Ordering code for standard program

	A2F		E		/	6		W	–	V						
01	02	03	04	05		06	07	08		09	10	11	12	13	14	15

Hydraulic fluid

01	Mineral oil and HFD. HFD for sizes 250 and 355 only in combination with long-life bearings "L" (without code)		
	HFB, HFC hydraulic fluid	Sizes 28 to 180 (without code)	
		Sizes 250 to 355 (only in combination with long-life bearings "L")	**E-**

Axial piston unit

02	Bent-axis design, fixed	**A2F**

Drive shaft bearing

		28 to 180	250 to 355	
03	Standard bearing (without code)	●	●	
	Long-life bearing	–	●	**L**

Operating mode

04	Motor, plug-in version	**E**

Sizes (NG)

05	Geometric displacement, see table of values on page 7												
	28	**32**	**45**	**56**	**63**	**80**	**90**	**107**	**125**	**160**	**180**	**250**	**355**

Series

06		**6**

Index

07		NG28 to 180	**1**
		NG250 and 355	**0**

Direction of rotation

08	Viewed on drive shaft, bidirectional	**W**

Seals

09	FKM (fluor-caoutchouc)	**V**

Drive shafts		**28**	**32**	**45**	**56**	**63**	**80**	**90**	**107**	**125**	**160**	**180**	**250**	**355**	
10	Splined shaft DIN 5480	●	●	–	●	●	●	●	●	●	●	●	–	–	**A**
		●	–	●	●	–	●	–	●	–	●	–	●	●	**Z**

Mounting flanges

			28 to 180	250 and 355	
11	ISO 3019-2	2-hole	●	–	**L**
		4-hole	–	●	**M**

● = Available ❍ = On request – = Not available = Preferred program

Ordering code for standard program

	A2F		E		/	6		W	–	V						
01	02	03	04	05		06	07	08		09	10	11	12	13	14	15

	Port plates[1]				**28**	**32**	**45**	**56**	**63**	**80**	**90**	**107**	**125**	**160**	**180**	**250**	**355**	
12	SAE flange ports A and B at rear		**01**	0	–	–	–	–	–	–	–	–	–	–	–	●	❍	**010**
				7	–	–	–	–	–	–	–	–	–	–	–	–	❍	**017**
	SAE flange ports A and B at side, opposite		**02**	0	–	–	–	–	–	–	–	–	–	–	–	●	❍	**020**
				7	–	–	●	▲	▲	▲	▲	●	●	●	●	●	–	**027**
				9	–	–	–	●	●	●	●	–	–	–	–	–	–	**029**
	SAE flange ports A and B at bottom (same side)		**10**	0	●	●	●	●	●	●	●	●	●	●	●	–	●	**100**
				7	–	–	–	–	–	–	–	–	–	–	–	–	●	**107**
	Port plate with 1-level pressure-relief valves for mounting a counterbalance valve[2]	BVD	**17**	1	–	–	–	–	–	–	–	●	●	–	–	–	–	**171 178**
			18	8	●	●	●	●	●	●	●	●	●	●	●	–	–	**181**
		BVE	**18**		–	–	–	–	–	–	–	●	●	●	●	–[4]	–	**188**
	Port plate with pressure-relief valves		**19**	1	●	●	●	●	●	●	●	●	●	●	●	–	–	**191**
				2	●	●	●	●	●	●	●	●	●	●	●	–	–	**192**

Valves (see pages 14 to 21)

Without valve	**0**
Pressure-relief valve (without pressure boost facility)	**1**
Pressure-relief valve (with pressure boost facility)	**2**
Flushing and boost pressure valve, mounted	**7**
Counterbalance valve BVD/BVE mounted[2][3]	**8**
Flushing and boost pressure valve, integrated	**9**

	Speed sensor (see page 22)	**28 to 45**	**56 to 180**	**250**	**355**[4]	
13	Without speed sensor (without code)	●	●	●	●	
	Prepared for HDD speed sensor	–	▲	●	–	**F**
	HDD speed sensor mounted[5]	–	▲	●	–	**H**
	Prepared for DSA speed sensor	❍	❍	❍	–	**U**
	DSA speed sensor mounted[5]	❍	❍	❍	–	**V**

Special version (only sizes 28 to 180)

14	Standard version (without code)	
	Special version for slew drives (standard with port plate 19)	**J**

Standard / special version

15	Standard version (without code)	
	Standard version with installation variants, e. g. T ports against standard open or closed	**–Y**
	Special version	**–S**

● = Available ❍ = On request – = Not available ▲ = Not for new projects ▭ = Preferred program

1) Fastening thread or threaded ports, metric

Technical data

Table of values (theoretical values, without efficiency and tolerances; values rounded)

Size	NG		28	32	45	56	63	80
Displacement geometric, per revolution	V_g	cm^3	28.1	32	45.6	56.1	63	80.4
Speed maximum[1]	n_{nom}	rpm	6300	6300	5600	5000	5000	4500
	n_{max}[2]	rpm	6900	6900	6200	5500	5500	5000
Input flow[3]								
at n_{nom} and V_g	q_V	L/min	177	202	255	281	315	362
Torque[4]								
at V_g and $\Delta p = 350$ bar	T	Nm	157	178	254	313	351	448
$\Delta p = 400$ bar	T	Nm	179	204	290	357	401	512
Rotary stiffness	c	kNm/rad	2.93	3.12	4.18	5.94	6.25	8.73
Moment of inertia for rotary group	J_{GR}	kgm^2	0.0012	0.0012	0.0024	0.0042	0.0042	0.0072
Maximum angular acceleration	α	rad/s^2	6500	6500	14600	7500	7500	6000
Case volume	V	L	0.20	0.20	0.33	0.45	0.45	0.55
Mass (approx.)	m	kg	10.5	10.5	15	18	19	23

