Chapter 4 MODEL NUMBER

4-1 Model Number Configuration

Example:

I	II	III	IV	V
SPS300A	100	A	1	00

I Basic Model No.	II Range	III Mounting	IV Power Voltage	V Additional Processing	Contents
SPS300A					Intelligent pressure sensor 4 to 20 mA DC output + relay 1 contact output
SPS300B					Intelligent pressure switch Relay 1 contact output + relay 1 contact output
	See table below.				
		A			Wall-mount type
		B			Flush-mount type
			1		100/200 VAC 50/60 Hz
			2		120/240 VAC 50/60 Hz
				0 0	None
				0 D	Inspection certificate provided
				0 T	Tropical zone treatment provided
				0 B	Tropical zone treatment provided with test data
				0 Y	Complying with the traceability certification

Range Model No. and Unit

Model No.	kgf/cm^2		Model No.	kPa		Model No.	psi		Model No.	mmHg		Model No.	bar		Model No.	MPa	
100	0 to	1	200	0 to	100	300	0 to	15	700	0 to	760	800	0 to	1	—	—	
101	0 to	2	201	0 to	200	301	0 to	30	701	0 to	1520	801	0 to	2	—	—	
102	0 to	5	202	0 to	500	302	0 to	75	702	0 to	3800	802	0 to	5	—	—	
103	0 to	10	203	0 to	1000	303	0 to	150	703	0 to	7600	803	0 to	10	903	0 to	1
104	0 to	20	204	0 to	2000	304	0 to	300	—	—		804	0 to	20	904	0 to	2
105	0 to	35	205	0 to	3500	305	0 to	500	—	—		805	0 to	35	905	0 to	3.5
106	-1 to	+1	206	-100 to	+100	306	-15 to	+15	706	-760 to	+760	806	-1 to	+1	—	—	
107	-1 to	+10	207	-100 to	+1000	307	-15 to	+150	707	-760 to	+7600	807	-1 to	+10	907	-0.1 to	+1
108	0.2 to	1	208	20 to	100	308	3 to	15	708	152 to	760	808	0.2 to	1	—	—	
109	0 to	3	209	0 to	300	309	0 to	45	709	0 to	2280	809	0 to	3	—	—	
110	-1 to	+20	210	-100 to	+2000	310	-15 to	+300	—	—		810	-1 to	+20	910	-0.1 to	+2
111	-1 to	+35	211	-100 to	+3500	311	-15 to	+500	—	—		811	-1 to	+35	911	-0.1 to	+3.5

4-2 Specifications

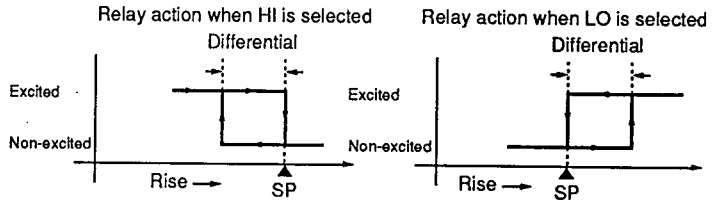
Applicable Fluids	Gases and liquids, except corrosive fluids that may corrode pressure receiver material (SUS316L)	
	Applicable fluid temperature	-20 to +60°C (condensation not allowed)
Pressure Detector	Pressure receiver structure	Oil-filled diaphragm structure protected by oil-seal
	Pressure detecting element	Piezo-resistance silicon pressure detector
	Fluid-contacting material	Diaphragm: SUS316L
		Pressure inlet: SUS316L
Display and Setting	Display/Setting method	Digital 4 digits, 7-segment LED display
	Display/Setting range:	See Table 1 below.

Table 1 Ranges and Units

kgf/cm²		kPa		psi	
Range	Display/Setting range	Range	Display/Setting range	Ragne	Display/Setting range
0 to 1	-0.100 to +1.100	0 to 100	-10.0 to +110.0	0 to 15	-1.50 to +16.50
0 to 2	-0.200 to +2.200	0 to 200	-20.0 to +220.0	0 to 30	-3.00 to +33.00
0 to 5	-0.500 to +5.500	0 to 500	-50.0 to +550.0	0 to 75	-7.50 to +82.50
0 to 10	-1.00 to +11.00	0 to 1000	-100 to +1100	0 to 150	-15.0 to +165.0
0 to 20	-1.20 to +22.00	0 to 2000	-120 to +2200	0 to 300	-18.0 to +330.0
0 to 35	-1.20 to +38.50	0 to 3500	-120 to +3850	0 to 500	-18.0 to +550.0
-1 to +1	-1.200 to +1.100	-100 to +100	-120.0 to +110.0	-15 to +15	-18.00 to +16.50
-1 to +10	-1.20 to +11.00	-100 to +1000	-120 to +1100	-15 to +150	-18.0 to +165.0
0.2 to 1	-0.100 to +1.100	20 to 100	-10.0 to +110.0	3 to 15	-1.50 to +16.50
0 to 3	-0.300 to +3.300	0 to 300	-30.0 to +330.0	0 to 45	-4.50 to +49.50
-1 to +20	-1.20 to +22.00	-100 to +2000	-120 to +2200	-15 to +300	-18.0 to +330.0
-1 to +35	-1.20 to +38.50	-100 to +3500	-120 to +3850	-15 to +500	-18.0 to +550.0

mmHg		bar		MPa	
Range	Display/Setting range	Range	Display/Setting range	Range	Display/Setting range
0 to 760	-76.0 to +836.0	0 to 1	-0.100 to +1.100	—	—
0 to 1520	-152 to +1672	0 to 2	-0.200 to +2.200	—	—
0 to 3800	-380 to +4180	0 to 5	-0.500 to +5.500	—	—
0 to 7600	-760 to +8360	0 to 10	-1.00 to +11.00	0 to 1	-0.100 to +1.100
—	—	0 to 20	-1.20 to +22.00	0 to 2	-0.120 to +2.200
—	—	0 to 35	-1.20 to +38.50	0 to 3.5	-0.120 to +3.850
-760 to +760	-836.0 to +836.0	-1 to +1	-1.200 to +1.100	—	—
-760 to +7600	-836 to +8360	-1 to +10	-1.20 to +11.00	-0.1 to +1	-0.120 to +1.100
152 to 760	-76.0 to +836.0	0.2 to 1	-0.100 to +1.100	—	—
0 to 2280	-228 to +2508	0 to 3	-0.300 to +3.300	—	—
—	—	-1 to +20	-1.20 to +22.00	-0.1 to +2	-0.120 to +2.200
—	—	-1 to +35	-1.20 to +38.50	-0.1 to +3.5	-0.120 to +3.850

