

Vertical Float Switch

Installation, Operation & Maintenance Manual

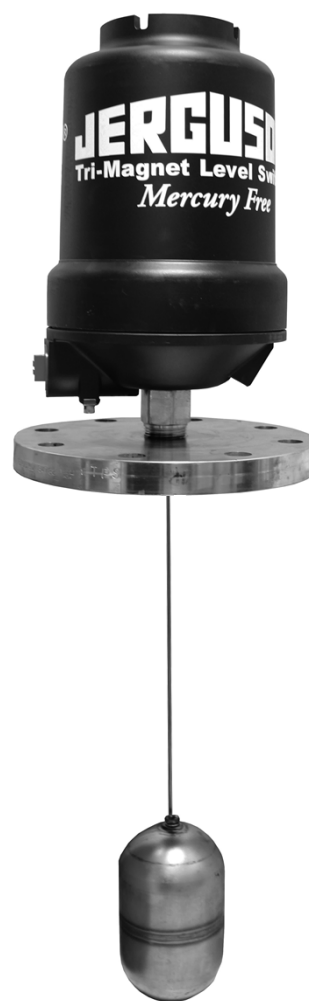
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Series JB__ F



Series JX__ F



Series JD__ F

JERGUSON®

A PRODUCT OF CLARK-RELIANCE

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Vertical Float Switches

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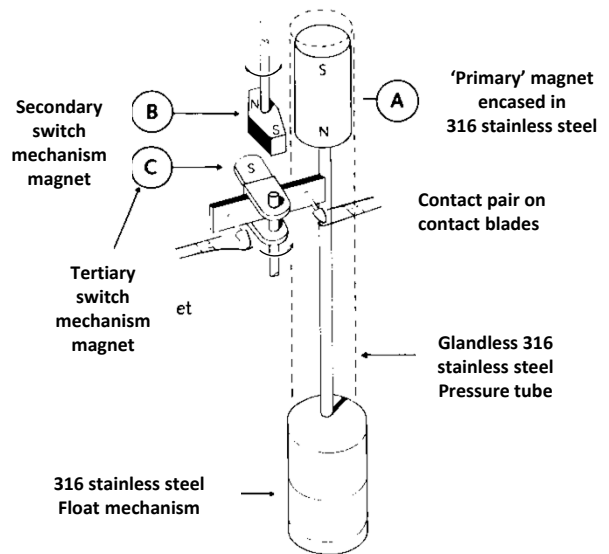
Vertical Float Switches

Principle of Operation

Switching is achieved with the Jerguson® Tri-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 Tri-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.

The primary magnet A is moved vertically in the pressure tube by a float mechanism which rises and falls with the liquid level.



Diagrammatic detail of Tri-Magnet system

Switch Assembly Identification

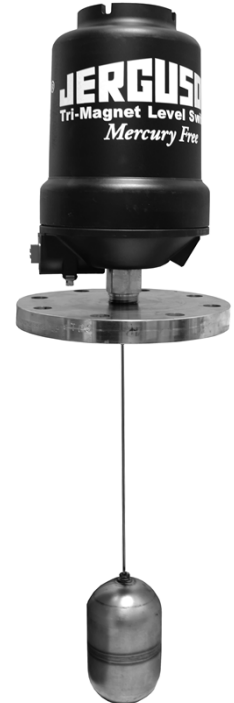
This manual covers the three series of switches: JB, JX and JD as shown opposite. Also covered in this manual are replacement enclosures & pressure tubes, replacement switches, replacement floats, as well as conversion kits (neither pictured). Your switch has a model number stamped on the nameplate, examples of which are shown on pages 4 & 5. From these numbers you can identify your switch and turn to the relevant pages in this manual. As switch mechanisms are common to all three series, electrical characteristics are given on page 6.



Series JB_F



Series JX_F



Series JD_F

Vertical Float Switches

Model Number - Part 1: Switch Assembly¹²

	J	B	C	1F	SA7F	1	X4	1	2	1	WN
Product Line/Tagging	J = Jerguson® (Omitted) = Magne-Sonics™										
Chamber Design Style (A-Z, Not w/in Ex scope)	B = Bottle/Sealed Chamber X = Flanged Chamber or Head Ass'y Only D = Top Mount (No Chamber)										
Chamber/Process Conn. Mat'l (A-Z or 0-9, Not w/in Ex scope)	C = Carbon Steel S = 316 Stnls Steel H = 1.25Cr - .50Mo										
Float (1F thru 99F, Not w/in Ex Scope)	1F, 2F, 3F, 4F, 5F, 6F, 7F, 8F, 9F										
Electrical Enclosure	LA4N = Weatherproof NEMA 4 / IP66, Long (1-3 Switches) SA4N = Weatherproof NEMA 4 / IP66 (Std.) (1-2 Switches) SA7F = Ex-Proof FM (Std.) (Al Alloy, 1-2 Switches) SI7F = Ex-Proof FM (Cast Iron, 1-2 Switches) RA7F = Ex-Proof FM (Short) (Al Alloy, 1 Switch)										
Switch Quantity	1, 2, 3, 4										
Switch Mechanism	X4, X8, D4, D8, H4, H8, P4, P8, E4, E8										
Process Conn. Orientation (Blank or 1 Alpha-Numeric, Not w/in Ex scope)	1 = Side-Bottom ("B" or "X" Chamber Design Style) 2 = Side-Side ("B" or "X" Chamber Design Style) D = Top Mount ("D" Chamber Design Style) (Omitted) = Head Ass'y Only (Less Chamber) ("X" Chamber Design Style)										
Process Conn. Size (Blank or 1 Alpha-Numeric, Not w/in Ex scope)	0 = .50" (DN15) 1 = .75" (DN20) 2 = 1.00" (DN25) 3 = 1.25" (DN32) 4 = 1.50" (DN40) 5 = 2.00" (DN50) 6 = 2.50" (DN65) 7 = 3.00" (DN80) 9 = 4.00" (DN100) A = 5.00" (DN125) B = 6.00" (DN150) (Omitted) = Head Ass'y Only (Less ("X" Chamber Design Style)										
Process Conn. Style (Blank or 1 Alpha-Numeric, Not w/in Ex scope)	F = FNPT M = MNPT S = FSW P = Plain-End/MSW (Sch.80) D ³ = Dual FSW & FNPT (Size 1" Only) 1 = 150#RFSO ANSI 3 = 300#RFSO ANSI 6 = 600#RFSO ANSI 9 = 900#RFSO ANSI 0 = 1500#RFSO ANSI (Omitted) = Head Ass'y Only (Less Chamber) ("X" Chamber Design Style)										
Design Options (Blank or <27 Alpha-Numerics, Not w/in Ex Scope)	(Omitted) = Standard Design WN = Weld Neck Flanges SW = Socket Weld Flanges S40 = Schedule 40 Branch RTJ = Ring Type Joint Flange: ST ³ = Sure Test X = Special Design										

