SAFA HYDRAULICS

PA-SAE

Bent Axis Pumps

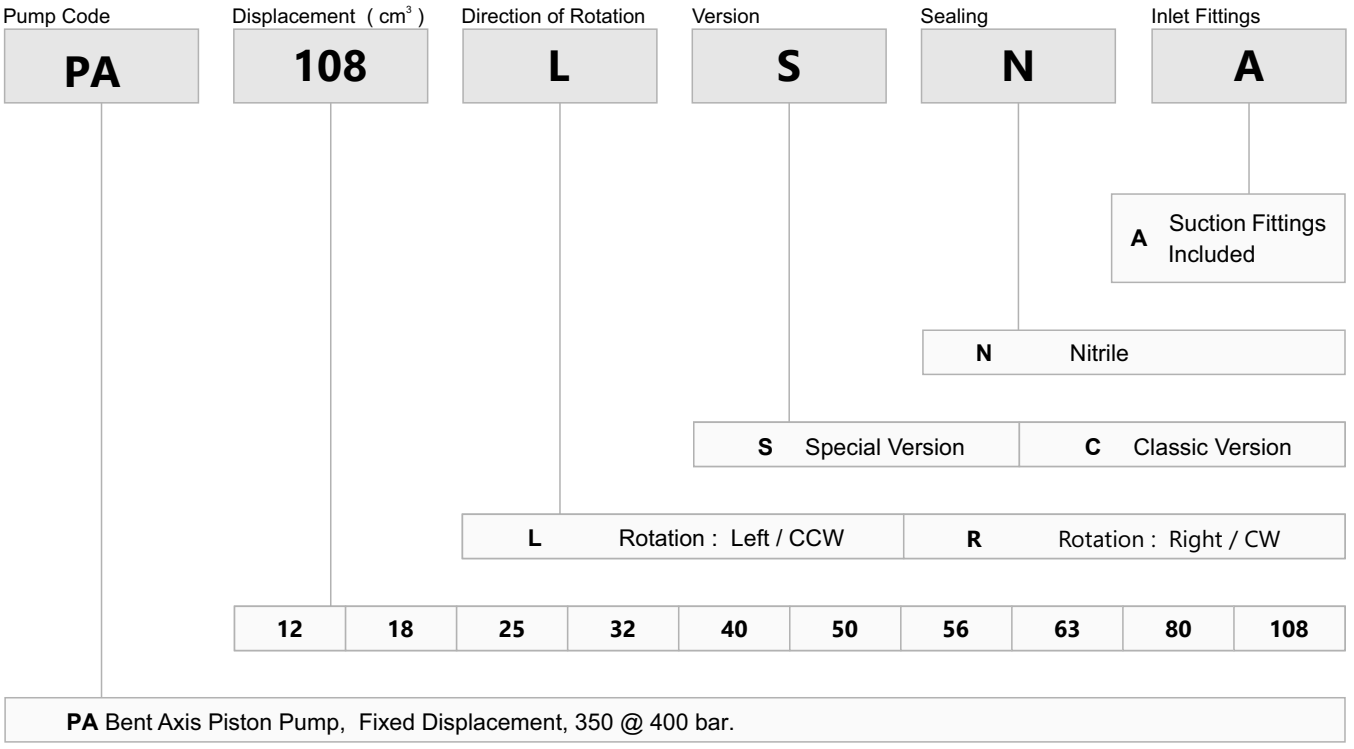
SAE Mounting Flange, Flange, 2 Bolt, 6 Bolt, 12cc to 130cc

SAE Mounting Flange, High Pressure Bent Axis Piston Pumps. Bi-Directional Rotation.
Displacement Range starting at; 12cc, 18cc, 25cc, 32cc, 40cc, 50cc, 63cc, 80cc, 108cc, 130cc
High Rotational Speed, High Pressure, Slim Design, High Efficiency.

info@safahydraulic.com

www.safahydraulic.com

Ordering Code of PA Pumps



Classic Version ; Default design

Special Version ; Back Cover
Drive Shaft
Mounting Flange

Formulas			
Pump Output Flow	GPM	GPM = (Speed (rpm) × disp. (cu. in.)) / 231	GPM = (n ×d) / 231
Pump Input Horsepower	HP	HP = GPM × Pressure (psi) / 1714 × Efficiency	HP = (Q ×P) / 1714 × E
Pump Efficiency	E	Overall Efficiency = Output HP / Input HP	Eoverall = HPOut / HPIn X 100
		Overall Efficiency = Volumetric Eff. × Mechanical Eff.	EOverall = EffVol. × EffMech.
Pump Volumetric Efficiency	E	Volumetric Efficiency = Actual Flow Rate Output (GPM) / Theoretical Flow Rate Output (GPM) × 100	EffVol. = QAct. / QTheo. X 100
Pump Mechanical Efficiency	E	Mechanical Efficiency = Theoretical Torque to Drive / Actual Torque to Drive × 100	EffMech = TTheo. / TAct. × 100
Pump Displacement	CIPR	Dsplcmnt (In.3 / rev.) = Flow Rate (GPM) × 231 / Pump RPM	CIPR = GPM × 231 / RPM
Pump Torque	T	Torque = Horsepower × 63025 / RPM	T = 63025 × HP / RPM
		Torque = Pressure (PSIG) × Pump Displacement (CIPR) / 2π	T = P × CIPR / 6.28

Horsepower for driving a pump : For every 1 hp of drive, the equivalent of 1 gpm @ 1500 psi can be produced.

Horsepower for idling a pump : To idle a pump when it is unloaded will require about 5% of it's full rated power

Wattage for heating hydraulic oil : Each watt will raise the temperature of 1 gallon of oil by 1° F. per hour.

Flow velocity in hydraulic lines : Pump suction lines 2 to 4 feet per second, pressure lines up to 500 psi - 10 to 15 ft./sec., pressure lines 500 to 3000 psi - 15 to 20 ft./sec.; all oil lines in air-over-oil systems; 4 ft./sec.

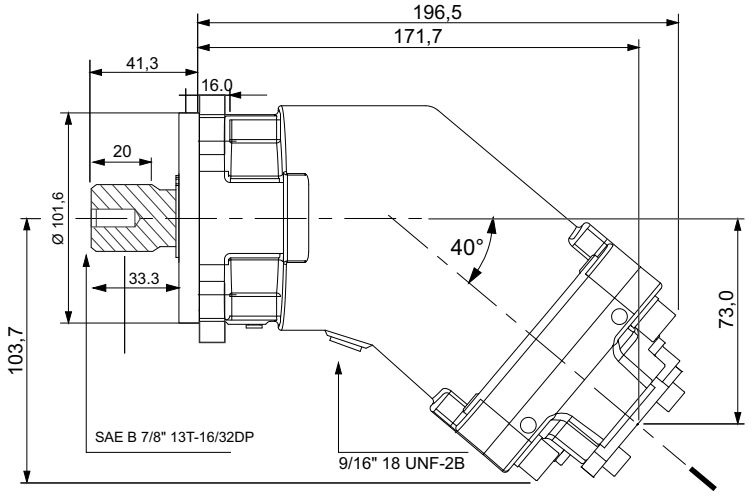
Technical Data

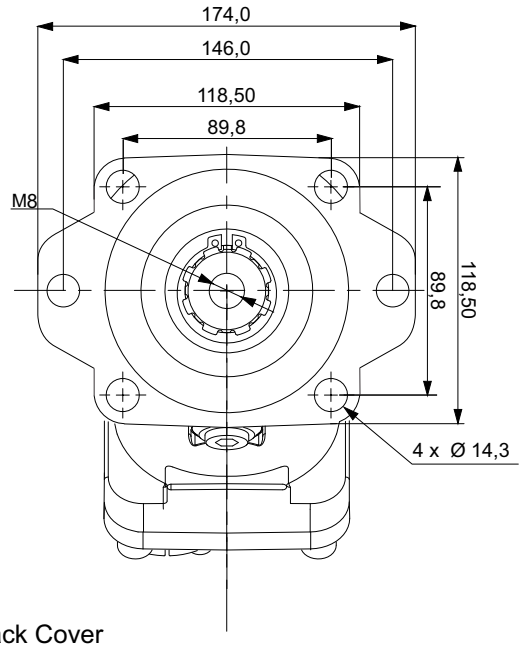
		12	18	25	32	40	50	56	63	80	108
Displacement	***cc***	12,00	18,00	25,00	32,00	40,20	50,00	56,40	63,00	80,00	108,4
Theoretical oil flow l/min at pump speed	***1000 rpm***	12,00	18,00	25,00	32,00	40,20	50,00	56,40	63,00	80,00	108,4
	1500 rpm	18,00	27,00	37,50	48,00	60,30	75,00	84,60	94,50	120,0	162,6
Maximum Pump Speed											
- Continuous	***rpm***	2300	2300	2300	2250	1900	1900	1900	1900	1700	1700
- Limited	***rpm***	3100	2900	2700	2700	2500	2500	2300	2300	2100	1900
Max. Continuous Pressure	***bar***	350	350	350	350	350	350	350	350	350	350
Max. Intermit. Peak Pressure	***bar***	400	400	400	400	400	400	400	400	400	400
Max. Torque at 350 bar	***Nm***	71	105	146	190	240	292	330	360	460	620
Weight											
- Without inlet fitting	***kg***	10,00	10,00	10,50	11,50	11,50	12,00	12,50	12,50	16,00	16,50
- With inlet fitting	***kg***	10,40	10,40	10,90	11,90	11,90	12,40	12,90	12,90	16,40	16,90
Rotation		cw,ccw	cw,ccw	cw,ccw	cw,ccw	cw,ccw	cw,ccw	cw,ccw	cw,ccw	cw,ccw	cw,ccw

PA 12

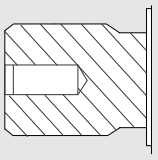
SAE B 7/8" 13T-16/32DP

SAE B2 & B4 BOLT MOUNTING (**SAE J744**)

