Axial piston variable pump
A4VSO Series 1x and 3x

RE 92050
Edition: 10.2018
Replaces: 04.2009

- Robust high-pressure pump for industrial applications
- Size 40 ... 1000
- Nominal pressure 350 bar
- Maximum pressure 400 bar
- Open circuit

Features

- Variable pump with axial piston rotary group of swash-plate design for hydrostatic drives in open circuit
- Flow is proportional to the drive speed and displacement.
- The flow can be infinitely varied by adjusting the swash-plate angle.
- Excellent suction performance
- Low noise level
- Long service life
- Modular design
- Variable through drive options
- Visual swivel angle indicator
- Freely variable installation position
- Suitable for variable-speed drives
- HF mode for reduced data possible for HFC mode, special version available

Contents

Supplementary information, see separate data sheets:

92053 (A4VSO for HFC hydraulic fluids)
92057 (DS2)
92060 (DR, DP, FR and DFR)
92064 (LR2.., LR3.., LR2..N and LR3..N)
92072 (EM and MA)
92076 (HM.., HS.., EO..)
92080 (HD..)
92088 (DFE1)

Type code

01	02	03	04	05	06		07	08		09	10	11	12	13	14
	A4VS		**O**			**/**			**–**						

Hydraulic fluid		**40**	**71**	**125**	**180**	**250**	**355**	**500**	**750**	**1000**	
01	Mineral oil and HFD hydraulic fluids (no code)	●	●	●	●	●	●	●	●	●	
	HFA, HFB and HFC hydraulic fluids[1)]	●	–	–	–	–	–	●	–	–	**E**
	High-speed version	–	●	–	○	●	●	●	–	–	**H**

Axial piston unit		
02	Swashplate design, variable, nominal pressure 350 bar, maximum pressure 400 bar	**A4VS**

Charge pump		**40**	**71**	**125**	**180**	**250**	**355**	**500**	**750**	**1000**	
03	without charge pump (without code)	●	●	●	●	●	●	●	●	●	
	With charge pump, only with connection plate 25 (see position 12)	–	–	–	–	–	–	–	●	–	**L**

Operating mode		
04	Pump, open circuit	**O**

Size (NG)		**40**	**71**	**125**	**180**	**250**	**355**	**500**	**750**	**1000**
05	Geometric displacement, see “Technical data” on page 8	**40**	**71**	**125**	**180**	**250**	**355**	**500**	**750**	**1000**

Control device		Data sheet									
06	Pressure controller, one-sided swiveling	92060	●	●	●	●	●	●	●	●	●	**DR..**[2)]
	Pressure controller for parallel operation		●	●	●	●	●	●	●	●	●	**DP..**[2)]
	Flow controller		●	●	●	●	●	●	–	–	–	**FR..**
	Pressure and flow controller		●	●	●	●	●	●	–	–	–	**DFR**
	Power controller with hyperbolic characteristic curve	92064	●	●	●	●	●	●	●	●	●	**LR..**[2)]
	Manual control	92072	●	●	●	●	●	●	●	–	–	**MA**
	Electric motor control		●	●	●	●	●	●	●	–	–	**EM**
	Hydraulic control, control volume dependent	92076	●	●	●	●	●	●	●	●	●	**HM..**
	Hydraulic control with servo/proportional valve		●	●	●	●	●	●	●	●	●	**HS..**[2)]
	Electronic control		●	●	●	●	●	●	●	●	●	**EO..**[2)]
	Hydraulic control, pressure dependent	92080	●	●	●	●	●	●	●	●	●	**HD..**[2)]
	Secondary closed loop pressure control	92057	●	●	●	●	●	●	●	●	●	**DS..**[2)]
	Electro-hydraulic control system DFE1 System solution SYHDFEE	92088 30035	●	●	●	●	●	●	–	–	–	**DFE1..**[2)]

Series		**40**	**71**	**125**	**180**	**250**	**355**	**500**	**750**	**1000**	
07	Series 1, index 0 (series 1, index 1, only for adjustment HD and EP)	●	●	–	–	–	–	–	–	–	**10(11)**
	Series 3, index 0	–	–	●	●	▲	●	▲	●	●	**30**
	Series 3, index 3, efficiency-optimized version. Only with high-speed rotary group “HA4VSO...” and “Sealing material NG” design	–	–	–	–	●	○	●	–	–	**33**

● = Available ○ = On request – = Not available ▲ = Not for new projects

1) For the enhanced-power special version in HFC mode, see data sheet 92053 and/or order position 09 For versions with HFA and HFB pressure media, see data sheet 90223

2) Observe the restrictions for operation with HF hydraulic fluids in the relevant data sheets for the adjustments and/or fitted valves.

POOCCA HYDRAULIC MANUFACTURING

01	02	03	04	05	06		07	08		09	10	11	12	13	14
	A4VS		**O**			**/**			**–**						

Directions of rotation **40 ... 1000**

08	Viewed on drive shaft	clockwise	**R**
		counter-clockwise	**L**

Sealing material

		40	71	125	180	250	355	500	750	1000	
09	NBR (nitrile rubber), shaft seal made of FKM (fluoroelastomer)	●	●	●	●	●	●	●	●	●	**P**
	FKM (fluoroelastomer) / HFD operation (for series 33 Standard)	●	●	●	●	●	●	●	●	●	**V**
	Special version for HFC mode, see data sheet 92053	–	●	●	●	●	●	–	–	–	**F.**

Drive shaft **40 ... 1000**

10	Parallel keyed shaft DIN 6885		**P**
	Splined shaft DIN 5480		**Z**

Mounting flange

			40	71	125	180	250	355	500	750	1000	
11	According to ISO 3019-2 metric	4-hole	●	●	●	●	●	●	–	–	–	**B**
		8-hole	–	–	–	–	–	–	●	●	●	**H**

Working port

		40	71	125	180	250	355	500	750	1000	
12	Connections **B** and **S**: Lateral SAE flange, offset 90°, metric fastening thread (only orderable without through drive (N00) or with K.. through drives)	●	●	●	●	●	●	–	–	–	**13**
	Connections **B** and **S**: Lateral SAE flange, offset 90°, metric fastening thread 2nd Pressure ports $\mathbf{B_1}$, opposite **B** plugged with flange plate on delivery	●	●	●	●	●	●	●	●	●	**25**

● = Available ○ = On request – = Not available ▲ = Not for new projects

POOCCA HYDRAULIC MANUFACTURING

01	02	03	04	05		06	07		08	09	10	11	12	13	14
	A4VS	**O**			/			–							

Through drive (for mounting options, see page 71)

13	Flange **ISO 3019-2** (metric)		Hub for splined shaft		40	71	125	180	250	355	500	750	1000	
	Diameter	Attachment	Diameter											
	Without through drive				●	●	●	●	●	●	●	●	●	**N00**
	With through drive	Without conversion option			●	●	–	–	–	–	●	●	●	**K...**
		For universal through drive, see data sheet 95581			–	–	●	●	●	●	–	–	–	**U...**
	125, 4-hole		32x2x14x9g[3]		●	●	●	●	●	●	●	●	○	**31**
	140, 4-hole		40x2x18x9g[3]		–	●	●	●	●	●	●	●	○	**33**
	160, -4-hole		50x2x24x9g[3]		–	–	●	●	●	●	●	●	○	**34**
	224, 4-hole		60x2x28x9g[3]		–	–	–	–	●	●	●	●	○	**35**
			70x3x22x9g[3]		–	–	–	–	–	●	●	○	●	**77**
	315, 8-hole		80x3x25x9g[3]		–	–	–	–	–	–	●	●	●	**43**
	400, 8-hole		90x3x28x9g[3)]		–	–	–	–	–	–	–	●	●	**76**
			100x3x32x9g[3]		–	–	–	–	–	–	–	–	●	**88**
	80, 2-hole		3/4 in	11T 16/32DP[4]	○	●	●	●	●	●	○	○	○	**B2**
	100, 2-hole		7/8 in	13T 16/32DP[4]	●	●	●	●	●	●	○	○	○	**B3**
			1 in	15T 16/32DP[4]	●	●	●	●	●	●	●	○	○	**B4**
	125, 4-hole		1 in	15T 16/3 2DP[4]	–	●	○	○	○	○	○	○	○	**E1**
	125, 2-hole		1 1/4 in	14T 12/24DP[4]	–	●	●	●	●	●	●	○	○	**B5**
			1 1/2 in	17T 12/24DP[4)]	–	–	●	●	●	●	○	○	○	**B6**
	160, 4-hole		1 1/4 in	14T 12/24DP[4]	–	○	●	●	●	●	○	○	○	**B8**
	180, 4-hole		1 1/2 in	17T 12/24DP[4]	–	–	○	○	○	○	○	○	○	**B9**
			1 3/4 in	13T 8/16DP[4]	–	–	–	●	●	●	○	○	○	**B7**
	Flange ISO **3019-1** (SAE)		Hub for splined shaft		40	71	125	180	250	355	500	750	1000	
	Diameter	Attachment	Diameter											
	82-2 (A)		5/8 in	9T 16/32DP[4]	●	●	●	●	●	●	●	●	○	**01**
			3/4 in	11T 16/32DP[4]	●	●	●	●	●	●	○	○	○	**52**
	101-2 (B)		7/8 in	13T 16/32DP[4]	●	●	●	●	●	●	●	●	○	**68**
			1 in	15T 16/32DP[4)]	●	●	●	●	●	●	●	○	○	**04**
			1 1/4 in	14T 12/24DP[4]	–	●	○	○	○	○	○	○	○	**06**
	127-4 (C)		1 in	15T 16/32DP[4]	○	●	●	●	○	○	○	○	○	**E2**
			1 1/4 in	14T 12/24DP[4]	–	●	●	●	●	●	●	○	○	**15**
	127-2 (C)		1 1/4 in	14T 12/24DP[4]	–	●	●	●	●	●	●	●	○	**07**
			1 1/2 in	17T 12/24DP[4]	–	–	●	●	●	●	●	●	●	**24**
	152-4 (D)		1 1/2 in	17T 12/24DP[4]	–	–	●	●	●	●	○	○	○	**96**
			1 3/4 in	13T 8/16DP[4]	–	–	●	●	●	●	●	●	○	**17**
	165-4 (D)		N50x2x24x9g[3]		–	–	–	–	○	○	●	○	○	**84**
	Ø 63, metr.4-hole		for keyed shaft Ø 25		●	●	●	●	●	●	○	○	○	**57**
	Prepared for through drive, with pressure-resistant plugged cover				●	●	●	●	●	●	●	●	●	**99**

Filtration (parameter only with HS and DS control)		40	71	125	180	250	355	500	750	1000	
14	Without filter	●	●	●	●	●	●	●	●	●	**N**
	Intermediate plate filter (for HS- and DS-control, see data sheet 92076 and 92057)	●	●	●	●	●	●	●[5)]	–	–	**Z**

● = Available ○ = On request – = Not available

3) Splined hub according to DIN 5480

4) Hub for splined shaft according to ANSI B92.1a, 30° pressure angle, flat root, side fit, tolerance class 5

5) For size 500, only available with DS control; for HS, see data sheet 92076.

Notice

- Observe the project planning notes (page 74).
- In addition to the type code, please specify the relevant technical data when placing your order.
- For notes on combination pumps, see page 71

POOCCA HYDRAULIC MANUFACTURING

Hydraulic fluids

The A4VSO, A4VSLO variable pump is designed for operation with HLP mineral oil according to DIN 51524. Application instructions and requirements for hydraulic fluids should be taken from the following data sheets before the start of project planning:

- 90220: Hydraulic fluids based on mineral oils and related hydrocarbons
- 90221: Environmentally acceptable hydraulic fluids
- 90222: Fire-resistant, water-free hydraulic fluids (HFDR/HFDU)
- 90235 Assessment of hydraulic fluids used in Rexroth hydraulic components (pumps and engines)
- 90245 Bosch Rexroth fluid rating list for Rexroth hydraulic components (pumps and engines)
- 90223: Fire-resistant, water-containing hydraulic fluids (HFAx, HFB, HCF)

Selection of hydraulic fluid

Bosch Rexroth evaluates hydraulic fluids using the Fluid Rating according to data sheet 90235.
Hydraulic fluids rated positive in the Fluid Rating can be found in the following data sheet:

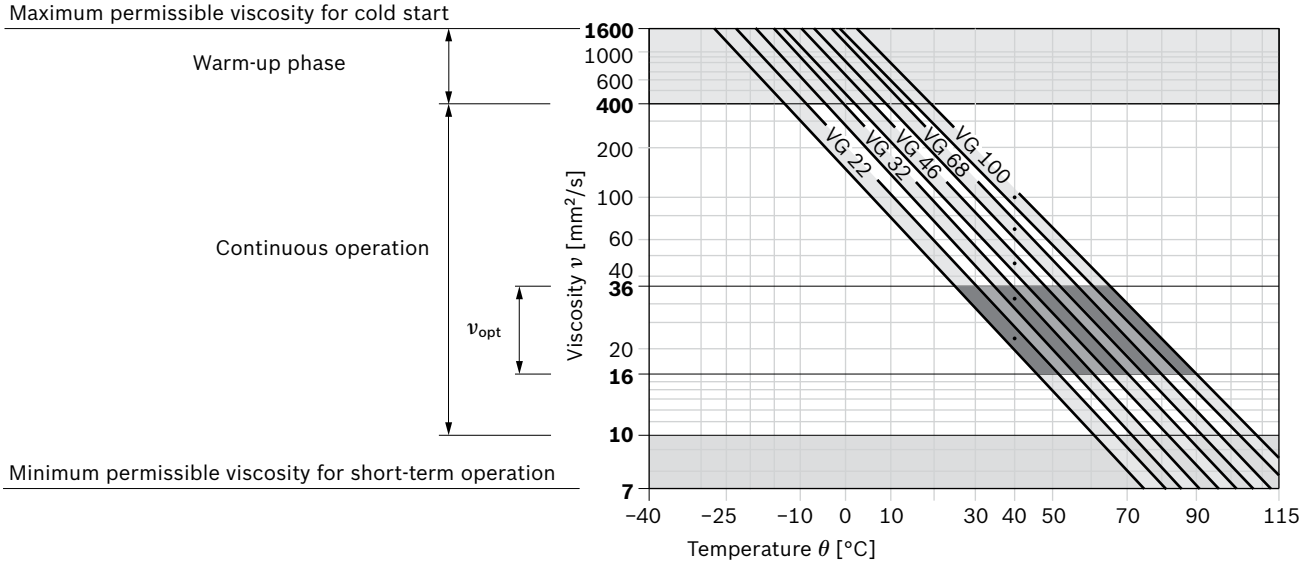
- 90245: Bosch Rexroth Fluid Rating List for Rexroth hydraulic components (pumps and motors)

The hydraulic fluid should be selected so that the operating viscosity in the operating temperature range is within the optimum range (v_{opt} see selection diagram).

Viscosity and temperature of hydraulic fluids

	Viscosity	Shaft seal	Temperature[2]	Comment
Cold start	$v_{max} \leq 1600$ mm²/s	NBR	$\theta_{St} \geq -40$ °C	$t \leq 3$ min, without load ($p \leq 50$ bar) Permissible temperature difference between axial piston unit and hydraulic fluid in the system maximum 25 K
		FKM	$\theta_{St} \geq -25$ °C	
Warm-up phase	$v = 1600 \ldots 400$ mm²/s			$t \leq 15$ min, $p \leq 0.7 \times p_{nom}$ and $n \leq 0.5 \times n_{nom}$
Continuous operation	$v = 400 \ldots 10$ mm²/s[1]	NBR	$\theta \leq +85$ °C	measured at port **T**
		FKM	$\theta_{St} \geq +110$ °C	
	$v_{opt} = 36 \ldots 16$ mm²/s			Range of optimum operating viscosity and efficiency
Short-term operation	$v_{min} = 10$ mm²/s	NBR[2]	$\theta \leq +85$ °C	$t \leq 3$ min, $p \leq 0.3 \times p_{nom}$, measured at port **T**
		FKM	$\theta_{St} \geq +110$ °C	

▼ **Selection diagram**



1) This corresponds, for example on VG 46, to a temperature range of +4 °C to +85 °C (see selection diagram)

2) If the temperature at extreme operating parameters cannot be adhered to, please contact us.

POOCCA HYDRAULIC MANUFACTURING

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 a hydraulic fluid viscosity of less than 10 mm^2/s (e.g. due to high temperatures during short-time duty) at the drain port, a cleanliness level of at least 19/17/14 according to ISO 4406 is required.

For example, the viscosity corresponds to 10 mm^2/s:

- HLP 32 a temperature of 73 °C
- HLP 46 a temperature of 85 °C

Bearing flushing

For the following operating conditions bearing flushing is required for a safe, continuous operation:

- Applications with special fluids (not mineral fluids) due to limited lubricity and narrow operating temperature range
- Operation with borderline conditions for temperature and viscosity during operation with mineral oil

With vertical installation (drive shaft facing upwards) bearing flushing is recommended for lubricating the front bearing and the shaft seal.

Bearing flushing is realized at port **U** in the area of the front flange of the variable pump. The flushing fluid flows through the front bearing and discharges with the pump drain at the drain port.

Depending on the individual sizes, the following flushing flows are recommended:

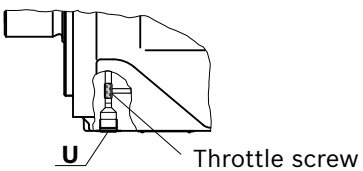
NG	40	71	125	180	250	355	500	750	1000
q_{Sp} l/min	3	4	5	7	10	15	20	30	40

For the flushing flows stated, there is a pressure differential of about 2 or 3 bar between port **U** (including fitting) and the drain chamber (series 1x and series 3x, respectively).

For version F (order position 09), the corresponding flushing quantities in accordance with data sheet 92053 must be observed.

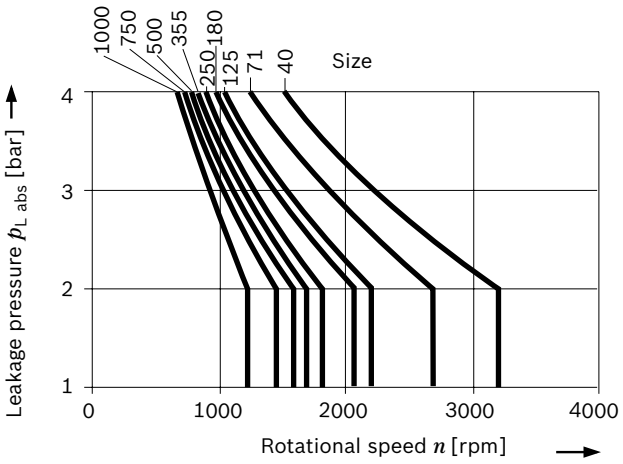
Notice regarding series 3x

When using external bearing flushing, the throttle screw in port **U** must be turned in to the end stop.



Leakage pressure

The permissible leakage pressure (case pressure) depends on the rotational speed (see diagram).



Maximum leakage pressure (case pressure)	
$p_{L\ abs\ max}$	4 bar absolute

These data are guideline figures; a restriction may be necessary under certain operating conditions.

Flow direction

S to **B**

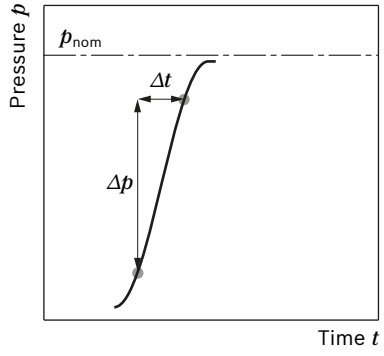
POOCCA HYDRAULIC MANUFACTURING

Working pressure range

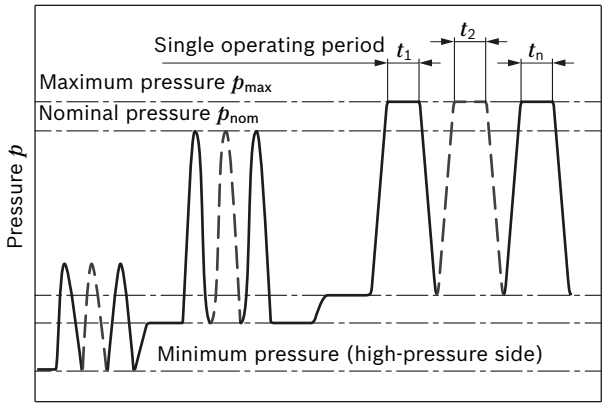
Pressure at working port B		**Definition**
Nominal pressure p_{nom}	350 bar	The nominal pressure corresponds to the maximum design pressure.
Maximum pressure p_{max}	400 bar	The maximum pressure corresponds to the maximum working pressure within the single operating period. The sum of the single operating periods must not exceed the total operating period (maximum number of cycles: approx. 1 million).
Single operating period	1 s	
Total operating period	300 h	
Minimum pressure $p_{B\,abs}$ (High-pressure side)	15 bar[1)]	Minimum pressure on the high-pressure side (**B**) which is required in order to prevent damage to the axial piston unit. The minimum pressure depends on the rotational speed and the swivel angle.
Rate of pressure change $R_{A\,max}$	16000 bar/s	Maximum permissible pressure build-up and reduction speed during a pressure change across the entire pressure range.
Pressure at suction port S (inlet)		
Version without charge pump		Minimum pressure at suction port **S** (inlet) which is required to prevent damage to the axial piston unit. The minimum required pressure is dependent on the rotational speed and displacement of the axial piston unit (see diagram “Maximum permissible speed” on page9).
Minimum pressure $p_{S\,min}$	≥ 0.8 bar absolute	
Maximum pressure $p_{S\,max}$	≤ 30 bar	

Case pressure at port T, K_1, K_2, R(L)		
Maximum static pressure $p_{L\,max}$	4 bar	Maximum 1.2 bar higher than inlet pressure at port **S**, but not higher than $p_{L\,max}$. A drain line to the reservoir is required.
Pressure peaks $p_{L\,peak}$	6 bar	t < 0.1s

▼ **Rate of pressure change $R_{A\,max}$**



▼ **Pressure definition**



Total operating period = $t_1 + t_2 + ... + t_n$

1) Lower values on request

POOCCA HYDRAULIC MANUFACTURING

Technical data

Standard rotary group version

Size		NG		40	71	125	180	250	355	500	750	750[5]	1000
Geometric displacement per revolution		$V_{g\,max}$	cm^3	40	71	125	180	250	355	500	750	750	1000
Rotational speed maximum[1]	at $V_{g\,max}$[2]	n_{nom}	rpm	2600	2200	1800	1800	1500	1500	1320	1200	1500	1000
	at $V_g \le V_{g\,max}$[3]	n_{max}	rpm	3200	2700	2200	2100	1800	1700	1600	1500	1500	1200
Flow	at n_{nom} and $V_{g\,max}$	q_v	l/min	104	156	225	324	375	533	660	900	1125	1000
	at 1500 rpm	q_v	l/min	60	107	186	270	375	533	581[6]	770[6]	1125	–
Power	at n_{nom}, $V_{g\,max}$ and Δp = 350 bar	P	kW	61	91	131	189	219	311	385	525	656	583
	at 1500 rpm	P	kW	35	62	109	158	219	311	339[6]	449[6]	656	–
Torque	at $V_{g\,max}$ and Δp = 350 bar[2]	M_{max}	Nm	223	395	696	1002	1391	1976	2783	4174	4174	5565
	and Δp = 100 bar[2]	M	Nm	64	113	199	286	398	564	795	1193	1193	1590
Rotary stiffness of drive shaft	Shaft end P	c	kNm/rad	80	146	260	328	527	800	1145	1860	1860	2730
	Shaft end Z	c	kNm/rad	77	146	263	332	543	770	1136	1812	1812	2845
Moment of inertia		J_{TW}	kgm^2	0.0049	0.0121	0.03	0.055	0.0959	0.19	0.3325	0.66	0.66	1.20
Maximum angular acceleration[4]		α	rad/s^2	17000	11000	8000	6800	4800	3600	2800	2000	2000	1450
Case volume		V	l	2	2.5	5	4	10	8	14	19	22	27
Weight (without through drive) approx.		m	kg	39	53	88	102	184	207	320	460	490	605

High-speed rotary group version

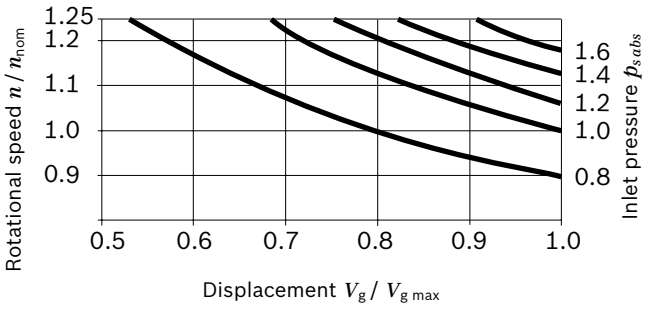
Size		NG		71	250	355	500
Displacement, geometric, per revolution		$V_{g\,max}$	cm^3	71	250	355	500
Rotational speed maximum[1]	at $V_{g\,max}$	n_{nom}	rpm	3000[2)7)8)]	1900[2]	1700[2]	1500[2]
	at $V_g \le V_{g\,max}$	n_{max}	rpm	–	2100[3]	1900[3]	1800[3]
Flow	at n_{nom} and $V_{g\,max}$	q_v	l/min	213[7)8)]	475	604	750
Power	at n_{nom}, $V_{g\,max}$ and Δp = 350 bar	P	kW	124	277	352	437
Torque	at $V_{g\,max}$ and Δp = 350 bar	M_{max}	Nm	395	1391[2]	1976[2]	2783[2]
Rotary stiffness of drive shaft	Shaft end P	c	kNm/rad	146	527	800	1145
	Shaft end Z	c	kNm/rad	146	543	770	1136
Moment of inertia		J_{TW}	kgm^2	0.0121	0.0959	0.19	0.3325
Maximum angular acceleration[4]		α	rad/s^2	11000	4800	3600	2800
Case volume		V	l	2.5	10	8	14
Weight (without through drive) approx.		m	kg	53	184	207	320

1) The values are applicable:
   – to the optimum viscosity range from v_{opt} = 36 to 16 mm^2/s
   – with hydraulic fluid based on mineral oils
2) The values apply at absolute pressure p_{abs} = 1 bar at suction port **S**.
3) Maximum rotational speed (speed limit) when increasing the inlet pressure p_{abs} at suction port **S** and $V_g < V_{g\,max}$, see diagram on page 9.
4) The data are valid for values between the minimum required and maximum permissible rotational speed. Valid for external excitation (e.g. diesel engine 2 to 8 times rotary frequency; cardan shaft twice the rotary frequency). The limit value is only valid for a single pump. The load capacity of the connecting parts must be considered.
5) with charge pump (A4VSLO)
6) At $V_g < V_{g\,max}$
7) If V_g > 30% (depending on speed dee diagram „High Speed NG71“)
8) For suction pressure < 1 bar see diagram Maximum rotational speed (speed limit) no rotational speed increase possible when the inlet pressure increases.

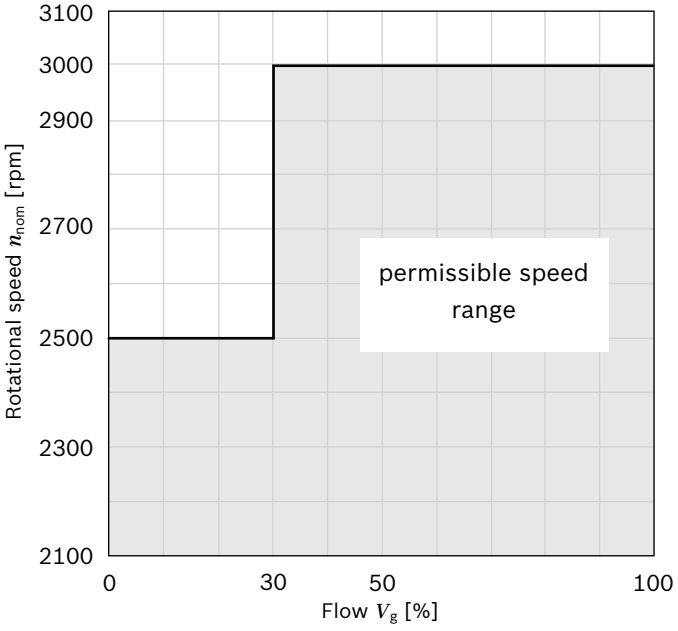
POOCCA HYDRAULIC MANUFACTURING

Maximum permissible speed (speed limit)

($p_{S\,abs}$ = Inlet pressure [bar])



Maximal permissible speed at High Speed size 71



Determining the characteristics			
Flow	$q_v = \frac{V_g \times n \times \eta_v}{1000}$		[l/min]
Torque	$M = \frac{V_g \times \Delta p}{20 \times \pi \times \eta_{hm}}$		[Nm]
Power	$P = \frac{2 \pi \times M \times n}{60000} = \frac{q_v \times \Delta p}{600 \times \eta_t}$		[kW]

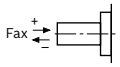
Key

V_g	=	Displacement per revolution [cm³]
Δp	=	Differential pressure [bar]
n	=	Rotational speed [rpm]
η_v	=	Volumetric efficiency
η_{hm}	=	Hydraulic-mechanical efficiency
η_t	=	Total efficiency ($\eta_t = \eta_v \times \eta_{hm}$)

Notices

- Theoretical values, without efficiency and tolerances; values rounded
- Operation above the maximum values or below the minimum values may result in a loss of function, a reduced service life or in the destruction of the axial piston unit. We recommend testing the loads by means of experiment or calculation / simulation and comparison with the permissible values.
- Special requirements apply in the case of belt drives. Please contact us.

