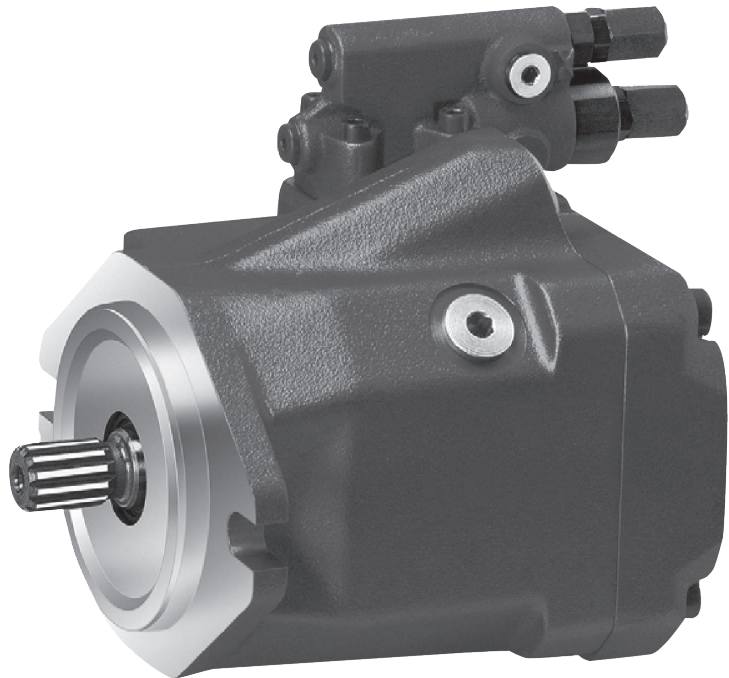


Variable Axial Piston Pump A10V Series - 52/53

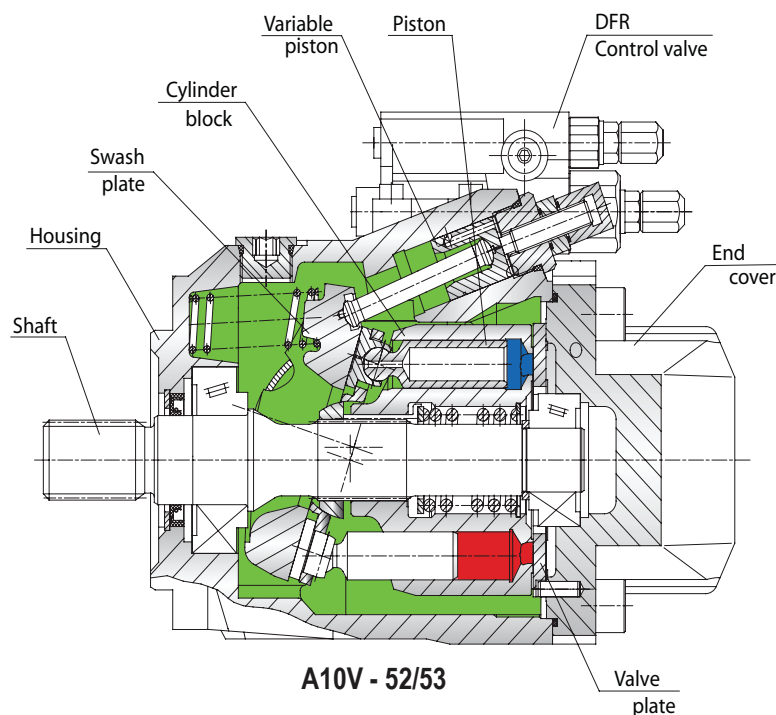
- Series 52/53 - Open Circuit
- Peak Pressure 315 bar (4,600 psi)
- Nominal Pressure 250 bar (3,600 psi)
- Sizes 10cm³/rev - 63cm³/rev (0.64in³/rev-3.8in³/rev)
- Control Options - Pressure, Pressure & Flow, and Power



Variable Displacement Pump A10V, Series 52/53

Features:

Axial piston pump A10V in swashplate design is used for hydrostatic transmission 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.



- Flange/Threaded connections SAE-UNC or metric
- 2 to 3 drain ports
- High permissible speeds
- Good suction characteristics
- Low noise level
- High power/weight ratio
- Long service life
- Short control times
- Axial and radial loading of drive shaft possible
- Wide range of controls
- Through drive option for multi-circuit system

Variable Displacement Pump A10V, Series 52/53

Technical Data:

1. Absolute Pressure at Port S (A)

P_{sabs} min.....11 psi (0.8 bar)

P_{sabs} max.....75 psi (5 bar)

2. Output Operating Pressure Range

Pressure at port B

Nominal pressure P_N3600 psi (250 bar)

Peak pressure P_{max}4600 psi (315 bar)

Minimum pressure P_{min} 145 psi (10 bar)

3. Case Drain Pressure

Maximum pressure of leakage fluid (at ports L, L₁ and L₂) 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)

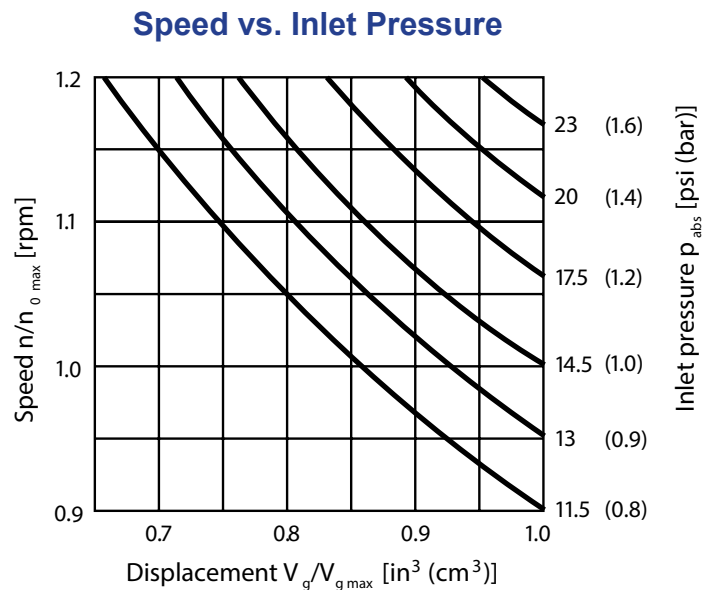
Size			10	45	60	63
Displacement	$V_{g\ max}$	cm ³ /rev (in ³ /rev)	10.5 (0.61)	45 (2.75)	60 (3.66)	63 (3.84)
Max. Speed	$N_{nom\ max}$	rpm	3600	2600	2600	2600
Flow @1800 rpm	$Q_{vE\ 1800}$	LPM (gpm)	18 (4.8)	81.6 (21.6)	108 (28.8)	114 (30)
Max. Flow	$Q_{v\ nom\ max}$	L/min (gpm)	37 (9.7)	117 (31)	156 (41)	163 (43)
Max. Power	$P_o\ max$	kW (HP)	35 (47)	49 (65)	65 (88)	68 (90)
Max. Torque	T_{max}	Nm (lb-ft)	42 (31)	179 (132)	238 (175.5)	250 (184)
Rotary Stiffness, Drive Shaft	S	Nm/rad (lb-ft/rad)	9200 (6760)	37500 (27656)	65500 (48100)	65500 (48100)
	R	Nm/rad (lb-ft/rad)	—	41000 (30240)	69400 (51200)	69400 (51200)
	U	Nm/rad (lb-ft/rad)	6800 (5020)	30000 (22130)	49200 (36290)	49200 (36290)
	W	Nm/rad (lb-ft/rad)	—	34400 (25370)	54000 (39830)	54000 (39830)
	Q	Nm/rad (lb-ft/rad)	—	—	34400 (25370)	34400 (25370)
	K /P /C	Nm/rad (lb-ft/rad)	10800 (7965)	43900 (32380)	73900 (54506)	73900 (54506)
Weight (without fluid)	M	kg (lbs)	8 (17)	18(40)	22 (48.5)	22 (48.5)

Note: Values shown are valid for an absolute pressure of 1 bar at suction port.

Variable Displacement Pump A10V, Series 52/53

Technical Data:

If the flow is reduced or if the inlet pressure is increased the speed may be increased according to the diagram.



6. Determination of Size

$$\begin{aligned}
 \text{Flow } q_v &= \frac{V_g \cdot n \cdot \eta_v}{231} \quad [\text{gpm}] \quad \left(q_v = \frac{V_g \cdot n \cdot \eta_v}{1000} \quad [\text{L/min}] \right) & V_g &= \text{Displacement per revolution in in}^3 \text{ (cm}^3\text{)} \\
 & & \Delta p &= \text{Differential pressure in psi (bar)} \\
 \text{Torque } T &= \frac{V_g \cdot \Delta p}{24 \cdot \pi \cdot \eta_{mh}} \quad [\text{lb-ft}] \quad \left(T = \frac{V_g \cdot \Delta p}{20 \cdot \pi \cdot \eta_{mh}} \quad [\text{Nm}] \right) & n &= \text{Speed in rpm (min}^{-1}\text{)} \\
 & & \eta_v &= \text{Volumetric efficiency} \\
 & & \eta_{mh} &= \text{Mechanical-hydraulic efficiency} \\
 \text{Power } P &= \frac{q_v \cdot \Delta p}{1714 \cdot \eta_t} \quad [\text{HP}] \quad \left(P = \frac{q_v \cdot \Delta p}{600 \cdot \eta_t} \quad [\text{kW}] \right) & \eta_t &= \text{Total efficiency}
 \end{aligned}$$

Fluid

MR20S (Q/TCNK12-2001)
ISO 32
ISO 46
ISO 68

Variable Displacement Pump A10V, Series 52/53

Technical Data:

Operating Viscosity Range

$$V_{opt} = 16 \text{ mm}^2/\text{s} \sim 36 \text{ mm}^2/\text{s} \text{ (80 to 170 SUS)}$$

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

$$V_{opt} = \text{optimum operating viscosity } 16 \text{ mm}^2/\text{s} \sim 36 \text{ mm}^2/\text{s} \\ \text{referred to tank temperature (open loop circuit).}$$

Limits of Viscosity Range

(The following values are valid for extreme operating conditions)

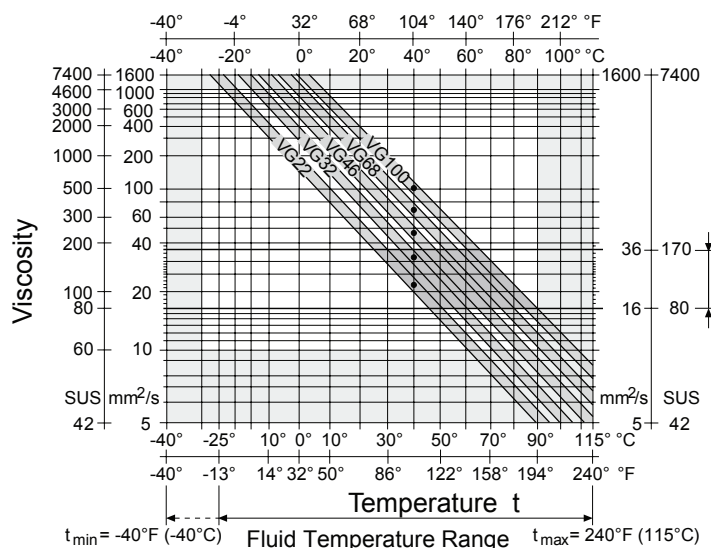
$$V_{min} = 10 \text{ mm}^2/\text{s} \\ \text{for short periods at max. leakage oil temperature of } 80^\circ\text{C} \text{ (176}^\circ\text{F)} \\ V_{max} = 1000 \text{ mm}^2/\text{s}$$

Temperature Range

$$t_{min} = -20^\circ\text{C} \text{ (-4}^\circ\text{F)} ; t_{max} = +80^\circ\text{C} \text{ (176}^\circ\text{F)}$$

Filtration

In order to ensure reliable operation of the axial piston unit, the operating fluid must be maintained to a cleanliness class of at least: 16/19 to ISO4406. This may be achieved with filter elements, cleanliness class of 10µm.



Installation Notes

The pump housing must be filled with fluid during commissioning and remain full when operating. The concentricity between engine transmission shaft and pump shaft must be less than $\Phi 0.05 \text{ mm}$.

