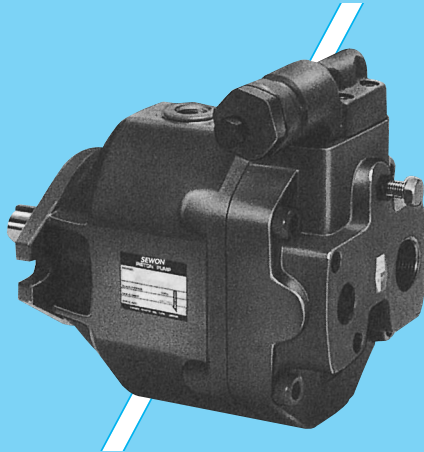
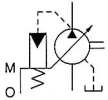


# AR Series Variable Displacement Piston Pumps



Pump Type	KS Graphic Symbol	Geometric Displacement cm <sup>3</sup> /rev							Maximum Operation Pressure MPa {kgf/cm <sup>2</sup> }	Page
		1	2	5	10	20	50	100	150	
AR Series Piston Pumps					AR16					16 {163}
					AR22					

## Hydraulic Fluids for AR series Variable Displacement Piston Pump

### 1. 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 (32 to 140 °F) both of which have to be satisfied for the use of the above hydraulic oils.

### 2. Control of Contamination

Due caution must be paid to maintaining control 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 mesh) reservoir type filter and the return line must have a filter of under 10 µm.

## Please take notice that when use the AR series Variable Displacement Piston Pump

### 1. Mounting

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

### 2. 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 TIR and maximum permissible misangular is less than 0.2 °.

### 3. Suction Pressure

Permissible suction pressure at inlet port of the pump is between -16 and +50 kPa. 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 from the oil level in the reservoir.

### 4. 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.

### 5. 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.

### 6. 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 and surge pressure of less than 0.5 MPa. Length of piping should be less than 1 m, 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. Do not apply bending and thrust torque to the fitting.

#### [Recommended Drain Piping Size]

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



### 7. Bleeding Air

It may be necessary to bleed air from pump case and outlet line to remove causes of vibration. An air bleed valve is recommended for this purpose.

### 8. Starting

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

### 9. 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.

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

Model Numbers	Adjustment Volume MPa {kgf/cm <sup>2</sup> }
AR16/AR22-FR01B	2.9 {29.6}
AR16/AR22-FR01C	5.4 {55.1}

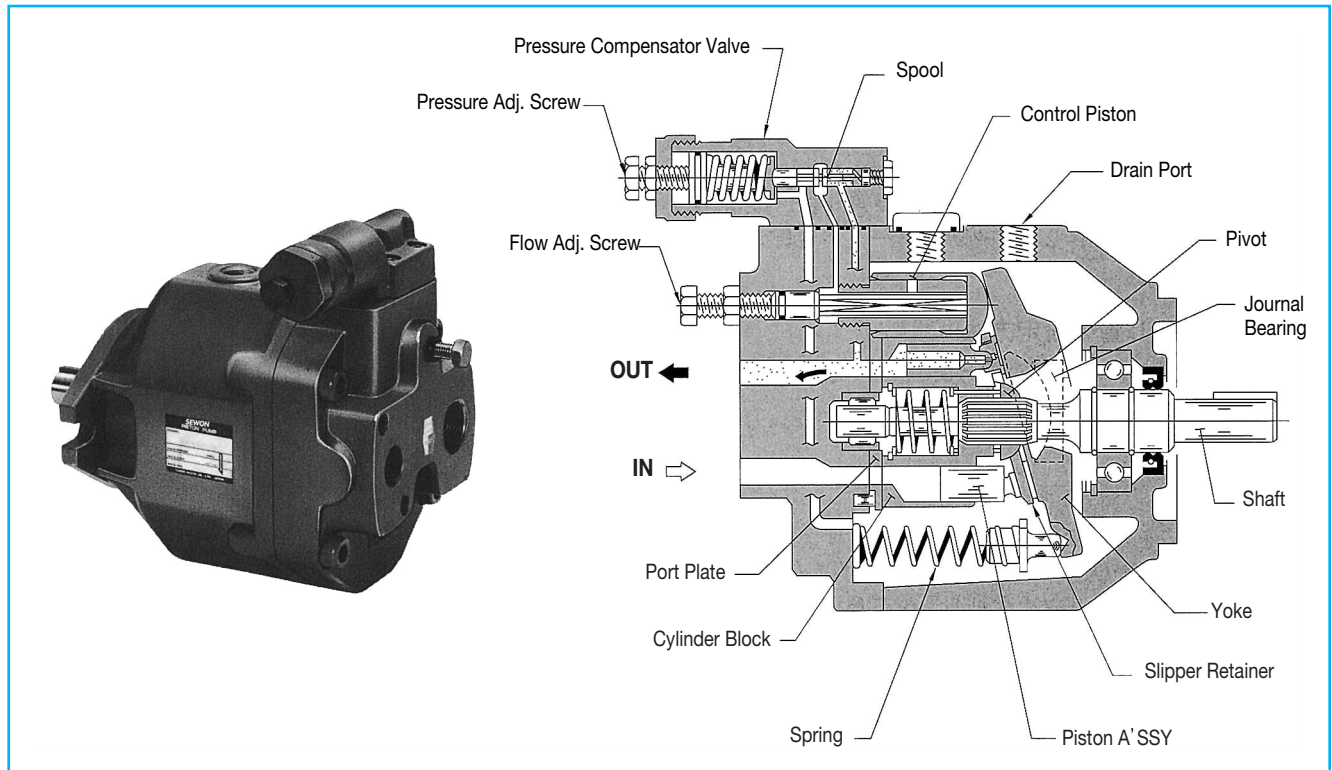
#### [Adjustment of Delivery]

Turning the delivery adjustment screw clockwise, decreases delivery. The minimum adjustable flow and adjustable volume of each full turn of the delivery adjustment screw.