¹ Standard offerings listed, but alternates are allowed. Unlisted alternates do not affect hazardous area safety components.

² For Chamber Design Style "D", internal access may be required to affix float when float diameter exceeds connection.

³ Not available with all offerings, consult factory for applicability.

Vertical Float Switches

Model Number - Part 2: Spare Enclosure & Pressure Tube ¹²³

Product Line/Tagging	S24867 - J S L - ST
J = Jerguson ®	
Pressure Tube Material	
C = Carbon Steel Threaded Adaptor w/ 316L Stainless Steel Tube & Plug	
S = 316 Stainless Steel Threaded Adaptor w/ Stainless Steel Tube & Plug	
Y = 321 Stainless Steel Threaded Adaptor w/ Stainless Steel Tube & Plug	
M = Alloy NA18 Adaptor w/ Alloy NA18 Stainless Steel Tube & Plug	
H = Alloy C-276 Threaded Adaptor w/ Alloy C-276 Tube & Plug	
6 = Alloy 625 Threaded Adaptor w/ Alloy 625 Tube & Plug	
8 = Alloy 825 Threaded Adaptor w/ Alloy 825 Tube & Plug	
Electrical Enclosure	
L = LA4 for Weatherproof NEMA 4 / IP66, (Long) (1-3 Switches)	
4 = SA4 for Weatherproof NEMA 4 / IP66 (Std.) (1-2 Switches)	
7 = SA7 for Ex-Proof FM (Std.) (Al Alloy, 1-2 Switches)	
I = SI7 for Ex-Proof FM (Std.) (Cast Iron, 1-2 Switches)	
R = RA7 for Ex-Proof FM (Short) (Al Alloy, 1 Switch)	
Assembly Options	
(Omitted) = Standard Design	
ST ⁴ = Sure Test	

Model Number - Part 3: Conversion Kits ¹⁵

Adaptor & Pressure Tube, (C,S,H,M,or I and L, 4, 7, or R; Example: CL)	JSCKIT - C4 J4 X4 X4 X4
Pick 1	
C = Carbon Steel Threaded Adaptor w/ 316L Stainless Steel Tube & Plug	
S = 316 Stainless Steel Threaded Adaptor w/ Stainless Steel Tube & Plug	
Y = 321 Stainless Steel Threaded Adaptor w/ Stainless Steel Tube & Plug	
M = Alloy NA18 Adaptor w/ Alloy NA18 Stainless Steel Tube & Plug	
H = Alloy C-276 Threaded Adaptor w/ Alloy C-276 Tube & Plug	
6 = Alloy 625 Threaded Adaptor w/ Alloy 625 Tube & Plug	
8 = Alloy 825 Threaded Adaptor w/ Alloy 825 Tube & Plug	
Pick 1	
L = LA4, Weatherproof NEMA 4 / IP66, (Long) (1-3 Switches)	
4 = SA4, Weatherproof NEMA 4 / IP66 (Std.) (1-2 Switches)	
7 = SA7/SI7, Ex-Proof FM (Std.) (1-2 Switches)	
R = RA7, Ex-Proof FM (Short) (Al Alloy, 1 Switch)	
Nameplate & Enclosure	
JL = Jerguson for LA4, Weatherproof NEMA 4 / IP66, (Long) (1-3 Switches)	
J4 = Jerguson for SA4, Weatherproof NEMA 4 / IP66 (Std.) (1-2 Switches)	
J7 = Jerguson for SA7, Ex-Proof FM (Std.) (Al Alloy, 1-2 Switches)	
JI = Jerguson for SI7, Ex-Proof FM (Std.) (Cast Iron, 1-2 Switches)	
JR = Jerguson for RA7, Ex-Proof FM (Short) (Al Alloy, 1 Switch)	
Switch Mechanism	
X4,X8,D4,D8,H4,H8,P4,P8,E4,E8	
Switch Mechanism - 2nd (If Applicable)	
X4,X8,D4,D8,H4,H8,P4,P8,E4,E8	
(Omitted) = No switch	
Switch Mechanism - 3rd (If Applicable)	
X4,X8,D4,D8,H4,H8,P4,P8,E4,E8	
(Omitted) = No switch	

¹ Standard offering listed, but alternates are allowed.

² Not available with Top Mount Chamber Design Style ("D")

³ Must be used with an approved switch to maintain hazardous location rating.

⁴ Not available with all offerings, consult factory for applicability.

