



3.2

HM5X SERIES

Swash-plate Type Axial Piston Fixed Displacement Motor

HM5X series swash plate quantitative plunger motor, suitable for High voltage open circuit. Highly compact design with mechanical brakes and accessory valves etc Highly integrated around rotating parts.

Apply to High voltage open circuit

| | | | | | | | | | | |
|------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Size : | 15 | 18 | 23 | 27 | 34 | 45 | 80 | 130 | 180 | 250 |
| Rated pressure (bar) : | 216 | 216 | 216 | 206 | 216 | 240 | 324 | 324 | 324 | 324 |
| Max. pressure (bar) : | 260 | 260 | 260 | 250 | 260 | 290 | 392 | 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 15/18/23/27/34/45:

- 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 | 15 | 18 | 23 | 27 | 34 | 45 | 80 | 130 | 180 | 250 | |
|-------------------------------------|------------------------------|------|------|------|------|--------|-------|-------|-------|-------|------|
| Normal displacement (cc/rev) | 14.5 | 18.1 | 23.6 | 27.4 | 30.5 | 44.1 | 79.9 | 129.2 | 180.1 | 250.1 | |
| Direction of rotation | Clockwise, Counter clockwise | | | | | | | | | | |
| Rotation speed | Max (rpm) | 2150 | 2150 | 1000 | 1600 | 1900 | 1750 | 2200 | 1850 | 1680 | 1520 |
| Pressure | Rated (bar) | 216 | 216 | 216 | 206 | 216 | 240 | 324 | 324 | 324 | 324 |
| | Max (bar) | 260 | 260 | 260 | 250 | 260 | 290 | 392 | 392 | 392 | 392 |
| Torque | Rated output torque (N·m) | 49.5 | 62 | 63 | 89.5 | 105 | 168.5 | 410 | 670 | 930 | 1290 |
| | Max. brake torque (N·m) | 68 | 68 | 68 | 103 | 116 | 178 | 475 | 874 | 1210 | 1770 |
| Barking Pilot Pressure | Min (bar) | 25 | 25 | 25 | 15 | 29 | 15 | 22 | 34 | 34 | 34 |
| | Max (bar) | 49 | 49 | 49 | 39 | 49 | 49 | 49 | 49 | 49 | 49 |
| Casting pressure | Rated (bar) | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 2 |
| | Max (bar) | 3 | 3 | 3 | 3 | 3 | 3 | 6 | 6 | 6 | 6 |
| Reduction ratio | 21.5 | 21.5 | 10 | 22.7 | 23.2 | 20.615 | — | — | — | — | |
| Weight (Kg) | 32 | | | | | | 37 | 25 | 52 | 58 | 84 |
| | Containing Reduction gear | | | | | | 38 | 55 | 61 | 100 | |
| Oil viscosity (mm ² /s) | 7~1600, Best range: 12~80 | | | | | | | | | | |
| Oil Temperature (°C) | -40~100, Best range: 60~85 | | | | | | | | | | |
| Oil Cleanliness | ISO 4406 20/18/15 | | | | | | | | | | |

When the viscosity is within 200 ~ 1000mm²/s, need to preheat before formal running.

Note: The HM5X15, 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)

| | | | | | | | | |
|------|----|---|---|-----|---|----------|---|-----|
| HMSX | 27 | 0 | 0 | 206 | - | RGSS 20A | - | XXX |
| ① | ② | ③ | ④ | ⑤ | | ⑥ | | ⑦ |

Product series

| | | |
|---|-------------------------------|------|
| ① | Swashplate piston fixed motor | HMSX |
|---|-------------------------------|------|

Displacement

| | | | | | | | |
|---|---------------------|----|----|----|----|----|----|
| ② | Displacement cc/rev | 15 | 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 | |
|---|----------------------|--|

Reducer type

| | | |
|---|------------------------------------|---------|
| ⑥ | Suitable for 18 displacement motor | RGSM11A |
| | Suitable for 18 displacement motor | RGSM14A |
| | Suitable for 23 displacement motor | RGSM06A |
| | Suitable for 27 displacement motor | RGSS20A |
| | Suitable for 34 displacement motor | RGSS25A |
| | Suitable for 45 displacement motor | RGSS35A |

Special code

| | | |
|---|--------------|--|
| ⑦ | Special code | |
|---|--------------|--|

Type introduction (2)

| | | | | | | |
|------|----|---|---|-----|---|-----|
| HM5X | 27 | 0 | 0 | 265 | - | XXX |
| ① | ② | ③ | ④ | ⑤ | | ⑥ |

Product series

| | | |
|---|-------------------------------|------|
| ① | Swashplate piston fixed motor | HM5X |
|---|-------------------------------|------|

Displacement

| | | | | | |
|---|---------------------|----|-----|-----|-----|
| ② | Displacement cc/rev | 80 | 130 | 180 | 250 |
|---|---------------------|----|-----|-----|-----|

