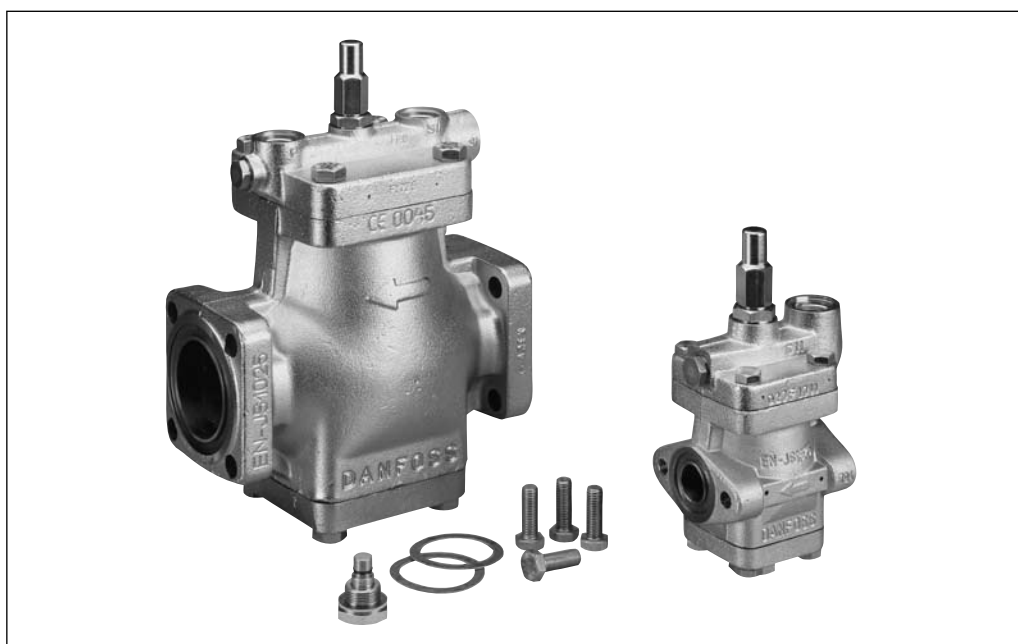


Pilot operated main valves for regulating pressure and temperature

Type PM

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Introduction

PM valves are pilot operated main valves for regulating pressure and temperature in refrigeration systems.

PM main valves can be used on the high and low-pressure sides, in wet and dry suction lines, and in liquid lines without phase change (i.e. where no expansion takes place in the valve).

The function of a PM valve depends solely on the pilot pressure applied to the valve, either from pilot valves or in the form of external pilot pressure.

PM 1 has one connection for pilot pressure/pilot valve, while PM 3 has three pilot pressure/pilot valve connections.

The associated Danfoss pilot valves can either be screwed direct into the main valve or be connected via an external pilot line. Several pilot valves can be used on one main valve to give a large number of different functions.

The PM valve top cover has a pressure gauge connection so that the inlet pressure can be measured when, for example, main valve function must be set or adjusted in relation to the system regulation performed by the pilot valves. The spindle in the top cover of the main PM valve can be used to manually open and close the valve (although PM 65-125 cannot be opened fully in this way).

The main valve bottom plug can be replaced by an AKS 45 electronic position indicator so that the position of the regulating cone can be read electronically.

Features

- Can be used for all normal, non-flammable refrigerants, including R 717, and non-corrosive gases/liquids - assuming seals of the correct material are used.
- Large range of flanges with connection dimensions in accordance with standards: DIN, ANSI, SOC, SA and FPT.
- Performs as a multifunction valve when several pilot valves are connected to the same main valve.
- All pilot valves can be used on all sizes of PM main valves. They can be screwed direct into the main valve so that there is no need for weld or solder connections, or separate pilot lines.
- The valve has a pressure gauge connection so that inlet pressure can be measured.
- The valve has a built-in filter and a teflon seat to give excellent tightness.
- The PM main valve top cover can be oriented in any direction without the function of pilot valves being affected.
- The valve can be equipped with an AKS 45 electronic position indicator as an accessory.

Design
Connections

There is a very wide range of connection possibilities with PM main valves:

- Welding, DIN (2448)
- Welding, ANSI (B 36.10)
- Welding socket, ANSI (B 16.11)
- Solder connection, DIN (2856)
- Solder connection, ANSI (B 16.22)
- FPT internal thread, NPT (ANSI/ASME B 1.20.1)

PM main valves are designed as pilot operated valves that can be fully opened with a very small differential pressure (0.2 bar/ 2.9 psi).

The valve design means that it will only fully close in the direction of flow.

Pressure Equipment Directive (PED)

The PM-valves are approved in accordance with the European standard specified in the Pressure Equipment Directive and are CE marked.

For further details / restrictions - see Installation Instruction

PM 1 will accept one pilot valve mounted direct on the valve, while PM 3 will accept three pilot valves.

Two of the PM 3 pilot valve connections (S1 and S2) are series connected while the third pilot connection (P) is connected in parallel. Thus, with different combinations of pilot valves it is possible to obtain a very large number of different functions from one PM main valve.

The PM main valve has a logarithmic or v-shaped throttle cone that ensures optimum regulating accuracy.

The PM main valve top cover can be oriented in any direction without the function of pilot valves being affected.

Valve body
EN-GJS-400-18-LT

Seals
Do not contain asbestos.



PM valves			
Nominal bore	DN ≤ 25 (1 in.)	DN 32-125 mm (1 1/4 - 5 in.)	DN 150 mm (6 in.)
Classified for	Fluid group I		
Category	Article 3, paragraph 3	II	III

Technical data
Refrigerants

Can be used for all normal, non-flammable refrigerants, including R 717, and non-corrosive gases/liquids - assuming seals of the correct material are used.
Use with flammable hydrocarbons cannot be recommended; please contact Danfoss.

Temperature range

-60/+120°C (-76/+248°F).

Surface

PM 5 - 65:

The external surface is zinc-chromated to give good protection against corrosion.

PM 80 - 125:

The surface of the PM 80 - 125 is treated with a multi-layer painting.

