



3.4

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

Size	45	55	63	65	75	85	100	130
Rated pressure (bar)	280/345	400	400	280	400	400	400	400
Maximum pressure(bar)	350/415	450	450	350	450	450	450	450



Contents

Technical Data	02
Type introduction	03
Min.boost pressure	06
Principle	06
Installation size	
· M70F(E) 45 Installation size	07
· M70F 55 Installation size	11
· M70F 63 Installation size	13
· M70FE 65 Installation size	15
· M70F 75 Installation size	17
· M70F 85 Installation size	19
· M70F 100 Installation size	21
· M70F 130 Installation size	23

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

M70F		45	-	-	63	-	75	85	100	130
M70F(E)		-	45	55	-	65	-	-	-	-
Max. Displacement: V_{max}	cm^3	44.2	45	55	63	65	75	85	100	130
Max. speed: N	min^{-1}	4100	4000	4250	5000	3400	4500	4500	3550	3400
Rated pressure: P_{nom} *1	bar	345	280	400	400	280	400	400	400	400
Max. pressure: P_{max} *2	bar	415	350	450	450	350	450	450	450	450
Theoretical output torque	$N \cdot m$	244.3	200	350	401	289	478	542	636	830
Power	Kw	104.9	84	155.7	210	103	225	255	236	295
Max. Flow: Q	L/min	182.45	180	233.8	315	221	337	382	355	442
Moment of inertia	$kg \cdot m^2$	0.0032	0.0033	0.006	0.0072	0.0072	0.0072	0.011	0.015	0.025
Volume in the case	L	0.7	0.7	1	1	0.7	1	0.5	0.5	1.2
Mass	Kg	19.5	19.4	29.2	26	29.9	26.5	28.6	32.8	49.4
Temperature	$^{\circ}C$	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.

* 2: Summation of pressure on A and B port shall be 560bar or less.

Type introduction

M70F	85	A	A	M	A	L2	—	N	N
①	②	③	④	⑤	⑥	⑦		⑧	⑨

Product series

①	Product series	45	55	63	65	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

Size

②	Size	45	55	63	65	75	85	100	130
---	------	----	----	----	----	----	----	-----	-----

Specifications and positions of the inlet and outlet ports

③	Port specification (M70F)	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
	1-1/16-12UN-2B	working ports A and B at side, opposite	●								4A
		working ports A and B, at bottom	●								4R
	G3/4	working ports A and B, at bottom	●								5R
	Port specification (M70FE)	Port position	45	55		65					Code
	ISO 6162-2 DN19	working ports A and B, at bottom	●			●					1R
	ISO 6162-2 DN25	working ports A and B, at bottom		●							2R

Type introduction

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

④	Port type (M70F)	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
	Port type (M70FE)	45	55		65					Code
	UNC port, ISO 11926	●	●		●					A

Thread type of Flange Port

⑤	Thread specification (M70F)	45		63		75	85	100	130	Code
	UNC threads (only for UNC port)	●		●		●	●	●		A
	Metric thread			●		●	●	●	●	M
	BSPPG thread, JIS B2351	●								G
	Thread specification (M70FE)	45	55		65					Code
	UNC threads (only for UNC port)		●							A
	Metric thread	●			●					M

Input Shaft

⑥	Standard (M70F)	Size	45		63		75	85	100	130	Code
	ANSI B92.1	1 1/2 in 17T 12/24DP									1
		1 3/4 in 13T 8/16DP									2
		2 in 15T 8/16DP									3
		1 3/8 in 21T 16/32DP					●	●	●		4
		1 1/4 in 14T 12/24DP						●			5
		23T 16/32DP					●	●	●		A
		13T 16/32DP	●								H
		15T 16/32DP	●								J
	DIN 5480	W30×2×14×9g	●								G
		W35×2×16×9g			●						6
		W40×2×18×9g									7
		W45×2×21×9g									8
		W50×2×24×9g									9
	SAE J498B	27T 16/32DP								●	B
	Straight shaft (shaft diameter Ø 34)		●								K
	Standard (M70FE)	Size	45	55		65					Code
	ANSI B92.1	1 1/4 in 14T 12/24DP		●							5
	Taper (125: 1000)		●			●					D

