

Fixed displacement axial piston pump type K60N

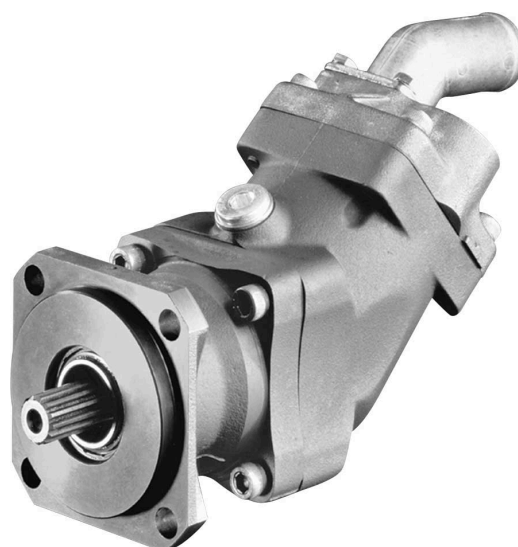
Product documentation



Open circuit

Nominal pressure $p_{\text{nom max}}$: 400 bar

Geometric displacement V_{max} : 108 cm³/rev



© by HAWE Hydraulik SE.

The reproduction and distribution of this document as well as the use and communication of its contents to others without explicit authorisation is prohibited.

Offenders will be held liable for the payment of damages.

All rights reserved in the event of patent or utility model applications.

Brand names, product names and trademarks are not specifically indicated. In particular with regard to registered and protected names and trademarks, usage is subject to legal provisions.

HAWE Hydraulik respects these legal provisions in all cases.

Printing date / document generated on: 28.10.2020

Contents

1	Overview of fixed displacement axial piston pump type K60N.....	4
2	Available versions, main data.....	5
3	Parameters.....	7
3.1	General.....	7
4	Dimensions.....	9
5	Assembly, operation and maintenance recommendations.....	10
5.1	Intended use.....	10
5.2	Assembly information.....	11
5.2.1	General information.....	11
5.2.2	Ports.....	12
5.2.3	Installation positions.....	12
5.2.4	Tank installation.....	13
5.3	Operating instructions.....	13
5.4	Maintenance information.....	14
6	Other information.....	15
6.1	Accessories, spare and individual parts.....	15
6.1.1	Suction intake.....	15
6.1.2	Bypass valve.....	16
6.2	Planning information.....	18

Overview of fixed displacement axial piston pump type K60N

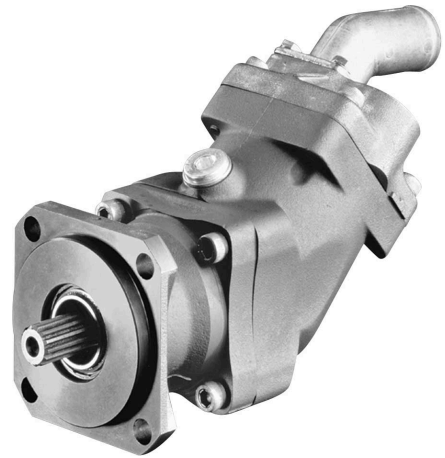
Fixed displacement axial piston pumps have a constant geometric displacement and convey a constant flow rate depending on the rotation speed. The axial piston pump type K60N is designed for open circuits in mobile hydraulics and operates based on the bent axis principle.

Features and benefits:

- Optimized power-to-weight ratio
- Slim design
- Long lifetime
- Smooth running across entire speed range

Intended applications:

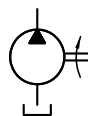
- Machines for forestry and agricultural purposes
- Loading cranes and elevating work platforms
- Truck-mounted concrete pumps
- Municipal trucks



Fixed displacement axial piston pump type K60N

2 Available versions, main data

Circuit symbol:



Order coding examples:

