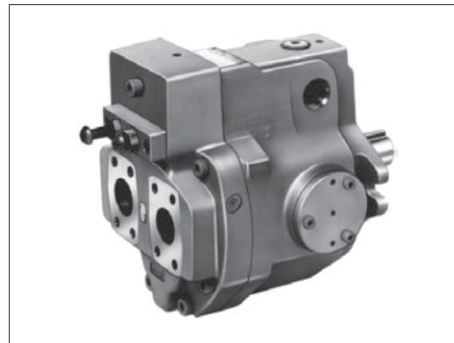
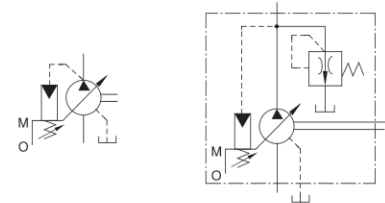


Series Variable Displacement Piston Pumps, Pressure Compensator Type



Graphic Symbol

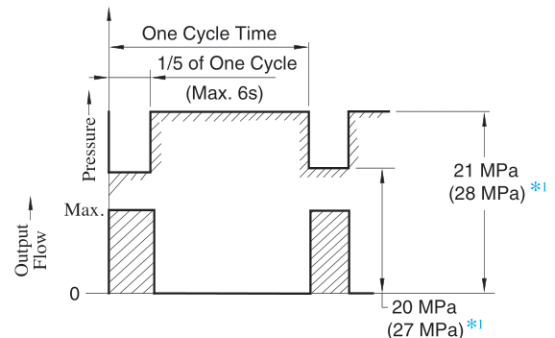


Applicable only for "A200"

Specifications

Model Numbers	Geometric Displacement cm ³ /rev	Minimum Adj. Flow cm ³ /rev	Operating Pressure MPa		Shaft Speed Range r/min		Approx. Mass kg	
			Rated ^{*2}	Intermittent ^{*1}	Max.	Min.	Flange Mtg.	Foot Mtg.
A10-FR01B-12	10.0	2	16	21	1800	600	5.1	—
A10-FR01C/H-12							8.5	
A16- *-R-01- *- *-K-32	15.8	4	16	21	1800	600	16.5	18.7
A22- *-R-01- *- *-K-32	22.2	6	16	16	1800	600	16.5	18.7
A37- *-R-01- *- *-K-32	36.9	10	16	21	1800	600	28.0	32.3
A56- *-R-01- *- *-K-32	56.2	12	16	21	1800	600	35.0	39.3
A70- *R01 *S-60	70.0	36	25	28	1800	600	58.5	70.5
A90- *R01 *S-60	91.0	56	25	28	1800	600	72.5	93
A100- *R01 *S-10	100	62	21	21	1800	600	72.5	93
A145- *R01 *S-60	145	83	25	28	1800	600	92.5	117.7

- ★1. Whenever setting pressure, make sure the full cut-off pressure never exceeds the maximum intermittent pressure.
- ★2. Care should be taken in cases of used at a higher pressure than the rated pressure, because operating terms may be restricted. For example, if used as per maximum illustrated operating conditions, intermittent time at maximum flow is restricted to under 1/5 of one cycle time and under six seconds simultaneously. Conditions may vary according to the actual working pressure and delivery (inclination angle of the swash plate). Consult factory or Yuken sales representative for further information.
- ★3. Care should be taken in cases of used at a higher pressure than the rated pressure, because operating terms may be restricted. For example, if used as per maximum illustrated operating conditions, intermittent time at maximum flow is restricted to under 1/5 of one cycle time and under six seconds simultaneously. Conditions may vary according to the actual working pressure and delivery (inclination angle of the swash plate). Consult factory or Yuken sales representative for further information.



*1. Applicable only for "A70/90/145"

Specifications and Design numbers for Special Fluids

Type of Fluids	Pump Series	Operating Pressure MPa		Allowable Maximum Shaft Speed r/min		Temperature Range °C	Viscosity Range mm ² /s	Design Numbers for Special Fluid
		Rated	Intermittent	Rated	Max.			
Water-Glycols	A16-A56	14	16 (14) ^{*1}	1200	(1800) ^{*2}	0-50	20-200	3230
	A70-A145	21	21					6030
	A100	16	16					1030
Phosphate Ester Type	A16-A56	14	16 (14) ^{*1}	1200	(1800) ^{*2}	0-60	20-200	3206
	A70-A145	21	21					6006
	A100	21	21					1006
Polyol Ester Type	A16-A56	16	16	1800	1800	0-60	20-200	32450
	A70-A145	21	21					60450
	A100	21	21					10450

- ★1. The figures in brackets are for A22 type.
- ★2. As the specific gravities of water-glycol fluids and phosphate ester type fluids are higher than one, an overhead reservoir is required when pumps are operated at 1400 r/min or more.

Model Number Designation

A16	-F	-R	-01	-B	-S	-K	-32
Series Number	Mounting	Direction of Rotation	Control Type	Pres. Adj. Range MPa	Port Position	Shaft Extension	Design Number
A16 (15.8 cm ³ /rev)	F: Flange Mtg.	(Viewed from Shaft End)	01: Pressure Compensator Type	B: 1.2 - 7 C: 1.2 - 16 H: 1.2 - 21	None: Axial Port	K: Keyed Shaft	32
A22 (22.2 cm ³ /rev)				B: 1.2 - 7 C: 1.2 - 16			32
A37 (36.9 cm ³ /rev)	L: Foot Mtg.	R: Clockwise* ² (Normal)		B: 1.2 - 7 C: 1.2 - 16 H: 1.2 - 21	S: Side Port		32
A56 (56.2 cm ³ /rev)				32			

A70	-F	R	01	B	S	-60	
Series Number	Mounting	Direction of Rotation	Control Type	Pres. Adj. Range MPa	Port Position	Design Number	
A10 (10.0 cm ³ /rev)	F: Flange* ¹ Mtg.	(Viewed from Shaft End)	01: Pressure Compensator Type	B: 1.2 - 7 C: 2.0 - 16 H: 2.0 - 21	—	12	
A70 (70.0 cm ³ /rev)	F: Flange Mtg.			R: Clockwise* ² (Normal)	B: 1.2 - 7 C: 1.5 - 16 H: 1.8 - 21 K: 2.0 - 28	S: Side Port	60
A90 (91.0 cm ³ /rev)							60
A100 (100 cm ³ /rev)	L: Foot Mtg.			60			
A145 (145 cm ³ /rev)		60					

★ 1. When A10 pump is used as the foot Mtg., order the Mtg. Bracket kit shown below separately. Refer to page 20 for dimensions of the Mtg. bracket.

Note: The mounting bracket kit consists of a mounting bracket, two hex. bolts and two plain washer.

Mtg. Bracket Kit Numbers	Approx. Mass kg
LP-1A-10	2.2

★ 2. Available to supply pump with anti-clockwise rotation (Except A100). Consult Yuken for details.

Pipe Flange Kits

Pipe flange kits are available. When ordering, specify the kit number from the table below.

Pump Model Numbers	Name of Port	Pipe Flange Kit Numbers		
		Threaded Connection	Socket Welding* ¹	Butt Welding
A16-*R01	Suction	F5-06-A-10	F5-06-B-10	F5-06-C-10
A22-*R01	Discharge	F5-06-A-10	F5-06-B-10	F5-06-C-10
A37-*R01	Suction	F5-10-A-10	F5-10-B-10	F5-10-C-10
A56-*R01	Discharge	F5-10-A-10	F5-10-B-10	F5-10-C-10
A70-*R01	Suction	F5-12-A-10	F5-12-B-10	F5-12-C-10
	Discharge	F5-08-A-10	F5-08-B-10	F5-08-C-10
A90-*R01	Suction	F5-16-A-10	F5-16-B-10	F5-16-C-10
A100-*R01	Discharge	F5-10-A-10	F5-10-B-10	F5-10-C-10
A145-*R01				

★ In case of using socket welding flanges, there is a case where the operating pressure should be set lower than the normal because of strength of the flanges. Therefore, please pay cautious attention to the operating pressure when the socket welding flanges are used.

● Details of the pipe flange kits are shown on page 262.

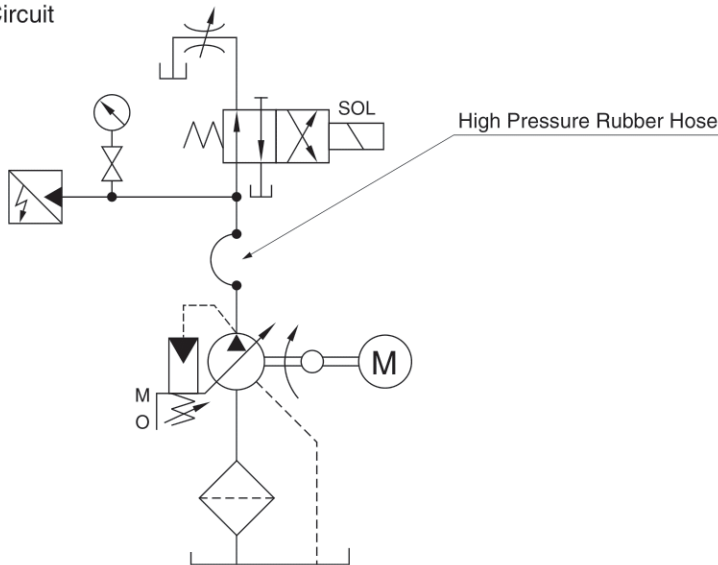
The below pumps are also available.
Please consult Yuken.

Model Number		A45 * R-01 * K-10	A220 * R-01 * K-10
Maximum Operating Pressure	MPa	16	16
Geometric Displacement	cm ³ /rev	45.0	219
Shaft Speed Range	r/min	600 - 1800	600 - 1500

Response Characteristics Change in Accordance with Circuits and Operating Conditions.

■ The Circuit and Conditions

● Circuit



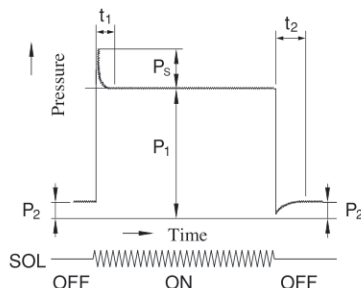
Model	Rubber Hose Size
A10	1/2" × 800 mm
A16 A22	3/4" × 700 mm
A37 A56	3/4" × 2000 mm
A70	3/4" × 3500 mm
A90 A100 A145	3/4" × 3000 mm + 1-1/4" × 2000 mm

● Conditions

Shaft Speed : 1500 r/min
Hydraulic Fluid : ISO VG 32 Oil
Oil Temperature: See right table

Model	Oil Temperature
A10 - A56	50°C (20 mm ² /s)
A70 - A145	40°C (32 mm ² /s)

■ Result of Measurement

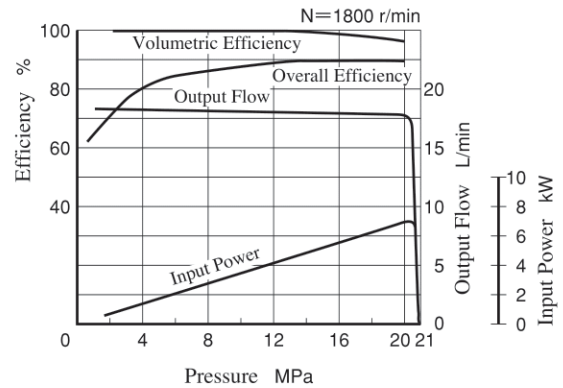
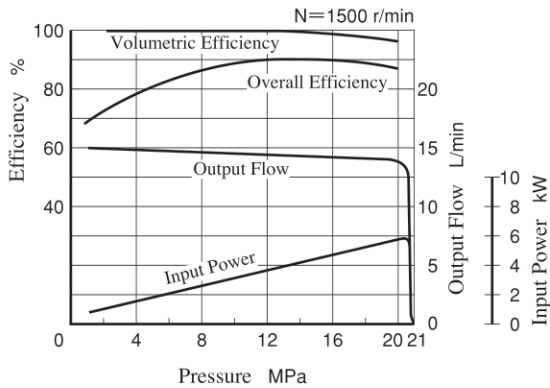


