

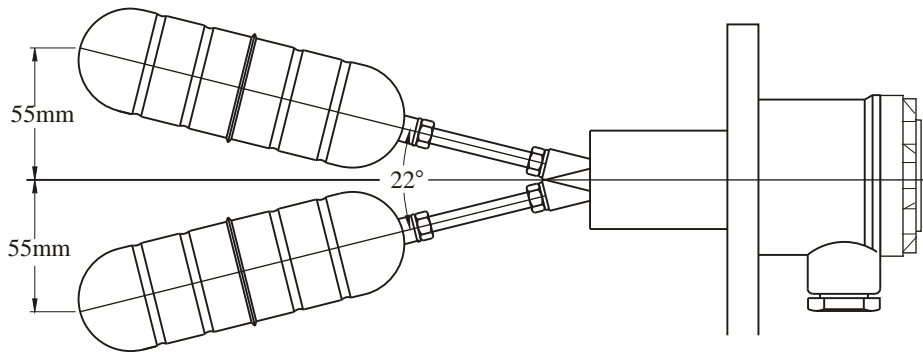
## PRINCIPLE

Simple theory as liquid buoyancy is utilized for the main principle of this "FF" series. A change of liquid level correspondingly travels the float to extreme levels up and down. The reed switch is thus "NC" and "NO" exchanged as well as the permanent magnet on pivot will have mutual repulsion to the other one inside on the housing for like poles, which the Microswitch is button-pushed by magnet to states "NO" and "NC" exchanging likewise.

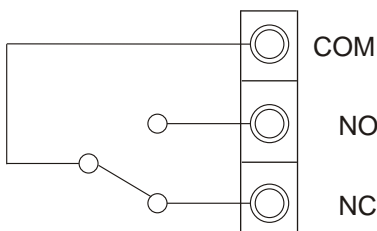
## FEATURES

The side mounted float level sensor ( FF series) are manufactured specifically for horizontal mounting in a tank or vessel. They work well as high or low level control.

1. Both MicroSwitch type and Reed Switch are available. The MicroSwitch type is usable even at ambient temp. of 100°C max.
2. Mounting flanges are custom-specifiable. (JIS, DIN, ANSI).
3. A rich variety of floats can be suited different specific gravity (S.G.) of liquid.(Custom-made)
4. Liquid-wetted party material can be selected for SUS304 or SUS316 as well as enclosure explosion proof model.



## WIRING



REED SWITCH ---- 1A, 30W 220Vac/200Vdc (FF20, 45, 55, 8□ )

MICRO SWITCH ---- 5A/250Vac

# CONFIGURATION CUTTING DRAWINGS

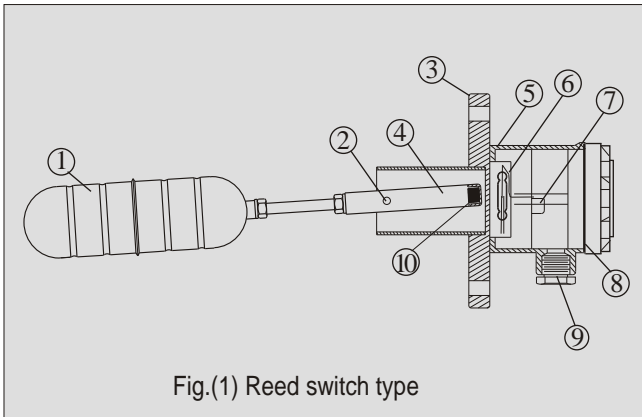


Fig.(1) Reed switch type

- 1. Float
- 2. Shaft
- 3. Flange
- 4. Pivot
- 5. Housing
- 6. Reed Switch
- 7. Terminal
- 8. O-ring
- 9. Conduit

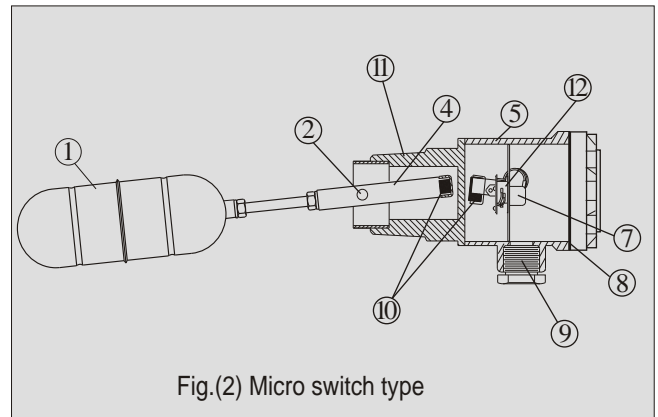


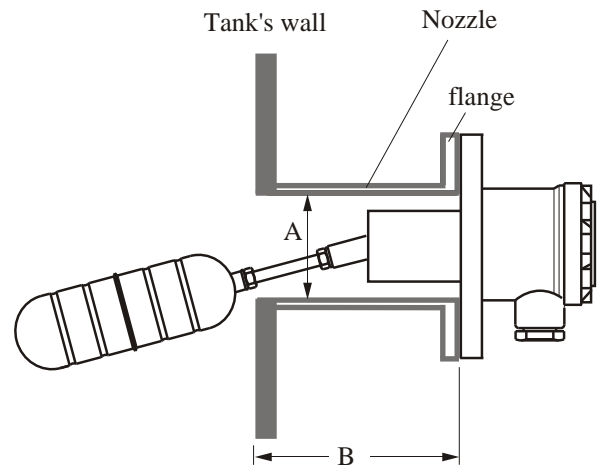
Fig.(2) Micro switch type

- 10. Magnet
- 11. Screw
- 12. Microswitch

► The diameter and length of the connecting pipe (of a tank) are in a direct ratio.

UNIT: mm

Pipe dia. (A)	45-50	50-55	55-60	60-65	65-70
Length (B) (Max.)	130	140	150	160	170



