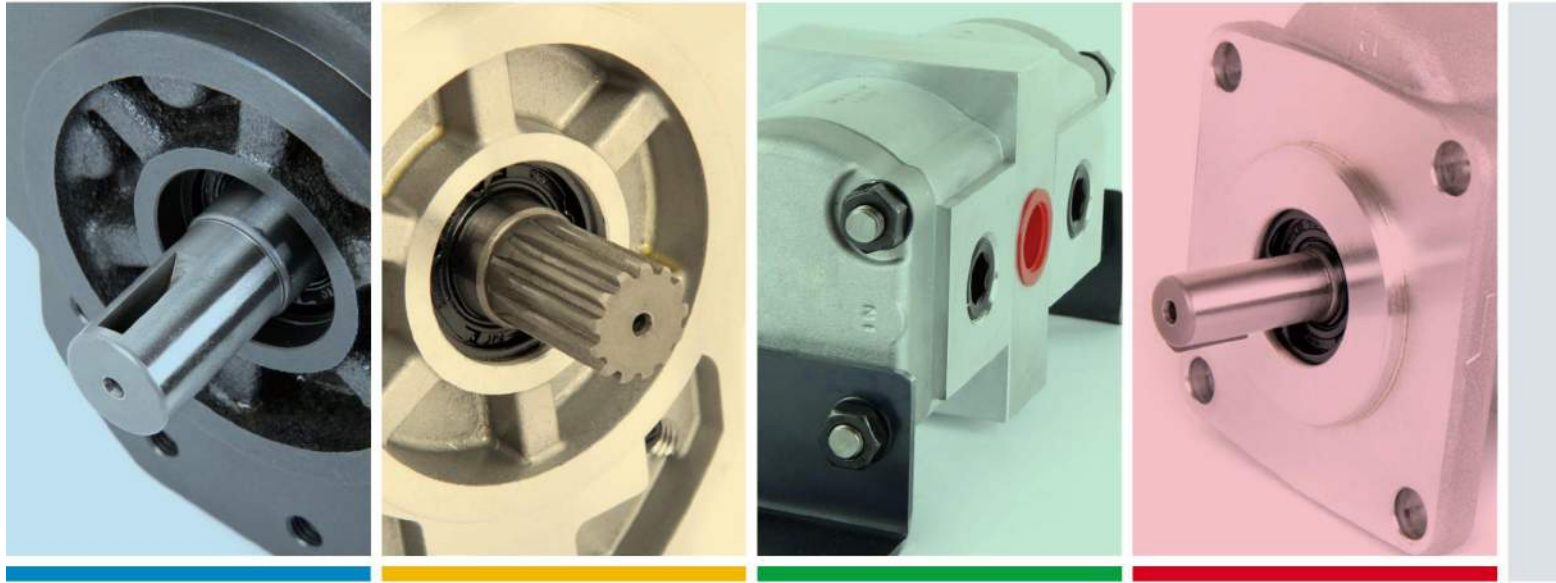




HYDRAULIC GEAR PUMPS

Single Gear Pump

Tandem Gear Pump

Synchronous Flow Divider

Gear Pump with Relief Valve

Contents

Index	02
--------------------	-----------

Features	04
-----------------------	-----------

Technical Information	05
------------------------------------	-----------

Single Gear Pump

HGP-05A	06
HGP-1A	08
HGP-2A	12
HGP-3A	16
HGP-3A2D	20
HGP-3AI	22
HGP-3AS	24
HGP-4A	26
HGP-5A	30
HGP-5AI	34
HGP-1AU	36
HGP-1.5A	38
HGP-3.5AF11R	40
HGP-3.5AF25R	41

Tandem Gear Pump

HGP-11A	38
HGP-22A	40
HGP-33A	42
HGP-55A	46
HGP-53A	49
HGP-55AI	51

Synchronous Flow Divider

DFM-302A	56
DFMN-302A	60

Gear Pump with Relief Valve

PR1	64
PR2	66
PR3	68



Index

SINGLE GEAR PUMP

Page No.	Model No.	Accurate Displacement Capacity	Operational Pressure	Max. Pressure		Flange Mounting Type			
		cc/rev	kgf/cm ²	kgf/cm ²	psi	SAE 2-bolt	DIN 4-bolt	European 4-bolt	JIS 4-bolt
06	HGP-05A	0.35 ~ 1.13	210	250	3500				
08	HGP-1A	0.5 ~ 7.8	210 ~ 170	250	3500	✓	✓	✓	
12	HGP-2A	2 ~ 12	210 ~ 175	250	3500				✓
16	HGP-3A	2 ~ 35	210 ~ 125	250	3500	✓	✓	✓	
20	HGP-3A2D	2 ~ 35	210 ~ 125	250	3500				
22	HGP-3AI	2 ~ 35	240 ~ 155	280	3920	✓	✓		
24	HGP-3AS	4 ~ 19.2	210	250	3500				✓
26	HGP-4A	20 ~ 70	250 ~ 125	300	4200	✓			
30	HGP-5A	22 ~ 90	250 ~ 160	300	4200	✓	✓		
34	HGP-5AI	22 ~ 90	280 ~ 170	330	4620	✓	✓		
36	HGP-1AU	0.5 ~ 7.8	210 ~ 170	250	3500				
38	HGP-1.5A	0.8 ~ 8	300 ~ 210	350	4900				
40	HGP-3.5AF11R	11	240	280	3920				
41	HGP-3.5AF25R	25	-	-	-				

DIMENSION OF SHAFT / INLET AND OUTLET SIZE

Page No.	Applicable Model List
11	HGP-1A, HGP-11A
15	HGP-2A, HGP-22A
19	HGP-3A, HGP-3A2D, HGP-3AI, HGP-3AS, HGP-33A, HGP-53A
29	HGP-4A
33	HGP-5A, HGP-5AI, HGP-55A, HGP-53A
55	HGP-55AI

Index

TANDEM GEAR PUMP

Page No.	Model No.	Accurate Displacement Capacity	Operational Pressure	Max. Pressure		Flange Mounting Type			
		cc/rev	kgf/cm ²	kgf/cm ²	psi	SAE 2-bolt	DIN 4-bolt	European 4-bolt	JIS 4-bolt
42	HGP-11A	0.5 ~ 8	210 ~ 170	250	3500	✓	✓	✓	
44	HGP-22A	2 ~ 12	210 ~ 175	250	3500				✓
46	HGP-33A	2 ~ 35	210 ~ 125	250	3500	✓	✓	✓	
50	HGP-55A	22 ~ 90	250 ~ 160	300	4200	✓	✓		
52	HGP-53A	24 ~ 125	250 ~ 120	300	4200	✓	✓		
54	HGP-55AI	22 ~ 90	280 ~ 150	300	4200		✓		

SYNCHRONOUS FLOW DIVIDER

Page No.	Model No.	Accurate Displacement Capacity	Max. Pressure		Stations					
		cc/rev	kgf/cm ²	psi	2	3	4	5	6	7
56	DFM-302A-M	4 ~ 35	210	2940	✓	✓	✓	✓	✓	✓
60	DFMN-302A-M	4 ~ 35	210	2940	✓	✓	✓	✓	✓	✓
60	DFMN-302A -MR	4 ~ 35	210	2940	✓	✓	✓	✓	✓	✓

GEAR PUMP WITH RELIEF VALVE

Page No.	Model No.	Accurate Displacement Capacity	Operational Pressure	Max. Pressure		Flange Mounting Type			
		cc/rev	kgf/cm ²	kgf/cm ²	psi	SAE 2-bolt	DIN 4-bolt	European 4-bolt	JIS 4-bolt
64	PR1	2 ~ 12	210 ~ 175	250	3500				✓
66	PR2	0.8 ~ 7.8	210 ~ 175	250	3500	✓	✓	✓	
68	PR3	2 ~ 35	210 ~ 125	250	3500	✓	✓	✓	

Features

1. The range of Gear Pumps and Motors is available in 4 basic frame sizes for flows up to 108lpm and pressure up to 250kgf/cm² (3500psi).
2. High tensile extruded aluminum alloy body and die casting covers machined as accurate tolerance, which ensure high volumetric and mechanical efficiency and low noise level.
3. Viton o-ring and back-up ring ensure high temperature proof.
4. Internal bearing design ensures high pressure capacity.
5. Clockwise, counter-clockwise and reverse rotations are available.
6. For comprehensive applications, the gear pump can be optionally mounted with cartridge relief or lifting valves.
7. The Synchronous Flow Divider can be assembled as multiple stages as requirements. The synchronous accuracy can achieve 95% compare than 70% of dividing valve.
8. If you need customized services, please contact us promptly.
We would like to find a common ground with you on the order amount and processing fees after receiving the product drawing.



Technical Information

1. Recommended Fluids

Petroleum-based fluids. For other fluids, consult HYDROME

2. Recommended Viscosity & Temperature

Circumstance Temperature : -15~80°C (5~176°F)

Viscosity : 12~ 800Cst

Recommended Viscosity: 16~40Cst

Filtration : Suction Side - 60μm ; Pressure Side - 10 ÷ 25μm

3. Installation & Drive

Installation and Drive of pumps must avoid radial and axial loads on the shaft.

The coupling should be able to compensate eventual misalignment errors and the shaft alignment must be within 0.8mm (0.003") TIR.

4. Pressure at Inlet

The lowest absolute pressure allowed in the Inlet side is 0.7kgf/cm².

5. Others

If any application as below, please consult HYDROME

Operating fluid temperature is above 60°C (140°F)

Mounting attitude is other than horizontal.

Changing shaft rotation, internal parts.

Special materials for seals, o-ring or covers.

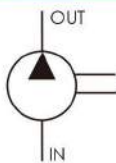


HGP-05A

- Displacement : 0.35~1.13 cc/rev
- Max. Pressure : 250 kgf/cm²
(3500psi)



SCHEMATIC SYMBOL



ORDER CODES

HGP-05A - **F** - **08** - **R** - **X**

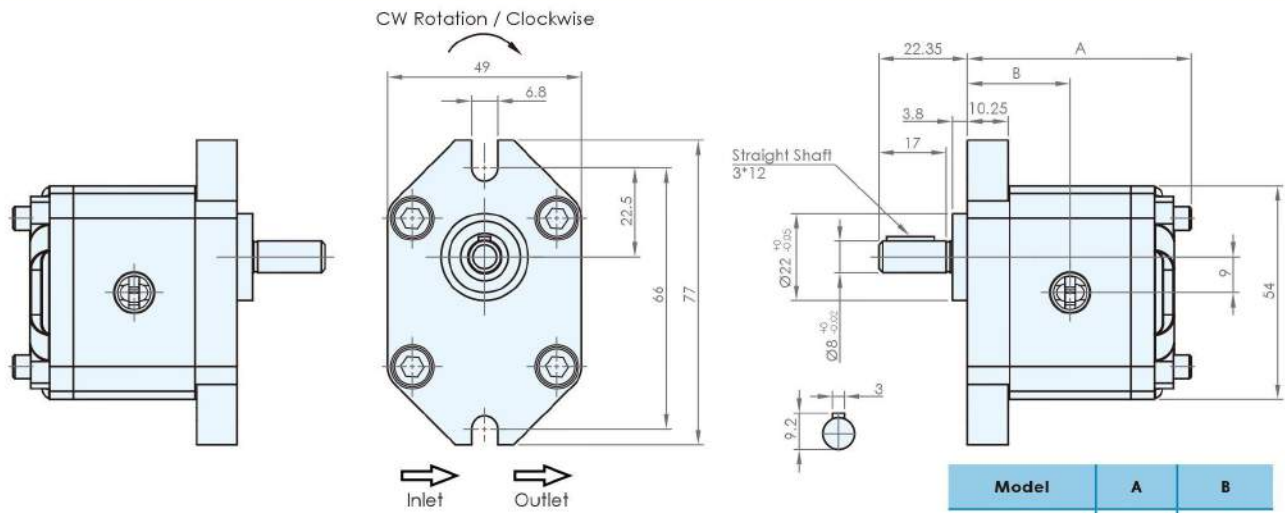
1
2
3
4
5

1	Model Name	HGP-05A	
2	Mounting	F	flange type
		L	foot type
3	Delivery Capacity	03, 05, 08, 11	
4	Rotation Direction	R	clockwise
		L	counter - clockwise
5	Shaft Type	X	straight shaft

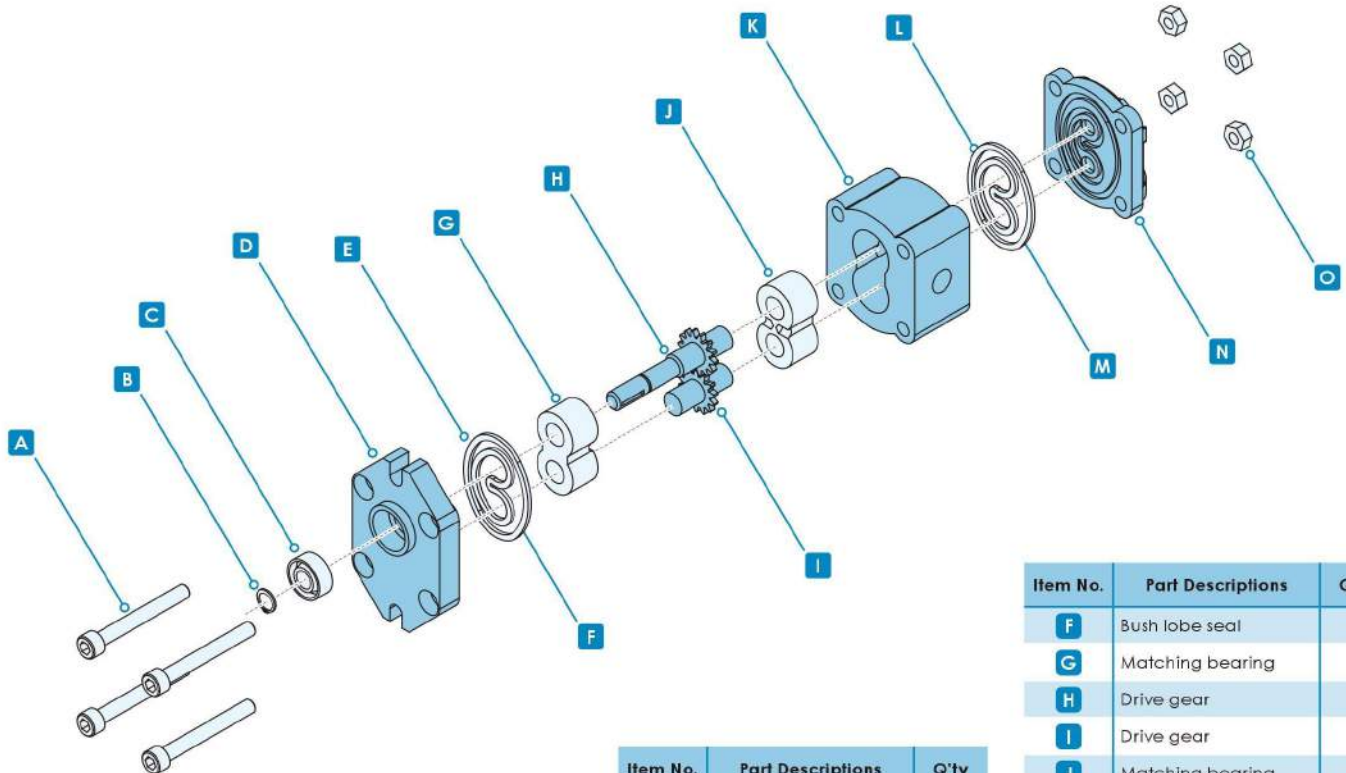
SPECIFICATIONS

Model	Accurate Displacement Capacity (cc/rev)	Operational Pressure (kgf/cm ²)	Max. Pressure (kgf/cm ²)	Speed (r.p.m.)			Ports Size (PT)		Weight (kg)
				Rate	Max.	Min.	Inlet	Outlet	
HGP-05A-03	0.35	210	250	1800	3500	800	1/8"	1/8"	0.40
HGP-05A-05	0.56	210	250	1800	3500	800	1/8"	1/8"	0.42
HGP-05A-08	0.85	210	250	1800	3500	800	1/4"	1/4"	0.43
HGP-05A-11	1.13	210	250	1800	3500	800	1/4"	1/4"	0.44

DIMENSIONS (unit : mm)



DECOMPOSITION CHARTS



Item No.	Part Descriptions	Q'ty
A	Bolt	4
B	C-ring	1
C	Shaft seal	1
D	Front cover	1
E	O-ring	1

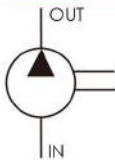
Item No.	Part Descriptions	Q'ty
F	Bush lobe seal	1
G	Matching bearing	1
H	Drive gear	1
I	Drive gear	1
J	Matching bearing	1
K	Housing	1
L	O-ring	1
M	Bush lobe seal	1
N	Rear cover	1
O	Nut	4

HGP-1A

- Displacement : 0.5~7.8 cc/rev
- Max. Pressure : 250 kgf/cm²
(3500psi)
- Flange : SAE 2-bolt, DIN 4-bolt,
European 4-bolt



SCHEMATIC SYMBOL



ORDER CODES

HGP-1A	-	F	-	08	-	R	-	X1	-	4BDA	-	P1
1		2		3		4		5		6		7

1	Model Name	HGP-1A	
2	Mounting	F	flange type
		L	foot type
3	Delivery Capacity	05, 08, 1, 2, 26, 3, 4, 5, 6, 8	
4	Rotation Direction	R	clockwise
		L	counter - clockwise
		M	hydraulic motor *
5	Shaft Type *	X: straight shaft Y: spline shaft Z: taper shaft	
6	Flange Mounting Type	2B	SAE 2-bolt
		4BDA	DIN 4-bolt (Type A)
		4BDB	DIN 4-bolt (Type B)
		4BE	European 4-bolt
7	Inlet and Outlet *	F: flange type(F1~F2) G: G, BSP, PF(G1~G2) P: PT(P1~P2) U: UNF(U1~U2)	

* The dimension of shafts and inlet & outlet sizes please refer to Page 11.

* Please contact the local distributors to obtain the specifications of hydraulic motors.

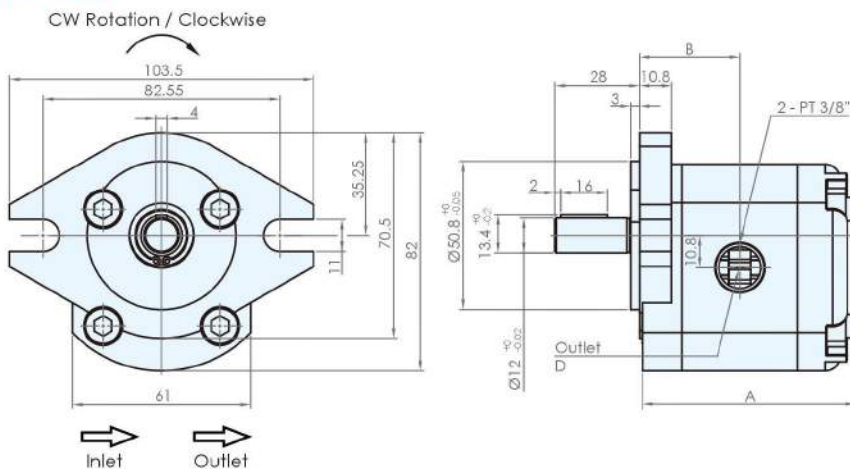
SPECIFICATIONS

Model	Accurate Displacement Capacity (cc/rev)	Operational Pressure (kgf/cm ²)	Max. Pressure (kgf/cm ²)	Speed (r.p.m.)			Weight (kg)
				Rate	Max.	Min.	
HGP-1A-05	0.5	210	250	1800	4500	1000	1.0
HGP-1A-08	0.8	210	250	1800	4500	1000	1.0
HGP-1A-1	1	210	250	1800	4500	1000	1.0
HGP-1A-2	2	210	250	1800	4500	600	1.05
HGP-1A-26	2.6	210	250	1800	4500	600	1.15
HGP-1A-3	3	210	250	1800	4500	600	1.15
HGP-1A-4	4	210	250	1800	4000	600	1.18
HGP-1A-5	5	210	250	1800	3200	600	1.2
HGP-1A-6	6	210	250	1800	3200	600	1.3
HGP-1A-8	7.8	170	210	1800	3200	600	1.4

* HGP-1A-05 and HGP-1A-26 do not belong to regular products. Customized service can be provided.

DIMENSIONS (unit : mm)

HGP-1A-2B

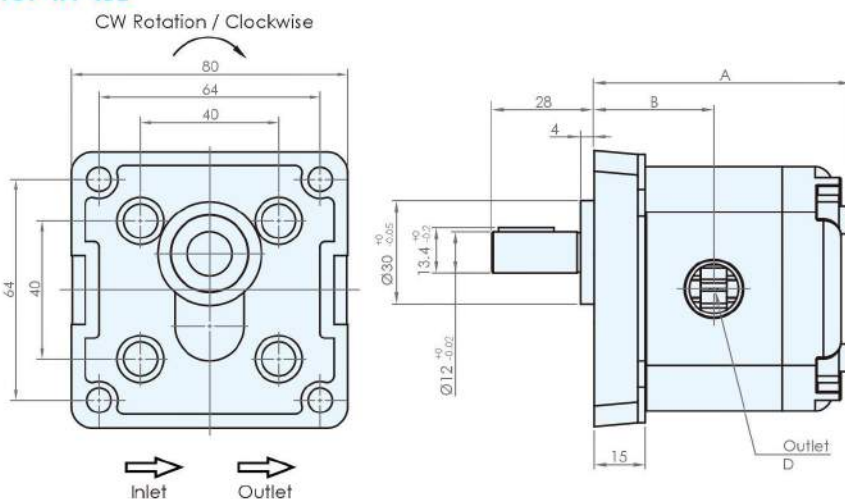


Model	A	B	C Inlet	D Outlet
HGP-1A-08	67.5	32.5	PT 3/8"	PT 3/8"
HGP-1A-1	69.5	33.5	PT 3/8"	PT 3/8"
HGP-1A-2	72	34.8	PT 3/8"	PT 3/8"
HGP-1A-3	77.5	37.5	PT 3/8"	PT 3/8"
HGP-1A-4	79.5	38.5	PT 3/8"	PT 3/8"
HGP-1A-5	83.5	40.5	PT 3/8"	PT 3/8"
HGP-1A-6	87.5	42.5	PT 3/8"	PT 3/8"
HGP-1A-8	93.5	45.5	PT 1/2"	PT 3/8"

* Thread: NPT or PT is optional.

* If you want to order HGP-1A-05 or HGP-1A-26, please email us to get further information.

HGP-1A-4BE



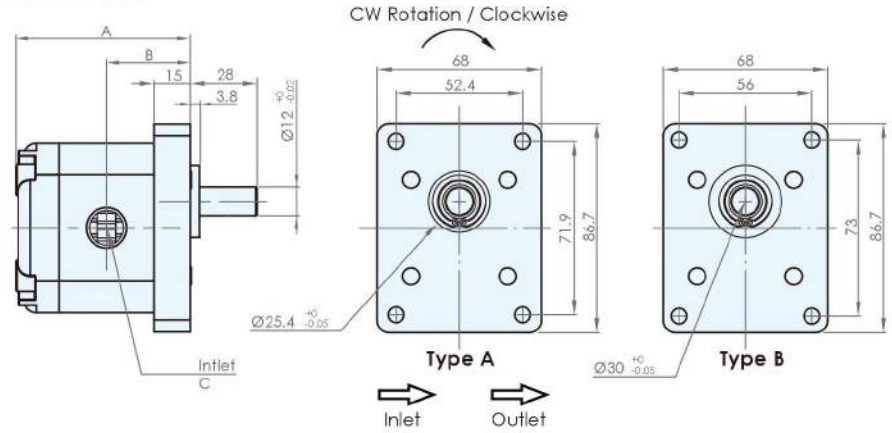
Model	A	B	C Inlet	D Outlet
HGP-1A-08	75.5	32.5	PT 3/8"	PT 3/8"
HGP-1A-1	77.5	33.5	PT 3/8"	PT 3/8"
HGP-1A-2	80.1	34.8	PT 3/8"	PT 3/8"
HGP-1A-3	85.5	37.5	PT 3/8"	PT 3/8"
HGP-1A-4	87.5	38.5	PT 3/8"	PT 3/8"
HGP-1A-5	91.5	40.5	PT 3/8"	PT 3/8"
HGP-1A-6	95.5	42.5	PT 3/8"	PT 3/8"
HGP-1A-8	101.5	45.5	PT 1/2"	PT 3/8"

* Thread: NPT or PT is optional.

* If you want to order HGP-1A-05 or HGP-1A-26, please email us to get further information.

DIMENSIONS
 (unit : mm)

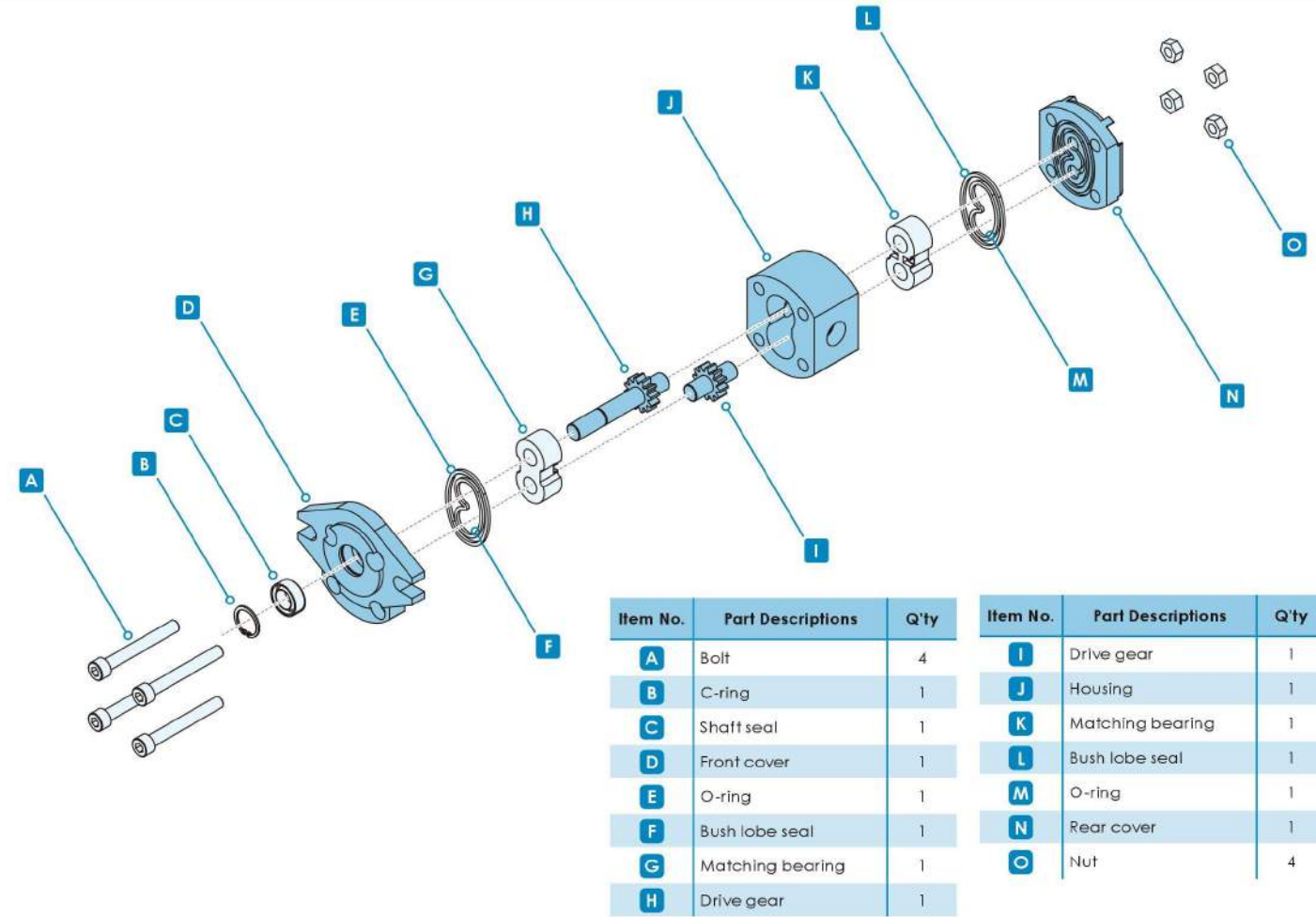
HGP-1A-4BD



Model	A	B	C Inlet	D Outlet
HGP-1A-08	67.5	32.5	PT 3/8"	PT 3/8"
HGP-1A-1	69.5	33.5	PT 3/8"	PT 3/8"
HGP-1A-2	72	34.8	PT 3/8"	PT 3/8"
HGP-1A-3	77.5	37.5	PT 3/8"	PT 3/8"
HGP-1A-4	79.5	38.5	PT 3/8"	PT 3/8"
HGP-1A-5	82.5	40.5	PT 3/8"	PT 3/8"
HGP-1A-6	87.5	42.5	PT 3/8"	PT 3/8"
HGP-1A-8	93.5	45.5	PT 1/2"	PT 3/8"

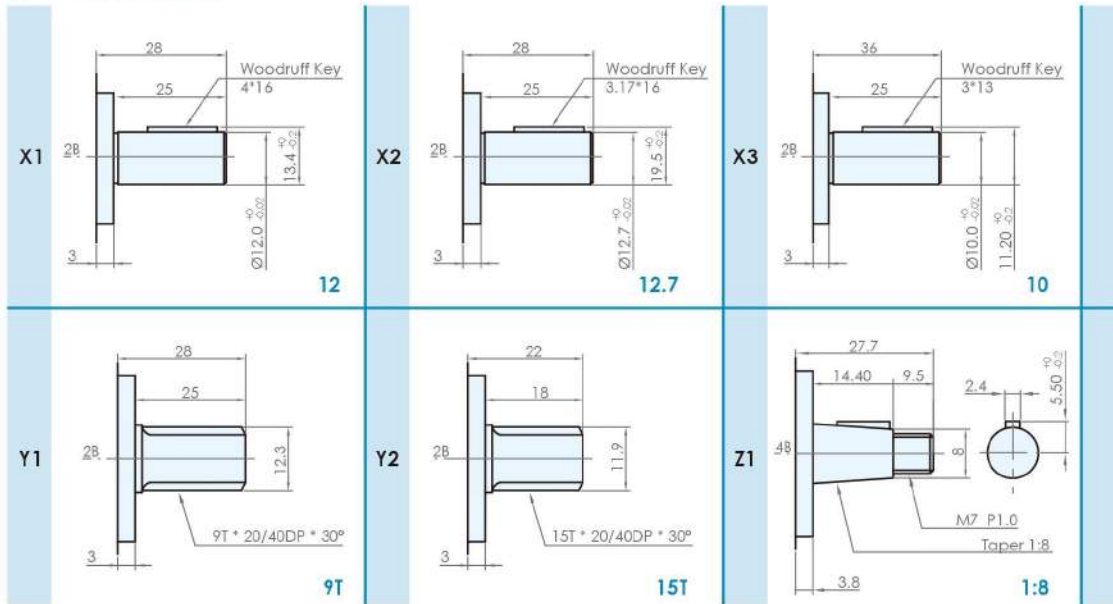
* Thread: NPT or PT is optional.
 * If you want to order HGP-1A-05 or HGP-1A-26, please email us to get further information.

