

PD-DIN

Bent Axis Pumps

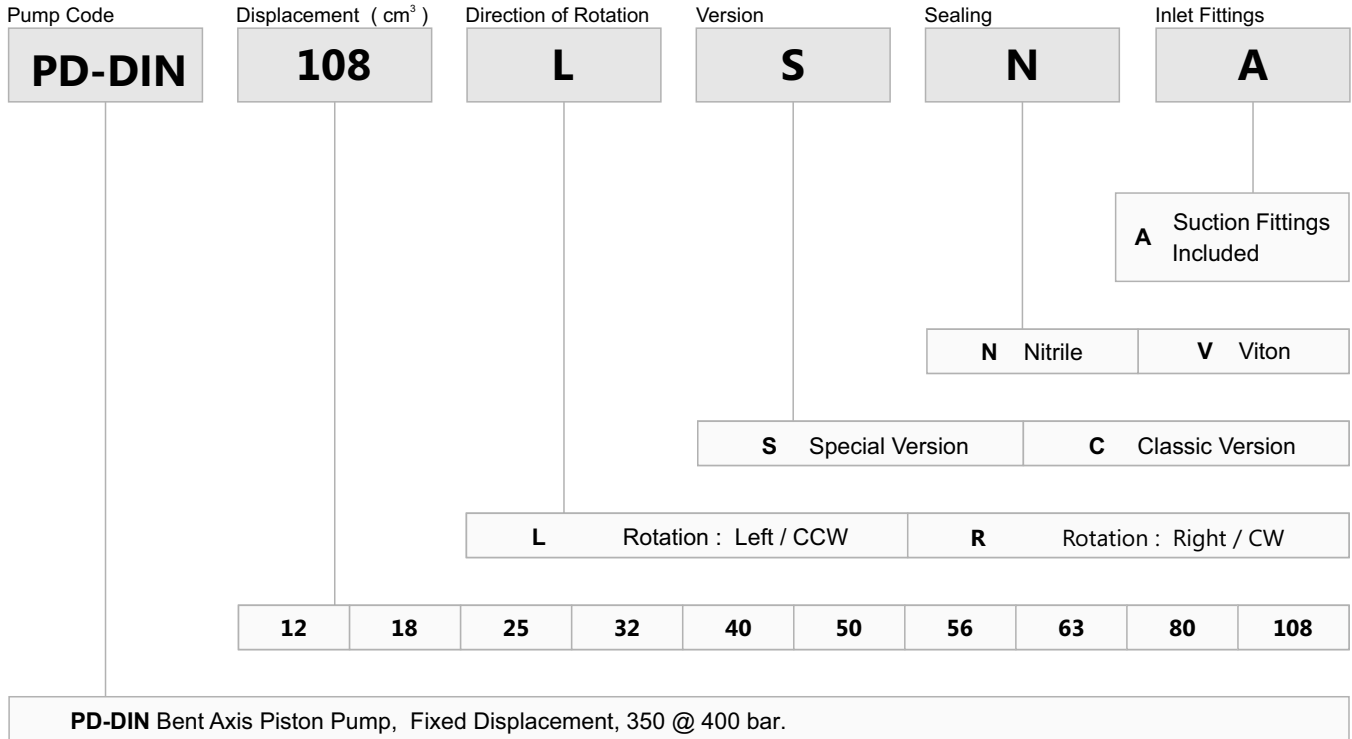


DIN Mounting Flange, Flange, 4 Bolt, 12cc to 130cc

DIN 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.



Ordering Code of PD-DIN Pumps



Classic Version ; Default design
Special Version ; Special for dealers

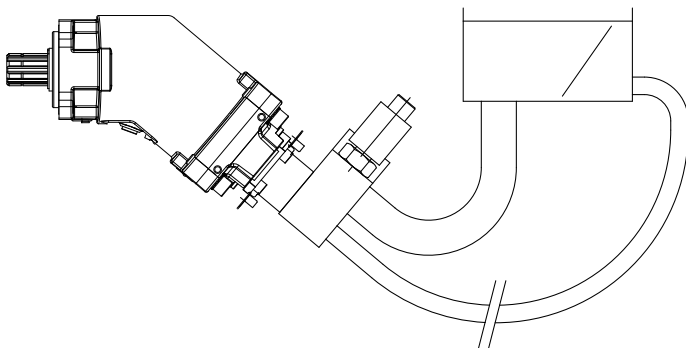
Formulas

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

- 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 I

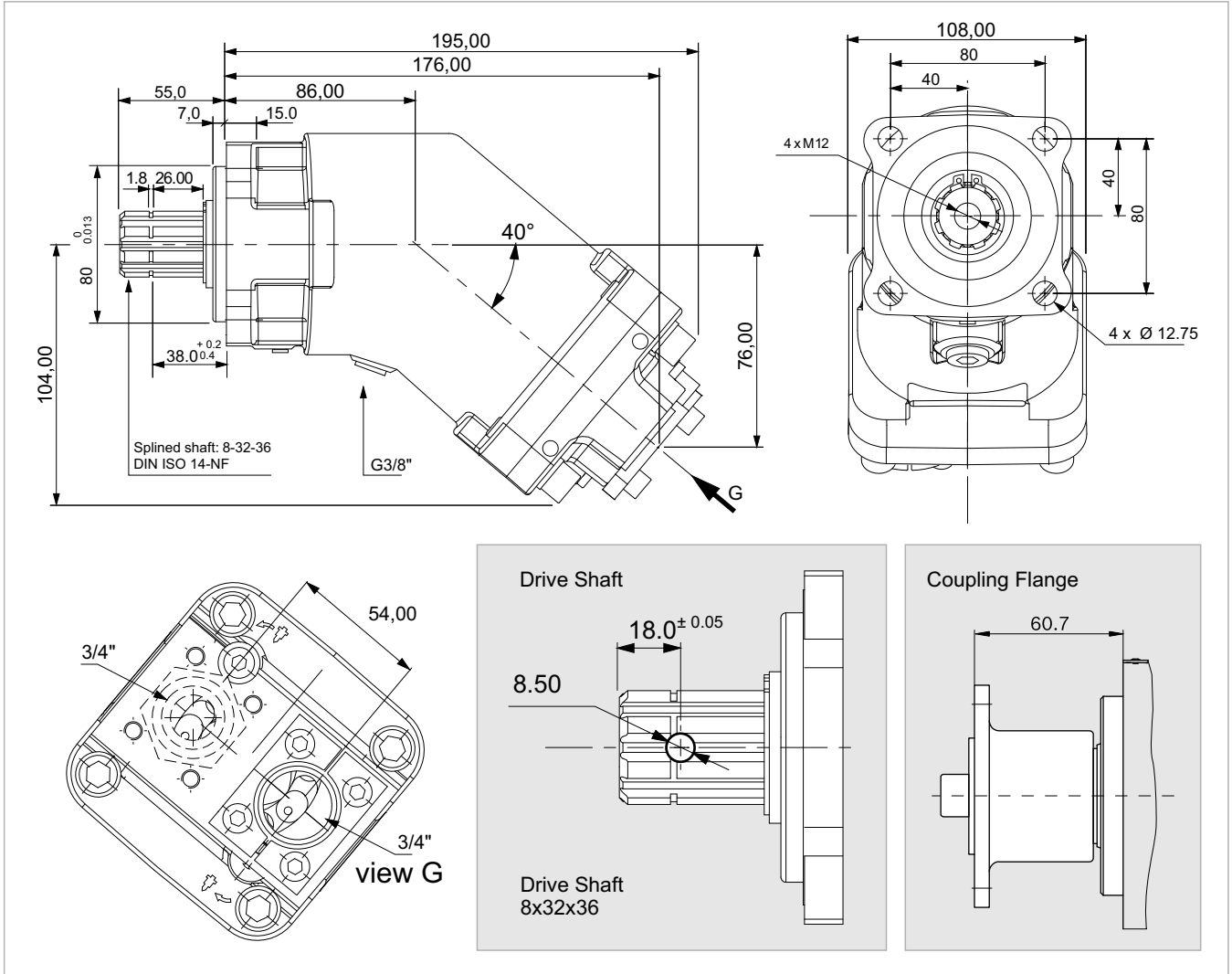
		12	18	25	32	40	50	56	63	80	108
Displacement	cc	12,00	18,00	25,00	32,00	40,20	50,00	56,40	63,00	80,00	108,4
Theoretical oil flow l/min at pump speed	1000 rpm	12,00	18,00	25,00	32,00	40,20	50,00	56,40	63,00	80,00	108,4
	1500 rpm	18,00	27,00	37,50	48,00	60,30	75,00	84,60	94,50	120,0	162,6
Maximum Pump Speed											
- 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	9,00	9,00	9,50	10,50	10,50	11,00	11,50	11,50	15,00	15,50
- With inlet fitting	kg	9,40	9,40	9,90	10,90	10,90	11,40	11,90	11,90	15,40	15,90
Overhang Torque											
- Without inlet fitting	N.m	8,70	8,75	8,82	11,00	11,12	11,72	11,79	11,82	17,80	17,92
- With inlet fitting	N.m	9,15	9,19	9,23	11,52	11,40	12,20	12,24	12,28	18,33	18,45
Rotation		CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW
Fluid		Mineral Based Hydraulic Oils									
Inlet & Outlet		3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	1"	1"



Overhang torque of PD-DIN pumps

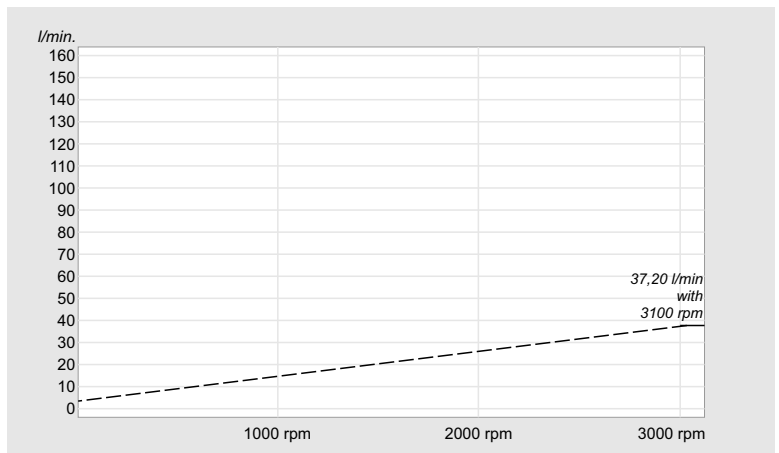
		12	18	25	32	40	50	56	63	80	108
weight	without inlet fitting kg	12,81	12,82	12,89	14,06	14,70	14,80	14,84	14,86	18,42	18,50
	with inlet fitting 2" kg	13,23	13,33	13,37	15,12	15,17	15,24	15,28	15,30	18,95	19,01
torque	without inlet fitting N.m	16,33	16,38	16,42	19,14	18,97	20,07	20,10	20,11	27,18	27,30
	with inlet fitting 2" N.m	16,92	16,94	17,01	19,61	19,58	20,68	20,70	20,72	27,81	27,95

PD-DIN 12

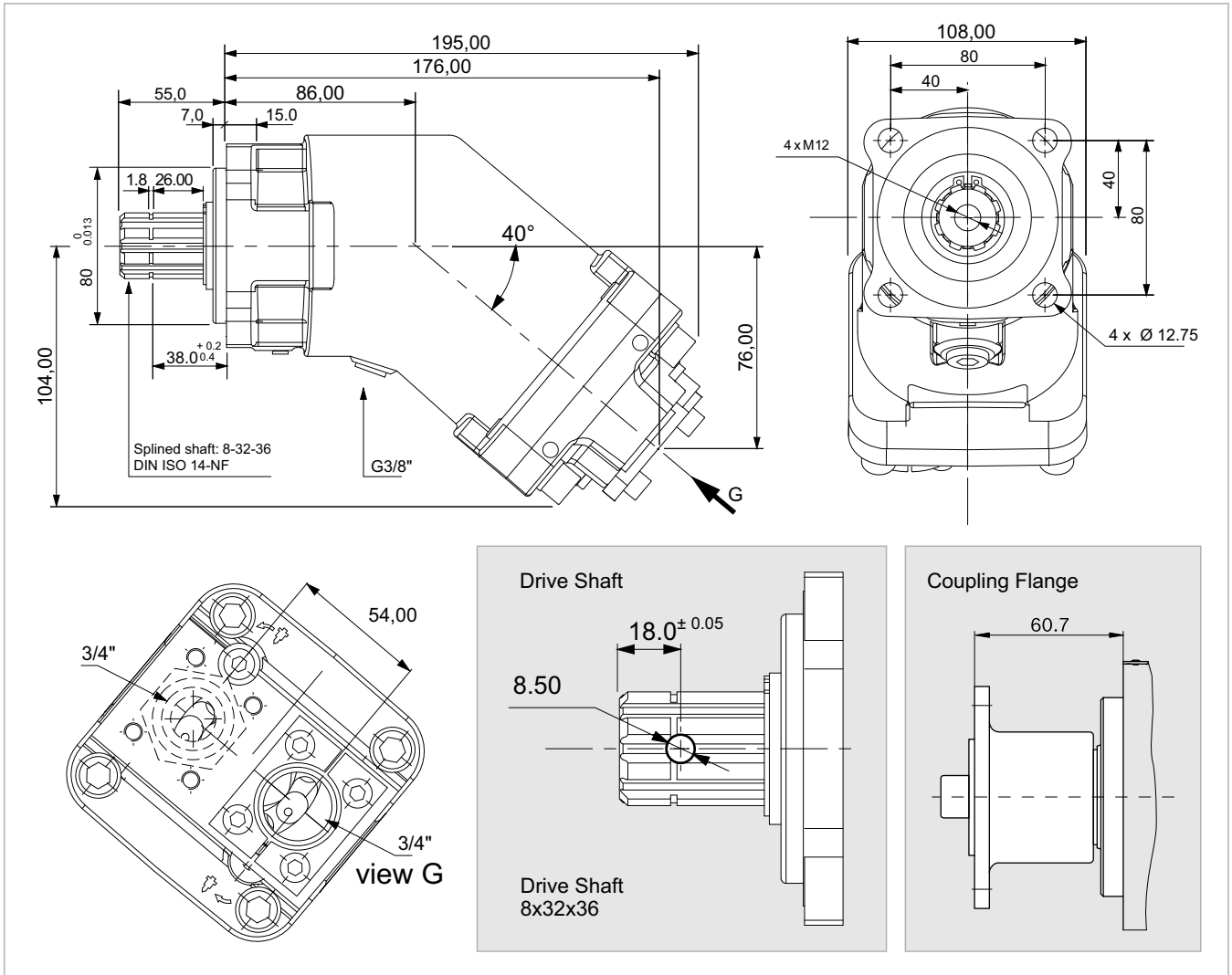


x 1000 rpm	12,00 cc
x 1500 rpm	18,00 cc
Max. Continuous Pump Speed	2300 rpm
Max. Limited Pump Speed	3100 rpm
Max. Continuous Pressure	350 bar
Max. Intermit. Peak Pressure	400 bar
Max. Torque at 350 bar	71 Nm
Weight without inlet fitting	9,00 kg
Weight with inlet fitting	9,40 kg
Torque without inlet fitting	8,70 N.m
Torque with inlet fitting	9,15 N.m
Rotation	CW-CCW
Fluid	Min.B.Hyd.Oil
Inlet & Outlet	3/4"

Flow, Speed, Pressure List of PD-DIN 12

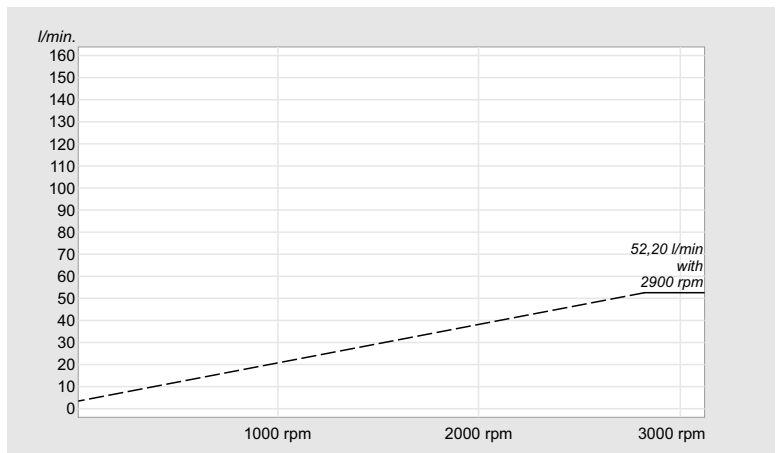


PD-DIN 18

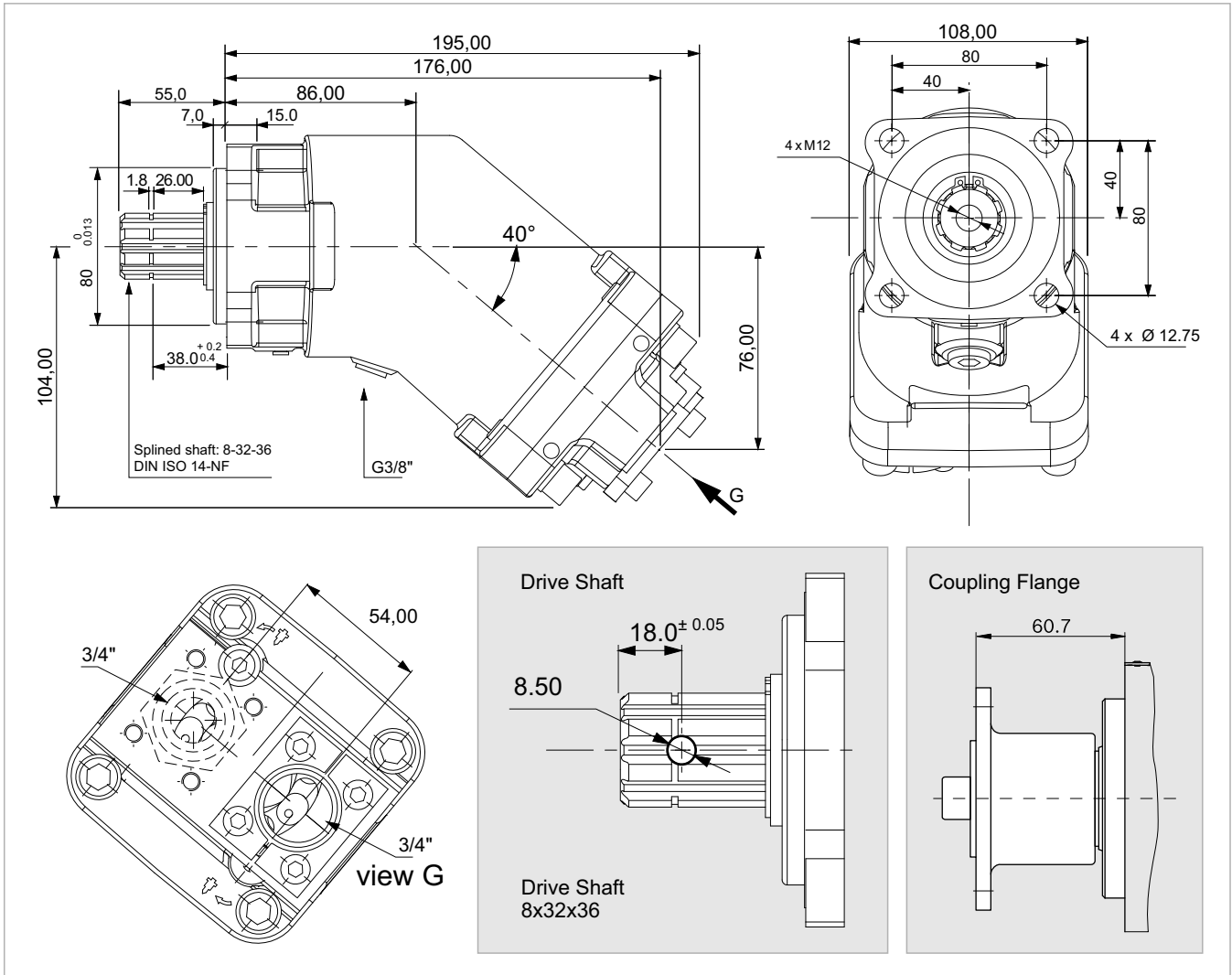


x 1000 rpm	18,00 cc
x 1500 rpm	27,00 cc
Max. Continuous Pump Speed	2300 rpm
Max. Limited Pump Speed	2900 rpm
Max. Continuous Pressure	350 bar
Max. Intermit. Peak Pressure	400 bar
Max. Torque at 350 bar	105 Nm
Weight without inlet fitting	9,00 kg
Weight with inlet fitting	9,40 kg
Torque without inlet fitting	8,75 N.m
Torque with inlet fitting	9,19 N.m
Rotation	CW-CCW
Fluid	Min.B.Hyd.Oil
Inlet & Outlet	3/4"

Flow, Speed, Pressure List of PD-DIN 18

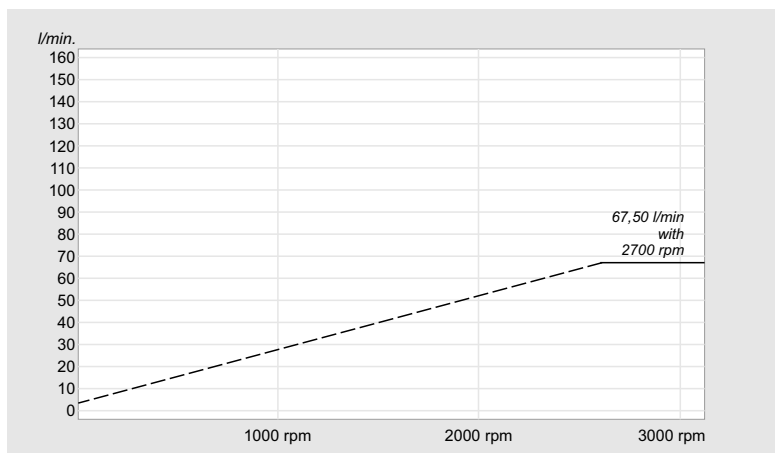


PD-DIN 25

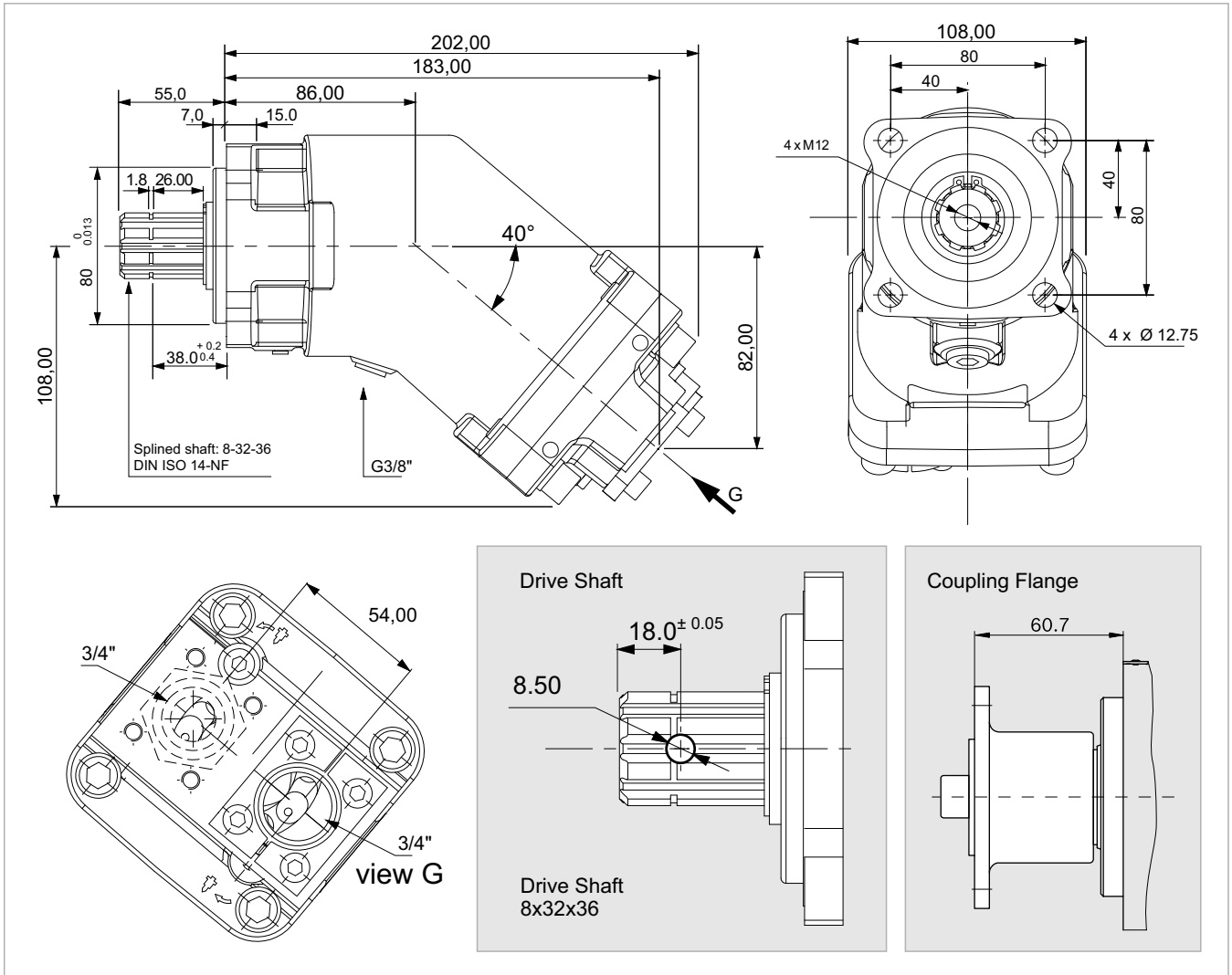


x 1000 rpm	25,00 cc
x 1500 rpm	37,50 cc
Max. Continuous Pump Speed	2300 rpm
Max. Limited Pump Speed	2700 rpm
Max. Continuous Pressure	350 bar
Max. Intermit. Peak Pressure	400 bar
Max. Torque at 350 bar	146 Nm
Weight without inlet fitting	9,50 kg
Weight with inlet fitting	9,90 kg
Torque without inlet fitting	8,82 N.m
Torque with inlet fitting	9,23 N.m
Rotation	CW-CCW
Fluid	Min.B.Hyd.Oil
Inlet & Outlet	3/4"

Flow, Speed, Pressure List of PD-DIN 25

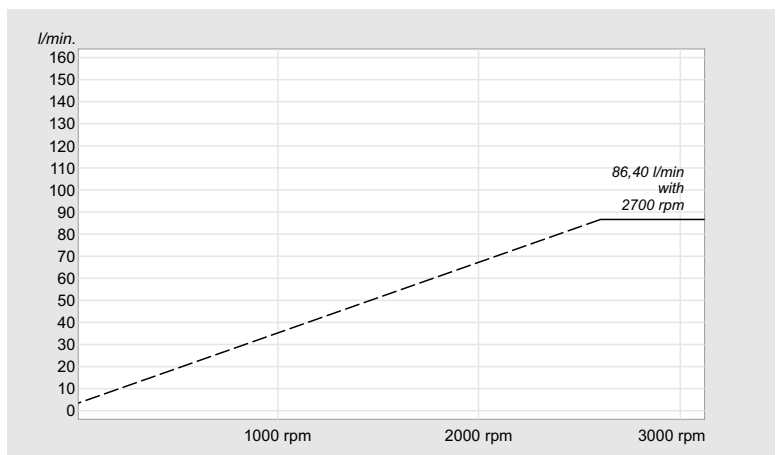


PD-DIN 32

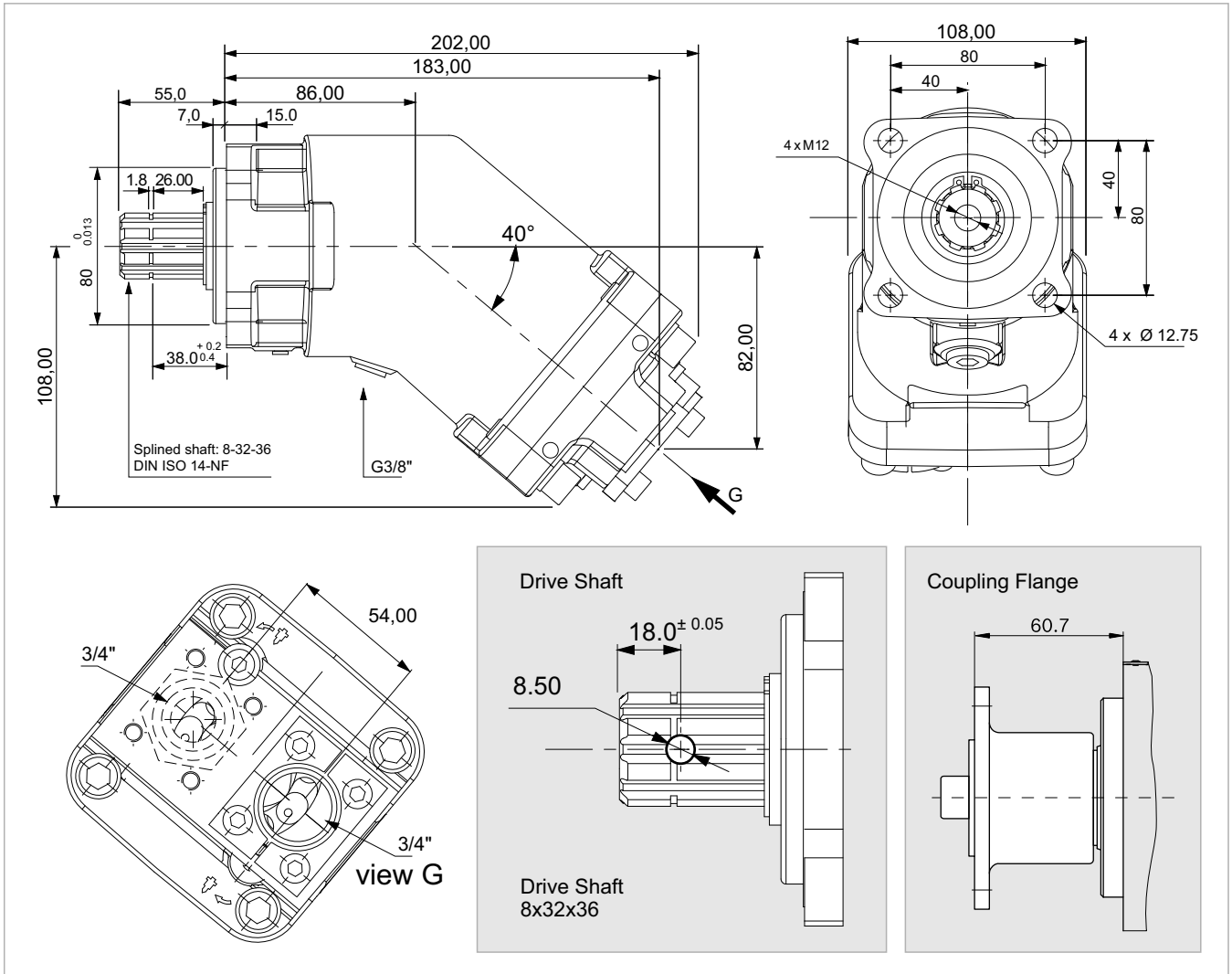


x 1000 rpm	32,00 cc
x 1500 rpm	48,00 cc
Max. Continuous Pump Speed	2250 rpm
Max. Limited Pump Speed	2700 rpm
Max. Continuous Pressure	350 bar
Max. Intermit. Peak Pressure	400 bar
Max. Torque at 350 bar	190 Nm
Weight without inlet fitting	10,50 kg
Weight with inlet fitting	10,90 kg
Torque without inlet fitting	11,00 N.m
Torque with inlet fitting	11,52 N.m
Rotation	CW-CCW
Fluid	Min.B.Hyd.Oil
Inlet & Outlet	3/4"

Flow, Speed, Pressure List of PD-DIN 32

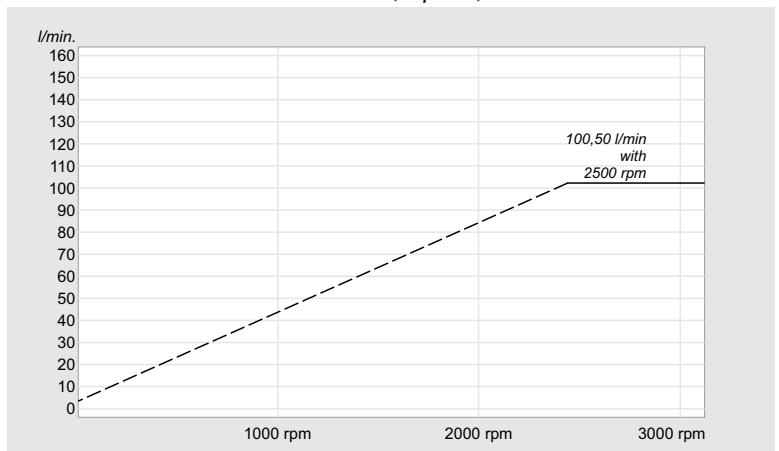


PD-DIN 40

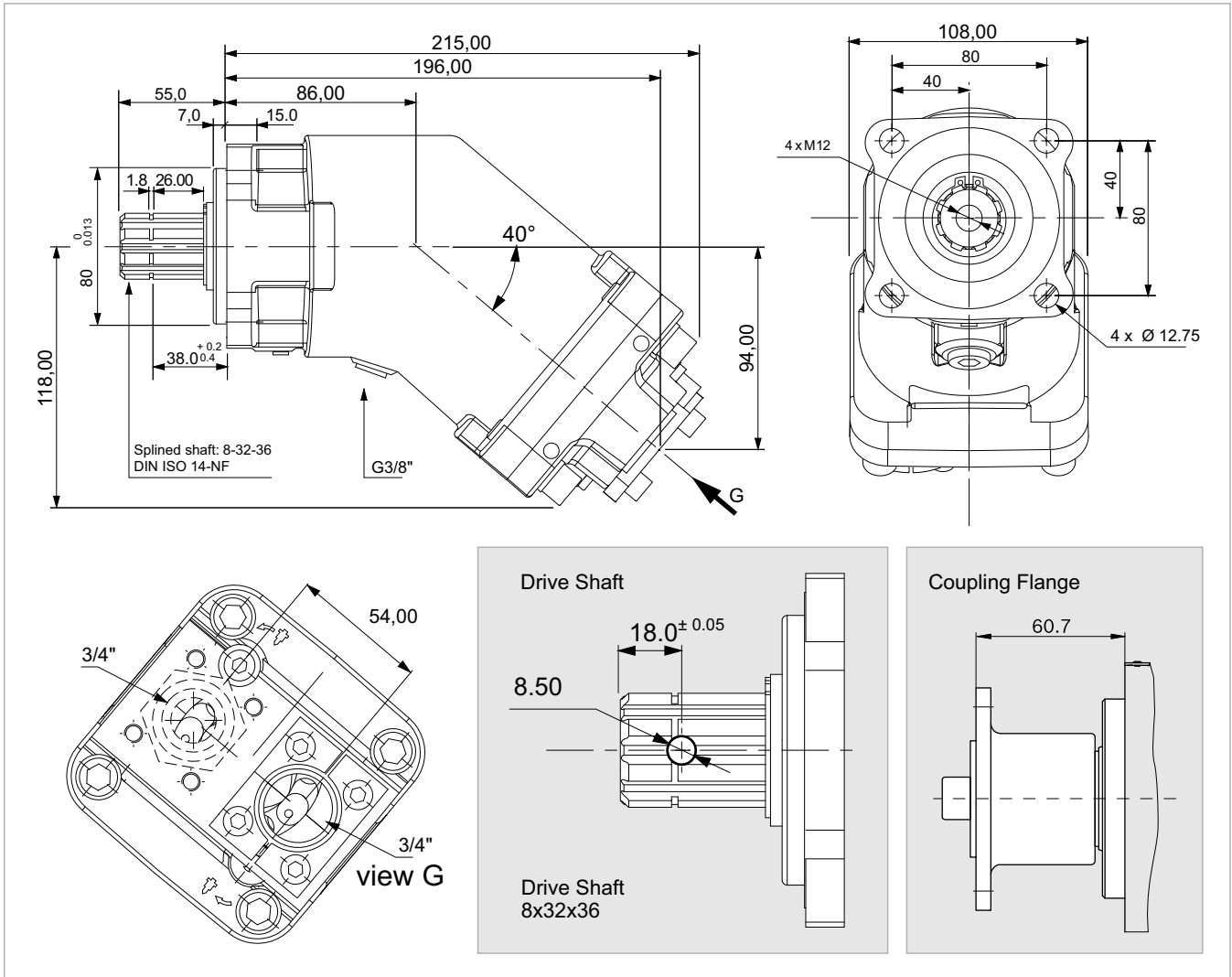


x 1000 rpm	40,20 cc
x 1500 rpm	60,30 cc
Max. Continuous Pump Speed	1900 rpm
Max. Limited Pump Speed	2500 rpm
Max. Continuous Pressure	350 bar
Max. Intermit. Peak Pressure	400 bar
Max. Torque at 350 bar	240 Nm
Weight without inlet fitting	10,50 kg
Weight with inlet fitting	10,90 kg
Torque without inlet fitting	11,12 N.m
Torque with inlet fitting	11,40 N.m
Rotation	CW-CCW
Fluid	Min.B.Hyd.Oil
Inlet & Outlet	3/4"

Flow, Speed, Pressure List of PD-DIN 40

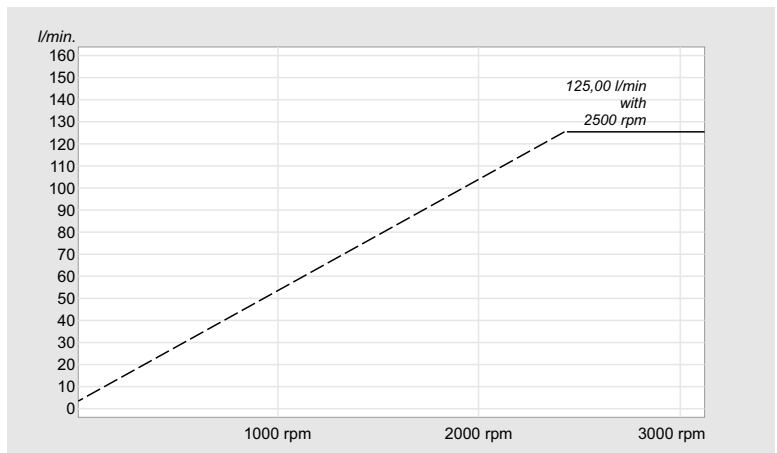


PD-DIN 50

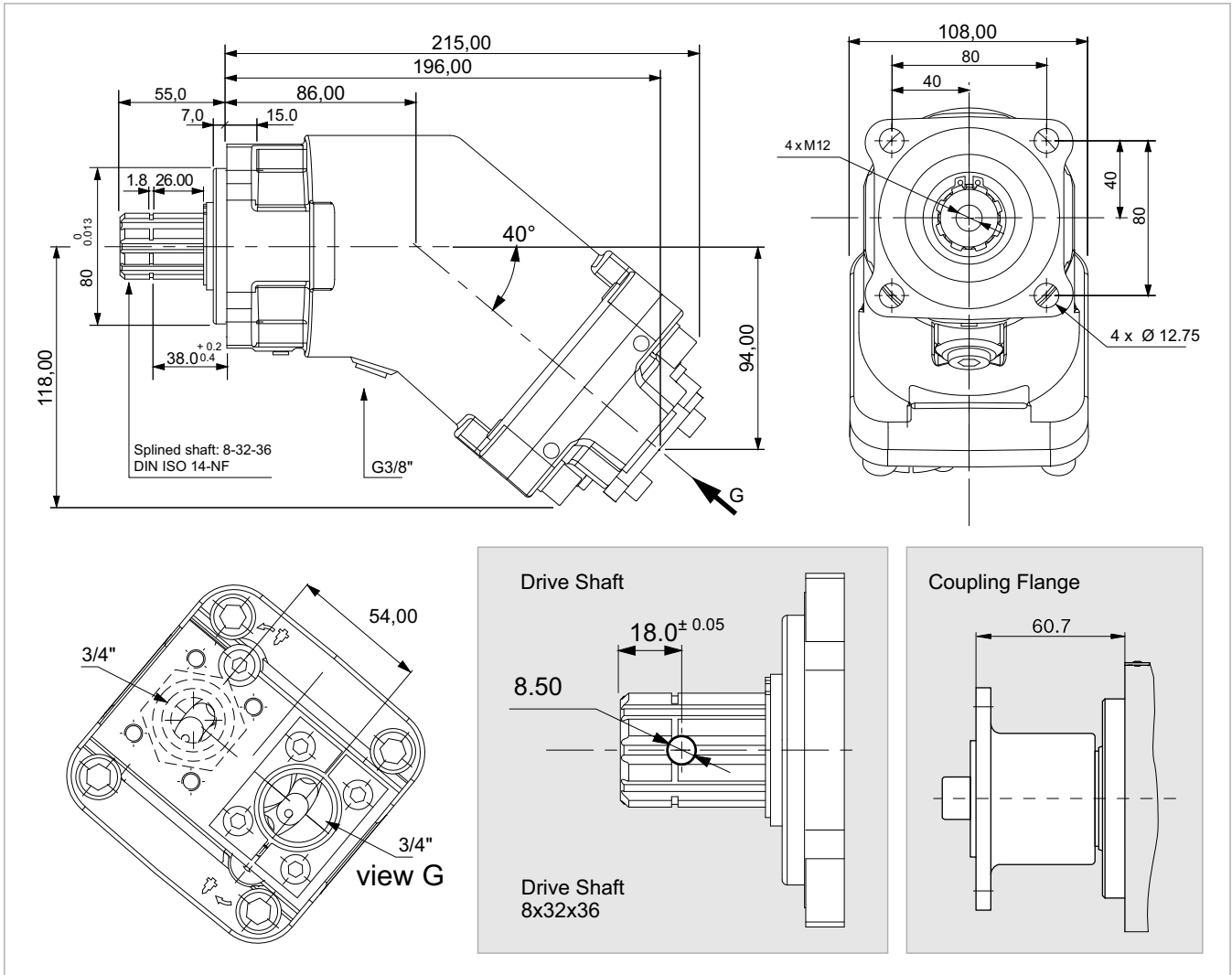


x 1000 rpm	50,00 cc
x 1500 rpm	75,00 cc
Max. Continuous Pump Speed	1900 rpm
Max. Limited Pump Speed	2500 rpm
Max. Continuous Pressure	350 bar
Max. Intermit. Peak Pressure	400 bar
Max. Torque at 350 bar	292 Nm
Weight without inlet fitting	11,00 kg
Weight with inlet fitting	11,40 kg
Torque without inlet fitting	11,72 N.m
Torque with inlet fitting	12,20 N.m
Rotation	CW-CCW
Fluid	Min.B.Hyd.Oil
Inlet & Outlet	3/4"

Flow, Speed, Pressure List of PD-DIN 50

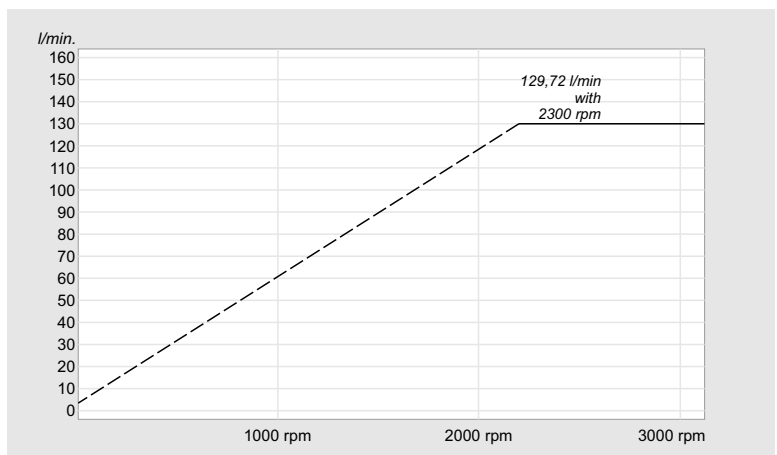


PD-DIN 56

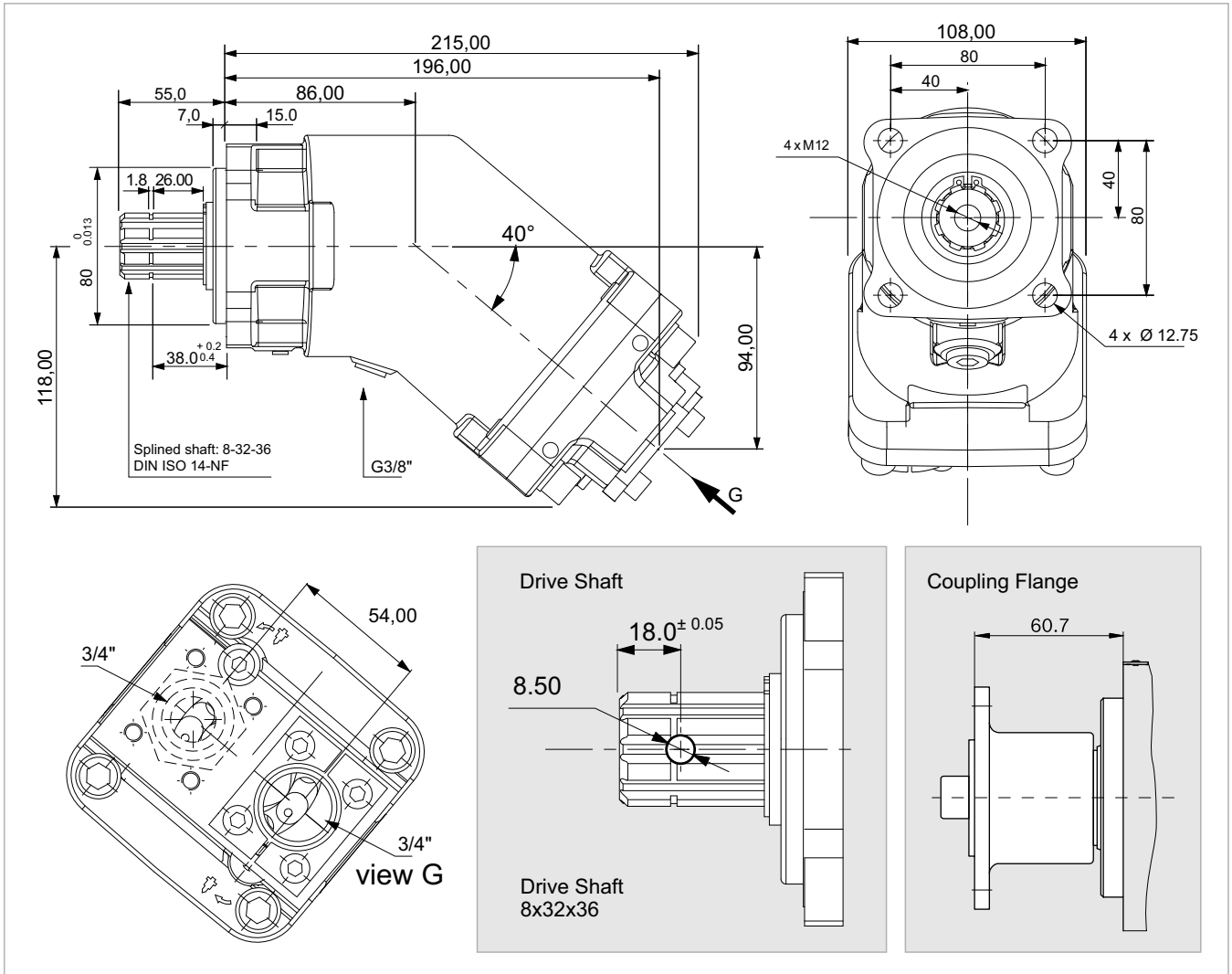


x 1000 rpm	56,40 cc
x 1500 rpm	84,60 cc
Max. Continuous Pump Speed	1900 rpm
Max. Limited Pump Speed	2300 rpm
Max. Continuous Pressure	350 bar
Max. Intermit. Peak Pressure	400 bar
Max. Torque at 350 bar	330 Nm
Weight without inlet fitting	11,50 kg
Weight with inlet fitting	11,90 kg
Torque without inlet fitting	11,79 N.m
Torque with inlet fitting	12,24 N.m
Rotation	CW-CCW
Fluid	Min.B.Hyd.Oil
Inlet & Outlet	3/4"

Flow, Speed, Pressure List of PD-DIN 56

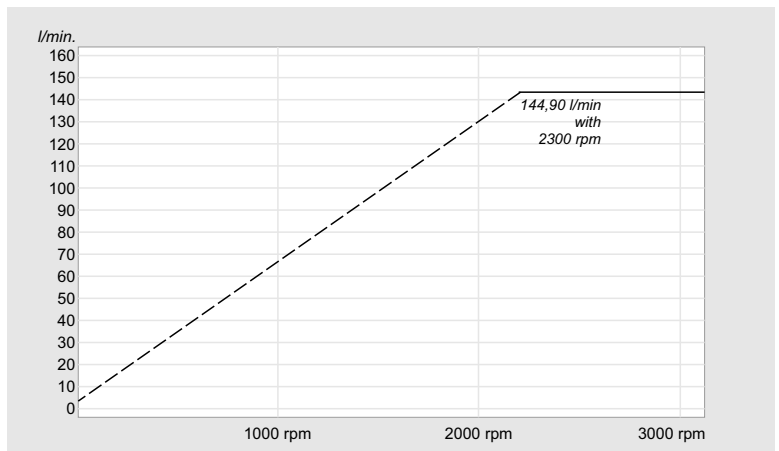


PD-DIN 63

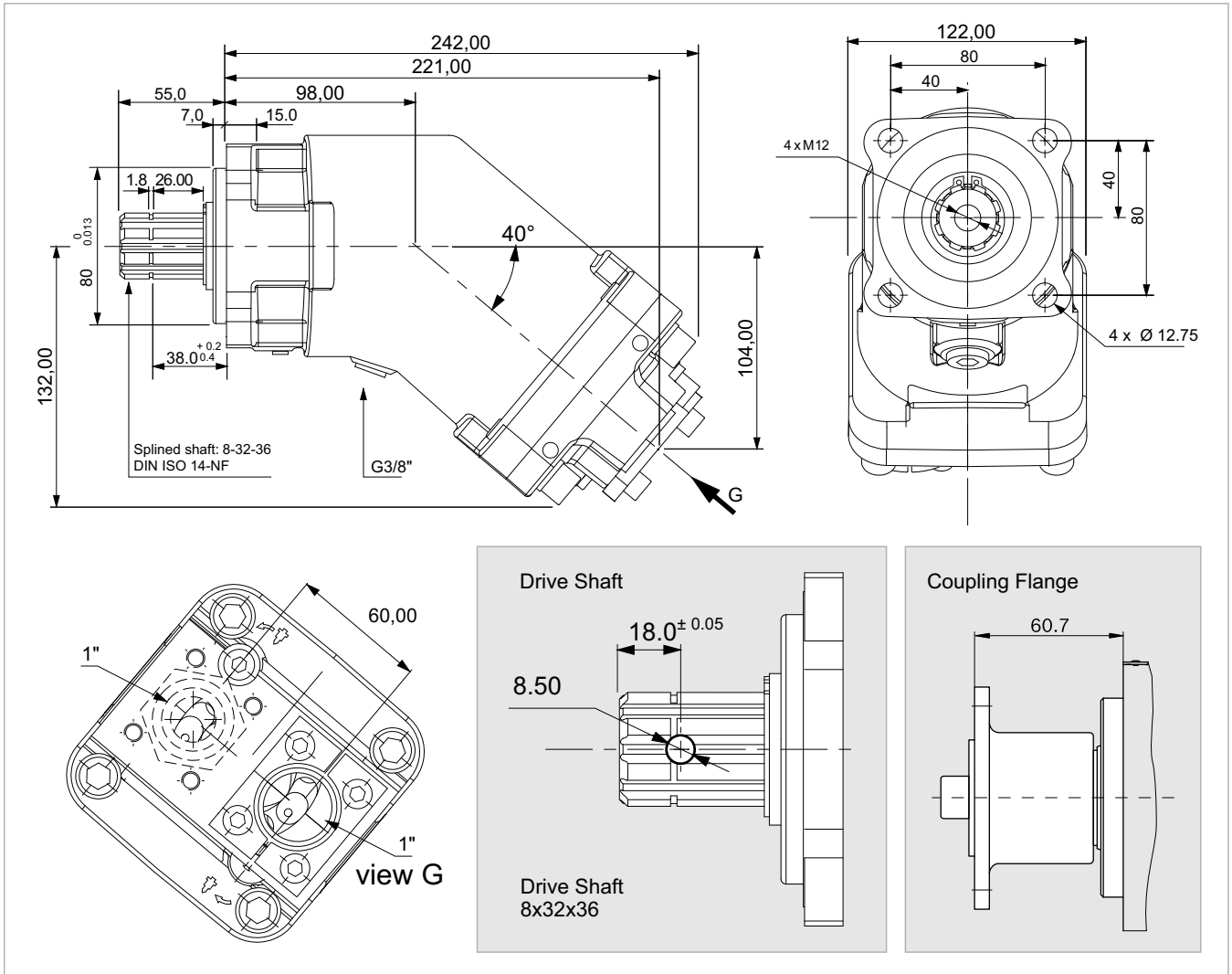


x 1000 rpm	63,00 cc
x 1500 rpm	94,50 cc
Max. Continuous Pump Speed	1900 rpm
Max. Limited Pump Speed	2300 rpm
Max. Continuous Pressure	350 bar
Max. Intermit. Peak Pressure	400 bar
Max. Torque at 350 bar	360 Nm
Weight without inlet fitting	11,50 kg
Weight with inlet fitting	11,90 kg
Torque without inlet fitting	11,82 N.m
Torque with inlet fitting	12,28 N.m
Rotation	CW-CCW
Fluid	Min.B.Hyd.Oil
Inlet & Outlet	3/4"

Flow, Speed, Pressure List of PD-DIN 63

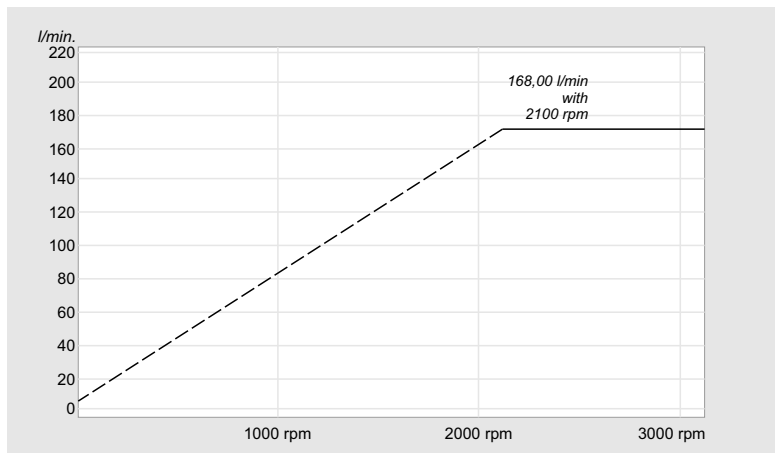


PD-DIN 80

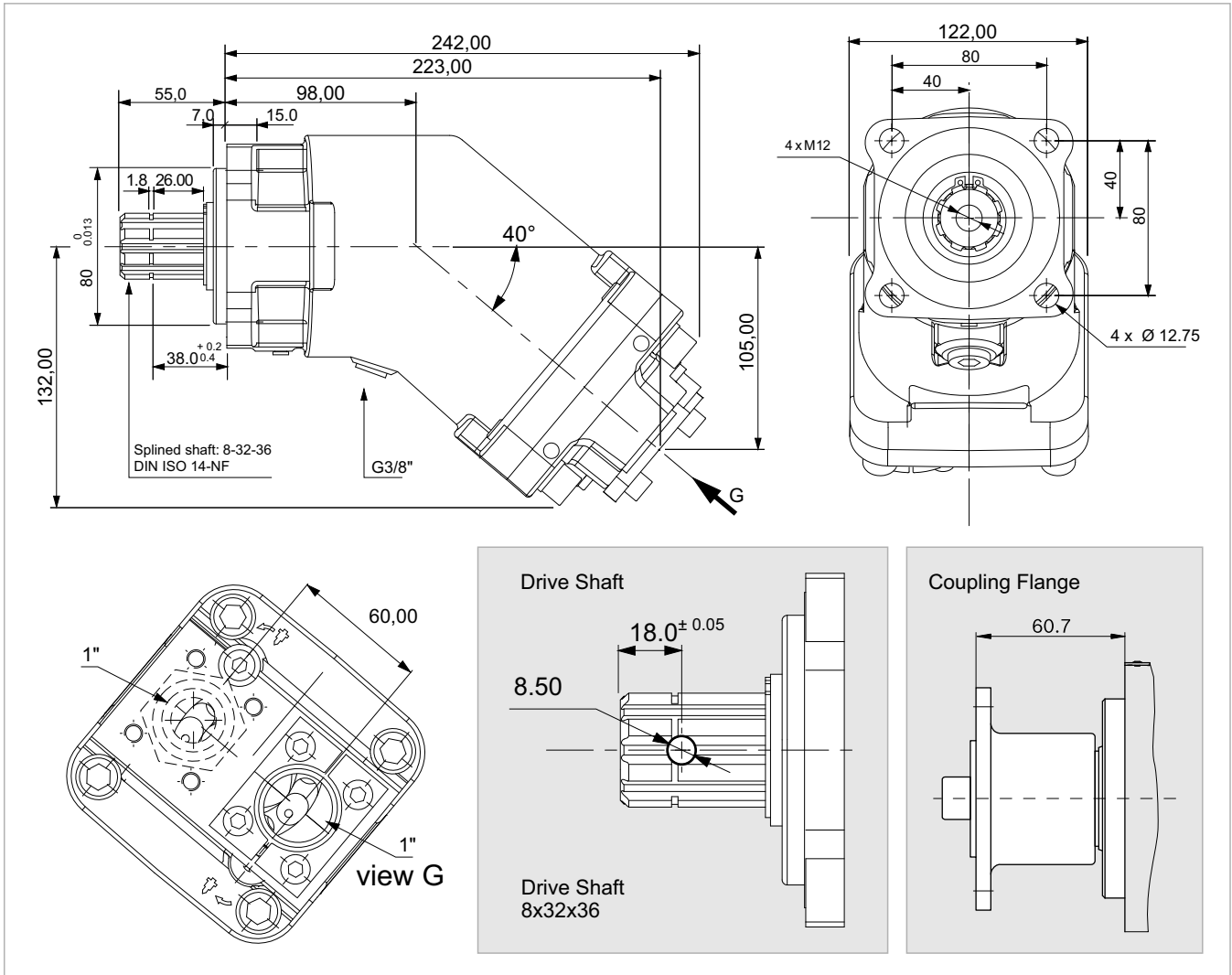


x 1000 rpm	80,00 cc
x 1500 rpm	120,00 cc
Max. Continuous Pump Speed	1700 rpm
Max. Limited Pump Speed	2100 rpm
Max. Continuous Pressure	350 bar
Max. Intermit. Peak Pressure	400 bar
Max. Torque at 350 bar	460 Nm
Weight without inlet fitting	15,00 kg
Weight with inlet fitting	15,40 kg
Torque without inlet fitting	17,80 N.m
Torque with inlet fitting	18,33 N.m
Rotation	CW-CCW
Fluid	Min.B.Hyd.Oil
Inlet & Outlet	1"

Flow, Speed, Pressure List of PD-DIN 80

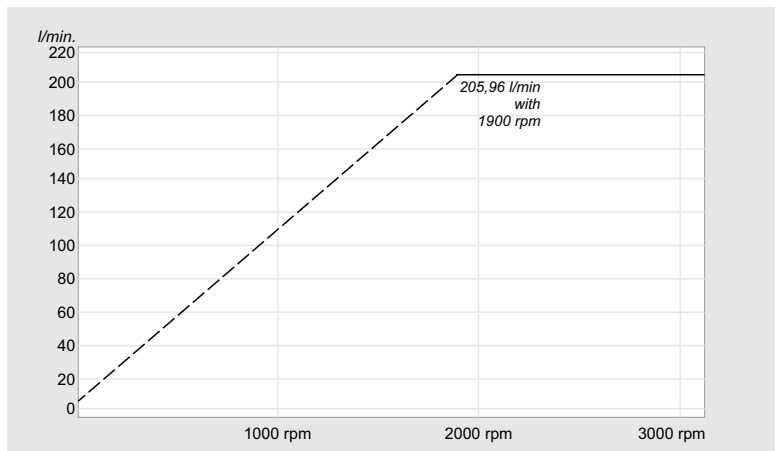


PD-DIN 108

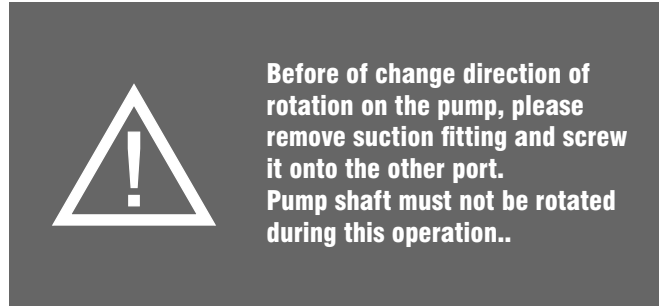
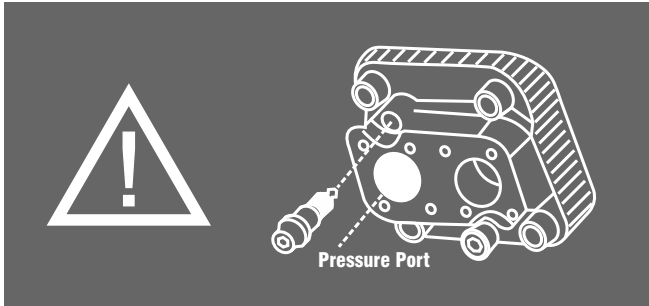


x 1000 rpm	108,40 cc
x 1500 rpm	162,60 cc
Max. Continuous Pump Speed	1700 rpm
Max. Limited Pump Speed	1900 rpm
Max. Continuous Pressure	350 bar
Max. Intermit. Peak Pressure	400 bar
Max. Torque at 350 bar	620 Nm
Weight without inlet fitting	15,50 kg
Weight with inlet fitting	15,90 kg
Torque without inlet fitting	17,92 N.m
Torque with inlet fitting	18,45 N.m
Rotation	CW-CCW
Fluid	Min.B.Hyd.Oil
Inlet & Outlet	1"

Flow, Speed, Pressure List of PD-DIN 108



Changing the Direction of Rotation



!! CHECK THE ROTATION FROM THE POWER TAKE OFF

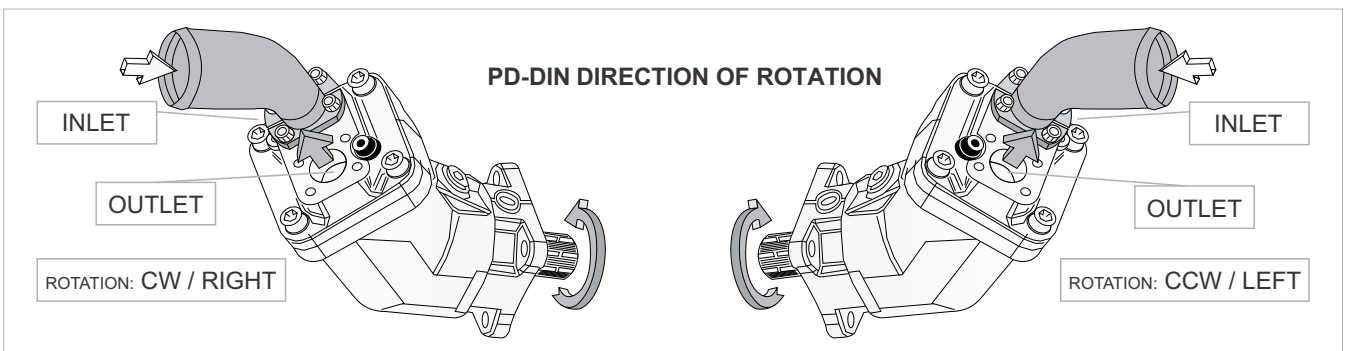
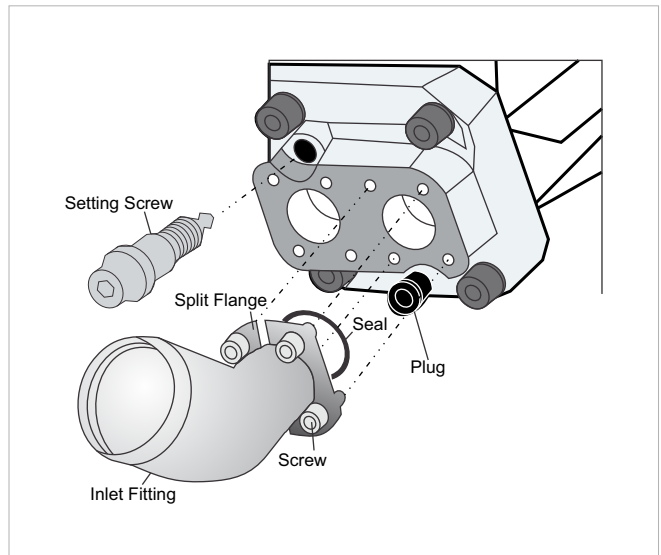
!! THE ROTATION DIRECTION OF THE PUMP

Left
Default delivered.

Right
Change rotation.

HOW TO CHANGE ROTATION OF THE PD-DIN 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.



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 PD-DIN 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 PD-DIN Bent Axis Pump may be damaged. After unscrewing the pressure connection, do not turn the drive shaft of the pump!

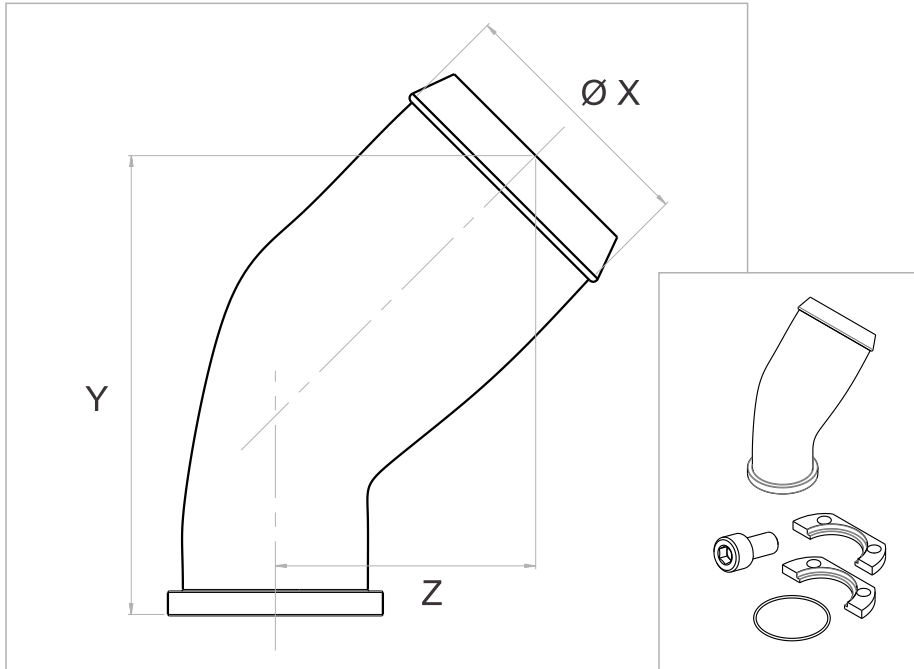
FLUID

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



Inlet Fittings, Accessories

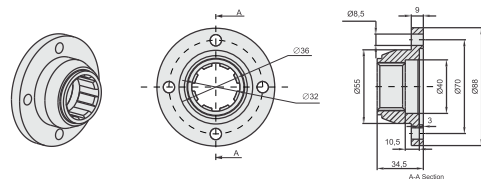
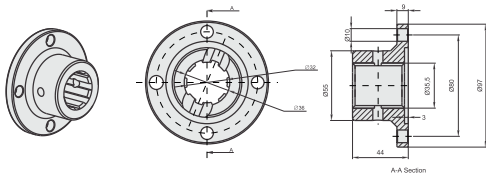
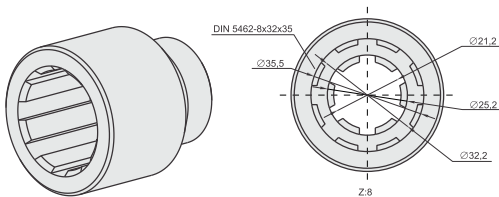
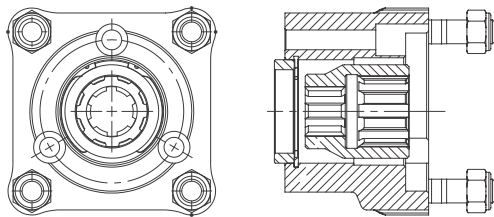


45° elbow fittings

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)



Couplers

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

Installation & User Guide

The PD-DIN pumps fitted with a rubber front seal

INSTALLATION

PD-DIN 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 PD-DIN 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 diometric pairs.
Connect the pressure line.

REPAIR

We offers a comprehensive range of services for the repair of our Bent Axis Pumps.

Repairs to the PD-DIN Bent Axis Pump may only be performed by authorized, skilled and instructed personnel. Only use original and pre-installed our PD-DIN spare parts from supplied to Manufacturer..

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

SPARE PARTS

The spare parts list and the PD-DIN pump order specific.

When ordering spare parts, quote the material and complete Ordering code number of the PD-DIN Bent Axis Pump as well as the right numbers of the spare parts.

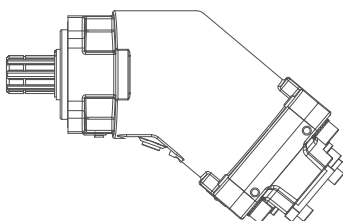
RISK OF DAMAGE!

Do not touch the drive shaft of the PD-DIN 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	9,00	9,00	9,50	10,50	10,50	11,00	11,50	11,50	15,00	15,50
- With inlet fitting	kg	9,40	9,40	9,90	10,90	10,90	11,40	11,90	11,90	15,40	15,90

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 PD-DIN 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



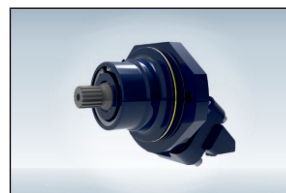
PS-ISO
Bent Axis Pumps



MS-ISO
Bent Axis Motor



PD Dual
Dual Flow Pumps



MF Fixed
Bent Axis Motor



PV
Variable Disp.
Piston Pumps

SAFA HYDRAULICS

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PA-SAE

Bent Axis Pumps

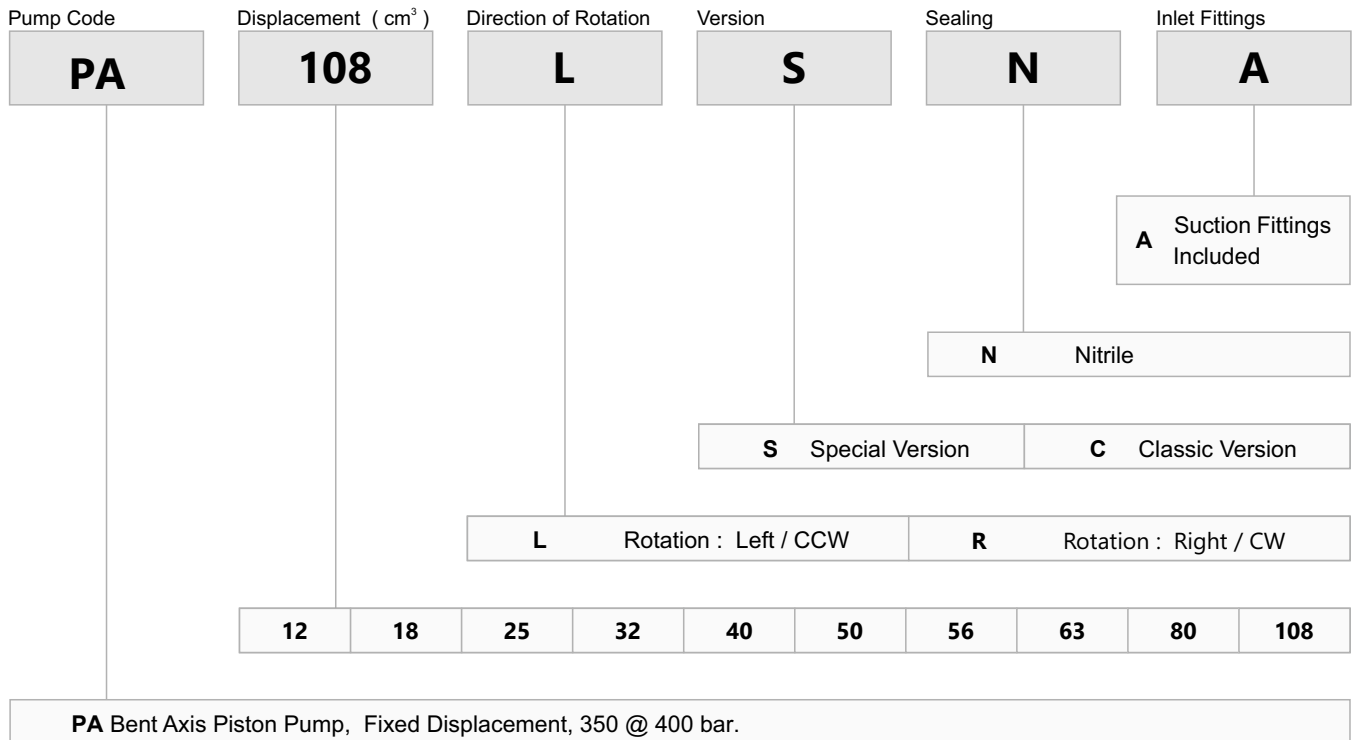


SAE Mounting Flange, Flange, 2 Bolt, 6 Bolt, 12cc to 130cc

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.



Ordering Code of PA Pumps



Classic Version ; Default design

Special Version ; Back Cover
Drive Shaft
Mounting Flange

Formulas			
Pump Output Flow	GPM	$GPM = (\text{Speed (rpm)} \times \text{disp. (cu. in.)}) / 231$	$GPM = (n \times d) / 231$
Pump Input Horsepower	HP	$HP = GPM \times \text{Pressure (psi)} / 1714 \times \text{Efficiency}$	$HP = (Q \times P) / 1714 \times E$
Pump Efficiency	E	Overall Efficiency = Output HP / Input HP	$E_{\text{Overall}} = \text{HP}_{\text{Out}} / \text{HP}_{\text{In}} \times 100$
		Overall Efficiency = Volumetric Eff. × Mechanical Eff.	$E_{\text{Overall}} = \text{EffVol.} \times \text{EffMech.}$
Pump Volumetric Efficiency	E	Volumetric Efficiency = Actual Flow Rate Output (GPM) / Theoretical Flow Rate Output (GPM) × 100	$\text{EffVol.} = Q_{\text{Act.}} / Q_{\text{Theo.}} \times 100$
Pump Mechanical Efficiency	E	Mechanical Efficiency = Theoretical Torque to Drive / Actual Torque to Drive × 100	$\text{EffMech} = T_{\text{Theo.}} / T_{\text{Act.}} \times 100$
Pump Displacement	CIPR	$\text{Displcmnt (In.}^3 \text{ / rev.)} = \text{Flow Rate (GPM)} \times 231 / \text{Pump RPM}$	$\text{CIPR} = GPM \times 231 / \text{RPM}$
Pump Torque	T	Torque = Horsepower × 63025 / RPM	$T = 63025 \times \text{HP} / \text{RPM}$
		Torque = Pressure (PSIG) × Pump Displacement (CIPR) / 2π	$T = P \times \text{CIPR} / 6.28$

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

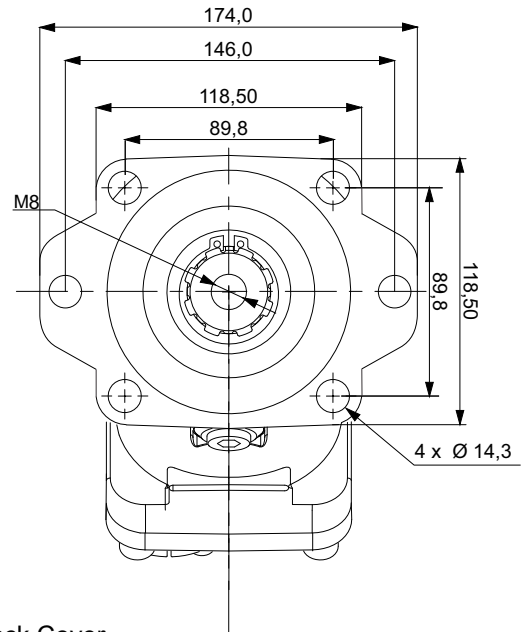
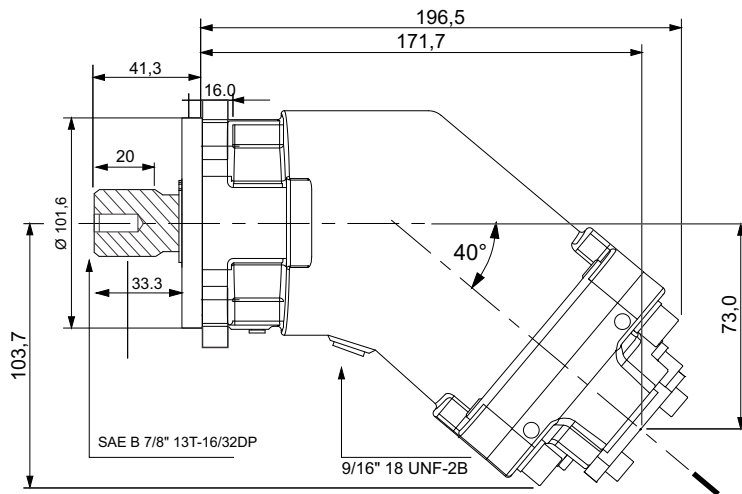
Wattage for heating hydraulic oil : Each watt will raise the temperature of 1 gallon of oil by 1° F. per hour.

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.