Permissible radial and axial forces of the drive shafts

Size		NG		40	71	125	180	250	355	500	750[1)]	1000
Radial force, maximum	 at X/2	$F_{q\,max}$	N	1000	1200	1600	2000	2000	2200	2500	3000	3500
Maximum axial force		$\pm F_{ax\,max}$	N	600	800	1000	1400	1800	2000	2000	2200	2200

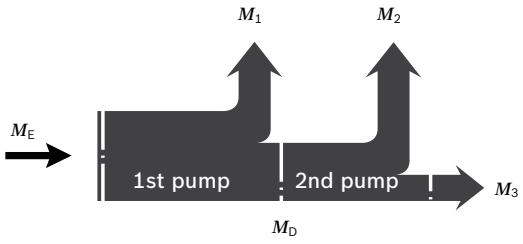
1) Values also apply for the version with charge pump (A4VSLO)

POOCCA HYDRAULIC MANUFACTURING

Permissible input and through-drive torques

Size		NG		40	71	125	180	250	355	500	750	1000
Torque at $V_{g\,max}$ and Δp = 350 bar[1)]		M_{max}	Nm	223	365	696	1002	1391	1976	2783	4174	5565
Maximum input torque at drive shaft[2)]												
	Splined shaft Z	$M_{E\,max}$	Nm	446	790	1392	2004	2782	3952	5566	8348	11130
	Shaft key P	$M_{E\,max}$	Nm	380	700	1392	1400	2300	3557	5200	7513	9444
Maximum through-drive torque												
	Splined shaft Z	$M_{D\,max}$	Nm	223	395	696	1002	1391	1976	2783	4174	5565
	Shaft key P	$M_{D\,max}$	Nm	157	305	696	398	909	1581	2417	3339	3879

▼ Distribution of torques



Torque at 1st Pump	M_1		
Torque at 2nd Pump	M_2		
Torque at 3rd Pump	M_3		
Input torque	M_E	=	$M_1 + M_2 + M_3$
	M_E	<	$M_{E\,max}$
Through-drive torque	M_D	=	$M_2 + M_3$
	M_D	<	$M_{D\,max}$

1) Efficiency not considered
2) For drive shafts with no radial force

POOCCA HYDRAULIC MANUFACTURING

Characteristic curves

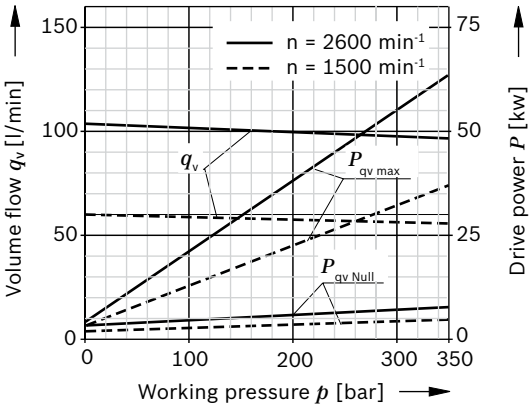
Drive power and flow

(Operating fluid: Hydraulic fluid ISO VG 46 DIN 51519, t = 50 °C)

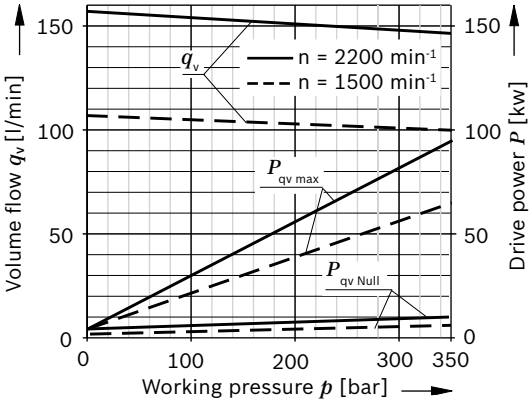
Total efficiency $n_t = \frac{q_v \times p}{P_{qv\ max} \times 600}$

Volumetric efficiency $n_v = \frac{q_v}{q_{v\ theor}}$

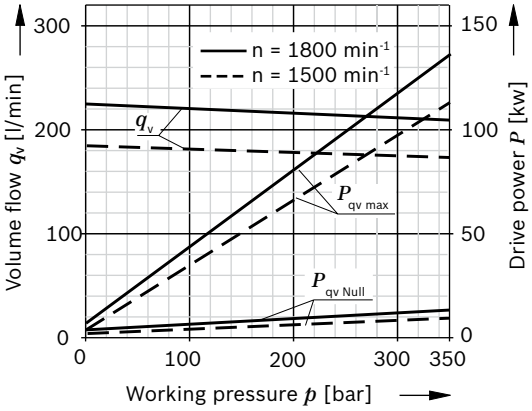
▼ **Size 40**



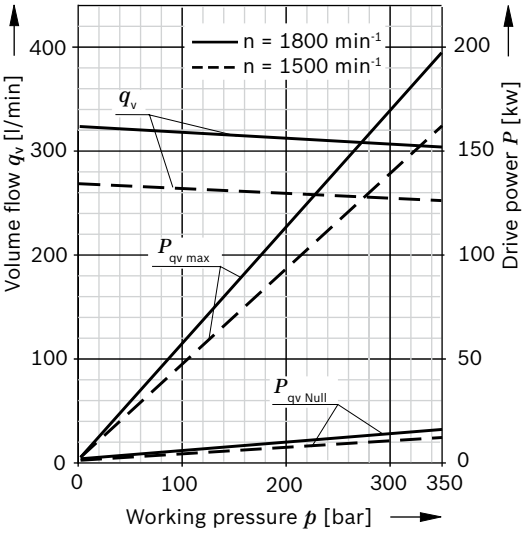
▼ **Size 71**



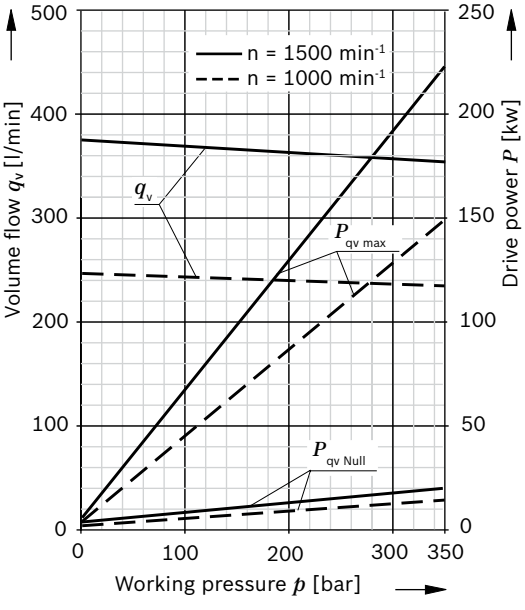
▼ **Size 125**



▼ **Size 180**



▼ **Size 250**



POOCCA HYDRAULIC MANUFACTURING

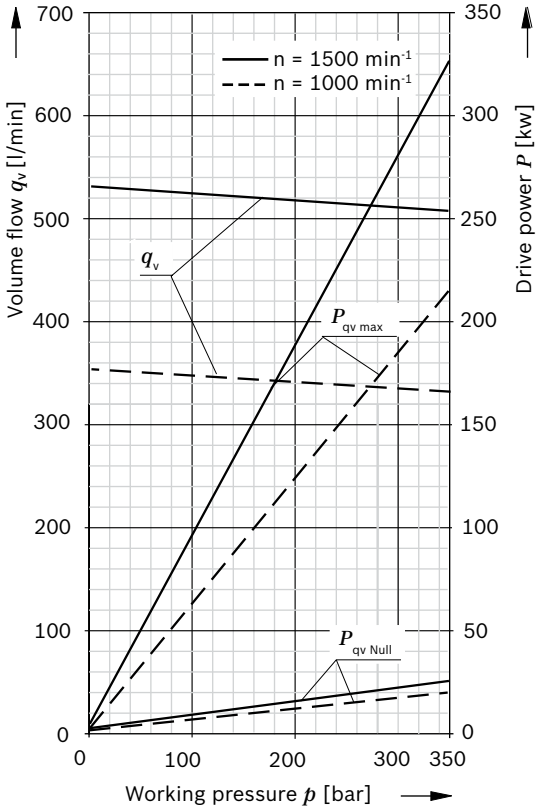
Drive power and flow

(Operating fluid: Hydraulic fluid ISO VG 46 DIN 51519,
t = 50 °C)

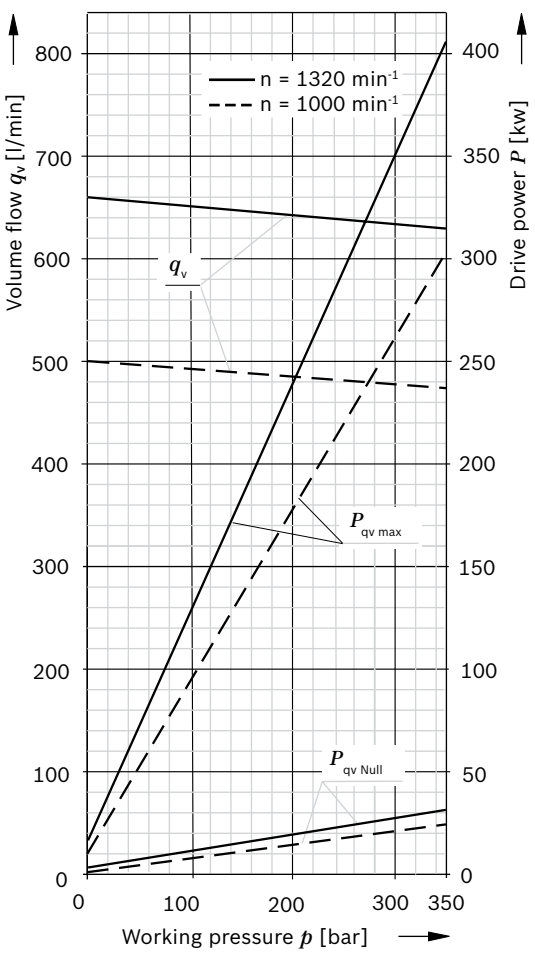
Total efficiency $n_t = \frac{q_v \times p}{P_{qv\ max} \times 600}$

Volumetric efficiency $n_v = \frac{q_v}{q_{v\ theor}}$

▼ **Size 355**



▼ **Size 500**



POOCCA HYDRAULIC MANUFACTURING

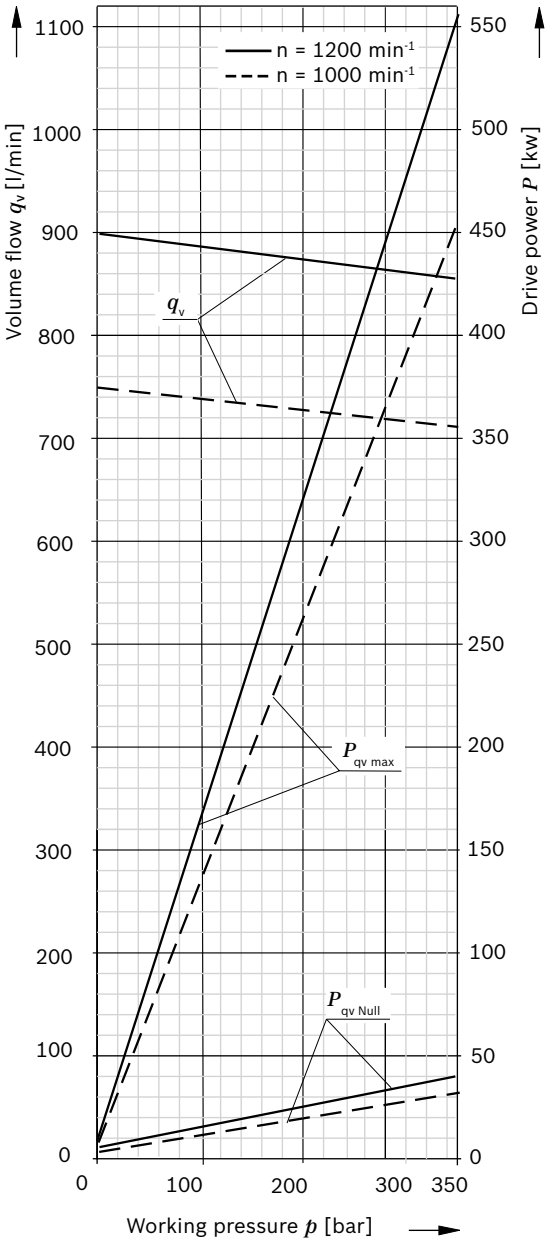
Drive power and flow

(Operating fluid: Hydraulic fluid ISO VG 46 DIN 51519, t = 50 °C)

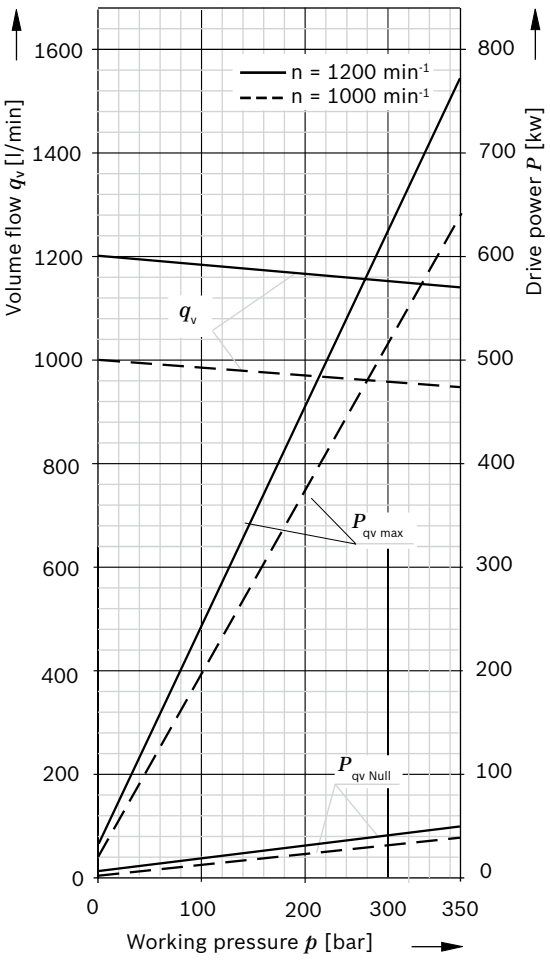
Total efficiency $n_t = \frac{q_v \times p}{P_{qv\ max} \times 600}$

Volumetric efficiency $n_v = \frac{q_v}{q_{v\ theor}}$

▼ **Size 750**



▼ **Size 1000**



POOCCA HYDRAULIC MANUFACTURING

Overview of control devices

Pressure controller DR
(for further information, see data sheet 92060)

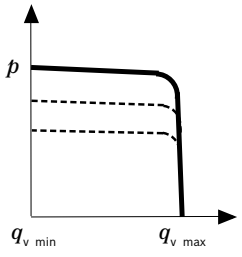
The pressure controller limits the maximum pressure at the pump outlet within the control range of the variable pump. The variable pump only supplies as much hydraulic fluid as is required by the consumers. If the working pressure exceeds the pressure command value at the pressure valve, the pump will regulate to a smaller displacement to reduce the control differential.

- Initial position in depressurized state: $V_{g\,max}$.
- Setting range for pressure control: 50 to 350 bar. Standard is 350 bar.

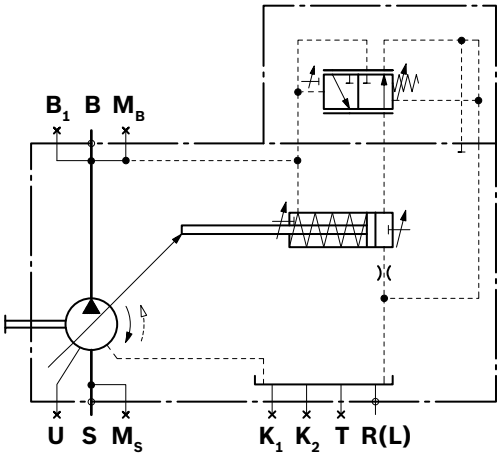
Optional:

- Pressure controller, remotely operated (DRG)

▼ **Characteristic curve**



▼ **Circuit diagram**



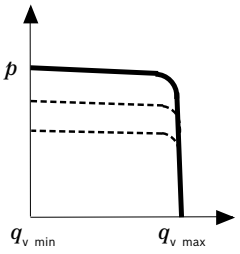
Pressure controller for parallel operation DP
(for further information, see data sheet 92060)

Suitable for pressure control of multiple axial piston units A4VSO in parallel operation.

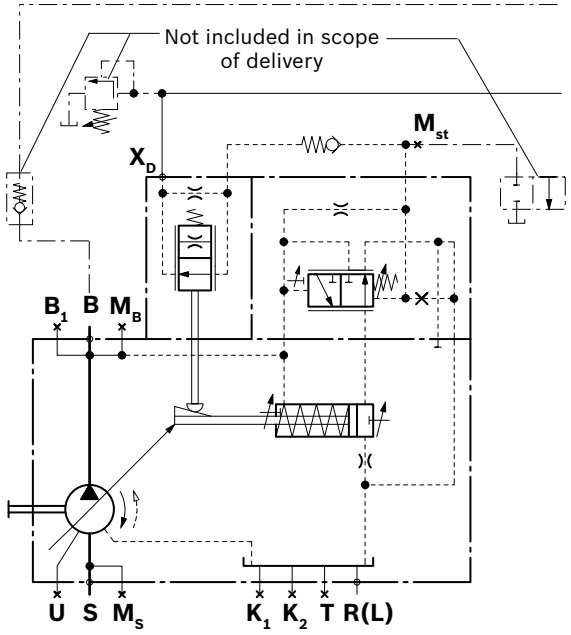
Optional:

- with flow control (DPF)

▼ **Characteristic curve**



▼ **Circuit diagram**



POOCCA HYDRAULIC MANUFACTURING

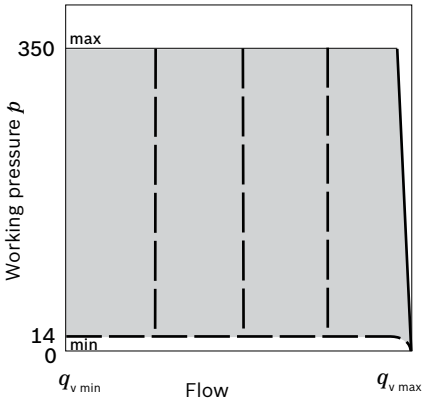
Flow controller FR
(for further information, see data sheet 92060)

The flow controller adjusts the displacement of the pump to the volume required by the consumer.
The flow of the pump is then dependent on the cross section of the external metering orifice (pos. **4**), which is located between the pump and the consumer. The flow is nearly independent of the load pressure within the control range of the pump.

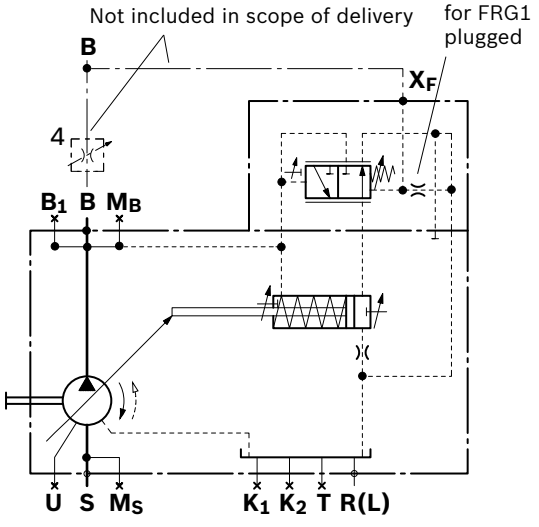
Initial position in depressurized state: $V_{g\,max}$
Mechanical minimum and maximum swivel angle limitation

- The $V_{g\,min}$ stop is set so that a pressure of 15 to 20 bar is set when port **B** is plugged.
- The $V_{g\,max}$ stop is set to nominal $V_{g\,max}$. When ordering, please state other settings values in plain text (possible setting ranges $V_{g\,max}$ to 50% $V_{g\,max}$).

▼ **Characteristic curve**



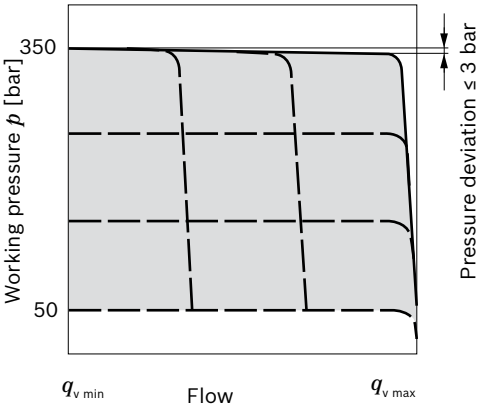
▼ **Schematic, example sizes 40 and 71**



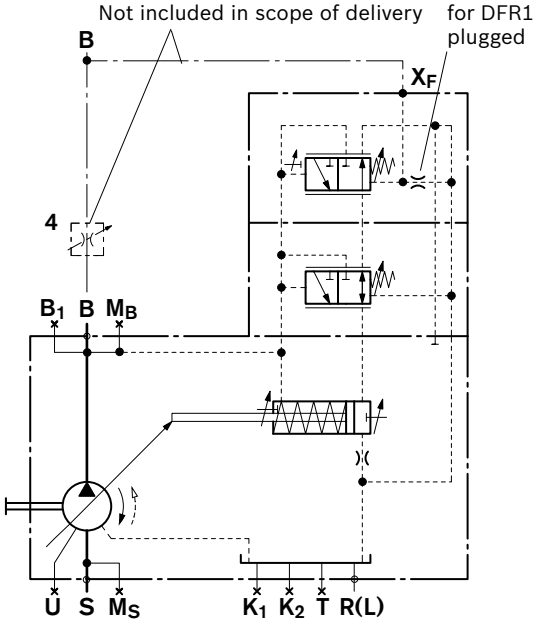
Pressure and flow controller DFR
(for further information, see data sheet 92060)

The pressure and flow controller is a combination of the DR pressure controller and FR flow controller.

▼ **Characteristic curve**



Schematic, example sizes 40 and 71



POOCCA HYDRAULIC MANUFACTURING

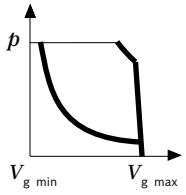
Power controller LR2 with hyperbolic characteristic curve (for further information, see data sheet 92064)

The hyperbolic power controller keeps the specified drive power constant at the same drive speed.

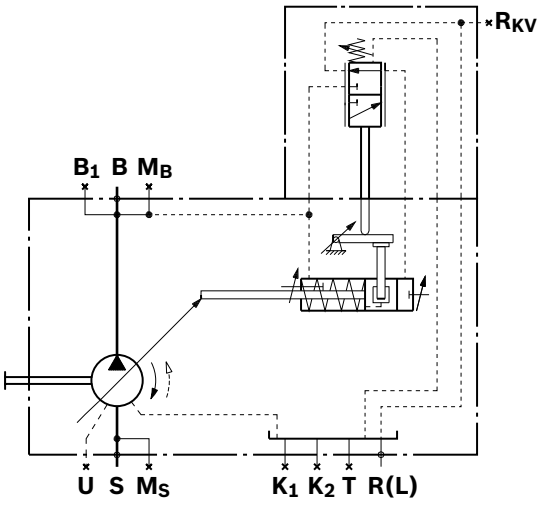
Optional:

- Pressure control (LR2D), remotely controllable (LR2G);
- Flow control
- (LR2F, LR2S);
- Hydraulic stroke limiter (LR2H);
- Mechanical stroke limiter (LR2Z);
- Hydraulic two-point control (LR2Z);
- With electric unloading valve as starting aid (LR2Y).

▼ **Characteristic curve**



▼ **Circuit diagram**



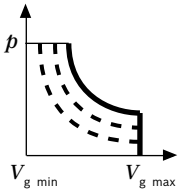
Power controller LR3 with remotely controllable power characteristic
(for further information, see data sheet 92064)

This hyperbolic power controller keeps the specified drive power constant, whereby the power characteristic is adjustable remotely.

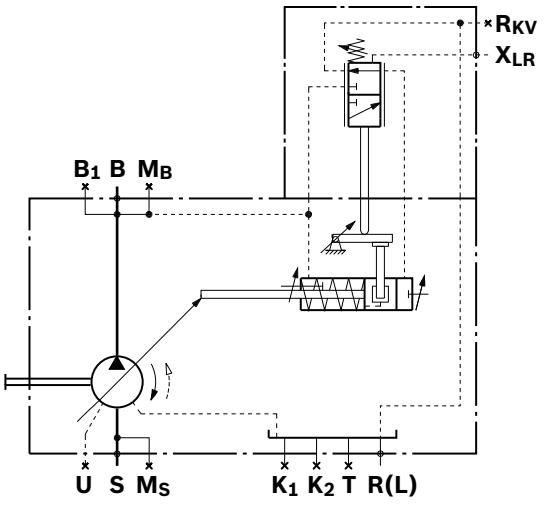
Optional:

- Pressure control (LR3D), remotely controllable (LR3G);
- Flow control
- (LR3F, LR3S);
- Hydraulic stroke limiter (LR3H);
- Mechanical stroke limiter (LR3Z);
- Hydraulic two-point control (LR3Z);
- With electric unloading valve as starting aid (LR3Y).

▼ **Characteristic curve**



▼ **Circuit diagram**



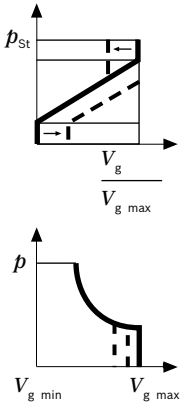
POOCCA HYDRAULIC MANUFACTURING

Hydraulic adjustment LR2N and LR3N pilot-pressure dependent, basic setting $V_{g\,min}$
(for further information, see data sheet 92064)

With superimposed power control.
The displacement volume is adjusted proportionally to the pilot pressure in $\mathbf{P}_{St}$.
The additional hyperbola power controller is superimposed on the pilot pressure signal and keeps the specified drive output constant.

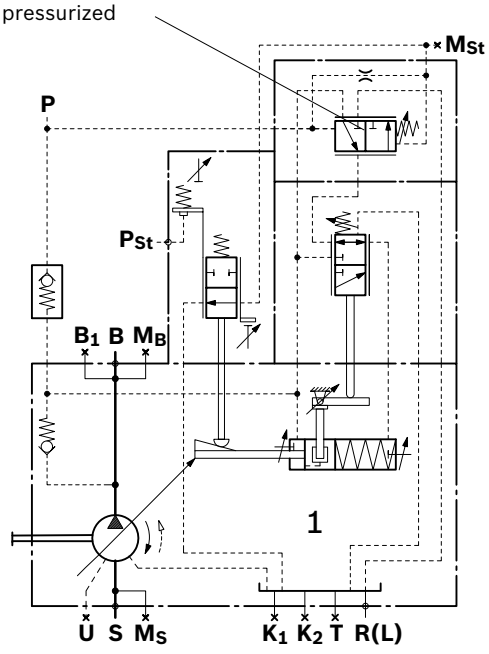
Optional:
- Power characteristics, remotely controllable (LR3N)
- Pressure control (LR.DN),
- Remote pressure control (LR.GN)
- Electrical control of pilot pressure (LR, NT)

▼ **Characteristic curve**



▼ **Circuit diagram**

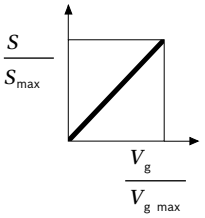
Shown in switched position,
i.e. **P** pressurized



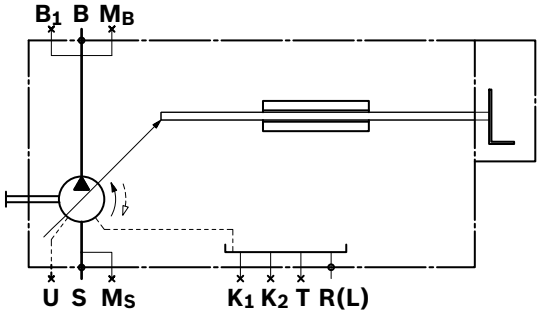
Manual control MA
(for further information, see data sheet 92072)

Stepless adjustment of displacement volume by means of a handwheel.

▼ **Characteristic curve**



▼ **Circuit diagram**

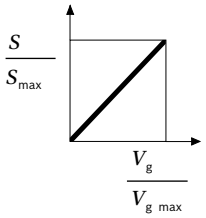


POOCCA HYDRAULIC MANUFACTURING

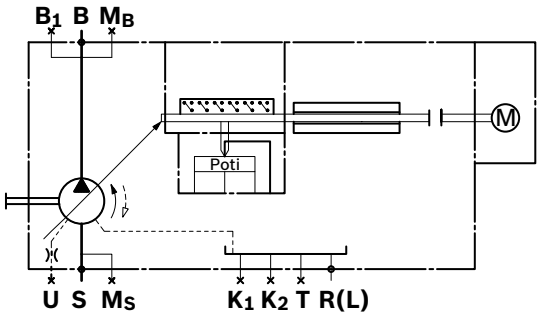
Electric motor control MA
(for further information, see data sheet 92072)

Stepless adjustment of displacement volume by means of the electric motor control EM.
Various intermediate displacement values can be selected with a programmed sequence control by means of built on limit switches and an optional potentiometer for feedback of the swivel angle.

▼ **Characteristic curve**



▼ **Circuit diagram**

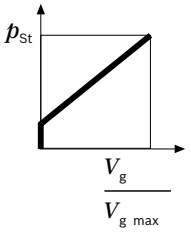


Hydraulic adjustment HD, pilot-pressure dependent
(for further information see data sheet 92080)

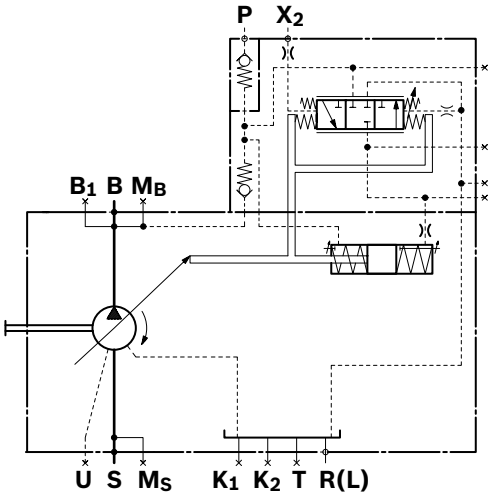
Stepless adjustment of the pump displacement according to the pilot pressure. The control is proportional to the specified pilot pressure (difference between pilot pressure and case pressure).

Optional:
- Control characteristics (HD1, HD2, HD3)
- Pressure control (HD.B),
- Remote pressure control (HD.GB)
- Power control (HD1P)
- Electrical control of pilot pressure (HD1T)

▼ **Characteristic curve**



▼ **Circuit diagram**

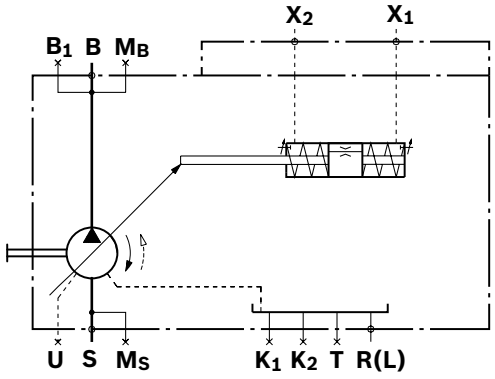


POOCCA HYDRAULIC MANUFACTURING

Hydraulic adjustment HM 1/2, quantity-dependent
(for further information see data sheet 92076)

The pump displacement can be steplessly varied in relation to the control oil volume in ports $\mathbf{X_1}$ and $\mathbf{X_2}$.
Application:
– 2-point circuit
– Base device for servo or proportional controls

▼ **Circuit diagram**

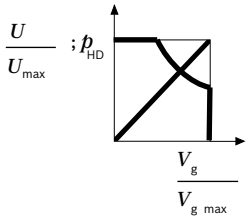


Control system HS, HS5, with servo or proportional valve
(for further information, see data sheet 92076)

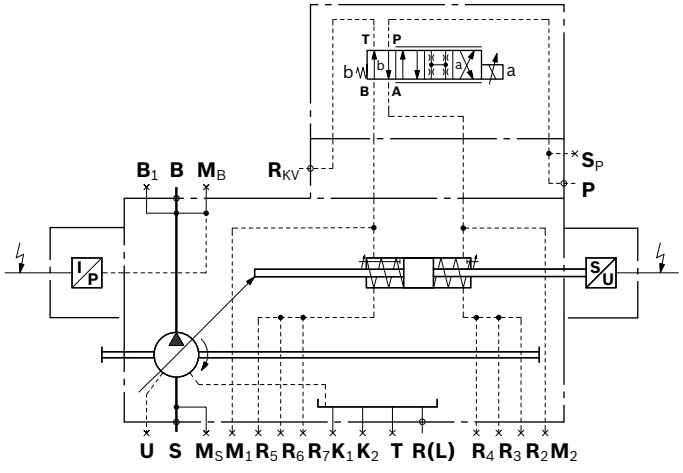
The stepless displacement control is accomplished by means of a servo or proportional valve and electrical feedback of the swivel angle.
The HS5P control system is equipped with a mounted pressure transducer, which means that it can be used for electric pressure and power control.

Optional:
- Servo valve (HS);
- Proportional valve (HS5);
- Short circuit valve (HSK, HS5K, HS5KP);
- For the den submerged oil insert (HS5M);
- With internal control pressure supply (HS5V);
- Control system with integrated **O**n **B**oard **E**lectronics OBE (HS5E).

▼ **Characteristic curve**



▼ **Schematic NG 125 and 180 HS5P**



POOCCA HYDRAULIC MANUFACTURING

Control system EO

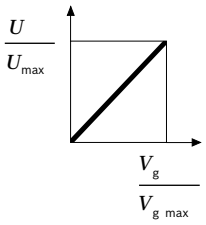
(for further information, see data sheet 92076)

The stepless control of the displacement flow is accomplished by means of a proportional valve and electrical feedback of the swivel angle. Thus, the control can be used as an electric displacement control.

