

A9MS (SAE) Bent Axis Piston Motor

SAE B, SAE B2, SAE B6, SAE C and SAE D Versions of Mounting Flange
High Pressure Hydraulic Bent Axis Piston Motors, High Pressure,
450/500 BAR Working Pressure. High Rotational Speed, High Efficiency,
Slim Design, Cast Iron Motor Body, Re-Designed in 2025.

Designation;

5cc, 10cc, 12cc, 18cc, 25cc, 32cc, 41cc, 50cc,
56cc, 63cc, 80cc, 108cc, 126cc



www.hydapac.com

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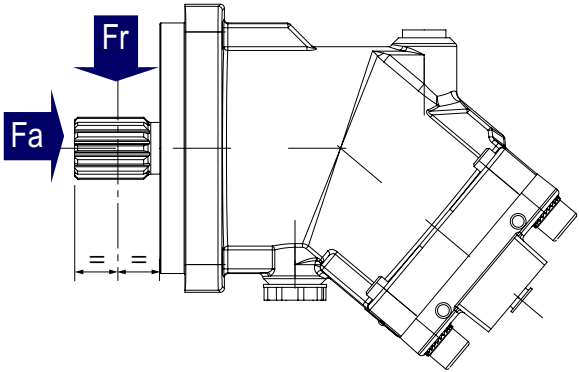
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Characteristics of the A9MS - SAE Flange Bent Axis Motors

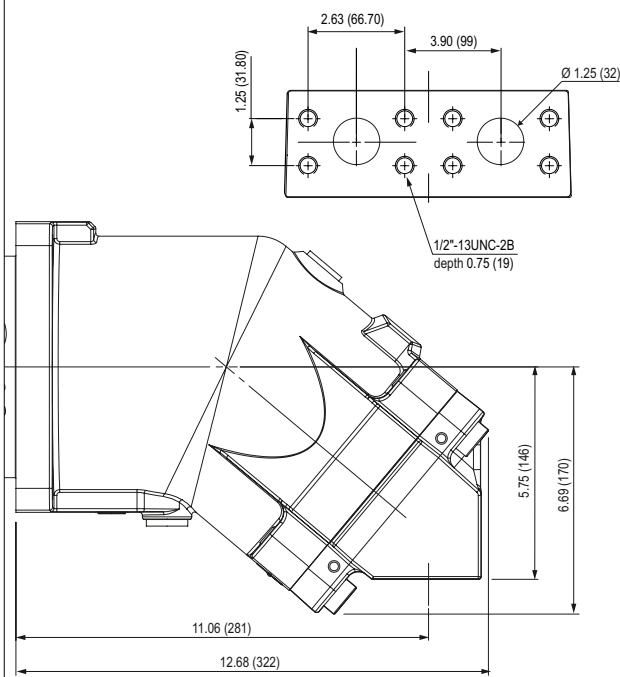
MOTOR MODEL	DISPL. (cc)	CONTINUOUS MAX. SPEED (rpm)	INTERMITTENT MAX. SPEED (rpm)	MAX. FLOW ABSORBED (l/mn)	TORQUE BAR (m.N/bar)	TORQUE AT 350 BAR (m.N)	THEORETCL MAX. POWER AT 400 BAR (HP / kW)	MAX. ALLOW PRESSURE CONTN./PEAK (bar)	WEIGHT (kg)
5 cc	5.1	8800	9600	45	0.09	46	64.1 / 48.2	400 / 450	6.4
10 cc	10.2	8600	9400	88	0.14	58	72.9 / 54.4	400 / 450	6.5
12 cc	12.0	8000	8800	96	0.19	67	85.5 / 64.4	400 / 450	6.5
18 cc	18.0	8000	8800	144	0.28	99	128.5 / 95.9	400 / 450	6.5
25 cc	25.0	6300	6900	158	0.40	139	140.0 / 104.4	400 / 450	11.4
32 cc	32.0	6300	6900	202	0.50	178	180.5 / 134.4	400 / 450	11.5
41 cc	41.0	5600	6200	230	0.65	228	205.2 / 153.1	400 / 450	11.6
45 cc	45.0	5600	6200	252	0.72	253	202.4 / 151.8	400 / 450	17.9
50 cc	50,3	5000	5500	252	0.80	280	224.1 / 167.5	400 / 450	18.1
56 cc	56,0	5000	5500	280	0.90	320	244.5 / 187.1	400 / 450	18.1
63 cc	63.0	5000	5500	315	1.00	351	281.6 / 209.1	400 / 450	18.2
80 cc	80,4	4500	5000	362	1.27	447	323.6 / 241.5	400 / 450	23.1
90 cc	90,1	4500	5000	405	1.43	500	361.5 / 269.9	400 / 450	23.2
108 cc	108	4000	4400	435	1.70	598	328.8 / 245.6	400 / 450	35.2
125 cc	125	3400	4400	428	2.00	698	382.6 / 284.6	400 / 450	38.8
160 cc	160	3400	4000	486	2.55	890	514.6 / 383.9	400 / 450	48.6
180 cc	180	3400	4000	612	2.86	1004	581.2 / 433.6	400 / 450	52.6



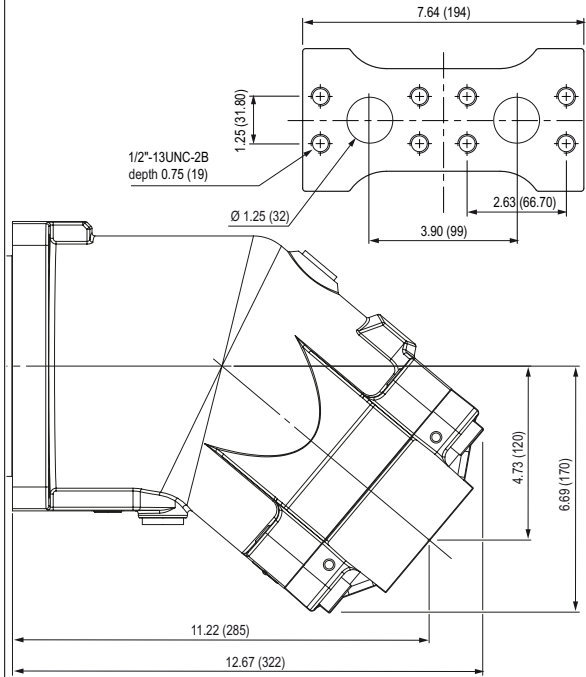
Motor model	5, 10, 12	18 cc	25 cc	32 cc	41. 45	50 cc	56, 63cc	80,90,108	125 cc	160, 180
Fr (lbf)	630	900	1350	1462.5	1462.5	1686	2023	2812	3262	4500
Fr (N/bar)	2800	4000	6000	6500	6500	7500	9000	12500	14500	20000
Fa (lbf)	0.23	0.31	0.42	0.46	0.62	0.62	0.77	1.24	1.33	1.47
Fa (N/bar)	(15)	(20)	(27)	(30)	(40)	(40)	(50)	(80)	(86)	(95)

A9MS - 160 cc (SAE D) - 4 Bolt

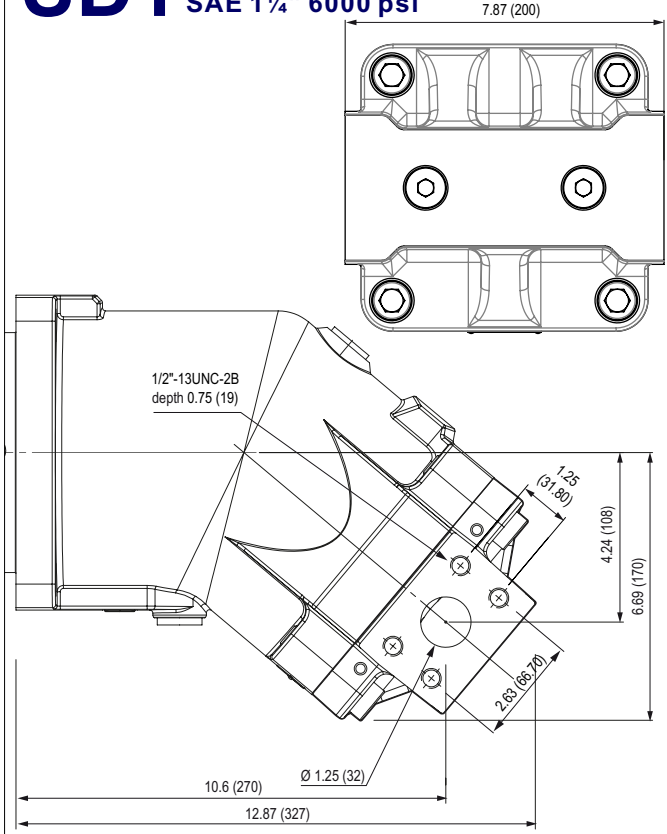
R45 SAE flange ports, rear
SAE 1 1/4" 6000 psi



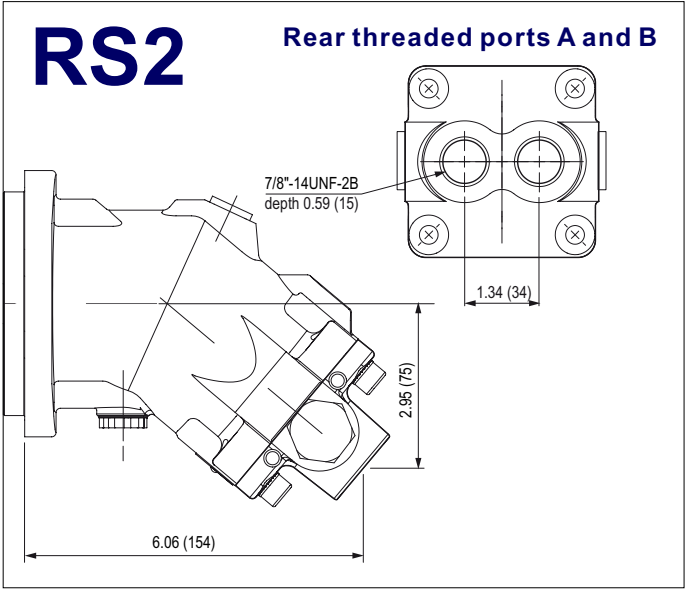
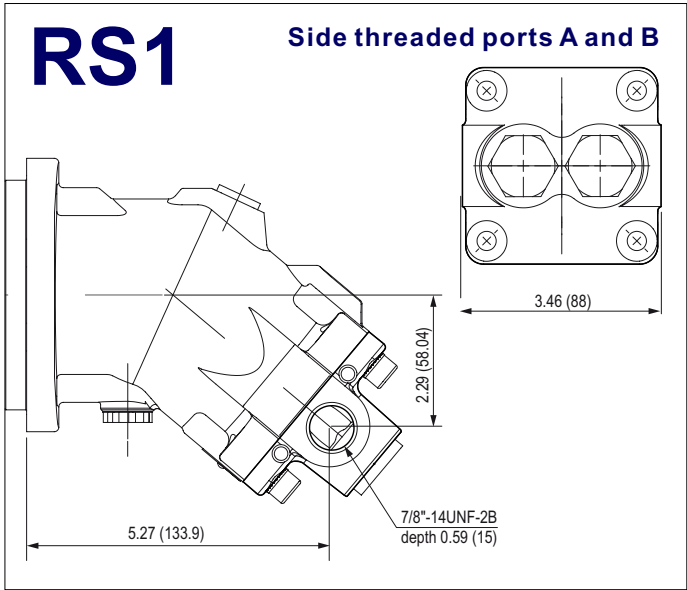
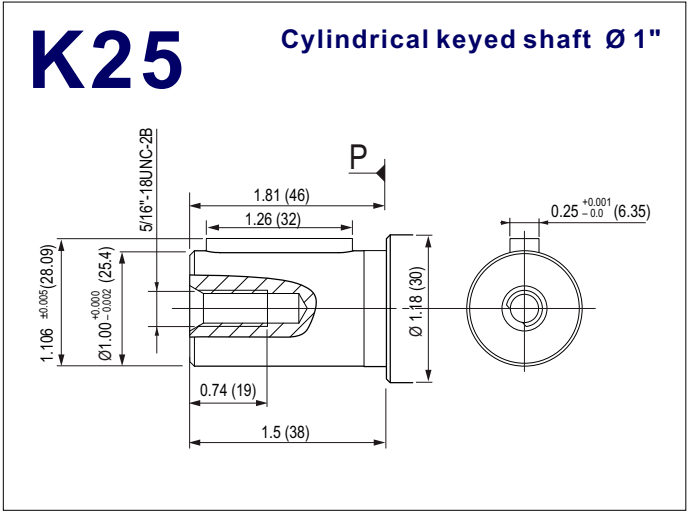
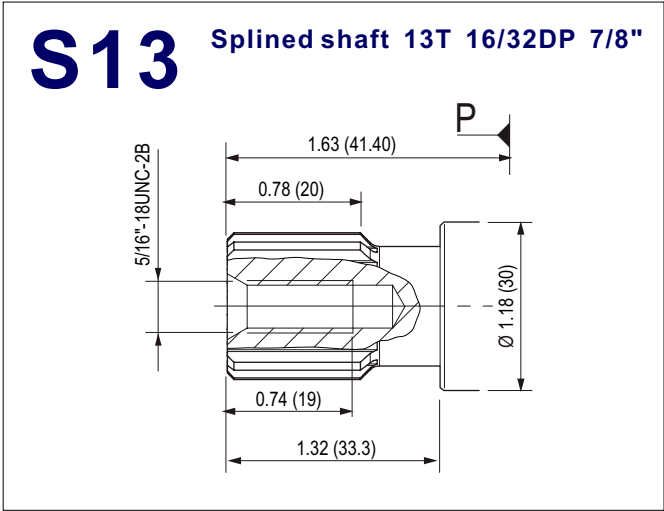
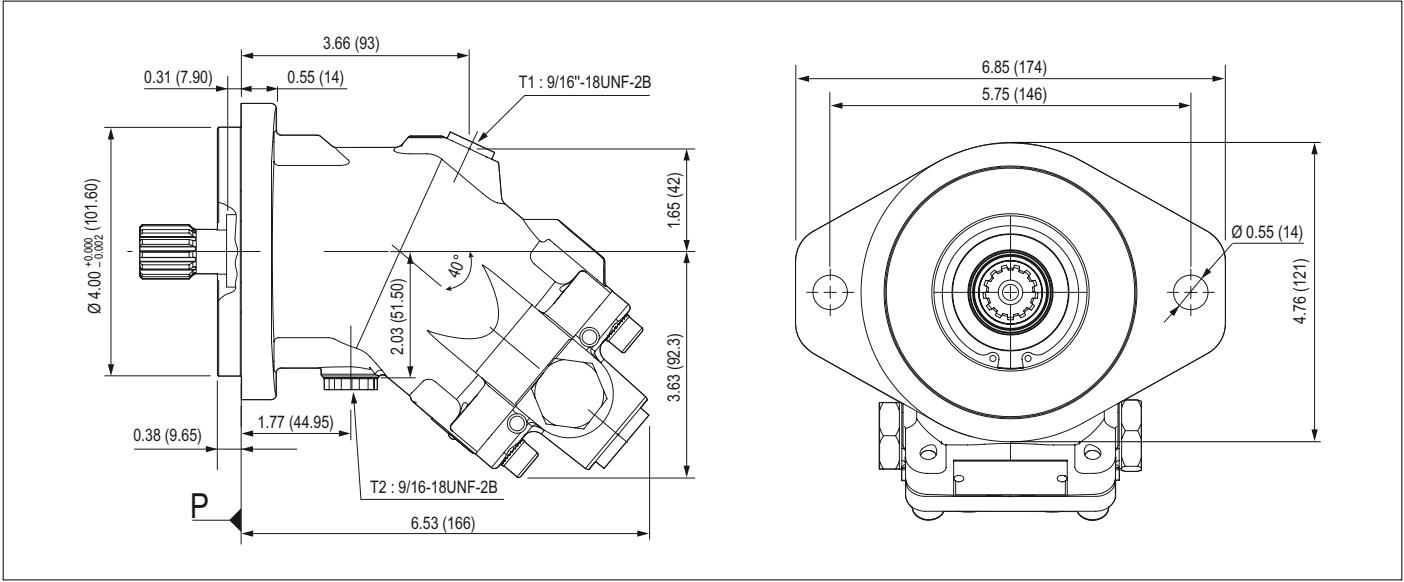
RD1 SAE flange ports, bottom
SAE 1 1/4" 6000 psi



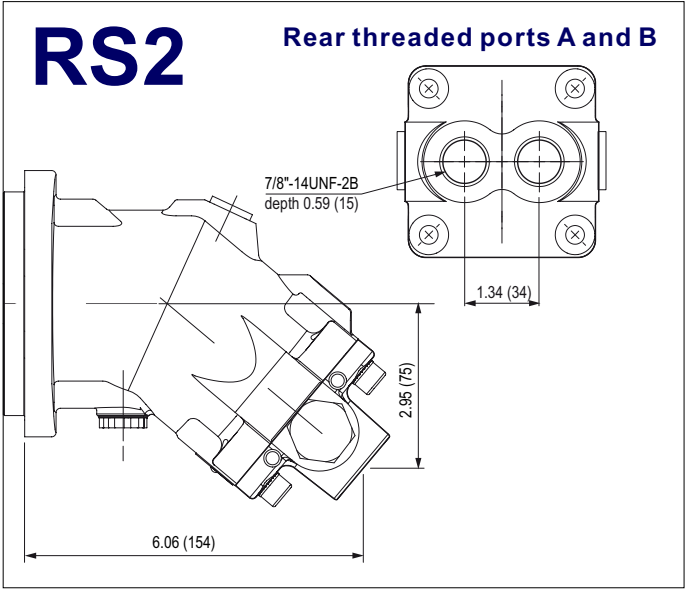
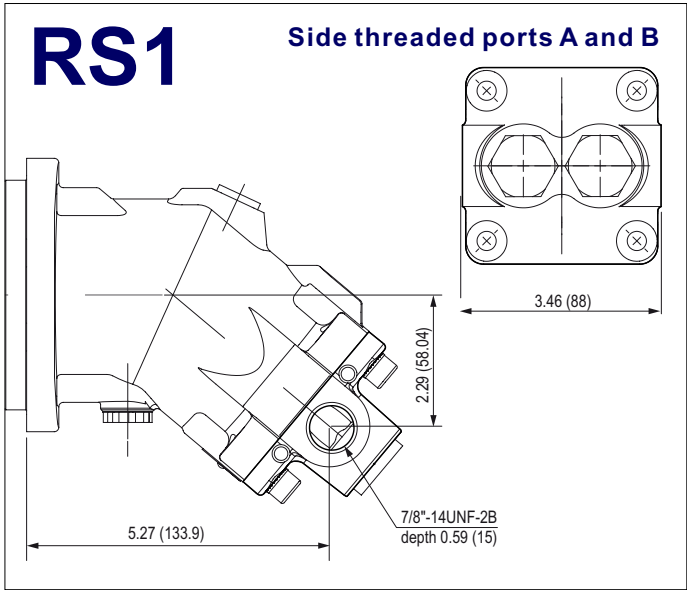
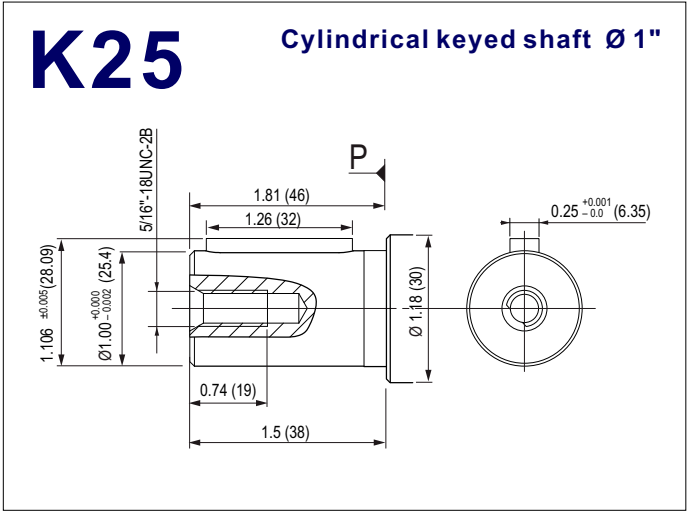
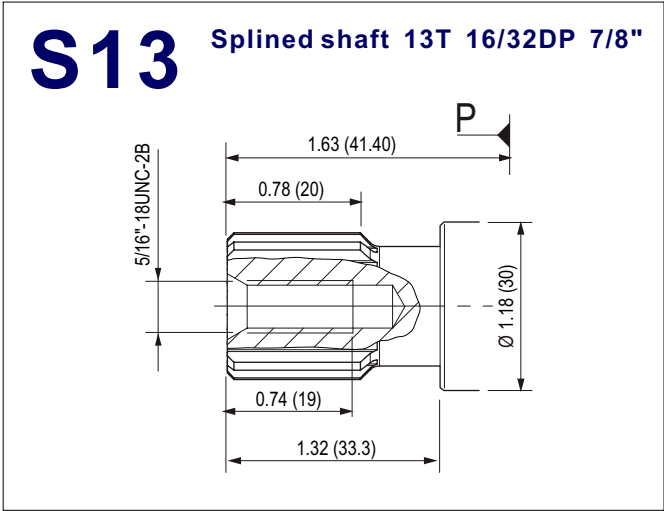
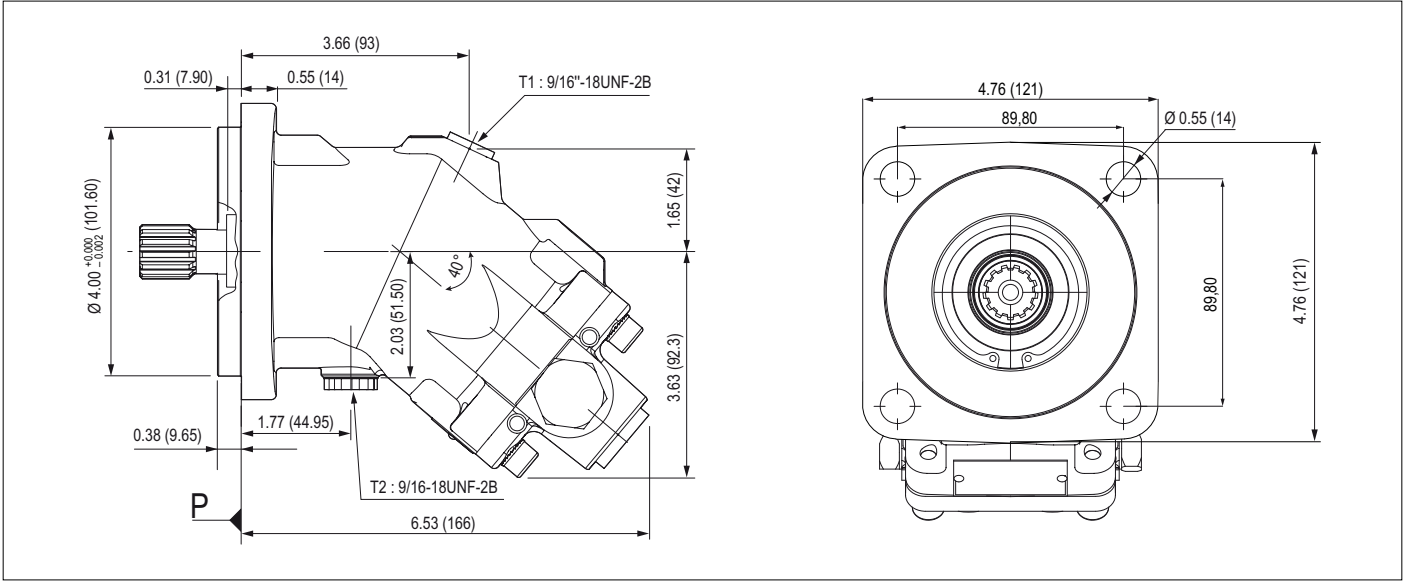
SD1 SAE flange ports, side A and B
SAE 1 1/4" 6000 psi



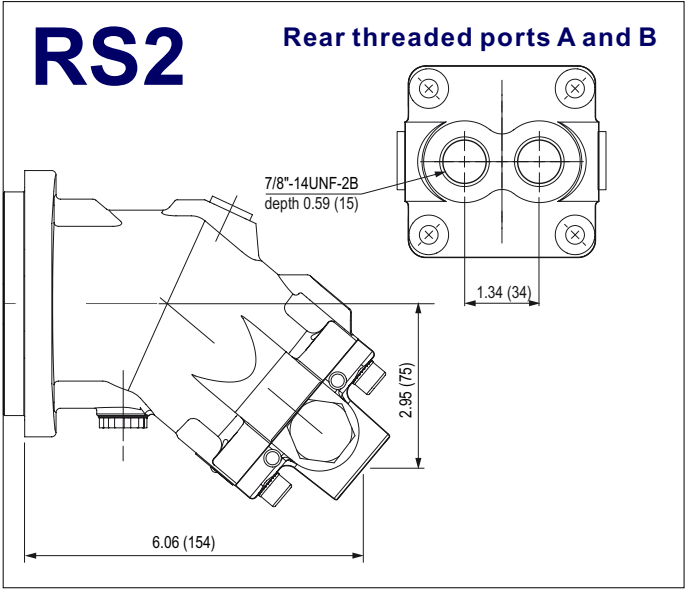
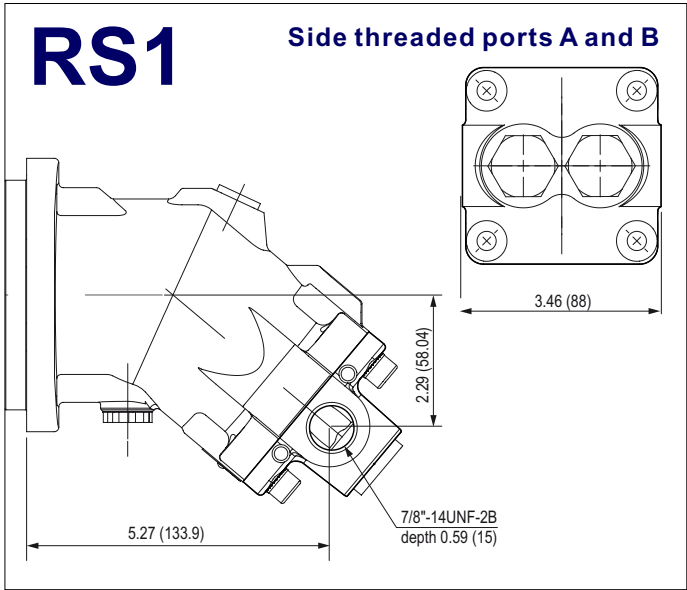
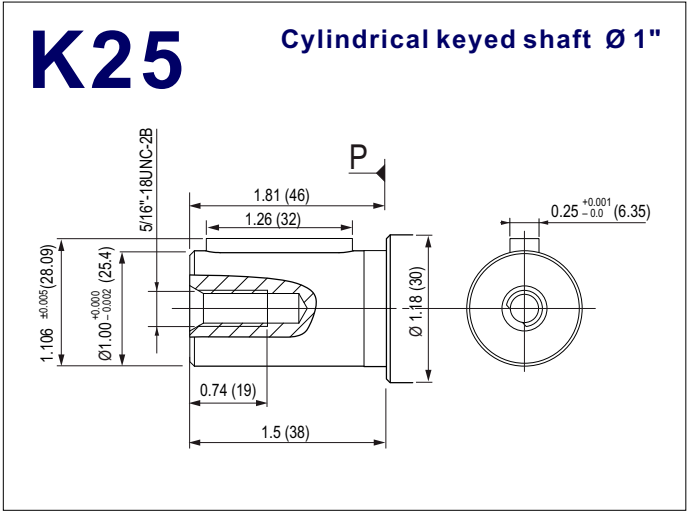
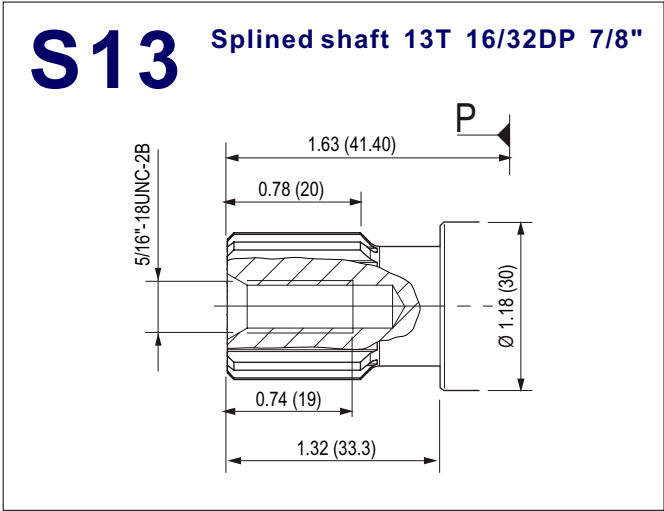
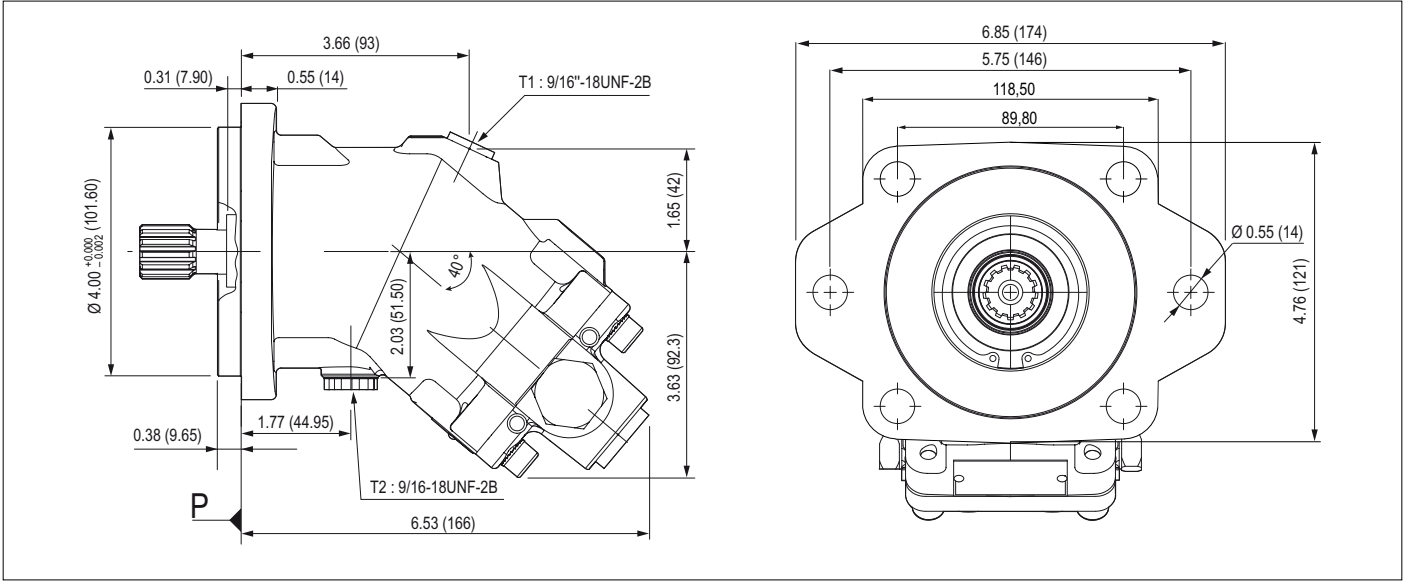
A9MS - 5 cc (SAE B) - 2 Bolt



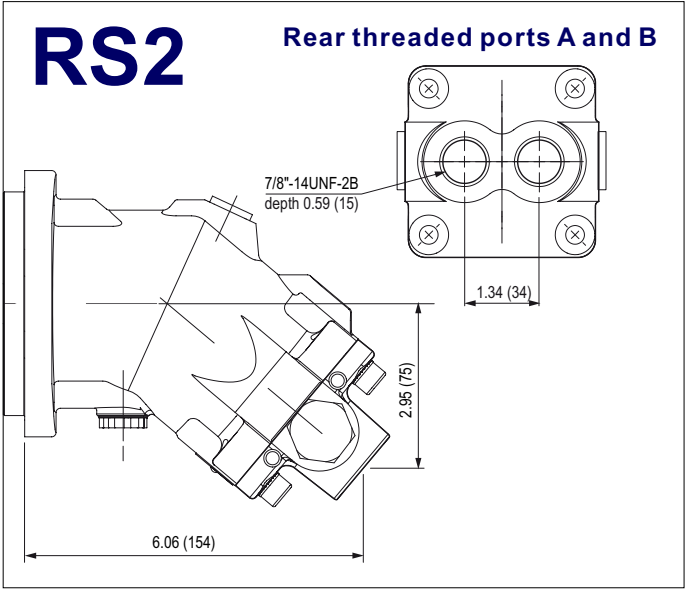
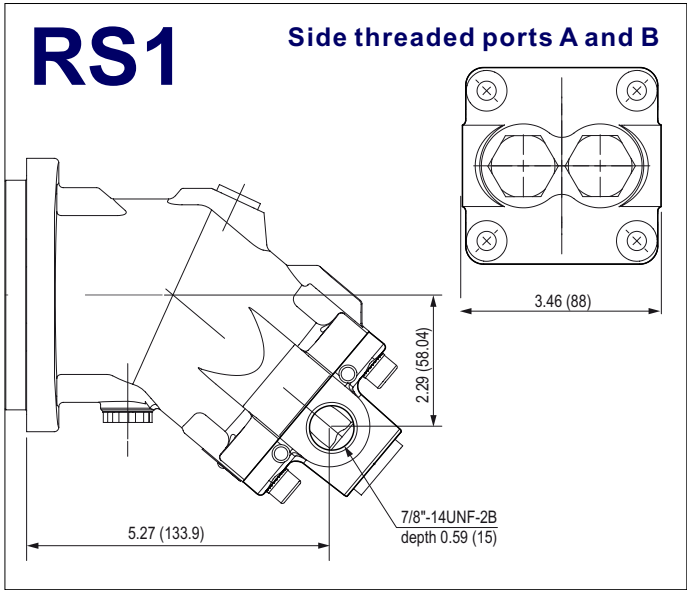
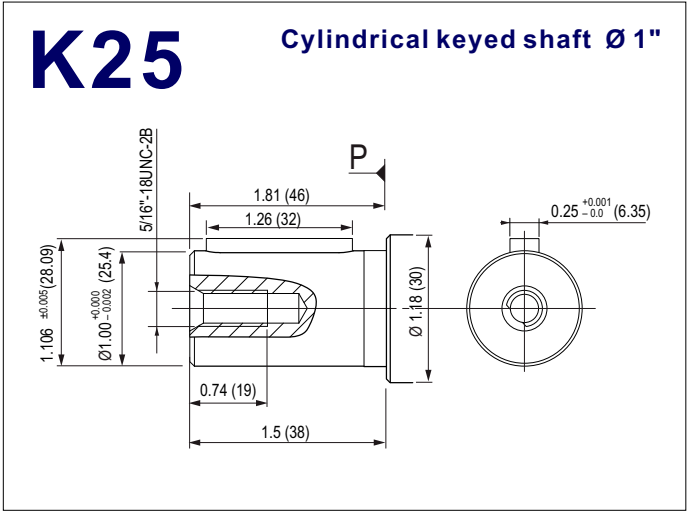
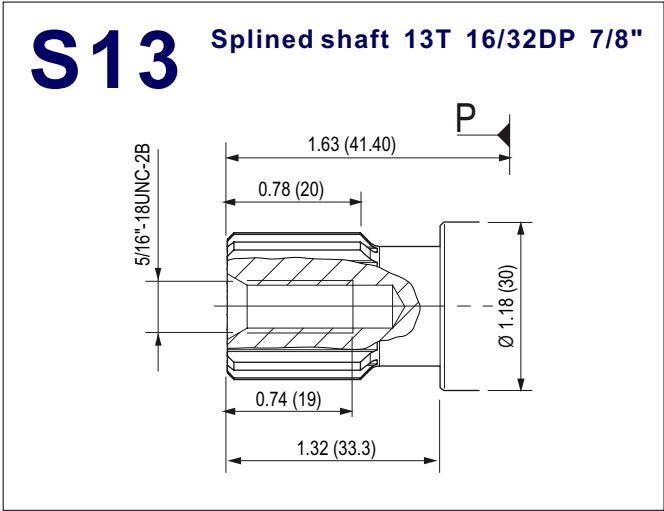
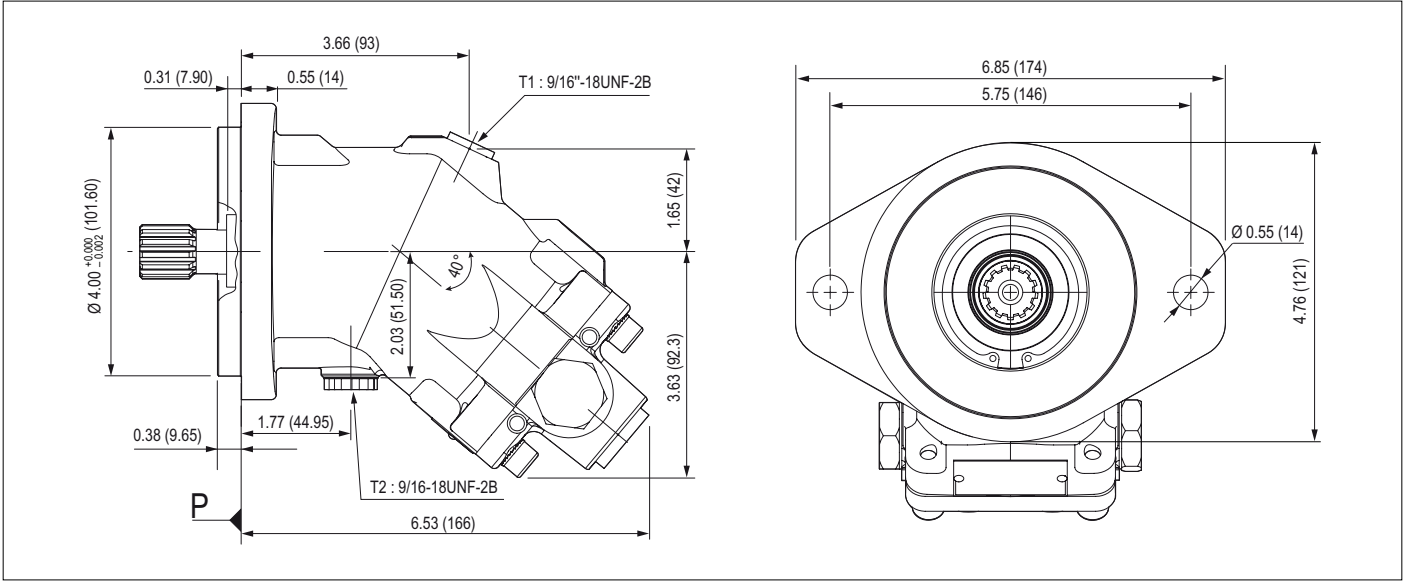
A9MS - 5 cc (SAE B) - 4 Bolt



