Type code for standard program

	PA10VS	O	45	DFLR	/	31	R	-	V	P	A	12	N00	
1	2	3	4	5		6	7		8	9	10	11	12	13

Version

		18	28	45	71	100	140		
1	Standard version (without symbol)	■	■	■	■	■	■		※
	HFA, HFB, HFC hydraulic fluid (except for Skydrol)	-	-	-	-	-	-	E	
	High-speed version	-	-	-	-	-	-	H	

Axial piston unit

2	Swashplate design,variable,nominal pressure 4000 psi(280 bar), maximum pressure 5100 psi(350 bar)	PA10VS

Operation mode

3	Pump, open circuit	O

Size (NG)

4	Geometric displacement, see table of values on pages 6 and 7	18	28	45	71	100	140	

Control device

				18	28	45	71	100	140		
5	Two-point control, directly operated I I			■	■	■	■	■	■	DG	
	Pressure control			■	■	■	■	■	■	DR	※
	with flow control, hydraulic										
		X-T open		■	■	■	■	■	■	DFR	※
		X-T closed		■	■	■	■	■	■	DFR1	
	with swivel-angle control,eletric			-	-	-	-	-	-	FE1 [1]	
		pressure and swivel-angle control, electric		-	-	-	-	-	-	DFE1 [1]	
	with pressure cut-off, remotely operated										
	hydraulic			■	■	■	■	■	■	DRG	
	electrical	negative characteristic	12V	-	-	-	-	-	-	ED71	
			24V	-	-	-	-	-	-	ED72	
		positive characteristic	12V	-	-	-	-	-	-	ER71 [2]	
			24V	-	-	-	-	-	-	ER72 [2]	
	Pressure, flow and power control			-	■	■	■	■	■	DFLR	※

Series

6	Series 3, Index 1	31

Direction of rotation

7	Viewed on drive shaft	clockwise	R
		counter clockwise L	L

Seals

8	FKM (VITON)	V	
	NBR	P	※

1)The following must be taken into account during project planning:
Excessive current levels (I >1200 mA with 12 V or I > 600 mA with 24 V) to the ER solenoid can result in undesiredincrease of pressure which can lead to pump or system damage:
- Use Imax current limiter solenoids.
- A sandwich plate pressure reducing valve can be used to protect the pump in the event of overflow.
An accessory kit with pressure reducing sandwich plate can be ordered from YEOSHE

■ = available - = on request ※ = standard type △ = custom made

[1] Coupling for splined shaft according to ANSI B92.1a
[2] Other electrical connector might be diffenrent
[3] Peference: SAE version from A-39

Type code for standard program

YEOSHE

	PA10VS	O	45	DFLR	/	31	R	-	V	P	A	12	N00	
1	2	3	4	5		6	7		8	9	10	11	12	13

Version

			18	28	45	71	100	140	
9	Splined shaft ANSI B92.1a	standard shaft	■	■	■	■	■	■	S ※
		similar to shaft "S" however for higher input torque	■	■	■	■	-	-	R
		reduced diameter, not for through drive	■	△	△	△	■	-	U
		same as "U", higher torque; not for through drive	-	△	△	△	△	-	W
	Parallel keyed shaft Not for through drive	Metric DIN 6885	■	■	■	■	■	■	P ※
		SAE ISO 3019-1	■	■	■	■	■	■	K

Note: Same splined shaft for SAE/Metric

Mounting flange 18 28

			18	28	45	71	100	140	
10	ISO 3019-2 (Metric)	2-hole	■	■	■	■	■	-	A
		4-hole	-	-	-	-	-	■	B
	ISO 3019-1 (SAE)	2-hole	■	■	■	■	■	-	C [3]
		4-hole	-	-	-	-	-	■	D [3]

Service line port

		18	28	45	71	100	140	
11	SAE flange ports on opposite side,metric-fastening thread	■	■	■	-	■	■	12
		-	-	-	■	-	-	42
	SAE flange ports on opposite side,UNC fastening thread	■	■	■	-	■	■	62 [3]
		-	-	-	■	-	-	92 [3]

Through drive

				18	28	45	71	100	140	
12	without through drive			■	■	■	■	■	■	N00 ※
	Flange ISO 3019-1 Diameter	coupling for splined shaft [1] diameter								
	82-2 (A)	5/8 in	9T 16/32DP	■	■	■	■	■	■	K01
		3/4 in	11T 16/32DP	■	■	■	■	■	■	K52
	101-2 (B)	7/8 in	13T 16/32DP	-	■	■	■	■	■	K68
		1 in	15T 16/32DP	-	-	■	■	■	■	K04
	127-2 (C)	1 1/4 in	14T 12/24DP	-	-	-	■	■	■	K07
		1 1/2 in	17T 12/24DP	-	-	-	-	■	■	K24
	152-4 (D)	1 3/4 in	13T 8/16DP	-	-	-	-	-	■	K17
	Ø 63，Metric 4 hole	key shaft Ø 25		-	■	■	■	■	■	K57
	Flange ISO 3019-2 Diameter									
	80，2-hole	3/4 in	11T 16/32DP	■	■	■	■	■	■	KB2
	100，2-hole	7/8 in	13T 16/32DP	-	■	■	■	■	■	KB3
		1 in	15T 16/32DP	-	-	■	■	■	■	KB4
	125，2-hole	1 1/4 in	14T 12/24DP	-	-	-	■	■	■	KB5
		1 1/2 in	17T 12/24DP	-	-	-	-	■	■	KB6
	180，4-hole	1 3/4 in	13T 8/16DP	-	-	-	-	-	■	KB7

Connectors for solenoids [2]

		18	28	45	71	100	140	
13	HIRSCHMANN connector – without suppressor diode	-	-	-	-	-	-	H

SAE

Technical data

Hydraulic fluid

When using environmentally acceptable hydraulic fluids,the limitations regarding technical data and seals must be observed.Please contact us.When ordering,indicate the hydraulic fluid that is to be used.

Operating viscosity range

For optimum efficiency and service life we recommend that the operating viscosity (at operating temperature) be selected in the rang

v_{opt} = opt. operating viscosity 80 - 170 SUS (16 ... 36 mm2/s)

referred to reservoir temperature (open circuit).

Limits of viscosity range

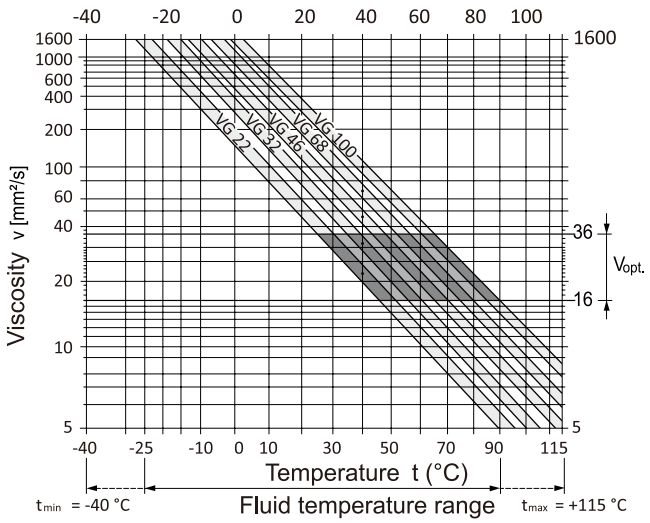
For critical operating conditions the following values apply:
nmin = 60 SUS (10 mm²/s)
short-term (t ≤ 1 min)
at max perm. case drain temp. of 195°F (90 °C).

