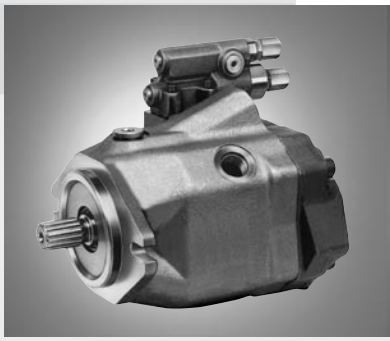
Rexroth
Bosch Group

Axial Piston Variable Pump A10VO

RA 92703/11.07 1/44
Replaces: 06.07

Data sheet

Series 52/53
Size 10...85
Nominal pressure 3600 psi (250 bar)
Peak pressure 4600 psi (315 bar)
Open circuit



Series 52

Series 53

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Features

- Variable axial piston pump in swash plate design for hydrostatic drives in open circuits
- Flow is proportional to drive speed and displacement. The flow is infinitely variable by adjustment of the swash plate.
- Strong bearings for long service life
- High permissible drive speeds
- High power to weight ratio
- Small dimensions
- Low noise level
- Good suction characteristics
- Axial and radial loading of drive shaft possible
- Pressure and flow control
- Electro-hydraulic pressure control
- Power control
- Electro-proportional displacement control
- Short response times

Ordering code - standard program

A10V(S)	**O**			/	**5**			–	**V**				
01	02	03	04		05	06	07		08	09	10	11	12

Axial piston unit

		10	18	28	45	63	85	
01	Swash plate design, variable	●	–	–	–	–	–	**A10VS**
	Nom. pressure 3600 psi (250 bar), peak pressure 4600 psi (315 bar)	–	●	●	●	●	●	**A10V**

Operating mode

02	Pump, open circuit	**O**

Size

			10	18	28	45	63	85
03	~displacement $V_{g\ max}$ in	in^3	0.61	1.10	1.71	2.75	3.84	5.18
		(cm^3)	(10)	(18)	(28)	(45)	(63)	(85)

Control devices[1)]

04	Pressure control	DR								●	●	●	●	●	●	**DR**
	with hydraulic flow control															
	X-T open	D				F	R			●	–	●	●	●	●	**DFR**
	X-T open	DR				F				–	●	○	○	○	○	**DRF**
	X-T closed	DFR1								●	–	●	●	●	●	**DFR1**
	X-T closed	DR				S				–	●	○	○	○	○	**DRS**
	with flow control, electro-hydraulic adjustment of differential pressure (inverse proportional characteristic), (RA 92 709)															
		EF	.	D		.				–	○	○	○	●	●	**EF.D.**
	with remote pressure control															
	hydraulic	DR			G					●	●	●	●	●	●	**DRG**
	electric, inverse characteristic	ED	.							–	●	●	●	●	●	**ED.**
	Power control															
	with pressure control															
	minimum start of control															
	145 to 510 psi (10 to 35 bar)	LA	5	D						–	●	●	●	●	●	**LA5D**
	520 to 1015 psi (36 to 70 bar)	LA	6	D						–	●	●	●	●	●	**LA6D**
	1030 to 1520 psi (71 to 105 bar)	LA	7	D						–	●	●	●	●	●	**LA7D**
	1535 to 2030 psi (106 to 140 bar)	LA	8	D						–	●	●	●	●	●	**LA8D**
	2045 to 3335 psi (141 to 230 bar)	LA	9	D						–	●	●	●	●	●	**LA9D**
	with remote pressure control															
	min. start of control see above	LA	X	D	G					–	●	●	●	●	●	**LAXDG**
	with pressure and flow control, X-T closed															
	min. start of control see above	LA	X	D		S				–	●	●	●	●	●	**LAXDS**
	with press. and flow controlol electr. adjustment of diff. press. (inverse prop. characteristic), X-T closed (RA 92 709)															
	min. start of control see above	LA	X			S		.		–	●	●	●	●	●	**LAXS.**
	Electro-proportional displacement control (RA 92 708)															
	with pressure and flow control, positive characteristic															
		EP	.	D		.				–	●	●	●	●	●	**EP.D.**
	with pressure and flow control, positive characteristic; deactivation of control at I = 0															
		EK	.	D		.				–	●	●	●	●	●	**EK.D.**

Series

05		**5**

[1)] For availability of control options in series 52 and 53 see index 06 in ordering code

