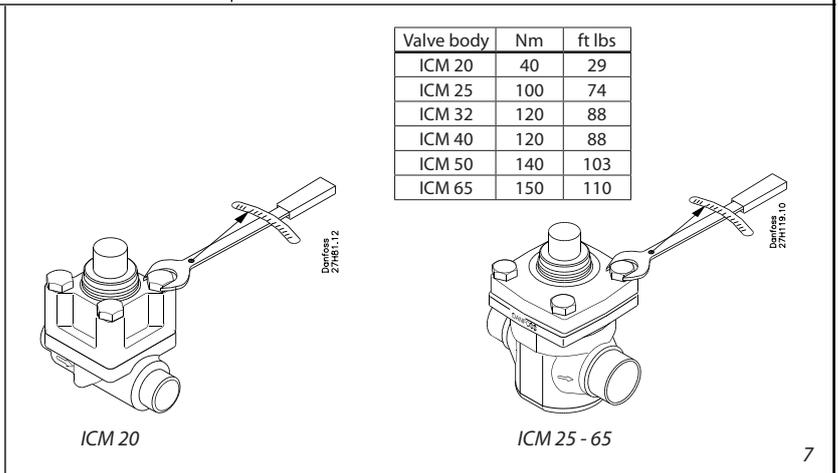
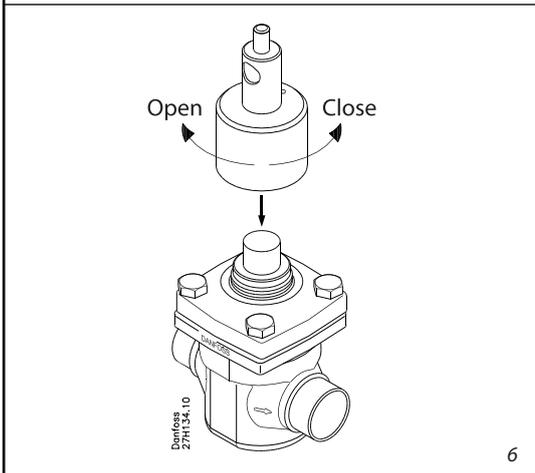
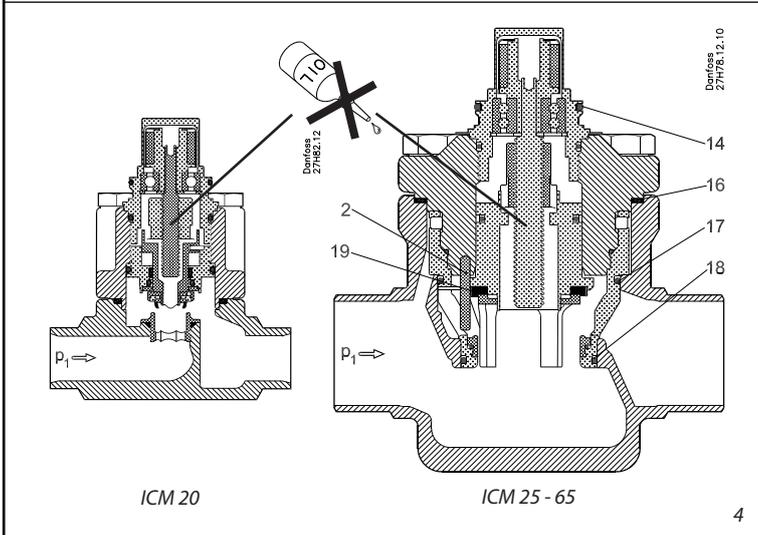
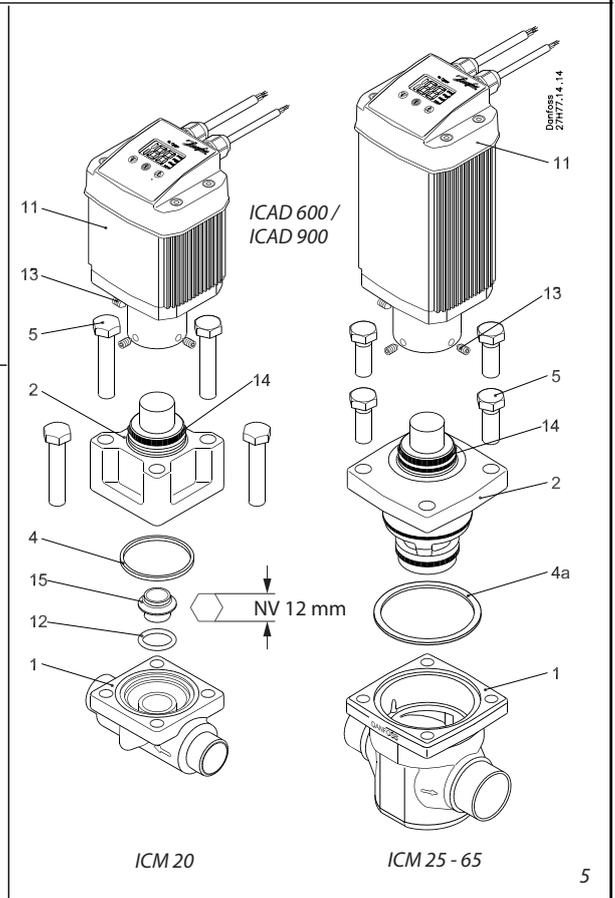