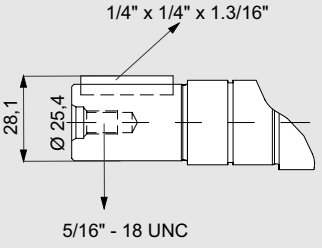




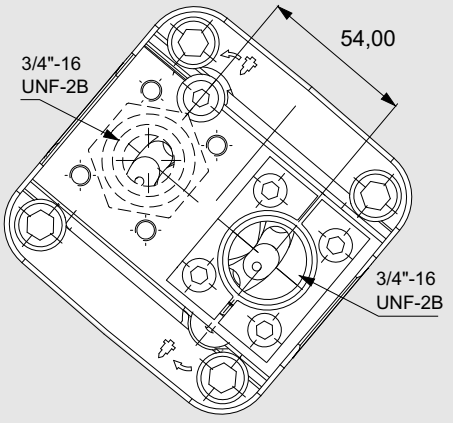
Spline Shaft



Keyed Shaft

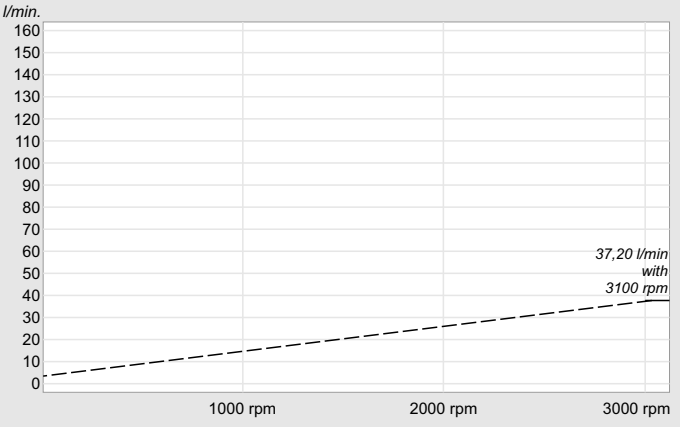


Back Cover



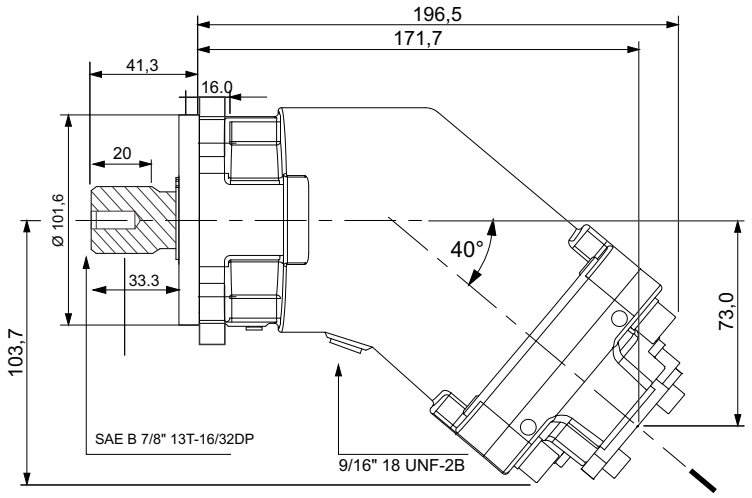
x 1000 rpm	12,00 cc
x 1500 rpm	18,00 cc
Max. Continuous Pump Speed	2300 rpm
Max. Limited Pump Speed	3100 rpm
Max. Continuous Pressure	350 bar
Max. Intermit. Peak Pressure	400 bar
Max. Torque at 350 bar	71 Nm
Weight without inlet fitting	10,00 kg
Weight with inlet fitting	10,40 kg
Rotation	CW-CCW

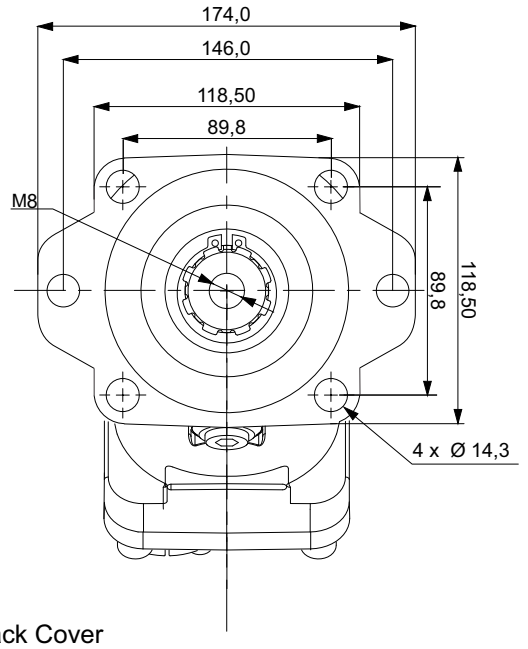
Flow, Speed, Pressure List of PA *12*



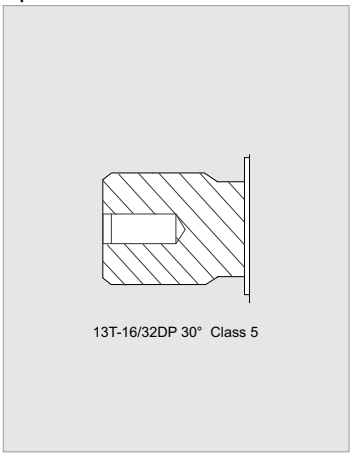
SAE B 7/8" 13T-16/32DP

SAE B2 & B4 BOLT MOUNTING (**SAE J744**)

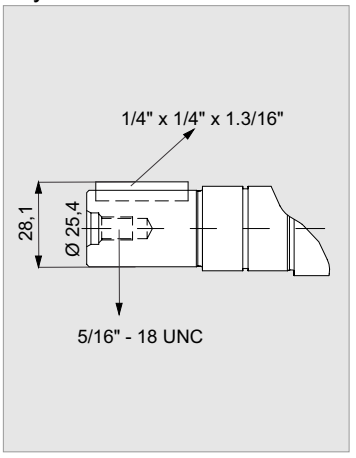




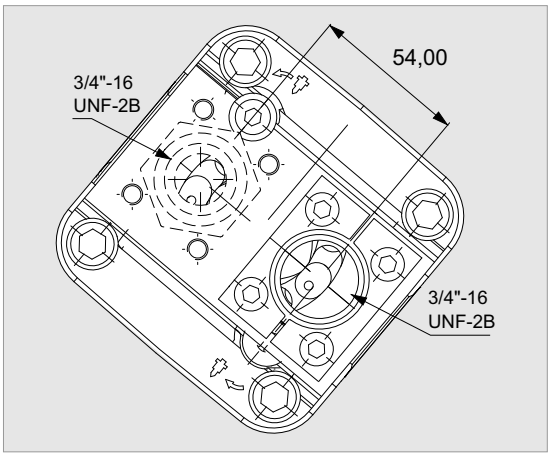
Spline Shaft



Keyed Shaft

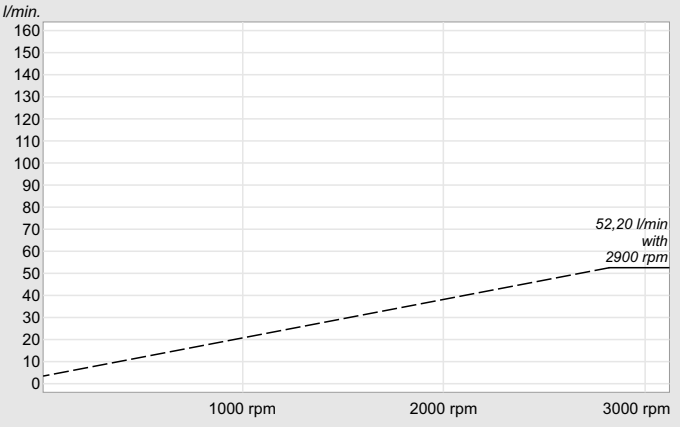


Back Cover



x 1000 rpm	18,00 cc
x 1500 rpm	27,00 cc
Max. Continuous Pump Speed	2300 rpm
Max. Limited Pump Speed	2900 rpm
Max. Continuous Pressure	350 bar
Max. Intermit. Peak Pressure	400 bar
Max. Torque at 350 bar	105 Nm
Weight without inlet fitting	10,00 kg
Weight with inlet fitting	10,40 kg
Rotation	CW-CCW

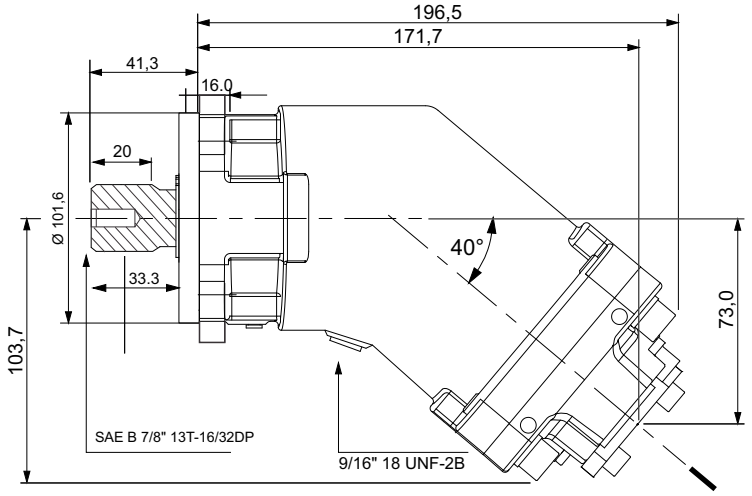
Flow, Speed, Pressure List of PA *18*

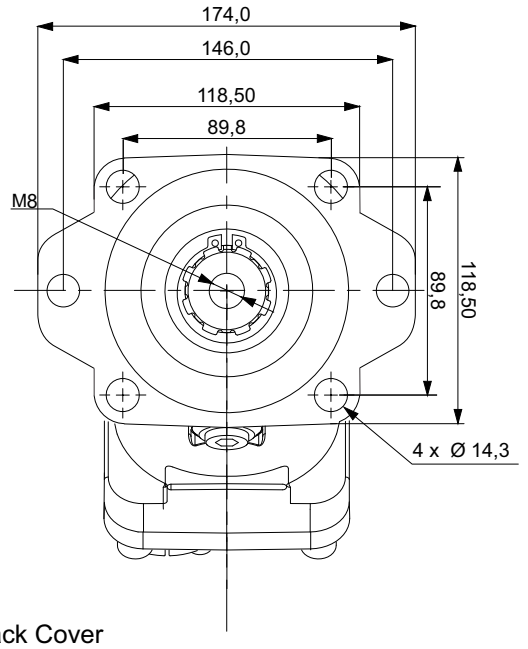


PA 25

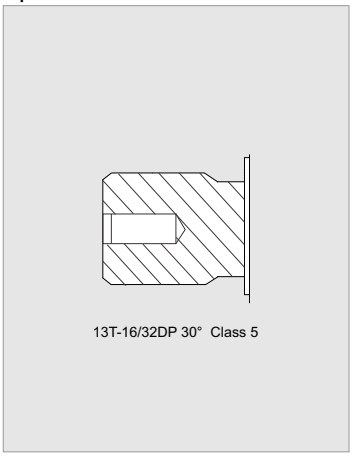
SAE B 7/8" 13T-16/32DP

SAE B2 & B4 BOLT MOUNTING (**SAE J744**)

