



Oil regulating valves

Type ORV 25-80 (1-3 in.)

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Introduction



ORV are 3-way industrial valves for maintaining a constant oil temperature in gas compressor systems, by mixing hot and cold oil in the lubricating system of e.g. screw or turbo type compressors.

The ORV valves are with few components and with extended cylindrical connections, to ensure ease of installation and service. The thermostatic element has a built-in temperature setting of 49°C (120°F) as standard.

Features

- Stainless steel nickel plated thermostatic element.
- Butt-weld (DIN, ANSI) or socket weld (SOC) connection.
- No manual adjustment.
- Plug and Play design.
- Optimised flow characteristics.
- Sturdy construction.
- High resistance against vibrations or shock.
- Can be mounted in any direction.
- Service friendly. Easy to dismantle and service when required.

Technical data

Oils:
Applicable to all common refrigeration oils.

Refrigerants:
Applicable to all common non-flammable refrigerants, including R717 and noncorrosive gases/liquids dependent on sealing material compatibility. Flammable hydrocarbons are not recommended. For further information please refer to installation instruction for ORV.

Temperature range:
Minimum operating temperature:
≥ -10°C (+14°F)
Continuous operation:
≤ +85°C (+185°F)
Short operating periods:
≤ +120°C (+248°F)
Pressure range:
The valves are designed for a max. working pressure of 40 bar g (580 psig)

Design

Connections

Available with the following connections:

- Butt weld DIN (2448)
- DN 25-80 (1-3 in.)
- Butt weld ANSI (B 36.10 Schedule 80),
- DN 25 - 40 (1 - 1½ in.)
- Butt weld ANSI (B 36.10 Schedule 40),
- DN 50 - 80 (2 - 3 in.)
- Socket Weld (ANSI B 16.11),
- DN 25 - 50 (1 - 2 in.)

Housing

Made of special, cold resistant steel approved for low temperature operations.

Installation

To achieve correct flow direction and function, the letter designations, A, B and C on the valve housing must be followed:

- A - Outlet
- B - Warm inlet
- C - Cold inlet

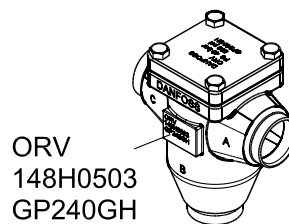
Pressure Equipment Directive (PED)

ORV valves are approved according to the European standard specified in the Pressure Equipment Directive and are CE marked. For further details / restrictions - see Installation Instruction.



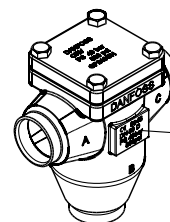
Identification

Example:



Danfoss
A148H63.10

ORV
148H0503
GP240GH



CE 0045
DN 50 D
PS 40 bar
580 psi

Function

The ORV oil regulating valve utilises the high coefficient of thermal expansion of wax to create the internal movement necessary to have a cold and a hot inlet mixing to a common outlet. The outlet temperature will correspond to the nominal temperature of the thermostatic element.