# SPECIFICATION

<b>SPEC. MODEL</b>	<b>Operating Temp.</b>	<b>Electrical Contact</b>	<b>Contact Capacity</b>	<b>Contact Element</b>	<b>Housing Spec.</b>	<b>Applicable S.G.</b>
<b>FF10BHM</b>	-10°C~100°C	SPDT(1C)	5A/250Vac	Microswitch	Aluminum Alloy IP65	0.25
<b>FF10CEM</b>	-10°C~100°C	SPDT(1C)	5A/250Vac	Microswitch	Aluminum Alloy IP65	0.65
<b>FF10CEM....SA</b>	-10°C~100°C	SPDT(1C)	5A/250Vac	Microswitch	Aluminum Alloy IP65	0.65
<b>FF10CEQ</b>	-10°C~100°C	SPDT(1C)	5A/250Vac	Microswitch	Aluminum Alloy IP65	0.65
<b>FF10CEQ....SA</b>	-10°C~100°C	SPDT(1C)	5A/250Vac	Microswitch	Aluminum Alloy IP65	0.65
<b>FF10CLO</b>	-10°C~100°C	SPDT(1C)	5A/250Vac	Microswitch	Aluminum Alloy IP65	0.65
<b>FF10CLO....SA</b>	-10°C~100°C	SPDT(1C)	5A/250Vac	Microswitch	Aluminum Alloy IP65	0.65
<b>FF10DFM</b>	-10°C~100°C	SPDT(1C)	5A/250Vac	Microswitch	Aluminum Alloy IP65	0.55
<b>FF10DFM....SA</b>	-10°C~100°C	SPDT(1C)	5A/250Vac	Microswitch	Aluminum Alloy IP65	0.55
<b>FF10DFQ</b>	-10°C~100°C	SPDT(1C)	5A/250Vac	Microswitch	Aluminum Alloy IP65	0.55
<b>FF10DFQ....SA</b>	-10°C~100°C	SPDT(1C)	5A/250Vac	Microswitch	Aluminum Alloy IP65	0.55
<b>FF10HEQ</b>	-10°C~100°C	SPDT(1C)	5A/250Vac	Microswitch	SUS304 IP65	0.8
<b>FF12CEM</b>	-10°C~100°C	SPDT(1C)X2	5A/250Vac	Microswitch	SUS304 IP65	0.65
<b>FF20BHM</b>	-40°C~200°C	SPDT(1C)	1A, 60W 220Vac/200Vdc	Reed Switch	Aluminum Alloy IP65	0.25
<b>FF20CEM</b>	-40°C~200°C	SPDT(1C)	1A, 30W 220Vac/200Vdc	Reed Switch	Aluminum Alloy IP65	0.65
<b>FF20CEQ</b>	-40°C~200°C	SPDT(1C)	1A, 30W 220Vac/200Vdc	Reed Switch	Aluminum Alloy IP65	0.65
<b>FF20DFM</b>	-40°C~200°C	SPDT(1C)	1A, 30W 220Vac/200Vdc	Reed Switch	Aluminum Alloy IP65	0.55
<b>FF20DFQ</b>	-40°C~200°C	SPDT(1C)	1A, 30W 220Vac/200Vdc	Reed Switch	Aluminum Alloy IP65	0.55
<b>FF20DLO</b>	-40°C~200°C	SPDT(1C)	1A, 30W 220Vac/200Vdc	Reed Switch	Aluminum Alloy IP65	0.55
<b>FF30A3Q</b>	-10°C~120°C	SPST(1A)	1A, 50W 240Vac/200Vdc	Reed Switch	SUS304 IP65	0.7

※ Model no. with "....SA"certified by Germany GL, USA ABS marine grade, the prices are subject to be different.  
Please notify when placing an order if necessary.

# SPECIFICATION

MODEL \ SPEC.	Operating Temp.	Electrical Contact	Contact Capacity	Contact Element	Housing Spec.	Applicable S.G.
FF40DFM	-10°C~100°C	SPDT(1C)	5A/250Vac	Microswitch	Aluminum Alloy IP65	0.55
FF45DFM	-40°C~200°C	SPDT(1C)	1A, 60W 220Vac/200Vdc	Reed switch	Aluminum Alloy IP65	0.55
FF50DFM	-10°C~100°C	SPDT(1C)	5A/250Vac	Microswitch	Aluminum Alloy IP65	0.55
FF50DFM....SA	-10°C~100°C	SPDT(1C)	5A/250Vac	Microswitch	Aluminum Alloy IP65	0.55
FF55DFM	-40°C~200°C	SPDT(1C)	1A, 60W 220Vac/200Vdc	Reed switch	Aluminum Alloy IP65	0.55
FF62DFM	-10°C~350°C	SPDT(1C)	5A/250Vac	Microswitch	Aluminum Alloy IP65	0.55
FF70/71BHM	-10°C~100°C	SPDT(1C)	3A/250Vac	Microswitch	SUS316 Ex d IIB T3~T6	0.25
FF70/71CFM	-10°C~100°C	SPDT(1C)	3A/250Vac	Microswitch	SUS316 Ex d IIB T3~T6	0.65
FF70/71DFM	-10°C~100°C	SPDT(1C)	3A/250Vac	Microswitch	SUS316 Ex d IIB T3~T6	0.55
FF73GLO	-10°C~100°C	SPDT(1C)	3A/250Vac	Microswitch	SUS316 Ex d IIB T3~T6	0.7
FF75DFM	-10°C~100°C	SPDT(1C)	3A/250Vac	Microswitch	SUS316 Ex d IIB T3~T6	0.55
FF80EFM	-10°C~80°C	SPDT(1C)	1A, 30W 220Vac/200Vdc	Reed switch	PC IP65	0.60
FF81EFM	-10°C~80°C	SPDT(1C)	1A, 30W 220Vac/200Vdc	Reed switch	—	0.60
FF90GLO	-10°C~100°C	SPDT(1C)	5A/250Vac	Microswitch	Aluminum Alloy IP65	0.7

※ Model no. with "...SA" certified by Germany GL, USA ABS marine grade, the prices are subject to be different.  
Please notify when placing an order if necessary.

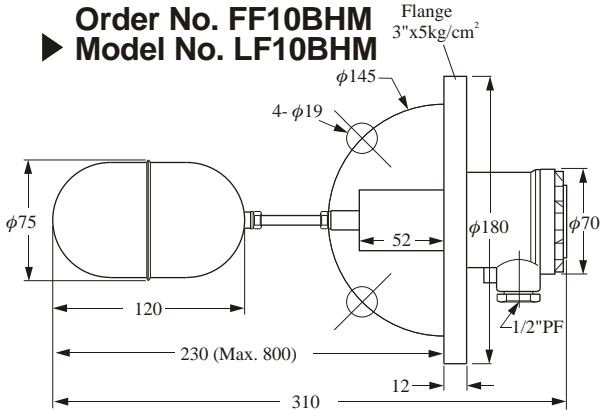
# STANDARD

Order No. FF

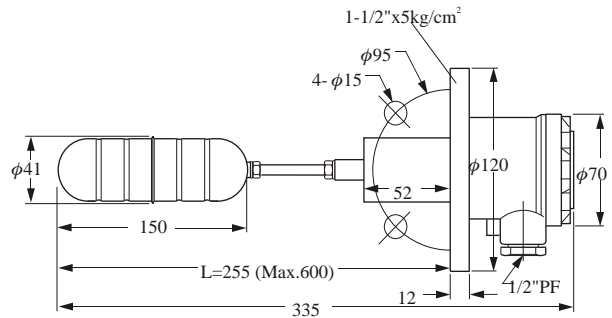
Connecting Type (Refer to page 13)  
 Float Type  
 10: Single Switch  
 12: Dual Switch



