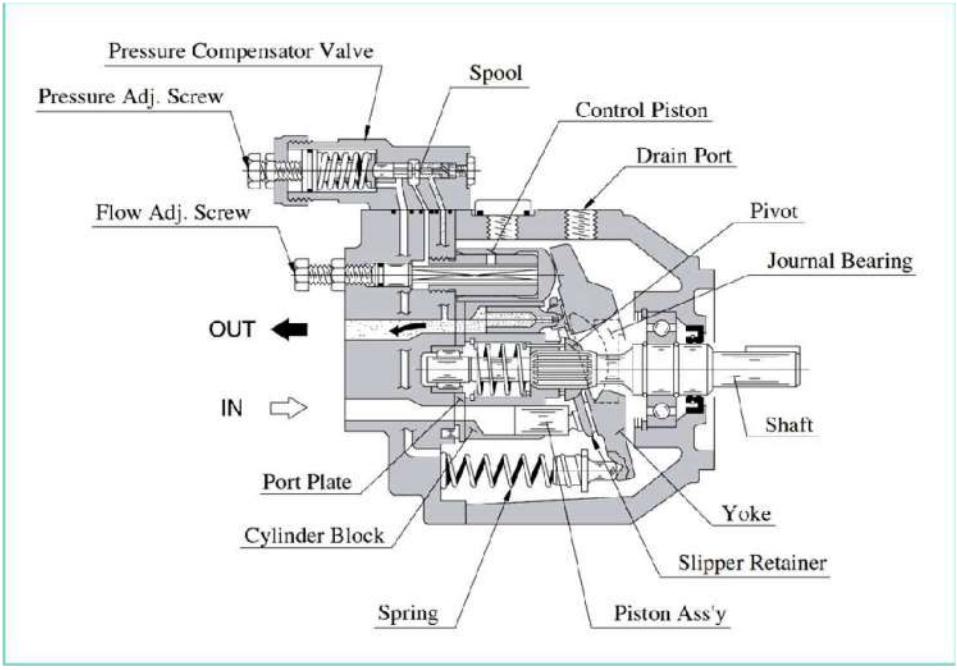
"AR" Series Variable Displacement Piston Pumps



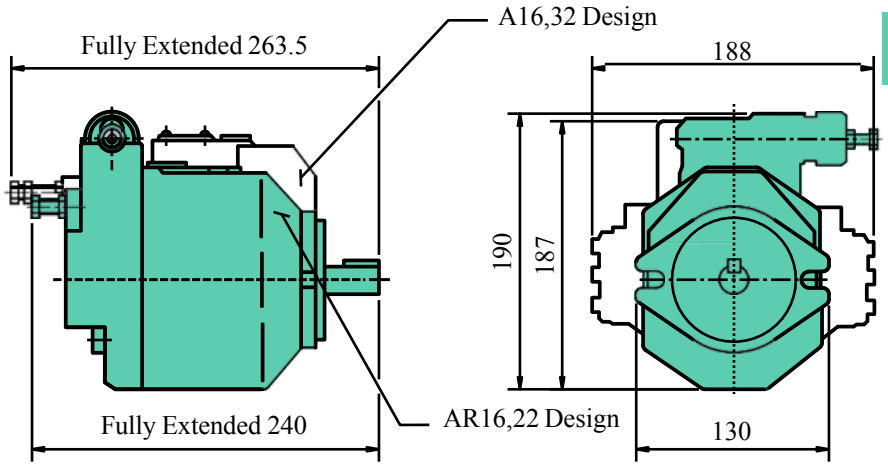
Features

- **Smaller in Size and Lighter in Mass**
  As indicated in the dimensional comparison presented below, the AR16 is smaller than the A16(32 design). Also, the mass of AR16 is substantially lighter than the A16.

- **Low Noise**
  The noise level of AR16 has been reduced by 1-2 dB (A) at full flow and full cut-off compared with that of the excellent A16 quiet pump.

[Comparison of "AR16" with "A16"]

DIMENSIONS IN MILLIMETRES



Model	Approx. Mass (Flange Mtg.)	Ratio of Mass (AR16/A16)
AR16	12.3 kg	75%
A16	16.5 kg	

Instructions

Hydraulic Fluids.

Use petroleum base oil such as anti-wear type hydraulic oils or R & O (Rust and oxidation inhibitor) type hydraulic oils (ISO VG 32 or 46) with a viscosity range of 20 to 400 cSt at temperature of 0-60^{0}C both to be satisfied.