Please also ensure that the max. case drain Ztemperature of 195 °F (90 °C) is not exceeded in localized areas (for instance,in the bearing area).The fluid temperature in the bearing area isapprox. 7 °F (5 K) higher than the average case drain temperature

nmax = 4640 SUS (1000 mm²/s)
short-term (t ≤ 1 min)
on cold start
(p ≤ 435 psi (30 bar),n ≤ 1000 rpm,tmin-13°F (-25 °C).

Depending on the installation situation,special measures are necessary at temperatures between -40 °C and -25 °C). Please contact YEOSHE.

Selection diagram



Notes on the choice of hydraulic fluid

In order to select the correct hydraulic fluid, it is necessary to know the operating temperature in the reservoir (open circuit) in relation to the ambient temperature.

The hydraulic fluid should be selected so that within the operating temperature range, the viscosity lies within the optimum range (νopt), see shaded section of the selection diagram. We recommend to select the higher viscosity grade in each case.

Example: at an ambient temperature of X °F (°C) the operating temperature is 140 °F (60 °C). In the optimum operating viscosity range (νopt; shaded area) this corresponds to viscosity grades VG 46 resp. VG 68; VG 68 should be selected.

Filtration of the hydraulic fluid

The finer the filtration the better the cleanliness level of the hydraulic fluid and the longer the service life of the axial piston unit.In order to guarantee the functional reliability of the axial piston unit it is necessary to carry out a gravimetric evaluation of the hydraulic fluid to determine the particle contamination and the cleanliness level according to ISO 4406. A cleanliness level of at least 20/18/15 must be maintained.At very high hydraulic fluid temperatures (195 °F (90 °C) to maximum 239 °F (115 °C)), a cleanliness level of at least 19/17/14 according to ISO 4406 is necessary.If the above cleanliness levels cannot be maintained, please contact us.

Important

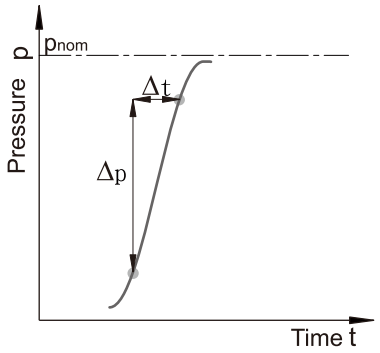
The case drain temperature is influenced by pressure and input speed and is always higher than the reservoir temperature.However, at no point in the component may the temperature exceed 195 °F (90 °C). The temperature difference specified on the left is to be taken into account when determining the viscosity in the bearing.
If the above conditions cannot be met, due to extreme operating parameters please contact us.

Technical data

YEOSHE

Operating pressure range

- Pressure at service line port B
- Nominal pressure pnom ____4000 psi (280 bar) absolute
- Maximum pressure pmax ____5100 psi (350 bar) absolute
  Single operating period _____2.5 ms
  Total operating period _____300 h
- Min. pressure(high-pressure side) _145 psi (10 bar) absolute[1)]
- Rate of pressure change $R_{A\ max}$ _ 232060 psi (16000 bar/s)



Pressure at suction port S (inlet)

Minimum pressure PS min___12 psi (0.8 bar) absolute
Maximum pressure PS max _145 psi (10 bar)[1)] absolute

Note

Please contact us for values for other hydraulic fluids.

Case drain pressure

Maximum permissible case drain pressure (at port L、L_1) :
Maximum 7 psi (0.5 bar) higher than the inlet pressure at port S, however not higher than 30 psi (2 bar) absolute.

$P_{L\ max\ abs}$_____2 bar absolute[1)]

[1)] Other values on request

Definition

- **Nominal pressure p_{nom}**

The nominal pressure corresponds to the maximum design pressure.

- **Maximum pressure p_{max}**

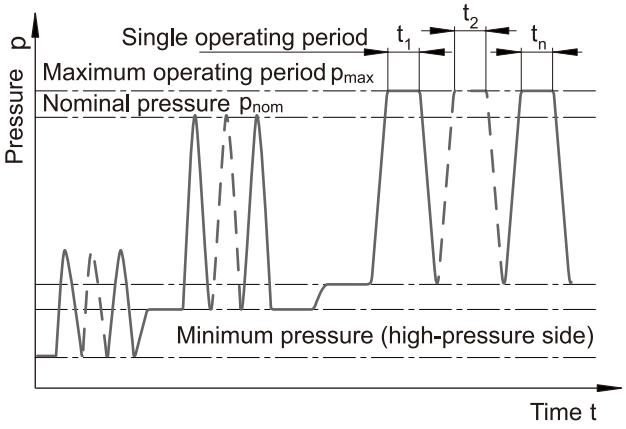
The maximum pressure corresponds to the maximum operating pressure within the single operating period. The total of the single operating periods must not exceed the total operating period.

- **Minimum pressure (high-pressure side)**

Minimum pressure in the high-pressure side (port B) that is required in order to prevent damage to the axial piston unit.The minimum pressure depends on the speed and displacement of the axial piston unit.

- **Rate of pressure change R_A**

Maximum permissible pressure build-up and pressure reduction speed with a pressure change over the entire pressure range.



Total operating period = t1 + t2 + ... + tn

Technical data, standard unit

Table of values (theoretical values, without efficiencies and tolerances: values rounded)

Size	NG		18	28	45	71	100	140
Geometrical displacement per revolution	$V_{g\,max}$	in³(cm³)	1.10(18)	1.71(28)	2.75(45)	4.33(71)	6.10(100)	8.54(140)
Speed [1]								
maximum at $V_{g\,max}$	n_{nom}	rpm	3300	3000	2600	2200	2000	1800
maximum at $V_g < V_{g\,max}$	$n_{max\,perm}$	rpm	3900	3600	3100	2600	2400	2100
Flow								
n_{nom} and $V_{g\,max}$	$q_{v\,max}$	gpm (l/min)	15.7 (59)	22 (84)	31 (117)	41 (156)	53 (200)	67 (252)
n_E =1800 rpm and $V_{g\,max}$	$q_{vE\,max}$	gpm (l/min)	7.2 (32)	13.3 (59)	21.4 (81)	33.8 (128)	47.6 (180)	67 (252)
Power at Δp = 4000 psi (280 bar) at nnom and Vg max	P_{max}	HP (kW)	36 (28)	51 (39)	72 (55)	96 (73)	124 (93)	156 (118)
n_E =1500 rpm and $V_{g\,max}$	$P_{E\,max}$	HP (kW)	19 (15)	31 (24)	50 (38)	91 (69)	111 (84)	156 (118)
Torque $V_{g\,max}$ and Δp = 4000 psi (280 bar)	T_{max}	lb-ft (Nm)	58 (80)	91 (125)	146 (200)	230 (316)	324 (445)	453 (623)
Δp = 1450psi (100 bar)	T	lb-ft (Nm)	14.6 (30)	33 (45)	53 (72)	83 (113)	117 (159)	164 (223)
Rotary stiffness, drive shaf S	c	lb-ft/rad (Nm/rad)	8082 (11087)	16400 (22317)	27560 (37500)	53018 (71884)	89348 (121142)	125042 (169537)
R	c	lb-ft/rad (Nm/rad)	10870 (14850)	19400 (26360)	30240 (41025)	56456 (76545)	– (–)	– (–)
P	c	lb-ft/rad (Nm/rad)	– (13158)	– (25656)	– (41232)	– (80627)	– (132335)	– (188406)
U	c	lb-ft/rad (Nm/rad)	5946 (8090)	– (–)	– (–)	– (–)	67180 (91093)	– (–)
K	c	lb-ft/rad (Nm/rad)	9805 (13340)	19712 (26189)	32270 (43905)	60352 (82112)	99448 (135303)	144680 (188406)
Moment of inertial rotary group	J_{TW}	lbs-ft² (kgm²)	0.022 (0.00093)	0.0403 (0.0017)	0.0783 (0.0033)	0.1970 (0.0083)	0.3963 (0.0167)	0.5743 (0.0242)
Angular acceleration, maximum [2]	α	rad/s²	6800	5500	4000	3300	2700	2700
Filling capacity	V	gal (L)	01.(0.4)	0.2(0.7)	0.26(1.0)	0.4(1.6)	0.6(2.2)	0.8(3.0)
Weight (without through drive)	m	lbs (kg)	26.5(12)	33(15)	46(21)	73(33)	99(45)	132(60)