Variable Displacement Pump A10V, Series 52/53

Technical Data:

Drive Power and Flow

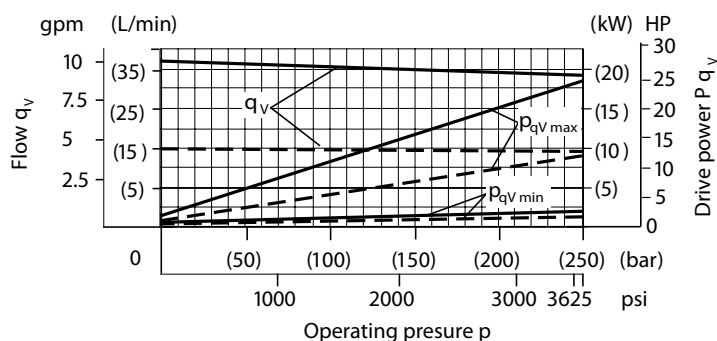
Operating material:

Hydraulic fluid ISO VG 46 DIN 51519, $t = 50\text{ }^{\circ}\text{C}$

Size 10

--- n = 1500 rpm

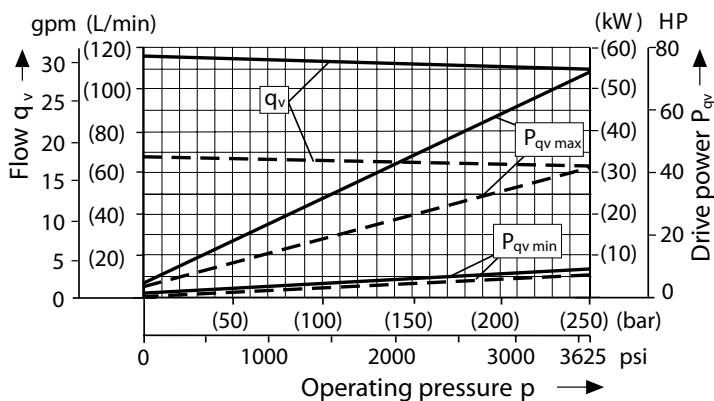
— n = 3600 rpm



Size 45

--- n = 1500 rpm

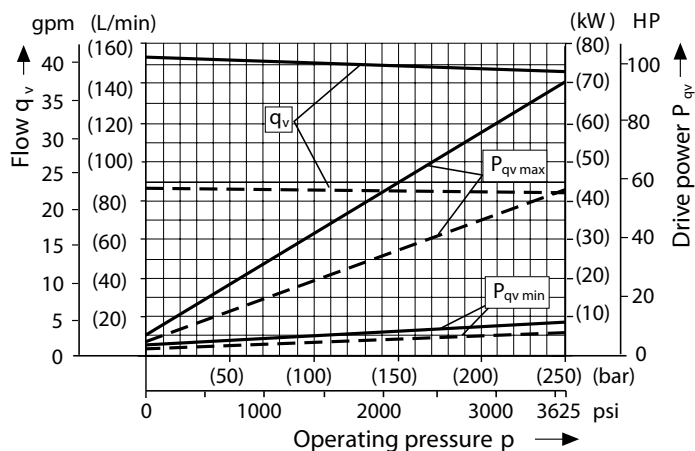
— n = 2600 rpm



Size 60/63

--- n = 1500 rpm

— n = 2600 rpm



Variable Displacement Pump A10V, Series 52/53

Ordering Code:

A10V		45		DR		52		L		P		S	
-------------	--	-----------	--	-----------	--	-----------	--	----------	--	----------	--	----------	--

Size				
Displacement	10	45	60¹⁾	63²⁾
cm ³ /rev	10.5	45	60	63
(in ³ /rev)	(0.61)	(2.75)	(3.66)	(3.84)

Control Devices		
Pressure control		DR
Pressure remote control		DRG
Pressure & Flow	(X-T port open)	DFR, DRF²⁾
	(X-T port blocked)	DFR1, DRS²⁾
Power Control w/ pressure cut-off		
Power control w/ pressure cut-off		LA(X)D²⁾
Power w/remote pressure		LA(X)DG²⁾
Power w/flow (X-T port blocked)		LA(X)DS²⁾
*Start of control LA5D - 10 to 35 bar (145-507 psi) LA6D - 36 to 70 bar (522-1015 psi) LA7D - 71 to 105 bar (1030-1523 psi) LA8D - 16 to 140 bar (1537-2031 psi) LA9D - 141 to 230 bar (2045-3336 psi)		

Series	10	45	60	63	
Series	●	●	●	—	52
	—	●	—	●	53

Direction of Rotation		
Viewed from shaft end	Clockwise	R
	Counter-clockwise	L

Seals	
Buna-N (NBR per DIN ISO 1629)	P
FPM (Fluorocarbon/Viton)	V

Shaft End	10	45	60	63	
Keyed	3/4"	1"	1 1/4"	1 1/4"	K
Splined	3/4"-11T	1"-15T	1 1/4"-14T	1 1/4"-14T	S
Full Splined -Reinforced "S"	—	1"-15T	1 1/4"-14T	1 1/4"-14T	R
Splined "Low Torque"	5/8"-9T	7/8"-13T	1"-15T	1"-15T	U
Full Splined -Reinforced "U"	—	7/8"-13T	1"-15T	1"-15T	W
Full Splined SAE-B	—	—	7/8"-13T	7/8"-13T	Q
Metric Keyed	18mm	—	—	—	P

Variable Displacement Pump A10V, Series 52/53

C	62	N00	S097
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Special Suffix

Omit if none required	—
Max volume stop adjust (std)	097

Thru Drives

			10	45	60	63	
Non-Thru Drive (without thru drive)			●	●	●	●	N00
With Thru Drive to mount pump on back (side ports only)							K**
Mtg Flg	Hub	To Mount					
82- 2 (A)	5/8"-9T (A)	A10V18(U,W), 10(U)	—	●	●	●	K01
82- 2 (A)	3/4"-11T (AB)	A10V18(S,R), 10(S)	—	●	●	●	K52
101- 2 (B)	7/8"-13T (B)	A10V28(S,R), 45(U,W)	—	●	●	●	K68/K02
101- 2 (B)	1"-15T (B-B)	A10V45(S,R), 60/63C(U,W)	—	●	●	●	K04
127- 2 (C)	1 1/4"-14T (C)	A10V71(S,R), 100(U,W)	—	—	●	●	K07
127- 4 (C)	1 1/4"-14T (C)	A10V60/63D(S,R)	—	—	●	●	K15

Service Ports

		10	45	60	63	
4-Bolt Flange Ports	Rear Ports, Metric Thread	—	●	●	●	11
	Rear Ports, UNC Thread	—	●	●	●	61
	Side Ports, Metric Thread	—	●	●	●	12
	Side Ports, UNC Thread	—	●	●	●	62
Str. Thread O-Ring Ports	Rear Ports, Threaded Metric	●	—	—	—	14
	Rear Ports, Threaded UNC	●	●	●	●	64

Mounting Flange

Pilot Diameter (in/mm)	10	45	60	63	
SAE 2-Bolt	SAE-A (3.25"/82.5)	SAE-B (4.0"/101.6)	SAE-B (4.0"/101.6)	SAE-B (4.0"/101.6)	C
ISO 2-Bolt Metric	80 mm	100 mm	—	—	A
SAE 4-Bolt	—	—	SAE-C (5.0"/127)	SAE-C (5.0"/127)	D

● = Available
— = Not available

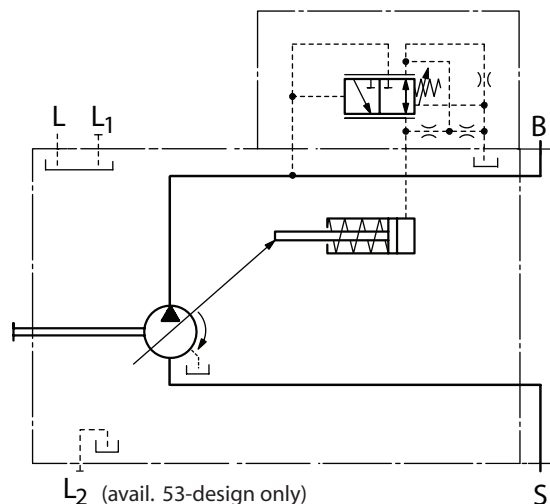
Note:

- Series 52 units are delivered as standard with 60 cm³/rev. Higher values on request.
- Control DRF, DRS, and LA(X)D(): Available with size 18, and 63, only in 53 series.

Variable Displacement Pump A10V, Series 52/53

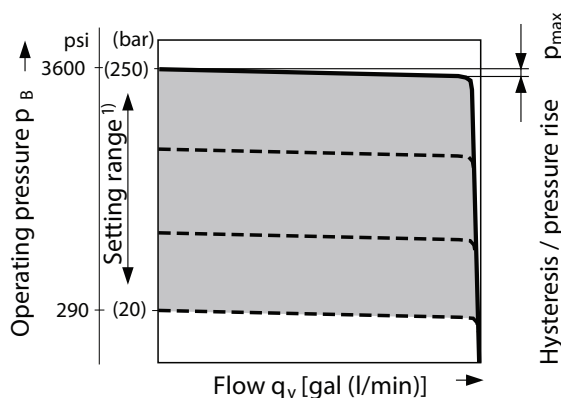
Pressure Control “DR”:

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 $n_1 = 1500$ rpm; $t_{fluid} = 120$ °F (50 °C))



Ports

B	Pressure port
S	Suction port
L, L_{1,2}	Case drain ports (L _{1,2} sealed)

Control Data

Hysteresis and repetitive accuracy Δpmax. 3 bar (44 psi)

Max. Pressure Increase

Size		10	45	60	63
▲ P	Bar (psi)	6 (90)	6 (90)	8 (115)	8 (115)

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

Variable Displacement Pump A10V, Series 52/53

Pressure Control, Remote Control “DRG”:

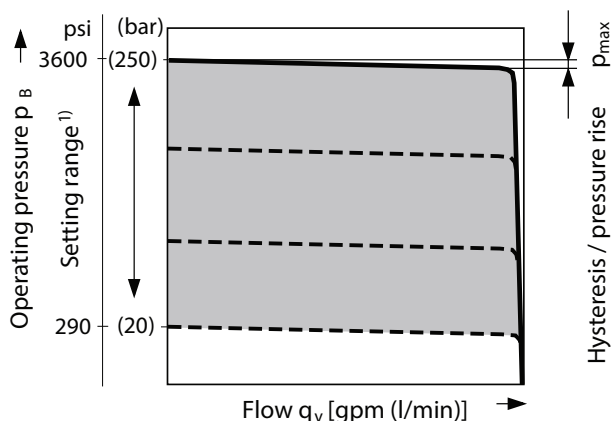
Function and design as for DR.

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

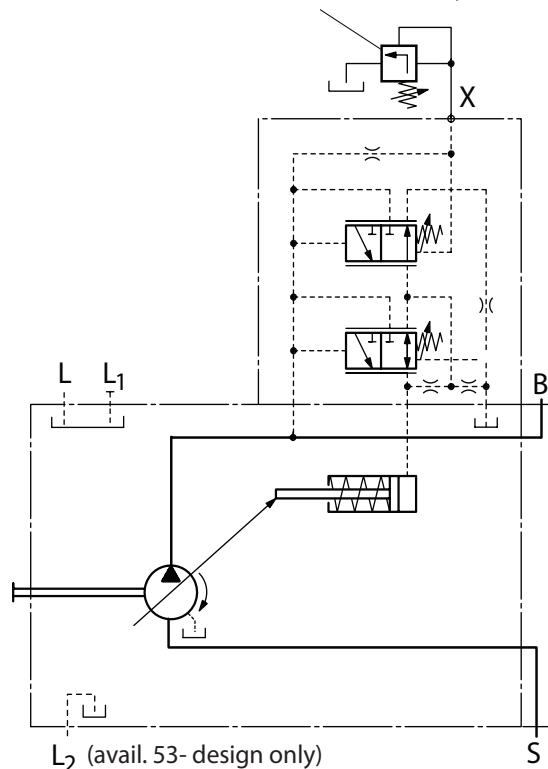
The differential pressure at the pilot valve is set as standard to 20 bar (290 psi) and this results in a pilot flow of 1.5 L/min (0.40 gpm). If another setting is required (in the range of 10-22 bar) (145-319 psi), please state this in clear text.