Control of contamination.

Much care should be taken to maintain control over contamination of the operating oil which can otherwise lead to breakdown and shorten the life of the unit. Please maintain the degree of contamination within NAS Grade 10.

The return line must have a line type filter of under 10μm or there should be an offline/independent filtration unit in the system.

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 thrust. Maximum permissible misalignment is less than 0.1 mm TIR and maximum permissible misangularity is less than 0.2^0.

Suction Pressure.

Permissible suction pressure at inlet port of the pump is between -0.16 and +0.5 Kgf/cm^2 (-125 mm Hg~+0.5 Kgf/cm^2). For piping to the suction port, use pipes of the same diameter as that of the specified pipe flange. Make sure that the height of the pump inlet port is within one meter from the oil level in the reservoir.

Hints on Piping.

When using steel piping for the suction of discharge ports, excessive load from the piping on 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 1 Kgf/cm^2 and surge pressure of less than 5 Kgf/cm^2.

Length of piping should be less than 1m, and the pipe end should be submerged in oil. In case AR16 and AR22 pumps, a screw-in torque of fitting is 4.0-5.0 Kgf-m. Do not apply bending and thrust to the fitting.

[Recommended Drain Piping Size] (Single Pump)

- Fix drain pipe for each side of the pump.

Model Number	Fitting Size	Inside Dia. of Pipe
AR16, AR22	3/8" (Inside Dia. 8.5mm or more)	10 mm

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 No. ST1004-※-1080) is recommended for this purpose.

Starting.

Before starting, first time fill the pump case with clean operating oil through the fill 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 tank or the actuator moves in a free load.

[Volume of Pre-Fill Oil Required]

Model Number	Volume cm^3
AR16, AR22	430

Setting Discharge Pressure and Delivery.

At the time of Despatch, the unit has been preset to the 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.

[Pressure adjusted by each one turn of the pressure adjustment screw]

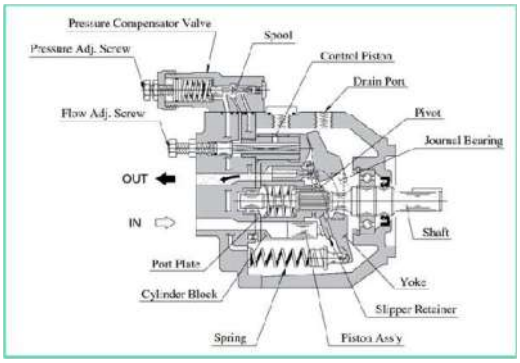
Model Numbers	Adjustment Pressure Kgf/cm^2
AR16/AR22-FR-01-B	29.6
AR16/AR22-FR-01-C	55.1

- **Adjustment of Delivery**
  Turning the delivery adjustment screw clockwise, decreases pressure.Lock the screw after adjustment.

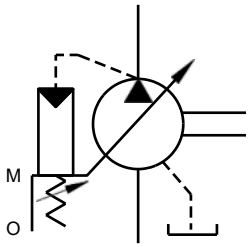
[The minimum adjustable flow and adjustable volume of each full turn of the delivery adjustment screw]

Model Numbers	Adjustable volume with each full turn of the adjustment screw	Minimum adjustable flow cm^3/rev.
AR16	1.5	6
AR22	2.1	8.5

"AR" Series Variable Displacement Piston Pumps-Single Pump, Pressure Compensator Type



Graphic Symbol



Specifications

AR16-FR01※-22	15.8	6.0	160	1800	600	12.3
AR22-FR01※-22	22.2	8.5				13.0

*1 When setting the pressure, make sure the full cut-off Pressure never exceeds the maximum intermittent pressure.

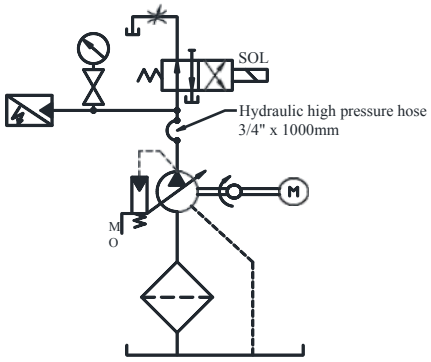
Model Number Designation

AR16	-F	R	01	B	S	-22
Series Number	Mounting	Direction of Rotation	Control Type	Pres. Adj. Range Kgf/cm²	Port Position	Design Number
AR16 (15.8 cm³/rev.)	**F:** Flange Mtg.	(Viewed from Shaft End) **R:***1 Clockwise (Normal)	**01:** Pressure Compensator Type	**B:** 12 ~ 70 **C:** 20 ~ 160	**None:** Axial Port **S:** Side Port	**22**
AR22 (22.2 cm³/rev.)						

