YAMATAKE **Specification**

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.

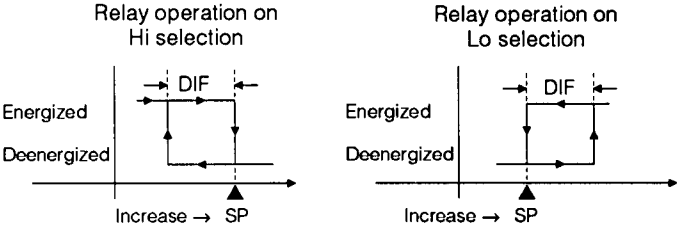
The SPS 300A is a pressure sensor which employs electric current and relay contact outputs.

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

- *High accuracy of ±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 filter constant*
  - ★ *Keylock*
  - ★ *Adjustable Hi-Lo relay action*
  - ★ *Manual output setting possible*
  - ★ *Adjustable indication figure*
  - ★ *Peak hold*
  - ★ *Output scaling*

SPECIFICATIONS

<table>
<tr><td>Appplicable fluids</td><td colspan="3">Gas and liquid, except for corrosive fluid with pressure element (SUS316L)</td><td>Fluid temperatures</td><td>−20 to +60°C
No freezing</td></tr>
<tr><td rowspan="2">Pressure detection</td><td>Structure of pressure receiving unit</td><td colspan="2">Barrier structure of oil-filled seal diaphragm</td><td rowspan="2">Material of part which contacts liquid</td><td>Diaphragm: SUS316L</td></tr>
<tr><td>Pressure detecting element</td><td colspan="2">Piezo resistance type
Silicon pressure detecting element</td><td>Pressure inlet: SUS316L</td></tr>
<tr><td rowspan="8">Indication and Setting</td><td>Display</td><td colspan="4">Digital 4-digit 7-segment LEDs Measuring range See Table 1</td></tr>
<tr><td>Digit position change</td><td colspan="4">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.</td></tr>
<tr><td>Input digital filter</td><td colspan="4">0.00 to 99.99 sec. adjustable, first-order-lag filter system
filter off at 0.00</td></tr>
<tr><td rowspan="3">Response speed</td><td>Indication output</td><td>100ms</td><td colspan="3" rowspan="3">Input digital filter = 0.00 at 63% response</td></tr>
<tr><td>Current output</td><td>50ms</td></tr>
<tr><td>Relay contact output</td><td>50ms</td></tr>
<tr><td rowspan="4">Indication accuracy (Note 1)</td><td>Ambient temperature range / Pressure range</td><td>−20 to 0°C</td><td>0 to 50°C</td><td>50 to 60°C</td></tr>
<tr><td>Positive pressure range</td><td>±1%FS±1 digit;
±2%FS±1 digit for
0 to 5Kgf/cm² type</td><td>±0.25%FS ±1 digit</td><td>±1%FS±1 digit;
±2%FS±1 digit for
0 to 5Kgf/cm² type</td></tr>
<tr><td>Negative pressure range</td><td>±2%FS±1 digit</td><td>±1%FS±1 digit</td><td>±2%FS±1 digit</td></tr>
<tr><td colspan="4">Note: 1. This indication accuracy is the total of the accuracy influenced by linearity, offset, hysterisis, etc. including those characteristics changed by power supply voltage fluctuations.</td></tr>
</table>