Model	Full Cut-off Pressure P ₁ MPa	Pressure at Full Flow P ₂ MPa	Response Time ms		Overshoot Pressure P _s MPa
			t ₁	t ₂	
A10	21	2	100	75	2.6
A16	16	2	38★	59★	3.6
A22	16	2	30★	72★	5.9
A37	16	2	40★	78★	7.8
A56	16	2	38★	88★	7.6
A70	25	2	80	100	7.8
A90	25	3	90	110	7.9
A100	21	3	90	110	8.1
A145	25	3	100	150	8.8

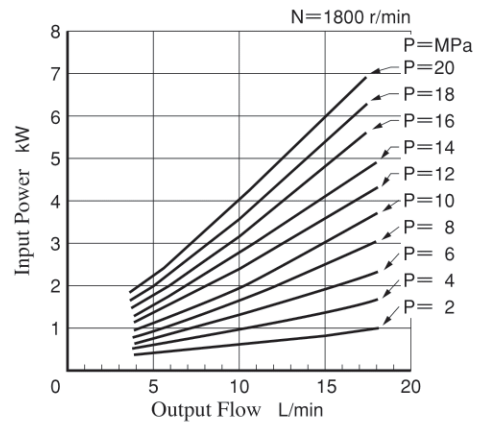
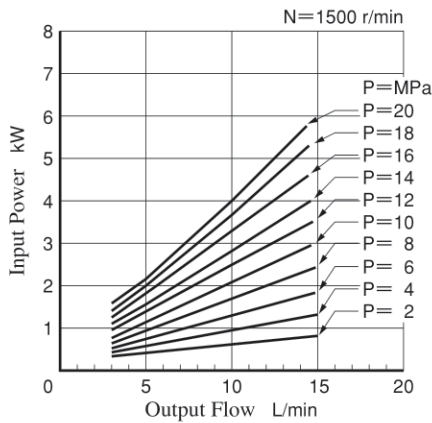
★ Response time except A16, A22, A37 and A56 is measured Yoke travel.

Typical Performance Characteristics of Type **A10** at Viscosity 20 mm²/s [ISO VG32 Oils, 50°C]

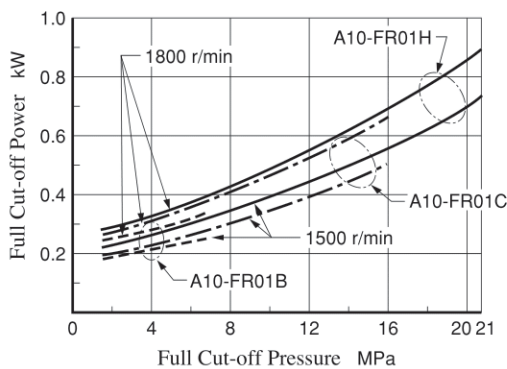
Performance Characteristic Curve



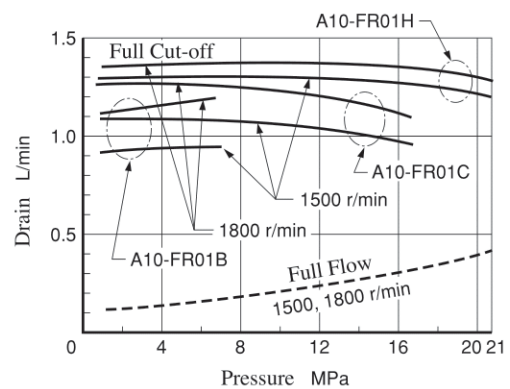
Input Power



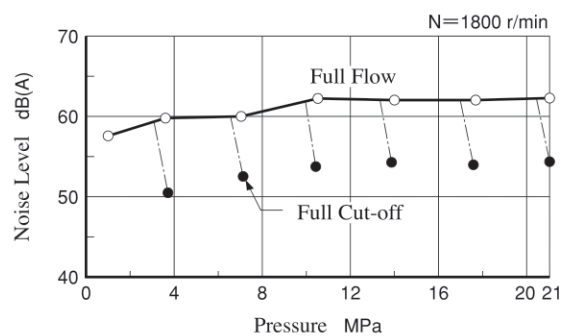
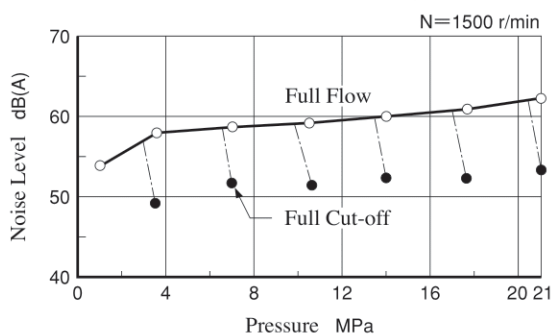
Full Cut-off Power



Drain

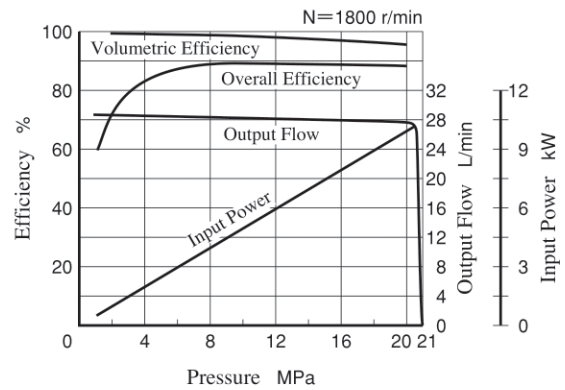
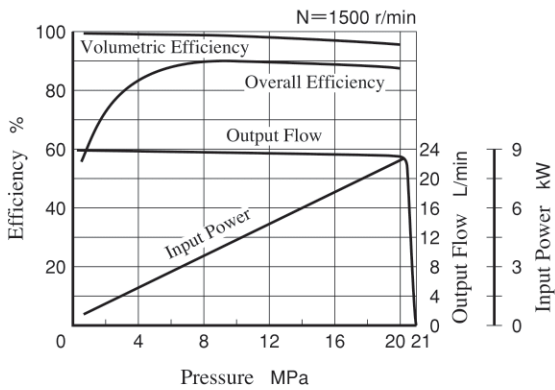


Noise Level [One metre horizontally away from pump head cover]

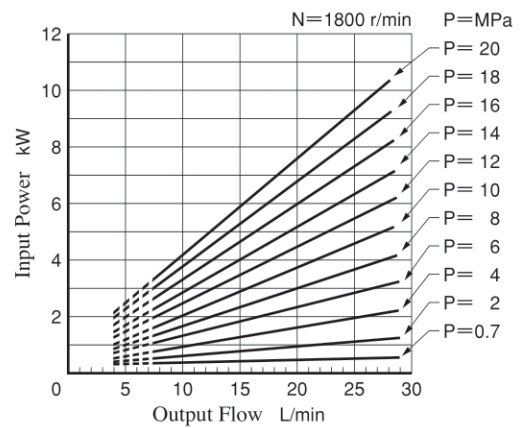
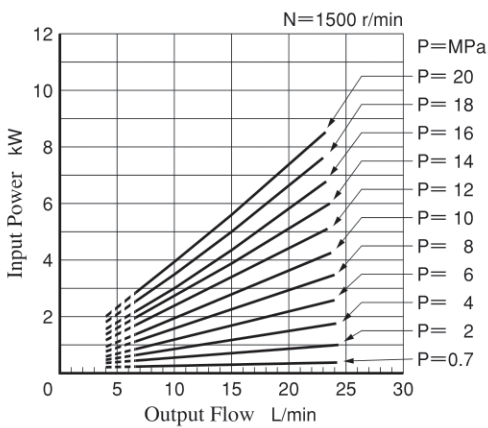


Typical Performance Characteristics of Type **A16** at Viscosity 20 mm²/s [ISO VG32 Oils, 50°C]

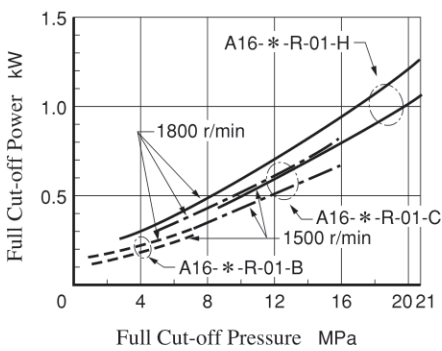
Performance Characteristic Curve



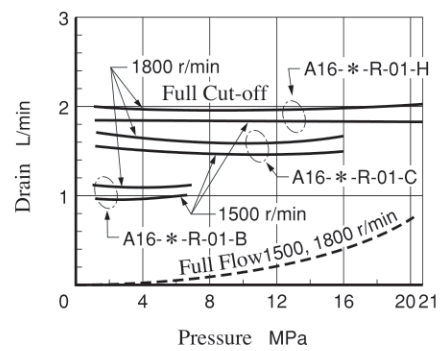
Input Power



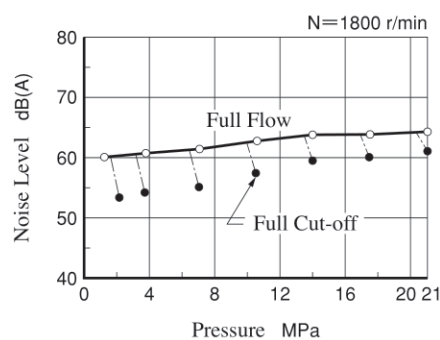
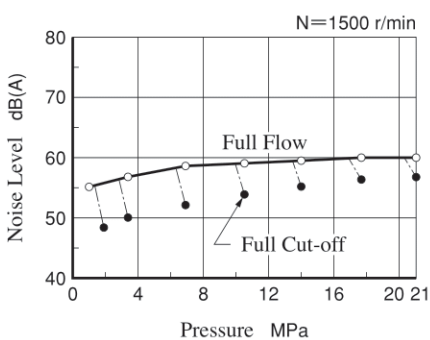
Full Cut-off Power



Drain

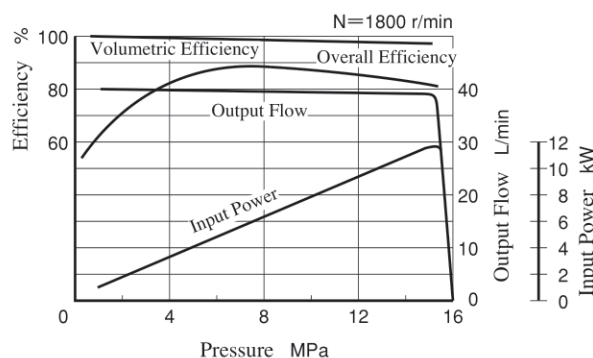
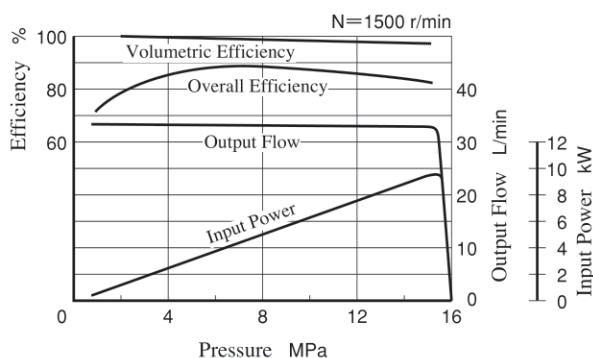


Noise Level [One metre horizontally away from pump head cover]

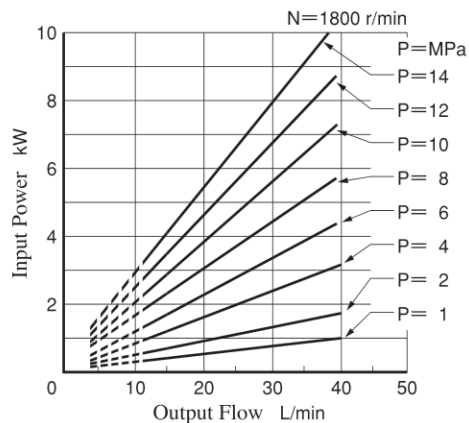
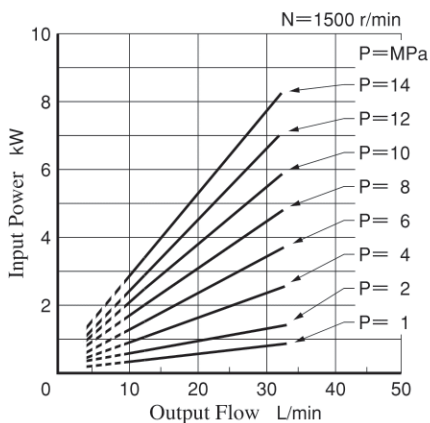