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

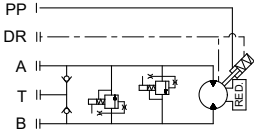
| | | |
|---|----------------------|--|
| ⑤ | Relief valve setting | |
|---|----------------------|--|

Special code

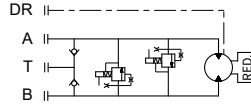
| | | |
|---|--------------|--|
| ⑥ | Special code | |
|---|--------------|--|

Principle

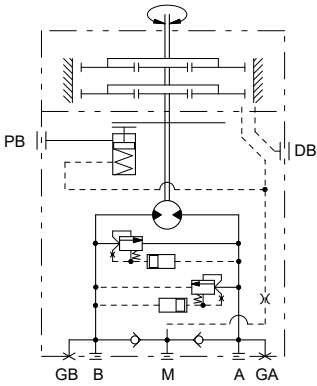
• HM5X 15/18



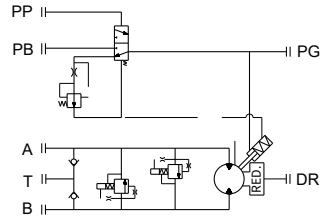
• HM5X 23



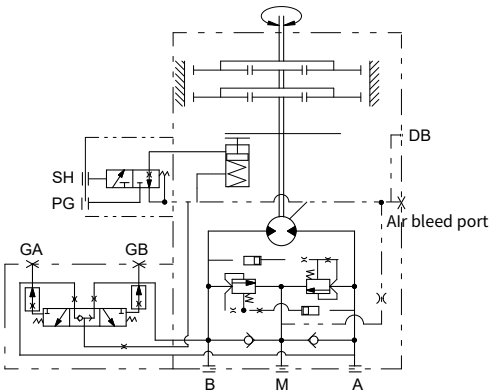
• HM5X 27



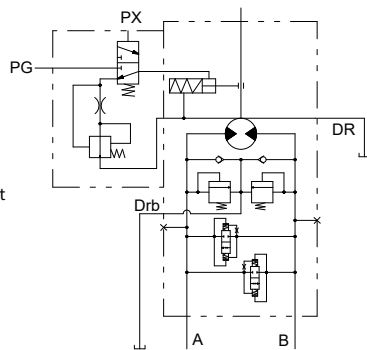
• HM5X 34



• HM5X 45

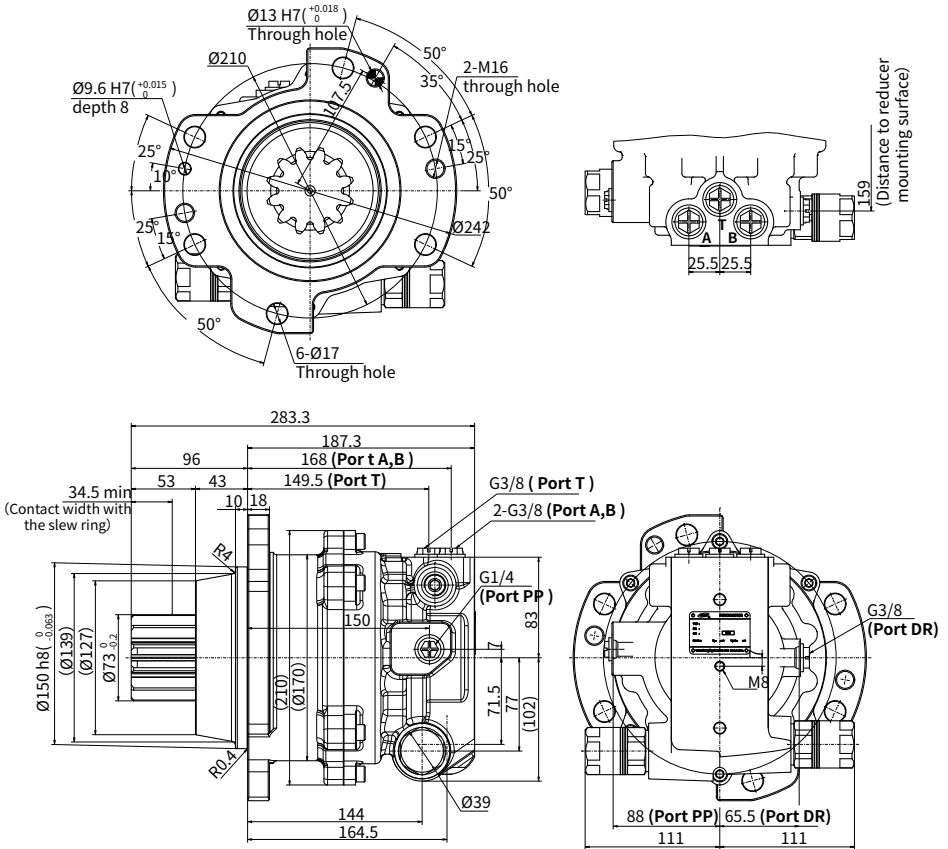


• HM5X 80 / 130 / 180 / 250



Installation size

• HM5X 15 Installation size

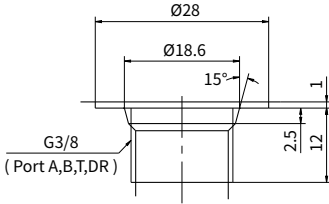


| Inlet port | Outlet port | Rotation direction |
|------------|-------------|--------------------|
| B | A | Clockwise |
| A | B | Anti-clockwise |