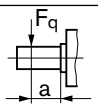
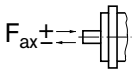
Size	NG		90	107	125	160	180	250	355
Displacement geometric, per revolution	V_g	cm^3	90	106.7	125	160.4	180	250	355
Speed maximum[1]	n_{nom}	rpm	4500	4000	4000	3600	3600	2700	2240
	n_{max}[2]	rpm	5000	4400	4400	4000	4000	–	–
Input flow3[3]									
at n_{nom} and V_g	q_V	L/min	405	427	500	577	648	675	795
Torque[4]									
at V_g and $\Delta p = 350$ bar	T	Nm	501	594	696	893	1003	1393	1978
$\Delta p = 400$ bar	T	Nm	573	679	796	1021	1146	–	–
Rotary stiffness	c	kNm/rad	9.14	11.2	11.9	17.4	18.2	73.1	96.1
Moment of inertia for rotary group	J_{GR}	kgm^2	0.0072	0.0116	0.0116	0.0220	0.0220	0.061	0.102
Maximum angular acceleration	α	rad/s^2	6000	4500	4500	3500	3500	10000	8300
Case volume	V	L	0.55	0.8	0.8	1.1	1.1	2.5	3.5
Mass (approx.)	m	kg	25	34	36	47	48	82	110

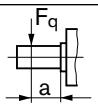
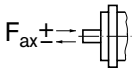
1) The values are valid:
   - for the optimum viscosity range from $\nu_{opt} = 36$ to 16 mm^2/s
   - with hydraulic fluid based on mineral oils
2) Intermittent maximum speed: overspeed for unload and overhauling processes, $t < 5$ s and $\Delta p < 150$ bar
3) Restriction of input flow with counterbalance valve,

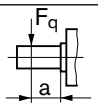
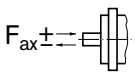
Technical data

Permissible radial and axial forces of the drive shafts

(splined shaft and parallel keyed shaft)

Size	NG		28	28	32	45	56	56[4]	56
Drive shaft	ø	mm	25	30	30	30	30	30	35
Maximum radial force[1] at distance a (from shaft collar) 	$F_{q\,max}$	kN	5.7	5.4	5.4	7.6	9.5	7.8	9.1
	a	mm	16	16	16	18	18	18	18
with permissible torque	T_{max}	Nm	179	179	204	290	357	294	357
≙ permissible pressure Δp	Δp_{perm}	bar	400	400	400	400	400	330	400
Maximum axial force[2] 	$+F_{ax\,max}$	N	500	500	500	630	800	800	800
	$-F_{ax\,max}$	N	0	0	0	0	0	0	0
Permissible axial force per bar operating pressure	$\pm F_{ax\,perm/bar}$	N/bar	5.2	5.2	5.2	7.0	8.7	8.7	8.7

Size	NG		63	80	80[4]	80	90	107	107
Drive shaft	ø	mm	35	35	35	40	40	40	45
Maximum radial force[1] at distance a (from shaft collar) 	$F_{q\,max}$	kN	9.1	11.6	11.1	11.4	11.4	13.6	14.1
	a	mm	18	20	20	20	20	20	20
with permissible torque	T_{max}	Nm	401	512	488	512	573	679	679
≙ permissible pressure Δp	Δp_{perm}	bar	400	400	380	400	400	400	400
Maximum axial force[2] 	$+F_{ax\,max}$	N	800	1000	1000	1000	1000	1250	1250
	$-F_{ax\,max}$	N	0	0	0	0	0	0	0
Permissible axial force per bar operating pressure	$\pm F_{ax\,perm/bar}$	N/bar	8.7	10.6	10.6	10.6	10.6	12.9	12.9

Size	NG		125	160	160	180	250	355
Drive shaft	ø	mm	45	45	50	50	50	60
Maximum radial force[1] at distance a (from shaft collar) 	$F_{q\,max}$	kN	14.1	18.1	18.3	18.3	1.2[5]	1.5[5]
	a	mm	20	25	25	25	41	52.5
with permissible torque	T_{max}	Nm	796	1021	1021	1146	[3]	[3]
≙ permissible pressure Δp	Δp_{perm}	bar	400	400	400	400	[3]	[3]
Maximum axial force[2] 	$+F_{ax\,max}$	N	1250	1600	1600	1600	2000	2500
	$-F_{ax\,max}$	N	0	0	0	0	0	0
Permissible axial force per bar operating pressure	$\pm F_{ax\,perm/bar}$	N/bar	12.9	16.7	16.7	16.7	[3]	[3]

1) With intermittent operation
2) Maximum permissible axial force during standstill or when the axial piston unit is operating in non-pressurized condition.
3) Please contact us.
4) Restricted technical data only for splined shaft
5) When at a standstill or when axial piston unit operating in non-pressurized conditions. Higher forces are permissible when under pressure, please contact us.