DECOMPOSITION CHARTS

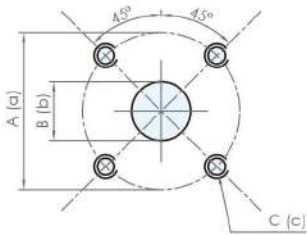


ADDITIONAL DIMENSION

Dimension of Shaft

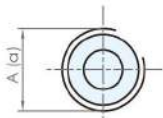


Inlet and Outlet Size



Flange Type

Code	Inlet			Outlet		
	A	B	C	a	b	c
F1	30	14.50	M6	30	14.50	M6
F2	35	14.50	M6	35	14.50	M6

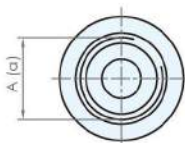


G, BSP, PF

Code	Inlet	Outlet
	A	a
G1	G 3/8"	G 3/8"
G2	G 1/2"	G 3/8"

PT

Code	Inlet	Outlet	Applicable Model
	A	a	
P1	3/8" PT	3/8" PT	1A-08 ~ 6
P2	1/2" PT	3/8" PT	1A-8



UNF

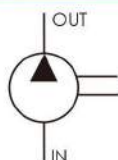
Code	Inlet	Outlet
	A	a
U1	9/16"-18UNF	9/16"-18UNF
U2	3/4"-16UNF	9/16"-18UNF

HGP-2A

- Displacement : 2~12 cc/rev
- Max. Pressure : 250 kgf/cm²
(3500psi)
- Flange : JIS 4-bolt



SCHEMATIC SYMBOL



ORDER CODES

HGP-2A	-	F	-	12	-	R	-	W1	-	4BJ	-	P2
1		2		3		4		5		6		7

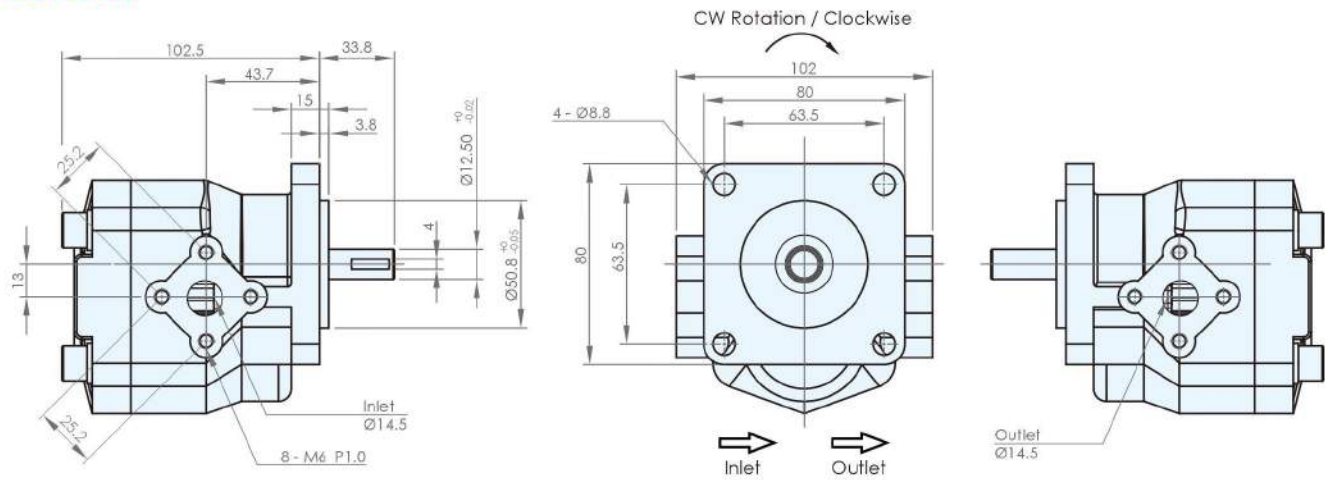
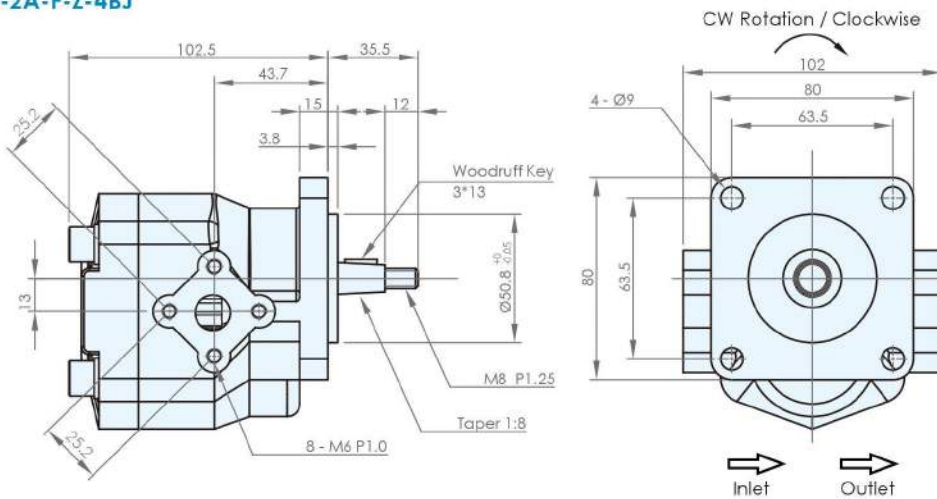
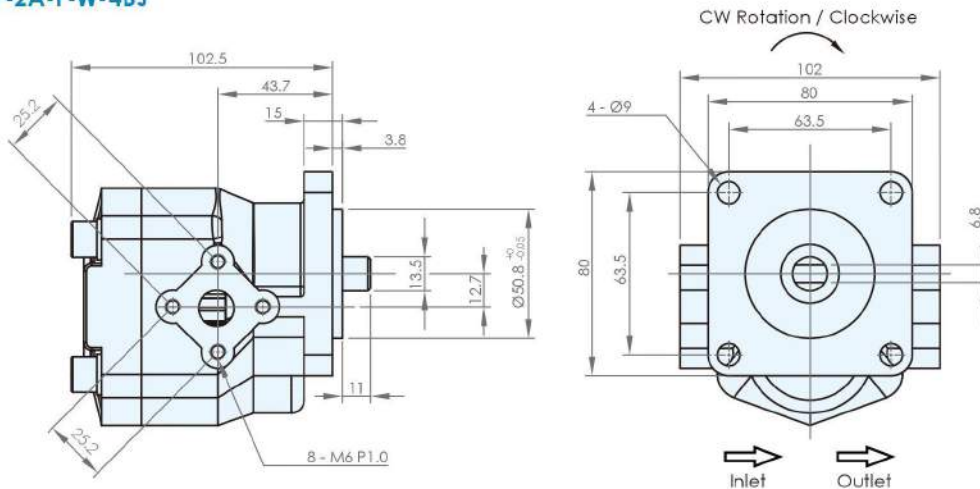
1	Model Name	HGP-2A	
2	Mounting	F	flange type
		L	foot type
3	Delivery Capacity	2, 25, 3, 4, 5, 6, 8, 9, 11, 12	
4	Rotation Direction	R	clockwise
		L	counter - clockwise
5	Shaft Type *	W: tang shaft Y: spline shaft	X: straight shaft Z: taper shaft
6	Flange Mounting Type	4BJ	JIS 4-bolt
7	Inlet and Outlet *	F: flange type(F1) P: PT(P1~P2)	G: G, BSP, PF(G1~G2)

* The dimension of shafts and inlet & outlet sizes please refer to Page 15.

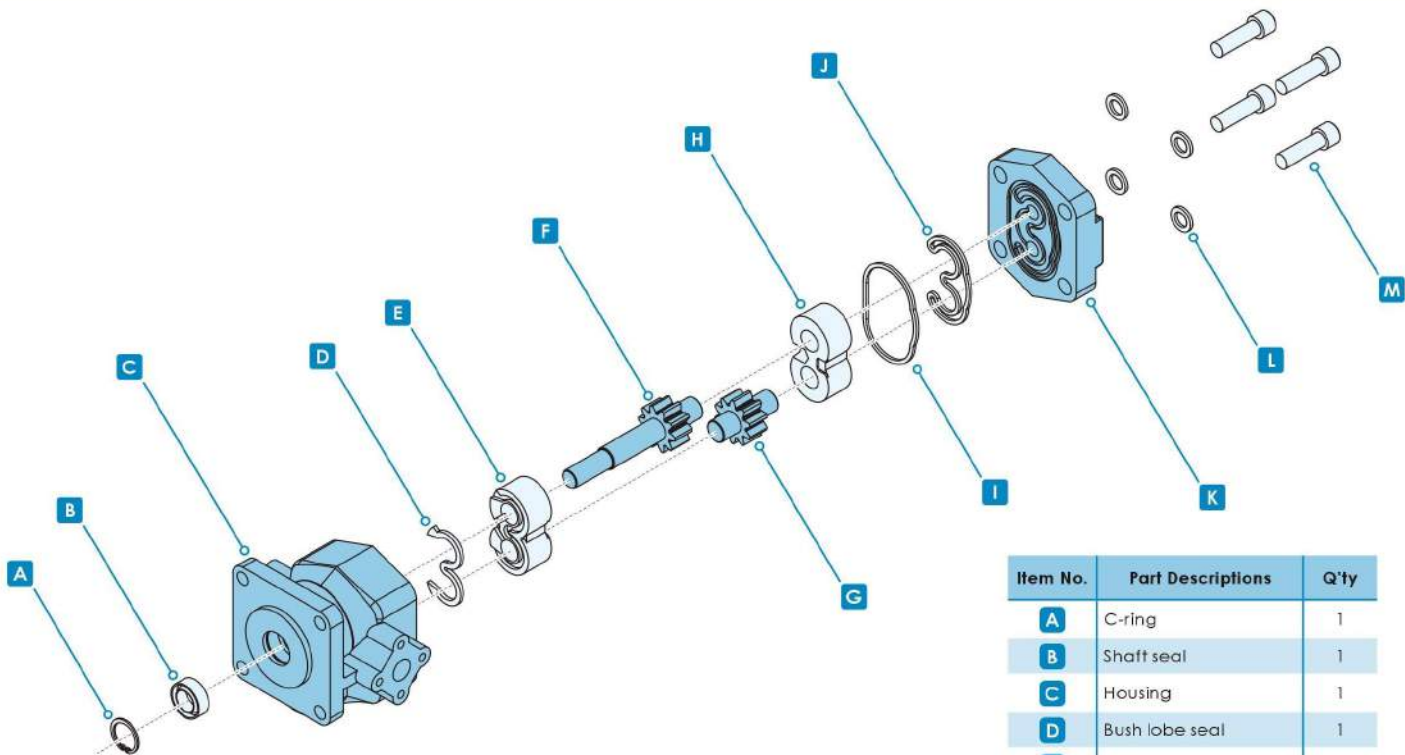
SPECIFICATIONS

Model	Accurate Displacement Capacity (cc/rev)	Operational Pressure (kgf/cm ²)	Max. Pressure (kgf/cm ²)	Speed (r.p.m.)			Weight (kg)
				Rate	Max.	Min.	
HGP-2A-2	2	210	250	1800	5000	1000	1.69
HGP-2A-25	2.5	210	250	1800	5000	850	1.70
HGP-2A-3	3	210	250	1800	5000	850	1.70
HGP-2A-4	4	210	250	1800	4500	800	1.71
HGP-2A-5	5	210	250	1800	3500	700	1.71
HGP-2A-6	6	210	250	1800	3500	700	1.72
HGP-2A-8	7.5	210	250	1800	3000	600	1.74
HGP-2A-9	9	210	250	1800	2500	550	1.74
HGP-2A-11	10.5	210	250	1800	2000	500	1.74
HGP-2A-12	12	175	210	1800	2000	500	1.76

* HGP-2A-25 and HGP-2A-5 do not belong to regular products. Customized service can be provided.

DIMENSIONS (unit : mm)**HGP-2A-F-X-4BJ****HGP-2A-F-Z-4BJ****HGP-2A-F-W-4BJ**

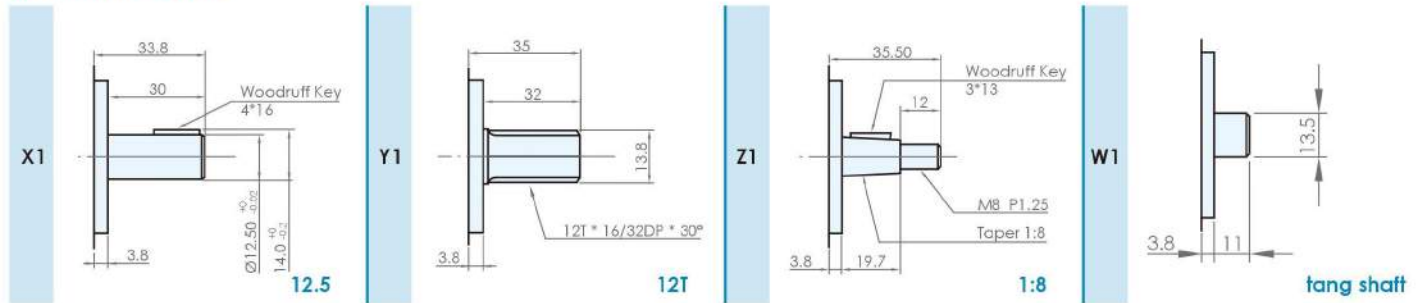
DECOMPOSITION CHARTS



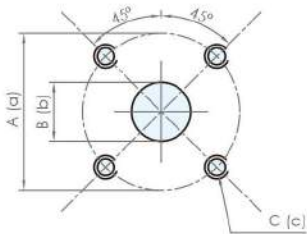
Item No.	Part Descriptions	Q'ty
A	C-ring	1
B	Shaft seal	1
C	Housing	1
D	Bush lobe seal	1
E	Matching bearing	1
F	Drive gear	1
G	Drive gear	1
H	Matching bearing	1
I	O-ring	1
J	Back-up ring	1
K	Rear cover	1
L	Bolt washer	4
M	Bolt	4

ADDITIONAL DIMENSION

Dimension of Shaft

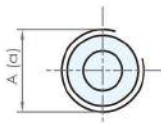


Inlet and Outlet Size



Flange Type

Code	Inlet			Outlet		
	A	B	C	a	b	c
F1	35	14.5	M6	35	14.5	M6



G, BSP, PF

Code	Inlet	Outlet
	A	a
G1	G 3/8"	G 3/8"
G2	G 1/2"	G 1/2"

PT

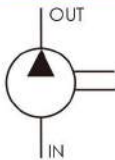
Code	Inlet	Outlet
	A	a
P1	3/8" PT	3/8" PT
P2	1/2" PT	1/2" PT

HGP-3A

- Displacement : 2~35 cc/rev
- Max. Pressure : 250 kgf/cm²
(3500psi)
- Flange : SAE 2-bolt, DIN 4-bolt,
European 4-bolt



SCHEMATIC SYMBOL



ORDER CODES

HGP-3A	-	F	-	13	-	R	-	X1	-	2B	-	P1
1		2		3		4		5		6		7

1	Model Name	HGP-3A	
2	Mounting	F	flange type
		L	foot type
3	Delivery Capacity	2, 3, 4, 6, 8, 11, 13, 14, 17, 19, 23, 25, 28, 30, 33, 35	
4	Rotation Direction	R	clockwise
		L	counter - clockwise
		M	hydraulic motor *
5	Shaft Type *	X: straight shaft Y: spline shaft Z: taper shaft	
6	Flange Mounting Type	2B	SAE 2-bolt
		4BD	DIN 4-bolt
		4BE	European 4-bolt
7	Inlet and Outlet *	F: flange type(F1~F6) G: G, BSP, PF(G1~G2) P: PT(P1~P2) U: UNF(U1~U2)	

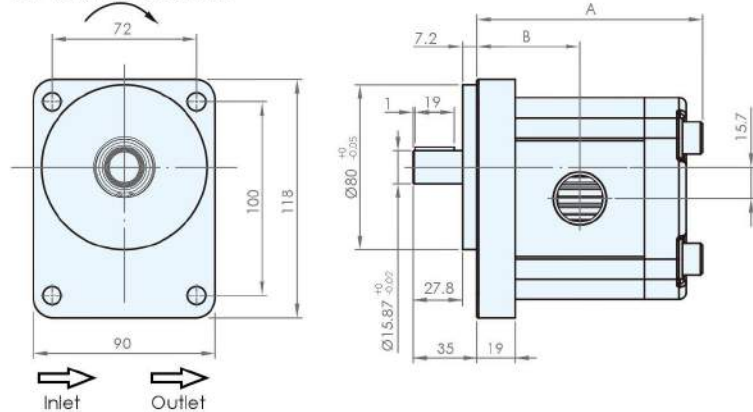
* The dimension of shafts and inlet & outlet sizes please refer to Page 19.

* Please contact the local distributors to obtain the specifications of hydraulic motors.

DIMENSIONS (unit : mm)

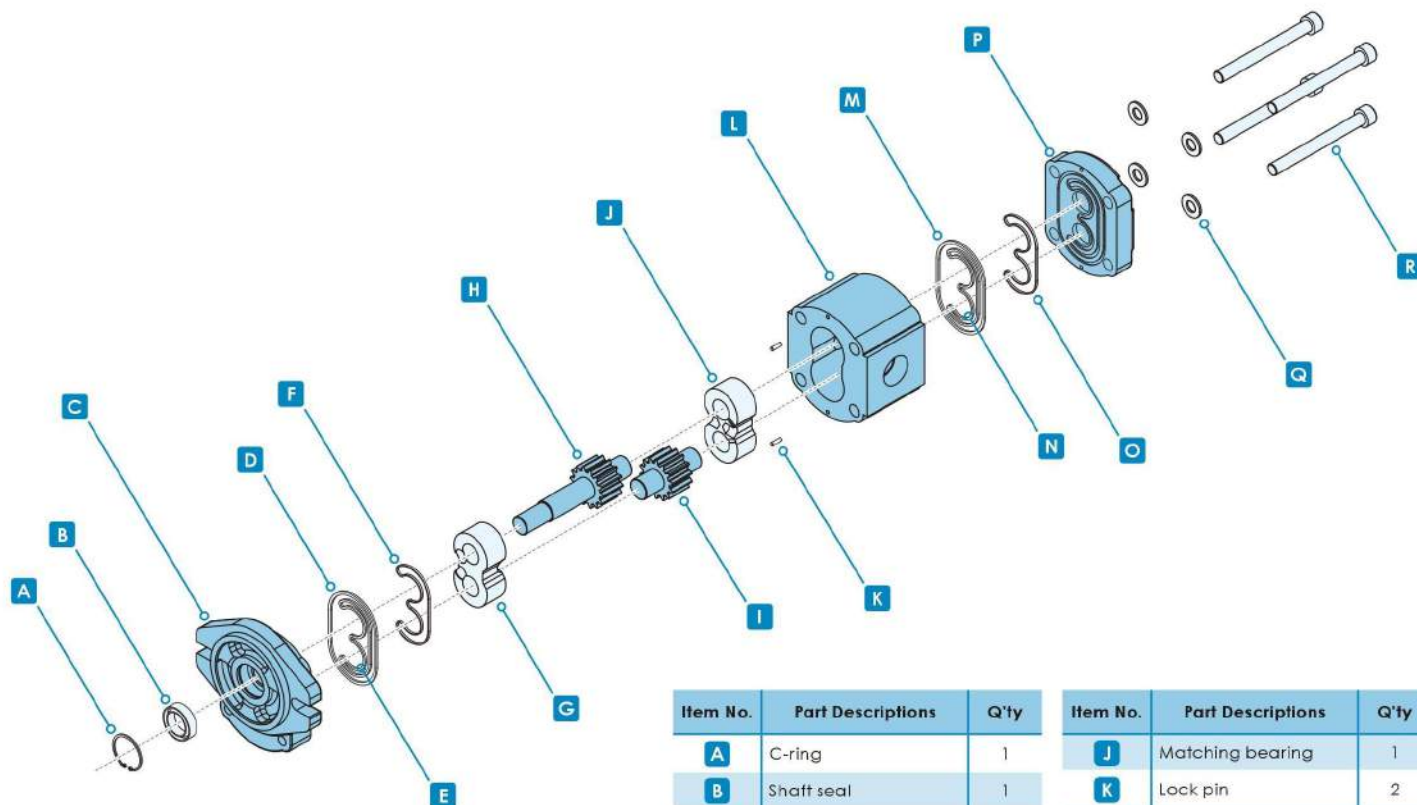
HGP-3A-F-X-4BD

CW Rotation / Clockwise



Model	A	B
HGP-3A-2-4BD	97.4	41.7
HGP-3A-3-4BD	99	42.5
HGP-3A-4-4BD	101	43.5
HGP-3A-6-4BD	105	45
HGP-3A-8-4BD	109	46.5
HGP-3A-11-4BD	113	49
HGP-3A-13-4BD	117	51
HGP-3A-14-4BD	119	52
HGP-3A-17-4BD	123	54
HGP-3A-19-4BD	127	56
HGP-3A-23-4BD	134	60
HGP-3A-25-4BD	137	61
HGP-3A-28-4BD	141	63
HGP-3A-30-4BD	145	65
HGP-3A-33-4BD	150	68
HGP-3A-35-4BD	154	70

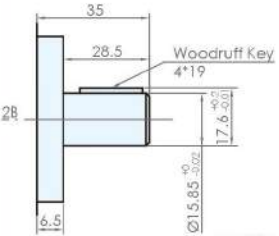
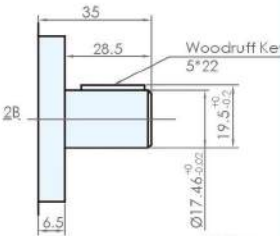
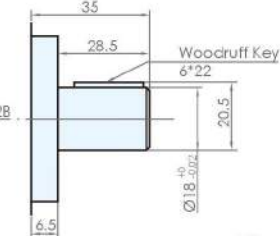
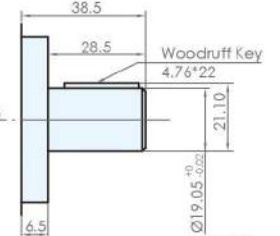
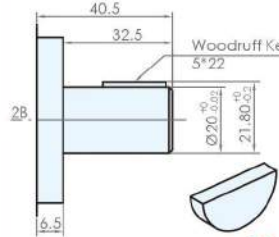
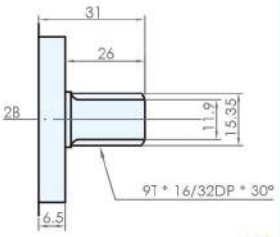
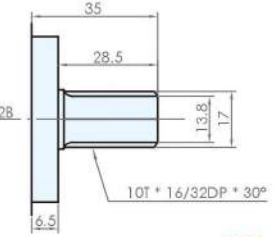
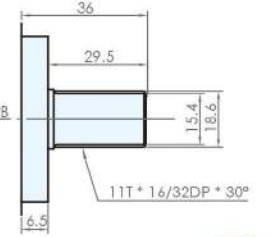
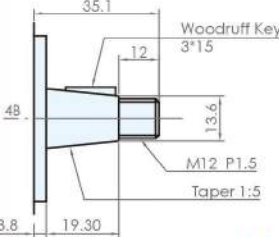
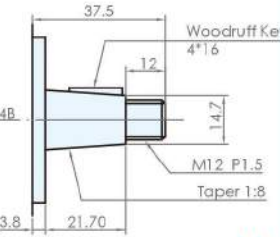
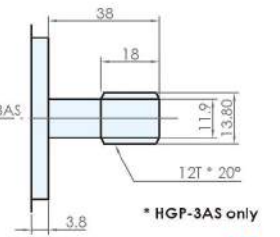
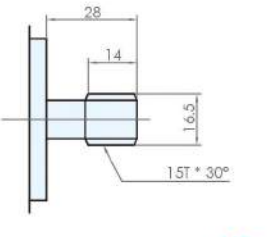
DECOMPOSITION CHARTS



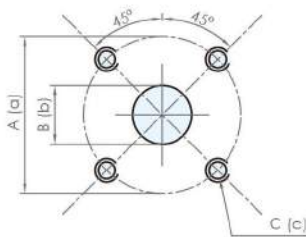
Item No.	Part Descriptions	Q'ty	Item No.	Part Descriptions	Q'ty
A	C-ring	1	J	Matching bearing	1
B	Shaft seal	1	K	Lock pin	2
C	Front cover	1	L	Housing	1
D	O-ring	1	M	O-ring	1
E	Back-up ring	1	N	Back-up ring	1
F	Bush lobe seal	1	O	Bush lobe seal	1
G	Matching bearing	1	P	Rear cover	1
H	Drive gear	1	Q	Bolt washer	4
I	Drive gear	1	R	Bolt	4

ADDITIONAL DIMENSION (unit : mm)

