

# SPS300A/B

## Digital Pressure Detectors

### Intelligent Pressure Sensor and Switch

#### Overview

The SPS300A/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 SPS300A is a pressure switch which offers two-stage relay contact (independent) outputs.

#### Features

- High accuracy of  $\pm 0.25$  %FS and high speed response of 50 ms (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
- Keylock
- Adjustable Hi-Lo relay action
- Manual output setting possible
- Peak hold
- Output scaling

#### 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	100 ms	Input digital filter = 0.00 at 63 % response		
		Current output	50 ms			
Relay contact output		50 ms				
<b>Indication accuracy *1</b>	Ambient temperature range	-20 to 0 °C	0 to 50 °C	50 to 60 °C		
	Pressure range					
	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	$\pm 1$ %FS $\pm 1$ digit	$\pm 0.25$ %FS $\pm 1$ digit	$\pm 1$ %FS $\pm 1$ digit		
*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>	SPS300A		SPS300B		
	<b>Output type</b>	Current + relay contact (SPDT)		Relay contact (SPDT) + relay contact (SPDT)		
	<b>Output rating</b>	Current	Current value	4 to 20 mA, external load resistance 300 $\Omega$ max.	Relay contact	SP1 250 Vac 3 A, Resistive load *2
			Scaling	Adjustable scaling setting is possible.	Relay contact	SP2 250 Vac 3 A, Resistive load *2
Manual			Manual setting of current output is possible.	*2 Mechanical life: 50,000,000 cycles Electrical life: 100,000 cycles		
Relay contact	SP1	250 Vac 3 A Resistive load *2				

<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>	25 ms			
<b>Output accuracy</b> *1	Ambient temperature range	-20 to 0 °C		0 to 50 °C	50 to 60° C
	Pressure range	Positive pressure range	±1 %FS	±0.25 %FS	±1 %FS
	Negative pressure range	±1 %FS	±0.25 %FS	±1 %FS	
	*1 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 the value of table 1) 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 300 kPa, 0 to 3500 kPa, -100 to +3500 kPa, 0 to 3.5 MPa, -0.1 to +3.5 MPa, 0 to 3 bar, 0 to 35 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 300 kPa, 0 to 3500 kPa, -100 to +3500 kPa, 0 to 3.5 MPa, -0.1 to +3.5 MPa, 0 to 3 bar, 0 to 35 bar and -1 to +35 bar.			
	<b>Rated power supply voltage</b>	100/200 Vac 50 to 60 Hz, 120/240 Vac 50 to 60 Hz or 12 to 24 Vdc			
	<b>Allowable power supply voltage</b>	100/200 Vac: 82 to 110 / 164 to 220 V 120/240 Vac: 99 to 132 / 198 to 264 V 12 to 24 Vdc: 10.8 to 26.4 V			
	<b>Power consumption</b>	7 W max. at max. load and relay on or 20 mA output			
	<b>Power on inrush</b>	10 A max, 200 ms max (SPS300 ____1____, SPS300 ____2____).			
	<b>current</b>	30 A max, 5 ms max (SPS300 ____5____).			
	<b>Power on reset time</b>	3 s max			
	<b>Insulation resistance</b>	More than 50 MΩ between primary power supply terminals and case, and also between primary and secondary power supply terminals by 500 Vdc megger. (SPS300 ____1____, SPS300 ____2____). More than 50 MΩ between power supply terminals and case by 250 Vdc megger (SPS300 ____5____).			
	<b>Dielectric strength</b>	1 minute at 1500 Vac or 1 second at 1800 Vac between primary power supply terminals and case, and also between primary and secondary power supply terminals. (SPS300 ____1____, SPS300 ____2____).			
		*2 A wall-mount model incorporates a lightning surge arrester for the power supply. Current flows when voltage above 1000 V 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. 1 second at 180 Vac or 1 second at 250 Vdc between power supply terminals and case (SPS300 ____5____).			
	<b>Lightning protection</b>	SPS300 ____A1____, SPS300 ____A2____: Lightning surge arrester (10 kV between power supply protection terminals, 6 kV between power supply terminals and case) is built in.			
		Model Nos. other than the above: 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>	4.9 m/s <sup>2</sup> max. 0 to 60 Hz, 2 hours each to each direction of X, Y, Z			
	<b>Shock resistance</b>	490 m/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 *1 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 (wall-mount type)			
	<b>Body color</b>	Case: gray Cover, window and nameplate: dark gray Door: gray semi-transparent			
	<b>Weight</b>	Approx. 1.1 kg (max: SPS300 ____B1____)			
	<b>Mounting position</b>	Vertical			
	<b>Installation status</b>	Permanent connection type equipment			
	<b>Installation category</b>	Category II (IEC60364-4-443, IEC60664-1)			
	<b>Pollution degree</b>	Pollution degree 2			
	<b>Applicable standard</b>	EN61010-1 *3, EN61326			
	<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>81446092-001</b> 1 set			
		Panel mount fittings (with pressure range indication label) Part No. <b>81446093-001</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>					

