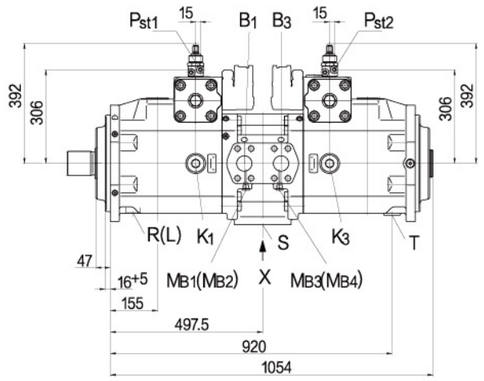
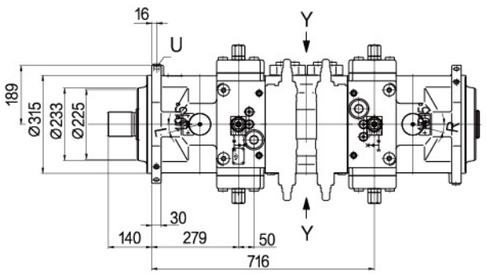
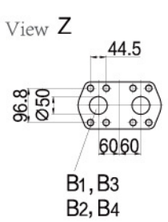
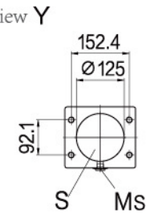
Unit Dimensions, Size 520





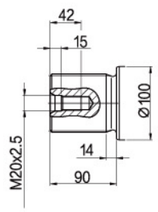




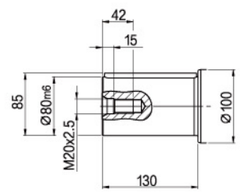
Shaft ends

Z Splined shaft DIN 5480

80x3x30x25x9g



P Parallel keyed shaft DIN 6885



Ports

B_1-B_4	Service line ports (High pressure series)	SAEJ518	2 in		
	Fastening threads	DIN13	M20×2.5	Deep 24	
S	Suction port (standard series)	SAEJ518	5 in		
	Fastening threads	DIN13	M16×2	Deep 24	
K_1-K_4	Flush ports		M48×2	Deep 22	960Nm
M_{B1},M_{B2}	Gauge point for operating pressure	DIN3852	M18×1.5	Deep 12	140Nm
M_{B1},M_{B2}	Gauge point for suction port	DIN3852	M18×1.5	Deep 12	140Nm
P_{st1},P_{st2}	Pilot pressure port		M14×1.5	Deep 22	960Nm
R(L)	Air bleed, drain port	DIN3852	M48×2	Deep 22	960Nm
T	Case drain	DIN3852	M48×2	Deep 22	960Nm
U	Flush port	DIN3852	M18×1.5	Deep 12	140Nm

ZP6VM

Axial piston variable motor

- Sizes (ml/r): 28-355
- Nominal pressure (bar): 400bar
- Maximum pressure (bar): 450bar
- Open and closed circuits

- The motor ZP6VM is bent-axis design and designed to be used in open and closed circuits.。
- Designed primarily for use in mobile applications.
- A comprehensive range of control options is available matching any high rotation speed and torque requirement. Displacement vary between Vg max toVg min = 0
- Output speed is up to the motor displacement and pump volume
- The output torque will increase with the pressure difference between the high pressure side and the low pressure side and the continuous increase of the displacement
- Optionally with flushing and boost-pressure valve mounted
- Optionally with integrated or mounted counterbalance
- Save cost by using small pump to replace the gear shift mechanism
- Robust motor with long service life
- High total efficiency
- Excellent start performance
- Low swing torque

ZHANPENG HYDRAULIC

HYDRAULIC COMPONENTS DEVELOPING AND MANUFACTURING

Ordering Code / Standard Program

ZP6V		M				/	63	W		-V								–	
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20

Hydraulic fluid

01	Mineral oil and HFD. HFD for sizes 250 to 1000 only in conjunction with long-life bearings "L" (without code)		E
	HFB,HFC hydraulic fluid	Sizes 28 (without code)	
		Sizes 250 to 1000 (only in conjunction with long-life bearings "L")	

Axial piston unit

02	Bent-axis design, variable	ZP6V

Drive shaft bearing

		28...200	250	355	
03	Standard bearings (without code)	●	●	●	L
	Long-life bearings	–	●	●	

Operating mode

04	Motor	M

Size

05	Geometric displacement	28	55	80	107	140	160	200	250	355	

Control device

06	Proportional control, hydraulic	△ p=10 bar	●	●	●	●	●	●	●	●	●	HD1
		△ p=25 bar	●	●	●	●	●	●	●	●	●	HD2
		△ p=35 bar	–	–	–	–	–	–	–	●	●	HD3
	Two-point control, hydraulic		–	–	–	–	–	–	–	●	●	HZ
			●	–	–	–	●	●	●	–	–	HZ1
			–	●	●	●	–	–	–	–	–	HZ3
	Proportional control, electric	12V	●	●	●	●	●	●	●	●	●	EP1
		24V	●	●	●	●	●	●	●	●	●	EP2
	Two-point control, electric	12V	●	–	–	–	●	●	●	●	●	EZ1
		24V	●	–	–	–	●	●	●	●	●	EZ2
		12V	–	●	●	●	–	–	–	–	–	EZ3
		24V	–	●	●	●	–	–	–	–	–	EZ4
	Automatic control, high-pressure related	With minimum pressure increase △p≤ approx.10bar	●	●	●	●	●	●	●	●	●	HA1
		With pressure increase△ p=100bar	●	●	●		●	●	●	●	●	HA2
	Automatic control, speed related Pst/PHD=3/100		–	–	–	–	–	–	–	●	●	DA
	Pst/PHD=5/100	Hydraulic travel direction valve	●	●	●	●	●	●	●	–	–	DA1
		Electric travel direction valve + electric $V_{g\,max}$ circuit 12V	●	●	●	●	●	●	●	–	–	DA2
		Electric travel direction valve + electric $V_{g\,max}$ circuit 24V	●	●	●	●	●	●	●	–	–	DA3
	Pst/PHD=8/100	Hydraulic travel direction valve	●	●	●	●	●	●	●	–	–	DA4
		Electric travel direction valve + electric $V_{g\,max}$ circuit 12V	●	●	●	●	●	●	●	–	–	DA5
		Electric travel direction valve + electric $V_{g\,max}$ circuit 24V	●	●	●	●	●	●	●	–	–	DA6

Pressure control/override (only for HD, EP)

			28	55	80	107	140	160	200	250	355	
07	Without pressure control/override		●	●	●	●	●	●	●	●	●	
	Pressure control	fixed setting	●	●	●	●	●	●	●	●	●	D
		Hydraulic override, two-point	●	●	●	●	●	●	●	–	–	E
		Hydraulic remote control, proportional	–	–	–	–	–	–	–	●	●	G

●= Available ○= On request △ = Not for new project –= Not available = Priority

1) standard with version D ((sizes 250 to 1000)

Ordering Code / Standard Program

ZP6V			M				/	63	W		-V								–	
01	02	03	04	05	06	07	08	09	10	11		12	13	14	15	16	17	18	19	20

Overrides for the HA1 and HA2 controls

			28	55	80	107	140	160	200	250	355	
08	Without override		●	●	●	●	●	●	●	●	●	
	Hydraulic override, remote control, proportional		●	●	●	●	●	●	●	●	●	T
	Remote control electric override, two-point	12V	●	●	●	●	●	●	●	–	–	U1
		24V	●	●	●	●	●	●	●	–	–	U2
	Electric override + travel direction valve, electric	12V	●	●	●	●	●	●	●	–	–	R1
		24V	●	●	●	●	●	●	●	–	–	R2

Series

09	Series 6, index 3	63

Direction of rotation

10	Viewed on drive shaft, bidirectional	W

Setting ranges for displacement 2)

		28	55	80	107	140	160	200	250	355	
11	$V_{g\,min}$=0 to 0.7$V_{g\,max}$	●	●	●	●	●	●	●	–	–	
	$V_{g\,min}$=0 to 0.4 $V_{g\,max}$ $V_{g\,max}$=$V_{g\,max}$ to 0.8$V_{g\,max}$	–	–	–	–	–	–	–	●	●	1
	$V_{g\,min}$>0.4$V_{g\,max}$ to 0.8$V_{g\,max}$ $V_{g\,max}$=$V_{g\,max}$ to 0.8$V_{g\,max}$	–	–	–	–	–	–	–	●	●	2

Sealing material

12	FKM (fluoroelastomer)	V

Drive shaft

		28	55	80	107	140	160	200	250	355	
13	Splined shaft DIN 5480	●	●	●	●	–	●	●	–	–	A
		●	●	●	●	●	●	–	●	●	Z
	Parallel keyed shaft DIN 6885	–	–	–	–	–	–	–	●	●	P