Dimension of Shaft

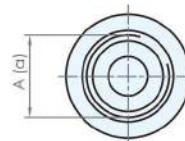
 35 28.5 Woodruff Key 4*19 28 6.5 17.6^{+0.02}_{-0.02} Ø15.85^{+0.02}_{-0.02} 15.85	 35 28.5 Woodruff Key 5*22 28 6.5 19.5^{+0.02}_{-0.02} Ø17.46^{+0.02}_{-0.02} 17.46	 35 28.5 Woodruff Key 6*22 28 6.5 20.5^{+0.02}_{-0.02} Ø18.02^{+0.02}_{-0.02} 18	 38.5 28.5 Woodruff Key 4.76*22 28 6.5 21.10^{+0.02}_{-0.02} Ø19.05^{+0.02}_{-0.02} 19.05
 40.5 32.5 Woodruff Key 5*22 28 6.5 21.80^{+0.02}_{-0.02} Ø20.02^{+0.02}_{-0.02} 20	 31 26 9T * 16/32DP * 30° 28 6.5 15.95^{+0.02}_{-0.02} Ø11.9^{+0.02}_{-0.02} 9T	 35 28.5 10T * 16/32DP * 30° 28 6.5 17^{+0.02}_{-0.02} Ø13.8^{+0.02}_{-0.02} 10T	 36 29.5 11T * 16/32DP * 30° 28 6.5 18.6^{+0.02}_{-0.02} Ø15.4^{+0.02}_{-0.02} 11T
 35.1 12 Woodruff Key 3*15 48 13.6 M12 P1.5 Taper 1:5 3.8 19.30 1:5	 37.5 12 Woodruff Key 4*16 48 14.7 M12 P1.5 Taper 1:8 3.8 21.70 1:8	 38 18 12T * 20° 3AS 3.8 13.80^{+0.02}_{-0.02} Ø11.9^{+0.02}_{-0.02} 12T	 28 14 15T * 30° 16.5 15T

Inlet and Outlet Size



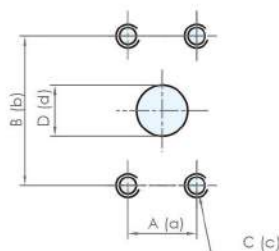
Flange Type

Code	Inlet			Outlet		
	A	B	C	a	b	c
F1	40	18.5	M6	35	14.5	M6
F2	40	18.5	M8	30	14.5	M6
F3	40	18.5	M8	40	14.5	M8



UNF

Code	Inlet	Outlet
	A	a
U1	1 1/16"-12UN	7/8"-14UNF
U2	1 5/16"-12UNF	1 1/16"-12UN



Flange Type

Code	Inlet				Outlet			
	A	B	C	D	a	b	c	d
F4	17.48	38.1	5/16"-18UNC	14.5	17.48	38.1	5/16"-18UNC	14.5
F5	22.23	47.63	3/8"-16UNC	18.5	17.48	38.1	5/16"-18UNC	14.5
F6	26.2	52.4	3/8"-16UNC	24	22.23	47.63	3/8"-16UNC	18.5

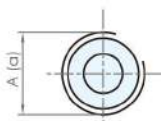
* UNC : Unified Coarse Thread

G, BSP, PF

Code	Inlet	Outlet
	A	a
G1	G 3/4"	G 1/2"
G2	G 1"	G 3/4"

PT

Code	Inlet	Outlet	Applicable Model
	A	a	
P1	3/4" PT	1/2" PT	3A-2 ~ 23
P2	1" PT	3/4" PT	3A-25 ~ 35

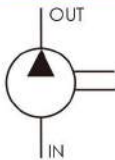


HGP-3A2D

- Displacement : 2~35 cc/rev
- Max. Pressure : 250 kgf/cm²
(3500psi)



SCHEMATIC SYMBOL



ORDER CODES

HGP-3A2D	-	F	-	13	-	R	-	Y4	-	P1
1		2		3		4		5		6

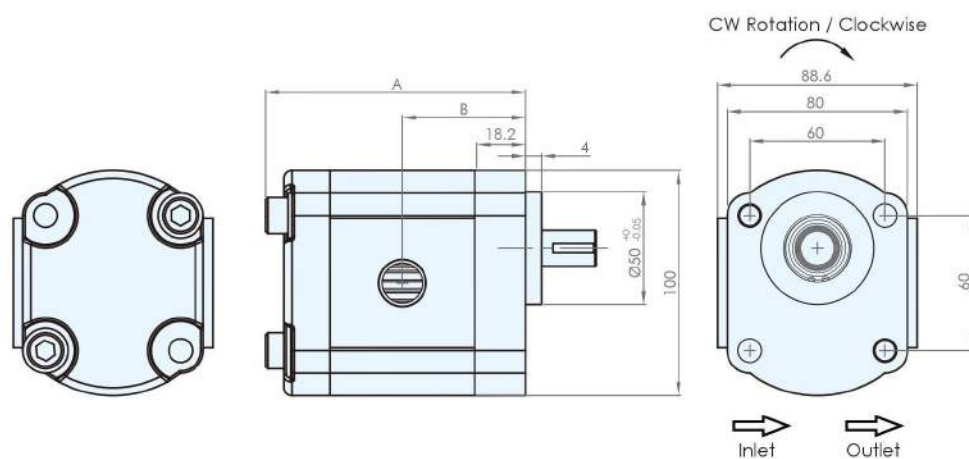
1	Model Name	HGP-3A2D	
2	Mounting	F	flange type
		L	foot type
3	Delivery Capacity	2, 3, 4, 6, 8, 11, 13, 14, 17, 19, 23, 25, 28, 30, 33, 35	
4	Rotation Direction	R	clockwise
		L	counter - clockwise
5	Shaft Type *	X: straight shaft Y: spline shaft Z: taper shaft	
6	Inlet and Outlet *	F: flange type(F1~F6)	G: G, BSP, PF(G1~G2)
		P: PT(P1~P2)	U: UNF(U1~U2)

* The dimension of shafts and inlet & outlet sizes please refer to Page 19.

SPECIFICATIONS

Model	Accurate Displacement Capacity (cc/rev)	Operational Pressure (kgf/cm ²)	Max. Pressure (kgf/cm ²)	Speed (r.p.m.)			Weight (kg)
				Rate	Max.	Min.	
HGP-3A2D-2	2	210	250	1800	4000	700	1.99
HGP-3A2D-3	3	210	250	1800	4000	700	2.03
HGP-3A2D-4	4	210	250	1800	4000	700	2.09
HGP-3A2D-6	6	210	250	1800	4000	700	2.17
HGP-3A2D-8	8.4	210	250	1800	3500	700	2.25
HGP-3A2D-11	11	210	250	1800	3000	600	2.40
HGP-3A2D-13	13	210	250	1800	3000	600	2.50
HGP-3A2D-14	14.3	210	250	1800	3000	500	2.56
HGP-3A2D-17	16.5	210	250	1800	3000	500	2.67
HGP-3A2D-19	19.2	210	250	1800	3000	500	2.79
HGP-3A2D-23	23	210	250	1800	3000	500	2.99
HGP-3A2D-25	25	175	210	1800	2800	500	3.04
HGP-3A2D-28	28	175	210	1800	2500	500	3.15
HGP-3A2D-30	30	175	210	1800	2500	500	3.25
HGP-3A2D-33	33	140	175	1200	2500	500	3.40
HGP-3A2D-35	35	125	140	1200	2500	500	3.51

DIMENSIONS (unit : mm)



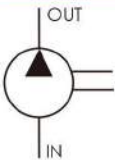
Model	A	B
HGP-3A2D-2	92.4	40.95
HGP-3A2D-3	93.9	41.7
HGP-3A2D-4	95.9	42.7
HGP-3A2D-6	98.9	44.2
HGP-3A2D-8	101.9	45.7
HGP-3A2D-11	106.9	48.2
HGP-3A2D-13	110.9	50.2
HGP-3A2D-14	112.9	51.2
HGP-3A2D-17	116.9	53.2
HGP-3A2D-19	120.9	55.2
HGP-3A2D-23	127.9	58.7
HGP-3A2D-25	130.9	60.2
HGP-3A2D-28	134.9	62.2
HGP-3A2D-30	138.9	64.2
HGP-3A2D-33	144.9	67.2
HGP-3A2D-35	148.9	69.2

HGP-3AI

- Displacement : 2~35 cc/rev
- Max. Pressure : 280 kgf/cm²
(3920psi)
- Flange : SAE 2-bolt, DIN 4-bolt



SCHEMATIC SYMBOL



ORDER CODES

HGP-3AI	-	F	-	11	-	R	-	X	-	2B
1		2		3		4		5		6

1	Model Name	HGP-3AI	
2	Mounting	F	flange type
		L	foot type
3	Delivery Capacity	2, 3, 4, 6, 8, 11, 13, 14, 17, 19, 23, 25, 28, 30, 33, 35	
4	Rotation Direction	R	clockwise
		L	counter - clockwise
5	Shaft Type	X: straight shaft Y: spline shaft Z: taper shaft	
6	Flange Mounting Type	2B	SAE 2-bolt
		4BD	DIN 4-bolt
7	Inlet and Outlet *	F: flange type(F1~F6) P: PT(P1~P2)	G: G, BSP, PF(G1~G2) U: UNF(U1~U2)

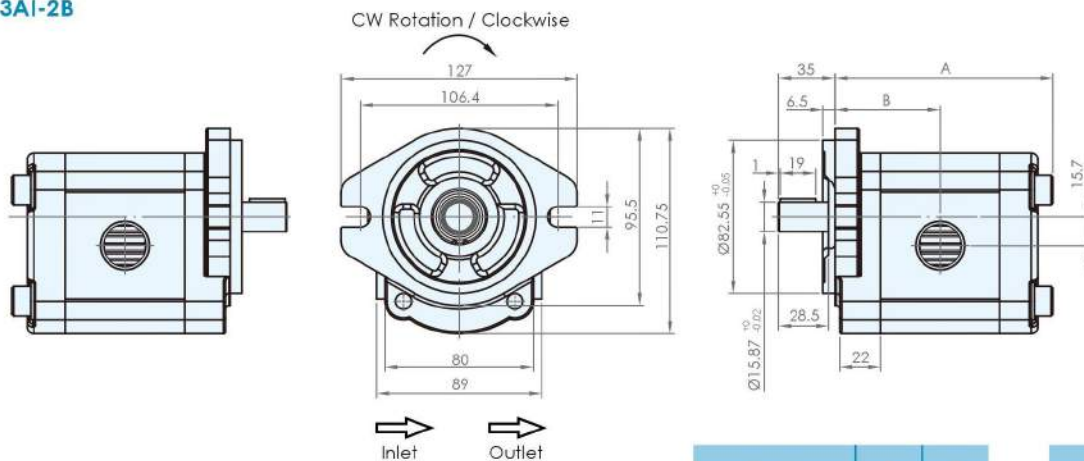
* The dimension of shafts and inlet & outlet sizes please refer to Page 19.

SPECIFICATIONS

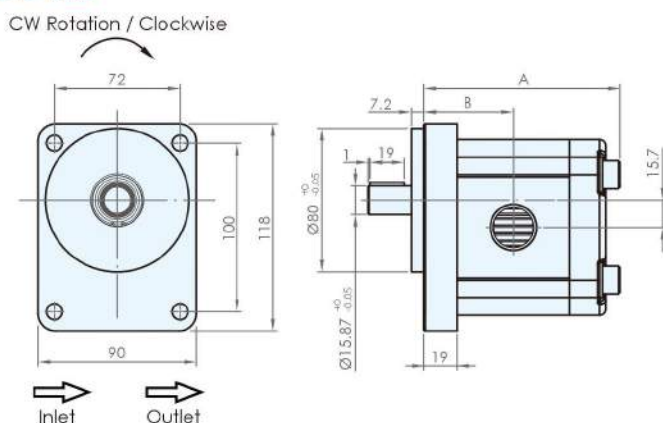
Model	Accurate Displacement Capacity (cc/rev)	Operational Pressure (kgf/cm ²)	Max. Pressure (kgf/cm ²)	Speed (r.p.m.)			Weight (kg)
				Rate	Max.	Min.	
HGP-3AI-2	2	240	280	1800	4000	700	3.69
HGP-3AI-3	3	240	280	1800	4000	700	3.73
HGP-3AI-4	4	240	280	1800	4000	700	3.79
HGP-3AI-6	6	240	280	1800	4000	700	3.87
HGP-3AI-8	8.4	240	280	1800	3500	700	3.95
HGP-3AI-11	11	240	280	1800	3000	600	4.10
HGP-3AI-13	13	240	280	1800	3000	600	4.20
HGP-3AI-14	14.3	240	280	1800	3000	500	4.26
HGP-3AI-17	16.5	240	280	1800	3000	500	4.37
HGP-3AI-19	19.2	240	280	1800	3000	500	4.49
HGP-3AI-23	23	240	280	1800	3000	500	4.69
HGP-3AI-25	25	205	240	1800	2800	500	4.74
HGP-3AI-28	28	205	240	1800	2500	500	4.85
HGP-3AI-30	30	205	240	1800	2500	500	4.95
HGP-3AI-33	33	170	205	1200	2500	500	5.10
HGP-3AI-35	35	155	170	1200	2500	500	5.21

DIMENSIONS (unit : mm)

HGP-3AI-2B



HGP-3AI-4BD



Model	A	B
HGP-3AI-2-4BD	97.4	41.7
HGP-3AI-3-4BD	99	42.5
HGP-3AI-4-4BD	101	43.5
HGP-3AI-6-4BD	105	45
HGP-3AI-8-4BD	109	46.5
HGP-3AI-11-4BD	113	49
HGP-3AI-13-4BD	117	51
HGP-3AI-14-4BD	119	52
HGP-3AI-17-4BD	123	54
HGP-3AI-19-4BD	127	56
HGP-3AI-23-4BD	134	60
HGP-3AI-25-4BD	137	61
HGP-3AI-28-4BD	141	63
HGP-3AI-30-4BD	145	65
HGP-3AI-33-4BD	150	68
HGP-3AI-35-4BD	154	70

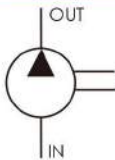
Model	A	B
HGP-3AI-2-2B	97.4	46.7
HGP-3AI-3-2B	99	47.5
HGP-3AI-4-2B	101	48.5
HGP-3AI-6-2B	105	50
HGP-3AI-8-2B	109	51.5
HGP-3AI-11-2B	113	54
HGP-3AI-13-2B	117	56
HGP-3AI-14-2B	119	57
HGP-3AI-17-2B	123	59
HGP-3AI-19-2B	127	61
HGP-3AI-23-2B	134	65
HGP-3AI-25-2B	137	66
HGP-3AI-28-2B	141	68
HGP-3AI-30-2B	145	70
HGP-3AI-33-2B	150	73
HGP-3AI-35-2B	154	75

HGP-3AS

- Displacement : 4~19.2 cc/rev
- Max. Pressure : 250 kgf/cm²
(3500psi)
- Flange : JIS 4-bolt



SCHEMATIC SYMBOL



ORDER CODES

HGP-3AS	-	F	-	19	-	R	-	X1	-	4BJ	-	P1
1		2		3		4		5		6		7

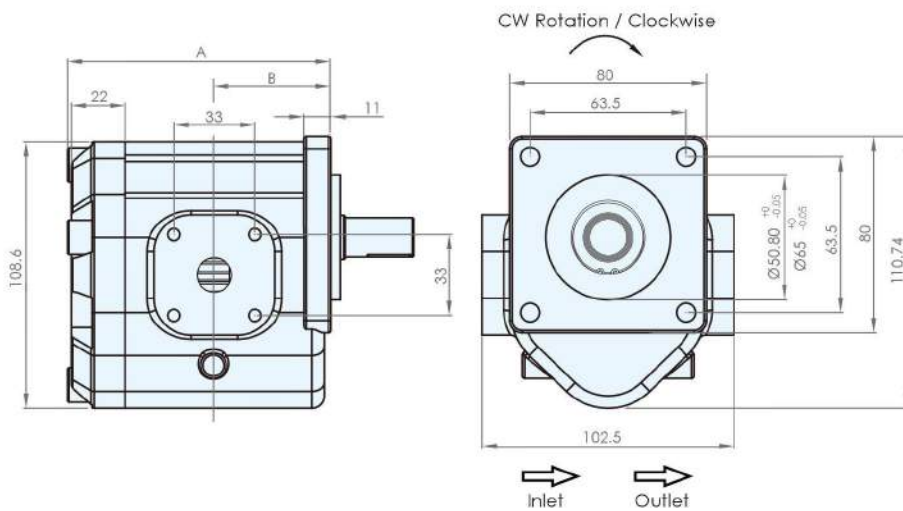
1	Model Name	HGP-3AS	
2	Mounting	F	flange type
		L	foot type
3	Delivery Capacity	4, 6, 8, 11, 13, 14, 17, 19	
4	Rotation Direction	R	clockwise
		L	counter - clockwise
5	Shaft Type *	X: straight shaft Y: spline shaft Z: taper shaft	
6	Flange Mounting Type	4BJ	JIS 4-bolt
7	Inlet and Outlet *	F: flange type(F1~F6) G: G, BSP, PF(G1~G2) P: PT(P1~P2) U: UNF(U1~U2)	

* The dimension of shafts and inlet & outlet sizes please refer to Page 19.

SPECIFICATIONS

Model	Accurate Displacement Capacity (cc/rev)	Operational Pressure (kgf/cm ²)	Max. Pressure (kgf/cm ²)	Speed (r.p.m.)			Weight (kg)
				Rate	Max.	Min.	
HGP-3AS-4	4	210	250	1800	4000	700	1.77
HGP-3AS-6	6	210	250	1800	4000	700	1.85
HGP-3AS-8	8.4	210	250	1800	3500	700	1.93
HGP-3AS-11	11	210	250	1800	3000	600	2.08
HGP-3AS-13	13	210	250	1800	3000	600	2.18
HGP-3AS-14	14.3	210	250	1800	3000	500	2.30
HGP-3AS-17	16.5	210	250	1800	3000	500	2.41
HGP-3AS-19	19.2	210	250	1800	3000	500	2.53

DIMENSIONS (unit : mm)



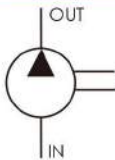
Model	A	B
HGP-3AS-4	101	48.5
HGP-3AS-6	105	50
HGP-3AS-8	109	51.5
HGP-3AS-11	113	54
HGP-3AS-13	117	56
HGP-3AS-14	119	57
HGP-3AS-17	123	59
HGP-3AS-19	127	61

HGP-4A

- Displacement : 20~70 cc/rev
- Max. Pressure : 300 kgf/cm²
(4200psi)
- Flange : SAE 2-bolt



SCHEMATIC SYMBOL



ORDER CODES

HGP-4A	-	F	-	23	-	R	-	Y1	-	2BB	-	P1
1		2		3		4		5		6		7

1	Model Name	HGP-4A	
2	Mounting	F	flange type
3	Delivery Capacity	20, 23, 25, 28, 32, 36, 40, 45, 50, 55, 60, 70	
4	Rotation Direction	R	clockwise
		L	counter - clockwise
5	Shaft Type *	X: straight shaft Y: spline shaft Z: taper shaft	
6	Flange Mounting Type	2BA	SAE 2-bolt (Type A)
		2BB	SAE 2-bolt (Type B)
7	Inlet and Outlet *	F: flange type(F1~F2) G: G, BSP, PF(G1~G2) P: PT(P1~P2)	

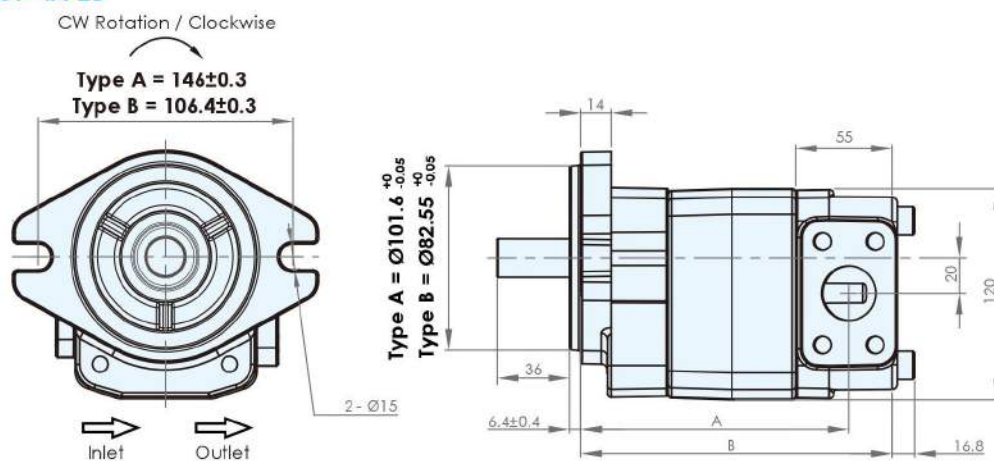
* The dimension of shafts and inlet & outlet sizes please refer to Page 29.

SPECIFICATIONS

Model	Accurate Displacement Capacity (cc/rev)	Operational Pressure (kgf/cm ²)	Max. Pressure (kgf/cm ²)	Speed (r.p.m.)		Weight (kg)
				Loaded	Unloaded	
HGP-4A-20	20	250	300	600	3000	4.1
HGP-4A-23	22.5	250	300	600	3000	4.6
HGP-4A-25	25	250	300	600	3000	5.1
HGP-4A-28	28	250	300	600	3000	5.7
HGP-4A-32	31.5	250	300	600	3000	6.4
HGP-4A-36	35.5	210	250	600	3000	7.1
HGP-4A-40	40	210	250	600	3000	8.0
HGP-4A-45	45	210	250	600	2600	8.8
HGP-4A-50	50	175	210	600	2500	9.7
HGP-4A-55	55	175	210	600	2400	10.7
HGP-4A-60	60	140	175	600	2000	11.8
HGP-4A-70	70	125	140	600	2000	13.1

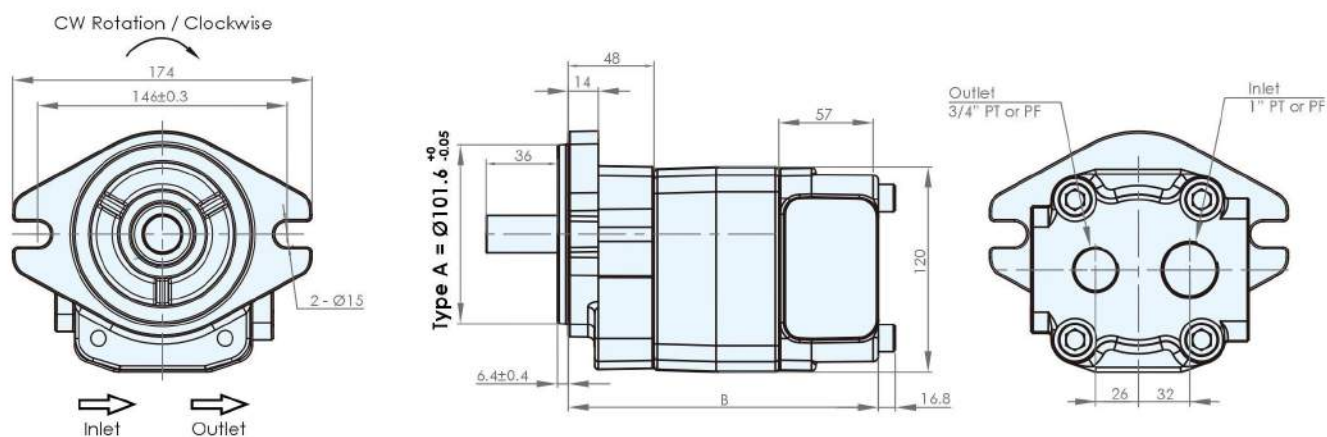
DIMENSIONS (unit : mm)

HGP-4A-2B



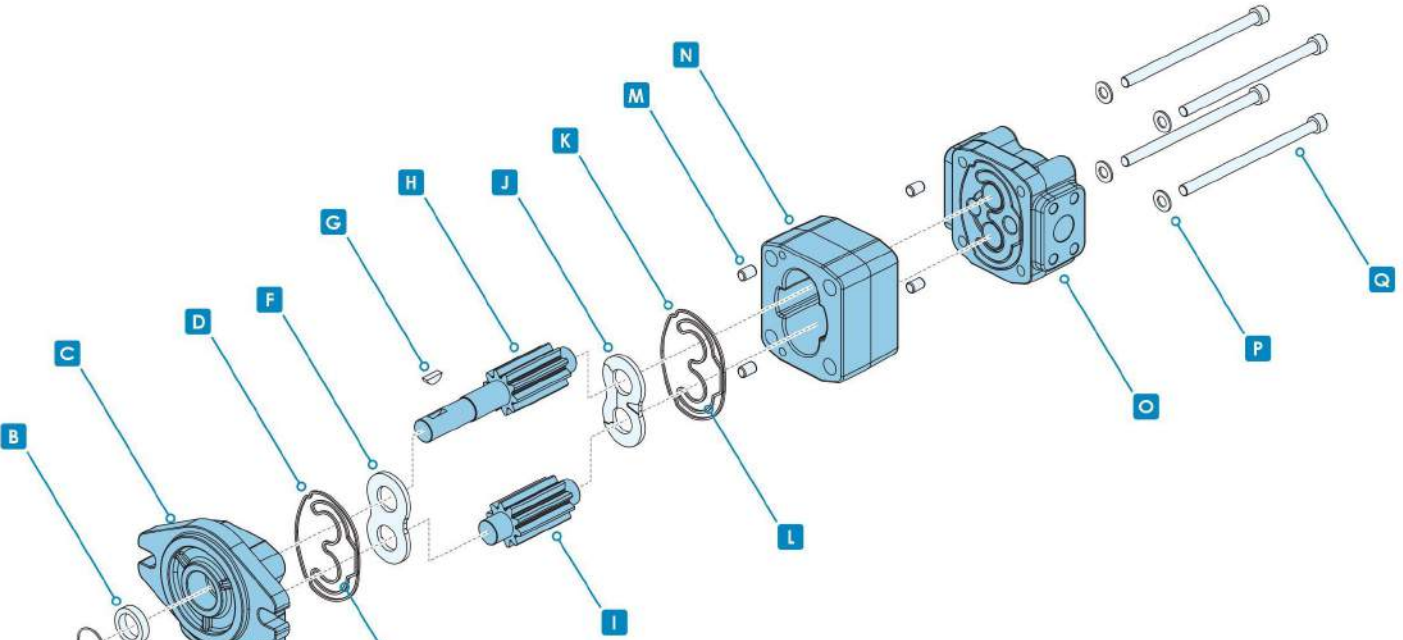
Model	A	B
HGP-4A-20	108.4	135.9
HGP-4A-23	110.9	138
HGP-4A-25	113.3	140.8
HGP-4A-28	116.3	143.8
HGP-4A-32	119.8	147.2
HGP-4A-36	123.7	151.2
HGP-4A-40	128.2	155.6
HGP-4A-45	133.1	160.6
HGP-4A-50	138	165.5
HGP-4A-55	143.4	170.9
HGP-4A-60	148.4	175.9
HGP-4A-70	157.4	184.9

HGP-4A (rear ports, customized)



* If you need customized services, please contact the local distributors to obtain the further information.

