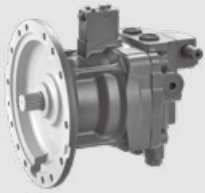
HM5X SERIES

Swash-plate Type
Axial Piston Fixed Displacement Motor

Size :	18	23	27	34	45	80	130	180	250
Rated pressure (bar) :	216	216	206	216	240	350	324	324	324
Max. pressure (bar) :	260	260	250	260	290	420	392	392	392



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HM5X series swashplate axial piston motor is fixed displacement motor, with wide application for high pressure open circuit.

The design provides for an extraordinarily compact motor whereby the motor's rotating group, integral mechanical brake element and the attached valve options are neatly packaged together. Assembling the mechanical brake around the rotating group means that there is no configurational difference in motor installation which allows the optional provision of a brake.

Features

HM5X 18/23/27/34/45:

- Swashplate type piston motor, integrated with mechanical brake, buffered relief valve, charge valve.
- Compact structure design with the motor's rotating group, integral mechanical brake element and the attached valve options.
- Special design of the mounting flange, can be directly connected with the ring gear of the reduction gear box.
- The motor and reduction gear box apply with the hydraulic oil lubrication method, reducing the maintenance cost of reducer.
- Applied in small excavators and other mobile machinery.

HM5X 80/130/180/250:

- Swashplate type piston motor, integrated with mechanical brake, relief valve, charge valve and anti-reaction valve;
- Compact structure design with the motor's rotating group, integral mechanical brake element and the attached valve options are neatly packaged together.
- Special design of the mounting flange, can be directly connected with the reducer.
- Structure is improved of light weight and compact based on the mature technology, increased the output power.
- Applied in the rotation condition of excavators and drilling rigs, etc.

Technical Data

Feature		18	23	27	34	45	80	130	180	250
Max displacement (cc/rev)		18.1	23.6	27.4	34	44.1	79	129.2	149 169 180	250.1
Direction of rotation		Clockwise, Counter clockwise								
Rotation speed	Max (rpm)	2150	1000	1605	1760	1760	2200	1850	1680	1520
Pressure	Rated (bar)	216	216	206	216	240	350	324	324	324
	Max (bar)	260	260	250	260	290	420	392	392	392
Torque	Rated output torque (N·m)	62	63	89.5	113	168.5	440	670	932	1290
	Max. brake torque (N · m)	68	-	90	125	178	423	843	1250	1470
Rated output power (Kw)		14	6.6	15.1	20.8	31	101	129	163	205
Barking Pilot Pressure	Normal (bar)	25	-	15	29	15	22	34	34	34
	Max (bar)	49	-	39	49	49	49	49	49	49
Casting pressure	Rated (bar)	2	1	1	1	1	2	2	2	2
	Max (bar)	3	3	3	3	3	6	6	6	6
Reduction ratio		21.5	10	22.7	21.5	20.615	—	—	—	—
Weight (Kg)		37	23	50	53	84.7	38	55	61	100
		Containing Reduction gear								
Oil viscosity (mm^2/s)		7~1600, Best range：12~80								
Oil Temperature (℃)		-40~100, Best range：60~85								
Oil Cleanliness		ISO 4406 20/18/15								

When the viscosity is within 200 ～ 1000mm^2/s, need to preheat before formal running.

Note: The HM5X18, HM5X23, HM5X27, HM5X34 and HM5X45 series hydraulic motor is delivered with reducer.
The above mentioned data represents the motor data only.
For the assembly data the reducer data shall be considered.

Type introduction (1)

HM5X	027	0	0	2060	L	27P
①	②	③	④	⑤	⑥	⑦

Product series

①	Swashplate piston fixed motor	HM5X

Displacement

②	Displacement cc/rev	18	23	27	34	45

Time delay valve

③	With Time delay valve	1
	Without Time delay valve	0

Anti-reaction valve

④	With Anti-reaction valve	1
	Without Anti-reaction valve	0

Relief valve setting

⑤	Relief valve setting	

Special code

⑥	Special code	

Reducer type

⑦	Suitable for 18 displacement motor	3B
	Suitable for 23 displacement motor	1B
	Suitable for 27 displacement motor	27P
	Suitable for 34 displacement motor	4B
	Suitable for 45 displacement motor	45P

Type introduction (2)