#### [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	Minimum adjustable flow cm <sup>3</sup> /rev
AR16	1.5	6
AR22	2.1	8.5

## AR SERIES Variable Displacement Piston Pumps

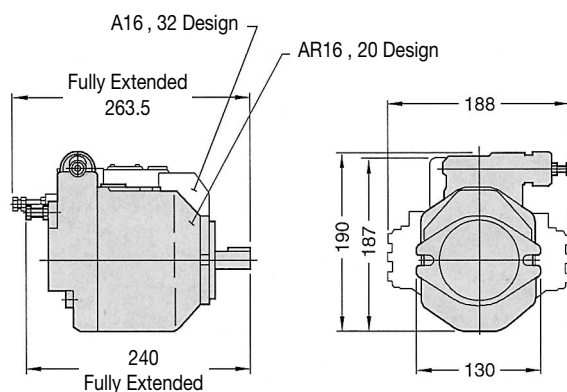


### Feature

#### 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.

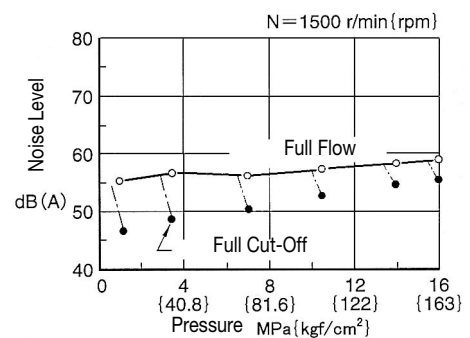
#### [Comparison of AR16 with A16]



#### 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 quite pump.

#### [AR Type noise level characteristics]



#### High Reliability

The main internal components of AR Series are having high reliability as it is using A16/A22 type having accumulated accomplishment.



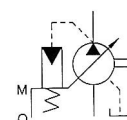


## AR Series Variable Displacement Piston Pumps

-Single Pump, Pressure Compensator Type



KS Graphic Symbol



### ■ Ratings

Model Numbers	Geometric Displacement cm <sup>3</sup> /rev	Operating Pres. MPa {kgf/cm <sup>2</sup> }		Shaft Speed Range r/min {rpm}		Approx. Mass kg
		Rated	Intermittent <sup>★1</sup>	Max.	Min.	
AR16-FR01 ※-20	15.8	6	16 {163}	1800	600	9.8
AR22-FR01 ※-20	22.2	8.5				

★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	-20
Series Number	Mounting	Direction of Rotation	Control Type	Pres.Adg.Range MPa {kgf/cm <sup>2</sup> }	Design Number
AR16 (15.8cm <sup>3</sup> /rev)	F:Flange Mtg.	[Viewed from Shaft End] ★ R:Clockwise (Normal)	01:Pressure Compensator Type	B:1.2~7 {12.2~71.4} C:2.0~16 {20.4~163}	20
AR22 (22.2cm <sup>3</sup> /rev)					20

★1. Available to supply pump with anti-clockwise rotation. Consult Sewon for details.

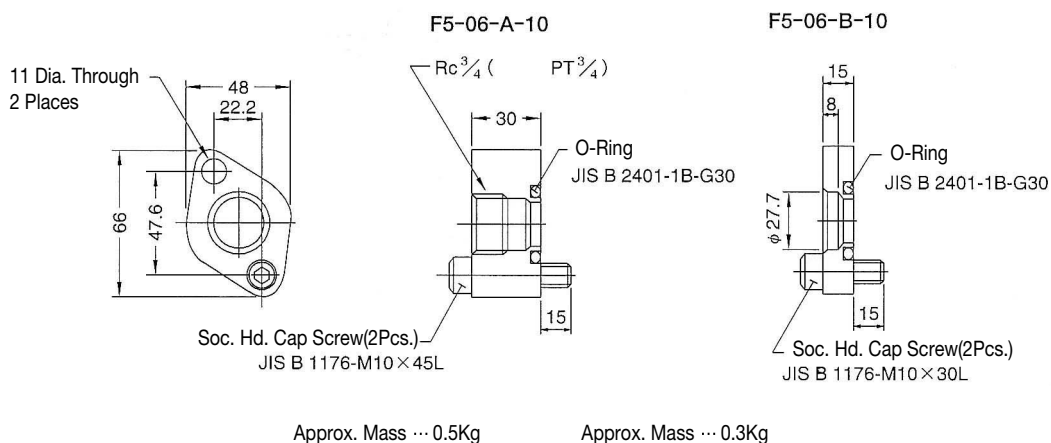
## ■ Pipe Flange Kits

This pumps is not included Pipe Flange Kits. When ordering, specify the kit number from the table below.

Pump Model Numbers	Name of Port	Pipe Flange Kit Numbers	
		Threaded Connection	Socket Welding
AR16-FR01	Suction Port	F5-06-A-10	F5-06-B-10
AR22-FR01	Discharge Port	★	★

★ Discharge port is available for the threaded connections.