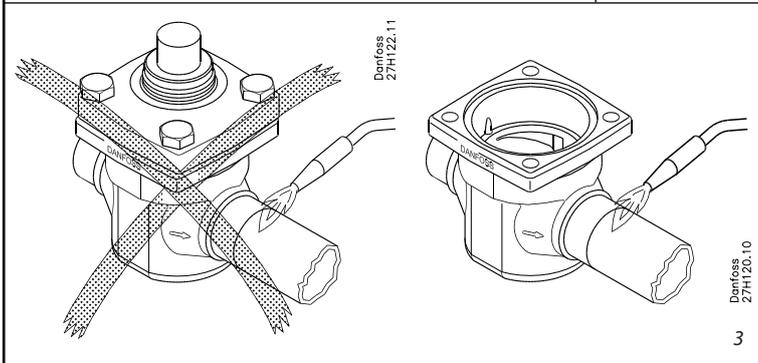
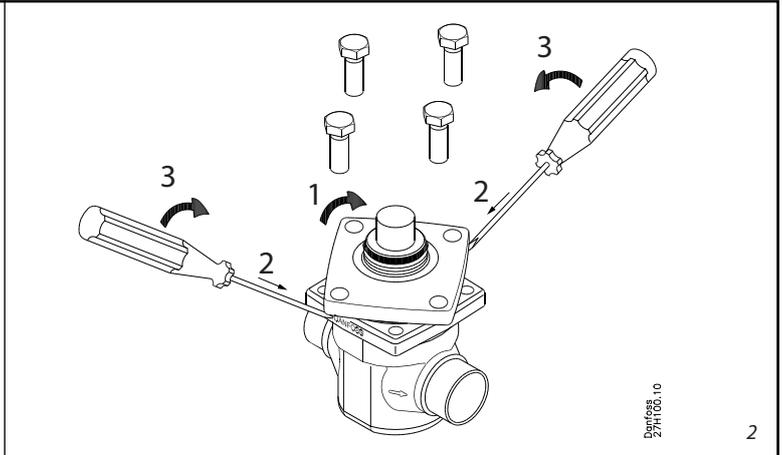
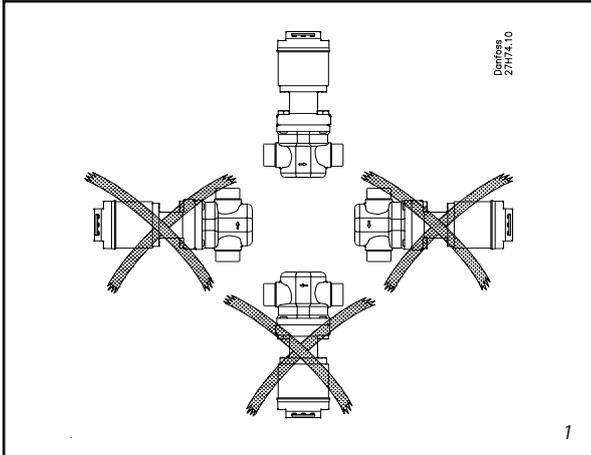