Pressure range

The valve is designed for:

Max. working pressure: 28 bar g (406 psig)

Test pressure: 42 bar g (609 psig)

Opening differential pressure:

Fully open: Min. 0.2 bar g (min. 2.9 psig)

Max. (MOPD), solenoid valves only

(10 W a.c. and 20 W d.c.):

21 bar g (305 psig)

Built-in filter

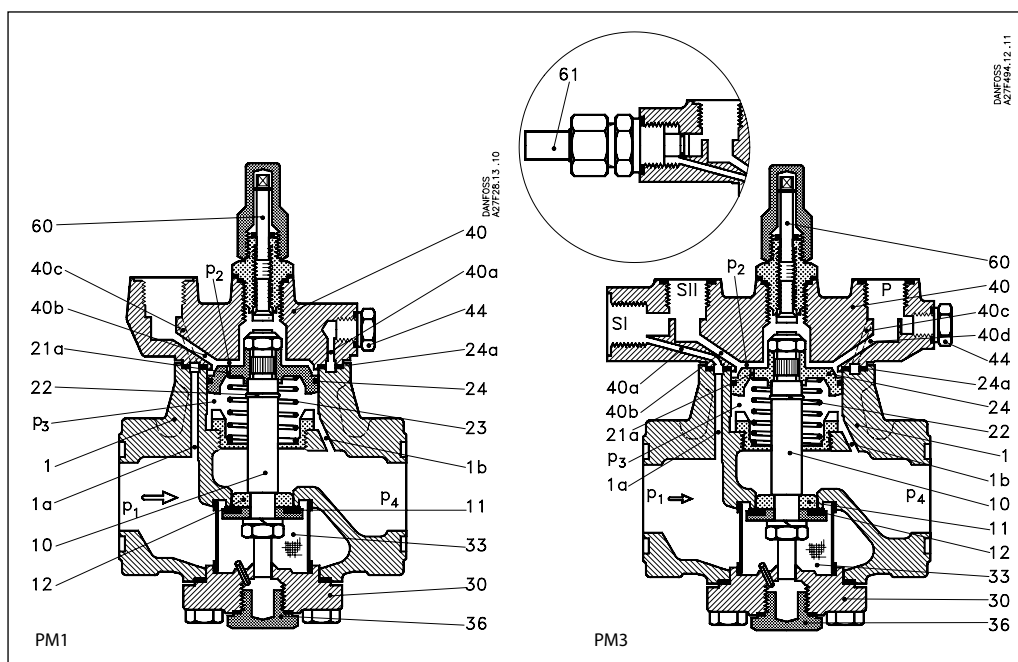
PM 5 - 40 mesh: 950 μ (18 mesh/in.)

PM 50 - 125 mesh: 1500 μ (10 mesh/in.)

Design, function

PM 1 and PM 3

- 1. Valve body
- 1 a Channels in valve body 1
- 1 b Channels in valve body 1
- 10. Valve spindle
- 11. Teflon valve plate
- 12. Throttle cone
- 21a. Equalisation hole in servo piston 24
- 22. Locking ring
- 24. Servo piston
- 24a. Gasket
- 30. Bottom cover
- 33. Strainer
- 36. Plug
- 40. Cover
- 40 a Channels in cover 40
- 40 b Channels in cover 40
- 40 c Channels in cover 40
- 40 d Channels in cover 40
- 44. Pressure gauge connection
- 60. Manual operating spindle
- 61. External pilot connection
- S I, S II Pilot valve connections in series connection holes
- P. Pilot valve connection in parallel connection hole



The PM main valve is a pilot operated valve whose function is determined by the pilot valve used. The main valve with pilot valve(s) controls refrigerant flow by modulation or on/off in accordance with the pilot valve or main valve status.

The degree of opening of the main valve is determined by the pressure difference (differential pressure) between pressure p_2 , which acts on top of the servo piston (24), and pressure p_3 , which acts on the underside of the servo piston.

If this pressure difference is 0, the main valve will be fully closed.

If the pressure difference is 0.2 bar (2.9 psi) or more, the main valve will be fully open. At pressure differences ($p_2 - p_3$) between 0.07 bar (1 psi) and 0.2 bar (2.9 psi), the degree of opening will be correspondingly proportional.

The shape of the throttle cone (12) is logarithmic, which gives an ideal regulation characteristic to pilot operated main valves. Because of valve body channel (1b), pressure p_3 acting on the underside of the servo piston (24) is equal to the main valve discharge pressure p_4 .

The degree of opening of the main valve is thus controlled by the application of a pressure, p_2 , on top of the servo piston which is equal to or greater than the discharge pressure, p_4 .

$p_2 = p_4$ ~ closed
 $p_2 = p_4 + 0.2 \text{ bar (2.9 psi)}$ ~ fully open
 $p_4 \leq p_2 \leq p_4 + 0.2 \text{ bar (2.9 psi)}$ ~ proportional degree of opening.

The maximum pressure, p_2 , that can be built up on the top of the servo piston (24) normally corresponds to the pressure, p_1 , acting on the main valve inlet side.

Inlet pressure p_1 is led, via the drilled channels (1a, 40a, 40b, 40c, 40d) in the valve body (1) and cover (40) through the individual pilot valves and onto the top of the servo piston (24). The degree of opening of the individual pilot valves determines the size of pressure p_2 and thus the degree of opening of the main valve, i.e. the equalisation hole (21a) in the servo piston (24) ensures that pressure p_2 is balanced in accordance with the degree of opening of the pilot valve.

Note:

When main valve type PM 3 is used with an external pilot connection (61), the internal pilot pressure will be shut off.

The PM 1 main valve can be fitted with just one screwed-on pilot valve. The degree of opening of the main valve will be in accordance with the control status from the pilot valve.

PM 1 is fully closed when the pilot valve is fully closed and fully open when the pilot valve is fully open. Otherwise the degree of opening of the main valve is proportional to the degree of opening of the pilot valve.

The PM 3 main valve can be fitted with either one, two, or three pilot valves so that up to three regulating functions are possible.

Design, function
(continued)

The relations between the functions of the screwed-in pilot valves are as follows:

- A. The pilot valves fitted in ports SI and SII are connected in series.
The PM 3 main valve will be fully closed if just one of the series-connected pilot valves is closed. The main valve can only open if both pilot valves are fully open at the same time.
- B. The pilot valve fitted in port P is connected in parallel to the pilot valves in ports SI and SII.

The PM3 main valve will be fully open if the pilot valve in P is fully open, irrespective of the degree of opening of pilot valves SI and SII.

The PM 3 main valve will be fully closed if the pilot valve in P is fully closed and at least one of the valves in SI or SII is fully closed at the same time. The relation between the pilot valves in ports SI, SII and P is shown in the table above.