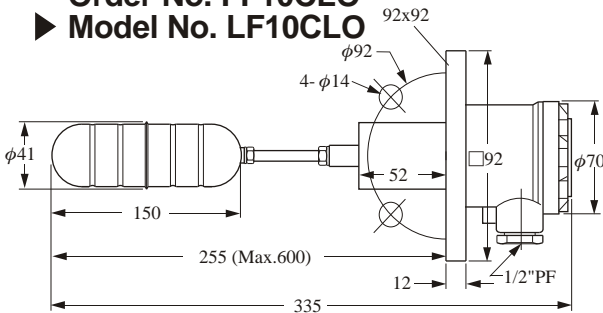
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 Model No. LF10BHM



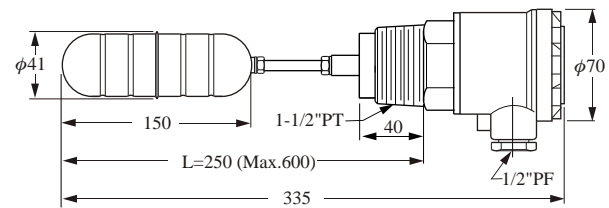
Order No. FF10CEM  
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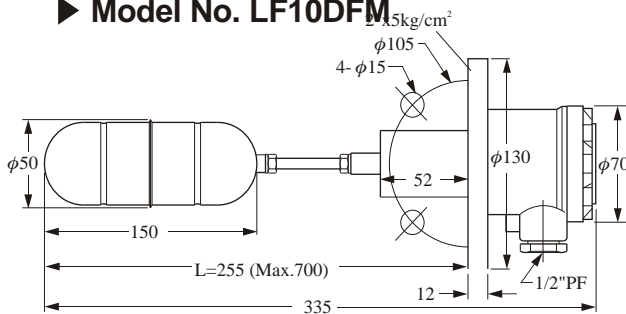
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 Model No. LF10CLO



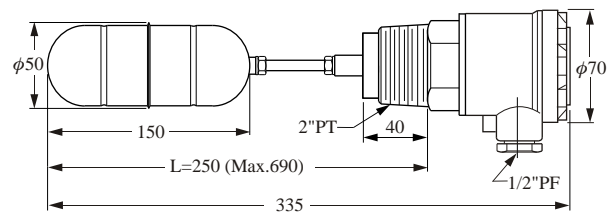
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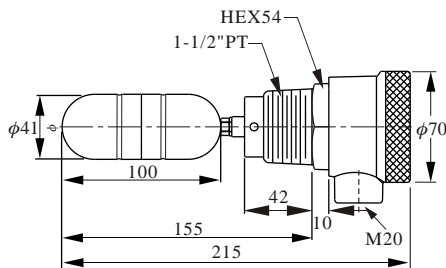
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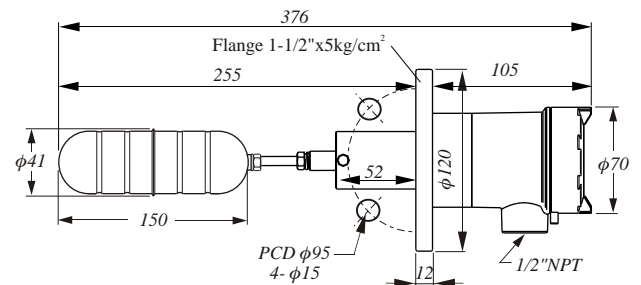
Order No. FF10DFQ  
 Model No. LF10DFQ



Order No. FF10HEQ  
 Model No. LF10HEQ

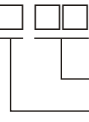


Order No. FF12CEM  
 Model No. LF12CEM



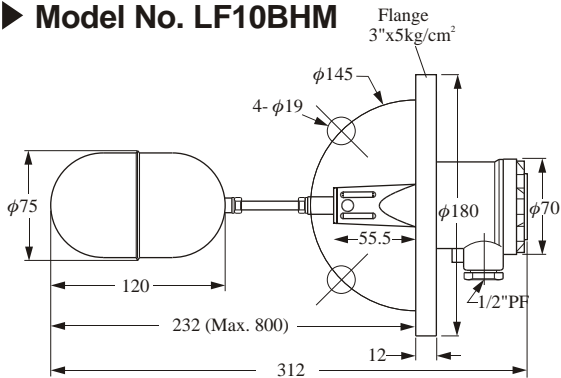
# STANDARD FLANGE

Order No. F F13

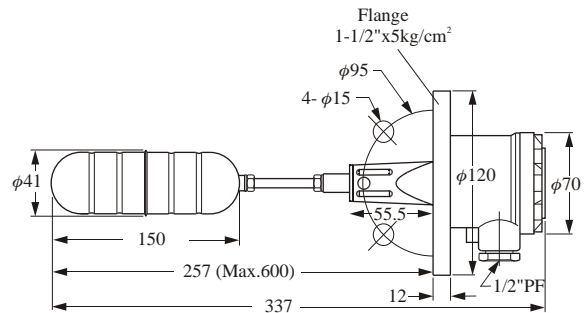


Connecting Type (Refer to page 13)  
Float Type

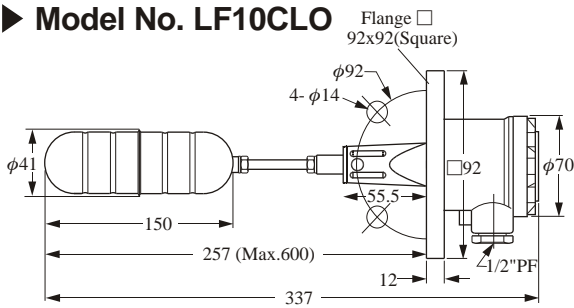
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Model No. LF10BHM



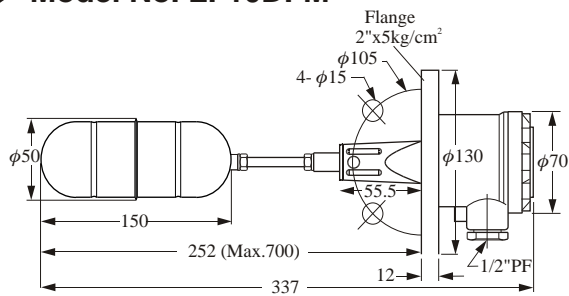
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Model No. LF10CEM



Order No. FF10CLO  
Model No. LF10CLO



Order No. FF10DFM  
Model No. LF10DFM



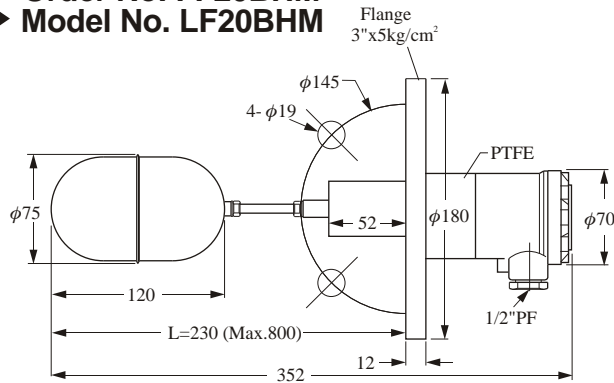
# HIGH TEMP.

