



3.3

M70F(E) SERIES

Swash-plate Type Axial Piston Fixed Displacement Motor

M70F(E) series swash plate axial piston motor is a kind of fixed displacement motor with wide application for open and closed circuit. The swashplate design allows a compact motor with high power density. This series is applicable to farm machinery, construction machinery and industrial vehicles.

Apply to open and closed hydraulic circuit

| | | | | | | |
|------------------------|-----|-----|-----|-----|-----|-----|
| Displacements (cc/rev) | 45 | 63 | 75 | 85 | 100 | 130 |
| Rated pressure (bar) | 280 | 400 | 400 | 400 | 400 | 400 |
| Maximum pressure(bar) | 350 | 450 | 450 | 450 | 450 | 450 |



Contents

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Features

- **High speed operation and smooth starting characteristics:**
Optimized rotary balance design high-speed performance and excellent starting characteristics.
- **Low speed operation:**
Superior performance in low speed operation provides excellent controllability.
- **Compact size:**
Swash plate conguration enables the motor to be much more compact.
- **Long bearing life:**
Swash plate conguration results in longer bearing life.

Technical Data

| | | | | | | | |
|-------------------------------------|------------------------------|---|--------|--------|-------|-------|-------|
| Size | | 45 | 63 | 75 | 85 | 100 | 130 |
| Max. Displacement: q_{\max} | cm^3 | 45 | 63 | 75 | 85 | 100 | 130 |
| Max. speed: N | min^{-1} | 4000 | 5000 | 4500 | 4500 | 3550 | 3400 |
| Rated pressure: P_{nom} *1 | bar | 280 | 400 | 400 | 400 | 400 | 400 |
| Max. pressure: P_{\max} *2 | bar | 350 | 450 | 450 | 450 | 450 | 450 |
| Theoretical output torque | $\text{N} \cdot \text{m}$ | 200 | 401 | 478 | 542 | 636 | 830 |
| Power | Kw | 84 | 210 | 225 | 255 | 236 | 295 |
| Max. Flow: Q | L/min | 180 | 315 | 337 | 382 | 355 | 442 |
| Moment of inertia | $\text{kg} \cdot \text{m}^2$ | 0.0033 | 0.0072 | 0.0072 | 0.011 | 0.015 | 0.025 |
| Volume in the case | L | 0.7 | 1 | 1 | 0.5 | 0.5 | 1.2 |
| Mass | Kg | 19.4 | 26 | 26.5 | 28.6 | 32.8 | 49.4 |
| Temperature | $^{\circ}\text{C}$ | at drain port: -20 ~ +115 at inlet port: -20 ~ +90 | | | | | |

The data in the above table is the theoretical value.

* 1: Nominal pressure corresponds to the design pressure to provide appropriate performance, function, and service life.

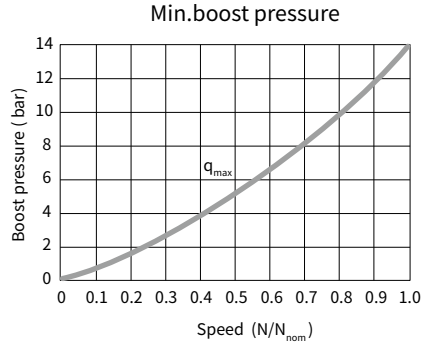
: Nominal pressure corresponds to the design pressure at which the products will function properly.

* 2: Hengli standard.

Min.boost pressure

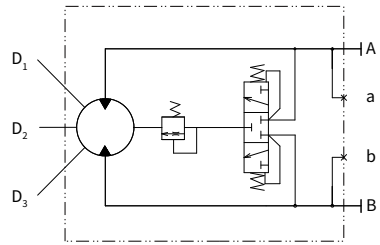
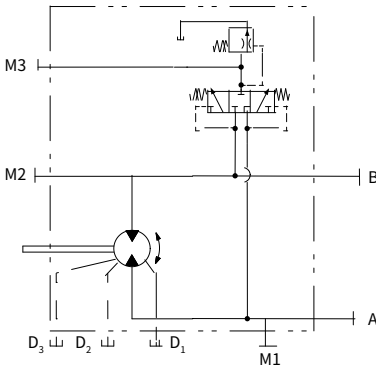
To prevent cavitation when the motor is operating in a pumping mode, a positive pressure is required at the suction port.