Mounting flange

			28	55	80	107	140	160	200	250	355	
14	ISO 3019-2	4 -hole	●	●	●	●	●	●	●	●	–	B
	Flange of the same standard	8-hole	–	–	–	–	–	–	–	–	●	H

Port plate for working line 2)

					28	55	80	107	140	160	200	250	355	
15	SAE working ports A and B at rear	01	0		●	●	●	●	●	●	●	●	●	010
			7		●	●	●	●	●	●	●	●	●	017
	SAE working ports A and B lateral, opposite	02	0		●	●	●	●	●	●	●	●	●	020
			7		●	●	●	●	●	●	●	●	●	027
	SAEworking ports A and B lateral, opposite + rear	15	0		–	–	–	–	–	–	–	●	●	150
	Port plate with 1-stage pressure relief valves for mounting a counterbalance valve	BVD 37	0		–	–	–	●	–	–	–	–	–	370 378
		BVD 38	0	8	–	●	●	●	●	●	●	●	–	380 388
		BVE 38			–	–	–	●	●	●	●	–	–	

Valve

Without valve	0	Flushing and boost-pressure valve, mounted	7	Counterbalance valve mounted	8

Speed sensor

		28	55	80	107	140	160	200	250	355	
16	Without speed sensor	●	●	●	●	●	●	●	●	●	0
	Prepared for HDD speed sensor	–	▲	▲	▲	▲	▲	▲	▲	●	F
	HDD speed sensor mounted	–	▲	▲	▲	▲	▲	▲	▲	●	H
	Prepared for DSM/DSA speed sensor	●	●	●	●	●	●	●	○	○	U
	DSM/DSA speed sensor mounted	●	●	●	●	●	●	●	○	○	V

Ordering Code / Standard Program

ZP6V		M				/	63	W		-V								–	
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20

Swivel angle sensor

		28	55	80	107	140	160	200	250	355	
17	Without swivel angle sensor without code	●	●	●	●	●	●	●	●	●	
	Optical swivel angle sensor	–	–	–	–	–	–	–	●	●	V
	Electric swivel angle sensor	–	–	–	–	–	–	–	●	●	E

Connector for solenoids

		28 to 200	250 to 1000	
18	Without connector (without solenoid, with hydraulic control only)	●	–	0
	(sizes 250 to 1000)	–	●	
	DEUTSCH molded connector, 2-pin without suppressor diode	●	–	P
	HIRSCHMANN connector – without suppressor diode (without code)	–	●	

Beginning of control

		28	55	80	107	140	160	200	250	355	
19	at $V_{g\,min}$ (standard for HA)(standard for HA)	●	●	●	●	●	●	●	●	●	A
	at $V_{g\,max}$ (standard for HD, HZ, EP, EZ, DA)	●	●	●	●	●	●	●	●	●	B

Standard / special version

20	Standard version	
	Standard version with installation variants, e.g. T ports open and closed contrary to standard	-Y
	Special version	-S

Technical data

Range of operating viscosity

Range of optimum operating viscosity and efficiency

ν opt = 16...36 mm 2/s

Working pressure range

Oil inlet

Port S(suction port) absolute pressure

Without charge pump

$P_{abs\,min}$ ——————————— 0.8 bar

$P_{abs\,max}$ ——————————— 30 bar

With charge pump

$P_{abs\,min}$ ——————————— 0.6 bar

$P_{abs\,max}$ ——————————— 2bar

Filtration of the hydraulic fluid

Finer filtration improves the cleanliness level of the hydraulic fluid, which increases the service life of the axial piston unit. A cleanliness level of at least 20/18/15 is to be maintained according to ISO 4406. At very high hydraulic fluid temperatures (90 ° C to maximum115 ° C), a cleanliness level of at least 19/17/14 according to ISO 4406 is necessary.

Oil outlet

Pressure at working port A or B

Norminal pressure P_N ——————————— 0.8 bar

Maximum pressure P_{max} ——————————— 30 bar

Minimum working pressure

a minimum pressure $P_{i\,min}$ has to be ensured at the working port (inlet). The minimum required pressure is dependent on the rotational speed and displacement of the axial piston unit.

Drain pressure of case

Drain pressure at port T1 and T2 is higher1.2 bar at most than at port S and cannot be higher than the following value.

PI. abs. max——————————2 bar.

An unimpeded full-size shell drain line is required to be connected directly to the tank.

Temperature range of oil sealing

permissible case temperature range of FKM sealing band: -25 C to +115 C.

Notice

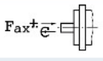
When temperature is below -25 C must use NBR(permissible temperature range: -40 C to +90 C).

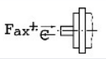
Technical data

Technical data

Size		NG	28	55	80	107	140	160	200	250	355
Geometric displacement[1], per revolution	$V_{g\,max}$	cm^3	28.1	54.8	80	107	140	160	200	250	355
	$V_{g\,min}$	cm^3	0	0	0	0	0	0	0	0	0
	$V_{g\,x}$	cm^3	18	35	51	68	88	61	76	188	270
Maximum rotational speed [2]											
(while adhering to the maximum permissible inlet flow)											
a t $V_{g\,max}$	n_{nom}	rpm	5550	4450	3900	3550	3250	3100	2900	2700	2240
V_g<$V_{g\,x}$ (see diagram)	n_{max}	rpm	8750	7000	6150	5600	5150	4900	4600	3600	2950
$V_{g\,0}$	n_{max}	rpm	10450	8350	7350	6300	5750	5500	5100	3600	2950
Inlet flow[3]											
n_{nom} and $V_{g\,max}$	qv_{max}	l/min	156	244	312	380	455	496	580	675	795
Torque [4]											
$V_{g\,max}$ and △ p=400bar	T	Nm	179	349	509	681	891	1019	1273	–	–
$V_{g\,max}$ and△ p=350bar	T	Nm	157	305	446	596	778	891	1114	1391	1978
Rotary stiffness											
$V_{g\,max}$ to $V_g/2$	C_{min}	KNm/rad	6	10	16	21	34	35	44	60	75
$V_g/2$ to 0 (interpolated)	C_{max}	KNm/rad	18	32	48	65	93	105	130	181	262
Moment of inertia for rotary group	J_{TW}	kgm^2	0.0014	0.0042	0.008	0 0127	0.0207	0.0253	0.0353	0.061	0.102
Maximum angular acceleration	α	rad/s^2	47000	31500	24000	19000	11000	11000	11000	10000	8300
Case volume	V	L	0.5	0.75	1.2	1.5	1.8	2.4	2.7	3.0	5.0
Weight approx.	m	kg	16	26	34	47	60	64	80	100	170

Permissible radial and axial forces of the drive shafts

Size	NG		28	28	55	55	80	80	107	107	140
Drive shaft	∅	mm	30	25	35	30	40	35	45	40	45
Maximum radial force at distance a (from shaft collar) 	$F_{q\,max}$	N	4838	6436	8069	7581	10283	10266	12215	13758	15982
	a	mm	17.5	14	20	17.5	22.5	20	25	22 5	25
Maximum torque	T_{max}	Nm	179	179	349	281	509	444	681	681	891
Maximum pressure△ pat $V_{g\,max}$	$P_{nom\,perm.}$	bar	400	400	400	322	400	349	400	400	400
Maximum axial force 	$+F_{ax\,max}$	N	315	315	500	500	710	710	900	900	1030
	$-F_{ax\,max}$	N	0	0	0	0	0	0	0	0	0
Permissible axial force per bar working pressure	$F_{ax\,perm./bar}$	N/bar	4.6	4.6	7.5	7.5	9.6	9.6	11.3	11.3	13 3

Size	NG		160	160	200	250	355
Drive shaft	∅	mm	50	45	50	50	60
Maximum radial force at distance a (from shaft collar) 	$F_{q\,max}$	N	16435	18278	20532	1200	1500
	a	mm	27.5	25	27.5	41	52.5
Maximum torque	T_{max}	Nm	1019	1019	1273	4)	4)
Maximum pressure ∧ pat $V_{g\,max}$	$P_{nom\,perm.}$	bar	400	400	400	4)	4)
Maximum axial force 	$+F_{ax\,max}$	N	1120	1120	1250	1200	1500
	$-F_{ax\,max}$	N	0	0	0	0	0
Permissible axial force per bar working pressure	$F_{ax\,perm./bar}$	N/bar	15.1	15.1	17.0	4)	4)

HD– Proportional control, hydraulic

The proportional hydraulic control provides infinite adjustment of the displacement. The control is proportional to the pilot pressure at port X.

-Beginning of control at $V_{g\,max}$ (maximum torque, minimum rotational speed at minimum pilot pressure)

-End of control at $V_{g\,min}$ (minimum torque, maximum permissible rotational speed, at maximum pilot pressure)

Notice

-Maximum permissible pilot pressure:: pst=100bar

-The control oil is internally taken out of the high pressure side of the motor (A or B). For reliable control, a working pressure of at least 30 bar is necessary in A(B).