Order No. FF20

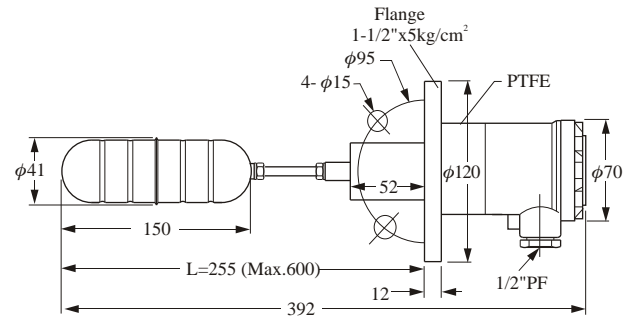
Connecting Type  
(Refer to page 13)  
Float Type



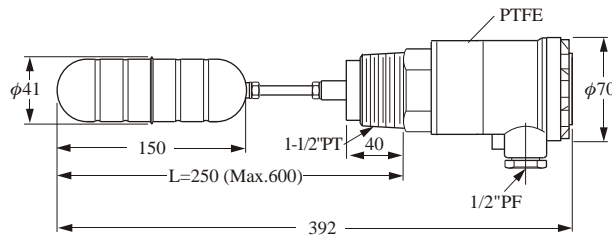
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Model No. LF20BHM



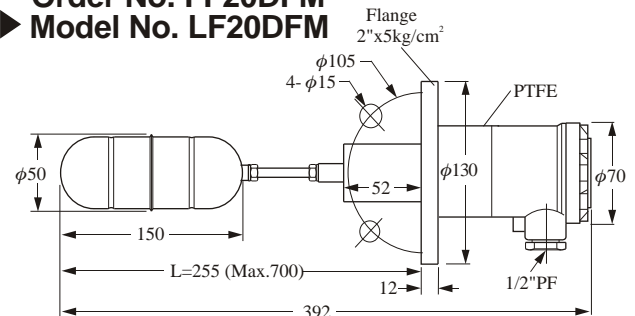
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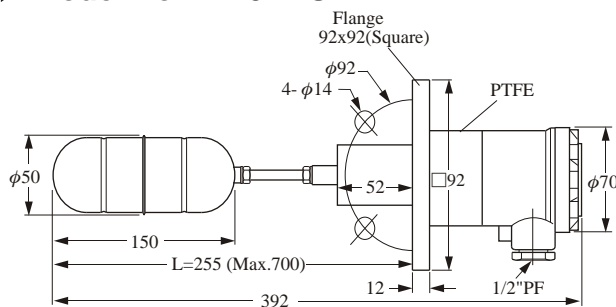
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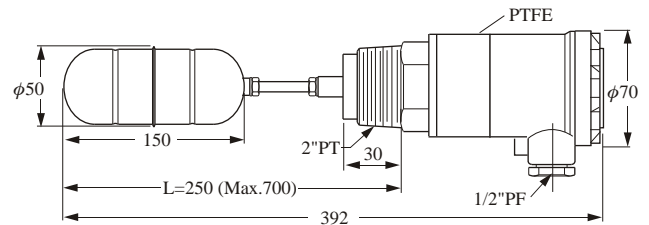
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Model No. LF20DFM



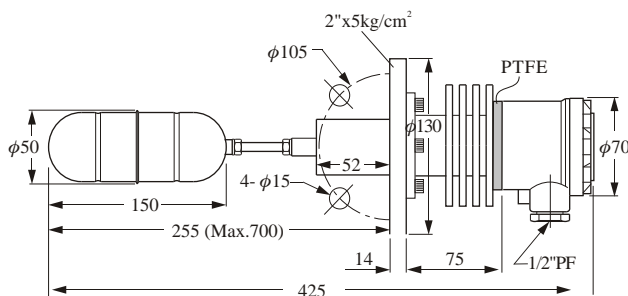
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Model No. LF20DLO



Order No. FF20DFQ  
Model No. LF20DFQ



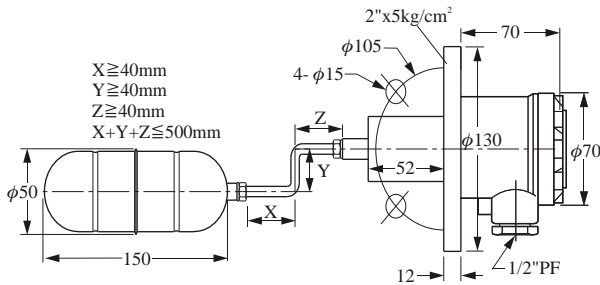
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Model No. LF62DFM



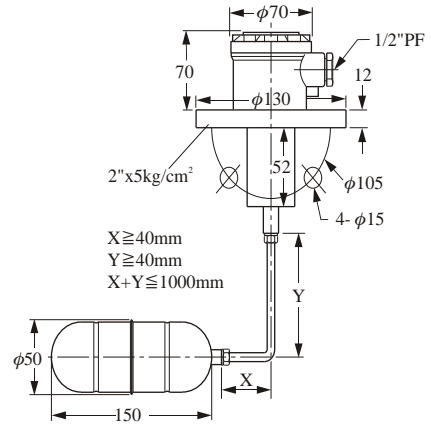
Order No. FF

- Connecting Type (Refer to page 13)
- Float Type
- 30: Mini Type
- 40: Double Angle Standard
- 45: Double Angle High Temp.
- 50: Vertical Standard
- 55: Vertical High Temp.

