

# Installation, Operation & Maintenance Instructions

## Float type Vertical Level Control Direct Or Chamber mounted

Models D,B & X 11/12/13/14/17



## SAFETY INSTRUCTIONS

Please refer to SAFETY MANUAL IP152/SI latest revision for installation.

- Information** ..points out useful tips, recommendations and information for efficient and trouble-free operation.
- CAUTION!** ..indicates a potentially dangerous situation that can result in light injuries or damage to equipment or the environment, if not avoided.
- WARNING!** ..indicates a potentially dangerous situation that can result in serious injury or death, if not avoided.
- WARNING!** ..identifies hazards caused by electric power. Should the safety instructions not be observed, there is a risk of serious or fatal injury.
- WARNING!** ..indicates a potentially dangerous situation that can result in burns, caused by hot surfaces or liquids, if not avoided.
- WARNING!** ..indicates a potentially dangerous situation in the hazardous area that can result in serious injury or death, if not avoided.
- Ex applications** ..special instructions for Ex applications.

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## Foreword

The unit is manufactured, checked and supplied in accordance with our published specification, and when installed and used in normal or prescribed applications, with the lid in place and within the parameters set for mechanical and electrical performance, will not cause danger or hazard to life or limb.

- Warning:** Units must be selected and installed by suitably trained and qualified personnel in accordance with appropriate codes of practice so that the possibility of failure resulting in injury or damage caused by misuse or misapplication is avoided.
- Warning:** before installation **check** that the instrument **characteristics** comply with process and plant requirements
- Warning:** The users attention is drawn to the fact that, when the unit is 'live' with respect to electrical or pressure supplies, a hazard may exist if the unit is opened or dismantled
- Warning:** where any special condition of the product has been required as identified by the last 4 digits of the part number, follow the necessary safety instruction for a correct installation.
- Warning:** Max thickness of paint is 0.2mm

If the equipment is likely to come into contact with aggressive substances, suitable precautions should be taken that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised. Aggressive substances: e.g. acidic liquids or gases that may attack metals or solvents that may affect non-metallic materials. Suitable precautions: e.g. regular checks as part of routine inspections or establishing

## Principle of operation

Switching is achieved with the Mobrey "three-magnet" system, giving snap-action "latch-on" switching. Vertical movement of the primary magnet A in a glandless pressure tube simultaneously actuates magnets B & C to switch the contacts. The "three-magnet" system enables the primary magnet to pass on and actuate switch mechanisms at other levels. Switch mechanisms already actuated can not re-set until the return of the primary magnet

actuates the magnet system once again . (see Fig. 1). The primary magnet is moved vertically in the pressure tube by a float or displacer mechanism which rises and falls with the liquid level.

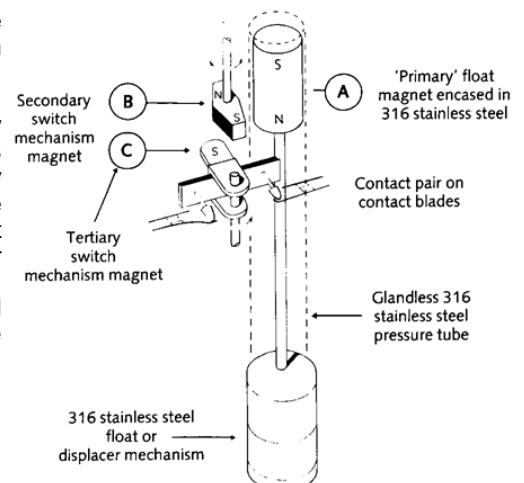


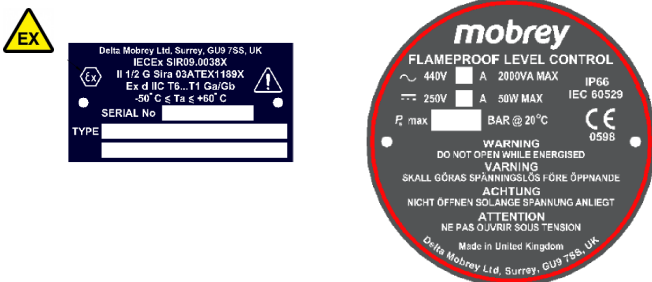
Fig.1

The “three- magnet” system enables the primary magnet to pass on and actuate switch mechanisms at other levels. Switch mechanisms already actuated cannot re-set until the return of the primary magnet actuates the magnet system once again.

## Marking

**Flameproof models** carry the following labels markings as shown in Fig.2:

**Fig. 2 Flameproof Nameplate**



Contact rating and P max, value, as defined by the part number.

### P4, P8, H4, H8 Switch Mechanisms - Simple Apparatus

These Switch Mechanisms in a standard switch housing are classified as “Simple Apparatus” when used in Intrinsically Safe circuits. They comply with the requirements of EN IEC EN 60079-0:2012/A11:2013, EN 60079-1:2007, EN 60079-26:2015 ‘Simple Apparatus’ and are not considered as a potential source of ignition for an explosive atmosphere.

They do not fulfill the definition of equipment in Article 1 (3) of Directive 2014/34/EU (Equipment Explosive Atmospheres (ATEX)) and are therefore outside the scope this Directive and do not have a Declaration of Conformity or CE mark related to this Directive.

When used as “Simple apparatus” within a hazardous atmosphere the following should be noted:

The product should be installed by suitably trained personnel, in accordance with the applicable code of practice.