027R9777

027R9777



Installation

Refrigerants

Applicable to all common non-flammable refrigerants, including R717 and non-corrosive gases/liquids dependent on sealing material compatibility. Flammable hydrocarbons are not recommended. The valve is only recommended for use in closed circuits. For further information please contact Danfoss.

Temperature range

Media: $-60/+120^{\circ}\text{C}$ ($-76/+248^{\circ}\text{F}$)

Ambient: $-30/+50^{\circ}\text{C}$ ($-22/+122^{\circ}\text{F}$)

Pressure

The valves are designed for a max. working pressure of 52 bar g (754 psig).

Technical data

ICM is a balanced valve which remains in its position. Return function must be provided with the actuator used.

The ICM can be used in suction, liquid, hot gas, and liquid/vapour lines. The ICM regulates the flow of the medium by modulation or on/off function, depending on the control impulse to the actuator. Refer to the technical leaflet for details on design and regarding selections.

The ICM valve is designed for use with the ICAD actuator from Danfoss. The ICAD actuator on the ICM ensures compatibility with the regulators provided by Danfoss plus a range of other controllers, especially PLC controllers. A control signal from a Danfoss controller or PLC will activate the ICAD motor and through a magnetic coupling rotate the spindle in the ICM to make the cone move vertically.

Valve cone

A V-shaped regulating cone provides optimum regulation accuracy.

Valve sizes

ICM is available in sizes from ICM 20-A (k_v : 0.6 m³/h) to ICM 65-B (k_v : 70 m³/h).

Modular valve concept

The ICM valve can be delivered as a parts program or a complete valve depending on the combination of parts wanted to form the selected and needed valve. If the valve is delivered as a parts program it will consist of a valve body, a complete function module, and an actuator.

Installation

ICM + ICAD can be installed in horizontal pipelines with the actuator pointing upwards (fig. 1).

The top cover of the ICM can be turned 90° in any direction without any influence on the valve function. The motor can be mounted in any position before locking it with the 4 Allen screws (fig. 5, pos.13).

The ICM valve must be installed with the arrow in the direction of flow. When installing an ICM, refrigerant must not be allowed to escape and dirt must not be allowed to enter the valve. The valve is designed to withstand a high internal pressure. However, the piping

system should be designed to avoid liquid traps and reduce the risk of hydraulic pressure caused by thermal expansion. It must be ensured that the valve is protected from pressure transients like "liquid hammer" in the system.

ICM valves must not be mounted in systems where the outlet side of the valve is open to atmosphere. The outlet side of the valve must always be connected to the system or properly capped off, for example with a welded-on end plate.

Welding (fig. 3)

The top cover, complete with function module, should be removed before welding to prevent damage to O-rings and Teflon (PTFE) in the function module and to avoid getting welding debris in the module.

Note: Remove all parts from the valve body before welding (as shown in fig. 3). Especially on ICM 20 it is important to remove the seat (fig. 5, pos. 15) as the heat will damage the seat. Reassemble and tighten with hexagon key 12 mm (2 Nm).



The internal surfaces and weld connections of the enclosed ICS/ICM valve have been applied with an anti-corrosion treatment.

In order to maintain the effectiveness of this anti-corrosion treatment, it is important to ensure that the valve is disassembled just prior to the welding / brazing process being undertaken.

In the event that the function modules are to be left disassembled for any length of time, please ensure that the function modules are further protected by placing in a polyethylene bag or by applying a rust protection agent (e.g. refrigeration oil or BRANOROL) on the surfaces.

Only materials and welding methods, compatible with the valve body material, must be welded to the valve body. The valve should be cleaned internally to remove welding debris on completion of welding and before the valve is reassembled.

Avoid welding debris and dirt in the valve body and the function module. The valve body must be free from stresses (external loads) after installation.

Manual operation

A magnetic coupling can be used to rotate the spindle manually if the actuator has been removed. To make use of the manual operation, a magnetic tool (optional) is used (see fig. 6). The code numbers for the manual magnet tools are:

ICM 20 – ICM 32: **027H0180**

ICM 40 – ICM 65: **027H0181**

Manual operation is also possible with the actuator mounted on the valve and the power supply connected to the actuator. No matter if the signal connections are wired to the actuator it will be possible to use the manual operation function built into the actuator electronics allowing the motor to

step in 1% increments meaning that 100 steps will correspond to a fully open valve. Please refer to the separate instruction on ICAD to address the manual function.

Insulation

Insulating the valve and its actuator is only necessary if an energy consideration in the plant requires this. Regarding the function of the ICM + ICAD no insulation is necessary when kept inside temperature limits.

Surface treatment and identification

The ICM valves are Zinc-Chromated from factory. If further corrosion protection is required, the valves can be painted.

Note: Magnet coupling must be protected.

