



INSTALLATION, OPERATING &
MAINTENANCE MANUAL

Water Drain Valve

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1. Introduction

This Water Drain Valve has been developed in collaboration with a major oil company having the prime objective of detecting the slight differences in density between fuel grades when discharging water through the drain line of a fuel storage tank. It can detect a density difference down to 1-2%, if required.

The hydraulic design ensures that when you drain water built up in a tank (caused by rain or condensation) the S.G change from water to fuel is detected, causing the float to form a liquid tight seal against the valve seat, saving valuable medium from being wasted and preventing any discharge into the environment within fuel storage facilities.

It is supplied with a useful manual check function that enables periodic checking of the valve operation. A number of options are available including aluminum, stainless steel or carbon steel body.



CAST VERSION



FABRICATED VERSION

2. Specification

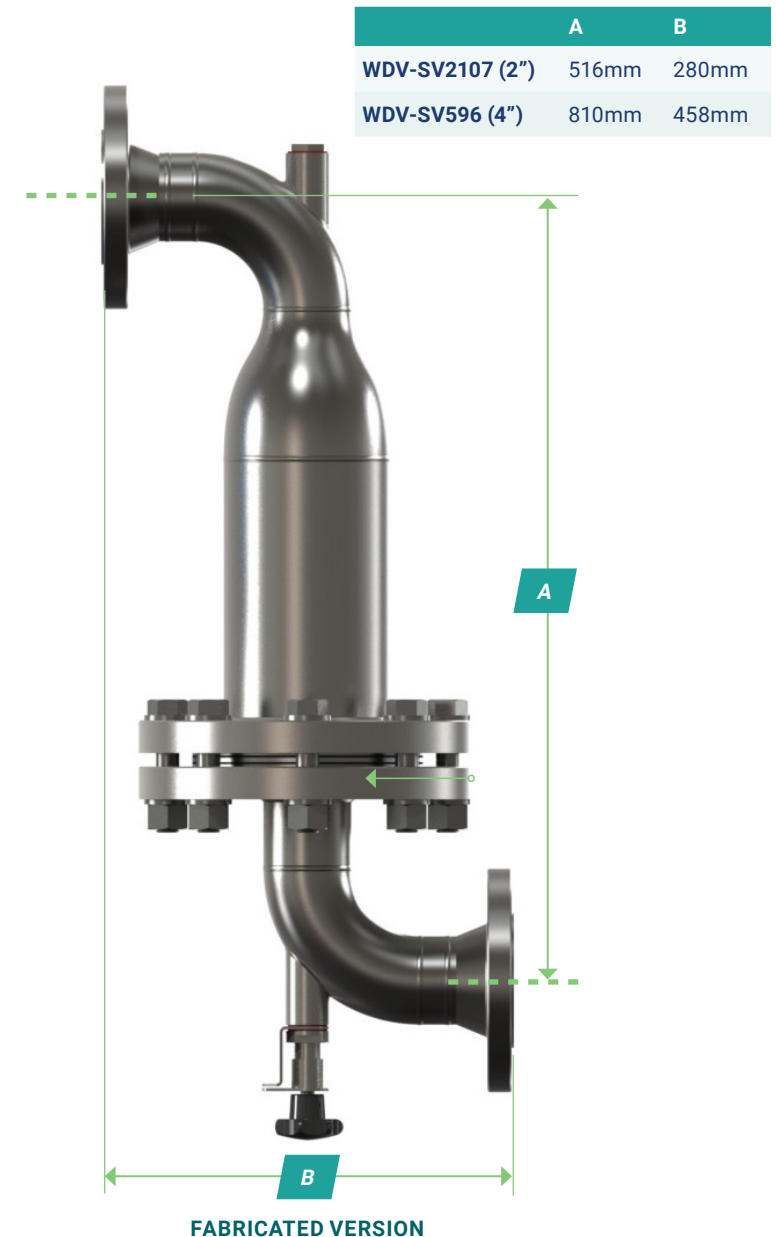
	Cast Versions	2" Fabricated Version	4" Fabricated Version
Part No:	WDV-SV2050 / WDV-SV2056	WDV-SV2107	WDV-SV596
Body Material:	Aluminium Alloy / 316 Stainless Steel	316L Stainless Steel / Carbon Steel	316L Stainless Steel / Carbon Steel
Float Material:	Polypropylene	Polypropylene	Polypropylene
Seal Materials:	Viton / Klingsill	Viton / Klingsill	Viton / Klingsill
Std Process Connections:	Screwed connections 2.5" BSPP or 2" NPT Flanged Connections 2" or 3" ANSI/ASME 150lb or 300lb*	Flanged 2" ANSI/ASME 150 Lbs. RF	Flanged 4" ANSI/ASME 150 Lbs. RF
Max Flow Rate:	300 Ltrs/Min	300 Ltrs/Min	1250 Ltrs/Min
Max Line Pressure:	10 Bar	10 Bar	15 Bar
Temperature Rating:	-18 to 200°C	-18 to 200°C	-18 to 200°C
Weight:	10 Kgs	35 Kgs	70 Kgs