As the product has no source of internal heating, the temperature classification is dependent on the ambient air temperature and the temperature of the process vessel to which it is attached.

Materials of construction : Refer to product catalogue or customer drawing for actual material of level switch concerned.

**Housing and Cover:** Carbon Steel, or Stainless Steel 316 type, or Aluminium Alloy LM25 or LM24 or B85 grd 360, or Cast Iron grd 250, or Gunmetal LG2

**Pressure Tube & Union:** Stainless Steel types 316, 321 or 304, or Carbon Steel 220M07, or Alloy NA18, or Alloy C-276 (UNS N10276) or Alloy 625, or Alloy 825

Note : The metallic alloy used for the enclosure material may be at the accessible surface of this equipment; in the event of rare accidents, ignition sources due to impact and friction sparks could occur. This shall be considered when the switch is being installed in locations that specifically require group II, category 1G equipment.

## Installation

It is the responsibility of the user to ensure :

**Warning:** The joint requirements between the switch housing and vessel are compatible with the process media.

**Warning:** The joint tightness is correct for the joint material used.

**Warning:** suitable temperature rated cable is used. Note : The cable entry temperature may exceed 70°C

**Warning:** The float is protected from impact or friction, or static electrical build-up from fast flowing non-conductive fluids, that could generate an ignition source.

### Additional for Type B&X with chamber

When installing, using or maintaining external chambers supplied compliant with the Pressure Equipment Directive, refer also to the Safety Information (leaflet No. IP152/SI) supplied with the product for further details.

**Caution:** Installation shall be carried out by suitably trained personnel in accordance with applicable codes of practice.

1- Remove all sealing tapes, tie strings and packing from the control prior to installation.

2- Mount the control on the inlet and outlet connections, ensuring that the central line axis of the control is vertical to the eye. Use suitable process connection gaskets and seals as dictated by the application.

3- Check bolt torques on process and switch head flange bolts are in accordance with torques shown on page 8&9.

**Warning:** A 50mm weld bead or label on the chamber indicates the highest operating level of the control. Switch point adjustment of 94mm is provided on multi-switch models only and is measured down from this level.

**Warning:** Allow at least 200mm above the control for removal of cover.

4- Remove switch head cover to reveal terminal block(s) to which electrical connections are to be made.

**Warning:** Flameproof models: Locate and slacken off M5 socket head safety grub screw on side of cover adjacent to base joint. Place a bar across the top of the cover, locating in the castellations. The cover can now be unscrewed from the base using the bar as a lever.









**Warning:** Weatherproof models: The cover can be removed by unscrewing the single hexagon nut at the crown of the cover.

5- Connect electrical wiring via the conduit entries using a suitable cable gland.

**Note that the base of the enclosure is rotatable on the pressure tube to allow the most convenient orientation of the conduit entry.**

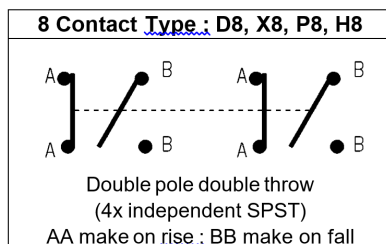
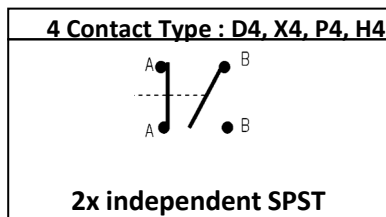
6- Please refer to WIRING section for correct wiring.

### Wiring

-  Disconnect all supply circuits before wiring. Wire in accordance with local and national codes. Use cables no larger than 2.5 mm<sup>2</sup> (14 AWG)
-  **Warning:** Do not exceed electrical ratings stated in literature and on nameplates.
-  **Warning:** If the ambient temperature exceeds 60 °C it is recommended to use cables suitable for operating temperatures not less than 105 °C.
-  **Caution:** Switches must not be used for the direct starting of motors. Contacts should be wired in series with the operating coils of relays, contactor starters or solenoid valves, and fused separately.
-  **Caution** The temperature of the switch enclosure may at times approach the temperature of the process and suitable heat resisting cables should therefore be used, together with appropriate cable glands. A sufficient length of flexible cable should be fitted to allow easy removal of the switch head and displacer assembly at any time.
-  **Warning** Cable entry must be fitted with a flameproof cable entry device, with or without thread adaptor, and should be used in accordance with a local Code of Practice subject to agreement by the local Inspecting Authority.
-  **Warning:** U.L. Approved Applications: Use copper conductors 60°/75°C: 140°/167°F ONLY. Torque terminals to 6kg/cm: 7lb/in.
-  **Warning:** Ensure the cover locking safety grub screw is replaced and tightened before energizing.

The instrument can be supplied with 1 or 2 switch mechanism. Refer to the leaflet for the description and difference between the type of mechanism..

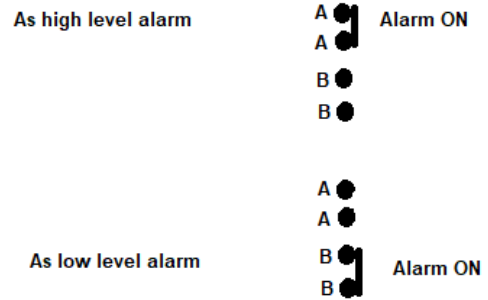
Each switch mechanism has flying leads which are factory wired to ceramic terminal blocks fixed in the switch enclosure.



