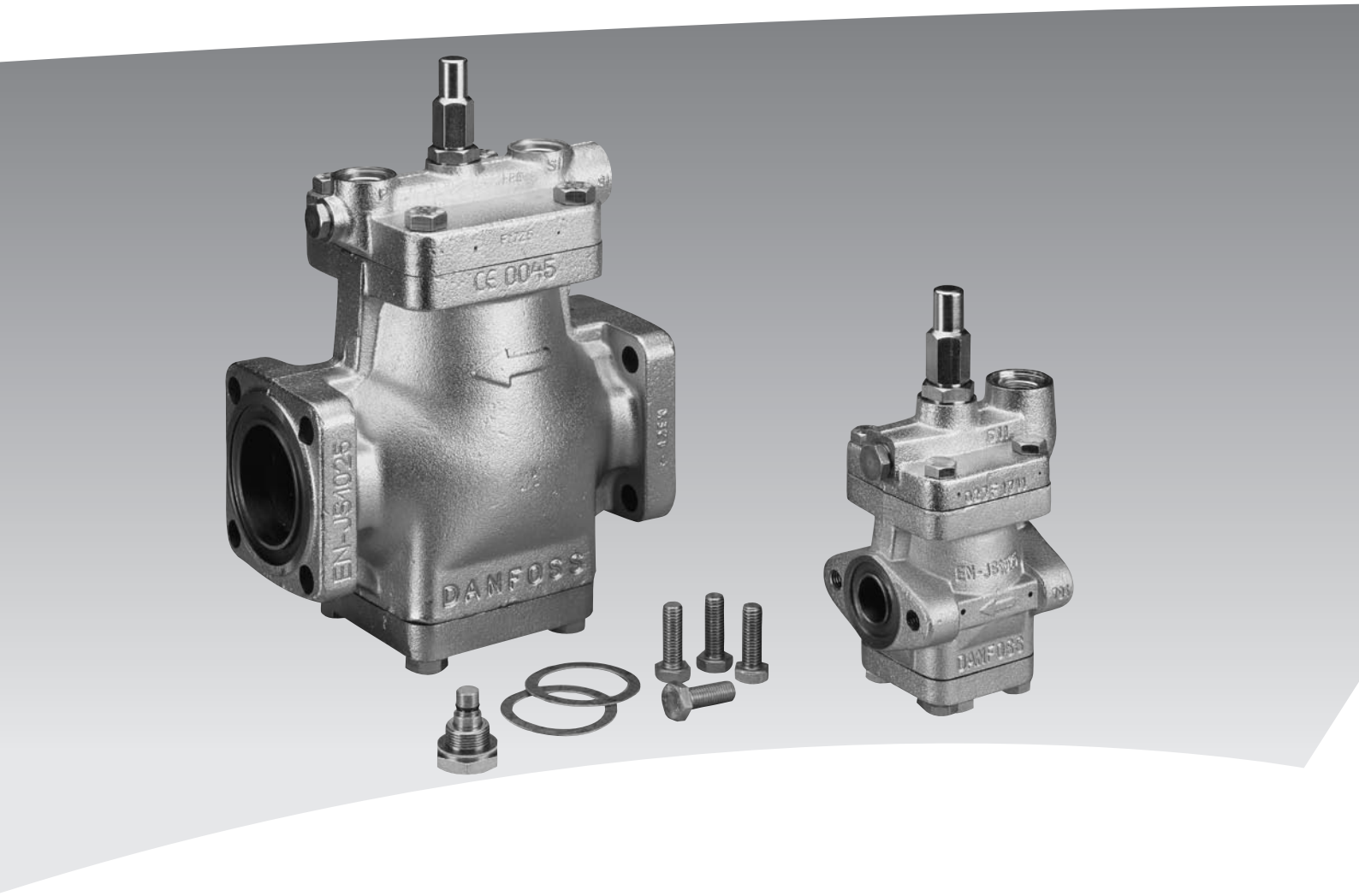

Pilot operated main valves for regulating pressure and temperature

Type PM

REFRIGERATION AND
AIR CONDITIONING

Technical leaflet

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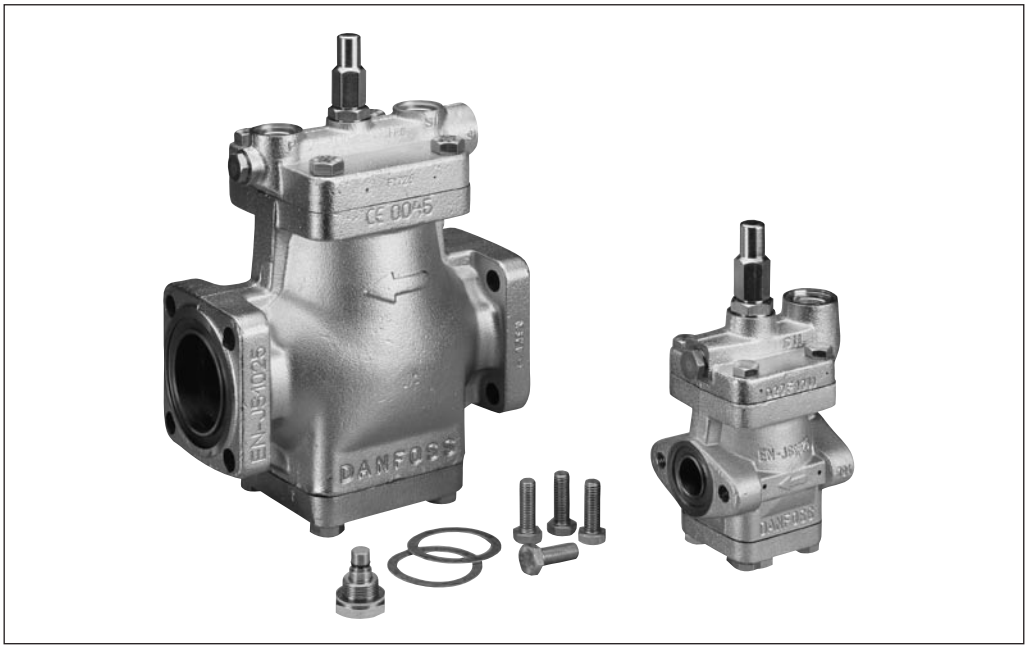

Introduction

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.

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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.

CE

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.)

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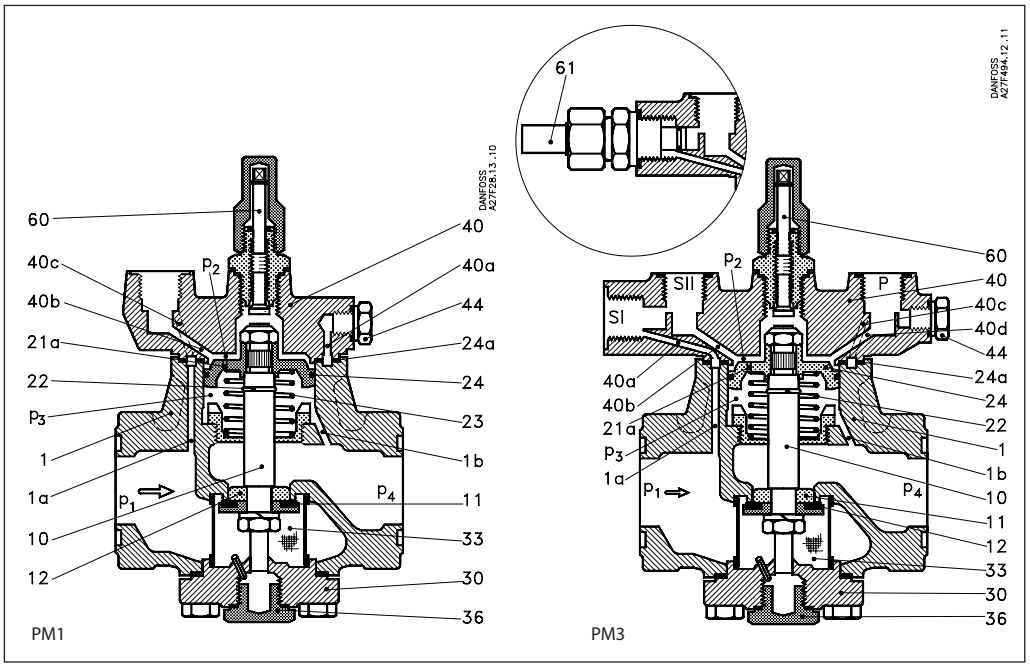
Design, function

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
$p_2 = p_4 + 0.2$ bar (2.9 psi)~ fully open
$p_4 \leq p_2 \leq p_4 + 0.2$ 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.

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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.

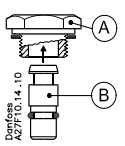
The PM3 main valve will be fully open if the pilot valve in P is fully open, irrespective of the degree of opening of pilot valves SI and SII.
The PM 3 main valve will be fully closed if the pilot valve in P is fully closed and at least one of the valves in SI or SII is fully closed at the same time. The relation between the pilot valves in ports SI, SII and P is shown in the table above.

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.

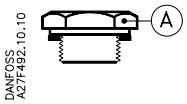
Depending on the function of the pilot valves, the PM regulating characteristic becomes:
on/off
proportional
integral or
cascade.

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

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



Blanking plug
A + B



Blanking plug A

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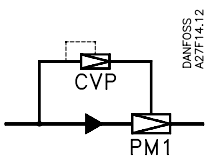
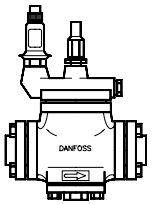
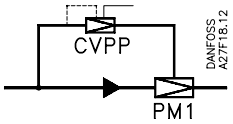
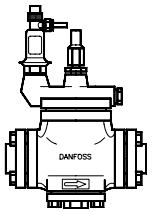
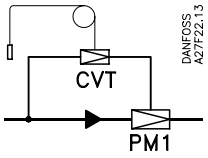
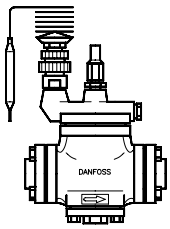
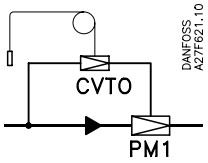
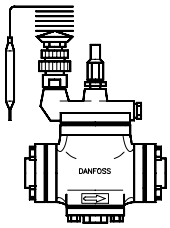
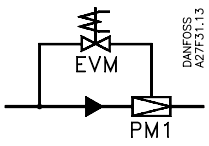
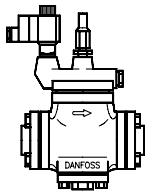
Function examples

Example no. 1-1		Products	
Constant pressure regulation. –0.66 to 7 bar g (19.5 in. Hg to 102 psig).		1 × PM 1 1 × CVP (LP) 2 × flanges	

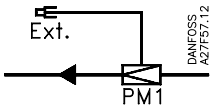
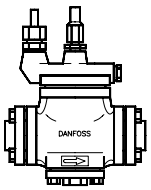
Example no. 1-2		Products	
Differential pressure regulation. 0 to 7 bar g (0 to 102 psig).		1 × PM 1 1 × CVPP (LP) 2 × flanges	

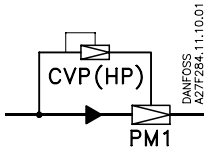
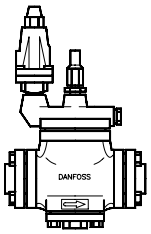
Example no. 1-3		Products	
Temperature regulation. –40 to 60°C (–40 to 140°F). Opening at rising temperature. Pressure independent.		1 × PM 1 1 × CVT 2 × flanges	

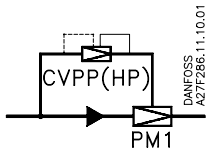
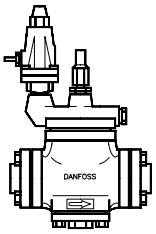
Example no. 1-4		Products	
Temperature regulation. –40 to 60°C (–40 to 140°F). Closing at rising temperature. Pressure independent.		1 × PM 1 1 × CVTO 2 × flanges	

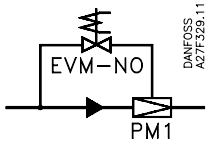
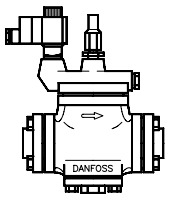
Example no. 1-5		Products	
On/off regulation (solenoid valve).		1 × PM 1 1 × EVM 2 × flanges	

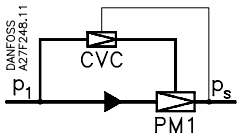
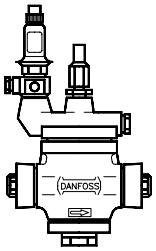
Function examples *(continued)*

Example no. 1-6		Products	
Regulation with external control pressure.		1 × PM 1 1 × nipple for external control pressure 2 × flanges	

Example no. 1-7		Products	
Constant pressure regulation. –0.66 to 28 bar g (19.5 in. Hg to 406 psig).		1 × PM 1 1 × CVP (HP) 2 × flanges	

Example no. 1-8		Products	
Differential pressure regulation. 0 to 22 bar g (0 to 319 psig).		1 × PM 1 1 × CVPP (HP) 2 × flanges	

Example no. 1-9		Products	
On/off regulation (solenoid valve).		1 × PM 1 1 × EVM-NO (12 W coil) 2 × flanges	

Example no. 1-10		Products	
Crankcase pressure regulation. (Max. suction pressure regulation) –0.45 to 7 bar g (13.3 in. Hg to 102 psig).		1 × PM 1 1 × CVC 2 × flanges	

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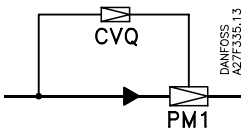
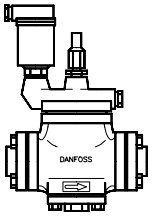
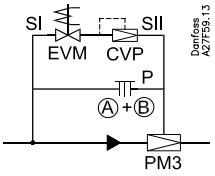
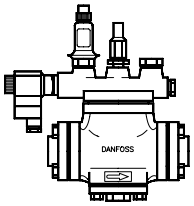
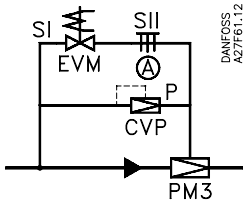
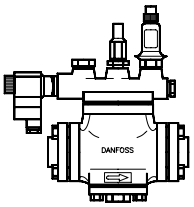
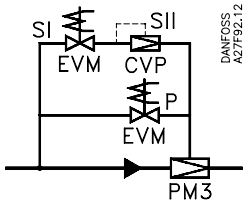
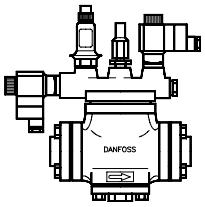
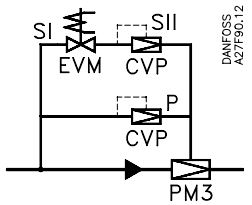
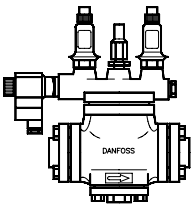
Function examples *(continued)*

Example no. 1-11		Products	
Electronically controlled media temperature regulation. –1 to 8 bar g (0 in. Hg to 116 psig).		1 × PM 1 1 × CVQ 2 × flanges	

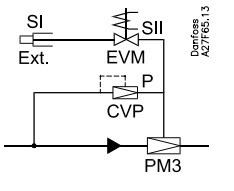
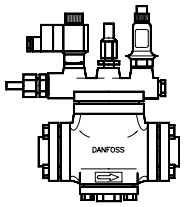
Example no. 3-1		Products	
Constant pressure regulation combined with electrical shut off. –0.66 to 7 bar g (19.5 in. Hg to 102 psig).		1 × PM 3 1 × blanking plug 1 × CVP (LP) 1 × EVM 2 × flanges	

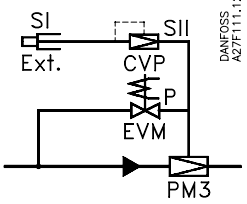
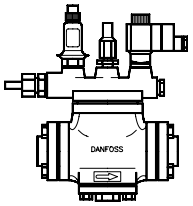
Example no. 3-2		Products	
Constant pressure regulation combined with electrical wide open. –0.66 to 7 bar g (19.5 in. Hg to 102 psig).		1 × PM 3 1 × blanking plug 1 × CVP (LP) 1 × EVM 2 × flanges	