K60N	- 064	L	SC	N	- SBP-1-M	- A45/76
						Suction intake See Chapter 6.1.1, "Suction intake"
						Bypass valve See Chapter 6.1.2, "Bypass valve"
						Seals "Table 4"
						Shaft version and mounting flange "Table 3"
						Rotation direction "Table 2"
						Nominal size "Table 1"

Basic type

Table 1 Nominal size

Coding	Geometric displacement (cm ³ /rev)	Nominal pressure p _{max} (bar)
012	12.6	400
017	17.0	400
025	25.4	400
034	34.2	400
040	41.2	400
047	47.1	400
056	56.0	400
064	63.6	400
084	83.6	400
108	108.0	400

Table 2 Rotation direction

Coding	Description
R	Clockwise
L	Anticlockwise

Table 3 Shaft version and mounting flange

Coding	Spline shaft	Flange	Nominal size
SB	SAE-B J 744 13T 16/32 DP 22-4 DIN ISO 3019-1	SAE-B 4-hole J 744 101-4 DIN ISO 3019-1	012, 017, 025, 034, 040, 047, 056, 064
SC	SAE-C J 744 14T 12/24 DP 32-4 DIN ISO 3019-1	SAE-C 4-hole J 744 127-4 DIN ISO 3019-1	040, 047, 056, 064, 084, 108

Table 4 Seals

Coding	Description
N	NBR

3 Parameters

3.1 General

General information

Designation	Axial piston pump
Design	Axial piston pump based on bent axis design
Mounting	Mounting flange as per DIN ISO 3019-1
Rotation direction	Clockwise or anticlockwise
Change of rotating direction	Turning the end of the pump (see Chapter 4, "Dimensions") by 180° Tightening torque of the four screws on the end: Nominal size <ul style="list-style-type: none"> ▪ 012 ... 064: 70 Nm ▪ 084, 108: 100 Nm
Material	Cast iron
Tightening torques	See Chapter 4, "Dimensions"
Installation position	Any (for installation information see Chapter 5, "Assembly, operation and maintenance recommendations")
Hydraulic fluid	Hydraulic oil: in accordance with DIN 51 524 part 2 and 3; ISO VG 10 to 68 in accordance with DIN 51 519 Viscosity range: min. approx. 10, max. approx. 700 mm ² /s Optimal operating range: approx. 20 – 40 mm ² /s Also suitable for biologically degradable hydraulic fluids type HEES (synthetic ester) at operating temperatures up to approx. +70°C.
Cleanliness level	ISO 4406 <hr/> 18/16/13
Temperatures	Ambient: approx. -40 to +60°C, oil: -25 to +80°C, pay attention to the viscosity range! Start temperature: down to -40°C is permissible (observe start-viscosity!), as long as the steady-state temperature is at least 20K higher for subsequent operation. Biologically degradable pressure fluids: note manufacturer specifications. With consideration for the seal compatibility, not above +70°C.

Weight

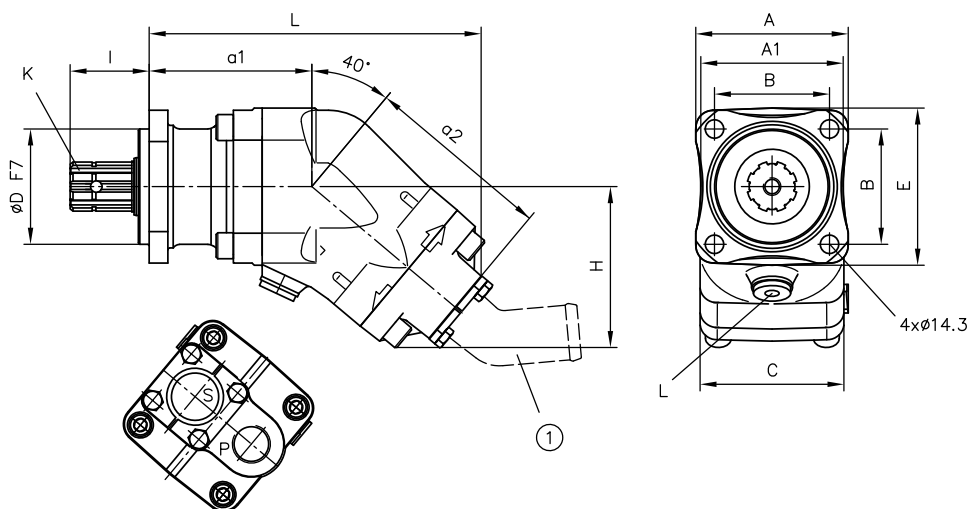
K60N	Nominal size	SAE standard	Weight
	012	SAE B	= 8.7 kg
017	= 8.6 kg		
025	= 8.9 kg		
034	= 8.8 kg		
040, 047, 056	= 12.3 kg		
064	= 12.2 kg		
040, 047, 056	SAE C	= 14.3 kg	
064		= 14.1 kg	
084		= 19.0 kg	
108		= 19.0 kg	

