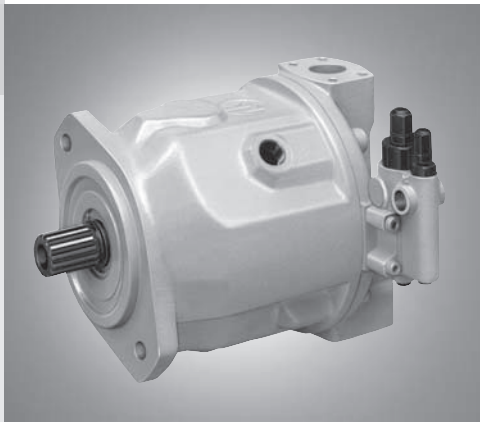
Rexroth
Bosch Group

Variable Axial Piston Pump A10V(S)O

RE 92 701/11.03 1/44
Replaces: 11.95

open circuit



Size 18...140
Series 31
Nominal pressure 280 bar
Peak pressure 350 bar

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Features

- Axial piston pump A10VO, variable, in swashplate design for hydrostatic transmissions in open loop circuit
- Flow is proportional to drive speed and displacement. By adjusting the swashplate angle it is possible to infinitely vary the flow
- Mounting flange acc. to SAE J744
- Flanged ports acc. to SAE J518
- 2 case drain ports
- Good suction characteristics
- Permissible working pressure 280 bar
- Low noise level
- Long service life
- Axial and radial loading of drive shaft possible
- High power to weight ratio
- Wide range of controls
- Short response times
- Through drive option for multiple pump system

Ordering code standard range

Version	**18, 28**	**45...140**	
High-Speed-Version	-	●	**H**

Axial piston unit	**18**	**28...140**	
Swashplate design variable	–	●	**A10V**
	●	–	**A10VS**

Mode of operation	
Pump open circuit	**0**

Size							
Displacement $V_{g\,max}$ (cm^3)	**18**	**28**	**45**	**71**	**100**	**140**	

Control devices				**18**	**28**	**45**	**71**	**100**	**140**	
Two point, direct control	DG			○	●	●	●	●	●	**DG**
Pressure control	DR			●	●	●	●	●	●	**DR**
	DR	G		●	●	●	●	●	●	**DRG**
remote control										
Pressure and flow control	DFR			●	●	●	●	●	●	**DFR**
	DFR	1		●	●	●	●	●	●	**DFR1**
Orifice in X-channel closed										
Pressure, flow and torque control				–	●	●	●	●	●	**DFLR**
Pilot pressure dependent displacement control with pressure control				–	●	●	●	●	●	**FHD**
Electro-hydr. pressure control, see RE 92707				●	●	●	●	●	●	**ED**
Pressure and flow control with electrically adjustable differential pressure see RE (in preparation)				○	●	●	●	●	○	**EF**

Series	
	31

Direction of rotation		
viewed ondrive shaft	clockwise	**R**
	anti-clockwise	**L**

Seals	
NBR (Nitrile rubber, shaft seal FKM)	**P**
FKM (Fluoro rubber)	**V**

Shaft end acc. to SAE J744	**18**	**28**	**45**	**71**	**100**	**140**	
Shaft end (not for through drive) [in]	5/8	–	7/8	–	1 1/4	–	**U**
Shaft end (with undercut) [in]	3/4	7/8	1	1 1/4	1 1/2	1 3/4	**S**
Shaft end (with runout, higher input torque) [in]	–	7/8	1	1 1/4	–	–	**R**
Shaft end [in]	–	–	7/8	–	1 1/4	–	**W**

● = available ○ = in preparation – = not available = preferred program

	A10V(S)	O			/	31		–					

Version

Axial piston unit

Mode of operation

Size

Control devices

Series

Direction of rotation

Seals

Shaft end

Mounting flange acc. to SAE J744	18	28	45	71	100	140	
2-hole	●	●	●	●	●	–	C
4-hole	–	–	–	–	–	●	D

Port for service lines		18	28	45	71	100	140	
Pressure port B suction port S	SAE flange rear, metric fixing thread	–	●	●	●	●	●	**11**
Pressure port B Suction port S	SAE flange on opposite side metric fixing threads	●	●	●	●	●	●	**12**
Pressure port B suction port S	SAE flange rear, fixing thread UNC	–	●	●	●	●	●	**61**
Pressure port B suction port S	SAE flange on opposite side fixing thread UNC	●	●	●	●	●	●	**62**

Port plate 11 and 61 only without through drive

Through drive			18	28	45	71	100	140	
Without through drive			●	●	●	●	●	●	**N00**
With through drive (port plate 12) Mounting flange[1]	Shaft/coupling[2]	Sealing							
82-2 (A)	16-4 (A)	axial	●	●	●	●	●	●	**K01**
82-2 (A)	19-4 (A-B)	axial	●	●	●	●	●	●	**K52**
101-2 (B)	22-4 (B)	radial	–	●	●	●	●	●	**K02**
101-2 (B)	22-4 (B)	axial	–	●	●	●	●	●	**K68**
101-2 (B)	25-4 (B-B)	axial	–	–	●	●	●	○	**K04**
127-2 (C)	32-4 (C)	axial	–	–	–	●	●	●	**K07**
127-2 (C)	38-4 (C-C)	axial	–	–	–	–	●	●	**K24**
152-4 (D)	44-4 (D)	axial	–	–	–	–	–	●	**K17**

[1] Flange acc. to ISO 3019-1

[2] Coupling for splined shaft acc. to SAE J744 OCT83

For mounting options on through drive see page 35.

Technical data

Fluid

Prior to project design, please see our data sheets RE 90220 (mineral oil) and RE 90221 (ecologically acceptable fluids) for detailed information on fluids and application conditions. When using ecologically acceptable fluids attention must be paid to possible limitations of the technical data. If necessary please contact us.

Operating viscosity range

For optimum efficiency and service life we recommend that the operating viscosity (at oprating temperature) be selected in the range

ν_{opt} = opt. operating viscosity 16...36 mm^2/s

referred to tank temperature (open loop circuit).

Limits of viscosity range

The following limits are valid for extreme operating conditions:

ν_{min} = 10 mm^2/s
short term (t ≤ 1 min)
at a max. permissible oil temperature of 115 °C.

Please note, that the max. fluid temperature of 115 °C is also not exceeded in certain areas (for instance bearing area). The temperature in the bearing area is approx. 5 K higher than average leakage fluid temperature.

ν_{max} = 1600 mm^2/s
short term (t ≤ 1 min)
on cold start
(t_{min} = p ≤ 30 bar, n ≤ 1000 min^{-1}, – 40 °C).

At temperatures between -25 °C and -40 °C special measures may be required for certain installation positions. Please contact us for further information.

For detailed information on operation at very low temperatures see RE 90300-03-B.

When operating at temperatures between +90 °C and 115 °C use FKM-seals (code designation V).

Notes on the selection of hydraulic fluid

In order to select the correct fluid, it is necessary to know the operating temperature in the tank (open circuit) in relation to the ambient temperature.

The hydraulic fluid should be selected so that within the operating temperature range, the viscosity lies within the optimum range ($\nu_{opt.}$); see shaded section of the selection diagram. We recommend that the higher viscosity grade is selected in each case.

Example: at an ambient temperature of X°C the operating temperature in the tank is 60 °C. In the optimum viscosity range ν_{opt} (shaded area), this corresponds to viscosity grades VG 46 or VG 68, VG 68 should be selected.

Important: The leakage oil temperature is influenced by pressure and speed and is typically higher than the tank temperature.However max. temperature at any point in the system may not exceed 115 °C.

At high temperatures please use FKM seals.

If the above mentioned conditions cannot be kept due to extreme operating parameters or high ambient temperatures, please consult us.

Filtration of fluid

The finer the filtration, the better the achieved cleanliness of the fluid and the longer the life of the axial piston unit.

To ensure a reliable functioning of the axial piston unit, a minimum cleanliness of

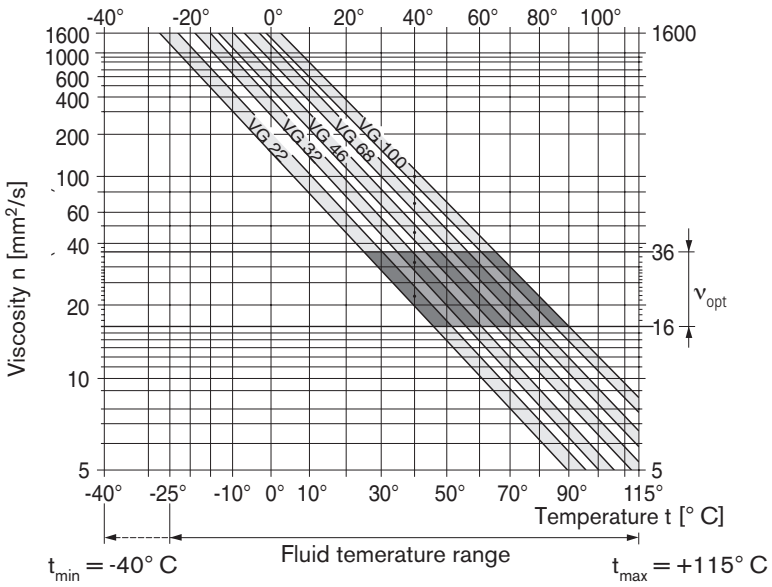
20/18/15 acc. to ISO 4406 is necessary.

At very high fluid temperatures (90 °C up to max. 115 °C) the minimum cleanliness has to be at least

19/17/14 acc. to ISO 4406.

If the above cleanliness classes cannot be met please consult us.

Selection diagram



Technical data (valid for mineral oil; for **ecologically acceptable fluids see RE 90221**)

Operating pressure range

Inlet

Absolute pressure at port S (A)

$p_{abs\ min}$ _____ 0,8 bar
$p_{abs\ max}$ _____ 30 bar

Outlet

Pressure at port B

Nominal pressure p_N _____ 280 bar
Peak pressure p_{max} _____ 350 bar
(Pressure data to DIN 24312)

Applications with intermittent operating pressures of up to 315 bar at 10% duty cycle are permitted.

Case drain pressures

Maximum pressure of leakage fluid (at ports L, L_1):

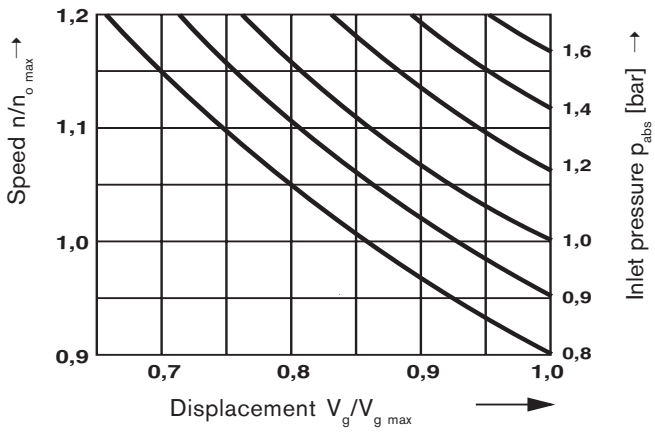
maximum 0,5 bar higher than inlet pressure at port S.

$p_{L\ max\ abs}$ _____ 2 bar

Direction of flow

S to **B**.

Determination of inlet pressure p_{abs} at inlet port S, or reduction in displacement for increasing speed.



High speed version

The sizes 45, 71, 100 and 140 are available in a High-Speed-version a.

Without any changes in dimensions, these optimized units are suitable for higher input speeds-see table on page 6.

Table of values (theoretical values, without considering η_{mh} and η_v: values rounded)

Size				18	28	45	71	100	140				
High-Speed-Version										45	71	100	140
Displacement		$V_{g\,max}$	cm^3	18	28	45	71	100	140	45	71	100	140
Speed [1]													
max. at $V_{g\,max}$		$n_{o\,max}$	min^{-1}	3300	3000	2600	2200	2000	1800	3000	2550	2300	2050
max. at $V_g < V_{g\,max}$		$n_{o\,max\,perm.}$	min^{-1}	3900	3600	3100	2600	2400	2100	3300	2800	2500	2200
Flow													
at $n_{o\,max}$		$q_{vo\,max}$	L/min	59,4	84	117	156	200	252	135	178	230	287
at $n_E = 1500\ min^{-1}$		$q_{vE\,max}$	L/min	27	42	68	107	150	210				
at $n_{o\,max.\,perm.}$		$q_{vo\,max\,perm.}$	L/min						149	199	250	308	
Power	($\Delta p = 280$ bar)												
at $n_{o\,max}$		$P_{o\,max}$	kW	27,7	39	55	73	93	118	63	83	107	134
at $n_E = 1500\ min^{-1}$		$P_{E\,max}$	kW	12,6	20	32	50	70	98	32	50	70	98
Torque													
at $V_{g\,max}$	$\Delta p = 280$ bar	T_{max}	Nm	80,1	125	200	316	445	623	200	316	445	623
	$\Delta p = 100$ bar	T	Nm	28,6	45	72	113	159	223	72	113	159	223
Moment of inertia about drive axis		J	kgm^2	0,00093	0,0017	0,0033	0,0083	0,0167	0,0242	0,0033	0,0083	0,0167	0,0242
Filling capacity			L	0,4	0,7	1,0	1,6	2,2	3,0	1,0	1,6	2,2	3,0
Weight (without fluid)		m	kg	12	15	21	33	45	60	21	33	45	60
Perm. loading of drive shaft:													
Axial force, max.		$F_{ax\,max}$	N	700	1000	1500	2400	4000	4800	1500	2400	4000	4800
Radial force, max. [2]		$F_{q\,max}$	N	350	1200	1500	1900	2300	2800	1500	1900	2300	2800

[1] Values shown are valid for an absolute pressure of 1 bar at inlet port S. At reduced displacement or increased inlet pressure the speed may be increased according to the diagram.

[2] For higher radial loads, please consult us.

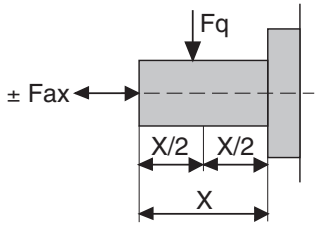
Determination of size

FLow $q_v = \dfrac{V_g \bullet n \bullet \eta_v}{1000}$ [L/min]

Drive torque $T = \dfrac{V_g \bullet \Delta p}{20 \bullet \pi \bullet \eta_{mh}}$ [Nm]

Leistung $P = \dfrac{2\pi \bullet T \bullet n}{60\,000} = \dfrac{q_v \bullet \Delta p}{600 \bullet \eta_t}$ [kW]

Forces



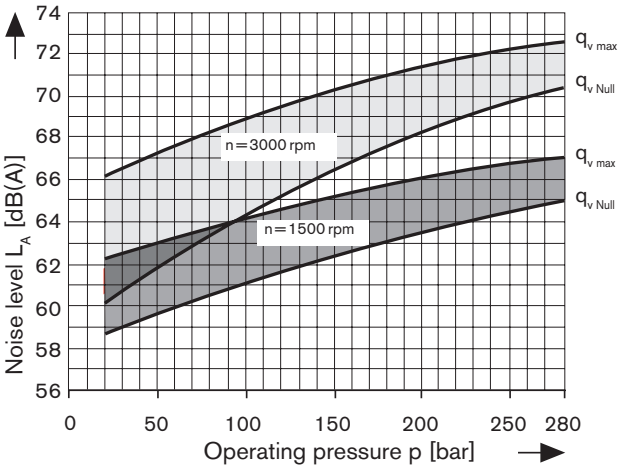
V_g = geometric displacement in cm^3 per rev.
Δp = Differential pressure in bar
n = Speed in rpm
η_v = volumetric efficiency
η_{mh} = mechanical-hydraulic efficiency
η_t = Total efficiency ($\eta_t = \eta_v \bullet \eta_{mh}$)

Characteristics for pump with pressure control DR

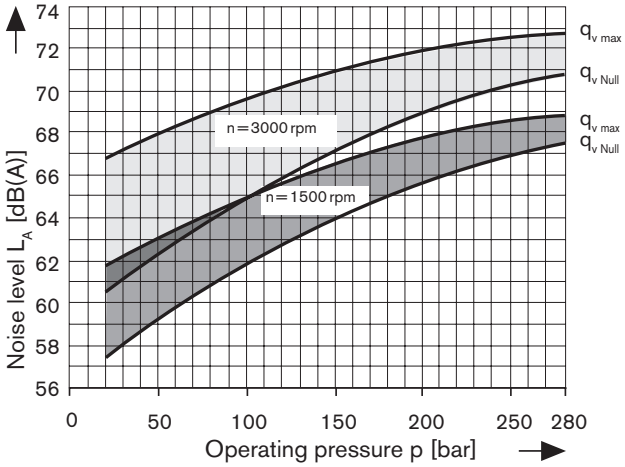
Noise characteristic

Measured in an anechoic chamber
Distance microphone-pump = 1 m
Max. measurement error ± 2 dB (A)
(Fluid: hydraulic oil ISO VG 46 DIN 51519, t = 50° C)

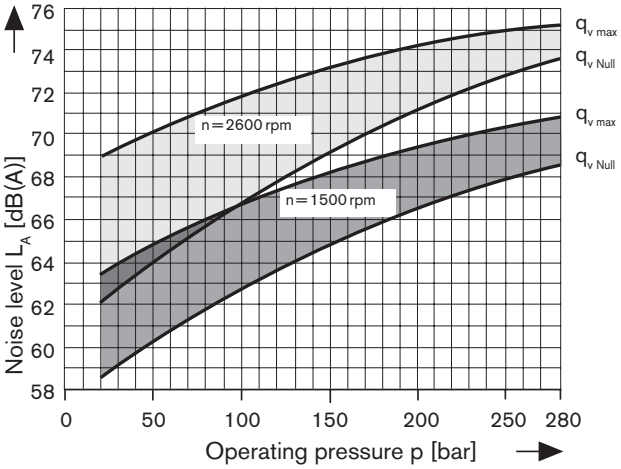
Size 18



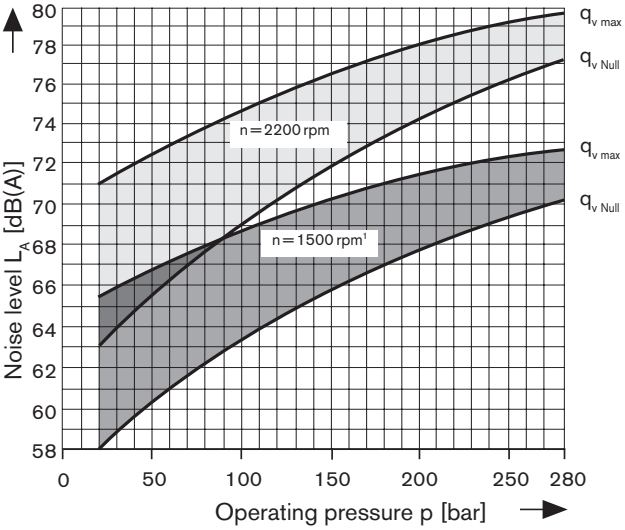
Size28



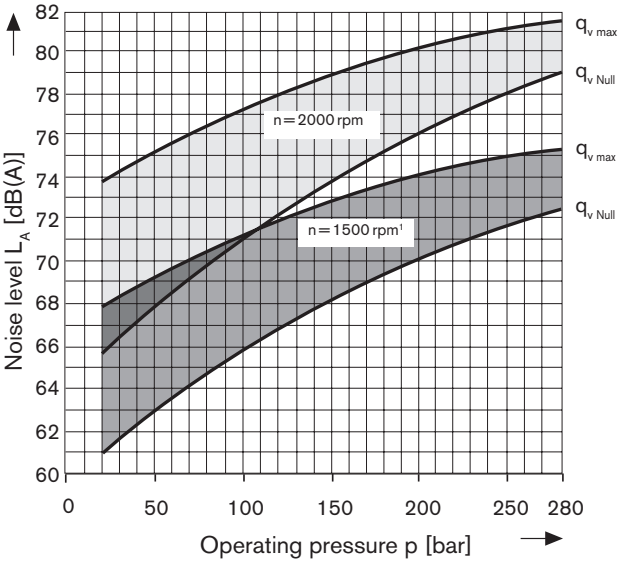
Size 45



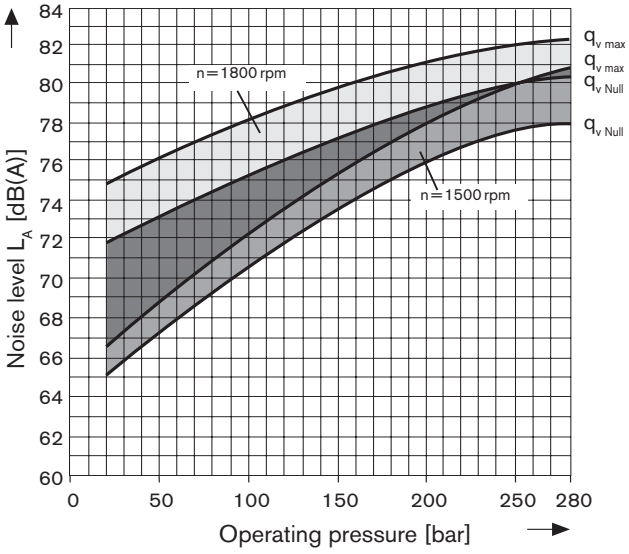
Size 71



Size 100



Nenngröße 140

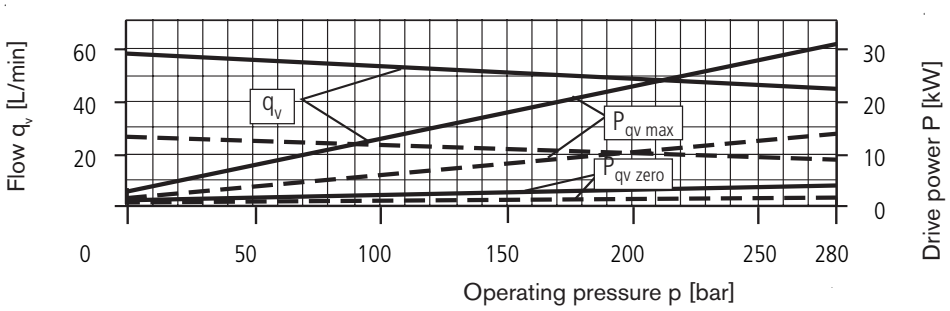


Drive power and flow

(fluid: hydraulic oil ISO VG 46 DIN 51519, t = 50° C)