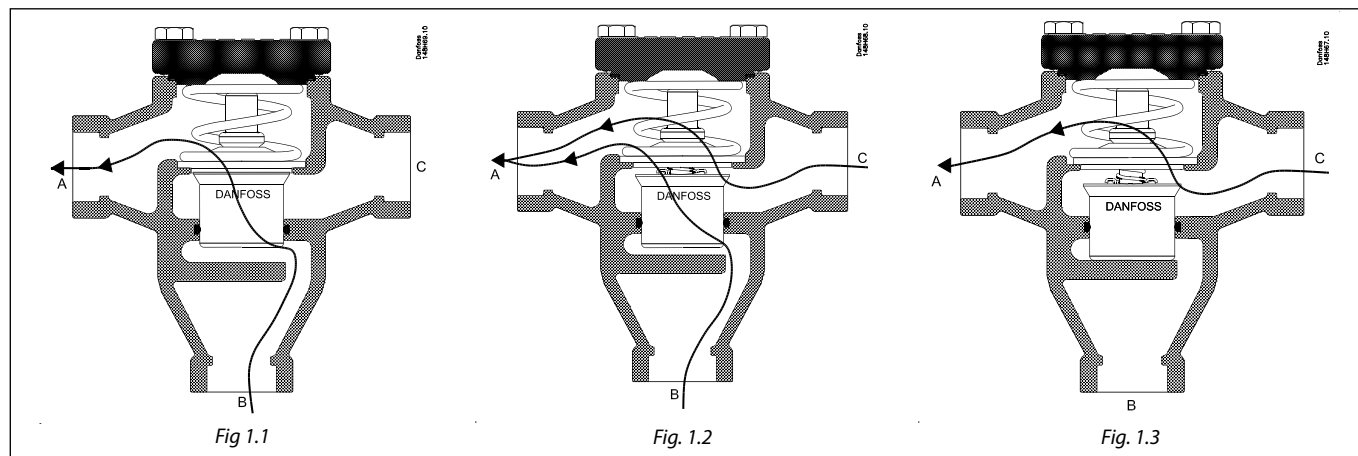
The valve house has three ports:

- Port A is used for the common outlet
- Port B is for the hot inlet
- Port C is for the cold inlet

When the compressor unit is cold at start up, the thermostatic element will be contracted to let

the full flow from port B pass until the nominal temperature (minus 8°K / 14°F) is reached (fig. 1.1). The thermostatic element will then begin to extract to let the outlet become a mixture of hot and cold oil.

When the nominal temperature is reached, the element is positioned in approximately half open position (fig. 1.2). If the temperature is reaching approximately the nominal temperature plus 8°K, the thermostatic element has been extracted to its fully open position (fig. 1.3). In this position the oil temperature will only come from the cold inlet port (C) from oil cooler.



From figure 1, it can be seen how the sleeve on the element is sliding in a vertical movement. The thermostatic element is kept in position by a spring.