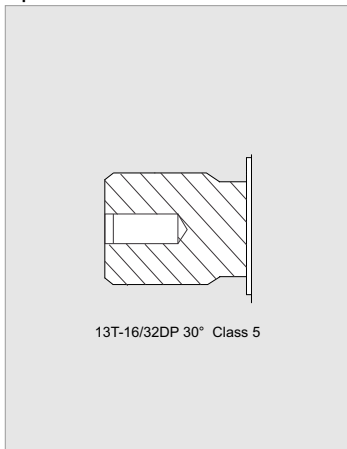
PA 12

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

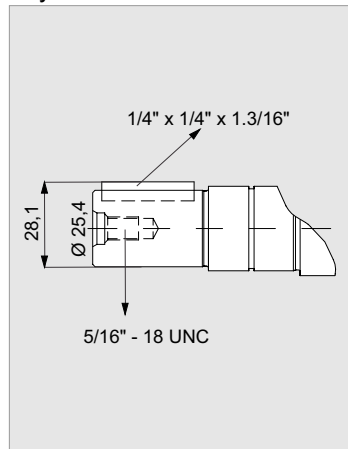
SAE B2 & B4 BOLT MOUNTING (SAE J744)



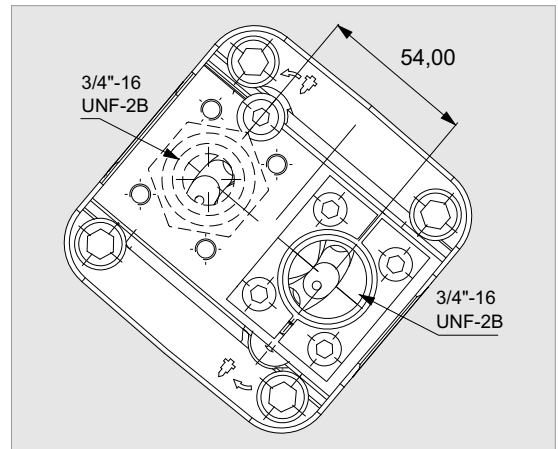
Spline Shaft



Keyed Shaft

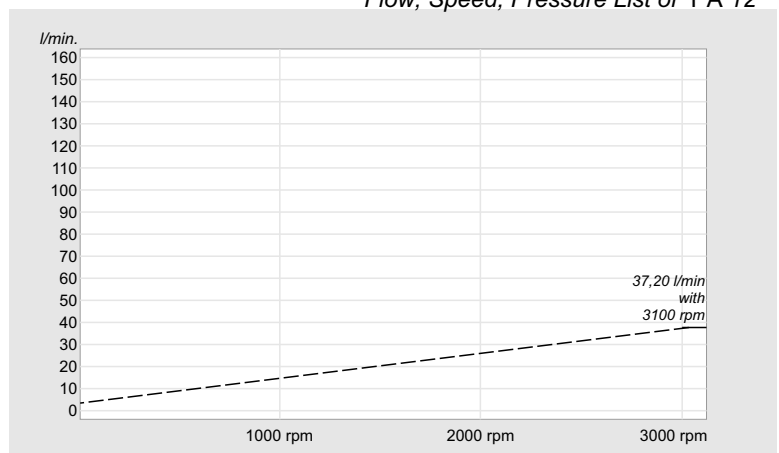


Back Cover



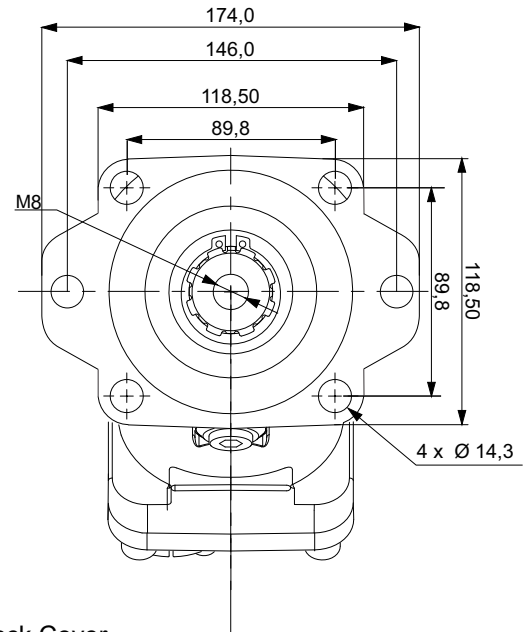
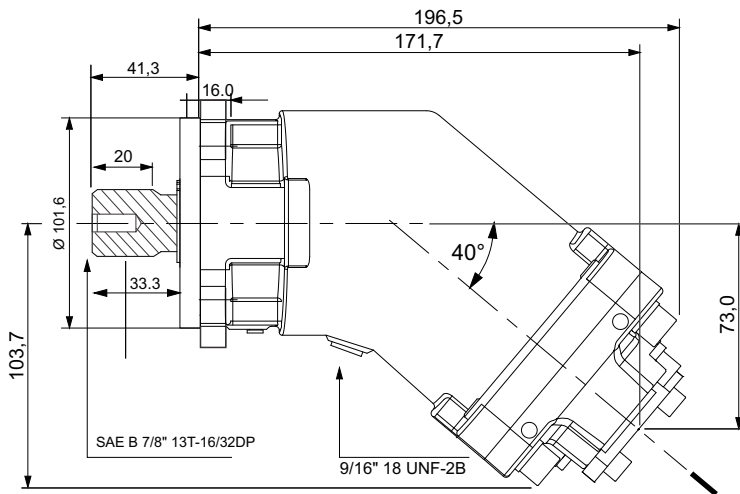
Flow, Speed, Pressure List of PA 12

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

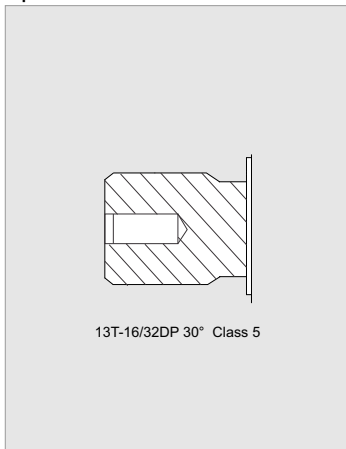


SAE B 7/8" 13T-16/32DP

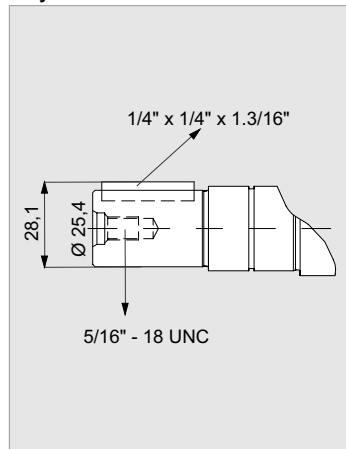
SAE B2 & B4 BOLT MOUNTING (SAE J744)



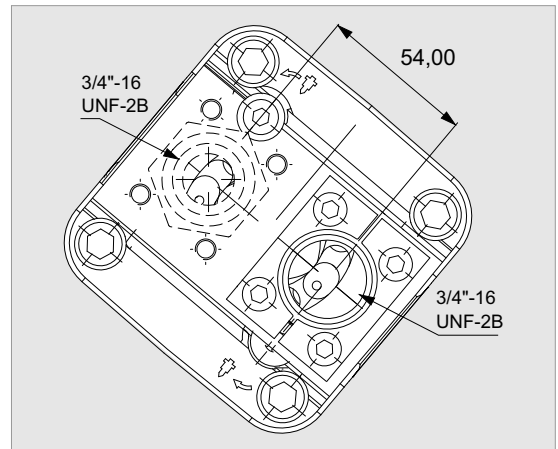
Spline Shaft



Keyed Shaft

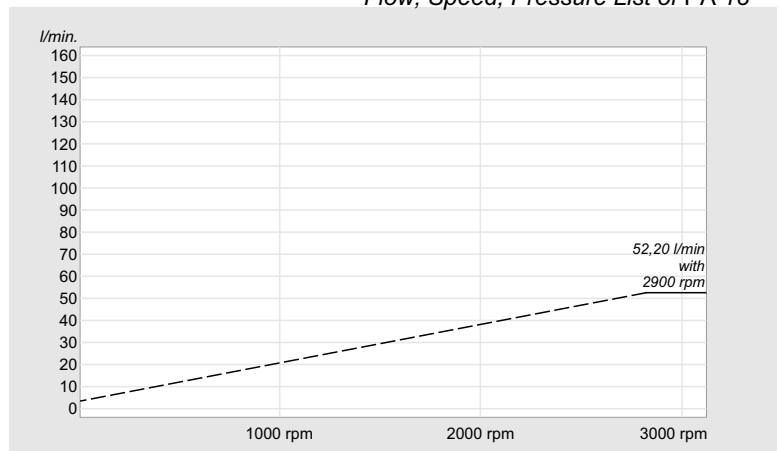


Back Cover



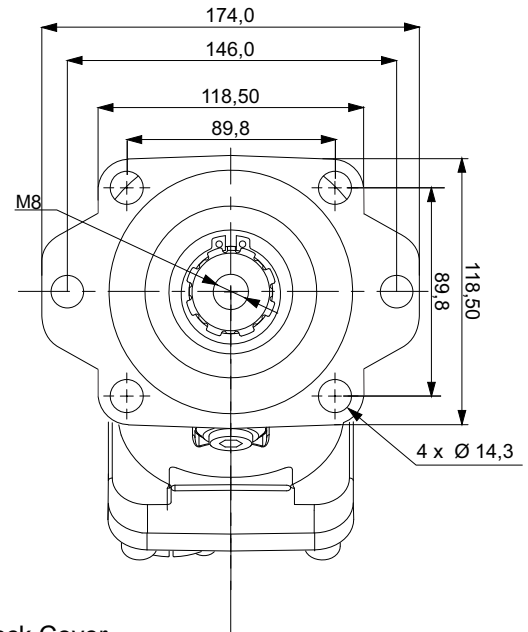
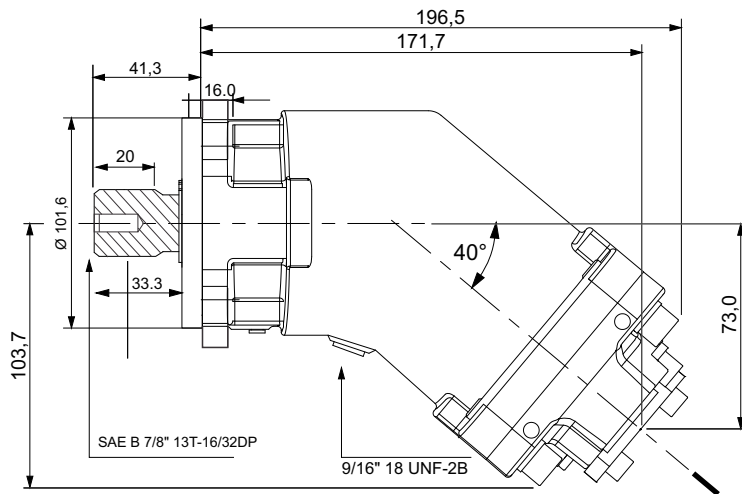
Flow, Speed, Pressure List of PA 18

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

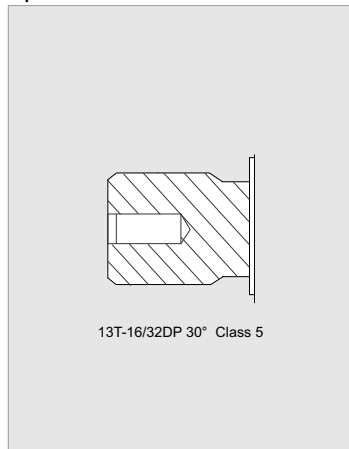


SAE B 7/8" 13T-16/32DP

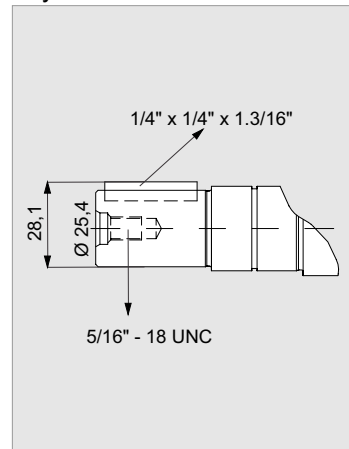
SAE B2 & B4 BOLT MOUNTING (SAE J744)



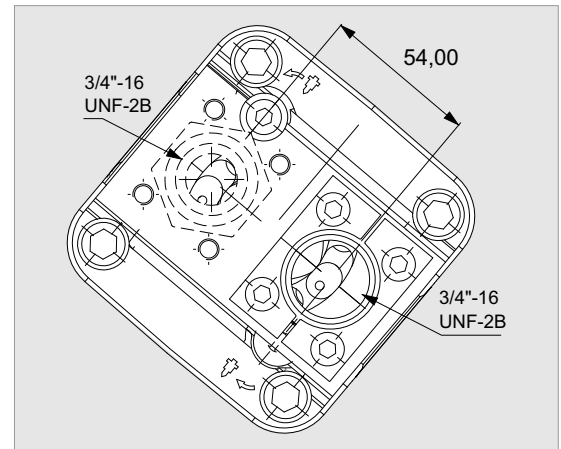
Spline Shaft



Keyed Shaft

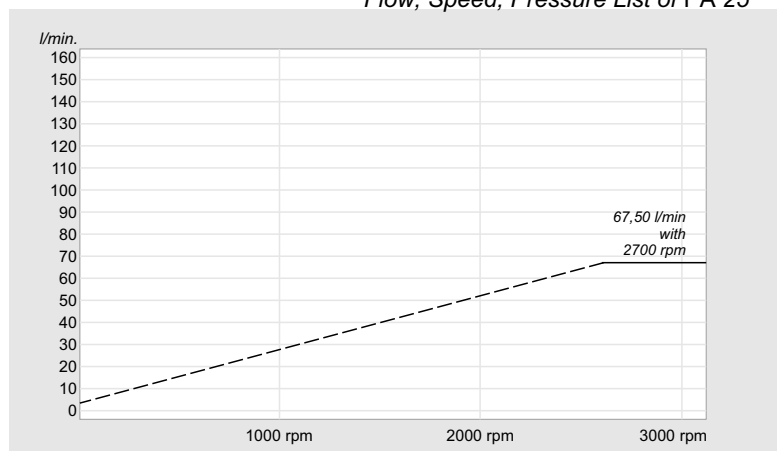


Back Cover



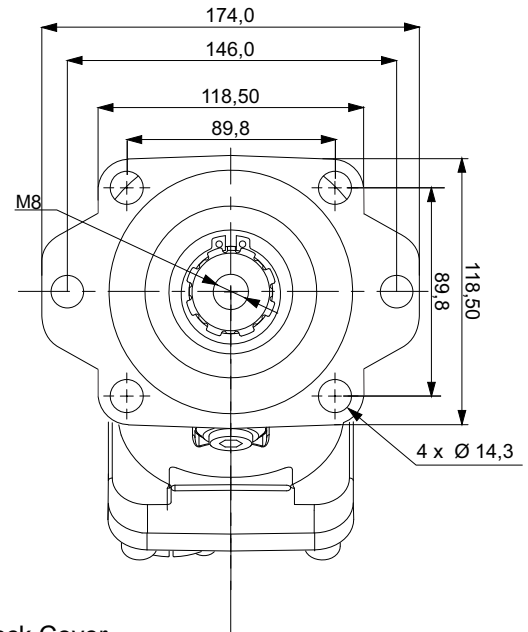
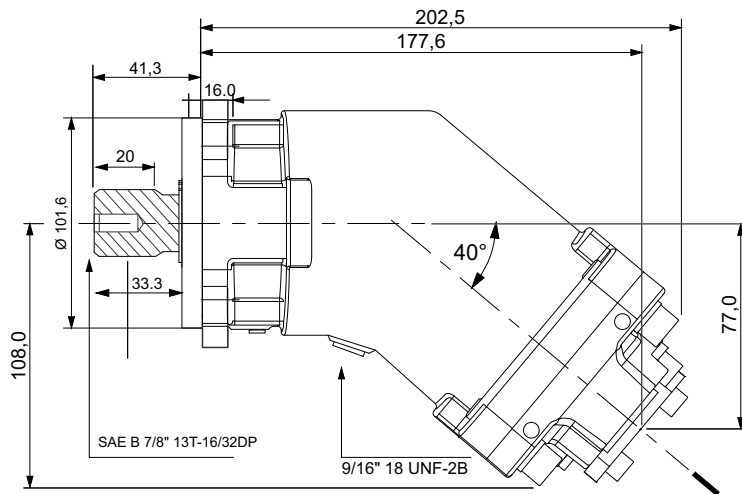
Flow, Speed, Pressure List of PA 25

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

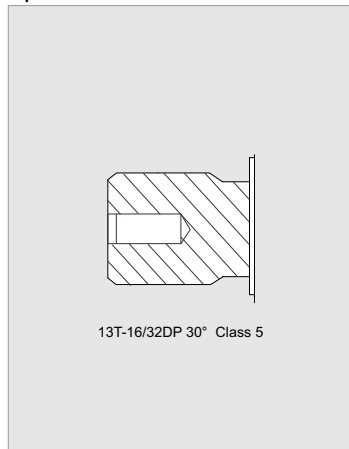


SAE B 7/8" 13T-16/32DP

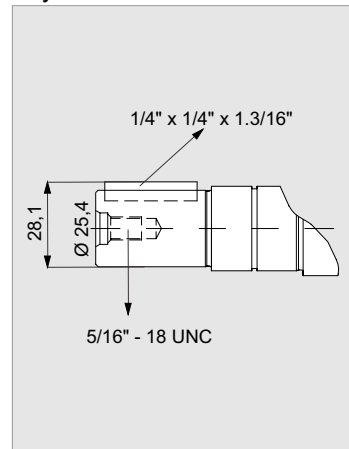
SAE B2 & B4 BOLT MOUNTING (SAE J744)



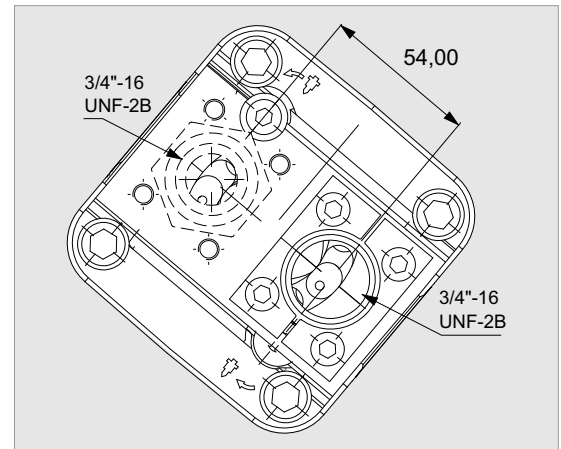
Spline Shaft



Keyed Shaft

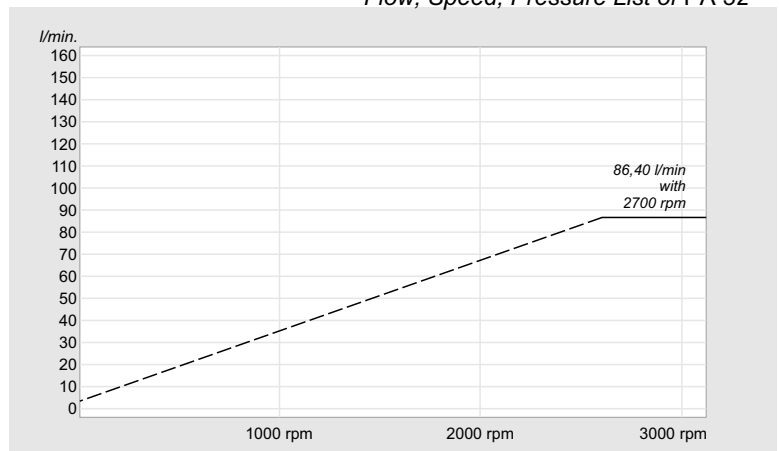


Back Cover



Flow, Speed, Pressure List of PA 32

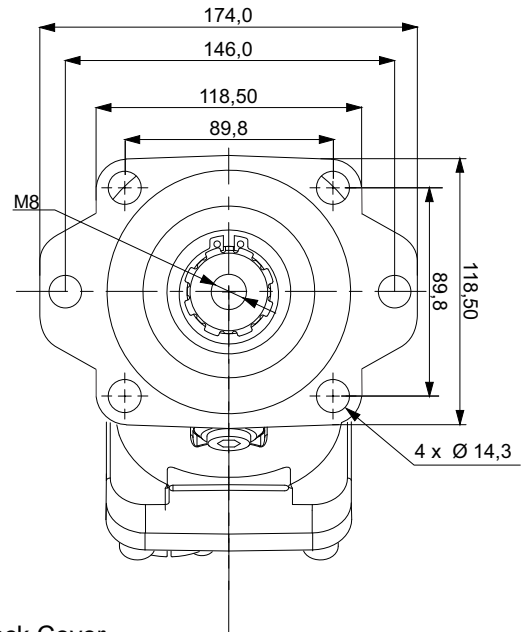
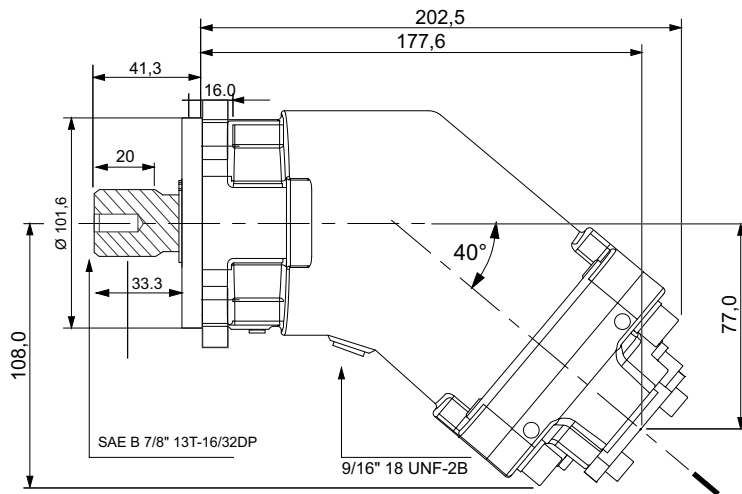
x 1000 rpm	32,00 cc
x 1500 rpm	48,00 cc
Max. Continuous Pump Speed	2250 rpm
Max. Limited Pump Speed	2700 rpm
Max. Continuous Pressure	350 bar
Max. Intermit. Peak Pressure	400 bar
Max. Torque at 350 bar	190 Nm
Weight without inlet fitting	11,50 kg
Weight with inlet fitting	11,90 kg
Rotation	CW-CCW



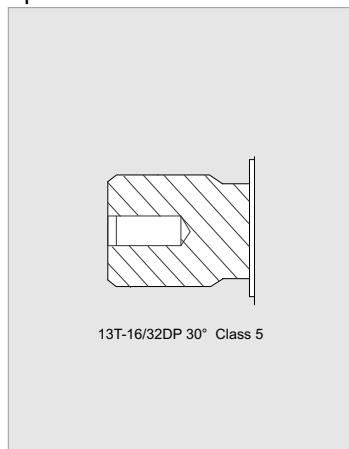
PA 40

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

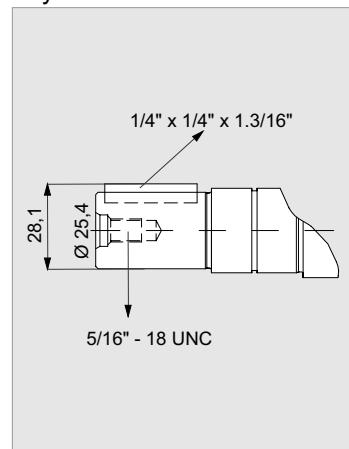
SAE B2 & B4 BOLT MOUNTING (SAE J744)



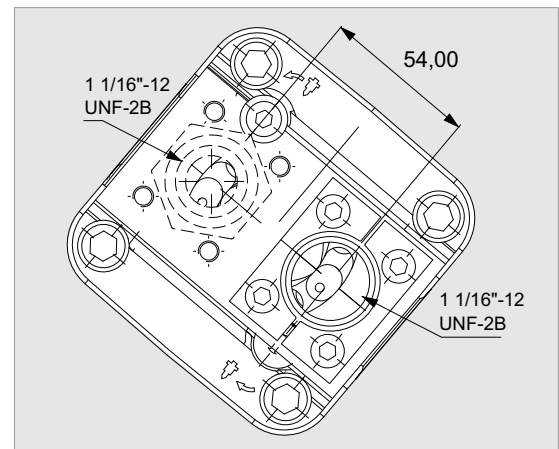
Spline Shaft



Keyed Shaft

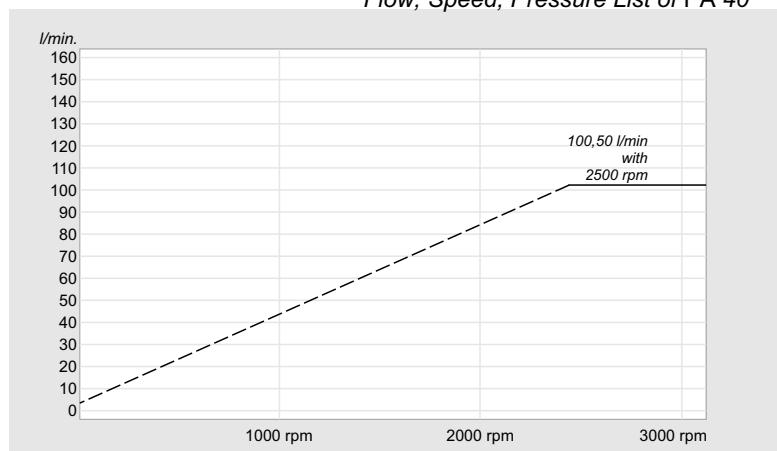


Back Cover



Flow, Speed, Pressure List of PA 40

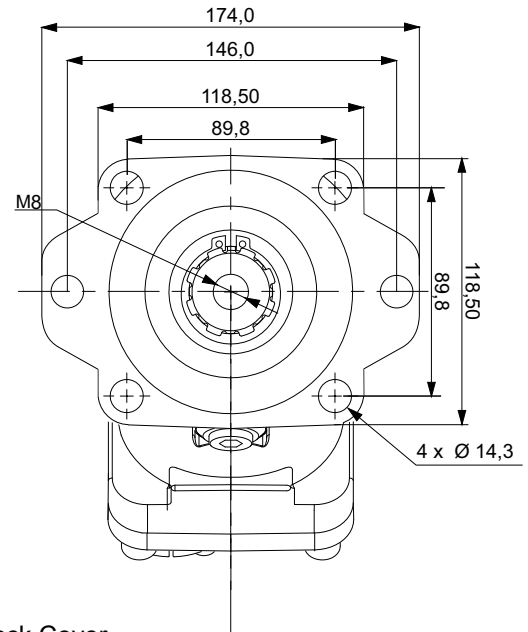
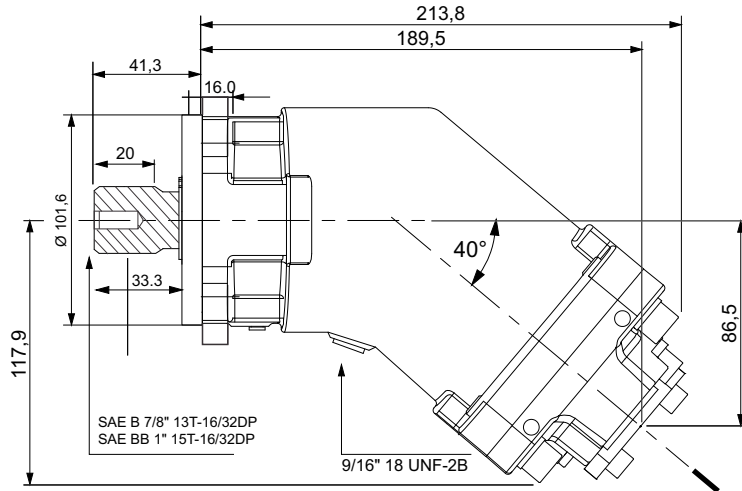
x 1000 rpm	40,20 cc
x 1500 rpm	60,30 cc
Max. Continuous Pump Speed	1900 rpm
Max. Limited Pump Speed	2500 rpm
Max. Continuous Pressure	350 bar
Max. Intermit. Peak Pressure	400 bar
Max. Torque at 350 bar	240 Nm
Weight without inlet fitting	11,50 kg
Weight with inlet fitting	11,90 kg
Rotation	CW-CCW



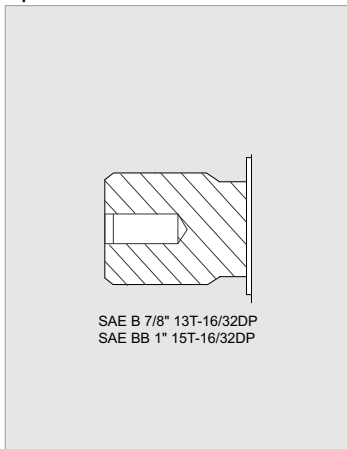
PA 50

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

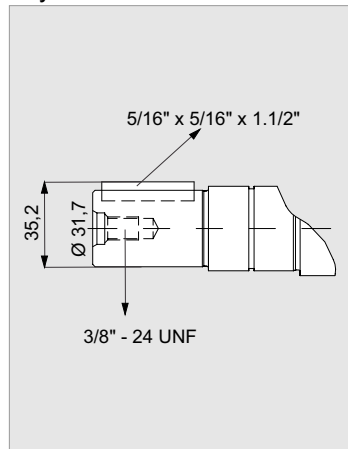
SAE B2 & B4 BOLT MOUNTING (SAE J744)



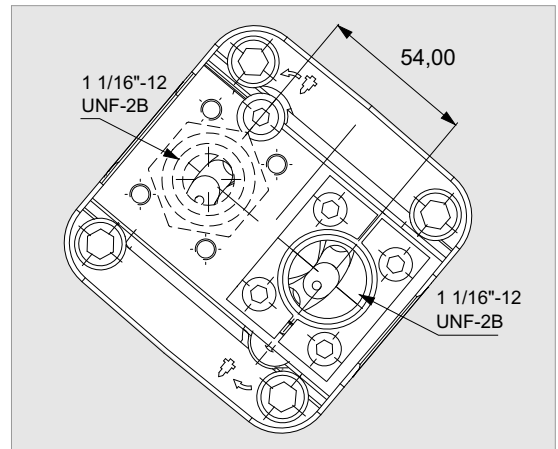
Spline Shaft



Keyed Shaft

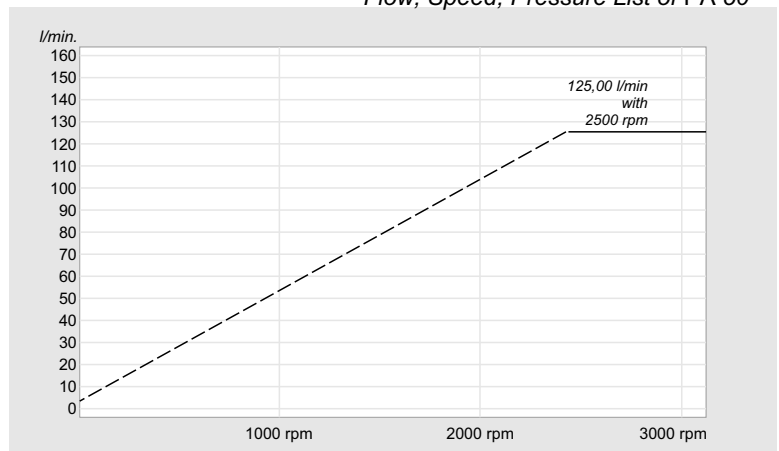


Back Cover



Flow, Speed, Pressure List of PA 50

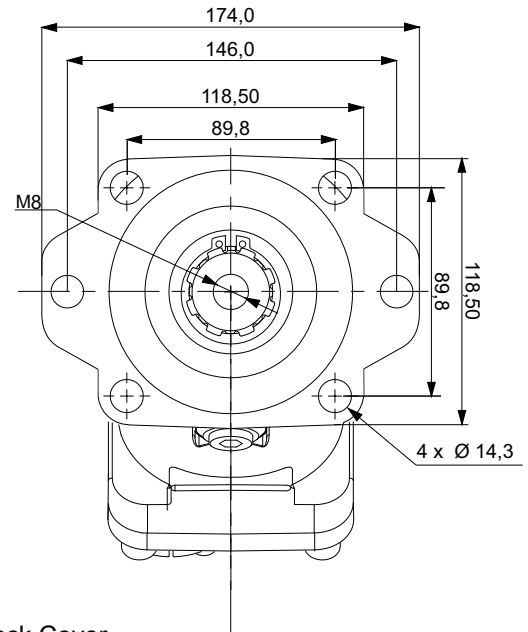
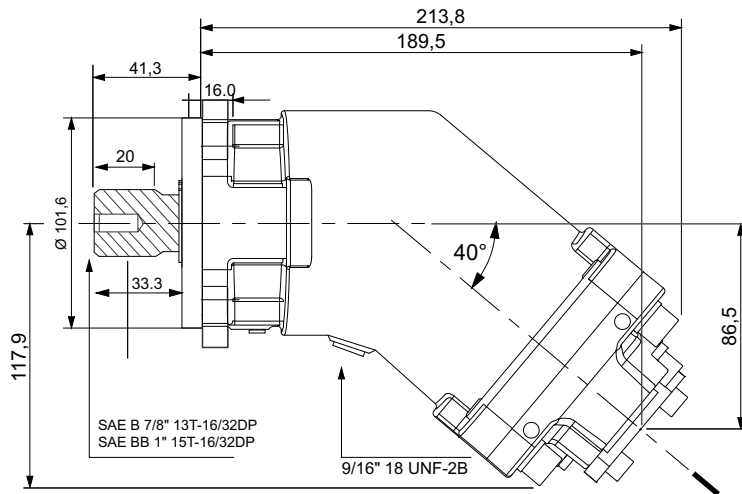
x 1000 rpm	50,00 cc
x 1500 rpm	75,00 cc
Max. Continuous Pump Speed	1900 rpm
Max. Limited Pump Speed	2500 rpm
Max. Continuous Pressure	350 bar
Max. Intermit. Peak Pressure	400 bar
Max. Torque at 350 bar	292 Nm
Weight without inlet fitting	12,00 kg
Weight with inlet fitting	12,40 kg
Rotation	CW-CCW



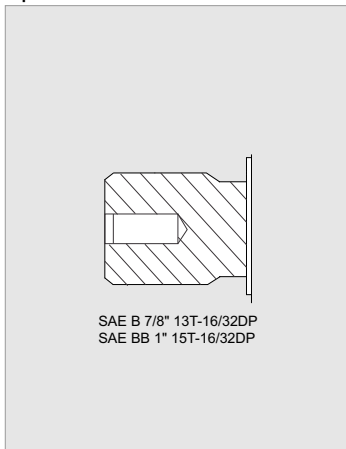
PA 56

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

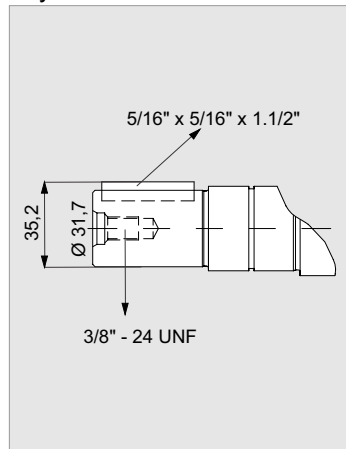
SAE B2 & B4 BOLT MOUNTING (SAE J744)



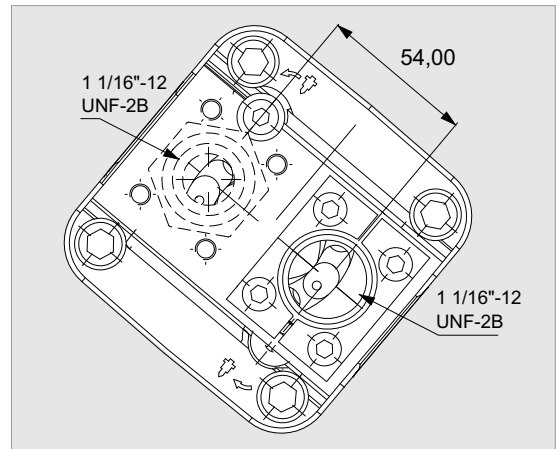
Spline Shaft



Keyed Shaft

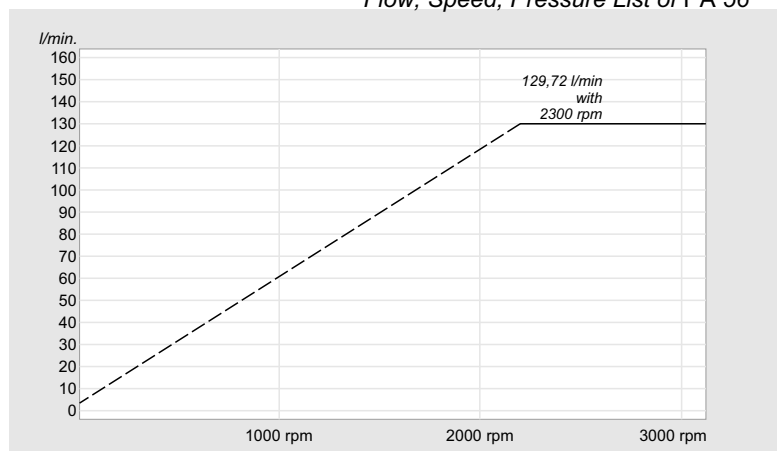


Back Cover



Flow, Speed, Pressure List of PA 56

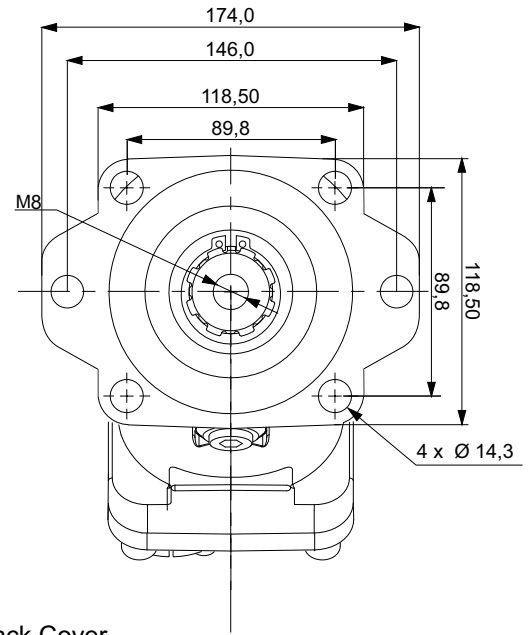
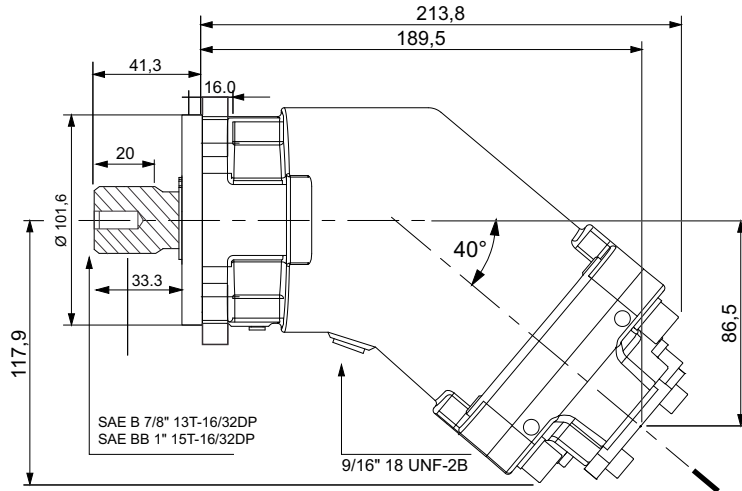
x 1000 rpm	56,40 cc
x 1500 rpm	84,60 cc
Max. Continuous Pump Speed	1900 rpm
Max. Limited Pump Speed	2300 rpm
Max. Continuous Pressure	350 bar
Max. Intermit. Peak Pressure	400 bar
Max. Torque at 350 bar	330 Nm
Weight without inlet fitting	12,50 kg
Weight with inlet fitting	12,90 kg
Rotation	CW-CCW



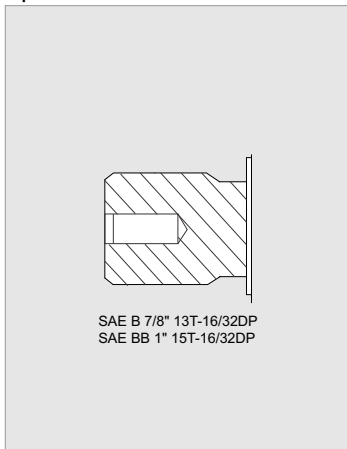
PA 63

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

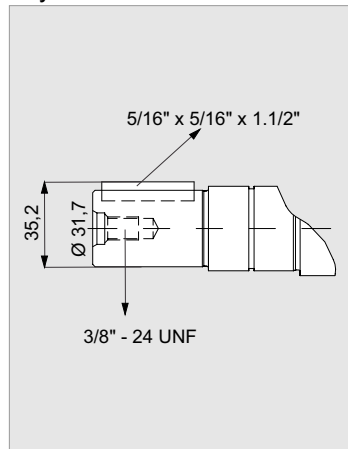
SAE B2 & B4 BOLT MOUNTING (SAE J744)



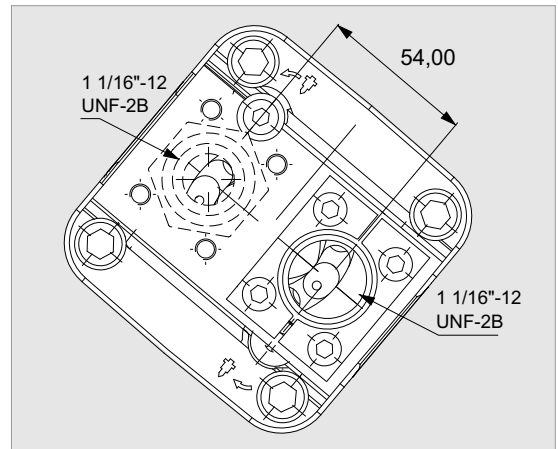
Spline Shaft



Keyed Shaft

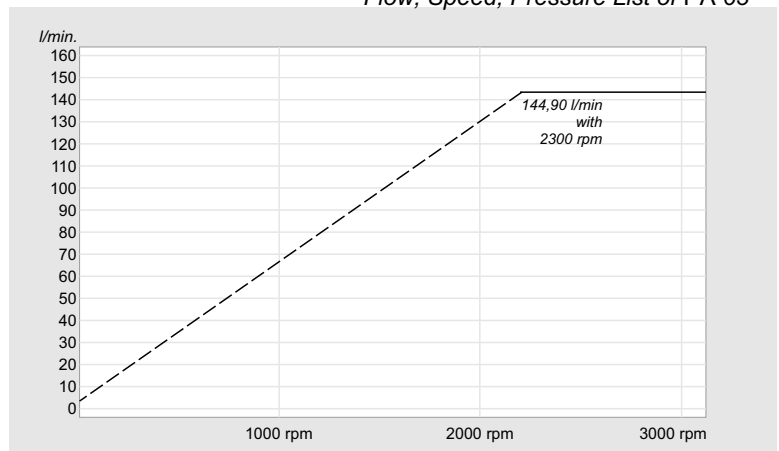


Back Cover



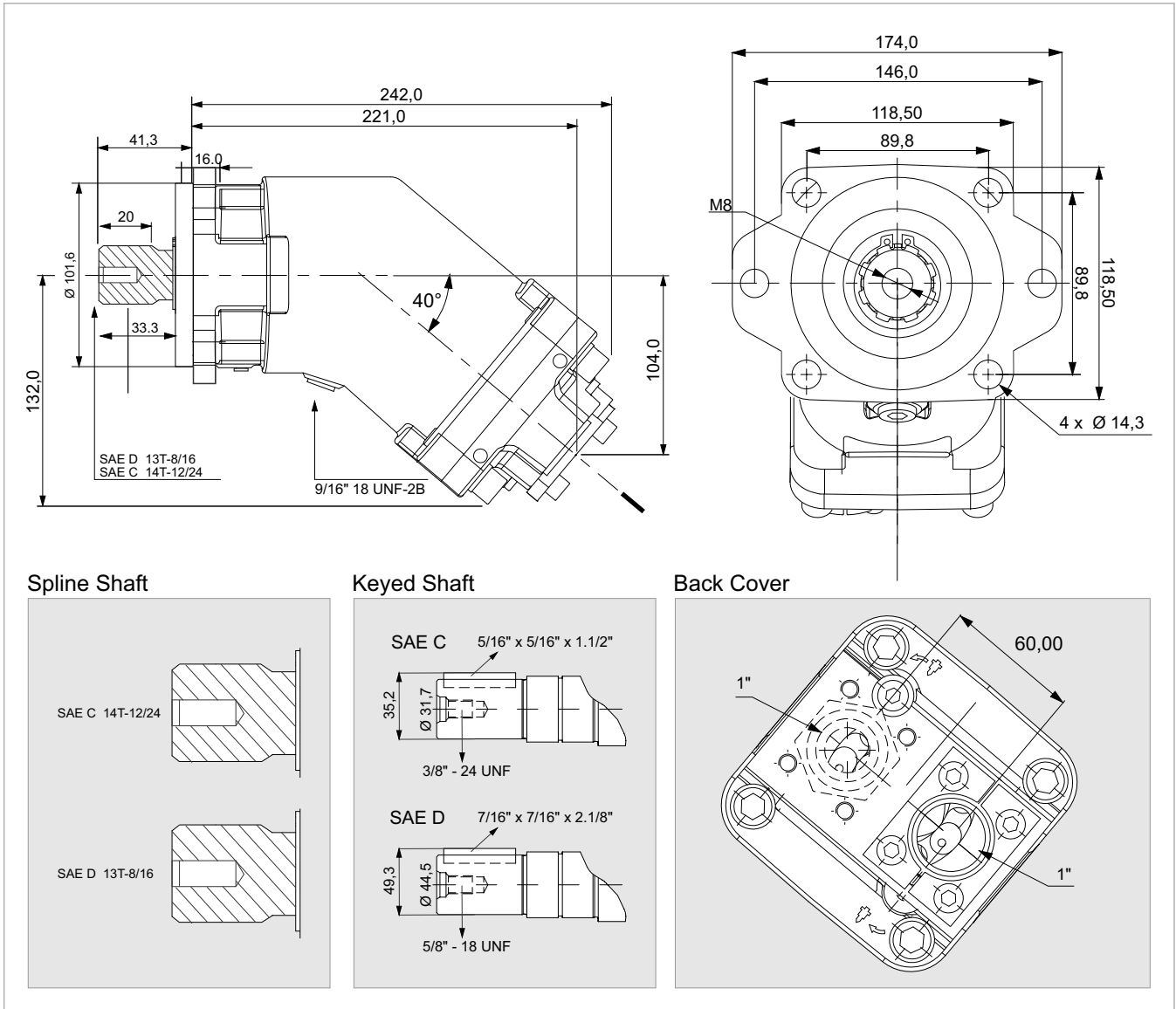
Flow, Speed, Pressure List of PA 63

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



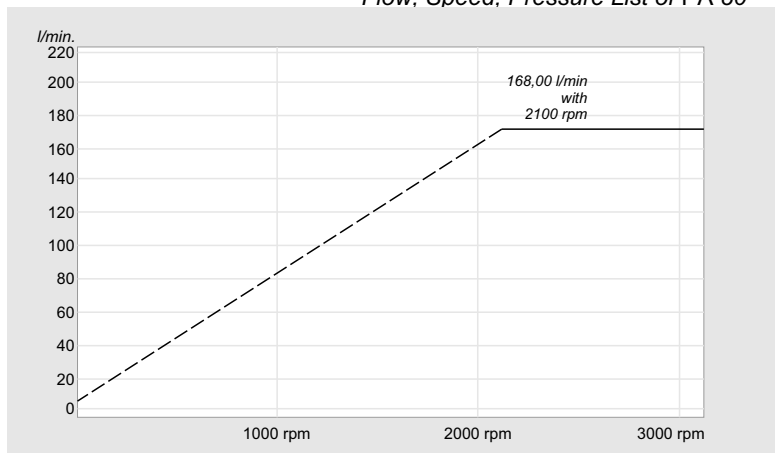
PA 80

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



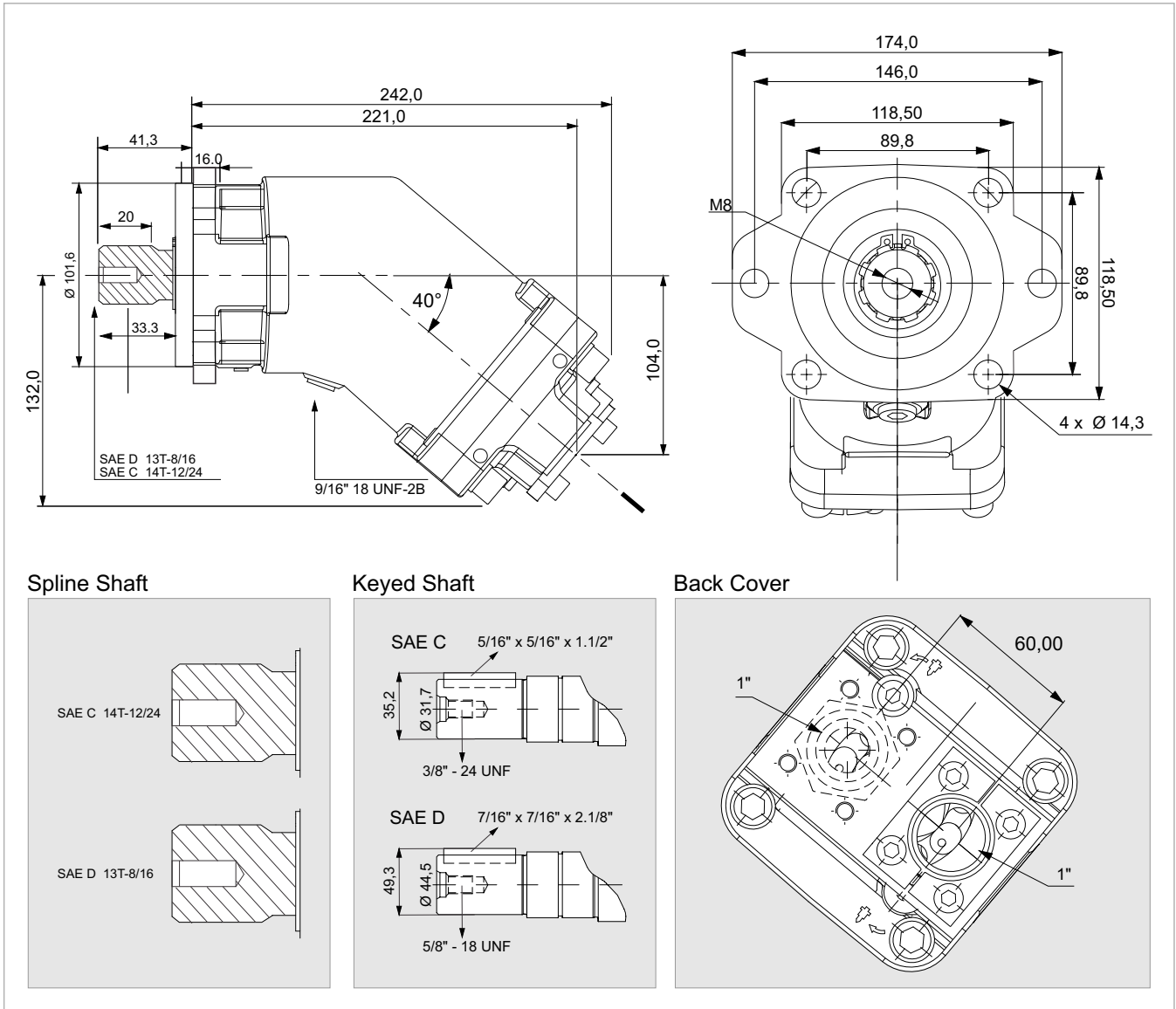
x 1000 rpm	80,00 cc
x 1500 rpm	120,00 cc
Max. Continuous Pump Speed	1700 rpm
Max. Limited Pump Speed	2100 rpm
Max. Continuous Pressure	350 bar
Max. Intermit. Peak Pressure	400 bar
Max. Torque at 350 bar	460 Nm
Weight without inlet fitting	16,00 kg
Weight with inlet fitting	16,40 kg
Rotation	CW-CCW

Flow, Speed, Pressure List of PA 80



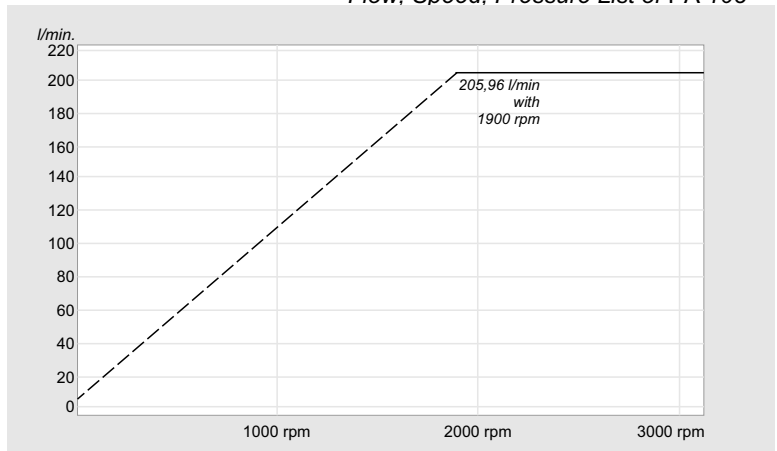
PA 108

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



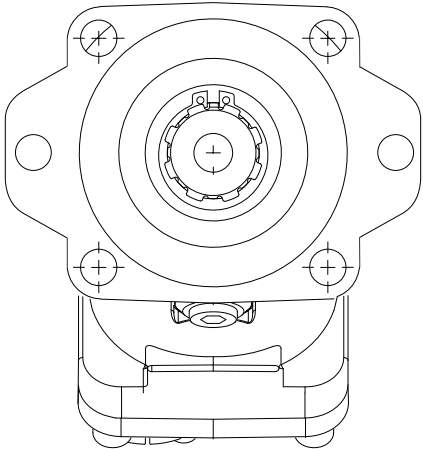
x 1000 rpm	108,40 cc
x 1500 rpm	162,60 cc
Max. Continuous Pump Speed	1700 rpm
Max. Limited Pump Speed	1900 rpm
Max. Continuous Pressure	350 bar
Max. Intermit. Peak Pressure	400 bar
Max. Torque at 350 bar	620 Nm
Weight without inlet fitting	16,50 kg
Weight with inlet fitting	16,90 kg
Rotation	CW-CCW

Flow, Speed, Pressure List of PA 108

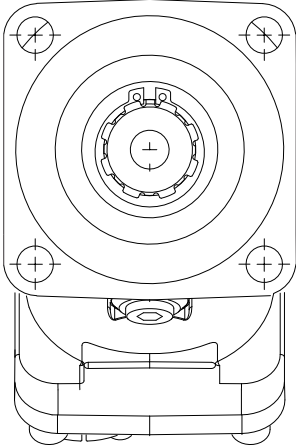


Special Mounting Flanges

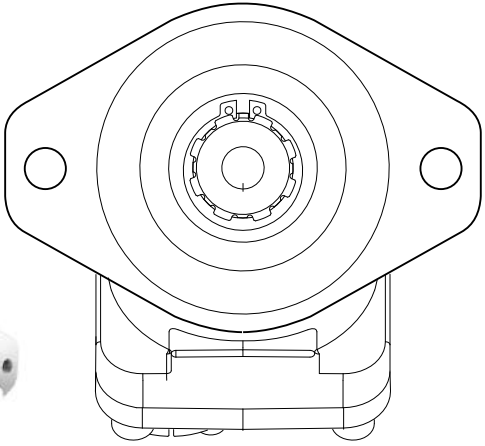
Default
Mounting Flange



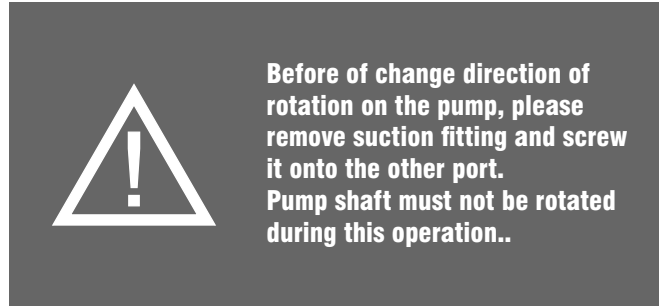
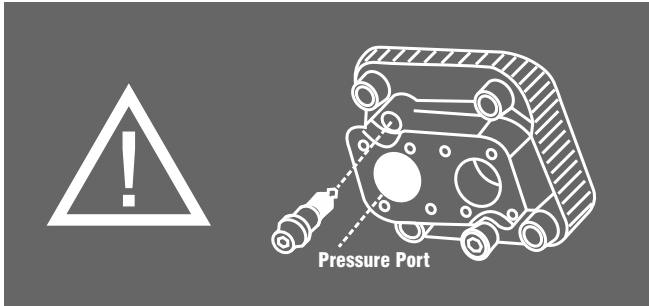
SAE B4 BOLT
(SAE J744)



SAE B2 BOLT
(SAE J744)



Changing the Direction of Rotation



!! CHECK THE ROTATION FROM THE POWER TAKE OFF

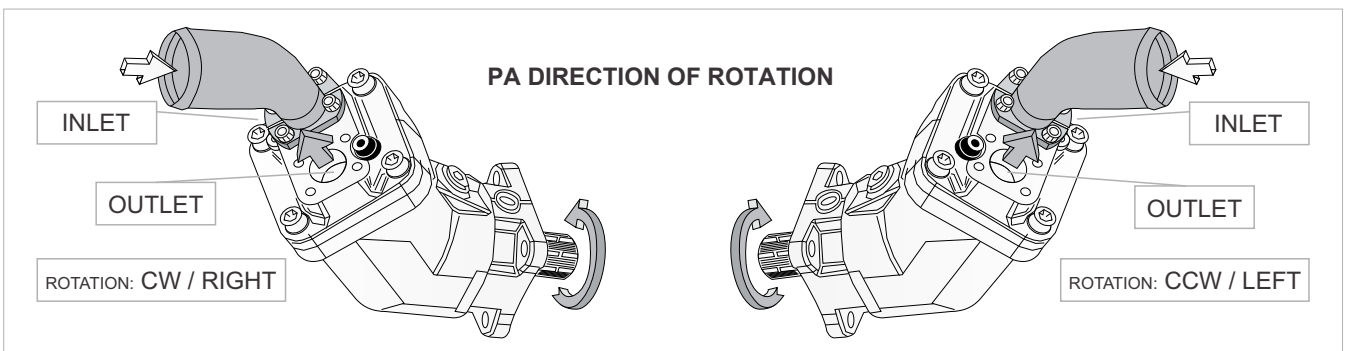
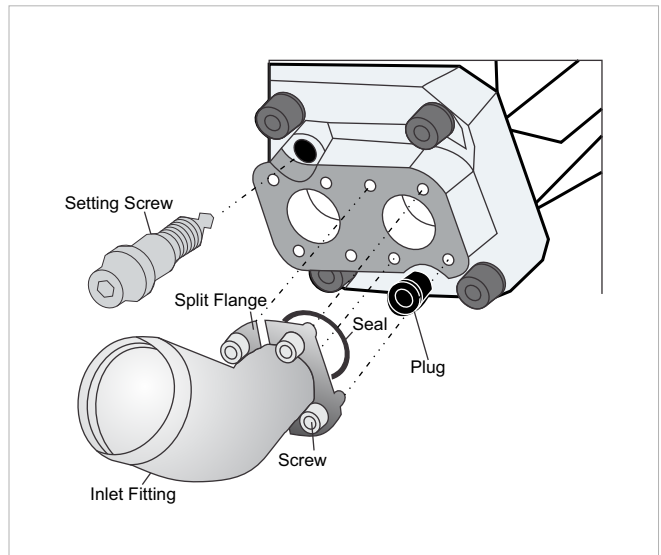
!! THE ROTATION DIRECTION OF THE PUMP

Left
Default delivered.

Right
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.



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!

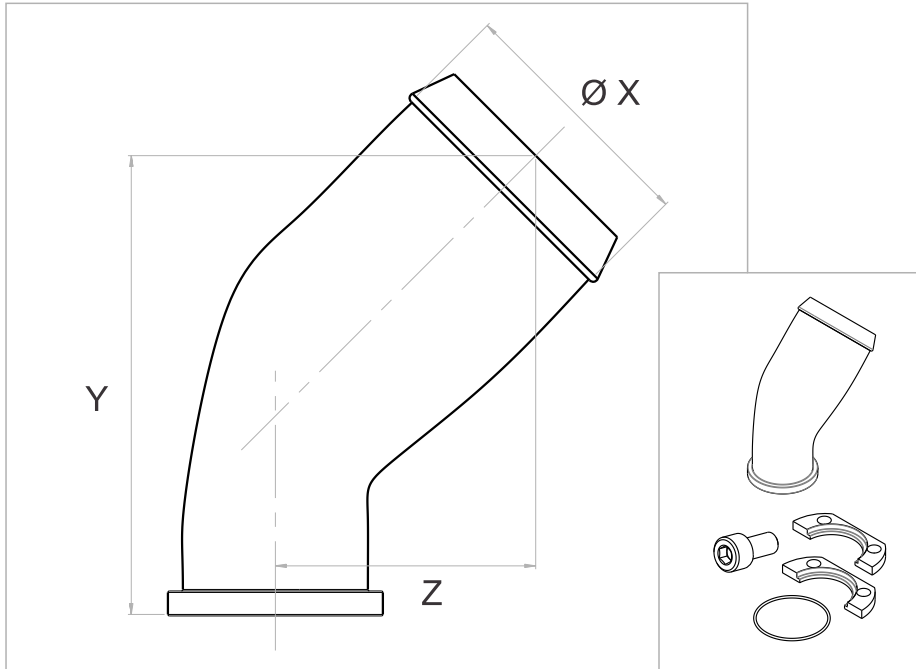
FLUID

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



Inlet Fittings, Accessories

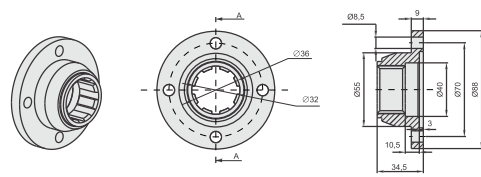
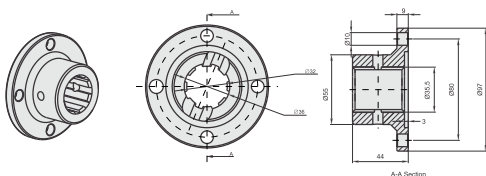
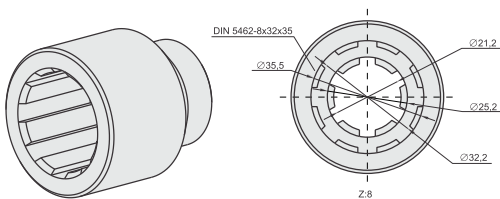
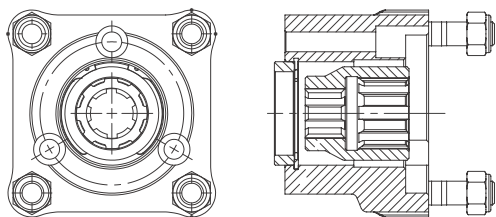


45° elbow fittings

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)



Couplers

- 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!

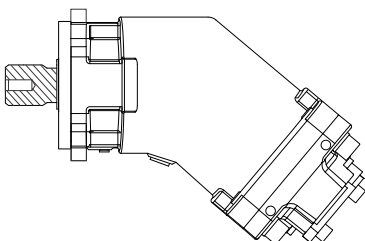
Do not touch the drive shaft of the PA Bent Axis Pump Do not touch sensor, valves and fittings

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



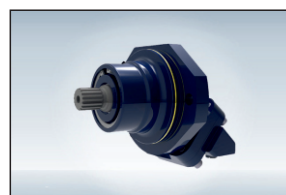
PS-ISO
Bent Axis Pumps



MS-ISO
Bent Axis Motor



PD Dual
Dual Flow Pumps



MF Fixed
Bent Axis Motor



PV
Variable Disp.
Piston Pumps

SAFA HYDRAULICS

ADDRESS:

Fevzi akmak Mahallesi 10465. Sk. Karatay | Konya / Turkey

TELEPHONE:

+90 332 342 10 21, +90 534 234 63 89, +90 539 592 71 71

FAX:

+90 332 342 45 71

E-MAIL:

info@safahydraulic.com

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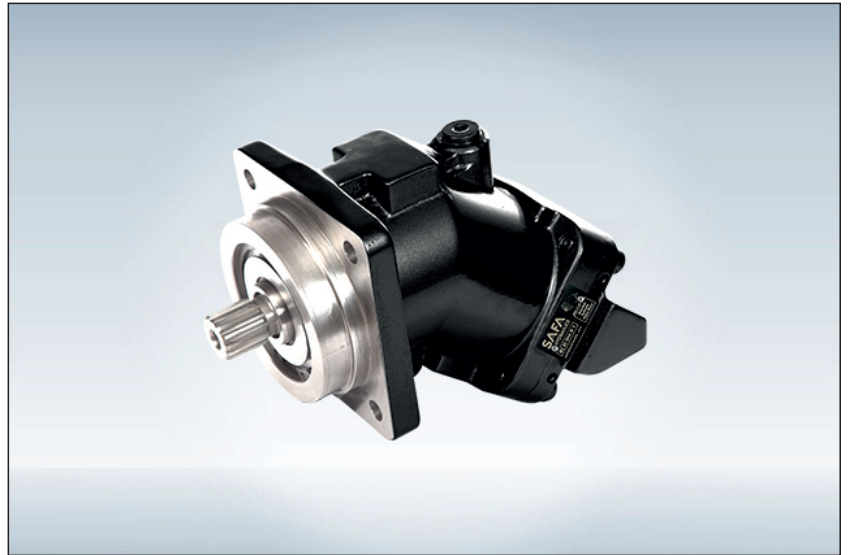


info@safahydraulic.com

www.safahydraulic.com

PS-ISO

Bent Axis Pumps

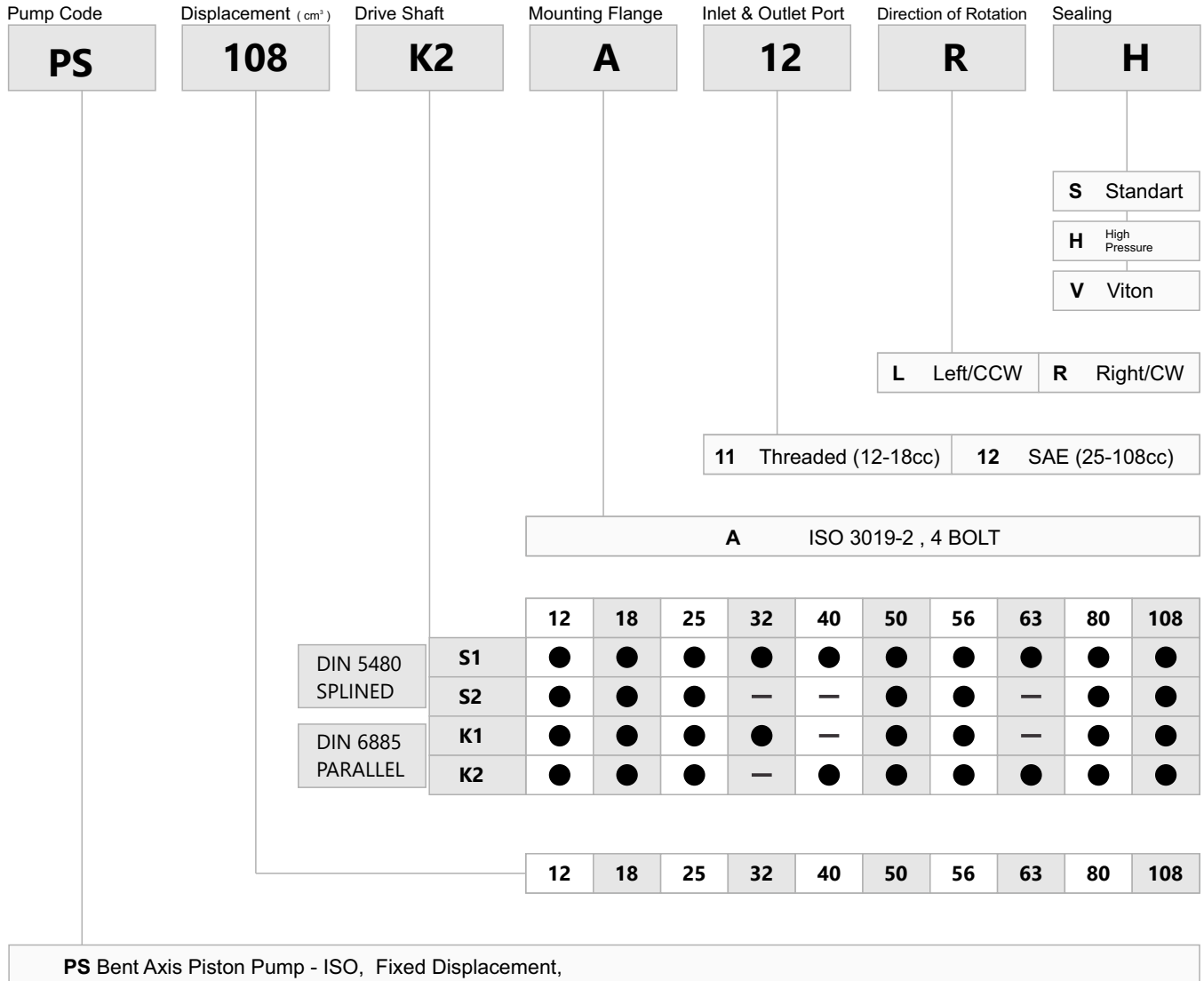


ISO Mounting Flange, Flange, 4 Bolt, 12cc to 130cc

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



Ordering Code of PS Pumps



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	3100	3100	2500	2500	2300	2300	2300	2300	2300	2000
Max. Continuous Pressure	bar	400	400	400	400	400	400	400	400	400	400
Max. Peak Pressure	bar	450	450	450	450	450	450	450	450	450	450
Max. Torque at 350 bar	Nm	66	98	141	174	225	280	320	350	445	600
Max. Flow	l/min.	37,20	55,80	62,50	80,00	92,46	115,0	129,7	144,9	184,0	216,0
Pump Temperature											
- Minimum	°C	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25
- Maximum	°C	110	110	110	110	110	110	110	110	110	110
Weight											
- Without accessories	kg	6,00	6,00	11,50	11,50	11,50	17,50	18,00	18,00	22,00	22,50
- With accessories	kg	6,20	6,20	11,80	11,90	11,90	18,00	18,50	18,50	22,50	23,00
Rotation		CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW	CW,CCW

Quick Calculation

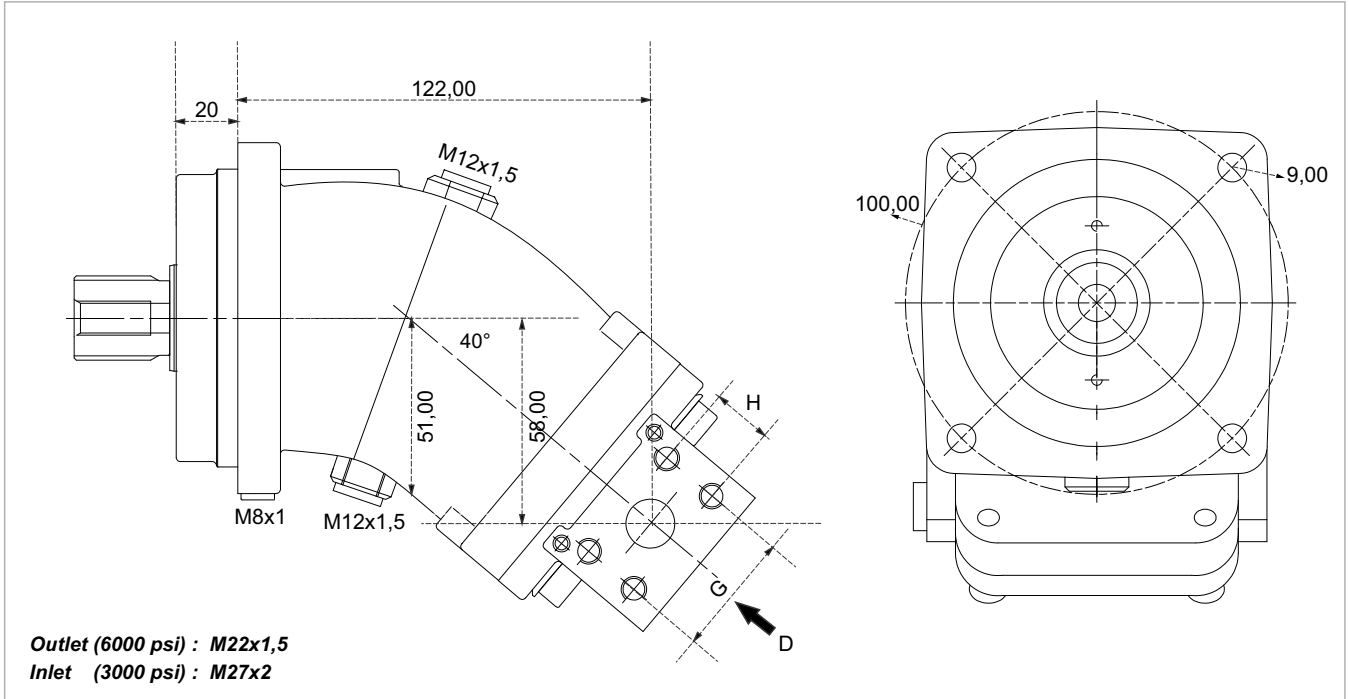
$$\text{Flow } Q = \frac{V_g \cdot n \cdot \eta_v}{1000} \quad \text{l/min}$$

$$\text{Torque } T = \frac{V_g \cdot \Delta P}{20 \cdot \pi \cdot \eta_{mh}} \quad \text{N}\cdot\text{m}$$

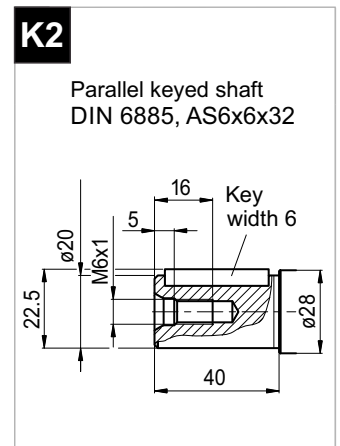
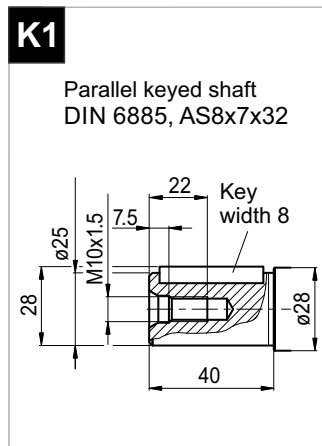
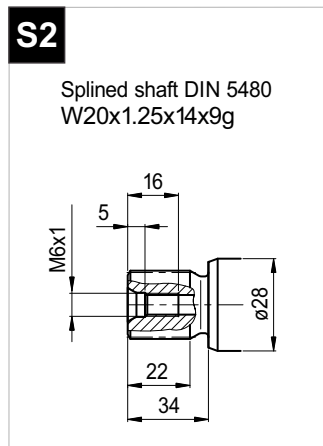
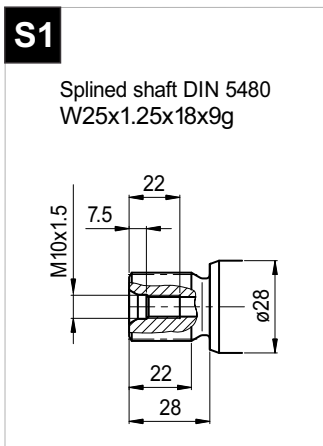
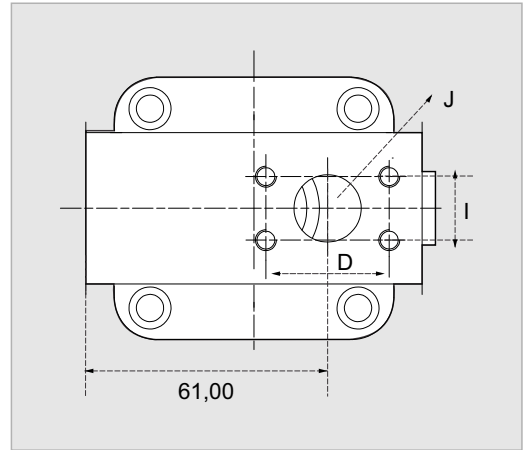
$$\text{Power } N = \frac{Q \cdot \Delta P}{612 \cdot \eta_t} \quad \text{kW}$$

- Q – flow, l/min
- T – torque, N•m
- N – power, kW
- V_g – displacement, ccm/rev
- n – shaft speed, rpm
- ΔP – pressure difference, bar
- η_v – volume efficiency
- η_{mh} – hydraulic mechanical efficiency
- $\eta_t = \eta_v \cdot \eta_{mh}$ – full efficiency coefficient

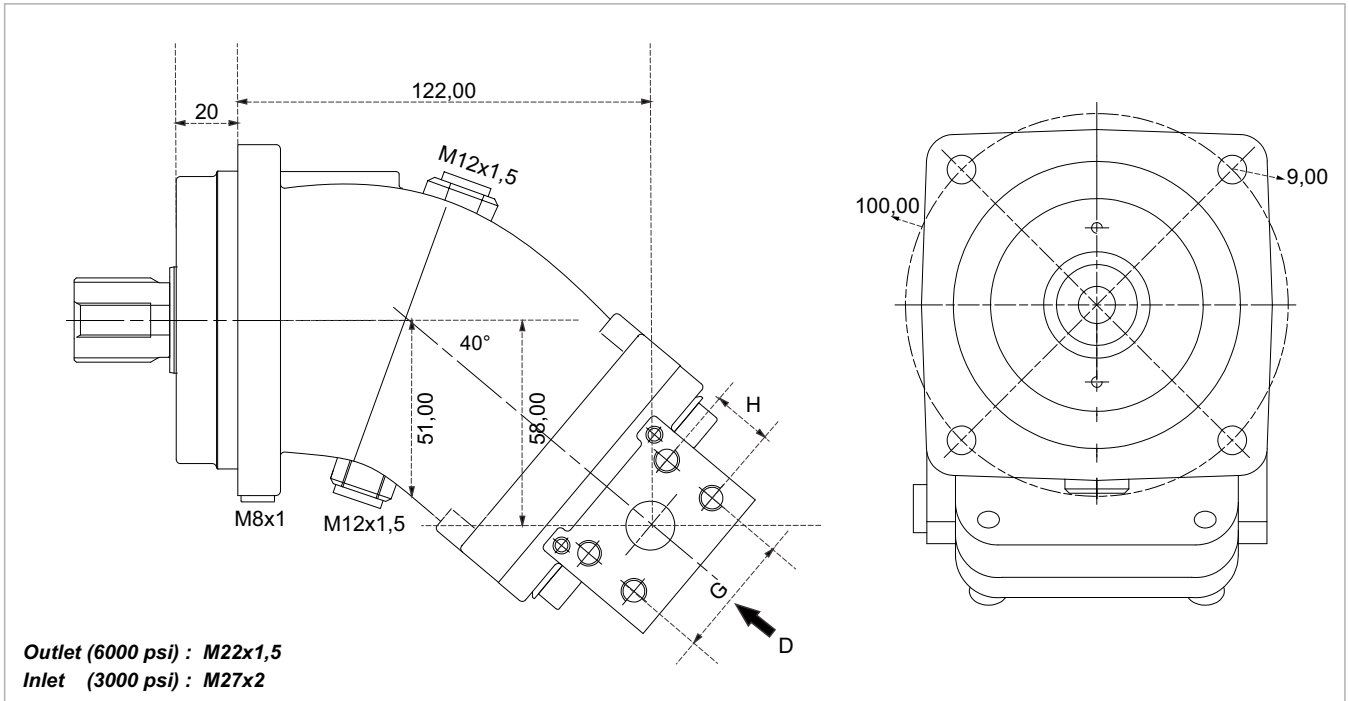
PS 12



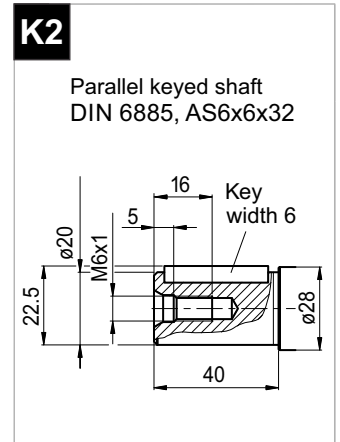
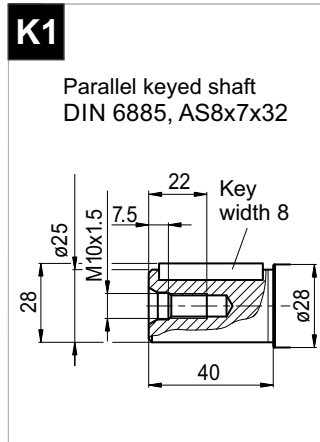
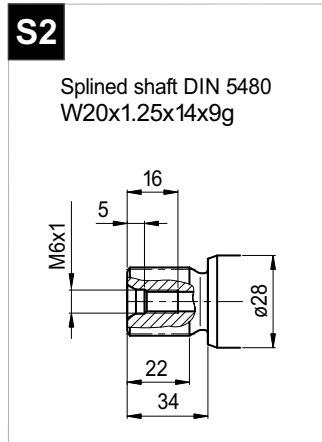
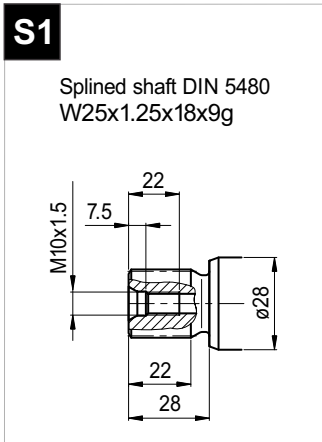
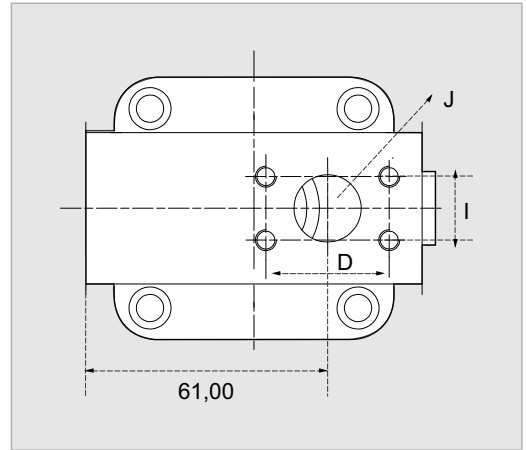
x 1000 rpm	12,00 cc
x 1500 rpm	18,00 cc
Max. Continuous Pump Speed	3100 rpm
Max. Continuous Pressure	400 bar
Max. Peak Pressure	450 bar
Max. Torque at 350 bar	66 Nm
Max. Flow	37,20 l/min.
Min. Pump Temperature	-25 °C
Max. Pump Temperature	110 °C
Weight without accessories	6,00 kg
Weight with accessories	6,20 kg
Rotation	CW-CCW