DECOMPOSITION CHARTS

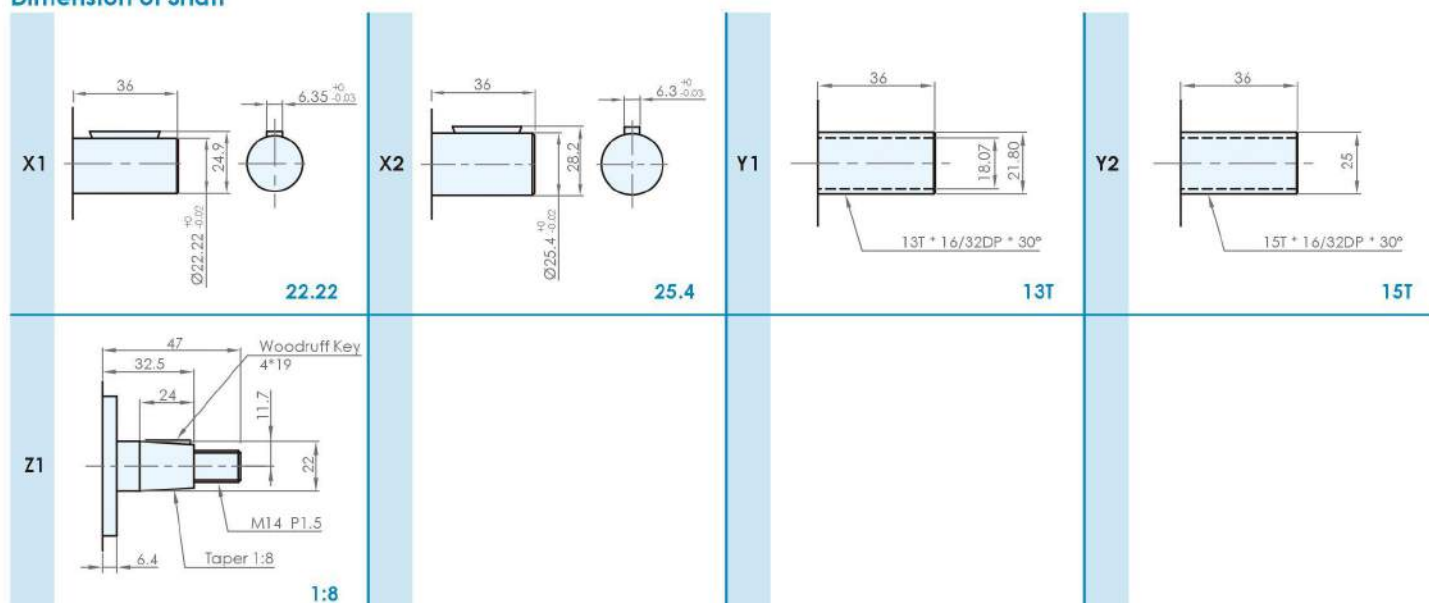


Item No.	Part Descriptions	Q'ty
A	C-ring	1
B	Shaft seal	1
C	Front cover	1
D	O-ring	1
E	Back-up ring	1
F	Matching bearing	1
G	Woodruff key	1
H	Drive gear	1
I	Drive gear	1

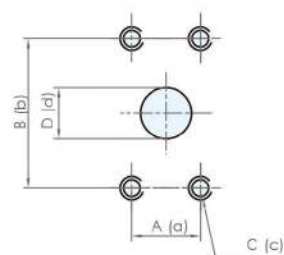
Item No.	Part Descriptions	Q'ty
J	Matching bearing	1
K	O-ring	1
L	Back-up ring	1
M	Lock pin	4
N	Housing	1
O	Rear cover	1
P	Bolt washer	4
Q	Bolt	4

ADDITIONAL DIMENSION (unit : mm)

Dimension of Shaft



Inlet and Outlet Size



Flange Type

Code	Inlet				Outlet			
	A	B	C	D	a	b	c	d
F1	22.2	47.6	M10	18.5	26.2	52.4	M10	25
F2	26.2	52.4	M10	25	30.2	58.7	M10	30

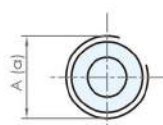
* UNC : Unified Coarse Thread

G, BSP, PF

Code	Inlet	Outlet
	A	a
G1	G 1"	G 3/4"
G2	G 1 1/4"	G 1"

PT

Code	Inlet	Outlet	Applicable Model
	A	a	
P1	1" PT	3/4" PT	4A-20 ~ 45
P2	1 1/4" PT	1" PT	4A-50 ~ 70

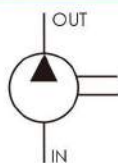


HGP-5A

- Displacement : 22~90 cc/rev
- Max. Pressure : 300 kgf/cm²
(4200psi)
- Flange : SAE 2-bolt, DIN 4-bolt



SCHEMATIC SYMBOL



ORDER CODES

HGP-5A	-	F	-	55	-	R	-	Z1	-	4BD	-	P1
1		2		3		4		5		6		7

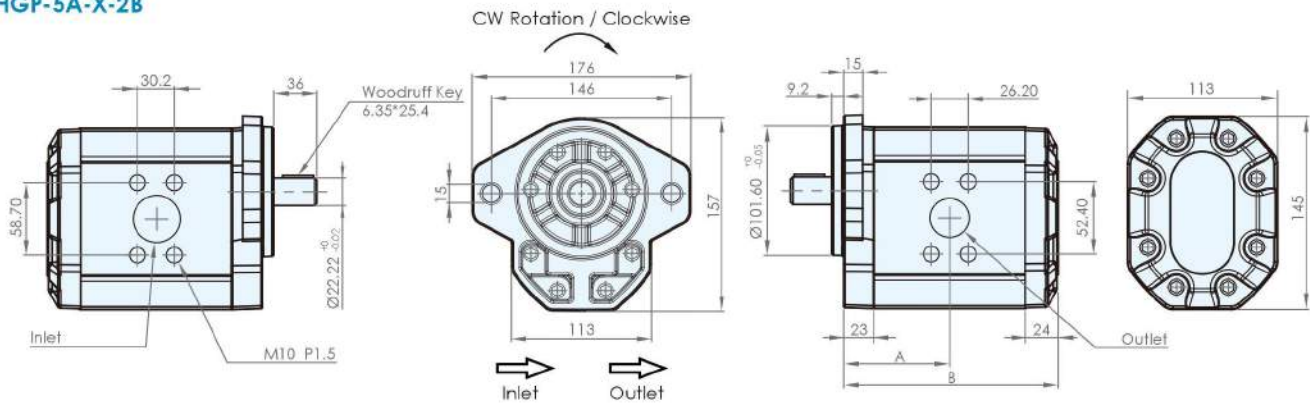
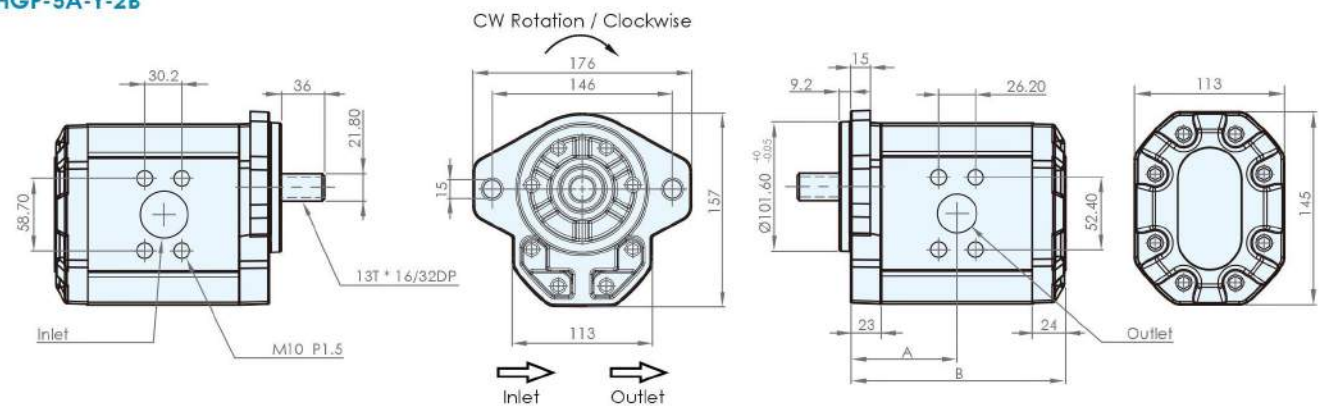
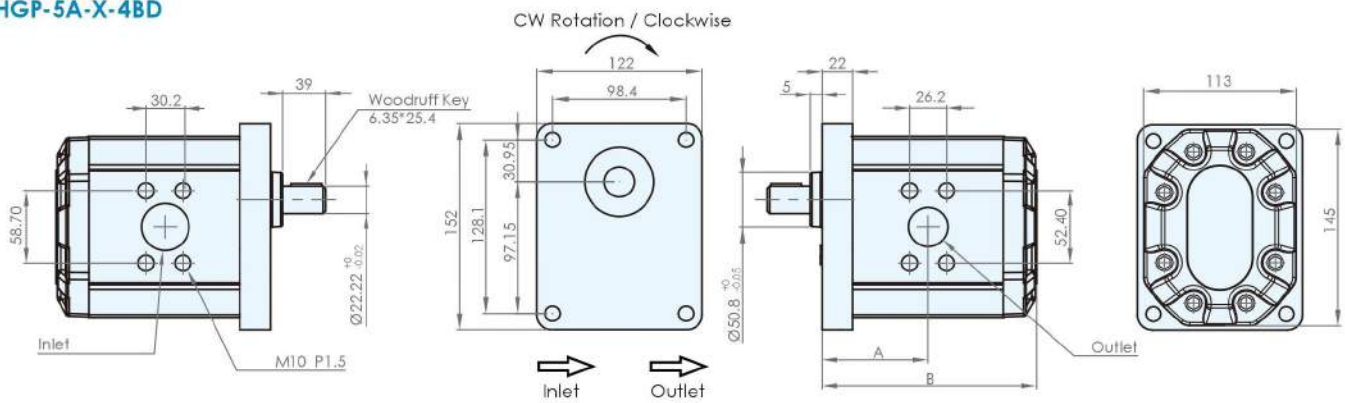
1	Model Name	HGP-5A	
2	Mounting	F	flange type
		L	foot type
3	Delivery Capacity	22, 26, 33, 44, 48, 55, 63, 75, 80, 90	
4	Rotation Direction	R	clockwise
		L	counter - clockwise
		M	hydraulic motor *
5	Shaft Type *	X: straight shaft Y: spline shaft Z: taper shaft	
6	Flange Mounting Type	2B	SAE 2-bolt
		4BD	DIN 4-bolt
7	Inlet and Outlet *	F: flange type(F1~F7) G: G, BSP, PF(G1~G4) P: PT(P1~P2) U: UNF(U1~U6)	

* The dimension of shafts and inlet & outlet sizes please refer to Page 33.

* Please contact the local distributors to obtain the specifications of hydraulic motors.

SPECIFICATIONS

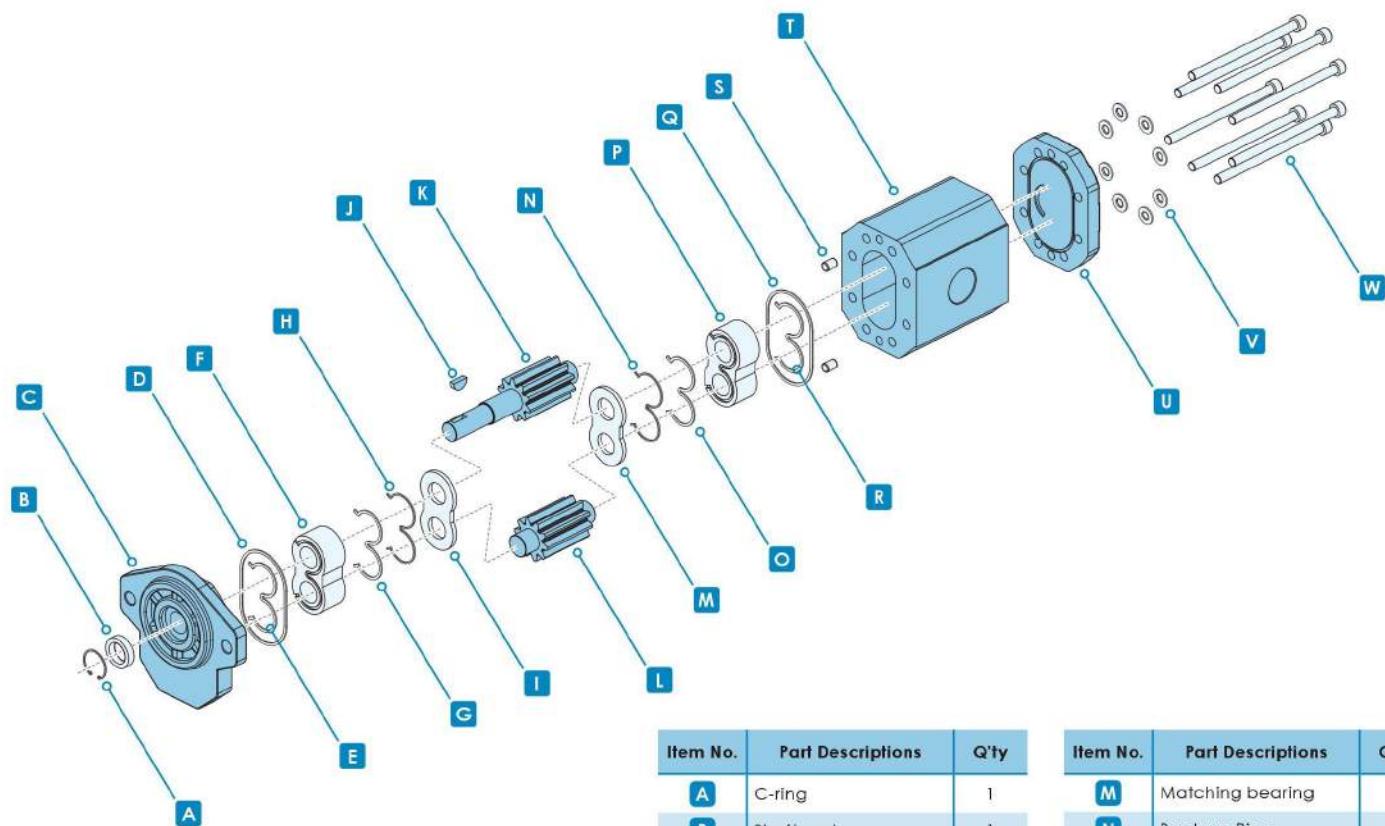
Model	Accurate Displacement Capacity (cc/rev)	Operational Pressure (kgf/cm ²)	Max. Pressure (kgf/cm ²)	Speed (r.p.m.)		Weight (kg)
				Loaded	Unloaded	
HGP-5A-22	22	250	300	3000	700	5.61
HGP-5A-26	26	250	300	3000	700	5.69
HGP-5A-33	33	250	300	3000	700	5.83
HGP-5A-44	44	210	250	3000	700	6.05
HGP-5A-48	48	210	250	3000	700	6.13
HGP-5A-55	55	210	250	3000	700	6.27
HGP-5A-63	63	190	240	3000	600	6.43
HGP-5A-75	75	180	210	3000	600	6.67
HGP-5A-80	80	170	200	3000	600	6.77
HGP-5A-90	90	160	190	2500	600	6.97

DIMENSIONS (unit : mm)**HGP-5A-X-2B****HGP-5A-Y-2B****HGP-5A-X-4BD**

Model	A	B
HGP-5A-2B-22	56.5	117
HGP-5A-2B-26	58.5	121
HGP-5A-2B-33	61	126
HGP-5A-2B-44	65	134
HGP-5A-2B-48	66.5	137
HGP-5A-2B-55	69	142
HGP-5A-2B-63	71	146
HGP-5A-2B-75	76	156
HGP-5A-2B-80	78	160
HGP-5A-2B-90	81.5	167

Model	A	B
HGP-5A-4BD-22	55.5	116
HGP-5A-4BD-26	57.5	120
HGP-5A-4BD-33	60	125
HGP-5A-4BD-44	64	133
HGP-5A-4BD-48	65.5	136
HGP-5A-4BD-55	68	141
HGP-5A-4BD-63	70	145
HGP-5A-4BD-75	75	155
HGP-5A-4BD-80	77	159
HGP-5A-4BD-90	80.5	166

DECOMPOSITION CHARTS

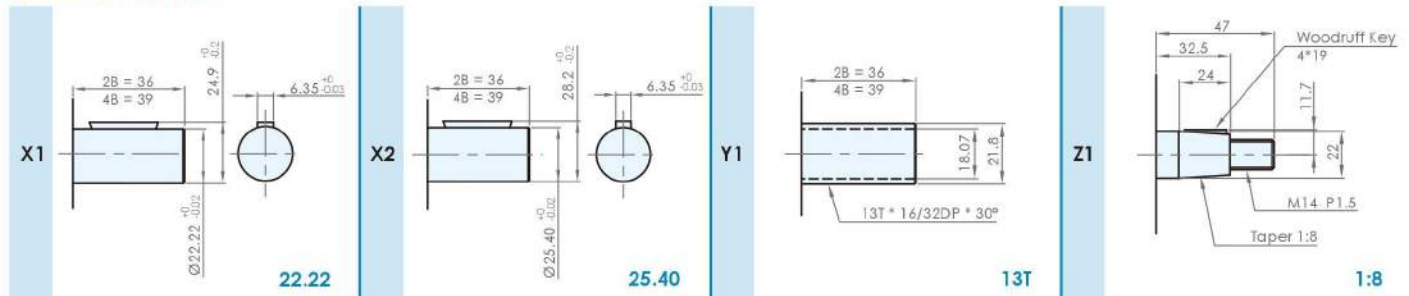


Item No.	Part Descriptions	Q'ty
A	C-ring	1
B	Shaft seal	1
C	Front cover	1
D	O-ring	1
E	Back-up ring	1
F	Matching bearing	1
G	Packing ring	1
H	Back-up Ring	1
I	Matching bearing	1
J	Woodruff key	1
K	Drive gear	1
L	Drive gear	1

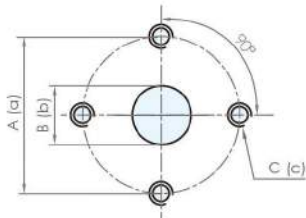
Item No.	Part Descriptions	Q'ty
M	Matching bearing	1
N	Back-up Ring	1
O	Packing ring	1
P	Matching bearing	1
Q	O-ring	1
R	Back-up ring	1
S	Lock pin	2
T	Housing	1
U	Rear cover	1
V	Bolt washer	8
W	Bolt	8

ADDITIONAL DIMENSION (unit : mm)

Dimension of Shaft

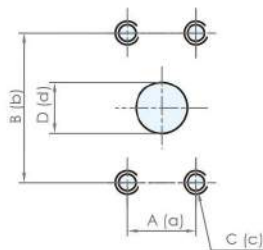


Inlet and Outlet Size



Flange Type

Code	Inlet			Outlet		
	A	B	C	a	b	c
F1	40	22	M8	40	22	M8
F2	51	27	M10	51	27	M10
F3	62	34	M10	62	34	M10

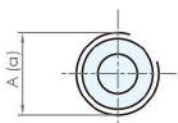


Flange Type

Code	Inlet				Outlet			
	A	B	C	D	a	b	c	d
F4	22.2	47.6	M10	18.5	22.2	47.6	M10	18.5
F5	26.2	52.4	M10	24	26.2	52.4	M10	24
F6	30.2	58.7	M10	30	30.2	58.7	M10	30
F7	35.7	69.8	M10	39	35.7	69.8	M10	39

* UNC : Unified Coarse Thread

G, BSP, PF

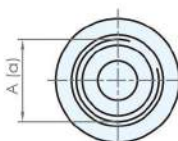


Code	Inlet	Outlet
	A	a
G1	G 3/4"	G 3/4"
G2	G 1"	G 1"
G3	G 1 1/4"	G 1 1/4"
G4	G 1 1/2"	G 1 1/2"

PT

Code	Inlet	Outlet	Applicable Model
	A	a	
P1	1" PT	3/4" PT	5A-22 ~ 33
P2	1 1/4" PT	1" PT	5A-44 ~ 90

UNF



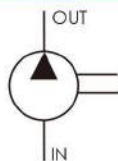
Code	Inlet	Outlet
	A	a
U1	1 1/16"-12UNF	1 1/16"-12UNF
U2	1 5/16"-12UNF	1 5/16"-12UNF
U3	1 5/8"-12UNF	1 5/8"-12UNF
U4	1 7/8"-13UNF	1 7/8"-13UNF
U5	1 1/16"-14UNF	1 1/16"-14UNF
U6	1 5/16"-14UNF	1 5/16"-14UNF

HGP-5AI

- Displacement : 22~90 cc/rev
- Max. Pressure : 330 kgf/cm²
(4620psi)
- Flange : SAE 2-bolt, DIN 4-bolt



SCHEMATIC SYMBOL



ORDER CODES

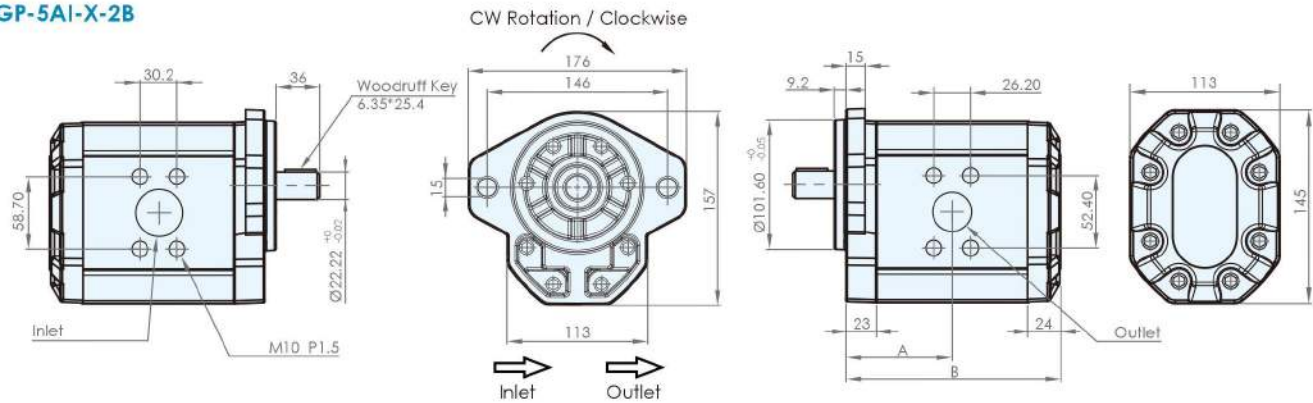
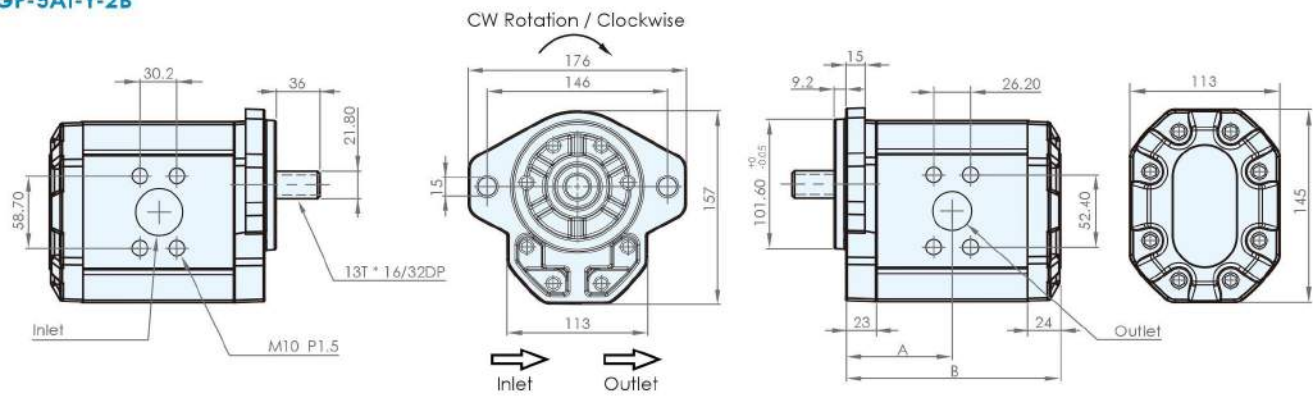
HGP-5AI	-	F	-	63	-	R	-	Z1	-	2B	-	P1
1		2		3		4		5		6		7

1	Model Name	HGP-5AI	
2	Mounting	F	flange type
		L	foot type
3	Delivery Capacity	22, 26, 33, 44, 48, 55, 63, 75, 80, 90	
4	Rotation Direction	R	clockwise
		L	counter - clockwise
5	Shaft Type *	X: straight shaft Y: spline shaft Z: taper shaft	
6	Flange Mounting Type	2B	SAE 2-bolt
		4BD	DIN 4-bolt
7	Inlet and Outlet *	F: flange type(F1~F8) G: G, BSP, PF(G1~G4) P: PT(P1~P2) U: UNF(U1~U6)	

*The dimension of shafts and inlet & outlet sizes please refer to Page 33.

SPECIFICATIONS

Model	Accurate Displacement Capacity (cc/rev)	Operational Pressure (kgf/cm ²)	Max. Pressure (kgf/cm ²)	Speed (r.p.m.)		Weight (kg)
				Loaded	Unloaded	
HGP-5AI-22	22	280	330	3000	700	8.96
HGP-5AI-26	26	280	330	3000	700	9.04
HGP-5AI-33	33	280	330	3000	700	9.18
HGP-5AI-44	44	240	290	3000	700	9.40
HGP-5AI-48	48	240	290	3000	700	9.48
HGP-5AI-55	55	210	255	3000	700	9.62
HGP-5AI-63	63	210	240	3000	600	9.78
HGP-5AI-75	75	190	210	3000	600	10.02
HGP-5AI-80	80	180	210	3000	600	10.12
HGP-5AI-90	90	170	190	2500	600	10.32

DIMENSIONS (unit : mm)**HGP-5AI-X-2B****HGP-5AI-Y-2B**

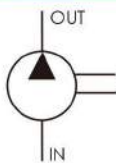
Model	A	B
HGP-5AI-2B-22	56.5	117
HGP-5AI-2B-26	58.5	121
HGP-5AI-2B-33	61	126
HGP-5AI-2B-44	65	134
HGP-5AI-2B-48	66.5	137
HGP-5AI-2B-55	69	142
HGP-5AI-2B-63	71	146
HGP-5AI-2B-75	76	156
HGP-5AI-2B-80	78	160
HGP-5AI-2B-90	81.5	167

HGP-1AU

- Displacement : 0.5~7.8 cc/rev
- Max. Pressure : 250 kgf/cm²
(3500psi)



SCHEMATIC SYMBOL



ORDER CODES

HGP-1AU - **F** - **08** - **L** - **W**

1
2
3
4
5

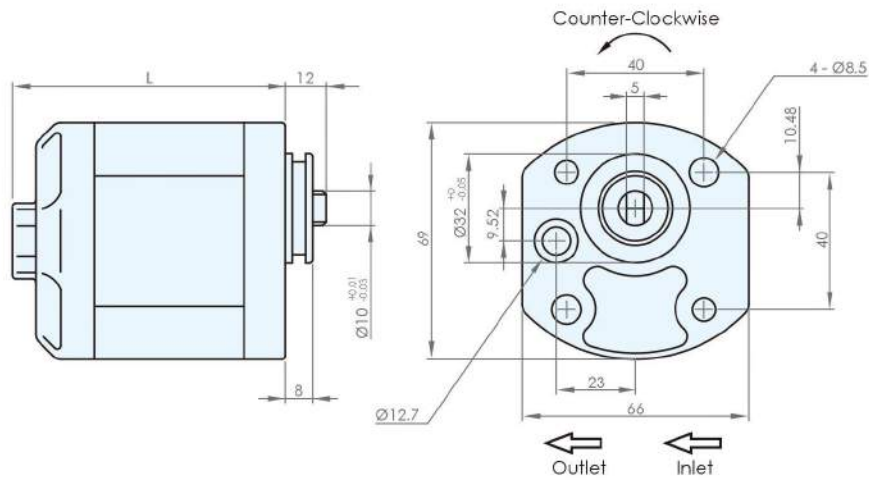
1	Model Name	HGP-1AU	
2	Mounting	F	flange type
3	Delivery Capacity	05, 08, 1, 2, 26, 3, 4, 5, 6, 8	
4	Rotation Direction	L	counter - clockwise
5	Shaft Type	W	tang shaft

SPECIFICATIONS

Model	Accurate Displacement Capacity (cc/rev)	Operational Pressure (kgf/cm ²)	Max. Pressure (kgf/cm ²)	Speed (r.p.m.)			Weight (kg)
				Rate	Max.	Min.	
HGP-1AU-05	0.5	210	250	1800	4500	1000	0.6
HGP-1AU-08	0.8	210	250	1800	4500	1000	0.65
HGP-1AU-1	1	210	250	1800	4500	1000	0.7
HGP-1AU-2	2	210	250	1800	4500	600	0.75
HGP-1AU-26	2.6	210	250	1800	4500	600	0.85
HGP-1AU-3	3	210	250	1800	4500	600	0.86
HGP-1AU-4	4	210	250	1800	4000	600	0.88
HGP-1AU-5	5	210	250	1800	3200	600	0.9
HGP-1AU-6	6	210	250	1800	3200	600	1.0
HGP-1AU-8	7.8	170	210	1800	3200	600	1.1

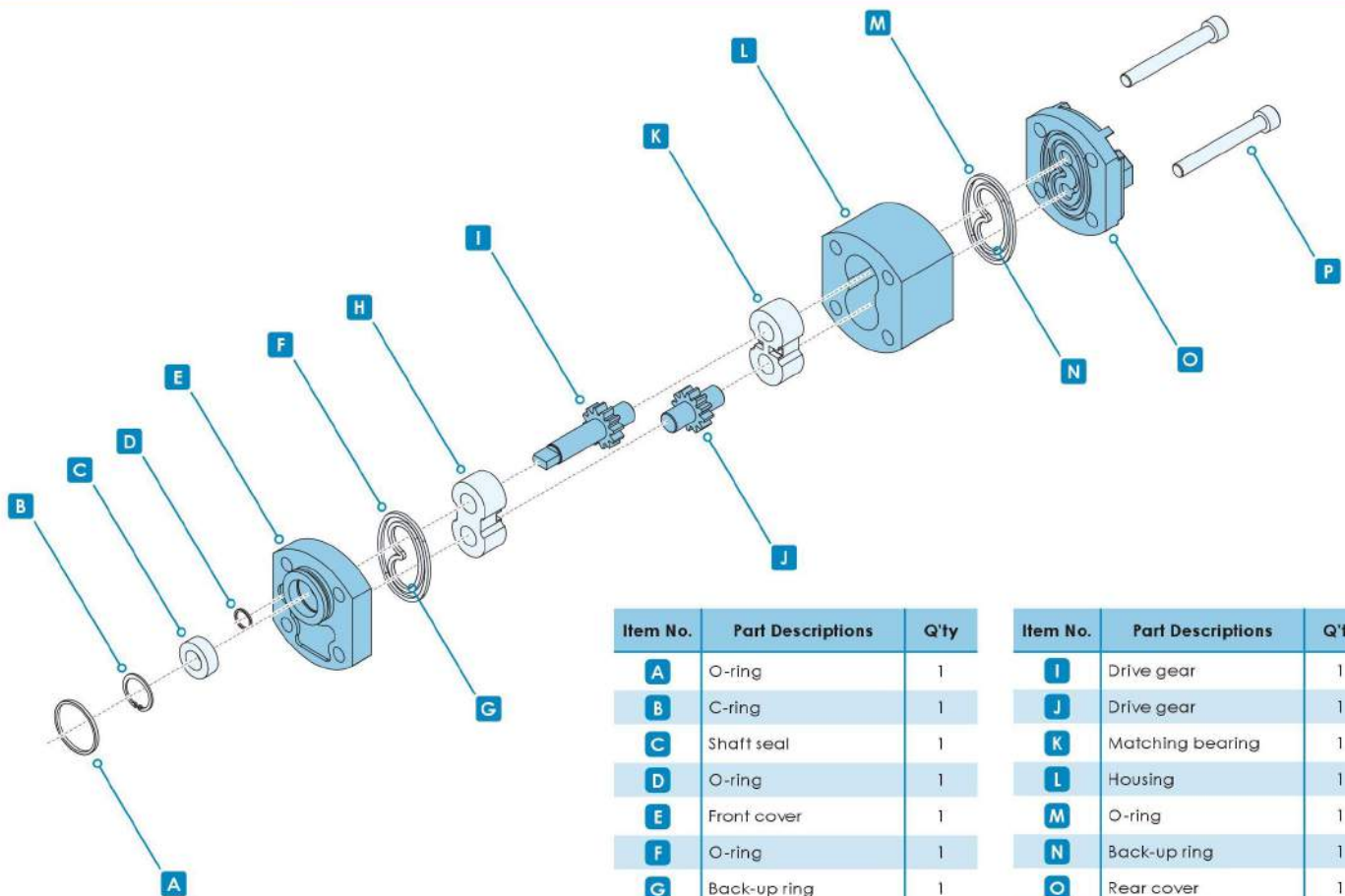
* HGP-1AU-05 and HGP-1AU-26 do not belong to regular products. Customized service can be provided.

