: 138 to 264 V, 47 to 63 Hz.

Maximum Power Consumption:

Model	24 V DC	100 V AC	220 V AC
SIHK-110	80 mA	6.4 VA	9.2 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 Input Terminal and Ground: 500 V AC for 1 minute.

Between Alarm Output Terminal and Ground: 1000 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).

Wiring:

Signal Wiring to/from the Field: ISO M4 size (4 mm) screws on terminal block.

Power and Ground Wiring:

100 V Version: JIS C 8303 two-pin plug with earthing contact.

220 V Version: CEE 7 VII (CENELEC standard) plug.

Cable Length: 300 mm.

Mounting: Flush panel mounting. Instruments are in housings, and may be mounted individually or side-by-side.

Instruments may be inclined with front up to 75° from vertical (rear of instruments lower than front).

Nameplate: Cream semi-gloss finish.

Size: 8 X 65.3 mm.

Lettering: In black, one or two rows each up to 14 alphanumeric characters long.

Front Panel Finish: Dark green (Munsell 2.5GY3/1).

Housing: Open front.

Bezel: Aluminium diecast, black baked-enamel finish.

Housing Dimensions (Height X Width X Depth): 182.5 (H) X 87 (W) X 480 (D) mm.

Weight:

Indicator: 2.5 kg.

Housing: 2 kg (excluding mounting kit).

2-2. Options.

/A2ER: For "220 V version" power supply.
/MTS: Indicator supplied with kit for individual mounting.
/SCF-G□M: Mounting kit bezel color change from standard color (black). Choose color from set of optional colors (see GS 22D1F1-E).
/NHS: No housing. Instrument only. Order housing separately.
/NPE: Letters engraved on front panel nameplate.

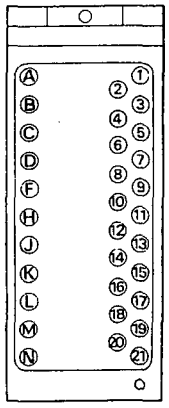
2-3. Accessories.

One 1 A fuse is supplied.

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

2-4. Model and Suffix Codes.

Model	Suffix Code	Description
SIHK .	. . . . .	Indicator (with Alarm)
Number of Inputs	-1	One input
Alarms	1	One input, two alarms
	0	Always 0
Style Code	*A	Style A
Options	/A2ER	220 V power supply
	/MTS	With mounting kit
	/SCF-G□M	Bezel color change
	/NHS	Without housing
	/NPE	Nameplate engraving



Terminal Connections

Terminal Designation	Description	Terminal Designation	Description
1	+ Input (1 to 5 V DC)	17	NC
2	− Input (1 to 5 V DC)	18	COM — Alarm output contact ("Low" alarm point)
3		19	NO
4		20	
5		21	
6		A	
7		B	
8		C	
9		D	
10		F	
11	+ Lamp 1 (upper)	H	
12	− Lamp 1 (upper)	J	NC
13	+ Lamp 2 (lower)	K	COM — Alarm output contact ("High" alarm point)
14		L	NO
15		M	
16		N	

Note NO: Normally Open (contact open when relay is released)
NC: Normally Closed (contact closed when relay is released)

Figure 2-1. Terminal Connections and Description.

3. INSTALLATION AND WIRING.

3-1. Installation.

To install this instrument, refer to the instruction manual IM 1B4F1-01E "Installation Manual for Panel Mounted Instruments".

3-2. Wiring.

Contact external wires to the terminal board (4 mm screws terminals) at the rear of the housing.

After completing the wiring, install the terminal cover (see Figure 3-1).

For terminal arrangement, see Figure 2-1.

3-3. Wiring Cautions.

(1) To connect external wires to the terminal board (screw terminals) at the rear of the housing, use solderless crimp-on lugs (4 mm) for each of wire end.

(2) When driving external equipment using the alarm contact, wire in accordance with the following instructions:

- o Do not connect any load which exceeds the contact rating.
- o Connect a surge absorber in parallel with load when driving a relay or other inductive device.

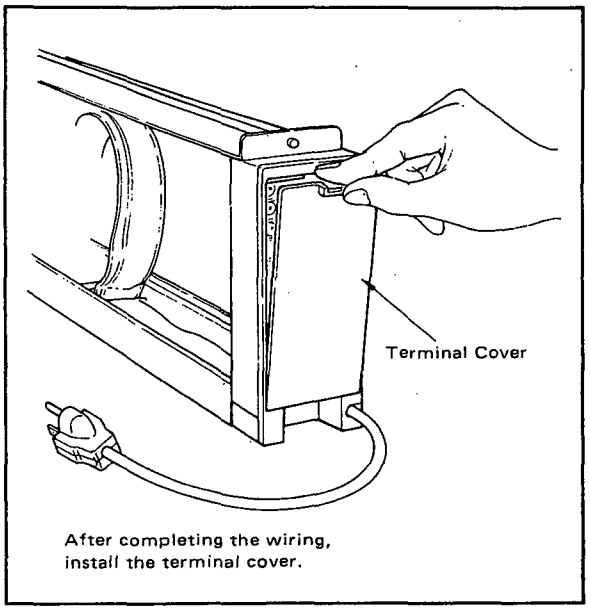


Figure 3-1.

4. PRINCIPLES OF OPERATION.

Figure 4-1 shows a block diagram of Model SIHK Indicator with Alarm configuration.

The process variable input signal enters a buffer amplifier. The switches SW1 and SW2 are set to measure process variable except setting alarm setpoint when the alarm setpoint knob on the front panel is pushed. Comparative amplifiers for the high and low alarms are separately installed. The amplifier compares the alarm setpoint value with the process variable and drives the alarm relay. This comparative action is selectable from direct (DIR) and reverse (RVS), which can be selected by the alarm action selector switch at input side of the comparative amplifier.