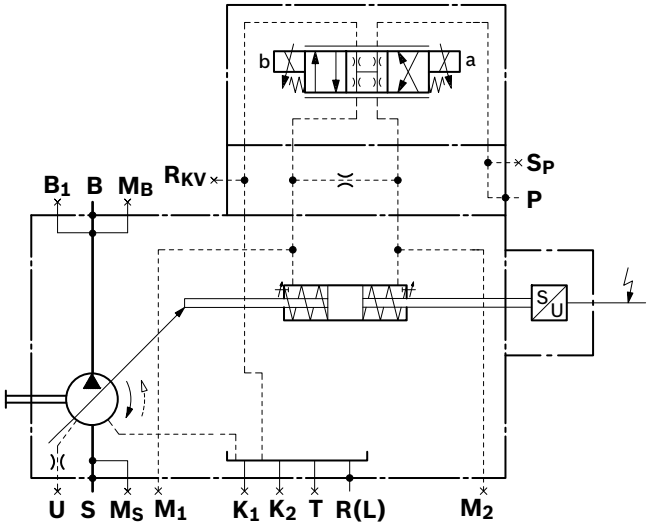
Optional:

- Control pressure range (EO1, EO2)
- Short circuit valve (EO1K, EO2K)
- Without valves (EO1E, EO2E)

▼ **Characteristic curve**



▼ **Circuit diagram**



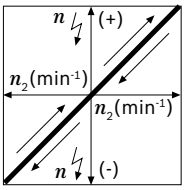
Speed control DS2, secondary-controlled

(for further information, see data sheet 92057)

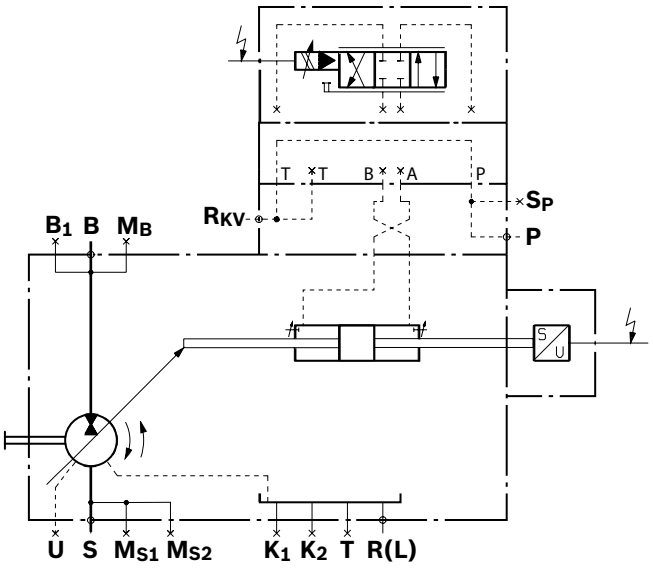
The speed control DS2 controls the secondary unit in such a manner, that this motor delivers sufficient torque to maintain the required rotational speed.

- This torque is
  - in the network with impressed pressure
  - proportional to the displacement volume and therefore proportional to the swivel angle.

▼ **Characteristic curve**



▼ **Circuit diagram**

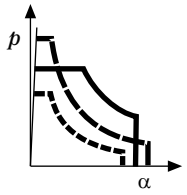


POOCCA HYDRAULIC MANUFACTURING

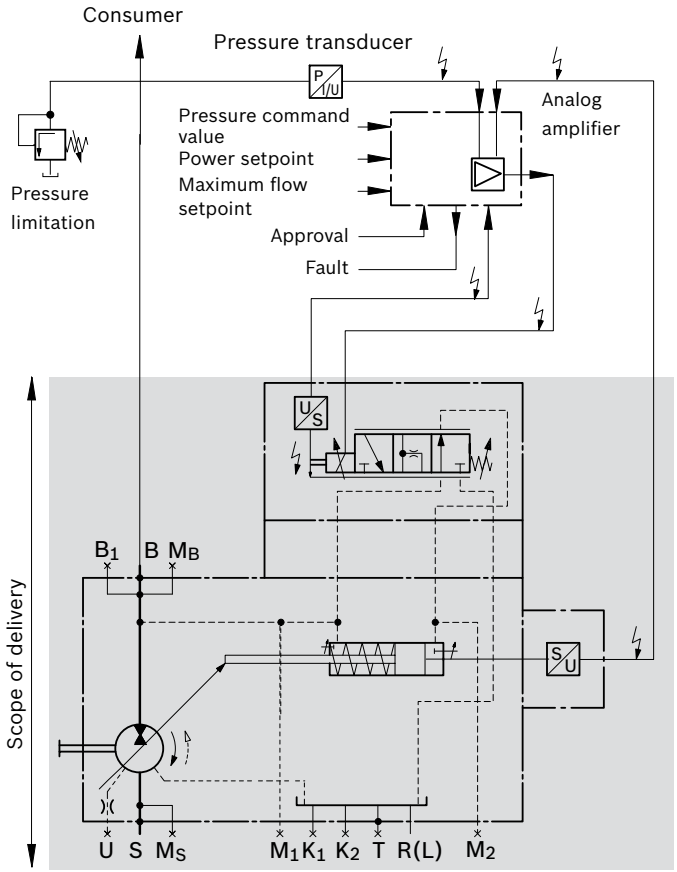
Electrohydraulic control system DFE1
(for further information, see data sheet 92088)

An electrically actuated proportional valve controls the power, pressure and swivel angle of the A4V.SO...DFE1 variable pump. The current at the proportional valve determines the position of the swashplate angle and thus the flow of the pump via the stroking piston and the position transducer.
With the electric motor switched off and actuator system depressurized, the pump swivels to maximum displacement ($V_{g\,max}$) through spring force.

▼ **Characteristic curve**

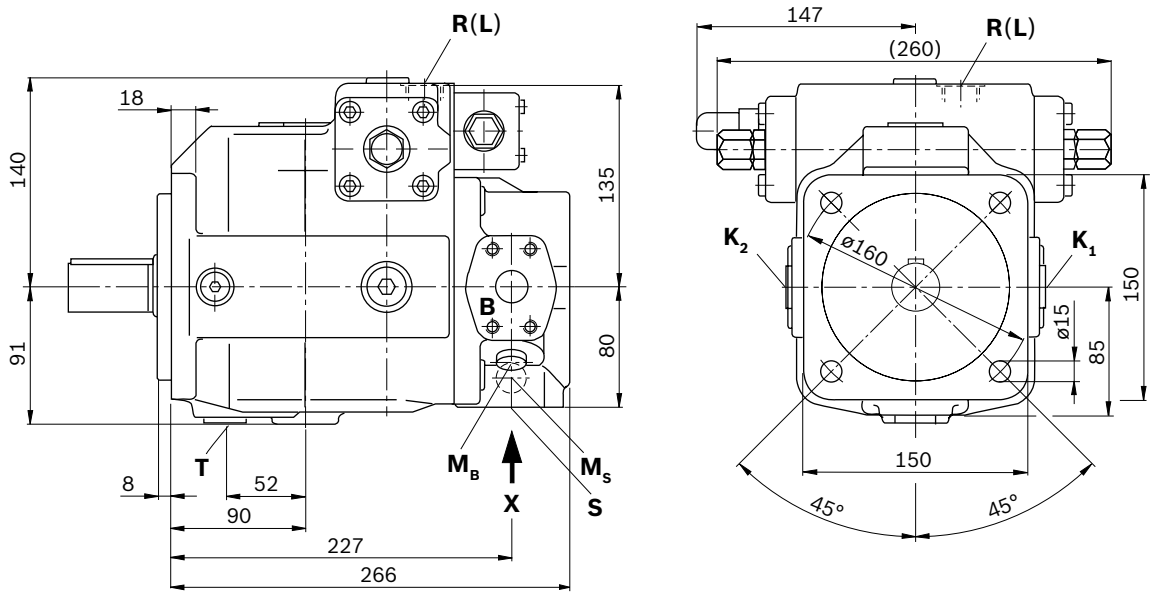


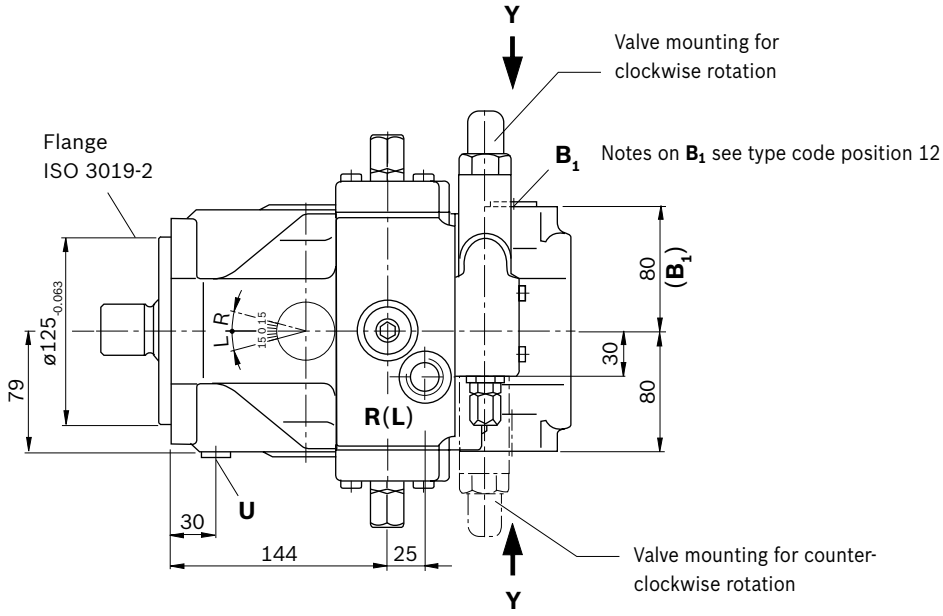
▼ **Circuit diagram**

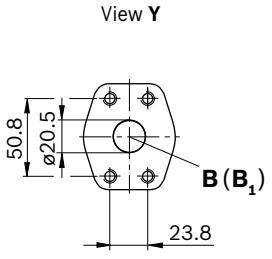


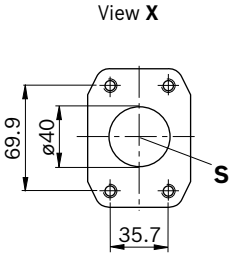
Dimensions, size 40

Main dimensions only for the basic unit, further dimensions are given in the relevant data sheets.





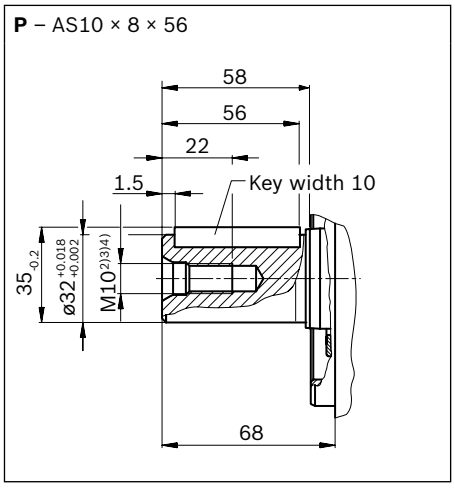




POOCCA HYDRAULIC MANUFACTURING

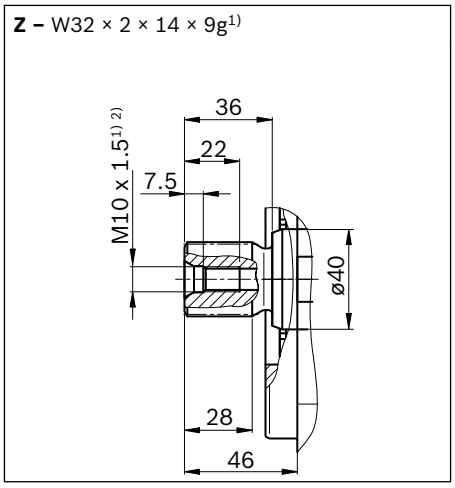
▼ **Parallel keyed shaft, DIN 6885**

P – AS10 × 8 × 56



▼ **Splined shaft (DIN 5480)**

Z – W32 × 2 × 14 × 9g[1)]



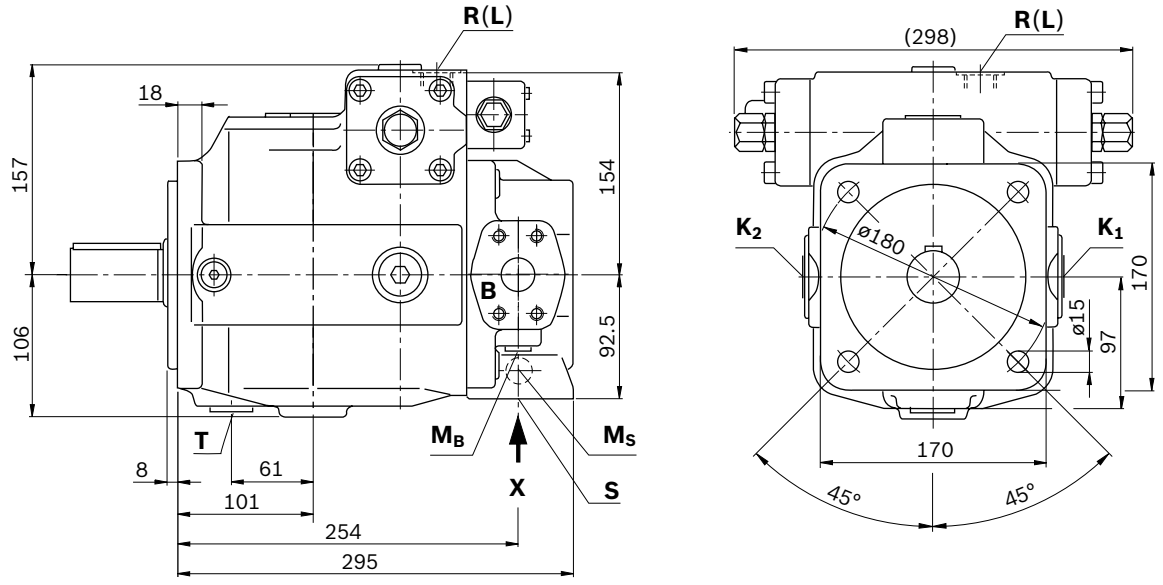
Ports		Standard	Size[4)]	$p_{max\ abs}$ [bar][5)]	State[9]
S	Suction port (standard pressure series) Fastening thread	SAE J518[6)] DIN 13	1 1/2 in M12 × 1.75; 20 deep	30	O
For version port plate 13					
B	Pressure port (high-pressure series) Fastening thread	SAE J518[6)] DIN 13	3/4 in M10 × 1.5; 17 deep	400	O
B_1	Additional connection	DIN 3852	M22 × 1.5; 14 deep	400	X
For version port plate 25					
B	Pressure port (high-pressure series) Fastening thread	SAE J518[6)] DIN 13	3/4 in M10 × 1.5; 17 deep	400	O
B_1	2nd working port (high-pressure series) Fastening thread	SAE J518[6)] DIN 13	3/4 in M10 × 1.5; 17 deep	400	X[10)]
K_1, K_2	Flushing port	DIN 3852	M22 × 1.5; 14 deep	4	X[8)]
T	Drain port	DIN 3852[7)]	M22 × 1.5; 14 deep	4	X[8)]
M_B	Measuring port working pressure	DIN 3852	M14 × 1.5; 12 deep	400	X
M_S	Measuring port suction pressure	DIN 3852	M14 × 1.5; 12 deep	30	X
R(L)	Drain port	DIN 3852[7)]	M22 × 1.5; 14 deep	4	O[8]
U	Flushing port	DIN 3852	M14 × 1.5; 12 deep	5	X

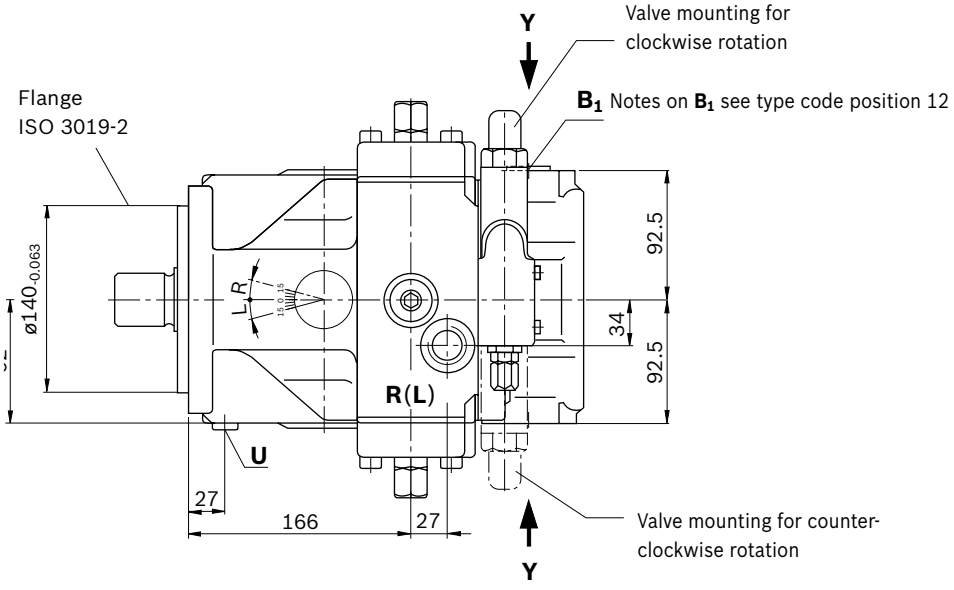
1) Splined shaft according to DIN 5480
2) Center bore according to DIN 332
3) Thread according to DIN 13
4) For notes on tightening torques, see the instruction manual.
5) Depending on the application, momentary pressure peaks can occur. Keep this in mind when selecting measuring devices and fittings.
6) Metric fastening thread is a deviation from standard.
7) The countersink can be deeper than as specified in the standard.
8) Depending on the installation position **T**, **K_1**, **K_2** or **R**(**L**) must be connected (see also installation instructions on pages 72 and 73)
9) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)
10) Plugged with flange plate

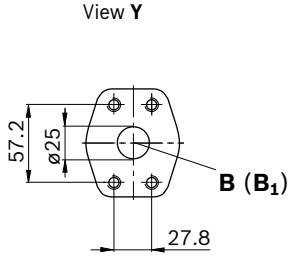
POOCCA HYDRAULIC MANUFACTURING

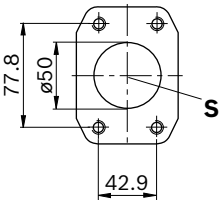
Dimensions, size 71

Main dimensions only for the basic unit, further dimensions are given in the relevant data sheets.





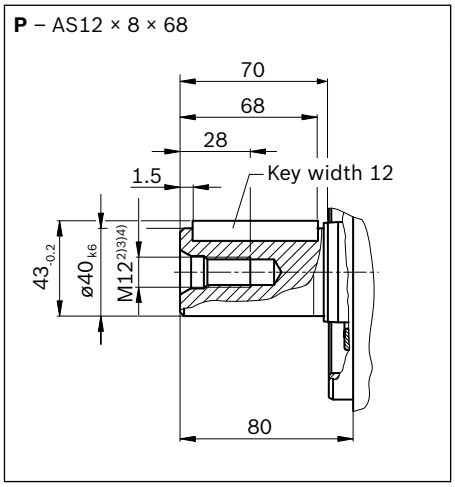




POOCCA HYDRAULIC MANUFACTURING

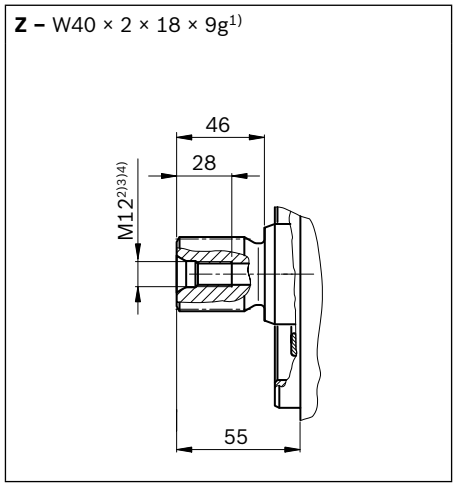
▼ **Parallel keyed shaft, DIN 6885**

P – AS12 × 8 × 68



▼ **Splined shaft (DIN 5480)**

Z – W40 × 2 × 18 × 9g[1)]



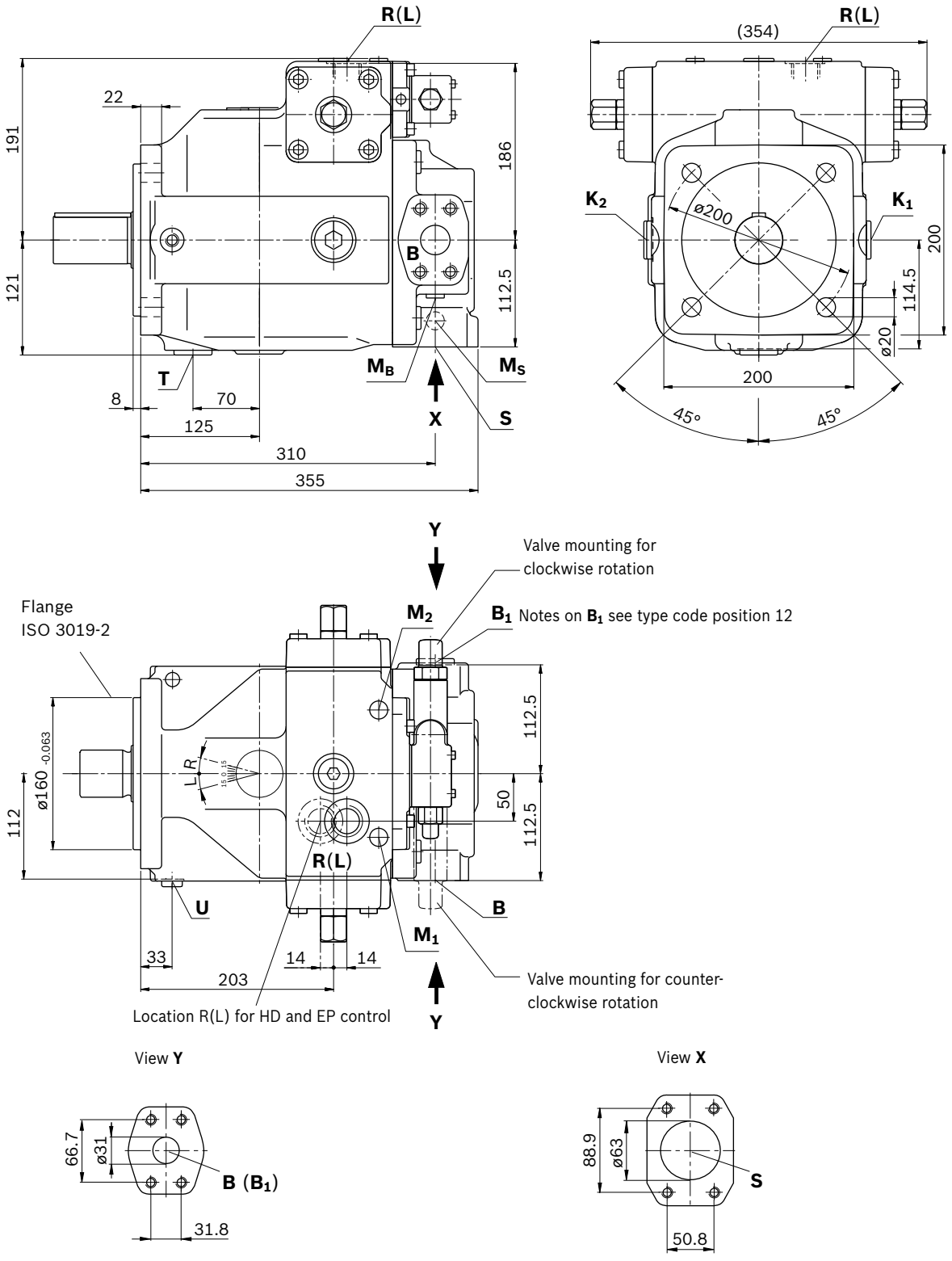
Ports		Standard	Size[4)]	$p_{max\ abs}$ [bar][5)]	State[9]
S	Suction port (standard pressure series)	SAE J518[6)]	2 in	30	O
	Fastening thread	DIN 13	M12 × 1.75; 20 deep		
For version port plate 13					
B	Pressure port (high-pressure series)	SAE J518[6)]	1 in	400	O
	Fastening thread	DIN 13	M12 × 1.75; 20 deep		
B_1	Additional connection	DIN 3852	M27 × 2; 16 deep	400	X
For version port plate 25					
B	Pressure port (high-pressure series)	SAE J518[6)]	1 in	400	O
	Fastening thread	DIN 13	M12 × 1.75; 20 deep		
B_1	2nd working port (high-pressure series)	SAE J518[6)]	1 in	400	X[10)]
	Fastening thread	DIN 13	M12 × 1.75; 20 deep		
K_1, K_2	Flushing port	DIN 3852	M27 × 2; 16 deep	4	X[8)]
T	Drain port	DIN 3852[7)]	M27 × 2; 16 deep	4	X[8)]
M_B	Measuring port working pressure	DIN 3852	M14 × 1.5; 12 deep	400	X
M_S	Measuring port suction pressure	DIN 3852	M14 × 1.5; 12 deep	30	X
R(L)	Drain port	DIN 3852[7)]	M27 × 2; 16 deep	4	O[8]
U	Flushing port	DIN 3852	M14 × 1.5; 12 deep	5	X

1) Splined shaft according to DIN 5480
2) Center bore according to DIN 332
3) Thread according to DIN 13
4) For notes on tightening torques, see the instruction manual.
5) Depending on the application, momentary pressure peaks can occur. Keep this in mind when selecting measuring devices and fittings.
6) Metric fastening thread is a deviation from standard.
7) The countersink can be deeper than as specified in the standard.
8) Depending on the installation position **T**, **K_1**, **K_2** or **R**(**L**) must be connected (see also installation instructions on pages 72 and 73)
9) O = must be connected (plugged when delivered)
X = plugged (in normal operation)
10) Plugged with flange plate

POOCCA HYDRAULIC MANUFACTURING

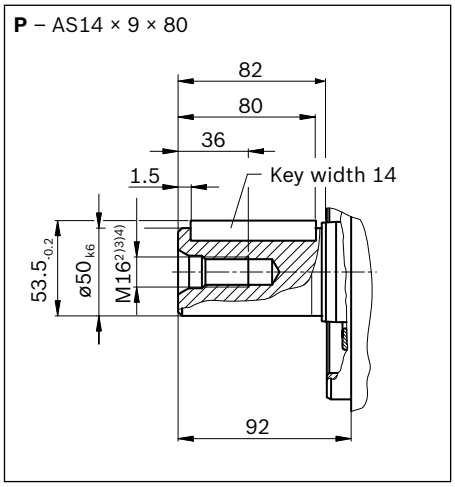
Dimensions, size 125

Main dimensions only for the basic unit, further dimensions are given in the relevant data sheets.



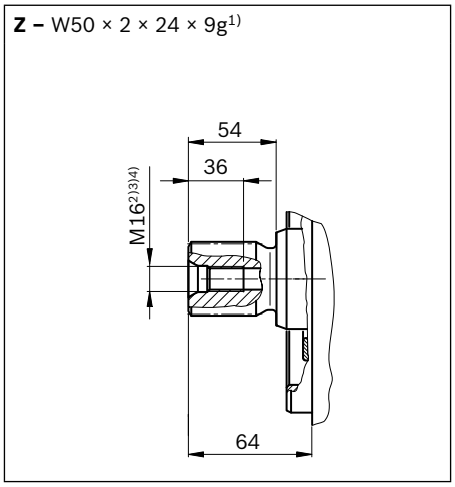
▼ **Parallel keyed shaft, DIN 6885**

P – AS14 × 9 × 80



▼ **Splined shaft (DIN 5480)**

Z – W50 × 2 × 24 × 9g[1)]



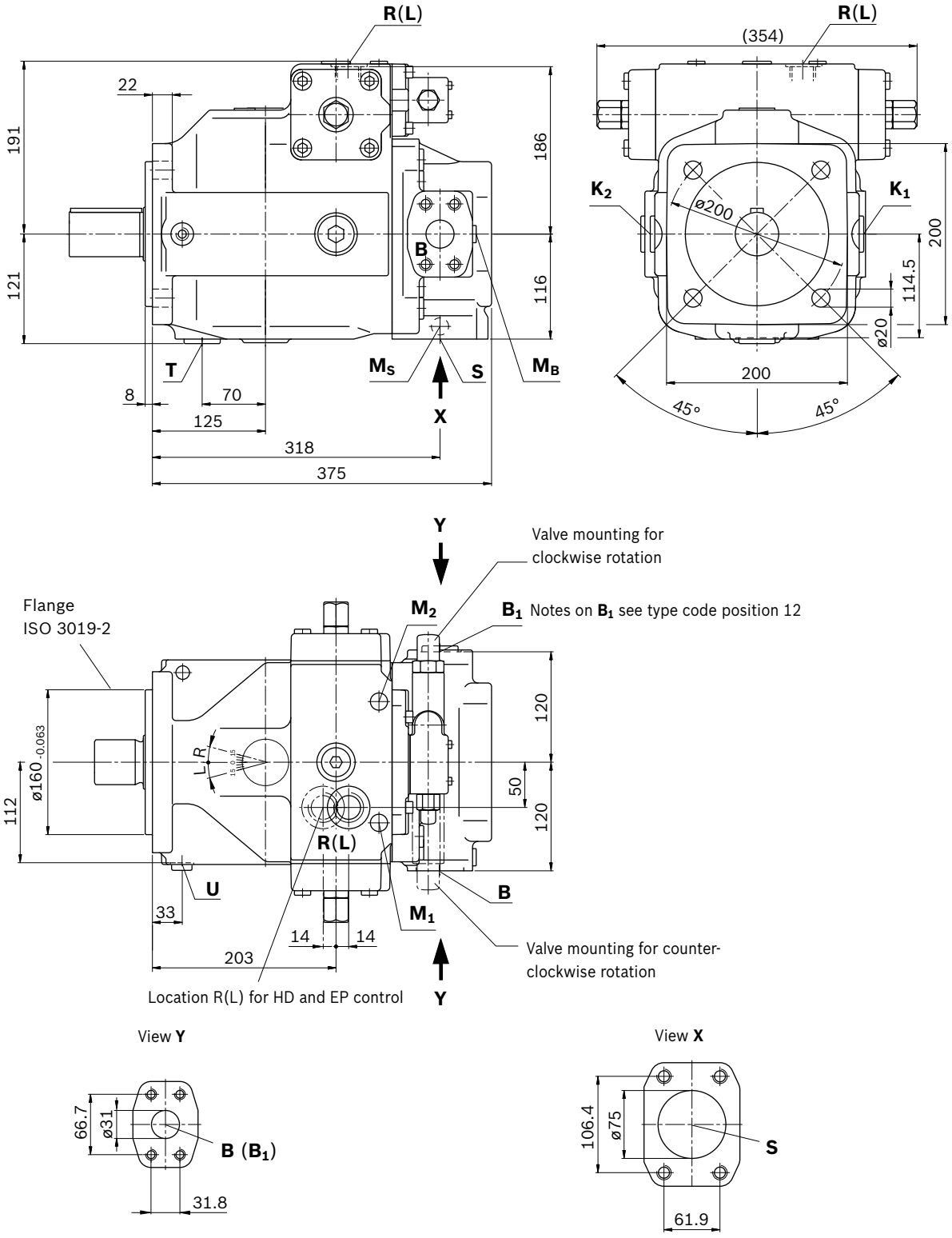
Ports		Standard	Size[4)]	$p_{max\ abs}$ [bar][5)]	State[9]
S	Suction port (standard pressure series)	SAE J518[6)]	2 1/2 in	30	O
	Fastening thread	DIN 13	M12 × 1.75; 17 deep		
For version port plate 13					
B	Pressure port (high-pressure series)	SAE J518[6)]	1 1/4 in	400	O
	Fastening thread	DIN 13	M14 × 2; 19 deep		
B_1	Additional connection	DIN 3852	M33 × 2; 18 deep	400	X
For version port plate 25					
B	Pressure port (high-pressure series)	SAE J518[6)]	1 1/4 in	400	O
	Fastening thread	DIN 13	M14 × 2; 19 deep		
B_1	2nd working port (high-pressure series)	SAE J518[6)]	1 1/4 in	400	X[10)]
	Fastening thread	DIN 13	M14 × 2; 19 deep		
K_1, K_2	Flushing port	DIN 3852	M33 × 2; 18 deep	4	X[8)]
T	Drain port	DIN 3852[7)]	M33 × 2; 18 deep	4	X[8)]
M_B	Measuring port working pressure	DIN 3852	M14 × 1.5; 12 deep	400	X
M_S	Measuring port suction pressure	DIN 3852	M14 × 1.5; 12 deep	30	X
R(L)	Drain port	DIN 3852[7)]	M33 × 2; 18 deep	4	O[8]
U	Flushing port	DIN 3852	M14 × 1.5; 12 deep	5	X

1) Splined shaft according to DIN 5480
2) Center bore according to DIN 332
3) Thread according to DIN 13
4) For notes on tightening torques, see the instruction manual.
5) Depending on the application, momentary pressure peaks can occur. Keep this in mind when selecting measuring devices and fittings.
6) Metric fastening thread is a deviation from standard.
7) The countersink can be deeper than as specified in the standard.
8) Depending on the installation position **T**, **K_1**, **K_2** or **R**(**L**) must be connected (see also installation instructions on pages 72 and 73)
9) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)
10) Plugged with flange plate

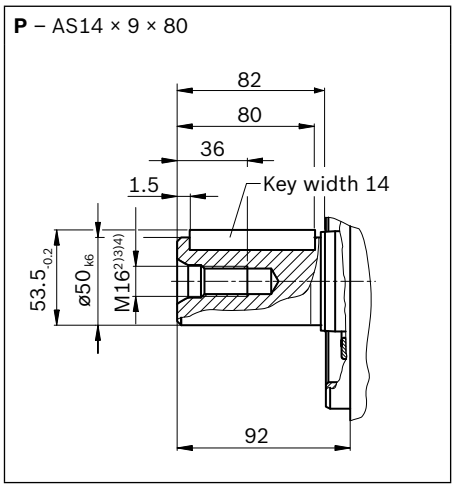
POOCCA HYDRAULIC MANUFACTURING

Dimensions, size 180

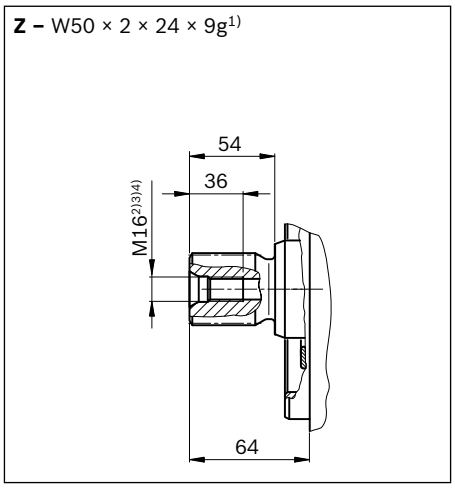
Main dimensions only for the basic unit, further dimensions are given in the relevant data sheets.