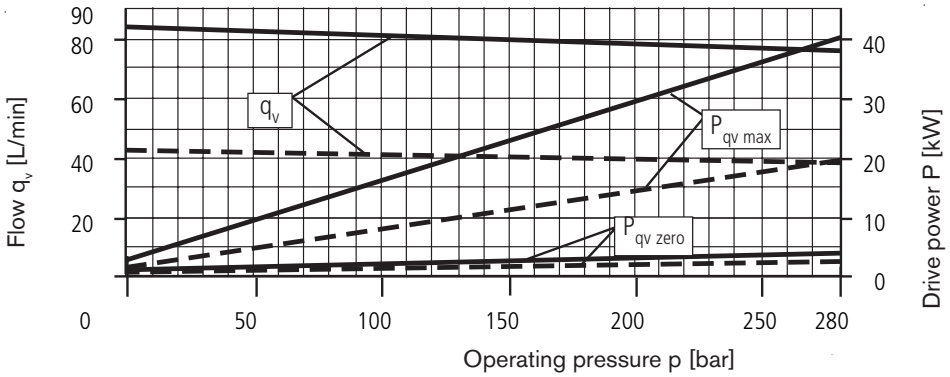
Size18

– – – – n = 1500 rpm
––––– n = 3300 rpm



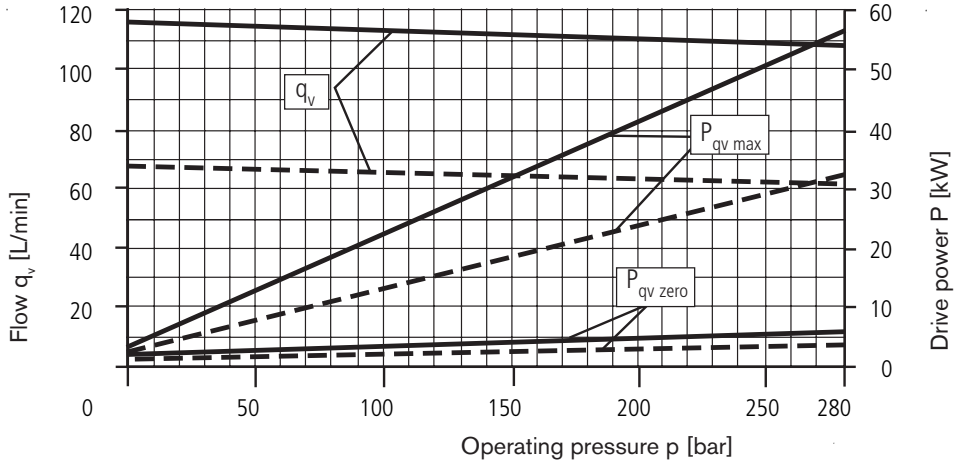
Size 28

– – – – n = 1500 rpm
––––– n = 3000 rpm



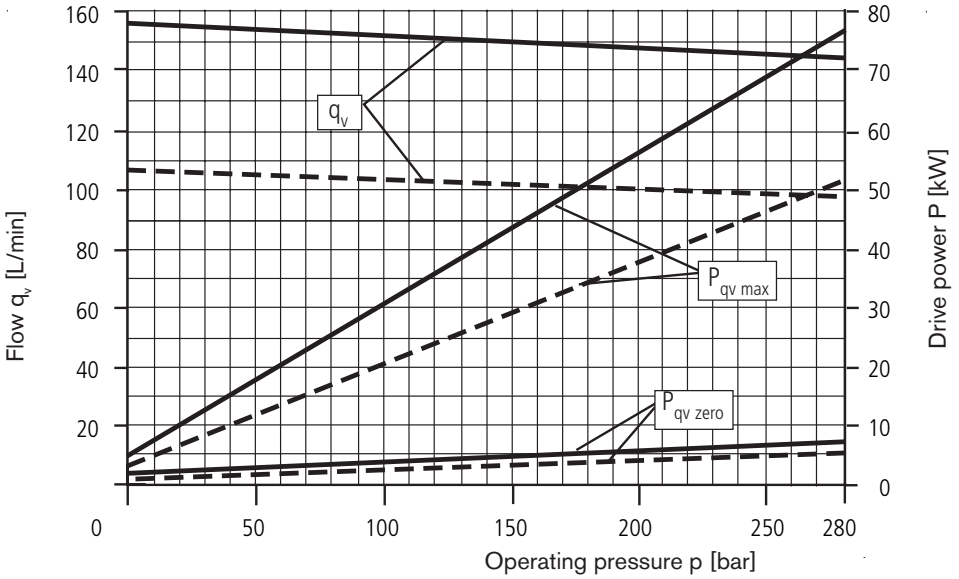
Size 45

– – – – n = 1500 rpm
––––– n = 2600 rpm



Size 71

– – – – n = 1500 rpm
––––– n = 2200 rpm

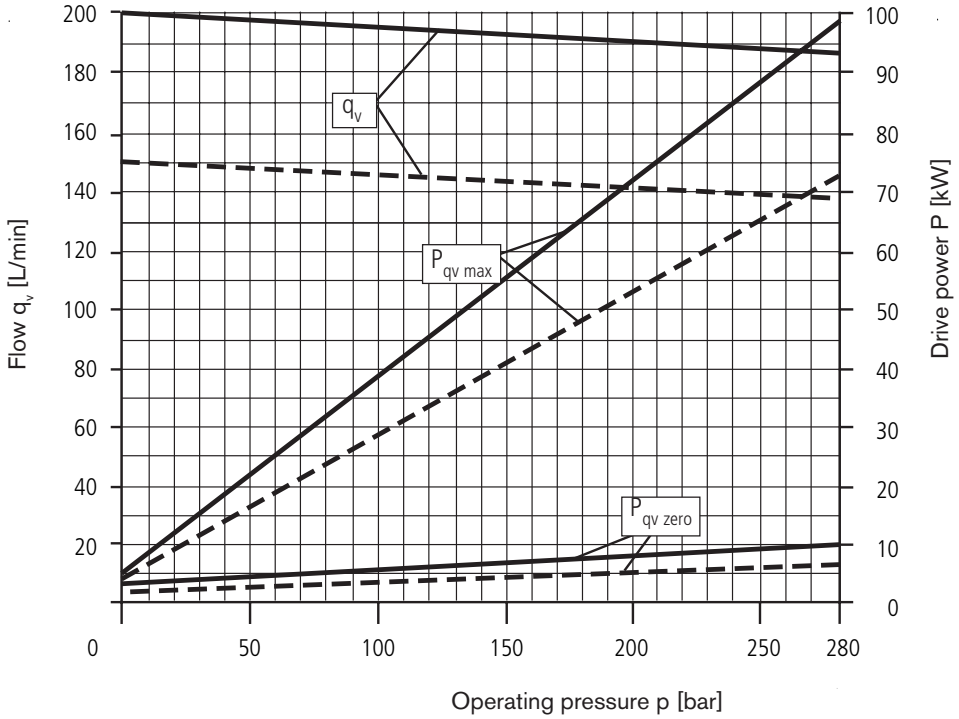


Drive power and flow

(Fluid: hydraulic oil ISO VG 46 DIN 51519, t = 50° C)

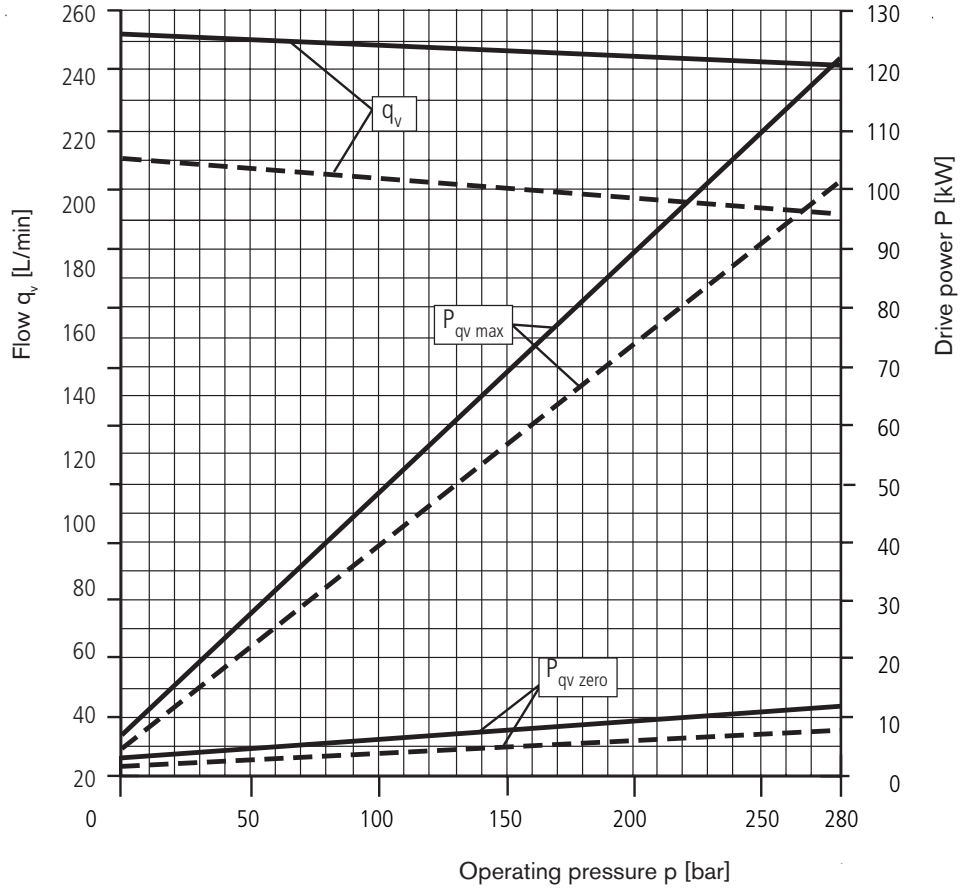
Size 100

– – – n = 1500 rpm
––––– n = 2000 rpm



Size140

– – – n = 1500 rpm
——— n = 1800 rpm



Total efficiency

$$\eta_t = \frac{q_v \bullet p}{P_{qv\ max} \bullet 600}$$

Volumetric efficiency:

$$\eta_v = \frac{q_v}{q_{v\ theor.}}$$

DG - two point, direct control

The pump can be set to a minimum swivel angle by connecting an external switching pressure to port X.

This will supply the control piston directly with control oil; a minimum pressure of 50 bar is required.

The pump can only be switched between $V_{g\,max}$ or $V_{g\,min}$.

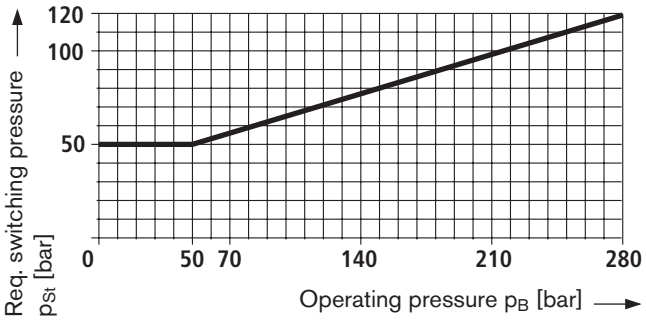
Please note, that the required switching pressure at port X is directly dependent on the actual operating pressure p_B in port B. (See switching pressure diagram)

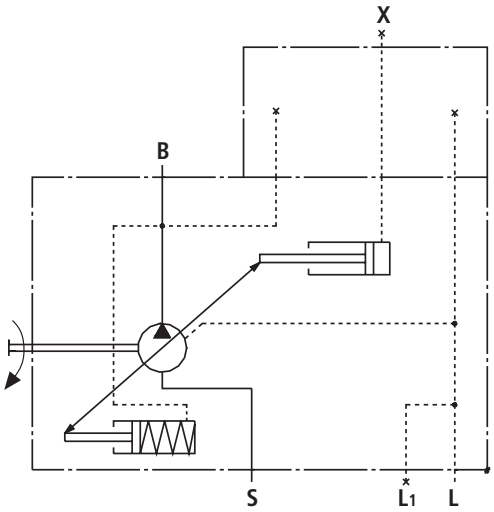
Control pressure p_{St} in X = 0 bar ≙ $V_{g\,max}$

Control pressure p_{St} in X ≥ 50 bar ≙ $V_{g\,min}$

The max. permissible switching pressure p_{St} is 280 bar.

Switching pressure diagram





Ports

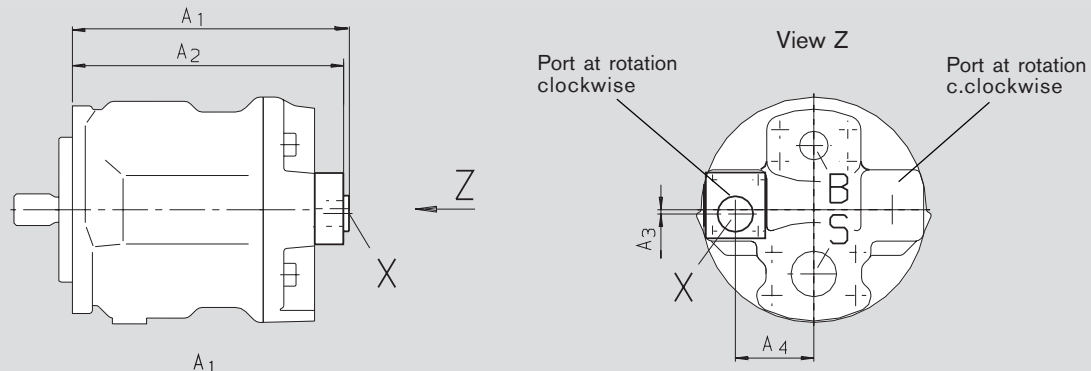
B	Pressure port
S	Inlet port
L, L1	Drain ports (L1 closed)
X	Control port (closed)

Unit dimensions DG

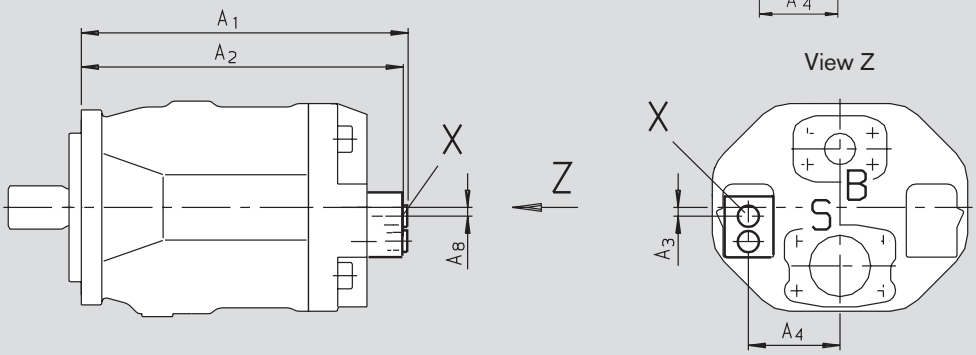
Before finalising your design please request a certified installation drawing.
Subject to revision.

Version 11 N00 and 61 N00 - Ports at rear

Size 28...100

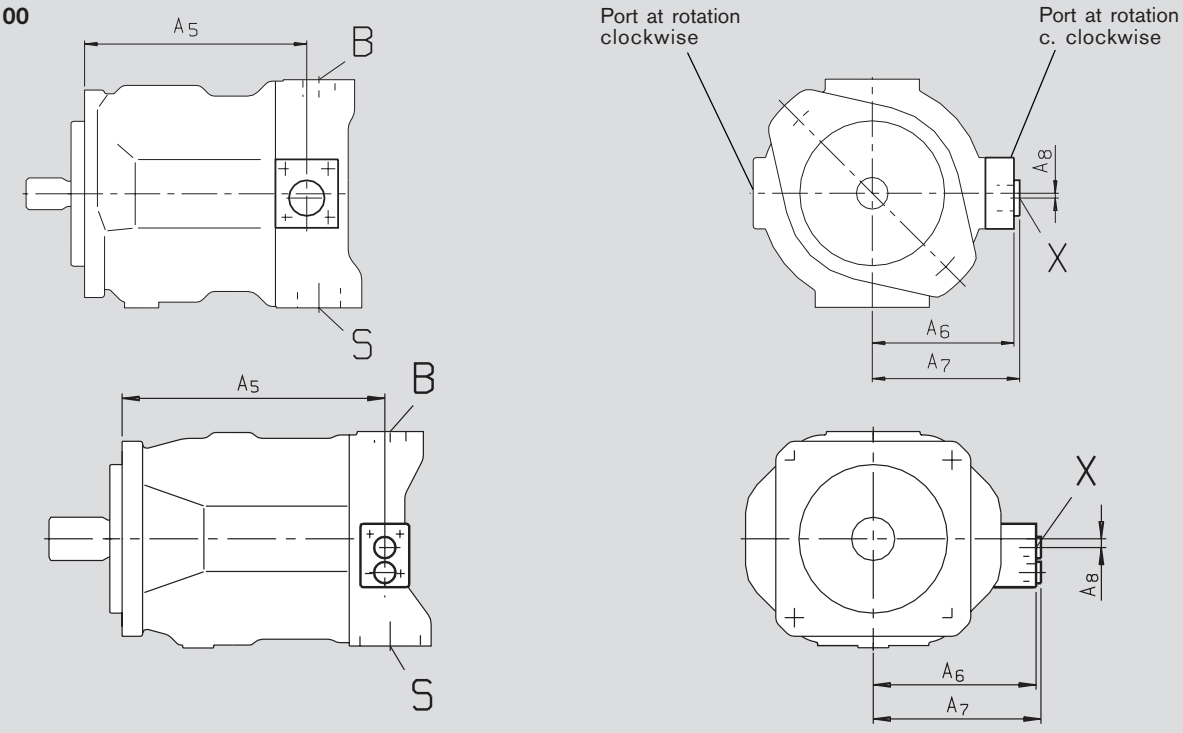


Size 140



Version 12 N00 and 61 N00 - Ports on side

Size 28...100



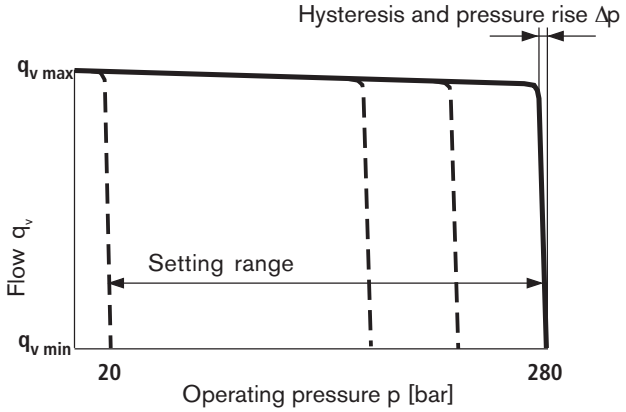
Size 140

Size	A_1	A_2	A_3	A_4	A_5	A	A_7	A_8	X (closed)
28	193,5	190	0	55	158	100	103,5	3	R 1/4 in - DIN 3852-1
45	212,5	209	3	63,5	173	110	113,5	3	R 1/4 in - DIN 3852-1
71	246,5	242,5	3	73,5	201	123,5	127,5	3	R 1/4 in - DIN 3852-1
100	311,5	307,5	3	81	268	128,5	132,5	3	R 1/4 in - DIN 3852-1
140	338	334	3	94	268	150,5	155	3	M14x1,5 - DIN 3852-1

DR - Pressure control

The pressure control serves to maintain a constant pressure in the hydraulic system, within the control range of the pump. The pump therefore supplies only the amount of hydraulic fluid required by the actuators. Pressure can be steplessly set at the pilot valve.

Static characteristic
(at $n_1 = 1500$ rpm; $t_{oil} = 50°$ C)



Dynamic characteristics

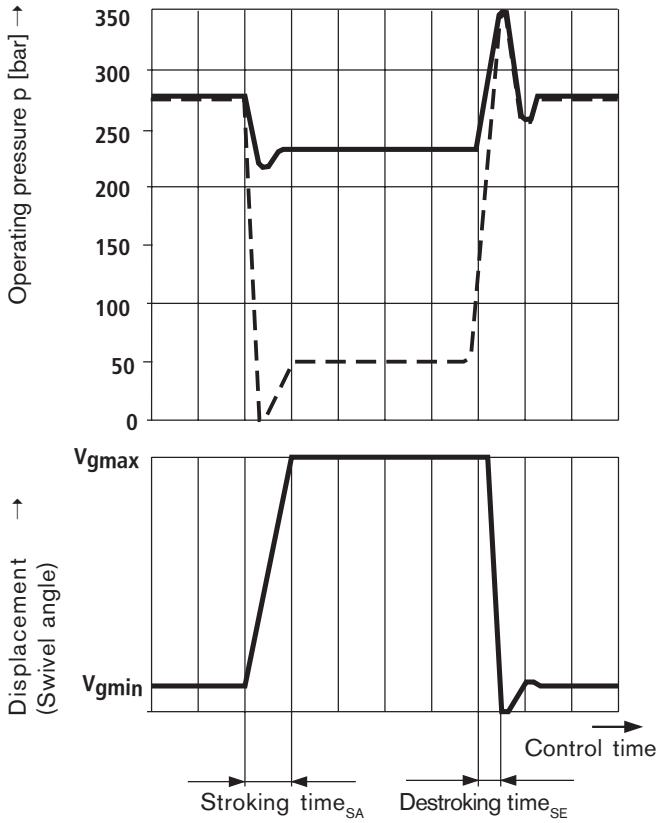
The curves show average measured values under test conditions.

Conditions: n = 1500 rpm

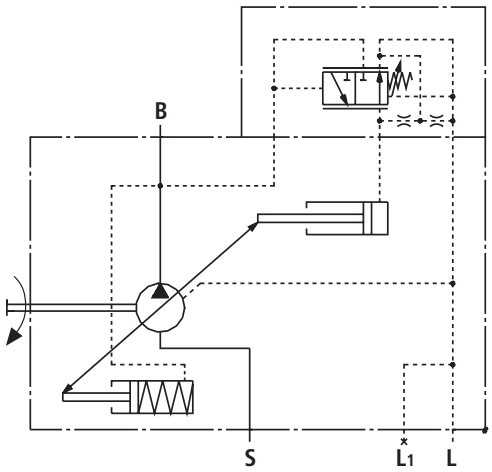
$t_{oil} = 50°$ C

Line main releif set at 350 bar

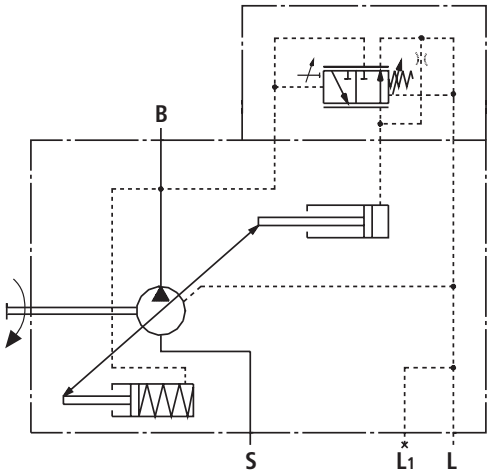
Stepped loading by suddenly opening or closing the pressure line using a pressure relief valve at 1 m downstream from the pump pressure outlet.



Size18...100



Size 140



Ports

B	Pressure port
S	Inlet port
L, L1	Drain ports (L1 closed)

Control data

Hysteresis and repetitive accuracy Δp _____ max. 3 bar

Pressure rise, max.

NG		18	28	45	71	100	140
Δp	bar	4	4	6	8	10	12

Pilot oil consumption _____ max. approx. 3 L/min

Flow loss at q_{vmax} see pages 8 and 9.

Control time

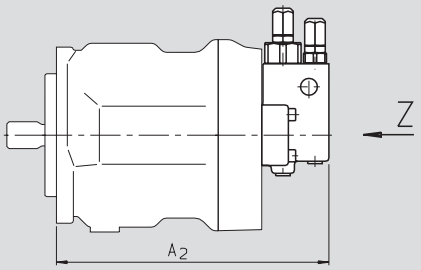
NG	t_{SA} [ms] against50 bar	t_{SA} [ms] against 220 bar	t_{SE} [ms] Zero stroke 280 bar
18	50	25	20
28	60	30	20
45	80	40	20
71	100	50	25
100	125	90	30
140	130	110	30

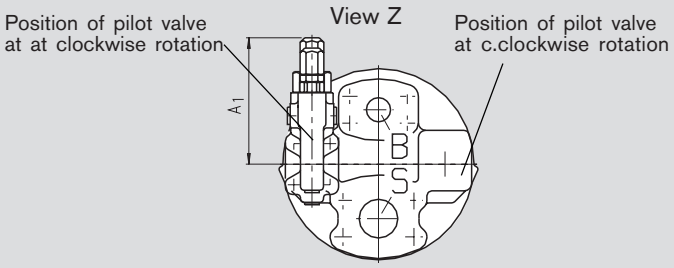
Unit dimensions DR

Before finalising your design please request a certified installation drawing.
Subject to revision.