*1 Pumps with 'counter-clockwise' direction are available. Consult CNIP for details.

Test Circuit and Conditions

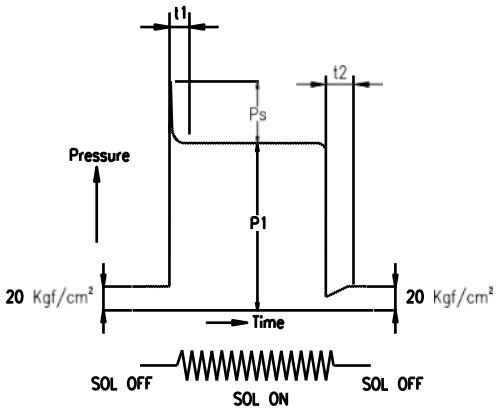
- **Circuit**



- **Conditions**

Drive Speed : 1500 r/min.
Hydraulic Fluid : ISO VG32 Oil
Oil Temperature : 50°C
Viscosity : 20mm²/s (cSt)

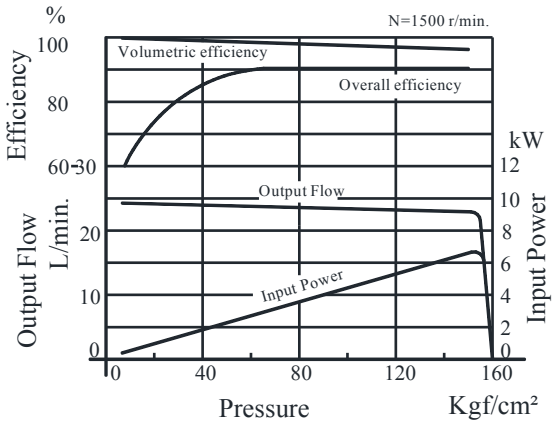
Result Of Measurement

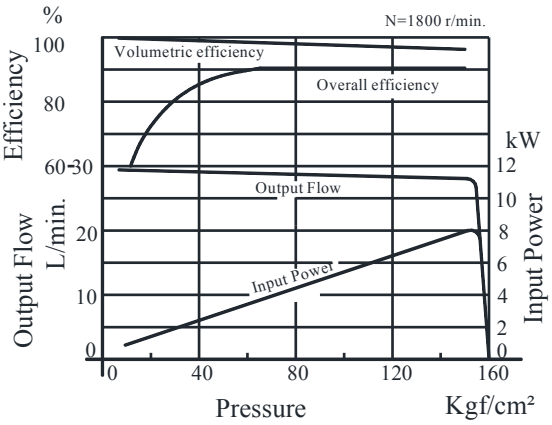


Models	Full Cut-Off Pressure P_1 Kgf/cm²	Response time ms		Overshoot Pressure Ps Kgf/cm²
		t_1	t_2	
AR16	160	60	65	56
AR22		70	70	73

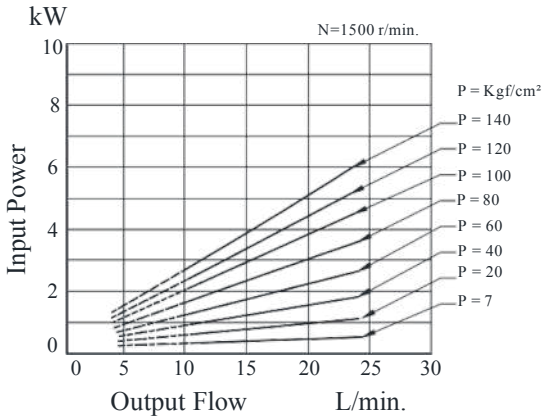
Typical Performance Characteristics of Type **"AR16"** Oil Viscosity 20 cSt [ISO VG 32, 50°C]