While either of the alarm setpoint knobs is pushed, the pointer reads the alarm setpoint now set. To change the setpoint, turn the knob pushing. The setpoint is a value which the pointer reads immediately before the knob released from being pushed.

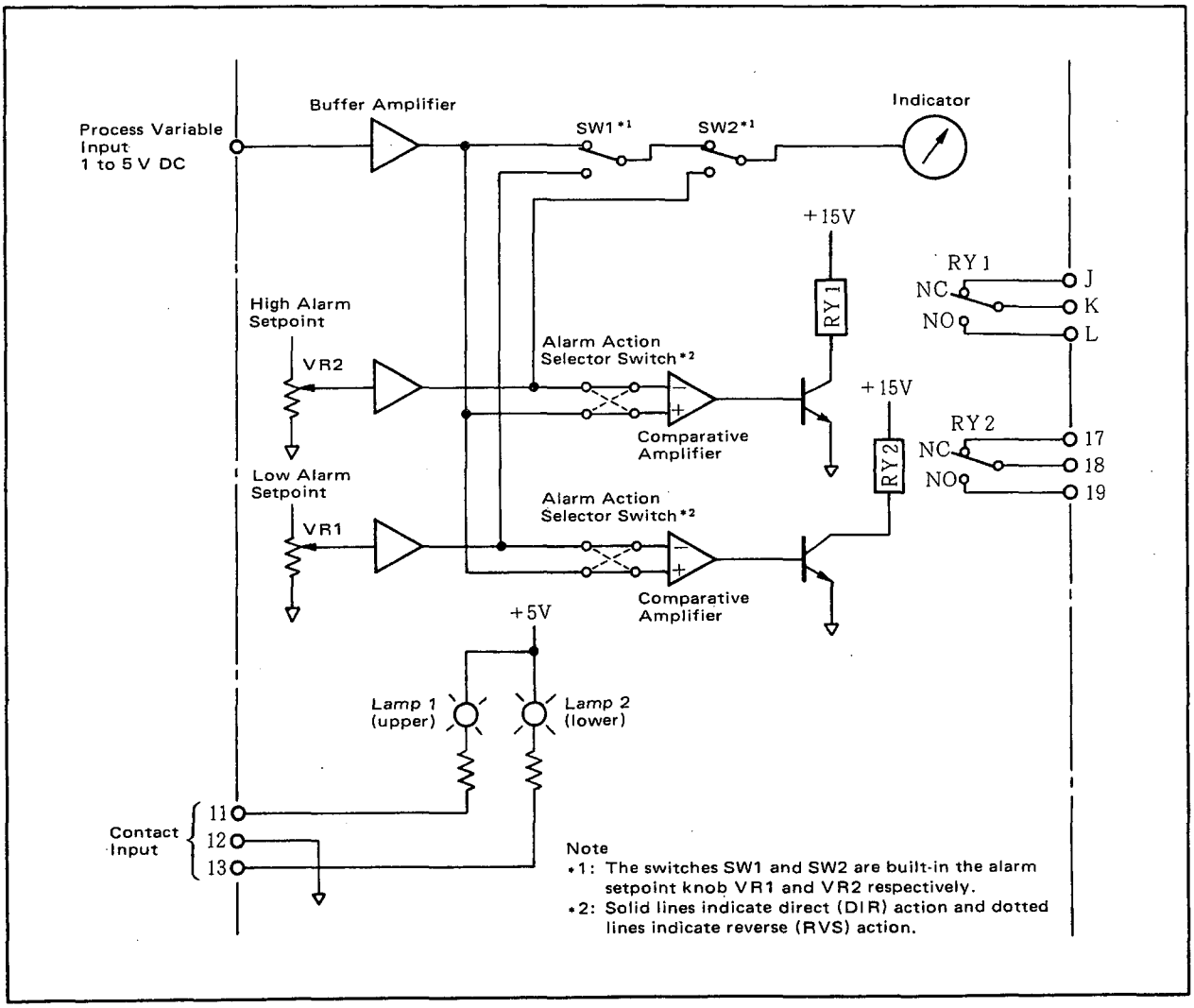


Figure 4-1. Block Diagram.

5. OPERATION.

5-1. Names and Functions of Components.