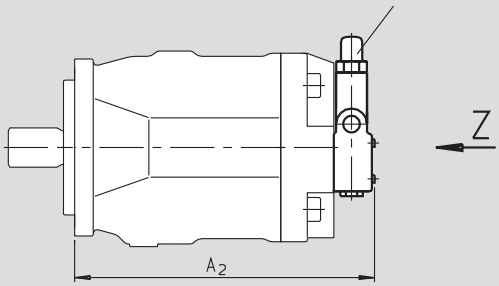
Version 11N00 and 61 N00 - Ports at rear

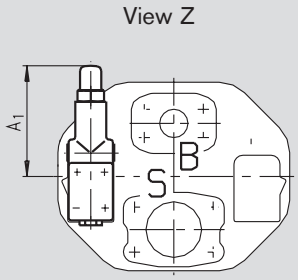
Size 28... 100





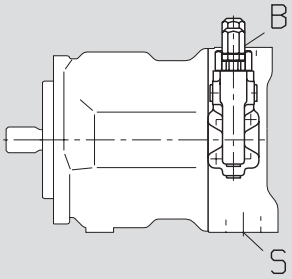
Size 140

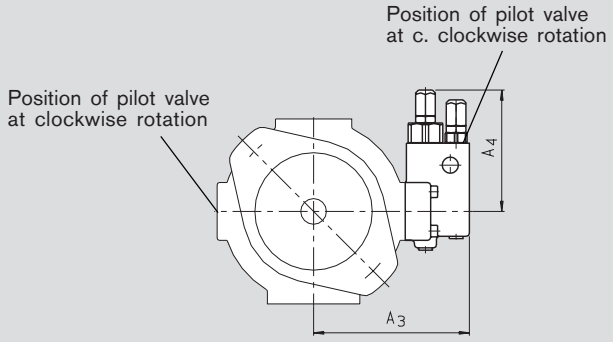




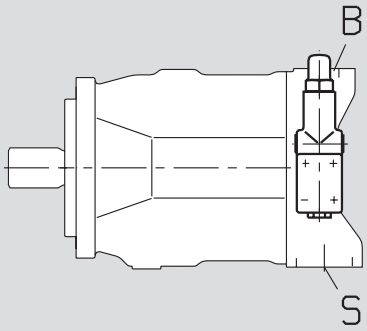
Version 12 N00 and 62 N00 - Ports on side

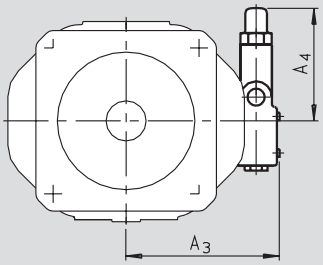
Size 28... 100





Size 140





NG	A_1	A_2	A_3	A_4
18	-	-	126	105
28	109	225	136	106
45	106	244	146	106
71	106	278	160	106
100	106	344	165	106
140	127	339	169	127

for sizes 28 to 100 the DFR valve is used, whereby the flow control spool is locked at the factory and not tested

DRG - Pressure control, remote

Function and design as for DR

A pressure relief valve may be externally piped to port X for remote control purposes. However it is not included in the scope of supply with the DRG control.

The differential pressure at the DRG control spool is set as standard to 20 bar and this results in a pilot flow of 1,5 L/min. If another setting is required, please state this in clear text.

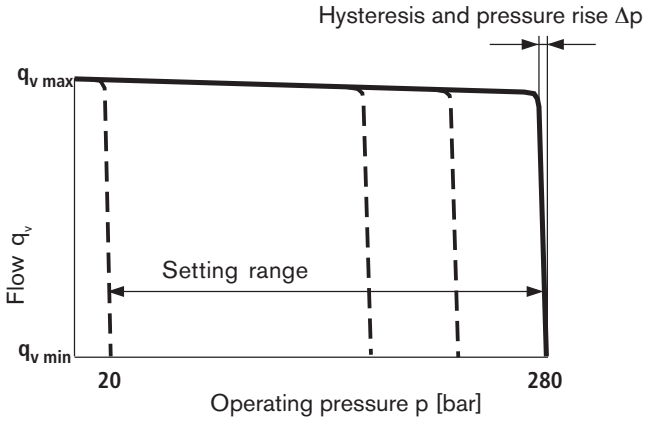
We recommend that one of the following is used as the separate pressure relief valve:

DBDH 6 (hydraulic) to RE 25402 or

DBETR -SO 381 with orifice ø0,8 in P (electrical) to RE29166.

Max. lenght of piping should not exceed 2m .

Static characteristic
(at $n_1 = 1500$ rpm; $t_{oil} = 50°$ C)



Control data

Hysteresis Δp _____ max. 3 bar

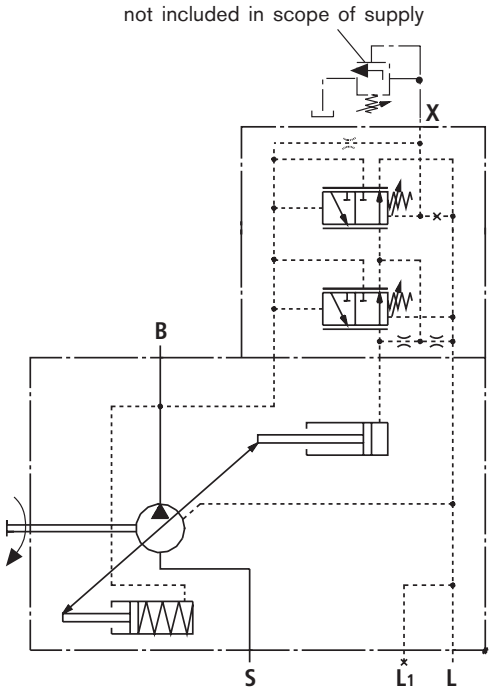
Pressure rise, max.

NG		18	28	45	71	100	140
Δp	bar	4	4	6	8	10	12

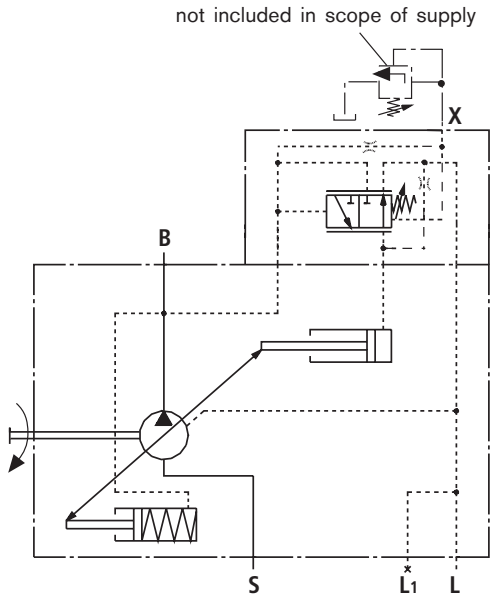
Pilot oil consumption _____ approx. 4,5 L/min

Flow loss at qv_{max} see pages 8 and 9.

Size 18...100



Size 140



Ports

B	Pressure port
S	Inlet port
L, L1	Drain port (L1 closed)
X	Pilot pressure port

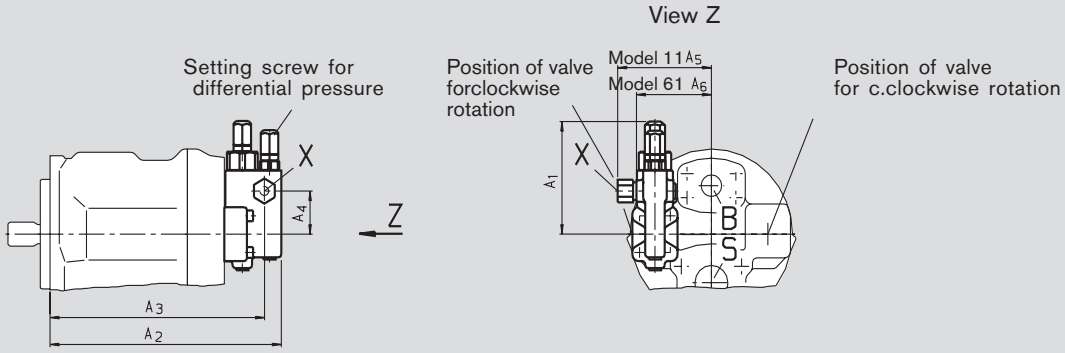
Version	Size 18...100	Size 140
11 and 12	with Adapter	without Adapter
61 and 62	without Adapter	with Adapter

Unit dimensions DRG

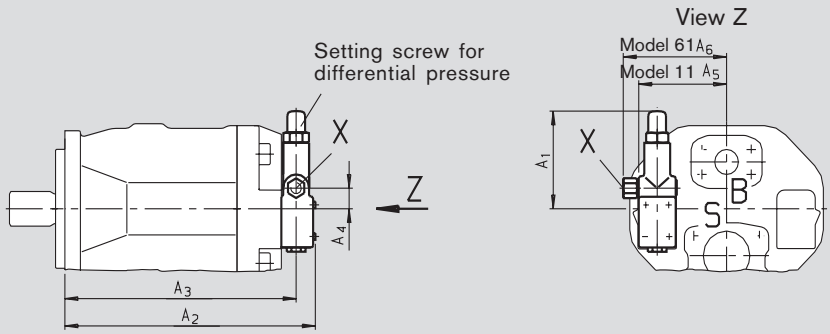
Before finalising your design please request a certified installation drawing.
Subject to revision.

Version 11 N00 and 61 N00 - Ports at rear

Size 28... 100

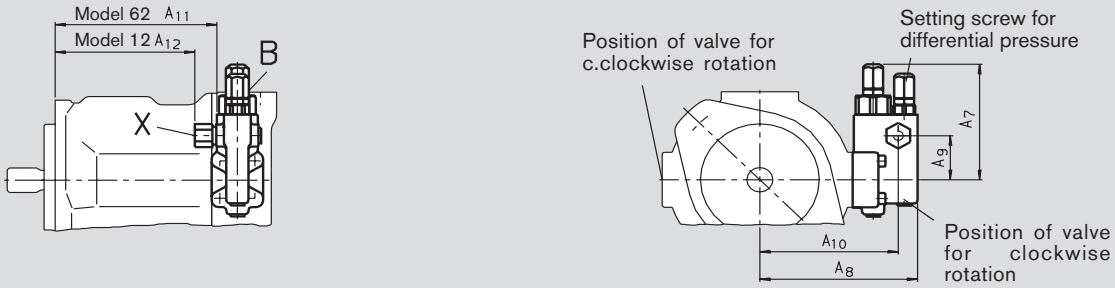


Size 140

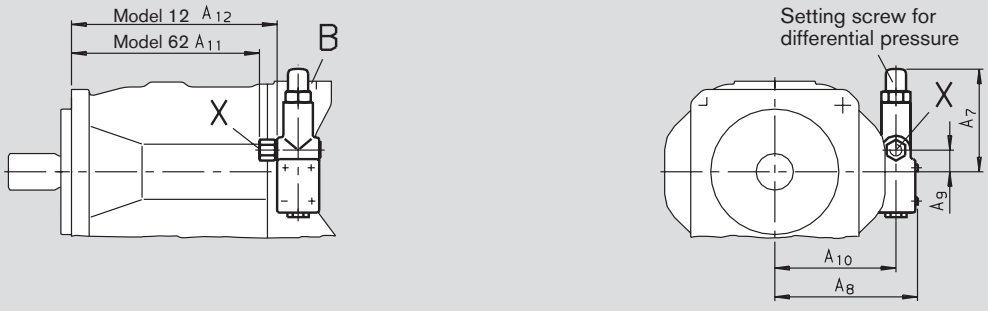


Version 12 N00 and 62 N00 - Ports on side

Size 18... 100



Size 140



Size	A_1	A_2	A_3	A_4	A_5	A_6	A_7	A_8	A_9	A_{10}	A_{11}	A_{12}	**Port X** Models 61 and 62	**Port X** Models 11 and 12
18	-	-	-	-	-	-	105	126	40	109	130	109	7/16-20 UNF-2B; 10 deep	M14x1,5; 12 deep
28	109	225	209	43	94	73	106	136	40	119	140	119	7/16-20 UNF-2B; 10 deep	M14x1,5; 12 deep
45	106	244	228	40	102,5	81,5	106	146	40	129	155	134	7/16-20 UNF-2B; 10 deep	M14x1,5; 12 deep
71	106	278	262	40	112,5	91,5	106	160	40	143	183	162	7/16-20 UNF-2B; 10 deep	M14x1,5; 12 deep
100	106	344	327	40	120	99	106	165	40	148	250	229	7/16-20 UNF-2B; 10 deep	M14x1,5; 12 deep
140	127	339	313	27	118	140	127	169	27	143	222	244	9/16-18 UNF-2B; 13 deep	M14x1,5; 12 deep

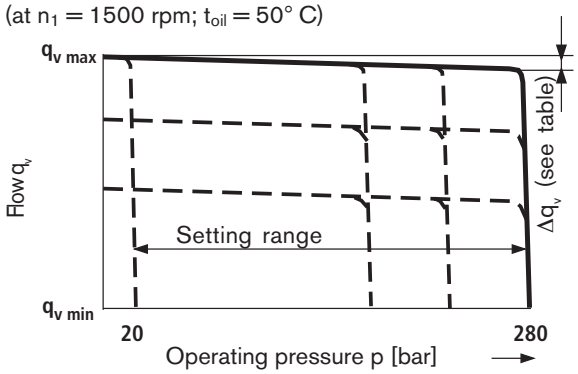
DFR/DFR1-Pressure-flow control

In addition to the pressure control function, the pump fllow to the actuator may be varied by means of a differential pressure (eg. over an orifice or directional control valve). The pump supplies only the amount of fluid as required by the actuator.

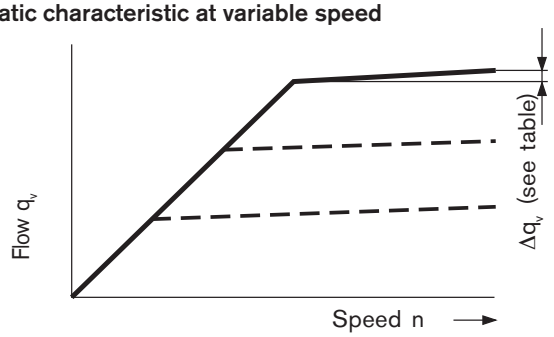
In the DFR1-valve version the orifice between the X port and ank is plugged.

For function and content of pressure control see pages 18/19.

Static characteristic
(at $n_1 = 1500$ rpm; $t_{oil} = 50°$ C)

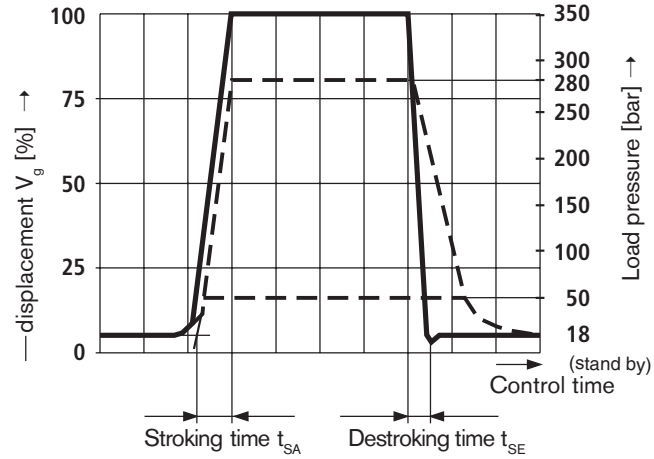


Static characteristic at variable speed



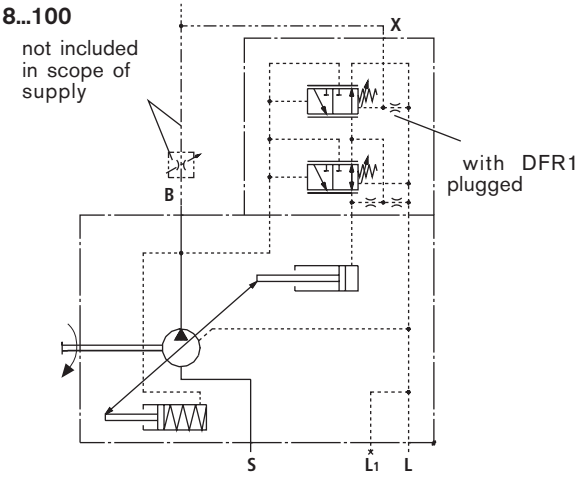
Dynamic characteristic of flow control

The curves shown are measured average values under test conditions.

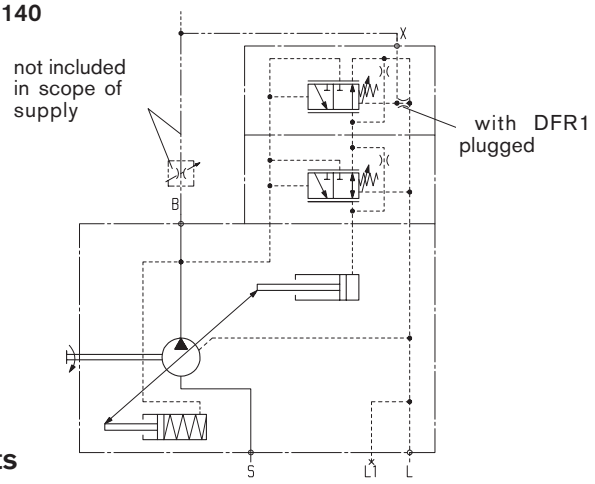


Size	t_{SA} [ms] stand by–280 bar	t_{SA} [ms] 280 bar stand by	t_{SE} [ms] 50 bar stand by
18	40	15	40
28	40	20	40

Size 18...100



Size 140



Ports

B	Pressure port
S	Inlet port
L, L1	Drain port (L1 closed)
X	Pilot pressure port

Version	Size 18-100	Size 140
11 and 12	with Adapter	without Adapter
61 and 62	without Adapter	with Adapter

Differential pressure Δp:

Standard setting: 14 bar. If a different setting is required please state in clear text.

When port X is unloaded to tank (and outlet B is closed), a zero stroke pressure (standby) of p = 18 ± 2 bar results. (depends on Δp).

Control data

For technical data pressure control see page 18.

Max. flow deviation (Hysteresis and rise) measured at drive speed n = 1500 rpm

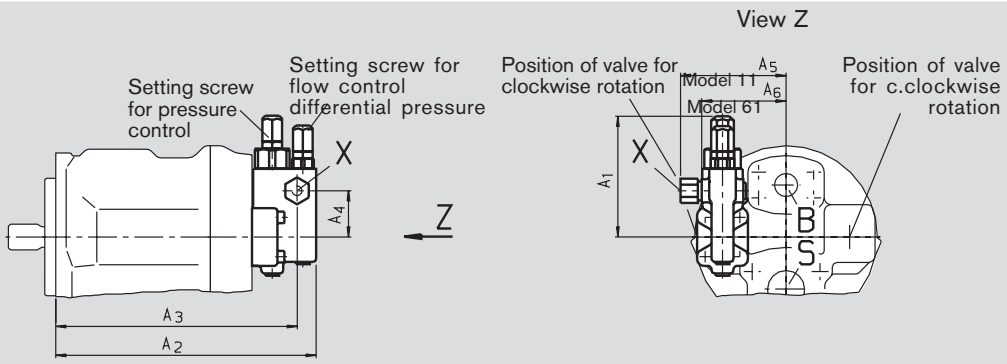
Size	18	28	45	71	100	140
Δqv_{max} L/min	0,9	1,0	1,8	2,8	4,0	6,0

Unit dimensions DFR/DFR1

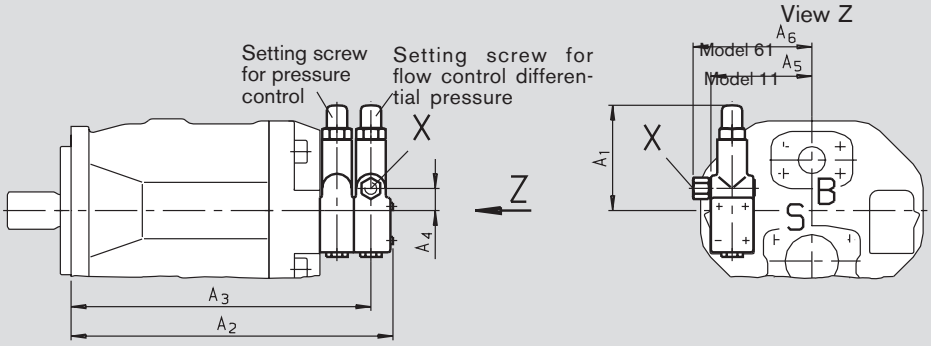
Before finalising your design please request a certified installation drawing.
Subject to revision.

Version 11 N00 and 61 N00 - Ports at rear

Size 28...100

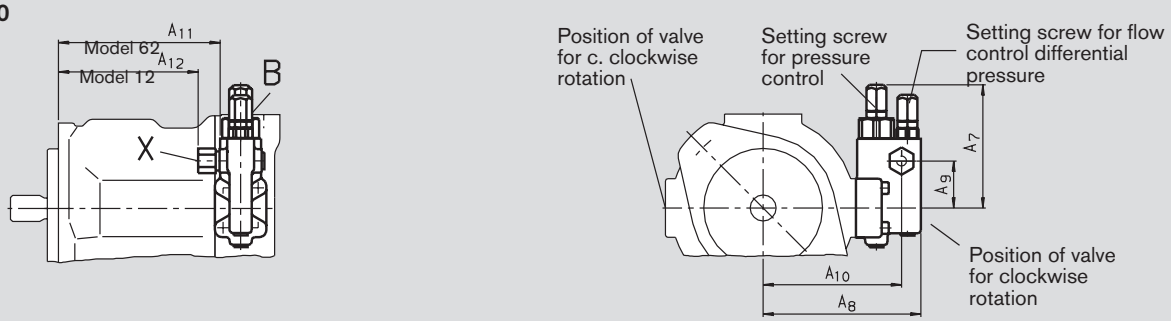


Size 140

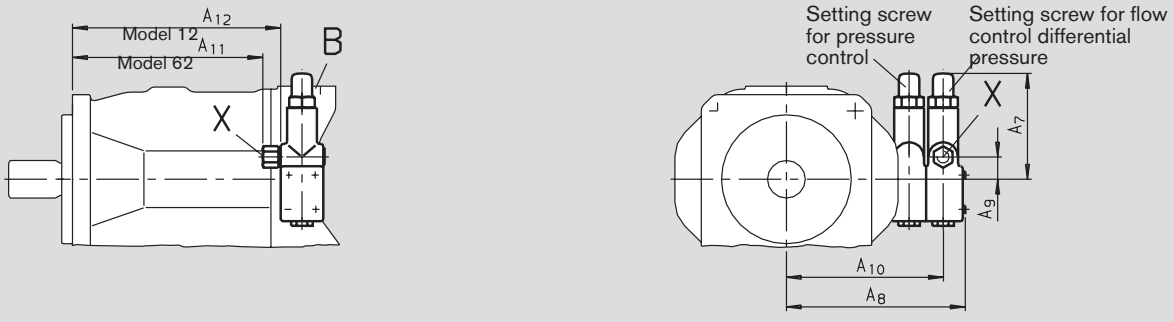


Version 12 N00 and 62 N00 - Ports on side

Size 18...100



Size 140



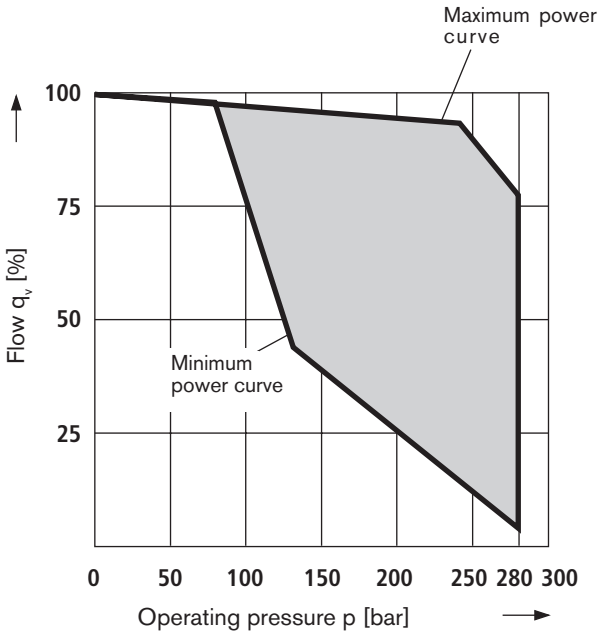
Size	A_1	A_2	A_3	A_4	A_5	A_6	A_7	A_8	A_9	A_{10}	A_{11}	A_{12}	**Port X** Models 61 and 62	**Port X** Models 11 and 12
18	-	-	-	-	-	-	105	126	40	109	130	109	7/16-20 UNF-2B; 10 deep	M14x1,5; 12 deep
28	109	225	209	43	94	73	106	136	40	119	140	119	7/16-20 UNF-2B; 10 deep	M14x1,5; 12 deep
45	106	244	228	40	102,5	81,5	106	146	40	129	155	134	7/16-20 UNF-2B; 10 deep	M14x1,5; 12 deep
71	106	278	262	40	112,5	91,5	106	160	40	143	183	162	7/16-20 UNF-2B; 10 deep	M14x1,5; 12 deep
100	106	344	327	40	120	99	106	165	40	148	250	229	7/16-20 UNF-2B; 10 deep	M14x1,5; 12 deep
140	127	379	353	27	118	140	127	209	27	183	222	244	9/16-18 UNF-2B; 13 deep	M14x1,5; 12 deep

DFLR - Pressure/flow/power control

In order to achieve a constant drive torque with a varying operating pressure, the swivel angle and with it the output flow from the axial piston unit is varied so that the product of flow and pressure remains constant.