Suction gas

Screw compressor

Hot gas

Oil separator

Prelube pump

Prelube filter

Main oil filter

Oil cooler

ORV

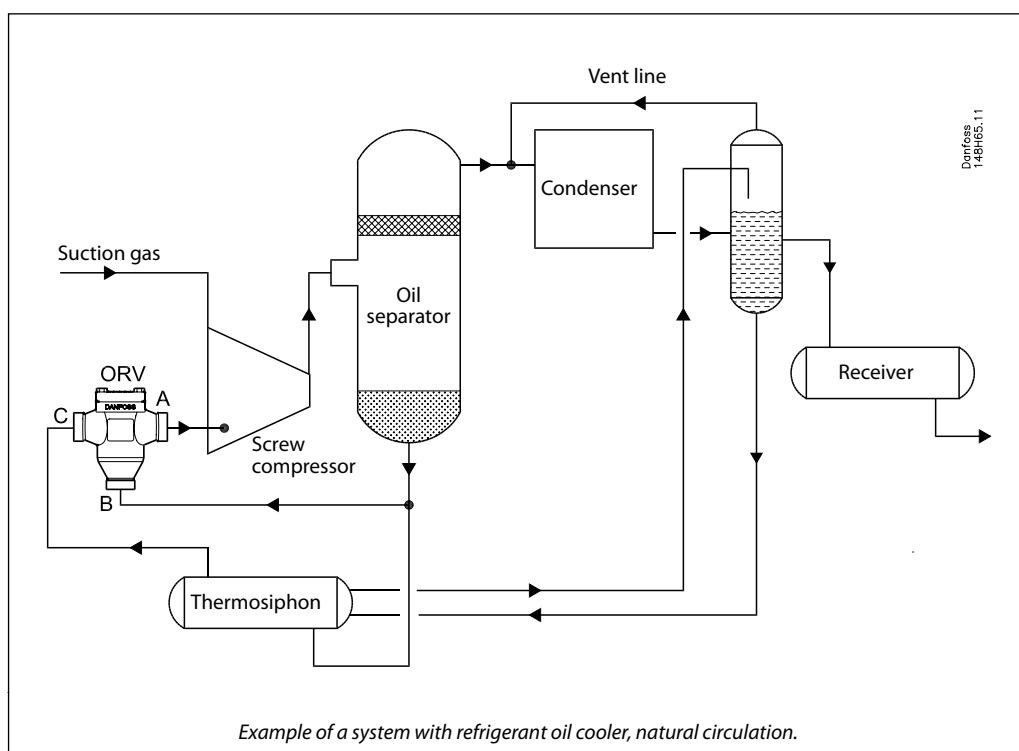
A

B

C

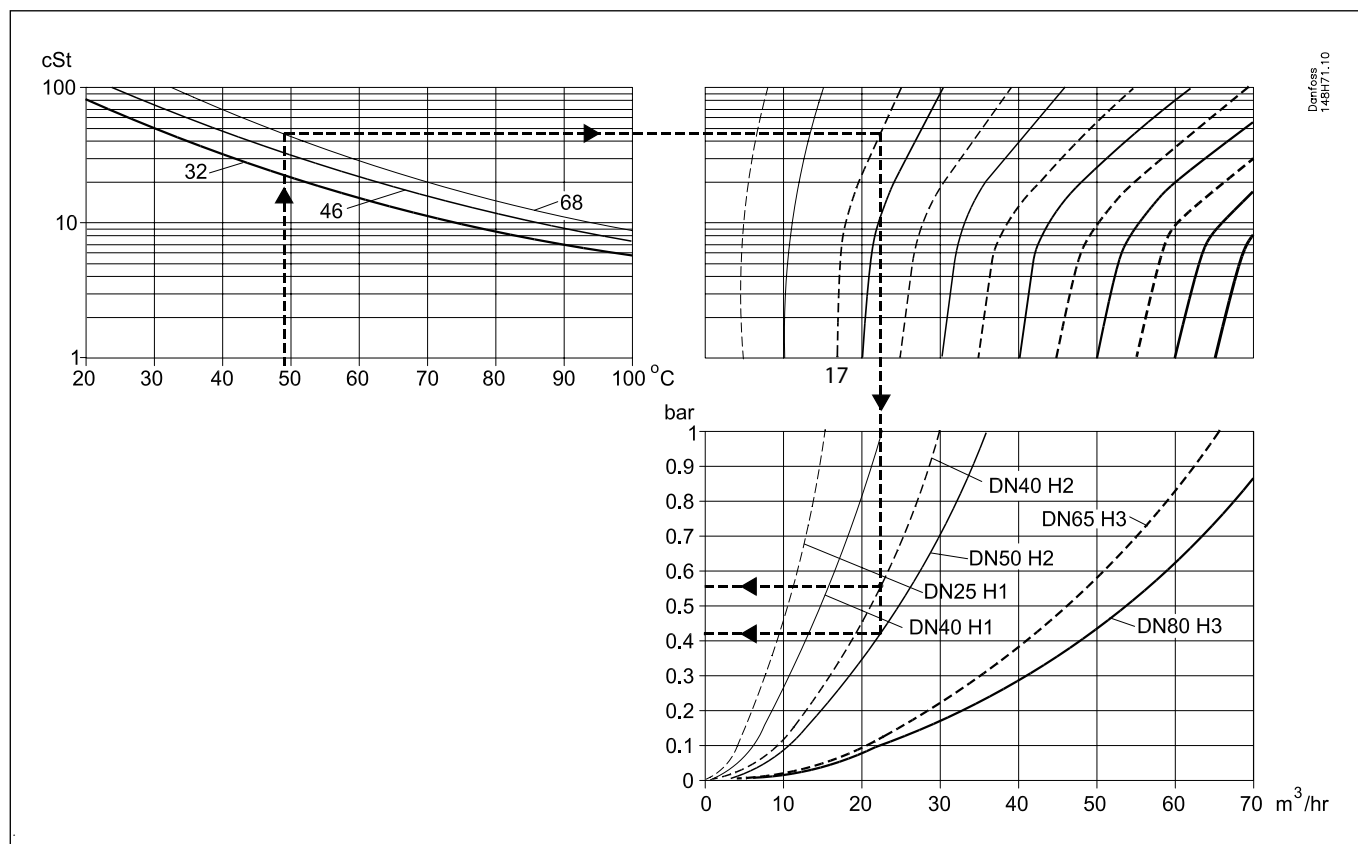
Don't see 148H64.12

Example of system with prelubrication and oil cooling by external cooling agent, e.g. water.



Capacities

SI units



Selection example

Oil type: Grade 68
 Required flow: 17 m³/h