Type introduction

Mounting flange

⑦	Mounting flange (M70F)	45		63		75	85	100	130	Code
	SAE J744 127-4			●		●	●	●		L2
	SAE J744 152-4								●	L3
	SAE J744 101.6-2	●								L4
	Special 2-Hole (127-2)	●								L6
	Mounting flange(M70FE)	45	55		65					Code
	Special 2-Hole (135-2)	●			●					L1
	Special 2-Hole (160-2)		●							L5

Flushing flow (L/min)

Standard version										N
⑧	Special version	Without flush valve (Only M70F45、M70FE55、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					

Speed sensor

⑨	Without speed sensor	N
	With speed sensor (supply voltage 4.5~8VDC)*	M
	With speed sensor (supply voltage 8~32VDC)*	P
	Installation of reserved speed sensor*	A

Note: “*” only the M70FE55 is available

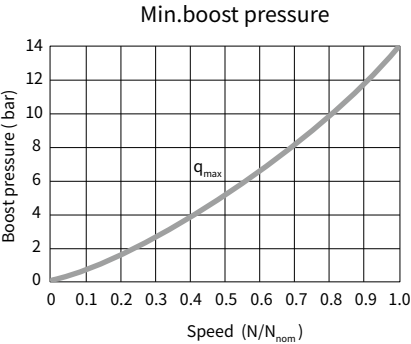
Please refer to page 7/26 for specific parameters of the speed sensor.

Remark: ● = Available; ○ = On request

Min.boost pressure

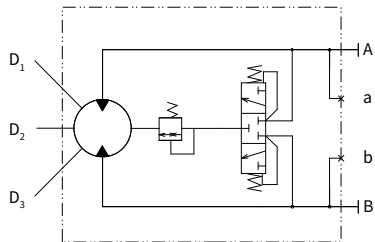
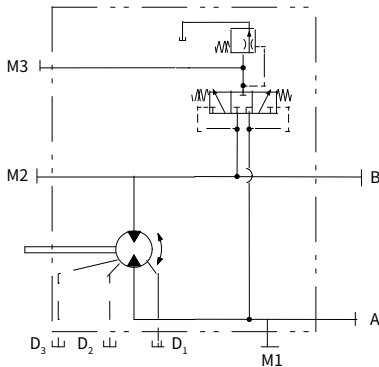
To prevent cavitation when the motor is operating in a pumping mode, a positive pressure is required at the suction port.

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.

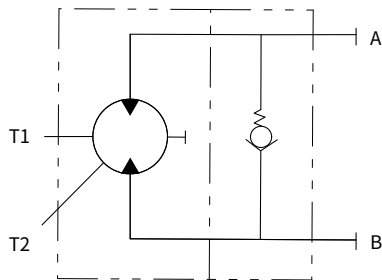
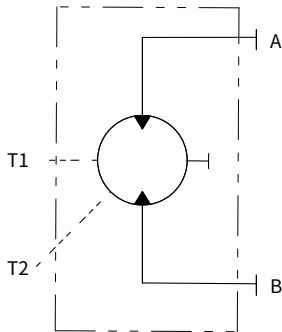


Principle

• M70F



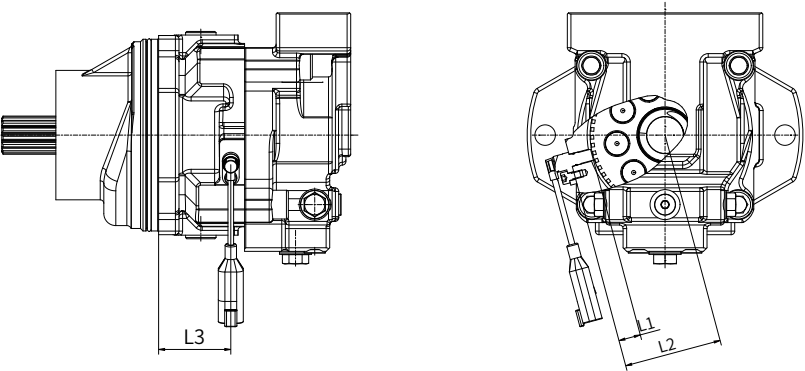
• M70FE



Speed sensor

The speed sensor is installed on the motor, which can record the motor speed and detect the direction of rotation of the motor.

