



Trouble shooting for electrical make-up system solenoid valve

1. Operation of the electrical make-up system.

The electrical make-up system consists of a solenoid valve and an electrical float switch. The make up valve is a normally closed valve. If tension is put on the coil, this one is magnetized and the valve is opened. The float switch gives a signal to open the valve at low water level and to close it at high level. Problems related to the electrical make up system can be related to malfunctioning of the float switch or damage to the solenoid valve. Trouble shooting of the float switch is explained in a separate document. This document only relates to the solenoid valve.

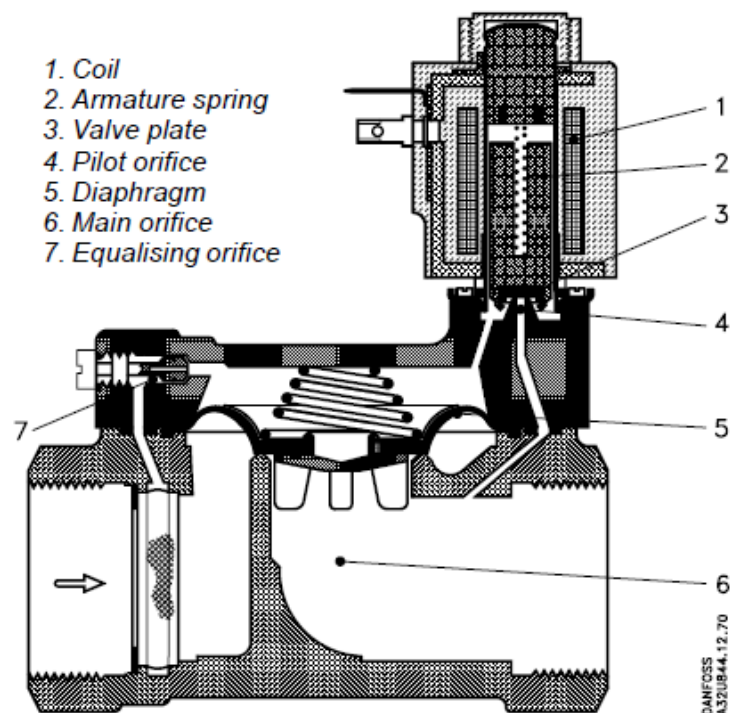
2. Working principle of the solenoid valve.

Coil voltage disconnected (closed):

When the voltage is disconnected, the valve plate (3) is pressed down against the pilot orifice (4) by the armature spring (2). The pressure across the diaphragm (5) is built up via the equalising orifice (7). The diaphragm closes the main orifice (6) as soon as the pressure across the diaphragm is equivalent to the inlet pressure. The valve will be closed for as long as the voltage to the coil is disconnected.

Coil voltage connected (open):

When voltage is applied to the coil (1), the pilot orifice (4) is opened. As the pilot orifice is larger than the equalising orifice (7), the pressure across the diaphragm (5) drops and therefore it is lifted clear of the main orifice (6). The valve is now open for unimpeded flow and will be open for as long as the minimum differential pressure across the valve is maintained, and for as long as there is voltage to the coil.





3. Trouble shooting guideline.

1) The valve stays open.

Remove tension from the coil or remove the connector from the coil. (The valve should close).

- If the valve closes the problem is located in the power supply to the coil. Check the control circuit (float switch).
- If the valve does not close the problem is located in the valve. Disassemble valve and check for pollution or damage to inner parts (see below for details).