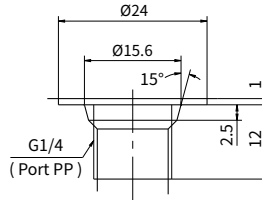
Note: The rotation direction is looked from the shaft end.

Installation size

• HMSX 15 Port details



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



Detailed description of G1/4
(Port PP)

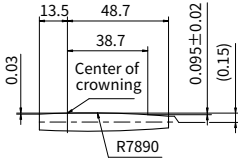
| | Port Name | Port Size and Description | Tightening Torque (N-m) |
|--------|------------------------------|---------------------------|-------------------------|
| A B | Inlet port and Delivery port | G3/8 (depth 12mm) | 70 |
| T | Charge port | G3/8 (depth 12mm) | 70 |
| DR | Housing drain port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

• Specifications of output pinion

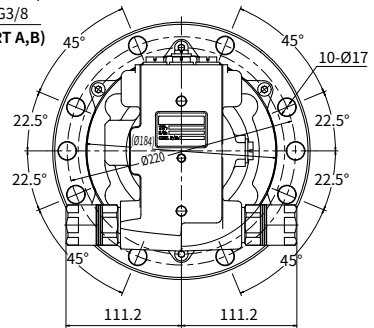
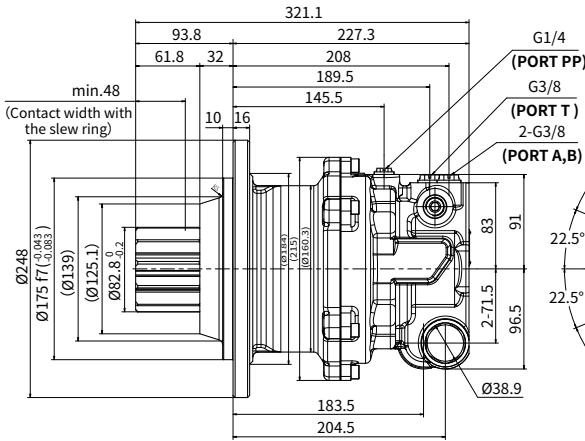
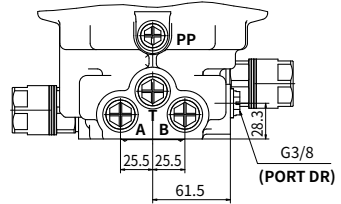
| | |
|-------------------------|--|
| Module | m=5 |
| No.Of teeth | Z=12 |
| Addendum mod. | X=0.4 |
| Displacement over teeth | 24.349 ^{+0.070} _{-0.170} (Measurements with two teeth) |
| Precision class | JIS Class 5 |
| Pressure angle | a=20° |

Installation size

• HM5X 18 Installation size



Detail of crowning

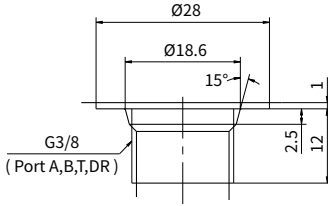


| Inlet port | Outlet port | Rotation direction |
|------------|-------------|--------------------|
| B | A | Clockwise |
| A | B | Anti-clockwise |

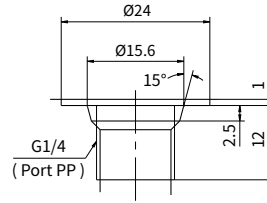
Note: The rotation direction is looked from the shaft end.

Installation size

• HM5X 18 Port details



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



Detailed description of G1/4
(Port PP)