A10V(S)	O			/	5			–	V				
01	02	03	04		05	06	07		08	09	10	11	12

	Index	10	18	28	45	63	85	
06	DR, DFR, DFR1, DRG, ED	●	–	●	●	●	●	**2**[1]
	DR, DRF, DRS, DRG, ED...	–	●	○	○	○	○	**3**
	EF..., LA..., EP..., EK...	–	●	●	●	●	●	**3**

Direction of rotation

07	viewing on shaft end	right hand	**R**
		left hand	**L**

Seals

08	FKM (fluor-rubber)	**V**

	Shaft end	10	18	28	45	63	85	
09	Splined shaft to SAE J744, standard shaft	●	●	●	●	●	●	**S**
	Similar to shaft „S“ however for higher input torque	–	●	●	●	●	–	**R**
	Splined shaft to SAE J744, reduced diameter, not for through drive	●	●	–	●	●	●	**U**
	Similar to shaft „U“ higher input torque, not for through drive	–	–	–	●	●	●	**W**
	Parallel shaft SAE with key	●	–	●	●	●	–	**K**[2]
	Tapered with Woodruff key	–	–	●	●	●	–	**C**[2]

Mounting flange

10	SAE 2-hole	●	●	●	●	●	●	**C**
	SAE 4-hole	–	–	–	–	●	○	**D**

Port for service lines

11	SAE flange at rear, UNC fixing thread(no through drive)	–	●	●	●	●	●	**61**
	SAE flange on side-opposite sides, UNC fixing thread (for through drive)	–	●	●	●	●	●	**62**
	Threaded ports at rear, UNC threads (no through drive)	●	–	●	●	–	–	**64**[2]

Through drive

12	Without through drive (standard for version 61 and 64)			●	●	●	●	●	●	**N00**
	Flange SAE J744	Coupler for splined shaft[3]	Sealing						
	82-2 (A)	5/8 in 9T 16/32DP	axial	–	○	●	●	●	●	**K01**
	82-2 (A)	3/4 in 11T 16/32DP	axial	–	○	●	●	●	●	**K52**
	101-2 (B)	7/8 in 13T 16/32DP	axial	–	–	●	●	●	●	**K68**
	101-2 (B)	1 in 15T 16/32DP	axial	–	–	–	●	●	●	**K04**
	127-4 (C)	1 1/4 in 14T 12/24DP	axial	–	–	–	–	●	–	**K15**
	127-2 (C)	1 1/4 in 14T 12/24DP	axial	–	–	–	–	–	●	**K07**
	127-2 (C)	1 1/2 in 17T 12/24DP	axial	–	–	–	–	–	●	**K24**

[1] Not for new projects. For new projects use only series 53.
[2] only Series 52
[3] 30° pressure angle, flat base, flank centering, fit class 5

● available ○ in preparation – not available

Hydraulic fluids

Prior to project design, please see our technical data sheets RE 90220 (mineral oil), RE 90221 (environmentally acceptable fluids) and RE 90223 (HF-fluids) for detailed information on fluids and operating conditions.

When using HF- or environmentally acceptable fluids attention must be paid to possible limitations of the technical data, if necessary contact us. (when ordering please state in clear text the fluid to be used). Operation on Skydrol is only possible after consultation with us.

Operating viscosity range

For optimum efficiency and service life we recommend that the operating viscosity be chosen in the range of:

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

referred to tank temperature (open circuit).

Limit of viscosity range

For critical operating conditions the following values apply:

ν_{min} = 60 SUS (10 mm²/s)
for short periods (t ≤ 1 min)
at max. permissible leakage fluid temperature of 239 °F (115 °C).