Pilot valve			PM 3 main valve
SI	SII	P	
Open	Open	Closed	Open
Open	Open	Open	Open
Open	Closed	Closed	Closed
Open	Closed	Open	Open
Closed	Open	Closed	Closed
Closed	Open	Open	Open
Closed	Closed	Closed	Closed
Closed	Closed	Open	Open

If the PM 3 is not fitted with three pilot valves, the unused port(s) must be sealed off with a blanking plug.

If the blanking plug is fitted as an assembled unit, A + B, the channels from the port concerned will be closed.

If only the top part, A, of the plug is fitted, the channels from the ports in question will be open.

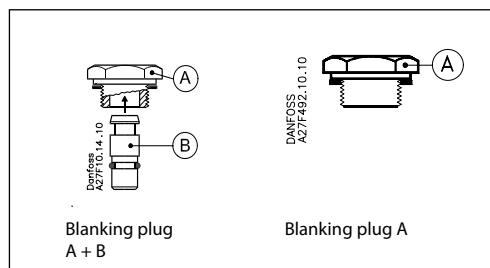
If the degree of opening of the PM main valve is not to be a function of the main valve inlet pressure, or if more than three regulating functions are required, ports SI, SII or P can be fitted with a nipple for the connection of external pilot pressure. This applies to both PM 1 and PM 3.

Pressure p_2 on top of the servo piston will then be determined by the pressure to which the external pilot line is connected. The main valve function will be determined by the pilot valves fitted in that external pilot line. Pilot valves installed in external lines must be mounted in a type CVH housing.

Depending on the function of the pilot valves, the PM regulating characteristic becomes:

- on/off
- proportional
- integral or
- cascade.

PM main valves are therefore especially suitable for all forms of temperature and pressure regulating systems.



Function examples

<p>Example no. 1-1</p> <p>Constant pressure regulation. -0.66 to 7 bar g (19.5 in. Hg to 102 psig).</p>		<p>Products</p> <p>1 × PM 1 1 × CVP (LP) 2 × flanges</p>	
<p>Example no. 1-2</p> <p>Differential pressure regulation. 0 to 7 bar g (0 to 102 psig).</p>		<p>Products</p> <p>1 × PM 1 1 × CVPP (LP) 2 × flanges</p>	
<p>Example no. 1-3</p> <p>Temperature regulation. -40 to 60°C (-40 to 140°F). Opening at rising temperature. Pressure independent.</p>		<p>Products</p> <p>1 × PM 1 1 × CVT 2 × flanges</p>	
<p>Example no. 1-4</p> <p>Temperature regulation. -40 to 60°C (-40 to 140°F). Closing at rising temperature. Pressure independent.</p>		<p>Products</p> <p>1 × PM 1 1 × CVTO 2 × flanges</p>	
<p>Example no. 1-5</p> <p>On/off regulation (solenoid valve).</p>		<p>Products</p> <p>1 × PM 1 1 × EVM 2 × flanges</p>	

Function examples (continued)

<p>Example no. 1-6</p> <p>Regulation with external control pressure.</p>		<p>Products</p> <ul style="list-style-type: none"> 1 × PM 1 1 × nipple for external control pressure 2 × flanges 	
<p>Example no. 1-7</p> <p>Constant pressure regulation. -0.66 to 28 bar g (19.5 in. Hg to 406 psig).</p>		<p>Products</p> <ul style="list-style-type: none"> 1 × PM 1 1 × CVP (HP) 2 × flanges 	
<p>Example no. 1-8</p> <p>Differential pressure regulation. 0 to 22 bar g (0 to 319 psig).</p>		<p>Products</p> <ul style="list-style-type: none"> 1 × PM 1 1 × CVPP (HP) 2 × flanges 	
<p>Example no. 1-9</p> <p>On/off regulation (solenoid valve).</p>		<p>Products</p> <ul style="list-style-type: none"> 1 × PM 1 1 × EVM-NO (12 W coil) 2 × flanges 	
<p>Example no. 1-10</p> <p>Crankcase pressure regulation. (Max. suction pressure regulation) -0.45 to 7 bar g (13.3 in. Hg to 102 psig).</p>		<p>Products</p> <ul style="list-style-type: none"> 1 × PM 1 1 × CVC 2 × flanges 	

Function examples (continued)

<p>Example no. 1-11</p> <p>Electronically controlled media temperature regulation. -1 to 8 bar g (0 in. Hg to 116 psig).</p>	<p>DANFOSS AZ7F355.13</p>	<p>Products</p> <p>1 × PM 1 1 × CVQ 2 × flanges</p>	
<p>Example no. 3-1</p> <p>Constant pressure regulation combined with electrical shut off. -0.66 to 7 bar g (19.5 in. Hg to 102 psig).</p>	<p>DANFOSS AZ7F58.13</p>	<p>Products</p> <p>1 × PM 3 1 × blanking plug 1 × CVP (LP) 1 × EVM 2 × flanges</p>	
<p>Example no. 3-2</p> <p>Constant pressure regulation combined with electrical wide open. -0.66 to 7 bar g (19.5 in. Hg to 102 psig).</p>	<p>DANFOSS AZ7F61.12</p>	<p>Products</p> <p>1 × PM 3 1 × blanking plug 1 × CVP (LP) 1 × EVM 2 × flanges</p>	
<p>Example no. 3-3</p> <p>Constant pressure regulation combined with electrical shut off and wide open. -0.66 to 7 bar g (19.5 in. Hg to 102 psig).</p>	<p>DANFOSS AZ7F82.12</p>	<p>Products</p> <p>1 × PM 3 1 × CVP (LP) 2 × EVM 2 × flanges</p>	
<p>Example no. 3-4</p> <p>Constant pressure regulation with change-over between two preset evaporating pressures. -0.66 to 7 bar g (19.5 in. Hg to 102 psig).</p>	<p>DANFOSS AZ7F90.12</p>	<p>Products</p> <p>1 × PM 3 2 × CVP (LP) 1 × EVM 2 × flanges</p>	

Function examples (continued)

