

# Digital Pressure Detectors (Intelligent Pressure Sensor and Switch) SPS 300A, B

## ■ Features

The SPS 300A, B are microprocessor-based high accuracy and high function digital pressure detectors. Liquid-filled dual diaphragm (SUS316L) and a semiconductor-based pressure detection elements are incorporated into the pressure detection unit. These detectors are used for gauge pressure measurement.

The SPS 300A is a pressure switch which offers two-stage relay contact (independent) outputs.

- High accuracy of  $\pm 0.25\%$ FS and high speed response of 50ms (63% response).
- High reliability of more than one million pressure-cycle mechanical life.
- Rainproof structure.
- Key operation and high visibility large digital indication.
- Smart functions ensure applicability to a wide range of sites:
  - ★ PV bias adjustable.      ★ Adjustable indication figure



- ★ Adjustable filter constant    ★ Peak hold
- ★ Keylock                            ★ Output scaling
- ★ Adjustable Hi-Lo relay action
- ★ Manual output setting possible

## ■ Specifications

<b>Applicable fluids</b>	Gas and liquid, except for corrosive fluid with pressure element (SUS316L)		<b>Fluid temperatures</b>	-20 to +60°C No freezing		
<b>Pressure detection</b>	<b>Structure of pressure receiving unit</b>	Barrier structure of oil-filled seal diaphragm		<b>Material of part which contacts liquids</b>	Diaphragm: SUS316L	
	<b>Pressure detecting element</b>	Piezo resistance type Silicon pressure detecting element			Pressure inlet: SUS316L	
<b>Indication and setting</b>	<b>Display</b>	Digital 4-digit 7-segment LEDs				
	<b>Measuring range</b>	See Table 1				
	<b>Digit position change</b>	To stop unstable display of digits during fine pressure fluctuation, the position of digits is shifted to the right so as not to display the least significant digit.				
	<b>Input digital filter</b>	0.00 to 99.99 sec. adjustable, first-order-lag filter system, filter off at 0.00				
	<b>Response speed</b>	Indication output	100ms	Input digital filter = 0.00 at 63% response		
		Current output	50ms			
		Relay contact output	50ms			
<b>Indication accuracy (Note 1)</b>	Ambient temperature range					
	Pressure range		-20 to 0°C	0 to 50°C	50 to 60°C	
	Positive pressure range		$\pm 1\%$ FS $\pm 1$ digit	$\pm 0.25\%$ FS $\pm 1$ digit	$\pm 1\%$ FS $\pm 1$ digit	
	Negative pressure range		$\pm 2\%$ FS $\pm 1$ digit	$\pm 1\%$ FS $\pm 1$ digit	$\pm 2\%$ FS $\pm 1$ digit	
Note 1: This indication accuracy is the total of the accuracy influenced by linearity, offset, hysteresis, etc. including those characteristics changed by power supply voltage fluctuations.						
<b>Output</b>	<b>Product name</b>	Intelligent pressure sensor		Intelligent pressure switch		
	<b>Basic model No.</b>	SPS 300A		SPS 300B		
	<b>Output type</b>	Current + relay contact (SPDT)		Relay contact (SPDT) + relay contact (SPDT)		
	<b>Output rating</b>	Current	Current value	4 to 20mA, external load resistance 300Ω max.	Relay contact	SP1 250Vac 3A, Resistive load (Note 2)
			Scaling	Adjustable zero point and span setting is possible.	Relay contact	SP2 250Vac 3A, Resistive load (Note 2)
	Relay contact	SP1	250Vac 3A Resistive load (Note 2)	Note 2: Mechanical life: 50,000,000 cycles Electrical life: 10,000 cycles		

