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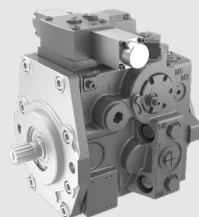
V40D SERIES

Swash-plate Type Axial Piston Variable Displacement Pump

V40D series variable axial piston pump with swashplate design for hydrostatic drives in closed circuit, high pressure, high speed, high reliability, low noise, can be applied in engineering machinery, mobile machinery and agricultural machinery.

Applied in medium pressure closed circuit

Size:	23	28	32
Rated pressure (bar):	250	345	345
Max. pressure (bar):	300	380	380



Contents

Technical Data	02-03
Type introduction	04-06
Control mode	
· Manual displacement control (MDC)	07
· Electrical displacement control (EDC)	08
Pump principle & installation size	
· V40D 23	09-12
· V40D 28	13-16
· V40D 32	17-20

Features

- Variable axial piston pump of swashplate design for hydrostatic drives in closed circuit.
- The flow is proportional to the drive speed and displacement. The flow increases as the angle of the swashplate is adjusted from zero to its maximum value.
- Flow direction changes smoothly when the swashplate is moved through the neutral position.
- Two pressure-relief valves are provided on the high pressure ports to protect the hydrostatic transmission (pump and motor) from overload.
- The integrated charge pump can provide system replenishing and cooling fluid flow.
- High reliability, long working lifetime
- Compact structure, high power density.

Technical data

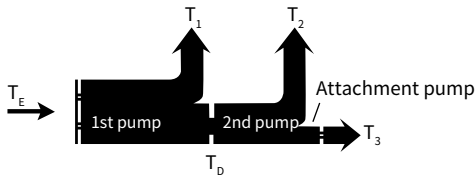
Size		23	28	32
Displacement (cc/rev)		23	28	32
Speed	Rated (rpm)	3300	3400	3400
	Max. (rpm)	3600	4000	4000
	Min. (rpm)	500	500	500
Pressure	Rated (bar) (relative to Charge pressure)	250	345	345
	Max. (bar) (relative to Charge pressure)	300	380	380
	Min. low loop pressure(bar) (relative to Charge pump)	10	10	10
Charge pressure (relative to Charge pump)	Min. (bar)	20	16	16
	Max. (bar)	30	31	31
Control Pressure (relative to Charge pump)	Min. (bar) (EDC control)(bar)	-	24	24
Charge pump displacement (cc/rev)		5.3/9.4	9/12	9/12
Casting pressure	Rated (bar)	1.5	3	3
	Max. (bar) (Short-time peak pressure)	2.5	5	5
Suction pressure (Absolute pressure)	Rated (bar) Oil viscosity ≤ 30mm²/s	0.8	0.8	0.8
	Max. (bar)	2	2	2
Oil viscosity (mm²/s)		10~1000, Best range: 16~36		
Oil Temperature (°C)		-20~95		
Oil Cleanliness		ISO 4406 20/18/15 or higher		
Weight (w/o auxiliary flange) (Kg)		15	32	32

02

Technical data

Permissible input and through-drive torques					
Size		23	28	32	
Torque at $V_{g,max}$ and $\Delta p = 345 \text{ bar}$ Nm	T	183	153.7	175.7	
Maximum input torque at drive shaft (Nm)					
ANSI B92.1b	7/8 in 13T 16/32DP	$T_{E,max}$	300	198	198
	1 in 15T 16/32 DP	$T_{E,max}$		319	319
Maximum through-drive torque (Nm)	$T_{D,max}$	100	198	198	

•Torque distribution



V40D	1st pump	T_1
	2nd pump	T_2
Attachment pump		T_3
Input torque		$T_E = T_1 + T_2 + T_3$
		$T_E < T_{E,max}$
Through-drive torque		$T_D = T_2 + T_3$
		$T_D < T_{D,max}$

Type introduction

V40	D	28	E1	M	/	R	N	B1	F1	A2	K4	2	P	S	-	F
①	②	③	④	⑤		⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭		⑮

