



### IPH Series IP Pump

.21 to 7.68 in<sup>3</sup>/rev  
4350 psi

This is a new design series in which all pump types are installation compatible with previous designs. Note, however, that there is no longer compatibility for some of the seal components between the IPH-3 and IPH-4 sizes and design numbers 10 and 12.

#### Features

A patented axial and radial pressure loading system provides high efficiency and generates pressures up to 4350 psi.

Outstanding durability and very long life. A modified involute short-tooth gear enables internal gearing for greatly reduced pulsation and noise, and

exceptionally quiet operation. A simple structure makes maintenance and inspection easier.

#### Specifications

Model No.	Capacity cm <sup>3</sup> /rev (in <sup>3</sup> )	Rated Pressure psi	Maximum Operating Pressure psi	Minimum Revolution Speed min <sup>-1</sup>	Maximum Revolution Speed min <sup>-1</sup>	Weight lbs	
						Type A	Type B
IPH-2A(B)- 3.5-11	5	3625	4350	600	2000	9.7	5.2
	6.5					9.9	5.5
	8					10.1	5.7
						10.5	6.1
IPH-3A(B) - 10-20	13	3625	4350	600	2000	23.1	10.5
	16					23.5	11.0
						24.2	11.6
IPH-4A(B) - 20-20	25	3625	4350	500	2000	33.5	20.9
	32					34.6	22.0
						35.7	23.1
IPH-5A(B)- 40-21(11)	50	3625	4350	400	2000	70.5	41.8
	64					72.7	44.1
						74.9	46.3
IPH-6A(B)- 80-21(11)	100	3625	4350	300	2000	136.7	85.9
	125					141.1	90.4
						145.5	94.8

Note:

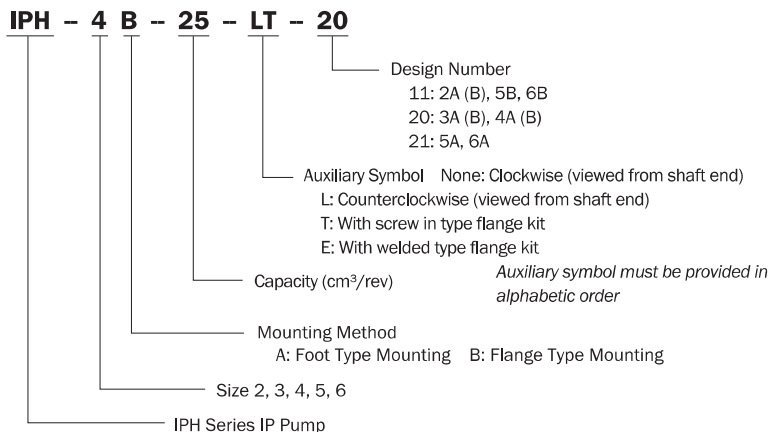
1. Suction Pressure: 3.6 psi.
2. Maximum working pressure shown here is the pressure limit when there are frequent pressure changes.
3. Avoid installation with the suction port towards the bottom of the pump.
4. Specify using the model number format shown below when pipe flanges are required.

- Handling
- 1 For the hydraulic operating fluid, use an R&O type and wear-resistant type of ISO VG32 to 68 or equivalent (viscosity index of at least 90). Use hydraulic operating fluid that provides kinematic viscosity during operation in the range of 20 to 150 centistokes.
  - 2 The operating temperature range is 40 to 149 °F. When the oil temperature at

- startup is 40 °F or less, perform a warm-up operation at low pressure until the oil temperature reaches 40 °F. Use the pump in an area where the temperature is within the range of 32 to 140 °F.
- 3 Suction pressure 3.6 psi, and the suction port flow rate should be to greater than 5 ft/sec.
- 4 Avoid pulley, gear, and other drive systems that impart a radial or thrust load on the end of the pump shaft.
- 5 Mount the hydraulic pump so its pump shaft is oriented horizontally. Provide a suction strainer with a filtering grade of about 100µm (150 mesh). For the return line to the tank, use a 10µm line filter.
- 6 Manage hydraulic operating fluid so contamination is maintained at class NAS10 or lower. Take care to avoid contamination with water and other foreign matter, and watch out for discoloration. Whitish fluid indicates that air has contaminated the fluid, and brownish fluid indicates the fluid is dirty.

(continued on following page)

#### Understanding Model Numbers



- 7 Operate within the RPM range in the catalog for the minimum RPM of the pump. Unload the pump's load pressure to operate at variable speeds. Condition of inflow piping must produce as little inflow load pressure as possible to minimize effect of cavitation.
- 8 When using water- or glycol-based hydraulic operating fluid, refer to page O-3 for details on applicable models
- 9 At startup, repeat the inching operation (start-stop) to bleed air from the pump and pipes.
- 10 Equip an air bleed valve in circuits where it is difficult to bleed air before startup. See page C-13 for more information.
- 11 To ensure proper lubrication of the pump's rubbing surfaces, supply oil to the interior of the pump before starting operation.
- 12 When centering the pump shaft, eccentricity with the motor shaft should be no greater than 0.001 in. Use a pump mounting base of sufficient rigidity. The angle error should be no greater than 1°.
- 13 Contact your agent for information about engines.