<b>Output</b>	<b>Relay operation</b>	Hi	Deenergized on pressure raise, energized on pressure drop	Can be switched	
		Lo	Energized on pressure raise, deenergized on pressure drop		
	<b>Differential</b>	0 to 100%FS adjustable			
	<b>Output/renewal cycle</b>	25ms			
	<b>Output accuracy (Note 3)</b>	Ambient temperature range	-20 to 0°C	0 to 50°C	
	Pressure range				
	Positive pressure range	±1%FS	±0.25%FS	±1%FS	
	Negative pressure range	±2%FS	±1%FS	±2%FS	
	Note 3: This indication accuracy is the total of the accuracy influenced by linearity, offset hysteresis, etc. including those characteristics change by power supply voltage fluctuations.				
<b>Other functions</b>	<b>Bias for measured value</b>	0 to 100%FS adjustable			
	<b>Adjustment of measured value</b>	Zero point and span adjustable for measured value			
	<b>Peak hold</b>	The highest pressure value applied in the past has been memorized and so can be confirmed by display. It is cleared when the power is turned off. The peak old function is not effective for approximately the initial 20 seconds after power is turned on.			
	<b>Keylock</b>	Used to protect the stored setpoint against change by incorrect operation or any other conditions. Contents for DISP or PARA mode can be displayed.			
	<b>Self-diagnostics</b>	Checksum is made between the user's and back-up setpoints, also between the manufacturer's and back-up setpoints. An alarm is output when an abnormal condition is discovered.			
	<b>Alarm</b>	Alarm code is displayed at overscale (above +10%FS or under -10%FS) or at abnormal fluid temperature (above +80°C or under -20°C)			
<b>General specifications</b>	<b>Breakage pressure</b>	3 times the maximum pressure of range but 1.5 times for the ranges of 0 to 300kPa, 0 to 3500kPa, -100 to +3500kPa, 0 to 3.5MPa, -0.1 to +3.5MPa, 0 to 3 bar, 0 to 3.5 bar and -1 to +35 bar.			
	<b>Allowable pressure</b>	1.1 times the maximum pressure of range but 1.0 times for the ranges of 0 to 300kPa, 0 to 3500kPa, -100 to +3500kPa, 0 to 3.5MPa, -0.1 to +3.5MPa, 0 to 3 bar, 0 to 3.5 bar and -1 to +35 bar.			
	<b>Rated power supply voltage</b>	100/200Vac 50 to 60Hz or 120/240Vac 50 to 60Hz			
	<b>Allowable power supply voltage</b>	100/200Vac: 82 to 110 / 164 to 220V 120/240Vac: 99 to 132 / 198 to 264V			
	<b>Power consumption</b>	7W max. at max. load and relay on or 20mA output			
	<b>Insulation resistance</b>	More than 50MΩ between primary power supply terminals and case, and also between primary and secondary power supply terminals by 500Vdc megger.			
	<b>Dielectric strength</b>	1 minute at 1500Vac or 1 second at 1800Vac between primary power supply terminals and case, and also between primary and secondary power supply terminals. Note: A wall-mount model incorporates a lightning surge arrester for the power supply. Current flows when voltage above 1000V is applied between the power supply terminals and case. Remove the dielectric strength test pin provided on the power supply board before the dielectric strength test is made. Return it to the original position after the test.			
	<b>Lightning protection</b>	Wall mount model: With a built-in lightning surge arrester (10KV between power supply terminals, 6KV between power supply terminals and case). Panel mount model: Without lightning arrester			
	<b>Ambient temperature</b>	-20 to +60°C No freezing			
	<b>Storage temperature</b>	-20 to +80°C No freezing			
	<b>Humidity</b>	40°C, 90%RH max. (non-condensing)			
	<b>Vibration resistance</b>	4.9m/s <sup>2</sup> max. 0 to 60Hz, 2 hours each to each direction of X, Y, Z			
	<b>Shock resistance</b>	490m/s <sup>2</sup> max. 3 times 2 hours each to each direction of X, Y, Z			
	<b>Construction</b>	Case and cover: aluminium die-cast, door, window and nameplate: polycarbonate			
	<b>Pressure inlet</b>	Rc1/4 Note: When the fluid temperature is above 60°C, use a siphon to decrease the temperature below 60°C			
	<b>Rating</b>	JIS C 0920 class 3 rainproof			
	<b>Body color</b>	Case: gray Cover, window and nameplate: dark gray Door: gray semi-transparent			
	<b>Weight</b>	Approx. 1.1kg			
	<b>Mounting position</b>	Vertical			
	<b>Installation status</b>	Permanent connection type equipment			
	<b>Installation category</b>	Category II (IEC664-1, IEC1010-1)			
	<b>Pollution degree</b>	Pollution degree 2			
	<b>Applicable standard</b>	EN61010-1, EN50081-2, EN50082-2			
<b>Installation</b>	Wall mount or panel mount				
<b>Standard accessories</b>	Wall mount fittings (with pressure range indication label, M4 screws 4 pcs)	Part No. <b>N3242</b>	1 set		
	Panel mount fittings (with pressure range indication label)	Part No. <b>N3243</b>	1 set		
<b>Auxiliary parts (separate order)</b>	Siphon	Part No. <b>J-14026</b>			
	Cover packing replacement	Part No. <b>81403871-001</b>			