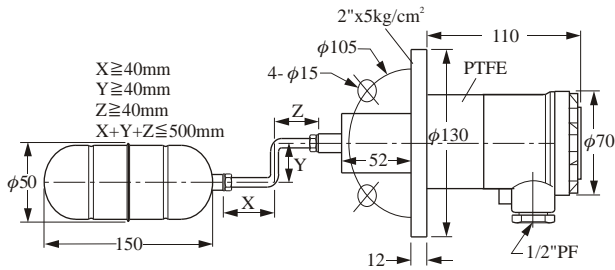
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Model No. LF40DFM



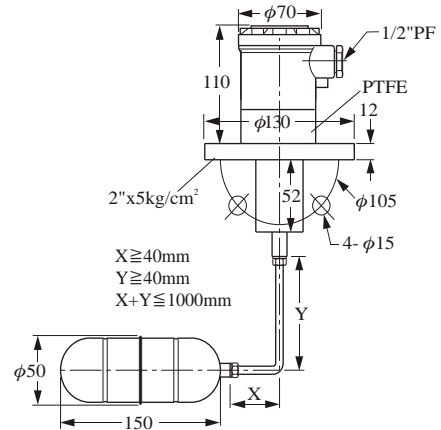
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Model No. LF50DFM



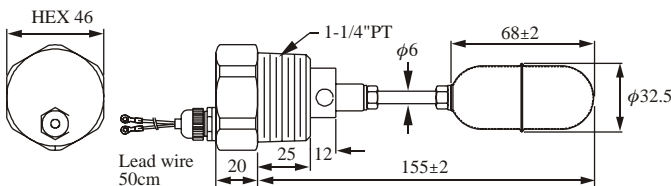
► Order No. FF45DFM  
Model No. LF45DFM



► Order No. FF55DFM  
Model No. LF55DFM



► Order No. FF30A3Q  
Model No. LF30A3Q





# ANTI-ACID / ALKALINE

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## PRINCIPLE

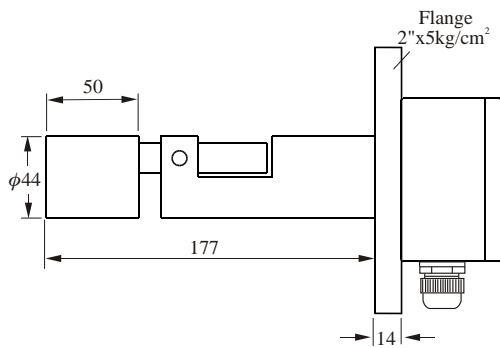
When the solid polypropylene float is flooded by a liquid, its weight is reduced by the buoyancy of the liquid and the float moves upward. Thus, a permanent magnet that built in the float actuates the reed switch in the sensor body to work the "NO" and "NC" exchanges.

**FF80EFM --- PC Housing**  
**FF81E --- Without Housing**

Wetted parts : P.P.  
Cable spec. : PVC 3x0.75 mm<sup>2</sup>

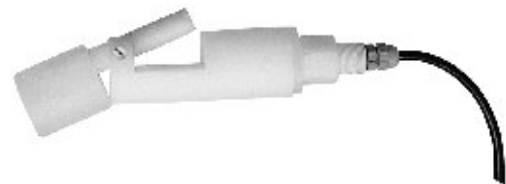
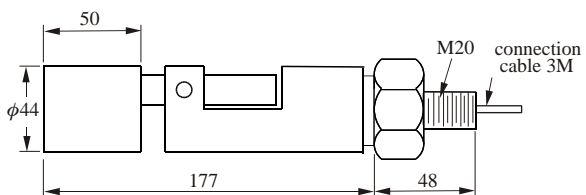
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► **Model No. LF80EFM**



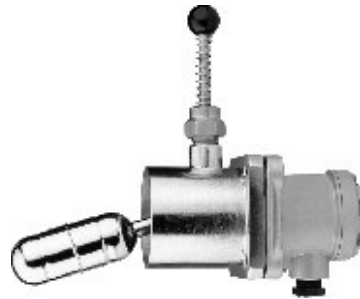
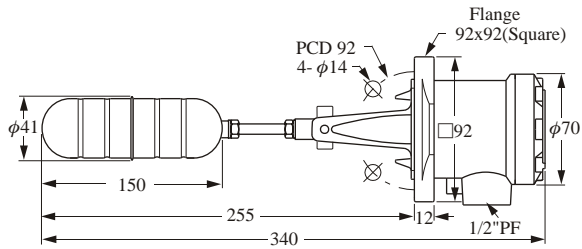
**Order No. FF81E**

► **Model No. LF81E**



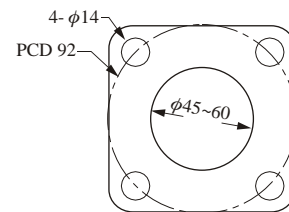
# SQUARE FLANGE & TEST ACCESSORY

Order No. FF90CLO  
 Model No. LF90CLO

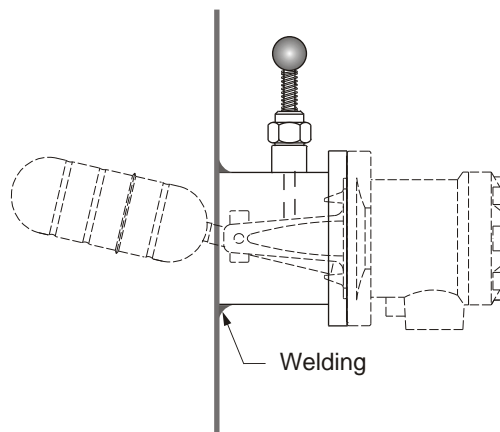
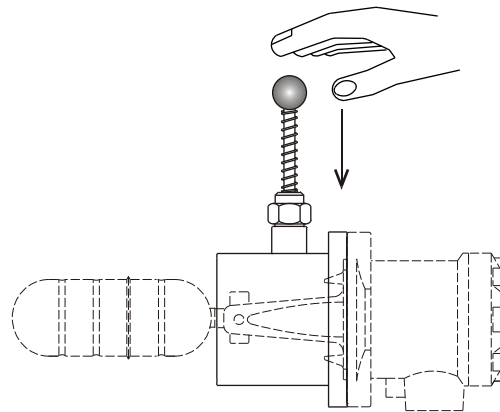
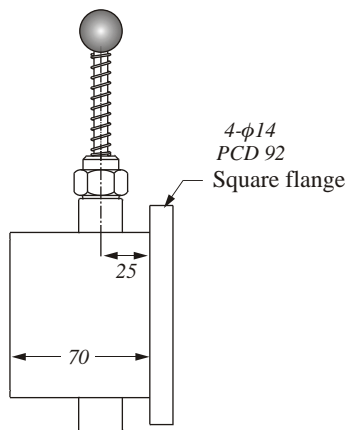


1. Housing material: Aluminum (IP65)
2. Suitable S.G.: >0.65
3. Operation temp.: -10~100°C
4. Contact form: SPDT(1C)
5. Contact rating: 5A/250Vac
6. Operation pressure: 15kg/cm<sup>2</sup>
7. Wetted parts: SUS304
8. Weight: approx. 1.2 kg