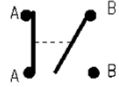
⁵ See switch upgrade bulletin, JS500.06, for complete conversion instructions.

⁶ Consult factory for all Magne-Sonics orders.

Vertical Float Switches

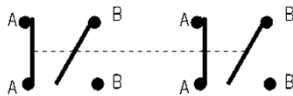
Electrical characteristics

4 Contact Type : D4, X4, P4, H4



2X independent SPST
AA make on rise : BB make on fall

8 Contact Type : D8, X8, P8, H8



Double pole double throw
(4X independent SPST)
AA make on rise : BB make on fall

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

Single Switch

As high level alarm



Alarm ON

As low level alarm



Alarm ON

Dual Switch: Combined Pump Control And Low Level Alarm

Pump Control Switch



Pump ON

LLA Switch



Alarm ON

Dual Switch: High and Low Level Alarm

HLA Switch



LLA Switch



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

Electrical rating

Type	Temp Wetside (°C)	Low Temp Use (°C)	AC Max. Values			DC Max. Values			
			VA	Volts	Amps	Watts	Volts	Res. Amps	Ind. Amps
X4 & X8	250	Amb.	2000	440	10	50	250	10	0.5
D4 & D8	400	Amb.	2000	440	5	50	250	5	0.5
H4 & H8	250	-100	2000	440	5	50	250	5	0.5
P4 & P8	400	Amb.	6	250	0.25	3.6	250	0.25	0.1
E4 & E8	455	Amb.	2000	440	5	50	250	5	0.5
			Power Factor 0.4mm			Time Constant 40ms Max.			

Warning

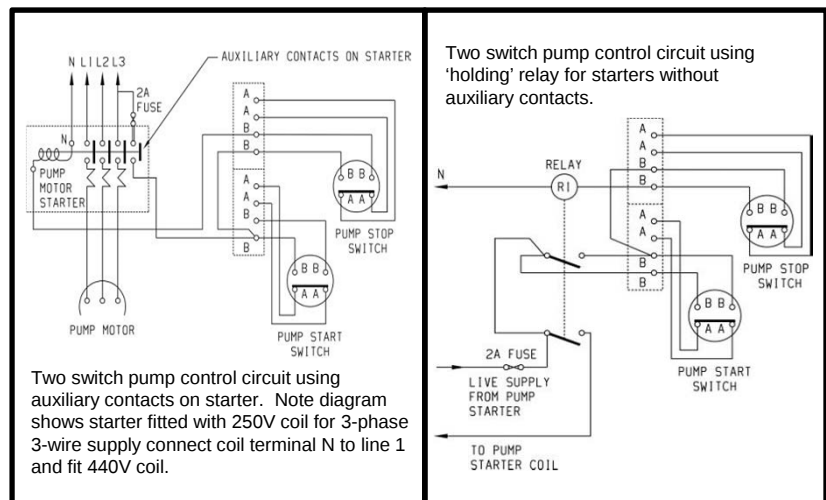
Gold plating on the contacts of the P4 and P8 switch mechanisms may be permanently damaged if the mechanisms are used to switch circuits with values greater than those shown above.

Important wiring notes

1. To minimize electrical shock hazard, **before energizing**, it is essential that the equipment is connected to a protective ground using the terminals supplied.
2. 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.
3. 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.
4. A sufficient length of flexible cable should be fitted to allow easy removal of the switch head and float assembly at any time.

Explosion-proof models

5. Cable entry shall be fitted with an explosion-proof cable entry device, with or without thread adaptor, and should be used in accordance with all local and national codes.
6. FM Approved Applications: Copper conductors 60°/75 °C: 140°/167°F ONLY. Torque terminals to 7in.-lbs (6cm.-kg).
7. **Ensure the cover locking safety grub screw is replaced and tightened before energizing.**



Vertical Float Switches

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

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

1. The product should be installed by suitably trained personnel, in accordance with all applicable local and national codes.

2. 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.

3. 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 Aluminum Alloy LM25 or LM24 or B85 grade 360, or Cast Iron grade 250

Pressure Tube & Union: Stainless Steel types 316 or 321, ASTM A108, or Alloy NA18, or Alloy C-276 (UNS N10276) or Alloy 625 (UNS N06625), or Alloy 825 (UNS N08825)

If the equipment is likely to come into contact with aggressive substances, it is the responsibility of the user to take suitable precautions 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 polymeric materials.

Suitable precautions: e.g. regular checks as part of routine inspections or establishing from the material's data sheet that it is resistant to specific chemicals.

4. It is the responsibility of the user to ensure:

- a. The joint requirements between the switch housing and vessel are compatible with the process media.
- b. The joint tightness is correct for the joint material used.
- c. That suitable temperature rated cable is used. **Note:** The cable entry temperature may exceed 70°C
- d. 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.

Vertical Float Switches

General Installation Instructions – Part 1: Switch Assembly

Installation shall be carried out by suitably trained personnel in accordance with all local and national codes.

For hazardous area installations, also see 'Installation Instructions Specific to Hazardous Areas' section, page 10.

1. Remove all packaging and inspect each switch assembly upon receipt and prior to installation. Careful handling is required at all times to ensure that any and all electrical enclosure(s), chamber(s), process connection(s) (flange facing, threading, etc.), exposed float(s) and/or rod(s) are not dirty, damaged, or bent.
2. Check the tag to ensure that both the operating conditions and electrical requirements of the application are within the ratings of the switch.
3. It is recommended that block/isolation valves be used, installed between the vessel and the switch assembly chamber, when provided with a chamber.
4. Mount the switch assembly to the process connection(s), ensuring that its' central line axis is vertical to the eye. Use suitable gaskets and/or seals for each connection and/or joint, if required, and as dictated by the application. **Note (Series JD__F):** If float cannot fit through mounting/process connection, it must be unthreaded from the unit prior to installation. Thread float back onto the unit, using a permanent thread locker, inside of the vessel after the head has been mounted, via an access panel or similar.