*Other flange sizes/ratings available on request.

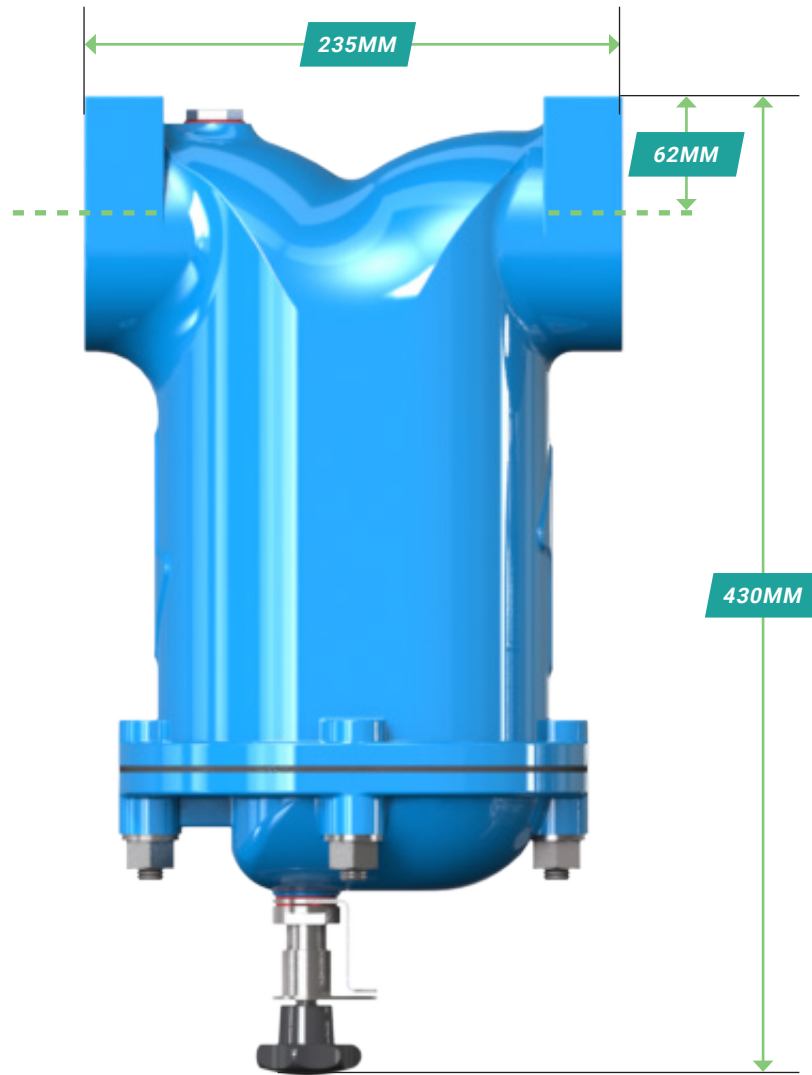
Maximum medium specific gravity (S.G) with the standard float is 0.92; the float will close in all mediums with an S.G below this value.

When the line medium freezes the valve will return to operation once the medium has thawed. Although Viton seals have a brittle point of -45°C and can operate satisfactorily at temperatures approaching this, it is recommended that they are replaced if subjected to temperatures below -18°C before the valve returns to operation.

Specification



Specification



CAST VERSION

3. Installation

Removal of Transport Packaging

Remove the Water Drain Valve from transportation packaging and unwrap from the protective packing.

Health and Safety Warning: The fabricated Water Drain Valves are heavy and if required, either use a second person to assist with lifting the valve or use a mechanical lifting device.

Installation

Location:

The Water Drain Valve should be installed in the storage tank drain line, close to the tank outlet.