\*2 Confirm the spec. carefully and use properly.

\*3 Product with model Nos. ending in B or T (with tropicalization treatment) do not comply with EN61010-1.

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

**Model selection guide**

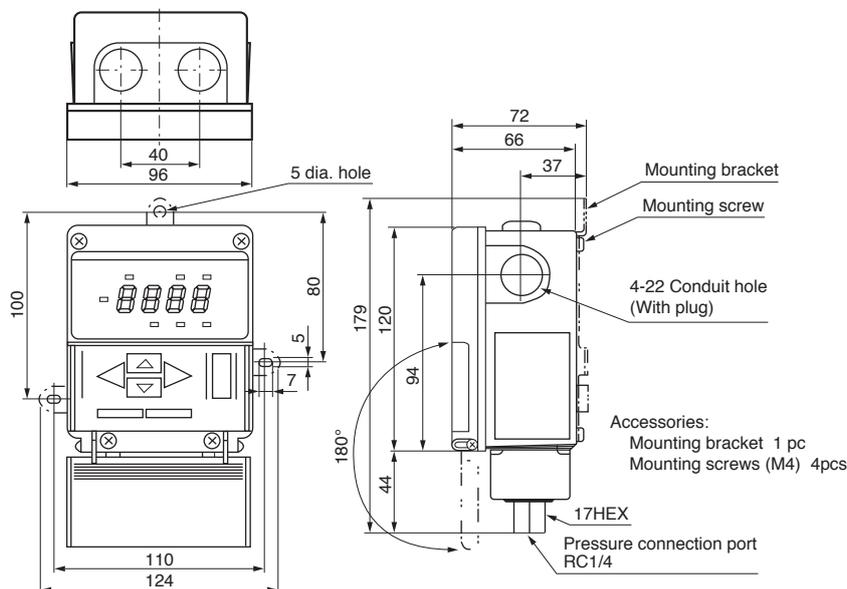
I II III IV V Example: SPS300A200A110

No.	Item	Code				Description				
I	Basic model No.	SPS300A				Intelligent pressure sensor				
		SPS300B				Intelligent pressure switch				
II	Range	Code	kPa		Code	bar		Code	MPa	
		200	0 to 100		800	0 to 1		—	—	
		201	0 to 200		801	0 to 2		—	—	
		202	0 to 500		802	0 to 5		—	—	
		203	0 to 1000		803	0 to 10		903	0 to 1	
		204	0 to 2000		804	0 to 20		904	0 to 2	
		205	0 to 3500		805	0 to 35		905	0 to 3.5	
		206	-100 to +100		806	-1 to +1		—	—	
		207	-100 to +1000		807	-1 to +10		907	-0.1 to +1	
		208	20 to 100		808	0.2 to 1		—	—	
		209	0 to 300		809	0 to 3		—	—	
		210	-100 to +2000		810	-1 to +20		910	-0.1 to +2	
211	-100 to +3500		811	-1 to +35		911	-0.1 to +3.5			
III	Mounting method	A				Wall-mount				
		B				Panel-mount				
IV	Power supply	1				100/200 Vac 50 to 60 Hz				
		2				120/240 Vac 50 to 60 Hz				
		5				12 to 24 Vdc				
V	Option	10				None				
		1D				With data sheet				
		1T				With tropicalization treatment				
		1B				With data sheet and tropicalization treatment				
		1Y				With traceability certification				