DIMENSIONS (unit : mm)



Model	L
HGP-1AU-05	75
HGP-1AU-08	76
HGP-1AU-1	78
HGP-1AU-2	80.6
HGP-1AU-26	83
HGP-1AU-3	86
HGP-1AU-4	88
HGP-1AU-5	92
HGP-1AU-6	96
HGP-1AU-8	102

DECOMPOSITION CHARTS



Item No.	Part Descriptions	Q'ty
A	O-ring	1
B	C-ring	1
C	Shaft seal	1
D	O-ring	1
E	Front cover	1
F	O-ring	1
G	Back-up ring	1
H	Matching bearing	1

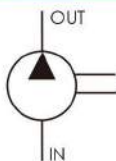
Item No.	Part Descriptions	Q'ty
I	Drive gear	1
J	Drive gear	1
K	Matching bearing	1
L	Housing	1
M	O-ring	1
N	Back-up ring	1
O	Rear cover	1
P	Bolt	2

HGP-1.5A

- Displacement : 0.8~8 cc/rev
- Max. Pressure : 350 kgf/cm²
(4900psi)



SCHEMATIC SYMBOL



ORDER CODES

HGP-1.5A - **F** - **2** - **L** - **Y**

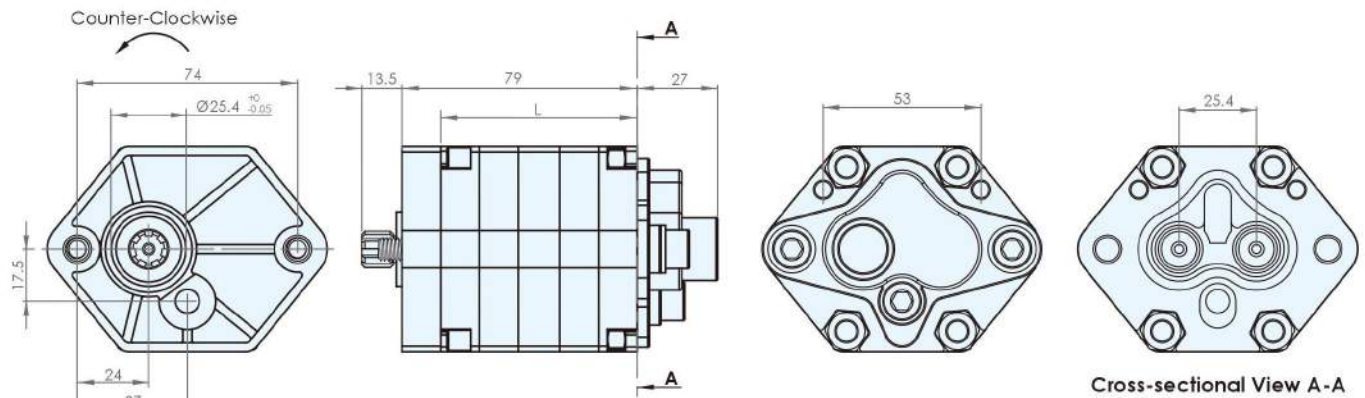
1
2
3
4
5

1	Model Name	HGP-1.5A	
2	Mounting	F	flange type
3	Delivery Capacity	08, 1, 12, 16, 2, 25, 3, 4, 5, 65, 8	
4	Rotation Direction	L	counter - clockwise
5	Shaft Type	Y	spline shaft

SPECIFICATIONS

Model	Accurate Displacement Capacity (cc/rev)	Operational Pressure (kgf/cm ²)	Max. Pressure (kgf/cm ²)	Speed (r.p.m.)			Weight (kg)
				Rate	Max.	Min.	
HGP-1.5A-08	0.8	300	350	1800	5000	1000	0.89
HGP-1.5A-1	1	300	350	1800	5000	800	0.91
HGP-1.5A-12	1.2	300	350	1800	5000	800	0.92
HGP-1.5A-16	1.6	300	350	1800	5000	800	0.93
HGP-1.5A-2	2	300	350	1800	4000	800	0.94
HGP-1.5A-25	2.5	300	350	1800	4000	800	0.95
HGP-1.5A-3	3.1	300	350	1800	4000	700	0.97
HGP-1.5A-4	4	300	350	1800	4000	600	1.0
HGP-1.5A-5	5	250	300	1800	4000	500	1.04
HGP-1.5A-65	6.3	250	300	1800	3200	500	1.14
HGP-1.5A-8	8	210	250	1800	2400	500	1.17

DIMENSIONS (unit : mm)

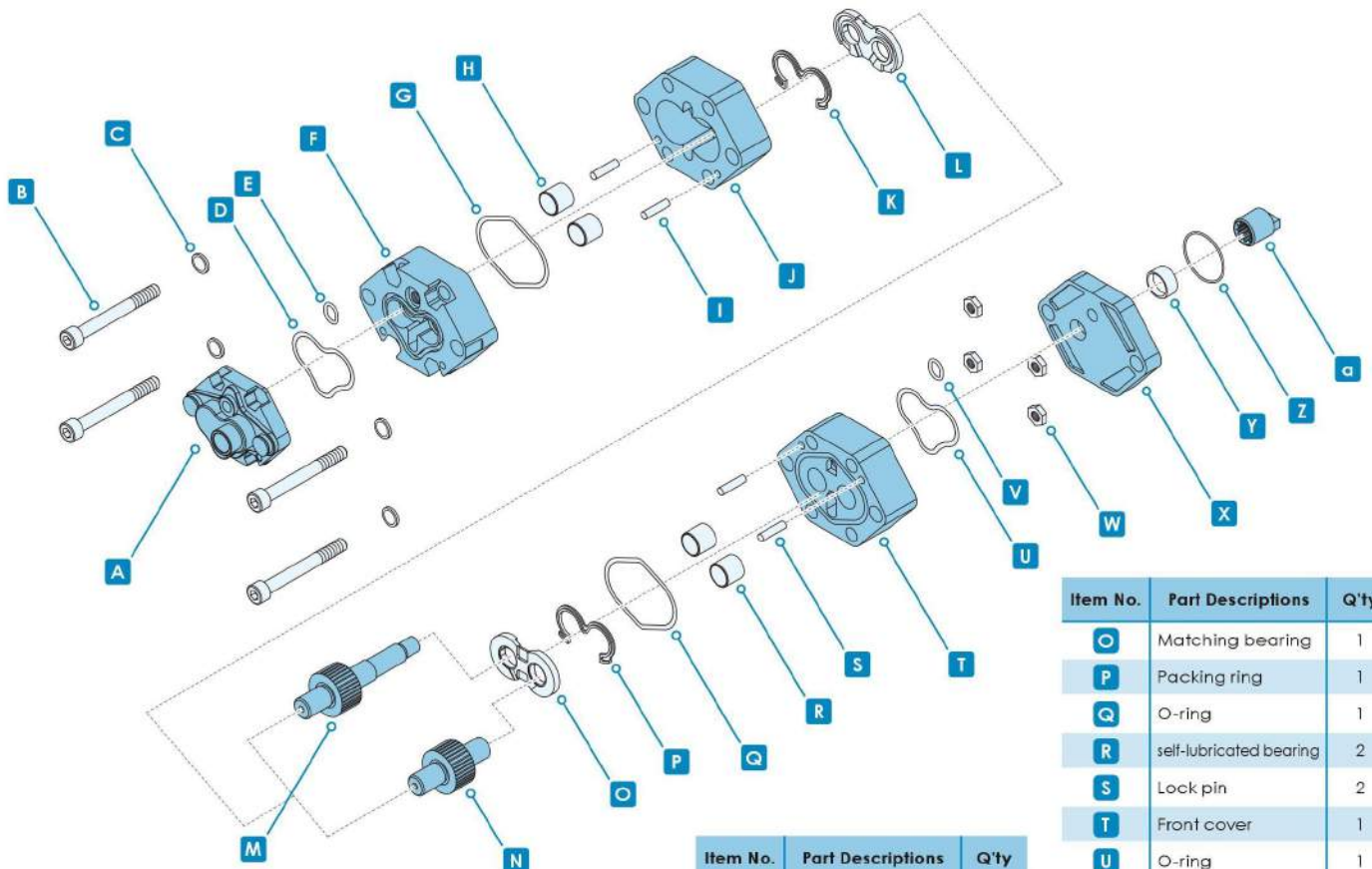


Model	L
HGP-1.5A-08	64.6
HGP-1.5A-1	65.1
HGP-1.5A-12	65.6
HGP-1.5A-16	66.6

Model	L
HGP-1.5A-2	67.6
HGP-1.5A-25	68.6
HGP-1.5A-3	70.1
HGP-1.5A-4	72.6

Model	L
HGP-1.5A-5	75.6
HGP-1.5A-65	79.6
HGP-1.5A-8	82.6

DECOMPOSITION CHARTS



Item No.	Part Descriptions	Q'ty
A	Rear cover	1
B	Bolt	4
C	Bolt washer	4
D	O-ring	1

Item No.	Part Descriptions	Q'ty
E	O-ring	1
F	Rear cover	1
G	O-ring	1
H	self-lubricated bearing	2

Item No.	Part Descriptions	Q'ty
I	Lock pin	2
J	Housing	1
K	Packing ring	1
L	Matching bearing	1
M	Drive gear	1
N	Drive gear	1

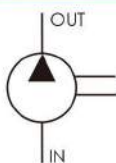
Item No.	Part Descriptions	Q'ty
O	Matching bearing	1
P	Packing ring	1
Q	O-ring	1
R	self-lubricated bearing	2
S	Lock pin	2
T	Front cover	1
U	O-ring	1
V	O-ring	1
W	Nut	4
X	Front cover	1
Y	Shaft seal	1
Z	O-ring	1
a	Couplings	1

HGP-3.5AF11R

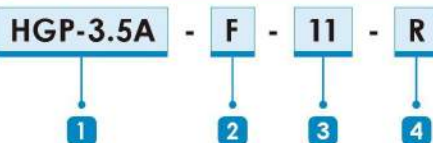
- Displacement : 11 cc/rev
- Max. Pressure : 280 kgf/cm²
(3920psi)



SCHEMATIC SYMBOL



ORDER CODES

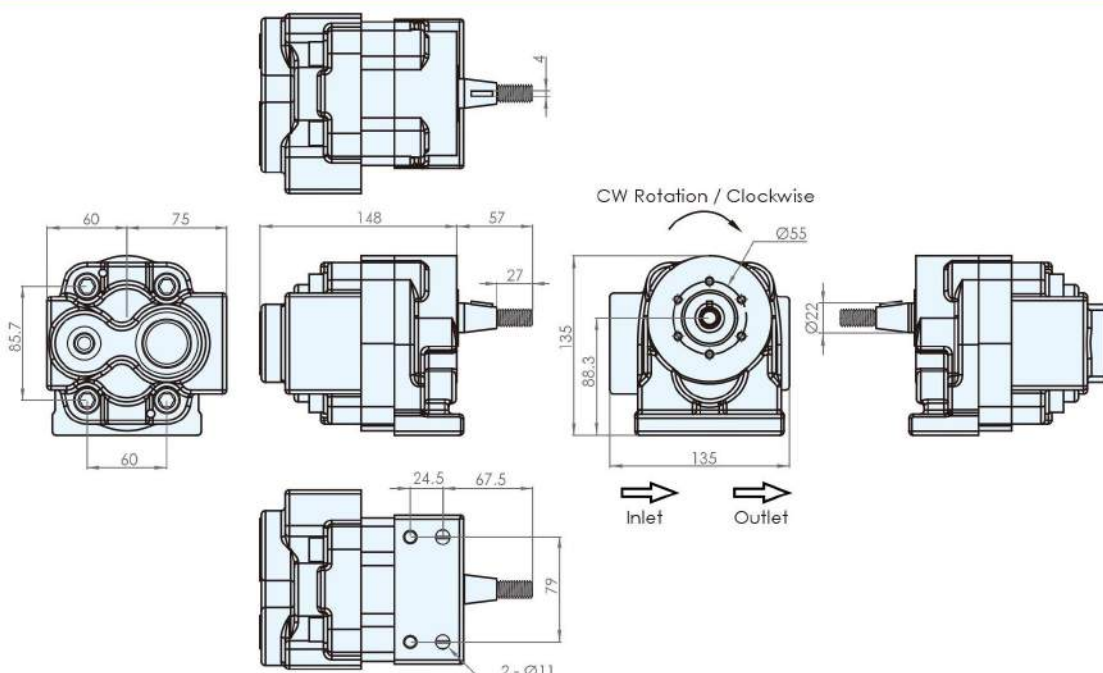


1	Model Name	HGP-3.5A	
2	Mounting	F	flange type
3	Delivery Capacity	11	
4	Rotation Direction	R	clockwise

SPECIFICATIONS

Model	Accurate Displacement Capacity (cc/rev)	Operational Pressure (kgf/cm ²)	Max. Pressure (kgf/cm ²)	Max.Speed (r.p.m.)	Weight (kg)
HGP-3.5A-F11R	11	240	280	3000	16

DIMENSIONS (unit : mm)





HGP-3.5AF25R

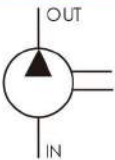
► Displacement : 25 cc/rev

ORDER CODES

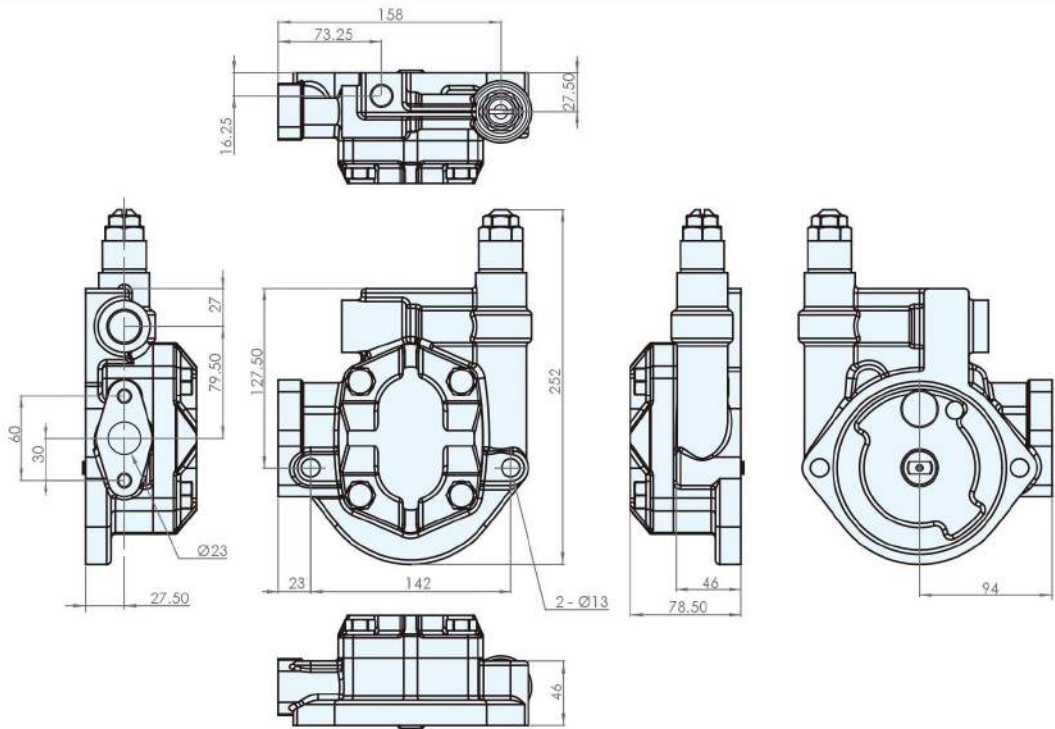
HGP-3.5A	-	F	-	25	-	R
1		2		3		4

1	Model Name	HGP-3.5A	
2	Mounting	F	flange type
3	Delivery Capacity	25	
4	Rotation Direction	R	clockwise

SCHEMATIC SYMBOL



DIMENSIONS (unit : mm)



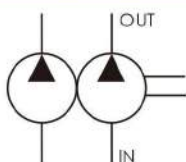
* Please contact the local distributors to obtain the further information.

HGP-11A

- Displacement : 0.5~8 cc/rev (single)
- Max. Pressure : 250 kgf/cm²
(3500psi)
- Flange : SAE 2-bolt, DIN 4-bolt,
European 4-bolt



SCHEMATIC SYMBOL



ORDER CODES

HGP-11A - **F** - **2** **08** - **R** - **X2** - **4BDB** - **P1**

1
2
3
3
4
5
6
7

1	Model Name	HGP-11A	
2	Mounting	F	flange type
		L	foot type
3	Delivery Capacity	05, 08, 1, 2, 26, 3, 4, 5, 6, 8	
4	Rotation Direction	R	clockwise
		L	counter - clockwise
5	Shaft Type *	X: straight shaft Y: spline shaft Z: taper shaft	
6	Flange Mounting Type	2B	SAE 2-bolt
		4BDA	DIN 4-bolt (Type A)
		4BDB	DIN 4-bolt (Type B)
		4BE	European 4-bolt
7	Inlet and Outlet *	F: flange type(F1~F2) P: PT(P1~P2)	G: G, BSP, PF(G1~G2) U: UNF(U1~U2)

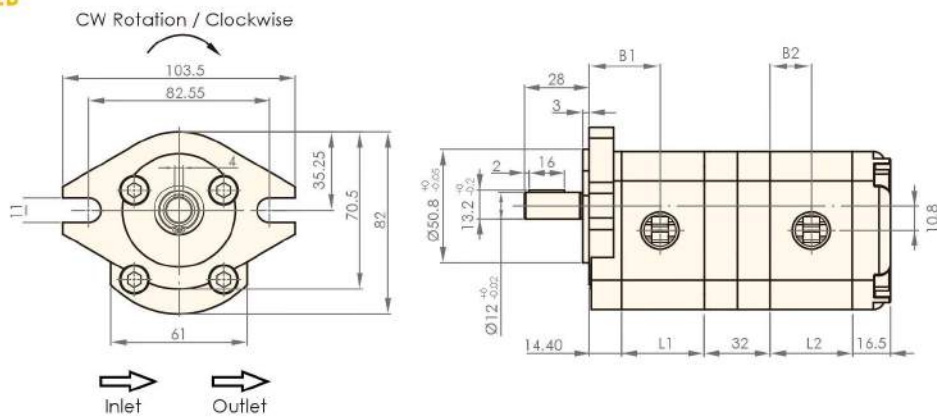
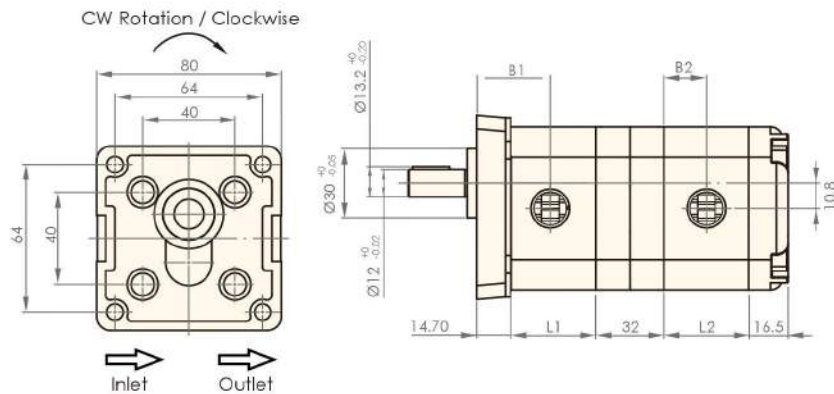
* The dimension of shafts and inlet & outlet sizes please refer to Page 11.

SPECIFICATIONS

Model	Accurate Displacement Capacity (cc/rev)	Operational Pressure (kgf/cm ²)	Max. Pressure (kgf/cm ²)	Speed (r.p.m.)			Weight (kg)
				Rate	Max.	Min.	
HGP-11A-0505	0.5+0.5	210	250	1800	4500	1000	2.61
HGP-11A-0808	0.8+0.8	210	250	1800	4500	1000	2.71
HGP-11A-11	1+1	210	250	1800	4500	1000	2.81
HGP-11A-22	2+2	210	250	1800	4500	600	2.91
HGP-11A-2626	2.6+2.6	210	250	1800	4500	600	3.11
HGP-11A-33	3+3	210	250	1800	4500	600	3.13
HGP-11A-44	4+4	210	250	1800	4000	600	3.17
HGP-11A-55	5+5	210	250	1800	3200	600	3.21
HGP-11A-66	6+6	210	250	1800	3200	600	3.41
HGP-11A-88	8+8	170	210	1800	3200	600	3.61

* We provide many options to meet your displacement inquiries of tandem gear pumps, such as HGP-11A-63 (6+3 cc/rev).

* HGP-11A-05 and HGP-11A-26 do not belong to regular products. Customized service can be provided.

DIMENSIONS (unit : mm)**HGP-11A-2B****HGP-11A-4BD, 4BE**

Model	L1, L2	B1	B2
HGP-11A-05-2B	34	31.4	17
HGP-11A-08-2B	35	31.9	17.5
HGP-11A-1-2B	37	32.9	18.5
HGP-11A-2-2B	40	34.4	20
HGP-11A-26-2B	42	35.4	21
HGP-11A-3-2B	45	36.9	22.5
HGP-11A-4-2B	47	37.9	23.5
HGP-11A-5-2B	51	39.9	25.5
HGP-11A-6-2B	55	41.9	27.5
HGP-11A-8-2B	61	44.9	30.5

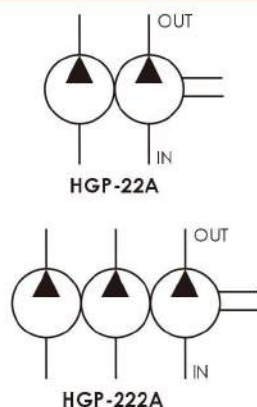
Model	L1, L2	B1	B2
HGP-11A-05-4BD, 4BE	34	31.7	17
HGP-11A-08-4BD, 4BE	35	32.2	17.5
HGP-11A-1-4BD, 4BE	37	33.2	18.5
HGP-11A-2-4BD, 4BE	40	34.7	20
HGP-11A-26-4BD, 4BE	42	35.7	21
HGP-11A-3-4BD, 4BE	45	37.2	22.5
HGP-11A-4-4BD, 4BE	47	38.2	23.5
HGP-11A-5-4BD, 4BE	51	40.2	25.5
HGP-11A-6-4BD, 4BE	55	42.2	27.5
HGP-11A-8-4BD, 4BE	61	45.2	30.5

HGP-22A

- Displacement : 2~12 cc/rev (single)
- Max. Pressure : 250 kgf/cm²
(3500psi)
- Flange : JIS 4-bolt



SCHEMATIC SYMBOL



ORDER CODES

HGP-22A - F - 3 2 - R - X2 - 4BJ - P2

1 2 3 3 4 5 6 7

1	Model Name	HGP-22A, HGP-222A	
2	Mounting	F	flange type
		L	foot type
3	Delivery Capacity	2, 3, 4, 5, 6, 8, 9, 11, 12	
4	Rotation Direction	R	clockwise
		L	counter - clockwise
5	Shaft Type *	W: tang shaft	X: straight shaft
		Y: spline shaft	Z: taper shaft
6	Flange Mounting Type	4BJ	JIS 4-bolt
7	Inlet and Outlet *	F: flange type(F1)	G: G, BSP, PF(G1~G2)
		P: PT(P1~P2)	

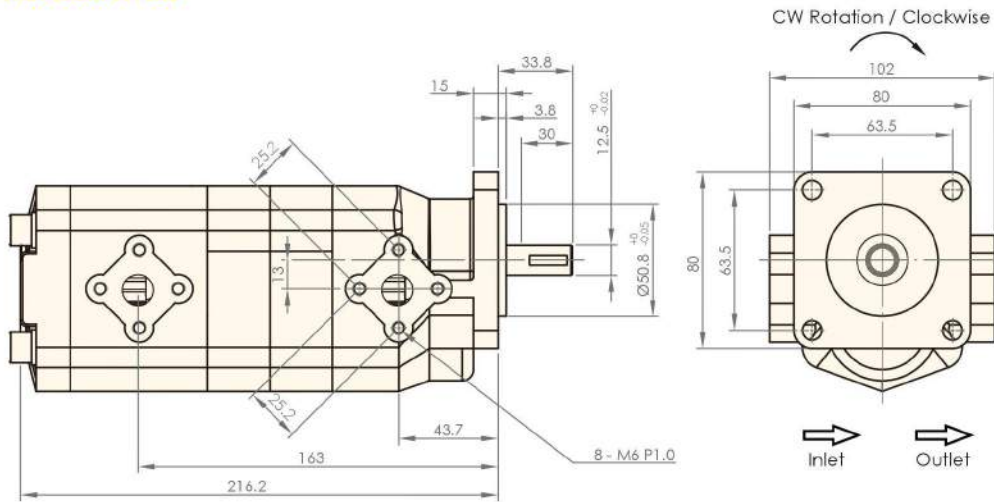
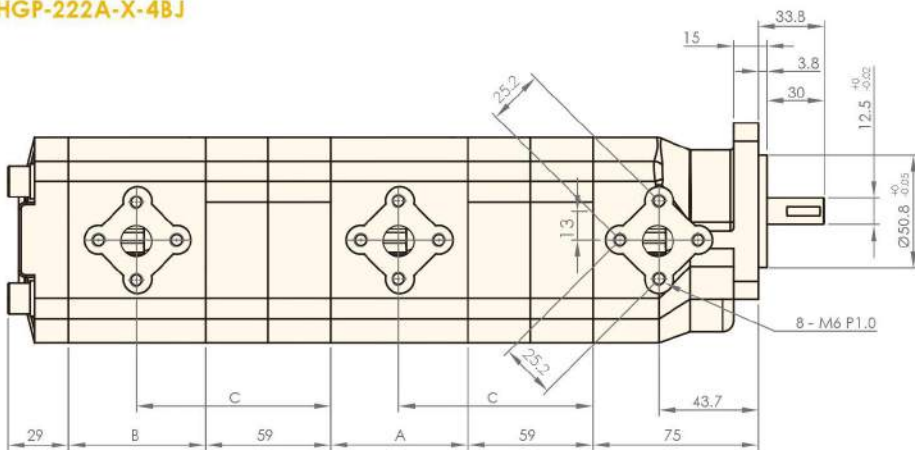
* The dimension of shafts and inlet & outlet sizes please refer to Page 15.