 Nominal oil temperature: 49°C
 Pipe dimension: 40 mm

The upper left curve shows the viscosity of different grades of oil as a function of the temperature. The viscosity is continued into the upper right curve where the 17 m³/h must be found. The line is drawn vertically downwards into the capacity table for the ORV valve models.

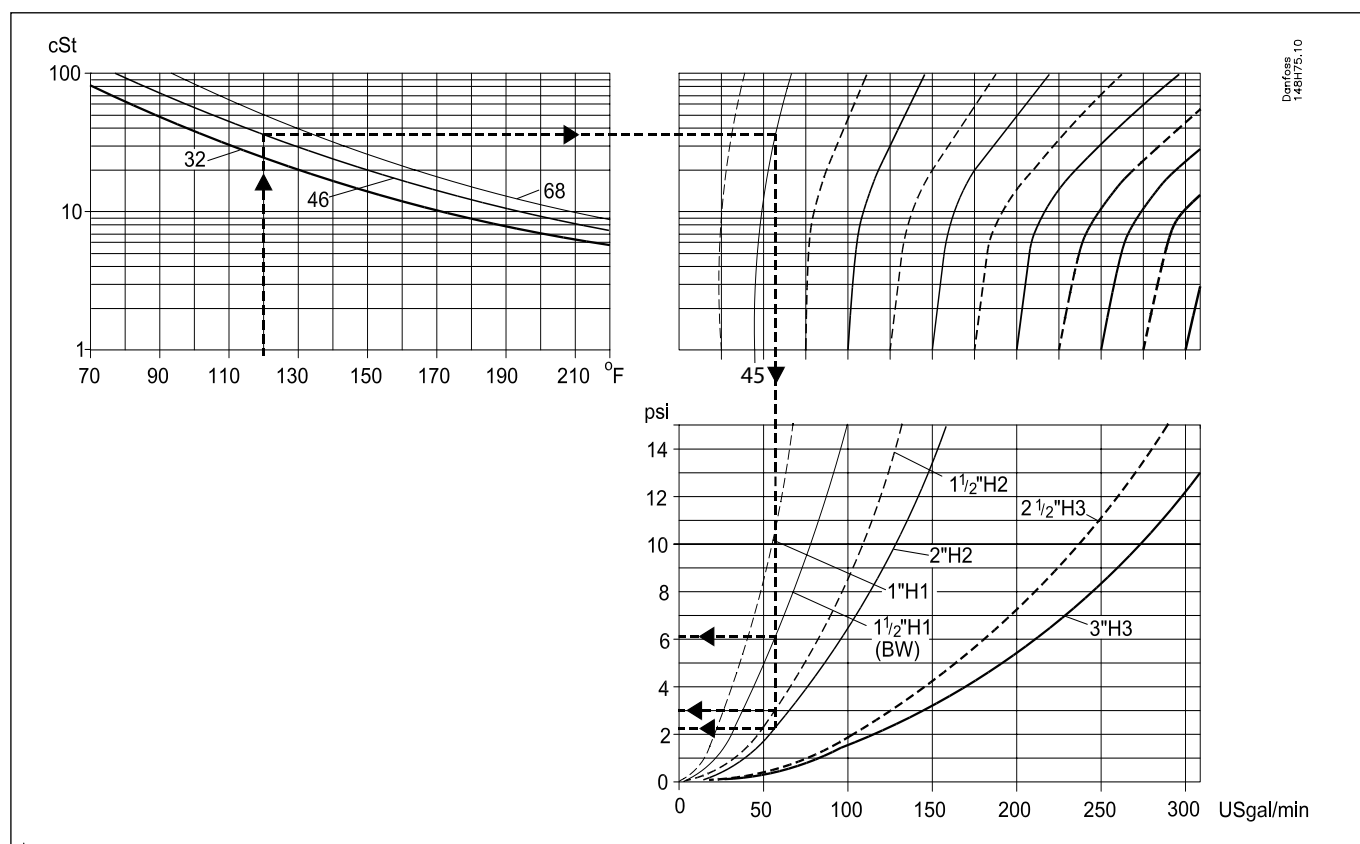
As shown two selections can be made:

Either ORV 40 H2 with pressure drop at approx. 0.56 bar or ORV 50 H2 with pressure drop at 0.42 bar.

The final selection will depend on the available pressures in the system. If the pressures are low (or can be low at certain loads) the ORV 50 H2 might be preferred. If the pressures are constantly available the pipe dimension may be taken into account and the ORV 40 H2 might be preferred.

Capacities

US units



Selection example

Oil type: Grade 46
 Required flow: 45 USgal/min.
 Nominal oil temperature: 120°F
 Pipe dimension: 1 1/2"

The upper left curve shows the viscosity of different grades of oil as a function of the temperature. The viscosity is continued into the upper right curve where the 45 USgal/min. must be found. The line is drawn vertically downwards into the capacity table for the ORV valve models.

As shown three selections can be made:

- Either
- ORV 1 1/2"H1 with pressure drop 6.2 psi or
 - ORV 1 1/2"H2 with pressure drop 3 psi or
 - ORV 2"H2 with pressure drop 2.2 psi

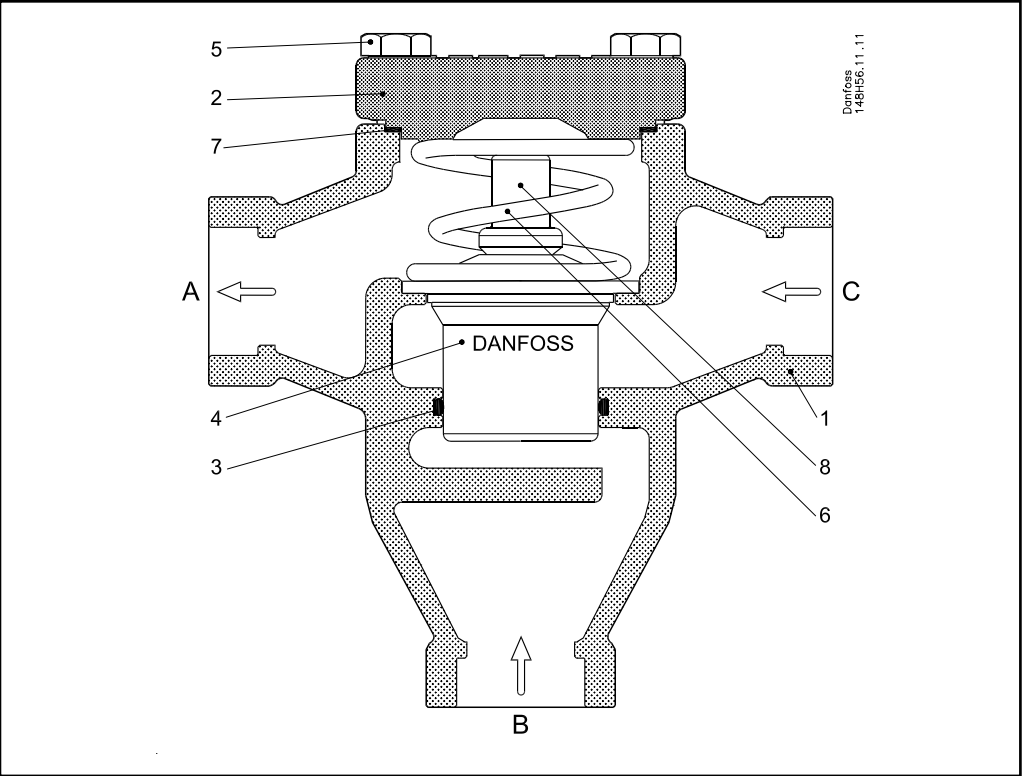
The fourth possible selection of ORV 1"H1 with pressure drop of more than 10 psi could not be recommended. The recommended operational span would be from 2 to 7 psi.