• M70F(E) Installation diagram



M70F(E) Displacement cc/rev	55
Number of teeth in the speed ring	58
L1 (Probe length)mm	18.4
L2 (Sensor mounting surface to center axis) mm	81.5
L3 (Sensor to flange surface) mm	60.2
Gear module	2

Installation size

• Drain port ,pressure measuring port , inlet port and outlet port

Parallel piping thread type (Code : G)

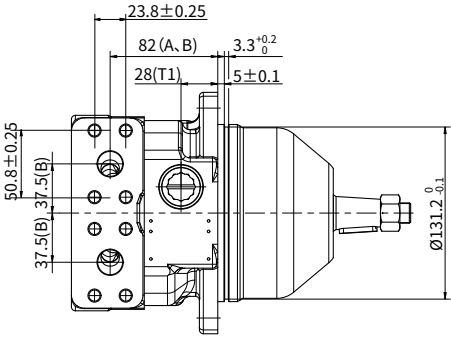
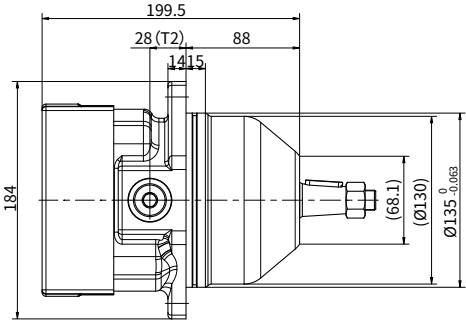
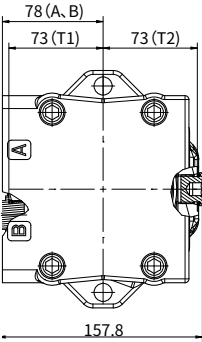
	Symbol	Port size and description
a, b	Inlet and outlet port	G3/4
T	Drain port	G3/8

ANSI thread type (Code : A)

	Symbol	Port size and description
a, b	Inlet and outlet port	1-1/16-12UN-2B
M1, M2	Pressure measuring port	7/16-20UNF-2B
T	Drain port	7/8-14UNF-2B

Installation size

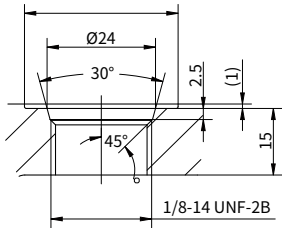
M70FE 45 Installation size



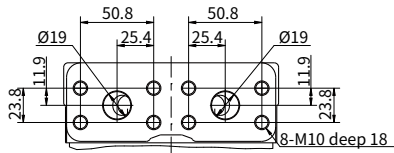
Control and Flow		Oil direction	
		Oil port A	Oil port B
Rotation direction	Clockwise rotation	Out	Inlet
	Counter clockwise rotation	Inlet	Out

Installation size

• M70FE 45 Port details



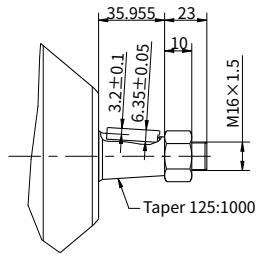
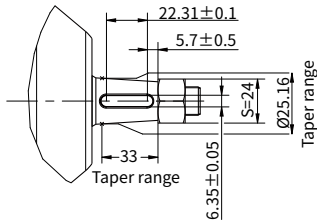
T1, T2 Port Details