Typical Performance Characteristics of Type **A22** at Viscosity 20 mm²/s [ISO VG32 Oils, 50°C]

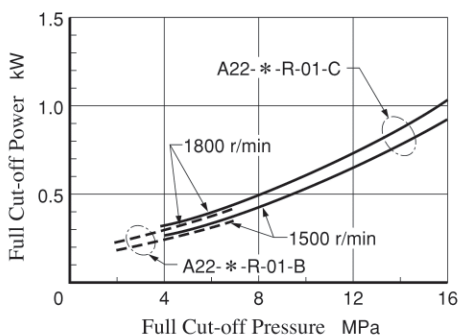
Performance Characteristic Curve



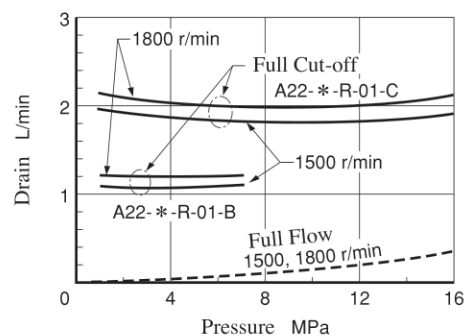
Input Power



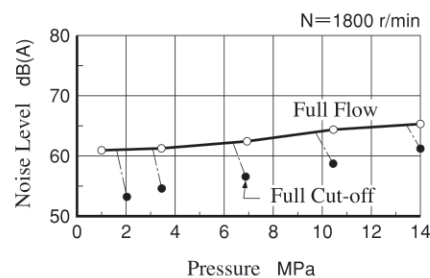
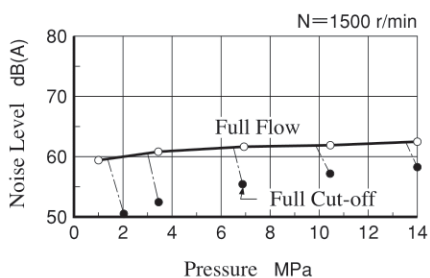
Full Cut-off Power



Drain

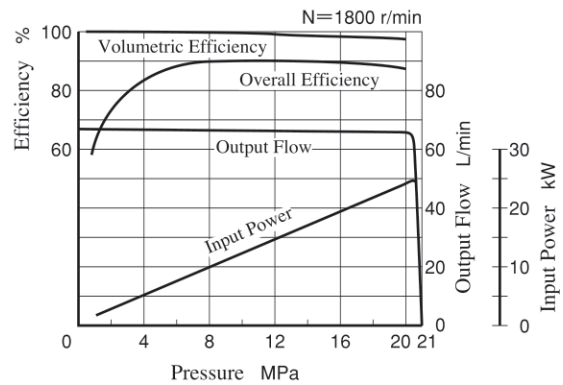
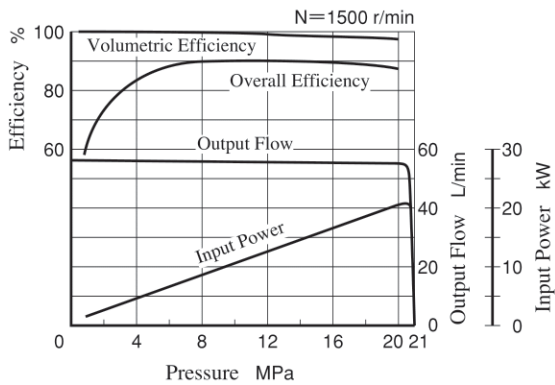


Noise Level [One metre horizontally away from pump head cover]

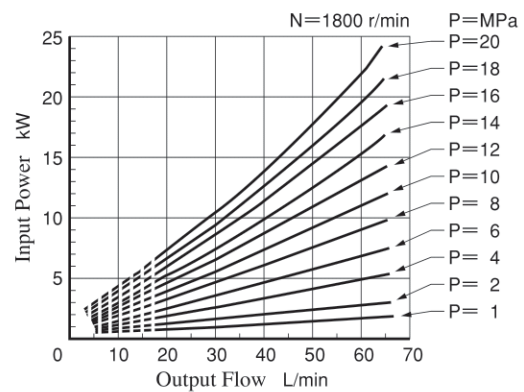
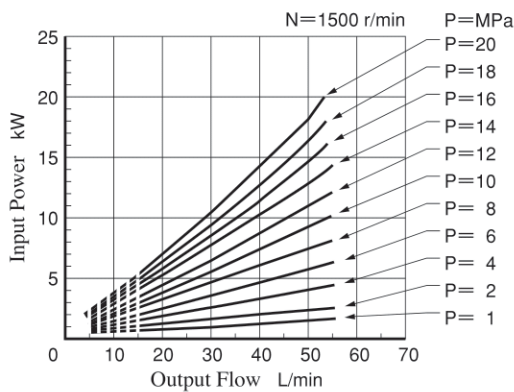


Typical Performance Characteristics of Type **A37** at Viscosity 20 mm²/s [ISO VG32 Oils, 50°C]

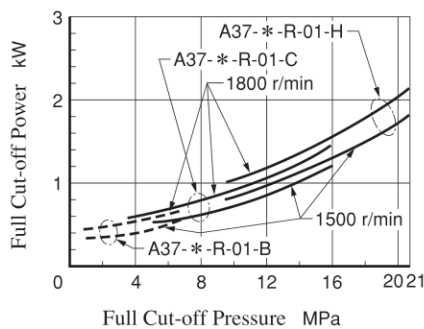
Performance Characteristic Curve



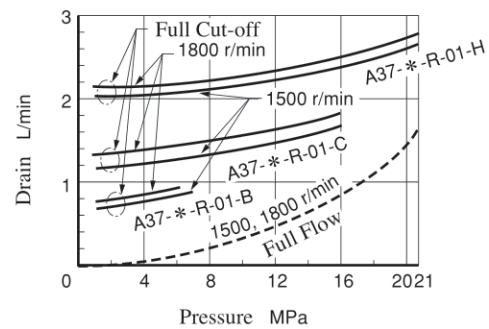
Input Power



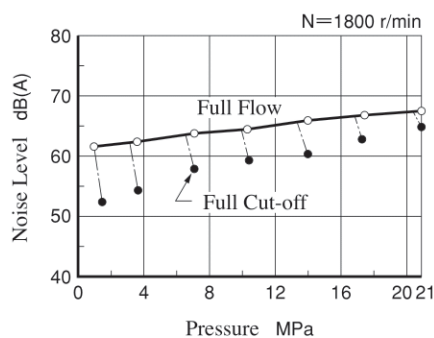
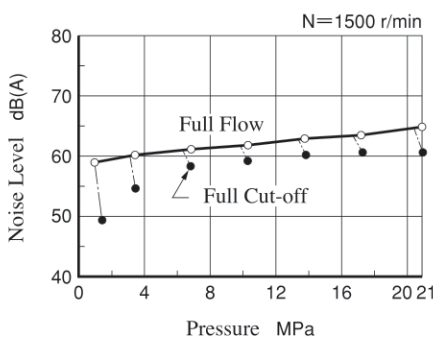
Full Cut-off Power



Drain

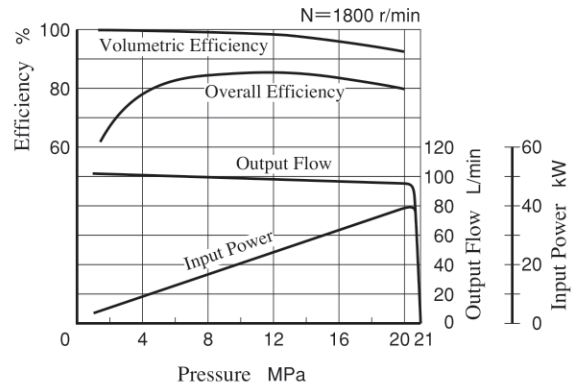
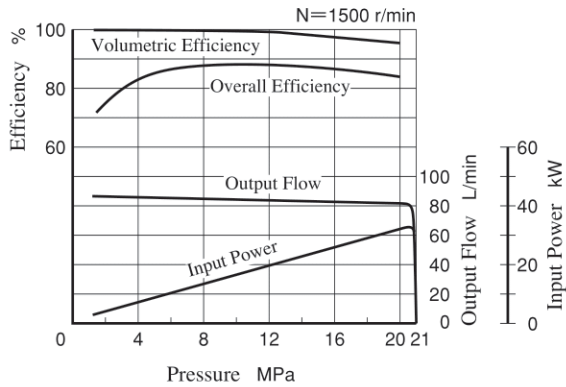


Noise Level [One metre horizontally away from pump head cover]

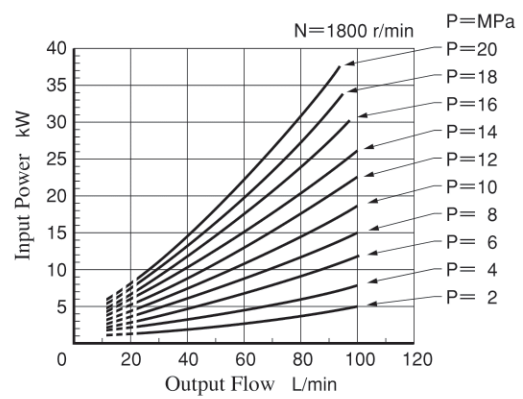
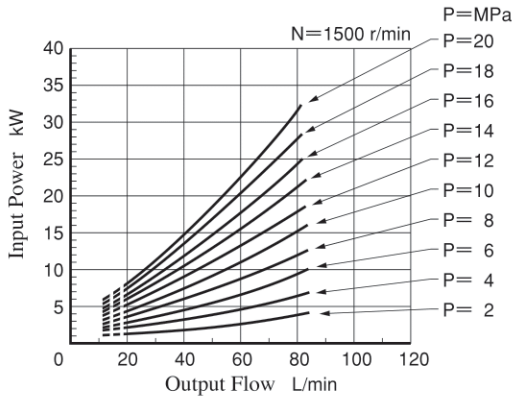


Typical Performance Characteristics of Type **A56** at Viscosity 20 mm²/s [ISO VG32 Oils, 50°C]

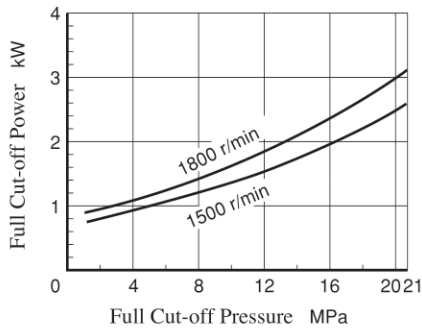
Performance Characteristic Curve



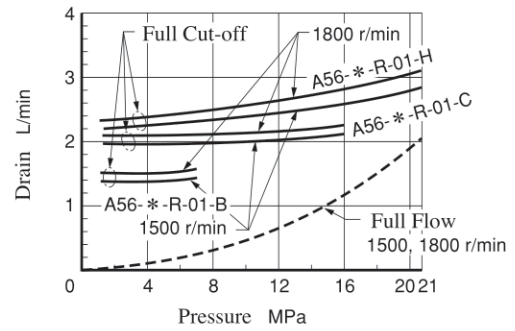
Input Power



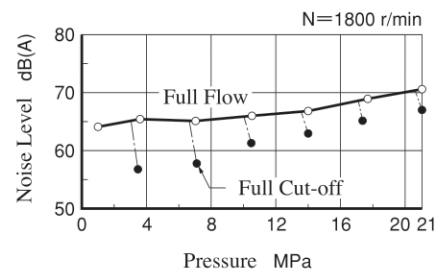
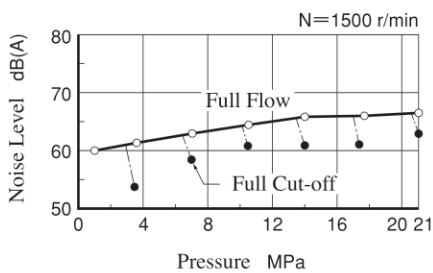
Full Cut-off Power