### Pipe Flange Kit for Suction Port : F5-06-<sup>A</sup>/<sub>B</sub>-10

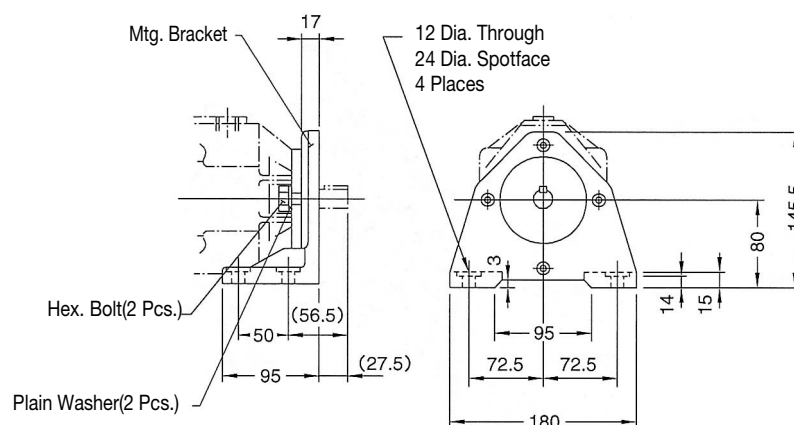


## ■ Mounting Bracket

Mounting bracket available on separate order.

Pump Model Numbers	Mtg. Bracket Kit Numbers	Composition Components	Mass Kg
AR16-FR01 AR22-FR01	LP-1A-10	Mtg. Bracket : 190-PK210616-9 (1Pcs) Soc. Hd. Cap Screw : JIS B 1180-M10 x 25L (2Pcs) Plain Washer : JIS B 1256-10 x 21 x 2 (2Pcs)	2.2

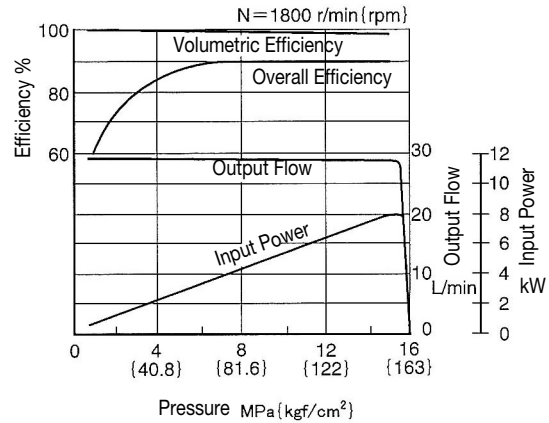
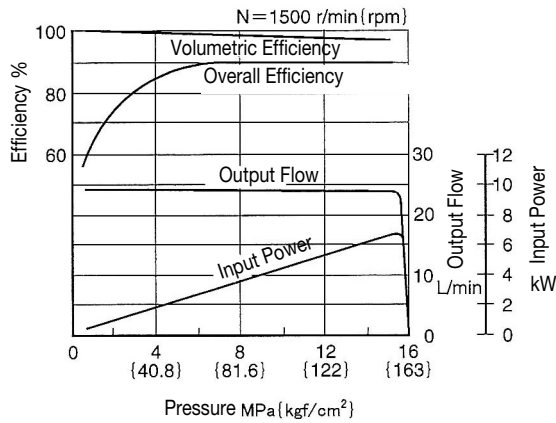
### Mounting Bracket Kits : LP-1A-10



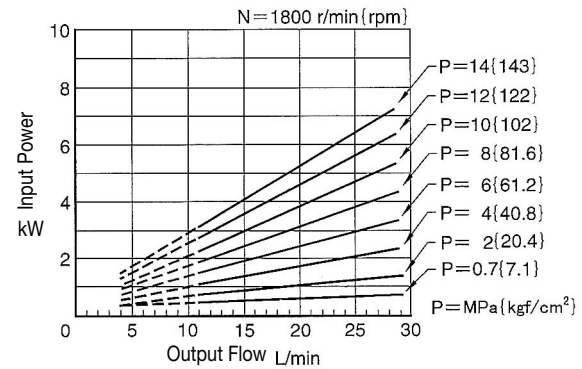
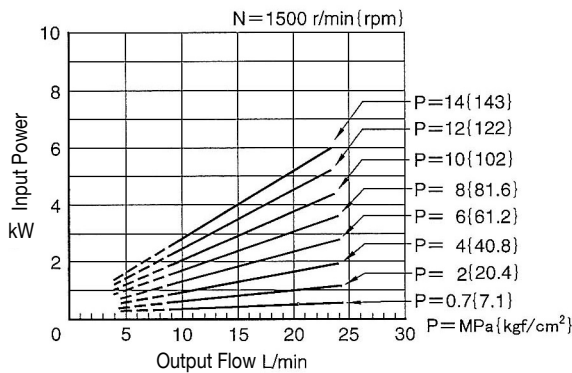
### AR16 Characteristics

Typical performance characteristics at viscosity 32mm<sup>2</sup>/s(ISO VG 32 Oil, 50°C)