If a control operation is performed at a working pressure < 30 bar, an auxiliary pressure of at least 30 bar must be applied at port G using an external check valve.

Please note that at port G up to 450 bar

-Specify the desired beginning of control in plain text when ordering, e.g.: beginning of control at 10 bar.

- Beginning of control and HD characteristic

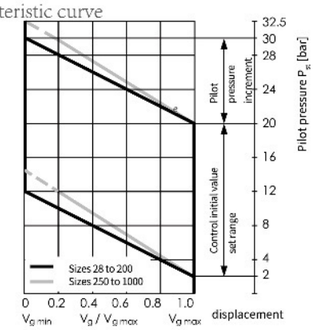
HD1 pilot pressure increase △ Pst= 10 bar

A pilot pressure increase of 10 bar at port X will cause a reduction in displacement from $V_{g\,max}$ to 0cm3 (sizes 28 to 200) or from $V_{g\,max}$ to 0.2 $V_{g\,max}$(sizes 250 to 1000) .

Beginning of control, setting range 2 to 20 bar.

Standard setting: beginning of control at 3 bar (end of control at 13 bar)

HD1 Characteristic curve



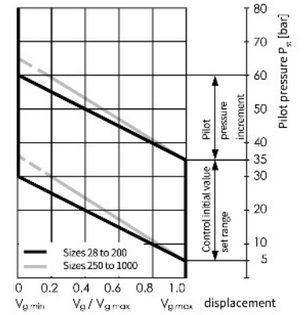
HD2 pilot pressure increase △ Pst= 25 bar

A pilot pressure increase of 25 bar at port X results in a reduction in displacement from $V_{g\,max}$ to 0cm3 (sizes 28 to 200) or from $V_{g\,max\,to}$ 0.2V g max(sizes 250 to 1000).

Beginning of control, setting range 5 to 35 bar.

Standard setting: beginning of control at 10 bar (end of control at 35 bar).

HD2 Characteristic curve



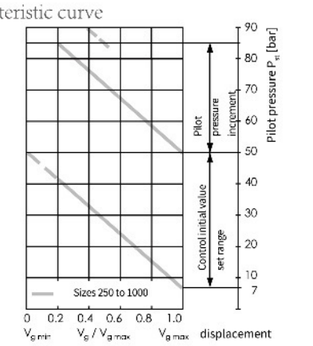
HD3 pilot pressure increase △ Pst= 35 bar

A pilot pressure increase of 35 bar at port X results in a reduction in displacement from $V_{g\,max}$ to 0.2$V_{g\,max}$

Beginning of control, setting range 7 to 50 bar.

Standard setting: beginning of control at 10 bar (end of control at 45 bar).

HD3 Characteristic curve



HD.E pressure control, hydraulic override, two-point, size

Size 28 to 200

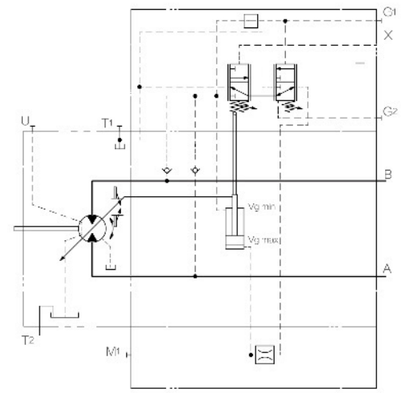
The pressure control setting can be overridden by applying an external pilot pressure at port G2, realizing a 2nd pressure setting.

Necessary pilot pressure at port G2:

Pst = 20 to 50bar

When ordering, please specify the 2nd pressure setting in plain text.

Circuit diagram **HD.E**

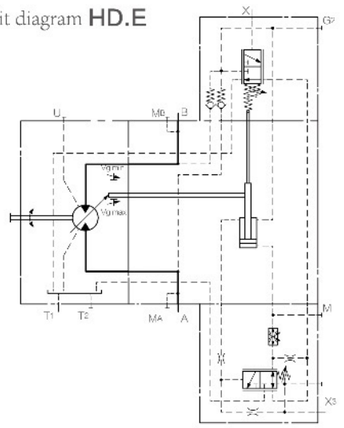


HD.G pressure control, remote controlled

regulates the motor to maximum displacement $V_{g\,max}$ A pressure relief valve (not included in the scope of delivery), which is located separately from the motor and which is connected to port X3, assumes the task of controlling the internal pressure cut-off valve. So long as the pressure command value has not been reached, pressure is evenly applied to the valve from both sides in addition to the spring force, and the valve remains closed. The pressure command value is between 80 bar and 350 bar. When the pressure command value is reached at the separate pressure-relief valve, this will open, reliving the pressure on the spring side to the reservoir. The internal control valve switches and the motor swivels to maximum displacement$V_{g\,max}$.

The differential pressure at the DRG control valve is set as standard to 25 bar. As a separate pressure relief valve, we recommend maximum line length should not exceed 2 m.

Circuit diagram **HD.E**



HD.D Pressure control, fixed setting

The pressure control overrides the HD control function. If the load torque or a reduction in motor swivel angle causes the system pressure to reach the setpoint value of the pressure control, the motor will swivel towards a larger angle. The increase in displacement and the resulting reduction in pressure cause the control deviation to decrease. With the increase in displacement the motor develops more torque, while the pressure remains constant.

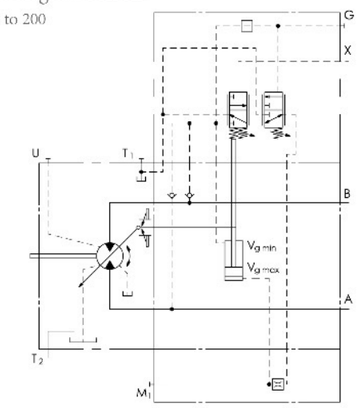
Setting range of the pressure control valve

Size 28to200 _____ 80to400bar

Size 250 to1000 _____ 80to350bar

Circuit diagram **HD.D**

sizes 28 to 200

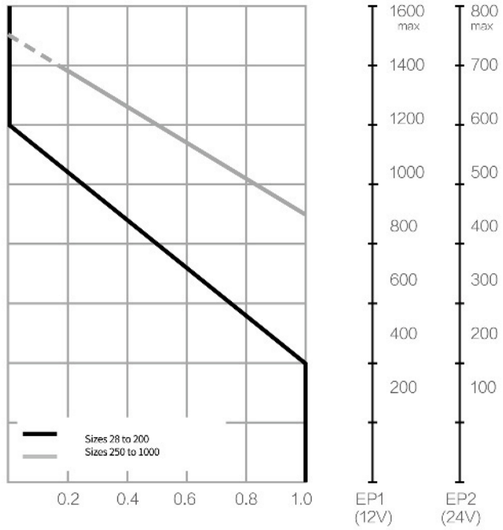


EP– Proportional control, electric

The electric control with proportional solenoid (size 28) or proportional valve (sizes 250 to 1000) enable the displacement to be steplessly adjusted. Control is proportional to the electric control current applied to the solenoid. Sizes 250 to 1000 require an external pilot oil supply at port P with a pressure of Pmin = 30 bar (Pmax =100bar).

-Beginning of control at $V_{g\,max}$ (maximum torque, minimum rotational speed at minimum control current).

-End of control at $V_{g\,min}$ (minimum torque, maximum permissible rotational speed at maximum control current).



Notice

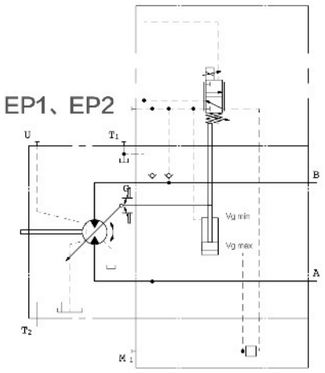
The control oil is internally taken out of the high pressure side of the motor (A or B). For reliable control, a working pressure of at least 30 bar is necessary in A (B). If a control operation is performed at a working pressure < 30 bar, an auxiliary pressure of at least 30 bar must be applied at port G using an external check valve. For lower pressures at port G, please contact us. Please note that at port G up to 450 bar (size 28) or 400 bar (sizes 250 to 1000) can occur.

