



# TECHNICAL GUIDANCE

Liquid level is outputted by DC4~20mA analog signal.  
Different types of material are available!

## FP-7100 Series LEVEL TRANSMITTER

### OUTLINE

FP-7100 is a magnet float type level transmitter. The liquid level is detected by float and converted into DC4~20mA current signal. The electronics are isolated from internal tank atmosphere by stainless steel or other pipe materials for safety.

FP-7100 is suitable for tough applications such as inflammable, corrosive liquids or pressurized and vacuum tanks.

In addition to standard material of stainless steel, PVC, PP and PFA lined versions are available for corrosive applications.

### STANDARD SPECIFICATION

Measuring objects : Liquids with density of 0.5g/cm<sup>3</sup> or more  
(Max. viscosity 600mPa·s and without sticking and crystallization. Type of float may be limited min. density of application liquid. Refer to FLOAT AVAILABILITY LIST for details.)  
Interface measurement is also applicable.  
(Density difference 0.2g/cm<sup>3</sup> or more)

Measuring range :

	Flameproof type	Weatherproof Intrinsically safe and explosion-proof
Measuring range	250 to 3810mm <sup>(*)</sup>	250 to 5000mm

The dead zone is required for the upper and lower sides of the measuring range. The length of the guide pipe may differ depending on float and material. For further details, refer to the outer dimension and the float availability list.

(\*1) In case the upper dead zone is 90mm and the lower one is 100mm, the length of guide pipe is available up to 4000mm.

Max. pressure :

Stainless steel float	1MPa
PVC,PP and PFA lined float	0.2MPa
Titanium float	1.5MPa and 2.4MPa

Refer to FLOAT AVAILABILITY LIST for details.

Temp. range : 0~100°C (0~60°C for PVC float)  
AMB temp : -10~60°C (-10~55°C for Flameproof version)

Enclosure : Weatherproof (equiv. to IP65),  
Flameproof (TIS Exd IIB T6)  
(Certificate No. TC14701~TC14703),  
Intrinsically safe (Ex ia IIC T4)  
(Certificate No. TC16353)

Power supply : DC24V (±10%)

Transmission scheme: Two-wire system

Output : DC4~20mA

Max.load : 600Ω (Line resistance, resistance inside barrier included)

Output accuracy : ±(20+0.002H) mm H: Measuring span (mm)

Resolution : 5mm

The above value indicates the resolution to detect float.

Cable entry : G3/4 x1 (Standard)

Process connection :

Standard : Tank top installation through flange  
JIS10K, ANSI#150, others  
Minimum size of flange:3" (80mm)  
Refer to FLOAT AVAILABILITY LIST for flange size

Material availability :



Flange CARBON STEEL, SUS304, SUS316, SUS316L, PVC, PP, PFA

Guide pipe SUS304, SUS316, SUS316L, PVC, PP, PFA

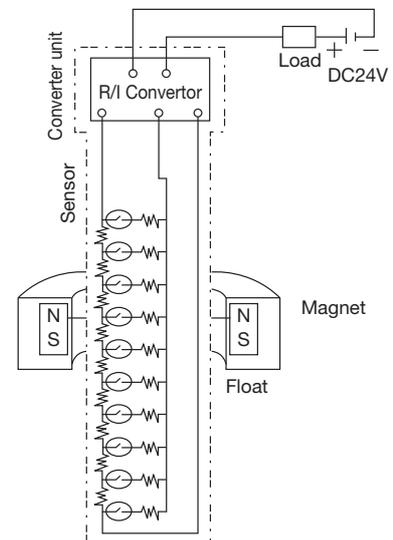
Float SUS316, SUS316L (std.), PVC, PP, PFA, Titanium

Housing ADC12

Refer to MATERIAL CONSTRUCTION for details.

### OPERATION PRINCIPLE

A position sensor which consists of fine resistors and reed switches is located in the lead pipe. The position of float which corresponds to liquid level is converted into resistance value. Such resistance value is converted into analog current signal by R/I converter to output in DC4~20mA. The output loop is 2-wire system and no additional power supply line is required.



