



Solenoid valves

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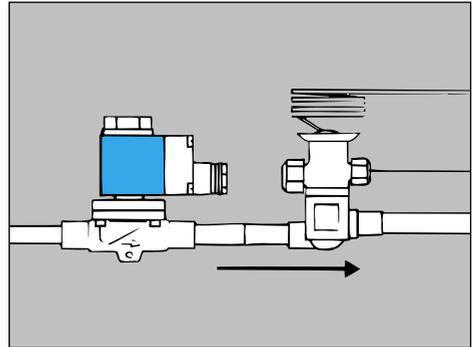
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Installation

All EVR/EVRA, and EVH types solenoid valves operate only when installed correctly in the direction of flow, i.e. in the direction indicated by the arrow.

Normally, solenoid valves installed ahead of a thermostatic expansion valve must be close to that valve.

This avoids liquid hammer when the solenoid valve opens.



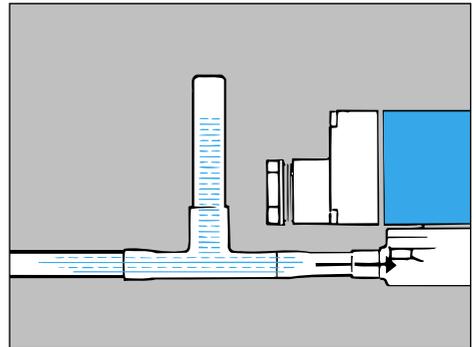
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Note!

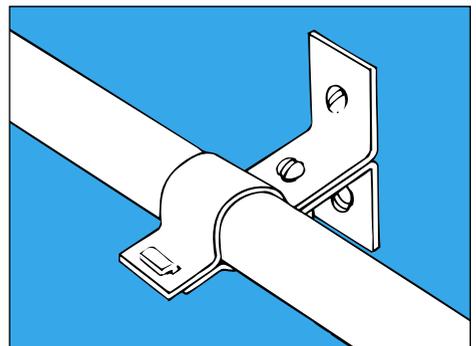
From April 1996 all EVR 6 - EVR 22 solenoid valves have been delivered with TORX screws in stainless steel.

If liquid hammer occurs when the solenoid valve closes, it can be remedied by mounting a sealed vertical pipe located in a T-piece ahead of the solenoid valve.



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Ensure that pipes around the valve are properly installed so that no fracture can occur.



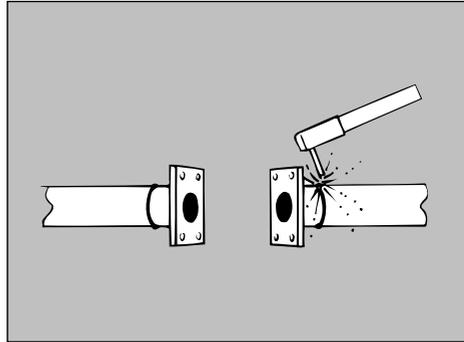
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Brazing/welding EVR/EVRA. and EVH solenoid valves does not normally necessitate dismantling, provided steps are taken to avoid heating the valve.

Note! Always protect the armature tube against weld spatter.

EVRA 32 & 40 precautions

After tacking the valve to the pipe, remove the valve body to protect O-rings and gaskets against heat. In installations with welded steel pipe, a FA type strainer or similar mounted ahead of the solenoid valve is recommended. (On new plant, flushing out before starting up is recommended).