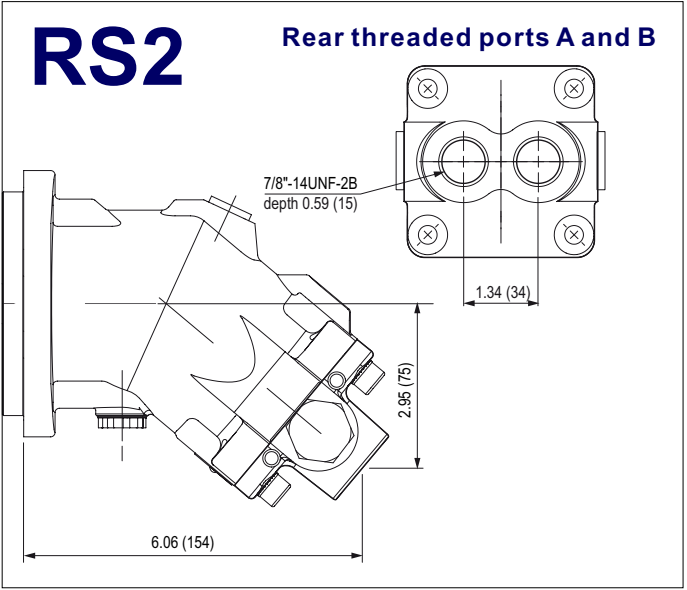
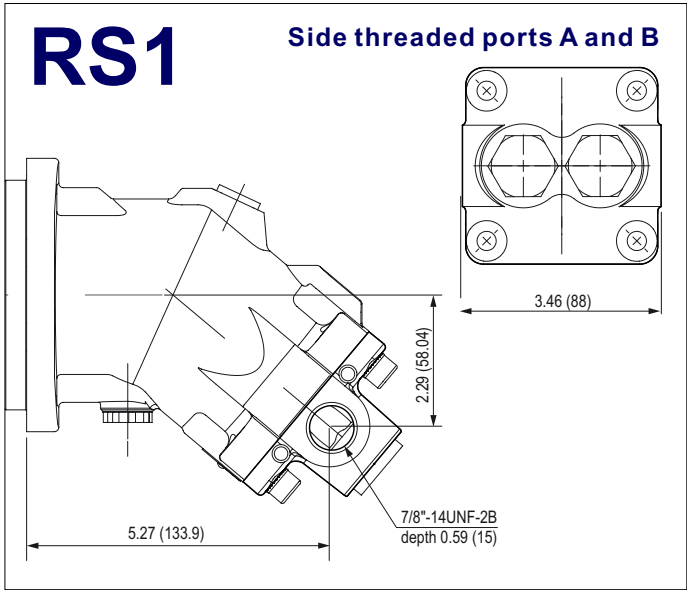
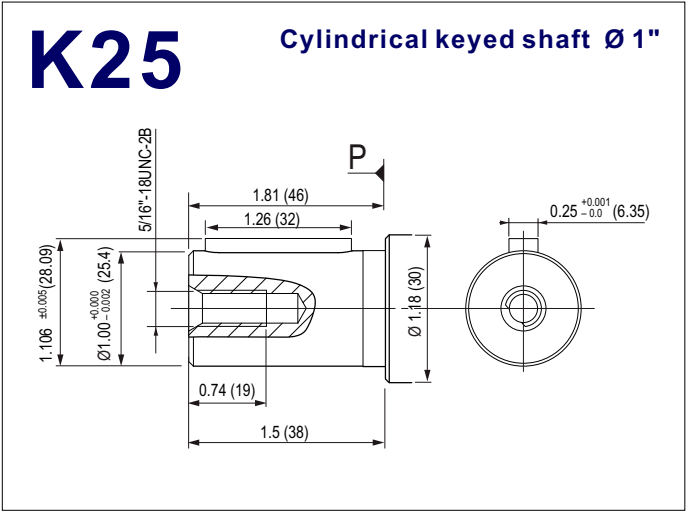
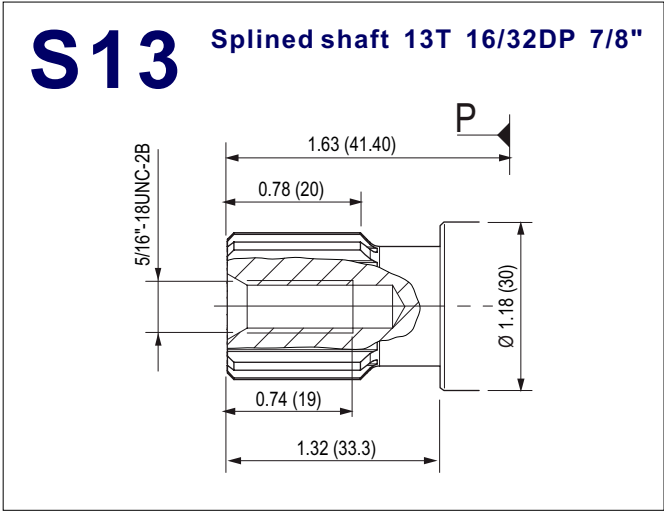
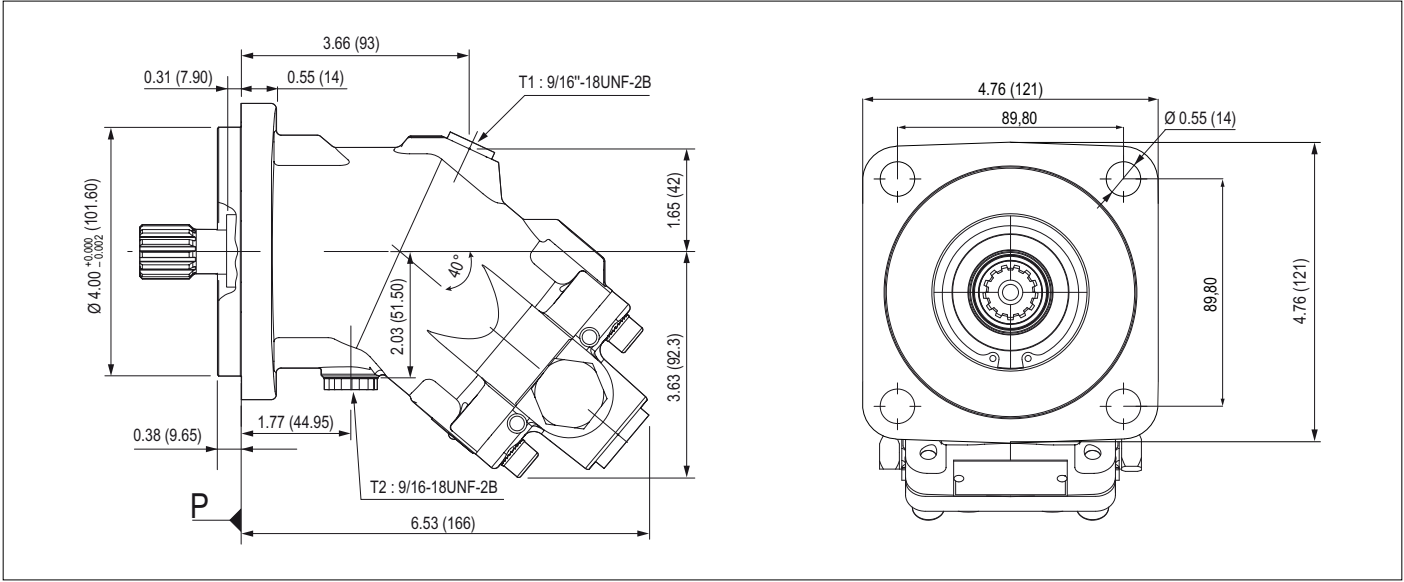
A9MS - 5 cc (SAE B) - 6 Bolt



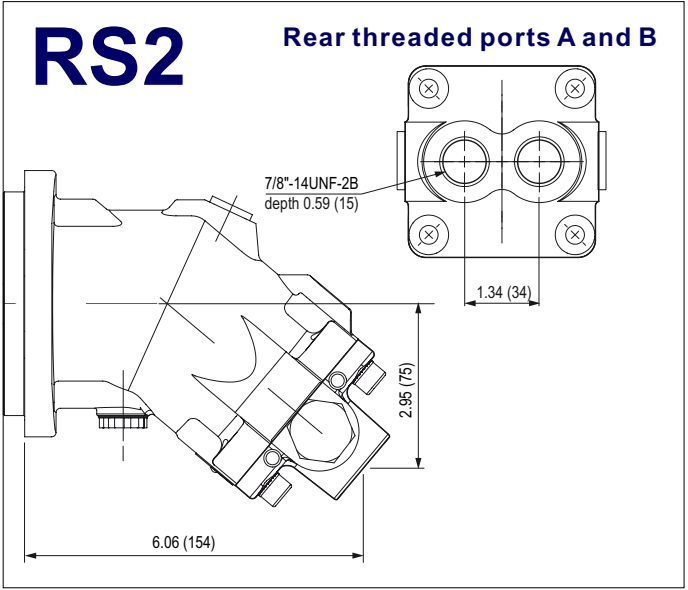
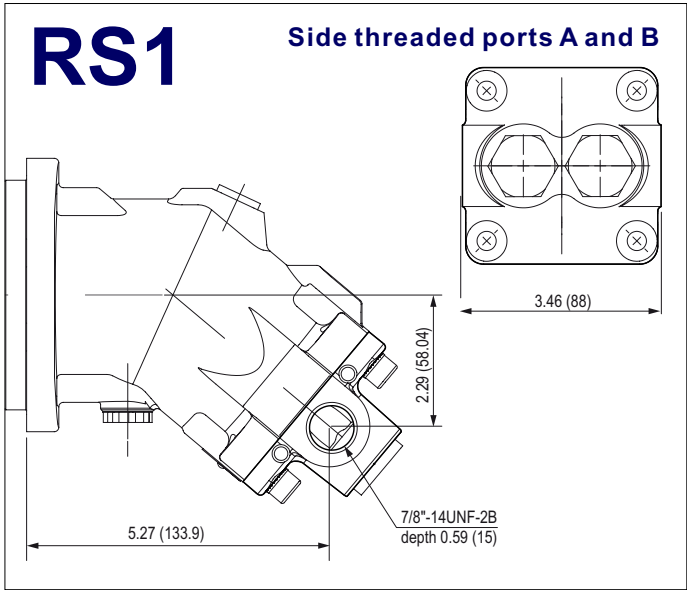
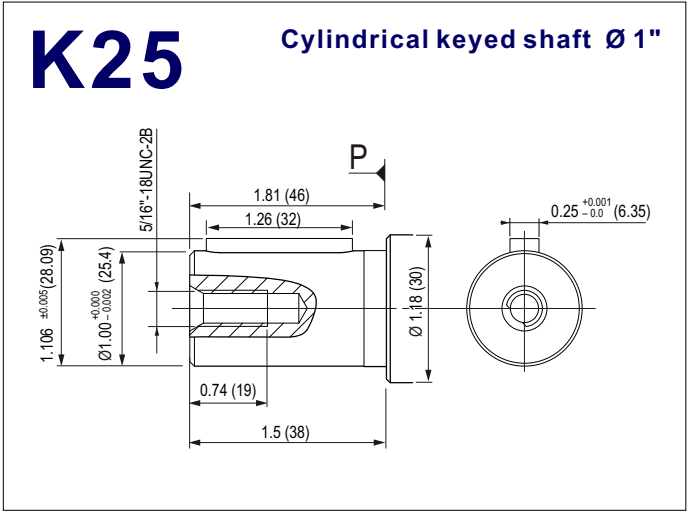
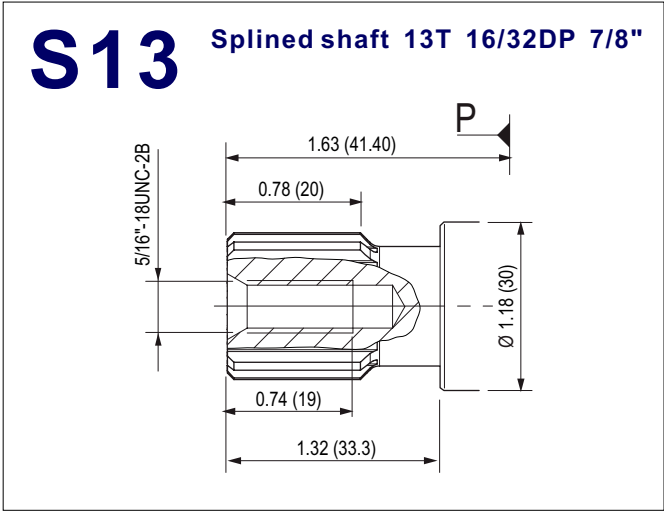
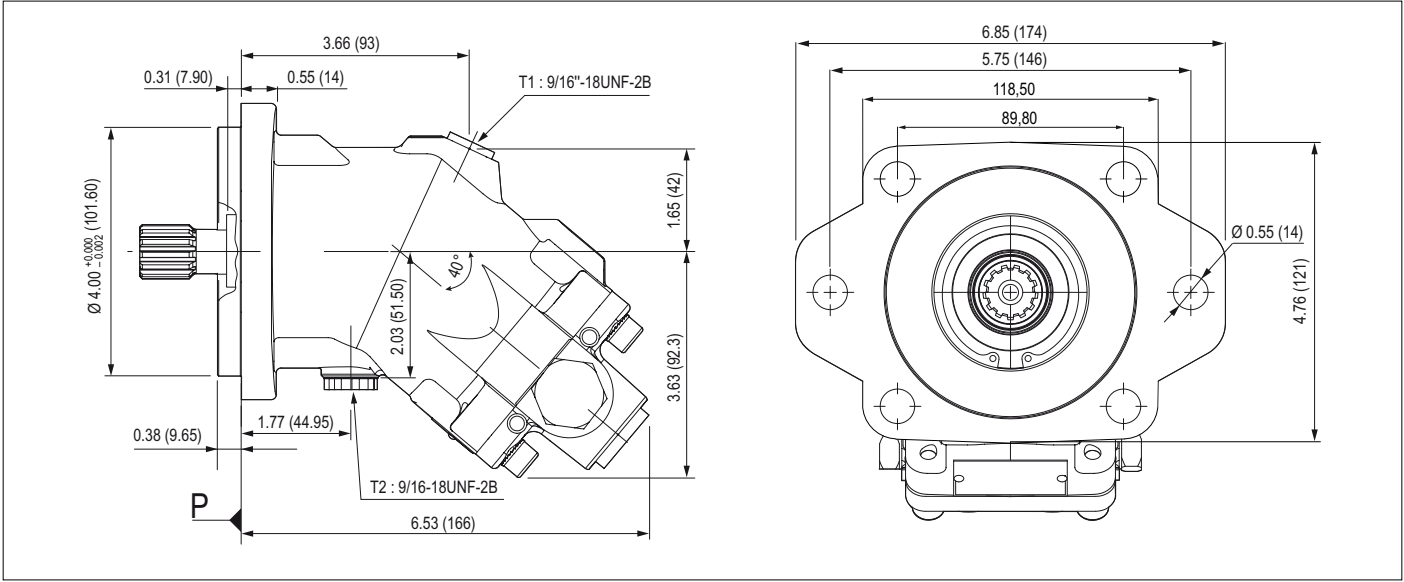
A9MS - 10 cc (SAE B) - 2 Bolt



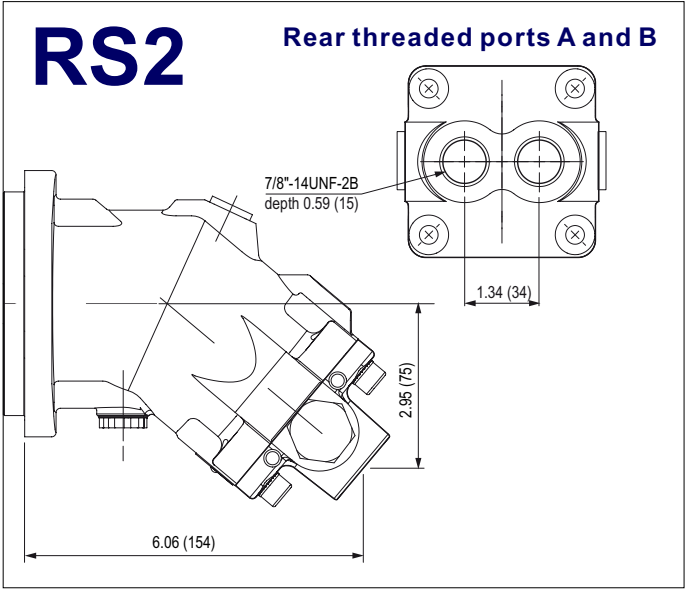
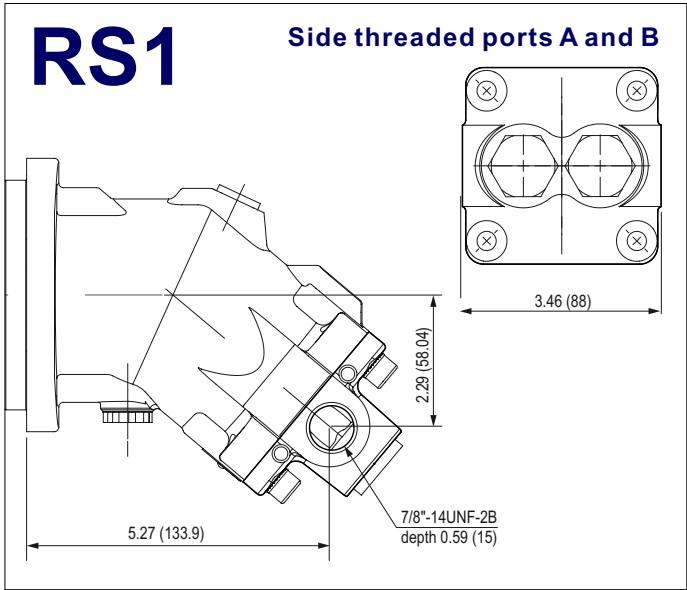
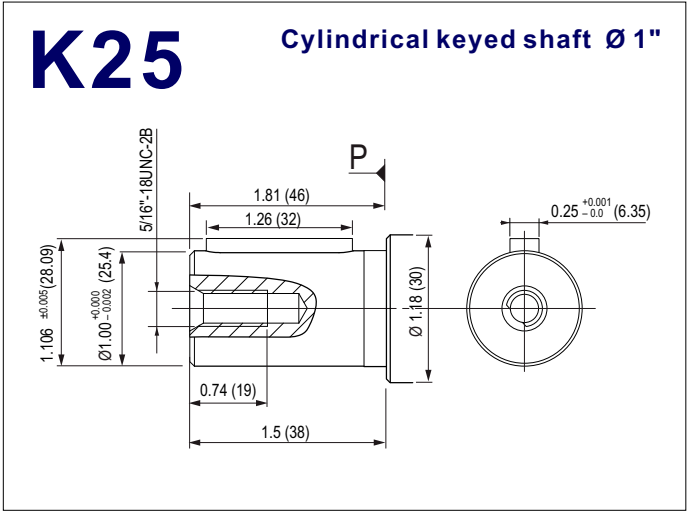
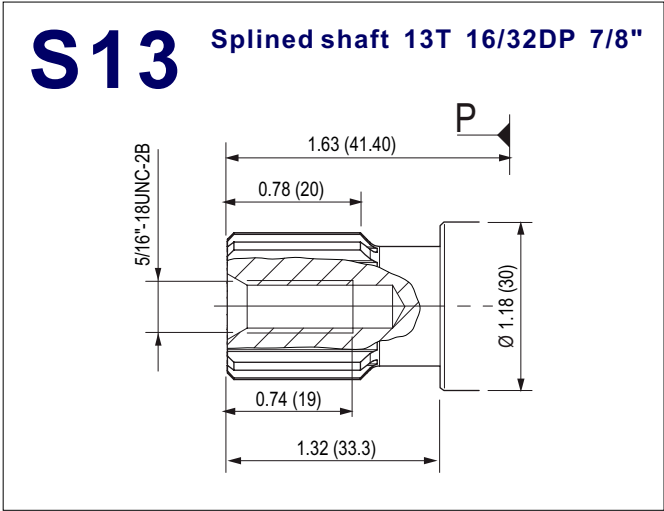
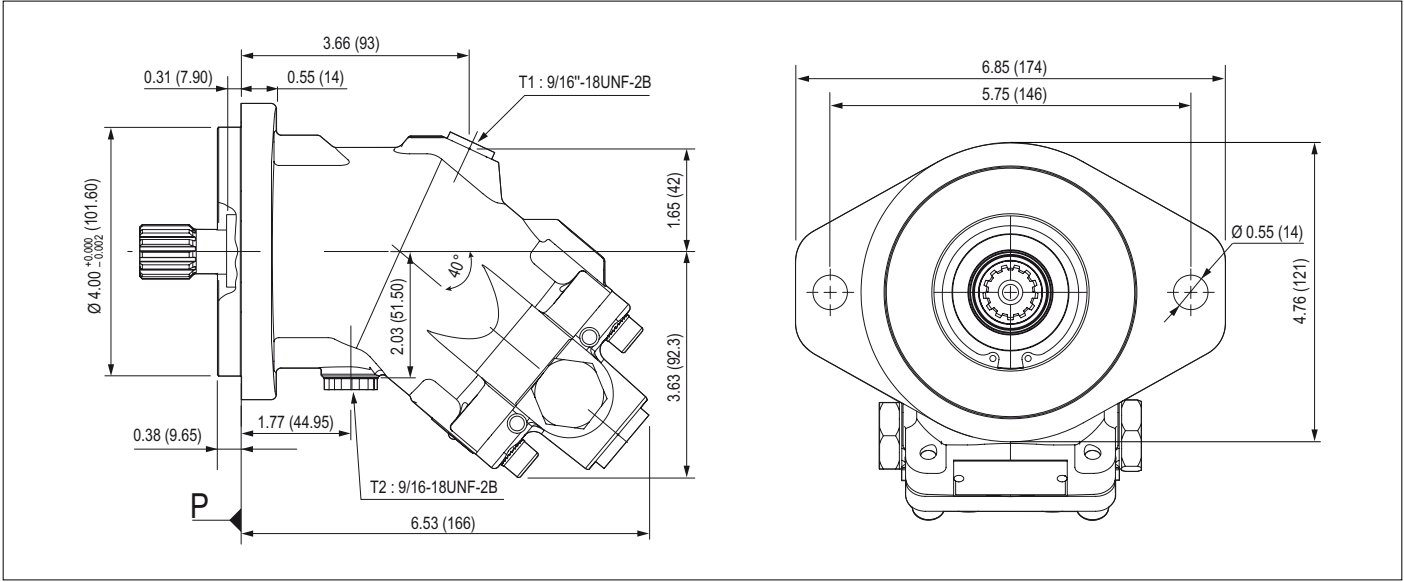
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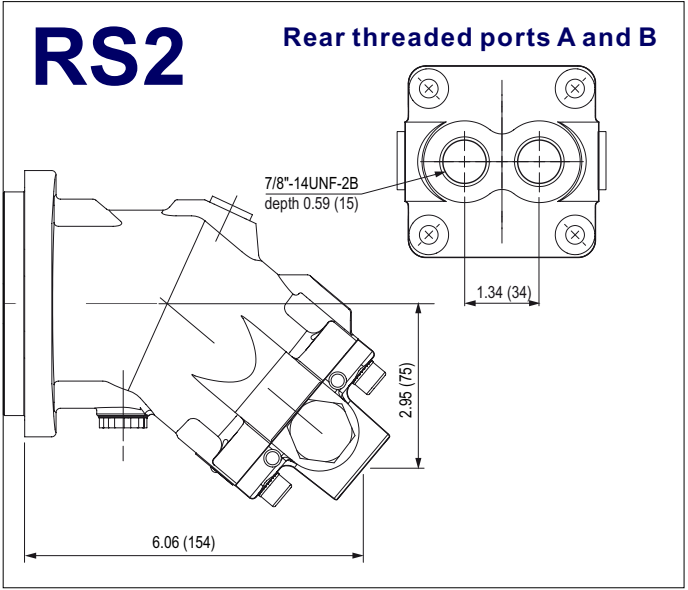
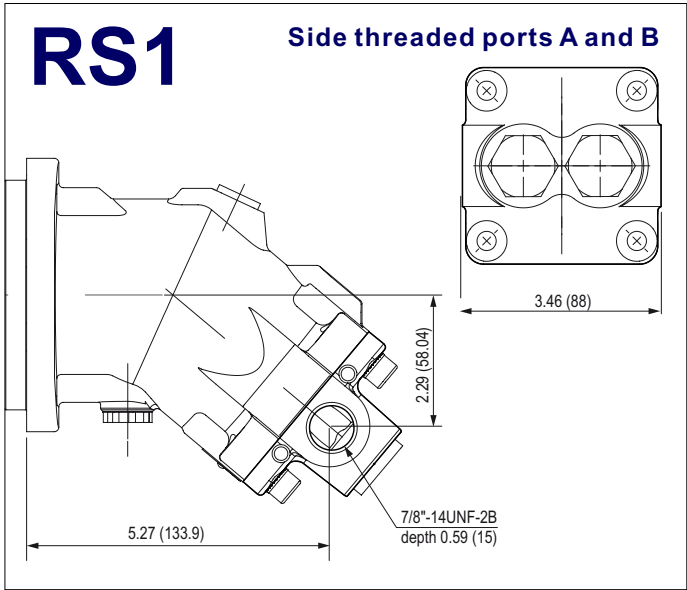
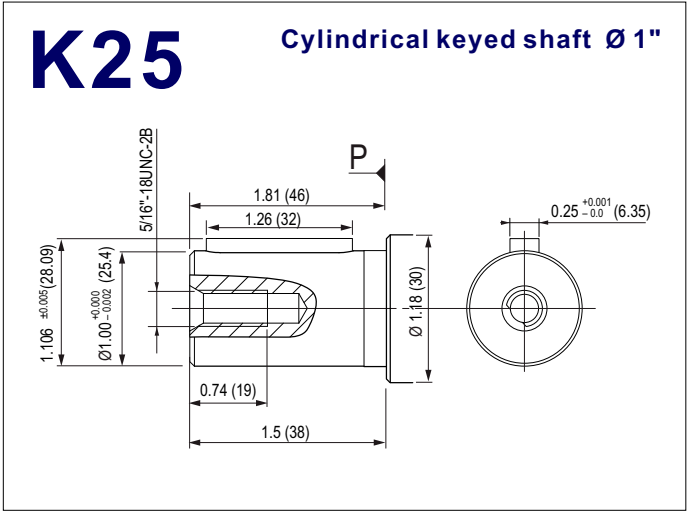
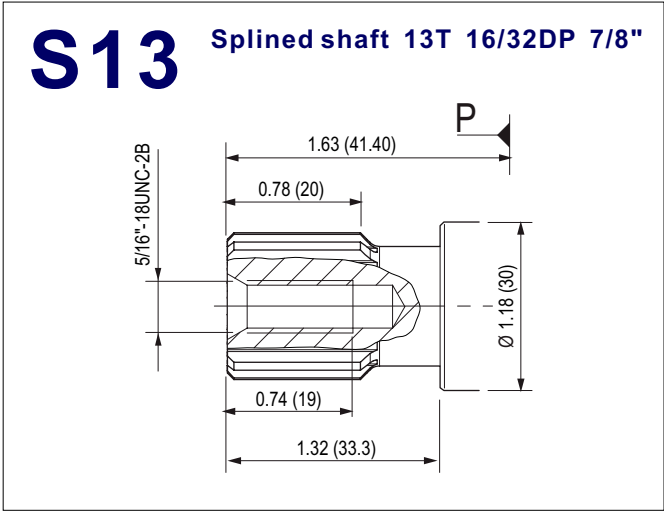
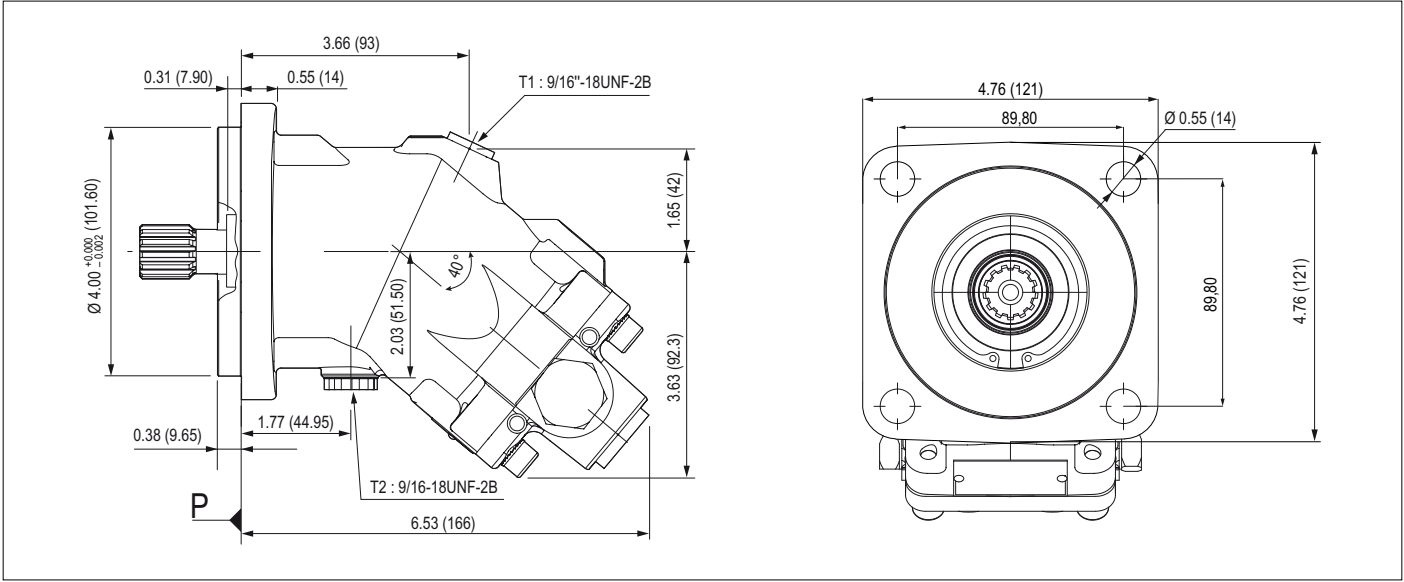
A9MS - 10 cc (SAE B) - 6 Bolt



