

ENGINEERING TOMORROW

Technical Information

Full flow high pressure relief valve for H1B Motors





Revision history

Table of revisions

Date	Changed	Rev
February 2025	Minor flow rate revisions	0102
November 2024	First edition	0101

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Technical Information Full flow High Pressure Relief Valves for H1B

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General information

Function of the FHPRV

Function of the Full Flow High Pressure Relief Valve (FHPRV) is a protection function in open and closed hydraulic circuits. The FHPRV block fits perfectly to the H1 Bent Axis Variable Motor platform and reflects same port dimensions as is.

The valve block with the integrated pressure valves is protecting motors from pressure transients / disruptions due to sudden load changes (overload). The cartridges are non-adjustable, only interchangeable.

Theory of operation FHPRV

The FHPRV is designed as an add-on block for the H1 Variable Motor. It can be bolted on the H1B motor. The purpose of the FHPRV is usage as safety valves.

The anti-shock relief cartridges limit maximum system pressure and limit the rate of pressure rise. The valve opens and then ramps get cut off, independent of set pressure and flows.

FHPRV schematic



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Specifications

FHPRV for H1B technical data

The following tables display mechanical specifications for the full flow high pressure relief valves.

General specifications

Design	Add-On Block for H1B with pressure cartridges
Pipe Connection	<i>Main pressure ports:</i> ISO 6162 split flange boss – distance according to best fit Danfoss motor

Physical properties

Features	Unit	DN19A	DN25A	DN32A	DN32B
Fits to Motor size with axial port end cap of H1B Motor	-	H1B060	H1B080/110	H1B160	H1B 250
Weight dry	kg [lb]	5.2 [11.5]	5.6 [12.3]	6.5 [14.3]	7.2 [15.9]
Maximum pressure	bar [psi]	As specified - from 18	80 [2610] up to 510 [73	397]	

Pressure settings

Pressure	Pressure settings in bar [psi]												
180	200	230	250	280	300	330	350	380	400	420	450	480	510
[2610]	[2900]	[3335]	[3625]	[4061]	[4351]	[4786]	[5076]	[5511]	[5801]	[6091]	[6526]	[6961]	[7397]

FHPRV fluid and cleanliness

Both temperature and viscosity values shall be met for operating conditions listed in the table. Operating temperature and converted kinematic viscosity measured at hottest point of the unit (typically case drain fluid in the motor).

Parameter	Temperature °C [°F]	Viscosity [mm ² /s]
Cold start	Minimum -20 [-4]	500 max.
Recommended range	50 [122]75 [167]	1220
Continuous rating	Maximum 105 [221]	7 min.

At the lowest temperature, not all functions will be available or not as specified. At the highest temperature, the lifetime will decrease. The amount of decreased lifetime is variable due to significant impact from the application.

Required system cleanliness level is ISO 4406 class 22/18/13 or better. Units as received can be expected to be at ISO 4406 class 25/22/17.



Master model code

FHRPV ordering information

When requesting a quote or an offer the following information is required: Motor size, pressure setting for A & B, other combinable valves, such as Counterbalance Valve (CBV).

FHPRV model code breakdown



FHPRV General product description

Size - Port diameter

Code	Description	
19A	DN19, nominal flow 216 l/min [57 gal/min] for H1B060	
25A	DN25, nominal flow 319 l/min [84 gal/min] for H1B080/H1B110	
32A	DN32, nominal flow 416 l/min [110 gal/min] for H1B160	
32B	DN32, nominal flow 550 l/min [145 gal/min] for H1B210 and/or H1B250	

A - Product version

Code	Description
A	Product version A

B - Variant

Code	Description
N	Standard housing

C - Pressure Side A

Code	Description	
K##	Pressure value in bar, e.g. K18 for 180 bar [2610 psi]	

D - Pressure Side B

ode	Description
K##	Pressure value in bar, e.g. K18 for 180 bar [2610 psi]