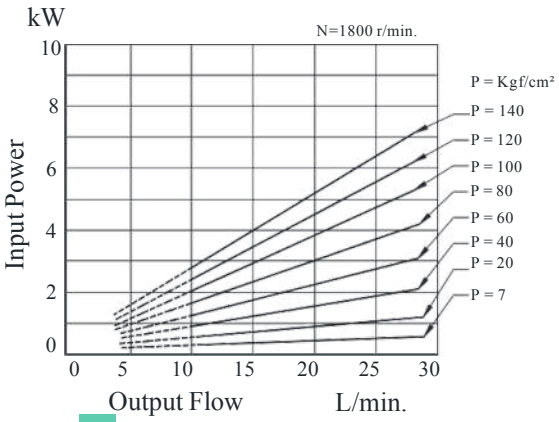
Performance Characteristic Curve



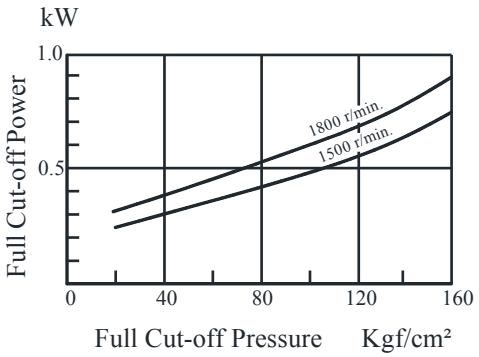


Input Power

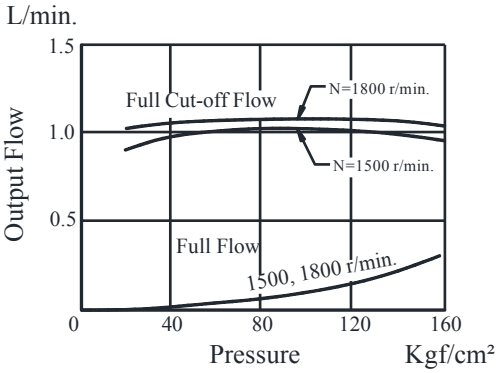




Full Cut-off Power

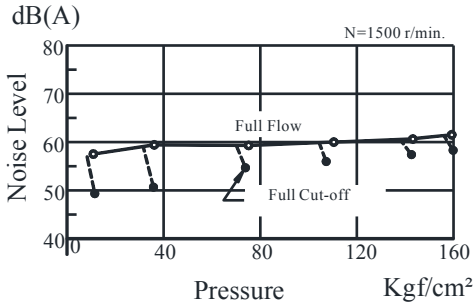


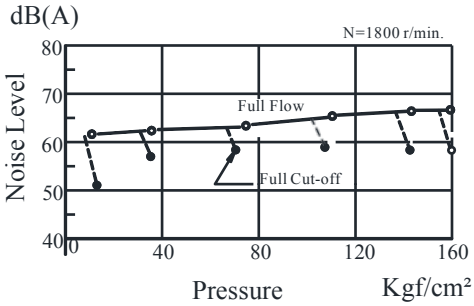
Drain



Noise Level

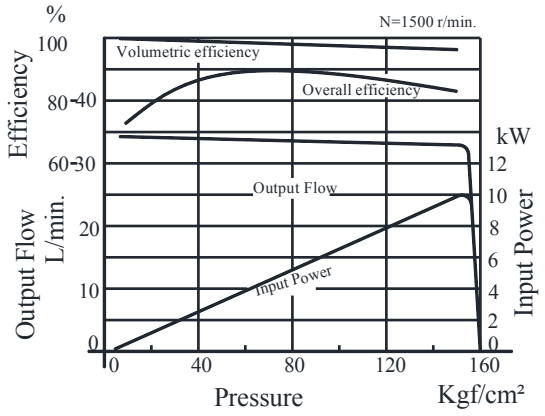
[One meter horizontally away from pump head cover]



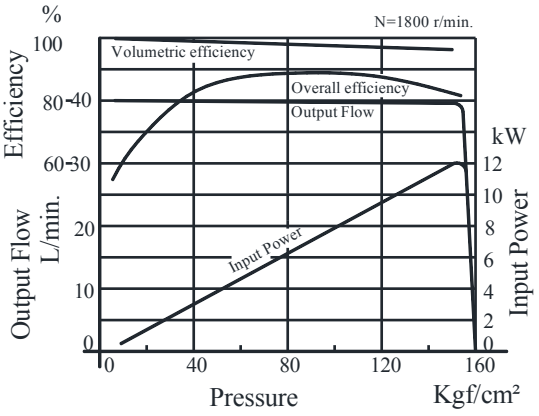


Typical Performance Characteristics of Type **"AR22"** Oil Viscosity 20 cSt [ISO VG 32, 50°C]