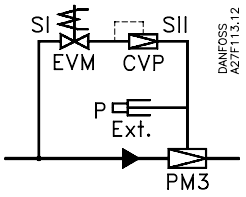
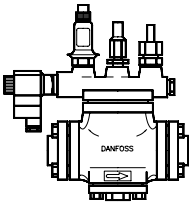
Example no. 3-3		Products	
Constant pressure regulation combined with electrical shut off and wide open. –0.66 to 7 bar g (19.5 in. Hg to 102 psig).		1 × PM 3 1 × CVP (LP) 2 × EVM 2 × flanges	

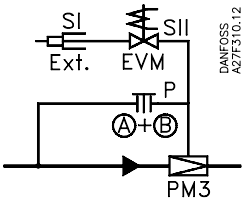
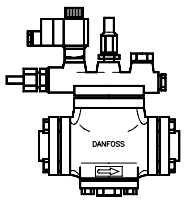
Example no. 3-4		Products	
Constant pressure regulation with change-over between two preset evaporating pressures. –0.66 to 7 bar g (19.5 in. Hg to 102 psig).		1 × PM 3 2 × CVP (LP) 1 × EVM 2 × flanges	

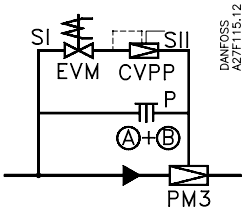
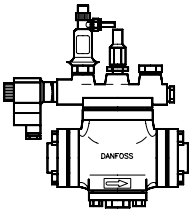
Function examples *(continued)*

Example no. 3-5		Products	
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).		1 × PM 3 1 × nipple for external control pressure 1 × CVP (LP) 1 × EVM 2 × flanges	

Example no. 3-6		Products	
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).		1 × PM 3 1 × nipple for external control pressure 1 × CVP (LP) 1 × EVM 2 × flanges	

Example no. 3-7		Products	
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).		1 × PM 3 1 × nipple for external control pressure 1 × CVP (LP) 1 × EVM 2 × flanges	

Example no. 3-8		Products	
Solenoid valve with external control pressure for small pressure drops.		1 × PM 3 1 × blanking plug 1 × nipple for external control pressure 1 × EVM 2 × flanges	

Example no. 3-9		Products	
Differential pressure regulation combined with electrical shut off. 0 to 7 bar g (0 to 102 psig).		1 × PM 3 1 × blanking plug 1 × CVPP (LP) 1 × EVM 2 × flanges	

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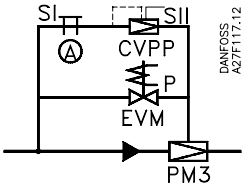
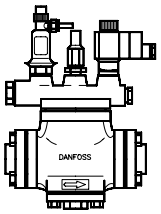
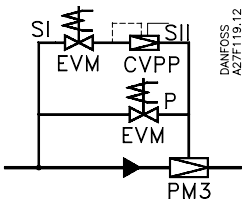
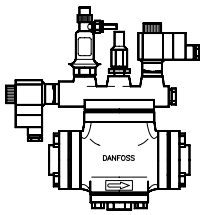
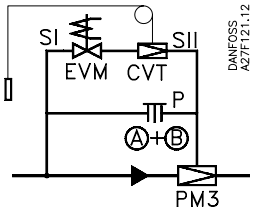
Function examples *(continued)*

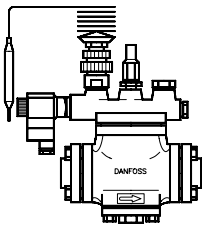
Example no. 3-10	
Differential pressure regulation combined with electrical wide open. 0 to 7 bar g (0 to 102 psig).	

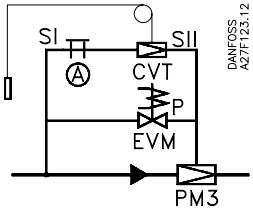
Products	
1 × PM 3 1 × blanking plug 1 × CVPP (LP) 1 × EVM 2 × flanges	

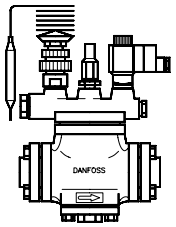
Example no. 3-11	
Differential pressure regulation combined with electrical wide open and shut off. 0 to 7 bar g (0 to 102 psig).	

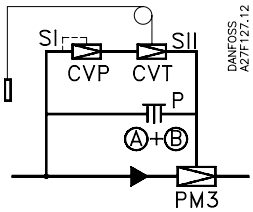
Products	
1 × PM 3 1 × CVPP (LP) 2 × EVM 2 × flanges	

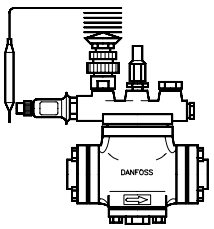
Example no. 3-12	
Thermostatic regulation combined with electrical shut off. Pressure independent. –40 to 60°C (–40 to 140°F).	

Products	
1 × PM 3 1 × blanking plug 1 × CVT 1 × EVM 2 × flanges	

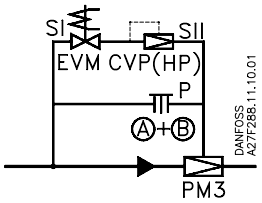
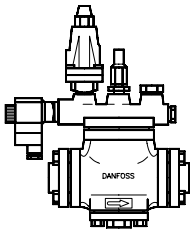
Example no. 3-13	
Thermostatic regulation combined with electrical wide open. Pressure independent. –40 to 60°C (–40 to 140°F).	

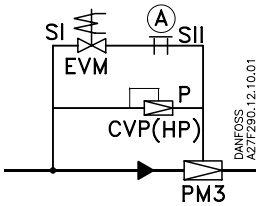
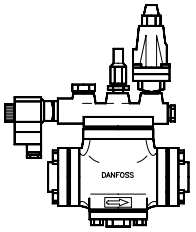
Products	
1 × PM 3 1 × blanking plug 1 × CVT 1 × EVM 2 × flanges	

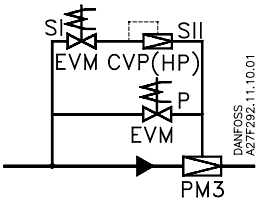
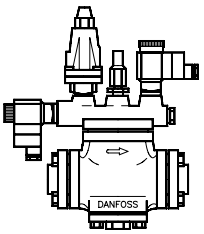
Example no. 3-14	
Thermostatic regulation with protection against too low evaporating pressure. –40 to 60°C (–40 to 140°F). –0.66 to 7 bar g (19.5 in. Hg to 102 psig).	

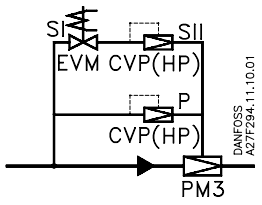
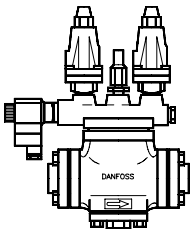
Products	
1 × PM 3 1 × blanking plug 1 × CVT 1 × CVP 2 × flanges	

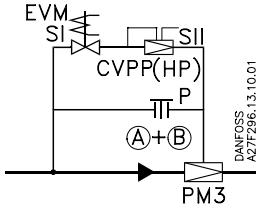
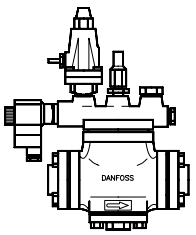
Function examples *(continued)*

Example no. 3-15		Products	
Constant pressure regulation combined with electrical shut off. –0.66 to 28 bar g (19.5 in. Hg to 406 psig).		1 × PM 3 1 × blanking plug 1 × CVP (HP) 1 × EVM 2 × flanges	

Example no. 3-16		Products	
Constant pressure regulation combined with electrical wide open. –0.66 to 28 bar g (19.5 in. Hg to 406 psig).		1 × PM 3 1 × blanking plug 1 × CVP (HP) 1 × EVM 2 × flanges	

Example no. 3-17		Products	
Constant pressure regulation combined with electrical shut off and wide open. –0.66 to 28 bar g (19.5 in. Hg to 406 psig).		1 × PM 3 1 × CVP (HP) 2 × EVM 2 × flanges	

Example no. 3-18		Products	
Constant pressure regulation with change-over between two preset evaporating pressures. –0.66 to 28 bar g (19.5 in. Hg to 406 psig).		1 × PM 3 2 × CVP (HP) 1 × EVM 2 × flanges	

Example no. 3-19		Products	
Differential pressure regulation combined with electrical shut off. 0 to 22 bar g (0 to 319 psig).		1 × PM 3 1 × blanking plug 1 × CVPP (HP) 1 × EVM 2 × flanges	

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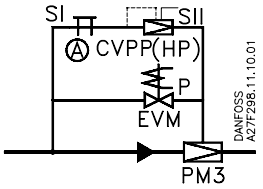
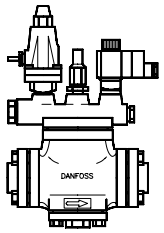
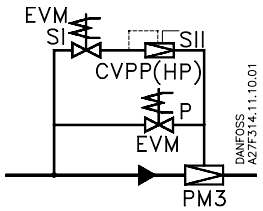
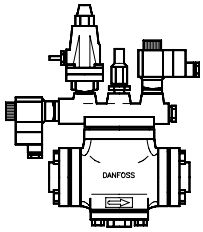
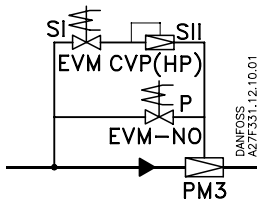
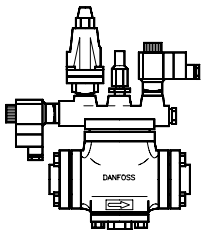
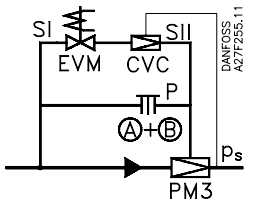
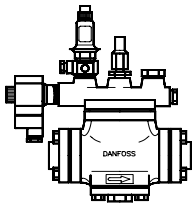
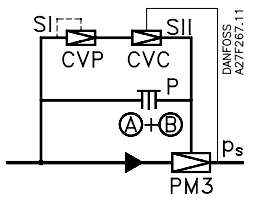
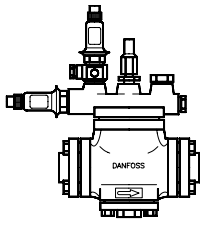
Function examples *(continued)*

Example no. 3-20		Products	
Differential pressure regulation combined with electrical wide open. 0 to 22 bar g (0 to 319 psig).		1 × PM 3 1 × blanking plug 1 × CVPP (HP) 1 × EVM 2 × flanges	

Example no. 3-21		Products	
Differential pressure regulation combined with electrical wide open and shut off. 0 to 22 bar g (0 to 319 psig).		1 × PM 3 1 × CVPP (HP) 2 × EVM 2 × flanges	

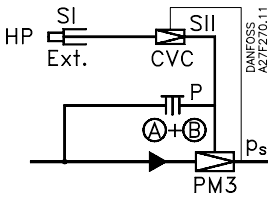
Example no. 3-22		Products	
Constant pressure regulation combined with electrical wide open and shut off. –0.66 to 28 bar g (19.5 in. Hg to 406 psig).		1 × PM 3 1 × CVP (HP) 1 × EVM 1 × EVM-NO (12 W coil) 2 × flanges	

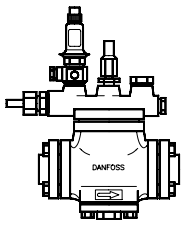
Example no. 3-23		Products	
Crankcase pressure regulation (max. suction pressure regulation) combined with shut off. –0.45 to 7 bar g (13.3 in. Hg to 102 psig).		1 × PM 3 1 × blanking plug 1 × CVC 1 × EVM 2 × flanges	

Example no. 3-24		Products	
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).		1 × PM 3 1 × blanking plug 1 × CVC 1 × CVP(LP) 2 × flanges	

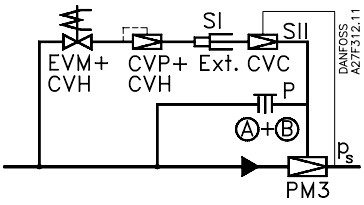
Function examples *(continued)*

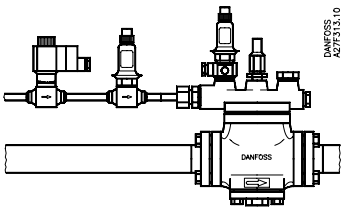
Example no. 3-25	Products
Crankcase pressure regulation (max. suction pressure regulation) at low pressure drops across the main valve. –0.45 to 7 bar g (13.3 in. Hg to 102 psig).	1 × PM 3 1 × blanking plug 1 × nipple for external control pressure 1 × CVC 2 × flanges



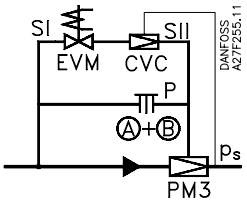


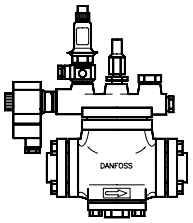
Example no. 3-26	Products
Crankcase pressure regulation (max. suction pressure regulation) combined with constant pressure regulation and electrical shut off. –0.66 to 7 bar g (19.5 in. Hg to 102 psig).	1 × PM 3 1 × blanking plug 1 × nipple for external control pressure 1 × CVP (LP) 1 × EVM 2 × CVH 1 × CVC 2 × flanges



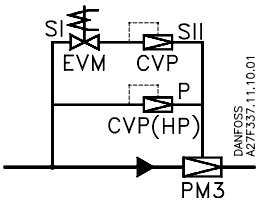


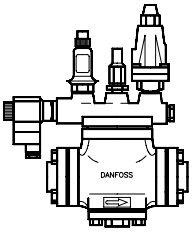
Example no. 3-27	Products
Hot gas bypass regulation combined with electrical shut off. –0.45 to 7 bar g (13.3 in. Hg to 102 psig).	1 × PM 3 1 × blanking plug 1 × CVC 1 × EVM 2 × flanges



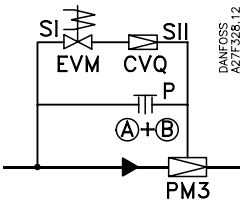


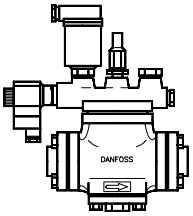
Example no. 3-28	Products
Constant pressure regulation with electrical shut off and protection against high pressure when suction line is closed. –0.66 to 28 bar g (19.5 in. Hg to 406 psig).	1 × PM 3 1 × CVP (LP) 1 × EVM 1 × CVP (HP) 2 × flanges





Example no. 3-29	Products
Electronically controlled media temperature regulation combined with electrical shut off. –1 to 8 bar g (0 in. Hg to 116 psig).	1 × PM 3 1 × blanking plug 1 × CVQ 1 × EVM 2 × flanges





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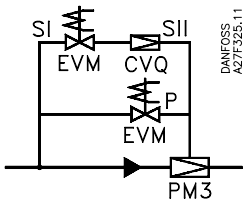
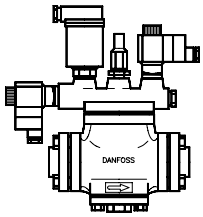
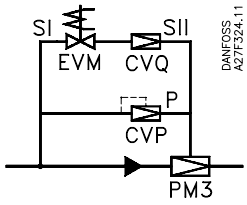
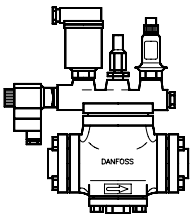
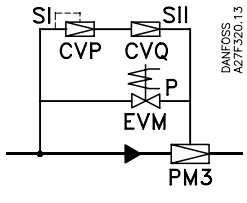
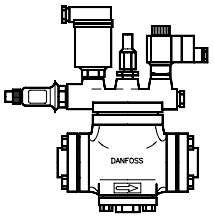
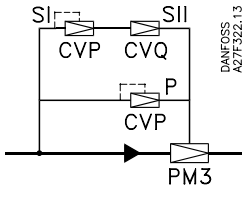
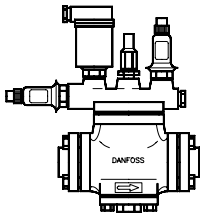
Function examples *(continued)*