Additional parameters

Designation		Nominal size									
		012	017	025	034	040	047	056	064	084	108
Absolute inlet pressure required in open circuit	bar	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Max. rotation speed, continuously (n_{nom})	rpm	2300	2300	2300	2300	1900	1900	1900	1900	1500	1500
Max. rotation speed, briefly (n_{max})	rpm	3000	3000	3000	3000	2500	2500	2500	2500	2000	2000
Flow rate at 500 rpm	lpm	6.3	8.5	12.7	17.1	20.6	23.5	28.0	31.8	41.5	54.0
Flow rate at 1000 rpm	lpm	12.6	17.0	25.4	34.2	41.2	47.1	56.0	63.6	83.6	108.0
Flow rate at 1500 rpm	lpm	18.9	25.5	38.1	51.3	61.8	70.6	84.0	95.4	125.4	162.0
Required drive torque at 100 bar	Nm	21	28	43	57	69	79	94	107	140	181
Drive power at 250 bar and 1,500 rpm	kW	8	11	17	23	27	31	37	42	55	71
Weight torque	Nm	6.9	6.9	7.4	7.4	13	13	13	13	21	21

4 Dimensions

All dimensions in mm, subject to change.



1 Suction intake

Ports (ISO 228-1)

P	Pressure connection G 3/4 (BSPP) (nominal size K61N-012...064)
	Pressure connection G 1 (BSPP) (nominal size K61N-084...108)
S	Flange suction port
L	Drain port G 1/2 (BSPP)

Nominal size	Coding	K	L	H	A	A1	B	C	ØD	E	l	a1	a2
012 ... 034	SB	SAE-B J 744	202	97	97	89	89.8	87	101.6	99	41	101	117
040 ... 064		13T 16/32 DP 22-4 DIN ISO 3019-1	228	112	106	99	89.8	95.5	101.6	109	41	117	130
040 ... 064	SC	SAE-C J 744	228	112	106	99	114.5	95.5	127	109	56	119	130
084 ... 108		14T 12/24 DP 32-4 DIN ISO 3019-1	259	126	123	115	114.5	115	127	126	56	128	147

5.1 Intended use

This pump is exclusively intended for hydraulic applications (fluid engineering).

The user must observe the safety measures and warnings in this documentation.

Essential requirements for the product to function correctly and safely:

- All information in this documentation must be observed. This applies in particular to all safety measures and warnings.
- The product must only be assembled and put into operation by qualified personnel.
- The product must only be operated within the specified technical parameters. The technical parameters are described in detail in this documentation.
- All components must be suitable for the operating conditions in the event of application in an assembly.
- The operating and maintenance manual of the components, assemblies and the specific complete system must also always be observed.

If the product can no longer be operated safely:

1. Remove the product from operation and mark it accordingly.
- ✓ It is then not permitted to continue using or operating the product.

5.2 Assembly information

The product must only be installed in the complete system with standard and compliant connection components (screw fittings, hoses, pipes, fixtures etc.).

The product must be shut down correctly prior to dismantling (in particular in combination with hydraulic accumulators).