SPECIFICATIONS

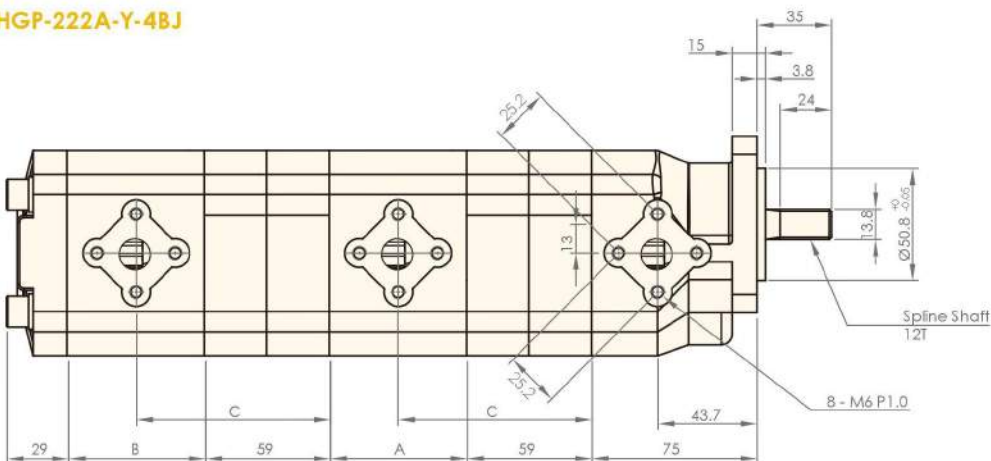
Model	Accurate Displacement Capacity (cc/rev)	Operational Pressure (kgf/cm ²)	Max. Pressure (kgf/cm ²)	Speed (r.p.m.)			Weight (kg)
				Rate	Max.	Min.	
HGP-22A-22	2+2	210	250	1800	4000	700	3.38
HGP-22A-33	3+3	210	250	1800	4000	700	3.40
HGP-22A-44	4+4	210	250	1800	4000	700	3.40
HGP-22A-55	5+5	210	250	1800	4000	700	3.42
HGP-22A-66	6+6	210	250	1800	3500	700	3.42
HGP-22A-88	8+8	210	250	1800	3000	600	3.48
HGP-22A-99	9+9	210	250	1800	2500	550	3.48
HGP-22A-1111	11+11	210	250	1800	2000	500	3.48
HGP-22A-1212	12+12	175	210	1800	2000	500	3.52

* We provide many options to meet your displacement inquiries of tandem gear pumps, such as HGP-22A-85 (8+5 cc/rev).

* HGP-22A-5 do not belong to regular products. Customized service can be provided.

DIMENSIONS (unit : mm)**HGP-22A-X-4BJ****HGP-222A-X-4BJ**

Model	A, B	C
HGP-222A-2	42.5	80.25
HGP-222A-3	45	81.5
HGP-222A-4	47	82.5
HGP-222A-5	49	83.5
HGP-222A-6	52	85
HGP-222A-8	54	86
HGP-222A-9	57	87.5
HGP-222A-11	57	87.5
HGP-222A-12	57	87.5

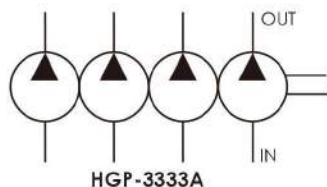
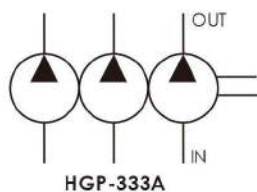
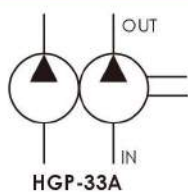
HGP-222A-Y-4BJ

HGP-33A

- Displacement : 2~35 cc/rev (single)
- Max. Pressure : 250 kgf/cm²
(3500psi)
- Flange : SAE 2-bolt, DIN 4-bolt,
European 4-bolt



SCHEMATIC SYMBOL



ORDER CODES

HGP-33A - **F** - **11** **8** - **R** - **X1** - **2B** - **P1**

1
2
3
3
4
5
6
7

1	Model Name	HGP-33A, HGP-333A, HGP-3333A	
2	Mounting	F	flange type
		L	foot type
3	Delivery Capacity	2, 3, 4, 6, 8, 11, 13, 14, 17, 19, 23, 25, 28, 30, 33, 35	
4	Rotation Direction	R	clockwise
		L	counter - clockwise
5	Shaft Type *	X: straight shaft Y: spline shaft Z: taper shaft	
6	Flange Mounting Type	2B	SAE 2-bolt
		4BD	DIN 4-bolt
		4BE	European 4-bolt
7	Inlet and Outlet *	F: flange type(F1~F6) G: G, BSP, PF(G1~G2) P: PT(P1~P2) U: UNF(U1~U2)	

* The dimension of shafts and inlet & outlet sizes please refer to Page 19.

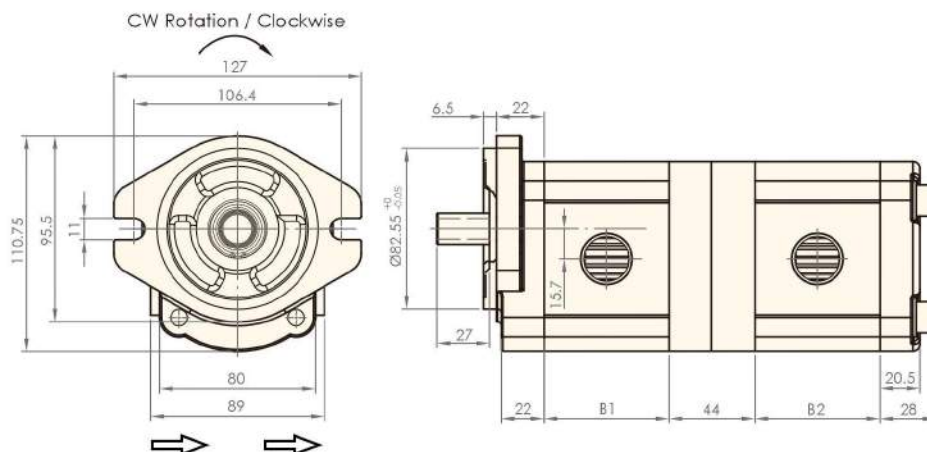
SPECIFICATIONS

Model	Accurate Displacement Capacity (cc/rev)	Operational Pressure (kgf/cm ²)	Max. Pressure (kgf/cm ²)	Speed (r.p.m.)			Weight (kg)
				Rate	Max.	Min.	
HGP-33A-22	2+2	210	250	1800	4000	700	3.42
HGP-33A-33	3+3	210	250	1800	4000	700	3.48
HGP-33A-44	4+4	210	250	1800	4000	700	4.38
HGP-33A-66	6+6	210	250	1800	4000	700	4.46
HGP-33A-88	8+8	210	250	1800	3500	700	4.58
HGP-33A-1111	11+11	210	250	1800	3000	600	5.20
HGP-33A-1313	13+13	210	250	1800	3000	600	5.40
HGP-33A-1414	14.3+14.3	210	250	1800	3000	500	5.52
HGP-33A-1717	16.5+16.5	210	250	1800	3000	500	5.74
HGP-33A-1919	19.2+19.2	210	250	1800	3000	500	5.98
HGP-33A-2323	23+23	210	250	1800	3000	500	6.38
HGP-33A-2525	25+25	175	210	1800	2800	500	6.48
HGP-33A-2828	28+28	175	210	1800	2500	500	6.70
HGP-33A-3030	30+30	175	210	1800	2500	500	6.90
HGP-33A-3333	33+33	140	175	1200	2500	500	7.20
HGP-33A-3535	35+35	125	140	1200	2500	500	7.42

* We provide many options to meet your displacement inquiries of tandem gear pumps, such as HGP-33A-3530 (35+30 cc/rev).

DIMENSIONS (unit : mm)

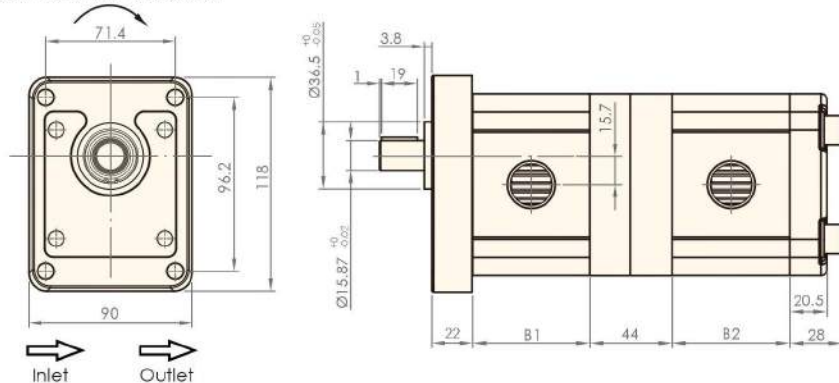
HGP-33A-2B



Model	B1, B2
HGP-33A-2	45.5
HGP-33A-3	47
HGP-33A-4	49
HGP-33A-6	52
HGP-33A-8	55
HGP-33A-11	60
HGP-33A-13	64
HGP-33A-14	66
HGP-33A-17	70
HGP-33A-19	74
HGP-33A-23	81
HGP-33A-25	84
HGP-33A-28	88
HGP-33A-30	92
HGP-33A-33	98
HGP-33A-35	102

DIMENSIONS (unit : mm)**HGP-33A-4BE**

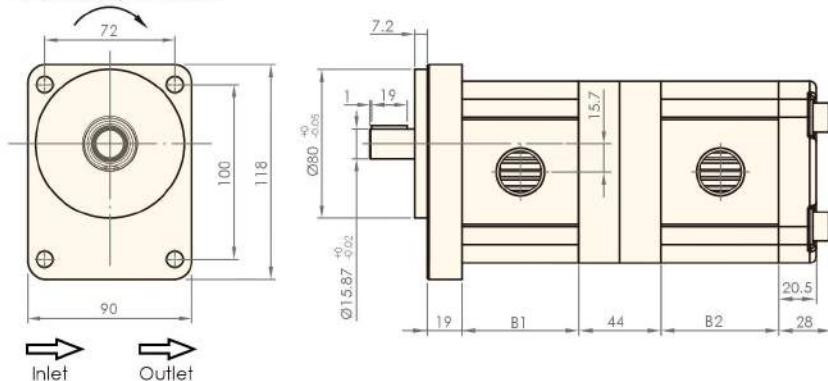
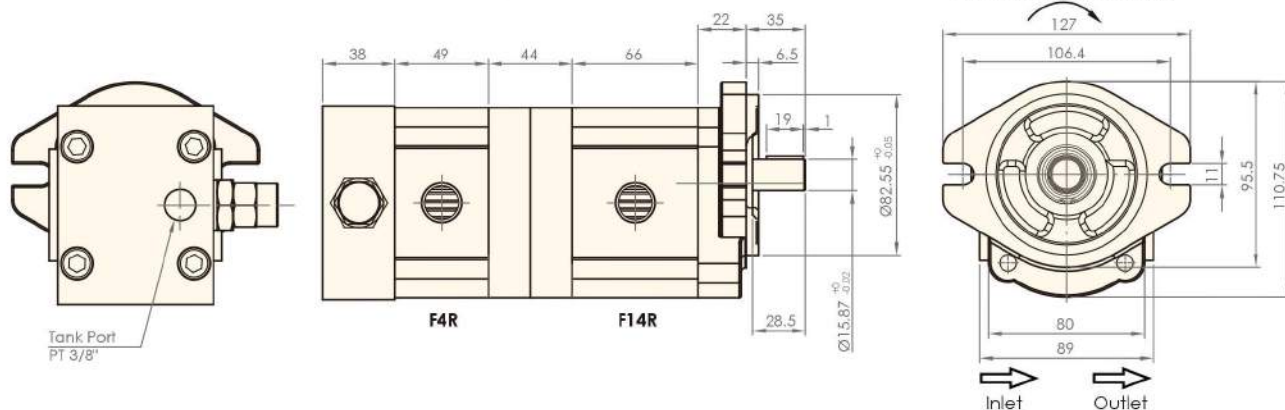
CW Rotation / Clockwise



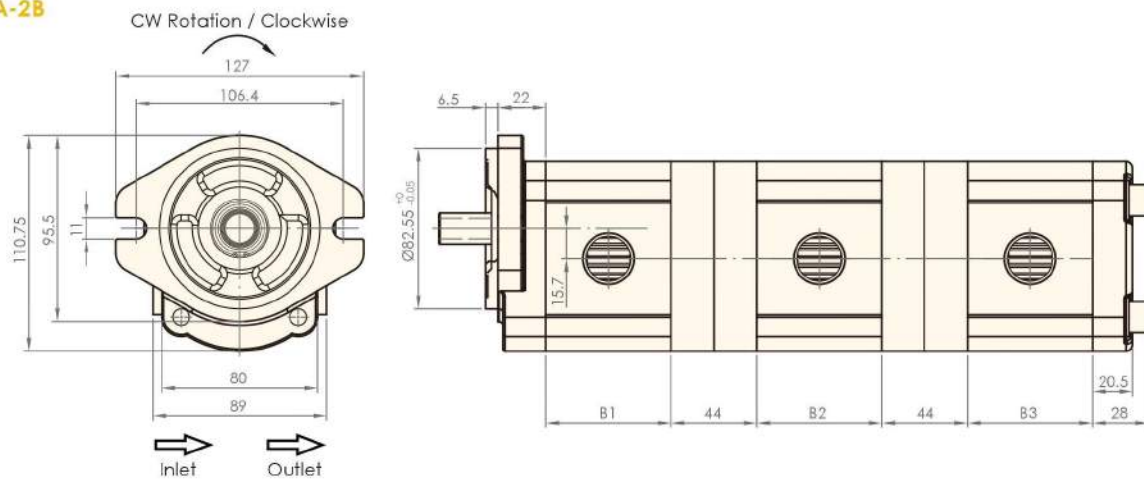
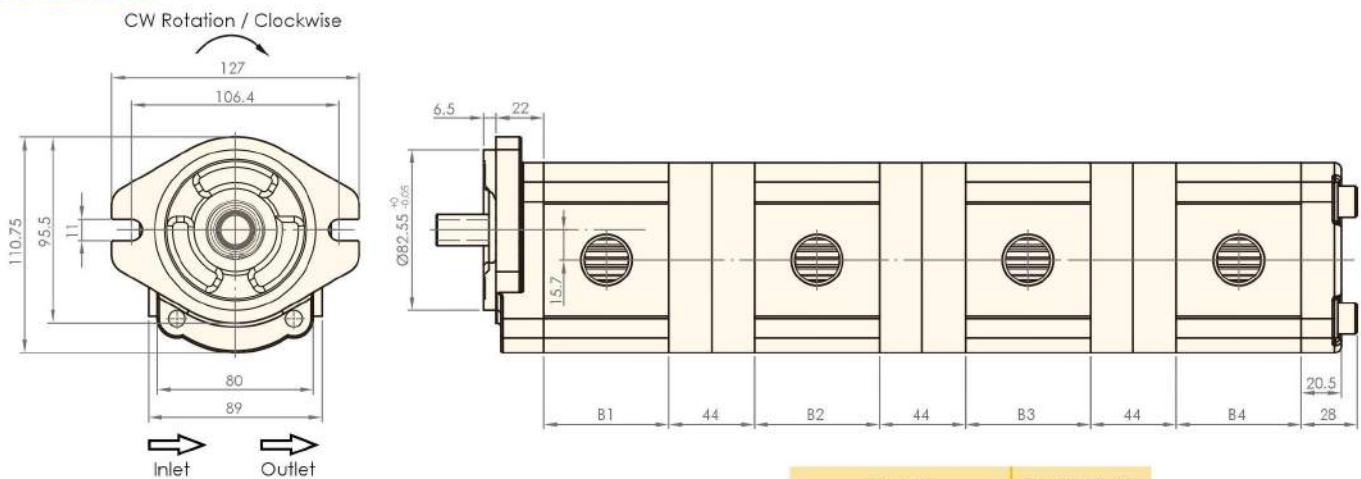
Model	B1, B2
HGP-33A-2	45.5
HGP-33A-3	47
HGP-33A-4	49
HGP-33A-6	52
HGP-33A-8	55
HGP-33A-11	60
HGP-33A-13	64
HGP-33A-14	66
HGP-33A-17	70
HGP-33A-19	74
HGP-33A-23	81
HGP-33A-25	84
HGP-33A-28	88
HGP-33A-30	92
HGP-33A-33	98
HGP-33A-35	102

HGP-33A-4BD

CW Rotation / Clockwise

**HGP-33A-F14+4R (with relief valve, customized)**

* If you need customized services, please contact the local distributors to obtain the further information.

DIMENSIONS (unit : mm)**HGP-333A-2B****HGP-3333A-2B**

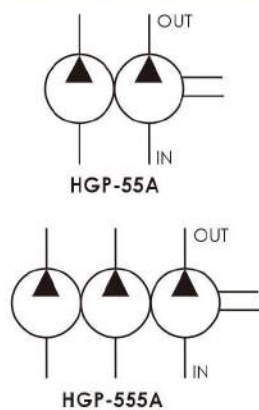
Model	B1, B2, B3, B4
HGP-333A, 3333A-2	45.5
HGP-333A, 3333A-3	47
HGP-333A, 3333A-4	49
HGP-333A, 3333A-6	52
HGP-333A, 3333A-8	55
HGP-333A, 3333A-11	60
HGP-333A, 3333A-13	64
HGP-333A, 3333A-14	66
HGP-333A, 3333A-17	70
HGP-333A, 3333A-19	74
HGP-333A, 3333A-23	81
HGP-333A, 3333A-25	84
HGP-333A, 3333A-28	88
HGP-333A, 3333A-30	92
HGP-333A, 3333A-33	98
HGP-333A, 3333A-35	102

HGP-55A

- Displacement : 22~90 cc/rev (single)
- Max. Pressure : 300 kgf/cm²
(4200psi)
- Flange : SAE 2-bolt, DIN 4-bolt



SCHEMATIC SYMBOL



ORDER CODES

HGP-55A - F - 63 48 - R - Z1 - 2B - P2

1 2 3 3 4 5 6 7

1	Model Name	HGP-55A, HGP-555A	
2	Mounting	F	flange type
		L	foot type
3	Delivery Capacity	22, 26, 33, 44, 48, 55, 63, 75, 80, 90	
4	Rotation Direction	R	clockwise
		L	counter - clockwise
5	Shaft Type	X: straight shaft Y: spline shaft Z: taper shaft	
6	Flange Mounting Type	2B	SAE 2-bolt
		4BD	DIN 4-bolt
7	Inlet and Outlet *	F: flange type(F1~F8) G: G, BSP, PF(G1~G4) P: PT(P1~P2) U: UNF(U1~U6)	

* The dimension of shafts and inlet & outlet sizes please refer to Page 33.

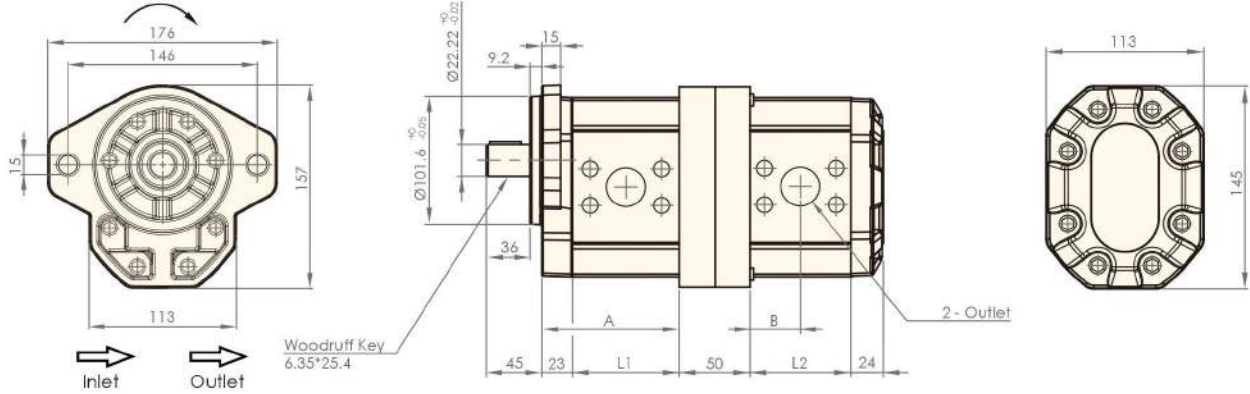
SPECIFICATIONS

Model	Accurate Displacement Capacity (cc/rev)	Operational Pressure (kgf/cm ²)	Max. Pressure (kgf/cm ²)	Speed (r.p.m.)		Weight (kg)
				Loaded	Unloaded	
HGP-55A-2222	22+22	250	300	3000	700	11.22
HGP-55A-2626	26+26	250	300	3000	700	11.38
HGP-55A-3333	33+33	250	300	3000	700	11.66
HGP-55A-4444	44+44	210	250	3000	700	12.10
HGP-55A-4848	48+48	210	250	3000	700	12.26
HGP-55A-5555	55+55	210	250	3000	700	12.54
HGP-55A-6363	63+63	210	250	3000	600	12.86
HGP-55A-7575	75+75	180	210	3000	600	13.34
HGP-55A-8080	80+80	170	200	3000	600	13.54
HGP-55A-9090	90+90	160	190	2500	600	13.94

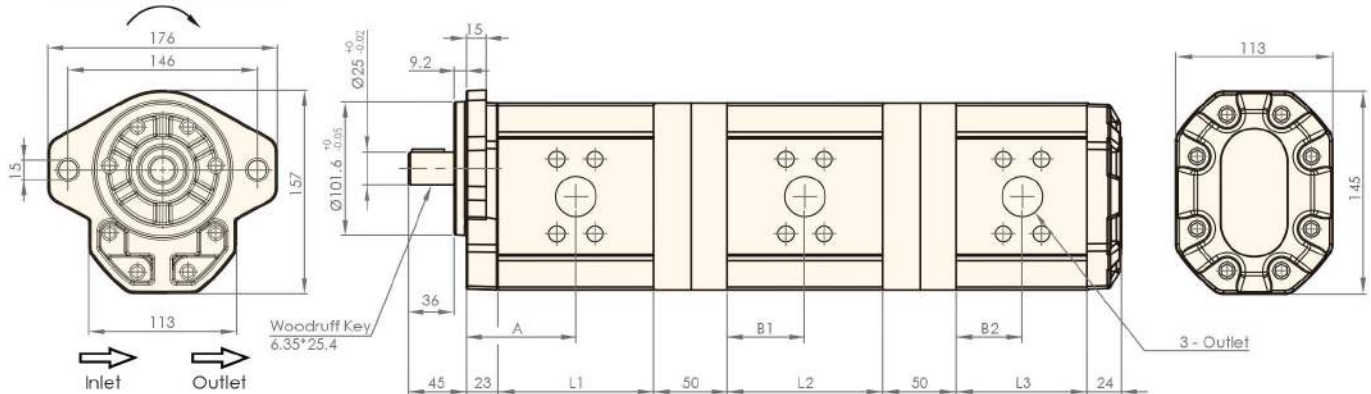
* We provide many options to meet your displacement inquiries of tandem gear pumps, such as HGP-55A-8063 (80+63 cc/rev).

DIMENSIONS (unit : mm)**HGP-55A-2B**

CW Rotation / Clockwise

**HGP-555A-2B**

CW Rotation / Clockwise

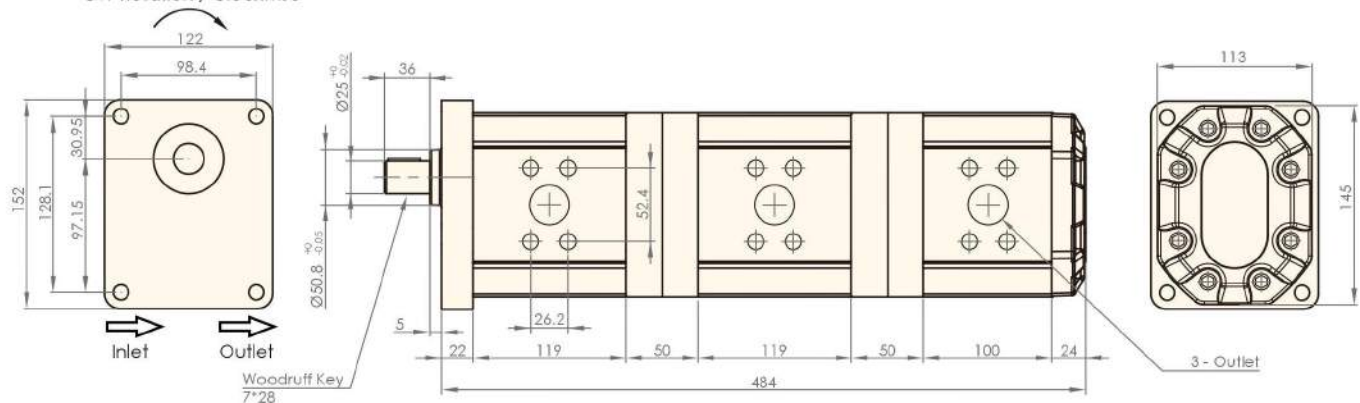


Model	L1, L2	A	B
HGP-55A-22	68	57	34
HGP-55A-26	71	58.5	35.5
HGP-55A-33	76	61	38
HGP-55A-44	84	65	42
HGP-55A-48	87	66.5	43.5
HGP-55A-55	92	69	46
HGP-55A-63	98	72	49
HGP-55A-75	106	76	53
HGP-55A-80	110	78	55
HGP-55A-90	117	81.5	58.5

Model	L1, L2, L3	A	B
HGP-555A-22	68	57	34
HGP-555A-26	71	58.5	35.5
HGP-555A-33	76	61	38
HGP-555A-44	84	65	42
HGP-555A-48	87	66.5	43.5
HGP-555A-55	92	69	46
HGP-555A-63	98	72	49
HGP-555A-75	106	76	53
HGP-555A-80	110	78	55
HGP-555A-90	117	81.5	58.5

HGP-555A-4B

CW Rotation / Clockwise



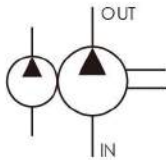
HGP-53A

► Max. Pressure : 300 kgf/cm²
(4200psi)

► Flange : SAE 2-bolt, DIN 4-bolt



SCHEMATIC SYMBOL



ORDER CODES

HGP-53A	-	F	-	75	-	R	-	X1	-	2B	-	F2	-	13	-	P1
1		2		3		4		5		6		7		8		9

1	Model Name	HGP-53A	
2	Mounting	F	flange type
		L	foot type
3	Delivery Capacity (5A)	22, 26, 33, 44, 48, 55, 63, 75, 80, 90	
4	Rotation Direction	R	clockwise
		L	counter - clockwise
5	Shaft Type *	X: straight shaft Y: spline shaft Z: taper shaft	
6	Flange Mounting Type	2B	SAE 2-bolt
		4BD	DIN 4-bolt
7	Inlet and Outlet * (5A)	F: flange type(F1~F8) P: PT(P1~P2)	G: G, BSP, PF(G1~G4) U: UNF(U1~U6)
8	Delivery Capacity (3A)	2, 3, 4, 6, 8, 11, 13, 14, 17, 19, 23, 25, 28, 30, 33, 35	
9	Inlet and Outlet * (3A)	F: flange type(F1~F6) P: PT(P1~P2)	G: G, BSP, PF(G1~G2) U: UNF(U1~U2)

* The dimension of shafts please refer to Page 33.