Note

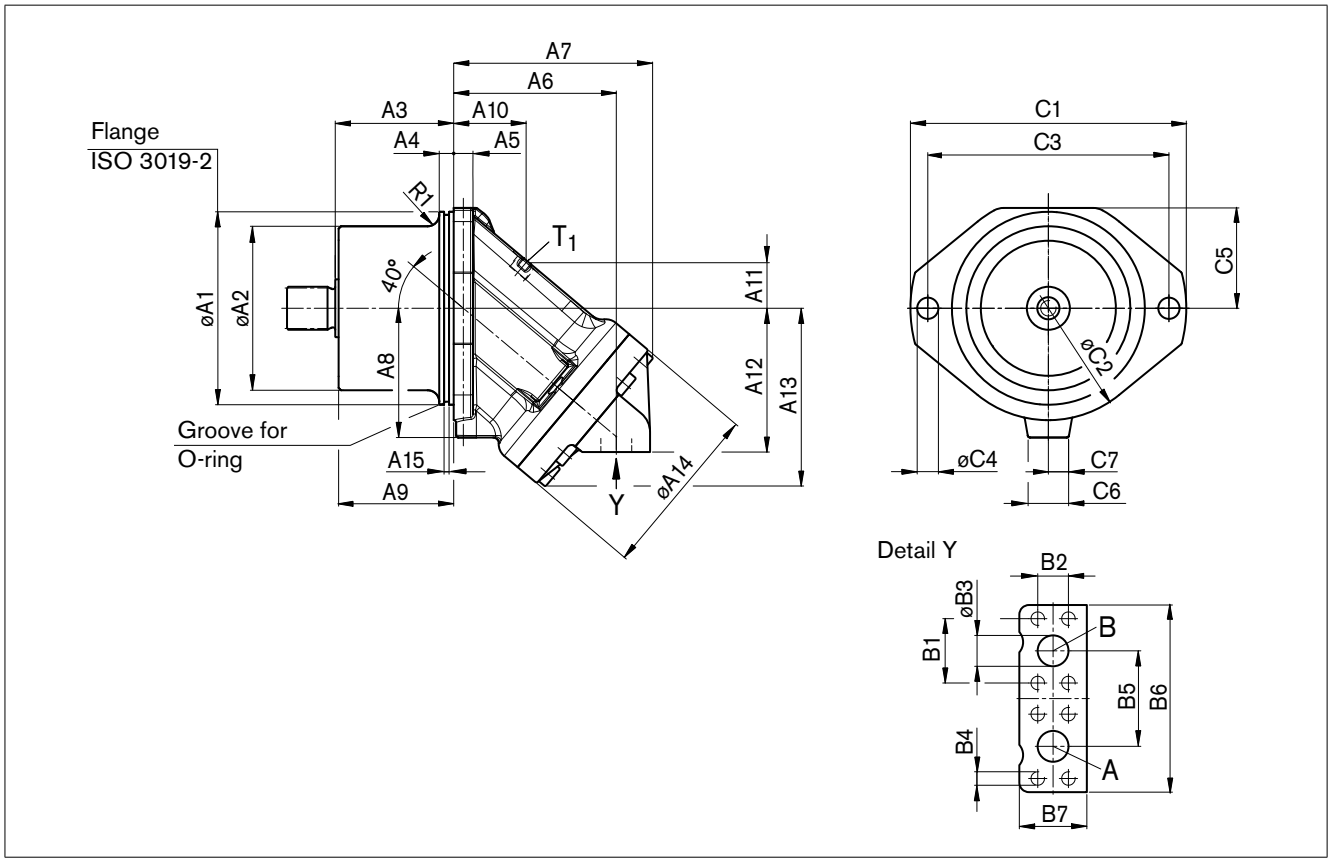
Influence of the direction of the permissible axial force:

$+F_{ax\,max}$ = Increase in service life of bearings

$-F_{ax\,max}$ = Reduction in service life of bearings (avoid)

Dimensions sizes 28 to 180

Port plate 10 – SAE flange ports at bottom



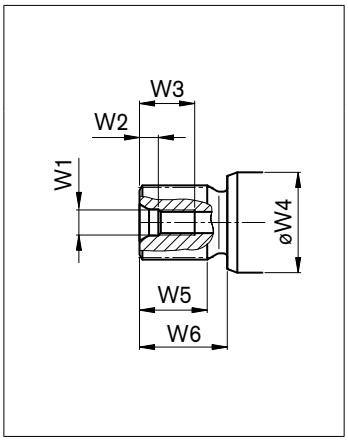
Size	øA1	øA2	A3[1]	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	øA14	A15
28, 32	$135_{-0.025}$	$94_{-0.5}$	88.8	15	16	94	114	95	87.1	45	27	91	106	106	5.2
45	$160_{-0.025}$	$117^{+1.5}_{-2}$	92.3	15	18	109	133	106	90	50	31.3	102	119	118	5.2
56, 63	$160_{-0.025}$	$121_{-0.5}$	92.3	15	18	122	146	109	90	59	34	107	130	128	5.2
80, 90	$190_{-0.029}$	$140.3_{-0.5}$	110	15	20	127	157	123	106	54	41	121	145	138	5.2
107, 125	$200_{-0.029}$	$152.3_{-0.5}$	122.8	15	20	143	178	135	119	58	41	136	157	150	5.2
160, 180	$200_{-0.029}$	$171.6_{-0.5}$	122.8	15	20	169	206	134	119.3	75	47	149	185	180	5.2