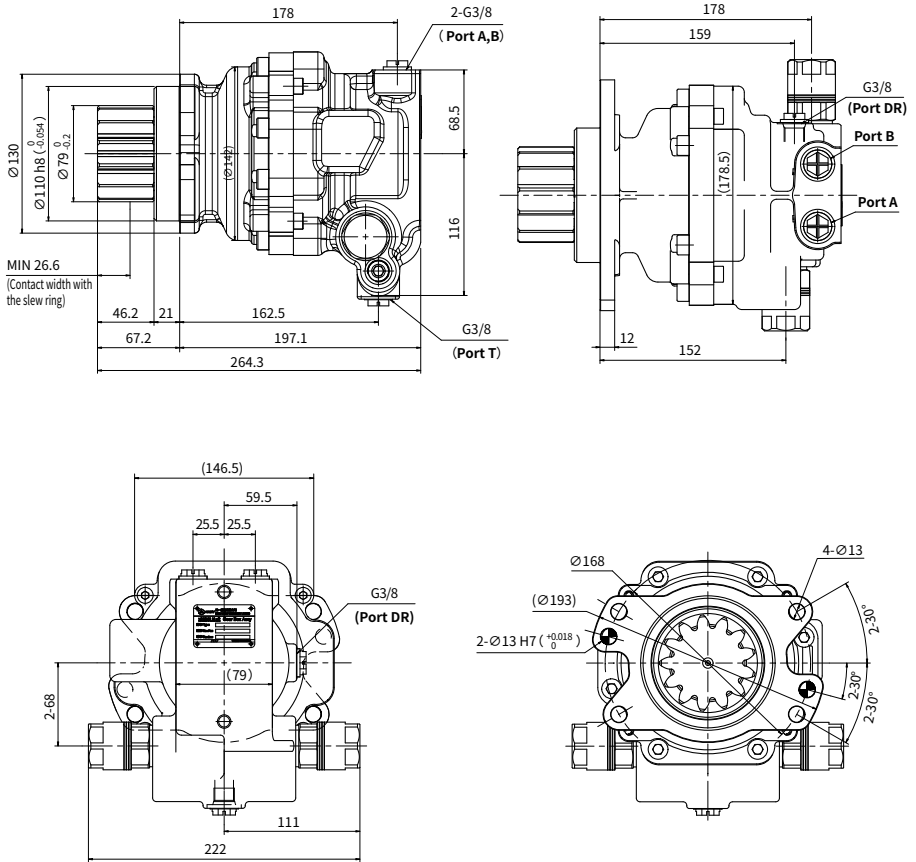
| | Port Name | Port Size and Description | Tightening Torque (N-m) |
|--------|------------------------------|---------------------------|-------------------------|
| A B | Inlet port and Delivery port | G3/8 (depth 12mm) | 70 |
| T | Charge port | G3/8 (depth 12mm) | 70 |
| DR | Housing drain port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

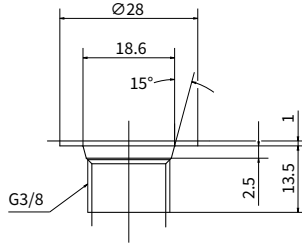


| Inlet port | Outlet port | Rotation direction |
|------------|-------------|--------------------|
| B | A | Clockwise |
| A | B | Anti-clockwise |

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

Installation size

• HM5X 23 Port details



Detailed description of G3/8

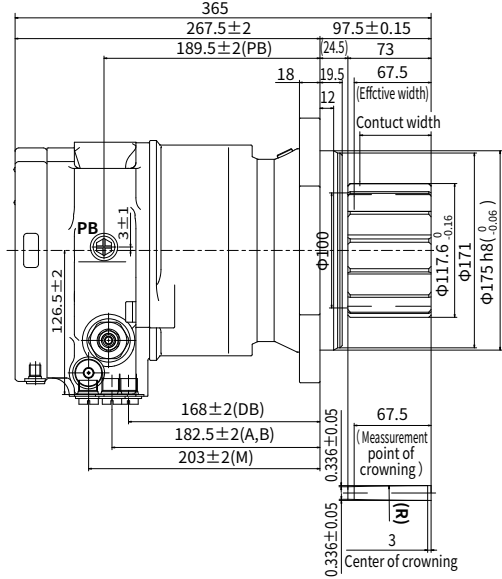
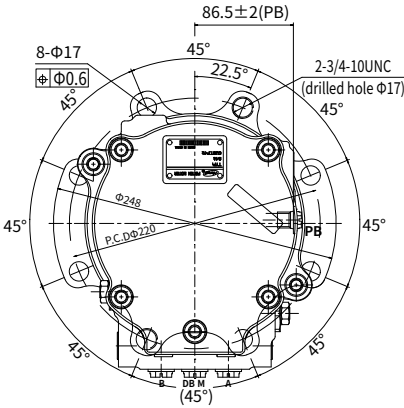
| | Port Name | Port Size and Description | Tightening Torque (N-m) |
|----|------------------------------|---------------------------|-------------------------|
| A | Inlet port and Delivery port | G3/8 (depth 12mm) | 70 |
| B | | | |
| T | Charge port | G3/8 (depth 12mm) | 70 |
| DR | Housing drain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



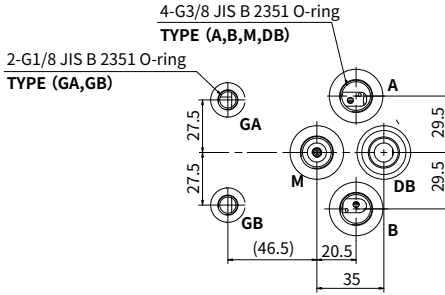
| Inlet port | Outlet port | Rotation direction |
|------------|-------------|--------------------|
| A | B | Clockwise |
| B | A | Anti-clockwise |