HM5X	130	C	H	B	-	10	A	-	01A	/	***	-	***
①	②	③	④	⑤		⑥	⑦		⑧		⑨		⑩

Product series

①	Swashplate piston fixed motor	HM5X

Displacement

②	Displacement cc/rev	80	130	180	250

Structure Type

③	Standard Type	C

Built-in device combination code

④	Built-in device combination code	H

Accessory device

⑤	None	O
	With mechanical brake	B

Shaft end shape

⑥	Convex shaft	10
	Concave shaft	20

Technical standard

⑦	Shaft standard	A

Special code

⑧	Special code	

Pressure reducing valve setting

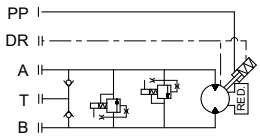
⑨	Pressure reducing valve setting	

Displacement setting

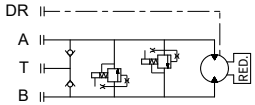
⑩	Displacement setting	

Principle

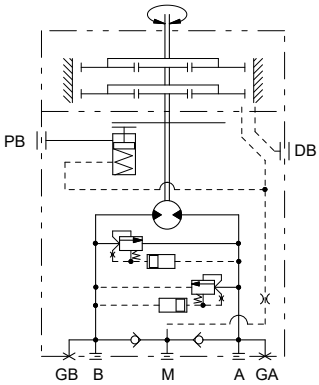
· HM5X 18



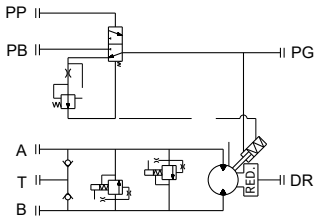
· HM5X 23



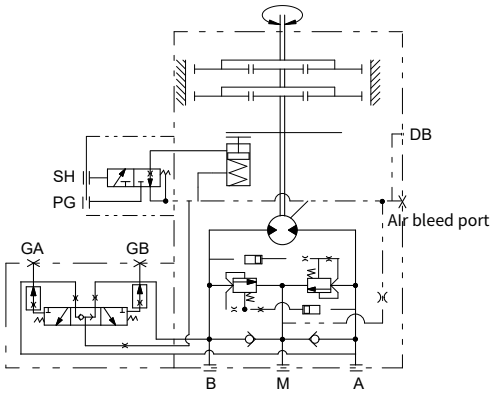
· HM5X 27



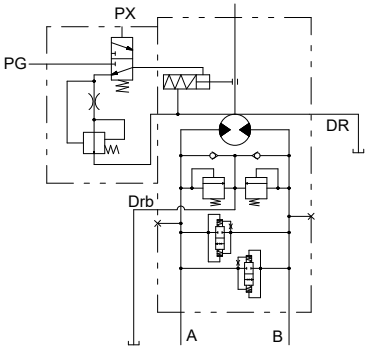
· HM5X 34



· HM5X 45

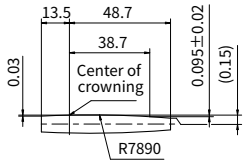


· HM5X 80/ 130 / 180 /250

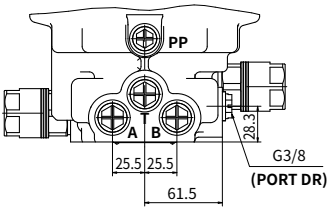


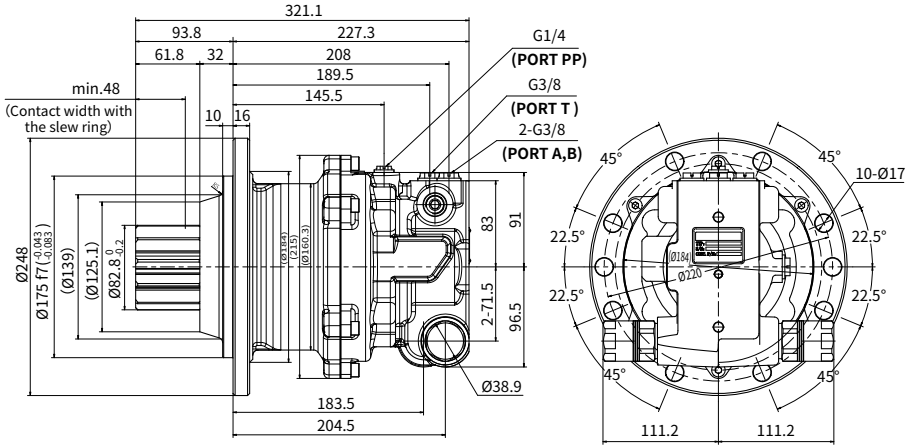
Installation size

· HM5X 18 Installation size



Detail of crowning



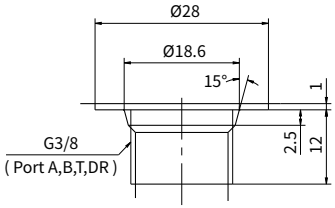


Inlet port	Outlet port	Rotation direction
B	A	Clockwise
A	B	Anti-clockwise

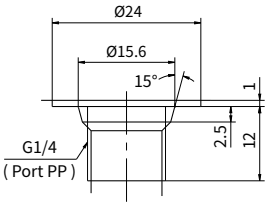
Note: The rotation direction is looked from the shaft end.

Installation size

·HM5X 18 Port details



Detailed description of G3/8
(Port A,B,T,DR)



Detailed description of G1/4
(Port PP)