Size	B1	B2	øB3	B4, DIN 13[2]	B5	B6	B7	C1	øC2	C3	øC4	C5	C6	C7
28, 32	40.5	18.2	13	M8 x 1.25; 15 deep	59	115	40	188	154	160	14	71	42	13
45	50.8	23.8	19	M10 x 1.5; 17 deep	75	147	49	235	190	200	18	82	47.5	15
56, 63	50.8	23.8	19	M10 x 1.5; 17 deep	75	147	48	235	190	200	18	82	36	0
80, 90	57.2	27.8	25	M12 x 1.75; 17 deep	84	166	60	260	220	224	22	98	40	0
107, 125	66.7	31.8	32	M14 x 2; 19 deep	99	194	70	286	232	250	22	103	40	0
160, 180	66.7	31.8	32	M14 x 2; 19 deep	99	194	70	286	232	250	22	104	42	0

Size	R1	O-ring[3]	Service line port A, B SAE J518	Drain port T_1 DIN 3852[2]
28, 32	10	126 x 4	1/2 in	M16 x 1.5; 12 deep
45	10	150 x 4	3/4 in	M18 x 1.5; 12 deep
56, 63	10	150 x 4	3/4 in	M18 x 1.5; 12 deep
80, 90	10	180 x 4	1 in	M18 x 1.5; 12 deep
107, 125	16	192 x 4	1 1/4 in	M18 x 1.5; 12 deep
160, 180	12	192 x 4	1 1/4 in	M22 x 1.5; 14 deep