Drain

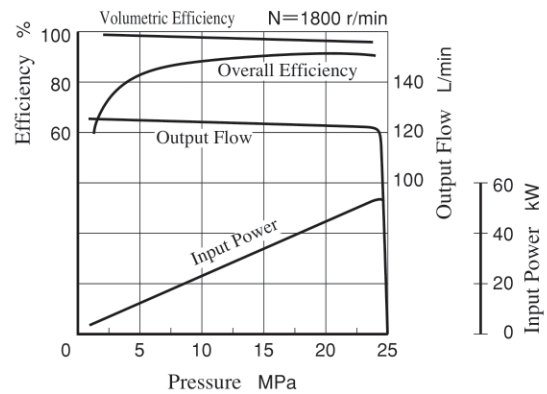
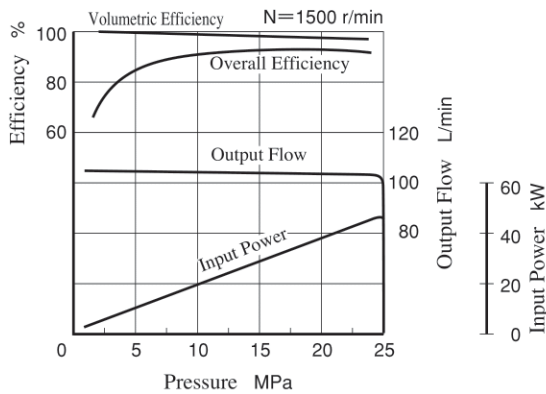


Noise Level [One metre horizontally away from pump head cover]

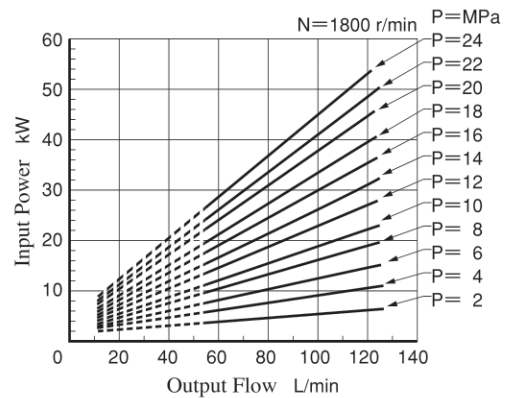
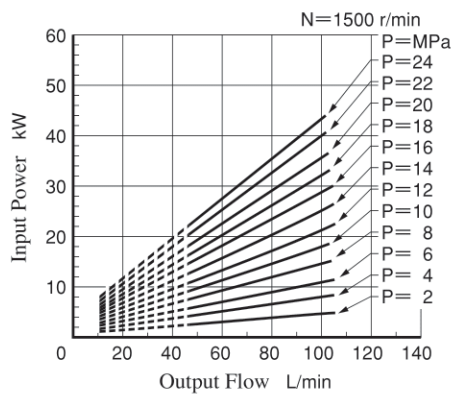


Typical Performance Characteristics of Type **A70** at Viscosity 20 mm²/s [ISO VG32 Oils, 50°C]

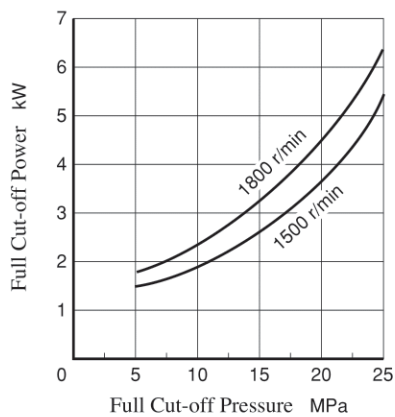
Performance Characteristic Curve



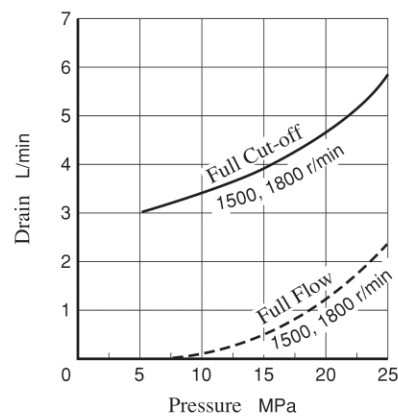
Input Power



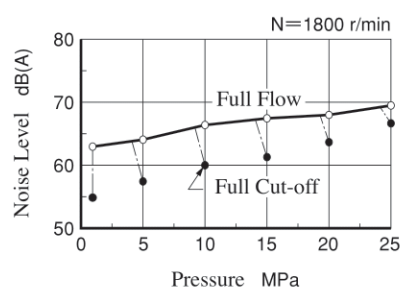
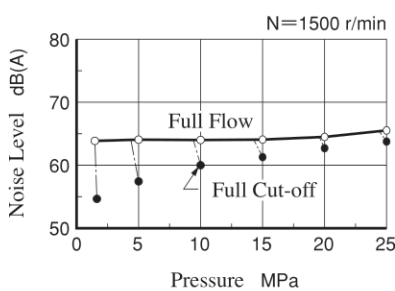
Full Cut-off Power



Drain

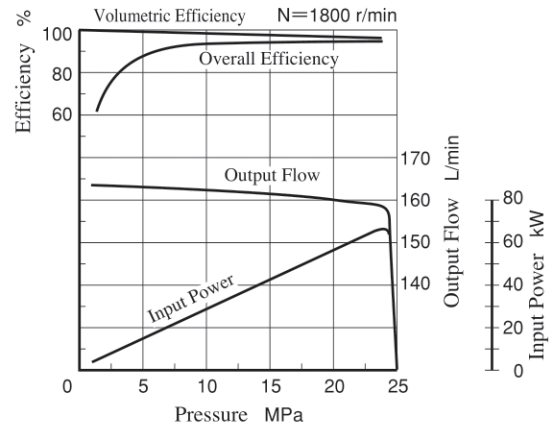
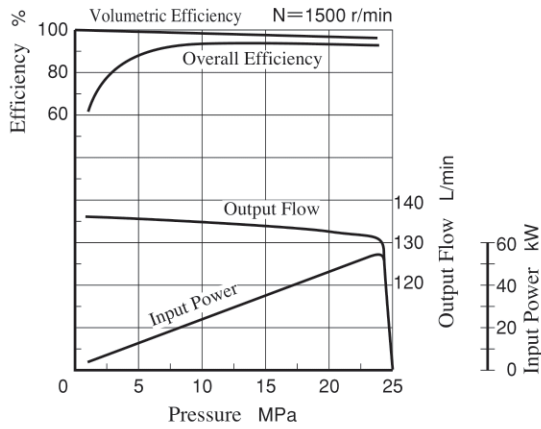


Noise Level [One metre horizontally away from pump head cover]

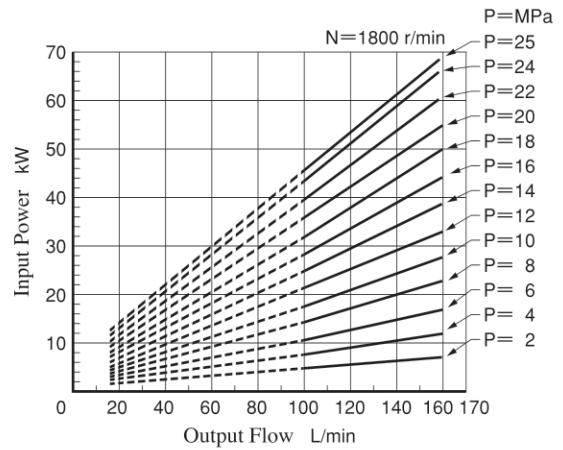
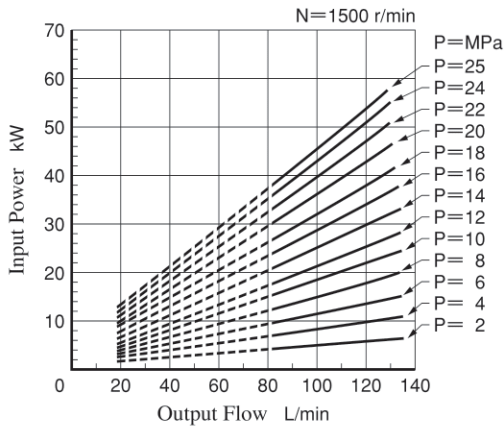


Typical Performance Characteristics of Type **A90** at Viscosity 20 mm²/s [ISO VG32 Oils, 50°C]

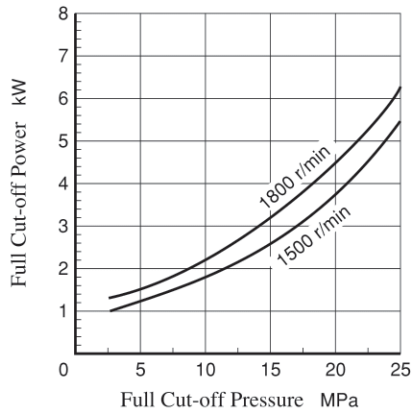
Performance Characteristic Curve



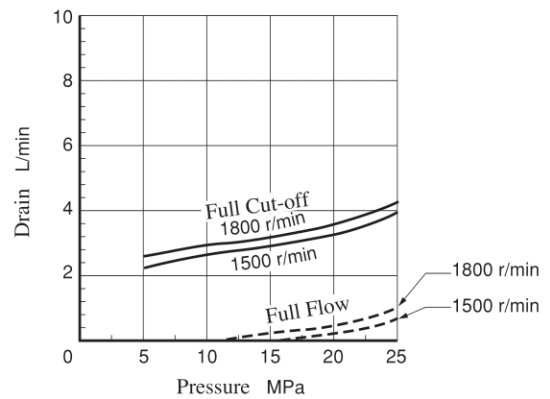
Input Power



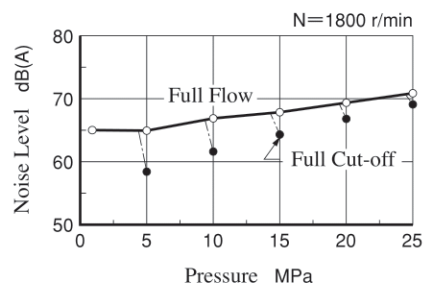
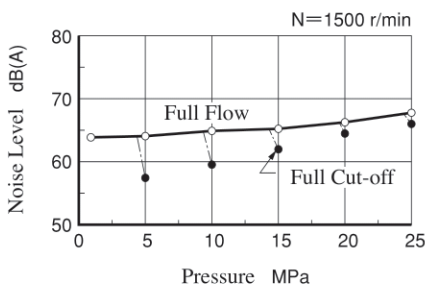
Full Cut-off Power



Drain

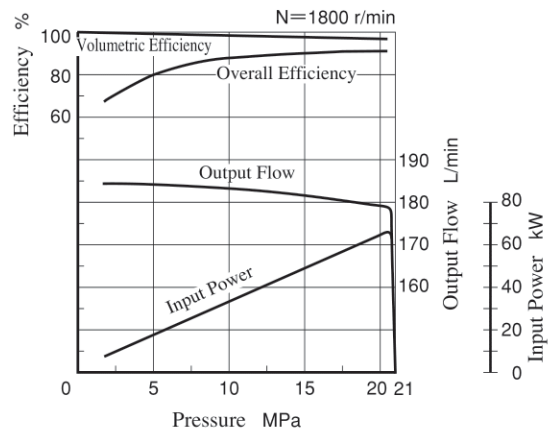
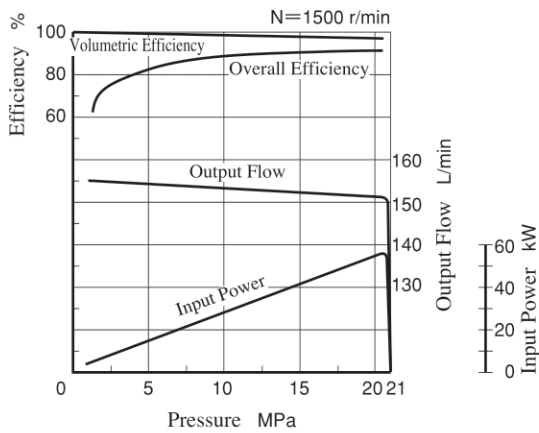


