

Marine Type Approved F/S FP Series Float Switch

The Marine Type Approved F/S FP Series Float Switch is a magnetic float on a reed switch sensor stem for control and indication of a liquid level in a marine environment.

Bureau Veritas Marine Type Approval Certificate: 53346/A0 BV

Features include:

- Available with Bureau Veritas Marine Type Approval.
- Custom length sensor stems up to 6 Metres.
- Stainless steel 316 housing and wetted components.
- Up to 7 switch points on one stem.
- Custom made for mixed normally open/normally closed switches.
- IP68 Ingress protection.
- Voltage free reed switch contacts or Hall Effect sensing technology.
- M20 or ½"NPT cable connections.
- Custom mounting options available.
- Narrow sensor stem and mounting for tanks without internal access.
- Suitable for high liquid temperatures.



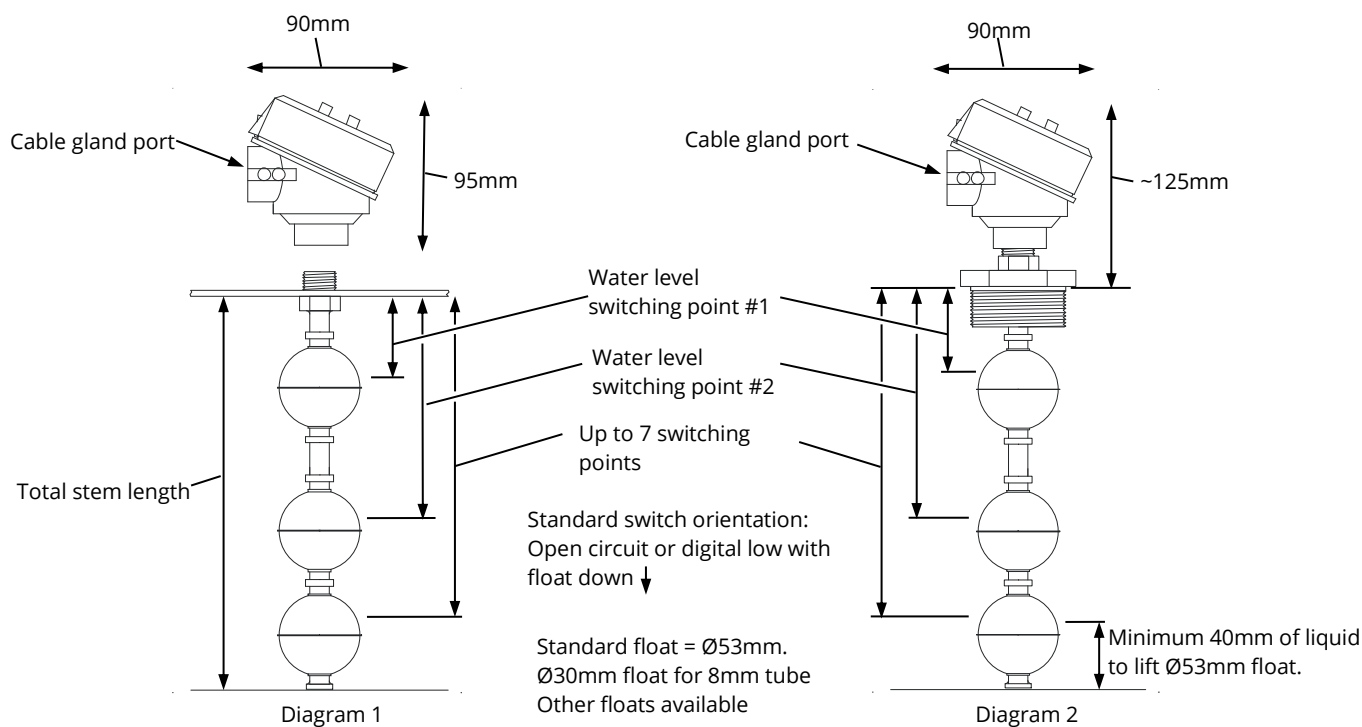
Marine Type Approved F/S FP Series Float Switch