Product series

①	Variable piston pump of swashplate in closed circuit	V40
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Nominal pressure

②	nominal pressure 345 bar	D
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Displacement

③	Displacement cc/rev	23	28	32
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Control mode

		23	28	32	Code
④	High current electric proportional displacement control (HC EDC), oil filled, Deutsch DT04-2P, voltage 12V DC, control range: 600mA~1650mA	●	●	●	E1
	High current electric proportional displacement control (HC EDC), oil filled, Deutsch DT04-2P, voltage 24V DC, control range: 200mA~500mA	●	●	●	E2
	Mechanical servo control	●	●	●	H1
	Mechanical servo control, with neutral position switch		●	●	H4
	Hydraulic pilot proportional control		●	●	H2
	Hydraulic control direct operated – optimized for hydraulic control	●			H3

Displacement Limiters

⑤	Without displacement limiters	Blank
	With displacement limiters	M

Rotation

⑥	Right hand (clockwise)	R
	Left hand (counter-clockwise)	L

Sealing material

		23	28	32	Code
⑦	NBR (nitrile rubber)	●	●	●	N
	Shaft seal in NBR (nitrile rubber)		●	●	W
	Cryogenic seal				

Type introduction

Mounting flange and input shaft

⑧	Mounting flange	Input shaft	23	28	32	Code
	SAE A J744-82-2	ANSI B92.1b 5/8 in 9T 16/32 DP	●			A1
	SAE B J744-101-2	ANSI B92.1b 7/8 in 13T 16/32DP	●	●	●	B1
		ANSI B92.1b 1 in 15T 16/32 DP		●	●	B3

Boost pump and rotary group configuration

⑨	Standard rotary group, without boost pump					K
	Standard rotary group, boost pump integrated	Charge pump displacement (cc/rev)	23	28	32	Code
		5.3	●			FF
		9		●	●	F1
		9.4	●			FG
		12		●	●	F3

Through drive option

⑩	Through drive		23	28	32	Code
	Without through drive		●	●	●	Blank
	Flange	Splined shaft				
	SAE A J744-82-2	ANSI B92.1b 5/8 in 9T 16/32 DP	●	●	●	A1
		ANSI B92.1b 3/4 in 11T 16/32 DP		●	●	A2
	SAE B J744-101-2	ANSI B92.1b 7/8 in 13T 16/32DP		●	●	B1

High-pressure relief valve

⑪	High-pressure relief valve	Setting range Δp	23	28	32	Code
	High pressure relief valve setting (differential pressure: relative to Charge pressure)	160 bar	●			KA
		170 bar	●			KB
		180 bar	●			KC
		190 bar	●			KD
		200 bar	●			KE
		230 bar	●			K0
		245 bar		●	●	K1
		250 bar	●			K2
		260 bar		●	●	K3
		280 bar		●	●	K4
		300 bar		●	●	K5
		320bar		●	●	K6
		330bar		●	●	K7
		345 bar		●	●	K8

Remark: Please contact us for configurations or pressures not shown in above form.

Type introduction

Setting pressure of the low pressure relief valve

⑫		23	28	32	Code
	21.5 bar	●	●	●	1
	24 bar		●	●	2
	26.9 bar		●	●	3

Control orifice

⑬		23	28	32	Code
	None	●	●	●	N
	Control orifice of Servo A&B $\phi 0.9\text{mm}$		●	●	P
	Control orifice of Servo A&B $\phi 1.3\text{mm}$		●	●	R

Filtration boost circuit/external boost pressure supply

⑭		23	28	32	Code
	Filtration in the boost pump suction line	●	●	●	S
	Filtration in the boost pump pressure line (ports with external filter circuit)	●	●	●	D

Standard / special version

⑮	Standard / Special version		23	28	32	Code
	Standard version		●	●	●	Blank
	Emergency return valve (Brake unloading valve)			●	●	F
	Special version	With				
		flush valve				
		(differential pressure $\Delta P=5\text{bar}$, low pressure side 20 bar, damping hold $\phi 1.6\text{mm}$)				