DANGER

Risk to life caused by sudden movement of the hydraulic drives when dismantled incorrectly!

Risk of serious injury or death.

- Depressurise the hydraulic system.
- Perform safety measures in preparation for maintenance.

5.2.1 General information

The K60N fixed displacement axial piston pump is designed for use in an open or semi-closed circuit.

It can be mounted on the usual mounting points (e.g. power take-off gearbox, combustion engine or electric drive, cardan shaft) using a flange mounting.

A change of rotating direction is possible by turning the connection cover. For conversion instructions, please contact HAWE Hydraulik.

During assembly, note the following principles:

Only trained persons are allowed to mount or remove the pump. Always ensure absolute cleanliness to prevent contamination from affecting the pump.

- Remove all plastic plugs before operation.
- Avoid installation above the tank (see [Chapter 5.2.3, "Installation positions"](#))
- Before initial use, fill the pump with hydraulic fluid and bleed. Automatic pump filling via the suction line by opening the drain ports is not possible.
- Never drain the pump.
- Always supply the pump with hydraulic fluid from the start. Even just a short period with insufficient hydraulic fluid can damage the pump. Such damage is not immediately visible once the pump is put into operation.
- Hydraulic fluid which flows back into the tank must not be sucked back in immediately (install baffles!).
- Before first use, run the pump for approx. 10 minutes at max. 50 bar after initial start-up.
- Do not use the entire pressure range of the pump until it has been thoroughly bled and flushed.
- From the start, always keep the temperature within the specified range (see [Chapter 3, "Parameters"](#)). Never exceed the maximum temperature.
- Always comply with the cleanliness level of the hydraulic fluid. In addition, always filter the hydraulic fluid appropriately (see [Chapter 3, "Parameters"](#)).
- Self-installed filters in the suction line must be approved beforehand by HAWE Hydraulik.
- A system pressure-limiting valve must be installed in the pressure line so that the maximum system pressure is not exceeded.

5.2.2 Ports

The nominal width of the connecting lines depends on the specified operating conditions, the viscosity of the hydraulic fluid, the start-up and operating temperatures and the rotation speed of the pump. In principle we recommend the use of hose lines due to the superior damping characteristics.

Pressure connection

The pressure connection for type K60N-012...064 is established via a threaded connection G 3/4 (BSPP), for type K60N-084...108 via a threaded connection G 1 (BSPP).

Suction port

The suction port on all pumps is established via standardised suction intakes with a size which depends on the max. delivery flow of the pump.

The specifications of the max. delivery flow Q_{\max} must be observed. These can be found in the table (see [Chapter 6.1, "Accessories, spare and individual parts"](#))

The suction intakes can be ordered as an option with the pump.

If possible, route the suction line to the tank on a rising gradient. This allows trapped air to escape. Observe the specifications in Installation positions [Chapter 5, "Assembly, operation and maintenance recommendations"](#). The absolute suction pressure must not fall below 0.85 bar. A hose line should generally be used in preference to a rigid pipe line.

Drain port

The K60N pumps have one drain port G 1/2 (BSPP).

The nominal width of the leakage line must not be less than 16 mm. The cross-section is determined by the max. permissible housing pressure.

Integrate the leakage line in the system in such a way as to prevent direct connection with the suction line of the pump. Both drain ports can be used simultaneously.

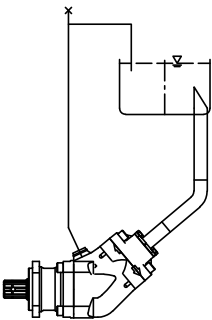
A separate leakage line from the controller to the tank is not required. Observe the specifications in [Chapter 5.2.3, "Installation positions"](#).

5.2.3 Installation positions

The K60N fixed displacement axial piston pump can be mounted in any installation position.

Horizontal installation: (pump below the min. fill level)

⇒ For horizontal installation, use the uppermost drain port



5.2.4 Tank installation

Tank installation (pump below the min. fill level)

The pump can be operated either with or without a suction intake. It is recommended to use a short suction intake (see [Chapter 6.1, "Accessories, spare and individual parts"](#)).