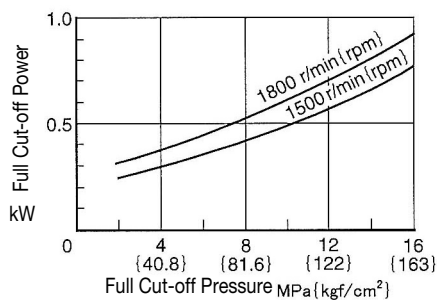
#### Performance Characteristic Curve



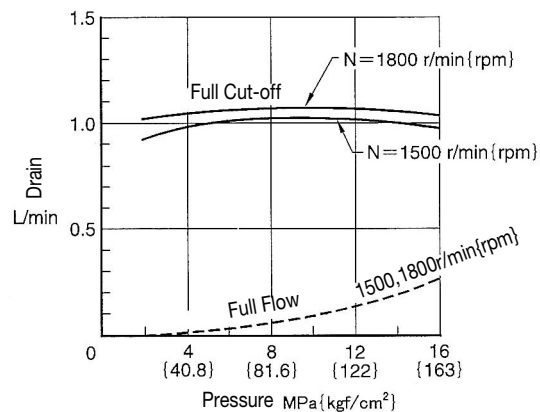
#### Input Power



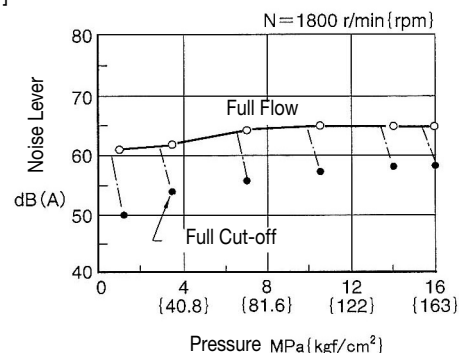
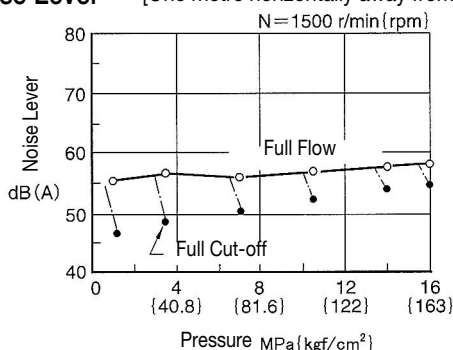
#### Full Cut-off Power



#### Drain



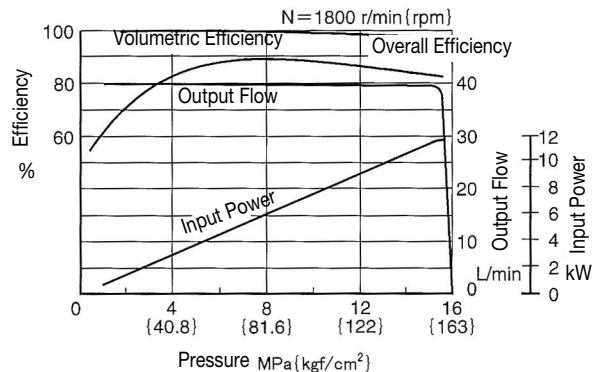
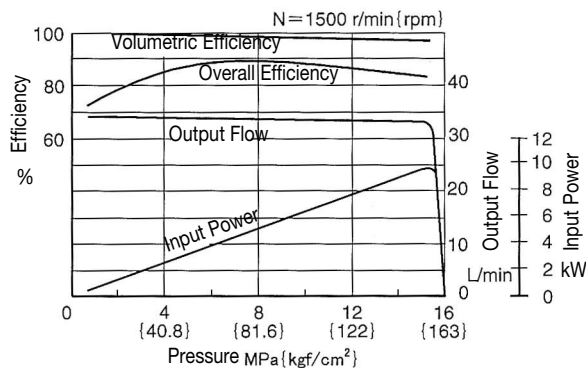
#### Noise Level [One metre horizontally away from pump head cover]



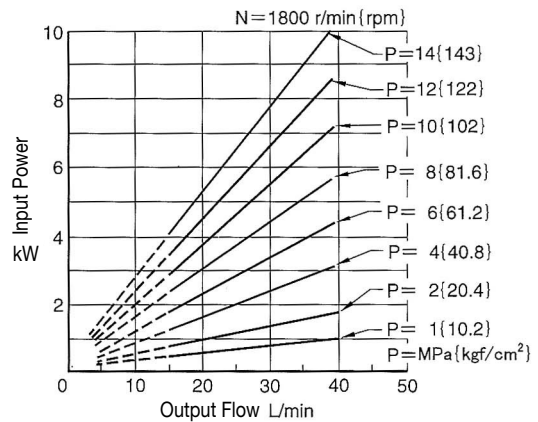
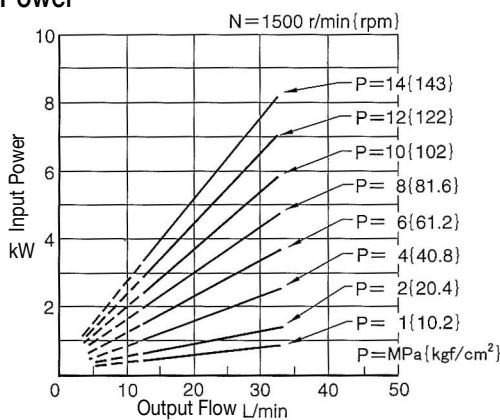
## AR22 Characteristics

Typical performance characteristics at viscosity 32mm<sup>2</sup>/s(ISO VG 32 Oil, 50°C)