The valve should be situated after a storage tank isolation valve and before a discharge control valve. There is no minimum distance required between the isolation and control valve and the Water Drain Valve inlet and outlet; however AMS-IAC would recommend a distance of at least 200mm.

The valve body of the 2" or 4" fabricated valve will hang below the level of the storage tank outlet isolation valve and therefore consideration must be made to enable future maintenance prior to installation of this version of the valve.

The pipework before and after the valve should be supported to prevent excessive loads being applied once installed.

Installation

Installation Orientation:

It is important when installing the Water Drain Valve to mount the valve in the correct orientation to ensure that the valve functions correctly.

The Water Drain Valve should always be installed so that the checkable mechanism is facing downwards and the valve must be installed vertically, failure to ensure that the valve is installed correctly may prevent the float rising and falling as designed and this can prevent the float forming a tight seal in the shutoff position.

It is also important to install the water drain valve with the inlet and outlet connections in the correct orientation, the Cast versions have arrows on the valve body below the process connections showing the correct direction of flow through the valve, and the inlet connection is adjacent to the ½" BSP vent plug.

On the fabricated versions, the inlet flange can be identified as it is adjacent to the ½" BSP vent plug.

Important Note:

1. If the Water Drain Valve is installed in the inverted position, it will have the opposite design effect resulting with the float being in the open position allowing the lower density fluid (hydrocarbon/fuel) to pass through the valve and shutting off when the density changes to water.
2. If it is desired that the valve should close with a higher density fluid then the AMS-IAC density control valve should be installed in place of the water drain valve.
3. The WDV's are designed for use in gravity fed system and do not operate on a pump fed system, for density shut off on pump fed systems please refer to the AMS-IAC fuel grade monitoring valve.

Installation

Connections

The pipe work or valve that the Water Drain Valve is being connected to should always be fitted with mating flanges to the same specification as the flanges on the Water Drain Valve being installed. The correct flange specification can be identified from the specification part of this document and the part number shown on the Water Drain Valve.

For the cast Water Drain Valve with screwed connections, either 2" NPT or 2.5" BSPP* nipples should be used to connect the valve to the installation pipework.

These can be supplied by AMS-IAC upon request.

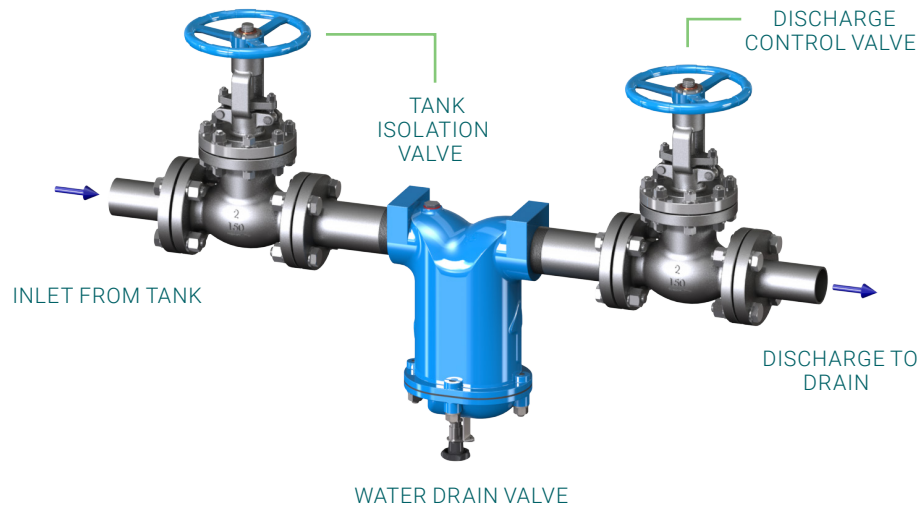
*Note: Depending upon option ordered.