▼ **Parallel keyed shaft, DIN 6885**



▼ **Splined shaft (DIN 5480)**



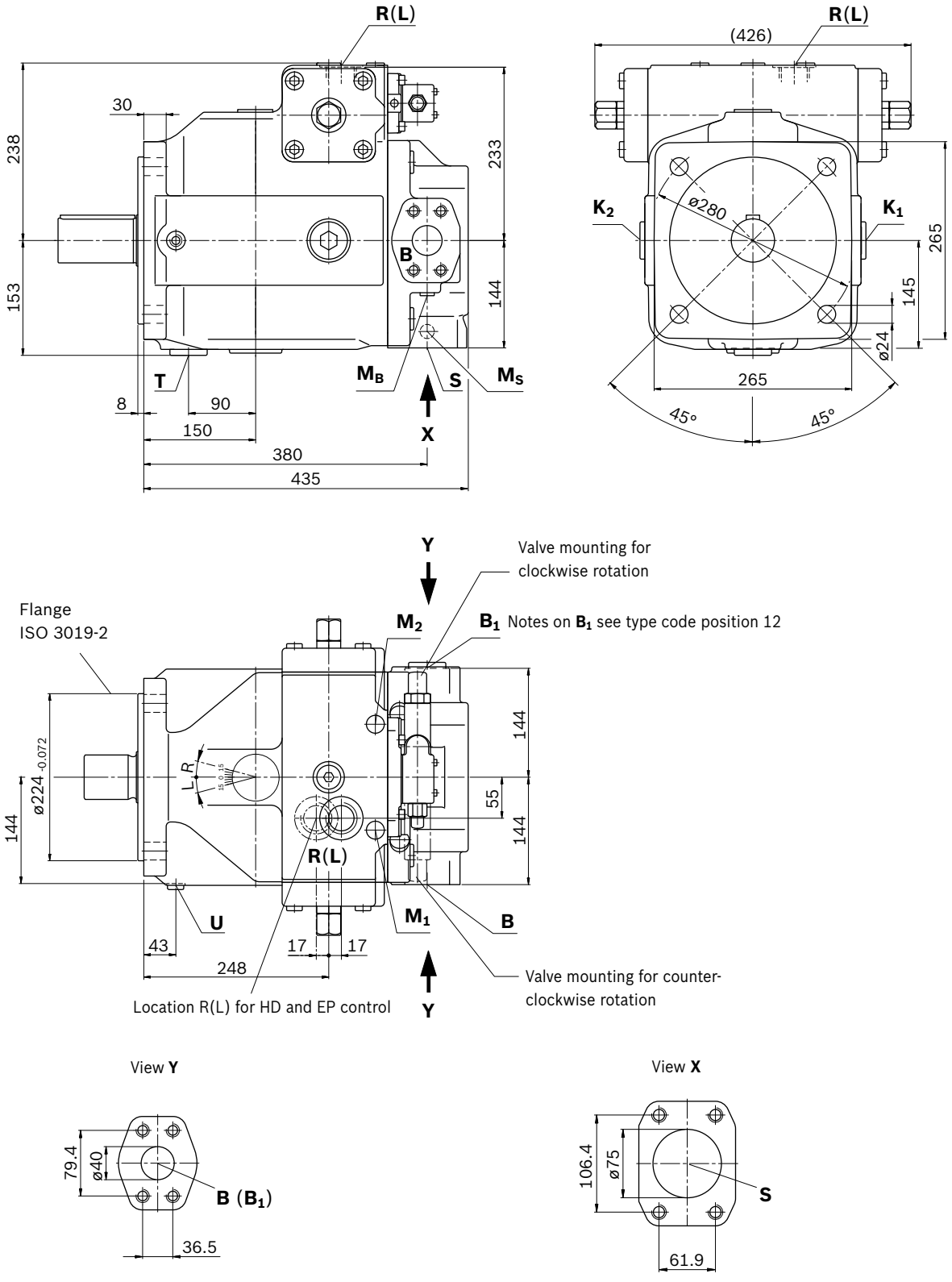
Ports		Standard	Size[4]	$p_{max\ abs}$ [bar][5]	State[9]
S	Suction port (standard pressure series) Fastening thread	SAE J518[6] DIN 13	3 in M16 × 2; 24 deep	30	O
For version port plate 13					
B	Pressure port (high-pressure series) Fastening thread	SAE J518[6] DIN 13	1 1/4 in M14 × 2; 19 deep	400	O
B_1	Additional connection	DIN 3852	M33 × 2; 18 deep	400	X
For version port plate 25					
B	Pressure port (high-pressure series) Fastening thread	SAE J518[6] DIN 13	1 1/4 in M14 × 2; 19 deep	400	O
B_1	2nd working port (high-pressure series) Fastening thread	SAE J518[6] DIN 13	1 1/4 in M14 × 2; 19 deep	400	X[10]
K_1, K_2	Flushing port	DIN 3852	M33 × 2; 18 deep	4	X[8]
T	Drain port	DIN 3852[7]	M33 × 2; 18 deep	4	X[8]
M_B	Measuring port working pressure	DIN 3852	M14 × 1.5; 12 deep	400	X
M_S	Measuring port suction pressure	DIN 3852	M14 × 1.5; 12 deep	30	X
R(L)	Drain port	DIN 3852[7]	M33 × 2; 18 deep	4	O[8]
U	Flushing port	DIN 3852	M14 × 1.5; 12 deep	5	X
M_1, M_2	Measuring port (stroking chamber pressure)	DIN 3852	M14 × 1.5; 12 deep	400	X

1) Splined shaft according to DIN 5480
2) Center bore according to DIN 332
3) Thread according to DIN 13
4) For notes on tightening torques, see the instruction manual.
5) Depending on the application, momentary pressure peaks can occur. Keep this in mind when selecting measuring devices and fittings.
6) Metric fastening thread is a deviation from standard.
7) The countersink can be deeper than as specified in the standard.
8) Depending on the installation position **T**, **K_1**, **K_2** or **R**(**L**) must be connected (see also installation instructions on pages 72 and 73)
9) O = must be connected (plugged when delivered)
X = plugged (in normal operation)
10) Plugged with flange plate

POOCCA HYDRAULIC MANUFACTURING

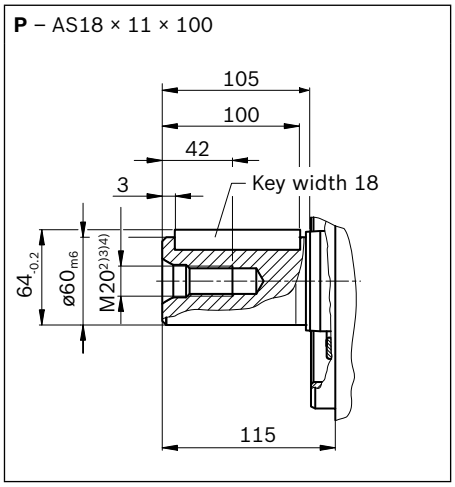
Dimensions, size 250

Main dimensions only for the basic unit, further dimensions are given in the relevant data sheets.



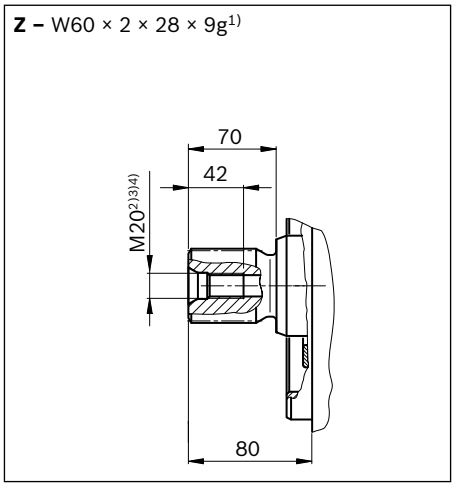
▼ **Parallel keyed shaft, DIN 6885**

P – AS18 × 11 × 100



▼ **Splined shaft (DIN 5480)**

Z – W60 × 2 × 28 × 9g[1)]



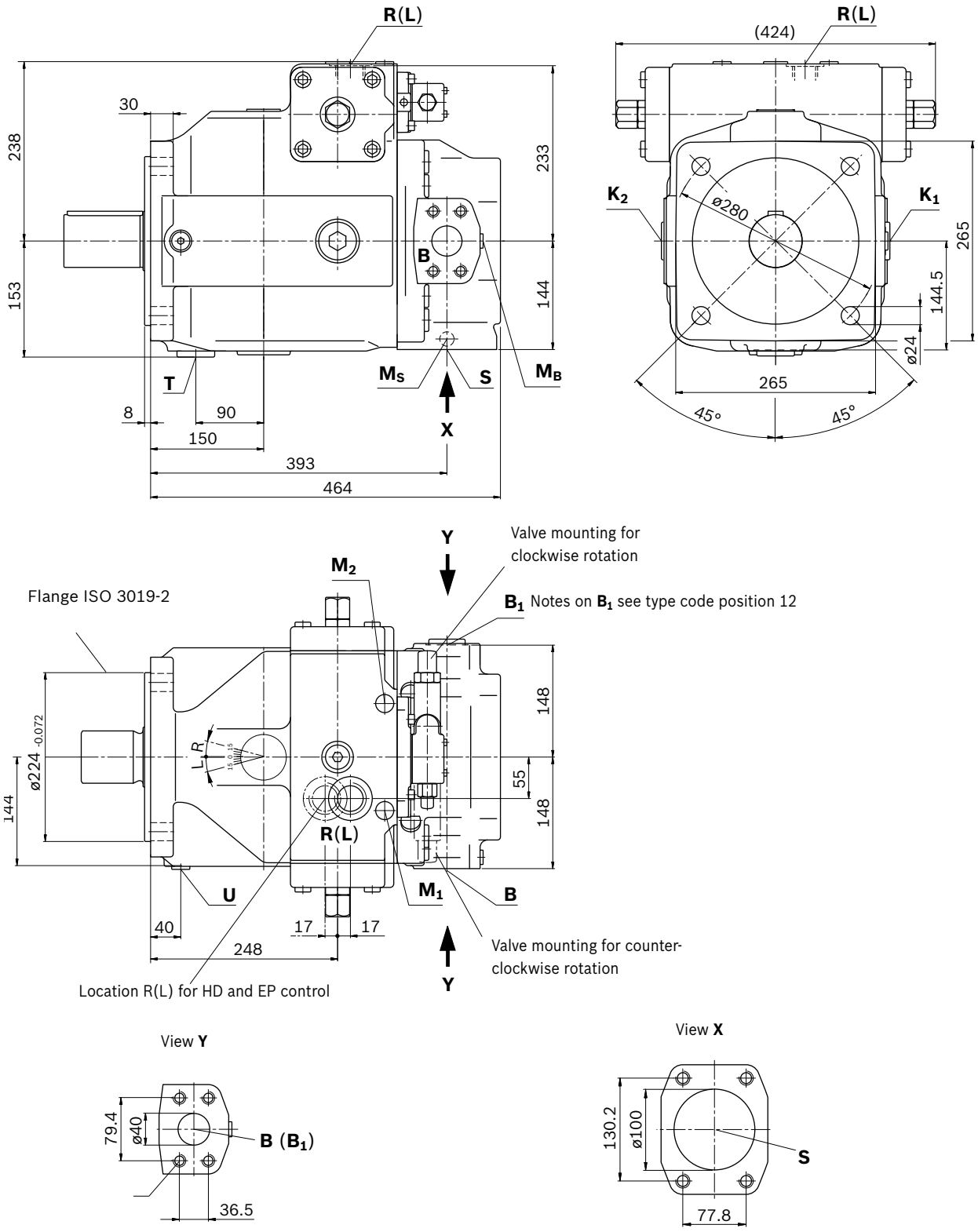
Ports		Standard	Size[4)]	$p_{max\ abs}$ [bar][5)]	State[9]
S	Suction port (standard pressure series)	SAE J518[6)]	3 in	30	O
	Fastening thread	DIN 13	M16 × 2; 24 deep		
For version port plate 13					
B	Pressure port (high-pressure series)	SAE J518[6)]	1 1/2 in	400	O
	Fastening thread	DIN 13	M16 × 2; 25 deep		
B_1	Additional connection	DIN 3852	M42 × 2; 20 deep	400	X
For version port plate 25					
B	Pressure port (high-pressure series)	SAE J518[6)]	1 1/2 in	400	O
	Fastening thread	DIN 13	M16 × 2; 25 deep		
B_1	2nd working port (high-pressure series)	SAE J518[6)]	1 1/2 in	400	X[10)]
	Fastening thread	DIN 13	M16 × 2; 25 deep		
K_1, K_2	Flushing port	DIN 3852	M42 × 2; 20 deep	4	X[8)]
T	Drain port	DIN 3852[7)]	M42 × 2; 20 deep	4	X[8)]
M_B	Measuring port working pressure	DIN 3852	M14 × 1.5; 12 deep	400	X
M_S	Measuring port suction pressure	DIN 3852	M14 × 1.5; 12 deep	30	X
R(L)	Drain port	DIN 3852[7)]	M42 × 2; 20 deep	4	O[8]
U	Flushing port	DIN 3852	M14 × 1.5; 12 deep	5	X
M_1, M_2	Measuring port (stroking chamber pressure)	DIN 3852	M18 × 1.5; 12 deep	400	X

1) Splined shaft according to DIN 5480
2) Center bore according to DIN 332
3) Thread according to DIN 13
4) For notes on tightening torques, see the instruction manual.
5) Depending on the application, momentary pressure peaks can occur. Keep this in mind when selecting measuring devices and fittings.
6) Metric fastening thread is a deviation from standard.
7) The countersink can be deeper than as specified in the standard.
8) Depending on the installation position **T**, **K_1**, **K_2** or **R(L)** must be connected (see also installation instructions on pages 72 and 73)
9) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)
10) Plugged with flange plate

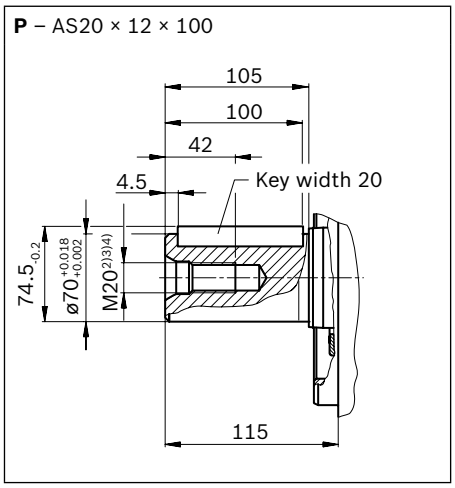
POOCCA HYDRAULIC MANUFACTURING

Dimensions, size 355

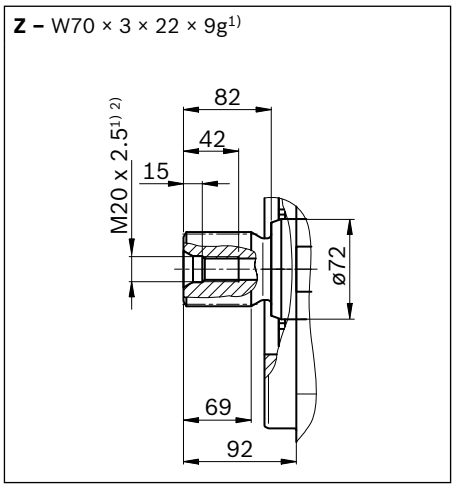
Main dimensions only for the basic unit, further dimensions are given in the relevant data sheets.



▼ **Parallel keyed shaft, DIN 6885**



▼ **Splined shaft (DIN 5480)**



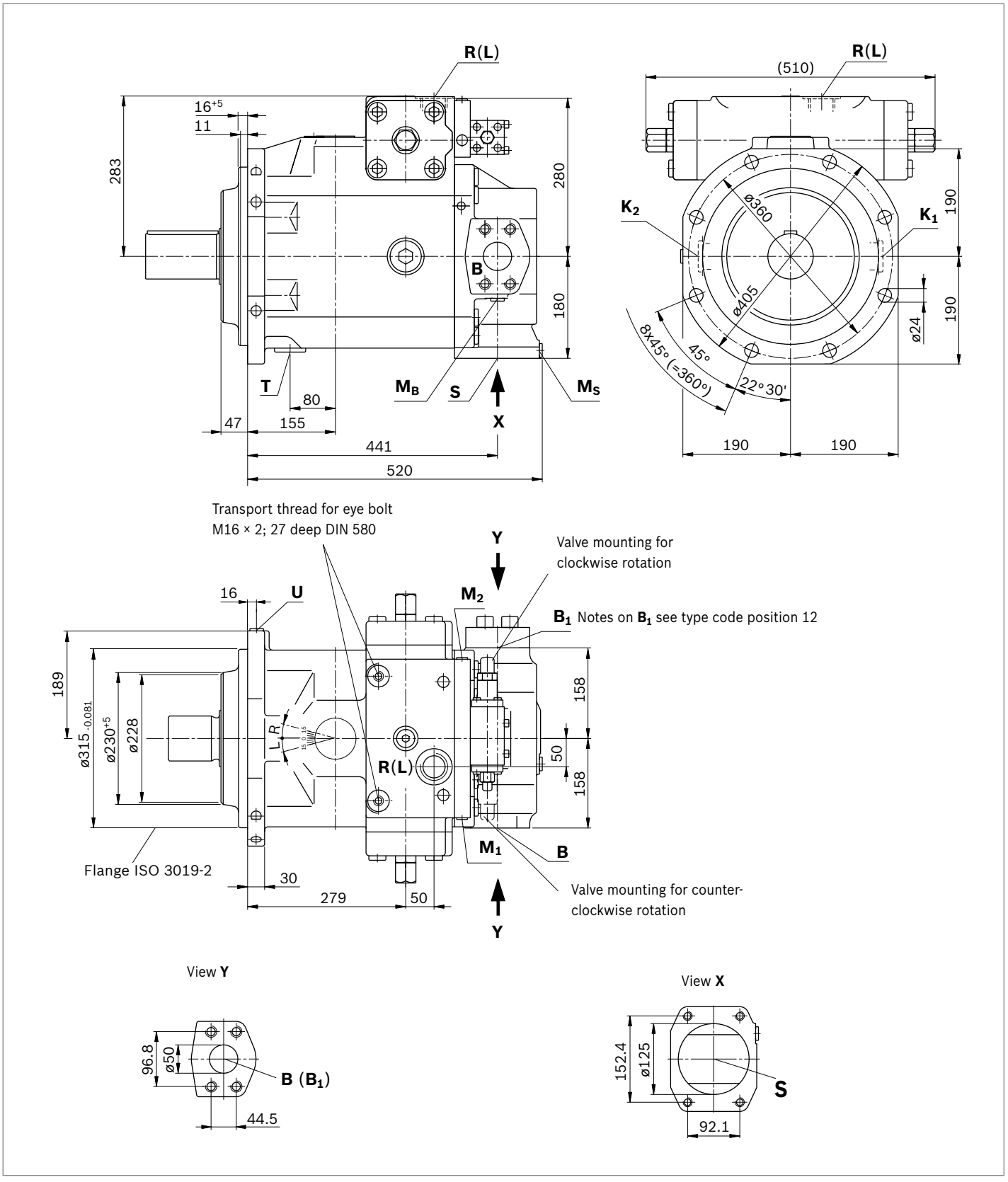
Ports		Standard	Size[4]	$p_{max\ abs}$ [bar][5]	State[9]
S	Suction port (standard pressure series)	SAE J518[6]	4 in	30	O
	Fastening thread	DIN 13	M16 × 2; 24 deep		
For version port plate 13					
B	Pressure port (high-pressure series)	SAE J518[6]	1 1/2 in	400	O
	Fastening thread	DIN 13	M16 × 2; 25 deep		
B_1	Additional connection	DIN 3852	M42 × 2; 20 deep	400	X
For version port plate 25					
B	Pressure port (high-pressure series)	SAE J518[6]	1 1/2 in	400	O
	Fastening thread	DIN 13	M16 × 2; 25 deep		
B_1	2nd working port (high-pressure series)	SAE J518[6]	1 1/2 in	400	X[10]
	Fastening thread	DIN 13	M16 × 2; 25 deep		
K_1, K_2	Flushing port	DIN 3852	M42 × 2; 20 deep	4	X[8]
T	Drain port	DIN 3852[7]	M42 × 2; 20 deep	4	X[8]
M_B	Measuring port working pressure	DIN 3852	M14 × 1.5; 12 deep	400	X
M_S	Measuring port suction pressure	DIN 3852	M14 × 1.5; 12 deep	30	X
R(L)	Drain port	DIN 3852[7]	M42 × 2; 20 deep	4	O[8]
U	Flushing port	DIN 3852	M18 × 1.5; 12 deep	5	X
M_1, M_2	Measuring port (stroking chamber pressure)	DIN 3852	M18 × 1.5; 12 deep	400	X

1) Splined shaft according to DIN 5480
2) Center bore according to DIN 332
3) Thread according to DIN 13
4) For notes on tightening torques, see the instruction manual.
5) Momentary pressure peaks may occur depending on the application. Keep this in mind when selecting measuring devices and fittings.
6) Metric fastening thread is a deviation from standard.
7) The countersink can be deeper than as specified in the standard.
8) Depending on the installation position **T**, **K_1**, **K_2** or **R(L)** must be connected (see also installation instructions on pages 72 and 73)
9) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)
10) Plugged with flange plate

POOCCA HYDRAULIC MANUFACTURING

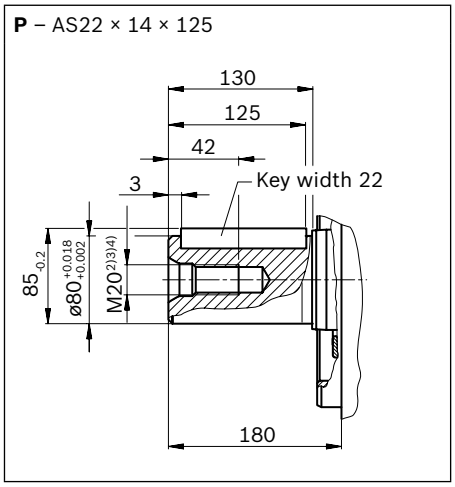
Dimensions, size 500

Main dimensions only for the basic unit, further dimensions are given in the relevant data sheets.



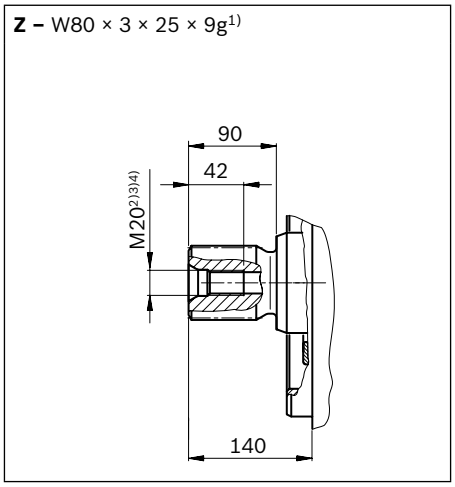
▼ **Parallel keyed shaft, DIN 6885**

P – AS22 × 14 × 125



▼ **Splined shaft (DIN 5480)**

Z – W80 × 3 × 25 × 9g[1)]



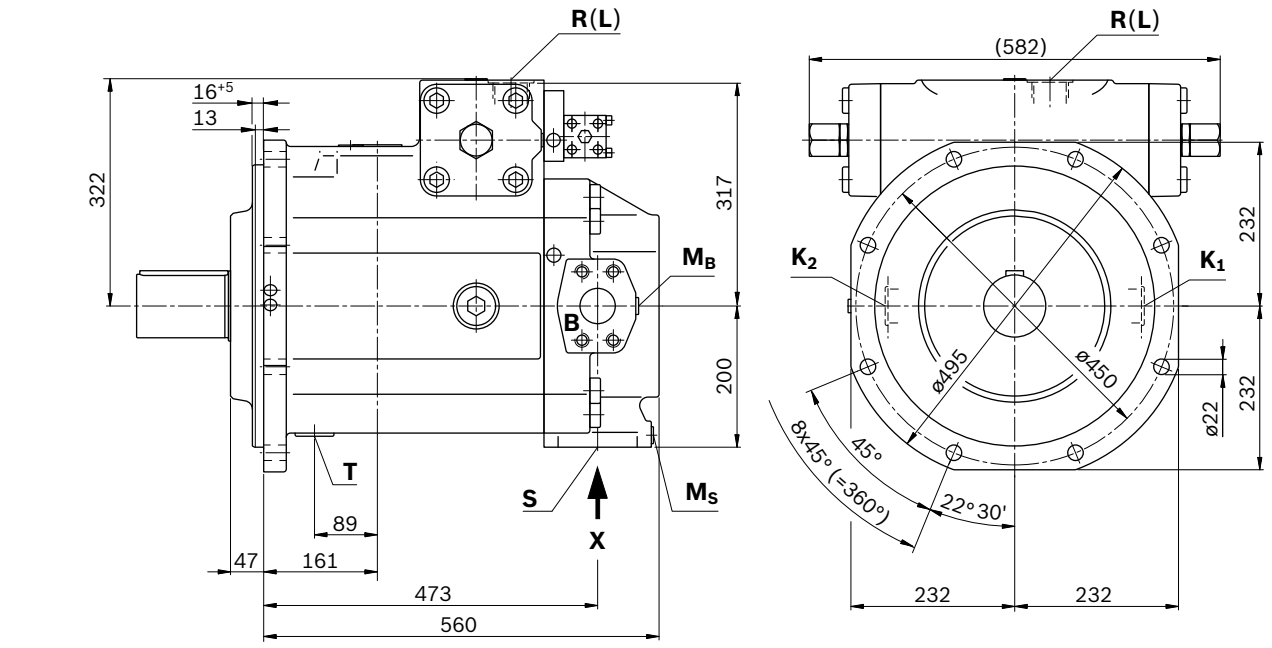
Ports		**Standard**	**Size**[4)]	$p_{max\ abs}$ **[bar]**[5)]	**State**[9]
S	Suction port (standard pressure series)	SAE J518[6)]	5 in	30	O
	Fastening thread	DIN 13	M16 × 2.5; 24 deep		
For version port plate 25					
B	Pressure port (high-pressure series)	SAE J518[6)]	2 in	400	O
	Fastening thread	DIN 13	M20 × 2; 25 deep		
B_1	2nd working port (high-pressure series)	SAE J518[6)]	2 in	400	X[10)]
	Fastening thread	DIN 13	M20 × 2; 24 deep		
K_1, K_2	Flushing port	DIN 3852	M48 × 2; 22 deep	4	X[8)]
T	Drain port	DIN 3852[7)]	M48 × 2; 22 deep	4	X[8)]
M_B	Measuring port working pressure	DIN 3852	M18 × 1.5; 12 deep	400	X
M_S	Measuring port suction pressure	DIN 3852	M18 × 1.5; 12 deep	30	X
R(L)	Drain port	DIN 3852[7)]	M48 × 2; 22 deep	4	O[8]
U	Flushing port	DIN 3852	M18 × 1.5; 12 deep	5	X
M_1, M_2	Measuring port (stroking chamber pressure)	DIN 3852	See data sheet adjusting devices	400	X

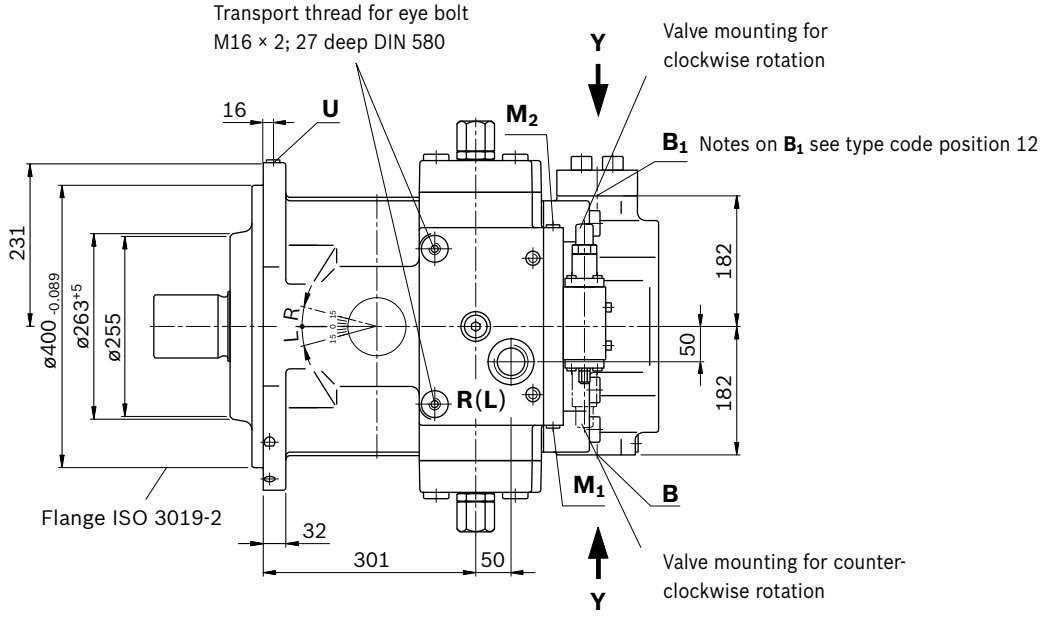
1) Splined shaft according to DIN 5480
2) Center bore according to DIN 332
3) Thread according to DIN 13
4) For notes on tightening torques, see the instruction manual.
5) Momentary pressure peaks may occur depending on the application. Keep this in mind when selecting measuring devices and fittings.
6) Metric fastening thread is a deviation from standard.
7) The countersink can be deeper than as specified in the standard.
8) Depending on the installation position **T**, **K_1**, **K_2** or **R(L)** must be connected (see also installation instructions on pages 72 and 73)
9) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)
10) Plugged with flange plate

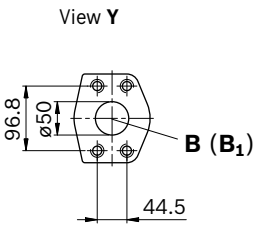
POOCCA HYDRAULIC MANUFACTURING

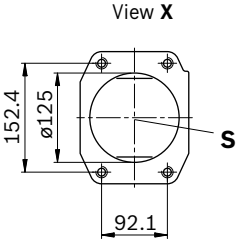
Dimensions, size 750

Main dimensions only for the basic unit, further dimensions are given in the relevant data sheets.