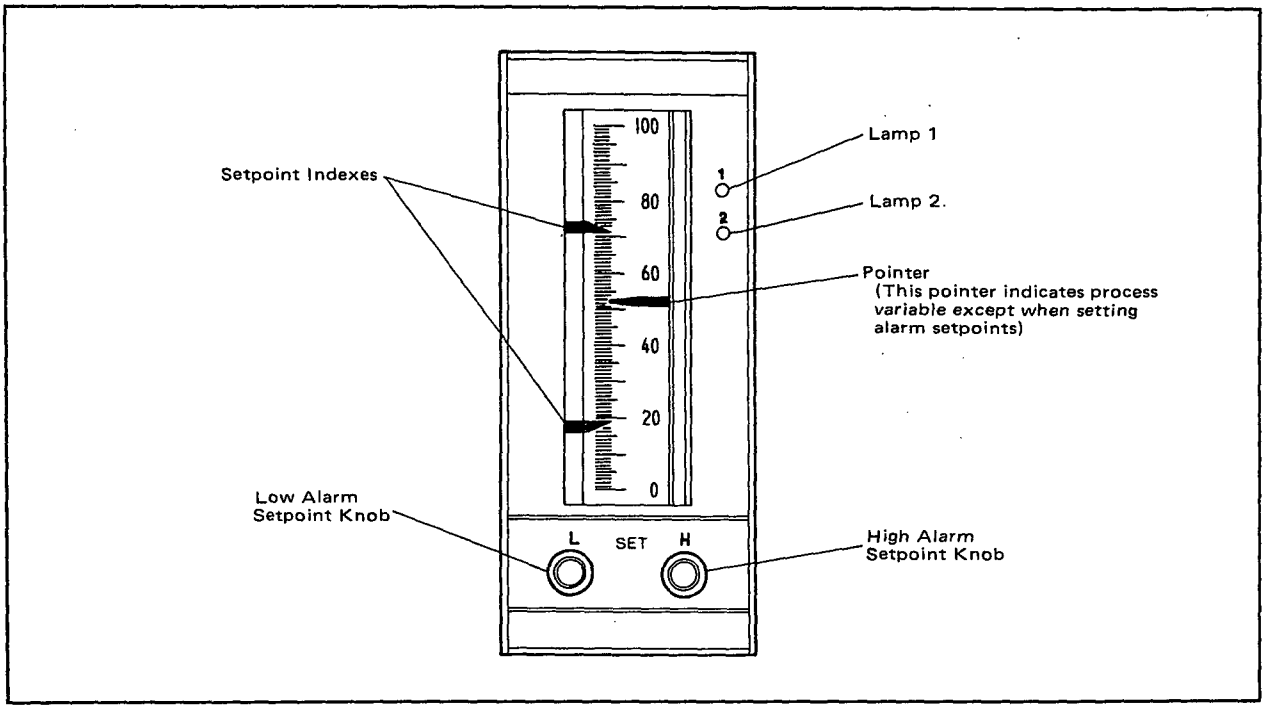


Figure 5-1. Front View.

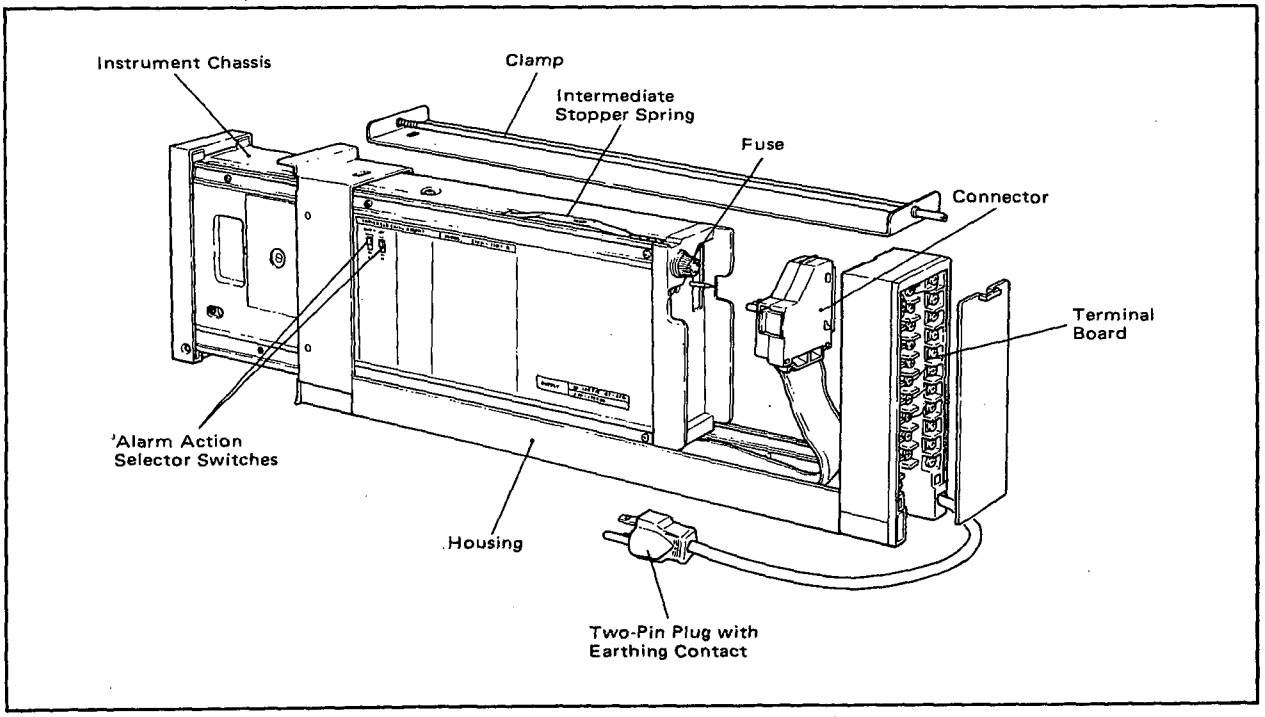


Figure 5-2. Side View.

5-2. Pulling the Instrument Chassis.

(1) Push up the stopper spring at the lower front of the instrument chassis. Pull the instrument chassis until it stops at the intermediate stopper (Figure 5-3).
(2) To remove the instrument chassis from the housing, pull the instrument chassis pushing the intermediate stopper as shown in Figure 5-4.
(3) Remove the connector from the instrument chassis. This separates the instrument chassis from the housing (Figure 5-5).

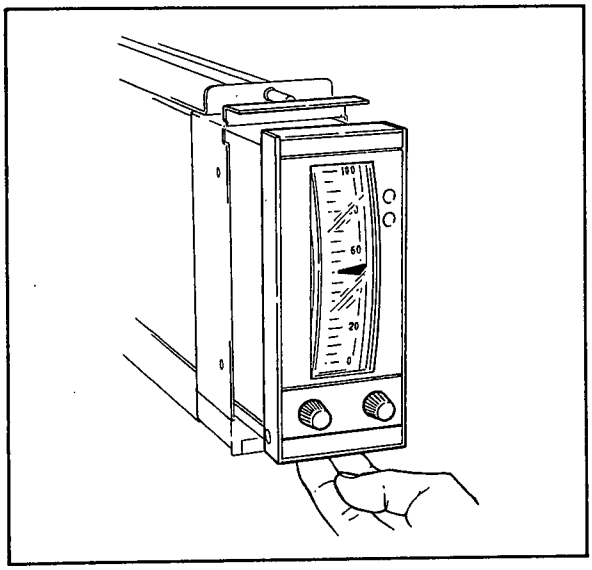


Figure 5-3. Pulling the Instrument Chassis (1).