Switch trip point locations.

- a) Series JB__F & JX__F: Refer to page 12 for default switch trip points. Refer to any applicable documents (purchase order, order acknowledgement, drawings, etc.) for switch assemblies ordered with non-standard switch trip points.
- b) Series JD__F: Switch trip points are customer specified. Refer to any applicable documents (purchase order, order acknowledgement, drawings, etc.) for switch trip points.

Enclosure Cover Removal: Allow for room above the switch assembly to remove enclosure cover. Actual distance varies by enclosure, see page 13. For electrical enclosure type, refer to model code on pages 4-5.

5. Check torque values for all bolted connection(s), if applicable. Values shall be in accordance with manufacturers recommendation based on bolting, gasket materials, etc. Reference page 14.
6. Remove the cover to the switch assembly's electrical enclosure to reveal the terminal block(s) to which electrical connections are to be made.

Explosion-proof models: Locate and loosen the M5 socket head safety grub screw on the side of enclosure 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. Secure the base of the switch assembly's electrical enclosure if it turns freely with the cover.

Weatherproof models: Loosen the hexagon bolt at the top and remove enclosure cover. Do not completely remove the bolt, since a retaining washer on the bolt, inside of the enclosure cover, will reduce the risk of loss. If bolt is removed, reassemble making sure that the fiber sealing washer sits below the bolt head.

7. 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.

Refer to wiring notes on page 6 (all locations), & if applicable, page 7 (hazardous locations) .

8. 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 electrical enclosure base, which protects the integrity of the wiring and terminal connections, particularly when the electrical enclosure cover is removed or re-fitted.
9. Switch point adjustments may now be made if necessary, see page 13.
10. Check that cover seals in the enclosure base are present and in good condition, and then replace the cover.

Explosion-proof models: Before energizing, ensure the cover locking safety grub screw is replaced and tightened. Do not energize if the cover locking safety grub screw is missing.

Weatherproof models: Before energizing, ensure that the fiber sealing washer and hexagon bolt were reinstalled at the top of the cover.

Vertical Float Switches

General Installation Instructions – Part 2: Spare Enclosure & Pressure Tube

Installation shall be carried out by suitably trained personnel in accordance with all local and national codes.

For hazardous area installations, also see 'Installation Instructions Specific to Hazardous Areas' section, page 10.

1. Remove all packaging and inspect each unit upon receipt and prior to installation. Careful handling is required at all times to ensure that any and all electrical enclosure(s), connection(s) (flange facing, threading, etc.) are not dirty, damaged, or bent.

2. Check the tag of the spare unit to ensure that any operating conditions and/or electrical requirements of the application are within the ratings of the switch.

3. De-energize the unit by cutting all power to the electrical components of the unit.

4. Remove the original units' enclosure cover to reveal the terminal block(s) to which electrical connections are made.

Explosion-proof models: Locate and loosen M5 socket head safety grub screw on side of enclosure 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: Loosen and remove the hexagon bolt and fiber sealing washer at the top of the cover.

5. Remove all terminal and conduit connections. Do not remove switch(es) or change its position on the pressure tube.

6. Take the switch out of service following the instructions on page 11.

7. Remove original units' pressure tube, with electrical enclosure base still attached, by loosening its threaded connection atop chamber/vessel. Carefully raise pressure tube, taking care not to bend the float rod, until the stop clip, located below the pressure tube, is visible.

8. Separate float assembly from pressure tube by removing stop clip. Pinch stop clip to remove, and do not let stop clip/float assembly to fall into chamber. (Note: The stop tube, which sits on the stop clip, may prevent you from pinching the stop clip sufficiently to remove it. Stop tube may have to be lifted up into the pressure tube in order to remove.)

9. On the original units' pressure tube, mark the location of each switch, then remove each switch. Each switch mechanism is mounted on the pressure tube by a locking screw and nut. These can be loosened, allowing the switch to be removed by sliding it up and off the pressure tube.

10. Remove new enclosures' electrical cover according to step 4.

11. Attach the stop clip to the bottom of the new pressure tube. (Note: Pinch stop clip in the absence of the stop tube in order to sufficiently install.)

12. Fit new pressure tube, with new electrical enclosure, into top threaded connection of chamber and tighten the pressure tube hex nut.

13. Transfer the switch locations from the original units' pressure tube onto the new pressure tube, and mount the switch(es) onto the pressure tube.

14. Connect electrical wiring via the conduit entry 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.

Refer to wiring notes on page 6 (all locations), & if applicable, page 7 (hazardous locations) .

15. 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 enclosure base, and is particularly important as it will prevent rotation when the enclosure cover is removed or re-fitted.

16. Check that cover seals in the enclosure base are present and in good condition, and then replace the cover.

Explosion-proof models: Before energizing, ensure the cover locking safety grub screw is replaced and tightened. Do not energize if the cover locking safety grub screw is missing.

Weatherproof models: Before energizing, ensure that the fiber sealing washer and hexagon bolt were reinstalled at the top of the cover.

17. Put switch back into service following steps on page 11.

18. Switch point adjustments may now be made if necessary, see page 13.

General Installation Instructions – Part 3: Conversion Kits

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

For hazardous area installations, also see 'Installation Instructions Specific to Hazardous Areas' section, page 10.