Seals

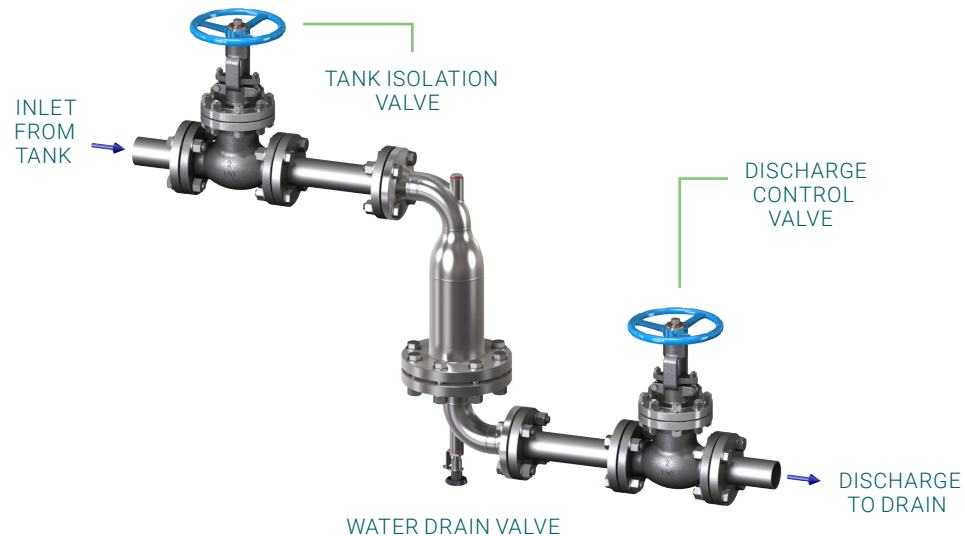
Suitable gaskets need to be fitted on the inlet and the outlet of the Water Drain Valve when mating with the pipe flange.

Installation

Suggested Installation for the Cast Water Drain Valve



Suggested Installation for the Fabricated Water Drain Valve



4. Operation

Valve Operation

Valve Status:

Discharge Control Valve: Closed

Tank Isolation Valve: Open

With the tank isolation valve in the open position, any water/condensation will slowly start to fill the float chamber in the Water Drain Valve, once the water rises in the float chamber and is level with the top of the float, the float will become buoyant and water will pass through the valve seat and fill the second chamber and pipeline up until the discharge control valve.

At routine periods set by the user, an operator can slowly open the discharge control valve which will allow any water built up in the valve to be drained, and when the flow of water stops the discharge control valve can be closed.

If during the draining stage hydrocarbons/fuel enters the float chamber the float will reseal due to the change in fluid S.G. forming a liquid tight seal to prevent an uncontrolled release of hydrocarbons/fuel to the environment.

Over a period of time water draining into the valve will displace any hydrocarbons/fuel as the level builds up in the base of the storage tank, so that the next time the tank is drained no hydrocarbons/fuel will be discharged.

Some water maybe left in the float chamber of the Water Drain Valve.

The Water Drain Valves are fitted with a checkable function which enables the operator to manually force the float up away from the valve seat.

This can be used to functionally confirm:

- a. That the float is free from any obstruction within the float cage
- b. When water is known to be present in the storage tank but no flow is present when the discharge control valve is opened indicating that hydrocarbons/fuel is present in the float chamber.

Operation

If water is known to be present in the storage tank with no flow to the drain present, before operating the check function it is advisable to close then re-open the discharge control valve slightly and place a container onto the drain to ensure any release of hydrocarbons/fuel is contained and not released to the environment.

To operate the checkable function:

- a. Unlock the padlock and turn the locking plate 90°
- b. Press the plunger upwards to lift the float away from the valve seat
- c. Release the plunger allowing the float to resit on the valve seat
- d. Return the locking plate to the locking position and refit the padlock.



Note: Adverse weather conditions

It is recommended that when the valve is operating in weather conditions that can reach freezing point (0°C) then lagging should be fitted around the Water Drain Valve and pipework to prevent the water contents in the valve and pipework from freezing.

If the valve and pipework is not lagged and the water contents in the valve freezes then any drainage operation should be postponed until the valve and pipework thaws, it is recommended that maintenance is carried out before drainage operations are re-started to confirm that the valve:

- a. Remains un-damaged from the freezing conditions
- b. The checkable function still is operational
- c. No ice particles or debris will prevent the valve from operating correctly.

Note: It is important not to functional test the valve via the checkable function. if there is any chance of ice particles still remaining in the valve or pipework from the tank, as particles could be trapped in the valve seat preventing the float from providing the liquid tight seal which could result in hydrocarbons / fuel being released to the environment.

5. Maintenance

While the valve has been designed to give trouble free operation, it is recommended that the valve forms part of a planned and preventive maintenance schedule.

