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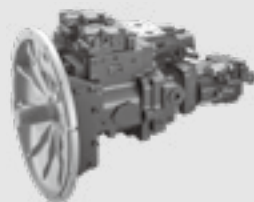
V90N-DP SERIES

**Swash-plate Type Axial Piston
Variable Displacement Double Pump**

(Original HP3V-D Series)

V90N-DP variable axial piston double pump is designed for the high pressure open circuit.

Displacement (cc/rev):	180×2	212×2	230×2	252×2
Nominal pressure (bar):	380	350	350	350
Max. pressure (bar):	420	392	392	392



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Features

- Variable axial piston double pump design for the open circuit.
- Various controllers available: hydraulic and electrical control design available, which can combined the different controllers of flow control, electric proportional control and power control.
- High efficiency, High working pressure (380 bar) and long lifetime.
- Compact design with PTO Power port drive for connecting different auxiliary pumps.
- Special pump housing structure design meets the low noise requirements.
- More suitable for mobile machinery like excavators, cranes, drilling rigs and so on.

Technical data

Size		V90N 180DP	V90N 212DP	V90N 230DP	V90N 252DP
Displacement(cc/rev)		180×2	212×2	230×2	252×2
Speed	Rated speed (rpm) ¹	2000	1800	1800	1800
	Maximum speed (rpm) ²	2400	2000	2000	2000
Pressure	Rated pressure (bar)	380	350	350	350
	Maximum pressure (bar)	420	392	392	392
Maximum torque (N.m)		1200	1500	1800	2100
Case volume (L)		10			
Suction port pressure (abs bar)		0.7 ~ 2			
Drain pressure (bar)		1			
Max. drain pressure (bar)		3			
Mass (Kg)		262	270	270	320
Temperature range (°C)		-20 ~ 95			
Hydraulic fluid viscosity range (mm ² /s)		10 ~ 1000* ³ (optimum viscosity range 16 ~ 36)			

1 Steady state suction pressure should be 0 bar and above (at normal condition);

2 If suction pressure less than 0 bar, Boost pressure should be required;

3 In case of 200-1000mm²/s, please allow system to warm up before using machine.

Type introduction

V90N	230	P	O	R	E1	/	F1	S7	N	B2	G	M	S
①	②	③	④	⑤	⑥		⑦	⑧	⑨	⑩	⑪	⑫	⑬

Product series

①	Product series	V90N
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Displacement

②	Displacement cc/rev	180	212	230	252
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Structure type

③		180	212	230	252	Code
	Parallel construction double pump	●	●	●	●	P

Charge pump (impeller)

④		180	212	230	252	Code
	with charge pump		●	●	●	H
	without charge pump	●				O

Direction rotation

⑤		180	212	230	252	Code
	Clockwise	●	●	●	●	R
	Counter-clockwise					L

Control type

⑥		180	212	230	252	Code	
	Electric proportional displacement	●	●	●	●	E1	
	Negative displacement control	Hydraulic pilot negative flow + Proportional increasing power control + (total power control)	●	●	●	●	H1
		Hydraulic pilot negative flow + Proportional decreasing power control + (total power control)	●	●	●	●	H2
		Hydraulic pilot negative flow +divided power control	○	○	○	○	H3

Mounting flange

⑦	Mounting flange	180	212	230	252	Code
	SAE C 127-2					C2
	SAE J617 NO.1 flywheel flange	●	●	●	●	F1
	SAE J617 NO.2 flywheel flange					F2
	SAE J617 NO.3 flywheel flange					F3
	4-hole flange					E

Type introduction

Input shaft

	Input shaft size	180	212	230	252	Code
	ANSI B92.1-1996 15T 8/16DP	●				S6
⑧	ANSI B92.1-1996 17T 8/16DP	●	●	●	●	S7
	JIS B1603 60×18×3				●	S8
	ANSI B92.1-1996 18T-8/16DP				●	S9

Through drive

		180	212	230	252	Code
⑨	None	●	●	●	●	N
	SAE B 101-2 SAE J744-22-4 13T 16/32DP	●	●	●	●	B1
	SAE B 101-2 SAE J744-25-4 15T 16/32DP	●	●	●	●	B2

PTO Power port drive

		180	212	230	252	Code
	None	●	●	●	●	N
⑩	SAE B 101-2 SAE J744 13T 16/32DP	●	●	●	●	B1
	SAE B 101-2 SAE J744 15T 16/32DP	●	●	●	●	B2
	SAE C 127-2 SAE J744-32-4 14T 12/24DP	●	●	●	●	C1

