

A2MS (SAE) Bent Axis Motors

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.

Designation;

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



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Index

Cover.....1

Index.....2

A2MS Motors.....3

Ordering Code of A2MS Motors.....4

A2MS - **5 cc** (SAE B) - 2 Bolt.....5

A2MS - **5 cc** (SAE B) - 4 Bolt.....6

A2MS - **5 cc** (SAE B) - 6 Bolt.....7

A2MS - **10 cc** (SAE B) - 2 Bolt.....8

A2MS - **10 cc** (SAE B) - 4 Bolt.....9

A2MS - **10 cc** (SAE B) - 6 Bolt.....10

A2MS - **12 cc** (SAE B) - 2 Bolt.....11

A2MS - **12 cc** (SAE B) - 4 Bolt.....12

A2MS - **12 cc** (SAE B) - 6 Bolt.....13

A2MS - **18 cc** (SAE B) - 2 Bolt.....14

A2MS - **18 cc** (SAE B) - 4 Bolt.....15

A2MS - **18 cc** (SAE B) - 6 Bolt.....16

A2MS - **25 cc** (SAE C) - 4 Bolt.....17

A2MS - **32 cc** (SAE C) - 4 Bolt.....19

A2MS - **41 cc** (SAE C) - 4 Bolt.....21

A2MS - **45 cc** (SAE C) - 4 Bolt.....23

A2MS - **50 cc** (SAE C) - 4 Bolt.....25

A2MS - **56 cc** (SAE C) - 4 Bolt.....27

A2MS - **63 cc** (SAE C) - 4 Bolt.....29

A2MS - **80 cc** (SAE C) - 4 Bolt.....31

A2MS - **90 cc** (SAE C) - 4 Bolt.....33

A2MS - **108 cc** (SAE C) - 4 Bolt.....35

A2MS - **108 cc** (SAE D) - 4 Bolt.....37

A2MS - **125 cc** (SAE C) - 4 Bolt.....39

A2MS - **125 cc** (SAE D) - 4 Bolt.....41

A2MS - **160 cc** (SAE D) - 4 Bolt.....43

A2MS - **180 cc** (SAE D) - 4 Bolt.....45

Direction of Rotation.....47

Installation and Assemble Information.....48

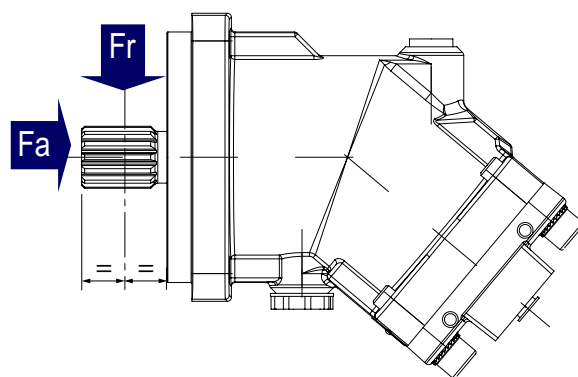
Formulas, Calculations.....49

Complete Product Range.....50

Contact Information.....51

Characteristics of the A2MS - SAE Flange Bent Axis Motors

MOTOR MODEL	DISPL. (cc)	CONTINUOUS MAX. SPEED (rpm)	INTERMITTENT MAX. SPEED (rpm)	MAX. FLOW ABSORBED (l/min)	TORQUE BAR (m.N/bar)	TORQUE AT 350 BAR (m.N)	THEORETICAL 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)

Ordering Code; A2MS - SAE Flange Bent Axis Motors

Model Code

A2MS

Bent Axis Hydraulic Piston Motor
(SAE) Mounting Flange

Displacement

63

5	10	12	18	25	32	41	45	50	56	63	80	90	108	125	160	180
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Flange Type SAE
2 Bolt, 4 Bolt, 6 Bolt

C4

B2	B2	B2	B2	C4	C4	C4	C4	C4	C4	C4	C4	C4	C4	C4	D4	D4
B4	B4	B4	B4										D4	D4		
B6	B6	B6	B6													

Shaft Type
Keyed or Splined

K32

S13	S13	S13	S13	S14	S14	S14	S14	S14	S14	S14	S14	S17	S17	S17	S13	S13	S13
K25	K25	K25	K25	K32	K32	K32	K32	K32	K32	K32	K32	S21	S21	S21	K44	K50	K50
												K38	K38	K38			

Rear Cover Type

R45

					R45	R45	R45	R45	R45	R45							
RS1	RS1	RS1	RS1	SD1	SD1	SD1	SD1	SD1	SD1	SD1	R45	R45	R45	R45	R45	R45	R45
RS2	RS2	RS2	RS2	RD1	RD1	RD1	RD1	RD1	RD1	RD1	SD1	SD1	SD1	SD1	SD1	SD1	SD1
				RD2	RD2	RD2	RD2	RD2	RD2	RD2	RD1	RD1	RD1	RD1	RD1	RD1	RD1
				SD2	SD2	SD2											
				SV1	SV1	SV1											

Speed Sensor

SN

SN Without Speed Sensor

SP With Speed Sensor

Valve Options

VN

VN Without Flushing Valve

VL With Flushing Valve

Rotation

W

W Reversible / Independet

Seal Options

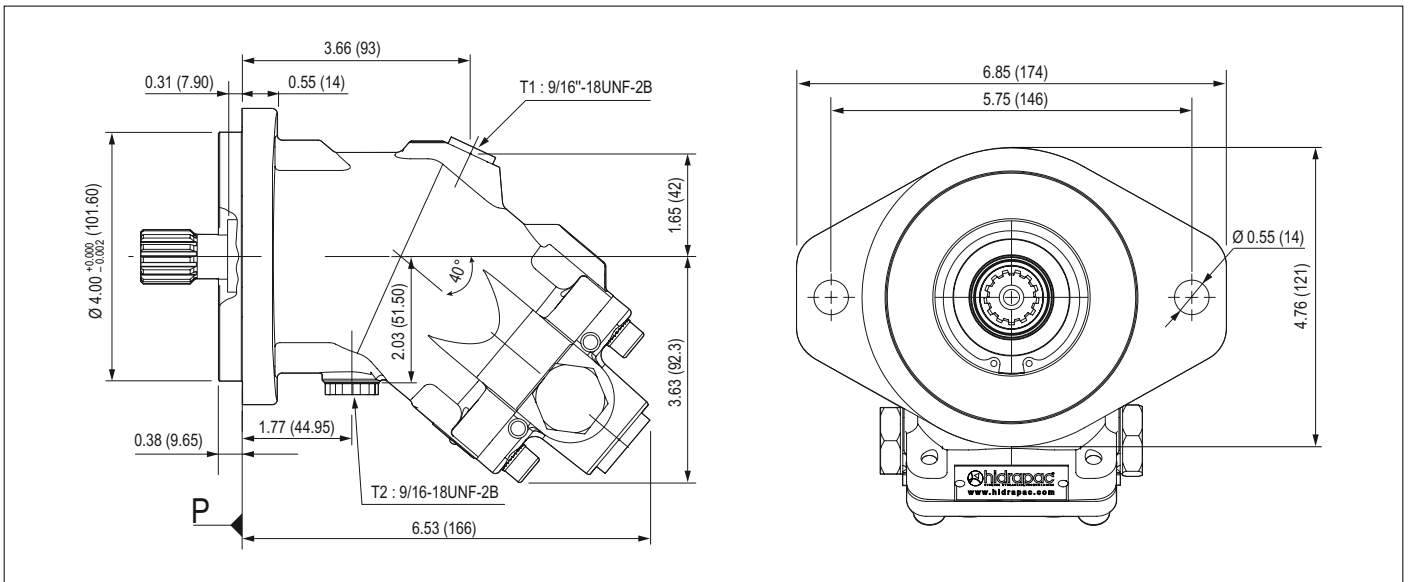
V

V Viton Seals

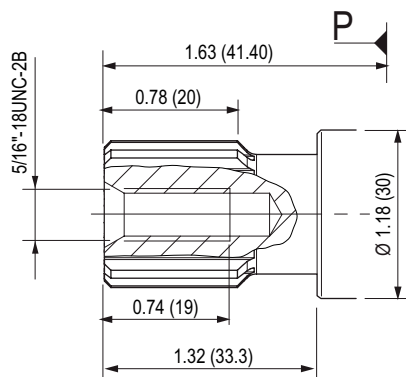
N Nitrile Seals

H High Pressure Seals

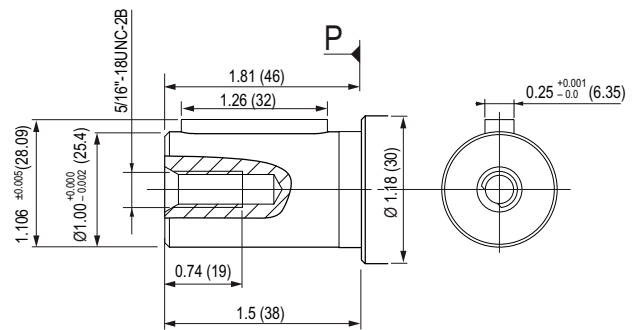
A2MS - 5 cc (SAE B) - 2 Bolt



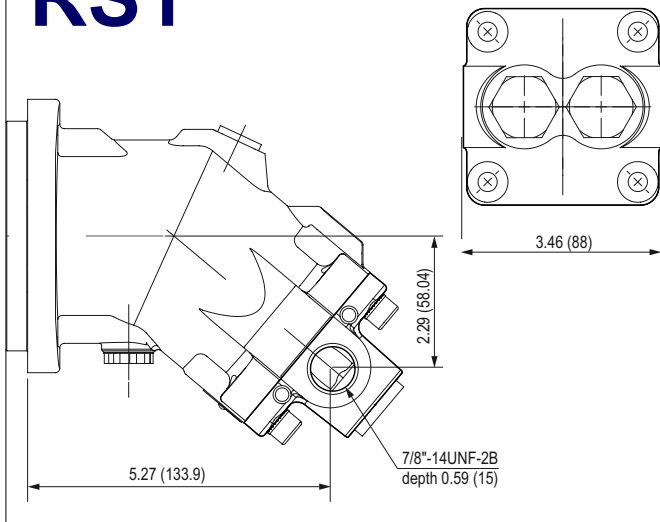
S13 Splined shaft 13T 16/32DP 7/8"