<table>
<tr><td rowspan="13">Display and settings</td><td>Display digit change</td><td colspan="3">Lower significant digit can be hidden and set to prevent flickering of hidden digit caused by small pressure fluctuations.</td></tr>
<tr><td>Input digital filter</td><td colspan="3">0.00 to 99.99 sec., variable First-order lag filter system
0.00: Filter OFF</td></tr>
<tr><td rowspan="3">Response speed</td><td>Display output</td><td>100 ms</td><td rowspan="3">Input digital filter = 0.00 at 63% response</td></tr>
<tr><td>Current output</td><td>50 ms</td></tr>
<tr><td>Relay contact outlet</td><td>50 ms</td></tr>
<tr><td rowspan="7">Readout accuracy (Note 1)</td><td>Working temperature range / Pressure range</td><td colspan="2">-20 to 0°C and 50 to 60°C</td></tr>
<tr><td>Positive pressure range</td><td colspan="2">± 1%FS ± 1 digit (± 2% 1 digit for the range codes 102, 202, 302, 702 and 802)</td></tr>
<tr><td>Negative pressure range</td><td colspan="2">± 2%FS ± 1 digit</td></tr>
<tr><td>Working temperature range / Pressure range</td><td colspan="2">0 to 50°C</td></tr>
<tr><td>Positive pressure range</td><td colspan="2">± 0.25%FS ± 1 digit</td></tr>
<tr><td>Negative pressure range</td><td colspan="2">± 1%FS ± 1 digit</td></tr>
<tr><td colspan="3">(Note 1) Overall accuracy including linearity, offset, hysteresis, and their temperature/power voltage characteristics.</td></tr>
<tr><td rowspan="12">Output unit</td><td>Model name</td><td colspan="3">Intelligent pressure sensor</td></tr>
<tr><td>Basic model No.</td><td colspan="3">SPS300A</td></tr>
<tr><td>Output type</td><td colspan="3">Current + relay contact (SPDT)</td></tr>
<tr><td rowspan="4">Output rating</td><td rowspan="3">Current</td><td>Current value</td><td>4 to 20 mA External load resistance: Lower than 300Ω</td></tr>
<tr><td>Scaling</td><td>Scaling can be set.</td></tr>
<tr><td>Manual</td><td>Current value manual output can be set.</td></tr>
<tr><td>Relay contact</td><td>SP1</td><td>250 VAC 3A resistive load (Note 2)</td></tr>
<tr><td>Model name</td><td colspan="3">Intelligent pressure switch</td></tr>
<tr><td>Basic model No.</td><td colspan="3">SPS300B</td></tr>
<tr><td>Output type</td><td colspan="3">Relay contact (SPDT) + relay contact (SPDT)</td></tr>
</table>

<table>
<tr><td rowspan="11">Output unit</td><td rowspan="3">Output rating</td><td>Relay contact</td><td>SP1</td><td colspan="2">250 VAC 3A resistive load (Note 2)</td></tr>
<tr><td>Relay contact</td><td>SP2</td><td colspan="2">250 VAC 3A resistive load (Note 2)</td></tr>
<tr><td colspan="4">(Note 2) Mechanical life: 50,000,000 cycles
Electrical life: 100,000 cycles (with rated load)</td></tr>
<tr><td>Relay action</td><td>Hi</td><td colspan="2">Relay de-excited on pressure rise, excited on pressure drop.</td><td rowspan="2">Selectable</td></tr>
<tr><td>Lo</td><td colspan="2">Relay excited on pressure rise, de-excited on pressure drop.</td></tr>
<tr><td>Output update cycle</td><td colspan="4">25 ms</td></tr>
<tr><td>Relay action</td><td colspan="4"> 
</td></tr>
<tr><td rowspan="7">Output accuracy (Note 3)</td><td colspan="2">Working temperature range / Pressure range</td><td colspan="2">-20 to 0°C and 50 to 60°C</td></tr>
<tr><td colspan="2">Positive pressure range</td><td colspan="2">± 1%FS (± 2%FS for the range codes 102, 202, 302, 702 and 802)</td></tr>
<tr><td colspan="2">Negative pressure range</td><td colspan="2">± 2%FS</td></tr>
<tr><td colspan="2">Working temperature range / Pressure range</td><td>0 to 50°C</td><td></td></tr>
<tr><td colspan="2">Positive pressure range</td><td>± 0.25%FS</td><td></td></tr>
<tr><td colspan="2">Negative pressure range</td><td>± 1%FS</td><td></td></tr>
<tr><td colspan="4">(Note 3) Overall accuracy including linearity, offset, hysteresis, and their temperature/power voltage characteristics.</td></tr>
<tr><td rowspan="4">Functions</td><td>PV adjustment</td><td colspan="4">PV bias, PV zero point and span adjustment</td></tr>
<tr><td>Peak hold</td><td colspan="4">The last maximum pressure value can be held in memory, displayed, and checked. This value is cleared when the power is turned OFF. This peak hold function is activated for 20 seconds only after turning the power supply ON.</td></tr>
<tr><td>Keylock</td><td colspan="4">This function is used to prevent inadvertent change to setting values. The contents of the DISP and PARAMETER modes can be displayed.</td></tr>
<tr><td>Self-diagnostics</td><td colspan="4">Sum check is carried out on user setting values and backup setting values, and on manufacturer setting values (adjusting values) and backup setting values. If an error is found, an alarm is output.</td></tr>
</table>

Functions	Alarms	Overscale (Pressure exceeding the Display/Setting range of Table 1) and abnormal working temperature (higher than +80°C or lower than -20°C) are displayed by alarm codes.
General specifications	Breakdown pressure	3 times the span (1.5 times with range codes 105, 109, 111, 205, 209, 211, 305, 309, 311, 709, 805, 809, 811, 905 and 911
	Allowable pressure	1.1 times the span (Equal to the span with range codes 105, 109, 111, 205, 209, 211, 305, 309, 311, 709, 805, 809, 811, 905 and 911
	Rated voltages	100/200 VAC 50/60 Hz or 120/240 VAC 50/60 Hz
	Working voltage range	100/200 VAC: 82 to 110/164 to 220 V 50/60 Hz ± 2 Hz 120/240 VAC: 99 to 132/198 to 264 V 50/60 Hz ± 2 Hz
	Power consumption	7 W max.
	Insulation resistance	At least 50 MΩ across both primary power supply and case, and primary and secondary power supplies using a 500 VDC megger.
	Dielectric strength	1500 VAC, for 1 minute or 1800 VAC, for 1 second across both primary power supply and case, and across primary and secondary power supplies.
		Caution: Wall-mount type is provided with a lightning surge protector for the power supply. A current will flow if a voltage of higher than about 1000 V is applied across the power supply and the case. To prevent this, disconnect the dielectric strength test pin from the power supply board before carrying out the dielectric strength test. Reinsert the pin after the test.
	Lightning surge countermeasure	Wall-mount type: A lightning surge protector is built in. (10 kV across power supply and sensor, 6 kV across the power supply and the case)
		Panel-flush mount type: No lightning surge protector provided.
	Working ambient temperature	-20 to +60°C (condensation not allowed)
	Ambient storage temperature	-20 to +80°C (condensation not allowed)
	Ambient working humidity	40°C, 90%RH max. (condensation not allowed)
	Vibration resistance	4.9 m/s² max., 10 to 60 Hz in X, Y, and Z directions, 2 hours each
	Shock resistance	490 m/s² max. in X, Y, and Z directions, 3 times
	Main unit materials	Case/cover: Diecast aluminum Door, window, decorative panel: Polycarbonate
	Pressure inlet	Rc ¼ Note:Liquid temperature must not be higher than 60°C. Use a siphon to reduce temperature.
	Structure standard	JIS C 0920 Class 3. Rain-proof type (wall-mount type)