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

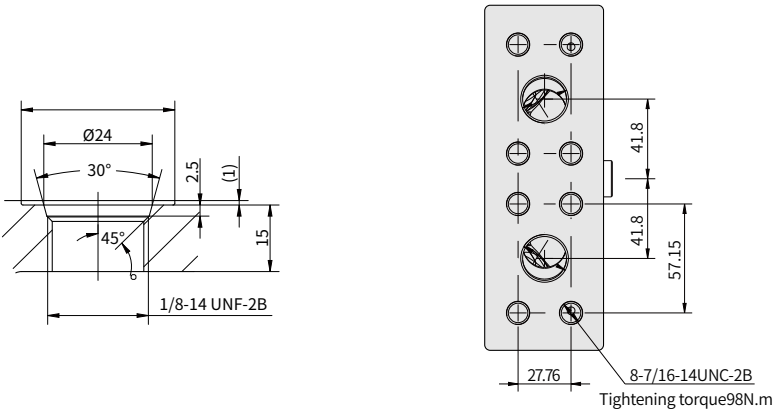
• M70FE 45 Input shaft type



“D” type shaft

Installation size

• M70FE 55 Port details



T1, T2 Port Details

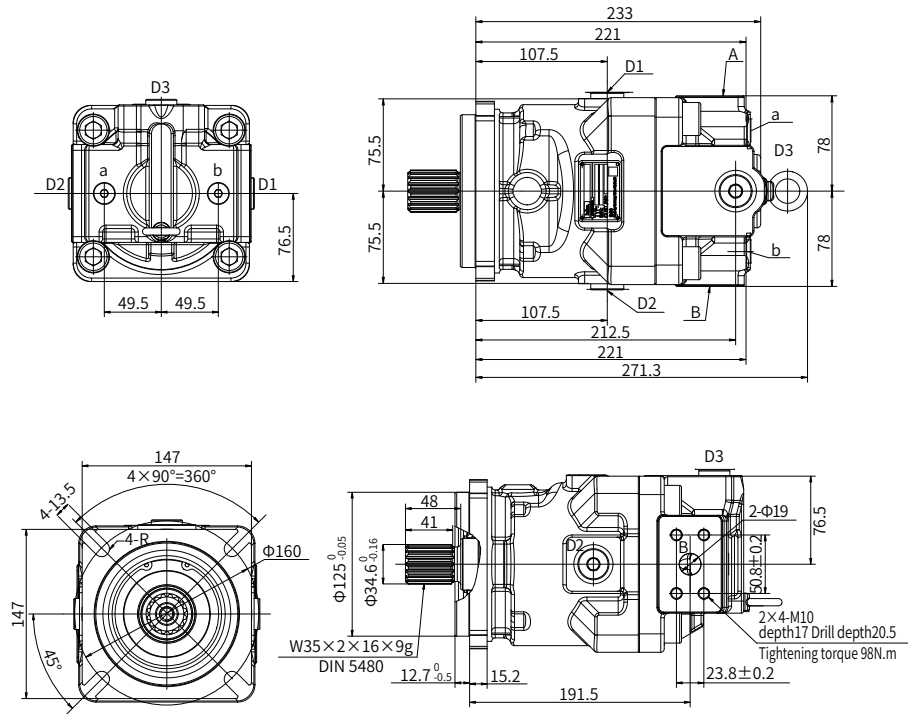
Port details

	Port name	Port size and description
A、B	Inlet port and Delivery port	SAE J518 1" 7/16-14UNC-2B
DI、D2	Case drain port	ISO 11926-1 7/8-14 UNF-2B
MI、M2、M3	Pressure measuring port	ISO 11926-1 9/16-18UNF-2B

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

• Drain port and gauge port

Parallel piping thread type (Code : G)

	Symbol	Port size and description
a, b	Gauge port	G1/4
D1, D2, D3	Drain port	G1/2

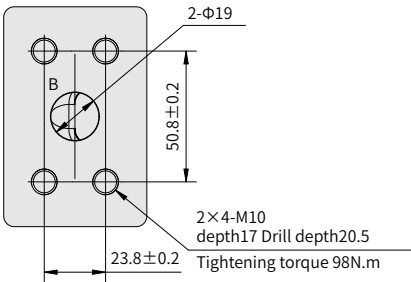
Metric thread type (Code : M)

	Symbol	Port size and description
a, b	Gauge port	M14×1.5
D1, D2, D3	Drain port	M27×2

ANSI thread type (Code : A)

