Float Type Level Switch(SMC-7)

SMC-7 SERIES

Operational manual LS-101

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1. Of present manual

Users should understand of the operation of this unit and confirm of attentive point in installation by reading the present manual before the float type level switch (SMC-7) is mounted, and let it into run.

1.1 Attentive points of safety

Handle this unit rightly after read the description of safety before operation. Please, read of safety description in here without missing because it mighty be critical matter on safety. The attentive points on safety are classified into danger, warning, and attention.

Danger

Where there exists a danger of electricity short on the terminal unit of input and output, do not touch them absolutely with any part of human body or a conductivity material.

Warning

1. Where there happens trouble on this unit or exists worrisome of critical accident, install an appropriate protection circuit in outside of it, and devise preventing against accident by structuring the system into double.
2. Confirm the specification of temperature and electricity load over the cable to be connected with present unit.
3. Make sure whether the voltage rate is applicable with respect to either damage prevention, or trouble prevention of this unit.
4. Do not apply the electricity power until all wiring are completed for either electricity short prevention or trouble prevention of present unit.
5. Do not apply this unit into the process, where measurement process might be solidified, because the operation over this unit is interrupted critically.
6. If the unit is injurious with respect to a shock, take of care not to be damaged by a working tool or dropping it into ground when mounting or conveying the unit.
7. Prohibit dissembling, processing, improving or transformation over present unit absolutely, because abnormal operation or danger with respect to fire exists.
8. Remove this unit after OFF the power source because there might exist causes of an electrical shock, malfunction or trouble.
9. The wound on body or loss on property might be brought if this unit is used in other than way directed by the manufacturer.

1.2 Attention on using or installing.

1.The description of present manual may be changed without pre-notice or any information.
2. Identify the specification ordered
3. Unwrap the package carefully, and confirm of whether any defect of products during transportation or damage on goods is found or not.
4. The instrument should be ran with range of ambient temperature 0 ~ 60℃/humidity0~99%RH (Not condition to be dewed).
5. Do not use it in explosive or combustible place other than using with explosion proof type

6. While a magnet core is moved along with the length of instrument Stem, use it in condition that the solidified things would not be sticked into the STEM, otherwise the measurement might be interfered greatly.
7. Use it in the place where Either vibrational frequency would be less than 1 KHz, or is not the main body damaged.
8. Do not sweep it with organic solvent including alcohol and benzene (wash it with neutral detergent)
9. Install it, avoiding from the place where great inductive interference exists or noise by electro -magnetic field is generated.
10. Keep it from the place where solar heat or radiant heat has been accumulated.
11. Since there might exist any danger of an electric leakage or of fire exists if there happens an accident penetrating water into the equipment, check it surely.
12 Turn off power source where a sensor is wired or replaced.
14. Do not connect some thing into the emptied terminal unit.
15. Wire exactly after being checked the polarity of terminal unit.
16. A switch or breaker should be installed near the place where a user may handle easily.
17. Regular check is advisable in order to use the present unit into long term and safety
18. Either may one component fitted into this unit have a certain life or may other have long term changeability.
19. The warrant period of this unit including several parts is given as two years when it is ran normally.
20. Take attention not to be shocked when conveying or installing the unit.
21. Take attention not to be penetrated moisture or dusty particles into the internal of switch.
22. Not allow to be dissembled the switch since its performance cannot be guaranteed.

1.3 Guarantee and limit of responsibility

1. Seo Jin instech Co., Ltd gives the guarantee of two years from the shipment date to any defect or fault in design, material or manufacturing of present product.
2. Where any defect or fault is happened within the warranty period mentioned above, SeoJin Instech Co., Ltd provides replacing the part related with the fault, with additional part or repairing, but without exchanging a whole product.
3. Any troubles predicted as below are not included into warranty service by Seo Jin Instech Co.,Ltd.
   - Error occurred by not obeying to the description of present manual.
   - Damage or error due wrong installation, wiring, operation, maintenance, inspection or store.
   - Error on the products changed or repaired by other company or a person not appointed.
   - Error on product repaired or corrected by using part or accessary or material not specified.
   - Error or malfunction occurred by setting a program or calibrating or measuring with an instrument not calibrated or the one elapsed the valid period of calibration.
   - Damage or loss on man power or things in direct or indirect, caused by connecting with other instrument or by using other.
   - Unvoidable accident like a natural calamity, irresistible force, and contamination by radiant
   - The utilization of present product is clearly mentioned in chapter 5.