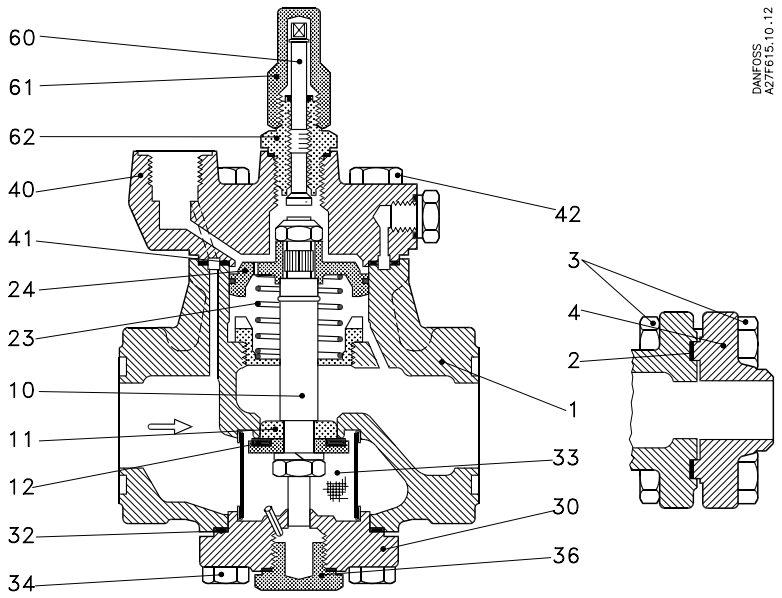
Example no. 3-30		Products	
Electronically controlled media temperature regulation combined with electrical shut off and wide open. –1 to 8 bar g (0 in. Hg to 116 psig).		1 × PM 3 1 × CVQ 2 × EVM 2 × flanges	

Example no. 3-31		Products	
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).		1 × PM 3 1 × CVQ 1 × CVP (LP) 1 × EVM 2 × flanges	

Example no. 3-32		Products	
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).		1 × PM 3 1 × CVQ 1 × CVP (LP) 1 × EVM 2 × flanges	

Example no. 3-33		Products	
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).		1 × PM 3 1 × CVQ 2 × CVP (LP) 2 × flanges	

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

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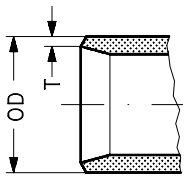
Flange connections

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

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

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

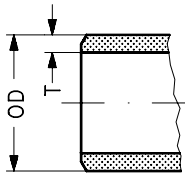
DIN



Butt welding DIN (2448)

For use with valve type	Size mm	Size in.	OD mm	T mm	OD in.	T in.	Flange type	Code no.
PM 5, 10, 15, 20, 25	20 25 32	3/4 1 1 1/4	26.9 33.7 42.4	2.3 2.6 2.6	1.059 1.327 1.669	0.091 0.103 0.102	3	**027N1220** **027N1225** **027N1230**
PM 32	32 40	1 1/4 1 1/2	42.4 48.3	2.6 2.6	1.669 1.902	0.102 0.103	10	**027N2332** **027N2340**
PM 40	40 50	1 1/2 2	48.3 60.3	2.6 2.9	1.902 2.370	0.103 0.110	11	**027N2440** **027N2450**
PM 50	50 65	2 2 1/2	60.3 76.1	2.9 2.9	2.370 3.000	0.110 0.110	12	**027N2550** **027N2565**
PM 65	65 80	2 1/2 3	76.1 88.9	2.9 3.2	3.000 3.500	0.110 0.130	13	**027N2665** **027N2680**
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**

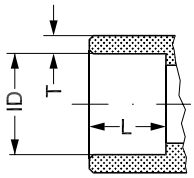
ANSI



Butt welding ANSI B 36.10

For use with valve type	Size mm	Size in.	OD mm	T mm	OD in.	T in.	Flange type	Schedule	Code no.
PM 5, 10, 15, 20, 25	20 25 32	3/4 1 1 1/4	26.9 33.7 42.4	4.0 4.6 4.9	1.059 1.327 1.669	0.158 0.181 0.193	3	80 80 80	**027N3031** **027N3032** **027N3033**
PM 32	32 40	1 1/4 1 1/2	42.4 48.3	4.9 5.1	1.669 1.902	0.193 0.201	10	80 80	**027N3034** **027N3035**
PM 40	40 50	1 1/2 2	48.3 60.3	5.1 3.9	1.902 2.370	0.201 0.150	11	80 40	**027N3036** **027N3037**
PM 50	50 65	2 2 1/2	60.3 73.0	3.9 5.2	2.370 2.870	0.150 0.200	12	40 40	**027N3038** **027N3039**
PM 65	65 80	2 1/2 3	73.0 88.9	5.2 5.5	2.870 3.500	0.200 0.220	13	40 40	**027N3040** **027N3041**
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



Socket welding ANSI (B 16.11)

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.
PM 5, 10, 15, 20, 25	20 25	3/4 1	27.2 33.9	4.9 5.7	1.071 1.335	0.193 0.224	13 13	0.512 0.512	3	**027N2001** **027N2002**
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**

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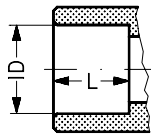
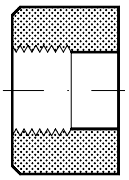
Flange connections

SA



For use with valve type	Size mm	Size in.	ID mm		ID in.		L mm	L in.	Flange type	Code no.
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		$^{7}/_{8}$ $1^{1}/_{8}$			0.875 1.125			0.650 1.024	3	**027L1223** **027L1229**
PM 32		$1^{3}/_{8}$			1.375			0.984	10	**027L2335**
PM 40		$1^{5}/_{8}$			1.625			1.102	11	**027L2441**
PM 50		$2^{1}/_{8}$			2.125			1.300	12	**027L2554**
PM 65		$2^{5}/_{8}$			2.625			1.300	13	**027L2666**

FPT



For use with valve type	Size mm	Size in.	Inside pipe thread	Flange type	Code no.
FPT inside pipe thread, NPT (ANSI/ASME B 1.20.1)					
PM 5, 10, 15, 20, 25	20 25	$^{3}/_{4}$ 1	($^{3}/_{4}$ × 14 NPT) (1 × 11.5 NPT)	3	**027G1001** **027G1002**

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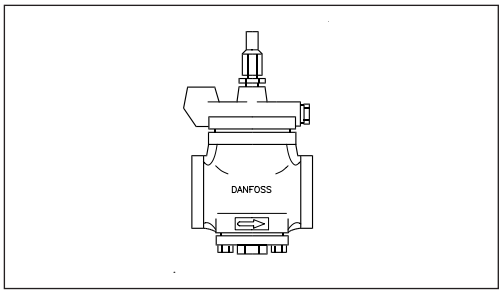
Ordering PM valves

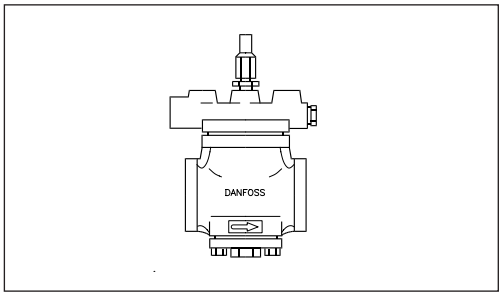
Main valve type PM 1
(for single pilot valve only)



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

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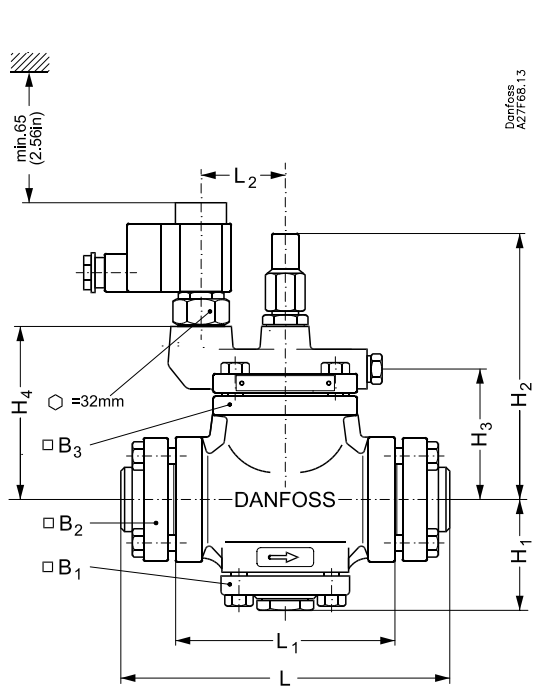
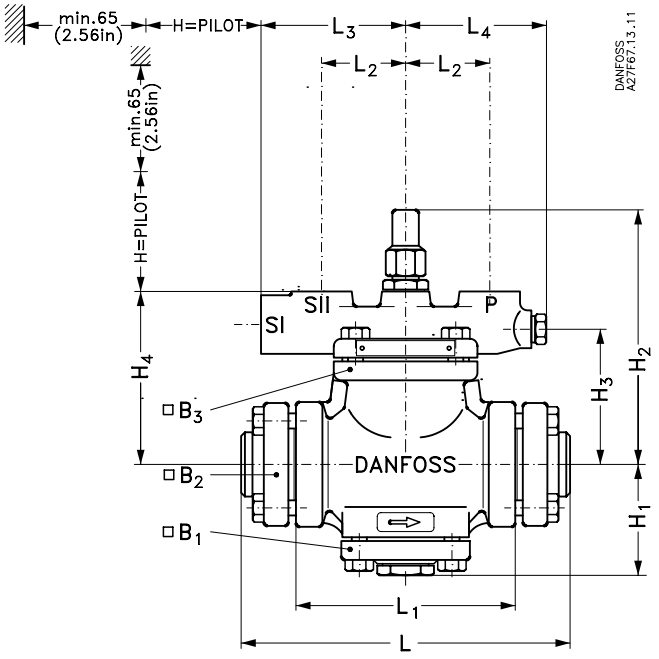
Dimensions and weights



PM 1



PM 3

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

[1] PM valve with flanges but without pilot valves

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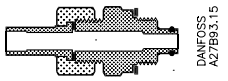
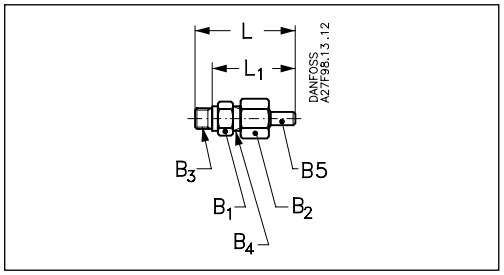
Accessories

Pressure gauge connection (weld / solder).

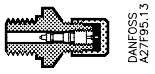


Description	Code no.
∅ 6.5 mm / ∅ 10 mm (∅ 0.26 in. / ∅ 0.39 in.) weld / solder	**027B2035**

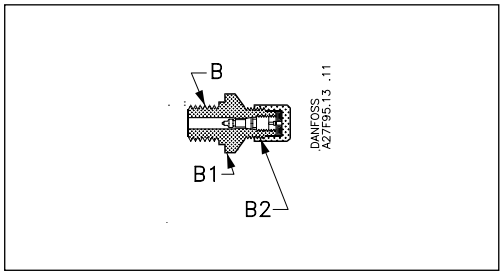


Accessories		L	L_1	B_1	B_2	B_3	B_4	B_5
Pressure gauge connection (weld / solder)								
	mm in.	66 2.60	54 2.13	AF 19	AF 22	G 1/4 A	G 3/8 A	∅6.5 / ∅10

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

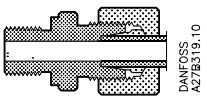


Description	Code no.
1/4 in. flare	**027B2041**

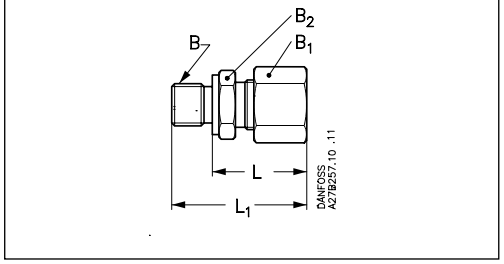


Accessories						B	B_1	B_2
Pressure gauge connection, 1/4 in. flare (self-closing)								
1/4 in. flare	mm in.					G 1/4 A	AF 19	1/4 in. flare

Pressure gauge connection (cutting ring).



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

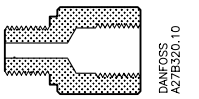


Accessories			L	L_1		B	B_1	B_2
Pressure gauge connection (cutting ring)								
6 mm	mm in.		27 1.06	39 1.54		G 1/4 A	AF 19	AF 14
10 mm	mm in.		29 1.14	40 1.57		G 1/4 A	AF 19	AF 14

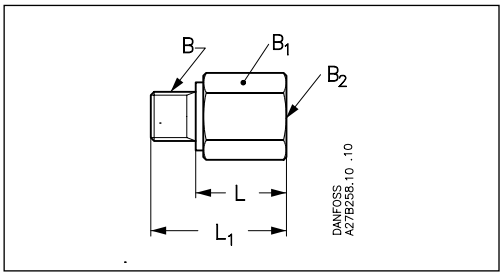
Stainless steel: flanges, bolts for flanges and bolts for top and bottom covers, see flange connections for ordering.

Accessories
(continued)

Pressure gauge connection ($^1/_4$ FPT).

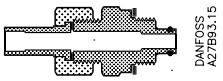


Description	Code no.
$^1/_4$ FPT	**027B2062**

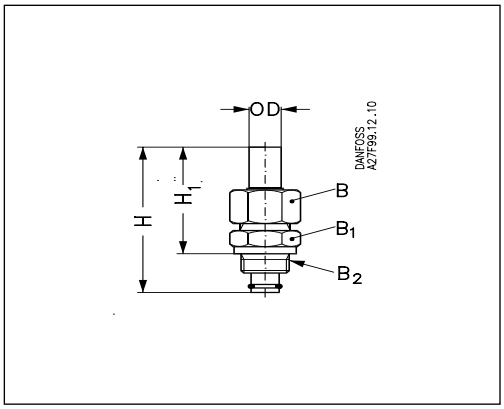


Accessories			L	L_1		B	B_1	B_2
Pressure gauge connection								
	mm in.		23 0.91	35.5 1.40		G $^1/_4$ A	AF 22	$^1/_4$ FPT

External pilot connection.



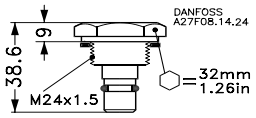
PM	Description	Code no.
5 - 65	External pilot connection (incl. damping orifice, D: 1.0 mm)	**027F1048**
80 - 125	External pilot connection (incl. damping orifice, D: 1.8 mm)	**027F1049**
5 - 125	Accessory bag with seal and O-ring for pilot valve	**027F0666**



Accessories			H	H_1	OD	B	B_1	B_2
External pilot connection								
	mm in.		90 3.54	66 2.60	18 0.71	AF 32	AF 32	M 24 × 1.5

Blanking plug for pilot valves.

Description	Code no.
Blanking plug	**027F1046**



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

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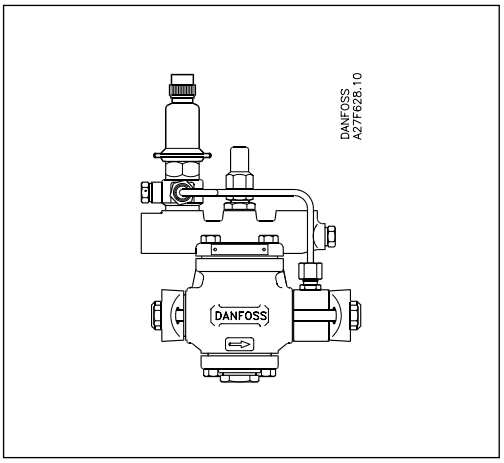
Accessories
(continued)

Mounting set for:
- PMC + CVC (hot gas bypass)
- PM + CVC (max. suction pressure regulation).

The mounting set contains all necessary parts for mounting a CVC pilot valve on a PM main valve.

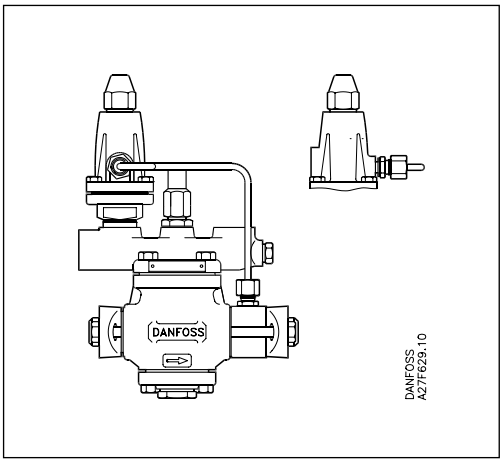
Main valve	Pilot valve	**Code no.**
PMC 5 - 25 PM 5 - 25	CVC	**027F3190**
PM 32	CVC	**027F3191**
PM 40	CVC	**027F3192**
PM 50	CVC	**027F3193**
PM 65	CVC	**027F3194**



Mounting set PM + CVPP (HP).

The mounting set contains all necessary parts for mounting a CVP (HP) pilot valve on a PM main valve.