1. Refer to Document JS500.06 for complete conversion instructions.

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Installation Instructions Specific to Hazardous Area

Examples of Model Numbers Covered:

Model Number - Part 1, page 4 : JBC1FSA7E1X410X ("E" indicates FM approval for hazardous locations.)

Model Number - Parts 2 & 3, page 5: S24867-JS# or JSCKIT-C#J#X4 ("#", when represented by "Z", "I", or "R", indicates FM approval for hazardous locations.)

Installation of this equipment shall be carried out by suitably trained personnel, in accordance with all local and national codes.

1. Inspection and maintenance of this equipment shall be carried out by suitably trained personnel, in accordance with all local and national codes.
2. No maintenance or repair of the flameproof enclosure is permitted.
3. The enclosure must not be opened when the equipment is electrically energized. Where Line Monitoring Resistors are fitted allow four minutes after isolation before removing cover.
4. The certification of this equipment relies upon the following materials used in its construction:
 - a. Housing and Cover: Aluminum Alloy LM25 or LM24 or B85 grade 360, or Cast Iron grade 250.
 - b. Pressure Tube & Union (Partition wall): Stainless Steel types 316, 321 or 304, or Carbon Steel 220M07 or ASTM A108, or Alloy NA18, or Alloy C-276 (UNS N10276) or Alloy 625 (UNS N06625), or Alloy 825 (UNS N08825)
 - i. If the equipment is likely to come into contact with aggressive substances, it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised.
 - ii. Aggressive substances: e.g. acidic liquids or gases that may attack metals or solvents that may affect polymeric materials.
 - iii. Suitable precautions: e.g. regular checks as part of routine inspections or establishing from the material's data sheet that it is resistant to specific chemicals.
 - iv. **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.
5. It is the responsibility of the user to ensure:
 - a. The voltage and current limits for this equipment are not exceeded.
 - b. That only suitably certified cable entry devices will be utilized when connecting this equipment.
 - c. That suitable temperature rated cable is used. **Note:** The cable entry temperature may exceed 70°C.
 - d. That any unused cable entries are sealed with suitably certified stopping plugs.
 - e. The joint requirements between the switch housing and vessel are compatible with the process media.
 - f. The joint tightness is correct for the joint material used.
 - g. The float is protected from impact or friction, or electrostatic charging from fast flowing non-conductive fluids, that could generate an ignition source.
6. Except for input gland, only screws and fittings provided by the manufacturer can be attached to the housing.
7. Technical data:
 - a. Coding: FM approval: Class I Div. 1 Groups B,C,D T6...T1 (-50°C ≤ Ta ≤ +60°C)
 - b. Pressure: Must not exceed the rating of the coupling/flange fitted.
 - c. Temperature:
 - i. Ambient Air Temperature (Ta) (-50°C ≤ Ta ≤ +60°C)
 - ii. Allowable process temperature (Tp)
8. Conditions of use:
 1. The equipment temperature code is determined by process temperature according to the table below.
 2. The equipment can be installed in the boundary wall between an area of Class I, Zone 0 and the less hazardous area, Class I, Zone 1. In this configuration, the process connection is installed in Class I, Zone 0, while the enclosure is installed in Class I, Zone 1.

Temperature Code	Process Temperature	Exclusions
T6	-50°C to +80°C	
T5	-50°C to +95°C	
T4	-50°C to +130°C	
T3	-50°C to +195°C	
T2	-50°C to +295°C	
T1	-50°C to +400°C	

The Temperature Class applicable for each application is determined by the process temperature (Tp) as shown in the table above.

Vertical Float Switches

Putting the Switch into Service

1. Check the tag to ensure that the operating conditions of the application are within the ratings of the switch.
2. Check that any and all valves, plugs, etc. are securely closed. Check torque values for bolting of process connections and/or switch head flange, if either apply. Values shall be in accordance with manufacturers recommendation based on bolting, gasket materials, etc. Reference page 14.
3. Slowly bring the switch up to pressure by opening the upper block/isolation valve, or by similar means. Take caution not to damage the switch if fluid is available to the upper block/isolation valve, or other. As fluid under pressure can be extremely dangerous.
4. If available, slowly introduce & equalize a liquid level to the switch by opening the lower block/isolation valve, or by similar means.

Taking the Switch out of Service

1. Isolate the switch from any pressure and/or fluid by closing both the upper and lower block/isolation valves, or by similar means.
2. Slowly open a vent valve, vent plug, or similar connection to relieve pressure on the switch. If the vent valve or connection is available to the fluid, take caution as fluid exiting the switch under pressure can be extremely dangerous.
3. Remove any remaining fluid from the chamber using a drain valve, drain plug, or the lowest connection.

