The Drive & Control Company

Rexroth
Bosch Group

Axial piston variable pump A10VO, A10VSO

Series 31

Instruction manual
RE 92701-01-B/04.2018

Replaces: 01.2012
English

5 About this product

5.1 Performance description

The axial piston variable pump generates, controls and regulates a hydraulic-fluid flow. The A10VO is designed for mobile applications such as construction machinery. The A10VSO is designed for stationary applications such as tooling machines.
Refer to data sheets 92701 and 92711 and the order confirmation for the technical data, operating conditions and operating limits of the axial piston unit.

5.2 Product description

The A10VO and A10VSO are variable pumps with axial piston rotary group in swashplate design for hydrostatic drive in an open circuit. Flow is proportional to drive speed and displacement. The flow can be steplessly changed by controlling the cradle (**14**). For axial piston units with swashplate design, the pistons are arranged axially relative to the drive shaft (**1**).

Open circuit

In an open circuit, the hydraulic fluid flows from the reservoir to the hydraulic pump from where it is fed to the consumer, e.g. hydraulic motor.
From the consumer, the hydraulic fluid flows directly back to the reservoir.

5.2.1 Axial piston unit layout

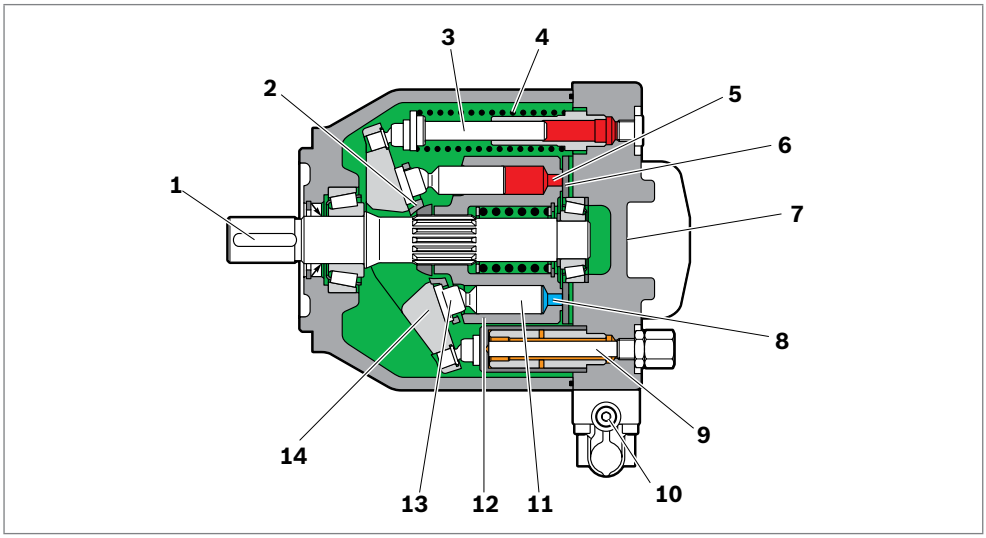


Fig. 2: Layout of the A10VO/A10VSO

1 Drive shaft
2 Retaining plate
3 Opposed piston
4 Spring
5 High-pressure side
6 Control plate (distributor plate)
7 Connection plate
8 Suction side
9 Stroking piston
10 Control valve
11 Piston
12 Cylinder
13 Slipper pad
14 Cradle