5.3 Operating instructions

Note product configuration and pressure / flow rate

The statements and technical parameters in this documentation must be strictly observed. The instructions for the complete technical system must also always be followed.

i NOTE

- Read the documentation carefully before usage.
- The documentation must be accessible to the operating and maintenance staff at all times.
- Keep documentation up to date after every addition or update.

Purity and filtering of the hydraulic fluid

Fine contamination can significantly impair the function of the hydraulic component. Contamination can cause irreparable damage.

Examples of fine contamination include:

- Metal chips
- Rubber particles from hoses and seals
- Dirt due to assembly and maintenance
- Mechanical debris
- Chemical ageing of the hydraulic fluid

i NOTE

New hydraulic fluid from the manufacturer does not necessarily have the required level of purity. The hydraulic fluid must be filtered during filling.

Pay attention to the cleanliness level of the hydraulic fluid to maintain faultless operation. (Also see cleanliness level in [Chapter 3, "Parameters"](#)).

Additionally applicable document: [D 5488/1](#) Oil recommendations

5.4 Maintenance information

Conduct a visual inspection at regular intervals, but at least once per year, to check if the hydraulic connections are damaged. If external leakages are found, shut down and repair the system.

Clean the device surface of dust deposits and dirt at regular intervals, but at least once per year.

6 Other information

6.1 Accessories, spare and individual parts

6.1.1 Suction intake

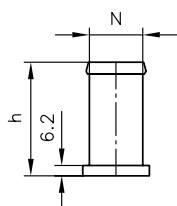
Order coding example:

K60N - 064 RSBN - A45/50

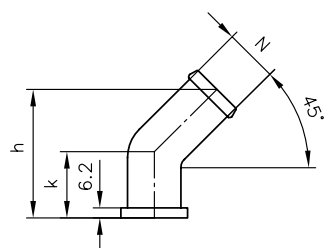
Table of suction intakes (including attachment kit)

Nominal width (N)	Flow rate Q_{max} (lpm)	Geometric shape										
		Straight		45°		90°		Thread				
		A00/..		A45/..		A90/..		A.				
			h		k	h		k	h		h	
K60N - 012 ... 064												
32 (1 1/4")	50	●	56	--	--	--	--	--	--	--	--	--
38 (1 1/2")	65	●	65	●	40	85	●	70	53	--	--	--
42 (1 5/8")	85	--	--	●	40	85	--	--	--	--	--	--
45 (1 3/4")	110	--	--	●	40	85	--	--	--	--	--	--
50 (2")	120	●	65	●	40	96	●	84	53	--	--	--
64 (2 1/2")	165	--	--	●	40	96	--	--	--	--	--	--
5 (G 1)	50	--	--	--	--	--	--	--	--	●	29	--
K60N - 084 ... 108												
38 (1 1/2")	65	●	65	--	--	--	●	70	53	--	--	--
42 (1 5/8")	85	--	--	●	40	85	--	--	--	--	--	--
45 (1 3/4")	110	--	--	●	40	85	--	--	--	--	--	--
50 (2")	120	●	65	●	40	96	●	84	53	--	--	--
64 (2 1/2")	165	●	90	●	40	96	●	130	108	--	--	--
75 (3")	260	●	106	●	40	106	--	--	--	--	--	--
6 (G 1 1/4)	80	--	--	--	--	--	--	--	--	●	29	--

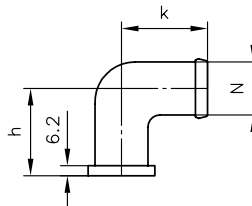
A00/..



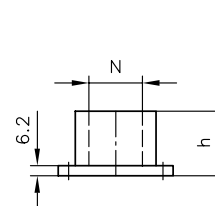
A45/..



A90/..