Flushing flow (L/min)	23	28	32	Code
6		●	●	1

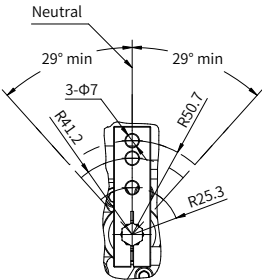
Remark: ● = Available; ○ = On request

Manual displacement control (MDC)

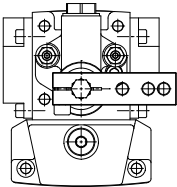
The manual proportional displacement control (MDC) consists of a handle on top of a rotary input shaft.

The shaft provides an eccentric connection to a feedback link. This link is connected on its one end with a porting spool. On its other end the link is connected the pumps swashplate.

The MDC changes the pump displacement between no flow and full flow into opposite directions.



Schematic diagram of control joystick adjustment



Control valve

Electrical displacement control (EDC)

The High Current Electrical Displacement Control (HC EDC) consists of a pair of proportional solenoids on each side of a three-position, four-way porting spool. The proportional solenoid applies a force input to the spool, which ports hydraulic pressure to either side of a double acting servo piston. Differential pressure across the servo piston rotates the swashplate, changing the pump's displacement from full displacement in one direction to full displacement in the opposite direction.

A serviceable 125 μm screen is located in the supply line immediately before the control porting spool.

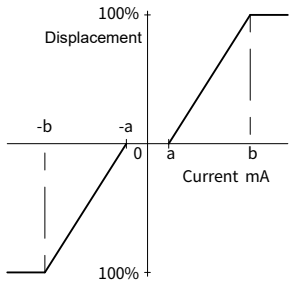
Features:

- Precision parts provide repeatable accurate displacement settings with a given input signal.
- Both ends of the double acting servo piston are drained to case when input signal current is not present. The servo piston is coupled to a spring centering mechanism.

Benefits:

- Simple, low-cost design.
- Pump will return to neutral after prime mover shuts down.
- Pump will return to neutral if external electrical input signal fails or if there is a loss of charge pressure

• Pump displacement — control current

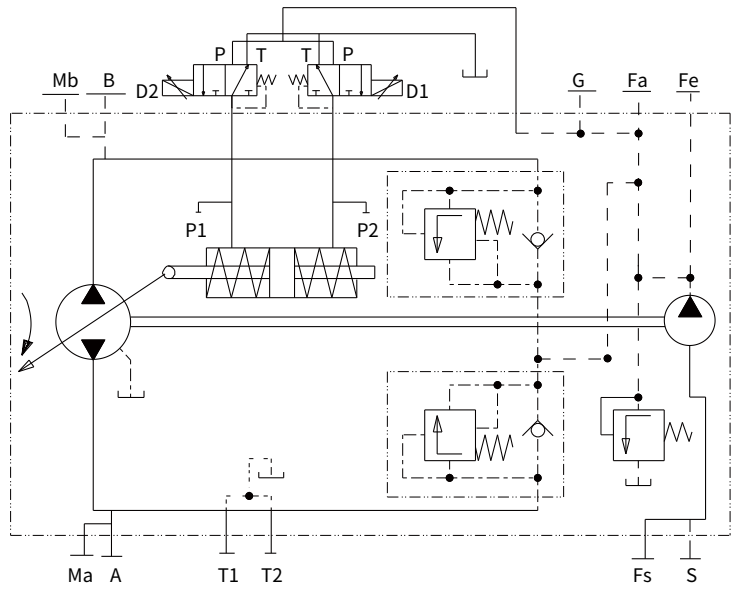


• EDC Response time

Orifice diameter* mm [in]	Average response time [seconds]	
	Acceleration	Deceleration
1.2 [0.046]	2.0	1.6
None	0.9	1.0

*Contact Hengli for special orifice combinations.