Static Characteristic

(at $n_1 = 1500$ rpm; $t_{fluid} = 120$ °F (50 °C))



Not included in the delivery contents



Ports

B	Pressure port
S	Suction port
L, L _{1,2}	Case drain ports (L _{1,2} sealed)
X	Pilot pressure port

Control Data

Hysteresis and repetitive accuracy ΔP max. 3 bar (44 psi)

Max. Pressure Increase

Size		10	45	60	63
ΔP	Bar (psi)	6 (90)	6 (90)	8 (115)	8 (115)

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

Variable Displacement Pump A10V, Series 52/53

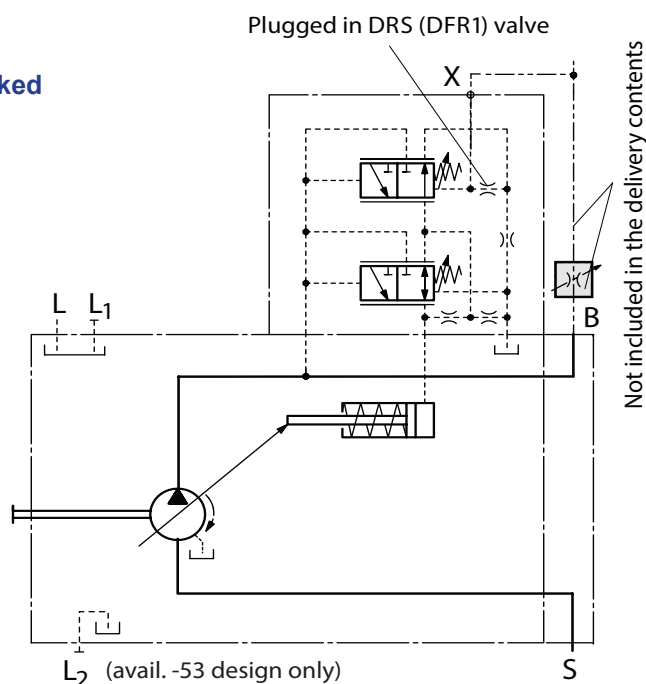
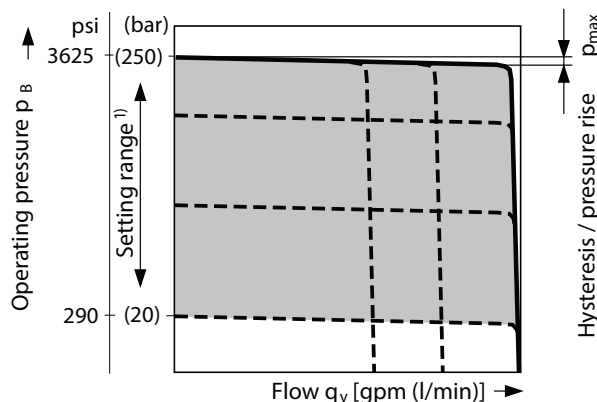
Pressure/Flow Control, Load Sensing: “DFR/DRF” X-T port open, “DFR1/DRS” X-T port blocked

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/DRS the X orifice is plugged.

Static Characteristic

Flow control at $n_1 = 1500 \text{ rpm}$; $t_{\text{fluid}} = 120 \text{ °F (50 °C)}$



Not included in the delivery contents

Ports

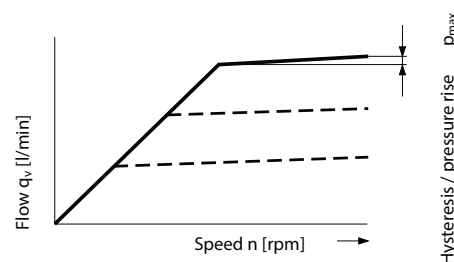
B	Pressure port
S	Suction port
L, L _{1,2}	Case drain ports (L _{1,2} sealed)
X	Pilot pressure port

Flow control/differential pressure Δp :

Adjustable between 14 and 22 bar (200-320 psi) (higher values on request). Standard setting: 21 bar (300 psi). If a different setting is required, please state in clear text.

When port X is unloaded to tank, a zero stroke pressure of $p = 21 \text{ bar (300 psi)}$ (“stand by”) 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 $n = 1450 \text{ rpm}$

Size		10	45	60/63
ΔQ_{max}	L/min (gpm)	1.5 (0.5)	1.8 (0.48)	2.5 (0.66)

Pilot oil consumption DFR/DRF.....max. approx. 3-4.5 L/min (0.8-1.19 gpm)

Pilot oil consumption DFR1/DRS.....max. approx. 3 L/min (0.8 gpm)

Variable Displacement Pump A10V, Series 52/53

Pressure, Flow, and Power Control “LA(X)D..”:

Pressure control equipped as DR(G), see page 11.

Flow control equipped as DRF, DRS, see page 12.

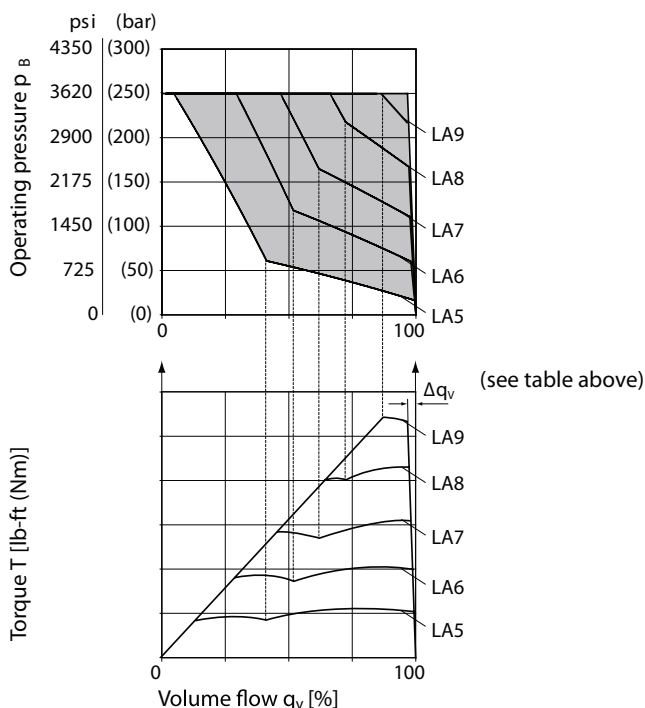
In order to achieve a constant drive torque with varying operating pressures, the cradle and with it the output flow from the axial piston pump is varied so that the product of the flow and pressure remains constant.

Flow control is possible below the power control curve.

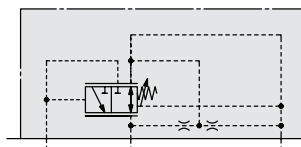
When ordering, the power setting requirements must be given:
(ie: 27 HP(20kW) @ 1500 rpm,
and 3,045 psi (210 bar) max
system pressure).

Start of Control psi (bar)	Torque T [lb-ft (Nm)]		Order Code
	45	63	
145-510 (10-35)	7.4-22.1 (10-30)	11-32 (15-43)	LA5
520-1015 (36-70)	22.2-43.5 (30.1-59)	32-61 (43.1-83)	LA6
1030-1520 (71-105)	43.6-62 (59.5-84)	61-88 (83.1-119)	LA7
1535-2030 (106-140)	62-83 (59.1-84)	88-116 (119-157)	LA8
2045-3335 (141-230)	83-139 (112.1-189)	116-195 (157.-264)	LA9

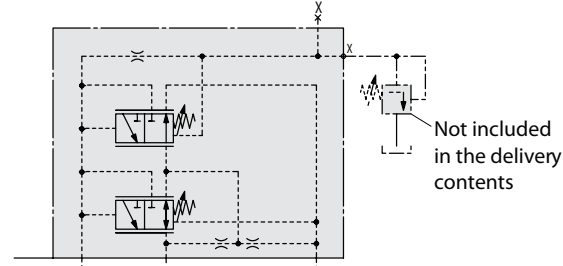
Static Curves and Torque Characteristic



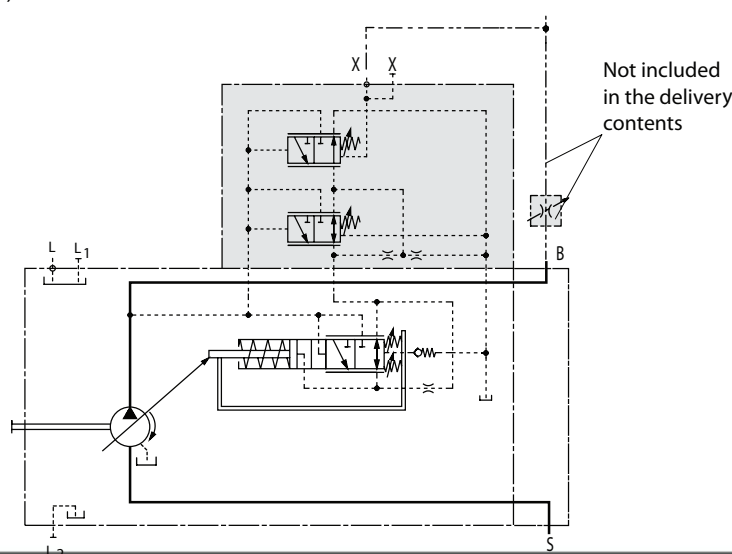
Circuit diagram (LAXD) with pressure cut-off



Circuit diagram (LAXDG) with pressure cut-off, remotely operated



Circuit diagram (LAXDS) with pressure and flow control

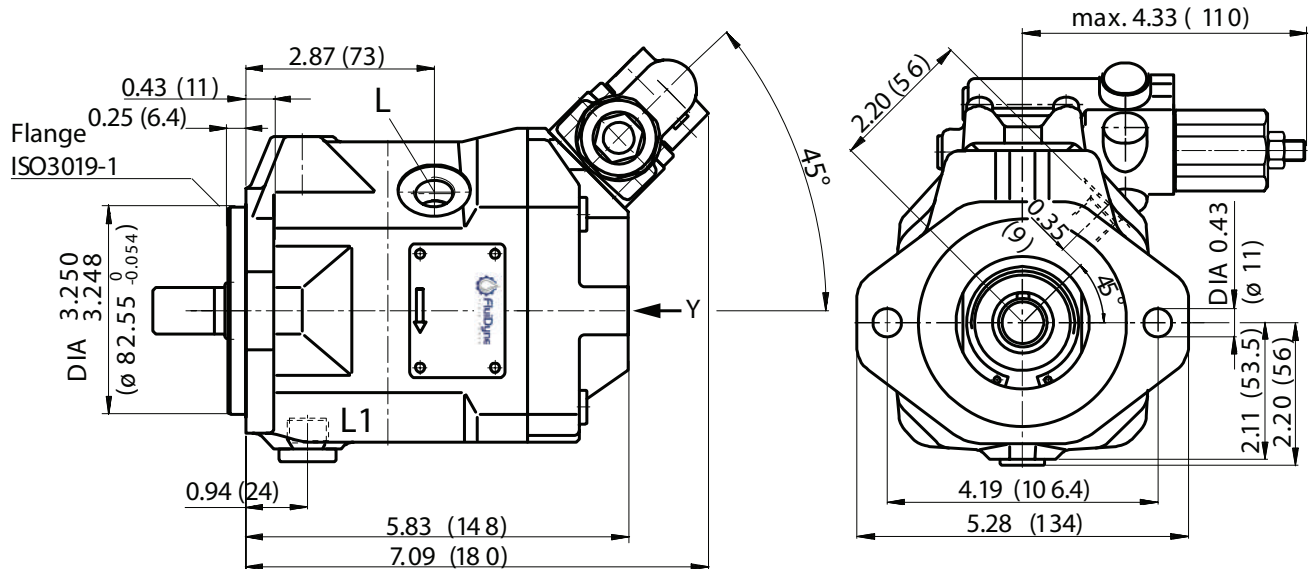


Variable Displacement Pump A10V, Series 52/53

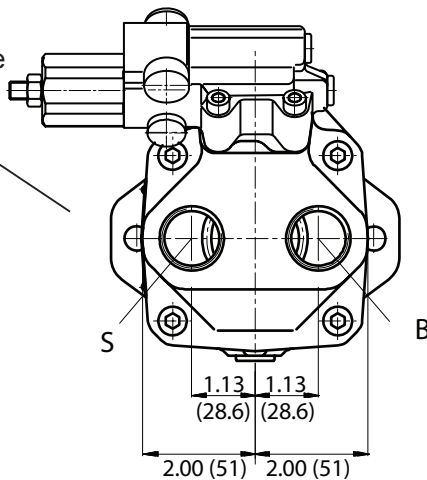
A10V10 Dimensions:

DR - Hydraulic Pressure Controller

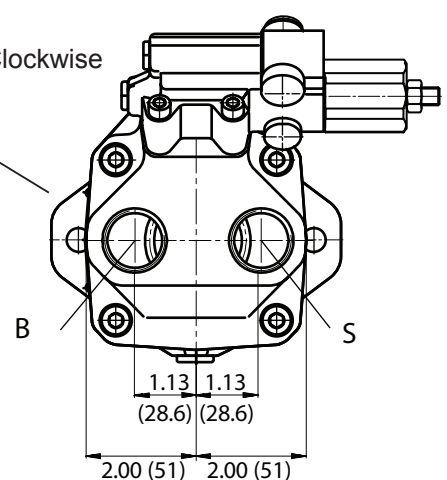
Clockwise Rotation



View Y
Clockwise
Rotation



View Y
Counter-Clockwise
Rotation

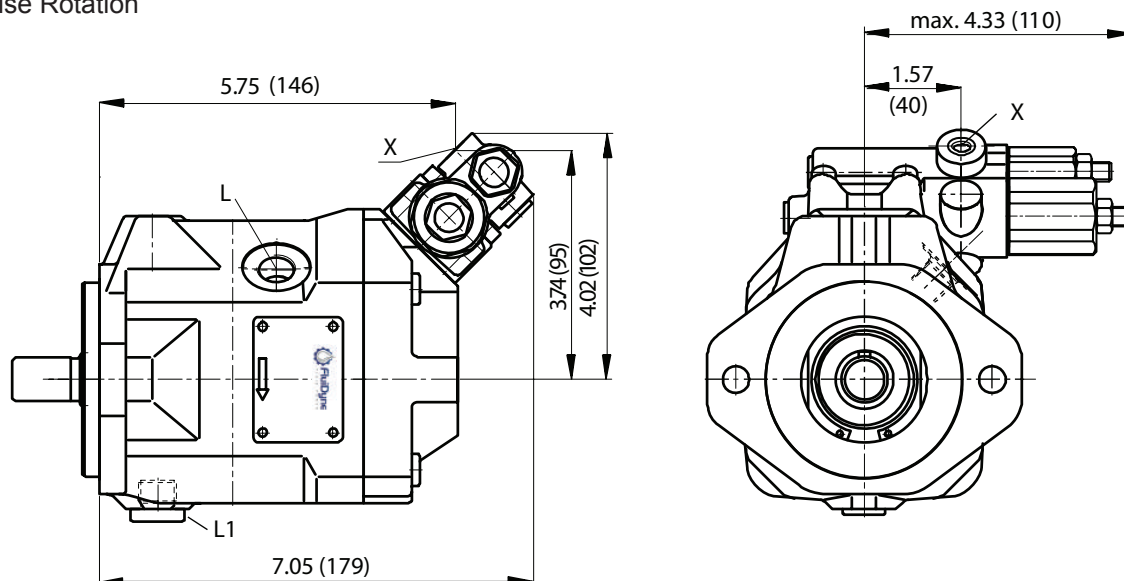


Variable Displacement Pump A10V, Series 52/53

A10V10 Dimensions:

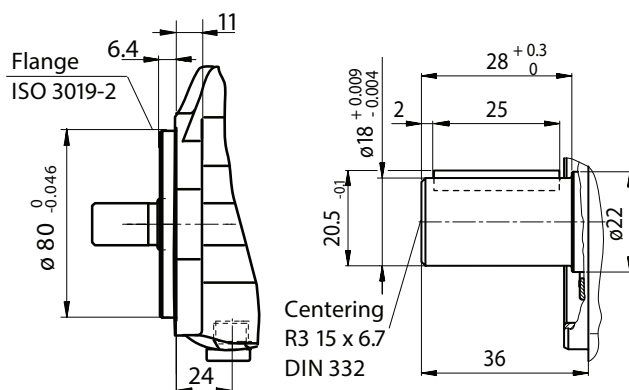
DRG / DFR / DFR1 - Hydraulic Controller

Clockwise Rotation



Metric Mounting Flange and Shaft

P - Parallel Keyed Shaft
20.5mm diameter
DIN 6885 A6x6x25 key

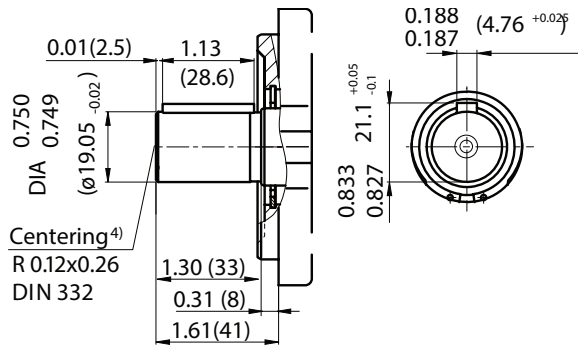


Variable Displacement Pump A10V, Series 52/53

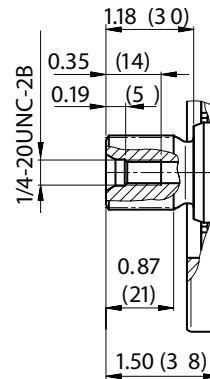
A10V10 Dimensions:

Drive Shafts and Port Dimensions

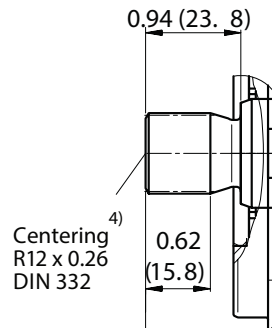
K - Parallel Keyed Shaft
3/4" diameter; 3/16" sq. key
ISO 3019-1 19-1



S - Splined Shaft
3/4" diameter; 11T 16/32 DP¹⁾
SAE J744



U - Splined Shaft
5/8" diameter; 9T 16/32 DP¹⁾
SAE J744



Ports

		Port Code	Standard	Size	Max Tightening Torque
B	Outlet Port, Rear Threaded	64	ISO 11926	1-1/16-12 UNF-2B; 0.79" (20) deep	243 lb-ft (330 Nm)
S	Inlet Port, Rear Threaded			1-1/16-12 UNF-2B; 0.79" (20) deep	
B	Outlet Port, Rear Threaded	14	ISO 11926 DIN 3852	M27x2; 0.63" (16) deep	243 lb-ft (330 Nm)
S	Inlet Port, Rear Threaded			M27x2; 0.63" (16) deep	
L, L ₁	Case Drain Ports (L ₁ plugged)	64/14	ISO 11926	9/16-18UNF-2B; 0.43" (11) deep	59 lb-ft (80 Nm)
X	Pilot Pressure Port	64/14	ISO 11926	7/16-20UNF-2B; 0.45 (11.5) deep	29 lb-ft (40 Nm)

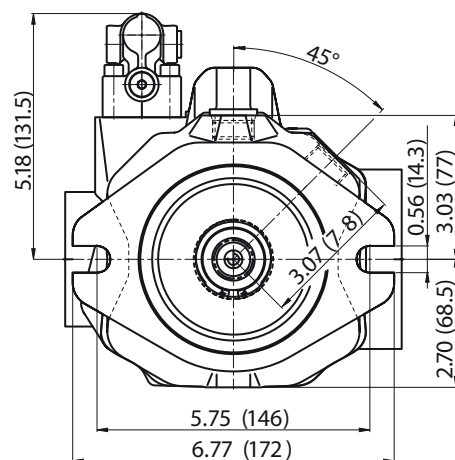
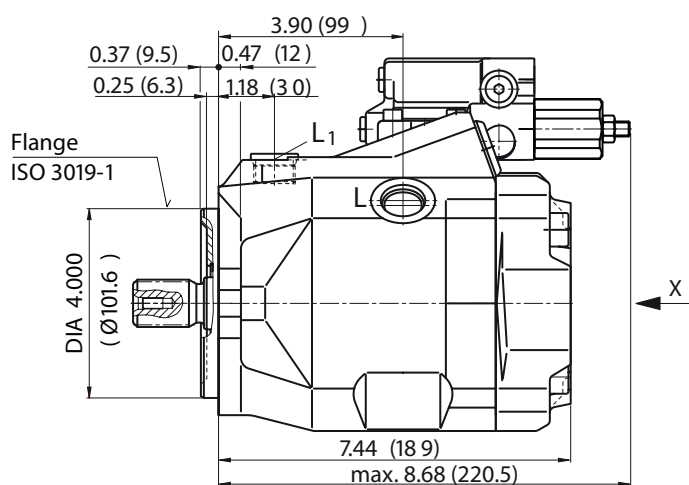
Variable Displacement Pump A10V, Series 52/53

A10V45 Dimensions:

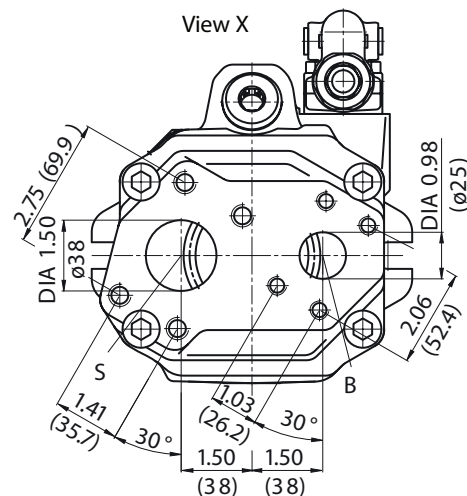
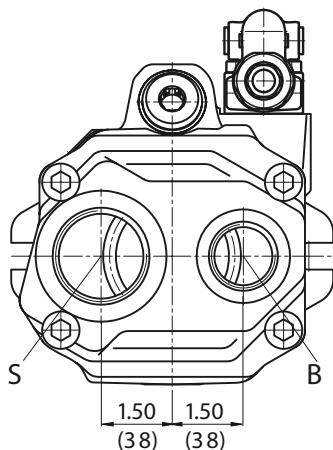
DR - Hydraulic Pressure Controller

Clockwise Rotation ²⁾, -52 Series

Port plate 61/11



Port plate 64



1) Primary dimensions for pump apply for series -52 and -53 as seen above.

2) Location of service ports S and B are turned 180° for counter-clockwise rotation.

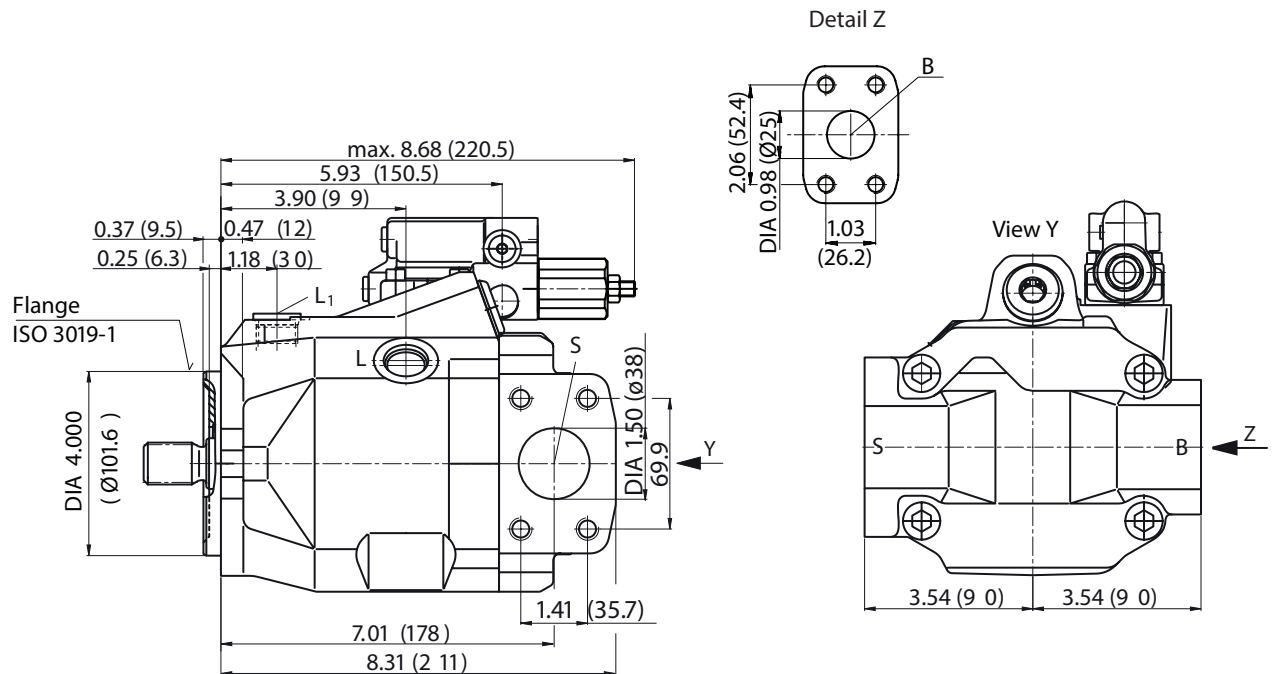
Variable Displacement Pump A10V, Series 52/53

A10V45 Dimensions:

