



## Danfoss ICS 25 – 65 (80) Pilot Operated Servo Valve Installation Guide

[Home](#) » [Danfoss](#) » Danfoss ICS 25 – 65 (80) Pilot Operated Servo Valve Installation Guide 



ICS 25 – 65 (80) Pilot Operated Servo Valve  
Installation Guide





## **Contents**

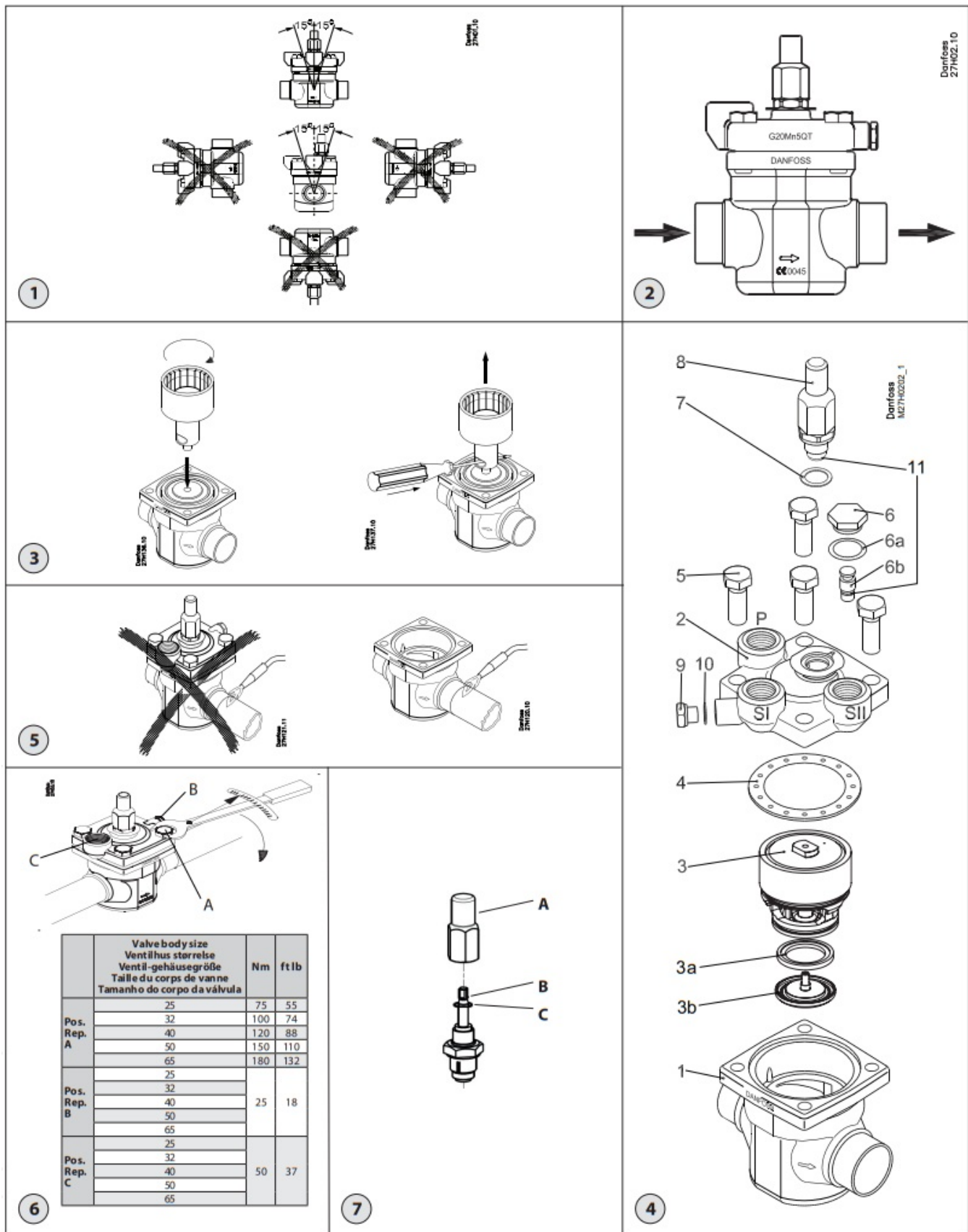
- [1 ICS 25 – 65 \(80\) Pilot Operated Servo Valve](#)
- [2 Installation](#)
- [3 Technical data](#)
- [4 Assembly](#)
- [5 Maintenance](#)
- [6 Documents / Resources](#)
- [7 Related Posts](#)

## **ICS 25 – 65 (80) Pilot Operated Servo Valve**

### **Installation guide**

#### **Pilot operated servo valve**

#### **ICS 25 – 65 (80)**



## Installation

### Refrigerants

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

Flammable hydrocarbons are not recommended.

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

## Technical data

The ICS can be used in suction, liquid, hotgas and liquid/vapor lines. The ICS regulates the flow of the medium by modulation or on/off function, depending on the control impulse from the screwed on pilot valve or valves.

### Regulating range

Dependent on the chosen type and combination of pilot valves.

### Opening differential pressure (p)

The ICS main valve requires a minimum opening differential pressure of 0.07 bar (1 psi) to begin to open and 0.2 bar (3 psi) to be completely open.



Back pressure to the ICS valve forces the piston to open and create a reverse flow. If reverse flow is not accepted, a checkvalve must be installed downstream of the ICS valve (be aware of the risk of trapped liquid).