Connection type (except inlet and outlet port)

		180	212	230	252	Code
⑪	UNC port, ISO11926		○	○	○	A
	Metric port, ISO 6149		○	○	○	M
	BSPP G thread, JIS B2351	●	●	●	●	G

Thread type of Flange Port

		180	212	230	252	Code
⑫	UNC threads (only for UNC port)					A
	Metric thread	●	●	●	●	M

Standard / special version

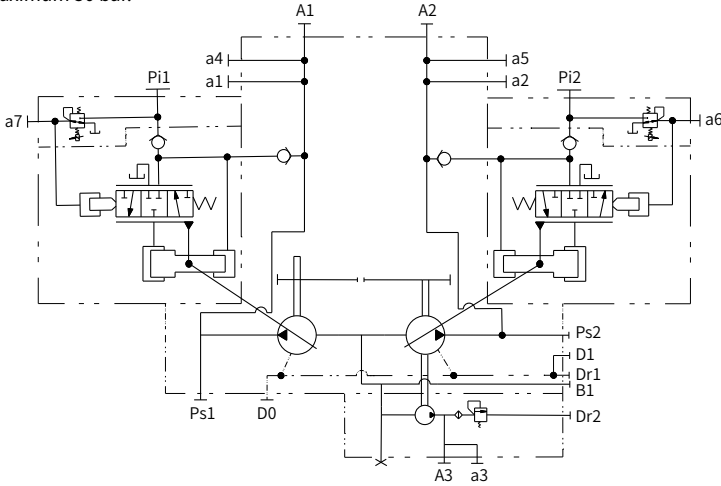
		130	180	280	300	Code
⑬	Standard version	●	●	●	●	None
	Special version	○	○	○	○	S

Remark: ● = Available; ○ = On request

V90N 180DP Control principle

·E1 Electro-proportional displacement control principle

Electro-proportional displacement control: With pilot-pressure-related control, the pump displacement is adjusted in proportion to the pilot pressure. Basic position without pilot signal is $V_{g\min}$, which includes the mechanically depressurized basic position $V_{g\min}$. With increasing pilot pressure the pump swivels to a larger displacement. The necessary control power is taken from the operating pressure or the external control pressure applied to port P. If the pump is to be adjusted from the zero basic setting or from a low operating pressure, port P must be supplied with an external control pressure of at least 30 bar, maximum 50 bar.

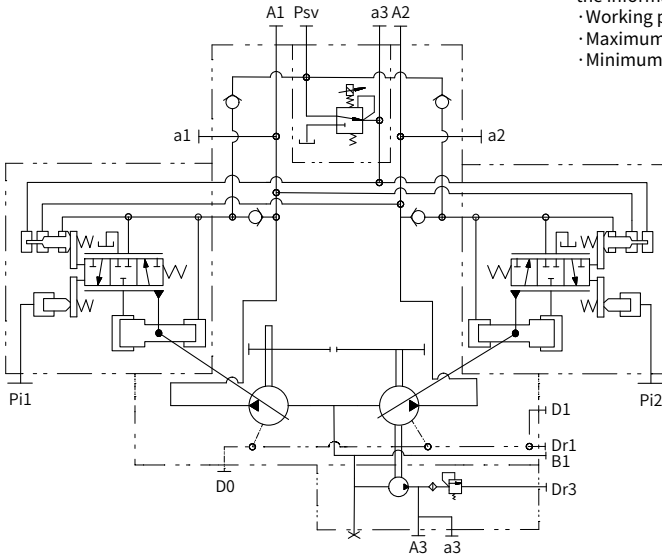


·H1 Negative flow control schematic

Note:

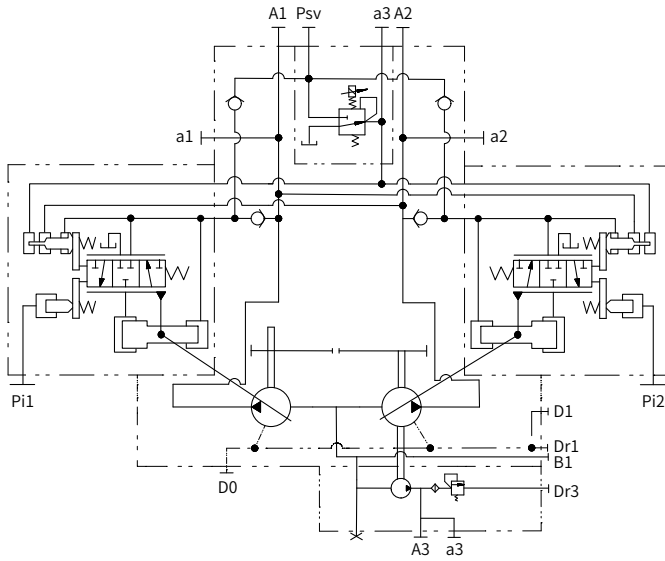
When ordering, please provide the information as below:

- Working pressure
- Maximum flow
- Minimum flow



V90N 180DP Control principle

· H2 Negative flow control schematic

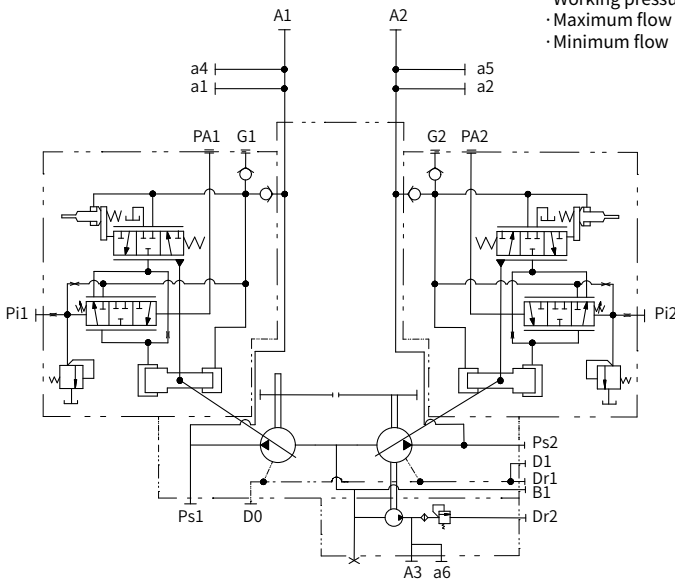


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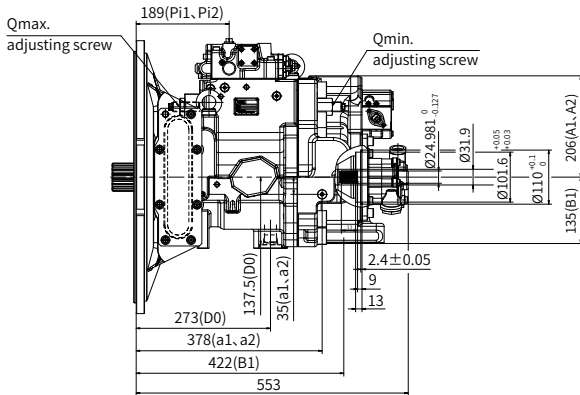
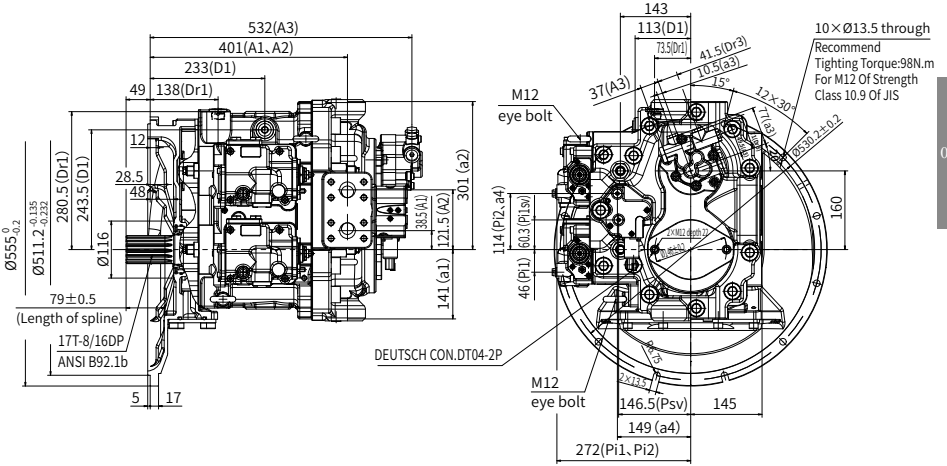
- Working pressure
- Maximum flow
- Minimum flow