DR - Hydraulic Pressure Controller

Clockwise Rotation ²⁾, -52 Series

Port plate 62/12

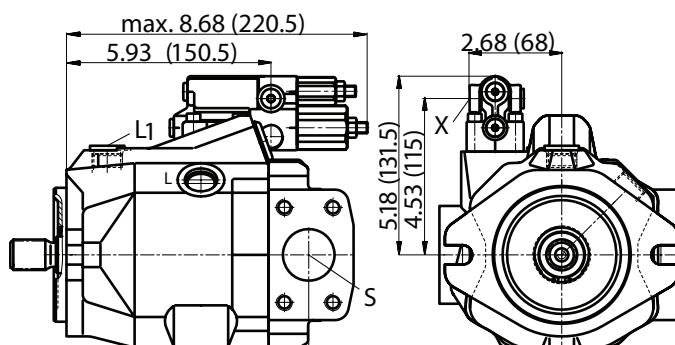


Variable Displacement Pump A10V, Series 52/53

A10V45 Dimensions:

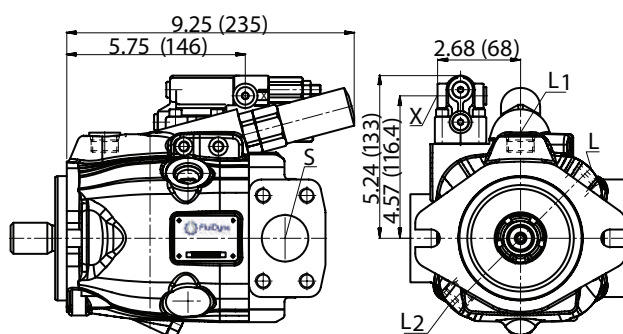
DRG / DFR / DFR1 ^{1) 3)} - Hydraulic Controller

Remote Pressure Control/ Pressure and Flow
Clockwise Rotation ²⁾, -52 Series



LA()D(S/G) ^{1) 4)} - Hydraulic Controller

Pressure, Flow and Power Control
Clockwise Rotation ²⁾, -53 Series



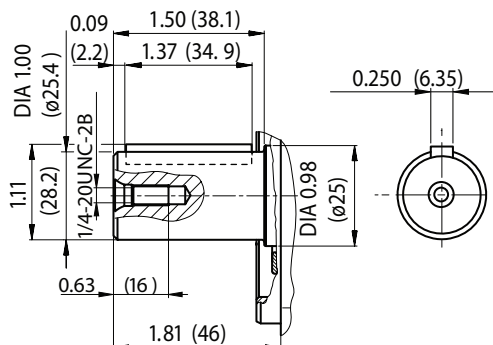
- 1) Primary dimensions for pump apply for series -52 and -53 as seen on page 18.
- 2) Location of service ports S and B are turned 180° for counter-clockwise rotation.
- 3) DFR1; Pressure and flow control with blocked bleed down orifice
- 4) Only for -53 series.

Variable Displacement Pump A10V, Series 52/53

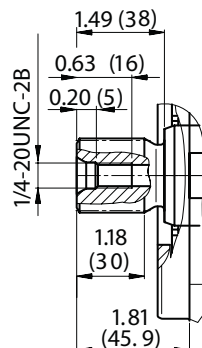
A10V45 Dimensions:

Drive Shafts and Port Dimensions

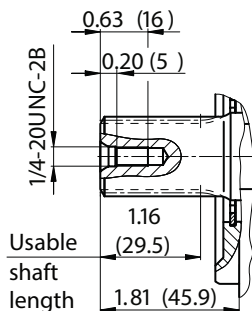
K - Parallel Keyed Shaft
1.0" diameter; 1/4" sq. key
ISO 3019-1 25-1



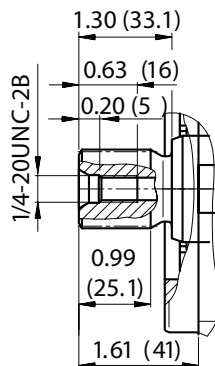
S - Splined Shaft
1.0" major dia. 15T 16/32 DP
SAE J744-25-4 (B-B)



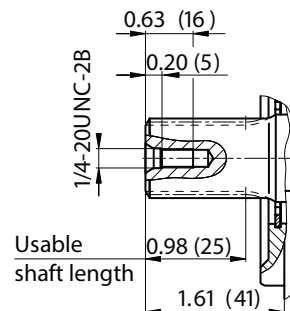
R - Splined Shaft
1.0" major dia. 15T 16/32 DP
SAE J744-25-4 (B-B)



U - Splined Shaft
7/8" major dia. 13T 16/32 DP
SAE J744-22-4 (B)



W - Splined Shaft
7/8" major dia. 13T 16/32 DP
SAE J744-22-4 (B)



Ports

		Port Code	Standard	Size	Max Tightening Torque
B	Outlet Port, SAE Flange (code 61)	61/62	SAE J518; ISO 68	1.0"; 3/8-16UNC-2B; 0.75 (19) deep 1-1/2"; 1/2-13 UNC-2B; 0.87 (22) deep	31 lb-ft (42 Nm)
S	Inlet Port, SAE Flange				
B	Outlet Port, SAE Flange (code 61)	11/12	SAE J518 ³⁾ ; DIN 13	1.0"; M10 x 1.5; 17 deep 1-1/2"; M12 x 1.75; 20 deep	48 lb-ft (66 Nm)
S	Inlet Port, SAE Flange				
B	Outlet Port; Threaded	64	ISO 11926	1-5/16"-12UN-2B; 0.79 (20) deep 1-7/8"-12UN-2B; 0.79 (20) deep	243 lb-ft (330 Nm)
S	Inlet Port; Threaded				
L, L ₁ , L ₂ ⁴⁾	Case Drain Ports (L ₁ plugged)	All	ISO 11926	3/4-16UNF-2B	116 lb-ft (160 Nm)
X	Pilot Pressure Port	All	ISO 11926	7/16-20UNF-2B; 0.45 (11.5) deep	29 lb-ft (40 Nm)

1) Primary dimensions for pump apply for series -52 and -53 as seen above.

2) Location of service ports S and B are turned 180° for counter-clockwise rotation.

3) Metric fixing thread is a deviation from standard.

4) Only for -53 series.

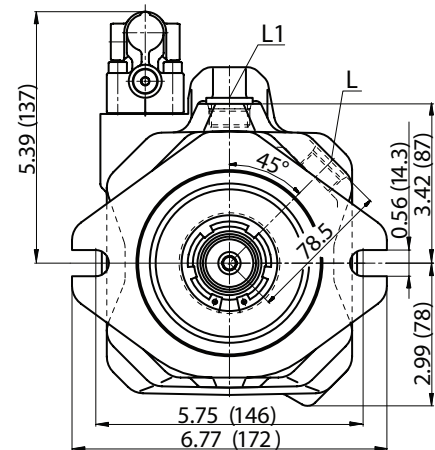
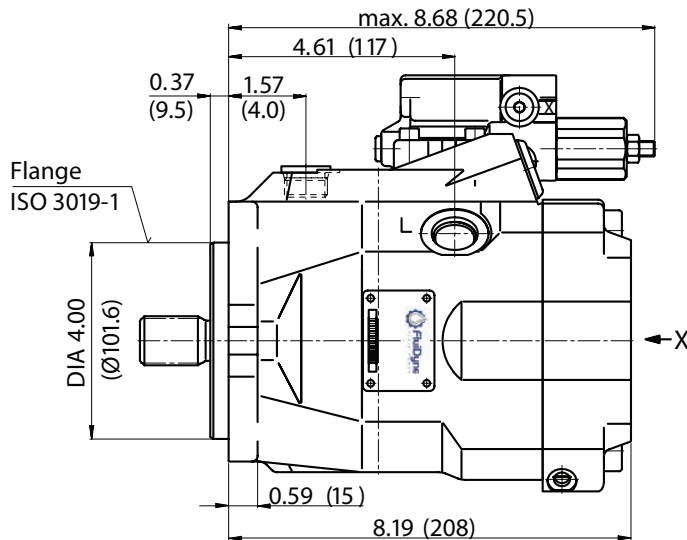
Variable Displacement Pump A10V, Series 52/53

A10V60/63¹⁾ Dimensions:

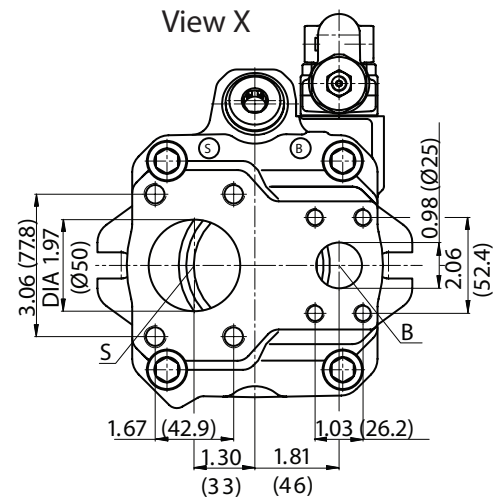
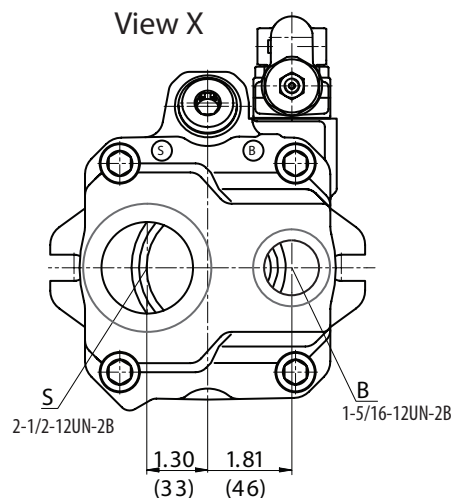
DR - Hydraulic Pressure Controller

Mounting Flange C, Clockwise Rotation ²⁾, -52 Series
A10V (60/63)DR/52R-PSC61N00

Port plate²⁾ 61/11



Port plate²⁾ 64



1) Primary dimensions for pump apply for series -52 and -53 as seen above.
2) Location of service ports S and B are turned 180° for counter-clockwise rotation.

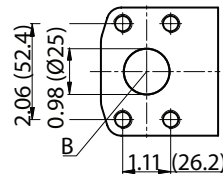
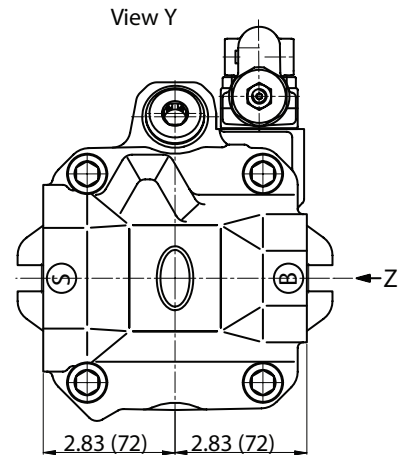
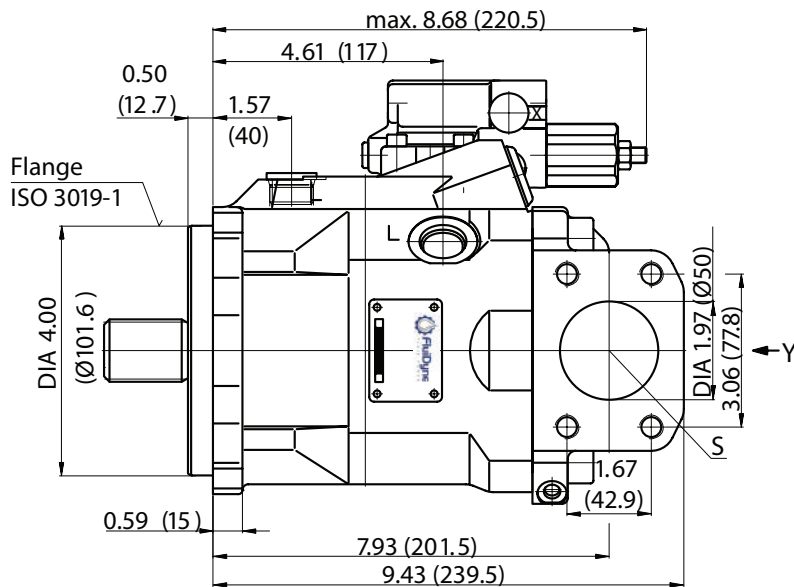
Variable Displacement Pump A10V, Series 52/53

A10V60/63¹⁾ Dimensions:

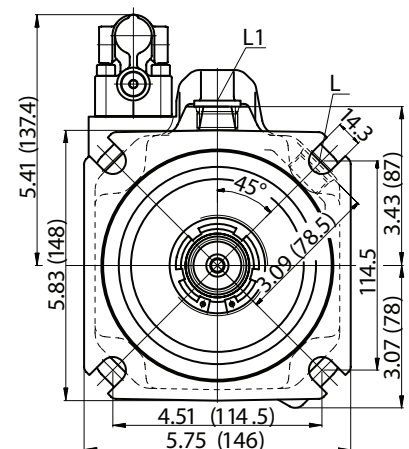
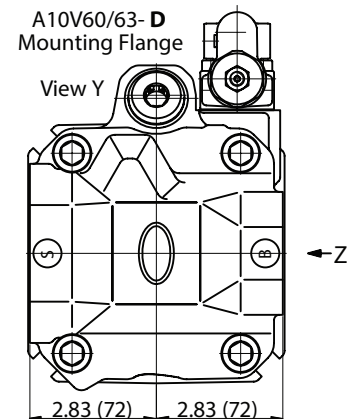
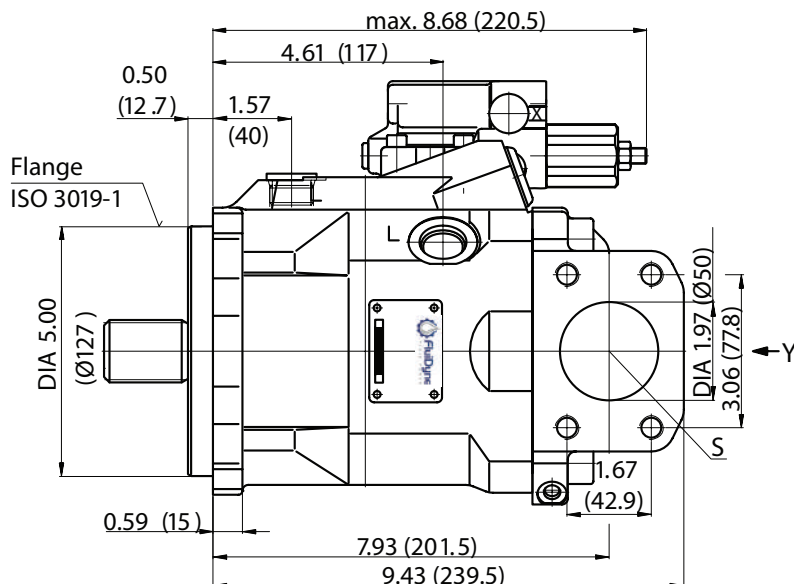
DR - Hydraulic Pressure Controller

Mounting Flange C, Clockwise Rotation ²⁾, -52 Series
A10V (60/63)DR/52R-PSCxxN00

Port plate²⁾ 62/12



Mounting Flange D ¹⁾, Clockwise Rotation ²⁾, -52 Series
A10V (60/63)DR/52R-PSDxxN00



1) Primary dimensions for pump apply for series -52 and -53 as seen above.

2) Location of service ports S and B are turned 180° for counter-clockwise rotation.

Variable Displacement Pump A10V, Series 52/53

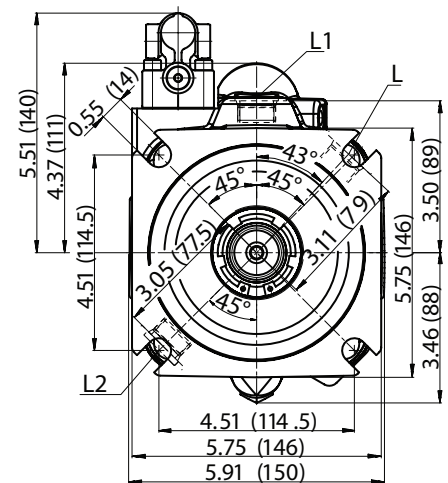
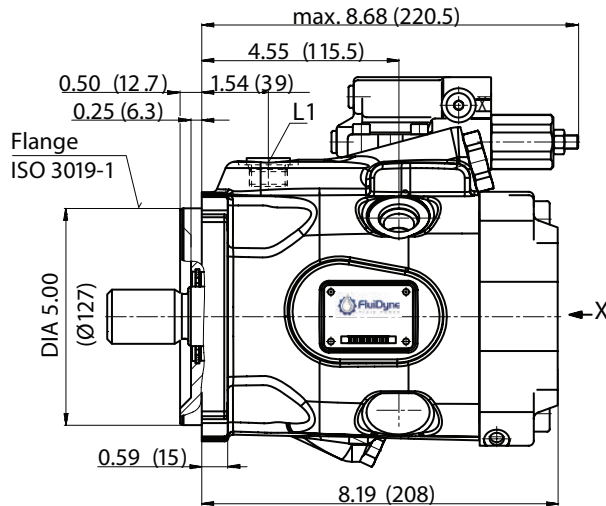
A10V60/63¹⁾ Dimensions:

DR - Hydraulic Pressure Controller

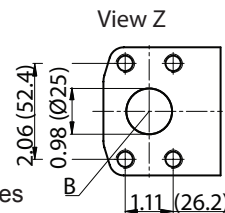
Mounting Flange D, Clockwise Rotation ²⁾, -53 Series

A10V (60/63)DR/53R-PSDxxN00

Port plate²⁾ 61/11



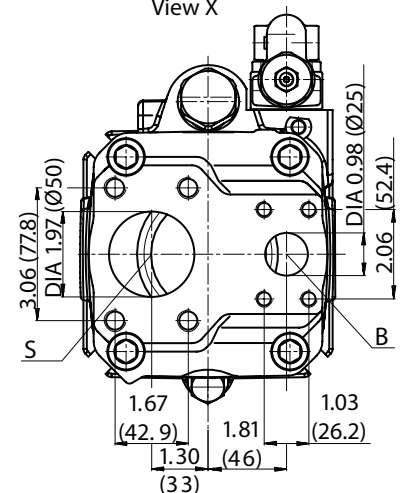
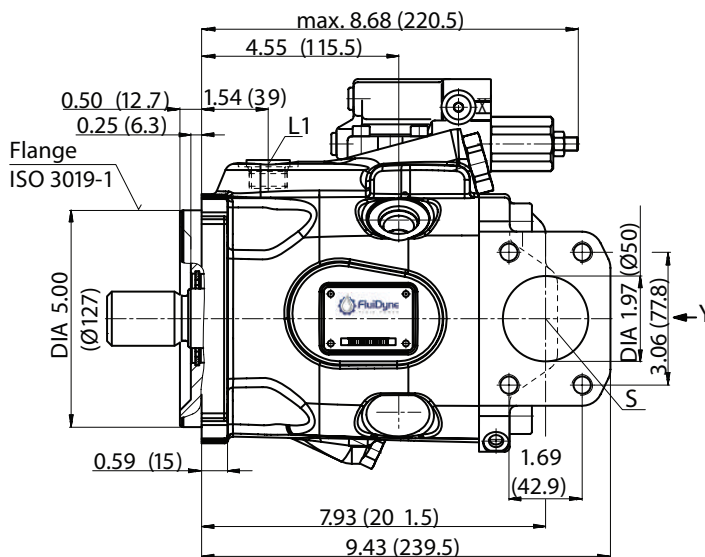
View X



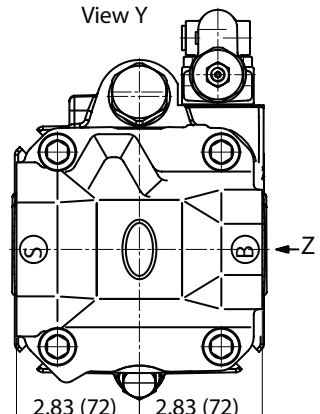
Mounting Flange D, Clockwise Rotation ²⁾, -53 Series

A10V (60/63)DR/53R-PSDxxN00

Port plate²⁾ 62/12



View Y



1) Primary dimensions for pump apply for series -52 and -53 as seen above.

2) Location of service ports S and B are turned 180° for counter-clockwise rotation.

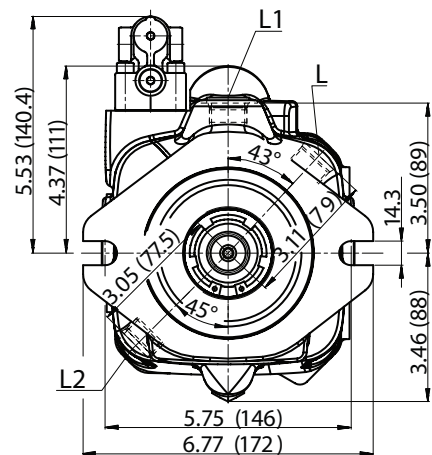
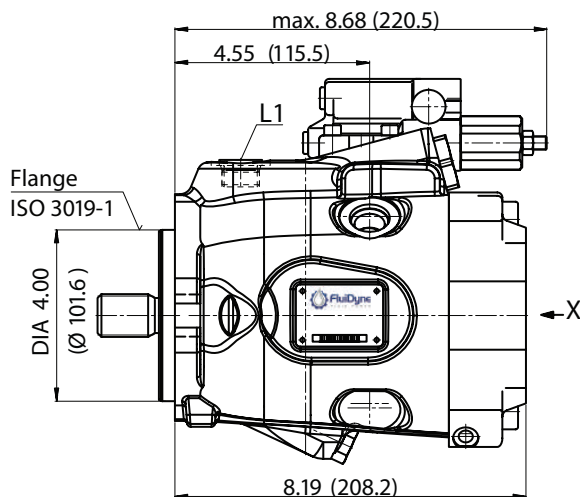
Variable Displacement Pump A10V, Series 52/53

A10V60/63¹⁾ Dimensions:

DR - Hydraulic Pressure Controller

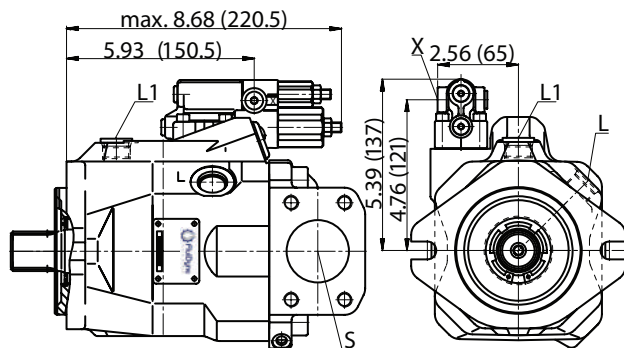
Mounting Flange C, Clockwise Rotation ²⁾, -53 Series
A10V (60/63)DR/53R-PSCxxN00

Port plate²⁾ 61/11



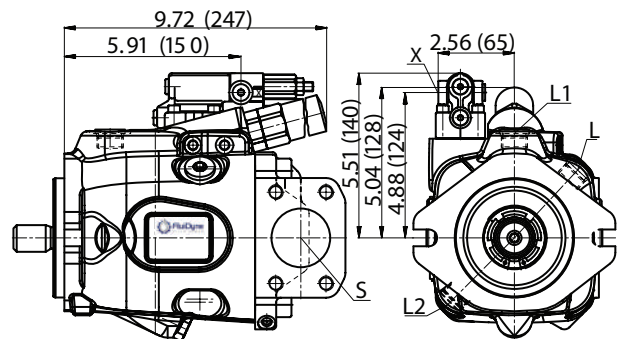
DRG / DFR / DFR1 ³⁾ - Hydraulic Controller ¹⁾ DRF ⁴⁾ / DRS ^{3) 4)}

Remote Pressure Control/ Pressure and Flow
Clockwise Rotation ²⁾, -52 Series



LA()D(S/G) ⁴⁾ - Hydraulic Controller ¹⁾

Pressure, Flow and Power Control
Clockwise Rotation ²⁾, -53 Series



1) Primary dimensions for pump apply for series -52 and -53 as seen above and on previous pages.

2) Location of service ports S and B are turned 180° for counter-clockwise rotation.

3) DFR1/DRS; Pressure and flow control with blocked bleed down orifice.

4) Only for -53 series.