Of Float type level switch (SMC-7)

The float type level switch should be installed according to the method presented in the installation manual

2. Introduction

2.1 Present manual describes of the specification of present product. Otherwise, the specification is not agreed, unless the order was given as a option model or a unique specification.

2.2 It is possible to be corrected into the specification meet to the operation condition of customer in installation condition or chemical resistance, and we Seo Jin instech.,Co Ltd shall do best to provide the best product for use purpose of customers.

2.3 Contact with sales office of SeoJin Instech Co., of questionnaire or of correction of present manual.

3. Character

3.1 Commodity name (nomenclature of type):
FLOAT TYPE LEVEL SWITCH

3.2 model name: SMC-7

3.3 Character

- Switching mechanism in stable and unique as world class.
- Simple installation and easy maintenance
- Easily handling as small size and light weight
- Possible to apply into high temperature and high pressure because of no spring mechanism.

3.4 Application

- into tank of Food and beverage, and medicine factory.
- into tank of crude oil, of oil refinery, and of oil stationary
- Refrigerator / Chemical tank
- Power plant, boiler, pressure vessel, heat exchanger.

4. Operational principle.

4.1 Operation principle

The level switch is operated on the principle that a magnetic field passes through non magnetic substance stainless steel. In this case, a core magnetic substance connected to float will be moved up and down within STEM in the inside of vessel. While this core moves up and down, it actuates the switching mechanism containing a permanent magnet. The inside of the STEM plays the role either to be interrupted from the part the pressure is applied, chamber or as a guide post letting the core move up and down.

4.2 Order of acuation

When the level of chamber ascends up as Fig. 1, the float makes core a magnetic substance mounted within the STEM into moving, then cause the switch mechanism within magnetic field to be moved. As the result, the permanent magnet is moved toward STEM, then letting the switch be moved to close a circuit. When the level descends down the core comes out of the magnetic field of magnet as the float coming down, and comes the switch back into the original position as Fig.2 by a tension spring.

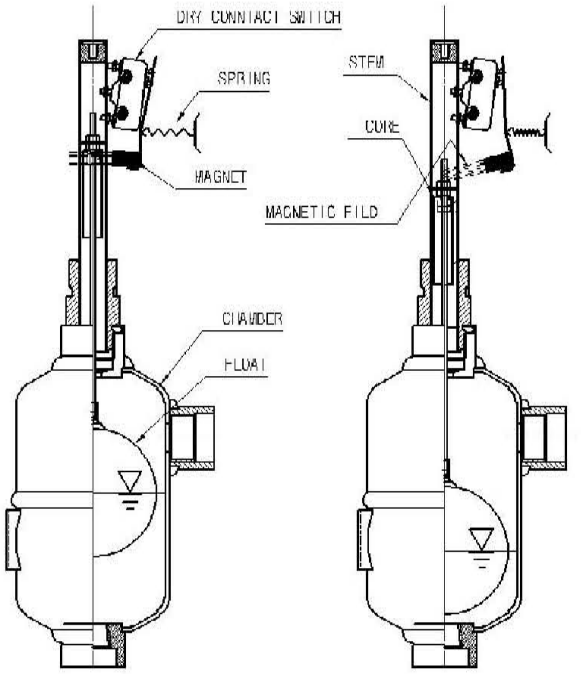


Fig.1. Switch connected Fig.2. Switch Released

The point requiring important alarm function.

Wherever requiring a sensitive alarming function, it is important that the switch of water level alarms at the position of HIGH -HIGH or LOW-LOW to protect the system as maximum as possible.

5. Technical specification

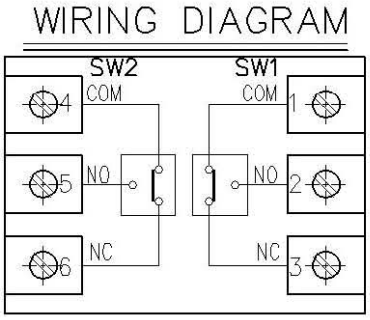
① Least specific gravity of process: 0.6
② Snap Acting Switch Assembly
- Switching type; Snap Acting Switch, Dry Contact Type
- Contact(Output); 1 DPDT, 2 DPDT
- Precision; ±1mm, Maximum applicable temperature; 400℃, Electrical life; more than fifty thousand times

