



***VARIABLE
DISPLACEMENT
PISTON PUMPS***

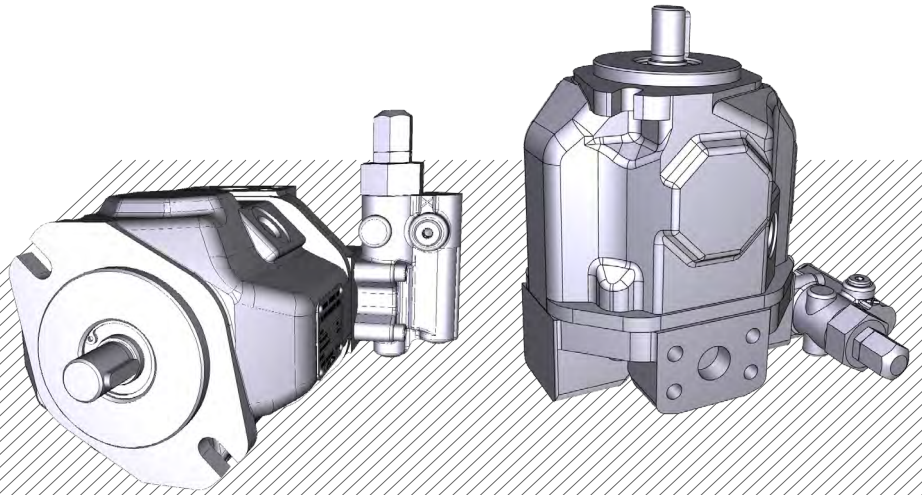
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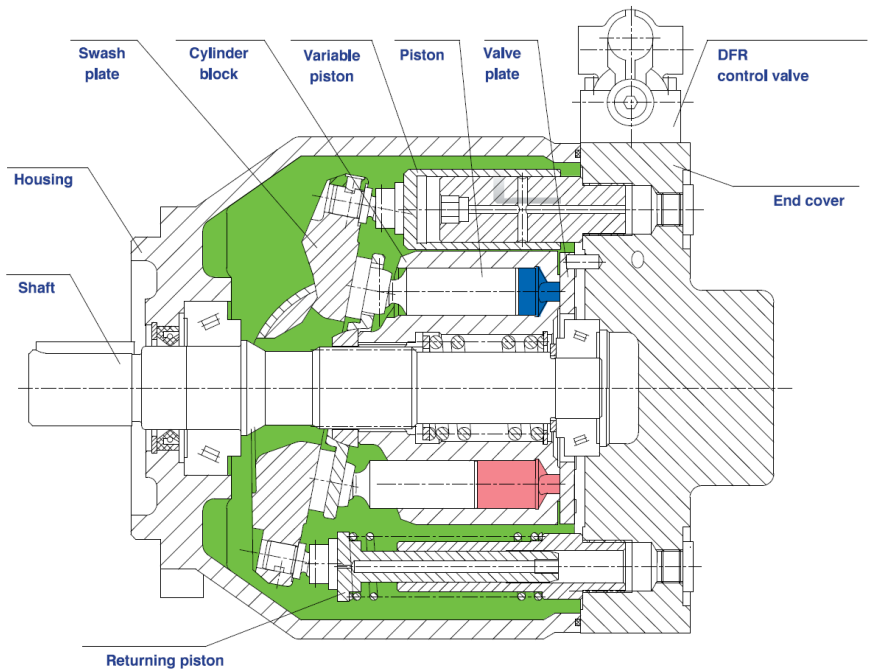


VNK BA10VS

Axial piston pump BA10VS in swashplate design is used for hydrostatic transmissions in open loop circuits. Flow is proportional to drive speed and displacement. By adjusting the position of the swashplate it is possible to smoothly vary the flow.



- Variable displacement axial piston pump of swashplate design for hydraulic open circuit systems.
- Flow is proportional to drive speed and displacement. It can be infinitely varied by adjustment of the swashplate.
- ISO mounting flange.
- Flange connections to SAE metric.
- 2 Case drain ports.
- Good suction characteristics.
- Permissible continuous pressure 28MPa.
- Low noise level.
- Long service life.
- Quick response time
- Axial and radial loading of drive shaft possible.
- High power-weight ratio
- Wide range of controls
- Through drive option for Multi-circuit system.



TECHNICAL DATA

1. Input operating pressure range

Absolute pressure at port S (A)

$P_{abs \text{ min}}$ 0.8bar (12 psi)
 $P_{abs \text{ max}}$ 30bar (435 psi)

2. Output operating pressure range

Pressure at port B

Nominal pressure P_N 280bar (4000 psi)
 Peak pressure P_{max} 350bar (5100 psi)

Pressure data to DIN24312

3. Case drain pressure

Maximum pressure of leakage fluid (at ports L, L1). Maximum 7 psi (0.5 bar) higher than input pressure at port S, but not higher than 30 psi (2 bar) absolute.

4. Direction of flow : (S to B)

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

Size cm ³ /rev			18	28	45	71	100	140
Displacement	$V_{g \text{ max}}$	cm ³ /rev (in ³ /rev)	18 (110)	28	45 (275)	71 (4.33)	100 (6.1)	140 (8.54)
Max. Speed	$N_{o \text{ max}}$	rpm	3300	3000	2600	2200	2000	1800
Max. Flow	$O_{o \text{ max}}$	L/min (gpm)	59.4 (15.7)	84 (22)	117 (31)	156 (41)	200 (53)	252 (67)
Max. Power	$P_{o \text{ max}}$	kW (HP)	28 (36.6)	39 (51)	55 (72)	73 (96)	93 (124)	118 (156)
Max. Torque @ $V_{g \text{ max}}, N_{o \text{ max}}$	T_{max}	Nm (ft-lb)	80 (58)	129 (91)	200 (146)	316 (230)	445 (324)	623 (453)
Weight (Without fluids)		Kg(lbs)	12 (27)	15 (33)	21 (46)	33 (73)	45 (99)	60 (132)

6. Determination of size

$$\text{Flow } q_v = \frac{V_g \cdot n \cdot \eta_v}{231} \text{ [gpm]} \quad \left(q_v = \frac{V_g \cdot n \cdot \eta_v}{1000} \text{ [L/min]} \right) \quad \begin{matrix} V_g = \text{Displacement per revolution in in}^3 \text{ (cm}^3\text{)} \\ \Delta p = \text{Differential pressure in psi (bar)} \end{matrix}$$

$$\text{Torque } T = \frac{V_g \cdot \Delta p}{24 \cdot \pi \cdot \eta_{mh}} \text{ [lb-ft]} \quad \left(T = \frac{V_g \cdot \Delta p}{20 \cdot \pi \cdot \eta_{mh}} \text{ [Nm]} \right) \quad \begin{matrix} n = \text{Speed in rpm (min}^{-1}\text{)} \\ \eta_v = \text{Volumetric efficiency} \end{matrix}$$

$$\text{Power } P = \frac{q_v \cdot \Delta p}{1714 \cdot \eta_t} \text{ [HP]} \quad \left(P = \frac{q_v \cdot \Delta p}{600 \cdot \eta_t} \text{ [kW]} \right) \quad \begin{matrix} \eta_{mh} = \text{Mechanical-hydraulic efficiency} \\ \eta_t = \text{Total efficiency} \end{matrix}$$



FLUID

The VNKBA10VSO variable displacement pump is suitable for use with mineral oil.

1. Operating viscosity range

We recommend that the operating viscosity (at operating temperature) for both the efficiency and life of the unit, be chosen within the optimum range of

V_{opt} = opt. operating viscosity 80...170 SUS (16...36 mm²/s)

2. Viscosity Limits

The limiting values for viscosity are as follows:

V_{min} = 10mm²/s short term at a max. permissible case temperature of 90°C

V_{max} = 1000mm²/s short term on cold start

3. Filtration

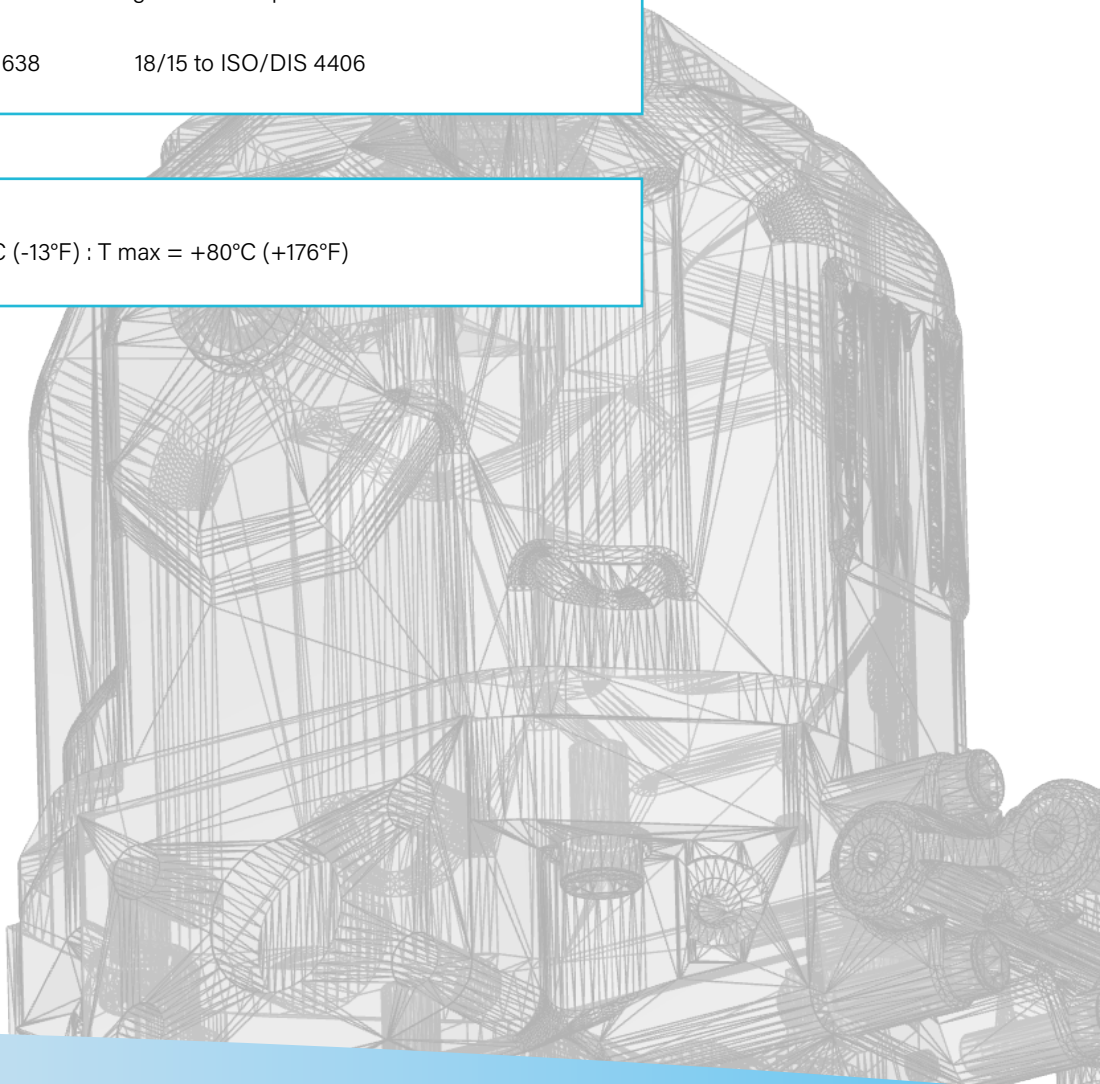
The finer the filtration, the better the achieved cleanliness of the pressure fluid and the longer the life of the axial piston unit. To ensure the functioning of the axial piston unit a minimum cleanliness level of:

9 to NAS 1638

18/15 to ISO/DIS 4406

4. Temperature range

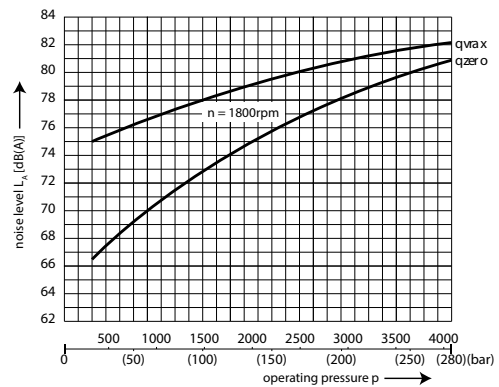
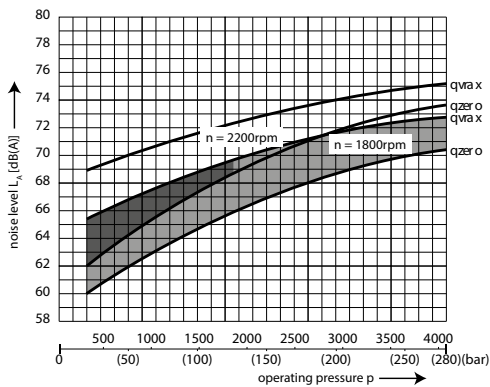
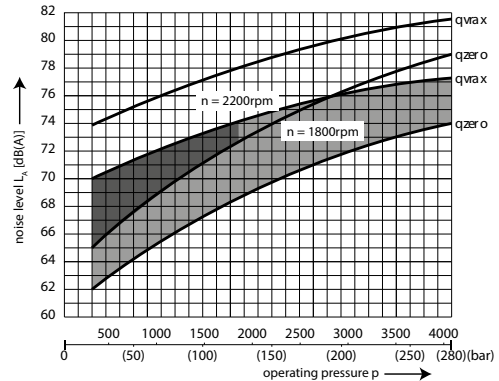
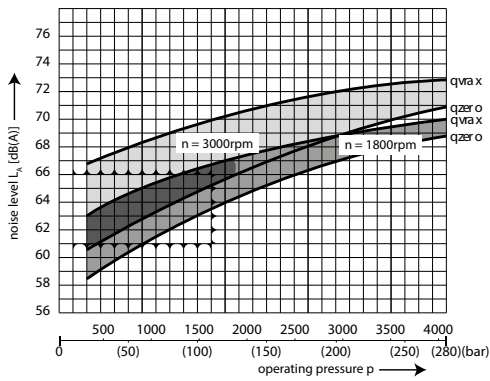
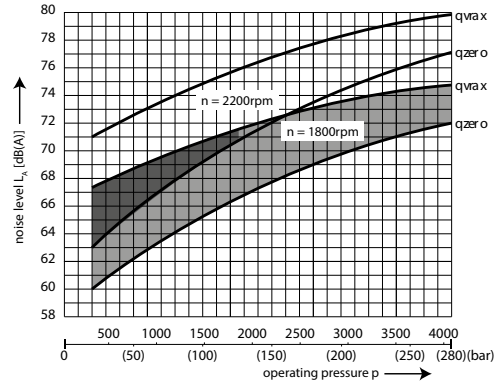
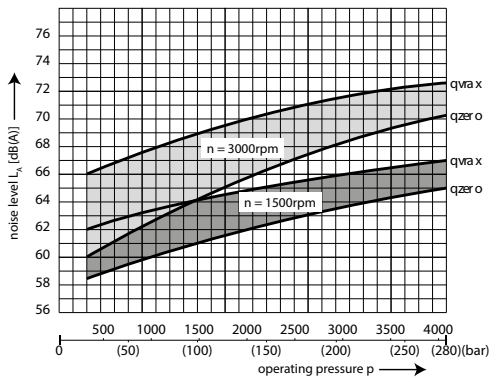
T min = -20°C (-13°F) : T max = +80°C (+176°F)



NOISE LEVEL

Characteristics for Pumps

Measured in a Sound Chamber
 Distance form microphone to pump = 3.3 ft (1 m)
 Measuring error: +2 dB (A)
 Fluid: Hydraulic oil to ISO VG 46 DIN 51519, $t = 122^{\circ}\text{F}$ (50°C)



ORDERING CODE

BA10V(S)	O	71	DR	/	31	R	-	P	S
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Axial Piston Unit

Swash late variable pump	BA10V
Swash plate variable pump for industrial	BA10VS

Mode of Operation

Pump, open circuit	O
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Size

Displacement V_{gmax}	cm ³ /rev (in ³ /rev)	18 (1.10)	28 (1.71)	45 (2.75)	71 (4.33)	100 (6.10)	140 (8.54)
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Control Devices