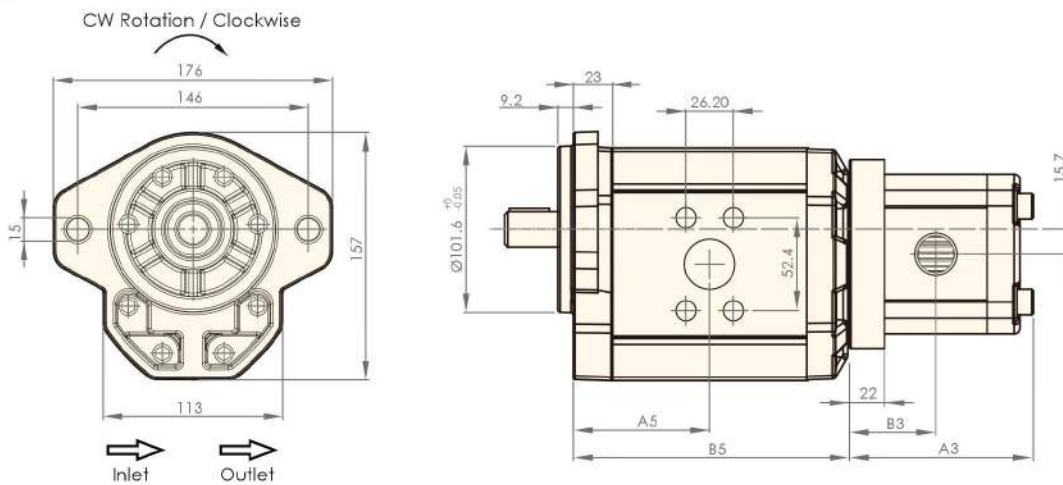
The dimension of inlet and outlet sizes please refer to Page 19 & 33.

SPECIFICATIONS

Model	Accurate Displacement Capacity (cc/rev)	Operational Pressure (kgf/cm ²)	Max. Pressure (kgf/cm ²)	Speed (r.p.m.)		Weight (kg)
				Loading	Unloading	
HGP-53A-22	22+3A	It depends on the 3A that meet your needs.	It depends on the 3A that meet your needs.	3000	700	7.6 ~ 10.5
HGP-53A-26	26+3A			3000	700	
HGP-53A-33	33+3A			3000	700	
HGP-53A-44	44+3A			3000	700	
HGP-53A-48	48+3A			3000	700	
HGP-53A-55	55+3A			3000	700	
HGP-53A-63	63+3A			3000	600	
HGP-53A-75	75+3A			3000	600	
HGP-53A-80	80+3A			3000	600	
HGP-53A-90	90+3A			2500	600	

DIMENSIONS (unit : mm)

HGP-53A-X-2B



Model	A5	B5
HGP-5A-2B-22	56.5	117
HGP-5A-2B-26	58.5	121
HGP-5A-2B-33	61	126
HGP-5A-2B-44	65	134
HGP-5A-2B-48	66.5	137
HGP-5A-2B-55	69	142
HGP-5A-2B-63	71	146
HGP-5A-2B-75	76	156
HGP-5A-2B-80	78	160
HGP-5A-2B-90	81.5	167

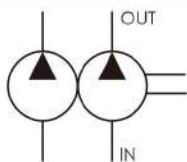
Model	A3	B3	Model	A3	B3
HGP-3A-2	97.4	46.7	HGP-3A-17	123	59
HGP-3A-3	99	47.5	HGP-3A-19	127	61
HGP-3A-4	101	48.5	HGP-3A-23	134	65
HGP-3A-6	105	50	HGP-3A-25	137	66
HGP-3A-8	109	51.5	HGP-3A-28	141	68
HGP-3A-11	113	54	HGP-3A-30	145	70
HGP-3A-13	117	56	HGP-3A-33	150	73
HGP-3A-14	119	57	HGP-3A-35	154	75

HGP-55AI

- Displacement : 22~90 cc/rev (single)
- Max. Pressure : 300 kgf/cm²
(4200psi)
- Flange : DIN 4-bolt



SCHEMATIC SYMBOL



ORDER CODES

HGP-55AI	-	F	-	80	55	-	R	-	Z1	-	4BD	-	P1
1		2		3	3		4		5		6		7

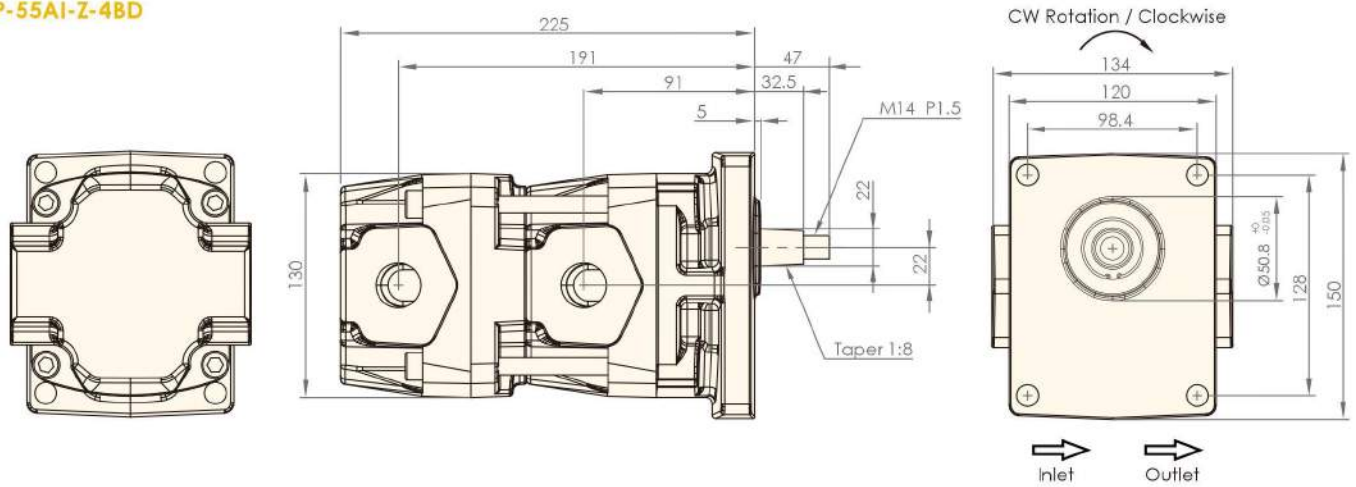
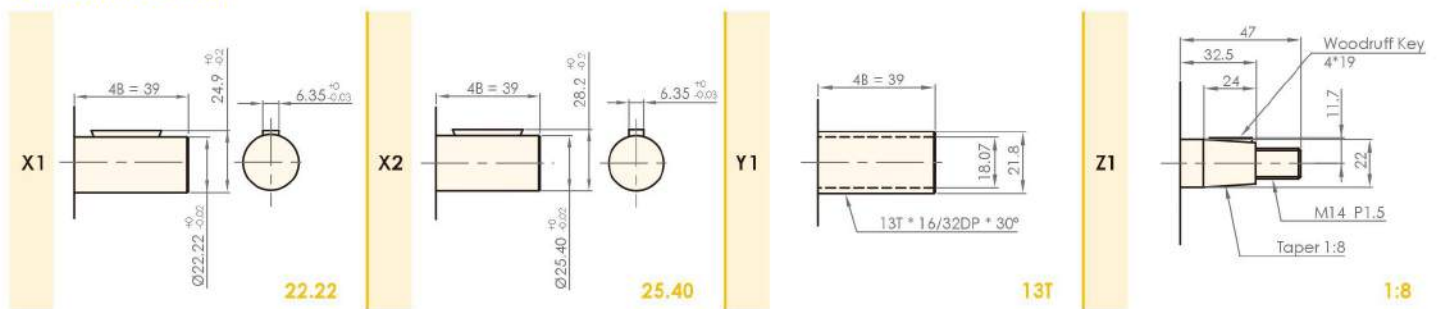
1	Model Name	HGP-55AI	
2	Mounting	F	flange type
3	Delivery Capacity	22, 26, 33, 44, 48, 55, 63, 75, 80, 90	
4	Rotation Direction	R	clockwise
		L	counter - clockwise
5	Shaft Type	X: straight shaft Y: spline shaft Z: taper shaft	
6	Flange Mounting Type	4BD	DIN 4-bolt
7	Inlet and Outlet *	F: flange type(F1~F7) G: G, BSP, PF(G1~G4) P: PT(P1~P2) U: UNF(U1~U6)	

* The dimension of shafts and inlet & outlet sizes please refer to Page 55.

SPECIFICATIONS

Model	Accurate Displacement Capacity (cc/rev)	Operational Pressure (kgf/cm ²)	Max. Pressure (kgf/cm ²)	Speed (r.p.m.)		Weight (kg)
				Loaded	Unloaded	
HGP-55AI-2222	22+22	280	300	3000	500	14.57
HGP-55AI-2626	26+26	280	300	3000	500	14.73
HGP-55AI-3333	33+33	280	300	3000	500	15.01
HGP-55AI-4444	44+44	240	300	3000	500	15.45
HGP-55AI-4848	48+48	240	300	3000	500	15.61
HGP-55AI-5555	55+55	210	250	3000	500	15.89
HGP-55AI-6363	63+63	190	240	2750	500	16.21
HGP-55AI-7575	75+75	170	210	2750	500	16.69
HGP-55AI-8080	80+80	170	210	2500	500	16.89
HGP-55AI-9090	90+90	150	180	2500	500	17.29

* We provide many options to meet your displacement inquiries of tandem gear pumps, such as HGP-55AI-6348 (63+48 cc/rev).

DIMENSIONS (unit : mm)**HGP-55AI-Z-4BD****ADDITIONAL DIMENSION** (unit : mm)**Dimension of Shaft****Inlet and Outlet Size**

Flange Type

Code	Inlet			Outlet		
	A	B	C	a	b	c
F1	40	22	M8	40	22	M8
F2	51	27	M10	51	27	M10
F3	62	34	M10	62	34	M10

UNF

Code	Inlet	Outlet
	A	a
U1	1 1/16"-12UNF	1 1/16"-12UNF
U2	1 5/16"-12UNF	1 5/16"-12UNF
U3	1 5/8"-12UNF	1 5/8"-12UNF
U4	1 7/8"-13UNF	1 7/8"-13UNF
U5	1 1/16"-14UNF	1 1/16"-14UNF
U6	1 5/16"-14UNF	1 5/16"-14UNF

Flange Type

Code	Inlet				Outlet			
	A	B	C	D	a	b	c	d
F4	22.2	47.6	M10	18.5	22.2	47.6	M10	18.5
F5	26.2	52.4	M10	24	26.2	52.4	M10	24
F6	30.2	58.7	M10	30	30.2	58.7	M10	30
F7	35.7	69.8	M10	39	35.7	69.8	M10	39

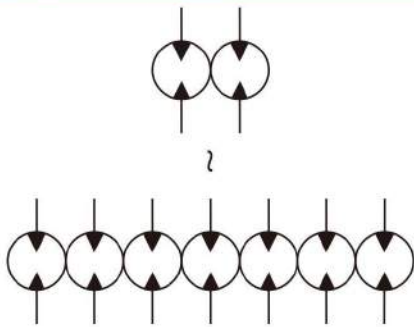
* UNC : Unified Coarse Thread

DFM-302A

- Displacement : 4~35 cc/rev
- Max. Pressure : 210 kgf/cm²
(3000psi)



SCHEMATIC SYMBOL



ORDER CODES

DFM-3	02A	-	11	M
1	2		3	4

1	Model Name	DFM-3	
2	Stations	02A	2 stations
		03A	3 stations
		04A	4 stations
		05A	5 stations
		06A	6 stations
		07A	7 stations
3	Flow Rate	4, 6, 8, 11, 13, 14, 17, 19, 23, 25, 28, 30, 35	
4	Functional Type	M	synchronous flow divider

SPECIFICATIONS

Model	Accurate Displacement Capacity (cc/rev)	Operational Pressure (kgf/cm ²)	Speed (r.p.m.)		Ports Size (PT)	
			Loaded	Unloaded	Inlet	Outlet
DFM-30*A-4M	4	210	1000	2000	3/4"	1/2"
DFM-30*A-6M	6	210	1000	2000	3/4"	1/2"
DFM-30*A-8M	8.4	210	1000	2000	3/4"	1/2"
DFM-30*A-11M	11	210	1000	2000	3/4"	1/2"
DFM-30*A-13M	13	210	1000	2000	3/4"	1/2"
DFM-30*A-14M	14.3	210	1000	2000	3/4"	1/2"
DFM-30*A-17M	16.5	210	1000	2000	3/4"	1/2"
DFM-30*A-19M	19.2	210	1000	2000	3/4"	1/2"
DFM-30*A-23M	23	210	1000	2000	3/4"	1/2"
DFM-30*A-25M	25	210	1000	2000	1"	3/4"
DFM-30*A-28M	28	210	1000	2000	1"	3/4"
DFM-30*A-30M	30	210	1000	2000	1"	3/4"
DFM-30*A-35M	35	210	1000	2000	1"	3/4"

* The initial pressure : 30kgf/cm²

MODEL WEIGHT

DFM-302A

Model	Weight (kg)
DFM-302A-4M	4.64
DFM-302A-6M	4.80
DFM-302A-8M	4.96
DFM-302A-11M	5.26
DFM-302A-13M	5.46
DFM-302A-14M	5.58
DFM-302A-17M	5.83
DFM-302A-19M	6.04
DFM-302A-23M	6.41
DFM-302A-25M	6.54
DFM-302A-28M	6.76
DFM-302A-30M	6.96
DFM-302A-35M	7.48

DFM-303A

Model	Weight (kg)
DFM-303A-4M	6.75
DFM-303A-6M	6.99
DFM-303A-8M	7.23
DFM-303A-11M	7.68
DFM-303A-13M	7.98
DFM-303A-14M	8.16
DFM-303A-17M	8.52
DFM-303A-19M	8.85
DFM-303A-23M	9.45
DFM-303A-25M	9.60
DFM-303A-28M	9.93
DFM-303A-30M	10.23
DFM-303A-35M	11.01

DFM-304A

Model	Weight (kg)
DFM-304A-4M	8.86
DFM-304A-6M	9.18
DFM-304A-8M	9.50
DFM-304A-11M	10.10
DFM-304A-13M	10.50
DFM-304A-14M	10.75
DFM-304A-17M	11.18
DFM-304A-19M	11.66
DFM-304A-23M	12.46
DFM-304A-25M	12.66
DFM-304A-28M	13.10
DFM-304A-30M	13.50
DFM-304A-35M	14.54

DFM-305A

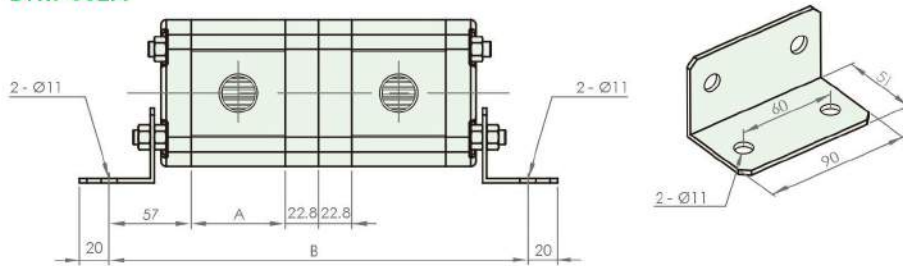
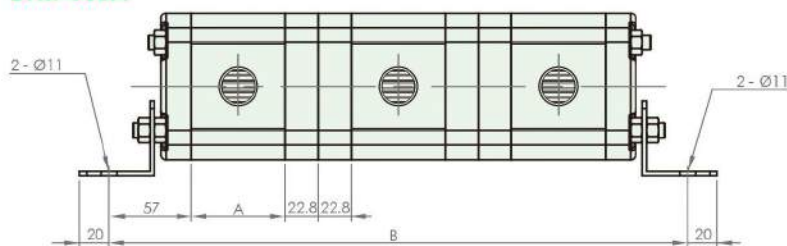
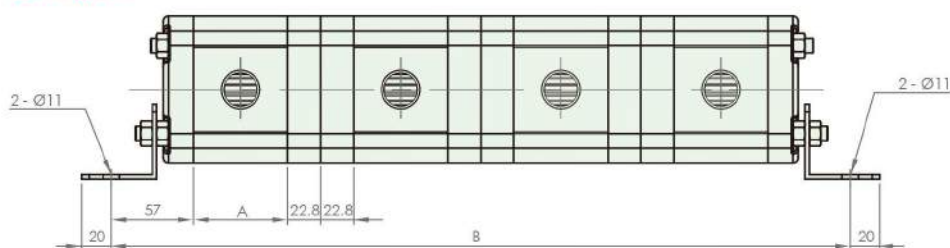
Model	Weight (kg)
DFM-305A-4M	10.97
DFM-305A-6M	11.37
DFM-305A-8M	11.77
DFM-305A-11M	12.52
DFM-305A-13M	13.02
DFM-305A-14M	13.32
DFM-305A-17M	13.87
DFM-305A-19M	14.47
DFM-305A-23M	15.47
DFM-305A-25M	15.72
DFM-305A-28M	16.27
DFM-305A-30M	16.77
DFM-305A-35M	18.07

DFM-306A

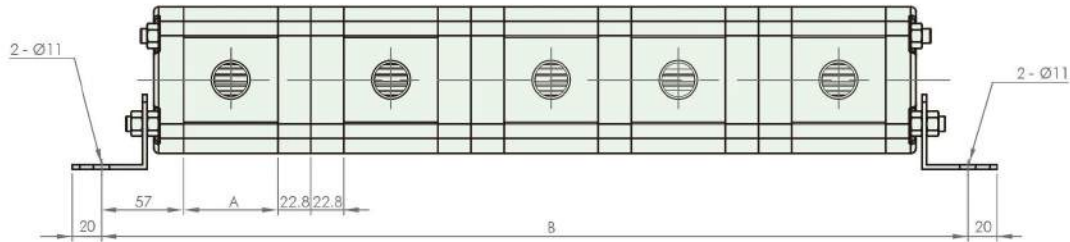
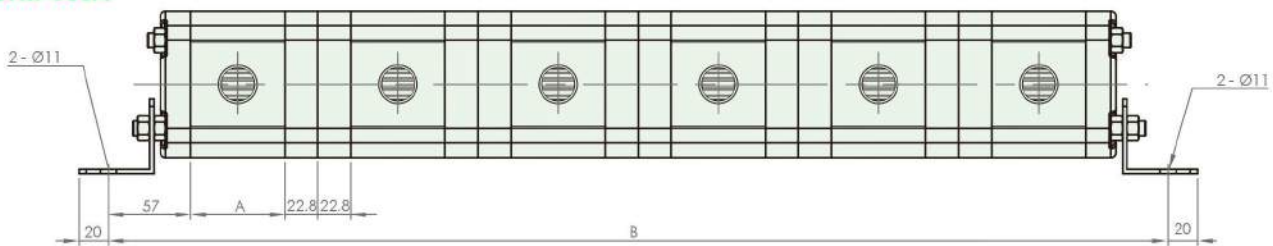
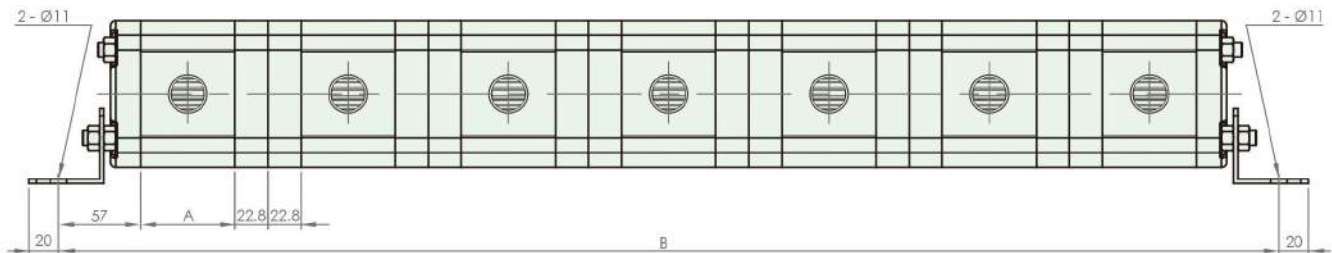
Model	Weight (kg)
DFM-306A-4M	13.08
DFM-306A-6M	13.56
DFM-306A-8M	14.04
DFM-306A-11M	14.94
DFM-306A-13M	15.54
DFM-306A-14M	15.90
DFM-306A-17M	16.56
DFM-306A-19M	17.28
DFM-306A-23M	18.48
DFM-306A-25M	18.78
DFM-306A-28M	19.44
DFM-306A-30M	20.04
DFM-306A-35M	21.60

DFM-307A

Model	Weight (kg)
DFM-307A-4M	15.19
DFM-307A-6M	15.75
DFM-307A-8M	16.31
DFM-307A-11M	17.36
DFM-307A-13M	18.06
DFM-307A-14M	18.48
DFM-307A-17M	19.25
DFM-307A-19M	20.09
DFM-307A-23M	21.49
DFM-307A-25M	21.84
DFM-307A-28M	22.61
DFM-307A-30M	23.31
DFM-307A-35M	25.13

DIMENSIONS (unit : mm)**DFM-302A****DFM-303A****DFM-304A**

Model	A	B	Model	A	B	Model	A	B
DFM-302A-4M	49	257.6	DFM-303A-4M	49	352.2	DFM-304A-4M	49	446.8
DFM-302A-6M	52	263.6	DFM-303A-6M	52	361.2	DFM-304A-6M	52	458.8
DFM-302A-8M	55	269.6	DFM-303A-8M	55	370.2	DFM-304A-8M	55	470.8
DFM-302A-11M	60	279.6	DFM-303A-11M	60	385.2	DFM-304A-11M	60	490.8
DFM-302A-13M	64	287.6	DFM-303A-13M	64	397.2	DFM-304A-13M	64	506.8
DFM-302A-14M	66	291.6	DFM-303A-14M	66	403.2	DFM-304A-14M	66	514.8
DFM-302A-17M	70	299.6	DFM-303A-17M	70	415.2	DFM-304A-17M	70	530.8
DFM-302A-19M	74	307.6	DFM-303A-19M	74	427.2	DFM-304A-19M	74	546.8
DFM-302A-23M	81	321.6	DFM-303A-23M	81	448.2	DFM-304A-23M	81	574.8
DFM-302A-25M	84	327.6	DFM-303A-25M	84	457.2	DFM-304A-25M	84	586.8
DFM-302A-28M	88	335.6	DFM-303A-28M	88	469.2	DFM-304A-28M	88	602.8
DFM-302A-30M	92	343.6	DFM-303A-30M	92	481.2	DFM-304A-30M	92	618.8
DFM-302A-35M	102	363.6	DFM-303A-35M	102	511.2	DFM-304A-35M	102	658.8

DIMENSIONS (unit : mm)**DFM-305A****DFM-306A****DFM-307A**

Model	A	B
DFM-305A-4M	49	495.8
DFM-305A-6M	52	510.8
DFM-305A-8M	55	525.8
DFM-305A-11M	60	550.8
DFM-305A-13M	64	570.8
DFM-305A-14M	66	580.8
DFM-305A-17M	70	600.8
DFM-305A-19M	74	620.8
DFM-305A-23M	81	655.8
DFM-305A-25M	84	670.8
DFM-305A-28M	88	690.8
DFM-305A-30M	92	710.8
DFM-305A-35M	102	760.8

Model	A	B
DFM-306A-4M	49	636
DFM-306A-6M	52	654
DFM-306A-8M	55	672
DFM-306A-11M	60	702
DFM-306A-13M	64	726
DFM-306A-14M	66	738
DFM-306A-17M	70	762
DFM-306A-19M	74	786
DFM-306A-23M	81	828
DFM-306A-25M	84	846
DFM-306A-28M	88	870
DFM-306A-30M	92	894
DFM-306A-35M	102	954

Model	A	B
DFM-307A-4M	49	730.6
DFM-307A-6M	52	751.6
DFM-307A-8M	55	772.6
DFM-307A-11M	60	807.6
DFM-307A-13M	64	835.6
DFM-307A-14M	66	849.6
DFM-307A-17M	70	877.6
DFM-307A-19M	74	905.6
DFM-307A-23M	81	954.6
DFM-307A-25M	84	975.6
DFM-307A-28M	88	1003.6
DFM-307A-30M	92	1031.6
DFM-307A-35M	102	1101.6

DFMN-302A

- Displacement : 4~35 cc/rev
- Max. Pressure : 210 kgf/cm²
(3000psi)



DFMN-302A-M

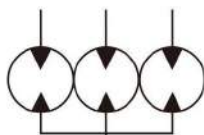


DFMN-302A-MR

SCHEMATIC SYMBOL



DFMN-302A



DFMN-303A

ORDER CODES

DFMN-3	02A	-	11	MR
1	2		3	4

1	Model Name	DFMN-3	
2	Stations	02A	2 stations
		03A	3 stations
		04A	4 stations
		05A	5 stations
		06A	6 stations
		07A	7 stations
3	Flow Rate	4, 6, 8, 11, 13, 14, 17, 19, 23, 25, 28, 30, 35	
4	Functional Type	M	synchronous flow divider
		MR	with relief valve

SPECIFICATIONS

Model	Accurate Displacement Capacity (cc/rev)	Operational Pressure (kgf/cm ²)	Speed (r.p.m.)		Ports Size (PT)	
			Loaded	Unloaded	Inlet	Outlet
DFMN-30*A-4M	4	210	1000	2000	3/4"	1/2"
DFMN-30*A-6M	6	210	1000	2000	3/4"	1/2"
DFMN-30*A-8M	8.4	210	1000	2000	3/4"	1/2"
DFMN-30*A-11M	11	210	1000	2000	3/4"	1/2"
DFMN-30*A-13M	13	210	1000	2000	3/4"	1/2"
DFMN-30*A-14M	14.3	210	1000	2000	3/4"	1/2"
DFMN-30*A-17M	16.5	210	1000	2000	3/4"	1/2"
DFMN-30*A-19M	19.2	210	1000	2000	3/4"	1/2"
DFMN-30*A-23M	23	210	1000	2000	3/4"	1/2"
DFMN-30*A-25M	25	210	1000	2000	3/4"	3/4"
DFMN-30*A-28M	28	210	1000	2000	3/4"	3/4"
DFMN-30*A-30M	30	210	1000	2000	3/4"	3/4"
DFMN-30*A-35M	35	210	1000	2000	3/4"	3/4"

* The initial pressure : 30kgf/cm²

MODEL WEIGHT

DFMN-302A

Model	Weight (kg)
DFMN-302A-4M	4.83
DFMN-302A-6M	4.99
DFMN-302A-8M	5.15
DFMN-302A-11M	5.45
DFMN-302A-13M	5.65
DFMN-302A-14M	5.77
DFMN-302A-17M	6.02
DFMN-302A-19M	6.23
DFMN-302A-23M	6.60
DFMN-302A-25M	6.73
DFMN-302A-28M	6.95
DFMN-302A-30M	7.15
DFMN-302A-35M	7.67

DFMN-303A

Model	Weight (kg)
DFMN-303A-4M	7.06
DFMN-303A-6M	7.30
DFMN-303A-8M	7.54
DFMN-303A-11M	7.99
DFMN-303A-13M	8.29
DFMN-303A-14M	8.47
DFMN-303A-17M	8.83
DFMN-303A-19M	9.16
DFMN-303A-23M	9.76
DFMN-303A-25M	9.91
DFMN-303A-28M	10.24
DFMN-303A-30M	10.54
DFMN-303A-35M	11.32