Dimensions sizes 28 to 180

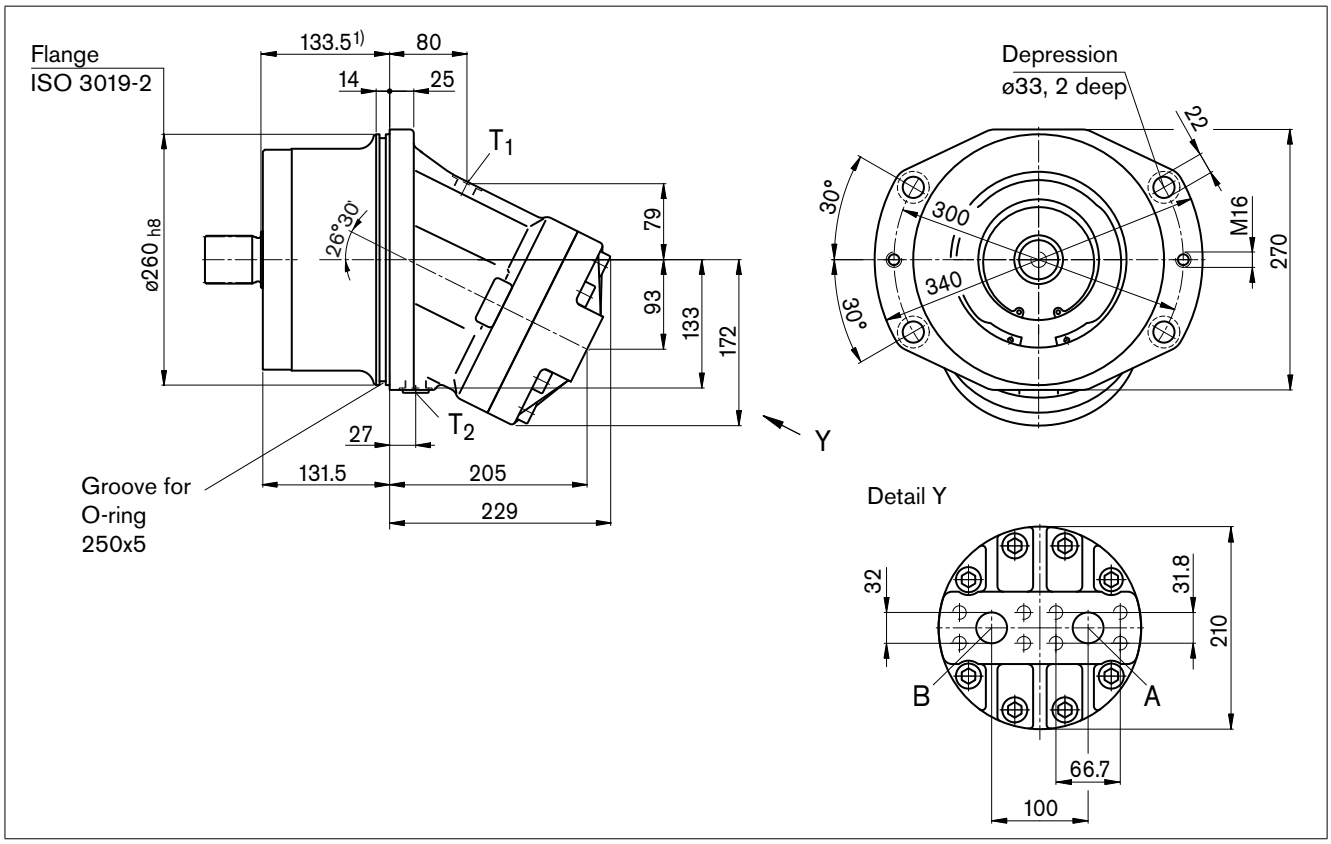
Drive shaft



Size	Splined shaft (DIN 5480)	W1 [1)]	W2	W3	øW4	W5	W6
28, 32	**A** W30 x 2 x 14 x 9g	M10 x 1.5	7.5	22	35	27	35
28	**Z** W25 x 1.25 x 18 x 9g	M8 x 1.25	6	19	35	28	43
45	**Z** W30 x 2 x 14 x 9g	M12 x 1.75	9.5	28	35	27	35
56, 63	**A** W35 x 2 x 16 x 9g	M12 x 1.75	9.5	28	40	32	40
56	**Z** W30 x 2 x 14 x 9g	M12 x 1.75	9.5	28	40	27	35
80, 90	**A** W40 x 2 x 18 x 9g	M16 x 2	12	36	45	37	45
80	**Z** W35 x 2 x 16 x 9g	M12 x 1.75	9.5	28	45	32	40
107, 125	**A** W45 x 2 x 21 x 9g	M16 x 2	12	36	50	42	50
107	**Z** W40 x 2 x 18 x 9g	M12 x 1.75	9.5	28	50	37	45
160, 180	**A** W50 x 2 x 24 x 9g	M16 x 2	12	36	60	44	55
160	**Z** W45 x 2 x 21 x 9g	M16 x 2	12	36	60	42	50

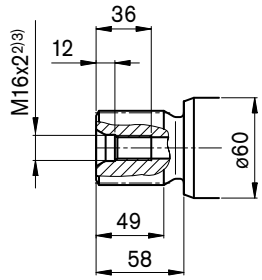
Dimensions size 250

Port plate 01 – SAE flange ports at rear

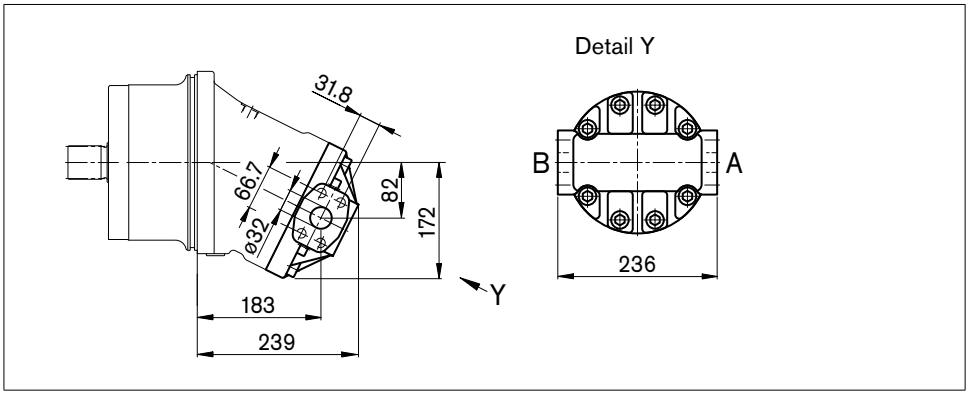


Drive shaft

Z Splined shaft DIN 5480
W50x2x24x9g



Port plate 02 – SAE flange ports at side



Ports

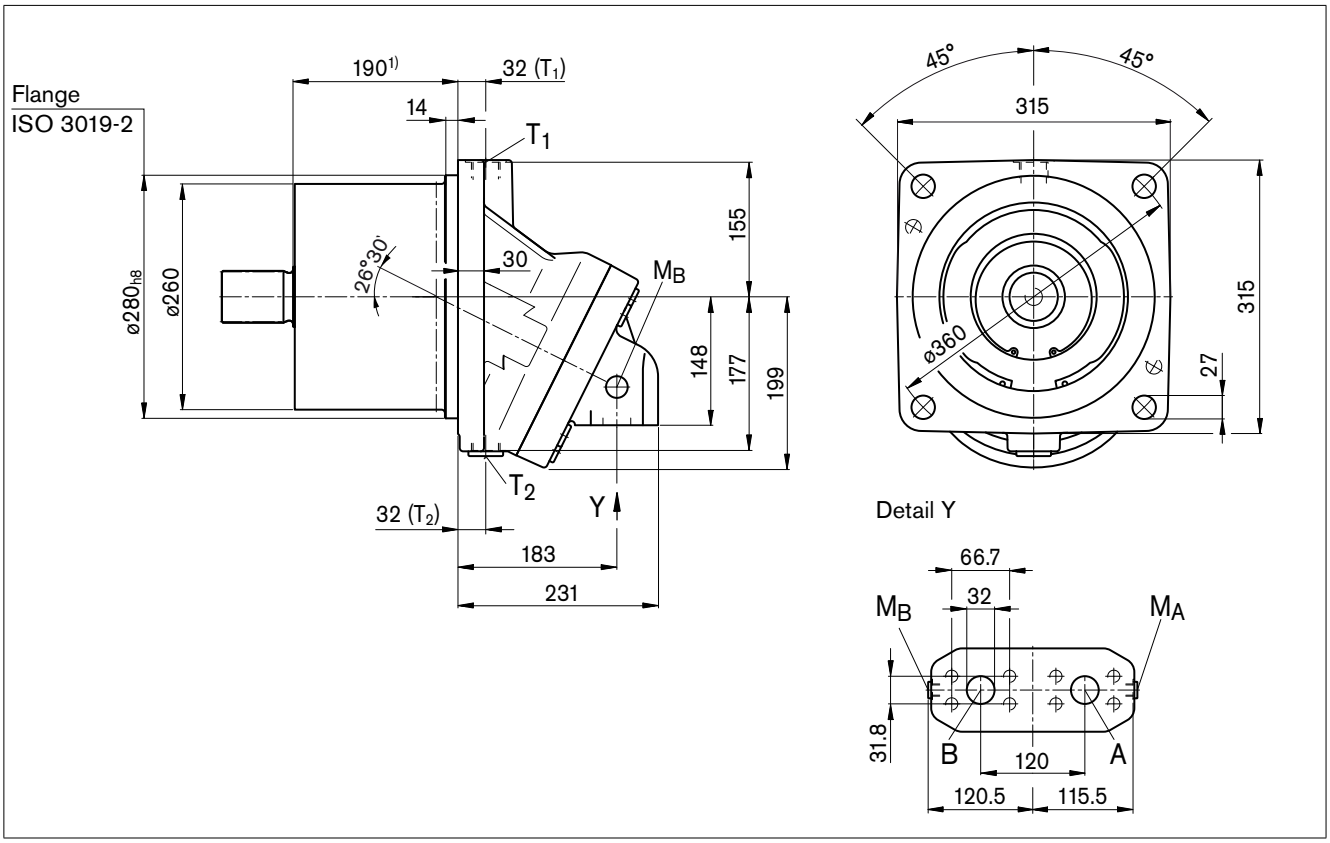
Designation	Port for	Standard	Size[3)]	Maximum pressure [bar][4)]	State[8)]
A, B	Service line fastening thread A/B	SAE J518[6)] DIN 13	1 1/4 in M14 x 2; 19 deep	400	O
T_1	Drain line	DIN 3852[7)]	M22 x 1.5; 14 deep	3	O[5)]
T_2	Drain line	DIN 3852[7)]	M22 x 1.5; 14 deep	3	X[5)]

