

October 1 2008



The company name  
was changed to  
**TOKYO KEIKI INC.**

2-16-46, Minami-Kamata, Ohta-Ku,  
Tokyo 144-8551, JAPAN  
TEL.+81-3-3732-2111  
FAX.+81-3-3736-0261  
<http://www.tokyo-keiki.co.jp/>

# Switches and sensors

---

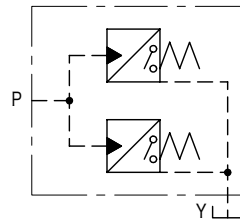
	Page
● Pressure Switch, SG1/ST1-02 _____	L 2
● Pressure Switch, SG-3 _____	L 4
● Electronic Pressure Switch, ESP _____	L 6
● Pressure Sensor (Press. Transmitter), ETP _____	L 10
● Pressure Monitor, TXS _____	L 12



# Pressure switch SG1/ST1-02



Functional Symbol



- The SG1/ST1-02 pressure switch senses circuit pressure to turn electrical circuits on and off.
- These products incorporate 2 micro-switches for high and low pressure settings.

## Model Code

**(F3) - ST1 - 02 - 10 - 11 - JA - S40 - J**

1 2 3 4 5 6

- 1 Fluid  
Omit for mineral oil, water glycol  
F3:Phosphate ester
- 2 Pressure switch  
ST1:Threaded type  
SG1:Gasket mounting

- 3 Size
- 4 Sensing pressure adjustment range  
See 'Specifications'
- 5 Design no.
- 6 ST1 only

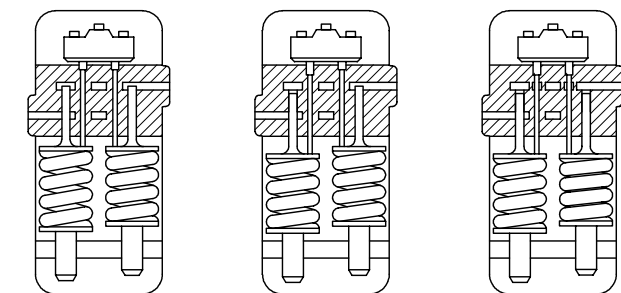
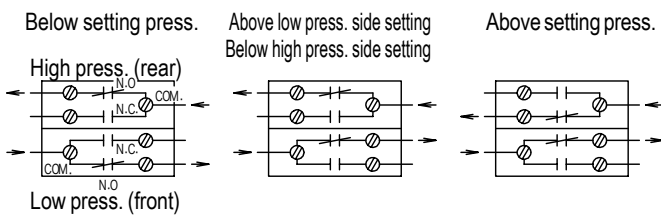
## Specifications

Model	Max. Oper. Output MPa	Sensing Press. Adj. Range		Weight kg
		Code	MPa	
ST1-02	35	10	0.7~7	3.0
SG1-02		20	0.7~14	
		50	3.5~35	

### ● Micro-Switch Rating

Power Supply	DC		AC	
	Voltage : V	125, 250, 480	125	250
Current A	15	0.5	0.25	

### ● Micro-Switch Operation



Low press. High press.

## Operating Considerations

- Remove cover, loosen locknut. Turn CW to increase sensing pressure, CCW to decrease sensing pressure.
- Connect drain port directly to tank.

## Mounting Bolts (JIS B1176, Strength Class 12.9)

Model	Hex Socket Bolt X 2	
	Metric	Unified
SG1-02	M6 × 50	1/4-20UNC × 50.8

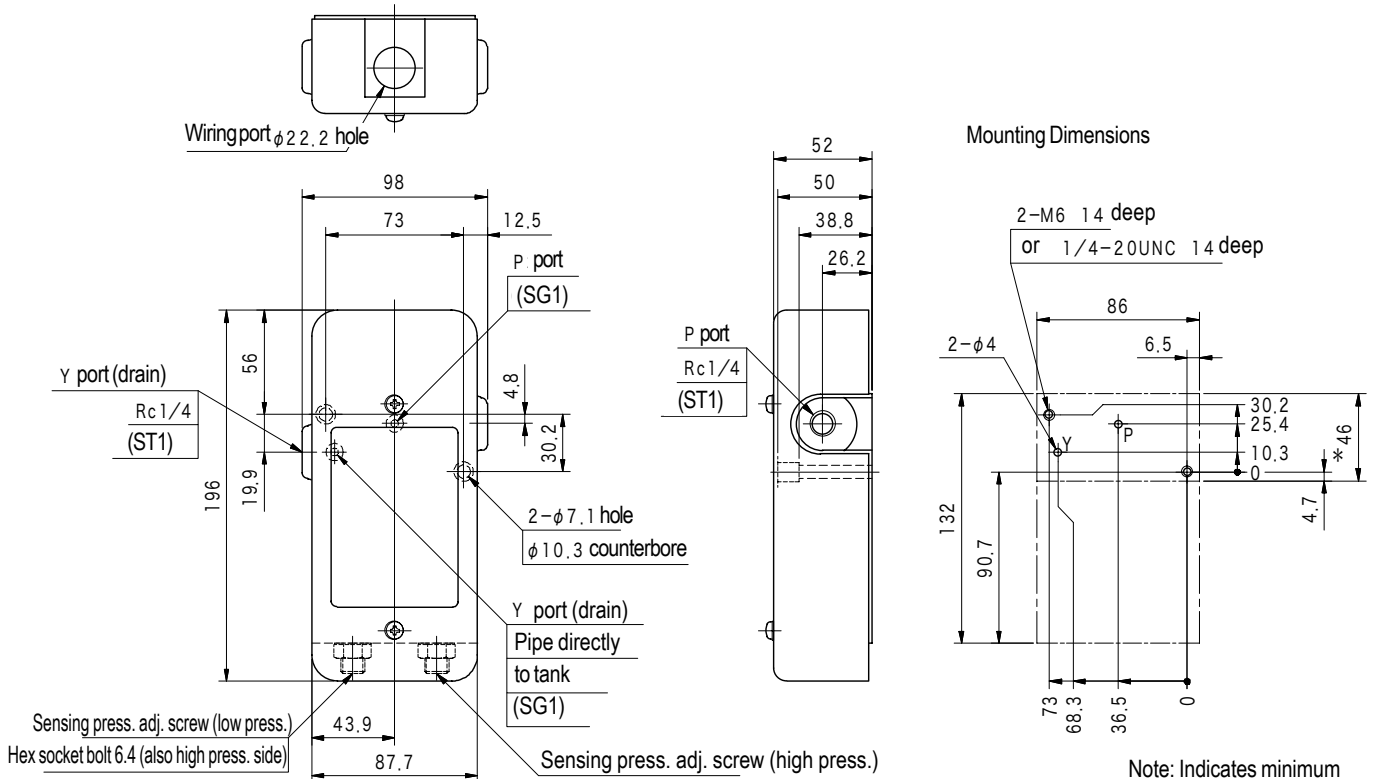
- Mounting bolts are not included with unit and must be ordered separately.
- Mounting bolt tightening torque: 12 ~ 15 Nm

