

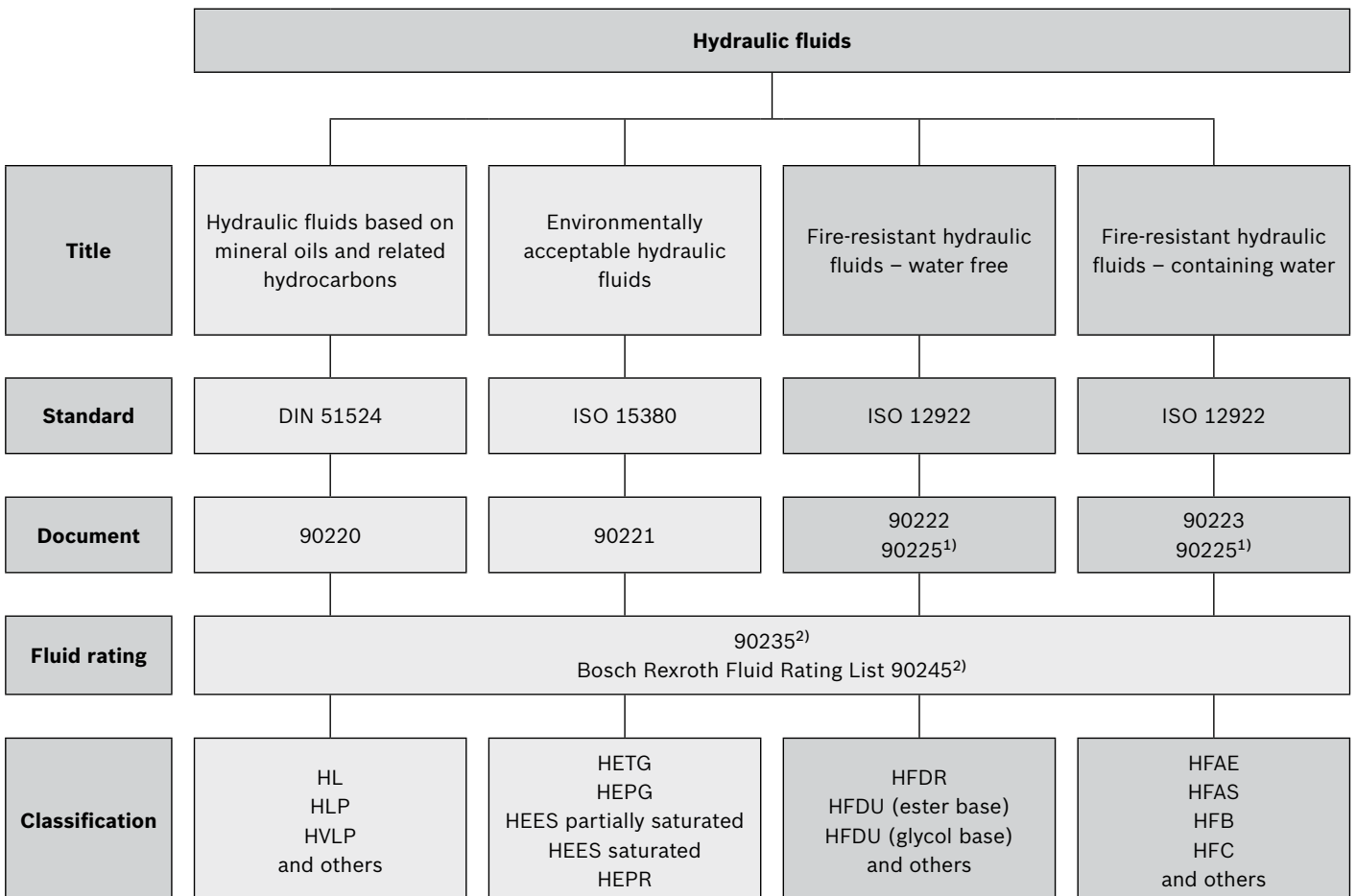
Axial piston units for operation with fire-resistant hydraulic fluids - water-free and water-containing (HFDR, HFDU, HFA, HFB, HFC)

RE 90225

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Application requirements and technical data for axial piston units



1) Valid for Bosch Rexroth axial piston units

2) Valid for Bosch Rexroth Business Unit "Mobile Applications" – pumps and motors

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1 Basic information

In accordance with DIN 51502 and DIN EN ISO 6743-4, fire resistant fluids – hereinafter referred to as HF hydraulic fluids – are divided into four groups A, B, C, D and correspondingly designated HFA, HFB, HFC, HFD. In the designation “HF”, the “H” for “hydraulic fluid” and “F” is for “fire resistant”.

