




# Danfoss ICF 50-4,ICF 65-3 Flex Line Large Valves Instruction Manual

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**ENGINEERING TOMORROW**  
Installation Guide  
Valve station  
ICF 50-4 and ICF 65-3

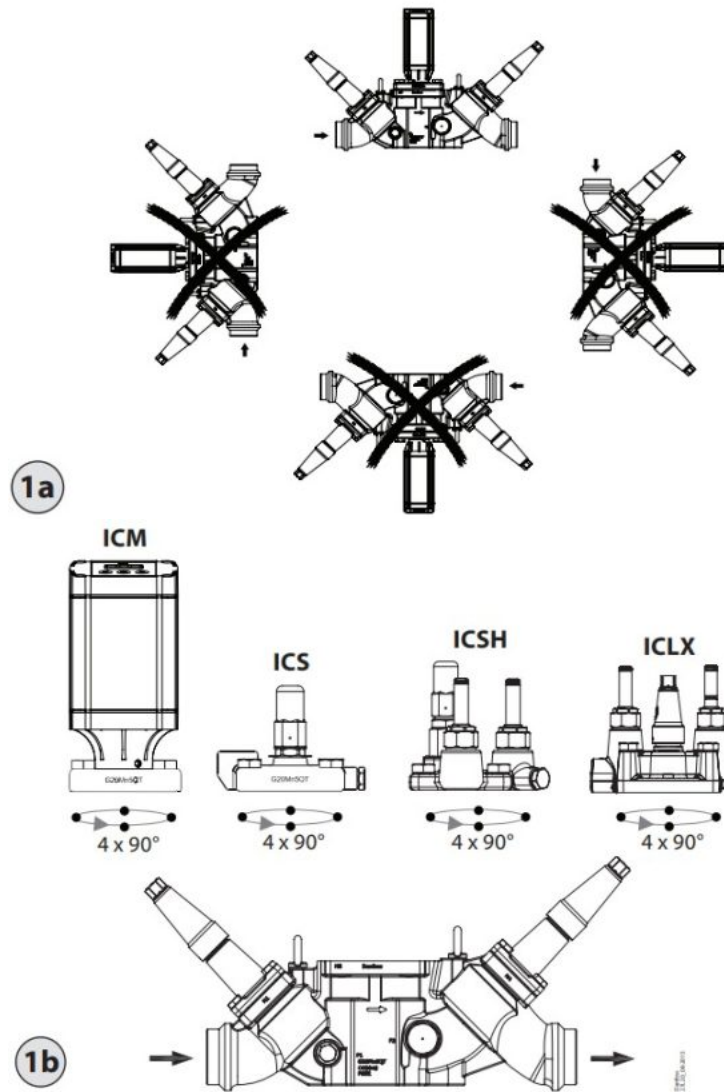
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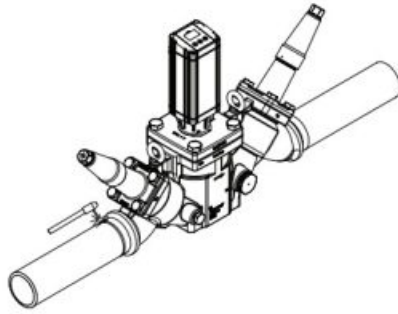
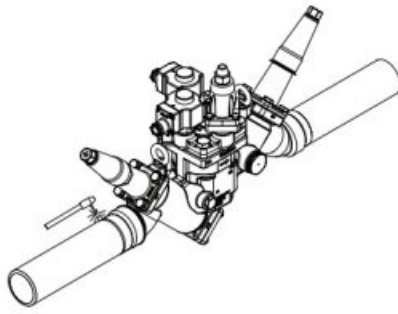
## ICF 50-4,ICF 65-3 Flex Line Large Valves

Orientation (all configurations)