Pressure control	•	•	•	•	•	•	DR
Pressure remote control							DRG
Pressure and flow control	•	•	•	•	•	•	DFR
Pressure & flow (w/ X port blocked)							DFR1
Pressure, Flow & Power control	•	•	•	•	•	•	DFLR

Series

Series	31
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Direction of Rotation

Viewed from shaft end	clockwise	R
	counter-clockwise	L

Seals

Buna-N (NBR per DIN ISO 1629):	P
FPM (fluorocarbon)	V

Shaft End

	18	28	45	71	100	140	
SAE- splined shaft	•	•	•	•	•	•	S
SAE-splined shaft, reinforced (higher thru drive torque)	•	•	•	•	-	-	R
SAE-splined shaft, smaller size (not for pumps with thru drive)	•	-	•	•	•	-	U
SAE-splined shaft, reinforced (U-type shaft)	•	•	•	•	•	-	W
SAE-keyed shaft	•	•	•	•	•	•	K
Parallel with key DIN 6885	•	•	•	•	•	•	P



C	62	N00
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Through drives				18	28	45	71	100	140	
Without through drive (Non- Thru Drive)				•	•	•	•	•	•	N00
With through drive to accept an axial piston pump or a gear pump										
Mounting flange SAEJ744	hub	sealing	to mount							
82-2 (A)	3/4" keyed (A-B)	axial	BA10V18 (K)	○	•	•	•	•	•	K401
101-2 (B)	7/8" keyed (B)	axial	BA10V28 (K)	-	•	•	•	•	•	K031
101-2 (B-B)	1" keyed (B-B)	axial	BA10V45 (K)	-	-	•	•	•	•	K051
127-2 (C)	1-1/4" keyed (C)	axial	BA10V71 (K)	-	-	-	•	•	•	K081
127-2 (C)	1-1/2" keyed (C)	radial	BA10V100 (K)	-	-	-	-	•	•	K381
152-4 (D)	1-3/4" keyed (D)	axial	BA10V140 (K)	-	-	-	-	-	•	K211
82-2 (A)	5/8" 9T (A)	axial	BA10V18 (U)	•	•	•	•	•	•	K01
82-2 (A)	3/4" 11T (A-B)	axial	BA10V18 (S,R), 10 (S)	•	•	•	•	•	•	K52
101-2 (B)	7/8" 13T (B)	axial	BA10V28 (S,R), 45 (U,W)	-	•	•	•	•	•	K68/K02
101-2 (B)	1" 15T (B-B)	axial	BA10V45 (S,R), 60 (U,W)	-	-	•	•	•	•	K04
127-2 (C)	1-1/4" 14T (C)	axial	BA10V71 (S,R), 100 (U,W)	-	-	-	•	•	•	K07/K15
127-2 (C)	1-1/2" 17T (C-C)	axial	BA10V100 (S,R) 85 (S)	-	-	-	-	•	•	K24
152-4 (D)	1-3/4" 13T (D)	axial	BA10V140 (S,R)	-	-	-	-	-	•	K17

Service Ports

(Pressure port B and Suction port S)

	18	28	45	71	100	140	
Rear ports, UNC mounting screws		•	•	•	•	-	61
Opposite side ports, UNC mounting screws	•	•	•	•	•	•	62
Rear ports, metric mounting screws		•	•	•	-	-	11
Opposite side ports, metric mounting screws		•	•	•	•	•	12
Rear ports, UNC mounting screws		-	•	•	-	-	91
Opposite side ports, UNC mounting screws		-	-	•	-	-	92
Rear ports, metric mounting screws				•		-	41
Opposite side ports, metric mounting screws		-	-	•	-	-	42

Mounting Flange

	18	28	45	71	100	140	
SAE 2 hole	•	•	•	•	•	-	C
ISO 2 hole	-	•	•	•	•	-	A
SAE 4 hole	-	-	-	-	-	•	D

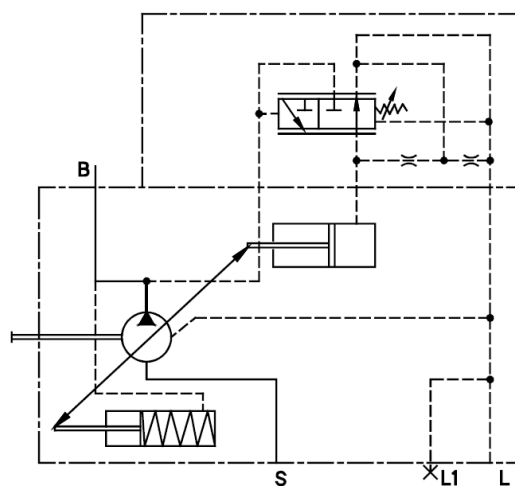
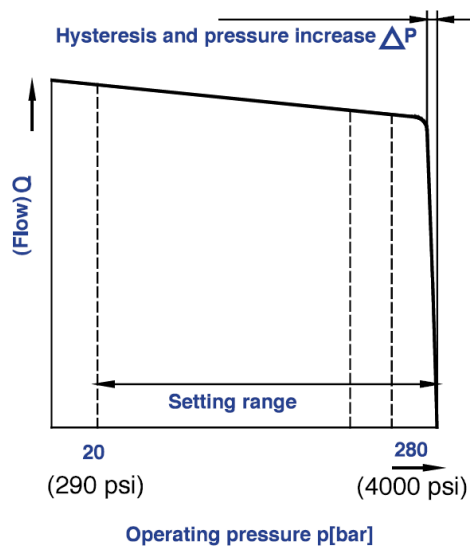


DR Pressure Control

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 may be smoothly set at the pilot valve.

Static characteristic
(at $n_1 = 1450\text{rpm}$; $t_{oil} = 50^\circ\text{C}$) 122°F



Ports

B	Pressure port
S	Suction port
L, L1	Case drain ports (L1 sealed)

CONTROL DATA

Hysteresis and repetitive accuracy Δpmax. 3 bar (45 psi)

Size		18	28	45	71	100	140
Δp	Bar (psi)	4 (58)	4(58)	6(87)	8(116)	10(145)	12(174)

Pilot oil consumption.....max. approx. 3 L/min (0.8 gpm)

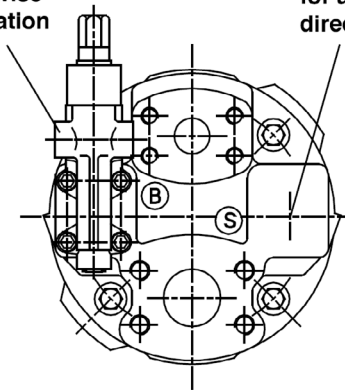


UNIT DIMENSIONS DR

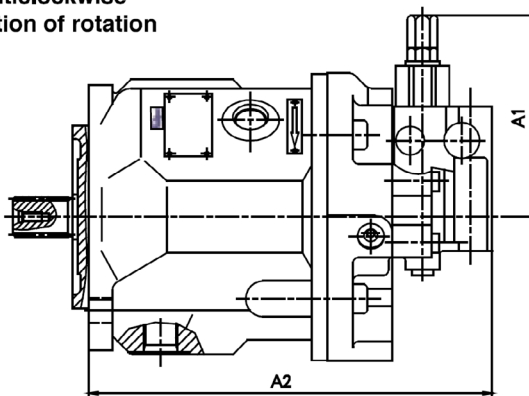
Service Ports at Rear; Models 61N00 and 11N00

Sizes 18 to 140

Mounting of pilot valve for clockwise direction of rotation



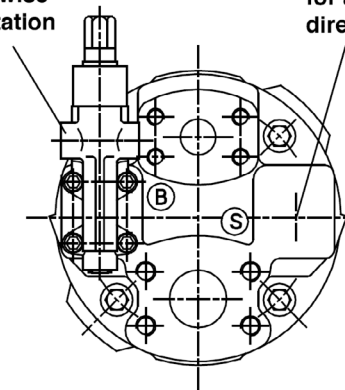
Mounting of pilot valve for anticlockwise direction of rotation



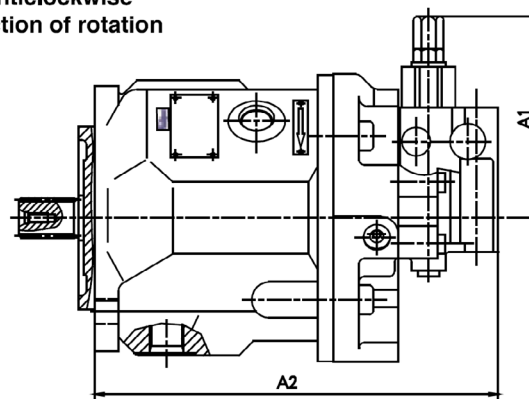
Service Ports at Rear; Models 62N00 and 12N00

Sizes 18 to 140

Mounting of pilot valve for clockwise direction of rotation



Mounting of pilot valve for anticlockwise direction of rotation



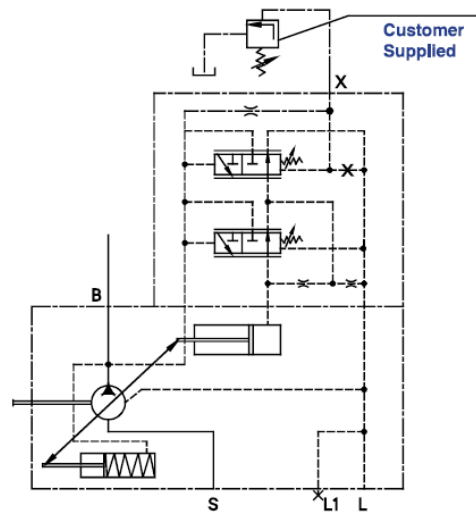
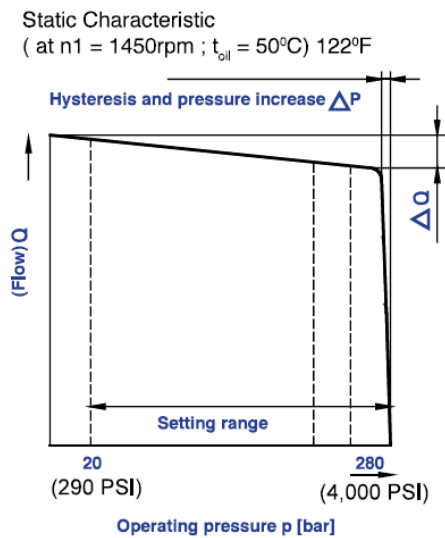
Sizes	A1 mm (in)	A2 mm (in)	A3 mm (in)	A4 mm (in)
18	110 (4.33")	-	105 (4.13")	126 (4.96")
28	108.5 (4.27")	226.2 (8.91")	108.5 (4.27")	136 (5.35")
45	108.5 (4.27")	245 (9.65")	108.5 (4.27")	146 (5.75")
71	106 (4.17")	279 (10.98")	108.5 (4.27")	160 (6.3")
100	108.5 (4.27")	344 (13.54")	108.5 (4.27")	158 (6.22")
140	126 (4.964")	-	127 (5.0")	169 (6.65")



DRG Pressure/ Remote Control

A pressure relief valve may be externally piped to port X for remote control purposes. It is not, however, included with DRG control.

The differential pressure at the pilot valve is set as standard to 20 bar (290 psi) and this results in a pilot flow of (0.4gpm) 1.5 L/min. If another setting is required (in the range 10-22 bar), please state this in clear text.



Ports

B	Pressure port
S	Suction port
L, L1	Case drain ports (L1 sealed)
X	Pilot pressure port

CONTROL DATA

Hysteresis and repetitive accuracy Δpmax. 3 bar (45 psi)

Max. pressure increases

Size		18	28	45	71	100	140
Δp	Bar (psi)	4 (58)	4(58)	6(87)	8(116)	10(145)	12(174)

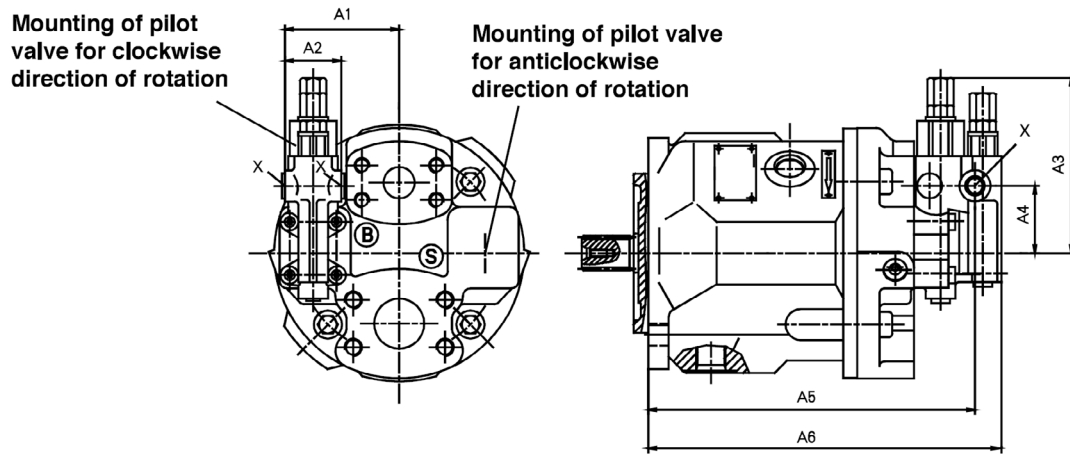
Pilot oil consumption.....max. approx. 4.5 L/min (1.19 gpm)



UNIT DIMENSIONS DRG

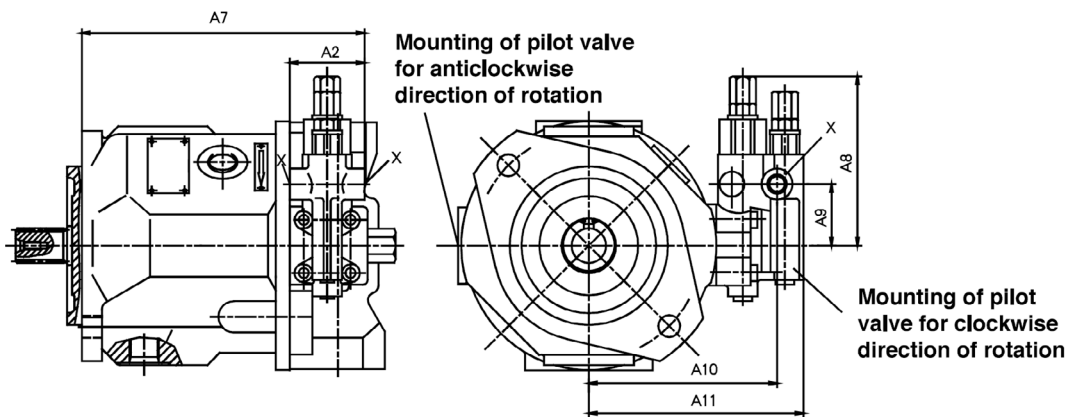
Service Ports at Rear; Models 61N00 and 11N00

Sizes 18 to 140



Service Ports at Rear; Models 62N00 and 12N00

Sizes 18 to 140



Sizes mm(in)	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	X
18	-	36 (1.42)	-	-	-	-	166 (6.54)	105 (4.13)	40 (1.57)	109 (4.29)	126 (4.96)	7/16-20UNF-2B
28	73 (2.87)	36 (1.42)	108.5 (4.27)	43 (1.69)	209.2 (8.9)	226.2 (8.9)	176 (6.9)	108.5 (4.27)	40 (1.57)	119 (4.69)	136 (5.35)	7/16-20UNF-2B
45	82 (3.21)	36 (1.42)	108.5 (4.27)	40 (1.57)	229 (8.98)	245 (9.56)	191 (7.5)	108.5 (4.27)	40 (1.57)	129 (5.08)	146 (5.75)	7/16-20UNF-2B
71	91 (3.60)	36 (1.42)	106 (4.17)	42 (1.65)	262 (10.31)	279 (10.98)	219 (8.6)	108.5 (4.27)	40 (1.57)	143 (5.63)	160 (6.30)	7/16-20UNF-2B
100	96.3 (3.79)	36 (1.42)	108.5 (4.27)	40 (1.57)	327 (12.87)	344 (13.54)	287 (11.3)	108.5 (4.27)	40 (1.57)	141 (5.55)	158 (6.22)	7/16-20UNF-2B
140	140 (5.51)	36 (1.42)	-	27 (1.06)	353 (13.9)	379 (14.92)	258 (10.16)	127 (5.0)	27 (1.06)	183 (7.2)	209 (8.23)	9/16-18UNF-2B



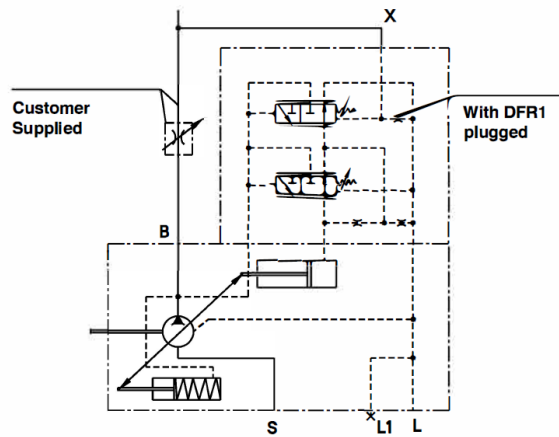
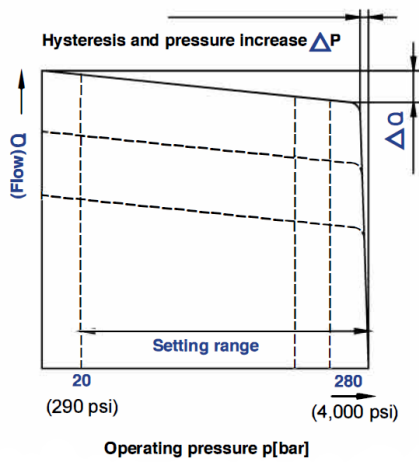
DFR/DFR1 Pressure/ Flow Control

In addition to the pressure control function, the pump flow may be varied by means of a differential pressure at the actuator (e.g. an orifice).