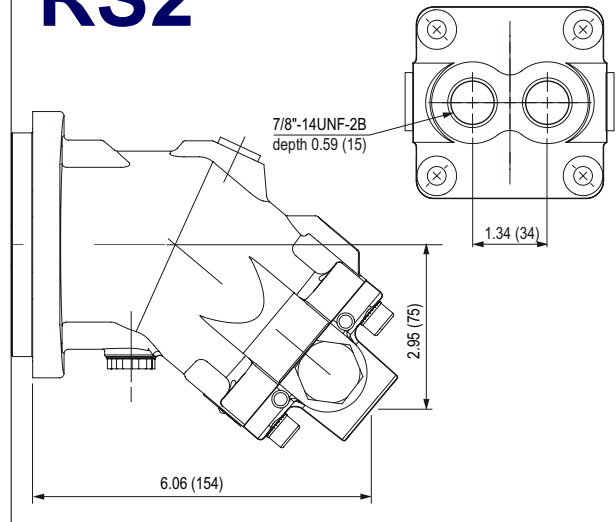
K25 Cylindrical keyed shaft Ø 1"



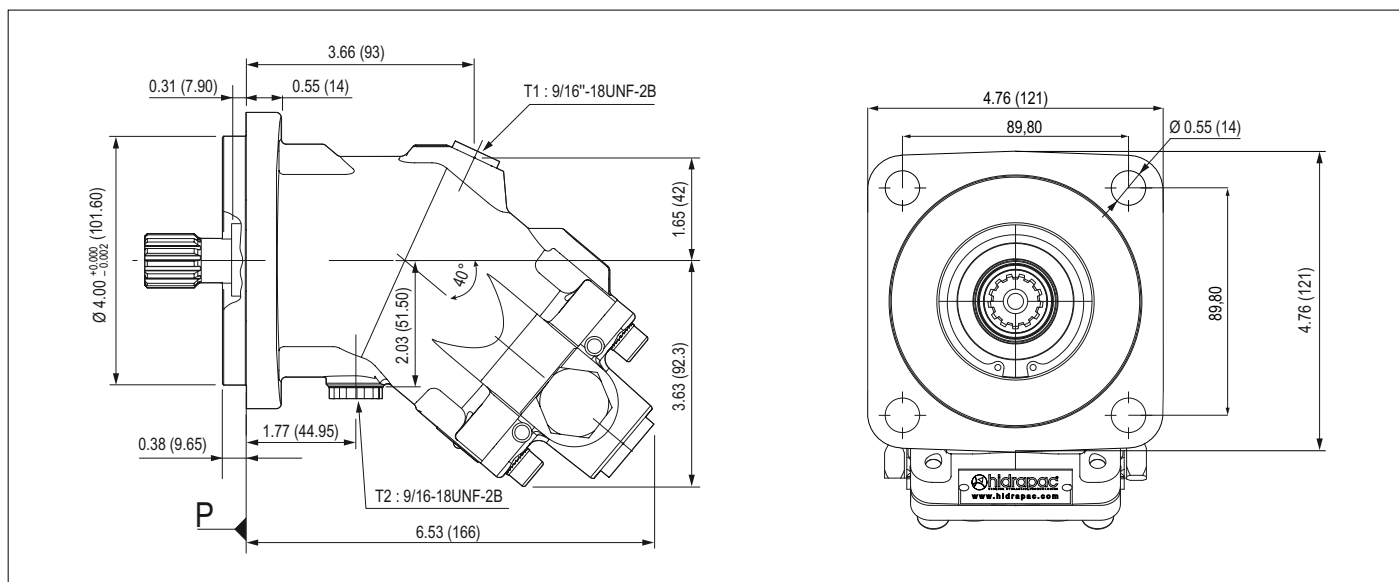
RS1 Side threaded ports A and B



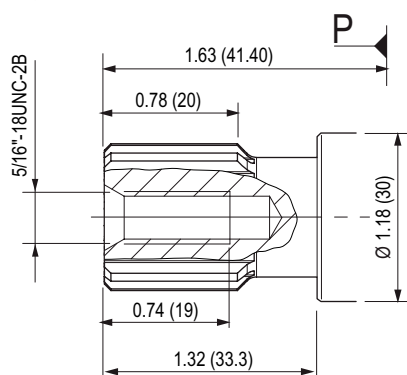
RS2 Rear threaded ports A and B



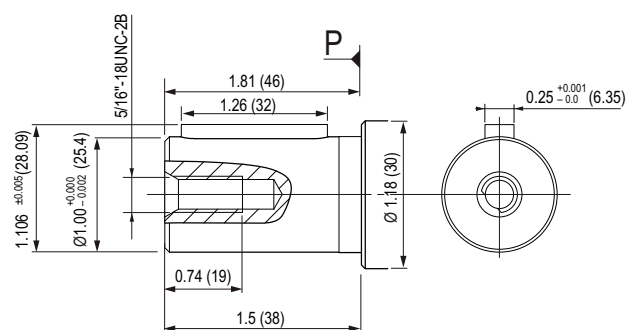
A2MS - 5 cc (SAE B) - 4 Bolt



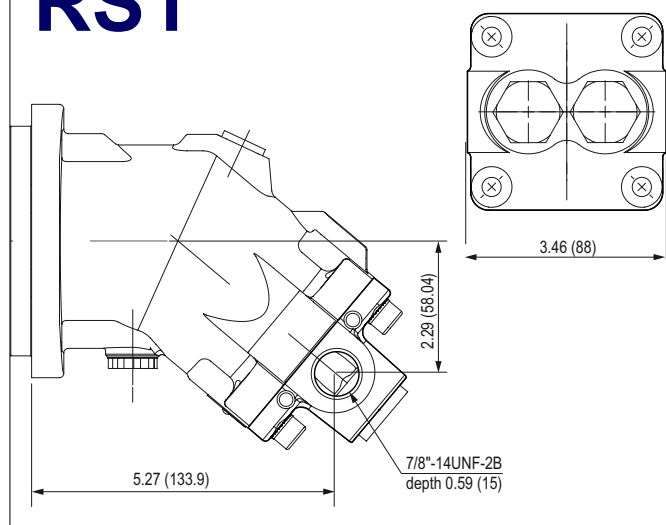
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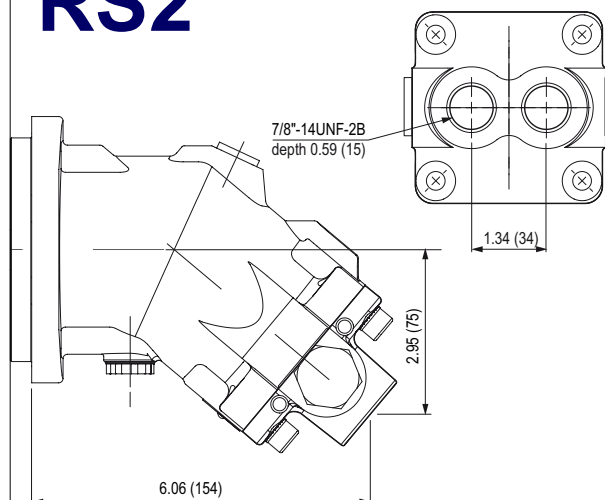
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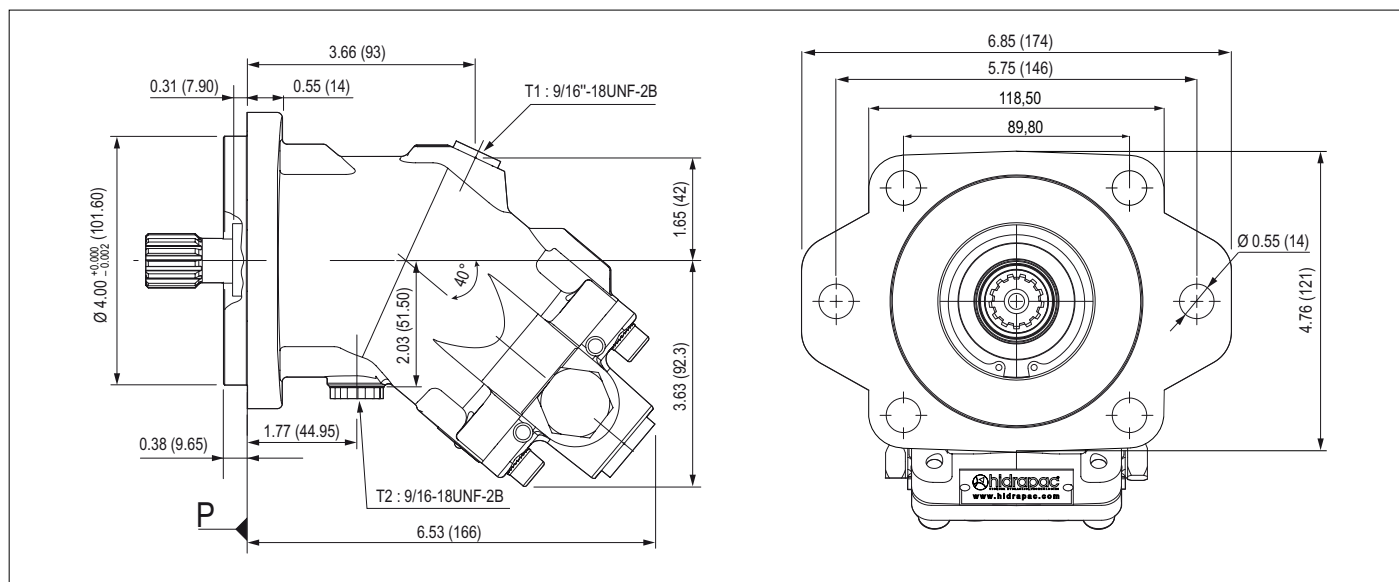
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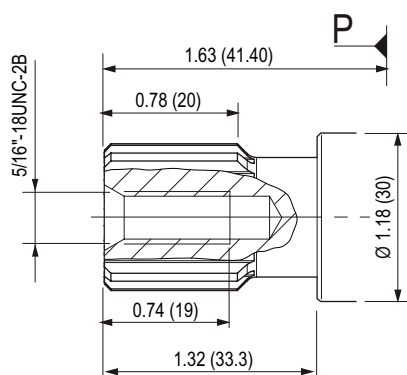