**Discharge Rate and Required Input for Each Pump Speed**

Speed	Pressure psi		Discharge Rate gpm					Required Input hp					
	Model No.		100	1015	2030	3045	3625	4350	100	1015	2030	3045	3625
1200 min <sup>-1</sup>	IPH-2A(B)- 3.5-11 5 6.5 8	1.1	1.1	1.0	1.0	1.0	1.0	.14	.68	1.6	2.4	2.8	3.5
		1.6	1.6	1.5	1.5	1.5	1.4	.20	1.2	2.3	3.5	4.1	5.0
		2.0	2.0	1.9	1.9	1.8	1.8	.25	1.5	2.9	4.3	5.1	6.2
		2.5	2.5	2.4	2.4	2.3	2.3	.30	1.9	3.6	5.3	6.3	7.6
	IPH-3A(B)- 10-20 13 16	3.2	3.1	3.0	3.0	2.9	2.9	.40	2.4	4.3	6.6	7.9	9.6
		4.2	4.2	4.0	3.9	3.9	3.8	.52	3.1	5.7	8.6	10.1	12.4
		4.9	4.8	4.8	4.7	4.6	4.5	.60	3.7	6.8	10.2	12	14.8
	IPH-4A(B)- 20-20 25 32	6.5	6.7	6.28	6.1	6.1	6.0	.83	5.0	8.9	13.2	15.8	19.0
		8.1	8.0	7.8	7.7	7.6	7.5	1.0	6.1	11.0	16.4	19.7	23.4
		10.2	10.0	9.8	9.7	9.5	9.4	1.2	7.5	13.9	20.7	24.6	29.5
IPH-5A(B)- 40-21(11) 50 64	12.9	12.6	12.4	12.1	12.0	11.8	1.6	9.9	17.2	26.1	30.9	38.0	
	15.9	15.6	15.4	15.1	14.9	14.7	1.9	11.9	21.7	32.1	38.3	45.9	
	20.2	19.8	19.5	19.2	19.0	18.8	2.4	15.0	27.6	40.9	48.6	58.3	
IPH-6A(B)- 80-21(11) 100 125	25.7	25.2	24.7	24.2	24.0	23.8	3.2	19.1	35.1	51.8	61.9	75.2	
	32.2	31.6	31.0	30.5	30.2	30.2	3.9	23.4	43.3	64.9	77.3	92.7	
	39.8	39.2	38.5	37.8	37.4	37.0	4.8	28.8	53.7	86.5	96.0	115.1	
1800 min <sup>-1</sup>	IPH-2A(B)- 3.5-11 5 6.5 8	1.7	1.6	1.6	1.5	1.5	1.5	.22	1.5	2.7	3.9	4.6	5.5
		2.4	2.4	2.3	2.3	2.2	2.2	.32	1.9	3.5	4.6	6.1	7.5
		3.0	3.0	2.9	2.9	2.8	2.8	.40	2.3	4.3	6.5	7.6	9.2
		3.8	3.8	3.7	3.6	3.5	3.5	.49	2.9	5.4	8.1	9.4	11.4
	IPH-3A(B)- 10-20 13 16	4.8	4.7	4.6	4.5	4.5	4.4	.65	3.8	6.7	10.0	11.9	14.4
		6.3	6.2	6.1	5.9	5.9	5.8	.83	4.9	8.8	12.9	15.1	18.6
		7.3	7.3	7.2	7.1	7.0	6.9	.96	5.7	10.4	15.2	18.1	22.1
	IPH-4A(B)- 20-20 25 32	9.8	9.6	9.5	9.3	9.2	9.1	1.3	7.5	13.4	19.9	23.6	28.4
		12.2	12.0	11.8	11.7	11.5	11.4	1.6	9.1	16.6	24.8	29.0	35.2
		15.3	15.1	14.9	14.6	14.5	14.3	1.9	11.3	20.9	30.9	36.8	44.2
IPH-5A(B)- 40-21(11) 50 64	19.3	19.0	18.7	18.4	18.2	17.9	2.6	15.6	27.0	40.2	47.7	58.6	
	23.9	23.5	23.2	22.8	22.6	22.4	3.1	18.9	33.0	49.4	58.7	70.5	
	30.3	29.9	29.4	29.0	28.8	28.5	3.9	23.6	42.3	62.7	74.6	89.7	
IPH-6A(B)- 80-21(11) 100 125	38.6	37.9	37.3	36.7	36.3	35.8	5.2	30.0	53.9	79.9	95.0	115	
	46.2	47.6	46.9	46.2	45.8	45.3	6.3	37.1	67.4	99.7	118	142	
	59.8	58.9	58.1	57.3	56.8	56.1	7.4	45.3	83.4	123.7	147	176	

Note: Values in the table are general values at an operating fluid viscosity of 46 centistokes. Use the values when selecting the model for your needs.

**Parts for IPH Pump (Standard)**

Single Pump	Seal Kit	Najimi 3 Parts Set*	Radial Piston Kit**	Axial Plate Kit***
	Mineral Oil/ Water Glycoloi	Mineral Oil	Mineral Oil	Mineral Oil
IPH-2B-***-(L)-11	IHAS-2S2***-10	FZD-7004***	IHP-2-***-10	IHQ-2-10
IPH-3B-***-(L)-20	IHAS-2S30***-20	FZD-7004-0**	IHP-3-0***-10	IHQ-3-10
IPH-4B-***-(L)-20	IHAS-2S40***-30	FZD-7004-0**	IHP-4-0***-10	IHQ-4-10
IPH-5B-***-(L)-11	IHAS-2S50***-10	FZD-7004-0**	IHP-5-0***-10	IHQ-5-10
IPH-6B-***-(L)-11	IHAS-2S6***-10	FZD-7004***	IHP-6-***-10	IHQ-6-10