③ the chamber made according to ASME B31.1, KEPIC MGE Code.
④ Float
- Material; 316LSS
- Float specific gravity; minimum 0.4
- Size; SMC-73, 74 ; OD 90mm, 0.7t,
  SMC-75, 76 ; OD 110mm, 1.2t,
- Maximum design temperature of process ; 400℃

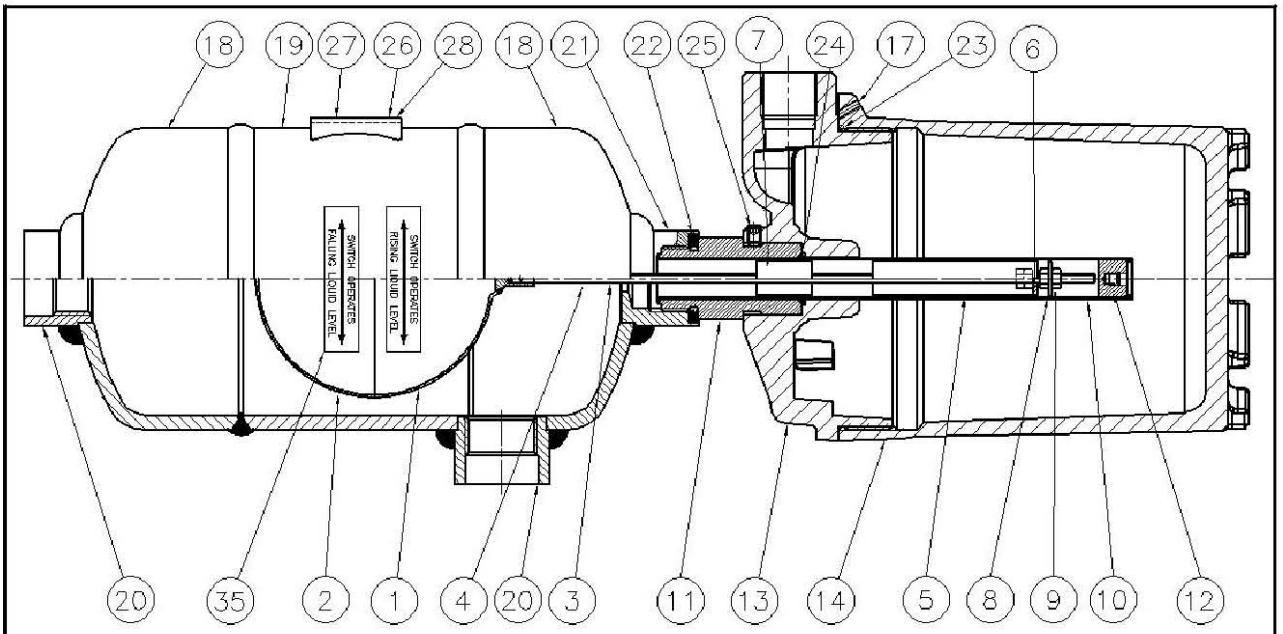
- **Maximum design process of Process ; TYPE 1; 70Bar / TYPE 2; 105Bar**

⑤ **Lamp(OPTION) for turning alarm on: is to identify the state of H/L emergency situation by an observer in site.**

