



3.1

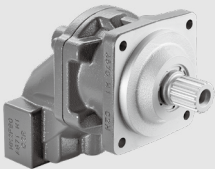
M60F SERIES

Bent-axial Piston
Fixed Displacement Motor

M60F series bent-axial piston fixed displacement motor is used in an open or closed circuit. The bent-axial structure ensures a larger displacement and a more compact structure under the same volume.

Apply to open or close circuit

Size:	23	28	32	56	63	80	90
Nominal pressure (bar):	400	400	400	400	400	400	400
Max pressure (bar):	450	450	450	450	450	450	450



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Features

- Higher pressure and higher speed
- High activation efficiency
- Optimized power-weight ratio
- High torque and long service life
- Superior performance in low speed operation provides excellent controllability
- Suitable for engineering machinery and general industrial vehicles

Technical Data

Feature		23	28	32	56	63	80	90
Max. Displacement (cc/rev)		23	28	32	56.1	63	79.8	90.5
Direction of rotation		Clockwise, Counter clockwise						
Rotation speed	Rated (rpm)	5500	6300	6300	5000		4500	
	Max. (rpm)	6000	6900	6900	5500		5000	
Rated pressure (bar)		400						
Max. pressure (bar)		450						
Theoretical output torque (N·m)	@ΔP=400 bar	146	179	204	357	401	508	576
Max. Flow (L/min)	@n _{nom}	138	177	202	281	315	359	407
Moment of inertia (kg·m ²)		0.0012	0.0012	0.0012	0.0042	0.0042	0.0056	0.0058
Weight (kg)		10.8	11.9	11.9	18		24.7	
Volume in the case (L)		0.2	0.20	0.2	0.45		0.65	
Oil viscosity (mm ² /s)		5 ~ 1600, Best range: 16~36						
Oil temperature (°C)		-25 ~ 103						
Oil cleanliness		ISO 4406 20/18/15						

Type Introduction

M60F	90	N	W	V	N4	D0	B	N	N	—	A
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩		⑪

Product series

①	Bent-axial piston fixed displacement motor	M60F
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Size

②	Size	23	28	32	56	63	80	90
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Thread type of ports

③		23	28	32	56	63	80	90	Code
	UNC threads	●	●	●	●	●	●	●	A
	Metric threads	●	●	●	●	●	●	●	N
	G3/4 thread oil port	●	●	●					M

Direction of rotation

④	Clockwise, Counter clockwise	W
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Seals

⑤	FKM (Viton rubber: DIN ISO 1629)	V
	NBR (Nitrile rubble :DIN ISO 1629)	N

Mounting flange

⑥		23	28	32	56	63	80	90	Code
	100-4 ISO 3019-2	●	●	●					N3
	125-4 ISO 3019-2				●	●			N5
	127-4 SAE J744				●	●	●	●	N6
	140-4 ISO 3019-2						●	●	N4
	101.6-2 SAE J744 (Double hole)	●	●	●					N8

Type Introduction

Input shaft

		23	28	32	56	63	80	90	Code
⑦	W30×2×14×9g DIN 5480	●	●	●	●	●			D3
	W35×2×16×9g DIN 5480				●	●			D0
	W40×2×18×9g DIN 5480						●	●	D1
	ANSI B92.1 21T-16/32DP						●	●	D2
	W25×1.25×30×18×9g DIN 5480	●	●	●					D4
	ASDI B92.1 14T-12/24DP				●	●			D6
	ASDI B92.1 13T-16/32DP	●	●	●					D7
	Straight shaft φ32 10×8×60*						●	●	D5
	Straight shaft φ25 8×7×40	●	●	●					K1
	Straight shaft φ30 8×7×50				●	●			K2
	Straight shaft φ35 10×8×50				●	●			K3
	Straight shaft φ31.75 C7.94×38.1						●	●	K4

Remark: The "D5" axis is a non-standard customized version. If you need to select, please contact Hengli.

Port position

		23	28	32	56	63	80	90	Code
⑧	Same side	●	●	●	●	●	●	●	B
	Two sides	●	●	●	●	●	●	●	A

Control

⑨	Without	N
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Speed sensor

⑩	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: Please refer to page 7/18 for specific parameters of the speed sensor.