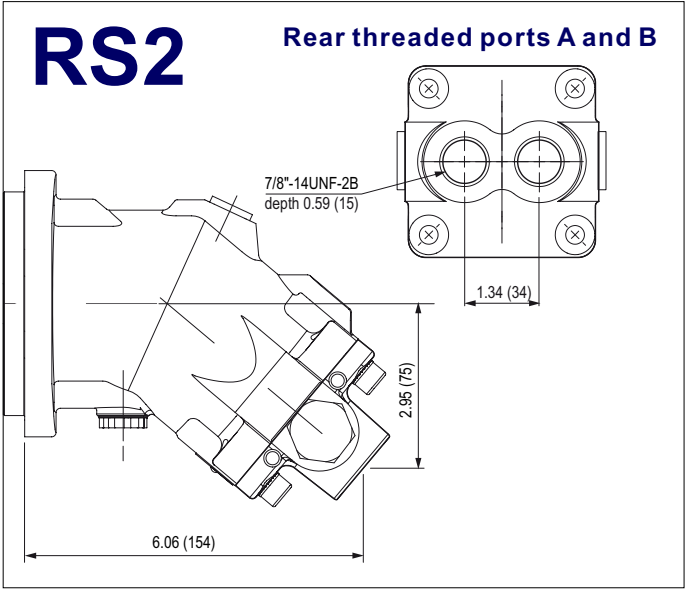
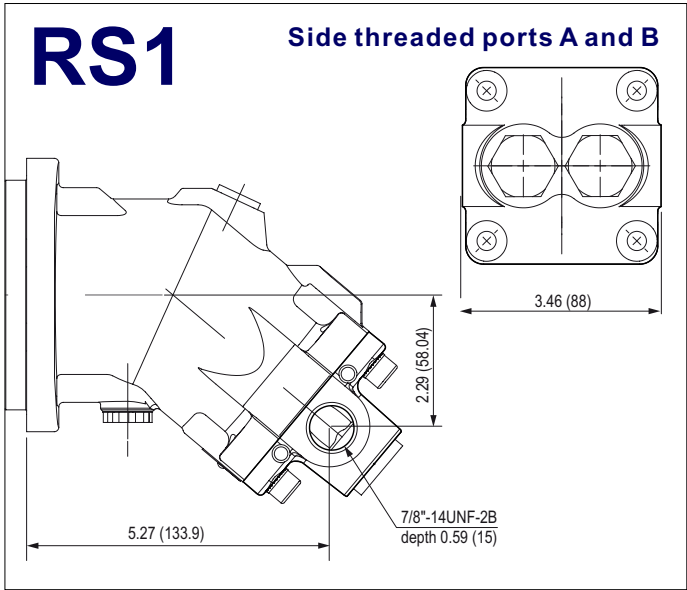
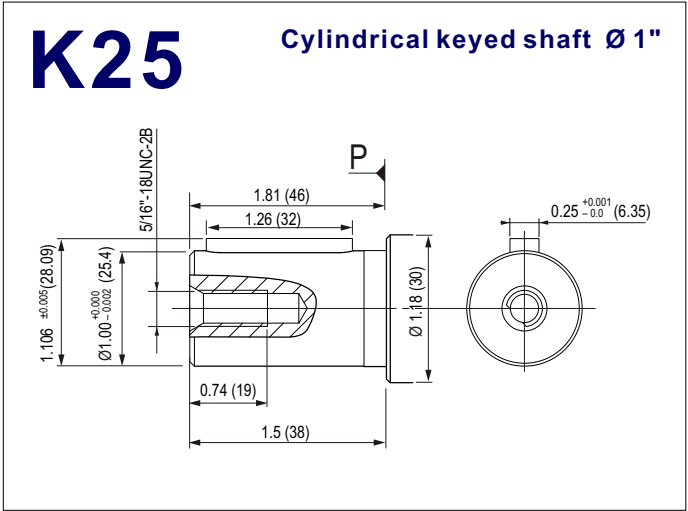
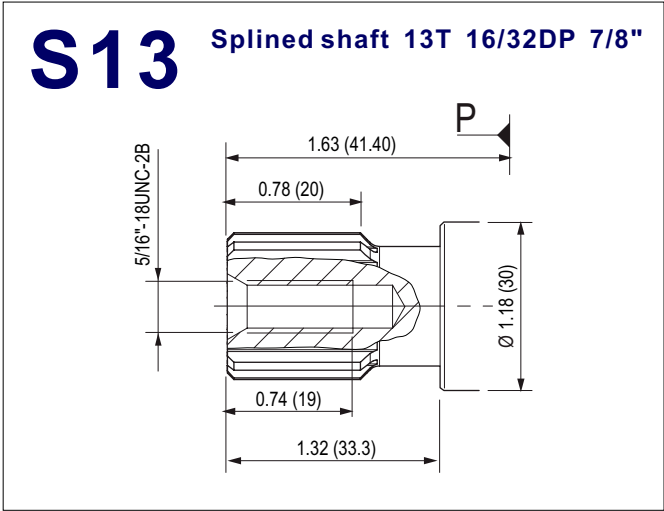
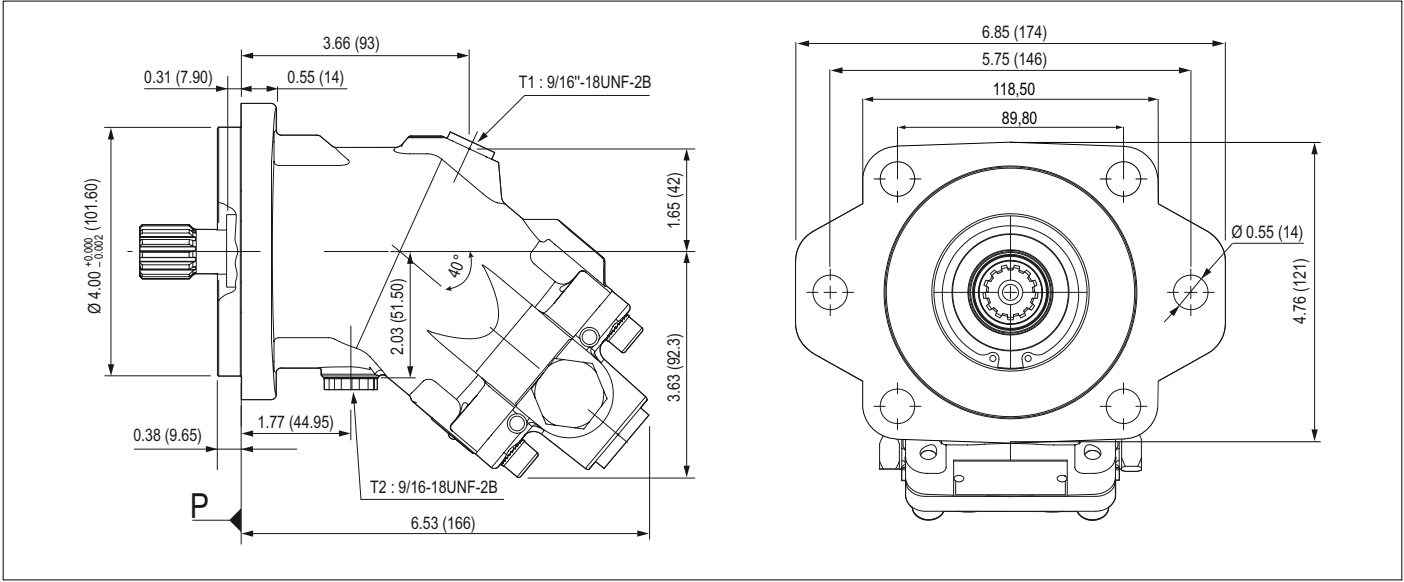
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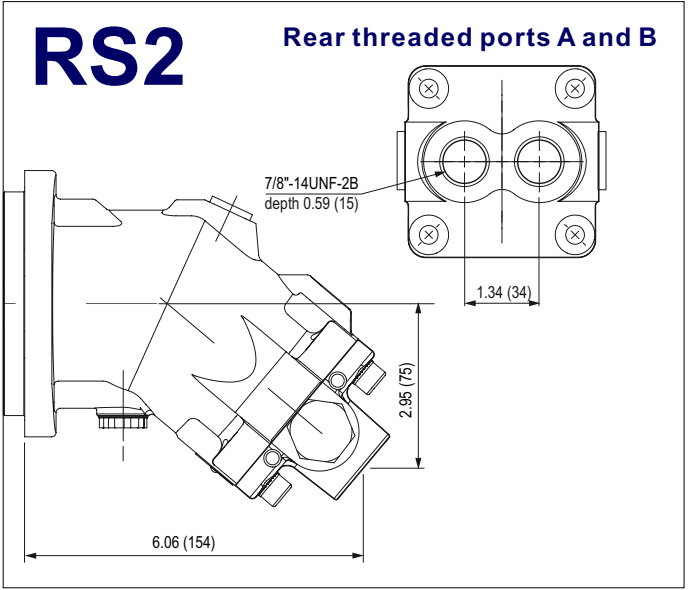
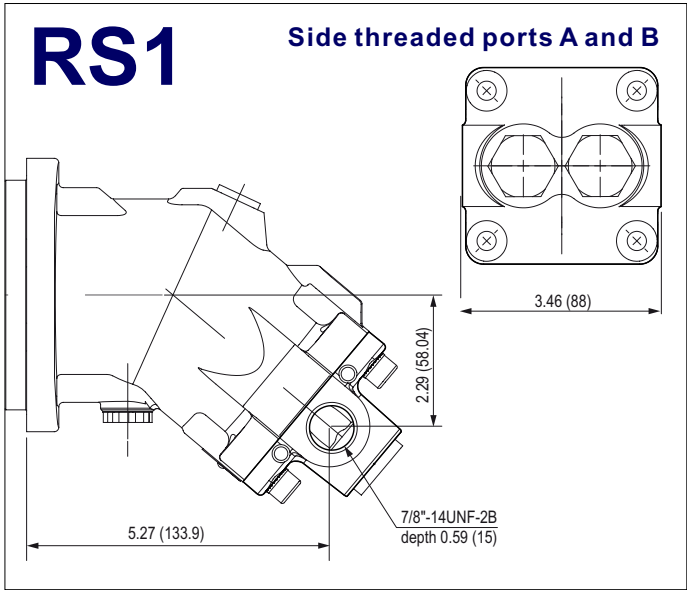
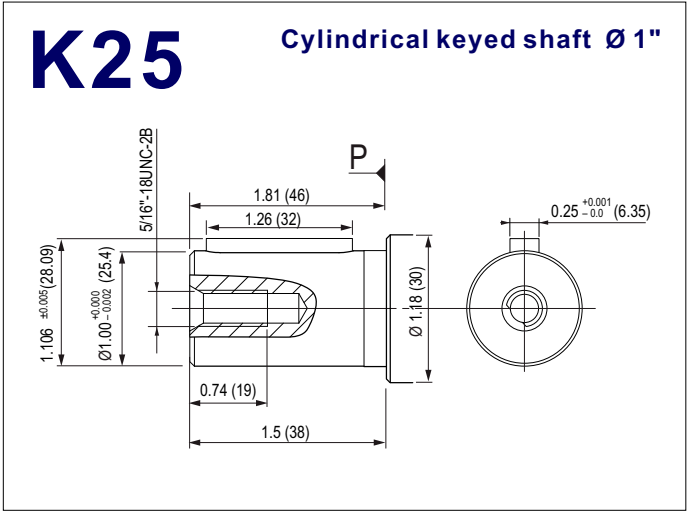
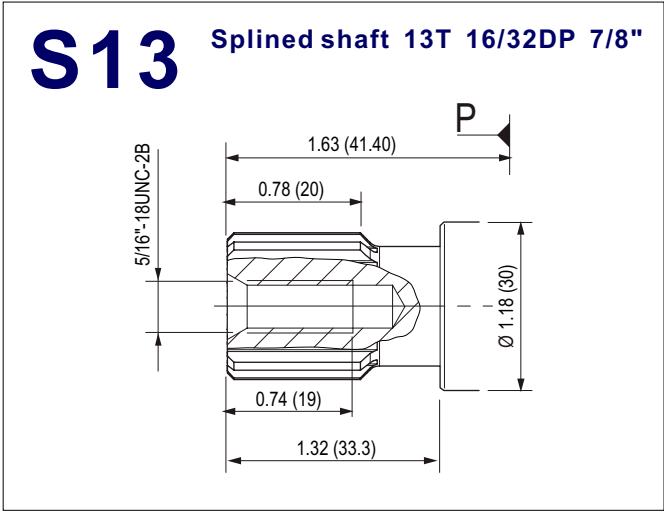
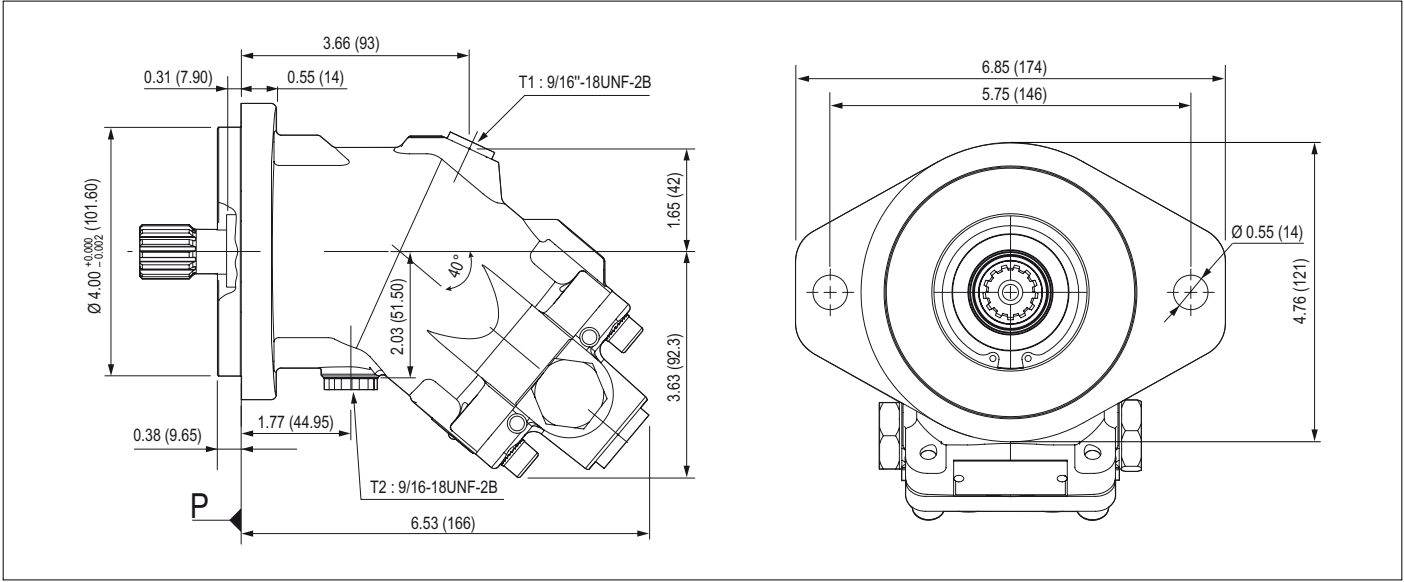
A9MS - 12 cc (SAE B) - 4 Bolt



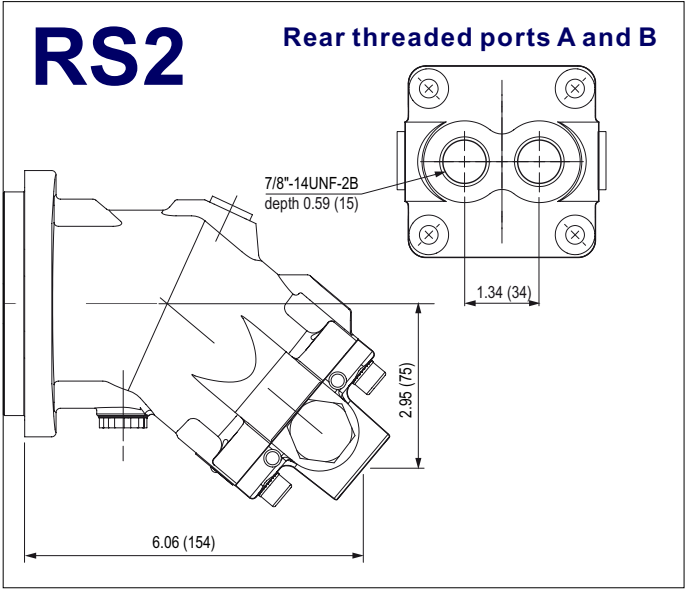
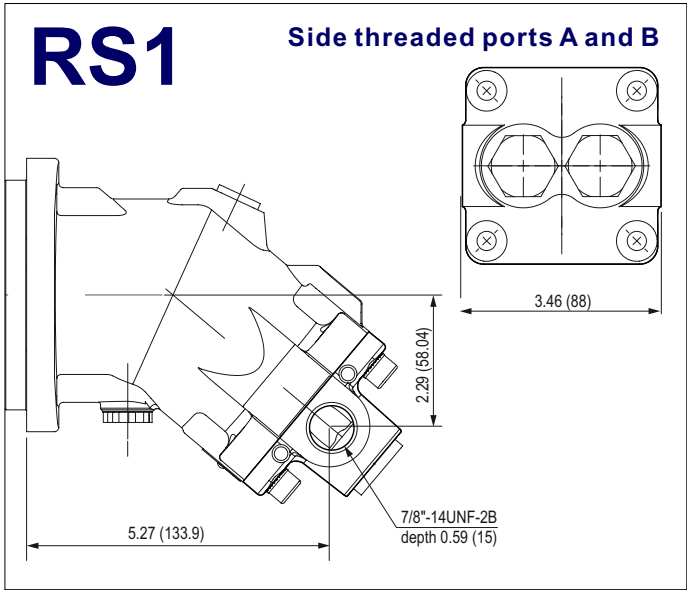
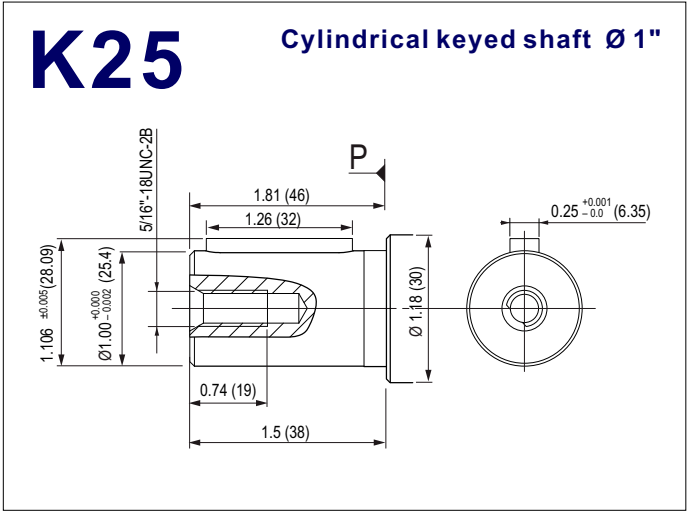
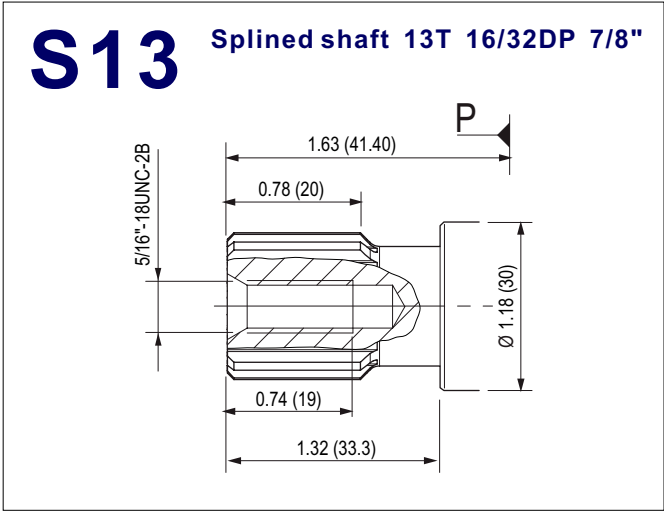
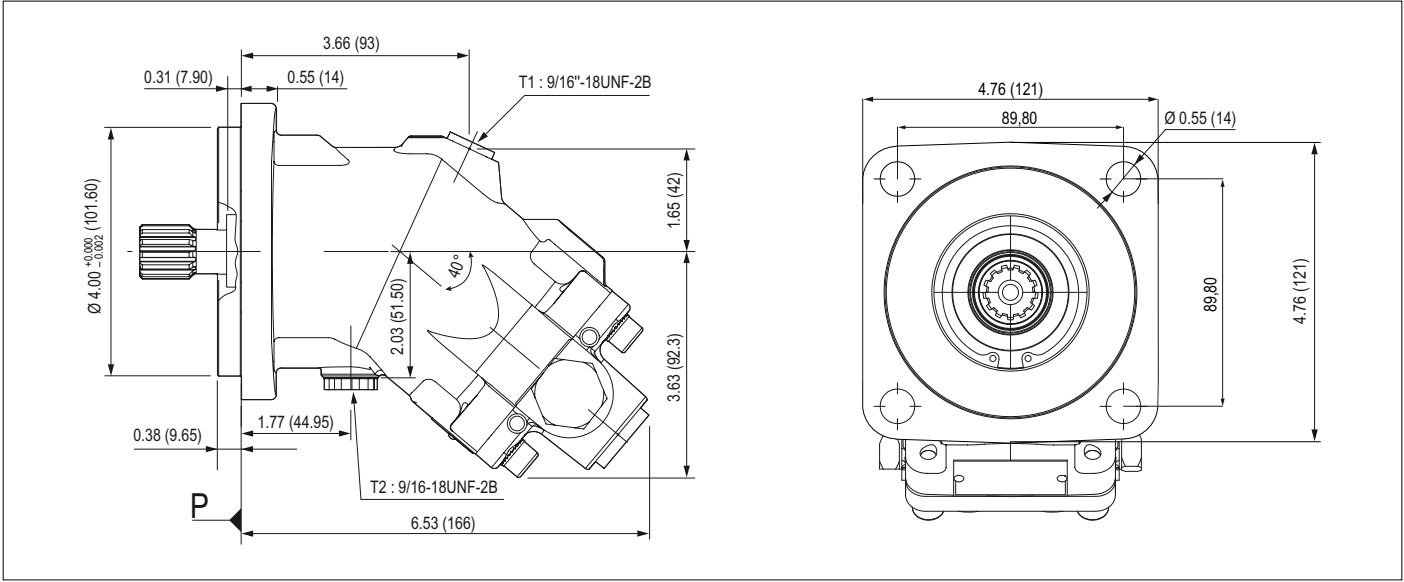
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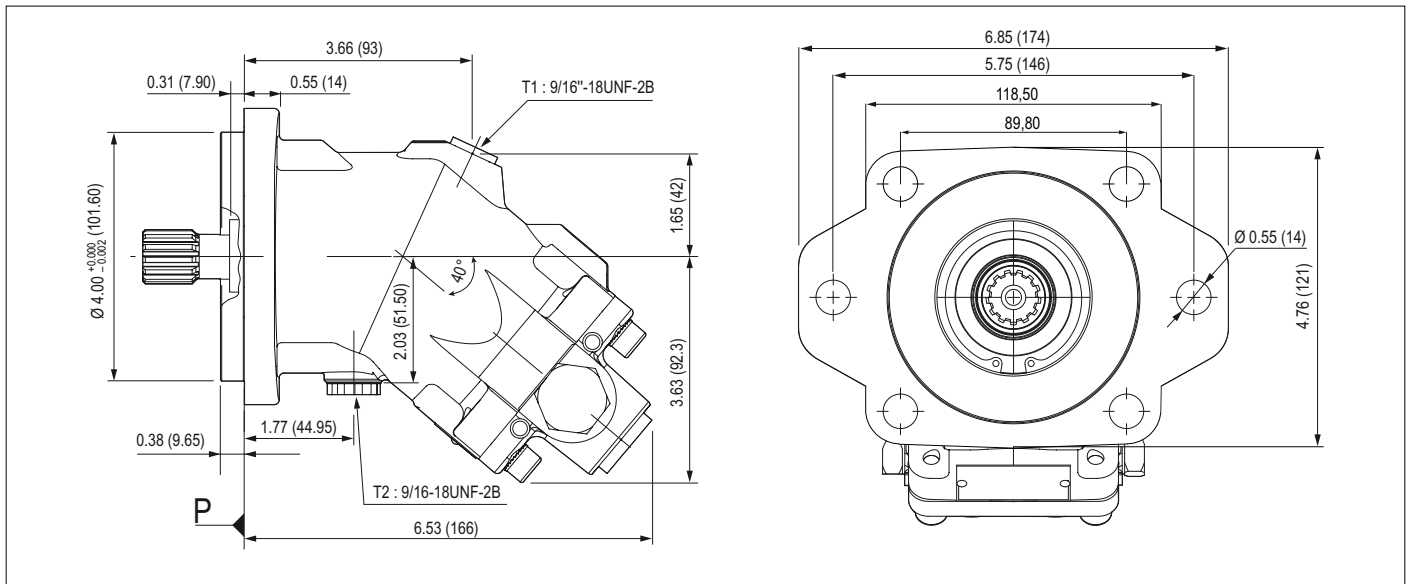
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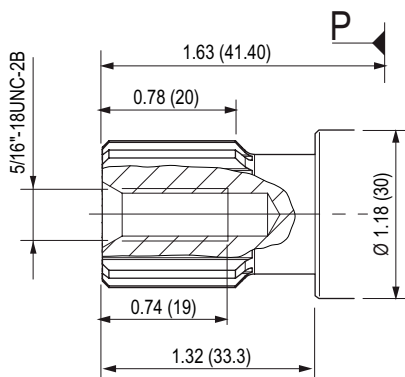
A9MS - 18 cc (SAE B) - 4 Bolt



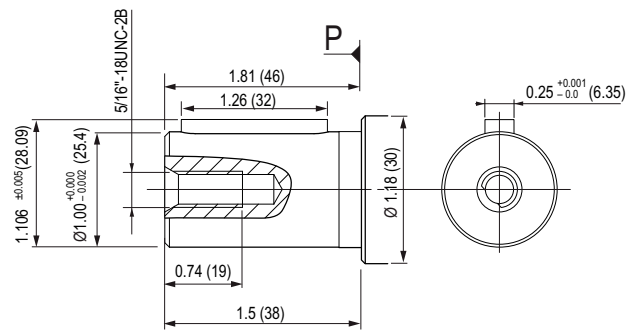
A9MS - 18 cc (SAE B) - 6 Bolt



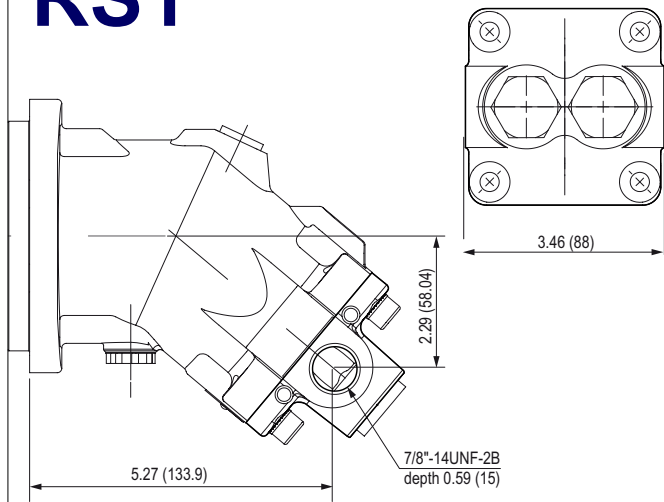
S13 Splined shaft 13T 16/32DP 7/8"



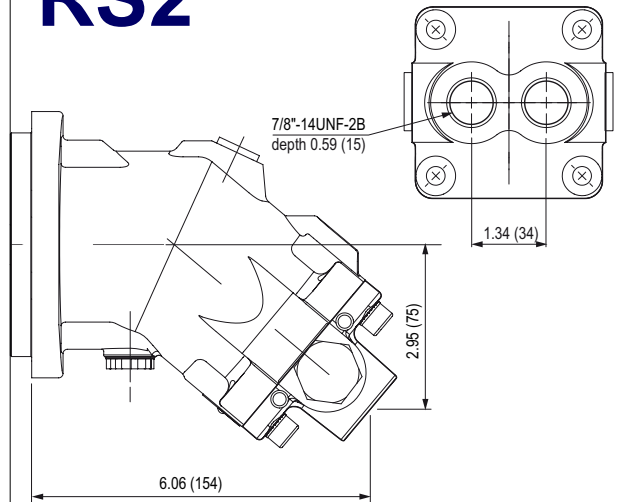
K25 Cylindrical keyed shaft Ø 1"



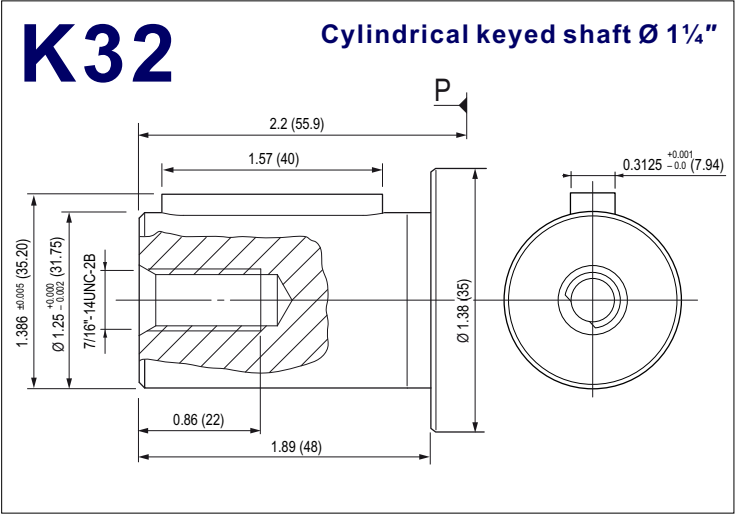
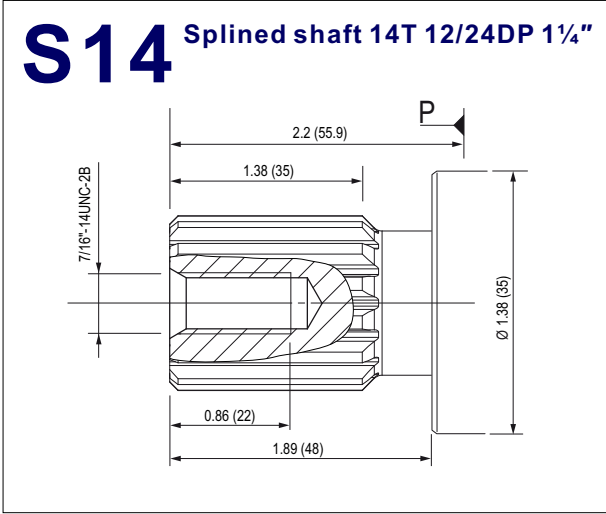
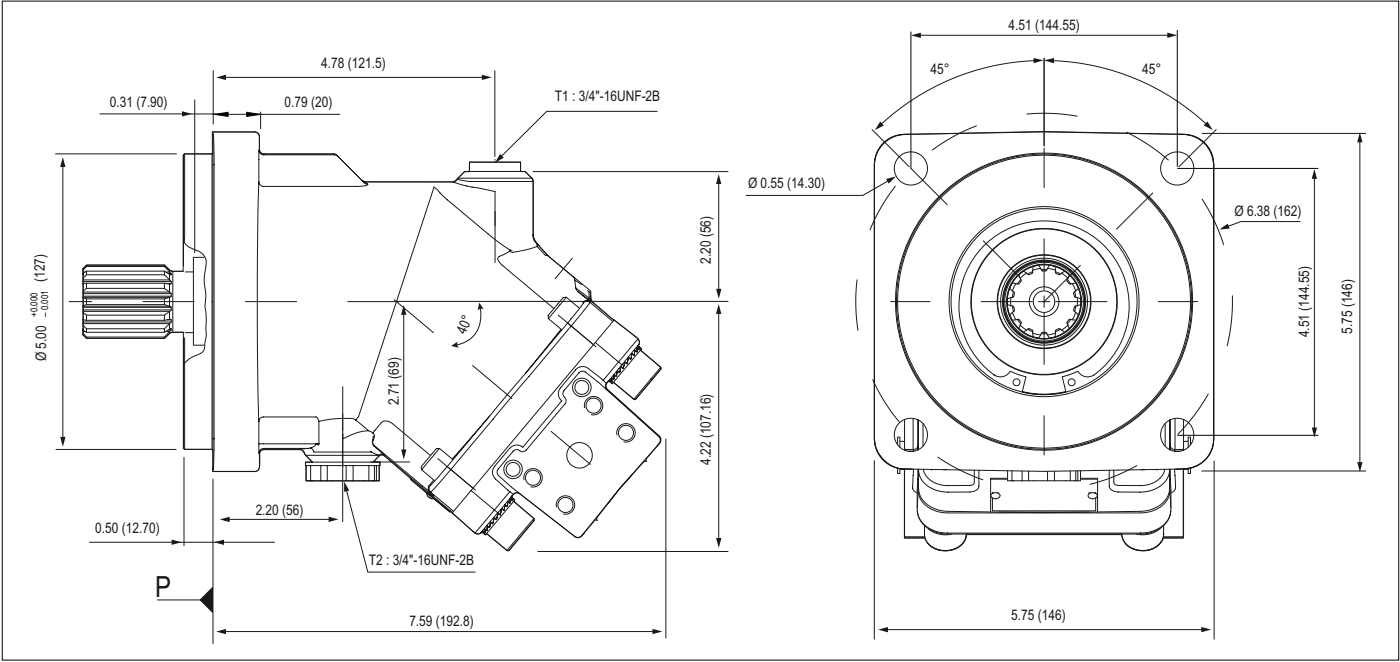
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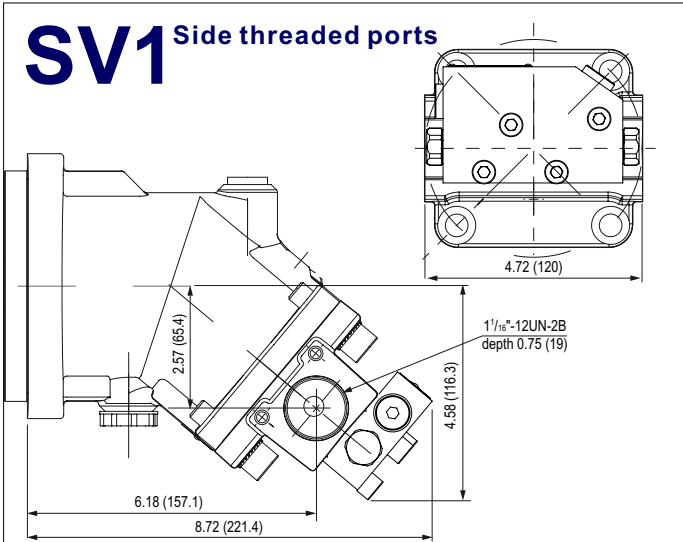
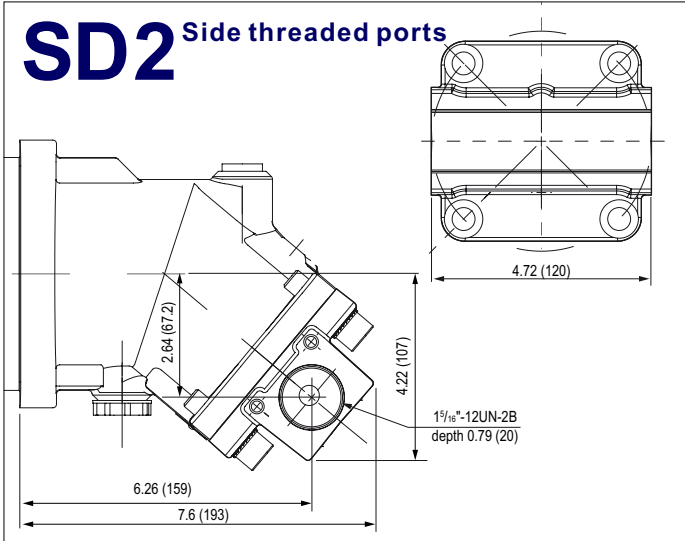
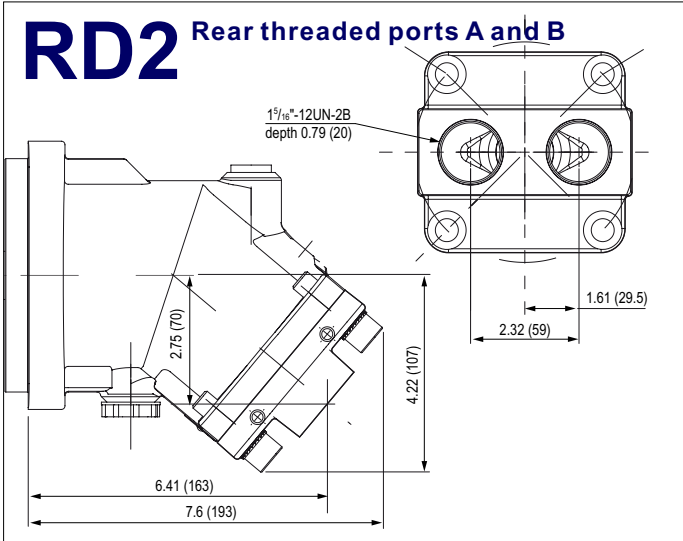
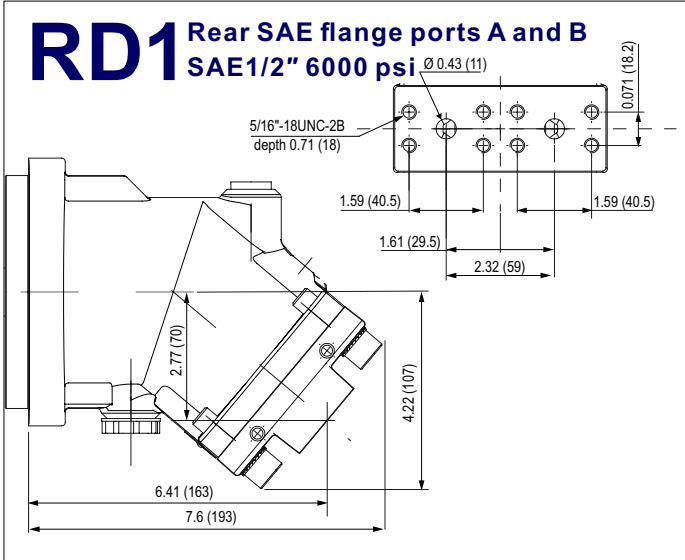
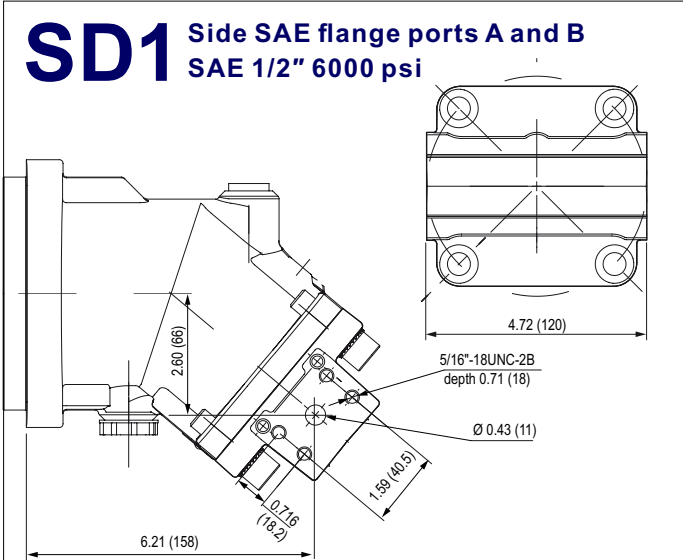
RS2