6. Wiring

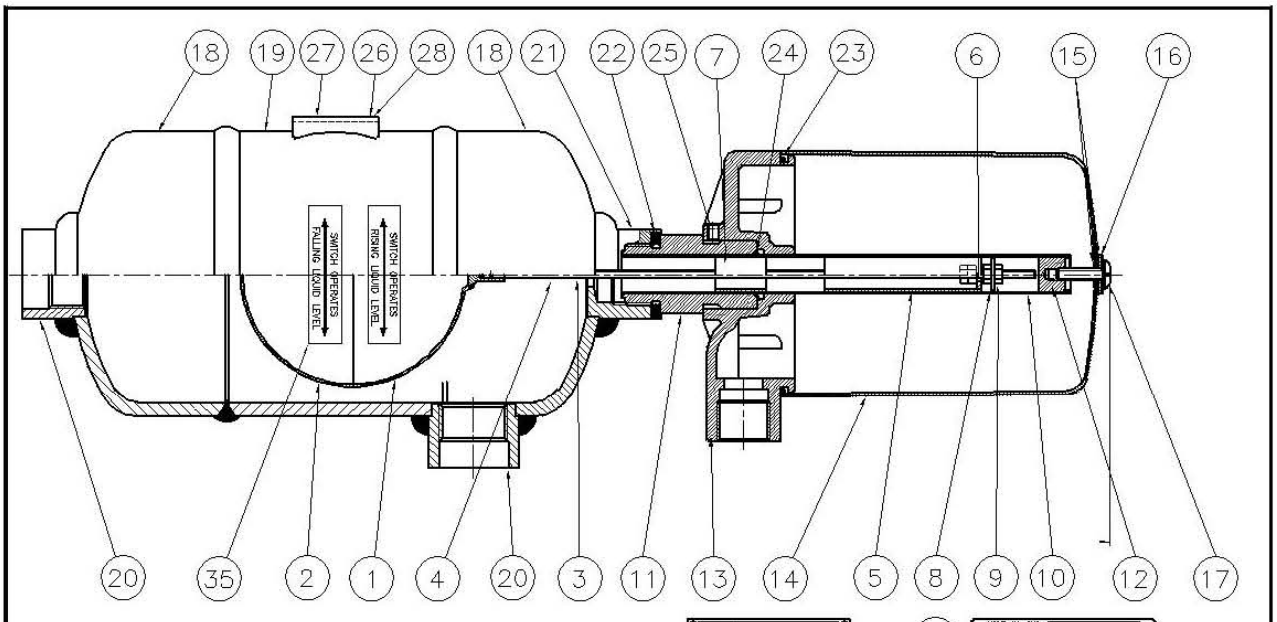


7. Each nomenclature

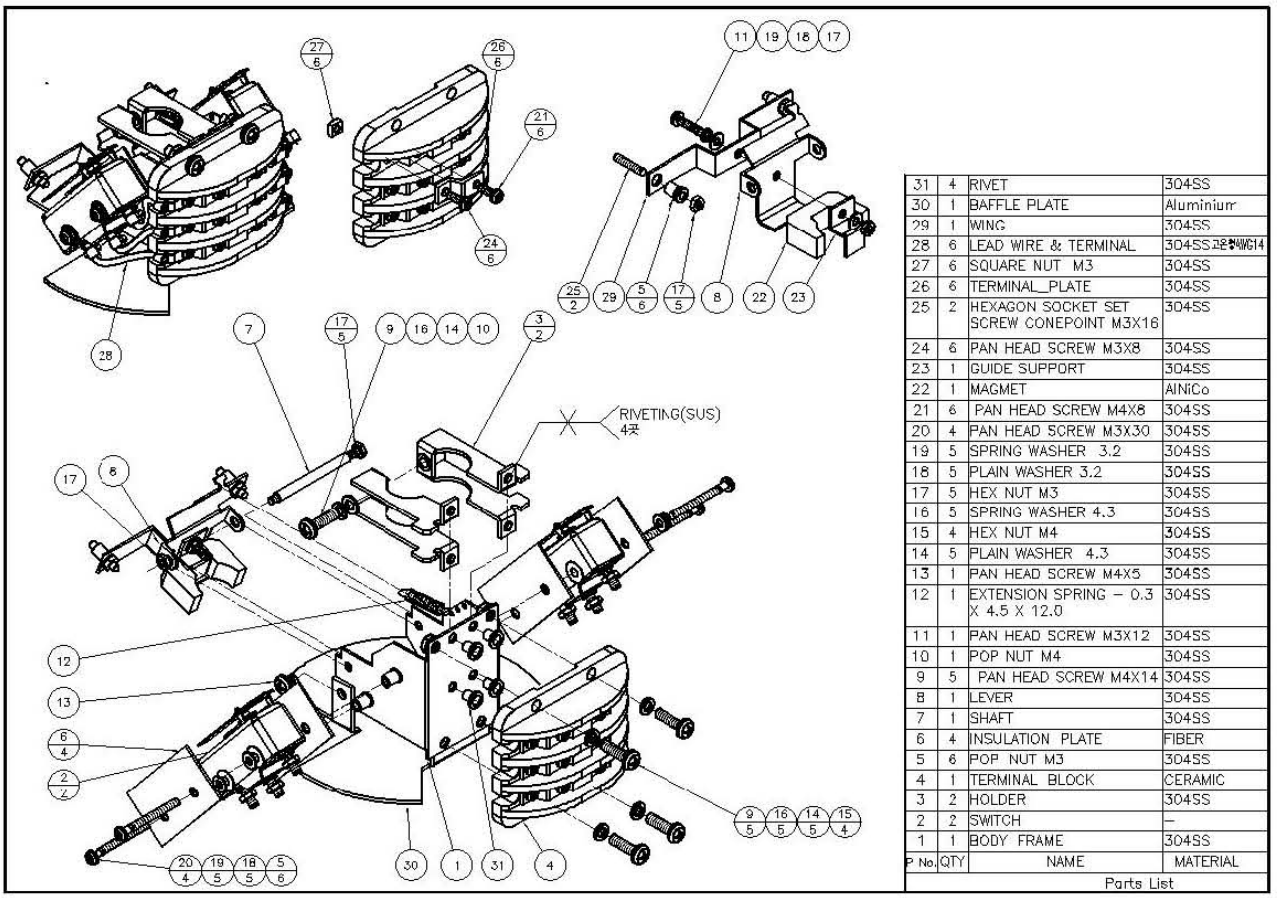


35	LEVEL STICKER	PE	2	
29	NAMEPLATE	304SS	1	
28	BOLT	304SS	4	M3 x 6L
27	NAMEPLATE	304SS	1	
26	NAME PLATE BRACKET	304SS	1	
25	무두랜지 볼트	SUS304	1	M6 x 8L
24	O RING (P19)	VITON R.	1	
23	O RING (G135)	VITON R.	1	
22	SPIRAL WOUND GASKET	316SS	1	
21	HEAD COUPLING	A105	1	
20	MOUNT BRANCH	A105	2	
19	CHAMBER PIPE	A106B	1	5"Sch.40
18	CHAMBER CAP	A234WPB	2	

17	BOLT (둥근머리 나사 M4)	304SS	1	M4 x 15L	8	WASHER (ø6)	316SS	1	
16					7	SPACER	304SS	1	
15					6	WASHER	304SS	1	
14	HEAD COVER	ADC12	1		5	CORE	SUH446 or 430SS	1	
13	HEAD	ADC12	1		4	COUPLING	316SS	1	
12	CAP	316SS	1		3	ROD	316SS	1	
11	MOUNT COUPLING	304SS	1		2	FLOAT CAP(B)	316SS	1	
10	STEM	316SS	1		1	FLOAT CAP(A)	316SS	1	
