



Rexroth Hydraulic Pump A10VO Series User Manual



Functional Purpose

This pump is preferred over a fixed displacement (gear) pump for many reasons.

A fixed displacement pump delivers a set volume of oil for each revolution of its drive shaft. Any of this fluid flow that is not required, by the hydraulic system, is sent back to the oil reservoir over a restriction. This oil flow times the pressure difference (between the system and the reservoir) is power that has been drawn from the engine and turned into heat. The heat generated is a direct indication of fuel wasted and of unnecessary wear and tear on the hydraulic fluid, and thus on the hydraulic system's mechanical components.

On the other hand, this variable displacement pump monitors (senses) by way of a small hydraulic line connecting it to the control valves – the power requirement (load) on your hydraulic system and provides just enough fluid flow and pressure to meet your system's immediate need. This means that the pump can be left running constantly and as your system's requirement changes the pump will simply adjust itself accordingly. By doing this, energy is not wasted away in the form of heat; translating into fuel savings for you and less wear and tear in your hydraulic system.

An adjustable pressure limit is also built onto the pump. It operates by reducing the output flow – all the way to zero if necessary – keeping the pressure supply to your hydraulic system from ever going too high.

Different maximum displacements (sizes) with standard mounting flanges are available to match the needs of your system. Also, various combinations of drive shafts (splined or keyed), rotation directions (left hand or right hand) and port locations (rear or side) can be chosen to facilitate your particular installation requirements (Direct engine mounting as well as transmission power take off mounting can be accommodated).

Contact Concord Road Equipment for any application or system questions you may have.

Variable displacement swash plate design axial piston pump

1. Housing
2. Control Piston
3. Input Shaft
4. Swash Plate
5. Control Valve Assembly
6. Pistons (x7)

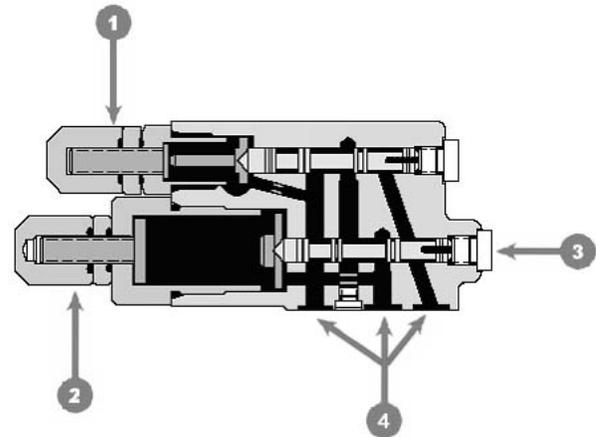
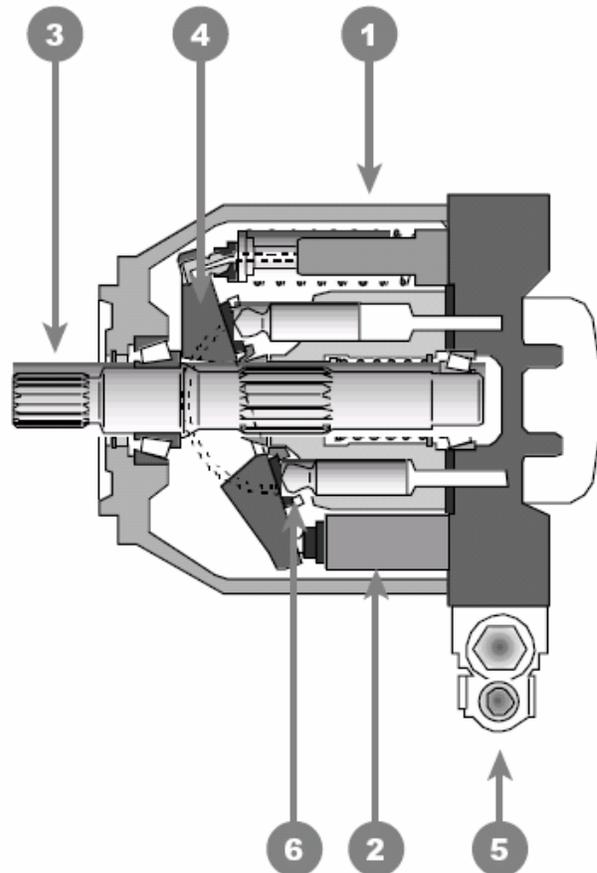
Axial piston pumps model A10VO are swash plate design variable displacement pumps. As illustrated by the picture under functional purpose they basically consist of a housing (1), control pistons (2) located inside cylinder barrel, drive shaft (3), swash plate (4), a control valve assembly (5), and pistons (6). This piston pump smoothly and continuously varies its displacement (volumetric output – size), by altering the angle of its swash plate. As your system operates, valves monitor the load pressures on the system's cylinders and/or motors and control the swash plate accordingly. The greater the angle of the swash plate, relative to the drive shaft, the further the pistons stroke in and out creating greater fluid flow.