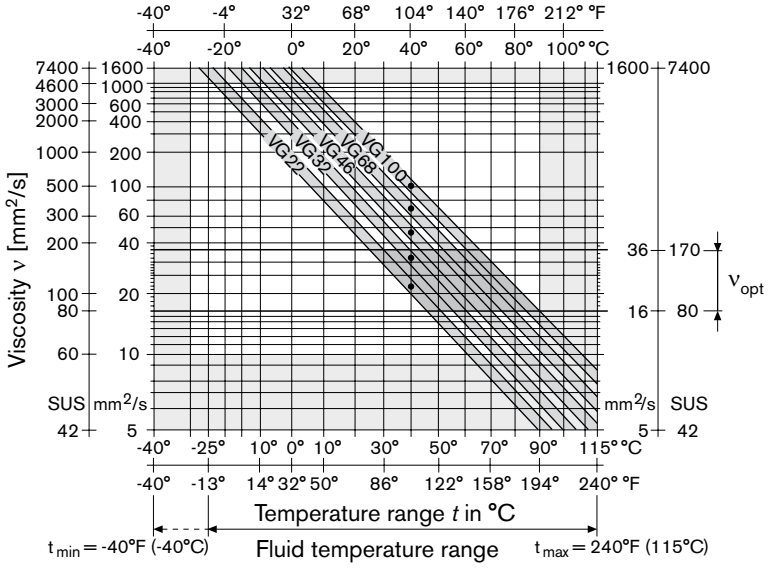
Please note, that the max fluid temperature of 239 °F (115 °C) is also not exceeded in certain areas (for instance bearing area) The fluid temperature in the bearing area is approx. 7 °F (5 K) higher than the average leakage fluid temperature.

ν_{max} = 7500 SUS (1600 mm²/s)
for short periods (t ≤ 1 min)
on cold start
(t_{min} = p ≤ 435 psi (30 bar), n ≤ 1000 rpm, -13 °F (-25 °C))

At temperatures between -13 °F (-25 °C) and -40 °F (-40 °C) special measures may be required, depending on installation conditions. Please consult us for further information.

For detailed information on operation with low temperatures see data sheet RE 90300-03-B.

Selection diagram



Notes on the selection of the 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 fluid should be selected so that within the operating temperature range, the viscosity lies within the optimum range (ν_{opt}), see shaded section of the selection diagram. We recommend to select the higher viscosity grade in each case.

Example: at an ambient temperatue of X °F (X °C) the operating temperature in the tank is 140 °F (60 °C). In the optimum viscosity range (ν_{opt}; shaded area) this corresponds to viscosity grades VG 46 resp. VG 68; VG 68 should be selected

Important: The leakage fluid (case drain fluid) temperature is influenced by pressure and input speed, and is always higher than the tank temperature. However, at no point in the circuit may the temperature exceed 239 °F (115 °C).

If it is not possible to comply with these conditions because of extreme operating parameters or high ambient temperatures, please consult us.

Filtration of fluid

The finer the filtration the better the achieved cleanliness of the hydraulic 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 to ISO 4406 is necessary.

At very high operating temperatures (195 °F (90 °C) to max. 239 °F (115 °C)) a cleanliness of

19/17/14 to ISO 4406 is necessary.

If above mentioned grades cannot be maintained please consult us.

Technical data

Operating pressure range

Inlet

Absolute pressure at port S

$p_{abs\ min}$ _____ 12 psi (0,8 bar)

$p_{abs\ max}$ _____ 73 psi (5 bar)

To determine the min. required inlet pressure p_{abs} at inlet port S or the reduction of displacement at higher input speeds see the diagram to the right.

Outlet

Pressure at port B

Nominal pressure p_N _____ 3600 psi (250 bar)

Peak pressure p_{max} _____ 4600 psi (315 bar)

(Pressures to DIN 24312)

Direction of flow

S to B.

Case drain pressure

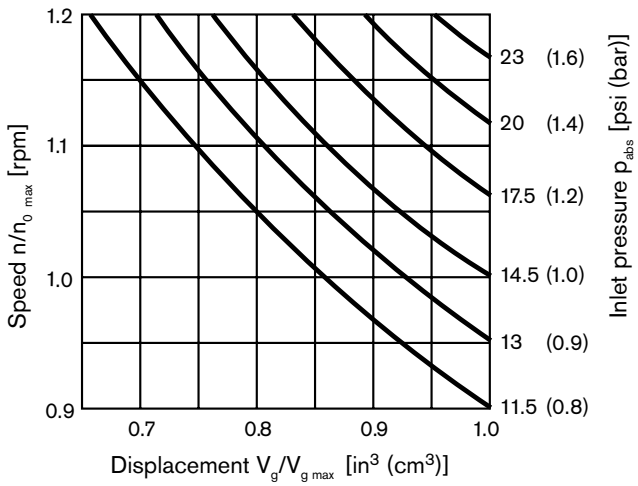
Maximum permissible case drain pressure (port L, $L_{1/2}$):

maximum 7 psi (0,5 bar) higher than the inlet pressure at port S, however not higher than 29 psi (2 bar) absolute.