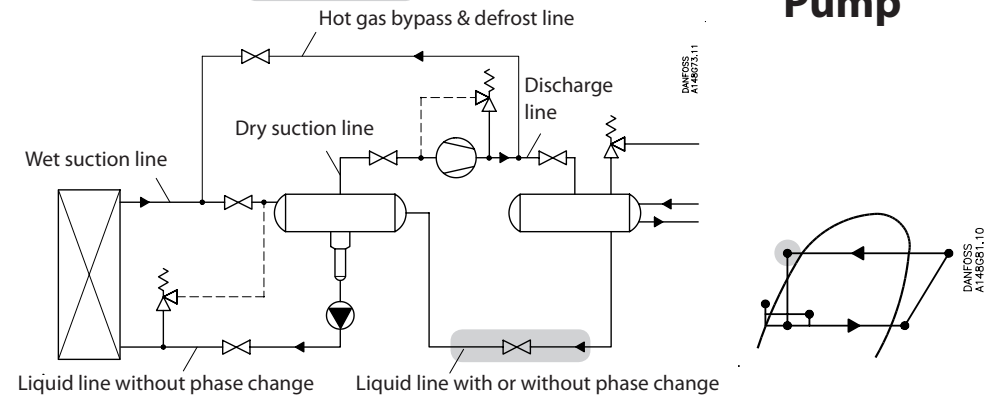
Main valve	Pilot valve	**Code no.**
PM 5 - 25	CVPP (HP)	**027F3195**
PM 32	CVPP (HP)	**027F3196**
PM 40	CVPP (HP)	**027F3197**
PM 50	CVPP (HP)	**027F3198**
PM 65	CVPP (HP)	**027F3199**



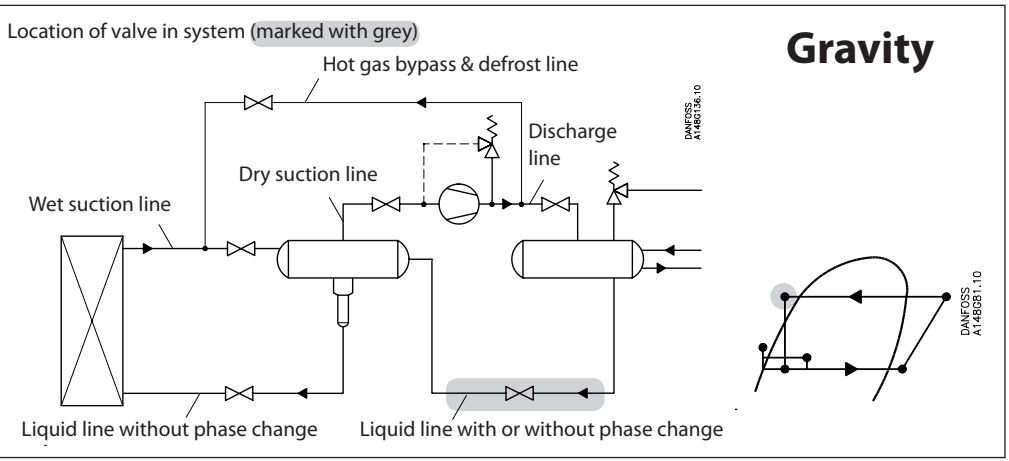
Nominal capacities

Liquid line

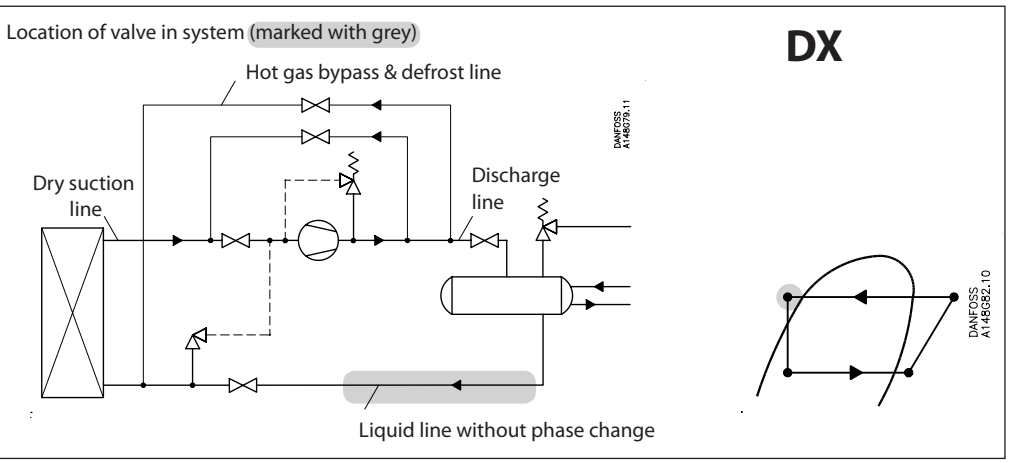
Pump



Gravity



DX



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Nominal capacities

Liquid line

SI units

Calculation example (R 134a capacities):

Running conditions in a plant are as follows:
T_e = –20°C
Q_0 = 300 kW
T_{liq} = 10°C
Max. ΔP = 0.3 bar

The capacity table is based on nominal conditions (ΔP = 0.2 bar, T_{liq} = 30°C).

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for ΔP 0.3 bar $f_{\Delta P}$ = 0.82.
Correction factor for liquid temperature f_{Tliq} = 0.82.

$Q_n = Q_o \times f_{\Delta P} \times f_{Tliq} = 300 \times 0.82 \times 0.82 = 202$ kW.

From the capacity table a PM 25 with Q_n = 224 kW is the correct selection for the application.

US units

Calculation example (R 134a capacities):

Running conditions in a plant are as follows:
T_e = –20°F
Q_o = 130 TR
T_{liq} = 50°F
Max. ΔP = 5 psi

The capacity table is based on nominal conditions (ΔP = 3 psi, T_{liq} = 90°F)

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for ΔP 5 psi, $f_{\Delta P}$ = 0.79
Correction factor for liquid temperature f_{Tliq} = 0.81.

$Q_n = Q_o \times f_{\Delta P} \times f_{Tliq} = 130 \times 0.79 \times 0.81 = 83.2$ TR

From the capacity table a PM 32 with Q_n = 91 TR is the correct selection for the application.

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Nominal capacities

Liquid line

SI units

Capacity table for nominal conditions, Q_N [kW],
T_{liq} = 30°C,
ΔP = 0.2 bar

R 717

Type	k_v m³/h	Evaporating temperature T_e							
		–50°C	–40°C	–30°C	–20°C	–10°C	0°C	10°C	20°C
PM 5	1.6	161	164	166	168	170	172	174	175
PM 10	3	302	307	311	316	319	322	325	328
PM 15	4	403	410	415	421	426	430	434	437
PM 20	7	706	717	727	736	745	752	759	765
PM 25	11.5	1159	1177	1194	1210	1224	1236	1247	1256
PM 32	17.2	1734	1761	1786	1809	1830	1849	1865	1879
PM 40	30	3025	3071	3115	3156	3192	3225	3253	3277
PM 50	43	4335	4402	4465	4523	4576	4622	4663	4697
PM 65	79	7965	8088	8203	8310	8406	8492	8567	8629
PM 80	141	14216	14435	14640	14831	15004	15157	15290	15401
PM 100	205	20669	20987	21286	21563	21814	22036	22231	22392
PM 125	329	33171	33682	34161	34605	35009	35365	35677	35936

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (bar)	Correction factor
0.2	**1.00**
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for liquid temperature (T_{liq})

Liquid temperature	Correction factor
–20°C	0.82
–10°C	0.86
0°C	0.88
10°C	0.92
20°C	0.96
30°C	**1.00**
40°C	1.04
50°C	1.09

US units

Capacity table for nominal conditions, Q_N [Tons of Refrigeration],
T_{liq} = 90°F,
ΔP = 3 psi

R 717

Type	C_v USgal/min	Evaporating temperature T_e							
		–60°F*	–40°F	–20°F	0°F	20°F	40°F	60°F	80°F
PM 5	1.9	46	47	47	48	48	49	49	49
PM 10	3.5	86	88	89	90	90	91	92	92
PM 15	4.6	115	117	118	119	121	121	122	122
PM 20	8.1	202	204	207	209	211	212	214	214
PM 25	13.3	331	336	340	343	347	349	351	352
PM 32	20	495	502	508	514	518	522	525	527
PM 40	35	864	876	886	896	904	911	915	919
PM 50	50	1238	1255	1271	1284	1296	1305	1312	1317
PM 65	92	2275	2306	2334	2359	2381	2398	2411	2419
PM 80	164	4060	4116	4166	4211	4249	4280	4303	4317
PM 100	238	5902	5984	6057	6122	6178	6223	6256	6277
PM 125	382	9473	9603	9721	9825	9914	9987	10040	10074

* 2°F below min. operating temperature.

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (psi)	Correction factor
3	**1.00**
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for liquid temperature (T_{liq})

Liquid temperature	Correction factor
–10°F	0.82
10°F	0.85
30°F	0.88
50°F	0.92
70°F	0.96
90°F	**1.00**
110°F	1.04
130°F	1.09

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Nominal capacities

Liquid line

SI units

Capacity table for nominal conditions, Q_N [kW],
T_{liq} = 30°C,
ΔP = 0.2 bar

R 22

Type	k_v m³/h	Evaporating temperature T_e							
		–50°C	–40°C	–30°C	–20°C	–10°C	0°C	10°C	20°C
PM 5	1.6	32	33	34	35	36	36	37	38
PM 10	3	59	61	63	65	67	68	70	71
PM 15	4	79	82	84	87	89	91	93	94
PM 20	7	139	143	147	151	155	159	162	165
PM 25	11.5	228	235	242	249	255	261	266	271
PM 32	17.2	341	352	362	372	382	391	399	406
PM 40	30	594	613	632	649	666	681	695	708
PM 50	43	852	879	906	931	954	976	996	1014
PM 65	79	1565	1616	1664	1710	1754	1794	1831	1863
PM 80	141	2794	2883	2970	3052	3130	3202	3267	3326
PM 100	205	4062	4192	4319	4437	4550	4655	4750	4835
PM 125	329	6519	6728	6931	7120	7303	7471	7623	7760

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (bar)	Correction factor
0.2	**1.00**
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for liquid temperature (T_{liq})

Liquid temperature	Correction factor
–20°C	0.71
–10°C	0.75
0°C	0.80
10°C	0.86
20°C	0.92
30°C	**1.00**
40°C	1.09
50°C	1.22

US units

Capacity table for nominal conditions, Q_N [Tons of Refrigeration],
T_{liq} = 90°F,
ΔP = 3 psi

R 22

Type	C_v USgal/min	Evaporating temperature T_e							
		–60°F*	–40°F	–20°F	0°F	20°F	40°F	60°F	80°F
PM 5	1.9	9	9	10	10	10	10	11	11
PM 10	3.5	17	17	18	18	19	19	20	20
PM 15	4.6	22	23	24	25	25	26	27	27
PM 20	8.1	39	41	42	43	44	45	47	47
PM 25	13.3	64	67	69	71	73	75	76	78
PM 32	20	96	100	103	106	109	112	114	116
PM 40	35	168	174	179	185	190	195	199	203
PM 50	50	240	249	257	265	272	279	286	291
PM 65	92	441	457	473	487	501	513	525	534
PM 80	164	788	816	843	869	893	916	937	954
PM 100	238	1146	1187	1226	1264	1299	1331	1362	1387
PM 125	382	1838	1904	1968	2028	2084	2136	2187	2226

* 2°F below min. operating temperature.

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (psi)	Correction factor
3	**1.00**
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for liquid temperature (T_{liq})

Liquid temperature	Correction factor
–10°F	0.73
10°F	0.77
30°F	0.82
50°F	0.87
70°F	0.93
90°F	**1.00**
110°F	1.09
130°F	1.20

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Nominal capacities

Liquid line

SI units

Capacity table for nominal conditions, Q_N [kW],
T_{liq} = 30°C,
ΔP = 0.2 bar

R 134a

Type	k_v m³/h	Evaporating temperature T_e							
		–50°C	–40°C	–30°C	–20°C	–10°C	0°C	10°C	20°C
PM 5	1.6	-	28	30	31	32	34	35	36
PM 10	3	-	53	56	58	61	63	66	68
PM 15	4	-	71	75	78	81	84	87	90
PM 20	7	-	125	130	136	142	148	153	158
PM 25	11.5	-	205	214	224	233	243	251	260
PM 32	17.2	-	306	321	335	349	363	376	389
PM 40	30	-	534	559	584	609	633	656	678
PM 50	43	-	765	801	837	872	907	940	972
PM 65	79	-	1406	1472	1539	1603	1666	1727	1785
PM 80	141	-	2509	2628	2746	2861	2973	3082	3186
PM 100	205	-	3648	3821	3993	4159	4323	4481	4632
PM 125	329	-	5855	6131	6408	6675	6938	7192	7434

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (bar)	Correction factor
0.2	**1.00**
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for liquid temperature (T_{liq})

Liquid temperature	Correction factor
–20°C	0.66
–10°C	0.70
0°C	0.76
10°C	0.82
20°C	0.90
30°C	**1.00**
40°C	1.13
50°C	1.29

US units

Capacity table for nominal conditions, Q_N [Tons of Refrigeration],
T_{liq} = 90°F,
ΔP = 3 psi

R 134a

Type	C_v USgal/min	Evaporating temperature T_e							
		–60°F*	–40°F	–20°F	-°F	20°F	40°F	60°F	80°F
PM 5	1.9	-	8	8	9	9	10	10	10
PM 10	3.5	-	15	16	17	17	18	19	20
PM 15	4.6	-	20	21	22	23	24	25	26
PM 20	8.1	-	35	37	39	41	42	44	46
PM 25	13.3	-	58	61	64	67	70	73	75
PM 32	20	-	86	91	95	100	104	109	112
PM 40	35	-	150	158	166	174	181	189	196
PM 50	50	-	215	227	238	249	260	271	281
PM 65	92	-	396	417	438	458	478	499	516
PM 80	164	-	707	744	782	818	853	890	921
PM 100	238	-	1027	1082	1136	1189	1240	1294	1340
PM 125	382	-	1649	1737	1824	1908	1990	2076	2150

* 2°F below min. operating temperature.

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (psi)	Correction factor
3	**1.00**
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for liquid temperature (T_{liq})

Liquid temperature	Correction factor
–10°F	0.64
10°F	0.68
30°F	0.74
50°F	0.81
70°F	0.89
90°F	**1.00**
110°F	1.15
130°F	1.35

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Nominal capacities

Liquid line

SI units

Capacity table for nominal conditions, Q_N [kW],
T_{liq} = 30°C,
ΔP = 0.2 bar

R 404A

Type	k_v m³/h	Evaporating temperature T_e							
		–50°C	–40°C	–30°C	–20°C	–10°C	0°C	10°C	20°C
PM 5	1.6	17.8	19.1	20	22	23	24	25	26
PM 10	3	33	36	38	40	43	45	47	48
PM 15	4	45	48	51	54	57	60	62	64
PM 20	7	78	83	89	94	99	104	109	113
PM 25	11.5	128	137	146	155	163	171	179	185
PM 32	17.2	192	205	219	232	244	256	267	277
PM 40	30	334	358	381	404	426	447	466	483
PM 50	43	479	513	546	579	611	641	668	693
PM 65	79	880	942	1004	1064	1122	1177	1228	1273
PM 80	141	1570	1681	1792	1899	2002	2100	2191	2272
PM 100	205	2283	2445	2605	2761	2911	3054	3185	3303
PM 125	329	3663	3923	4181	4431	4672	4901	5112	5300

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (bar)	Correction factor
0.2	**1.00**
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for liquid temperature (T_{liq})

Liquid temperature	Correction factor
–20°C	0.55
–10°C	0.60
0°C	0.66
10°C	0.74
20°C	0.85
30°C	**1.00**
40°C	1.23
50°C	1.68

US units

Capacity table for nominal conditions, Q_N [Tons of Refrigeration],
T_{liq} = 90°F,
ΔP = 3 psi

R 404A

Type	C_v USgal/min	Evaporating temperature T_e							
		–60°F*	–40°F	–20°F	0°F	20°F	40°F	60°F	80°F
PM 5	1.9	4.9	5.3	5.7	6.1	6.4	6.8	7.1	7.4
PM 10	3.5	9.2	9.9	10.6	11.4	12.1	12.7	13.3	13.8
PM 15	4.6	12.2	13.2	14.2	15.2	16.1	16.9	17.8	18.4
PM 20	8.1	21	23	25	27	28	30	31	32
PM 25	13.3	35	38	41	44	46	49	51	53
PM 32	20	53	57	61	65	69	73	76	79
PM 40	35	92	99	106	114	121	127	133	138
PM 50	50	131	142	153	163	173	182	191	198
PM 65	92	241	261	280	299	317	334	351	364
PM 80	164	431	466	501	534	567	597	626	649
PM 100	238	626	677	728	777	824	868	911	944
PM 125	382	1005	1087	1168	1247	1322	1392	1461	1515

* 2°F below min. operating temperature.