In model DFR1 the X orifice is plugged.

Static Characteristic

(at $n_1 = 1450\text{rpm}$; $t_{oil} = 500\text{C}$) 1220F



Ports

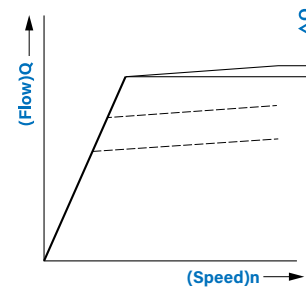
B	Pressure port
S	Suction port
L, L1	Case drain ports (L1 sealed)
X	Pilot pressure port

Flow Control / Differential Pressure Δp

Standard setting: 14 bar (203psi). If a different setting is required, please state in clear text.

When port X is unloaded to tank, a zero stroke pressure ("stand by") of $p = 18 \pm 2$ bar (260 \pm 30 psi) results.

Static characteristic at variable speed



CONTROL DATA

For pressure control technical data see DR Pressure control

Max. flow deviation (hysteresis and increase) measured at drive speed $n = 1450$ rpm

Size	18	28	45	71	100	140
▲ Qmax (gpm) L/min	0.9 (0.24)	1.0 (0.26)	1.8 (0.48)	2.0 (0.74)	4.0 (1.06)	6.0 (1.6)

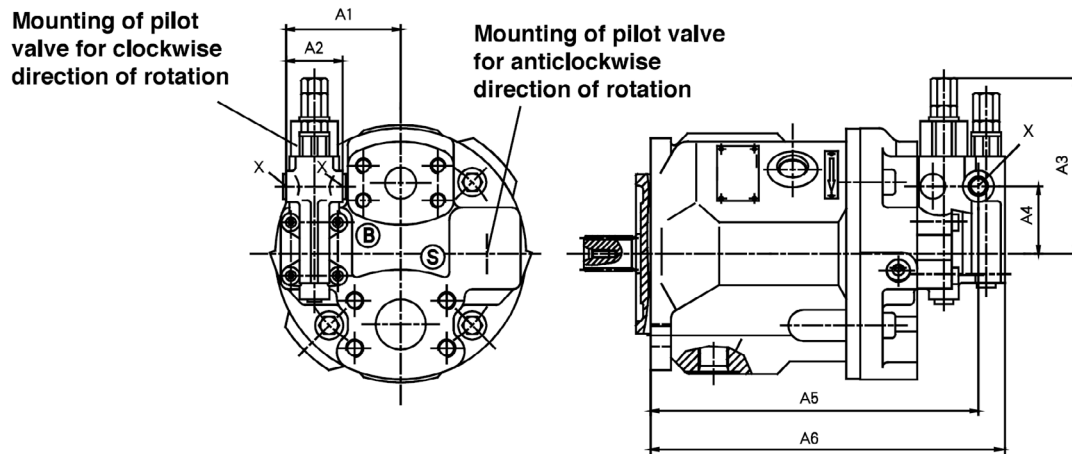
Pilot oil consumption DFR.....max. approx. 3-4, 5 L/min (0.70-1.19 gpm)

Pilot oil consumption DFR1.....max. approx. 3 L/min (0.70 gpm)

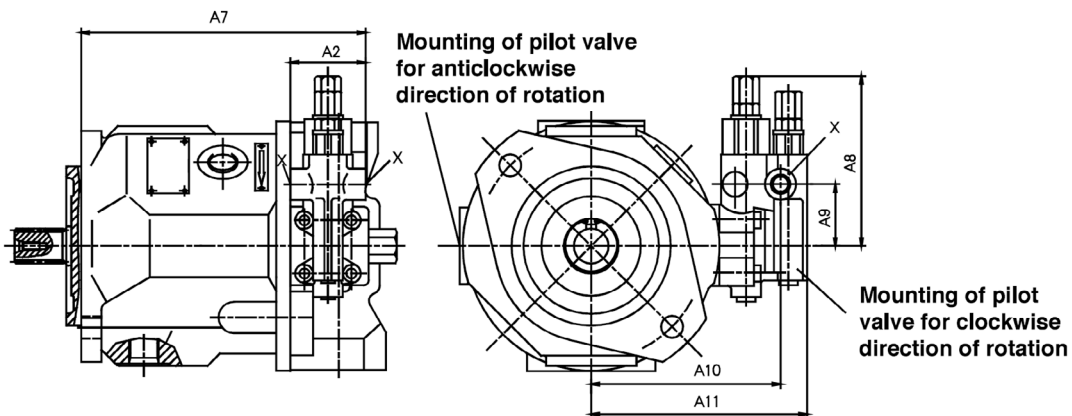


UNIT DIMENSIONS DFR/DFR1
Service Ports at Rear; Models 61N00 and 11N00

Sizes 18 to 140


Service Ports at Rear; Models 62N00 and 12N00

Sizes 18 to 140



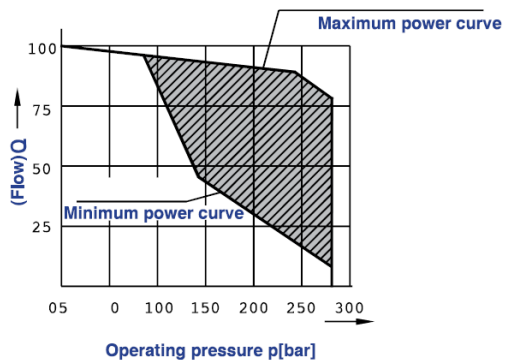
Sizes mm(in)	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	X
18	-	36 (1.42)	-	-	-	-	166 (6.54)	105 (4.13)	40 (1.57)	109 (4.29)	126 (4.96)	7/16-20UNF-2B
28	73 (2.87)	36 (1.42)	108.5 (4.27)	43 (1.69)	209.2 (8.9)	226.2 (8.9)	176 (6.9)	108.5 (4.27)	40 (1.57)	119 (4.69)	136 (5.35)	7/16-20UNF-2B
45	82 (3.21)	36 (1.42)	108.5 (4.27)	40 (1.57)	229 (8.98)	245 (9.56)	191 (7.5)	108.5 (4.27)	40 (1.57)	129 (5.08)	146 (5.75)	7/16-20UNF-2B
71	91 (3.60)	36 (1.42)	106 (4.17)	42 (1.65)	262 (10.31)	279 (10.98)	219 (8.6)	108.5 (4.27)	40 (1.57)	143 (5.63)	160 (6.30)	7/16-20UNF-2B
100	96.3 (3.79)	36 (1.42)	108.5 (4.27)	40 (1.57)	327 (12.87)	344 (13.54)	287 (11.3)	108.5 (4.27)	40 (1.57)	141 (5.55)	158 (6.22)	7/16-20UNF-2B
140	140 (5.51)	36 (1.42)	-	27 (1.06)	353 (13.9)	379 (14.92)	258 (10.16)	127 (5.0)	27 (1.06)	183 (7.2)	209 (8.23)	9/16-18UNF-2B



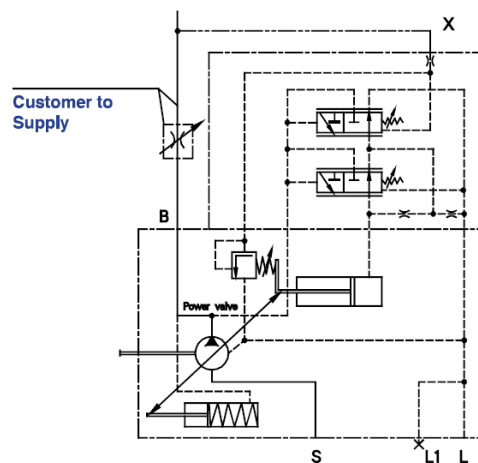
DFLR Pressure/Flow/ Power Control

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 remain constant.

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



The power characteristics is factory - set, so please enter details in clear text, e.g. 20kW at 1450 rpm (5HP, 1800RPM).



Ports

B	Pressure port
S	Suction port
L, L1	Case drain ports (L1 sealed)
X	Pilot pressure port

CONTROL DATA

For pressure control technical data see DR Pressure control
For flow control technical data see DFR control

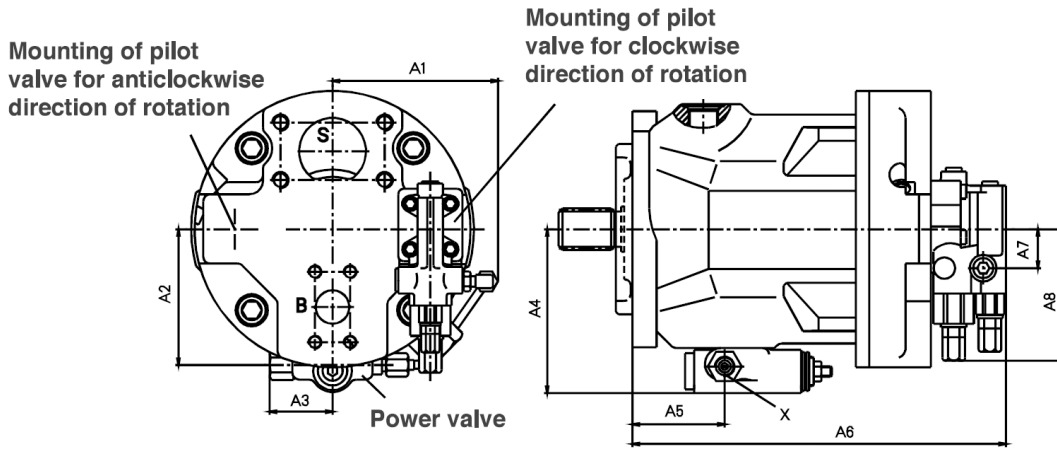
Start of control.....from 80 bar (1,160 psi)
Pilot oil consumption.....max. approx. 5.5 L/min (1.45 gpm)



UNIT DIMENSIONS DFLR

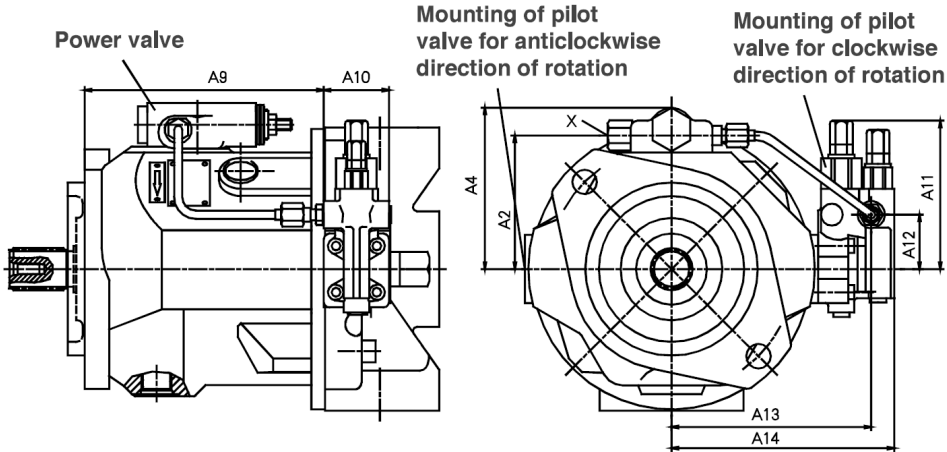
Service Ports at Rear; Models 61N00 and 11N00

Sizes 18 to 140



Service Ports on Side; Models 62N00 and 12N00

Sizes 18 to 140



Sizes mm(in)	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	X
28	120 (4.72)	87 (3.44)	47 (1.9)	108.5 (4.27)	48 (1.89)	226.2 (8.9)	43 (1.69)	108.5 (4.27)	140 (5.51)	36 (1.42)	108.5 (4.27)	40 (1.57)	119 (4.69)	136 (5.35)	7/16-20UNF-2B x 0.39H
45	129 (5.08)	92.8 (3.65)	47 (1.9)	112.5 (4.43)	55 (2.17)	245 (9.56)	40 (1.57)	108.5 (4.27)	155 (6.10)	36 (1.42)	108.5 (4.27)	40 (1.57)	129 (5.08)	146 (5.75)	7/16-20UNF-2B x 0.39H
71	139 (5.47)	103.5 (4.07)	47 (1.9)	124 (4.88)	69 (2.72)	279 (10.98)	42 (1.65)	106 (4.17)	218.8 (8.61)	36 (1.42)	108.5 (4.27)	40 (1.57)	143 (5.63)	160 (6.30)	7/16-20UNF-2B x 0.39H
100	145 (5.71)	112.6 (4.43)	47 (1.9)	132.5 (5.22)	110.8 (4.36)	344 (13.54)	40 (1.57)	108.5 (4.27)	250 (9.84)	36 (1.42)	108.5 (4.27)	40 (1.57)	148 (5.83)	165 (6.50)	M14 x 1.5-6H
140	148 (5.83)	140 (5.51)	-	140 (5.51)	99 (3.90)	379 (14.92)	209 (8.23)	183 (7.2)	-	-	127 (5.00)	27 (1.06)	183 (7.29)	209 (8.23)	9/16-18UNF-2B x 0.51H

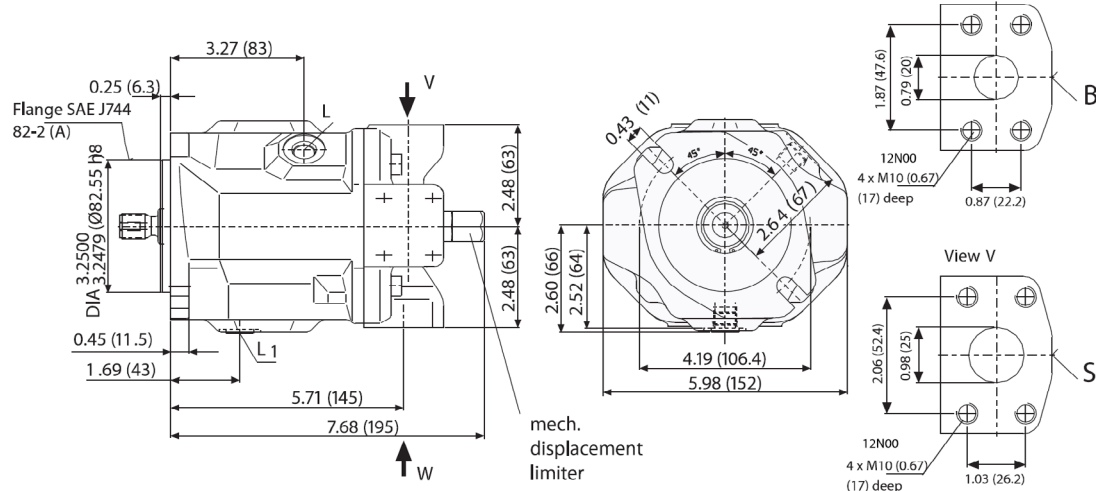


Mounting Dimensions

Size 18, Series 31

Service Ports on Side; Non Through Drive, Models 62N00 and 12N00 without considering adjustment

BA10VSO 18, Service ports on side, Models 62N00 & 12N00



Shaft End

Shaft Type	Keyway	Key Dimensions	Other Dimensions
K Parallel with key	ISO 3019-1 19-1	0.1884, 0.1874, 4.76 (+0.025)	0.83 (21.1), DIA 0.7500 (Ø19.05 -0.02), 1.13 (28.6), 0.10 (2.5), 1.30 (33), 1.61 (41)
R Splined shaft 3/4 in 11T	16/32 DP ²⁾	SAE J744-19-4 (A-B)	0.63 (16), 0.55 (14), 1.50 (38), DIA 3/4 in, 1/4-20UNC-2B, usable spline length
S Splined shaft 3/4 in 11T	16/32 DP ²⁾	SAE J744-19-4 (A-B)	Ø 3/4 in, 1/4-20UNC-2B, 0.87 (22), 1.18 (30), 1.50 (38)
U Splined shaft 5/8 in 9T	16/32 DP ²⁾	SAE J744-16-4 (A)	Centering ³⁾ R3.15x6.7 DIN332, Ø 5/8", 0.62 (15.8), 0.94 (23.8), 1.25 (31.8)

2) ANSI B92.1a-1976, 30° pressure angle, flat root side fit, flank centering, tolerance class 5.

