

FOR MULTIPOINT LEVEL ALARM DETECTION BY ONE UNIT

## FP-4000 Series

#### FLOAT LEVEL SWITCH

#### **OUTLINE**

The FP-4000 series is a float level switch, which is installed through the tank nozzle on tanks and/or pits.

Level alarm detection is possible at up to 11 points (up to 6 points for the flameproof version). This switch can be used to control loading/unloading pumps and monitor High-high and Low-low level alarms, saving total instrumentation costs.

In addition to the standard stainless steel material for wet parts, other materials such as PVC, HPVC, PP and fluorocarbon resins are also available. Thus, the switch can be used for monitoring and controlling the level of ordinary water, waste water, chemicals and highly corrosive liquids. Besides weatherproof type, flameproof and intrinsic safety versions are available for use in hazardous area.

#### **MAIN APPLICATIONS**

- Preventing overflow of liquids and idle suction by pumps
- □ Controlling loading/unloading pumps
- ☐ Monitoring the liquid level of underground tanks/pits

#### STANDARD SPECIFICATION

Any liquids with a viscosity of 600 mPas or Measuring objects:

less

No freezing, adhesion, or coagulation

Minimum liquid density: See "Float details & outside dimensions of body."

a. Model FP-4000 and FP-4100

Wetted part material	Material code	Liquid temp. range
SUS304,316,316L	0123	-5 to 100°C (Special: -20 to -5°C) (Special: 100 to 150°C)
PVC	4	0 to 60°C
H PVC	5	0 to 80°C
PP	6	0 to 60°C
PFA	7	0 to 100°C

#### b. Model FP-4200

Liquid temp.:

Wetted part material	Material code	Liquid temp. range
SUS304,316,316L	0123	−5 to 80°C
PVC	4	0 to 60°C
H PVC	5	0 to 80°C
PP	6	0 to 60°C
PTFE	7	−5 to 80°C
DEΔ	Q	0 to 80°C

Ambient temperature: –20 to 70°C

> -20 to 55°C (Flameproof) -20 to 60°C (Intrinsic safety)

Pressure range:

Model FP-4000 and FP-4100

Model FP-4200 Connection:

Model FP-4000 and FP-4100

Model FP-4200 Max length of guide pipe:

Enclosure:

Model FP-4000

Model FP-4100 and FP-4200

Protection code

\*1Class

See float details. See float details.

2" (50 mm) flange. 3" (80 mm) flange for PFA Thread connections such as G2 and R2 are also available excluding PFA. Contact us for details. 3" (80 mm) flange Refer to it for each model.

Weatherproof or intrinsic safety

(safety relay required)

Weatherproof, flameproof\*1 or

intrinsic safety (safety relay required)

Equiv. to IP65

Exd II BT6 (RIIS, Japan) Model FP-4100 TC14695-14697 Model FP-4200 TC14698-14700

FP-4000 FP-4200

: Reed switch, NO or NC Alarm contract

Contact setting : Set the operation for each contact point.

Contact capacity:

Model FP-4000 and FP-4100

Max. switching voltage 220 V AC, 110 V DC Max. switching current

Model FP-4200 10 W AC/DC

Max. switching voltage 100 V AC/DC

Max. switching current

A surge suppressor is provided except for the intrinsically safe ver-

Repeatability : Within ±5 mm Reset span : 10 mm or less

No. of alarm point:

Model Wiring	FP-4000	FP-4100	FP-4200
Independent	3	6	6
Common return	5	11* <sup>2</sup>	11 <sup>*2</sup>

\*2: Special order

One entry (either G1/2 or G3/4) Cable entry : Model FP-4000:

Model FP-4100 and FP-4200:

One entry (G3/4) as standard Max. two entries on request

Adapters will be provided when different sizes or NPT connection are designated.

Flameproof cable glands are available on request for use in hazardous areas. Use the following cable gland to conform

to explosionproof standards. Designated cable gland: Model SXC-22B by Shimada

Electric, which is suitable for cables with a diameter of 12 to 14 mm. For other cable sizes, specify a cable diameter among 7 to 10, 10 to 12, or 14 to 16 mm to select a proper cable gland.