There are two control valves, located in a removable housing, bolted to the pump. The standard type of control used is referred as flow and pressure compensator, type DFR.

The flow and pressure compensator, matches pump output flow and pressure to system demand. This control will automatically regulate the pump displacement to deliver the flow required to maintain a constant pressure drop across a valve spool or other flow limiting device. When there is no system demand, the pump stands by at zero flow and low pressure. When the system demands flow, the pump delivers only the flow required by the system, at a pressure required to move the load. To protect the system from infinite load pressures, the pressure compensator section of the control will cause the pump to automatically de-stroke when the pre-adjusted maximum system pressure is reached.

Flow and pressure compensator valve

1. Standby pressure adjustment screw
2. Maximum pressure adjustment screw
3. Gauge test port
4. Connections to pump control piston





Cautions and Warnings

Always read all instructions thoroughly and familiarize yourself with the equipment before operating or attempting repairs or service. Observe all caution and warning statements in the applicable manual and on the equipment.

Always use extreme caution when working with any pressurized system. Always be aware of other persons and/or equipment in the immediate area and the hazards involved. Be prepared to immediately shut down the truck and/or hydraulic system if required, especially during initial startup and testing.

The equipment must be assembled and serviced by a trained mechanic or technician.

Ensure only properly trained individuals should operate the equipment.

Always use personal protection equipment, such as eye and ear protection, when indicated by the instructions or by the work environment.

Always operate equipment safely and within its rated capacity and performance range.

Hydraulic fluid in the human bloodstream can be fatal. If hydraulic fluid penetrates the skin under pressure, seek medical attention immediately!

Hydraulic oil, solvents, and pipe sealers may cause skin irritation and rashes. Avoid lengthy exposure to these materials. Wash your hands thoroughly after contact with oils, solvents, and other chemicals. Remove clothing that is saturated with oil.

Do not operate equipment that is damaged or in need of maintenance. Repair equipment as soon as problems are identified.

A component supported by an actuator will drop if the actuator or its pressure supply fails, or if the actuator control is accidentally engaged. If you are under the component when it drops, you will be killed or seriously injured. Always return an actuated component to its "rest" position or support it by other means before working under the component. If an actuated component such as a dump box or plow must be raised for service, it must be supported by some means other than the actuator. Use body props, blocks, or stands to support the component.

Never attempt to support a "loaded" dump body for service. The body must be empty.

Use tools that are suited to the task, and keep your tools in good repair.

Use proper lifting equipment when moving or installing heavy components.

Keep your work area clean and safe. Always clean up any spills immediately and properly dispose of the material in the designated refuse container.

Always shut off the vehicle engine and disconnect pump electrical power before working on the hydraulic system.

Concord Road Equipment Mfg., Inc. is not responsible or liable for injury, damage, or loss caused by improper installation by the end user, misuse of the equipment, lack of maintenance, accidents, or failure to follow instructions. In cases where equipment application was determined by the end user, Concord Road Equipment Mfg., Inc. is not responsible or liable for injury, damage, or loss caused by misapplication of this equipment.

Specifications, parts descriptions, illustrations, and instructions in this manual were accurate at the time of publication. Concord Road Equipment Mfg., Inc. reserves the right to discontinue products and to change specifications and/or designs at any time without notice and without incurring any obligation.