$p_{L\ abs\ max}$ _____ 29 psi (2 bar)

Maximum permissible speed (Speed limit)

Permissible speed by increase of inlet pressure p_{abs} at the inlet port S or reduction of displacement ($V_g \leq V_{g\ max}$).



Technical data

Table of values (theoretical values, without considering efficiencies and tolerances; values rounded)

Size		A10V(S)O		10	18	28	45	63	85
Displacement		$V_{g\ max}$	in^3	0.64	1.10	1.71	2.75	3.84	5.18
			(cm^3)	(10,5)	(18)	(28)	(45)	(63)	(85)
Speed[1]									
max. at $V_{g\ max}$		$n_{0\ max}$	rpm	3600	3300	3000	2600[2]	2600	2500
max. at $V_g < V_{g\ max}$		$n_{0\ max\ zul}$	rpm	4320	3960	3600	3120	3140	3000
Flow									
at $n_{0\ max}$		$q_{V0\ max}$	gpm	9.7	15.6	22	31	43	55
			(L/min)	(37)	(59)	(84)	(117)	(163)	(212)
at n_E=1500 min^{-1}		$q_{VE\ max}$	gpm	4	7.1	11.1	18	25.1	34
			(L/min)	(15)	(27)	(42)	(68)	(95)	(128)
Power	Δp = 3600 psi (250 bar)								
at $n_{0\ max}$		$P_{o\ max}$	HP (kW)	22 (16)	34 (25)	47 (35)	65 (49)	90 (68)	119 (89)
at n_E=1500 min^{-1}		$P_{E\ max}$	HP (kW)	9.4 (7)	15 (11)	24 (18)	38 (28)	52 (39)	71 (53)
Torque									
at $V_{g\ max}$	Δp = 3600 psi (250 bar)	T_{max}	lb-ft	31	52	82	132	184	247
			(Nm)	(42)	(71)	(111)	(179)	(250)	(338)
	Δp = 1440 psi (100 bar)	T	lb-ft	13	21	33	53	74	102
			(Nm)	(17)	(29)	(45)	(72)	(100)	(135)
Torsional stiffness	Shaft S	c	lb-ft/rad	6760	8082	16400	27560	48100	105100
			(Nm/rad)	(9200)	(11000)	(22300)	(37500)	(65500)	(143000)
	Shaft R	c	lb-ft/rad	–	10870	19400	30240	51200	–
			(Nm/rad)	–	(14800)	(26300)	(41000)	(69400)	–
	Shaft U	c	lb-ft/rad	5020	5870	–	22130	36290	75900
			(Nm/rad)	(6800)	(8000)	–	(30000)	(49200)	(102900)
	Shaft W	c	lb-ft/rad	–	–	–	25370	39830	86960
			(Nm/rad)	–	–	–	(34400)	(54000)	(117900)
	Shaft K/C	c	lb-ft/rad	7965	–	19770	32380	54506	–
			(Nm/rad)	(10800)	–	(26800)	(43900)	(73900)	–
Moment of inertia rotary group		J_{TW}	$lbs\text{-}ft^2$	0.0142	0.2207	0.0403	0.0783	0.1329	0.2848
			(kgm^2)	(0,0006)	(0,00093)	(0,0017)	(0,0033)	(0,0056)	(0,012)
Angular acceleration, max.[3]		α	rad/s^2	8000	6800	5500	4000	3300	2700
Fill volume		V	gal	0.05	0.06	0.08	0.13	0.21	0.26
			(L)	(0,2)	(0,25)	(0,3)	(0,5)	(0,8)	(1)
Weight approx. (without fluid)		m	lbs (kg)	17 (8)	25 (11,5)	31 (14)	40 (18)	48.5 (22)	75 (34)

[1] Values are valid with inlet pressure of 15 psi (1 bar) at suction inlet S. With reduced displacement or increased inlet pressure the drive speed can be increased according to the diagram on page 5.

[2] For higher drive speeds please consult us.

[3] – These values are valid for conditions between the min. required and the max. permissible drive speeds. For external sources of excitation (eg. diesel engine 2-8 fold rotary frequency, cardan shaft 2 fold rotary frequency).
– The limit is valid for a single pump.
– The load carrying capacity of the connecting parts must be taken into consideration.

Caution: Exceeding these limits can lead to a loss of operability, reduction of service life or complete destruction of the axial piston unit. The permissible values can be calculated.