General specifications	Main unit color	Case: Gray Cover, window, decorative panel: Dark gray Door: Gray smoke
	Mass	Approx. 1.1 kg
	Mounting position	Vertical
	Mounting	Wall-mount or panel flush-mount
	Mounting state	Permanent connected device
	Installation category	Category II (IEC664-1, EN61010-1)
	Pollution degree	2
	Applicable standards	EN61010-1, EN50081-2, EN50082-2, EN61326

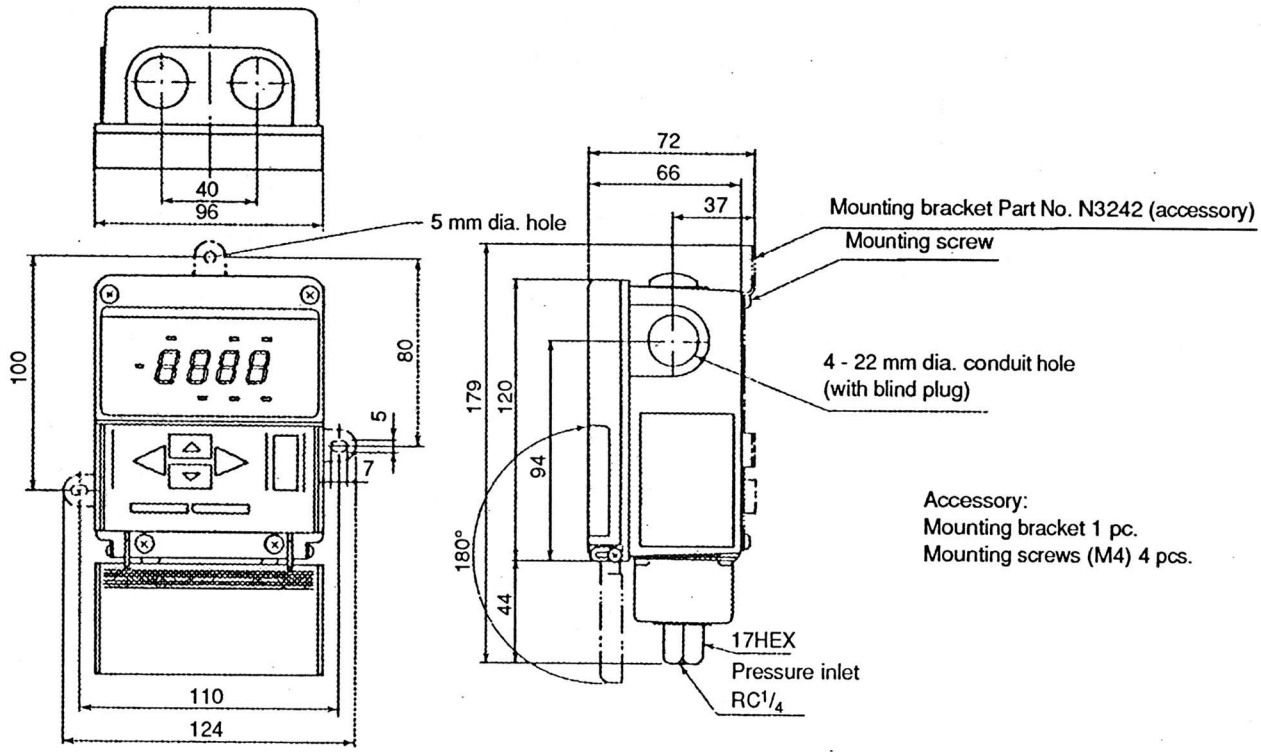
4-3 Accessories and Optional Parts

Standard accessories	Wall mounting bracket (with pressure range indicator label and four M4 screws) Part No. N3242 1 set	
	Panel mounting bracket (with pressure range indicator label) Part No. N3243 1 set	
Auxiliary parts (optional)	Siphon	Part No. J-14026
	Cover packing for replacement	Part No. 81403871-001