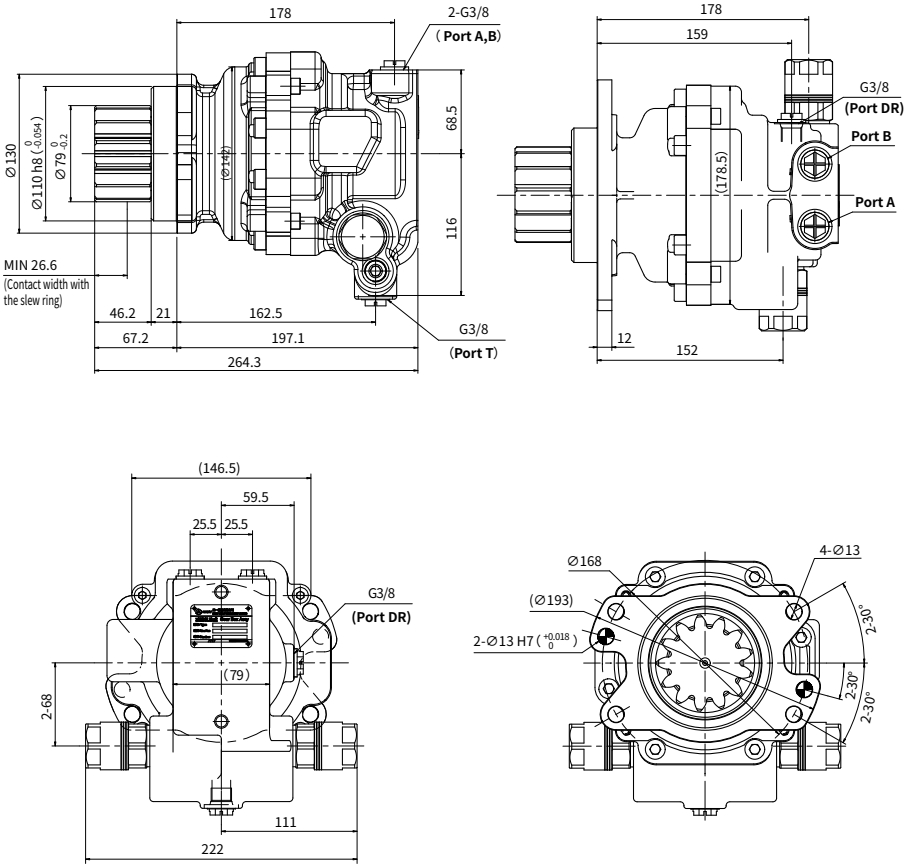
	Port Name	Port Size and Description	Tightening Torque (N-m)
A	Inlet port and Delivery port	G3/8（depth 12mm）	70
B			
T	Charge port	G3/8（depth 12mm）	70
DR	Housing drain port	G3/8（depth 12 mm）	70
PP	Braking release pilot port	G1/4（depth 12 mm）	45

·Specifications of output pinion

Module	m=6
No.Of teeth	Z=11
Addendum mod.	X=0.5
Displacement over teeth	$29.546^{-0.080}_{-0.180}$ (Measurements with two teeth)
Precision class	JIS Class 5
Pressure angle	a=20°

Installation size

· HM5X 23 Installation size

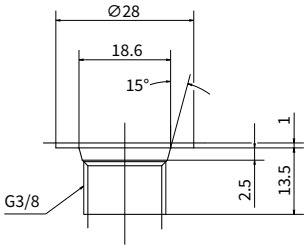


Inlet port	Outlet port	Rotation direction
B	A	Clockwise
A	B	Anti-clockwise

Note: The rotation direction is looked from the shaft end.

Installation size

·HM5X 23 Port details



Detailed description of G3/8

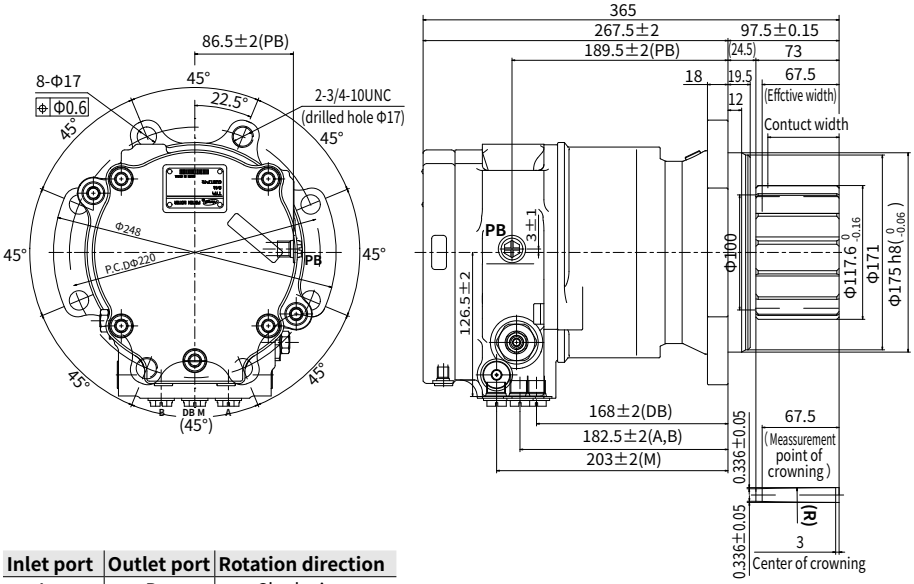
	Port Name	Port Size and Description	Tightening Torque (N-m)
A	Inlet port and Delivery port	G3/8（depth 12mm）	70
B			
T	Charge port	G3/8（depth 12mm）	70
DR	Housing drain port	G3/8（depth 12 mm）	70

·Specifications of output pinion

Module	m=5
No.Of teeth	Z=13
Addendum mod.	X=0.5
Displacement over teeth	$39.522^{-0.070}_{-0.170}$ (Measurements with two teeth)
Precision class	JIS Class 5
Pressure angle	a=20°

Installation size

·HM5X 27 Installation size

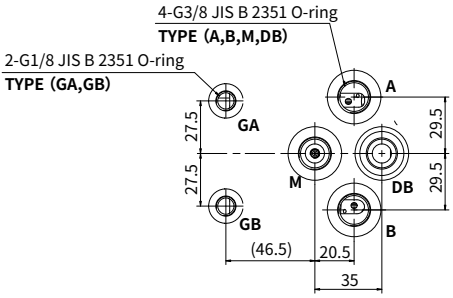


Inlet port	Outlet port	Rotation direction
A	B	Clockwise
B	A	Anti-clockwise

Note: The rotation direction is looked from the shaft end.