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (psi)	Correction factor
3	**1.00**
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for liquid temperature (T_{liq})

Liquid temperature	Correction factor
–10°F	0.52
10°F	0.57
30°F	0.63
50°F	0.72
70°F	0.83
90°F	**1.00**
110°F	1.29
130°F	1.92

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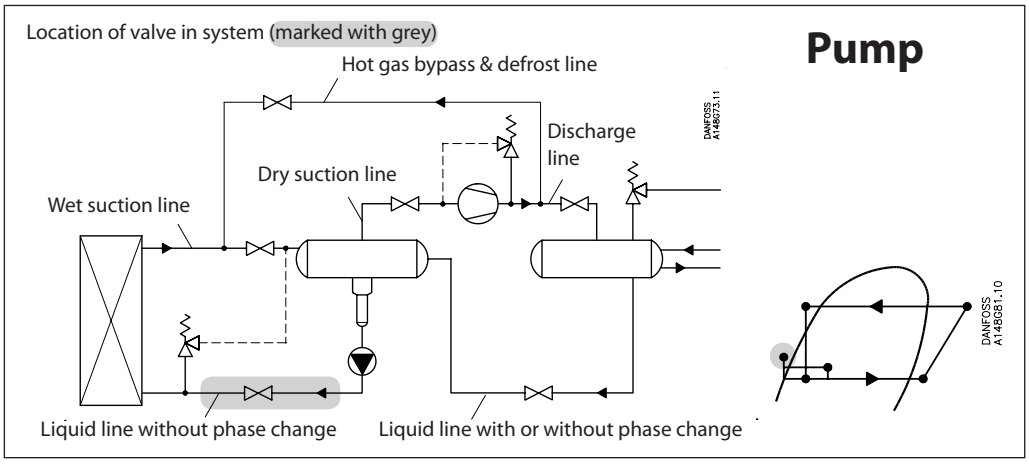
Nominal capacities

Pumped liquid line



SI units

Calculation example (R 717 capacities):

Running conditions in a plant are as follows:

T_e = –20°C
Q_0 = 180 kW
circulation rate = 3
Max. ΔP = 0.3 bar

The capacity table is based on nominal conditions (pressure drop ΔP = 0.3 bar, circulation rate = 4).

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for ΔP 0.3 bar $f_{\Delta P} = 0.82$
Correction factor for circulation rate $f_{rec} = 0.75$.

$Q_n = Q_0 \times f_{\Delta p} \times f_{rec} = 180 \times 0.82 \times 0.75 = 111$ kW

From the capacity table a PM 15 with Q_n = 133 kW is the correct selection for the application.

US units

Calculation example (R 717 capacities):

Running conditions in a plant are as follows:

T_e = –20°F
Q_0 = 130 TR
Circulation rate = 3
Max. ΔP = 5 psi

The capacity table is based on nominal conditions (pressure drop Δp = 3 psi, circulation rate = 4).

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for ΔP 5 psi $f_{\Delta p} = 0.79$
Correction factor for circulation rate $f_{rec} = 0.75$.

$Q_n = Q_0 \times f_{\Delta P} \times f_{circ} = 140 \times 0.79 \times 0.75 = 83$ TR

From the capacity table a PM 25 with Q_n = 114 TR is the correct selection for the application.

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Nominal capacities

Pumped liquid line

SI units

Capacity table for nominal conditions, Q_N [kW], circulation rate = 4, ΔP = 0.2 bar

R 717

Type	k_v m^3/h	Evaporating temperature T_e							
		–50°C	–40°C	–30°C	–20°C	–10°C	0°C	10°C	20°C
PM 5	1.6	58	57	55	53	51	50	48	46
PM 10	3	109	106	103	100	96	93	89	85
PM 15	4	146	142	137	133	129	124	119	114
PM 20	7	255	248	241	233	225	217	208	199
PM 25	11.5	420	407	395	383	370	356	342	328
PM 32	17.2	628	609	591	572	553	533	512	490
PM 40	30	1095	1063	1031	998	964	929	893	855
PM 50	43	1569	1523	1478	1431	1382	1332	1280	1225
PM 65	79	2883	2798	2715	2629	2539	2448	2351	2251
PM 80	141	5146	4994	4847	4691	4532	4369	4197	4017
PM 100	205	7482	7261	7046	6821	6589	6351	6102	5841
PM 125	329	12007	11654	11309	10947	10575	10193	9793	9374

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (bar)	Correction factor
0.2	**1.00**
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for circulation rate (f_{rec})

Circulation rate	Correction factor
2	0.5
3	0.75
4	**1**
6	1.5
8	2
10	2.5

US units

Capacity table for nominal conditions, Q_N [Tons of Refrigeration], circulation rate = 4, ΔP = 3 psi

R 717

Type	C_v USgal/min	Evaporating temperature T_e							
		–60°F*	–40°F	–20°F	0°F	20°F	40°F	60°F	80°F
PM 5	1.9	16.9	16.4	15.9	15.3	14.7	14.1	13.4	12.8
PM 10	3.5	32	31	30	29	28	26	25	24
PM 15	4.6	42	41	40	38	37	35	34	32
PM 20	8.1	74	72	69	67	64	62	59	56
PM 25	13.3	121	118	114	110	106	101	96	92
PM 32	20	182	176	170	165	158	152	144	137
PM 40	35	317	307	297	287	276	264	251	239
PM 50	50	454	440	426	411	395	379	360	343
PM 65	92	834	809	783	756	726	696	662	630
PM 80	164	1489	1443	1397	1349	1295	1242	1182	1124
PM 100	238	2165	2098	2031	1961	1883	1806	1718	1634
PM 125	382	3474	3367	3260	3148	3022	2898	2757	2623

* 2°F below min. operating temperature.

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (psi)	Correction factor
3	**1.00**
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for circulation rate (f_{rec})

Circulation rate	Correction factor
2	0.5
3	0.75
4	**1**
6	1.5
8	2
10	2.5

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Nominal capacities

Pumped liquid line

SI units

Capacity table for nominal conditions, Q_N [kW], circulation rate = 4, ΔP = 0.2 bar

R 22

Type	k_v m^3/h	Evaporating temperature T_e							
		–50°C	–40°C	–30°C	–20°C	–10°C	0°C	10°C	20°C
PM 5	1.6	14	14	13	13	12	12	11	10
PM 10	3	27	26	25	24	23	22	21	19
PM 15	4	36	34	33	32	30	29	27	26
PM 20	7	62	60	58	56	53	51	48	45
PM 25	11.5	102	99	95	91	87	83	79	74
PM 32	17.2	153	148	142	137	131	124	118	110
PM 40	30	267	258	248	238	228	217	205	193
PM 50	43	383	370	356	342	327	311	294	276
PM 65	79	703	679	654	628	600	571	540	508
PM 80	141	1255	1212	1168	1121	1071	1019	964	906
PM 100	205	1825	1763	1698	1629	1558	1482	1402	1317
PM 125	329	2929	2829	2725	2615	2500	2378	2249	2114

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (bar)	Correction factor
0.2	**1.00**
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for circulation rate (f_{rec})

Circulation rate	Correction factor
2	0.5
3	0.75
4	**1**
6	1.5
8	2
10	2.5

US units

Capacity table for nominal conditions, Q_N [Tons of Refrigeration], circulation rate = 4, ΔP = 3 psi

R 22

Type	C_v USgal/min	Evaporating temperature T_e							
		–60°F*	–40°F	–20°F	0°F	20°F	40°F	60°F	80°F
PM 5	1.9	4.1	4.0	3.8	3.6	3.5	3.3	3.0	2.8
PM 10	3.5	8	7	7	7	6	6	6	5
PM 15	4.6	10	10	10	9	9	8	8	7
PM 20	8.1	18	17	17	16	15	14	13	12
PM 25	13.3	30	29	27	26	25	24	22	20
PM 32	20	44	43	41	39	37	35	33	30
PM 40	35	77	75	71	68	65	61	57	53
PM 50	50	111	107	102	98	93	88	82	76
PM 65	92	204	196	188	180	171	161	151	140
PM 80	164	364	350	336	321	305	288	269	249
PM 100	238	529	509	489	467	444	419	391	363
PM 125	382	849	817	784	749	712	673	627	582

* 2°F below min. operating temperature.

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (psi)	Correction factor
3	**1.00**
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for circulation rate (f_{rec})

Circulation rate	Correction factor
2	0.5
3	0.75
4	**1**
6	1.5
8	2
10	2.5

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Nominal capacities

Pumped liquid line

SI units

Capacity table for nominal conditions, Q_N [kW], circulation rate = 4, ΔP = 0.2 bar

R 404A

Type	k_v m^3/h	Evaporating temperature T_e							
		–50°C	–40°C	–30°C	–20°C	–10°C	0°C	10°C	20°C
PM 5	1.6	12	11	11	10	9	9	8	7
PM 10	3	22	21	20	19	18	17	15	14
PM 15	4	29	28	26	25	24	22	20	19
PM 20	7	51	49	46	44	41	39	36	33
PM 25	11.5	83	80	75	72	68	64	59	54
PM 32	17.2	125	120	113	108	102	95	88	80
PM 40	30	217	208	197	188	177	166	154	140
PM 50	43	311	299	282	269	254	238	220	200
PM 65	79	572	549	519	495	467	437	405	368
PM 80	141	1021	980	926	883	834	781	722	657
PM 100	205	1484	1424	1346	1284	1213	1135	1050	956
PM 125	329	2382	2286	2160	2061	1947	1822	1685	1534

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (bar)	Correction factor
0.2	**1.00**
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for circulation rate (f_{rec})

Circulation rate	Correction factor
2	0.5
3	0.75
4	**1**
6	1.5
8	2
10	2.5

US units

Capacity table for nominal conditions, Q_N [Tons of Refrigeration], circulation rate = 4, ΔP = 3 psi

R 404A

Type	C_v USgal/min	Evaporating temperature T_e							
		–60°F*	–40°F	–20°F	0°F	20°F	40°F	60°F	80°F
PM 5	1.9	3.4	3.2	3.0	2.9	2.7	2.5	2.2	2.0
PM 10	3.5	6	6	6	5	5	5	4	4
PM 15	4.6	8	8	8	7	7	6	6	5
PM 20	8.1	15	14	13	13	12	11	10	9
PM 25	13.3	24	23	22	21	19	18	16	14
PM 32	20	36	35	33	31	29	27	24	21
PM 40	35	63	60	57	54	50	47	42	37
PM 50	50	90	86	81	77	72	67	60	54
PM 65	92	166	159	150	141	133	123	111	98
PM 80	164	296	283	267	252	237	219	198	176
PM 100	238	431	412	388	367	344	318	287	255
PM 125	382	691	661	623	589	552	511	461	410

* 2°F below min. operating temperature.

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (psi)	Correction factor
3	**1.00**
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for circulation rate (f_{rec})

Circulation rate	Correction factor
2	0.5
3	0.75
4	**1**
6	1.5
8	2
10	2.5

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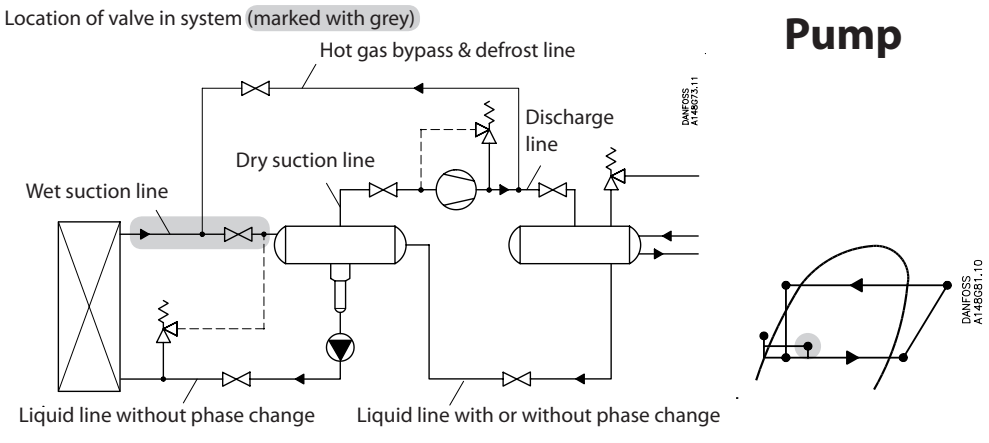
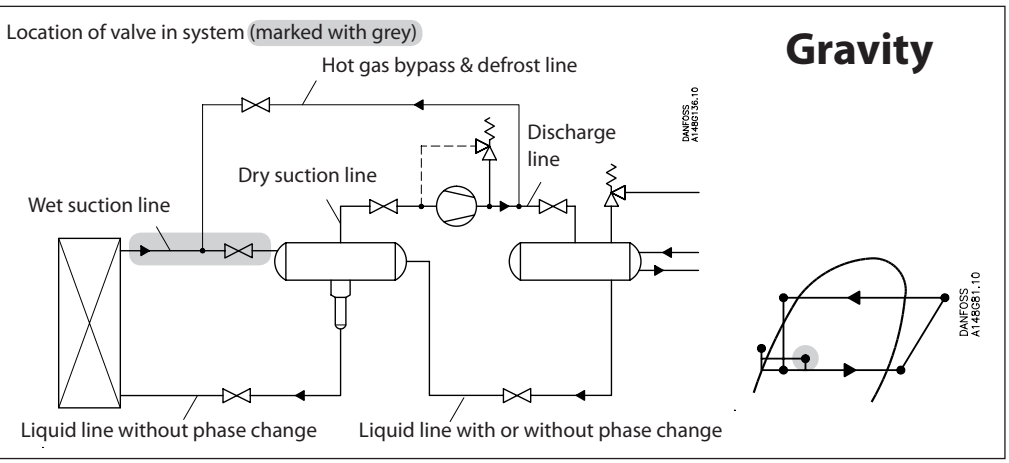
Nominal capacities

Wet suction line

Pump



Gravity



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Nominal capacities

Wet suction line

SI units

Calculation example (R 717 capacities):

Running conditions in a plant are as follows:

T_e = –20°C
Q_0 = 100 kW
Circulation rate = 3
Max. ΔP = 0.3 bar

The capacity table is based on nominal conditions (pressure drop ΔP = 0.2 bar, circulation rate = 4).

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for ΔP 0.3 bar $f_{\Delta P} = 0.82$
Correction factor for circulation rate $f_{rec} = 0.9$.

$Q_n = Q_0 \times f_{\Delta P} \times f_{rec} = 100 \times 0.82 \times 0.9 = 73{,}8$ kW.

From the capacity table a PM 40 with Q_n = 107 kW is the correct selection for the application.

US units

Calculation example (R 717 capacities):

Running conditions in a plant are as follows:

T_e = – 20°F
Q_0 = 10 TR
Circulation rate = 3
Max. ΔP = 5 psi

The capacity table is based on nominal conditions (pressure drop ΔP = 3 psi, circulation rate = 4).

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for ΔP 5 psi $f_{\Delta p} = 0.79$
Correction factor for circulation rate $f_{rec} = 0.9$.

$Q_n = Q_0 \times f_{\Delta P} \times f_{circ} = 10 \times 0.79 \times 0.9 = 7.1$ TR

From the capacity table a PM 25 with Q_n = 10.0 TR is the correct selection for the application.