The figure above shows the minimum boost pressure requirement based on regular operation. In case of a rapid change of the ow, more boost pressure must be applied.

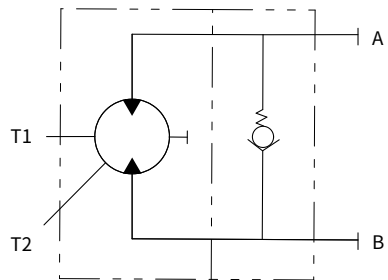
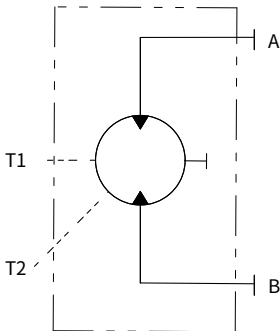


Principle

• M70F



• M70FE



Type introduction

| | | | | | | | | |
|------|----|---|---|---|---|----|---|---|
| M70F | 85 | A | A | M | A | L2 | — | N |
| ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | | ⑧ |

Product series

| | | | | | | | | |
|---|--|----|----|----|----|-----|-----|-------|
| ① | Product series | 45 | 63 | 75 | 85 | 100 | 130 | Code |
| | Swash-plate Type Axial Piston Fixed Displacement Motor (Flange-type motor) | | ● | ● | ● | ● | ● | M70F |
| | Swash-plate Type Axial Piston Fixed Displacement Motor (Plug-in motor) | ● | | | | | | M70FE |

Displacement

| | | | | | | | |
|---|--------------|----|----|----|----|-----|-----|
| ② | Displacement | 45 | 63 | 75 | 85 | 100 | 130 |
|---|--------------|----|----|----|----|-----|-----|

Port flange and port position

| | | | | | | | | | |
|----------------------------------|--------------------|---|----|----|----|----|-----|-----|------|
| ③ | Port flange | Port position | 45 | 63 | 75 | 85 | 100 | 130 | Code |
| | ISO 6162-2 DN19 | working ports A and B at side, opposite | | ● | | | | | 1A |
| | | working ports A and B, at bottom | ● | | | | | | 1R |
| | ISO 6162-2 DN25 | working ports A and B at side, opposite | | | ● | ● | | | 2A |
| | | working ports A and B, at bottom | | | ● | ● | | | 2R |
| | ISO 6162-2 DN32 | working ports A and B at side, opposite | | | | | | | 3A |
| working ports A and B, at bottom | | | | | | ● | ● | 3R | |

Thread connection type (except inlet and thread type of Flange Port)

| | | | | | | | | |
|---|-------------------------|----|----|----|----|-----|-----|------|
| ④ | | 45 | 63 | 75 | 85 | 100 | 130 | Code |
| | UNC port, ISO 11926 | ● | ● | ● | ● | ● | ● | A |
| | Metric port, ISO 6149 | | ● | ● | ● | ● | | M |
| | Metric port, DIN 3852 | | ● | ● | ● | ● | | E |
| | BSPPG thread, JIS B2351 | | ● | ● | ● | ● | | G |

Thread type of Flange Port

| | | | | | | | | |
|---|---------------------------------|----|----|----|----|-----|-----|------|
| ⑤ | | 45 | 63 | 75 | 85 | 100 | 130 | Code |
| | UNC threads (only for UNC port) | | ● | ● | ● | ● | | A |
| | Metric thread | ● | ● | ● | ● | ● | ● | M |