Output	Product name	Intelligent pressure sensor			Intelligent pressure switch			
	Basic model no.	SPS 300A			SPS 300B			
	Output type	Current+relay contact (SPDT)			Relay contact (SPDT)+relay contact (SPDT)			
	Output rating	Current	Current value	4 to 20mA, external load resistance 300Ω max.	Relay contact	SP1	250Vac 3A, Resistance load (Note 2)	
			Scaling	Adjustable zero point and span setting	Relay contact	SP2	250Vac 3A, Resistance load (Note 2)	
			Manual	Manual setting of current output is possible	Note 2: Mechanical life: 50,000,000 cycles Electrical life: 100,000 cycles			
		Relay contact	SP1	250Vac 3A Resistance load (Note 2)				
	Relay operation	Hi	Deenergized on pressure raise, energized on pressure drop	Can be switched				
		Lo	Energized on pressure raise, deenergized on pressure drop					
	Differential	0 to 100%FS adjustable						
	Output/renewal cycle	25ms						
	Output accuracy (Note 3)	Ambient temperature range / Pressure range			–20 to 0°C		0 to 50°C	50 to 60°C
		Positive pressure range			±1%FS, but ±2%FS for 0 to 5Kgf/cm² type		±0.25%FS	±1%FS, but ±2%FS for 0 to 5Kgf/cm² type
		Negative pressure range			±2%FS		±1%FS	±2%FS
		Note: 3. This indication accuracy is the total of the accuracy influenced by linearity, offset, hysterisis, etc. including those characteristics changed by power supply voltage fluctuations.						
Other functions	Bias for measured value	0 to 100%FS adjustable						
	Adjustment of measured value	Zero point and span adjustable for measured value						
	Peak hold	The highest pressure value applied in the part has been memorized and so can be confirmed by display. It is cleared when the power is turned off. The peak hold function is not effective for approximately the initial 20 seconds after power is turned on.						
	Keylock	Used to protect the stored setpoint against change by incorrect operation or any other conditions. Contents for DISP or PARA mode can be displayed.						
	Self-diagnostics	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.						
	Alarm	Alarm code is displayed at overscale (above +10%FS or under –10%FS) or at abnormal fluid temperatures (above +80°C or under –20°C).						
General specifi-cations	Breakage pressure	3 times the maximum pressure of range but 1.5 times for the 0 to 294, 0 to 3432, –98 to 3432kPa (0 to 3, 0 to 35, –1 to 35 kgf/cm²)						
	Allowable pressure	1.1 times the maximum pressure of range but 1.0 times for the 0 to 294, 0 to 3432, –98 to 3432kPa (0 to 3, 0 to 35, –1 to 35 kgf/cm²)						
	Rated power supply voltage	100/200Vac 50 to 60Hz or 120/240Vac 50 to 60Hz						
	Allowable power supply voltage	100/200Vac : 82 to 110 / 164 to 220V 120/240Vac : 99 to 132 / 198 to 264V						
	Power consumption	7W max. at relay on or 20mA output						
	Insulation resistance	More than 50MΩ between primary power supply terminals and case, and also between primary and secondary power supply terminals by 500Vdc megger.						
	Dielectric strength	1 minute at 1500V ac 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 arrestor 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.						

General specifications	Lightning protection	Wall mount model: With a built-in lightning surge arrestor (10KV between power supply terminals, 6KV between power supply terminal and case).
		Panel mount model: Without lightning arrestor
	Ambient temperature	–20 to +60°C No freezing
	Storage temperature	–20 to +80°C No freezing
	Humidity	40°C, 90%RH max. (non-condensing)
	Vibration resistance	4.9m/s^2 (0.5G max.) 0 to 60Hz, 2 hours each to each direction of X, Y, Z
	Shock resistance	490m/s^2 (50G max.), 3 times vertically
	Construction	Case and cover: almunium die-cast, door, window and nameplate: polycarbonate
	Pressure inlet	Rc1/4 Note: When the fluid temperature is above 60°C, use a siphon to decrease the temperature below 60°C
	Rating	JIS C 0920 class 3 rainproof
	Body color	Case: gray Cover, window and nameplate: dark gray Door: gray semi-transparent
	Weight	About 1.1Kg
	Mounting position	Vertical
	Installation	Wall mount or panel mount
	Standard accessories	Wall mount fittings (with pressure range indication label, M4 screws 4 pcs) Part no. N3242 1 set
		Panel mount fittings (with pressure range indication label) Part no. N3243 1 set
	Auxiliary parts (separate order)	Siphon Part no. J-14026 Cover packing replacement Part no. 81403871-001

Caution: Confirm the spec. carefully and use properly.

Table 1. Measuring range · Unit

kgf/cm^2		kPa		psi		mmHg		bar	
Measuring range	Indication and setting range	Measuring range	Indication and setting range	Measuring range	Indication and setting range	Measuring range	Indication and setting range	Measuring range	Indication and setting range
0 to 1	-0.1 to 1.1	0 to 100	-10.0 to 110.0	0 to 15	-1.5 to 16.5	0 to 760	-76.0 to 836.0	0 to 1	-0.1 to 1.1
0 to 2	-0.2 to 2.2	0 to 200	-20.0 to 220.0	0 to 30	-3.0 to 33.0	0 to 1520	-152.0 to 1672	0 to 2	-0.2 to 2.2
0 to 5	-0.5 to 5.5	0 to 500	-50.0 to 550.0	0 to 75	-7.5 to 82.5	0 to 3800	-380.0 to 4180	0 to 5	-0.5 to 5.5
0 to 10	-1.0 to 11.0	0 to 1000	-100.0 to 1100	0 to 150	-15.0 to 165.0	0 to 7600	-760.0 to 8360	0 to 10	-1.0 to 11.0
0 to 20	-1.2 to 22.0	0 to 2000	-120.0 to 2200	0 to 300	-18.0 to 330.0	—	—	0 to 20	-1.2 to 22.0
0 to 35	-1.2 to 38.5	0 to 3500	-120.0 to 3850	0 to 500	-18.0 to 550.0	—	—	0 to 35	-1.2 to 38.5
-1 to 1	-1.2 to 1.1	-100 to 100	-120.0 to 110.0	-15 to 15	-18.0 to 16.5	-760 to 760	-836.0 to 836.0	-1 to 1	-1.2 to 1.1
-1 to 10	-1.2 to 11.0	-100 to 1000	-120.0 to 1100	-15 to 150	-18.0 to 165.0	-760 to 7600	-836.0 to 8360	-1 to 10	-1.2 to 11.0
0.2 to 1	-0.1 to 1.1	20 to 100	-10.0 to 110.0	3 to 15	-1.5 to 16.5	152 to 760	-76.0 to 836.0	0.2 to 1	-0.1 to 1.1
0 to 3	-0.3 to 3.3	0 to 300	-30.0 to 330.0	0 to 45	-4.5 to 49.5	0 to 2280	-228.0 to 2508	0 to 3	-0.3 to 3.3
-1 to 20	-1.2 to 22.0	-100 to 2000	-120.0 to 2200	-15 to 300	-18.0 to 330.0	—	—	-1 to 20	-1.2 to 22.0
-1 to 35	-1.2 to 38.5	-100 to 3500	-120.0 to 3850	-15 to 500	-18.0 to 550.0	—	—	-1 to 35	-1.2 to 38.5