Unless the pipeline was 2" the ORV 2"H2 would not be a practical selection.

The selection between the 1 1/2"H1 or 1 1/2"H2 house would be a consideration of the available pressure in the system. If the pressures are constantly at a high level the H1 house would be sufficient, but if the pressure at any given operating condition could be low, the bigger H2 house with lesser pressure drop would be preferred.

Material specification

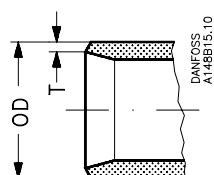
ORV 25-80



No.	Part	Material	EN		ASTM standard		JIS standard	
1	Housing	Steel	GP240GH	10213-2	WCB	A 216	SCPH 1	G 5151
2	Cover	Steel	GP240GH	10213-2	WCB	A 216	SCPH 1	G 5151
3	Guiding tape	PTFE						
4	Element	Stainless steel						
5	Element top	Ni plated						
6	Spring	Steel	DIN17223	10270-1				
7	Gasket	Non asbestos						
8	Bolts	Steel	Quality 8.8	ISO4017	Grade 5		8.8	B 1051

Connections

DIN

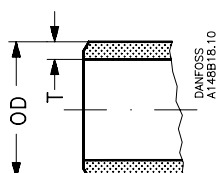


Size mm	Size in	OD mm	T mm	OD in	T in			K _v / C _v H1 housing	K _v / C _v H2 housing	K _v / C _v H3 housing
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Butt-weld DIN (2448)

								K _v m³/h	C _v Usgal/min	K _v m³/h	C _v Usgal/min	K _v m³/h	C _v Usgal/min
25	1	33.7	2.6	1.327	0.103			15	17	-	-	-	-
40	1½	48.3	2.6	1.902	0.103			22	26	30	35	-	-
50	2	60.3	2.9	2.37	0.11			-	-	36	42	-	-
65	2½	76.1	2.9	3	0.11			-	-	-	-	65	75
80	3	88.9	3.2	3.5	0.13			-	-	-	-	75	87

ANSI



Size mm	Size in	OD mm	T mm	OD in	T in			K _v / C _v H1 housing	K _v / C _v H2 housing	K _v / C _v H3 housing
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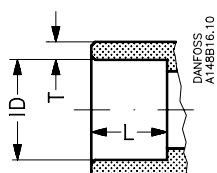
Butt-weld ANSI (B 36.10 Schedule 80)

								K _v m³/h	C _v Usgal/min	K _v m³/h	C _v Usgal/min	K _v m³/h	C _v Usgal/min
25	1	33.7	4.6	1.327	0.181			15	17	-	-	-	-
40	1½	48.3	5.1	1.902	0.201			22	26	30	35	-	-