In general, fire-resistant hydraulic fluids are divided into water-free, fire-resistant hydraulic fluids and water-containing, fire-resistant hydraulic fluids. The water-free, fire-resistant hydraulic fluids are described in Rexroth data sheet 90222, the water-containing ones are described in Rexroth data sheet 90223.

Compared with hydraulic fluids based on mineral oils and related hydrocarbons, fire-resistant hydraulic fluids do have other, sometimes disadvantageous, properties. This document is intended to show how these special properties have to be considered in the selection and operation of axial piston units.

For axial piston units which may, in accordance with product data sheet, be operated with fire-resistant hydraulic fluids, note the following:

- ▶ The operation with HFA, HFB and HFC hydraulic fluids usually requires a reduction in the permissible pressures and rotational speeds. Depending on the product size or nominal size, a special version of the axial piston unit is needed (version **E**-...).
However, Rexroth hydraulic components that have been specifically developed for water-containing, fire-resistant hydraulic fluids are available without limitation of operational data (e.g. 92053 axial piston variable pump A4VSO for HFC hydraulic fluids).
- ▶ When using hydraulic fluids of the category HFDR (ester base), there are permissible standard values for pressure and rotational speed for these axial piston units just as there are for hydraulic fluids based on mineral oils and related hydrocarbons. For operation with HFDR and HFDR (glycol base), for example, a reduction in the permissible rotational speeds results from the significantly higher density of the fluid.
- ▶ Note that for almost all HF hydraulic fluids, due to the higher density compared with hydraulic fluids based on mineral oils, the pressure will not fall below the minimum permissible suction pressure at the pump inlet.

- ▶ Additional technical data and required sealing materials for the axial piston units are listed in the table on page 4.

When ordering the axial piston unit, please state in plain text the hydraulic fluid that is to be used.

2 Classification of HF-hydraulic fluids

Classification	Containing water					Water-free		
	HFAE	HFAS	HFB	HFC	HFC-E ³⁾	HFDR	HFDU ⁴⁾ (Glycol base)	HFDU (Ester base)
Features	Oil-in-water emulsions	Chemical solutions in water	Water-in-oil emulsions	Watery polymer solutions	Watery polymer solutions	Basic fluids	Basic fluids	Basic fluids
						Phosphoric acid ester	Glycols	Ester
Water content [% (m/m)]	≥ 95	≥ 95	≥ 40	≥ 35	≥ 20±2	–	–	–
Reservoir temperature T [°C]	5 to 50	5 to 50	5 to 50	-20 to 50	-20 to 70	80	80	80
Optimal reservoir temperature T_{opt} [°C]	40	40	40	40	40	70	70	70
Bearing service life ¹⁾ [%]	10	10	20	100 ²⁾ 20	100 ²⁾ 20	100	100	100
Cleanliness level acc. to ISO 4406	– / 18 / 15	– / 18 / 15	– / 18 / 15	– / 18 / 15	– / 18 / 15	20 / 18 / 15	20 / 18 / 15	20 / 18 / 15
Filter material	Glass fiber, do not use cellulose (filter paper)					–	–	–
Sealing material	NBR	NBR	NBR	NBR	NBR	FKM	FKM	FKM
Minimum suction pressure Port S $p_{s min}$ [bar] (operation as a pump, open circuit)	1.0 (abs.)	1.0 (abs.)	1.0 (abs.)	1.0 (abs.)	1.0 (abs.)	1.0 (abs.)	1.0 (abs.)	1.0 (abs.)