Caution: Confirm the spec. carefully and use properly.

**Table 1 Measuring range - Unit**

kPa		bar		MPa	
Measuring range	Indication and setting range	Measuring range	Indication and setting range	Measuring range	Indication and setting range
0 to 100	-10.0 to +110.0	0 to 1	-0.100 to +1.100	—	—
0 to 200	-20.0 to +220.0	0 to 2	-0.200 to +2.200	—	—
0 to 500	-50.0 to +550.0	0 to 5	-0.500 to +5.500	—	—
0 to 1000	-100 to +1100	0 to 10	-1.00 to +11.00	0 to 1	-0.100 to +1.100
0 to 2000	-120 to +2200	0 to 20	-1.20 to +22.00	0 to 2	-0.120 to +2.200
0 to 3500	-120 to +3850	0 to 35	-1.20 to +38.50	0 to 3.5	-0.120 to +3.850
-100 to +100	-120.0 to +110.0	-1 to +1	-1.200 to +1.100	—	—
-100 to +1000	-120 to +1100	-1 to +10	-1.20 to +11.00	-0.1 to +1	-0.120 to +1.100
20 to 100	-10.0 to +110.0	0.2 to 1	-0.100 to +1.100	—	—
0 to 300	-30.0 to +330.0	0 to 3	-0.300 to +3.300	—	—
-100 to +2000	-120 to +2200	-1 to +20	-1.20 to +22.00	-0.1 to +2	-0.120 to +2.200
-100 to +3500	-120 to +3850	-1 to +35	-1.20 to +38.50	-0.1 to +3.5	-0.120 to +3.850