Flow control is possible below the limet of the power curve.

Static characteristic



The power characteristic is factory-set so please enter details in clear ext, eg. 20 kW at 1500 rpm.

Control data

For technical data pressure control see page 14.

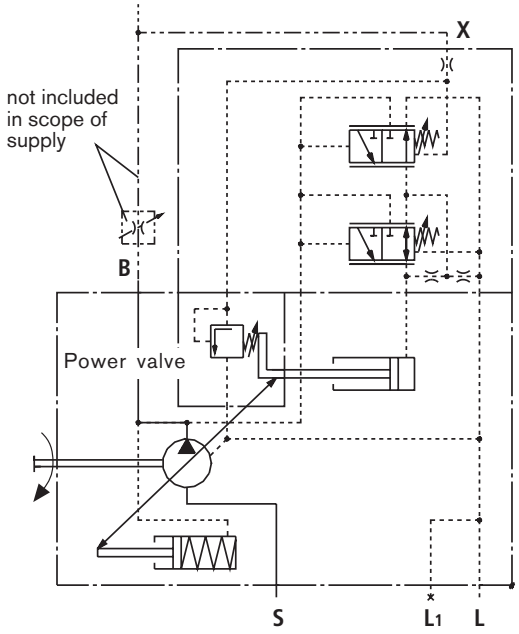
For technical data flow control see page 16.

Start of control _____ from 80 bar

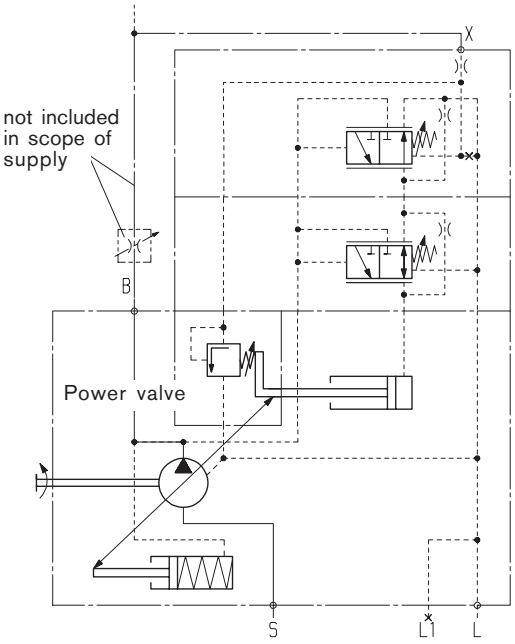
Pilot oil consumption _____ max. approx. 5,5 L/min

Flow loss at q_{vmax} see page 8 and 9.

Size 28... 100



Size 140



Ports

B Pressure port

S Inlet port

L, L1 Drain port (L1 closed)

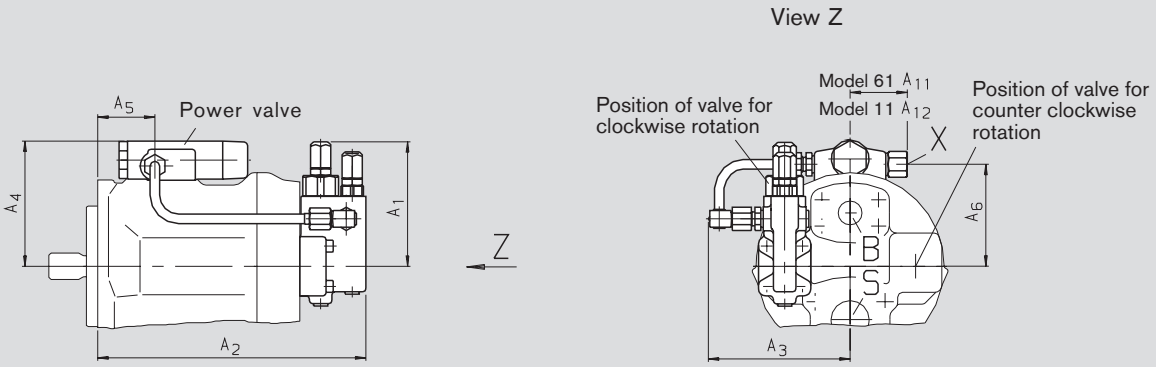
X Pilot pressure port

Unit dimensions DFLR

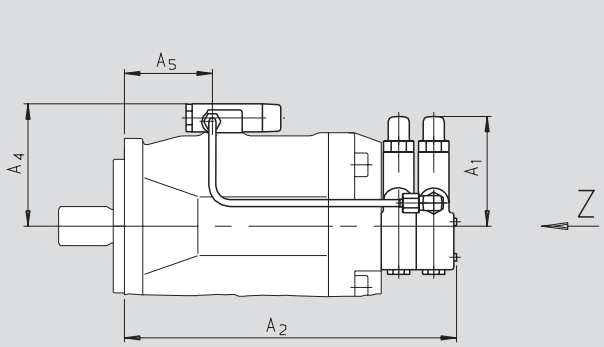
Before finalising your design please request a certified installation drawing.
Subject to revision.

Version 11N00 and 61 N00 - Ports at rear

Size 28...100

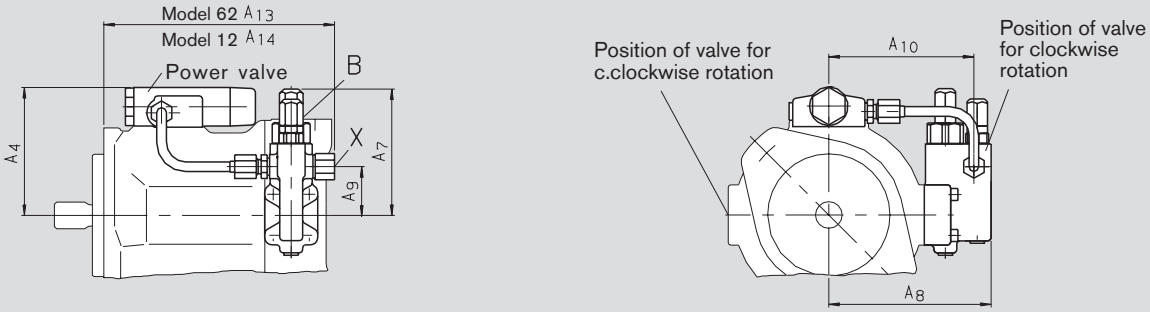


Size 140

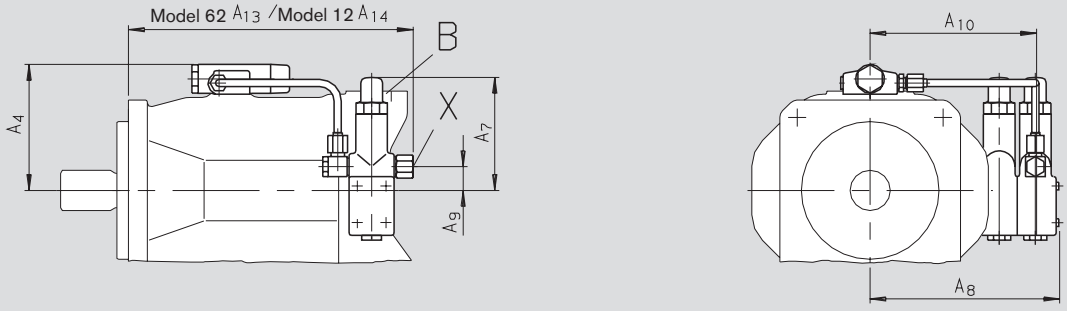


Version 12N00 and 62 N00 - Ports on side

Size 28...100



Size 140



NG	A_1	A_2	A_3	A_4	A_5	A_6	A_7	A_8	A_9	A_{10}	A_{11}	A_{12}	A_{13}	A_{14}	**Port X** Models 61 and 62	**Port X** Models 11 and 12
28	109	225	120	107	48	86	106	136	40	119	48	51	194	197	7/16-20 UNF-2B; 10 deep	M14x1,5; 12 deep
45	106	244	129	112	54	91,5	106	146	40	129	48	51	209	212	7/16-20 UNF-2B; 10 deep	M14x1,5; 12 deep
71	106	278	139	124	69	103,5	106	160	40	143	48	51	237	240	7/16-20 UNF-2B; 10 deep	M14x1,5; 12 deep
100	106	344	145	129	111	108,5	106	165	40	148	48	51	304	307	7/16-20 UNF-2B; 10 deep	M14x1,5; 12 deep
140	127	379	148	140	99	123,5	127	209	26	183	48	51	314	314	7/16-20 UNF-2B; 10 t.(Mod.61)	M14x1,5;
140															9/16-18 UNF-2B; 13 t.(Mod.62)	

FHD - Displacement control, pilot pressure dependent, with pressure control

The swivel angle of the pump, and hence the displacement or flow, is dependent on the pilot pressure $p_{St\,X}$ in port X.

A constant pressure $p_y = 35$ bar is required at port Y.

An overriding pressure control is integrated, and can be steplessly set at the control valve

(Please state setting values in clear text).

Control data

Hysteresis± 2 % of $V_{g\,max}$

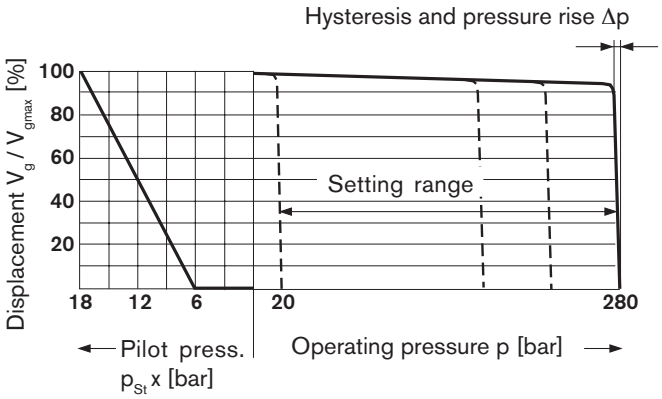
External Pilot oil consumption in Y__max. approx. 3 ... 4,5 L/min

Pressure rise Δp _____ max. 4 bar

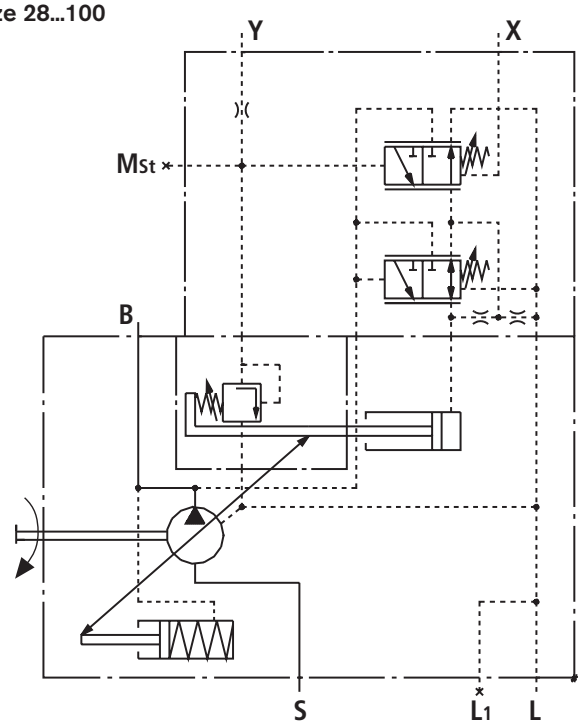
Min. system pressure p_{min} _____ 18 bar

Flow loss at q_{vmax} see pages 8 and 9.

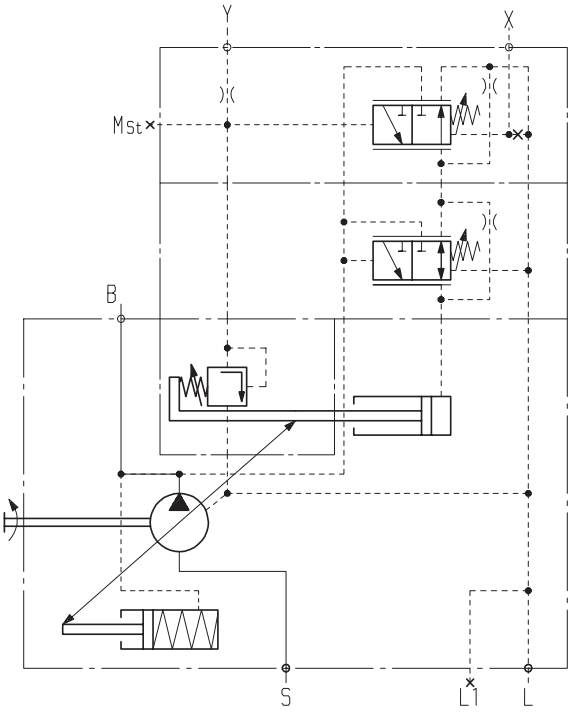
Static characteristic
(at $n_1 = 1500$ rpm; $t_{oil} = 50°$ C)



Size 28...100



Size 140



Ports

B	Pressure port
S	Inlet port
L, L1	Drain ports (L1 closed)
X, Y	Pilot pressure ports

Unit dimensions FHD

Before finalising your design please request a certified installation drawing.
Subject to revision.

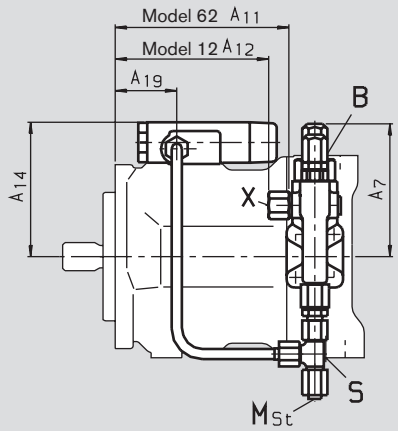
Version 11N00 - Ports at rear

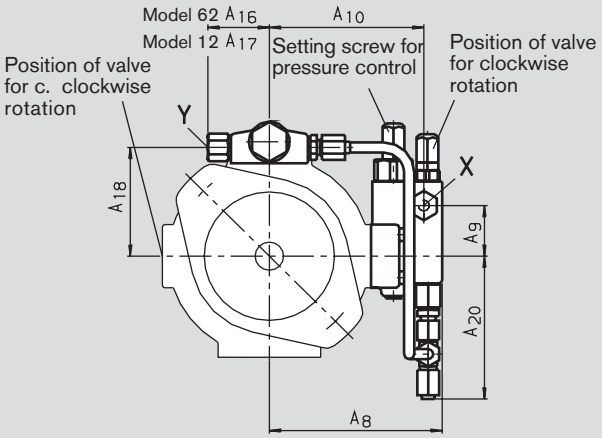
Size 28... 100

On request

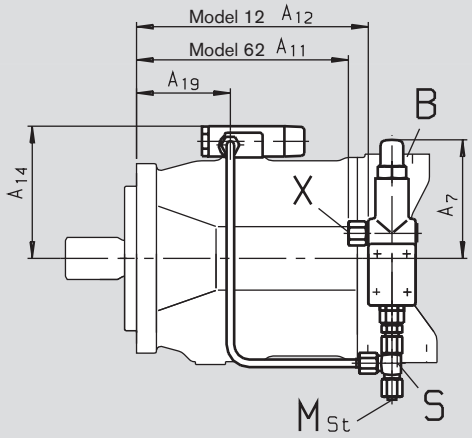
Version 12N00 and 62 N00 -Ports on side

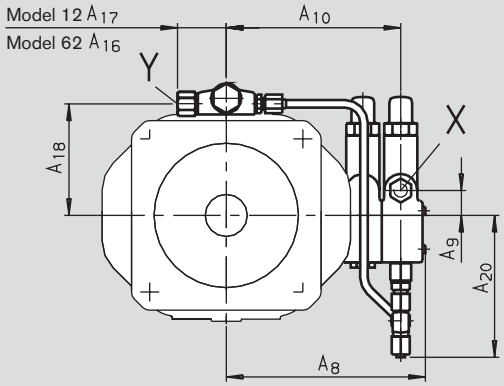
Size 28... 100





Size 140





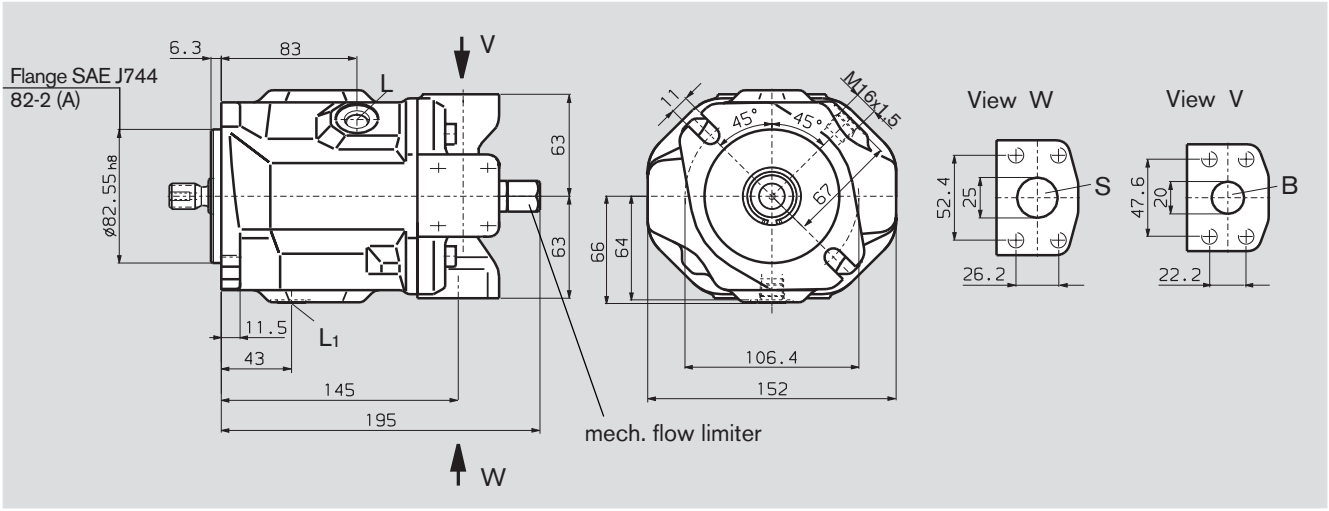
NG	A_7	A_8	A_9	A_{10}	A_{11}	A_{12}	A_{14}	A_{16}	A_{17}	A_{18}	A_{19}	A_{20}	Port X and Y	Port X and Y
28	106	136	40	119	140	119	107	48	51	86	48	113	7/16-20 UNF-2B; 10 deep	M14x1,5; 12 deep
45	106	146	40	129	155	134	112	48	51	91,5	54	113	7/16-20 UNF-2B; 10 deep	M14x1,5; 12 deep
71	106	160	40	143	183	162	124	48	51	103,5	69	113	7/16-20 UNF-2B; 10 deep	M14x1,5; 12 deep
100	106	165	40	148	250	229	129	48	51	108,5	111	113	7/16-20 UNF-2B; 10 deep	M14x1,5; 12deep
140	127	209	27	183	222	244	140	48	51	119	99	150	7/16-20 UNF-2B; 10 t.(X)	M14x1,5;
140													9/16-18 UNF-2B; 13 t.(Y)	

Unit dimensions, Size 18

Before finalising your design please request a certified installation drawing.

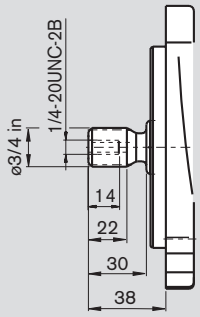
Version 12 N00

Service ports on side, no through drive (without control valves)

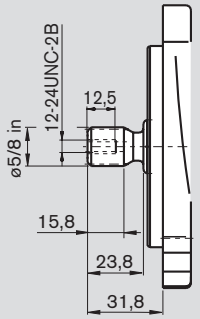


Shaft ends (acc. to SAE J744 OCT83)

S Splined shaft 19-4 11T 16/32DP[1])
(similar to SAE J744 – 19-4 (A-B))



U Splined shaft 16-4 9T 16/32DP [1])
(similar to SAE J744 – 16-4 (A))



Ports

				Tightening torques, max.[2])
B	Pressure port (Standard pressure range)	SAE J518	3/4 in	
	Fixing thread	DIN 13	M10x1,5; 17deep	60 Nm
S	Inlet port (Standard pressure range)	SAE J518	1in	
	Fixing thread	DIN 13	M10x1,5; 17 deep	60 Nm
L, L_1	Drain ports	DIN 3852-1	M16x1,5	100 Nm

[1]) ANSI B92.1a-1976, 30°pressure angle, flat base, flank centering, fit class 5

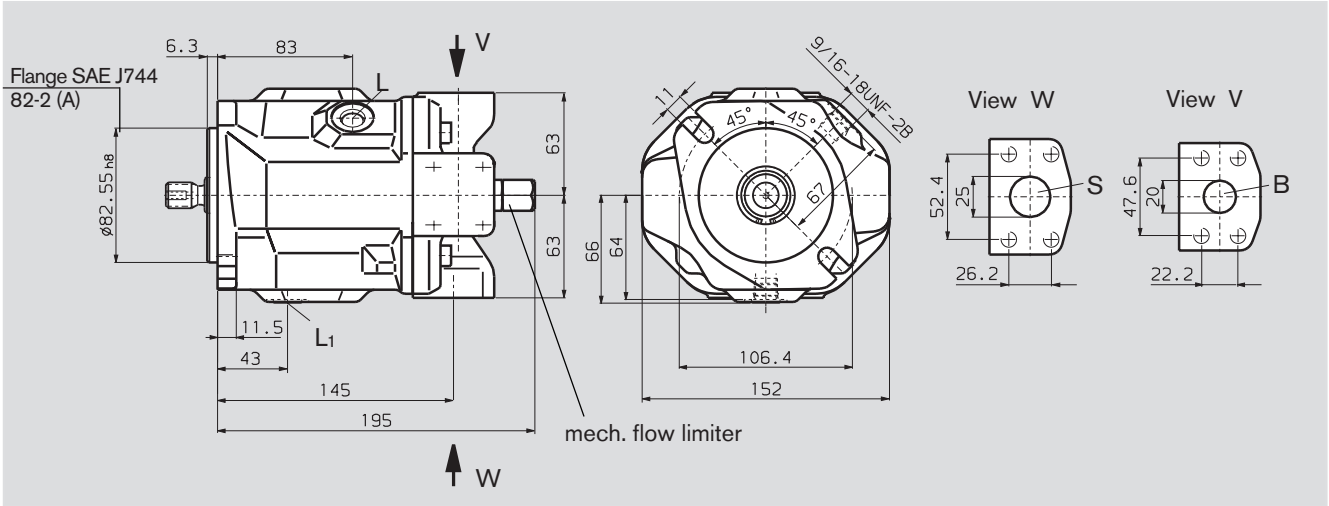
[2]) See safety information

Unit dimensions, Size 18

Before finalising your design please request a certified installation drawing.