Notice

- ▶ Sealing material and filter grade is to be agreed upon with the manufacturer of the hydraulic fluid or with Bosch Rexroth Filtration System.
Link: Bosch Rexroth Filtration System
- ▶ Compared to hydraulic fluids based on mineral oils, HFC hydraulic fluids have a very good low-temperature performance, a lower pour point and a lower viscosity-pressure coefficients.
- ▶ Bosch Rexroth offers the rating of hydraulic fluids for Rexroth hydraulic components as a service. You can find further information on this in the following data sheet:
90235: Rating of hydraulic fluids for Rexroth hydraulic components

1) Attainable bearing service life based on operation with hydraulic fluids based on mineral oils, according to the specifications of the bearing manufacturer.
Practical application cases show results that are much higher.

2) Axial piston variable pump A4VSO for HFC hydraulic fluids, see document 92053

3) Not standardized according to ISO 12922.

4) Can be water-soluble

3 Technical data for axial piston units operating with HF-hydraulic fluids

Notice

- ▶ Maximum permissible rotational speeds
- ▶ In the following tables, HFA includes HFAE and HFAS
- ▶ Nominal pressure/maximum pressure for HFD corresponds to the specifications for mineral oil; see product data sheet
- ▶ For HFDU (ester and glycol) as well as for HFDR, there is no pressure limitation
- ▶ For HFDR and HFDU (glycol), the maximum allowable rotational speed must be reduced due to the high density of the hydraulic fluid
- ▶ The manufacturer's specifications concerning the suction performance, the temperatures, the working pressures and the rotational speeds are to be strictly adhered to for a long service life of the axial piston unit

3.1 Swashplate pumps for open circuit

Variable pump A4VSO series 1x and series 30

for open circuit (data sheet 92050)

Size		40	71	125	180	250	355	500	750	1000	
HFA	Nominal pressure $p_N = 140$ bar Maximum pressure $p_{max} = 160$ bar	rpm	1950 ¹⁾	1650	1350	1350	1120	1120	1000 ¹⁾	900	750
HFB	Nominal pressure $p_N = 160$ bar Maximum pressure $p_{max} = 210$ bar	rpm	2100 ¹⁾	1760	1450	1450	1200	1200	1050 ¹⁾	960	800
HFC	Nominal pressure $p_N = 250$ bar Maximum pressure $p_{max} = 280$ bar	rpm	2100 ¹⁾ 2)	2)	2)	2)	2)	2)	1050 ¹⁾	960	800
HFD	HFDR, HFDU (glycol base)	rpm	2100	1760	1450	1450	1200	1200	1050	960	800
	HFDU (ester base)	rpm	2600	2200	1800	1800	1500	1500	1320	1200	1000

Variable pump A4VSO series 1x and series 30 for HFC hydraulic fluids

for open circuit (data sheet 92053)

Size		71	125	180	250	355
HFA		See table above: Variable pump A4VSO series 1x and series 30 Please contact us.				
HFB		See table above, variable pump A4VSO series 1x and series 30 Please contact us.				
HFC	Nominal pressure $p_N = 350$ bar Maximum pressure $p_{max} = 400$ bar	rpm	2200 ³⁾	1800 ³⁾	1800 ³⁾	1500 ³⁾⁴⁾ 1500 ³⁾
HFD		See table above, variable pump A4VSO series 1x and series 30 Please contact us.				

1) Version E-A4VSO

2) See table below, variable pump A4VSO series 1x and series 30 for HFC hydraulic fluids

3) Version A4VSO-F

4) Version A4VSO-F2

Fixed pump A4FO series 10, series 3x

for open circuit (data sheet 91455)

Size			16	22	28	40	71	125	180	250	500
HFA	Nominal pressure $p_N = 140$ bar	rpm	–	–	–	–	1650 ¹⁾	1350 ¹⁾	1350 ¹⁾	1120 ¹⁾	1000 ¹⁾
	Maximum pressure $p_{max} = 160$ bar										
HFB	Nominal pressure $p_N = 160$ bar	rpm	–	–	–	–	1760 ¹⁾	1450 ¹⁾	1450 ¹⁾	1200 ¹⁾	1050 ¹⁾
	Maximum pressure $p_{max} = 210$ bar										
HFC	Nominal pressure $p_N = 250$ bar	rpm	–	–	–	–	1760 ¹⁾	1450 ¹⁾	1450 ¹⁾	1200 ¹⁾	1050 ¹⁾
	Maximum pressure $p_{max} = 280$ bar										
HFD	HFDR, HFDU (glycol base)	rpm	3200	2880	2400	2200	1760	1450	1450	1200	1050
	HFDU (ester base)	rpm	4000	3600	3000	2750	2200	1800	1800	1500	1320