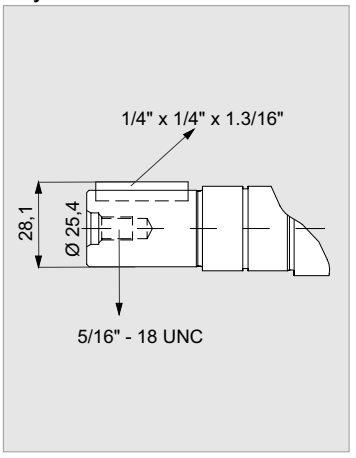




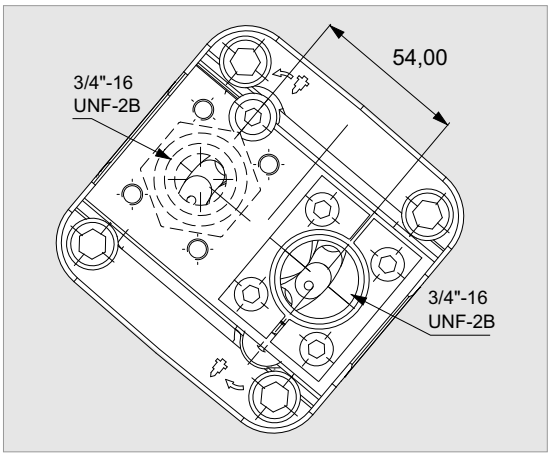
Spline Shaft



Keyed Shaft

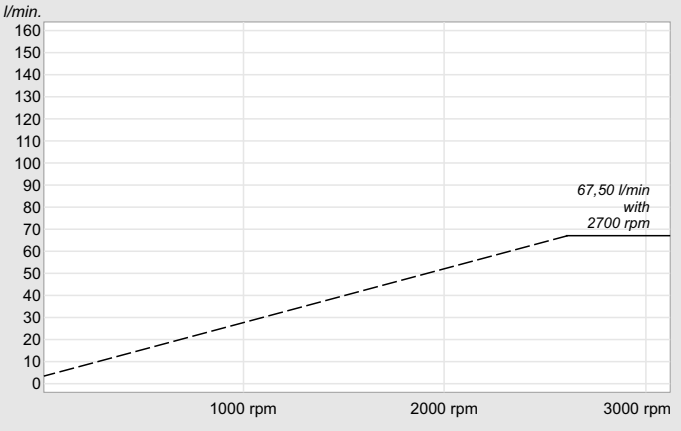


Back Cover



x 1000 rpm	25,00 cc
x 1500 rpm	37,50 cc
Max. Continuous Pump Speed	2300 rpm
Max. Limited Pump Speed	2700 rpm
Max. Continuous Pressure	350 bar
Max. Intermit. Peak Pressure	400 bar
Max. Torque at 350 bar	146 Nm
Weight without inlet fitting	10,50 kg
Weight with inlet fitting	10,90 kg
Rotation	CW-CCW

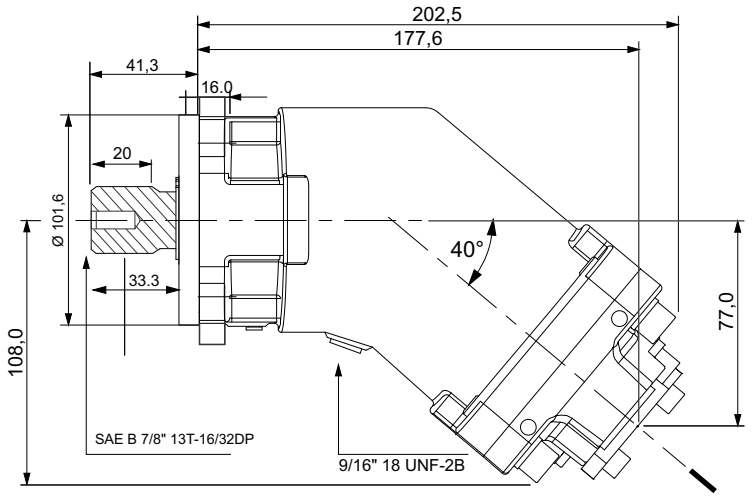
Flow, Speed, Pressure List of PA *25*

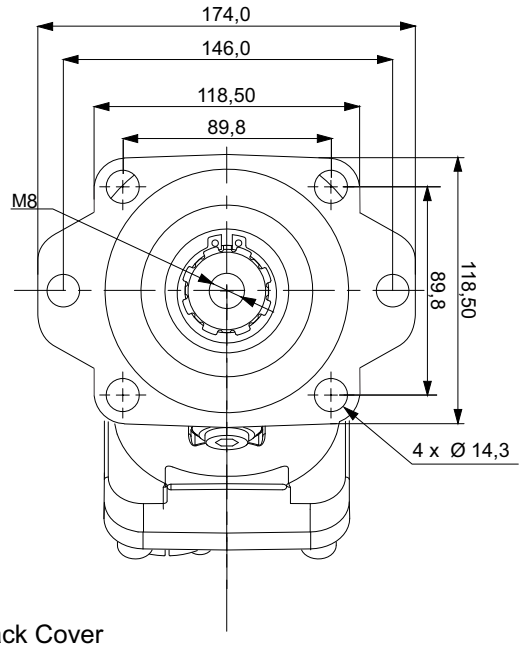


PA 32

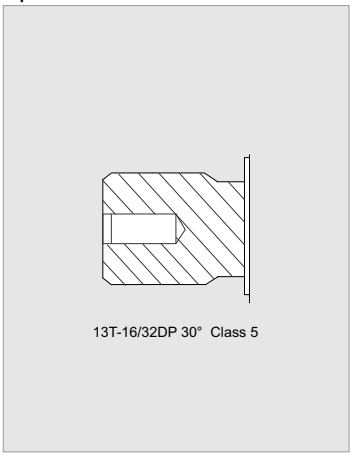
SAE B 7/8" 13T-16/32DP

SAE B2 & B4 BOLT MOUNTING (**SAE J744**)

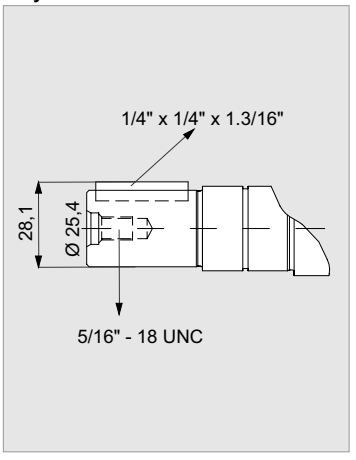




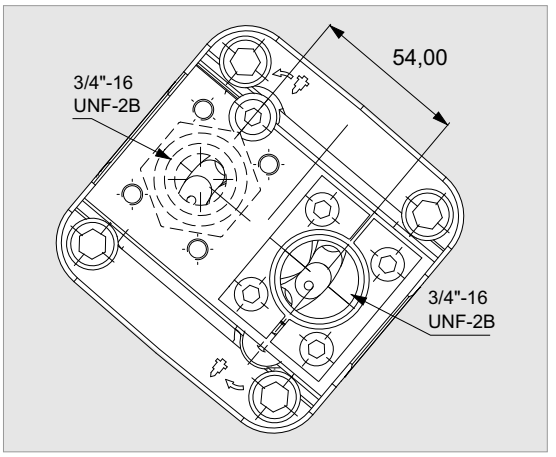
Spline Shaft



Keyed Shaft

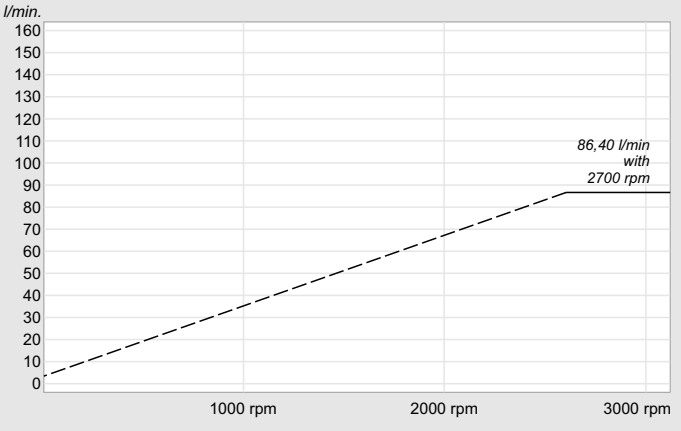


Back Cover



x 1000 rpm	32,00 cc
x 1500 rpm	48,00 cc
Max. Continuous Pump Speed	2250 rpm
Max. Limited Pump Speed	2700 rpm
Max. Continuous Pressure	350 bar
Max. Intermit. Peak Pressure	400 bar
Max. Torque at 350 bar	190 Nm
Weight without inlet fitting	11,50 kg
Weight with inlet fitting	11,90 kg
Rotation	CW-CCW