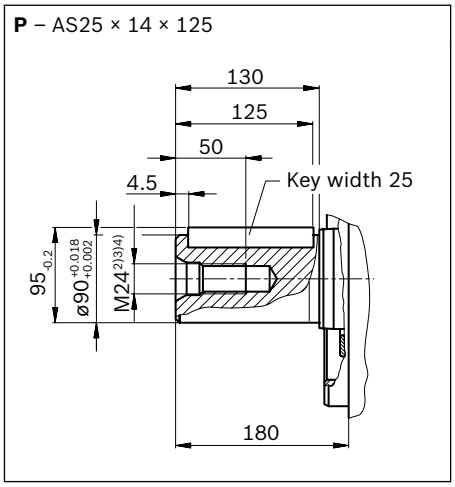




POOCCA HYDRAULIC MANUFACTURING

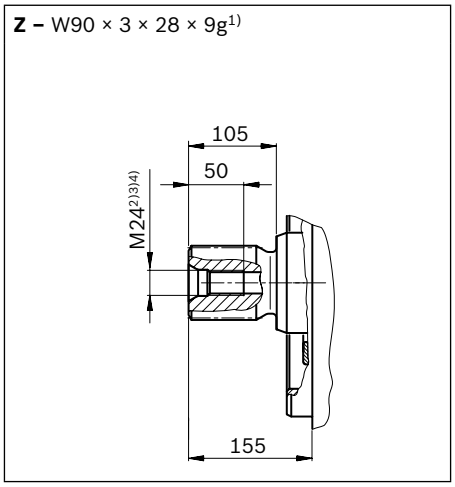
▼ **Parallel keyed shaft, DIN 6885**

P – AS25 × 14 × 125



▼ **Splined shaft (DIN 5480)**

Z – W90 × 3 × 28 × 9g[1)]



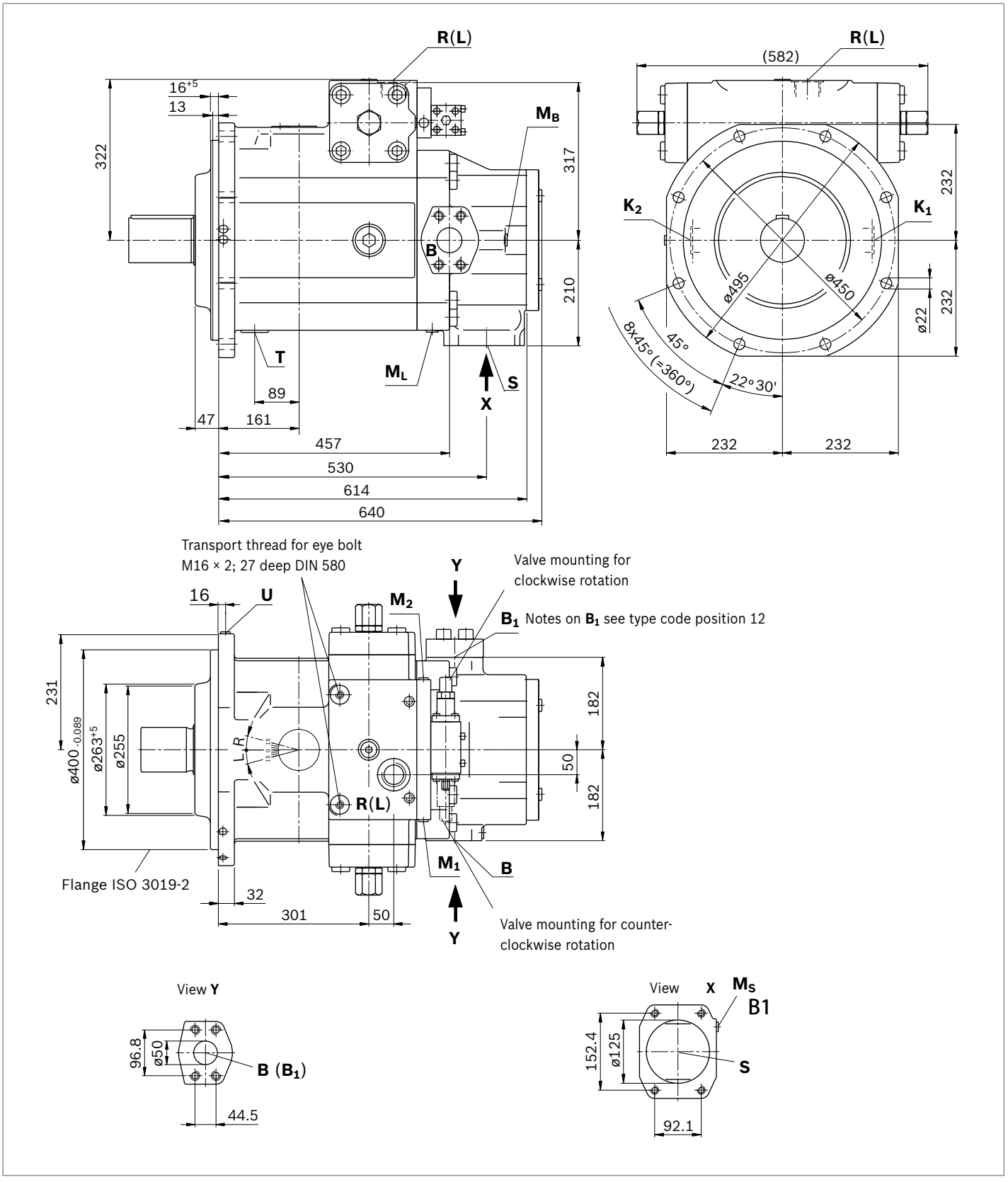
Ports		**Standard**	**Size**[4)]	$p_{max\ abs}$ **[bar]**[5)]	**State**[9]
S	Suction port (standard pressure series)	SAE J518[6)]	5 in	30	O
	Fastening thread	DIN 13	M16 × 2.5; 24 deep		
For version port plate 25					
B	Pressure port (high-pressure series)	SAE J518[6)]	2 in	400	O
	Fastening thread	DIN 13	M20 × 2; 25 deep		
B_1	2nd working port (high-pressure series)	SAE J518[6)]	2 in	400	X[10)]
	Fastening thread	DIN 13	M20 × 2; 24 deep		
K_1, K_2	Flushing port	DIN 3852	M48 × 2; 20 deep	4	X[8)]
T	Drain port	DIN 3852[7)]	M48 × 2; 20 deep	4	X[8)]
M_B	Measuring port working pressure	DIN 3852	M18 × 1.5; 12 deep	400	X
M_S	Measuring port suction pressure	DIN 3852	M18 × 1.5; 12 deep	30	X
R(L)	Drain port	DIN 3852[7)]	M48 × 2; 20 deep	4	O[8]
U	Flushing port	DIN 3852	M18 × 1.5; 12 deep	5	X
M_1, M_2	Measuring port (stroking chamber pressure)	DIN 3852	See data sheet adjusting devices	400	X

1) Splined shaft according to DIN 5480
2) Center bore according to DIN 332
3) Thread according to DIN 13
4) For notes on tightening torques, see the instruction manual.
5) Momentary pressure peaks may occur depending on the application. Keep this in mind when selecting measuring devices and fittings.
6) Metric fastening thread is a deviation from standard.
7) The countersink can be deeper than as specified in the standard.
8) Depending on the installation position **T**, **K_1**, **K_2** or **R**(**L**) must be connected (see also installation instructions on pages 72 and 73)
9) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)
10) Plugged with flange plate

POOCCA HYDRAULIC MANUFACTURING

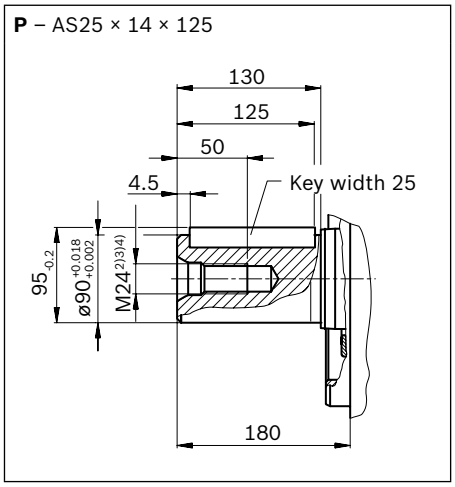
Dimensions of size 750 with charge pump (impeller)

Main dimensions only for the basic unit, further dimensions are given in the relevant data sheets.



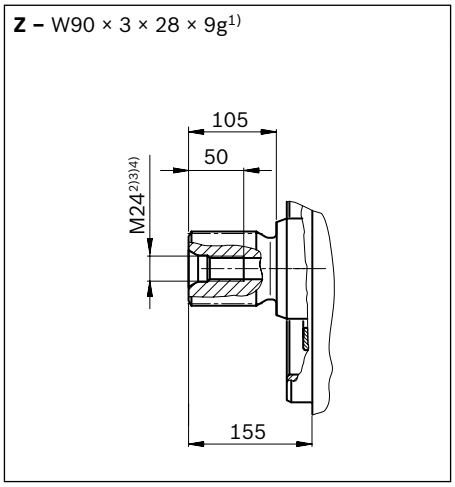
▼ **Parallel keyed shaft, DIN 6885**

P – AS25 × 14 × 125



▼ **Splined shaft (DIN 5480)**

Z – W90 × 3 × 28 × 9g[1)]



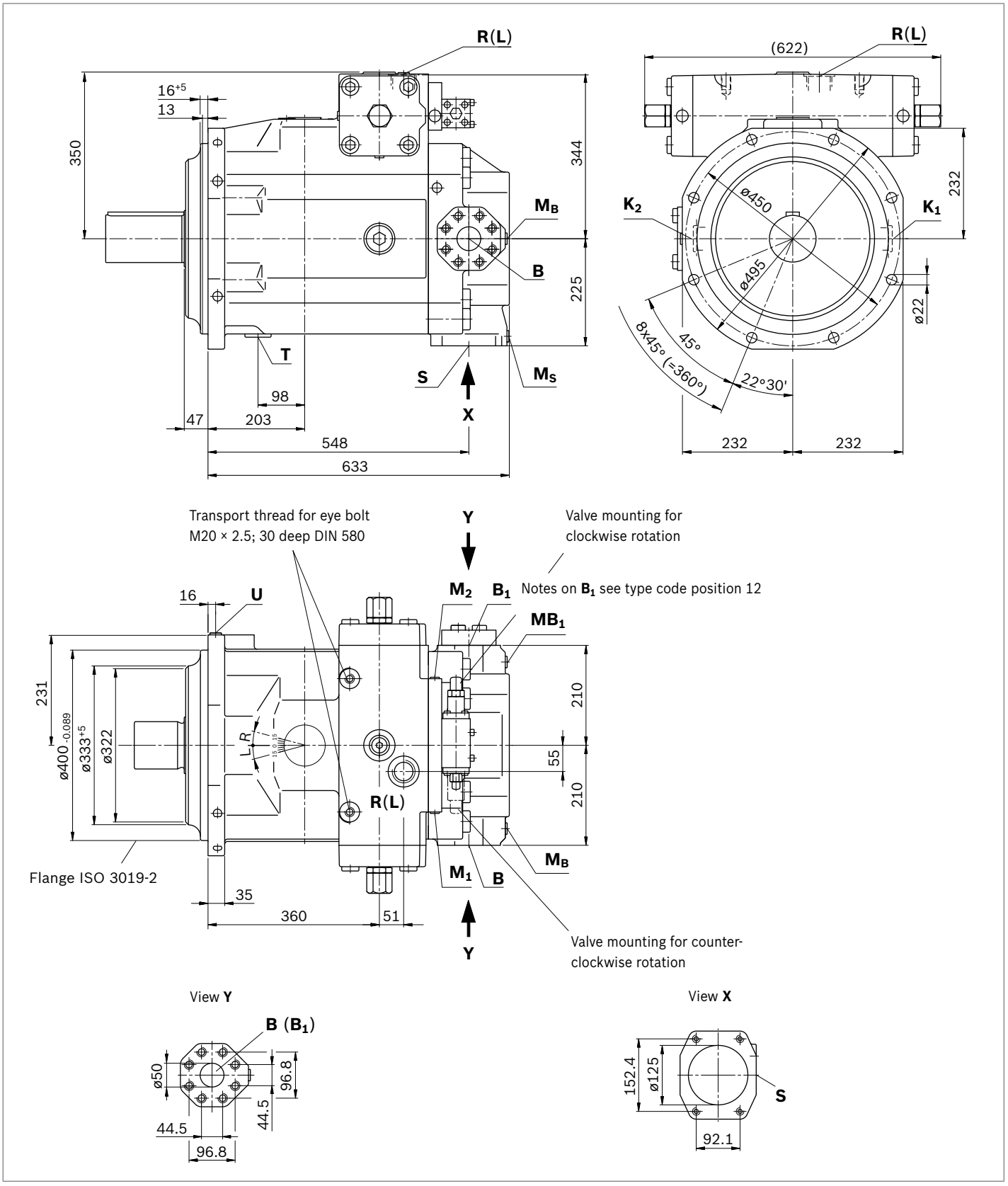
Ports		Standard	Size[4)]	$p_{max\ abs}$ [bar][5)]	State[9]
S	Suction port (standard pressure series)	SAE J518[6)]	5 in	30	O
	Fastening thread	DIN 13	M16 × 2.5; 24 deep		
For version port plate 25					
B	Pressure port (high-pressure series)	SAE J518[6)]	2 in	400	O
	Fastening thread	DIN 13	M20 × 2; 25 deep		
B_1	2nd working port (high-pressure series)	SAE J518[6)]	2 in	400	X[10)]
	Fastening thread	DIN 13	M20 × 2; 24 deep		
K_1, K_2	Flushing port	DIN 3852	M48 × 2; 20 deep	4	X[8)]
T	Drain port	DIN 3852[7)]	M48 × 2; 20 deep	4	X[8)]
M_B	Measuring port working pressure	DIN 3852	M18 × 1.5; 12 deep	400	X
M_S	Measuring port suction pressure	DIN 3852	M18 × 1.5; 12 deep	30	X
M_L	Measuring port charging pressure	DIN 3852	M18 × 1.5; 12 deep	30	X
R(L)	Drain port	DIN 3852[7)]	M48 × 2; 20 deep	4	O[8]
U	Flushing port	DIN 3852	M18 × 1.5; 12 deep	5	X
M_1, M_2	Measuring port (stroking chamber pressure)	DIN 3852	See data sheet adjusting devices	400	X

1) Splined shaft according to DIN 5480
2) Center bore according to DIN 332
3) Thread according to DIN 13
4) For notes on tightening torques, see the instruction manual.
5) Momentary pressure peaks may occur depending on the application. Keep this in mind when selecting measuring devices and fittings.
6) Metric fastening thread is a deviation from standard.
7) The countersink can be deeper than as specified in the standard.
8) Depending on the installation position **T**, **K_1**, **K_2** or **R**(**L**) must be connected (see also installation instructions on pages 72 and 73)
9) O = Must be connected (plugged on delivery)
   X = Plugged (in normal operation)
10) Plugged with flange plate

POOCCA HYDRAULIC MANUFACTURING

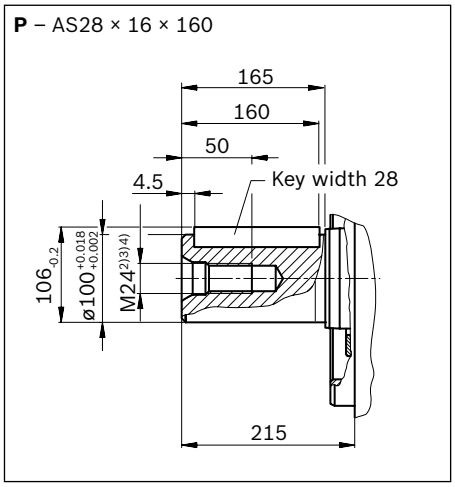
Dimensions, size 1000

Main dimensions only for the basic unit, further dimensions are given in the relevant data sheets.



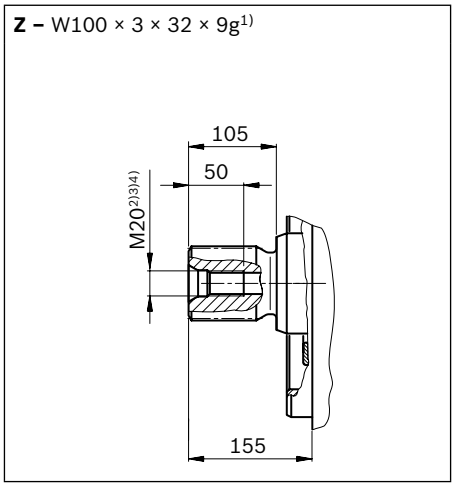
▼ **Parallel keyed shaft, DIN 6885**

P – AS28 × 16 × 160



▼ **Splined shaft (DIN 5480)**

Z – W100 × 3 × 32 × 9g[1)]



Ports		**Standard**	**Size**[4)]	$p_{max\ abs}$ **[bar]**[5)]	**State**[9]
S	Suction port (standard pressure series)	SAE J518[6)]	5 in	30	O
	Fastening thread	DIN 13	M16 × 2.5; 24 deep		
For port plate version 25					
B	Pressure port (high-pressure series)	SAE J518[6)]	2 in	400	O
	Fastening thread	DIN 13	M20 × 2; 30 deep		
B_1	2nd working port (high-pressure series)	SAE J518[6)]	2 in	400	X[10)]
	Fastening thread	DIN 13	M20 × 2; 30 deep		
K_1, K_2	Flushing port	DIN 3852	M48 × 2; 20 deep	4	X[8)]
T	Drain port	DIN 3852[7)]	M48 × 2; 20 deep	4	X[8)]
M_B, M_{B1}	Measuring port working pressure	DIN 3852	M18 × 1.5; 12 deep	400	X
M_S	Measuring port suction pressure	DIN 3852	M18 × 1.5; 12 deep	30	X
R(L)	Drain port	DIN 3852[7)]	M48 × 2; 20 deep	4	O[8]
U	Flushing port	DIN 3852	M18 × 1.5; 12 deep	5	X
M_1, M_2	Measuring port (stroking chamber pressure)	DIN 3852	See data sheet adjusting devices	400	X

1) Splined shaft according to DIN 5480
2) Center bore according to DIN 332
3) Thread according to DIN 13
4) For notes on tightening torques, see the instruction manual.
5) Momentary pressure peaks may occur depending on the application. Keep this in mind when selecting measuring devices and fittings.
6) Metric fastening thread is a deviation from standard.
7) The countersink can be deeper than as specified in the standard.
8) Depending on the installation position **T**, **K_1**, **K_2** or **R**(**L**) must be connected (see also installation instructions on pages 72 and 73)
9) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)
10) Plugged with flange plate

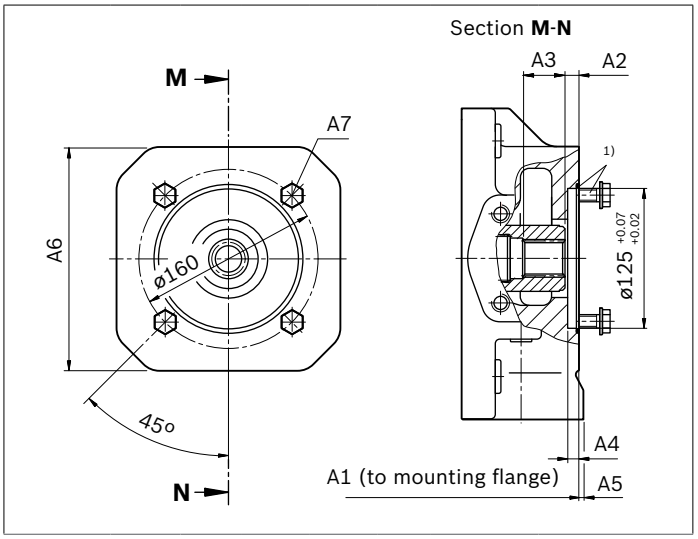
POOCCA HYDRAULIC MANUFACTURING

Dimensions, through drive

Flange ISO 3019-2 (metric)		Hub for splined shaft[2]	Availability over sizes									Code
Diameter	Symbol	Diameter	40	71	125	180	250	355	500	750	1000	
125-4		N32×2×14×8H	●	●	–	–	–	–	●	●	○	K31
		N32×2×14×8H	–	–	●	●	●	●	–	–	–	U31

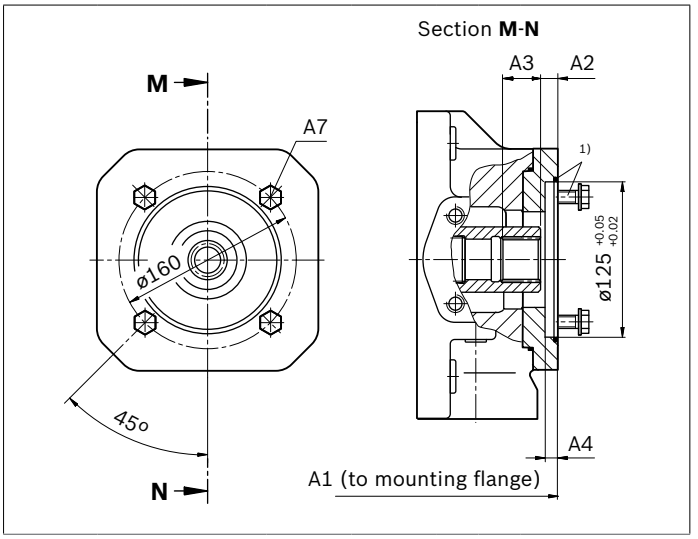
● = Available ○ = On request – = Not available

▼ **125-4**



K31	NG	A1	A2	A3	A4	A5	A6	A7[3]
	40	288	12.5	40	9	–	–	M12; 24 deep
	71	316	12.5	33.6	9	–	–	M12; 24 deep
	500	505	12.5	38.6	9	15	240	M12; 18 deep
	750	555	12.5	44.5	9	15	240	M12; 18 deep

▼ **125-4**



U31	NG	A1	A2	A3	A4	A7[3]
	125	369	12.5	35.6	9	M12; 22 deep
	180	393	12.5	35.6	9	M12; 22 deep
	250	453	12.5	38.0	9	M12; 15 deep
	355	482	12.5	38.0	9	M12: 15 deep

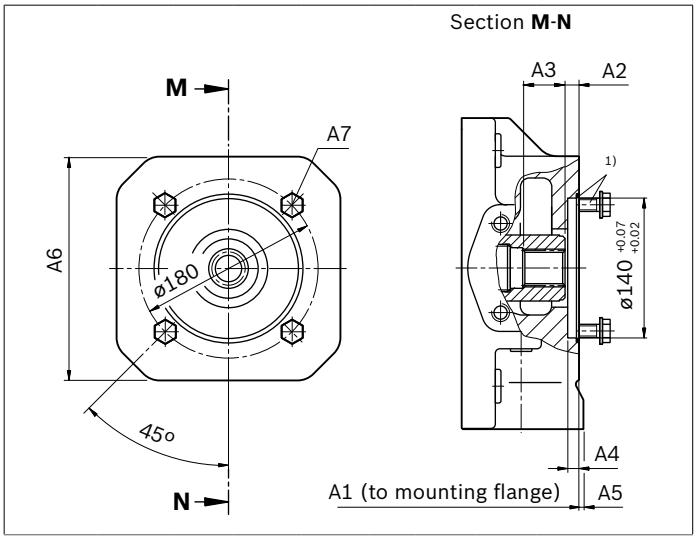
1) Mounting bolts and O-ring seal are included in the scope of delivery
2) Splined hub according to DIN 5480
3) Thread according to DIN 13, see instruction manual for maximum tightening torques.

POOCCA HYDRAULIC MANUFACTURING

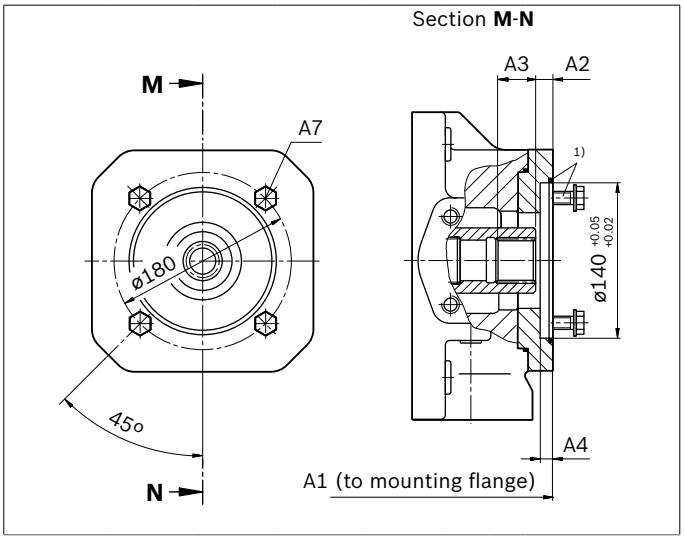
Flange ISO 3019-2 (metric)		Hub for splined shaft[2]										Code
Diameter	**Symbol**	**Diameter**	**40**	**71**	**125**	**180**	**250**	**355**	**500**	**750**	**750[4]**	**1000**	
140-4		N40×2×18×8H	–	●	–	–	–	–	●	●	○	●	K33
		N40×2×18×8H	–	–	●	●	●	●	–	–	–	–	U33

● = Available ○ = On request – = Not available

▼ **140-4**



▼ **140-4**



K33	NG	A1	A2	A3	A4	A5	A6	A7[3]
	71	316	11.5	42.8	9	–	–	M12; 24 deep
	500	505	12.5	57	9	–	–	M12; 18 deep
	750	555	12.5	44.5	9	15	240	M12; 18 deep
	1000	628	12.5	60	10	–	280	M12; 18 deep

U33	NG	A1	A2	A3	A4	A7[3]
	125	369	12.5	43.8	9	M12; 22 deep
	180	393	12.5	43.8	9	M12; 22 deep
	250	453	12.5	48.9	9	M12; 22 deep
	355	482	12.5	48.0	9	M12; 22 deep

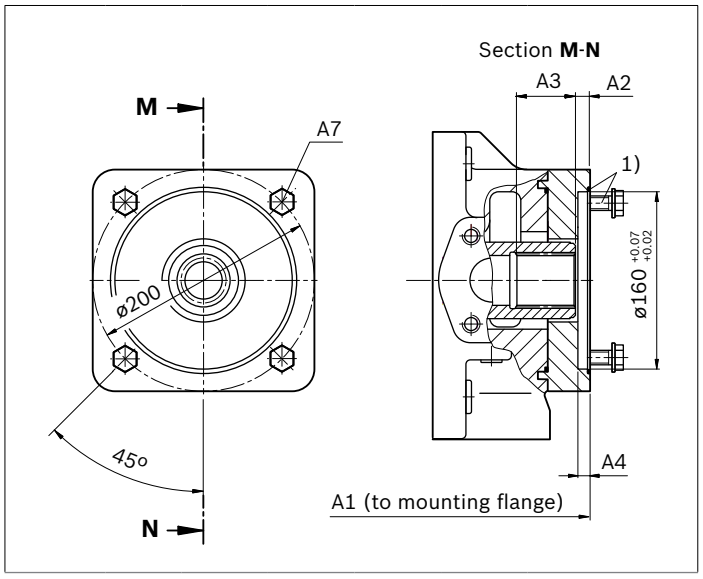
1) Mounting bolts and O-ring seal are included in the scope of delivery
2) Splined hub according to DIN 5480
3) Thread according to DIN 13, see instruction manual for maximum tightening torques.
4) With charge pump

POOCCA HYDRAULIC MANUFACTURING

Flange ISO 3019-2 (metric)		Hub for splined shaft[2]										Code
Diameter	**Symbol**	**Diameter**	**40**	**71**	**125**	**180**	**250**	**355**	**500**	**750**	**750[4]**	**1000**	
160-4		N50×2×24×8H	–	–	–	–	–	–	●	●	○	○	K34
		N50×2×24×8H	–	–	●	●	●	●	–	–	–	–	U34

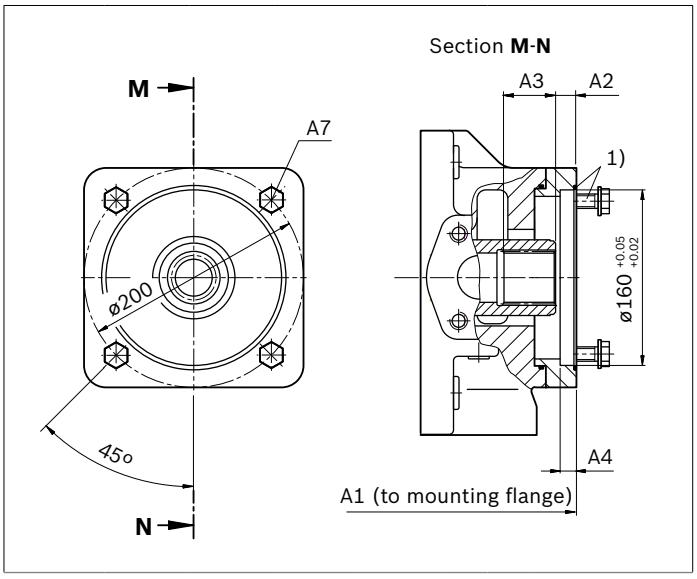
● = Available ○ = On request – = Not available

▼ **160-4**



K34	NG	A1	A2	A3	A4	A7[3]
	500	505	13.5	54.5	10	M16; 24 deep
	750	555	13.5	55.5	10	M16; 24 deep
	1000	628	12.5	54.5	10	M16; 24 deep

▼ **160-4**



U34	NG	A1	A2	A3	A4	A7[3]
	125	369	12.5	51.6	9	M16; 22 deep
	180	393	12.5	51.6	9	M16; 22 deep
	250	453	12.5	54.0	9	M16; 22 deep
	355	482	12.5	54.0	9	M16; 22 deep

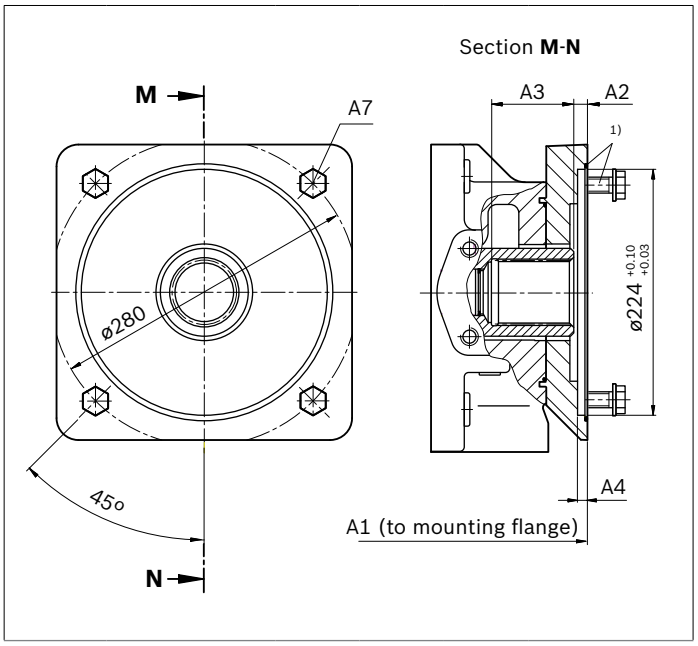
1) Mounting bolts and O-ring seal are included in the scope of delivery
2) Splined hub according to DIN 5480
3) Thread according to DIN 13, see instruction manual for maximum tightening torques.
4) With charge pump