Butt-weld ANSI (B 36.10 Schedule 40)

								K _v m³/h	C _v Usgal/min	K _v m³/h	C _v Usgal/min	K _v m³/h	C _v Usgal/min
50	2	60.3	3.9	2.37	0.15			-	-	36	42	-	-
65	2½	73	5.2	2.87	0.2			-	-	-	-	65	75
80	3	88.9	5.5	3.5	0.22			-	-	-	-	75	87

SOC

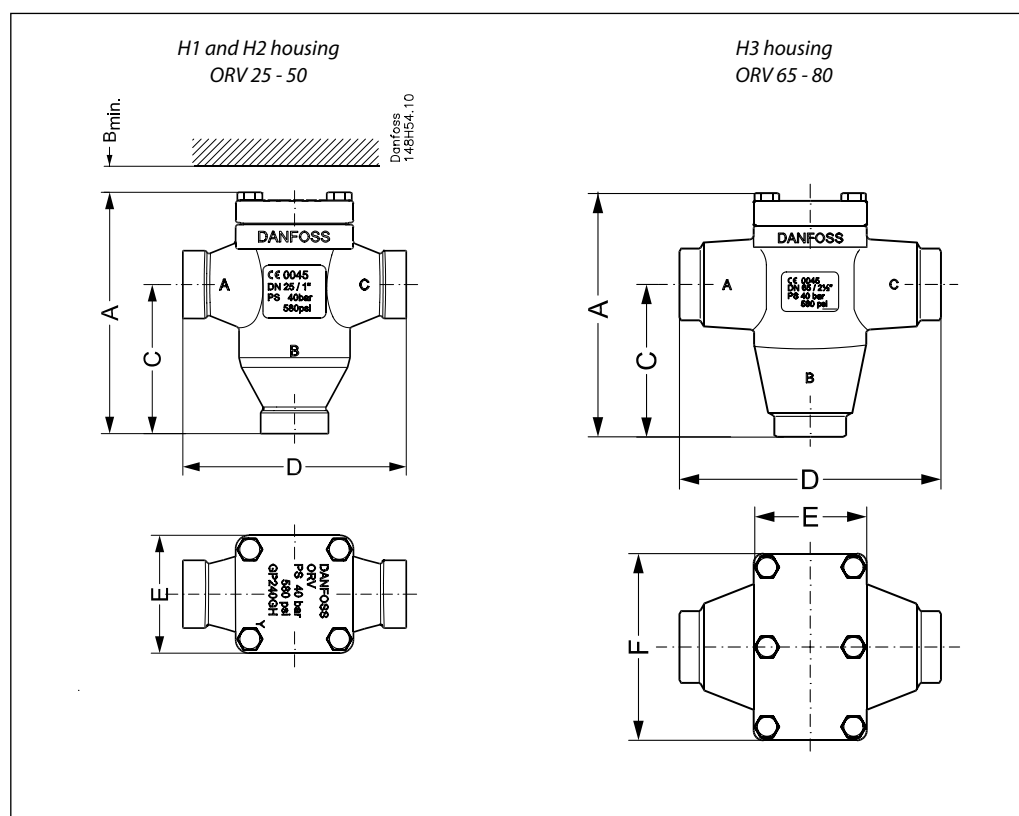


Size mm	Size in	ID mm	T mm	ID in	T in	L mm	L in	K _v / C _v H1 housing	K _v / C _v H2 housing	K _v / C _v H3 housing
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Socket welding ANSI (B 16.11)

								K _v m³/h	C _v Usgal/min	K _v m³/h	C _v Usgal/min	K _v m³/h	C _v Usgal/min
25	1	33.9	7.2	1.335	0.284	13	0.51	15	17	-	-	-	-
40	1½	48.8	6.6	1.921	0.26	13	0.51	-	-	30	35	-	-
50	2	61.2	6.2	2.41	0.24	16	0.63	-	-	36	42	-	-