Type introduction

Input Shaft

| | Standard | Size | 45 | 63 | 75 | 85 | 100 | 130 | Code |
|---|-------------------|----------------------|----|----|----|----|-----|-----|------|
| ⑥ | ANSI B92.1 | 1 1/2 in 17T 12/24DP | | | | ○ | | | 1 |
| | ANSI B92.1 | 1 3/4 in 13T 8/16DP | | | | ○ | | | 2 |
| | ANSI B92.1 | 2 in 15T 8/16DP | | | | ○ | | | 3 |
| | ANSI B92.1 | 1 3/8 in 21T 16/32DP | | | ● | ● | ○ | | 4 |
| | ANSI B92.1 | 1 1/4 in 14T 12/24DP | | | | ○ | | | 5 |
| | DIN 5480 | W35×2×16×9g | | ● | | ○ | | | 6 |
| | DIN 5480 | W40×2×18×9g | | | | ○ | | | 7 |
| | DIN 5480 | W45×2×21×9g | | | | ○ | | | 8 |
| | DIN 5480 | W50×2×24×9g | | | | ○ | | | 9 |
| | ANSI B92.1 | 23T 16/32DP | | | ● | ● | ● | | A |
| | SAE J498B | 27T 16/32DP | | | | | ○ | ● | B |
| | Taper (125: 1000) | | | ● | | | | | D |

Mounting flange

| | | | | | | | | |
|---|------------------------|----|----|----|----|-----|-----|------|
| ⑦ | Mounting flange (M70F) | | 63 | 75 | 85 | 100 | 130 | Code |
| | SAE J744 127-4 | | ● | ● | ● | ● | | L2 |
| | SAE J744 152-4 | | | | | | ● | L3 |
| | Mounting flange(M70FE) | 45 | | | | | | Code |
| | SAE 2-Hole | ● | | | | | | L1 |

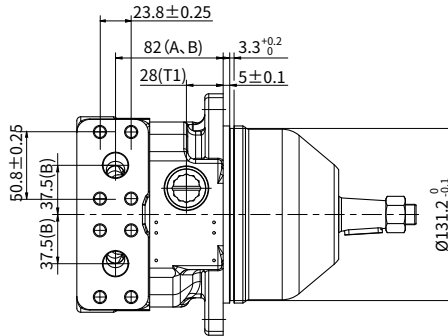
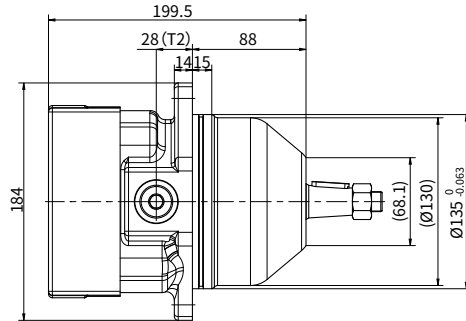
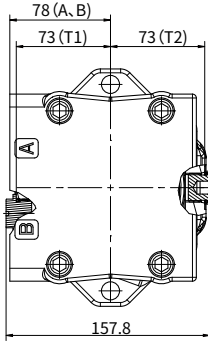
Flushing flow (L/min)

| Standard version | | | | | | | N |
|------------------|-----------------|--|---------------|------|---------------|------|--|
| ⑧ | Special version | Without flush valve (Only M70F75、M70F85、M70F100、M70F130) | Flushing flow | Code | Flushing flow | Code | Opening pressure 16bar, differential pressure ΔP=25bar |
| | | | 3.5 | A | 20 | G | |
| | | | 5 | B | 25 | H | |
| | | | 8 | C | 30 | I | |
| | | | 10 | D | 35 | J | |
| | | | 14 | E | 40 | K | |
| | | | 17 | F | | | |

Remark: ● = Available; ○ = On request

Installation size

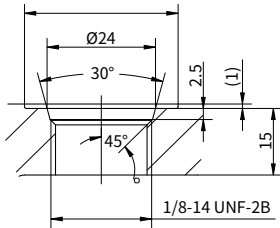
M70FE 45 Installation size



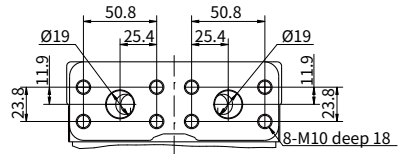
| Control and Flow | | Oil direction | |
|--------------------|----------------------------|---------------|------------|
| | | Oil port A | Oil port B |
| Rotation direction | Clockwise rotation | Out | Inlet |
| | Counter clockwise rotation | Inlet | Out |