The following only needs to be noted for sizes 250 to 1000:

The beginning of control and the EP characteristic curve are influenced by the case pressure. An increase in the case pressure causes an increase in the beginning of control (see page 6) and thus a parallel displacement of the characteristic curve

Circuit diagram **EP1、EP2**

Sizes 28 to 200



Technical data, solenoid

Sizes 28 to 200

	EP1	EP2
Voltage	12V (±20%)	24V (±20%)
Control current		
Beginning of control	400mA	200mA
End of control	1200mA	600mA
Current limit	1.54A	0.77A
Nominal resistance (at 20°C)	5.5Ω	22.7Ω
Dither Frequency	100Hz	100Hz
Duty cycle	100%	100%

Technical data, proportional valve

sizes 250 to 1000

	EP1	EP2
Voltage	12V (±20%)	24V (±20%)
Start of control at $V_{g\,max}$	900mA	450mA
End of control at $V_{g\,min}$	1400mA	700mA
Current limit	2.2A	1.0A
Nominal resistance (at 20°C)	2.4Ω	12Ω
Dither Frequency	5.5Ω	22.7Ω
Duty cycle	100%	100%

Notice

The spring return device in the control unit is not a safety device.

The control unit may be stuck in an uncertain position by an internal foreign object(Hydraulic fluid impurities, wear and tear on system components, or deposits). As a result, the controller no longer responds correctly to operator commands.

Check whether additional security measures need to be taken on your machine to move the drive actuator to a controlled safe location(Emergency shutdown). When necessary, ensure that these actions are performed correctly.

EP.D pressure control, fixed setting

The pressure control overrides the EP control function. If the load torque or a reduction in motor swivel angle causes the system pressure to reach the setpoint value of the pressure control, the motor will swivel towards a larger angle. The increase in displacement and the resulting reduction in pressure cause the control deviation to decrease. With the increase in displacement the motor develops more torque, while the pressure remains constant.

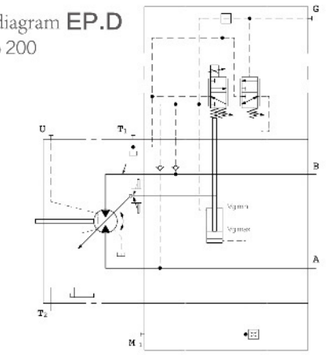
Setting range of the pressure control valve

Size 28to200 _____ 80to400bar

Size 250to1000 _____ 80to350bar

Circuit diagram **EP.D**

sizes 28 to 200



EP.E pressure control, hydraulic override, two-point

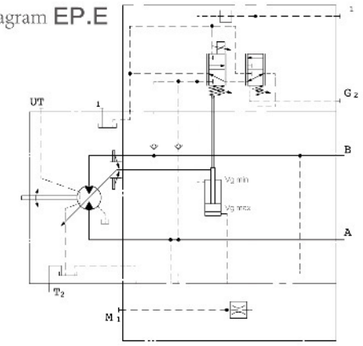
Sizes 28 to 200

The pressure control setting can be overridden by applying an external pilot pressure at port G2, realizing a Necessary pilot pressure at port G2 :

Pst=20 to 50bar

When ordering, please specify the 2nd pressure setting in plain text.

Circuit diagram **EP.E**



HZ– Two-point control, hydraulic

The two-point hydraulic control allows the displacement to be set to either $V_{g\,min}$ or $V_{g\,max}$ by switching the pilot pressure at port X on or off.

-Position at $V_{g\,max}$ (without pilot pressure, maximum torque, minimum rotational speed)

-Position at $V_{g\,min}$ (with pilot pressure > 15 bar minimum torque, maximum permissible rotational speed)

Notice

-Maximum permissible pilot pressure: 100bar

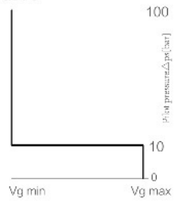
-The control oil is internally taken out of the high pressure side of the motor (A or B). For reliable control, a working pressure of at least 30 bar is necessary in A(B). If a control operation is performed at a working pressure < 30 bar, an auxiliary pressure of at least 30 bar must be applied at port G using an external check valve. For lower pressures, please contact us.

Please note that at port G up to 450 bar

- A leakage flow of maximum 0.3 l/min can occur at port X due to internal leakage. he control is to be suitably configured to avoid an independent build-up of pilot pressure.

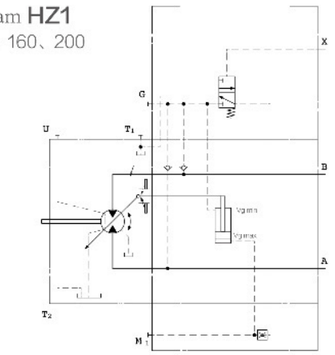
Characteristic curve

HZ



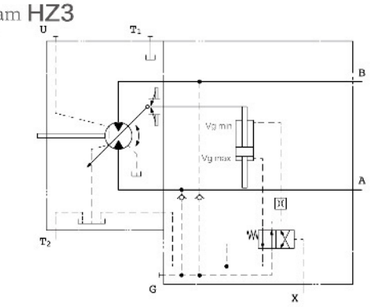
Circuit diagram **HZ1**

sizes 28、140、160、200



Circuit diagram **HZ3**

sizes 55 to 107



EZ– Two-point control, electric

he two-point electric control allows the displacement to be set to either $V_{g\,min}$ or $V_{g\,max}$ by switching the electric current on or off to a switching solenoid (size 28) or to an on/off valve (sizes 250 to 1000)

Notice

The control oil is internally taken out of the high pressure side of the motor (A or B). For reliable control, a working pressure of at least 30 bar is necessary in A (B). If a control operation is performed at a working pressure < 30 bar, an auxiliary pressure of at least 30 bar must be applied at port G using an external check valve. For lower pressures, please contact us.

Technical data, solenoid with Ø 37

Sizes 28、140、160、200

	EZ1	EZ2
Voltage	12V(±20%)	24V(±20%)
Position $V_{g\,max}$	de-energized	de-energized
Position $V_{g\,min}$	energized	energized
Nominal resistance (at 20℃)	5.5Ω	21.7Ω
Nominal power	26W	26.5W
Minimum active current required	1.32A	0.67A
Duty cycle	100%	100%
Type of protection: "Plug design"		

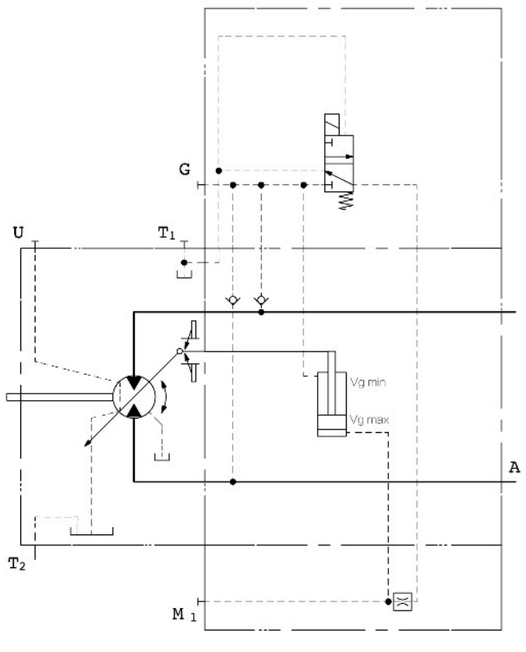
Technical data, solenoid with Ø 45

Sizes 55 to 107

	EZ3	EZ4
Voltage	12V(±20%)	24V(±20%)
Position $V_{g\,max}$	de-energized	de-energized
Position $V_{g\,min}$	energized	energized
Nominal resistance (at 20℃)	4.8Ω	19.2Ω
Nominal power	30W	30W
Minimum active current required	1.5A	0.75A
Duty cycle	100%	100%
Type of protection: "Plug design"		

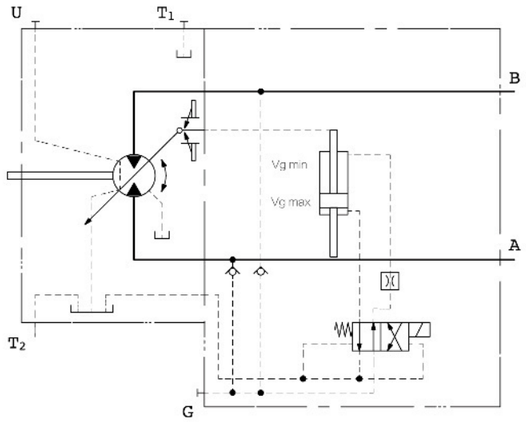
Circuit diagram EZ1、EZ2

Sizes 28、140、160、200



Circuit diagram EZ3、EZ4

Sizes 55 to 107



HA– Automatic high-pressure related control

The automatic high-pressure related control adjusts the displacement automatically depending on the working pressure.

The displacement of the ZP6VM motor with HA control is $V_{g\,min}$ (maximum rotational speed and minimum torque). The control device measures internally the working pressure at A or B (no control line required) and upon reaching the set beginning of control, the controller swivels the motor with increasing pressure from $V_{g\,min}$ to$V_{g\,max}$.The displacement is modulated between $V_{g\,min}$ and$V_{g\,max}$.