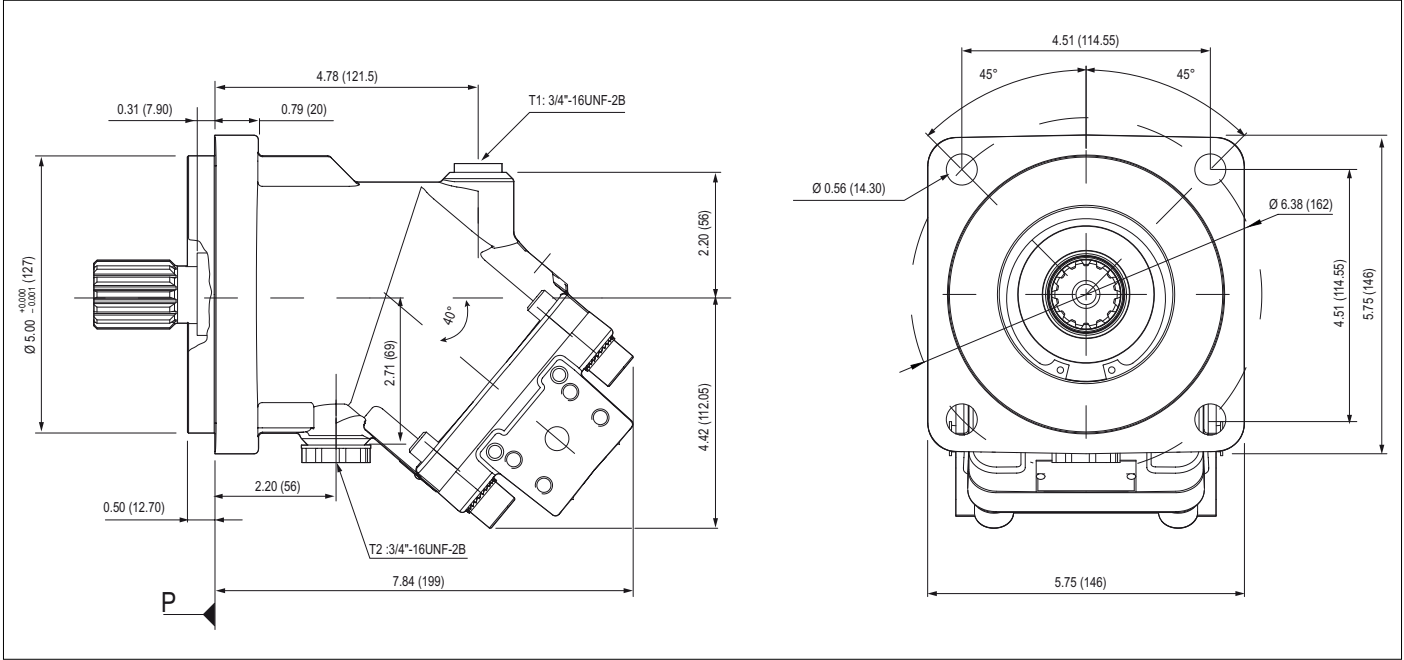
A9MS - 25 cc (SAE C) - 4 Bolt



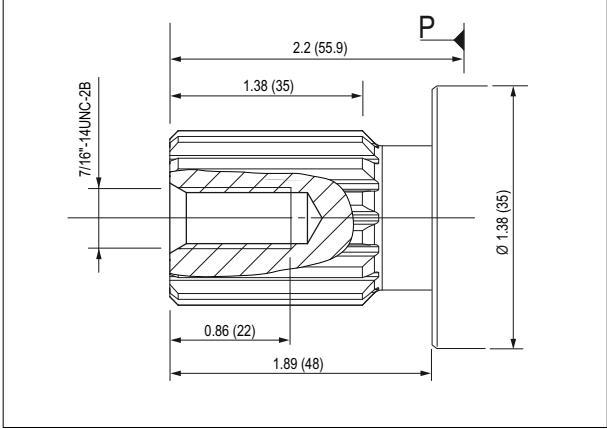
A9MS - 25 cc (SAE C) - 4 Bolt



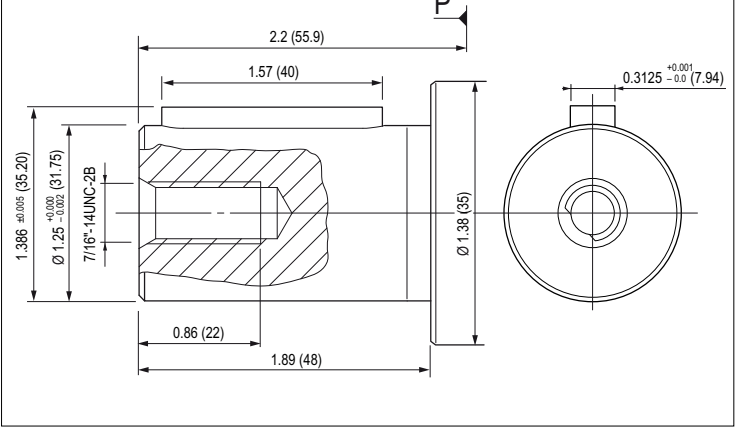
A9MS - 32 cc (SAE C) - 4 Bolt



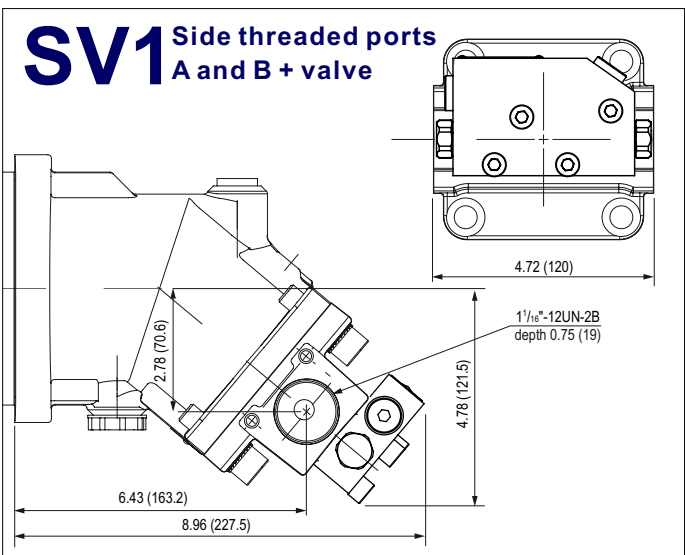
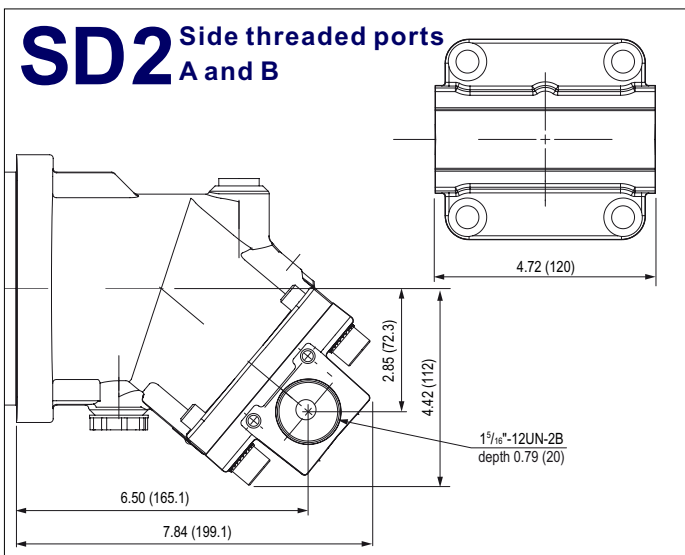
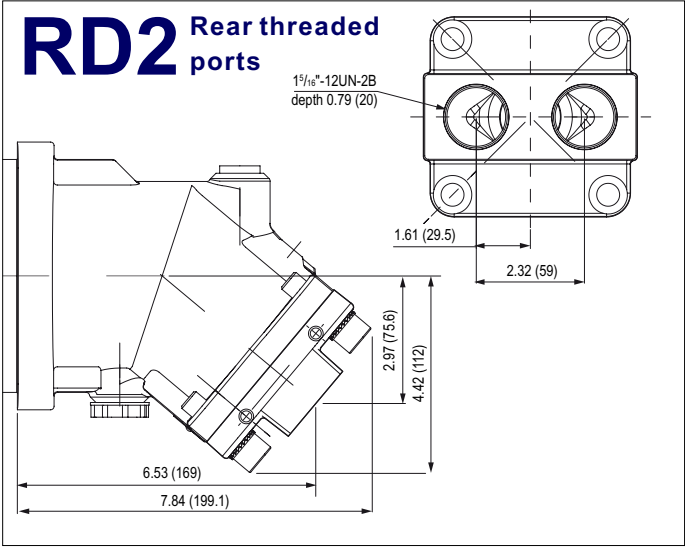
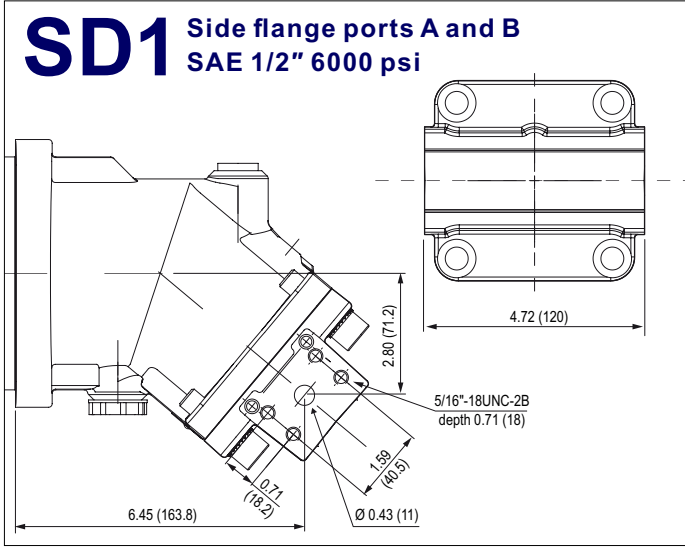
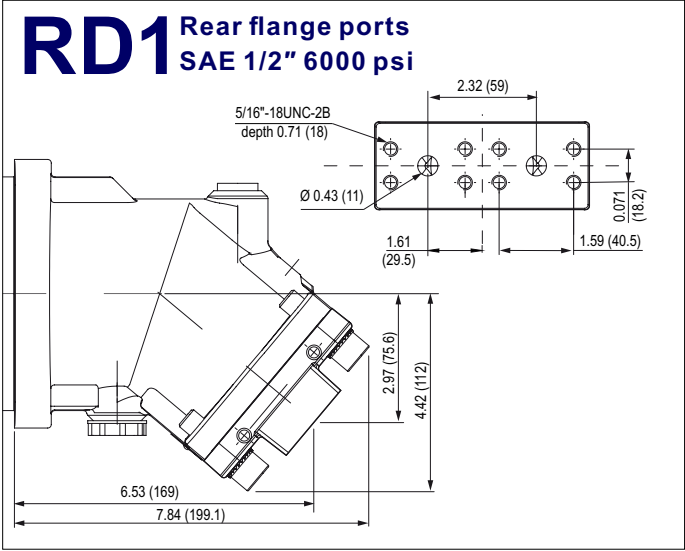
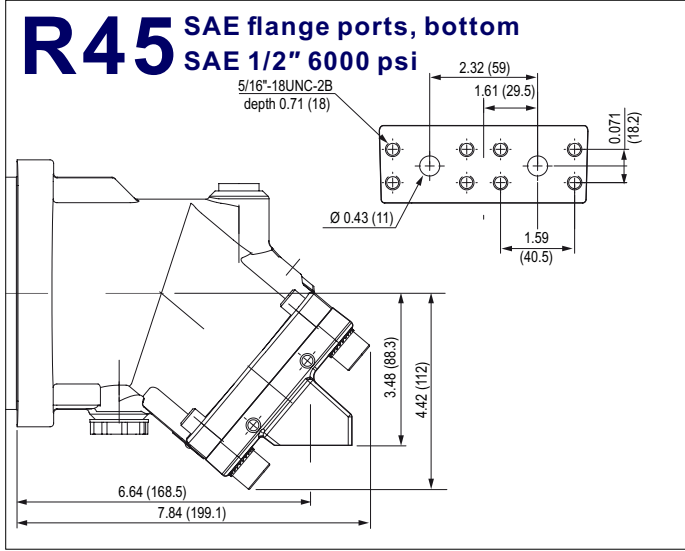
S14 Splined shaft 14T 12/24DP 1 1/4"



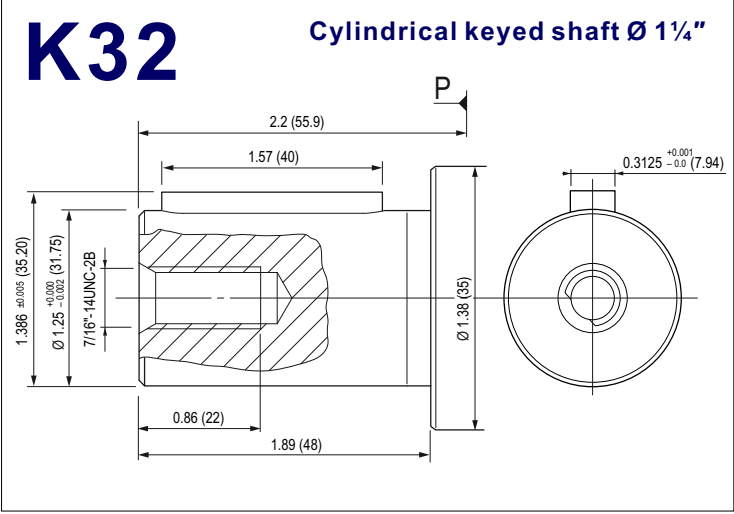
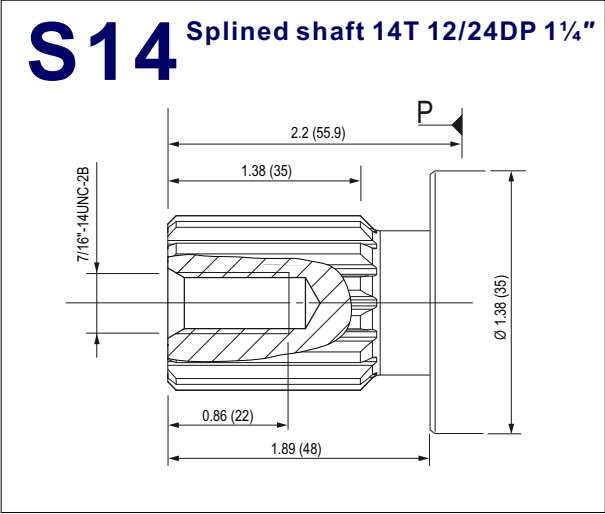
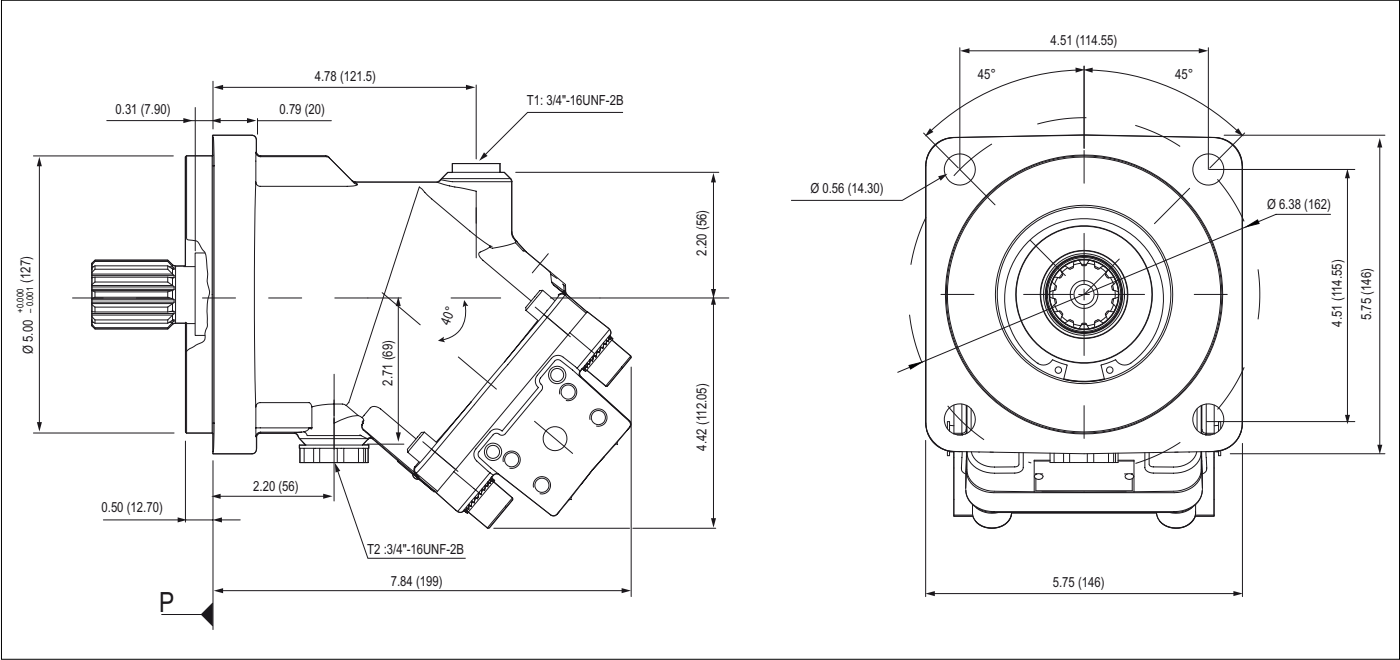
K32 Cylindrical keyed shaft $\varnothing 1 1/4"$



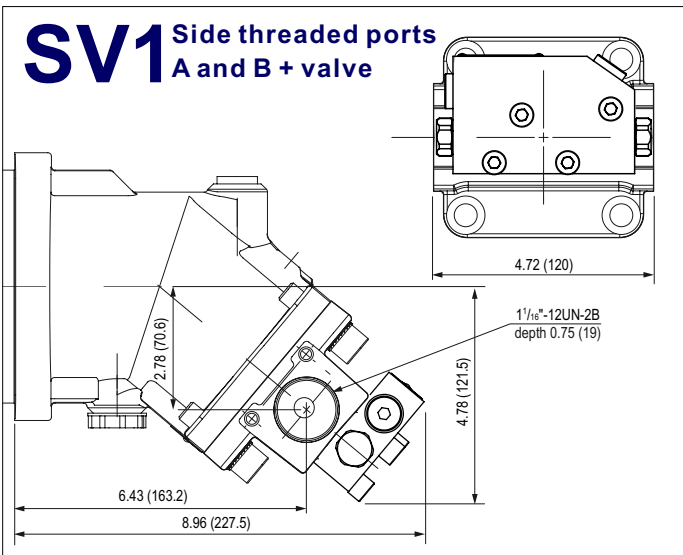
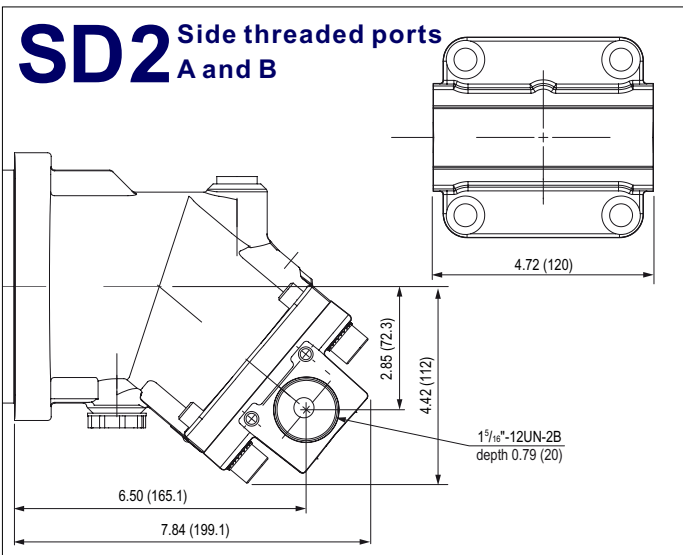
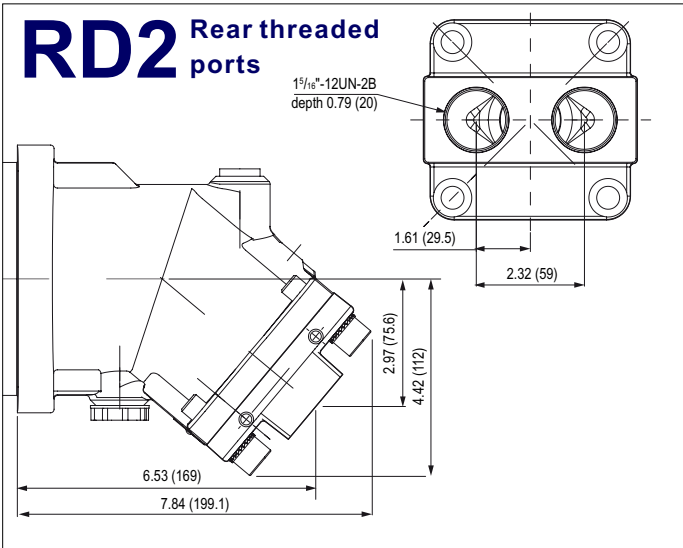
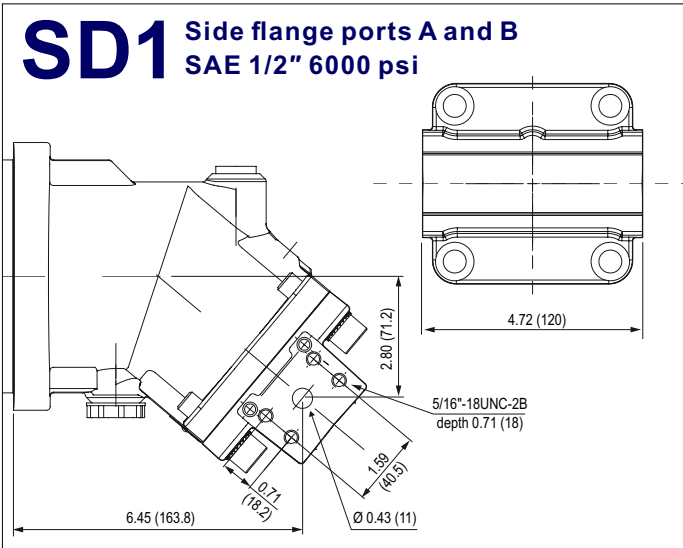
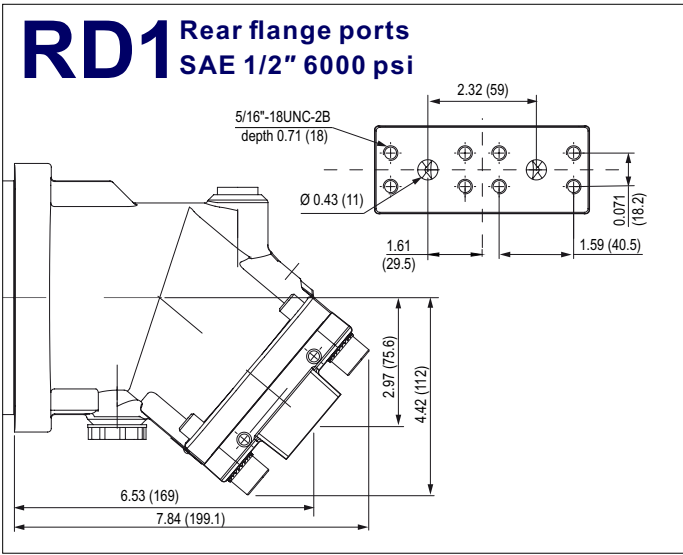
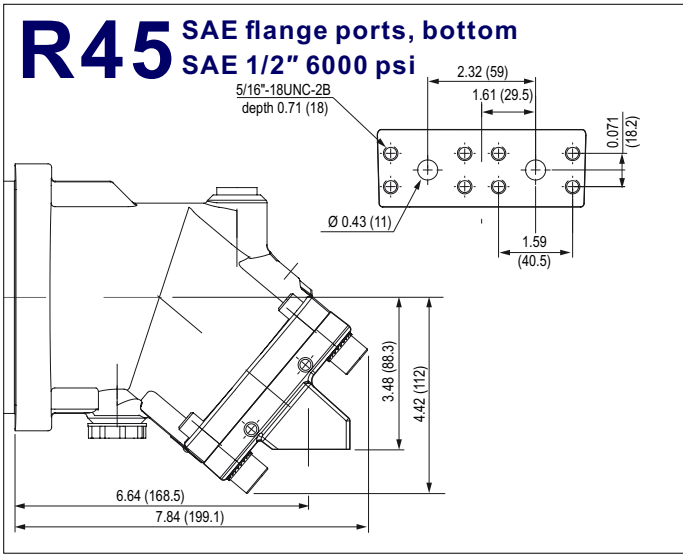
A9MS - 32 cc (SAE C) - 4 Bolt



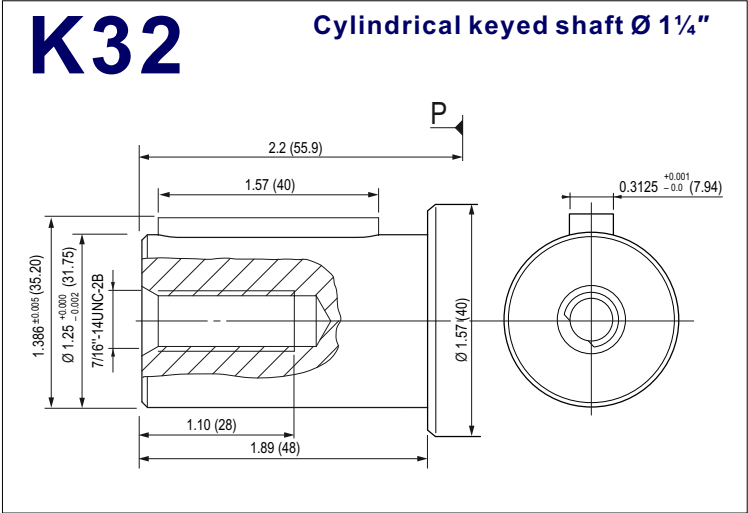
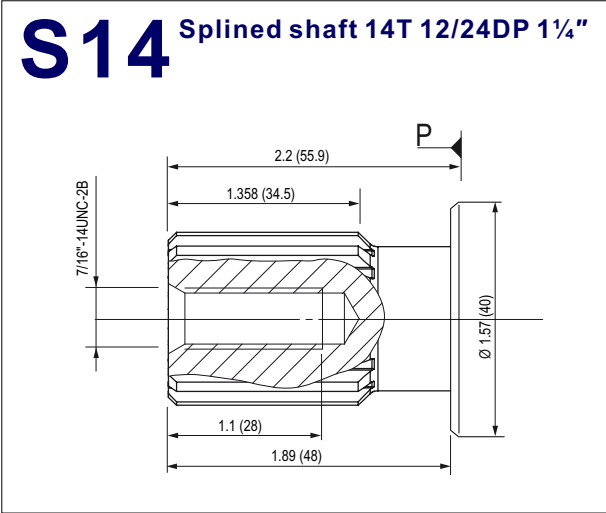
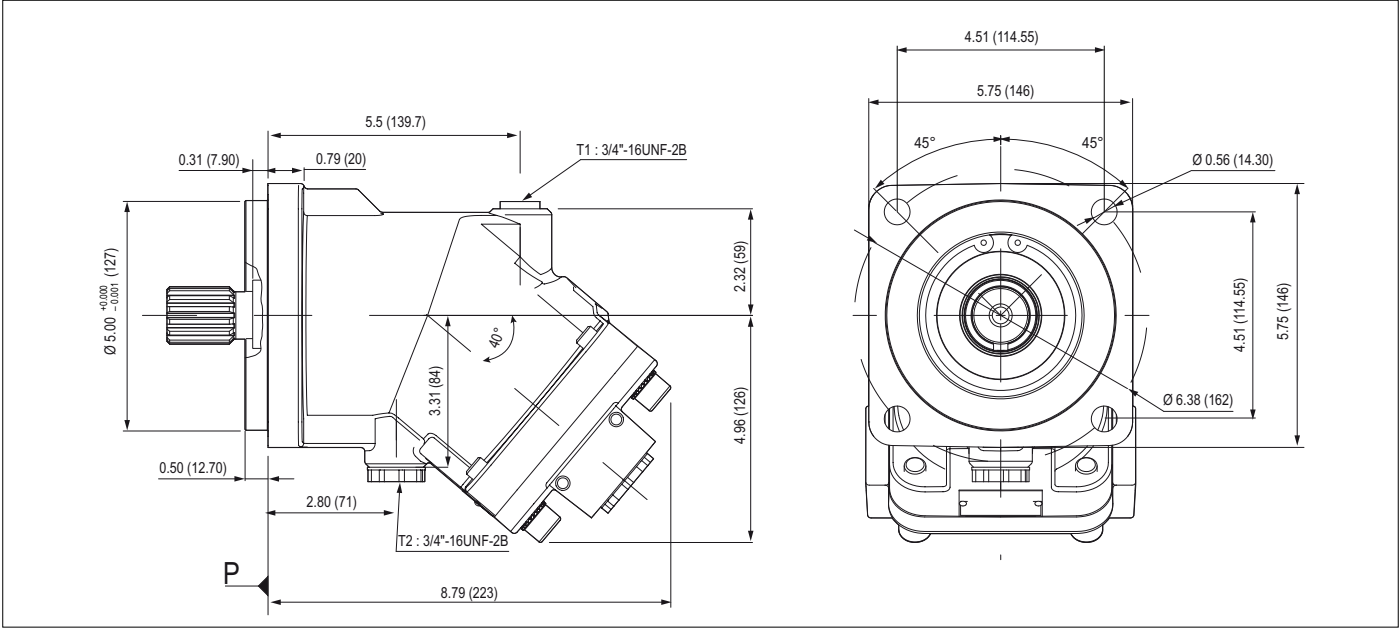
A9MS - 41 cc (SAE C) - 4 Bolt