Noise Level [One metre horizontally away from pump head cover]

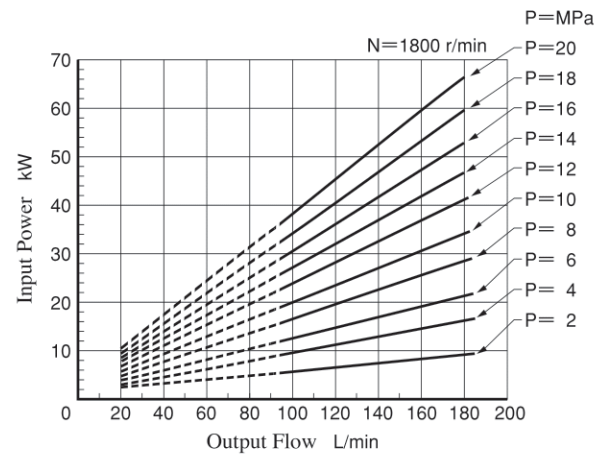
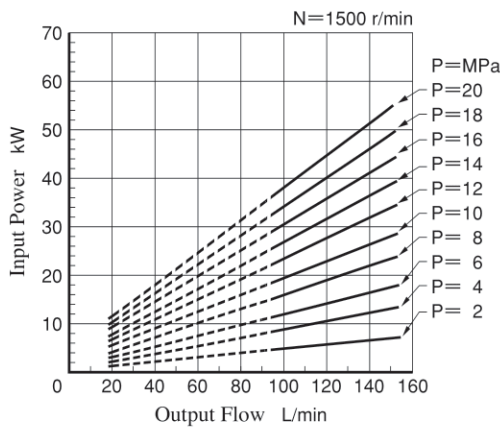


Typical Performance Characteristics of Type **A100** at Viscosity 20 mm²/s [ISO VG32 Oils, 50°C]

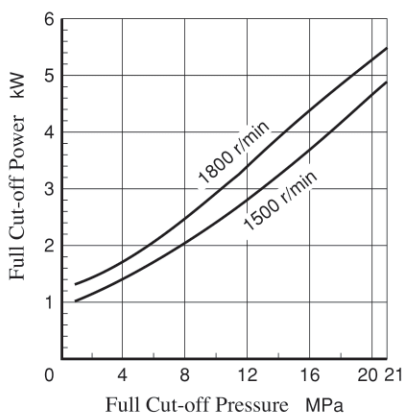
Performance Characteristic Curve



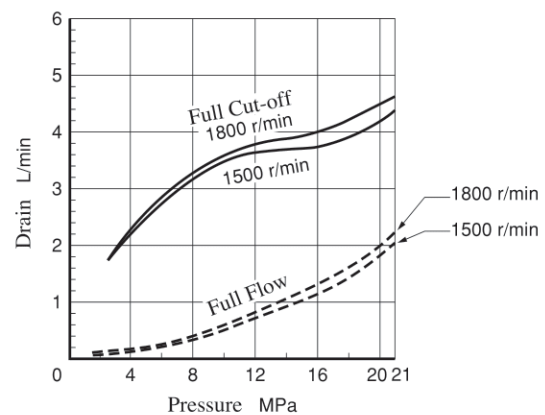
Input Power



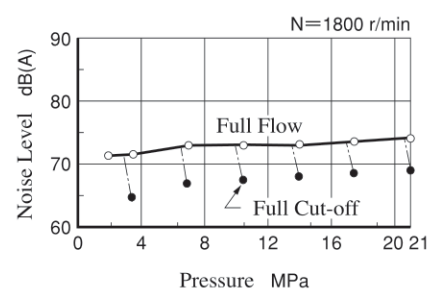
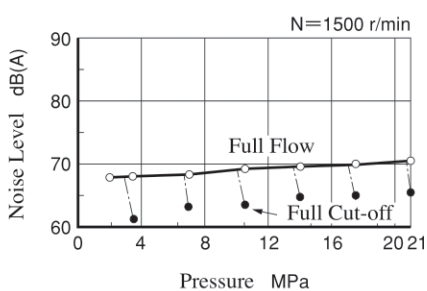
Full Cut-off Power



Drain

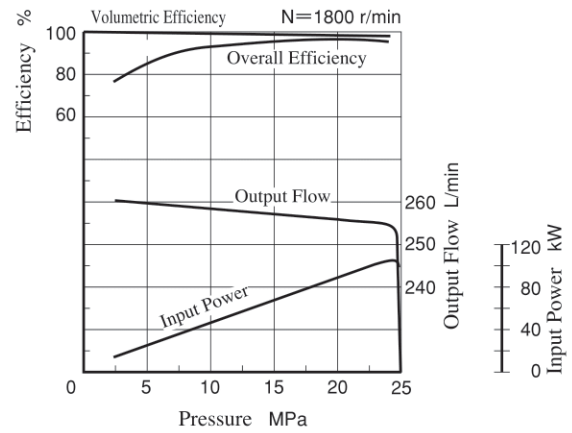
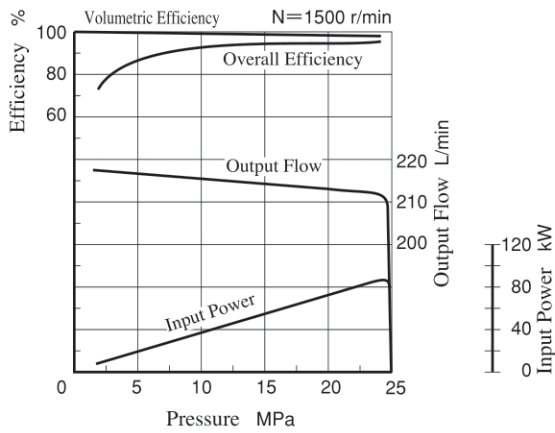


Noise Level [One metre horizontally away from pump head cover]

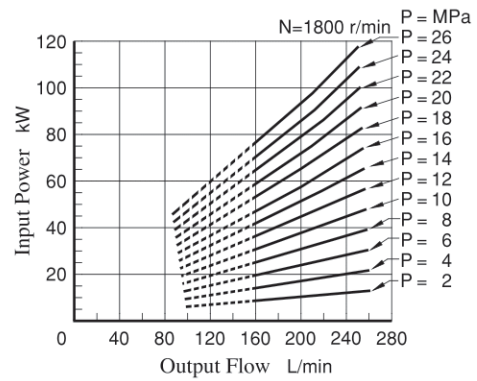
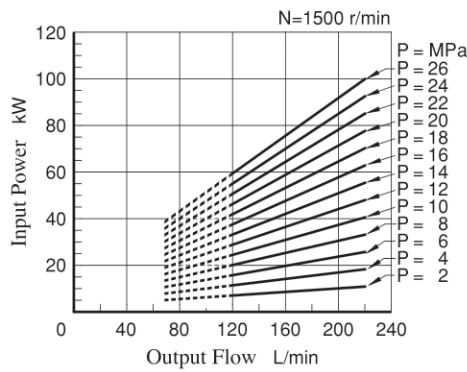


Typical Performance Characteristics of Type **A145** at Viscosity 20 mm²/s [ISO VG32 Oils, 50°C]

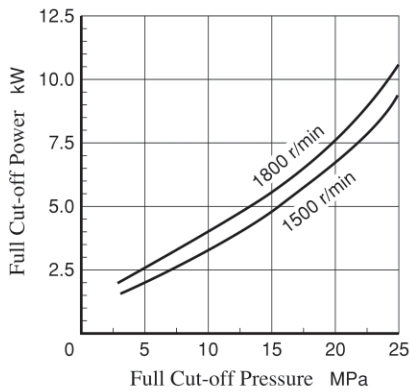
Performance Characteristic Curve



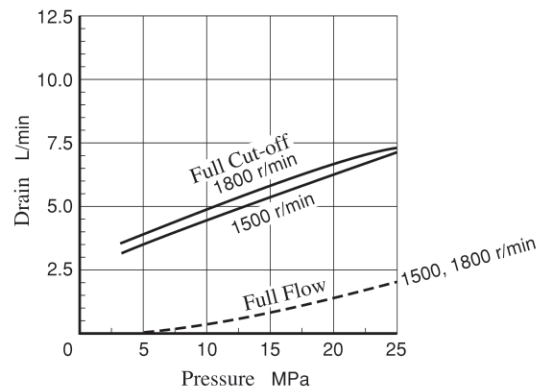
Input Power



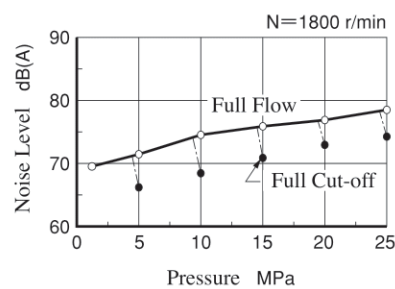
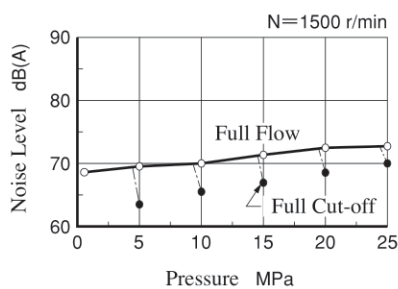
Full Cut-off Power



Drain



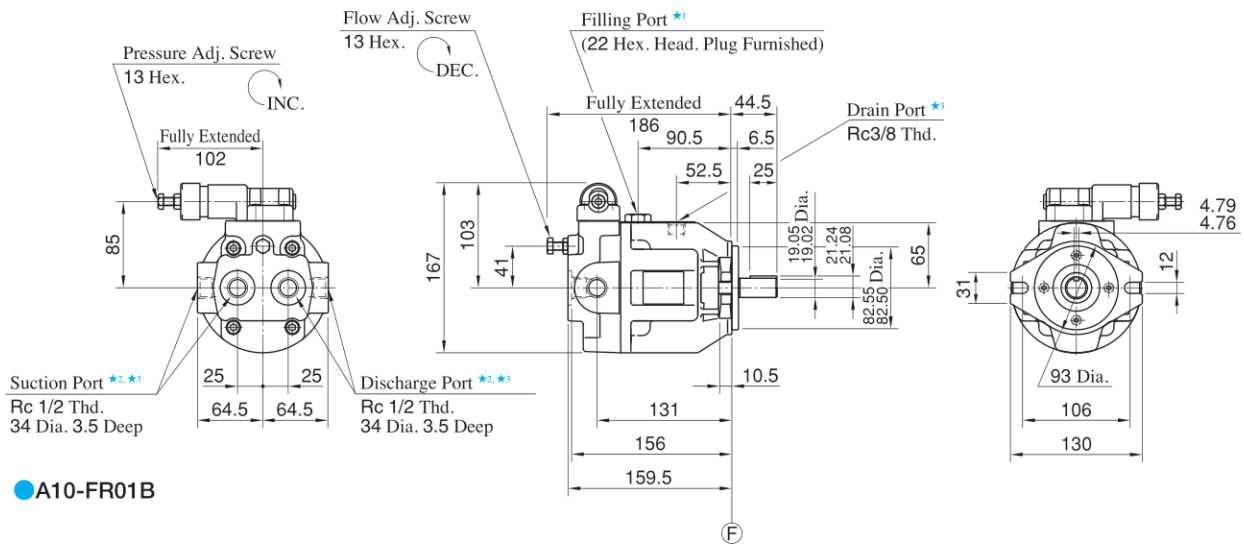
Noise Level [One metre horizontally away from pump head cover]