Type	Specification	
Sensor technology	Magnetic float with reed switch	
Sensor tube and wetted materials	Stainless steel 316L	
Connection head material	Stainless steel 316	
IP rating with suitable cable gland fitted	IP68	
Approximate weight: Ø12mm stem	1Kg +process connector + 0.5Kg/Metre	
Float Diameter: Specific gravity:	53mm : 0.65	Other floats available
Maximum liquid temperature:	-20 to +120°C	-55°C to +190°C on request. See note 1
Maximum head temperature	-20 to +120°C	Note 1
Maximum operating pressure	150PSI / 10Bar standard 450PSI / 31Bar	Note 2
Thread connection-Sensor tube	½"-14 NPT	
Thread connection-Wiring port	½"-14 NPT or M20X1.5	
Connection head height	95mm	
Switch rating:		
>4 point Reed switch	0 to 50Vdc. 1Amp. 50Watts Max	
≤4 point reed switch	0 to 240vac. 1Amp. 50Watts max	

Note 1: When this equipment is intended to be used in a liquid with a process temperature above 120°C it is an essential requirement that the sensor head temperature is measured to determine if the ambient air cooling is sufficient to keep the head below 120°C. See installation manual for detail.

Note 2: The F/S FP sensor float and tube can withstand the stated pressure when sealed inside a tank. The connection head and resin seal to the sensor stem must not be pressurised. The standard fittings are rated at 10bar. Please call our technical sales department regarding sensors for liquid pressures up to 31bar.

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Ordering information

Due to the various options available please call our sales office to discuss your requirements. Options include: Probe length, Switch voltage, Switch point quantity, Switch point height, Threaded mounting/seal options, float sizes, 8 or 12mm sensor tube, cable entry thread.

Upon receipt of the above information a drawing and Deeter part No. will be issued to identify the options selected. This part No. will be required when making your order.

All electrical equipment should be installed by a qualified/certified electrician. Reed Switches are easily damaged by inductive loads. Please ensure adequate electrical protection is in place before use.

Deeter Electronics Ltd. follows a policy of continual development of its products and reserves the right to change specifications and/or features without notice.

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Identification

The Marine Type Approved F/S FP Series Float Switch covered by this document can be identified by these labels attached to the sensor head.

Both the head label and the sensor tube end stop are marked with their date of manufacture in the form of 2 letters.

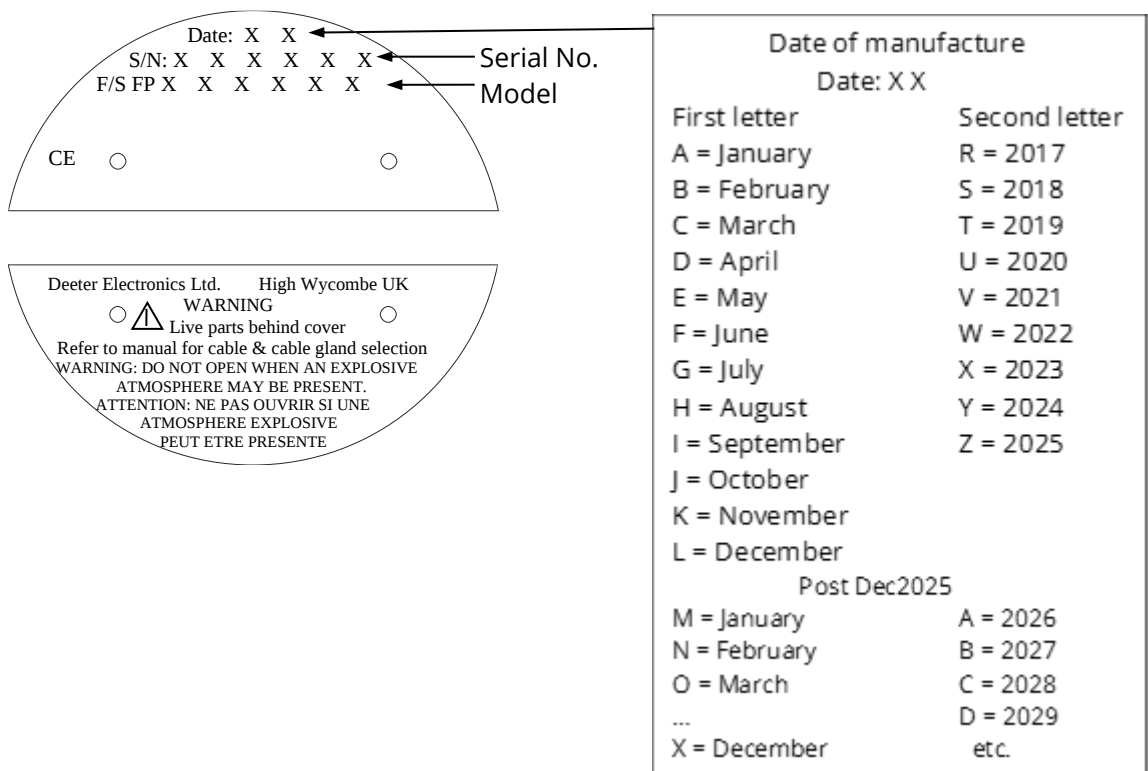
The S/N:xxxxxx is a unique serial No. given to each piece of equipment.