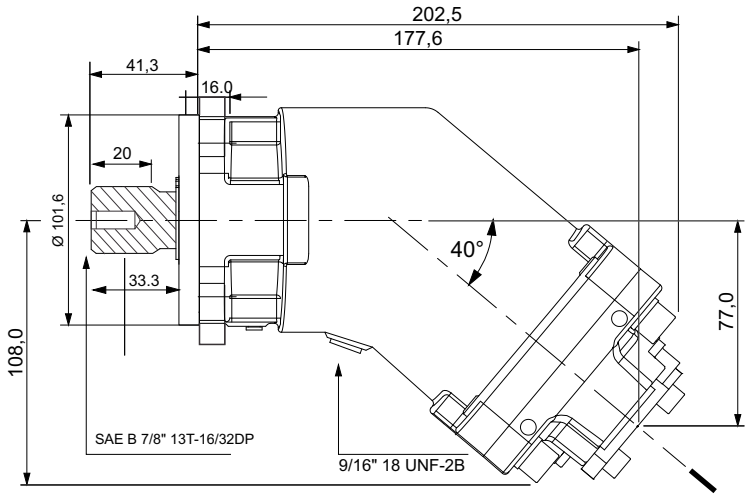
Flow, Speed, Pressure List of PA *32*

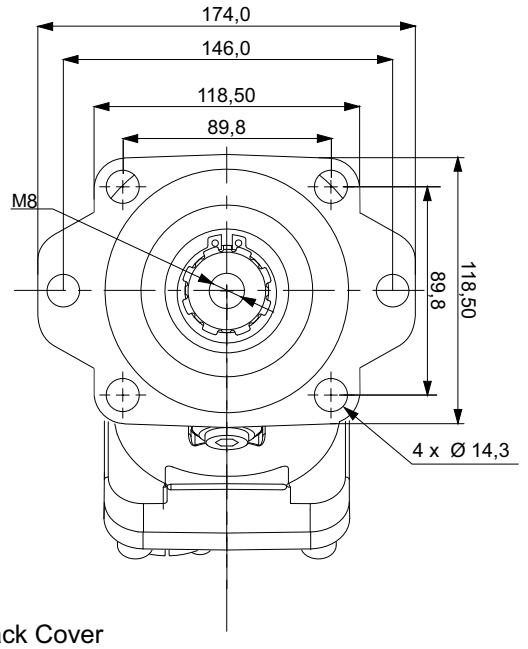


PA 40

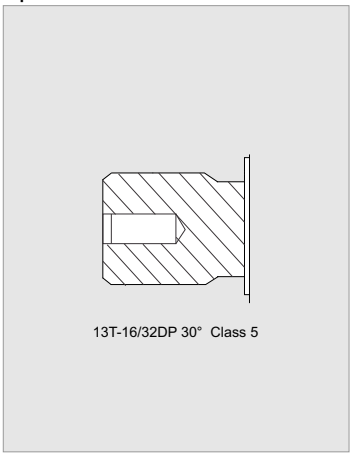
SAE B 7/8" 13T-16/32DP

SAE B2 & B4 BOLT MOUNTING (**SAE J744**)

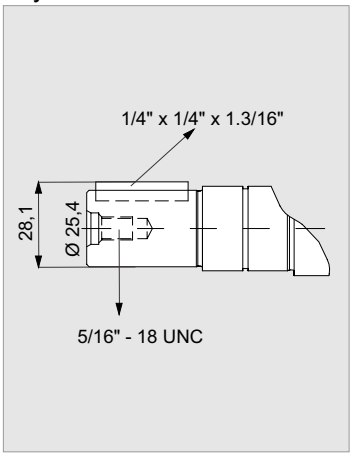




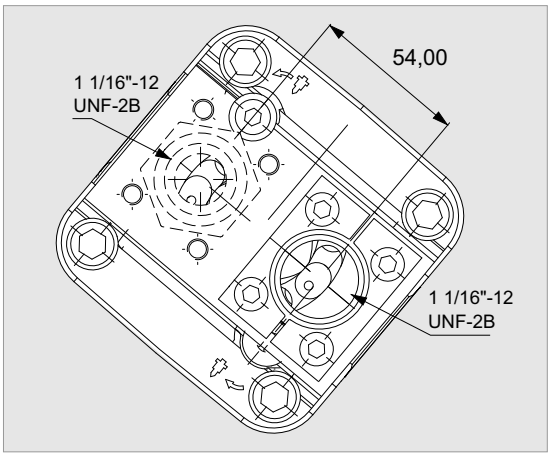
Spline Shaft



Keyed Shaft

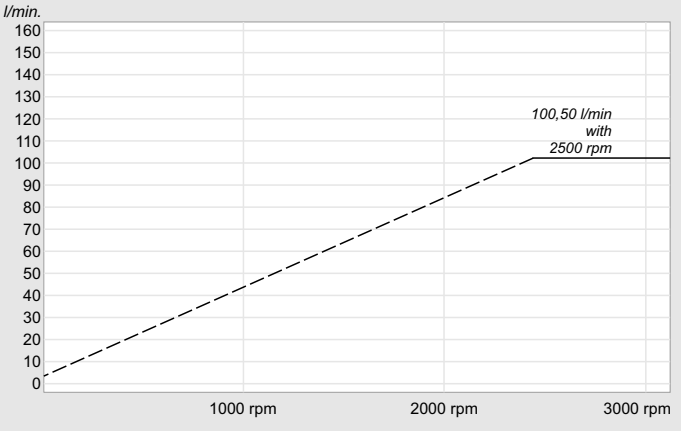


Back Cover



x 1000 rpm	40,20 cc
x 1500 rpm	60,30 cc
Max. Continuous Pump Speed	1900 rpm
Max. Limited Pump Speed	2500 rpm
Max. Continuous Pressure	350 bar
Max. Intermit. Peak Pressure	400 bar
Max. Torque at 350 bar	240 Nm
Weight without inlet fitting	11,50 kg
Weight with inlet fitting	11,90 kg
Rotation	CW-CCW

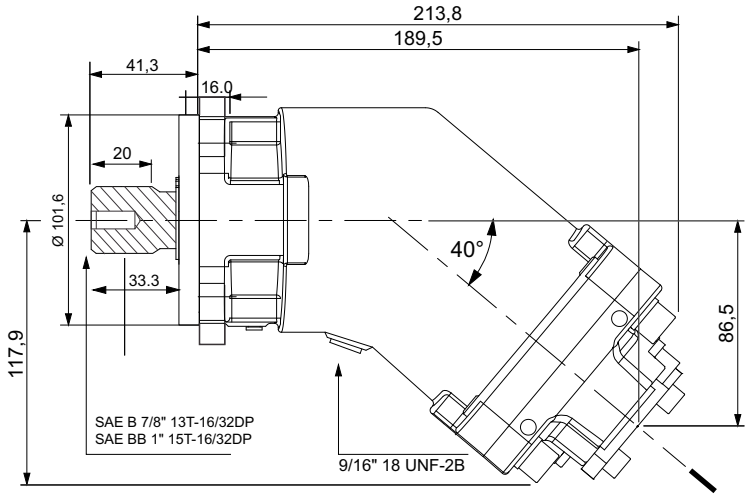
Flow, Speed, Pressure List of PA *40*

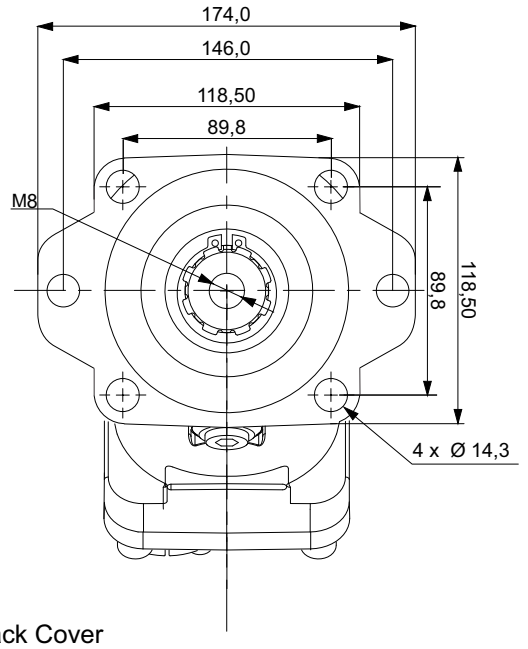


PA 50

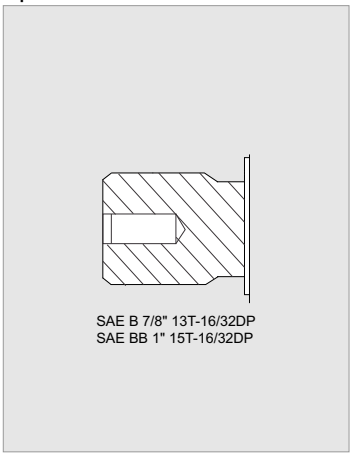
SAE B 7/8" 13T-16/32DP
SAE BB 1" 15T-16/32DP

SAE B2 & B4 BOLT MOUNTING (**SAE J744**)

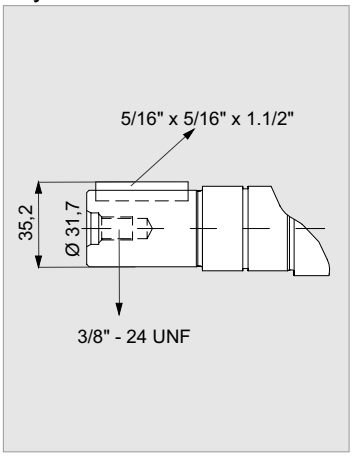




Spline Shaft



Keyed Shaft



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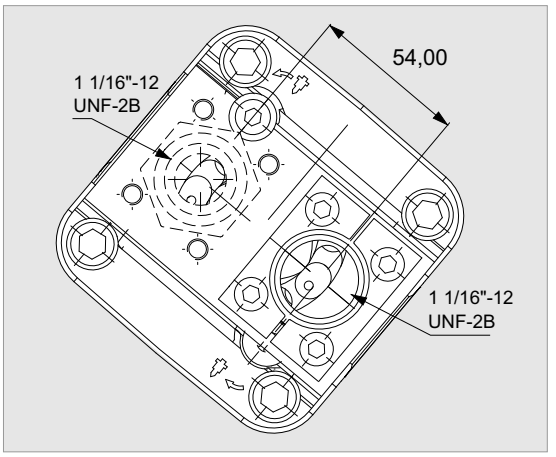
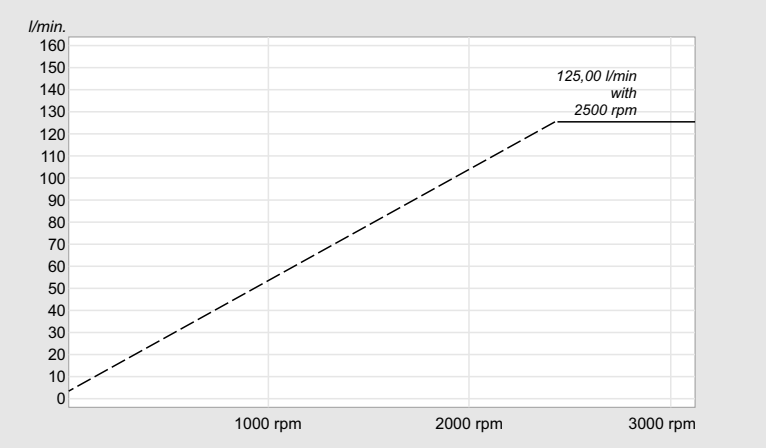