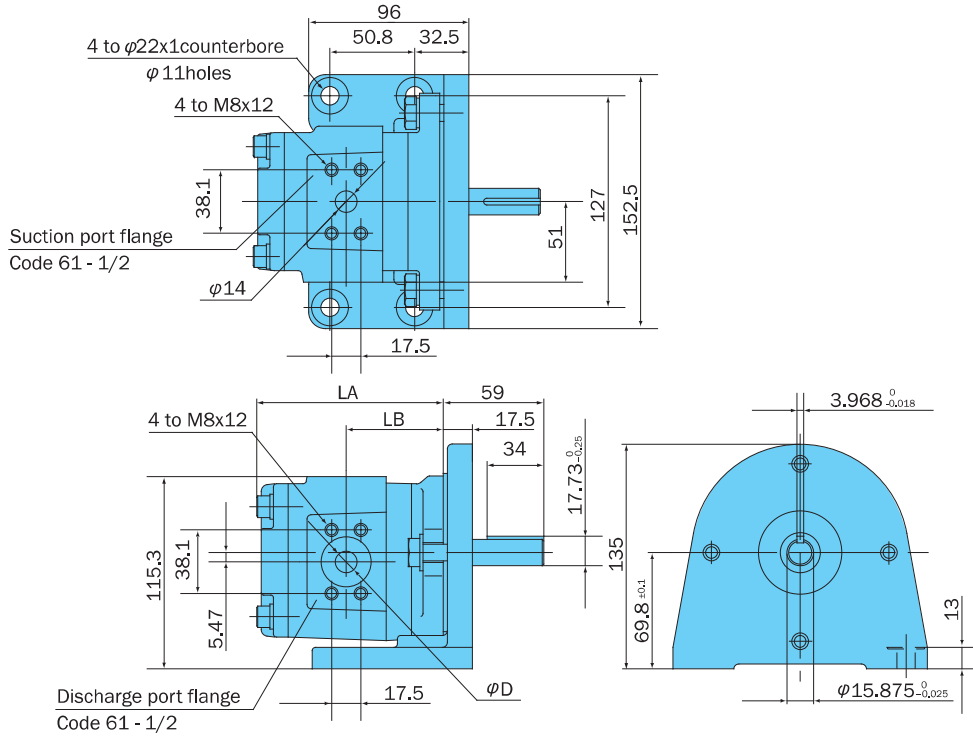
\*Najimi set includes: Stopper-pin, axial plate-1, axial plate-2, feeler piece, axial backup ring, O-ring; \*\*Radial Piston Kit includes: Radial piston, radial backup ring, backup ring, O-ring and washer  
\*\*\*Axial Plate Kit includes: Axial plate-1, axial plate-2, axial backup ring and O-ring

Double Pump	Head (Rear) Side Pump		Shaft Side Pump	
	Pump Model	Seal Kit	Pump Model	Seal Kit
IPH-22B-***-***-(L)-11	IPH-2H-***-(L)-11	IHAS-2H2***-10	IPH-2S-***-(L)-11	IHAS-2S2***-10
IPH-23B-***-***-(L)-11	IPH-2H-***-(L)-11	IHAS-2H2***-10	IPH-3S-***-(L)-11	IHAS-2S30***-20
IPH-24B-***-***-(L)-11	IPH-2H-***-(L)-11	IHAS-2H2***-10	IPH-4S-***-H(L)-11	IHAS-2S40***-30
IPH-25B-***-***-(L)-11	IPH-2H-***-(L)-11	IHAS-2H2***-10	IPH-5S-***-H(L)-11	IHAS-2S50***-10
IPH-26B-***-***-(L)-11	IPH-2H-***-(L)-11	IHAS-2H2***-10	IPH-6S-***-H(L)-11	IHAS-2S6***-10
IPH-33B-***-***-(L)-11	IPH-3H-***-(L)-11	IHAS-2H30***-20	IPH-3S-***-(L)-11	IHAS-2S30***-20
IPH-34B-***-***-(L)-11	IPH-3H-***-(L)-11	IHAS-2H30***-20	IPH-4S-***-(L)-S-11	IHAS-2S40***-30
IPH-35B-***-***-(L)-11	IPH-3H-***-(L)-11	IHAS-2H30***-20	IPH-5S-***-H(L)-11	IHAS-2S50***-10
IPH-36B-***-***-(L)-11	IPH-3H-***-(L)-11	IHAS-2H30***-20	IPH-6S-***-H(L)-11	IHAS-2S6***-10
IPH-44B-***-***-(L)-11	IPH-4H-***-(L)-11	IHAS-2H40***-30	IPH-4S-***-(L)-S-11	IHAS-2S40***-30
IPH-45B-***-***-(L)-11	IPH-4H-***-(L)-11	IHAS-2H40***-30	IPH-5S-***-(L)-S-11	IHAS-2S50***-10
IPH-46B-***-***-(L)-11	IPH-4H-***-(L)-11	IHAS-2H40***-30	IPH-6S-***-H(L)-11	IHAS-2S6***-10
IPH-55B-***-***-(L)-11	IPH-5H-***-(L)-11	IHAS-2H50***-10	IPH-5S-***-F(L)-11	IHAS-2S50***-10
IPH-56B-***-***-(L)-11	IPH-5H-***-(L)-11	IHAS-2H50***-10	IPH-6S-***-F(L)-11	IHAS-2S6***-10
IPH-66B-***-***-(L)-11	IPH-6H-***-(L)-11	IHAS-2H6***-10	IPH-6S-***-F(L)-11	IHAS-2S6***-10

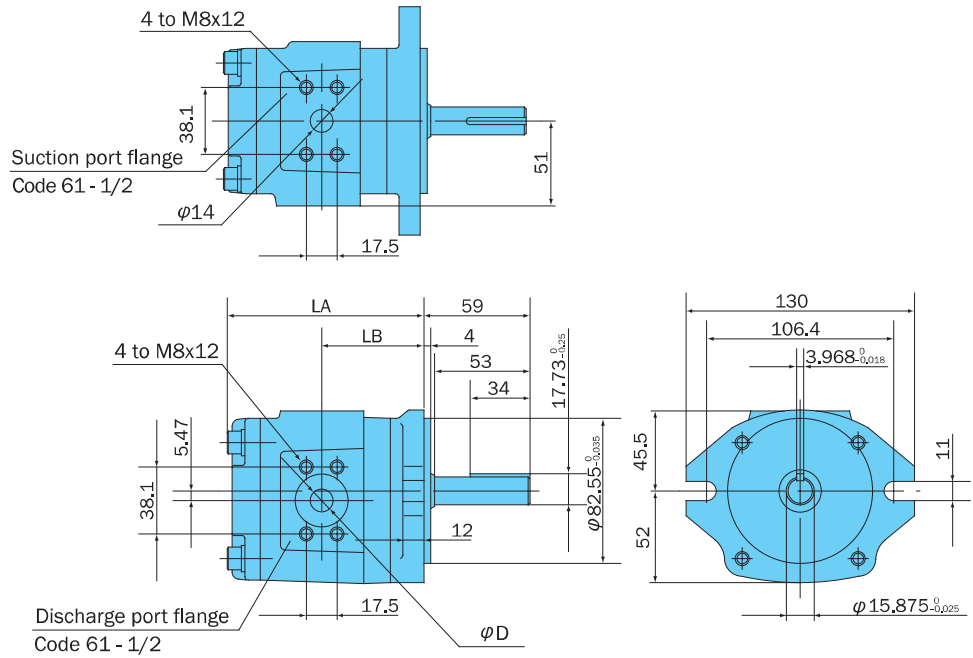
\*Regarding Shaft side pump: H, F means the way of the bolt - H: 2-Bolt type, F: 4-Bolt type