Installation size

• M70FE 45 Port details



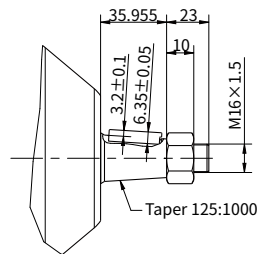
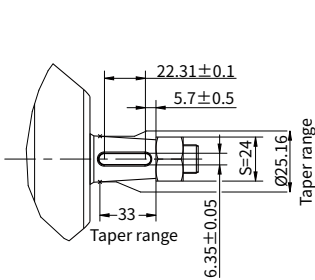
T1, T2 Port Details



Port details

| | Port name | Port size and description |
|--------|------------------------------|---------------------------|
| A、 B | Inlet port and Delivery port | SAE J518 3/4" M10 |
| T1、 T2 | Case drain port | ISO 11926 7/8-14 UNF-2B |

• M70FE 45 Input shaft type

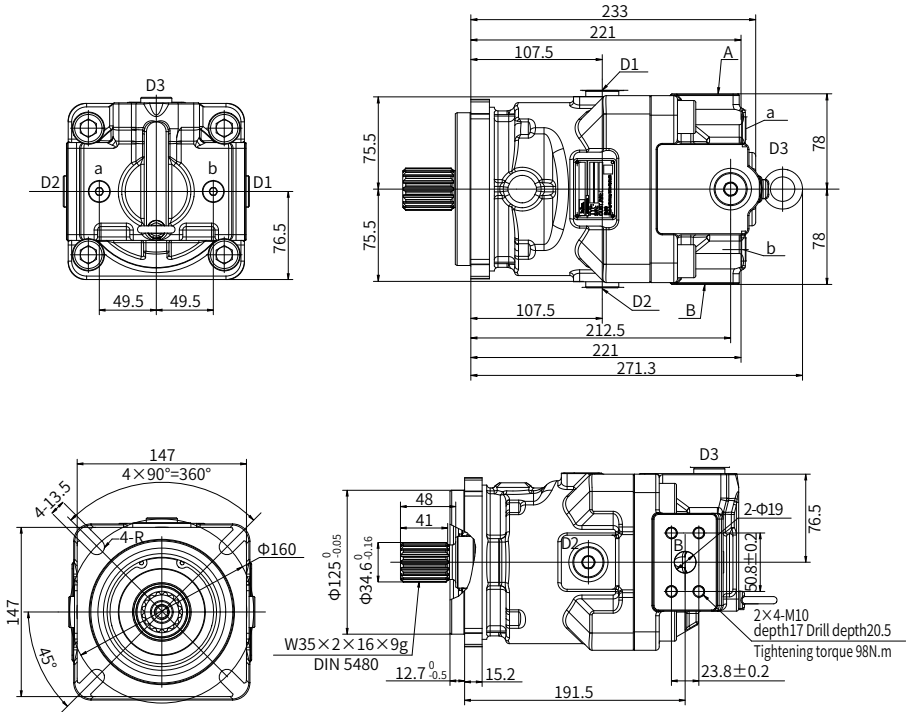


“D” type shaft

Installation size

M70F 63 Installation size

Working ports A and B at side, opposite



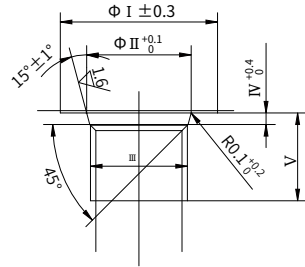
| Inlet port | Outlet port | Rotation direction |
|------------|-------------|--------------------|
| A | B | Clockwise |
| B | A | Anti-clockwise |

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

Installation size

• Port and flange fixing thread

(Ordering Code ④)