Variable pump A10VO series 31

for open circuit (data sheet 92701)

Size			18 ²⁾	28	45	71	100	140
HFA	not permissible		–	–	–	–	–	–
HFB	not permissible		–	–	–	–	–	–
HFC	not permissible		–	–	–	–	–	–
HFD	HFDR, HFDU (glycol base)	rpm	2650	2400	2100	1760	1600	1450
	HFDU (ester base)	rpm	3300	3000	2600	2200	2000	1800

Variable pump A10VSO series 31

for open circuit (data sheet 92711)

Size			18	28	45	71	100	140
HFA	Nominal pressure $p_N = 140$ bar	rpm	2450 ³⁾	2250 ³⁾	1950 ³⁾	1650 ³⁾	1500 ³⁾	1350 ³⁾
	Maximum pressure $p_{max} = 160$ bar							
HFB	Nominal pressure $p_N = 140$ bar	rpm	2650 ³⁾	2400 ³⁾	2100 ³⁾	1760 ³⁾	1600 ³⁾	1450 ³⁾
	Maximum pressure $p_{max} = 160$ bar							
HFC	Nominal pressure $p_N = 175$ bar	rpm	2650 ³⁾	2400 ³⁾	2100 ³⁾	1760 ³⁾	1600 ³⁾	1450 ³⁾
	Maximum pressure $p_{max} = 210$ bar							
HFD	HFDR, HFDU (glycol base)	rpm	2650	2400	2100	1760	1600	1450
	HFDU (ester base)	rpm	3300	3000	2600	2200	2000	1800

Variable pump A10VO series 32

for open circuit (data sheet 92705)

Size			45	71	100	140
HFA	not permissible		–	–	–	–
HFB	not permissible		–	–	–	–
HFC	not permissible		–	–	–	–
HFD	HFDR, HFDU (glycol base)	rpm	2100	1760	1600	1450
	HFDU (ester base)	rpm	2600	2200	2000	1800

1) Version E-A4FO

2) Version A10VSO

3) Version E-A10VSO

Variable pump A10VSO series 32

for open circuit (data sheet 92714)

Size			45	71	100	140	180
HFA	not permissible		-	-	-	-	-
HFB	not permissible		-	-	-	-	-
HFC	not permissible		-	-	-	-	-
HFD	HFDR, HFDU (glycol base)	rpm	2100	1760	1600	1450	On request
	HFDU (ester base)	rpm	2600	2200	2000	1800	On request

Variable pump A11VO series 1x

for open circuit (data sheet 92500)

Size			40	60	75	95	130	145	190	260
HFA	not permissible		-	-	-	-	-	-	-	-
HFB	not permissible		-	-	-	-	-	-	-	-
HFC	not permissible		-	-	-	-	-	-	-	-
HFD	HFDR, HFDU (glycol base)	rpm	2400	2200	2050	1900	1700	1700	1700	1450
	HFDU (ester base)	rpm	3000	2700	2550	2350	2100	2100	2100	1800

Variable pump A11VLO series 1x

for open circuit (data sheet 92500)

Size			130	145	190	260
HFA	not permissible		-	-	-	-
HFB	not permissible		-	-	-	-
HFC	not permissible		-	-	-	-
HFD	HFDR, HFDU (glycol base)	rpm	2000	2000	2000	1850
	HFDU (ester base)	rpm	2500	2500	2500	2300

Variable pump A11VO series 41¹⁾

for open circuit (data sheet 92510)

Size			280
HFA	not permissible		-
HFB	not permissible		-
HFC	not permissible		-
HFD	HFDR, HFDU (glycol base)	rpm	1450
	HFDU (ester base)	rpm	1800

1) Version P

VVariable pump A11VLO series 41¹⁾

for open circuit (data sheet 92510)

Size	280		
HFA	not permissible		–
HFB	not permissible		–
HFC	not permissible		–
HFD	HFDR, HFDU (glycol base)	rpm	1850
	HFDU (ester base)	rpm	2300

Variable pump A15VO series 11¹⁾

for open circuit (data sheet 92800)