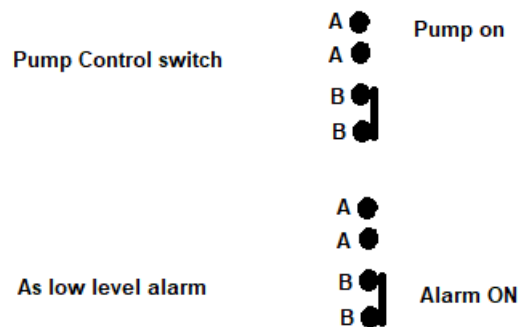
**Note:** For DPDT operation, installer must common any one pair of A and B wires in the terminal block for each of the two ends of the switch mechanism.  
Wiring examples on successive page.

Wiring examples :

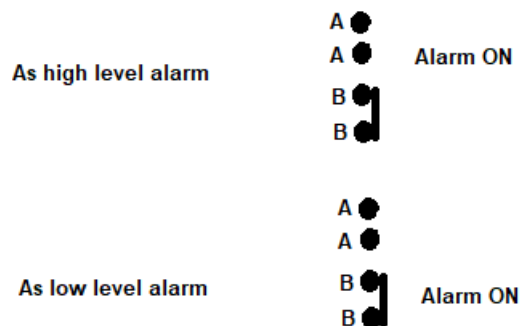
#### SINGLE SWITCH CONTROL



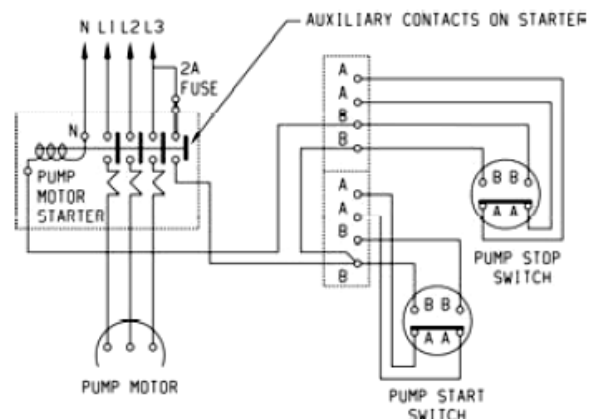
#### TWO SWITCH CONTROL Combined Pump Control and Low level alarm



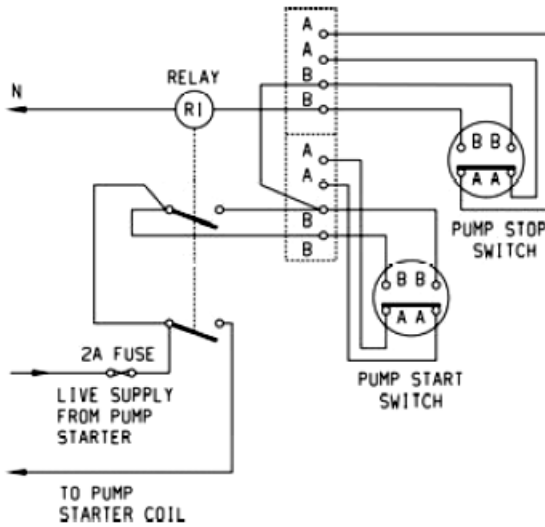
#### TWO SWITCH CONTROL High and Low Level alarm



Two switch pump control circuit using auxiliary contacts on starter..  
Note diagram shows starter fitted with 250V coil for 3-phase 3-wire supply connect coil terminal N to line 1 and fit 440V coil.



Two switch pump control circuit using 'holding' relay for starters without auxiliary contacts.



**Electrical rating**

Type	Temp wetside °C	Low Temp use	AC max. values			DC max. values			
			VA	Volts	Amps	Watts	Volts	Resist. Amps	Induct. Amps
D4, D8	400	Amp.	2000	440	5	50	250	5	0.5
X4, X8	250	Amb.	2000	440	10	50	250	10	0.5
P4, P8	400	Amb.	6	250	0.25	3.6	250	0.25	0.1
H8, H8	250	-100°C	2000	400	10	50	250	10	0.5
			Power factor 0.4 mm			Time constant 40ms max.			



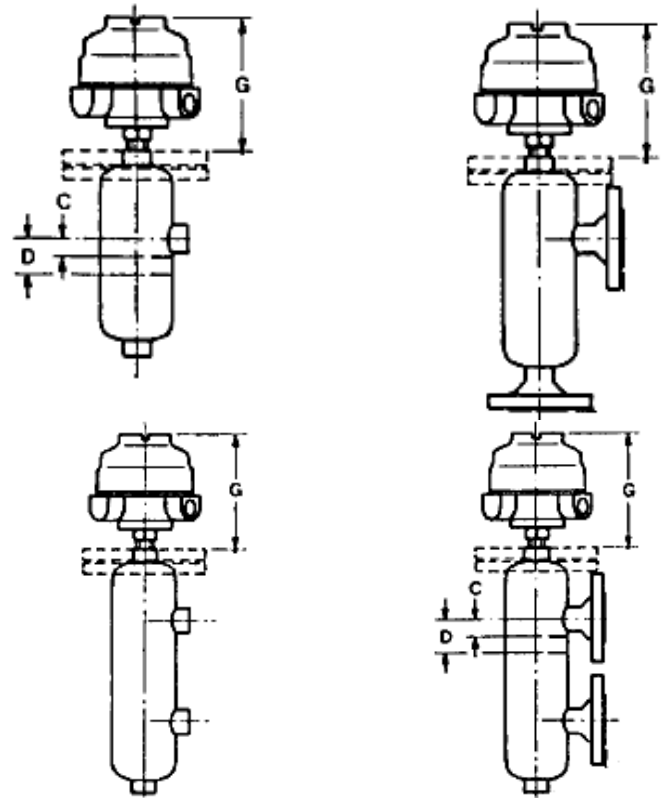
**Warning:** Gold plating on the contact of the P4 and P8 switch mechanism may be permanently damaged if the mechanism are used to switch circuits with values greater than those shown above.