• Drain port and gauge port

Parallel piping thread type (Code : 1)

| | Symbol | I | II | III | IV | V | Tightening torque (N.m) |
|----------|------------|----|------|------|-----|----------|-------------------------|
| a,b | Gauge port | 24 | 15.6 | G1/4 | 2.5 | 15 | 36 |
| D1/D2/D3 | Drain port | 34 | 22.6 | G1/2 | 2.5 | 13/13/19 | 98 |

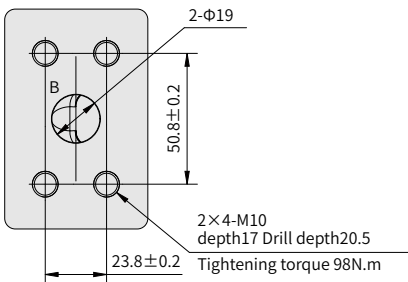
Metric thread type (Code : 4)

| | Symbol | I | II | III | IV | V | VI | Tightening torque (N.m) |
|----|------------|------|---------|-----|------|----|-----|-------------------------|
| 25 | Gauge port | 15.6 | M14×1.5 | 2.4 | 15.5 | 15 | 47 | 59 |
| 40 | Drain port | 29.2 | M27×2 | 3.1 | 13 | 15 | 180 | 170 |

ANSI thread type (Code : 2, 3)

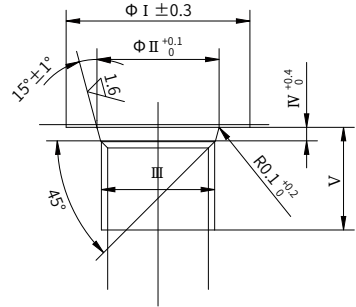
| | Symbol | I | II | III | IV | V | VI | Tightening torque (N.m) |
|----|------------|----|------|----------------|-----|------|----|-------------------------|
| 25 | Gauge port | 25 | 15.6 | 9/16-18UNF-2B | 2.5 | 15.5 | 12 | 59 |
| 34 | Drain port | 41 | 29.2 | 1-1/16-12UN-2B | 3.3 | 13 | 15 | 170 |

• Port details



Installation size

- **Port and flange fixing thread**
(Ordering Code ④)

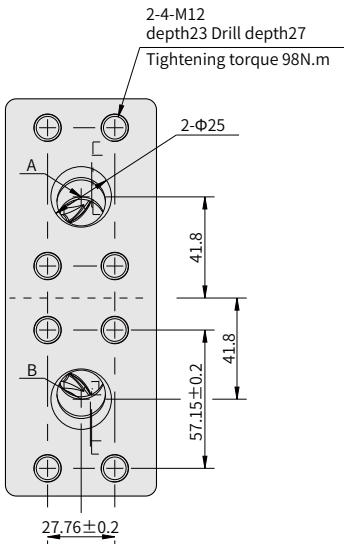


- **Drain port and gauge port**

ANSI thread type (Code : 2,3)

| | Symbol | I | II | III | IV | V | Tightening torque (N.m) |
|----------|------------|----|------|------|-----|----------|-------------------------|
| M1/M2/M3 | Gauge port | 24 | 15.6 | G1/4 | 2.5 | 15 | 36 |
| D1/D2/D3 | Drain port | 34 | 22.6 | G1/2 | 2.5 | 13/13/19 | 98 |