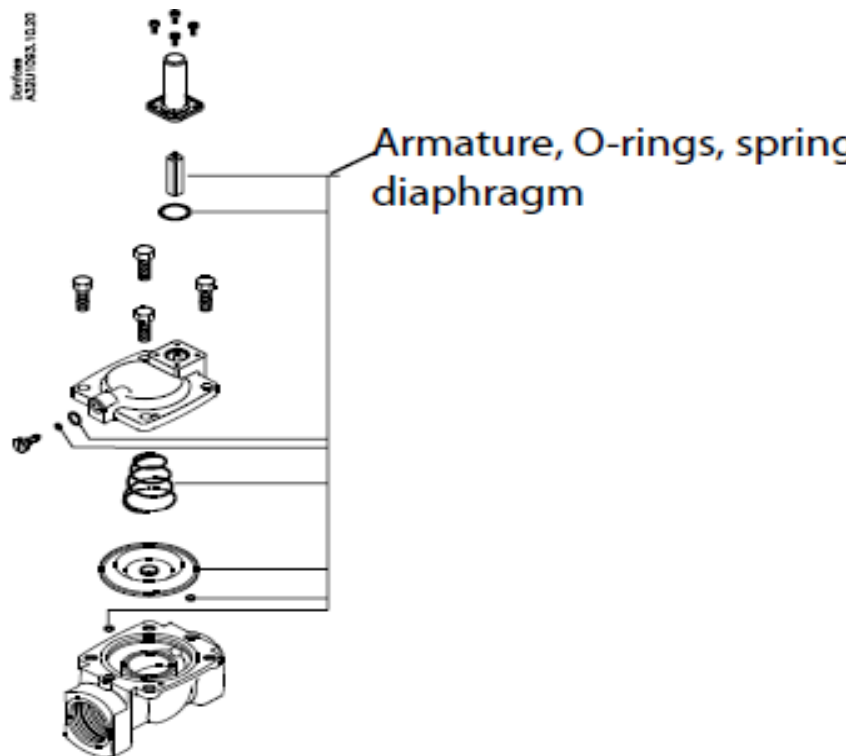
2) The valve stays closed.

Put the correct tension on the coil (220V or 24V (check coil data)). (The valve should open.)

Activation of the coil can be checked by holding a metal part close to it. The coil becomes magnetic when activated so metal parts are attracted to it.

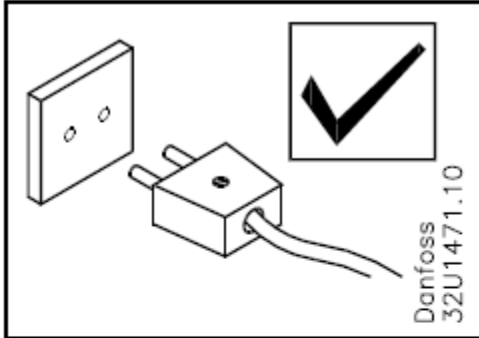
- If the valve opens closes the problem is located in the power supply to the coil. Check the control circuit (float switch).
- If the valve does not open the problem is located in the valve. Disassemble valve and check for pollution or damage to inner parts (diaphragm).

The drawing below shows the inner parts of the valve. They are also illustrated by pictures. Please note that depending on the size of the valve different executions might be possible. The principle of operation stays the same.

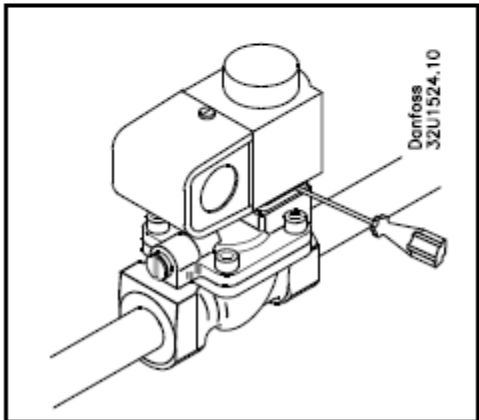




For disassembly of the valve, first remove the connector and coil.