## Subplate

Model	Subplate	Connection Port Rc
SG1-02	SG1SM-02-10-JA-J	1/4

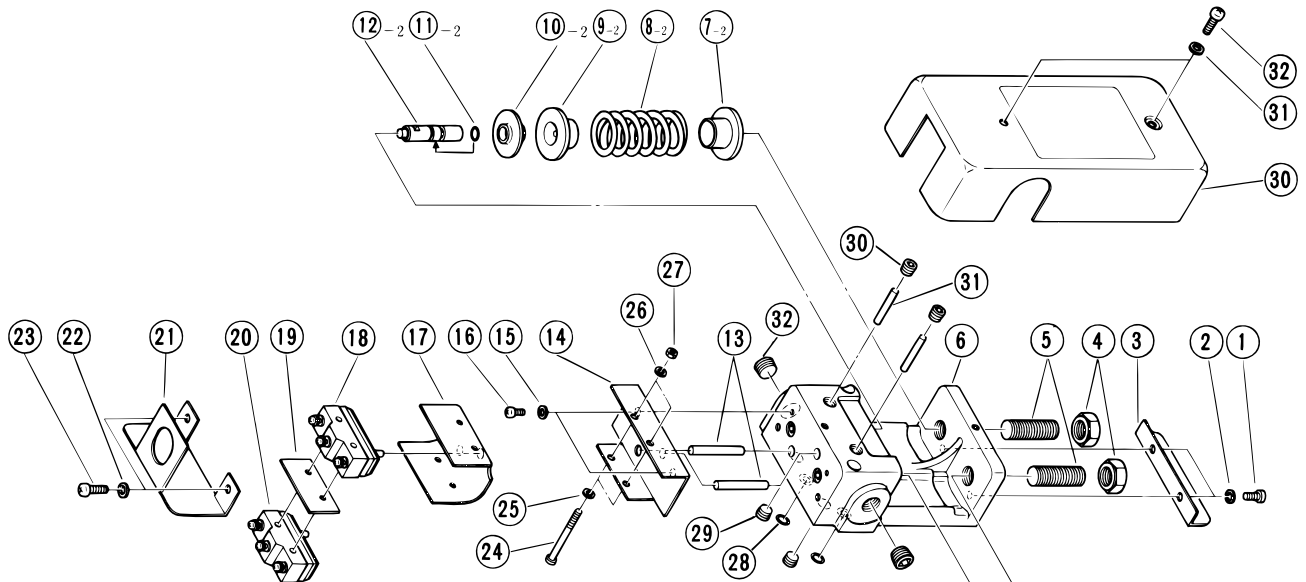
- Subplate is not included with unit and must be ordered separately.
- Subplate includes mounting bolts (unified thread).
- See page Q11 for dimensions.

## Dimensions



Note: Indicates minimum req'd seating surface.

## Construction

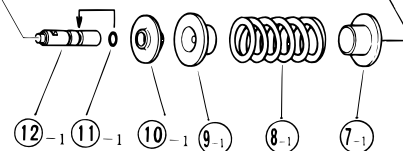


### O-Ring

No.	Part No.	Standard	Qty
11	007900917	AS568-009 (NBR, Hs70)	2
28	007901019	AS568-010 (NBR, Hs90)	2

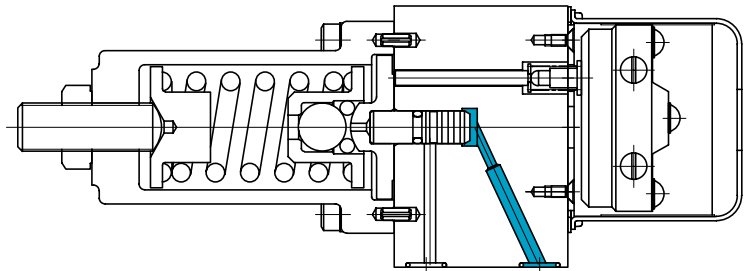
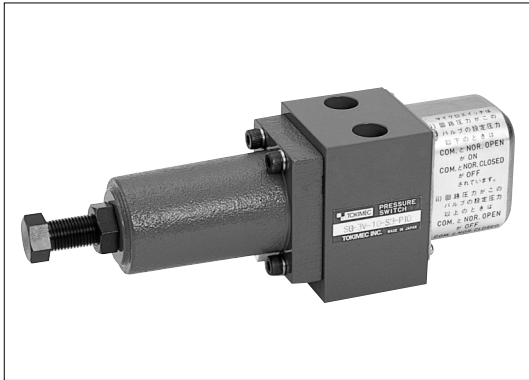
### Spring

Code	Part No.	Qty
10	VP162833	2
20	VP108903	2
50	VP108901	2

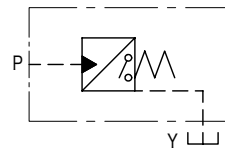


(10) is inserted in (12)  
(28) (32) used only with SG1.

# Pressure switch SG-3



Functional Symbol



- This pressure switch is used to sense pressure in hydraulic circuits to turn electrical circuits ON and OFF.