POOCCA HYDRAULIC MANUFACTURING

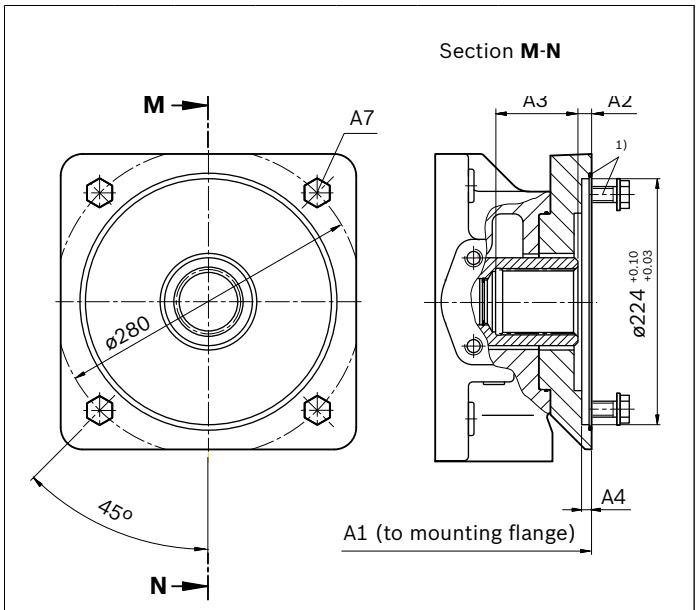
Flange ISO 3019-2 (metric)		Hub for splined shaft[2]										Code
Diameter	**Symbol**	**Diameter**	**40**	**71**	**125**	**180**	**250**	**355**	**500**	**750**	**750[4]**	**1000**	
224-4	⌘	N60×2×28×8H	–	–	–	–	–	–	●	●	○	●	K35
		N60×2×28×8H	–	–	–	–	●	●	–	–	–	–	U35

● = Available ○ = On request

▼ **224-4**



▼ **224-4**



K35	NG	A1	A2	A3	A4	A7[3]
	500	541	12.5	74	9	M20; 36 deep
	750	591	12.5	74	9	M20; 36 deep
	1000	664	12.5	70	9	M20; 36 deep

U35	NG	A1	A2	A3	A4	A7[3]
	250	469	12.5	75	9	M20; 37 deep
	355	498	12.5	75	9	M20; 37 deep

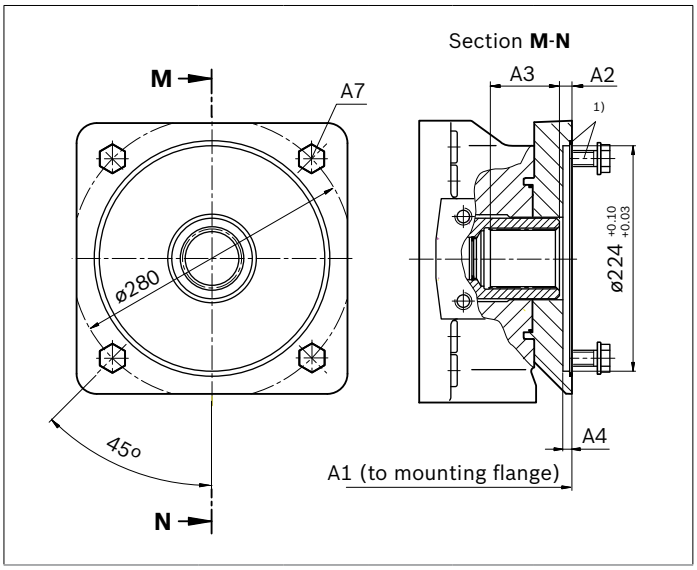
1) Mounting bolts and O-ring seal are included in the scope of delivery
2) Splined hub according to DIN 5480
3) Thread according to DIN 13, see instruction manual for maximum tightening torques.
4) With charge pump

POOCCA HYDRAULIC MANUFACTURING

Flange ISO 3019-2 (metric)		Hub for splined shaft[2]									Code
Diameter	Symbol	Diameter	40	71	125	180	250	355	500	750	1000	
224-4		N70×3×22×8H	–	–	–	–	–	–	●	○	●	K77
		N70×3×22×8H	–	–	–	–	–	●	–	–	–	U77

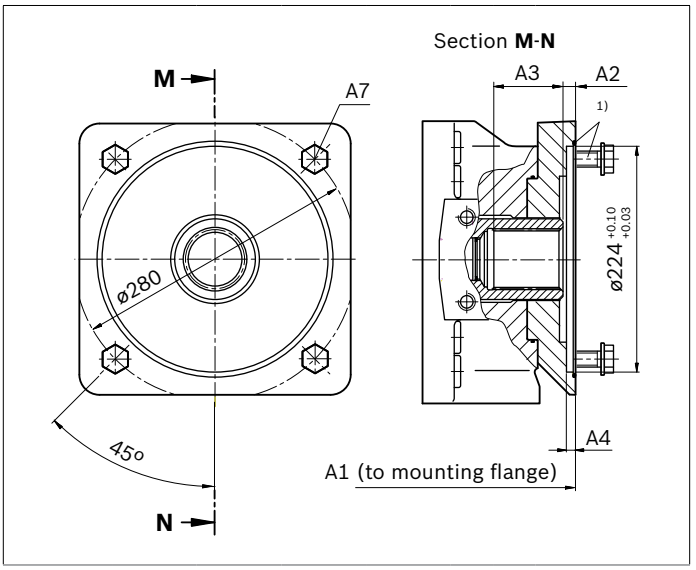
● = Available ○ = On request – = Not available

▼ **224-4**



K77	NG	A1	A2	A3	A4	A7[3]
	500	541	12.5	82	9	M20; 36 deep
	1000	664	12.5	82	9	M20; 36 deep

▼ **224-4**



U77	NG	A1	A2	A3	A4	A7[3]
	355	498	12.5	75	9	M20; 37 deep

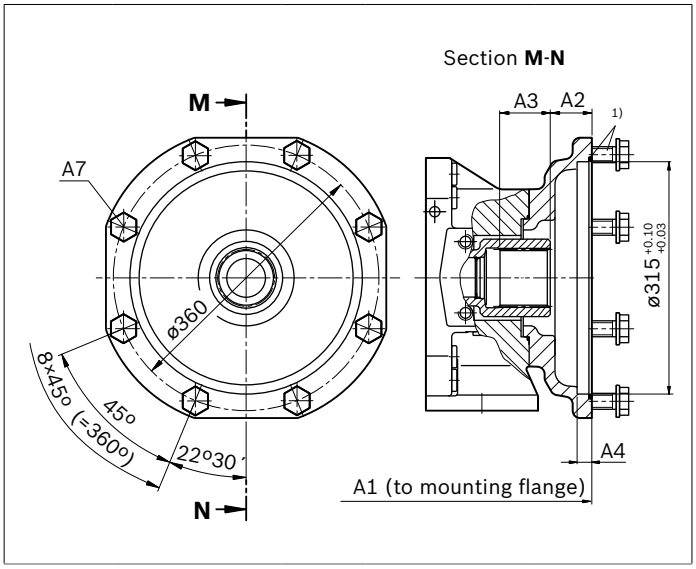
1) Mounting bolts and O-ring seal are included in the scope of delivery
2) Splined hub according to DIN 5480
3) Thread according to DIN 13, see instruction manual for maximum tightening torques.

POOCCA HYDRAULIC MANUFACTURING

Flange ISO 3019-2 (metric)		Hub for splined shaft[2]										Code
Diameter	**Symbol**	**Diameter**	**40**	**71**	**125**	**180**	**250**	**355**	**500**	**750**	**750[4]**	**1000**	
315-8		N80×3×25×8H	–	–	–	–	–	–	●	●	○	●	K43
		N90×3×28×8H	–	–	–	–	–	–	–	●	●	●	K76

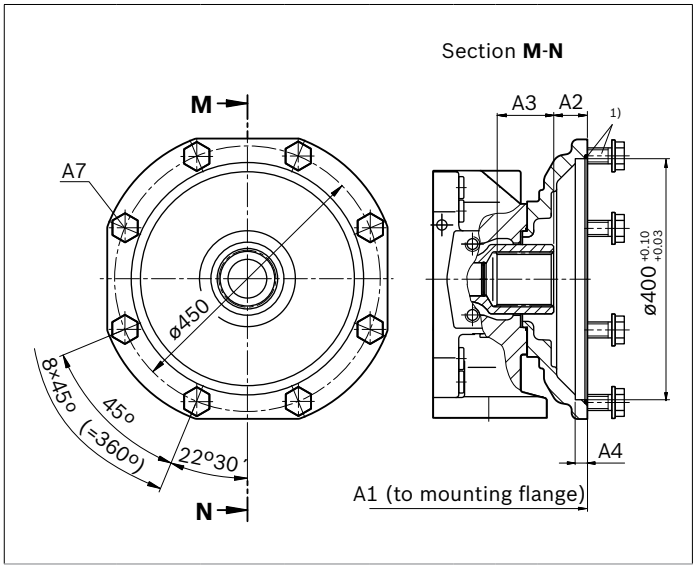
● = Available ○ = On request – = Not available

▼ **315-8**



K43	NG	A1	A2	A3	A4	A7[3]
	500	590	53.5	71.9	19	M20; 26 deep
	750	640	53.5	71.9	19	M20; 26 deep
	1000	713	53.5	71	19	M20; 26 deep

▼ **315-8**



K76	NG	A1	A2	A3	A4	A7[3]
	750	655	53	104	19	M20; 26 deep
	750[4]	749	53	97	19	M20; 26 deep
	1000	728	53	97	19	M20; 26 deep

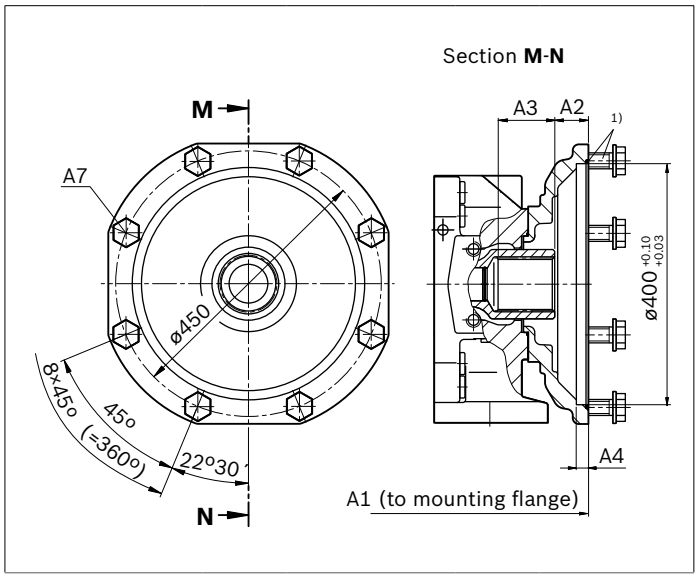
1) Mounting bolts and O-ring seal are included in the scope of delivery
2) Splined hub according to DIN 5480
3) Thread according to DIN 13, see instruction manual for maximum tightening torques.
4) With charge pump

POOCCA HYDRAULIC MANUFACTURING

Flange ISO 3019-2 (metric)		Hub for splined shaft[2]									Code
Diameter	Symbol	Diameter	40	71	125	180	250	355	500	750	1000	
400-8	⚙	N100×3×32×8H	–	–	–	–	–	–	–	–	●	K88

● = Available ○ = On request – = Not available

▼ **400-8**



K88	NG	A1	A2	A3	A4	A7[3]
	1000	728	53	99	19	M20; 26 deep

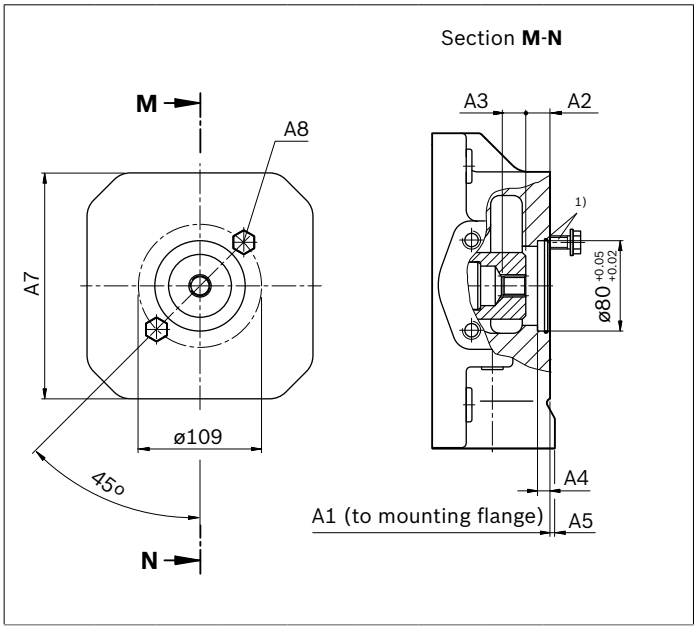
1) Mounting bolts and O-ring seal are included in the scope of delivery
2) Splined hub according to DIN 5480
3) Thread according to DIN 13, see instruction manual for maximum tightening torques.

POOCCA HYDRAULIC MANUFACTURING

Flange ISO 3019-2 (metric)		Hub for splined shaft[2]									Code
Diameter	**Symbol**	**Diameter**	**40**	**71**	**125**	**180**	**250**	**355**	**500**	**750**	**1000**	
80-2		3/4in 11T 16/32DP	○	●	–	–	–	–	○	○	○	KB2
		3/4in 11T 16/32DP	–	–	●	●	●	●	–	–	–	UB2

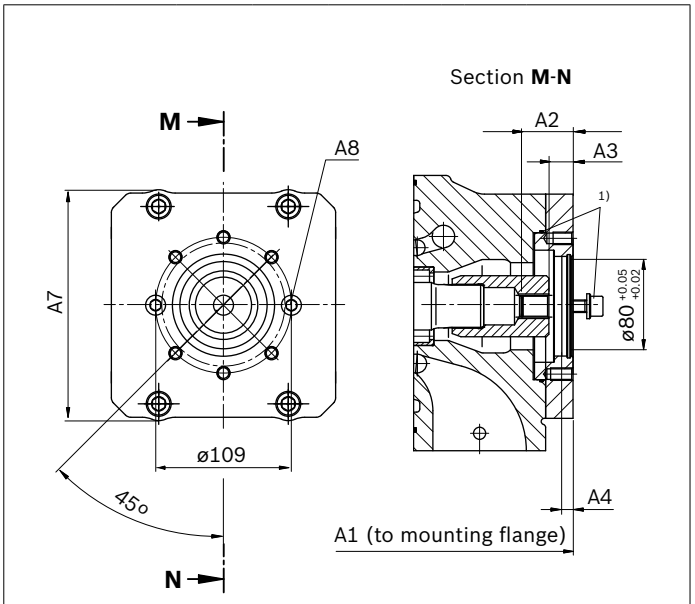
● = Available ○ = On request – = Not available

▼ **80-2**



KB2	NG	A1	A2	A3	A4	A5	A7	A8[3]
	71	291	21.5	19	10	2	140	M10, 15 deep

▼ **80-2**



UB2	NG	A1	A2	A3	A4	A7[3]	A8[3]
	125	367	40.5	19.4	9	180	M10; 16 deep
	180	393	40.5	19.4	9	180	M10; 16 deep
	250	453	40.5	19	9	200	M10; 16 deep
	355	482	40.4	19	9	200	M10; 16 deep

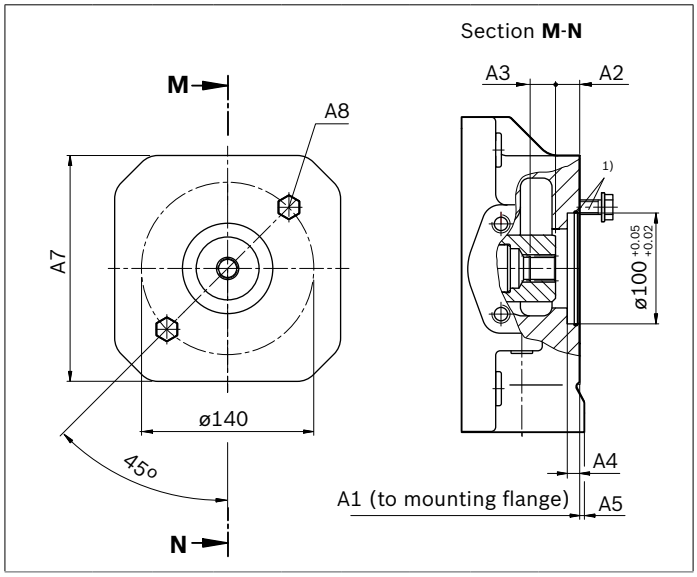
1) Mounting bolts and O-ring seal are included in the scope of delivery
2) Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit, tolerance class 5
3) Thread according to DIN 13, see instruction manual for maximum tightening torques.

POOCCA HYDRAULIC MANUFACTURING

Flange ISO 3019-2 (metric)		Hub for splined shaft[2]									Code
Diameter	Symbol	Diameter	40	71	125	180	250	355	500	750	1000	
100-2		7/8in 13T 16/32DP	●	●	–	–	–	–	○	○	○	KB3
		7/8in 13T 16/32DP	–	–	●	●	●	●	–	–	–	UB3

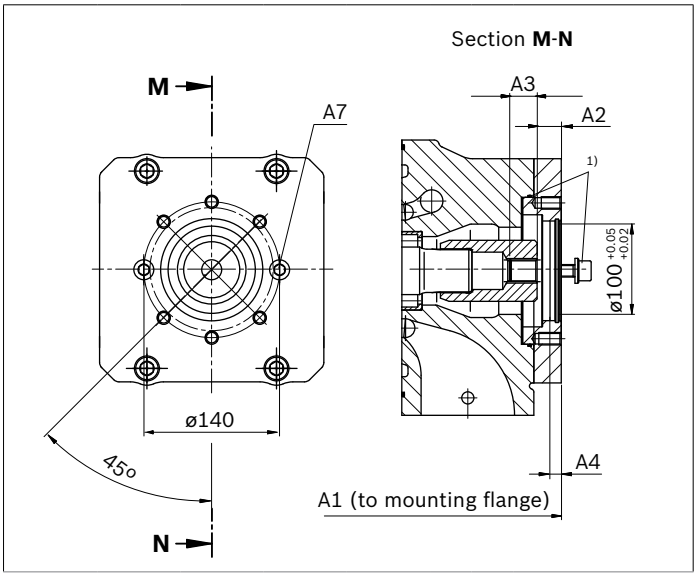
● = Available ○ = On request – = Not available

▼ **100-2**



KB3	NG	A1	A2	A3	A4	A5	A7[3]	A8
	40	290	20.3	23	10	–	–	M12;18 deep
	71	291	20.4	23	10	2	140	M12; 18 deep

▼ **100-2**



UB3	NG	A1	A2	A3	A4	A7[3]
	125	369	20.5	24.9	10	M12; 22 deep
	180	393	20.5	24.9	10	M12; 22 deep
	250	453	19.5	23	10	M12; 18 deep
	355	482	19.5	23	10	M12; 18 deep

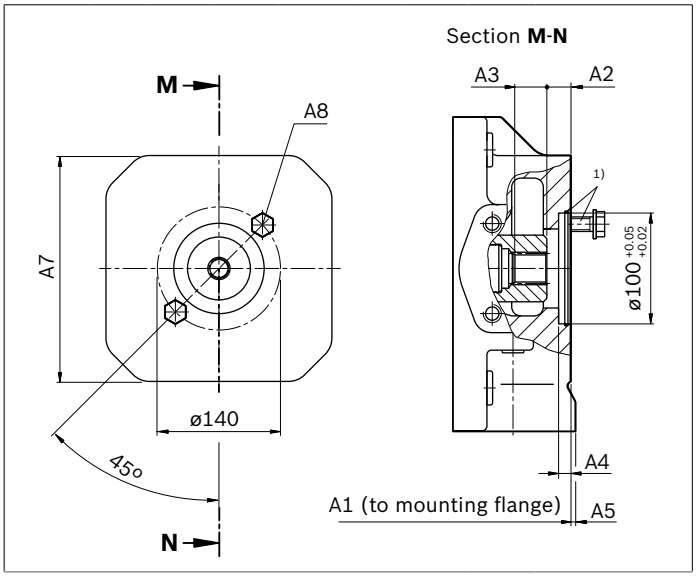
1) Mounting bolts and O-ring seal are included in the scope of delivery
2) Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit, tolerance class 5
3) Thread according to DIN 13, see instruction manual for maximum tightening torques.

POOCCA HYDRAULIC MANUFACTURING

Flange ISO 3019-2 (metric)		Hub for splined shaft[2]									Code
Diameter	Symbol	Diameter	40	71	125	180	250	355	500	750	1000	
100-2		1in 15T 16/32DP	●	●	–	–	–	–	●	○	○	KB4
		1in 15T 16/32DP	–	–	●	●	●	●	–	–	–	UB4

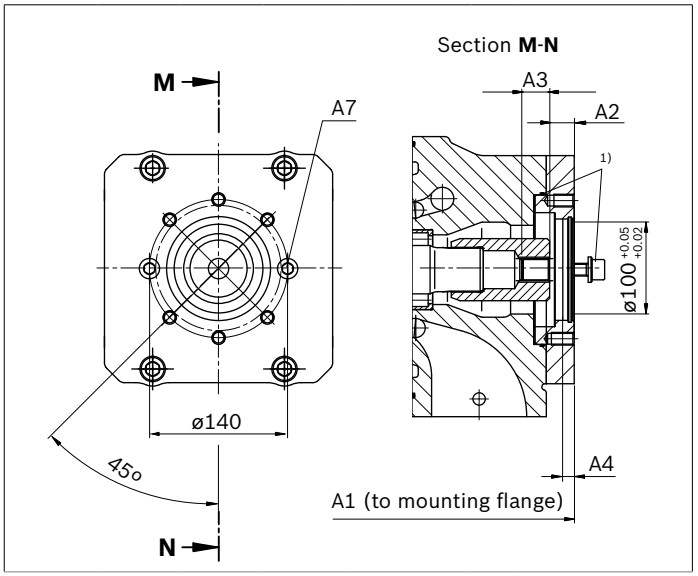
● = Available ○ = On request – = Not available

▼ **100-2**



KB4	NG	A1	A2	A3	A4	A5	A7[3]	A8
	40	290	20.8	27.5	10	–	–	M12; 18 deep
	71	316	20.8	27.5	8	–	–	M12; 24 deep
	500	505	20.4	28.9	10	15	240	M12; 18 deep

▼ **100-2**



UB4	NG	A1	A2	A3	A4	A7[3]
	125	369	18.9	29.5	10	M12; 22 deep
	180	393	18.9	29.5	10	M12; 22 deep
	250	453	20.9	29.5	10	M12; 18 deep
	355	482	20.9	29.5	10	M12; 18 deep

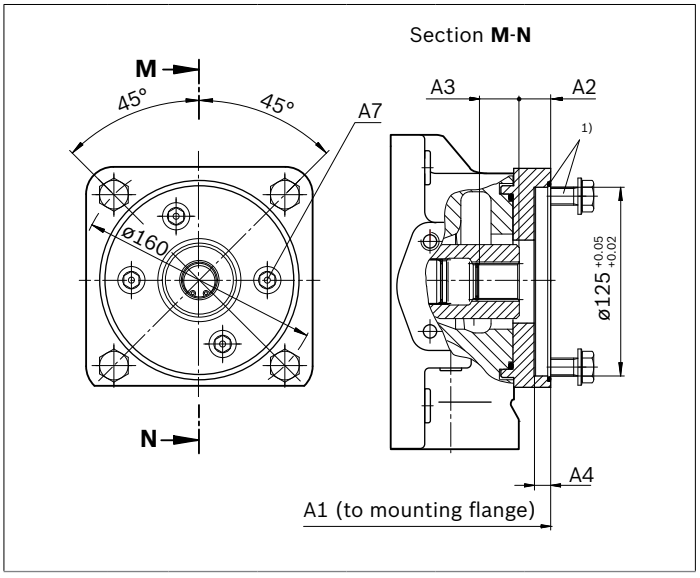
1) Mounting bolts and O-ring seal are included in the scope of delivery
2) Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit, tolerance class 5
3) Thread according to DIN 13, see instruction manual for maximum tightening torques.

POOCCA HYDRAULIC MANUFACTURING

Flange ISO 3019-2 (metric)		Hub for splined shaft[2]									Code
Diameter	**Symbol**	**Diameter**	**40**	**71**	**125**	**180**	**250**	**355**	**500**	**750**	**1000**	
125-4		1in 15T 16/32DP	–	●	–	–	–	–	○	○	○	KE1
		1in 15T 16/32DP	–	–	○	○	○	○	–	–	–	UE1

● = Available ○ = On request – = Not available

▼ **125-4**



KE1	NG	A1	A2	A3	A4	A7[3]
	71	316	20.8	27.5	10	M12; 24 deep

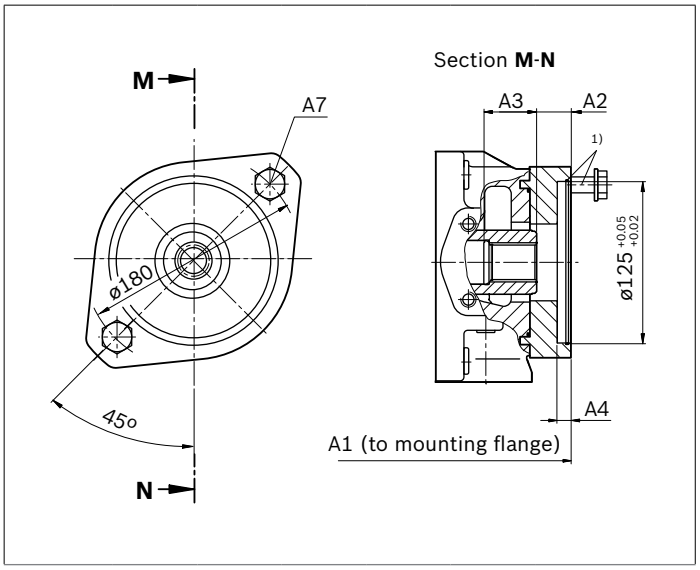
1) Mounting bolts and O-ring seal are included in the scope of delivery
2) Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit, tolerance class 5
3) Thread according to DIN 13, see instruction manual for maximum tightening torques.

POOCCA HYDRAULIC MANUFACTURING

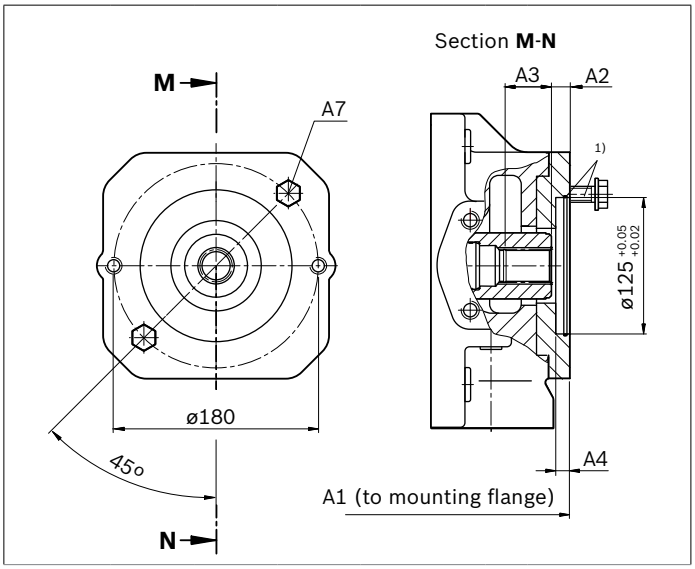
Flange ISO 3019-2 (metric)		Hub for splined shaft[2]										Code
Diameter	Symbol	Diameter	40	71	125	180	250	355	500	750	750[4]	1000	
125-2		1 1/4 in 14T 12/24DP	–	●	–	–	–	–	●	○	●	○	KB5
		1 1/4 in 14T 12/24DP	–	–	●	●	●	●	–	–	–	–	UB5

● = Available ○ = On request – = Not available

▼ **125-2**



▼ **125-2**



KB5	NG	A1	A2	A3	A4	A7[3]
	71	321	23	38	10	M16; 29 deep
	500	505	19.3	40.4	10	M16; 24 deep
	750[4]	649	19.3	40.4	10	M16; 20 deep

UB5	NG	A1	A2	A3	A4	A7[3]
	125	369	20	38	9	M16; 22 deep
	180	393	20	38	9	M16; 22 deep
	250	453	20.9	37.9	9	M16; 22 deep
	355	482	20.9	37.9	9	M16; 22 deep

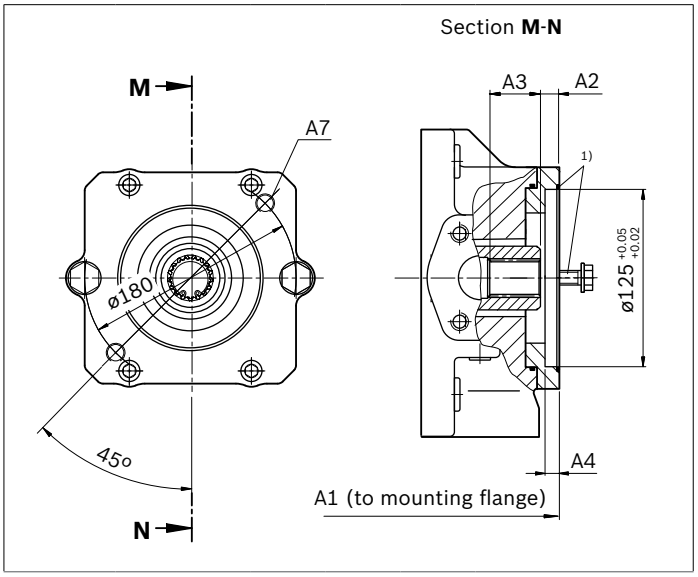
1) Mounting bolts and O-ring seal are included in the scope of delivery
2) Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit, tolerance class 5
3) Thread according to DIN 13, see instruction manual for maximum tightening torques.
4) With charge pump

POOCCA HYDRAULIC MANUFACTURING

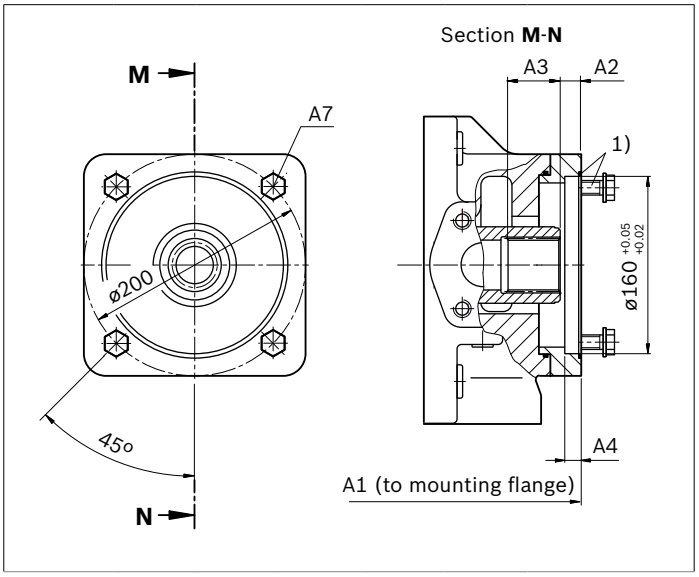
Flange ISO 3019-2 (metric)		Hub for splined shaft[2]									Code
Diameter	Symbol	Diameter	40	71	125	180	250	355	500	750	1000	
125-2		1 1/2 in 17T 12/24DP	–	–	–	–	–	–	o	o	o	KB6
		1 1/2 in 17T 12/24DP	–	–	●	●	●	●	–	–	–	UB6
160-4		1 1/4 in 14T 12/24DP	–	o	–	–	–	–	o	o	o	KB8
		1 1/4 in 14T 12/24DP	–	–	●	●	●	●	–	–	–	UB8

● = Available o = On request – = Not available

▼ **125-2**



▼ **160-4**



UB6	NG	A1	A2	A3	A4	A7[3]
	125	369	10.4	50	9	M16; 22 deep
	180	393	10.4	50	9	M16; 22 deep
	250	453	12.5	55	9	M16; 22 deep
	355	482	12.5	55	9	M16; 22 deep

UB8	NG	A1	A2	A3	A4	A7[3]
	125	369	20	38	9	M16; 22 deep
	180	393	20	38	9	M16; 22 deep
	250	453	20.9	38	9	M16; 22 deep
	355	482	20.9	38	9	M16; 22 deep

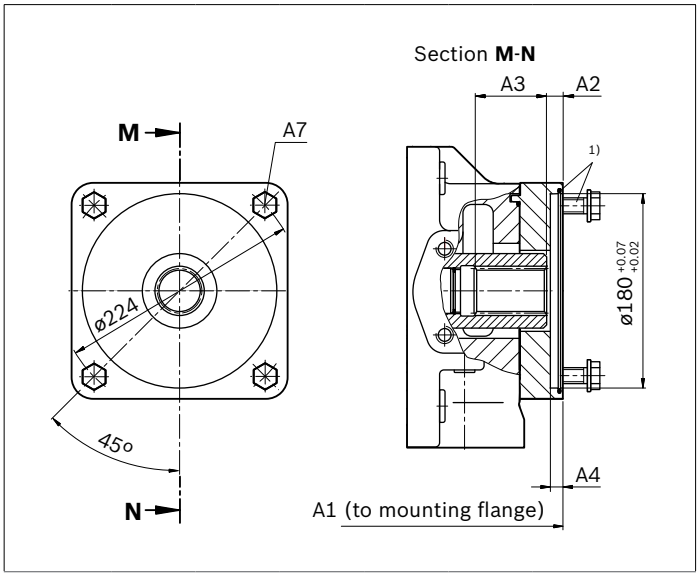
1) Mounting bolts and O-ring seal are included in the scope of delivery
2) Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit, tolerance class 5
3) Thread according to DIN 13, see instruction manual for maximum tightening torques.