MODEL SELECTION GUIDE

I	II	III	IV	V	**Example: SPS300A100A100**

No.	Item	Code	Description
I	Basic Model No.	SPS300A	Intelligent Pressure Sensor
		SPS300B	Intelligent Pressure Switch

No.	Item	Code	kgf/cm²	Code	kPa	Code	psi	Code	mmHg	Code	bar
II	Range	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
		104	0 to 20	204	0 to 2000	304	0 to 300	—	—	804	0 to 20
		105	0 to 35	205	0 to 3500	305	0 to 500	—	—	805	0 to 35
		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
		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
		111	−1 to 35	211	−100 to 3500	311	−15 to 500	—	—	811	−1 to 35

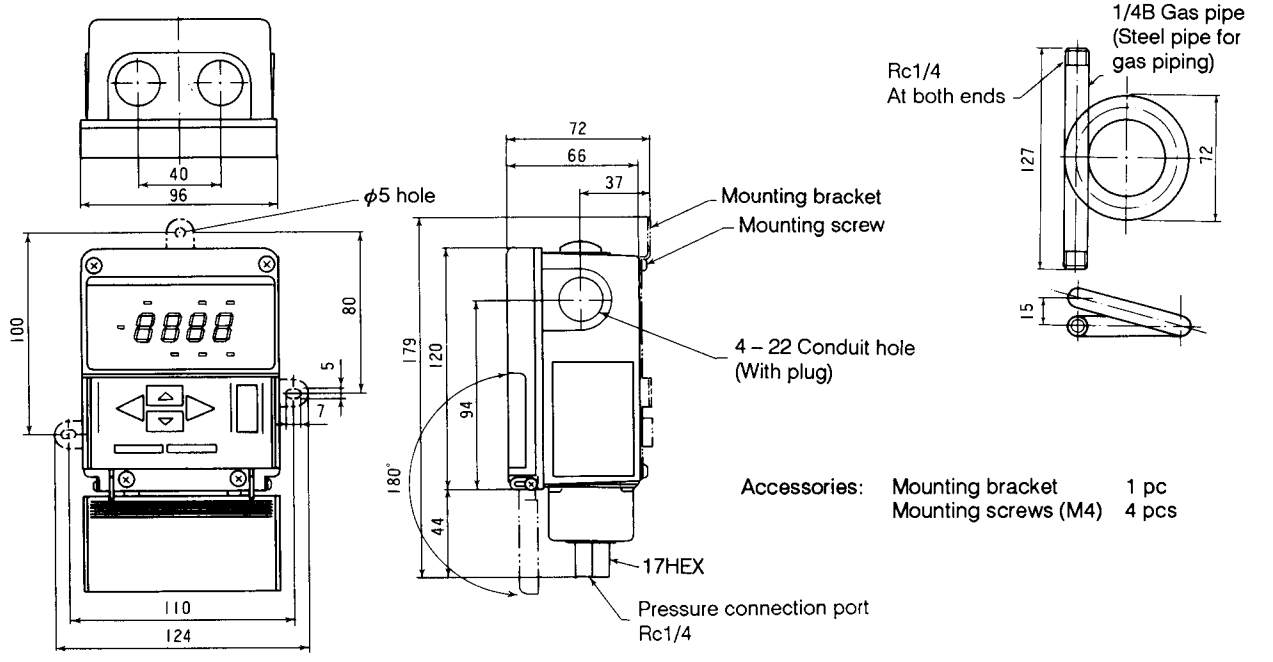
No.	Item		Description
III	Mounting Method	A	Wall-mount
		B	Panel-mount
IV	Power Supply	1	100/200 Vac 50 – 60Hz
		2	100/240 Vac 50 – 60Hz
		E	120/240 Vac 50 – 60Hz Honeywell version
V	Option	0 0	None
		0 D	With data sheet
		0 T	With tropicalization treatment
		0 B	With data sheet and tropicalization treatment