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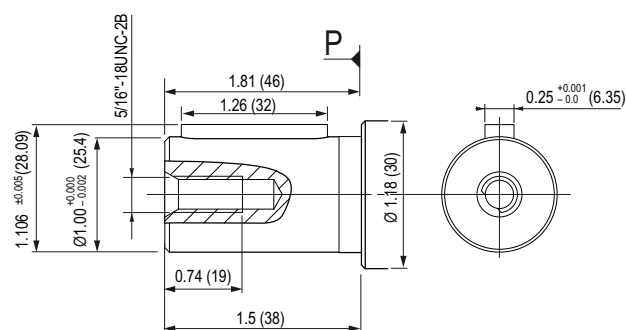
A2MS - 5 cc (SAE B) - 6 Bolt



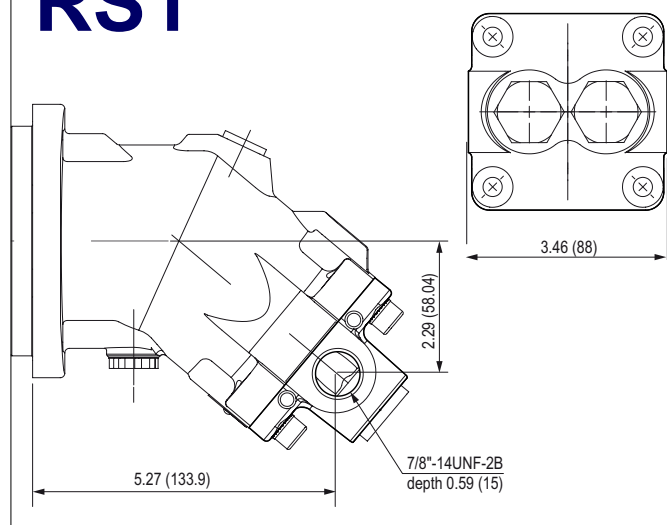
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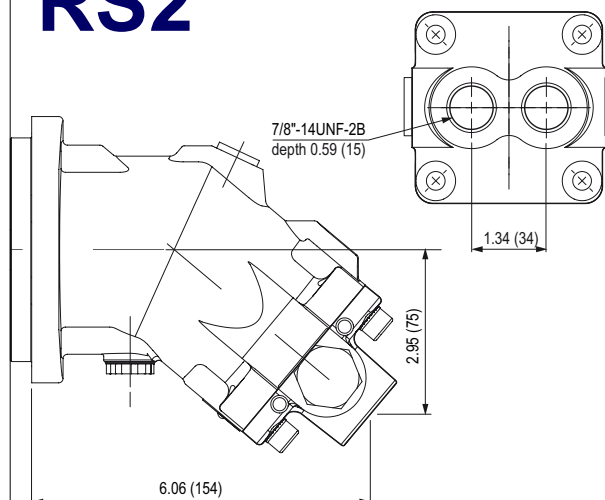
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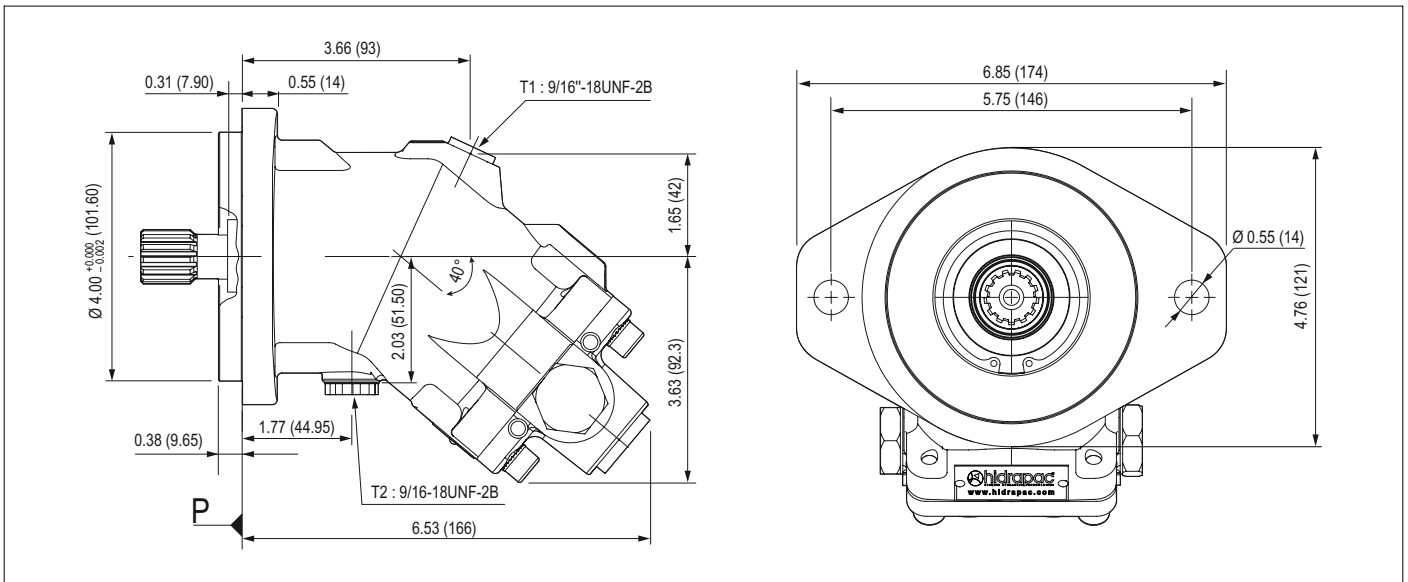
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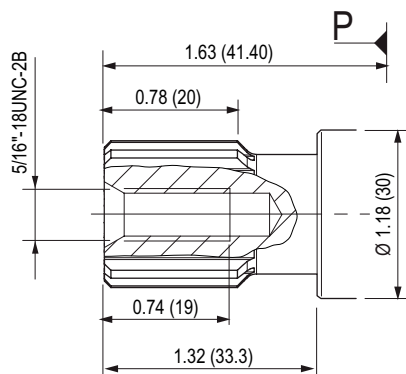
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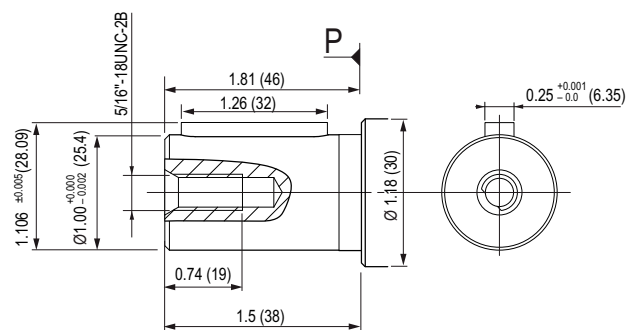
A2MS - 10 cc (SAE B) - 2 Bolt