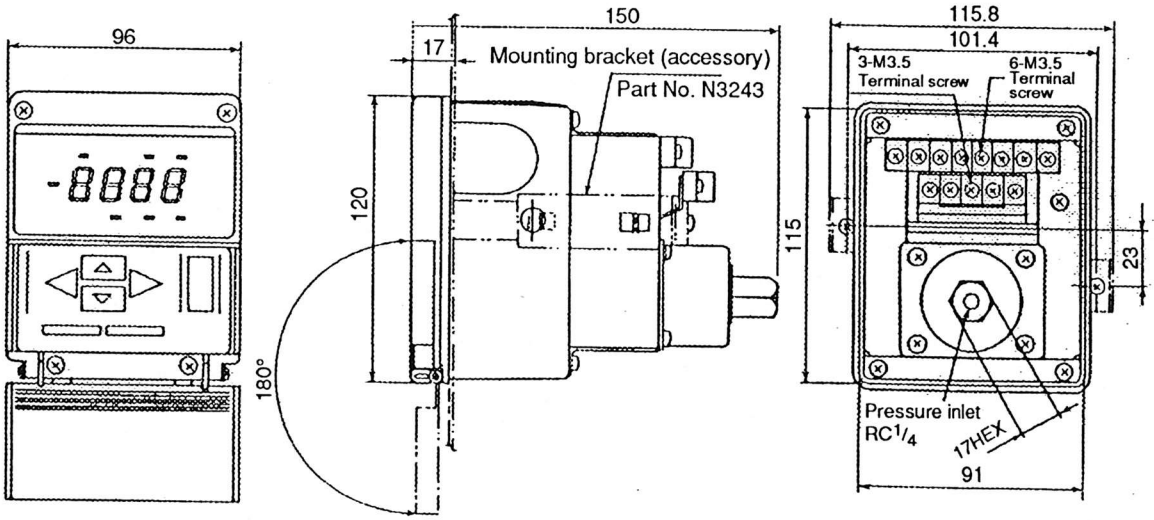
4-4 External Dimension Drawing

SPS300A/B □□□ A: Wall-mount type

Unit: mm

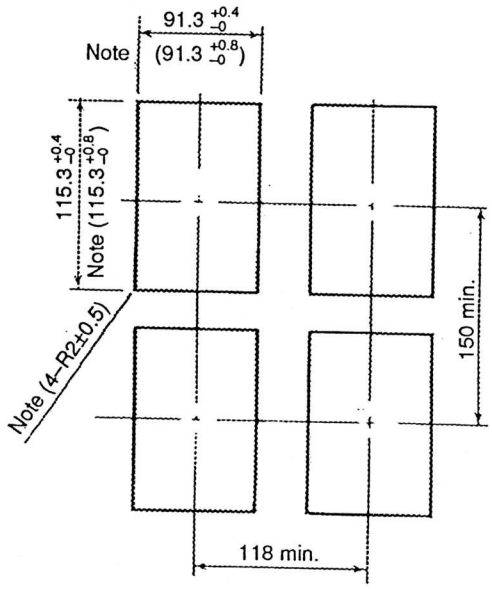


SPS300A/B □□□ B: Panel-mount



Unit: mm

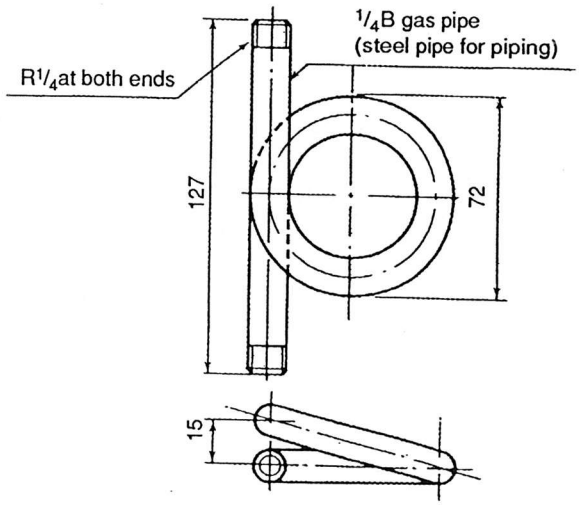
[Panel cutout size]



Note:
Apply the cutout hole dimensions in Note () parentheses to round corners.

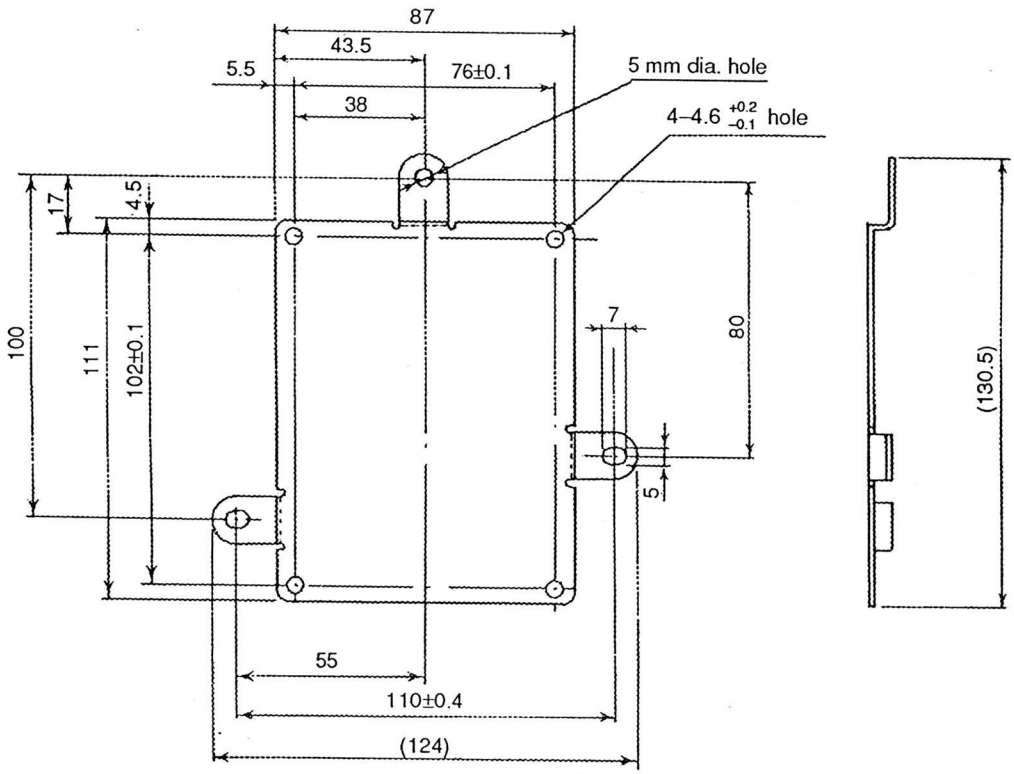
(Option)

Siphon Part No. J-14026



(Accessories)

Wall mounting bracket Part No. N3242



Chapter 5 INSTALLATION

5-1 Siting Environment

Avoid installing the SPS300 A/B in the following locations:

① Locations outside of the operating temperature range -20 to 60°C

② Locations exceeding the operating humidity range 90%RH

③ Locations subject to sudden changes in temperature and condensation

④ Locations subject to corrosive or flammable gases

⑤ Locations subject to large amounts of dirt, dust, salt, conductive substances such as iron powder, or organic solvents

⑥ Locations that directly subject the body to vibration or impact

⑦ Locations subject to the direct sunlight

⑧ Locations subject to large amounts of water or rain

⑨ Locations subject to splashing by oil or chemicals

⑩ Locations where strong magnetic or electrical fields are generated

⑪ Locations where connector joints are subject to surge pressure

⚠ CAUTION

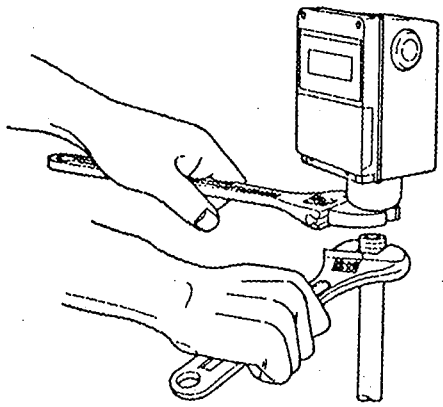
Always use wall-mounting bracket (part No. N3242).