The values are applicable :

[1]- for an absolute pressure p_{abs} = 15 psi (1 bar) at suction port S
- within the optimum viscosity range from ν_{opt} = 80 to 170 SUS (16 to 36 mm²/s)
- for mineral-oil based hydraulic fluid.

[2] The scope of application lies between the minimum necessary and the maximum permissible drive speeds. Valid for external excitation(e.g. diesel engine 2- to 8-fold rotary frequency, cardan shaft 2-fold rotary frequency). The limiting value is only valid for a single pump. The loading capacity of the connecting parts must be taken into account.

Note

Exceeding the maximum or falling below the minimum permissible values can lead to a loss of function, a reduction in operational life or total destruction of the axial piston unit. We recommend to check the loading through tests or calculation / simulation and comparison with the permissible values.

Determination of size

Flow $q_V = \frac{V_g \cdot n \cdot \eta v}{231(1000)}$ [gpm l/min]

Torque $T = \frac{V_g \cdot \Delta p}{24(20) \cdot p \cdot h_{mh}}$ [lb-ft Nm]

Power $P = \frac{2\pi \cdot T \cdot n}{33000(60000)} = \frac{q_v \cdot \Delta p}{1714(600) \cdot \eta t}$ [HP kW]

V_g = Displacement per revolution in in3 (cm³)
Δp = Differential pressure in psi (bar)
n = Speed in rpm (rpm)
ηV = Volumetric efficiency
ηmh = Mechanical-hydraulic efficiency
ηt = Total efficiency ($\eta t = \eta V \cdot \eta mh$)

Technical data, high-speed version

YEOSHE

Table of values (theoretical values, without efficiencies and tolerances: values rounded)

Size		NG		45	71	100	140
Geometrical displacement per revolution		$V_{g\,max}$	in³ (cm³)	2.75(45)	4.33(71)	6.1(100)	8.54(140)
Speed [1]							
maximum at $V_{g\,max}$		n_{nom}	rpm	3000	2550	2300	2050
maximum at $V_g < V_{g\,max}$		$n_{max\,perm}$	rpm	3300	2800	2500	2200
Flow n_{nom} and $V_{g\,max}$		$q_{v\,max}$	gpm (l/min)	35 (135)	48 (178)	61 (230)	76 (287)
Power at Δp = 4000 psi (280 bar) at n_{nom} and $V_{g\,max}$		P_{max}	HP (kW)	83 (63)	112 (83)	142 (107)	177 (134)
Torque $V_{g\,max}$ and	Δp = 4000 psi (280 bar)	T_{max}	lb-ft (Nm)	146 (200)	230 (316)	324 (445)	453 (623)
	Δp = 1450 psi (100 bar)	T	lb-ft (Nm)	53 (72)	83 (113)	117 (159)	164 (223)
Rotary stiffness, drive shaf	S	c	lb-ft/rad (Nm/rad)	27560 (37500)	53018 (71884)	89348 (121142)	125042 (169537)
	R	c	lb-ft/rad (Nm/rad)	30240 (41025)	56456 (76545)	– (–)	
	P	c	lb-ft/rad (Nm/rad)	– (41232)	– (80627)	– (132335)	– (188406)
	U	c	lb-ft/rad (Nm/rad)	– (–)	– (–)	67180 (91093)	– (–)
	K	c	lb-ft/rad (Nm/rad)	32270 (43950)	60352 (82112)	99448 (135303)	144680 (188406)
Moment of inertial rotary group		J_{TW}	lbs-ft² (kgm²)	0.0783 (0.0033)	0.1970 (0.0083)	0.3963 (0.0167)	0.5743 (0.0242)
Angular acceleration, maximum [2]		α	rad/s²	4000	3300	2700	2700
Filling capacity		V	gal (L)	0.26(1.0)	0.4(1.6)	0.6(2.2)	0.8(3.0)
Weight (without through drive)		m	lbs (kg)	46(21)	73(33)	99(45)	132(60)

The values are applicable：

[1]- for an absolute pressure p_{abs} = 15 psi(1 bar) at suction port S
- within the optimum viscosity range from v_{opt} = 80 to 170 (16 to 36 mm²/s)
- for mineral-oil based hydraulic fluid.

[2] The scope of application lies between the minimum necessary and the maximum permissible drive speeds.
Valid for external excitation (e.g. diesel engine 2- to 8-fold rotary frequency, cardan shaft 2-fold rotary frequency)
The limiting value is only valid for a single pump.
The loading capacity of the connecting parts must be taken into account.

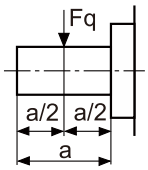
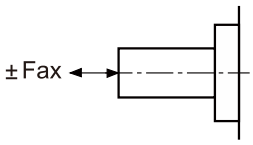
Note

Exceeding the maximum or falling below the minimum permissible values can lead to a loss of function, a reduction in operational service life or total destruction of the axial piston unit. We recommend to check the loading through tests or calculation / simulation and comparison with the permissible values.

Sizes 45, 71, 100 and 140 are optionally available in high-speed version.
External dimensions are not affected by this option.

Technical data

Permissible radial and axial loading on the drive shaft

Size	NG		18	28	45	71	100	140
Radial force maximum at a/2 	Fq max	lbf	79	270	337	427	517	630
		(N)	(350)	(1200)	(1500)	(1900)	(2300)	(2800)
Axial force maximum 		lbf	157	225	337	540	900	1080
		(N)	(700)	(1000)	(1500)	(2400)	(4000)	(4800)

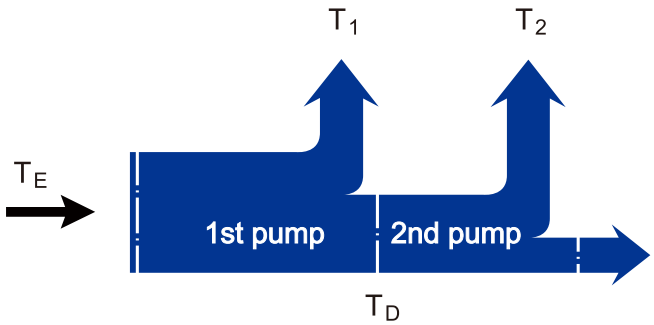
Permissible input and through-drive torques