## Model Code

**(F3) - SG - 3 F -12 - (LA)**

1 2 3 4 5

- 1 Fluid  
Omit for mineral oil, water glycol  
F3:phosphate ester
- 2 Pressure switch (gasket mounting)
- 3 Sensing pressure adjustment range  
See 'Specifications'
- 4 Design no.
- 5 Indicator lamp (option)  
Omit for no indicator lamp (st'd)  
LA:Indicator lamp

## Specifications

Model	Max. Oper. Output MPa	Sensing Press. Adj. Range		Weight kg
		Code	MPa	
SG-3	21	F	0.7~14	1.9
		V	3.5~21	

### ● Micro-Switch Rating

Power Supply	AC		DC	
Voltage V	125, 250, 480	125	250	
Voltage A	15	0.5	0.25	

### ● Micro-Switch and Circuit Pressure Relationship

1. Circuit pressure lower than setting pressure



2. Circuit pressure higher than setting pressure



## Operating Considerations

- Loosen locknut, turn adjustment screw clockwise to raise sensing pressure setting, counterclockwise to lower sensing pressure setting.
- Drain port should be connected directly to tank.
- Indicator lamp flashes when circuit pressure exceeds setting pressure, activating micro-switch (option).

## Mounting Bolts (JIS B1176, Strength Class 12.9)

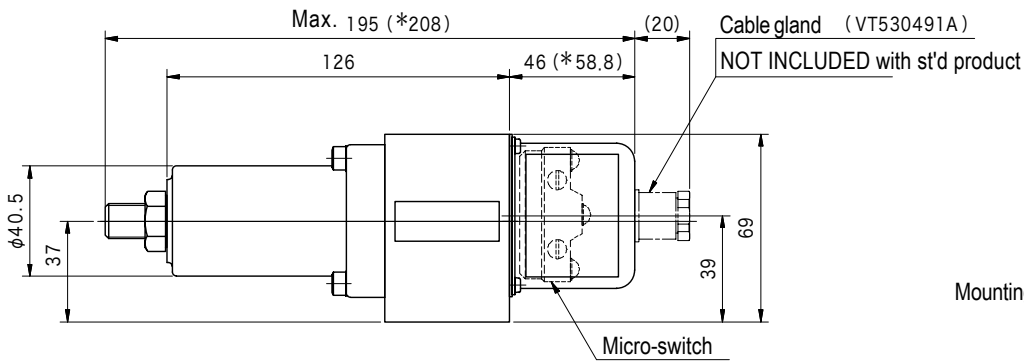
Model	Hex Socket Bolts X 2	
	Metric	Unified
SG-3	M8 x 70	5/16-18UNC x 76.2

- Pressure switch mounting bolts are not included and must be ordered separately.
- Mounting bolt tightening torque: 27 - 33Nm

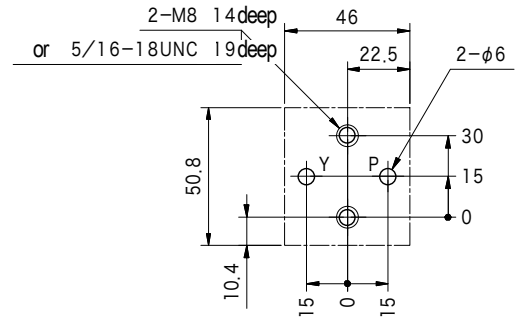
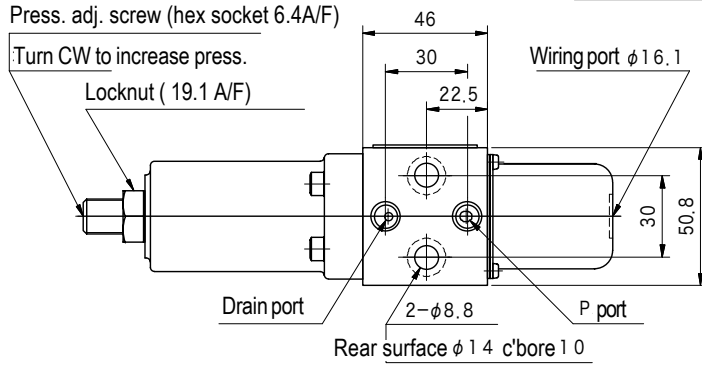
## Subplate

No subplate is available. Mount on manifold block.