### Installation Dimension Drawings

IPH-2A-\*-11 (Foot Mounting, Clockwise Rotation)



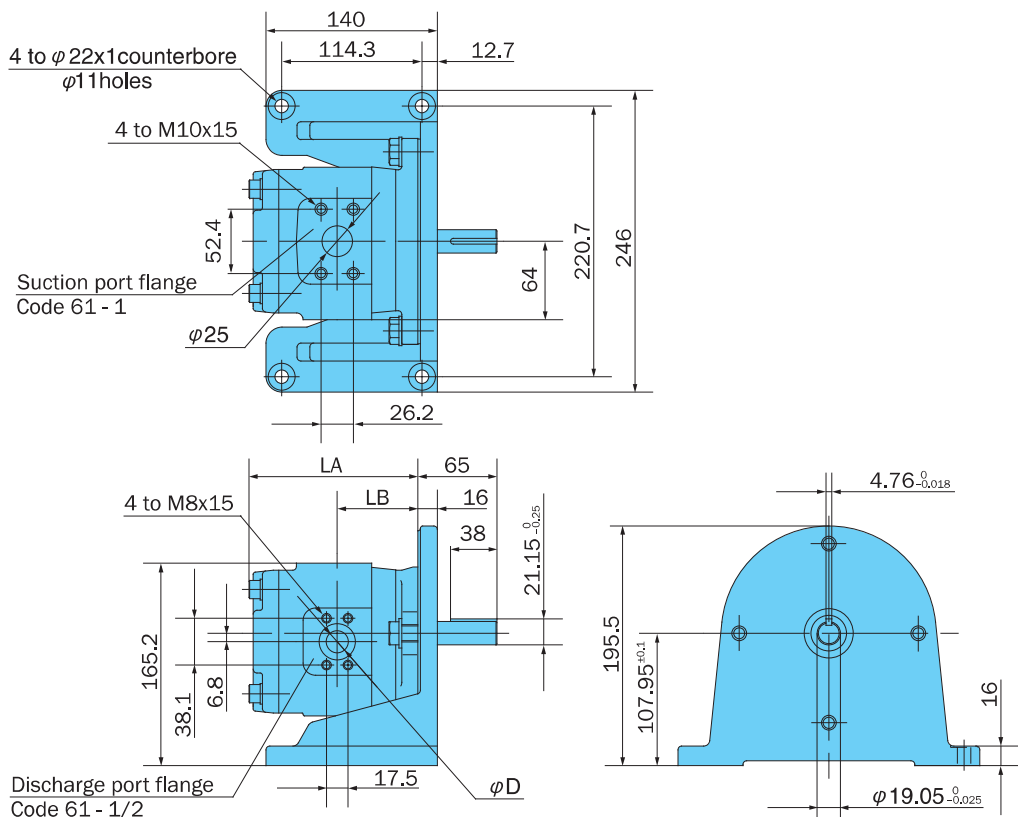
IPH-2B-\*-11 (Flange Mounting, Clockwise Rotation) SAE A Mount



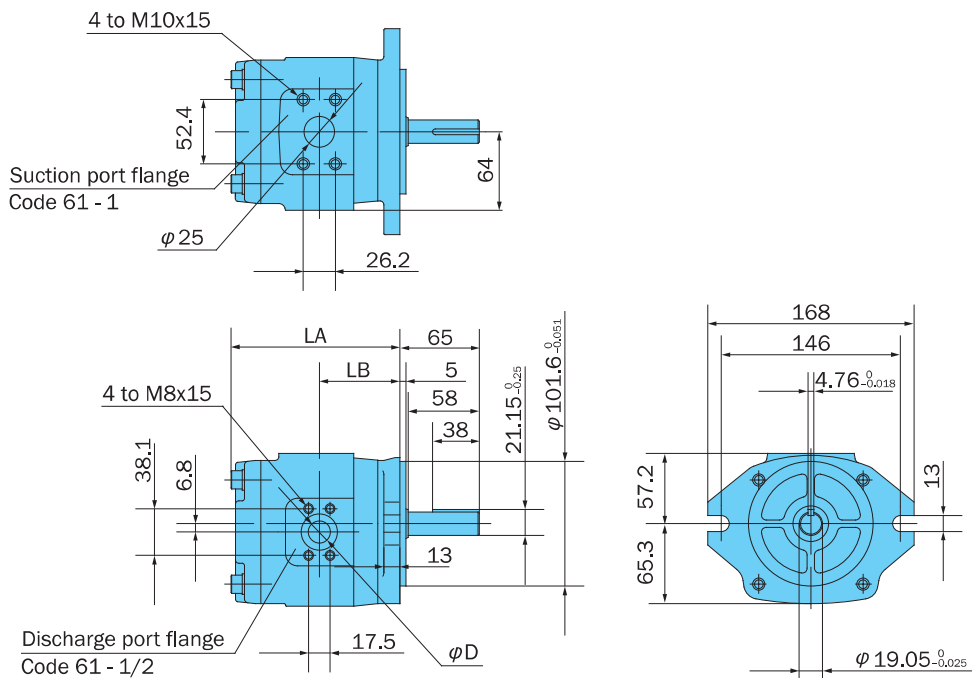
Model No.	Dimensions (mm)		
	LA	LB	$\phi D$
IPH-2*-3.5-*-11	107	51.0	8.9
IPH-2*-5-*-11	112	53.5	11
IPH-2*-6.5-*-11	116	55.5	12
IPH-2*-8-*-11	121	58.0	13

Note: IPH-2A (B)-\*-L-11 (foot mounting/flange mounting, counterclockwise rotation) are the mirror image of the drawings shown above. In the case the suction port flange is facing upwards, the discharge port flange is positioned to the right when viewed from the shaft side.