# ICF 50-4 & ICF 65-3

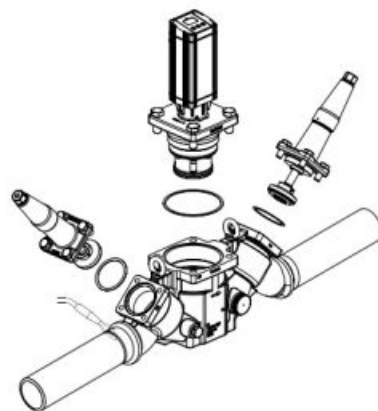
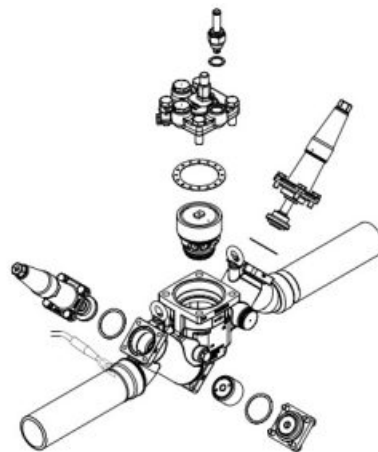


**Welding**  
TIG/MIG/SMAW



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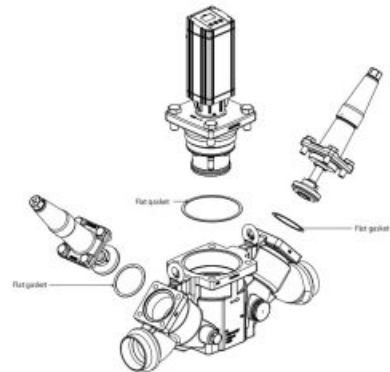
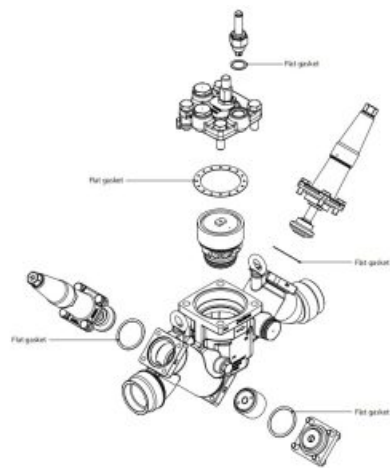
## Gas welding

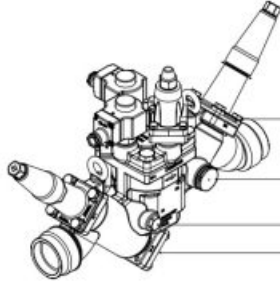


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## Maintenance

ICF 50-4 / ICF 65-3





	M1	M2	M3	M4
ICF 30-4	11 Nm (24.3 lbf ft)	11 Nm (24.3 lbf ft)	140 Nm (102.2 lbf ft)	11 Nm (24.3 lbf ft)
ICF 40-3	17 Nm (12.1 lbf ft)		130 Nm (95.0 lbf ft)	17 Nm (12.1 lbf ft)


ICF 30-4	1.10 Nm (8.1 lbf ft)
ICF 40-3	1.10 Nm (8.1 lbf ft)

ICF 30-4	40 Nm (44.3 lbf ft)
ICF 40-3	40 Nm (44.3 lbf ft)
ICF 50-4	40 Nm (35.2 lbf ft)