## Dimensions

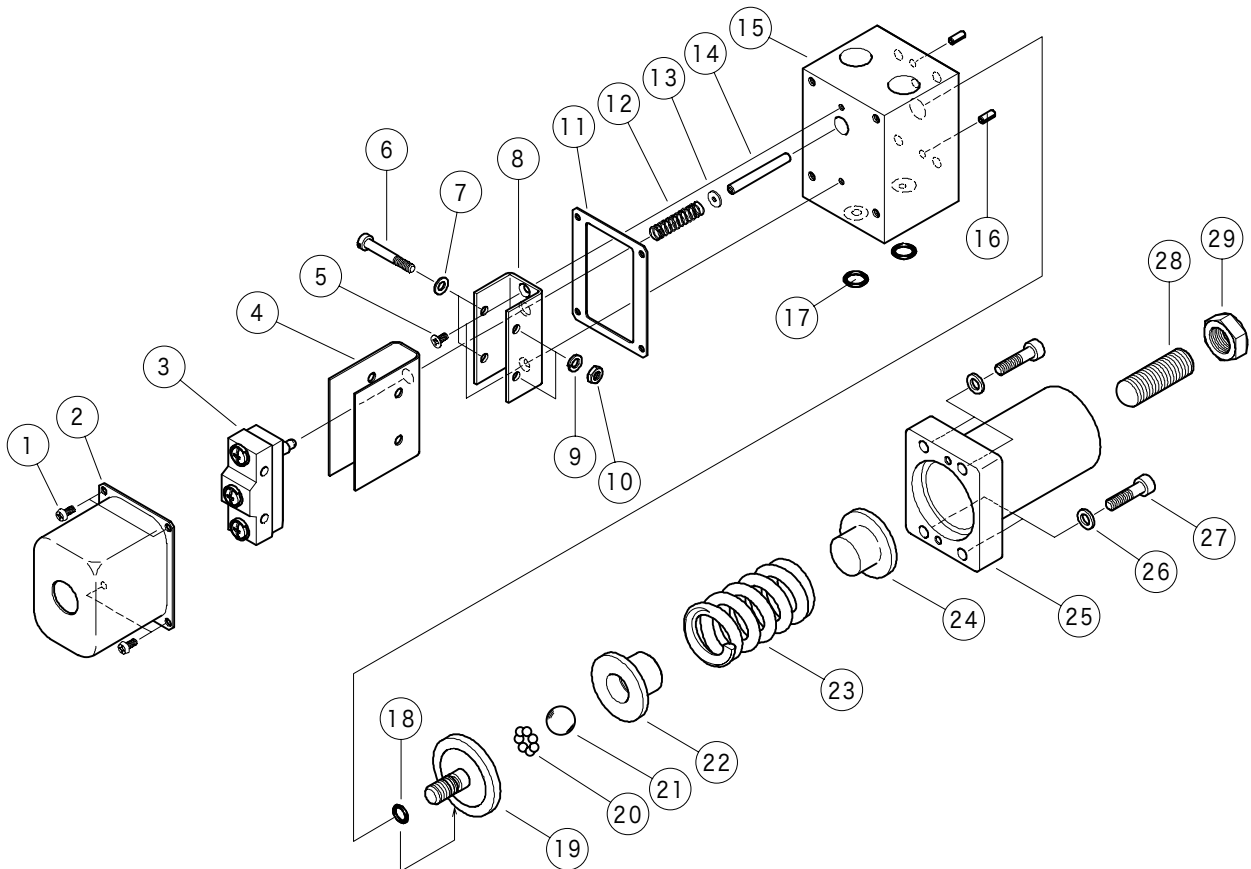


Mounting Dimensions



Note: Marked dimensions indicates model LA (with indicator lamp).

## Construction



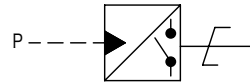
### O-Rings

No.	Part No.	Standard	Qty
17	007901117	AS568-011 (NBR, Hs70)	2
18	VA19495		1

# Electronic pressure switch ESP



Functional Symbol



- The ESP electronic pressure switch incorporates a vapor deposition type semiconductor strain gauge pressure sensor module and hybrid electronic circuit.
- There are no moving parts to cause mechanical friction and wear. The ESP is compact and offers reliability and life superior to conventional Bourdon Tube and piston type pressure switches.

## Model Code

### ESP P -H (2)- H (20) - 10

1 2 3 4 5 6 7

- Electronic pressure switch
- Mounting thread  
P:R1/4  
F:G1/4 O-ring seal
- Sensing pressure setting range  
L1:0.02 1 MPa  
L :0.2 10 MPa  
H :0.7 35 MPa  
H1:1 50 MPa
- No. of contacts, deadband adjustment  
Omitted:1contact, variable deadband  
2:2contacts, fixed deadband  
3:1contact, fixed deadband
- Power supply, output rating  
H: Power supply DC24V(10~28V)  
Output NPN open collector output DC30V, 80mA MAX.

- (\*1)HN:Power supply DC24V (10~28V)  
Output PNP open collector output DC30V, 80mA MAX.
- Construction, accuracy (see 'Specifications')  
Omitted: Drip proof  
(\*2)20:Water proof
- Design no.

#### Note:

- \*1. HN type not applicable with 4 'Omitted: 1 contact, variable deadband'
- \*2. 6 '20: Water proof type is applicable with 4 '3: 1 contact, fixed deadband'

## Specifications

### ● Sensing, Output

Allowable max. pressure	Code	L1	L	H	H1
	MPa	2	20	52.5	75

Sensing pressure setting method: rotary variable resistor (3 turns). Contact method: upper limit contact (transistor ON when pressure rises to setting pressure.)

Deadband:	Variable	2~10 %F. S.
	Fixed	1 %F. S. (TYP.)

Indicator: LED

Power supply and output rating: see 'Model Code'

Cable: 3 core (4 core) cable 2000mm

Repeatability: less than  $\pm 0.2$  %F. S. 以内

Temperature drift:	Drip proof	Less than $\pm 0.05$ %F. S.
	Water proof	Less than $\pm 0.1$ %F. S.

Response: less than 1ms

Fluctuating voltage effect: less than

### ● Environment, Construction

Oper. temperature:  $-20 \sim +70^{\circ}\text{C}$

Allowable humidity :5~90%RH

Insul. resistance: Above:100M $\Omega$  (at DC500 megaV)

Resis. voltage: AC350 V 1 min. (measured current above 5mA)

Vibration resis.: JIS D 1601 steps 70 X, Y, Z direction

Shock resis.: JIS C 0912-1984 196 m/s<sup>2</sup> X, Y, Z direction

Cycle durability: above:10<sup>7</sup>

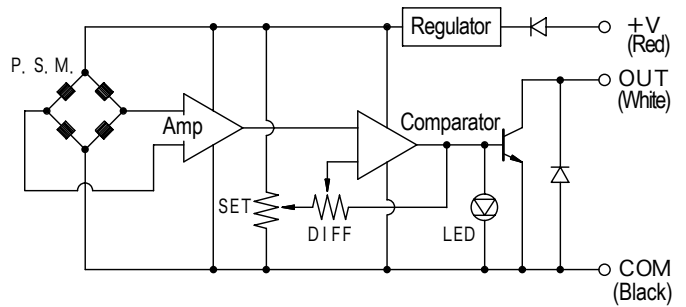
# Specifications

Water Resistance:	JIS D 0203-D2 and IEC-IP66	Water Proof
	JIS D 0203-M2	Drip Proof

Wetted surface mat'l :SUS630 or SUS316  
 Mounting thread:R1/4 or G1/4

Weight :	440 g	Water Proof
	200 g	Drip Proof

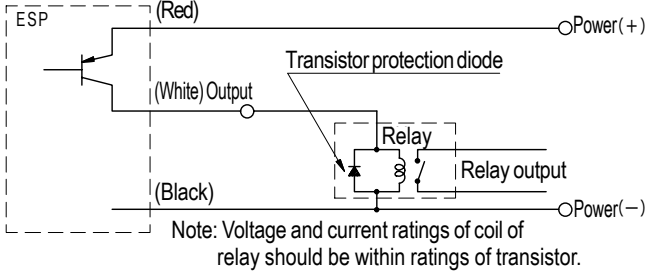
## ● Circuit



## ● Open Collector Output Application Example

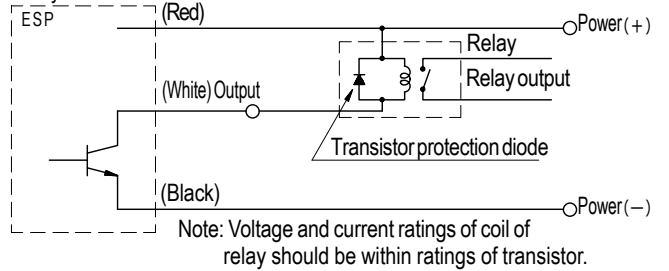
HN(PNP-VDE Specification)