The F/S FP:xxxxxx is a 6 digit model code.

The model code is also the Deeter reference number of a drawing which identifies the electrical connections and custom mechanical dimensions. A copy of this drawing should be attached to this manual.

Labelling with additional information not shown in the label diagram below indicates another device from the F/S FP Series. Such devices should only put into service after following the correct manual.

Head labels



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Instruction for mounting and wiring a Marine Type Approved F/S FP Series Float Switch

- 1) This document details the installation of marine approved version of Deeter F/S FP Series switch. Separate documents are available for our ATEX approved F/S FP and LVCS FP series sensors for use in a hazardous location.
- 2) F/S FP Series –marine without a custom mounting option can be installed by suspending the sensor over the liquid as shown in diagram 3 and 4.
- 3) All versions of F/S FP must be mounted vertically $\pm 5^\circ$ with the head positioned so it will not become immersed in liquid during normal operation. A F/S FP with a liquid tight seal can be mounted from the bottom of a tank with the stem above the head if required.
The magnetic float and sensor stem must be installed away from any magnetic field or ferrous materials which could influence its operation.
- 4) The F/S FP Series -marine must be mounted where the ambient temperature will allow the sensor head to cool to below 120°C . This is especially significant where the process temperature is above 120°C .
- 5) The standard F/S FP sensor is supplied ready to mount through a 22.5mm hole in the top of a tank or onto a mounting bracket as shown in diagram 3. When the thickness of the tank or bracket exceeds 4mm thick ensure the head can be screwed onto the stem and be wrench tight without gripping or being restricted by the bracket. Bracket thickness can never exceed 10mm.

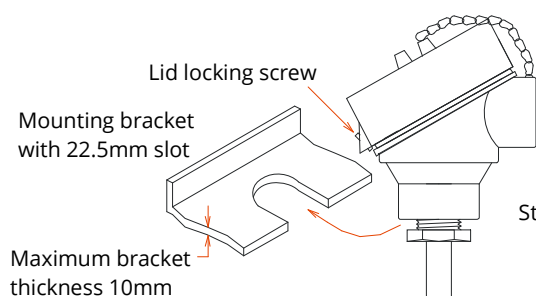


Diagram 3

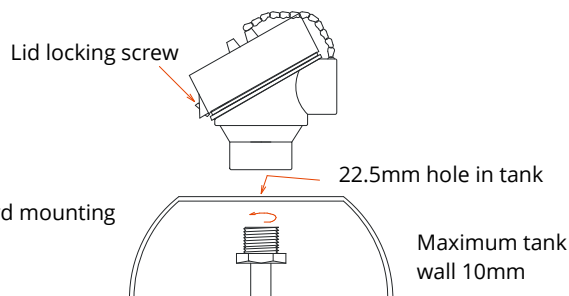


Diagram 4

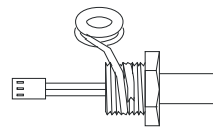
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6) Loosen the lid locking screw and unscrew the top of the head. Detach the wires going into the sensor stem by pulling the connector off the circuit board.