**IPH-3A-\*-20 (Foot Mounting, Clockwise Rotation)**



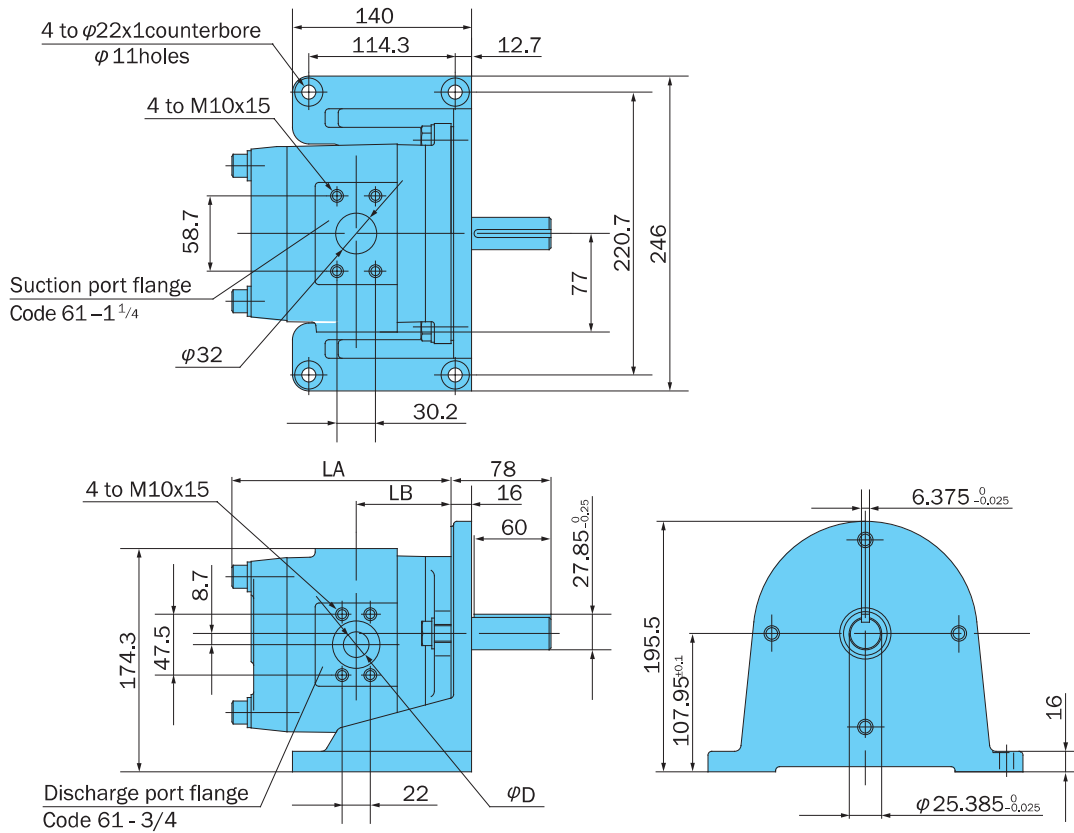
**IPH-3B-\*-20 (Flange Mounting, Clockwise Rotation) SAE B Mount 3/4 Shaft**



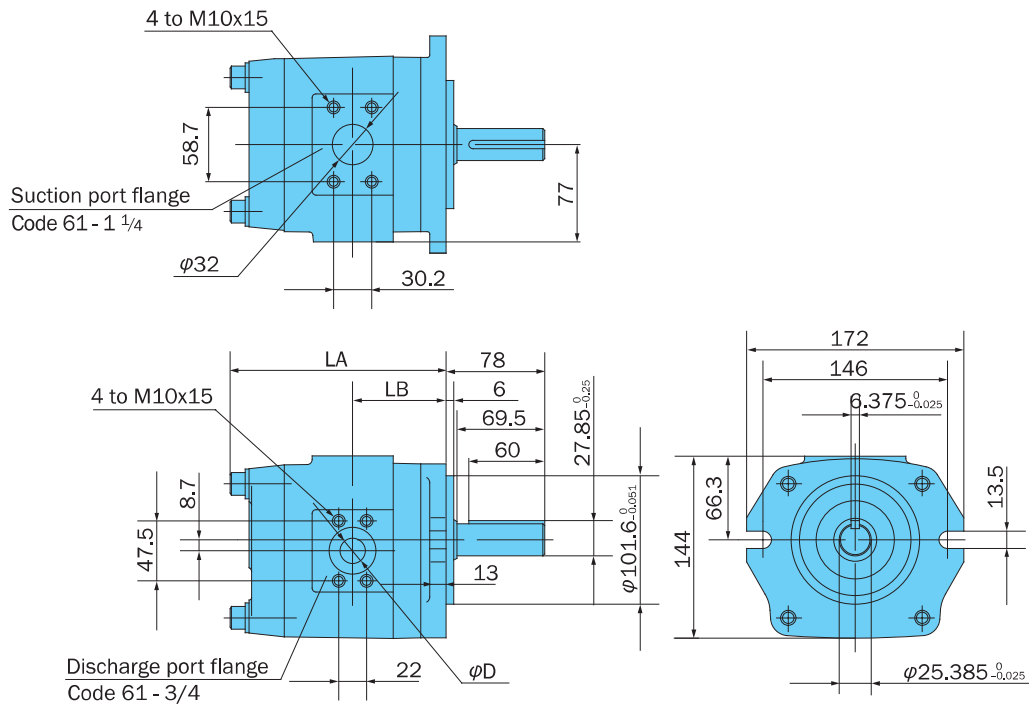
Model No.	Dimensions (mm)		
	LA	LB	$\phi D$
IPH-3*-10-*-20	128,5	60,0	14
IPH-3*-13-*-20	134,5	63,0	17
IPH-3*-16-*-20	139,5	65,5	18

Note: IPH-3A (B)-\*-L-20 (foot mounting/flange mounting, counterclockwise rotation) are the mirror image of the drawings shown above. In the case the suction port flange is facing upwards, the discharge port flange is positioned to the right when viewed from the shaft side.