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Nominal capacities

Wet suction line

SI units

Capacity table for nominal conditions, Q_N [kW],
circulation rate = 4,
ΔP = 0.2 bar

R 717

Type	k_v m^3/h	Evaporating temperature T_e							
		–50°C	–40°C	–30°C	–20°C	–10°C	0°C	10°C	20°C
PM 5	1.6	2.9	3.8	4.7	5.7	6.8	8.0	9.2	10.4
PM 10	3	5.5	7.1	8.8	10.7	12.8	15.0	17.2	19.6
PM 15	4	7.3	9.5	11.8	14.3	17.0	19.9	23.0	26.1
PM 20	7	12.8	16.6	20.6	25.0	29.8	34.9	40	46
PM 25	11.5	21.0	27.2	33.8	41	49	57	66	75
PM 32	17.2	31.4	41	51	61	73	86	99	112
PM 40	30	55	71	88	107	128	150	172	196
PM 50	43	79	102	126	154	183	214	247	281
PM 65	79	144	187	232	282	336	394	454	516
PM 80	141	258	334	415	504	600	703	810	920
PM 100	205	375	485	603	733	873	1022	1177	1338
PM 125	329	601	779	968	1176	1401	1640	1890	2147

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (bar)	Correction factor
0.2	**1.00**
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for circulation rate (f_{rec})

Circulation rate	Correction factor
2	0.77
3	0.90
4	**1**
6	1.13
8	1.20
10	1.25

US units

Capacity table for nominal conditions, Q_N [Tons of Refrigeration],
circulation rate = 4,
ΔP = 3 psi

R 717

Type	C_v USgal/min	Evaporating temperature T_e							
		–60°F*	–40°F	–20°F	0°F	20°F	40°F	60°F	80°F
PM 5	1.9	0.8	1.1	1.4	1.7	2.1	2.5	2.8	3.2
PM 10	3.5	1.5	2.1	2.6	3.2	3.9	4.6	5.3	6.1
PM 15	4.6	2.0	2.7	3.5	4.3	5.2	6.2	7.1	8.1
PM 20	8.1	3.6	4.8	6.1	7.6	9.1	10.8	12.4	14.2
PM 25	13.3	5.9	7.9	10.0	12.4	15.0	17.7	20	23
PM 32	20	8.8	11.8	14.9	18.6	22	26	31	35
PM 40	35	15.3	21	26	32	39	46	53	61
PM 50	50	22	29	37	46	56	66	76	87
PM 65	92	40	54	69	85	103	122	140	160
PM 80	164	72	96	122	152	184	217	251	286
PM 100	238	104	140	178	221	267	315	365	415
PM 125	382	168	225	285	355	428	506	585	666

* 2°F below min. operating temperature.

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (psi)	Correction factor
3	**1.00**
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for circulation rate (f_{rec})

Circulation rate	Correction factor
2	0.77
3	0.90
4	**1**
6	1.13
8	1.20
10	1.25

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Nominal capacities

Wet suction line

SI units

Capacity table for nominal conditions, Q_N [kW], circulation rate = 4, ΔP = 0.2 bar

R 22

Type	k_v m³/h	Evaporating temperature T_e							
		–50°C	–40°C	–30°C	–20°C	–10°C	0°C	10°C	20°C
PM 5	1.6	1.4	1.7	2.1	2.5	2.8	3.2	3.6	4.0
PM 10	3	2.7	3.3	3.9	4.6	5.3	6.0	6.7	7.4
PM 15	4	3.6	4.4	5.2	6.1	7.1	8.0	9.0	9.9
PM 20	7	6.2	7.6	9.2	10.8	12.4	14.1	16	17
PM 25	11.5	10.3	12.6	15.1	18	20	23	26	28
PM 32	17.2	15.3	19	23	26	30	35	39	43
PM 40	30	27	33	39	46	53	60	67	74
PM 50	43	38	47	56	66	76	86	97	106
PM 65	79	70	86	103	121	140	159	177	196
PM 80	141	126	154	185	217	250	283	317	349
PM 100	205	183	224	268	315	363	412	460	507
PM 125	329	293	359	431	505	583	661	739	814

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (bar)	Correction factor
0.2	**1.00**
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for circulation rate (f_{rec})

Circulation rate	Correction factor
2	0.77
3	0.90
4	**1**
6	1.13
8	1.20
10	1.25

US units

Capacity table for nominal conditions, Q_N [Tons of Refrigeration], circulation rate = 4, ΔP = 3 psi

R 22

Type	C_v USgal/min	Evaporating temperature T_e							
		–60°F*	–40°F	–20°F	0°F	20°F	40°F	60°F	80°F
PM 5	1.9	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.2
PM 10	3.5	0.8	0.9	1.2	1.4	1.6	1.8	2.1	2.3
PM 15	4.6	1.0	1.3	1.5	1.8	2.1	2.4	2.8	3.0
PM 20	8.1	1.8	2.2	2.7	3.2	3.7	4.3	4.8	5.3
PM 25	13.3	2.9	3.6	4.4	5.3	6.1	7.0	8	9
PM 32	20	4.3	5.4	6.6	7.9	9	10	12	13
PM 40	35	7.6	9	12	14	16	18	21	23
PM 50	50	11	14	17	20	23	26	30	33
PM 65	92	20	25	30	36	42	48	54	60
PM 80	164	35	45	54	65	75	86	97	107
PM 100	238	52	65	79	94	109	125	141	156
PM 125	382	83	104	127	151	175	200	227	250

* 2°F below min. operating temperature.

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (psi)	Correction factor
3	**1.00**
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for circulation rate (f_{rec})

Circulation rate	Correction factor
2	0.77
3	0.90
4	**1**
6	1.13
8	1.20
10	1.25

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Nominal capacities

Wet suction line

SI units

Capacity table for nominal conditions, Q_N [kW], circulation rate = 4, ΔP = 0.2 bar

R 404A

Type	k_v m^3/h	Evaporating temperature T_e							
		–50°C	–40°C	–30°C	–20°C	–10°C	0°C	10°C	20°C
PM 5	1.6	1.5	1.8	2.1	2.5	2.8	3.1	3.5	3.8
PM 10	3	2.8	3.4	3.9	4.6	5.3	5.9	6.5	7.1
PM 15	4	3.7	4.5	5.3	6.1	7.0	7.9	8.7	9.4
PM 20	7	6.5	7.8	9.2	10.7	12.3	13.8	15	16
PM 25	11.5	10.6	12.9	15.1	18	20	23	25	27
PM 32	17.2	15.9	19	23	26	30	34	37	41
PM 40	30	28	34	39	46	53	59	65	71
PM 50	43	40	48	56	66	75	85	93	101
PM 65	79	73	88	104	121	138	155	172	186
PM 80	141	130	158	185	216	247	277	306	332
PM 100	205	189	229	269	314	359	403	445	483
PM 125	329	304	368	432	504	576	647	715	775

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (bar)	Correction factor
0.2	**1.00**
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for circulation rate (f_{rec})

Circulation rate	Correction factor
2	0.77
3	0.90
4	**1**
6	1.13
8	1.20
10	1.25

US units

Capacity table for nominal conditions, Q_N [Tons of Refrigeration], circulation rate = 4, ΔP = 3 psi

R 404A

Type	C_v USgal/min	Evaporating temperature T_e							
		–60°F*	–40°F	–20°F	0°F	20°F	40°F	60°F	80°F
PM 5	1.9	0.4	0.5	0.6	0.7	0.8	0.9	1.1	1.1
PM 10	3.5	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.1
PM 15	4.6	1.0	1.3	1.5	1.8	2.1	2.4	2.6	2.8
PM 20	8.1	1.8	2.3	2.7	3.2	3.7	4.1	4.6	5.0
PM 25	13.3	3.0	3.7	4.4	5.2	6.0	6.8	8	8
PM 32	20	4.5	5.6	6.6	7.8	9	10	11	12
PM 40	35	7.8	10	12	14	16	18	20	21
PM 50	50	11	14	17	20	23	25	28	31
PM 65	92	21	26	31	36	41	47	52	56
PM 80	164	37	46	55	64	74	84	93	100
PM 100	238	54	66	79	93	108	121	135	146
PM 125	382	86	106	127	150	173	195	217	234

* 2°F below min. operating temperature.

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (psi)	Correction factor
3	**1.00**
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for circulation rate (f_{rec})

Circulation rate	Correction factor
2	0.77
3	0.90
4	**1**
6	1.13
8	1.20
10	1.25

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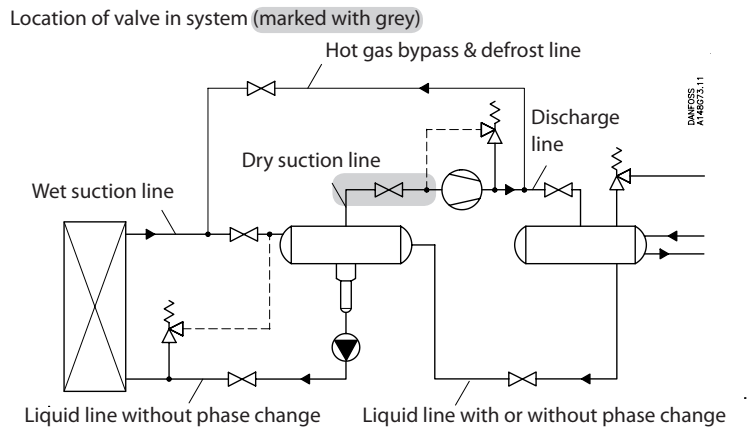
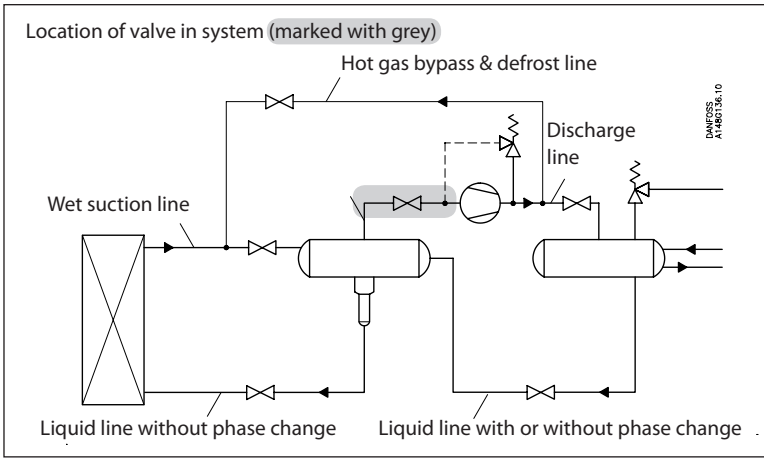
Nominal capacities

Dry suction line

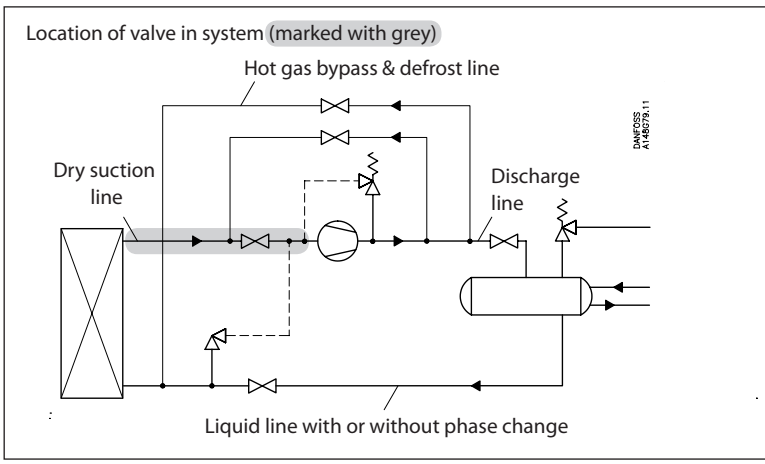
Pump



Gravity



DX



Nominal capacities

Dry suction line

SI units

Calculation example (R 134a capacities):

Running conditions in a plant are as follows:

T_e = –20°C
Q_0 = 90 kW
T_{liq} = 10°C
T_s = 6°C
Max. ΔP = 0.3 bar

The capacity table is based on nominal conditions (pressure drop ΔP = 0.2 bar, T_{liq} = 30°C).

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for ΔP 0.3 bar $f_{\Delta P} = 0.82$
Correction factor for liquid temperature $f_{Tliq} = 0.82$
Correction factor for superheat (T_S) = 1,0

$Q_n = Q_0 \times f_{\Delta P} \times f_{Tliq} \times f_{Ts}$
$= 90 \times 0.82 \times 0.82 \times 1.0 = 60.5$ kW

From the capacity table a PM 50 with Q_n = 64 kW is the correct selection for the application.

US units

Calculation example (R 134a capacities):

Running conditions in a plant are as follows:

T_e = 0°F
Q_0 = 23 TR
T_{liq} = 50°F
T_s = 10°F
Max. ΔP = 5 psi

The capacity table is based on nominal conditions (pressure drop ΔP = 3 psi, T_{liq} = 90°F)

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for ΔP 5 psi $f_{\Delta p} = 0.79$
Correction factor for liquid temperature $f_{Tliq} = 0.81$
Correction factor for superheat (T_S) = 1,0

$Q_n = Q_0 \times f_{\Delta P} \times f_{Tliq} \times f_{Ts}$
$= 20 \times 0{,}79 \times 0{,}81 \times 1{,}0 = 12{,}6$ TR

From the capacity table a PM 4 with Q_n = 13 TR is the correct selection for the application.

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Nominal capacities

Dry suction line

SI units

Capacity table for nominal conditions, Q_N [kW],
T_{liq} = 30°C,
ΔP = 0.2 bar

R 717

Type	k_v m³/h	Evaporating temperature T_e							
		–50°C	–40°C	–30°C	–20°C	–10°C	0°C	10°C	20°C
PM 5	1.6	4.1	5.4	7.0	8.8	10.8	13.1	15.7	18.5
PM 10	3	7.7	10.2	13.1	16.5	20	25	29	35
PM 15	4	10.3	13.6	17.4	22	27	33	39	46
PM 20	7	18.1	24	31	38	47	57	69	81
PM 25	11.5	30	39	50	63	78	94	113	133
PM 32	17.2	44	59	75	94	116	141	169	199
PM 40	30	77	102	131	165	202	246	294	348
PM 50	43	111	146	187	236	290	352	422	498
PM 65	79	204	269	344	434	533	647	775	915
PM 80	141	364	480	615	774	952	1155	1383	1634
PM 100	205	529	698	894	1126	1384	1680	2011	2375
PM 125	329	848	1120	1435	1807	2221	2696	3227	3812

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (bar)	Correction factor
0.2	**1.00**
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for superheat (T_S)

T_s	Correction factor
6°C	1.00
8°C	1.00
10°C	1.00
12°C	1.00

Correction factor for liquid temperature (T_{liq})

Liquid temperature	Correction factor
–20°C	0.82
–10°C	0.86
0°C	0.88
10°C	0.92
20°C	0.96
30°C	**1.00**
40°C	1.04
50°C	1.09

US units

Capacity table for nominal conditions, Q_N [Tons of Refrigeration],
T_{liq} = 90°F,
ΔP = 3 psi

R 717

Type	C_v USgal/min	Evaporating temperature T_e							
		–60°F*	–40°F	–20°F	0°F	20°F	40°F	60°F	80°F
PM 5	1.9	1.1	1.6	2.1	2.6	3.3	4.1	4.9	5.9
PM 10	3.5	2.1	2.9	3.9	4.9	6.2	7.7	9.2	11.0
PM 15	4.6	2.9	3.9	5.1	6.6	8.3	10.2	12.3	14.7
PM 20	8.1	5.0	6.9	9.0	11.5	14.5	17.9	22	26
PM 25	13.3	8.2	11.3	14.8	18.9	24	29	35	42
PM 32	20	12.3	16.9	22	28	36	44	53	63
PM 40	35	21	29	39	49	62	77	92	110
PM 50	50	30.8	42	55	71	89	110	132	158
PM 65	92	56.5	78	101	130	164	202	243	290
PM 80	164	100.9	139	181	231	292	361	434	517
PM 100	238	146.6	202	263	336	425	525	631	752
PM 125	382	235	323	423	540	682	843	1013	1207

* 2°F below min. operating temperature.