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

03

Installation size

• HMSX 27 Port details



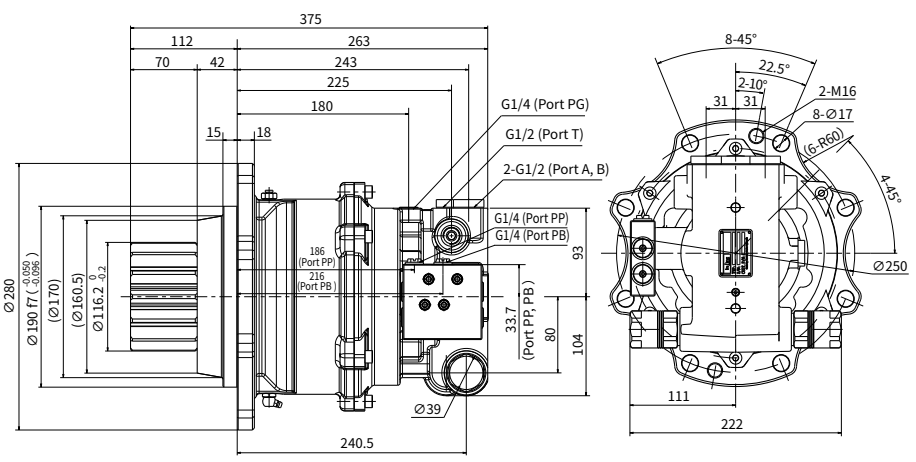
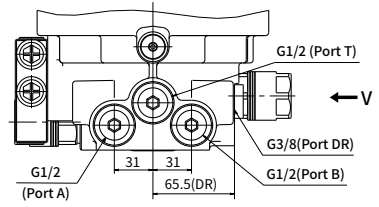
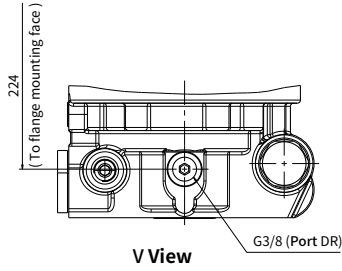
| | Port Name | Port Size and Description | Tightening Torque (N-m) |
|----------|------------------------------|---------------------------|-------------------------|
| A B | Inlet port and Delivery port | G3/8(depth 15mm) | 70 |
| M | Charge port | | |
| DB | Housing drain port | G3/8(depth 15 mm)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

• 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

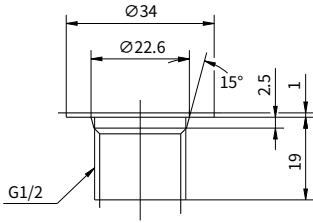


| Inlet port | Outlet port | Rotation direction |
|------------|-------------|--------------------|
| B | A | Clockwise |
| A | B | Anti-clockwise |

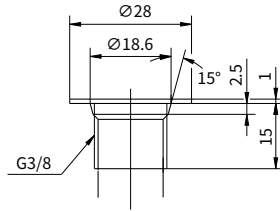
Note: The rotation direction is looked from the shaft end.

Installation size

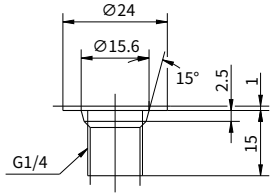
• HMSX 34 Port details



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)

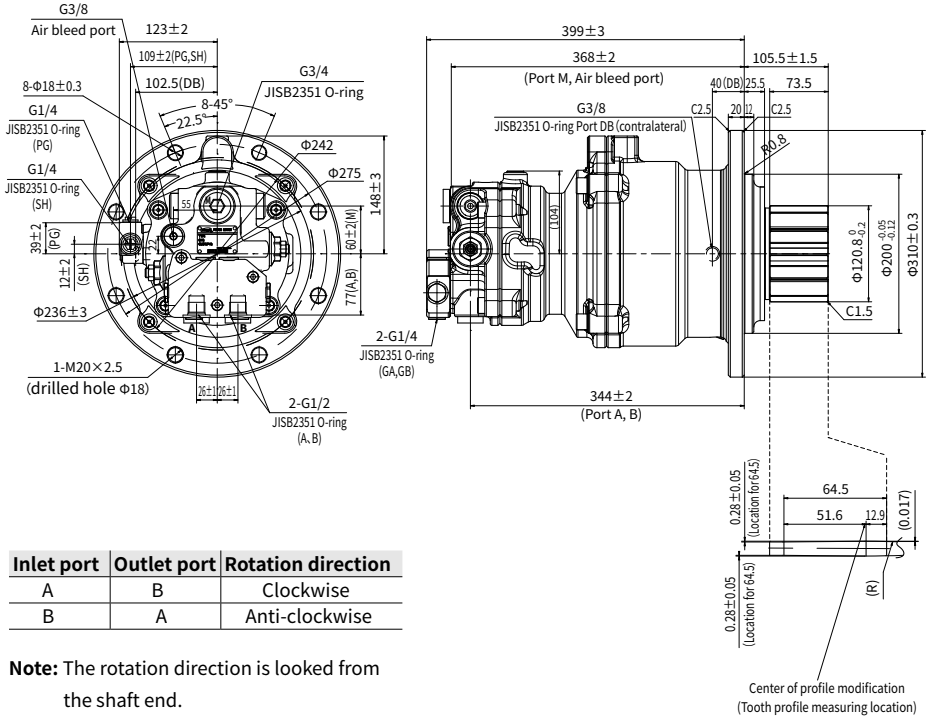
| | Port Name | Port Size and Description |
|----|------------------------------|---------------------------|
| A | Inlet port and Delivery port | G1/2 (depth 19mm) |
| B | | |
| T | Charge port | |
| DR | Housing drain port | G3/8 (depth 15 mm) |
| PP | Braking release pilot port | G1/4 (depth 15 mm)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