Flow, Speed, Pressure List of PA *50*

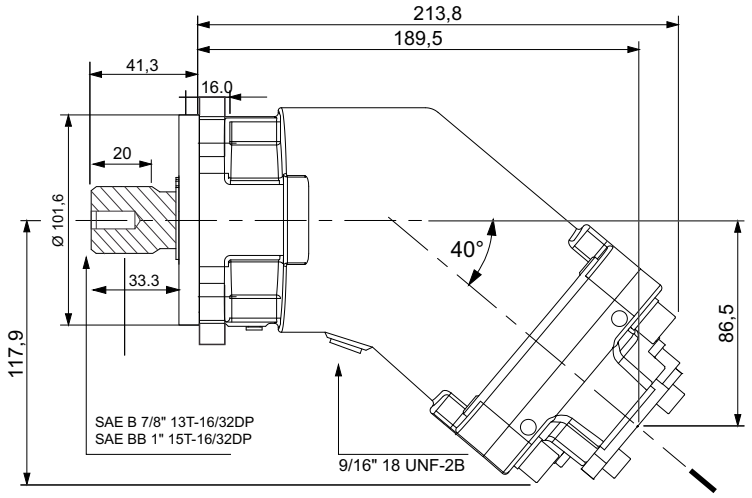


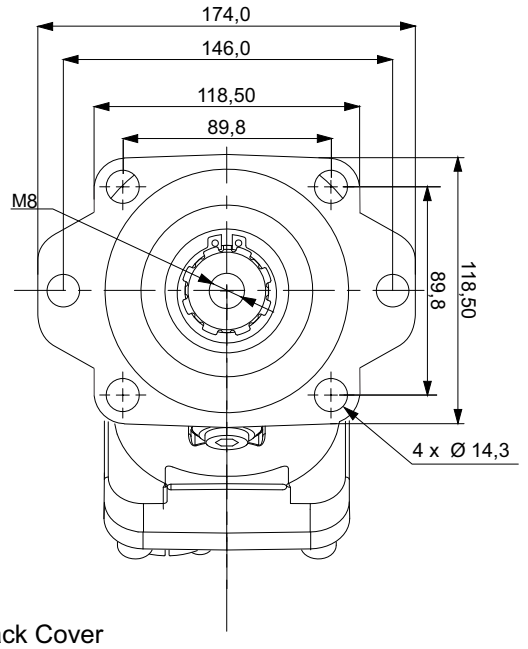
x 1000 rpm	50,00 cc
x 1500 rpm	75,00 cc
Max. Continuous Pump Speed	1900 rpm
Max. Limited Pump Speed	2500 rpm
Max. Continuous Pressure	350 bar
Max. Intermit. Peak Pressure	400 bar
Max. Torque at 350 bar	292 Nm
Weight without inlet fitting	12,00 kg
Weight with inlet fitting	12,40 kg
Rotation	CW-CCW

PA 56

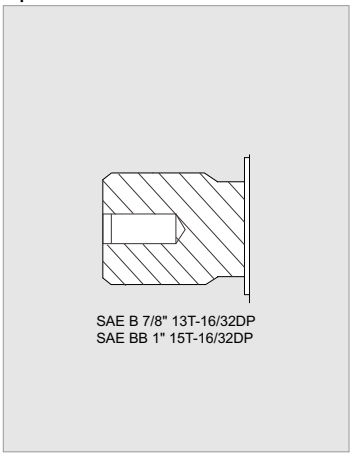
SAE B 7/8" 13T-16/32DP
SAE BB 1" 15T-16/32DP

SAE B2 & B4 BOLT MOUNTING (**SAE J744**)

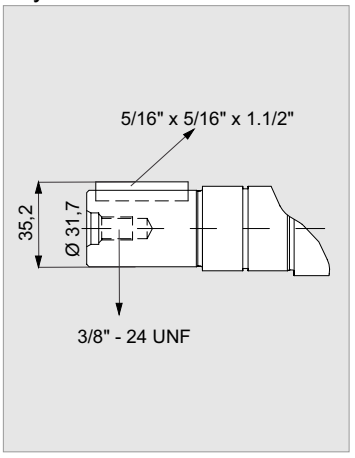




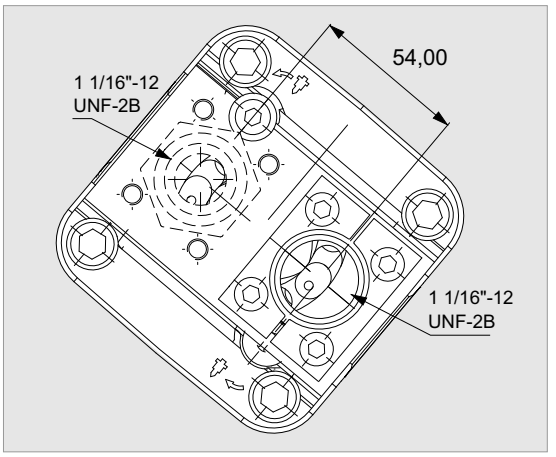
Spline Shaft



Keyed Shaft

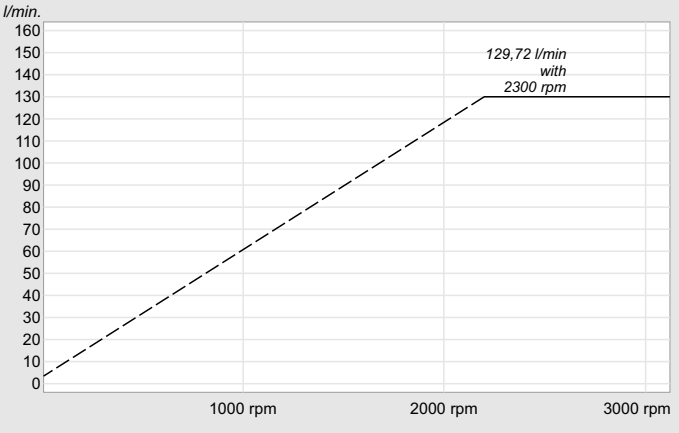


Back Cover



x 1000 rpm	56,40 cc
x 1500 rpm	84,60 cc
Max. Continuous Pump Speed	1900 rpm
Max. Limited Pump Speed	2300 rpm
Max. Continuous Pressure	350 bar
Max. Intermit. Peak Pressure	400 bar
Max. Torque at 350 bar	330 Nm
Weight without inlet fitting	12,50 kg
Weight with inlet fitting	12,90 kg
Rotation	CW-CCW

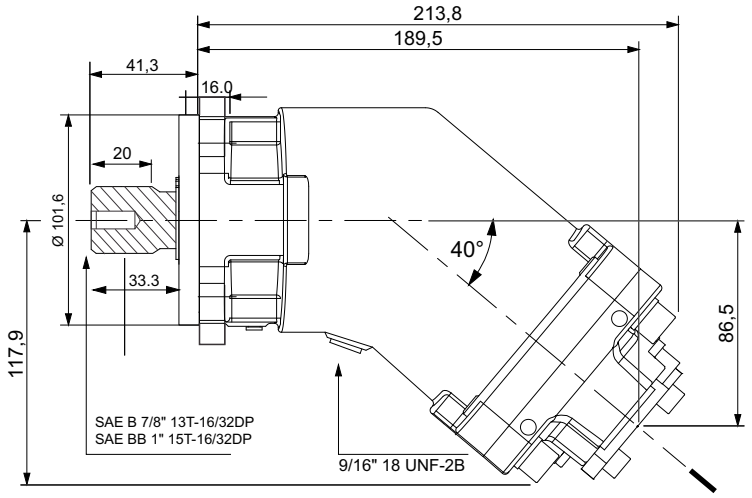
Flow, Speed, Pressure List of PA *56*

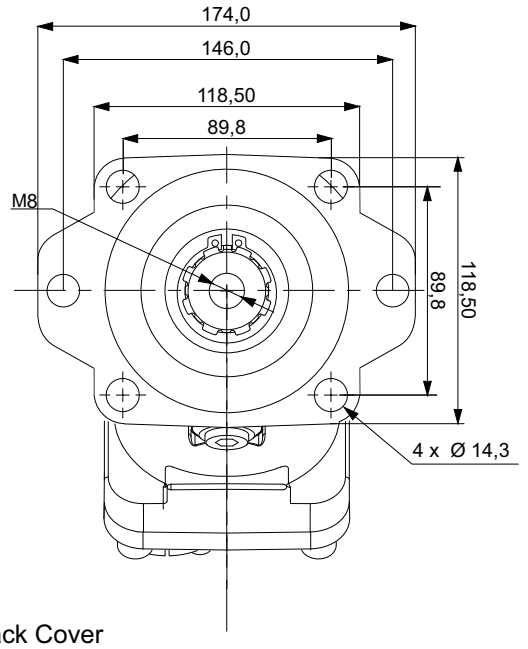


PA 63

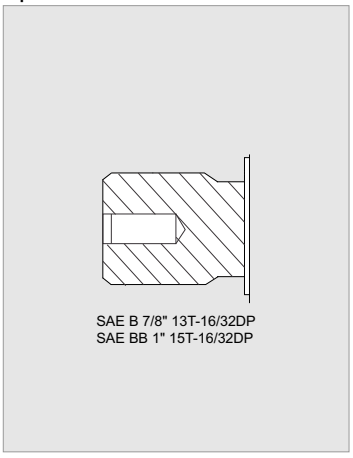
SAE B 7/8" 13T-16/32DP
SAE BB 1" 15T-16/32DP