<p>Example no. 3-5</p> <p>External control pressure with electrical shut off combined with constant pressure regulation. -0.66 to 7 bar g (19.5 in. Hg to 102 psig).</p>	<p style="text-align: right;">DANFOSS A27FE5.13</p>	<p>Products</p> <ul style="list-style-type: none"> 1 × PM 3 1 × nipple for external control pressure 1 × CVP (LP) 1 × EVM 2 × flanges 	
<p>Example no. 3-6</p> <p>Constant pressure regulation with external control pressure combined with electrical wide open. -0.66 to 7 bar g (19.5 in. Hg to 102 psig).</p>	<p style="text-align: right;">DANFOSS A27F11.12</p>	<p>Products</p> <ul style="list-style-type: none"> 1 × PM 3 1 × nipple for external control pressure 1 × CVP (LP) 1 × EVM 2 × flanges 	
<p>Example no. 3-7</p> <p>Constant pressure regulation with electrical shut off combined with external control pressure. -0.66 to 7 bar g (19.5 in. Hg to 102 psig).</p>	<p style="text-align: right;">DANFOSS A27F13.12</p>	<p>Products</p> <ul style="list-style-type: none"> 1 × PM 3 1 × nipple for external control pressure 1 × CVP (LP) 1 × EVM 2 × flanges 	
<p>Example no. 3-8</p> <p>Solenoid valve with external control pressure for small pressure drops.</p>	<p style="text-align: right;">DANFOSS A27F310.12</p>	<p>Products</p> <ul style="list-style-type: none"> 1 × PM 3 1 × blanking plug 1 × nipple for external control pressure 1 × EVM 2 × flanges 	
<p>Example no. 3-9</p> <p>Differential pressure regulation combined with electrical shut off. 0 to 7 bar g (0 to 102 psig).</p>	<p style="text-align: right;">DANFOSS A27F115.12</p>	<p>Products</p> <ul style="list-style-type: none"> 1 × PM 3 1 × blanking plug 1 × CVPP (LP) 1 × EVM 2 × flanges 	

Function examples (continued)

<p>Example no. 3-10</p> <p>Differential pressure regulation combined with electrical wide open. 0 to 7 bar g (0 to 102 psig).</p>	<p>DANFOSS AZ7F17.1,2</p>	<p>Products</p> <p>1 × PM 3 1 × blanking plug 1 × CVPP (LP) 1 × EVM 2 × flanges</p>	
<p>Example no. 3-11</p> <p>Differential pressure regulation combined with electrical wide open and shut off. 0 to 7 bar g (0 to 102 psig).</p>	<p>DANFOSS AZ7F19.1,2</p>	<p>Products</p> <p>1 × PM 3 1 × CVPP (LP) 2 × EVM 2 × flanges</p>	
<p>Example no. 3-12</p> <p>Thermostatic regulation combined with electrical shut off. Pressure independent. -40 to 60°C (-40 to 140°F).</p>	<p>DANFOSS AZ7F12.1,2</p>	<p>Products</p> <p>1 × PM 3 1 × blanking plug 1 × CVT 1 × EVM 2 × flanges</p>	
<p>Example no. 3-13</p> <p>Thermostatic regulation combined with electrical wide open. Pressure independent. -40 to 60°C (-40 to 140°F).</p>	<p>DANFOSS AZ7F13.1,2</p>	<p>Products</p> <p>1 × PM 3 1 × blanking plug 1 × CVT 1 × EVM 2 × flanges</p>	
<p>Example no. 3-14</p> <p>Thermostatic regulation with protection against too low evaporating pressure. -40 to 60°C (-40 to 140°F). -0.66 to 7 bar g (19.5 in. Hg to 102 psig).</p>	<p>DANFOSS AZ7F127.1,2</p>	<p>Products</p> <p>1 × PM 3 1 × blanking plug 1 × CVT 1 × CVP 2 × flanges</p>	

Function examples (continued)

<p>Example no. 3-15</p> <p>Constant pressure regulation combined with electrical shut off. -0.66 to 28 bar g (19.5 in. Hg to 406 psig).</p>	<p>DANFOSS A27F288.11.10.01</p>	<p>Products</p> <ul style="list-style-type: none"> 1 × PM 3 1 × blanking plug 1 × CVP (HP) 1 × EVM 2 × flanges 	
<p>Example no. 3-16</p> <p>Constant pressure regulation combined with electrical wide open. -0.66 to 28 bar g (19.5 in. Hg to 406 psig).</p>	<p>DANFOSS A27F290.12.10.01</p>	<p>Products</p> <ul style="list-style-type: none"> 1 × PM 3 1 × blanking plug 1 × CVP (HP) 1 × EVM 2 × flanges 	
<p>Example no. 3-17</p> <p>Constant pressure regulation combined with electrical shut off and wide open. -0.66 to 28 bar g (19.5 in. Hg to 406 psig).</p>	<p>DANFOSS A27F292.11.10.01</p>	<p>Products</p> <ul style="list-style-type: none"> 1 × PM 3 1 × CVP (HP) 2 × EVM 2 × flanges 	
<p>Example no. 3-18</p> <p>Constant pressure regulation with change-over between two preset evaporating pressures. -0.66 to 28 bar g (19.5 in. Hg to 406 psig).</p>	<p>DANFOSS A27F294.11.10.01</p>	<p>Products</p> <ul style="list-style-type: none"> 1 × PM 3 2 × CVP (HP) 1 × EVM 2 × flanges 	
<p>Example no. 3-19</p> <p>Differential pressure regulation combined with electrical shut off. 0 to 22 bar g (0 to 319 psig).</p>	<p>DANFOSS A27F296.13.10.01</p>	<p>Products</p> <ul style="list-style-type: none"> 1 × PM 3 1 × blanking plug 1 × CVP (HP) 1 × EVM 2 × flanges 	

Function examples (continued)