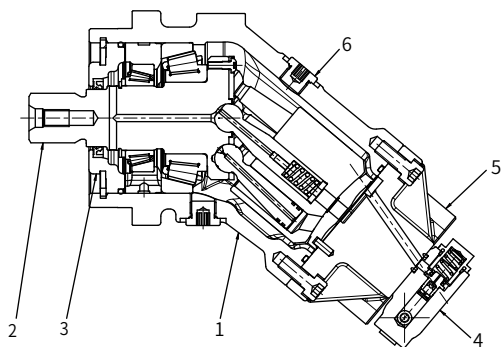
Standard / special version

Standard version								N
⑪	Special version	With flush valve	Flushing flow (L/min)	Code	Flushing flow (L/min)	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

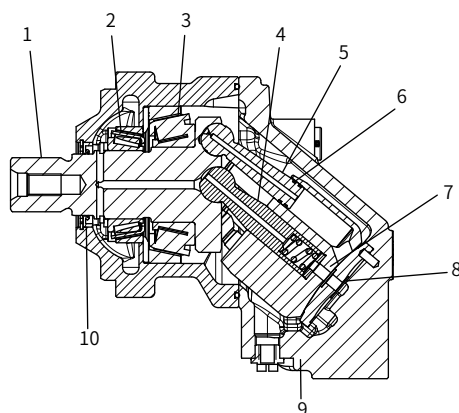
Section view

• M60F 23/28/32/56/63



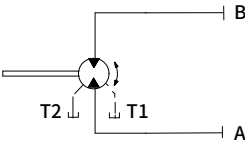
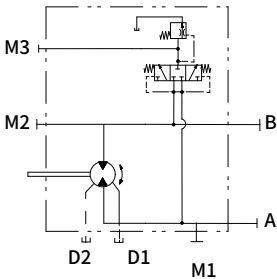
1. Housing
2. Rotating unit
3. Oil seal cover
4. Flush valve
5. Rear cover
6. Hex socket plug

• M60F 80/90



1. Output shaft
2. Tapered roller bearing (small)
3. Tapered roller bearing (large)
4. Centering journal
5. Piston
6. Sealing ring
7. Cylinder block
8. Valve plate
9. End cap
10. Oil seal

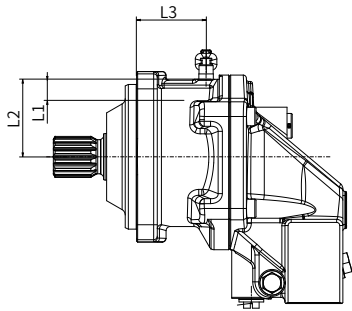
Principle



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.

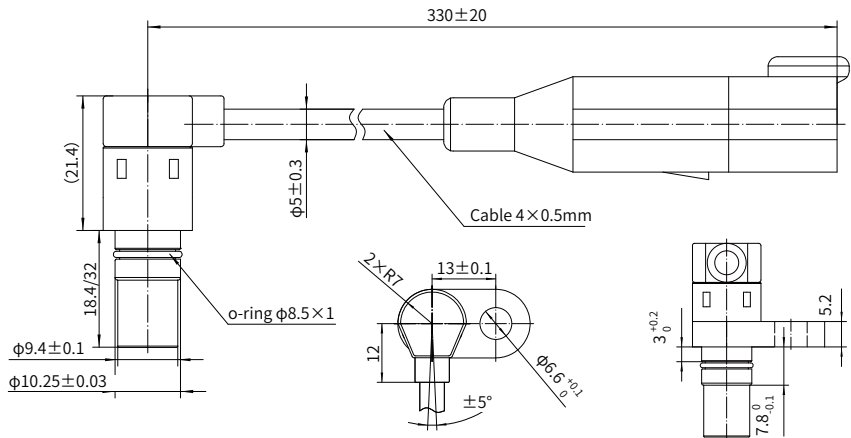
• M60V Installation diagram



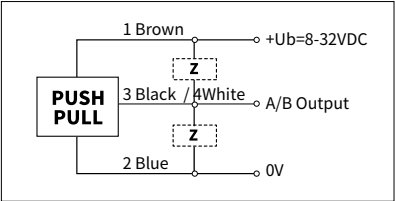
M60F Displacement cc/rev	23	28	32	56	63	80	90
Number of teeth in the speed ring	38	38	38	47	47	54	54
L1 (Probe length)mm	18.4	18.4	18.4	18.4	18.4	18.4	18.4
L2 (Sensor mounting surface to center axis) mm	57.9	57.9	57.9	69.9	69.9	75	75
L3 (Sensor to flange surface) mm	54.7	54.7	54.7	61.5	61.5	67.2	67.2
Gear module	2	2	2	2	2	2	2