1) To shaft collar

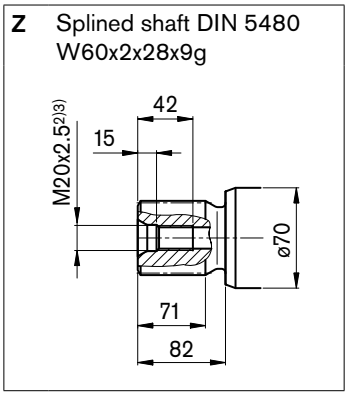
2) Center bore according to DIN 332 (thread according to DIN 13)

Dimensions size 355

Port plate 10 – SAE flange ports at bottom



Drive shaft



Ports

Designation	Port for	Standard	Size[3)]	Maximum pressure [bar][4)]	State[8)]
A, B	Service line fastening thread A/B	SAE J518[6)] DIN 13	1 1/4 in M14 x 2; 22 deep	400	O
T_1	Drain line	DIN 3852[7)]	M33 x 2; 18 deep	3	O[5)]
T_2	Drain line	DIN 3852[7)]	M33 x 2; 18 deep	3	X[5)]

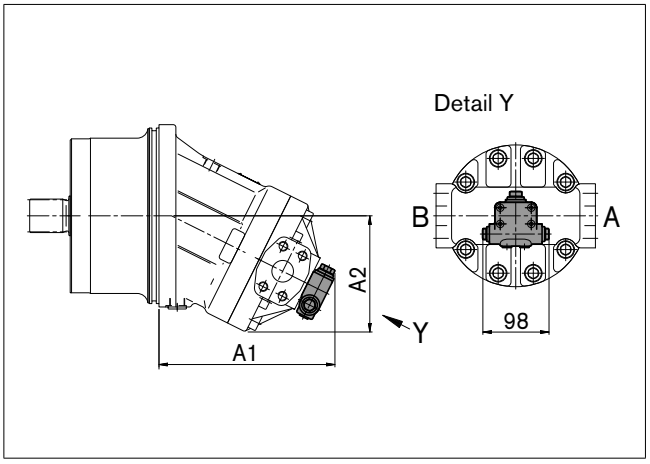
1) To shaft collar

2) Center bore according to DIN 332 (thread according to DIN 13)

Flushing and boost pressure valve

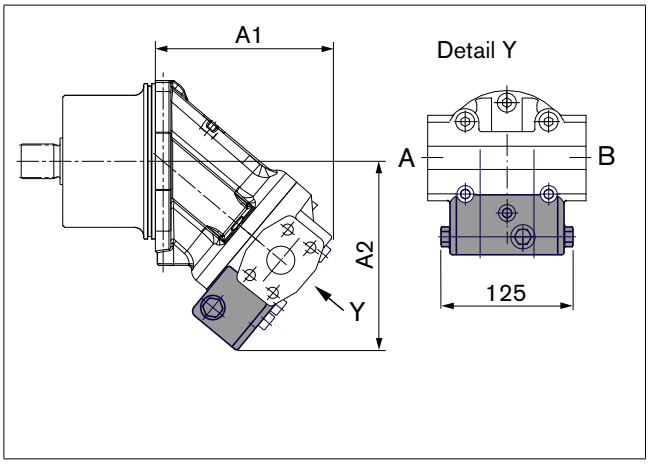
Dimensions

Sizes 107 to 250
Port plate 027 – SAE flange ports at side



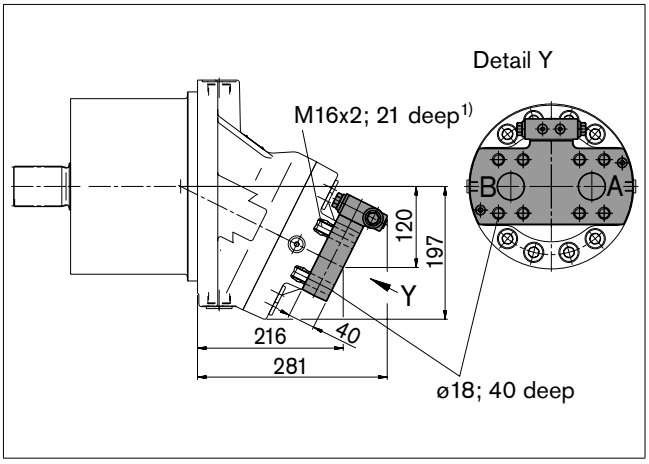
Size	A1	A2
107, 125	211	192
160, 180	232	201
250	260.5	172