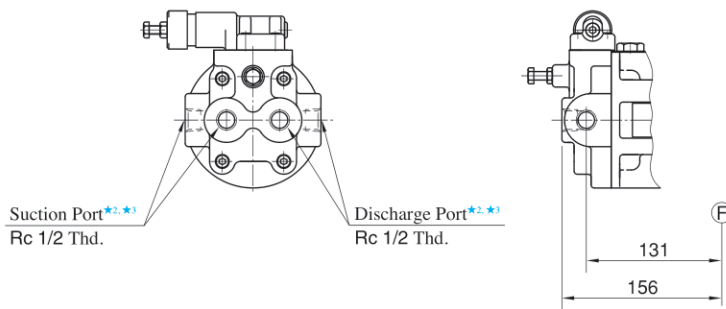
Flange Mtg. : A10-FR01 *

DIMENSIONS IN MILLIMETRES

● A10-FR01C/H



● A10-FR01B



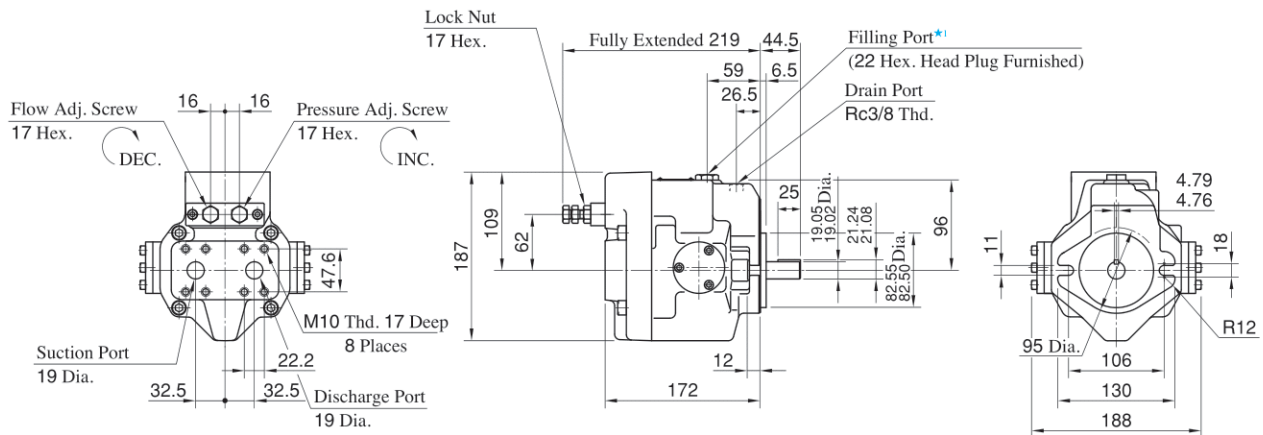
- ★1. Install the pump so that the "Filling Port" is at the top.
- ★2. Use either port of two suction and discharge ports at your option. Keep the remaining ports plugged.
- ★3. As the tightening torques of suction, discharge and drain port fittings, conform to the below.

Name of Port	Tightening Torque Nm
Suction	65 - 75
Discharge	
Drain	40 - 50

Axial Port Type

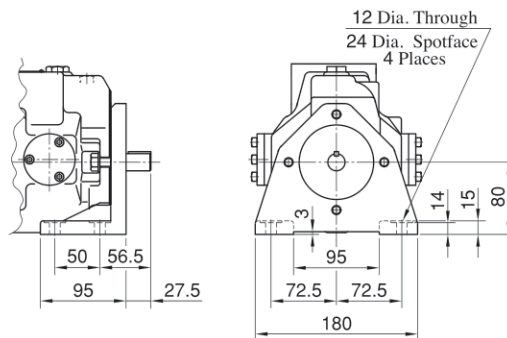
DIMENSIONS IN MILLIMETRES

**Flange Mtg. : A16-F-R-01- *-K
A22-F-R-01- *-K**



★ 1. Install the pump so that the “Filling Port” is at the top.

**Foot Mtg. : A16-L-R-01- *-K
A22-L-R-01- *-K**

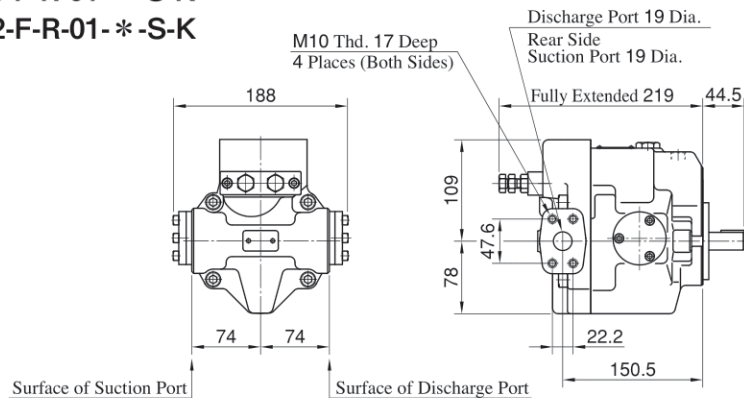


● For other dimensions, refer to “Flange Mtg.”.

Side Port Type

DIMENSIONS IN MILLIMETRES

**Flange Mtg. : A16-F-R-01- *-S-K
A22-F-R-01- *-S-K**

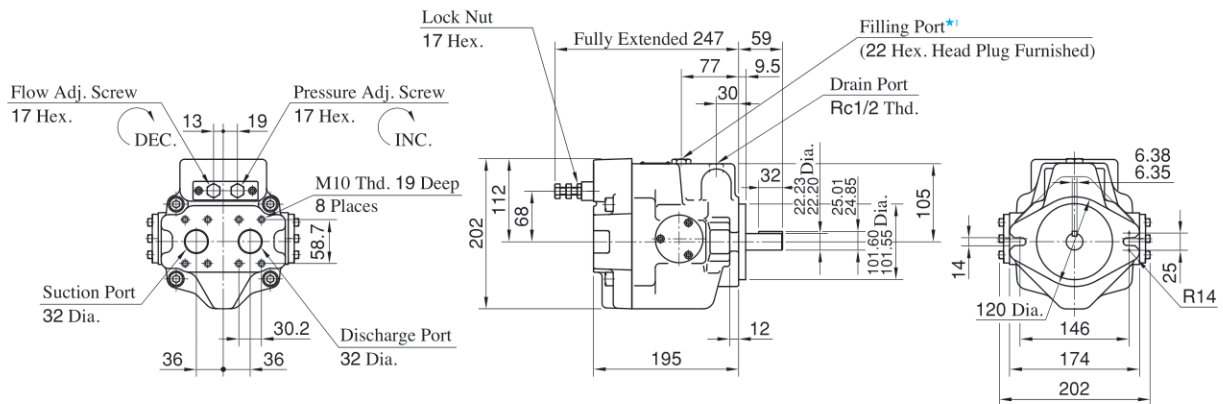


● For other dimensions, refer to “Axial Port Type”.
● Foot Mtg. Type : Mounting bracket is common to that of “Axial Port Type”.

Axial Port Type

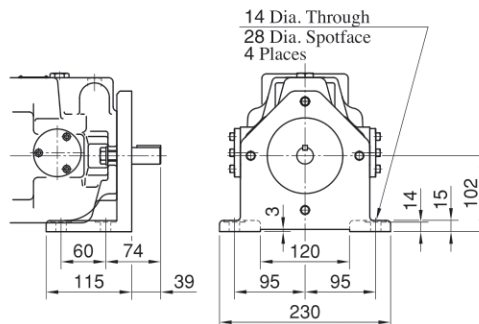
DIMENSIONS IN MILLIMETRES

Flange Mtg. : A37-F-R-01- *-K



★ 1. Install the pump so that the “Filling Port” is at the top.

Foot Mtg. : A37-L-R-01- *-K

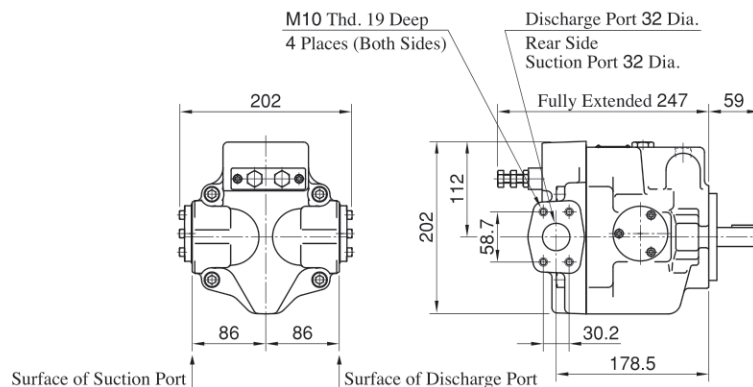


● For other dimensions, refer to “Flange Mtg.”.

Side Port Type

DIMENSIONS IN MILLIMETRES

Flange Mtg. : A37-F-R-01- *-S-K



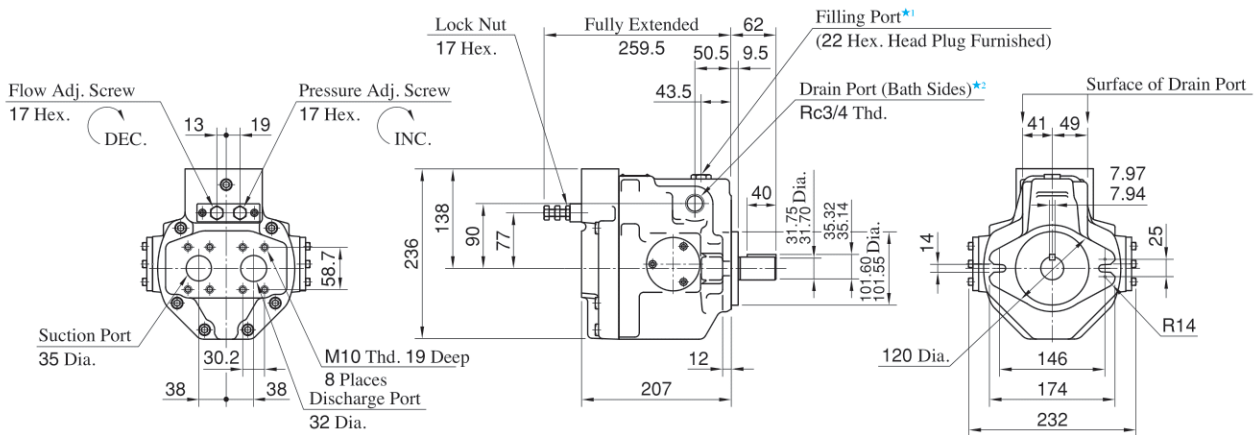
● For other dimensions, refer to “Axial Port Type”.

● Foot Mtg. Type : Mounting bracket is common to that of “Axial Port Type”.

Axial Port Type

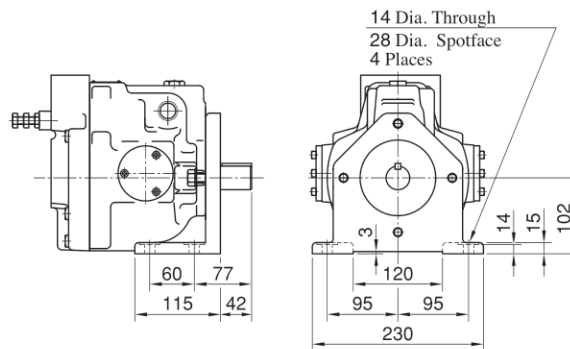
Flange Mtg. : A56-F-R-01- *-K

DIMENSIONS IN MILLIMETRES



- ★ 1. Install the pump so that the “Filling Port” is at the top.
- ★ 2. Use either port of the two drain ports at your option. Keep the remaining port plugged.

Foot Mtg. : A56-L-R-01- *-K

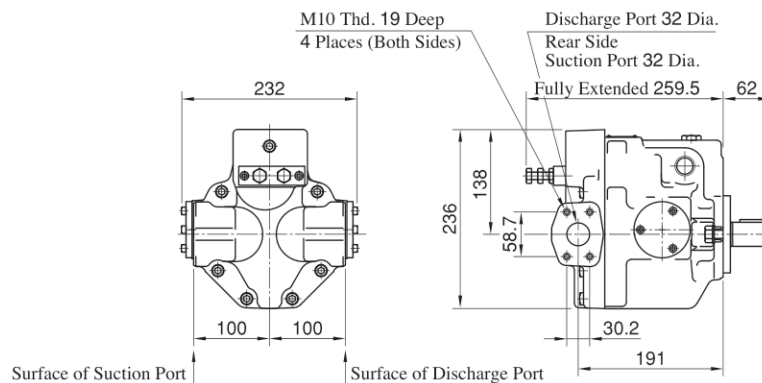


● For other dimensions, refer to “Flange Mtg.”.