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (psi)	Correction factor
3	**1.00**
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for superheat (T_S)

T_s	Correction factor
10°F	1.00
14°F	1.00
18°F	1.00
20°F	1.00

Correction factor for liquid temperature (T_{liq})

Liquid temperature	Correction factor
–10°F	0.82
10°F	0.85
30°F	0.88
50°F	0.92
70°F	0.96
90°F	**1.00**
110°F	1.04
130°F	1.09

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Nominal capacities

Dry suction line

SI units

Capacity table for nominal conditions, Q_N [kW],
T_{liq} = 30°C,
ΔP = 0.2 bar

R 22

Type	k_v m^3/h	Evaporating temperature T_e							
		–50°C	–40°C	–30°C	–20°C	–10°C	0°C	10°C	20°C
PM 5	1.6	1.6	2.1	2.7	3.3	4.1	4.9	5.8	6.8
PM 10	3	3.0	3.9	5.0	6.3	8	9	11	13
PM 15	4	4.1	5.3	6.7	8	10	12	15	17
PM 20	7	7.1	9	12	15	18	21	25	30
PM 25	11.5	12	15	19	24	29	35	42	49
PM 32	17.2	17	23	29	36	44	52	62	73
PM 40	30	30	39	50	63	76	92	109	128
PM 50	43	44	57	72	90	109	131	156	184
PM 65	79	80	104	132	165	200	241	287	337
PM 80	141	143	186	235	294	357	430	512	602
PM 100	205	208	270	342	427	519	626	744	876
PM 125	329	334	433	549	685	834	1004	1194	1405

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (bar)	Correction factor
0.2	**1.00**
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for superheat (T_S)

T_s	Correction factor
6°C	1.00
8°C	1.00
10°C	1.00
12°C	1.00

Correction factor for liquid temperature (T_{liq})

Liquid temperature	Correction factor
–20°C	0.71
–10°C	0.75
0°C	0.80
10°C	0.86
20°C	0.92
30°C	**1.00**
40°C	1.09
50°C	1.22

US units

Capacity table for nominal conditions, Q_N [Tons of Refrigeration],
T_{liq} = 90°F,
ΔP = 3 psi

R 22

Type	C_v USgal/min	Evaporating temperature T_e							
		–60°F*	–40°F	–20°F	0°F	20°F	40°F	60°F	80°F
PM 5	1.9	0.4	0.6	0.8	1.0	1.2	1.5	1.8	2.2
PM 10	3.5	0.8	1.1	1.5	1.8	2.3	2.8	3.4	4.1
PM 15	4.6	1.1	1.5	1.9	2.5	3.1	3.7	4.6	5.4
PM 20	8.1	2.0	2.6	3.4	4.3	5.3	6.5	8	9
PM 25	13.3	3.2	4.3	5.6	7.1	9	11	13	16
PM 32	20	4.8	6.4	8	11	13	16	20	23
PM 40	35	8	11	15	18	23	28	34	41
PM 50	50	12.1	16	21	26	33	40	49	58
PM 65	92	22.2	30	38	49	60	74	90	107
PM 80	164	39.6	53	68	87	108	131	161	191
PM 100	238	57.5	77	99	126	156	191	234	278
PM 125	382	92	123	160	202	251	307	375	445

* 2°F below min. operating temperature.

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (psi)	Correction factor
3	**1.00**
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for superheat (T_S)

T_s	Correction factor
10°F	1.00
14°F	1.00
18°F	1.00
20°F	1.00

Correction factor for liquid temperature (T_{liq})

Liquid temperature	Correction factor
–10°F	0.73
10°F	0.77
30°F	0.82
50°F	0.87
70°F	0.93
90°F	**1.00**
110°F	1.09
130°F	1.20

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Nominal capacities

Dry suction line

SI units

Capacity table for nominal conditions, Q_N [kW],
T_{liq} = 30°C,
ΔP = 0.2 bar

R 134a

Type	k_v m³/h	Evaporating temperature T_e							
		–50°C	–40°C	–30°C	–20°C	–10°C	0°C	10°C	20°C
PM 5	1.6	-	1.4	1.8	2.4	3.0	3.7	4.6	5.5
PM 10	3	-	2.6	3.4	4.5	5.6	7.0	8.6	10.4
PM 15	4	-	3.5	4.6	5.9	7.5	9.3	11.4	13.9
PM 20	7	-	6.0	8.0	10.4	13.1	16.3	20	24
PM 25	11.5	-	9.9	13.1	17.1	22	27	33	40
PM 32	17.2	-	14.9	20	26	32	40	49	60
PM 40	30	-	26	34	45	56	70	86	104
PM 50	43	-	37	49	64	80	100	123	149
PM 65	79	-	68	90	117	148	184	226	274
PM 80	141	-	122	161	209	264	329	403	489
PM 100	205	-	177	234	304	383	478	586	711
PM 125	329	-	284	376	488	615	767	941	1140

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (bar)	Correction factor
0.2	**1.00**
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for superheat (T_S)

T_s	Correction factor
6°C	1.00
8°C	1.00
10°C	1.00
12°C	1.00

Correction factor for liquid temperature (T_{liq})

Liquid temperature	Correction factor
–20°C	0.66
–10°C	0.70
0°C	0.76
10°C	0.82
20°C	0.90
30°C	**1.00**
40°C	1.13
50°C	1.29

US units

Capacity table for nominal conditions, Q_N [Tons of Refrigeration],
T_{liq} = 90°F,
ΔP = 3 psi

R 134a

Type	C_v USgal/min	Evaporating temperature T_e							
		–60°F*	–40°F	–20°F	0°F	20°F	40°F	60°F	80°F
PM 5	1.9	-	0.4	0.5	0.7	0.9	1.2	1.5	1.8
PM 10	3.5	-	0.7	1.0	1.3	1.7	2.2	2.7	3.4
PM 15	4.6	-	1.0	1.3	1.8	2.3	2.9	3.7	4.5
PM 20	8.1	-	1.7	2.3	3.1	4.0	5.0	6	8
PM 25	13.3	-	2.8	3.8	5.0	7	8	10	13
PM 32	20	-	4.2	6	8	10	12	16	19
PM 40	35	-	7	10	13	17	22	27	34
PM 50	50	-	10	14	19	24	31	39	48
PM 65	92	-	19	26	35	45	57	72	88
PM 80	164	-	34	47	62	80	101	129	158
PM 100	238	-	50	68	90	116	148	187	229
PM 125	382	-	80	109	144	187	237	300	368

* 2°F below min. operating temperature.

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (psi)	Correction factor
3	**1.00**
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for superheat (T_S)

T_s	Correction factor
10°F	1.00
14°F	1.00
18°F	1.00
20°F	1.00

Correction factor for liquid temperature (T_{liq})

Liquid temperature	Correction factor
–10°F	0.64
10°F	0.68
30°F	0.74
50°F	0.81
70°F	0.89
90°F	**1.00**
110°F	1.15
130°F	1.35

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Nominal capacities

Dry suction line

SI units

Capacity table for nominal conditions, Q_N [kW],
T_{liq} = 30°C,
ΔP = 0.2 bar

R 404A

Type	k_v m³/h	Evaporating temperature T_e							
		–50°C	–40°C	–30°C	–20°C	–10°C	0°C	10°C	20°C
PM 5	1.6	1.2	1.6	2.1	2.7	3.4	4.2	5.2	6.2
PM 10	3	2.3	3.1	4.0	5.1	6	8	10	12
PM 15	4	3.1	4.1	5.3	7	9	11	13	16
PM 20	7	5.3	7	9	12	15	18	23	27
PM 25	11.5	9	12	15	20	25	30	37	45
PM 32	17.2	13	18	23	29	37	45	55	67
PM 40	30	23	31	40	51	64	79	97	116
PM 50	43	33	44	57	74	92	114	138	167
PM 65	79	60	81	105	135	169	209	254	306
PM 80	141	108	144	188	241	302	372	454	547
PM 100	205	157	209	273	351	438	541	660	795
PM 125	329	251	336	439	563	704	869	1059	1276

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (bar)	Correction factor
0.2	**1.00**
0.25	0.89
0.3	0.82
0.4	0.71
0.5	0.63
0.6	0.58

Correction factor for superheat (T_S)

T_s	Correction factor
6°C	1.00
8°C	1.00
10°C	1.00
12°C	1.00

Correction factor for liquid temperature (T_{liq})

Liquid temperature	Correction factor
–20°C	0.55
–10°C	0.60
0°C	0.66
10°C	0.74
20°C	0.85
30°C	**1.00**
40°C	1.23
50°C	1.68

US units

Capacity table for nominal conditions, Q_N [Tons of Refrigeration],
T_{liq} = 90°F,
ΔP = 3 psi

R 404A

Type	C_v USgal/min	Evaporating temperature T_e							
		–60°F*	–40°F	–20°F	0°F	20°F	40°F	60°F	80°F
PM 5	1.9	0.3	0.5	0.6	0.8	1.0	1.3	1.6	2.0
PM 10	3.5	0.6	0.9	1.1	1.5	1.9	2.4	3.0	3.7
PM 15	4.6	0.8	1.1	1.5	2.0	2.6	3.2	4.1	4.9
PM 20	8.1	1.4	2.0	2.7	3.5	4.5	5.6	7	9
PM 25	13.3	2.4	3.3	4.4	5.8	7	9	12	14
PM 32	20	3.5	4.9	7	9	11	14	17	21
PM 40	35	6	9	11	15	19	24	30	37
PM 50	50	8.9	12	16	22	28	35	44	53
PM 65	92	16.3	22	30	40	51	64	80	98
PM 80	164	29.1	40	54	71	90	113	143	174
PM 100	238	42.2	58	78	103	131	165	208	254
PM 125	382	68	94	126	165	211	265	334	407

* 2°F below min. operating temperature.

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (psi)	Correction factor
3	**1.00**
4	0.87
5	0.79
6	0.72
7	0.66
8	0.62

Correction factor for superheat (T_S)

T_s	Correction factor
10°F	1.00
14°F	1.00
18°F	1.00
20°F	1.00

Correction factor for liquid temperature (T_{liq})

Liquid temperature	Correction factor
–10°F	0.52
10°F	0.57
30°F	0.63
50°F	0.72
70°F	0.83
90°F	**1.00**
110°F	1.29
130°F	1.92

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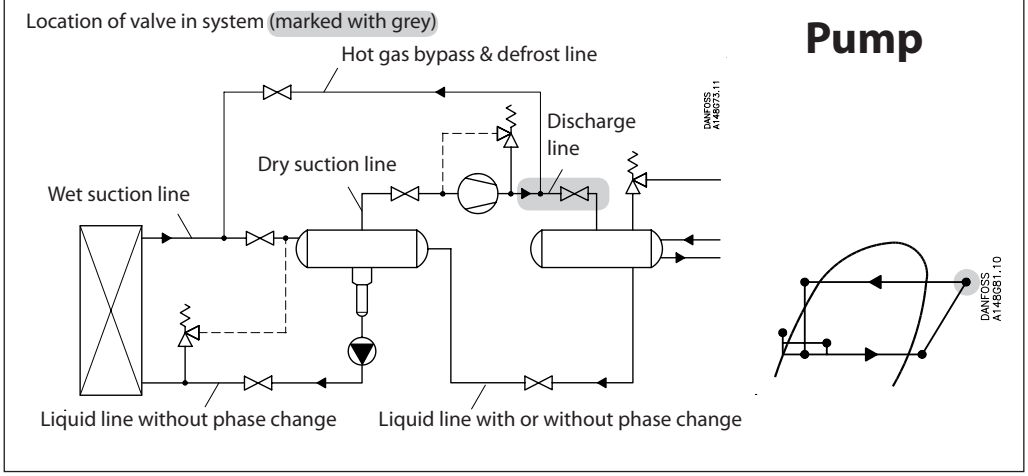
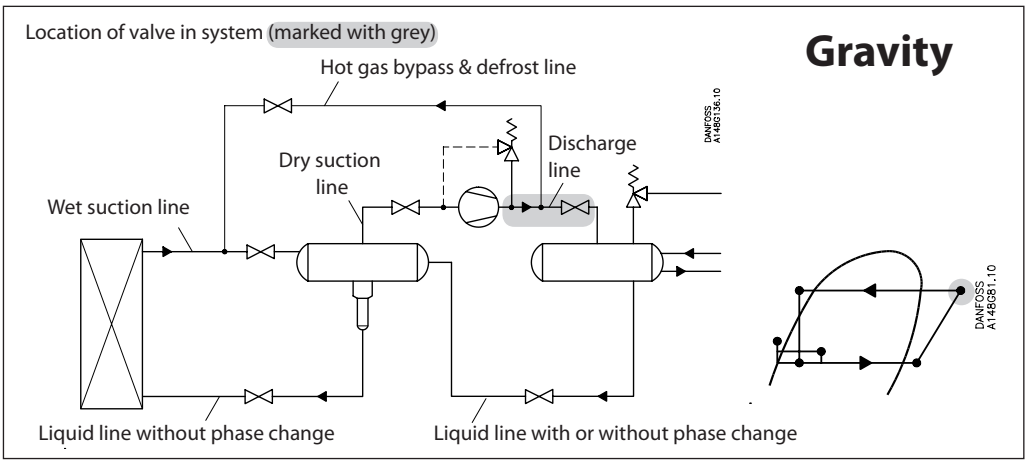
Nominal capacities

Discharge line

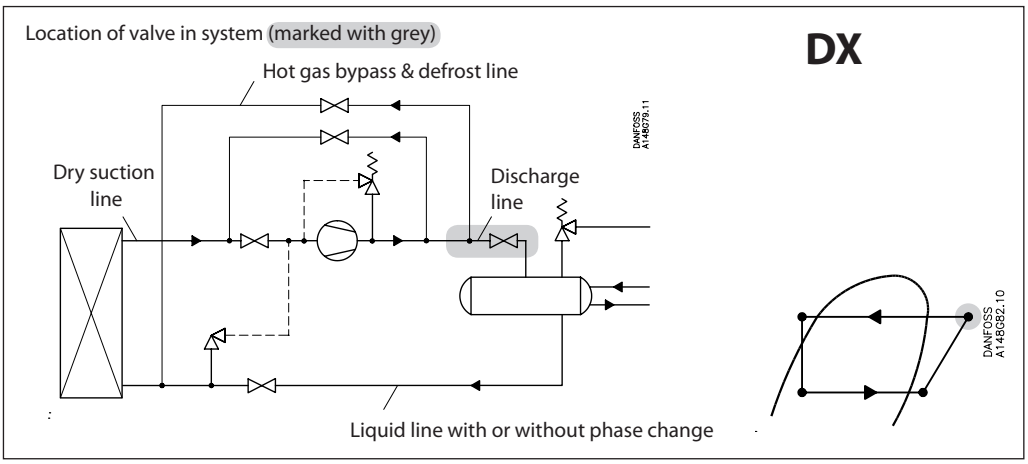
Pump



Gravity



DX



Nominal capacities

Discharge line

SI units

Calculation example (R 717 capacities):

Running conditions in a plant are as follows:

T_e = –20 °C
Q_o = 90 kW
T_{liq} = 10 °C
Max. ΔP = 0.4 bar
T_{disch} = 60°C

The capacity table is based on nominel conditions (ΔP = 0.2 bar, T_{liq} = 30°C, P_{disch}= 12 bar, T_{disch} = 80°C).

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for ΔP 0.4 bar $f_{\Delta P}$ = 0.72.
Correction factor for liquid temperature f_{Tliq} = 0.92.
Correction factor for T_{disch} 60°C, f_{disch} = 0.97.
Correction factor for P_{disch} 12 bar, f_{pdisch} = 1.0.

$Q_n = Q_o \times f_{\Delta P} \times f_{Tliq} \times f_{Tdisch} \times f_{Pdisch}$
$= 90 \times 0.72 \times 0.92 \times 0.97 \times 1.0 = 58$ kW.

From the capacity table a PM 20 with Q_n = 80 kW is the correct selection for the application.

US units

Calculation example (R 717 capacities):

Running conditions in a plant are as follows:

T_e = 0°F
Q_o = 18 TR
T_{liq} = 50 °F
Max. ΔP = 7 psi
T_{disch} = 120°F

The capacity table is based on nominel conditions (ΔP = 3 psi, T_{liq} = 90 °F, P_{disch}= 185 psi, T_{disch} = 180°F).

The actual capacity must therefore be corrected to a nominal condition by multiplication with correction factors.

Correction factor for ΔP 7 psi $f_{\Delta P}$ = 0.67.
Correction factor for liquid temperature f_{Tliq} = 0.92.
Correction factor for T_{disch} 120°F, f_{disch} = 0.95.
Correction factor for P_{disch} 185 psi, f_{pdisch} = 1.0.

$Q_n = Q_o \times f_{\Delta P} \times f_{Tliq} \times f_{circ} \times f_{Pdisch}$
$= 18 \times 0.67 \times 0.92 \times 0.95 \times 1.0 = 10.5$ TR

From the capacity table a PM15 with Q_n = 13.1 TR is the correct selection for the application.

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Nominal capacities

Discharge line

SI units

Capacity table for nominal conditions, Q_N [kW],
T_{liq} = 30°C,
$P_{disch.}$ = 12 bar,
ΔP = 0.2 bar,
$T_{disch.}$ = 80°C

R 717

Type	k_v m³/h	Evaporating temperature T_e							
		–50°C	–40°C	–30°C	–20°C	–10°C	0°C	10°C	20°C
PM 5	1.6	17.5	17.8	18.0	18.3	18.5	18.7	18.8	18.9
PM 10	3	33	33	34	34	35	35	35	35
PM 15	4	44	44	45	46	46	47	47	47
PM 20	7	77	78	79	80	81	82	82	83
PM 25	11.5	126	128	130	131	133	134	135	136
PM 32	17.2	188	191	194	196	199	201	203	203
PM 40	30	328	333	338	343	347	350	353	354
PM 50	43	471	478	485	491	497	502	506	507
PM 65	79	865	878	891	902	913	922	930	932
PM 80	141	1543	1567	1590	1610	1629	1645	1660	1664
PM 100	205	2244	2279	2311	2341	2369	2392	2414	2419
PM 125	329	3601	3657	3709	3757	3802	3839	3874	3882

Correction factor for discharge pressure (P_{disch})

P_{disch} (bar)	Correction factor
12	**1.00**
16	0.87
20	0.78

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (bar)	Correction factor
0.2	**1.00**
0.4	0.72
0.6	0.59
0.8	0.52
1	0.46
1.5	0.39
2	0.34
4	0.27

Correction factor for discharge temperature (T_{disch}).