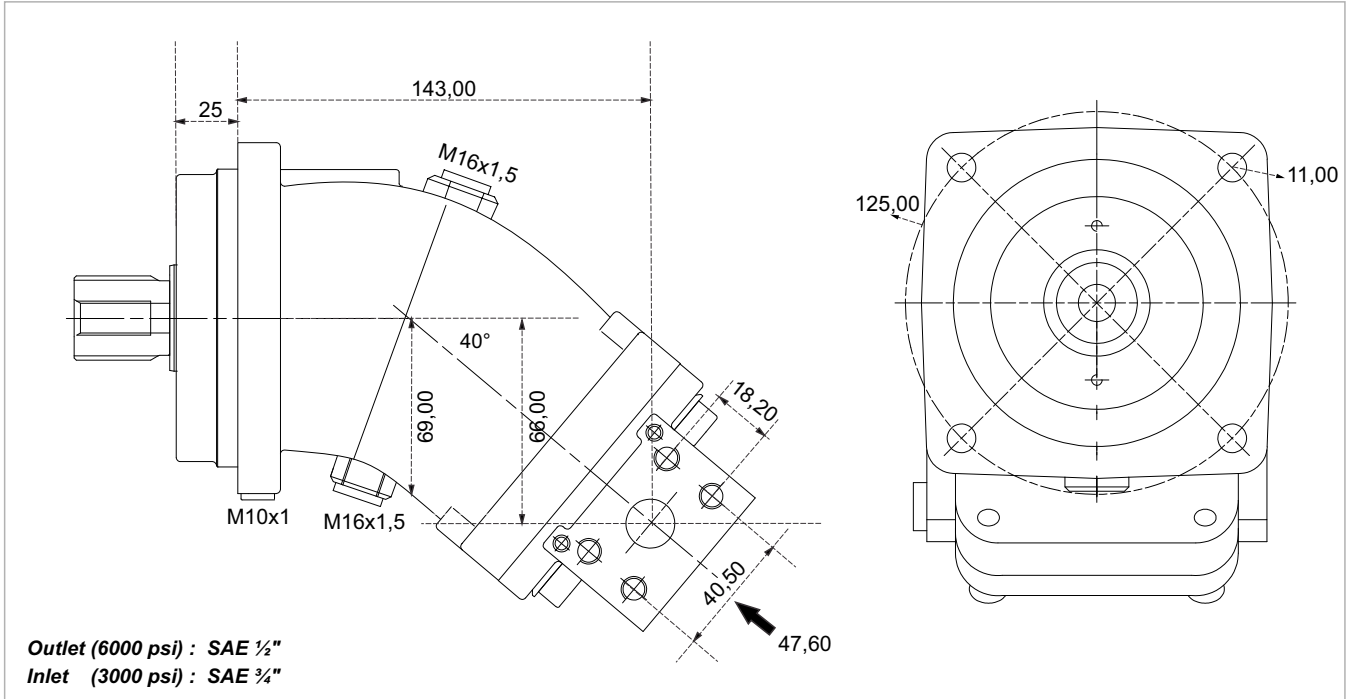
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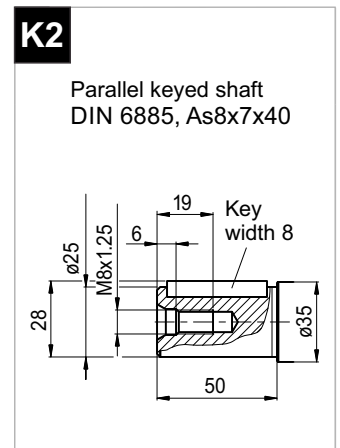
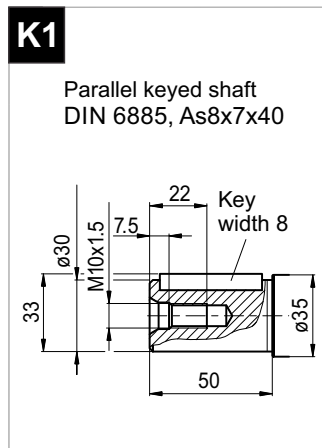
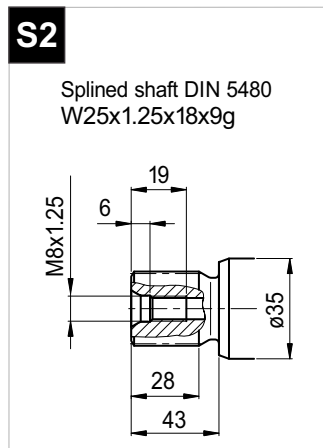
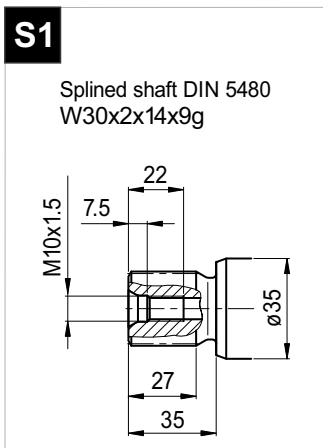
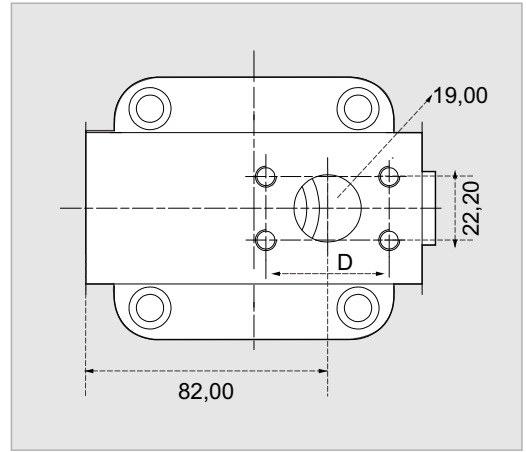
x 1000 rpm	18,00 cc
x 1500 rpm	27,00 cc
Max. Continuous Pump Speed	3100 rpm
Max. Continuous Pressure	400 bar
Max. Peak Pressure	450 bar
Max. Torque at 350 bar	98 Nm
Max. Flow	55,80 l/min.
Min. Pump Temperature	-25 °C
Max. Pump Temperature	110 °C
Weight without accessories	6,00 kg
Weight with accessories	6,20 kg
Rotation	CW-CCW



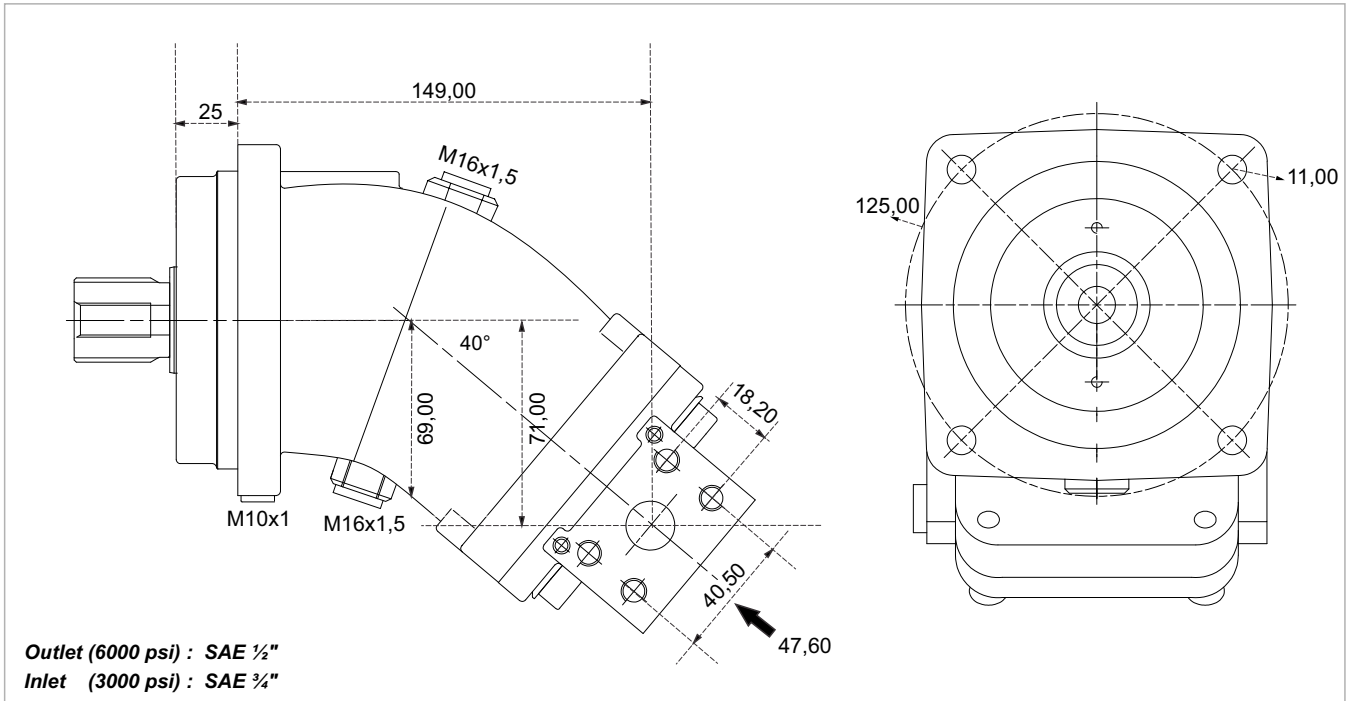
PS 25



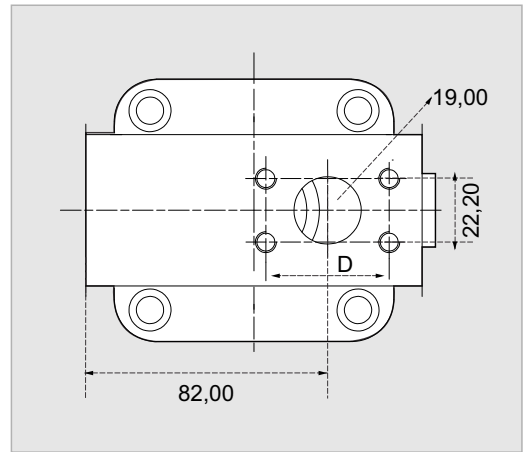
x 1000 rpm	25,00 cc
x 1500 rpm	37,50 cc
Max. Continuous Pump Speed	2500 rpm
Max. Continuous Pressure	400 bar
Max. Peak Pressure	450 bar
Max. Torque at 350 bar	141 Nm
Max. Flow	62,50 l/min.
Min. Pump Temperature	-25 °C
Max. Pump Temperature	110 °C
Weight without accessories	11,50 kg
Weight with accessories	11,80 kg
Rotation	CW-CCW



PS 32

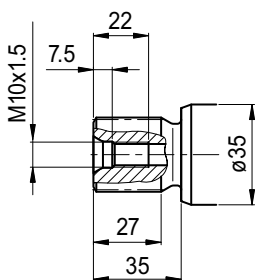


x 1000 rpm	32,00 cc
x 1500 rpm	48,00 cc
Max. Continuous Pump Speed	2500 rpm
Max. Continuous Pressure	400 bar
Max. Peak Pressure	450 bar
Max. Torque at 350 bar	174 Nm
Max. Flow	80,00 l/min.
Min. Pump Temperature	-25 °C
Max. Pump Temperature	110 °C
Weight without accessories	11,50 kg
Weight with accessories	11,90 kg
Rotation	CW-CCW



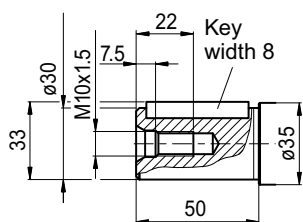
S1

Splined shaft DIN 5480
 W30x2x14x9g

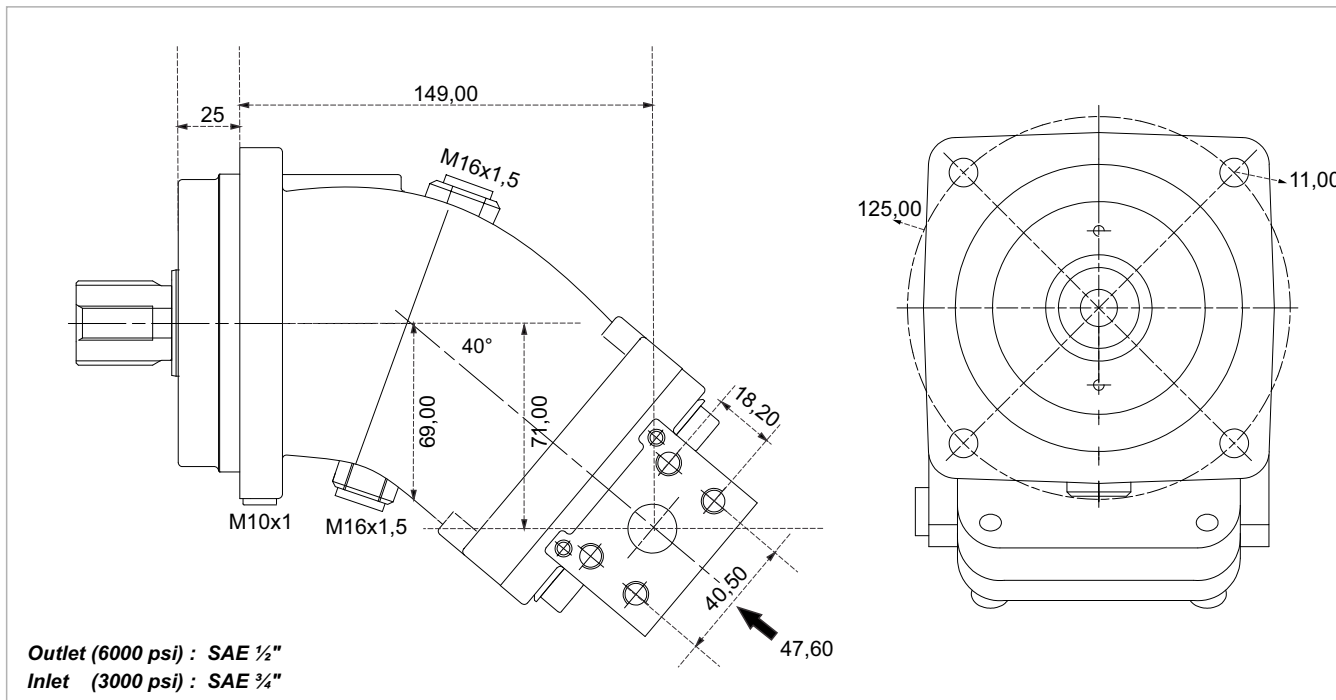


K1

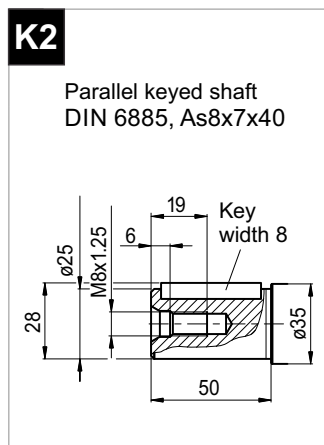
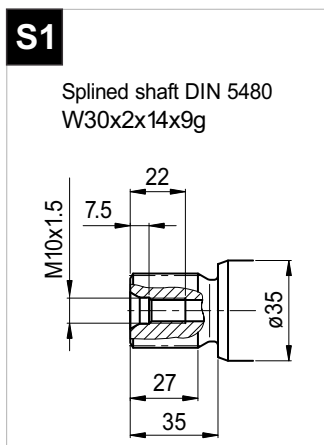
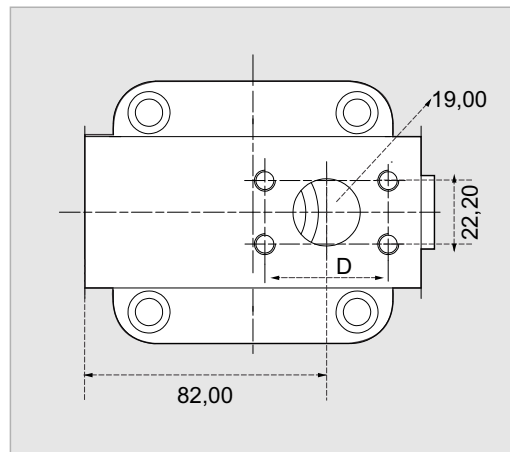
Parallel keyed shaft
 DIN 6885, As8x7x40



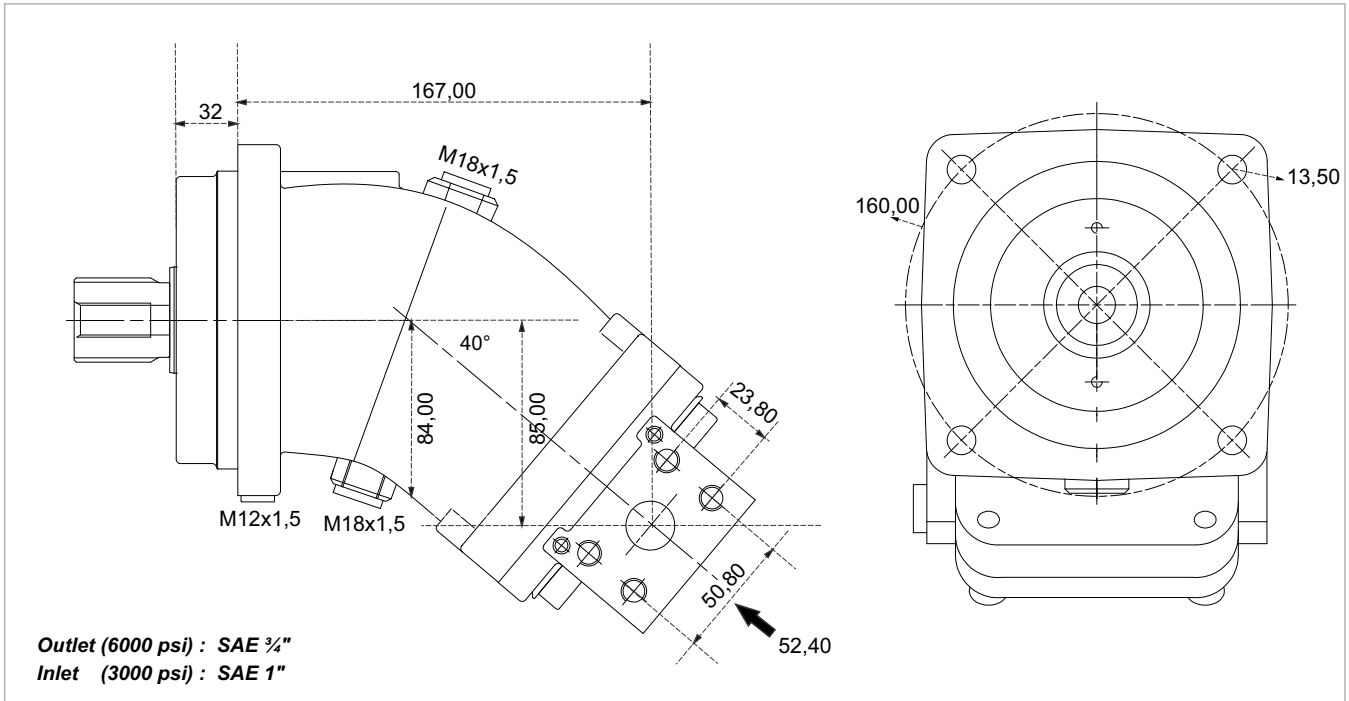
PS 40



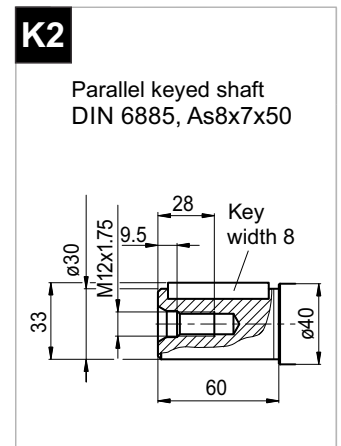
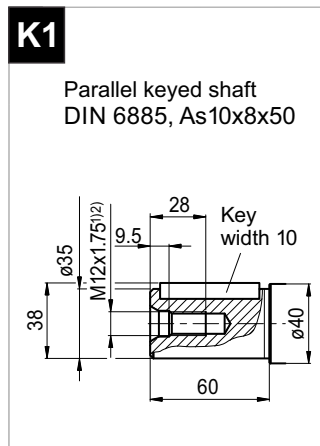
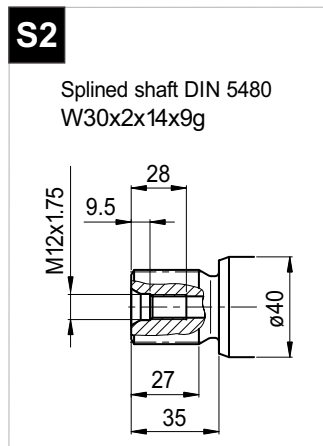
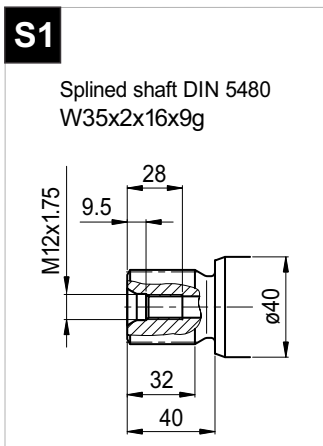
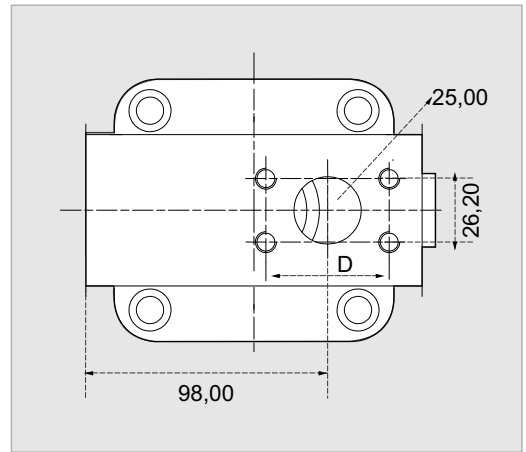
x 1000 rpm	40,20 cc
x 1500 rpm	60,30 cc
Max. Continuous Pump Speed	2300 rpm
Max. Continuous Pressure	400 bar
Max. Peak Pressure	450 bar
Max. Torque at 350 bar	225 Nm
Max. Flow	92,46 l/min.
Min. Pump Temperature	-25 °C
Max. Pump Temperature	110 °C
Weight without accessories	11,50 kg
Weight with accessories	11,90 kg
Rotation	CW-CCW



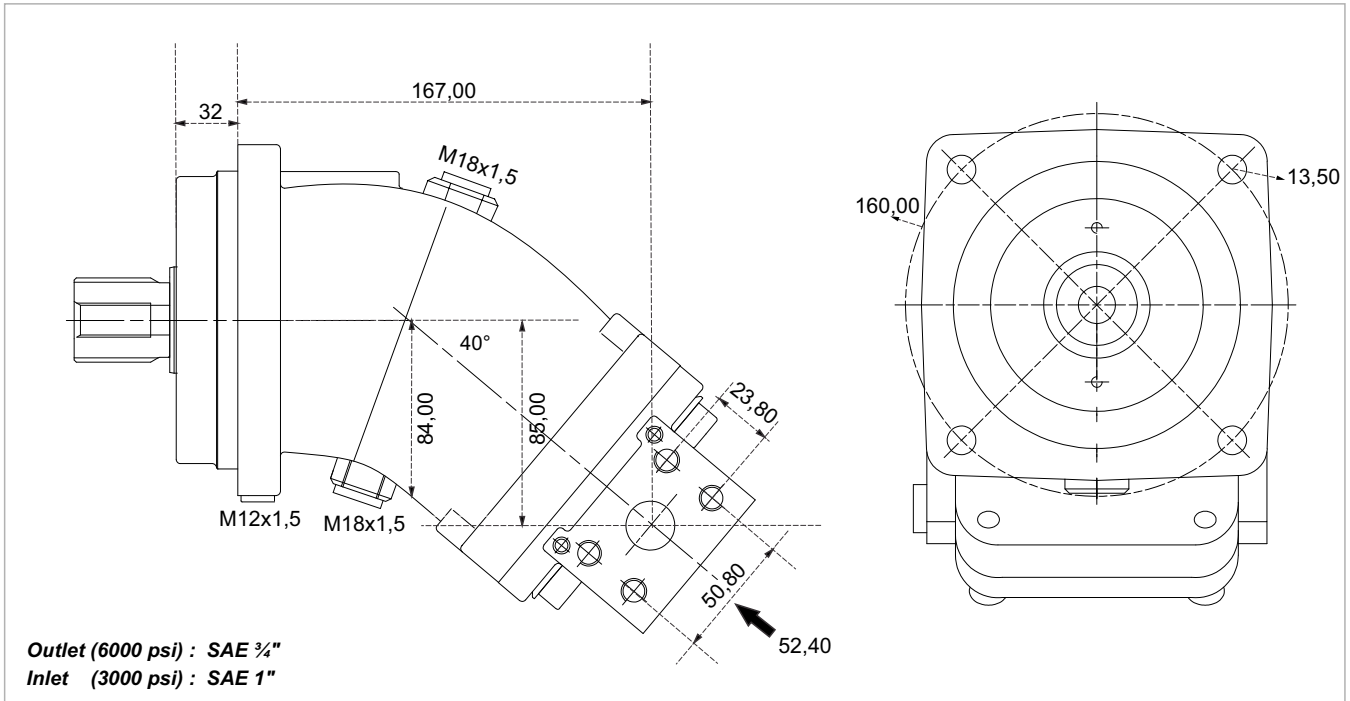
PS 50



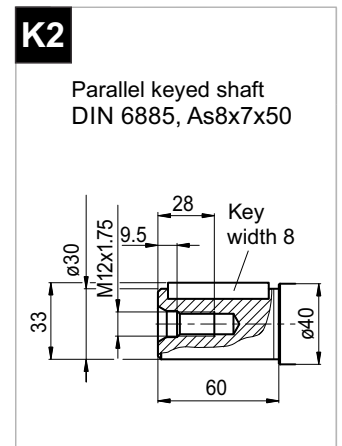
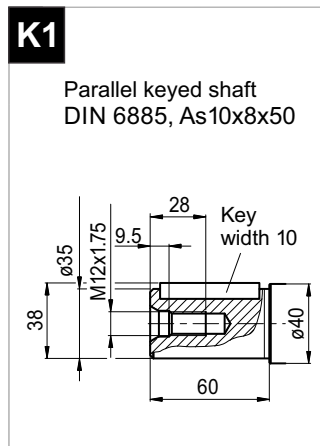
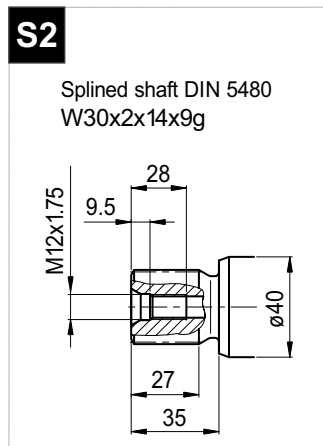
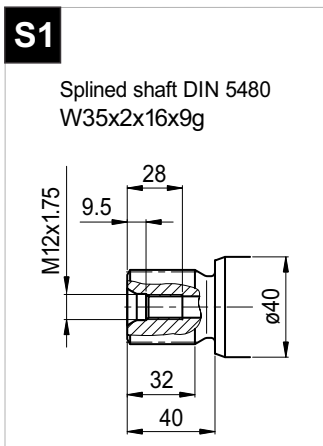
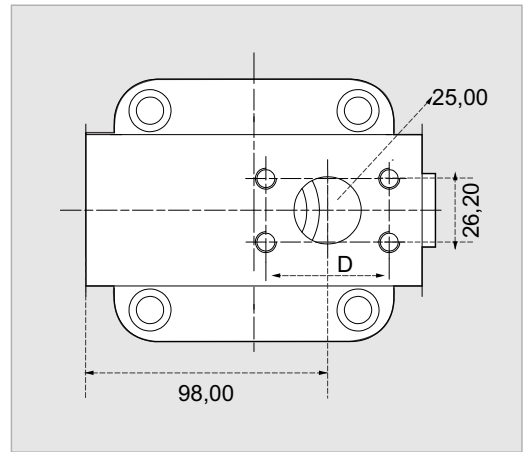
x 1000 rpm	50,00 cc
x 1500 rpm	75,00 cc
Max. Continuous Pump Speed	2300 rpm
Max. Continuous Pressure	400 bar
Max. Peak Pressure	450 bar
Max. Torque at 350 bar	280 Nm
Max. Flow	115,00 l/min.
Min. Pump Temperature	-25 °C
Max. Pump Temperature	110 °C
Weight without accessories	17,50 kg
Weight with accessories	18,00 kg
Rotation	CW-CCW



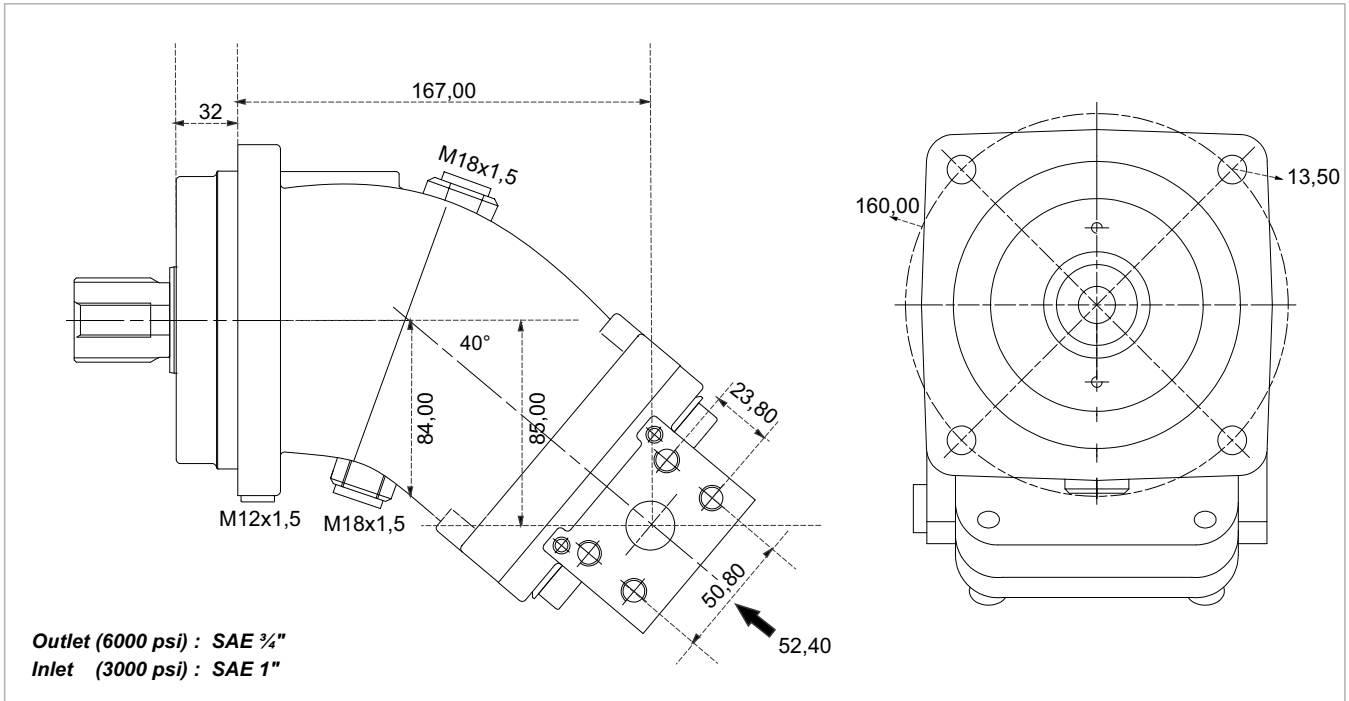
PS 56



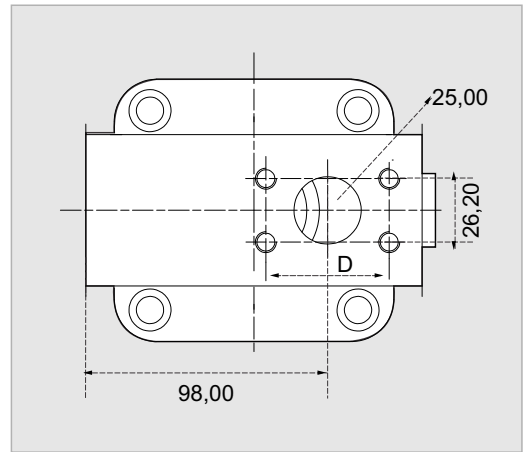
x 1000 rpm	56,40 cc
x 1500 rpm	84,60 cc
Max. Continuous Pump Speed	2300 rpm
Max. Continuous Pressure	400 bar
Max. Peak Pressure	450 bar
Max. Torque at 350 bar	320 Nm
Max. Flow	129,70 l/min.
Min. Pump Temperature	-25 °C
Max. Pump Temperature	110 °C
Weight without accessories	18,00 kg
Weight with accessories	18,50 kg
Rotation	CW-CCW



PS 63

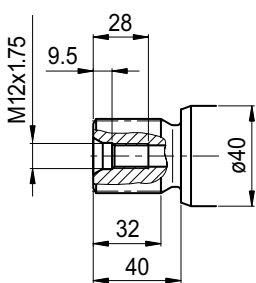


x 1000 rpm	63,00 cc
x 1500 rpm	94,50 cc
Max. Continuous Pump Speed	2300 rpm
Max. Continuous Pressure	400 bar
Max. Peak Pressure	450 bar
Max. Torque at 350 bar	350 Nm
Max. Flow	144,90 l/min.
Min. Pump Temperature	-25 °C
Max. Pump Temperature	110 °C
Weight without accessories	18,00 kg
Weight with accessories	18,50 kg
Rotation	CW-CCW



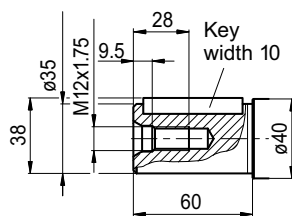
S1

Splined shaft DIN 5480
W35x2x16x9g

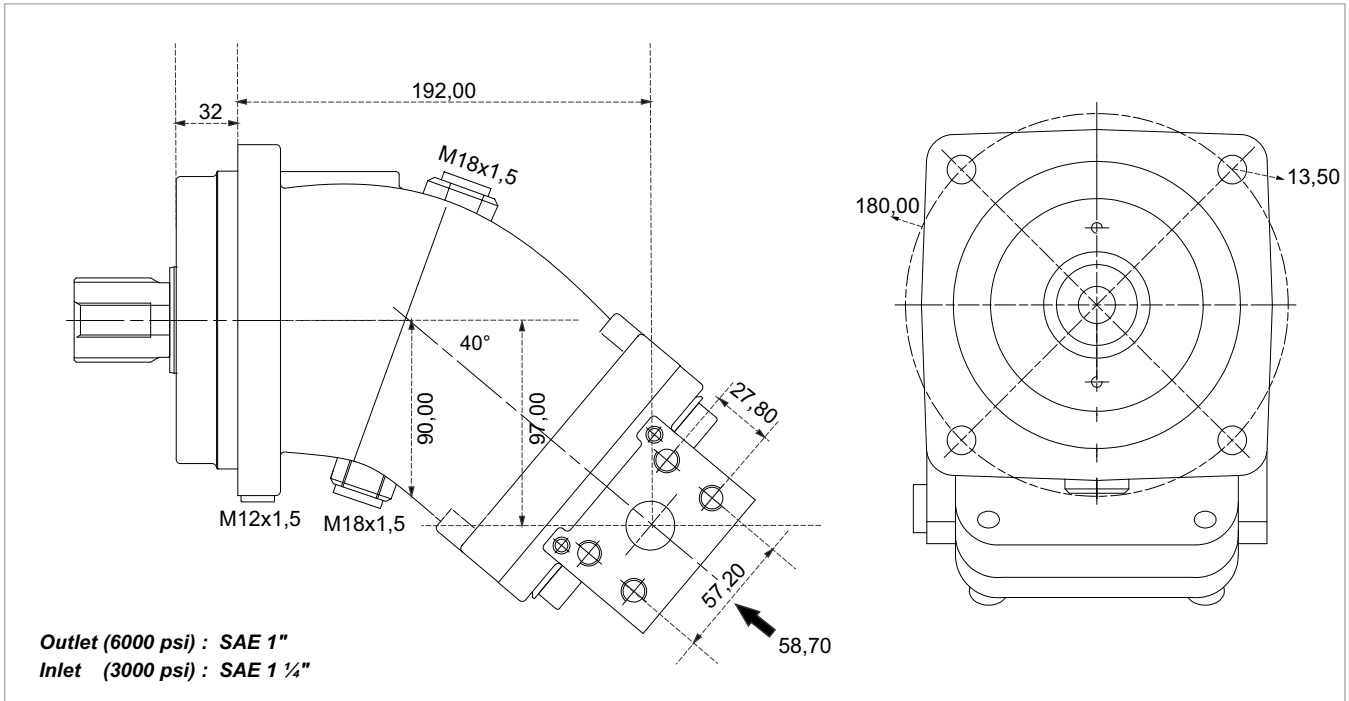


K1

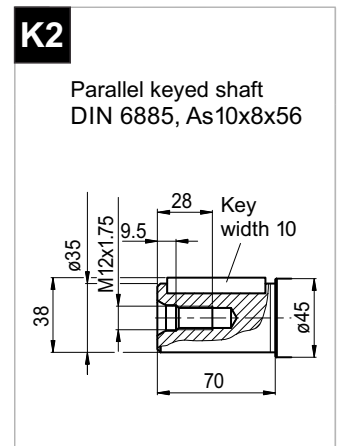
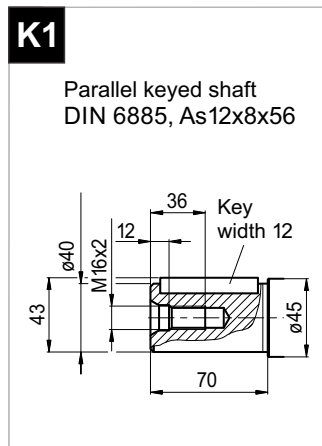
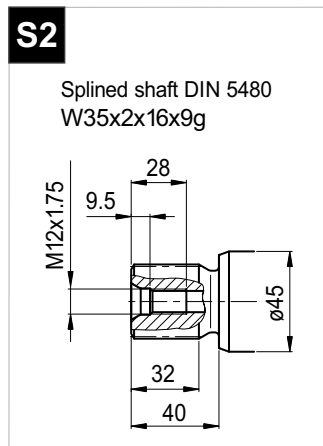
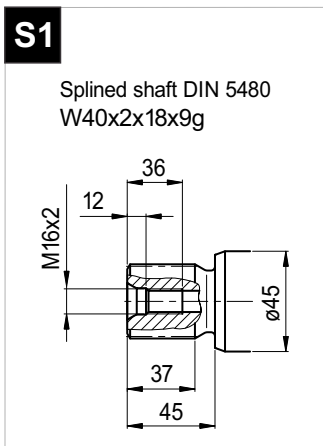
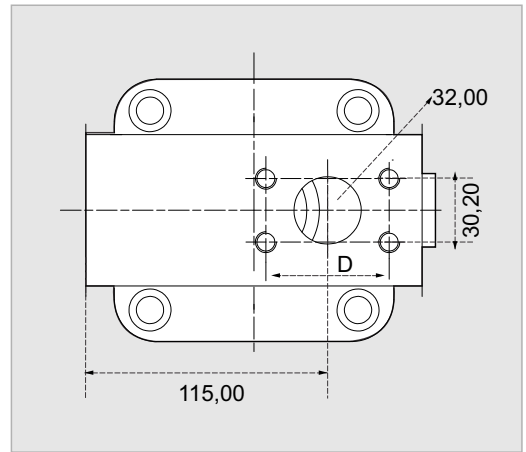
Parallel keyed shaft
DIN 6885, As10x8x50



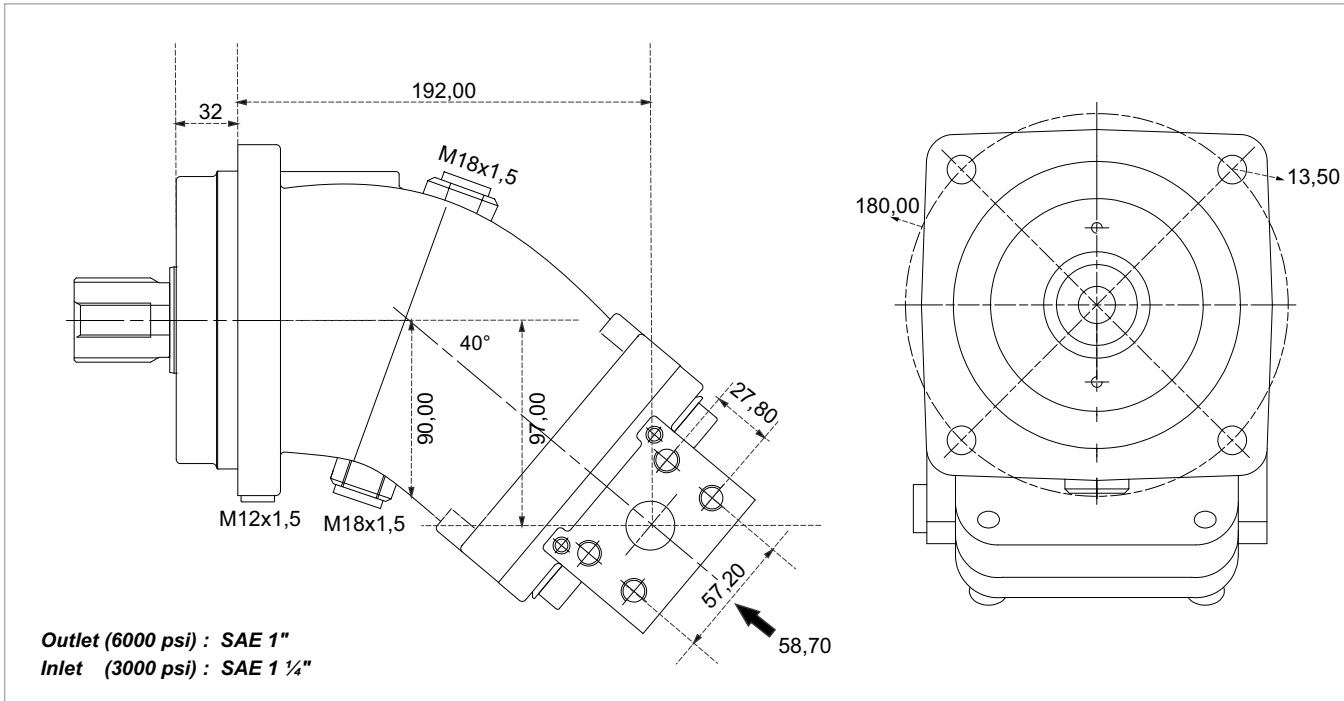
PS 80



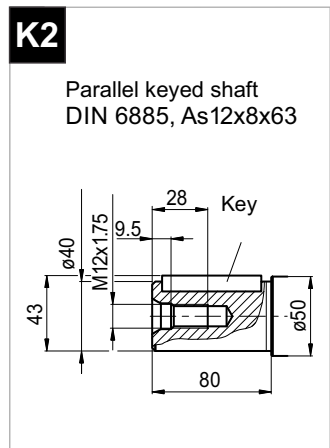
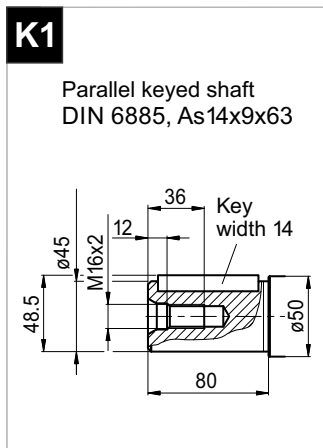
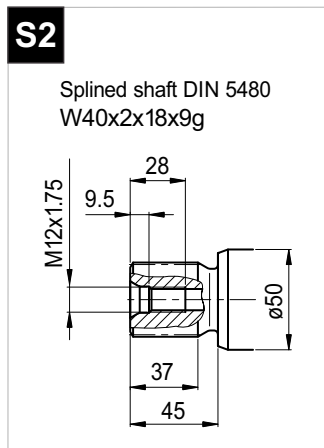
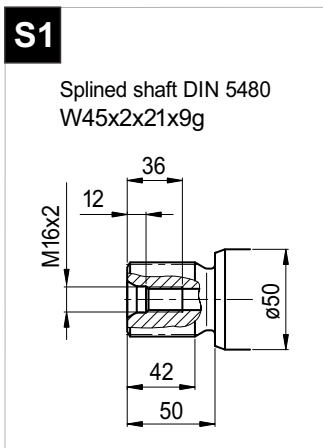
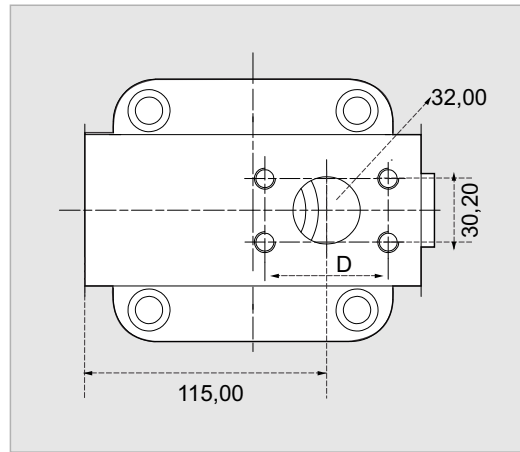
x 1000 rpm	80,00 cc
x 1500 rpm	120,00 cc
Max. Continuous Pump Speed	2300 rpm
Max. Continuous Pressure	400 bar
Max. Peak Pressure	450 bar
Max. Torque at 350 bar	445 Nm
Max. Flow	184,00 l/min.
Min. Pump Temperature	-25 °C
Max. Pump Temperature	110 °C
Weight without accessories	22,00 kg
Weight with accessories	22,50 kg
Rotation	CW-CCW



PS 108

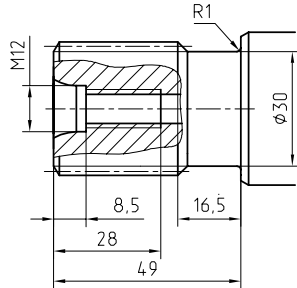


x 1000 rpm	108,40 cc
x 1500 rpm	162,60 cc
Max. Continuous Pump Speed	2000 rpm
Max. Continuous Pressure	400 bar
Max. Peak Pressure	450 bar
Max. Torque at 350 bar	600 Nm
Max. Flow	216,00 l/min.
Min. Pump Temperature	-25 °C
Max. Pump Temperature	110 °C
Weight without accessories	22,50 kg
Weight with accessories	23,00 kg
Rotation	CW-CCW

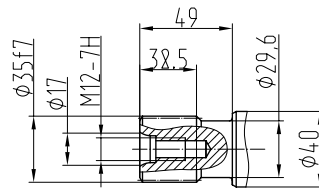


Special Shaft Drive & Special Back Cover

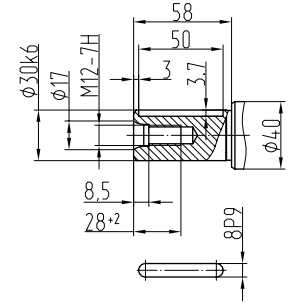
Splined shaft
35xf7x2x9g GOST 6033-80



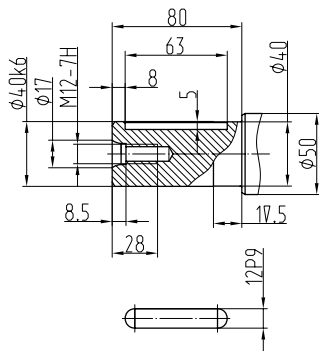
35xf7x2x9g ГOCT6033



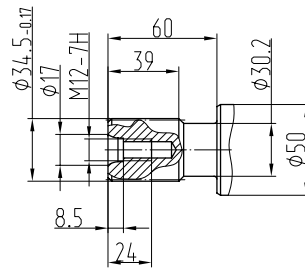
Parallel keyed shafts



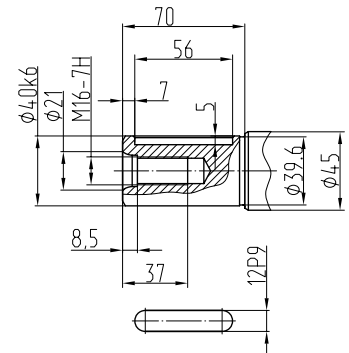
Parallel keyed shafts



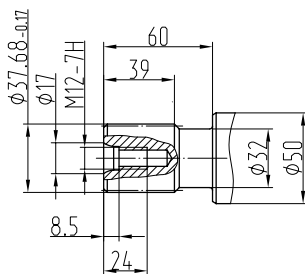
1 3/8' 21T 16/32DP ANSI B92



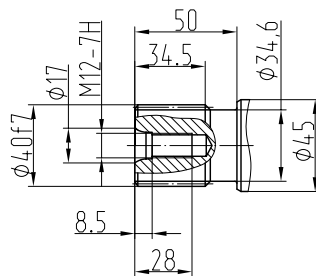
Parallel keyed shafts



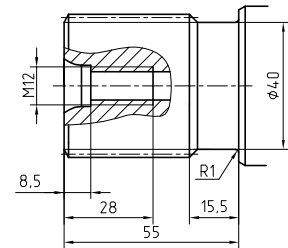
1 1/2' 23T 16/32DP ANSI B92



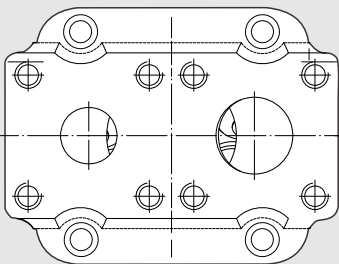
40xf7x2x9g GOST6033



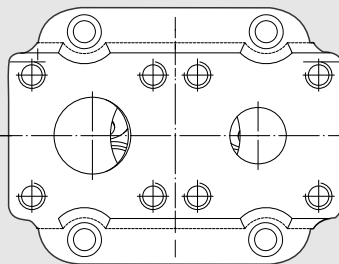
45xh8x2x9g GOST 6033-80



Special Cover / Rotation : LEFT

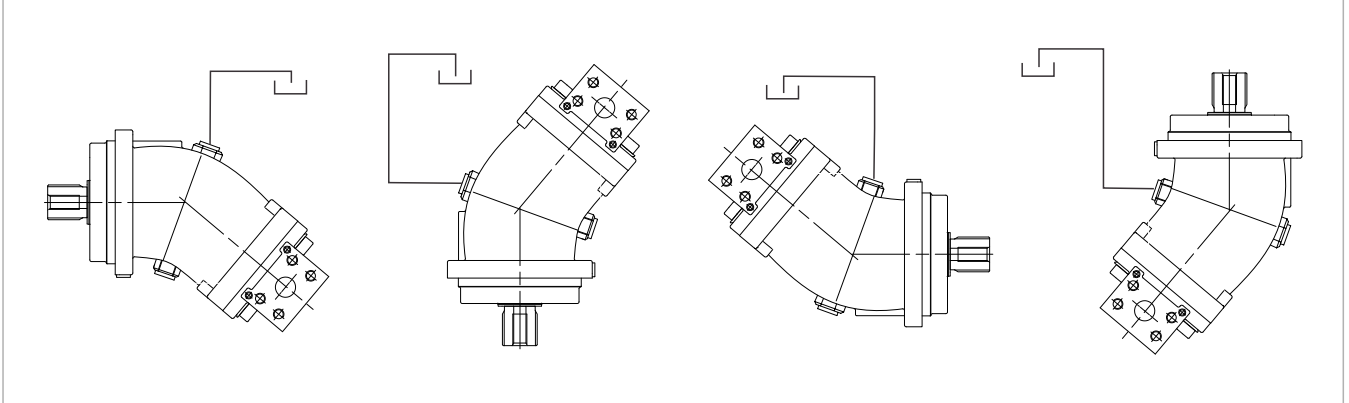


Special Cover / Rotation : RIGHT



Installation

The PS Pumps can be operate any position.
See following examples.



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 PS Bent Axis Pump may only be performed by authorized, skilled and instructed personnel.

Only use original and pre-installed our PS spare parts from supplied to Manufacturer..

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

SPARE PARTS

The spare parts list and the PS pump order specific.

When ordering spare parts, quote the material and complete Ordering code number of the PS Bent Axis Pump as well as the right numbers of the spare parts.

RISK OF DAMAGE!

Do not touch the drive shaft of the PS Bent Axis Pump

Do not touch sensor, valves and fittings

Do not touch sealing surfaces.

DIMENSIONS & WEIGHTS

Weight											
- Without accessories	kg	6,00	6,00	11,50	11,50	11,50	17,50	18,00	18,00	22,00	22,50
- With accessories	kg	6,20	6,20	11,80	11,90	11,90	18,00	18,50	18,50	22,50	23,00

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 PS Bent Axis Pumps.

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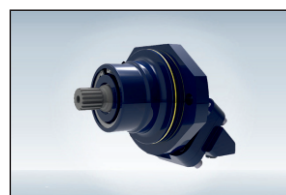
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PD Dual
Dual Flow Pumps



MF Fixed
Bent Axis Motor



PV
Variable Disp.
Piston Pumps

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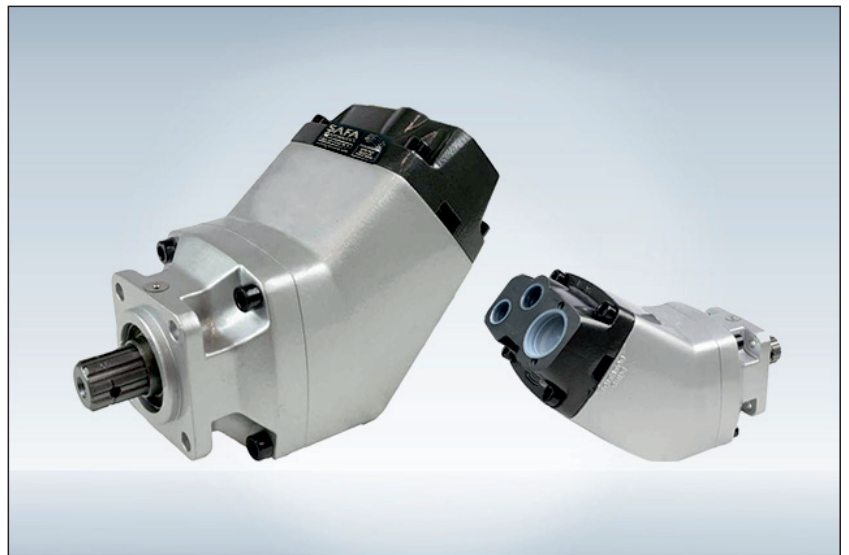


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PD Dual

Dual Flow Pumps



DIN Mounting Flange, Flange, 4 Bolt

DIN Mounting Flange,
High Pressure Bent Axis Piston Pumps. CW and CCW Rotation Options.
Displacement Range starting at; 53/53-R, 53/53-L, 70/70-R, 70/70-L, 40/40-R, 40/40-L
High Rotational Speed, High Pressure, Slim Design, High Efficiency.

Twin Flow Bent Axis Piston Pumps

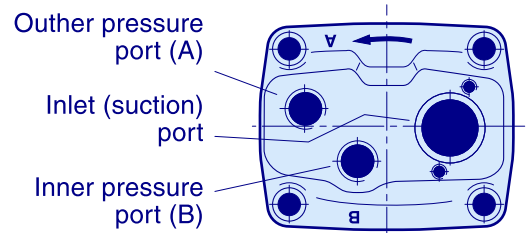
(fixed displacement)

Specifications

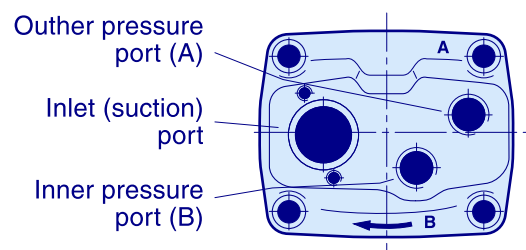
Frame size	53/53	70/35
Displacement [cm ³ /rev]		
Port A	54	69
Port B	52	36
Max operating pressure [bar]	350	350
Max shaft speed [rpm]		
(unloaded pump; low pressure)	2550	2550
Max selfpriming speed [rpm]		
Ports A ¹⁾²⁾ and B ¹⁾²⁾ pressurized	1800	1800
Port A ²⁾ unloaded, pressure in port B	2100	2100
Input power [kW]		
Max intermittent ³⁾	110	110
Max continuous	88	88
Weight [kg]	19	19

- 1) Valid with 2 1/2" inlet (suction) line; with 2" inlet line: max 1400 rpm.
- 2) Measured at 1.0 bar abs. inlet pressure.
Please note: A lower inlet pressure affects pump performance.
- 3) Max 6 seconds in any one minute.

'Left hand' and 'right hand' end caps



End cap for right hand rotating pump



End cap for left hand rotating pump

Flow vs. shaft speed (theoretical)

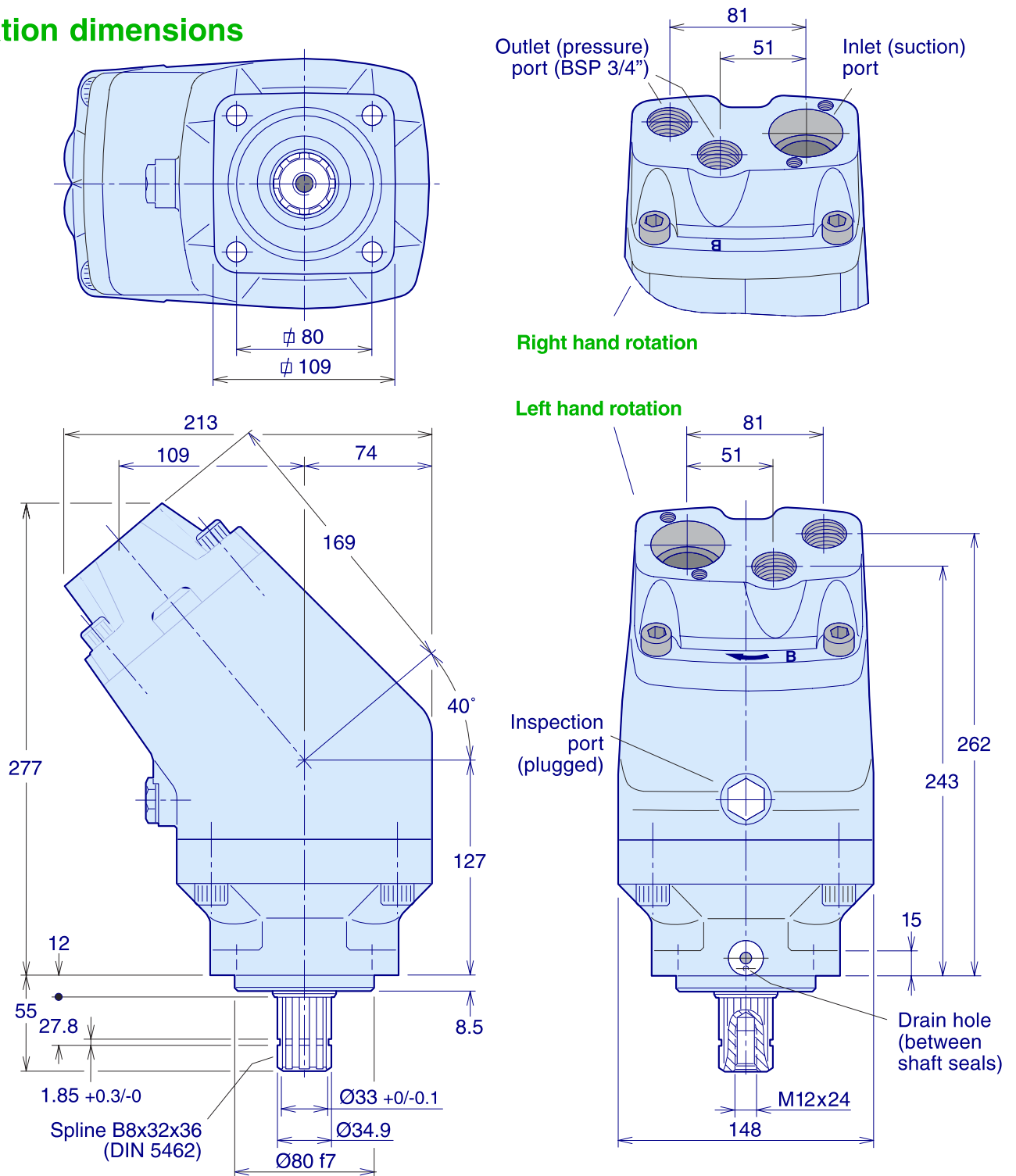
Pump speed [rpm]	800	1000	1200	1400	1600	1800	1900	2000	2100
53/53 flow [l/min]									
Port A	43	54	65	76	86	97	-	-	-
Port B	42	52	62	73	83	94	99	104	109
Total (ports A + B)	85	106	127	149	169	191	-	-	-
70/35 flow [l/min]									
Port A	55	69	83	97	110	124	-	-	-
Port B	29	36	43	50	58	65	68	72	76
Total (ports A + B)	84	105	126	147	168	189	-	-	-

Shaft torque vs. pressure (theoretical)

Pressure [bar]	150	200	250	300	350
53/53 torque [Nm]					
Port A	126	168	210	252	294
Port B	124	165	206	248	289
Total (ports A and B)	250	333	416	500	583
70/35 torque [Nm]					
Port A	164	219	274	329	383
Port B	86	114	143	171	200
Total (ports A and B)	250	333	417	500	583

Twin Flow Bent Axis Piston Pumps (fixed displacement)

Installation dimensions



Ordering code

53/53 - L	53/53 - R	Rotation
70/35 - L	70/35 - R	L : Left
76/76 - L	76/76 - R	R : Right
64/32 - L	64/32 - R	
46/46 - L	46/46 - R	
56/26 - L	56/26 - R	CW : Right
35/35 - L	35/35 - R	CCW : Left
40/40 - L	40/40 - R	
40/20 - L	40/20 - R	
28/28 - L	28/28 - R	
20/20 - L	20/20 - R	W : Bi-Direct.

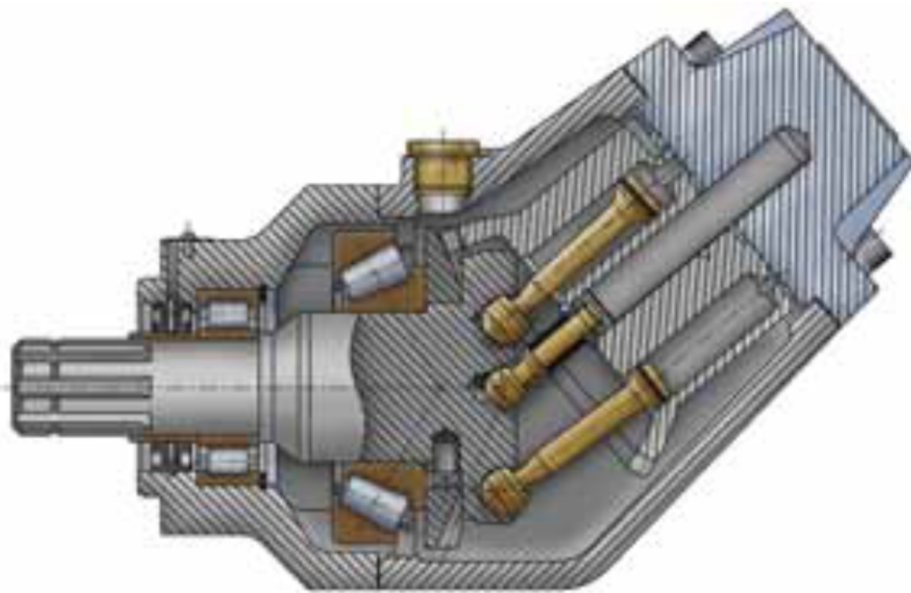
NOTE:

- Before start-up, tighten the inspection port plug to 70–100 Nm.
- To change the direction of rotation, **the end cap must be replaced.**

NOTE: The pump **does not** include a suction fitting; it must be ordered separately. See chapter 9.

Twin Flow Bent Axis Piston Pumps

(fixed displacement)



Benefits/Features

- **Two separate outlet flows with a single inlet**
- **Operating pressures to 6000 PSI (413.7 BAR) intermittent**
- **Higher overall efficiency**
- **Increased reliability**
- **Low noise level**
- **Compact package that only weighs 42 lbs (19.1 kg).**

Twin Flow Bent Axis Piston Pumps

(fixed displacement)



Fixed Displacement Piston Pumps are widely used on truck applications with operating pressure up to 5000 PSI (350 BAR). These twin flow pumps provide two independent output flows with a single inlet in a compact package. These lightweight, efficient pumps were designed specifically for truck applications including cargo cranes, hook loaders, forest cranes and concrete mixer.

Pump Performance Data

Model Series	Max. Displacement in ³ /rev (cc/rev)	Outlet Pressure PSI (BAR)	Drive Speed RPM	Flow** @ 1800 RPM		Max. Input Power HP (KW)
				Port A GPM (LPM)	Port B GPM (LPM)	
42/42	2.62/2.50 (43/41)	5000 (350)	1800	204 (77.2)	19.5 (73.8)	118 (88.0)
55/28	3.36/1.71 (55/28)	5000 (350)	1800	261 (98.6)	13.3 (50.3)	118 (88.0)
53/53	3.30/3.17 (54/52)	5000 (350)	1800	255 (96.5)	24.8 (93.9)	147 (109.8)
70/35	4.21/2.20 (69/36)	5000 (350)	1800	327 (123.8)	17.2 (65.1)	147 (109.8)
70/70	4.15/4.15 (68/68)	4350 (300)	1650	323 (122.3)	32.3 (122.3)	150 (111.9)

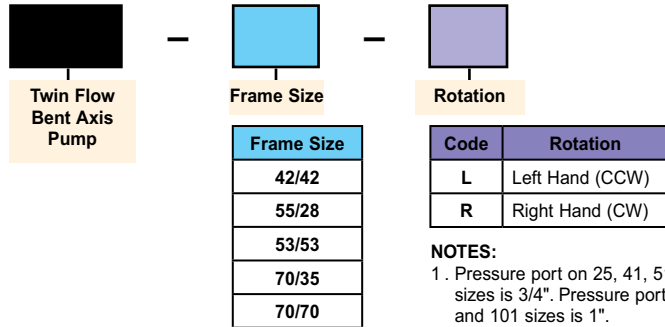
Markets

Applications

Forestry	Knuckle Boom Loader, Cranes, Mowers / Cutters
Construction	Off-Highway Trucks, Fan Drives
Mining	Dump Trucks
Material Handling	Truck Mounted Cranes, Lift Trucks
Recycling	Vaccum Truck Systems, Refuse Trucks - ASL, Rear Loaders
Military	

Twin Flow Bent Axis Piston Pumps (fixed displacement)

Piston Pumps Model Ordering Code



NOTES:

1. Pressure port on 25, 41, 51 and 61 sizes is 3/4". Pressure port on 81 and 101 sizes is 1".
2. Suction fitting must be ordered separately.
3. Use seven digit number when placing order.

Ordering Code	Ordering No.
42/42-R	9378 4042
42/42-L	9378 4043
55/28-R	9378 4128
55/28-L	9378 4129
53/53-R	9378 1453
53/53-L	9378 1454
70/35-R	9378 1470
70/35-L	9378 1471
70/70-R	9378 4070
70/70-L	9378 4071

Suction Fittings

A suction fitting consists of a straight, 45°, 90° or 135° suction fitting, 2 clamps, 2 cap screws and an O-ring.

Straight Suction Fittings

Ordering no.	A in. (mm)	B in. (mm)	C dia. in. (mm)
	0 (0)	3.35" (85)	1.5" (38)
	0.67" (17)	5.35" (136)	2.0" (50)
	0.98" (25)	5.71" (145)	2.5" (63)
	0.67" (17)	5.35" (136)	1.77" (45)
	0.67" (17)	5.35" (136)	1.77" (48)

45° Suction Fittings

Ordering no.	A in. (mm)	B in. (mm)	C dia. in. (mm)
	2.36" (60)	4.09" (104)	1.25" (32)
	2.36" (60)	4.09" (104)	1.5" (38)
	2.64" (67)	4.33" (110)	2" (50)
	2.95" (75)	4.61" (117)	2.5" (63)
	2.64" (67)	4.33" (110)	1.57" (40)
	2.64" (67)	4.33" (110)	1.77" (45)
	2.64" (67)	4.33" (110)	1.89" (48)

1) Suitable for frame size F1-25.

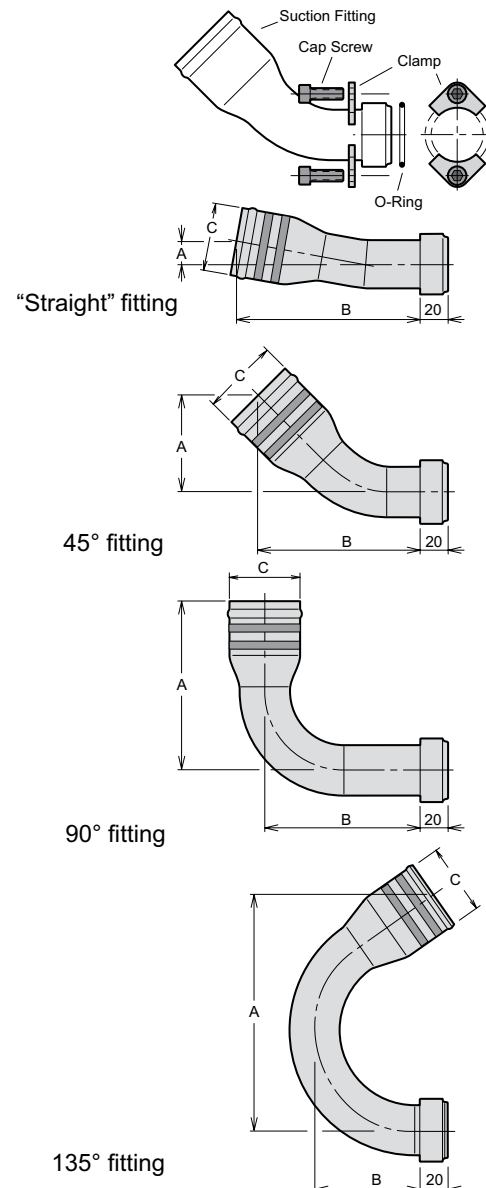
2) Suitable for pump sizes F1-41,-51,-61,-81 and -110.

90° Suction Fittings

Ordering no.	A in. (mm)	B in. (mm)	C dia. in. (mm)
	4.96" (126)	3.27" (83)	1.5" (38)
	5.31" (135)	3.27" (83)	2" (50)
	5.31" (135)	3.27" (83)	1.77"(45)
	5.31" (135)	3.27" (83)	1.89" (48)
	5.79" (147)	4.06" (103)	2.5" (63)

135° Suction Fitting

Ordering no.	A in. (mm)	B in. (mm)	C dia. in. (mm)
	6.54" (166)	2.87" (73)	2" (50)



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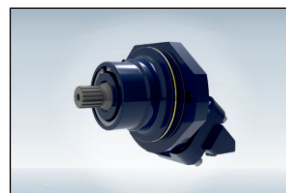
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Bent Axis Pumps



MS-ISO
Bent Axis Motor



PD Dual
Dual Flow Pumps



MF Fixed
Bent Axis Motor



PV
Variable Disp.
Piston Pumps

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PV
Variable Disp.
Piston Pumps



DIN Mounting Flange, Flange, 4 Bolt, 40cc to 150cc

DIN Mounting Flange,
Variable Displacement Hydraulic Piston Pumps. CW and CCW Rotation Options.
Displacement Range starting at; 40cc, 60cc, 75cc, 92cc, 120cc, 130cc, 150cc
High Rotational Speed, High Pressure, Slim Design, High Efficiency.

Variable Displacement Piston Pumps

Pump reference	Direction of rotation	Maximum displac. ⁽¹⁾ (cc/rev)	Max. operating pressure (bar)	Max. peak pressure (intermittent: 5%) (bar)	Torque at 300 bar ⁽²⁾ (N.m)	Max. speed at full displacement ⁽³⁾ rpm	Max. speed in stand-by rpm	Weight (kg)	Overhang torque ⁽⁴⁾ (N.m)
40 cc	CW CCW	40	400	420	225	3000	3000	26	34
60 cc	CW CCW	60	400	420	335	2600	3000	26	34
75 cc	CW CCW	75	400	420	420	2000	3000	26	34
92 cc	CW CCW	92	400	420	515	1900	3000	26	34
120 cc	CW CCW	120	380	400	675	2100	3000	26	34
130 cc	CW CCW	130	365	380	730	2100	3000	28,2	38,6
150 cc	CW CCW	150	310	330	840	2000	3000	28,2	38,6

► Calculation of power to be supplied to the shaft as a function of flow and pressure

$$P = \frac{\Delta P \times Q}{600 \times \eta_{\text{global}}}$$

Calculation of torque to determine PTO,
as a function of the displacement and the pressure

$$C = \frac{\text{Cyl} \times \Delta P}{62.8 \times \eta_{\text{méca}}}$$

Avec :

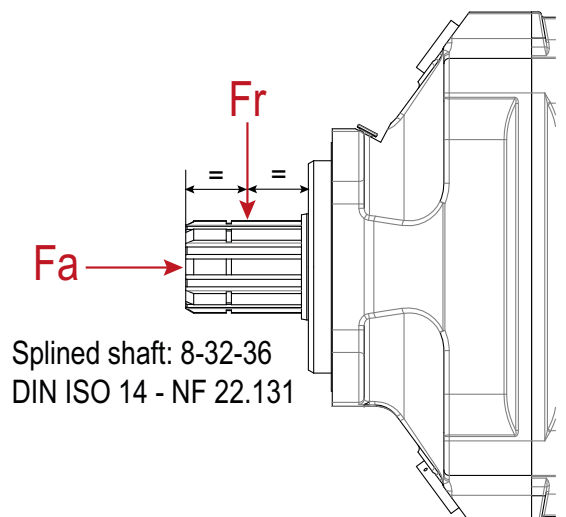
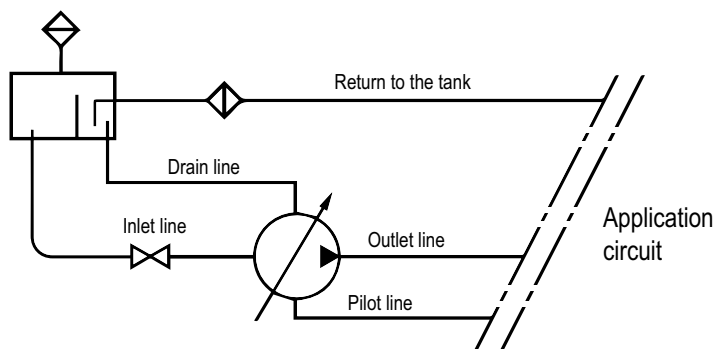
- P = Hydraulic power in kW
- ΔP = Differential pressure in bar
- Q = Flow in l/min
- C = Torque in N.m
- Cyl = Displacement in cc/rev
- $\eta_{\text{méca}}$ = Mechanical efficiency
- η_{global} = Mechanical efficiency + volumetric efficiency

► Force on pump shaft

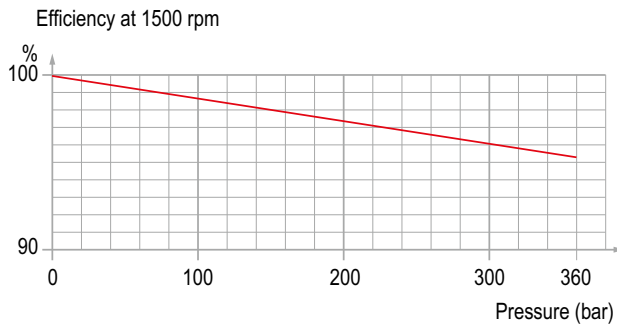
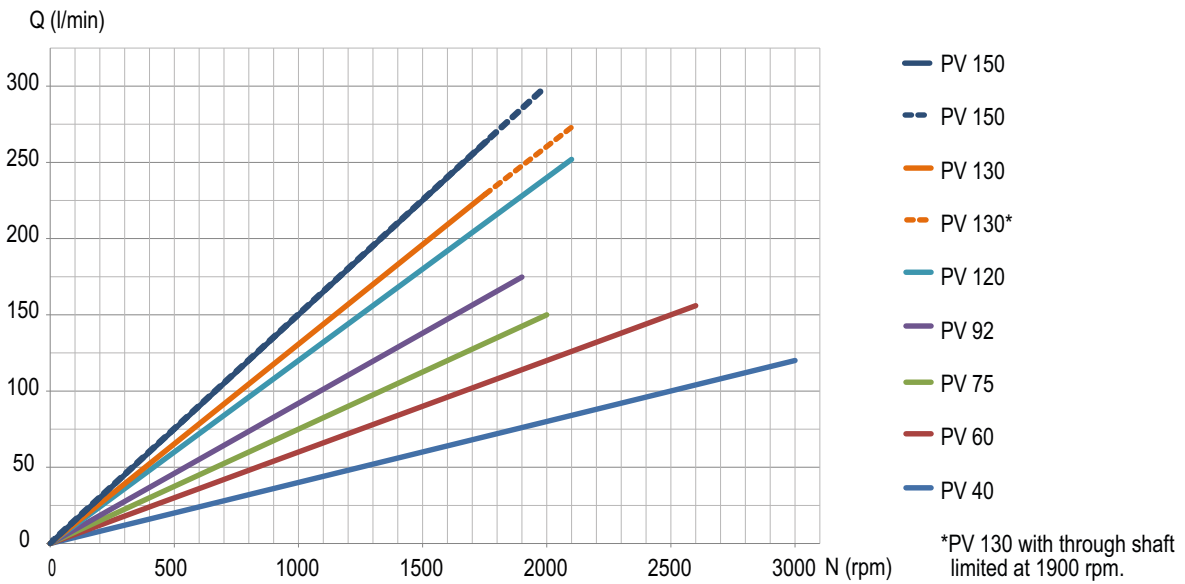
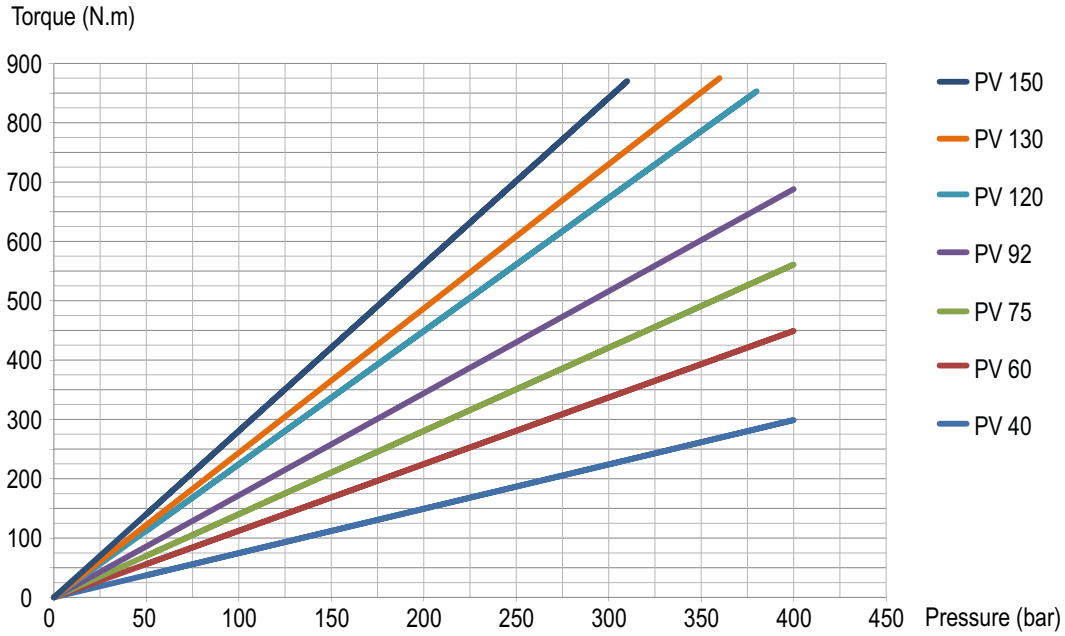
Fr : Acceptable max. radial force = 3000 N

Fa : Acceptable axial force = 1600 N.

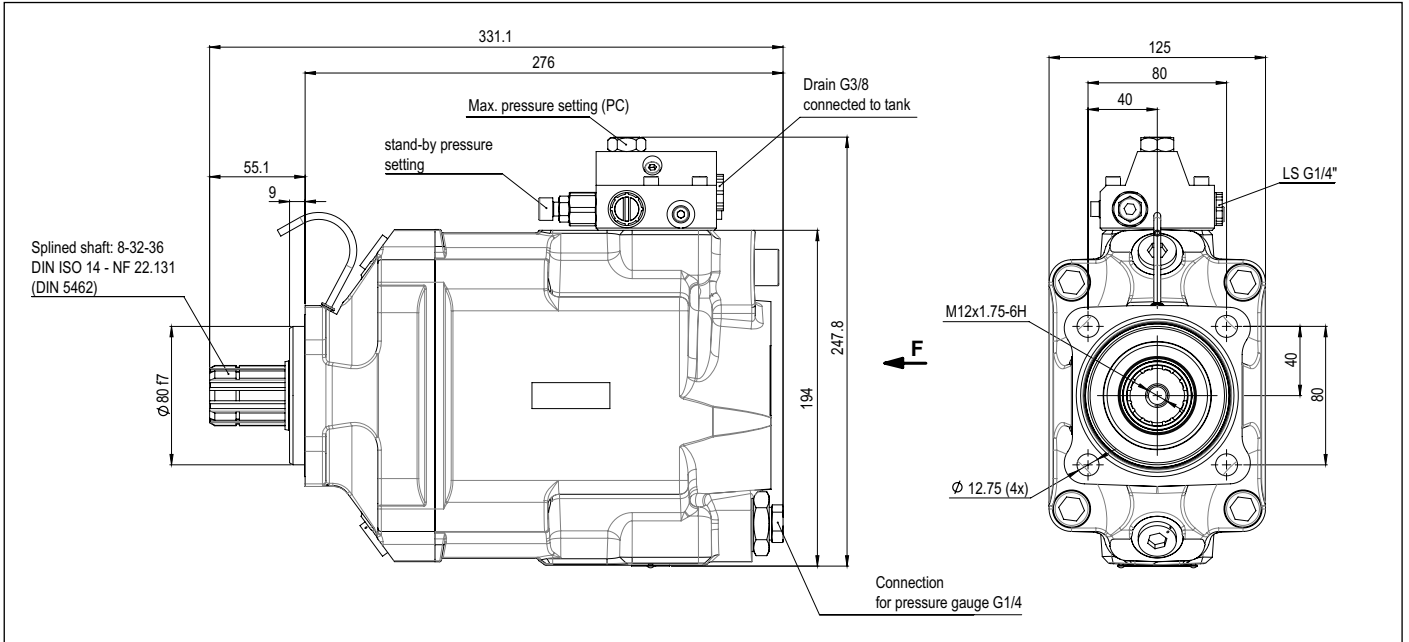
► Ideal installation



Variable Displacement Piston Pumps



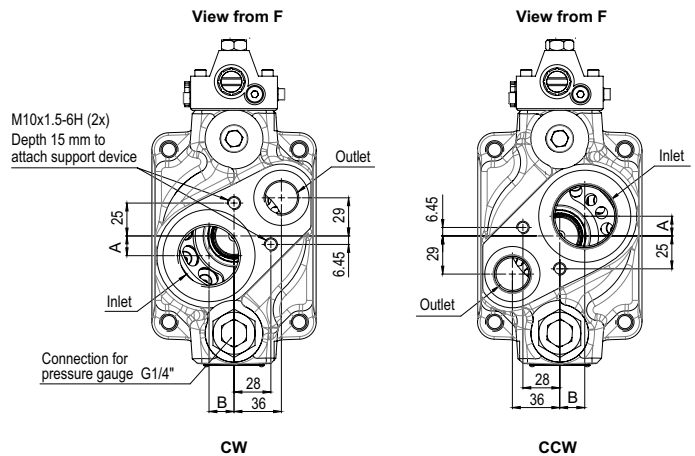
PV 40cc to 120cc



Dimensions in mm.