5-2 Pressure Inlet Connection

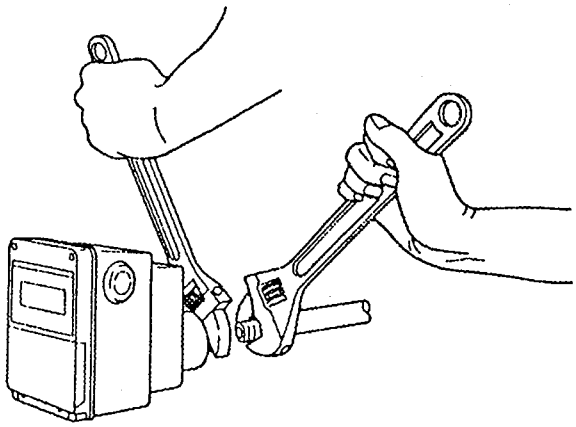
Do not screw in the pipe while holding the unit when connecting the pipe to the pressure inlet. Doing so might damage the unit.

1) Correct connection

a) Wall-mount

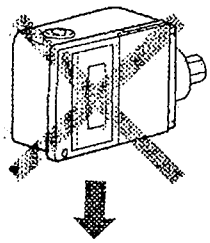


b) Panel-mount

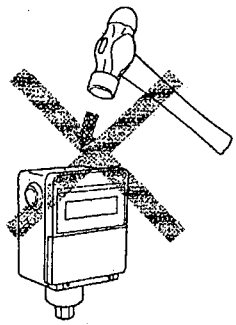


2) Incorrect connection

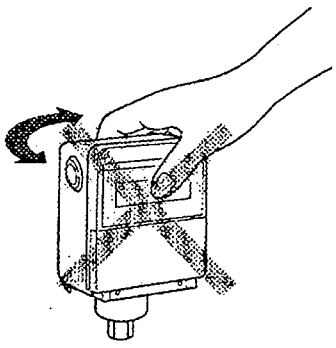
a) Drop



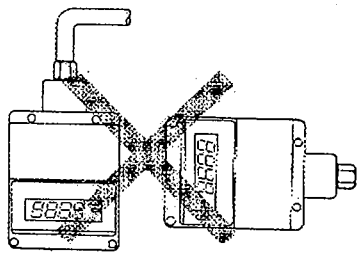
b) Strike



c) Screw-in, push, or pull



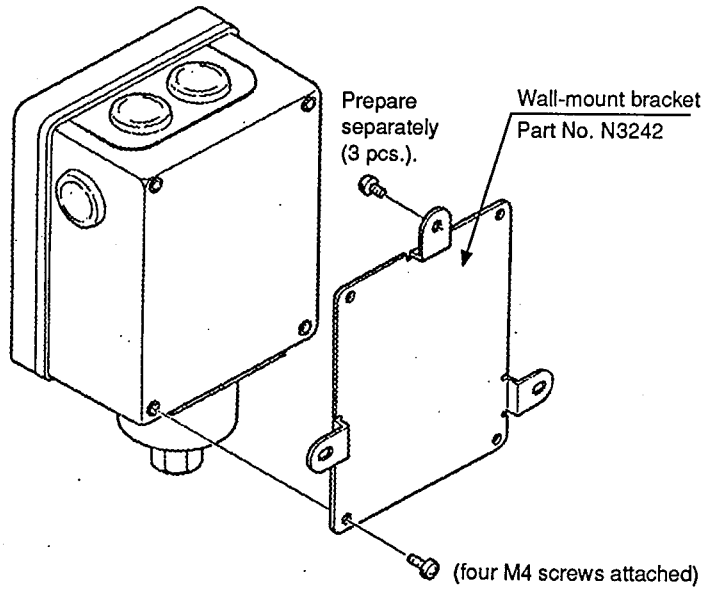
d) Upside-down or horizontal



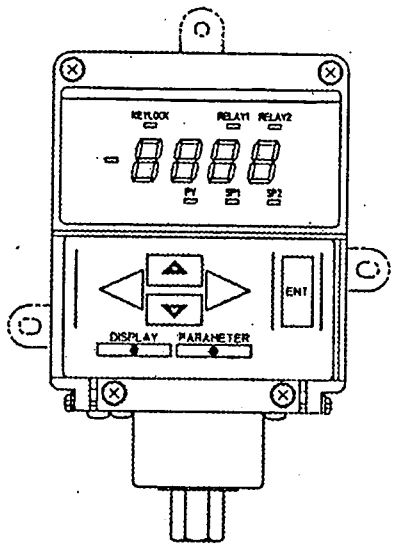
5-3 Installation

1) Wall-mount

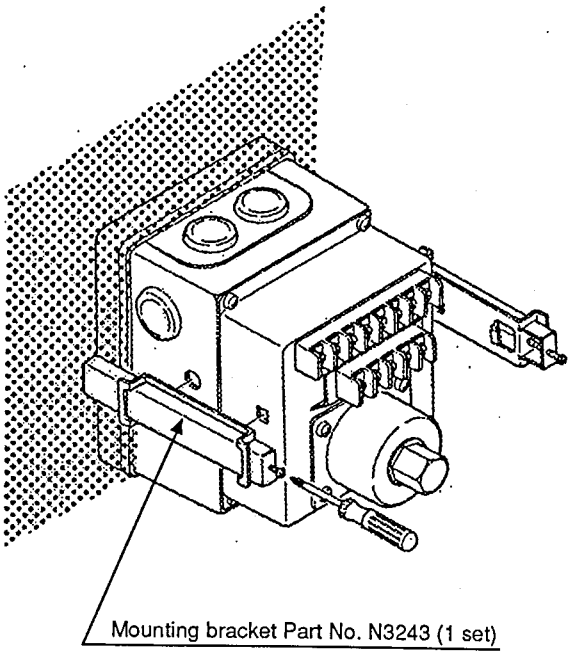
a) Wall-mount bracket installation



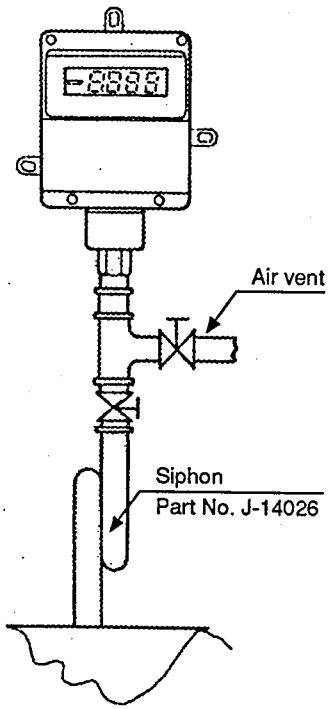
b) Wall-mount bracket diagram



2) Panel-mount bracket installation



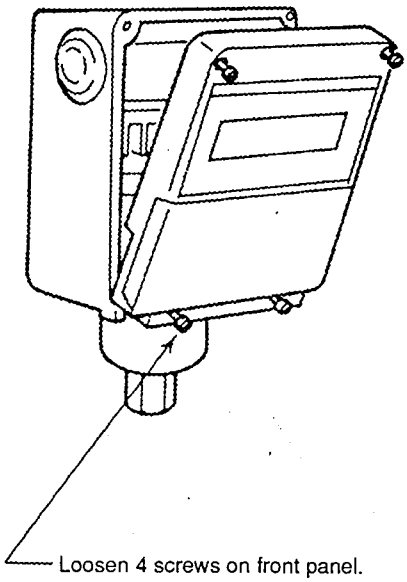
Example of siphon installation

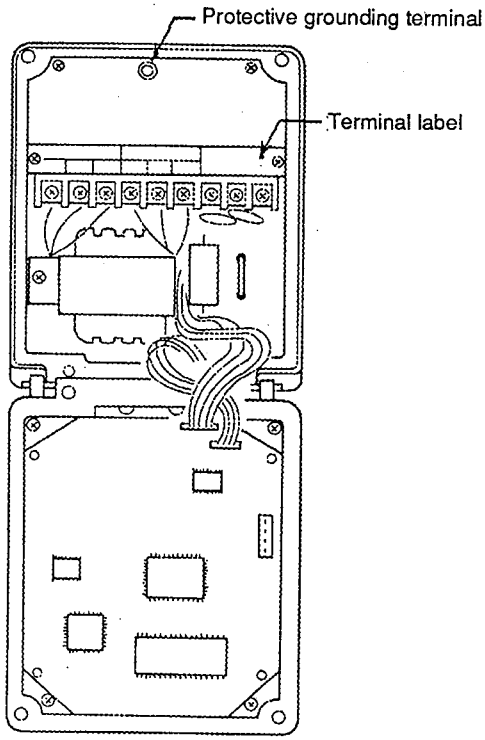