Vertical Float Switches

Maintenance of the Jerguson® Vertical Float Switch

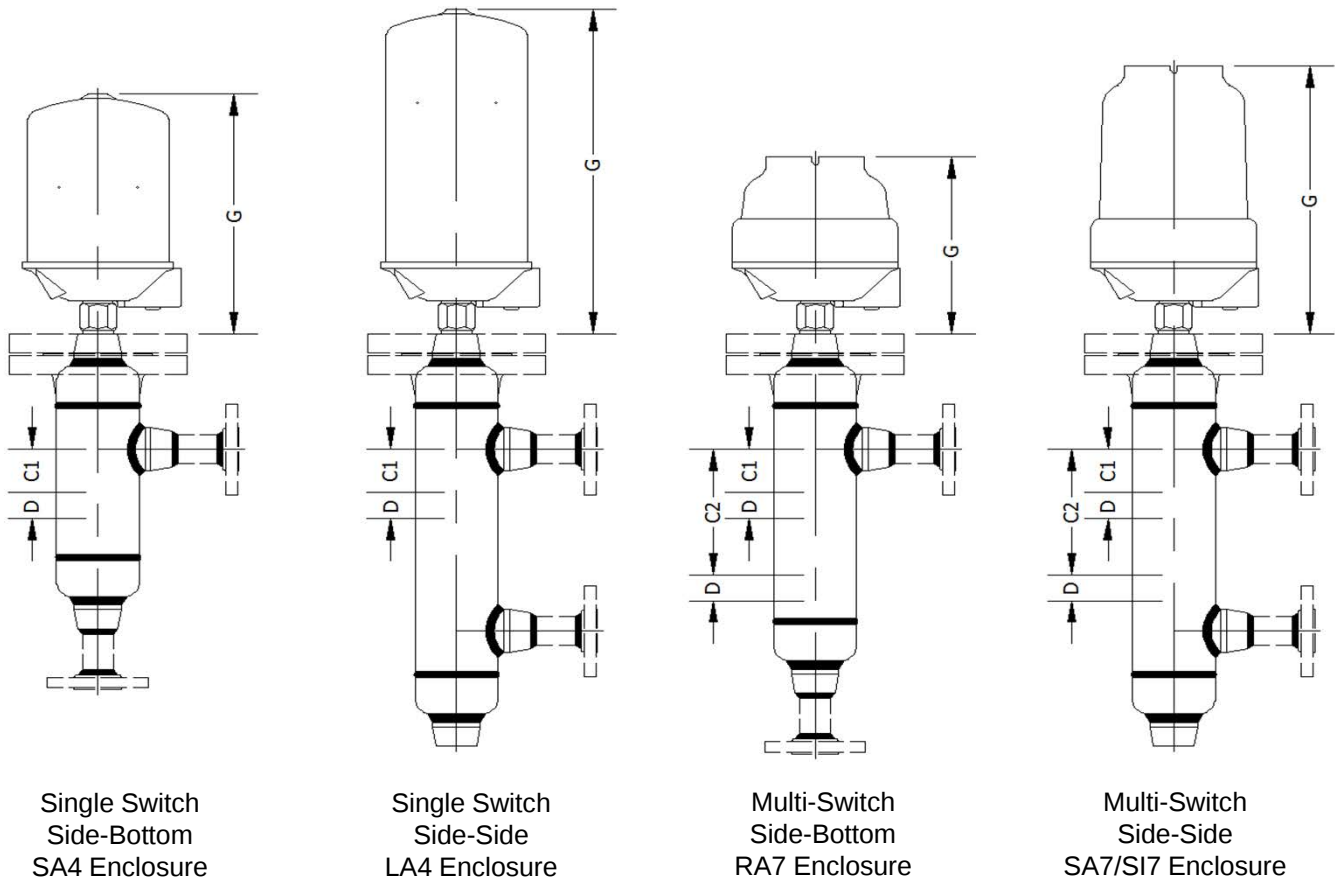
Inspection and maintenance shall be carried out by suitably trained personnel in accordance with all local and national codes.

1. Isolate electrical circuits to switch and disconnect wiring as necessary.
 - a. Series JB__F switches: Continue with step 9.
 - b. Series JX__F & JD__F switches: Continue with step 2.
2. Take switch out of service, according to the respective section above.
3. Remove top flange nuts holding switch to chamber/vessel and carefully withdraw switch head and float assembly, taking care not to bend the float rod.
4. Separate float assembly from pressure tube by pinching & removing stop clip. (Note: The stop tube, which sits on the stop clip, may prevent you from pinching the stop clip sufficiently to remove it. Stop tube may have to be moved into the pressure tube in order to remove.)
5. Check float, float rod, magnet, sealing surface and gasket for excessive wear and/or damage. Clean and/or replace as necessary.
6. Inspect the chamber and remove any deposits.
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 14.
8. Bring switch into service, according to the respective section above.
9. 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 mechanism is not recommended and replacement of the complete switch mechanism will be found to offer the quickest and most economical solution in event of faulty operation.** See page 15.
10. Check sealing gasket / "O" ring and replace if necessary.
11. Check the cover seals are present and in good condition, and then replace the cover.
 - a. **Explosion-proof models: Before energizing**, ensure the cover locking safety grub screw is replaced and tightened. Do not energize if the cover locking safety grub screw is missing.
 - b. **Weatherproof models: Before energizing**, ensure that the fiber sealing washer and hexagon bolt were reinstalled at the top of the cover.

Vertical Float Switches

Operating Level Data

Series JB__F & JX__F



C1 = Single Switch: Process C/L to rising trip point of switch.

= Multi-Switch : Process C/L to rising trip point of upper/high level switch.

C2 = Multi-Switch : Process C/L to rising trip point of lower/low level switch.

D = Switch Deadband. Distance between the switch trip and reset.

G = Enclosure Height. See table on page 13.