V40D23 Pump principle



Control and Flow		Start the electromagnet	Control pressure	High pressure	Low voltage
Rotation direction	Dextrorotation	D1	P2	A1	B1
		D2	P1	B1	A1
	Levorotation	D1	P2	B1	A1
		D2	P1	A1	B1

V40D23 installation size

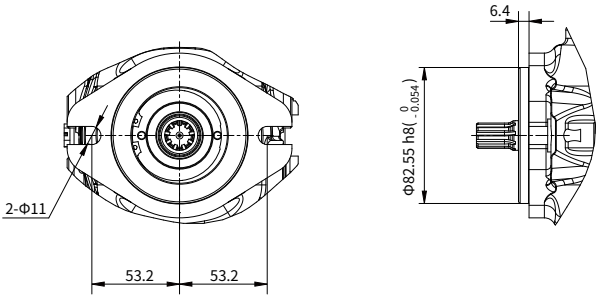
Installation size

•V40D23Port details

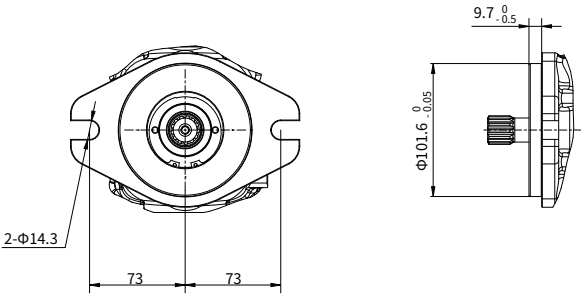
Port	Port Name	Port Size and Description	Tightening Torque(N.m)	Maximum pressure (bar)
A, B	Work lines	ISO 1179-1	G 1/2 (depth 15)	250
Ma, Mb	Outlet pressure	ISO 1179-1	G 1/4 (depth 12.5)	250
P1, P2	Control chamber pressure	ISO 1179-1	G 1/4 (depth 12.5)	30
S	Oil suction line	ISO 1179-1	G 1/2 (depth 15)	5
T1, T2	Oil drain line	ISO 1179-1	G 1/2 (depth 15)	3
G	Top-up pressure	ISO 1179-1	G 1/4 (depth 12.5)	30
Fe	Oil replenishment pressure outlet	ISO 1179-1	G 1/4 (depth 12.5)	30
Fa	Oil replenishment pressure inlet	ISO 1179-1	G 1/4 (depth 12.5)	30
Fs	Oil suction pressure	ISO 1179-1	G 1/8 (depth 8)	3