**IPH-4A-\*-20 (Foot Mounting, Clockwise Rotation)**



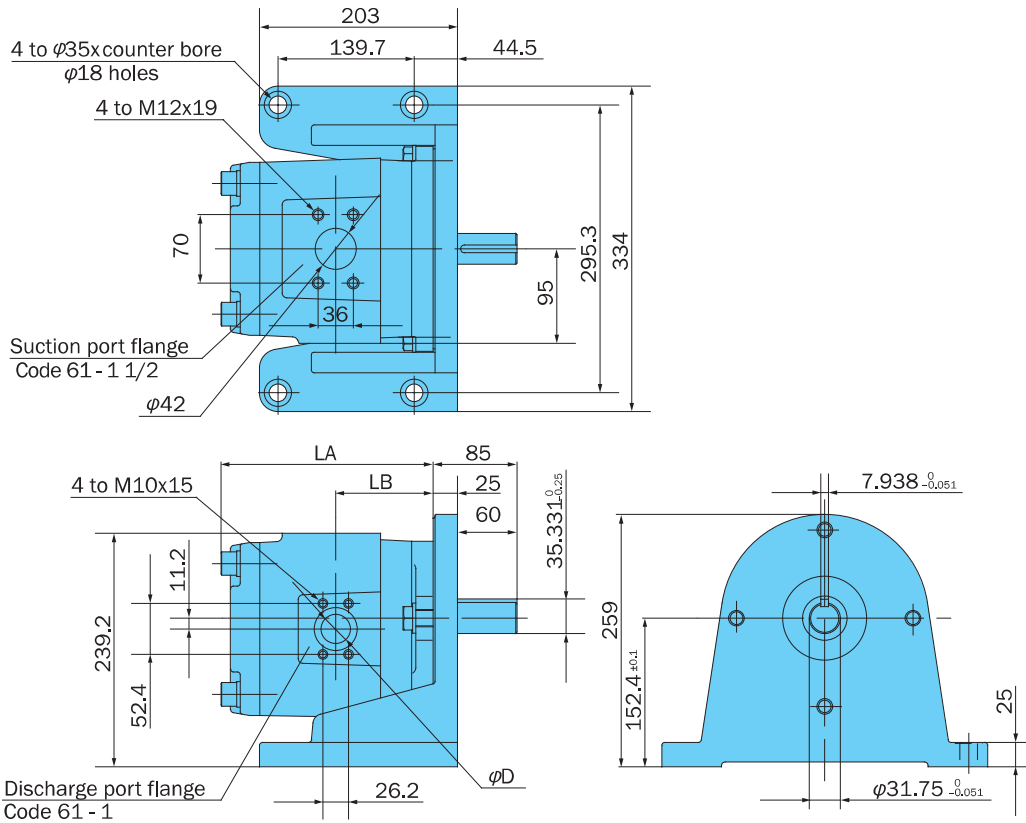
**IPH-4B-\*-20 (Flange Mounting, Clockwise Rotation) SAE BB Mount**



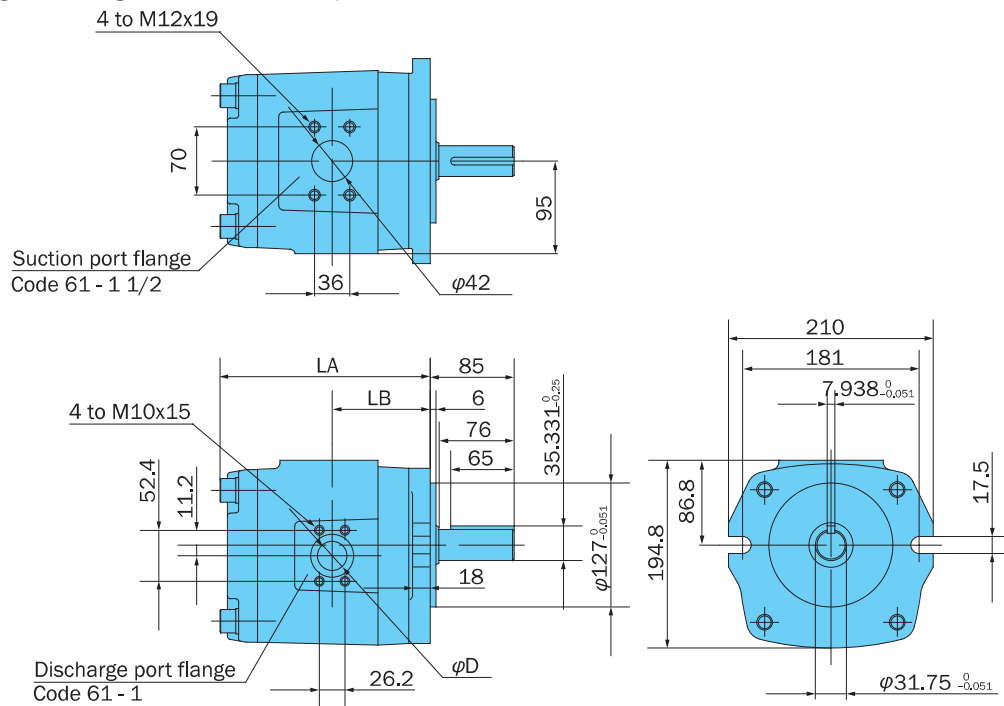
Model No.	Dimensions (mm)		
	LA	LB	$\phi D$
IPH-4*-20-*-20	164,5	71	18
IPH-4*-25-*-20	170,5	74	20
IPH-4*-32-*-20	178,5	78	24

Note: IPH-4A (B)-\*-L-20 (foot mounting/flange mounting, counterclockwise rotation) are the mirror image of the drawings shown above. In the case the suction port flange is facing upwards, the discharge port flange is positioned to the right when viewed from the shaft side.