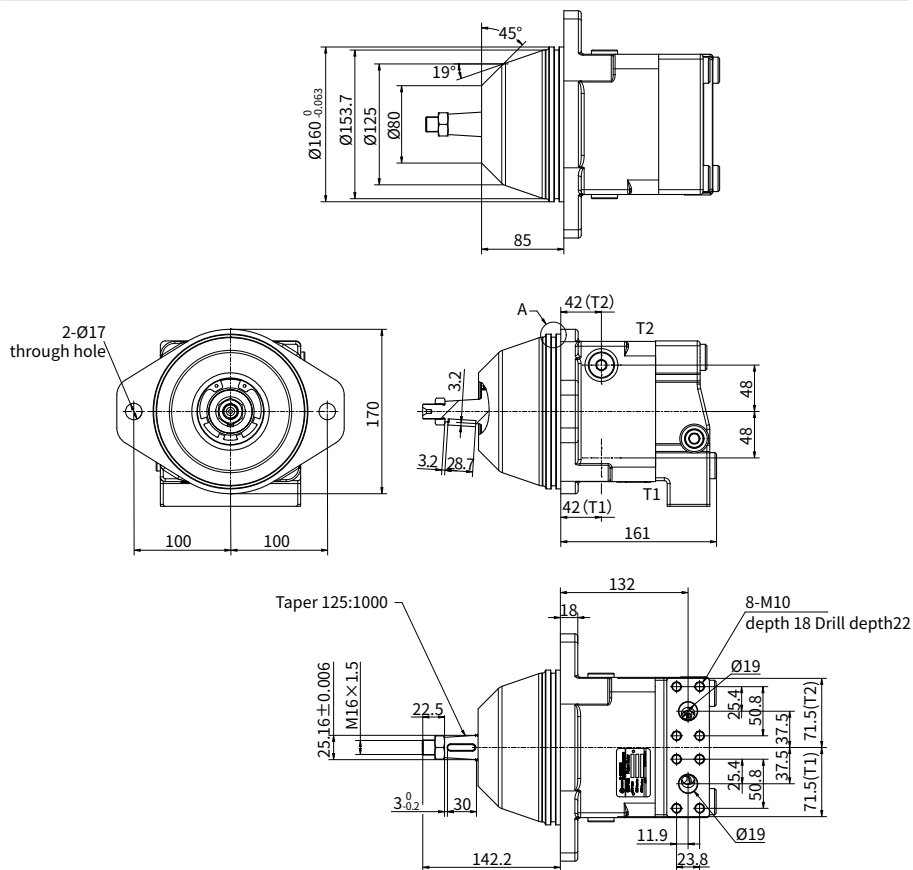
	Symbol	Port size and description
a, b	Gauge port	9/16-18UNF-2B
D1, D2, D3	Drain port	1-1/16-12UN-2B

• Port details



Installation size

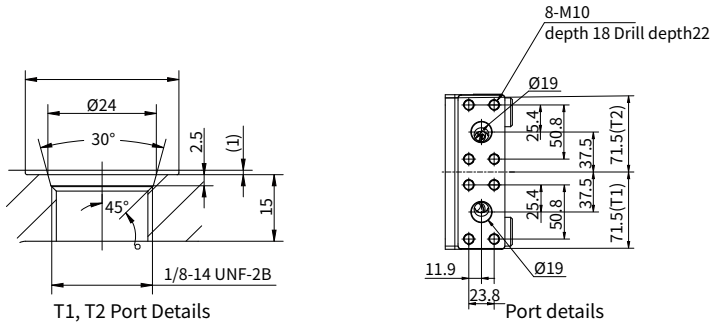
M70FE 65 Installation size



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

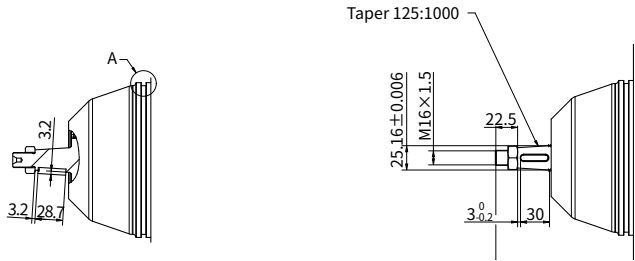
Installation size

• M70FE 65 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 65 Input shaft type