Installation size

V40D23 Mounting Flange

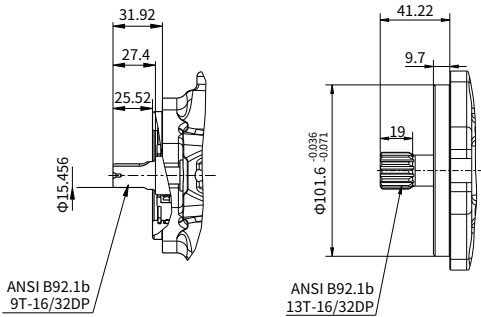


SAE "A1" type



SAE "B1" type

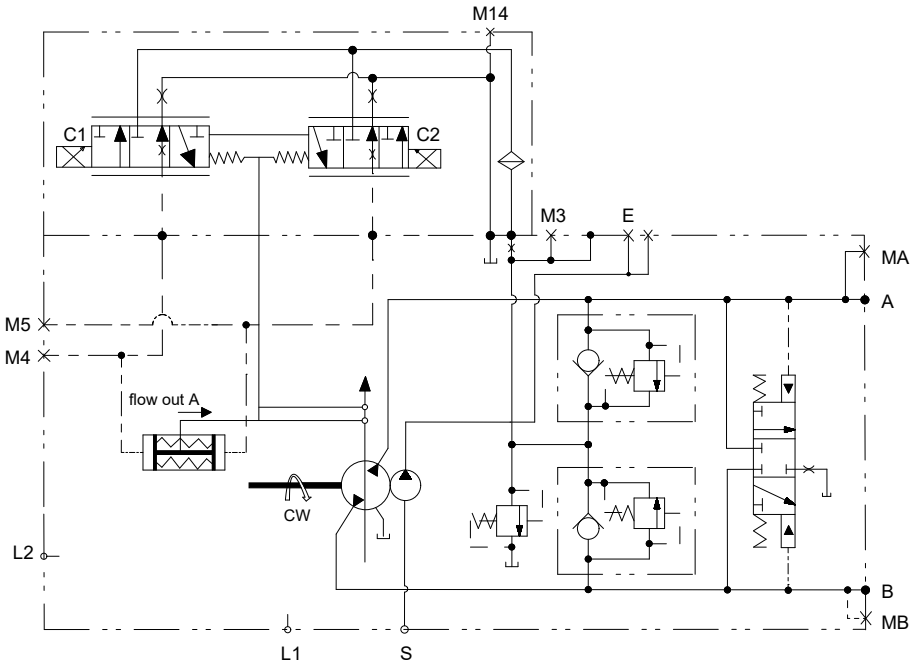
V40D23 Input Shaft type



"A1" type spline shaft

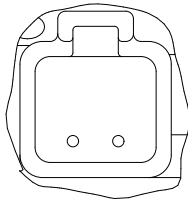
"B1" type spline shaft

V40D28 Pump principle



Input shaft rotation	CW		CCW	
Energized coil	C2	C1	C2	C1
Oil port A	Out	In	In	Out
Oil port B	In	Out	Out	In
Servo pressure acting oil port	M4	M5	M4	M5

Connector:

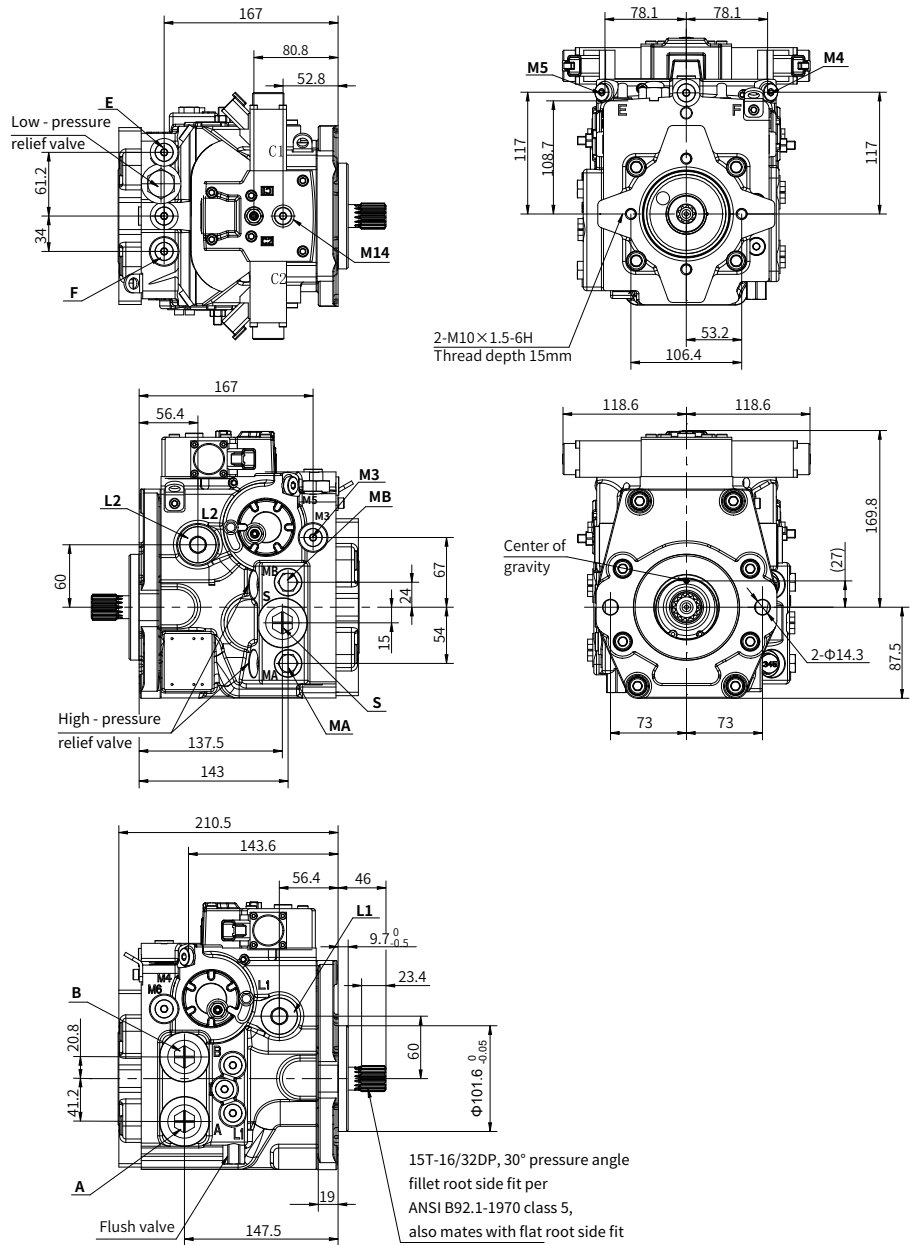


Deutsch DT04-2P
Voltage: 12V/24V
V View

Refer to pump installation drawing for port locations.

Installation size

V40D28 installation size



Installation size

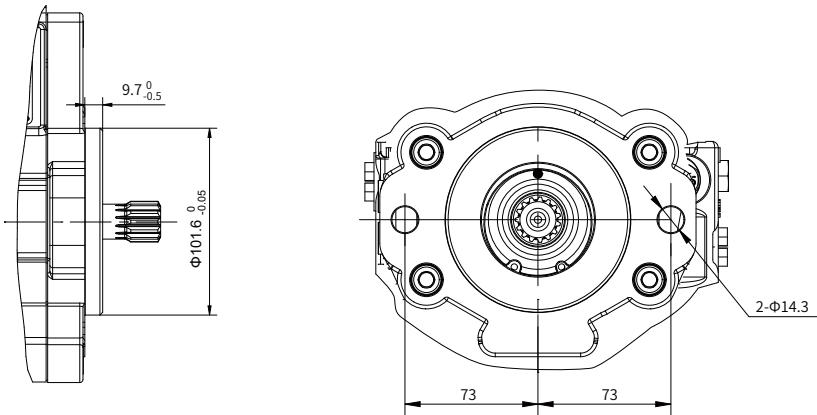
•V40D28Port details

Port	Port Name	Port Size and Description	Tightening Torque(N.m)	Maximum pressure (bar)
S	Suction port	ISO 11926-1 (1 1/16-12UN)	101	2
A, B	Working port	ISO 11926-1 (1 1/16-12UN)	101	380
L1, L2	Drain port	ISO 11926-1 (1 1/16-12UN)	101	3
MA, MB	Port "A" and "B" gage port	ISO 11926-1 (9/16-18UNF)	25	380
M3	Gauge port of charge pump	ISO 11926-1 (9/16-18UNF)	25	27
E, F	External control port	ISO 11926-1 (9/16-18UNF)	25	27
M4, M5	Servo gage port	ISO 11926-1 (7/16-20UNF)	15	27
M14	Air bleed port	ISO 11926-1 (7/16-20UNF)	15	3