Side Port Type

Flange Mtg. : A56-F-R-01- *-S-K

DIMENSIONS IN MILLIMETRES

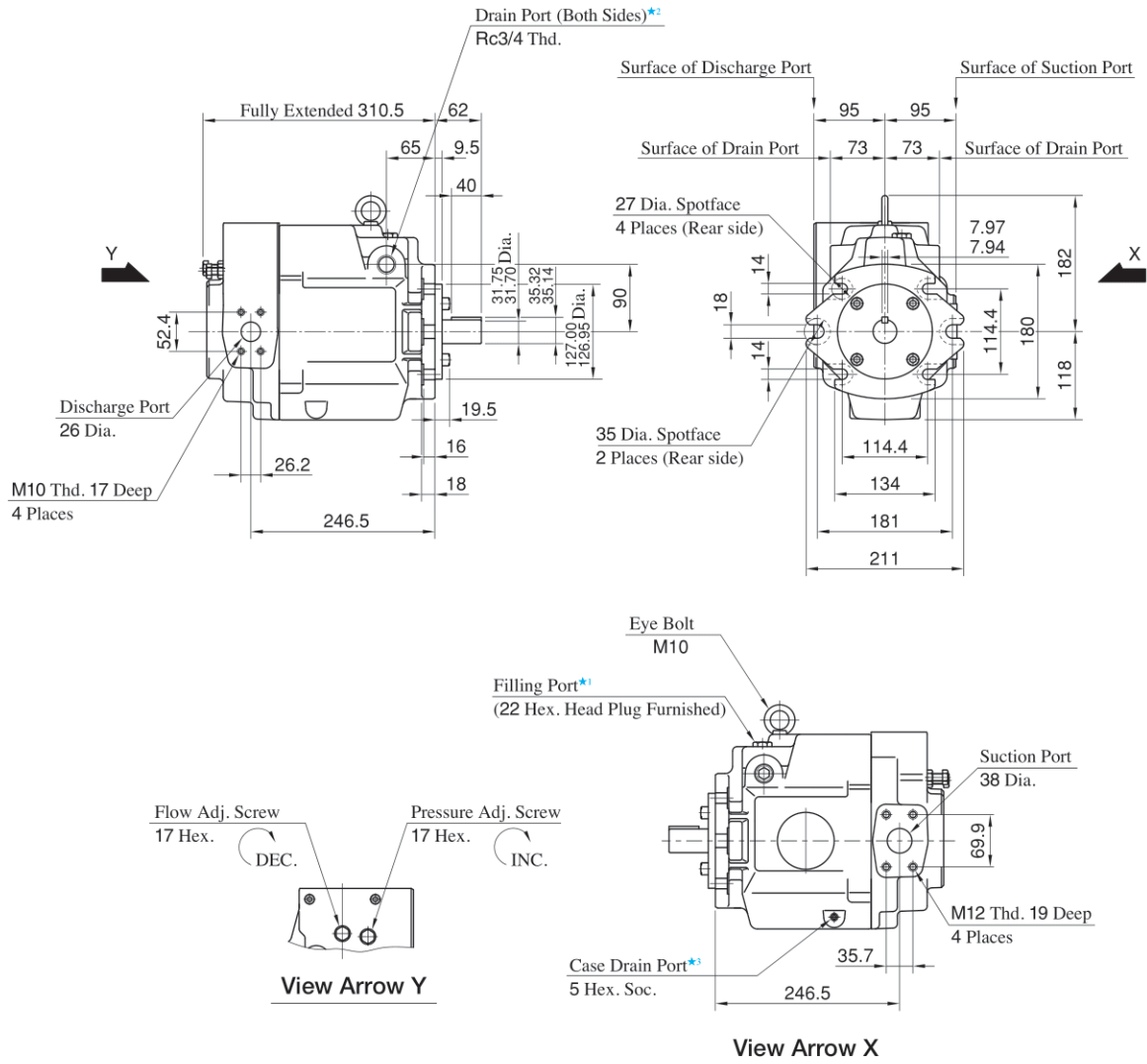


● For other dimensions, refer to “Axial Port Type”.

Side Port Type

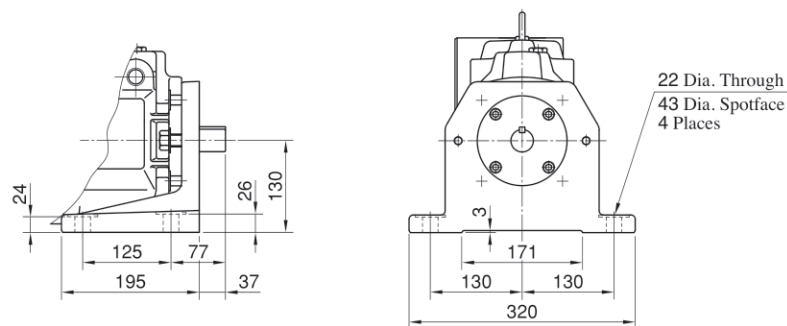
Flange Mtg. : A70-FR01 * S

DIMENSIONS IN MILLIMETRES



- ★1. Install the pump that the “Filling Port” is at the top.
- ★2. Use either port of the two drain port at your option. Keep the remaining port plugged.
- ★3. Case drain port is available for use when draining hydraulic fluid from pump casing.

Foot Mtg. : A70-LR01 * S

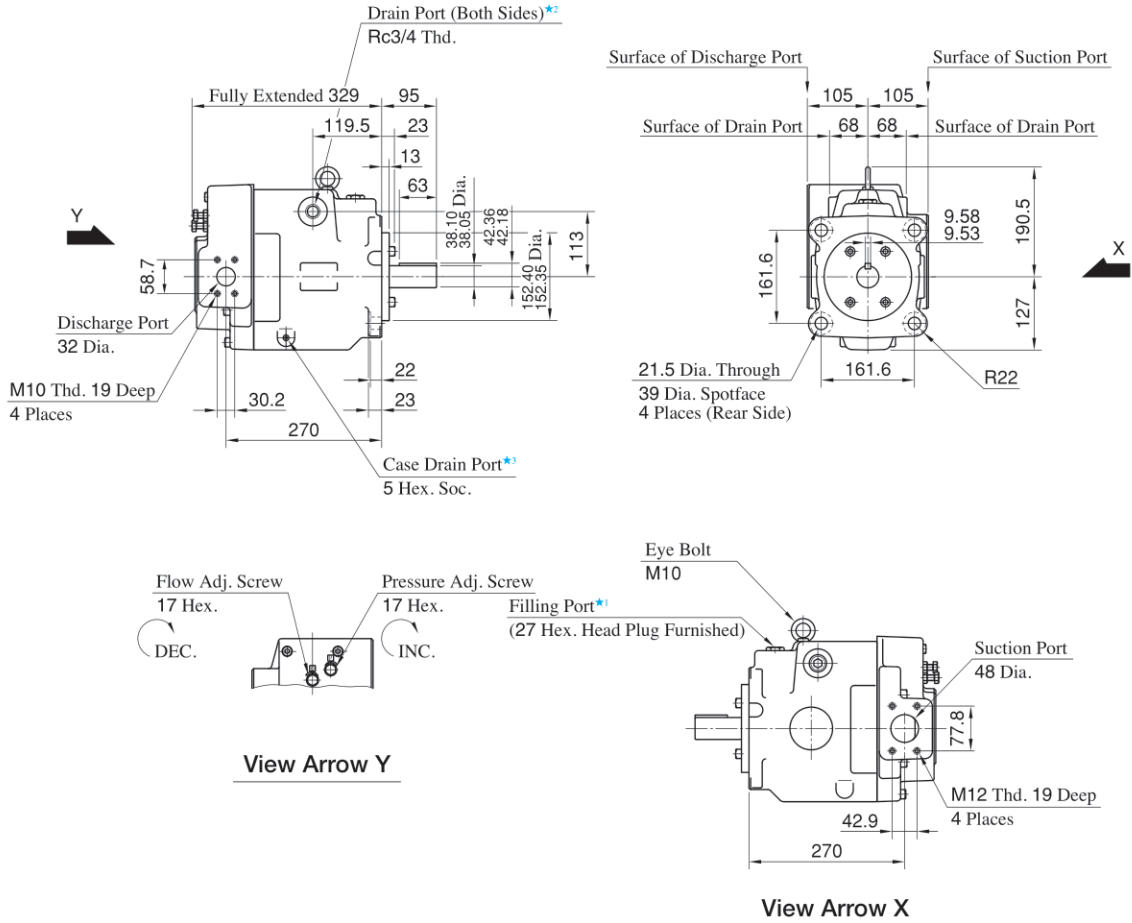


● For other dimensions, refer to “Flange Mtg.”.

Side Port Type

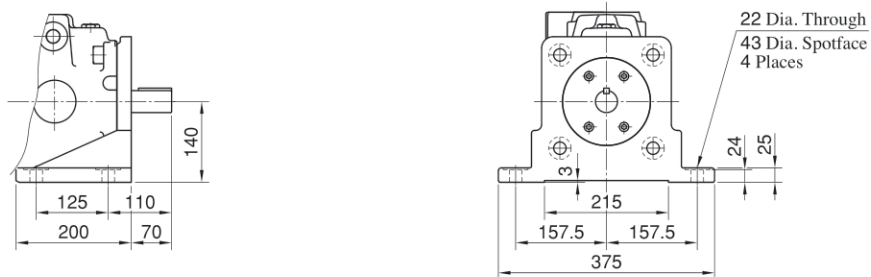
DIMENSIONS IN MILLIMETRES

**Flange Mtg. : A90-FR01 * S
A100-FR01 * S**



- ★1. Install the pump that the “Filling Port” is at the top.
- ★2. Use either port of the two drain port at your option. Keep the remaining port plugged.
- ★3. Case drain port is available for use when draining hydraulic fluid from pump casing.

**Foot Mtg. : A90-LR01 * S
A100-LR01 * S**

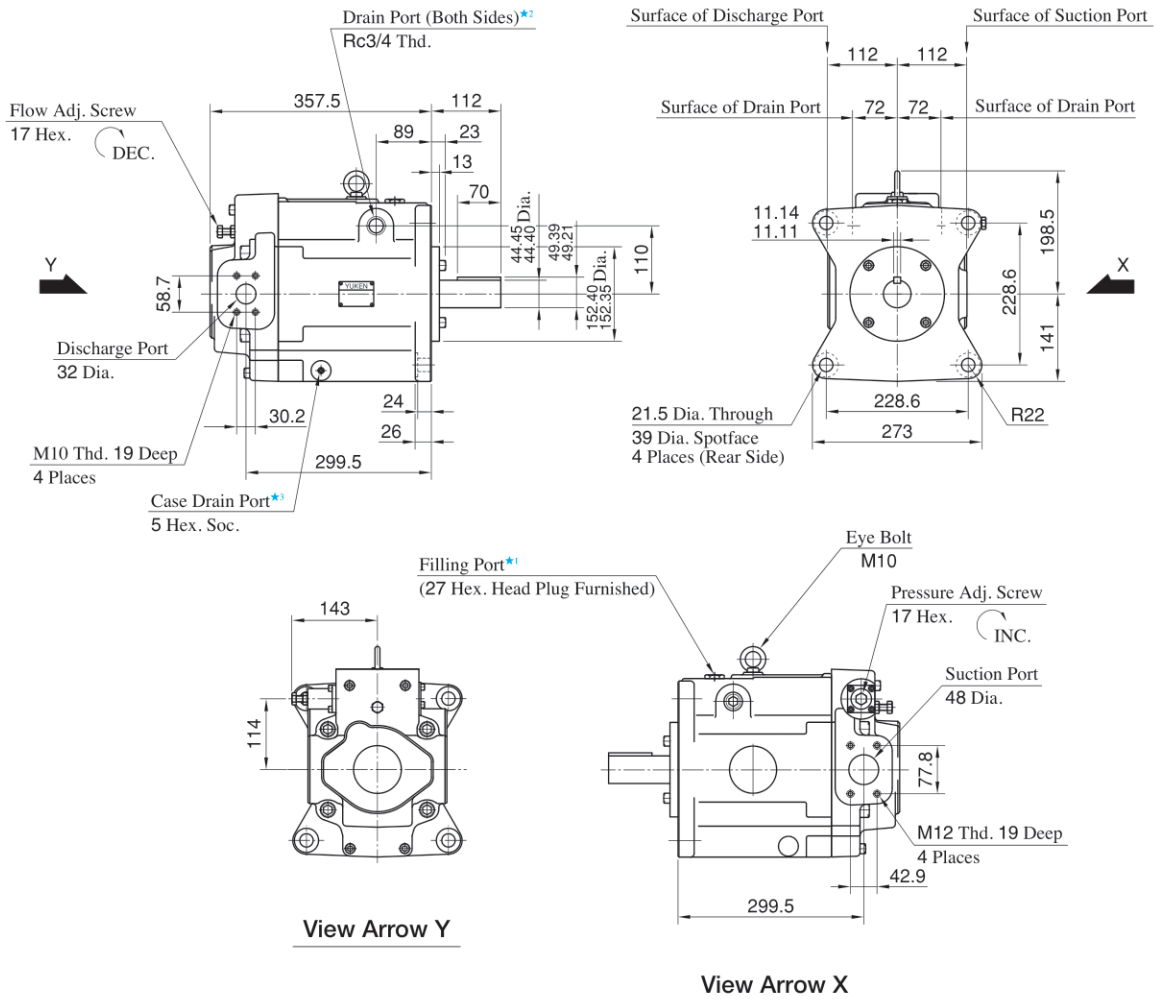


● For other dimensions, refer to “Flange Mtg.”.