E - Nametag & Paint

Code	Description
NNN	Zinc coated & Danfoss nametag

F - Specials

Code	Description
NNN	Standard



Master model code

Pressure	Cartridge	Overview
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Setting – selectable in modelcode module C and D	DN19 / DN25 / DN32A fit into A & B	DN32B fit into A & B
180 bar [2610 psi]	11049120	-
200 bar [2900 psi]	11049121	11049144
230 bar [3335 psi]	11049122	11049146
250 bar [3625 psi]	11049123	11049147
280 bar [4061 psi]	11049124	11049148
300 bar [4351 psi]	11049125	11049149
310 bar [4496 psi]	11238037	-
330 bar [4786 psi]	11049126	11049150
350 bar [5076 psi]	11049127	11049151
380 bar [5511 psi]	11049128	11049152
400 bar [5801 psi]	11049129	11049153
420 bar [6091 psi]	11049130	11049154
430 bar [6236 psi]	11166242	11069762
440 bar [3681 psi]	11145242	11116160
450 bar [6526 psi]	11049131	11049155
460 bar [6671 psi]	11194807	11106573
480 bar [6961 psi]	11049132	11049156
510 bar [7397 psi]	11049133	11049157

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FHPRV installation

The valve block scope of delivery is the housing with installed cartridge valves and plugs, as well as seals for the motor facing side. Mounting screws are not included. There are two through-holes for tacking screws that can be used to assemble the FHPRV block with the motor (with endcap options TC/PE), before fixing the pressure hoses. When mounting the valve to an endcap option TA/TB, spacer fittings are necessary.

The valve block gets mounted to the motor ports.

H1B motor with FHPRV assembly



FHPRV assembly



In case plugs or pressure cartridges get changed following torques are needed:

Description	Туре	Torque
Pressure cartridge	DN19/DN25	70 Nm [52 ft-lb]
	DN32	110 Nm [81ft-lb]
Block plugs	M18x1.5	46 Nm [34 ft-lb]
	M22x1.5	70 Nm [52 ft-lb]



FHPRV dimensions

Dimensions are shown in mm [in].







Dimension table

Size	DN19	DN25	DN32A	DN32B
AA	150 [5.90]	160 [6.29]	180 [7.09]	190 [7.48]
AB	27 [1.06]	30 [1.18]	30 [1.18]	30 [1.18]
AC	96 [3.78]	100 [3.94]	120 [4.72]	130 [5.12]
BA	122 [4.80]	127 [5.00]	132 [5.20]	132 [5.20]
BB	152.6 [6.01]	159 [6.26]	162.6 [6.40]	189.7 [7.47]
BC	30 [1.18]	32.5 [1.28]	46.3 [1.82]	59.9 [2.36]
BD	62 [2.44]	62 [2.44]	70 [2.76]	70 [2.76]
CA	48.6 [1.91]	48.6 [1.91]	48.6 [1.91]	48.6 [1.91]



Safety information

FHPRV safety guidelines

Failure to observe any of the following points may lead to uncontrolled working conditions with serious personal injury and material damage.

Caution

Analyze all aspects of the applications.

The machine builder / system integrator alone is responsible for making the final selection of the products and assuring that all performance, safety and warning requirements of the application are met. The process of choosing the control system and safety levels is governed by Machinery Directive 2006-42-EC and harmonized standard EN13849.

- FHPRV are designed to be used in open and closed circuits. The FHPRV valve absorbs shocks.
- In combination with Counterbalance Valve the whole system has to be considered.
- The data and note contained herein must be adhered to.
- The valve will become hot during operation touching the surface might lead to injuries.
- In certain operating conditions, the motor (when operating as a pump) may cavitate because of insufficient inlet pressure. To prevent this any countermeasures has to be taken.

Above safety measures must be considered and adapted to the application. They have to be extended, if necessary.

For further configuration yourDanfossRepresentative will support you.

Recommended safety standards

All documented safety measures must be considered and adopted to the application. If necessary, safety measures may be extended.

The following standards are recommended:

- ISO 4413: 2010 Hydraulic fluid power: general rules and safety requirements for systems and their components (former times EN DIN 982).
- ISO 13849-2: 2003 Safety of machinery: safety-related parts of control systems Part 2 Table C1 + C2.
- Machinery-Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC.



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