Size	NG			18	28	45	71	100	140
Torque at Vg max and Δp = 4000 psi (280 bar) [1]		T_{max}	lb-ft (Nm)	58(80)	91(125)	146(200)	230(316)	324(445)	453(623)
Input torque for drive shaft, maximum [2]									
	S	$T_{E\,max}$	lb-ft (Nm)	92(124)	146(198)	235(319)	462(626)	814(1104)	1195(1620)
		Ø	in	3/4	7/8	1	1 1/4	1 1/2	1 3/4
	R	$T_{E\,max}$	lb-ft (Nm)	118(160)	184(250)	295(400)	475(644)	– (–)	– (–)
		Ø	in	3/4	7/8	1	1 1/4	–	–
	P	$T_{E\,max}$	lb-ft (Nm)	– (88)	– (137)	– (200)	– (439)	– (857)	– (1206)
		Ø	mm	18	22	25	32	40	45
	U	$T_{E\,max}$	lb-ft (Nm)	43(59)	– (–)	– (–)	– (–)	439(595)	– (–)
		Ø	in	5/8	–	–	–	1 1/4	–
	K	$T_{E\,max}$	lb-ft (Nm)	77(104)	107(145)	156(212)	319(433)	553(750)	875(1186)
		Ø	in	0.7500	0.8750	1.0000	1.2500	1.5000	1.7500
			(mm)	(19.05)	(22.225)	(25.4)	(31.75)	(38.1)	(44.45)
Maximum through-drive torque for drive shaft									
	S	$T_{D\,max}$	lb-ft (Nm)	80(108)	118(160)	235(319)	363(492)	574(778)	934(1266)
	R	$T_{D\,max}$	lb-ft (Nm)	88(120)	130(176)	269(365)	404(548)	– (–)	– (–)
	P	$T_{D\,max}$	lb-ft (Nm)	– (88)	– (137)	– (200)	– (439)	– (778)	– (1206)
	K	$T_{D\,max}$	lb-ft (Nm)	77(104)	107(145)	156(212)	319(433)	553(750)	875(1186)

[1] Without considering efficiency

[2] For drive shafts free of radial load

Distribution of torques



Technical data

YEOSHE

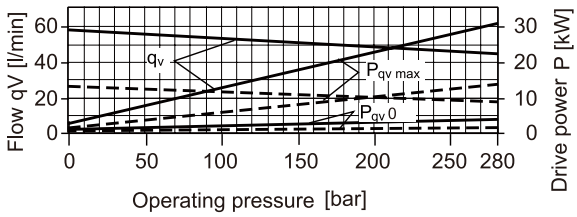
Drive power

Working position ：

Flow ISO VG 46 DIN 51519，t = 50 °C

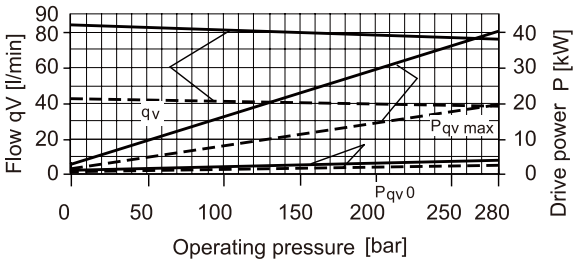
size 18

_ _ _ _ n = 1500 rpm
_____ n = 3300 rpm



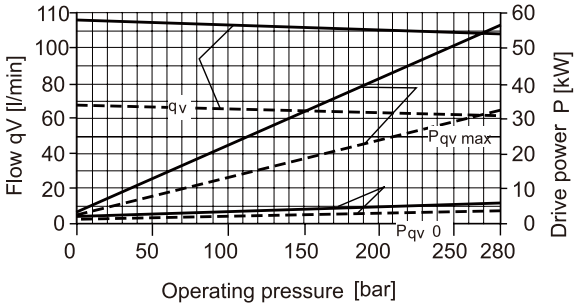
size 28

_ _ _ _ n = 1500 rpm
_____ n = 3000 rpm



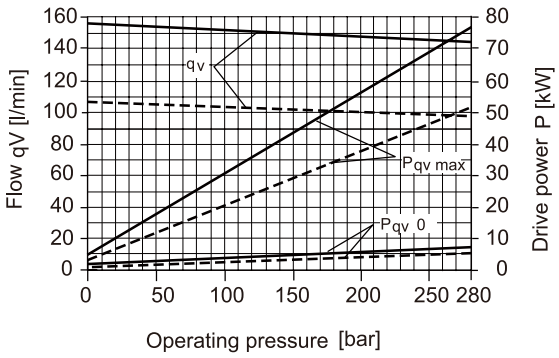
size 45

_ _ _ _ n = 1500 rpm
_____ n = 2600 rpm



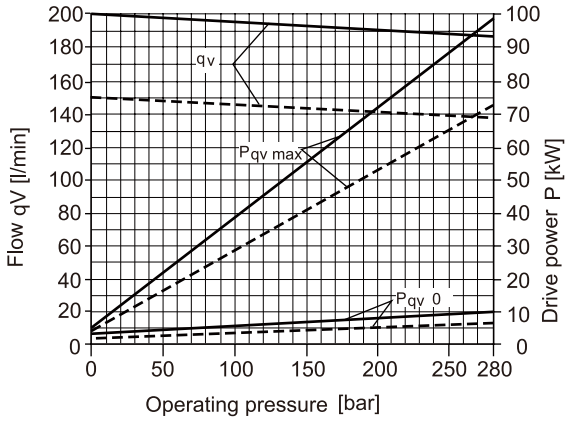
size 71

_ _ _ _ n = 1500 rpm
_____ n = 2200 rpm



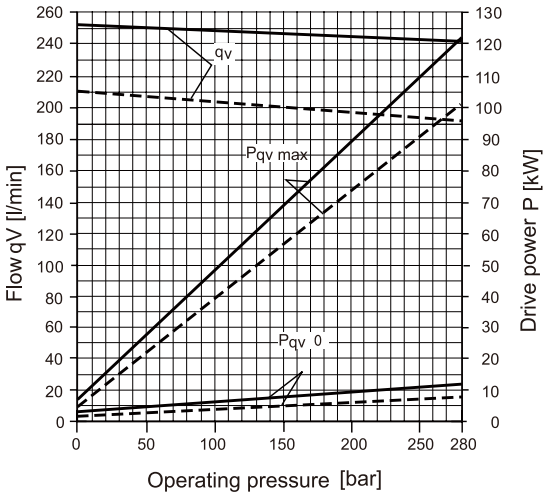
size 100

_ _ _ _ n = 1500 rpm
_____ n = 2000 rpm



size 140

_ _ _ _ n = 1500 rpm
_____ n = 1800 rpm



DG — Two-point control, directly operated

The variable pump can be set to a minimum swivel angle by connecting an external control pressure to port X.