Size	280		
HFA	not permissible		–
HFB	not permissible		–
HFC	not permissible		–
HFD	HFDR, HFDU (glycol base)	rpm	1450
	HFDU (ester base)	rpm	1800

Variable pump A15VLO series 11¹⁾

for open circuit (data sheet 92800)

Size	280		
HFA	not permissible		–
HFB	not permissible		–
HFC	not permissible		–
HFD	HFDR, HFDU (glycol base)	rpm	1850
	HFDU (ester base)	rpm	2300

Variable pump A18VO series 11

for open circuit (data sheet 92270)

Size	55	80	107
HFA	not permissible	–	–
HFB	not permissible	–	–
HFC	not permissible	–	–
HFD	For operation with HFD hydraulic fluids, limitations for the technical data and the sealing materials are to be observed. Please contact us.		

1) Version P

Variable pump A18VLO series 11
for open circuit (data sheet 92280)

Size	80
HFA not permissible	–
HFB not permissible	–
HFC not permissible	–
HFD	For operation with HFD hydraulic fluids, limitations for the technical data and the sealing materials are to be observed. Please contact us.

Variable double pump A20VO series 10
for open circuit (data sheet 93100)

Size		95	190	260	520	
HFA	Nominal pressure $p_N = 140$ bar Maximum pressure $p_{max} = 160$ bar	rpm	–	–	–	1000
HFB	Nominal pressure $p_N = 160(140^{1})$ bar Maximum pressure $p_{max} = 210(160^{1})$ bar	rpm	–	–	–	1000
HFC	Nominal pressure $p_N = 250(175^{1})$ bar Maximum pressure $p_{max} = 280(210^{1})$ bar	rpm	–	–	–	1000
HFD	HFDR, HFDU (glycol base)	rpm	1900	2000	1850	1000
	HFDU (ester base)	rpm	2350	2500	2300	1300

3.2 Swashplate pumps for closed circuit

Variable pump A4VSG series 1x and series 30
for closed circuit (data sheet 92100)

Size		40	71	125	180	250	355	500	750	1000	
HFA	Nominal pressure $p_N = 140$ bar Maximum pressure $p_{max} = 160$ bar	rpm	2750 ¹⁾²⁾	2400 ¹⁾²⁾	1950 ¹⁾²⁾	1800 ¹⁾²⁾	1650 ¹⁾²⁾	1500 ¹⁾²⁾	1350 ¹⁾²⁾	1200 ²⁾	1200 ²⁾
HFB	Nominal pressure $p_N = 160$ bar Maximum pressure $p_{max} = 210$ bar	rpm	3000 ¹⁾²⁾	2550 ¹⁾²⁾	2100 ¹⁾²⁾	1920 ¹⁾²⁾	1750 ¹⁾²⁾	1600 ¹⁾²⁾	1450 ¹⁾²⁾	1300 ²⁾	1300 ²⁾
HFC	Nominal pressure $p_N = 250$ bar Maximum pressure $p_{max} = 280$ bar	rpm	3000 ¹⁾²⁾	2550 ¹⁾²⁾	2100 ¹⁾²⁾	1920 ¹⁾²⁾	1750 ¹⁾²⁾	1600 ¹⁾²⁾	1450 ¹⁾²⁾	1300 ²⁾	1300 ²⁾
HFD		rpm	3700	3200	2600	2400	2200	2000	1800	1600	1600

Variable pump A4VG series 32
for closed circuit (data sheet 92003)

Size		28	40	56	71	90	125	180	250	
HFA not permissible		–	–	–	–	–	–	–	–	
HFB not permissible		–	–	–	–	–	–	–	–	
HFC not permissible		–	–	–	–	–	–	–	–	
HFD		rpm	4250	4000	3600	3300	3050	2850	2500	2400

1) Bearing flushing at U port required!
2) Version E-A4VSG

Variable pump A4VG series 40

for closed circuit (data sheet 92004)

Size	45	65	85	110	145	175	210	280
HFA not permissible	-	-	-	-	-	-	-	-
HFB not permissible	-	-	-	-	-	-	-	-
HFC not permissible	-	-	-	-	-	-	-	-
HFD	For operation with HFD hydraulic fluids, limitations for the technical data and the sealing materials are to be observed. Please contact us.							