Port overview

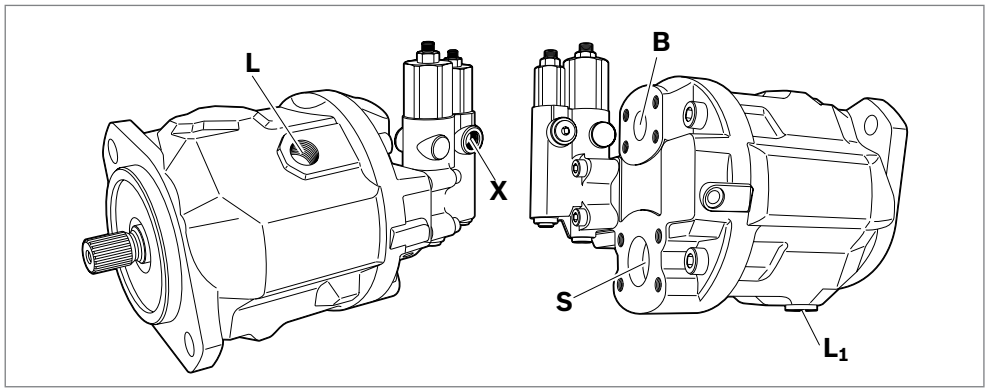


Fig. 13: Port overview A10VO Series 31, SAE flange ports at rear

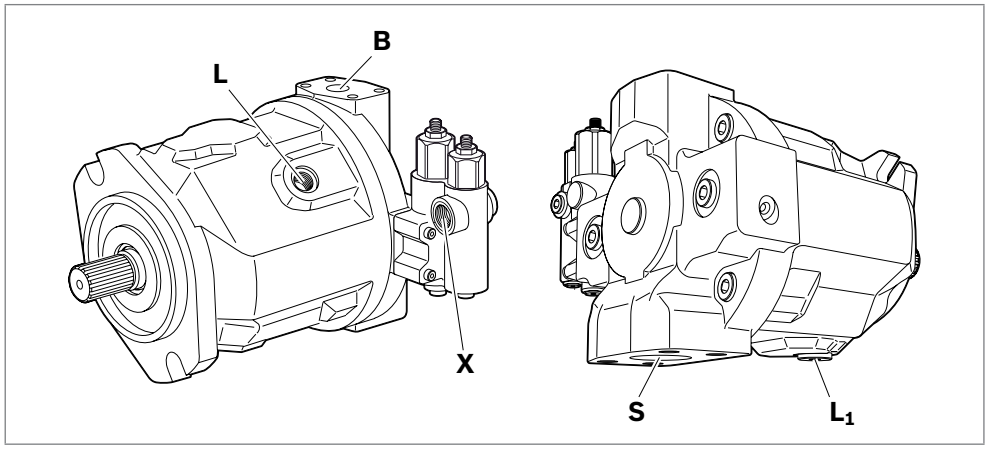


Fig. 14: Port overview A10VO/A10VSO Series 31, SAE flange ports at top, opposite at bottom

Table 11: Ports A10VO/A10VSO Series 31

Ports[1]		p_{max} **[bar]**[2]	**State**[3]
B	Working port (standard pressure series)	350	O
S	Suction port (standard pressure series)	10	O
L	Drain port	2	O[4]
$\mathbf{L_1}$	Drain port	2	X[4]
X	Pilot pressure	350	O
X	Pilot pressure with DG-control	350	O

[1] The measuring system and thread size can be found in the installation drawing.

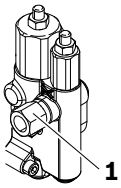
[2] Momentary pressure peaks may occur depending on the application. Keep this in mind when selecting measuring devices and fittings.

[3] O = Must be connected (plugged when delivered)
X = Plugged (in normal operation)

[4] Depending on the installation position, **L** or $\mathbf{L_1}$ must be connected (see section 7.3 “Installation position” on page 27).

Connect line to pilot pressure port with adapter

Please comply with the following information for the version with adapter (concerns controller DRG, DFR/DFR1/DRSC, DFLR).



- When connecting and tightening the connection line to the pilot pressure port **X**, the adapter (**1**) must be secured with a tightening torque of 20 Nm (WAF 19). The maximum permissible tightening torque of 45 Nm in the female thread of the adapter (M14 x 1.5, 12 deep) must not be exceeded.

If the adapter (**1**) is unscrewed from the pilot pressure port **X** and then screwed back in again, it must be tightened with a tightening torque of 23 + 2.5 Nm.

For the version without adapter, the pilot pressure port **X** has an ISO 11926 thread of size 7/16-20 UNF-2B; 11.5 deep.

Tightening torques

The following tightening torques apply:

- Fittings:
  Observe the manufacturer's specifications regarding the tightening torques of the fittings used.
- Female threads in the axial piston unit:
  The maximum permissible tightening torques $M_{G\,max}$ are the max. values of the female threads and should not be exceeded. For values, see Table 12.
- Threaded plugs:
  For the metallic threaded plugs supplied with the axial piston unit, the required tightening torques of threaded plugs M_V apply. For values, see Table 12.
- Mounting bolts:
  For mounting bolts with metric ISO threads as defined in DIN 13 or threads defined in ASME B1.1, we recommend checking the tightening torque on a case-by-case basis in accordance with VDI 2230.

14 Troubleshooting

Table 14 is intended to help you with troubleshooting. This table is not exhaustive. Issues may occur in practice that are not listed here.
Only authorized personnel may perform troubleshooting inside a safety area designated by the machine manufacturer.

14.1 How to proceed for troubleshooting

- Preferably perform the troubleshooting with reduced operating data (e.g. slowly swinging in or out and slow pressure increase).
- Use a systematic and targeted approach, even when pressed for time. Random, indiscriminate removal and changing of settings could make it impossible to determine the original cause of the fault.
- First get a general idea of how your product works in conjunction with the entire system.
- Try to find out whether or not the product was working properly in conjunction with the entire system before the fault occurred.
- Try to determine any changes to the entire system in which the product is installed:
  - Were there any changes to the product's application conditions or operating range?
  - Has maintenance work recently been carried out? Is there an inspection or maintenance log?
  - Have any changes (e.g. upgrades) or repairs been made to the overall system (machine/system, electronics, control) or to the product? If yes, which?
  - Has the hydraulic fluid been changed?
  - Has the product or machine been used as intended?
  - How does the malfunction appear?
- Try to get a clear idea of the cause of the fault. Directly ask the (machine) operator.
- Document the work carried out.
- If you cannot rectify the fault, get in touch with one of the contact addresses found at:
  `www.boschrexroth.com/addresses`.