Ports

Designation	Port for	Standard	Size	Peak Pressure [psi (bar)]	Tightening Torque Max [lb-ft (Nm)]
B	Pressure port (standard pressure range) Threading in bolt holes	SAE J518 ISO 68	3/4 in 3/8-16 UNC-2B; 0.79 (20) deep	5100 (350)	29 (40)
S	Inlet (standard pressure range) Threading in bolt holes	SAE J518 ISO 68	1 in 3/8-15 UNC-2B; 0.79 (20) deep	75 (5)	29 (40)
L, L ₁	Case drain (L ₁ plugged)	ISO 11926	9/16-18 UNF-2B	30 (2)	59 (80)
X	Pilot Pressure	ISO 19926	7/16-20 UNF-2B; 0.39 (10) deep	5100 (350)	29 (40)
X	Control pressure for DG control	DIN 3852	R 1/4 in	1740 (120)	48 (70)

1) Dependent on the installation position, port L or L₁, must be connected



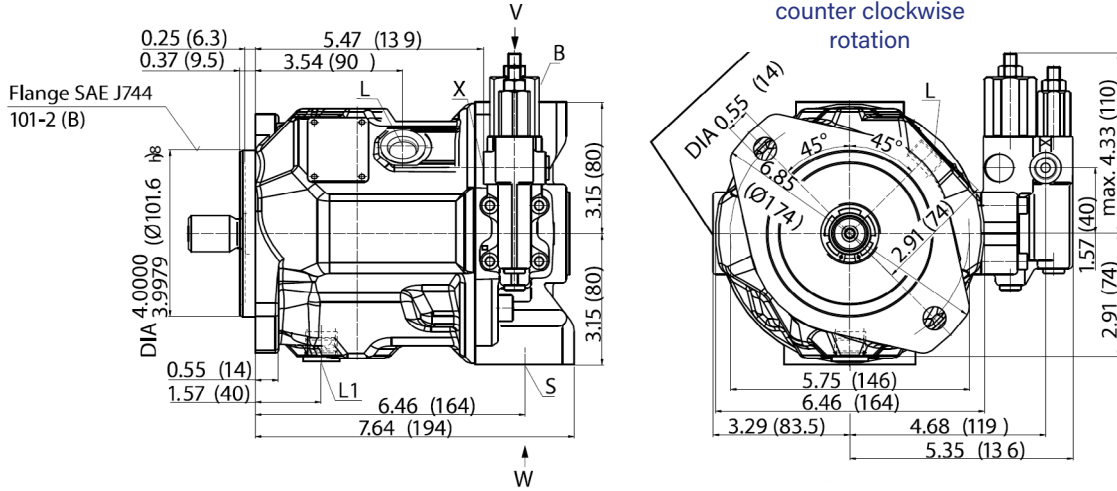
Mounting Dimensions

Size 28, Series 31

Service Ports on Side; Non Through Drive without considering adjustment

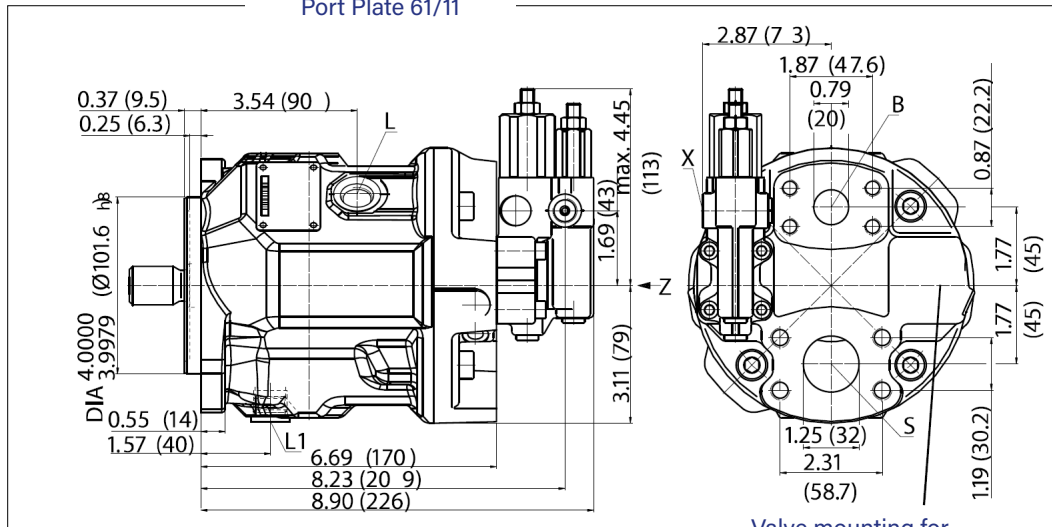
Port Plate 62/12

Valve mounting for counter clockwise rotation



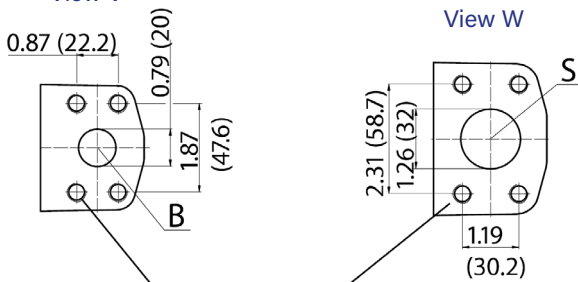
Port Plate 61/11

Valve mounting for counter clockwise rotation



View V

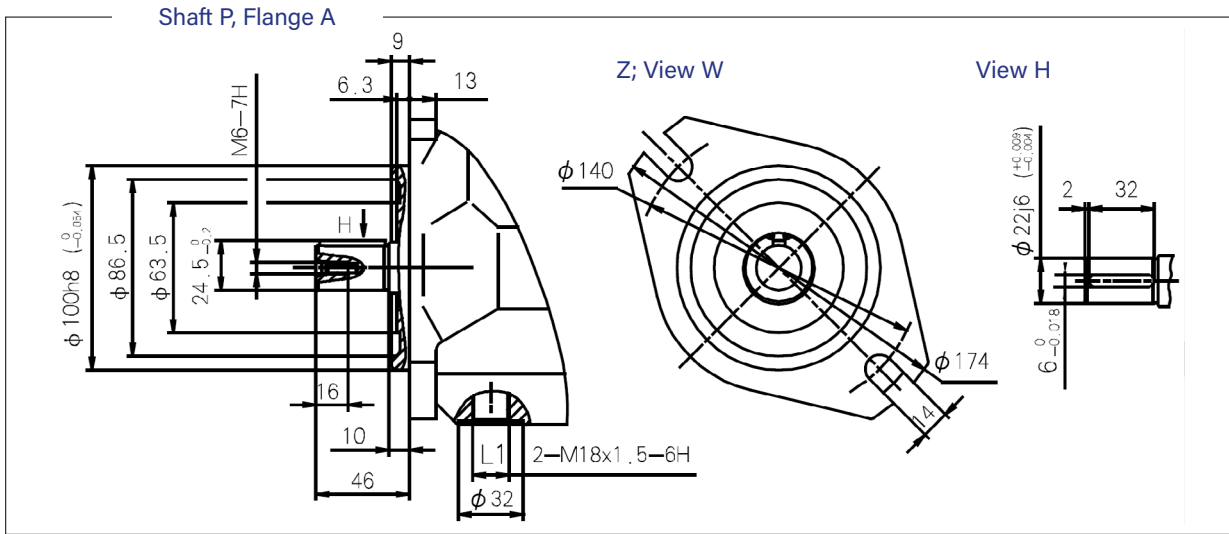
View W



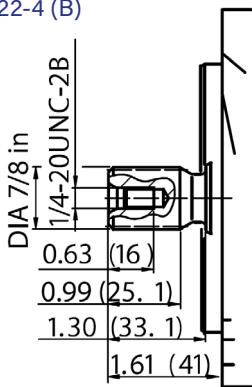
11/12N00 threads,
M10; 17 deep



BA10V28 Shaft, Metric Mount, and Port Dimensions
without considering adjustment

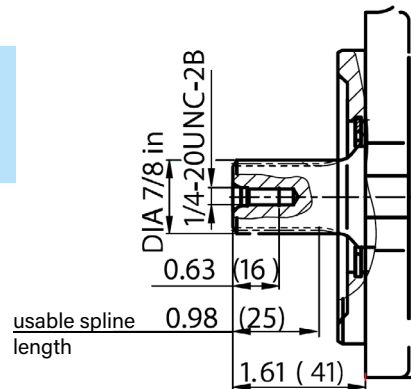


S Splined shaft 7/8 in 13T 16/32 DP SAE J744-22-4 (B)



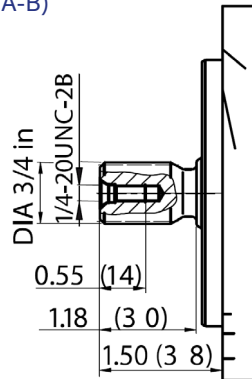
1) ANSI B92.1a-1976, 30° pressure angle, flat root sidefit, flank centering, tolerance class 5

R Splined shaft 7/8 in 13T 16/32 DP

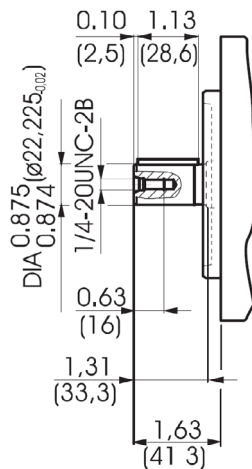
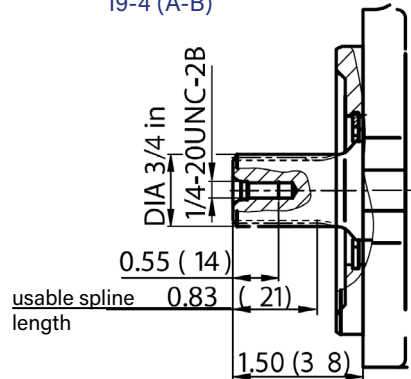


K Parallel with key ISO 3019-1 22-1

U Splined shaft 3/4 in 11T 16/32 DP SAE J744-19-4 (A-B)



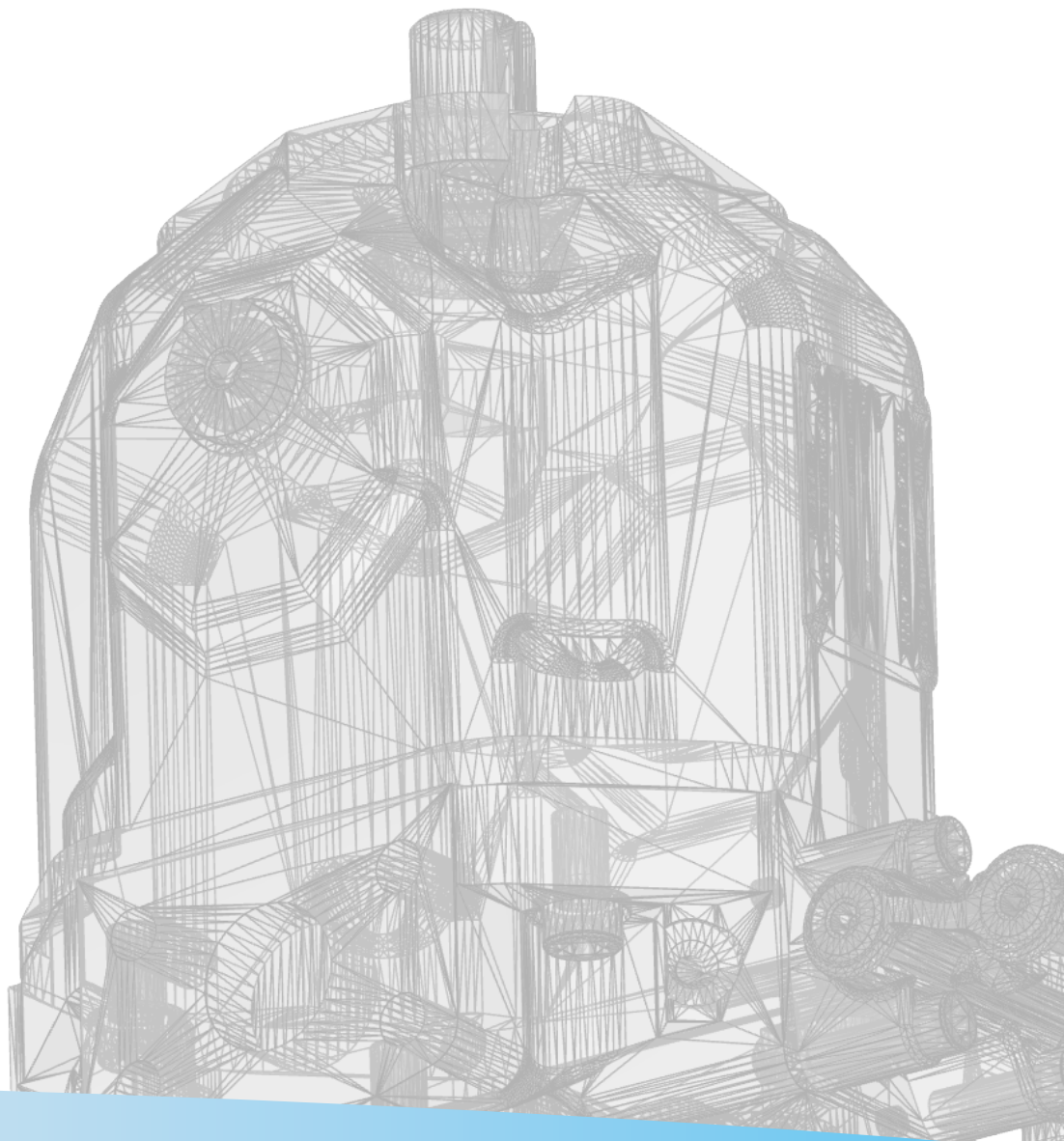
W Splined shaft 3/4 in 11T 16/32 DP SAE J744-19-4 (A-B)



Ports BA10V28

Designation	Port for	Standard	Size	Peak Pressure [psi (bar)]	Tightening Torque Max [lb-ft (Nm)]	State
B	Service Line (standard pressure range) Fixing thread	SAE J518 ISO 68	3/4 in 3/8-16 UNC-2B; 0.79 (20) deep	5100 (350)	29 (40)	O
S	Inlet (standard pressure range) Fixing thread	SAE J518 ISO 68	1 1/4 in 7/16-14 UNC-2B; 0.94 (24) deep	75 (5)	48 (85)	O
L, L ₁	Case drain (L ₁ plugged)	ISO 11926	3/4-16 UNF-2B; 0.47 (12) deep	30 (2)	118 (160)	O ¹⁾
X	Pilot Pressure	ISO 11926	7/16-20 UNC-2B; 0.47 (12) deep	5100 (350)	29 (40)	O
X	Control pressure for DG control	DIN 3852	R 1/4 in	1740 (120)	48 (70)	O

1) Dependent on the installation position, port L or L₁, must be connected
 O= Must be connected