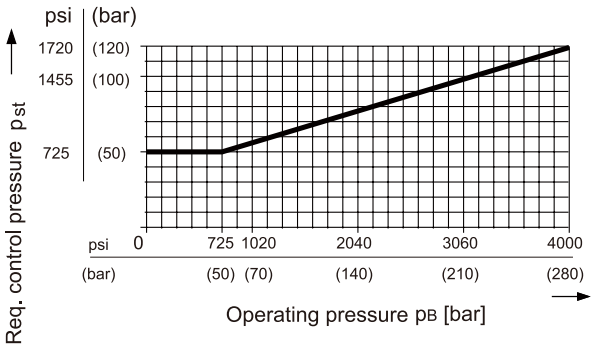
This will supply control fluid directly to the stroke piston; a minimum control pressure of $p_{st} \geq 725$ psi (50 bar) is required. ◦

The variable pump can only be switched between $V_{g\,max}$ or $V_{g\,min}$ ◦

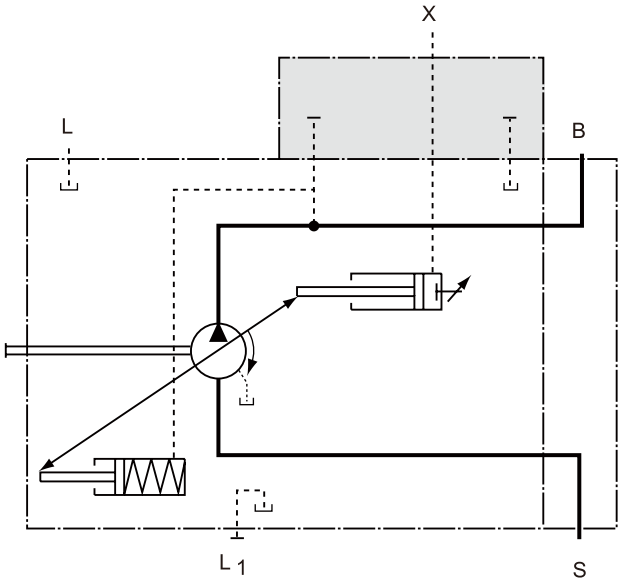
Please note, that the required control pressure at port X is directly dependent on the actual operating pressure p_B in port B. (See control pressure characteristic).

Control pressure p_{st} = 0 psi (0 bar) ≙ $V_{g\,max}$
Control pressure $p_{st} \geq$ 725 psi (50 bar) ≙ $V_{g\,min}$

Control pressure characteristic



Circuit diagram



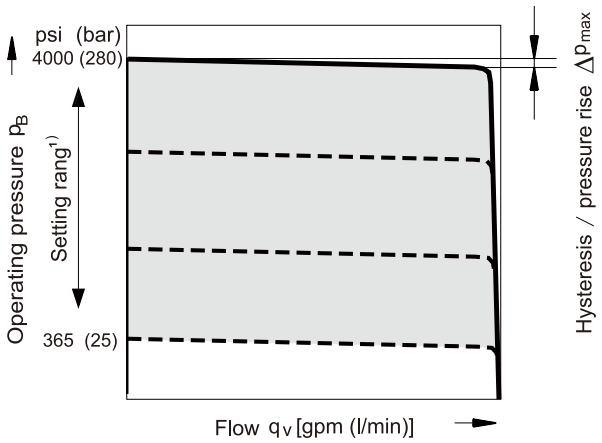
	Port for
B	Service line
S	Suction line
L、L1	Case drain (L1 plugged)
X	Pilot pressure

DR — Pressure control

The pressure control limits the maximum pressure at the pump output within the pump control range. The variable pump only supplies as much hydraulic fluid as is required by the consumers.If the operating pressure exceeds the pressure setpoint set at the integrated pressure valve, the pump will adjust towards a smaller displacement and the control deviation will be reduced. The pressure can be set steplessly at the control valve.

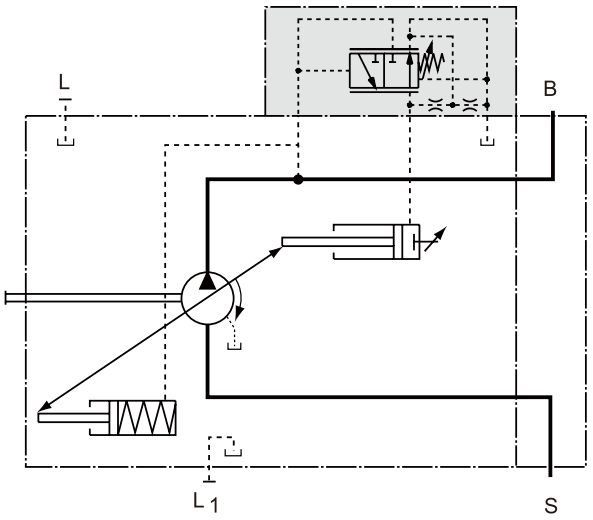
Static characteristic

(at n_1 = 1800 rpm ; t_{fluid} = 122°F (50 °C)

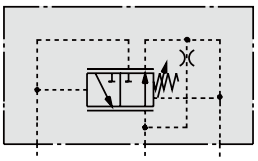


[1)] In order to prevent damage to the pump and the system,this setting range is the permissible setting range and must not be exceeded.The range of possible settings at the valve are greater.

Circuit diagram,sizes 18 to 100



Circuit diagram,size 140



	Port for
B	Service line
S	Suction line
L 、L_1	Case drain (L_1 plugged)

Control data

Hysteresis and repeatability Δp__max. approx. 3 bar

Pressure rise, maximum

NG	18	28	45	71	100	140
Δp psi	60	60	90	8	115	175
(bar)	(4)	(4)	(6)	(8)	(10)	(12)

Contr. fluid consum___max.approx.0.8 gpm (3 l/min)

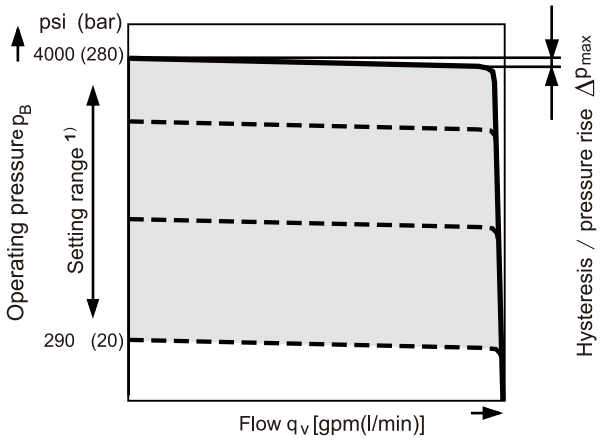
please following page A-8

DRG — Pressure control, remotely operated

A pressuer relief valve can be externally piped to por X for remote setting of pressure below the setting of the DR control valve spool.This relief valve is not included in the delivery contents of the DRG control.
The differential pressure at the DRG control valve is set as standard to 290 psi (20 bar).This results in a pilot oil fiow to the relief valve of approx.0.4 gpm (1.5 l/min) at port X.If another If another setting is reqired (range from 145 to 320 psi (10-22 bar)) please state in clear text.
The max.length of piping should not exceed 6.6 ft (2m).

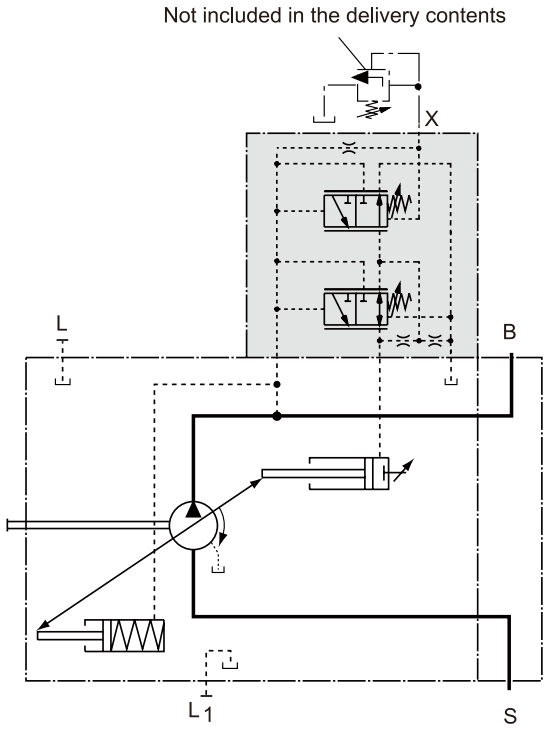
Static characteristic

(at n_1 = 1800 rpm ; t_{fluid} =122°F (50 °C)

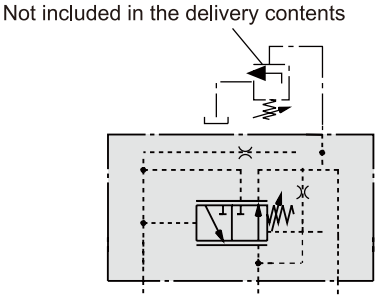


1) In order to prevent damage to the pump and the system,this setting range is the permissible setting range and must not be exceeded.
The range of possible settings at the valve are greater.