14.2 Malfunction table

Table 14: Axial piston unit malfunction table

Malfunction	Possible cause	Remedy
Unusual noises	Insufficient air bleeding of the hydraulic system	Fill the axial piston unit, suction line for the hydraulic pump and the reservoir
		Completely air bleed the axial piston unit and hydraulic system
		Check correct installation position
	Insufficient suction conditions, for example, insufficient dimensioning of the suction line, viscosity of the hydraulic fluid too high, suction height too high, suction pressure too low, foreign particles in the suction line, impermissible filter in the suction line	Machine/system manufacturer: check the system, for example, optimize inlet conditions, use suitable hydraulic fluid
		Fill the suction line with hydraulic fluid
		Remove foreign particles from the suction line
	Drive speed too high	Machine/system manufacturer: Reduce drive speed
	Wrong direction of rotation	Machine/system manufacturer: Check correct direction of rotation; see chapter 7.4.1 “Preparation” on page 31
	Improper mounting of the axial piston unit	Check the mounting of the axial piston unit according to the specifications of the machine/ system manufacturer – observe tightening torques
	Improper mounting of assembled parts, hydraulic lines or improper installation of the coupling	Mount assembled parts according to the information provided by the coupling fitting manufacturer
	Valve and controller vibrations	Optimize the adjustment of the axial piston unit and the pressure limitation in the hydraulic system
	Mechanical damage to the axial piston unit (e.g. bearing damage)	Replace axial piston unit
		Contact Bosch Rexroth Service
Increased, unusual vibration	Bearings worn	Contact Bosch Rexroth Service

Table 14: Axial piston unit malfunction table

Malfunction	Possible cause	Remedy
No or insufficient flow	Insufficient air bleeding of the hydraulic system	Fill the axial piston unit, suction line for the hydraulic pump and the reservoir
		Completely air bleed the axial piston unit and hydraulic system
	Faulty mechanical drive (for example, defective coupling)	Contact machine/system manufacturer
	Drive speed too low	Contact machine/system manufacturer
	Insufficient suction conditions, for example, insufficient dimensioning of the suction line, viscosity of the hydraulic fluid too high, suction height too high, suction pressure too low, foreign particles in the suction line, impermissible filter in the suction line	Machine/system manufacturer: check the system, for example, optimize inlet conditions, use suitable hydraulic fluid
		Fill the suction line with hydraulic fluid
		Remove foreign particles from the suction line
	Hydraulic fluid not in optimal viscosity range	Machine/system manufacturer: Check temperature range and use suitable hydraulic fluid
	Insufficient pilot pressure or control pressure	Check pilot pressure or control pressure
		Contact Bosch Rexroth Service
	Malfunction of the control device or controller of the axial piston unit	Contact Bosch Rexroth Service
	Control of the control device defective	Check control (contact machine/system manufacturer or Bosch Rexroth Service)
	Wear or mechanical damage to the axial piston unit	Replace axial piston unit
		Contact Bosch Rexroth Service

Table 14: Axial piston unit malfunction table

Malfunction	Possible cause	Remedy
No or insufficient pressure	Insufficient air bleeding of the hydraulic system	Fill the axial piston unit, suction line for the hydraulic pump and the reservoir
		Completely air bleed the axial piston unit and hydraulic system
		Check correct installation position
	Faulty mechanical drive (for example, defective coupling)	Contact machine/system manufacturer
	Drive power too low	Contact machine/system manufacturer
	Insufficient suction conditions, for example, insufficient dimensioning of the suction line, viscosity of the hydraulic fluid too high, suction height too high, suction pressure too low, foreign particles in the suction line, impermissible filter in the suction line	Machine/system manufacturer: check the system, for example, optimize inlet conditions, use suitable hydraulic fluid
		Fill the suction line with hydraulic fluid
		Remove foreign particles from the suction line
	Hydraulic fluid not in optimal viscosity range	Machine/system manufacturer: Check temperature range and use suitable hydraulic fluid
	Insufficient pilot pressure or control pressure	Check pilot pressure or control pressure
		Contact Bosch Rexroth Service
	Malfunction of the control device or controller of the axial piston unit	Contact Bosch Rexroth Service
	Control of the control device defective	Check control (contact machine/system manufacturer or Bosch Rexroth Service)
	Wear or mechanical damage to the axial piston unit	Replace axial piston unit
		Contact Bosch Rexroth Service
	Output unit defective (e.g. hydraulic motor or cylinder)	Contact machine/system manufacturer
Pressure/flow fluctuations/ instabilities	Insufficient air bleeding of the hydraulic system	Fill the axial piston unit, suction line for the hydraulic pump and the reservoir
		Completely air bleed the axial piston unit and hydraulic system
		Check correct installation position
	Insufficient suction conditions, for example, insufficient dimensioning of the suction line, viscosity of the hydraulic fluid too high, suction height too high, suction pressure too low, foreign particles in the suction line, impermissible filter in the suction line	Machine/system manufacturer: check the system, for example, optimize inlet conditions, use suitable hydraulic fluid
		Fill the suction line with hydraulic fluid
		Remove foreign particles from the suction line
	Valve and controller vibrate	Optimize the adjustment of the axial piston unit and the pressure limitation in the hydraulic system
	Unstable control signal	Contact machine/system manufacturer or Bosch Rexroth Service
	Malfunction in the control devices or the controller	Contact Bosch Rexroth Service