**OPERATION DATA**

Set and Reset values of the float type level switches, depends by the function & the number of switching units.

Refer to the below table and drawings to determine the operation of the instrument.

OPERATING LEVELS: SINGLE SWITCH MODELS				
Function & Min. Operating S.G.	11F : 0.8	12F : 0.75	13F : 0.65	14F : 0.54
Dimension C	50	50	50	50
Dimension D	70	70	70	70
Type 17D & Operating S.G.	0.4 0.5	0.6 0.7	0.8 0.9	1.0 1.1 1.2
Dimension C	65 73	82 91	100 109	118 127 136
Dimension D	118 122	127 132	137 141	147 152 156
OPERATING LEVELS: MULTIPLE SWITCH MODELS				
Function & Min. Operating S.G.	11F : 0.8	12F : 0.75	13F : 0.65	14F : 0.54
Dimension C	50	50	50	50
Dimension D	170	170	170	170



**Single Switch**

C= Highest Operating Liquid Level  
D= Reset Value

**Multi Switch**

D=Lowest operating Liquid Level  
D-C= Wet Differential (Max)

**ENCLOSURE dimension G**

	Diam	N	A	I
R	φ163	170	190	190
S	φ180	275	300	300
L	φ180	375	/	/

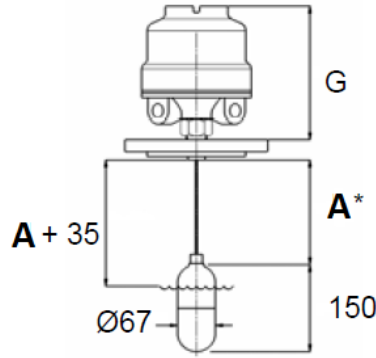
**SET POINT ADJUSTMENT**

Each switch mechanism is mounted on a bracket, which is secured on the pressure tube by a locking screw and lock nut. These can be loosened, allowing the bracket to be adjusted up or down as required. Always ensure that the small pressure plate between the locking screw and the pressure tube is in place before re-tightening the locking screw nut.



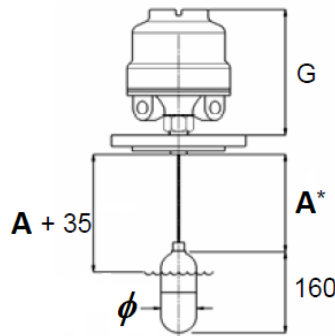
**Warning:** Switches cannot be adjusted outside of the range set by the stops on the pressure tube. Displacer operated control type x17x are single switch models with the switching point factory set. There is no site adjustment.

**FLOATS FOR 3"NB MOUNTING, TYPE 11F**



A dimension when used	11F		Switch Adjust	Wet Switching differential
	Min.A	Max A		
R4N, R7A, R71	155	315	none	20mm
S4N, S7A, S71	155	315	94 mm	114mm max
L4N				

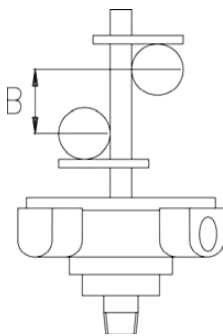
**FLOATS FOR 4" MOUNTING TYPE 12F, 13F,14F**



13F, 14F = Ø 88  
12F = Ø 90

A dimension when used	12F,13F,14F		Switch Adjust	Wet Switching differential
	Min.A	Max A		
R4N, R7A, R71	155	415	none	20mm
S4N, S7A, S71	155	415	94 mm	114mm max
L4N	155	415	194mm	214mm max

Lowest operating level = A + 35  
Highest operating level = (A+35) - (B+20)

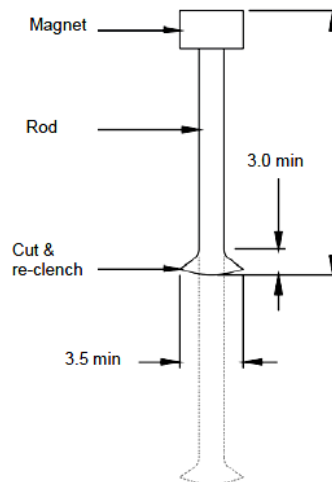


ENCLOSURE TYPE		SWITCH MECHANISM		
		D4,P4,X4	H4	D8,P8,X8,H8
Max nr. of switches	R7A	1	1	1
Sw. Adjustment "B" in mm	R7I	7	7	7
Max Wet Switching differential	R4N	all : 20mm (for type 17D, see table 2)		
Max nr. of switches		4	4	2
Sw. Adjustment "B" in mm	S7A	94	94	94
Min. SW Crs "B" in mm	S7I	94	94	94
Max. SW Crs "B" in mm	S4N	7	0	56
Max Wet Switching differential		for all : 120mm (not for 17D)		