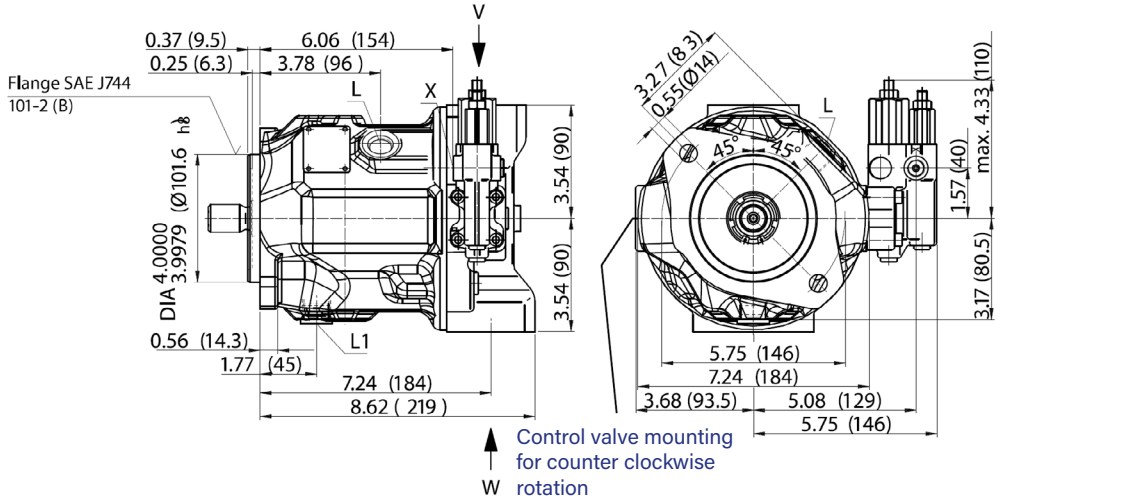


Mounting Dimensions

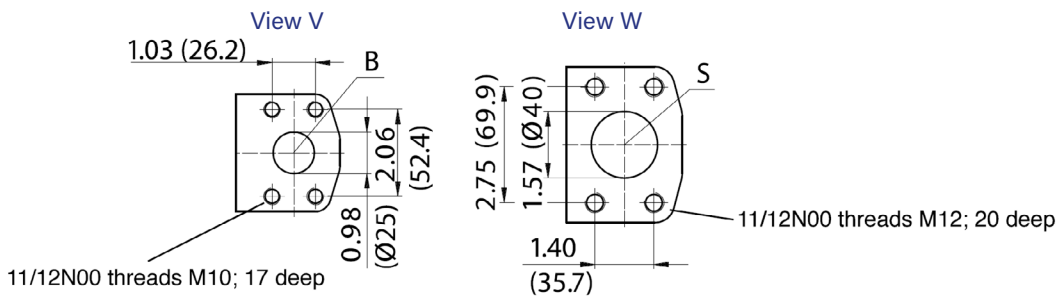
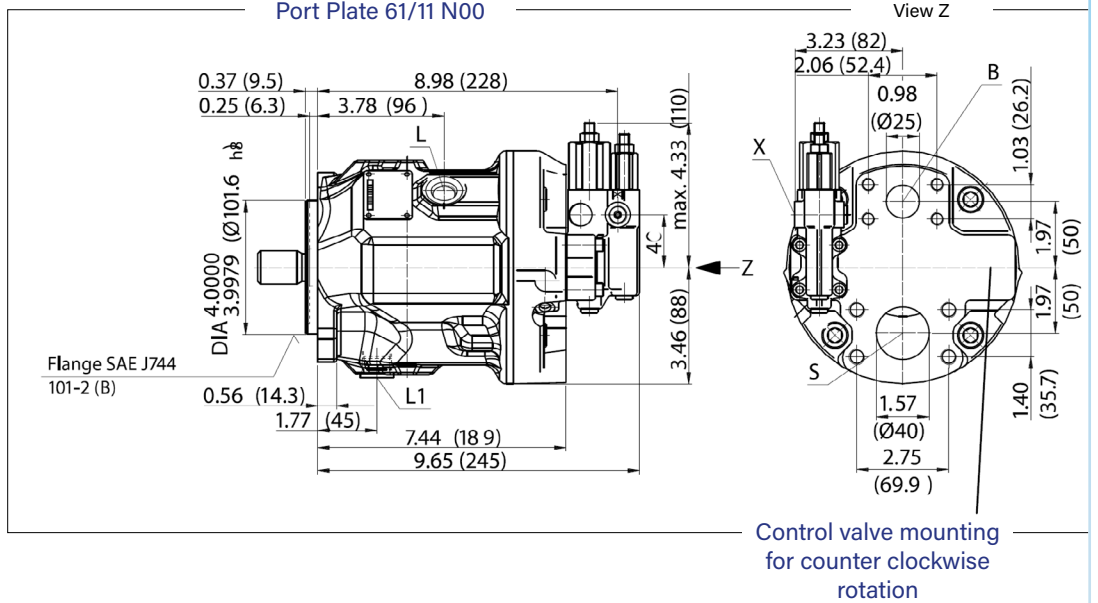
Size 45, Series 31

Service Ports at Side and Rear; Non Through Drive
without considering adjustment

Port Plate 62/12 N00

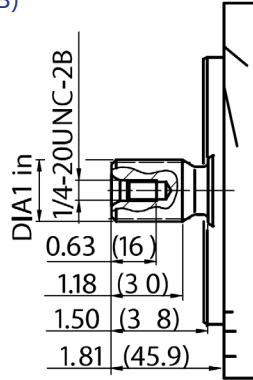


Port Plate 61/11 N00

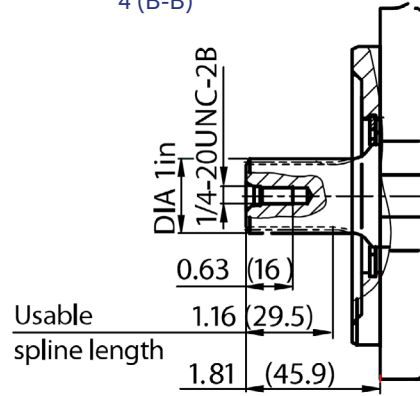


B10V45 Shaft, Metric Mount, and Port Dimensions
without considering adjustment

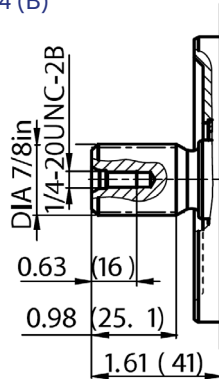
S Splined shaft 1 in 15T
16/32 DP SAE J744-25-4 (B-B) 1)



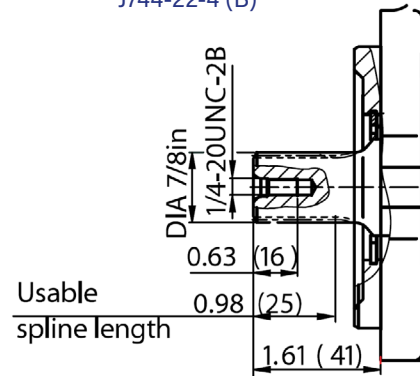
R Splined shaft 1 in 15T
16/32 DP SAE J744-25-4 (B-B) 1)



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

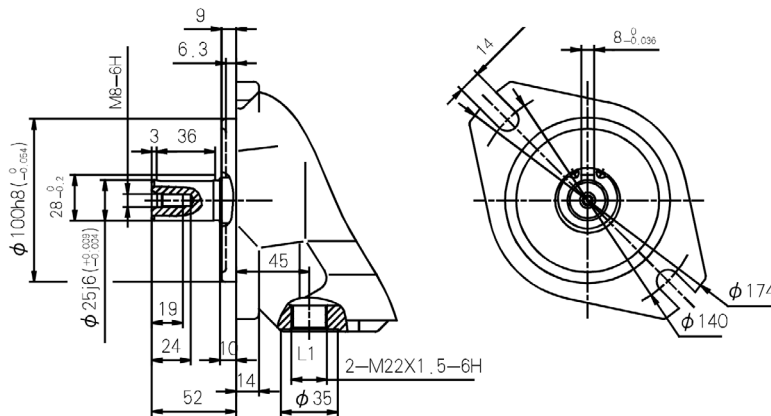


W Splined shaft 7/8
in 13T 16/32 DP SAE
J744-22-4 (B) 1)

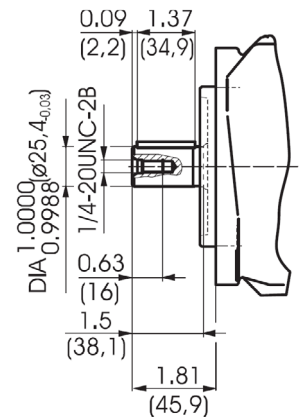


2) ANSI B92.1a-1976,
30° pressure angle,
flat root sidefit, flank
centering, tolerance
class 5

Shaft P, ISO Flange A
25mm ø Shaft



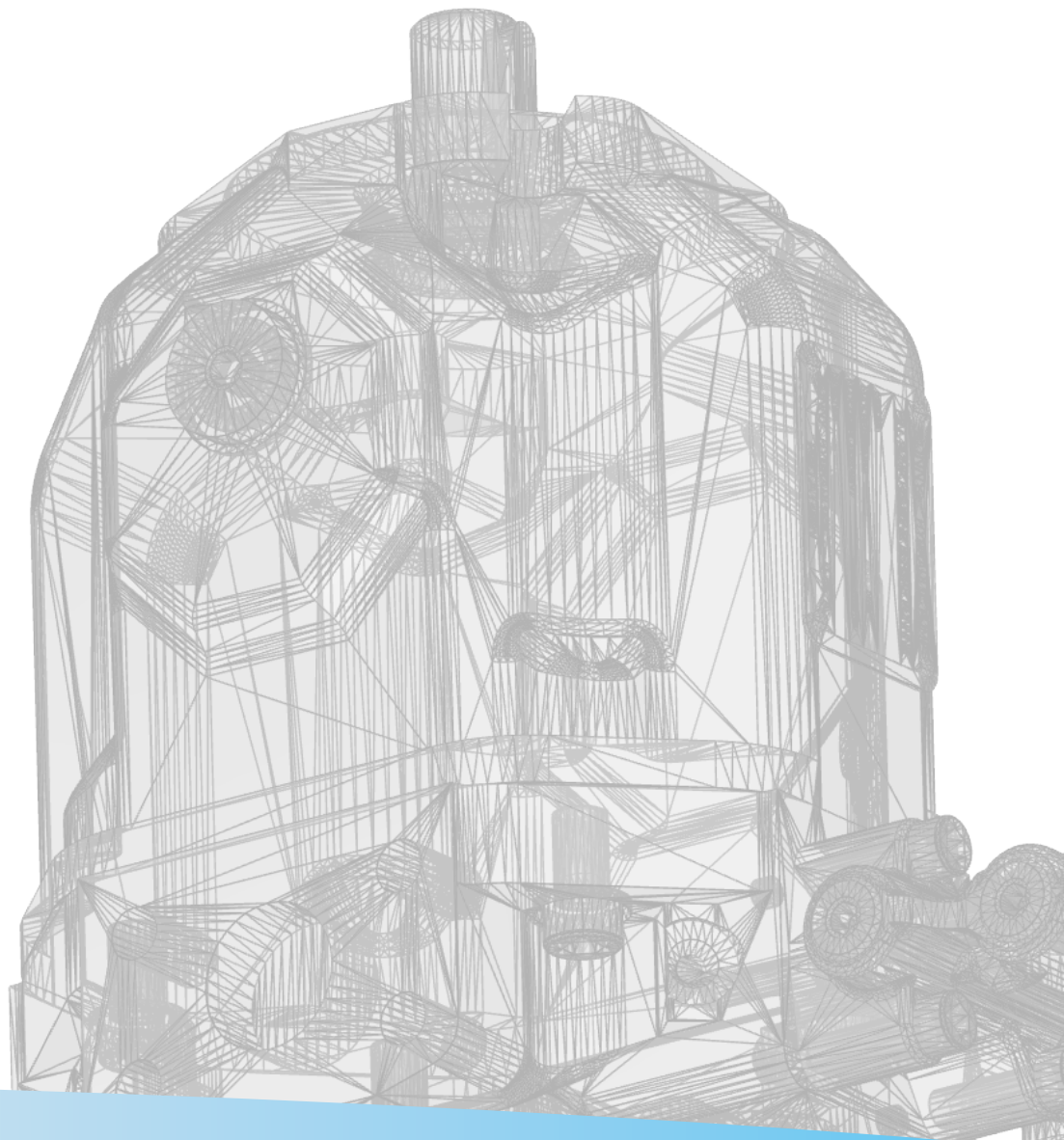
K Parallel with key
ISO 3019-1 25-1



Ports BA10V45

Designation	Port for	Standard	Size	Peak Pressure [psi (bar)]	Tightening Torque Max [lb-ft (Nm)]	State
B	Service Line (standard pressure range) Fixing thread	SAE J518 ISO 68	1 in 3/8-16 UNC-2B; 0.71 (17) deep	5100 (350)	29 (40)	O
S	Inlet (standard pressure range) Fixing thread	SAE J518 ISO 68	1 1/2 in 1/2-13 UNC-2N; 0.87 (22) deep	75 (5)	66 (90)	O
L, L ₁	Case drain	ISO 11926	7/8-14 UNF-2B	30 (2)	177 (240)	O ¹⁾
X	Pilot Pressure	ISO 11926	7/16-20 UNF-2B; 0.39 (10) deep	5100 (350)	29 (40)	O
X	Control pressure for DG control	DIN 3852	R 1/4 in	1740 (120)	48 (70)	O

1) Dependent on the installation position, port L or L₁, must be connected
 O= Must be connected



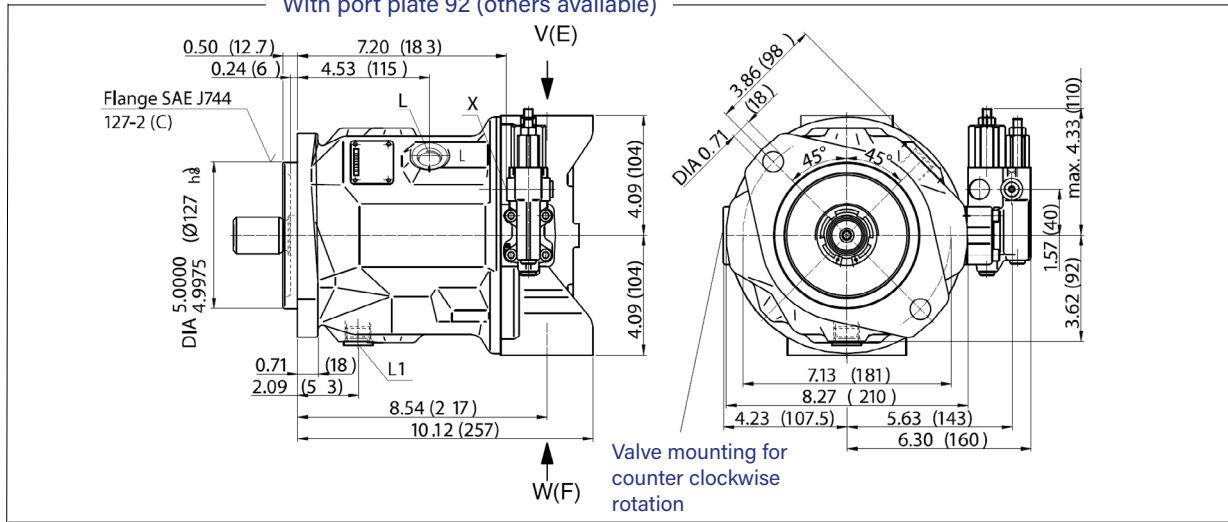
Mounting Dimensions

Size 71, Series 31

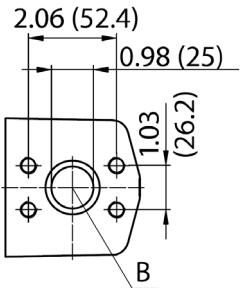
Service Ports at Side and Rear; Non Through Drive
without considering adjustment

DFR/DFR1 Pressure and flow control, clockwise rotation

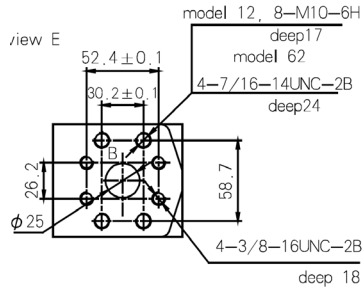
With port plate 92 (others available)