Dimensions and weights



Valve size	Valve size		A	B _{MIN.}	C	D	E	F	Weight
H1 housing	ORV 25-40	mm	178	75	110	165	87	-	4.5 kg
	(1-1½)	in.	7.00	3.00	4.33	6.50	3.43	-	10 lb
H2 housing	ORV 40-50	mm	215	80	138	196	110	-	9.0 kg
	(1½-2)	in.	8.46	3.15	5.43	7.72	4.33	-	20 lb
H3 housing	ORV 65-80	mm	252	80	155	266	115	190	18 kg
	(2½-3)	in.	9.92	3.15	6.10	10.47	4.53	7.48	40 lb

Ordering

Type codes

Valve type	ORV	Oil regulating valve, high specification
Nominal size in mm (valve size measured on the connection diameter)		Available connections
		DIN ANSI SOC
	25	X X X
	40	X X X
	50	X X X
	65	X X X
	80	X X X
Connection	A	Butt weld connection: ANSI
	D	Butt weld connection: DIN
	SOC	Socket welding
Valve housing	3-WAY	3-WAY

Important!

Where products need to be certified according to specific certification societies or where higher pressures are required, the relevant information should be included at the time of ordering.

Code numbers

Example:
ORV 40 DIN H2 49°C/120°F = **148H3230**

Type	Code number
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Valve house: H1

ORV 25 D H1 49°C/120°F	148H3227
ORV 25 A H1 49°C/120°F	148H3228
ORV 25 SOC H1 49°C/120°F	148H3229
ORV 40 D H1 49°C/120°F	148H3241
ORV 40 A H1 49°C/120°F	148H3242

Valve house: H2

ORV 40 D H2 49°C/120°F	148H3230
ORV 40 A H2 49°C/120°F	148H3231
ORV 40 SOC H2 49°C/120°F	148H3232
ORV 50 D H2 49°C/120°F	148H3233
ORV 50 A H2 49°C/120°F	148H3234
ORV 50 SOC H2 49°C/120°F	148H3235

Valve house: H3

ORV 65 D H3 49°C/120°F	148H3236¹⁾
ORV 65 A H3 49°C/120°F	148H3237¹⁾
ORV 80 D H3 49°C/120°F	148H3239¹⁾
ORV 80 A H3 49°C/120°F	148H3240¹⁾

D = Butt-weld DIN
A = Butt-weld ANSI
SOC = Socket welding

¹⁾ For valve housing H3 there are two thermostats and one seal

If you have other needs concerning the thermostat temperature settings please see table below.

Alternative thermostatic elements

Type	Qty	Code number
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Thermostat for H1 housing

Thermostatic element 43°C/110°F	1	148H3250
Thermostatic element 54°C/130°F	1	148H3251
Thermostatic element 66°C/150°F	1	148H3252
Thermostatic element 77°C/170°F	1	148H3253

Thermostat for H2 + H3 housing

Thermostatic element 43°C/110°F	1	148H3254
Thermostatic element 54°C/130°F	1	148H3255
Thermostatic element 66°C/150°F	1	148H3256
Thermostatic element 77°C/170°F	1	148H3257

Note:

For a H3 valve housing two thermostatic elements are required.

Spare parts

Part	Spare parts for	Code no.
Thermostat 49°C/120°F and gasket + guide ring	ORV 25 and ORV 40 H1	148H3243
	ORV 40 and ORV 50 H2	148H3244
	ORV 65 and ORV 80 H3	148H3245¹⁾

Part	Spare parts for	Code no.
Gasket and guide ring	ORV 25 and ORV 40 H1	148H3246
	ORV 40 and ORV 50 H2	148H3247
	ORV 65 and ORV 80 H3	148H3248¹⁾

¹⁾ For valve housing H3 there are two thermostats, two guide rings, and one seal.

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