Specifications of standard variable axial piston pumps

A10VO60DFR/52R-PUC61NOO	
Standard application: PTO driven, direct mount, usually driven at 130% of engine speed	
Part number	139175
General specifications	
Weight	50 lbs.
Displacement	3.66 C.I. (60 CC) per revolution
Nominal pressure	3600 psi
Peak pressure	4500 psi
Maximum speed at max nominal pressure	2700 RPM
Rotation (viewed from shaft end)	Clockwise
Input shaft	1", 15T splined shaft, SAE BB
Mount	SAE B, 2-bolt
Operating temperature	-20 to 160 degrees Fahrenheit
Filtration required	Inlet: 100 mesh screen Return: 10 micron absolute return filter
Calculated specifications	
Volume output at 1000 rpm (nominal pressure)	15.8 gallons per minute
Volume output at 1300 rpm (nominal pressure)	20.6 gallons per minute
Connection porting	
Inlet connection port	SAE 2" flange, code 61, rear facing
Outlet connection port	SAE 1" flange, code 61, rear facing
Load sense connection port	SAE - 4
Case drain connection port	SAE - 10
Recommended Hose Sizes	
Inlet	SAE 32R4, 2" wire reinforced
Outlet	SAE 100R16, 1" hose for pressures up to 2000 psi SAE 100R12, 1" hose for pressures above 2000 psi
Case Drain	SAE 100R16, 3/4" hose
Load Sense	SAE 100R16, 3/8" hose

Specifications of standard variable axial piston pumps (continued)

A10VO60DFR/52L-PUC62NOO	
Standard application: Front engine driven with drive shaft off of engine crank adaptor	
Part number	147074
General specifications	
Weight	50 lbs.
Displacement	3.66 C.I. (60 CC) per revolution
Nominal pressure	3600 psi
Peak pressure	4500 psi
Maximum speed at max nominal pressure	2700 RPM
Rotation (viewed from shaft end)	Counter-Clockwise
Input shaft	1-1/4" keyed shaft
Mount	SAE B, 2-bolt
Operating temperature	-20 to 160 degrees Fahrenheit
Filtration required	Inlet: 100 mesh screen Return: 10 micron absolute return filter
Calculated specifications	
Volume output at 1000 rpm (nominal pressure)	15.8 gallons per minute
Volume output at 1300 rpm (nominal pressure)	20.6 gallons per minute
Connection porting	
Inlet connection port	SAE 2" flange, code 61, side facing max torque 45 ft-lbs
Outlet connection port	SAE 1" flange, code 61, side facing max torque 95 ft-lbs
Load sense connection port	SAE – 4; 7/8-14UNF-2B max torque 30 ft-lbs
Case drain connection port	SAE – 10; 7/16-20UNF-2B max torque 175 ft-lbs
Recommended Hose Sizes	
Inlet	SAE 32R4, 2" wire reinforced
Outlet	SAE 100R16, 1" hose for pressures up to 2000 psi SAE 100R12, 1" hose for pressures above 2000 psi
Case Drain	SAE 100R16, 3/4" hose
Load Sense	SAE 100R16, 3/8" hose

Specifications of standard variable axial piston pumps (continued)

A10V071DFR/31L-PKC92NOO	
Standard application: Front engine driven with drive shaft off of engine crankshaft adaptor	
Part number	103616
General specifications	
Weight	73 lbs.
Displacement	4.33 C.I. (71 CC) per revolution
Nominal pressure	4000 psi
Peak pressure	5000 psi
Maximum speed at max nominal pressure	2200 RPM
Rotation (viewed from shaft end)	Counter-Clockwise
Input shaft	1-1/4" shaft with 5/16" key
Mount	SAE C, 2-bolt
Operating temperature	-20 to 160 degrees Fahrenheit
Filtration required	Inlet: 100 mesh screen Return: 10 micron absolute return filter
Calculated specifications	
Volume output at 1000 rpm (nominal pressure)	18.75 gallons per minute
Connection porting	
Inlet connection port	SAE 2" flange, code 61, side facing max torque 45 ft-lbs
Outlet connection port	SAE 1" flange, code 61, side facing max torque 95 ft-lbs
Load sense connection port	SAE – 4; 7/8-14UNF-2B max torque 30 ft-lbs
Case drain connection port	SAE – 10; 7/16-20UNF-2B max torque 175 ft-lbs
Recommended Hose Sizes	
Inlet	SAE 32R4, 2" wire reinforced
Outlet	SAE 100R16, 1" hose for pressures up to 2000 psi SAE 100R12, 1" hose for pressures above 2000 psi
Case Drain	SAE 100R16, 3/4" hose
Load Sense	SAE 100R16, 3/8" hose

Specifications of standard variable axial piston pumps (continued)