PV connections

Pump reference	Outlet (Ø)	Inlet (Ø)	A (mm)	B (mm)
PV 40 to 92	G 3/4"	G 1 1/2"	15	19
PV 120	G 1"		6	23.57

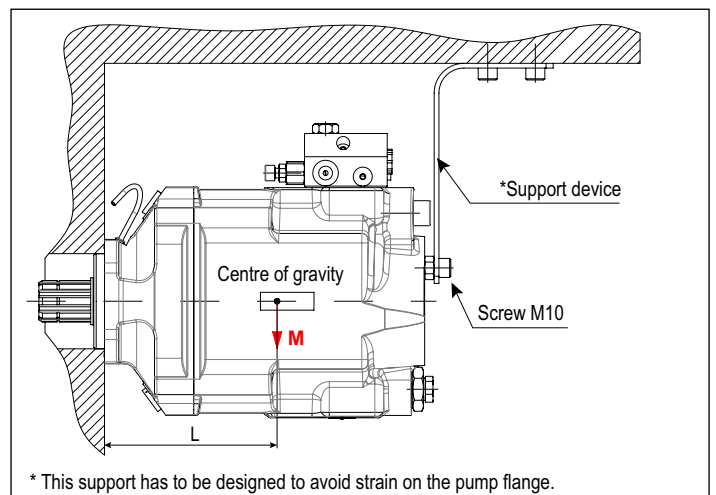


Support device

In cases where it is necessary to use a support device (overhang torque) for the pump, this must be fixed to the same part which the pump is mounted on.

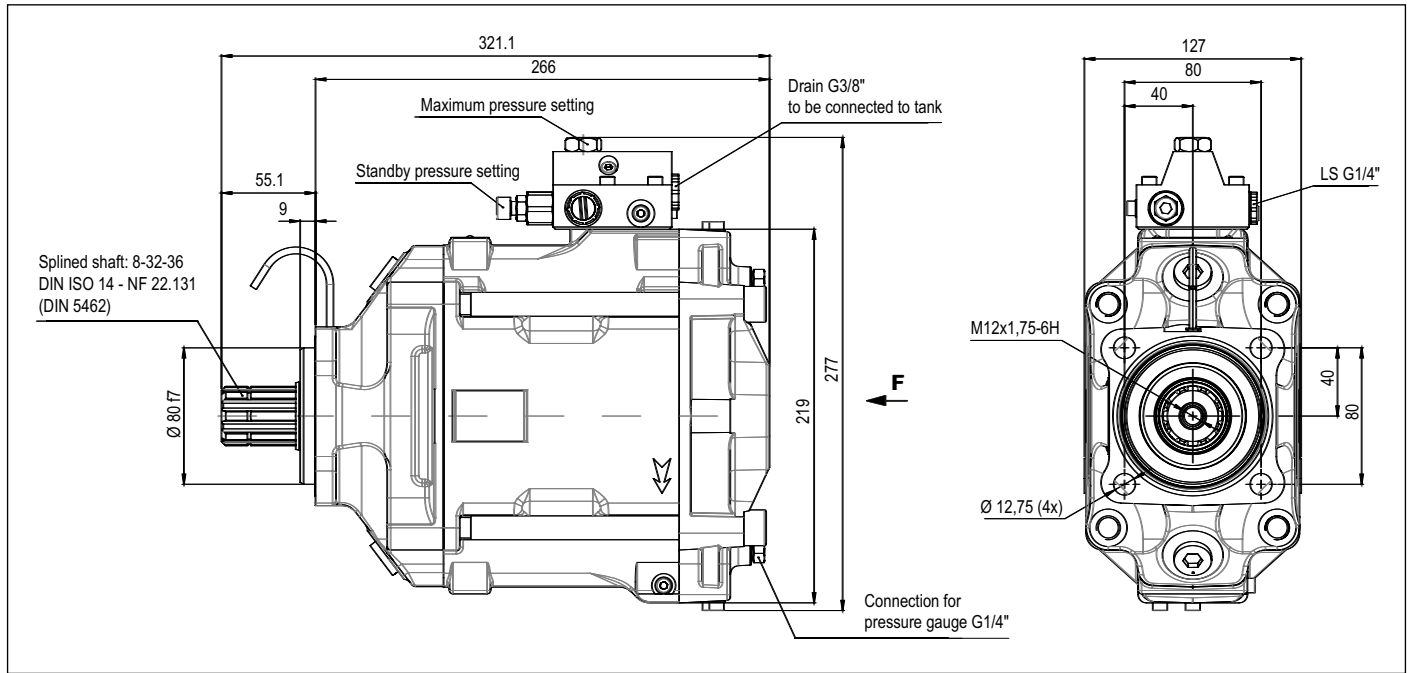
Mass and position of centre of gravity

Pump type	L (mm)	Weight (kg)	Overhang torque (N.m)
PV 40 - 92	130	26	34
PV 120	130	26	34
PV 130 - PV 150	128	28.2	38.6
PV 130 - PV 150	128	29.3	42
PV 130 with through shaft	152.6	31.1	47.4
PV 130 constant torque	143	28.3	40

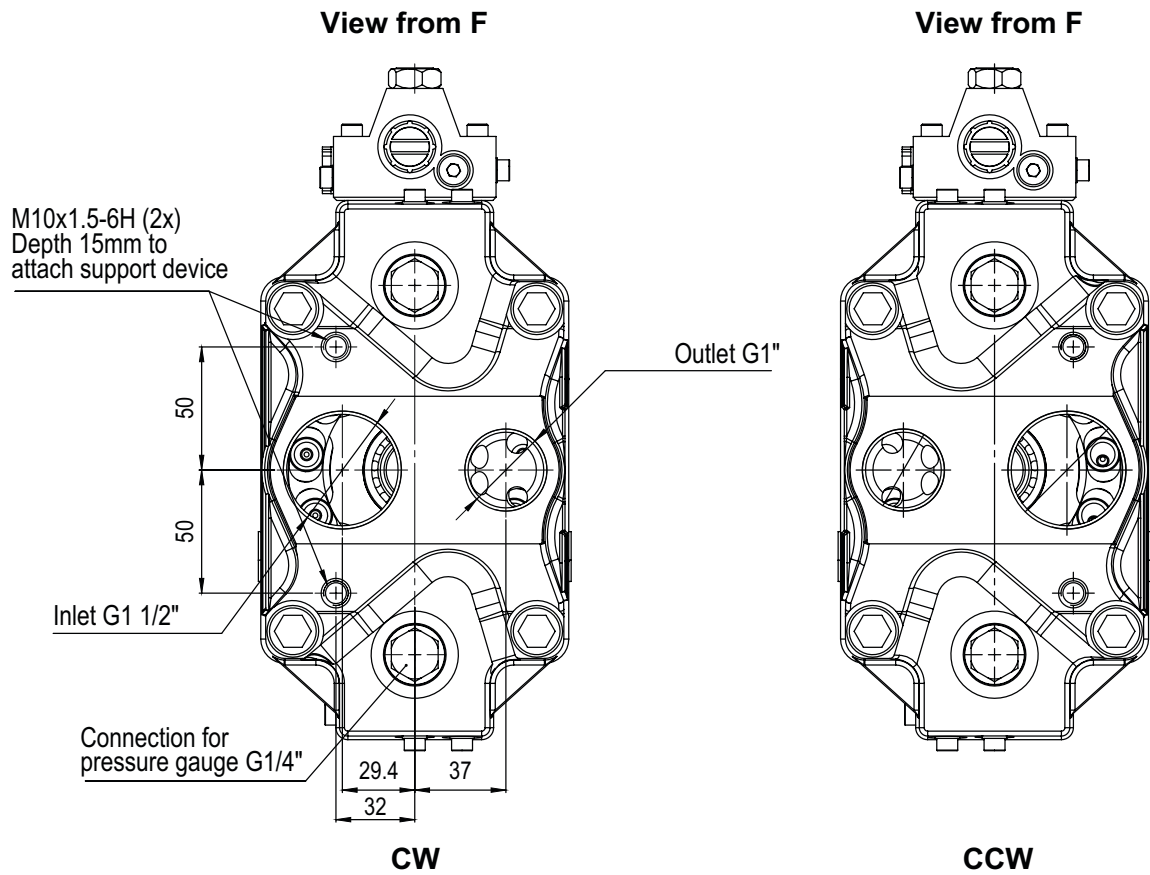


* This support has to be designed to avoid strain on the pump flange.

PV 150cc



Dimensions in mm.



Variable Displacement Piston Pumps

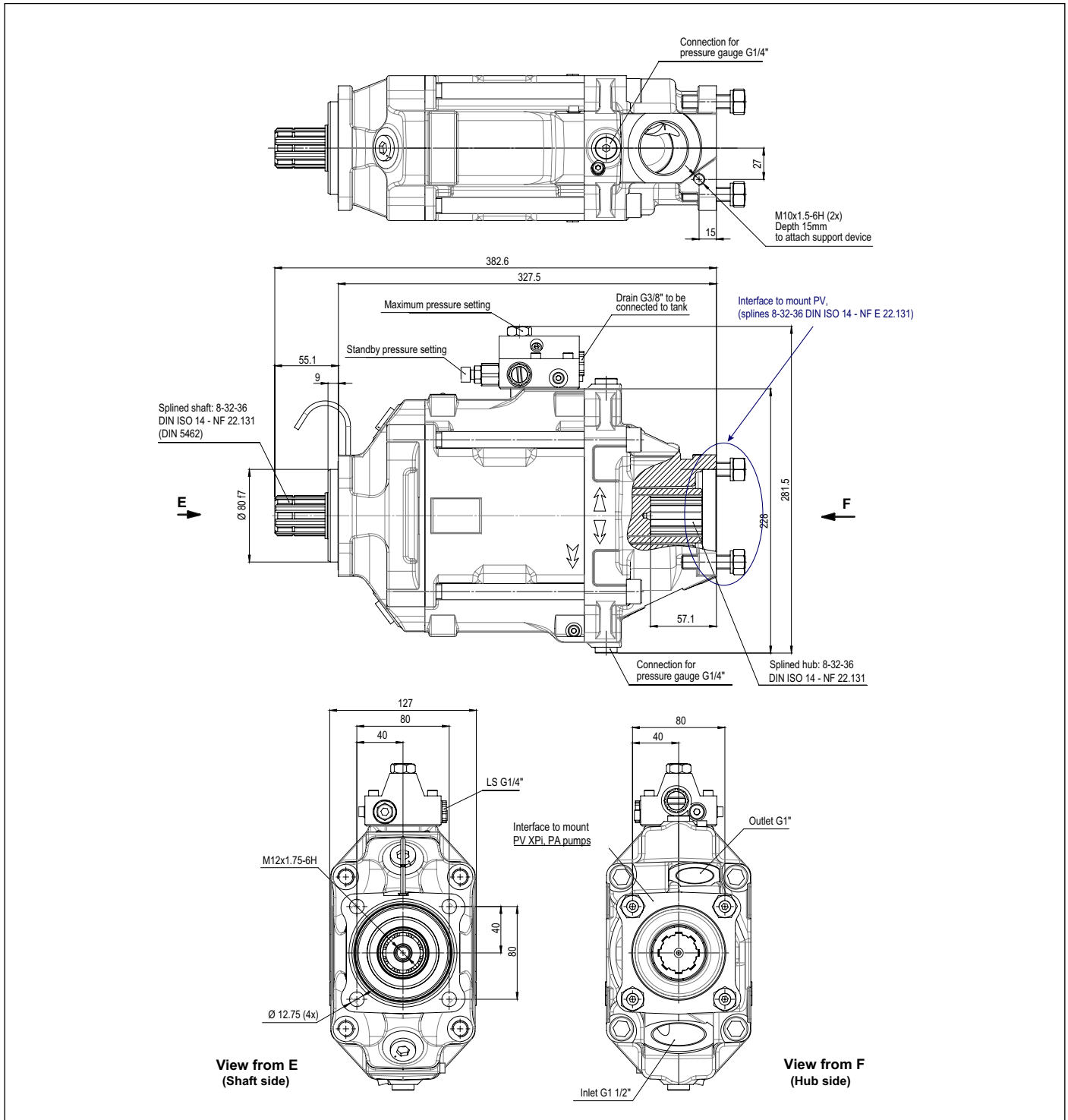
PV 130 THROUGH SHAFT PUMP

The PV 130 pump exists in a "through shaft" version.

With side porting for inlet and output, this "through shaft" PV 130 configuration means any PV pump, or fixed displacement pumps or axial piston pump pump, can be mounted on the back.

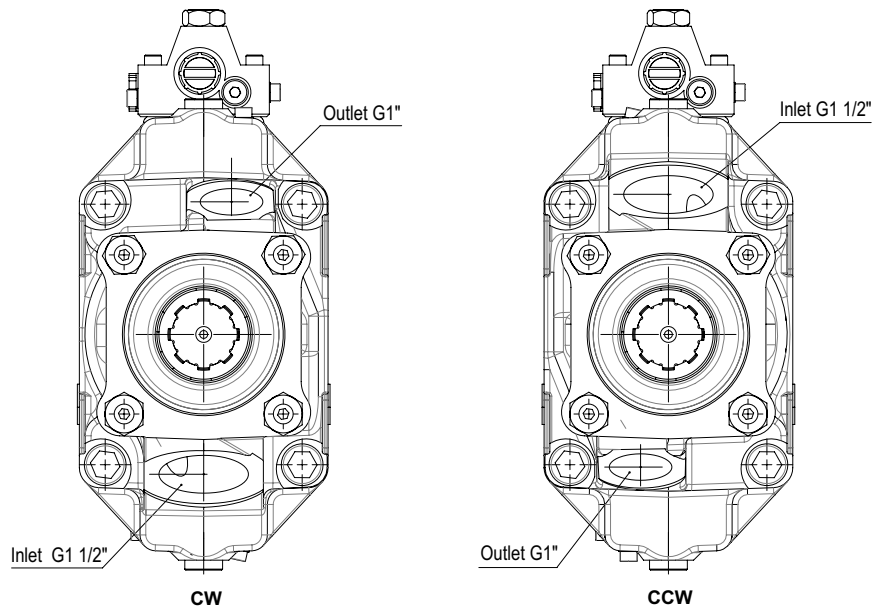
The maximum displacement of the "through shaft" PV 130 can be factory set, on request, between 60 and 130 cc/rev.

It is important to check that maximum torque to be transmitted by the shaft of the "through shaft" PV 130 does not exceed 900 N.m.



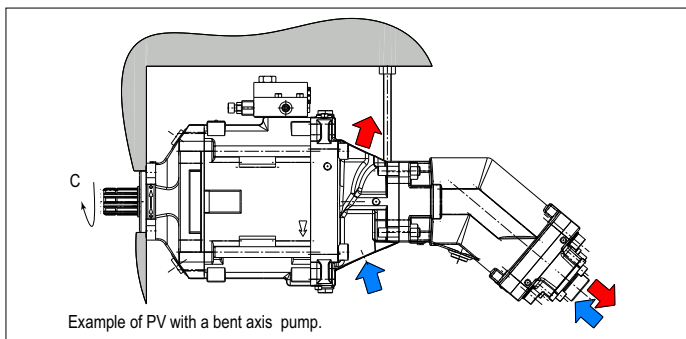
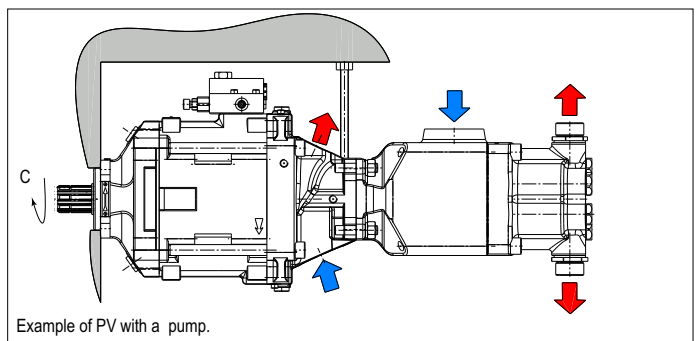
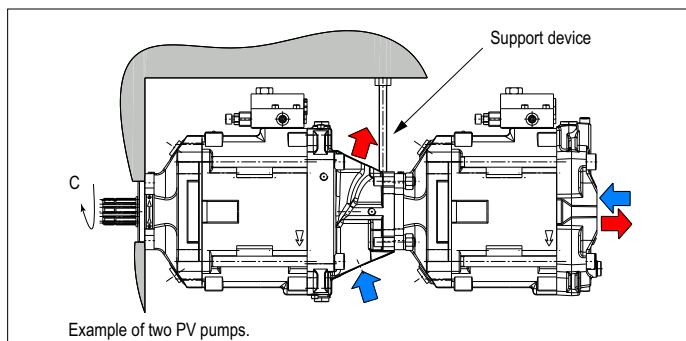
Variable Displacement Piston Pumps

View from F



Support device

The support device for the pump must be fixed to the same part which the pump is mounted on (see diagram below) and has to be designed to avoid strain on the pump flange.



**Maximum torque transferable by the shaft
of the pump driven by the PTO:**

$$C = 900 \text{ N.m}$$

That is, the sum of torque for both pumps must be $< 900 \text{ N.m}$.

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Bent Axis Motor



PA-SAE
Bent Axis Pumps



MA-SAE
Bent Axis Motor



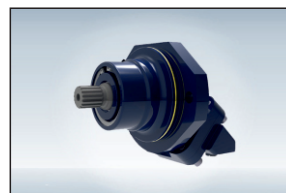
PS-ISO
Bent Axis Pumps



MS-ISO
Bent Axis Motor



PD Dual
Dual Flow Pumps



MF Fixed
Bent Axis Motor



PV
Variable Disp.
Piston Pumps

SAFA HYDRAULICS

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MD-DIN

Bent Axis Motor

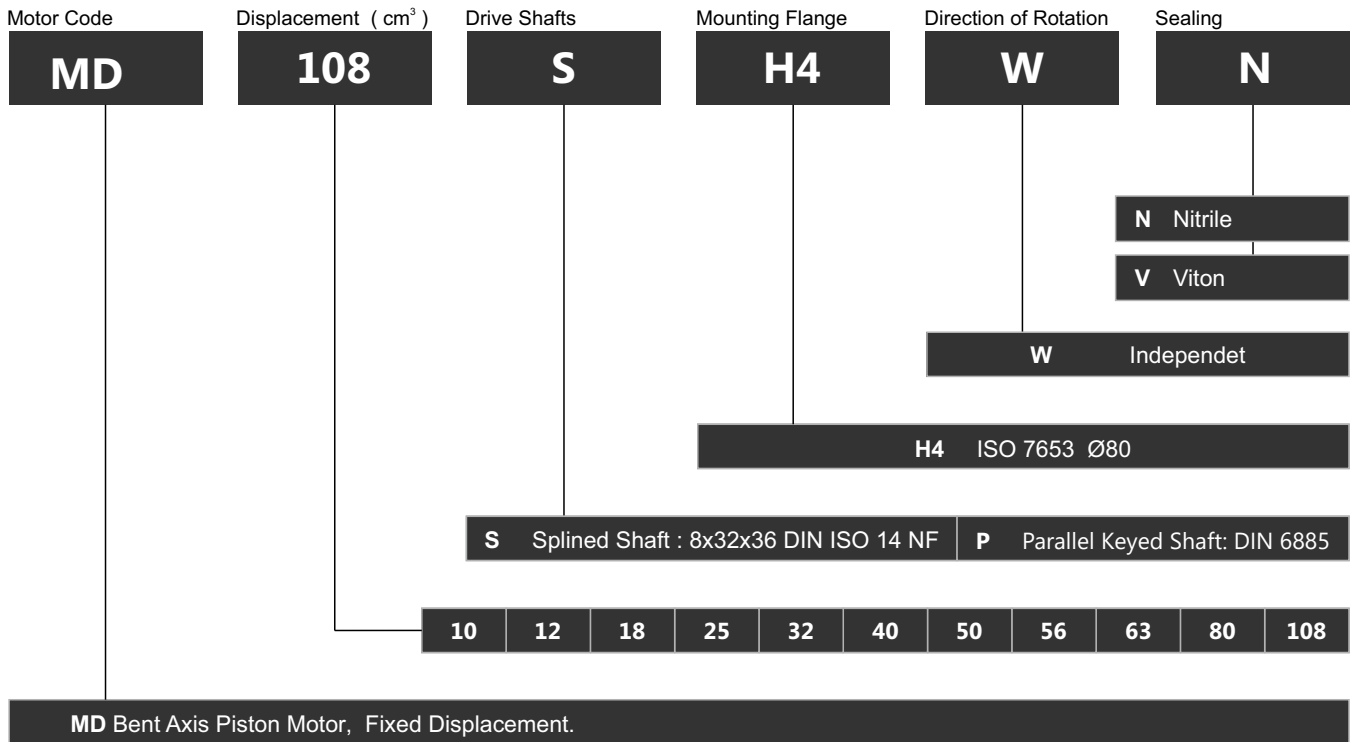


DIN Mounting Flange, Flange, 4 Bolt, 12cc to 130cc

DIN Mounting Flange, High Pressure Bent Axis Piston Motors. Reversible Direction of Rotation.
Displacement Range starting at; 12cc, 18cc, 25cc, 32cc, 40cc, 50cc, 63cc, 80cc, 108cc, 130cc
400/450 Bar, High Pressure, High Rotational Speed, Slim Design, High Efficiency.



Ordering Code of MD Motors

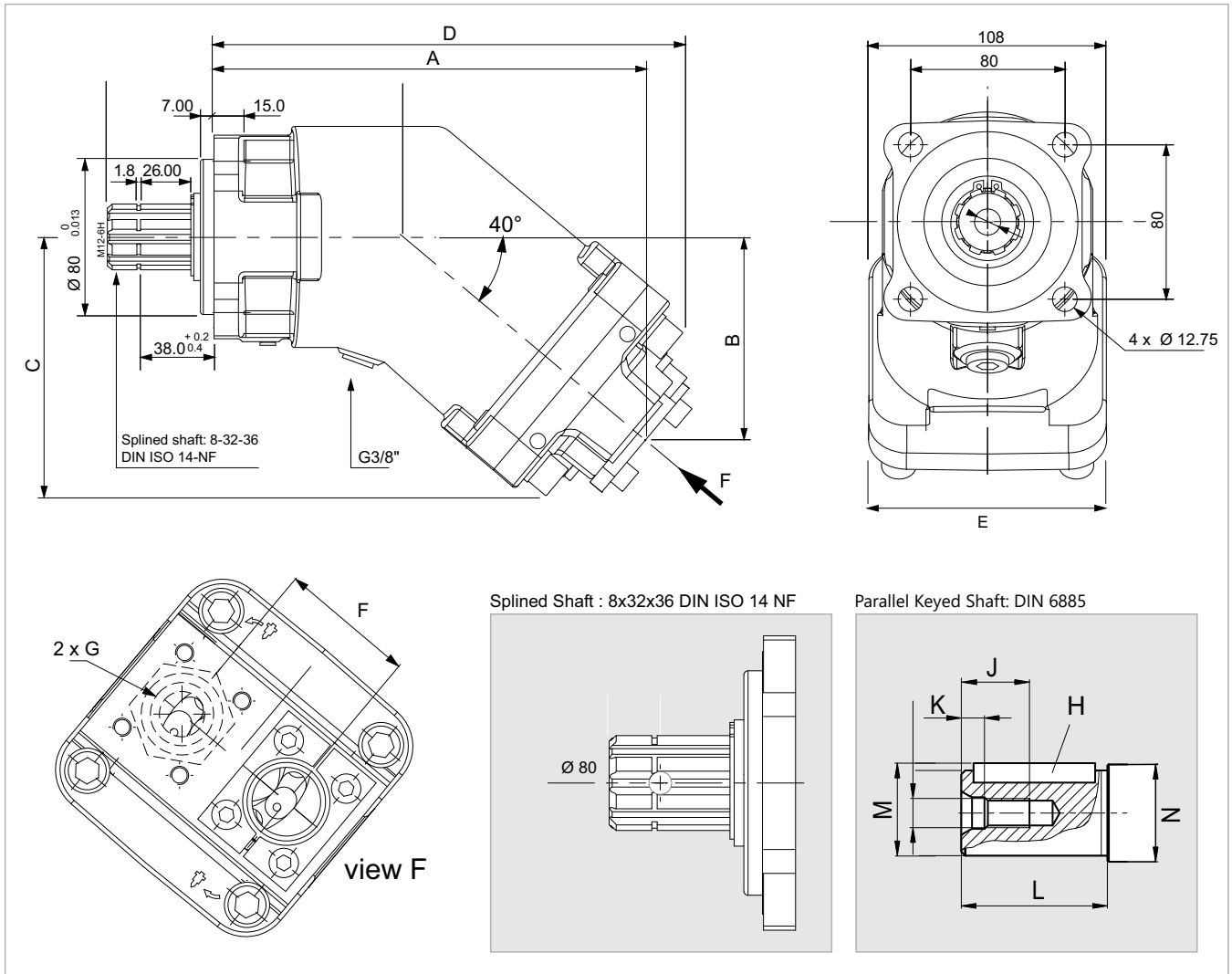


Formulas

Pump Output Flow	GPM	$GPM = (\text{Speed (rpm)} \times \text{disp. (cu. in.)}) / 231$	$GPM = (n \times d) / 231$
Pump Input Horsepower	HP	$HP = GPM \times \text{Pressure (psi)} / 1714 \times \text{Efficiency}$	$HP = (Q \times P) / 1714 \times E$
Pump Efficiency	E	Overall Efficiency = Output HP / Input HP	$E_{\text{Overall}} = \text{HP}_{\text{Out}} / \text{HP}_{\text{In}} \times 100$
		Overall Efficiency = Volumetric Eff. × Mechanical Eff.	$E_{\text{Overall}} = \text{EffVol.} \times \text{EffMech.}$
Pump Volumetric Efficiency	E	Volumetric Efficiency = Actual Flow Rate Output (GPM) / Theoretical Flow Rate Output (GPM) × 100	$\text{EffVol.} = \text{Q}_{\text{Act.}} / \text{Q}_{\text{Theo.}} \times 100$
Pump Mechanical Efficiency	E	Mechanical Efficiency = Theoretical Torque to Drive / Actual Torque to Drive × 100	$\text{EffMech} = \text{T}_{\text{Theo.}} / \text{T}_{\text{Act.}} \times 100$
Pump Displacement	CIPR	$\text{Displcmnt (In.}^3 \text{ / rev.)} = \text{Flow Rate (GPM)} \times 231 / \text{Pump RPM}$	$\text{CIPR} = \text{GPM} \times 231 / \text{RPM}$
Pump Torque	T	Torque = Horsepower × 63025 / RPM	$T = 63025 \times \text{HP} / \text{RPM}$
		Torque = Pressure (PSIG) × Pump Displacement (CIPR) / 2π	$T = P \times \text{CIPR} / 6.28$

- 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.

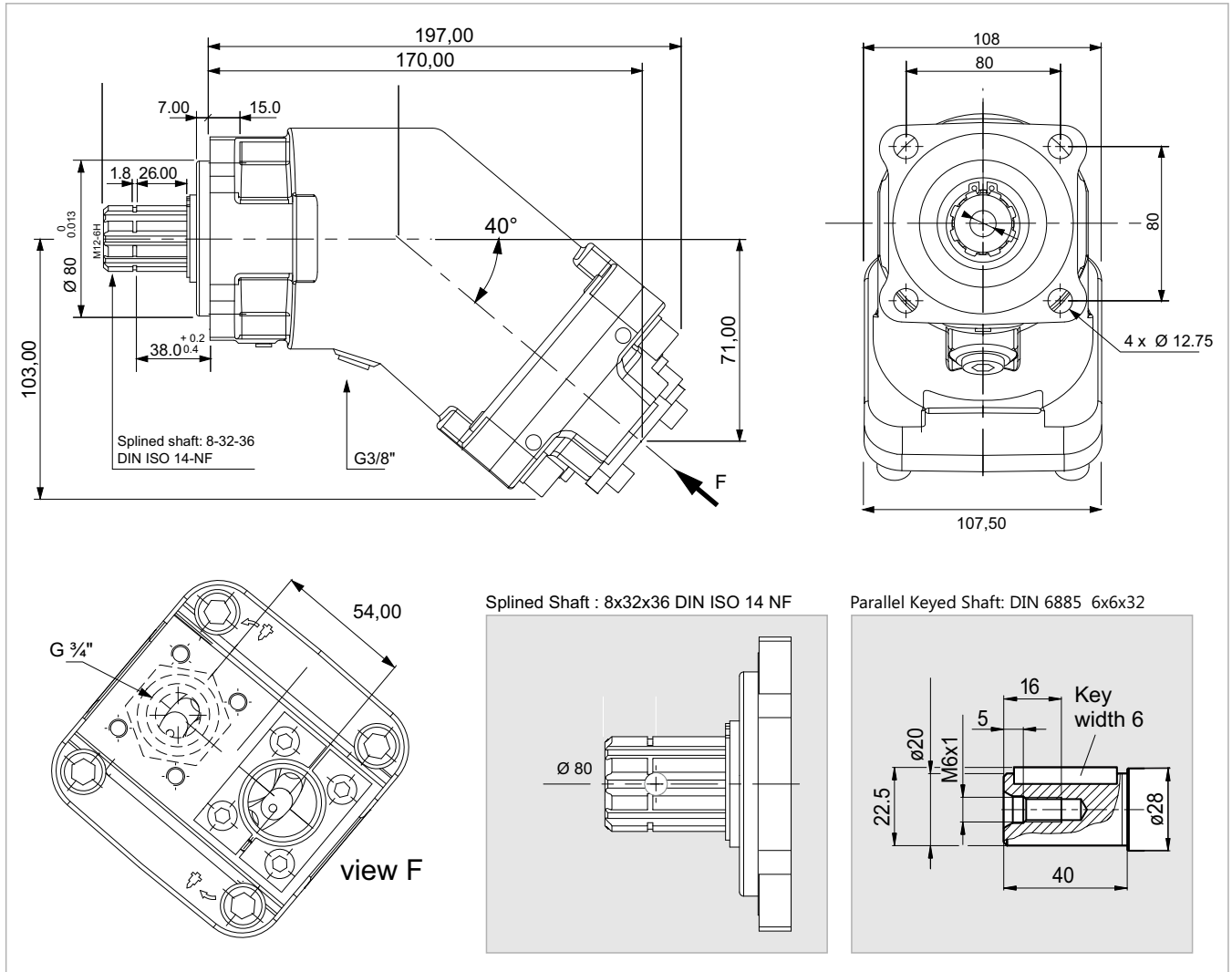
Technical Data II



	10	12	18	25	32	40	50	56	63	80	108
cc	10,00	12,00	18,00	25,00	32,00	40,20	50,00	56,40	63,00	80,00	108,4
A	170,0	170,0	170,0	170,0	177,0	177,0	188,0	188,0	188,0	215,0	215,0
B	71,0	71,0	71,0	71,0	76,0	76,0	86,0	86,0	86,0	98,0	98,0
C	103,0	103,0	103,0	103,0	108,0	108,0	118,0	118,0	118,0	132,0	132,0
D	197,0	197,0	197,0	197,0	202,0	202,0	214,0	214,0	214,0	240,0	240,0
E	107,5	107,5	107,5	107,5	107,5	107,5	107,5	107,5	107,5	122,5	122,5
F	54,0	54,0	54,0	54,0	54,0	54,0	54,0	54,0	54,0	60,0	60,0
G	G 3/4"	G 3/4"	G 3/4"	G 3/4"	G 3/4"	G 3/4"	G 3/4"	G 3/4"	G 3/4"	G 1"	G 1"

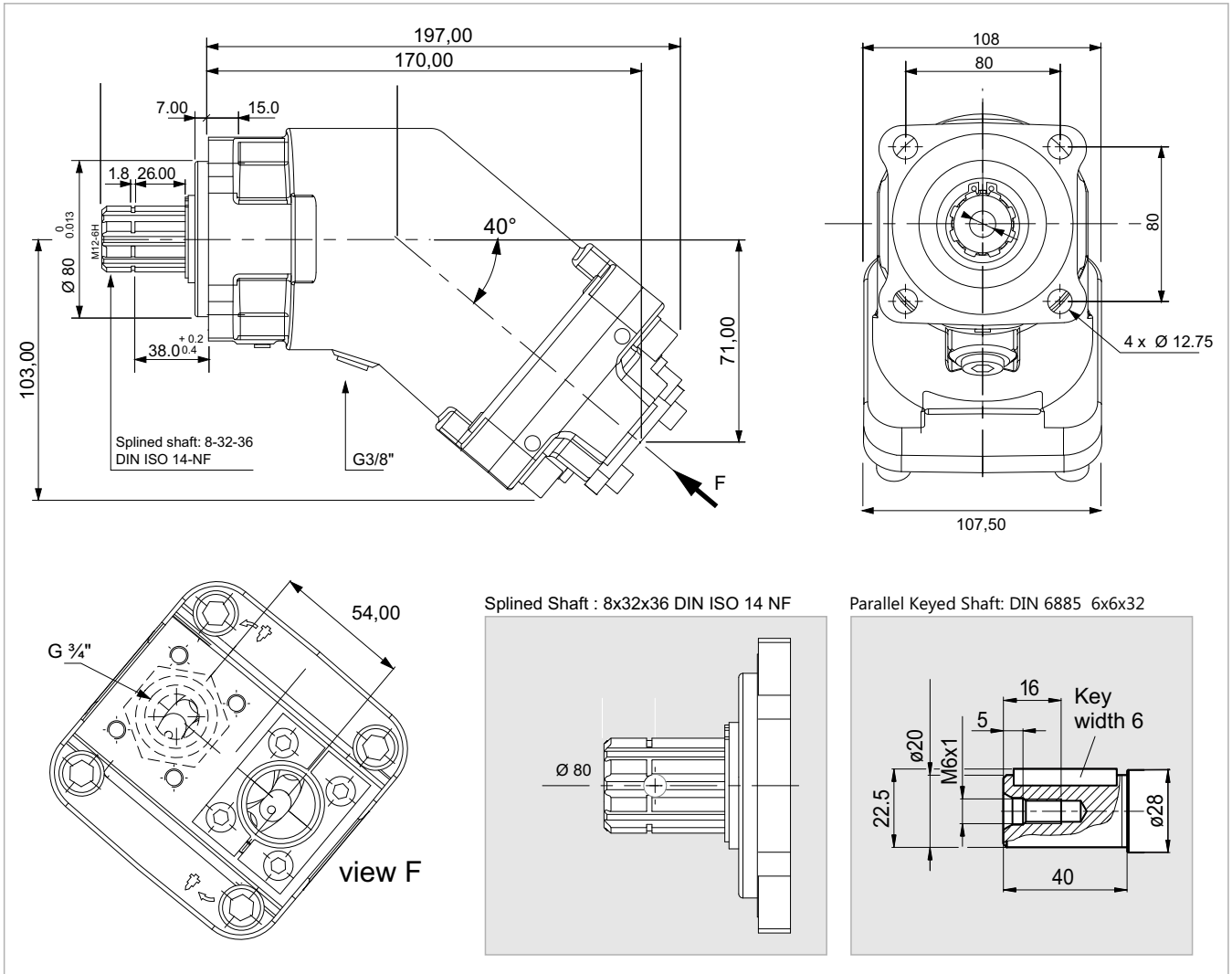
H	6	6	8	8	10	10	10	10	10	12	12
J	16	16	22	22	28	28	28	28	28	28	28
K	5	5	7,5	7,5	9,5	9,5	9,5	9,5	9,5	9,5	9,5
L	40	40	50	50	60	60	60	60	60	70	80
M	22,5	22,5	33	33	38	38	38	38	38	38	43
N	Ø 28	Ø 28	Ø 35	Ø 35	Ø 35	Ø 35	Ø 40	Ø 40	Ø 40	Ø 45	Ø 50

MD 10



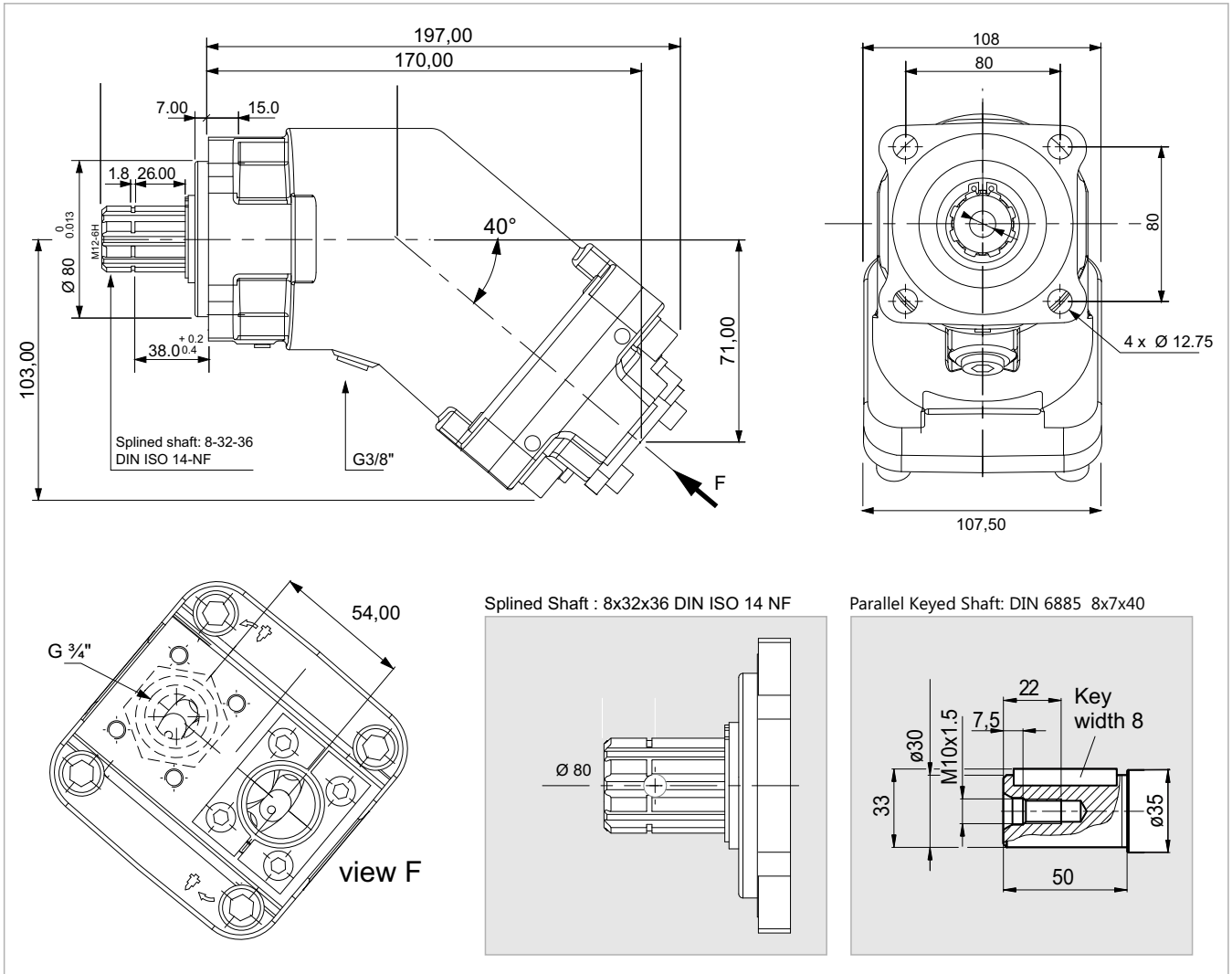
x 1000 rpm	10,00 cc
x 1500 rpm	15,00 cc
Max. Continuous Pump Speed	8000 rpm
Max. Intermittent Pump Speed	8800 rpm
Max. Continuous Pressure	400 bar
Max. Peak Pressure	450 bar
Torque bar	0.17 m.N/bar
Torque at 350 bar	64 m.N
Weight without accessories	9,00 kg
Weight with accessories	9,50 kg
Max. Motor Temperature	-25°
Min. Motor Temperature	110°

MD 12



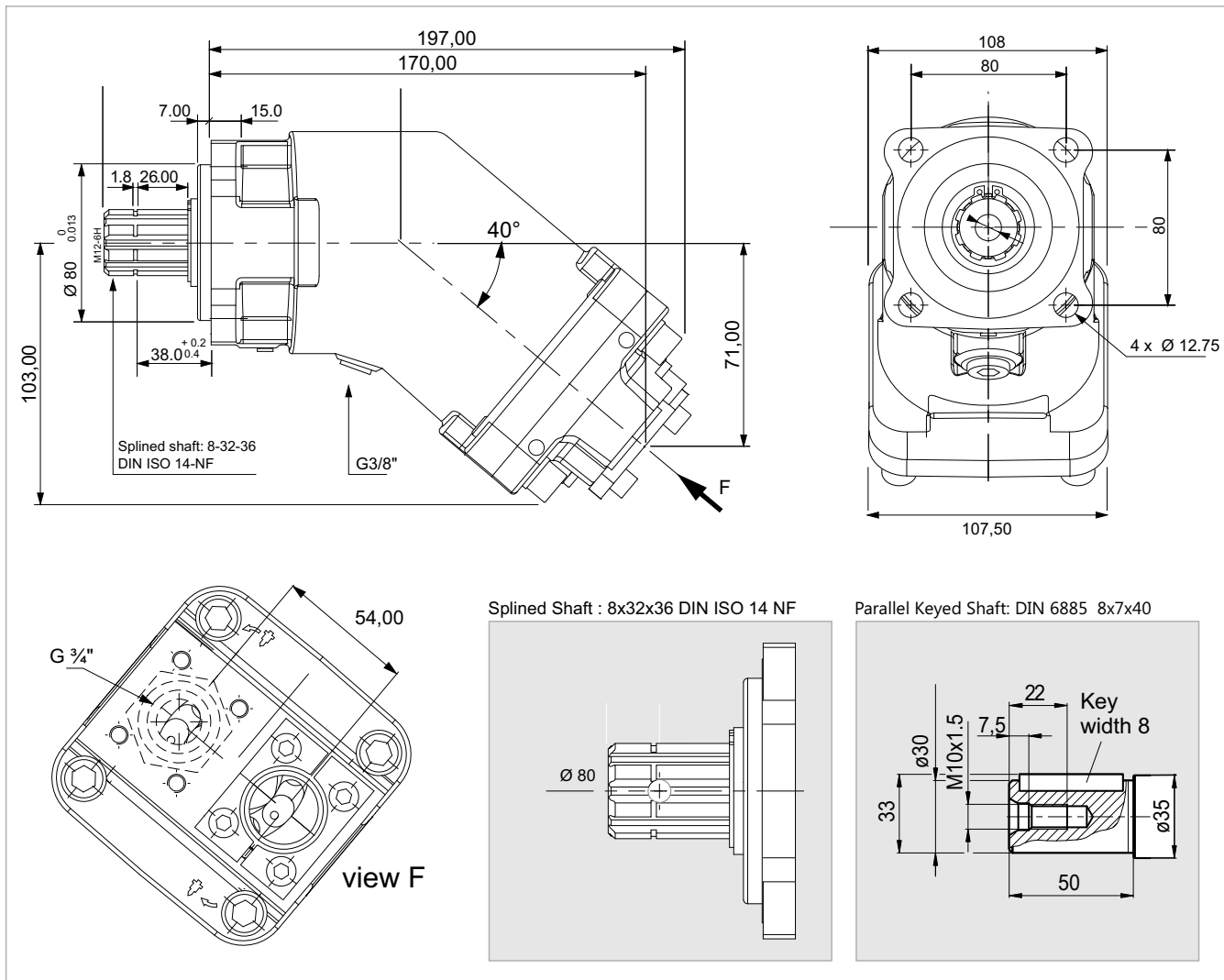
x 1000 rpm	12,00 cc
x 1500 rpm	18,00 cc
Max. Continuous Pump Speed	8000 rpm
Max. Intermittent Pump Speed	8800 rpm
Max. Continuous Pressure	400 bar
Max. Peak Pressure	450 bar
Torque bar	0.18 m.N/bar
Torque at 350 bar	66 m.N
Weight without accessories	9,00 kg
Weight with accessories	9,50 kg
Max. Motor Temperature	-25°
Min. Motor Temperature	110°

MD 18



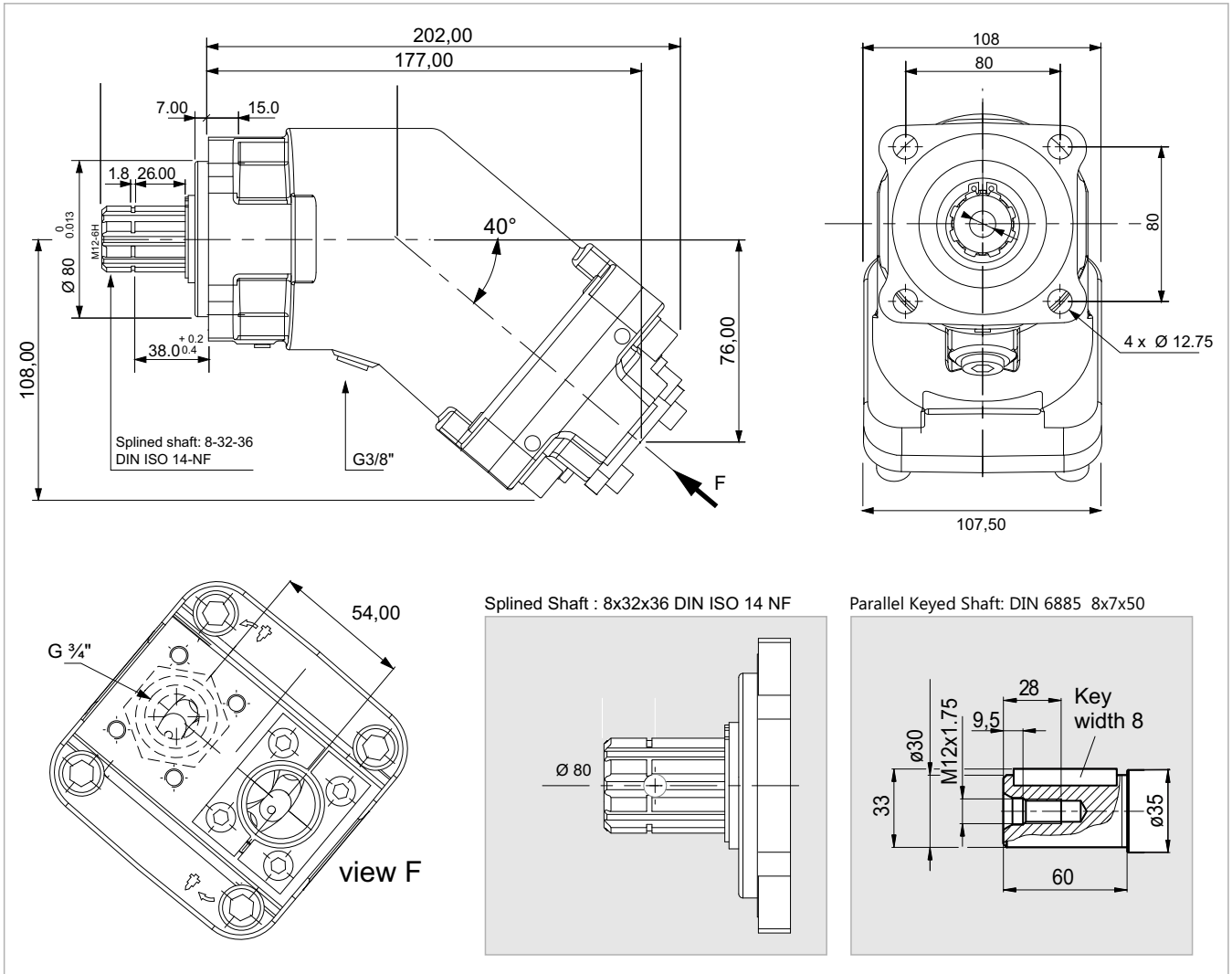
x 1000 rpm	18,00 cc
x 1500 rpm	27,00 cc
Max. Continuous Pump Speed	8000 rpm
Max. Intermittent Pump Speed	8800 rpm
Max. Continuous Pressure	400 bar
Max. Peak Pressure	450 bar
Torque bar	0.28 m.N/bar
Torque at 350 bar	98 m.N
Weight without accessories	10,00 kg
Weight with accessories	10,50 kg
Max. Motor Temperature	-25°
Min. Motor Temperature	110°

MD 25



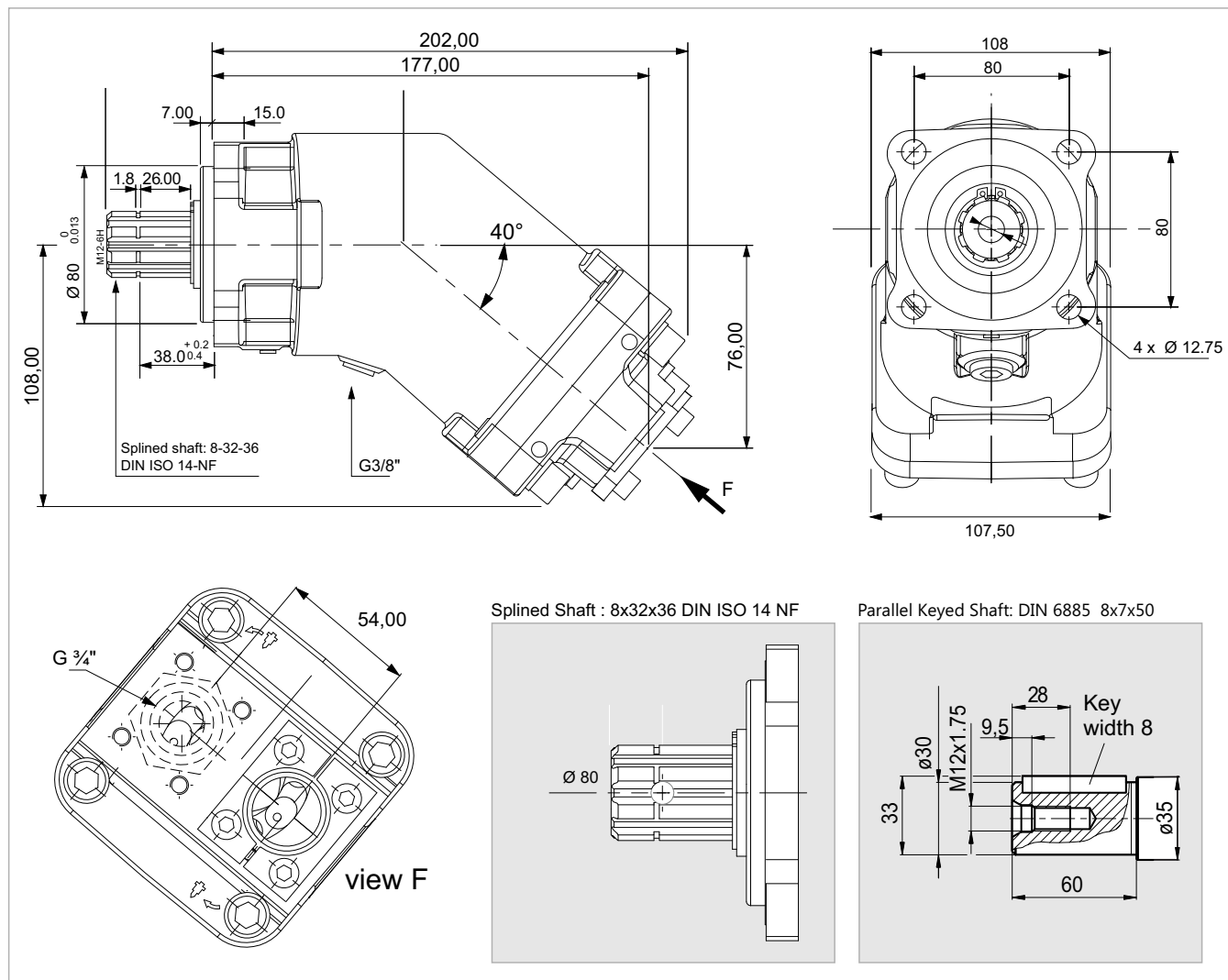
x 1000 rpm	25,00 cc
x 1500 rpm	37,50 cc
Max. Continuous Pump Speed	6250 rpm
Max. Intermittent Pump Speed	6800 rpm
Max. Continuous Pressure	400 bar
Max. Peak Pressure	450 bar
Torque bar	0.40 m.N/bar
Torque at 350 bar	140 m.N
Weight without accessories	10,00 kg
Weight with accessories	10,50 kg
Max. Motor Temperature	-25°
Min. Motor Temperature	110°

MD 32



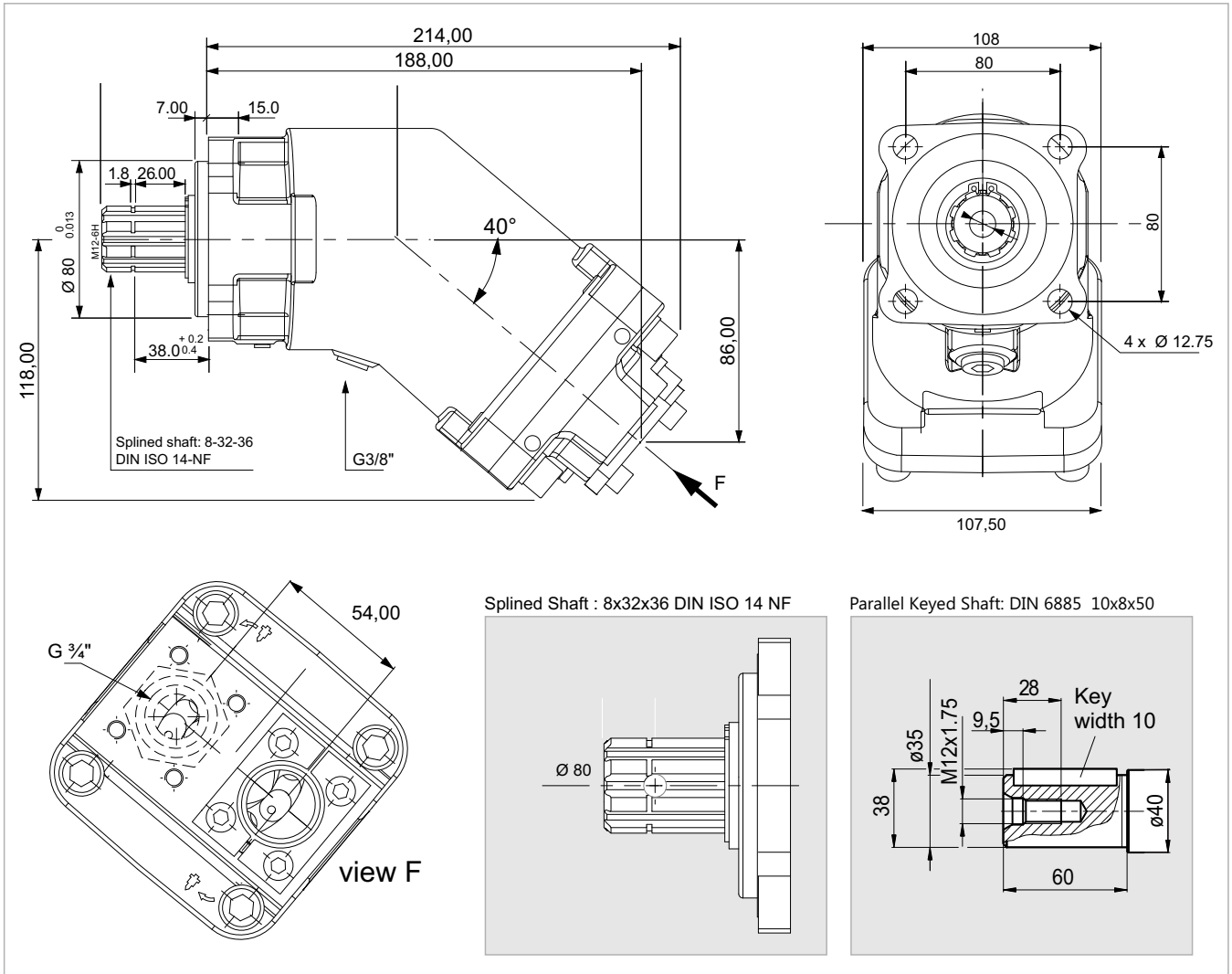
x 1000 rpm	32,00 cc
x 1500 rpm	48,00 cc
Max. Continuous Pump Speed	6250 rpm
Max. Intermittent Pump Speed	6800 rpm
Max. Continuous Pressure	400 bar
Max. Peak Pressure	450 bar
Torque bar	0.51 m.N/bar
Torque at 350 bar	174 m.N
Weight without accessories	11,00 kg
Weight with accessories	11,50 kg
Max. Motor Temperature	-25°
Min. Motor Temperature	110°

MD 40



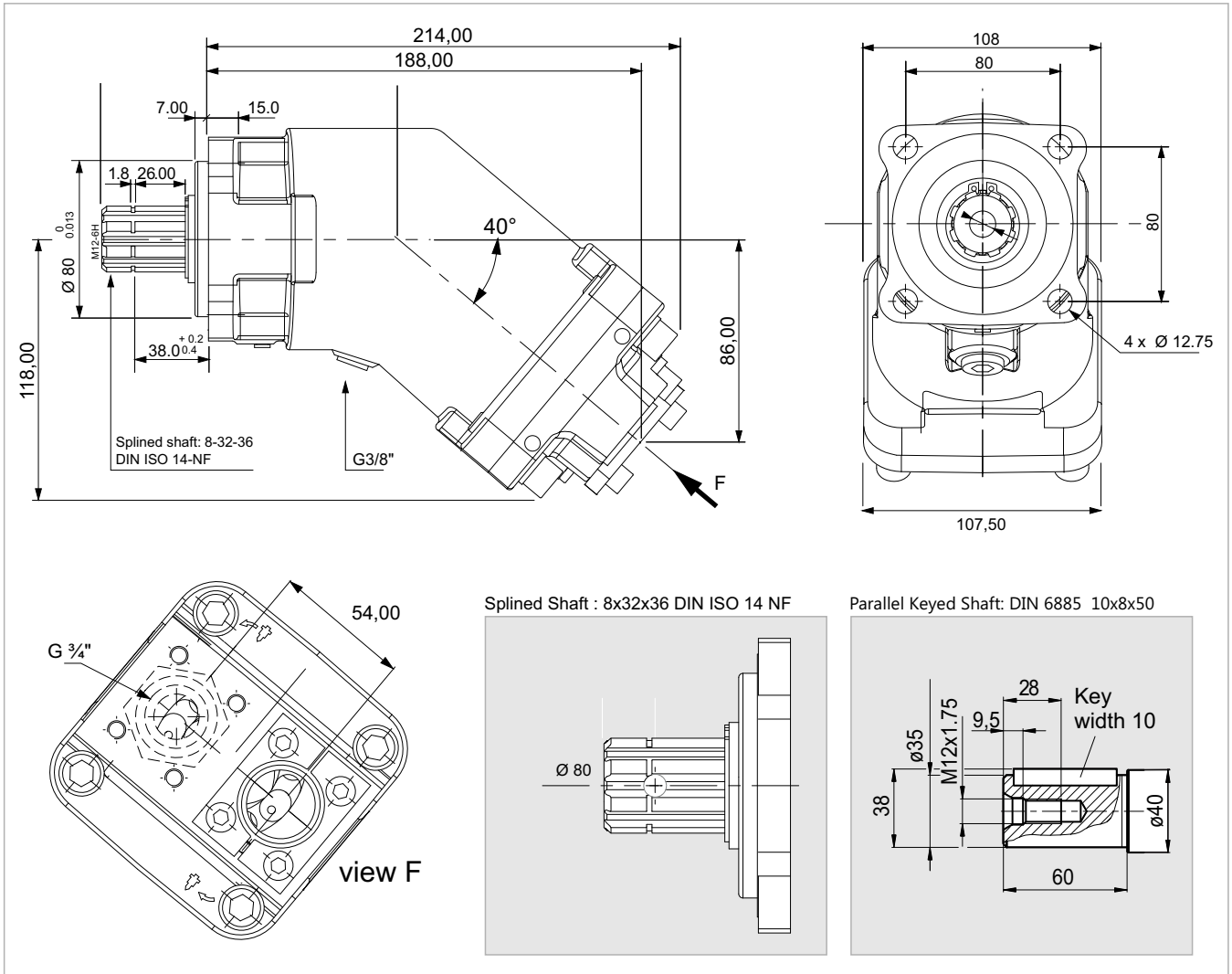
x 1000 rpm	40,20 cc
x 1500 rpm	60,30 cc
Max. Continuous Pump Speed	5600 rpm
Max. Intermittent Pump Speed	6300 rpm
Max. Continuous Pressure	400 bar
Max. Peak Pressure	450 bar
Torque bar	0.65 m.N/bar
Torque at 350 bar	228 m.N
Weight without accessories	11,00 kg
Weight with accessories	11,50 kg
Max. Motor Temperature	-25°
Min. Motor Temperature	110°

MD 50



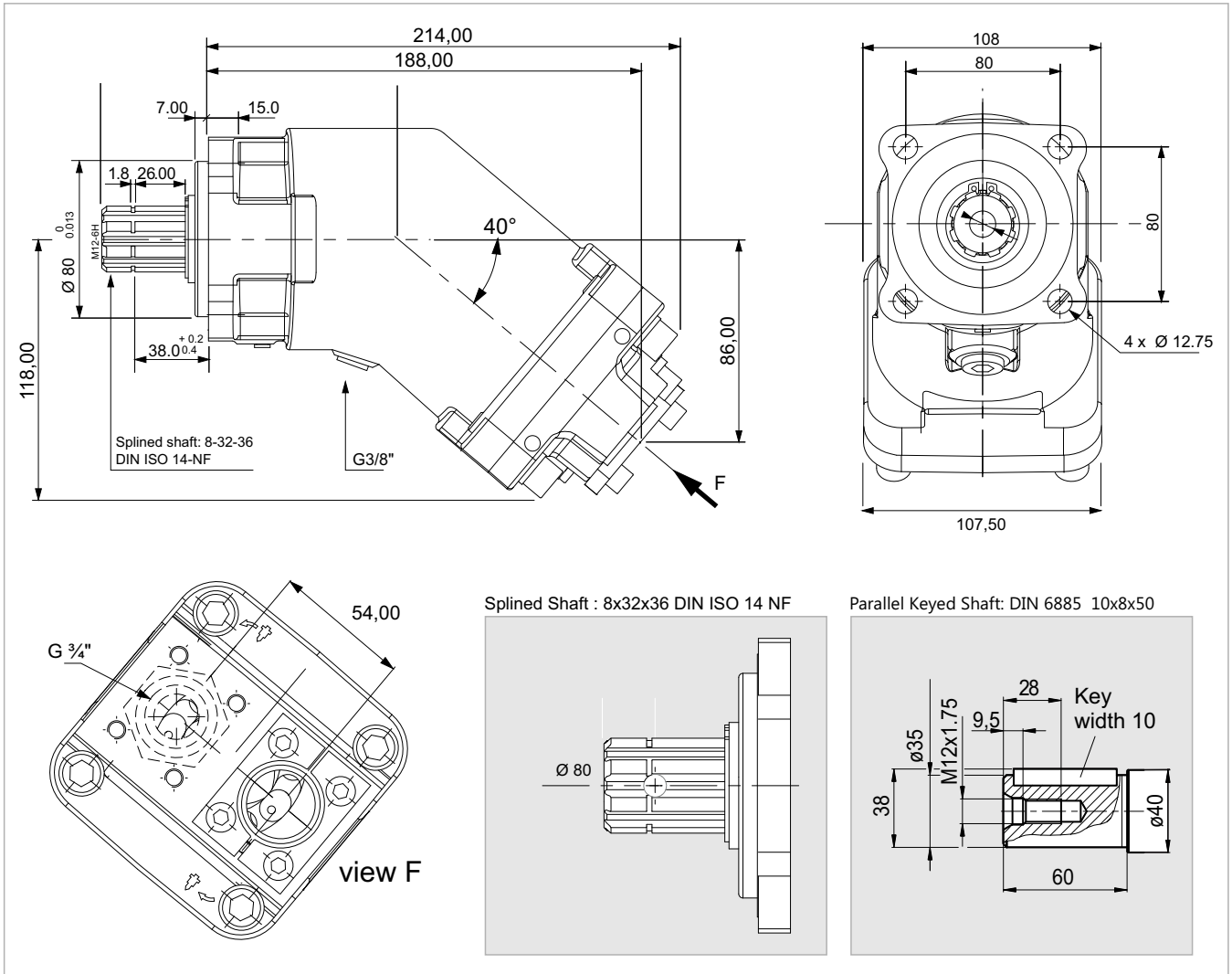
x 1000 rpm	50,00 cc
x 1500 rpm	75,00 cc
Max. Continuous Pump Speed	5000 rpm
Max. Intermittent Pump Speed	5500 rpm
Max. Continuous Pressure	400 bar
Max. Peak Pressure	450 bar
Torque bar	0.80 m.N/bar
Torque at 350 bar	280 m.N
Weight without accessories	11,00 kg
Weight with accessories	11,50 kg
Max. Motor Temperature	-25°
Min. Motor Temperature	110°

MD 56



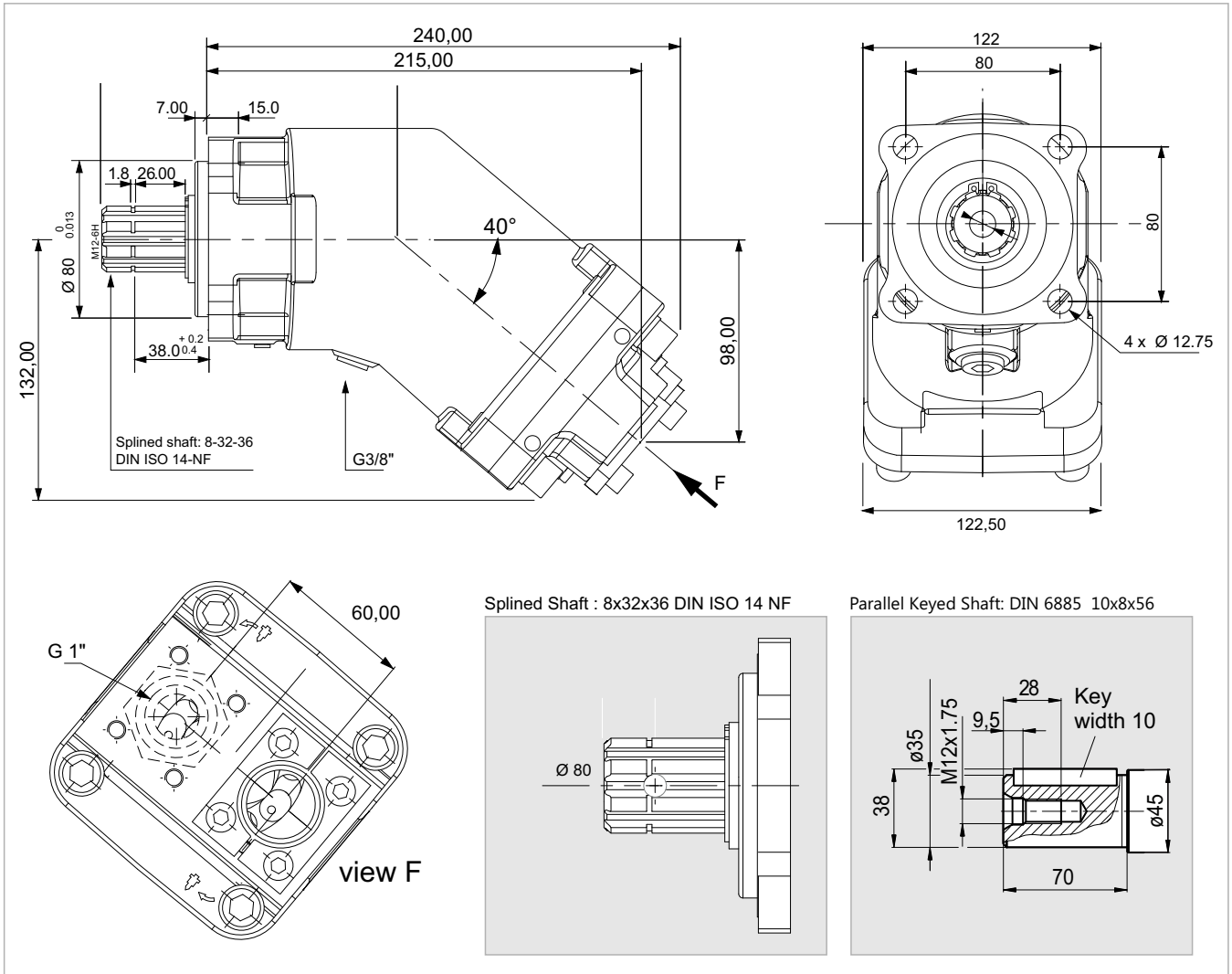
x 1000 rpm	56,40 cc
x 1500 rpm	84,60 cc
Max. Continuous Pump Speed	5000 rpm
Max. Intermittent Pump Speed	5500 rpm
Max. Continuous Pressure	400 bar
Max. Peak Pressure	450 bar
Torque bar	0.92 m.N/bar
Torque at 350 bar	320 m.N
Weight without accessories	12,00 kg
Weight with accessories	12,50 kg
Max. Motor Temperature	-25°
Min. Motor Temperature	110°

MD 63



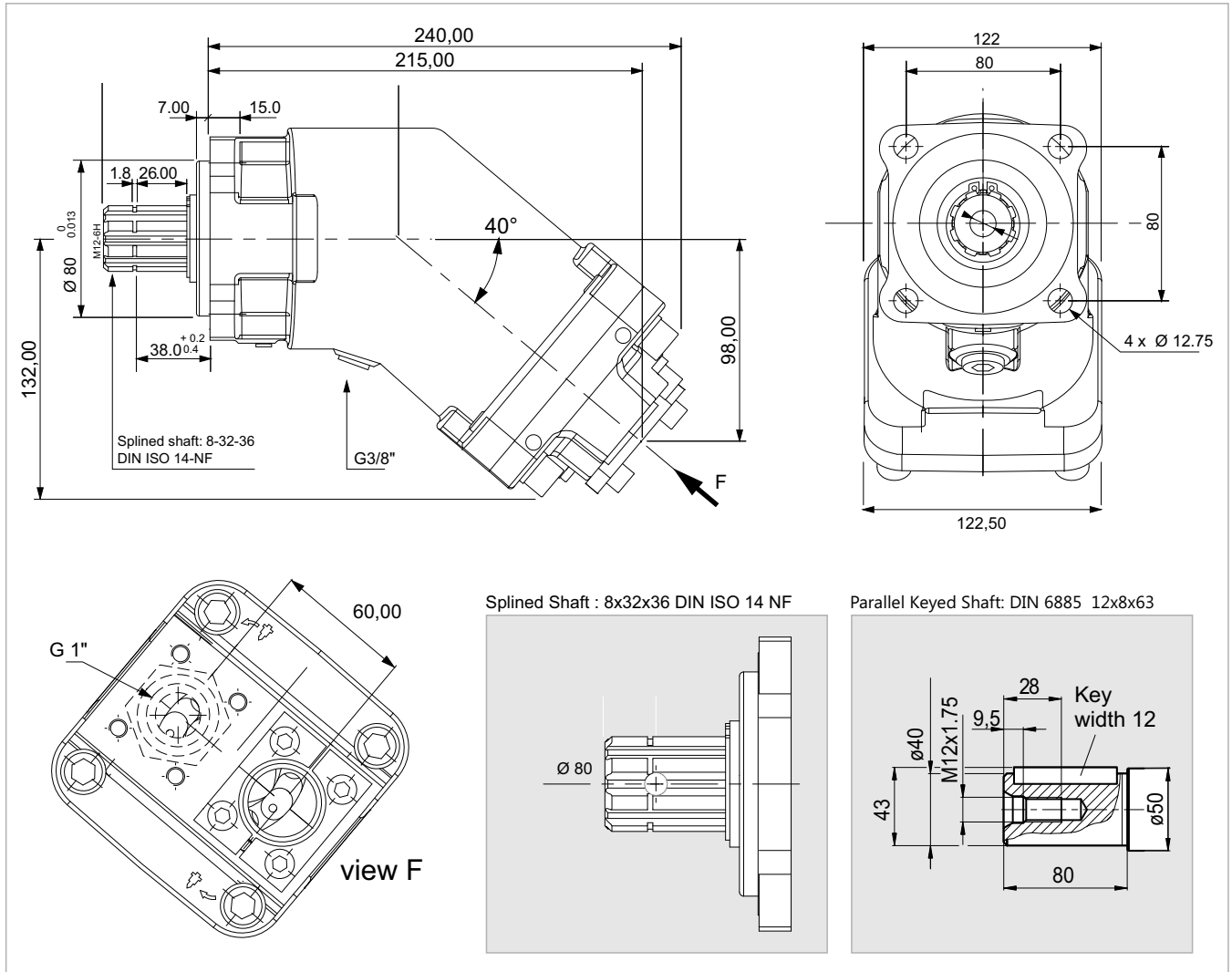
x 1000 rpm	63,00 cc
x 1500 rpm	94,50 cc
Max. Continuous Pump Speed	5000 rpm
Max. Intermittent Pump Speed	5500 rpm
Max. Continuous Pressure	400 bar
Max. Peak Pressure	450 bar
Torque bar	1.00 m.N/bar
Torque at 350 bar	350 m.N
Weight without accessories	12,00 kg
Weight with accessories	12,50 kg
Max. Motor Temperature	-25°
Min. Motor Temperature	110°

MD 80



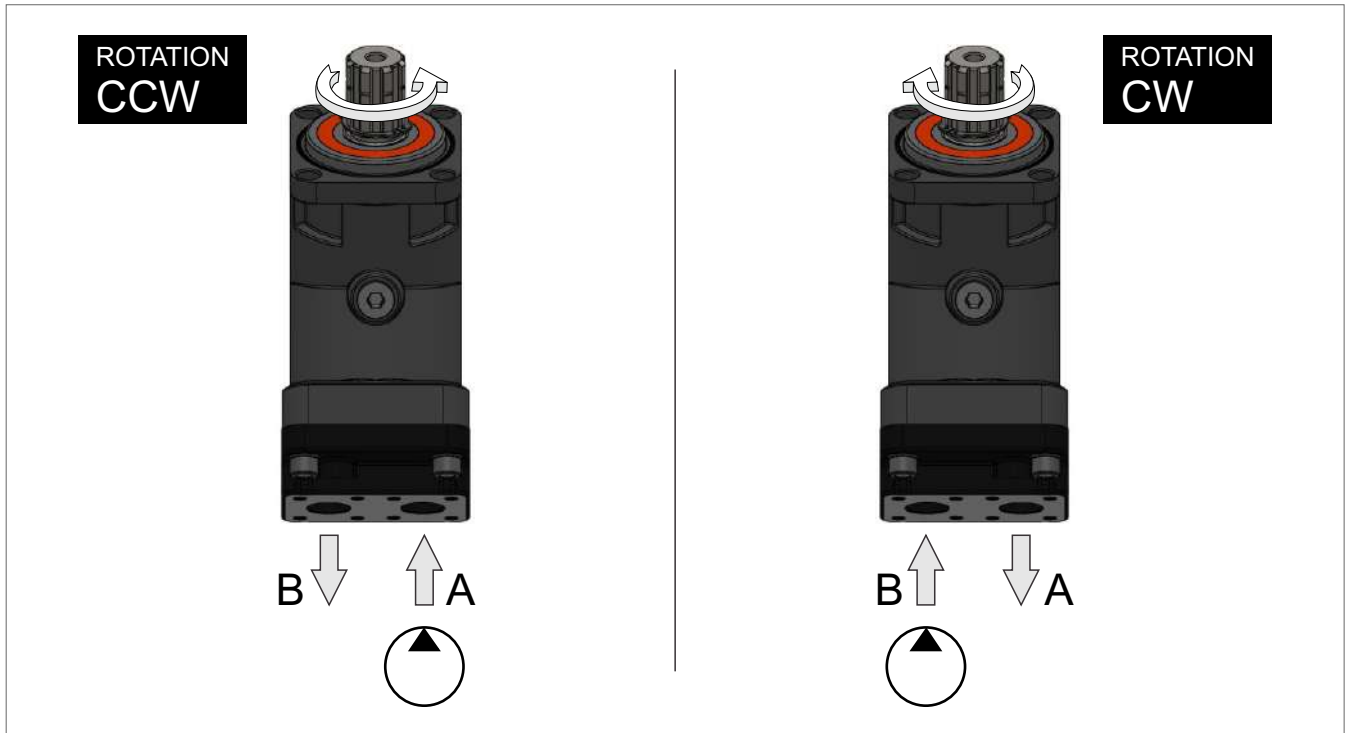
x 1000 rpm	80,00 cc
x 1500 rpm	120,00 cc
Max. Continuous Pump Speed	4400 rpm
Max. Intermittent Pump Speed	4900 rpm
Max. Continuous Pressure	400 bar
Max. Peak Pressure	450 bar
Torque bar	1.28 m.N/bar
Torque at 350 bar	440 m.N
Weight without accessories	15,00 kg
Weight with accessories	15,50 kg
Max. Motor Temperature	-25°
Min. Motor Temperature	110°

MD 108



x 1000 rpm	108,40 cc
x 1500 rpm	162,60 cc
Max. Continuous Pump Speed	4000 rpm
Max. Intermittent Pump Speed	4400 rpm
Max. Continuous Pressure	400 bar
Max. Peak Pressure	450 bar
Torque bar	1.69 m.N/bar
Torque at 350 bar	600 m.N
Weight without accessories	16,00 kg
Weight with accessories	16,50 kg
Max. Motor Temperature	-25°
Min. Motor Temperature	110°

Direction of Rotation



Quick Calculation

Flow rate

$$Q = \frac{V_s \cdot n}{1000 \eta_v} \text{ (lpm)}$$

Torque

$$M = \frac{V_s \cdot \Delta p \cdot \eta_{mh}}{63} \text{ (Nm)}$$

Power

$$P = \frac{2\pi \cdot M \cdot n}{60000} = \frac{M \cdot n}{9549} = \frac{Q \cdot \Delta p \cdot \eta_t}{600} \text{ (kw)}$$

Speed

$$n = \frac{1000 \cdot Q \cdot \eta_v}{V_s} \text{ (rpm)}$$

V_s = Displacement (ccm/rev.)

Δp = Diff. pressure (bar)

n = Speed (rpm)

Q = Flow (lpm)

η_v = Volumetric efficiency

η_{mh} = Mechanical-hydraulic efficiency

η_t = Total efficiency ($\eta_t = \eta_v \times \eta_{mh}$)

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 MD Bent Axis Motors.

Installation

POSITION

MD Motors can be operate any position.

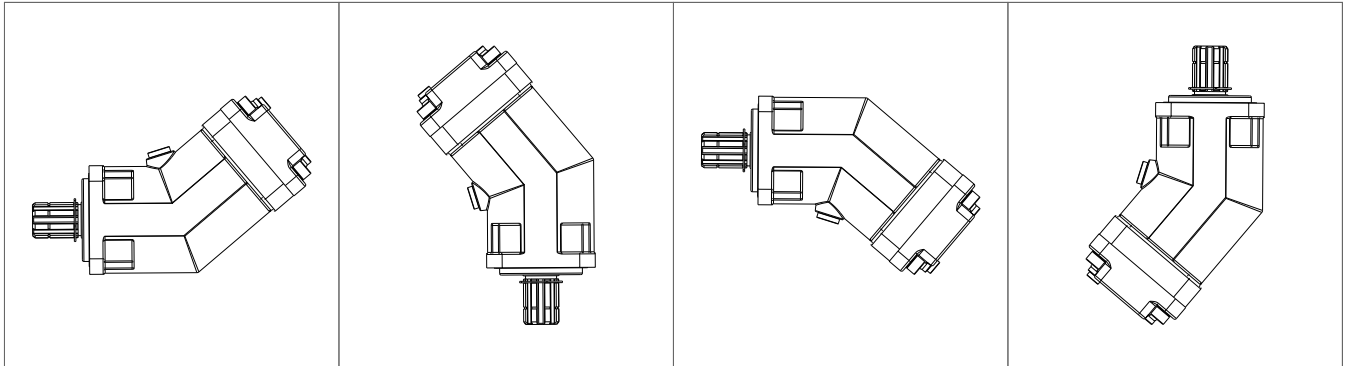
DIRECTION OF ROTATION

MD Motors can be operate in both directions of rotation.