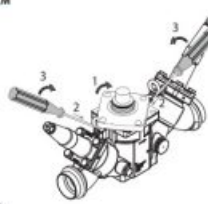
**5**

**ICS / ICSH**




**6a**

**ICM**




**7**

**ICLX**

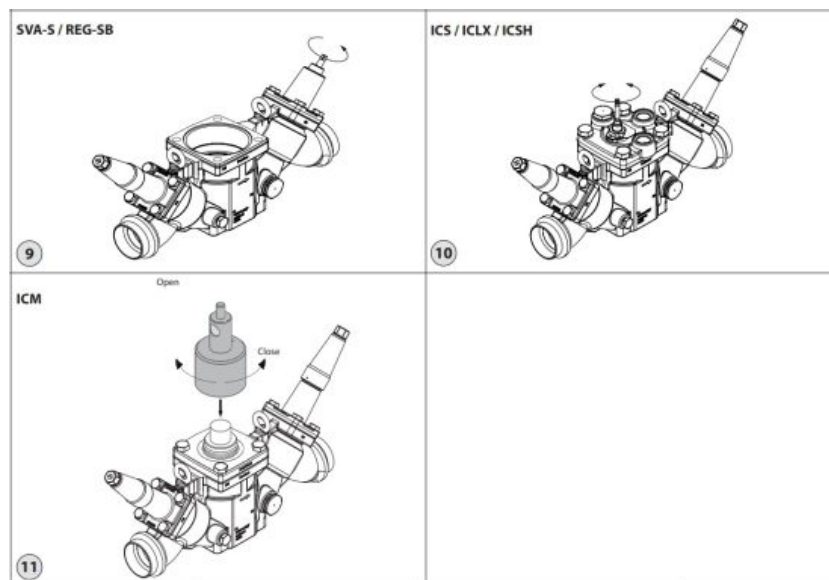


**8a**

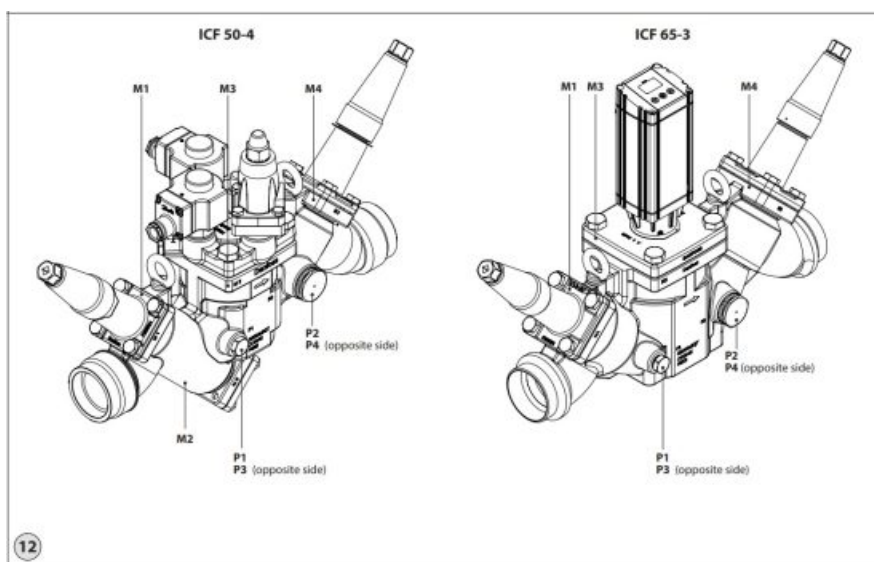


**8b**

## Manual operation



## Module and side port location



## Refrigerants

Applicable to HCFC, non flammable HFC, R717 (Ammonia) and R744 (CO<sub>2</sub>).

The use of ICF valve stations with flammable hydrocarbons is not recommended.

The ICF is only recommended for use in closed circuits. For further information please contact Danfoss.

Temperature range -60 – 120 °C / -76 – 248 °F

## Pressure range

The ICF is designed for a max. working pressure of 52 bar g / 754 psi g.

## Application

The ICF can be used in suction, liquid, hotgas and liquid/vapor lines. The ICF regulates the flow of the medium by modulation or on/off function, depending on function modules installed in the ICF.

## Regulating range

Dependent on the chosen type and combination of modules installed in the valve.

## Orientation

### (fig. 1)

The ICF must be installed according to figg. 1. The ICF must be installed with the arrow in the direction of the flow).

The ICF will be delivered with all the function modules fully assembled. The modules can be taken out for service or inspection and may be rotated 4 x 90° in relation to the valve body upon installation (fig. 1b).

The ICF 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 ICF is protected from pressure transients like “liquid hammer” in the system.

### **Welding (fig. 2 and 3)**

The ICF valve station can be welded by using either TIG/MIG/SMAW welding (fig. 2) or gas welding (fig. 3). Always keep inlet and outlet protecting caps on the valve until the valve is ready to be installed, in order to prevent rust formation inside the valve station.

#### **TIG/MIG/SMAW welding**

It is not necessary to remove any of the function modules prior to TIG/MIG/SMAW welding (fig. 2) and auxiliary cooling is not needed at normal heat impact.

Every precaution must be taken to minimize welding spatter.