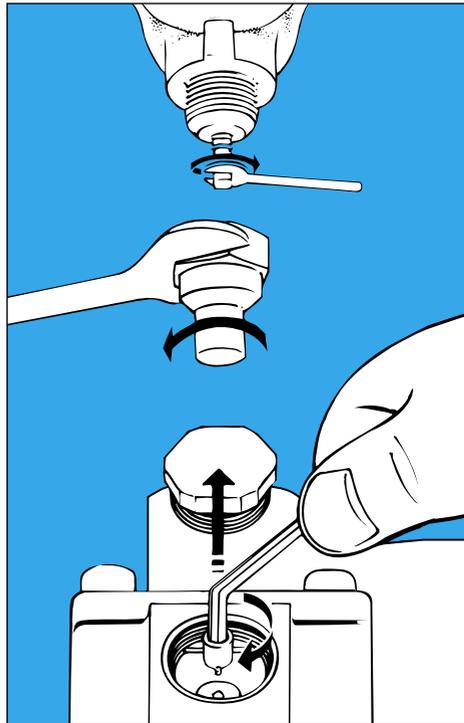


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When pressure testing

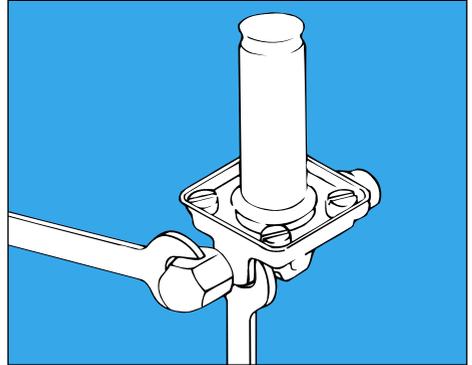
All solenoid valves in the system must be open, either by applying voltage to the coils or by opening the valves manually (provided a manual operation spindle is fitted).

Remember to screw the spindle back before starting up, otherwise the valve will be unable to close.



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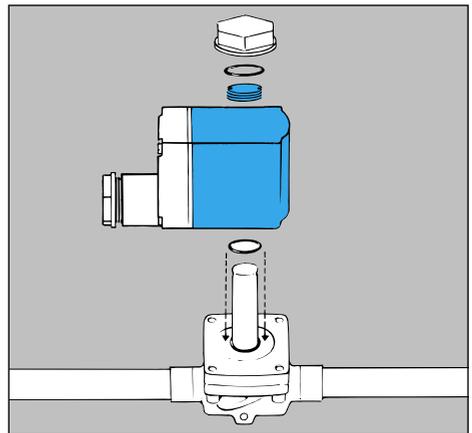
Always use counter force when finally tightening the solenoid valve on pipes, i.e. two spanners on the same side of the valve.



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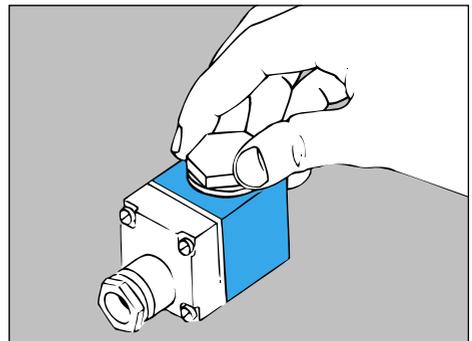
The coil

Check the rated voltage of the coil.
O-rings must be fitted correctly.



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Tightening up must be performed correctly:
First finger-tight, then about half a turn with a spanner.
Be careful the plastic thread can be damaged by over-tightening.



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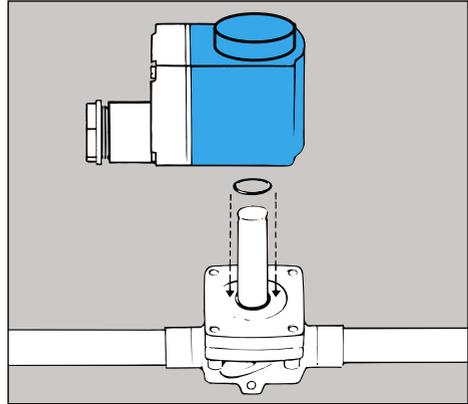
The clip-on coil

In 2001 Danfoss introduced a clip-on coil which includes all components. When fitting the coil, it has merely to be pressed down over the armature tube until a click is heard. This means that the coil has been correctly fitted.

Note: Remember to fit an O-ring between valve body and coil.