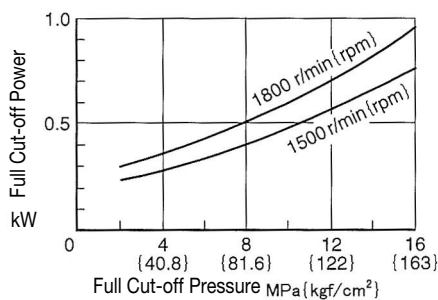
### Performance Characteristic Curve



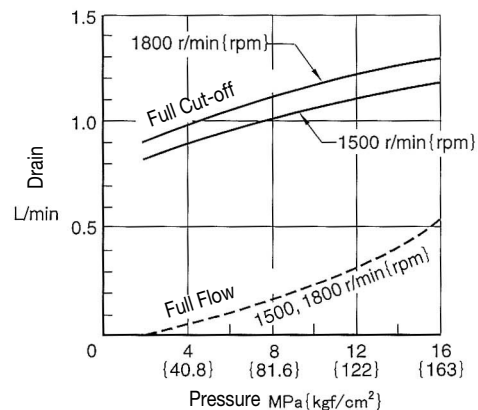
### Input Power



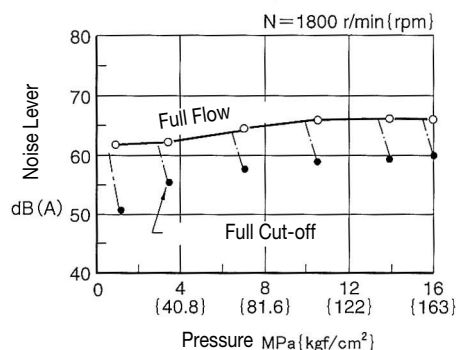
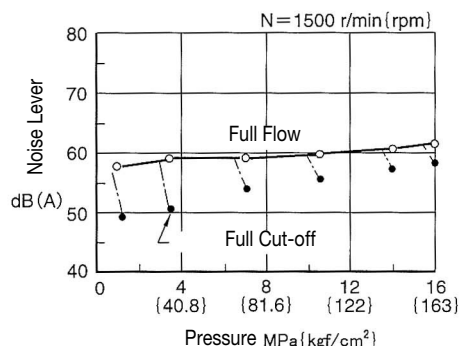
### Full Cut-off Power



### Drain



### Noise Level [One metre horizontally away from pump head cover]



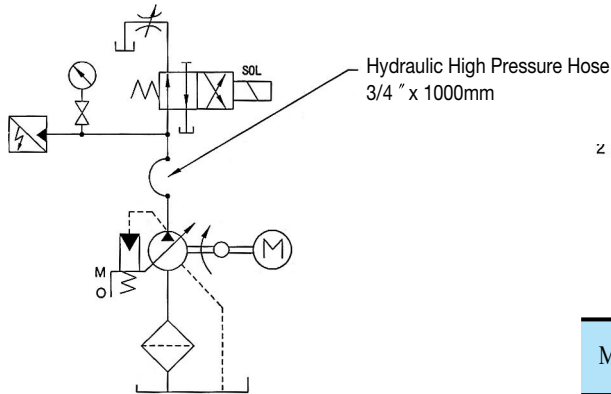


### Response Characteristics

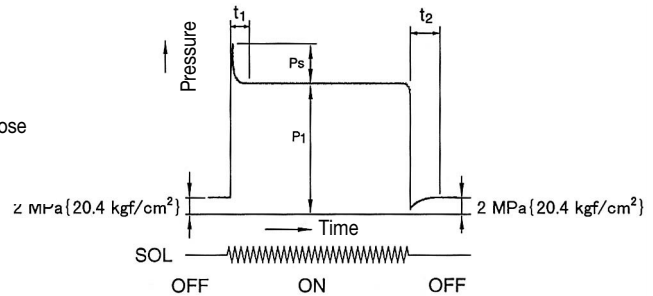
Response characteristics Change in Accordance with Circuits and Operating Conditions.

#### Test Circuit and Conditions

##### Circuit



#### Result of Measurement



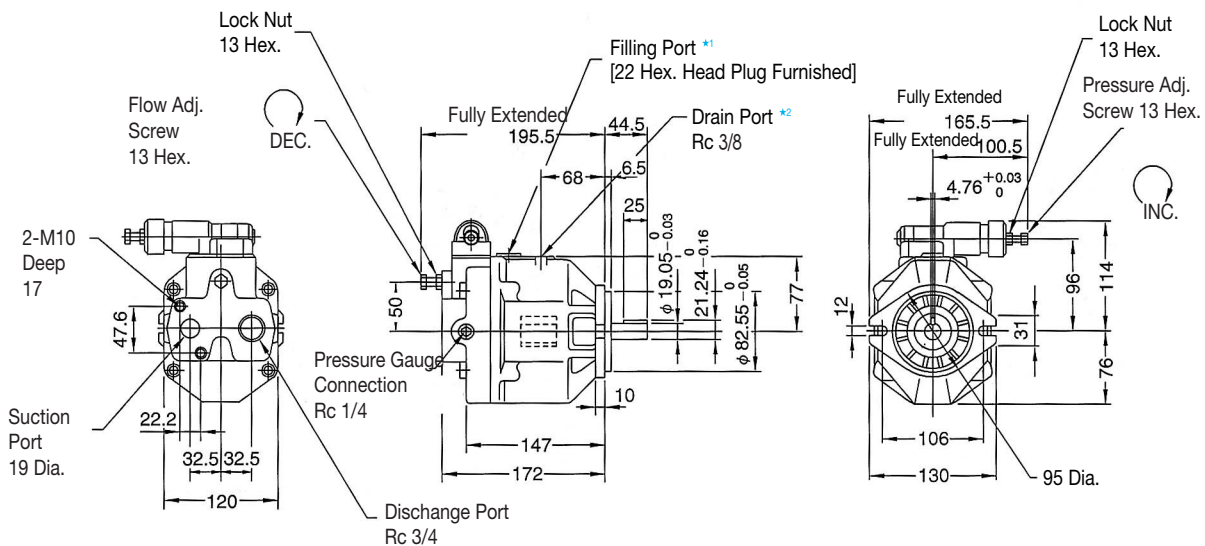
Model	Full Cut-off Pressure $P_1$ MPa {kgf/cm <sup>2</sup> }	Response Time ms		Outshoot Pressure $P_2$ MPa {kgf/cm <sup>2</sup> }
		$t_1$	$t_2$	
AR16	16 {163}	60	65	5.6 {57}
AR22		70	70	7.3 {74}

##### Conditions

Drive Speed: 1500 r/min {rpm}  
Hydraulic Fluid: ISO VG32 oil  
Oil Temperature: 50 °C  
Viscosity: 20mm<sup>2</sup>/s (cSt)

#### Installation Drawing

##### Axial Port Type



- ★1. Install the pump so that the filling port is at the top.
- ★2. A screw-in torque of fitting is 40~50 Nm.  
Do not apply bending and thrust torque to the fitting.