Installation size

·HM5X 27 Port details



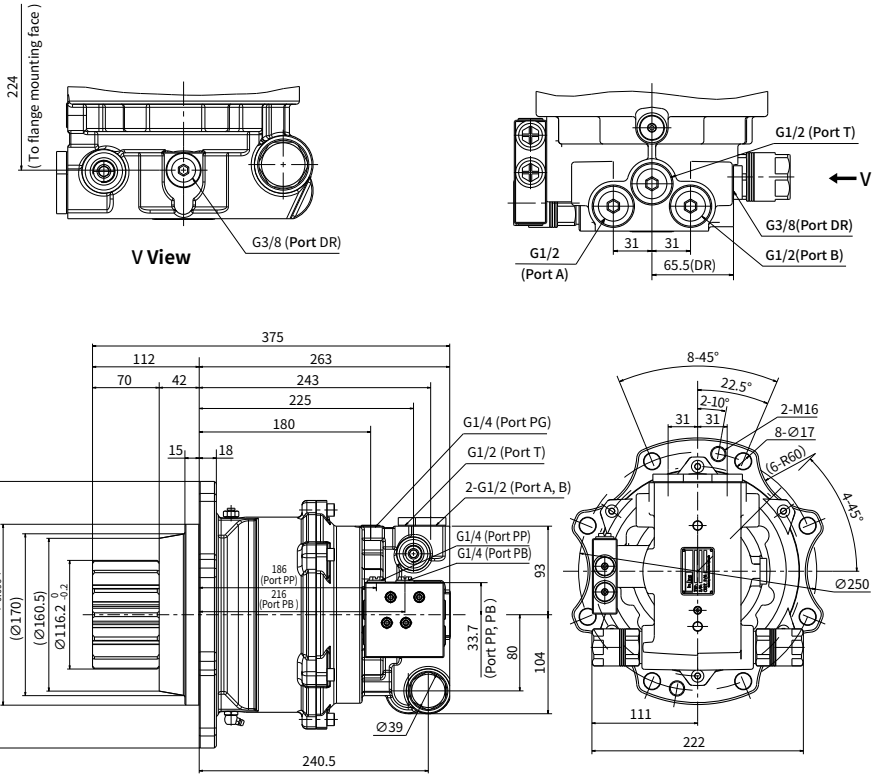
	Port Name	Port Size and Description	Tightening Torque (N-m)
A	Inlet port and Delivery port	G3/8(depth 15mm)	70
B			
M	Charge port		70
DB	Housing drain port	G3/8(depth 15 mm)	70
PB	Braking release pilot port	G1/4(depth 12 mm)	45
GA	Gauge port of "A" and "B"	G1/8(depth 12 mm)	13
GB			

·Specifications of output pinion

Spar gear		
Tool	Tooth profile	Standard gear
	Module	7
	Pressure angle	20°
No. Of teeth		14
Pitch diameter		Φ98.00
Addendum mod.		+2.80(X=+0.4)
Tooth thickness	Displacement over teeth	54.950($^{0}_{-0.155}$)
	No.Of teeth	3
Precision class		JIS Class 5
Tooth surface roughness		3.2

Installation size

· HM5X 34 Installation size

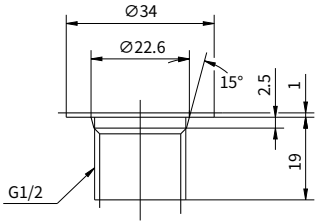


Inlet port	Outlet port	Rotation direction
B	A	Clockwise
A	B	Anti-clockwise

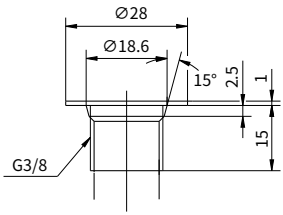
Note: The rotation direction is looked from the shaft end.

Installation size

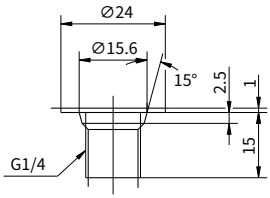
·HM5X 34 Port details



Detailed description of G1/2
(Port A,B,T)



Detailed description of G3/8
(Port DR)



Detailed description of G1/4
(Port PP,PB,PG)