### Relay Connection

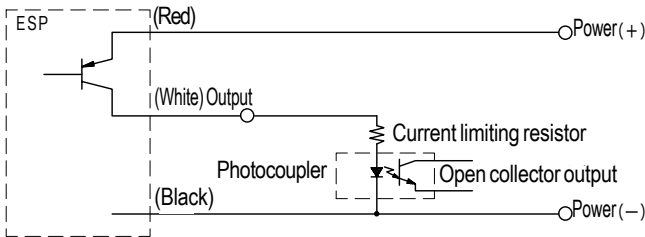


### H (NPN)

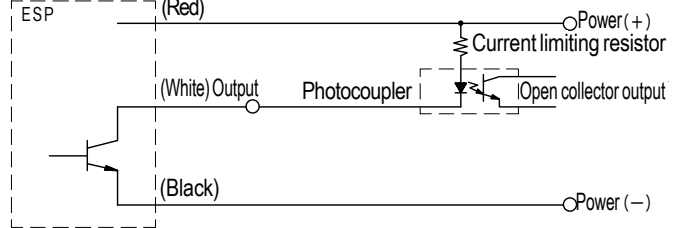
### Relay Connection



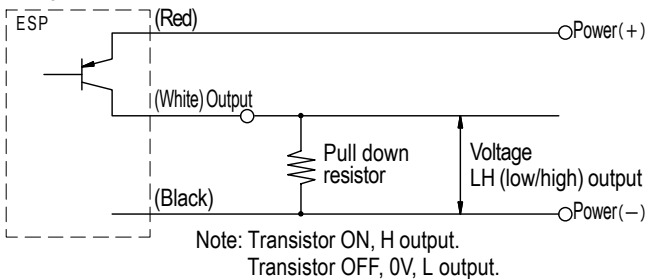
### Photocoupler Connection



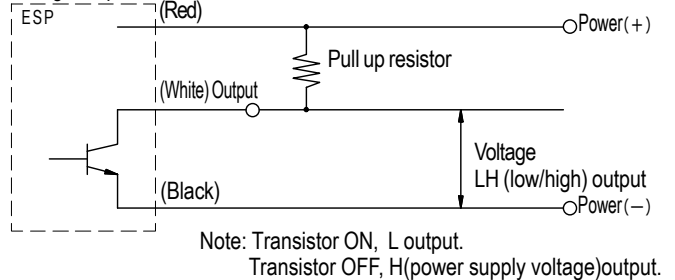
### Photocoupler Connection



### Voltage Output



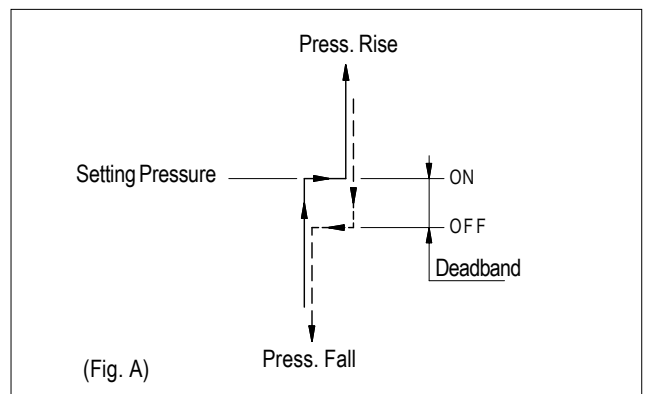
### Voltage Output



# Operating Considerations

- Surge pressure may vary depending on the design of the circuit but surges 2 to 5 times greater than circuit pressure may be generated. Use restrictors to protect equipment under such conditions.
- Adjust trimmer for pressure setting while observing pressure gauge. After setting, confirm contact points using the LED display. Make sure to tighten trimmer drip proof cap after adjustment.
- Setting hints
  - First turn pressure setting trimmer (SET) in UP direction to set pressure at maximum then turn deadband adjustment trimmer (DIFF) in the direction opposite of INC to set minimum deadband.
  - Pressurize until unit switches ON, and obtain constant pressure.
  - Gradually turn SET in direction opposite UP, and stop at point when output switches ON (LED lights).
  - Turn DIFF in the direction of INC and maximize deadband.
  - Reduce pressure to the unit to the desired OFF point and fix (value of OFF point is ON point reduced by the deadband).

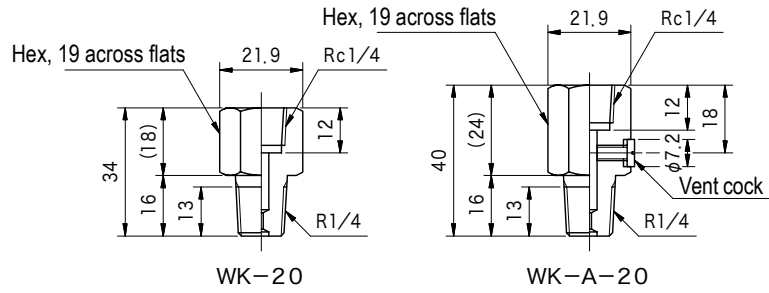
- Gradually turn DIFF in the direction opposite of INC, and stop at the output OFF point (LED extinguished).
- Raise and lower pressure and confirm ON, OFF function.