<p>Example no. 3-20</p> <p>Differential pressure regulation combined with electrical wide open. 0 to 22 bar g (0 to 319 psig).</p>	<p>DANFOSS A27F298.11.10.01</p>	<p>Products</p> <ul style="list-style-type: none"> 1 × PM 3 1 × blanking plug 1 × CVPP (HP) 1 × EVM 2 × flanges 	
<p>Example no. 3-21</p> <p>Differential pressure regulation combined with electrical wide open and shut off. 0 to 22 bar g (0 to 319 psig).</p>	<p>DANFOSS A27F314.11.10.01</p>	<p>Products</p> <ul style="list-style-type: none"> 1 × PM 3 1 × CVPP (HP) 2 × EVM 2 × flanges 	
<p>Example no. 3-22</p> <p>Constant pressure regulation combined with electrical wide open and shut off. -0.66 to 28 bar g (19.5 in. Hg to 406 psig).</p>	<p>DANFOSS A27F331.12.10.01</p>	<p>Products</p> <ul style="list-style-type: none"> 1 × PM 3 1 × CVP (HP) 1 × EVM 1 × EVM-NO (12 W coil) 2 × flanges 	
<p>Example no. 3-23</p> <p>Crankcase pressure regulation (max. suction pressure regulation) combined with shut off. -0.45 to 7 bar g (13.3 in. Hg to 102 psig).</p>	<p>DANFOSS A27F255.11</p>	<p>Products</p> <ul style="list-style-type: none"> 1 × PM 3 1 × blanking plug 1 × CVC 1 × EVM 2 × flanges 	
<p>Example no. 3-24</p> <p>Crankcase pressure regulation (max. suction pressure regulation) combined with evaporating pressure regulation. -0.66 to 28 bar g (19.5 in. Hg to 406 psig).</p>	<p>DANFOSS A27F267.11</p>	<p>Products</p> <ul style="list-style-type: none"> 1 × PM 3 1 × blanking plug 1 × CVC 1 × CVP(LP) 2 × flanges 	

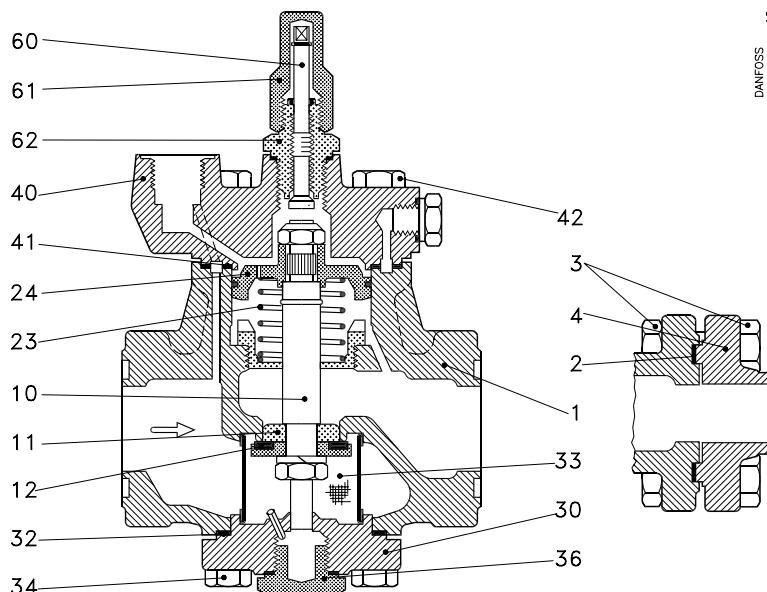
Function examples (continued)

<p>Example no. 3-25</p> <p>Crankcase pressure regulation (max. suction pressure regulation) at low pressure drops across the main valve. -0.45 to 7 bar g (13.3 in. Hg to 102 psig).</p>		<p>Products</p> <ul style="list-style-type: none"> 1 × PM 3 1 × blanking plug 1 × nipple for external control pressure 1 × CVC 2 × flanges 	
<p>Example no. 3-26</p> <p>Crankcase pressure regulation (max. suction pressure regulation) combined with constant pressure regulation and electrical shut off. -0.66 to 7 bar g (19.5 in. Hg to 102 psig).</p>		<p>Products</p> <ul style="list-style-type: none"> 1 × PM 3 1 × blanking plug 1 × nipple for external control pressure 1 × CVP (LP) 1 × EVM 2 × CVH 1 × CVC 2 × flanges 	
<p>Example no. 3-27</p> <p>Hot gas bypass regulation combined with electrical shut off. -0.45 to 7 bar g (13.3 in. Hg to 102 psig).</p>		<p>Products</p> <ul style="list-style-type: none"> 1 × PM 3 1 × blanking plug 1 × CVC 1 × EVM 2 × flanges 	
<p>Example no. 3-28</p> <p>Constant pressure regulation with electrical shut off and protection against high pressure when suction line is closed. -0.66 to 28 bar g (19.5 in. Hg to 406 psig).</p>		<p>Products</p> <ul style="list-style-type: none"> 1 × PM 3 1 × CVP (LP) 1 × EVM 1 × CVP (HP) 2 × flanges 	
<p>Example no. 3-29</p> <p>Electronically controlled media temperature regulation combined with electrical shut off. -1 to 8 bar g (0 in. Hg to 116 psig).</p>		<p>Products</p> <ul style="list-style-type: none"> 1 × PM 3 1 × blanking plug 1 × CVQ 1 × EVM 2 × flanges 	

Function examples (continued)

<p>Example no. 3-30</p> <p>Electronically controlled media temperature regulation combined with electrical shut off and wide open. -1 to 8 bar g (0 in. Hg to 116 psig).</p>	<p>DANFOSS AZ7F323.11</p>	<p>Products</p> <p>1 × PM 3 1 × CVQ 2 × EVM 2 × flanges</p>	
<p>Example no. 3-31</p> <p>Electronically controlled media temperature regulation combined with electrical shut off and changeover to constant pressure regulation. -1 to 8 bar g (0 in. Hg to 116 psig).</p>	<p>DANFOSS AZ7F324.11</p>	<p>Products</p> <p>1 × PM 3 1 × CVQ 1 × CVP (LP) 1 × EVM 2 × flanges</p>	
<p>Example no. 3-32</p> <p>Electronically controlled media temperature regulation with low evaporating pressure protection combined with wide open. -1 to 8 bar g (0 in. Hg to 116 psig).</p>	<p>DANFOSS AZ7F324.13</p>	<p>Products</p> <p>1 × PM 3 1 × CVQ 1 × CVP (LP) 1 × EVM 2 × flanges</p>	
<p>Example no. 3-33</p> <p>Electronically controlled media temperature regulation with low evaporating pressure protection combined with changeover to constant pressure regulation. -1 to 8 bar g (0 in. Hg to 116 psig).</p>	<p>DANFOSS AZ7F322.13</p>	<p>Products</p> <p>1 × PM 3 1 × CVQ 2 × CVP (LP) 2 × flanges</p>	