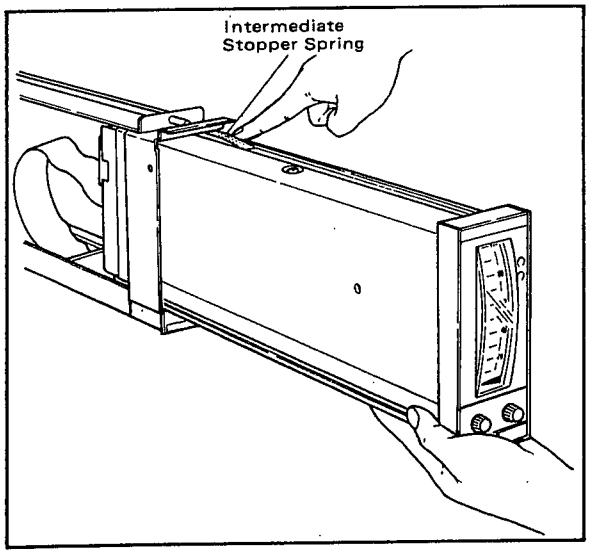


Figure 5-4. Pulling the Instrument Chassis (2).

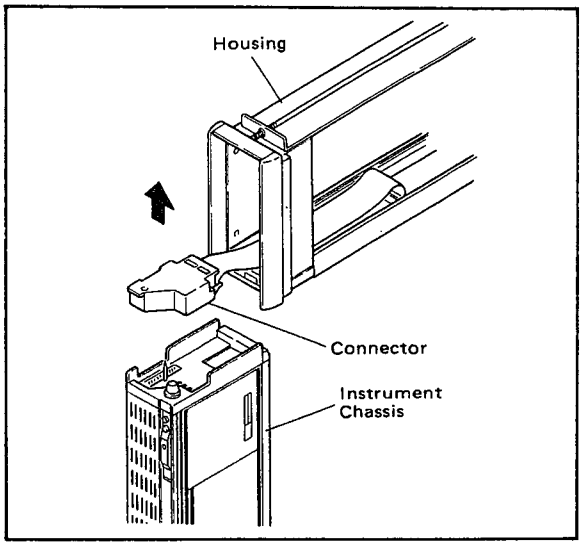


Figure 5-5. Removing the Instrument Chassis from the Housing.

5-3. Pre-Operational Checks.

Before applying power to the indicator, check that the scale plate, nameplate and fuse are properly installed.

Next, check that the signal cable, the power cable and the housing connector are properly connected with the indicator.

5-4. Selecting Alarm Action.

Alarm action (direct and reverse) can be selected by the switches on the side panel (see Figure 5-6). The switches are two; for high and low alarm setpoints. Alarm setting (the relay operates and releases) is different between direct (DIR) and reverse (RVS) because of hysteresis. Take account of this hysteresis when setting.

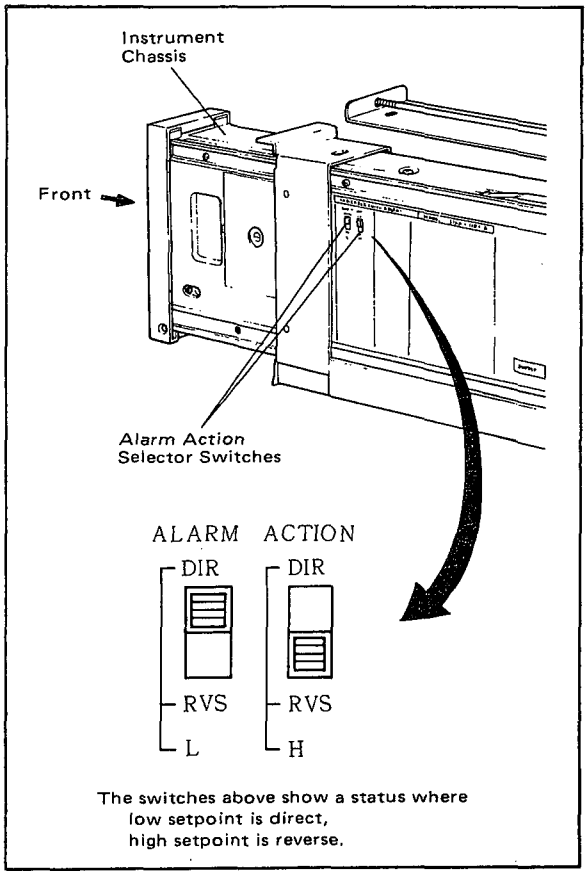


Figure 5-6. Alarm Action Selector Switches.

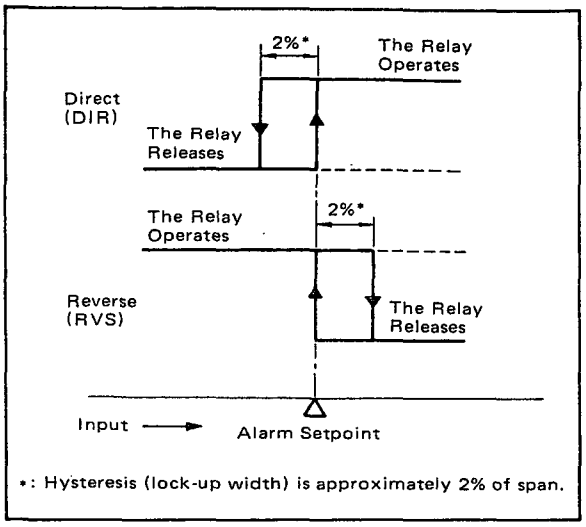


Figure 5-7. Alarm Action and Alarm Relay Movement.