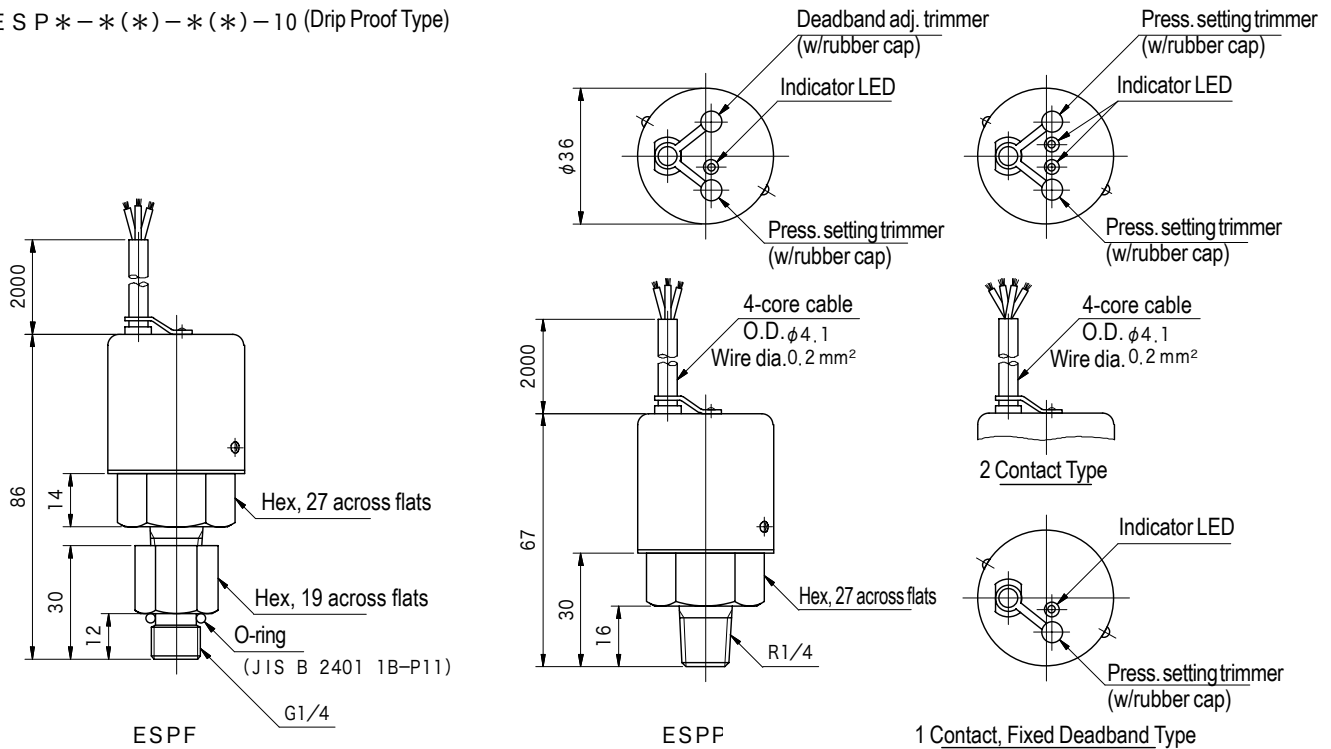
## Power Supply, Fittings

- Special Power Supply (DC24V output)  
TSP-100:AC100 V Power supply  
TSP-101:AC200 V Power supply
- Restrictor Fitting  
WK-20  
WK-A-20



## Dimensions

E S P \* - \* ( \* ) - \* ( \* ) - 10 (Drip Proof Type)

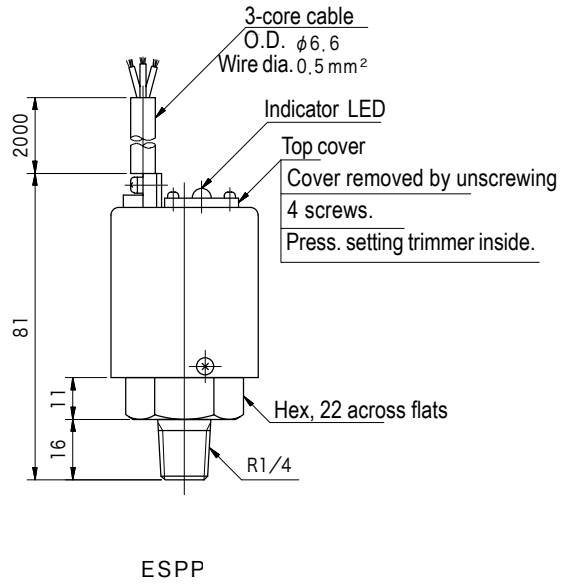
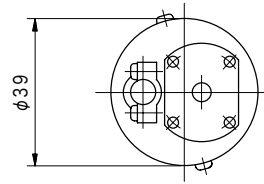
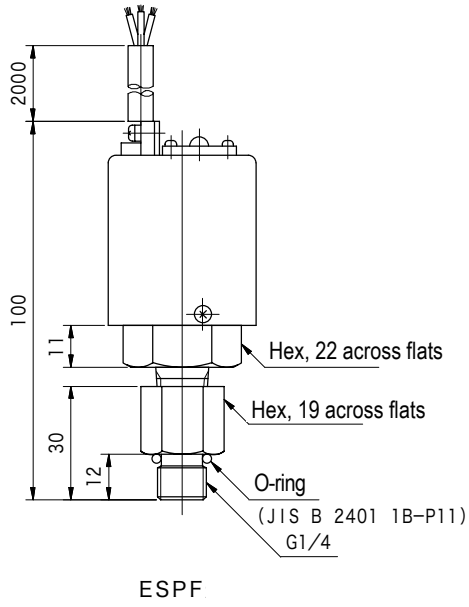


Cable Wire Color

(1 Contact)	(2 Contact)
Red Power Supply (+)	Red Power Supply (+)
White Output (1)	White Output (1)
Black Power Supply (-) COMMON	Green Output (2)
	Black Power Supply (-) COMMON

## Dimensions

E S P \* - H 3 - H 2 0 - 1 0 (Water Proof Type)



# Pressure sensor (Pressure transmitter) ETP



- This pressure sensor incorporates a vapor deposition type semiconductor strain gauge pressure sensing module and amplifier circuit.