Before any maintenance operations are carried out on the valve ensure that the tank isolation valve and discharge control valve are fully closed and if required locked in the closed position.

The Water Drain Valve can be maintained in situ, without the need for removing it from the pipework thus saving maintenance time.

If the Water Drain Valve is to be removed from the pipelines for maintenance, ensure that the relevant lifting procedures are followed, weights of the valves are given in the specification section of this document.

Always note that the valve will still contain liquid and therefore will be heavier than the weights stated.

Disassembly & Inspection Procedure:

1. Ensure that a suitable container is placed under the valve to capture any liquid remaining in the valve and pipeline
2. Undo the nuts, bolts and washers (as applicable) holding the valve cover to the valve body. Note: support the valve cover to prevent it from dropping
3. Slowly remove the valve cover, float and float cage and gaskets from the valve body
4. Visually inspect the valve body internals for signs of damage or debris. If debris is present remove it, if the valve body is damaged then the complete valve assembly should be sent back to AMS-IAC for damage assessment

Maintenance

5. Remove the float from the float cage; inspect the float for signs of damage, paying attention to the float sealing face. If any damage is found a replacement part can be purchased from AMS-IAC (see parts list for details)
6. If required the float can be checked for correct operation by placing it in a container of water and the float should be buoyant, if the float is placed in a container of hydrocarbons / fuel it should sink. Failure to operate correctly means it has to be replaced
7. Inspect the valve seat for signs of damage, if any damage is suspected return the valve to AMS-IAC for assessment
8. Inspect the float cage for any signs of distortion (potentially caused by over pressure or contact from debris in the pipeline). If any damage is found a replacement part can be purchased from AMS-IAC (see parts list for details)
9. Test the checkable plunger assembly and ensure that the operation is smooth, if any signs of stiffness is detected during the operation than the plunger assembly must be replaced as a complete unit.

Assembly Procedure (Cast Versions)

1. Refit the float and float cage assembly to the valve cover as shown in the maintenance images
2. Fit a new gasket to the valve cover
3. Align the valve head cover mounting holes up with the valve body studs and assemble the valve cover to the valve body, tighten the nuts to the recommended torque value of 30Nm
4. Press the plunger upwards to lift the float away from the valve seat, release the plunger and listen for the float dropping back onto the valve seat
5. Apply the padlock to the plunger assembly