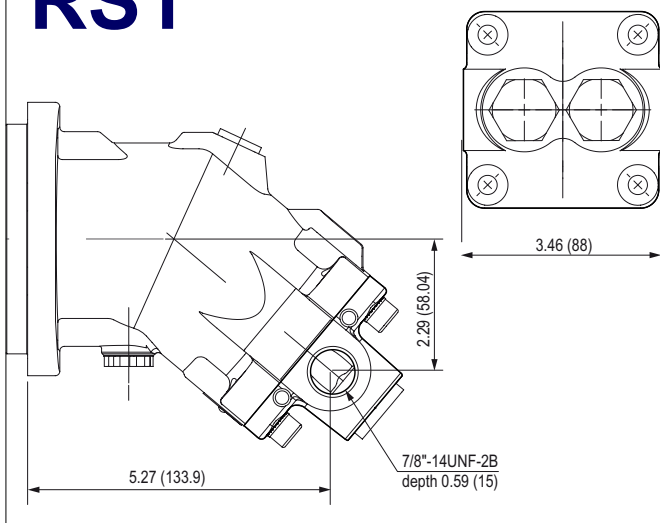
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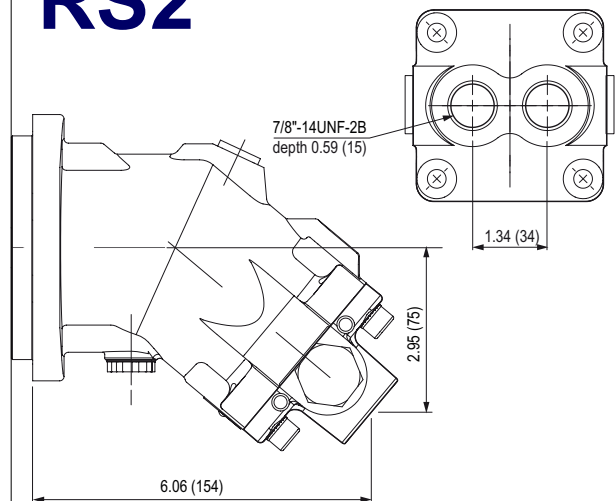
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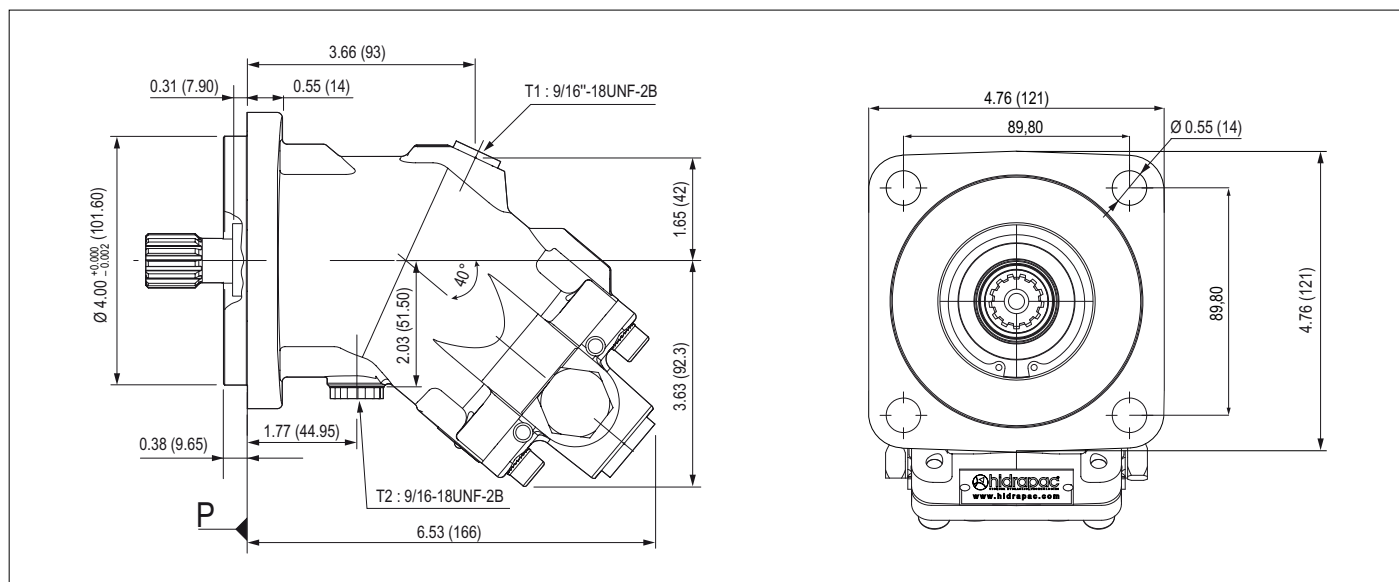
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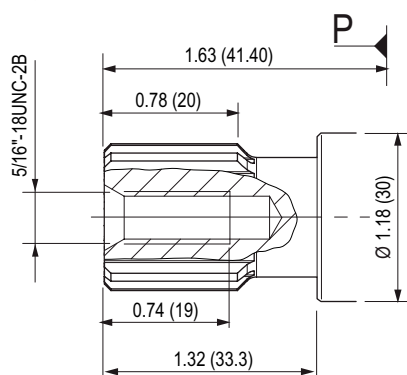
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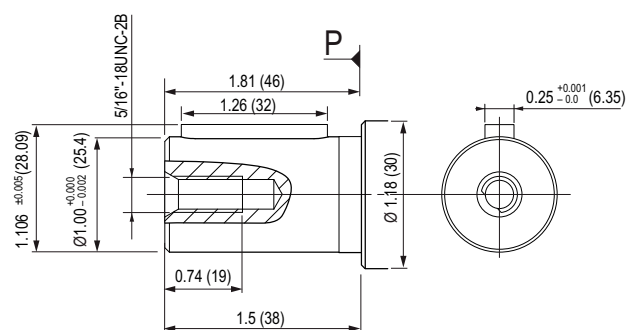
A2MS - 10 cc (SAE B) - 4 Bolt



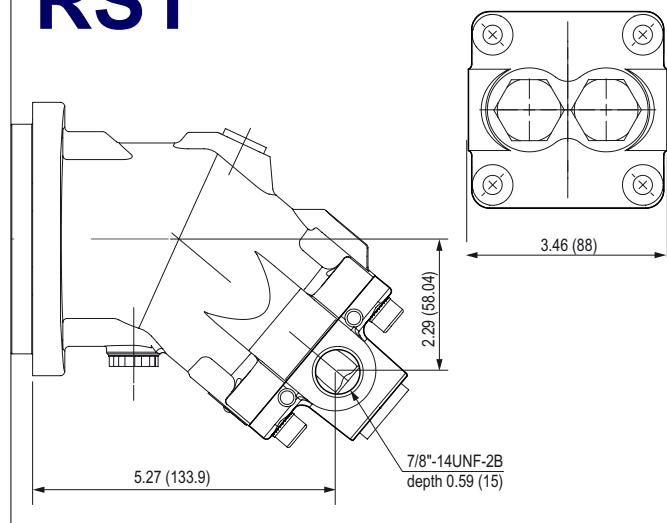
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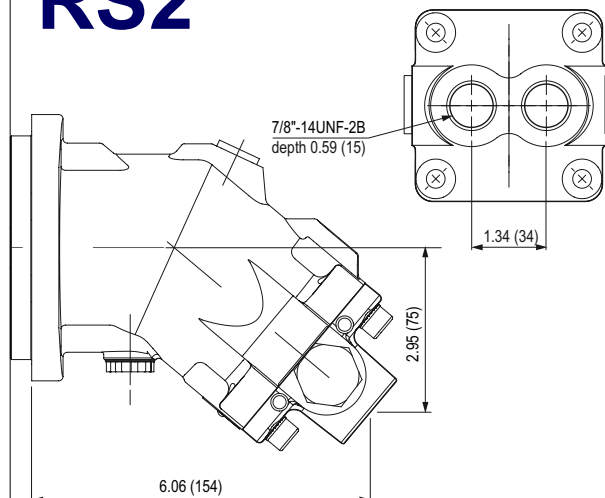
K25 Cylindrical keyed shaft Ø 1"