Before of Installation operation, the motor must be filled with hydraulic fluid and air bled.

INSTALLATION POSITION

See following examples.

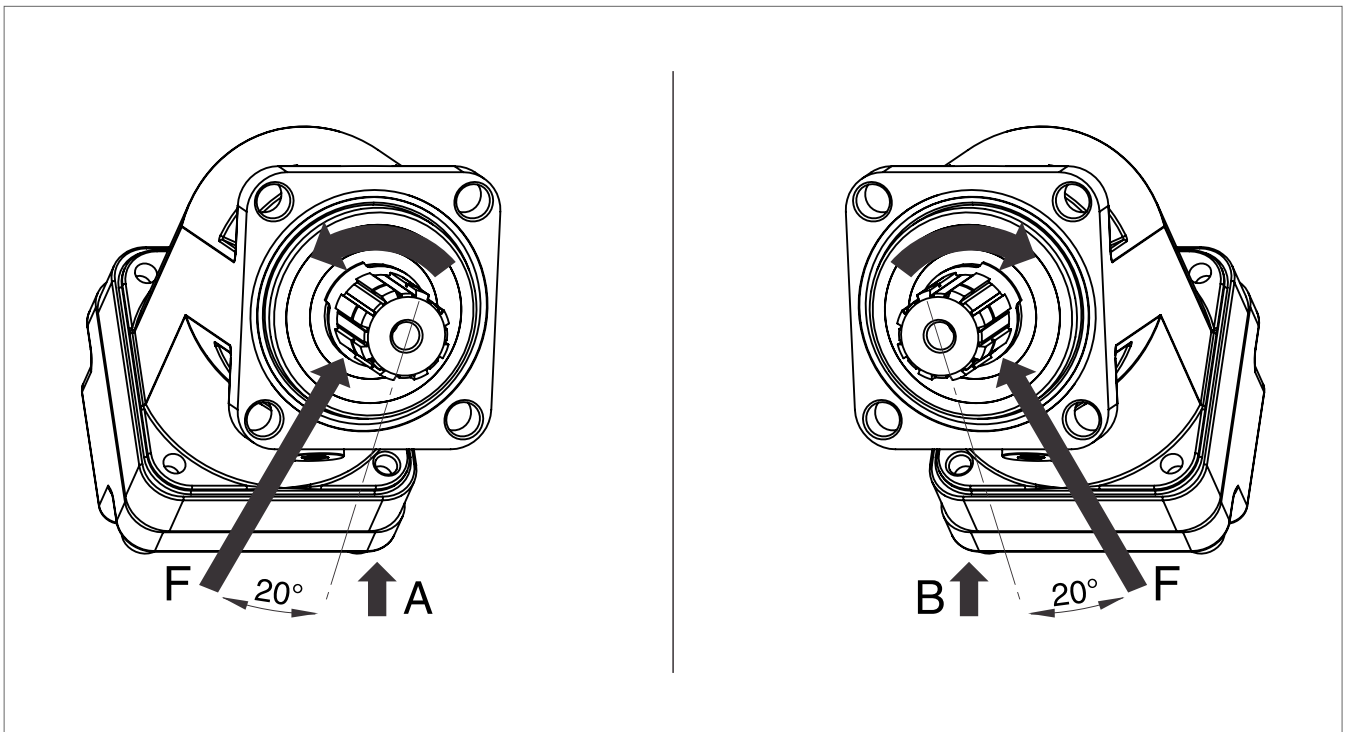


HYDRAULIC FLUID

Recommended ;

Generally : between 15 and 200 cSt.

Maximum : between 5 and 1600 cSt.



FOR USE;

Available via e-mail on request or each motor is supplied via Starting datasheet.

For detailed information about MD Bent Axis Motors, please contact with Technical Department !!!

SAFA

HYDRAULICS



PD-DIN
Bent Axis Pumps



MD-DIN
Bent Axis Motor



PA-SAE
Bent Axis Pumps



MA-SAE
Bent Axis Motor



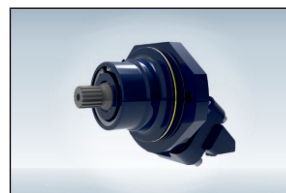
PS-ISO
Bent Axis Pumps



MS-ISO
Bent Axis Motor



PD Dual
Dual Flow Pumps



MF Fixed
Bent Axis Motor



PV
Variable Disp.
Piston Pumps

SAFA HYDRAULICS

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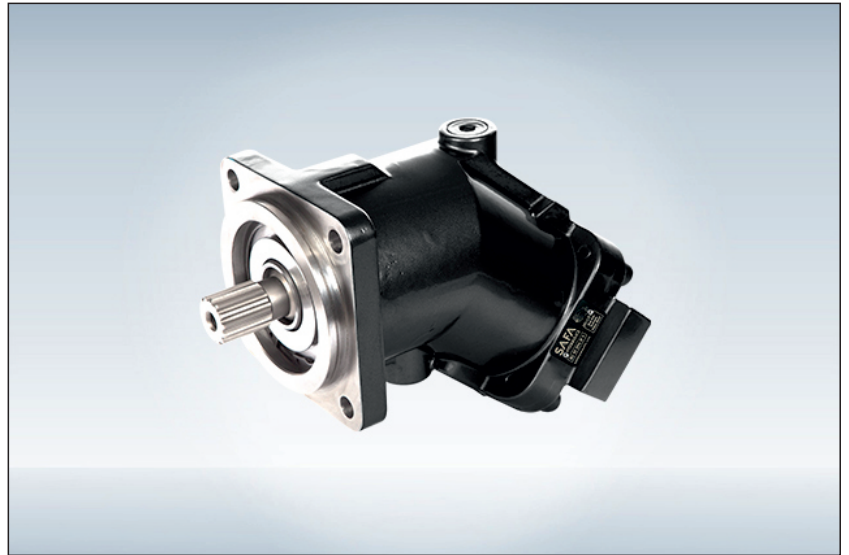
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MA-SAE
Bent Axis Motor

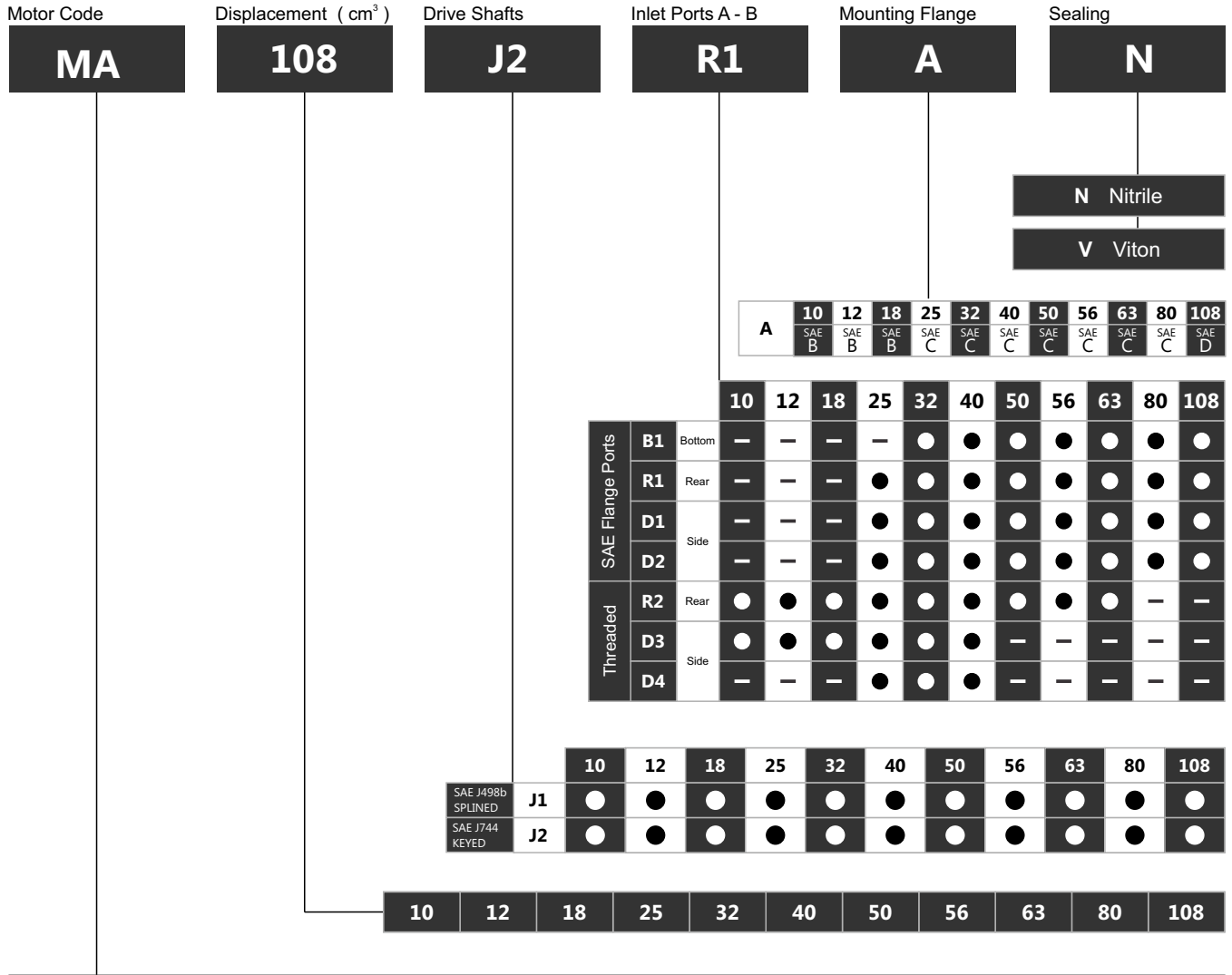


SAE Mounting Flange, Flange, 2, 4, 6 Bolt 12cc to 130cc

SAE Mounting Flange, High Pressure Bent Axis Piston Motors. Reversible Direction of Rotation.
Displacement Range starting at; 12cc, 18cc, 25cc, 32cc, 40cc, 50cc, 63cc, 80cc, 108cc, 130cc
400/450 Bar, High Pressure, High Rotational Speed, Slim Design, High Efficiency.

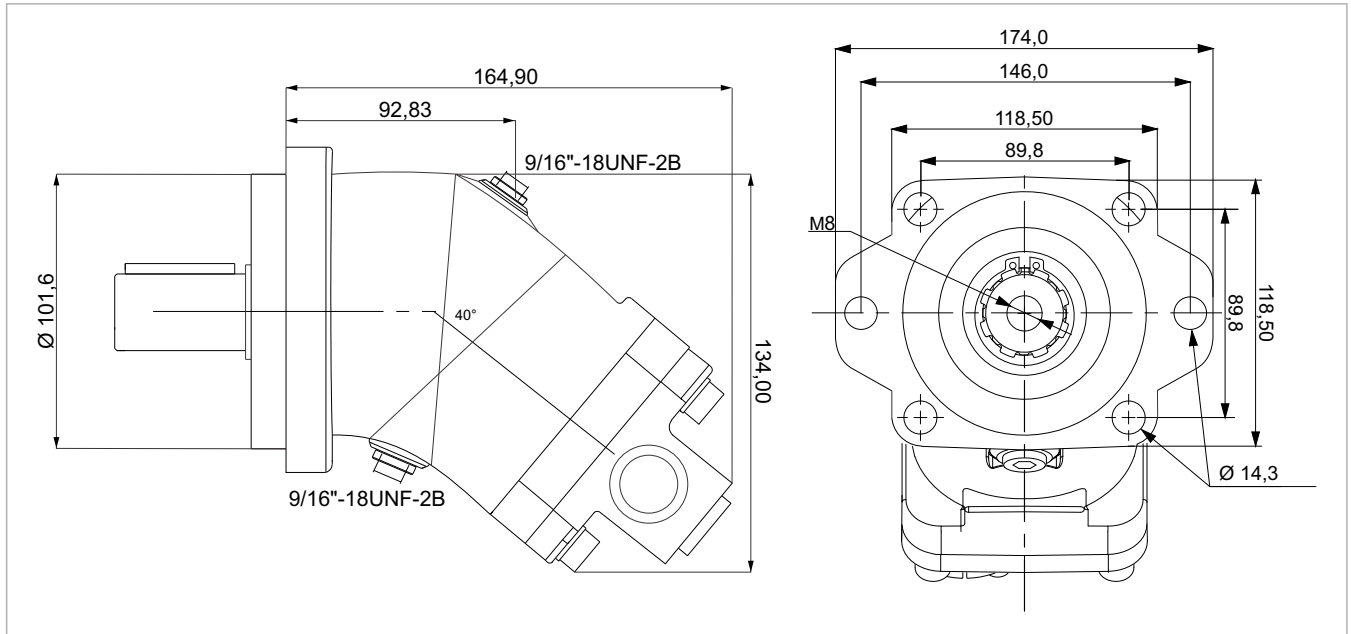


Ordering Code of MA Motors

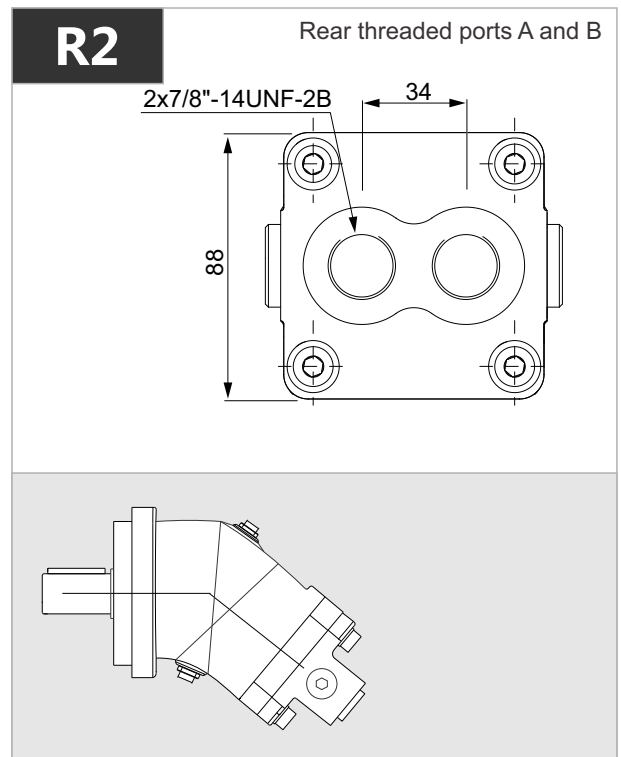
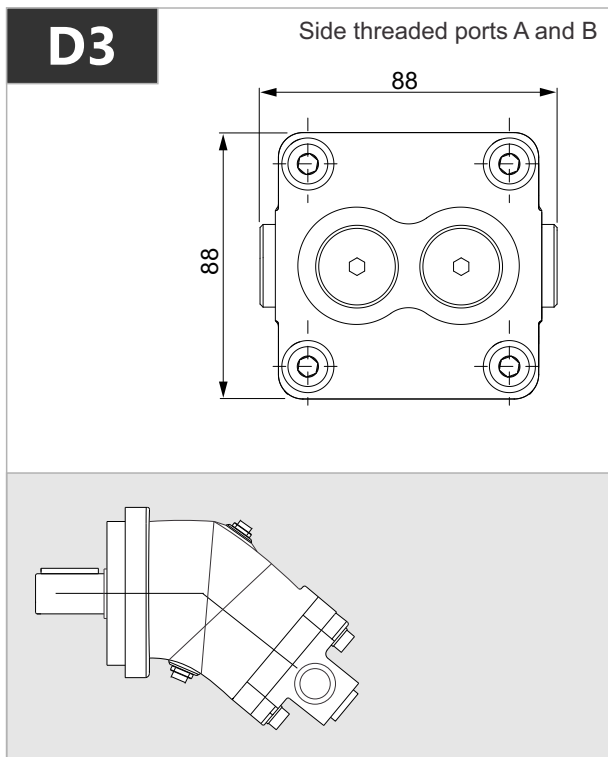


MA Bent Axis Piston Motor - SAE, Fixed Displacement.

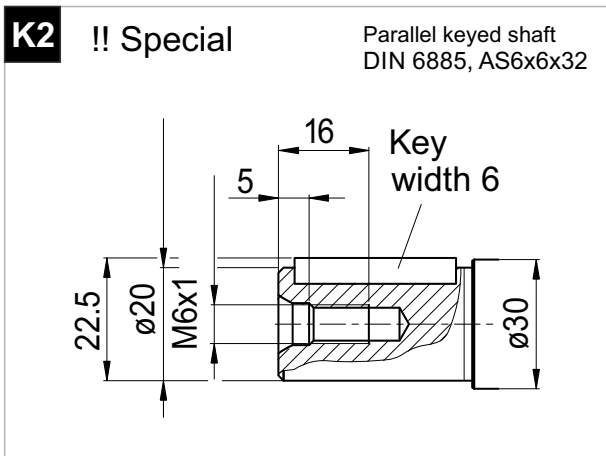
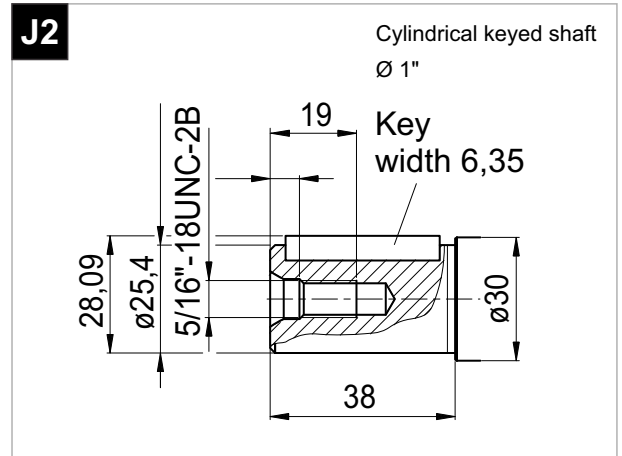
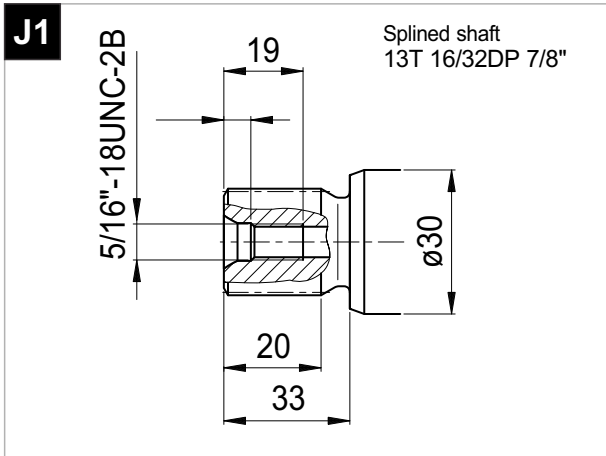
MA 10



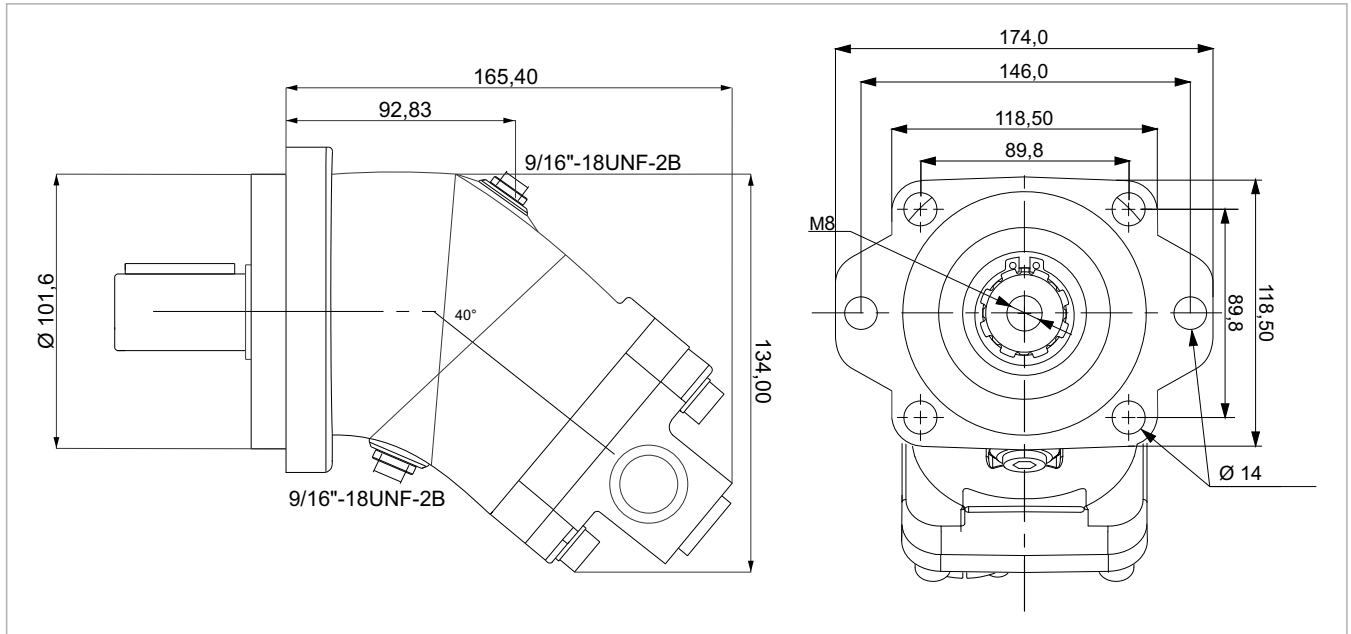
x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
10,00 cc	15,00 cc	8000 rpm	8800 rpm	400 bar	450 bar	0.17 m.N/bar	64 m.N	80	6,50 kg	7,00 kg	-25°	110°



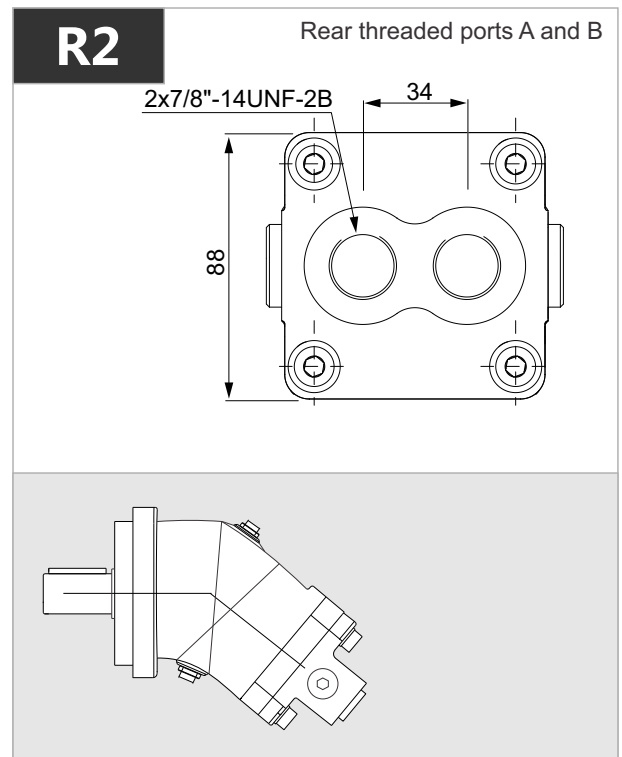
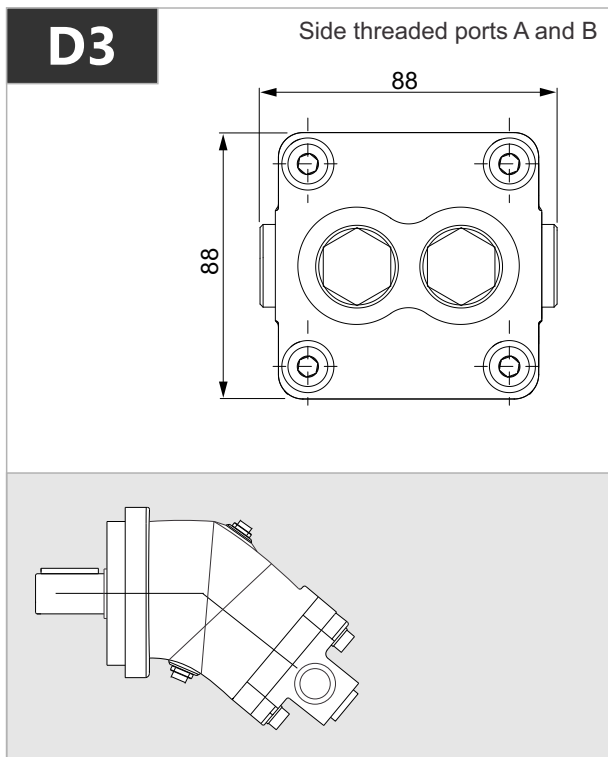
MA 10



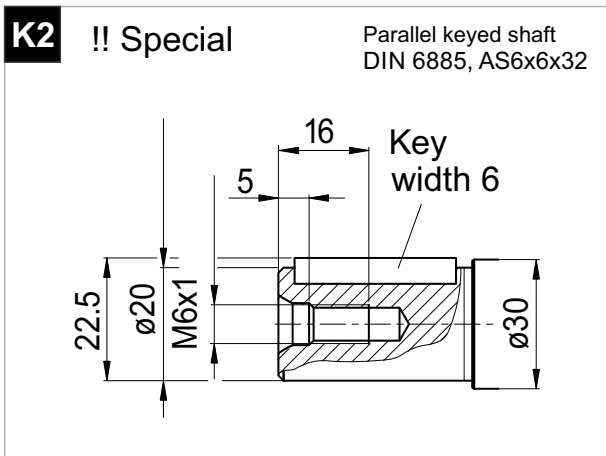
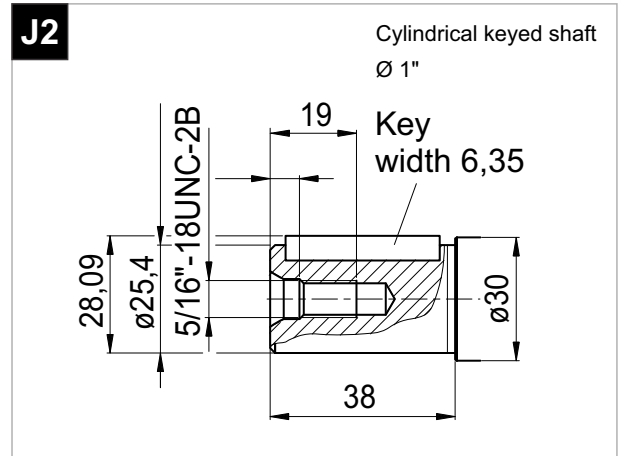
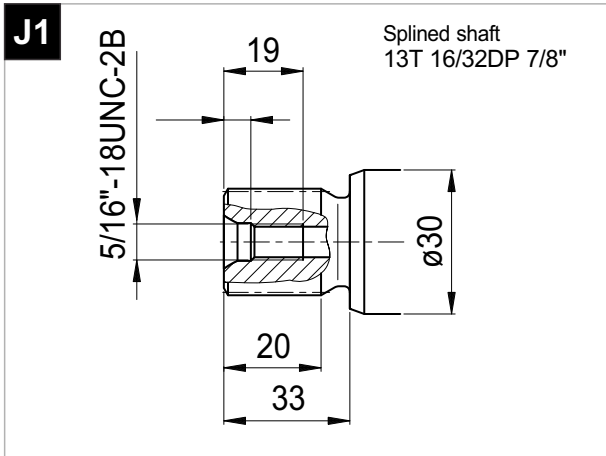
MA 12



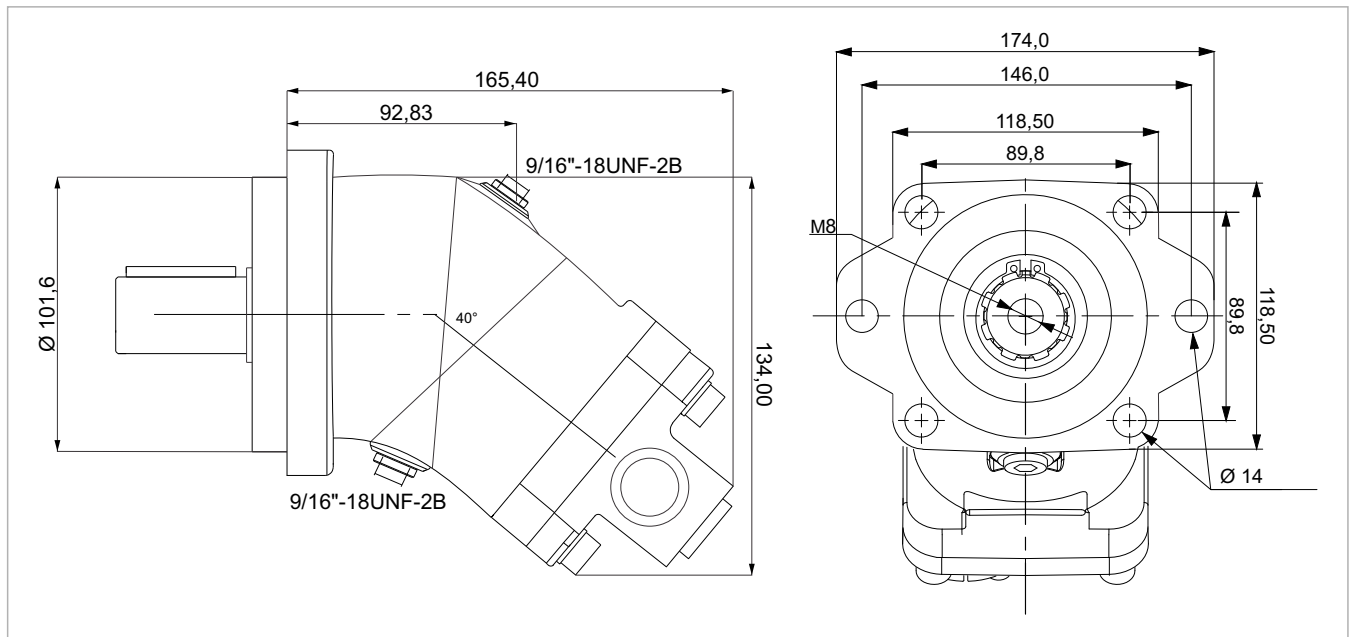
x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
12,00 cc	18,00 cc	8000 rpm	8800 rpm	400 bar	450 bar	0.18 m.N/bar	66 m.N	96	6,50 kg	7,00 kg	-25°	110°



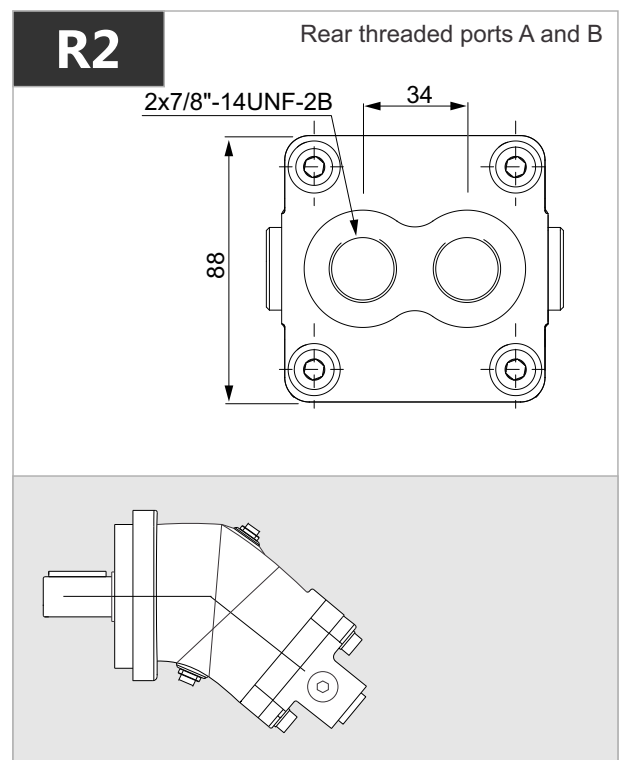
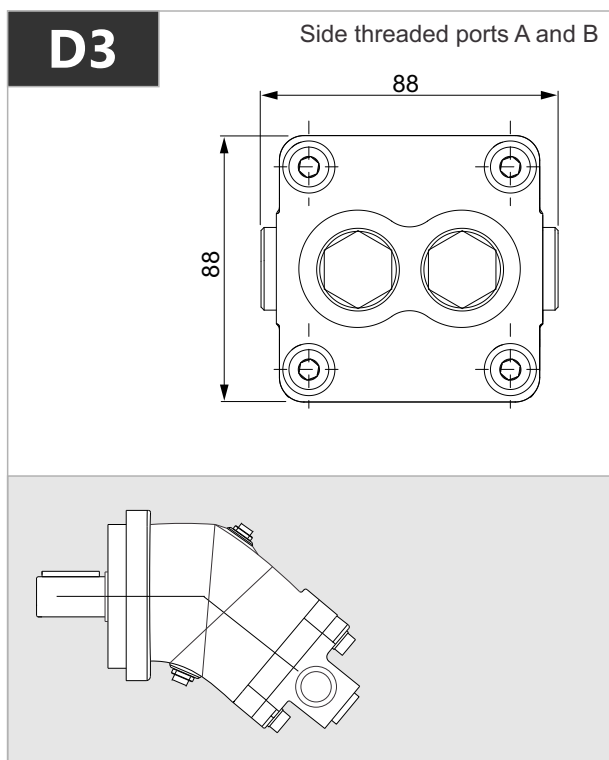
MA 12



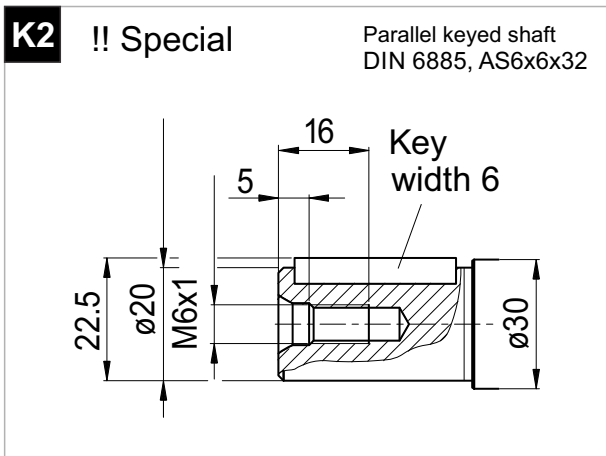
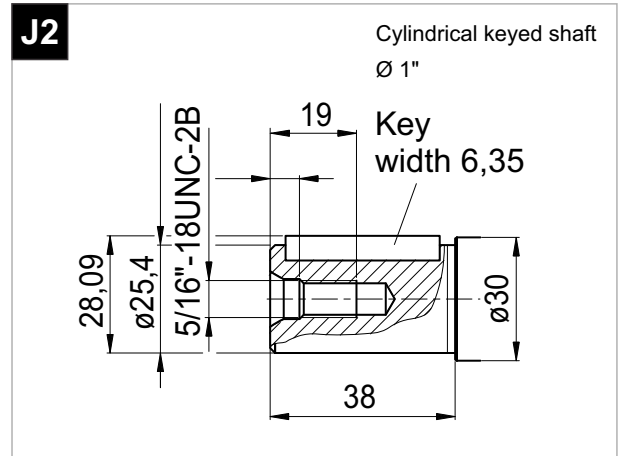
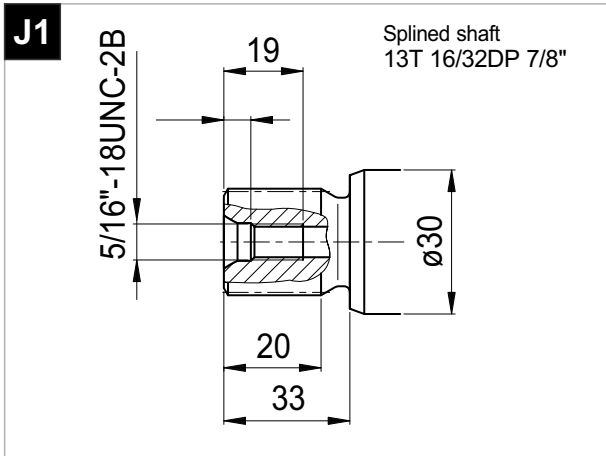
MA 18



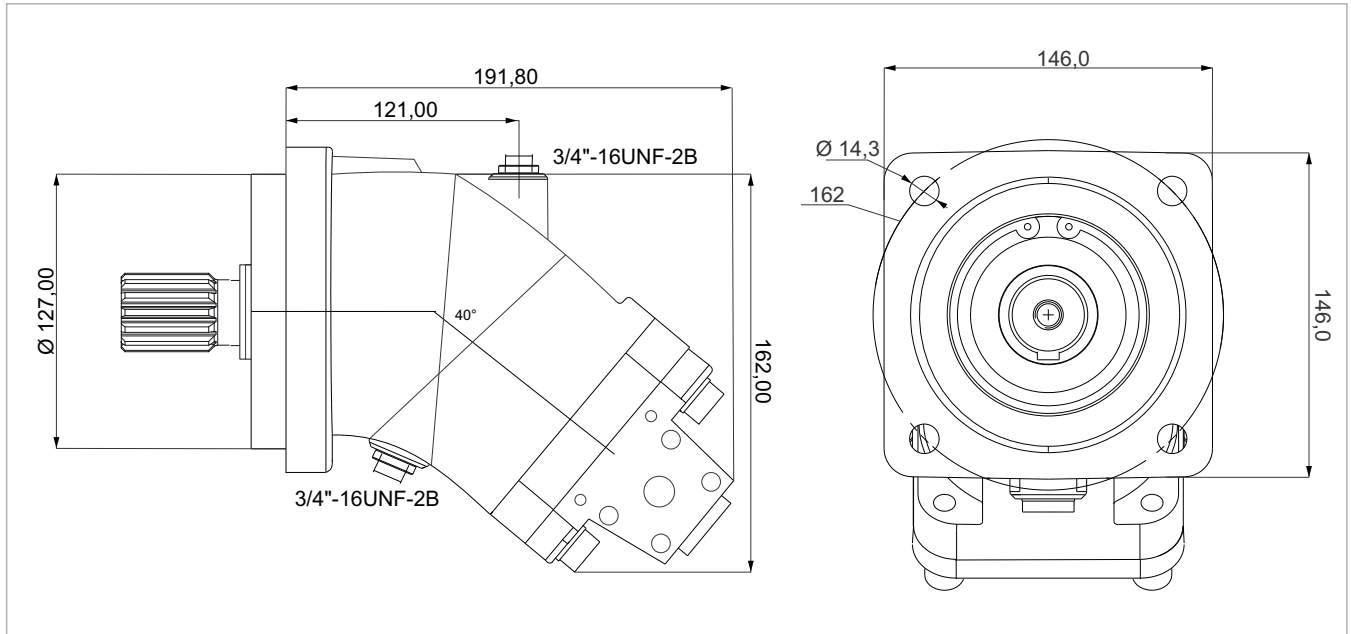
x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
18,00 cc	27,00 cc	8000 rpm	8800 rpm	400 bar	450 bar	0.28 m.N/bar	98 m.N	144	6,50 kg	7,0 kg	-25°	110°



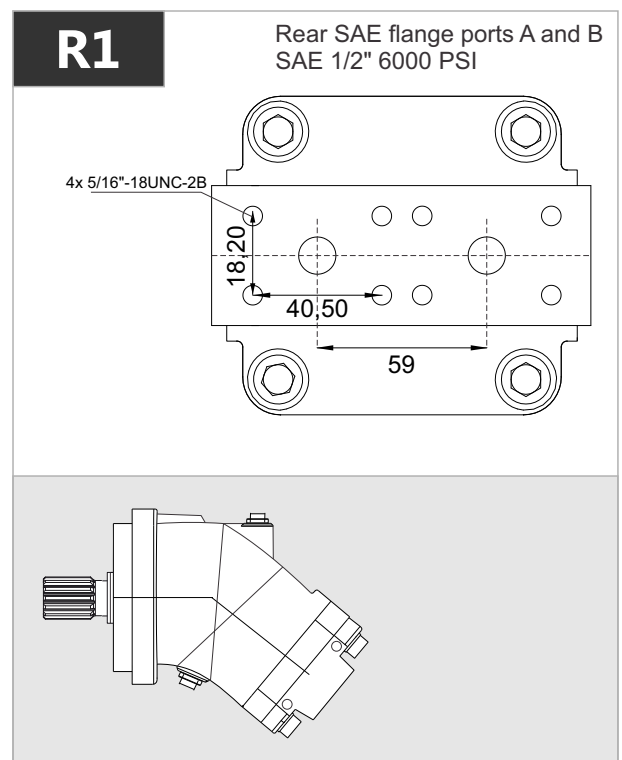
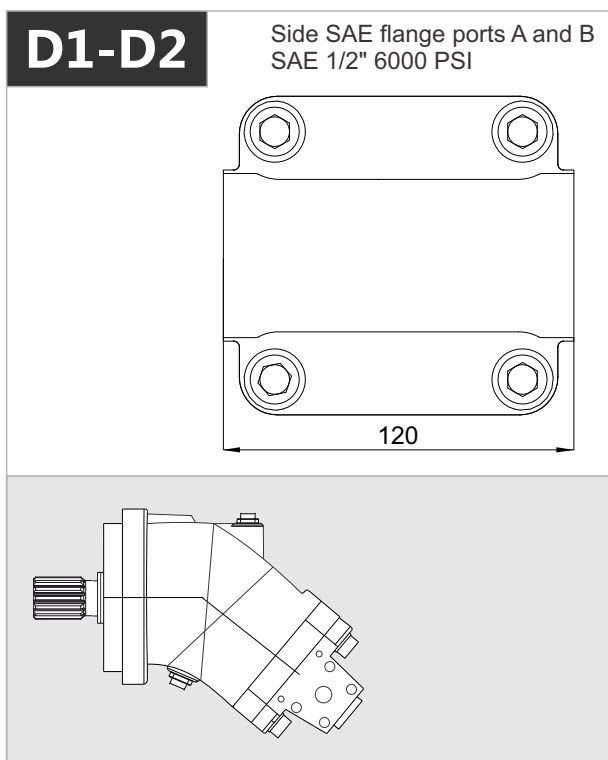
MA 18



MA 25



x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
25,00 cc	37,50 cc	6250 rpm	6800 rpm	400 bar	450 bar	0.40 m.N/bar	140 m.N	156	11,50 kg	11,80 kg	-25°	110°

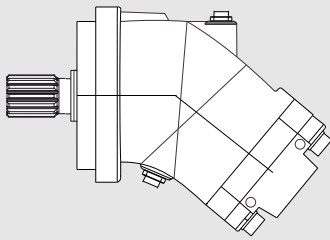
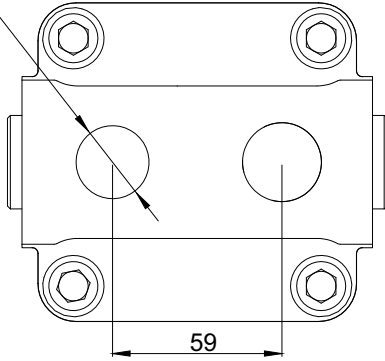


MA 25

R2

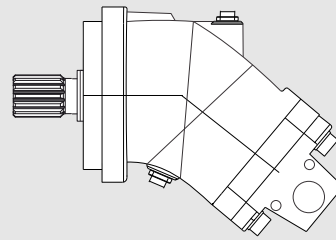
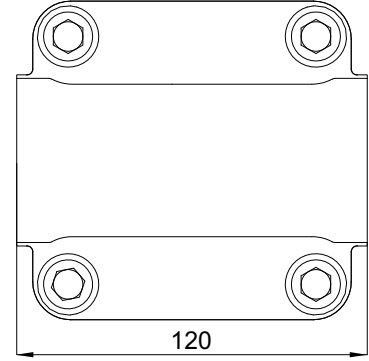
Rear threaded ports A and B

2x1 5/16"-
12UN-2B



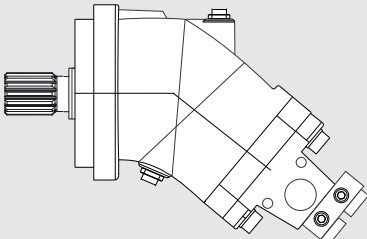
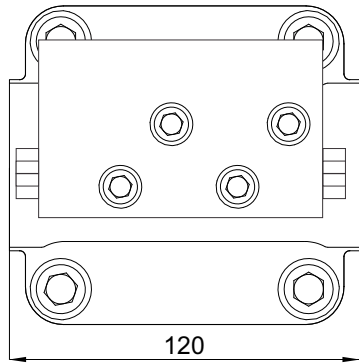
D3

Side threaded ports

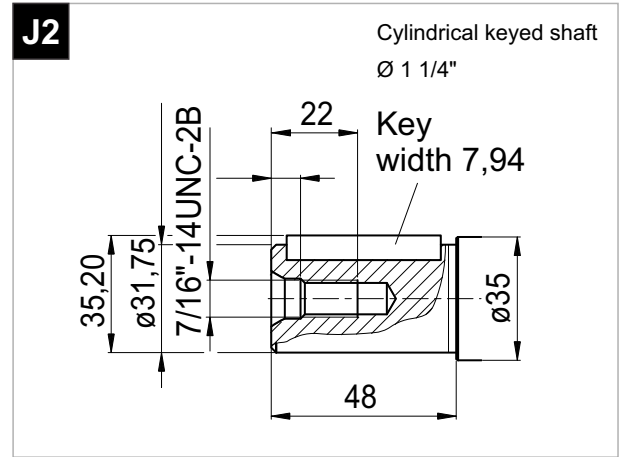
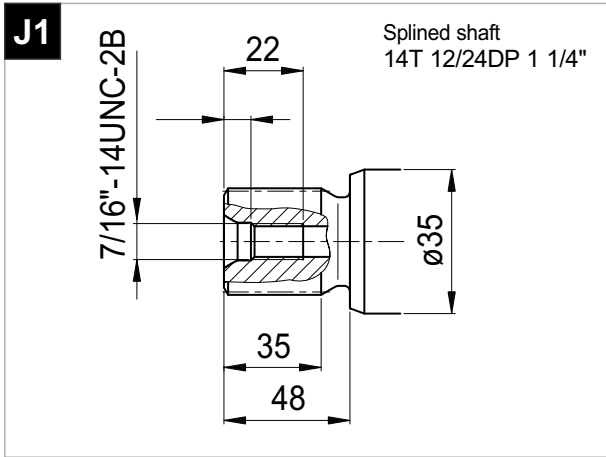


D4

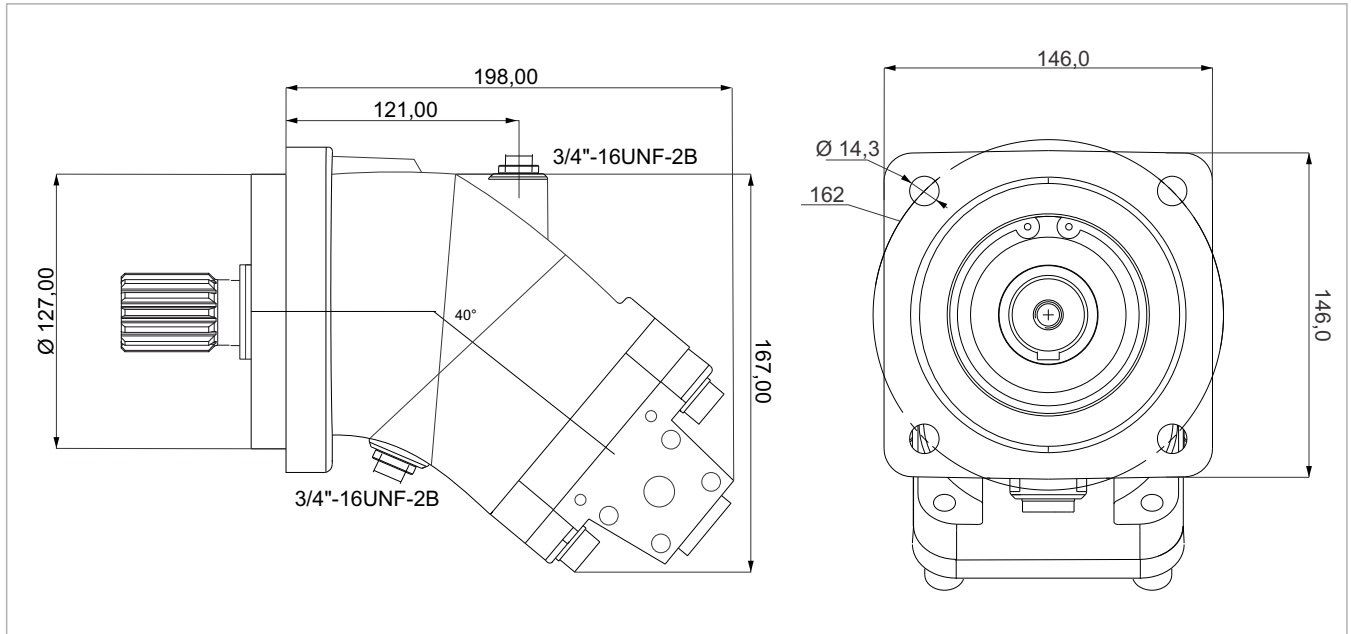
Side threaded ports



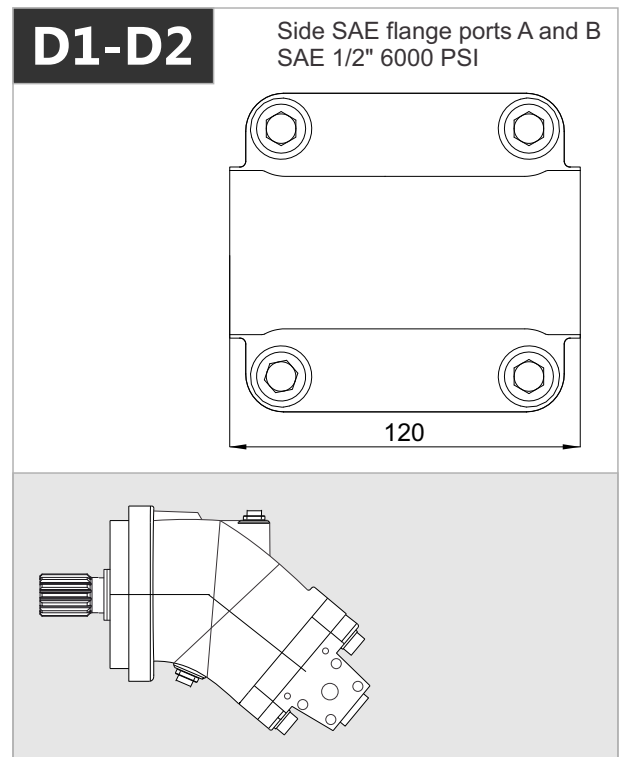
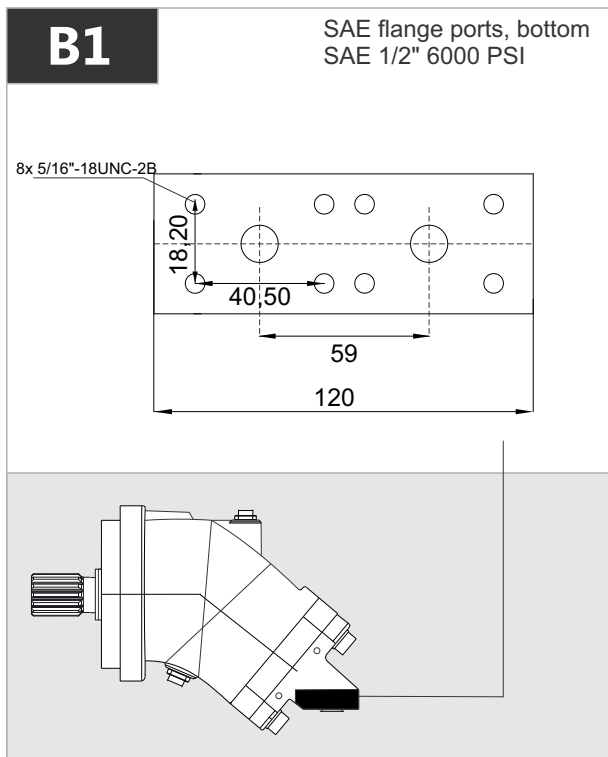
MA 25



MA 32

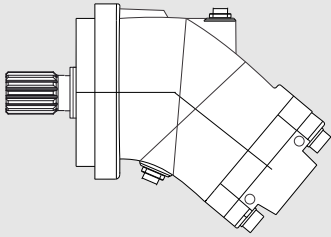
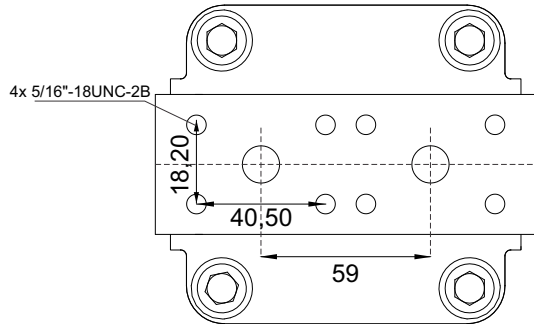


x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
32,00 cc	48,00 cc	6250 rpm	6800 rpm	400 bar	450 bar	0.51 m.N/bar	174 m.N	200	11,50 kg	11,90 kg	-25°	110°



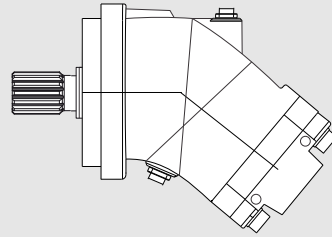
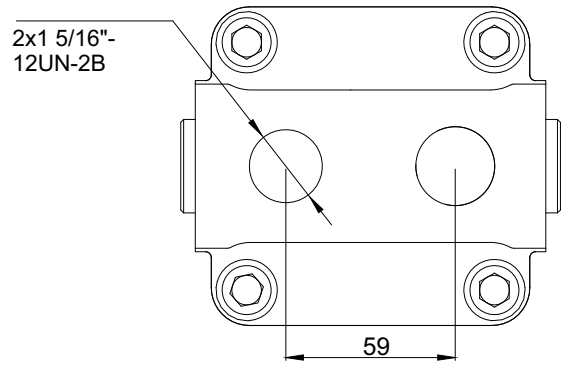
R1

Rear SAE flange ports A and B
SAE 1/2" 6000 PSI



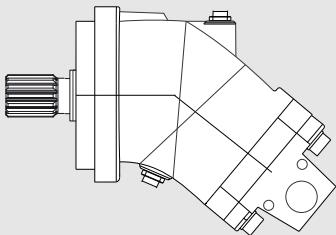
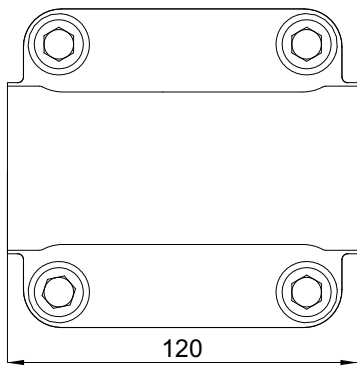
R2

Rear threaded ports



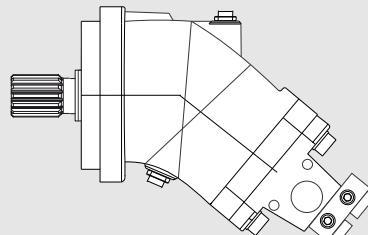
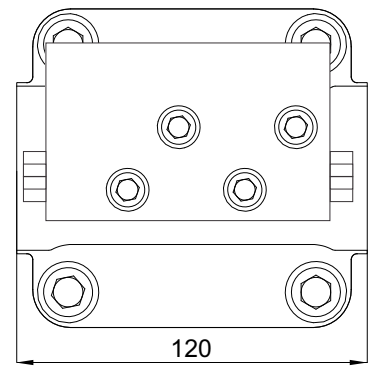
D3

Side threaded ports A and B

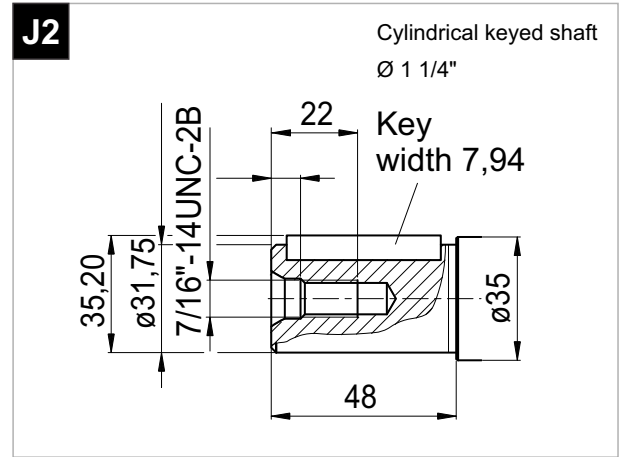
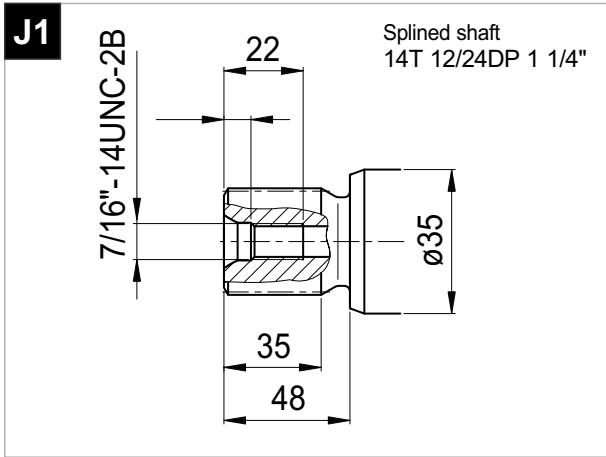


D4

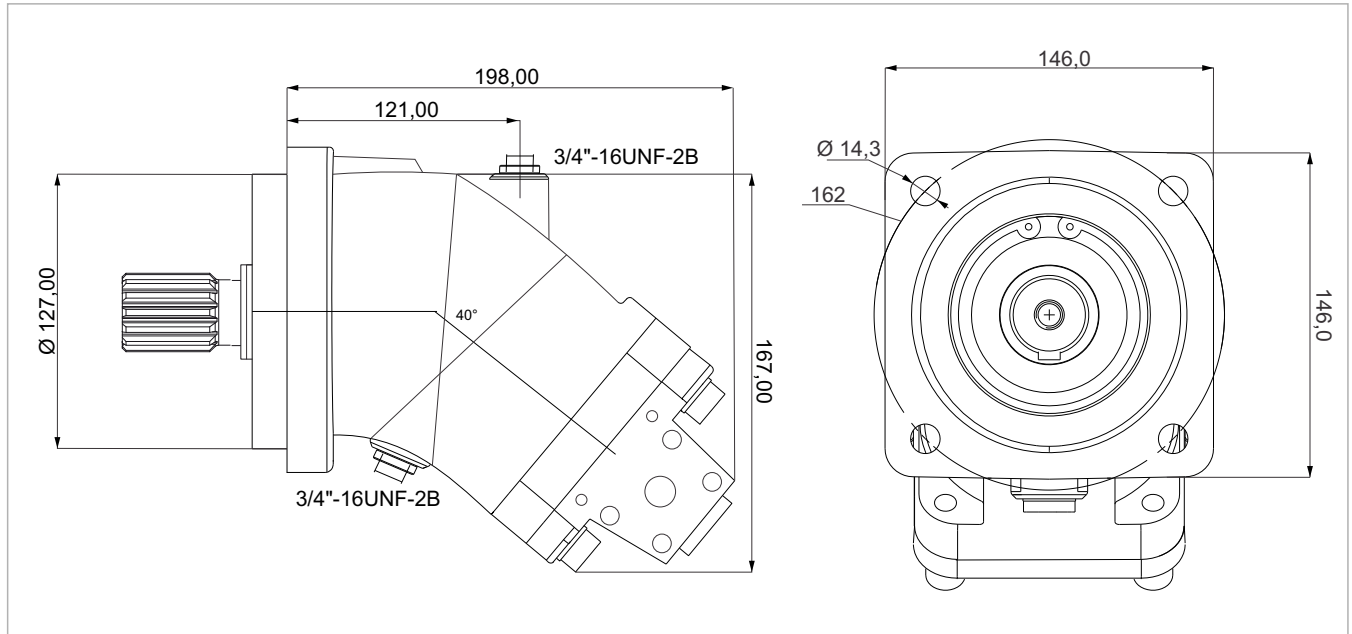
Side threaded ports A and B



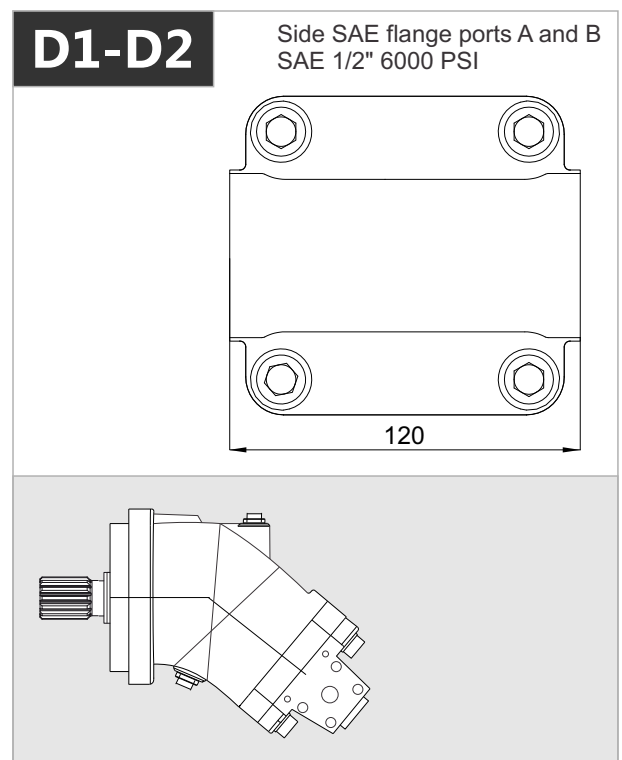
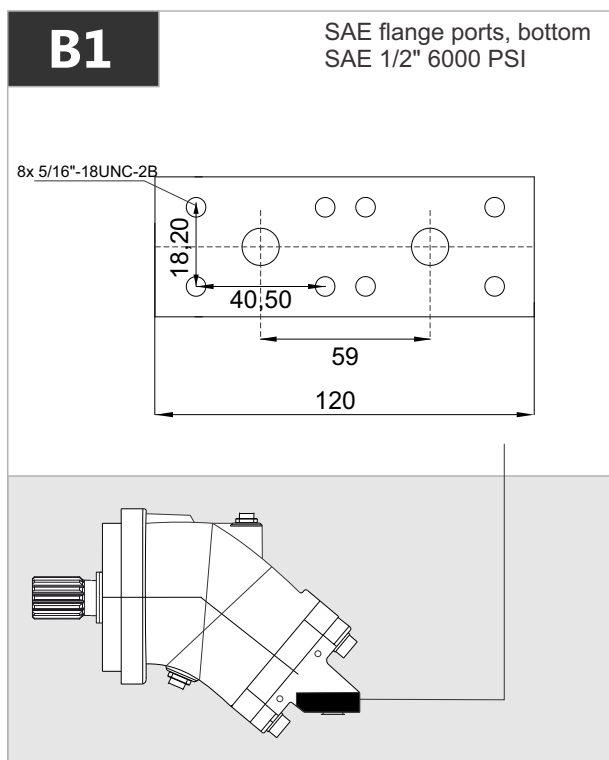
MA 32



MA 40



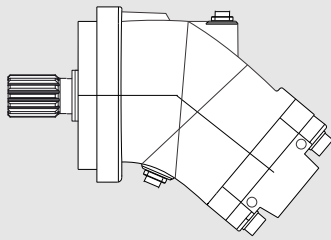
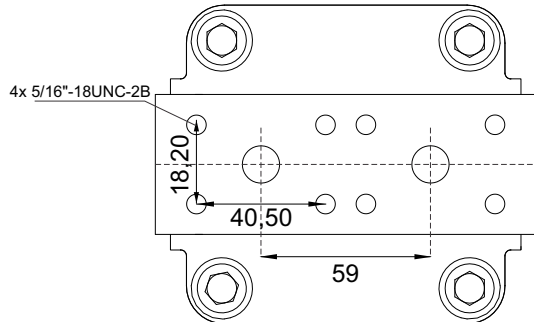
x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
40,20 cc	60,30 cc	5600 rpm	6300 rpm	400 bar	450 bar	0.68 m.N/bar	228 m.N	225	11,50 kg	11,90 kg	-25°	110°



MA 40

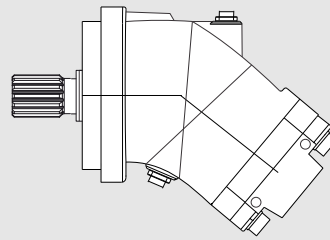
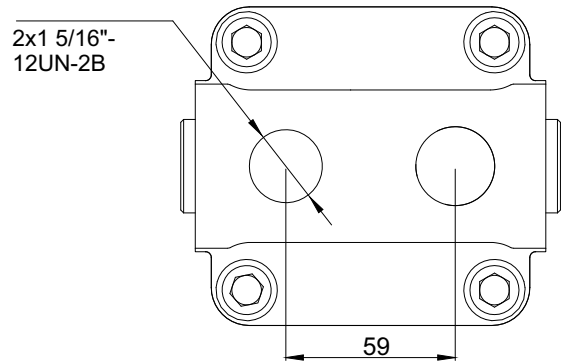
R1

Rear SAE flange ports A and B
SAE 1/2" 6000 PSI



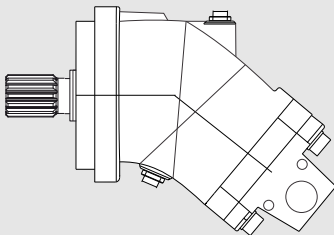
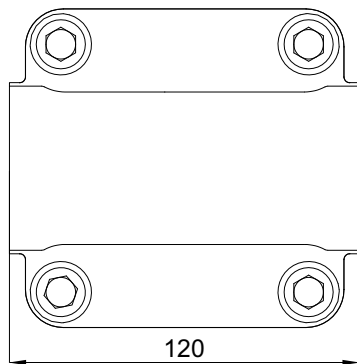
R2

Rear threaded ports



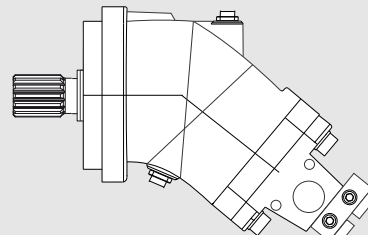
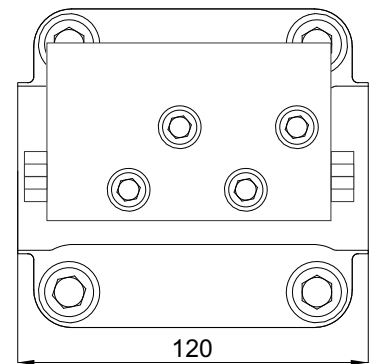
D3

Side threaded ports A and B

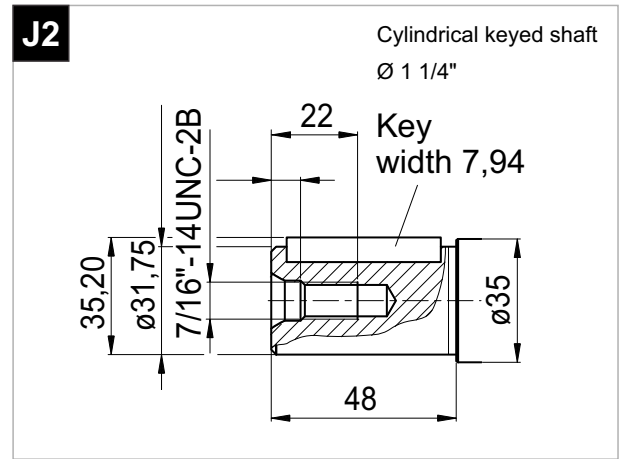
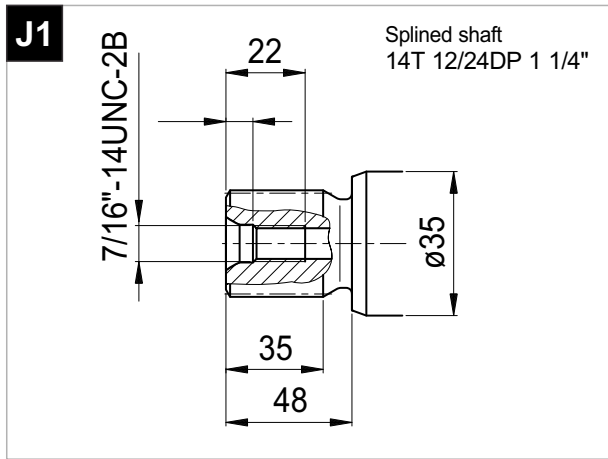


D4

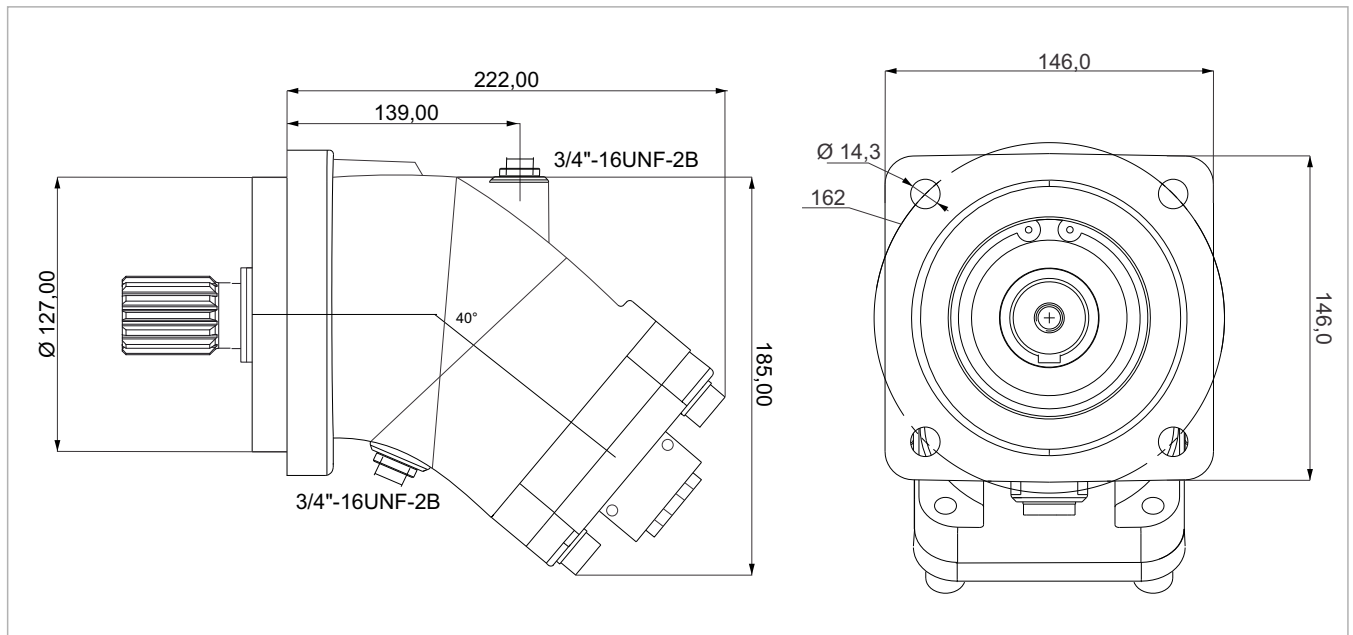
Side threaded ports A and B



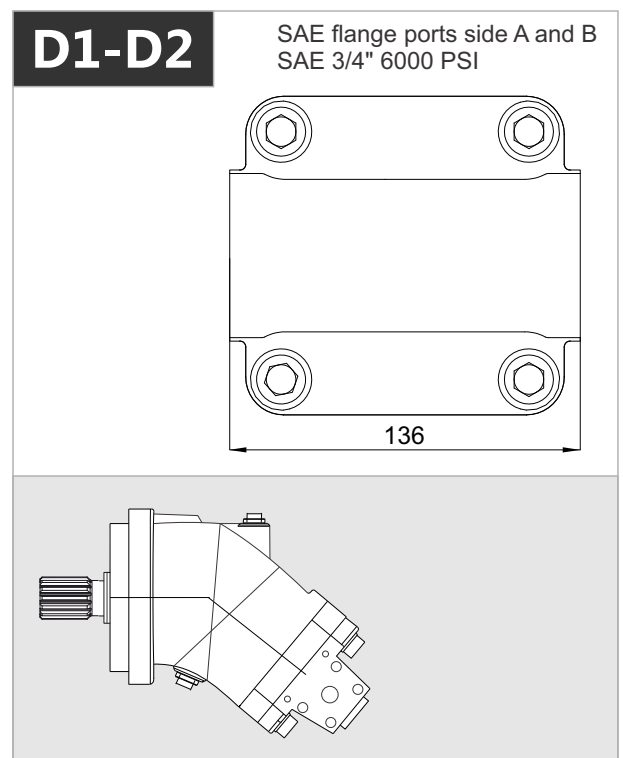
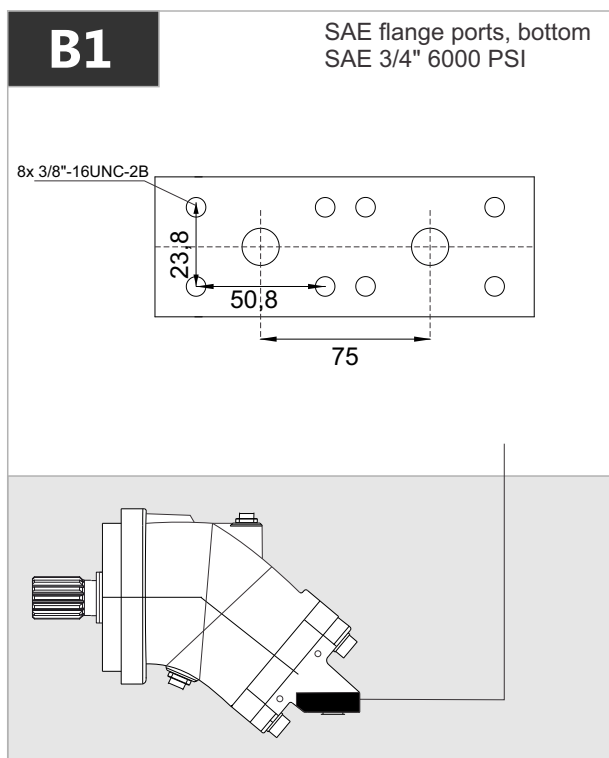
MA 40



MA 50



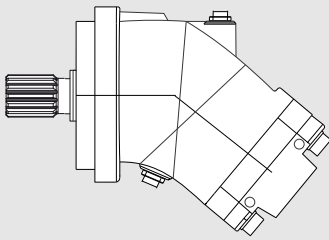
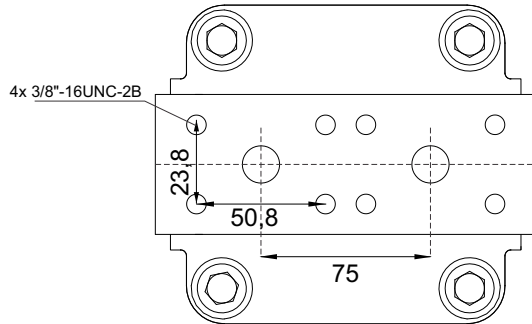
x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
50,00 cc	75,00 cc	5000 rpm	5500 rpm	400 bar	450 bar	0.80 m.N/bar	280 m.N	250	17,50 kg	18,00 kg	-25°	110°



MA 50

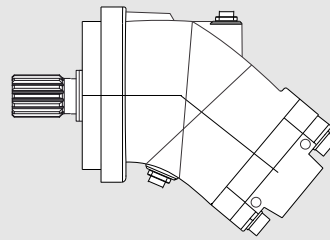
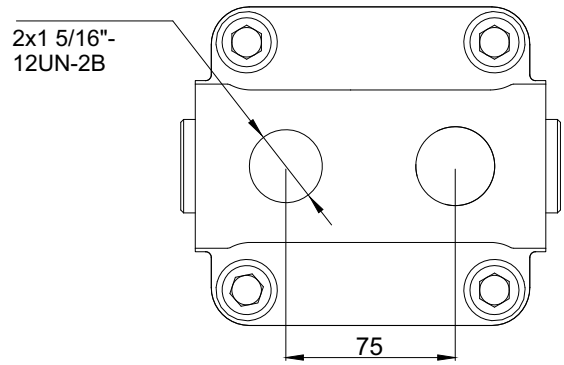
R1

SAE flange ports rear
SAE 3/4" 6000 PSI



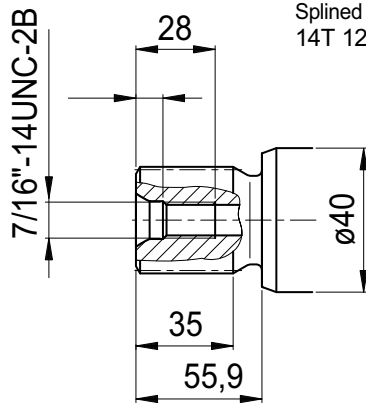
R2

Rear threaded ports



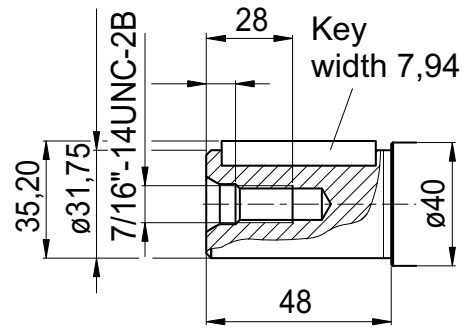
J1

Splined shaft
14T 12/24DP 1 1/4"

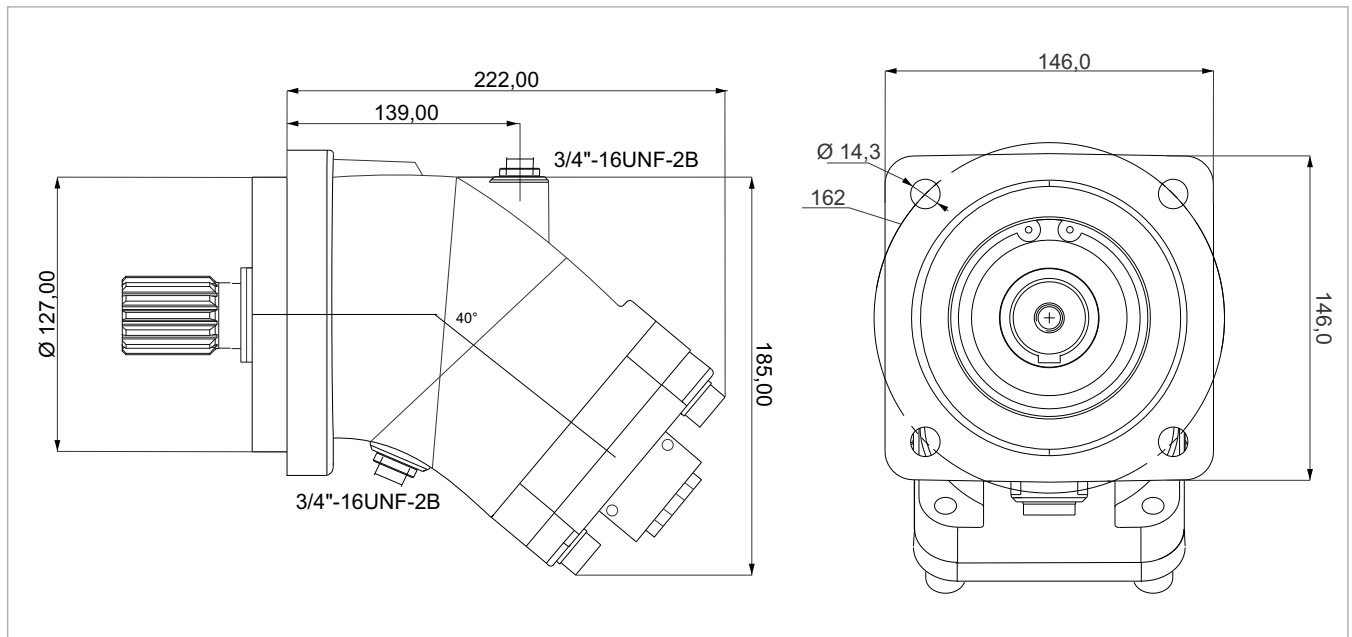


J2

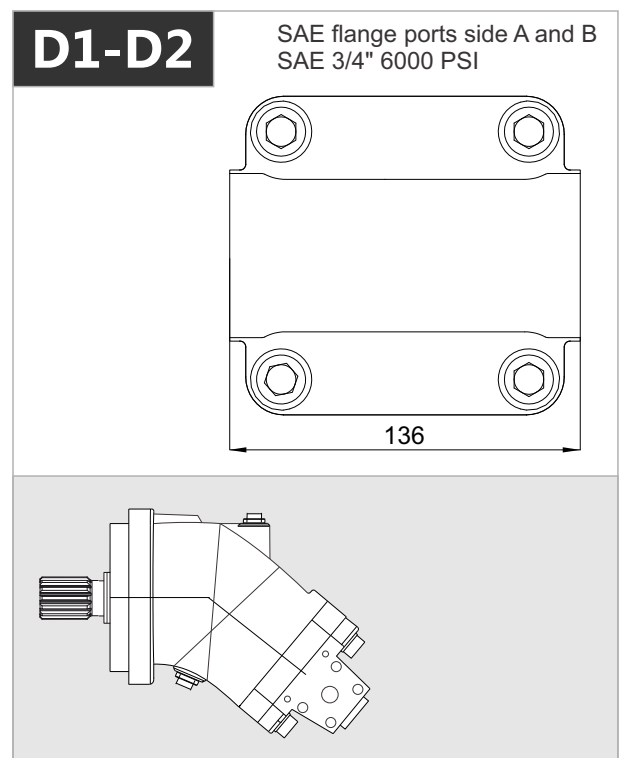
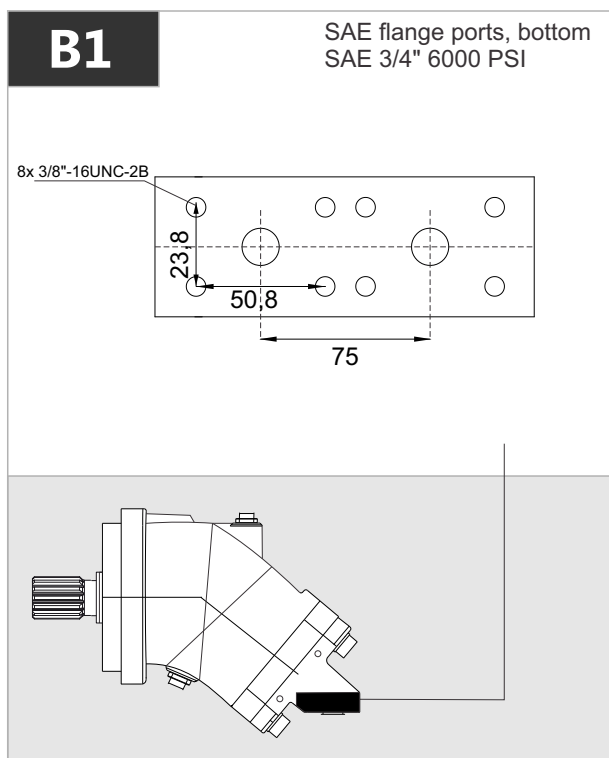
Cylindrical keyed shaft
Ø 1 1/4"