SAE B2 & B4 BOLT MOUNTING (**SAE J744**)

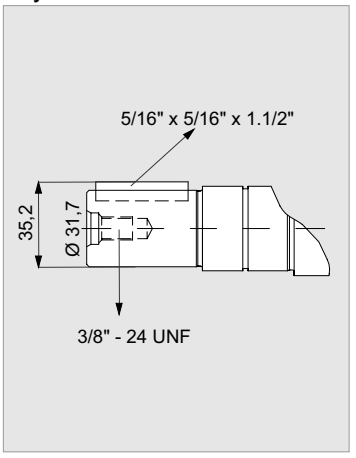




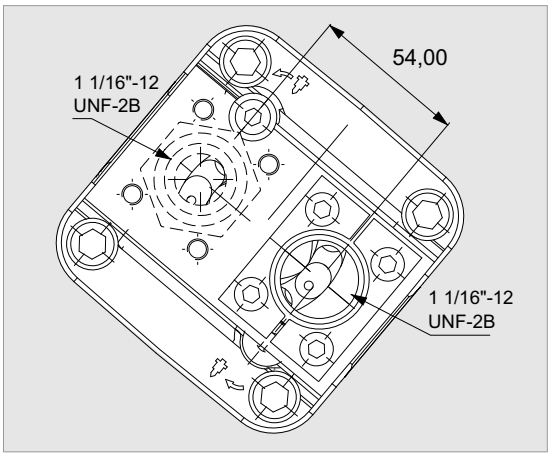
Spline Shaft



Keyed Shaft

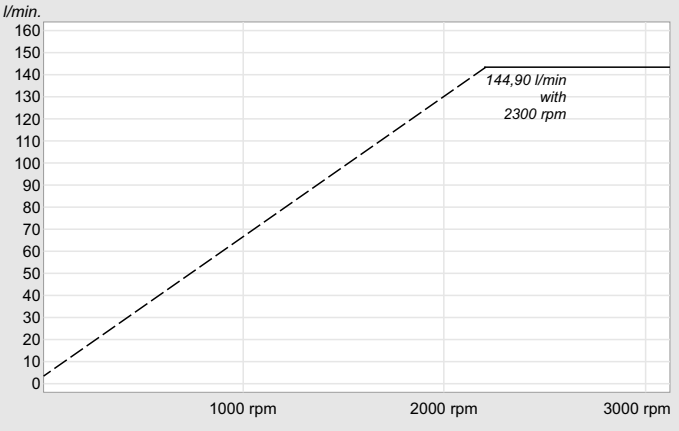


Back Cover



x 1000 rpm	63,00 cc
x 1500 rpm	94,50 cc
Max. Continuous Pump Speed	1900 rpm
Max. Limited Pump Speed	2300 rpm
Max. Continuous Pressure	350 bar
Max. Intermit. Peak Pressure	400 bar
Max. Torque at 350 bar	360 Nm
Weight without inlet fitting	12,50 kg
Weight with inlet fitting	12,90 kg
Rotation	CW-CCW

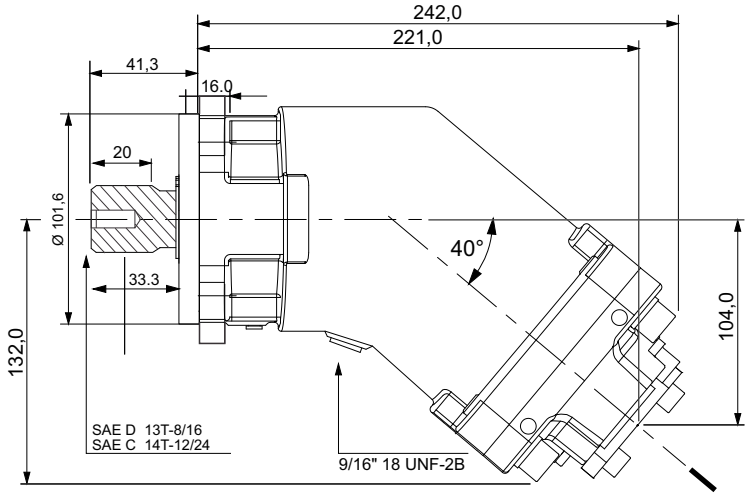
Flow, Speed, Pressure List of PA *63*

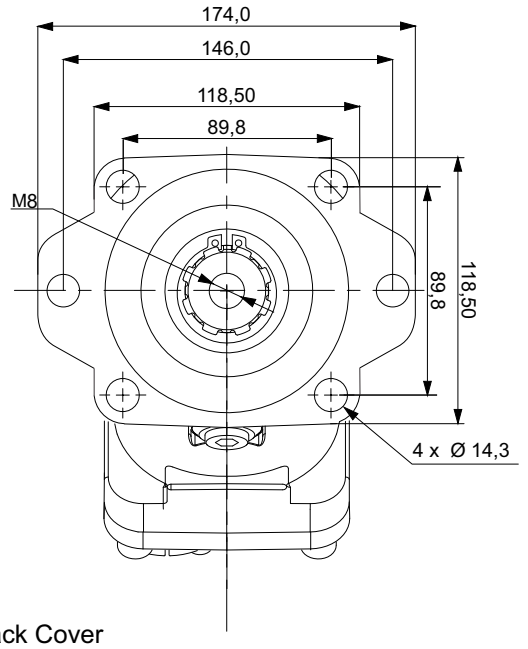


Dimensions Size;

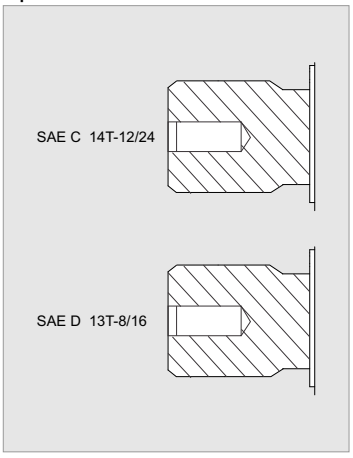
PA 80

SAE D 13T-8/16
SAE C 14T-12/24

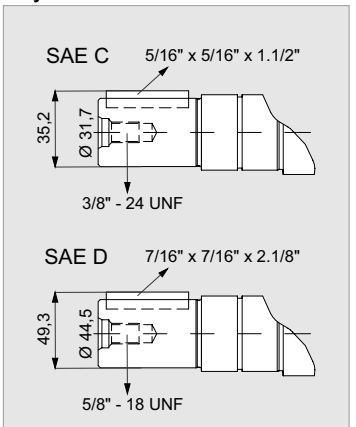




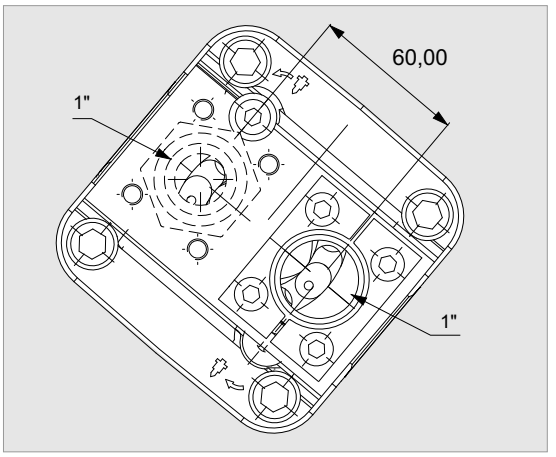
Spline Shaft



Keyed Shaft

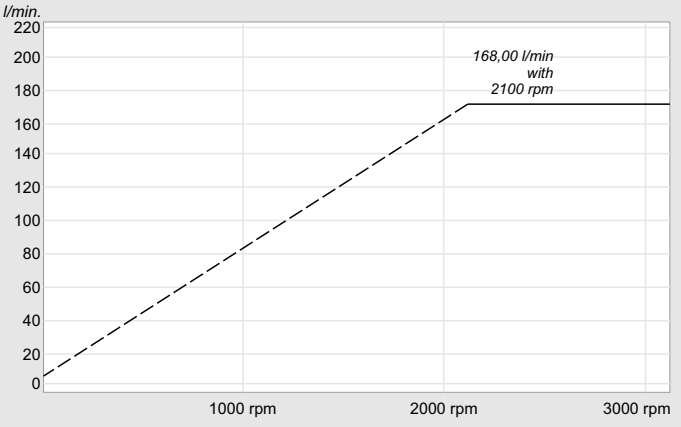


Back Cover



x 1000 rpm	80,00 cc
x 1500 rpm	120,00 cc
Max. Continuous Pump Speed	1700 rpm
Max. Limited Pump Speed	2100 rpm
Max. Continuous Pressure	350 bar
Max. Intermit. Peak Pressure	400 bar
Max. Torque at 350 bar	460 Nm
Weight without inlet fitting	16,00 kg
Weight with inlet fitting	16,40 kg
Rotation	CW-CCW