· H3 Negative flow control schematic



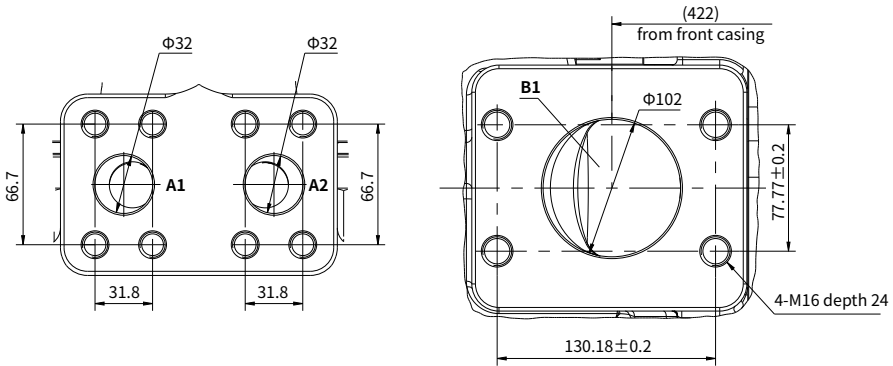
Installation size

V90N 180DP type



Installation size

·V90N 180DP Description of oil port



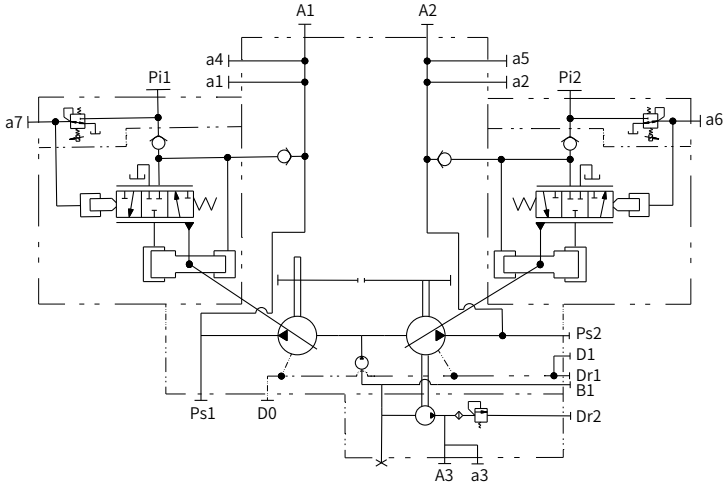
Port Details

	Port Name	Port Size and Description	Tighting Torque(N.m)
A1, A2	Delivery Port	SAE 6000psi 1 1/4"	98
B1	Suction Port	SAE 500psi 4"	240
Dr1	Drain Port	G 3/4 depth 20	170
Psv	Serve Assist Port	G 1/4 depth 15	36
Pi1, Pi2	Pilot Port	G 1/4 depth 15	36
a1, a2, a3	Gauge Port	G 1/4 depth 15	36
D1	Oil Filling Port	G 3/4 depth 20	170
D0	Outlet Port	G 3/4 depth 20	170
A3	Gear Pump Delivery Port	G 1/2 depth 19	53
Dr3	Gear Pump Drain Port	G 3/8 depth 15	34
a3	Gear Pump Gauge Port	G 1/4 depth 15	16

V90N 212DP/230DP Control principle

·E1 Electro-proportional displacement control principle

Electro-proportional displacement control: With pilot-pressure-related control, the pump displacement is adjusted in proportion to the pilot pressure. Basic position without pilot signal is $V_g \text{ min}$, which includes the mechanically depressurized basic position $V_{g\text{min}}$. With increasing pilot pressure the pump swivels to a larger displacement. The necessary control power is taken from the operating pressure or the external control pressure applied to port P. If the pump is to be adjusted from the zero basic setting or from a low operating pressure, port P must be supplied with an external control pressure of at least 30 bar, maximum 50 bar.

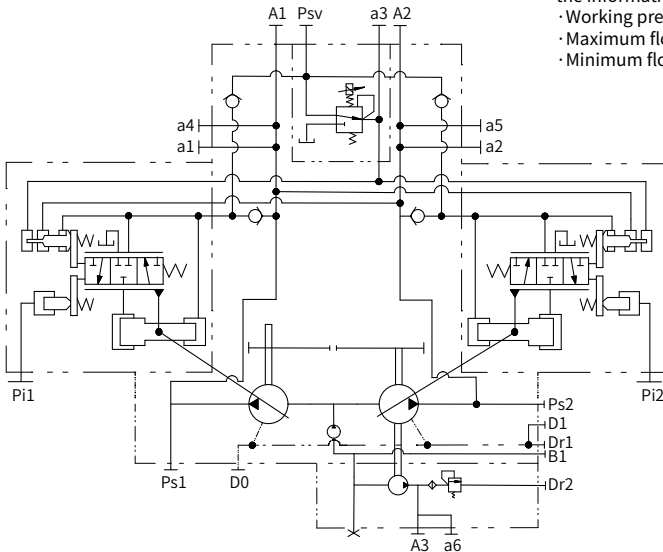


·H1 Negative flow control schematic

Note:

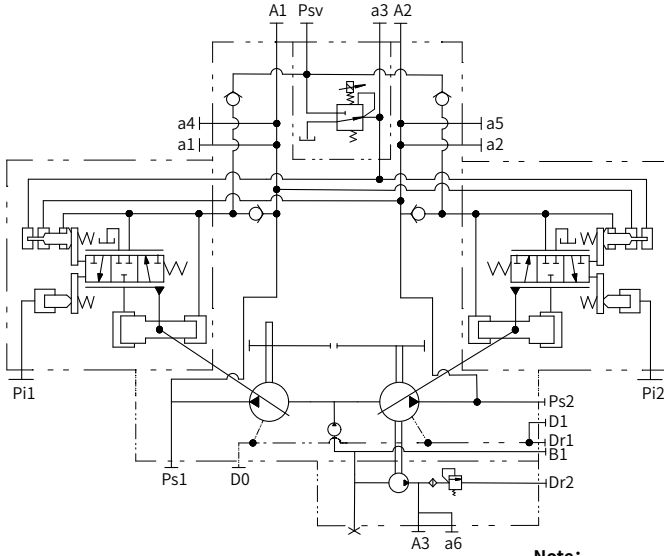
When ordering, please provide the information as below:

- Working pressure
- Maximum flow
- Minimum flow



V90N 212DP/230DP Control principle

· H2 Negative flow control schematic

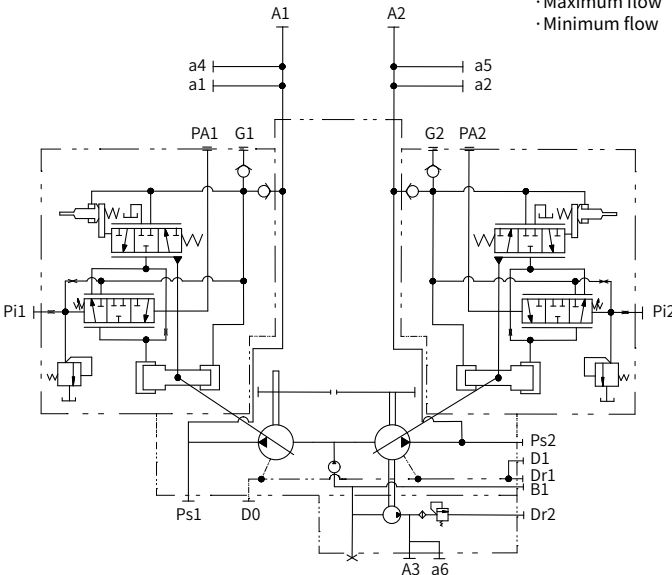


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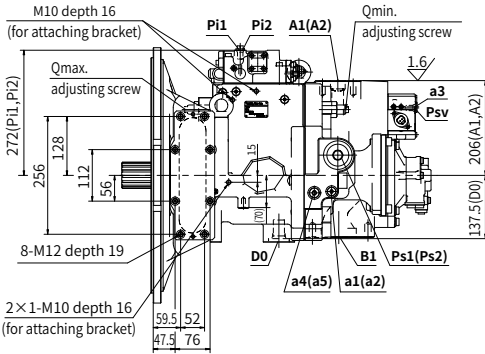
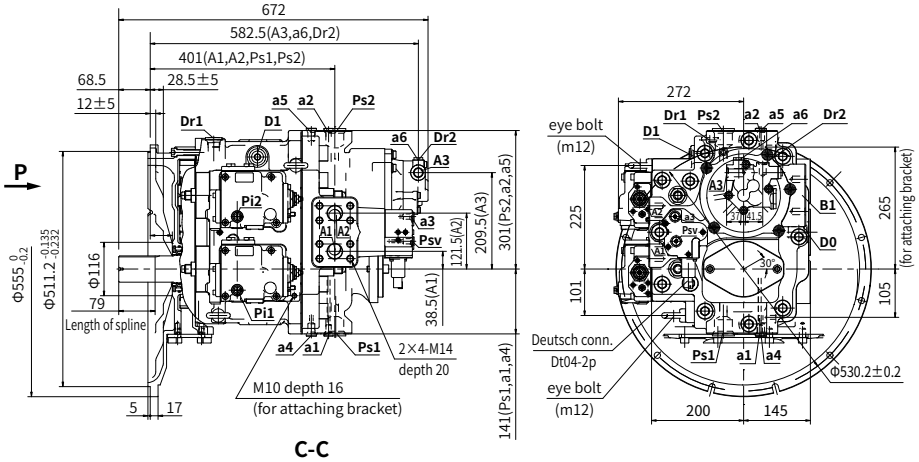
- Working pressure
- Maximum flow
- Minimum flow