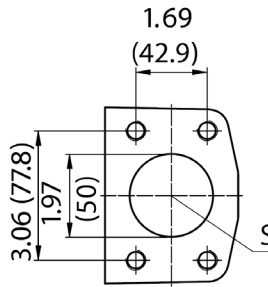
View W
Model 92



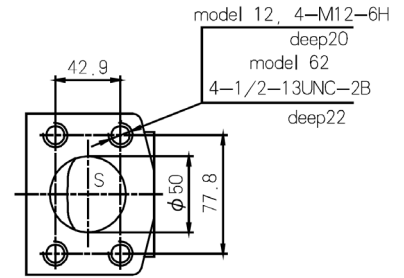
View E



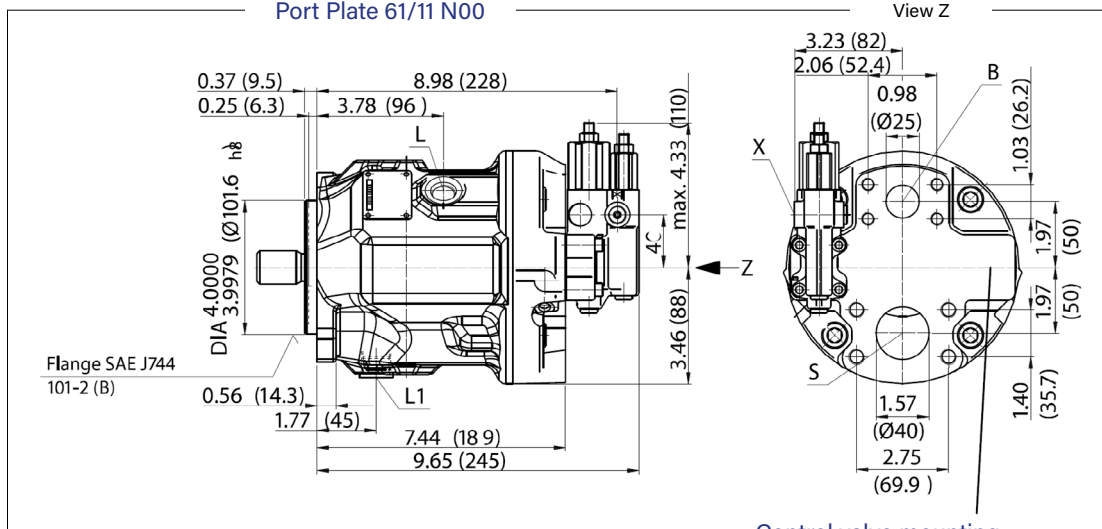
View V
Model 92



View F



Port Plate 61/11 N00

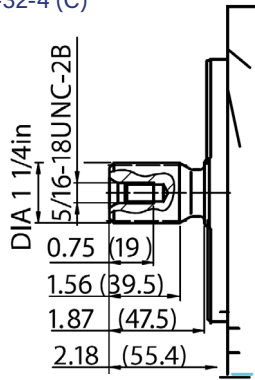


Control valve mounting
for counter clockwise
rotation

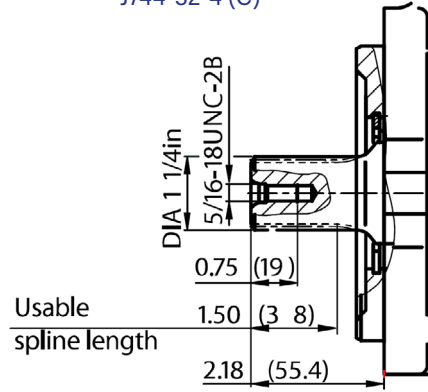


BA10V71 Shaft, Metric Mount, and Port Dimensions
without considering adjustment

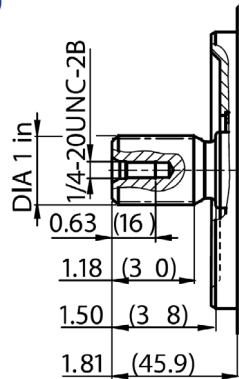
S Splined shaft 1 1/4 in 14T 12/24 DP SAE J744-32-4 (C) 2)



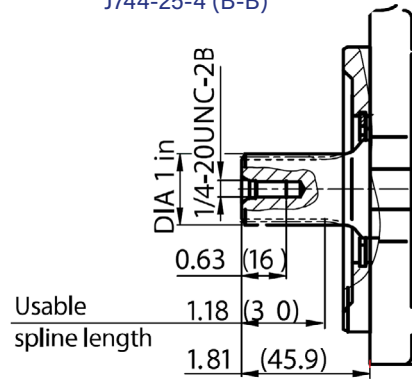
R Splined shaft 1 1/4 in 14T 12/24 DP SAE J744-32-4 (C) 2)



U Splined shaft 1 in 15T 16/32 DP SAE J744-25-4 (B-B) 2)

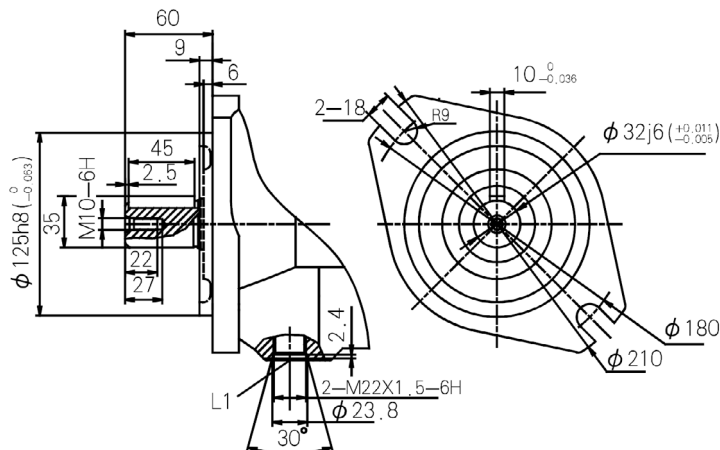


W Splined shaft 1 in 15T 16/32 DP SAE J744-25-4 (B-B) 2)

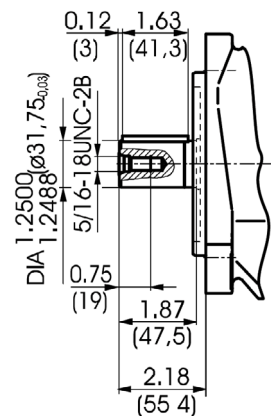


2) ANSI B92.1a-1976, 30° pressure angle, flat root sidefit, flank centering, tolerance class 5

Shaft P, ISO Flange A
32mm ø Shaft



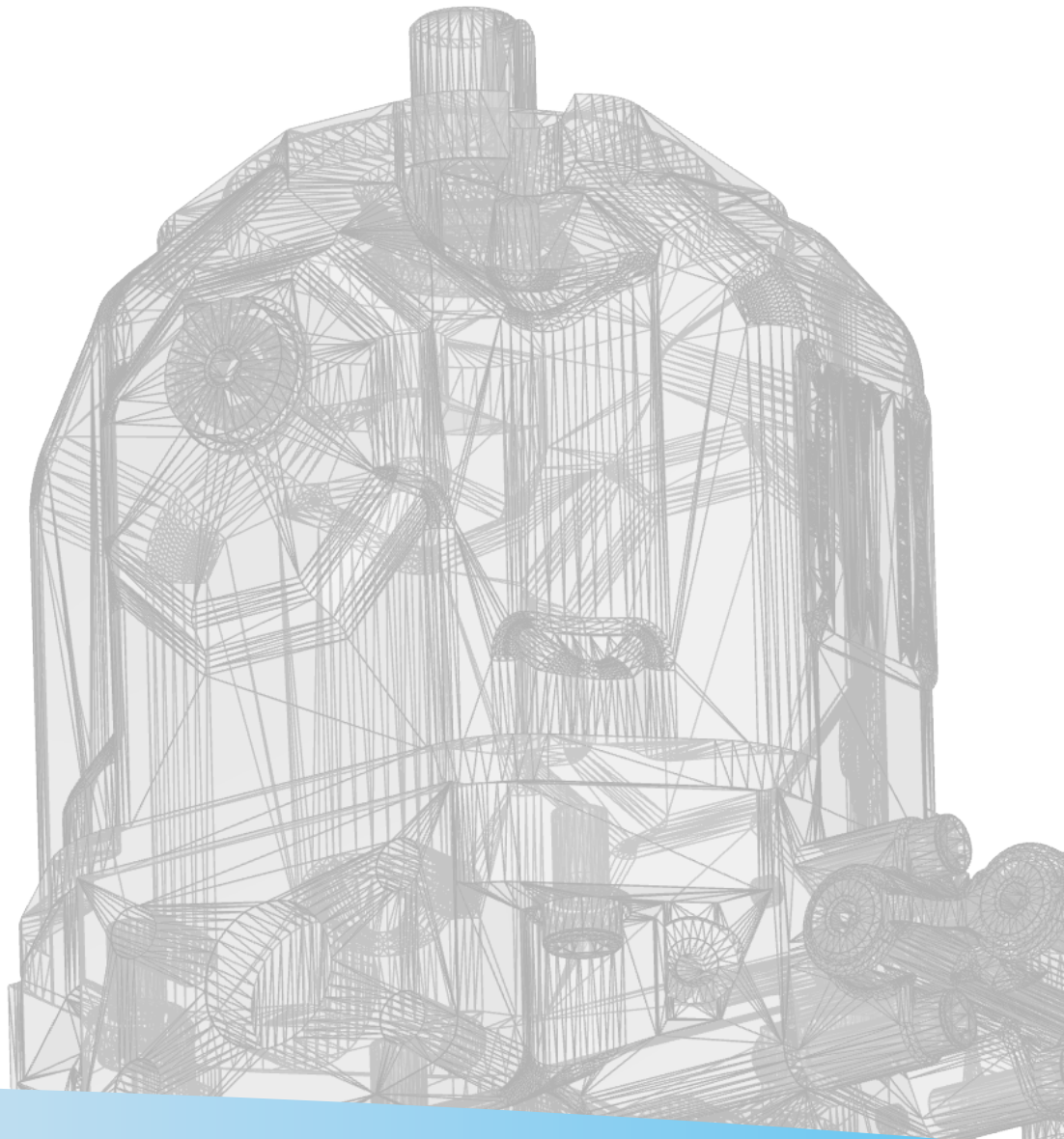
K Parallel with key
ISO 3019-1 32-1



Ports BA10V71

Designation	Port for	Standard	Size	Peak Pressure [psi (bar)]	Tightening Torque Max [lb-ft (Nm)]	State
B	Service Line (standard pressure range) Fixing thread	SAE J518 ISO 68	1 in 3/8-16 UNC-2B; 0.71 (18) deep	5100 (350)	29 (40)	O
S	Inlet (standard pressure range) Fixing thread	SAE J518 ISO 68	2 in 1/2-13 UNC-2B; 0.87 (22) deep	75 (5)	66 (90)	O
L, L ₁	Case drain	ISO 11926	7/8-14 UNF-2B	30 (2)	177 (240)	O ¹⁾
X	Pilot Pressure	ISO 11926	7/8-14 UNF-2B; 0.39 (10) deep	5100 (350)	29 (40)	O
X	Control pressure for DG control	DIN 3852	R 1/4 in	1740 (120)	48 (70)	O

1) Dependent on the installation position, port L or L₁, must be connected
 O= Must be connected



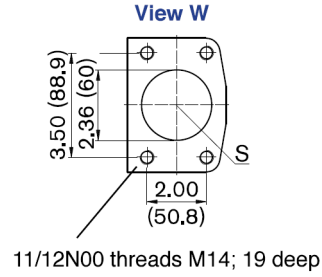
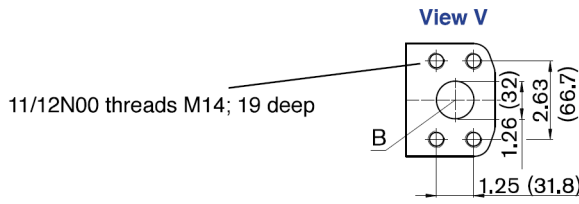
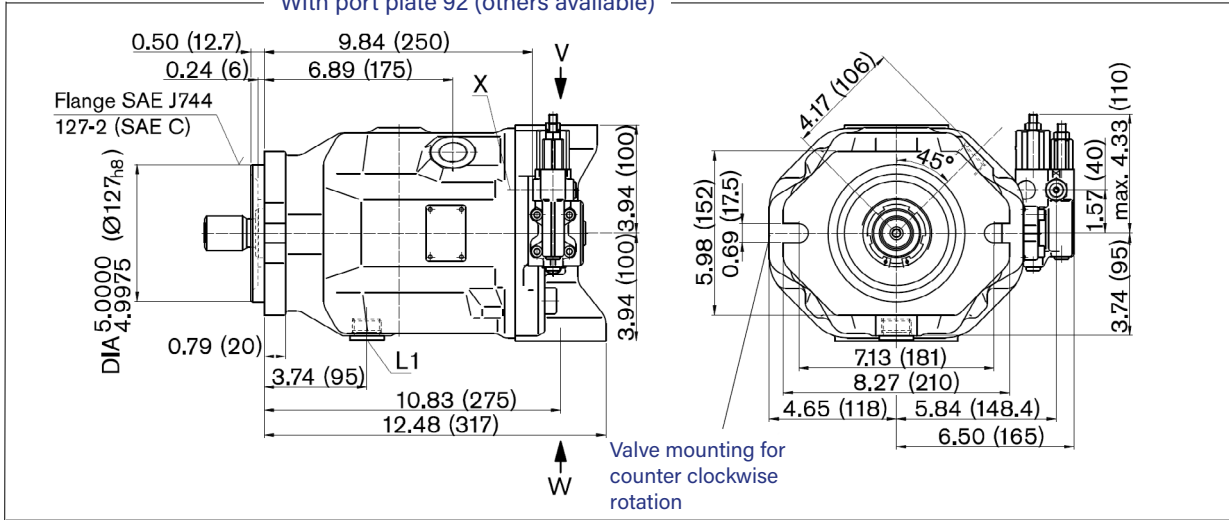
Mounting Dimensions

Size 100, Series 31

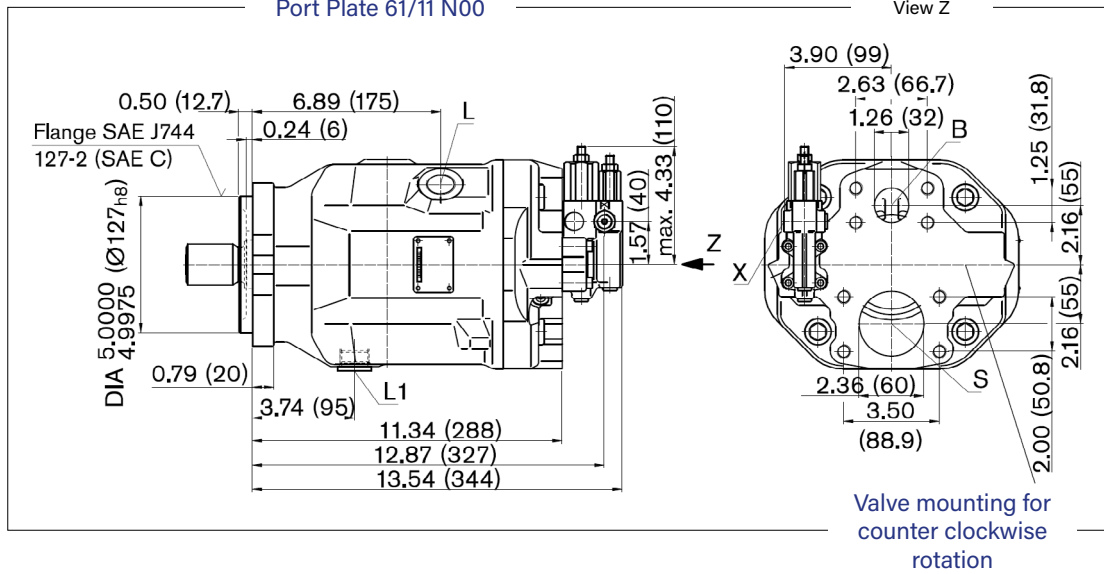
Service Ports at Side and Rear; Non Through Drive without considering adjustment

DFR/DFR1 Pressure and flow control, clockwise rotation

With port plate 92 (others available)