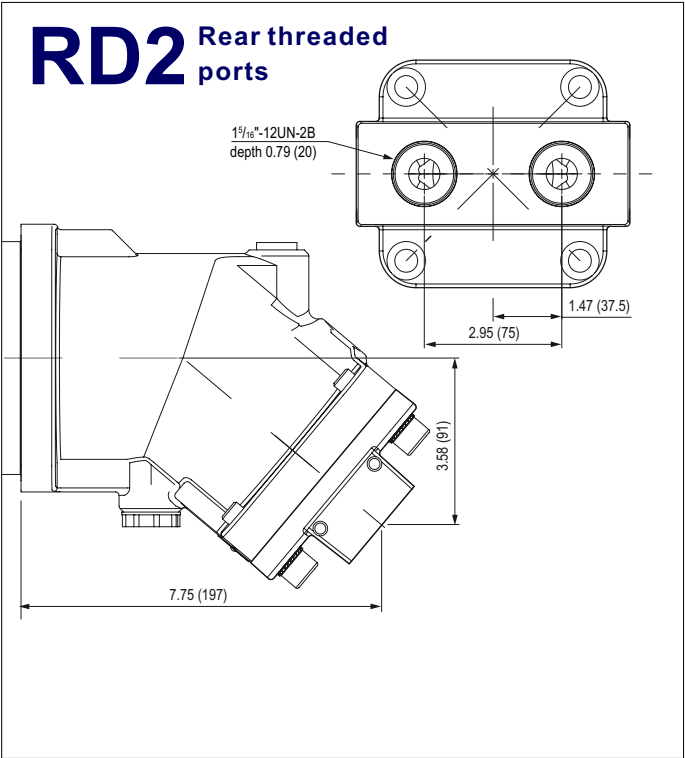
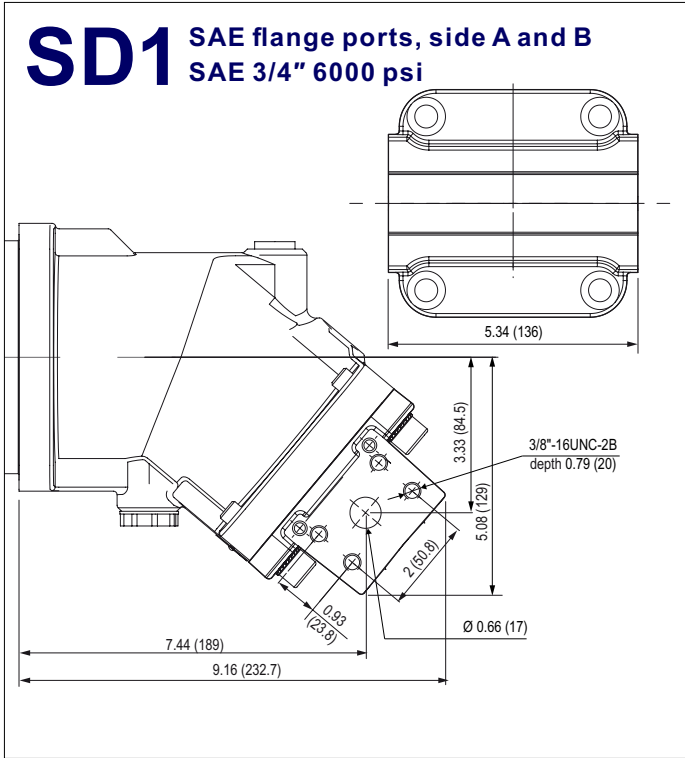
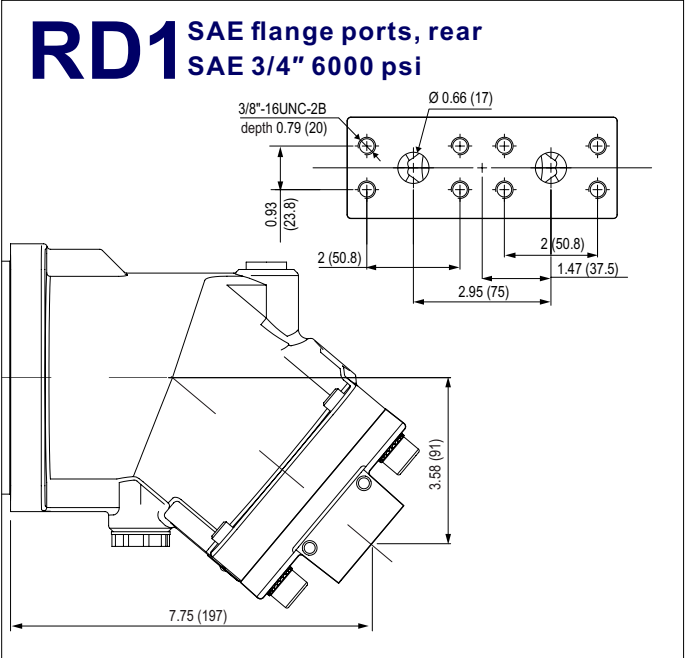
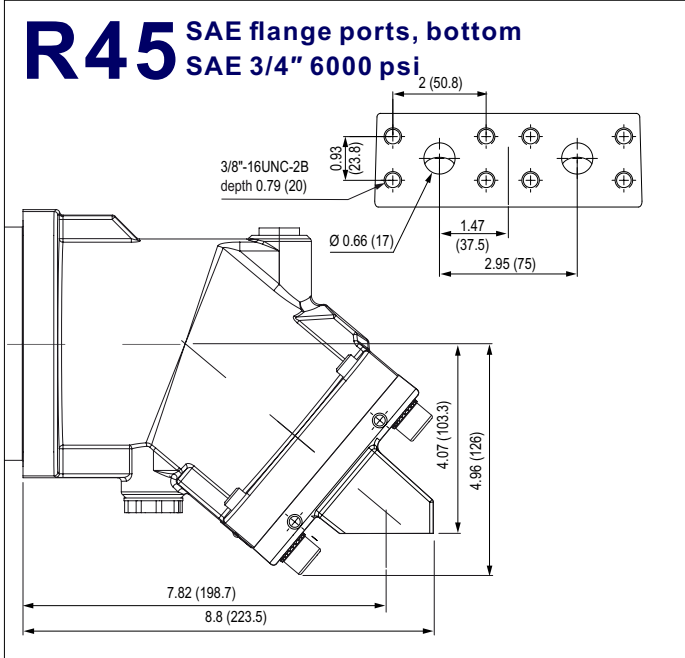
A9MS - 41 cc (SAE C) - 4 Bolt



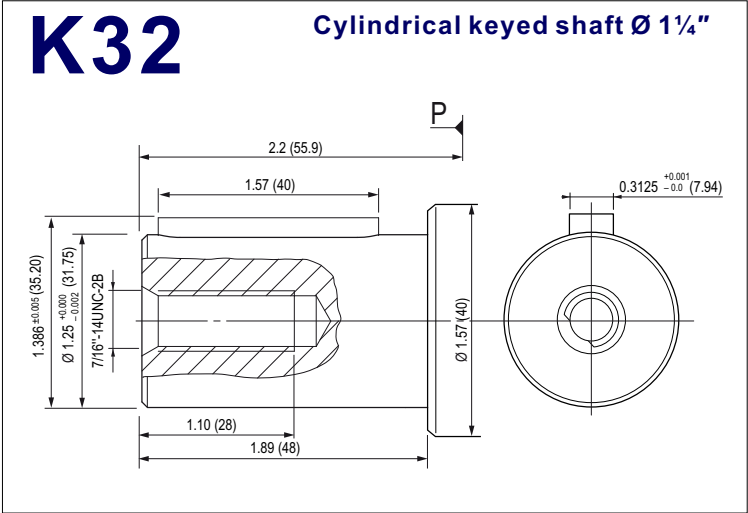
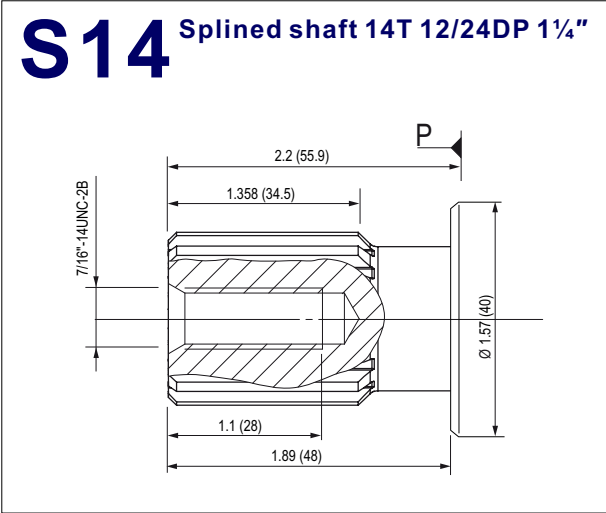
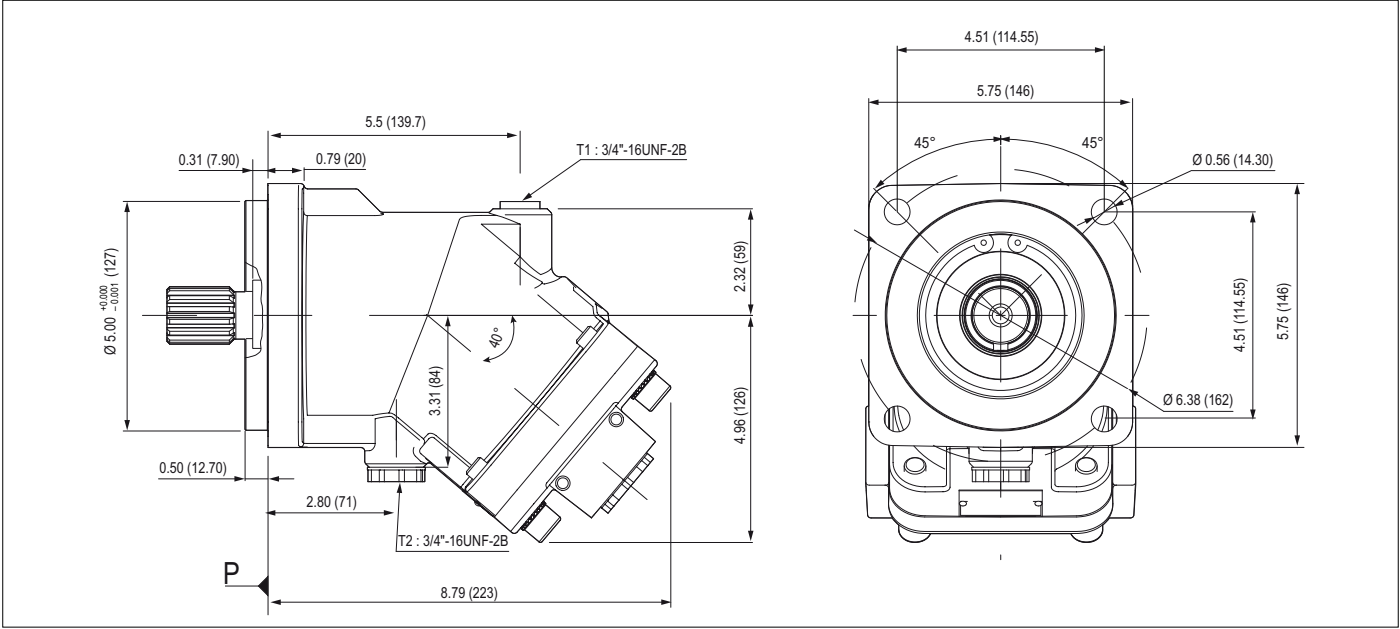
A9MS - 45 cc (SAE C) - 4 Bolt



A9MS - 45 cc (SAE C) - 4 Bolt

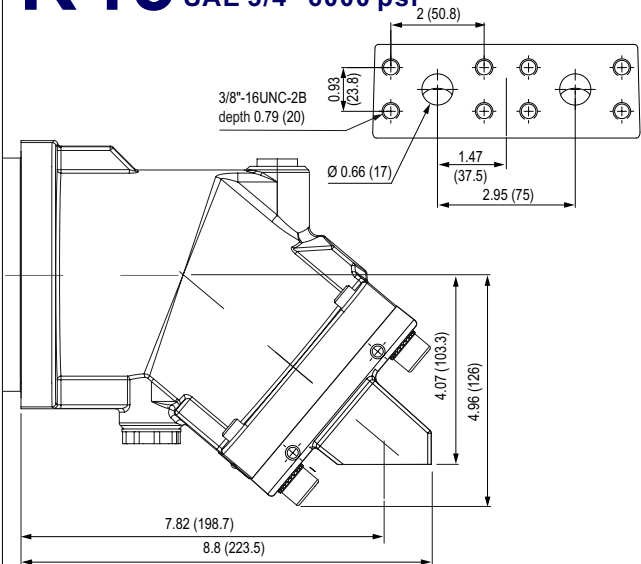


A9MS - 50 cc (SAE C) - 4 Bolt

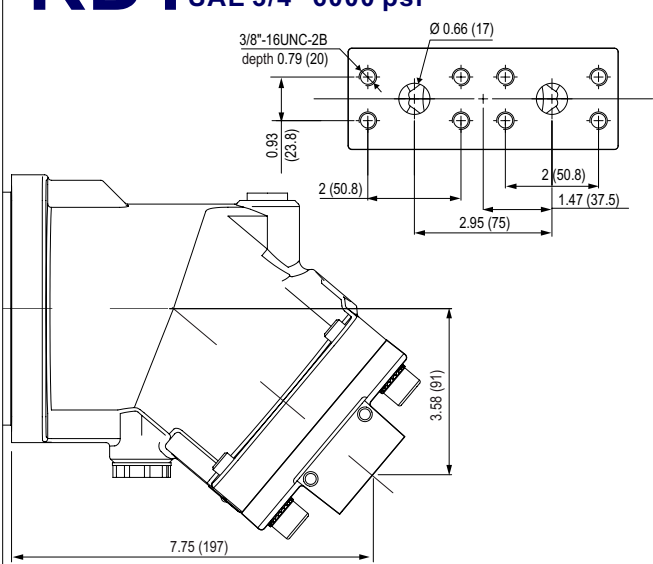


A9MS - 50 cc (SAE C) - 4 Bolt

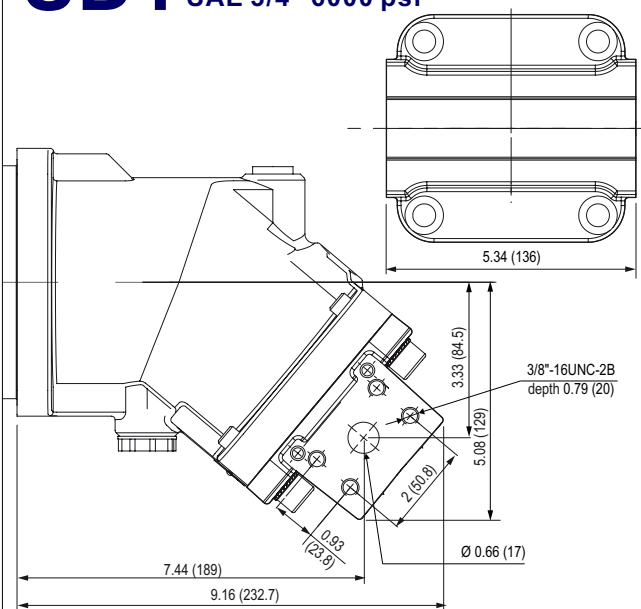
R45 SAE flange ports, bottom
SAE 3/4" 6000 psi



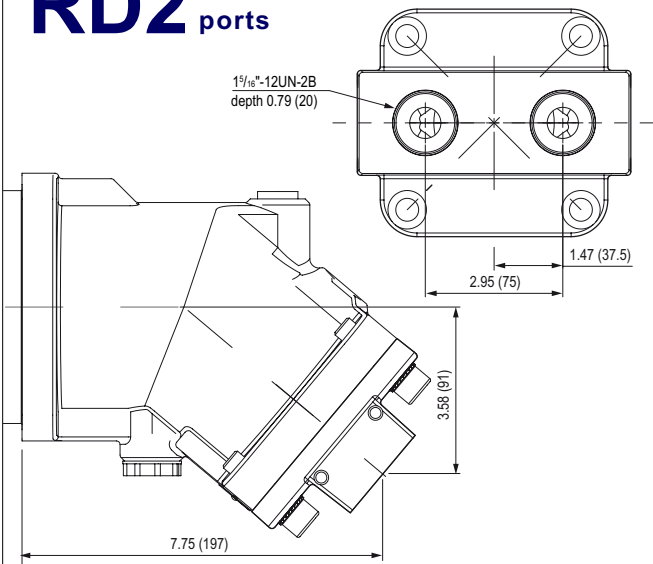
RD1 SAE flange ports, rear
SAE 3/4" 6000 psi



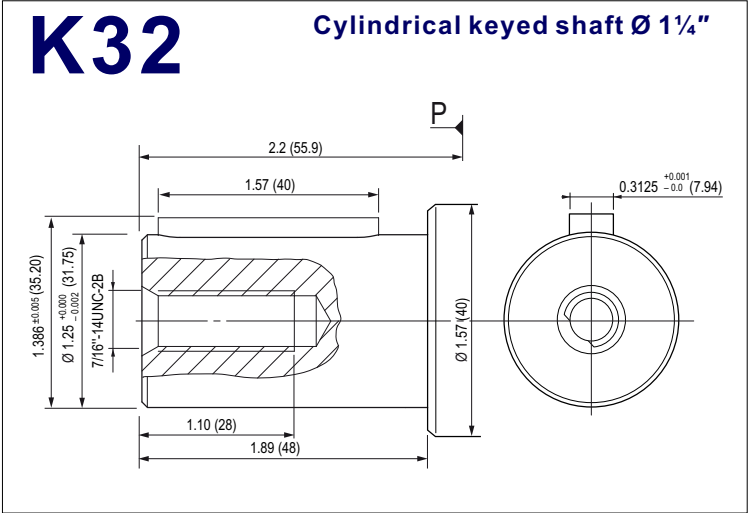
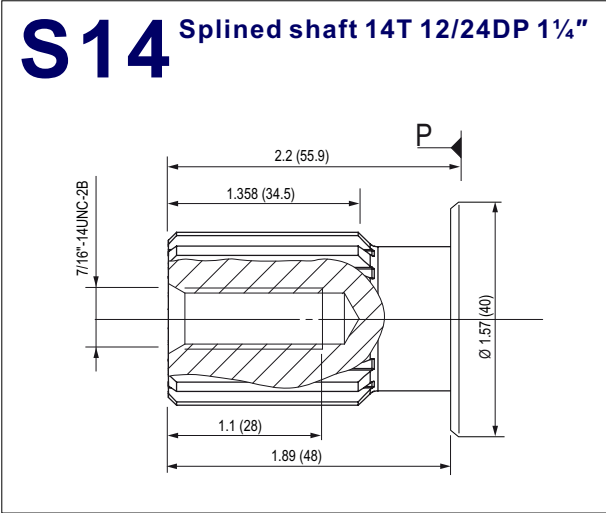
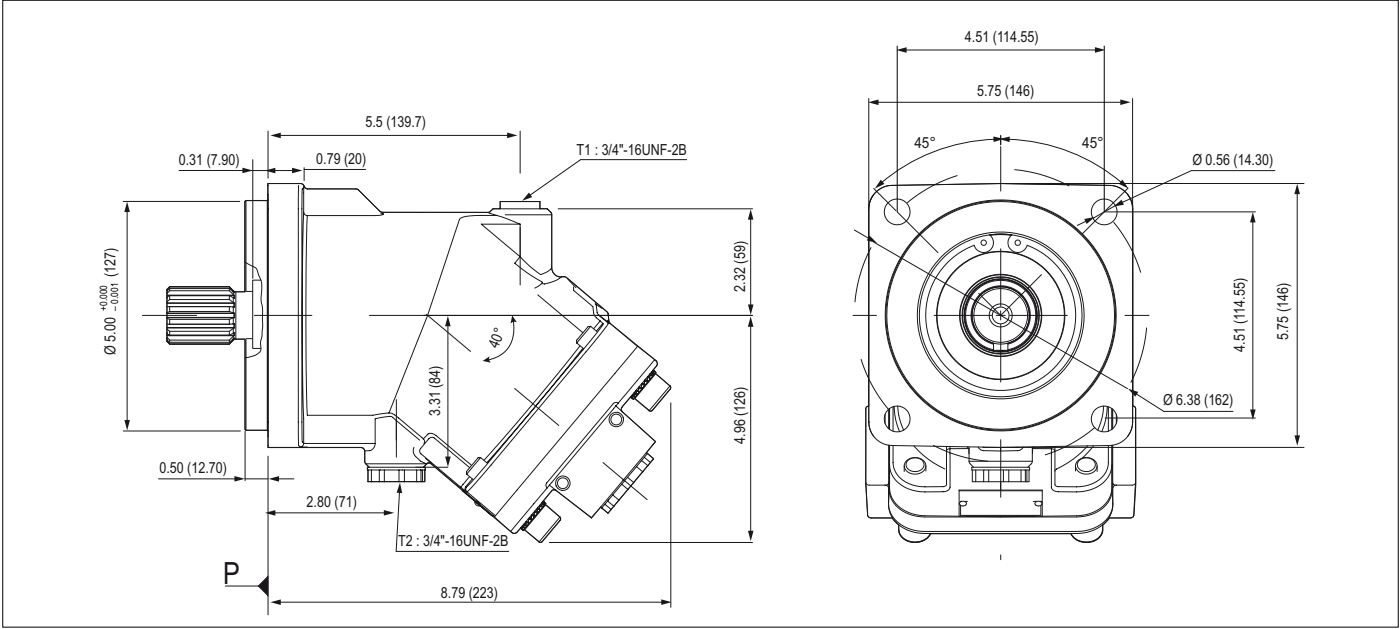
SD1 SAE flange ports, side A and B
SAE 3/4" 6000 psi



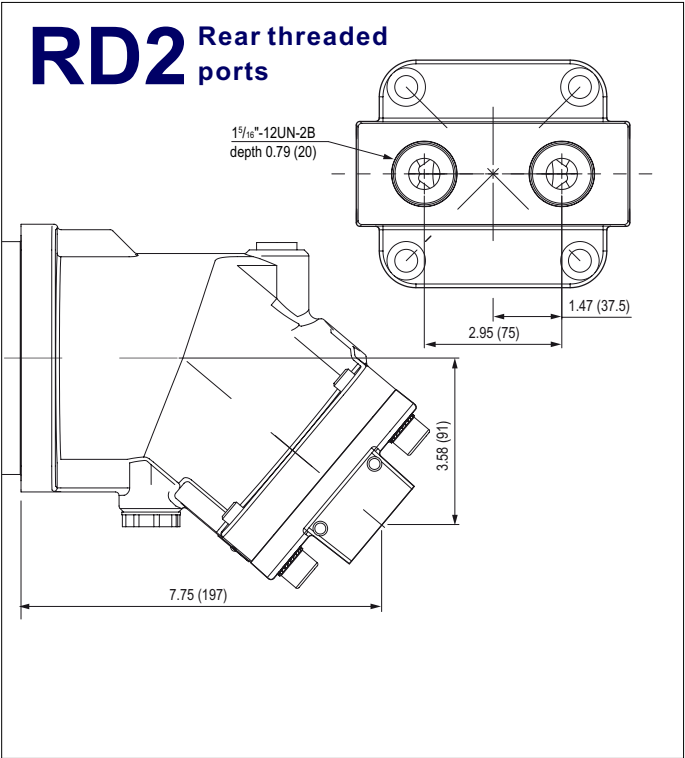
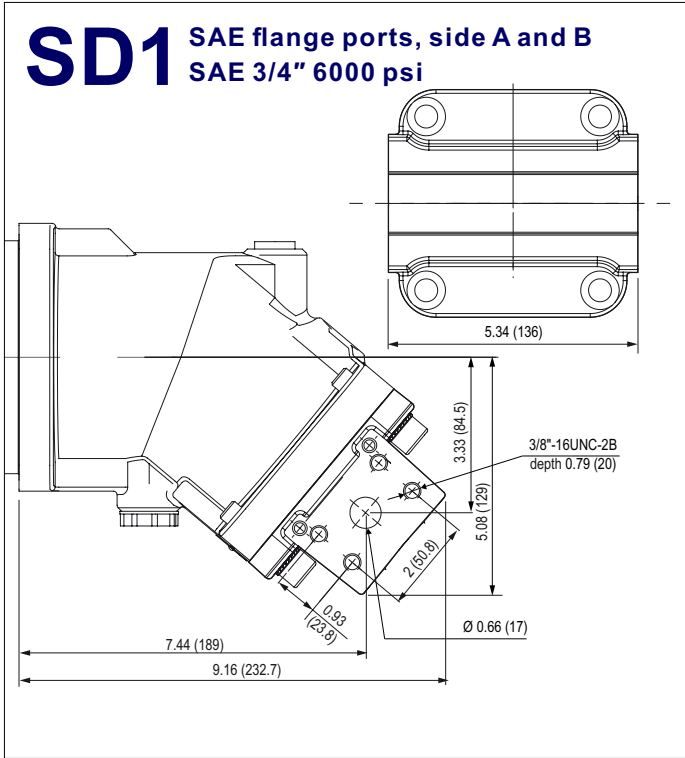
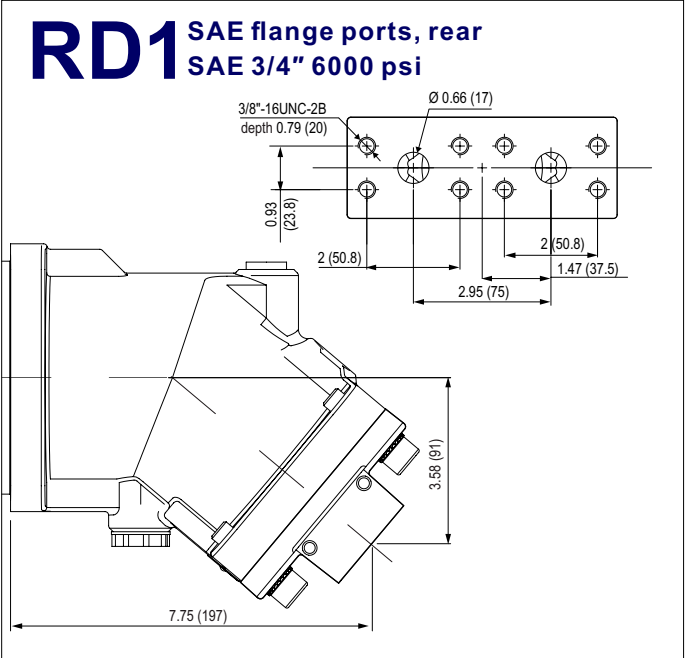
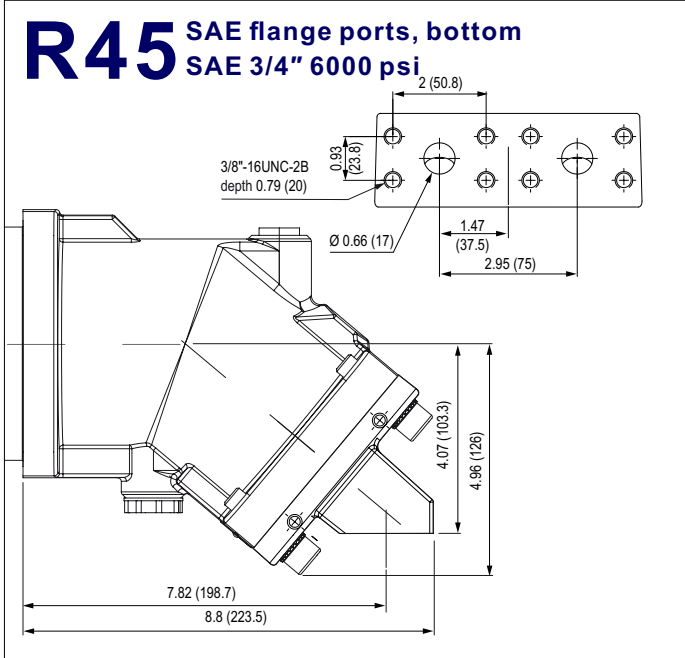
RD2 Rear threaded ports



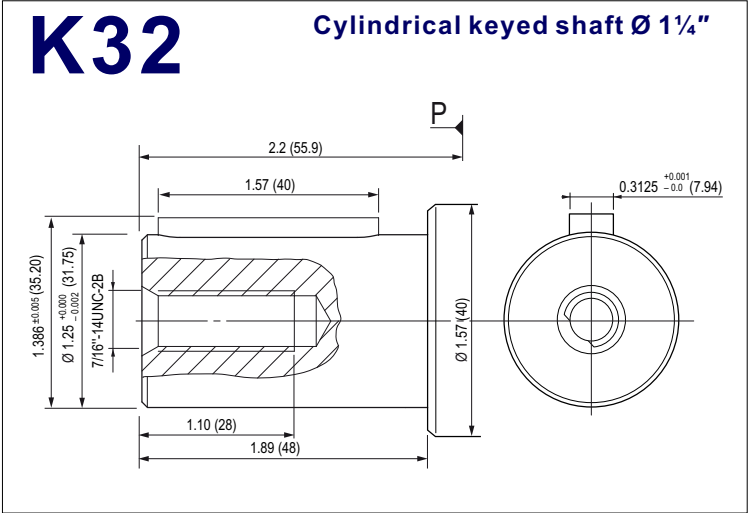
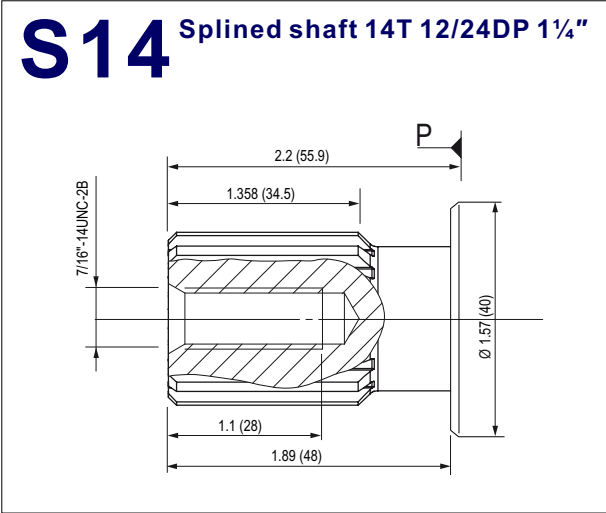
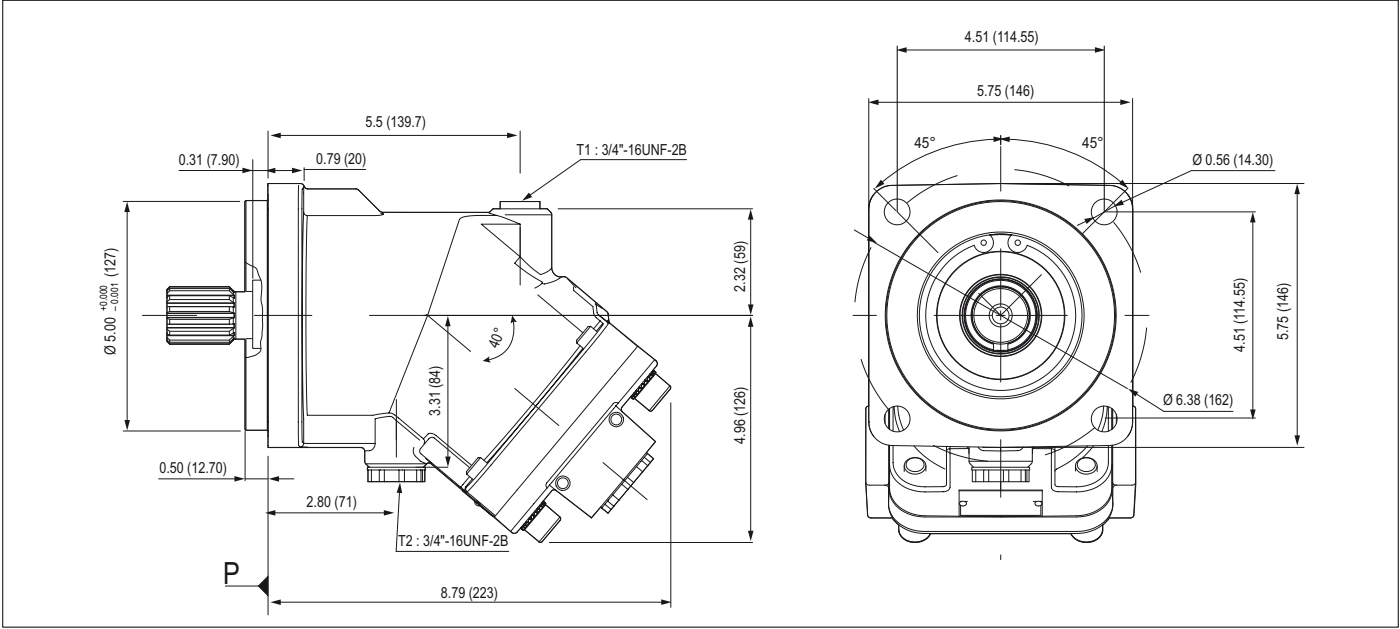
A9MS - 56 cc (SAE C) - 4 Bolt



A9MS - 56 cc (SAE C) - 4 Bolt

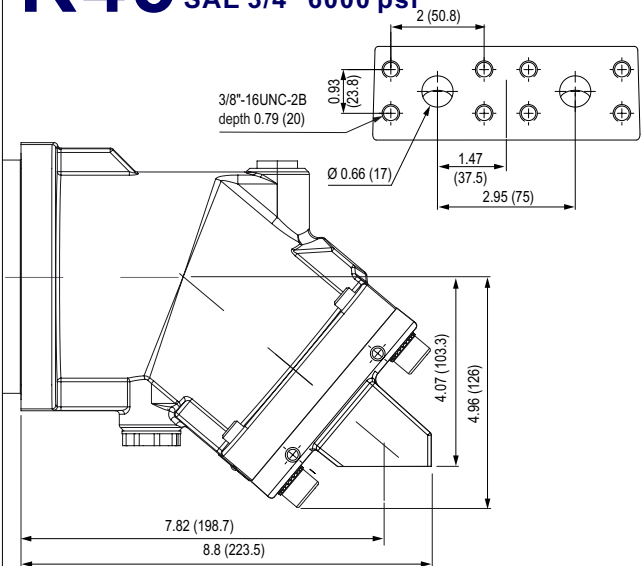


A9MS - 63 cc (SAE C) - 4 Bolt

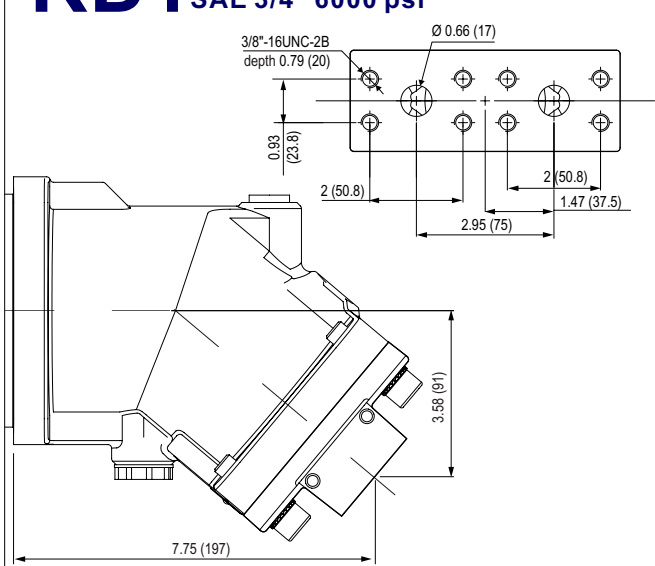


A9MS - 63 cc (SAE C) - 4 Bolt

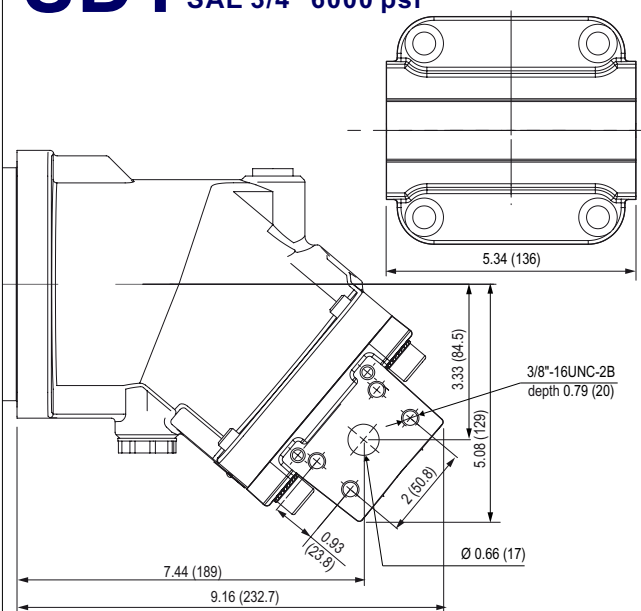
R45 SAE flange ports, bottom
SAE 3/4" 6000 psi