**Float Rod Length Adjustment**

The highest operating level given by the float rod as supplied can be made higher (i.e. nearer the mounting point) by shortening the float rod on site, as follows:

- 1- Remove float unit from control by locating the Stop Assembly in the base of the 1"NPT threaded boss and easing the spring clip out of the two locating holes in the pressure tube. The rod and the magnet assembly can now be withdrawn from the pressure tube.
- 2- Undo the hexagonal float adaptor to remove the float from the rod, and slide the adaptor up the rod.
- 3- Hacksaw the stainless steel rod to the required length according to the diagram below, and then re-clench the rod end in a vice as shown.
- 4- Re-fit the float, ensuring the spring washer is used between float and adaptor.
- 5- Re-fit the float unit to the switch head, ensuring that the magnet is free from swarf and debris.
- 6- Locate the two ends of the spring clip in the two cross holes in the pressure tube; ensuring that the rod and magnet assembly are free to move vertically in the pressure tube and that it is securely retained by the Stop Assembly.



Minimum lengths with switch heads to give highest operating level of 190mm  
R7A R71 R4N : 316  
S7A S71 S4N : 421  
L4N : 521

**PUTTING INTO OPERATION**

Every type of vertical float switch is designed for different use.

Remove all sealing tapes, tie strings and protective packings from the control prior to installation. If float rod length needs adjusting to allow a higher operating level, refer to the above adjustment notes.



**Warning:** Careful handling is required at all times to ensure float and float rod are not damaged or bent. If a control is fitted with a longer than standard rod (i.e. dimension H is greater than that shown in the adjoining table) or the liquid is subject to excessive turbulence or agitation, then a stilling tube should be fitted.

**Warning :** If control has been ordered without a mounting flange, the float unit must be removed from the control before the switch head can be mounted on the vessel via the 1"NPT threaded boss provided. This is achieved by locating the Stop Assembly at the base of the 1"NPT threaded boss and easing the spring clip, allowing the entire float assembly to be removed.

**Warning :** Mount the switch head on the vessel using the flange (if provided) or the 1"NPT threaded boss ensuring that the centre line axis is vertical to the eye. If the threaded boss is used, ensure a pressure tight seal is formed between it and the vessel. Use only the hexagonal boss to tighten the 1"NPT thread into the mounting boss or flange. Torque flange bolts in accordance with torques shown below.

**Warning :** Ensure that magnet is free from swarf and debris before re-fitting to switch head. Locate the two ends of the spring clip in the two cross holes in the base of the pressure tube ensuring that float assembly is free to move vertically and is securely retained by the Stop Assembly.

**Warning :** Remove switch head cover to reveal terminal block(s) to which electrical connections are to be made:

**EX** -**Flameproof models:** Locate and slacken off M5 socket head safety grub screw on side of cover adjacent to base joint. Place a bar across the top of the cover, locating in the castellations. The cover can now be unscrewed from the base using the bar as a lever.

**!** - **Weatherproof models:** The cover can be removed by unscrewing the single hexagon nut at the crown of the cover.

**Warning :** Connect electrical wiring via the conduit entries using a suitable cable gland. Note that the base of the enclosure is rotatable on the pressure tube to allow the most convenient orientation of the conduit entry.

On models with flameproof enclosures type □7□ the switch mechanism may be raised on the pressure tube to ease access to the Terminal Block. Ensure that the switch mechanism is re-positioned to its lowest position (i.e. sitting on the limit tube around the pressure tube) after wiring.

**Warning :** Switch point adjustment may now be made if necessary. See page 8.

**Warning :** The lugs of the tab washer directly underneath the base must now be bent over to locate on the most appropriate flats of the hexagon union. This prevents further rotation of the switch head, and is particularly important as it will prevent rotation when the cover is removed or re-fitted.

**Warning :** Check the cover seals are present and in good condition, and then replace the cover.

(i) Before energizing flameproof / Type □7□ models, ensure the cover locking safety grub screw is replaced and tightened. Do not energize if the cover locking safety grub screw is missing.

(ii) Before energizing weatherproof / Type □4□ models, ensure the weatherproofing fibre sealing washer at the crown nut is in place.

## Earthing connections

**EX** **Warning:** The instrument is supplied with two protective grounding connection, one inside and one outside the enclosure. The two connection provide effective connection of a conductor with a cross-sectional area of at least 4 mm<sup>2</sup>.

**EX** **Caution:** In order to protect the instrument against extreme environmental conditions, a coating thicker than 0,2 mm should be applied. The grounding connection has to be adequately realized to prevent an electrostatic surcharge on the instrument surface.  
**CLEAN ONLY with a damp cloth**

## Commissioning

**EX** **Warning:** Ensure the enclosure is sealed and the cover locking set screw is screwed in fully before the switch is energized.

The instrument starts operating as soon as is installed inside the tank as shown in previous chapters and energized.

## Inspections and maintenance

The instrument is maintenance-free but is a good practice to proceed with periodical visual inspection every 6 months and a functional inspections at least once a year. These could be reduced according to environmental conditions and customer maintenance plan.