-Beginning of control at $V_{g\,min}$ (minimum torque, maximum rotational speed).

-End of control at $V_{g\,max}$ (maximum torque, minimum rotational speed).

Notice

- For safety reasons, winch drives are not permissible with beginning of control at(standard for HA).

-The control oil is internally taken out of the high pressure side of the motor (A or B). For reliable control, a working pressure of at least 30 bar is necessary in A (B). If a control operation is performed at a working pressure < 30 bar, an auxiliary pressure of at least 30 bar must be applied at port G using an external check valve. For lower pressures, please contact us. Please note that at port G up to Please note that at port G up to 450 bar.

-The beginning of control and the HA characteristic curve are influenced by the case pressure. An increase in the case pressure causes an increase in the beginning of control (see page 6) and thus a parallel displacement of the characteristic curve. Only for HA1T (sizes 28 to 200) and for HA1, HA2 and HA.T (sizes 250 to 1000)

-A leakage flow of maximum 0.3 l/min occurs at port X (working pressure > pilot pressure). To avoid a build-up of pilot pressure, pressure must to be relieved from port X to the reservoir. Only for HA.T control.

HA1 with minimum pressure increase, positive control

A working pressure increase of △p ≈approx.10bar, results in an increase in displacement from 0cm^3 to $V_{g\,max}$ (sizes 28 to 200) or from 0.2$V_{g\,max}$ to $V_{g\,max}$ (sizes 250 to1000).

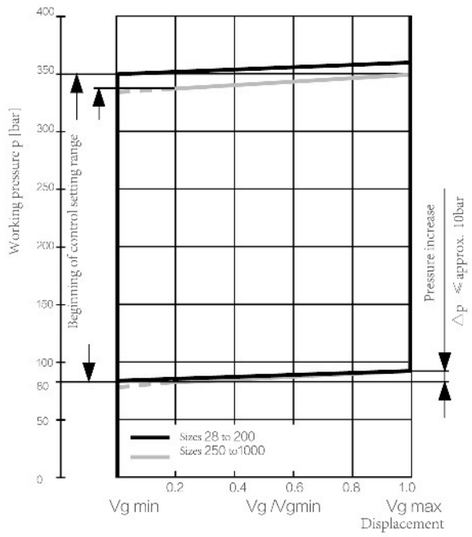
Setting range of the pressure control valve

Sizes 28 to 200 ——— 80 to 350bar

Sizes 250 to 1000 ——— 80 to 340bar

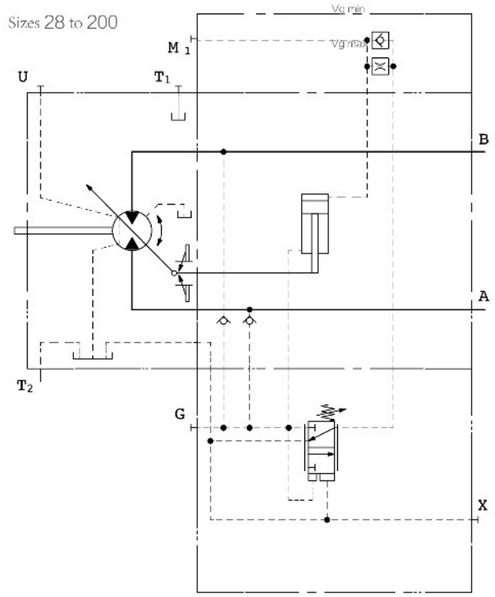
Please state the desired beginning of control in plain text when ordering, e.g.: beginning of control at 300 bar.

Characteristic curve HA1



Circuit diagram HA1

Sizes 28 to 200



HA2 with pressure increase, positive control

A working pressure increase of △ p= approx.100bar， results in an increase in displacement from 0cm3 to Vg max（sizes 28 to 200）or from 0.2Vg max to Vg max（sizes 250 to1000).

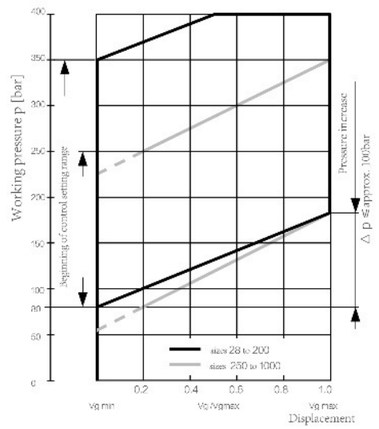
Please state the desired beginning of control in plain text when ordering, e.g.: beginning of control at 200 bar.

Setting range of the pressure control valve

sizes 28 to200 _____ 80 to 350bar

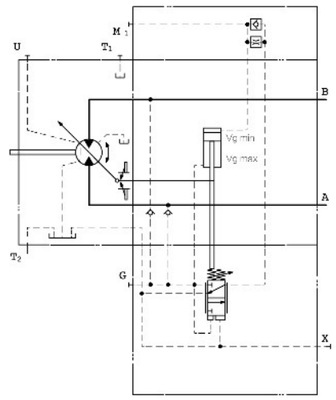
sizes 250 to 1000 _____ 80 to 250bar

Characteristic curve **HA2**



Circuit diagram **HA2**

sizes 28 to 200



HA.T Hydraulic override, remote control, proportional

With the HA.T3 control, the beginning of control can be influenced by applying a pilot pressure to port X.For every 1 bar of pilot pressure, the beginning of control is reduced by 17 bar (sizes 28 to 200) or 8bar(sizes 250 to 1000). Example (size 28 to 200).

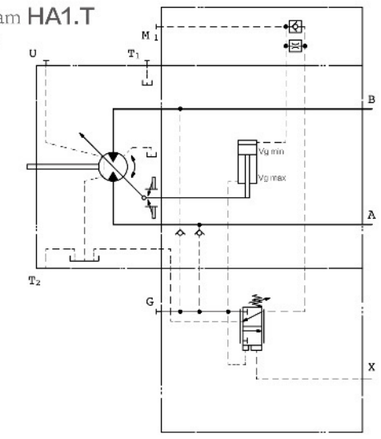
Notice

Maximum permissible pilot pressure 100bar.

Settings for the beginning of control	300bar	300bar
Pilot pressure at port X	0bar	10bar
Beginning of control at	300bar	130bar

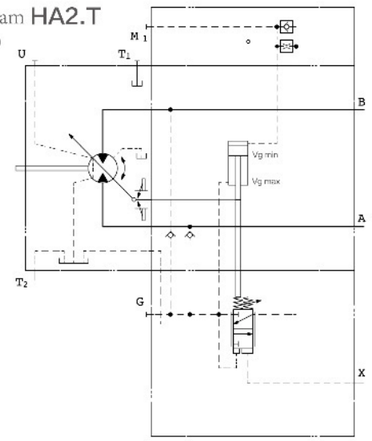
Circuit diagram **HA1.T**

sizes 28 to 200



Circuit diagram **HA2.T**

sizes 28 to 200



DA– Automatic control, speed related

The variable motor ZP6VM with automatic speed-related control is intended for use in hydrostatic travel drives in combination with the variable pump A4VG with DA control.

A drive speed-related pilot pressure signal is generated by the A4VG variable pump, and that signal, together with the working pressure, regulates the swivel angle of the hydraulic motor.

Increasing drive speed, i.e. increasing pilot pressure, causes the motor to swivel to a smaller displacement (lower torque, higher rotational speed), depending on the working pressure.

If the working pressure exceeds the pressure command value of the controller, the variable motor swivels to a larger displacement (higher torque, lower rotational speed).

Pressure ratio pst/pHD:3/100、5/100、8/100

DA control is only suitable for certain types of travel drive systems and requires review of the engine and vehicle parameters to ensure that the motor is used correctly and that machine operation is safe and efficient. We recommend that all DA applications be reviewed by a Zhanpeng application

Notice

The beginning of control and the DA characteristic curve are influenced by case pressure. An increase in the case pressure causes a decrease / reduction in the beginning of control and thus a parallel displacement of the characteristic curve.

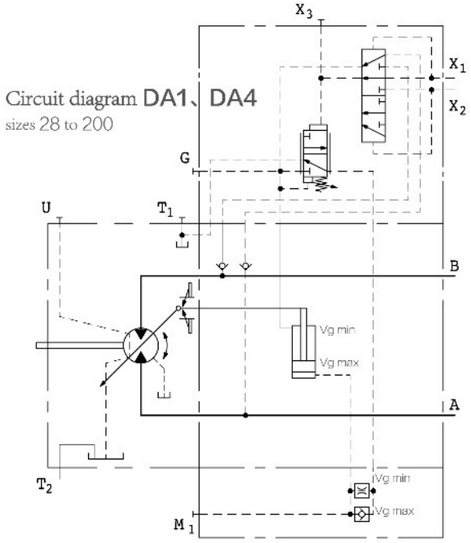
DA、DA1、DA4 hydraulic travel direction valve

Dependent on the direction of rotation (travel direction), the travel direction valve is switched by using pilot pressures X1 or X2.