A10V071DFR/31R-PKC91NOO	
Standard application: PTO driven, remote mount with drive shaft	
Part number	149312
General specifications	
Weight	73 lbs.
Displacement	4.33 C.I. (71 CC) per revolution
Nominal pressure	4000 psi
Peak pressure	5000 psi
Maximum speed at max nominal pressure	2200 RPM
Rotation (viewed from shaft end)	Clockwise
Input shaft	1-1/4" shaft with 5/16" key
Mount	SAE C, 2-bolt
Operating temperature	-20 to 160 degrees Fahrenheit
Filtration required	Inlet: 100 mesh screen Return: 10 micron absolute return filter
Calculated specifications	
Volume output at 1000 rpm (nominal pressure)	18.75 gallons per minute
Connection porting	
Inlet connection port	SAE 2" flange, code 61, side facing max torque 45 ft-lbs
Outlet connection port	SAE 1" flange, code 61, side facing max torque 95 ft-lbs
Load sense connection port	SAE – 4; 7/8-14UNF-2B max torque 30 ft-lbs
Case drain connection port	SAE – 10; 7/16-20UNF-2B max torque 175 ft-lbs
Recommended Hose Sizes	
Inlet	SAE 32R4, 2" wire reinforced
Outlet	SAE 100R16, 1" hose for pressures up to 2000 psi SAE 100R12, 1" hose for pressures above 2000 psi
Case Drain	SAE 100R16, 3/4" hose
Load Sense	SAE 100R16, 3/8" hose

Specifications of standard variable axial piston pumps (continued)

A10V074DFR/31L-PKC92NOO	
Standard application: Front engine driven with drive shaft off of engine crankshaft adaptor	
Part number	R902401335-001
General specifications	
Weight	73 lbs.
Displacement	4.52 C.I. (74 CC) per revolution
Nominal pressure	4000 psi
Peak pressure	5000 psi
Maximum speed at max nominal pressure	2200 RPM
Rotation (viewed from shaft end)	Counter-Clockwise
Input shaft	1-1/4" shaft with 5/16" key
Mount	SAE C, 2-bolt
Operating temperature	-20 to 160 degrees Fahrenheit
Filtration required	Inlet: 100 mesh screen Return: 10 micron absolute return filter
Calculated specifications	
Volume output at 1000 rpm (nominal pressure)	19.54 gallons per minute
Connection porting	
Inlet connection port	SAE 2" flange, code 61, side facing max torque 45 ft-lbs
Outlet connection port	SAE 1" flange, code 61, side facing max torque 95 ft-lbs
Load sense connection port	SAE – 4; 7/8-14UNF-2B max torque 30 ft-lbs
Case drain connection port	SAE – 10; 7/16-20UNF-2B max torque 175 ft-lbs
Recommended Hose Sizes	
Inlet	SAE 32R4, 2" wire reinforced
Outlet	SAE 100R16, 1" hose for pressures up to 2000 psi SAE 100R12, 1" hose for pressures above 2000 psi
Case Drain	SAE 100R16, 3/4" hose
Load Sense	SAE 100R16, 3/8" hose

Specifications of standard variable axial piston pumps (continued)

A10VO100DFR/31L-PKC62N00	
Standard application: Front engine driven with drive shaft off of engine crankshaft adaptor	
Part number	130924
General specifications	
Weight	100 lbs.
Displacement	6.1 C.I. (100 CC) per revolution
Nominal pressure	4000 psi
Peak pressure	5000 psi
Maximum speed at max nominal pressure	2000 RPM
Rotation (viewed from shaft end)	Counter-Clockwise
Input shaft	1-1/2" shaft with 3/8" key
Mount	SAE C, 2-bolt
Operating temperature	-20 to 160 degrees Fahrenheit
Filtration required	Inlet: 100 mesh screen Return: 10 micron absolute return filter
Calculated specifications	
Volume output at 1000 rpm (nominal pressure)	26.4 gallons per minute
Connection porting	
Inlet connection port	SAE 2-1/2" flange, code 61, side facing
Outlet connection port	SAE 1-1/4" flange, code 62, side facing
Load sense connection port	SAE - 4
Case drain connection port	SAE - 12
Recommended Hose Sizes	
Inlet	Minimum SAE 32R4, 2" wire reinforced
Outlet	Minimum SAE 100R16, 1" hose for pressures up to 2000 psi SAE 100R12, 1" hose for pressures above 2000 psi
Case Drain	SAE 100R16, 3/4" hose
Load Sense	SAE 100R16, 3/8" hose