## Drill Hole



**Test Accessory** (Optional)  
 Order No. FFB-0300  
 Material: SS41



# MARINE ASSOCIATION APPROVALS

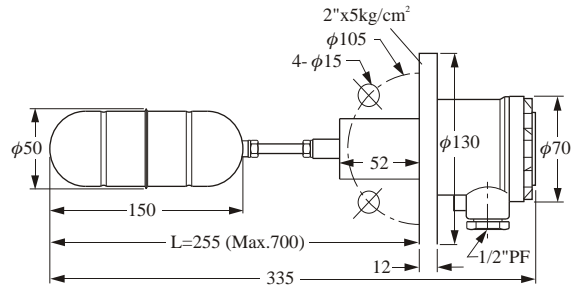


Germanischer Lloyd  
(Germany)

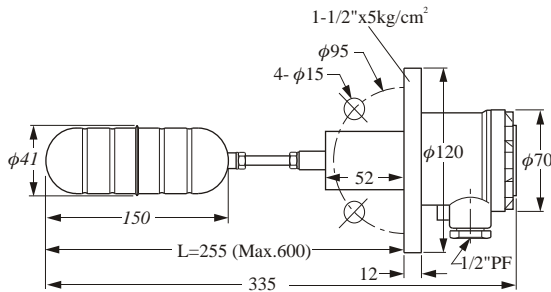


American Bureau of  
Shipping (USA)

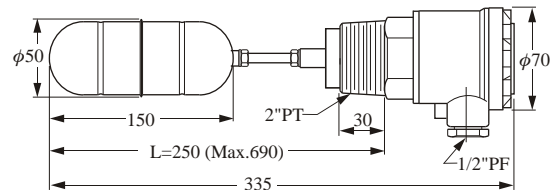
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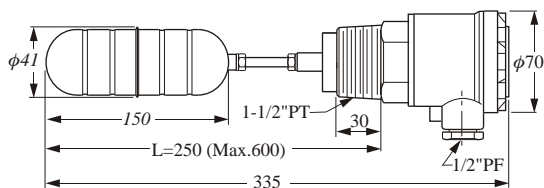
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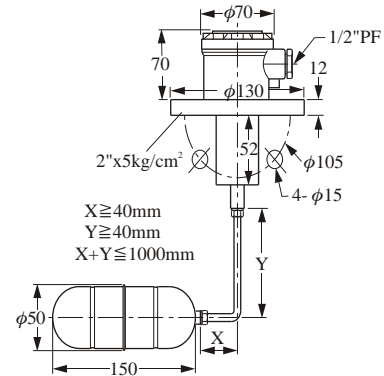
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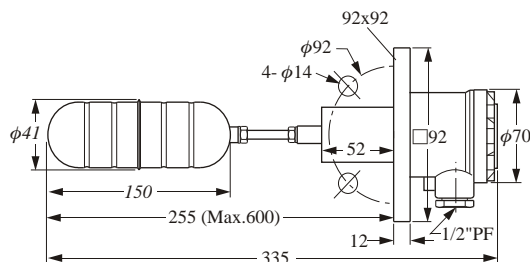
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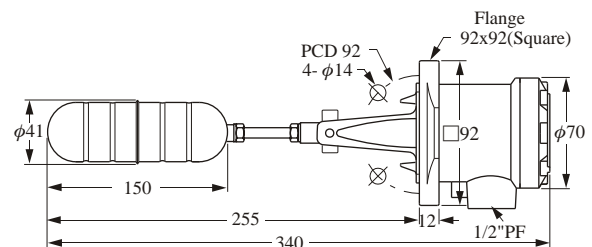
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## Order No. FF10CLO...SA ▶ Model No. LF10CLO...SA



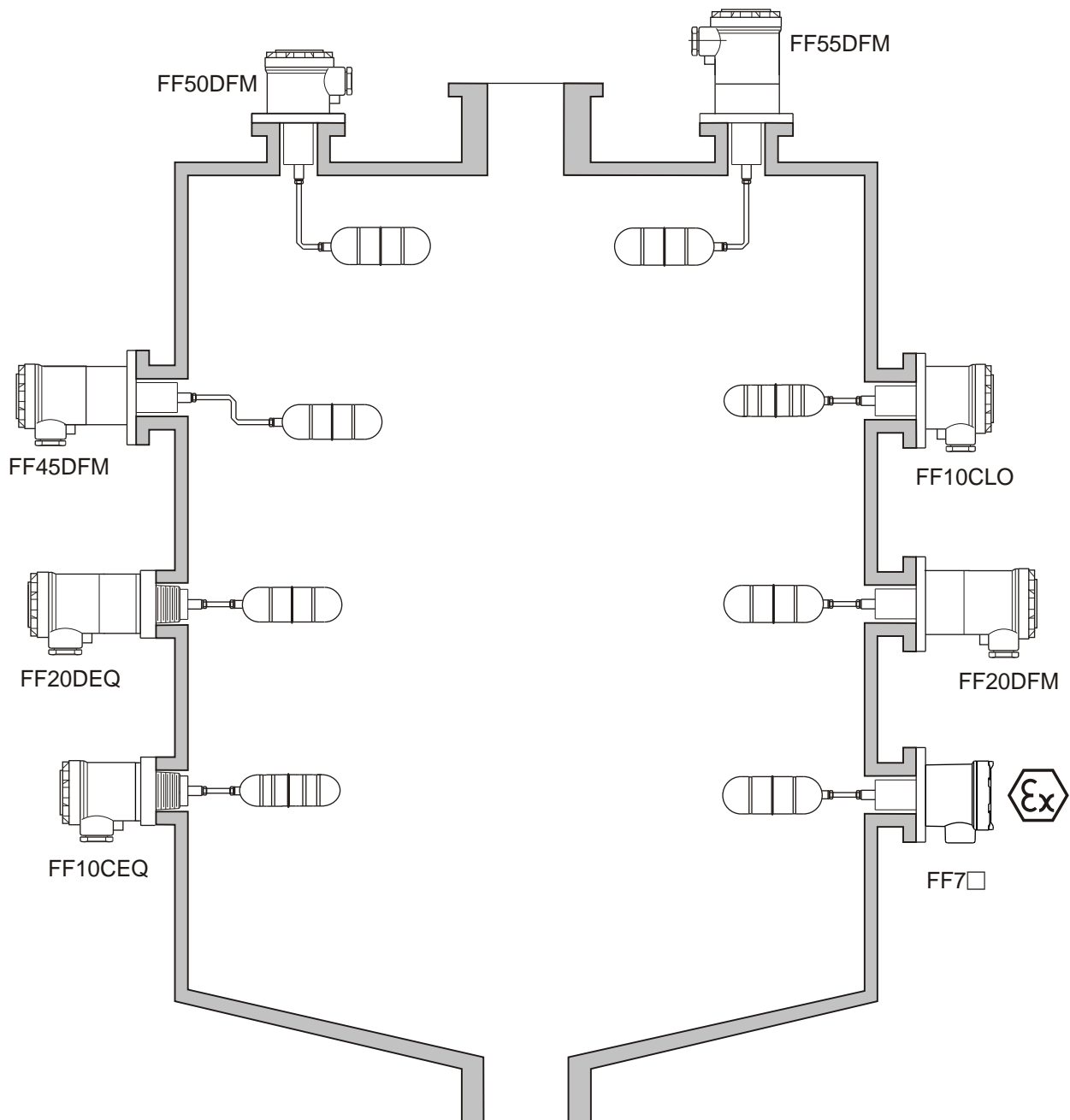
## Order No. FF90CLO...SA ▶ Model No. LF90CLO...SA