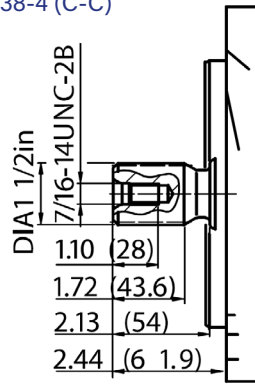


Port Plate 61/11 N00

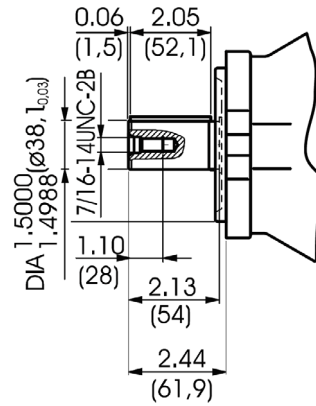


BA10V100 Shaft, Metric Mount, and Port Dimensions
without considering adjustment

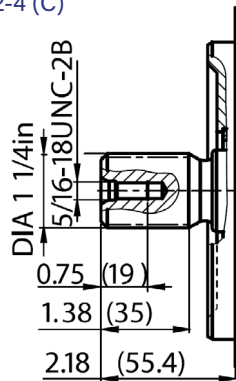
S Splined shaft 1/2 in
17T 12/24 DP1) SAE
J744-38-4 (C-C) 1)



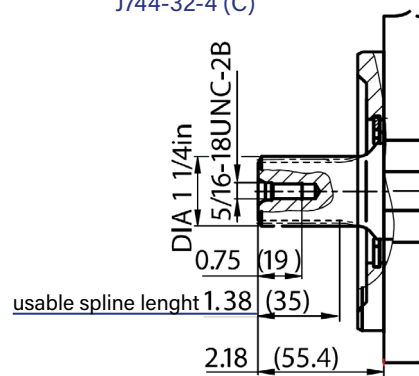
K Parallel with key
ISO 3019-1 38-1



U Splined shaft 1 1/4
in 14T 12/24 DP1) SAE
J744-32-4 (C) 1)

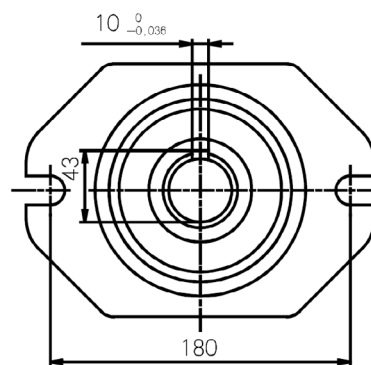
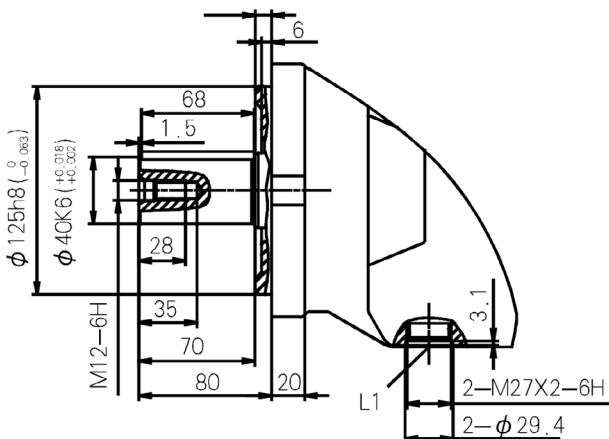


W Splined shaft 1 1/4
14T 12/24 DP1) SAE
J744-32-4 (C) 1)



1) ANSI B92.1a-1976,
30° pressure angle,
flat root sidefit, flank
centering, tolerance
class 5

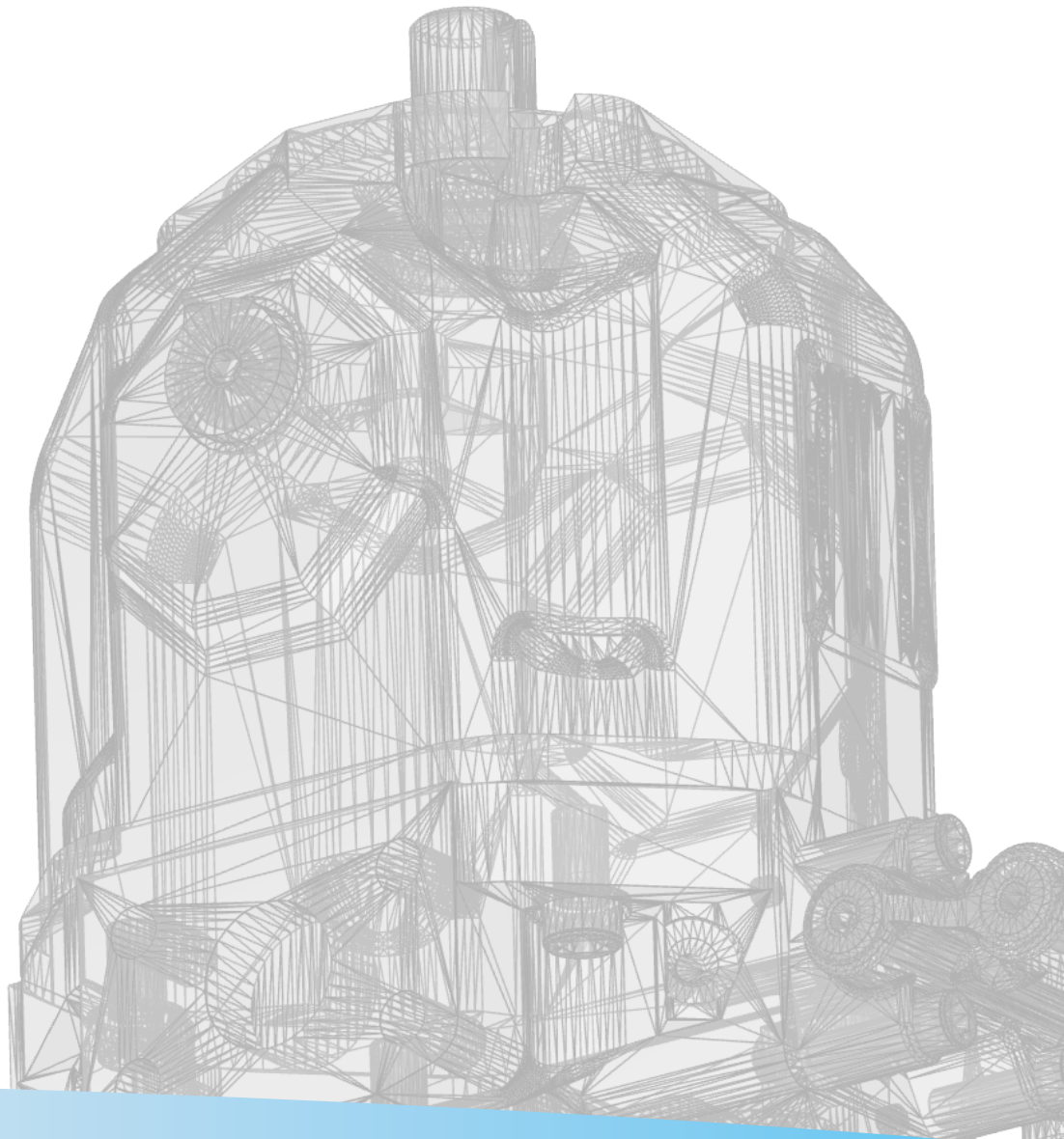
Shaft P, ISO Flange A
40mm Ø Shaft



Ports BA10V100

Designation	Port for	Standard	Size	Peak Pressure [psi (bar)]	Tightening Torque Max [lb-ft (Nm)]	State
B	Service Line (standard pressure range) Fixing thread	SAE J518 ISO 68	1 1/4 in 1/2-13 UNC-2B; 0.75 (19) deep	5100 (350)	66 (90)	O
S	Inlet (standard pressure range) Fixing thread	SAE J518 ISO 68	2 1/2 in 1/2-13 UNC-2B; 1.06 (17) deep	75 (5)	66 (90)	O
L, L ₁	Case drain	ISO 11926	1 1/16-12 UNF-2B	30 (2)	265 (360)	O ¹⁾
X	Pilot Pressure	ISO 11926	7/16-20 UNF-2B; 0.39 (10) deep	5100 (350)	59 (80)	O
X	Control pressure for DG control	DIN 3852	R 1/4 in	1740 (120)	59 (80)	O

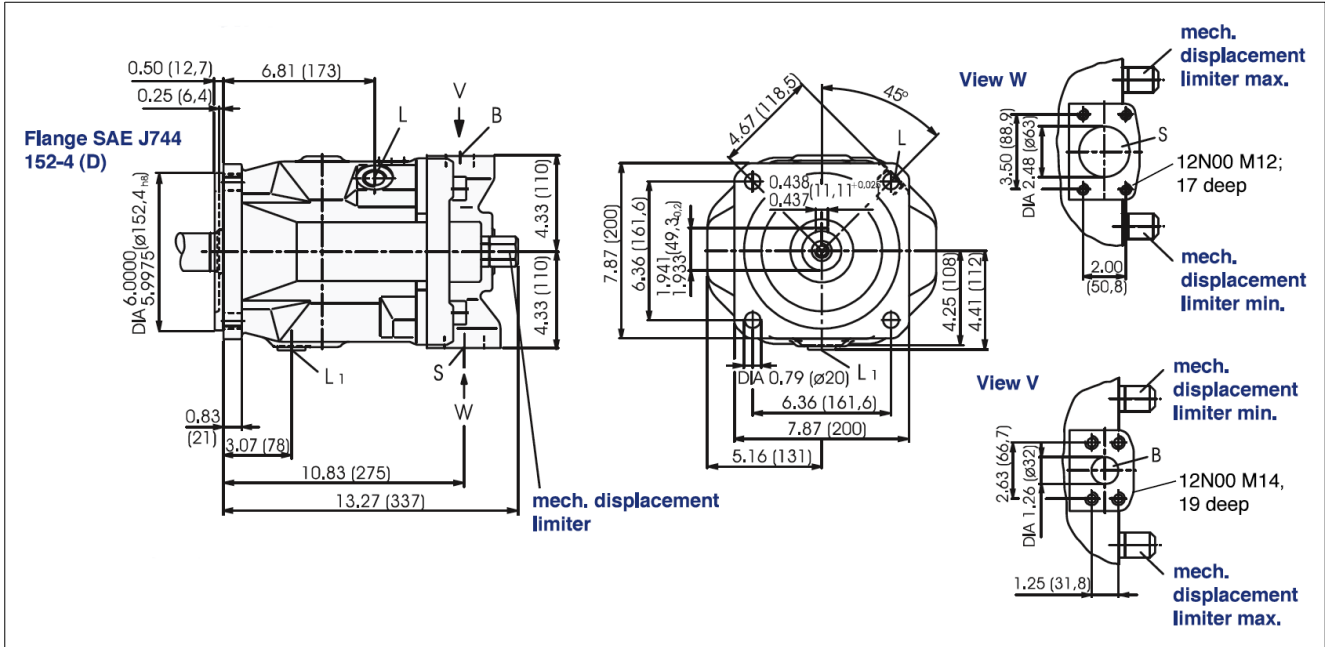
1) Dependent on the installation position, port L or L₁, must be connected
 O= Must be connected



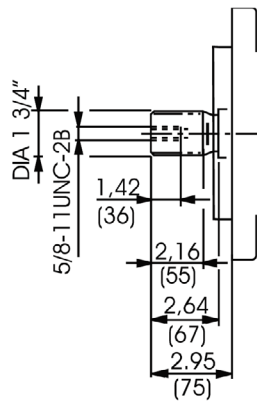
Mounting Dimensions

Size 140, Series 31

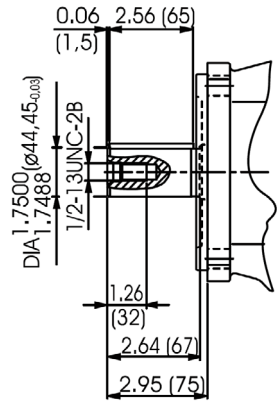
Service Ports on Side; Non Through Drive, Models 62N00 and 12N00
without considering adjustment



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



K Parallel with key
ISO 3019-1 44-1



Ports BA10V140

Designation	Port for	Standard	Size	Peak Pressure [psi (bar)]	Tightening Torque Max [lb-ft (Nm)]
B	Pressure port (standard pressure range) Threading in bolt holes	SAE J518 ISO 68	1 1/4 in 1/2-13 UNC-2B; 0.75 (24) deep	5100 (350)	66 (90)
S	Inlet (standard pressure range) Threading in bolt holes	SAE J518 ISO 68	2 1/2 in 1/2-13 UNC-2B; 0.94 (24) deep	75 (5)	66 (90)
L, L ₁	Case drain (L1 plugged)	ISO 11926	1 1/16-12 UNF-2B	30 (2)	265 (360)
X	Pilot Pressure	ISO 11926	9/16-18 UNF-2B; 0.51 (13) deep	5100 (350)	59 (80)
X	Control pressure for DG control	DIN 3852	M14 x 1.5; 0.47 (12) deep	1740 (120)	59 (80)

1) Dependent on the installation position, port L or L₁ must be connected
O= Must be connected



Through Drive

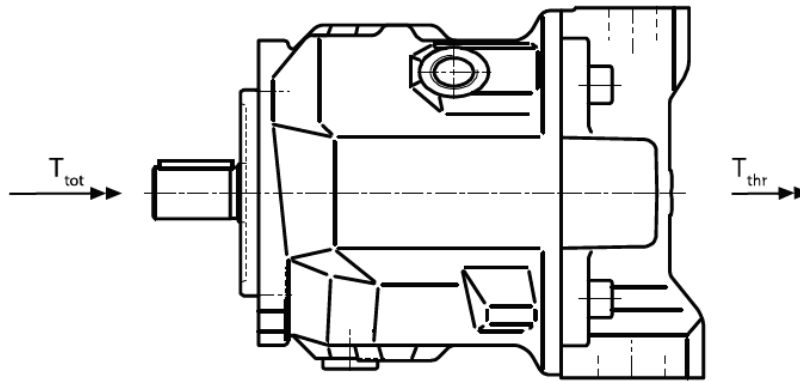
Through Drive Mounting Options

Shaft Torque Data

Axial piston units BA10V can be supplied with a through drive as shown in the ordering code on page. The type of through drive is determined by codes (KB3-KB6). If the combination pump is not mounted in the factory, the simple type of code is sufficient.

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

Maximum permissible input and through drive torque.



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.