DFMN-304A

Model	Weight (kg)
DFMN-304A-4M	9.32
DFMN-304A-6M	9.68
DFMN-304A-8M	9.96
DFMN-304A-11M	10.50
DFMN-304A-13M	10.90
DFMN-304A-14M	11.15
DFMN-304A-17M	11.58
DFMN-304A-19M	12.06
DFMN-304A-23M	12.86
DFMN-304A-25M	13.10
DFMN-304A-28M	13.55
DFMN-304A-30M	13.96
DFMN-304A-35M	14.99

DFMN-305A

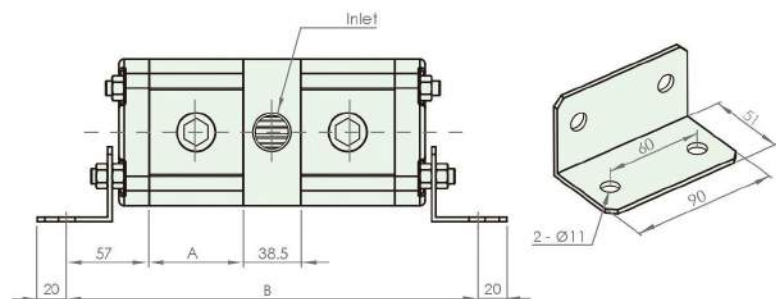
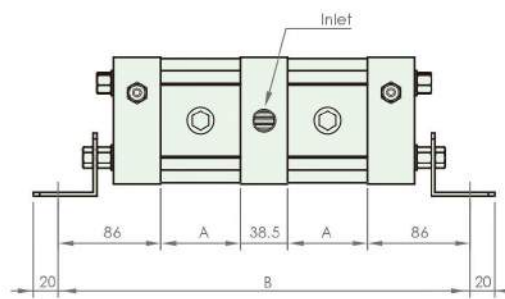
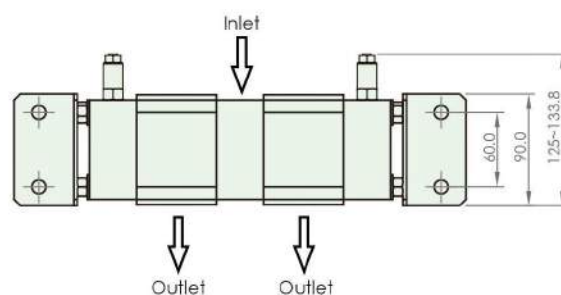
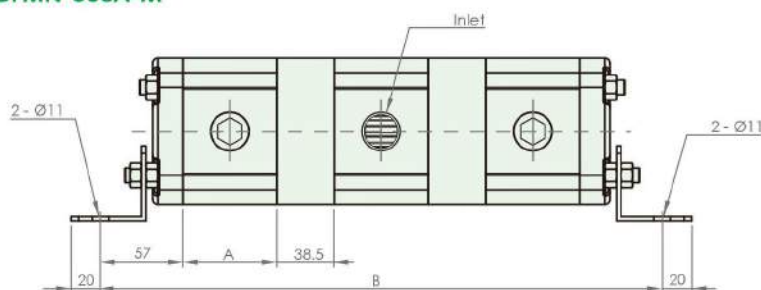
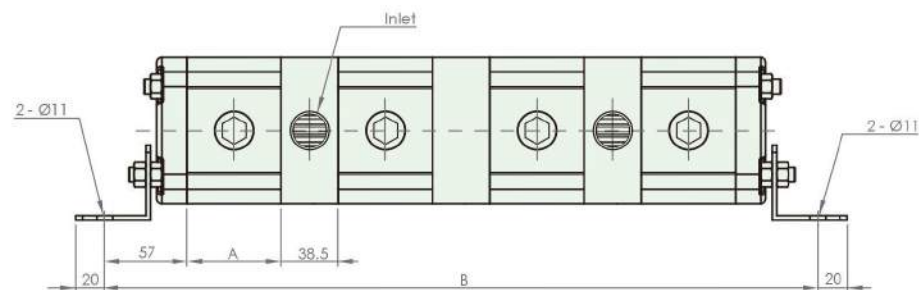
Model	Weight (kg)
DFMN-305A-4M	11.47
DFMN-305A-6M	11.87
DFMN-305A-8M	12.27
DFMN-305A-11M	13.02
DFMN-305A-13M	13.52
DFMN-305A-14M	13.82
DFMN-305A-17M	14.37
DFMN-305A-19M	14.97
DFMN-305A-23M	15.97
DFMN-305A-25M	16.27
DFMN-305A-28M	16.85
DFMN-305A-30M	17.32
DFMN-305A-35M	18.63

DFMN-306A

Model	Weight (kg)
DFMN-306A-4M	13.68
DFMN-306A-6M	14.16
DFMN-306A-8M	14.64
DFMN-306A-11M	15.54
DFMN-306A-13M	16.14
DFMN-306A-14M	16.50
DFMN-306A-17M	17.16
DFMN-306A-19M	17.88
DFMN-306A-23M	19.08
DFMN-306A-25M	19.45
DFMN-306A-28M	20.10
DFMN-306A-30M	20.71
DFMN-306A-35M	22.27

DFMN-307A

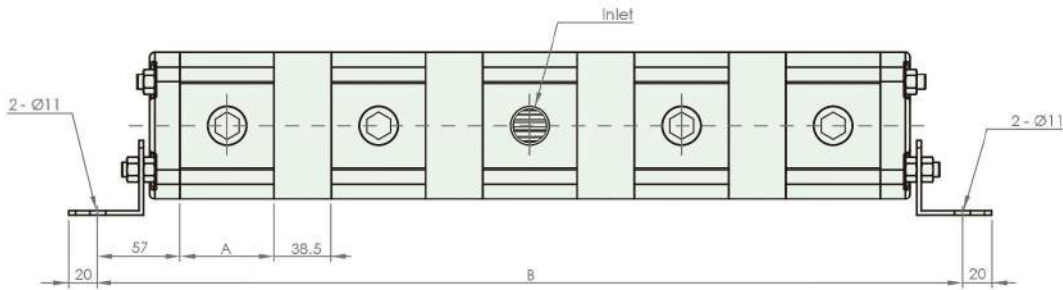
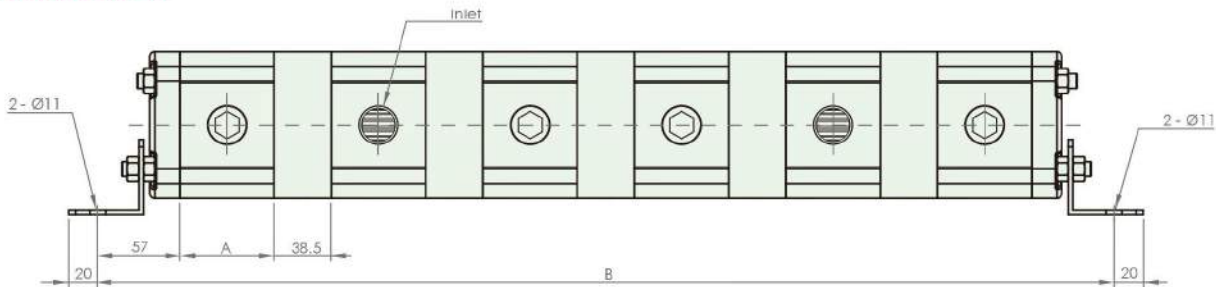
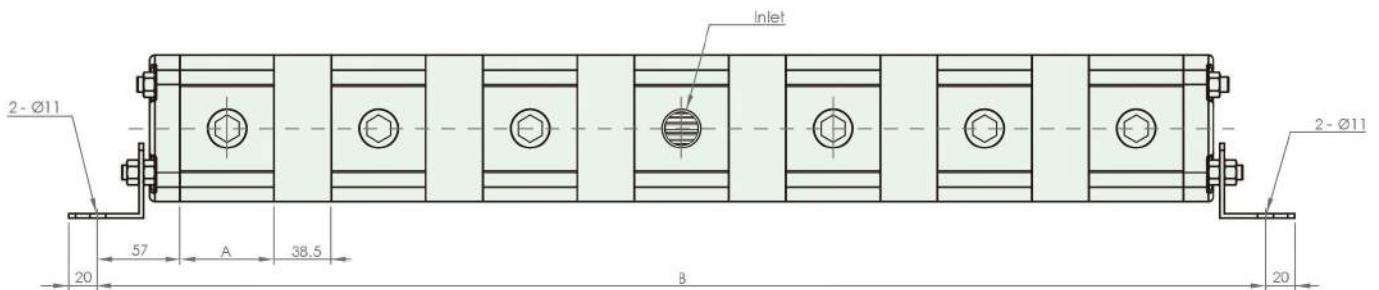
Model	Weight (kg)
DFMN-307A-4M	15.89
DFMN-307A-6M	16.45
DFMN-307A-8M	17.01
DFMN-307A-11M	18.06
DFMN-307A-13M	18.76
DFMN-307A-14M	19.18
DFMN-307A-17M	19.95
DFMN-307A-19M	20.79
DFMN-307A-23M	22.19
DFMN-307A-25M	22.64
DFMN-307A-28M	23.41
DFMN-307A-30M	24.10
DFMN-307A-35M	25.92

DIMENSIONS (unit : mm)**DFMN-302A-M****DFMN-302A-MR****DFMN-303A-M****DFMN-304A**

Model	A	B
DFMN-302A-4M	49	250.5
DFMN-302A-6M	52	256.5
DFMN-302A-8M	55	262.5
DFMN-302A-11M	60	272.5
DFMN-302A-13M	64	280.5
DFMN-302A-14M	66	284.5
DFMN-302A-17M	70	292.5
DFMN-302A-19M	74	300.5
DFMN-302A-23M	81	314.5
DFMN-302A-25M	84	320.5
DFMN-302A-28M	88	328.5
DFMN-302A-30M	92	336.5
DFMN-302A-35M	102	356.5

Model	A	B
DFMN-303A-4M	49	338
DFMN-303A-6M	52	347
DFMN-303A-8M	55	356
DFMN-303A-11M	60	371
DFMN-303A-13M	64	383
DFMN-303A-14M	66	389
DFMN-303A-17M	70	401
DFMN-303A-19M	74	413
DFMN-303A-23M	81	434
DFMN-303A-25M	84	443
DFMN-303A-28M	88	455
DFMN-303A-30M	92	467
DFMN-303A-35M	102	497

Model	A	B
DFMN-304A-4M	49	425.5
DFMN-304A-6M	52	437.5
DFMN-304A-8M	55	449.5
DFMN-304A-11M	60	469.5
DFMN-304A-13M	64	485.5
DFMN-304A-14M	66	493.5
DFMN-304A-17M	70	509.5
DFMN-304A-19M	74	525.5
DFMN-304A-23M	81	553.5
DFMN-304A-25M	84	565.5
DFMN-304A-28M	88	581.5
DFMN-304A-30M	92	597.5
DFMN-304A-35M	102	637.5

DIMENSIONS (unit : mm)**DFMN-305A-M****DFMN-306A-M****DFMN-307A-M**

Model	A	B
DFMN-305A-4M	49	513
DFMN-305A-6M	52	528
DFMN-305A-8M	55	543
DFMN-305A-11M	60	568
DFMN-305A-13M	64	588
DFMN-305A-14M	66	598
DFMN-305A-17M	70	618
DFMN-305A-19M	74	638
DFMN-305A-23M	81	673
DFMN-305A-25M	84	688
DFMN-305A-28M	88	708
DFMN-305A-30M	92	728
DFMN-305A-35M	102	778

Model	A	B
DFMN-306A-4M	49	600.5
DFMN-306A-6M	52	618.5
DFMN-306A-8M	55	636.5
DFMN-306A-11M	60	666.5
DFMN-306A-13M	64	690.5
DFMN-306A-14M	66	702.5
DFMN-306A-17M	70	726.5
DFMN-306A-19M	74	750.5
DFMN-306A-23M	81	792.5
DFMN-306A-25M	84	810.5
DFMN-306A-28M	88	834.5
DFMN-306A-30M	92	858.5
DFMN-306A-35M	102	918.5

Model	A	B
DFMN-307A-4M	49	688
DFMN-307A-6M	52	709
DFMN-307A-8M	55	730
DFMN-307A-11M	60	765
DFMN-307A-13M	64	793
DFMN-307A-14M	66	807
DFMN-307A-17M	70	835
DFMN-307A-19M	74	863
DFMN-307A-23M	81	912
DFMN-307A-25M	84	933
DFMN-307A-28M	88	961
DFMN-307A-30M	92	989
DFMN-307A-35M	102	1059

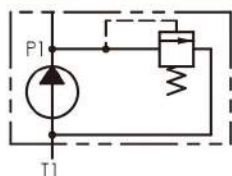
* If you need customized services, please contact the local distributors to obtain the further information.

PR1

- Displacement : 2~12 cc/rev
- Max. Pressure : 250 kgf/cm²
(3500psi)
- Flange : JIS 4-bolt



SCHEMATIC SYMBOL



ORDER CODES

PR1	-	020	-	R	-	X1	-	4BJ	-	P1
1		2		3		4		5		6

1	Model Name	PR1	
2	Delivery Capacity	020, 030, 040, 060, 075, 090, 105, 120	
3	Rotation Direction	R	clockwise
		L	counter - clockwise
4	Shaft Type	W: tang shaft Y: spline shaft	X: straight shaft Z: taper shaft
5	Flange Mounting Type	4BJ	JIS 4-bolt
6	Inlet and Outlet *	F: flange type(F1) P: PT(P1~P2)	G: G, BSP, PF(G1~G2)

* The dimension of shafts and inlet & outlet sizes please refer to Page 15.

SPECIFICATIONS

Model	Accurate Displacement Capacity (cc/rev)	Operational Pressure (kgf/cm ²)	Max. Pressure (kgf/cm ²)	Speed (r.p.m.)			Weight (kg)
				Rate	Max.	Min.	
PR1-020	2	210	250	1800	5000	900	1.69
PR1-030	3	210	250	1800	5000	850	1.7
PR1-040	4	210	250	1800	4500	800	1.71
PR1-060	6	210	250	1800	3500	700	1.72
PR1-075	7.5	210	250	1800	3000	600	1.74
PR1-090	9	210	250	1800	2500	550	1.74
PR1-105	10.5	210	250	1800	2000	500	1.74
PR1-120	12	175	210	1800	2000	500	1.76

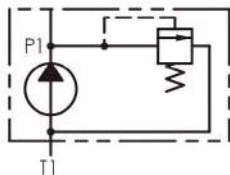
* PR1-025 and PR1-050 do not belong to regular products. Customized service can be provided.

PR2

- Displacement : 0.8~7.8 cc/rev
- Max. Pressure : 250 kgf/cm²
(3500psi)
- Flange : SAE 2-bolt, DIN 4-bolt,
European 4-bolt



SCHEMATIC SYMBOL



ORDER CODES

PR2	-	008	-	R	-	Y1	-	2B	-	P1
1		2		3		4		5		6

1 Model Name	PR2	
2 Delivery Capacity	008, 010, 020, 030, 040, 050, 060, 080	
3 Rotation Direction	R	clockwise
	L	counter - clockwise
4 Shaft Type *	X: straight shaft Y: spline shaft Z: taper shaft	
5 Flange Mounting Type	2B	SAE 2-bolt
	4BDA	DIN 4-bolt (Type A)
	4BDB	DIN 4-bolt (Type B)
	4BE	European 4-bolt
6 Inlet and Outlet *	F: flange type(F1~F2) G: G, BSP, PF(G1~G2) P: PT(P1~P2) U: UNF(U1~U2)	

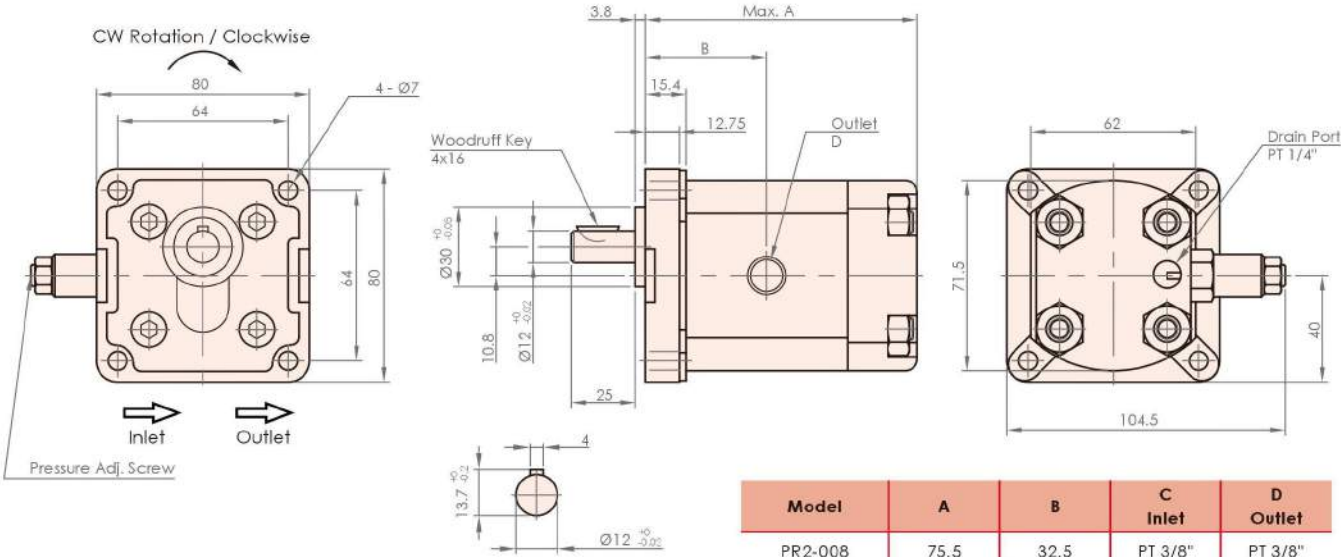
* The dimension of shafts and inlet & outlet sizes please refer to Page 11.

SPECIFICATIONS

Model	Accurate Displacement Capacity (cc/rev)	Operational Pressure (kgf/cm ²)	Max. Pressure (kgf/cm ²)	Speed (r.p.m.)			Weight (kg)
				Rate	Max.	Min.	
PR2-008	0.8	210	250	1800	4500	1000	1.0
PR2-010	1	210	250	1800	4500	1000	1.0
PR2-020	2	210	250	1800	4500	600	1.05
PR2-030	3	210	250	1800	4500	600	1.15
PR2-040	4	210	250	1800	4000	600	1.18
PR2-050	5	210	250	1800	3200	600	1.2
PR2-060	6	210	250	1800	3200	600	1.3
PR2-080	7.8	175	210	1800	3200	600	1.4

* PR2-008 and PR2-026 do not belong to regular products. Customized service can be provided.

DIMENSIONS (unit : mm)



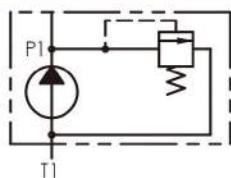
Model	A	B	C Inlet	D Outlet
PR2-008	75.5	32.5	PT 3/8"	PT 3/8"
PR2-010	77.5	33.5	PT 3/8"	PT 3/8"
PR2-020	80.1	34.8	PT 3/8"	PT 3/8"
PR2-030	85.5	37.5	PT 3/8"	PT 3/8"
PR2-040	87.5	38.5	PT 3/8"	PT 3/8"
PR2-050	91.5	40.5	PT 3/8"	PT 3/8"
PR2-060	95.5	42.5	PT 3/8"	PT 3/8"
PR2-080	101.5	45.5	PT 1/2"	PT 3/8"

PR3

- Displacement : 2~35 cc/rev
- Max. Pressure : 250 kgf/cm²
(3500psi)
- Flange : SAE 2-bolt, DIN 4-bolt,
European 4-bolt



SCHEMATIC SYMBOL



ORDER CODES

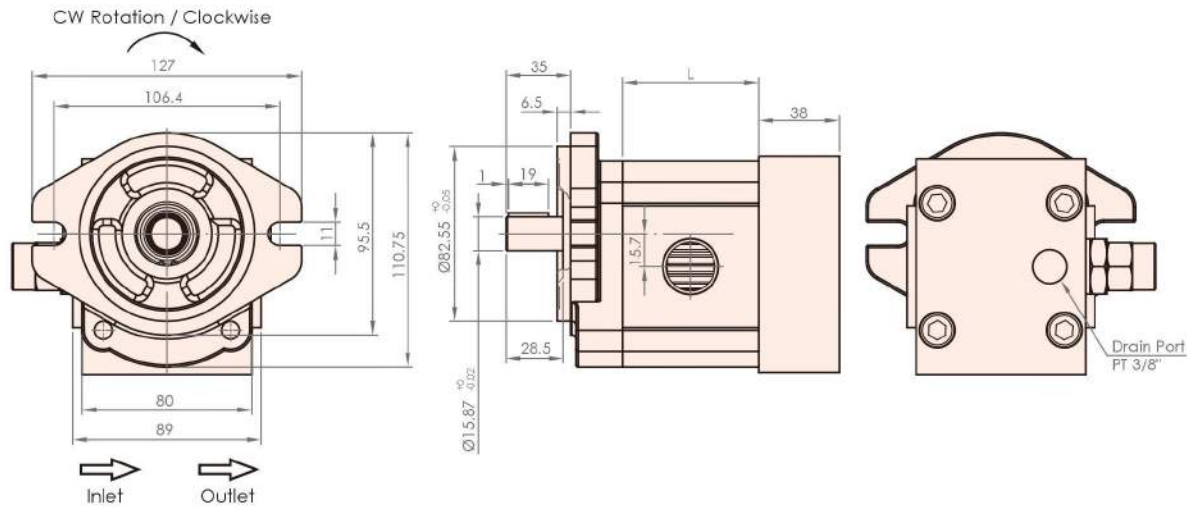
PR3	-	13	-	R	-	Y1	-	2B	-	P1
1		2		3		4		5		6

1	Model Name	PR3	
2	Delivery Capacity	2, 3, 4, 6, 8, 11, 13, 14, 17, 19, 23, 25, 28, 30, 33, 35	
3	Rotation Direction	R	clockwise
		L	counter - clockwise
4	Shaft Type *	X: straight shaft Y: spline shaft Z: taper shaft	
5	Flange Mounting Type	2B	SAE 2-bolt
		4BD	DIN 4-bolt
		4BE	European 4-bolt
6	Inlet and Outlet *	F: flange type(F1~F6) G: G, BSP, PF(G1~G2) P: PT(P1~P2) U: UNF(U1~U2)	

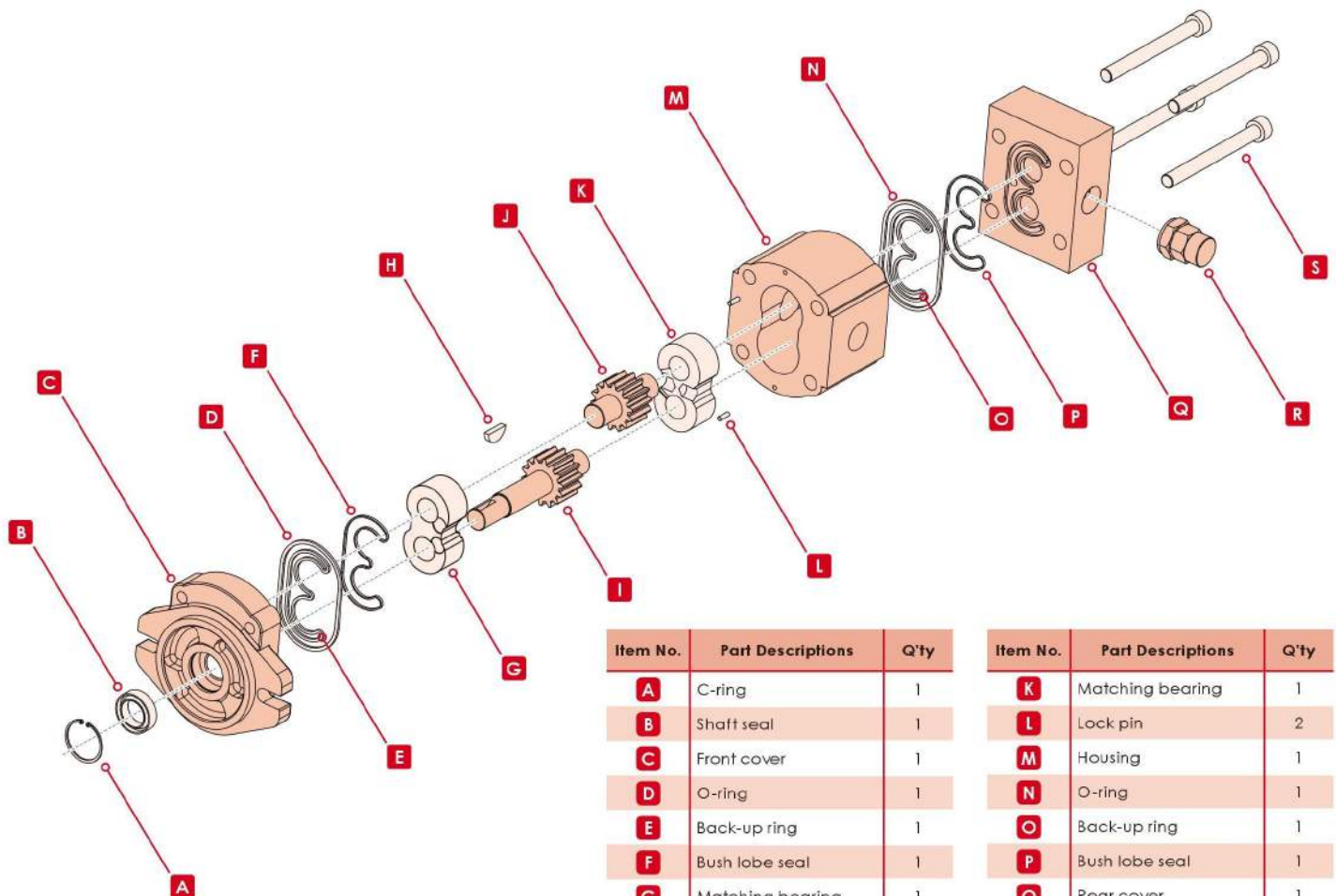
* The dimension of shafts and inlet & outlet sizes please refer to Page 19.

SPECIFICATIONS

Model	Accurate Displacement Capacity (cc/rev)	Operational Pressure (kgf/cm ²)	Max. Pressure (kgf/cm ²)	Speed (r.p.m.)			Weight (kg)
				Rate	Max.	Min.	
PR3-2	2	210	250	1800	4000	700	2.73
PR3-3	3	210	250	1800	4000	700	2.77
PR3-4	4	210	250	1800	4000	700	2.83
PR3-6	6	210	250	1800	4000	700	2.91
PR3-8	8.4	210	250	1800	3500	700	2.99
PR3-11	11	210	250	1800	3000	600	3.14
PR3-13	13	210	250	1800	3000	600	3.24
PR3-14	14.3	210	250	1800	3000	500	3.3
PR3-17	16.5	210	250	1800	3000	500	3.41
PR3-19	19.2	210	250	1800	3000	500	3.53
PR3-23	23	210	250	1800	3000	500	3.73
PR3-25	25	175	210	1800	2800	500	3.78
PR3-28	28	175	210	1800	2500	500	3.89
PR3-30	30	175	210	1800	2500	500	3.99
PR3-33	33	140	175	1200	2500	500	4.14
PR3-35	35	125	140	1200	2500	500	4.25

DIMENSIONS (unit : mm)

Model	L
PR3-2	45.5
PR3-3	47
PR3-4	49
PR3-6	52
PR3-8	55
PR3-11	60
PR3-13	64
PR3-14	66
PR3-17	70
PR3-19	74
PR3-23	81
PR3-25	84
PR3-28	88
PR3-30	92
PR3-33	98
PR3-35	102

DECOMPOSITION CHARTS

Item No.	Part Descriptions	Q'ty
A	C-ring	1
B	Shaft seal	1
C	Front cover	1
D	O-ring	1
E	Back-up ring	1
F	Bush lobe seal	1
G	Matching bearing	1
H	Woodruff key	1
I	Drive gear	1
J	Drive gear	1

Item No.	Part Descriptions	Q'ty
K	Matching bearing	1
L	Lock pin	2
M	Housing	1
N	O-ring	1
O	Back-up ring	1
P	Bush lobe seal	1
Q	Rear cover	1
R	Relief valve	1
S	Bolt	4



* We reserve the right to make changes without notice in the course of continued development.