MA 56



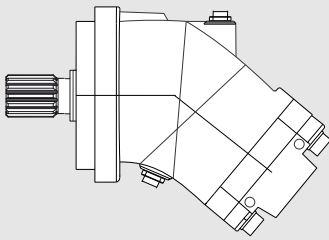
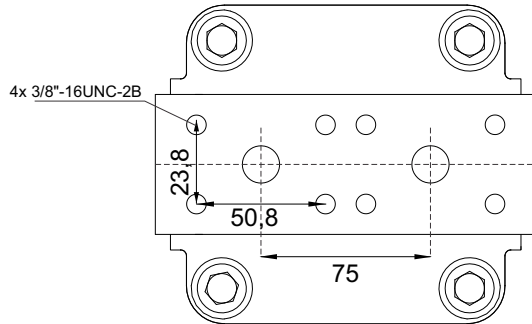
x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
56,40 cc	84,60 cc	5000 rpm	5500 rpm	400 bar	450 bar	0,92 m.N/bar	320 m.N	282	18,00 kg	18,50 kg	-25°	110°



MA 56

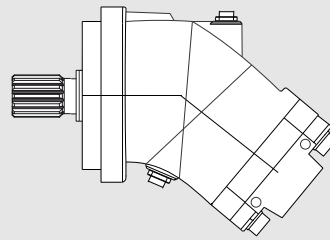
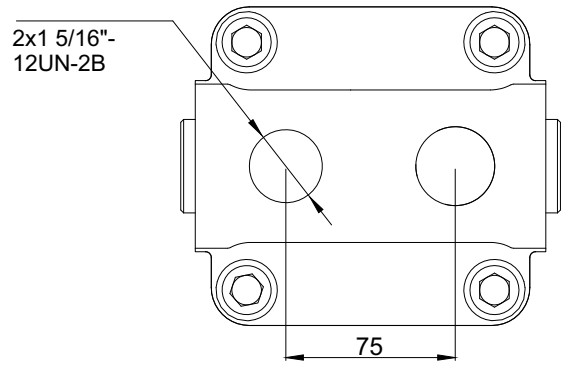
R1

SAE flange ports rear
SAE 3/4" 6000 PSI



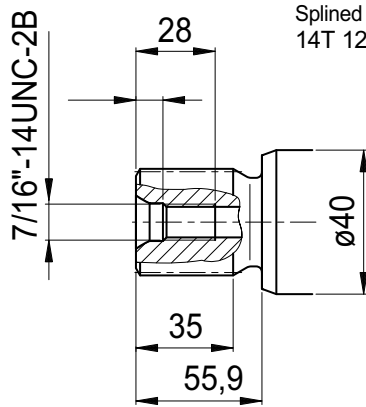
R2

Rear threaded ports



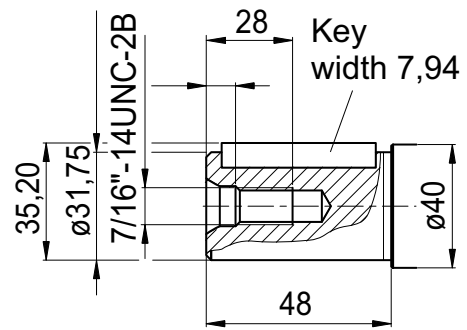
J1

Splined shaft
14T 12/24DP 1 1/4"

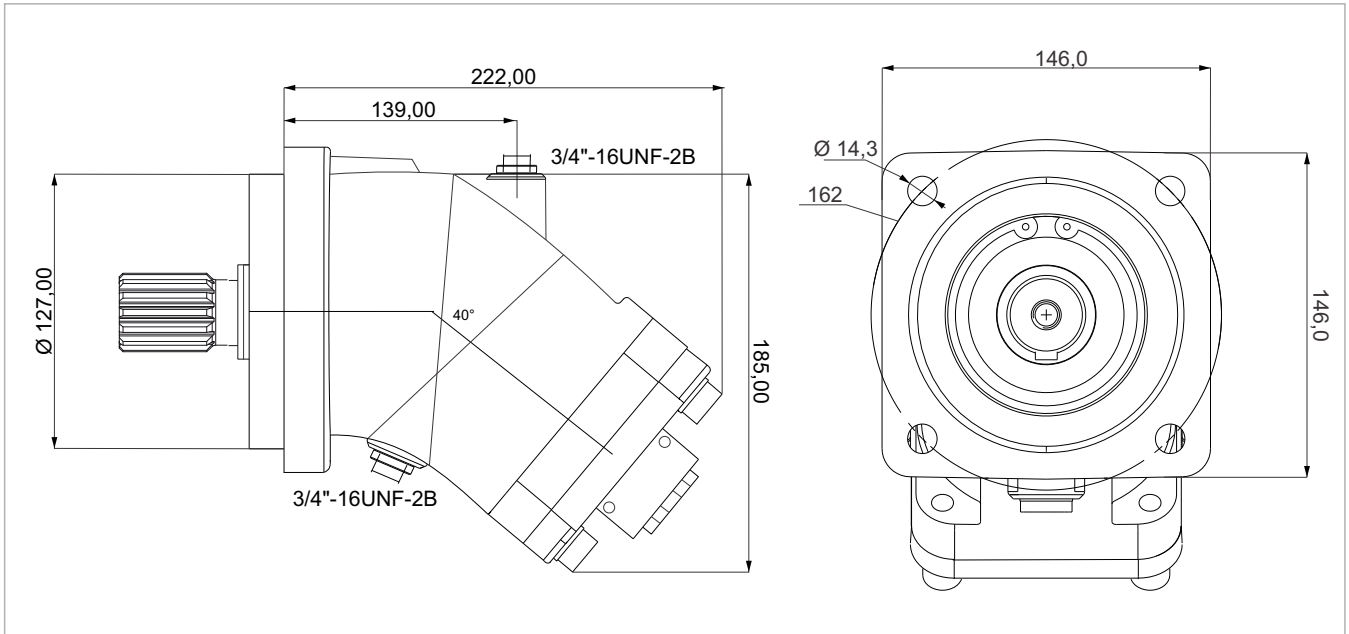


J2

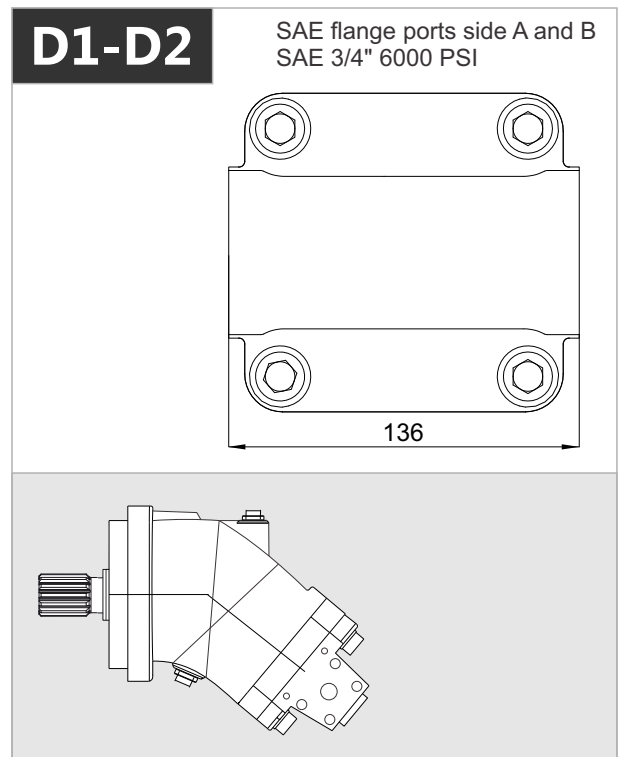
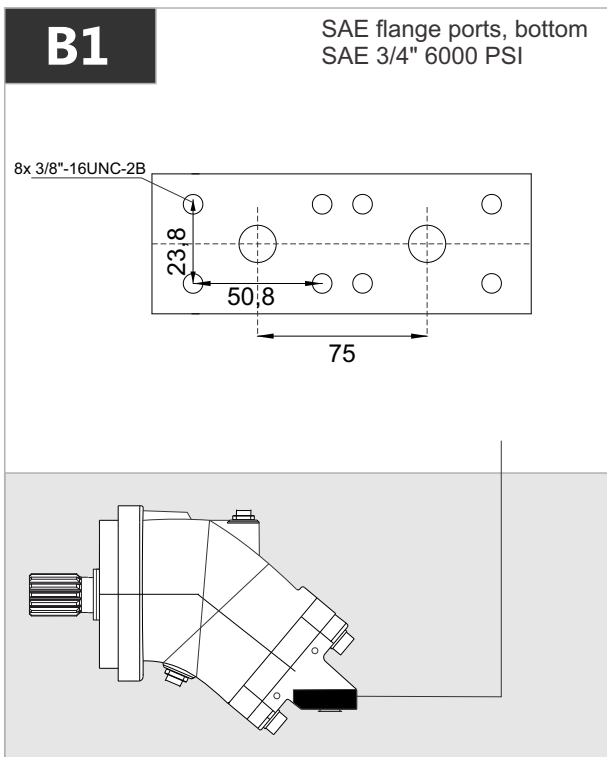
Cylindrical keyed shaft
Ø 1 1/4"



MA 63



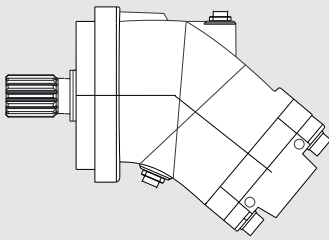
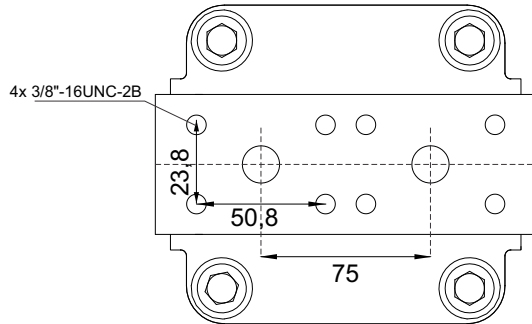
x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
63,00 cc	94,50 cc	5000 rpm	5500 rpm	400 bar	450 bar	1.00 m.N/bar	350 m.N	315	18,00 kg	18,50 kg	-25°	110°



MA 63

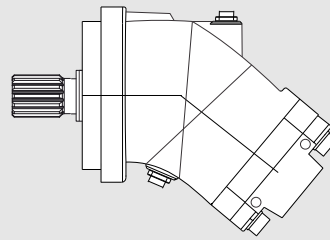
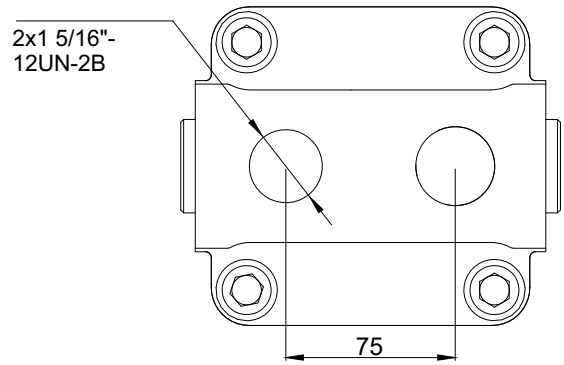
R1

SAE flange ports rear
SAE 3/4" 6000 PSI



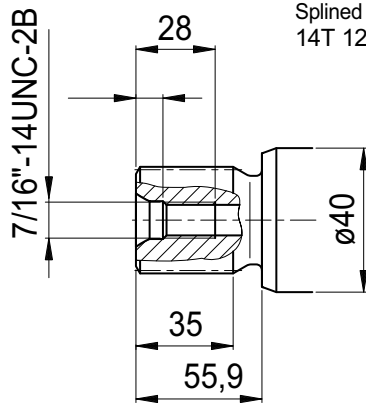
R2

Rear threaded ports



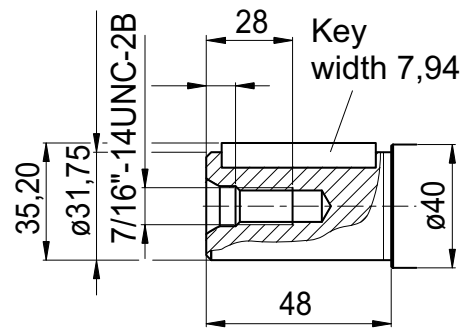
J1

Splined shaft
14T 12/24DP 1 1/4"

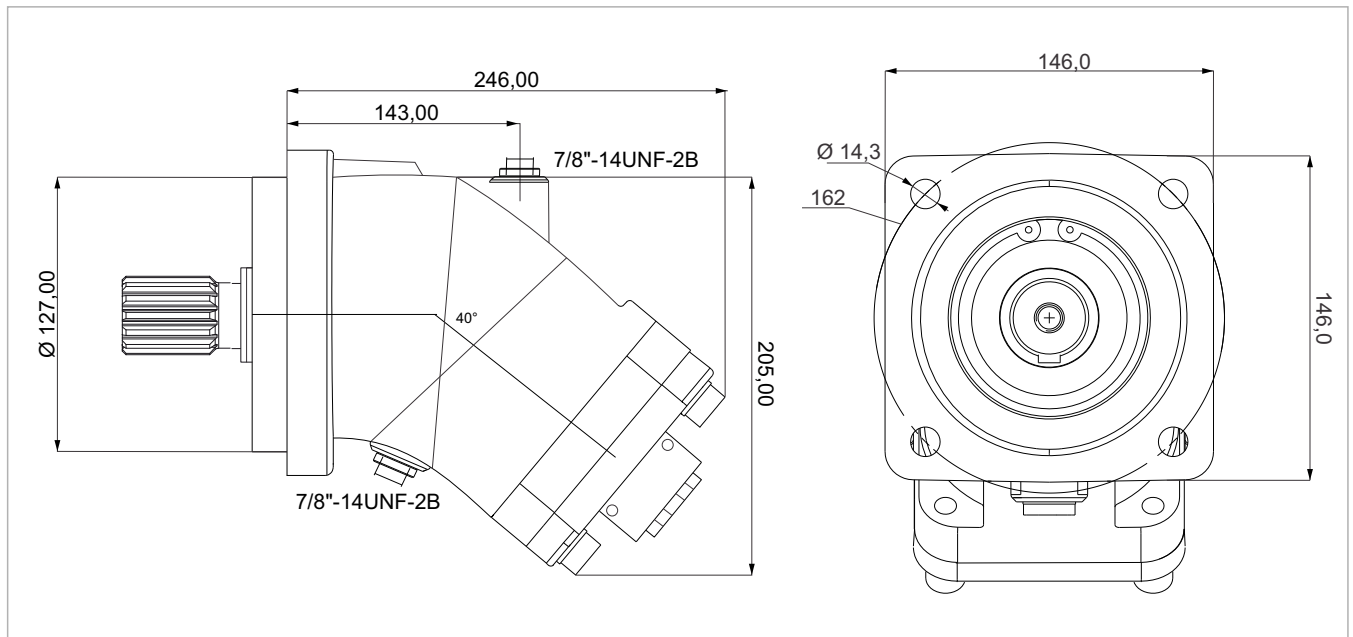


J2

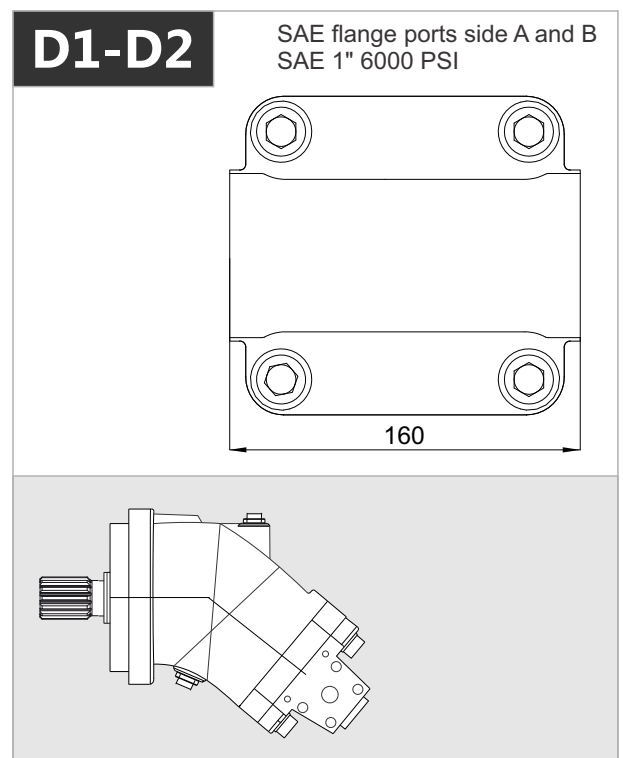
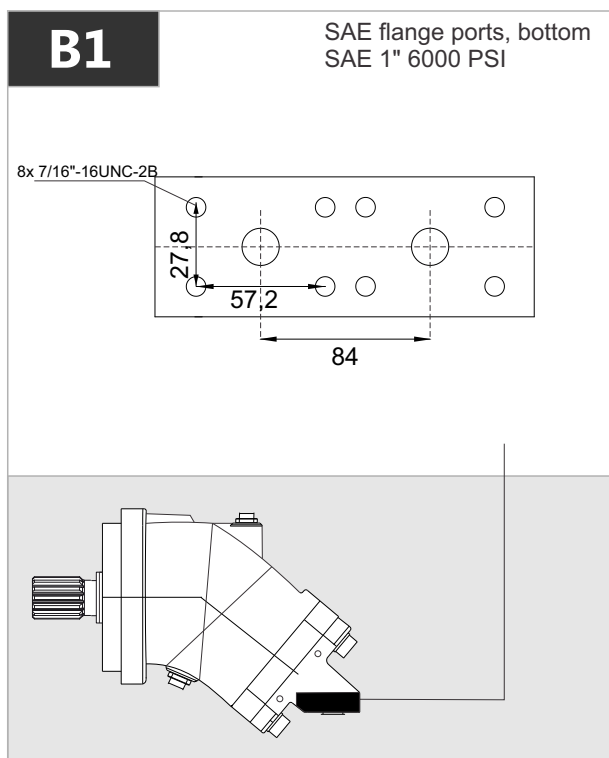
Cylindrical keyed shaft
Ø 1 1/4"



MA 80



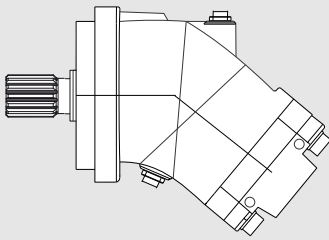
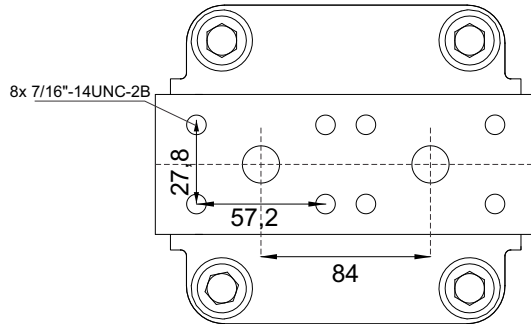
x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
80,00 cc	120,00 cc	4400 rpm	4900 rpm	400 bar	450 bar	1.28 m.N/bar	440 m.N	352	22,00 kg	22,50 kg	-25°	110°



MA 80

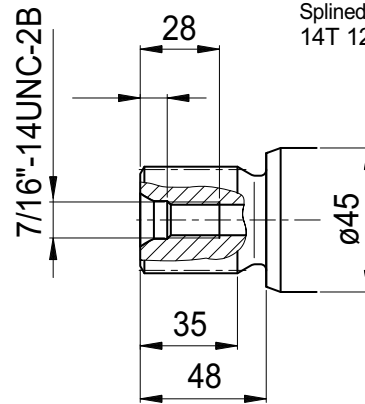
R1

SAE flange ports rear
SAE 1" 6000 PSI



J1

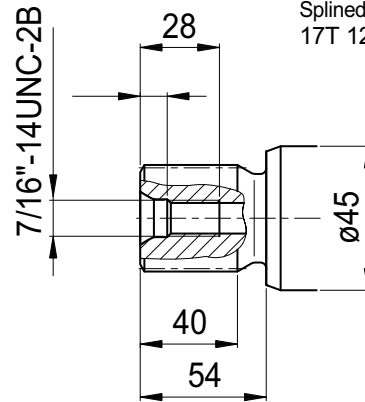
Splined shaft
14T 12/24DP 1 1/4"



!! Special

J1

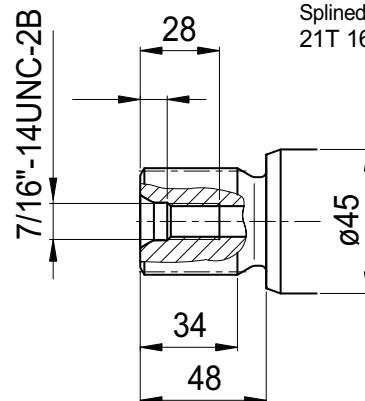
Splined shaft
17T 12/24DP 1 1/2"



!! Special

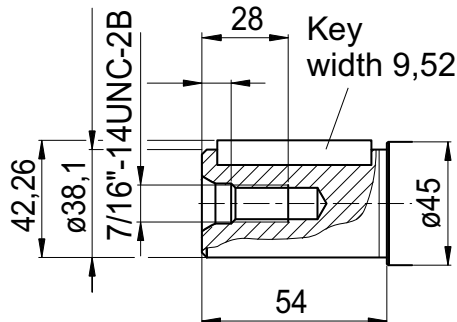
J1

Splined shaft
21T 16/32DP 1 3/8"

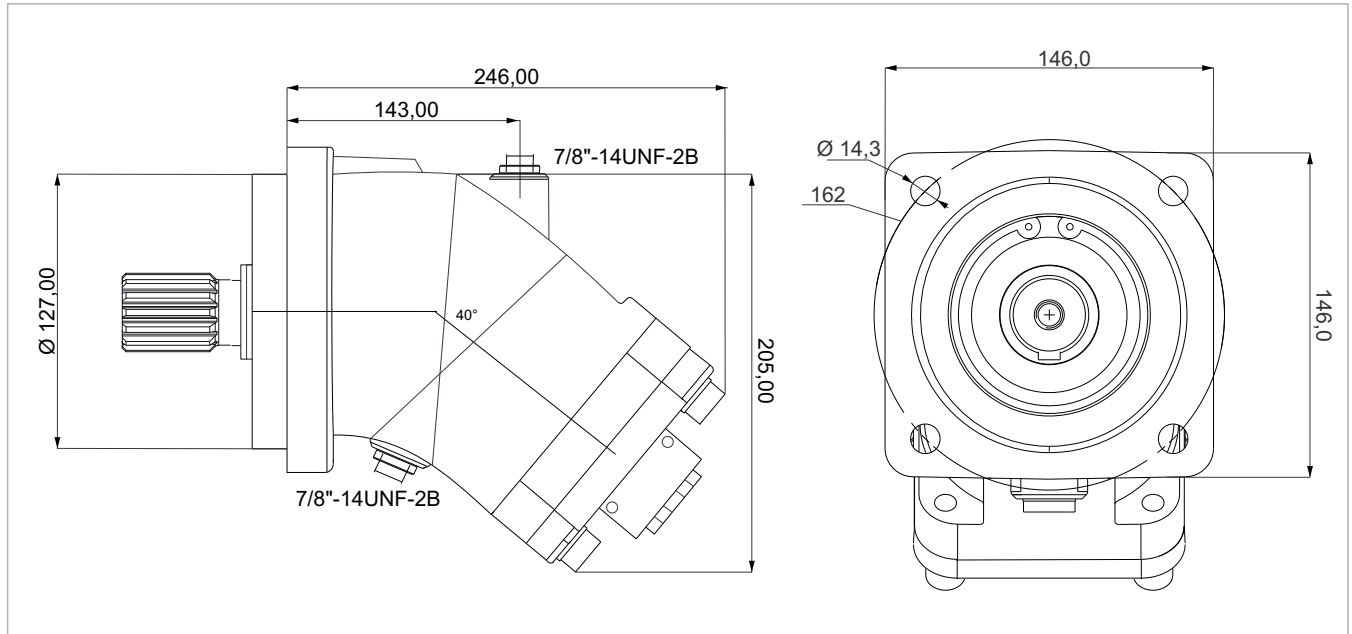


J2

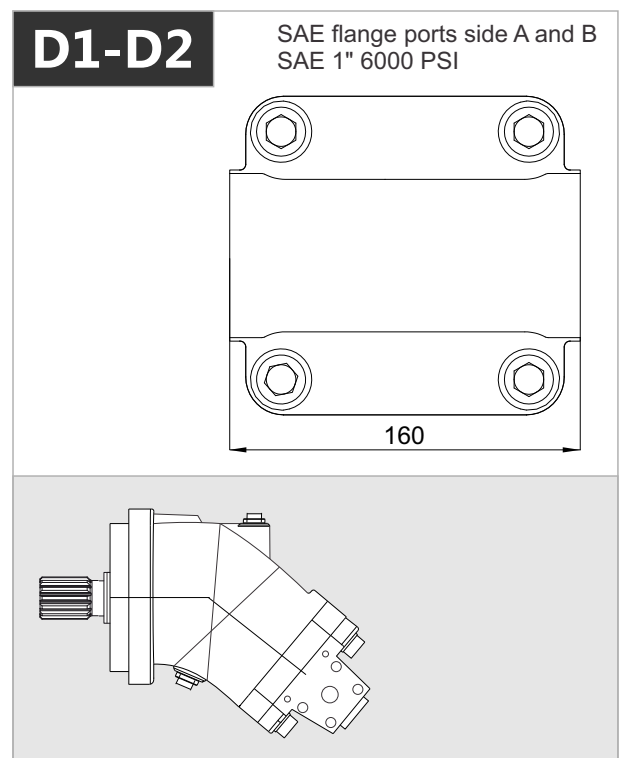
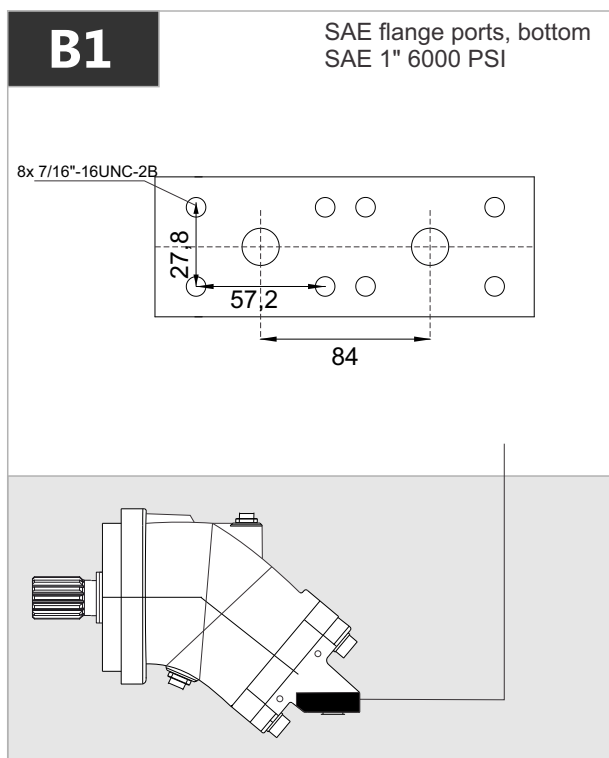
Cylindrical keyed shaft
Ø 1 1/2"



MA 108



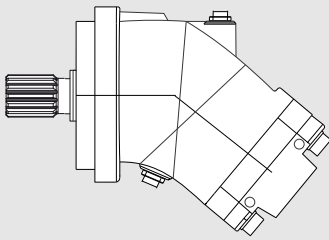
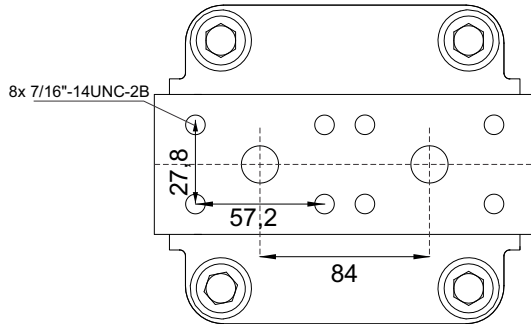
x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
108,4 cc	162,6 cc	4000 rpm	4400 rpm	400 bar	450 bar	1.69 m.N/bar	600 m.N	433	22,50 kg	23,00 kg	-25°	110°



MA 108

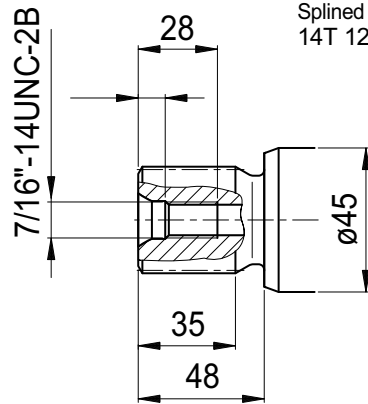
R1

SAE flange ports rear
SAE 1" 6000 PSI



J1

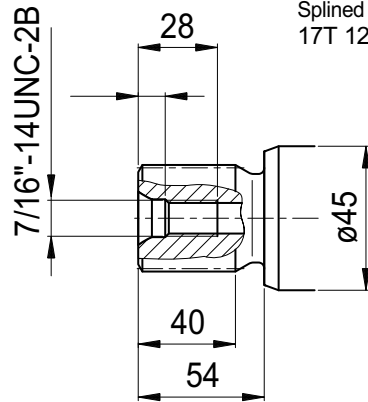
Splined shaft
14T 12/24DP 1 1/4"



!! Special

J1

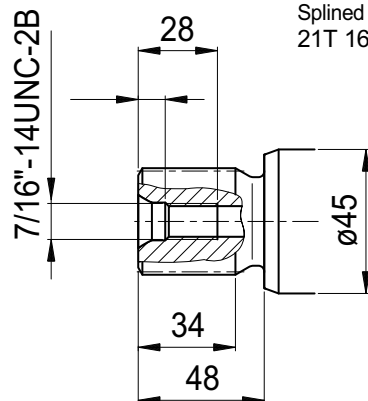
Splined shaft
17T 12/24DP 1 1/2"



!! Special

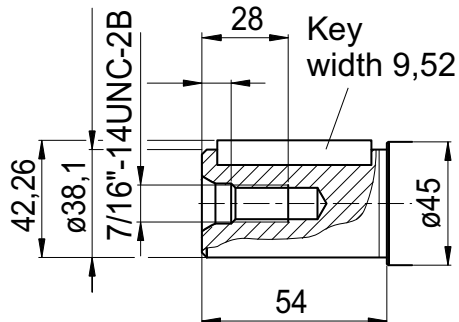
J1

Splined shaft
21T 16/32DP 1 3/8"



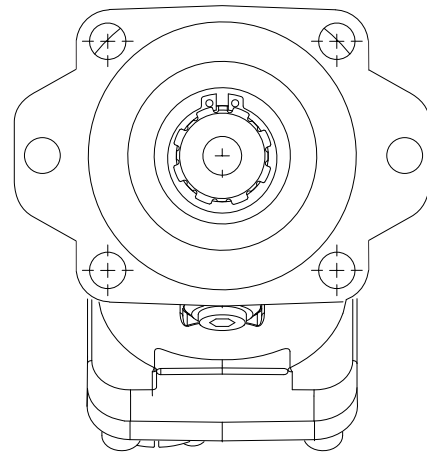
J2

Cylindrical keyed shaft
ø 1 1/2"

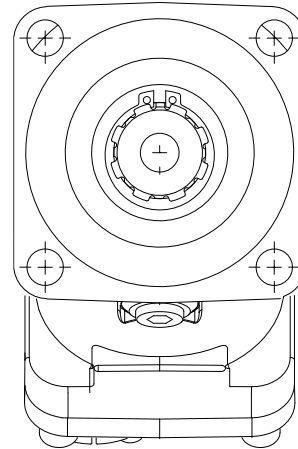


Special Mounting Flanges

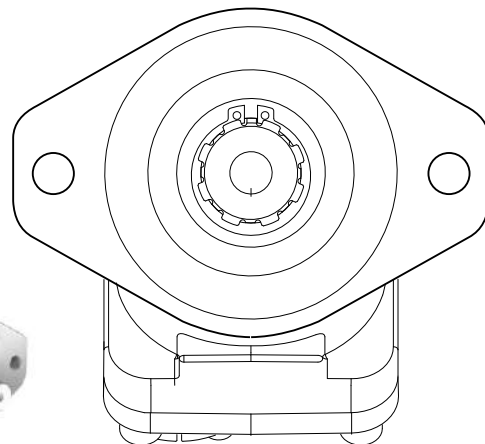
6 BOLT
Mounting Flange



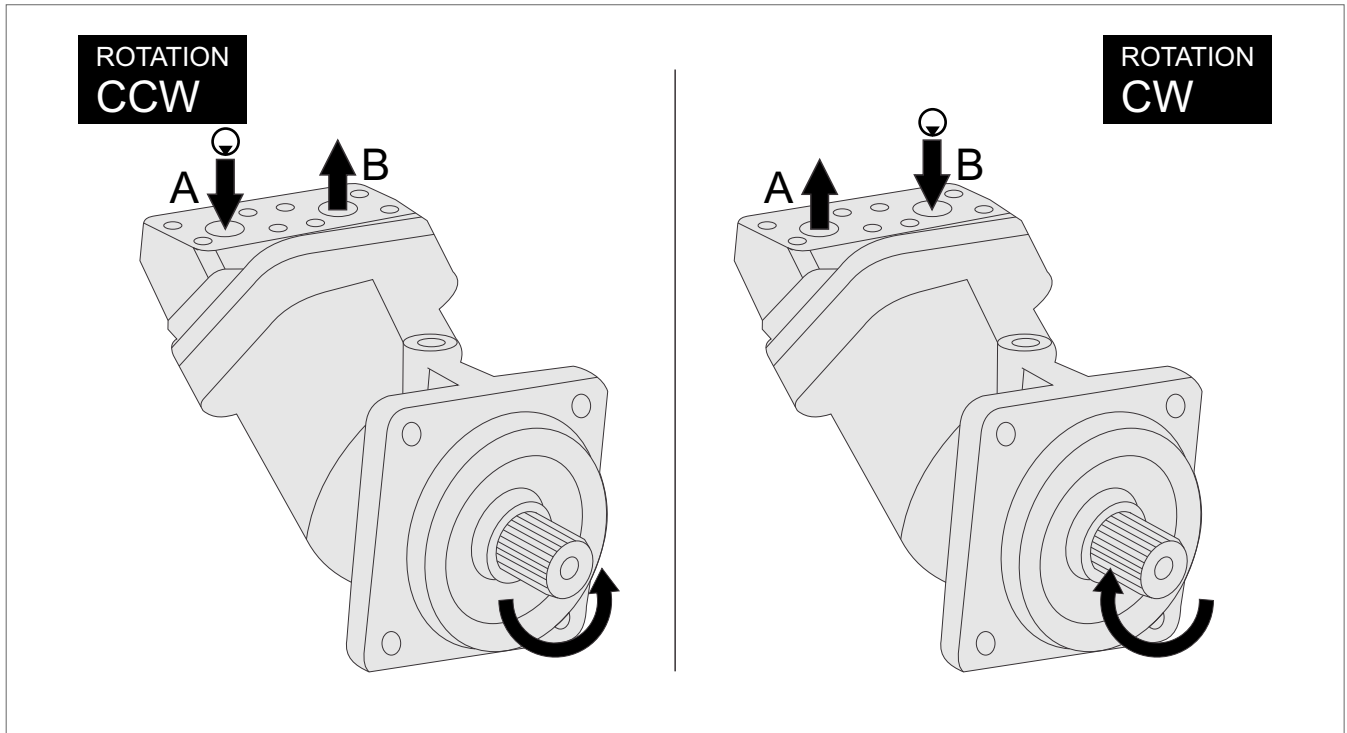
SAE B 4 BOLT



SAE B 2 BOLT



Direction of Rotation



Quick Calculation

Flow rate

$$Q = \frac{V_s \cdot n}{1000 \eta_v} \text{ (lpm)}$$

Torque

$$M = \frac{V_s \cdot \Delta p \cdot \eta_{mh}}{63} \text{ (Nm)}$$

Power

$$P = \frac{2\pi \cdot M \cdot n}{60000} = \frac{M \cdot n}{9549} = \frac{Q \cdot \Delta p \cdot \eta_t}{600} \text{ (kw)}$$

Speed

$$n = \frac{1000 \cdot Q \cdot \eta_v}{V_s} \text{ (rpm)}$$

V_s = Displacement (ccm/rev.)

Δp = Diff. pressure (bar)

n = Speed (rpm)

Q = Flow (lpm)

η_v = Volumetric efficiency

η_{mh} = Mechanical-hydraulic efficiency

η_t = Total efficiency ($\eta_t = \eta_v \times \eta_{mh}$)

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 MA Bent Axis Motors.

Installation

POSITION

MA Motors can be operate any position.

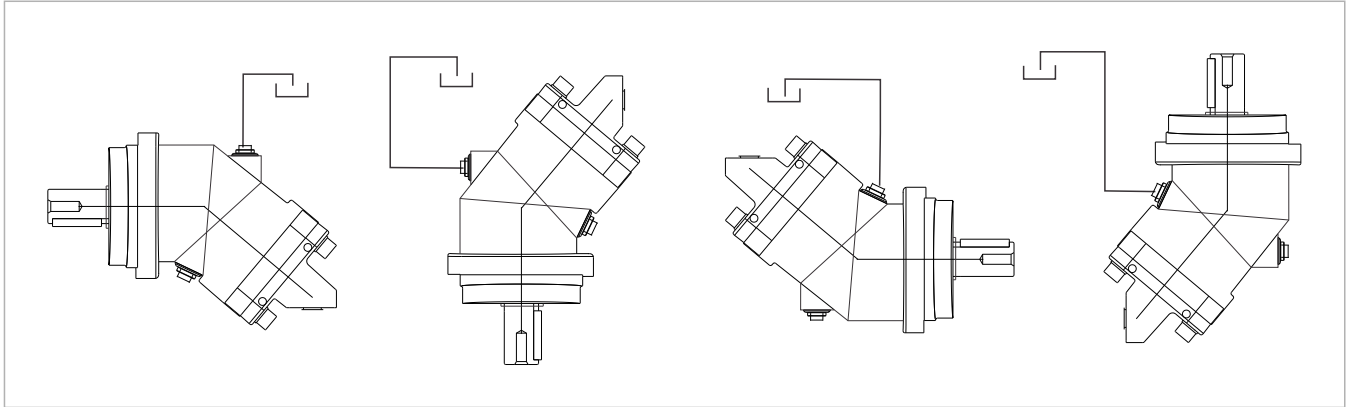
DIRECTION OF ROTATION

MA Motors can be operate in both directions of rotation.

Before of Installation operation, the motor must be filled with hydraulic fluid and air bled.

INSTALLATION POSITION

See following examples.

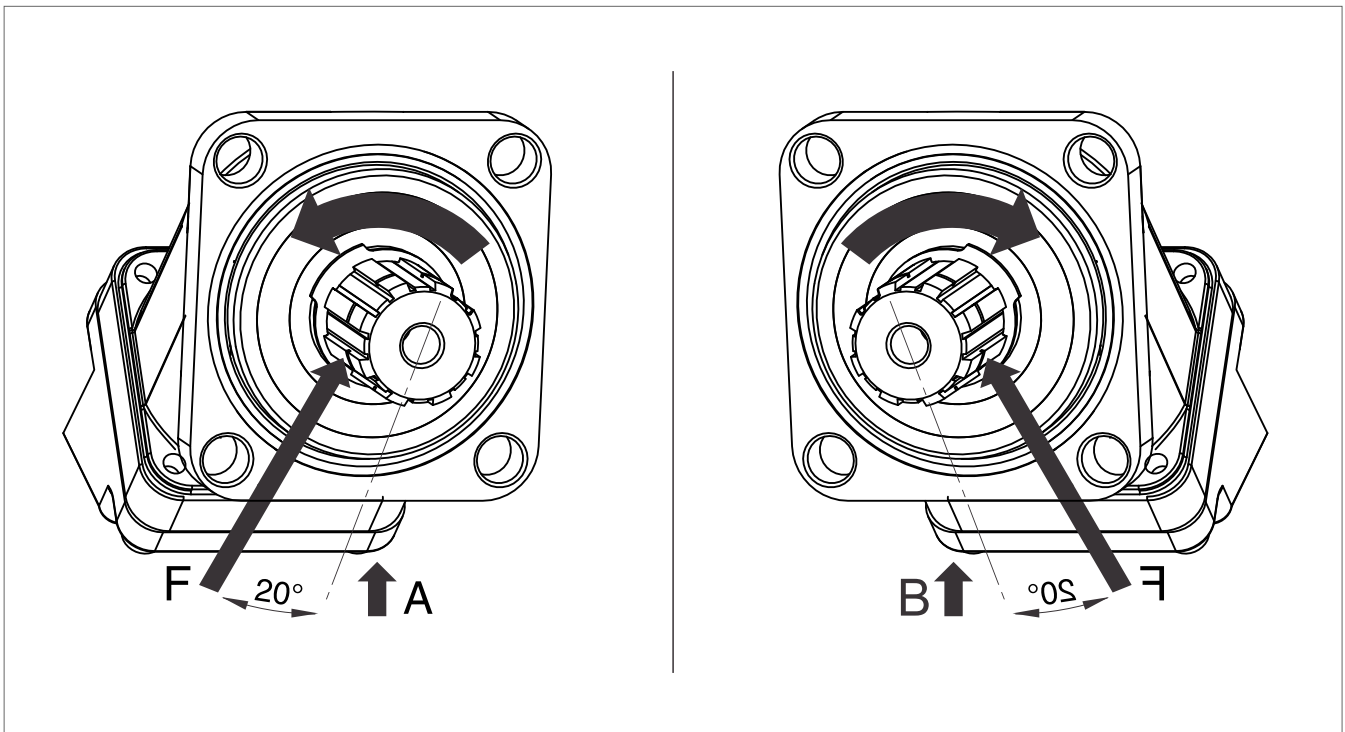


HYDRAULIC FLUID

Recommended ;

Generally : between 15 and 200 cSt.

Maximum : between 5 and 1600 cSt.



FOR USE;

Available via e-mail on request or each motor is supplied via Starting datasheet.

For detailed information about MA Bent Axis Motors, please contact with Technical Department !!!

SAFA

HYDRAULICS



PD-DIN
Bent Axis Pumps



MD-DIN
Bent Axis Motor



PA-SAE
Bent Axis Pumps



MA-SAE
Bent Axis Motor



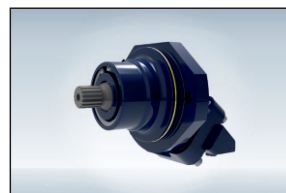
PS-ISO
Bent Axis Pumps



MS-ISO
Bent Axis Motor



PD Dual
Dual Flow Pumps



MF Fixed
Bent Axis Motor



PV
Variable Disp.
Piston Pumps

SAFA HYDRAULICS

ADDRESS:

Fevzi akmak Mahallesi 10465. Sk. Karatay | Konya / Turkey

TELEPHONE:

+90 332 342 10 21, +90 534 234 63 89, +90 539 592 71 71

FAX:

+90 332 342 45 71

E-MAIL:

info@safahydraulic.com

www.safahydraulic.com

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f t i l p

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www.safahydraulic.com

MS-ISO

Bent Axis Motor

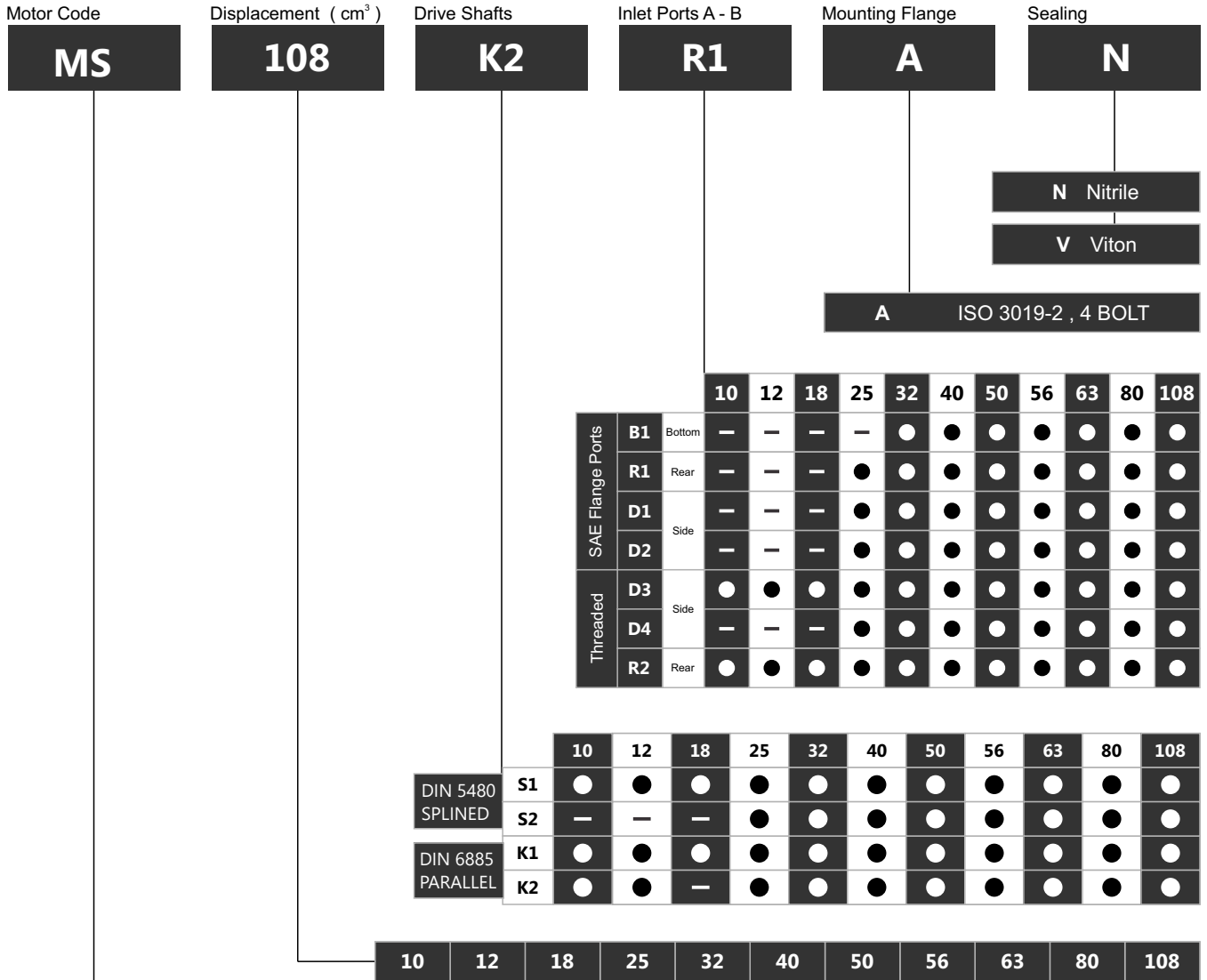


ISO Mounting Flange, Flange, 4 Bolt, 12cc to 130cc

ISO Mounting Flange, High Pressure Bent Axis Piston Motors. Reversible Direction of Rotation.
Displacement Range starting at; 12cc, 18cc, 25cc, 32cc, 40cc, 50cc, 63cc, 80cc, 108cc, 130cc
400/450 Bar, High Pressure, High Rotational Speed, Slim Design, High Efficiency.

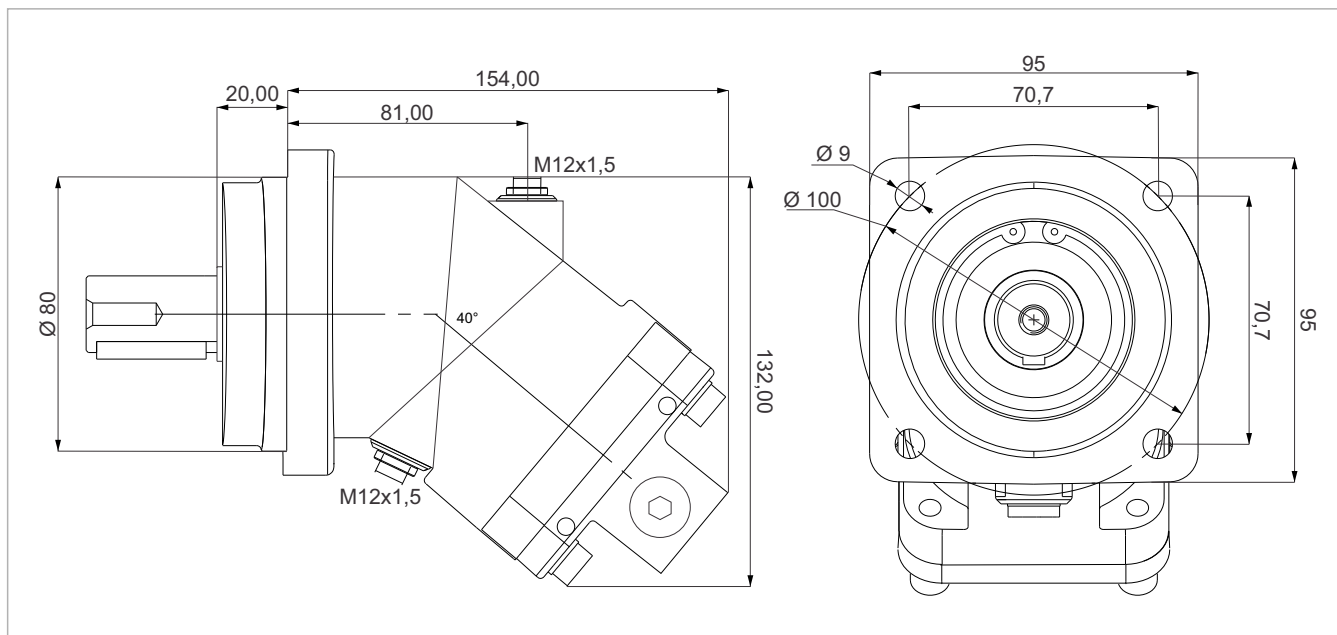


Ordering Code of MS Motors

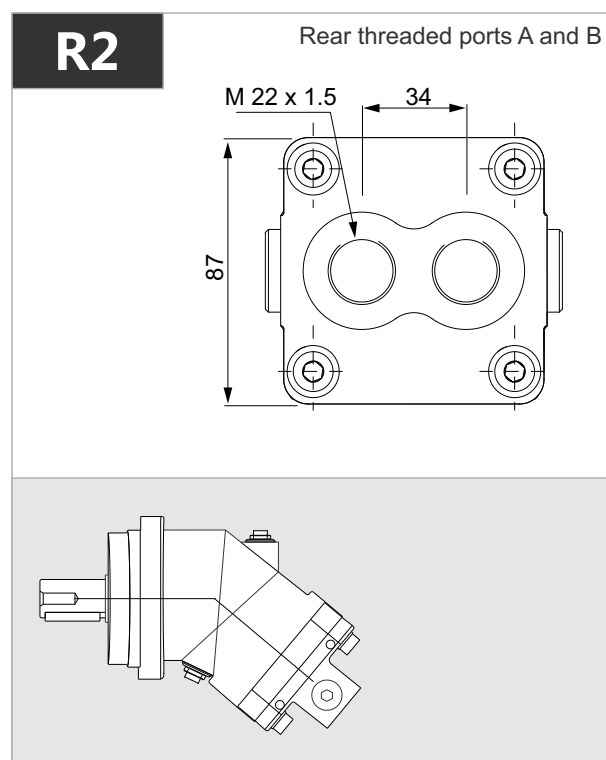
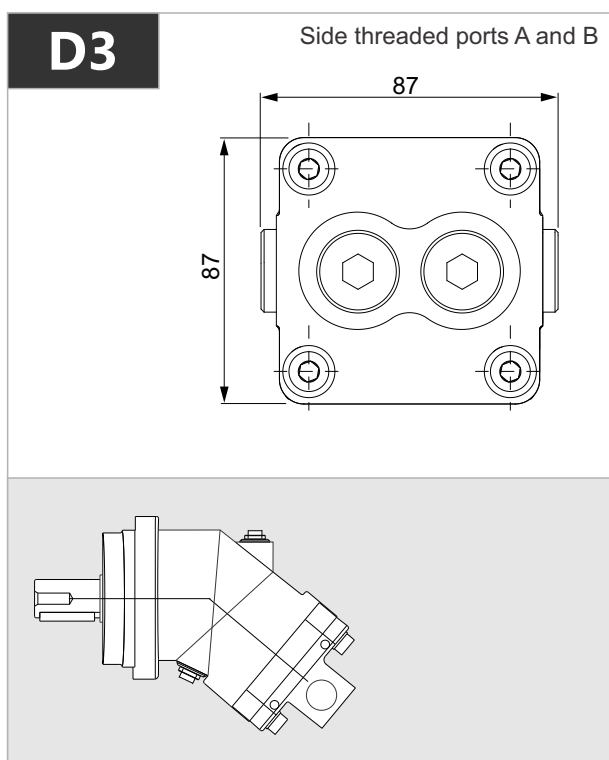


MS Bent Axis Piston Motor - ISO, Fixed Displacement.

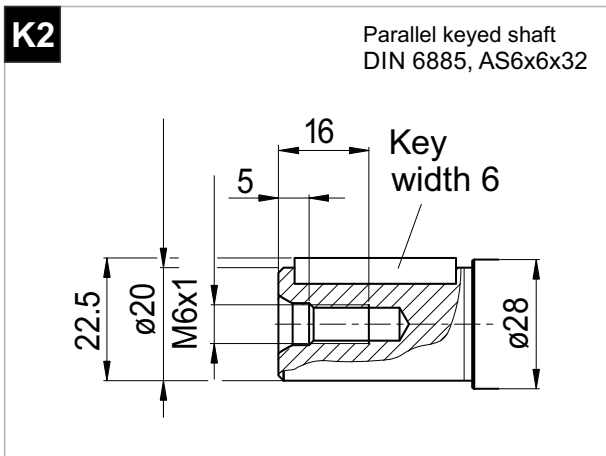
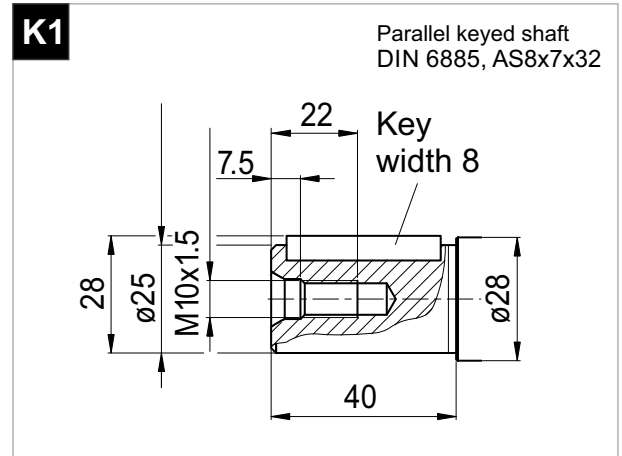
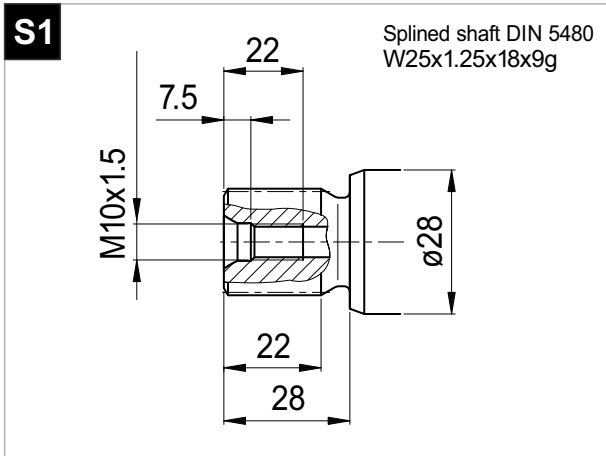
MS 10



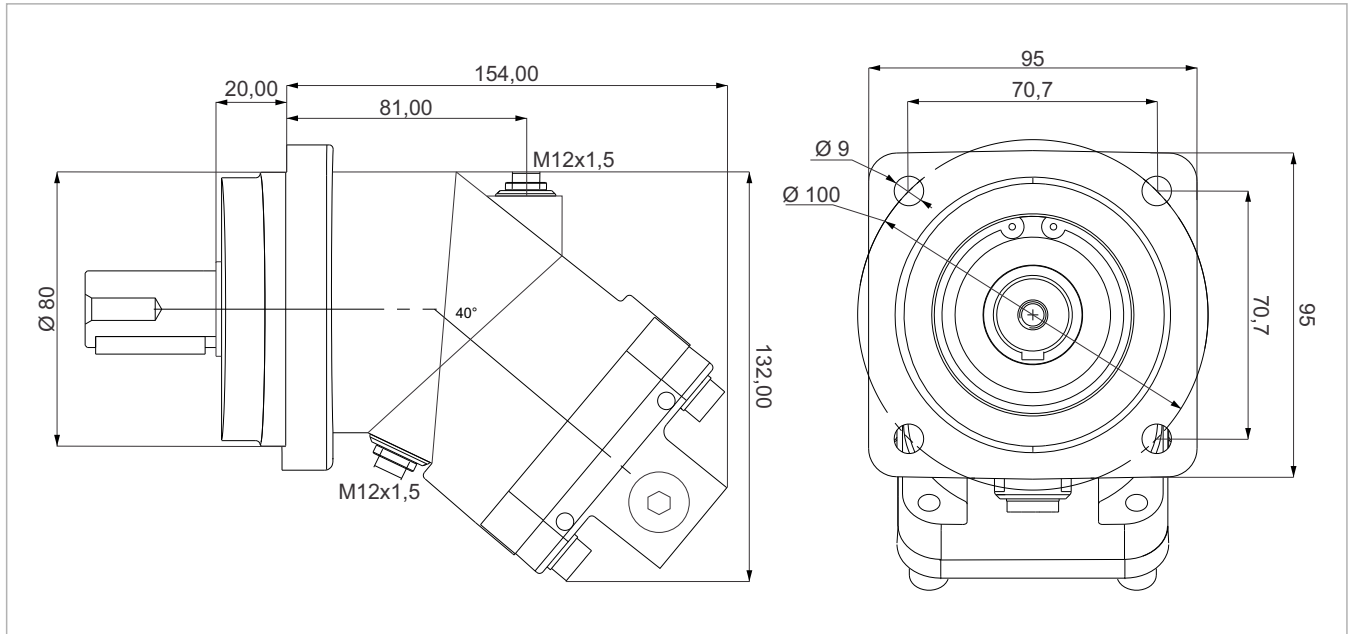
x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
10,00 cc	15,00 cc	8000 rpm	8800 rpm	400 bar	450 bar	0.17 m.N/bar	64 m.N	80	6,00 kg	6,20 kg	-25°	110°



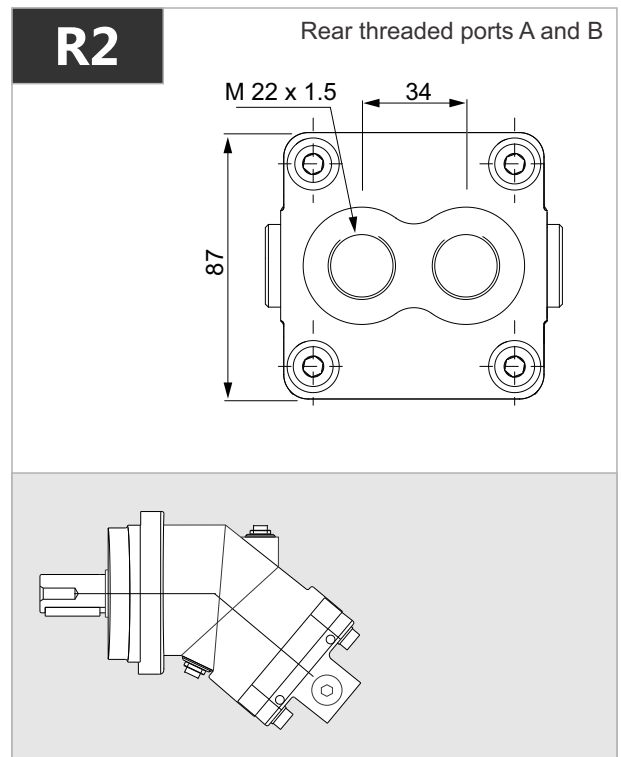
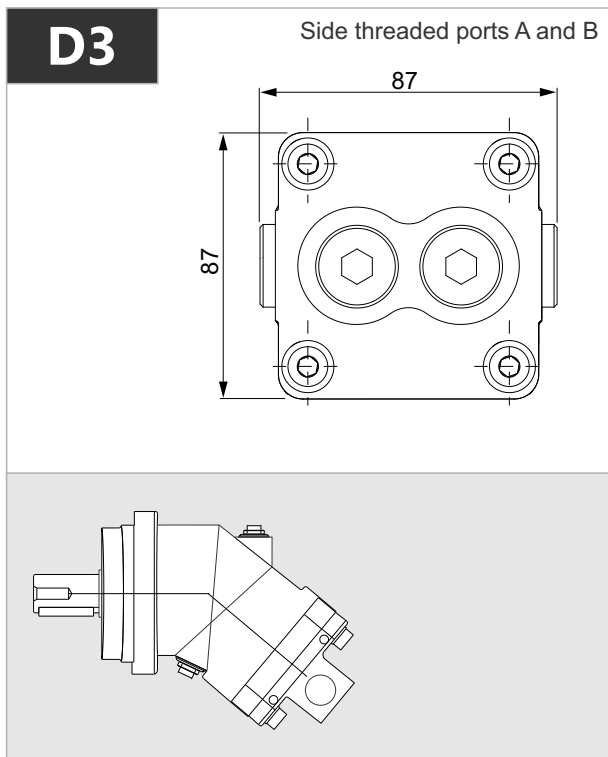
MS 10



MS 12



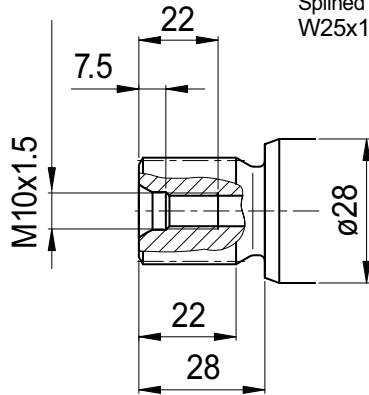
x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
12,00 cc	18,00 cc	8000 rpm	8800 rpm	400 bar	450 bar	0.18 m.N/bar	66 m.N	96	6,00 kg	6,20 kg	-25°	110°



MS 12

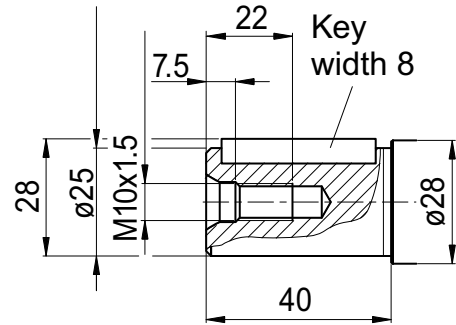
S1

Splined shaft DIN 5480
W25x1.25x18x9g



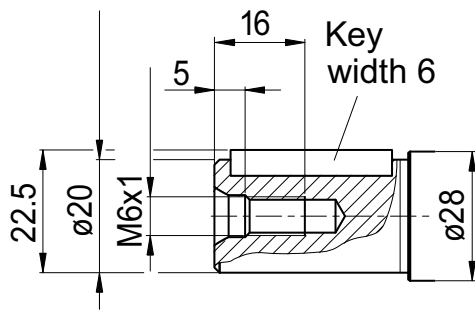
K1

Parallel keyed shaft
DIN 6885, AS8x7x32

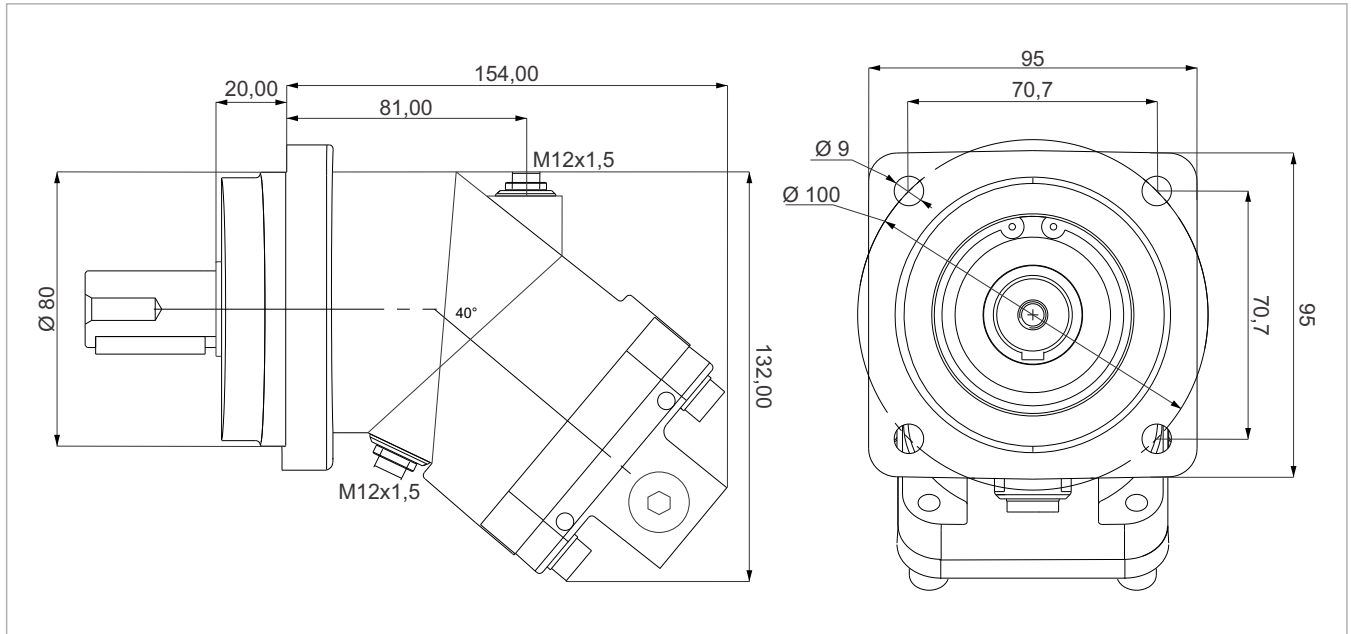


K2

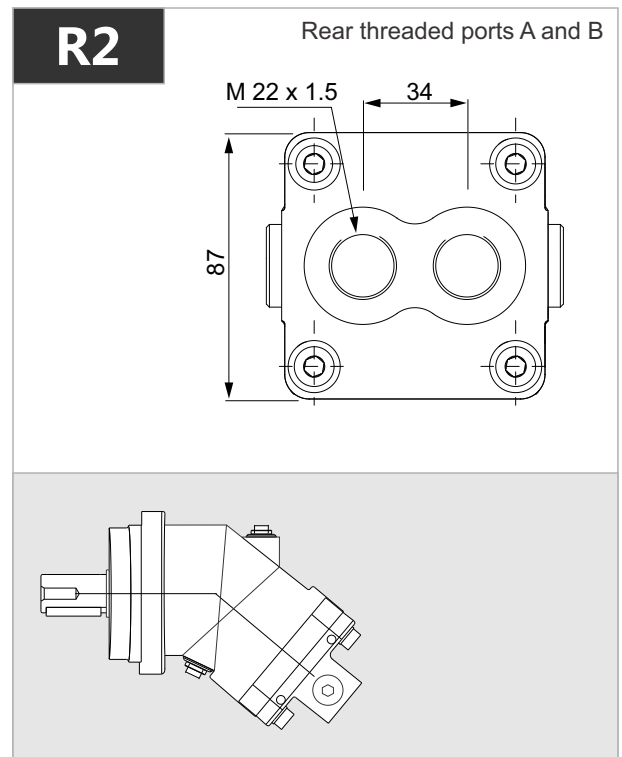
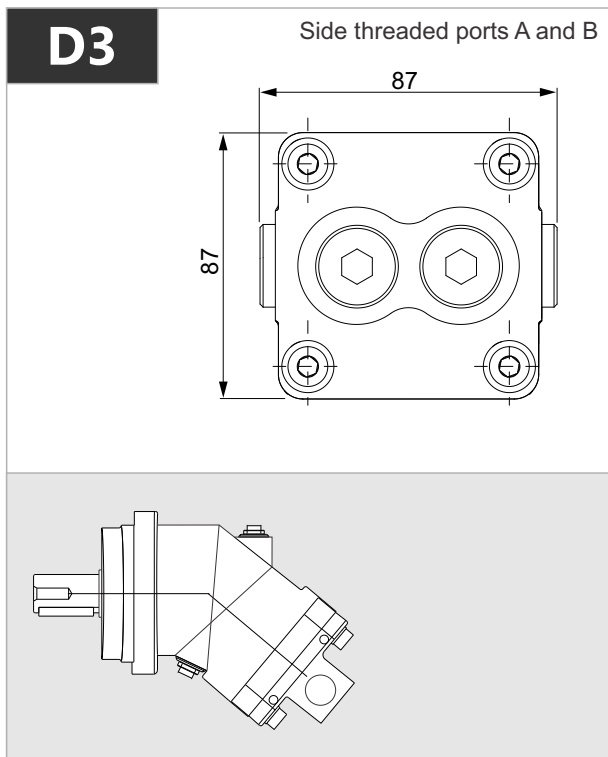
Parallel keyed shaft
DIN 6885, AS6x6x32



MS 18

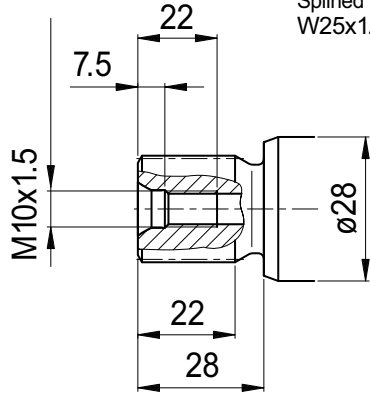


x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
18,00 cc	27,00 cc	8000 rpm	8800 rpm	400 bar	450 bar	0.28 m.N/bar	98 m.N	144	6,00 kg	6,20 kg	-25°	110°



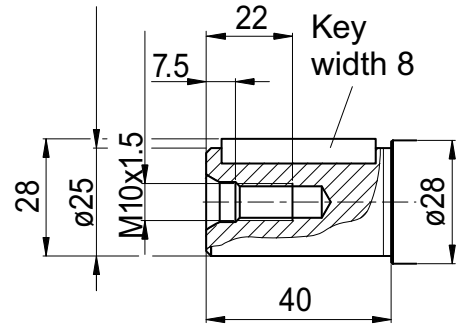
S1

Splined shaft DIN 5480
W25x1.25x18x9g

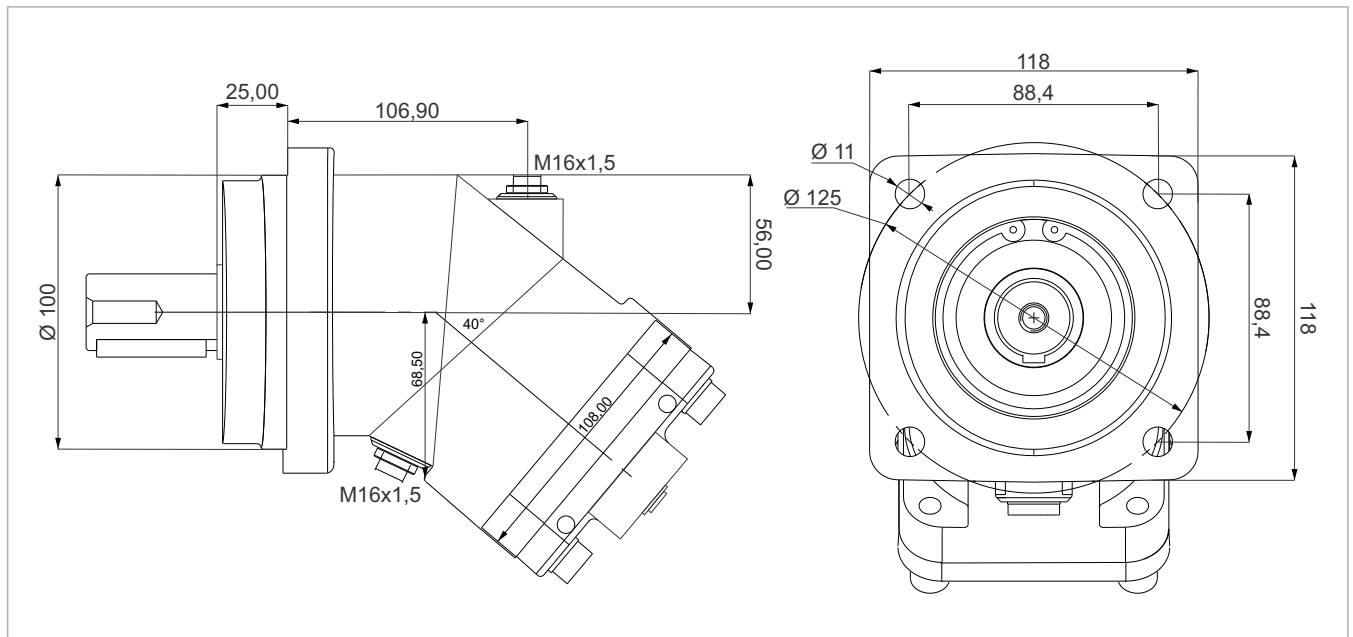


K1

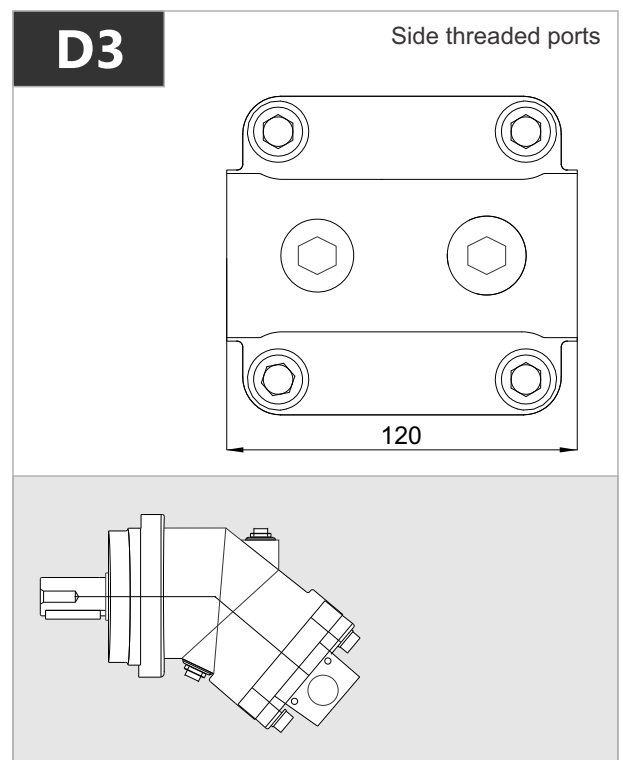
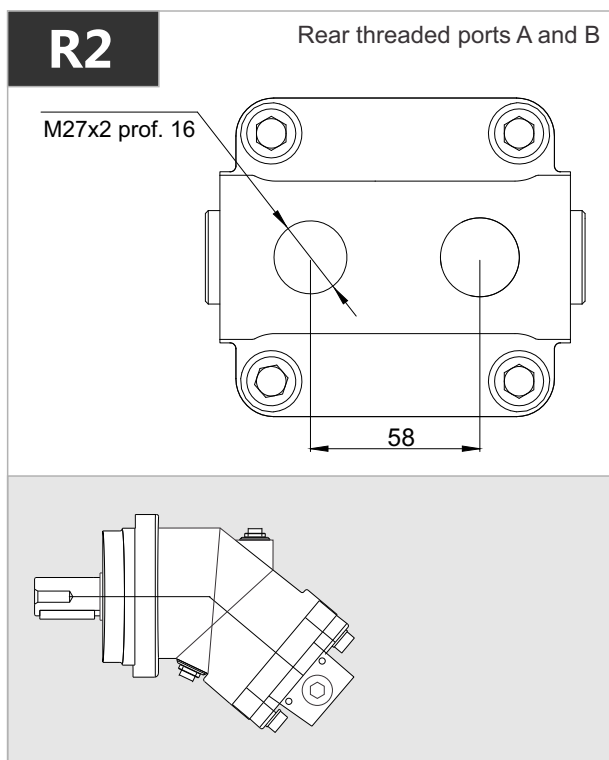
Parallel keyed shaft
DIN 6885, AS8x7x32



MS 25



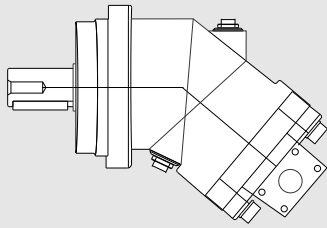
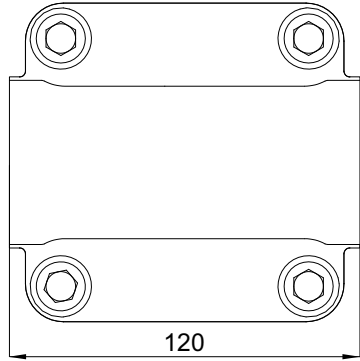
x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
25,00 cc	37,50 cc	6250 rpm	6800 rpm	400 bar	450 bar	0.40 m.N/bar	140 m.N	156	11,50 kg	11,80 kg	-25°	110°



MS 25

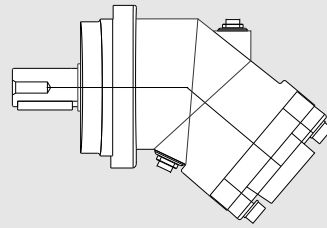
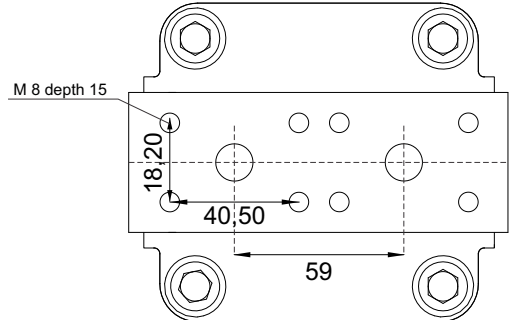
D1-D2