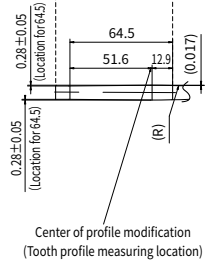
Installation size

• 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.



Center of profile modification
(Tooth profile measuring location)

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

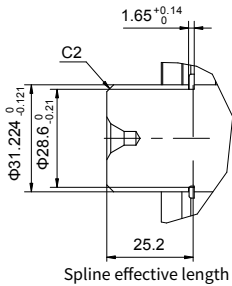
| | | |
|------------------------------|-------------------------|---|
| Tool | Tooth profile | Standard gear |
| | Module | 8 |
| | Pressure angle | 20° |
| No. Of teeth | 12 | |
| Pitch diameter | Φ96 | |
| Addendum mod. | 4.4 (X=+0.55) | |
| Tooth thickness | Displacement over teeth | 39.780 $^{+0.083}_{-0.189}$ (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

• HMSX 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 |

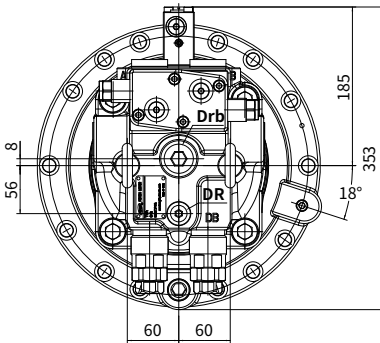
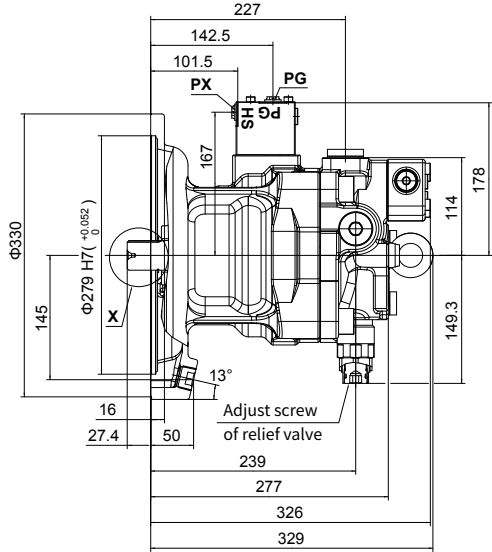
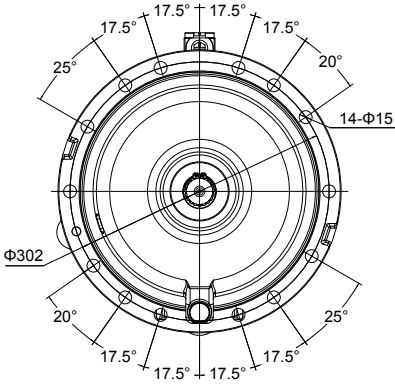
• HMSX 80 Shaft specification



| 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



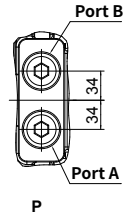
| Inlet port | Outlet port | Rotation direction |
|------------|-------------|--------------------|
| A | B | Clockwise |
| B | A | Anti-clockwise |