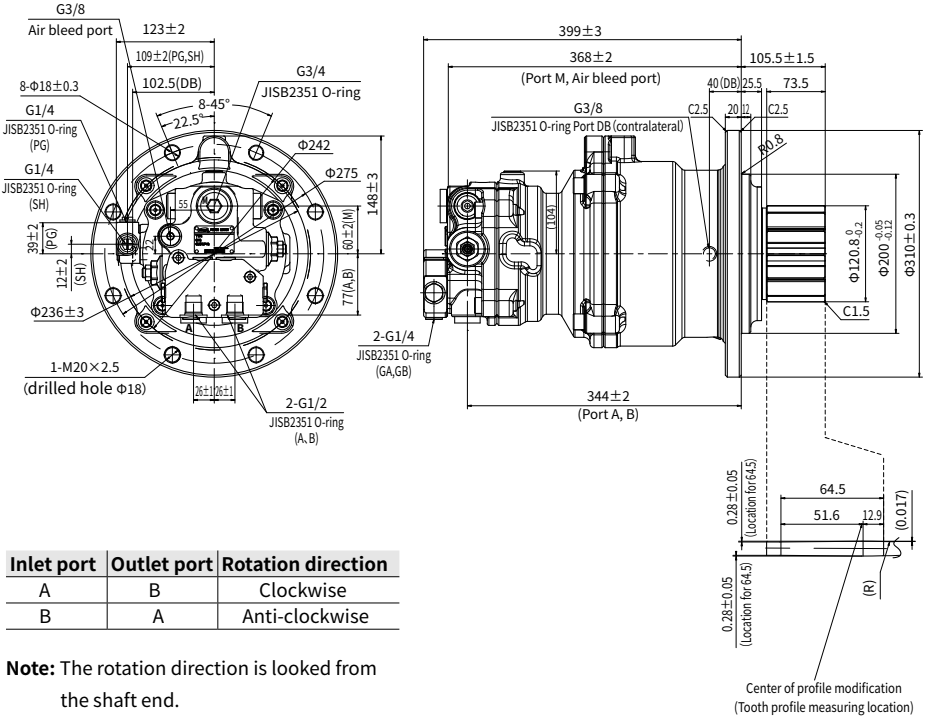
	Port Name	Port Size and Description
A	Inlet port and Delivery port	G1/2 （depth 19mm ）
B		
T	Charge port	
DR	Housing drain port	G3/8 （depth 15 mm ）
PP	Braking release pilot port	G1/4 （depth 15 mm ）
PB	Braking release port	

·Specifications of output pinion

Spar gear		
Tool	Tooth profile	Standard gear
	Module	7
	Pressure angle	20°
No. Of teeth		14
Pitch diameter		∅ 98.00
Addendum mod.		+2.80 （X=+0.4 ）
Tooth thickness	Displacement over teeth	54.950($^{-0.090}_{-0.190}$)
	No.Of teeth	3

Installation size

· HM5X 45 Installation size



Inlet port	Outlet port	Rotation direction
A	B	Clockwise
B	A	Anti-clockwise

Note: The rotation direction is looked from the shaft end.

Installation size

·HM5X 45 Port details

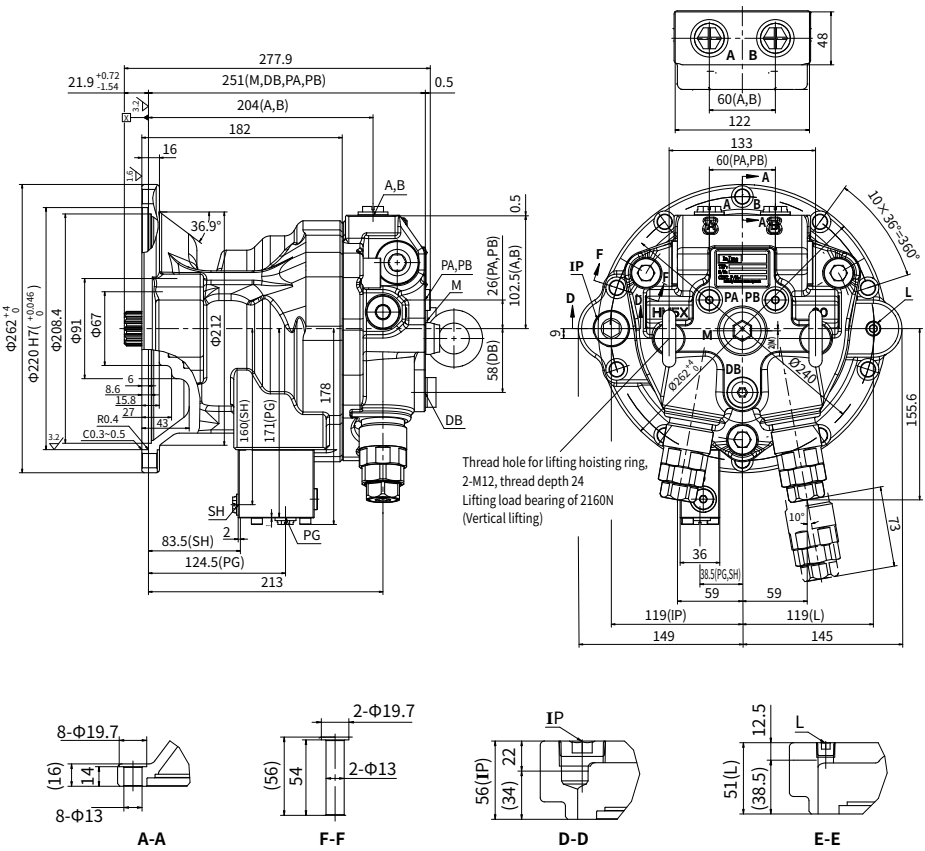
	Port Name	Port Size and Description	Tightening Torque (N-m)
A	Inlet port and Delivery port	G1/2（depth 16mm）	109
B			
M	Charge port	G3/4（depth 17 mm）	200
DB	Housing drain port	G3/8（depth 12 mm）	70
PG	Braking pilot port	G1/4（depth 12 mm）	39.2
SH	Braking release control port		
GA、GB	Gauge port	G1/4（depth 12 mm）	39.2