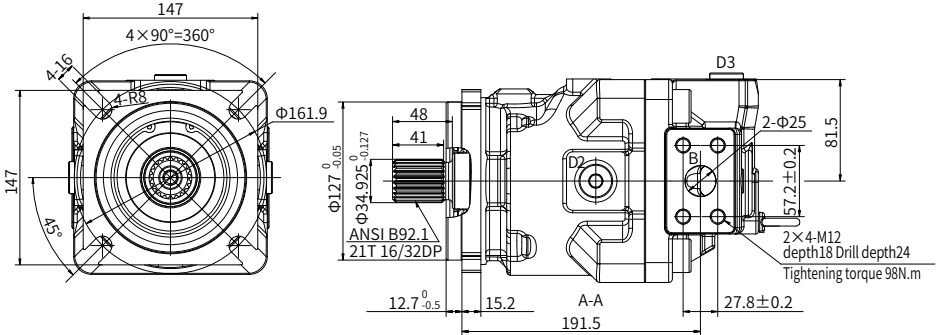
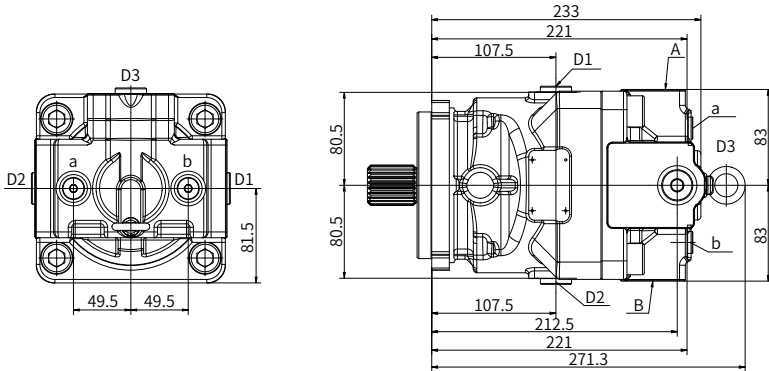
- **Port details**



Installation size

M70F 85 Installation size

working ports A and B at side, opposite



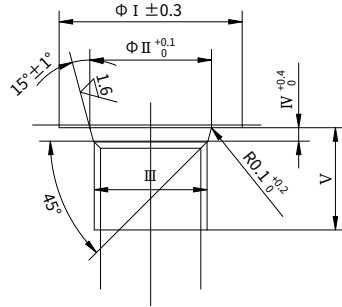
| Inlet port | Outlet port | Rotation direction |
|------------|-------------|--------------------|
| A | B | Clockwise |
| B | A | Anti-clockwise |

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

Installation size

• Port and flange fixing thread

(Ordering Code ④)



• Drain port and gauge port

ANSI thread type (Code : 2,3)

| | Symbol | I | II | III | IV | V | Tightening torque (N.m) |
|----------|------------|----|------|------|-----|----------|-------------------------|
| a,b | Gauge port | 24 | 15.6 | G1/4 | 2.5 | 15 | 36 |
| D1/D2/D3 | Drain port | 34 | 22.6 | G1/2 | 2.5 | 13/13/19 | 98 |

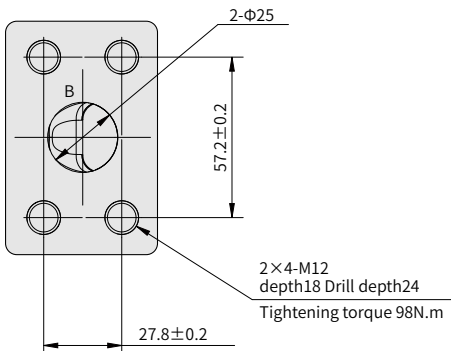
Metric thread type (Code : 4)

| | Symbol | I | II | III | IV | V | VI | Tightening torque (N.m) |
|----|------------|------|---------|-----|------|----|-----|-------------------------|
| 25 | Gauge port | 15.6 | M14×1.5 | 2.4 | 15.5 | 15 | 47 | 59 |
| 40 | Drain port | 29.2 | M27×2 | 3.1 | 13 | 15 | 180 | 170 |

Parallel piping thread type (Code : 1)