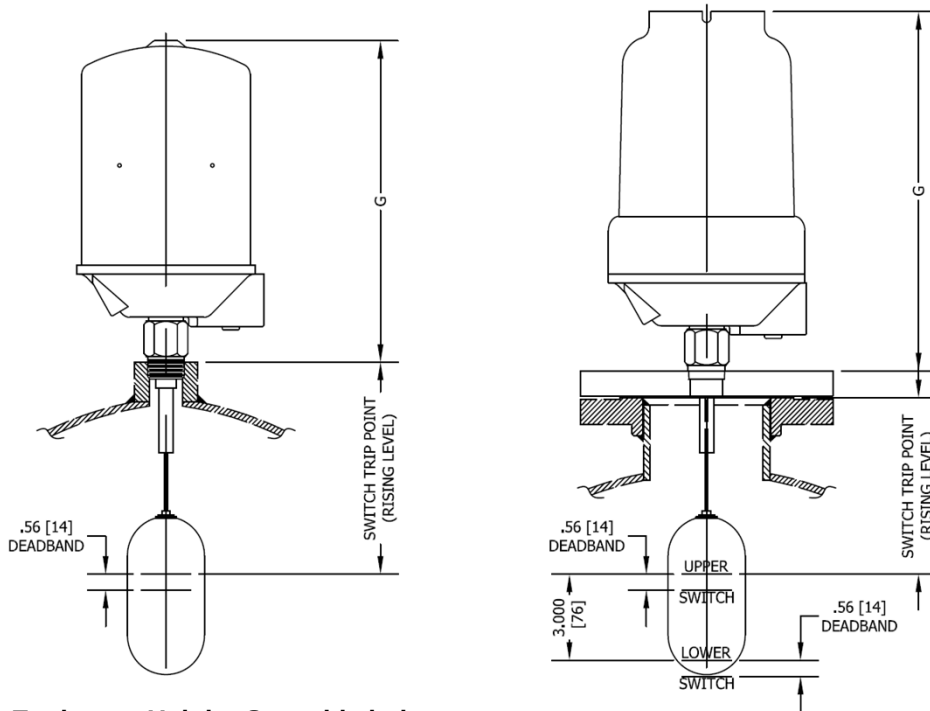
	Model									
	-1F	-2F	-3F	-4F	JB_5F	JX_5F	-6F	-7F	-8F	-9F
Dim C1 ⁺ (in)	2.00									
Dim C2 ⁺ (in)	5.00									
Dim D ⁺ (in)	.56									

⁺ Default trip locations at minimum operating SG. See 'Switching Point Adjustment' section, page 13.

Vertical Float Switches

Operating Level Data

Series JD__F



JD__F units are custom built for each application. The minimum SG of any unit is specific to the application and final design, based on the float, the elevation of the switch trip point, and the switch being used.

G = Enclosure Height, See table below.

	Electrical Enclosure				
	SA4	LA4	SA7	SI7	RA7
Dim G (in)	11.94	15.88	13.25	13.25	9.00
Clearance[‡] (in)	7.25	11.25	6.50	6.50	2.25

[‡] Clearance above enclosure required to remove cover.

Switching 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, and therefore the switch trip point elevation, 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.

Each switch, unless otherwise ordered, is assembled with factory default switch trip points, for the minimum specific gravity (SG) of the unit. Higher application SG's will cause the switch to trip sooner, at a lower elevation. Any change made to the factory default switch positions are done at the customers discretion, and should be tested in the application fluid to ensure that each switch mechanism can be tripped and also reset.

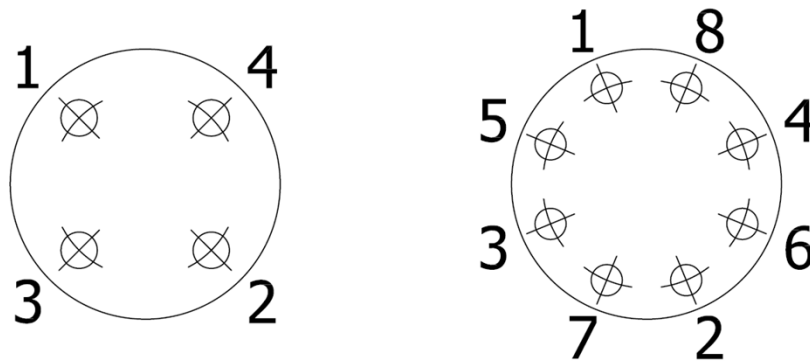
Vertical Float Switches

Bolting Torques

Information in this section is to the best of our knowledge correct. Since conditions of use are beyond our switch, users must satisfy themselves that bolt torques are suitable for their flange/process/conditions/gasket material of the application(s).

		Bolt Torque Values, (Ft.-Lbs. / Nm) (For ASME B16.5 Raised Face Flanges with lubricated A193 Gr.B7 Bolting)								
		150#			300#			600#	900#	1500#
		Compressed Sheet	Graphoil	Spiral Wound	Compressed Sheet	Graphoil	Spiral Wound	Spiral Wound	Spiral Wound	Spiral Wound
Nominal Flange Size, NPS (DN)	0.50 (15)	28/38	20/27	47/64	28/38	20/27	47/64	47/64	100/136	100/136
	0.75 (20)	40/54	27/37	60/81	51/69	34/46	84/114	84/114	100/136	100/136
	1.00 (25)	53/72	35/47	60/81	67/91	45/61	115/156	115/156	160/217	160/217
	1.50 (40)	60/81	60/81	60/81	151/205	101/137	197/267	197/267	266/361	353/479
	2.00 (50)	120/163	120/163	120/163	108/146	72/98	113/153	113/153	160/217	227/308
	3.00 (80)	120/163	120/163	120/163	200/271	138/187	200/271	200/271	319/433	451/611
	4.00 (100)	120/163	120/163	120/163	200/271	196/266	200/271	320/434	572/776	694/941
	5.00 (125)	200/271	200/271	200/271	200/271	200/271	200/271	490/664	804/1090	970/1315
	6.00 (150)	200/271	200/271	200/271	200/271	200/271	200/271	490/664	664/900	867/1175
	8.00 (200)	200/271	200/271	200/271	320/434	320/434	320/434	710/963	1000/1356	1297/1758

Correct 4 and 8 Bolt Pattern Tightening Sequence:



Vertical Float Switches

Switch Mechanism Replacement

IMPORTANT NOTE

If a spare switch mechanism is fitted at any time, it is important that the magnet system is left in the correct mode. After installation of a replacement switch mechanism, always check that the 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, and the switch is located on the pressure tube to allow it to trip in both directions, 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 switch mechanism in the correct operating mode. (For a switch 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 or replacement switch mechanism.