Direction of rotation	Working pressure in	Pilot pressure in
clockwise	A	X1
counter-clockwise	B	X2

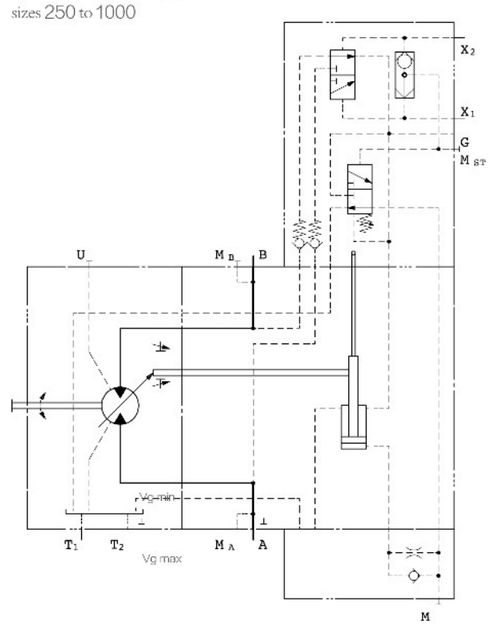
Circuit diagram **DA1、DA4**

sizes 28 to 200



Circuit diagram **DA**

sizes 250 to 1000



DA2、DA3、DA5、DA6

electric travel direction valve + electric Vg max -circuit

Depending on the direction of rotation (direction of travel),the travel direction valve is actuated through the compression spring or the switching solenoid

When switching solenoid b is energized, the control can be overridden and the motor can be swiveled to maximum displacement (high torque, lower rotational speed)(electric Vg max -circuit)

Technical data, solenoid a with∅ 37

（Travel direction valve）

	DA2、DA5	DA3、DA6
Voltage	12V(±20%)	24V(±20%)
Direction of rotation Working pressure		
counter-clockwise B	de-energized	de-energized
clockwise A	energized	energized
Nominal resistance （at 20℃）	5.5Ω	21.7Ω
Nominal power	26.2W	26.5W
Minimum active current required	1.32A	0.67A
Duty cycle	100%	100%

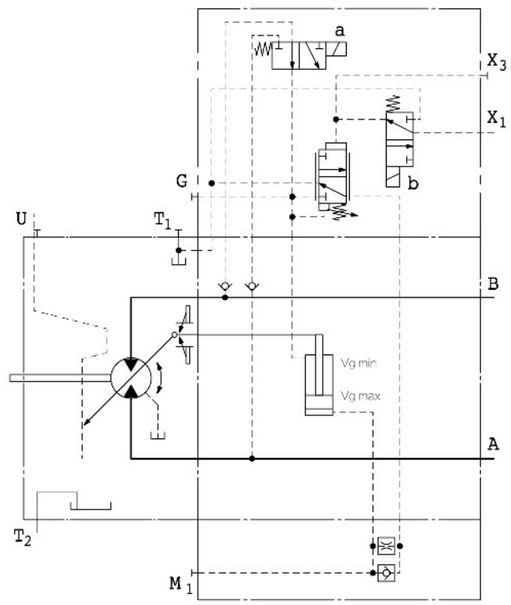
Technical data, solenoid b with∅ **37** （Electric override）

	DA2、DA5	DA3、DA6
Voltage	12V(±20%)	24V(±20%)
No override	de-energized	de-energized
Position $V_{g\ max}$	energized	energized
Nominal resistance （at 20℃）	5.5Ω	21.7Ω
Nominal power	26.2W	26.5W
Minimum active current required	1.32A	0.67A
Duty cycle	100%	100%

Circuit diagram

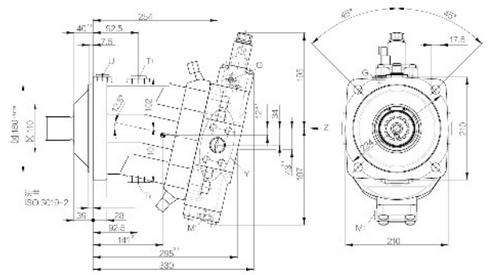
DA2、DA3、DA5、DA6

sizes 28 to 200

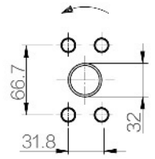


EP1、EP2– Proportional control, electric

Port plate 2 02– SAE working ports A and B lateral, opposing

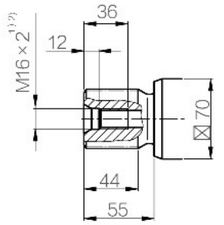


Working port（Detail Y）

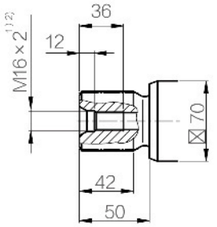


Drive shaft

A Splined shaft DIN 5480
W50×2×24×9g

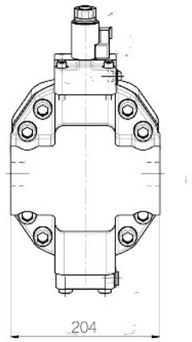


Z Splined shaft DIN 5480
W70×3×22×9g

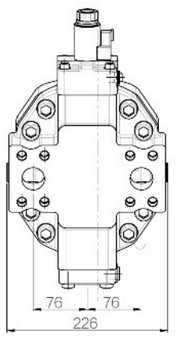


Location of the working ports on the port plates（view Z）

02 AE working ports A and B lateral, opposite



01 SAE working ports A and B lateral, opposite



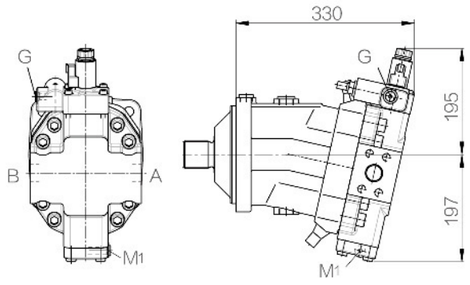
Ports

Ports		Standard	Size	P_{max} bar	State
A、B	Working port	SAEJ518	1 1/4in	450	O
	Fastening thread A/B	DIN 13	M14×2; 19(Deep)		
T1	Drain port	DIN 3852	M26×1.5; 16(Deep)	3	X
T2	Drain port	DIN 3852	M26×1.5; 16(Deep)	3	O
G	Synchronous control	DIN 3852	M14×1.5; 12(Deep)	450	X
G2	2nd pressure setting（HD.E、EP.E）	DIN 3852	M14×1.5; 12(Deep)	100	X
U	Bearing flushing	DIN 3852	M22×1.5; 14(Deep)	3	X
X	Pilot signal（HD、HZ、HA1T/HA2T）	DIN 3852	M14×1.5; 12(Deep)	100	O
X	Pilot signal（HA1、HA2）	DIN 3852	M14×1.5; 12(Deep)	3	X
X1、X2	Pilot signal（DA1、DA4）	DIN 2353-CL	8B-ST	40	O
X1	Pilot signal（DA2、DA3、DA5、DA6）	DIN 3852	M14×1.5; 12(Deep)	40	O
X3	Pilot signal（DA2、DA3、DA5、DA6）	DIN 3852	M14×1.5; 12(Deep)	40	X
M1	Stroking chamber measurement	DIN 3852	M14×1.5; 12(Deep)	450	X

O = Must be connected (plugged when delivered)
X = Plugged (in normal operation)

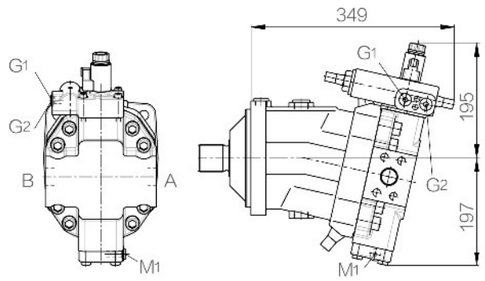
EP.D

Proportional control electric, with pressure control
fixed setting



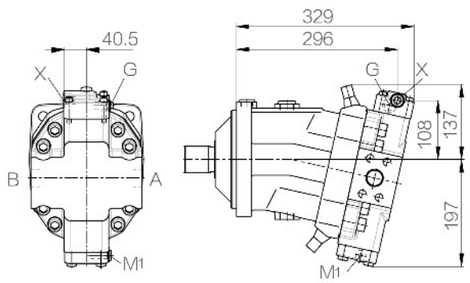
EP.E

Proportional control electric, wirh two
point hydraulic override control



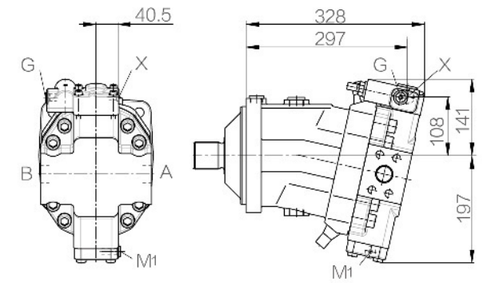
HD1、HD2

Proportional control hydraulic



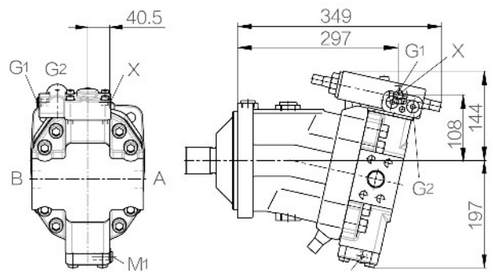
HD.D

Proportional control hydraulic， with pressure
control fixed setting, remote controlled