Chapter 6 WIRING

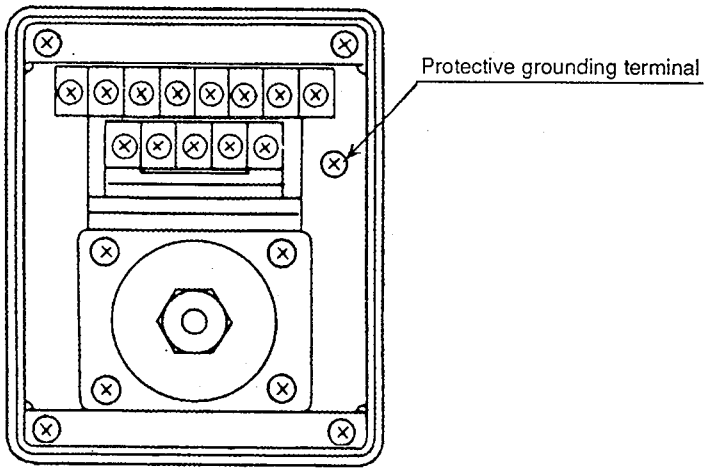
■ SPS300 □□□□ A

The terminal board can be accessed by opening the front cover.





■ SPS300 □□□□ B



■ Wiring Precautions

- To prevent electric shock on panel-mounted types, prevent direct contact with the terminals by the operator.
- A switch in the main power supply is required within operating range of the equipment.

  * Provide a fuse(s) matched to the mains power supply in the instrument power supply wiring.

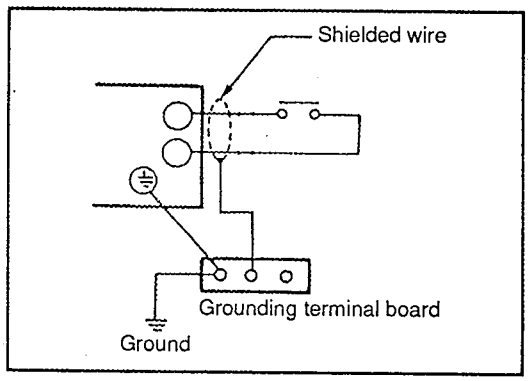
    Type F 100 mA, 250 VAC fuse (supply voltage: 100/120 VAC)

    Type F 50 mA, 250 VAC fuse (supply voltage: 200/240 VAC)
- Grounding must be carried out at one point on the protective ground terminal.
- Shielded cables should be grounded by connection to an earth bar.
- Ground according to the following conditions:

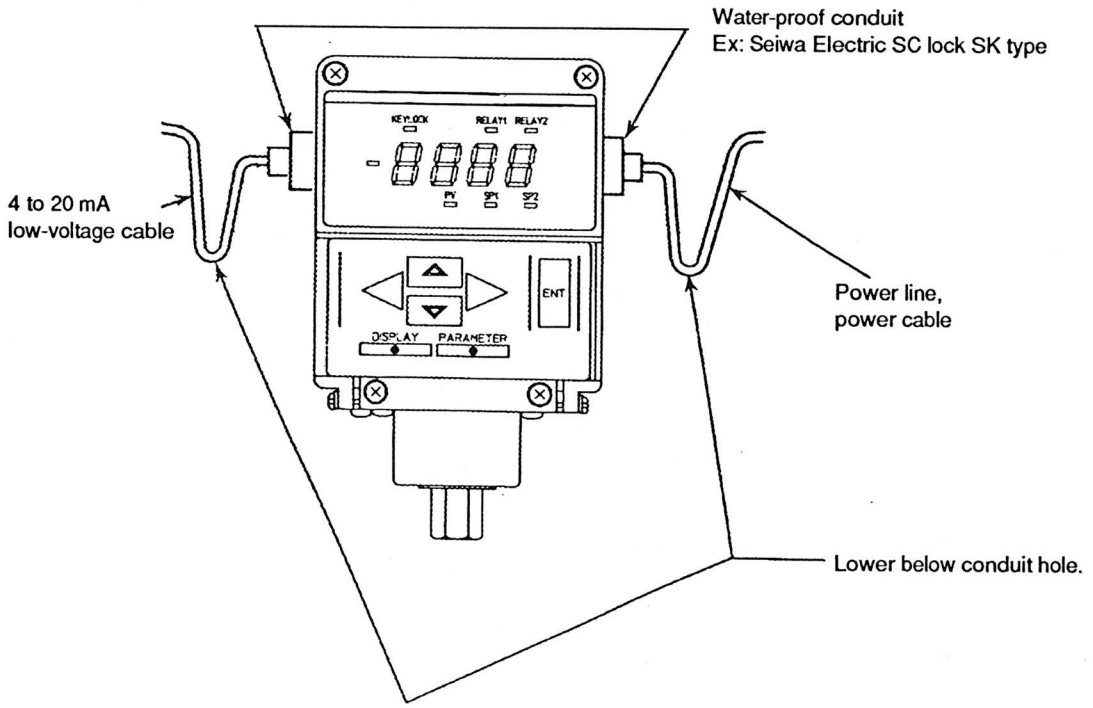
  Grounding type: Grounding resistance of 100Ω max.