5-5. Notes for Alarm Setpoint.

To set alarm setpoints, turn the knobs (SET) at the lower of the instrument front panel (see Figure 5-8).

The pointer indicates already designated setpoint value when the knob is pushed. While the knob is turned right pushing, the pointer moves upward and turned left, the pointer moves downward. Push and turn the knob until the pointer reads the desired variable.

After completing the set, slide setpoint indexes into a guide rail at the left of the scale and place them to the setpoints.

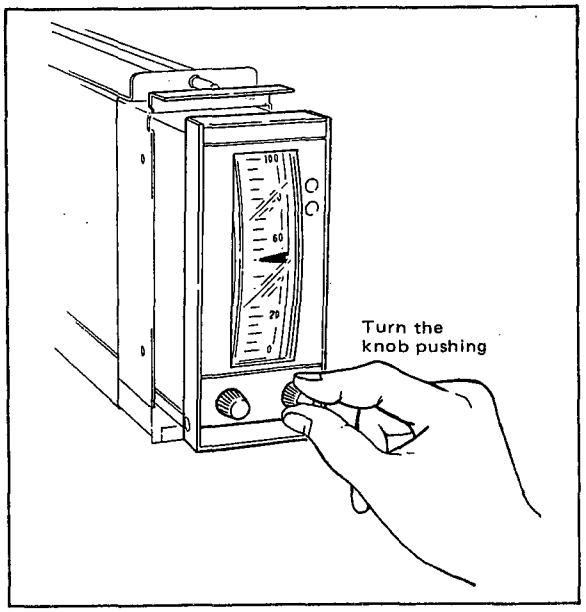


Figure 5-8. Setting Alarm Setpoint.

6. MAINTENANCE.

This chapter explains procedures for adjusting the indicator and replacing parts.

6-1. Calibration Equipment.

DC voltage/current standard:
YOKOGAWA Type 2554 or equivalent 1
Circuit tester 1

6-2. Inspection and Adjustment.

(1) Apply 3.0 V DC to process variable input terminals (terminal number 1(+) and 2(−)) from voltage/current standard.
(2) Confirm that the pointer reads 50% ±0.5% of span.
(3) If the specified accuracy is not obtained at this point, adjust the zero adjustment until the pointer reads 50% as shown in Figure 6-1.
(4) Similary apply 1.0, 2.0, 4.0 and 5.0 V DC and confirm that the pointer reads 0, 25, 75 and 100% ±0.5% of span respectively.
Check each calibration mark at the position where line of sight and set point value indicator are horizontal.
(5) If the specified accuracy is not obtained at every point of step (4), apply 3.0 V DC again and sligthly adjust the pointer within ±0.5% of span.
(6) Check the indicator accuracy at each point like step (4). Repeat steps (4) and (5) until the required accuracy is obtained.

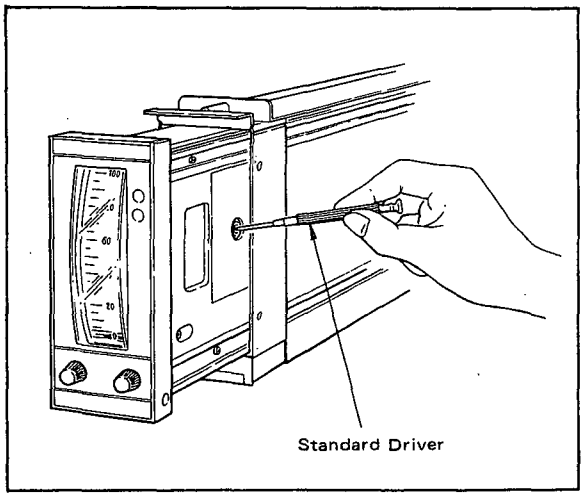


Figure 6-1. Zero Adjustment.