**Model Selection Guide**



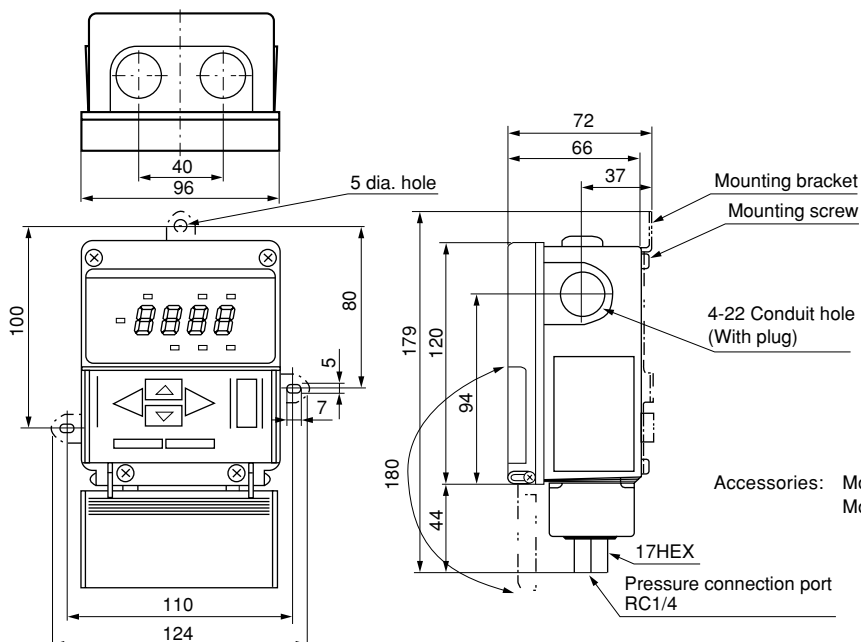
Example: 300A200A100

No.	Item	Code	Description				
I	Basic Model No.	<b>SPS300A</b>	Intelligent Pressure Sensor				
		<b>SPS300B</b>	Intelligent Pressure Switch				
II	Range	Code	kPa	Code	bar	Code	MPa
		<b>200</b>	0 to 00	<b>800</b>	0 to 1	—	—
		<b>201</b>	0 to 200	<b>801</b>	0 to 2	—	—
		<b>202</b>	0 to 500	<b>802</b>	0 to 5	—	—
		<b>203</b>	0 to 1000	<b>803</b>	0 to 10	<b>903</b>	0 to 1
		<b>204</b>	0 to 2000	<b>804</b>	0 to 20	<b>904</b>	0 to 2
		<b>205</b>	0 to 3500	<b>805</b>	0 to 35	<b>905</b>	0 to 3.5
		<b>206</b>	-100 to +100	<b>806</b>	-1 to +1	—	—
		<b>207</b>	-100 to +1000	<b>807</b>	-1 to +10	<b>907</b>	-0.1 to +1
		<b>208</b>	20 to 100	<b>808</b>	0.2 to 1	—	—
		<b>209</b>	0 to 300	<b>809</b>	0 to 3	—	—
<b>210</b>	-100 to +2000	<b>810</b>	-1 to +20	<b>910</b>	-0.1 to +2		
<b>211</b>	-100 to +3500	<b>811</b>	-1 to +35	<b>911</b>	-0.1 to +3.5		
III	Mounting Method	<b>A</b>	Wall-mount				
		<b>B</b>	Panel-mount				
IV	Power supply	<b>1</b>	100/200Vac 50 to 60Hz				
		<b>2</b>	120/24Vac 50 to 60Hz				
V	Option	<b>00</b>	None				
		<b>0D</b>	With data sheet				
		<b>0T</b>	With tropicalization treatment				
		<b>0B</b>	With data sheet and tropicalization treatment				

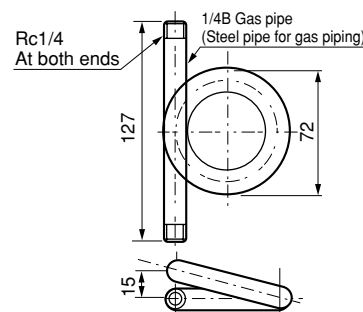
**Dimensions**

SPS300<sup>A</sup>□□□A: Wall mount type

(Unit: mm)