**!** **Caution:** It is recommended that instruments used to provide an alarm or a shutdown safety related are operated *periodically* to ensure they are functioning correctly.

If maintenance or replacement of parts further than those listed under REPLACEMENTS OF PARTS is required, seek advice from Delta Mobrey before attempting repair or replace parts.

Depending by the configuration of the instrument, the operation for the maintenance could differ.

Please refer to:

- Bottle type chamber level control**
- Flanged type chamber level control**
- Direct mount level control**

See successive pages for details

**a. Bottle type chamber level control**

This type of control is of the 'sealed chamber' type and the float or displacer mechanism cannot be removed.

However, the switch mechanisms and switch head should be visually checked periodically.

1. Isolate electrical circuits to control and disconnect wiring as necessary.

2. Remove the switch head cover and examine the switch mechanism body for any damage. Ensure that wiring is in good order and that all the screws are tight. Dismantling of switch unit is not recommended and replacement of the complete switch unit will be found to offer the quickest and most economical solution in event of faulty operation.

3. Check sealing gasket / "O" ring and replace if necessary.

4. Check the cover seals are present and in good condition, and then replace the cover.

(i) Before energizing flameproof / Type □7□ models, ensure the cover locking safety grub screw is replaced and tightened. Do not energize if the cover locking safety grub screw is missing.

(ii) Before energizing weatherproof / Type □4□ models, ensure the weatherproofing fibre sealing washer at the crown nut is in place.

**b. Flanged type chamber level control**

This type of control is flanged between the switch head and chamber such that the float may be withdrawn and removed from the chamber for inspection.

1. Isolate electrical circuits to control and disconnect wiring as necessary.

2. Isolate the chamber from the pressure vessel by closing the isolation valves, and open the valve of the drain connection.

3. Remove nuts holding control to chamber, carefully withdraw switch head and float assembly, taking care not to bend the float rod.

4. Separate float assembly from switch head by removing stop clip.

5. Inspect the chamber and remove any deposits.

6. Check float, float rod and magnet for excessive wear, clean and replace as necessary.

7. Fit replacement joint and reassemble, taking care not to bend the float rod. Firmly tighten nuts on top flange, using bolt torque values given in tables on page 12.

8. Remove the switch head cover and examine the switch mechanism body for any damage. Ensure that wiring is in good order and that all the screws are tight. Dismantling of switch units is not recommended and replacement of the complete switch unit will be found to offer the quickest and most economical solution in event of faulty operation.

9. Check sealing gaskets / "O" ring and replace if necessary.

10. Check the cover seals are present and in good condition, and then replace the cover.

(i) Before energizing flameproof / Type □7□ models, ensure the cover locking safety grub screw is replaced and tightened. Do not energize if the cover locking safety grub screw is missing.



(ii) Before energizing weatherproof / Type □4□ models, ensure the weatherproofing fibre sealing washer at the crown nut is in place.

11. Close drain valve connection, open isolating valves and check that the control is operating at the correct levels

**c. Direct mount level control**

This type of control is mounted directly onto the process vessel, or may be mounted in a chamber.

1. Isolate electrical circuits to control and disconnect wiring as necessary.

2. Ensure the vessel is vented to atmosphere, or isolate any chamber from the vessel by closing the isolating valves, and open the valve of the drain connection.

3. Remove nuts holding control to chamber or vessel. Carefully withdraw switch head and float assembly, taking care not to bend the float rod.

4. Separate float assembly from switch head by removing stop clip.

Inspect the chamber or stilling tube and remove any deposits.

6. Check float, float rod, and magnet for excessive wear, clean and replace as necessary.

7. Fit replacement joint and reassemble, taking care not to bend the float rod. Use bolt torque values given in tables above.

8. Remove the switch head cover and examine the switch mechanism body for any damage. Ensure that the wiring is in good order and that all screws are tight. Dismantling of switch units is not recommended and replacement of the complete switch unit will be found to offer the quickest and most economical solution in event of faulty operation.

9. Check sealing gaskets / "O" ring and replace if necessary.

10. Check the cover seals are present and in good condition, and then replace the cover.



(i) Before energizing flameproof / Type □7□ models, ensure the cover locking safety grub screw is replaced and tightened. Do not energize if the cover locking safety grub screw is missing.



(ii) Before energizing weatherproof / Type □4□ models, ensure the weatherproofing fibre sealing washer at the crown nut is in place.

11. If the control is mounted into a chamber, close drain valve connection, open isolating valves and check that the control is operating at the correct levels.



### Part replacement



Only original parts can be used as spare.



**Warning:** If a spare switch mechanism is fitted at any time, it is vitally important that the magnet system is left in the correct mode.

After installation of a replacement switch mechanism, always check that B-B contacts are made, assuming the chamber is empty of liquid. If the chamber is full of liquid, then A-A contacts should be checked to ensure they are made.