Version 62 N00

Service ports on side, no through drive (without control valves)



Ports

				Tightening torques, max.[1)]
B	Pressure port (Standard pressure range)	SAE J518	3/4 in	
	Fixing thread		3/8-16UNC-2B; 20 deep	40 Nm
S	Inlet port (Standard pressure range)	SAE J518	1in	
	Fixing thread		3/8-16UNC-2B; 20 deep	40 Nm
L, L_1	Drain ports	DIN 11926	9/16-18UNF-2B	80 Nm

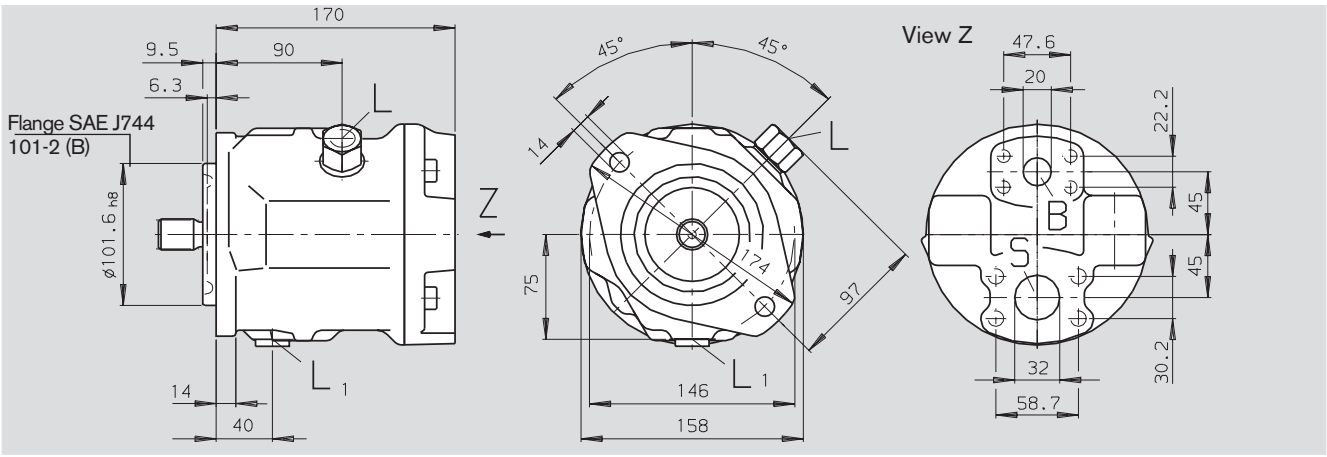
[1]) See safety information

Unit dimensions, size 28

Before finalising your design please request a certified installation drawing.

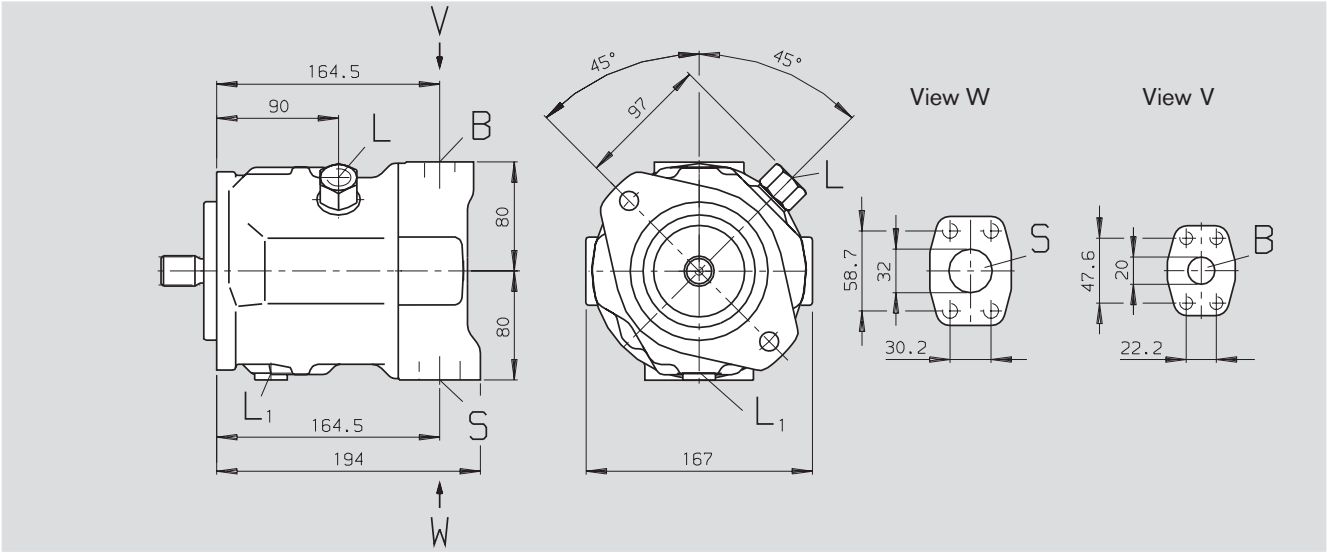
Version 11 N00

Ports at rear, no through drive (without control valves)



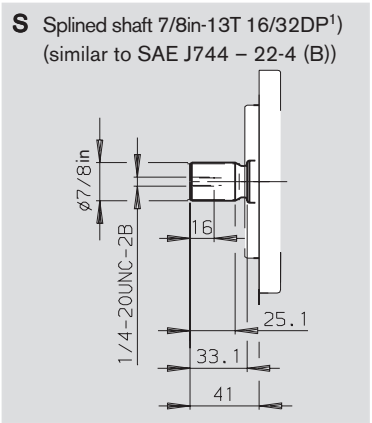
Version 12 N00

Ports on side, no through drive

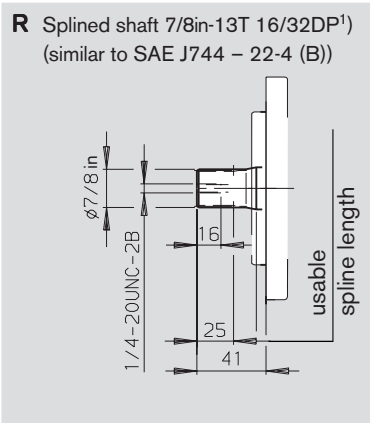


Shaft ends (acc. to SAE J744 OCT83)

S Splined shaft 7/8in-13T 16/32DP[1])
(similar to SAE J744 – 22-4 (B))



R Splined shaft 7/8in-13T 16/32DP[1])
(similar to SAE J744 – 22-4 (B))



Ports

				Tightening torques, max.[2])
B	Pressure port (Standard pressure range)	SAE J518	3/4 in	
	Fixing thread	DIN 13	M10x1,5; 17 deep	60 Nm
S	Inlet port (Standard pressure range)	SAE J518	1 1/4 in	
	fixing thread	DIN 13	M10x1,5; 17 deep	60 Nm
L	Drain port	DIN 3852-1	M18x1,5;	140 Nm
L_1	Drain port (closed)	ISO 11926	3/4-16 UNF-2B	160 Nm

[1]) ANSI B92.1a-1976, 30° pressure anglel, flat base, flank centering, fit class 5

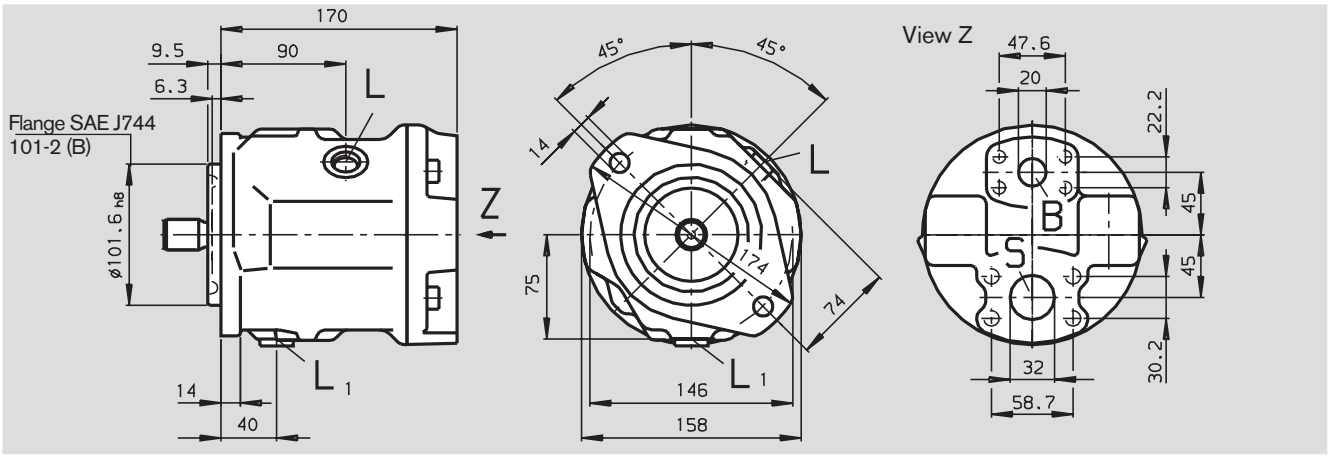
[2]) See safety information

Unit dimensions, size 28

Before finalising your design please request a certified installation drawing.

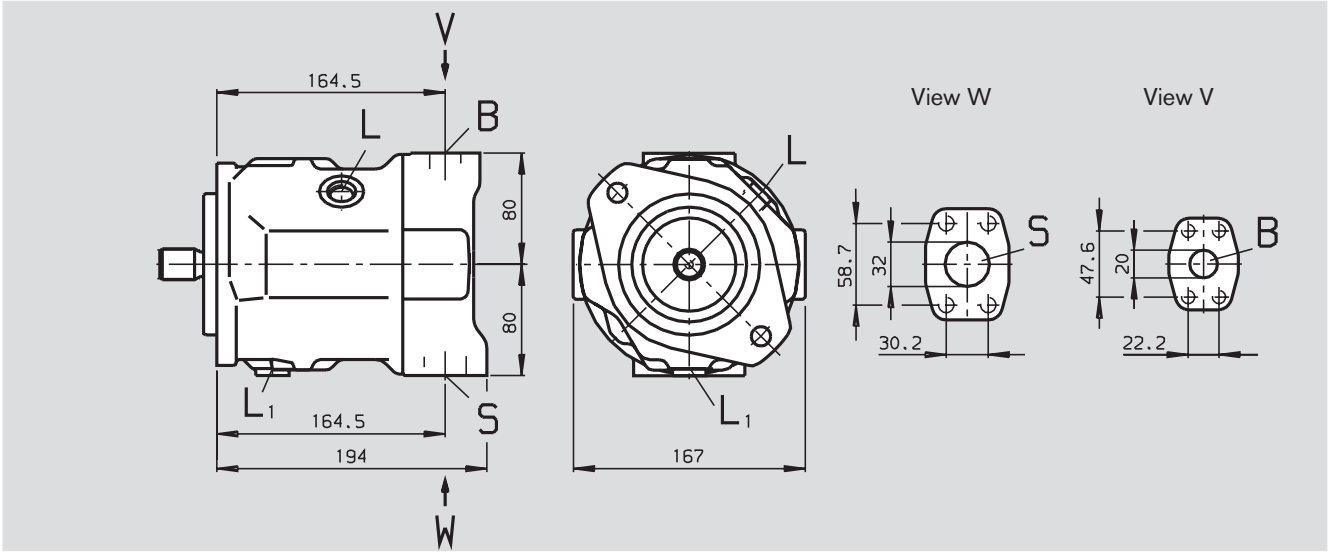
Version 61 N00

Ports at rear, no through drive (without control valves)



Version 62 N00

Ports on side, no through drive



Ports

				Tightening torques, max. [1)]
B	Pressure port (Standard pressure range)	SAE J518	3/4 in	
	Fixing thread		3/8-16UNC-2B; 18 deep	40 Nm
S	Inlet port (Standard pressure range)	SAE J518	1 1/4 in	
	fixing thread		7/16-14UNC-2B; 24 deep	65 Nm
L, L_1	Drain ports (L_1 closed)	ISO 11926	3/4-16 UNF-2B	160 Nm

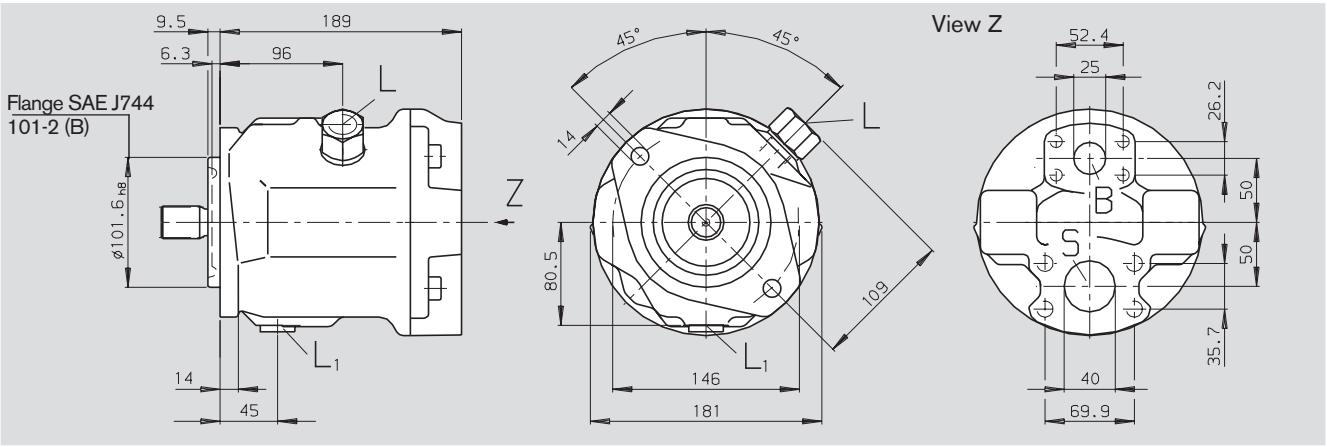
[1)] See safety information

Unit dimensions size 45

Before finalising your design please request a certified installation drawing.

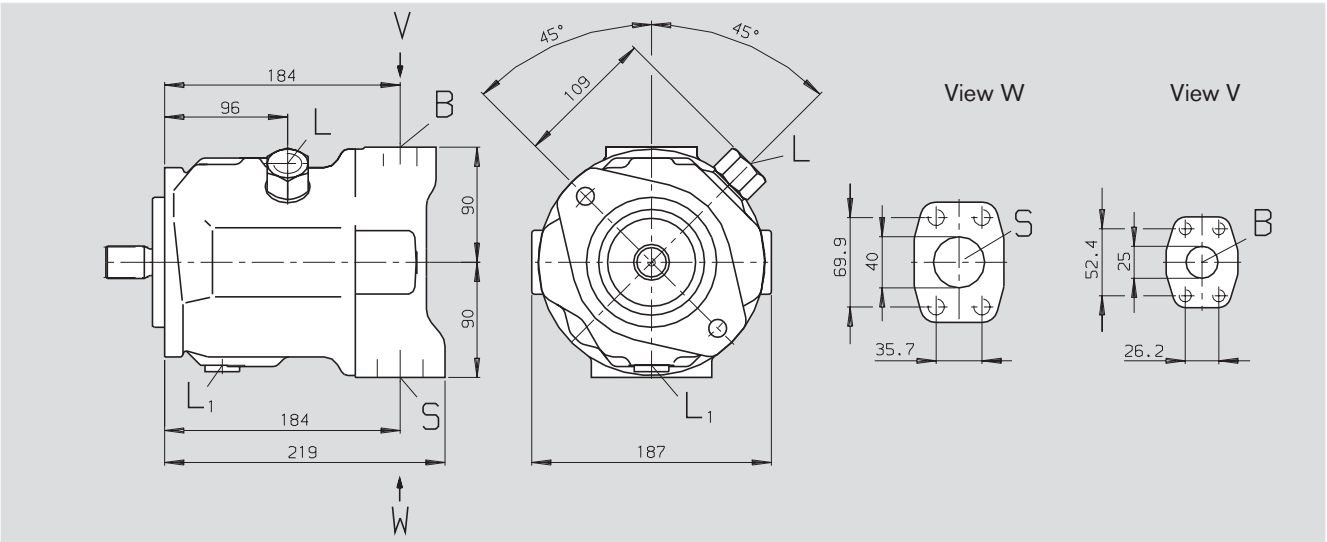
Version 11 N00

Ports at rear, no through drive (without control valves)



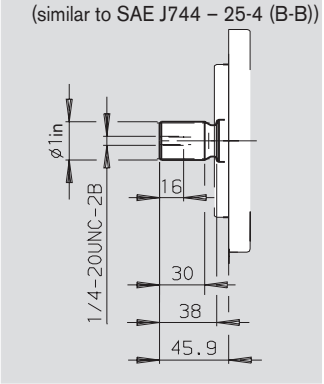
Version 12 N00

Ports on side, no through drive

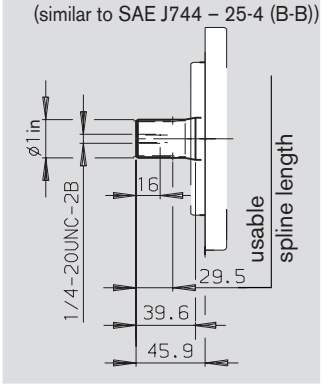


Shaft ends (acc.to SAE J744 OCT83)

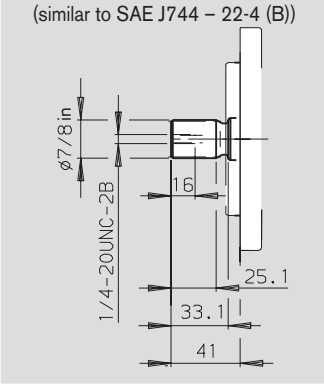
S Splined shaft 1in-15T 16/32DP[1]) (similar to SAE J744 – 25-4 (B-B))



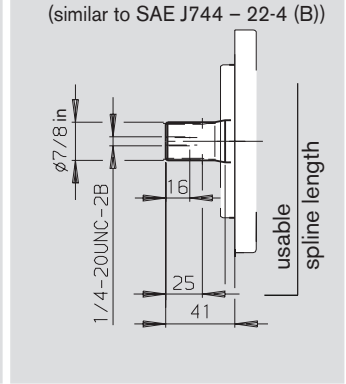
R Splined shaft 1in-15T 16/32DP [1]) (similar to SAE J744 – 25-4 (B-B))



U Splined shaft 7/8in-13T 16/32DP [1]) (similar to SAE J744 – 22-4 (B))



W Splined shaft 7/8in-13T 16/32DP [1]) (similar to SAE J744 – 22-4 (B))



Ports

				Tightening torques, max.[2])
B	Pressure port (Standard pressure range)	SAE J518	1 in	
	Fixing thread	DIN 13	M10x1,5; 17 deep	60 Nm
S	Inlet port (Standard pressure range)	SAE J518	1 1/2 in	
	Fixing thread	DIN 13	M12x1,75; 20 deep	130 Nm
L	Drain port	DIN 3852-1	M22x1,5	210 Nm
L_1	Drain port (closed)	ISO 11926	7/8-14 UNF-2B	240 Nm

[1]) ANSI B92.1a-1976, 30° pressure angle, flat base, flange centering, fit class 5

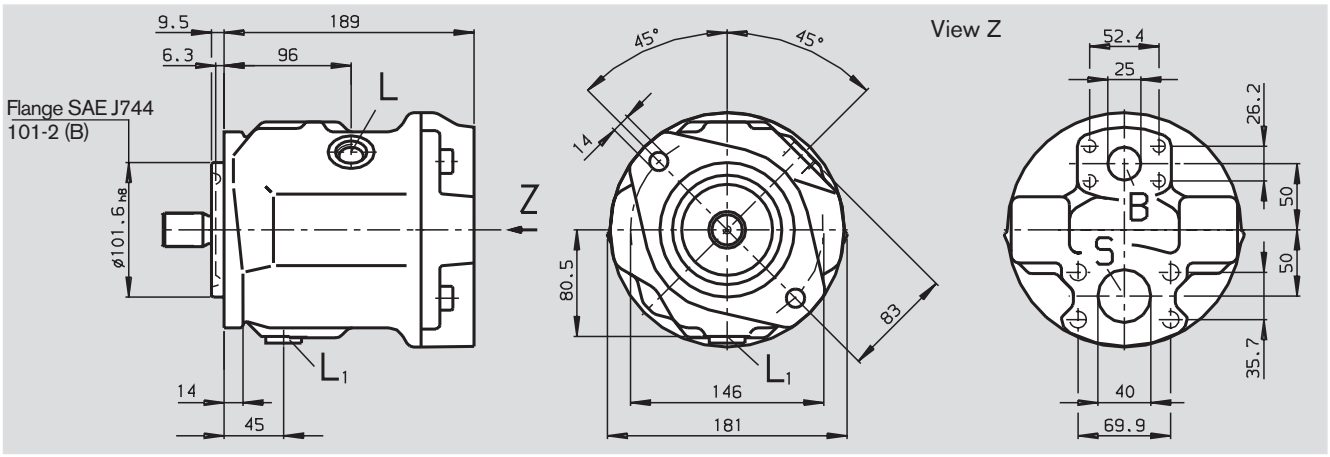
[2]) See safety information

Unit dimensions size 45

Before finalising your design please request a certified installation drawing.