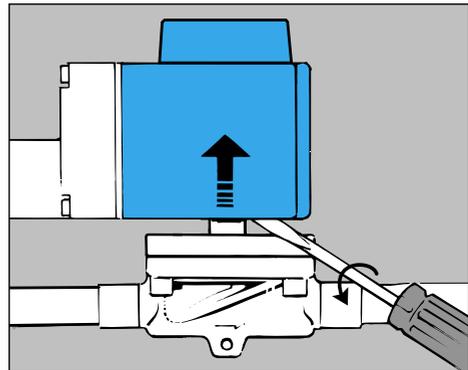
Be sure that the O-ring is smooth, not damaged and that the surface is free from paint or any other material.

Note: The O-ring must be changed at service.



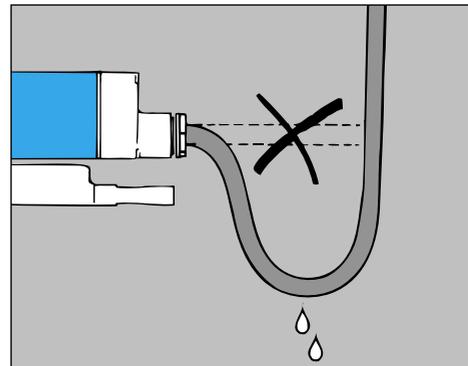
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The coil can be removed by inserting a screwdriver between valve body and coil. The screwdriver can then be used as a lever to loosen the coil.



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Be careful with cable entries. It must not be possible for water to enter the terminal box. The cable must be led out via a drip loop.



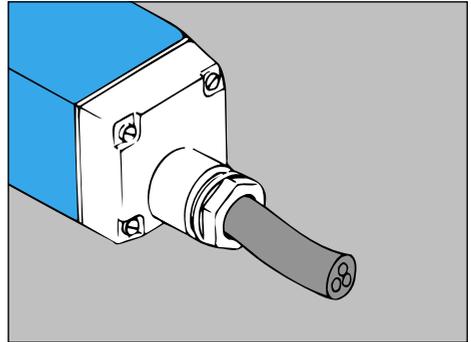
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Fitters notes

Solenoid valves

The entire cable circumference must be retained by the cable entry.

Therefore, always use round cable (which is the only type of cable that can be sealed effectively).

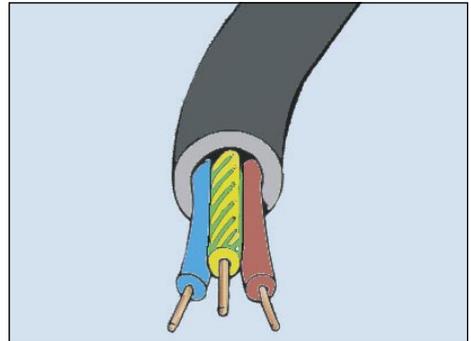


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Be aware of the colour of leads in the cable.

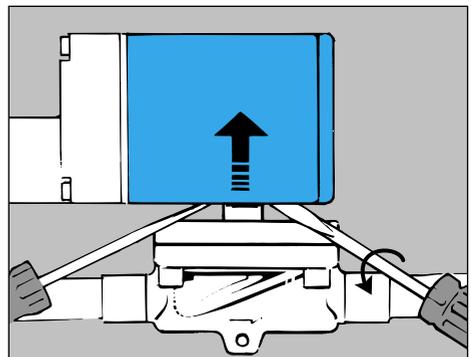
Yellow/green is always earth.

Leads of one colour are either phase or neutral.



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When removing a coil it might be necessary to use hand tools, e.g. two screwdrivers.



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The correct product

Make sure that coil data (voltage and frequency) and supply voltage correspond. If they do not, the coil might burn out. Always ensure that valve and coil match each other.