POOCCA HYDRAULIC MANUFACTURING

Flange ISO 3019-2 (metric)		Hub for splined shaft[2]									Code
Diameter	Symbol	Diameter	40	71	125	180	250	355	500	750	1000	
180-4	⌘	1 3/4in 13T 8/16DP	–	–	–	–	–	–	o	o	o	KB7
		1 3/4in 13T 8/16DP	–	–	–	●	●	●	–	–	–	UB7

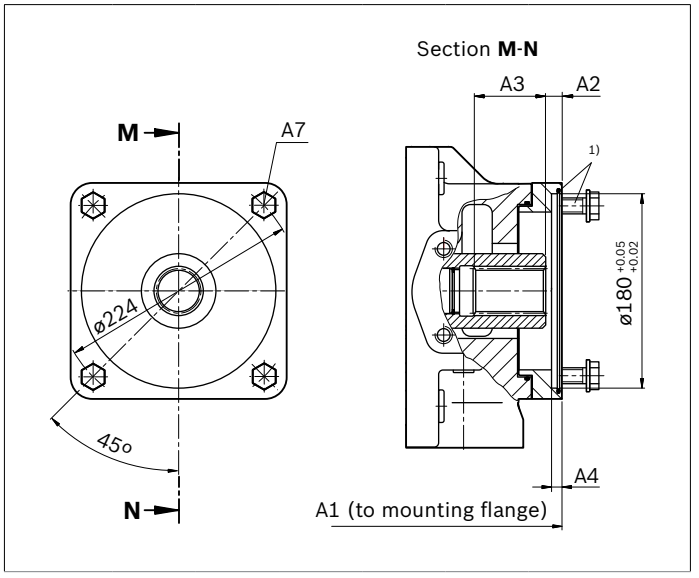
● = Available o = On request – = Not available

▼ **180-4**



KB7	NG	A1	A2	A3	A4	A7[3]
	500	530	10.4	63.6	10	M16; 25 deep
	750	580	10.4	63.6	10	M16; 25 deep

▼ **180-4**



UB7	NG	A1	A2	A3	A4	A7[3]
	180	406	10.6	62	9	M16; 34 deep
	250	453	10.6	64	9	M16; 22 deep
	355	482	10.6	64	9	M16; 22 deep

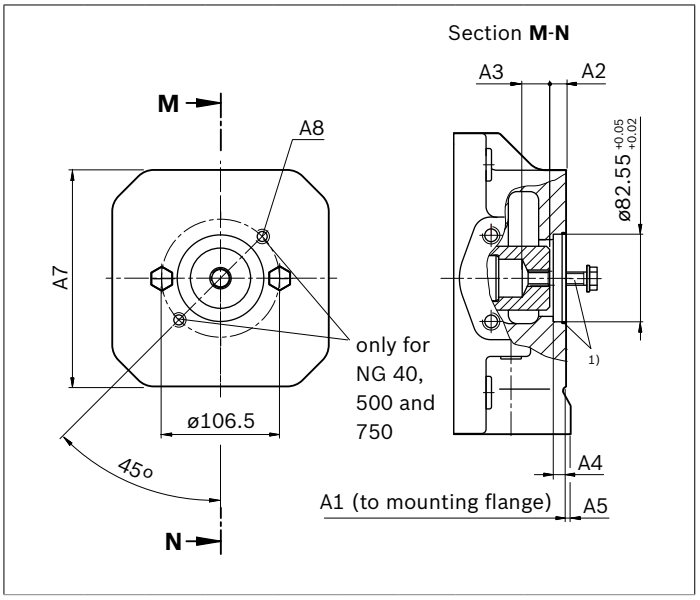
1) Mounting bolts and O-ring seal are included in the scope of delivery
2) Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit, tolerance class 5
3) Thread according to DIN 13, see instruction manual for maximum tightening torques.

POOCCA HYDRAULIC MANUFACTURING

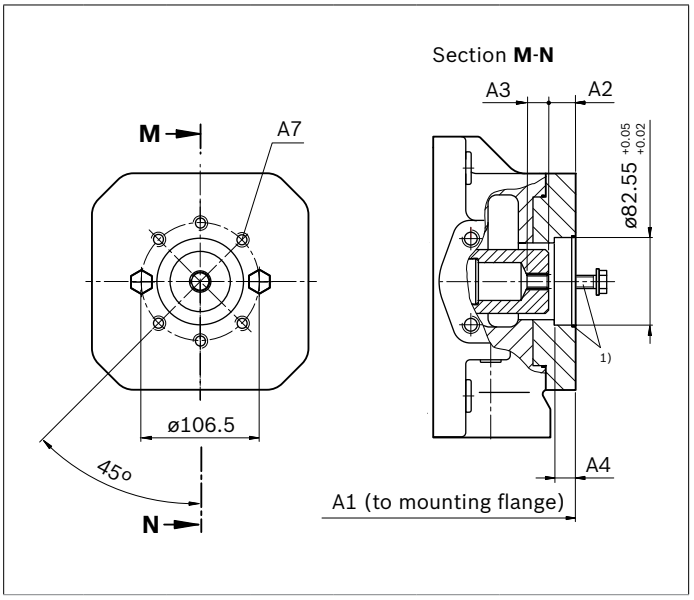
Flange ISO 3019-1 (SAE)		Hub for splined shaft[2]	Availability over sizes										Code
Diameter	Symbol	Diameter	40	71	125	180	250	355	500	750	750[4]	1000	
82-2 (A)		5/8in 9T 16/32DP	●	●	–	–	–	–	●	●	○	○	K01
		5/8in 9T 16/32DP	–	–	●	●	●	●	–	–	–	–	U01

● = Available ○ = On request – = Not available

▼ **82-2**



▼ **82-2**



K31	NG	A1	A2	A3	A4	A5	A7	A8[3]
	40	263	10.3	25.9	10	–	–	M10; 15 deep
	71	291	10.3	24.6	10	2	140	M10; 15 deep
	500	505	10.3	32.7	10	15	240	M10; 15 deep
	750	555	10.3	32.7	10	–	–	M10; 15 deep

U01	NG	A1	A2	A3	A4	A7[3]
	125	369	10.3	19.4	13	M10; 16 deep
	180	393	10.3	19.4	13	M10; 16 deep
	250	453	16	19.4	13	M10; 16 deep
	355	482	16	19.4	13	M10; 16 deep

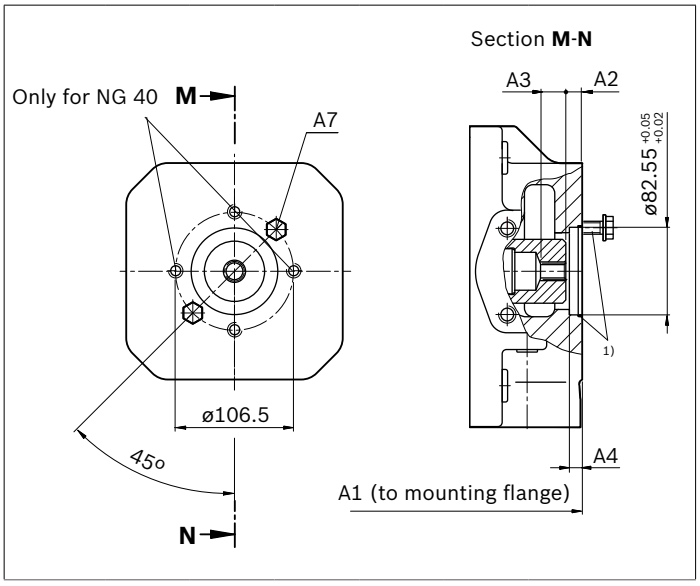
1) Mounting bolts and O-ring seal are included in the scope of delivery
2) Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit, tolerance class 5
3) Thread according to DIN 13, see instruction manual for maximum tightening torques.
4) With charge pump

POOCCA HYDRAULIC MANUFACTURING

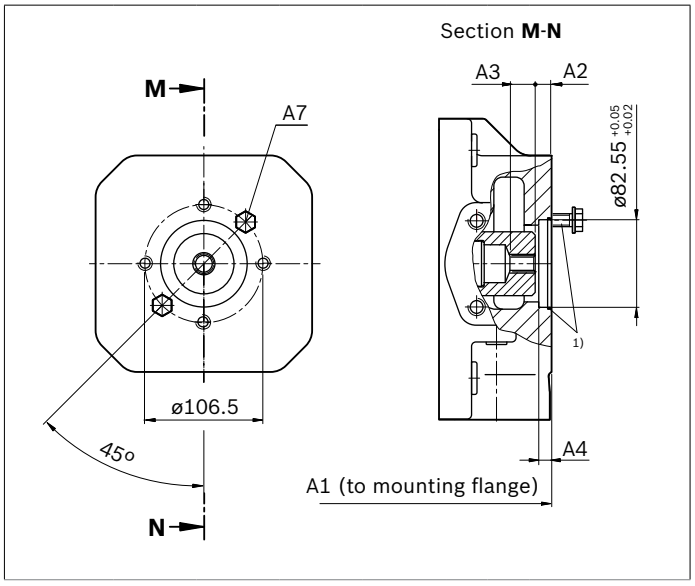
Flange ISO 3019-1 (SAE)		Hub for splined shaft[2]	Availability over sizes									Code
Diameter	Symbol	Diameter	40	71	125	180	250	355	500	750	1000	
82-2 (A)		3/4in 11T 16/32DP[4]	●	●	–	–	–	–	○	○	○	K52
		3/4in 11T 16/32DP	–	–	●	●	●	●	–	–	–	U52

● = Available ○ = On request – = Not available

▼ **82-2**



▼ **82-2**



K52	NG	A1	A2	A3	A4	A7[3]
	40	263	10.5	33.8	10	M10; 15 deep
	71	312.5	21.5	19	10	M10; 15 deep

U52	NG	A1	A2	A3	A4	A7[3]
	125	369	19.4	21.1	10	M10, 16 deep
	180	393	19.4	21.1	10	M10, 16 deep
	250	453	19.5	23.9	10	M10, 16 deep
	355	482	19.4	23.9	10	M10, 16 deep

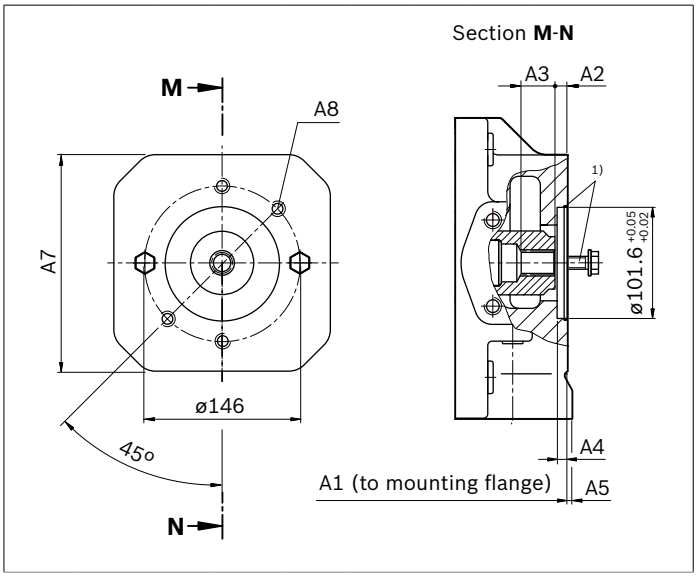
1) Mounting bolts and O-ring seal are included in the scope of delivery
2) Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit, tolerance class 5
3) Thread according to DIN 13, see instruction manual for maximum tightening torques.
4) If an attachment pump with “R” shaft is to be fitted, please contact us.

POOCCA HYDRAULIC MANUFACTURING

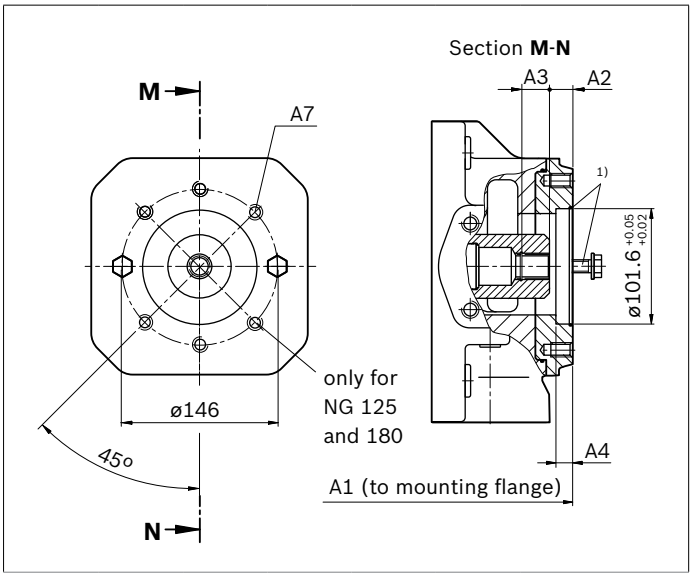
Flange ISO 3019-1 (SAE)		Hub for splined shaft[2]	Availability over sizes										Code
Diameter	Symbol	Diameter	40	71	125	180	250	355	500	750	750[4]	1000	
101-2 (B)		7/8in 13T 16/32DP	●	●	–	–	–	–	●	●	●	○	K68
		7/8in 13T 16/32DP	–	–	●	●	●	●	–	–	–	–	U68

● = Available ○ = On request – = Not available

▼ **101-2**



▼ **101-2**



K68	NG	A1	A2	A3	A4	A5	A7	A8[3]
	40	290	20.4	23.1	10	–	–	M12; 18 deep
	71	322	20.5	23.1	10	–	–	M12; 30 deep
	500	505	19.5	25	10	15	240	M12; 18 deep
	750	555	19.5	25	10	–	–	M12; 18 deep
	750[4]	649	19.5	25	10	–	–	M12; 18 deep

U68	NG	A1	A2	A3	A4	A7[3]
	125	369	28	25	13	M12; 22 deep
	180	393	28	25	13	M12; 22 deep
	250	453	19.5	23.1	13	M12; 18 deep
	355	482	19.5	23.1	13	M12; 18 deep

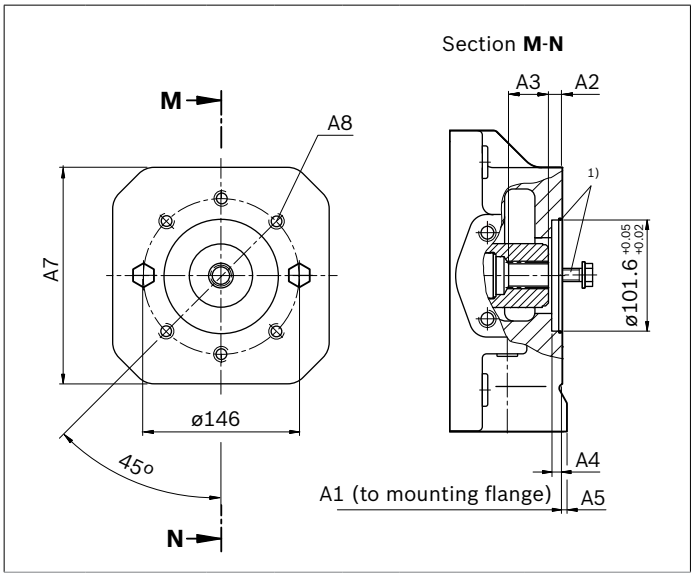
1) Mounting bolts and O-ring seal are included in the scope of delivery
2) Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit, tolerance class 5
3) Thread according to DIN 13, see instruction manual for maximum tightening torques.
4) With charge pump

POOCCA HYDRAULIC MANUFACTURING

Flange ISO 3019-1 (SAE)		Hub for splined shaft[2]	Availability over sizes									Code
Diameter	Symbol	Diameter	40	71	125	180	250	355	500	750	1000	
101-2 (B)		1in 15T 16/32DP	●	●	–	–	–	–	●	○	○	K04
		1in 15T 16/32DP	–	–	●	●	●	●	–	–	–	U04

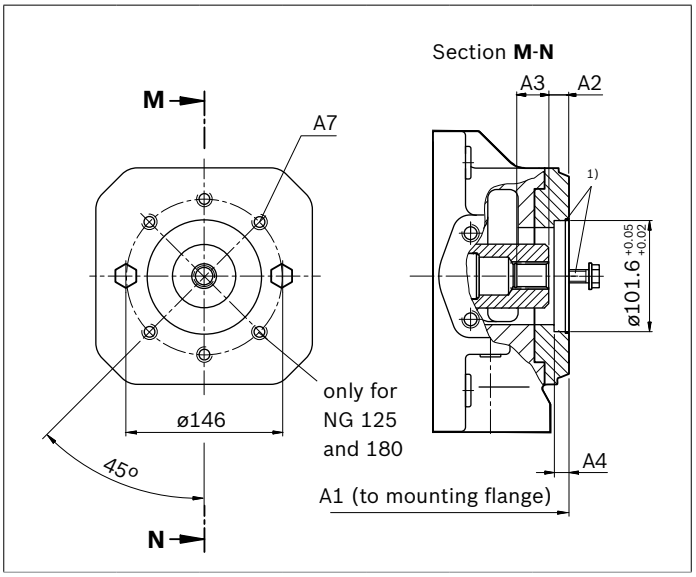
● = Available ○ = On request – = Not available

▼ **101-2**



K04	NG	A1	A2	A3	A4	A5	A7	A8[3]
	40	290	20.8	27.5	10	–	–	M12; 20 deep
	71	322	20	29.4	10	–	–	M12; 30 deep
	500	505	20.4	28.9	10	15	240	M12; 18 deep

▼ **101-2**



U04	NG	A1	A2	A3	A4	A7[3]
	125	369	18.9	29.4	13	M12; 22 deep
	180	393	18.9	29.4	13	M12; 22 deep
	250	453	18.9	29.4	13	M12; 18 deep
	355	482	18.9	29.4	13	M12; 18 deep

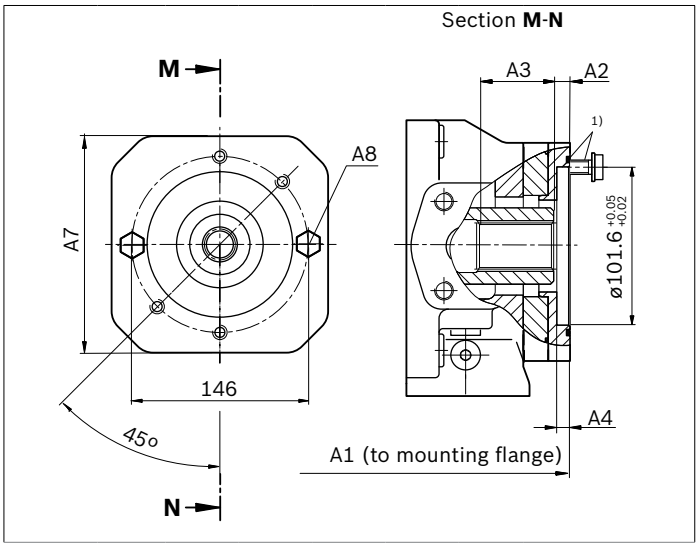
1) Mounting bolts and O-ring seal are included in the scope of delivery
2) Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit, tolerance class 5
3) Thread according to DIN 13, see instruction manual for maximum tightening torques.

POOCCA HYDRAULIC MANUFACTURING

Flange ISO 3019-1 (SAE)		Hub for splined shaft[2]									Code
Diameter	Symbol	Diameter	40	71	125	180	250	355	500	750	1000	
101-2 (B)		1 1/4in 14T 12/24 DP	–	●	–	–	–	–	○	○	○	K06
		1 1/4in 14T 12/24 DP	–	–	○	○	○	○	–	–	–	U06

● = Available ○ = On request – = Not available

▼ **101-2**[4]



K06	NG	A1	A2	A3	A4	A7	A8[3]
	71	322	20.8	38	10	140	M12; 30 deep

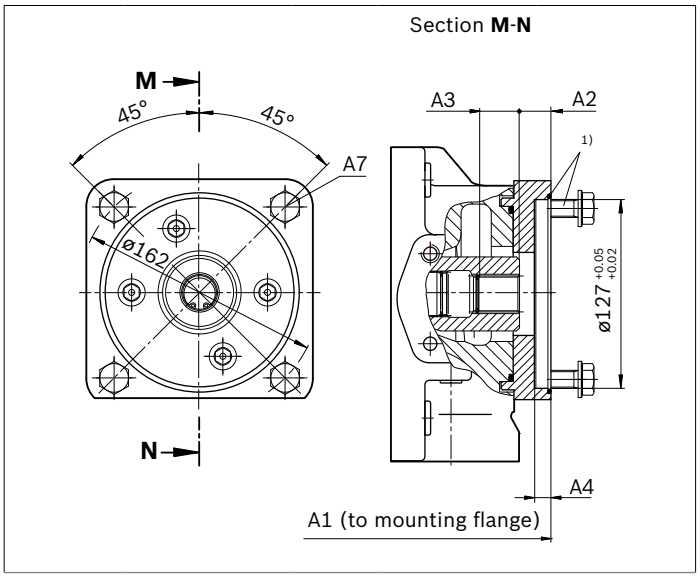
1) Mounting bolts and O-ring seal are included in the scope of delivery
2) Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit, tolerance class 5
3) Thread according to DIN 13, see instruction manual for maximum tightening torques.
4) For attaching A10FZO/G63

POOCCA HYDRAULIC MANUFACTURING

Flange ISO 3019-1 (SAE)		Hub for splined shaft[2]	Availability over sizes									Code
Diameter	Symbol	Diameter	40	71	125	180	250	355	500	750	1000	
127-4 (C)		1in 15T 16/32 DP	○	●	–	–	–	–	○	○	○	KE2
		1in 15T 16/32 DP	–	–	●	●	○	○	–	–	–	UE2

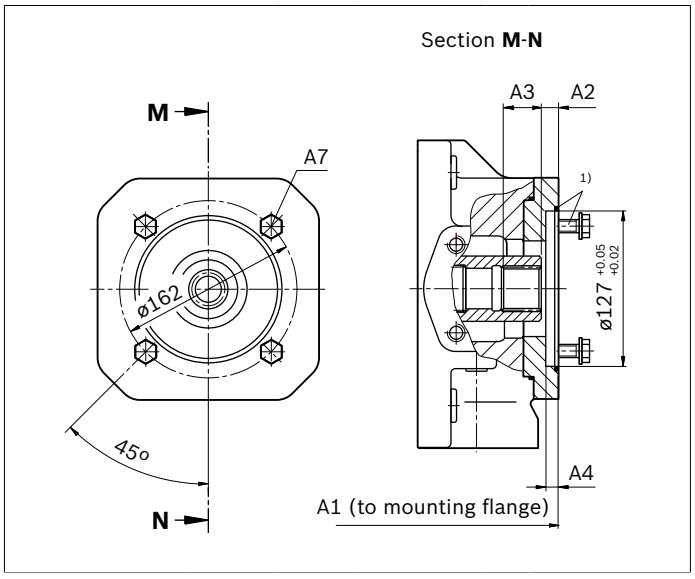
● = Available ○ = On request – = Not available

▼ **127-4**[4]



KE2	NG	A1	A2	A3	A4	A7[3]
	71	321	19	29.4	13	M12; 30 deep

▼ **127-4**



UE2	NG	A1	A2	A3	A4	A7[3]
	125	369	19.9	29.5	13	M12; 22 deep
	180	393	19.9	29.5	13	M12; 22 deep

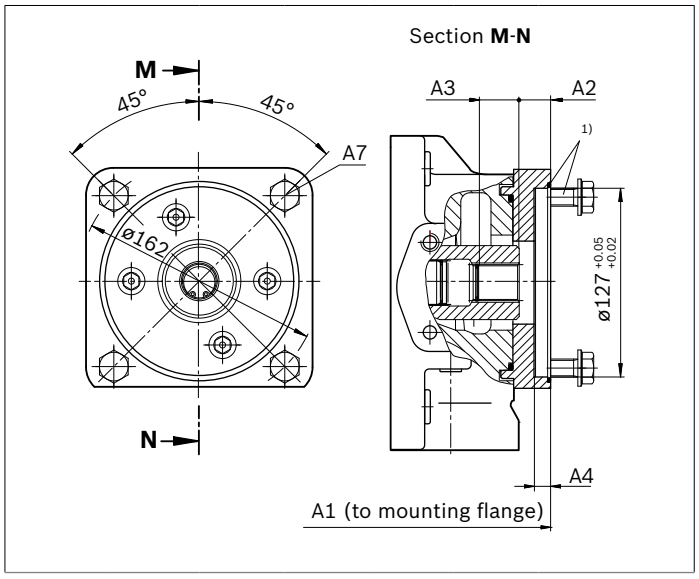
1) Mounting bolts and O-ring seal are included in the scope of delivery
2) Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit, tolerance class 5
3) Thread according to DIN 13, see instruction manual for maximum tightening torques.
4) For fitting an A10VZO45

POOCCA HYDRAULIC MANUFACTURING

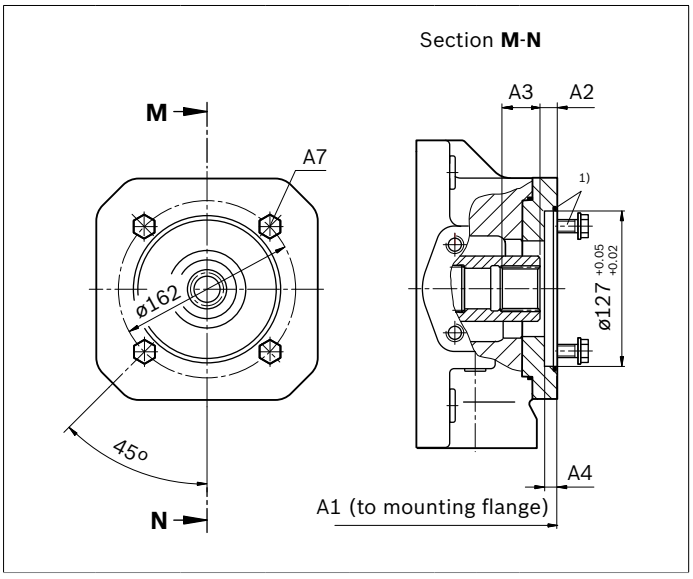
Flange ISO 3019-1 (SAE)		Hub for splined shaft[2]	Availability over sizes									Code
Diameter	Symbol	Diameter	40	71	125	180	250	355	500	750	1000	
127-4 (C)		1 1/4in 14T 12/24 DP	–	●	–	–	–	–	●	○	○	K15
		1 1/4in 14T 12/24 DP	–	–	●	●	●	●	–	–	–	U15

● = Available ○ = On request – = Not available

▼ **127-4**[4]



▼ **127-4**



K15	NG	A1	A2	A3	A4	A7[3]
	71	321	23	38	13	M12; 30 deep
	500	505	19.3	40	13	M12; 18 deep

U15	NG	A1	A2	A3	A4	A7[3]
	125	369	20	38	13	M12; 22 deep
	180	393	20	38	13	M12; 22 deep
	250	453	20.9	38	13	M12; 22 deep
	355	482	20.9	38	13	M12; 22 deep

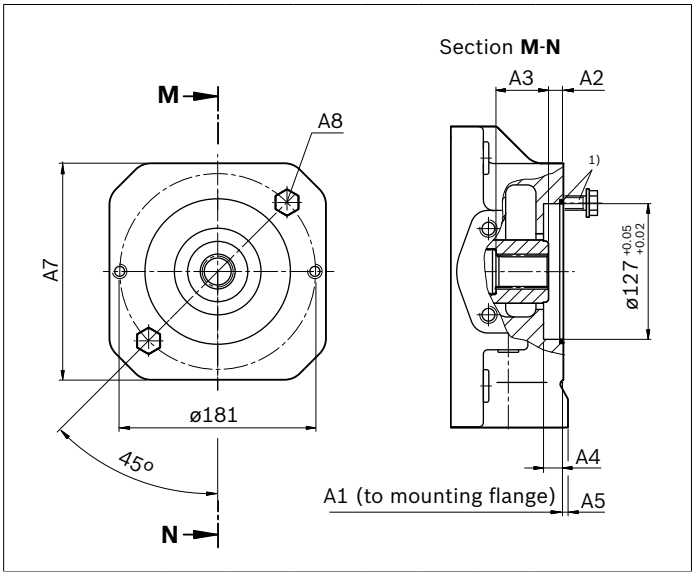
1) Mounting bolts and O-ring seal are included in the scope of delivery
2) Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit, tolerance class 5
3) Thread according to DIN 13, see instruction manual for maximum tightening torques.
4) For fitting an A10VZO71

POOCCA HYDRAULIC MANUFACTURING

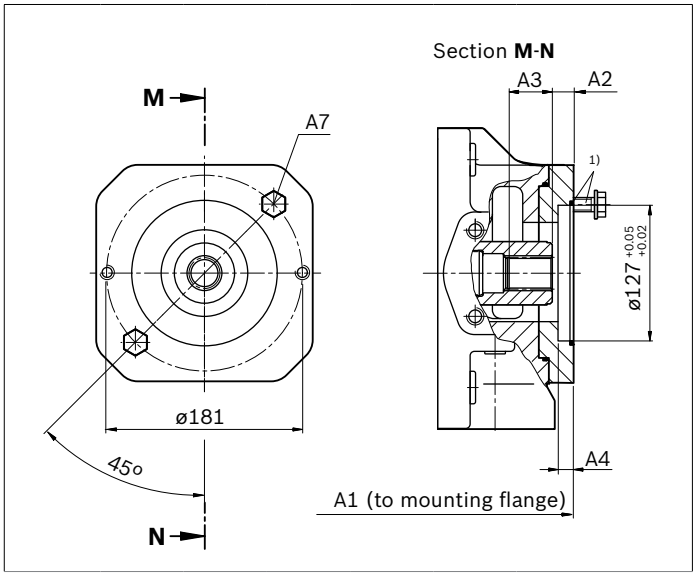
Flange ISO 3019-1 (SAE)		Hub for splined shaft[2]										Code
Diameter	Symbol	Diameter	40	71	125	180	250	355	500	750	750[4]	1000	
127-2 (C)		1 1/4in 14T 12/24 DP	–	●	–	–	–	–	●	●	●	○	K07
		1 1/4in 14T 12/24 DP	–	–	●	●	●	●	–	–	–	–	U07

● = Available ○ = On request – = Not available

▼ **127-2**



▼ **127-2**



K07	NG	A1	A2	A3	A4	A5	A7	A8[3]
	71	321	23	38	13	–	–	M16; 30 deep
	500	505	19.3	40.4	13	15	240	M16; 24 deep
	750	555	19.3	40.4	13	–	260	M16; 24 deep
	750[4]	649	19.3	40.4	13	–	–	M16; 24 deep

U07	NG	A1	A2	A3	A4	A7[3]
	125	369	20.9	37.9	13	M16; 22 deep
	180	393	20.9	37.9	13	M16; 22 deep
	250	453	20.9	37.9	13	M16; 22 deep
	355	482	20.9	37.9	13	M16; 22 deep

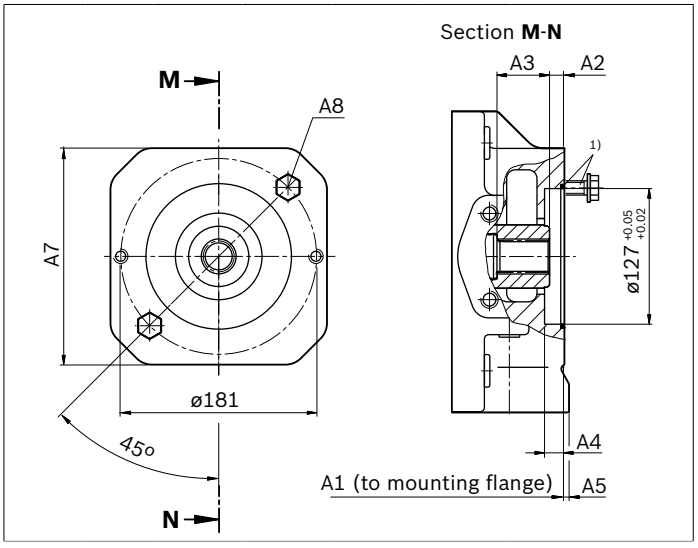
1) Mounting bolts and O-ring seal are included in the scope of delivery
2) Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit, tolerance class 5
3) Thread according to DIN 13, see instruction manual for maximum tightening torques.
4) With charge pump

POOCCA HYDRAULIC MANUFACTURING

Flange ISO 3019-1 (SAE)		Hub for splined shaft[2]									Code
Diameter	Symbol	Diameter	40	71	125	180	250	355	500	750	1000	
127-2 (C)		1 1/2in 17T 12/24 DP	–	–	–	–	–	–	●	●	●	K24
		1 1/2in 17T 12/24 DP	–	–	●	●	●	●	–	–	–	U24

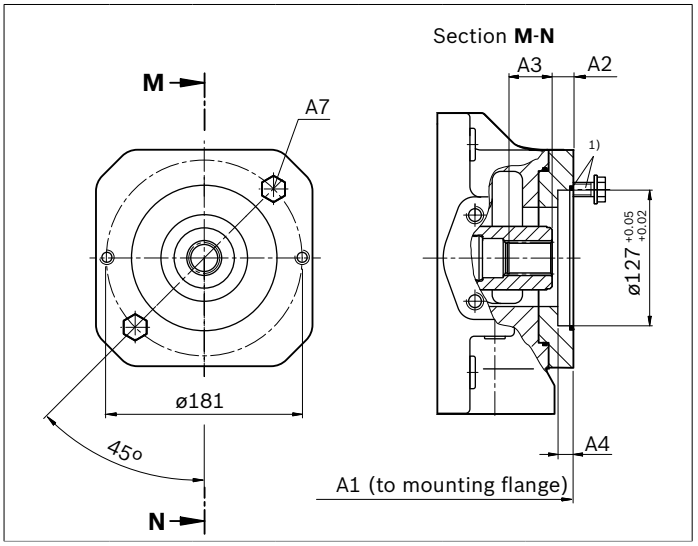
● = Available o = On request – = Not available

▼ **127-2**



K24	NG	A1	A2	A3	A4	A7[3]
	500	505	10.3	56.7	13	M16; 24 deep
	750	555	10.3	56.7	13	M16; 24 deep
	1000	628	10.4	56.6	13	M16; 32 deep

▼ **127-2**



U24	NG	A1	A2	A3	A4	A7[3]
	125	369	10.4	50	13	M16; 22 deep
	180	393	10.4	50	13	M16; 22 deep
	250	453	12.4	55	13	M16; 22 deep
	355	482	12.4	55	13	M16; 22 deep

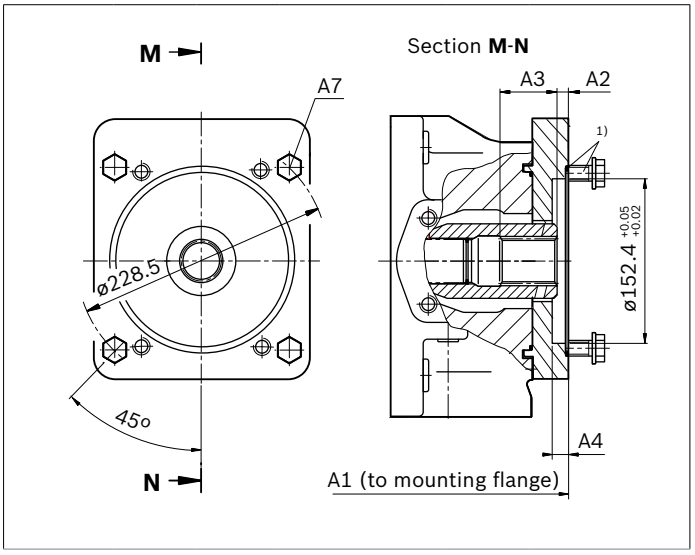
1) Mounting bolts and O-ring seal are included in the scope of delivery
2) Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit, tolerance class 5
3) Thread according to DIN 13, see instruction manual for maximum tightening torques.