9	NUT (M4)	316SS	4	TUBE 5/4"0.049"t	NO	NAME OF PART	MATERIAL	Q'TY	REMARKS



NO	NAME OF PART	MATERIAL	Q'TY	REMARKS
35	LEVEL STICKER	PE	2	
29	NAMEPLATE	304SS	1	
28	BOLT	304SS	4	M3 x 6L
27	NAMEPLATE	304SS	1	
26	NAME PLATE BRACKET	304SS	1	
25	무두렌치 볼트	SUS304	1	M6 x 8L
24	O RING (P19)	VITON R.	1	
23	O RING (G110)	VITON R.	1	
22	SPIRAL WOUND GASKET	316SS	1	
21	HEAD COUPLING	A105	1	
20	MOUNT BRANCH	A105	2	
19	CHAMBER PIPE	A106B	1	5"Sch.40
18	CHAMBER CAP	A234WPB	2	
17	BOLT (둥근머리 나사 M6)	304SS	1	M6 x 25L
16	WASHER	304SS	1	
15	WASHER	VITON R.	2	ø20xø5.5x1.5t
14	HEAD COVER	SS41	1	
13	HEAD	AC2B	1	
12	CAP	316SS	1	
11	MOUNT COUPLING	304SS	1	
10	STEM	316SS	1	
9	NUT (M4)	316SS	4	TUBE 3/4"0.049"t
8	WASHER (ø6)	316SS	1	
7	SPACER	304SS	1	
6	WASHER	304SS	1	
5	CORE	SUH446 or 430SS	1	
4	COUPLING	316SS	1	
3	ROD	316SS	1	
2	FLOAT CAP(B)	316SS	1	
1	FLOAT CAP(A)	316SS	1	