P/N	STANDARD SPARE FLOAT & ROD ASSEMBLY	
S23991	Base Part Number	
	CODE	FLOAT / ROD DESCRIPTION
	X1F	2-3/4" OD x 5" Long, Float w/ Std Length Rod
	X2F	3-1/2" OD x 6" Long, Float w/ Std Length Rod
	X3F	3-1/2" OD x 6" Long, Float w/ Std Length Rod
	X4F	3-1/2" OD x 6" Long, Float w/ Std Length Rod
	X5F	3-1/2" OD x 6" Long, Float w/ Std Length Rod
	X6F	5-1/2" OD, Float w/ Std Length Rod
	X7F	5-1/2" OD, Float w/ Std Length Rod
	X8F	5-1/2" OD, Float w/ Std Length Rod
	X9F	7" OD, Float w/ Std Length Rod
	CODE	NUMBER OF SWITCHES
	1	1 Switch
	2	2 Switches
	3	3 Switches (Requires LA4N Enclosure)
	CODE	TEMPERATURE EXTENSION
	(Omitted)	Standard, No Temperature Extension
	3	3" Temperature Extension
	F	6" Temperature Extension / Cooling Fins

S23991 - X3F - 2 - 3

SPARE FLOATS		
MODEL	FLOAT SIZE	P/N
JX_1F	2-3/4" OD x 5" Long	D-4171-13
JX_2F	3-1/2" OD x 6" Long	D-4261-13
JX_3F	3-1/2" OD x 6" Long	D-4251-13
JX_4F	3-1/2" OD x 6" Long	D-4291-13
JX_5F	3-1/2" OD x 6" Long	D-4241-13
JX_6F	5-1/2" OD Sphere	D-3361-13
JX_7F	5-1/2" OD Sphere	D-3341-13
JX_8F	5-1/2" OD Sphere	D-3331-13
JX_9F	7" OD Sphere	D-3431-13

SPARE SWITCH MECHANISMS ¹²		
SWITCH	SWITCH TYPE	P/N
X4	SPDT	K-2008-00
D4	SPDT Hi Temp.	K-2009-00
H4	SPDT Herm. Sealed	K-2011-00
P4	SPDT Gold Plated	K-2010-00
E4	SPDT Hi Temp. Encapsulated	K-2020-00
X8	DPDT	K-2012-00
D8	DPDT Hi Temp.	K-2013-00
H8	DPDT Herm. Sealed	K-2015-00
P8	DPDT Gold Plated	K-2014-00
E8	DPDT Hi Temp. Encapsulated	K-2021-00

¹ (1) Spare switch mechanism is recommended for every (10) installed switch mechanisms. Refer to model no. for switch mechanism quantity, pages 4 & 5.

² Refer to page6, 'Electrical rating' table, for switch mechanism ratings.

Installation, Operation, & Maintenance Instructions

IOM JS500.03

2018.05

Vertical Float Switches

JERGUSON® A PRODUCT OF CLARK-RELIANCE		 APPROVED
STRONGSVILLE, OHIO 44149, U.S.A. Ph: (440) 572-1500 www.jerguson.com		
GENERAL PURPOSE LEVEL SWITCH		
TYPE 4		
WARNING: ISOLATE BEFORE REMOVING COVER. IF REPLACING SWITCHES REFER TO MAINTENANCE INSTRUCTIONS FOR CORRECT PROCEDURES.		ATTENTION: DANGER D'OUVERTURE SOUS TENSION. POUR REMPLACER LE CONTACTEUR VEUILLEZ RESPECTER LA PROCEDURE DU MODE D'EMPLOI.
MODEL		MIN. S.G.
SERIAL		MAX. PSIG
TAG		MAX. TEMP.
IOM JS500.		SWITCH RATED A @

JERGUSON® A PRODUCT OF CLARK-RELIANCE	
MODEL	1.67
SERIAL	1.67
⊕ TAG	1.44
SEAL CONDUIT WITHIN 18 INCHES. INSTALL PER IOM JS500.0	
CL I, Div 1., Grp B, C, D, T6 CL II, III, Div 1., Grp E, F, G, T6 CL I, ZN 0/1, AEx d IIC, T6...T1 -50°C ≤ TA ≤ +60°C; TYPE 4, IP66	
Mfg. by the Clark-Reliance® Corporation; Strongsville, Ohio 44149 USA +1 (440) 572-1500 www.Clark-Reliance.com	
 APPROVED	

Vertical Float Switches

JERGUSON®
A PRODUCT OF CLARK-RELIANCE

**EXPLOSIONPROOF
LEVEL CONTROL**

MAX. P.S.I.G. @ 100°F

MIN. MAX. TEMP. °F .50

S.G.

SWITCH RATED A@ VAC

SEAL CONDUIT WITHIN 18 INCHES
CL I, Div 1., Grp B, C, D, T6
CL II, III, Div 1., Grp E, F, G, T6
CL I, 2N 0/1, AEx d IIC, T6...T1
-50°C ≤ TA ≤ +60°C; TYPE 4, IP66

WARNING!
DO NOT OPEN COVER
WHILE CIRCUITS ARE LIVE

COOL DOWN 4 MINUTES BEFORE OPENING
Mfg. by the Clark-Reliance® Corporation;
Strongsville, Ohio 44149 USA
+1 (440) 572-1500; www.Clark-Reliance.com

INSTALL PER IOM JS500.0

FM
APPROVED

Vertical Float Switches

NOTES:

Vertical Float Switches



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