MODEL CODE

FP-71						Description
Flange size**1	3					3" (80mm)
	4					4" (100mm)
	5					5" (125mm)
	6					6" (150mm)
	8					8" (200mm)
	Z					Others
Flange rating	1					JIS10KRF
	2					JIS10KFF
	3					ANSI#150
	4					JPI#150
	5					JIS5KFF
	Z					Others
Enclosure	W					Weather proof
	E					Flameproof (TIIS Exd IIB T6)
	S					Intrinsically safe Ex ia IIC T4 *2
Guide pipe, Flange Material	1				} Refer to MATERIAL CONSTRUCTION	
	2					
	3					
	4					
	5					
	6					
	7					
	Z					Others
Float type	1				} Refer to FLOAT AVAILABILITY LIST	
	2					
	3					
	4					
	5					
	6					
	7					
	8					
	9					
	Z					Others

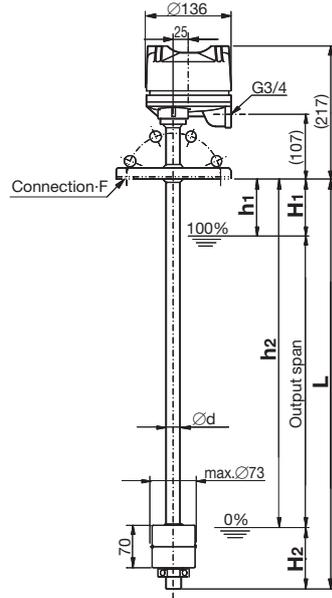
\*1 Refer to FLOAT AVAILABILITY LIST and select suitable size of flange.  
 \*2 The intrinsically safe version must be used with a safety barrier. Please order the MTL7728+ barrier with the intrinsically safe version.

MATERIAL CONSTRUCTION

Material code / Part name	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7
Flange	CARBON STEEL	SUS304	SUS316	SUS316L	PVC	PP	PFA/SUS
Guide pipe	SUS304	SUS304	SUS316	SUS316L	PVC/SUS	PP/SUS	PFA/SUS
Stopper	SUS316	SUS316	SUS316	SUS316L	PVC	PP	PFA
Available float type	1,2,3,4,5,6	1,2,3,4,5,6	1,2,3,4,5,6	1,2,3,4,5,6	7	8	9

\* Housing material is ADC12 (Aluminum di-casting) for all material codes

DIMENSIONS



h1: Please indicate distance between flange face and 100% liquid level  
 h2: Please indicate distance between flange face and 0% liquid level  
 Refer to the FLOAT AVAILABILITY LIST for the size of H1 and H2. Short output span version can be also manufactured. The available short span range is shown as follows.

Guide pipe length L (mm)	Possible shortest span (mm)
440~954	250
955~2954	700
2955~5000*	2000

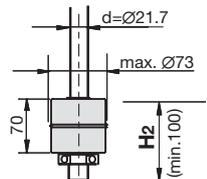
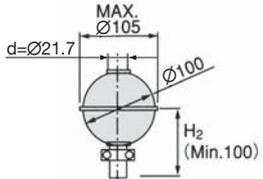
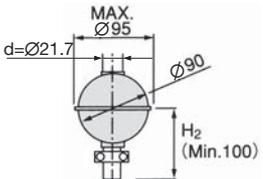
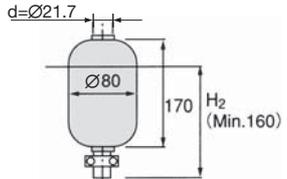
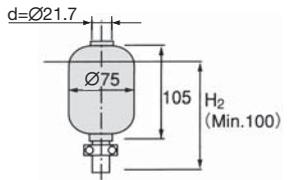
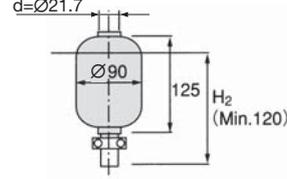
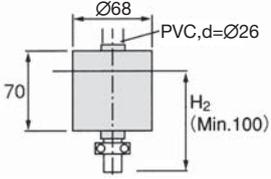
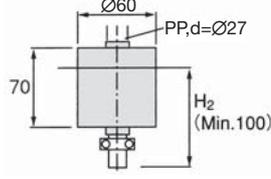
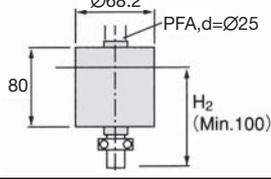
\* Flameproof version is L=4000mm (Max.)