Cable termination:

Model FP-4000 M4 screw Model FP-4100 and FP-4200 M3.5 screw

Aluminum part Silver Stainless steel

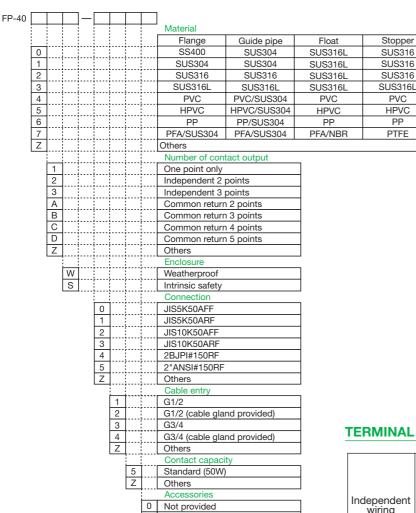
Approved products for High Pressure Gas Safety Act are available. Consult us for details.

#### **FP-4000**

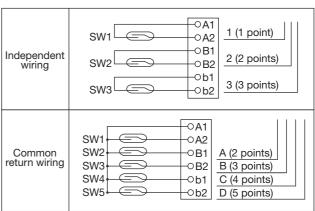
The FP-4000 is highly cost-effective thanks to its compact design.

Weatherproof and intrinsic safety versions are available (see Model FP-4100 and FP-4200 for the flameproof version).

#### **MODEL CODE**



#### **TERMINAL ARRANGEMENT**



#### **INTRINSICALLY SAFE RELAY (TYPE: EB3C)**

1 Safety relay

Z Others

2 RD-1000 relay driver

For the intrinsic safety version (Code S), an intrinsically safe relay unit will be provided on request. Specify the power supply voltage (100/110 V AC or 200/220 V AC).

#### Standard specifications

Standard Specifications						
Type of protection	Intrinsic safety					
Objective gas	Ex ia IIC					
Intrinsic safety rated voltage	12V DC ±10%					
Intrinsic safety rated current	10mA DC ±20%					
Place to be installed	Non-hazardous area					
Contact configuration	1a contact					
Relay output	250V AC 3A					
(Resistance load)	24V DC 3A					
Contact permissible power	750VA DC					
(Resistance load)	72W DC					
Insulation resistance	10MΩ at 500V DC ohmmeter					
Withstand voltage	1500V AC, 1 minute					
	·					

Model code				Contents
EB3C-	R			Model name
Output type	Relay output		Relay output	
Number of		01		For 1 point
		02		For 2 points
point		03		For 3 points
Cupply voltage	oltage		Α	100 to 240V AC, 50/60Hz
Supply voltage			D	24V DC

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#### **OUTSIDE DIMENSION**

#### Float details & outside dimensions of body

	Material of float	SUS	3161	P۱	/C HPV	C PP	PFA	/NBR
A	Allowable pressure [MPa]		66	0.13 0.2		0.2		
	ard) Withstand pressure test [MPa]		.8 *4			0.3	0.3	
	Allowable minimum liquid density [g/cm³]	0.6	0.78	1.0	0.75	1.0	0.79	1.3
Di-	Diameter of guide pipe (d)	13	3.8		18	22	1	6
men-	11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	52	43 *7	42	48 *7	50	68.2	42.6
sion	Inside diameter of float	15	5.4		20	25	1	9
[mm]	Height of float (H)	58	50		70	60	100	50
Mir	nimum h1 dimension [mm]	6	0		90		140	80
N	finimum interval (S) [mm]	100	90		120 *5		150	100
Lo	Minimum L dimension owest end point + X [mm] *2	X=	=60		X=90		X=140	X=80
	Outside drawing *3 ①Terminal box ②Flange ③Guide pipe ④Float ⑤Stopper		3/4 3/4 0/4 0/4 0/4 0/4 0/4 0/4 0/4 0	Connection D	SW3	99 (S) (N) (N) (N) (N) (N) (N) (N) (N) (N) (N	<del>-&gt; K</del> -	140 H2

- \*1: Confirm that the float can be inserted into the nozzle.
- \*2: Can be reduced depending on liquid density and the operation of contacts. Contact us for details.
- \*3: The number of floats and stoppers in figures may differ for smaller intervals.
- \*4: The test will be carried out at 1.0 MPa for floats with a design pressure from 0.53 to 0.66 MPa.
- \*5: Available from 100 mm by special order (see \*3)
- \*6: Max. length of the guide pipe

				frinii			
Structure		Material					
Structure	SUS	PVC	PP	PFA			
Weatherproof (W)	4900	3900	3900	3900			
Intrinsic safety (S)	4300	3300	3300	3300			
Flameproof (E)	3900						

- \*7: Floats come in this size unless another size is specified.
- \*8: G1/2 is applied as standard.

