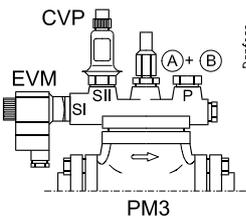
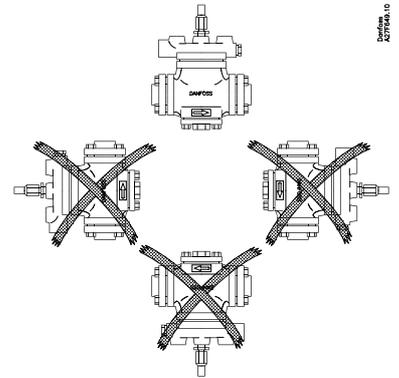
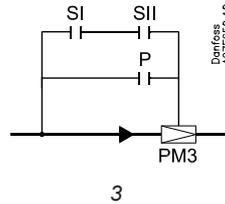
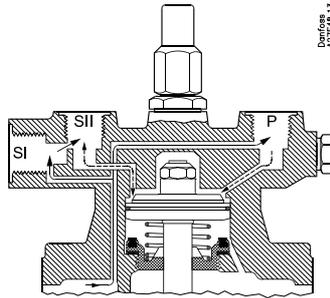
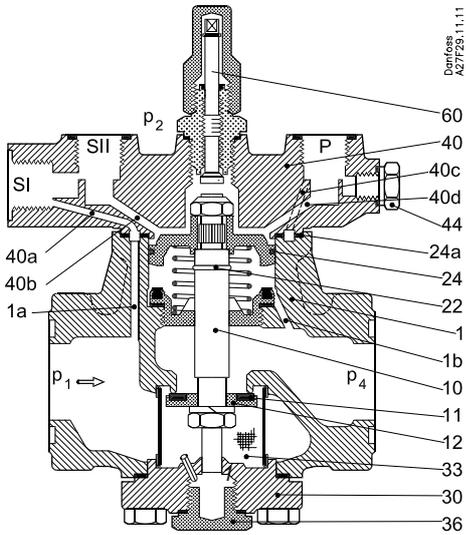
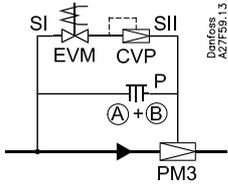


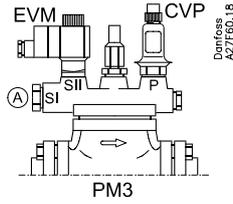
Installation



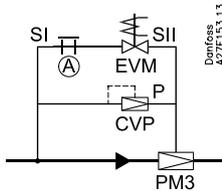
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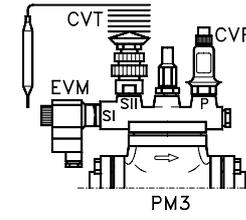
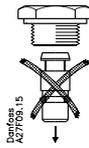
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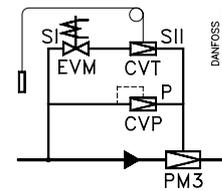
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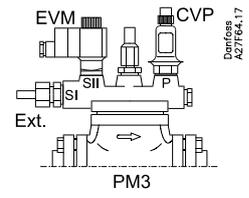
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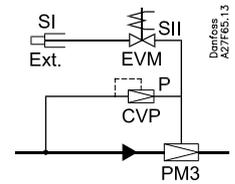
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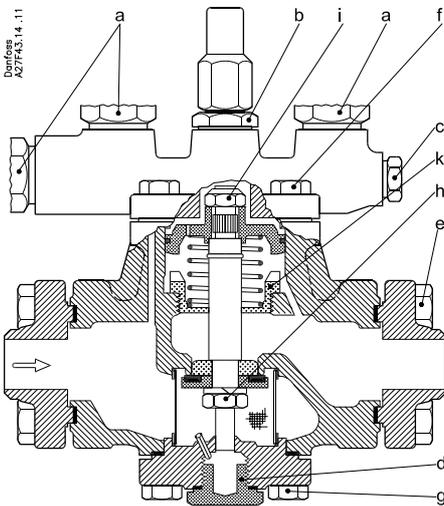
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12



13

Table 1

Pos.	Tightening Torque in Nm					
	PM size					
	5-20	25	32	40	50	65
a	50					
b	50					
c	25					
d	50					
e	60			80		
f	35		60		80	
g	35		60		80	
h	30		40		50	
i	25					
k	80			100		

Installation

Design

See fig. 1

1. Valve body
- 1a and 1b. Channels in valve body (1)
10. Valve spindle
11. Throttle cone
12. Valve seat
22. Locking ring
24. Servo piston
- 24a. Equalizing hole in servo piston (24)
30. Bottom cover
33. Strainer
36. Bottom plug
40. Cover
- 40a, b, c and d. Channels in cover (40)
44. Pressure gauge connection
60. Manual operating spindle
- S I, S II and P. Pilot valve connections

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

PM: -60/+120°C (-76/+248°F)

Pressure range

PM: The valves are designed for a max. working pressure of 28 bar g (406 psi g).