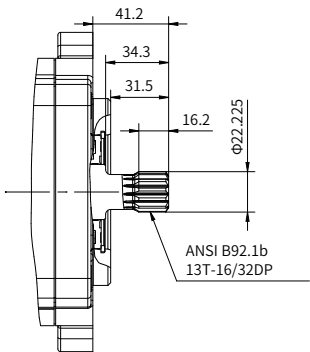
02

Installation size

V40D28 Mounting Flange

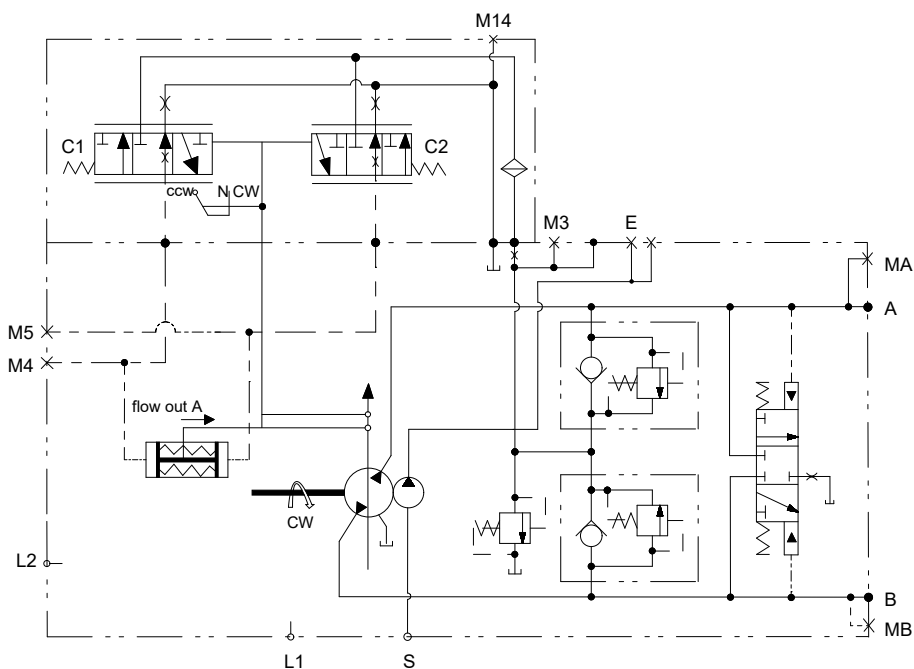


V40D28 Input Shaft type



"B1" type spline shaft

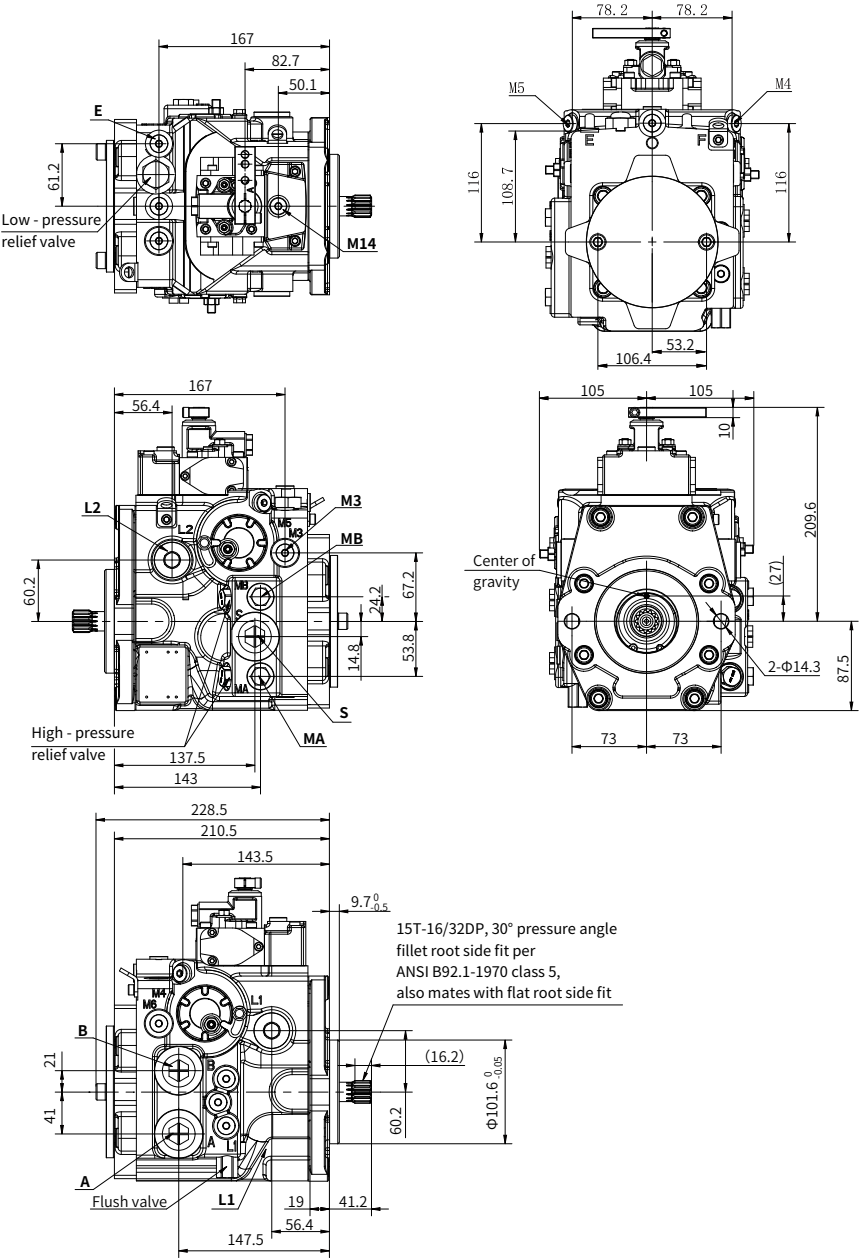
V40D32 Pump principle



Input shaft rotation	CW		CCW	
Energized coil	C2	C1	C2	C1
Oil port A	Out	In	In	Out
Oil port B	In	Out	Out	In
Servo pressure acting oil port	M4	M5	M4	M5

Installation size

V40D32 Installation size



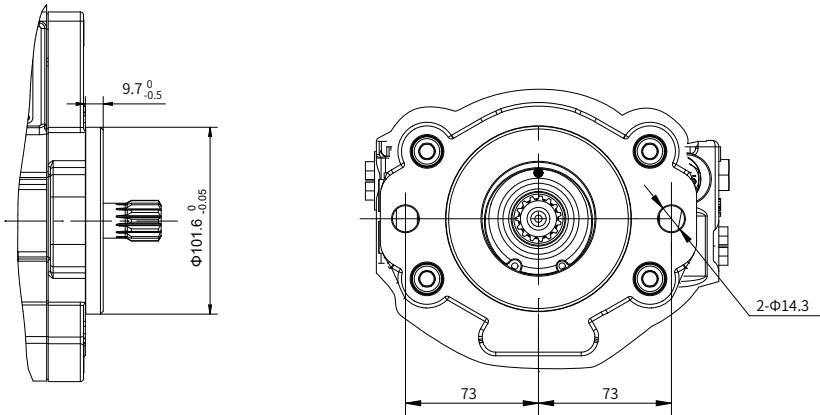
Installation size

•V40D32 Port details

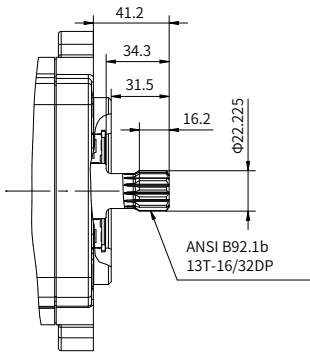
Port	Port Name	Port Size and Description	Tightening Torque(N.m)	Maximum pressure (bar)
S	Suction port	ISO 11926-1 (1 1/16-12UN)	101	2
A, B	Working port	ISO 11926-1 (1 1/16-12UN)	101	380
L1, L2	Drain port	ISO 11926-1 (1 1/16-12UN)	101	3
MA, MB	Port "A" and "B" gage port	ISO 11926-1 (9/16-18UNF)	25	380
M3	Gauge port of charge pump	ISO 11926-1 (9/16-18UNF)	25	27
E, F	External control port	ISO 11926-1 (9/16-18UNF)	25	27
M4, M5	Servo gage port	ISO 11926-1 (7/16-20UNF)	15	27
M14	Air bleed port	ISO 11926-1 (7/16-20UNF)	15	3

Installation size

V40D32 Mounting Flange



V40D32 Input Shaft type



"B1" type spline shaft

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