P No.	QTY	NAME	MATERIAL
31	4	RIVET	304SS
30	1	BAFFLE PLATE	Aluminium
29	1	WING	304SS
28	6	LEAD WIRE & TERMINAL	304SS고온용AWG14
27	6	SQUARE NUT M3	304SS
26	6	TERMINAL_PLATE	304SS
25	2	HEXAGON SOCKET SET SCREW CONEPOINT M3X16	304SS
24	6	PAN HEAD SCREW M3X8	304SS
23	1	GUIDE SUPPORT	304SS
22	1	MAGMET	AlNiCo
21	6	PAN HEAD SCREW M4X8	304SS
20	4	PAN HEAD SCREW M3X30	304SS
19	5	SPRING WASHER 3.2	304SS
18	5	PLAIN WASHER 3.2	304SS
17	5	HEX NUT M3	304SS
16	5	SPRING WASHER 4.3	304SS
15	4	HEX NUT M4	304SS
14	5	PLAIN WASHER 4.3	304SS
13	1	PAN HEAD SCREW M4X5	304SS
12	1	EXTENSION SPRING - 0.3 X 4.5 X 12.0	304SS
11	1	PAN HEAD SCREW M3X12	304SS
10	1	POP NUT M4	304SS
9	5	PAN HEAD SCREW M4X14	304SS
8	1	LEVER	304SS
7	1	SHAFT	304SS
6	4	INSULATION PLATE	FIBER
5	6	POP NUT M3	304SS
4	1	TERMINAL BLOCK	CERAMIC
3	2	HOLDER	304SS
2	2	SWITCH	-
1	1	BODY FRAME	304SS

Parts List

8. Installation and how to wire.

Confirm following points before installing and wiring.

8.1 Confirm whether the specification ordered is correct.

8.2 Confirm whether the unit is bent or damaged by a shock or vibration during conveying

8.3 Confirm whether the screw is loosened or broken away.

8.4 Application into high density or high viscosity of process is not available.

8.5 Check whether the micro-switch is chosen within the temperature range

8.6 Installation

① Piping work

Fig3. shows the pattern of piping work of conventional SMC-7 series, to be connected into the pressurized vessel. The pipe to be used shall have strength enough to support the present equipment.

If required, additional support or hanger can be installed to bear the heavy weight. All pipe shall be straight run, and no air pocket in line. So shall the vapor captured on top of liquefied level be easily escaped away out of the pressurized container. A shut off valve shall be installed on between the pressurized container and present equipment. Wherever this unit is applied into a liquid having low boiling point or into normal liquid of high temperature might be boiled by inflowing heat from outside; so it is necessary that chamber and piping shall be insulated. The vapor trapped from liquid within the chamber may cause the level indication to be disturbed.

Note: Do not insulate the switching house.

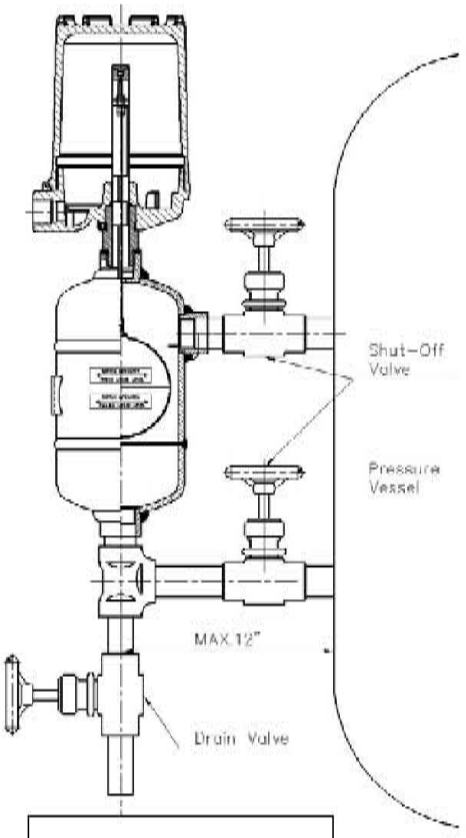


Fig.3 Piping work

② Installation

By means of piping work, place the unit uprightly within ±3°, then fit it into counter flange or counter screw attached to piping structure. A user may discern 3 degree of the tilting with respect to upright line with the naked eyes. However, During installing the equipment, the maximum liquid level detectable by the float within chamber shall be checked. This unit should be installed as close into the pressurized vessel as possible. When it is so done, the accuracy and credibility of liquid level variation detectable by this unit will be increased. The longer of the separate distance from mounting position to the pressurized vessel is, the more cooling down is happened, then the density of liquid to be detected is more lowered than that of pressurized vessel, so the actual level might be dropped below that of pressurized vessel.

