

# "AR" Series Variable Displacement Piston Pumps



AR16  
Axial Port Type



AR16  
Side Port Type

"AR" series variable displacement pump has been developed which the aim of even further the quietness in operation, smaller in size and lighter in mass and based on Yuken technology and engineering which put on market the "A" series pump which has a reputation for its quiet operation and high efficiency.

Pump Type	Graphic Symbol	Geometric Displacement										Maximum Operating Pressure MPa (PSI)	Page		
		1	2	5	10	20	50	100	200	300	cu. in./rev 10 15			cm <sup>3</sup> /rev	
"AR" Series Variable Displacement Piston Pumps					AR16									16 (2320)	18
					AR22										

## Hydraulic Fluids

### Hydraulic Fluids

Use petroleum base oils such as anti-wear type hydraulic oils or R & O (Rust and Oxidation inhibitor) type hydraulic oils equivalent to ISO VG-32 or 46. The recommended viscosity range is from 20 to 400 mm<sup>2</sup>/s (98 to 1800 SSU) and temperature range is from 0 to 60 °C (32 to 140 °F), both of which have to be satisfied for the use of the above hydraulic oils.

### Control of Contamination

Due caution must be paid to maintaining control over contamination of the operating oil which can otherwise lead to breakdowns and shorten the life of the unit.

Please maintain the degree of contamination within NAS Grade 10.

The suction port must be equipped with at least a 100 μm (150 mesh) reservoir type filter and the return line must have a line type filter of under 10 μm.

## Instructions

### Mounting

When installing the pump the filling port should be positioned upwards.

### Alignment of Shaft

Employ a flexible coupling whenever possible, and avoid any stress from bending or thrust.

Maximum permissible misalignment is less than 0.1 mm (.004 inches) TIR and maximum permissible misangular is less than 0.2°.

### Suction Pressure

Permissible suction pressure at inlet port of the pump is between -16.7 and +50 kPa (5 in.Hg Vacuum and 7 PSIG). For piping to the suction port, use the pipes of the same diameter as that of the specified pipe flange to be used.

Make sure that the height of the pump suction port is within one metre (3.3 ft) from the oil level in the reservoir.

### Hints on Piping

When using steel pipes for the suction or discharge ports, excessive load from the piping to the pump generates excessive noise.

Whenever there is fear of excessive load, please use rubber hoses.

### Suction Piping

In case the pump is installed above the oil level, the suction piping and suction line filter should be located lower than the pump position to prevent air in the suction line.

### Drain Piping

Install drain piping according to the chart and ensure that pressure within the pump housing should be maintained at a normal pressure of less than 0.1 MPa (14.5 PSI) and surge pressure of less than 0.5 MPa (72.5 PSI).

Length of piping should be less than 1 m (3.3 ft.), and the pipe end should be submerged in oil.

In case AR16 and AR22 pump, a screw-in torque of fitting is 40 to 50 Nm (354 to 443 IN.lbs.). Do not apply bending and thrust torque to the fitting.

[Recommended Drain Piping Size]

Model	Fitting Size		Inside Dia. of Pipe
	Japnese Std. "JIS" & European Design Std.	N.American Design Std.	
AR16, AR22	3/8 [Inside Dia. 8.5 mm (.33 in.) or more]	SAE #8	10 mm (.39 in.)

### Bleeding Air

It may be necessary to bleed air from pump case and outlet line to remove causes of vibration. An air bleed valve (Model Number ST1004-\*-10\*, [Page 820](#)) is recommended for this purpose.



**Starting**

Before first starting, fill pump case with clean operating oil via the filling port.

In order to avoid air blockage when first starting, adjust the control valves so that the discharged oil from the pump is returned direct to the reservoir or the actuator moves in a free load.

[Volume of Pre-fill Oil Required]

Model	Volume cm <sup>3</sup> (in. <sup>3</sup> )
AR16 AR22	430 (26.2)

**Setting Discharge Pressure and Delivery**

At the time of shipment, the unit has been preset to maximum delivery and minimum discharge pressure.

Adjust the preset delivery and pressure to meet your system requirements.

**Adjustment of Discharge Pressure**

Turning the adjustment screw clockwise, increases pressure.

[ Volume adjusted by each full turn of the pressure adjustment screw ]

Model Numbers	Adjustment Volume MPa (PSI)
AR16/AR22-FR01B	2.9 (420)
AR16/AR22-FR01C	5.4 (780)

**Adjustment of Delivery**

Turning the delivery adjustment screw clockwise, decreases delivery.

[ The minimum adjustable flow and adjustable volume of each full turn of the delivery adjustment screw ]

Model Numbers	Adjustable volume with each full turn of the adjustment screw cm <sup>3</sup> /rev (cu.in./rev)	Minimum adjustable flow cm <sup>3</sup> /rev (cu.in./rev)
AR16	1.5 (.092)	6 (.366)
AR22	2.1 (.128)	8.5 (.519)