When replacing a coil in an EVR 20 NC (NC = normally closed) note:

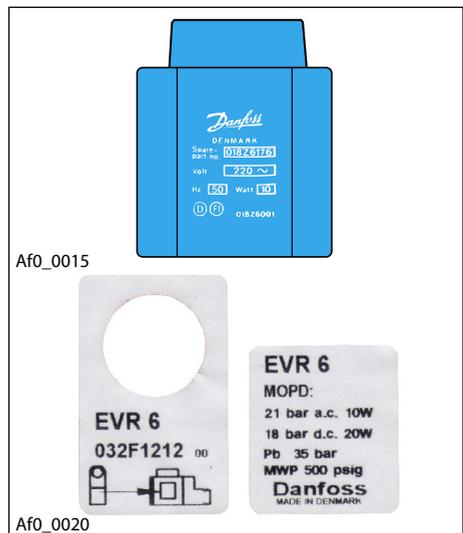
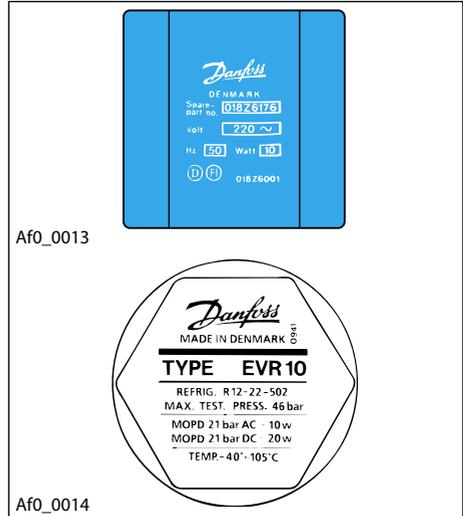
- A valve body using an a.c. coil has a square armature.
- A valve body using a d.c. coil has a round armature.

Fitting the wrong coil results in a lower MOPD. See data on the top nut. As far as possible, always choose single-frequency coils. These give off less heat than double-frequency coils.

Use NC (normally closed) solenoid valves for systems in which the valve must remain closed (de-energised) for most of the operating time. Use NO (normally open) solenoid valves for systems in which the valve must remain open (de-energised) for most of the operating time. Never replace an NO (normally open) solenoid valve with an NC (normally closed) valve - or vice versa.

Two labels are supplied with each clip-on coil (see illustration).

The adhesive label is for attaching to the side of the coil, while the other, perforated label should be placed over the armature tube before the coil is clicked into position.



Fault location

Symptom	Possible cause	Remedy
Solenoid valve does not open.	No voltage on coil	Check whether the valve is open or closed 1) use a magnetic field detector 2) lift the coil and feel whether there is resistance. NOTE! Never take the coil off the valve if voltage is applied - the coil can burn out. Check the wiring diagram and wiring itself. Check relay contacts. Check lead connections. Check fuses.
	Incorrect voltage/frequency.	Compare coil data with installation data. Measure operating voltage at the coil. – Permissible variation: 10% higher than rated voltage. 15% lower than rated voltage. Replace with correct coil if necessary.
	Burnt-out coil	See symptom "Burnt-out coil"
	Differential pressure too high	Check technical data and differential pressure of valve. Replace with suitable valve. Reduce differential pressure e.g. inlet pressure.
	Differential pressure too low	Check technical data and differential pressure of valve. Replace with suitable valve. Check diaphragm and/or piston rings and replace O-rings and gaskets *) Replace O-rings and gaskets *)
	Damaged or bent armature tube	Replace defective components *) Replace O-rings and gaskets *)
	Impurities in diaphragm/piston	Replace defective components *) Replace O-rings and gaskets *)
	Impurities in valve seat. Impurities in armature/armature	Clean out impurities. Replace defective parts *) Replace O-rings and gaskets *)
	Corrosion/cavitation	Replace defective parts *) Replace O-rings and gaskets *)
	Missing components after dismantling valve	Fit missing components. Replace O-rings and gaskets *)

* See cross section in the instruction. See also the spare parts documentation on <http://www.danfoss.com>