DIMENSIONS

[in mm]

SPS300 $\begin{matrix}A\\B\end{matrix}$ □□□A : Wall mount type

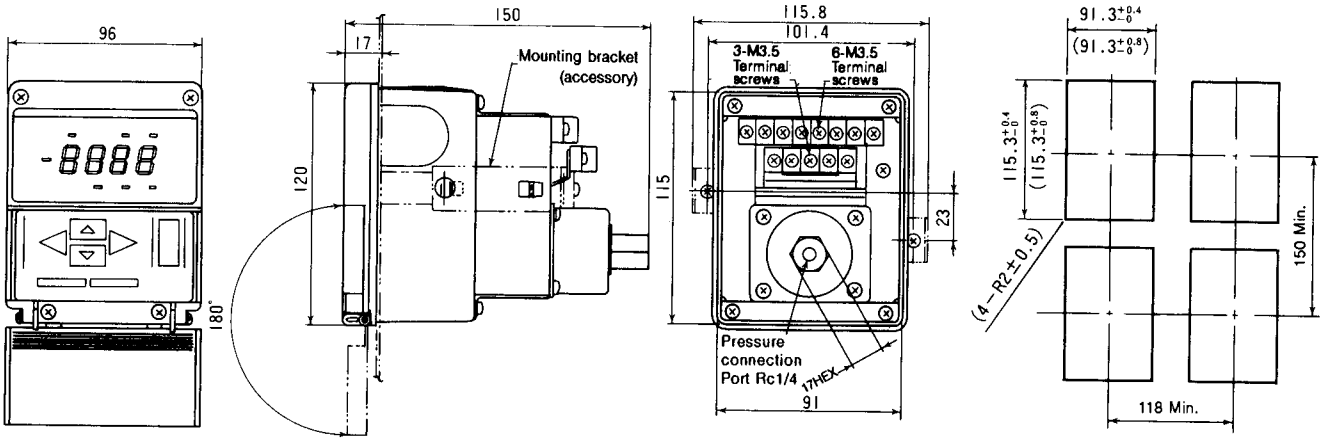
Siphon Part No. J – 14026



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

APS300 $\frac{A}{B}$ □□□ B : Panel mount model

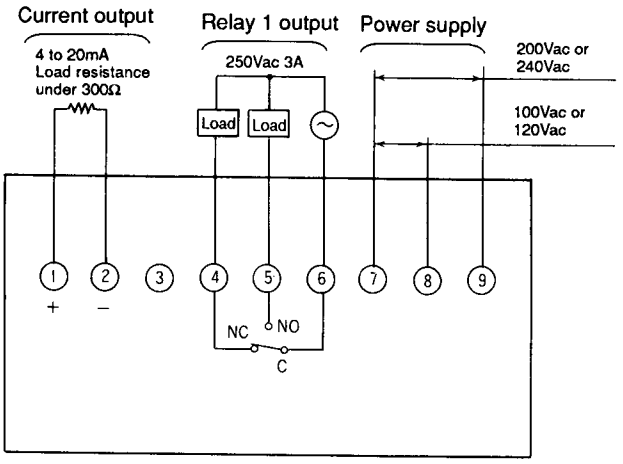
Panel Cutout



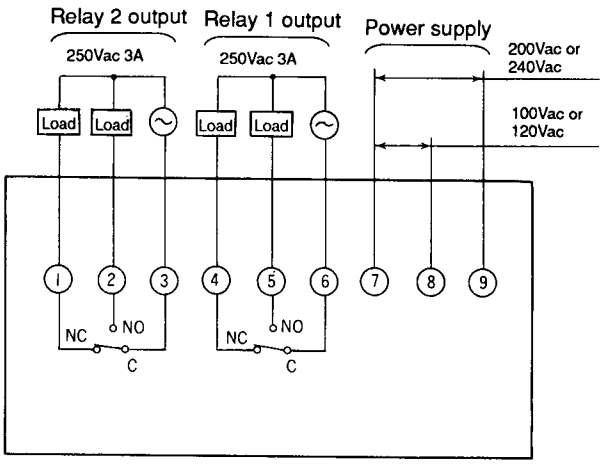
Note: ( ) shows the size when dimensional tolerance of the cutout hole is $^{+0.8}_{-0}$ with rounded conrners.

WIRING

SPS300A



SPS300B



Specifications are subject to change without notice.

YAMATAKE

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