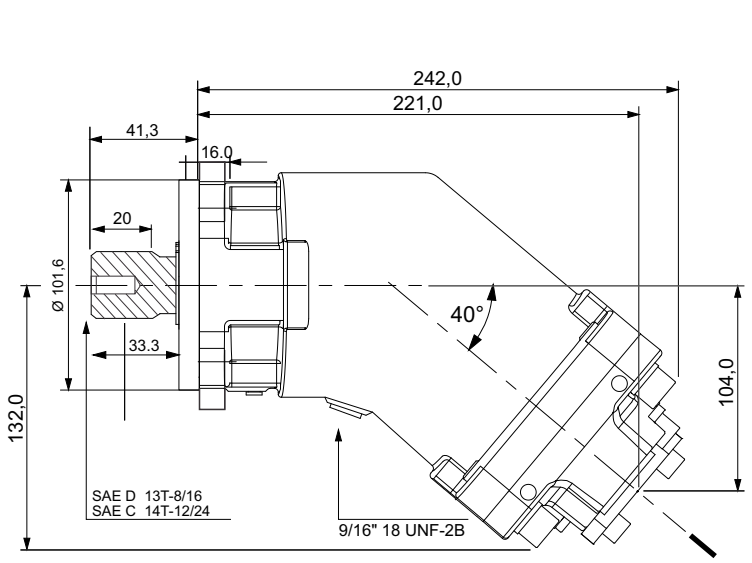
Flow, Speed, Pressure List of PA *80*

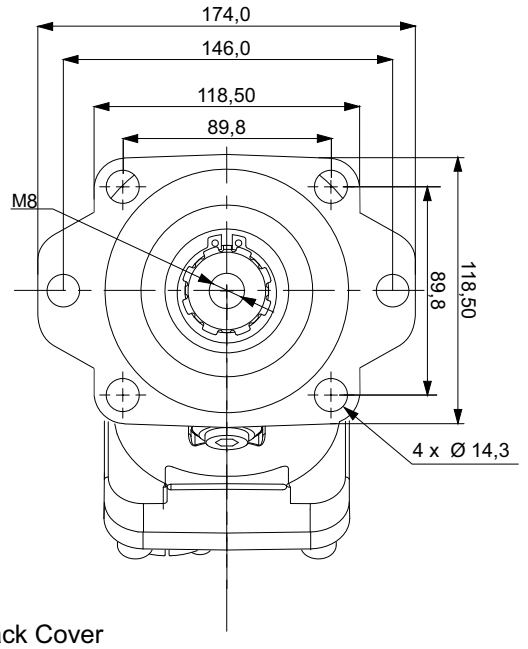


Dimensions Size;

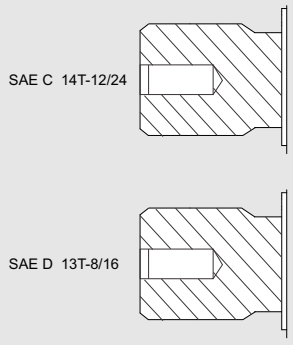
PA 108

SAE D 13T-8/16
SAE C 14T-12/24

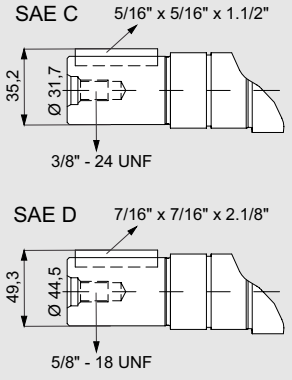




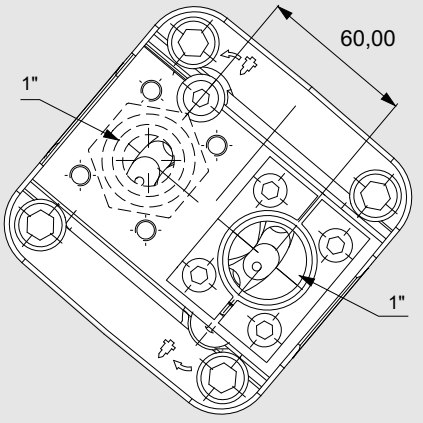
Spline Shaft



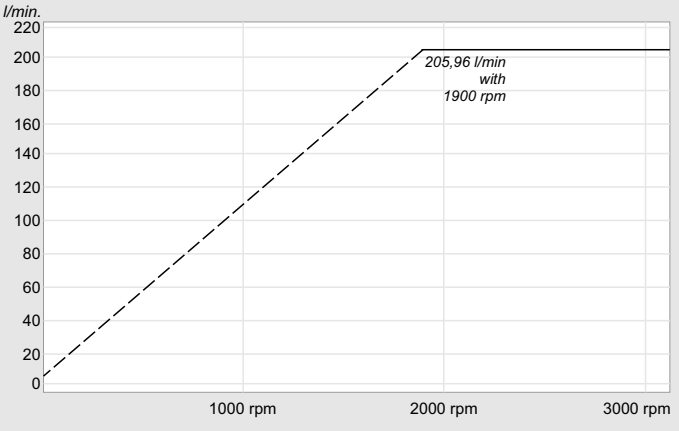
Keyed Shaft



Back Cover



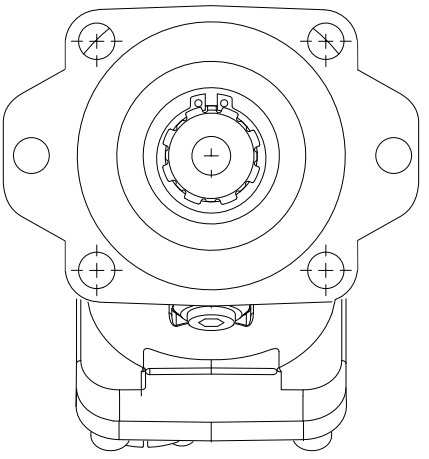
Flow, Speed, Pressure List of PA *108*



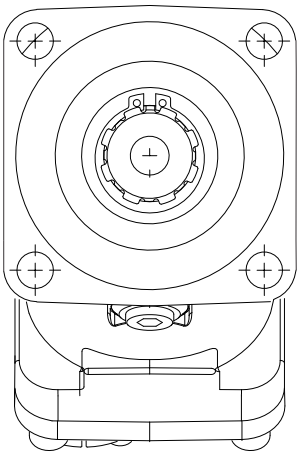
x 1000 rpm	108,40 cc
x 1500 rpm	162,60 cc
Max. Continuous Pump Speed	1700 rpm
Max. Limited Pump Speed	1900 rpm
Max. Continuous Pressure	350 bar
Max. Intermit. Peak Pressure	400 bar
Max. Torque at 350 bar	620 Nm
Weight without inlet fitting	16,50 kg
Weight with inlet fitting	16,90 kg
Rotation	CW-CCW

Special Mounting Flanges

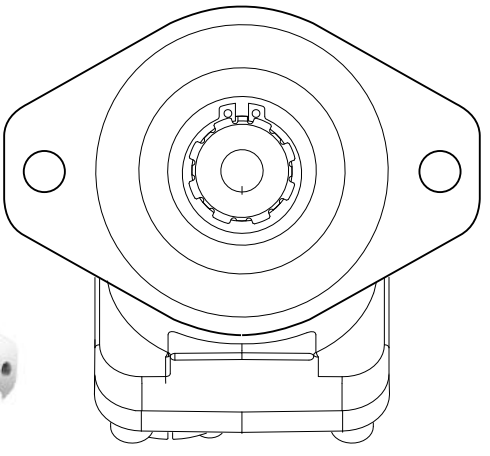
Default
Mounting Flange



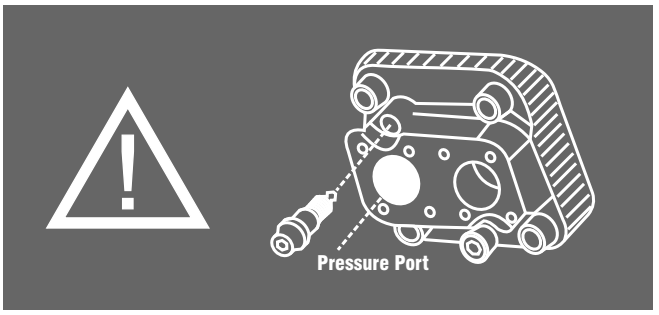
SAE B4 BOLT
(SAE J744)



SAE B2 BOLT
(SAE J744)



Changing the Direction of Rotation



Before of change direction of rotation on the pump, please remove suction fitting and screw it onto the other port.
Pump shaft must not be rotated during this operation..

!! CHECK THE ROTATION FROM THE POWER TAKE OFF

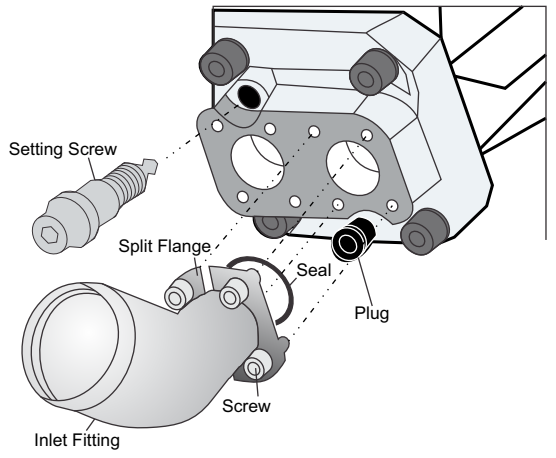
!! THE ROTATION DIRECTION OF THE PUMP

Left	Right
Default delivered.	Change rotation.

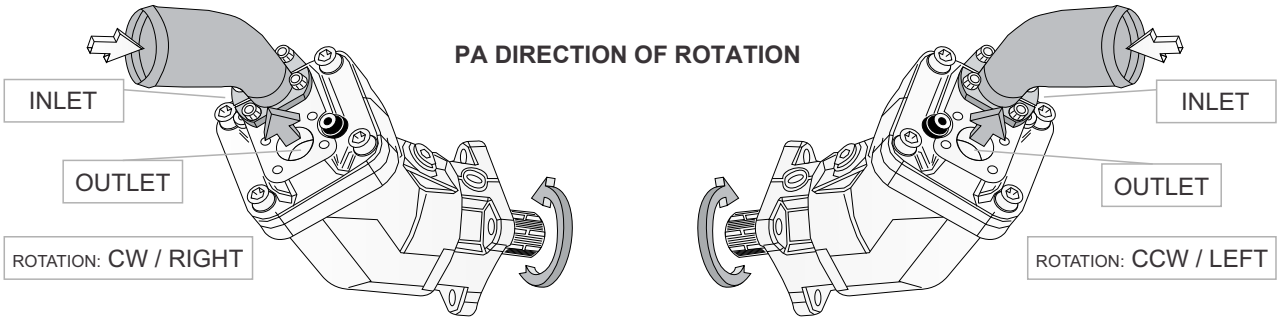
HOW TO CHANGE ROTATION OF THE PA PUMP;

- Remove the inlet fitting with split flange,
- Remove the setting screw,
- Remove the plug,

- Put the setting screw where the plug was,
- Put the plug where the setting screw was,
- Put seal on the inlet fitting, then the inlet fitting on the side where the plug is, and fix with the split flange, Tighten with the screws.