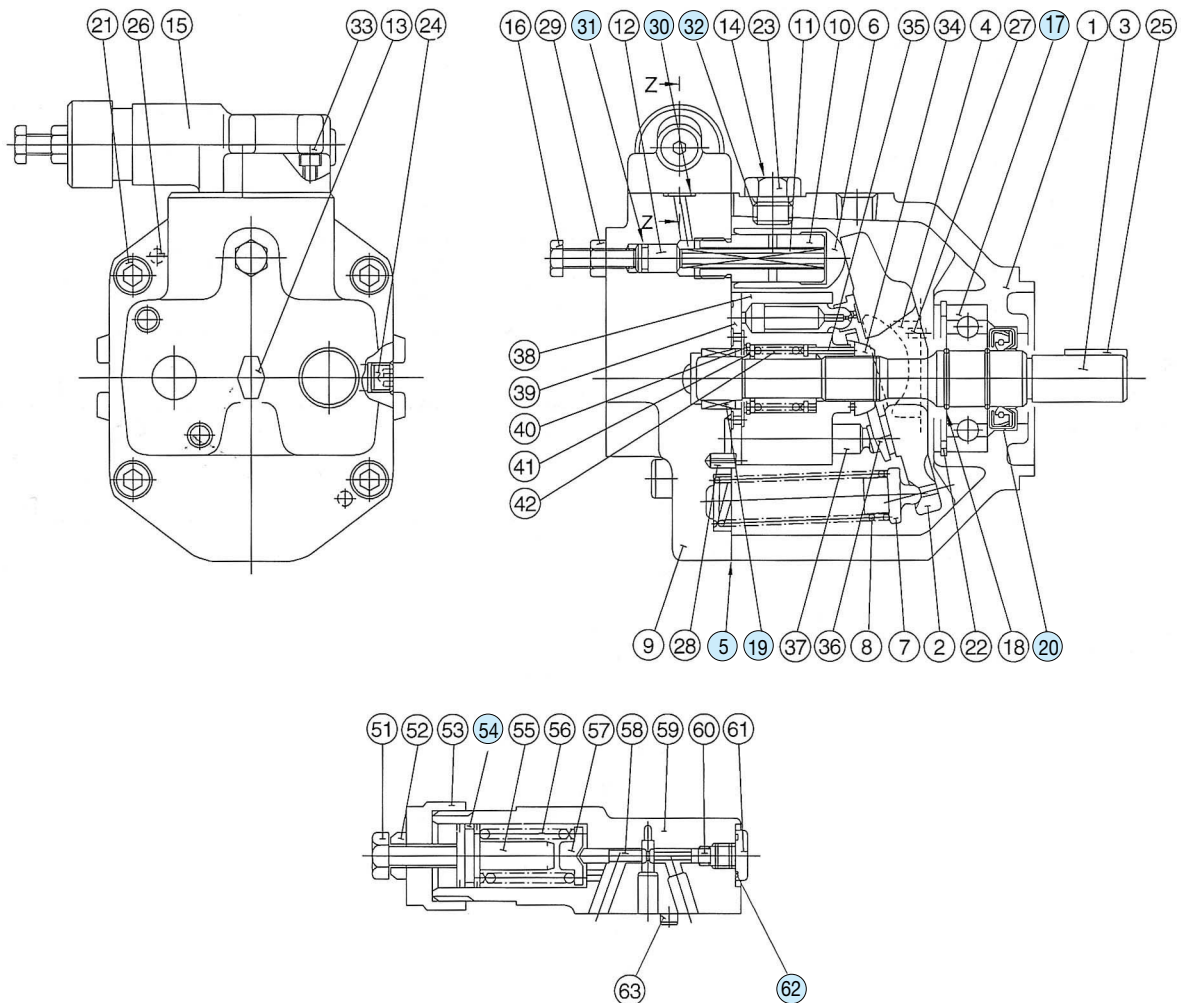
## CAUTION

When making replacement of seals or bearing, please do it carefully after reading through the relevant instructions in the Operator's Manual.

### List of Seals and Bearing

AR16-FR01

AR22-FR01



Section Z-Z

Item	Name of Parts	Part Numbers		Qty.
		AR16-FR01	AR22-FR01	
5	Gasket	1302-PK312891-5		1
17	Bearing	6305		1
19	Bearing	HMK 1715 V2	Z30-1303-PK410300-8	1
20	Oil Seal	TCN 254511		1
30	O-Ring	JIS B 2401-1B-P9		3
31	O-Ring	JIS B 2401-1A-P8		1
32	O-Ring	JIS B 2401-1B-P14		1
54	O-Ring	AS 568-018(NBR, Hs70)		1
62	O-Ring	JIS B 2401-1B-P10		1