Sizes 56 to 90
Port plate 029 – SAE flange ports at side

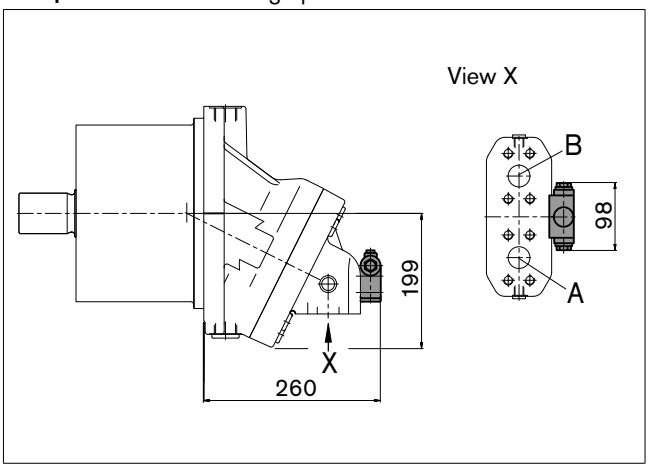


Size	A1	A2
56, 63	165	176
80, 90	178	186.7

Size 355
Port plate 017 – SAE flange ports at rear

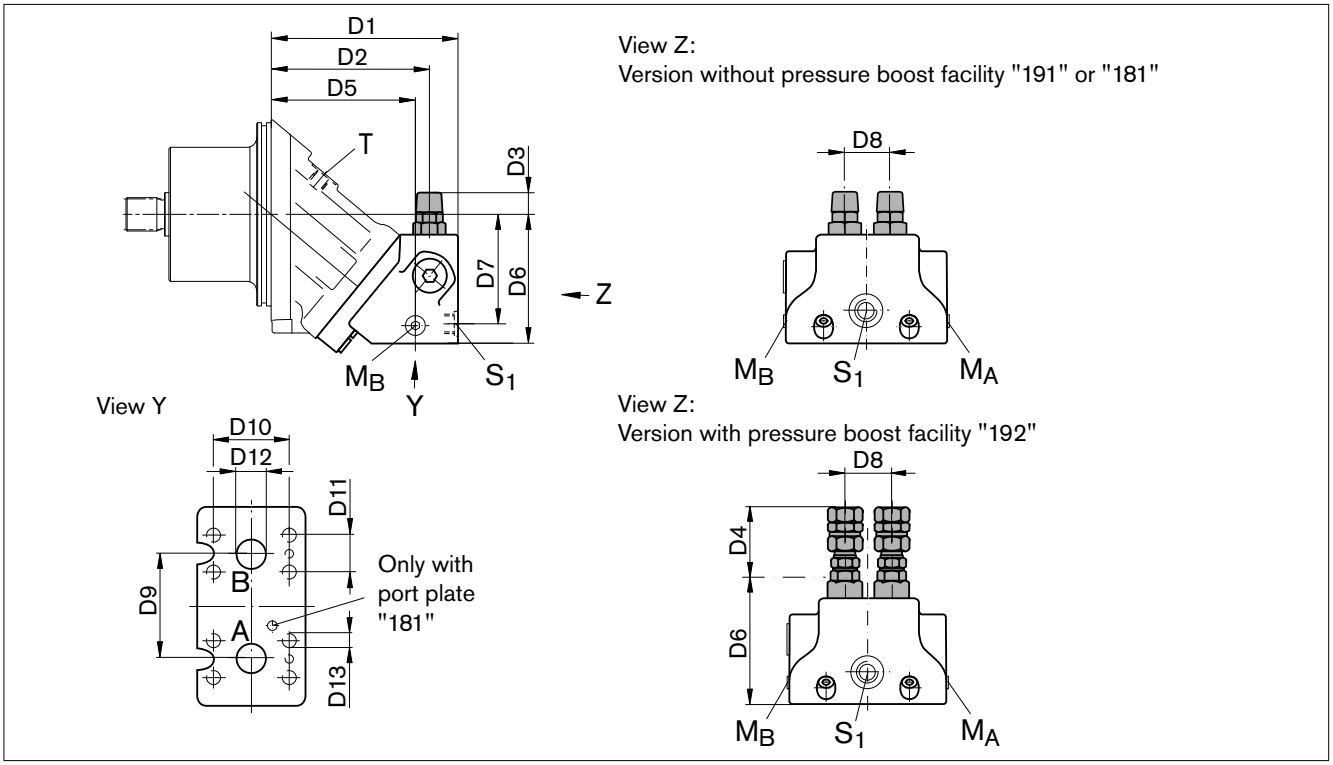


Port plate 107 – SAE flange ports at bottom



Pressure-relief valve

Dimensions



Size		D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13[2]
28, 32	MHDB.**16**	145	122	25	68	110	102	87	36	66	50.8	23.8	ø19	M10; 17 deep
45	MHDB.**16**	161	137	22	65	126	113	98	36	66	50.8	23.8	ø19	M10; 17 deep
56, 63	MHDB.**22**	189	162	19	61	147	124	105	42	75	50.8	23.8	ø19	M10; 13 deep
80, 90	MHDB.**22**	193	165	17.5	59	151	134	114	42	75	57.2	27.8	ø25	M12; 18 deep
107, 125	MHDB.**32**	216	184	10	52	168	149.5	130	53	84	66.7	31.8	ø32	M14; 19 deep
160, 180	MHDB.**32**	249	218	5	47	202	170	149	53	84	66.7	31.8	ø32	M14; 19 deep