Variable pump A4VTG series 33

for closed circuit (data sheet 92013)

Size	71	90
HFA not permissible	-	-
HFB not permissible	-	-
HFC not permissible	-	-
HFD	For operation with HFD hydraulic fluids, limitations for the technical data and the sealing materials are to be observed. Please contact us.	

Variable pump A10VG series 10

for closed circuit (data sheet 92750)

Size	18	28	45	63	
HFA not permissible	-	-	-	-	
HFB not permissible	-	-	-	-	
HFC not permissible	-	-	-	-	
HFD	rpm	5000	4250	3800	3500

Variable double pump A20VG series 11 and A22VG series 11

for closed circuit (data sheet 93220)

Size	45
HFA not permissible	-
HFB not permissible	-
HFC not permissible	-
HFD	For operation with HFD hydraulic fluids, limitations for the technical data and the sealing materials are to be observed. Please contact us.

Variable double pump A22VG series 40

for closed circuit (data sheet 93221)

Size	45
HFA not permissible	–
HFB not permissible	–
HFC not permissible	–
HFD	For operation with HFD hydraulic fluids, limitations for the technical data and the sealing materials are to be observed. Please contact us.

Variable double pump A24VG series 10

for closed circuit (data sheet 93240)

Size	45 - 45	65 - 45	65 - 65
HFA not permissible	–	–	–
HFB not permissible	–	–	–
HFC not permissible	–	–	–
HFD	For operation with HFD hydraulic fluids, limitations for the technical data and the sealing materials are to be observed. Please contact us.		

Variable double pump A30VG series 10

for closed circuit (data sheet 93430)

Size	28
HFA not permissible	–
HFB not permissible	–
HFC not permissible	–
HFD	For operation with HFD hydraulic fluids, limitations for the technical data and the sealing materials are to be observed. Please contact us.

3.3 Bent-axis pumps for open circuit

Fixed pump A2FO series 6

for open circuit (data sheet 91401)

Size			5	10	12	16	23	28	32	45	56	63	80
HFA	not permissible		-	-	-	-	-	-	-	-	-	-	-
HFB	Nominal pressure $p_N = 160$ bar Maximum pressure $p_{max} = 210$ bar	rpm	4500	2520	2520	2520	2000	2000	2000	1800	1600	1600	1440
HFC	Nominal pressure $p_N = 200$ bar Maximum pressure $p_{max} = 250$ bar	rpm	4500	2520	2520	2520	2000	2000	2000	1800	1600	1600	1440
HFD	HFD, HFDU (glycol base)	rpm	4500	2520	2520	2520	2000	2000	2000	1800	1600	1600	1440
	HFDU (ester base)	rpm	5600	3150	3150	3150	2500	2500	2500	2240	2000	2000	1800
Size			90	107	125	160	180	200	250	355	500	710	1000
HFA	not permissible		-	-	-	-	-	-	-	-	-	-	-
HFB	Nominal pressure $p_N = 160$ bar Maximum pressure $p_{max} = 210$ bar	rpm	1440	1280	1280	1160	1160	1240	1200 ¹⁾	1060 ¹⁾	950 ¹⁾	950 ¹⁾	750 ¹⁾
HFC	Nominal pressure $p_N = 200$ bar Maximum pressure $p_{max} = 250$ bar	rpm	1440	1280	1280	1160	1160	1240	1200 ¹⁾	1060 ¹⁾	950 ¹⁾	950 ¹⁾	750 ¹⁾
HFD	HFD, HFDU (glycol base)	rpm	1440	1280	1280	1160	1160	1240	1200 ²⁾	1060 ²⁾	950 ²⁾	950 ²⁾	750 ²⁾
	HFDU (ester base)	rpm	1800	1600	1600	1450	1450	1550	1500 ²⁾	1320 ²⁾	1200 ²⁾	1200 ²⁾	950 ²⁾

Variable pump A7VO series 63

for open circuit (data sheet 92202)

Size			55	80	107	160
HFA	not permissible		-	-	-	-
HFB	Nominal pressure $p_N = 160$ bar Maximum pressure $p_{max} = 210$ bar	rpm	2000	1800	1600	1400
HFC	Nominal pressure $p_N = 200$ bar Maximum pressure $p_{max} = 250$ bar	rpm	2000	1800	1600	1400
HFD	HFD, HFDU (glycol base)	rpm	2000	1800	1600	1400
	HFDU (ester base)	rpm	2500	2240	2150	1900