#### **FP-4100**

The FP-4100 uses a large terminal box which can accommodate up to 12 terminals. Up to 6 points can be used for independent wiring, making the wiring procedure and sequence easy. Weatherproof, intrinsic safety (safety relay required), and flameproof versions are available.

With the common return wiring, up to 11 points can be used as alarm contacts (up to 6 points for the flameproof version). Therefore, a single unit can cover multicontrol of liquids or other special purposes such as a liquid level meter.

Stopper

SUS316

SUS316

SUS316

SUS316L

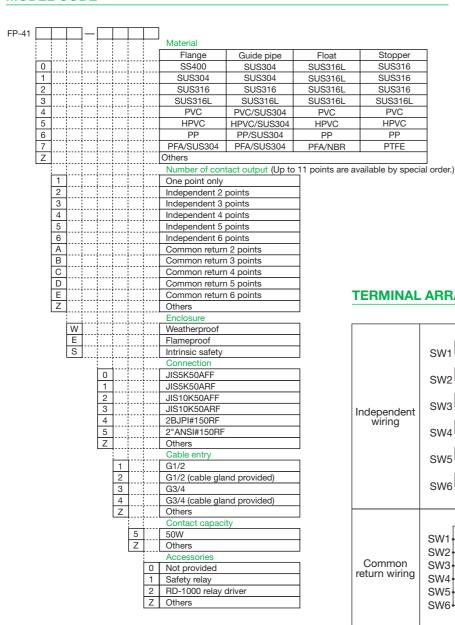
PVC

HPVC

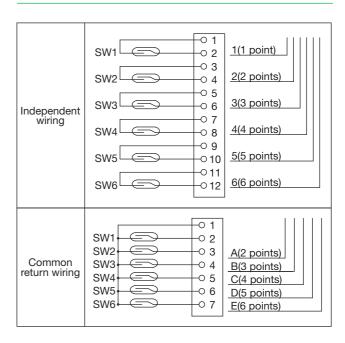
PP

PTFE

#### **MODEL CODE**



#### TERMINAL ARRANGEMENT



#### **RD-1000 RELAY DRIVER GENERAL**

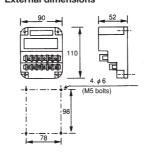
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The RD-1000 amplifies the contact capacity of field level switches to directly drive solenoid valves, actuators, buzzer lamps, etc. Its integrated sequence circuit enables automatic loading and pump control by using the upper and lower limit contacts of the FP-4000 series level switch (note that the RD-1000 is not intrinsic safety).

### STANDARD SPECIFICATION

Power supply 100 or 200V AC +10%.50/60Hz 12V DC Max. field supply voltage Max, field supply current 3mA DC 250V AC,125V DC Max. contact voltage Max. contact capacity 1100V AC (Resistance load) 120W DC (Resistance load) Insulation resistance 100MΩ at 500V DC ohmmeter 1500V AC for 1 min Withstand voltage

### **External dimensions**



#### **Applications**

- 1. Incrementing the contact capacity
- 2. Controlling loading pumps
- 3. Controlling unloading pumps For details, see the Technical Guidance for RD-1000 Relay Driver TG-L931.

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#### **OUTSIDE DIMENSION**

#### Float details & outside dimensions of body

	Mata data different	CLIC	04.01	D)	10	LIDVO	DD	DEA	/NDD
<u> </u>	Material of float	SUS		PVC HPVC PP		PFA/NBR			
	Allowable pressure [MPa]	0.0		0.13 0.2			0.2		
Stand	ard) Withstand pressure test [MPa]	0	.8 *4		0.2		0.3	U.	.პ 
	Allowable minimum liquid density [g/cm³]	0.6	0.78	1.0	0.7	75	1.0	0.79	1.3
Di-	Diameter of guide pipe (d)	13			18		22	1	6
men-	Maximum outside diameter of float(D) *1	52	43 * <sup>7</sup>	42	48	<b>*</b> 7	50	68.2	42.6
sion	Inside diameter of float	15	5.4		20		25	1	9
[mm]	Height of float (H)	58	50		70		60	100	50
Mi	nimum h1 dimension [mm]	6	0			00		140	80
N	linimum interval (S) [mm]	100	90		12	0 *5		150	100
Lo	Minimum L dimension owest end point + X [mm] *2	X=	=60		X=	=90		X=140	X=80
	Outside drawing *3 ①Terminal box ②Flange ③Guide pipe ④Float ⑤Stopper		> \( \frac{\cup 0/4}{}{}	Connection, D T	SY SY SY SY SY	24 V3 V V V V V V V V V V V V V V V V V V	© (X) h5 ( 14) (189 )	Connection SW SW SW SW SW SW	82 PH 18 PH