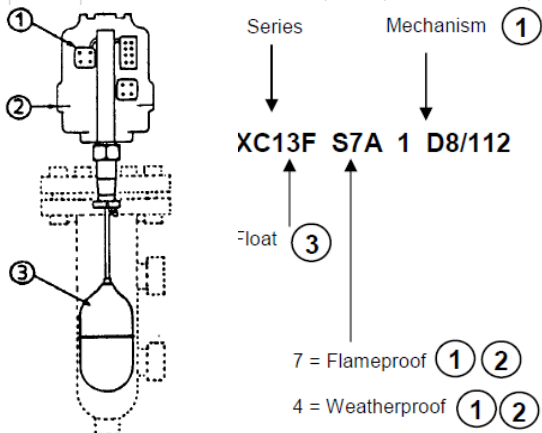
If it is found that a switch mechanism is not in the correct mode, then the liquid level in the chamber should be raised such that the primary float magnet passes through the switching point. Lowering the liquid level will then cause the float magnet to fall back through the switching point, thus leaving the mechanism in the correct operating mode. (For a control operating as Low Level alarm, the liquid level should be first lowered then raised back to ensure the switch mechanism is in the correct operating mode).

Full Fitting instructions are supplied with each spare switch mechanism.

1	switch mechanism kit comprising switch mechanism and fittings	Series B,X,D	
		Weatherproof	Series B,X,D Flameproof
	4 contact - 5 A	D4	SK178
	4 contact - Gold plated	P4	SK179
	4 contact - 10A	X4	SK180
	4 contact - sealed	H4	SK181
	8 contact - 5 A	D8	SK182
	8 contact - Gold plated	P8	SK183
	8 contact - 10A	X8	SK184
	8 contact - sealed	H8	SK185
	Sales Kit		SK190

3	Float Unit only (this spare is not available for Bottle type)	Series X		Series D
		11F	SK192	SK192
	12F	SK193	SK193	
	13F	SK194	SK194	
	14F	SK195	SK195	
	17D	SK196	SK196	

3	Complete Float Assembly :float, rod and magnet assembly. (this spare is not available for Bottle type)	Series X		Series D
		11F	contact our sales department giving full part number of the original supplied product	
12F				
13F				
14F				
	17D			



### Bolting Torques

For use with **High Tensile steel bolts** only Delta Mobrey Limited use high tensile bolts/studs as standard for pressure vessel flange applications which allows use to full switch rating. The following recommended torques assume the use of high tensile bolts. If ordinary carbon steel bolts are fitted see below for bolt tightening torques.

Min. Torques in Nm (lbf. Ft) Max. torque = Min + 10%

Flange	Class 150	Class 300
3"	230 (169)	125 (169)
4"	190 (140)	220 (140)
6"	352 (260)	

Flange	PN16	PN40
DN65	185 (136)	80 (59)
DN80	125 (92)	95 (70)
DN100	125 (92)	150 (111)
DN125	195 (144)	225 (166)
DN150	255 (188)	280 (206)

Mobrey A	34 (25)
Mobrey G	26 (20)

For use with **Carbon Steel bolts** only ordinary carbon steel or similar lower quality bolts are used the torques recommended are as shown on the left.

The gasket sealing force created by the application of these torques is not sufficient to withstand full flange pressure rating. To achieve full rating, use high tensile steel bolts as above.

If in doubt about your bolt/sealing application consult your engineering department or gasket manufacturer.

Min. Torques in Nm (lbf. Ft) Max. torque = Min + 10%

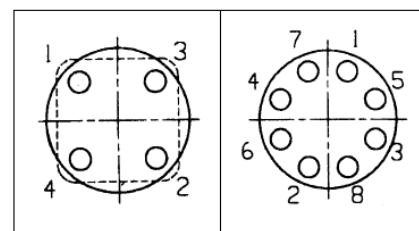
Flange	Class 150	Class 300
3"	54 (40)	95 (70)
4"	54 (40)	95 (70)
6"	95 (70)	

Flange	PN16	PN40
DN65	58 (43)	58 (43)
DN80	58 (43)	58 (43)
DN100	58 (43)	113 (83)
DN125	58 (43)	194 (143)
DN150	113 (83)	194 (143)

Mobrey A	20 (15)
Mobrey G	20 (15)



Bolts should be lubricated with suitable grease and follow the below tightening sequence





Bolts torque for SPIRAL WOUND GASKET with a compression stop: High Tensile Steel Bolts only.

Bolt Size	Nm	Lbf. ft
5/8"	122	90
3/4"	203	150
7/6"	325	240
1"	499	368
1 – 1/8"	722	533
1 – 1/4"	101	750

Gasket compression for joints without compression stops: High Tensile Steel Bolts only.

Initial gasket thickness	Compressed thickness	Compression
1.6mm	1.3/1.4mm	0.2/0.3mm
2.5mm	1.9/2.0mm	0.5/0.6mm
3.2mm	2.3/2.5mm	0.7/0.9mm
4.4mm	3.2/2.5mm	1.0/1.2mm
6.4mm	4.6/5.1mm	1.3/1.8mm

## List of standard to which the product is conform

### General

#### - LVD:

EN 60947-1:2007 + A1:2010 + A2:2014  
EN60947-5-1:2004+ A1:2009

#### - PED 2014/68/EU:

module D, D1, E1 & H of Annexe III

#### - VDE 0470-1 / EN 60529 /

#### IEC 60529

Protection Degree IP66

#### - 2014/30/EU

Electromagnetic Compatibility

### Hazardous Area related

#### IECEX

IEC 60079-0:2011  
IEC 60079-1:2007-04  
IEC 60079-26:2014-10

#### ATEX

EN 60079-26:2015  
EN 60079-0:2012+ A11:2013  
IEC 60079

#### UKEx

EN IEC 60079-0:2018  
EN 60079-1:2014  
EN 60079-26:2015

#### FM

FM Class 3810:2005, ANSI/ISA 61010-1:2004

## Warranty

See Standard Conditions of Sale

## Decommissioning



**Warning:** Ensure the vessel is vented to atmosphere, or isolate any chamber from the vessel by closing the isolating valves, and open the valve of the drain connection..