Circuit diagram, sizes 18 to 100



Circuit diagram, size 140



	Port for
B	Service line
S	Suction line
L、L_1	Case drain (L_1 plugged)
X NG 18 to 100 without adapter	Pilot pressure
X NG 140 with adapter	Pilot pressure

Control data

Hysteresis and repeatability Δp__max.approx. 45 psi (3 bar)

Pressure rise, maximum

NG	18	28	45	71	100	140
Δp psi	60	60	90	115	145	175
(bar)	(4)	(4)	(6)	(8)	(10)	(12)

Contr. fluid consum__max.approx. 1.2 gpm (4.5 l/min)
please following page A-8

DFR/DFR1 — Pressure and flow control

YEOSHE

In addition to the pressure control function,the pump flow may be varied by means of a differential pressure over an adjustable orifice (e.g. directional valve)installed in the service line to the actuator.The pump flow is equal to the actual required flow by the actuator,regardless of changing pressure levels.

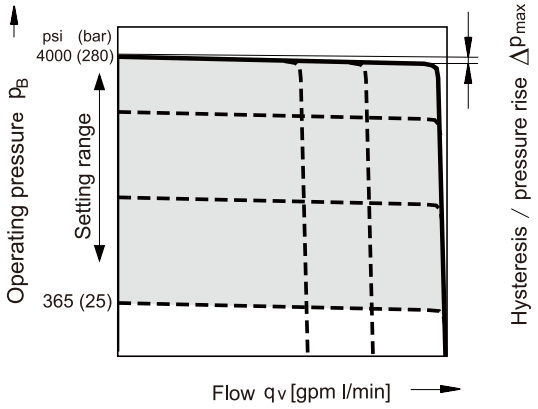
The pressure control overrides the flow control function.

Note

The DFR1 version has no connection between X and the reservoir. Unloading the LS-pilot line must be possible in the valve system.
Because of the flushing function sufficient unloading of the X-line must also be provided.

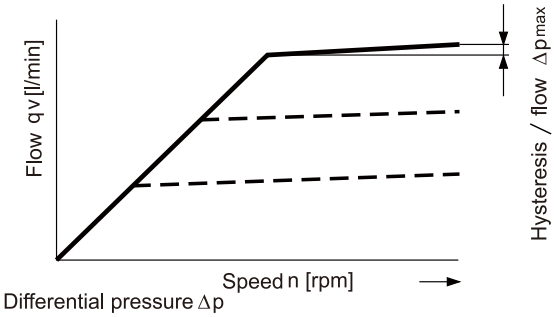
Static characteristic

Flow control at n1 = 1500 rpm ; t fluid = 122°F(50 °C)



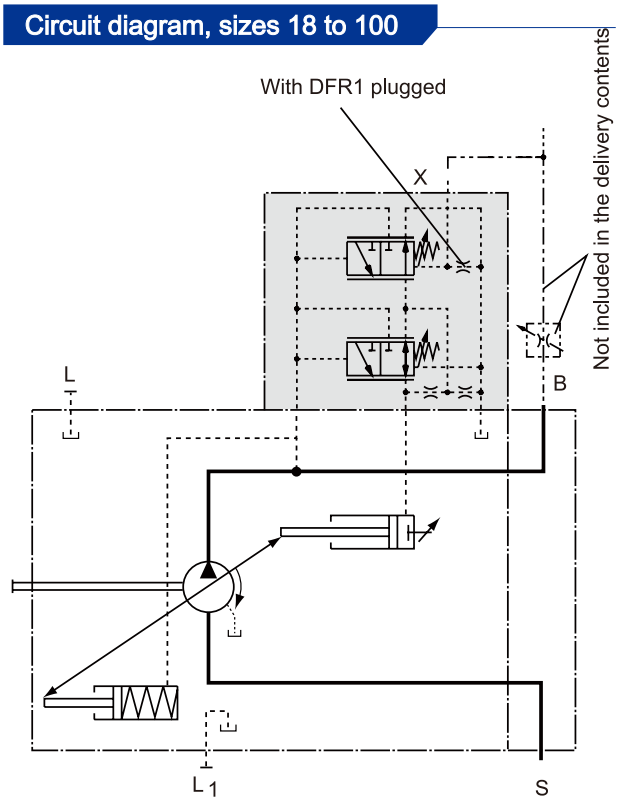
[1] In order to prevent damage to the pump and the system,this setting range is the permissible setting range and must not be exceeded.The range of possible settings at the valve are greater.

Static characteristic at variable speed

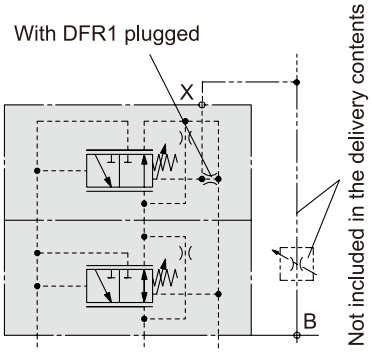


Standard setting：200 to 320 psi (14 to 22 bar).
If another setting is required, please state in clear text.
Relieving the load on port X to the reservoir results in a zero stroke ("standby") pressure which lies about15 to 30 psi (1 to 2 bar) higher than the differential pressure Δp.System influences are not taken into account.

Circuit diagram, sizes 18 to 100



Circuit diagram, size 140



	Port for
B	Service line
S	Suction line
L 、L_1	Case drain (L_1 plugged)
X	Pilot pressure

Control data

Data for pressure control DR, plesee following page A-10.
Maximum flow deviation measured at drive speed n = 1500 rpm.