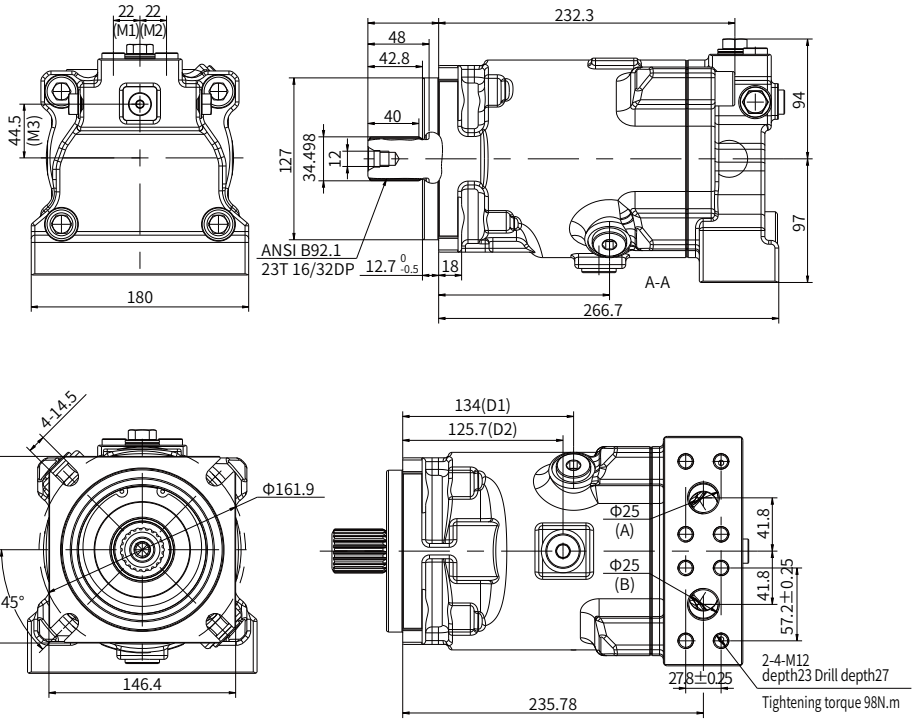
| | Symbol | I | II | III | IV | V | VI | Tightening torque (N.m) |
|----|--------|------|-------|-----|------|----|----|-------------------------|
| 25 | 25 | 15.6 | G 1/4 | 2.5 | 15.5 | 15 | 36 | 59 |
| 34 | 34 | 29.2 | G 1/2 | 2.5 | 13 | 15 | 98 | 170 |

• Port details



Installation size

M70F 100 Installation size working ports A and B, at bottom



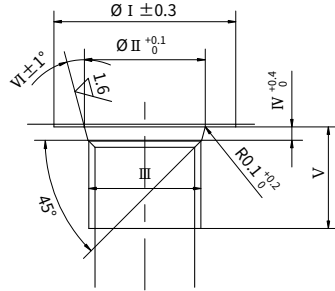
| Inlet port | Outlet port | Rotation direction |
|------------|-------------|--------------------|
| A | B | Clockwise |
| B | A | Anti-clockwise |

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

Installation size

• Port and flange fixing thread

(Ordering Code ④)



• Drain port and gauge port

ANSI thread type (Code : 2,3)

| | Symbol | I | II | III | IV | V | VI | Tightening torque (N.m) |
|----------|------------|----|------|----------------|-----|------|----|-------------------------|
| M1/M2/M3 | Gauge port | 25 | 15.6 | 9/16-18UNF-2B | 2.5 | 15.5 | 12 | 59 |
| D1/D2/D3 | Drain port | 41 | 29.2 | 1-1/16-12UN-2B | 3.3 | 13 | 15 | 170 |

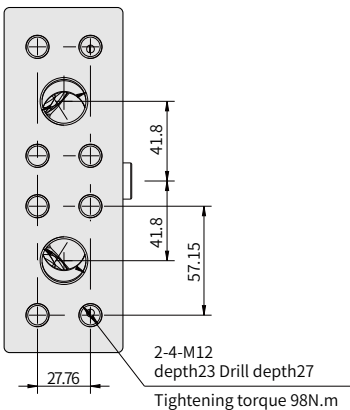
Metric thread type (Code : 4)

| | Symbol | I | II | III | IV | V | VI | Tightening torque (N.m) |
|----|------------|------|---------|-----|------|----|-----|-------------------------|
| 25 | Gauge port | 15.6 | M14×1.5 | 2.4 | 15.5 | 15 | 47 | 59 |
| 40 | Drain port | 29.2 | M27×2 | 3.1 | 13 | 15 | 180 | 170 |