Material specification



Material specification for PM valves

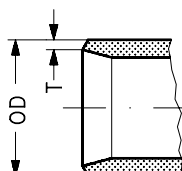
No.	Part	Material	DIN	ISO	ASTM
1	Valve body	Low temperature, cast iron (spherical)	EN-GJS-400-18-LT EN 1563		
2	Gasket between body and flange	Non-metal Non-asbestos			
3	Bolts for flange	Stainless steel	A2-70	A2-70	TYPE 308
4	Flange PM 5 - 65	Steel	RSt. 37-2, 10025	Fe360 B, 630	Grade C, A 283
4	Flange PM 80 - 125	Steel	TSTE 355, 2635 / 3159		
10	Valve spindle	Steel	9SMn28 1651	Type 2 R683/9	1213 SAE J 403
11	Trottle cone	Steel	9SMn28 1651	Type 2 R683/9	1213 SAE J 403
12	Valve seat	Teflon [PTFE]			
23	Spring	Steel			
24	Servo piston	Cast iron	GG-25	Grade 250	Class 40B
30	Bottom cover	Low temperature, cast iron (spherical)	EN-GJS-400-18-LT EN 1563		
32	Gasket between body and bottom cover	Non-metal Non-asbestos			
33	Strainer	Stainless steel			
34	Bolts for bottom cover	Stainless steel	A2-70	A2-70	TYPE 308
36	Plug	Steel	9SMn28 1651	Type 2 R683/9	1213 SAE J 403
40	Cover	Low temperature, cast iron (spherical)	EN-GJS-400-18-LT EN 1563		
41	Gasket	Non-metal Non-asbestos			
42	Bolts for top cover	Stainless steel	A2-70	A2-70	TYPE 308
60	Manual operating spindle	Steel	9SMn28 1651	Type 2 R683/9	1213 SAE J 403
61	Cap for manual operating spindle	Steel	9SMn28 1651	Type 2 R683/9	1213 SAE J 403
62	Spindle seal	Steel	9SMn28 1651	Type 2 R683/9	1213 SAE J 403

Flange connections

Danfoss flange sets are specially made for the Danfoss product range and must only be used for the purpose described.

Gaskets, bolts and nuts are supplied with the PM valve.

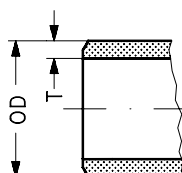
When ordering PM valves, first select the valve according to the capacity required. Then select the suitable flanges.

DIN


For use with valve type	Size mm	Size in.	OD mm	T mm	OD in.	T in.	Flange type	Code no.
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Butt welding DIN (2448)

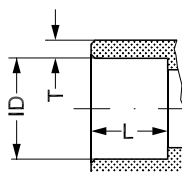
PM 5, 10, 15, 20, 25	20	3/4	26.9	2.3	1.059	0.091	3	027N1220 027N1225 027N1230
	25	1	33.7	2.6	1.327	0.103		
	32	1 1/4	42.4	2.6	1.669	0.102		
PM 32	32	1 1/4	42.4	2.6	1.669	0.102	10	027N2332 027N2340
	40	1 1/2	48.3	2.6	1.902	0.103		
PM 40	40	1 1/2	48.3	2.6	1.902	0.103	11	027N2440 027N2450
	50	2	60.3	2.9	2.370	0.110		
PM 50	50	2	60.3	2.9	2.370	0.110	12	027N2550 027N2565
	65	2 1/2	76.1	2.9	3.000	0.110		
PM 65	65	2 1/2	76.1	2.9	3.000	0.110	13	027N2665 027N2680
	80	3	88.9	3.2	3.500	0.130		
PM 80	100	4	114.3	3.6	4.500	0.140	14A	027F2123
PM 100	125	5	139.7	4.0	5.500	0.160	14B	027F2124
PM 125	150	6	168.3	4.5	6.630	0.180	14C	027F2125

ANSI


For use with valve type	Size mm	Size in.	OD mm	T mm	OD in.	T in.	Flange type	Schedule	Code no.
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Butt welding ANSI B 36.10

PM 5, 10, 15, 20, 25	20	3/4	26.9	4.0	1.059	0.158	3	80	027N3031 027N3032 027N3033
	25	1	33.7	4.6	1.327	0.181			
	32	1 1/4	42.4	4.9	1.669	0.193			
PM 32	32	1 1/4	42.4	4.9	1.669	0.193	10	80	027N3034 027N3035
	40	1 1/2	48.3	5.1	1.902	0.201			
PM 40	40	1 1/2	48.3	5.1	1.902	0.201	11	80	027N3036 027N3037
	50	2	60.3	3.9	2.370	0.150			
PM 50	50	2	60.3	3.9	2.370	0.150	12	40	027N3038 027N3039
	65	2 1/2	73.0	5.2	2.870	0.200			
PM 65	65	2 1/2	73.0	5.2	2.870	0.200	13	40	027N3040 027N3041
	80	3	88.9	5.5	3.500	0.220			
PM 80	100	4	114.3	6.0	4.500	0.240	14A	40	027N3042
PM 100	125	5	141.3	6.6	5.560	0.260	14B	40	027N3043
PM 125	150	6	168.3	7.1	6.630	0.280	14C	40	027N3044

SOC


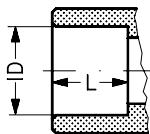
For use with valve type	Size mm	Size in.	ID mm	T mm	ID in.	T in.	L mm	L in.	Flange type	Code no.
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Socket welding ANSI (B 16.11)

PM 5, 10, 15, 20, 25	20	3/4	27.2	4.9	1.071	0.193	13	0.512	3	027N2001 027N2002
	25	1	33.9	5.7	1.335	0.224	13	0.512		
PM 32	32	1 1/4	42.7	6.05	1.681	0.238	13	0.512	10	027N2003
PM 40	40	1 1/2	48.8	6.35	1.921	0.250	13	0.512	11	027N2004
PM 50	50	2	61.2	6.95	2.409	0.274	16	0.630	12	027N2005
PM 65	65	2 1/2	74.0	8.75	2.913	0.344	16	0.630	13	027N2006

Flange connections

SA



For use with valve type	Size mm	Size in.	ID mm	ID in.	L mm	L in.	Flange type	Code no.
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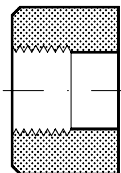
Soldering DIN (2856)