Size	A, B	S_1[1]	M_A, M_B[1]	P_{St}[1]
28, 32	3/4 in	M22 x 1.5; 14 deep	M20 x 1.5; 14 deep	G 1/4
45	3/4 in	M22 x 1.5; 14 deep	M20 x 1.5; 14 deep	G 1/4
56, 63	3/4 in	M26 x 1.5; 16 deep	M26 x 1.5; 16 deep	G 1/4
80, 90	1 in	M26 x 1.5; 16 deep	M26 x 1.5; 16 deep	G 1/4
107, 125	1 1/4 in	M26 x 1.5; 16 deep	M26 x 1.5; 16 deep	G 1/4
160, 180	1 1/4 in	M26 x 1.5; 16 deep	M30 x 1.5; 16 deep	G 1/4

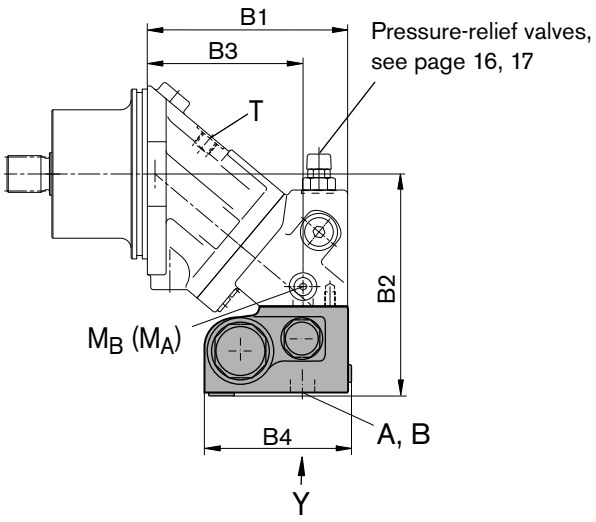
Assembly instruction for port plate with pressure boost facility "192":
The lock nut must be counterheld when installing the hydraulic line at the p_{st} port!

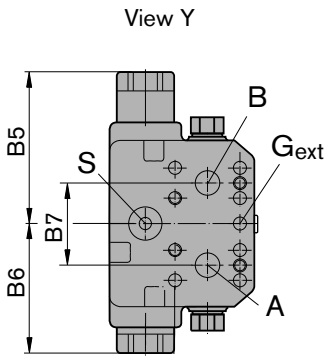
Ports

Designation	Port for	Standard	Size	Maximum pressure [bar][2]	State [3]
A, B	Service line	SAE J518	See above	450	O
S_1	Supply (only with port plate 191/192)	DIN 3852	See above	5	O
M_A, M_B	Measuring operating pressure	DIN 3852	See above	450	X
P_{St}	Pilot pressure (only with port plate 192)	DIN ISO 228	See above	30	O

Counterbalance valve BVD and BVE

Dimensions





A2FE Size	Counterbalance valve Type	Ports A, B	Dimensions B1	B2	B3	B4 (S)	B4 (L)	B5	B6	B7
28, 32	BVD**20**..16	3/4 in	145	175	110	142	147	139	98	66
45	BVD**20**..16	3/4 in	161	196	126	142	147	139	98	66
56, 63	BVD**20**..17	3/4 in	189	197	147	142	147	139	98	75
80, 90	BVD**20**..27	1 in	193	207	151	142	147	139	98	75
107, 125	BVD**20**..28	1 in	216	238	168	142	147	139	98	84
107, 125	BVD**25**..38	$1^1/_4$ in	216	239	168	158	163	175	120.5	84
160, 180	BVD**25**..38	$1^1/_4$ in	249	260	202	158	163	175	120.5	84
107, 125	BVE**25**..38	$1^1/_4$ in	216	240	168	167	172	214	137	84
160, 180	BVE**25**..38	$1^1/_4$ in	249	260	202	167	172	214	137	84
250	On request									

Ports

Designation	Port for	Version	Standard	Size[1)]	Maximum pressure [bar][2)]	State[4)]
A, B	Service line		SAE J518	see table above	420	O
S	Infeed	BVD20	DIN 3852[3)]	M22 x 1.5; 14 deep	30	X
		BVD25, BVE25	DIN 3852[3)]	M27 x 2; 16 deep	30	X
Br	Brake release, reduced high pressure	L	DIN 3852[3)]	M12 x 1.5; 12.5 deep	30	O
G_{ext}	Brake release, high pressure	S	DIN 3852[3)]	M12 x 1.5; 12.5 deep	420	X
M_A, M_B	Measuring pressure A and B		ISO 61493[3)]	M12 x 1.5; 12 deep	420	X