**Warning:** verify, in case of flameproof instrument, the absence of explosive atmosphere before removing the lid or the cable glands.

Do not dispose the process fluid on environment if this cause pollution or personal injury.



**Warning:** In case of flame proof instruments, it is recommended to follow at least the standard IEC 60079-17 and for the withdrawal from service of electrical apparatus.

- Slacken the lid lock screw and unscrew the lid.
- Disconnect all the live terminals and insulate the cables.
- Disconnect the grounding.
- Remove the cable gland.
- Dismount the instrument from the process connection.

**Warning:** the process fluid can be hot or corrosive.

- Plug the process pipe.
- Reassembly the lid.

## Disposal

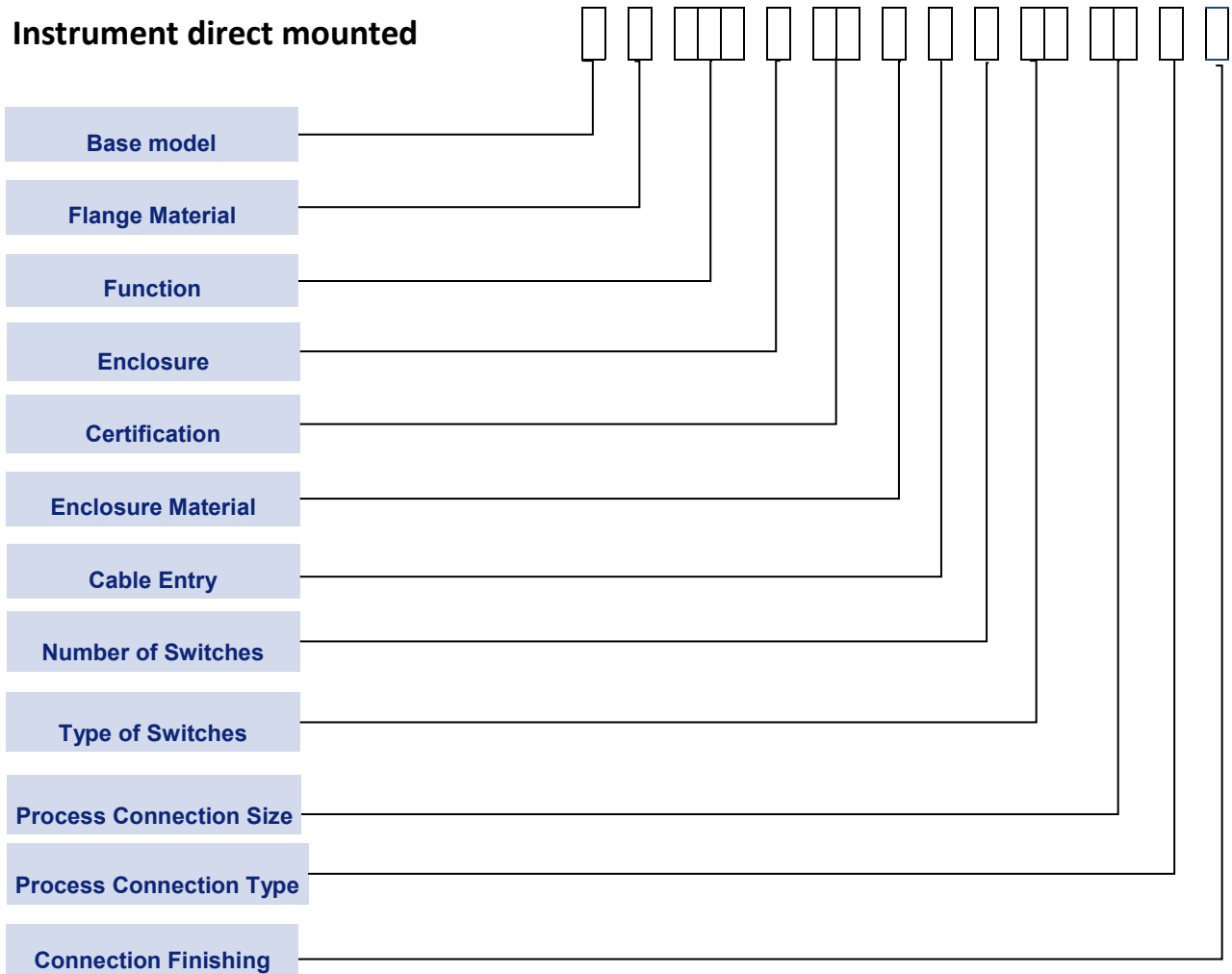
The main parts of the instrument are mainly made of aluminium and stainless steel (see model number & part description for exotic materials used). Remove the switching mechanism and clean the wetted parts before scrap the instrument. Follow the local regulation to dispose & recycle all the components.

## Model code

Your level switch has a part number stamped on the nameplate, an example of which is shown below. From this number you can identify your control and turn to the relevant pages in this manual. Please refer to the technical leaflet for explanation of each single digit of the part number

See next page for the details of codes

**Instrument direct mounted**



**Instrument chamber mounted**