Speed sensor

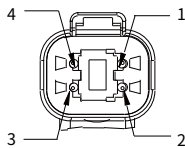
• Installation size



• Wiring diagram



Current consumption when unloaded	MAX.15mA
Maximum load current	50mA
Frequency range	0~20kHz
Temperature range for use	-40~125°C
Protection grade	IP67/IP69K
Output pulse count	Refer to the table for the number of teeth in the speed ring
Rotation recognition	Dual frequency output, 90 ° phase difference
Pressure resistance of measuring surface	10bar



DEUTSCH DT 04-4P	
PIN	function
1	VDC(8-32V)
2	GROUND
3*	Frequency signal A
4*	Frequency signal B

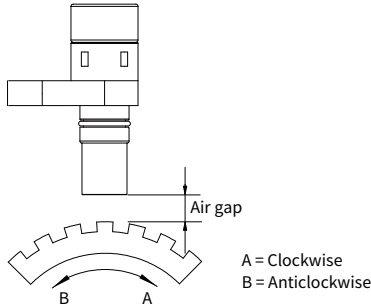
Note: “*” PIN3. See 17/48 for the waveform diagram of output 4.

Speed sensor

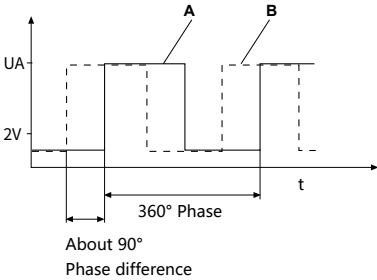
• Output signal

Reverse pulse output: $I_{max} \leq 50\text{mA}$

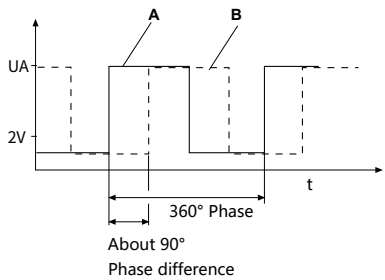
The frequency signal can be measured within the range of 0Hz to 20kHz.



⌚ Rotate clockwise to output waveform

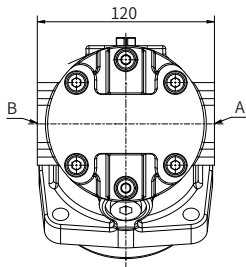
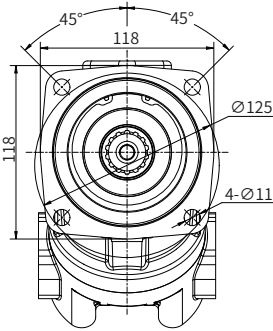


⌚ Rotate counterclockwise to output waveform

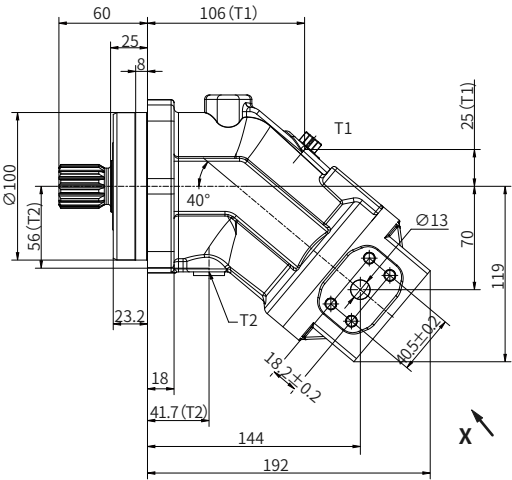


Installation size

M60F 23/28/32 Installation size



X View



Installation size

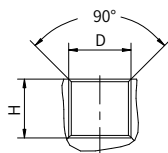
• M60F 23/28/32 Direction of rotation and oil flow direction

Installation	Rotation
Flow A → B	Clockwise
Flow B → A	Counter-clockwise

• M60F 23/28/32 Port details

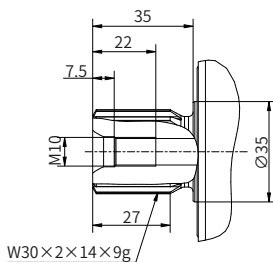
	Port name	Port size and description	Tightening torque (N·m)
A、B	Inlet port and Delivery port	SAE J518 DIN 13 1/2" M12×1.75 (depth 17mm)	32
T1、T2	Case drain port	DIN 3852 M18×1.5 (depth 12mm)	55