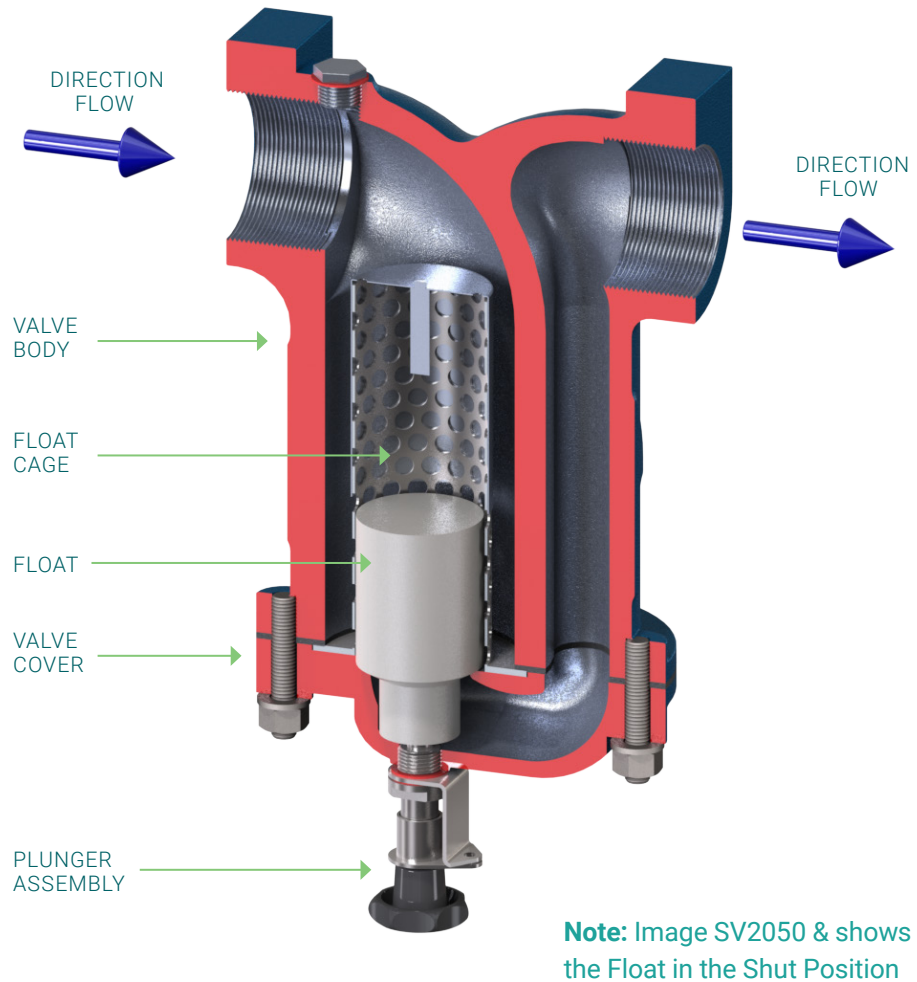
Maintenance

6. Re-install the Water Drain Valve to the pipeline (if removed)
7. Open the tank isolation valve, allowing any water/condensation to fill the float chamber. The Water Drain Valve is now ready for operation.

Assembly Procedure (Fabricated Versions)

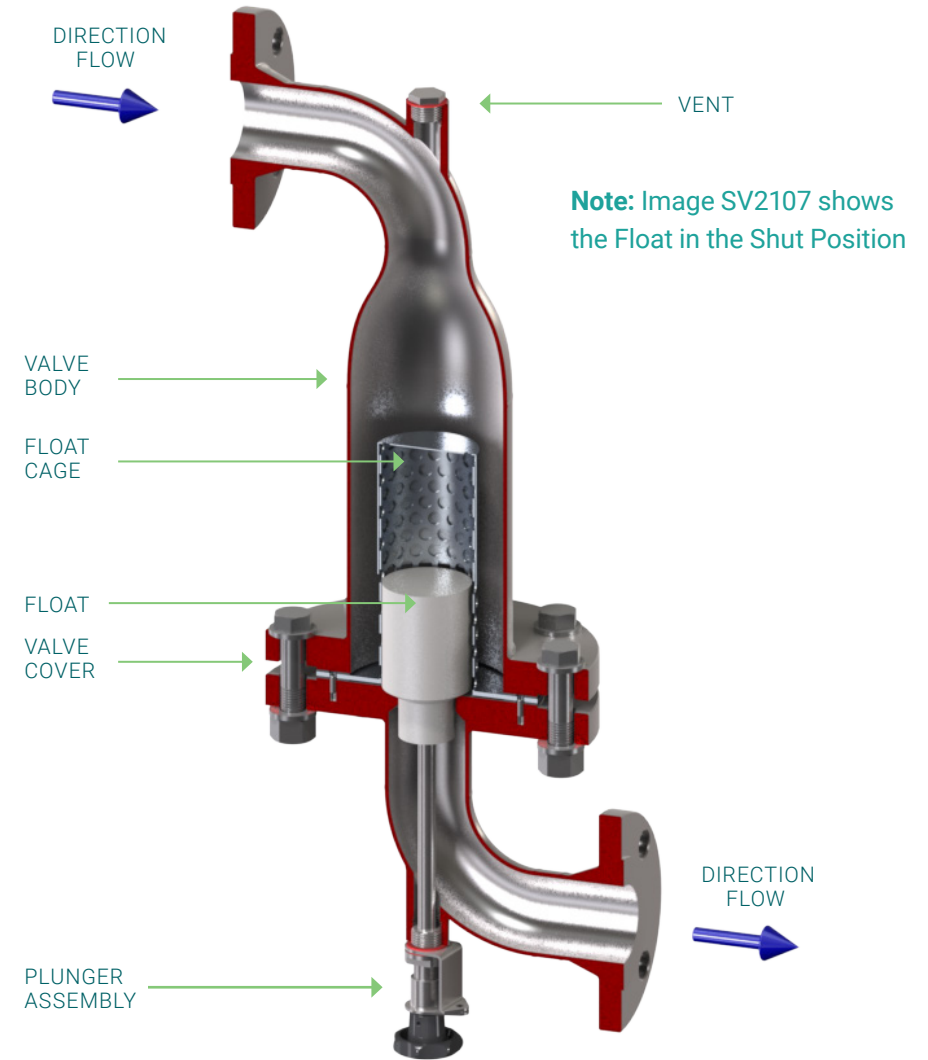
1. Fit a new gasket to the valve cover, aligning the holes in the gasket with the pins on the valve cover
2. Refit the float and float cage assembly to the valve cover as shown in the maintenance images
3. Fit a new gasket over the float cage assembly
4. Align the valve cover process flange with the valve body process flange so that the flange faces are parallel
5. Assemble the valve cover to the valve body and tighten the bolts / nuts to the recommended torque value of 30Nm
6. Press the plunger upwards to lift the float away from the valve seat, release the plunger and listen for the float dropping back onto the valve seat
7. Apply the padlock to the plunger assembly
8. Re-install the Water Drain Valve to the pipeline (if removed)
9. Open the tank isolation valve, allowing any water / condensation to fill the float chamber. The Water Drain Valve is now ready for operation.