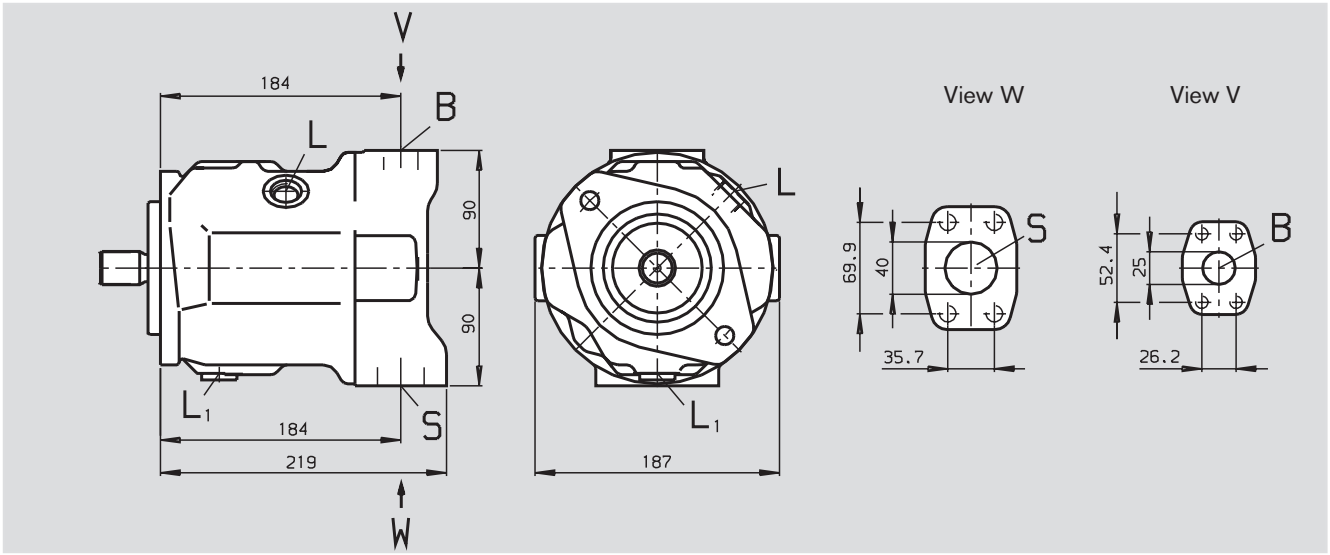
Version 61 N00

Ports at rear, no through drive (without control valves)



Version 62 N00

Ports on side, no through drive



Ports

				Tightening torques, max.[1)]
B	Pressure port (Standard pressure range)	SAE J518	1 in	
	Fixing thread		3/8-16UNC-2B; 18 deep	40 Nm
S	Inlet port (Standard pressure range)	SAE J518	1 1/2 in	
	Fixing thread		1/2-13UNC-2B; 22 deep	90 Nm
L, L_1	Drain ports (L_1 closed)	ISO 11926	7/8-14 UNF-2B	240 Nm

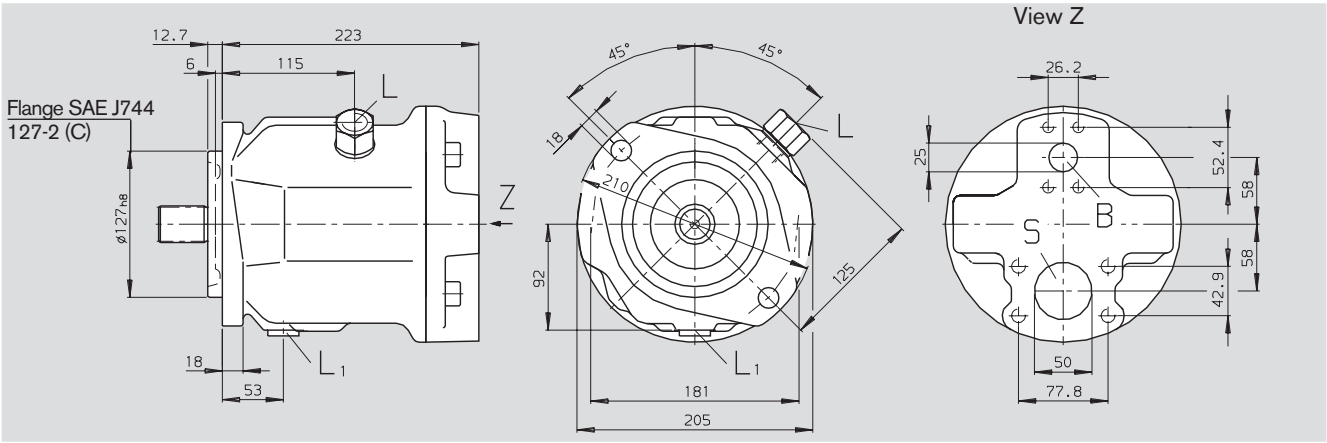
[1]) See safety information

Unit dimensions size 71

Before finalising your design please request a certified installation drawing.

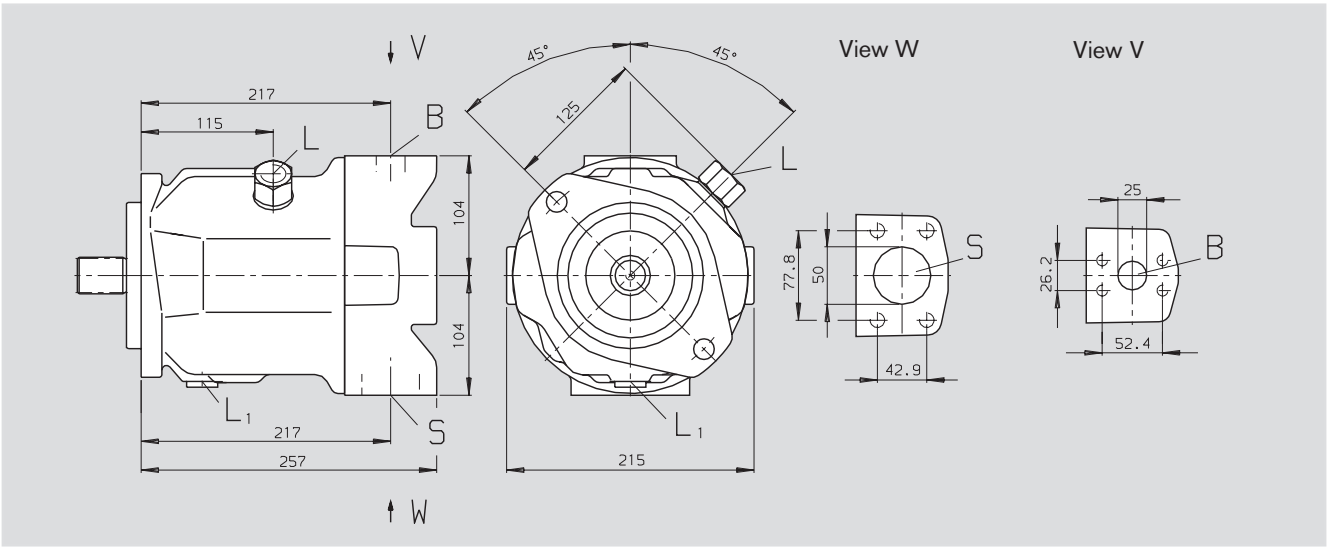
Version 11 N00

Ports at rear, no through drive (without control valves)



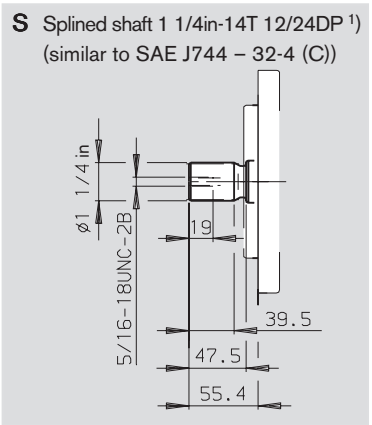
Version 12 N00

Ports on side, no through drive

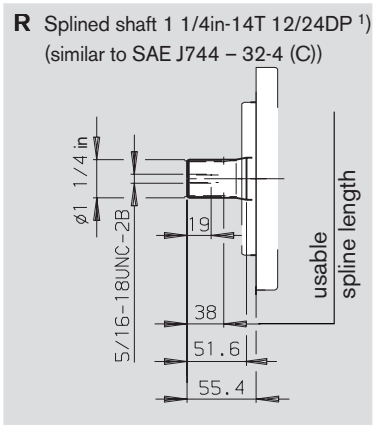


Shaft ends (acc. to SAE J744 OCT83)

S Splined shaft 1 1/4in-14T 12/24DP [1]
(similar to SAE J744 – 32-4 (C))



R Splined shaft 1 1/4in-14T 12/24DP [1]
(similar to SAE J744 – 32-4 (C))



Ports

				Tightening torques, max. [2]
B	Pressure port(Standard pressure range)	SAE J518	1 in	
	Fixing thread	DIN 13	M10x1,5; 17 deep	60 Nm
S	Inlet port (Standard pressure range)	SAE J518	2 in	
	Fixing thread	DIN 13	M12x1,75; 22deep	130 Nm
L	Drain port	DIN 3852-1	M22x1,5	210 Nm
L_1	Drain port (closed)	ISO 11926	7/8-14 UNF-2B	240 Nm

[1]) ANSI B92.1a-1976, 30° pressure angle, flat base, flank centering, fit class 5

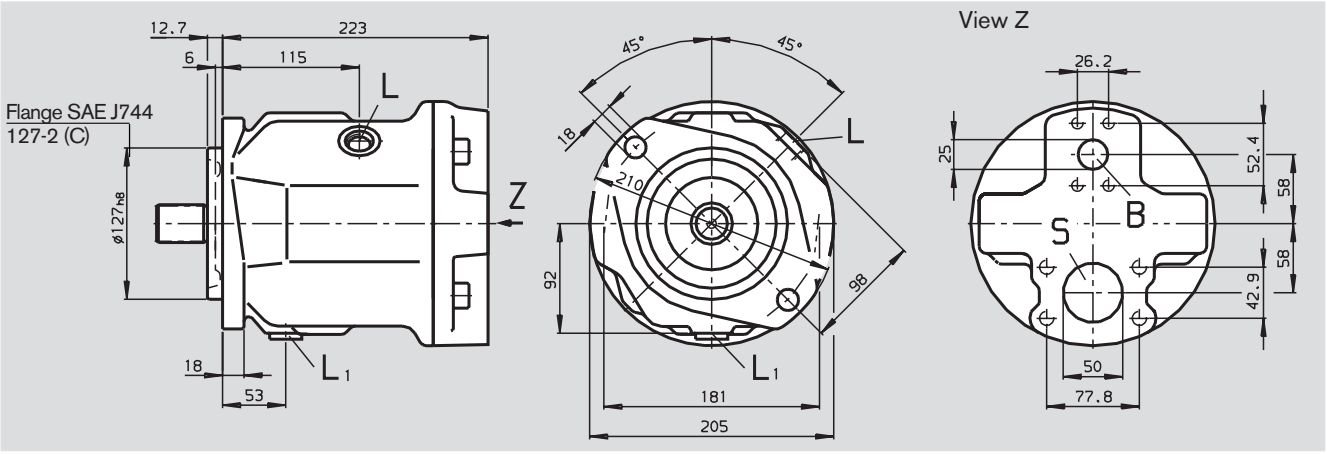
[2]) See safety information

Unit dimensions size 71

Before finalising your design please request a certified installation drawing.

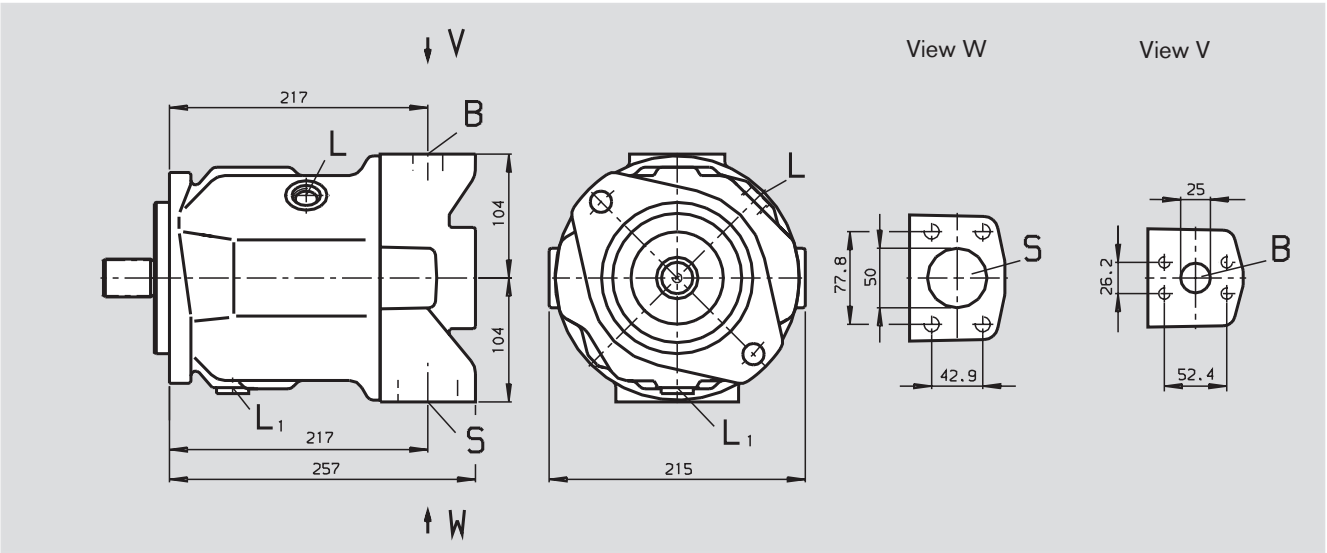
Version 61 N00

Ports at rear, no through drive (without control valves)



Version 62 N00

Ports on side, no through drive



Ports

				Tightening torques, max.[1)]
B	Pressure port(Standard pressure range)	SAE J518	1 in	
	Fixing thread		3/8-16UNC-2B; 18 deep	40 Nm
S	Inlet port (Standard pressure range)	SAE J518	2 in	
	Fixing thread		1/2-13UNC-2B; 22 deep	90 Nm
L, L_1	Drain ports (L_1 closed)	ISO 11926	7/8-14 UNF-2B	240 Nm

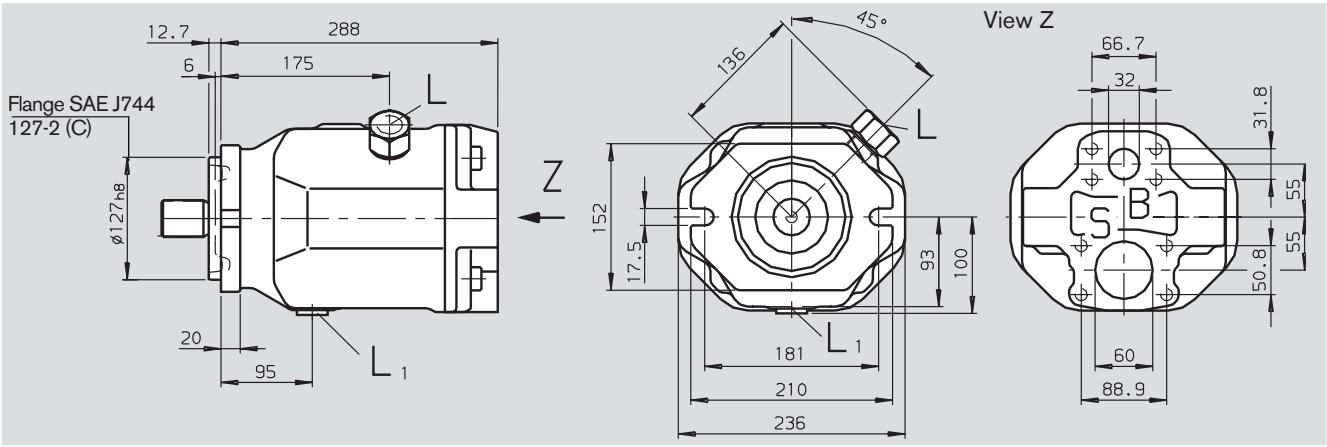
[1]) See safety information

Unit dimensions size 100

Before finalising your design please request a certified installation drawing.

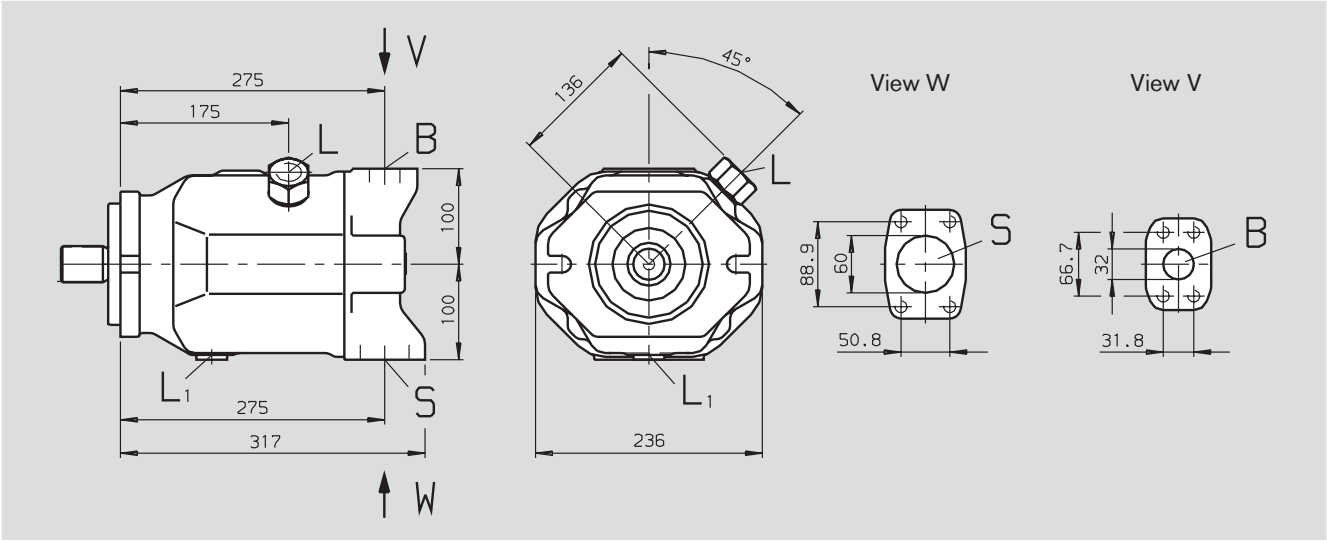
Version 11 N00

Ports at rear, no through drive (without control valves)



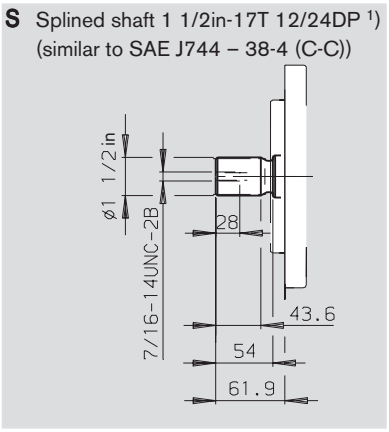
Version 12 N00

Ports on side, no through drive

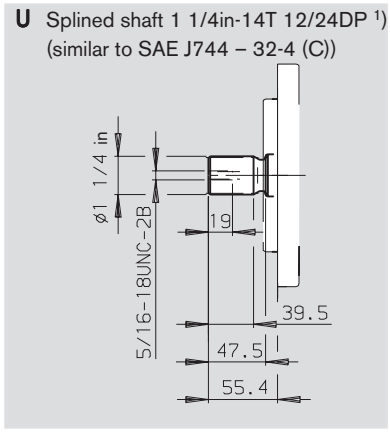


Shaft ends (acc.to SAE J744 OCT83)

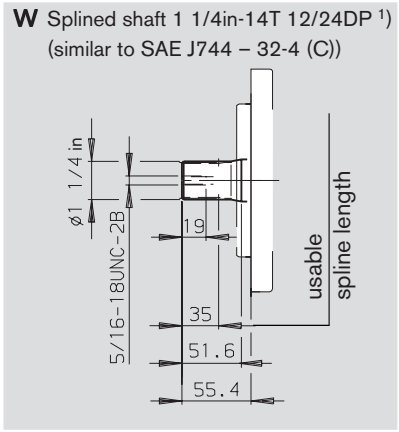
S Splined shaft 1 1/2in-17T 12/24DP [1]
(similar to SAE J744 – 38-4 (C-C))



U Splined shaft 1 1/4in-14T 12/24DP [1]
(similar to SAE J744 – 32-4 (C))



W Splined shaft 1 1/4in-14T 12/24DP [1]
(similar to SAE J744 – 32-4 (C))



Ports

				Tightening torques, max. [2]
B	Pressure port (Standard pressure range)	SAE J518	1 1/4 in	
	Fixing thread	DIN 13	M14x2; 19 deep	205 Nm
S	Inlet port (Standard pressure range)	SAE J518	2 1/2 in	
	Fixing thread	DIN 13	M12x1,75; 17deep	130 Nm
L	Drain port	DIN 3852-1	M27x2	330 Nm
L_1	Drain port (closed)	ISO 11926	1 1/16-12 UN-2B	360 Nm

[1] ANSI B92.1a-1976, 30° pressure angle, flat base, flank centering, fit class 5

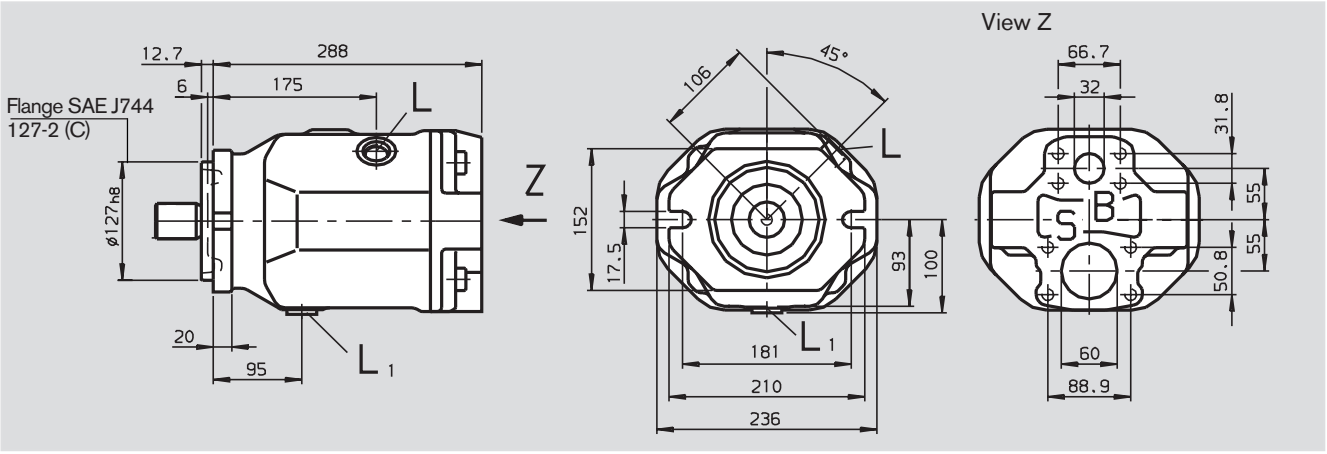
[2] See safety information

Unit dimensions size 100

Before finalising your design please request a certified installation drawing.