Port	H	D	M
T1	12	Ø 16	M16×1.5
T2	12	Ø 16	M16×1.5



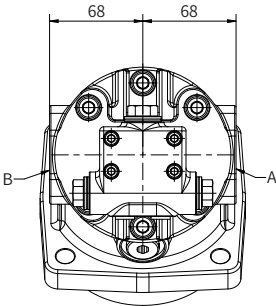
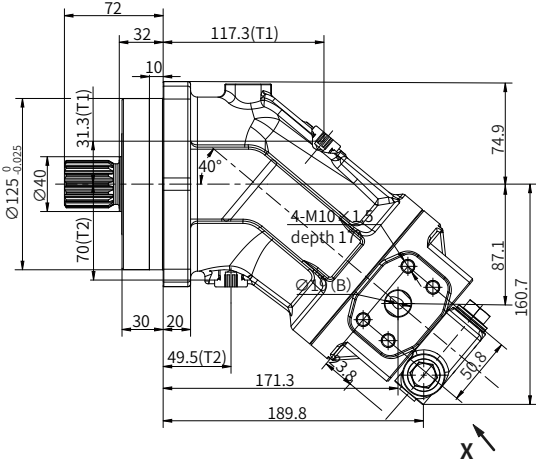
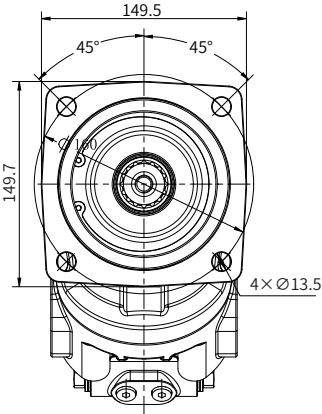
- M60F 23/28/32 Input shaft type

“D3” type shaft



Installation size

M60F 56/63 Installation size



X View

Installation size

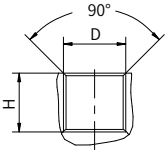
• M60F 56/63 Direction of rotation and oil flow direction

Installation	Rotation
Flow A → B	Clockwise
Flow B → A	Counter-clockwise

• M60F 56/63 Port details

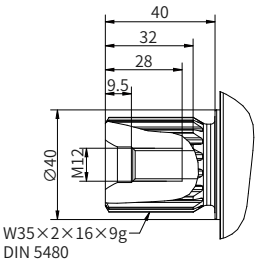
	Port name	Port size and description	Tightening torque (N·m)
A、B	Inlet port and Delivery port	SAE J518 DIN 13 3/4" M12×1.75 (depth 17mm)	130
TI、T2	Case drain port	DIN 3852 M18×1.5 (depth 12mm)	60

Port	H	D	M
T1	17	∅ 18	M18×1.5
T2	17	∅ 18	M18×1.5



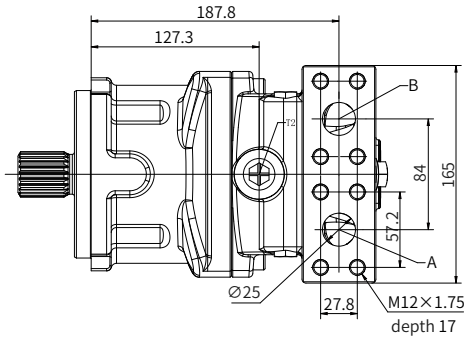
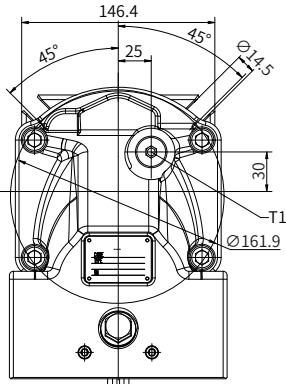
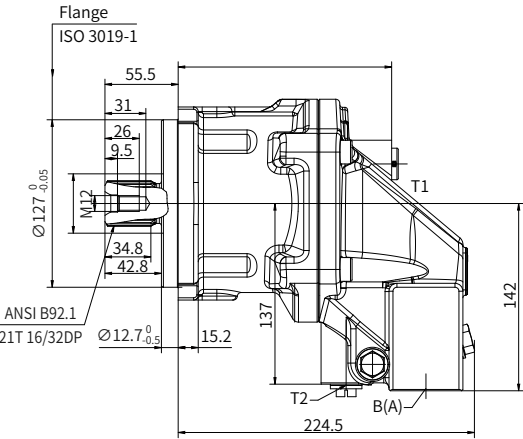
• M60F 56/63 Input shaft type

“D0” type shaft



Installation size

M60F 80/90 Installation size



Installation size

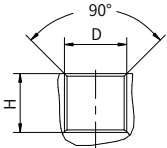
• M60F 80/90 Direction of rotation and oil flow direction