Unscrew the stem from the head.

Remove old PTFE tape and apply several layers of new PTFE tape to the male thread. As an alternative a grease may be used to replace the PTFE tape.

Failure to apply PTFE tape or grease may lead to thread galling and irreparable damage to this thread.



7) Mount the stem in the tank and screw the head back on top.

Clamp the head and use a 24mm spanner on the stem hexagon to tighten the joint. Do not use grips on the tube or end stop.

The NPT taper head / stem joint must be wrench tight. Ensure the stem is tight into the head and it has not gripped the mounting bracket or tank wall.

8) F/S FP Series -marine with a custom mounting do not require the separation of the head and stem, but during installation the head/stem joint should be checked that it is secure as described above.

10) All F/S FP with custom mounting options are supplied with a drawing to identify the supplied fitting. The supplied mounting will enable the installer to screw or clamp the sensor into place. It is not possible to install a sensor by welding as the welding process will damage the sensors internal electronics. When tightening threaded pipe fittings as shown in diagram 5, do not use the grips on the stem or use the head as a lever, always use a spanner on the pipe fitting.

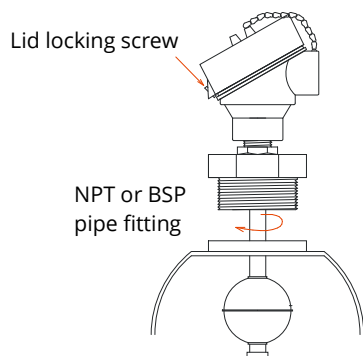
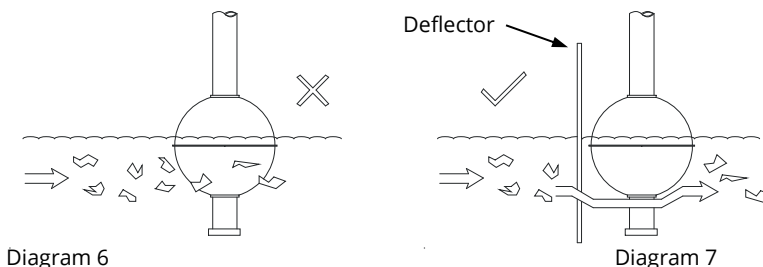


Diagram 5

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11) When a sensor is installed in a position where it may be exposed to excessive vibration, stress or impact from liquid bound particles. Then the sensor must be protected by additional support or deflectors as shown in diagram 7.



12) When this equipment is intended to be used in a liquid with a process temperature above 120°C it is an essential requirement that the sensor head temperature is measured to determine if the ambient air cooling is sufficient to keep the head below 120°C. With the sensor stem immersed to its maximum level in the process liquid at maximum temperature, a measurement of the temperature at the base of the head must be taken. Consideration of the ambient temperature during the measurement should be made and an evaluation of the maximum temperature the sensor head may reach should be recorded. Where the head temperature is expected to rise above 120°C then additional air cooling is required to keep the head below 120°C.

13) With the F/S FP mounted in the tank the cables can be connected. The sensor head is not normally supplied with a cable gland so the installer is free to select a suitable explosion proof gland or conduit to mate with the M20X1.5 or ½"-14NPT port in the stainless steel head. When selecting components to attach to the F/S FP the following conditions should be considered.

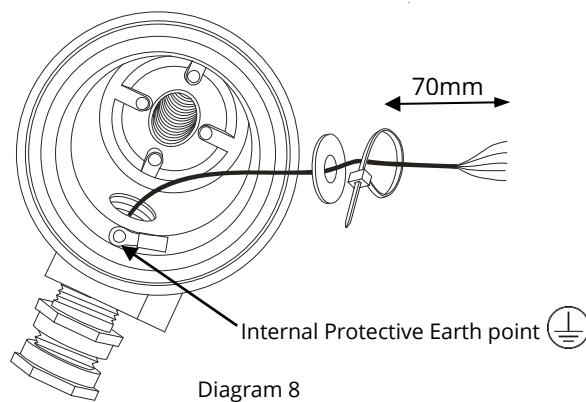
If ambient temperature around the sensor head is greater than 65°C the connecting cable and its gland must be able to withstand the increased temperature range. These components must have a minimum ingress protection rating of IP68.