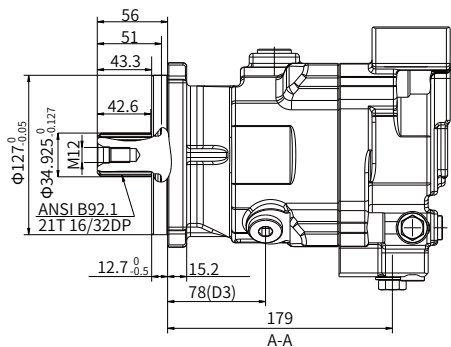
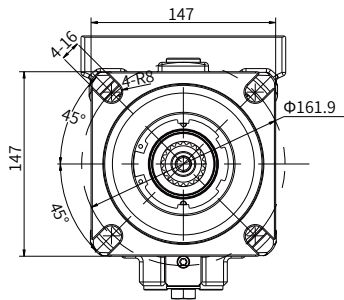
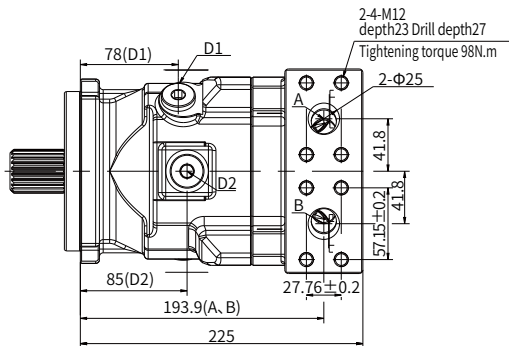
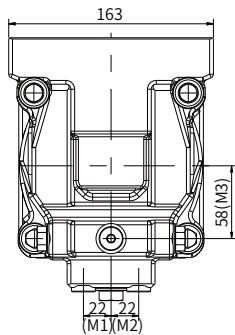


“D” type shaft

Installation size

M70F 75 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.

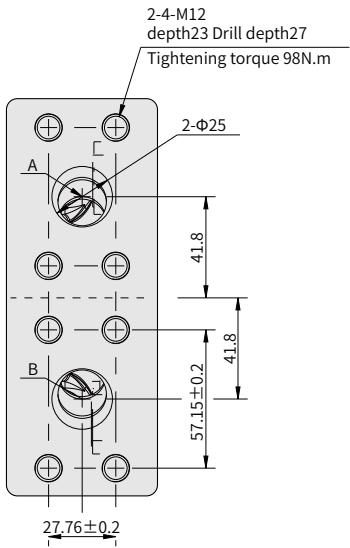
Installation size

• Drain port and gauge port

ANSI thread type (Code : A)

	Symbol	Port size and description
M1, M2, M3	Gauge port	9/16-18UNF-2B
D1, D2, D3	Drain port	1-1/16-12UN-2B

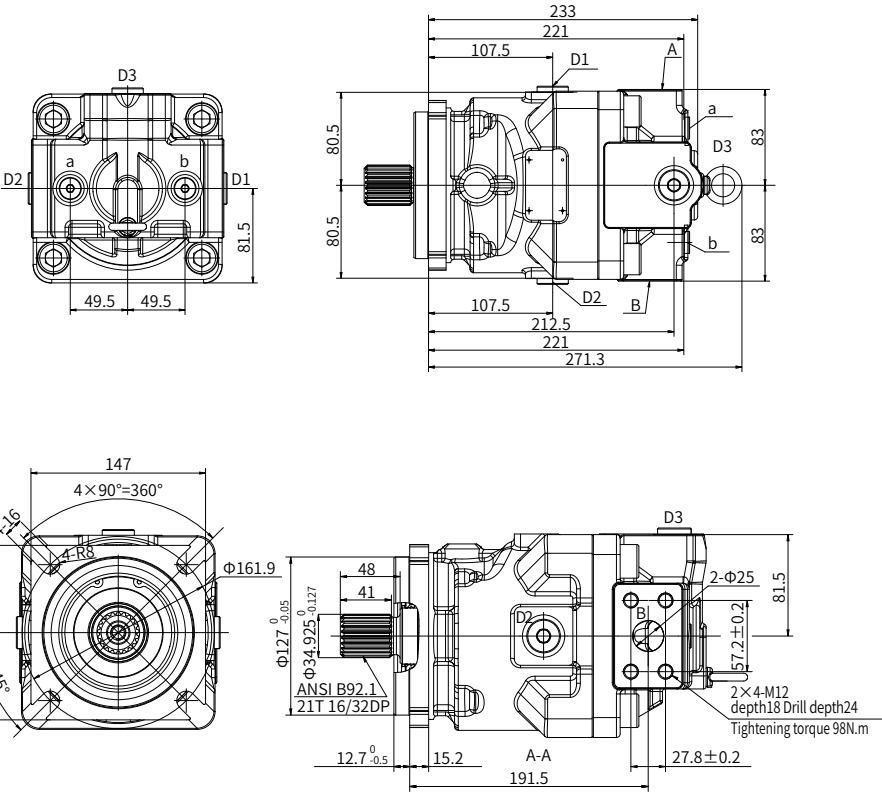
• Port details



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

• Drain port and gauge port

Parallel piping thread type (Code : G)