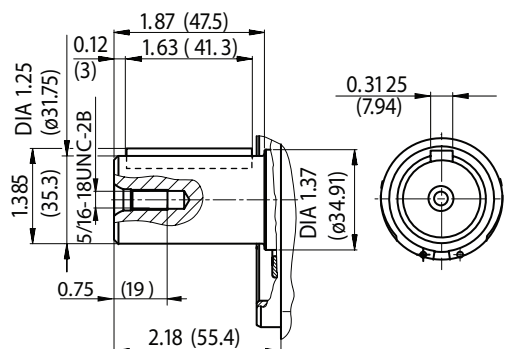
Variable Displacement Pump A10V, Series 52/53

A10V60/63 Dimensions:

Drive Shafts and Port Dimensions

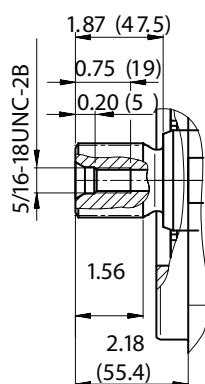
K - Parallel Keyed Shaft

1.25" diameter; 5/16" sq. key
ISO 3019-1 32-1 (C)



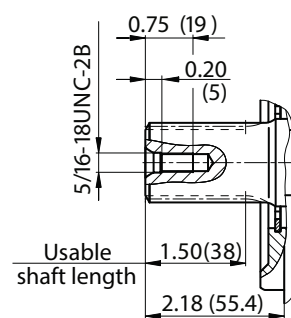
S - Splined Shaft

1.25" major dia. 14T 12/24 DP⁴⁾
SAE J744-32-4 (C)



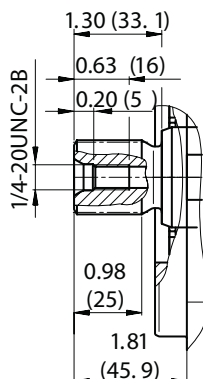
R - Splined Shaft

1.25" major dia. 14T 12/24 DP⁴⁾⁵⁾
SAE J744-32-4 (C)



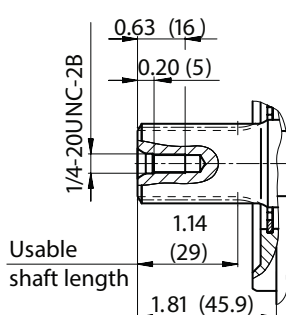
U - Splined Shaft

1.0" major dia. 15T 16/32 DP⁴⁾
SAE J744-25-4 (B-B)



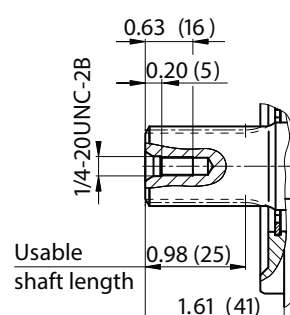
W - Splined Shaft

1.0" major dia. 15T 16/32 DP⁴⁾⁵⁾
SAE J744-25-4 (B-B)



Q - Full Splined Shaft

7/8" major dia. 13T 16/32 DP⁴⁾⁵⁾
SAE J744-22-4 (B)



Ports

		Port Code	Standard	Size	Max Tightening Torque
B	Outlet Port, SAE Flange (code 61)	61/62	SAE J518; ISO 68	1.0"; 3/8-16UNC-2B; 0.75 (19) deep	31 lb-ft (42 Nm)
S	Inlet Port, SAE Flange			2.0"; 1/2-13 UNC-2B; 0.87 (22) deep	
B	Outlet Port, SAE Flange (code 61)	11/12	SAE J518 ³⁾ ; DIN 13	1.0"; M10 x 1.5; 17 deep	48 lb-ft (66 Nm)
S	Inlet Port, SAE Flange			2.0"; M12 x 1.75; 20 deep	
B	Outlet Port; Threaded	64	ISO 11926	1-5/16"-12UN-2B; 0.79 (20) deep	243 lb-ft (330 Nm)
S	Inlet Port; Threaded			2-1/2"-12UN-2B; 0.87 (22) deep	
L ₁ , L ₂ ⁴⁾	Case Drain Ports (L ₁ plugged)	All	ISO 11926	7/8-14UNF-2B; 0.51 (13) deep	116 lb-ft (160 Nm)
X	Pilot Pressure Port	All	ISO 11926	7/16-20UNF-2B; 0.45 (11.5) deep	29 lb-ft (40 Nm)

1) Primary dimensions for pump apply for series -52 and -53 as seen above and on previous pages.

2) Location of service ports S and B are turned 180° for counter-clockwise rotation.

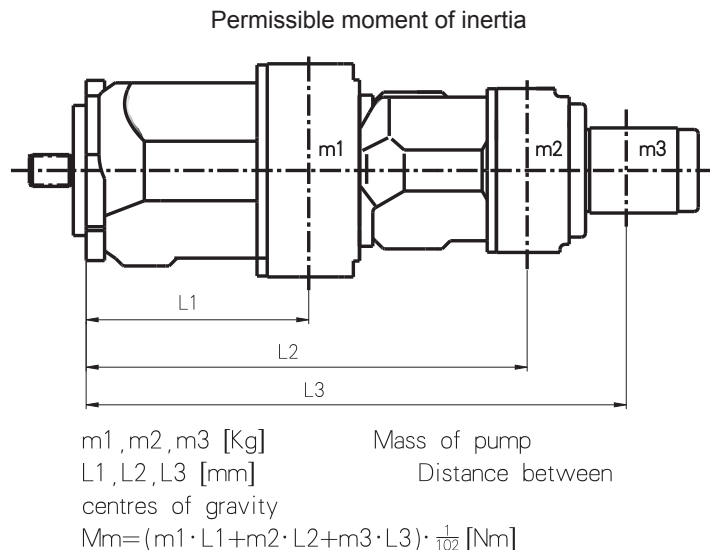
3) Metric fixing thread is a deviation from standard.

4) ANSI B92.1a, 30° pressure angle, flat root, side fit, tolerance class 5.

5) Splines according to ANSI B92.1a, run out of spline is a deviation from standard.

Variable Displacement Pump A10V, Series 52/53

Through Drives:



Sizes		10	45	60	63
m1	kg (lbs)	18 (8)	18 (40)	22 (49)	22 (49)
L1	mm (ins)	—	95 (3.74")	100 (3.94")	100 (3.94")

Axial piston unit A10V0 can be supplied with a through drive, as shown in the ordering code on pages 8 and 9.

The type of through drive is determined by codes (K01-K15). If the combination pump is not mounted in the factory, the simple type code is sufficient.

Order the coupling kit separately. Included in the kit are:
Coupling sleeve, seals and bolts.

Combination Pumps:

By mounting combination pumps circuits independent of each other are available for use.

1. If the combination pump consists of two A10V pumps and if these are to be delivered ready assembled, then the two types codes are to be combined with a "+".

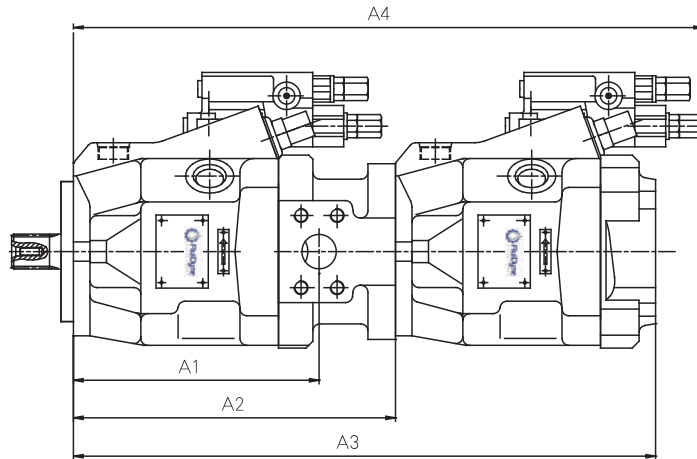
Ordering Example: A10V45DR/52R-PSC62K04 + A10V45DFR/52R-PSC62N00

2. If a gear pump or radial piston pump is to be mounted in the factory as a second pump. It contains a list of the various pump combinations together with the type code of the first pump.

Variable Displacement Pump A10V, Series 52/53

Unit Dimensions of Combination Pumps:

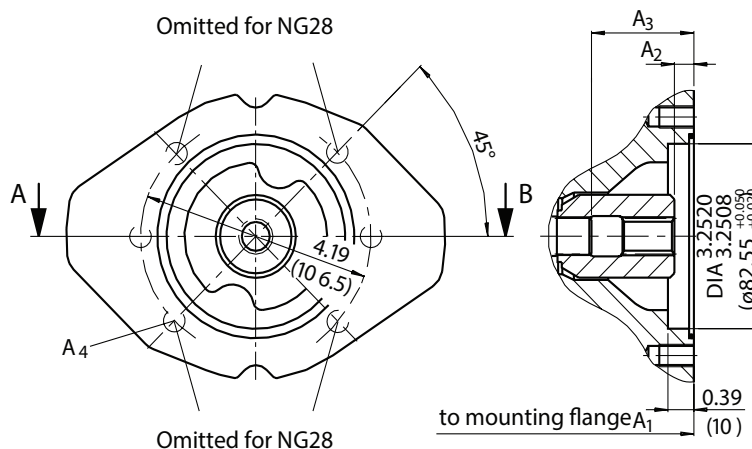
A10V()0 + A10V()0



Pump 1 (Dimensions mm)	A10V/45				A10V/60				A10V/63			
	A1	A2	A3	A4	A1	A2	A3	A4	A1	A2	A3	A4
Pump 2												
A10V45	178	229	418	445	202	255	444	471	202	255	444	471
A10V60	-	-	-	-	202	255	463	471	202	255	463	471
A10V63	-	-	-	-	202	255	463	471	202	255	463	471

Dimensions of Through Drives:

K01 Flange SAE 82-2 (SAE A, 2-hole) for mounting of external gear pump G2 or an A10V10, A10V18 - U Shaft. Order K01 coupling separately to mate to a 5/8" dia. 9T-tooth shaft.

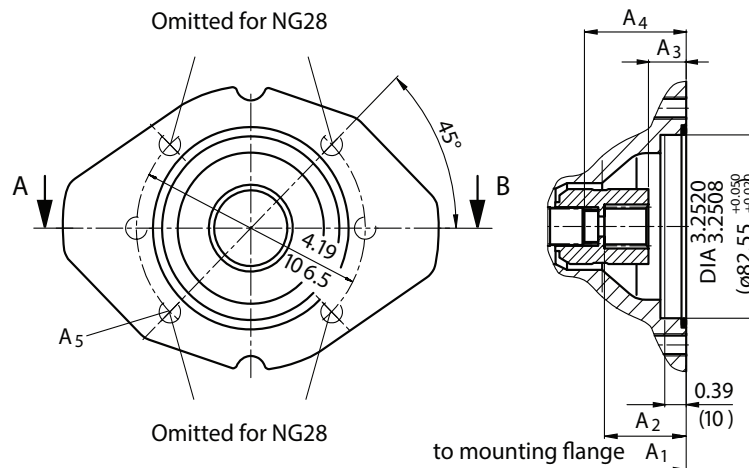


Sizes	A1 mm (in.)	A2 mm (in.)	A3 mm (in.)	A4
45	234 (9.21")	10.7 (0.42")	53 (2.09")	6-M10-1.5, (16 deep)
60/63	255 (10.01")	9.5 (0.37")	59 (2.32")	6-M10-1.5, (16 deep)

Variable Displacement Pump A10V, Series 52/53

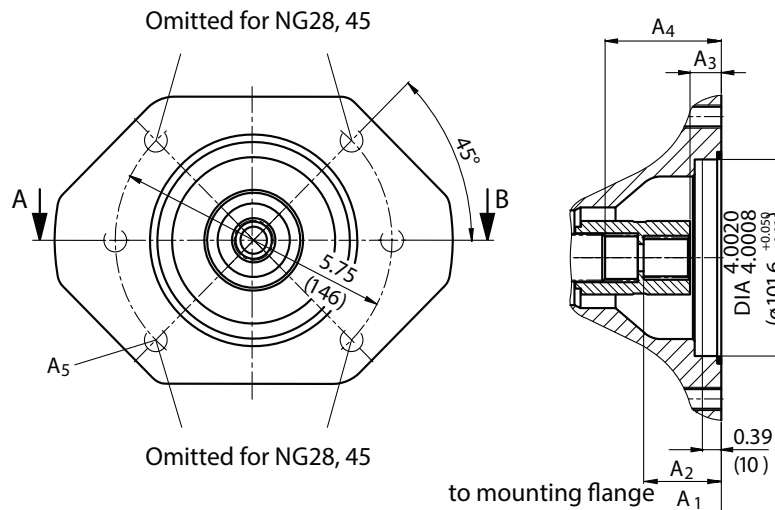
Dimensions of Through Drives (continued):

K52 Flange SAE 82-2 (SAE A, 2-hole) for mounting of an A10V10, A10V18 - S shaft or an A10V28 - U shaft. Order K01 coupling separately to mate to a 3/4" dia. 11T-tooth shaft.



Sizes	A1 mm (in.)	A2 mm (in.)	A3 mm (in.)	A4
45	234 (9.21")	39.4 (1.55")	53 (2.09")	6-M10-1.5, (16 deep)
60/63	255 (10.01")	39.4 (1.55")	59 (2.32")	6-M10-1.5, (16 deep)

K68 Flange SAE 101-2 (SAE B, 2 hole) for mounting an A10V45 - U shaft or an A10V28 - S shaft. Order K68 coupling separately to mate to a 7/8" dia. 13T-tooth shaft.