PA DIRECTION OF ROTATION



NOTE I
The Inlet Fitting is pre-assembled on delivery and must be tightened to the torque specified for the thread size before installation.

NOTE II
To change the direction of rotation of the PA Bent Axis Pump, you must change the pressure connection from to right port to the left port.

NOTE III
If the pump drive shaft moves while making the change, the PA Bent Axis Pump may be damaged.
After unscrewing the pressure connection, do not turn the drive shaft of the pump!

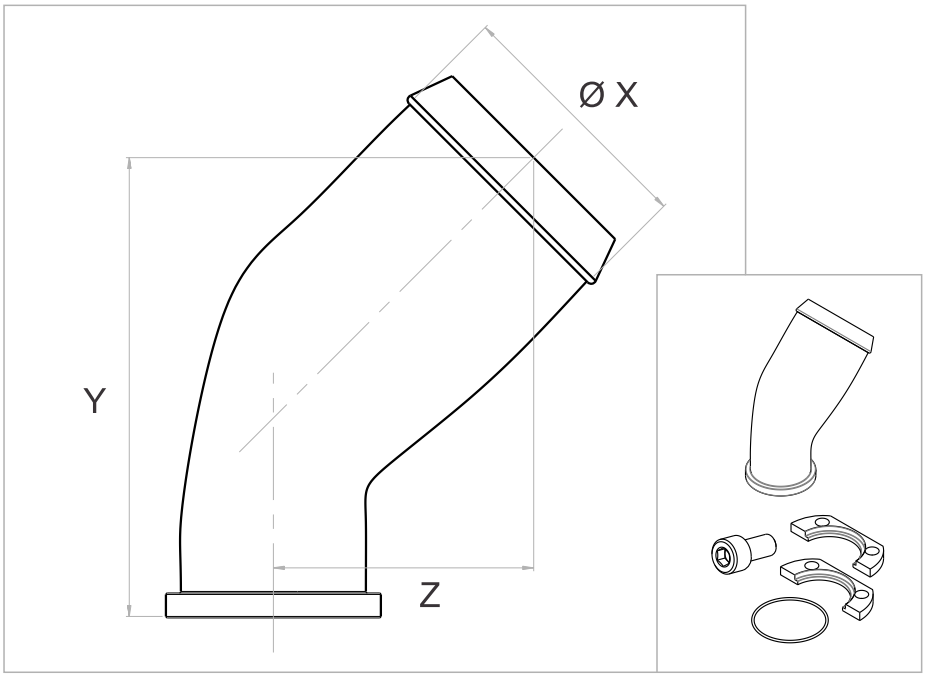
FLUID

Please check the following recommendations:
Mineral oil

Viscosity	20 to 40 cSt
Min. viscosity	5 cSt
Viscosity for correct operation	10 to 400 cSt
Recommended filtration	10µ absolute class 9 NAS 1638 class 6 SAE class 18/15 ISO
Max temp.	100° C

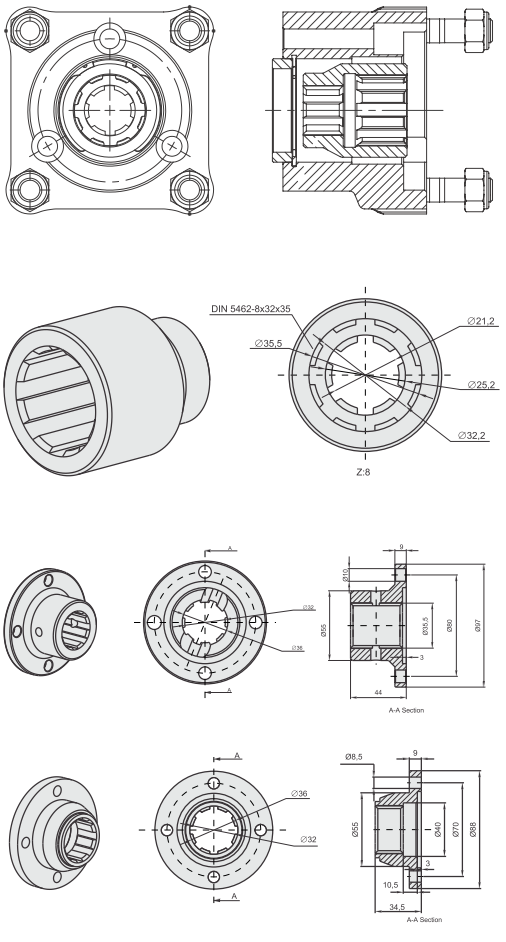
For detailed information about PA Bent Axis Pumps, please contact with Technical Department !!!

Inlet Fittings, Accessories



	45° elbow fittings		
Ø hose	1 ½"	1 ¾"	2 ½"
Ø X	39	46	64
Y	91	91	125
Z	46	46	62

	90° elbow fittings		
Ø hose	1 ½"	2"	2 ½"
Ø X	39	51	64
Y	58	64	71
Z	80	80	87



Inlet Fittings & Installation Parts
- Split Flange
- Seal
- Screw

By-Pass Valves
- 12 V
- 24 V

Hydraulic Adapters
- PTO Piston Pump Adapter
- PTO Gear Pump Adapter
- Long / Short Adapter

Flanges
- 1120 (6 Spline)
- 1120 (8 Spline)
- 1300 (6 Spline)
- 1300 (8 Spline)

Couplars
- 6 x 8 Couplar
- 6 x 8 Couplar (Long)
- 8 x 8 Couplar
- 8 x 8 Couplar (Long)

Installation & User Guide

The PA pumps fitted with a rubber front seal.

INSTALLATION
PA pumps are direct mounting on the PTO.
Grease the splined shaft before installation. Do not tap the gear wheel/driver into position.

Remove any mounted screws on the pump.
The PA was delivered with protective covers and plastic/threaded plugs.
It should be removed before of install.Please check seals and surfaces.If sealing or other surfaces damaged please contact your responsible Service Partner.

Start up and run the pump at medium speed (800 to 1000 rpm at the PTO) until the oil flowing out of the pump. (There are no more air bubbles.)

OIL SUPPLY
Oil and supply line should be clean, and the supply line is airtight.

SUCTION LINE
Connect the suction line, tighten the suction connection bolts in diametric pairs.
Connect the pressure line.

REPAIR
We offers a comprehensive range of services for the repair of our Bent Axis Pumps.
Repairs to the PA Bent Axis Pump may only be performed by authorized, skilled and instructed personnel.
Only use original and pre-installed our PA spare parts from supplied to Manufacturer..

Tested and pre-installed PA pumps successful repair requiring only little time.

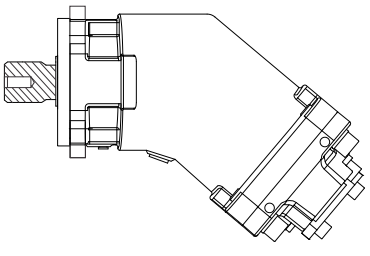
SPARE PARTS
The spare parts list and the PA pump order specific.
When ordering spare parts, quote the material and complete Ordering code number of the PA Bent Axis Pump as well as the right numbers of the spare parts.

RISK OF DAMAGE!
Do not touch the drive shaft of the PA Bent Axis Pump Do not touch sensor, valves and fittings
Do not touch sealing surfaces.

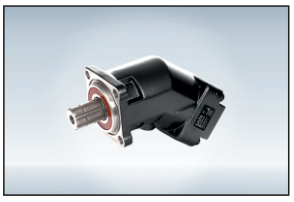
DIMENSIONS & WEIGHTS

		12	18	25	32	40	50	56	63	80	108
- Without inlet fitting	***kg***	10,00	10,00	10,50	11,50	11,50	12,00	12,50	12,50	16,00	16,50
- With inlet fitting	***kg***	10,40	10,40	10,90	11,90	11,90	12,40	12,90	12,90	16,40	16,90

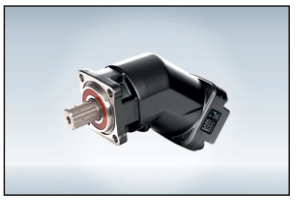
Address all questions regarding spare parts to your responsible Our Service Partner or the technical service department of the manufacture's plant / factory for the PA Bent Axis Pumps.



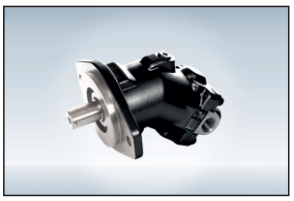
SAFA HYDRAULICS



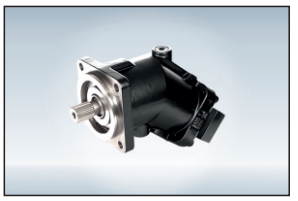
PD-DIN
Bent Axis Pumps



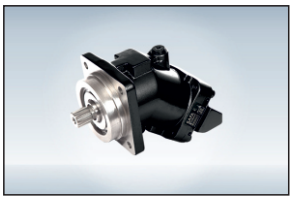
MD-DIN
Bent Axis Motor



PA-SAE
Bent Axis Pumps

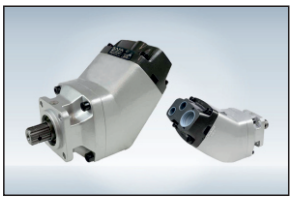


MA-SAE
Bent Axis Motor

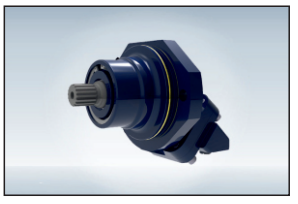


PS-ISO
Bent Axis Pumps

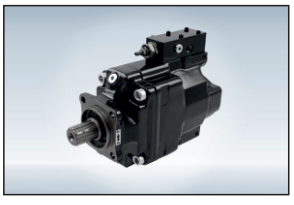
MS-ISO
Bent Axis Motor



PD Dual
Dual Flow Pumps



MF Fixed
Bent Axis Motor



PV
Variable Disp.
Piston Pumps

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