## Interchangeability In Installation between A Series and AR Series

### Ratings

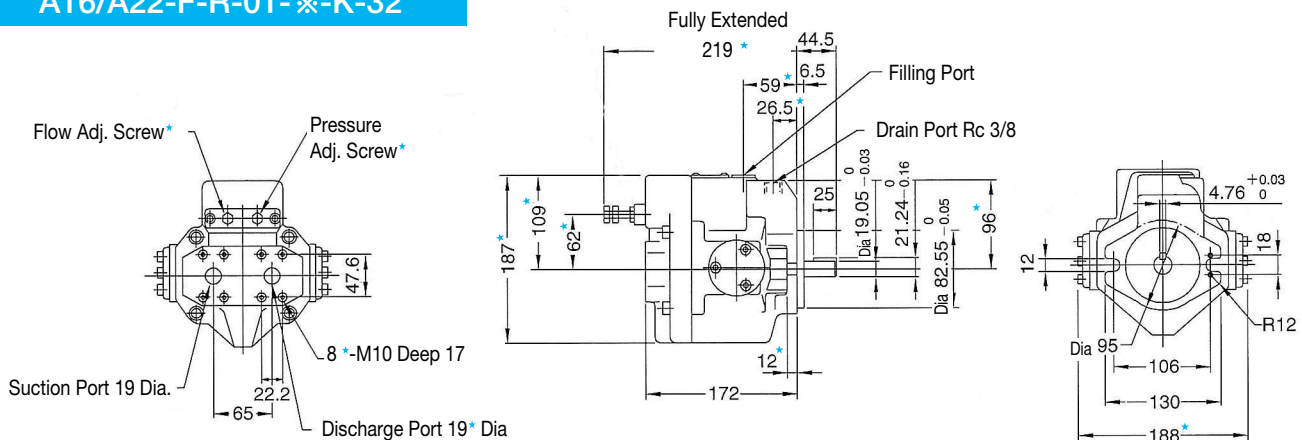
Description \ Model	A16-※-R-01-※-K-32	AR16-FR01 ※-20	A22-※-R-01-※-K-32	AR22-FR01 ※-20
Geometric Displacement	15.8cm <sup>3</sup> /rev		22.2cm <sup>3</sup> /rev	
Operating Pres.	Rated	16MPa {163kgf/cm <sup>2</sup> }	16MPa {163kgf/cm <sup>2</sup> }	
	Intermittent	21MPa {214kgf/cm <sup>2</sup> }	16MPa {163kgf/cm <sup>2</sup> }	
Shaft Speed Range	600~1800r/min {rpm}		600~1800r/min {rpm}	
Approx. Mass(Flange Mtg.)	16.5kg	9.8kg	16.5kg	9.8kg

### Interchangeability in Installation

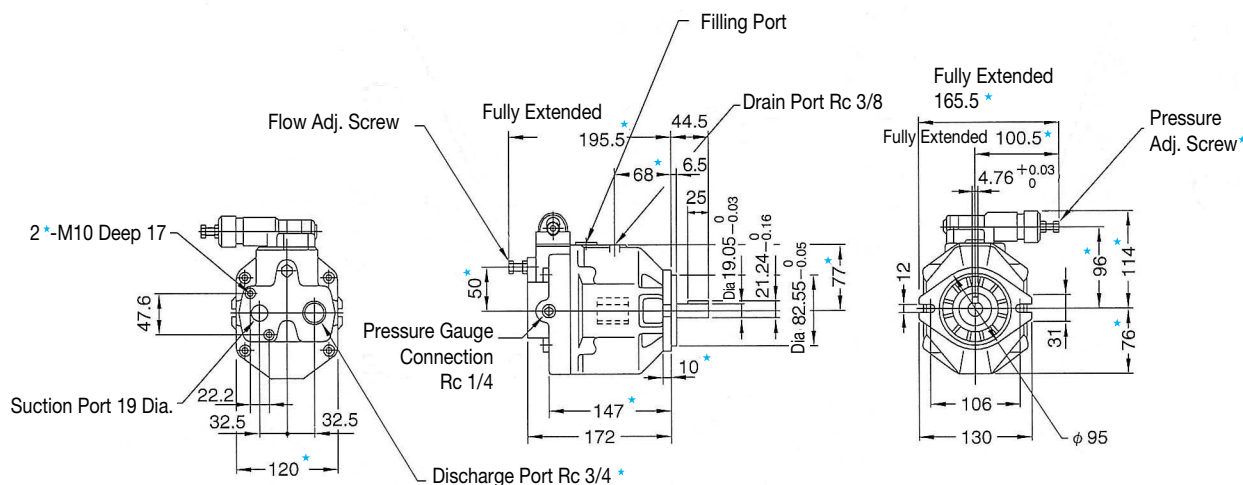
Model Numbers		Interchangeability in Installation			
		Mtg. Flange & Shaft End	Piping		
A Series	AR Series		Suction Port	Discharge Port	Drain Port
A16-※-R-01-※-K-32	AR16-FR01 ※-20	Yes	Yes	Yes	Yes
A22-※-R-01-※-K-32	AR22-FR01 ※-20				

● Comparison of dimensions between A series and AR series are shown below. Note : Dimensions with star mark ★ are identical to each other.