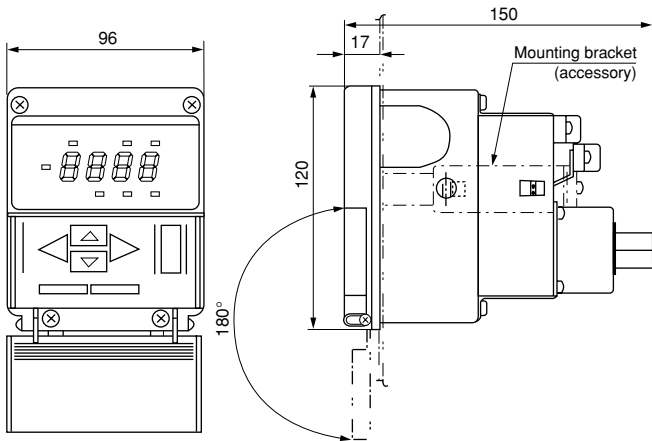
Siphon Part No. J-14026



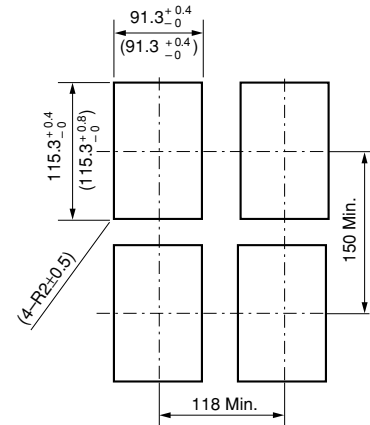
Accessories: Mounting bracket 1pc  
Mounting screws (M4) 4pcs

(Unit: mm)

### SPS300A□□□B: Panel mount model



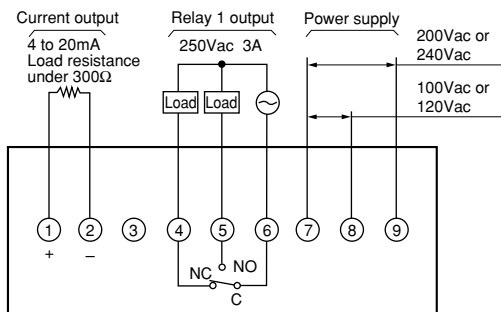
### Panel Cutout



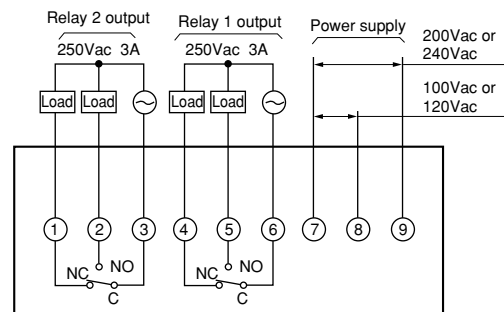
Note: ( ) shows the size when dimensional tolerance of the cutout hole is  $+0.8/-0$ .

## ■ Wiring

### SPS 300A



### SPS 300B



## Precautions on Use

1. Confirm the SPS 300A/B specifications and its usage conforming to safety requirements.
2. The SPS 300A/B must be mounted vertically. Different mounting orientation might cause measurement errors.
3. SPS 300A/B must be secured firmly onto the wall or panel to avoid problems caused by vibration.
4. When the SPS 300A/B is used for non-compressible liquids such as water or oils, ensure caution while opening or closing the valves in order to avoid sensor damage caused by sudden pressure surges.
5. While mounting the pipe, grip the hexagonal nut of the

- pressure connection port and tighten it firmly to avoid leakage. Holding the case while tightening might cause damage.
6. After wiring, ensure that the power cable and the output signal cables are routed through different conduits.
7. If rain-proofing is required, seal the conduit hole with a water proof conduit.
8. To ensure rain-proofing, tighten the front cover firmly after wiring.
9. After turning ON the power supply of the system, wait for 10 minutes for the system to stabilize.

## ⚠ RESTRICTIONS ON USE

This product has been designed, developed and manufactured for general-purpose application in machinery and equipment. Accordingly, when used in the applications outlined below, special care should be taken to implement a fail-safe and/or redundant design concept as well as a periodic maintenance program.

- Safety devices for plant worker protection
- Start/stop control devices for transportation and material handling machines
- Aeronautical/aerospace machines
- Control devices for nuclear reactors

Never use this product in applications where human safety may be put at risk.

Specifications are subject to change without notice.

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