	Symbol	Port size and description
a, b	Gauge port	G1/4
D1, D2, D3	Drain port	G1/2

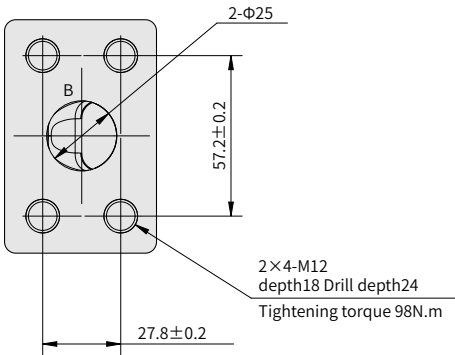
Metric thread type (Code : M)

	Symbol	Port size and description
a, b	Gauge port	M14×1.5
D1, D2, D3	Drain port	M27×2

ANSI thread type (Code : A)

	Symbol	Port size and description
a, b	Gauge port	9/16-18UNF-2B
D1, D2, D3	Drain port	1-1/16-12UN-2B

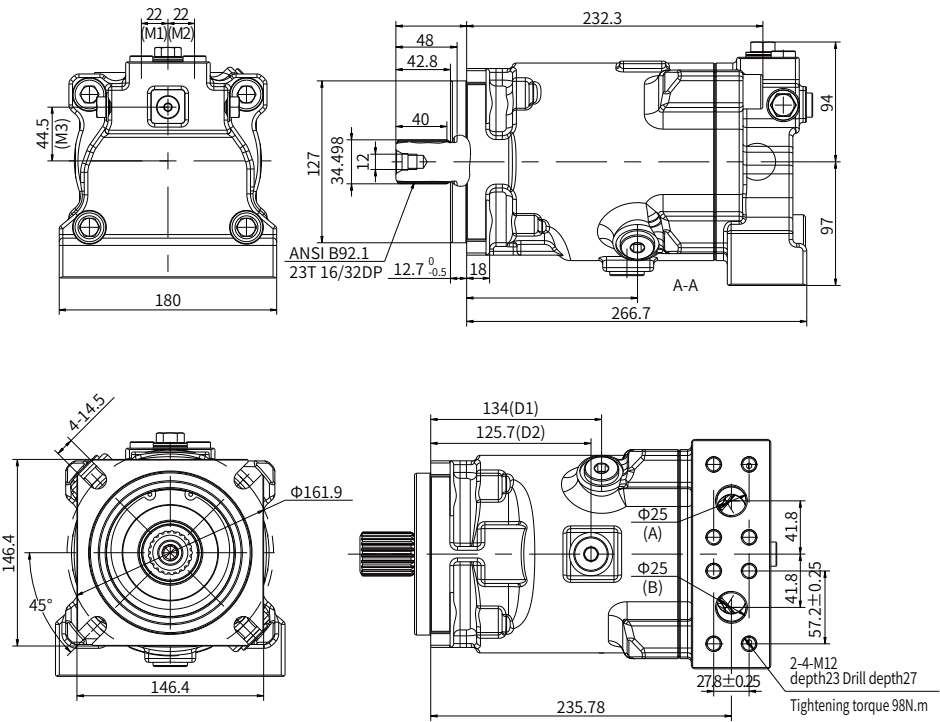
• Port details



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

• Drain port and gauge port

Parallel piping thread type (Code : G)

	Symbol	Port size and description
M1, M2, M3	Gauge port	G1/4
D1, D2, D3	Drain port	G1/2