Variable pump A7VLO series 63

for open circuit (data sheet 92203)

Size			250	355	500
HFA	not permissible		-	-	-
HFB	not permissible		-	-	-
HFC	not permissible		-	-	-
HFD	HFD, HFDU (glycol base)	rpm	1200	1060	950
	HFDU (ester base)	rpm	1500	1320	1200

1) Version E-A2FLO

2) Version A2FLO

Variable double pump A8VO series 6x

for open circuit (data sheet 93010)

Size		55	80	107	140	200	
HFA	not permissible	-	-	-	-	-	
HFB	not permissible	-	-	-	-	-	
HFC	not permissible	-	-	-	-	-	
HFD	HFDR, HFDU (glycol base)	rpm	2000	1800	1600	-	-
	HFDU (ester base)	rpm	2500	2240	2150	2100	1950

Fixed pump A17FO series 10

for open circuit (data sheet 91520)

Size		23	32	45	63	80	107
HFA	not permissible	-	-	-	-	-	-
HFB	not permissible	-	-	-	-	-	-
HFC	not permissible	-	-	-	-	-	-
HFD	For operation with HFD hydraulic fluids, limitations for the technical data and the sealing materials are to be observed. Please contact us.						

Fixed pump A17FNO series 10

for open circuit (data sheet 91510)

Size		125
HFA	not permissible	-
HFB	not permissible	-
HFC	not permissible	-
HFD	For operation with HFD hydraulic fluids, limitations for the technical data and the sealing materials are to be observed. Please contact us.	

3.4 Swashplate motor

Fixed motor A4FM series 1x and series 3x

for open and closed circuit (data sheet 91120)

Size		22	28	40	56	71	125	250	500	
HFA	Nominal pressure $p_N = 140$ bar	rpm	-	-	-	-	2400 ¹⁾	1950 ¹⁾	1650 ¹⁾	1350 ¹⁾
	Maximum pressure $p_{max} = 160$ bar									
HFB	Nominal pressure $p_N = 160$ bar	rpm	-	-	-	-	2550 ¹⁾	2100 ¹⁾	1750 ¹⁾	1450 ¹⁾
	Maximum pressure $p_{max} = 210$ bar									
HFC	Nominal pressure $p_N = 250$ bar	rpm	-	-	-	-	2550 ¹⁾	2100 ¹⁾	1750 ¹⁾	1450 ¹⁾
	Maximum pressure $p_{max} = 280$ bar									
HFD		rpm	4250	4250	4000	3600	3200	2600	2200	1800

1) Version E-A4FM

3.5 Bent-axis motors

Fixed motor A2FM series 6x

for open and closed circuit (data sheet 91001)

Size			10	12	16	23	28	32	45	56	63	80	90
HFA	not permissible		-	-	-	-	-	-	-	-	-	-	-
HFB	Nominal pressure $p_N = 160$ bar Maximum pressure $p_{max} = 210$ bar	rpm	4800	4800	4800	3800	3800	3800	3400	3000	3000	2680	2680
HFC	Nominal pressure $p_N = 200$ bar Maximum pressure $p_{max} = 250$ bar	rpm	4800	4800	4800	3800	3800	3800	3400	3000	3000	2680	2680
HFD		rpm	8000	8000	8000	6300	6300	6300	5600	5000	5000	4500	4500
Size			107	125	160	180	200	250	355	500	710	1000	
HFA	not permissible		-	-	-	-	-	-	-	-	-	-	
HFB	Nominal pressure $p_N = 160$ bar Maximum pressure $p_{max} = 210$ bar	rpm	2400	2400	2100	2100	2200	2150 ¹⁾	1800 ¹⁾	1600 ¹⁾	1280 ¹⁾	1280 ¹⁾	
HFC	Nominal pressure $p_N = 200$ bar Maximum pressure $p_{max} = 250$ bar	rpm	2400	2400	2100	2100	2200	2150 ¹⁾	1800 ¹⁾	1600 ¹⁾	1280 ¹⁾	1280 ¹⁾	
HFD		rpm	4000	4000	3600	3600	2750	2700 ²⁾	2240 ²⁾	2000 ²⁾	1600 ²⁾	1600 ²⁾	