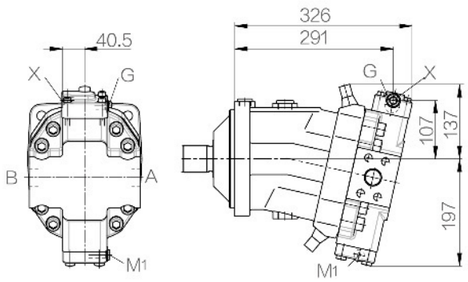
HD.E

Proportional control hydraulic， wirh two
point hydraulic override control



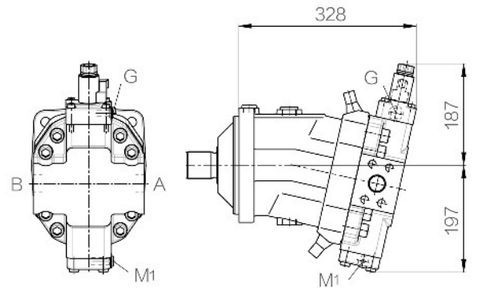
HZ1

Two-point hydraulic control



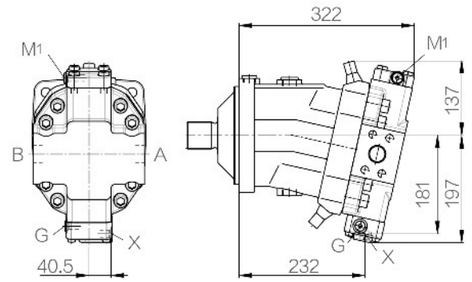
EZ1、EZ2

Two-point control, electric



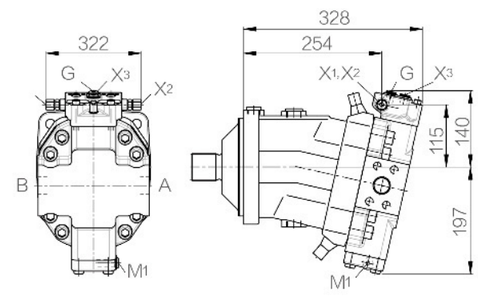
HA1、HA2/HA1T、HA2T

Automatic high-pressure related
control, with override hydraulic remote control, proportional



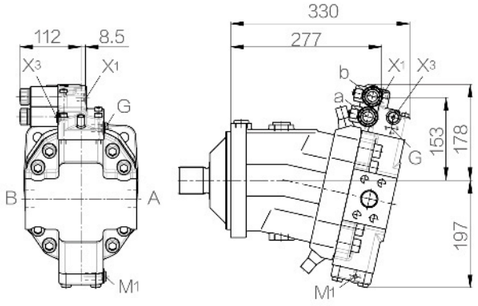
DA1、DA4

Automatic speed related control, with hydraulic
travel direction valve



DA2、DA3、DA5、DA6

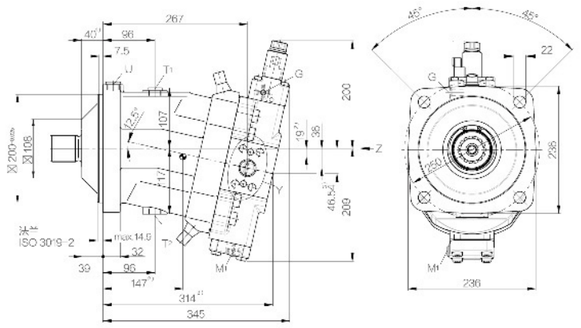
Automatic speed related control,
with electric travel direction valve and electric $V_{g\,max}$ circuit



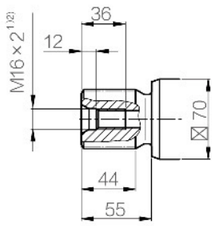
Dimensions, size 200

EP1、EP2– Proportional control, electric

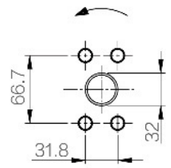
Port plate 2 — SAE working ports A and B lateral, opposing



Drive shaft

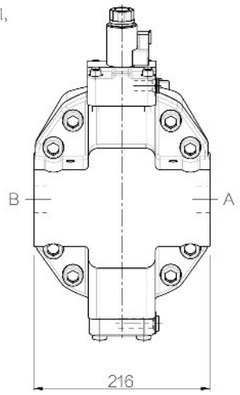


Working port（Detail Y）

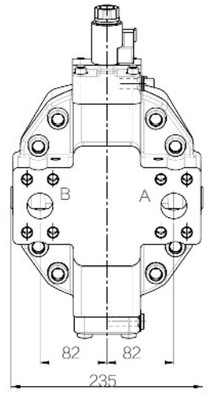


Location of the working ports on the port plates（View Z）

SAE working ports A and B lateral, opposite



SAE working ports A and B at rear



Ports

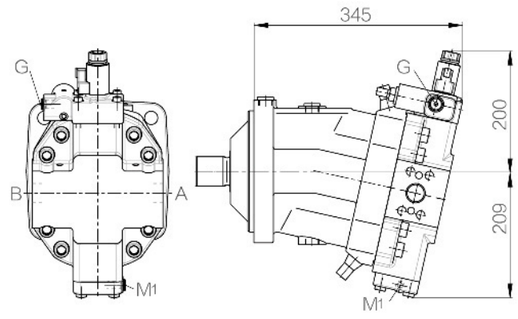
Ports		Standard	Size	P_{max} bar	State
A、B	Working port	SAEJ518	1 1/4in	450	O
	Fastening thread A/B	DIN 13	M14×2; 19(Deep)		
T1	Drain port	DIN 3852	M26×1.5; 16(Deep)	3	X
T2	Drain port	DIN 3852	M26×1.5; 16(Deep)	3	O
G	Synchronous control	DIN 3852	M14×1.5; 12(Deep)	450	X
G2	2nd pressure setting（HD.E、EP.E）	DIN 3852	M14×1.5; 12(Deep)	100	X
U	Bearing flushing	DIN 3852	M22×1.5; 14(Deep)	3	X
X	Pilot signal（HD、HZ、HA1T/HA2T）	DIN 3852	M14×1.5; 12(Deep)	100	O
X	Pilot signal（HA1、HA2）	DIN 3852	M14×1.5; 12(Deep)	3	X
X1、X2	Pilot signal（DA1、DA4）	DIN 2353-CL	8B-ST	40	O
X1	Pilot signal（DA2、DA3、DA5、DA6）	DIN 3852	M14×1.5; 12(Deep)	40	O
X3	Pilot signal（DA2、DA3、DA5、DA6）	DIN 3852	M14×1.5; 12(Deep)	40	X
M1	Stroking chamber measurement	DIN 3852	M14×1.5; 12(Deep)	450	X

O = Must be connected (plugged when delivered)
X = Plugged (in normal operation)