Max. perm. input torque T_{tot}		18	28	45	71	100	140
With shaft U	T_{tot}	lb.ft (Nm) 43 (59)	- (-)	139 (188)	- (-)	439 (595)	- (-)
With shaft K	T_{tot}	lb.ft (Nm) 77 (104)	107 (145)	156 (212)	319 (433)	553 (750)	875 (1186)
With shaft S	T_{tot}	lb.ft (Nm) 92 (124)	146 (198)	235 (319)	462 (626)	814 (1104)	1195 (1620)
With shaft R	T_{tot}	lb.ft (Nm) 111 (150)	166 (225)	295 (400)	475 (644)	- (-)	- (-)
Max. perm. through drive torque T_{thr}							
With shaft K	T_{thr}	lb.ft (Nm) 77 (150)	107 (145)	156 (212)	319 (433)	553 (750)	875 (1186)
With shaft S	T_{thr}	lb.ft (Nm) 80 (108)	118 (160)	235 (319)	363 (492)	574 (778)	934 (1266)
With shaft R	T_{thr}	lb.ft (Nm) 88 (120)	130 (176)	269 (365)	404 (548)	- (-)	- (-)
Keyed shaft	$T_{thr\ keyed}$	lb.ft (Nm) 53 (72)	83 (112)	132 (179)	293 (398)	293 (398)	411 (557)

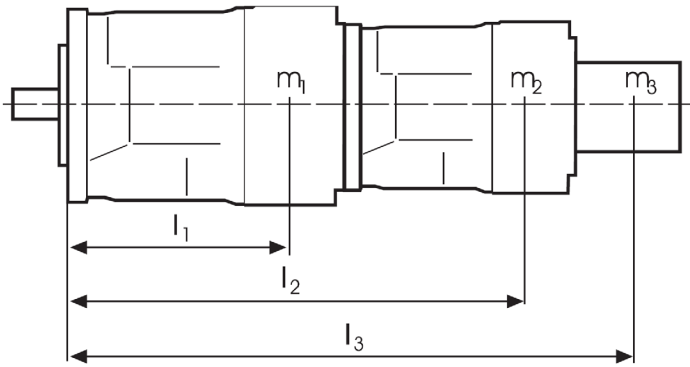
T_{tot} = max. permissible input torque pump 1

T_{thr} = max. permissible through drive torque

$T_{thr\ keyed}$ = max. permissible through drive torque at through drive to keyed shaft



Permissible overhang moment

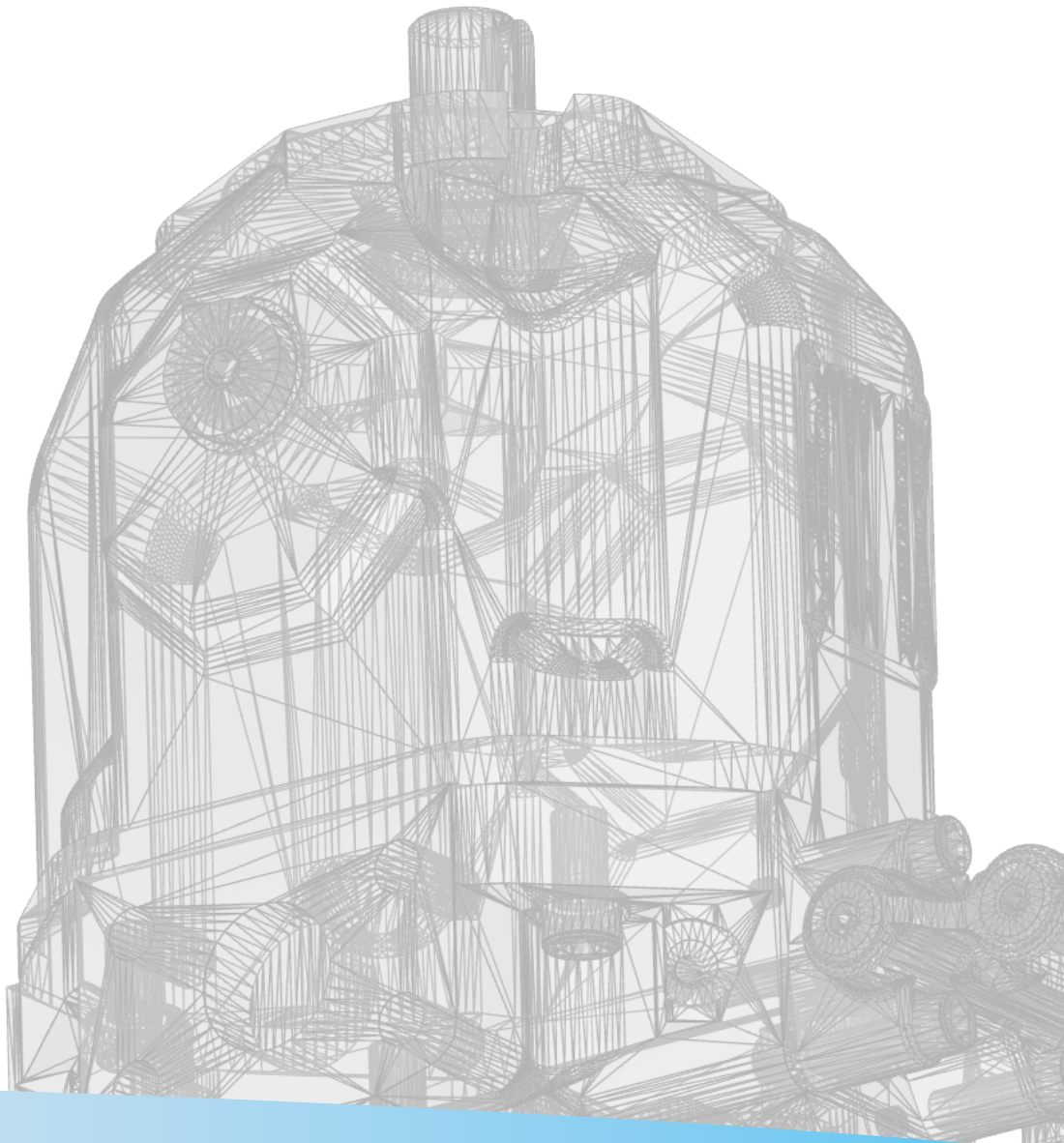


m_1, m_2, m_3 weight of pumps [lbs (kg)]
 l_1, l_2, l_3 distance to center of gravity [in (mm)]

$$T_m = (m_1 \cdot l_1 + m_2 \cdot l_2 + m_3 \cdot l_3) \cdot \frac{1}{12} \text{ [lb.ft]}$$

$$\dots \cdot \frac{1}{12} \text{ [Nm]}$$

Size			18	28	45	71	100	140
Permissible overhang moment	T_m	lb.ft (Nm)	369 (500)	649 (880)	1010 (1370)	1593 (2160)	2213 (3000)	3319 (4500)
at dyn. acceleration 10g = 98.1 m/s ²	T_m	lb.ft (Nm)	37 (50)	65 (88)	101 (137)	159 (216)	221 (300)	332 (450)
Weight	m	lbs (kg)	26.5 (12)	33 (15)	46 (21)	73 (33)	99 (45)	132 (60)
Distance to center of gravity	l1	in (mm)	3.54 (90)	4.33 (110)	5.12 (130)	5.91 (150)	6.30 (160)	6.30 (160)



Through Drive Mounting Options

Through drives - A10V		Code	Mounting option - 2nd pump			available on size
Flange SAE J744	Hub Keyed		(A)A10VSO../31... size (shaft)	A10V(S)O../52 size (shaft)	gear pump	
82-2 (A)	keyed (A-B)	K40	18 (K)	10 (K)	-	18-100
101-2 (B)	keyed (B)	K03	28 (K)	28 (K)	-	28-140
101-2 (B-B)	keyed (B-B)	K05	45 (K)	60.45 (K)	-	45-140
127-2 (C)	keyed (C)	K08	71 (K)	-	-	71-140
127-2 (C)	keyed (C)	K38	100 (K)	85 (K)	-	100-140
152-4 (D)	keyed (D)	K21	140 (K)	-	-	140
SAE J744	Splined					
82-2 (A)	5/8 in (A)	K01	18 (U)	-	size F	18-140
82-2 (A)	3/4 in (A-B)	K52	18 (S, R)	10 (S)	-	18-140
101-2 (B)	7/8 in (B)	K68 K02	28 (S, R) 45 (U) ¹⁾	28 (S, R) 45 (U, W) ¹⁾	size N, G	28-140
101-2 (B)	1 in (B-B)	K04	45 (S, R)	45 (S, R) 60 (U, W) ²⁾	-	45-140
127-2 (C)	1 1/4 in (C)	K07	71 (S, R) 100 (U) ³⁾	85 (U, W) ³⁾	-	71-140
127-2 (C)	1 1/2 in (C-C)	K24	100 (S)	85 (S)	-	100-140
152-4 (D)	1 3/4 in (D)	K17	140 (S)	-	-	140

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

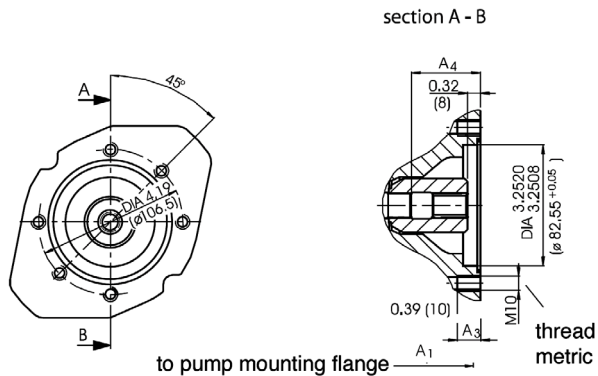
²⁾Not with K04 through drive on main pump size 45

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

Dimensions of Through Drives

K01 Flange SAE J744-82-2 (A)

Hub for splined shaft to ANSI B.92.1a-1976
5/8 in 9T 16/32 DP



¹⁾(SAE J744-16-4 (A))

Size	A1	A3	A4
18	7.16 (182)	0.57 (14.5)	1.65 (42)
28	8.03 (204)	0.63 (16)	1.85 (47)
45	9.02 (229)	0.63 (16)	2.09 (53)
71	10.51 (267)	0.79 (20)	2.40 (61)
100	13.31 (338)	0.79 (20)	2.56 (65)
140	13.78 (350)	0.63 (17)	3.03 (77)

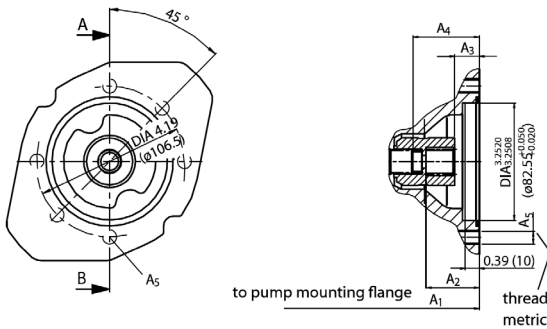


Dimensions of Through Drives

K52 Flange SAE J744-82-2 (A)

Hub for splined shaft to ANSI B.92.1a-1976
3/4 in 11T 16/32 DP

section A - B



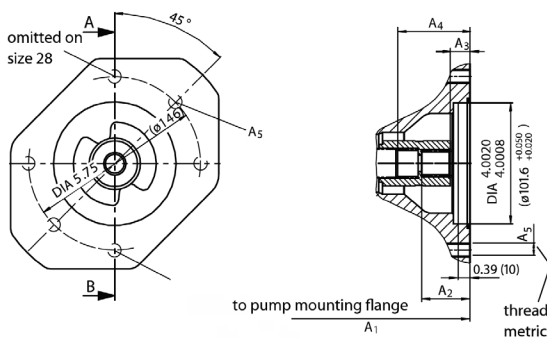
¹⁾(SAE J744-19-4 (A-B))

Size	A ₁	A ₂	A ₃	A ₄	A ₅
18	7.16 (182)	1.57 (40)	0.74 (18.8)	1.69 (43)	M10; 0.57 (14,5) deep
28	8.03 (204)	1.53 (39)	0.74 (18.8)	1.85 (47)	M10; 0.63 (16) deep
45	9.02 (229)	1.59 (40.5)	0.75 (18.9)	2.09 (53)	M10; 0.63 (16) deep
71	10.51 (267)	1.57 (40)	0.84 (21.3)	2.40 (61)	M10; 0.79 (20) deep
100	13.31 (338)	1.57 (40)	0.75 (19)	2.56 (65)	M10; 0.79 (20) deep
140	13.78 (350)	1.61 (41)	0.75 (18.9)	3.03 (77)	M10; 0.67 (17) deep

K02/K68 Flange SAE J744-101-2 (B)

Hub for splined shaft to ANSI B.92.1a-1976
7/8 in 13T 16/32 DP

section A - B

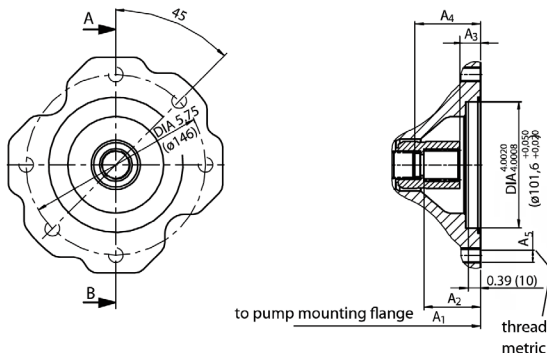


¹⁾(SAE J744-22-4 (B))

Size	A ₁	A ₂	A ₃	A ₄	A ₅
28	8.03 (204)	1.69 (43)	0.70 (17.8)	1.85 (47)	M12; 0.71 (18) deep
45	9.02 (229)	1.65 (42)	0.70 (17.9)	2.09 (53)	M12; 0.71 (18) deep
71	10.51 (267)	1.69 (43)	0.80 (20.3)	2.40 (61)	M12; 0.79 (20) deep
100	13.31 (338)	1.61 (41)	0.71 (18)	2.56 (65)	M12; 0.79 (20) deep
140	13.78 (350)	1.73 (44)	0.70 (17.9)	3.03 (77)	M12; 0.79 (20) deep

¹⁾pressure angle 30°, flat root side fit, tolerance class 5

section A - B



¹⁾(SAE J744-25-4 (B-B))

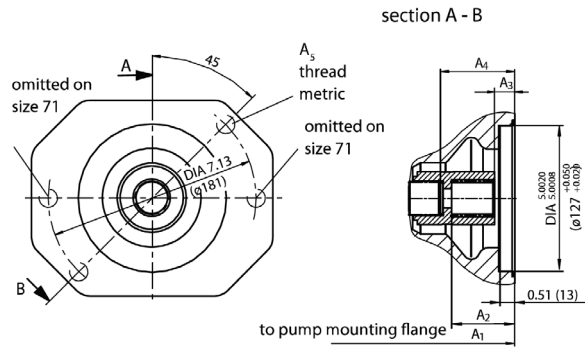
Size	A ₁	A ₂	A ₃	A ₄	A ₅
45	9.02 (229)	1.87 (47.5)	0.73 (18.4)	2.09 (53)	M12; 0.71 (18) deep
71	10.51 (267)	1.87 (47.5)	0.82 (20.8)	2.40 (61)	M12; 0.79 (20) deep
100	13.31 (338)	1.87 (47.5)	0.72 (18.2)	2.56 (65)	M12; 0.79 (20) deep
140	13.78 (350)	1.87 (47.5)	0.73 (18.4)	3.03 (77)	M12; 0.79 (20) deep



Dimensions of Through Drives

K07 Flange SAE J744-127-2 (C)

Hub for splined shaft to ANSI B.92.1a-1976 1
1/4 in 14T 12/24 DP

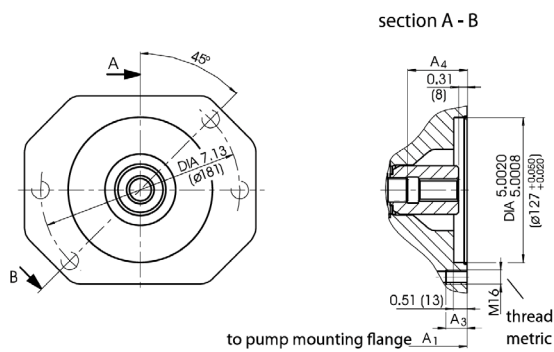


¹⁾(SAE J744-32-4 (C))

Size	A ₁	A ₂	A ₃	A ₄	A ₅
71	10.51 (267)	2.18 (55.5)	0.87 (22)	2.40 (61)	M16; 0.70 (18) deep
100	13.31 (338)	2.24 (57)	0.77 (19.5)	2.56 (65)	M16; 0.95 (24) deep
140	13.78 (350)	2.36 (60)	0.77 (19.4)	3.03 (77)	M16; 0.95 (24) deep

K24 Flange SAE J744-127-2 (C)

Hub for splined shaft to ANSI B.92.1a-1976 1
1/2 in 17T 12/24 DP



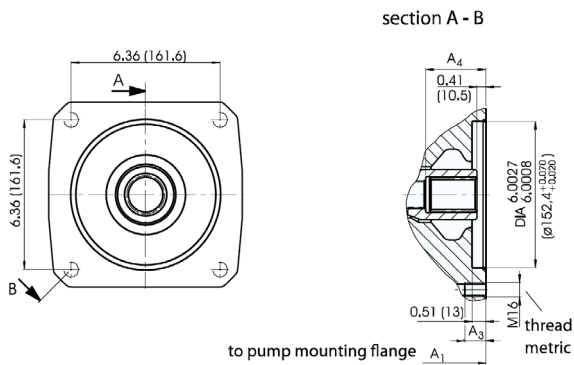
¹⁾(SAE J744-38-4 (C-C))

Size	A ₁	A ₃	A ₄
100	13.31 (338)	0.95 (24)	2.56 (65)
140	13.78 (350)	0.95 (34)	3.03 (77)

¹⁾pressure angle 30°, flat root side fit, tolerance class 5

K17 Flange SAE J744-152-4 (D)

Hub for splined shaft to ANSI B.92.1a-1976 1
3/4 in 13T 8/16 DP



¹⁾(SAE J744-44-4 (D))

Size	A ₁	A ₃	A ₄
140	13.78 (350)	approx. 0.83 (ca. 21)	3.03 (77)



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