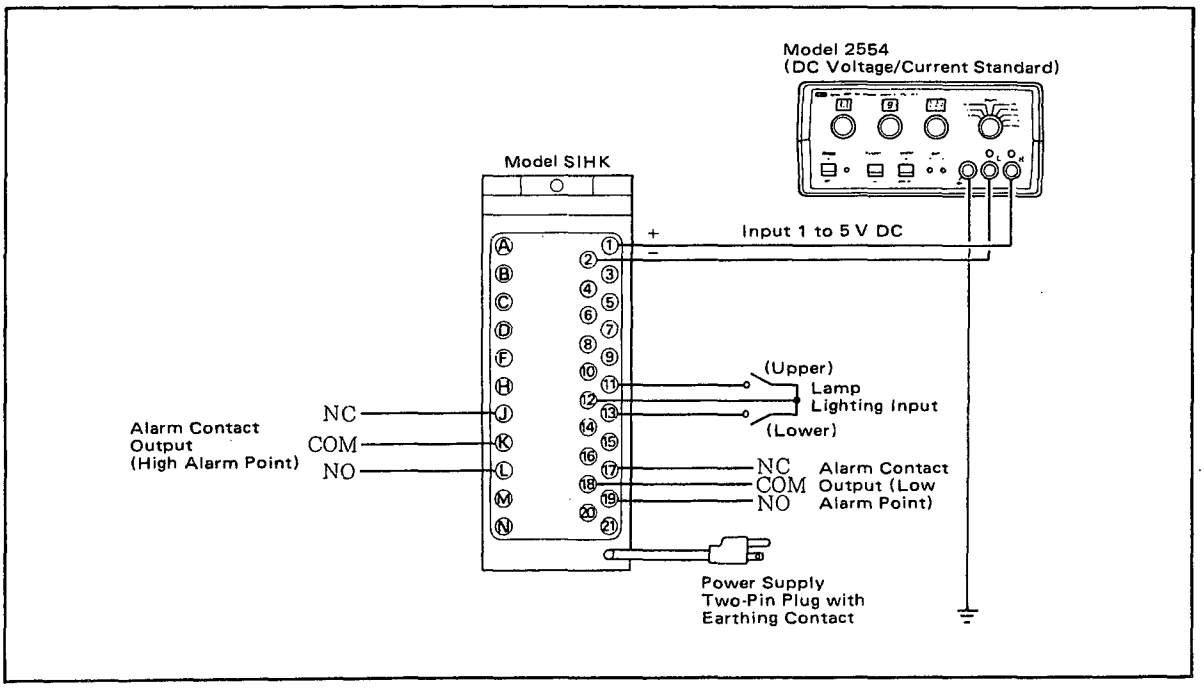


Figure 6-2. Wiring Diagram.

6-3. Verifying Alarm Action.

(1) Apply input signals to the indicator as in section 6-2.
(2) Select direct (DIR) or reverse (RVS) by the alarm action selector switches.
(3) Check the alarm setpoints at 0, 50 and 100% points of span. Increase the input signal slowly. Check contact at the alarm setpoint with a circuit tester.
For example, set the alarm action selector switch to DIR and the alarm setpoint to 50% of span and check the alarm action. First, increase the input signal slowly from 0%. The point at which the alarm relay operates (relay contact closed between COM and NO) shall be 50% ±0.5% of span. Next, decrease the input signal slowly from 100%. Check the pointer reading when the alarm relay is released (relay contact closed between COM and NC). The difference between the above-mentioned operating relay point and the relay release point is approximately 2% of span.

6-4. Verifying Lamp Lighting.

Power supply for lamps is built-in the indicator. Apply the switch input to lamp lighting input terminals (terminal number 11, 12 and 13) and check the lamp lighting (see the lower left of Figure 4-1).
When closed between terminal 11 and 12, the upper lamp lights.
When closed between terminal 13 and 12, the lower lamp lights.

6-5. Parts Replacement.

(1) Replacing the nameplate
Pull the instrument chassis out slightly from the housing, open the lid on the top of the front panel, and replace the nameplate with a new one.
(2) Replacing the scale plate
Pull the instrument chassis out slightly from the housing. Remove the scale plate retainer and the scale plate using tweezers. Insert a new scale plate and reinstall the scale plate retainer (see Figure 6-3).

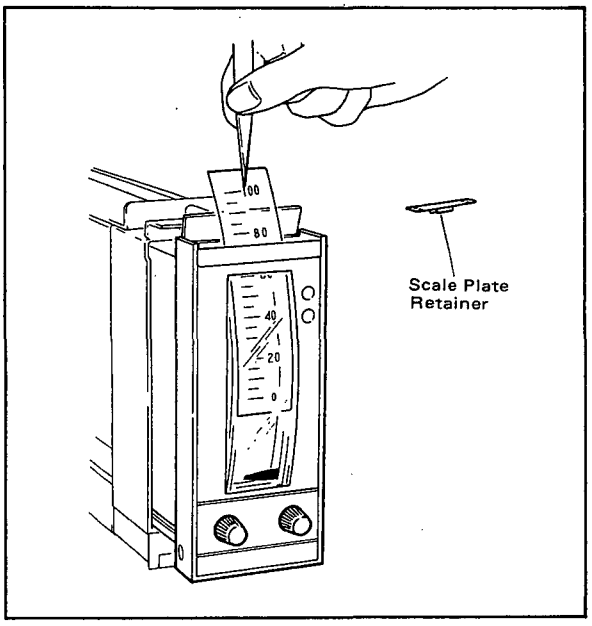
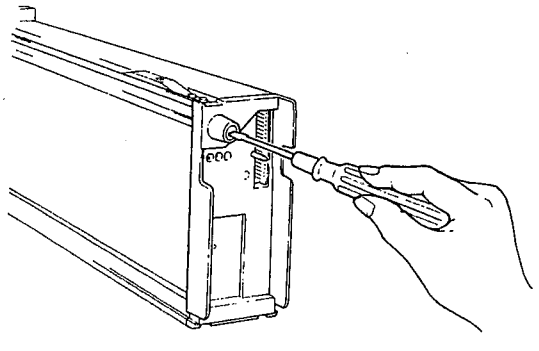


Figure 6-3. Replacing the Scale Plate.

(3) Replacing the fuse
Remove the fuseholder cap located on the rear of the instrument chassis and replace the fuse with a new one.
Recommended replacement interval: About 3 years.

Note: Use the dedicated fuse (S9510VK). Do not use a fuse for other products.