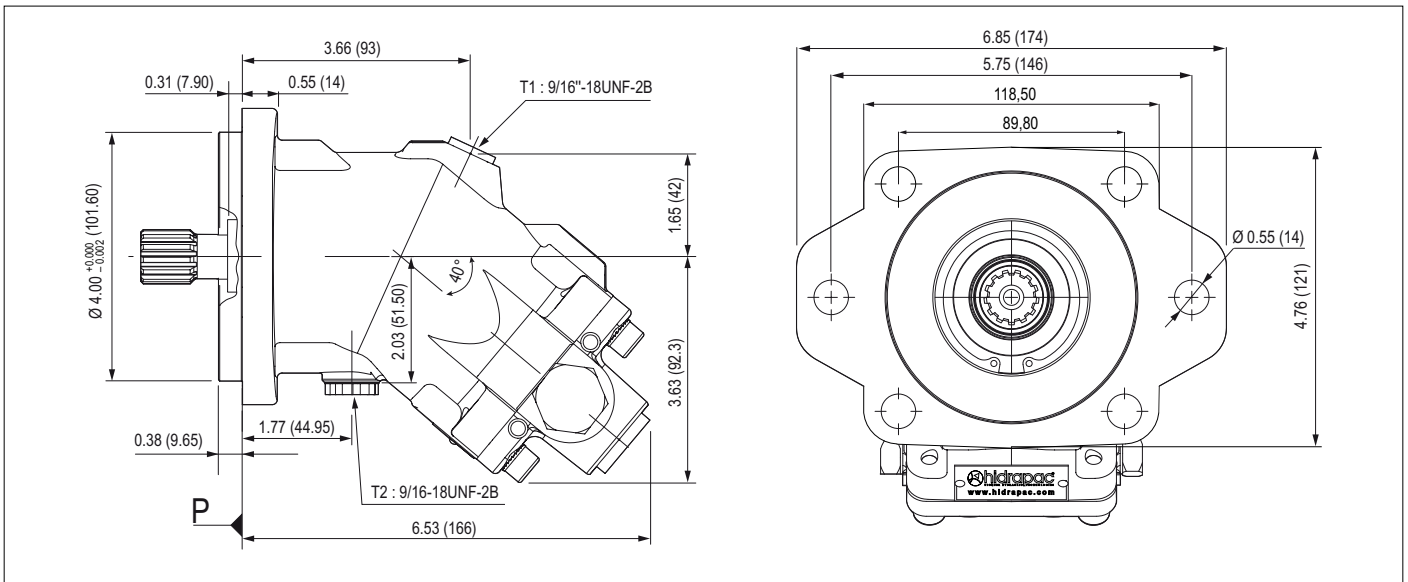
RS1 Side threaded ports A and B



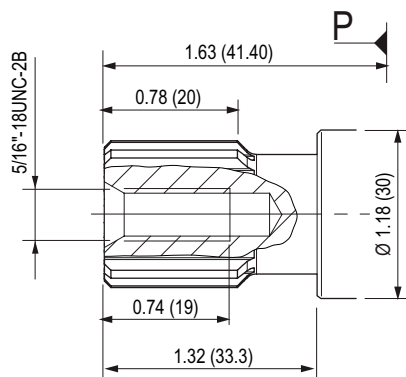
RS2 Rear threaded ports A and B



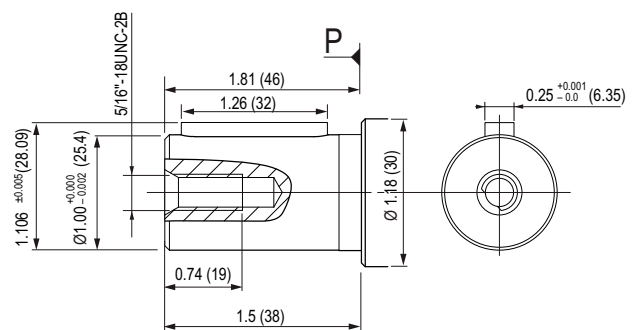
A2MS - 10 cc (SAE B) - 6 Bolt



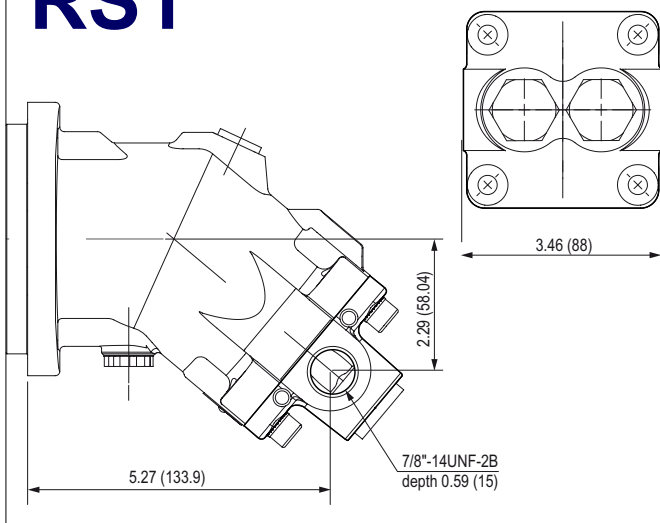
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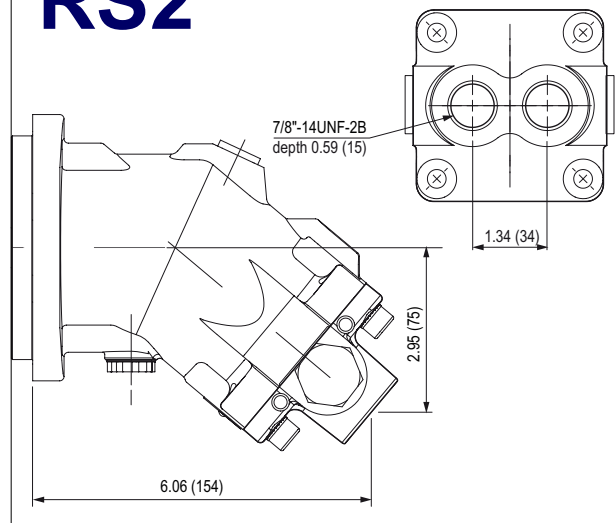
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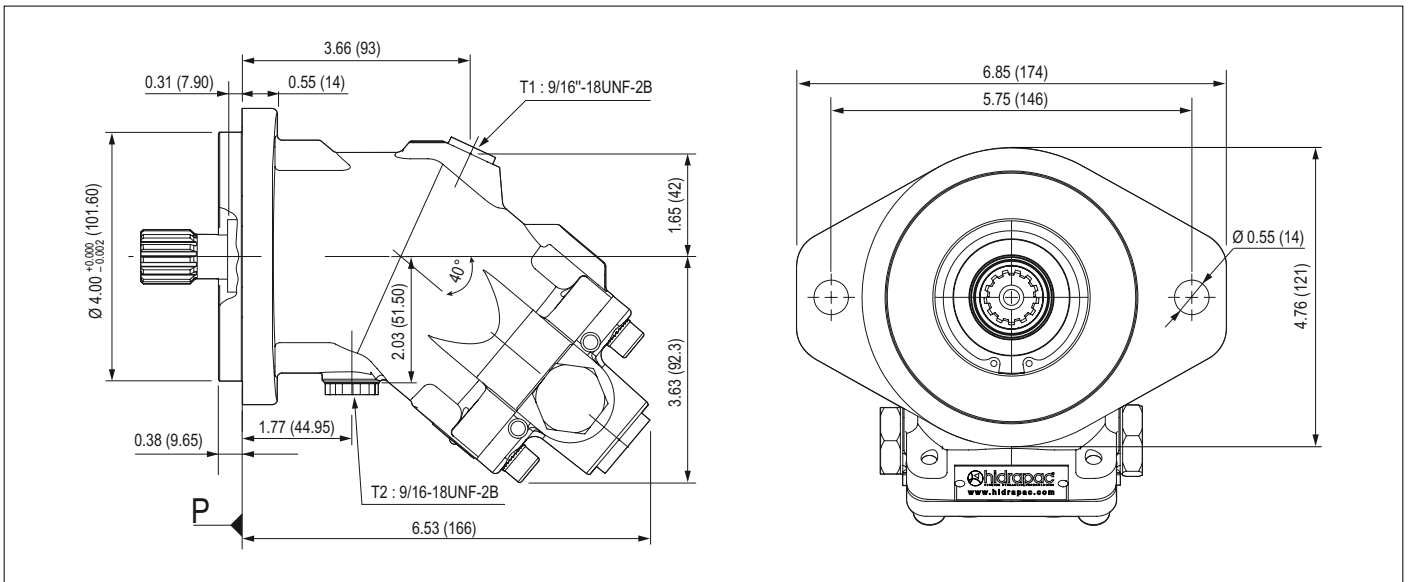
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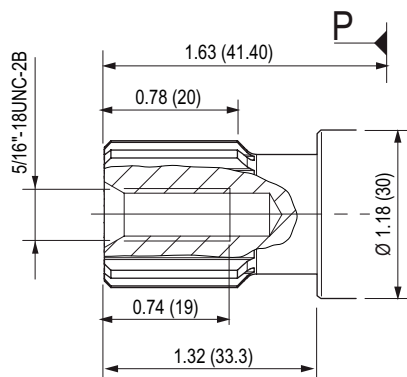
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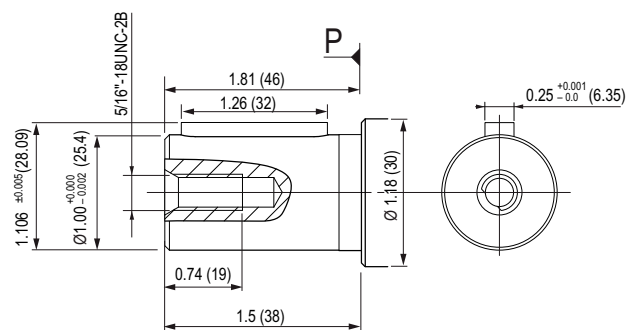
A2MS - 12 cc (SAE B) - 2 Bolt