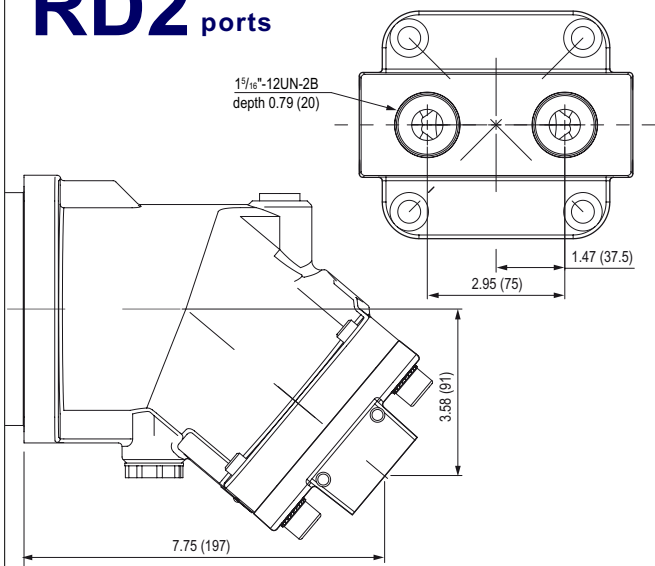
RD1 SAE flange ports, rear
SAE 3/4" 6000 psi



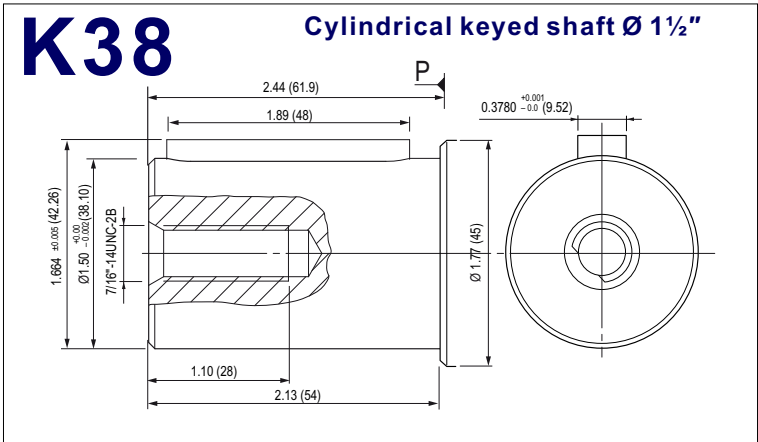
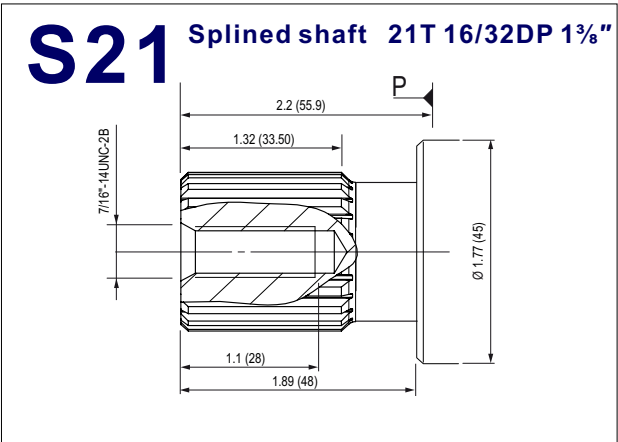
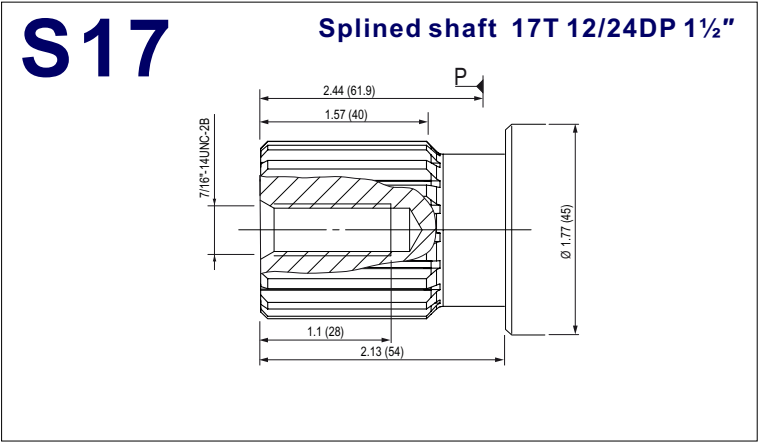
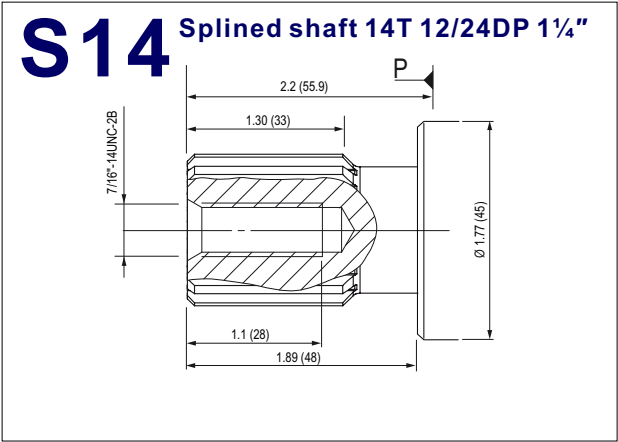
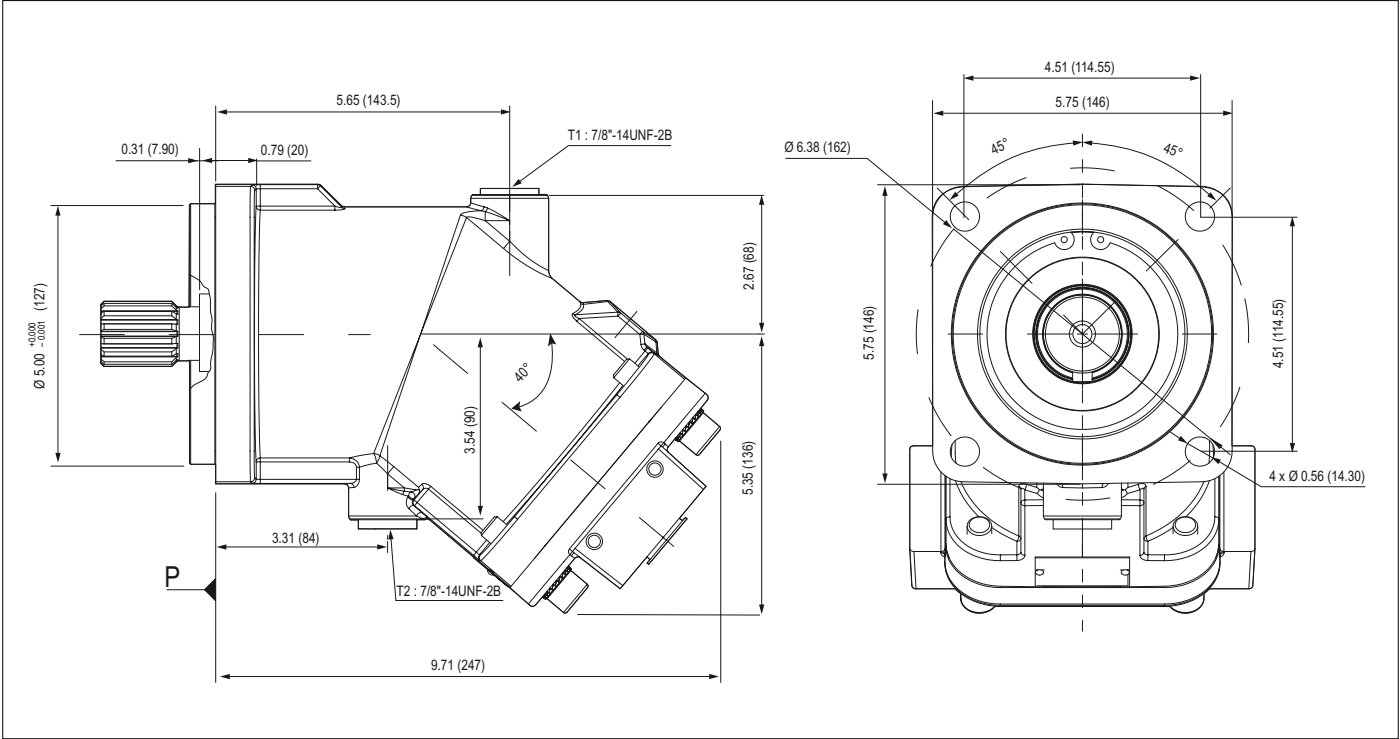
SD1 SAE flange ports, side A and B
SAE 3/4" 6000 psi



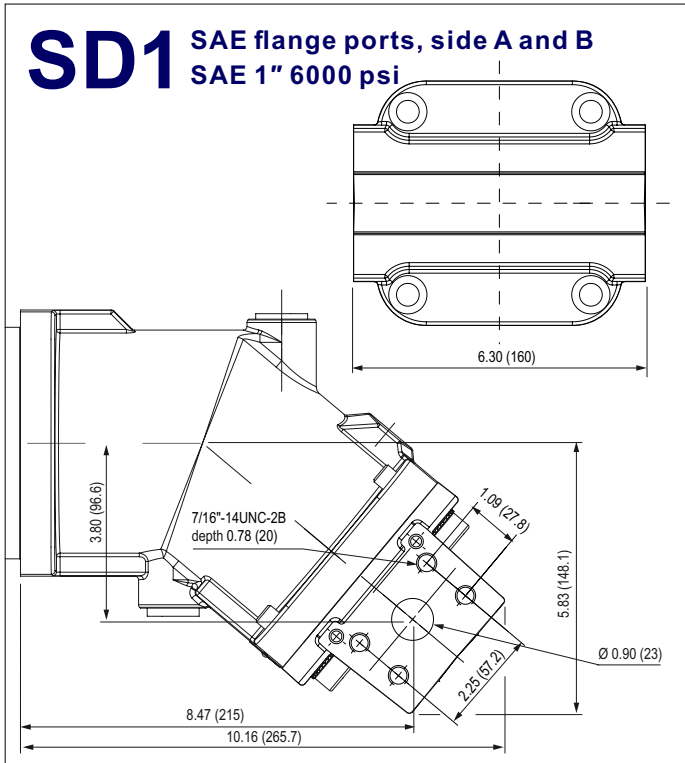
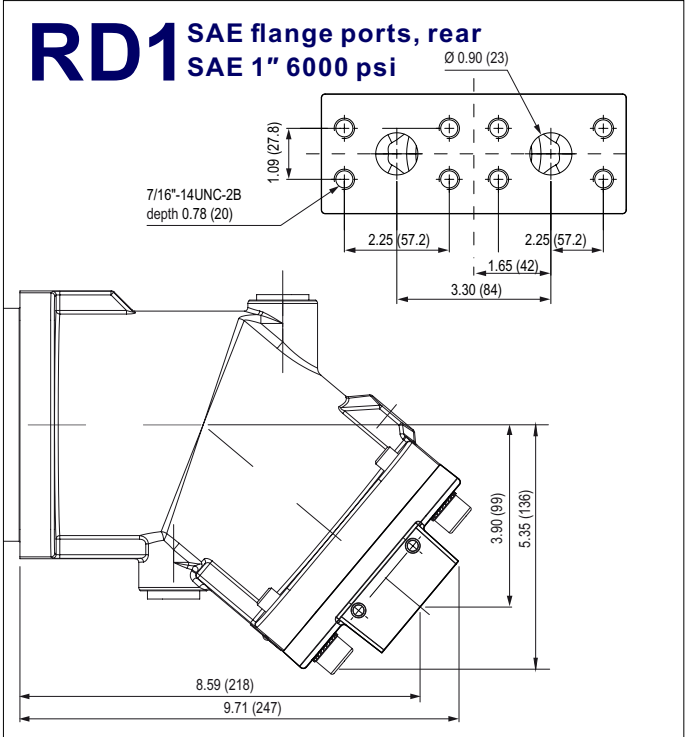
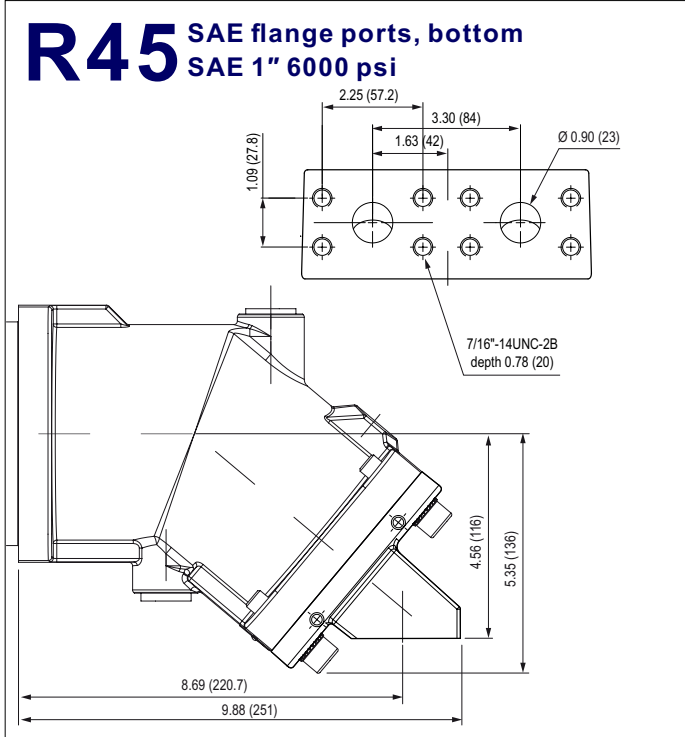
RD2 Rear threaded ports



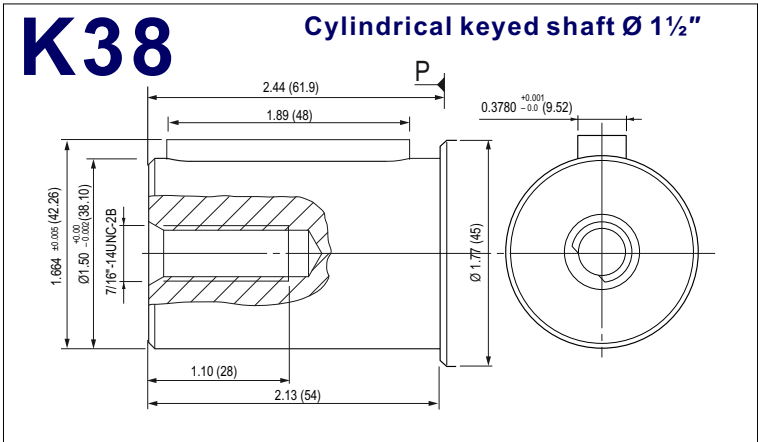
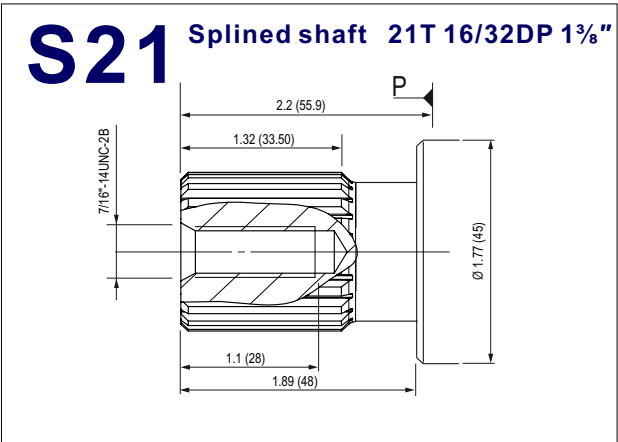
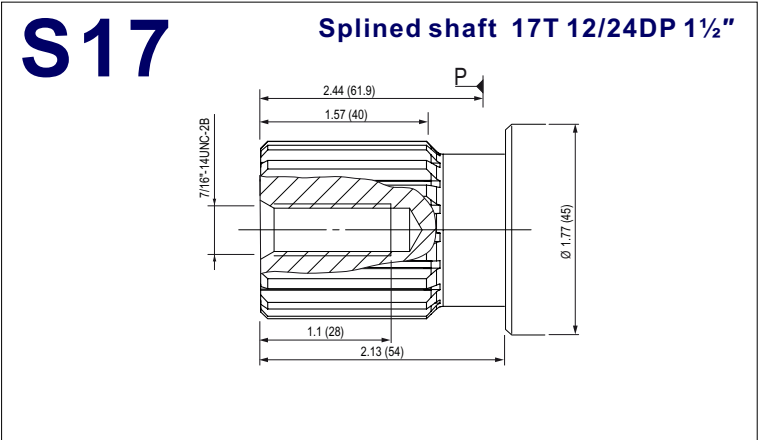
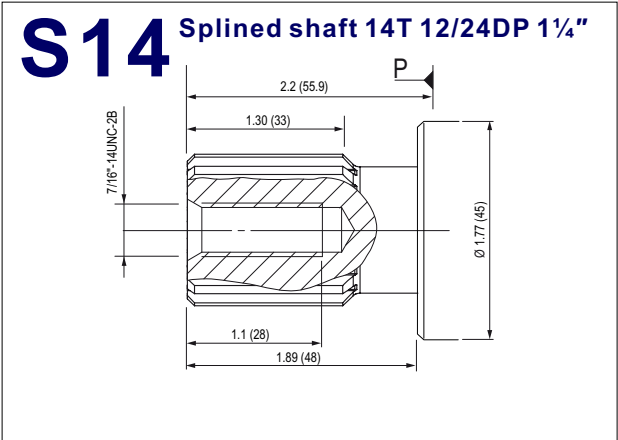
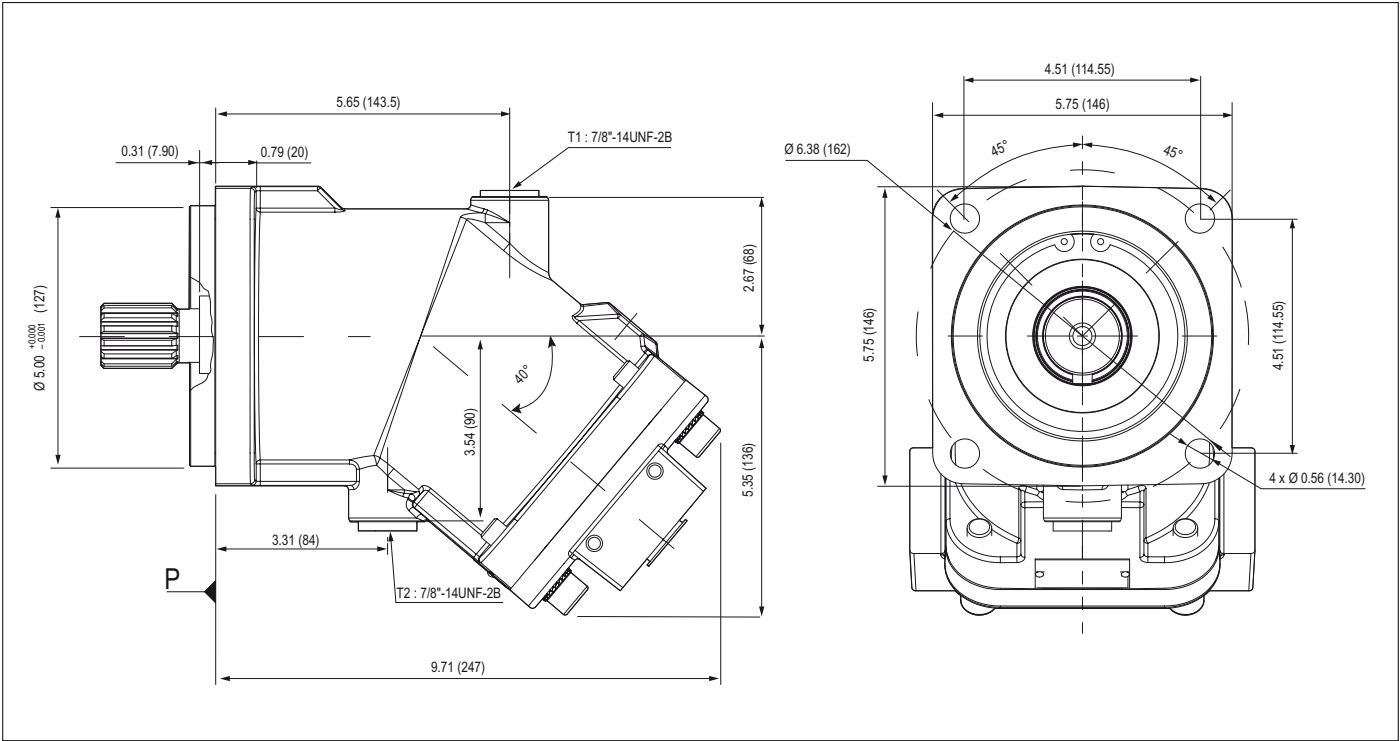
A9MS - 80 cc (SAE C) - 4 Bolt



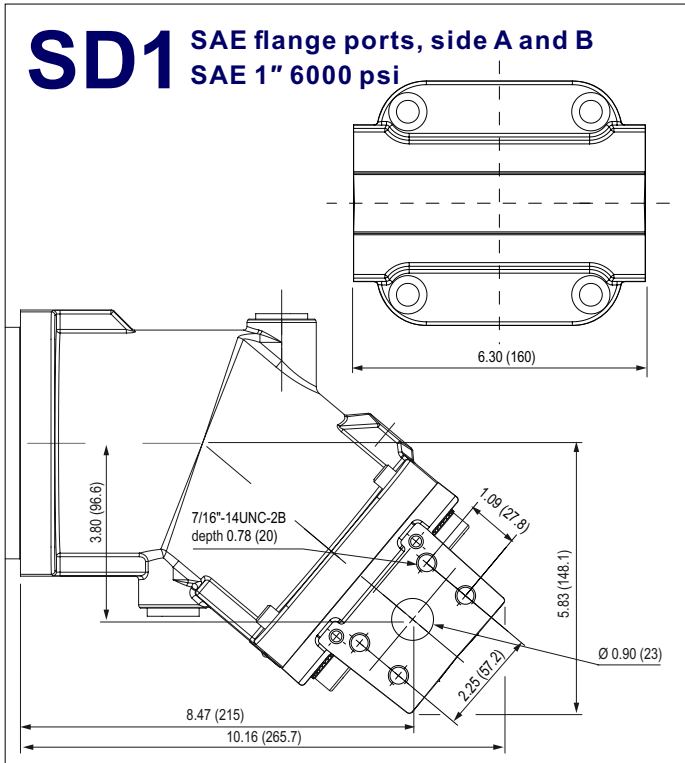
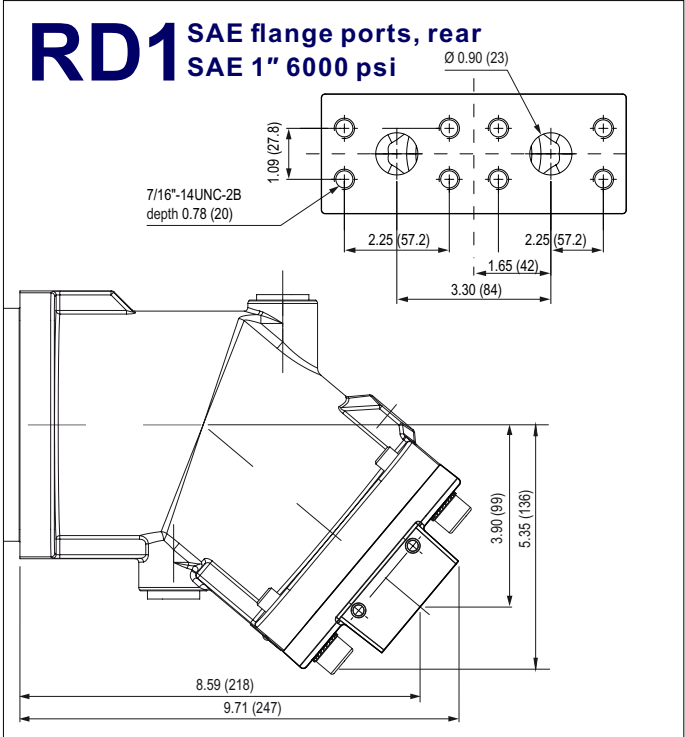
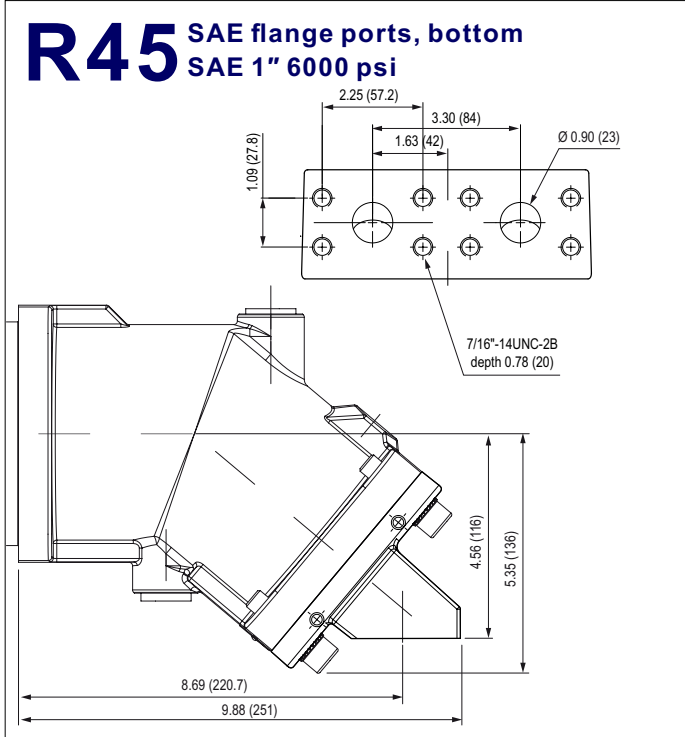
A9MS - 80 cc (SAE C) - 4 Bolt



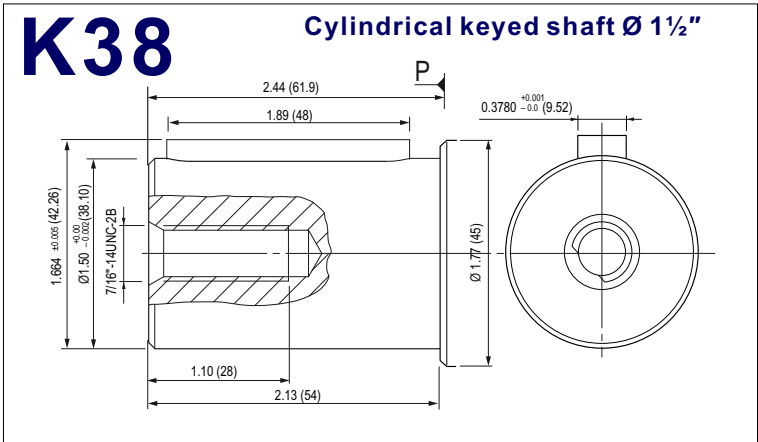
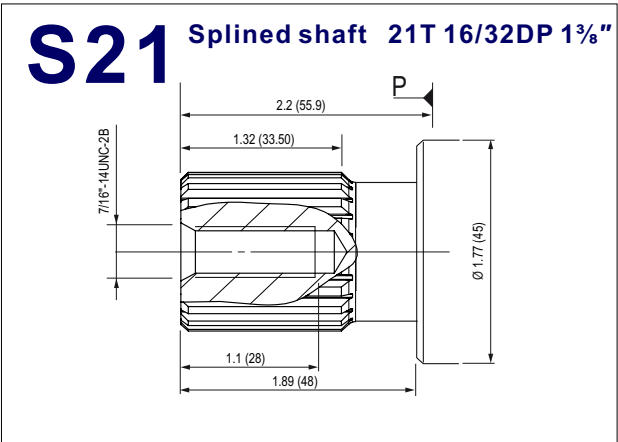
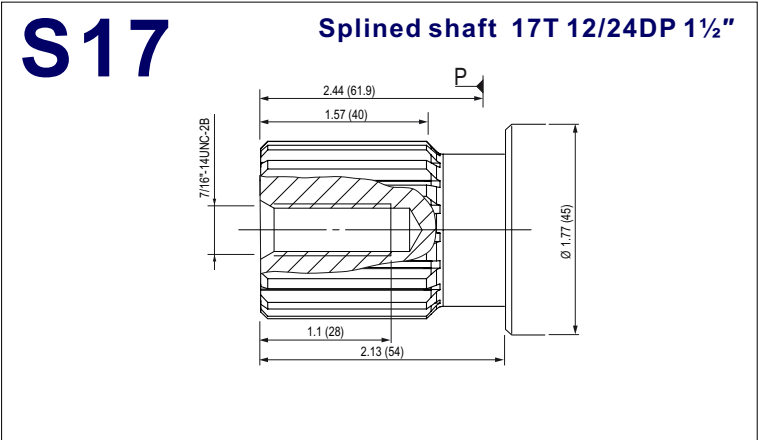
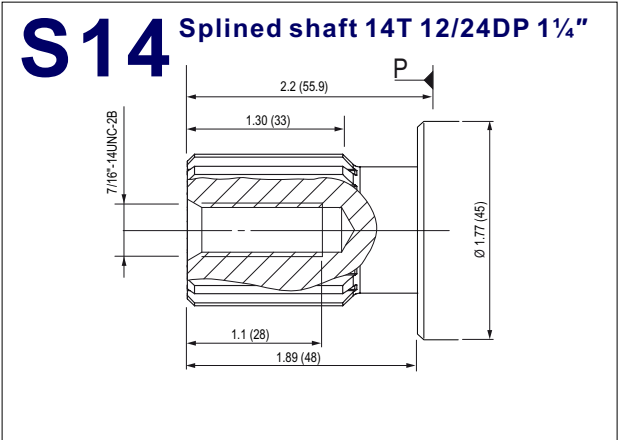
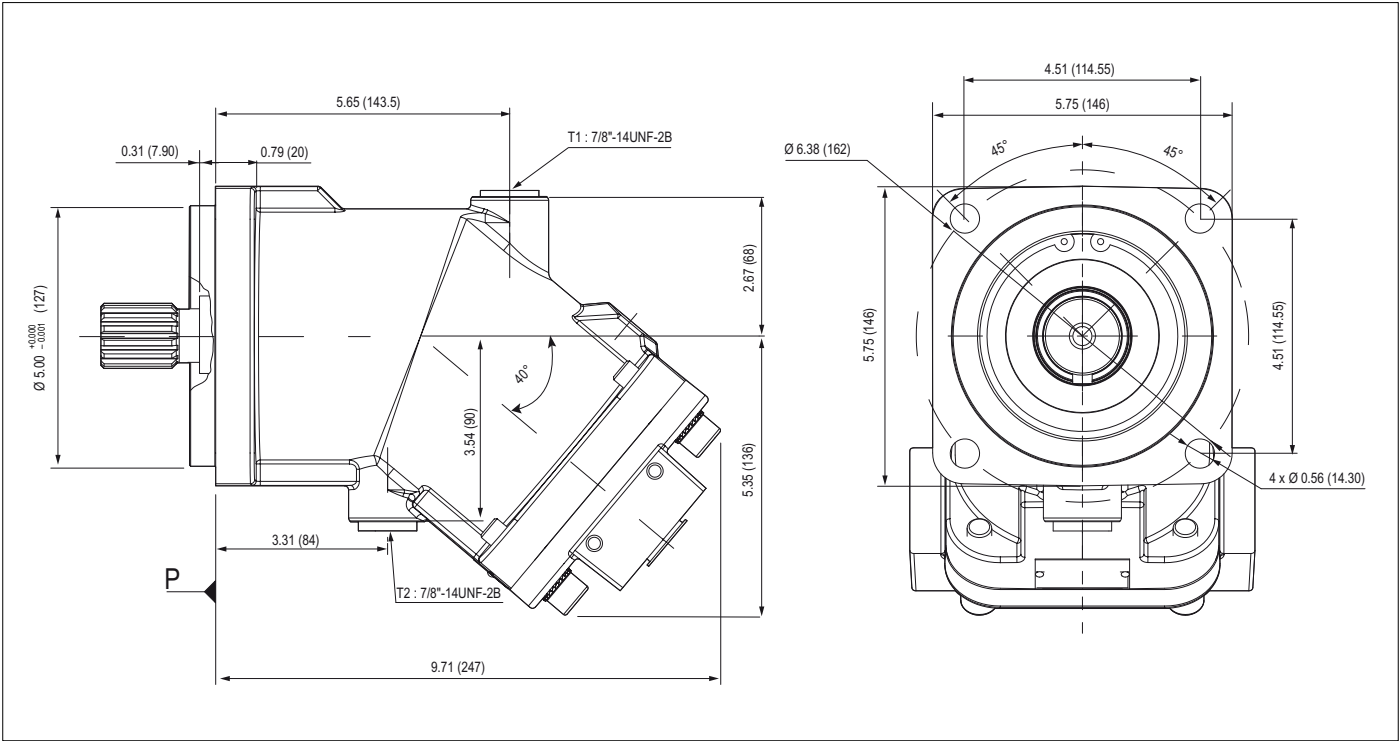
A9MS - 90 cc (SAE C) - 4 Bolt



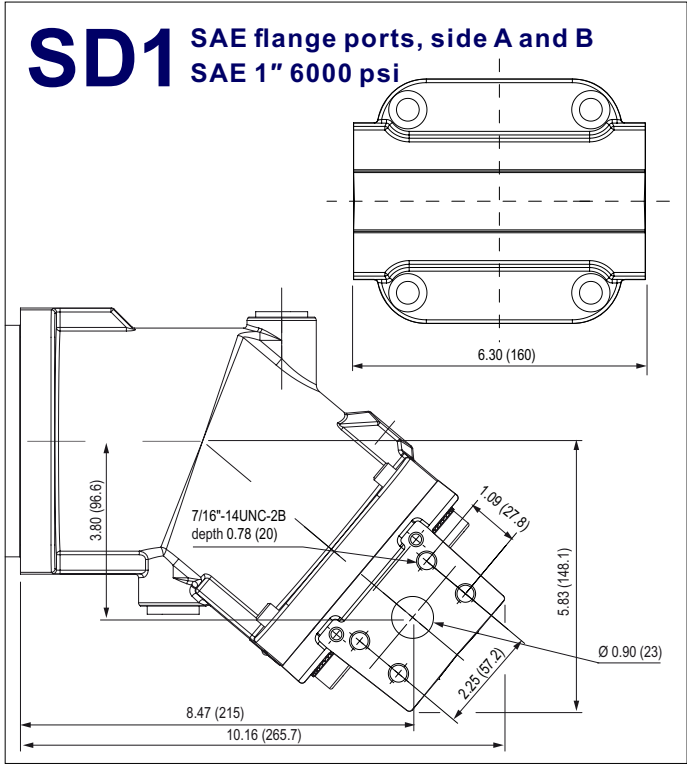
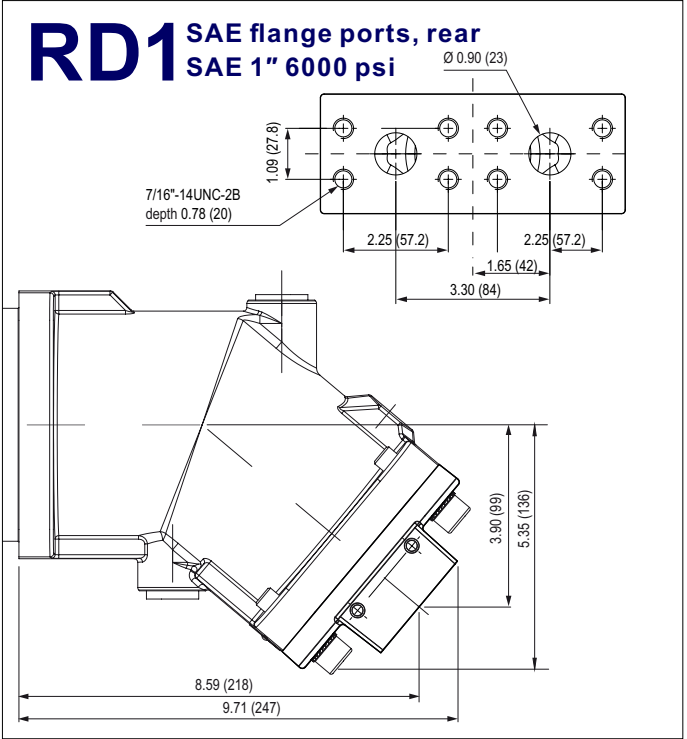
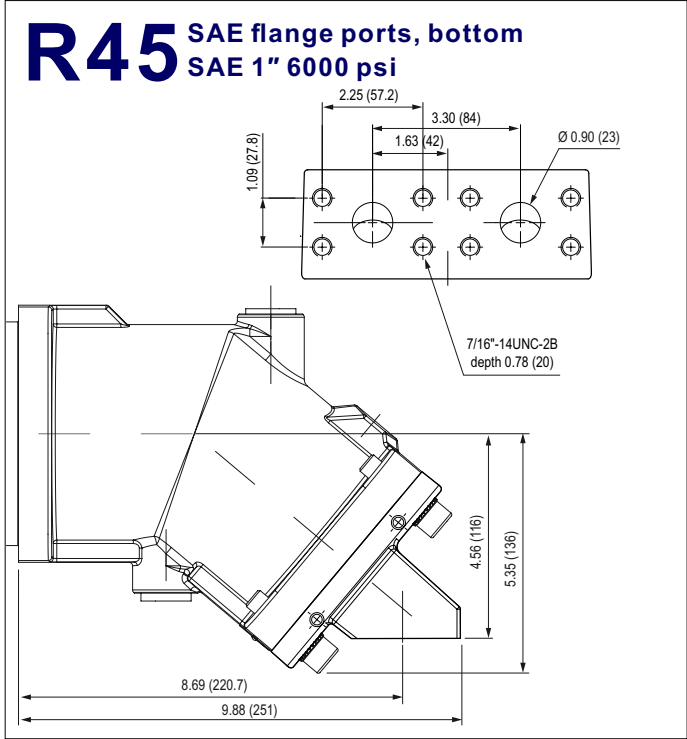
A9MS - 90 cc (SAE C) - 4 Bolt