To avoid any welding spatter entering the valve station and to avoid heat impact to the Teflon seat during welding, it is recommended to open the valves slightly (approx. 1 turn from closed position) in first and last module (M1 and M4).

When welding is completed it is recommended to close the 2 modules again (M1 and M4) in order to protect the interior of the valve until the system is ready for operation.

#### **Gas welding**

Remove all inserts before welding (fig. 3).

Auxiliary cooling is not needed at normal heat impact.

Every precaution must be taken to minimize welding spatter.

After welding, clean the valve inside for welding spatter and welding debris.

It is recommended to reinstall the modules right after welding and to close the 2 modules again (M1 and M4) in order to protect the interior of the valve until the system is ready for operation.

In case the valve is not assembled immediately make sure that rust protective oil is applied to the inside surfaces.

### **Mounting of valves**

- Make sure that piping into which a valve is installed is properly supported and aligned square and plumb to the joining sections.
- Ensure that the finalized valve assembly is free of any stresses from external loads- Use only new gaskets manufactured by Danfoss.
- Ensure that installed valves are properly pressure tested, leak tested, evacuated before charging with refrigerant in accordance with ANSI /IIAR 5, EN378-2 or ISO 5149-2.

The enclosed 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.

#### **Side port connections (fig. 12)**

The ICF features 2 groups of 2 individual side ports. The 2 smaller ports P1 and P3 are intended for service devices like service valve, gauge or sight glass, while the bigger ports P2 and P4 can be used for defrost drain from the evaporator when doing defrost (typically hot gas).

P2 and P4 can be converted to side ports similar to P1 and P3 by installing separate accessories (see the ICF data sheet).

#### **Surface protection and identification**

The external surface is zinc-chromated to provide corrosion protection according to EN 12284:2003 8.13.

The Zinc-Chromatization does not cover the welding connections. After installation has been completed the external surface of the valve must be protected against corrosion with a suitable top coating.

Coverage of the ID label when painting the ICF is recommended.

Precise identification of the ICF is made via the ID label on each of the 4 function modules.

### **Maintenance (fig. 4)**

#### **Service**

The ICF valve stations are easy to service.

Do not open the ICF while it is still under pressure.  
Upon opening and removal of the modules:

- Check that the flat gaskets and/or O-rings between the module and the housing and O-rings on the function module has not been damaged.

Replace flat gaskets and O-rings if not intact.

A valve with a damaged o-ring/gasket might not modulate according to the specification.

Flat gaskets and O- are present in the locations shown in fig. 4.



### **CO<sup>2</sup> applications**

When used in CO<sup>2</sup> systems the O-rings (see fig. 4) can swell (grow).

At service it is recommended to replace the actual number of used O-rings before the modules are reinstalled in the ICF valve body.

### **Assembly**

Remove any dirt from the housing before the ICF is assembled.

- Check that all channels in the ICF are free of particles or similar debris.  
If possible, apply some refrigeration oil to ease the insertion of the modules and to protect the O-rings.

### **Tightening (fig. 5)**

Tighten the top covers and plugs with a torque wrench, to the values indicated in the table (see fig. 5).

### **Replacing or servicing the function module in the ICS, ICM, ICLX and ICSH modules:**

#### **ICS/ICSH module (fig. 6)**

Remove the top cover.

The function module can be lifted out using a bolt size M6 or multi-function tool screwed into the threaded hole of the piston on the function module (fig. 6). Debris blocking the bolt hole will need cleaning.

- Remove the old module.
- Oil the O-rings on the new module with a small amount of refrigeration oil.

#### **ICM module (fig. 7)**

Remove the existing module (fig. 7):

1. After 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.

#### **ICLX modules (fig. 8a and 8b)**

Often the cover and function module can be removed while still assembled (fig. 8a).

1. Unscrew and remove all top cover screws.
2. Push two screwdrivers in between the top cover and the valve body and pull the screwdrivers downwards to release the function module and its o-rings.

If the internal O-rings stick to the metal surface it is necessary to disassemble in 2 steps (fig. 8b).

1. Remove spindle sign, lock ring and lock washer and turn the spindle downwards, out of thread.  
Remove the top cover.
2. Insert two screwdrivers into the two grooves in the function module and press the screwdrivers downwards to release the function module and its o-rings.