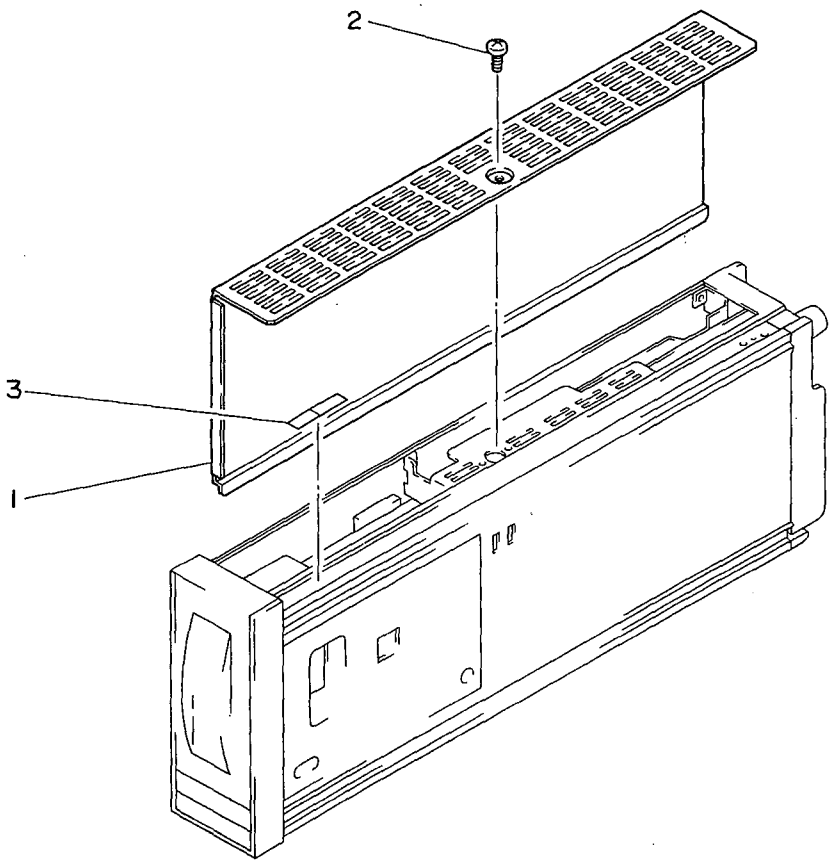
Fuse Part No. : S9510VK
Rating : 1A

Figure 6-4. Replacing the Fuse.

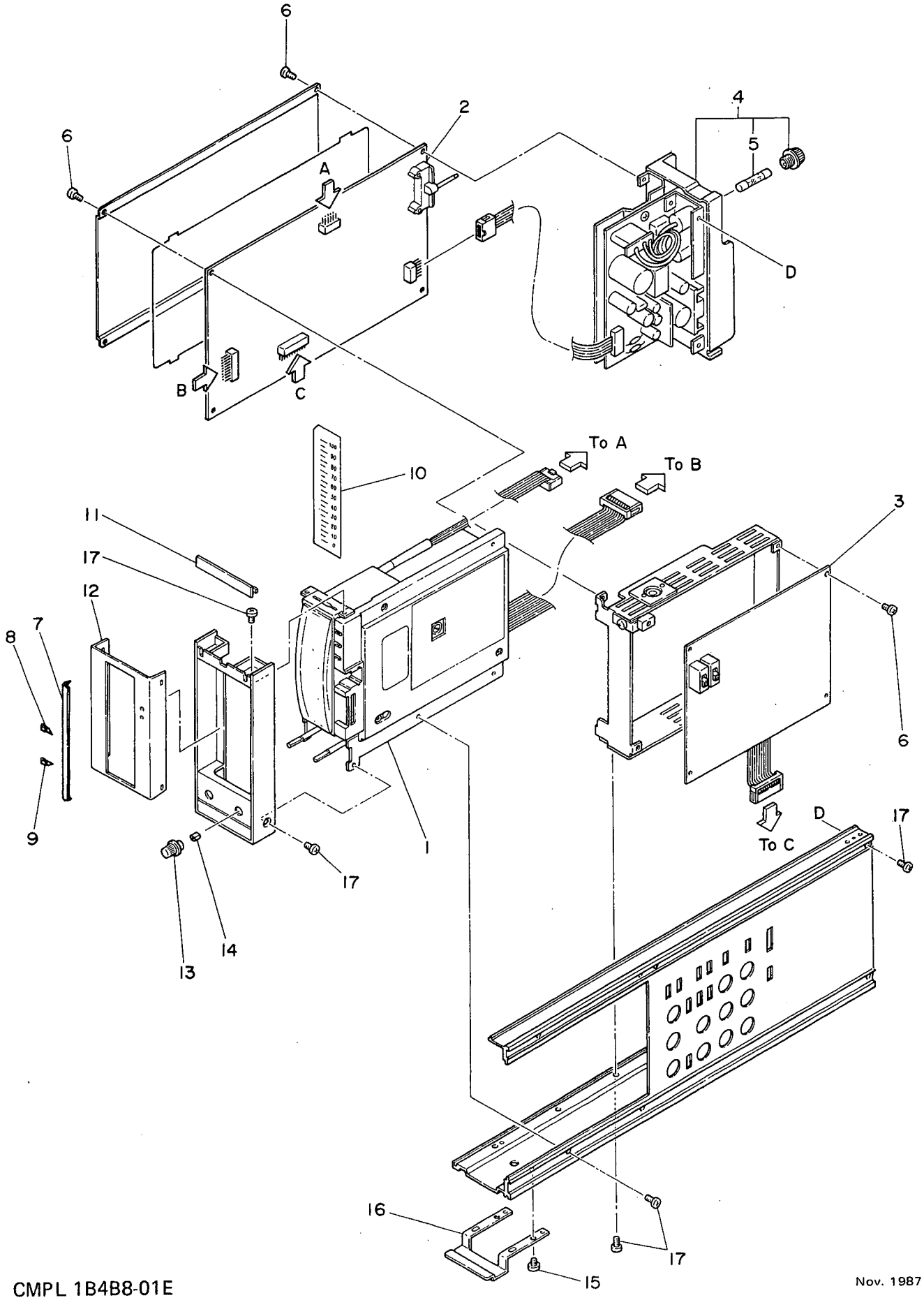
Customer Maintenance Parts List

Model SIHK
INDICATOR (With Alarms)