Fixed motor A2FE series 6x

for open and closed circuit (data sheet 91008)

Size			28	32	45	56	63	80	90	107	125	160	180
HFA	not permissible		-	-	-	-	-	-	-	-	-	-	-
HFB	Nominal pressure $p_N = 160$ bar Maximum pressure $p_{max} = 210$ bar	rpm	3800	3800	3400	3000	3000	2680	2680	2400	2400	2100	2100
HFC	Nominal pressure $p_N = 200$ bar Maximum pressure $p_{max} = 250$ bar	rpm	3800	3800	3400	3000	3000	2680	2680	2400	2400	2100	2100
HFD		rpm	6300	6300	5600	5000	5000	4500	4500	4000	4000	3600	3600
Size			250	355									
HFA	not permissible		-	-									
HFB	Nominal pressure $p_N = 160$ bar Maximum pressure $p_{max} = 210$ bar	rpm	2150 ³⁾	1800 ³⁾									
HFC	Nominal pressure $p_N = 200$ bar Maximum pressure $p_{max} = 250$ bar	rpm	2150 ³⁾	1800 ³⁾									
HFD		rpm	2700 ⁴⁾	2240 ⁴⁾									

1) Version E-A2FLM

2) Version A2FLM

3) Version E-A2FLE

4) Version A2FLE

Variable motor A6VM series 63

for open and closed circuit (data sheet 91604)

Size		28	55	80	107	140	160	200	250	355	500	1000	
HFA	not permissible	-	-	-	-	-	-	-	-	-	-	-	
HFB	Nominal pressure $p_N = 160$ bar Maximum pressure $p_{max} = 210$ bar	rpm	3700	3000	2600	2300	2200	2100	1900	2150 ¹⁾	1800 ¹⁾	1600 ¹⁾	1280 ¹⁾
HFC	Nominal pressure $p_N = 200$ bar Maximum pressure $p_{max} = 250$ bar	rpm	3700	3000	2600	2300	2200	2100	1900	2150 ¹⁾	1800 ¹⁾	1600 ¹⁾	1280 ¹⁾
HFD		rpm	5550	4450	3900	3550	3250	3100	2900	2700 ²⁾	2240 ²⁾	2000 ²⁾	1600 ²⁾

Variable motor A6VE series 63

for open and closed circuit (data sheet 91606)

Size		28	55	80	107	160	250	
HFA	not permissible	-	-	-	-	-	-	
HFB	Nominal pressure $p_N = 160$ bar Maximum pressure $p_{max} = 210$ bar	rpm	3700	3000	2600	2300	2100	2150 ³⁾
HFC	Nominal pressure $p_N = 200$ bar Maximum pressure $p_{max} = 250$ bar	rpm	3700	3000	2600	2300	2100	2150 ³⁾
HFD		rpm	5550	4450	3900	3550	3100	2700 ⁴⁾

Variable motor A6VM series 65

for open and closed circuit (data sheet 91607)

Size		55	80	107	140	160	200	
HFA	not permissible	-	-	-	-	-	-	
HFB	Nominal pressure $p_N = 160$ bar Maximum pressure $p_{max} = 210$ bar	rpm	3000	2600	2300	2200	2100	1900
HFC	Nominal pressure $p_N = 200$ bar Maximum pressure $p_{max} = 250$ bar	rpm	3000	2600	2300	2200	2100	1900
HFD		rpm	4450	3900	3550	3250	3100	2900

Variable motor A6VM series 71

for open and closed circuit (data sheet 91610)

Size		60	85	115	150	170	215	
HFA	not permissible	-	-	-	-	-	-	
HFB	Nominal pressure $p_N = 160$ bar Maximum pressure $p_{max} = 210$ bar	rpm	3000	2600	2300	2200	2100	1900
HFC	Nominal pressure $p_N = 200$ bar Maximum pressure $p_{max} = 250$ bar	rpm	3000	2600	2300	2200	2100	1900
HFD		rpm	4450	3900	3550	3250	3100	2900

1) Version E-A6VLM

2) Version A6VLM

3) Version E-A6VLE

4) Version A6VLE

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