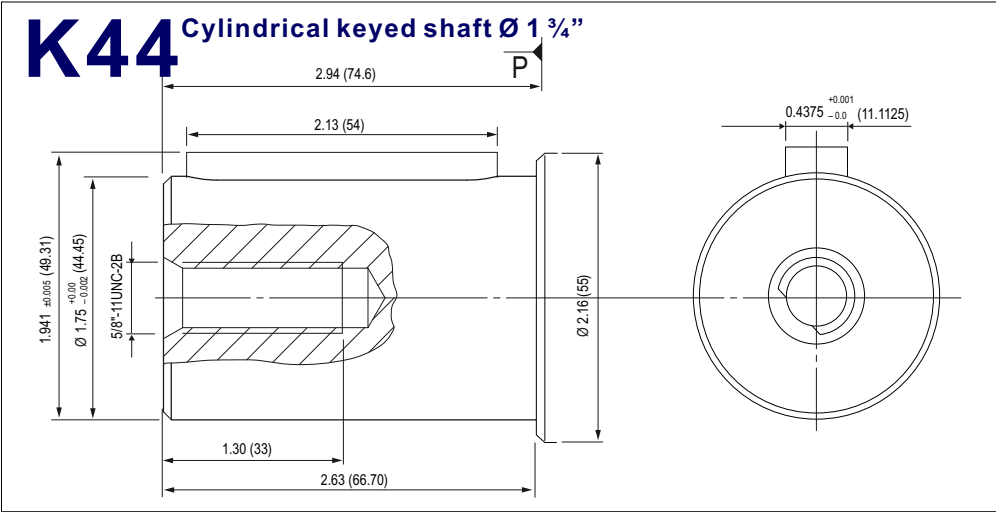
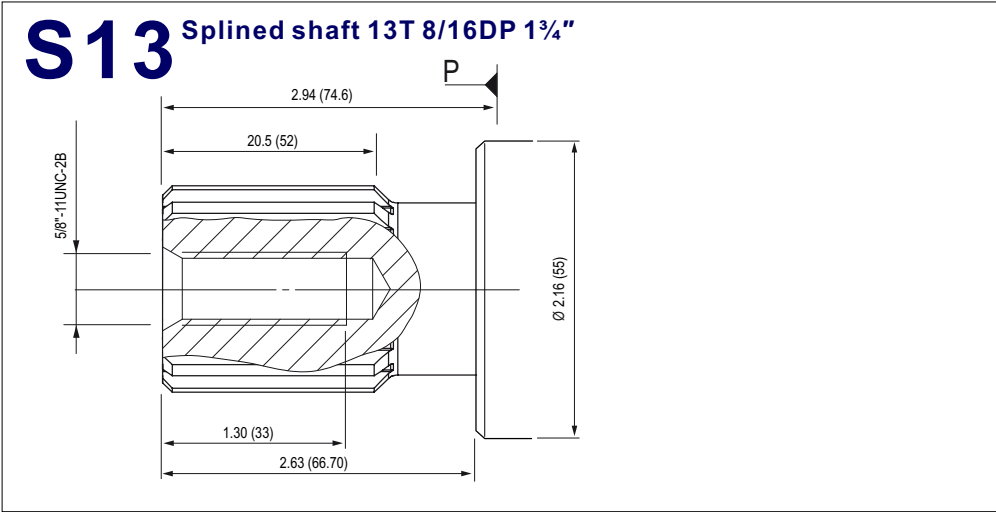
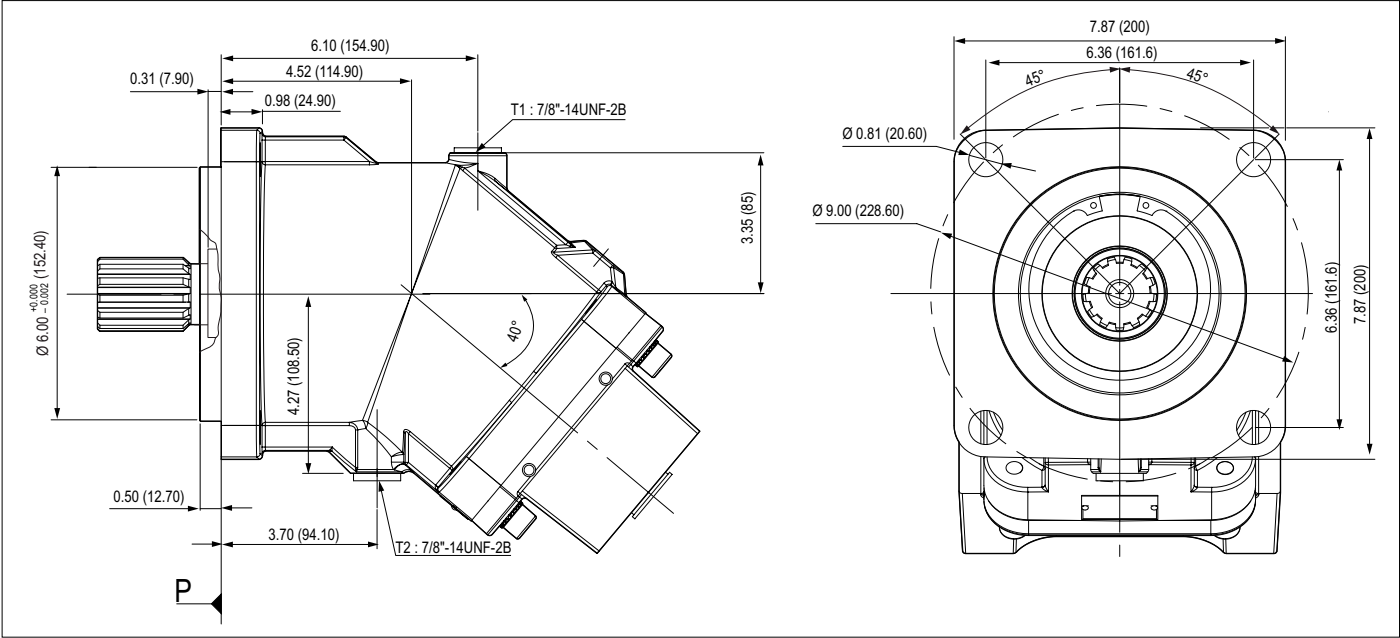
A9MS - 108 cc (SAE C) - 4 Bolt



A9MS - 108 cc (SAE C) - 4 Bolt

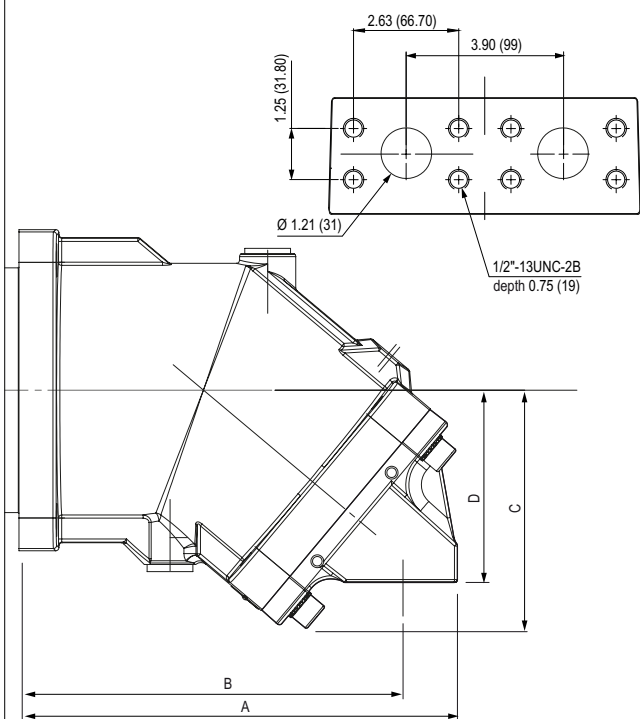


A9MS - 108 cc (SAE D) - 4 Bolt

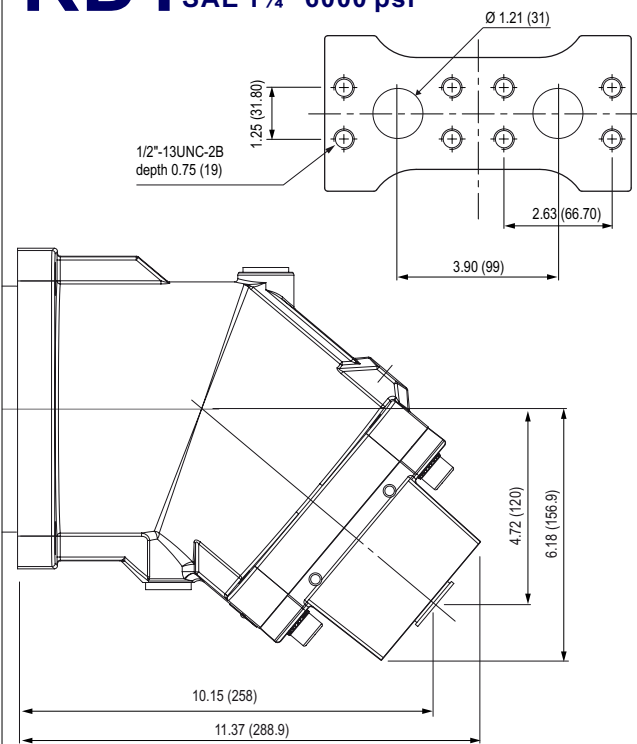


A9MS - 108 cc (SAE D) - 4 Bolt

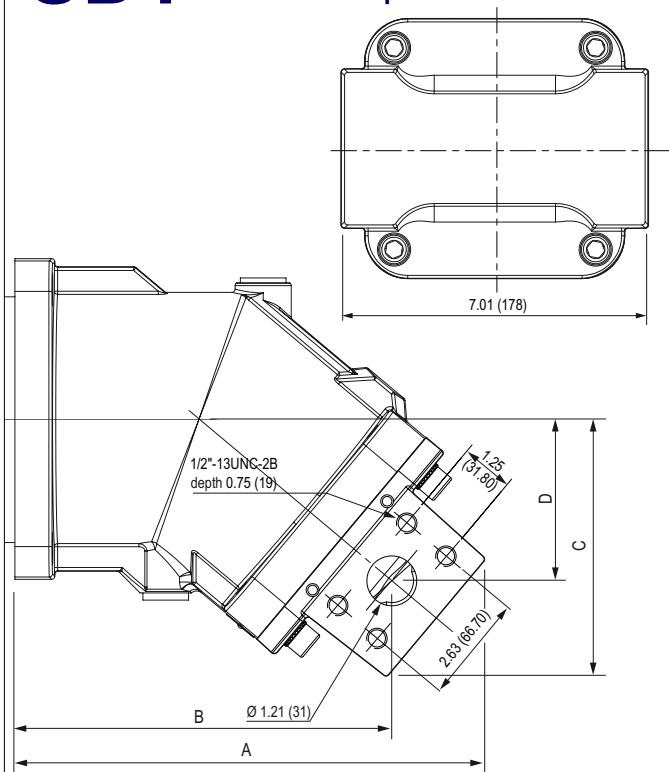
R45 SAE flange ports, rear SAE 1 1/4" 6000 psi



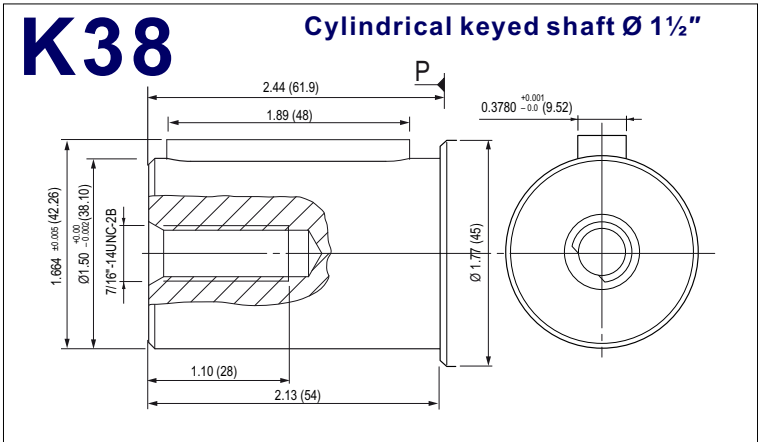
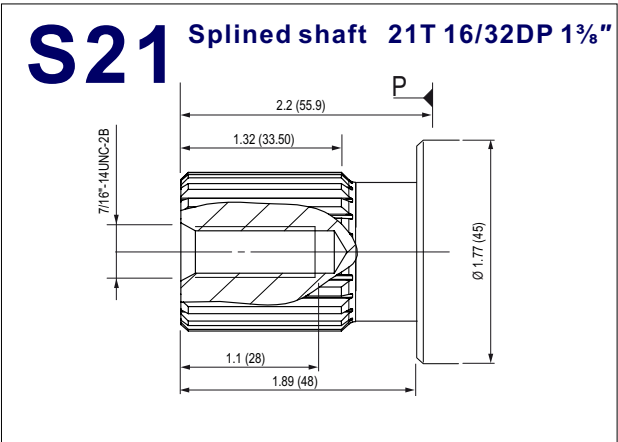
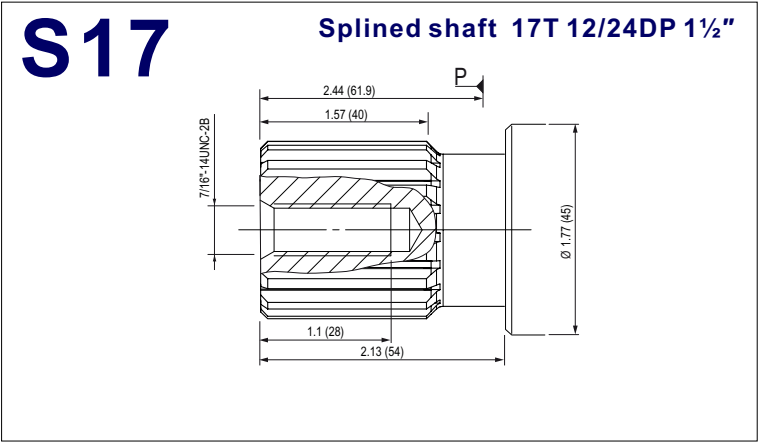
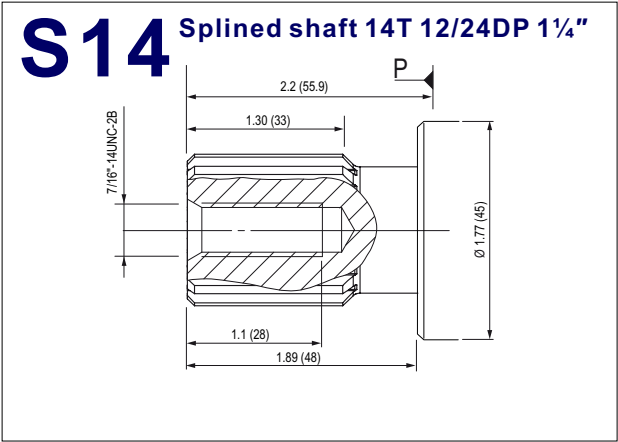
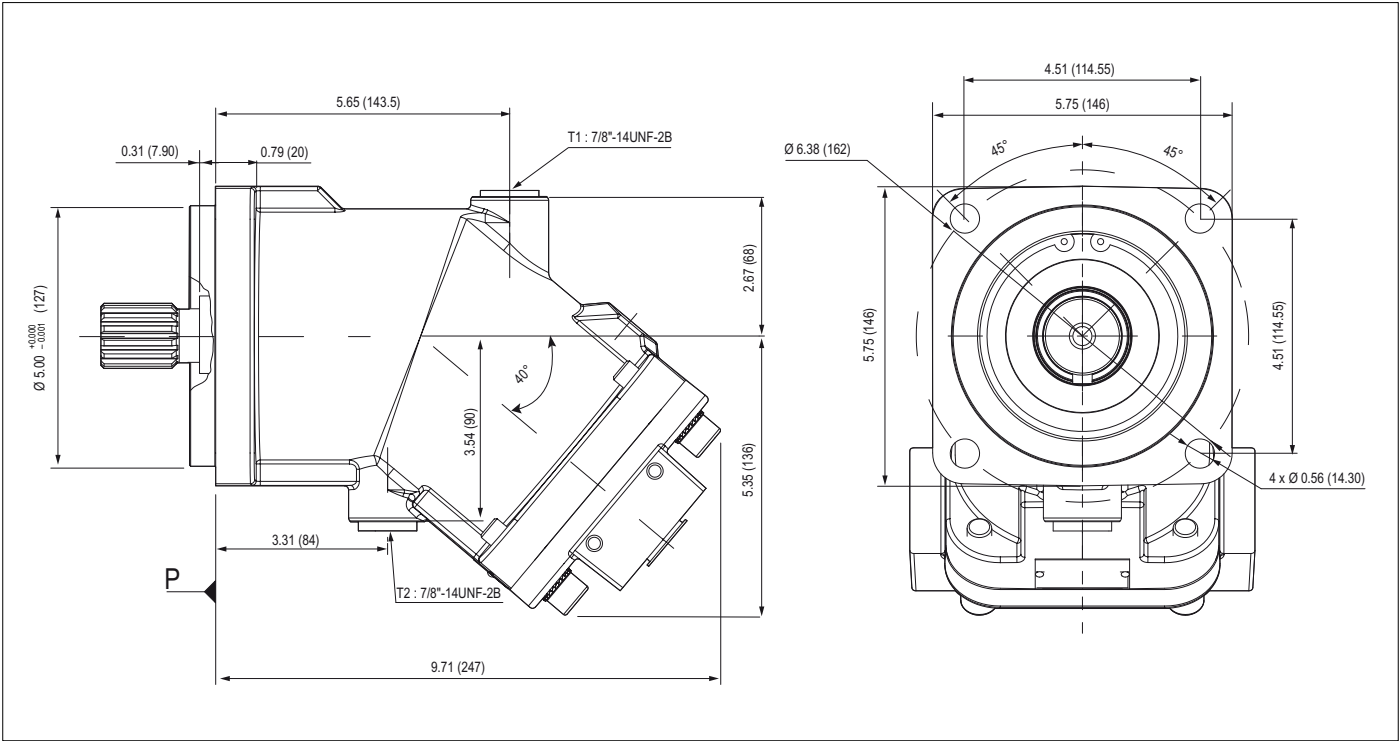
RD1 SAE flange ports, bottom SAE 1 1/4" 6000 psi



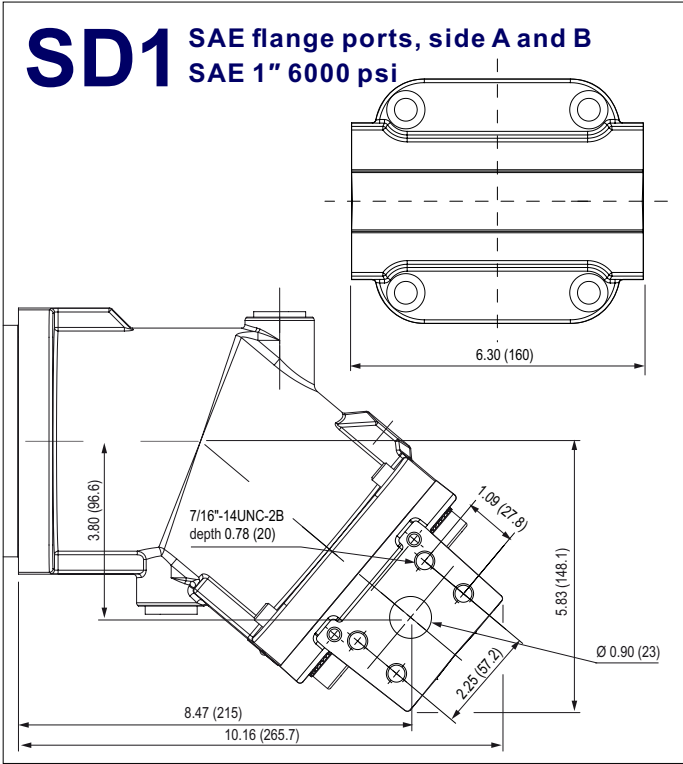
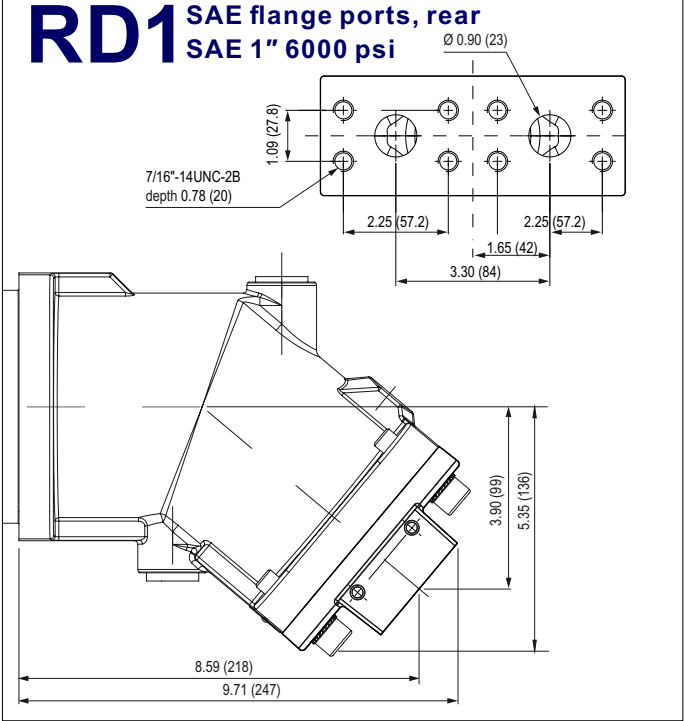
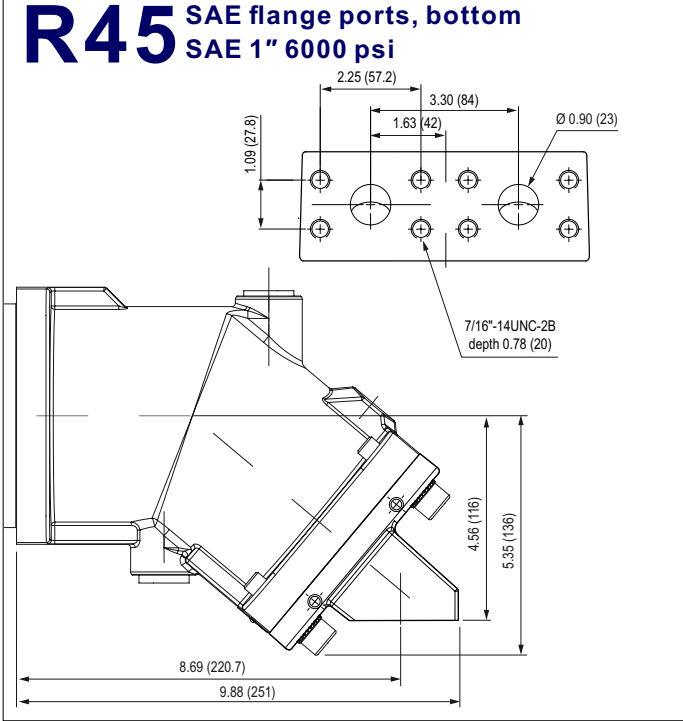
SD1 SAE flange ports, side A and B SAE 1 1/4" 6000 psi



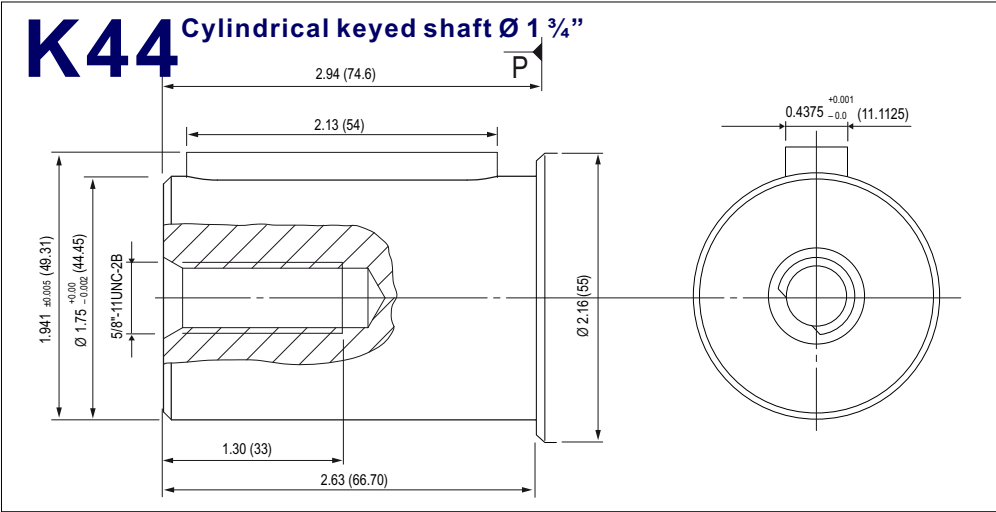
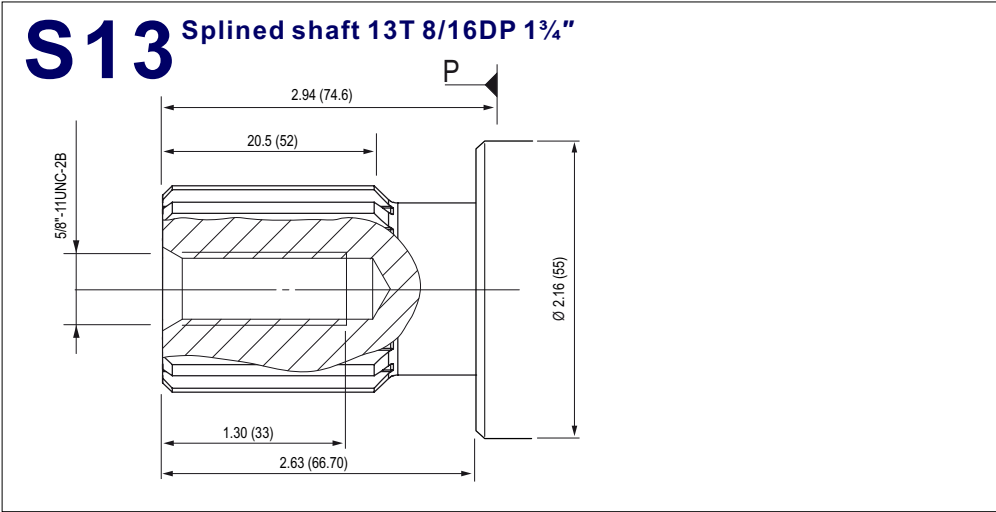
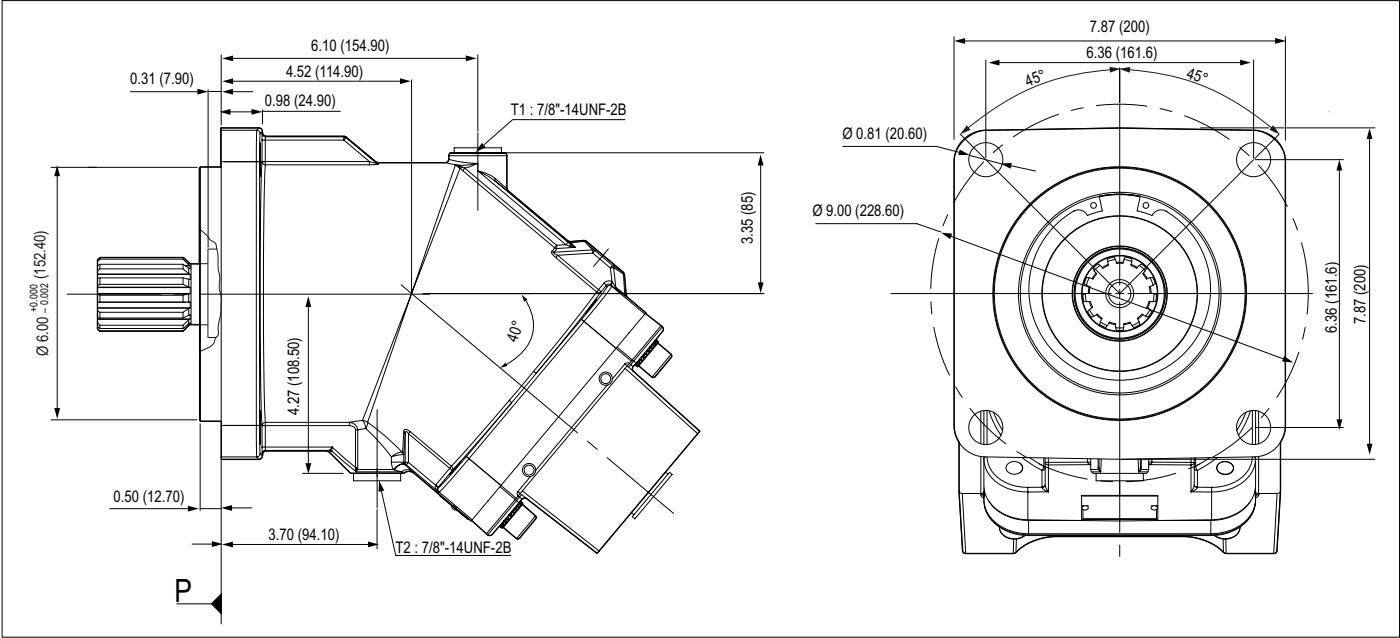
A9MS - 125 cc (SAE C) - 4 Bolt



A9MS - 125 cc (SAE C) - 4 Bolt

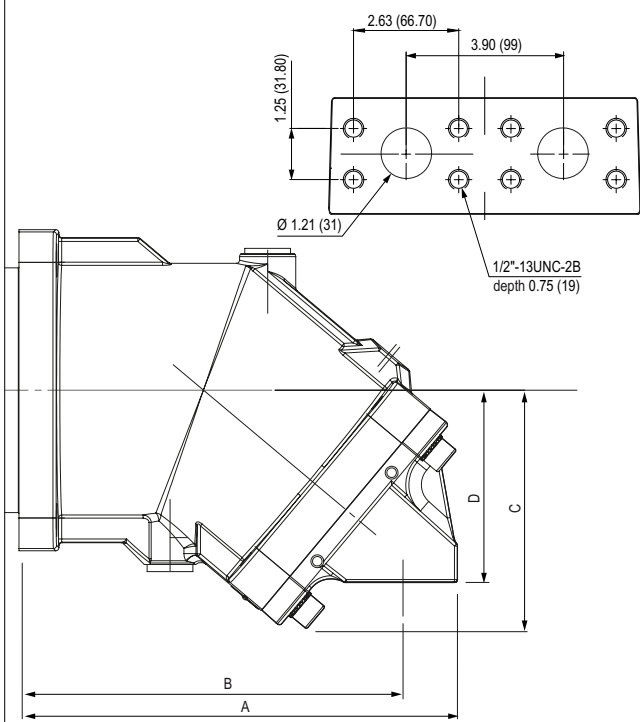


A9MS - 125 cc (SAE D) - 4 Bolt

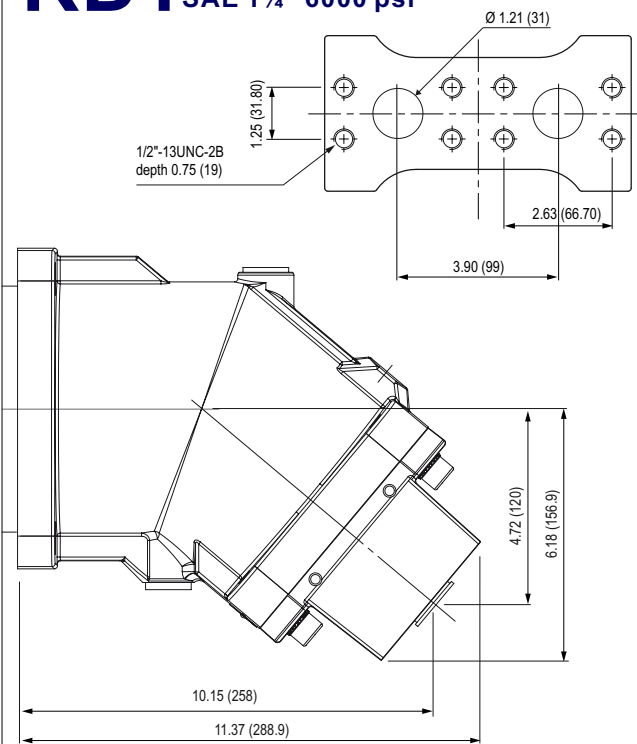


A9MS - 125 cc (SAE D) - 4 Bolt

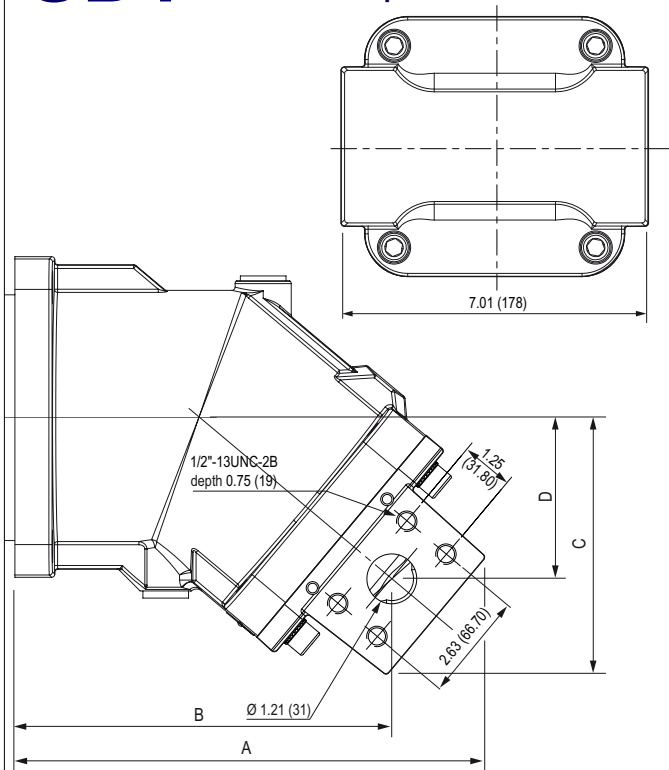
R45 SAE flange ports, rear SAE 1 1/4" 6000 psi