**IPH-5A-\*-21 (Foot Mounting, Clockwise Rotation)**

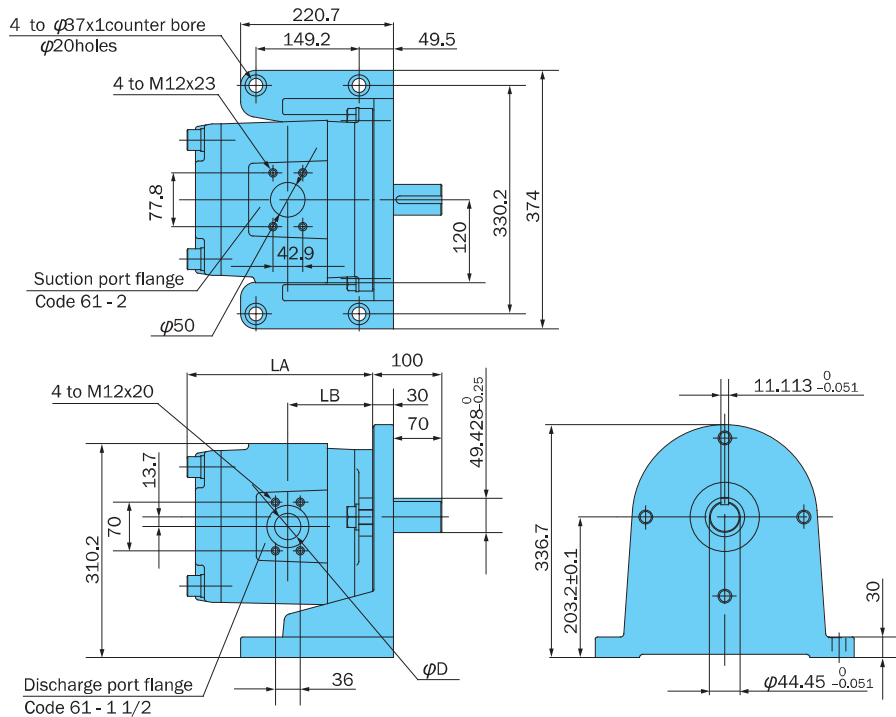
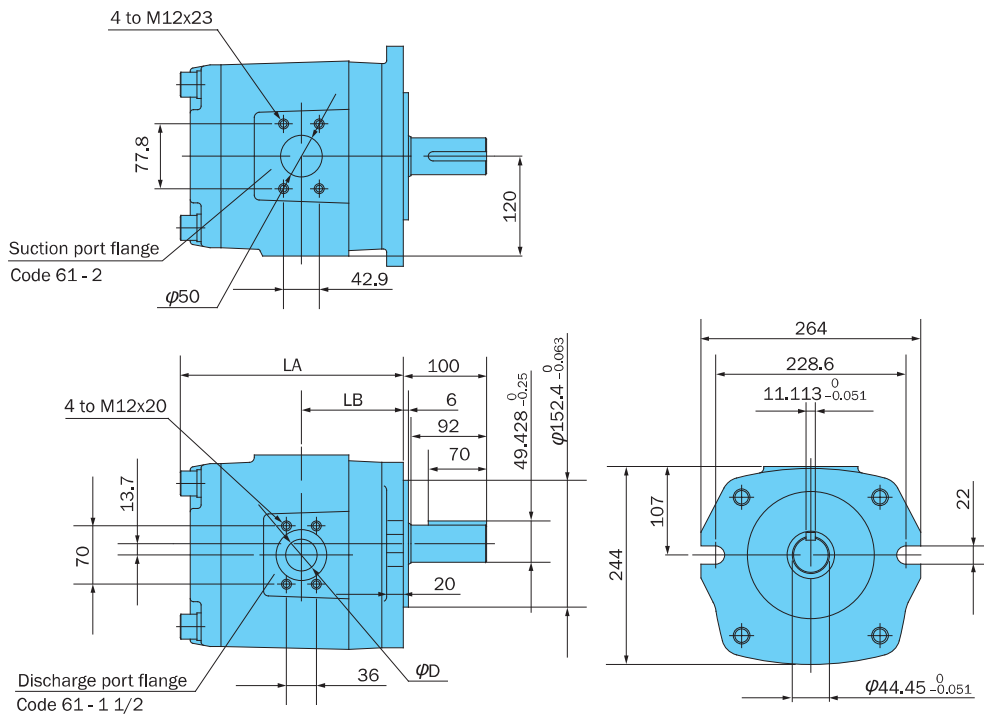


**IPH-5B-\*-11 (Flange Mounting, Clockwise Rotation) SAE C Mount**



Model No.	Dimensions (mm)		
	LA	LB	$\phi D$
IPH-5*-40-*-21 (11)	201.5	91.0	24
IPH-5*-50-*-21 (11)	208.5	94.5	26
IPH-5*-64-*-21 (11)	218.5	99.5	28

Note: IPH-5A (B)-\*-L-21 (11) (foot mounting/flange mounting, counterclockwise rotation) are the mirror image of the drawings shown above. In the case the suction port flange is facing upwards, the discharge port flange is positioned to the right when viewed from the shaft side.