### Design (fig. 4)

1. Body
2. Top cover
3. Function module
  - 3a Valve plate (Teflon) (available as spare part)
  - 3b Washer plate
4. Gasket
5. Bolts
6. Plug
7. Gasket
8. Manual operating spindle
9. Plug
10. Gasket

The valve must be installed with the spindle in vertically upwards position (fig. 1).

The valve must be installed with the arrow in the direction of the flow and the top cover upwards (fig. 2). The top cover can be rotated 4 X 90° in relation to the valve body.

The valve is fitted with a spindle for manual opening. If an external pilot valve is used, the pilot line must be connected to the upper side of the main line so that any dirt and oil from the plant will not find its way into the pilot line.

If the ICS 1 is to be used as a solenoid valve in a liquid line, external control pressure cannot be recommended because it can cause liquid hammer.

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.

### Welding (fig. 3, 4 and 5)

The top cover (fig. 4, pos. 2) and function module (fig. 4, pos. 3), must 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.

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. 3). Debris blocking the bolt hole will need cleaning.

**Note:** Remove all parts from the valve body before welding (as shown in fig. 5).



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.

The 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.

## **Assembly**

Remove welding debris and any dirt from pipes and valve body before assembly. Check that the o-rings are intact before replacing the function module. If possible, apply some refrigeration oil to ease the insertion and to protect the o-rings. Check that the top gasket has not been damaged. If the surface has been damaged or the gasket has been bent, it must be replaced.

### **Tightening (fig. 6)**

Tighten the top cover with a torque wrench, to the values indicated in the table.

Colours and identification

The ICS valves are Zinc-Chromated from factory. The Zinc-Chromatization does not cover the welding connections. If further corrosion protection is required, the valves can be painted. Precise identification of the valve is made via the ID plate on the top cover.

The external surface of the valve housing must be protected against corrosion with a suitable top coating after installation involving welding and consequent assembly.

Protection of the ID plate when painting the valve is recommended.

## **Maintenance**

### **Service**

The ICS valves are easy to dismantle.

Do not open the valve while the valve is still under pressure.

Pressure relief can be done by carefully opening the manual operating spindle. Small grooves along the thread will release refrigerant into open air. This operation must only be done after providing the correct countermeasures under local legislation.

The function module can be lifted out using a bolt size M6 screwed into the threaded hole of the piston on the function module (fig. 3). Debris blocking the bolt hole will need cleaning.

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 modulate according to the specification.
- Check that the piston and cylinder is free of scratches and look for wear marks. If the wear is excessive the function module should be replaced to prevent false pilot signal around the piston ring.
- Check that the movement of the cylinder and valve seat is free and with low friction.
- If the teflon valve plate is damaged it must be replaced. It is available as spare part:

Type	Code number
ICS 25 repair kit	027H2219
ICS 32 repair kit	027H3017
ICS 40 repair kit	027H4015
ICS 50 repair kit	027H5015
ICS 65 repair kit	027H6017
ICS 80 repair kit	027H6017

**For mounting instructions please see DKRCI.PI.HS0.D.**

#### **Assembly**

Remove any dirt from the body before the valve is assembled. Check that all channels in the valve are not blocked by particles or similar.

If possible, apply some refrigeration oil to ease the insertion and to protect the o-rings.

#### **Tightening (fig. 6)**

Tighten the top cover with a torque wrench, to the values indicated in the table.

#### **Note:**

Always pay attention to the spindle during operation of the manual opener (see fig 7)

1. Make sure that the C-clip (C) is positioned on the spindle (B) and is intact. A new C-clip is available in the inspection kit for the valve.
2. Pay attention to the C-clip reaching the top nut of the packing gland 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 top nut.
3. When turning the spindle (B) anticlockwise, for deactivation of the manual opener, to the top point, tighten the spindle further anticlockwise to 8 Nm (5.9 lb/ft) torque.
4. Remount the cap (A) and tighten it clockwise to 8 Nm (5.9 lb/ft) torque.

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.



**LISTED**

**The following text is applicable to the UL listed products ICS 25-65**

Applicable to all common non-flammable refrigerants, including/excluding (+) R717 and to non-corrosive gases/liquids dependent on sealing material compatibility (++). The design pressure shall not be less than the value outlined in Sec. 9.2 of ANSI/ASHRAE 15 for the refrigerant used in the system. (+++).

#### **Danfoss A/S Climate Solutions**

• [danfoss.com](http://danfoss.com)

• +45 7488 2222

Any information, including, but not limited to information on selection of product, its application or use, product design, weight, dimensions, capacity or any other technical data in product manuals, catalogues descriptions, advertisements, etc. and whether made available in writing, orally, electronically, online or via download, shall be considered informative, and is only binding if and to the extent, explicit reference is made in a quotation or order confirmation. Danfoss cannot accept any responsibility for possible errors in catalogues, brochures, videos and other material. Danfoss reserves the right to alter its products without notice. This also applies to products ordered

but not delivered provided that such alterations can be made without changes to form, fit or function of the product.

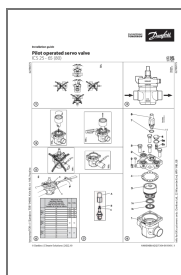
All trademarks in this material are property of Danfoss A/S or Danfoss group companies. Danfoss and the Danfoss logo are trademarks of Danfoss A/S. All rights reserved.



AN17198641964802-000401

© Danfoss | Climate Solutions | 2022.06

## Documents / Resources



[Danfoss ICS 25 - 65 \(80\) Pilot Operated Servo Valve](#) [pdf] Installation Guide  
ICS 25 - 65 80 Pilot Operated Servo Valve, ICS 25 - 65 80, Pilot Operated Servo Valve, Operated Servo Valve, Servo Valve, Valve