· H3 Negative flow control schematic



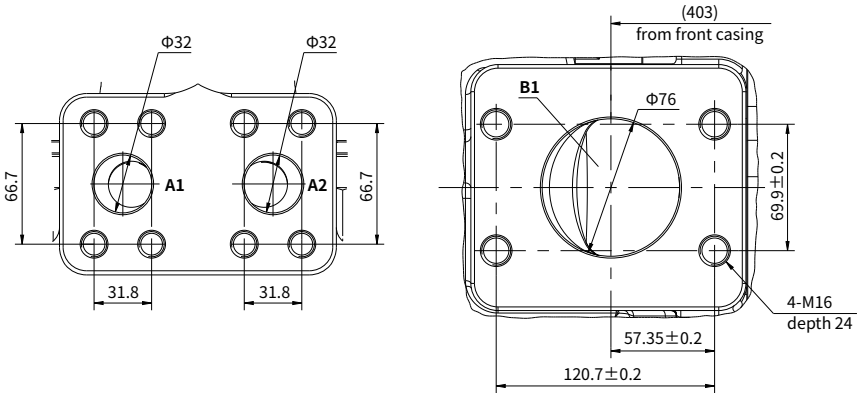
Installation size

V90N 212DP/230DP type



Installation size

·V90N 212DP/230DP Description of oil port



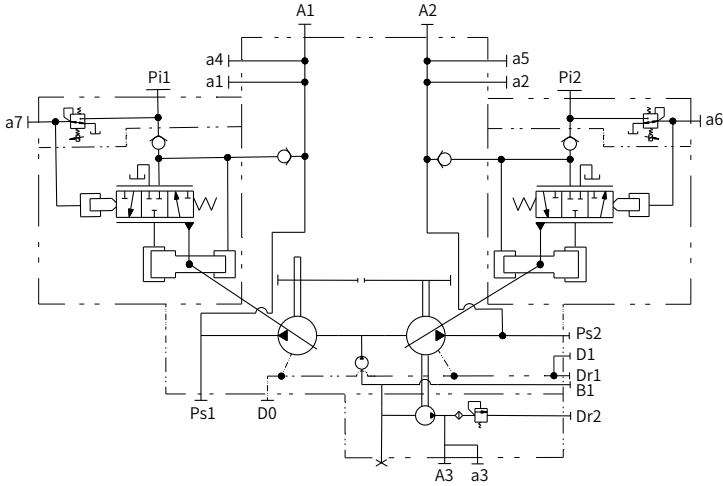
Port Details

	Port Name	Port Size and Description
A1, A2	Output Port	1 1/4" SAE J518C Code 62 (6000psi)
B1	Suction Port	3-1/2" SAE J518C Code 61 (2500psi)
Dr1	Drain Port	G 3/4 depth 20mm
Psv	Servo Assist Port	G 1/4 depth 15mm
Pi1, Pi2	Pilot Port	G 1/4 depth 15mm
D1	Oil Filling Port	G 3/4 depth 20mm
D0	Outlet Port	G 3/4 depth 20mm
A3	Gear Pump Output Port	G 1/2 depth 19mm
Dr2	Gear Pump Drain Port	G 3/8 depth 15mm

V90N 252DP Control principle

·E1 Electro-proportional displacement control principle

Electro-proportional displacement control: With pilot-pressure-related control, the pump displacement is adjusted in proportion to the pilot pressure. Basic position without pilot signal is $V_g \text{ min}$, which includes the mechanically depressurized basic position $V_{g\text{min}}$. With increasing pilot pressure the pump swivels to a larger displacement. The necessary control power is taken from the operating pressure or the external control pressure applied to port P. If the pump is to be adjusted from the zero basic setting or from a low operating pressure, port P must be supplied with an external control pressure of at least 30 bar, maximum 50 bar.