POOCCA HYDRAULIC MANUFACTURING

Flange ISO 3019-1 (SAE)		Hub for splined shaft[2]									Code
Diameter	Symbol	Diameter	40	71	125	180	250	355	500	750	1000	
152-4 (D)		1 1/2 in 17T 12/24DP	–	–	–	–	–	–	○	○	○	K96
		1 1/2 in 17T 12/24DP	–	–	●	●	●	●	–	–	–	U96

● = Available ○ = On request – = Not available

▼ **152-4**



U96	NG	A1	A2	A3	A4	A7[3]
	125	369	10.4	52	13	M16; 22 deep
	180	393	10.4	52	13	M16; 22 deep
	250	453	12.4	55	13	M16; 22 deep
	355	482	12.4	55	13	M16; 22 deep

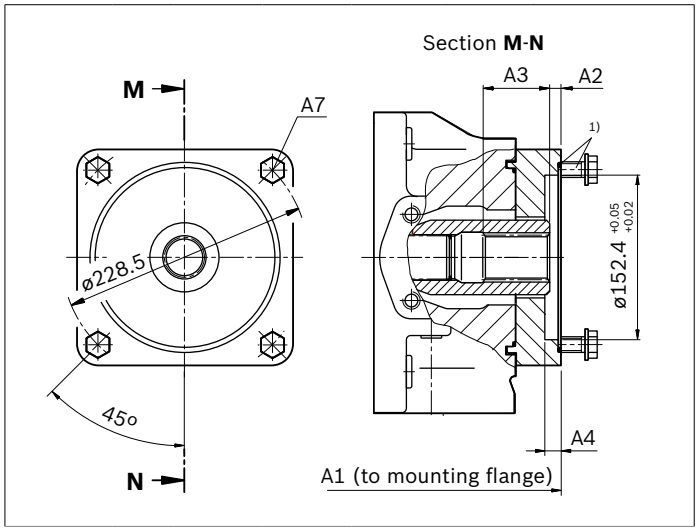
1) Mounting bolts and O-ring seal are included in the scope of delivery
2) Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit, tolerance class 5
3) Thread according to DIN 13, see instruction manual for maximum tightening torques.

POOCCA HYDRAULIC MANUFACTURING

Flange ISO 3019-1 (SAE)		Hub for splined shaft[2]	Availability over sizes									Code
Diameter	Symbol	Diameter	40	71	125	180	250	355	500	750	1000	
152-4		1 3/4in 13T 8/16DP	–	–	–	–	–	–	●	●	○	K17
		1 3/4in 13T 8/16DP	–	–	●	●	●	●	–	–	–	U17

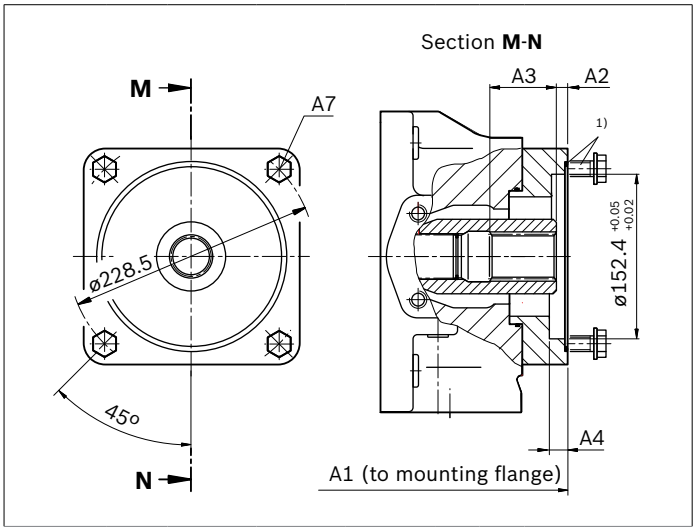
● = Available ○ = On request – = Not available

▼ **152-4**



K17	NG	A1	A2	A3	A4	A7[3]
	500	530	10.4	59.6	13	M16; 25 deep
	750	580	10.4	59.6	13	M16; 25 deep

▼ **152-4**



U17	NG	A1	A2	A3	A4	A7[3]
	125	382	10.4	62	13	M16; 35 deep
	180	406	10.4	62	13	M16; 35 deep
	250	453	10.6	62	13	M16; 22 deep
	355	482	10.6	62	13	M16: 22 deep

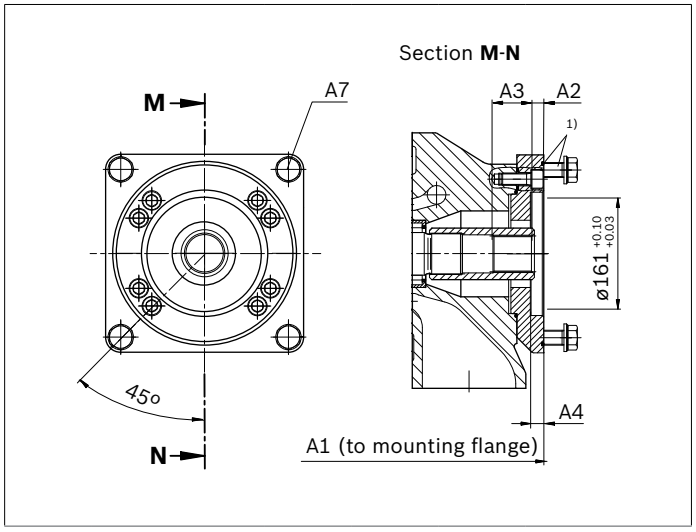
1) Mounting bolts and O-ring seal are included in the scope of delivery
2) Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit, tolerance class 5
3) Thread according to DIN 13, see instruction manual for maximum tightening torques.

POOCCA HYDRAULIC MANUFACTURING

Flange ISO 3019-1 (SAE)		Hub for splined shaft[2]	Availability over sizes									Code
Diameter	Symbol	Diameter	40	71	125	180	250	355	500	750	1000	
165-4 (D)		N50×2×24×8H	–	–	–	–	–	–	●	○	○	K84
		N50×2×24×8H	–	–	–	–	○	○	–	–	–	U84

● = Available – = Not available

▼ **165-4**



K84	NG	A1	A2	A3	A4[2]	A7
	500	541	12.5	55.5	18	M20; 36 deep

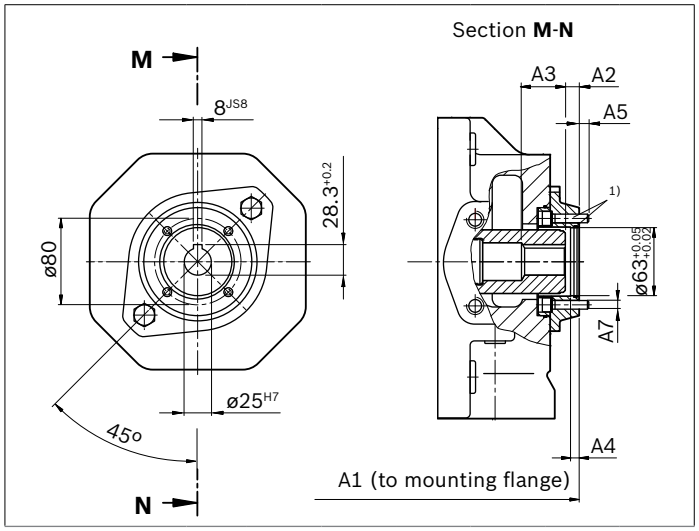
1) Mounting bolts and O-ring seal are included in the scope of delivery
2) Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit, tolerance class 5
3) Thread according to DIN 13, see instruction manual for maximum tightening torques.

POOCCA HYDRAULIC MANUFACTURING

Flange ISO 3019-1 (SAE)		Hub for splined shaft[2]	Availability over sizes									Code
Diameter	Symbol	Diameter	40	71	125	180	250	355	500	750	1000	
ø63		Shaft key ø25	●	●	–	–	–	–	○	○	○	K57
		Shaft key ø25	–	–	●	●	●	●	–	–	–	U57

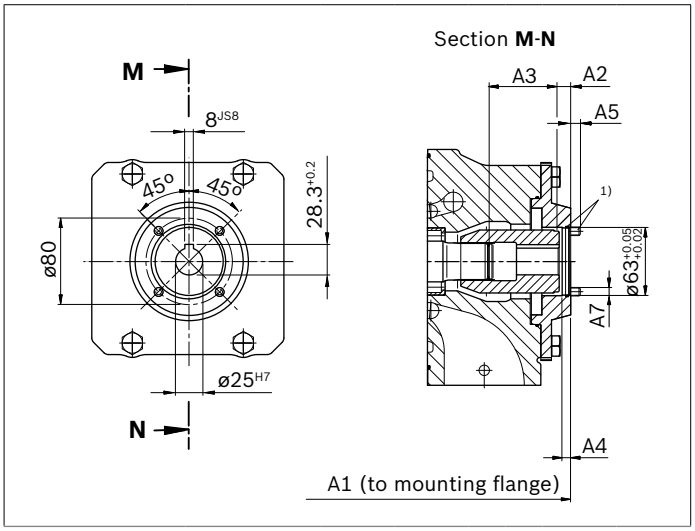
● = Available ○ = On request – = Not available

▼ **ø63**



K57	NG	A1	A2	A3	A4	A5	A7[2]
	40	288	11	56	9	9	M8
	71	319	10.9	42	8	9	M8

▼ **ø63**



U57	NG	A1	A2	A3	A4	A5	A7[2]
	125	375	10.8	40	8	9	M8
	180	399	10.8	40	8	9	M8
	250	459	10.8	42.6	8	9	M8
	355	488	10.8	42.6	8	9	M8

1) Mounting bolts and O-ring seal are included in the scope of delivery
2) Thread according to DIN 13, see instruction manual for maximum tightening torques.

POOCCA HYDRAULIC MANUFACTURING

Overview of mounting options

Through drive[1]			Mounting options – 2nd pump						
Flange	**Hub for splined shaft**	**Code**	**A4VSO/G NG (shaft)**	**A4CSG NG (shaft)**	**A10V(S)O/3x[5] NG (shaft)**	**A10V(S)O/5x NG (shaft)**	**A10FZO/G NG (shaft)**	**A10VZO/G NG (shaft)**	**External/ internal gear pump**
Flange ISO 3019-2 (metric)									
80-2	3/4 in[3]	K/U B2	–	–	18 (S)/31	10 (S)/52	–	–	–
100-2	7/8 in[3]	K/U B3	–	–	28 (S)/31	–	–	–	–
	1 in[3]	K/U B4	–	–	45 (S)/31	–	–	–	–
125-2	1 1/4 in[3]	K/U B5	–	–	71/88 (S)/31	–	–	–	–
	1 1/2 in[3]	K/U B6	–	–	100 (S)/31	–	–	–	–
125-4	1 in[3]	K/U E1	–	–	45 (S)/32	–	–	–	
	W32[2]	K/U 31	40 (Z)	–	–	–	–	–	–
140-4	W40[2]	K/U 33	71 (Z)	–	–	–	–	–	–
160-4	W50[2]	K/U 34	125 (Z)	–	–	–	–	–	–
	W50[2]	K/U 34	180 (Z)	–	–	–	–	–	–
	1 1/4 in[3]	K/U B8	–	–	71/88 (S)/31	–	–	–	–
180-4	1 3/4 in[3]	K/U B7	–	–	140/180 (S)/ 31/32	–	–	–	–
	1 1/2 in[3]	K/U B9	–	–	100 (S)/32	–	–	–	–
224-4	W60[2]	K/U 35	250 (Z)	250 (Z)	–	–	–	–	–
	W70[2]	K/U 77	355 (Z)	355 (Z)	–	–	–	–	–
315-8	W80[2]	K43	500 (Z)	500 (Z)	–	–	–	–	–
400-8	W90[2]	K76	750 (Z)	750 (Z)	–	–	–	–	–
	W100[2]	K88	1000 (Z)	–	–	–	–	–	–
Flange SAE J 744 (ISO 3019-1)									
82-2 (A)[1]	5/8 in[3]	K/U 01	–	–	–	–	–	–	F NG 004 to 022[4]
	3/4 in[3]	K/U 52	–	–	18 (S)/31	10/18 (S)	3...10 (S) 11...18 (R)	3...10 (S) 18 (R)	–
101-2 (B)[1]	7/8 in[3]	K/U 68	–	–	28 (S)/31	28 (S)	21...28 (R)	28 (R)	N NG 020 to 032[4]
	1 in[3]	K/U 04	–	–	45 (S)/31	45 (S)	37...45 (R)	45 (R)	PGH4
	1 1/4 in[3]	K/U 06	–	–	–	–	63 (R)/10	–	–
127-2 (C)[1]	1 1/4 in[3]	K/U 07	–	–	71/88 (S)/31	–	–	–	–
	1 1/2 in[3]	K/U 24	–	–	100 (S)/31	85/100 (S)	–	–	PGH5
127-4 (C)[1]	1 in[3]	K/U E2	–	–	–	–	–	45 (R)/10	–
	1 1/4 in[3]	K/U 15	–	–	–	60/63/72 (S)	–	71 (R)/10	
152-4 (D)[1]	1 3/4 in[3]	K/U 17	–	–	140/180 (S)/ 31/32	–	–	140/180 (S)	–
	1 1/2 in[3]	K/U 96	–	–	100 (S)/32	–	–	100 (S)	–
ø63-4, metr.	shaft key ø25	K/U 57	–	–	–	–	–	–	R4

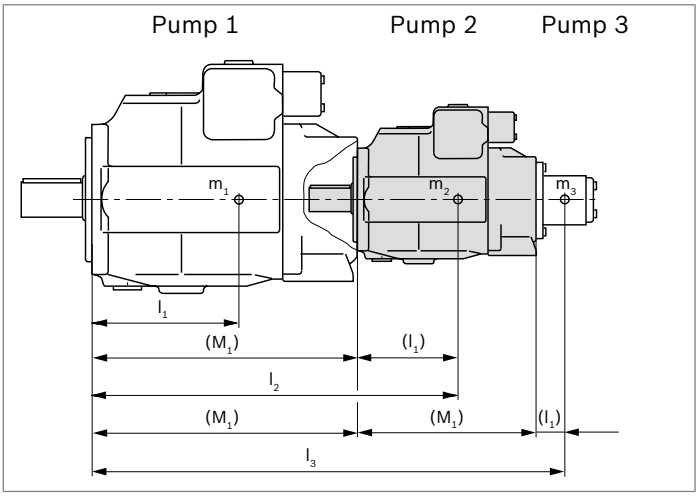
1) Additional through drives are available on request
2) According to DIN 5480
3) Splined shaft in accordance with SAE J744
4) Bosch Rexroth recommends special versions of the external gear pumps. Please contact us.
5) If a through drive for an A10V(S)O with R-shaft is desired, please contact us.

POOCCA HYDRAULIC MANUFACTURING

Permissible mass torque

Based on mounting flange on primary pump

Size			40	71	125	180	250	355	500	750	1000
Permissible moment of inertia	$T_{m\ perm.}$	Nm	1800	2000	4200	4200	9300	9300	15600	19500	19500
Permissible moment of inertia for dynamic mass acceleration 10 g (= 98.1 m/s²)[2]	$T_{m\ perm.}$	Nm	180	200	420	420	930	930	1560	1950	1950
Weight (A4VSO...DR)	m	kg	39	53	88	102	184	207	320	460	605
Distance from center of gravity	l_1	mm	120	140	170	180	210	220	230	260	290



m_1, m_2, m_3	Weight of pump	[kg]
l_1, l_2, l_3	Distance from center of gravity	[mm]

$$T_m = (m_1 \times l_1 + m_2 \times l_2 + m_3 \times l_3) \times \frac{1}{102}\ [Nm]$$

Calculation for multiple pumps
l_1 = distance, center of gravity, front pump (value from “Permissible mass moment of inertia” table)
l_2 = mass “M_1” from through drive drawings (from page 42) + l_1 of the 2nd pump
l_3 = mass “M_1” from through drive drawings (from page 42) of the 1st Pump + “M_1” of the 2nd pump + l_1 of the 3rd pump

POOCCA HYDRAULIC MANUFACTURING

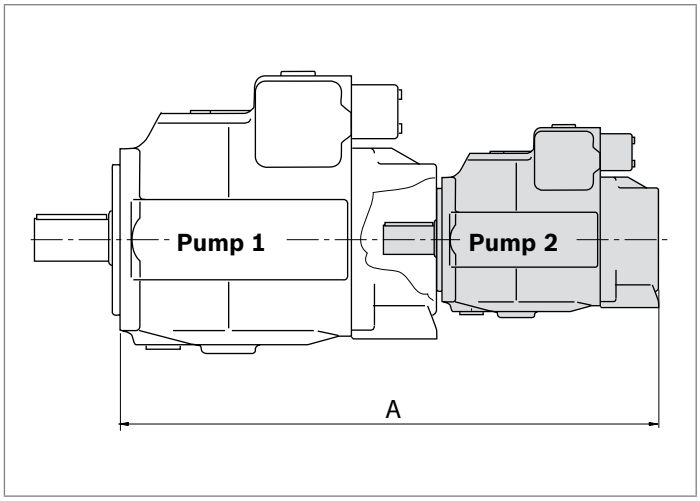
Combination pumps A4VSO + A4VSO

Total length A

A4VSO (1. pump)	A4VSO...DR...NOO (2. pump)								
	NG 40	NG 71	NG 125	NG 180	NG 250	NG 355	NG 500	NG 750	NG 1000
NG 40	554	–	–	–	–	–	–	–	–
NG 71	582	611	–	–	–	–	–	–	–
NG 125	635	664	724	–	–	–	–	–	–
NG 180	659	688	748	768	–	–	–	–	–
NG 250	719	748	808	828	904	–	–	–	–
NG 355	748	777	837	857	933	962	–	–	–
NG 500	771	800	860	880	976	1005	1110	–	–
NG 750	821	850	910	930	1026	1055	1160	1214	–
NG 1000	o	923	983	1003	1099	1128	1233	1288	1368

o = On request

By using combination pumps, it is possible to have independent circuits without the need for splitter gearboxes. When ordering combination pumps, the type designations of the 1st and 2nd pumps must be connected with a "**+**" and are combined in one part number. When ordering, the single pumps should be ordered according to type code.



Notice

- The combination pumptype code is shown in shortened form in the order confirmation.
  Example:
  A4VSO 250LR2D/30R+A4VSO 250LR2D/30R
- Each through drive is plugged with a **non-pressure resistant** cover. Before commissioning the units, they must therefore be equipped with pressure-resistant covers. Through drives can also be ordered with a pressure-resistant cover. Please specify in plain text.

Order example:
A4VSO 250LR2D/30R-PZB25U35
A4VSO 250LR2D/30R-PZB25N00
It is permissible to use a combination of two single pumps of the same size (tandem pump), considering a dynamic mass acceleration of maximum 10 *g* (= 98.1 m/s²) without additional support brackets.
For combination pumps consisting of more than two pumps, the mounting flange must be rated for the permissible moment of inertia.

POOCCA HYDRAULIC MANUFACTURING

Installation instructions

General

The axial piston unit must be filled with hydraulic fluid and air bled during commissioning and operation. This must also be observed following a longer standstill as the axial piston unit may empty via the hydraulic lines.
Particularly in the installation position “drive shaft upwards”, filling and air bleeding must be carried out completely as there is, for example, a danger of dry running.
The leakage in the housing area must be directed to the reservoir via the highest drain port (**T**, $\mathbf{K_1}$, $\mathbf{K_2}$, **R**(**T**)).
For combination pumps, the leakage must be drained off at each pump.
If a shared drain line is used for several units, make sure that the case pressure in each unit is not exceeded. The shared drain line must be sized to ensure that the maximum permissible case pressure of all connected units is not exceeded in any operating conditions, particularly on cold start. If this is not possible, lay separate drain lines, if necessary.
To achieve favorable noise values, decouple all connecting lines using elastic elements and avoid above-reservoir installation.
In all operating conditions, the suction line and drain line must flow into the reservoir below the minimum fluid level. The permissible suction height h_S results from the total pressure loss. However, it must not be higher than $h_{S\,max}$ = 800 mm. The minimum suction pressure at port **S** must also not fall below 0.8 bar absolute (without charge pump) or 0.7 bar absolute (with charge pump) during operation and during a cold start.
When designing the reservoir, ensure adequate distance between the suction line and the case drain line. This prevents the heated, and possible foaming return flow from being drawn directly back into the suction line.

Notice

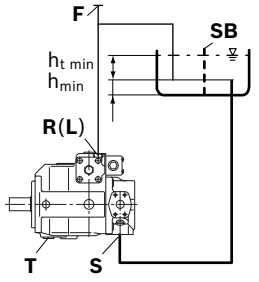
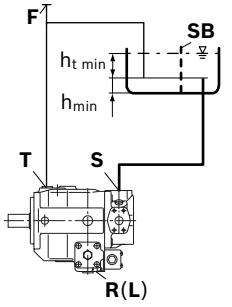
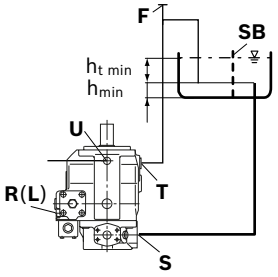
In certain installation positions, an influence on the control or closed loop control can be expected. Gravity, dead weight and case pressure can cause minor characteristic shifts and changes in response time.

Installation position

See the following examples **1** up to **7**.
Further installation positions are available upon request.
Recommended installation position: **1** and **2**

Below-reservoir installation (standard)

Below-reservoir installation means that the axial piston unit is installed outside of the reservoir and below the minimum fluid level of the reservoir.

Installation position	Air bleed	Filling
1 	R(L) + F	S + R(L)
2 	T + F	S + T
3 	T + F	S + T + U

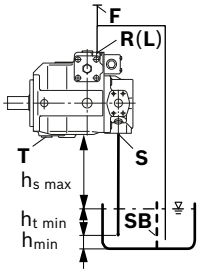
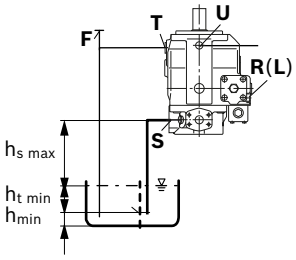
For key, see page 73

POOCCA HYDRAULIC MANUFACTURING

Above-reservoir installation

Above-reservoir installation means that the axial piston unit is installed above the minimum fluid level of the reservoir. Observe the maximum permissible suction height $h_{S\ max}$ = 800 mm.

The above reservoir installation is not recommended for sizes 180 to 1000 and is not permissible for units with charge pump (A4VS**L**O).

Installation position	Air bleed	Filling
4 	**F** + **R**(**L**)	**R**(**L**) + **F**
5[1] 	**F** + **T**	**T** + **F** + **U**

Key	
R(**L**)	Filling/air bleeding
S	Suction port
T	Drain port
U	Flushing port
K_1, **K_2**	Flushing port
SB	Baffle (baffle plate)
$h_{t\ min}$	Minimum required immersion depth (200 mm)
h_{min}	Minimum required distance to reservoir bottom (100 mm)
$h_{S\ max}$	Maximum permissible suction height (800 mm)

Inside-reservoir installation

Inside-reservoir installation is when the axial piston unit is installed in the reservoir below the minimum fluid level. The axial piston unit is completely below the hydraulic fluid.

If the minimum fluid level is equal to or below the upper edge of the pump, see chapter "**Above reservoir installation**".

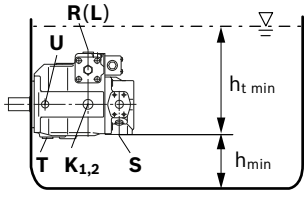
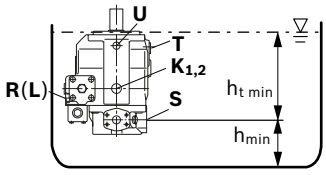
Axial piston units with electrical components (e.g., electric control, sensors) may not be installed in a reservoir below the fluid level.

The exception is adjustment HS5M

The proportional valve can be positioned separately and the piping installed at the connections **X_1** and **X_2** of the pump.

The unit can be installed in the reservoir together with the directly mounted position transducer.

Approved for HLP fluids DIN 51524.

Installation position	Air bleed	Filling
6 	Via the highest port **R(L)**	Automatically via the open port **T**, **$K_{1,2}$** due to the position under the hydraulic fluid level
7 	Via the highest open port **T**, **U**	Automatically via the open port **R(L)**, **T**, **$K_{1,2}$** due to the position under the hydraulic fluid level

Notice

Port **F** is part of the external piping and must be provided on the customer side to make filling and air bleeding easier.

1) For the high-speed version, **P_{HD}** must be filled.

POOCCA HYDRAULIC MANUFACTURING

Project planning notes

- The A4VSO axial piston variable pump is designed to be used in open circuit.
- The project planning, installation and commissioning of the axial piston unit requires the involvement of qualified skilled personnel.
- Before using the axial piston unit, please read the corresponding instruction manual completely and thoroughly. If necessary, this can be requested from Bosch Rexroth.
- Before finalizing your design, please request a binding installation drawing.
- The specified data and notes must be observed. More information on the products can be found in the data sheets on page 1.
- Depending on the operating conditions of the axial piston unit (working pressure, fluid temperature), the characteristic curve may shift.
- The characteristic curve may also shift due to the dither frequency or control electronics.
- Preservation: Our axial piston units are supplied as standard with preservative protection for a maximum of 12 months. If longer preservative protection is required (maximum 24 months), please specify this in plain text when placing your order. The preservation periods apply under optimal storage conditions, details of which can be found in the data sheet 90312 or in the instruction manual.
- Not all versions of the product are approved for use in safety functions according to ISO 13849. Please consult the responsible contact person at Bosch Rexroth if you require reliability parameters (e.g. $MTTF_d$) for functional safety.
- Depending on the type of control used, electromagnetic effects can be produced when using solenoids. Use of the recommended direct current (DC) on the electromagnet does not produce any electromagnetic interference (EMI), nor is the electromagnet influenced by EMI. Potential electromagnetic interference (EMI) exists if the solenoid is energized with a modulated direct current (e.g. PWM signal). The machine manufacturer should conduct appropriate tests and take appropriate measures to ensure that other components or operators (e.g. with a pacemaker) are not affected by the potentiality.
- Pressure controllers are not safeguards against pressure overload. Be sure to add a pressure relief valve to the hydraulic system.
- For drives that are operated for a long period with constant rotational speed, the natural frequency of the hydraulic system can be stimulated by the excitation frequency of the pump (rotational speed frequency ×9). This can be prevented with suitably designed hydraulic lines.
- Please note the details regarding the tightening torques of port threads and other threaded joints in the instruction manual.
- Working ports:
  - The ports and fastening threads are designed for the specified maximum pressure. The machine or system manufacturer must ensure that the connecting elements and lines correspond to the specified application conditions (pressure, flow, hydraulic fluid, temperature) with the necessary safety factors.
  - The working ports and function ports are only intended to accommodate hydraulic lines.

POOCCA HYDRAULIC MANUFACTURING

Safety instructions

- During and shortly after operation, there is a risk of getting burnt on the axial piston unit and especially on the solenoids. Take appropriate safety measures (e.g. by wearing protective clothing).
- Moving parts in control equipment (e.g. valve spools) can, under certain circumstances, get stuck in position as a result of contamination (e.g. impure hydraulic fluid, abrasion, or residual dirt from components). As a result, the hydraulic fluid flow and the build-up of torque in the axial piston unit can no longer meet the operator's specifications. Even the use of various filter elements (external or internal flow filtration) will not rule out a fault but merely reduce the risk. The machine/system manufacturer must test whether remedial measures are needed on the machine for the application concerned in order to set the consumer being driven to a safe position (e.g. safe stop) and if necessary to ensure it is properly implemented.

POOCCA HYDRAULIC MANUFACTURING

POOCCA HYDRAULIC

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