Note

Cable gland is supplied with the flameproof version as standard as the flameproof approval includes the cable gland. Therefore, cable gland of flameproof packing type will be attached as standard.  
 Standard cable outer diameter: Ø8 to Ø10.0 mm  
 Please inform us of the cable outer diameter if it is out of standard size.

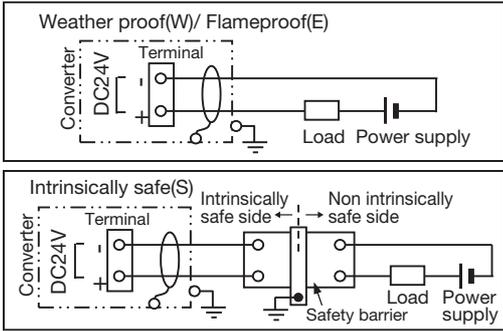
\*Applicable cable outer diameter: Max. Ø16 mm

FLOAT AVAILABILITY LIST

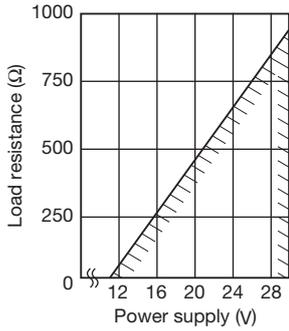
CODE	DIMENSION (DEAD BAND)	Inside diameter of float	MIN. H <sub>1</sub> (mm)	MATERIAL	MIN. DENSITY (g/cm <sup>3</sup> )	MAX. PRESS	MIN. NOZZLE FLANGE SIZE
1		ø24	90	SUS316L (Standard)	0.72	0.2MPa	3"
2		ø26	90		0.6	1.0MPa	5"
3		ø26	90		0.7	1.0MPa	4"
4		ø24	150		0.73	1.0MPa	4"
5		ø28	90	Titanium	0.8	1.5MPa	3"
6		ø28	90		0.5	2.4MPa	4"
7		ø28	90		PVC	0.85	0.13MPa
8		ø29	90	PP	0.8	0.13MPa	3"
9		ø27.7	90	PFA (The inside is filled up with NBR.*)	0.95	0.2MPa (Vacuum pressure is not acceptable.)	3"

\* It is also possible not to use NBR according to conditions.

**WIRING**



Power supply and load resistance



**PRECAUTIONS FOR USE**

- 1) When there is the flow in the liquid, there may be the malfunctions and damage caused by the stirring machine etc. Install an inner chamber.
- 2) It is not suitable to use under such operating conditions as the liquid freezes, congeals or sticks.

**ORDERING INFORMATION**

Specify the following for order or inquiry ;

- Model code FP-71□□□-□□
- Liquid name \_\_\_\_\_
- Design pressure (MPa) \_\_\_\_\_
- Density (g/cm<sup>3</sup>) \_\_\_\_\_
- Guide pipe length L \_\_\_\_\_ mm
- 100% output point h1 \_\_\_\_\_ mm
- 0% output point h2 \_\_\_\_\_ mm
- Cable outer diameter (Flameproof type) ∅ \_\_\_\_\_ mm
- Other instructions/special notice if any

**STANDARD ACCESSORIES (OPTION)**

- Safety barrier: MTL7728+

Although you can use other barriers, they MUST satisfy all conditions listed below.

1. Standard-qualified
2. Rating

Protection class: ia

Group: IIC

Maximum voltage: DC28V

Maximum current: DC93mA

Maximum electric power: 650mW

Allowable inductance L<sub>o</sub>: >2.23mH+LW

(LW = value for the wire of an intrinsically safe circuit)

Allowable capacitance C<sub>o</sub>: >0.021μF+CW

(CW = value for the wire of an intrinsically safe circuit)

\* Specification is subject to change without notice.



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