## Model Code

### ETP P- H1 -H L D-W-(C) -11

1 2 3 4 5 6 7 8 9

- |                                                                                                                                                                                                          |                                                                                                                                                                                                                            |                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>1</b> Electronic pressure sensor</p> <p><b>2</b> Mounting thread<br/>P:R1/4</p> <p><b>3</b> Pressure sensing range<br/>L1:0~ 1MPa<br/>L:0~ 10MPa<br/>M:0~ 20MPa<br/>H:0~ 35MPa<br/>H1:0~ 50MPa</p> | <p><b>4</b> Power supply<br/>H:DC24V<br/>G:DC+15V<br/>E:DC15V</p> <p><b>5</b> Output ratings<br/>See 'Specifications'</p> <p><b>6</b> Accuracy<br/>See 'Specifications'</p> <p><b>7</b> Cap<br/>W:With water proof cap</p> | <p><b>8</b> Calibration switch<br/>Omitted for momentary switch<br/>C:Toggle switch,<br/>self-holding type</p> <p><b>9</b> Design no.</p> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|

## Specifications

### ● Sensing, Output

Press. Sensing Range Code	Allow. Max. Press. MPa	Power Supply Code	Consump. Current (at no load)
L1	0~ 1	H DC24 V ±15 %	35 mA
L	0~10	G DC±15 V ±5 %	30 mA
M	0~20	E DC15 V ±5 %	35 mA
H	0~35		
H1	0~50		

Code	Output Ratings	Calibration Signal Output
H	0~10 V DC ( Min. load resis. 10 kΩ)	10 V
L	0~ 5 V DC ( Min. load resis. 10 kΩ)	5 V
A	4~20 mA DC ( Max. load resis. 350 Ω)	20 mA

Code	Accuracy (※1)	Temperature Drift
C (※2)	±0.25 % F. S.	±0.025 % F. S. /°C
D	±0.5 % F. S.	±0.05 % F. S. /°C

Note ※1 : Accuracy includes linearity, repeatability, and hysteresis.  
 ※2 : Accuracy code 'C' applicable for pressure sensing range codes L1, L, and M only.

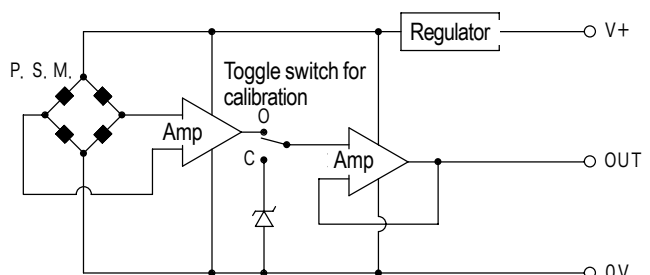
Response: less than 1ms  
 Voltage fluctuations effect: less than: +0.1%F.S. of rated voltage.

### ● Environment, Construction

Operating temp.: -20~+70°C (Accuracy guaranteed range 0~+70°C)  
 Allowable humidity: 5~95%RH  
 Insul. resistance: above 100 MΩ (at DC 500 megaV)  
 Resis. voltage: AC 350 V 1 min.  
 Vibration resis.: JIS D 1601 steps 70 X, Y, Z direc. 4H  
 Shock resis.: JIS C 0912-1984 196 m/s<sup>2</sup> X, Y, Z direction  
 Cycle durability: above 10<sup>7</sup>  
 Water resis.: splash proof (JIS C 0920)  
 Wetted surface mat'l: SUS630 or SUS316  
 Weight: 320 g

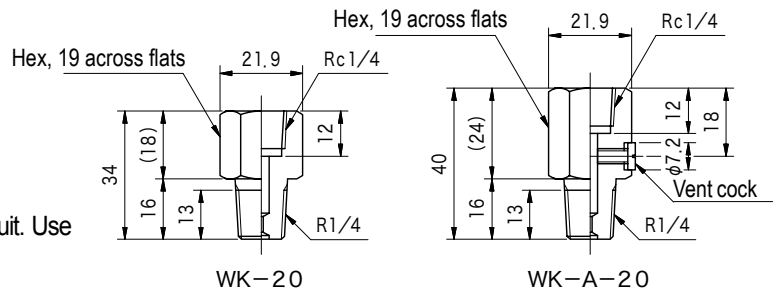
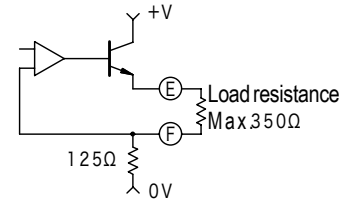
### ● Circuit

Power supply : H type

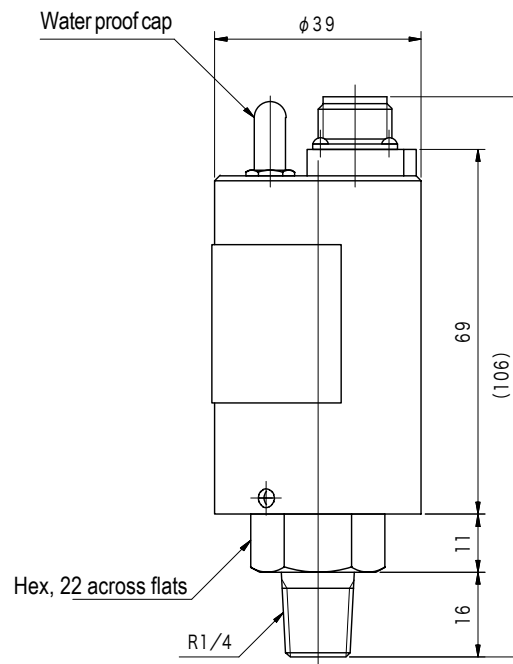
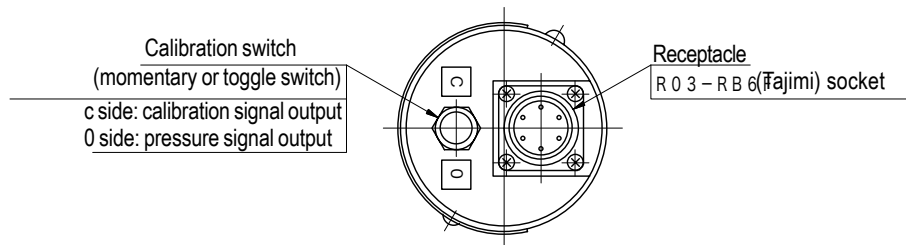