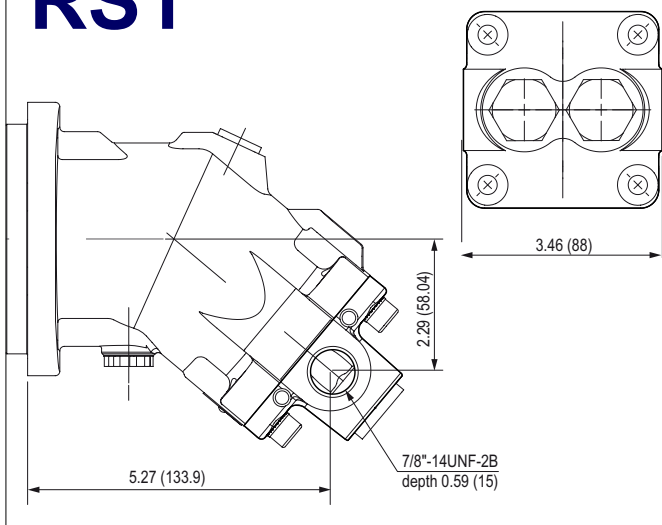
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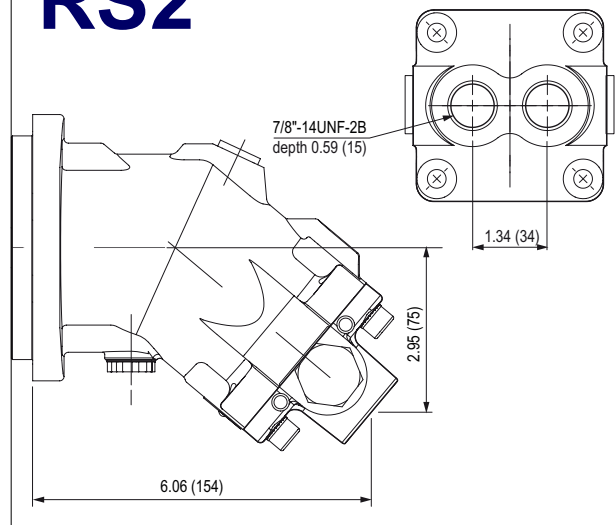
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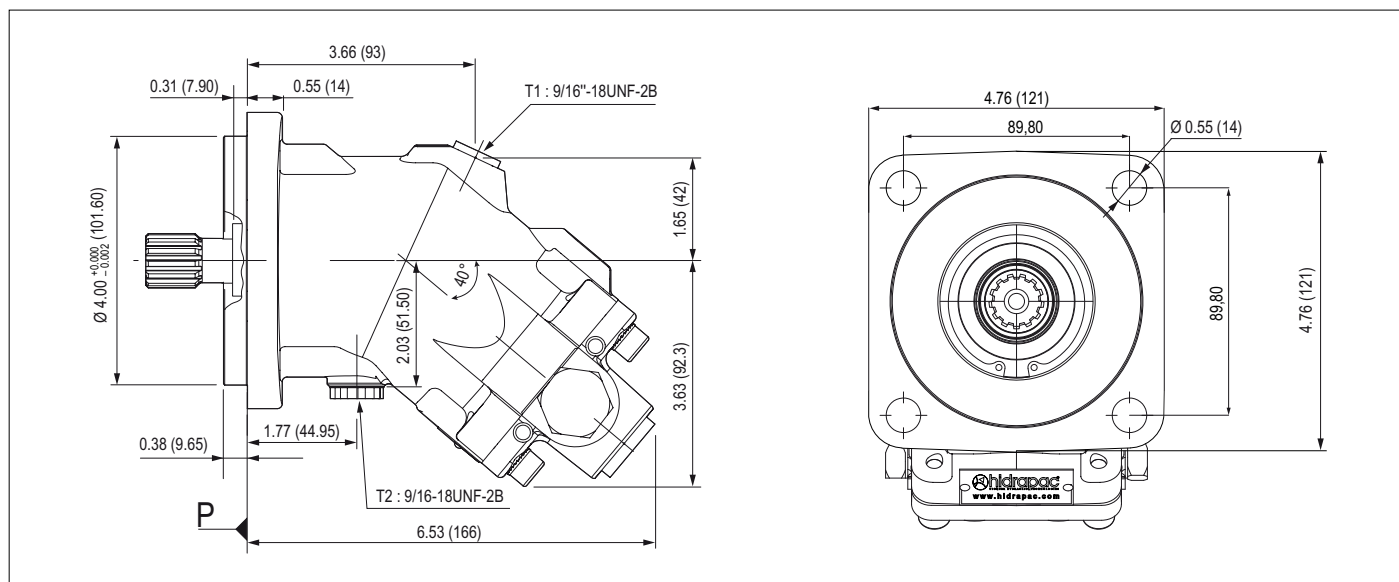
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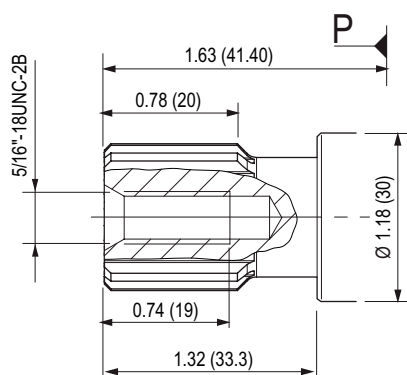
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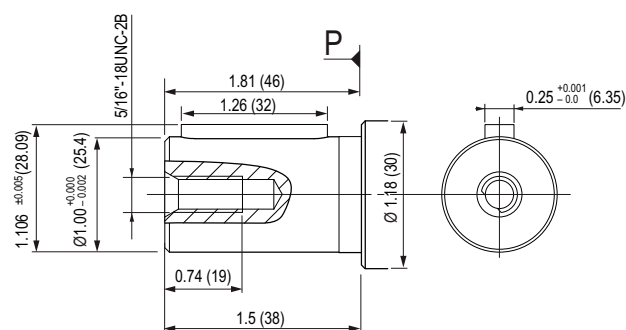
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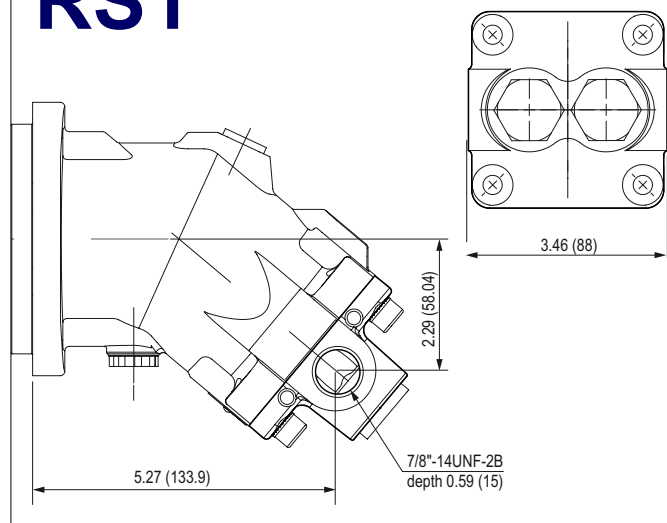
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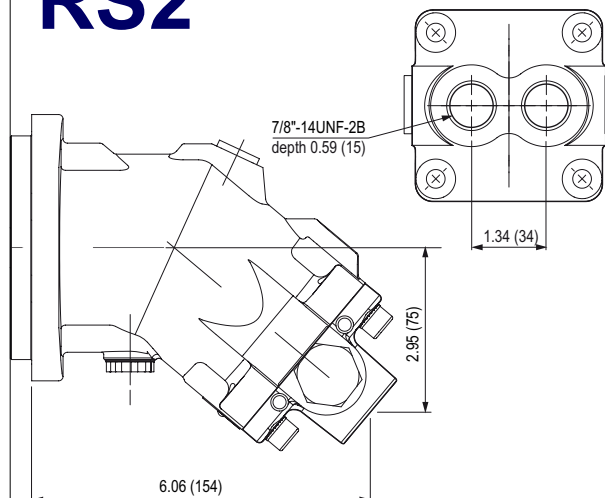
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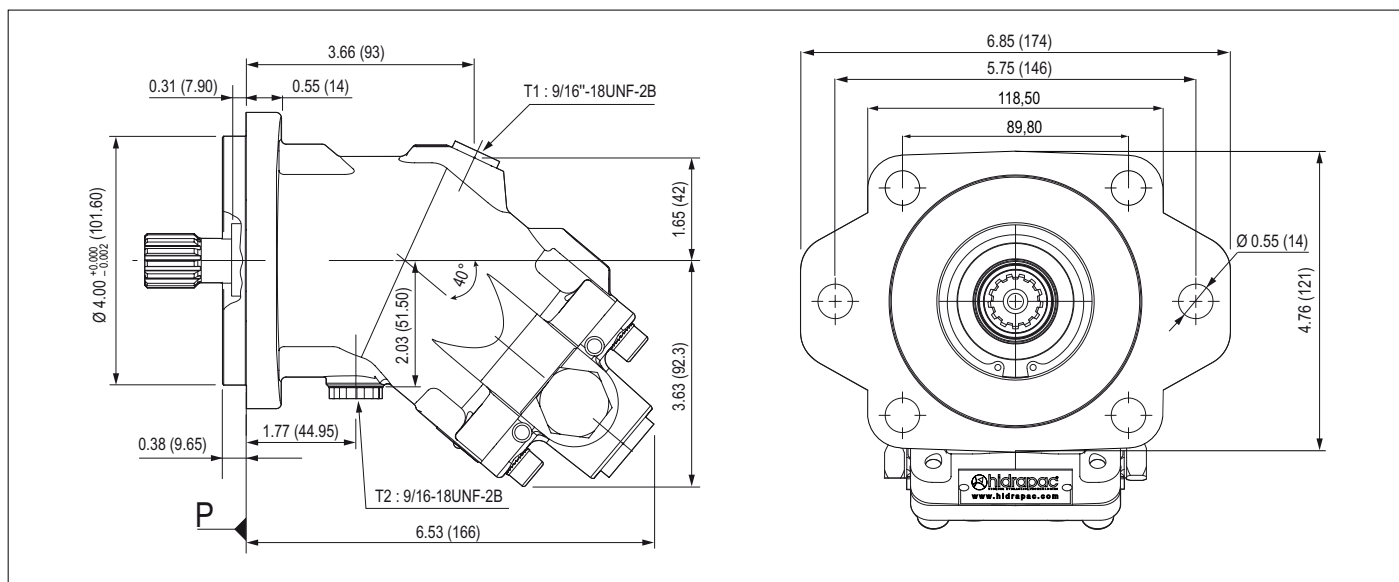
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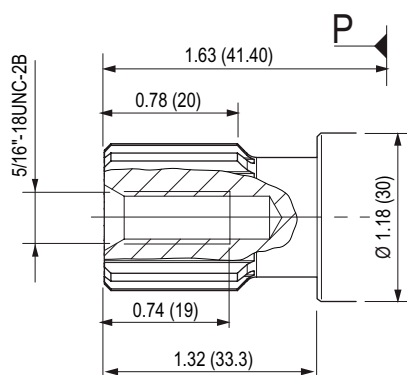
RS2 Rear threaded ports A and B