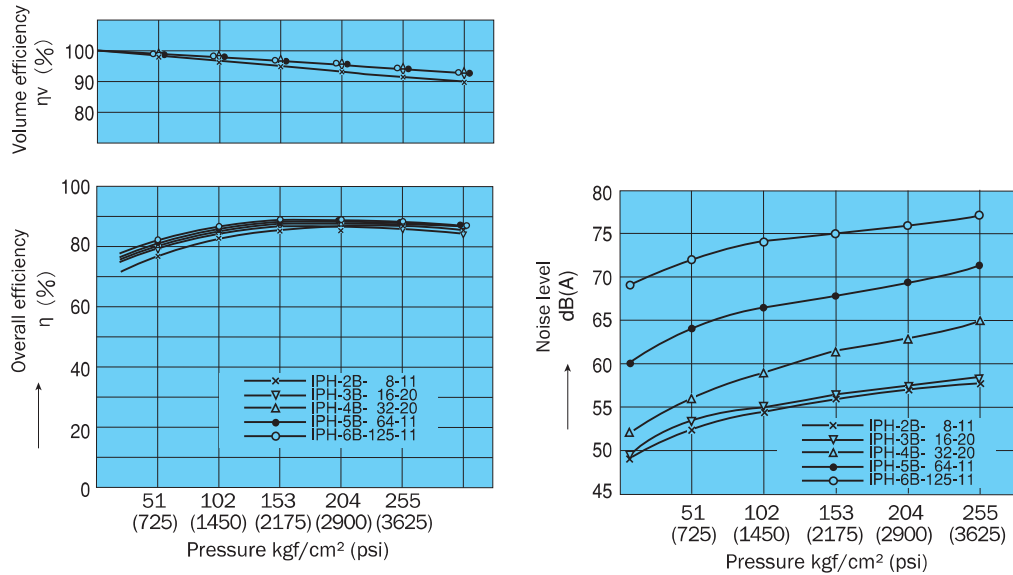
**IPH-6A-\*-21 (Foot Mounting, Clockwise Rotation)**

**IPH-6B-\*-11 (Flange Mounting, Clockwise Rotation) SAE D Mount**


Model No.	Dimensions (mm)		
	LA	LB	$\phi D$
IPH-6*- 80-*-21 (11)	241.5	111.5	32
IPH-6*-100-*-21 (11)	251.5	116.5	36
IPH-6*-125-*-21 (11)	263.5	122.5	38

Note: IPH-6A (B)-\*-L-21 (11) (foot mounting/flange mounting, counterclockwise rotation) are the mirror image of the drawings shown above. In the case the suction port flange is facing upwards, the discharge port flange is positioned to the right when viewed from the shaft side.

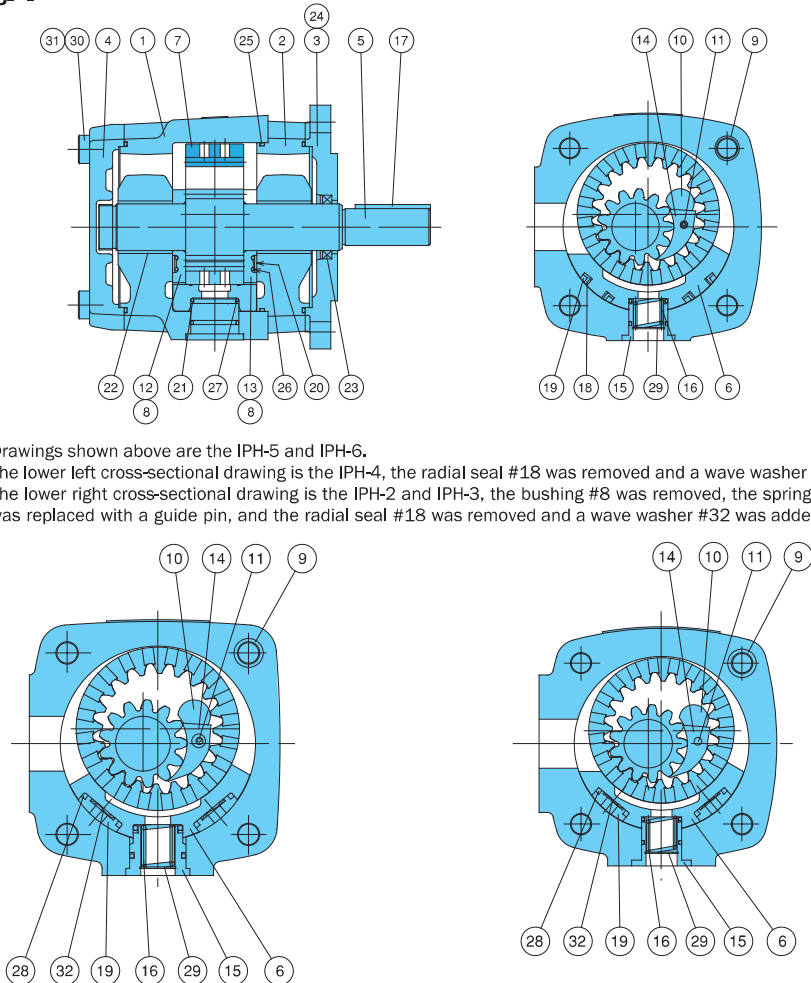
## Performance Curves

Revolution Speed 1200 rpm  
 Operating Hydraulic Fluid Viscosity 46 centistokes  
 Representative Characteristics Under Above Conditions



## Cross-sectional Drawing

IPH-\*B-\*-\*



Note: Drawings shown above are the IPH-5 and IPH-6.  
 The lower left cross-sectional drawing is the IPH-4, the radial seal #18 was removed and a wave washer was added.  
 The lower right cross-sectional drawing is the IPH-2 and IPH-3, the bushing #8 was removed, the spring pin #11 was replaced with a guide pin, and the radial seal #18 was removed and a wave washer #32 was added.

Part No.	Part Name
1	Body -1
2	Body -2
3	Mounting
4	Rear cover
5	Pinion shaft
6	Radial piston
7	Internal gear
8	Bushing
9	Knock pin
10	Stopper pin
11	Spring pin (guide pin)
12	Axial plate -1
13	Axial plate -2
14	Feeler piece
15	Spring holder
16	Spring
17	Key
18	Radial seal
19	Radial backup ring
20	Axial backup ring
21	Backup ring
22	Bearing
23	Oil seal
24	Pin
25	O-ring
26	O-ring
27	O-ring
28	O-ring
29	Snap ring
30	Screw
31	Washer
32	Wave washer

\*Note: See page C2 for Parts/Kit Numbers