## Operating Considerations

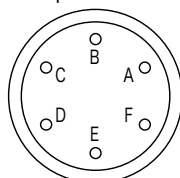
- Pressure is adjusted prior to shipment from factory. As such do not touch trimmer and electronic parts inside of cover.
- 4~20mA output circuit (floating constant load current type) is shown at right. Output remains constant regardless of fluctuation in load resistance.
- Special cord with connector (5 core cable, outer dia.  $\phi 6.2$ , wire dia.  $0.18\text{mm}^2$ )
  - CAY-2-10: cord length 2m
  - CAY-3-10: cord length 3m
  - CAY-6-10: cord length 6m
  - CAY-10-10: cord length 10m
  - CAY-20-10: cord length 20m
- Special power supply (DC24V output)
  - TSP-100: AC100V
  - TSP-101: AC200V
- Sudden surge pressure may be generated in hydraulic circuit. Use fitting with restrictor to protect pressure sensor.



## Dimensions



Receptacle Interface



Note: Connection plug, R04-P6M (Tajimi) Water proof type

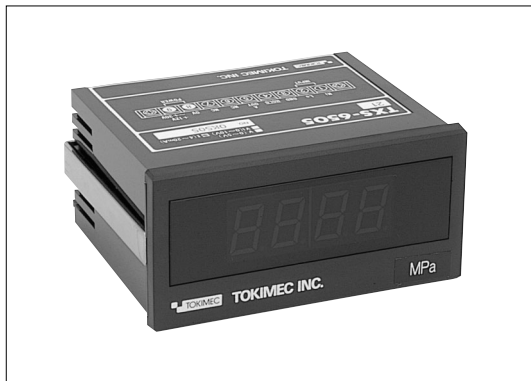
0~5. 0~10V Output

Pin Code	Cable Col.	DC24 V	DC15 V
A	Red	+24V (power)	+15V (power)
B	Blue		-15V (power)
C	White	0 V	0 V
D			
E	Green	Output	Output
F			

4~20mA Output

Pin Code	Cable Col.	DC24 V	DC15 V
A	Red	+24V (power)	+15V (power)
B	Blue		-15V (power)
C	White	0 V	0 V
D			
E	Green	Output (+)	Output (+)
F	Yellow	Output (-)	Output (-)

# Pressure monitors TXS



- The TXS digital scaling meter incorporates a scaling function which allows input signals to be displayed as physical and stoichiometric values in 3-1/2 digit readouts.
- Unit can be used as a pressure monitor when used together with our ETP pressure sensor.
- Analog output of monitor values, hold function is standard.

## Model Code

**TXS - 6505 - I - 30**

1 2 3

- 1 Pressure monitor  
TXS-6505: Digital panel meter
- 2 Input signal  
I: 4~20mA  
V: 0~5V      V1: 0~10V

3 Design no.

## Specifications

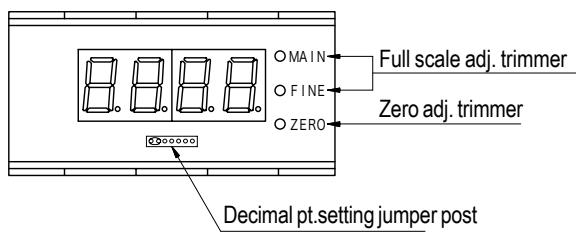
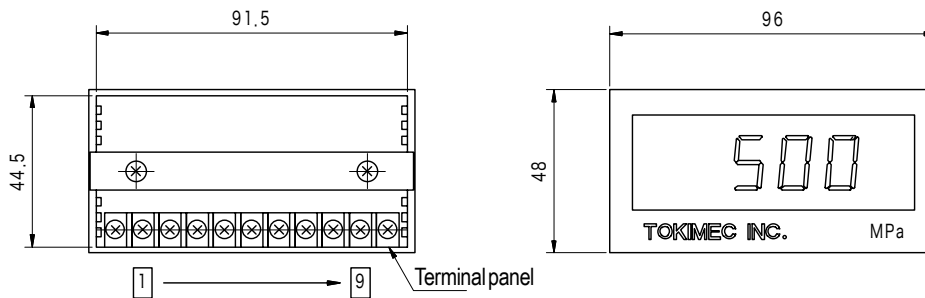
Description	Condition	TXS-6505
Input power		DC12 V~DC30 V
Current consumption	DC12 V	Less than 90 mA
	DC15 V	70 mA standard
	DC24 V	55 mA standard
Input method		Floating input method
Input signal		I : 4~20 mA, V : 0~5 V, V1 : 0~10 V
A-D conversion		Double integral method
NMRR	Sampling rate 2.5 times/sec.	40dB st'd 50/60 Hz
Measurement accuracy	Ta=+23 °C±1 °C 20~85%RH, 1 year	± (0.15 % of Irdgl+1 digit)
Temperature drift	Ta=0~+50 °C	Less than ± (100 ppm of Irdgl+0.1 digit) /°C
Sampling rate	Ta=+23 °C±1 °C 20~85%RH	Approx. 2.5 times/sec.
Warm up time		5 min.
HOLD input		Negative logic, 5 V-CMOS · LSTTL compatible
Analog output	Output voltage	Display value unit, (mV) (except hold time)
	Output current	Less than DC1 mA
Display		7 segment red LED
Display character size		14.2 mm
Polarity display		r _ j displayed only when minus
Overflow display	Display value > +1999	r 1 j displayed
Decimal point display		DP1~DP3 setting possible (jumper post setting)

## Specifications

Operating temperature		0~55 °C
Operating humidity		20~85 %RH
Storage temperature		-20~+70 °C
Storage humidity	Ta ≤ 40 °C	20~95 %RH
CMV	OV-INPUT Lo (GND)	All less than ±1000 V
Withstand voltage	Panel -DPM OV	AC2000 V 1 min.
	Panel -DPM GND	
	Panel -DPM LO	
Insulation resistance	Panel -DPM OV	Above 500 MΩ (at DC500 megaV)
	Panel -DPM GND	
	Panel -DPM LO	

## Dimensions

TXS-6505



With front panel removed

Terminal Panel Arrangement