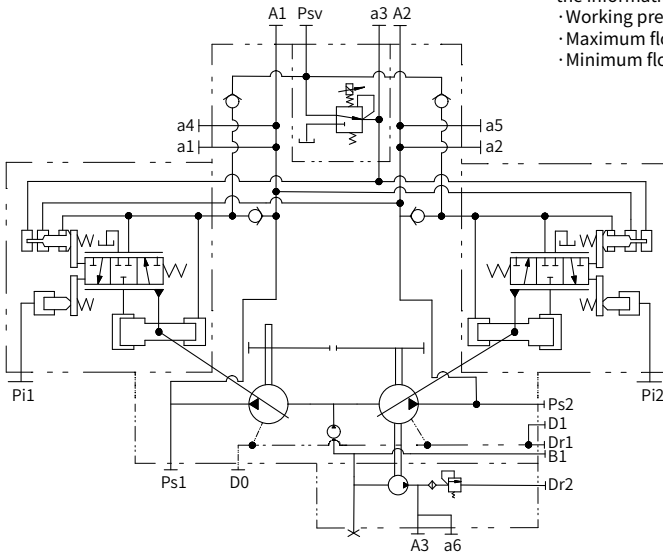


·H1 Negative flow control schematic

Note:

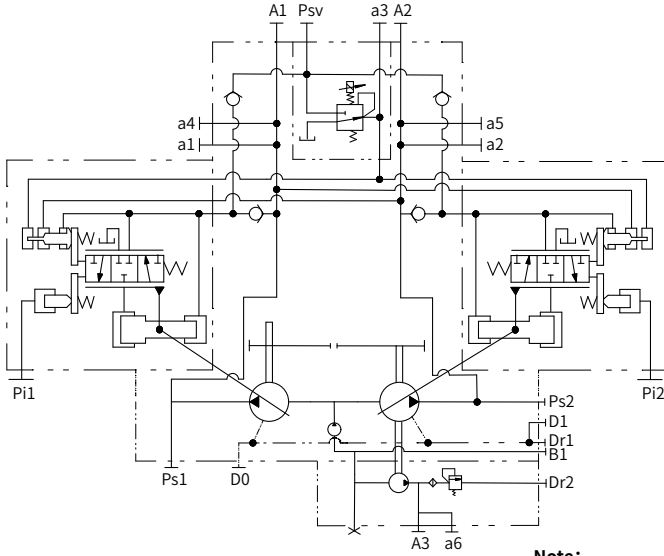
When ordering, please provide the information as below:

- Working pressure
- Maximum flow
- Minimum flow



V90N 252DP Control principle

· H2 Negative flow control schematic

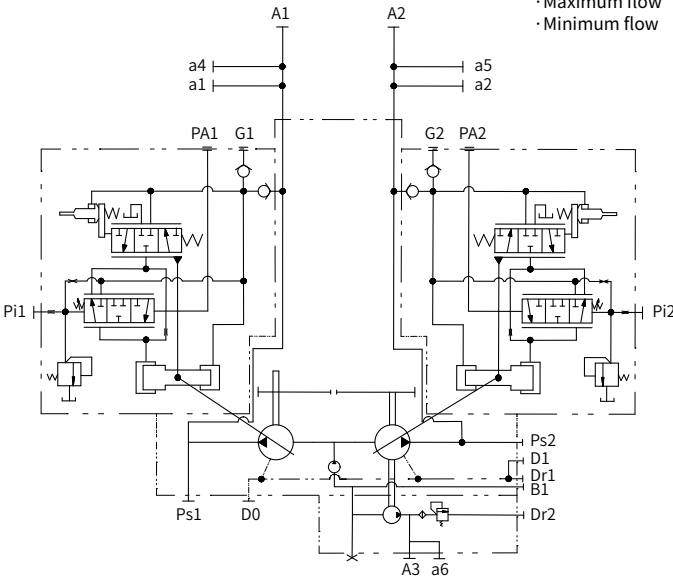


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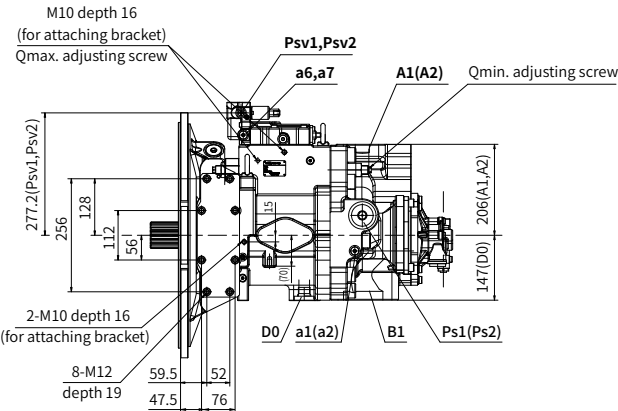
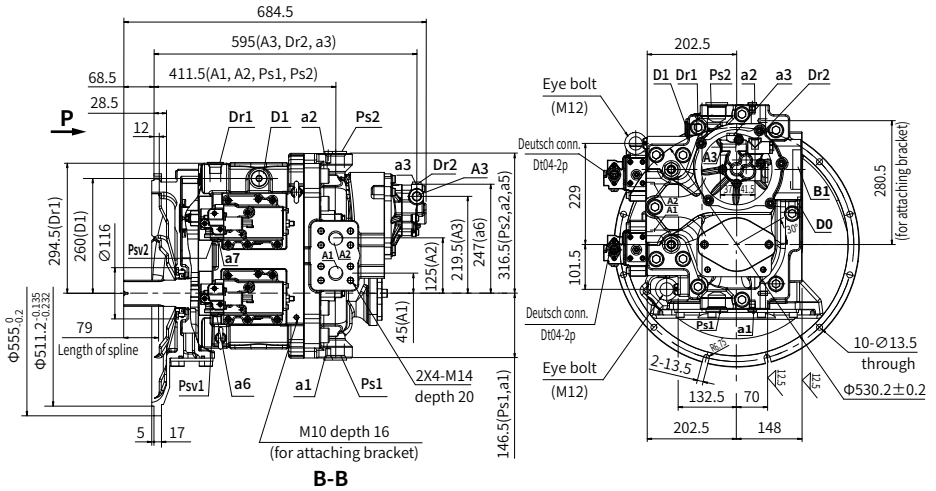
- Working pressure
- Maximum flow
- Minimum flow

· H3 Negative flow control schematic



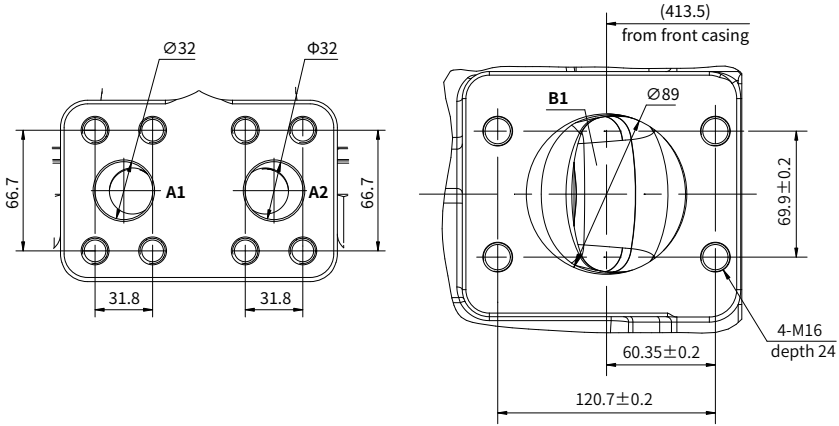
Installation size

V90N 252DP type



Installation size

·V90N 252DP Description of oil port



Port Details

	Port Name	Port Size and Description
A1, A2	Output Port	1 1/4" SAE J518C Code 62 (6000psi)
B1	Suction Port	3-1/2" SAE J518C Code 61 (2500psi)
Dr1	Drain Port	G 3/4 depth 20mm
Ps1,s2	Gauge Port	G 1 1/4 depth 24mm
Psv1,sv2	Pilot Port	G 1/4 depth 13mm
a1,a2	Gauge Port	G 1/4 depth 15mm
a4,a5	Gauge Port	G 3/8 depth 15mm
a6,a7	Gauge Port	G 1/4 depth 13mm
D1	Oil Filling Port	G 3/4 depth 20mm
D0	Outlet Port	G 3/4 depth 20mm
A3	Gear Pump Output Port	G 1/2 depth 19mm
Dr2	Gear Pump Drain Port	G 3/8 depth 15mm
a3	Gear Pump Gauge Port	G 1/4 depth 14mm

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