Discharge temperature	Correction factor
50°C	0.96
60°C	0.97
80°C	**1.00**
90°C	1.01
100°C	1.03
110°C	1.04
120°C	1.06

Correction factor for liquid temperature (T_{liq}).

Liquid temperature	Correction factor
–20°C	0.82
–10°C	0.86
0°C	0.88
10°C	0.92
20°C	0.96
30°C	**1.00**
40°C	1.04
50°C	1.09

US units

Capacity table for nominal conditions, Q_N [Tons of Refrigeration],
T_{liq} = 90°F,
ΔP = 3 psi,
$P_{disch.}$ = 185 psi,
$T_{disch.}$ = 180°F

R 717

Type	C_v USgal/min	Evaporating temperature T_e							
		–60°F*	–40°F	–20°F	0°F	20°F	40°F	60°F	80°F
PM 5	1.9	5.1	5.1	5.2	5.2	5.3	5.3	5.4	5.4
PM 10	3.5	9.5	9.6	9.8	9.8	9.9	10.0	10.0	10.1
PM 15	4.6	12.7	12.8	13.0	13.1	13.2	13.4	13.4	13.5
PM 20	8.1	22	22	23	23	23	23	23	24
PM 25	13.3	36	37	37	38	38	38	38	39
PM 32	20.0	54	55	56	56	57	57	58	58
PM 40	35	95	96	98	98	99	100	100	101
PM 50	50	136	138	140	141	142	144	144	145
PM 65	92	250	253	257	259	261	264	264	266
PM 80	164	446	452	458	463	466	471	472	474
PM 100	238	648	658	667	673	678	685	686	689
PM 125	382	1041	1055	1070	1080	1088	1099	1101	1107

* 2°F below min. operating temperature.

Correction factor for discharge pressure (P_{disch})

P_{disch} (psi)	Correction factor
185	**1.00**
240	0.87
300	0.78

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (psi)	Correction factor
3	**1.00**
5	0.79
7	0.67
10	0.56
15	0.47
20	0.41
30	0.35
60	0.28

Correction factor for discharge temperature (T_{disch}).

Discharge temperature	Correction factor
120°F	0.95
140°F	0.97
180°F	**1.00**
200°F	1.02
210°F	1.02
230°F	1.04
250°F	1.06

Correction factor for liquid temperature (T_{liq}).

Liquid temperature	Correction factor
–10°F	0.82
10°F	0.85
30°F	0.88
50°F	0.92
70°F	0.96
90°F	**1.00**
110°F	1.04
130°F	1.09

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Nominal capacities

Discharge line

SI units

Capacity table for nominal conditions, Q_N [kW],
T_{liq} = 30°C,
$P_{disch.}$ = 12 bar,
ΔP = 0.2 bar,
$T_{disch.}$ = 80°C

R 22

Type	k_v m³/h	Evaporating temperature T_e							
		–50°C	–40°C	–30°C	–20°C	–10°C	0°C	10°C	20°C
PM 5	1.6	5.5	5.7	5.9	6.0	6.2	6.3	6.5	6.6
PM 10	3	10.4	10.7	11.0	11.3	11.6	11.9	12.1	12.4
PM 15	4	13.8	14.3	14.7	15.1	15.5	15.9	16.2	16.5
PM 20	7	24.2	25.0	25.8	26.5	27.1	27.8	28.3	28.8
PM 25	11.5	39.8	41.1	42.3	43.5	44.6	45.6	46.5	47.4
PM 32	17.2	59.5	61.4	63.3	65.0	66.7	68.2	69.6	70.9
PM 40	30	103.8	107.2	110.4	113.4	116.3	119.0	121.4	123.6
PM 50	43	148.8	153.6	158.2	162.6	166.7	170.6	174.0	177.2
PM 65	79	273.4	282.2	290.7	298.7	306.3	313.4	319.8	325.5
PM 80	141	488.0	503.7	518.9	533.0	546.7	559.3	570.7	580.9
PM 100	205	709.5	732.3	754.4	775.0	794.8	813.2	829.7	844.6
PM 125	329	1138.7	1175.2	1210.7	1243.8	1275.6	1305.0	1331.6	1355.5

Correction factor for discharge pressure (P_{disch})

P_{disch} (bar)	Correction factor
12	**1.00**
16	0.87
20	0.78

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (bar)	Correction factor
0.2	**1.00**
0.4	0.72
0.6	0.59
0.8	0.52
1	0.46
1.5	0.39
2	0.34
4	0.27

Correction factor for discharge temperature (T_{disch}).

Discharge temperature	Correction factor
50°C	0.96
60°C	0.97
80°C	**1.00**
90°C	1.01
100°C	1.03
110°C	1.04
120°C	1.06

Correction factor for liquid temperature (T_{liq}).

Liquid temperature	Correction factor
–20°C	0.71
–10°C	0.75
0°C	0.80
10°C	0.86
20°C	0.92
30°C	**1.00**
40°C	1.09
50°C	1.22

US units

Capacity table for nominal conditions, Q_N [Tons of Refrigeration],
T_{liq} = 90°F,
ΔP = 3 psi,
$P_{disch.}$ = 185 psi,
$T_{disch.}$ = 180 °F

R 22

Type	C_v USgal/min	Evaporating temperature T_e							
		–60°F*	–40°F	–20°F	0°F	20°F	40°F	60°F	80°F
PM 5	1.9	1.6	1.6	1.7	1.7	1.8	1.8	1.9	1.9
PM 10	3.5	3.0	3.1	3.2	3.3	3.4	3.5	3.5	3.6
PM 15	4.6	4.0	4.1	4.2	4.4	4.5	4.6	4.7	4.8
PM 20	8.1	6.9	7.2	7.4	7.6	7.9	8.1	8.2	8.4
PM 25	13.3	11.4	11.8	12.2	12.6	12.9	13.2	13.5	13.8
PM 32	20.0	17.0	17.6	18.2	18.8	19.3	19.8	20.3	20.6
PM 40	35	29.7	30.8	31.8	32.8	33.7	34.5	35.3	36.0
PM 50	50	42.6	44.1	45.6	47.0	48.3	49.5	50.6	51.5
PM 65	92	78.2	81.0	83.7	86.3	88.7	90.9	93.0	94.7
PM 80	164	139.6	144.6	149.4	154.0	158.3	162.2	166.0	169.0
PM 100	238	203.0	210.2	217.2	223.9	230.1	235.8	241.4	245.7
PM 125	382	325.7	337.4	348.6	359.3	369.3	378.5	387.4	394.3

*) 2°F below min. operating temperature.

Correction factor for discharge pressure (P_{disch})

P_{disch} (psi)	Correction factor
185	**1.00**
240	0.87
300	0.78

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (psi)	Correction factor
3	**1.00**
5	0.79
7	0.67
10	0.56
15	0.47
20	0.41
30	0.35
60	0.28

Correction factor for discharge temperature (T_{disch}).

Discharge temperature	Correction factor
120°F	0.95
140°F	0.97
180°F	**1.00**
200°F	1.02
210°F	1.02
230°F	1.04
250°F	1.06

Correction factor for liquid temperature (T_{liq}).

Liquid temperature	Correction factor
–10°F	0.73
10°F	0.77
30°F	0.82
50°F	0.87
70°F	0.93
90°F	**1.00**
110°F	1.09
130°F	1.20

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Nominal capacities

Discharge line

SI units

Capacity table for nominal conditions, Q_N [kW],
T_{liq} = 30°C,
P_{disch} = 8 bar,
ΔP = 0.2 bar
T_{disch} = 80 °C

R 134a

Type	k_v m³/h	Evaporating temperature T_e							
		–50°C	–40°C	–30°C	–20°C	–10°C	0°C	10°C	20°C
PM 5	1.6	-	4.3	4.5	4.7	4.9	5.1	5.3	5.5
PM 10	3	-	8.1	8.5	8.9	9.2	9.6	10.0	10.3
PM 15	4	-	10.8	11.3	11.8	12.3	12.8	13.3	13.7
PM 20	7	-	18.9	19.8	20.7	21.6	22.4	23.2	24.0
PM 25	11.5	-	31.1	32.5	34.0	35.4	36.8	38.2	39.5
PM 32	17.2	-	46.5	48.7	50.9	53.0	55.1	57.1	59.0
PM 40	30	-	81.1	84.9	88.7	92.4	96.1	99.6	102.9
PM 50	43	-	116.2	121.7	127.2	132.5	137.7	142.7	147.6
PM 65	79	-	213.5	223.6	233.7	243.4	253.0	262.3	271.1
PM 80	141	-	381.1	399.1	417.1	434.4	451.6	468.1	483.9
PM 100	205	-	554.1	580.2	606.3	631.6	656.5	680.5	703.5
PM 125	329	-	889.2	931.2	973.1	1013.7	1053.6	1092.2	1129.0

Correction factor for discharge pressure (P_{disch})

P_{disch} (bar)	Correction factor
8	**1.00**
12	0.82
16	0.70
20	0.62

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (bar)	Correction factor
0.2	**1.00**
0.4	0.72
0.6	0.59
0.8	0.52
1	0.46
1.5	0.39
2	0.34
4	0.27

Correction factor for discharge temperature (T_{disch}).

Discharge temperature	Correction factor
50°C	0.96
60°C	0.97
80°C	**1.00**
90°C	1.01
100°C	1.03
110°C	1.04
120°C	1.06

Correction factor for liquid temperature (T_{liq}).

Liquid temperature	Correction factor
–20°C	0.66
–10°C	0.70
0°C	0.76
10°C	0.82
20°C	0.90
30°C	**1.00**
40°C	1.13
50°C	1.29

US units

Capacity table for nominal conditions, Q_N [Tons of Refrigeration],
T_{liq} = 90°F,
ΔP = 3 psi
P_{disch} = 120 psi,
T_{disch} = 180 °F

R 134a

Type	C_v USgal/min	Evaporating temperature T_e							
		–60°F*	–40°F	–20°F	0°F	20°F	40°F	60°F	80°F
PM 5	1.9	-	1.3	1.3	1.4	1.5	1.5	1.6	1.6
PM 10	3.5	-	2.4	2.5	2.6	2.7	2.8	3.0	3.1
PM 15	4.6	-	3.1	3.3	3.5	3.6	3.8	4.0	4.1
PM 20	8.1	-	5.5	5.8	6.1	6.4	6.6	6.9	7.2
PM 25	13.3	-	9.0	9.5	10.0	10.5	10.9	11.4	11.8
PM 32	20	-	13.5	14.3	15.0	15.7	16.3	17.0	17.6
PM 40	35	-	23.6	24.9	26.1	27.3	28.5	29.7	30.8
PM 50	50	-	33.8	35.6	37.4	39.2	40.8	42.6	44.1
PM 65	92	-	62.2	65.5	68.7	71.9	75.0	78.3	81.1
PM 80	164	-	110.9	116.9	122.7	128.4	133.9	139.7	144.7
PM 100	238	-	161.3	169.9	178.4	186.7	194.7	203.1	210.4
PM 125	382	-	258.8	272.7	286.3	299.6	312.5	326.0	337.6

* 2°F below min. operating temperature.

Correction factor for discharge pressure (P_{disch})

P_{disch} (psi)	Correction factor
120	**1.00**
185	0.83
240	0.71
300	0.64

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (psi)	Correction factor
3	**1.00**
5	0.79
7	0.67
10	0.56
15	0.47
20	0.41
30	0.35
60	0.28

Correction factor for discharge temperature (T_{disch}).

Discharge temperature	Correction factor
120°F	0.95
140°F	0.97
180°F	**1.00**
200°F	1.02
210°F	1.02
230°F	1.04
250°F	1.05

Correction factor for liquid temperature (T_{liq}).

Liquid temperature	Correction factor
–10°F	0.64
10°F	0.68
30°F	0.74
50°F	0.81
70°F	0.89
90°F	**1.00**
110°F	1.15
130°F	1.35

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Nominal capacities

Discharge line

SI units

Capacity table for nominal conditions, Q_N [kW],
T_{liq} = 30°C,
P_{disch} = 12 bar
ΔP = 0.2 bar,
T_{disch} = 80 °C

R 404A

Type	k_v m^3/h	Evaporating temperature T_e							
		–50°C	–40°C	–30°C	–20°C	–10°C	0°C	10°C	20°C
PM 5	1.6	3.7	3.9	4.2	4.4	4.7	4.9	5.1	5.3
PM 10	3	6.9	7.4	7.8	8.3	8.8	9.2	9.6	9.9
PM 15	4	9.2	9.8	10.5	11.1	11.7	12.3	12.8	13.3
PM 20	7	16.0	17.2	18.3	19.4	20	21	22	23
PM 25	11.5	26	28	30	32	34	35	37	38
PM 32	17.2	39	42	45	48	50	53	55	57
PM 40	30	69	74	78	83	88	92	96	99
PM 50	43	99	106	112	119	126	132	138	143
PM 65	79	181	194	207	219	231	242	253	262
PM 80	141	323	346	369	391	412	432	451	468
PM 100	205	470	503	536	568	599	629	656	680
PM 125	329	754	807	860	912	962	1009	1052	1091

Correction factor for discharge pressure (P_{disch})

P_{disch} (bar)	Correction factor
12	**1**
16	0.87
20	0.78

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (bar)	Correction factor
0.2	**1.00**
0.4	0.72
0.6	0.59
0.8	0.52
1	0.46
1.5	0.39
2	0.34
4	0.27

Correction factor for discharge temperature (T_{disch}).

Discharge temperature	Correction factor
50°C	0.96
60°C	0.97
80°C	**1.00**
90°C	1.01
100°C	1.03
110°C	1.04
120°C	1.06

Correction factor for liquid temperature (T_{liq}).

Liquid temperature	Correction factor
–20°C	0.55
–10°C	0.60
0°C	0.66
10°C	0.74
20°C	0.85
30°C	**1.00**
40°C	1.23
50°C	1.68

US units

Capacity table for nominal conditions, Q_N [Tons of Refrigeration],
T_{liq} = 90°F,
ΔP = 3 psi,
P_{disch} = 185 psi,
T_{disch} = 180°F

R 404A

Type	C_v USgal/min	Evaporating temperature T_e							
		–60°F*	–40°F	–20°F	0°F	20°F	40°F	60°F	80°F
PM 5	1.9	1.0	1.1	1.2	1.3	1.3	1.4	1.5	1.5
PM 10	3.5	1.9	2.1	2.2	2.4	2.5	2.7	2.8	2.9
PM 15	4.6	2.6	2.8	3.0	3.2	3.4	3.5	3.7	3.9
PM 20	8.1	4.5	4.8	5.2	5.6	5.9	6.2	6.5	6.8
PM 25	13.3	7.4	8.0	8.6	9.1	9.7	10.2	10.7	11.1
PM 32	20	11.0	11.9	12.8	13.7	14.5	15.2	16.0	16.6
PM 40	35	19.2	21	22	24	25	27	28	29
PM 50	50	28	30	32	34	36	38	40	41
PM 65	92	51	55	59	63	66	70	73	76
PM 80	164	90	98	105	112	119	125	131	136
PM 100	238	131	142	152	163	173	182	191	198
PM 125	382	210	228	245	261	277	292	306	317

* 2°F below min. operating temperature.

Correction factor for discharge pressure (P_{disch})

P_{disch} (psi)	Correction factor
185	**1**
240	0.87
300	0.78

Correction factor for ΔP ($f_{\Delta P}$)

ΔP (psi)	Correction factor
3	**1.00**
5	0.79
7	0.67
10	0.56
15	0.47
20	0.41
30	0.35
60	0.28

Correction factor for discharge temperature (T_{disch}).

Discharge temperature	Correction factor
120°F	0.95
140°F	0.97
180°F	**1.00**
200°F	1.02
210°F	1.02
230°F	1.04
250°F	1.05

Correction factor for liquid temperature (T_{liq}).

Liquid temperature	Correction factor
–10°F	0.52
10°F	0.57
30°F	0.63
50°F	0.72
70°F	0.83
90°F	**1.00**
110°F	1.29
130°F	1.92

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