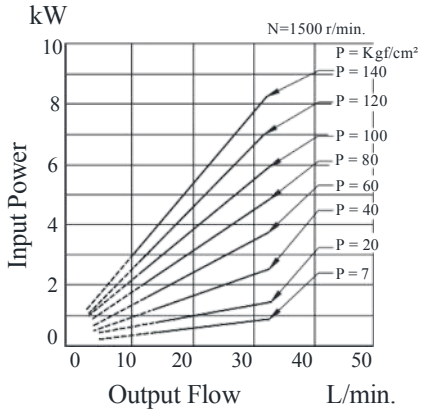
Performance Characteristic Curve

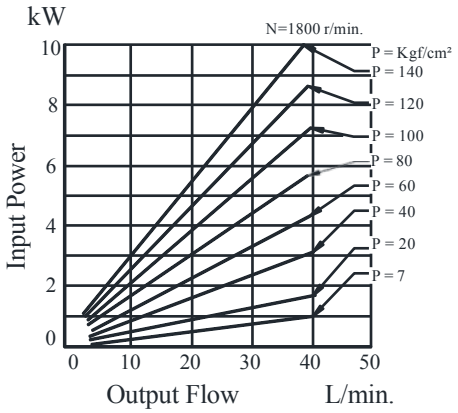


Input Power

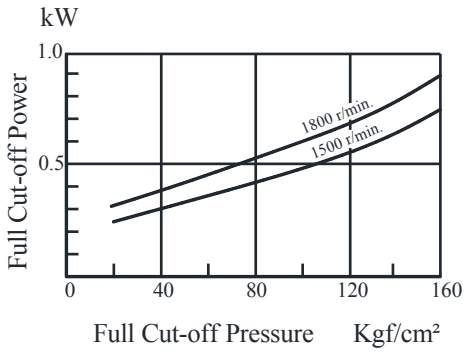


Input Power

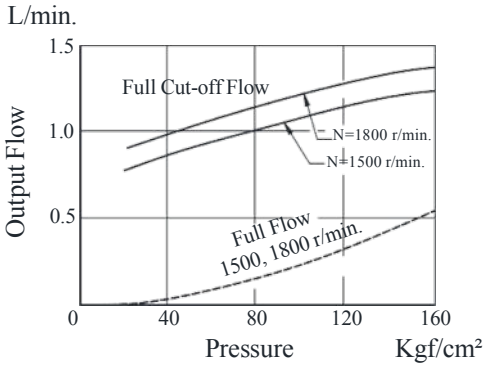




Full Cut-off Power

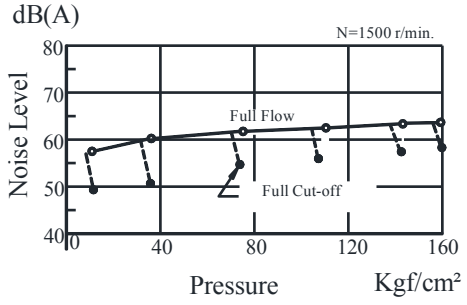


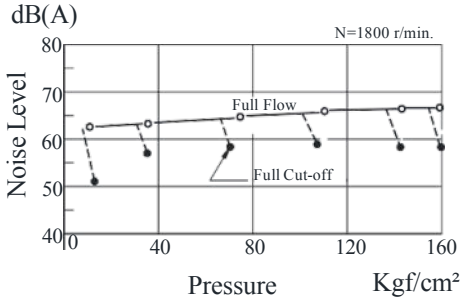
Drain



Noise Level

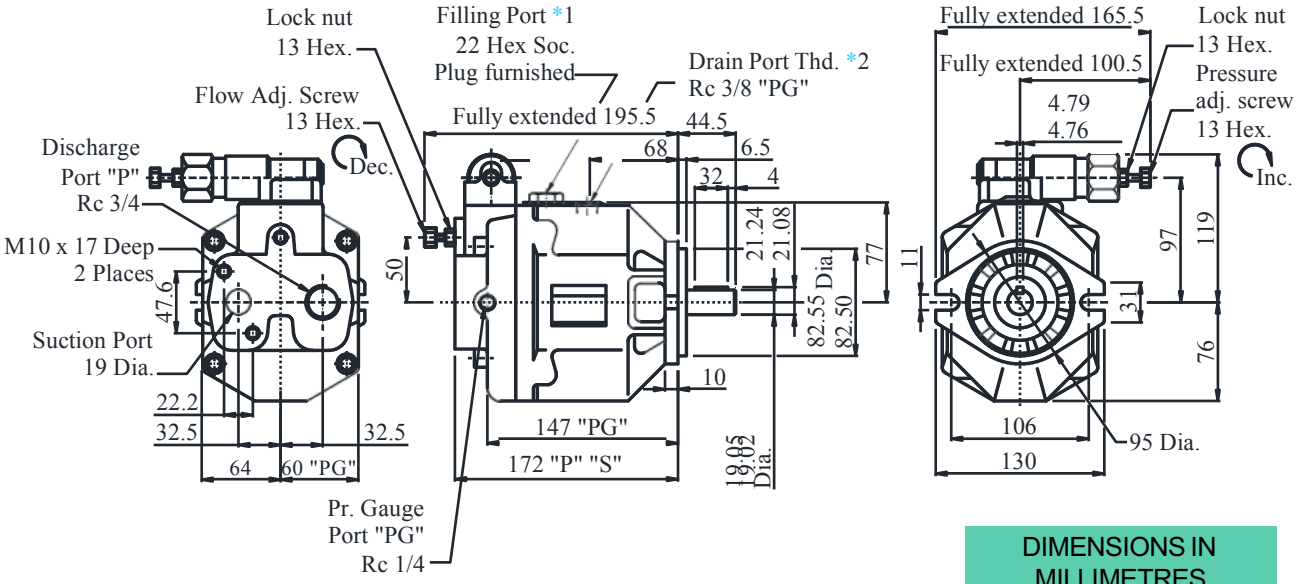
[One meter horizontally away from pump head cover]





Axial Port Type

- **AR 16-FR01※ - 22**
- **AR 22-FR01※ - 22**

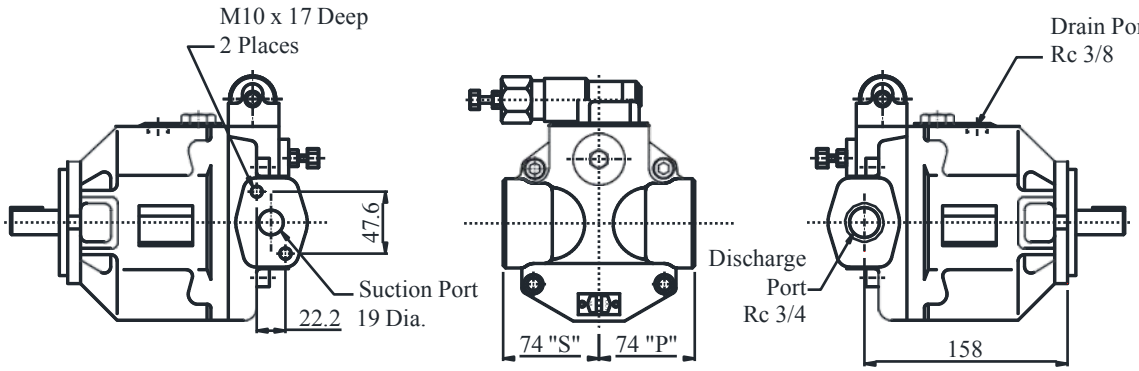


DIMENSIONS IN MILLIMETRES

*1 Install the pump so that the "Filling port" is at the top.
*2 A screw-in torque of fitting is 4.0 – 5.0 Kgf-m.
Do not apply bending and thrust torque to the fitting.

Side Port Type

- **AR 16-FR01※S - 22**
- **AR 22-FR01※S - 22**



A16/22-FR01※※-22

- **List of Seals**

Sl. No.	Name of Parts	Part Numbers		Qty.
		AR16-FR01	AR22-FR01	
1	Gasket	1302-PK3 12891-5		1
4	Oil Seal	TCN 254511		1
5	O-Ring	SO-NB-P9		3
6	O-Ring	SO-NA-P8		1
7	O-Ring	SO-NB-P14		1
8	O-Ring	AS568-018 (NBR, Hs70)		1
9	O-Ring	SO-NB-P10		1