HYDRAULIC PUMP COMMISSIONING INSTRUCTIONS

- 1) Ensure all components are flushed clean and free of grit and dirt.
- 2) Fill the hydraulic oil reservoir and pump through a filter to avoid adding contamination to the hydraulic system.
- ⚠ **IMPORTANT NOTE:** Fill the pump case to the highest case drain or vent port. Use clean filtered fluid. A pump of this construction relies on the oil it is pumping to provide lubrication for its moving parts. Never run an A10VO series pump dry, it will be instantly damaged.
- 3) Ensure all hoses, fittings, and couplers are tightened correctly.
- 4) If the system is equipped with a cartridge style shut off in the main pressure line from the hydraulic pump to the valve, remove the shutdown coil and cartridge and install a SAE o-ring seal plug in its place.
- 5) If the system is equipped with shutoff valves in the suction, pressure or return circuits, check and be sure that all are open for flow.
- 6) Install a pressure gauge in the pressure line from the pump (this can be easily accomplished by installing a gauge into the test port in the bottom of the compensator. See compensator figure for test port location. Some valves may be equipped with a gauge port for this purpose, contact Concord Road Equipment for details about the equipment you are working on.)
- ⚠ **IMPORTANT NOTE:** Failure to use proper adaptors or properly rated test equipment can cause component failure or personal bodily injury. Contact Concord Road Equipment for the proper adaptor to install a gauge in the compensator or any other hydraulic test equipment you might need.
- 7) Remove both caps (if applicable) and loosen both jam nuts on the compensator adjustment screws. Use a 17mm wrench if your compensator has caps on the adjustments screws, or a 13mm wrench if your compensator does not have caps over the adjustment screws.
- 8) Using a 3mm hexagonal key, turn the maximum pressure adjustment screw on the pump compensator counter clockwise as far as possible.
- ⚠ **IMPORTANT NOTE:** New and rebuilt pumps are tested for performance at very high pressure; failure to adjust this pressure to match your system requirements may cause component failure, hoses to rupture, and personal bodily injury.
- 9) Since air has been introduced into the suction side of the hydraulic system either because this is the first time starting or because of replacing the pump, the air must be bled off to allow pump fluid to be pumped. Air will not automatically flow through because the valve has a closed center design, meaning that no fluid flows unless a function is activated. Bleeding air can be accomplished in a number of different ways, either by directing the main pressure line back to the reservoir, by loosening the main pressure line fitting until pump fully primes, or by activating a free flowing spreader function like the spinner circuit.
- ⚠ **IMPORTANT NOTE:** Loose connections or lines can be extremely dangerous, as can be hydraulic fluid under pressure. Take extreme caution to prevent injuries during this process.
- 10) Start truck and engage pump / PTO (If applicable)
- 11) Allow pump to run for a few moments and fully prime.
- 12) Shut the system down, re-assemble any hoses or connection changed during step 9
- 13) Using a 3mm hexagonal key, turn the standby pressure adjustment screw on the pump compensator counter clockwise as far as possible.
- 14) Re-start truck and engage pump / PTO (If applicable)

HYDRAULIC PUMP COMMISSIONING INSTRUCTIONS

(Continued from previous page)

- 15) Using a 3mm hexagonal key, turn the standby pressure adjustment screw on the pump compensator clockwise as far as possible.
- 16) Observe the gauge reading while using a 3mm hexagonal key to turn the maximum pressure adjustment screw clockwise slowly. If gauge reading does not change within the first few rotations, stop and start the process from step 1 again
- 17) Turn the maximum pressure adjustment screw clockwise slowly until the gauge reads the correct setting for maximum system pressure. Then lock the jam nut and double check that the setting did not change.

⚠ IMPORTANT NOTE: If you do not know the proper setting for maximum system pressure, contact technical support at Concord Road Equipment

- 18) Turn the standby pressure adjustment screw counter clockwise while observing the pressure gauge. The pressure reading will drop off rapidly at first then slowly. Adjust the pressure to between 350 to 400 PSI. Then lock the jam nut and double check that the setting did not change.
- 19) Run the system under load until oil reaches operating temperature (Should not exceed 140°F) and check all functions for leaks.
- 20) Ensure there is still a sufficient quantity of oil in the reservoir now that all lines are full.

⚠ IMPORTANT NOTE: Erratic operation may indicate there is still air trapped in the system. By working control valves both ways the remaining air can be eliminated. The system is free of air when all functions can be operated smoothly and the oil in the reservoir shows no foam on the surface.