- \*1: Confirm that the float can be inserted into the nozzle.
- \*2: Can be reduced depending on liquid density and the operation of contacts. Contact us for details.
- \*3: The number of floats and stoppers in figures may differ for smaller intervals.
- $^*4$ : The test will be carried out at 1.0 MPa for floats with a design pressure from 0.53 to 0.66 MPa.
- \*5: Available from 100 mm by special order (see \*3)

\*6: Max. length of the guide pipe

a	9	, b.b.		[iriirij			
Ctransture	Material						
Structure	SUS	PVC	PP	PFA			
Weatherproof (W)	4900	3900	3900	3900			
Intrinsic safety (S)	4900	3900	3900	3300			
Flameproof (E)	3900						

\*7: Floats come in this size unless another size is specified.

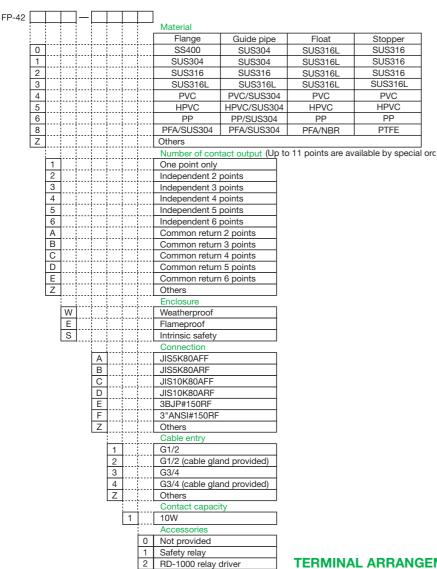
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#### FP-4200

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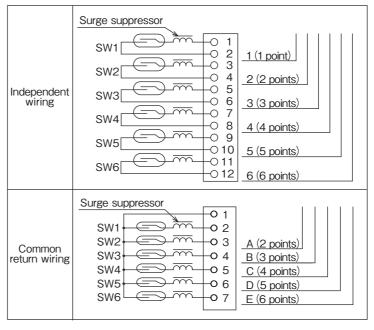
A single FP-4200 can detect a liquid level at multiple points by using its self-holding reed switches. The minimum point interval is 50 mm. Weatherproof, flameproof, and intrinsic safety versions are available.

#### **MODEL CODE**



Others

#### TERMINAL ARRANGEMENT



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#### **OUTSIDE DIMENSION**

#### Float details & outside dimensions of body

	Material of float	SUS316L	PVC HPVC	PP	PFA/NBR
	Allowable pressure [MPa]	0.13	0.13	0.13	0.13
(Stanc	lard) Withstand pressure test [MPa]	0.2	0.2	0.2	0.2
	Allowable minimum liquid density [g/cm³]	0.7	0.8	0.8	0.9
Di-	Diameter of guide pipe (d)	21.7	26	27	25
men-	Maximum outside diameter of float(D) *1	75	70	70	68.2
sion	Inside diameter of float	24	29	29	27.7
[mm]	Height of float (H)	70	100	100	100
Mir	nimum h1 dimension [mm]	100	150	150	150
N	Minimum interval (S) [mm]	50	50	50	50
	Minimum L dimension west end point + X [mm] *2	X = 100	X = 150		X = 150
	Outside drawing *3 ①Terminal box ②Flange ③Guide pipe ④Float ⑤Stopper	(a) SW3 SW4 (b) SW5 SW6 X (c) SW6 X	Connection  SW1 SW2 SW3 SW4  Material code 4 5	X	Connection  SW2  SW3  SW4  Material code 8

<sup>\*1:</sup> Confirm that the float can be inserted into the nozzle.

\*3: Max. length of the guide pipe

18	lax. length of the guide pipe [mm							
	Structure							
	Structure	SUS	PVC	PP	PFA			
	Weatherproof (W)	4900	3900	3900	3900			
	Intrinsic safety (S)	4900	3900	3900	3300			
Flameproof (E) 3900								

\* Specification is subject to change without notice.

# TOKYO KEISO CO., LTD.

Head Office: Shiba Toho Building, 1-7-24 Shibakoen, Minato-ku, Tokyo 105-8558

Tel: +81-3-3431-1625 (KEY); Fax: +81-3-3433-4922

e-mail: overseas.sales@tokyokeiso.co.jp; URL: http://www.tokyokeiso.co.jp

<sup>\*2:</sup> Can be reduced depending on liquid density and the operation of contacts. Contact us for details.