Side flange ports A and B
SAE 1/2" 6000 PSI



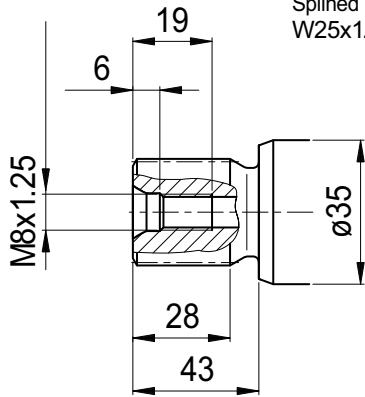
R1

Rear flange ports A and B
SAE 1/2" 6000 PSI



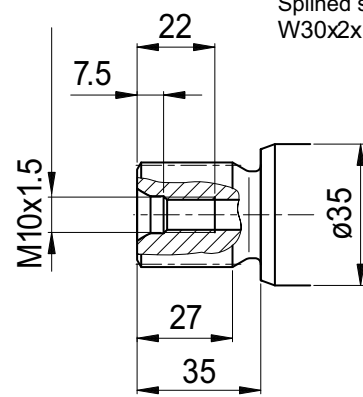
S1

Splined shaft DIN 5480
W25x1.25x18x9g



S2

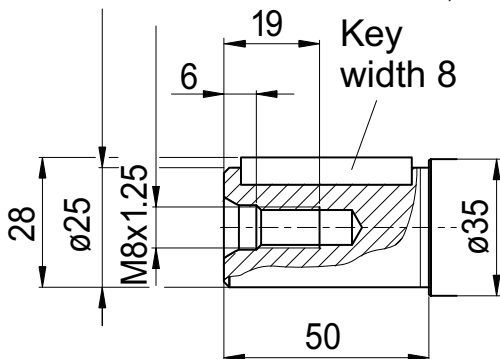
Splined shaft DIN 5480
W30x2x14x9g



K1

Parallel keyed shaft
DIN 6885, As8x7x40

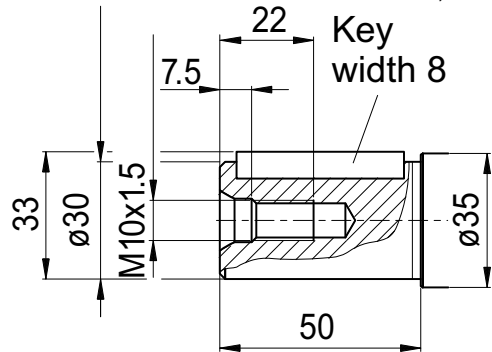
Key
width 8



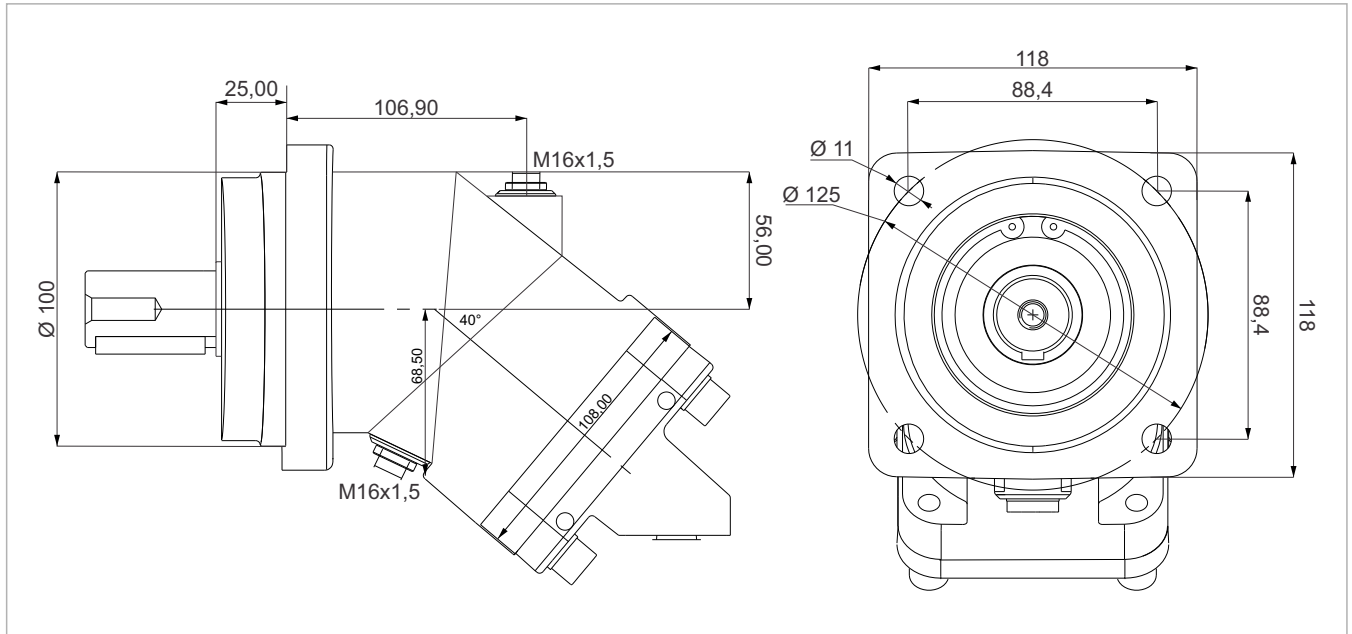
K2

Parallel keyed shaft
DIN 6885, As8x7x40

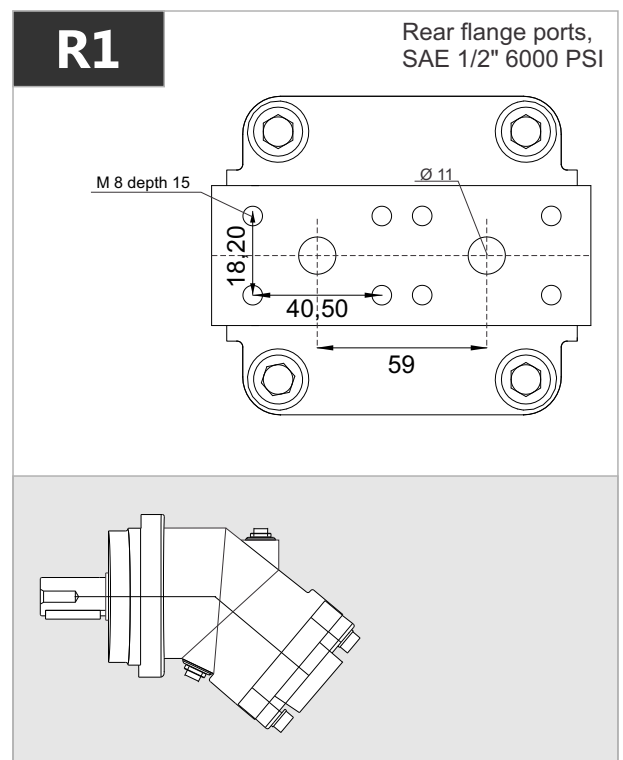
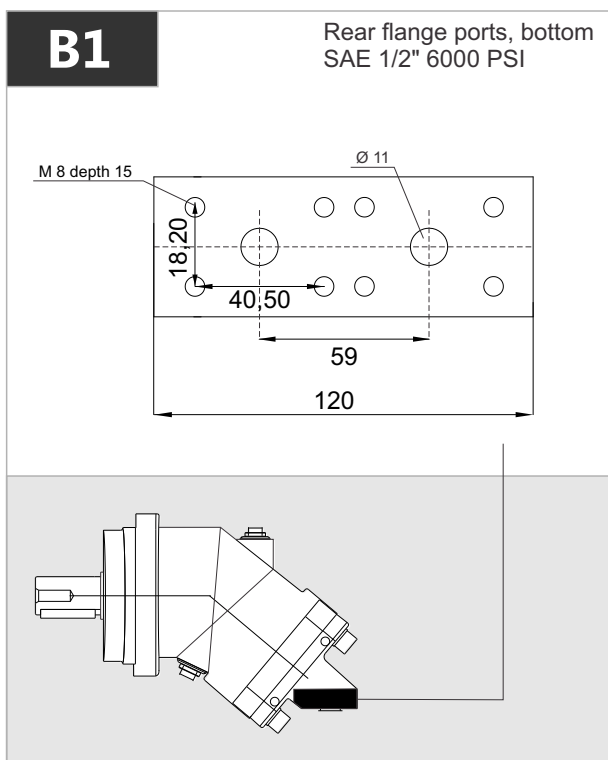
Key
width 8



MS 32



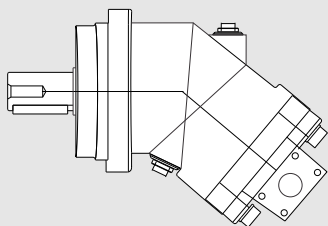
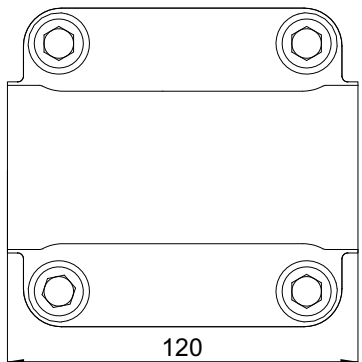
x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
32,00 cc	48,00 cc	6250 rpm	6800 rpm	400 bar	450 bar	0.51 m.N/bar	174 m.N	200	11,50 kg	11,90 kg	-25°	110°



MS 32

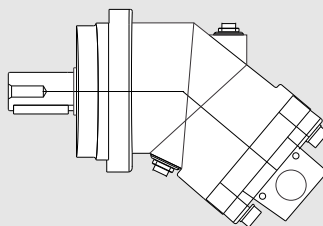
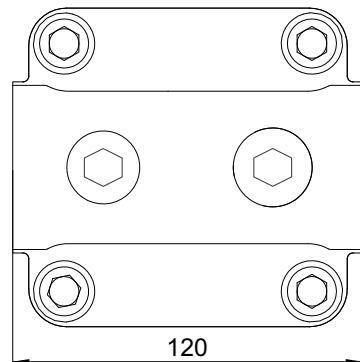
D1-D2

Side flange ports A and B
SAE 1/2" 6000 PSI



D3

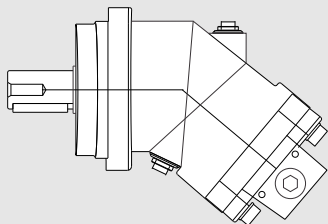
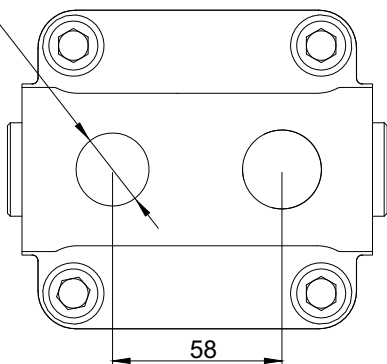
Side threaded ports A and B



R2

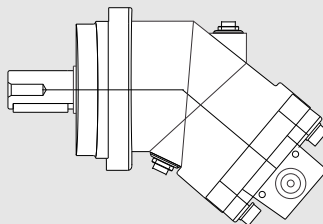
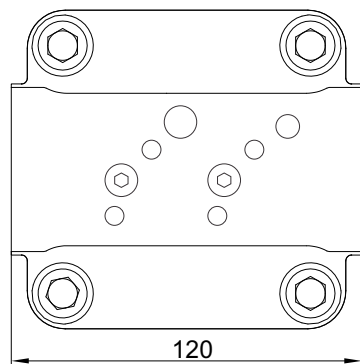
Rear threaded ports

M27x2 prof. 16

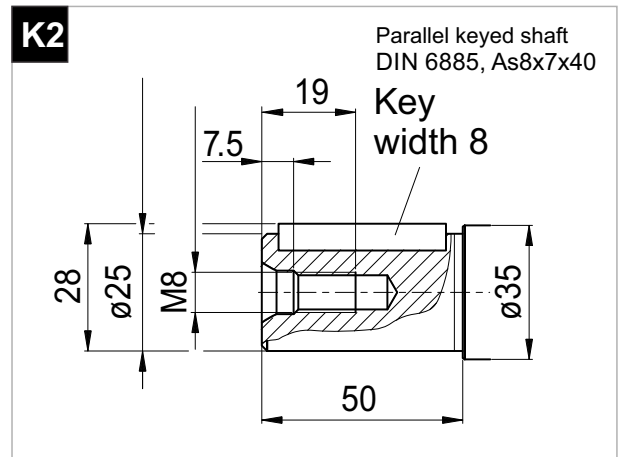
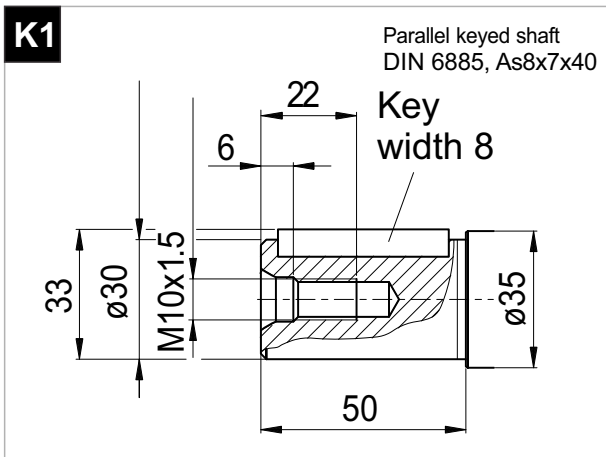
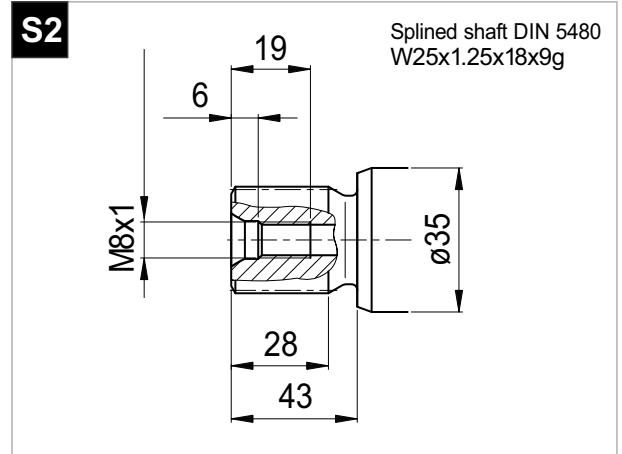
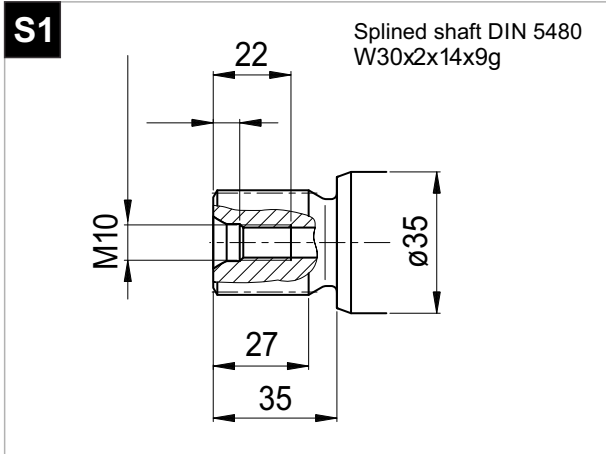


D4

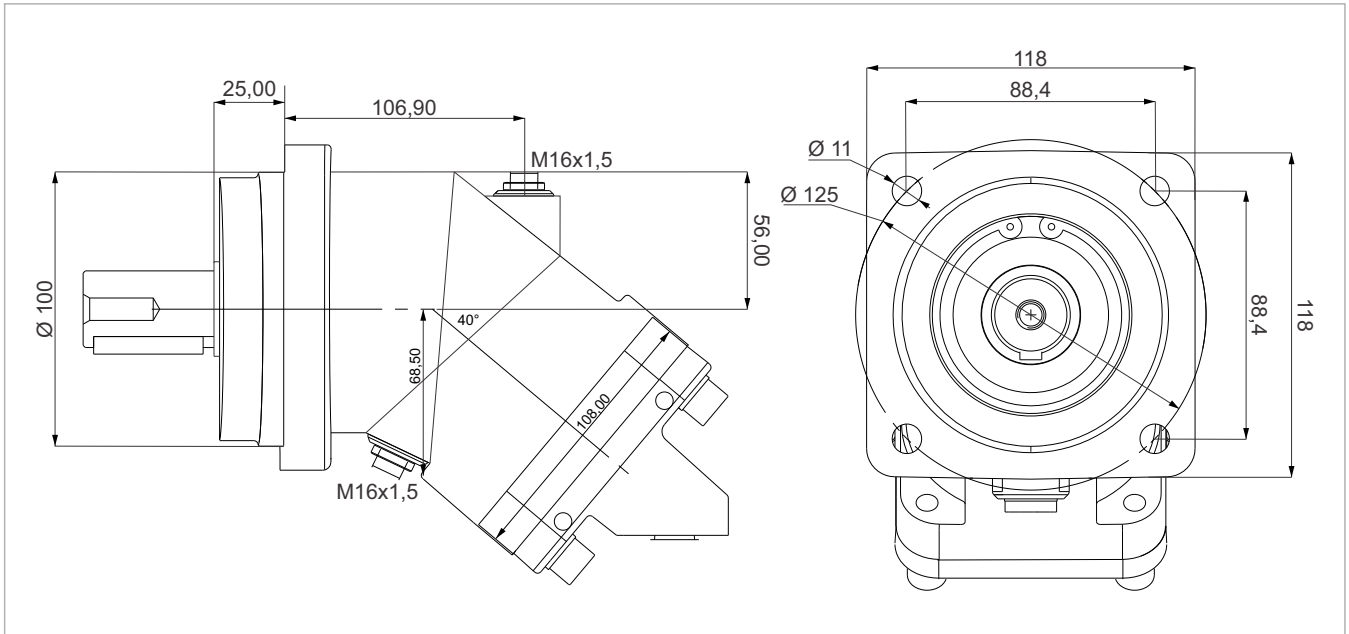
Side threaded ports A and B



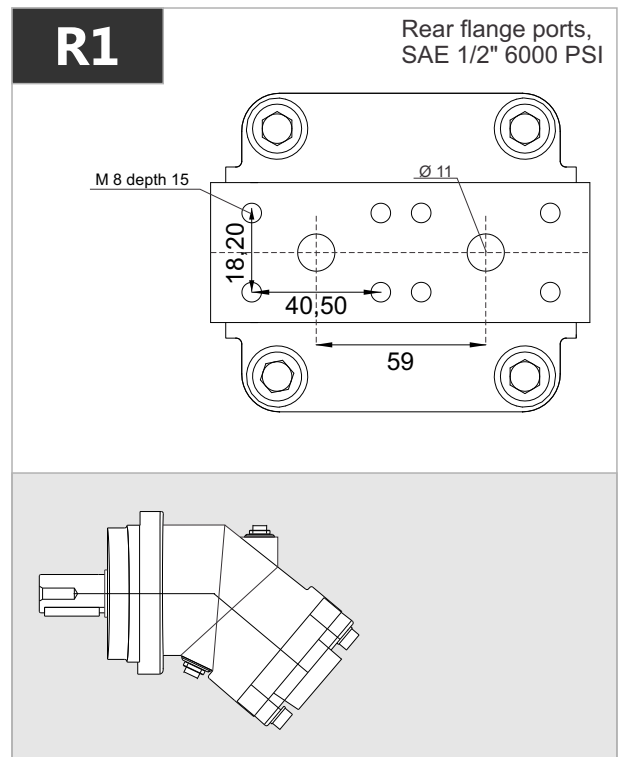
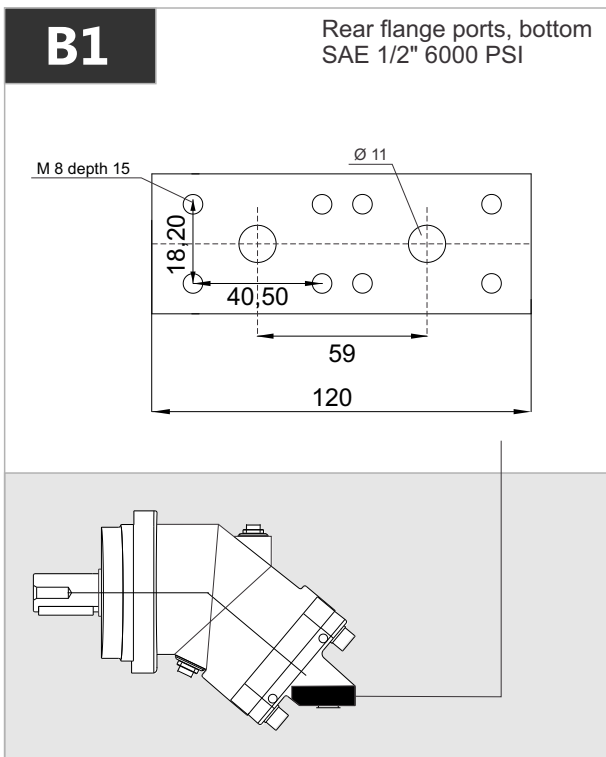
MS 32



MS 40



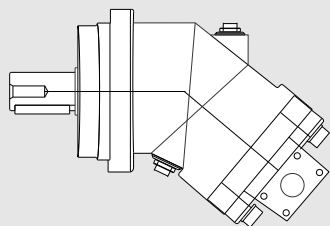
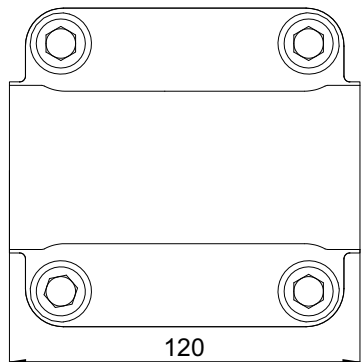
x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
40,20 cc	60,30 cc	5600 rpm	6300 rpm	400 bar	450 bar	0.68 m.N/bar	228 m.N	225	11,50 kg	11,90 kg	-25°	110°



MS 40

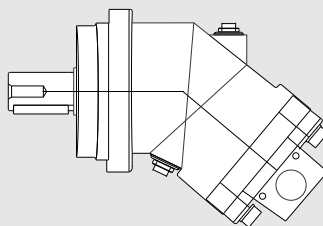
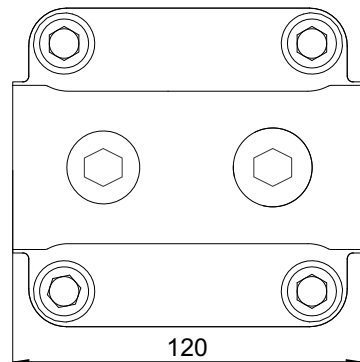
D1-D2

Side flange ports A and B
SAE 1/2" 6000 PSI



D3

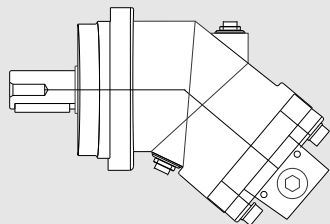
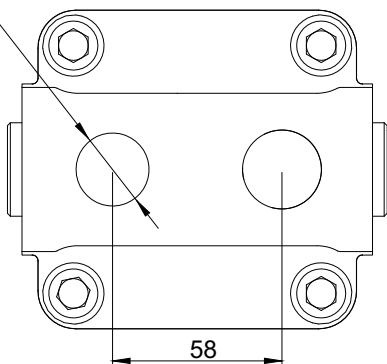
Side threaded ports A and B



R2

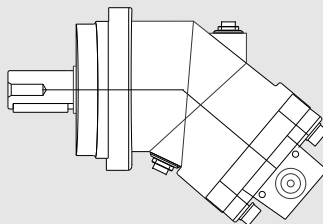
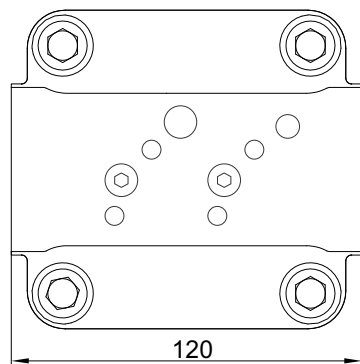
Rear threaded ports

M27x2 prof. 16

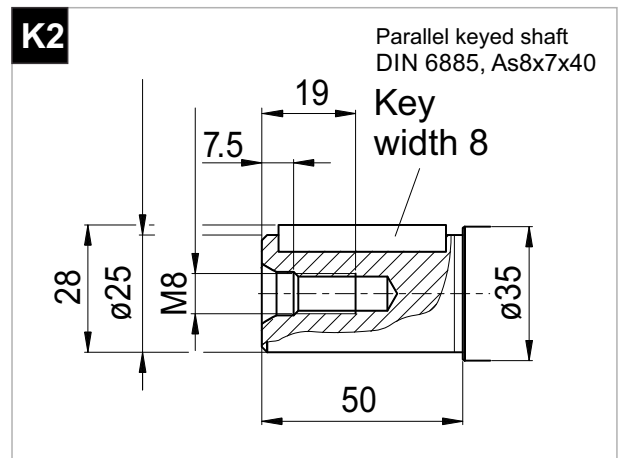
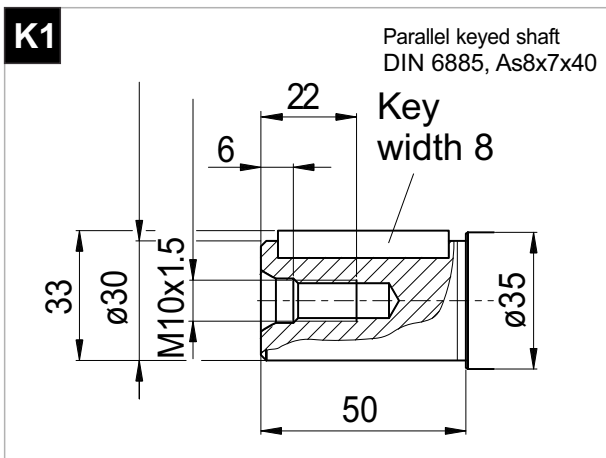
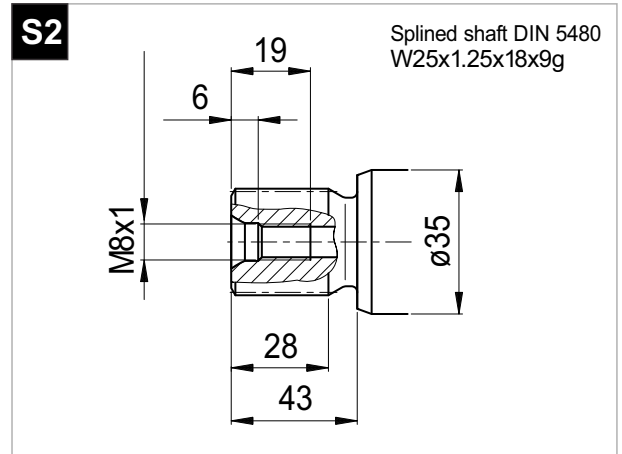
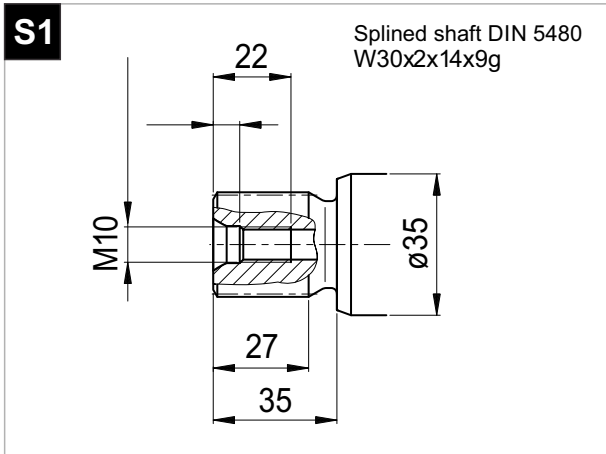


D4

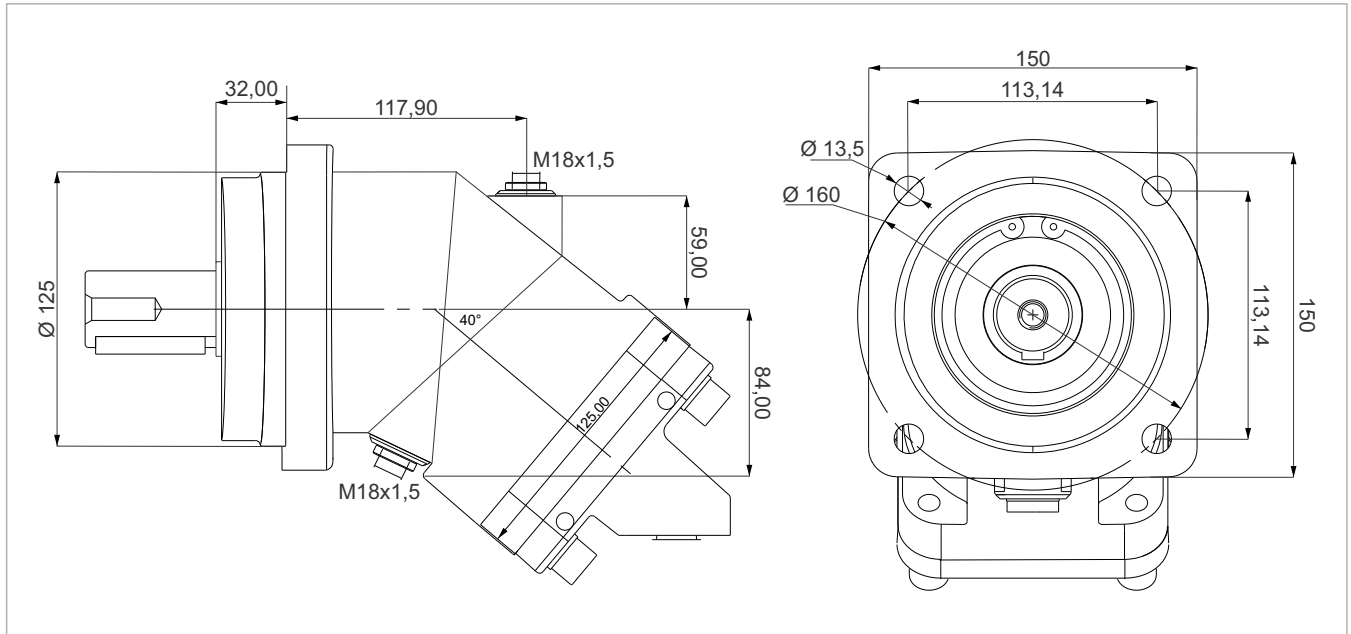
Side threaded ports A and B



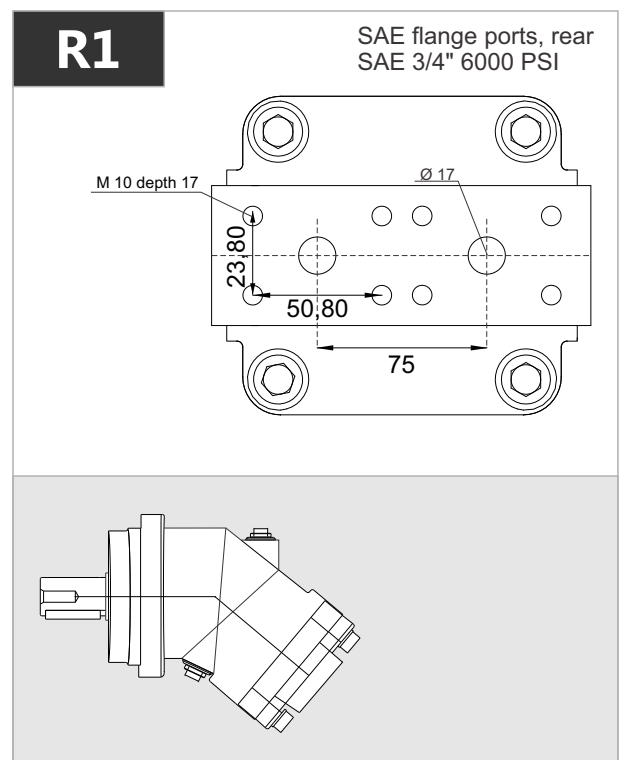
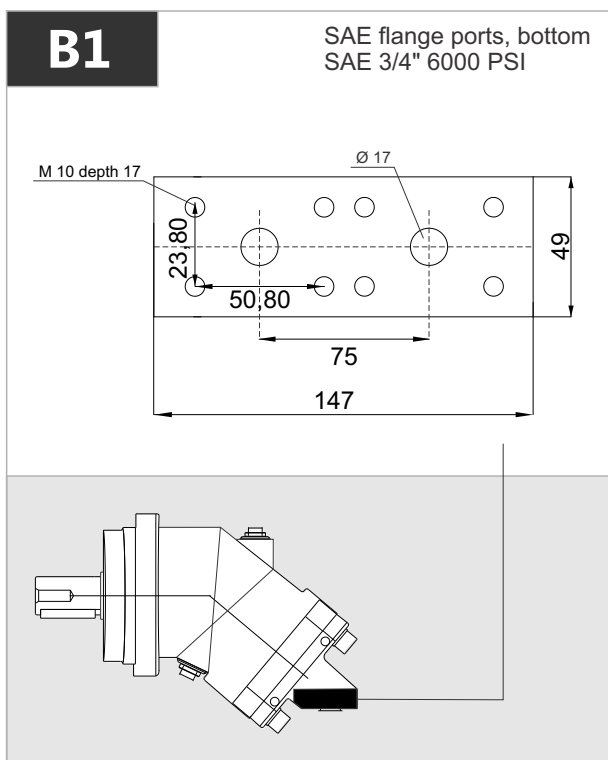
MS 40



MS 50



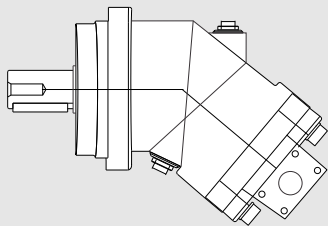
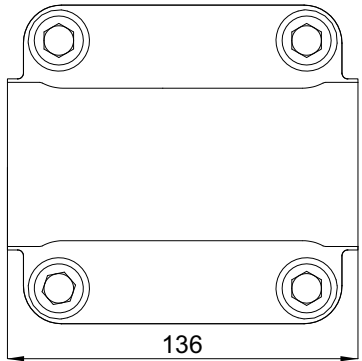
x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
50,00 cc	75,00 cc	5000 rpm	5500 rpm	400 bar	450 bar	0.80 m.N/bar	280 m.N	250	17,50 kg	18,00 kg	-25°	110°



MS 50

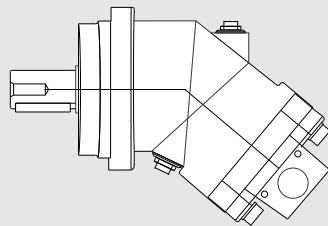
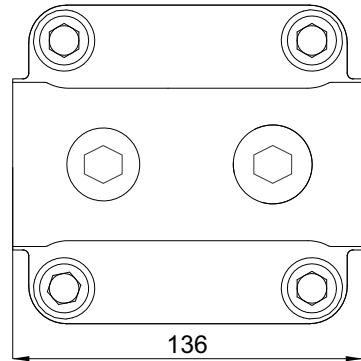
D1-D2

SAE flange ports, side A and B
SAE 3/4" 6000 PSI



D3

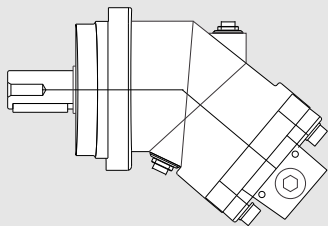
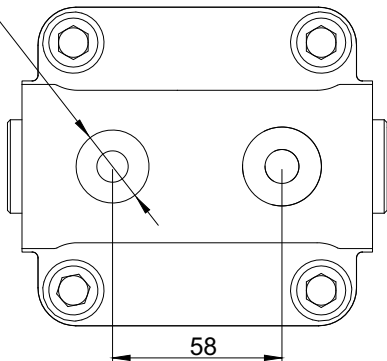
Side threaded ports A and B



R2

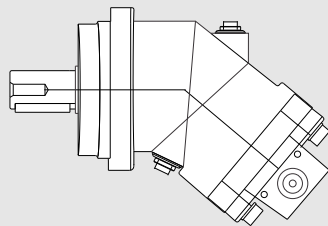
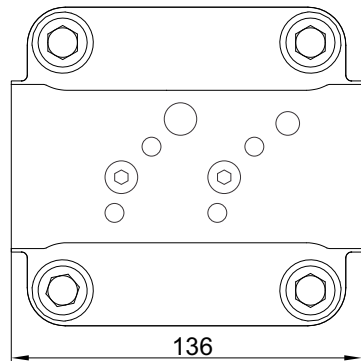
Rear threaded ports

M33x2 prof. 18

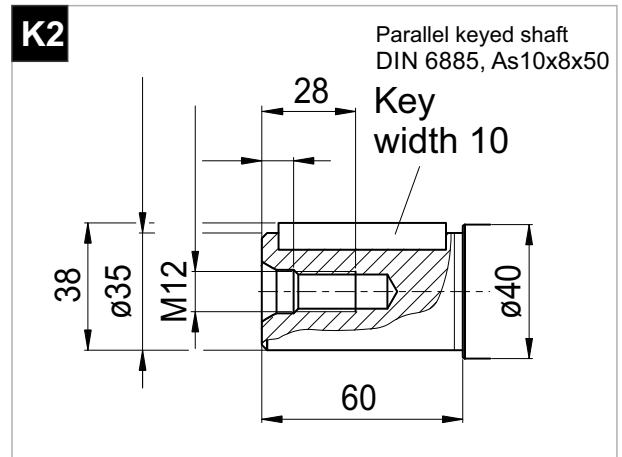
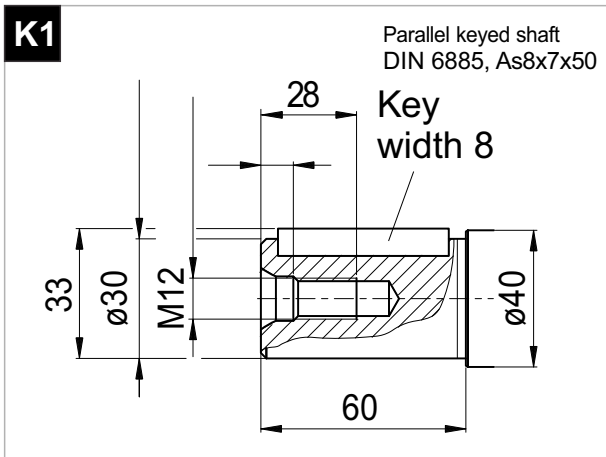
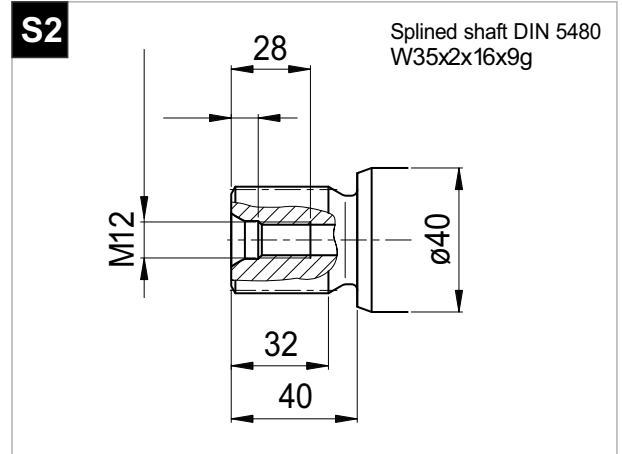
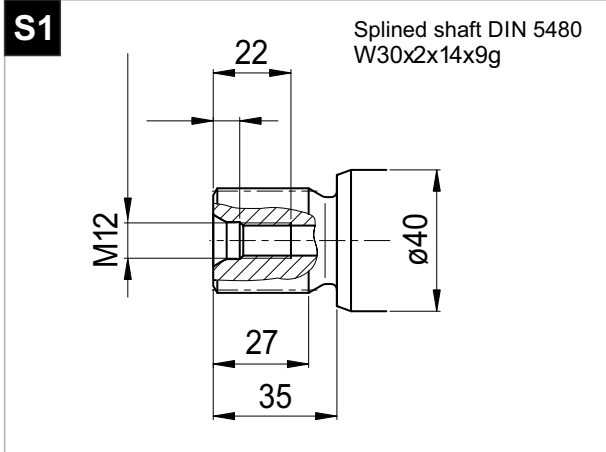


D4

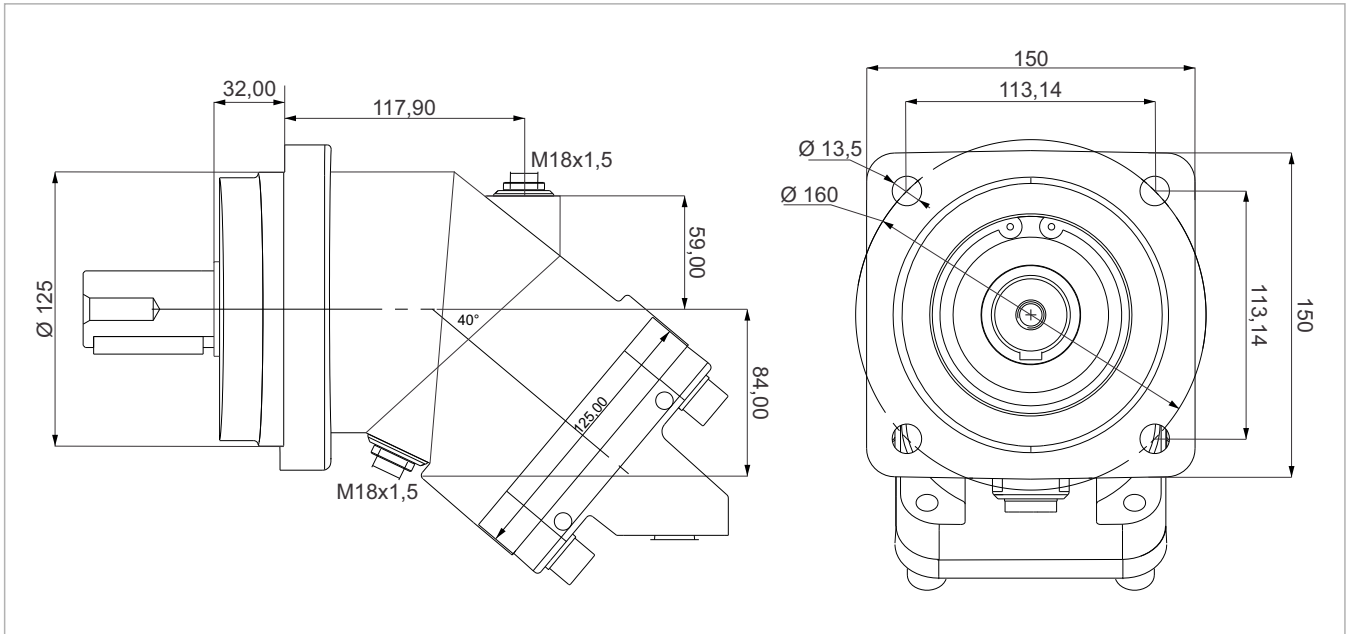
Side threaded ports A and B



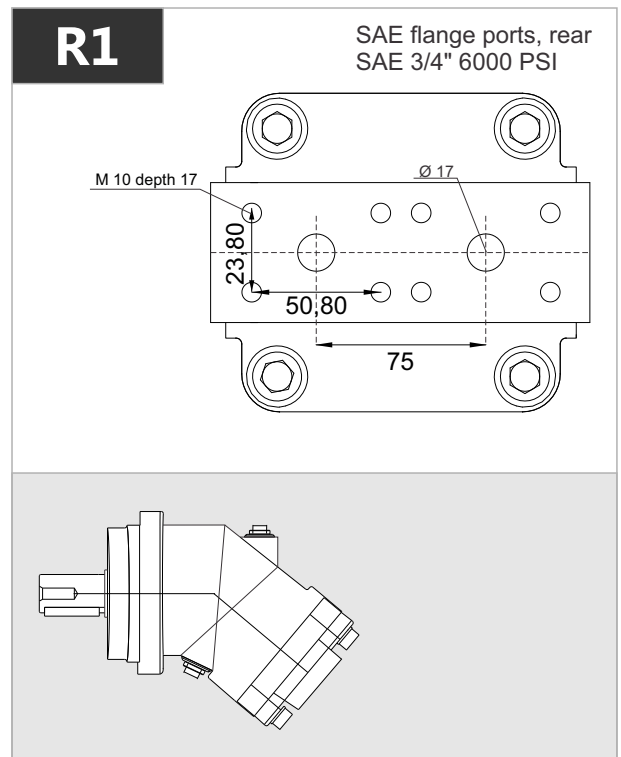
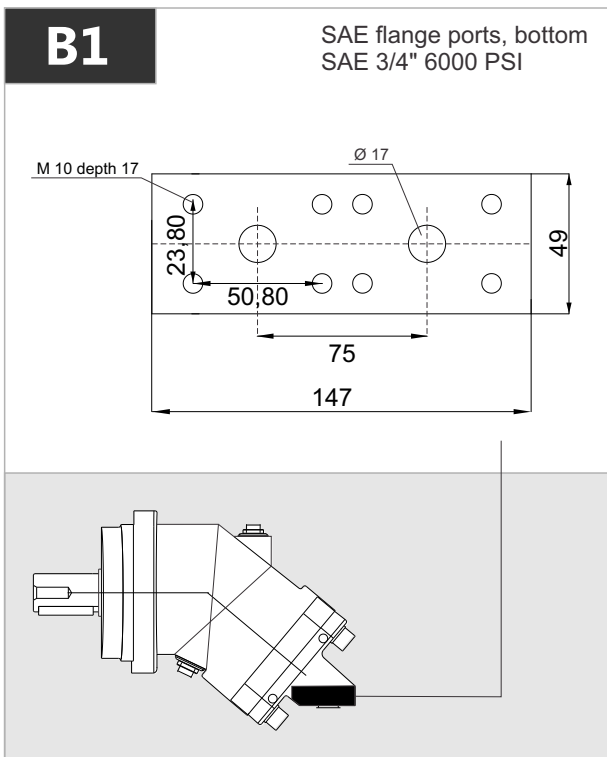
MS 50



MS 56



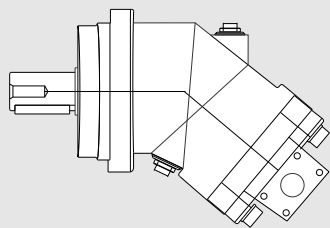
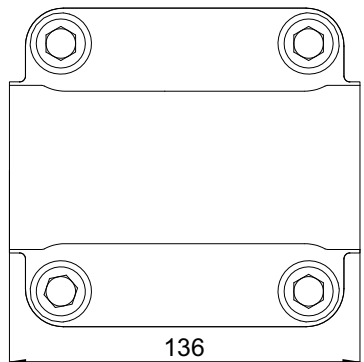
x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
56,40 cc	84,60 cc	5000 rpm	5500 rpm	400 bar	450 bar	0.92 m.N/bar	320 m.N	282	18,00 kg	18,50 kg	-25°	110°



MS 56

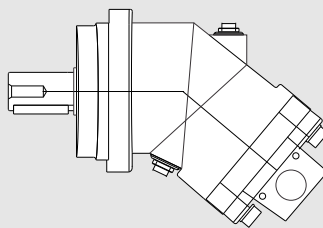
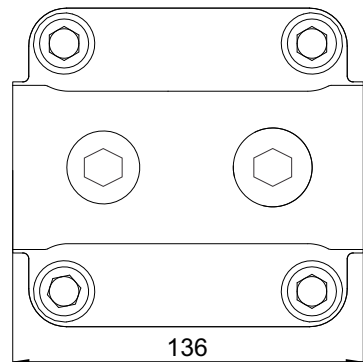
D1-D2

SAE flange ports, side A and B
SAE 3/4" 6000 PSI



D3

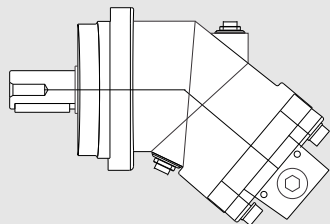
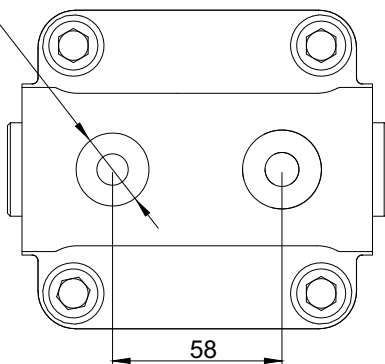
Side threaded ports A and B



R2

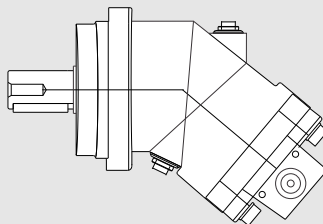
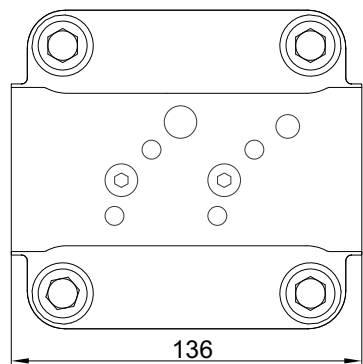
Rear threaded ports

M33x2 prof. 18

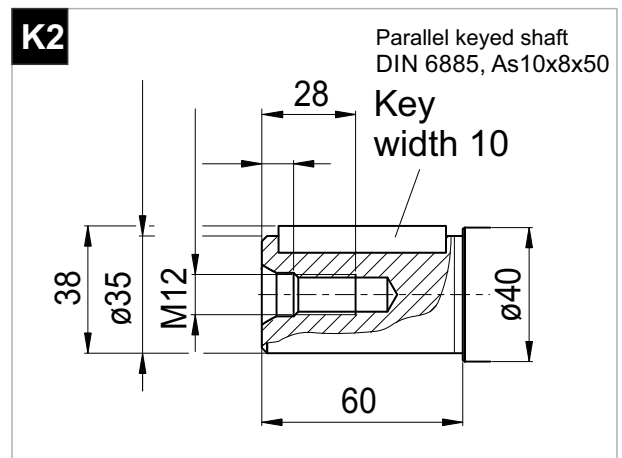
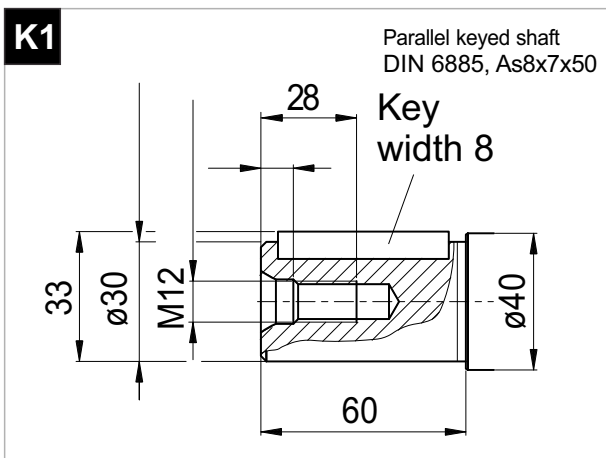
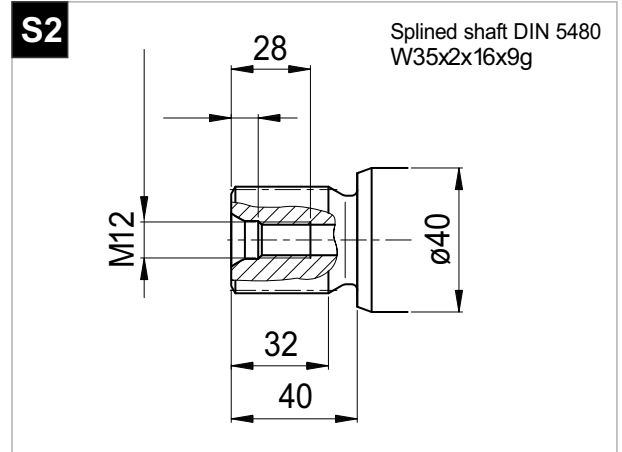
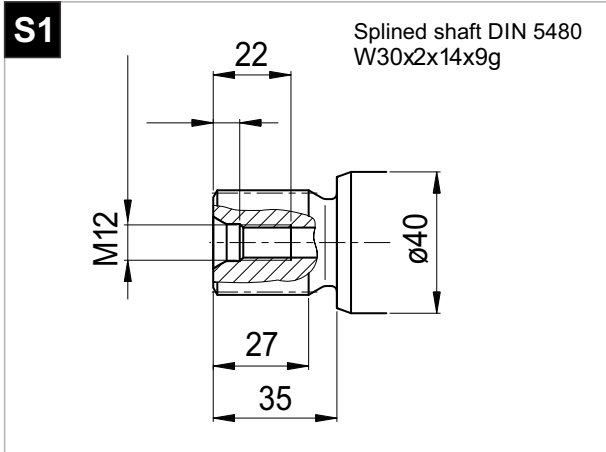


D4

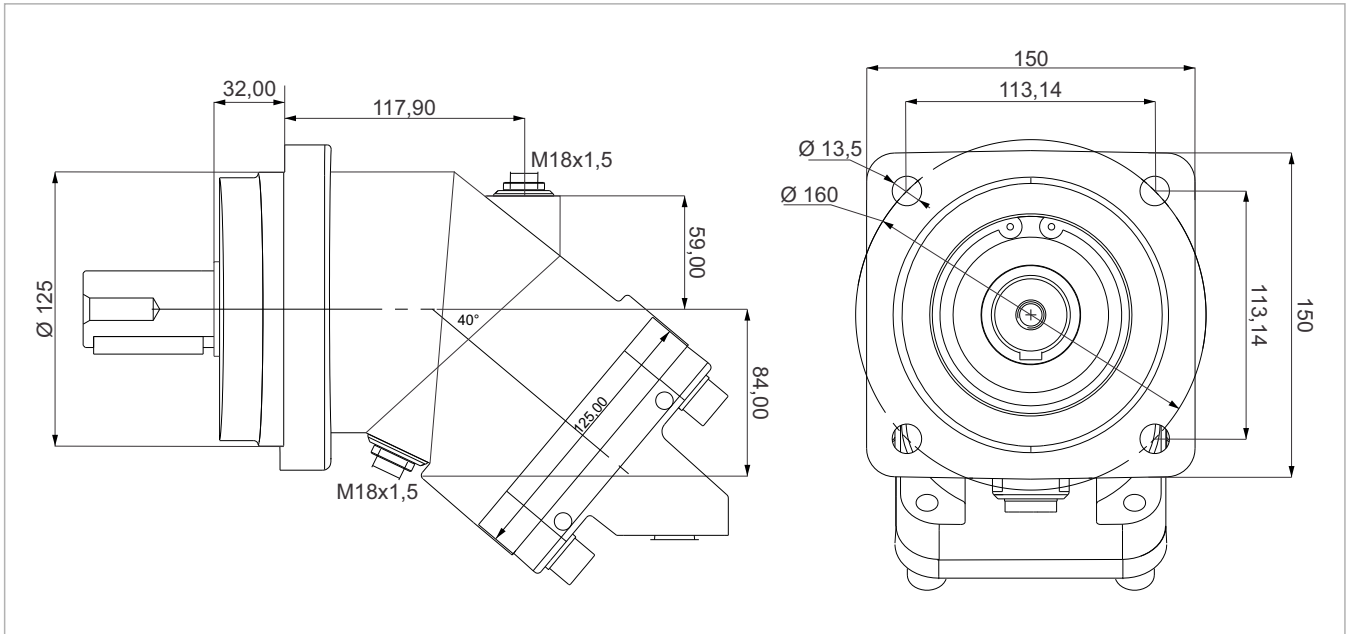
Side threaded ports A and B



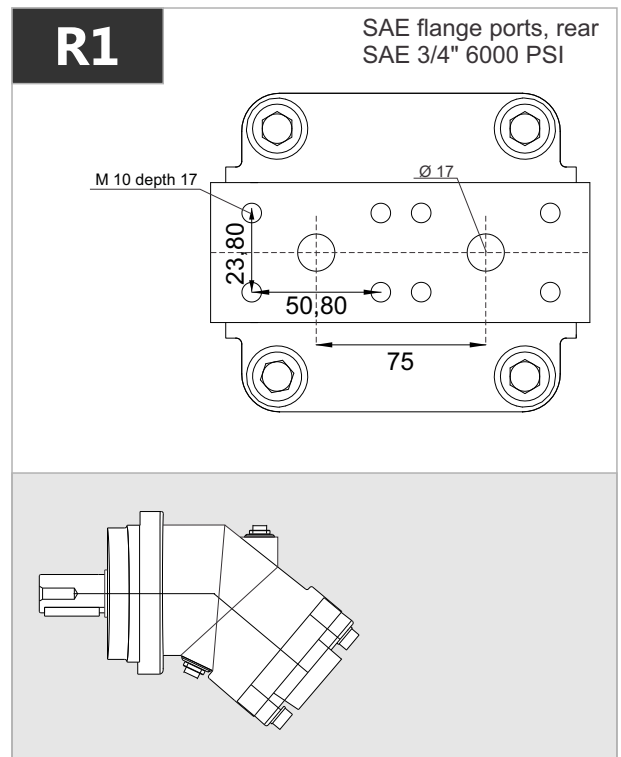
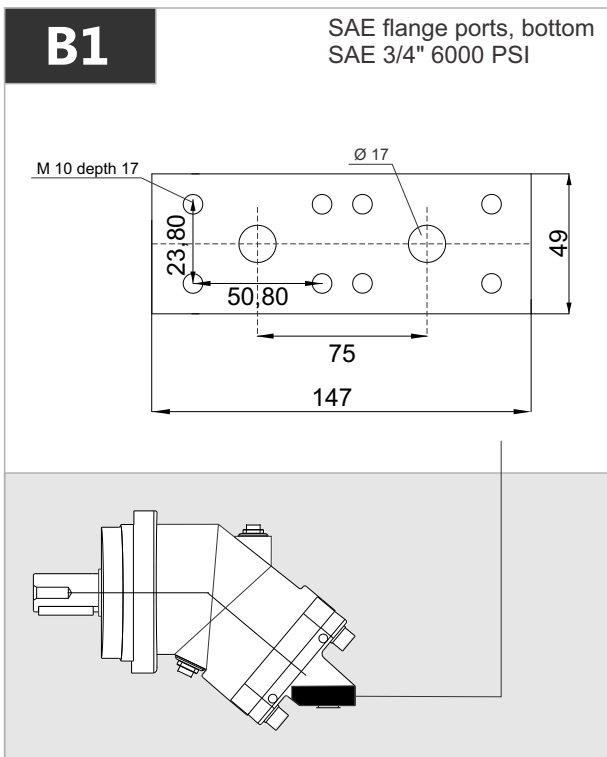
MS 56



MS 63



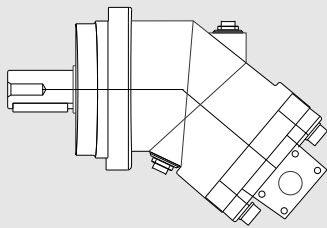
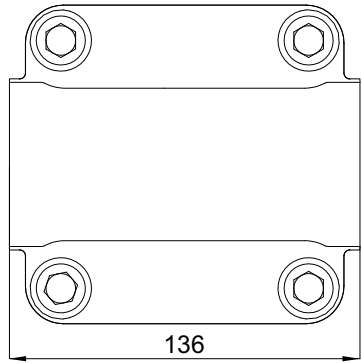
x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
63,00 cc	94,50 cc	5000 rpm	5500 rpm	400 bar	450 bar	1.00 m.N/bar	350 m.N	315	18,00 kg	18,50 kg	-25°	110°



MS 63

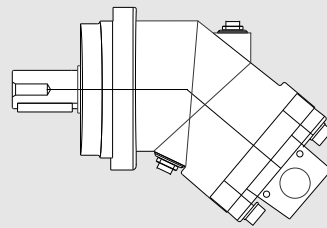
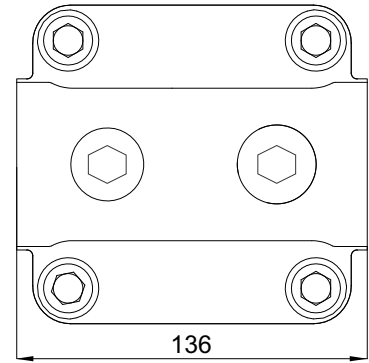
D1-D2

SAE flange ports, side A and B
SAE 3/4" 6000 PSI



D3

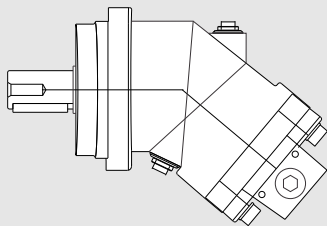
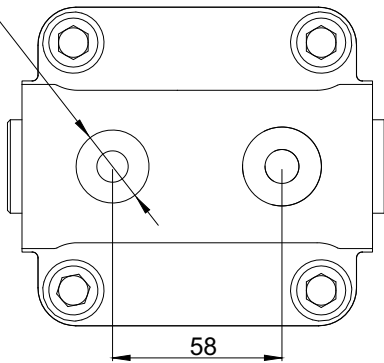
Side threaded ports A and B



R2

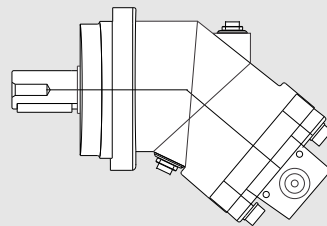
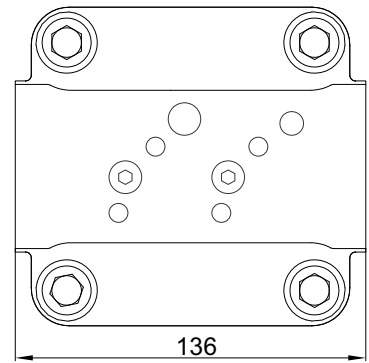
Rear threaded ports

M33x2 prof. 18

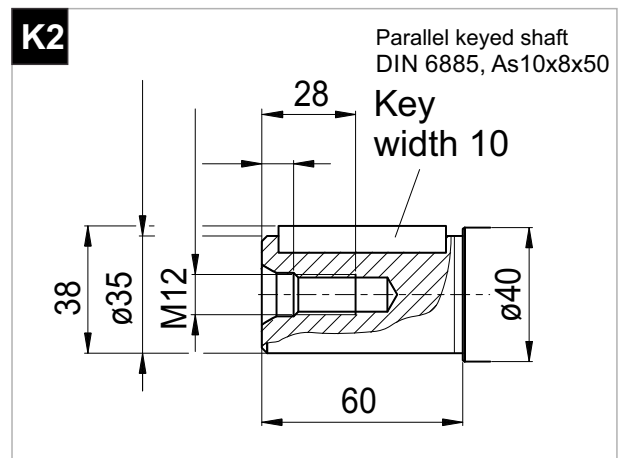
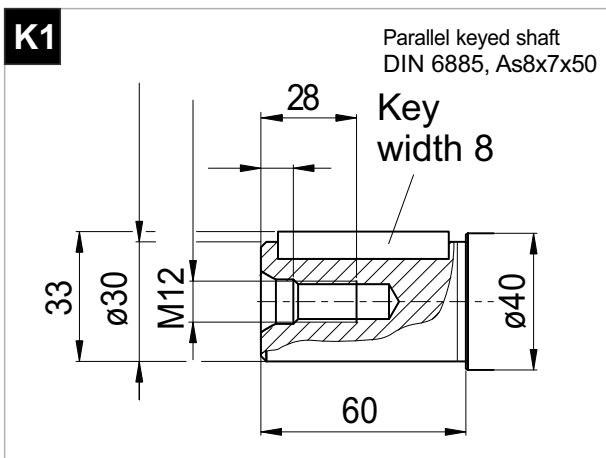
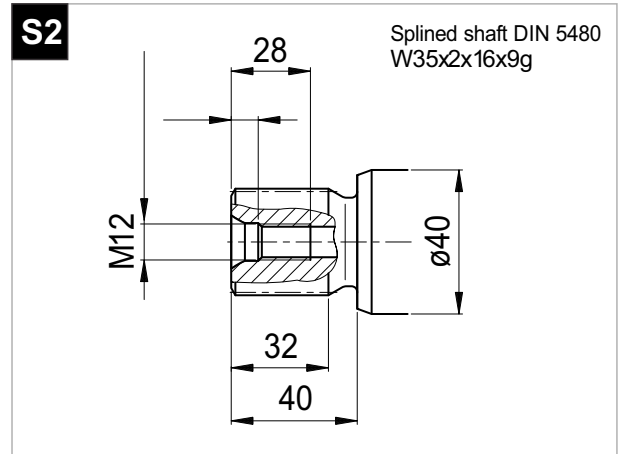
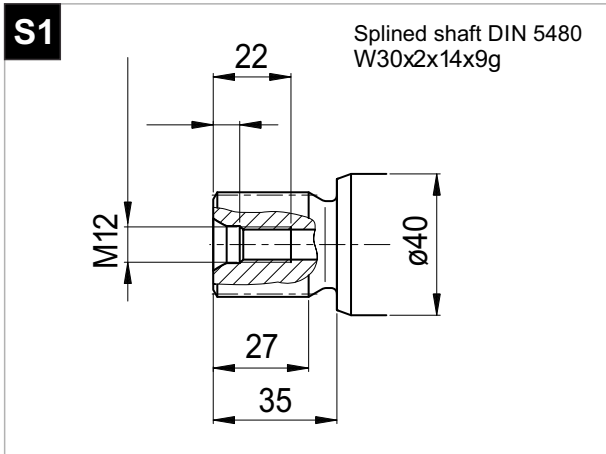


D4

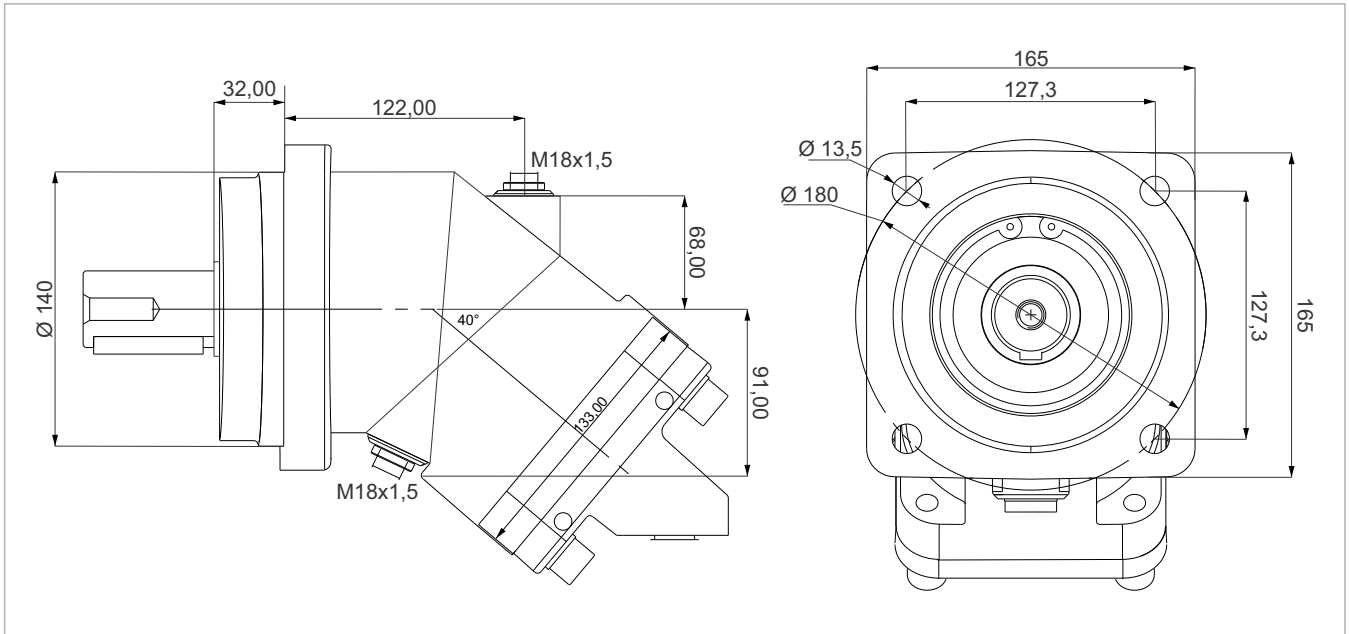
Side threaded ports A and B



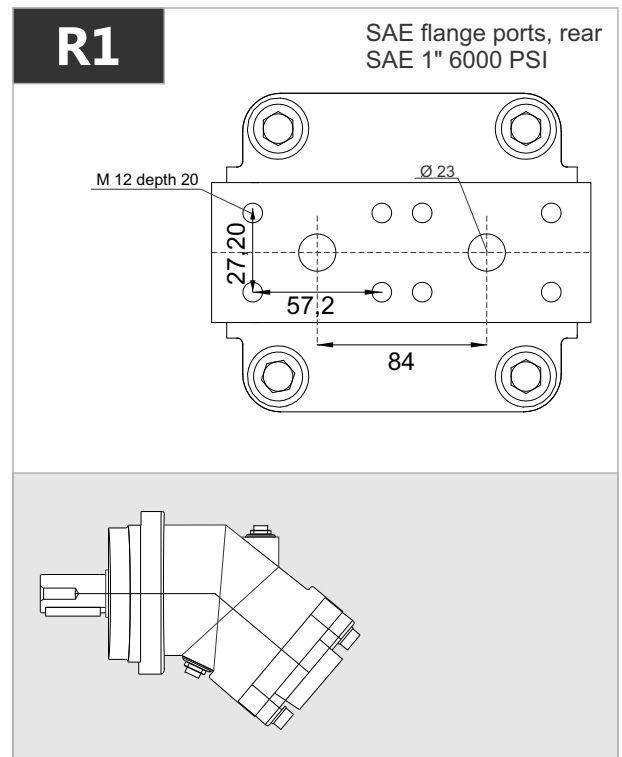
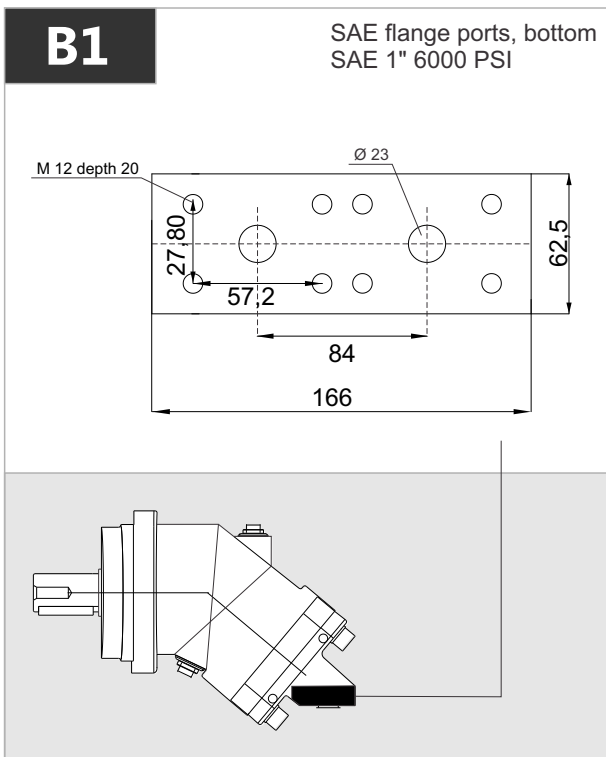
MS 63



MS 80



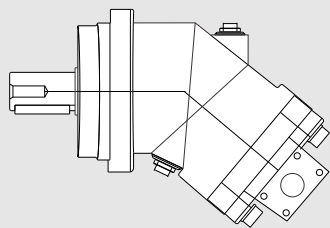
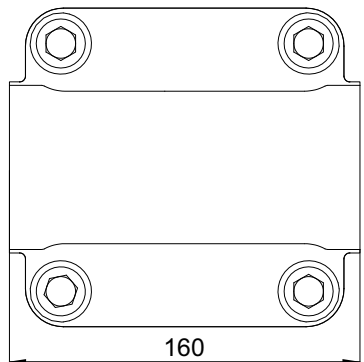
x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
80,00 cc	120,00 cc	4400 rpm	4900 rpm	400 bar	450 bar	1.28 m.N/bar	440 m.N	352	22,00 kg	22,50 kg	-25°	110°



MS 80

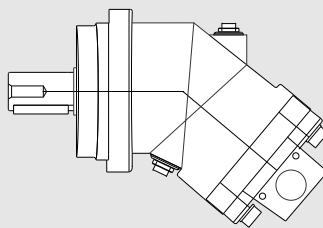
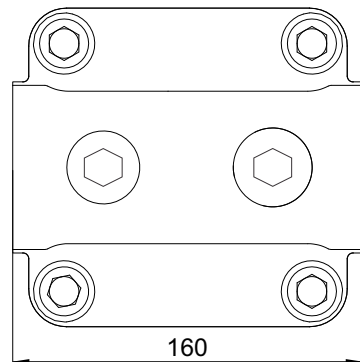
D1-D2

SAE flange ports, side
SAE 1" 6000 PSI



D3

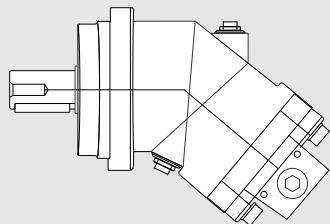
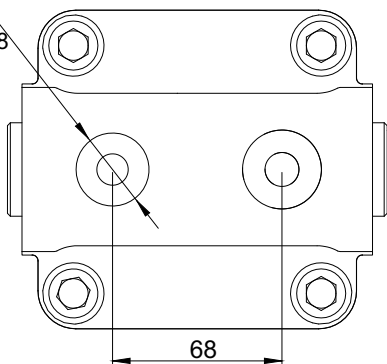
Side threaded ports



R2

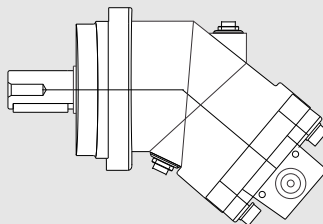
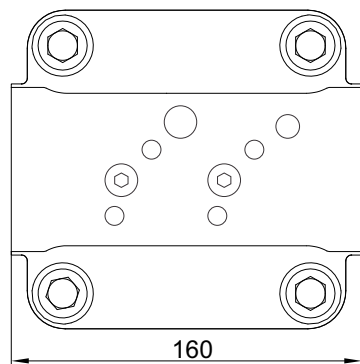
Rear threaded ports

M33x2 depth 18

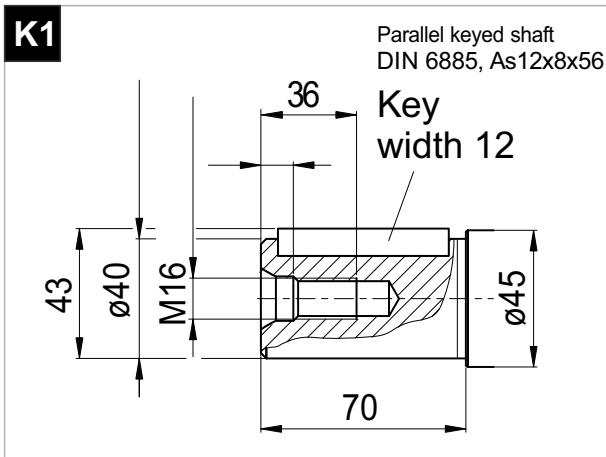
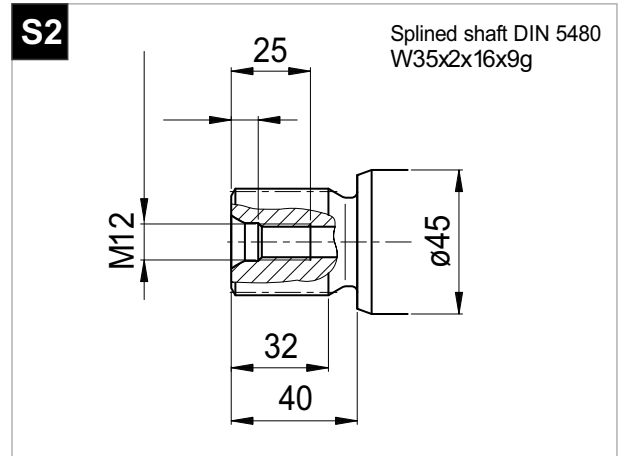
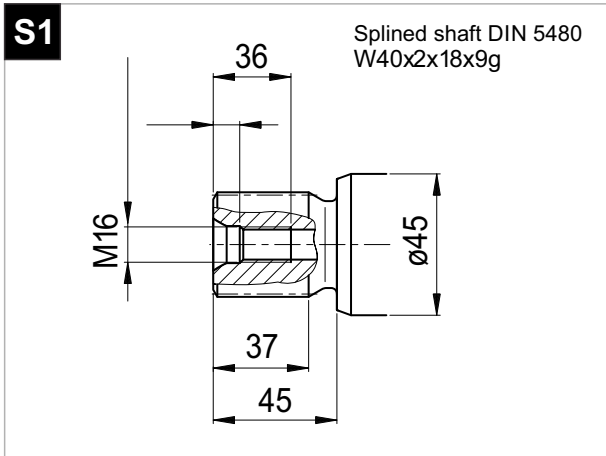


D4

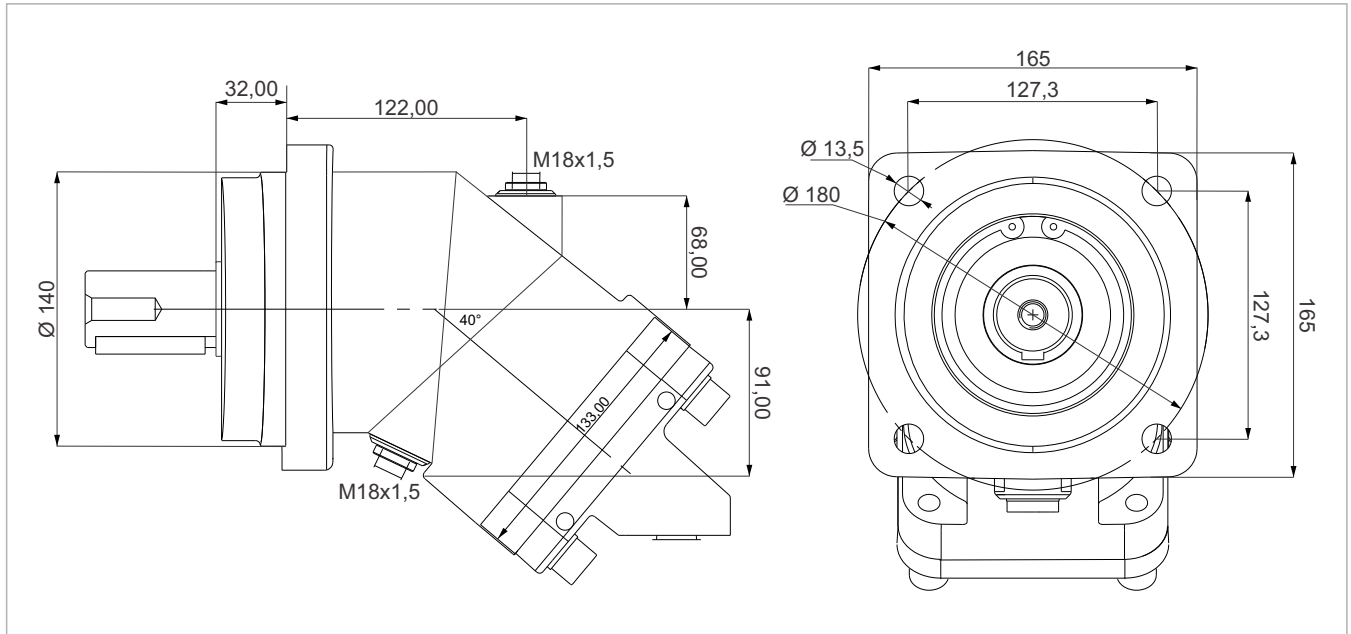
Side threaded ports



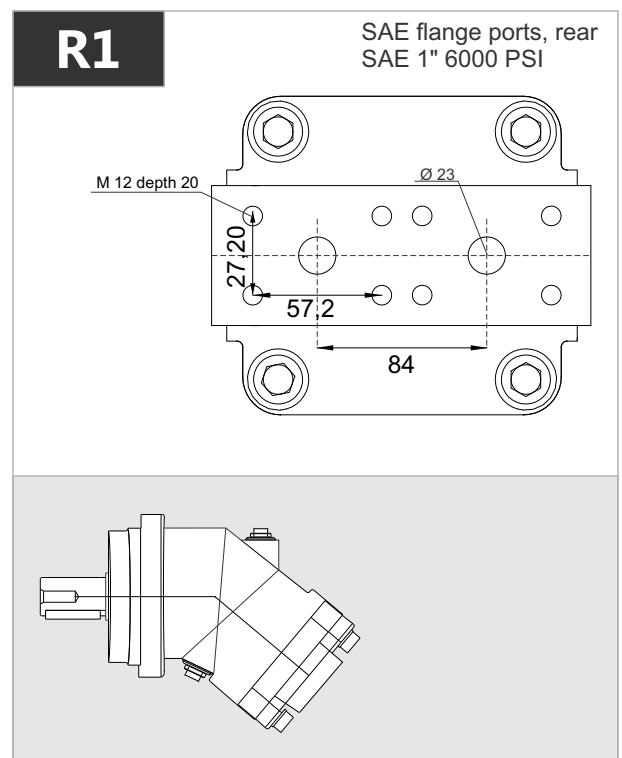
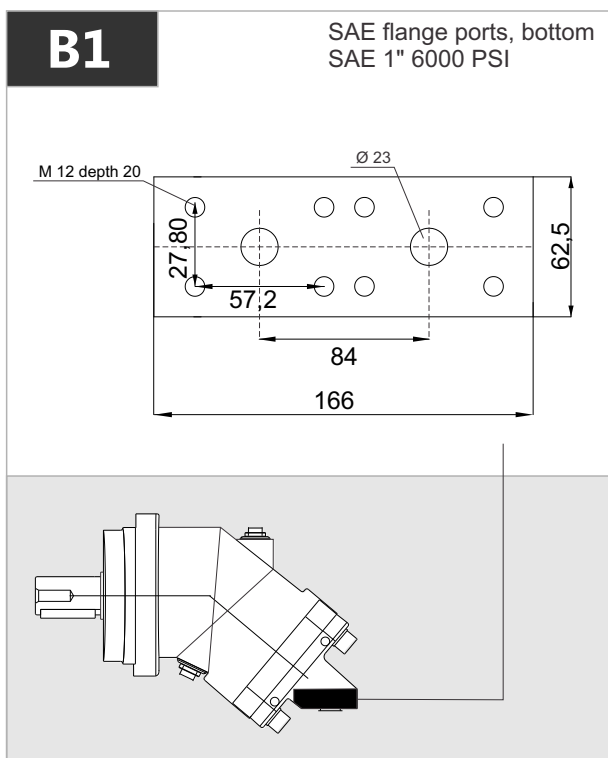
MS 80