  Grounding wire: Mild copper wire of more than 2mm²

  Grounding wire length: 20 m max.
- If waterproofing is required seal the conduit hole with a water-proof conduit.

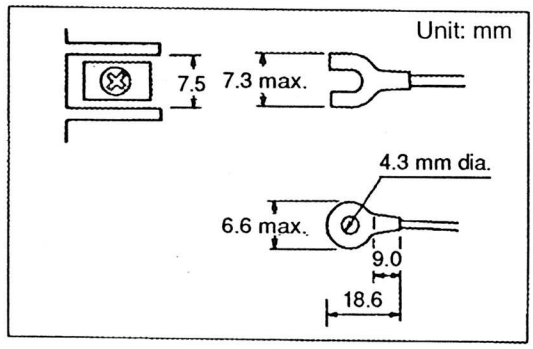


- Wire cables as shown in the figure below.



- Separate as far as possible low-output signal cables and drive power cables, or especially power cables of higher than 100 V. Do not insert them into the same conduit or duct.
- Use crimped terminals that can be used on 3.5 screws.

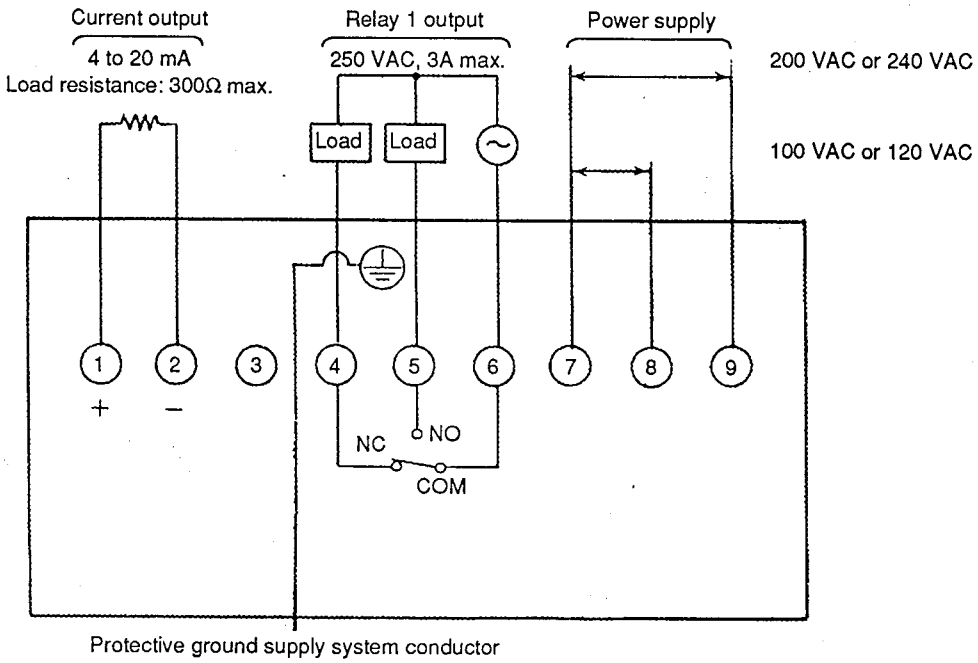
  When installing the SPS300 A/B at locations subject to a lot of vibration or shock, be sure to use round terminals that do not come loose from the terminals.



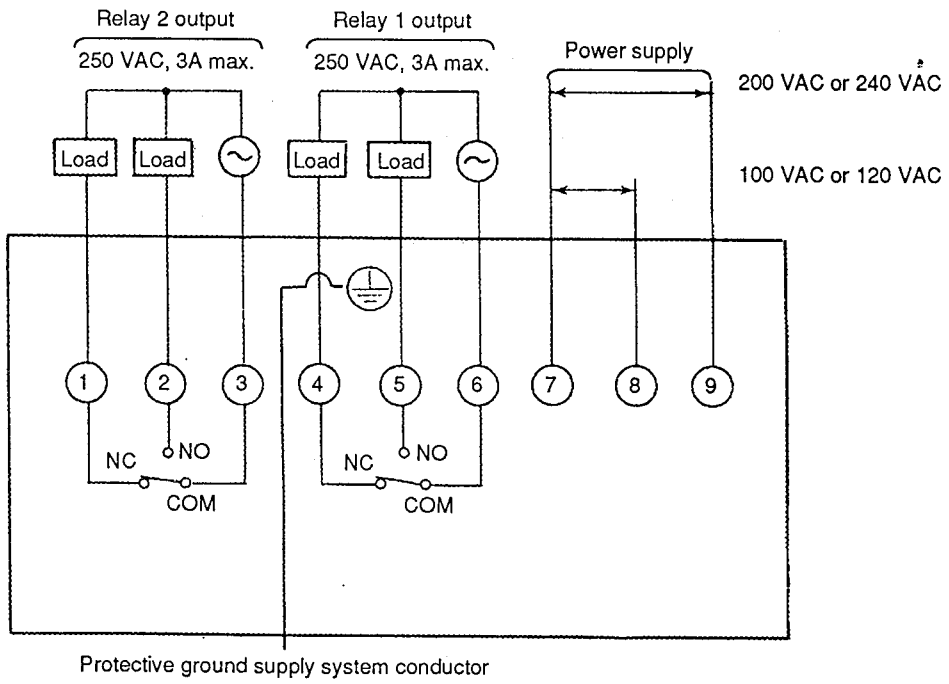
- Be careful not to scratch electronic parts, lead wires, and other components with a screwdriver or other tools.
- First confirm the model number of your unit, then connect cables according to the proper connection diagram.
- After wiring, check that the wiring is correct.

Terminal connection diagram (wall-mount type)