# IMPORTANCE FOR INSTALLATION

1. SUS304/SUS316 materials is not available for corrosive application.
2. The cable duct(s) must face downward to prevent moisture sipping in.
3. The float and extension rod must be inserted into a bin completely.
4. Be sure the liquid object's S.G. before installation.
5. The mounting hole must be larger than the external diameter of float.
6. Don't mount the devices near the bin's inlet or outlet.

## Typical Positioning



# HOW TO MAKE YOUR ORDER

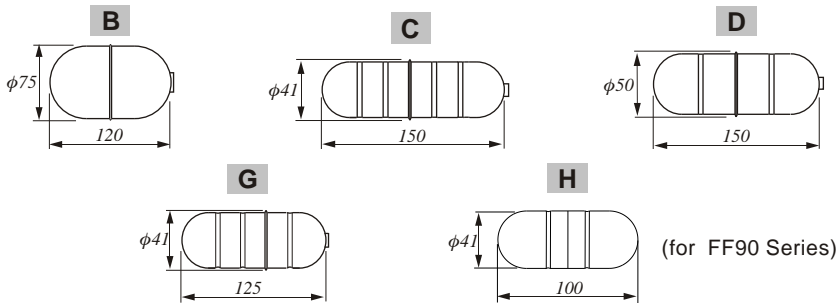
Order No. **FF** **10** **C** **EM** **(S)** **(T)**  
 Model No. **LF** **10** **C** **EM** **(S)** **(T)**

## ORDER NO.

- |   |                        |
|---|------------------------|
| 10/16: STANDARD                               | 80: ANTI-ACID/ALKALINE |
| 13: STANDARD FLANGE                           | 81: ANTI-ACID/ALKALINE |
| 20/26: HIGH TEMP.                             | 90/96: SQUARE FLANGE   |
| 40: DOUBLE ANGLE STANDARD                     |                        |
| 45: DOUBLE ANGLE HIGH TEMP.                   |                        |
| 50: VERTICAL STANDARD                         |                        |
| 55: VERTICAL HIGH TEMP.                       |                        |
| 62/66: HIGH TEMP RADIATOR                     |                        |
| 70: LF70 Screw Type (Ex d II C T3~T6)         |                        |
| 71: LF71 Flange Type (Ex d II C T3~T6)        |                        |
| 73: LF73 Square Flange Type (Ex d II C T3~T6) |                        |
| 75: LF75 Top Mounting Type (Ex d II C T3~T6)  |                        |

## FLOAT TYPE

- B:  $\phi 75 \times 120$  (OPERATION PRESSURE  $10 \text{ kg/cm}^2$  S.G. 0.25)  
 C:  $\phi 41 \times 150$  (OPERATION PRESSURE  $15 \text{ kg/cm}^2$  S.G. 0.65)  
 D:  $\phi 50 \times 150$  (OPERATION PRESSURE  $30 \text{ kg/cm}^2$  S.G. 0.55)  
 G:  $\phi 41 \times 125$  (OPERATION PRESSURE  $15 \text{ kg/cm}^2$  S.G. 0.7)  
 H:  $\phi 41 \times 100$  (OPERATION PRESSURE  $15 \text{ kg/cm}^2$  S.G. 0.8)



## CONNECTING TYPE

- |                 |                         |                  |
|-----------------|-------------------------|------------------|
| E: 1-1/2" (40A) | M: $5 \text{ kg/cm}^2$  | W: PN 10 (10Bar) |
| F: 2" (50A)     | N: $10 \text{ kg/cm}^2$ | X: PN 16 (16Bar) |
| G: 2-1/2" (65A) | O: 150 Lbs              | Y: PN 25 (25Bar) |
| H: 3" (80A)     | P: 300 Lbs              | Z: PN 40 (40Bar) |
| I: 4" (100A)    | Q: PT                   | S: Others        |
| J: 5" (125A)    | R: PF(G)                |                  |
| K: 6" (150A)    | T: BSP                  |                  |
| L: 92x92        | U: NPT                  |                  |

## CUSTOM LENGTH(L) (UNIT: mm)

## TEST ACCESSORY

- ※ Tolerance of the total product length is  $\pm 5 \text{ mm}$
- ※ Characteristics, specifications and dimensions are subject to change without notice.
- ※ Please contact your nearest distributor office for further information.

# ENCLOSURE EXPLOSION PROOF

NEPSI PROOF No. GYJ06235 Ex d IIC T3~T6

PTB PROOF No. 05 ATEX 1025 Ex II 2G EEx d IIB T3~T6

Ex II 2D IP65 T3~T6

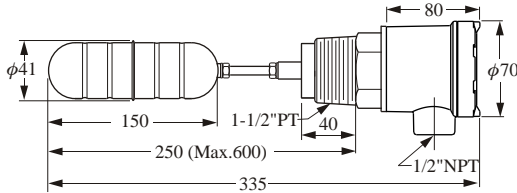
Order No. FF

Connecting Type  
(Refer to page 14)

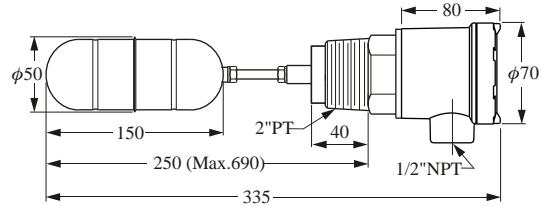
Float Type

7 : Explosion Proof (EX d IIB T4)

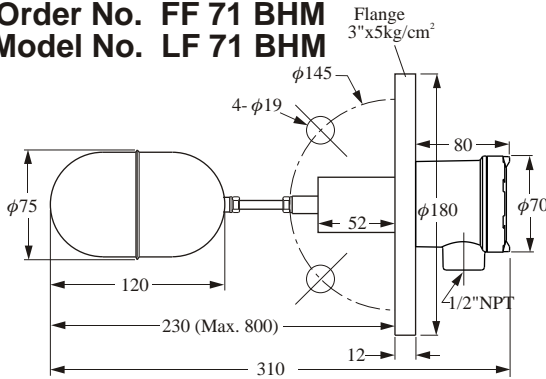
▶ Order No. FF 70 CEQ  
Model No. LF 70 CEQ