14) A cable strain relief can be made by passing the cable through the nylon washer and fixing a cable tie tight to the cable, leaving a minimum of 70mm after the cable tie.

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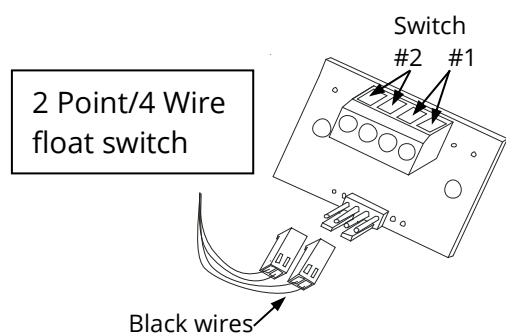
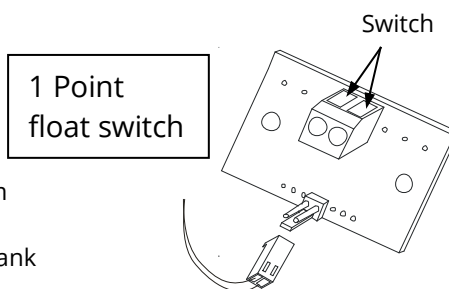
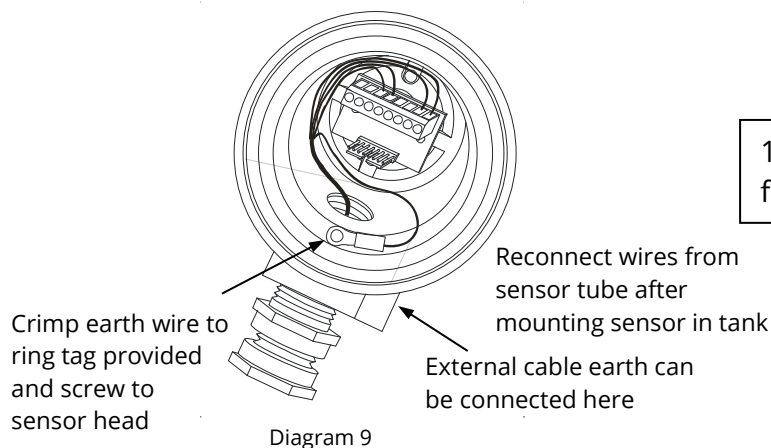
15) The connecting wires to the printed circuit board must be between 16 to 22AWG (Metric capacity 1.5mm²) with 6mm stripped ends. The earth wire should be connected to the screw point in the head using the crimp terminal provided.



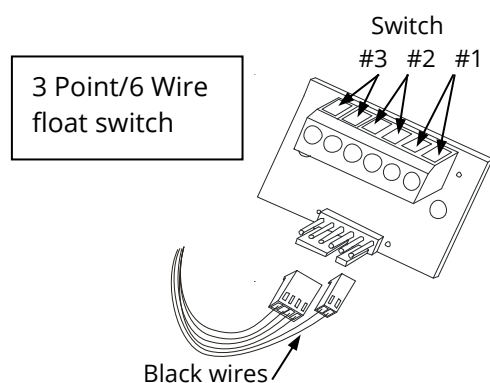
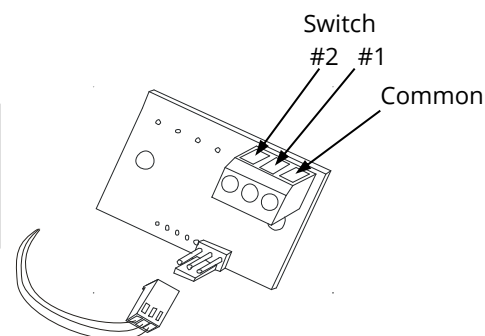
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16) The electrical wiring required depends on the number of switch points on the sensor stem.