1. Before removing the coil, voltage must be disconnected, otherwise the coil will burn out



2. Use a screwdriver to lever the coil from the armature.

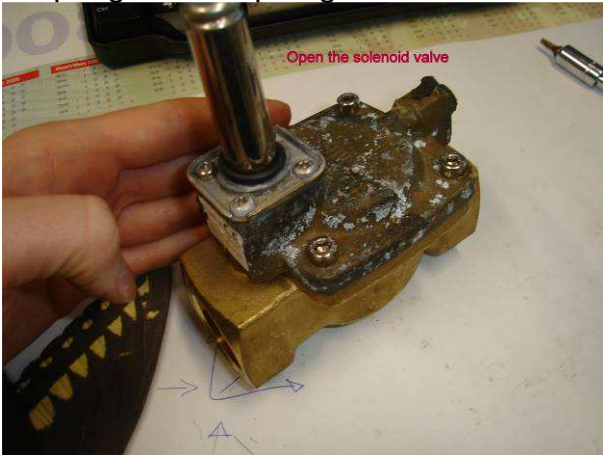


Other coils might require unscrewing the top nut as in the picture below.





After coil removal the valve body can be opened to clean the orifices and inner parts like springs and diaphragm.



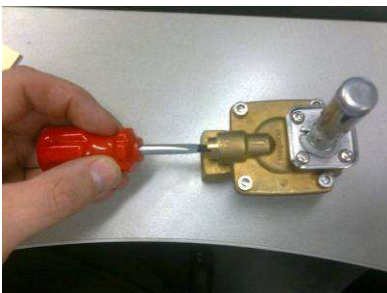
Remove screws to open valve

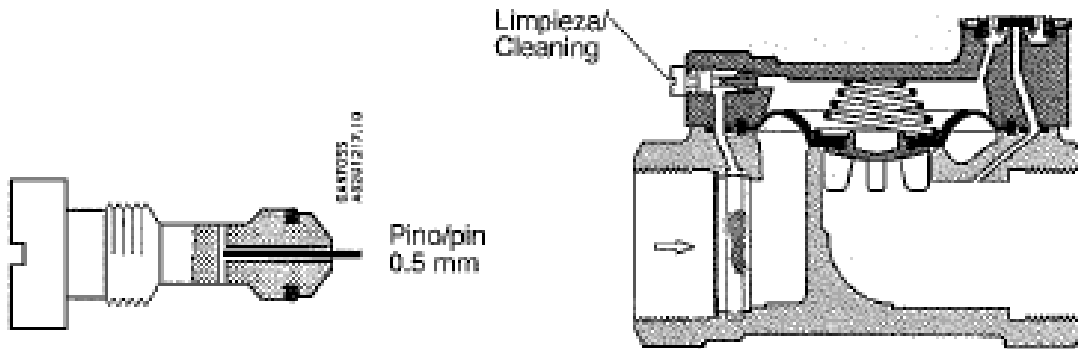


check the armature spring on the cover



Remove the calibration screw and clean as per instruction below





Note that small valves have the calibration opening incorporated in the diaphragm as indicated in pictures below.

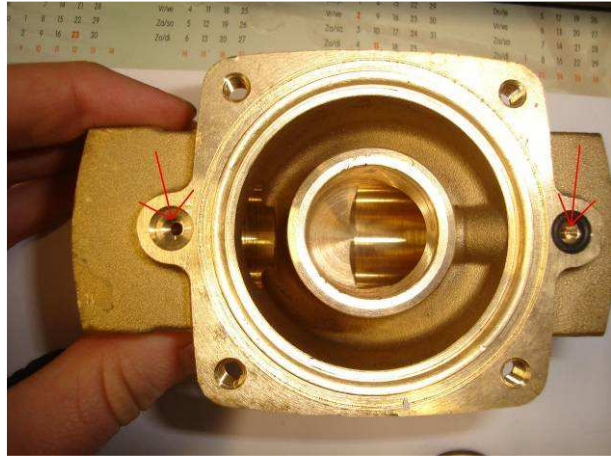


All inner openings and parts must be cleaned in valve cover and body.





Clean orifices in cover



clean orifices in body

Assemble valve again after cleaning and inspection of inner parts.