·Specifications of output pinion

Spar gear		
Tool	Tooth profile	Standard gear
	Module	8
	Pressure angle	20°
No. Of teeth		12
Pitch diameter		Φ96
Addendum mod.		4.4（X=+0.55）
Tooth thickness	Displacement over teeth	39.780 $^{-0.083}_{-0.189}$ (Measurements with two teeth)
Reduction in tooth thickness		0.088 ～ 0.201
Precision class		JIS B 1702-1976 Class 5
Tooth surface roughness		3.2

Installation size

· HM5X 80 Installation size



Inlet port	Outlet port	Rotation direction
A	B	Clockwise
B	A	Anti-clockwise

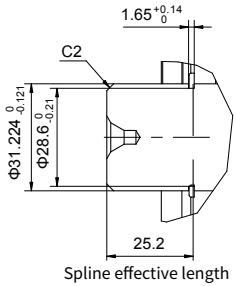
Note: The rotation direction is looked from the shaft end.

Installation size

·HM5X 80 Port details

	Port Name	Port Size and Description	Tightening Torque (N-m)	Plug type
A , B	Inlet port and Delivery port	G1/2（depth 19mm）	108	G1/2 Plastic plug
M	Charge port	G3/4（ depth 20mm）	167	G3/4 Plastic plug
PA , PB	Gauge port	G1/4（ depth 15 mm）	36	G1/4 Steel plug
DB	Housing drain port	G3/8（ depth 15 mm）	74	G3/8 Plastic plug
PG	Braking release port	G1/4（ depth 12 mm）	36	G1/4 Plastic plug
SH	Braking pilot port	G1/4（ depth 12 mm）	36	G1/4 Plastic plug
L	Oil level port	Rc1/4-12.5	22	Steel plug
IP	Gear oil filling port	Rc1-22	127	Steel plug

·HM5X 80 Shaft specification

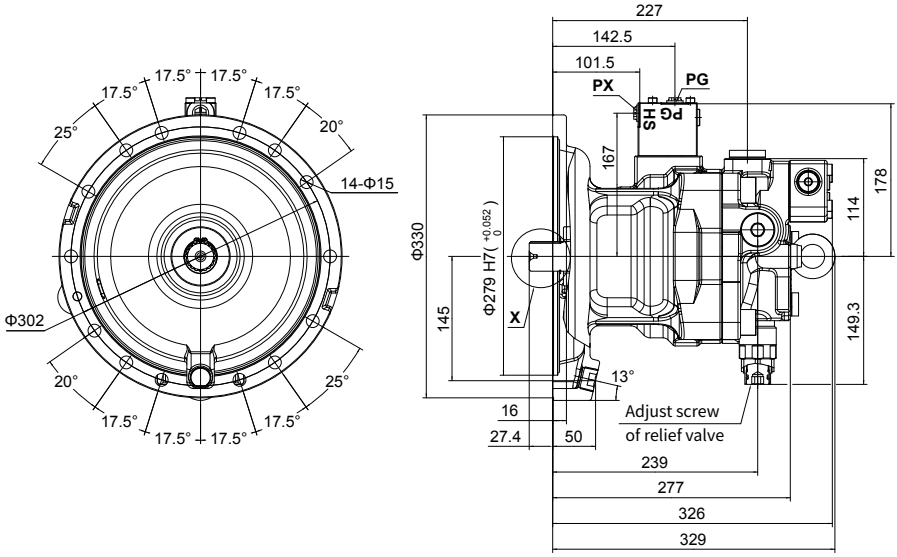


Spline effective length

Involute spline 14-12/24DP	
Side fit	
Spline pitch	12/24
No. Of teeth	14
Pressure angle	30°
Major diameter	Ø31.224 $^{0}_{-0.16}$
Minor diameter	Ø26.993 $^{0}_{-0.2}$
Pitch diameter	Ø29.634
Base diameter	Ø25.663
Diameter of pina	Ø4.064
Spacing of pina	Ø35.719 ～ Ø35.783
Reference tooth thickness	3.230 ～ 3.273
Lead tolerance	0.015
Spline standard	SAE J498B

Installation size

· HM5X 130 Installation size



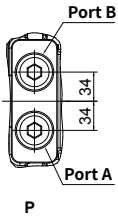
Inlet port	Outlet port	Rotation direction
A	B	Clockwise
B	A	Anti-clockwise

Note: The rotation direction is looked from the shaft end.