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

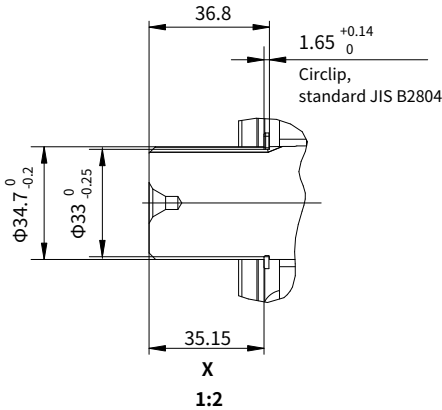
Installation size

• 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 | | |



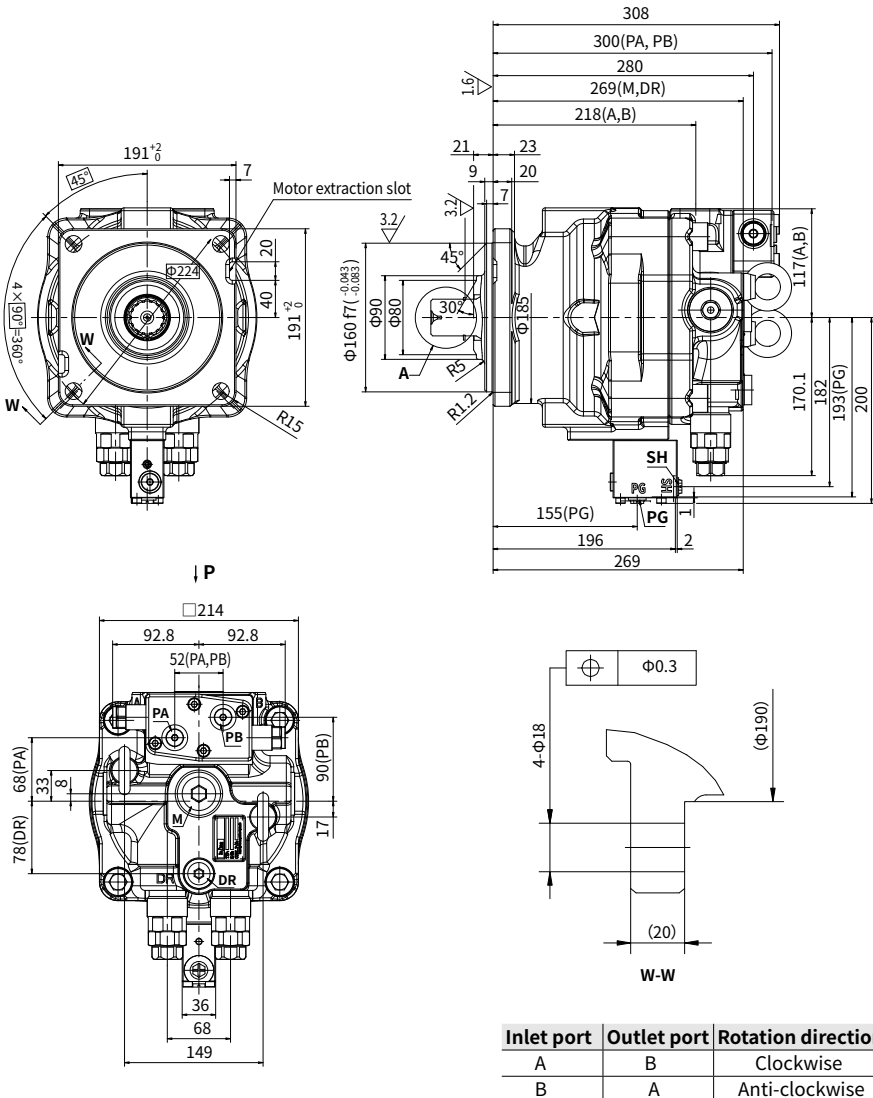
• HM5X 130 Shaft specification



| | |
|-----------------|-----------|
| 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

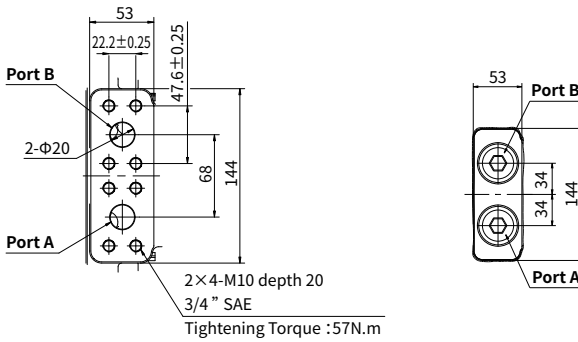
• HMSX 180 Ports size

(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 measuring | G1/4(depth 15mm) | 36 |

• HMSX 180 Inlet and Delivery ports options

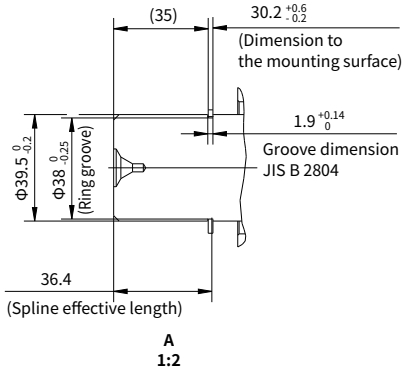
(P direction)



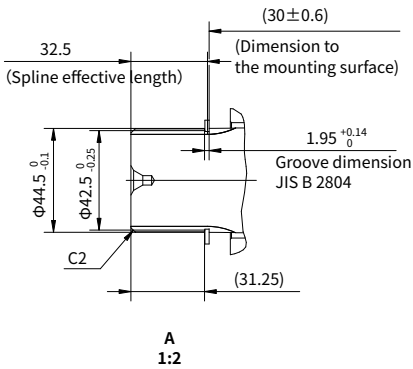
| | Port Name | Port Size and Description | Tightening Torque (N-m) |
|---------------|-----------|------------------------------|-------------------------|
| Flanged type | A | Inlet port and Delivery port | SAE G3/4 |
| | B | | |
| Threaded type | A | Inlet port and Delivery port | G3/4(depth 20mm)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