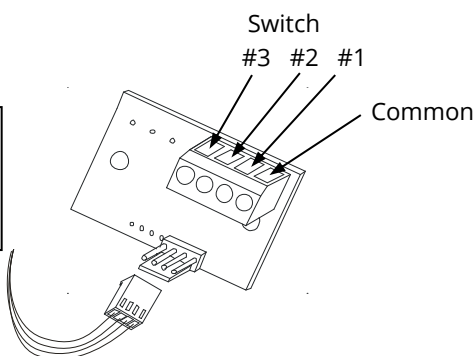
F/S FP with 1 to 7 reed switches. 50V Maximum.



2 Point Common Wire float switch

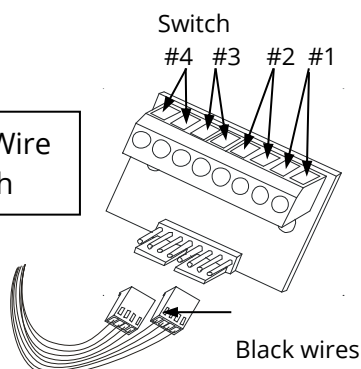


3 Point Common Wire float switch

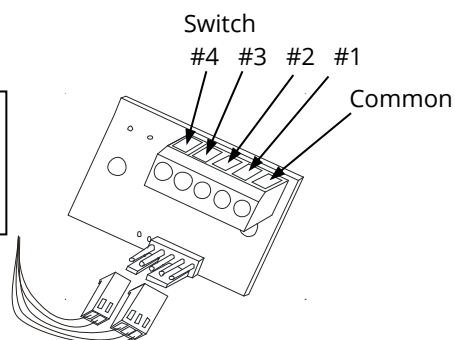


Marine Type Approved F/S FP Series Float Switch

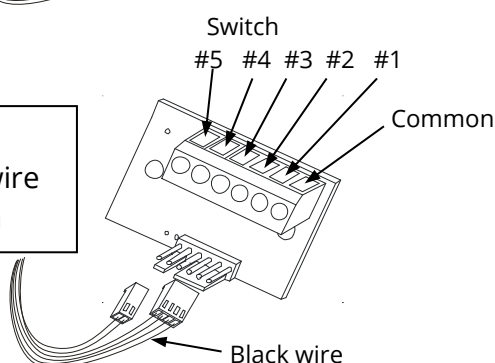
4 Point/8 Wire
float switch



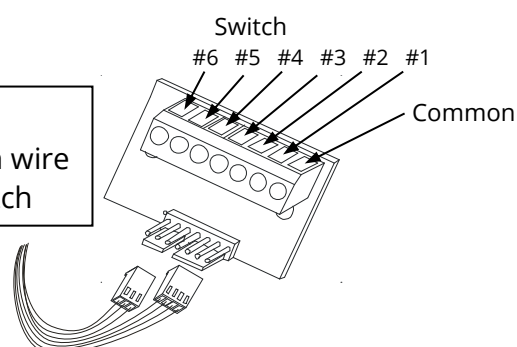
4 Point
Common Wire
float switch



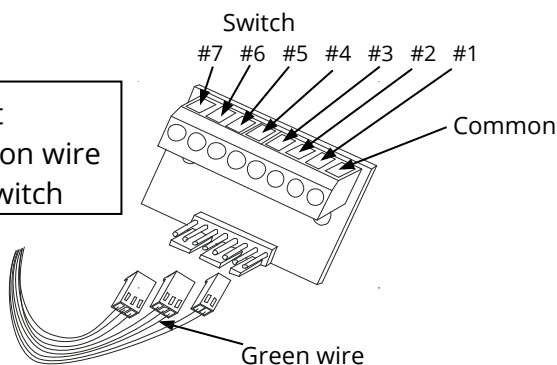
5 Point
Common wire
float switch



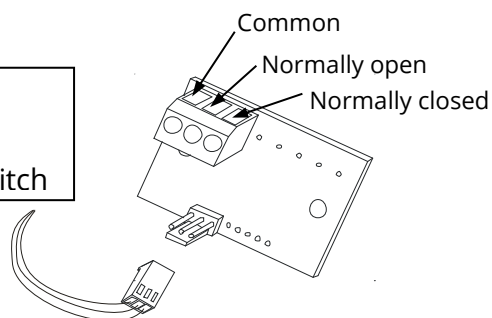
6 Point
Common wire
float switch



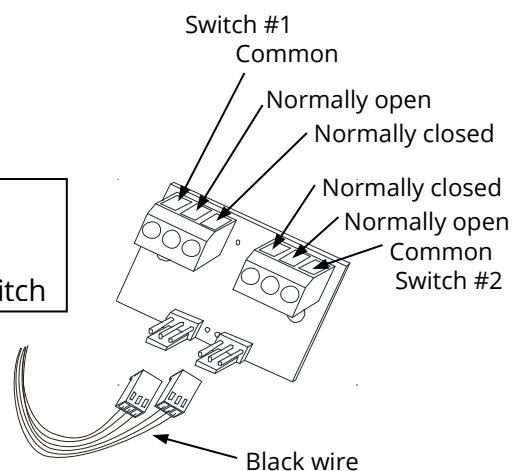
7 Point
Common wire
float switch



1 Point
SPDT
float switch



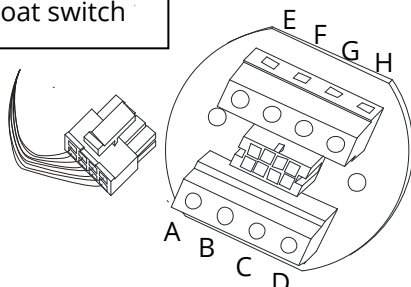
2 Point
SPDT
float switch



Marine Type Approved F/S FP Series Float Switch

F/S FP with 1 to 4 reed switches. 240Vac Maximum.

1, 2, 3 or 4 Point
240Volt float switch



Switch #1: Terminals A and E
Switch #2: Terminals B and F
Switch #3: Terminals C and G
Switch #4: Terminals D and H



17) The electrical supply to all the switches must be connected through a protection device to limit excess current should a fault occur. A fast blow 1A fuse can be used to limit the total current drawn by all the switches together. If each switch point is fused individually the sum of all the fuse links must not exceed 1Amp. The fuse must be placed in a position where it protects the cable and the sensor should a fault occur.