SPS300A

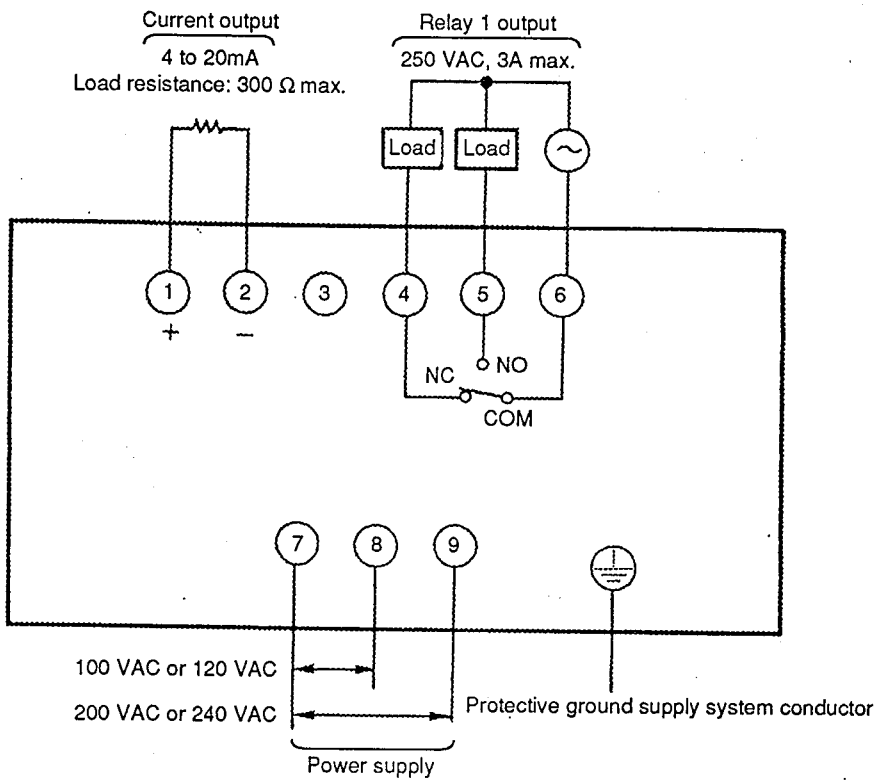


SPS300B

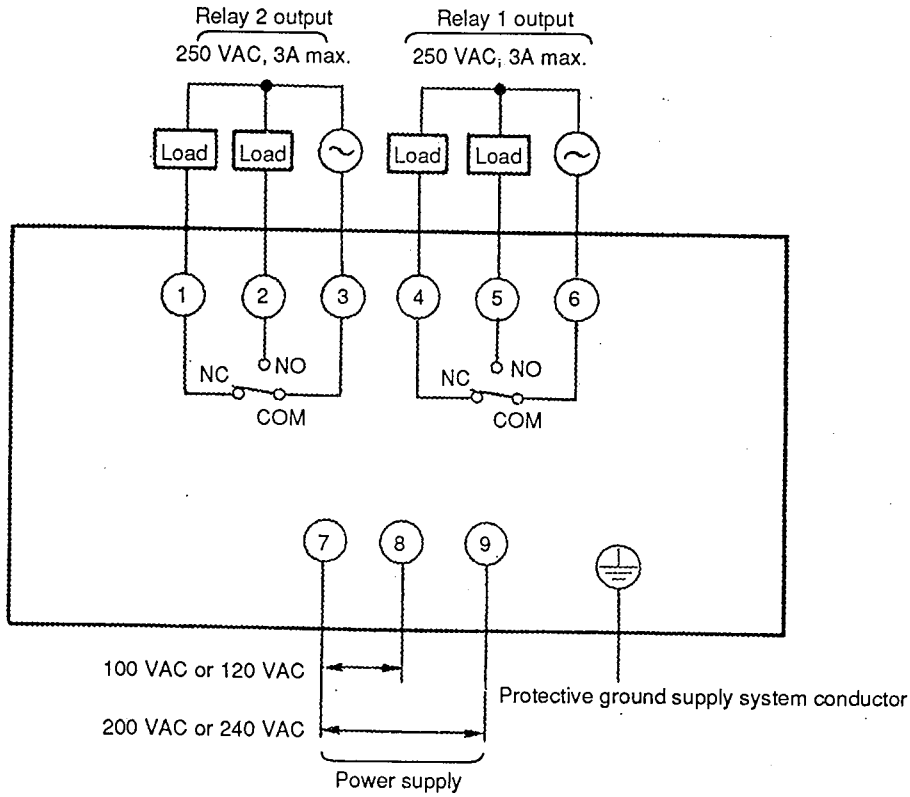


Terminal connection diagram (panel-mount type)

SPS300A



SPS300B



Precautions during Use

- Perform pressure calibration at least once per year.
- This unit is a precision instrument. Protect the unit from excessive shock during installation or operation.
- This unit is not free-standing. Firmly fix onto a mounting plate.
- Do not hold the case while threading the pipe into unit. Use a hexagonal nut to secure the SPS300 A/B while attaching the pipe.
- Install the SPS300 A/B upright only. Installing the SPS300 A/B horizontally, for example, may result in errors.
- The SPS300 A/B is designed to be rain-proof (JIS C 0920 Class 3). However, install the unit out of the direct sunlight or rain. Also, when the SPS300 A/B must be protected from the rain, provide a water-proof conduit
- Do not exceed allowable pressure limits. If abnormal pressures are applied to the SPS300 A/B, drift in readout accuracy may occur. Check the unit for abnormalities after use.
- The SPS300 A/B is designed to have a sufficient tolerance when allowable pressures are exceeded. However, use caution when opening and closing valves, when pressure surge through non-compressible liquids might damage the pressure sensor.
- Protect liquid-contacting parts from freezing. If freezing is anticipated, protect with a low-grade, external heat source.
- Reduce the pressure inlet temperature to 60°C or lower by installing a siphon when measuring high-temperature media.
- Wait for at least 10 minutes after turning the power ON for the unit to stabilize.

Chapter 7 MAINTENANCE

1. Cleaning

To remove dirt on the SPS300 A/B, wipe with a soft, dry cloth.

2. Dielectric strength test

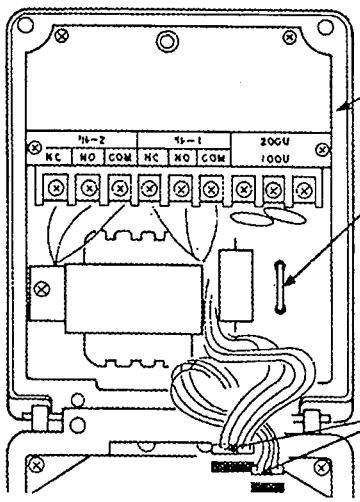
Remove the dielectric strength test pin from next to the transformer before starting the dielectric strength test on wall-mount types. Re-insert the pin securely at the end of test.

3. Parts replacement

Parts must be replaced by authorized personnel only.

- **Replacing packing**

If rain-protection is required, replace the rubber packing (Part No. 81403871-001) if one year has passed since the seal was broken.



How to Replace the Rubber Packing

1. Disconnect the connector.
2. Replace the rubber packing. (Mount new packing in original position.)
3. Reconnect the connector.

- **Replacing fuses**

Use specified standard parts when replacing fuses provided on the mains power supply wiring.

Standard: IEC127
Type: F
Rated voltage: 250 V
Rated current: 100 mA (supply voltage: 100/120 VAC)
50 mA (supply voltage: 200/240 VAC)

Specifications are subject to change without notice.

YAMATAKE

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This has been printed on recycled paper.

Printed in Japan.
3rd Edition: Issued in Nov., 1998(K)
6th Edition: Issued in Jan., 2003(M)