PM 5, 10, 15, 20, 25	22 28		22.08 28.08		16.5 26		3	027L1222 027L1228
PM 32	35		35.07		25		10	027L2335
PM 40	42		42.09		28		11	027L2442
PM 50	54		54.09		33		12	027L2554
PM 65	76		76.1		33		13	027L2676

Soldering (ANSI B 16.22)

PM 5, 10, 15, 20, 25		$\frac{7}{8}$ $1\frac{1}{8}$		0.875 1.125		0.650 1.024	3	027L1223 027L1229
PM 32		$1\frac{3}{8}$		1.375		0.984	10	027L2335
PM 40		$1\frac{5}{8}$		1.625		1.102	11	027L2441
PM 50		$2\frac{1}{8}$		2.125		1.300	12	027L2554
PM 65		$2\frac{5}{8}$		2.625		1.300	13	027L2666

FPT



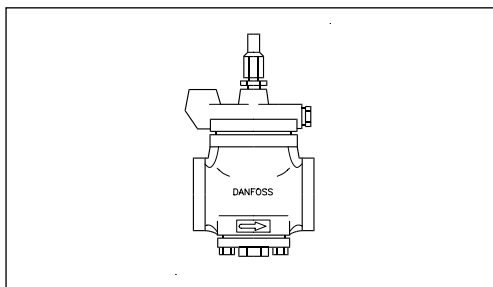
For use with valve type	Size mm	Size in.	Inside pipe thread	Flange type	Code no.
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FPT inside pipe thread, NPT (ANSI/ASME B 1.20.1)

PM 5, 10, 15, 20, 25	20 25	$\frac{3}{4}$ 1	$(\frac{3}{4} \times 14 \text{ NPT})$ $(1 \times 11.5 \text{ NPT})$	3	027G1001 027G1002
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Ordering PM valves

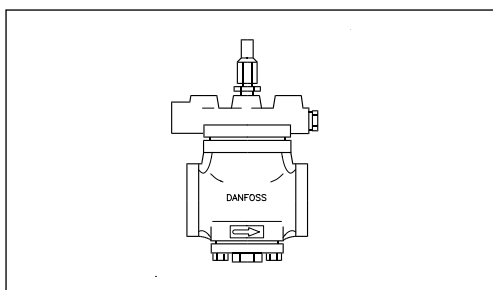
Main valve type PM 1
(for single pilot valve only)



Code number includes: PM 1 valve with flange gaskets and bolts (but without flanges)

Valve type	Code no.
	EN-GJS-400-18-LT*
PM 1-5	027F3001
PM 1-10	027F3002
PM 1-15	027F3003
PM 1-20	027F3004
PM 1-25	027F3005
PM 1-32	027F3006
PM 1-40	027F3007
PM 1-50	027F3008
PM 1-65	027F3009

Main valve type PM 3
(for up to three pilot valves)

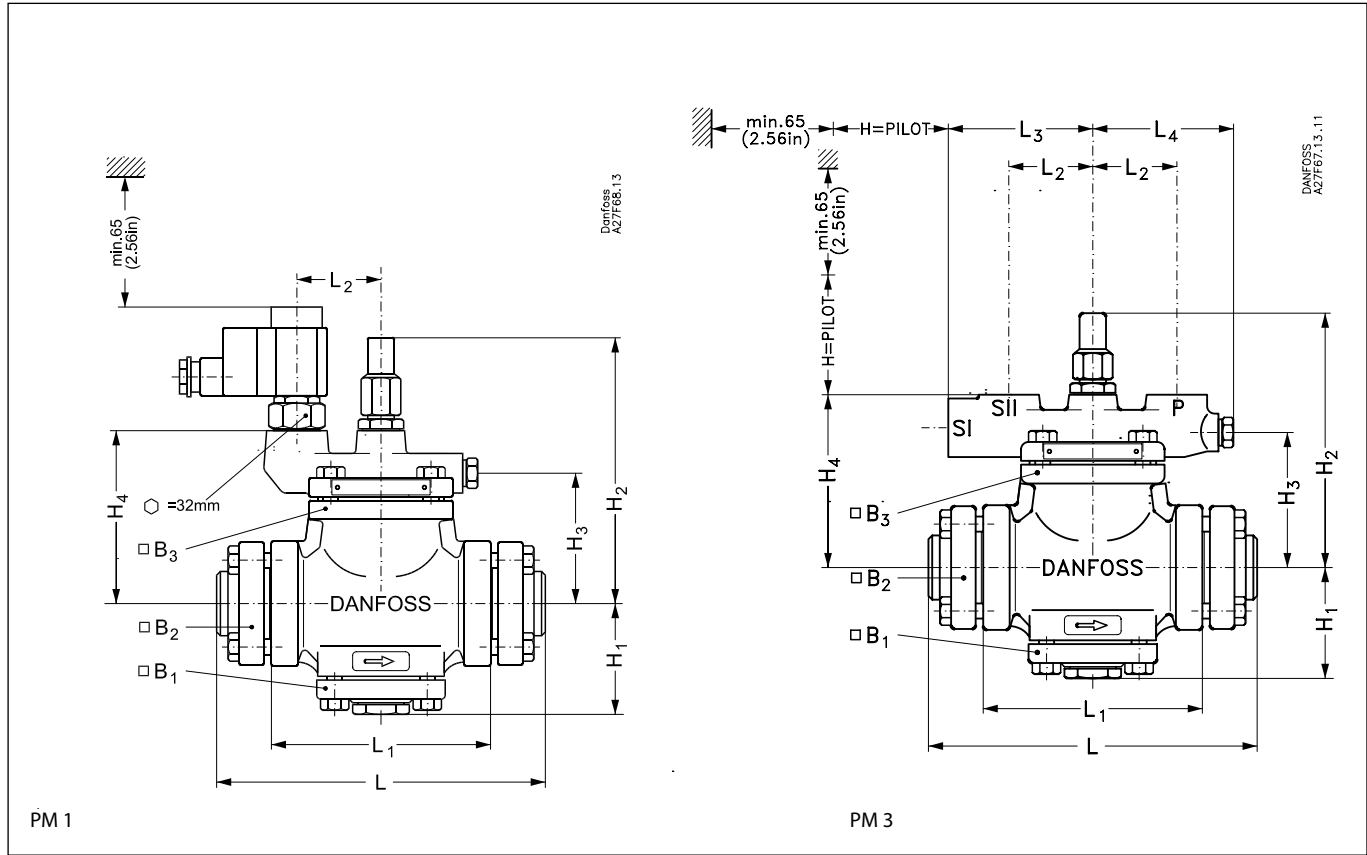


Code number includes: PM 3 valve with flange gaskets and bolts (but without flanges)