Precise identification of the valve is made via the ID plate on the top cover. After welding, the external surface around the connections of the valve body must be protected to prevent against corrosion with a suitable coating. Protection of the ID plate when repainting the valve is recommended.

Assembly

Remove welding debris and any dirt from pipes and valve body before assembly. Check that the cone has been fully screwed back towards the top cover before it is mounted in the valve body. Use the manual magnetic tool (fig. 6) to achieve rotation through the top. A small amount of refrigeration oil on both O-rings can make the insert easier to install into the valve body.

Tightening

Tighten the top cover/function module with a torque wrench, to the values indicated in the table (fig. 7).

Maintenance

Service

A precise service schedule cannot be given for the valve as service intervals will depend on operating conditions, i.e. how often the valve operates and the amount of impurities and dirt the system carries. The ICM valves are easy to dismantle and all parts inside can be replaced by changing the function module. Do not open the valve while the valve is still under pressure.

Be aware that the valve can be under pressure from both sides and that the manual magnet tool (fig. 6) can be used to open the seat and thus equalize pressure internally before removing the top cover.

If the Teflon ring (fig. 4, pos. 19) has been damaged, the Teflon must be machined or replaced according to the condition of the parts.

Dismantling the valve (fig. 2)

Do not remove the function module while the valve is still under pressure.

- (1) Upon removing the 4 bolts twist the module approx. 45° in either direction.
- (2) Push two screwdrivers in between the top cover and the valve body.
- (3) Pull the screwdrivers upwards to release the function module and its o-rings.

Replacement of the function module

The function module is easily replaced.

Remove the existing module (fig. 2):

- (1) Upon removing the 4 bolts twist the module approx. 45° in either direction.
 - (2) Push two screwdrivers in between the top cover and the valve body.
 - (3) Pull the screwdrivers upwards to release the function module and its o-rings.
- Remove the old module.
 - Oil the O-rings on the new module with a small amount of refrigeration oil.



The spindle inside the valve must not be greased or oiled (fig. 4).

If the valve seat has been dismantled, the ICM top must remain loosely connected to this. The two Allen screws that are holding the insert should not be tightened for the alignment to be precise.

Use only original Danfoss parts, including o-rings and gaskets for replacement. Materials of new parts are certified for the relevant refrigerant.

In cases of doubt, please contact Danfoss.

Drawings are only for illustration, not for dimensioning or construction.

Danfoss accepts no responsibility for errors and omissions. Danfoss Industrial Refrigeration reserves the right to make changes to products and specifications without prior notice.

DECLARATION OF CONFORMITY
The Pressure Equipment Directive 97/23/EC



Name and Address of Manufacturer within the European Community

Danfoss Industrial Refrigeration A/S
Stormosevej 10
PO Box 60
DK-8361 Hasselager
Denmark

Description of Pressure Equipment

Refrigerant regulation valve, with straight bonnet arrangement

Type ICM, ICS, ICL

Nominal bore	ICM, ICS, ICL DN20-80 mm (³ / ₄ - 3 in.)	
Classified for	Fluid Group I (all refrigerants (toxic, non-toxic, flammable and non-flammable)) For further details / restrictions - see Installation Instruction	
Temperature range	ICM, ICS, ICL	-60°C/+120°C (-76°F/+248°F)
Maximum allowable working pressure	ICM, ICS, ICL DN20-DN80 (³ / ₄ - 3 in.)	52 bar (754 psi) -60°C/+120°C (-76°F/+248°F)

Conformity and Assessment Procedure Followed

		ICV 25-65 platform	ICV 20 platform
Category		II	Article 3, paragraph 3
Module		D1	
Certificate ID		D1: 07 202 0511 Z 0009/1/H-0002	
Nominal bore	Standard appl.	ICM, ICS, ICL DN20-80 mm (³ / ₄ - 3 in.)	ICM DN 15-25 (¹ / ₂ - 1 in.)

Name and Address of the Notified Body which carried out the Inspection

TÜV-Nord e.V.
Grosse Bahnstrasse 31
22525 Hamburg, Germany



Name and Address of the Notified Body monitoring the Manufacturer's Quality Assurance System

TÜV-Nord e.V.
Grosse Bahnstrasse 31
22525 Hamburg, Germany

References of Harmonised Standards used

EN 10213-3 EN 10222-4

References of other Technical Standards and Specifications used

EN 12284 AD-Merkblätter

Authorised Person for the Manufacturer within the European Community

Name: Michael Breumsø **Title:** Production Manager

Signature:  **Date:** 03/11/2004