NG		18	28	45	71	100	140
$\Delta q_{V\,max}$	gpm	0.24	0.26	0.48	0.75	1.06	1.60
	l/min	(0.9)	(1.0)	(1.8)	(2.8)	(4.0)	(6.0)

Contr fluid consum. DFR _max. approx. 0.8 to 1.2 gpm (3 to 4.5 l/min)
Contr fluid consum. DFR1 _max. approx 0.8 gpm (3 l/min)
please following page A-8

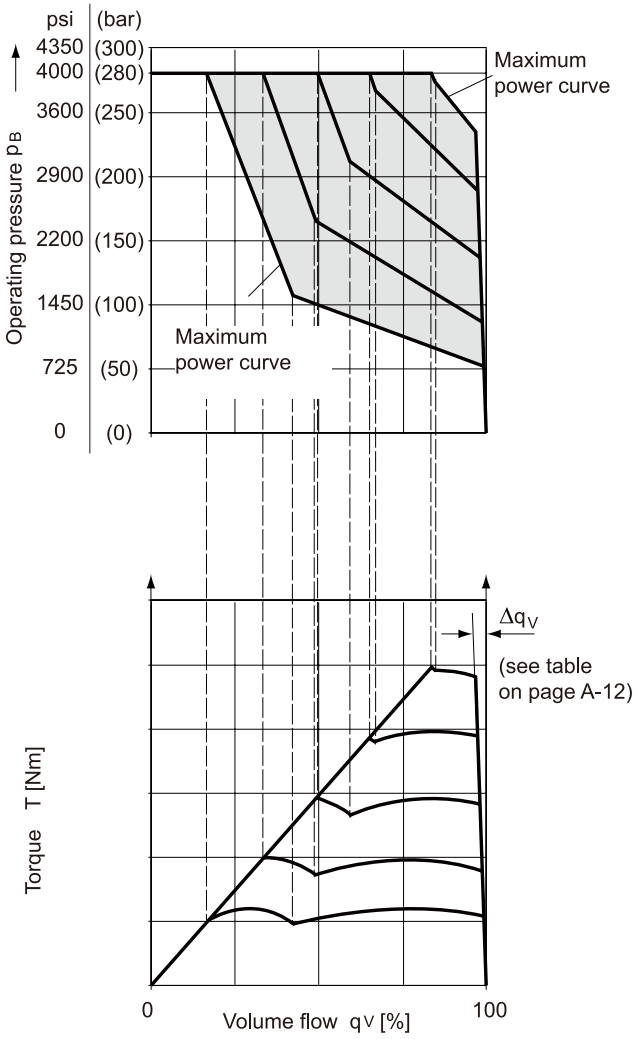
DFLR — Pressure, flow and power

Execution of the pressure control like,DR(G),please following page A-10(11).
Execution of the flow control like DFR,DFR1,please following page A-12.

In order to achieve a constant drive torque with varying operating pressures, the swivel angle and with it the output flow from the axial piston pump is varied so that the product of flow and pressure remains constant.

Flow control is possible below the power control curve.

Static curves and torque characteristic



Control data

Beginning of control_____ 735 psi (50 bar)
Control fluid consumption_max.approx. 1.45 gpm (5.5 l/min)
please following page A-8

	Port for
B	Service line
S	Suction line
L、L1	Case drain （L1 plugged）
X	Pilot pressure

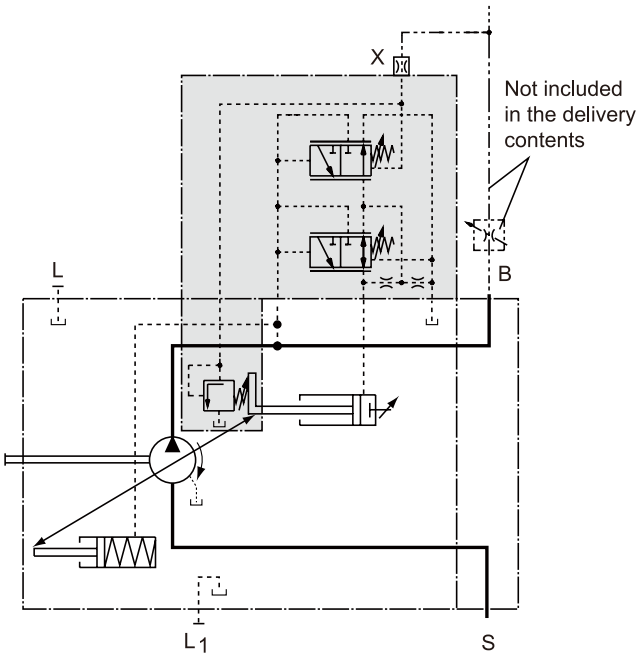
The power characteristic is set in the factory; when ordering,please state in clear text, e.g. 27HP (20 kW) at 1800 rpm

Control data

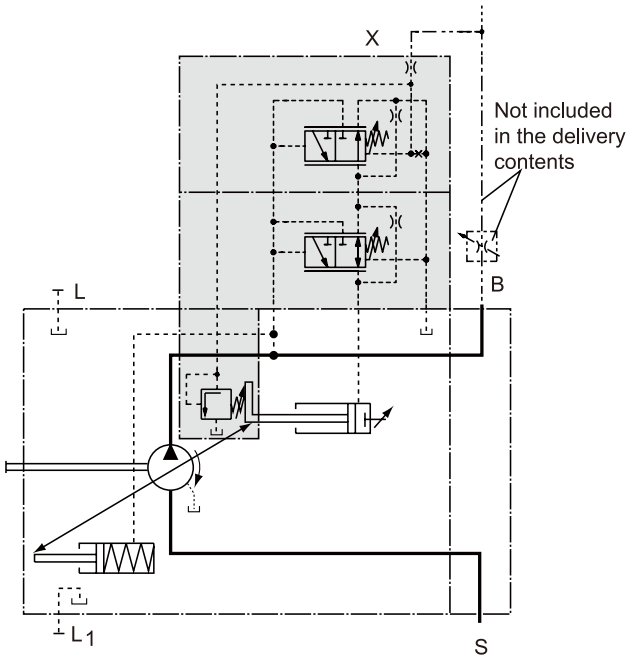
For pressure control DR data,please following page A-10.

For flow control DFR / DFR1 data,please following

Circuit diagram, sizes 28 to 100



Circuit diagram, size 140



ED — Electro-hydraulic pressure control

YEOSHE

The ED valve is set to a certain pressure by a specified,variable solenoid current.

If there is a change at the consumer (load pressure),the position of the control piston changes. This causes an increase or decrease in the pump swivel angle(flow) in order to maintain the electrically set pressure level.

The pump thus only delivers as much hydraulic fluid as the consumers can take. The desired pressure level can be set steplessly by varying the solenoid current.

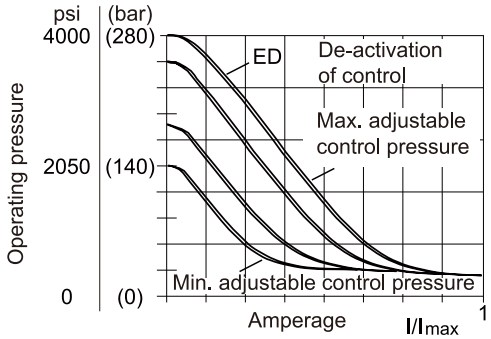
When the solenoid current signal drops towards a zero value,the maximum output pressure is limited to p_{max} by an adjustable hydraulic pressure cut-off (secure fail safe function in case of a loss of power e.g. for use as fan drives).

The response time characteristic of the ED-control was optimized for the use as a fan drive system.

When ordering,state the type of application in clear text.