Technical data

The PM 3 can be used in suction, liquid, hot-gas and liquid/vapour lines.

The PM 3 regulates the flow of the medium by modulation or on/off function, depending on the control impulse from the screwed-on pilot valves.

The PM 3 has three connections for pilot valves: two in series, marked "S I" and "S II", and one in parallel with these two, marked "P", see figs. 2 and 3.

Schematic examples of pilot valves connected to the PM can be seen in figures 6, 8, 10, and 12.

If only two pilot valves are necessary for the function required, the third pilot connection must be sealed with a blanking plug (see fig. 5 and 7). A blanking plug is supplied with the valve.

Regulating range

Dependent on pilot valves.

Opening differential pressure (Δp)

The PM main valve requires a minimum opening differential pressure of 0.07 bar (1 psi) to begin to open and 0.2 bar (2.8 psi) to be completely open.

Note: The valve opens when differential pressure against the direction of flow occurs.

Installation

Flange set for the PM is delivered separately. The valve must be installed with the arrow in the direction of the flow and the top cover upwards (fig. 4). 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 PM 3 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

If using welding flanges, only materials and welding methods, compatible with the flange material must be welded to the flanges. The flanges should be cleaned internally to remove welding debris on completion of welding and before the valve is inserted.

The valve housing and flanges must be free from stresses (external loads) after installation.

PM 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.

Colours and identification

The PM valves are Zinc-Chromated in the factory. 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 prevented against corrosion with a suitable protective coating after installation and assembly.

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

- Check that the O-ring has not been damaged.
- Check that the spindle is free of scratches and impact marks.
- If the teflon ring has been damaged, the parts must be replaced.

Assembly

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

Tightening**Tightening torques**

See fig. 13 and table 1.

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

In cases of doubt, please contact Danfoss.

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

Maintenance

Service

The PM valves are easy to dismantle and most of its parts are replaceable. When the bottom cover is removed, the strainer can be taken out for cleaning. Do not open the valve while the valve is still under pressure.

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

Declaration

We hereby declare that below-mentioned equipment are classified for Fluid Group I (all refrigerants (toxic, non-toxic, flammable and non-flammable)), and that all are covered by Article 3, paragraph 3.

For further details / restrictions - see Installation Instruction

Description of Pressure Equipment

Refrigerant main regulating valves
Type **PM, PMC, PMFH, PMFL, MRV, MEV**

Nominal bore **DN ≤ 25 mm.** (1 in)

References of other Technical Standards and Specifications used

prEN 12284 DIN 3158
EN 1563 AD-Merkblätter

Authorised Person for the Manufacturer within the European Community

Name: Morten Steen Hansen **Title:** Production Manager

Signature: Morten Steen Hansen **Date:** 16/01/2002

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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 main regulating valves
Type PM, PML, PMLX, PMFH, PMFL, MRV, MEV

Nominal bore	DN32-150 mm (1¼ - 6 in.)	
Classified for	Fluid Group I (all refrigerants (toxic, nontoxic, flammable and nonflammable)). For further details / restrictions - see Installation Instruction.	
Temperature range	All	-60°C (-76°F) to 120°C (248°F)
Maximum allowable working pressure		28 bar (406 psi)

Conformity and Assessment Procedure Followed

Category	II	III
Module	D1	B1+D
Certificate ID	D1: 07 202 0511 Z 0009/1/H-0002	B1: 07 202 0511 Z 0074/1/H-0001 D: 07 202 0511 Z 0009/1/H-0001
Nominal bore	DN 32-125 mm (1¼-5 in)	DN150 mm (6 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

References of other Technical Standards and Specifications used

prEN 12284 DIN 3158
EN 1563 AD-Merkblätter

Authorised Person for the Manufacturer within the European Community

Name: Morten Steen Hansen **Title:** Production Manager

Signature: Morten Steen Hansen **Date:** 16/01/2002