Valve type	Code no.
	EN-GJS-400-18-LT*
PM 3-5	027F3010
PM 3-10	027F3011
PM 3-15	027F3012
PM 3-20	027F3013
PM 3-25	027F3014
PM 3-32	027F3015
PM 3-40	027F3016
PM 3-50	027F3017
PM 3-65	027F3018
PM 3-80	027F1271
PM 3-100	027F1276
PM 3-125	027F1281

* CE marked

Dimensions and weights

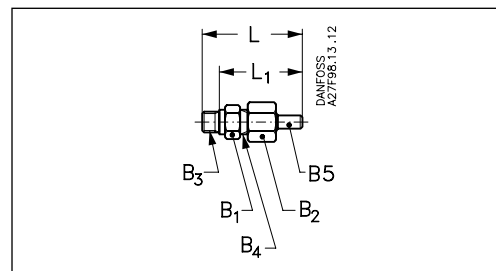


Valve size		H ₁	H ₂	H ₃	H ₄	L	L ₁	L ₂	L ₃	L ₄	B ₁	B ₂	B ₃	Weight ¹⁾	Weight ¹⁾	
<i>PM 1 and PM 3 valve body with flanges</i>													PM 1	PM 3		
PM 5 - 25 (DN 20 - 25 - 32)	mm in.	66 2.60	162 6.38	79 3.11	101 3.98	177 6.97	106 4.17	52 2.05	94 3.70	89 3.50	75 2.95	Oval flange	87 3.43	6.5 kg. 14.3 lb	7 kg. 15.4 lb	
PM 32 (DN 32 - 40)	mm in.	72 2.83	178 7.01	96 3.78	118 4.65	240 9.45	170 6.69	52 2.05	94 3.70	89 3.50	84 3.31	82 3.23	94 3.70	10.8 kg. 23.8 lb	11.3 kg. 24.9 lb	
PM 40 (DN 40 - 50)	mm in.	79 3.11	187 7.36	105 4.13	127 5.00	254 10.00	170 6.69	55 2.17	97 3.82	92 3.62	94 3.70	89 3.50	102 4.02	13.7 kg. 30.2 lb	14 kg. 30.9 lb	
PM 50 (50 - 65)	mm in.	95 3.74	205 8.07	123 4.84	144 5.67	288 11.34	200 7.87	55 2.17	97 3.82	92 3.62	104 4.09	106 4.17	113 4.45	19.5 kg. 43.0 lb	19.8 kg. 43.7 lb	
PM 65 (65 - 80)	mm in.	109 4.29	227 8.94	146 5.75	167 6.57	342 13.46	250 9.84	60 2.36	102 4.02	97 3.82	127 5.00	113 4.45	135 5.31	28 kg. 61.7 lb	28.3 kg. 62.4 lb	
PM 80 (DN 100)	mm in.	152 5.98	365 14.37	214 8.43	238 9.37	437 17.20	310 12.20	69 2.72	115 4.53	119 4.69	190 7.48	235 9.25	210 8.27		80 kg. 176.4 lb	
PM 100 (DN 125)	mm in.	173 6.81	396 15.59	246 9.69	269 10.59	489 19.25	350 13.78	83 3.27	125 4.92	133 5.24	226 8.90	270 10.63	243 9.57		120 kg. 264.6 lb	
PM 125 (DN 150)	mm in.	208 8.19	453 17.83	301 11.85	325 12.80	602 23.70	455 17.91	99 3.90	151 5.94	155 6.10	261 10.28	300 11.81	286 11.26		170 kg. 374.8 lb	

¹⁾ PM valve with flanges but without pilot valves

Accessories

Pressure gauge connection (weld / solder).



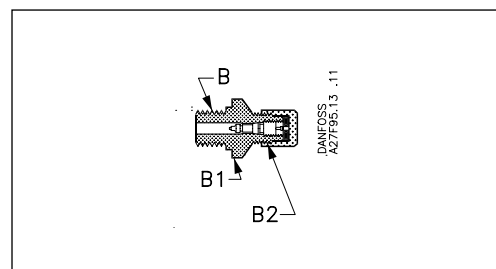
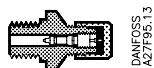
Description	Code no.
∅ 6.5 mm / ∅ 10 mm (∅ 0.26 in. / ∅ 0.39 in.) weld / solder	027B2035

Accessories		L	L ₁	B ₁	B ₂	B ₃	B ₄	B ₅
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Pressure gauge connection (weld / solder)

	mm	66	54	AF 19	AF 22	G 1/4 A	G 3/8 A	∅6.5 / ∅10
	in.	2.60	2.13					

Pressure gauge connection, 1/4 in. flare (self-closing)
Must not be used in ammonia plant.



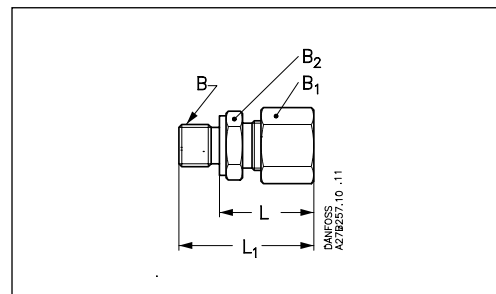
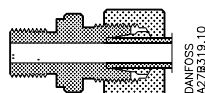
Description	Code no.
1/4 in. flare	027B2041

Accessories						B	B ₁	B ₂
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Pressure gauge connection, 1/4 in. flare (self-closing)

1/4 in. flare	mm					G 1/4 A	AF 19	1/4 in. flare
	in.							

Pressure gauge connection (cutting ring).



Description	Code no.
Cutting ring connection, 6 mm	027B2063
Cutting ring connection, 10 mm	027B2064

Accessories		L	L ₁			B	B ₁	B ₂
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Pressure gauge connection (cutting ring)

6 mm	mm		27	39		G 1/4 A	AF 19	AF 14
	in.		1.06	1.54				
10 mm	mm		29	40		G 1/4 A	AF 19	AF 14
	in.		1.14	1.57				

Stainless steel: flanges, bolts for flanges and bolts for top and bottom covers, see flange connections for ordering.