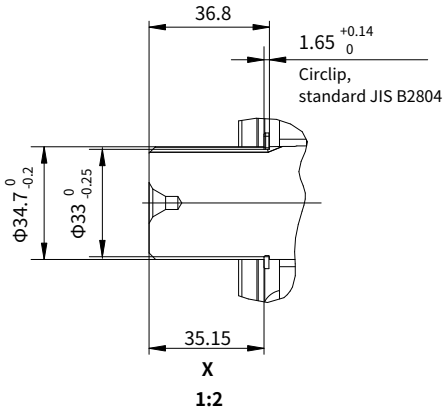
Installation size

·HM5X 130 Port details

	Port Name	Port Size and Description	Tightening Torque (N-m)
A	Inlet port and Delivery port	G3/4 (depth 20mm)	320
B			
Drb	Charge port		200
DR	Housing drain port	G3/8 (depth 15 mm)	70
PG	Braking pilot port	G1/4 (depth 12 mm)	45
PX	Braking release control port		



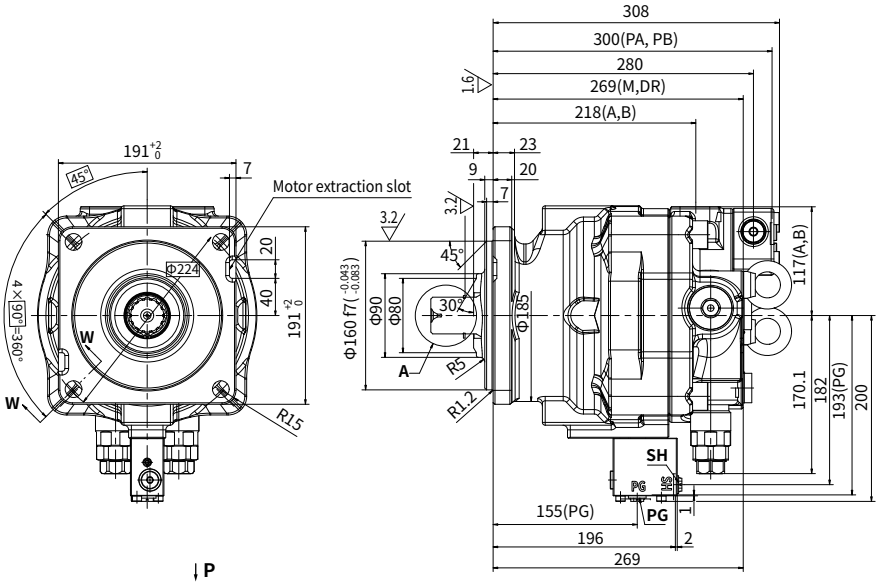
·HM5X 130 Shaft specification

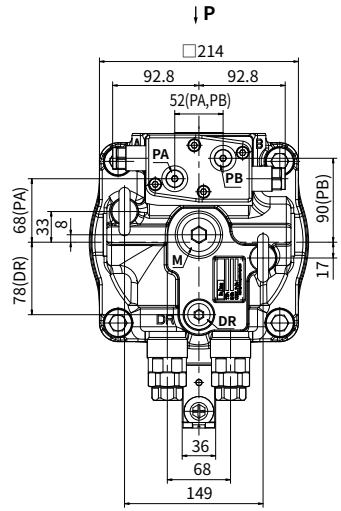


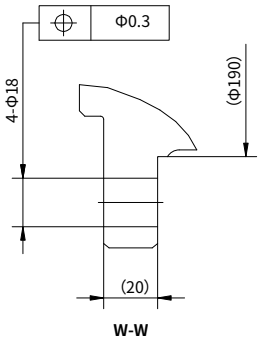
Spline standard	JIS D2001
Number of teeth	19
Module	1.667

Installation size

· HM5X 180 Installation size







Inlet port	Outlet port	Rotation direction
A	B	Clockwise
B	A	Anti-clockwise

Note: The rotation direction is looked from the shaft end.

Installation size

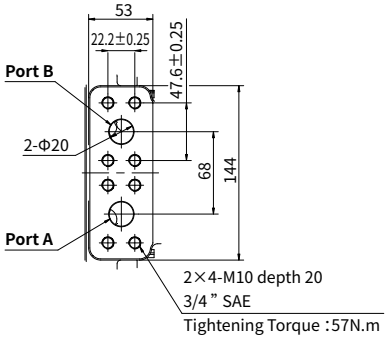
·HM5X 180 Ports size

(Exclude Inlet and Delivery ports)

	Port Name	Port Size and Description	Tightening Torque (N-m)
M	Charge port	G1(depth 24mm)	200
DR	Housing drain port	G1/2(depth 23mm)	109
PG	Braking release port	G1/4(depth 12mm)	36
SH	Braking pilot port	G1/4(depth 12mm)	36
PA, PB	Pressure measureing	G1/4(depth 15mm)	36

·HM5X 180 Inlet and Delivery ports options

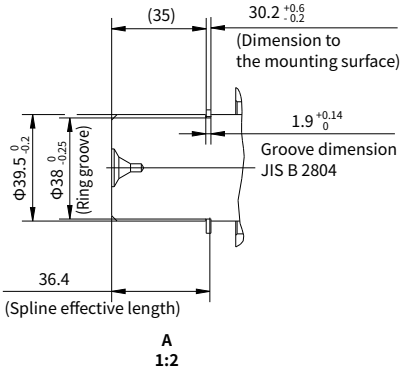
(P direction)



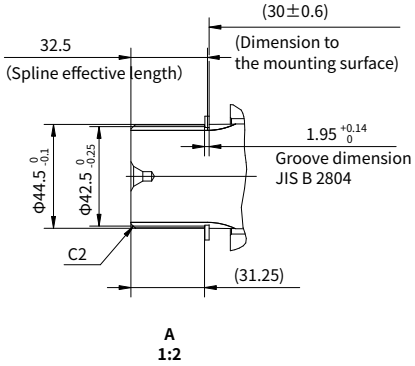
		Port Name	Port Size and Description	Tightening Torque (N-m)
Flanged type	A	Inlet port and Delivery port	SAE G3/4	—
	B			
Threaded type	A	Inlet port and Delivery port	G3/4(depth 20mm)	167
	B			