Side Port Type

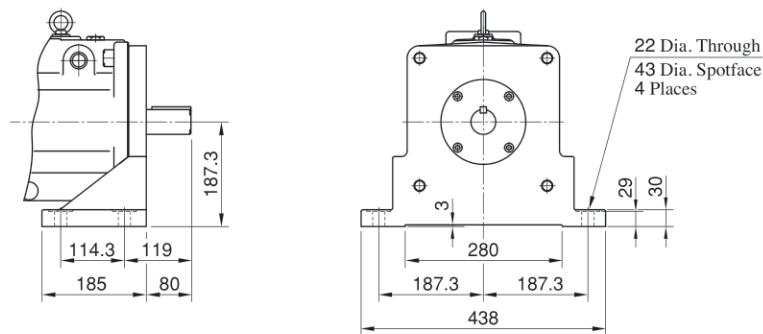
DIMENSIONS IN MILLIMETRES

Flange Mtg. : A145-FR01 * S



- ★1. Install the pump that the “Filling Port” is at the top.
- ★2. Use either port of the two drain port at your option. Keep the remaining port plugged.
- ★3. Case drain port is available for use when draining hydraulic fluid from pump casing.

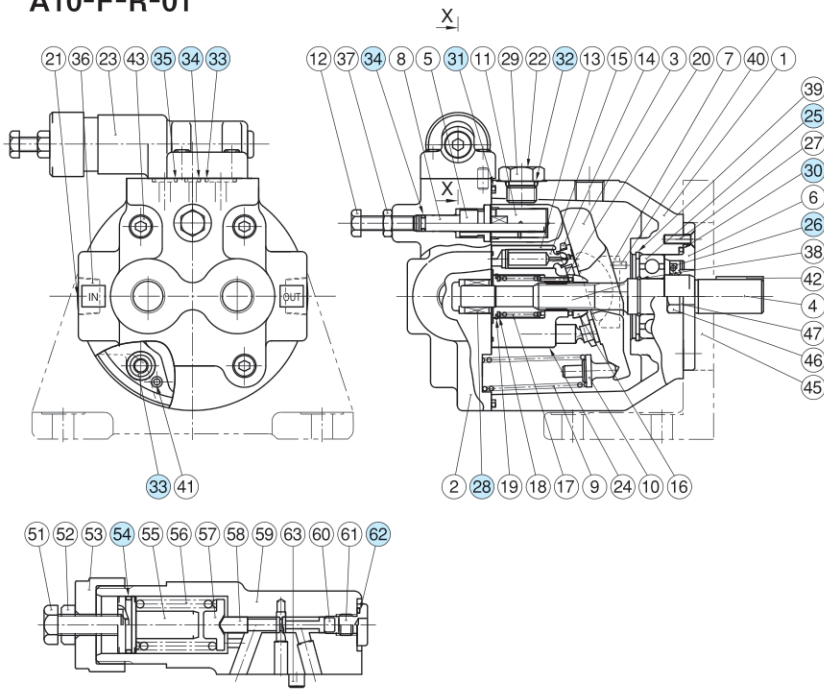
Foot Mtg. : A145-LR01 * S



● For other dimensions, refer to “Flange Mtg.”.

Spare Parts List

A10-F-R-01

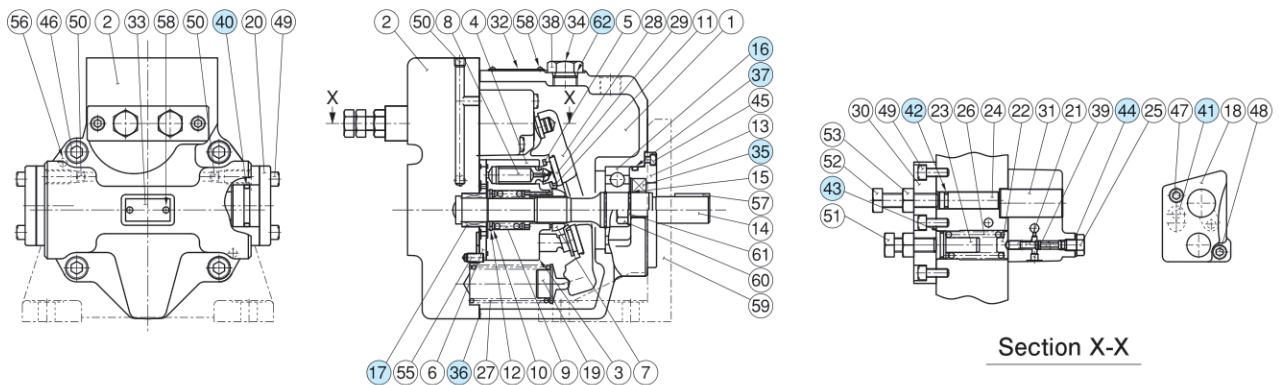


Section X-X

Item	Name of Parts	Part Numbers	Qty.
25	Bearing	6204	1
26	Oil Seal	TCN24408Y	1
28	Bearing	HMK1215	1
30	O-Ring	SO-NB-G50	1
31	O-Ring	SO-NB-G120	1
32	O-Ring	SO-NB-P14	1
33	O-Ring	SO-NB-P12	5
34	O-Ring	SO-NB-P6	2
35	O-Ring	SO-NB-P9★	1
54	O-Ring	AS568-018 (NBR-70)	1
62	O-Ring	SO-NB-P10	1

★O-Ring of Item 35 shall be SO-NB-P12 in case of A10-FR01-B.

A16/A22/A37/A56- *-R-01

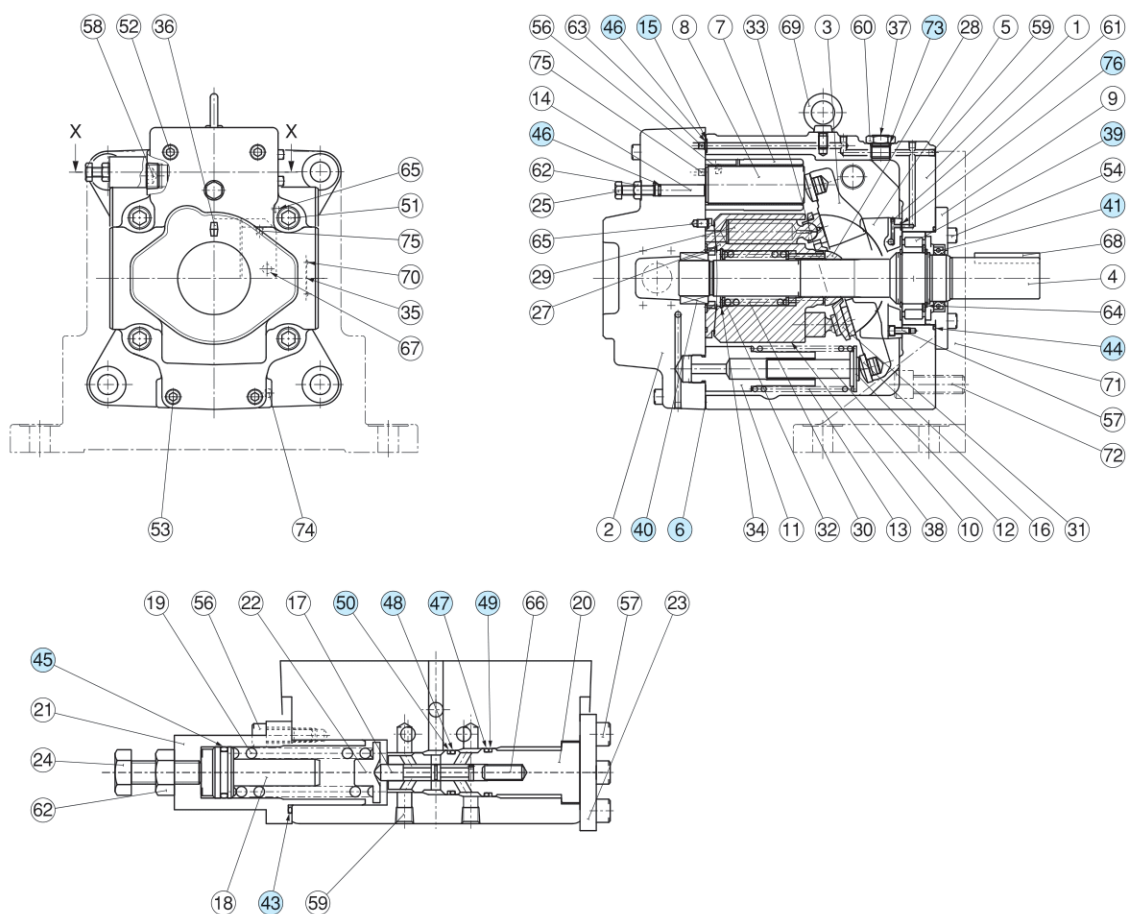


Section X-X

Item	Name of Parts	Part Numbers				Qty.
		A16- *-R-01	A22- *-R-01	A37- *-R-01	A56- *-R-01	
16	Bearing	6305		6307	NUP 207E	1
17	Bearing	HMK 1715	Z30-1303-PK410300-8	HMK 2025V2	HMK 2530V2	1
35	Oil Seal	TCN 254511		TCN 355511	TCN 355511	1
36	Gasket	130-PK211969-1		1316-PK211970-9	1307-PK21197-7	1
37	O-Ring	SO-NA-G55		SO-NA-G75		1
40	O-Ring	SO-NA-G25		SO-NA-G30	SO-NA-P36	2
41	O-Ring	SO-NB-P12		SO-NB-P10A		1
42	O-Ring	SO-NB-P9				1
43	O-Ring	AS568-017 (NBR-70)				1
44	Seal Washer	W8				1
62	O-Ring	SO-NB-P14				1

Spare Parts List

A145-*R01*S



Section X-X

Item	Name of Parts	Part Numbers	Qty.
6	Gasket	1312-PK211974-1	1
15	Back Up Ring	1310E-PK412440-0	1
39	Bearing	NUP 2211ET2	1
40	Needle Bearing	8Q-NK38×55×30	1
41	Oil Seal	TCN 507212 (FKM)	1
43	O-Ring	S-31.5 (NBR-70)	1
44	O-Ring	SO-FA-G105	1
45	O-Ring	SO-NA-P18	1
46	O-Ring	SO-NB-P9	2
47	O-Ring	AS568-017 (NBR-70)	1
48	O-Ring	AS568-016 (NBR-70)	1
49	Back Up Ring	For AS568-017 (NBR-70)	1
50	Back Up Ring	For AS568-016 (NBR-70)	1
73	O-Ring	SO-NB-P18	1
76	O-Ring	SO-NB-P5	1