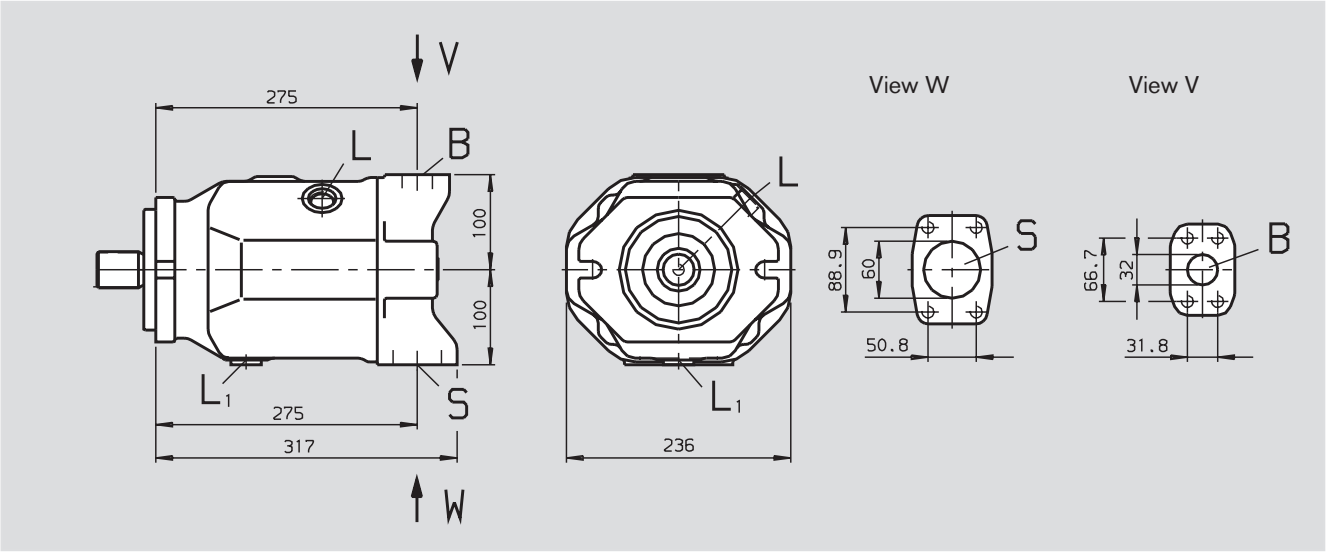
Version 61 N00

Ports at rear, no through drive (without control valves)



Version 62 N00

Ports on side, no through drive



Ports

				Tightening torques, max.[1)]
B	Pressure port (Standard pressure range)	SAE J518	1 1/4 in	
	Fixing thread		1/2-13UNC-2B; 19 deep	90 Nm
S	Inlet port (Standard pressure range)	SAE J518	2 1/2 in	
	Fixing thread		1/2-13UNC-2B; 24 deep	90 Nm
L, L_1	Drain ports (L_1 closed)	ISO 11926	1 1/16-12 UN-2B	360 Nm

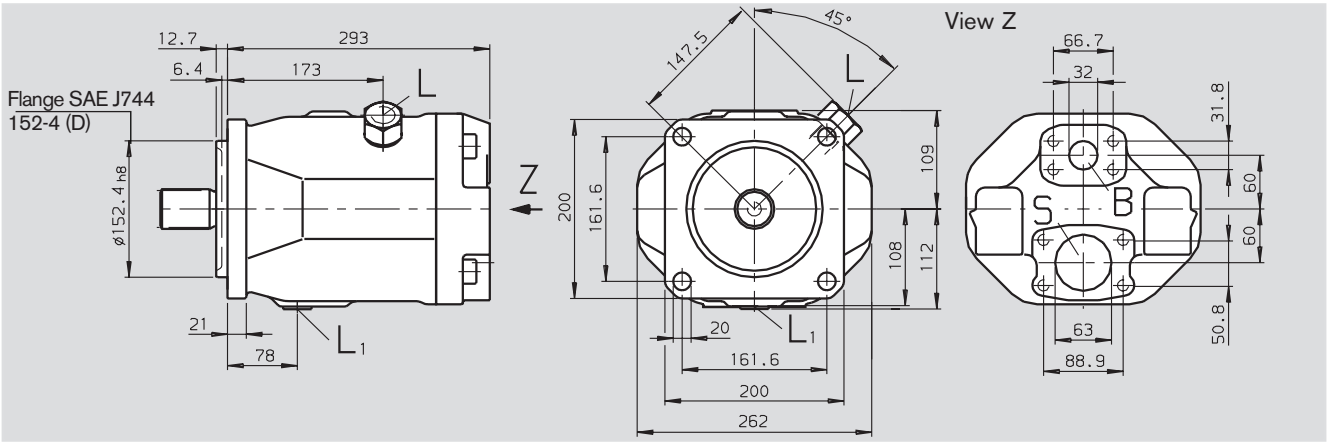
[1]) See safety information

Unit dimensions size 140

Before finalising your design please request a certified installation drawing.

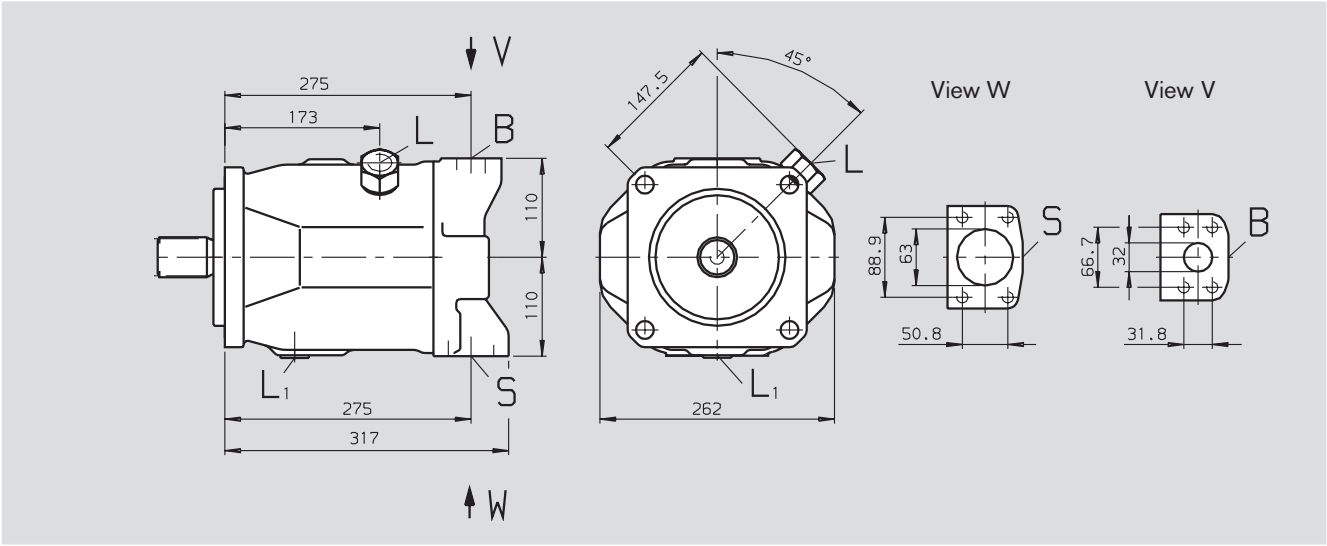
Version 11 N00

Ports at rear, no through drive (without control valves)



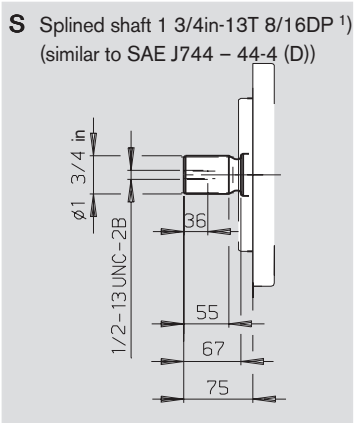
Version 12 N00

Ports on side, no through drive



Shaft ends (acc. to SAE J744 OCT83)

S Splined shaft 1 3/4in-13T 8/16DP [1]
(similar to SAE J744 – 44-4 (D))



Ports

				Tightening torques, max. [2]
B	Pressure port (Standard pressure range)	SAE J518	1 1/4 in	
	Fixing thread	DIN 13	M14x2; 19 deep	205 Nm
S	Inlet port (Standard pressure range)	SAE J518	2 1/2 in	
	Fixing thread	DIN 13	M12x1,75; 17 deep	130 Nm
L	Drain port	DIN 3852-1	M27x2	330 Nm
L_1	Drain port(closed)	ISO 11926	1 1/16-12 UN-2B	360 Nm

[1] ANSI B92.1a-1976, 30° pressure angle, flat base, flank centering, fit class 5

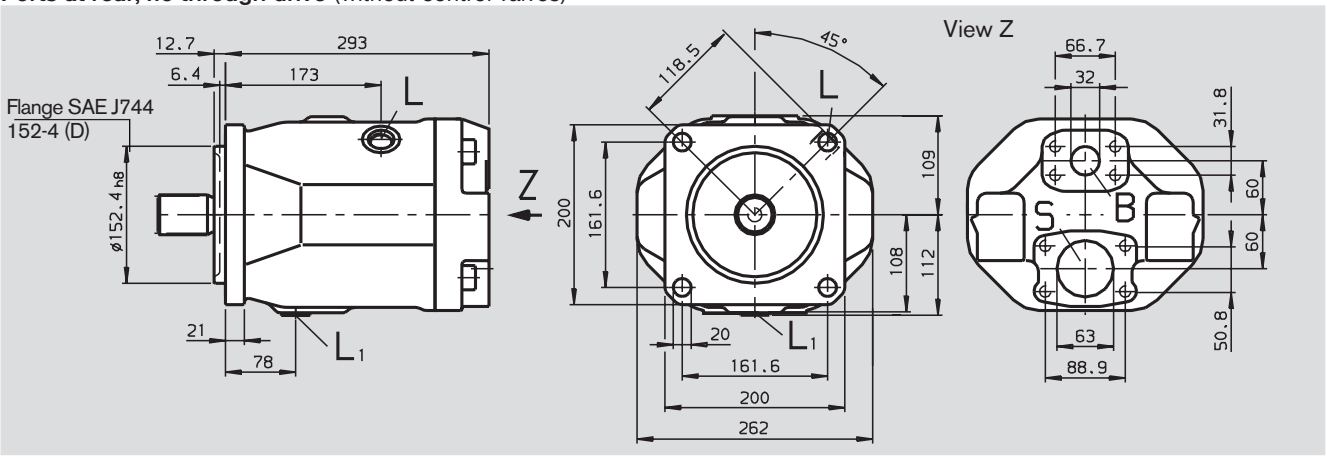
[2] See safety information

Unit dimensions size 140

Before finalising your design please request a certified installation drawing.

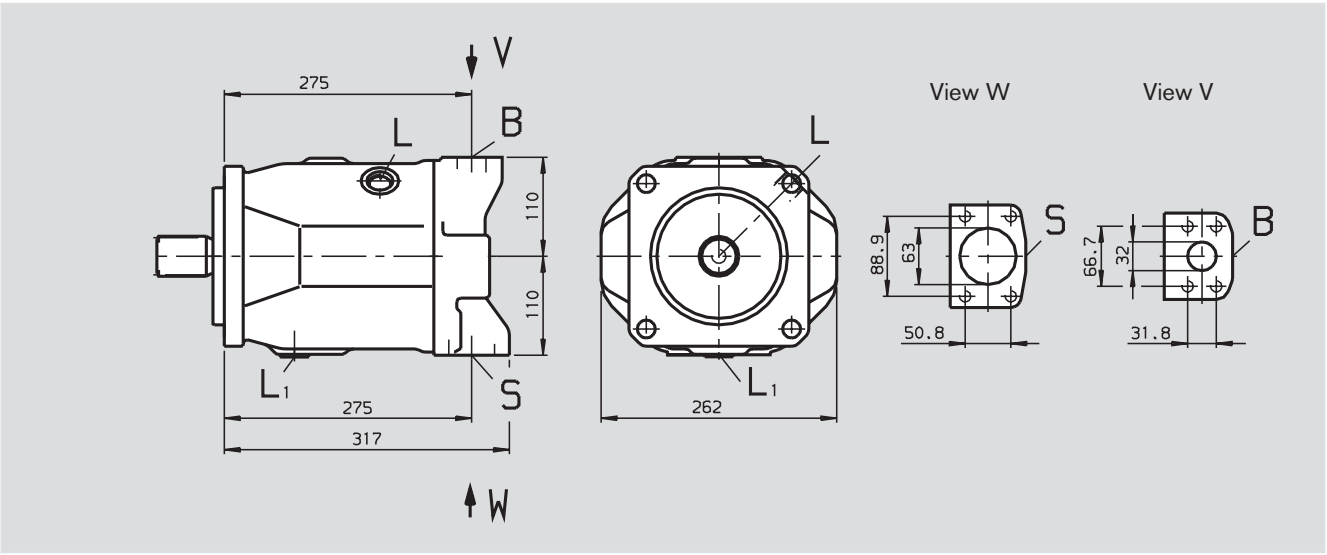
Version 61 N00

Ports at rear, no through drive (without control valves)



Version 62 N00

Ports on side, no through drive



Ports

				Tightening torques, max. [1]
B	Pressure port (Standard pressure range)	SAE J518	1 1/4 in	
	Fixing thread		1/2-13UNC-2B; 24 deep	90 Nm
S	Inlet port (Standard pressure range)	SAE J518	2 1/2 in	
	Fixing thread		1/2-13UNC-2B; 24 deep	90 Nm
L, L_1	Drain ports (L_1 closed)	ISO 11926	1 1/16-12 UN-2B	360 Nm

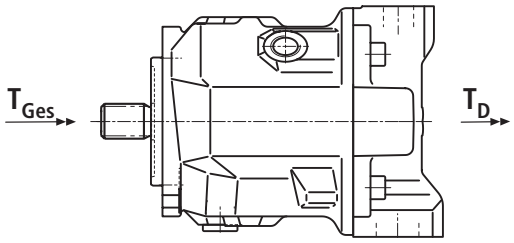
[1]) See safety information

Through drives

Axial piston units A10V(S)O can be supplied with a through drive as shown in the ordering code on page 3. The type of through drive is determined by codes (K01–K24). If the combination pump is not mounted in the factory, the simple type code is sufficient.

Included in this case are: Shaft coupler, seals, and if necessary an adapter flange.

Maximum permissible input and through drive torques

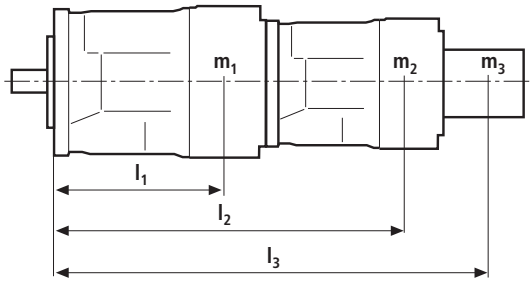


The drive torques for pump 1 and pump 2 can be split up as required. However the max. permissible input torque T_{tot} as well as the max. permissible through drive torque T_{thr} may not be exceeded.

Size				18	28	45	71	100	140
Max. perm. input torque T_{tot}									
With shaft S	T_{tot}	Nm		124	198	319	626	1104	1620
With shaft R	T_{tot}	Nm		150	225	400	644	-	-
Max. perm. through drive torque T_{thr}									
With shaft S	T_{thr}	Nm		108	160	319	492	778	1266
With shaft R	T_{thr}	Nm		120	176	365	548	-	-

T_{tot} = Max. permissible input torque pump1
T_{thr} = Max. permissible through drive torque at 2nd shaft end of pump 1.

Permissible moment of inertia



m_1, m_2, m_3 Weight of pump in kg

l_1, l_2, l_3 Distance to center of gravity in mm

$T_m = (m_1 \bullet l_1 + m_2 \bullet l_2 + m_3 \bullet l_3) \bullet \frac{1}{102}$ in Nm

Size				18	28	45	71	100	140
Perm. moment of inertia	M_{mper}	N m		500	880	1370	2160	3000	4500
at dyn. acceleration 10g 98,1 m/sec^2	M_{mper}	N m		50	88	137	216	300	450
Weight	m	kg		12	15	21	33	45	60
Distance to center of gravity	l_1	m m		90	110	130	150	160	160

Overview of through drive mounting options

Before finalising your design please request a certified installation drawing.

Through drive - Flange (ISO 3019-1)	A10V(S)O Coupler for shaft (ISO 3019-1)	Code	Mounting option - 2. pump A10V(S)O../31... Size (shaft)	A10V(S)O.../52... Size (shaft)	Gear pump	Through dr. available on size
82-2 (A)	16-4 (5/8in)	**K01**	18 (U)		Size F	18 – 140
	19-4 (3/4in)	**K52**	18 (S and R)	10 (S)		18 – 140
101-2 (B)	22-4 (7/8in)	**K02**			Size N and G	28 – 140
		K68	28 (S and R) 45 (U and W) [1]	28 (S and R) 45 (U and W) [1]		28 – 140
	25-4 (1in)	**K04**	45 (S and R)	45 (S and R) 60 (U and W) [2]		45 – 100
127-2(C)	32-4 (1 1/4in)	**K07**	71 (S and R) 100 (U) [3]	85 (U and W) [3]		71 – 140
	38-4 (1 1/2in)	**K24**	100 (S)	85 (S)		100 – 140
152-4 (4-hole)	44-4 (1 3/4in)	**K17**	140 (S)			140

[1]) Not with K68-through drive on main pump size 28

[2]) Not with K04-through drive on main pump size 45

[3]) Not with K07-through drive on main pump size 71

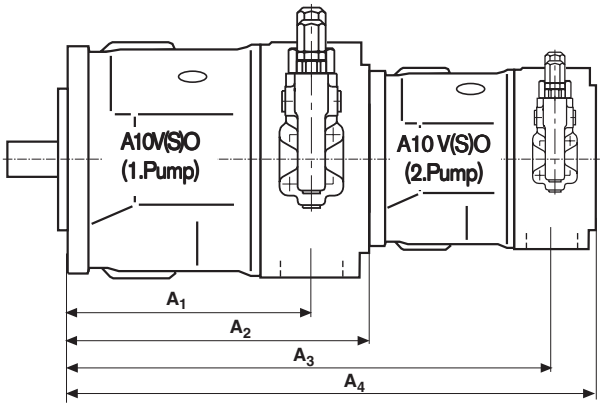
Unit dimensions combination pumps A10V(S)O + A10V(S)O

A10V(S)O (1. Pump)	A10V(S)O (2.Pumpe) A10VSO 18				A10VO 28				A10VO 45				A10VO 71				A10VO 100				A10VO 140			
	A_1	A_2	A_3	A_4	A_1	A_2	A_3	A_4	A_1	A_2	A_3	A_4	A_1	A_2	A_3	A_4	A_1	A_2	A_3	A_4	A_1	A_2	A_3	A_4
A10VSO 18	145	182	327	377	165	204	349	399	184	229	374	424	217	267	412	462	275	338	483	533	275	350	495	545
A10VO 28	–	–	–	–	165	204	369	398	184	229	394	423	217	267	432	461	275	338	503	532	275	350	515	544
A10VO 45	–	–	–	–	–	–	–	–	184	229	413	448	217	267	451	486	275	338	522	557	275	350	534	569
A10VO 71	–	–	–	–	–	–	–	–	–	–	–	–	217	267	484	524	275	338	555	595	275	350	567	607
A10VO 100	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	275	338	631	664	275	350	625	679
A10VO 140	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	275	350	625	688

1. If a **second Rexroth pump must be factory mounted** the two individual model codes must be combined with a „+“.
   Model code pump 1+ model code pump 2.

   Ordering example :
   A10VO 100DR/31R-PSC12K07 + A10VO 71DR/31R-PSC12N00

2. If a **gear pump or a radial piston pump is to be factory mounted** as a second pump please consult the factory.

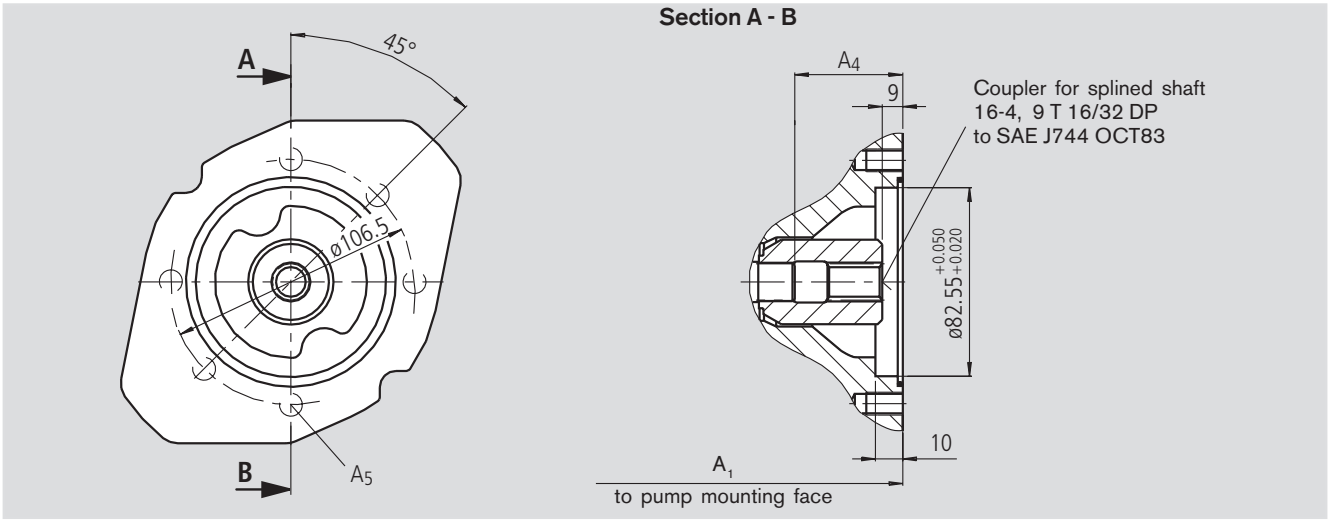


Dimensions of through drives

Before finalising your design please request a certified installation drawing.