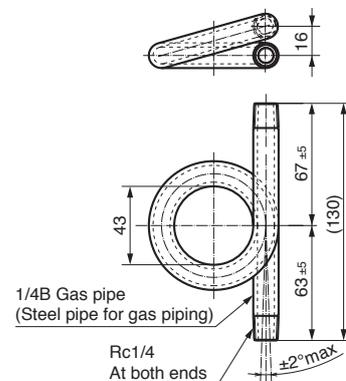
**Dimensions**

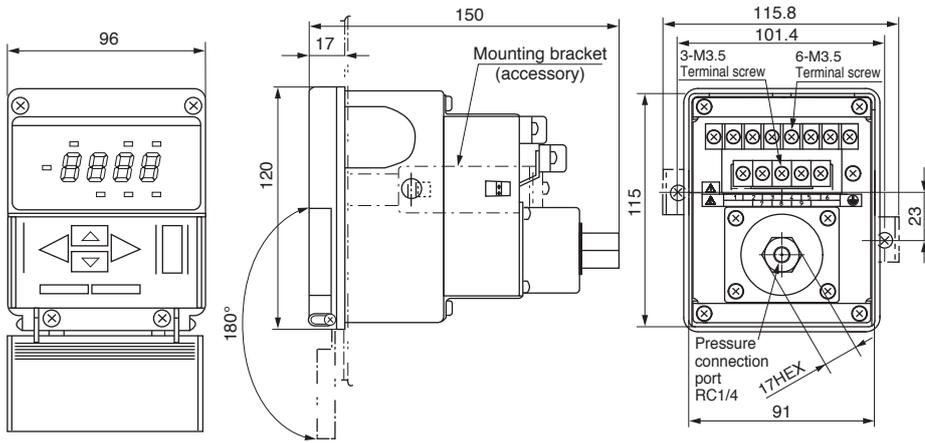
(Unit: mm)

SPS300A\_\_\_A / SPS300B\_\_\_A: Wall mount type

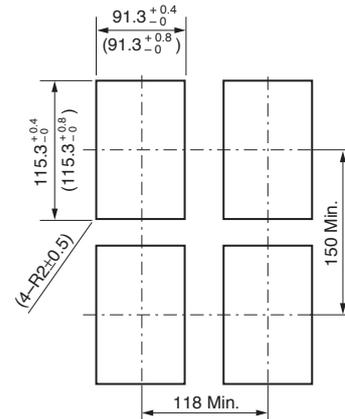


Siphon Part No. J-14026





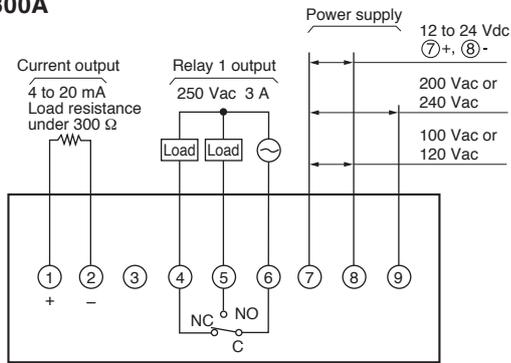
**Panel cutout**



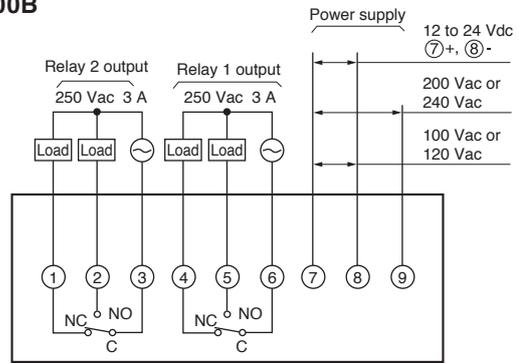
Note: ( ) shows the size when dimensional tolerance of the cutout hole is  $\begin{matrix} +0.8 \\ 0 \end{matrix}$ .

**Wiring**

**SPS300A**



**SPS300B**



**Precautions on use**

1. Confirm the SPS300A/B specifications and its usage conforming to safety requirements.
2. The SPS300A/B must be mounted vertically. Different mounting orientation might cause measurement errors.
3. SPS300A/B must be secured firmly onto the wall or panel to avoid problems caused by vibration.
4. When the SPS300A/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.

Please, read 'Terms and Conditions' from following URL before the order and use.

<http://www.azbil.com/products/factory/order.html>

Specifications are subject to change without notice.



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