Parallel piping thread type (Code : 1)

| | Symbol | I | II | III | IV | V | VI | Tightening torque (N.m) |
|----|--------|------|-------|-----|------|----|----|-------------------------|
| 25 | 25 | 15.6 | G 1/4 | 2.5 | 15.5 | 15 | 36 | 59 |
| 34 | 34 | 29.2 | G 1/2 | 2.5 | 13 | 15 | 98 | 170 |

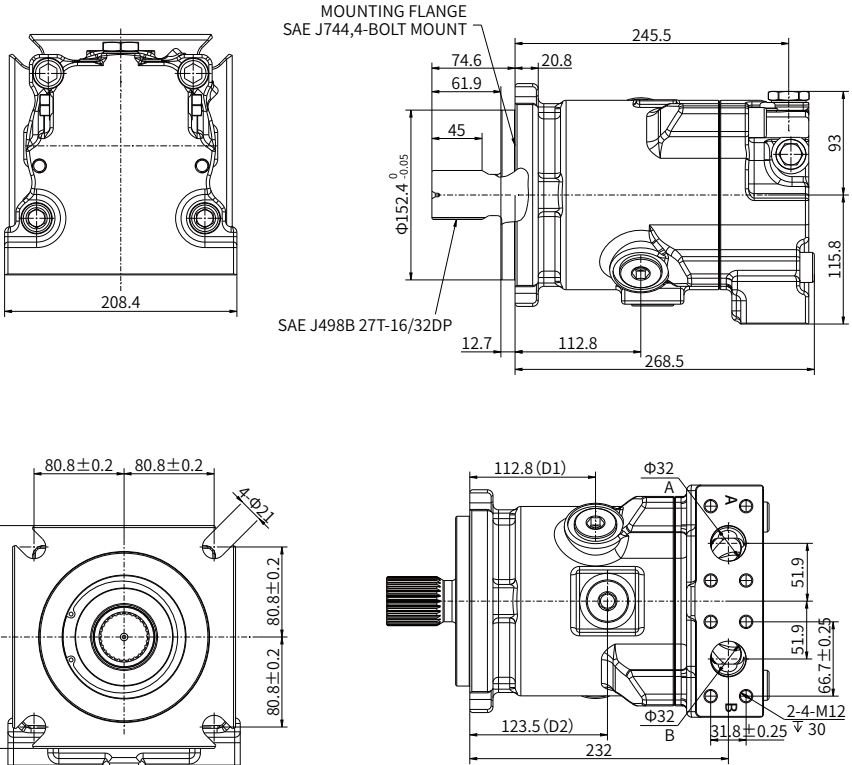
• Port details



Installation size

M70F 130 Installation size

working ports A and B, at bottom

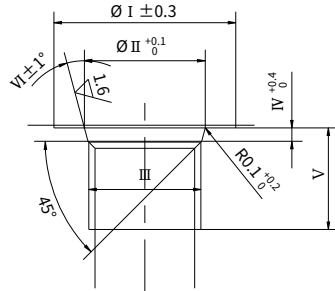


| Inlet port | Outlet port | Rotation direction |
|------------|-------------|--------------------|
| A | B | Clockwise |
| B | A | Anti-clockwise |

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

Installation size

• Port and flange fixing thread (Ordering Code ④)

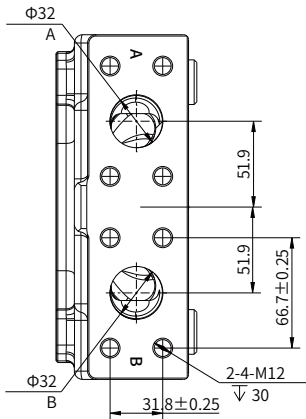


• Drain port and gauge port

ANSI thread type (Code : 2,3)

| | Symbol | I | II | III | IV | V | VI | Tightening torque (N.m) |
|----------|------------|----|-------|----------------|-----|------|-----|-------------------------|
| a,b | Gauge port | 25 | 15.7 | 9/16-18UNF-2B | 2.5 | 14.5 | 12° | 30 |
| D1/D2/D3 | Drain port | 49 | 35.55 | 1 5/16-12UN-2B | 3.3 | 24 | 15° | 150 |

• Port details



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