③ Wiring

Both a connection tube in the side of pressurized vessel and a conduit hole for switching house in count direction (180 degree of opposite direction) are provided over most equipments to be

supplied for wiring easily

When the appropriate installation is completed, 4 stages of wiring are begun. If other wiring is desirable, the switching house can be turned into a proper position as procedure of below description of stage1, stage 2, and stage 3(using the part 25 among chamber denotations in previous drawing).

Stage 1; Loose two wrench threads in the bottom of switch house.

Stage 2; Turn the CONDUIT hole into desired direction.

Stage 3; Tighten the two wrench threads loosened.

Stage 4; Go on wiring after removed the cover of switching house. Apply lubricant oil into the portion tightening thread.

NOTE : In High temperature applications (above 250°F, 121°C in float chamber), a high temperature wire should be used with a junction box (terminal box) in a cooler area to be connected with this unit. On non-hazardous applications, flexible conduit may be used between this unit and a junction box.

Stage 5; Put a specified cable into the hole of CONDUIT, and connect it to terminal unit through the bottom of BAFFLE PLATE. Confirm the wiring diagram before the connection.

Stage 6 ; Check of whether the wiring is interfered by the cover of switching house or actuation mechanism.

Stage 7 ; Follow the wiring procedure, obeying to normal regulation.

Stage 8 ; Where the unit is applied into a dangerous area or explosive region, do not turn power on before either the conduit is sealed or is assembling completed, or is the cover tightened safety.

Stage 9 ; Tighten the cover housing.

Stage 10:Where explosion proof or moisture proof is demanded, seal the entrance of CONDUIT by using a appropriate compound or non hardening sealant.

Stage 11; Examine the switch actuation by varying the liquid level within chamber of float.

NOTE. If the switching mechanism is not properly actuated, check the state installing vertically of this equipment, and if improper installation is found, correct the installation of switching mechanism to be actuated smoothly.

9. TROUBLESHOOTING

The general malfunction on actuation might generally come from failure of function of the controlled unit i.e: though pump will start (or stop), signal lamps fail to indicate the both states. If such a symptom is found, check first the external factors following during temporary or regular maintenance.

- Is the fuse opened?
- Whether resetting is required with reset button.
- Whether the power is turned off.
- Whether the stem is bent due any impact.
- Whether any fault is found in wire or mid-wire connected to this unit.

If no fault in above check point is found, check the switching mechanism of devices by means of following actions:

① confirm of whether the switch is cut off or the circuit connected to this unit is unactuated

② Remove the cover of switching house.

③ Try pressing or relieving the movable magnet manually. Confirm carefully of fitting state, and let it be moved entirely without applying any force into the assembly.

④ If either the magnet is interfered or the mechanism connecting to switch is not combined, or the screws are too tightened to move, they shall be relieved

⑤ If the mechanism is not yet still actuated while the magnet assembly of switch is movable freely, check of whether the installation of the unit is out of from upright line more than 3 degree of angle

NOTE: Spare switch must always be ready for unexpected accident.

If the switch mechanism is satisfactorily actuated, following examines of performance of unit shall be carried out.

⑥ To decide whether the equipments to be controlled by connecting with this unit will be operated again, let the switching mechanism be carefully and electrically actuated manually by means of using a non -magnetic tool

Attention; When electrical power turns on, take attention not to touch the connection wire of terminal block with the lead wire of switch

⑦ If the equipments to be controlled give response by a manual test, It is considered that there exists the problem in the portion detecting the liquid level of this unit (float, stem, core).

NOTE: First, check of whether the chamber of float or pressurized vessel is under the liquid inflowing from outside. There are several cases of problem, if a fault is found in the system supplying liquid: either the valve may be sometimes closed or is the piping blocked

⑧ If the process liquid has been filled completely with the chamber of float or with pressurized vessel, progress the next process of check to confirm the action detecting the liquid level in the state the switching house assembly has been removed.

Attention ; Confirm of whether the switch is cut off or the circuit connecting to this unit falls into nonactive.

a. Cut off pressure from the pressurized vessel, and let all liquid within chamber of this unit be drained.

NOTE; No need to be removed the pipe connected to the chamber of this unit or piping to the pressurized vessel.

b. Dissemble the switching house by loosening the threads at the bottom of head

⑨ Confirm of whether there exists a chief cause the magnetic field of switch not to be reached into the core: for example, either the movement may be interfered by lees or may be inside of stem corroded.

⑩ Check whether the buoyancy subject to float of this unit is useful , and if a damage is found in the float, it shall be replace at once.