Symptom	Possible cause	Remedy
Solenoid valve opens partially	Differential pressure too low	Check valve technical data and differential pressure. Replace with suitable valve.
	Damaged or bent armature tube	Check diaphragm and/or piston rings and replace O-rings and gaskets *) Replace defective components *) Replace O-rings and gaskets *)
	Impurities in diaphragm/piston	Clean out impurities. Replace defective components *) Replace O-rings and gaskets *)
	Impurities in valve seat. Impurities in armature/armature tube.	Clean out impurities. Replace defective parts *) Replace O-rings and gaskets *)
	Corrosion/cavitation	Replace defective parts *) Replace O-rings and gaskets *)
	Missing components after dismantling of valve	Fit missing components *) Replace O-rings and gaskets *)
Solenoid valve does not close/ closes partially	Continuous voltage on coil	Lift coil and feel whether there is any resistance. NOTE! Never take the coil off if voltage is applied - the coil can burn out. Check the wiring diagram and wiring itself. Check relay contacts. Check lead connections.
	Manual spindle not screwed back after use	Check spindle position.
	Pulsation in discharge line. Differential pressure too high in open position. Pressure in outlet side sometimes higher than in inlet.	Check technical data of valve. Check pressure and flow condition Replace with suitable valve. Check remainder of system.
	Damaged or bent armature tube	Replace defective components *) Replace O-rings and gaskets *)
	Defective valve plate, diaphragm or valve seat	Check pressure and flow conditions. Replace defective components *) Replace O-rings and gaskets *)
	Diaphragm or support plate wrong way round	Check for correct valve assembly *) Replace O-rings and gaskets *)
	Impurities in valve plate. Impurities in pilot orifice. Impurities in armature tube.	Clean out impurities. Replace O-rings and gaskets *)

* See cross section in the instruction. See also the spare parts documentation on <http://www.danfoss.com>

Symptom	Possible cause	Remedy
Solenoid valve does not close/ closes partially	Corrosion/cavitation of pilot/main orifice	Replace defective parts *) Replace O-rings and gaskets *)
	Missing components after dismantling of valve	Replace missing components *) Replace O-rings and gaskets *)
Solenoid valve noisy	Frequency noise (hum)	The solenoid valve is not the cause. Check electrical supply.
	Liquid hammer when solenoid valve opens	See "Installation"
	Liquid hammer when solenoid valve closes	See "Installation"
	Differential pressure too high and/or pulsation in discharge line	Check technical data of valve. Check pressure and flow conditions. Replace with suitable valve. Check remainder of system.
Burnt-out coil (Coil cold with voltage on)	Incorrect voltage/frequency	Check coil data. Replace with correct coil if necessary. Check wiring diagram or wiring itself. Check max. voltage variation. - Permissible variation: 10% higher than rated voltage 15% lower than rated voltage.
	Short-circuit in coil (can be moisture in coil).	Check remainder of system for short-circuiting. Check lead connections at coil. After remedying fault, replace coil (make sure voltage is correct). Check O-rings fitted on armature tube and inside top nut.
	Armature will not lift in armature tube a) Damaged or bent armature tube b) Damaged armature c) Impurities in armature tube	Replace defective components. Clean out impurities *) Replace O-rings and gaskets *)
	Temperature of medium too high	Compare valve and coil data installation data. Replace with suitable valve.
	Ambient temperature too high	Change of valve position might be necessary. Compare valve and coil data with installation data. Increase ventilation around valve and coil.
	Damaged piston, piston rings (on servo-operated solenoid valves type EVSA)	Replace defective parts. Replace O-rings and gaskets *)

* See cross section in the instruction. See also the spare parts documentation on <http://www.danfoss.com>



The Danfoss product range for the refrigeration and air conditioning industry

Appliance Controls

General temperature controls for the home appliance industry. The product range comprises CFC-free electromechanical and electronic thermostats for refrigerators and freezers produced to customer specifications as well as service thermostats for all refrigeration and freezing appliances.

Commercial Compressors

Large hermetic reciprocating and scroll compressor technologies for commercial air conditioning and refrigeration. The compressors and condensing units are used in a large array of applications in both businesses. This ranges from water chillers, large packaged air conditioners as well as medium and low temperature refrigeration systems for food storage and processing.

Danfoss Compressors

Hermetic compressors and fan-cooled condensing units for refrigerators, freezers and light commercial applications such as bottle coolers and display counters. Danfoss also produces compressors for heating pump systems as well as 12 and 24 volt compressors for refrigerators and freezers used in mobile applications and solar power. The division has a leading position within energy utilisation, noise filtering and know-how about environment-friendly compressors.

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