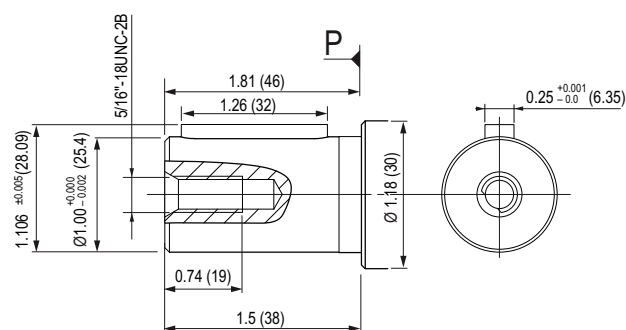
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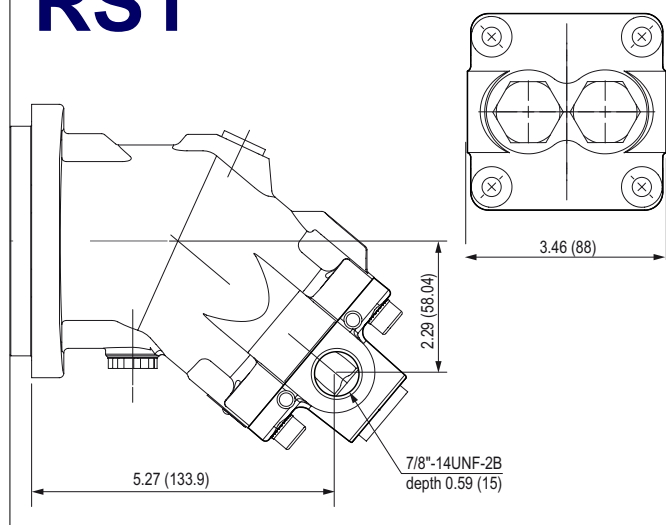
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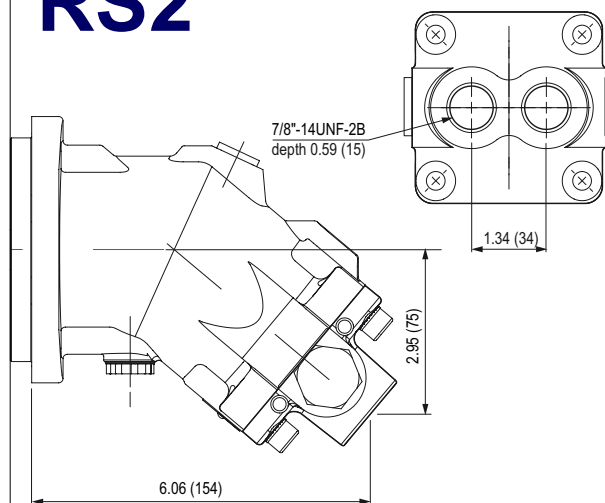
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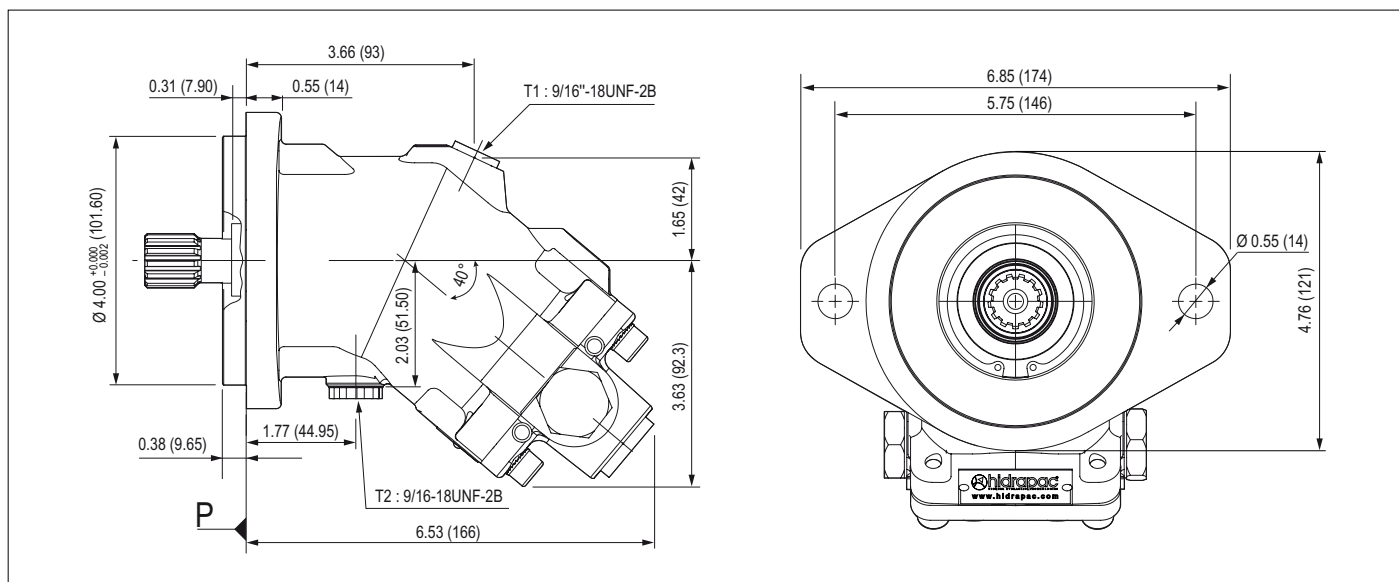
RS1 Side threaded ports A and B