Installation	Rotation
Flow A → B	Clockwise
Flow B → A	Counter-clockwise

• M60F 80/90 Port details

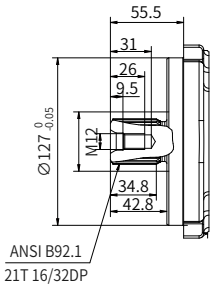
	Port name	Port size and description	Tightening torque (N·m)
A、B	Inlet port and Delivery port	SAE J518 DIN 13 1" M12×1.75 (depth 17mm)	130
TI、T2	Case drain port	DIN 3852 M18×1.5 (depth 12mm)	60

Port	H	D	M
T1	17	∅ 18	M18×1.5
T2	17	∅ 18	M18×1.5

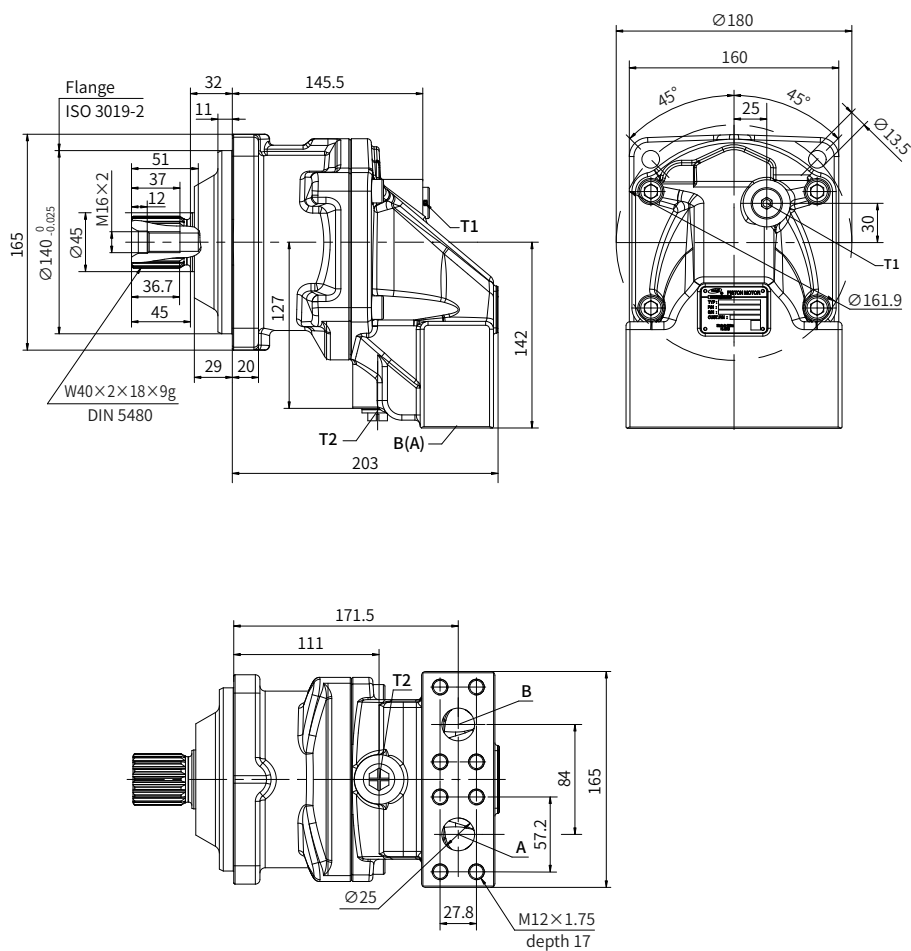


• M60F 80/90 Input shaft type

“D2” type shaft



M60F 80/90 Installation size



Installation size

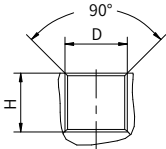
• M60F 80/90 Direction of rotation and oil flow direction

Installation	Rotation
Flow A → B	Clockwise
Flow B → A	Counter-clockwise

• M60F 80/90 Port details

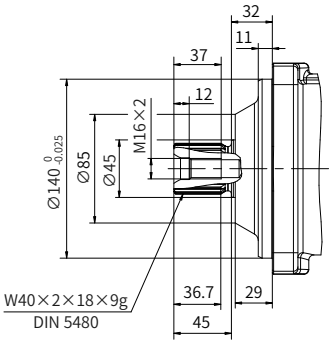
	Port name	Port size and description	Tightening torque (N·m)
A、B	Inlet port and Delivery port	SAE J518 DIN 13 1" M12×1.75 (depth 17mm)	130
TI、T2	Case drain port	DIN 3852 M18×1.5 (depth 12mm)	60

Port	H	D	M
T1	17	∅ 18	M18×1.5
T2	17	∅ 18	M18×1.5



• M60F 80/90 Input shaft type

“D1” type shaft



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