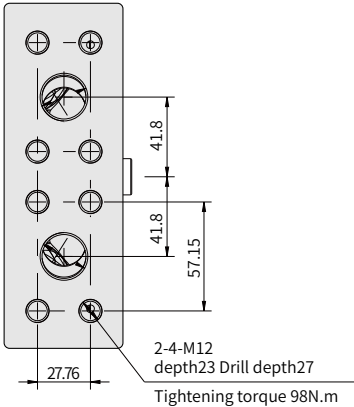
Metric thread type (Code : M)

	Symbol	Port size and description
M1, M2, M3	Gauge port	M14×1.5
D1, D2, D3	Drain port	M27×2

ANSI thread type (Code : A)

	Symbol	Port size and description
M1, M2, M3	Gauge port	9/16-18UNF-2B
D1, D2, D3	Drain port	1-1/16-12UN-2B

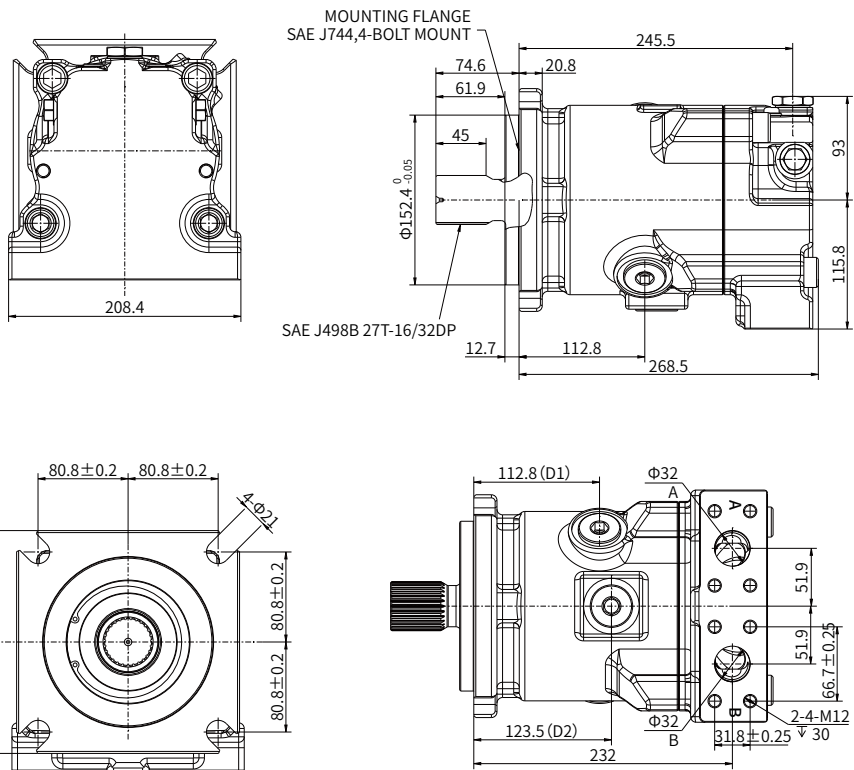
• Port details



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.

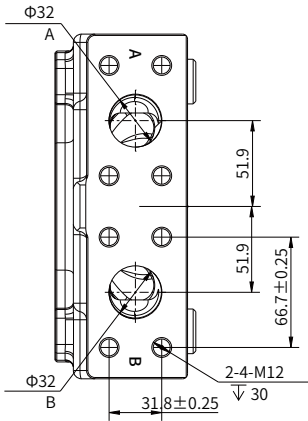
Installation size

• Drain port and gauge port

ANSI thread type (Code : A)

	Symbol	Port size and description
a, b	Gauge port	9/16-18UNF-2B
D1, D2, D3	Drain port	1-1/16-12UN-2B

• Port details



China +86 400 101 8889	America +01 630 995 3674
Germany +49 (30) 72088-0	Japan +81 03 6809 1696



© This brochure can be reproduced, edited, reproduced or transmitted electronically without the authorization of Hengli Hydraulic Company. Due to the continuous development of the product, the information in this brochure is not specific to the specific conditions or applicability of the industry, thus, Hengli does not take any responsibility for any incomplete or inaccurate description.

4 Motor (Variable)

Contents

	Page
4.1 M60V(E)series bent-axial piston variable displacement motor	381-428
4.2 HM3V series axial piston variable displacement motor	429-438
4.3 HM4V series axial piston variable displacement motor	439-454
4.4 HM5V series axial piston variable displacement motor	455-462