K01

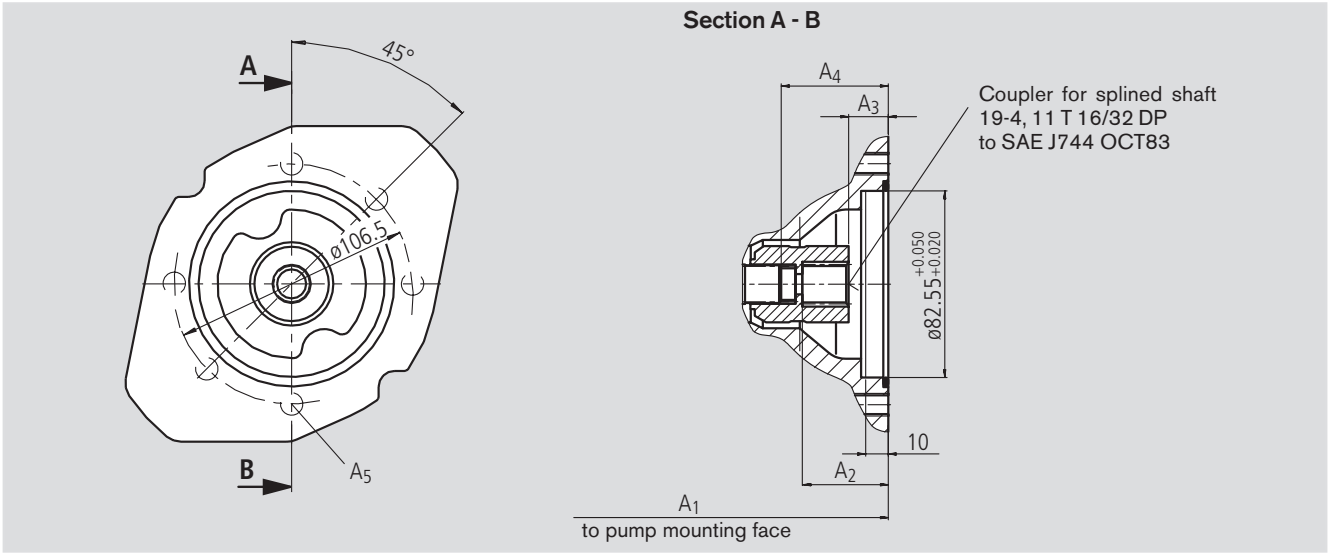
for mounting a pump with **flange 82-2** (ISO 3019-1) and **Shaft 16-4** (SAE J744 OCT83), eg. A10VSO18...with U-Shaft



Size main pump	A_1	A_4	A_5
18	182	42	M10; 14 deep
28	204	47	M10; 14,5 deep
45	229	53	M10; 14,5 deep
71	267	61	M10; 17 deep
100	338	65	M10; 17 deep
140	350	77	M10; 17 deep

K52

for mounting a pump with **flange 82-2** (ISO 3019-1)and **shaft 19-4** (SAE J744 OCT83), eg. A10VSO18...with S- or R-shaft



Size main pump	A_1	A_2	A_3	A_4	A_5
18	182	40	17,5	43	M10; 16 deep
28	204	39	17,5	47	M10; 16 deep
45	229	40,5	17,5	53	M10; 16 deep
71	267	40	17,5	61	M10; 20 deep
100	338	40	17,5	65	M10; 20 deep
140	350	41	17,5	77	M10; 20 deep

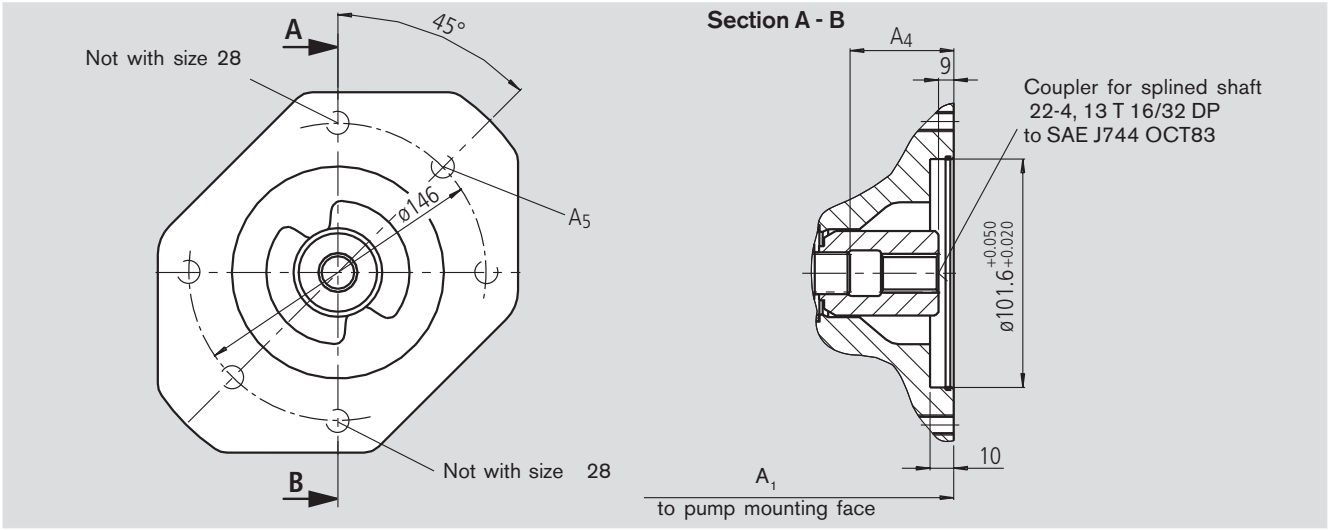
Dimension of through drives

Before finalising your design please request a certified installation drawing.

K02

for mounting a pump with **flange 101-2** (ISO 3019-1SAE J744 OCT83) and **shaft 22-4** (SAE J744 OCT83)

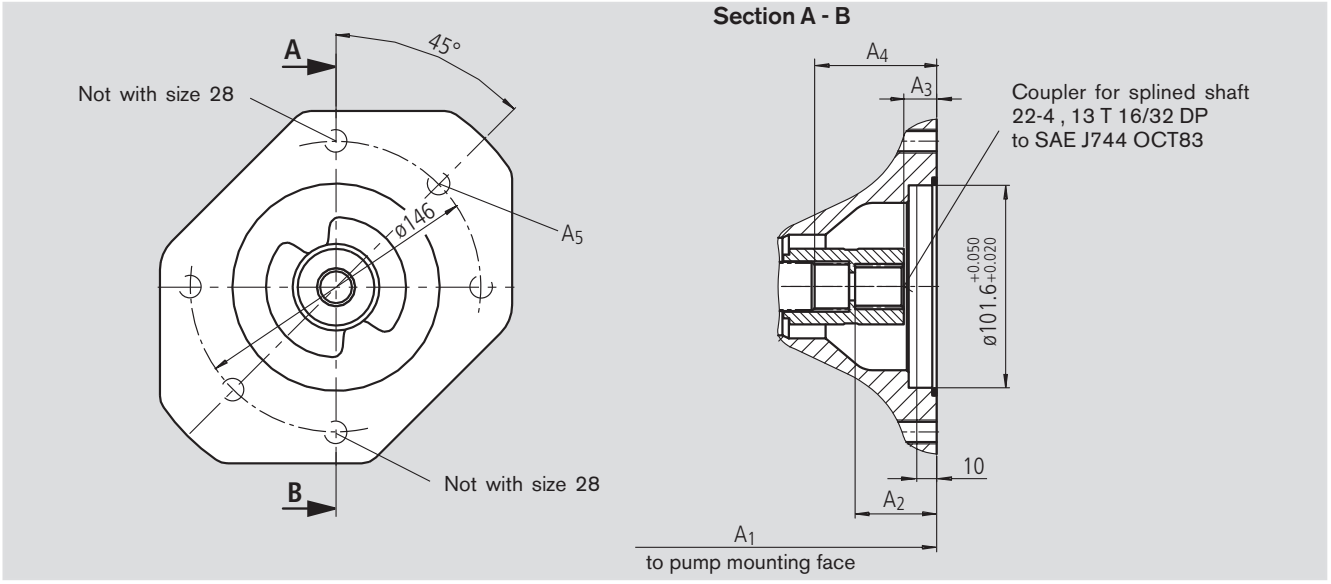
Radial O-Ring seal at pilot diameter



Size main pump	A_1	A_4	A_5
28	204	47	M12; 15 deep
45	229	53	M12; 18 deep
71	267	61	M12; 20 deep
100	338	65	M12; 20 deep
140	350	77	M12; 20 deep

K68

for mounting a pump with **flange 101-2** (ISO 3019-1) and **shaft 22-4** (SAE J744 OCT83), z.B. A10VO28...with S- or R-shaft



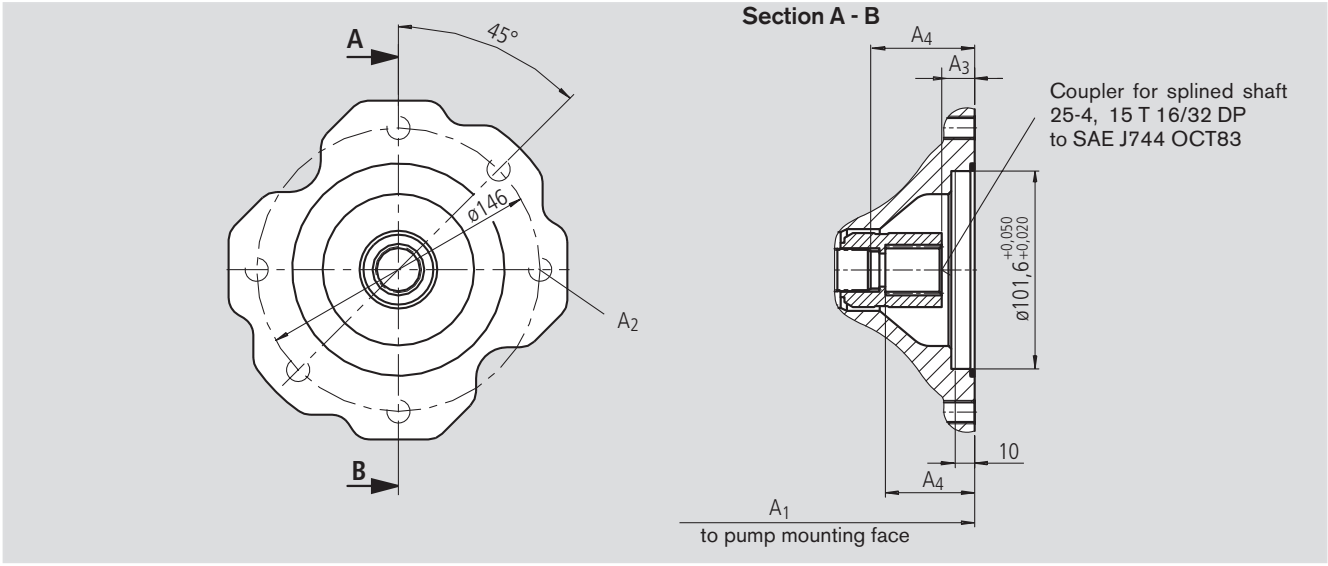
Size main pump	A_1	A_2	A_3	A_4	A_5
28	204	43	16,5	47	M12; 15 deep
45	229	42	16,5	53	M12; 18 deep
71	267	43	16,5	61	M12; 20 deep
100	338	41	16,5	65	M12; 20 deep
140	350	44	16,5	77	M12; 20 deep

Dimensions through drives

Before finalising your design please request a certified installation drawing.

K04

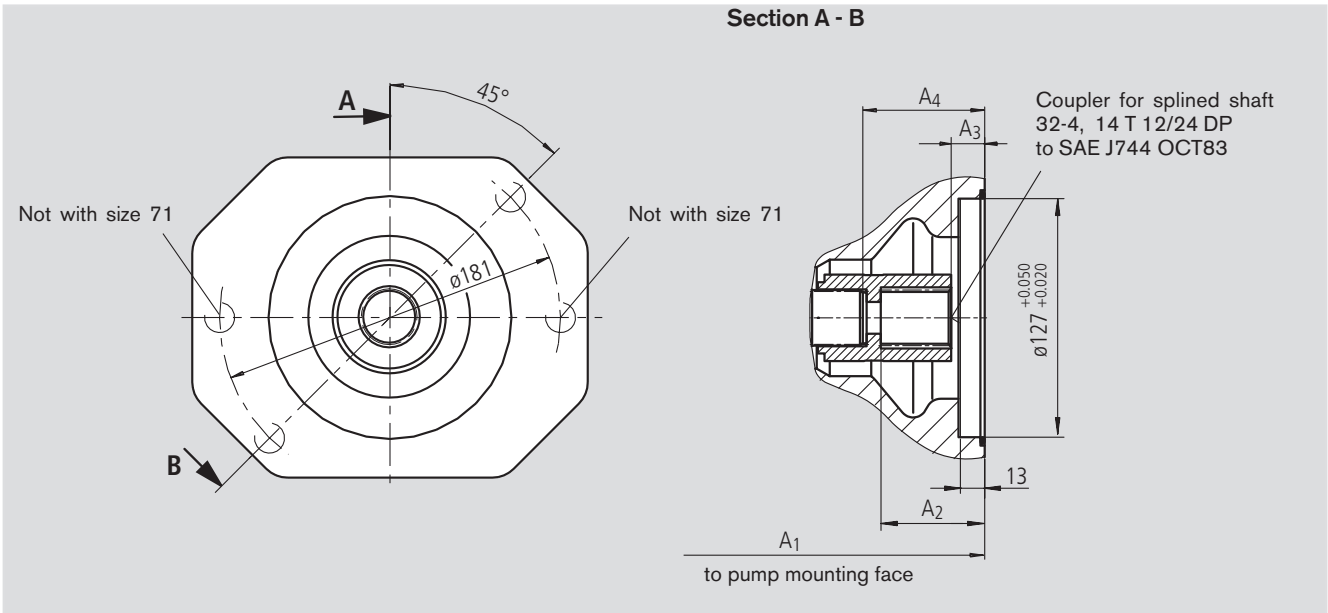
for mounting a pump with **flange 101-2** (ISO 3019-1) and shaft **25-4** (SAE J744 OCT83) eg. A10VO 45... with S- or R-shaft



Size main pump	A_1	A_2	A_3	A_4	A_5
45	229	47,5	16,9	53	M12; 18 deep
71	267	47,5	16,9	61	M12; 20 deep
100	338	47,5	16,9	65	M12; 20 deep

K07

for mounting a pump with **flange 127-2** (ISO 3019-1) and **shaft 32-4** (SAE J744 OCT83) eg. A10VO 71... with S- or R-shaft



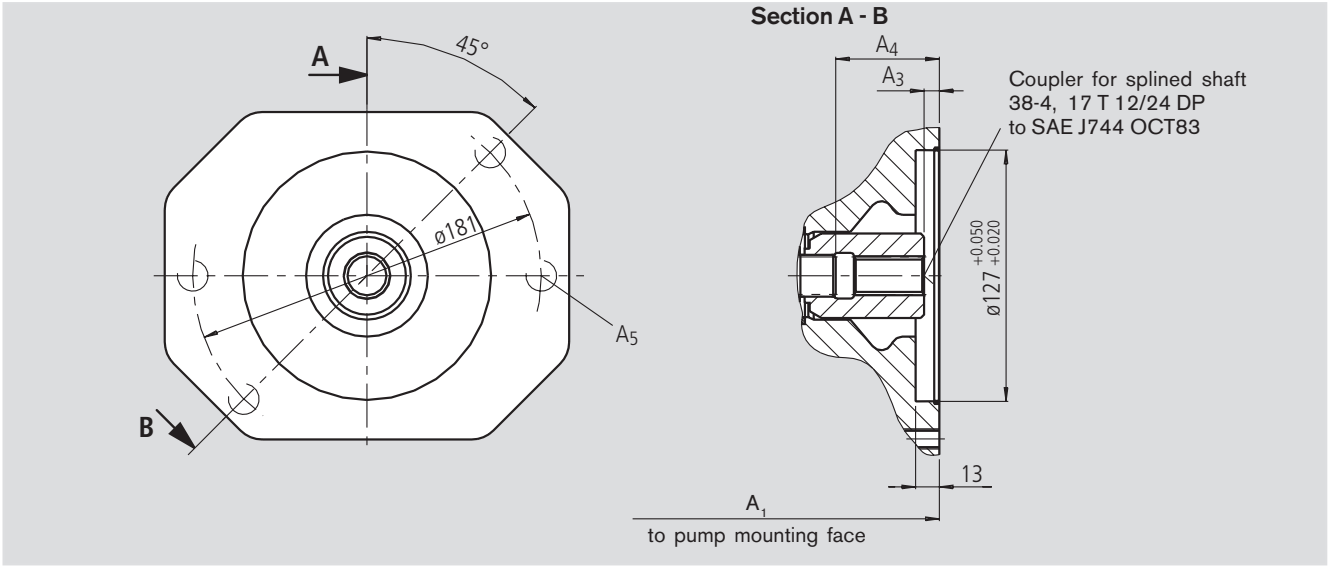
Size main pump	A_1	A_2	A_3	A_4	A_5
71	267	55,5	17,9	61	M16; 18 deep
100	338	57	17,9	65	M16; 25 deep
140	350	60	17,9	77	M16; 32 deep

Dimensions through drives

Before finalising your design please request a certified installation drawing.

K24

for mounting a pump with **flange 127-2** (ISO 3019-1) and **shaft 38-4** (SAE J744 OCT83) eg. A10VO 100... with S-shaft

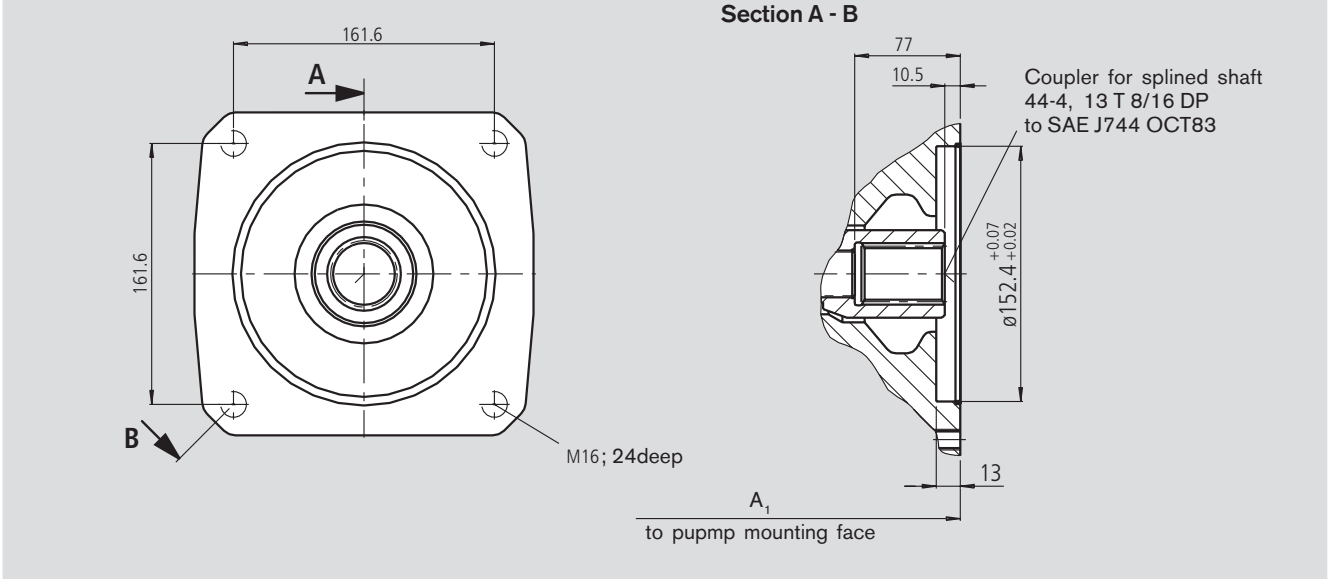


Size main pump	A_1	A_3	A_4	A_5
100	338	8	65	M16; 20 deep
140	350	9	77,3	M16; 32 deep

K17

for mounting a pump with **flange 152-4** (ISO 3019-1) and **shaft 44-4** (SAE J744 OCT83) z.B. A10VO 140... with S-shaft

Main pump size 140



Installation notes

Optional installation position.The pump housing must be filled with fluid during commissionig and operation.

In order to attain the lowest noise level, all connections (suction, pressure, pilot,case drain) must be linked by flexible members to tank.

Avoid placing a check valve in the case drain line. In some cases it may be permissible however. Please consult us.

At the high-altitude leakage oil port according to the port size the largest pipe out of the standard row has to be installed.

1. Vertical installation (Shaft end upwards)

The following installation conditions must be taken into account:

1.1 Arrangement inside the reservoir

Before installation fill pump housing , keeping it in a horizontal position..

a) If the min. fluid level is equal to or above the pump mounting surface:

Close port „L“, "L_1" and “S” open; L_1 piped and also S with suction pipe (see Fig. 1).

b)If the min. fluid level is below the pump mounting surface: pipe port „L“ and „S“ acc. to fig. 2. Conditions acc. to item 1.2.1, close port „L“

Note: In order to avoid demages at the pump, all attached parts (e.g. protective caps, covers, etc.) must be removed before installation.

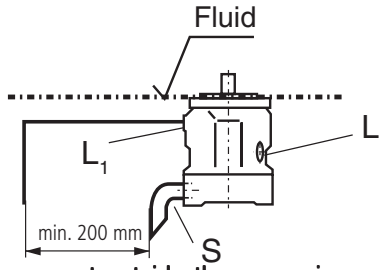


Fig. 1

1.2 Arrangement outside the reservoir

Before installation fill pump housing, keeping it in a horizontal position. For mounting above the tank see fig. 2.

Limiting condition:

1.2.1 Min. pump inlet pressure $p_{abs\ min} = 0{,}8$ bar under static and dynamic loading.

Note: Avoid mounting above tank wherever possible in order to attain a low noise level.

The permissible suction height h is a result of the overall pressure loss, but may not be greater than $h_{max} = 800$ mm (Immersion depth $h_{t\ min} = 200$ mm).

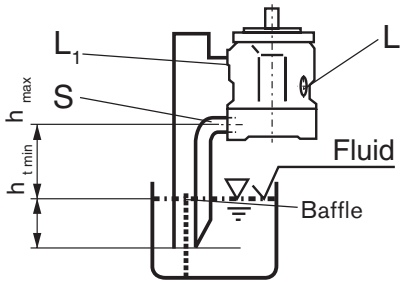


Fig. 2

Total pressure losst $\Delta p_{Ges} = \Delta p_1 + \Delta p_2 + \Delta p_3 \leq (1 - p_{abs\ min}) = 0{,}2$ bar

Δp_1:Pressure loss in pipe due to accelerating column of fluid

$$\Delta p_1 = \frac{\rho \bullet l \bullet dv}{dt} \bullet 10^{-5}\ (\text{bar})$$

ρ = density(kg/m³)
l = pipe lenght (m)
dv/dt = change in fluid velocity suction pipe (m/s²)

Δp_2: Pressure loss due to static head

$\Delta p_2 = h \bullet \rho \bullet g \bullet 10^{-5}$ (bar) h = height (m)
ρ = density (kg/m³)
g = acc. due to gravity. = 9,81 m/s²

Δp_3: Line losses (Elbows etc.)

2. Horizontal installation

The pump must be installaed in such a manner, that either „L“ or „L1“ is at the top.

2.1 Arrangement inside the reservoir

a) If the min. fluid level is above the top of the pump:

Close “L_1” , "L" and “S” open, mount suction pipe to port S, and pipe „L“ at least 200 mm away from suction pipe.(see. fig. 3)

b)If the min. fluid level is equal to or below the top of the pump:

Pipe port "L" and "S" acc.to.fig. 4 , port "L_1" closed. Conditions correspond with item1.2.1

Note: In order to avoid demages at the pump, all attached parts (e.g. protective caps) must be removed.

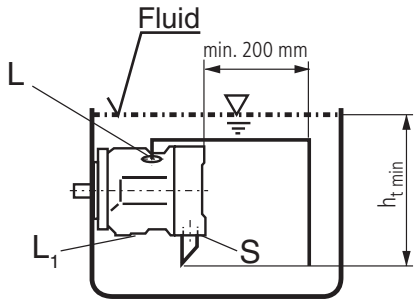


Fig. 3

2.2 Arrangement outside the reservoir

Fill pump housing before commissioning.

Pipe port "S" and the higher of the two case drain ports "L" or "L_1" .

a)For mounting above tank see fig. 4.

Conditions correspond with item 1.2.1

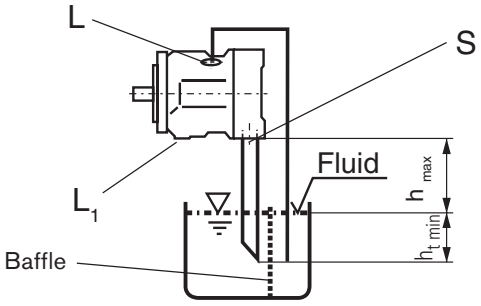


Fig. 4

b) Position below tank

Pipe port "L_1" and “S” acc. to fig. 5, port "L" closed.

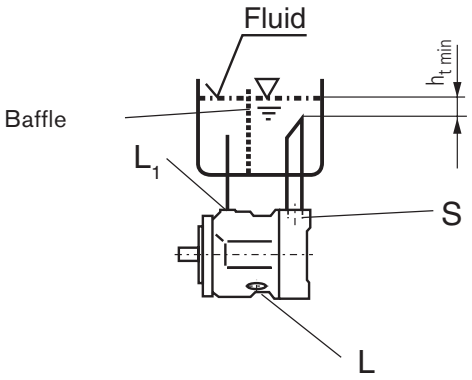


Fig. 5

Safety information

- Pump A10V(S)O was designed for operation in open loop circuits.
- Systems design, installation and commissioning requires trained technicians or tradesmen.
- All hydraulic ports can only be used for the fastening of hydraulic service lines .
- Tightening torques: please comply with the manufacturer's information regarding the max. permissible tightening torques for the used fittings.
  For fastening screws to DIN 13 we recommend to check the permissible tightening torques in each individual case acc. to VDI 2230 dated 2003.
- During and shortly after operation of a pump the housing and especially a solenoid can be extremely hot, avoid being burned!

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