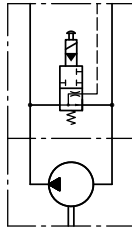


A5, A6



6.1.2 Bypass valve

Circuit symbol:



Order coding example:

K60N	- 025	RSBN	- SBP-1-M	- 12V
			Bypass valve	Nominal voltage See electrical parameters
				Nominal size

Coding	Description	Nominal size
SBP-1-M	Bypass valve for K60N	012, 017, 025, 034, 040, 047, 056, 064
SBP-2-M		084, 108

Weight

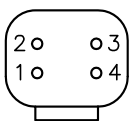
Coding	Weight
SBP-1-M	= 2.95 kg
SBP-2-M	= 3.35 kg

Electrical parameters

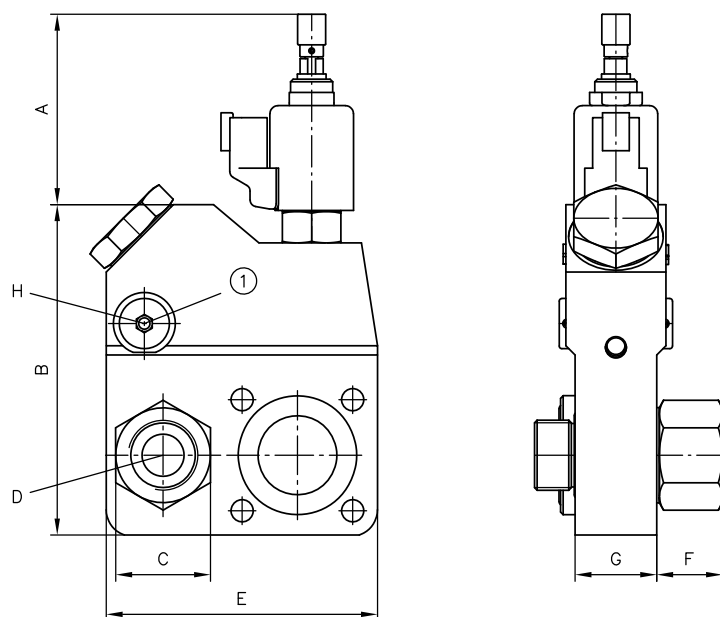
Nominal voltage	12 V DC	24 V DC
Limit current I_G	1.67 A	0.83 A
Nominal power P_N	23 W	23 W
Actuated time	S1 (100%)	
Protection class	IP 69K	
Electrical connection	Deutsch DT04-2P	

Electrical connection

DT



Dimensions



1 Drain port

Coding	A	B	C	E	F	G	Ports (ISO 228-1) (BSPP)	
							D	H
SBP-1-M	63	126	36	103	25	31	G 3/4"	G 1/4"
SBP-2-M	51	139	41	119	27.5	31	G 1"	G 3/8"

6.2 Planning information

Determination of nominal sizes

Delivery flow

$$Q = \frac{V_g \cdot n \cdot \eta_v}{1000} \text{ (l/min)}$$

Q = Flow rate (lpm)

Drive torque

$$M = \frac{V_g \cdot \Delta p}{20 \cdot \pi \cdot \eta_{mh}} \text{ (Nm)}$$

M = Torque (Nm)

P = Power (kW)

Drive power

$$P = \frac{2\pi \cdot M \cdot n}{60000} = \frac{Q \cdot \Delta p}{600 \cdot \eta_t} \text{ (kW)}$$

V_g = Geom. output volume (cm³/rev.)

Δp = Differential pressure

n = Rotation speed (rpm)

η_v = Volumetric efficiency

η_{mh} = Mechanical-hydraulic efficiency

η_t = Overall efficiency ($\eta_t = \eta_v \cdot \eta_{mh}$)

Further information

Additional versions

- Axial piston pump type K61N: D 7961 K
- Variable displacement axial piston pump type V60N: D 7960 N
- Variable displacement axial piston pump type V30D: D 7960
- Variable displacement axial piston pump type V30E: D 7960 E
- Variable displacement axial piston pump type V80M: D 7962 M
- Axial piston motors type M60N: D 7960 M