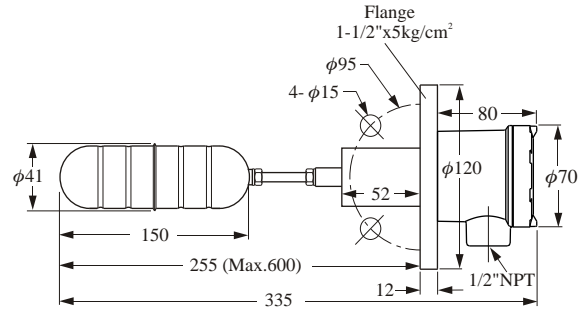
▶ Order No. FF 70 DFQ  
Model No. LF 70 DFQ



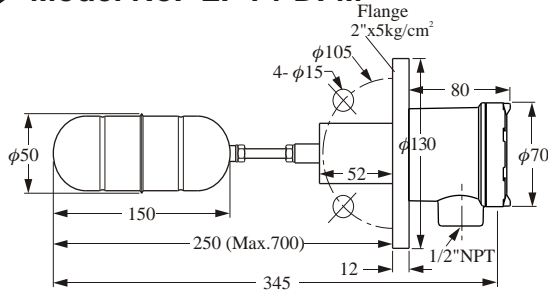
▶ Order No. FF 71 BHM  
Model No. LF 71 BHM



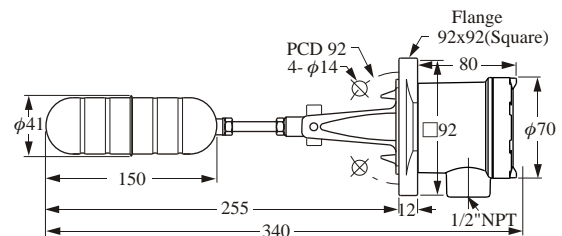
▶ Order No. FF 71 CEM  
Model No. LF 71 CEM



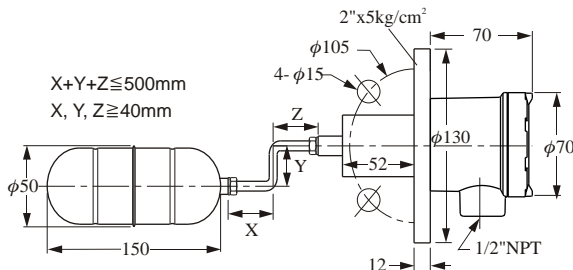
▶ Order No. FF 71 DFM  
Model No. LF 71 DFM



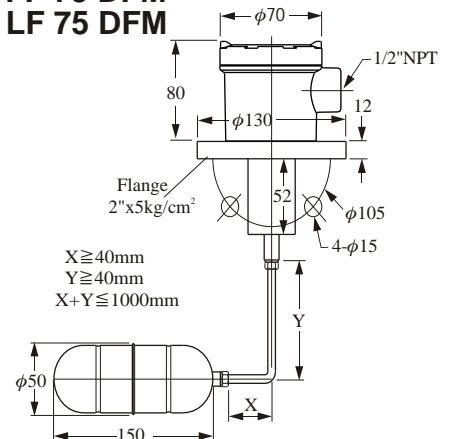
▶ Order No. FF 73 CLO  
Model No. LF 73 CLO



▶ Order No. FF 74 DFM  
Model No. LF 74 DFM



▶ Order No. FF 75 DFM  
Model No. LF 75 DFM



# HOW TO MAKE YOUR ORDER

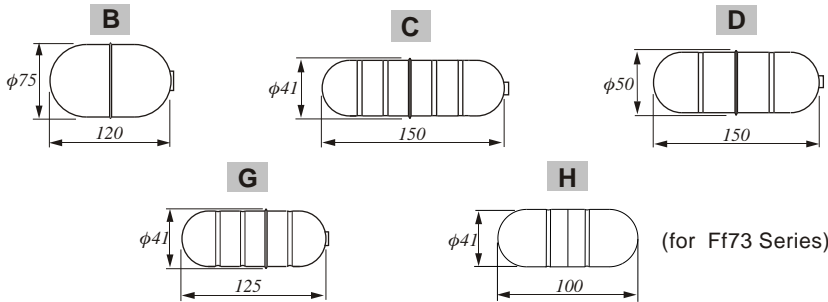
Order No. **FF** **70** **C** **E** **M** **S** **T**  
 Model No. **LF** **70** **C** **E** **M** **S** **T**

**ORDER NO.** \_\_\_\_\_

70: LF70 ENCLOSURE EXPLOSION PROOF (Ex d IIC T3~T6)  
 71: LF71 ENCLOSURE EXPLOSION PROOF (Ex d IIC T3~T6)  
 73: LF73 ENCLOSURE EXPLOSION PROOF (Ex d IIC T3~T6)  
 75: LF75 ENCLOSURE EXPLOSION PROOF (Ex d IIC T3~T6)

**FLOAT TYPE** \_\_\_\_\_

B:  $\phi 75 \times 120$  (OPERATION PRESSURE  $10 \text{ kg/cm}^2$  S.G. 0.25)  
 C:  $\phi 41 \times 150$  (OPERATION PRESSURE  $15 \text{ kg/cm}^2$  S.G. 0.65)  
 D:  $\phi 50 \times 150$  (OPERATION PRESSURE  $30 \text{ kg/cm}^2$  S.G. 0.55)  
 G:  $\phi 41 \times 125$  (OPERATION PRESSURE  $15 \text{ kg/cm}^2$  S.G. 0.7)  
 H:  $\phi 41 \times 100$  (OPERATION PRESSURE  $15 \text{ kg/cm}^2$  S.G. 0.8)



**CONNECTING TYPE** \_\_\_\_\_

E: 1-1/2" (40A)	M: $5 \text{ kg/cm}^2$	W: PN10 (10Bar)
F: 2" (50A)	N: $10 \text{ kg/cm}^2$	X: PN16 (16Bar)
G: 2-1/2" (65A)	O: 150 Lbs	Y: PN25 (25Bar)
H: 3" (80A)	P: 300 Lbs	Z: PN40 (40Bar)
I: 4" (100A)	Q: PT	S: Others
J: 5" (125A)	R: PF(G)	
K: 6" (150A)	T: BSP	
L: 92x92	U: NPT	

※ Flanges are in thickness of factory standard 12mm.

**CUSTOM LENGTH(L)** (UNIT: mm) \_\_\_\_\_

**TEST ACCESSORY** \_\_\_\_\_

- ※ Characteristics, specifications and dimensions are subject to change without notice.
- ※ Tolerance of the total product length is  $\pm 5 \text{ mm}$
- ※ Please contact your nearest distributor office for further information.