18) After connecting the earth, supply and output wires screw the lid down hand-tight, keep applying torque by hand until the lid cannot be turned any further. Tighten the lid-locking screw so the lid cannot be accidentally removed.

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Maintenance/Repair

Any repairs or replacements parts must be carried out by the manufacturers or their appointed repair agent.

Sensors with a long unsupported stem or in contact with fast moving liquids should include a maintenance plan to inspect the welded joints for fracture and fatigue.

A sensor stem immersed in hot or aggressive chemicals should be checked for corrosion on a regular basis with special attention to the stem end stop weld.

There are no fuses contained inside the sensor. See section 17 regarding fuse location.

The three threads show in diagram 10, and there interconnecting parts must be free from dust or debris before assembly.

Anti-seize grease may be used.

The Oring under the head cover should be inspected for damage.

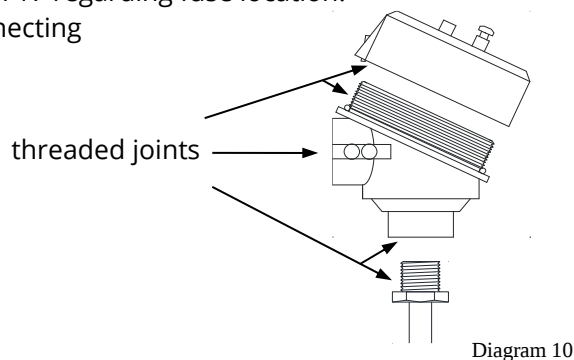


Diagram 10

Storage

Store in dry conditions without strong magnetic influence. Protect the float from impact.

Transport

Transport in rigid container with sensor head supported. Support sensor stem evenly and limit the float from moving along the stem. Protect float sides from impact by supporting sensor stem in the middle of the packing. Remove packing material from around the float to avoid secondary impact to the float. The float must not be used to support the stem.