Installation size

·HM5X 180 Shaft specification



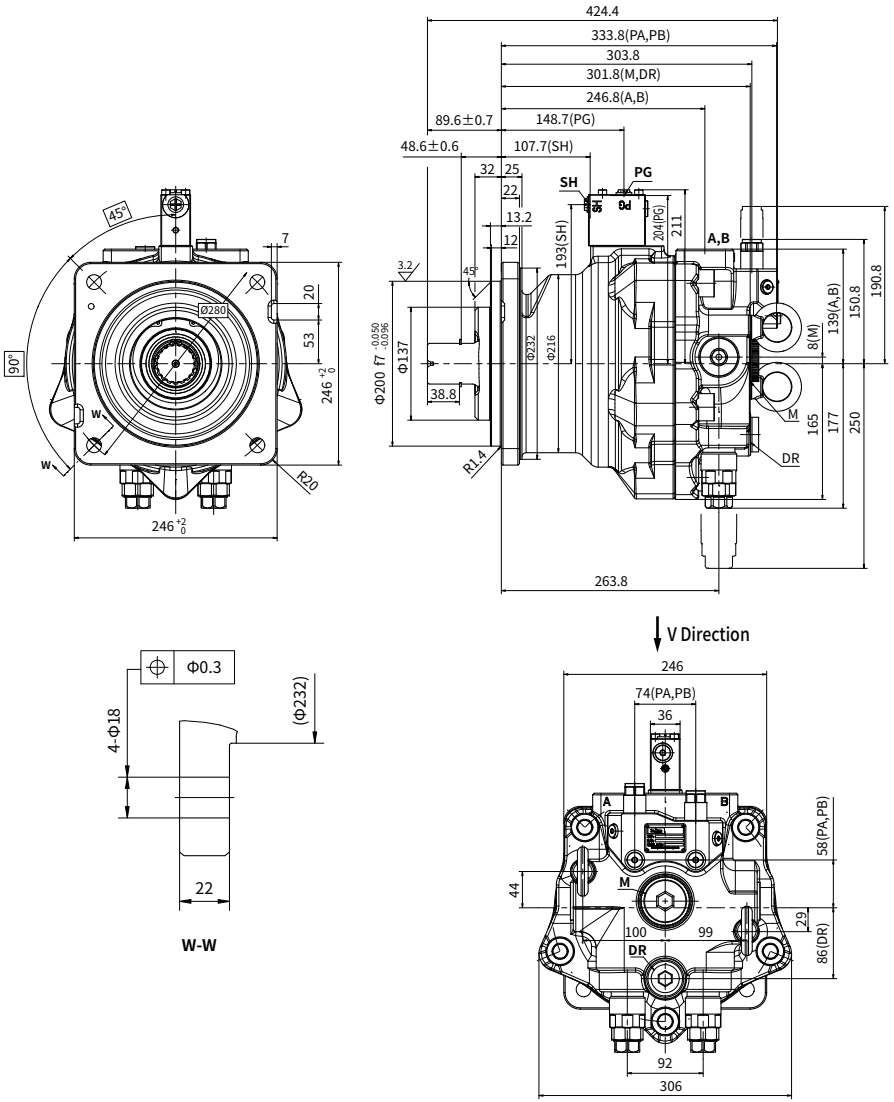
Spline standard	JIS D2001
Number of teeth	14
Module	2.5



Spline standard	JIS D2001
Number of teeth	16
Module	2.5

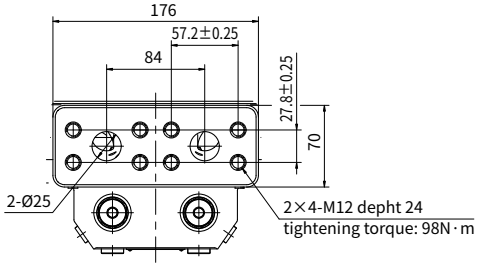
Installation size

HM5X 250 Installation size



Installation size

· HM5X 250 Port details



V Direction View

	Port Name	Port Size and Description	Tightening Torque (N-m)	Plug type
M	Charge port	G1·1/4	200	G1 Plastic plug
DR	Housing drain port	G3/4	109	G1/2 Plastic plug
PG	Braking release port	G1/4（depth 12 mm）	36	G1/4 Plastic plug
SH	Braking pilot port	G1/4（depth 12 mm）	36	G1/4 Plastic plug
PA , PB	Gauge port	G1/4（depth 15 mm）	36	G1/4 Steel plug

· Specifications of output pinion

Shaft spline 49.5×18×2.5		
Flat root and Side fit		
stand-off error		0.8
Tool	Tooth profile	Substandard gear
	Module	2.5
	Pressure angle	20°
No. Of teeth		18
Pitch diameter		Φ45
Major diameter		$\Phi 49.4\ ^{0}_{-0.1}$
Minor diameter		$\Phi 44\ ^{0}_{-0.1}$
Diameter of pina		Φ4.5
Spacing of pina		$\Phi 54.366\ ^{-0.132}_{-0.223}$
Lead tolerance		0.04
Precision class		Class a
Spline standard		JIS D2001

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