Dimensions, sizes 200

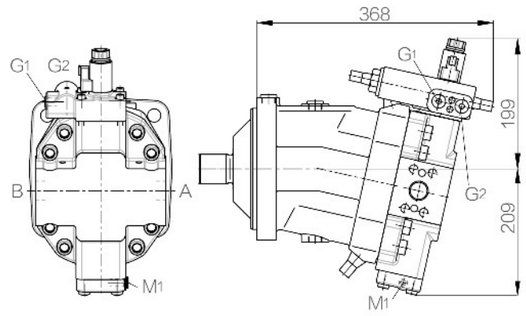
EP.D

Proportional control electric, with pressure control fixed setting



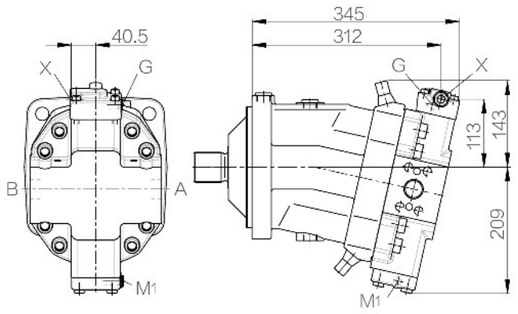
EP.E

Proportional control electric, with two point hydraulic override control



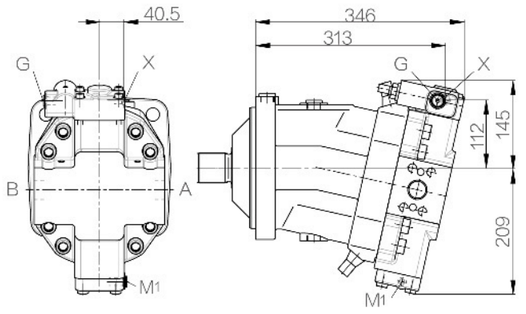
HD1、HD2

Proportional control hydraulic



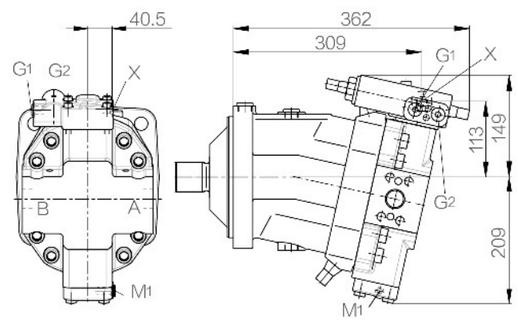
HD.D

Proportional control hydraulic, with pressure control fixed setting, remote controlled



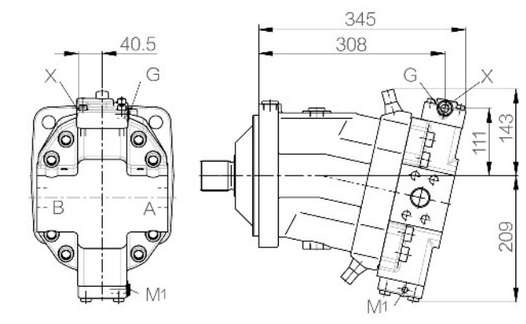
HD.E

Proportional control hydraulic，wirh two point hydraulic override control



HZ1

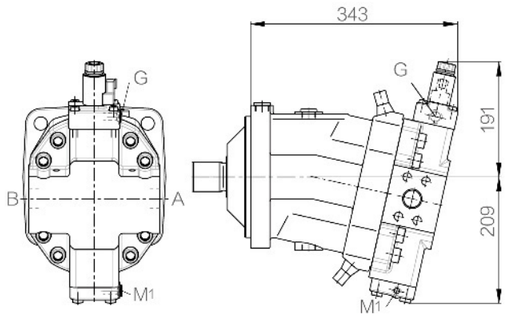
with two point hydraulic override control



Dimensions, size 200

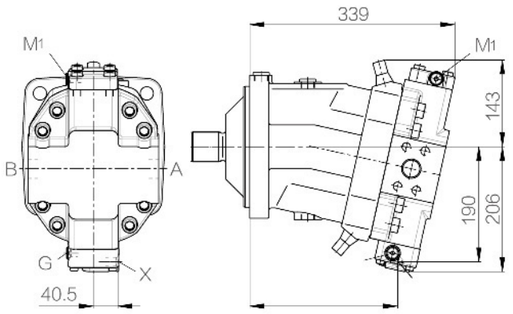
EZ1、EZ2

Two-point control, electric



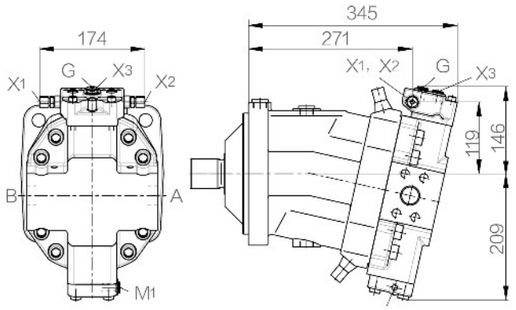
HA1、HA2/HA1T、HA2T

Automatic high-pressure related control, with override hydraulic remote control, proportional



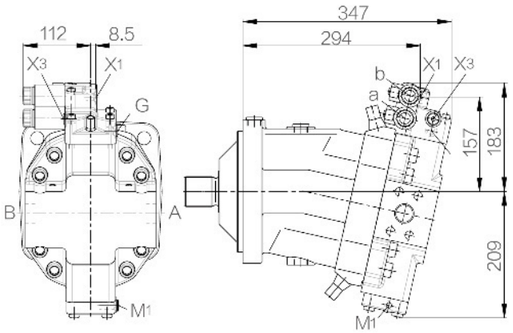
DA1、DA4

Automatic speed related control, with hydraulic travel direction valve



DA2、DA3、DA5、DA6

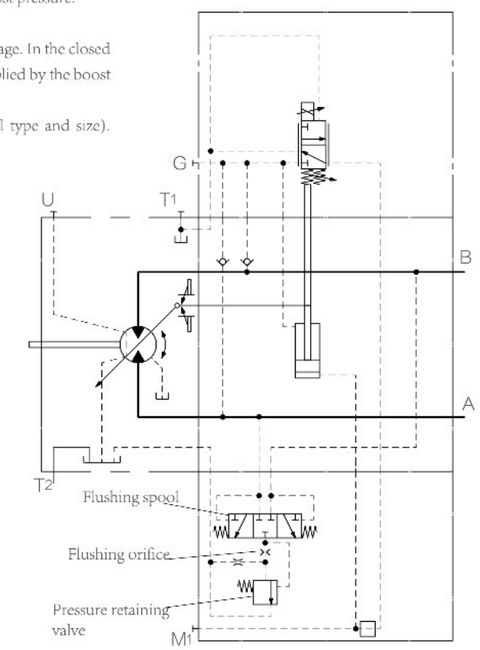
Automatic speed related control, with electric travel direction valve and electric $V_{g\,max}$ circuit



Flushing and boost-pressure valve

The flushing and boost-pressure valve is used to remove heat from the hydraulic circuit.
In a open circuit, it is only used for flushing the case
In a closed circuit, it is used for flushing the case and safeguarding the minimum boost pressure.
Hydraulic fluid is directed from the respective low pressure
side into the motor housing. This is then fed into the reservoir,together with the leakage. In the closed circuit, the removed hydraulic fluid must be replaced by cooled hydraulic fluid supplied by the boost pump.
The valve is mounted on the port plate or integrated (depending on the control type and size).
Cracking pressure of pressure retaining valve
(observe when setting the primary valve)
fixed setting _____ 16 bar
Switching pressure of flushing spool Δp _____ 8 ± 1 bar
Flushing flow qv
Orifices can be used to adjust the flushing flows as required.
The following parameters are based on:
ΔpND = pND-pG = 25 bar and ν = 10 mm2/s
(pND = low pressure, pG = case pressure)

Circuit diagram **EP**
Sizes 28 to 200



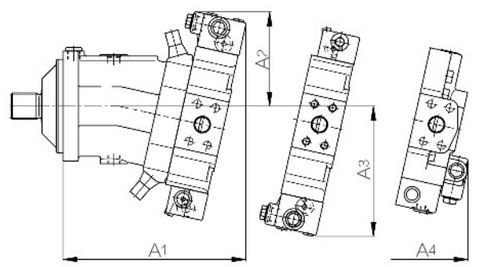
Size	Flushing flow qv L/min	Material number of orifice
28、55	3.5	R909651766
80	5	R909419695
107	8	R909419696
140、160、200	10	R909419697
250	10	R909419697
355、500、1000	16	R910803019

Sizes 28 to 200, can provide throttle orifice for 3.5 to - 10 L/min flushing flow. Specify flushing requirement in order。 At lower pressure ΔpND = 25 bar, flushing flow without throttle orifice is 12 to14 L.

Dimenssions

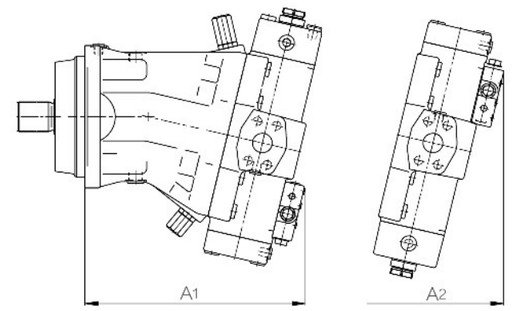
Sizes 28 to 200

HA1,HA2 HD,HZ1,DA, ZP,EZ1, EZ2 HZ3, EZ3, EZ4



NG	A1	A2	A3	A4
28	214	125	161	–
55	243	133	176	236
80	273	142	193	254
107	288	144	200	269
140	321	154	218	–
160	328	154	220	–
200	345	160	231	–

HD,HZ,DA, EP,EZ HA1,HA2



NG	A1	A2
250	357	402
355	397	446
500	440	504
1000	552	629