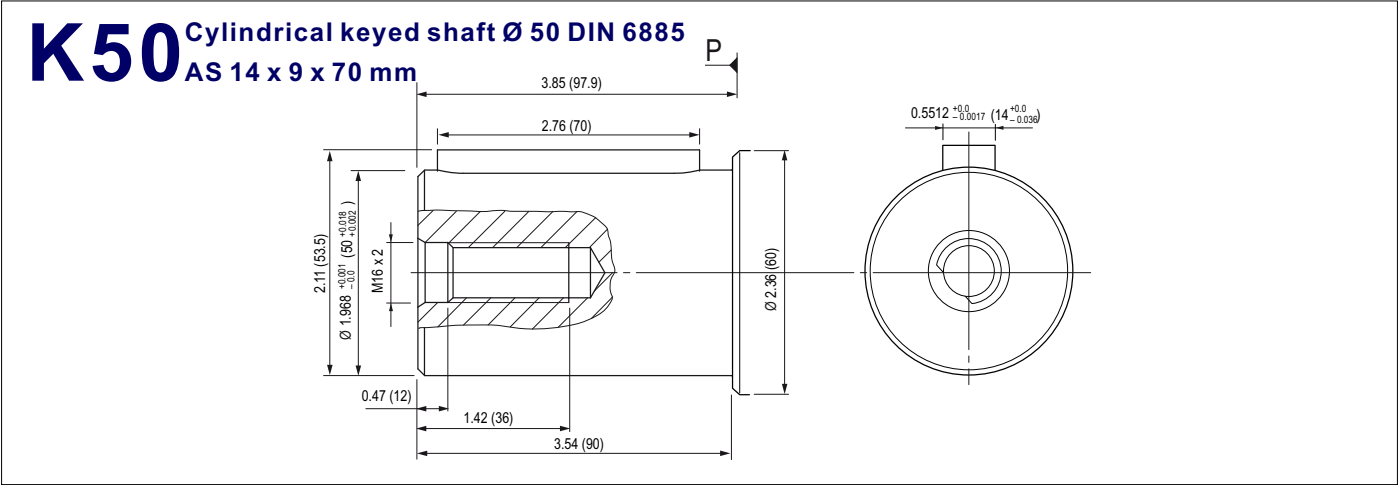
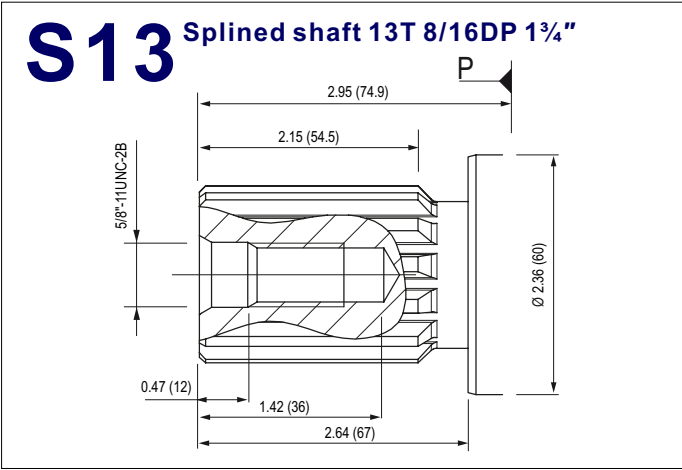
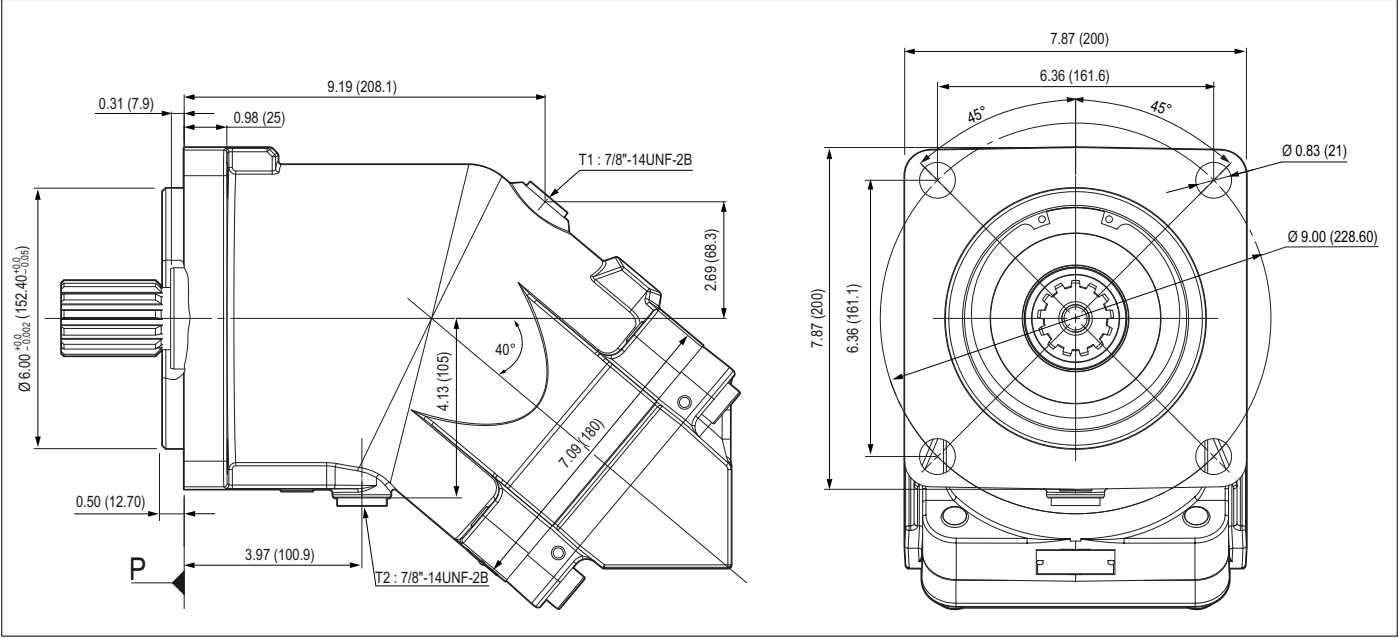
RD1 SAE flange ports, bottom SAE 1 1/4" 6000 psi



SD1 SAE flange ports, side A and B SAE 1 1/4" 6000 psi

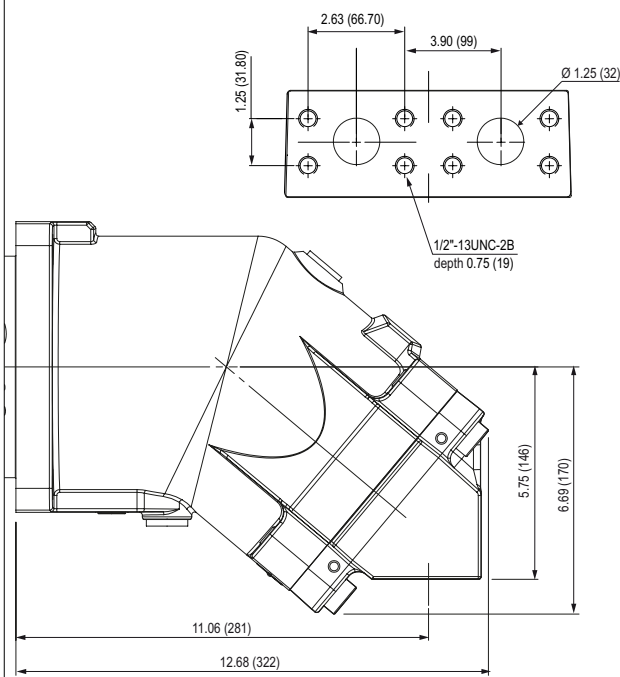


A9MS - 160 cc (SAE D) - 4 Bolt

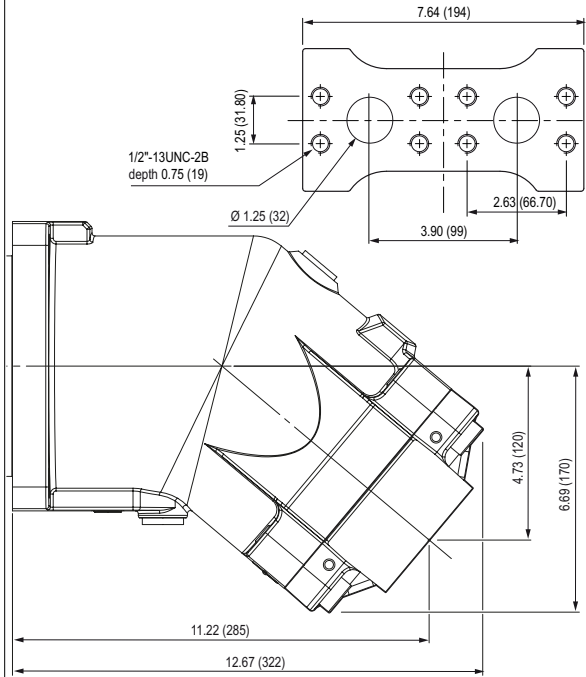


A9MS - 160 cc (SAE D) - 4 Bolt

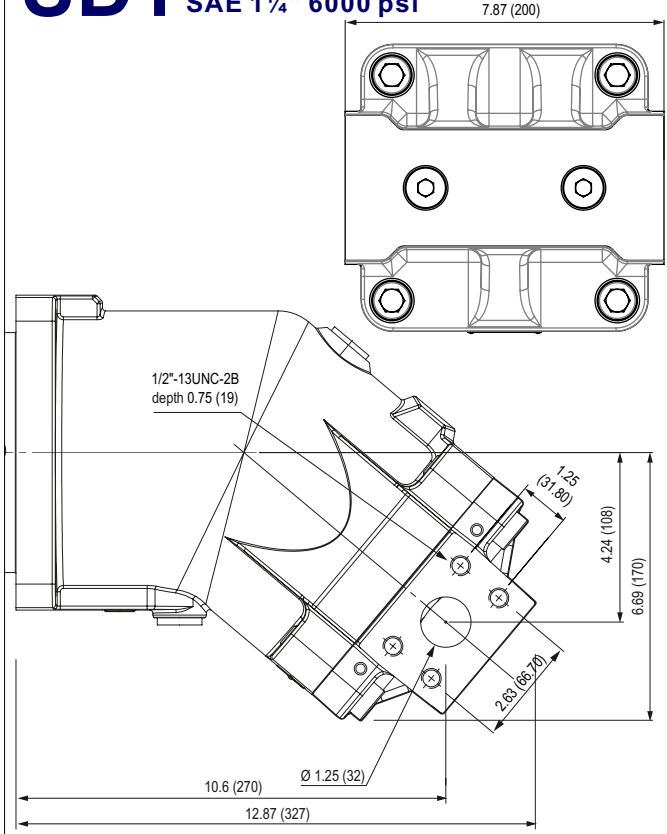
R45 SAE flange ports, rear
SAE 1 1/4" 6000 psi



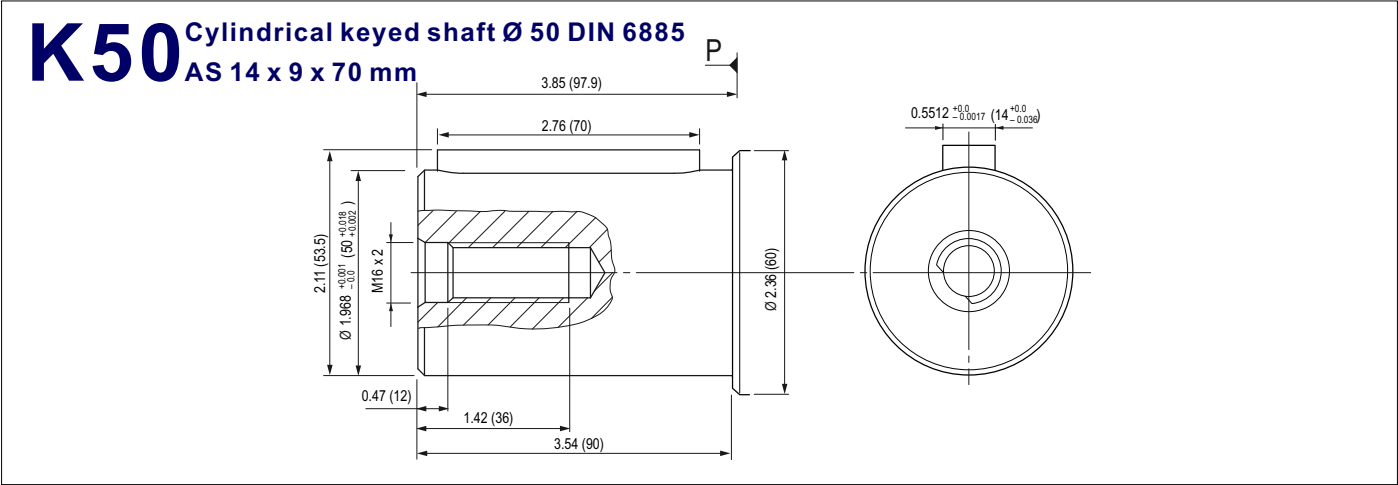
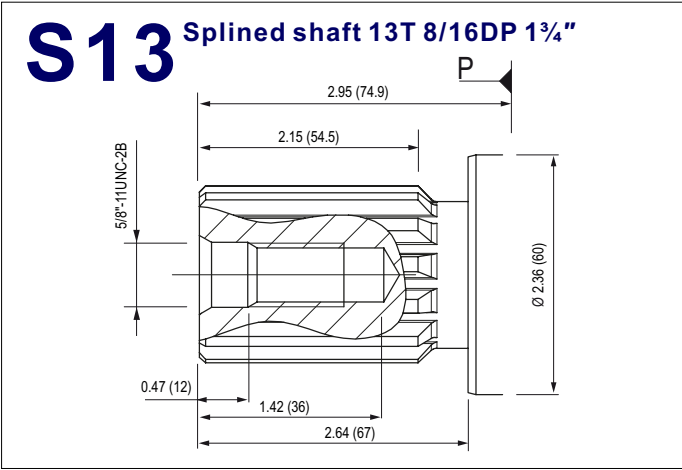
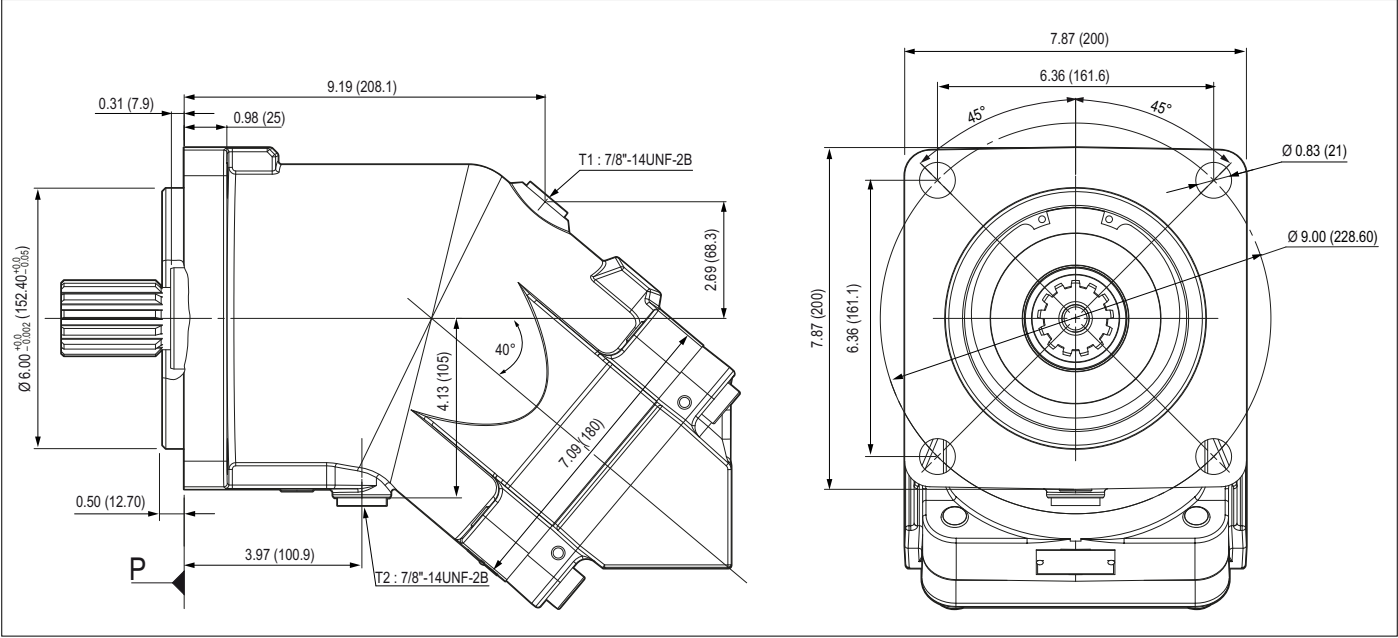
RD1 SAE flange ports, bottom
SAE 1 1/4" 6000 psi



SD1 SAE flange ports, side A and B
SAE 1 1/4" 6000 psi

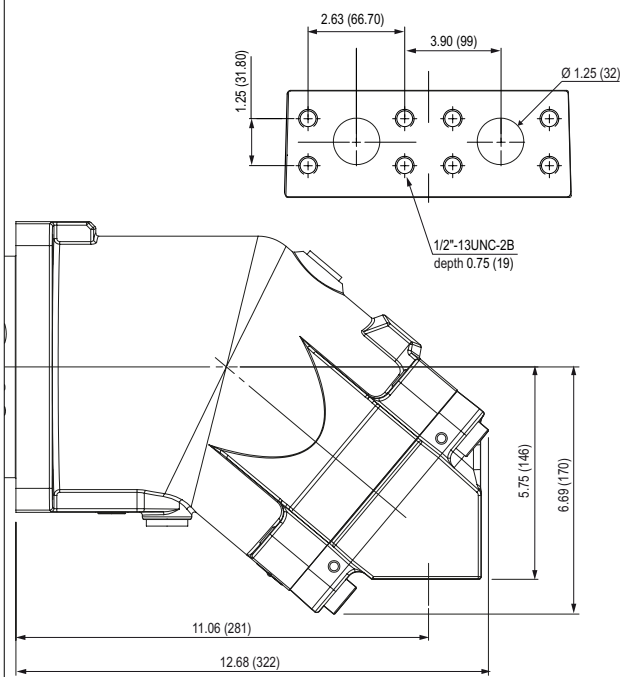


A9MS - 180 cc (SAE D) - 4 Bolt

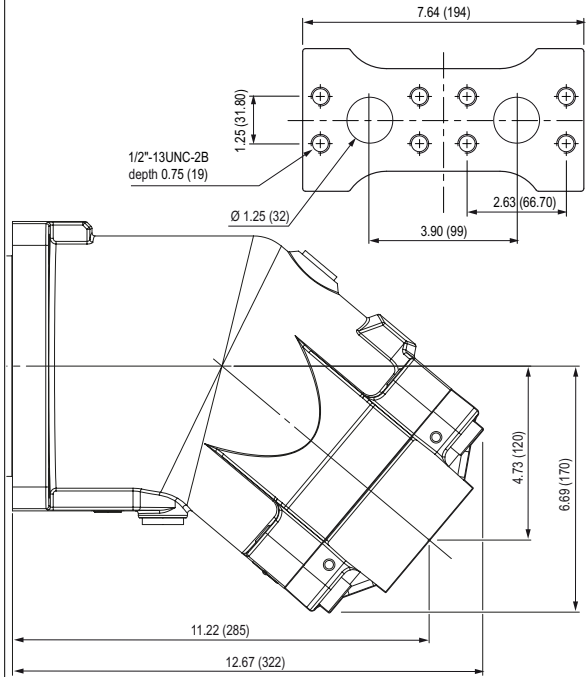


A9MS - 180 cc (SAE D) - 4 Bolt

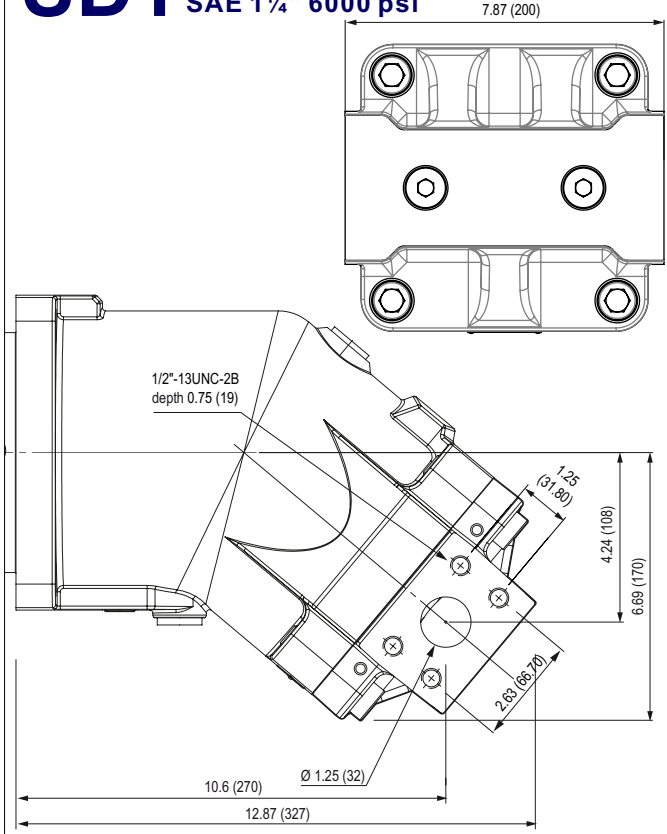
R45 SAE flange ports, rear
SAE 1 1/4" 6000 psi



RD1 SAE flange ports, bottom
SAE 1 1/4" 6000 psi

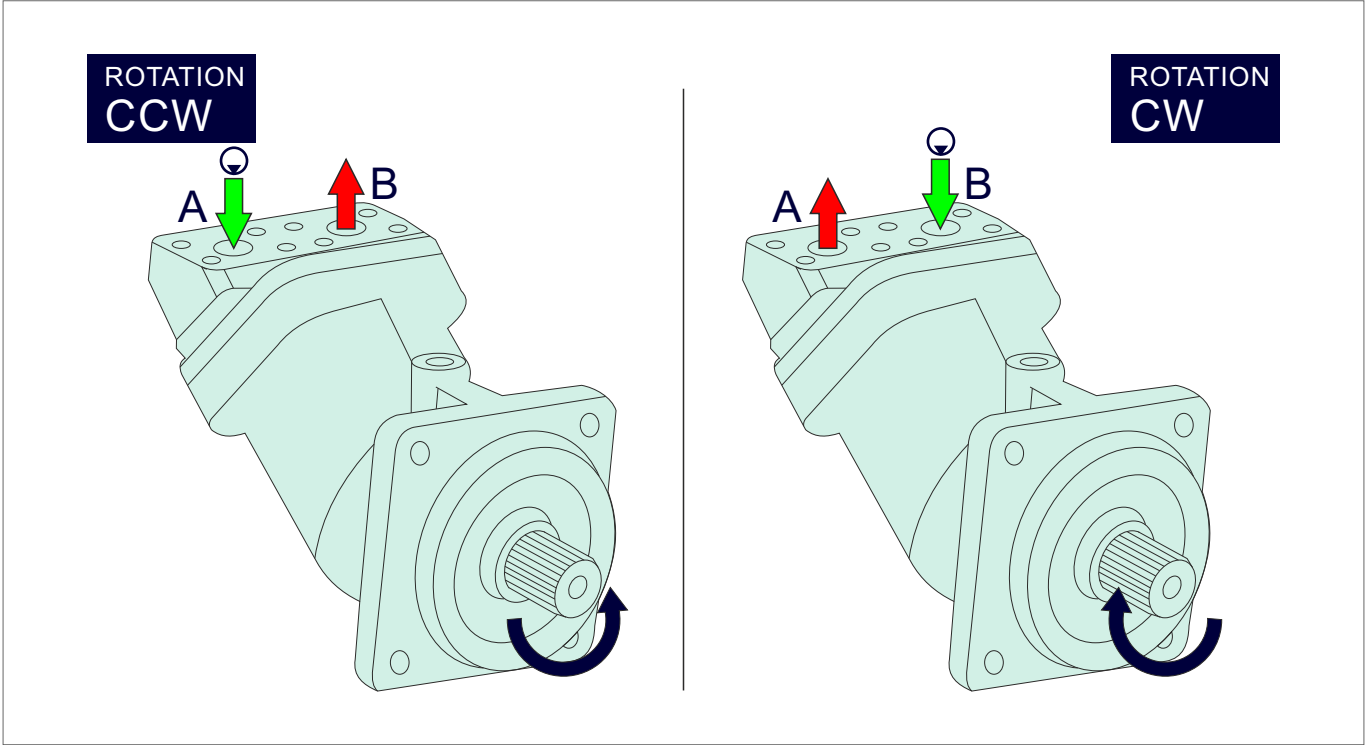


SD1 SAE flange ports, side A and B
SAE 1 1/4" 6000 psi



Direction of Rotation; Reversible

The motors rotate clockwise or counter-clockwise depending on the direction of hydraulic flow entering the motor.



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

- 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 / 20 ft./sec.; all oil lines in air-over-oil systems; 4 ft./sec.

Installation & Assemble Informations for Bent Axis Motors

POSITION

SAE Flange Bent Axis Motors can be operate any position.

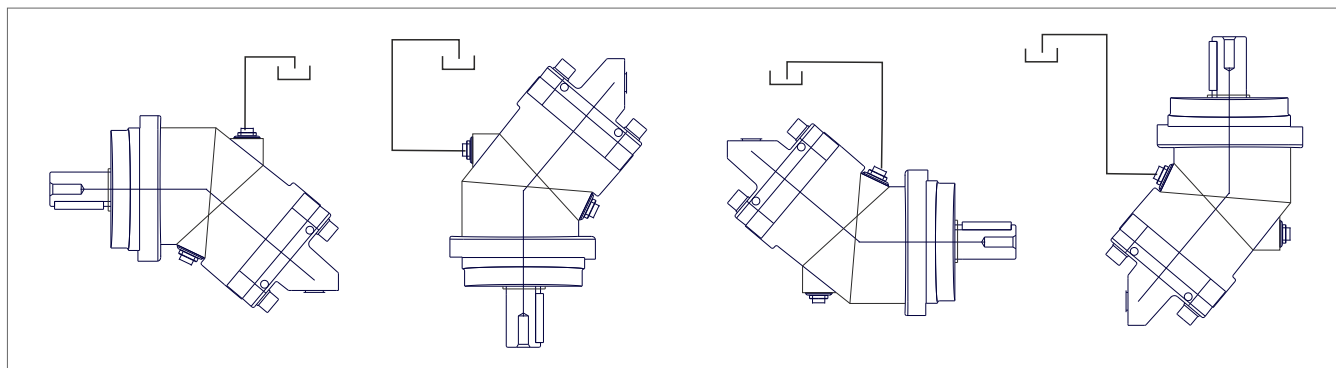
DIRECTION OF ROTATION

SAE Flange Bent Axis 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.

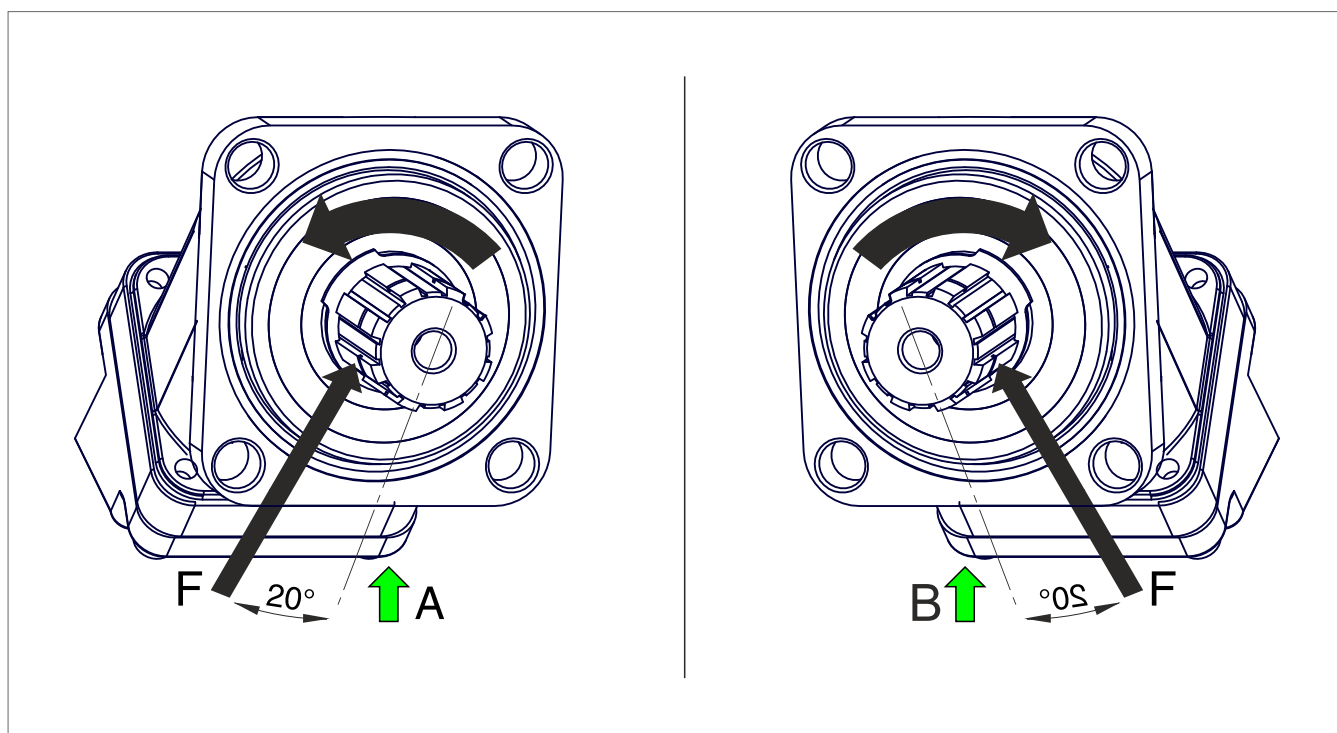


HYDRAULIC FLUID

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.

Formulas, Calculations, Installation Guide

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

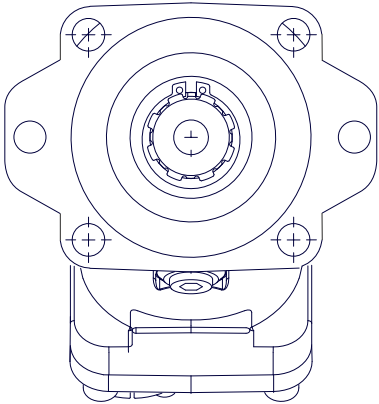
$$P = \frac{2\pi \cdot M \cdot n}{60000} = \frac{M \cdot n}{9549} = \frac{Q \cdot \Delta p \cdot \eta_t}{600} \text{ (kw)}$$

Speed

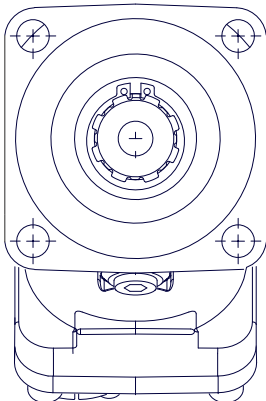
$$n = \frac{1000 \cdot Q \cdot \eta_v}{V_s} \text{ (rpm)}$$

- 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 ($\eta_t = \eta_v \times \eta_{mh}$)

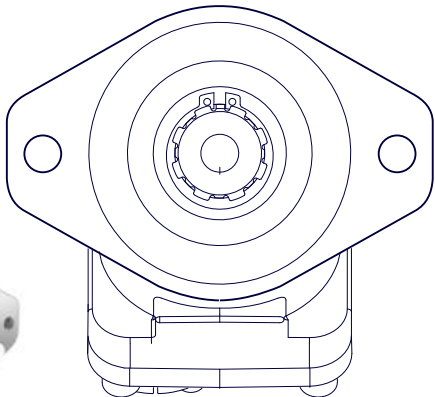
SAE B
6 Bolt Version



SAE C
4 Bolt Version



SAE B
2 Bolt Version



Complete Product Range

Bent Axis Piston Motors

A9MD (DIN) Bent Axis Motors
A9MO (ISO) Bent Axis Motors
A9MS (SAE) Bent Axis Motors
A9ML (SAE2) Bent Axis Motors
A9MF (Fixed Plugin) Bent Axis Motors
A10M (HYBRID) Bent Axis Motors
A7GM Hydraulic Gear Motors
A7GMT Tandem Hydraulic Gear Motors

Bent Axis Piston Pumps

A8PA (Aluminum) Bent Axis Pumps
A8PD (DIN) Bent Axis Pumps
A8PO (ISO) Bent Axis Pumps
A8PS (SAE) Bent Axis Pumps
A8PF (Fixed Plugin) Bent Axis Pumps
A10 (HYBRID) Bent Axis Pumps
A11 (ISO2) Bent Axis Pumps
A11 (SAE2) Bent Axis Pumps

Variable Displacement Pumps

A12V Variable Displacement Piston Pumps

Dual Flow Piston Pumps

A8PL (DIN) Dual Flow Pumps

Axial Piston & Gear Pumps

A4PP Axial Hydraulic Piston Pumps
A6HP High Pressure Piston Pumps
A7GP Hydraulic Gear Pumps
A7GPT Tandem Hydraulic Gear Pumps

Valve (ByPass) (Flushing) (Cavitation)

Circulation Valve
ByPass Valve
Anti-Cavitation Valve
Flushing Valve
LS Valve
AntiShock Valve
Speed Sensor

Hydraulic Spare Parts

Suction Fittings
Couplars
Adapters
Flanges
Power Take Off
Monoblock Valve
Section Valve

Hydraulic Pumps, Motors

Bent Axis Hydraulic Piston Motors, Bent Axis Hydraulic Piston Pumps, Piston Pumps, Variable Displacement Piston Pumps, Variable Displacement Piston Motors, Axial Piston Pumps, High Pressure Piston Pumps, Gear Pumps, Gear Motors, Hydraulic Valve.

www.hydapac.com

Address;

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Address; (Fabrika, İmalat)

Fevzicakmak Mah. Sıla Cad. Kobisan 3 San. Sit.

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Address; (Montaj, Sevkiyat)

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