Installation size

· HM5X 180 Shaft specification



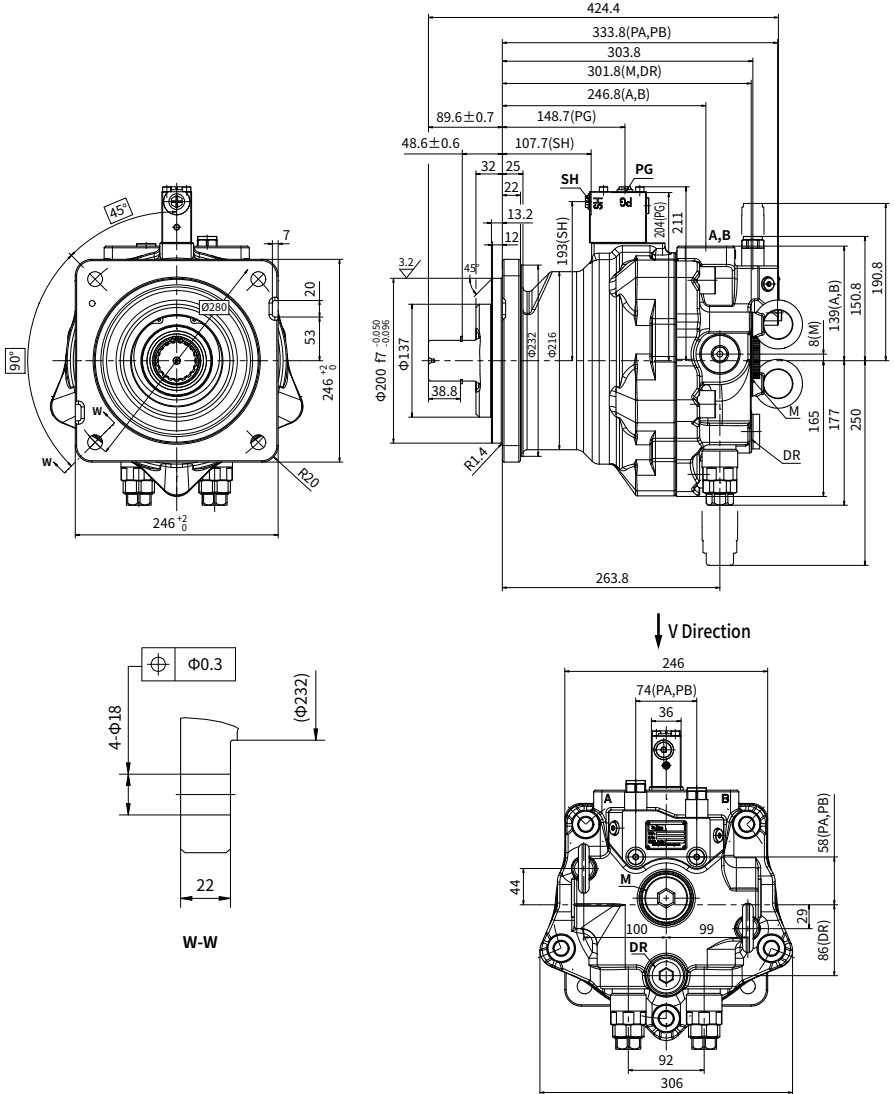
| | |
|-----------------|-----------|
| Spline standard | JIS D2001 |
| Number of teeth | 14 |
| Module | 2.5 |



| | |
|-----------------|-----------|
| Spline standard | JIS D2001 |
| Number of teeth | 16 |
| Module | 2.5 |

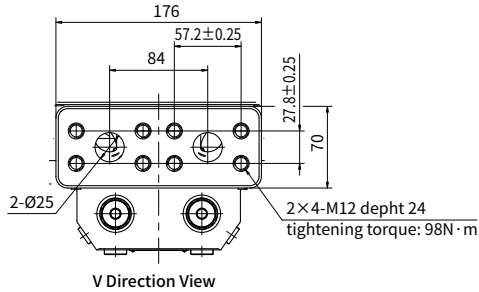
Installation size

HM5X 250 Installation size



Installation size

·HM5X 250 Port details



| | 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 | Φ49.4 ⁰ _{-0.1} | |
| Minor diameter | Φ44 ⁰ _{-0.1} | |
| Diameter of pina | Φ4.5 | |
| Spacing of pina | Φ54.366 ^{-0.132} _{-0.223} | |
| Lead tolerance | 0.04 | |
| Precision class | Class a | |
| Spline standard | JIS D2001 | |

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