MS 108



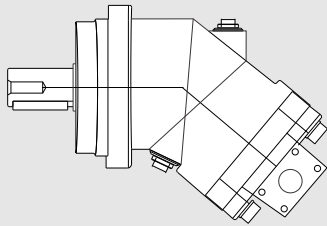
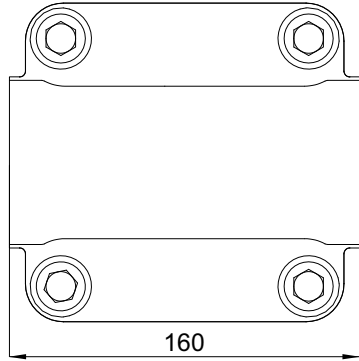
x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
108,4 cc	162,6 cc	4000 rpm	4400 rpm	400 bar	450 bar	1.69 m.N/bar	600 m.N	433	22,50 kg	23,00 kg	-25°	110°



MS 108

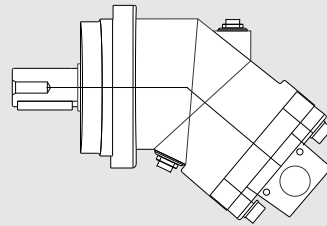
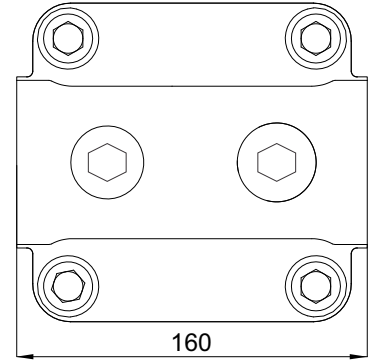
D1-D2

SAE flange ports, side
SAE 1" 6000 PSI



D3

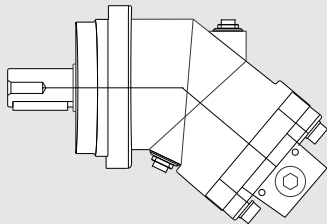
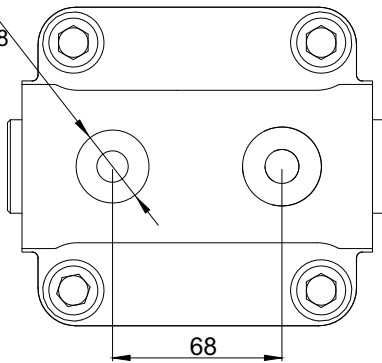
Side threaded ports



R2

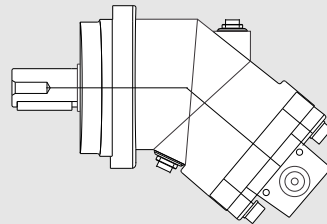
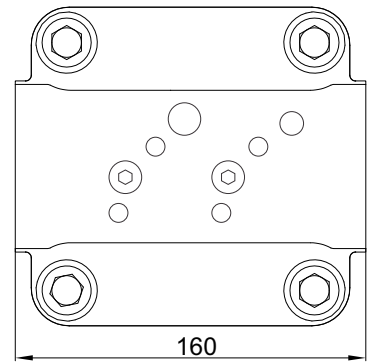
Rear threaded ports

M33x2 depth 18

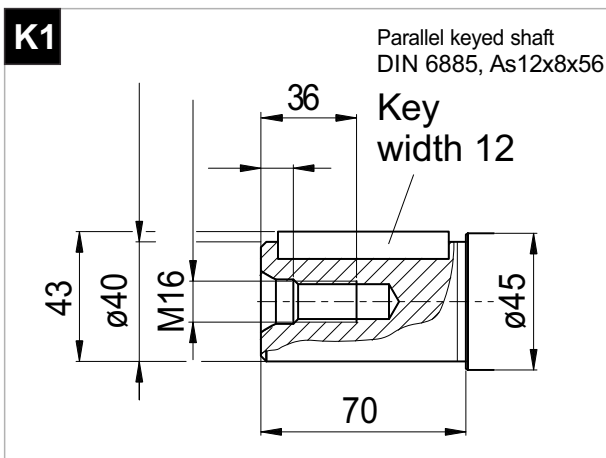
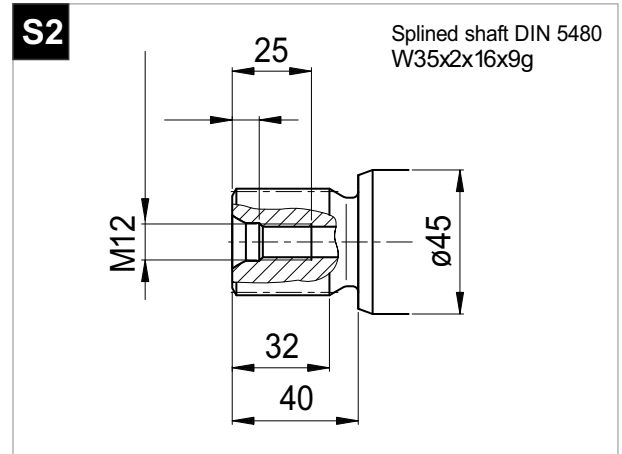
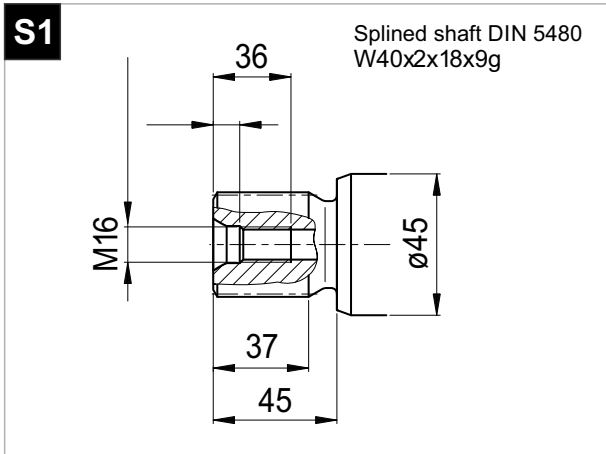


D4

Side threaded ports

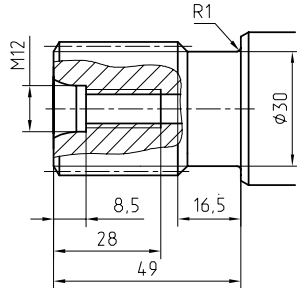


MS 108

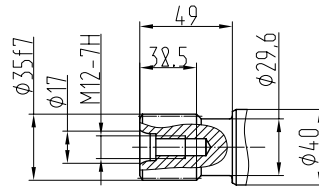


Special Shaft Drive

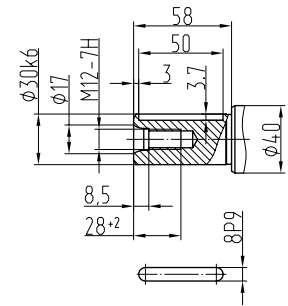
Splined shaft
35xf7x2x9g GOST 6033-80



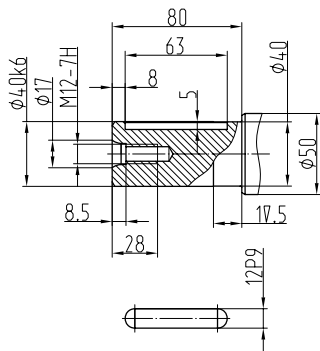
35xf7x2x9g ГOCT6033



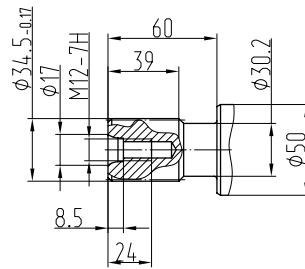
Parallel keyed shafts



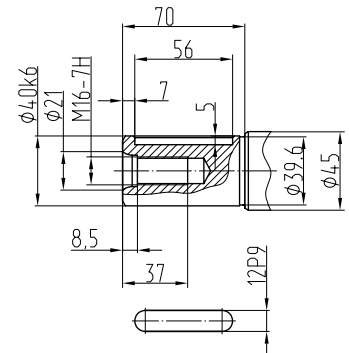
Parallel keyed shafts



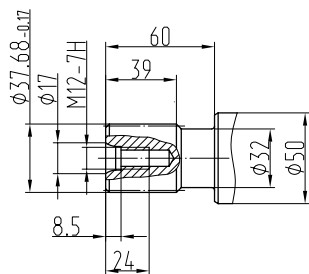
1 3/8' 21T 16/32DP ANSI B92



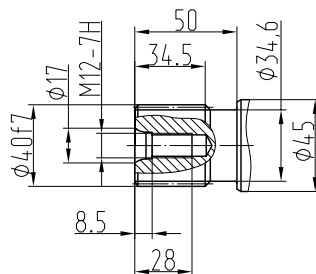
Parallel keyed shafts



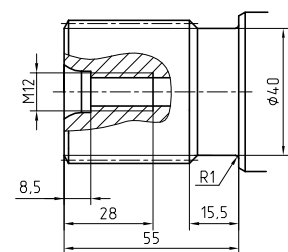
1 1/2' 23T 16/32DP ANSI B92



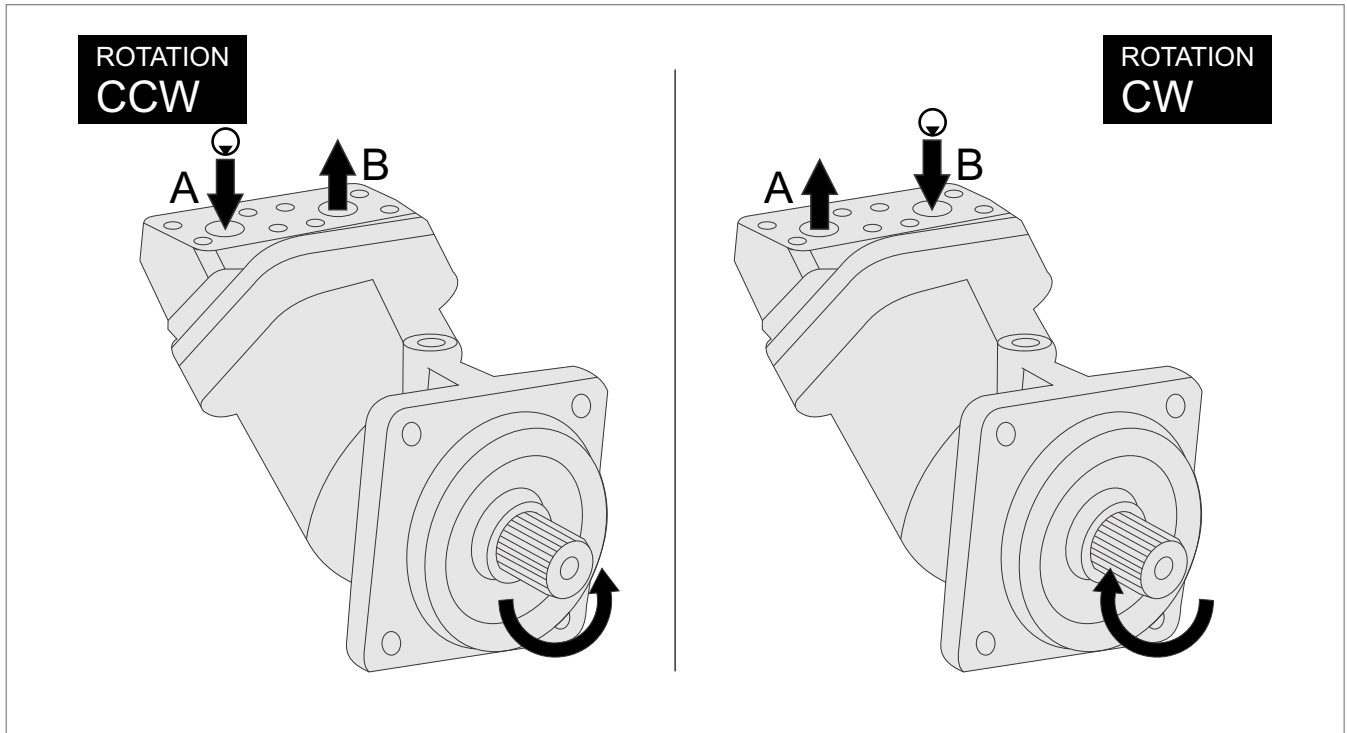
40xf7x2x9g GOST6033



45xh8x2x9g GOST 6033-80



Direction of Rotation



Quick Calculation

Flow rate

$$Q = \frac{V_s \cdot n}{1000 \eta_v} \text{ (lpm)}$$

Torque

$$M = \frac{V_s \cdot \Delta p \cdot \eta_{mh}}{63} \text{ (Nm)}$$

Power

$$P = \frac{2\pi \cdot M \cdot n}{60000} = \frac{M \cdot n}{9549} = \frac{Q \cdot \Delta p \cdot \eta_t}{600} \text{ (kw)}$$

Speed

$$n = \frac{1000 \cdot Q \cdot \eta_v}{V_s} \text{ (lpm)}$$

V_s = Displacement (ccm/rev.)

Δp = Diff. pressure (bar)

n = Speed (rpm)

Q = Flow (lpm)

η_v = Volumetric efficiency

η_{mh} = Mechanical-hydraulic efficiency

η_t = Total efficiency ($\eta_t = \eta_v \times \eta_{mh}$)

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 MS Bent Axis Motors.

Installation

POSITION

MS Motors can be operate any position.

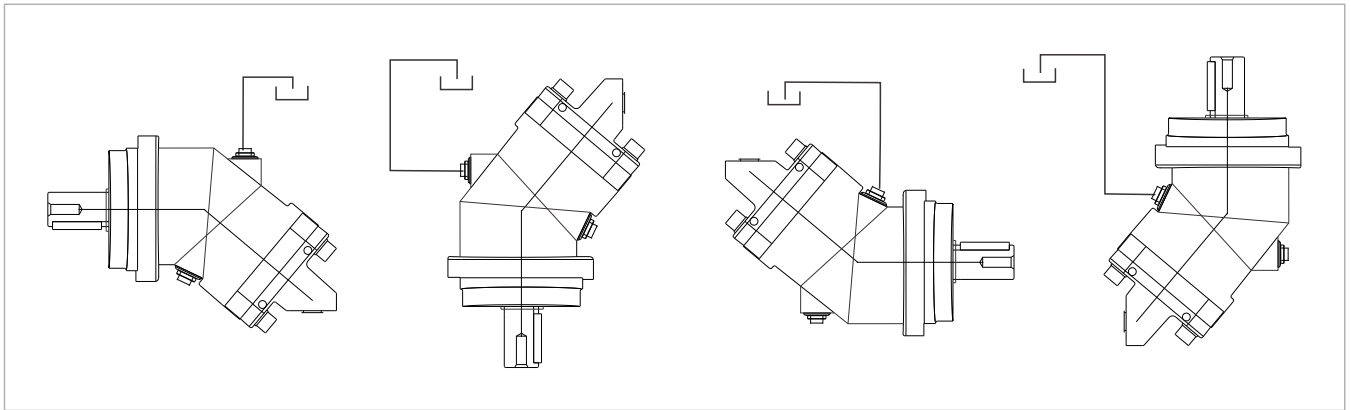
DIRECTION OF ROTATION

MS Motors can be operate in both directions of rotation.

Before of Installation operation, the motor must be filled with hydraulic fluid and air bled.

INSTALLATION POSITION

See following examples.

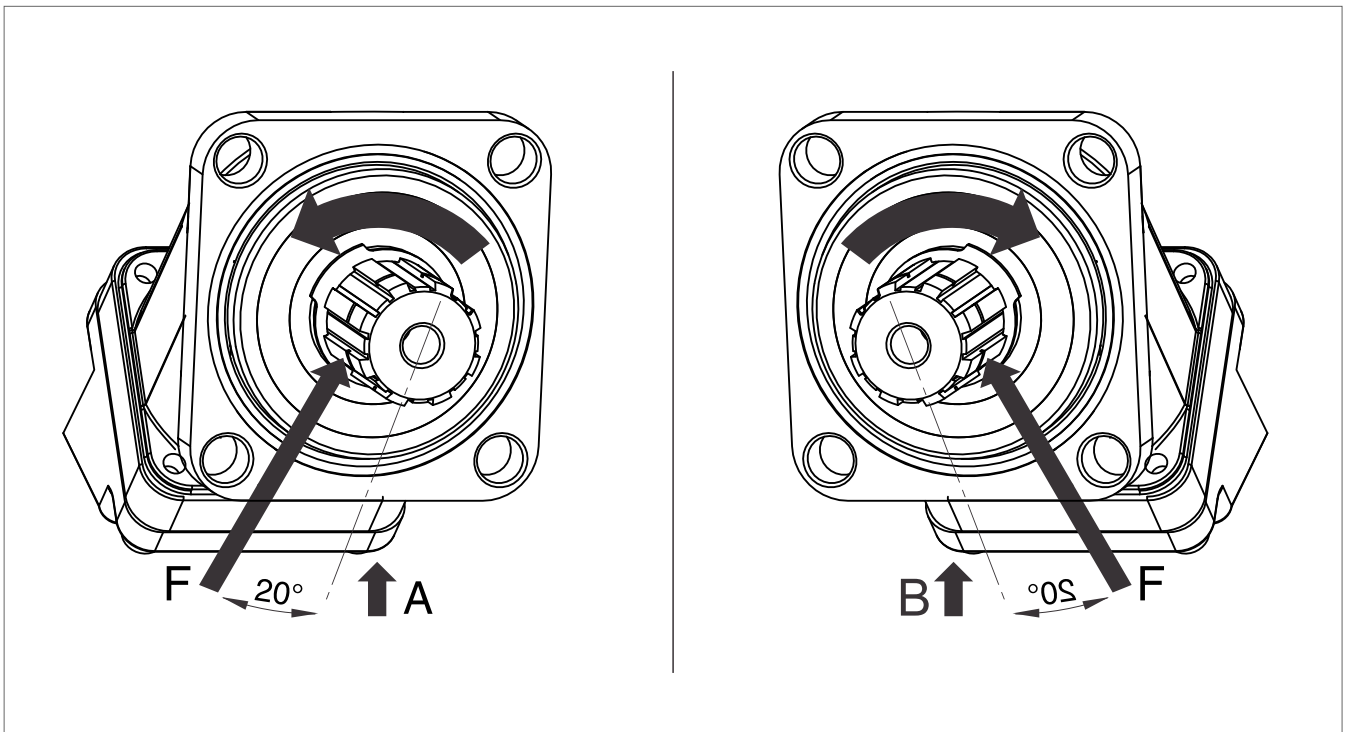


HYDRAULIC FLUID

Recommended ;

Generally : between 15 and 200 cSt.

Maximum : between 5 and 1600 cSt.



FOR USE;

Available via e-mail on request or each motor is supplied via Starting datasheet.

For detailed information about MS Bent Axis Motors, please contact with Technical Department !!!

SAFA

HYDRAULICS



PD-DIN
Bent Axis Pumps



MD-DIN
Bent Axis Motor



PA-SAE
Bent Axis Pumps



MA-SAE
Bent Axis Motor



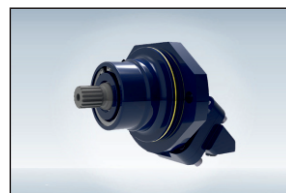
PS-ISO
Bent Axis Pumps



MS-ISO
Bent Axis Motor



PD Dual
Dual Flow Pumps



MF Fixed
Bent Axis Motor



PV
Variable Disp.
Piston Pumps

SAFA HYDRAULICS

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FAX:

+90 332 342 45 71

E-MAIL:

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www.safahydraulic.com

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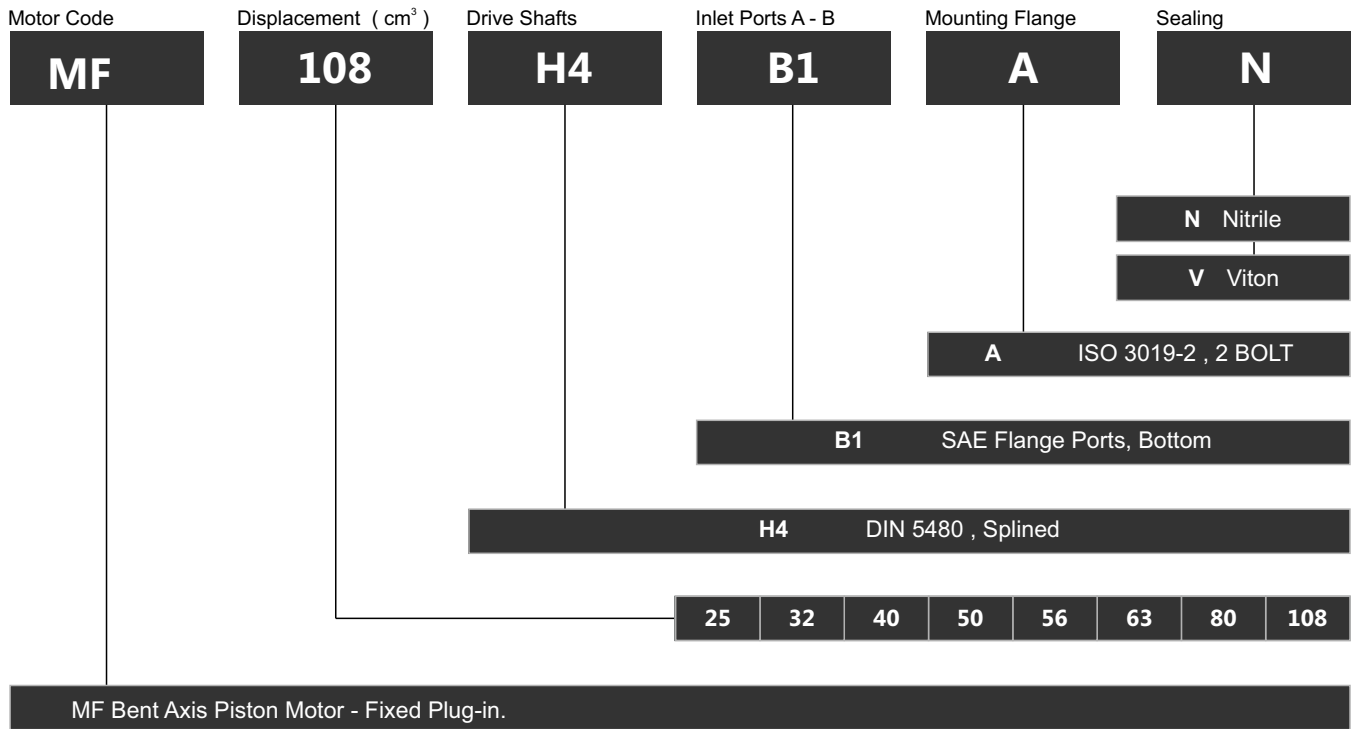
MF Fixed Bent Axis Motor

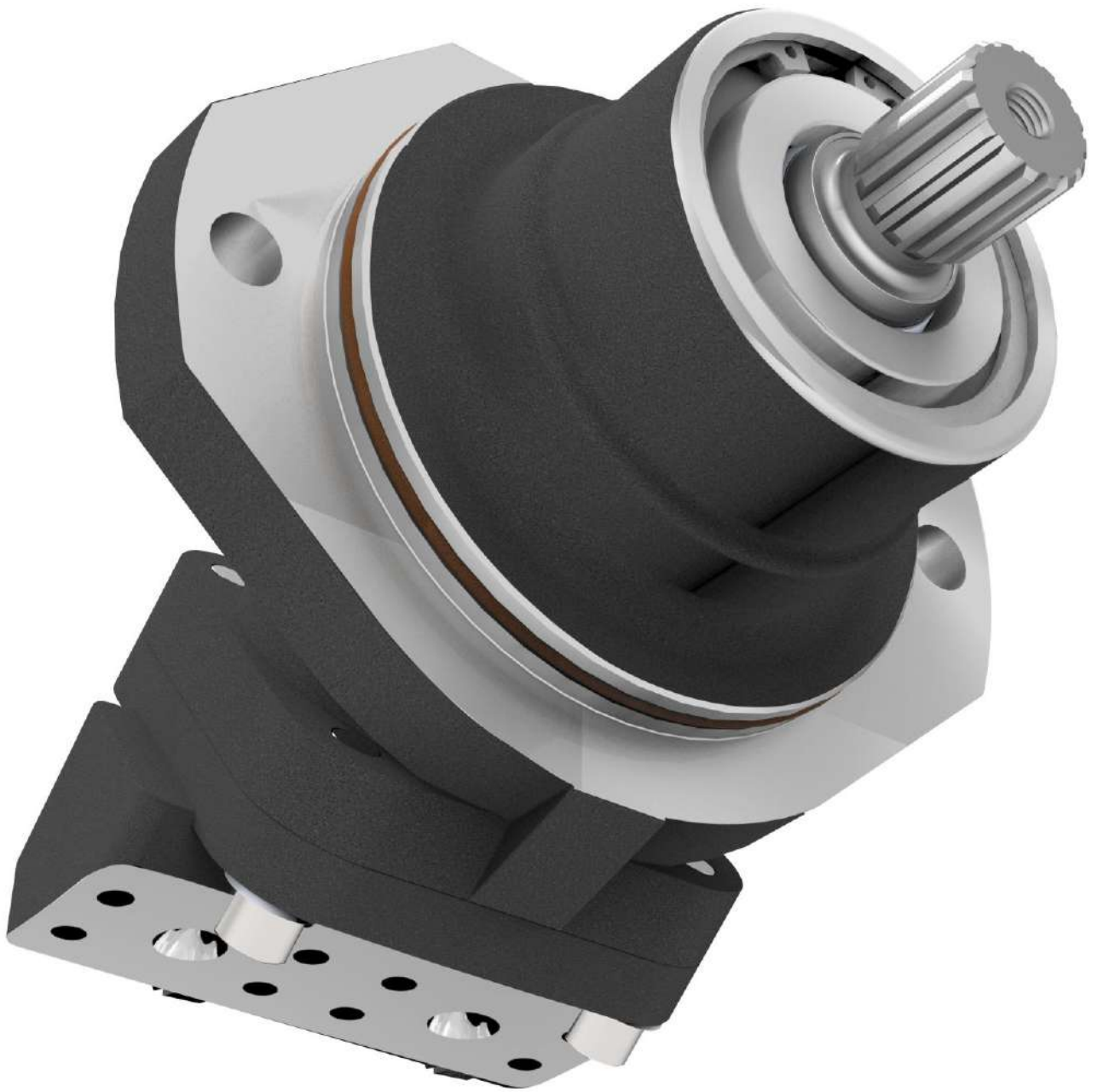


M2 Mounting Flange, Flange, 4 Bolt, 32cc to 108cc

Fixed Plugin Mounting Flange,
High Pressure Bent Axis Piston Motors. Reversible Direction of Rotation.
Displacement Range starting at; 32cc, 40cc, 50cc, 63cc, 80cc, 108cc, 130cc
400/450 Bar, High Pressure, High Rotational Speed, Slim Design, High Efficiency.

Ordering Code of MF Motors



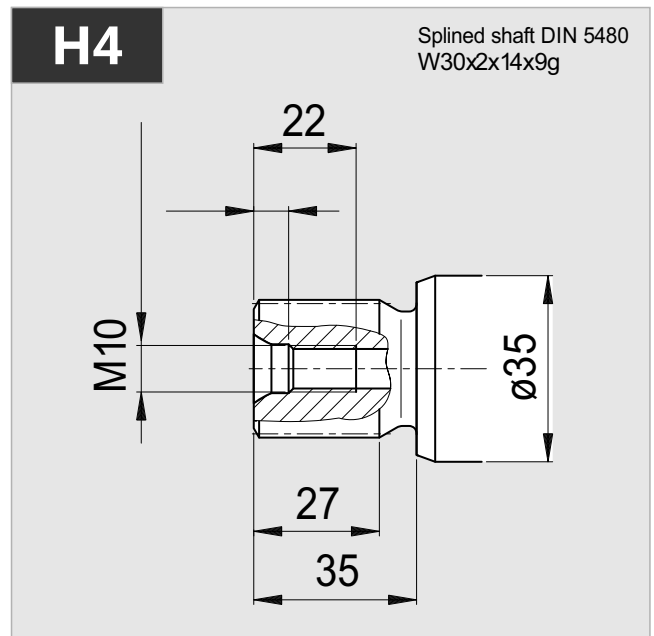
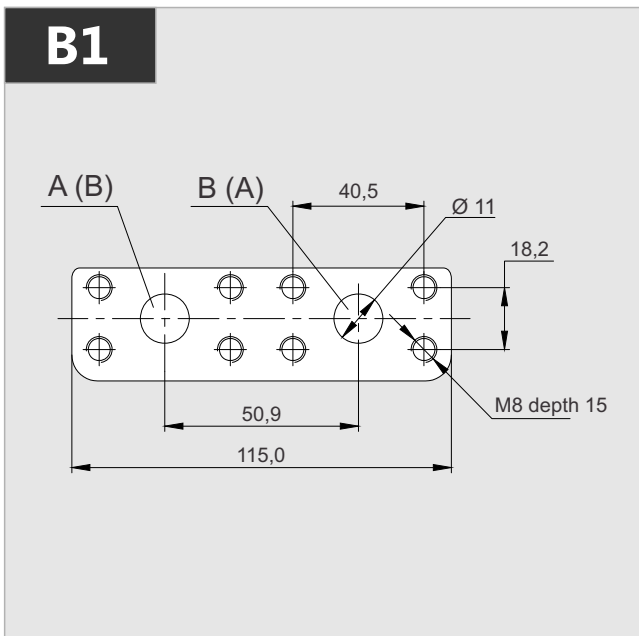
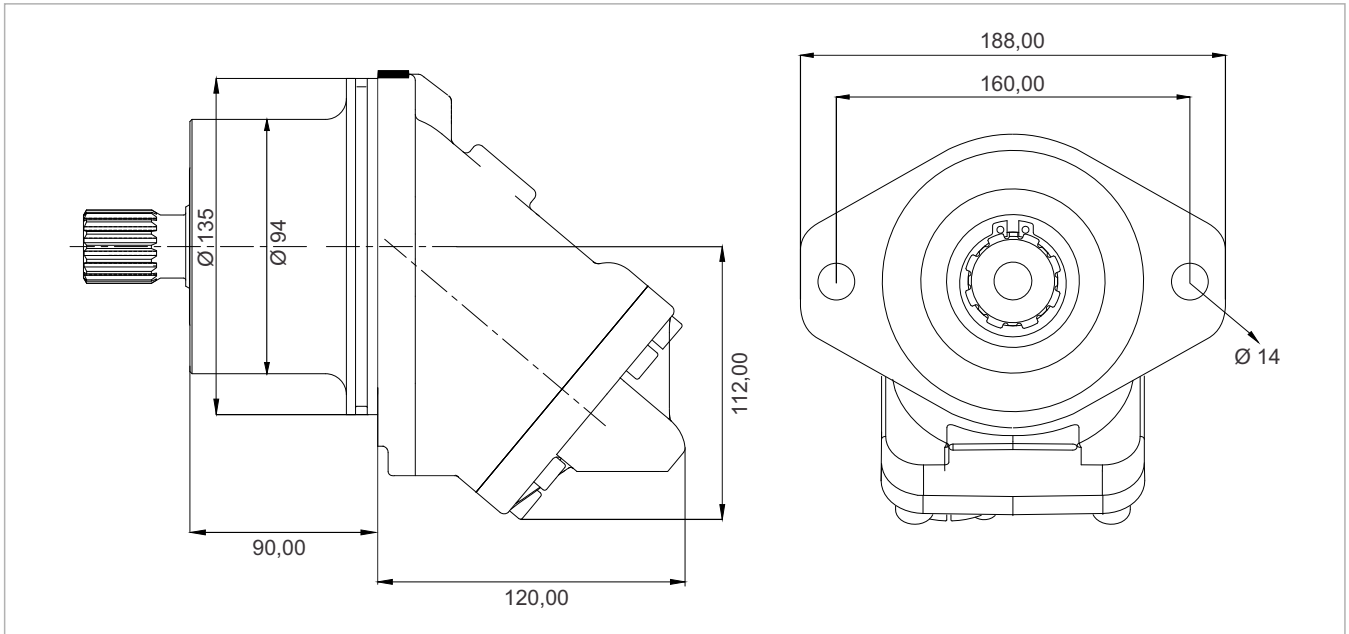


MF

Fixed Plug-in

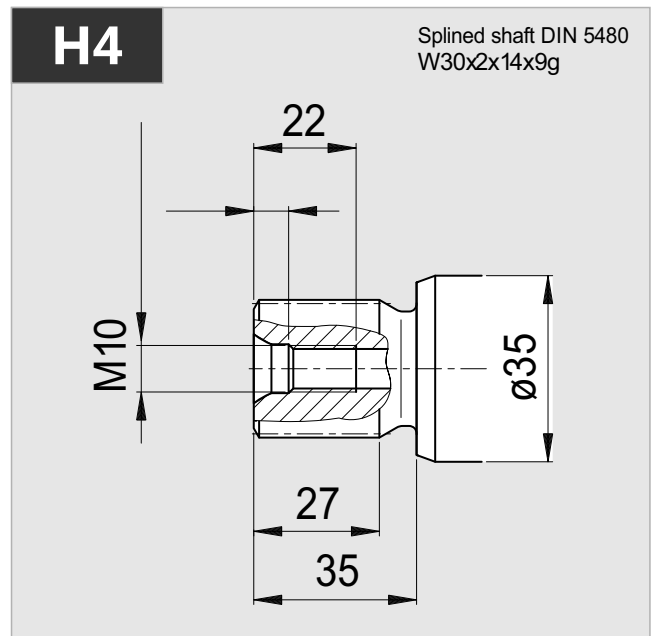
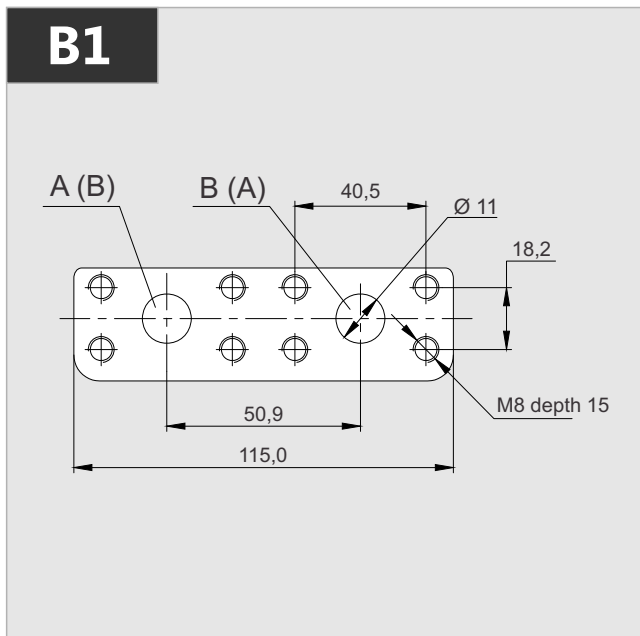
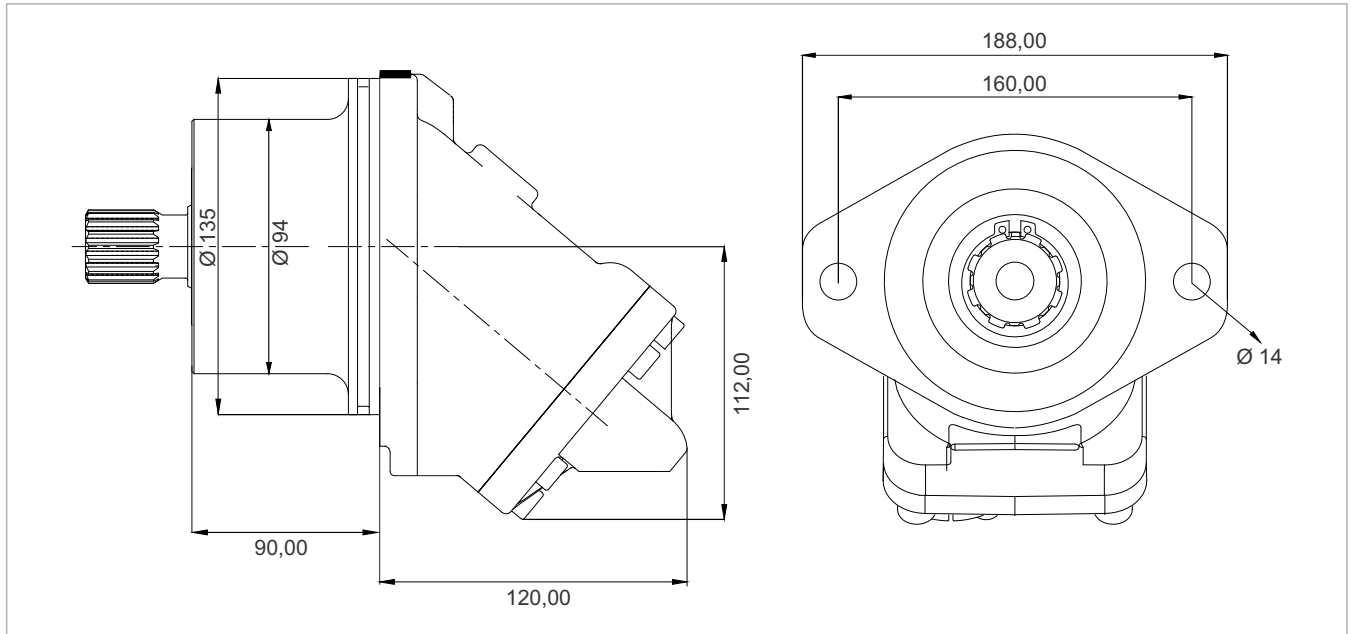
Bent Axis Piston Motors

MF 25



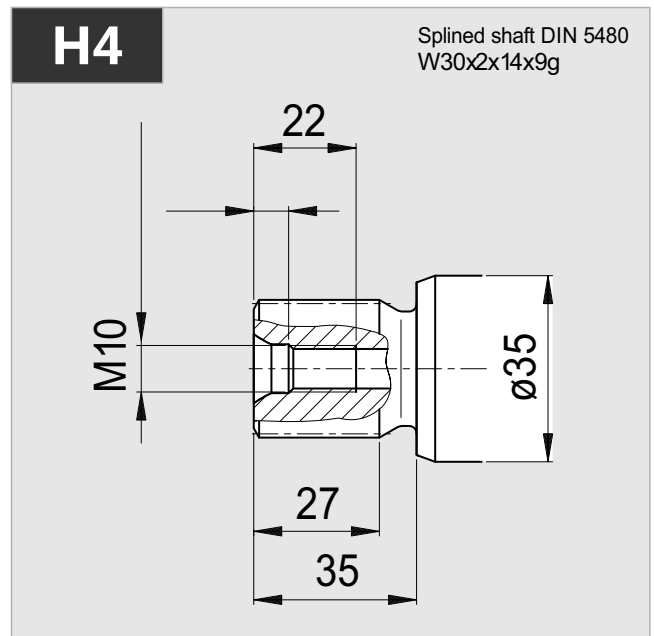
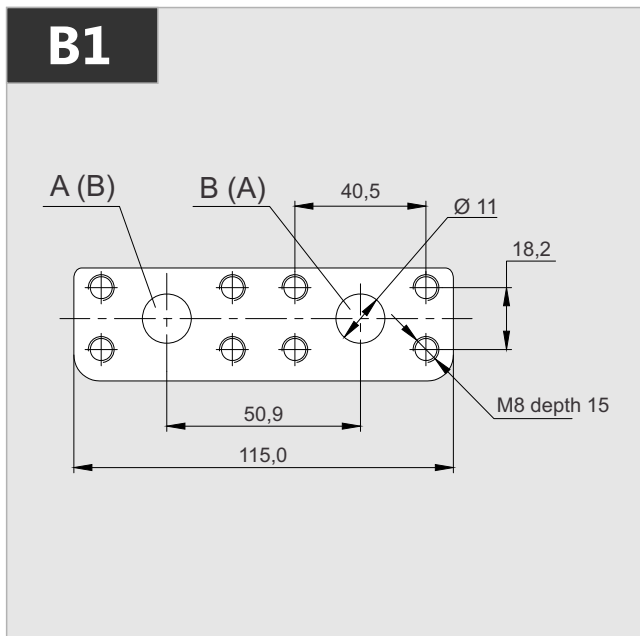
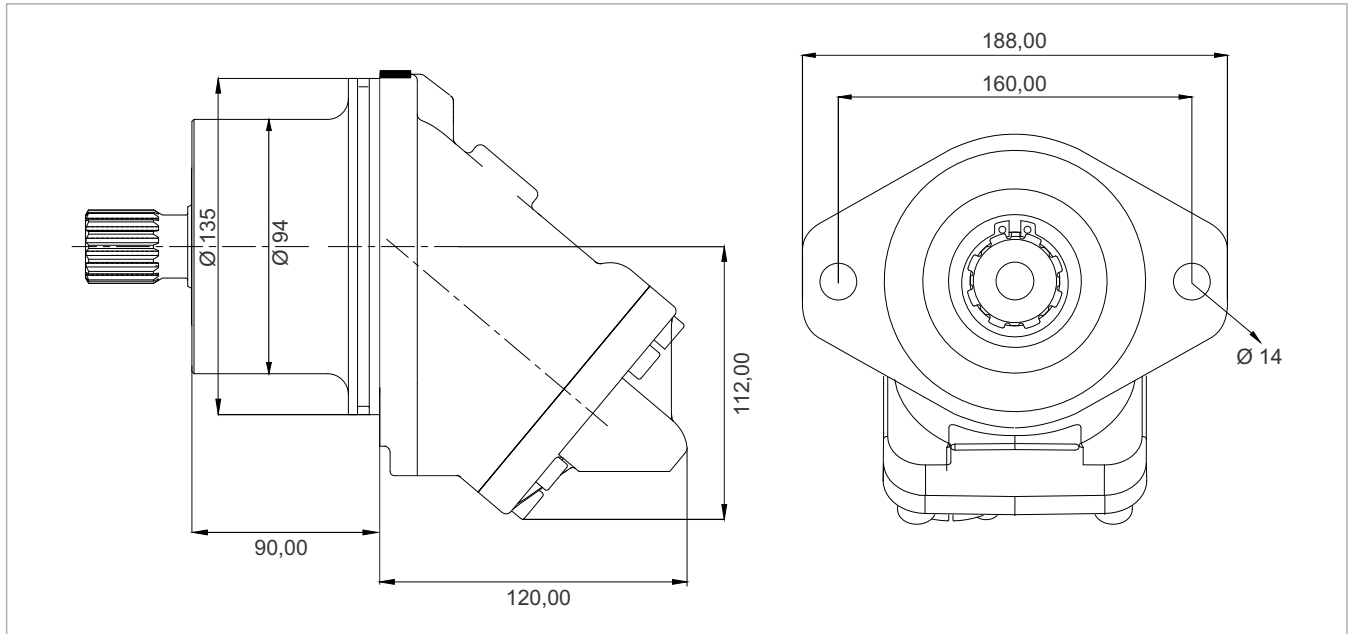
x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
25,00 cc	37,50 cc	6250 rpm	6800 rpm	400 bar	450 bar	0.40 m.N/bar	140 m.N	156	12,00 kg	12,50 kg	-25°	110°

MF 32



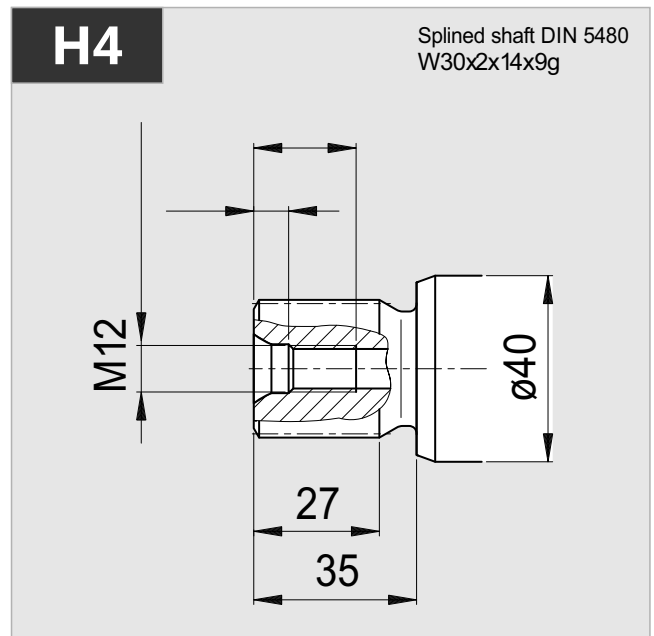
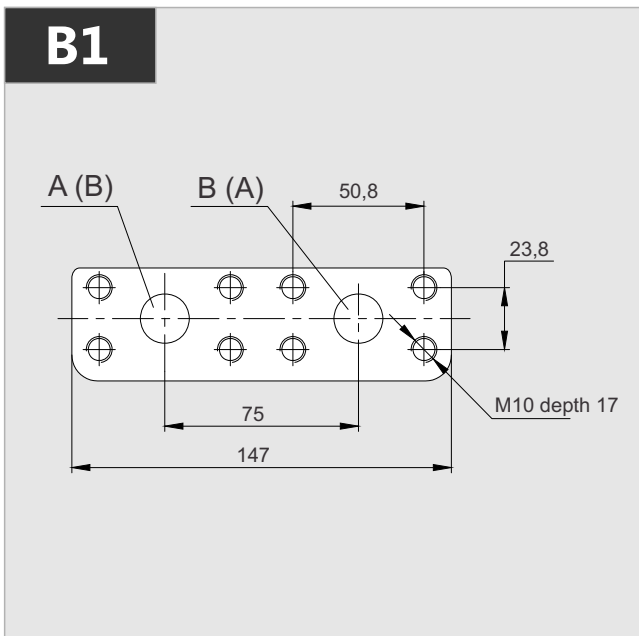
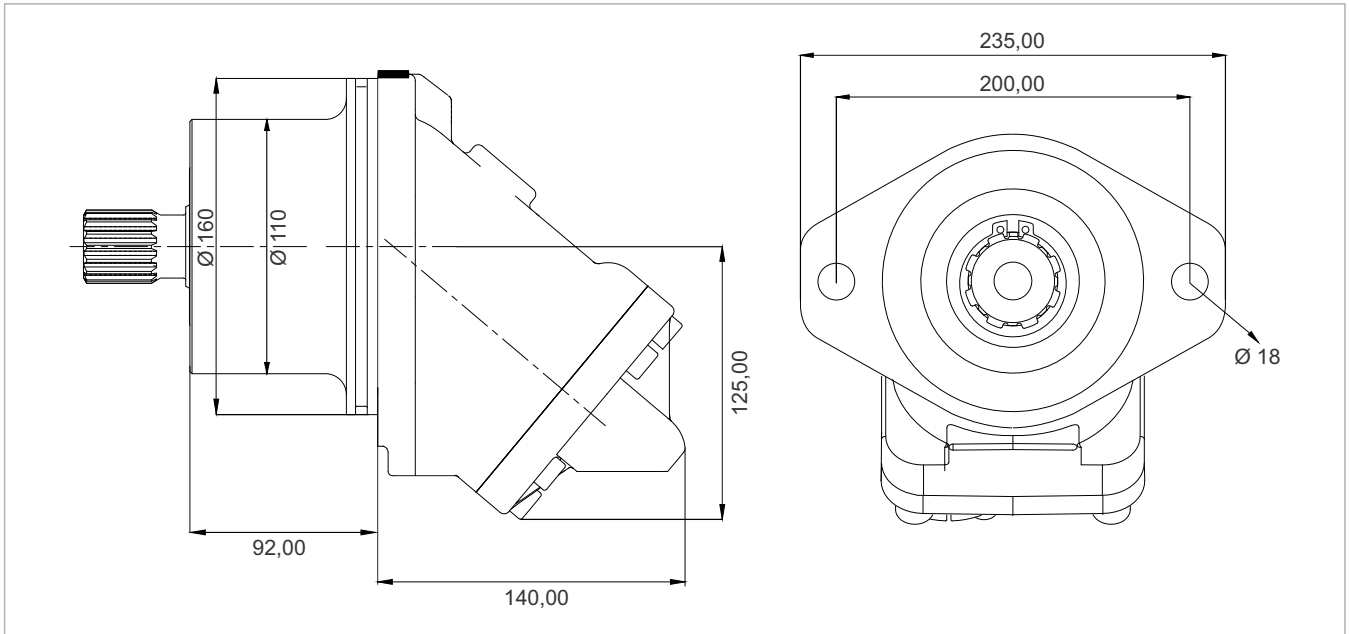
x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
32,00 cc	48,00 cc	6250 rpm	6800 rpm	400 bar	450 bar	0.51 m.N/bar	174 m.N	200	12,00 kg	12,50 kg	-25°	110°

MF 40



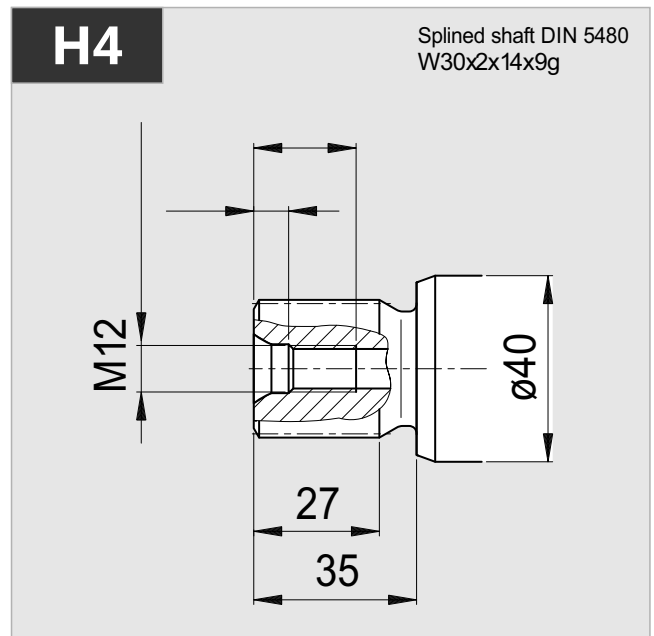
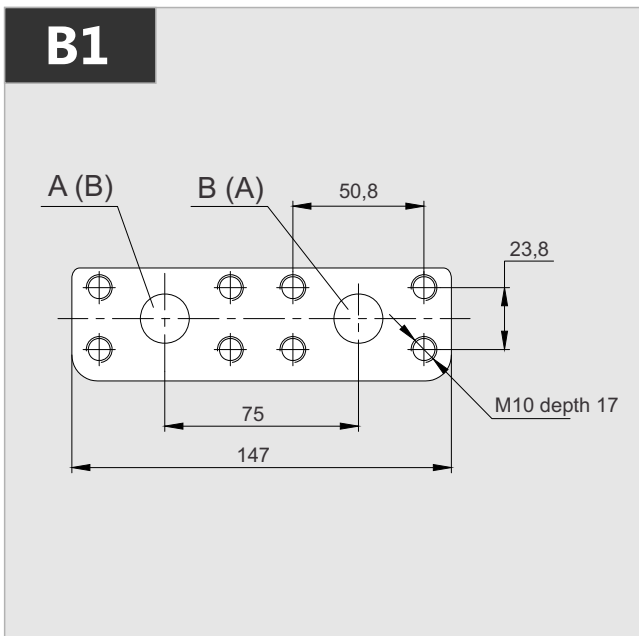
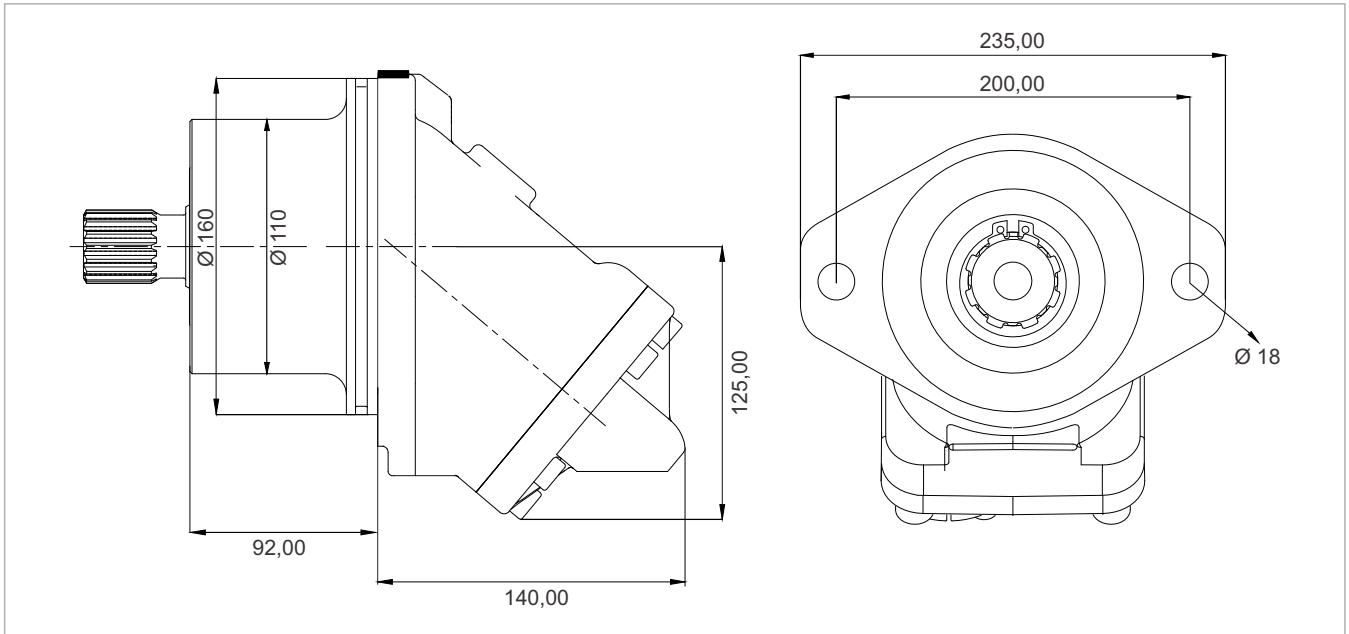
x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
40,20 cc	60,30 cc	5600 rpm	6300 rpm	400 bar	450 bar	0.68 m.N/bar	228 m.N	225	12,00 kg	12,50 kg	-25°	110°

MF 50



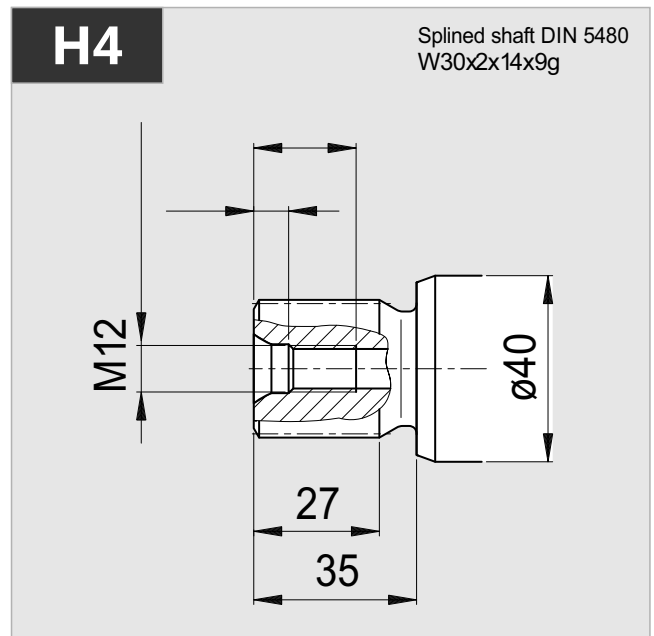
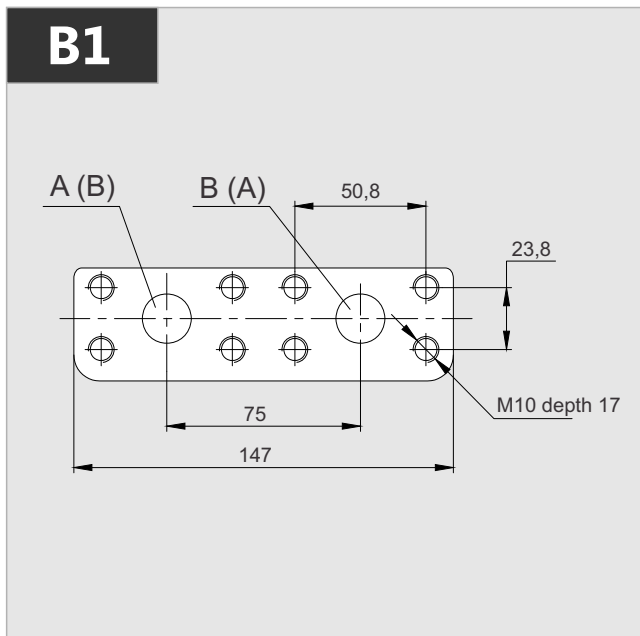
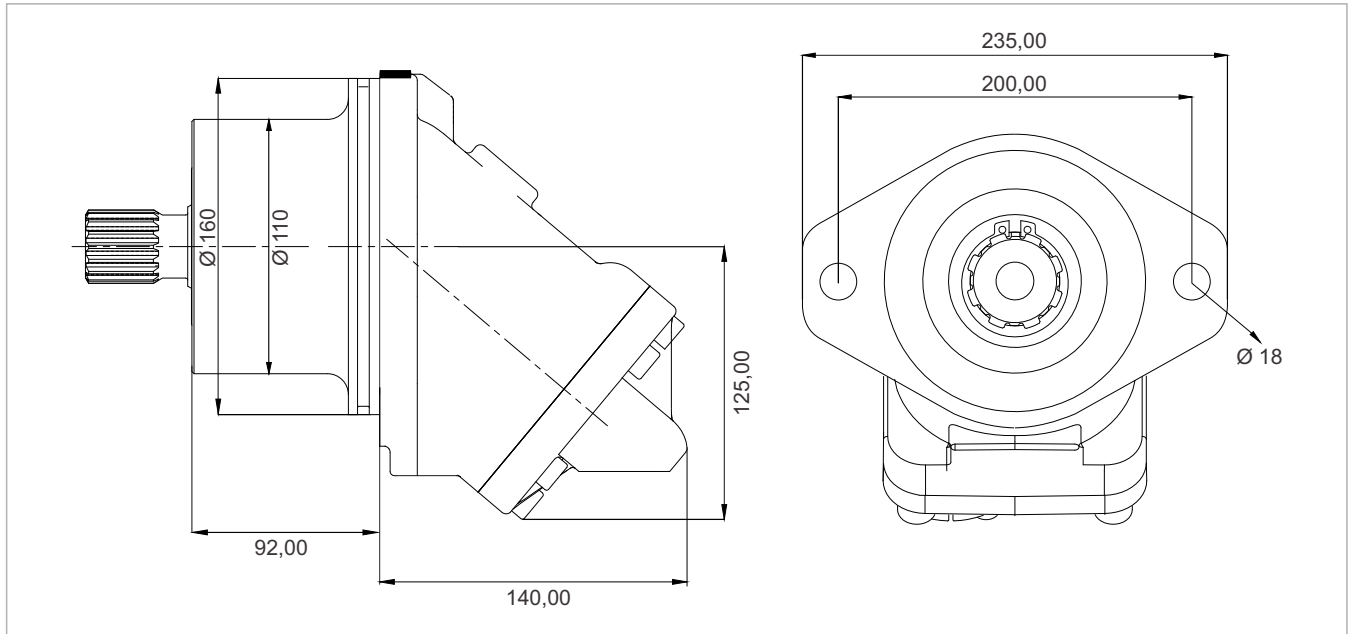
x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
50,00 cc	75,00 cc	5000 rpm	5500 rpm	400 bar	450 bar	0.80 m.N/bar	280 m.N	250	18,50 kg	19,00 kg	-25°	110°

MF 56



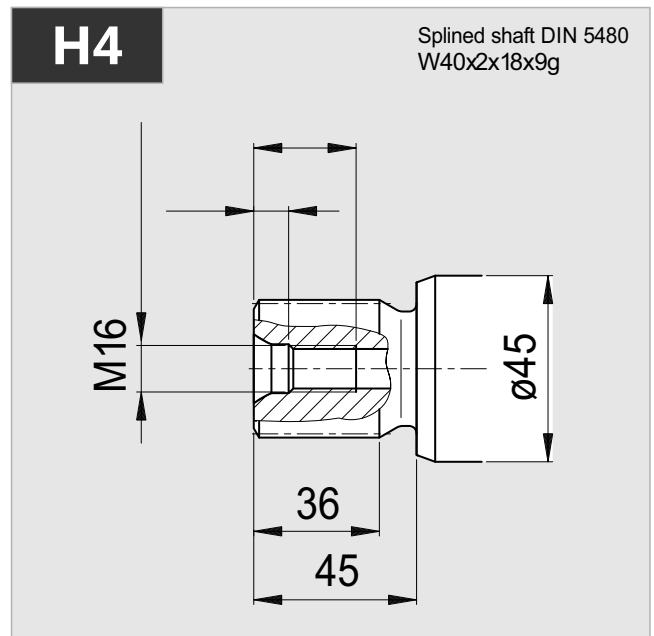
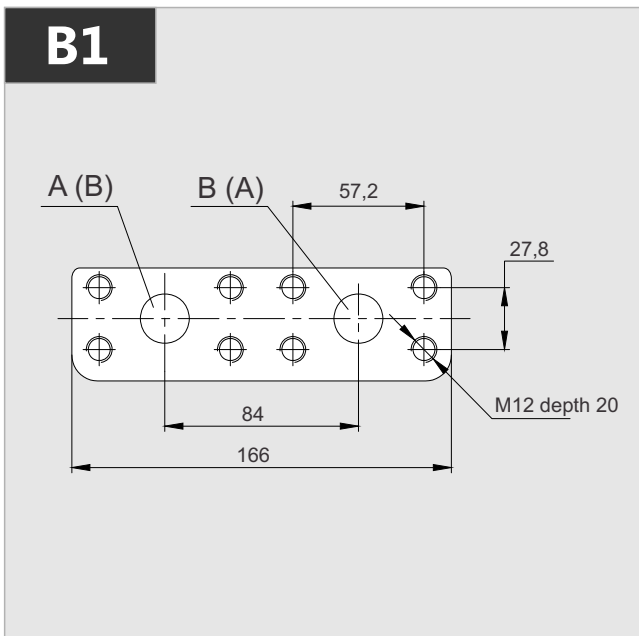
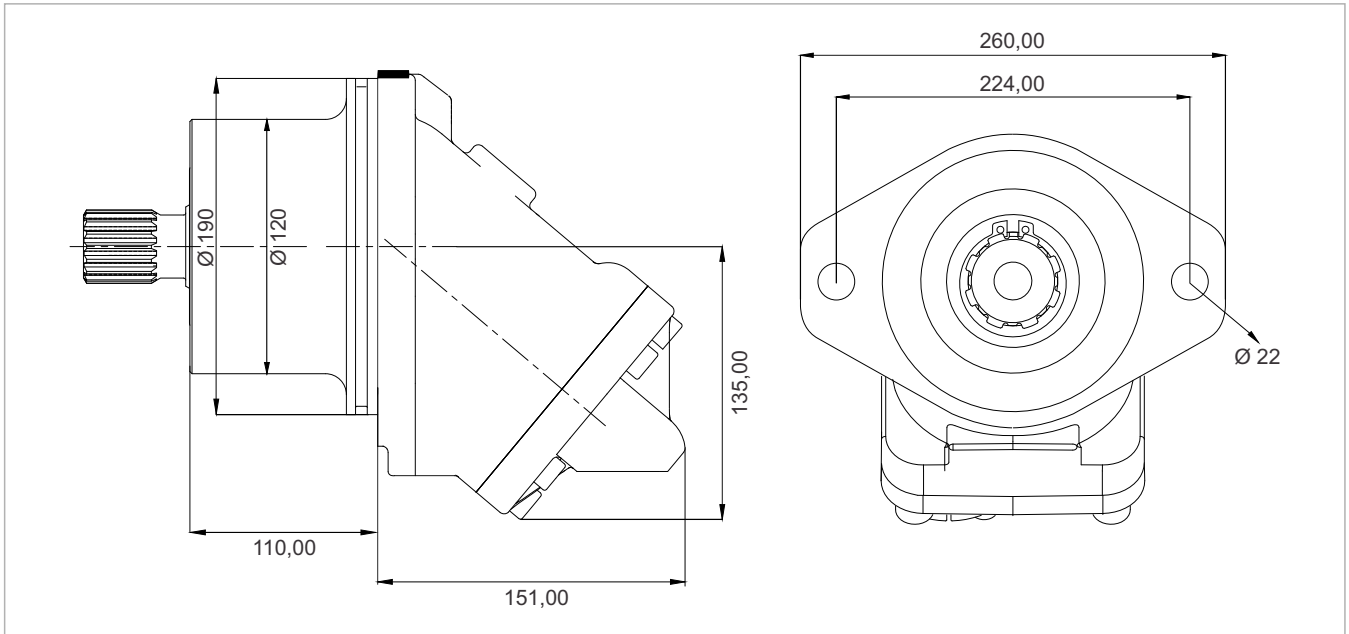
x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
56,40 cc	84,60 cc	5000 rpm	5500 rpm	400 bar	450 bar	0.92 m.N/bar	320 m.N	282	18,50 kg	19,00 kg	-25°	110°

MF 63



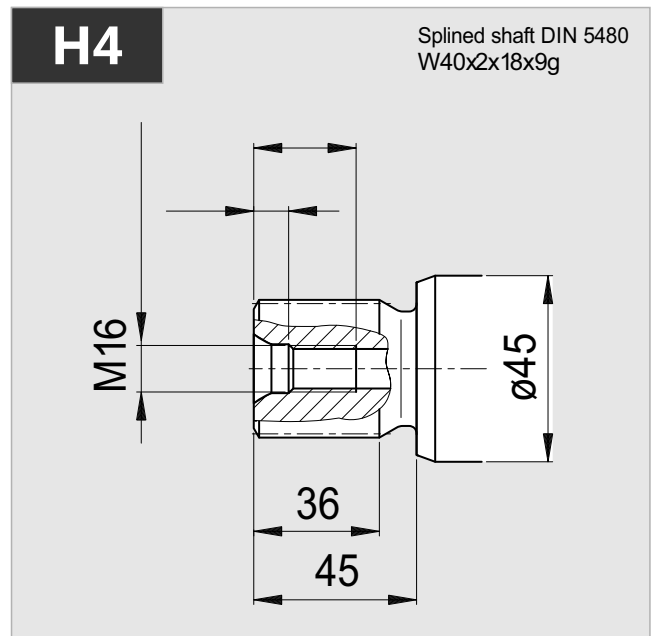
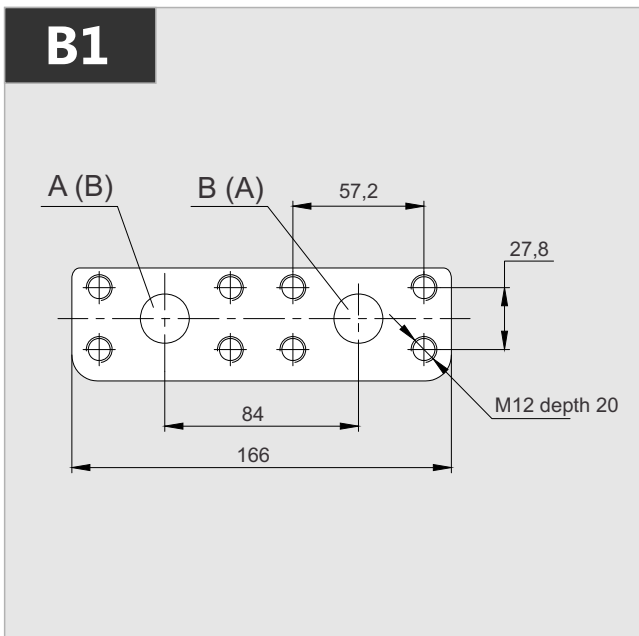
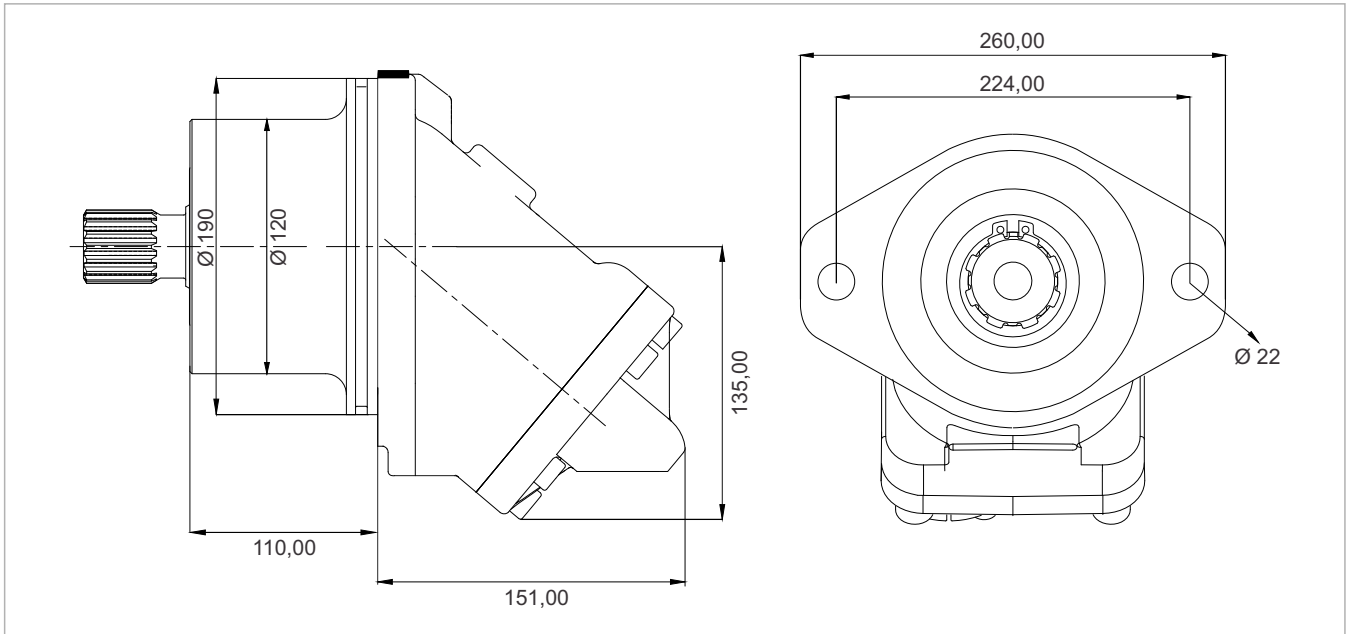
x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
63,00 cc	94,50 cc	5000 rpm	5500 rpm	400 bar	450 bar	1.00 m.N/bar	350 m.N	315	18,50 kg	19,00 kg	-25°	110°

MF 80



x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
80,00 cc	120,00 cc	4400 rpm	4900 rpm	400 bar	450 bar	1.28 m.N/bar	440 m.N	352	25,50 kg	26,00 kg	-25°	110°

MF 108



x 1000 rpm	x 1500 rpm	Max. Contin. Pump Speed	Max. Intermit. Pump Speed	Max. Contin. Pressure	Max. Peak Pressure	Torque bar	Torque at 350 bar	Max. Flow	Weight without accessor.	Weight with accessor.	Max. Motor Temp.	Min. Motor Temp.
108,4 cc	162,6 cc	4000 rpm	4400 rpm	400 bar	450 bar	1.69 m.N/bar	600 m.N	433	25,50 kg	26,00 kg	-25°	110°

Special Shaft Drive

35xf7x2x9g
ГОСТ6033

A8x7x50
DIN6885

A10x5x50
DIN6885

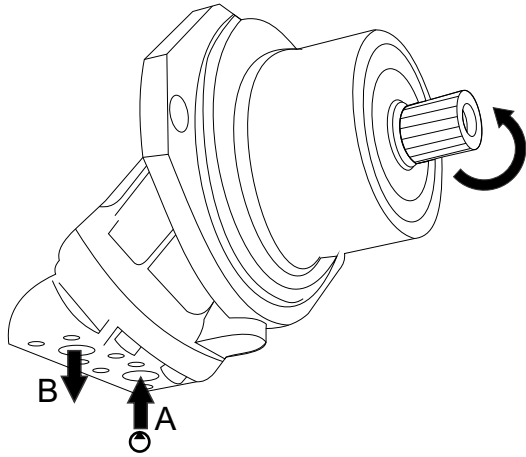
45xh8x2x9g
ГОСТ6033

A12x8x63
DIN6885

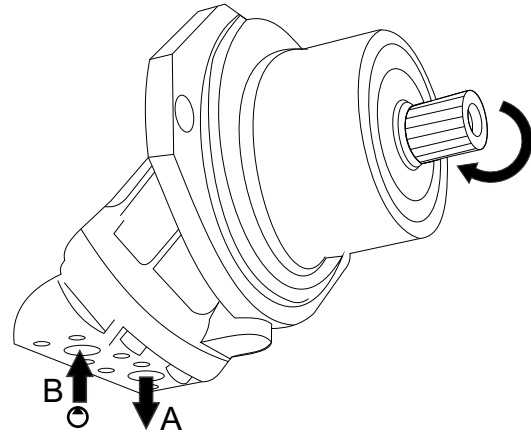
A14x9x63
DIN6885

Direction of Rotation

ROTATION
CCW



ROTATION
CW



Quick Calculation

Flow rate

$$Q = \frac{V_s \cdot n}{1000 \eta_v} \text{ (lpm)}$$

Torque

$$M = \frac{V_s \cdot \Delta p \cdot \eta_{mh}}{63} \text{ (Nm)}$$

Power

$$P = \frac{2\pi \cdot M \cdot n}{60000} = \frac{M \cdot n}{9549} = \frac{Q \cdot \Delta p \cdot \eta_t}{600} \text{ (kw)}$$

Speed

$$n = \frac{1000 \cdot Q \cdot \eta_v}{V_s} \text{ (lpm)}$$

V_s = Displacement (ccm/rev.)

Δp = Diff. pressure (bar)

n = Speed (rpm)

Q = Flow (lpm)

η_v = Volumetric efficiency

η_{mh} = Mechanical-hydraulic efficiency

η_t = Total efficiency ($\eta_t = \eta_v \times \eta_{mh}$)

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 MF Bent Axis Motors.

Installation

POSITION

MF Motors can be operate any position.

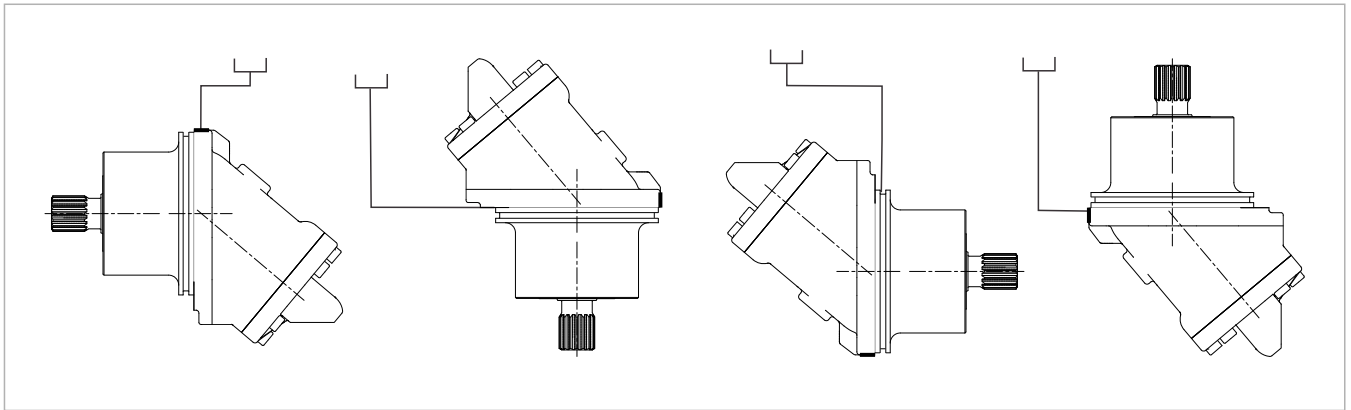
DIRECTION OF ROTATION

MF Motors can be operate in both directions of rotation.

Before of Installation operation, the motor must be filled with hydraulic fluid and air bled.

INSTALLATION POSITION

See following examples.

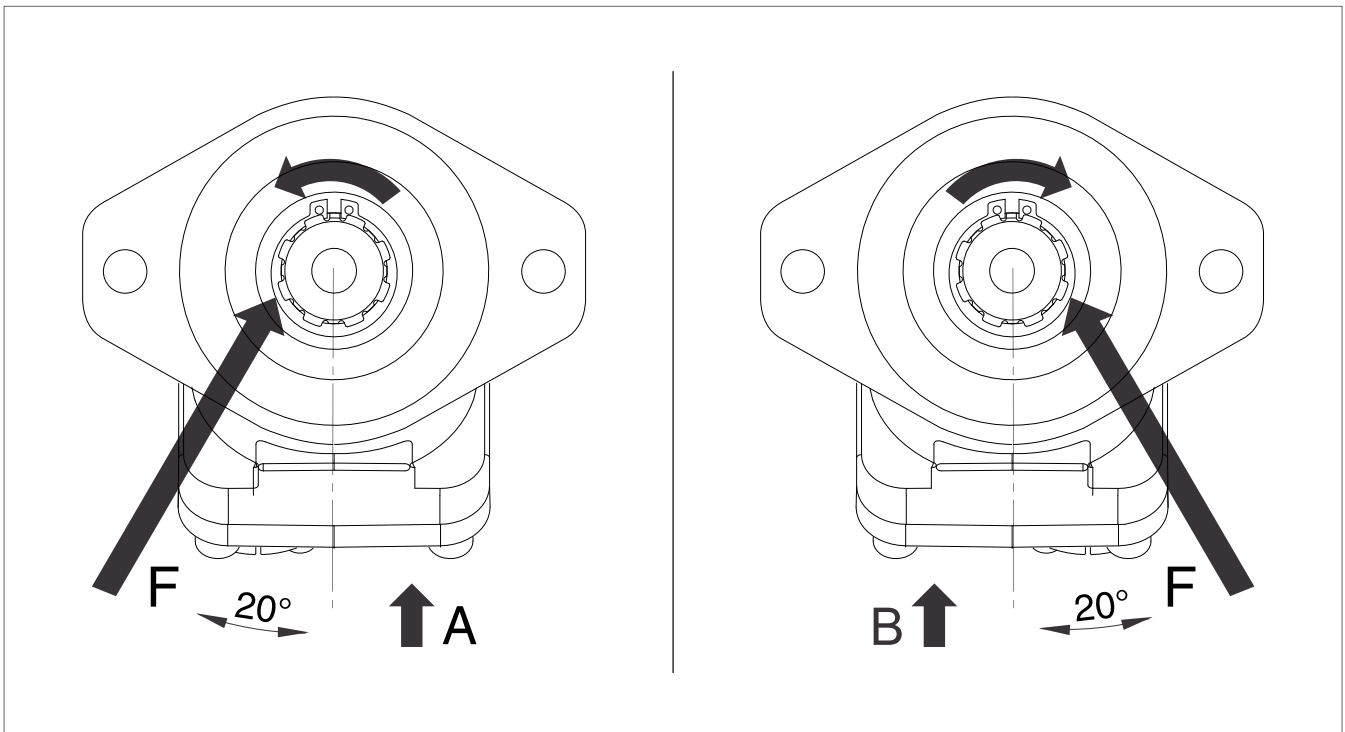


HYDRAULIC FLUID

Recommended ;

Generally : between 15 and 200 cSt.

Maximum : between 5 and 1600 cSt.



FOR USE;

Available via e-mail on request or each motor is supplied via Starting datasheet.

For detailed information about MF Bent Axis Motors, please contact with Technical Department !!!

SAFA

HYDRAULICS



PD-DIN
Bent Axis Pumps



MD-DIN
Bent Axis Motor



PA-SAE
Bent Axis Pumps



MA-SAE
Bent Axis Motor



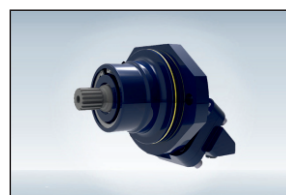
PS-ISO
Bent Axis Pumps



MS-ISO
Bent Axis Motor



PD Dual
Dual Flow Pumps



MF Fixed
Bent Axis Motor



PV
Variable Disp.
Piston Pumps

SAFA HYDRAULICS

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