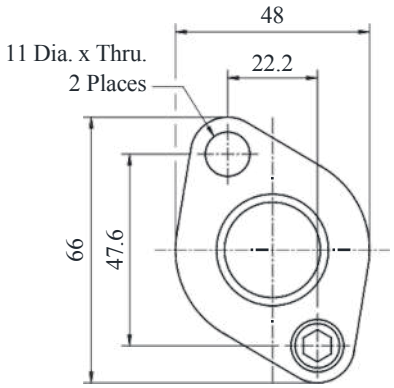
- **List of Seal Kits**

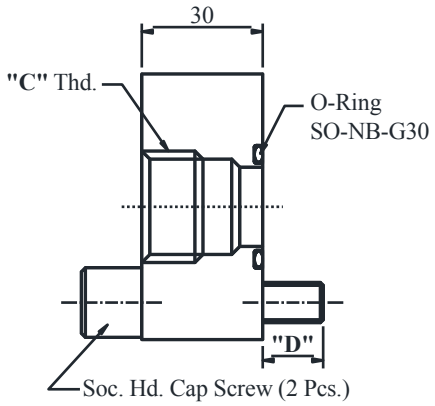
Pump Model Numbers	Seal Kit Numbers
AR16-FR01※※- 22	KS-AR16-01-22
AR22-FR01※※- 22	KS-AR22-01-22

Note: When ordering seals, please specify the seal kit number from the table above.

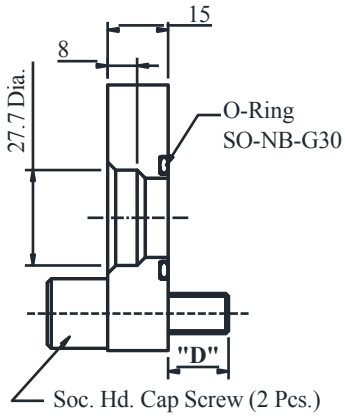
Pipe Flange Kit for Suction Port

F5-06-A-1021



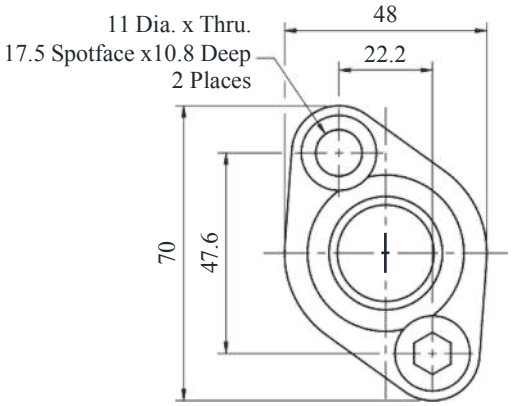


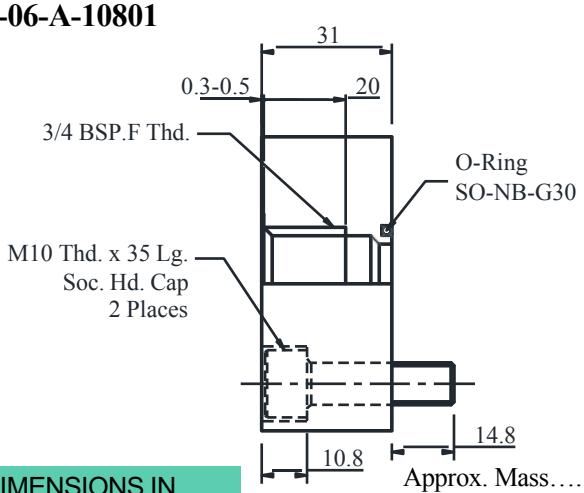
F5-06-B-1021



Kit Numbers	"C" Thd.	"D" mm	Soc. Hd. Cap Screw	Approx. Mass Kg
F5-06-A-1021	Rc 3/4	15	M10 x 45Lg.	0.5
F5-06-B-1021	---	15	M10 x 30Lg.	0.3

F5-06-A-10801





Approx. Mass……...0.5 Kg.

DIMENSIONS IN MILLIMETRES

Mounting Bracket Kits

Mounting bracket available on separate order.

Pump Model Numbers	Mtg. Bracket Kit Numbers	Approx. Mass Kg
AR16/AR22	LP-1A-10	2.2

Note:The Mounting bracket kit consists of a mounting bracket, 2 Hex. bolts and 2 plain washers.

Mtg. Bracket Kit

LP-1A-10