Static current-pressure characteristic ED

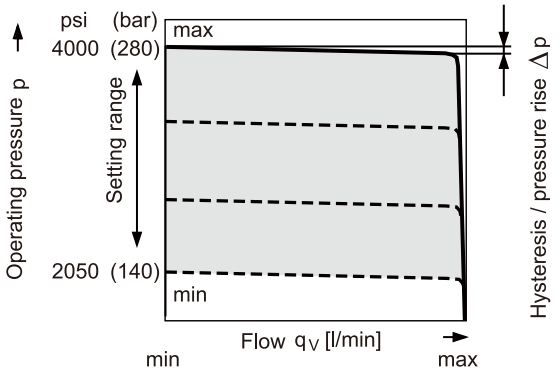
(measured at pump in zero stroke – negative characteristic)



Hysteresis static current-press. characteristic < 45 psi 3 bar

Static flow-pressure characteristic

(at n_1 = 1800 rpm ; t_{fluid} = 122°F (50 °C))



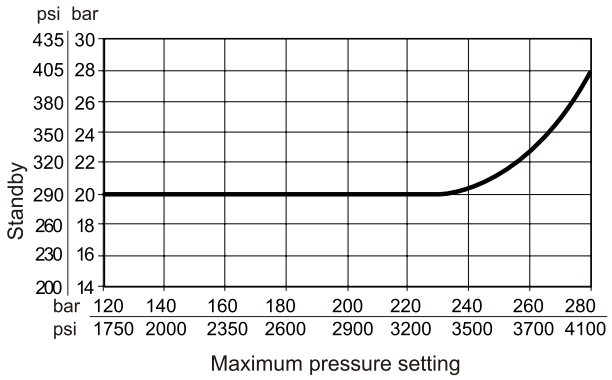
Control data

Stand-by standard setting 290 psi (20 bar),other values on request.

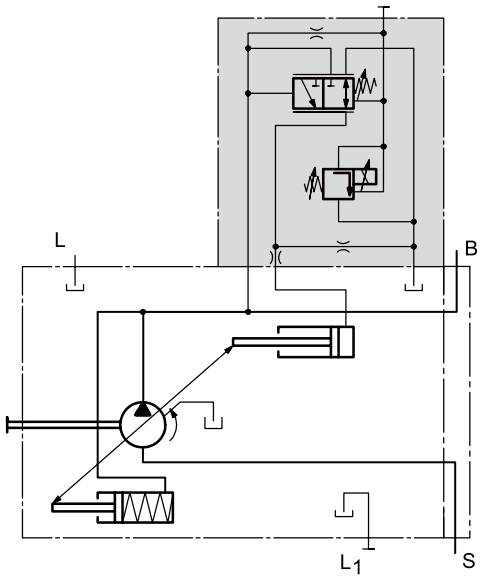
Hysteresis and pressure rise___Δp < 60 psi (4 bar)

Control fluid consumption__0.8 to 1.2 gpm (3 to 4.5 l/min)

Influence of pressure setting on standby level



Circuit diagram ED..



	Port for
B	Service line
S	Suction line
L、L1	Case drain (L1 plugged)

Technical data, solenoid	ED71	ED72
Voltage	12 V (±20 %)	24 V (±20%)
Control current		
Control begin at $q_{v\,min}$	100 mA	50 mA
End of control at $q_{v\,max}$	1200 mA	600 mA
Limiting current	1.54 A	0.77 A
Nominal resistance (at 68°F (20°C))	5.5 Ω	22.7 Ω
Dither frequency	100 to 200 Hz	100 to 200 Hz
Actuated time	100 %	100 %

For type of protection,Please contact YEOSHE.
For dectails on the control eletronics,following page A-15.

Operating temperature range at valve -4°F to 239°F (-20 °C to +115 °C)

ER — Electro-hydraulic pressure control

The ER valve is set to a specific pressure by a specified,variable solenoid current.

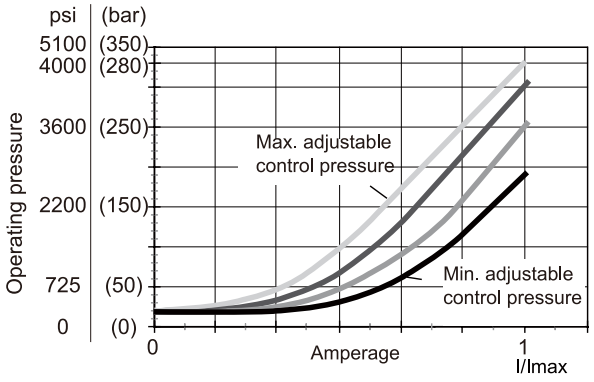
If there is a change at the consumer (load pressure),the position of the control piston changes.

This causes an increase or decrease in the pump swivel angle (flow) in order to maintain the electrically set pressure level.
The pump thus only delivers as much hydraulic fluid as the consumers can take. The desired pressure level can be set steplessly by varying the solenoid current.

If the solenoid current drops to zero, the pressure is limited to p_{min} (stand-by).

Static current-pressure characteristic ER

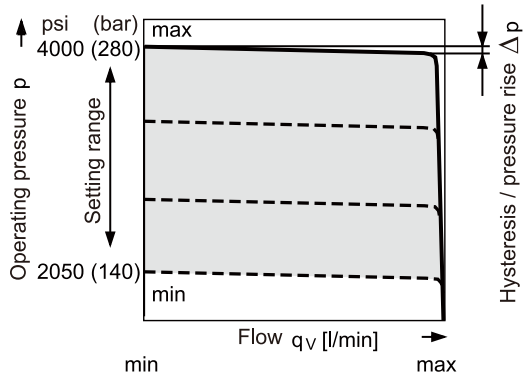
(measured at pump in zero stroke – positive characteristic)



Hysteresis static current-press. characteristic < 45 psi (3 bar)
Influence of pressure setting on stand-by ±30 psi (±2 bar)

Static flow-pressure characteristic

(at n= 1800 rpm； t_{fluid} = 122°F (50 °C))

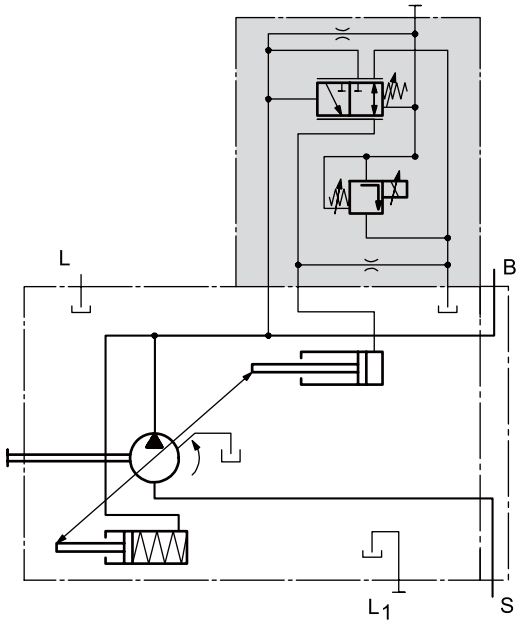


Control data

Standby standard setting 290 psi (20 bar),other values on request.

Hysteresis and pressure increase__Δp < 60 psi (4 bar)
Control fluid consumption_0.8 to 1.2 gpm (3 to 4.5 l/min)

Circuit diagram ER..



	Port for
B	Service line
S	Suction line
L、L_1	Case drain （L_1 plugged）

Technical data, solenoid	ER71	ER72
Voltage	12 V (±20 %)	24 V (±20 %)
Control current		
Control begin at $q_{v\,min}$	100 mA	50 mA
End of control at $q_{v\,max}$	1200 mA	600 mA
Limiting current	1.54 A	0.77 A
Nominal resistance 20°C	5.5 Ω	22.7 Ω
Dither frequency	100 to 200 Hz	100 to 200 Hz
Actuated time	100 %	100 %
For type of protection,Please contact YEOSHE.		
Operating temperature range at valve (-20 °C to +115 °C)	-4°F to 239°F	

The following electric controllers and amplifiers are available for controlling the proportional solenoids

[1] Power outlets for 2 valves,can be actuated separately
[2] Only 24V nominal voltage