YEWSERIES 80



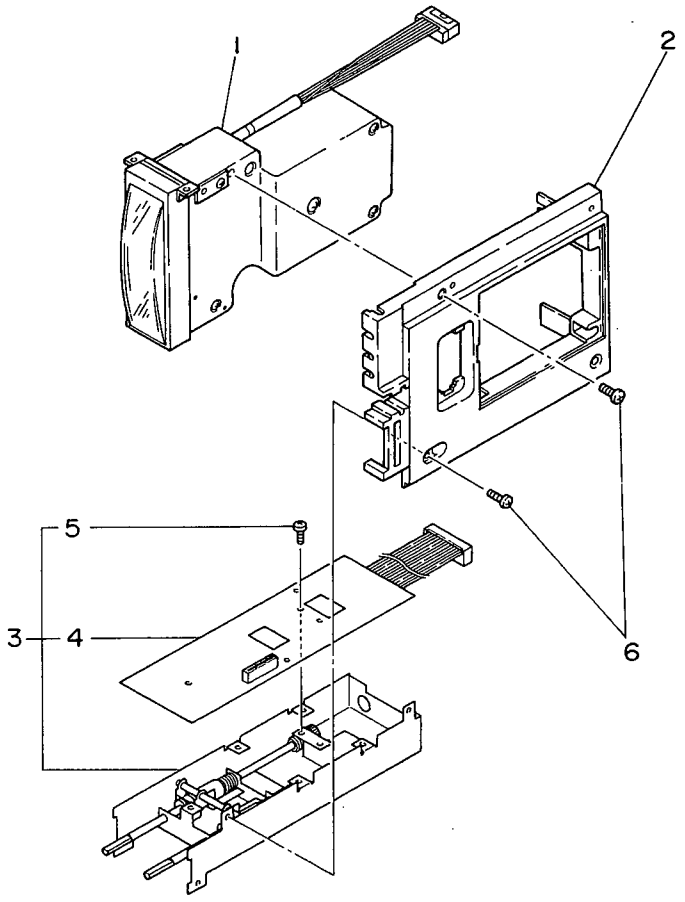
Item	Part No.	Qty	Description
1	E9711TG	1	Cover
2	Y9405JB	1	B. H. Screw, M4 x 5
3	Y9422NP	1	Tag No. Label


6
6
2
4
5
A
D
B
C
To A
To B
10
11
17
12
3
8
7
6
9
1
D
17
To C
17
13
14
16
17
15

Item	Part No.	Qty	Description
1	E9711AK	1	Display Assembly (see page 4)
–	E9711NU	1	Control Assembly (items 2 through 6)
2	E9716JC	1	Main Card
3	E9716JD	1	*Tuning Card*
4	Below	1	Power Supply Unit
	E9716YA		For 100 V Version
	E9716YR		For 220 V Version
5	S9510VK	1	Fuse (1A/250V)
6	Y9306JB	12	Pan H. Screw, M3 x 6
7	E9711MS	1	Bracket
8	E9711MT	1	Pointer
9	E9711MU	1	Pointer
10	–	1	Scale*
11	E9711FG	1	Plate
12	E9711HK	1	Bracket
13	E9711MW	2	Knob
14	E9711MX	2	Knob Spring
15	E9711TE	2	Screw
16	E9711TD	1	Stopper
17	Y9306JB	12	Pan H. Screw, M3 x 6

Note: Specify model,range, unit and characteristic.

E9711AK Display Assembly



Item	Part No.	Qty	Description
1	E9711CD	1	Display Assembly
2	E9711DK	1	Frame Assembly
3	E9711MD	1	Manual Unit
4	E9716WW	1	Manual Board Assembly
5	Y9306JB	5	Pan H. Screw, M3 x 6
6	Y9306JB	5	Pan H. Screw, M3 x 6

Instruction Manual

/ HTB
Power Supply Terminal Connections for Panel - mounted Instruments (Option)

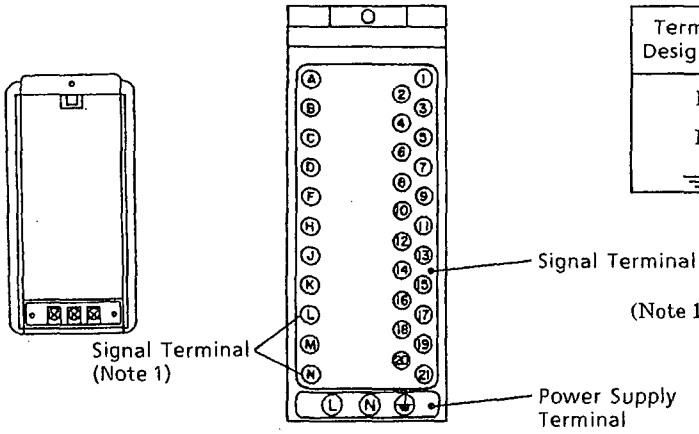
1. GENERAL.

If you specify the terminal board to which the power source is directly connected (suffix code / HTB), the external wiring to the terminal board is necessary.

2. APPLICABLE INSTRUMENTS.

Model	Description
SRVD	Strip Chart Recorder
SIHM	Indicator (With Housing)
SIHF	Bar Graph Indicator (With Alarms)
SIHK	Indicator (With Alarms)
SLCD	Indicating Controller
SLPC	Programmable Indicating Controller
SLMC	Programmable Indicating Controller with Pulse → Width Output
SMLD	Manual Station
SMST	Auto / Manual Station
SMRT	Ratio Set Station
SCMS	Programmable Computing Station
SBSD	Batch Set Station
SLCC	Blending Controller
SLBC	Batch Controller
STLD	Totalizer

3. NAME OF COMPONENTS AND TERMINAL DESIGNATION OF POWER SUPPLY



Terminals Layout

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

(Note 1) Be careful for which Signal Terminals have L, N terminals, too.

4. POWER SUPPLY AND GROUND WIRING.

(1) All cable ends must be furnished with crimp - on type solderless lugs (for 4mm screw).

(2) Examples of applicable cables.

Cross - sectional area of the cable conductor : 2.0mm^2.*

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.

Applicable cable : 600V vinyle insulated cable (IV), conforming to JIS C3307.
Vinyle sheathed cables for electric appliances (KIV), conforming to JIS C3316.

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

FD No. 10004 - S

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