Upon opening and removal of the function module:

- Check that the o-rings on the function module has not been damaged.  
A valve with a damaged o-ring might not operate according to the specification.
- The insert and piston assembly can be disassembled and wear parts can be replaced.

For detailed information please see the installation guide for ICS, ICM, ICLX or ICSH valves.

Backseating SVA-S or REG-SB module (fig. 9)

To backseat turn the spindle counterclockwise until the valve is fully open.

Before remounting the cap on the modules please ensure that the gasket is present in the cap. Then tighten the cap with 16 Nm (12 ft lbs).

#### **Manual operation of ICLX module (fig. 10)**

Normal operation mode:

For the valve to operate normally under the influence of the pilot valves the spindle of the manual operation device needs to be turned fully clockwise.

Manual forced opening:

To manually open the valve the spindle of the manual operation device needs to be turned fully counter clockwise.

#### **Manual operation of ICS/ICSH module (fig. 10)**

Normal operation mode:

For the valve to operate normally under the influence of the pilot valves the spindle of the manual operation device needs to be turned fully counter clockwise.

Manual forced opening:

To manually open the valve the spindle of the manual operation device needs to be turned fully clockwise.

#### **Note:**

Always pay attention to the spindle during operation of the manual opener

1. Pay attention to the C-clip reaching the top of the manual stem top nut (ICSH: spacer between C-clip and manual stem top nut) when turning the manual stem clockwise for opening the valve.  
Never use excessive torque and stop turning when the C-clip gets in contact with the Nut/Spacer.
2. When turning the spindle anticlockwise, for deactivation of the manual opener, to the top point, tighten the spindle further anticlockwise to 8 Nm (5.9 lb/ft) torque for back-seating.
3. Remount the cap and tighten it clockwise to 8 Nm (5.9 lb/ft) torque.

#### **Manual operation of ICM module (fig. 11)**

A magnetic coupling can be used to rotate the spindle manually when the actuator has been removed. To make use of the manual operation, a multi-function tool (optional) is used (see fig. 11).

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. 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. For further service / maintenance details on the modules ICM, ICS, ICSH, ICLX, SVA-S, REG-SB and FIA; please refer to the individual product installation guide, which can be downloaded from [danfoss.com](https://danfoss.com).

**Module and side port location (fig. 12)**  
**ICF 50-4**

Function Module Type		Can be installed in these locations			
ICM	Motor operated valve module			M3	
ICS	Pilot operated servo valve module			M3	
ICSH	Dual position solenoid valve module			M3	
ICLX	Solenoid valve module			M3	
SVA-S	Shut-off valve module	M1 *)			M4
REG-SB	Regulating valve module				M4
FIA	Strainer module		M2		

P1 & P3 (P3 on the opposite side of P1): Side ports for gauge valve, sight glass, etc..  
P2 & P4 (P4 on the opposite side of P2): Side ports for defrost drain or other purposes.

**ICF 65-3**

Function Module Type		Can be installed in these locations			
ICM	Motor operated valve module			M3	
ICS	Pilot operated servo valve module			M3	
ICLX	Solenoid valve module			M3	
SVA-S	Shut-off valve module	M1 *)			M4
REG-SB	Regulating valve module				M4

P1 & P3 (P3 on the opposite side of P1): Side ports for gauge valve, sight glass, etc..  
P2 & P4 (P4 on the opposite side of P2): Side ports for defrost drain or other purposes.

location not possible  
\*) Modules are fixed

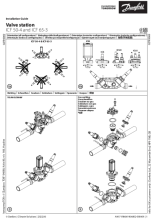
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**Documents / Resources**



**[Danfoss ICF 50-4,ICF 65-3 Flex Line Large Valves](#)** [pdf] Instruction Manual  
ICF 50-4, ICF 65-3, ICF 50-4, ICF 50-4 ICF 65-3 Flex Line Large Valves, ICF 50-4 ICF 65-3, Flex Line Large Valves, Line Large Valves, Large Valves

## References

-  [Engineering Tomorrow | Danfoss](#)
- [User Manual](#)

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