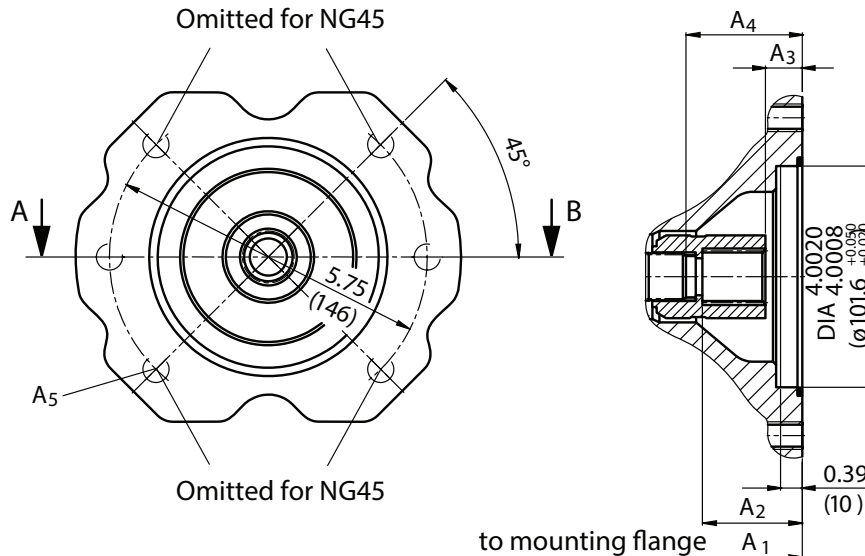


Sizes	A1 mm (in.)	A2 mm (in.)	A3 mm (in.)	A5
45	234 (9.21")	42.4 (1.67")	18 (0.71")	2-M12-1.75, (18 deep)
60/63	255 (10.04")	42.4 (1.67")	18 (0.71")	2-M12-1.75, (18 deep)

Variable Displacement Pump A10V, Series 52/53

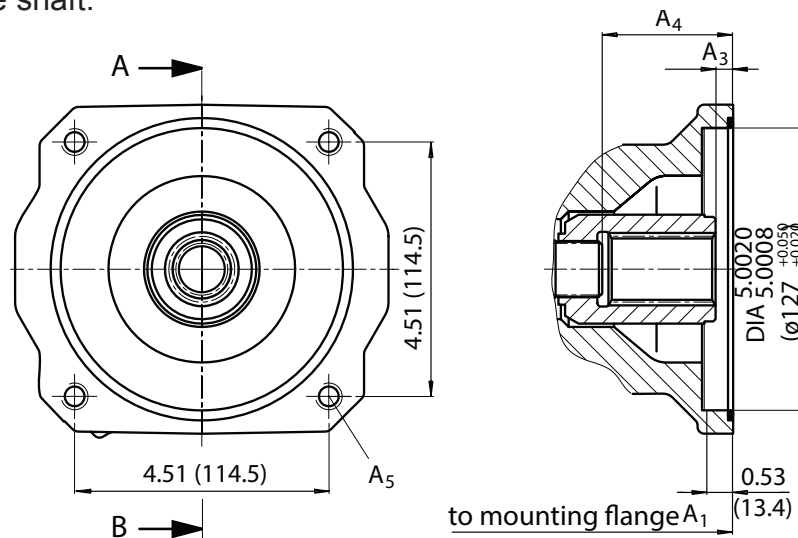
Dimensions of Through Drives (continued):

K04 Flange SAE 101-2 (SAE B, 2 hole) for mounting an A10V45 - shaft S or an A10V60/63 - U Shaft. Order K04 coupling separately to mate to a 1" dia. 15T-tooth shaft.



Sizes	A1 mm (in.)	A2 mm (in.)	A3 mm (in.)	A5
45	229 (9.02")	48 (1.88")	19 (0.74")	2-M12-1.75, (18 deep)
60/63	255 (10.04")	47.4 (1.87")	18.4 (0.72")	2-M12-1.75, (18 deep)

K15 Flange SAE 127-4 (SAE C, 4 hole) for mounting an A10V60/63 "D" pilot pump with an S-shaft. Order K15 coupling kit separately, for mating with a 1-1/4" dia. 14T-tooth spline shaft.



Sizes	A1 mm (in.)	A3 mm (in.)	A4 mm (in.)	A5
60/63	255 (10.04")	8 (0.31")	59 (2.32")	2-M12-1.75, (16 deep)

Variable Displacement Pump A10V, Series 52/53

Installation Instructions:

General

The axial piston unit must be filled with hydraulic fluid and air bled during commissioning and operation. This must also be observed following a longer standstill as the axial piston unit empty via the hydraulic lines.

Especially with the installation position “pump shaft upwards” or “pump shaft downwards”, attention must be paid to completely filling and air bleeding the pump since there is a risk of dry running.

The case drain fluid in the case interior must be directed to the reservoir via the highest case drain port (L, L₁, L₂).

For combinations of multiple units, make sure that the respective case pressure in each unit is not exceeded. In the event of the pressure differences at the drain ports of the units, the shared drain line must be changed so that the minimum permissible case pressure of all connected units is not exceeded in any situation. If this is not possible, separate drain lines must be laid.

To achieve favorable noise values, decouple all connecting lines using elastic elements and avoid above reservoir installation.

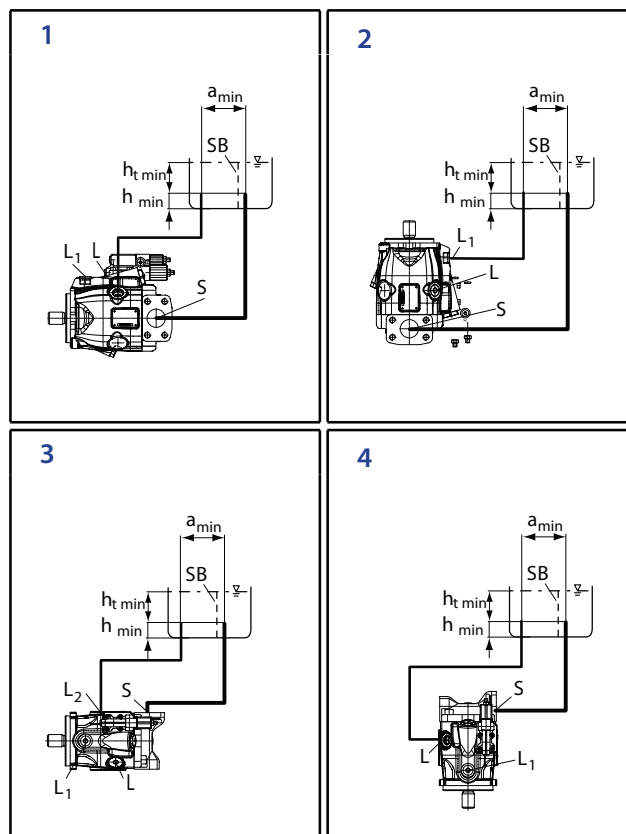
In all operating conditions, the suction line and the case drain line must flow into the reservoir below the minimum fluid level. The permissible suction height $h_{s \max} = 31.50$ in (800 mm). The minimum suction pressure at port S must also not fall below 12 psi (0.8 bar) absolute during operation.

Installation Position:

See the following examples 1 thru 12 for proper plumbing of hydraulic lines for various pump installations. Installation positions 1 and 3 are the recommended conditions most favorable for a long extended life of the pump.

Below-Reservoir Installation (Standard)

Below-reservoir installation means the axial piston unit is installed outside of the reservoir below the minimum fluid level.



Installation position	Air bleed	Filling
1	L	S + L
2	L ₁	S + L ₁
3 ¹⁾	L ₂	S + L ₂
4	L	S + L

¹⁾ Only series 53

Key on following page

Variable Displacement Pump A10V, Series 52/53

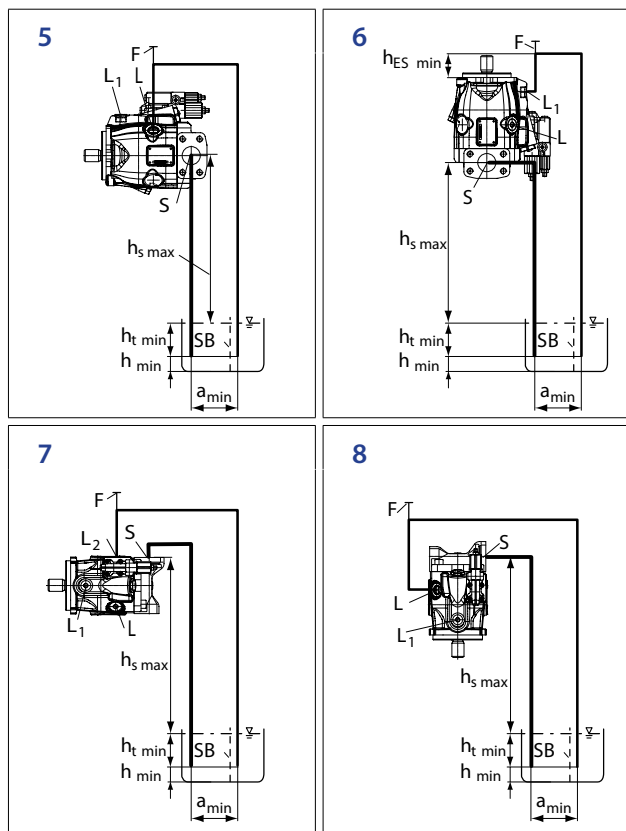
Installation Instructions:

Above-reservoir installation

Above-reservoir installation means the axial piston unit is installed above the minimum fluid level of the reservoir. To prevent the axial piston unit from draining, a height difference $h_{ES \min}$ of at least 0.98 in (25 mm) is required in installation position 6.

Observe the maximum permissible suction height $h_{S \max} = 31.50$ in (800 mm).

A check valve in the case drain line is only permissible in individual cases.



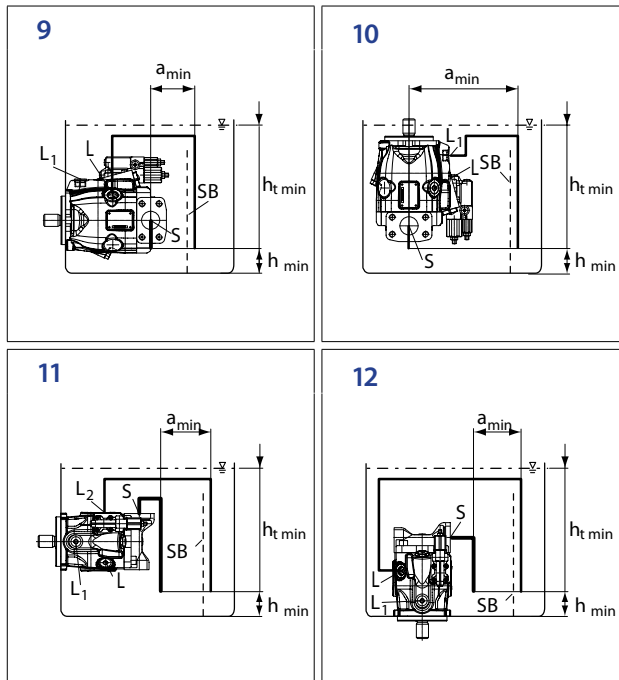
Installation position	Air bleed	Filling
5	F	L, L ₁ (F)
6	F	L ₁ (F)
7 ¹⁾	F	S + L ₂ (F)
8	F	S + L (F)

¹⁾ Only series 53

Inside-reservoir installation

Inside-reservoir installation means the pump is installed within the minimum reservoir fluid level.

Axial piston units with electrical components (e.g. electric control, sensors) may not be installed in a reservoir below the fluid level.



Installation position	Air bleed	Filling
9	L ₁	L, L ₁
10	L ₁	L, L ₁
11 ¹⁾	L ₂	S
12	L	S + L

- S** Suction port
- F** Filling / air bleeding
- L, L₁, L₂** Case drain port
- SB** Baffle (baffle plate)
- $h_{t \min}$** Minimum necessary immersion depth (7.87 in (200 mm))
- $h_{\min}$** Minimum necessary spacing to reservoir base (3.94 in (100 mm))
- $h_{ES \min}$** Minimum necessary height needed to protect the axial piston unit from draining (0.98 in (25 mm))
- $h_{S \max}$** Maximum permissible suction height (21.50 in (800 mm))
- $a_{\min}$** When designing the reservoir, ensure adequate distance between the suction line and the case drain line. This prevents the heated, return flow from being drawn directly back into the suction line.