Maintenance



CUT OUT VIEW OF THE CAST VERSION

Maintenance



CUT OUT VIEW OF THE FABRICATED VERSION

6. Repairs/Serviceing

AMS-IAC offer a full valve overhaul & repair service and valve repair from our workshop, or onsite through authorised contractors. The service includes replacement of any damaged parts, replacement of seals, cleaning of the valve body and valve head internally, replacement of washers, nuts and bolts and functionality test.

The workshop overhaul includes a pressure test of the reassembled product and 12 months warranty.

For a price and further information contact our Sales team on
+44 (0)1726 839909.

7. Spares

WATER DRAIN VALVE	WDV-	XXXX-	XX-	X-	X-	XX
Base model						
4" Fabricated version		SV596				
2" Fabricated version		SV2107				
2" NPT cast version		SV2056				
2" BSPP cast version		SV2050				
BODY MATERIAL						
Aluminium Alloy (Cast) Grade: LM 25M			AC			
Stainless Steel (Cast) Grade: BS3100 316 C16			SC			
Stainless Steel (Fabricated) Grade: 316SS			SF			
Carbon steel (Fabricated) Grade: ASTM A106 (Body)/ASTM A234 (Elbows & Reducers)			CF			
FLANGE MATERIAL						
316 Stainless steel grade: ASTM A182 F316				S		
Carbon Steel grade: ASTM A105				C		
No Flange				0		
FLANGE SIZE						
2"						2
3"						3
4"						4
Others (special)						X
FLANGE RATING						
150lb ANSI/ASME B16.5						15
300lb ANSI/ASME B16.5						30
Others (special)						X

Spares

Paint Specification

The Cast Aluminium and Fabricated Carbon Steel Water Drain Valves are supplied painted with Amercoat 385 Multi-Purpose Epoxy (+120 Deg C Max), AMS-IAC Blue Colour (RAL 5005) as standard.

AMS-IAC can supply the Water Drain Valves painted to suit individual customer paint requirements, please specify at time of enquiry.

Spares

MSK-SV596	Maintenance Spares Kit for SV596, includes 1 x gasket for body/cover, 1 x SV384 Plunger Assembly, 1 x SV404 Float
MSK-SV2107	Maintenance Spares Kit for SV2107, includes 2 x gasket for body/cover, 1 x SV471 Plunger Assembly, 1 x SV375 Float
MSK-SV2056	Maintenance Spares Kit for SV2056, includes 1 x gasket for body/cover, 1 x SV364 Plunger Assembly, 1 x SV375 Float
MSK-SV2050	Maintenance Spares Kit for SV2050, includes 1 x gasket for body/cover, 1 x SV364 Plunger Assembly, 1 x SV375 Float
SV399	Float Guide Assembly (SV596)
SV2070	Float Guide Assembly (SV2107)
SV273	Float Guide Assembly (SV2050/SV2056)

8. Diagnostics

The following information should be used to help diagnose faults when the product supplied is not functioning correctly.

Fault Remedy

Valve does not open

1. Is the valve installed vertically?
2. Is water present in the float chamber?
3. Is the control valve closed?
4. Operate the manual check facility and lift the float by pushing the plunger up
5. Check the operation of the isolation and control valves
6. Check the valve body orientation is correct
7. Check the float by placing it in water to float and the medium to sink.

Valve does not close

1. Is the valve installed vertically?
2. Is the hydrocarbon flowing through the valve?
3. Is the medium S.G below 0.90?
4. Check the valve for debris and the float condition
5. Check the float plunger is not depressed and it is inactive and locked.



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