#### A16/A22-F-R-01-※-K-32

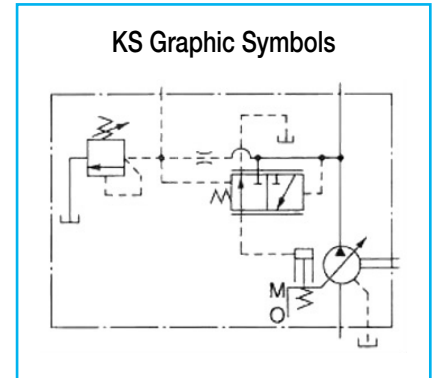
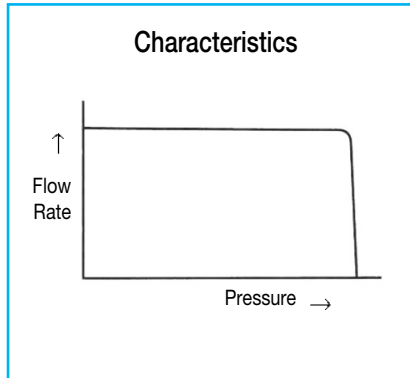
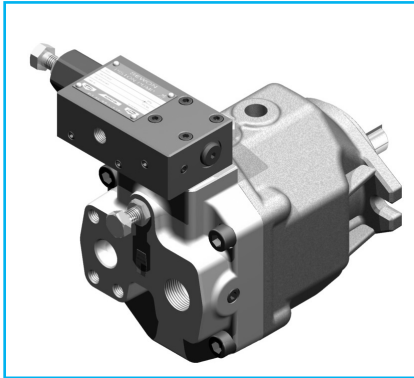


#### AR16/AR22-FR01-※-20



## AR Series Variable Displacement Piston Pumps

### - Single Pump, Pilot Pressure Control Type Pressure Compensator



#### ■ Feature

- High efficiency, Low Noise & Low Heat
- It can be used in combination with pilot relief valve or a dedicated multi-stage pressure control valve
- It can freely control Full Cut-Off pressure by controlling pilot pressure

#### ■ Model Number Designation

Model Numbers	Mounting	Direction of Rotation	Control Type	Direction of Piping	Shaft Extension	Design Number
<b>AR 16</b> (15.8cm <sup>3</sup> /rev)	<b>F</b> : Flange Mtg.	(Viewd from Shaft End) <b>R</b> : Clockwise (Standard)	<b>07</b> : Pilot Control Pressure Compensator	None : Axial Port Side Port	<b>K</b> : Keyed Shaft	<b>20</b>
<b>AR 22</b> (22.2cm <sup>3</sup> /rev)	<b>L</b> : Foot Mtg.					

#### ■ Ratings

Model Numbers	Geometric Displacement cm <sup>3</sup> /rev	Minimum Adj. Flow cm <sup>3</sup> /rev	Operating Pres. MPa		Mass kg	Shaft Speed Rate r/min	
			Rated	Intermittent		Max.	Min.
AR16-※-R-07-※-20	15.8	6	16	16	9.8	1800	600
AR22-※-R-07-※-20	22.2	8.5	16	16	9.8	1800	600

★ 1. When you use beyond the rated pressure is limited to the terms of use. For more details, please contact SEWON.

#### ■ Feature

- As features refer to Pressure Compensator Type.

#### ■ Pipe Flange Kits

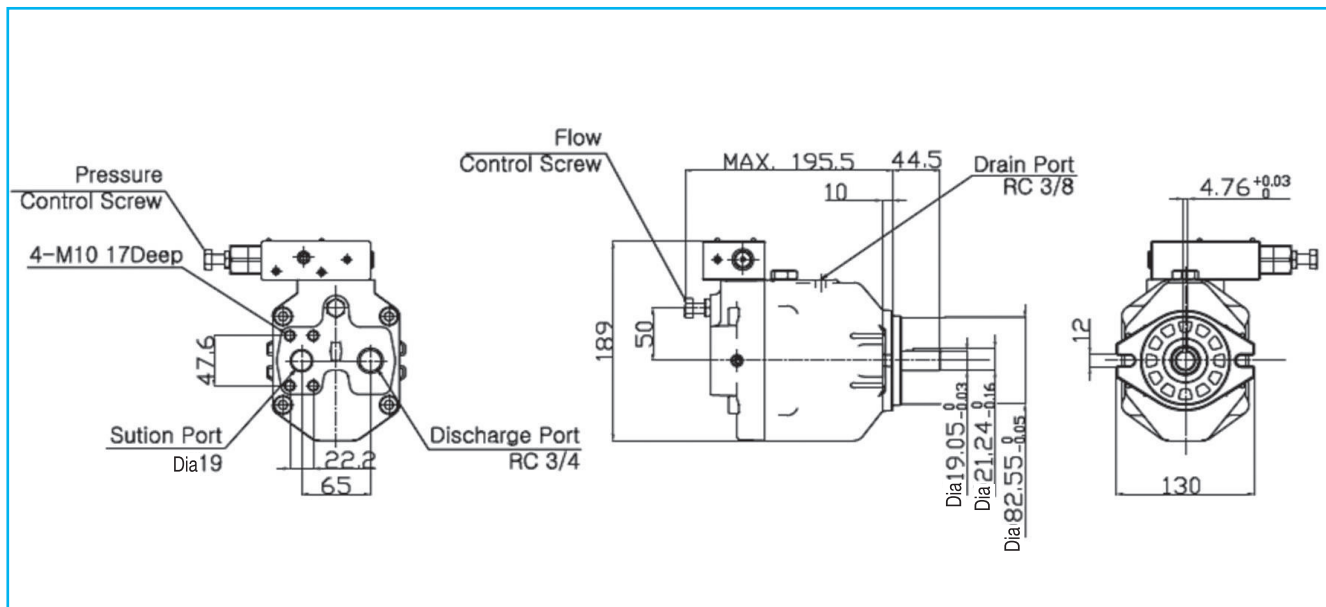
- This pump does not include the port flange.



### Axial Port Type

AR16-FR07 (Flange Mtg.)

AR22-FR07 (Flange Mtg.)



- ★ 1. Install the pump so that the Filling Port is at the top.
- ★ 2. A screw-in torque of fitting is 40 ~ 50 Nm.

Do not apply bending and thrust torque to the fitting.