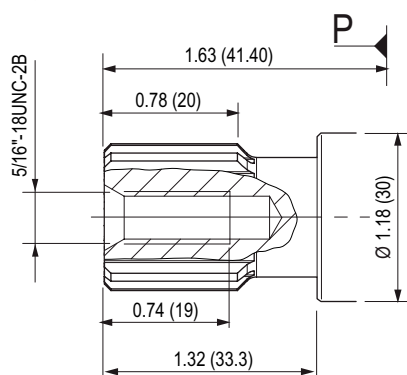
RS2 Rear threaded ports A and B



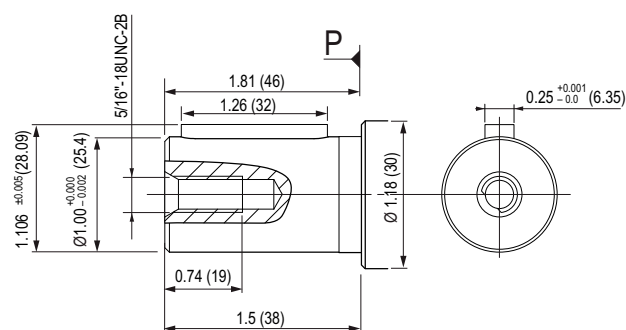
A2MS - 18 cc (SAE B) - 2 Bolt



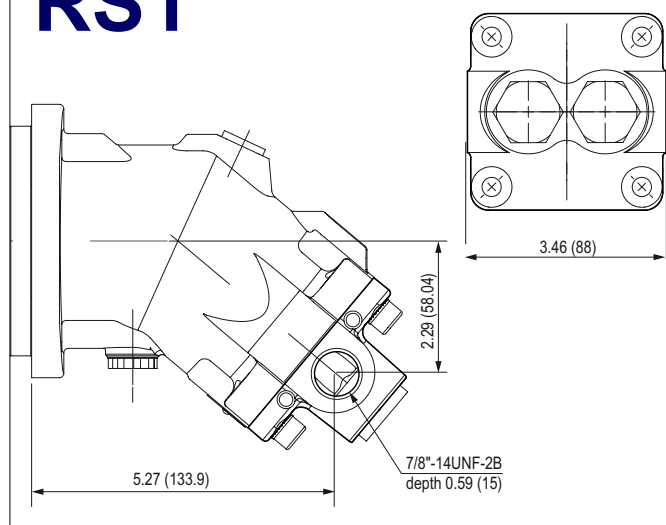
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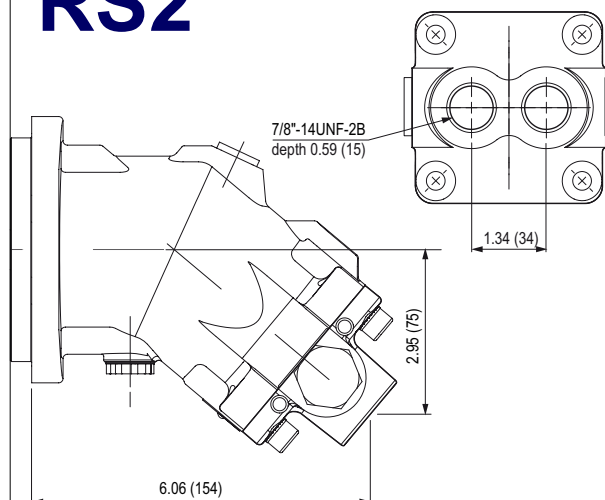
K25 Cylindrical keyed shaft Ø 1"



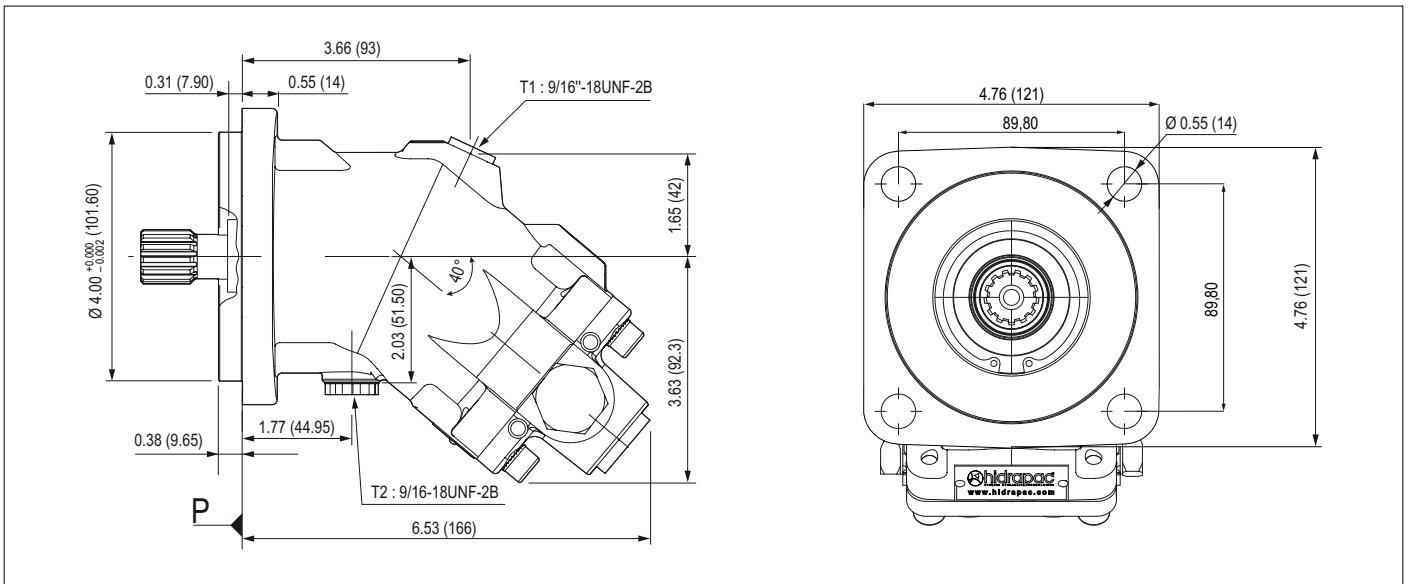
RS1 Side threaded ports A and B



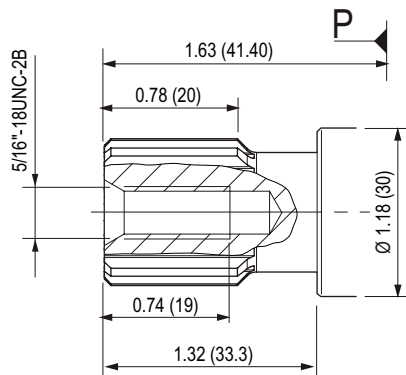
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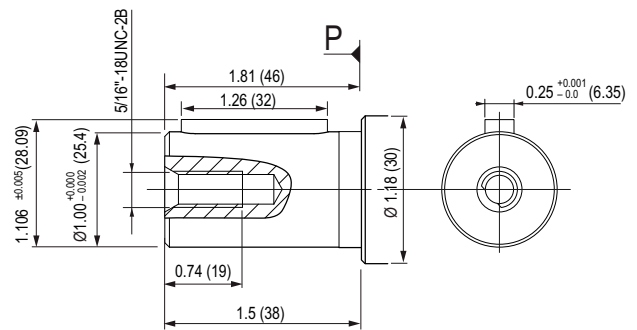
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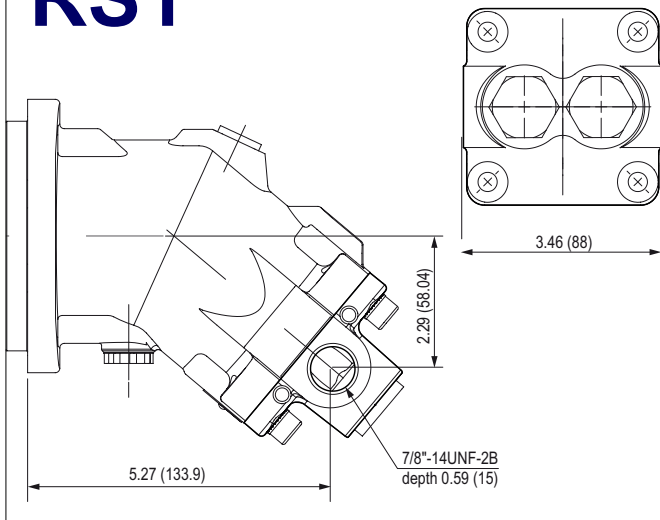
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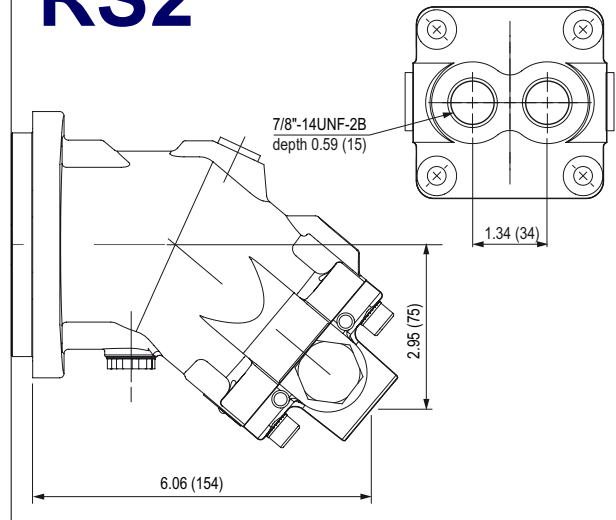
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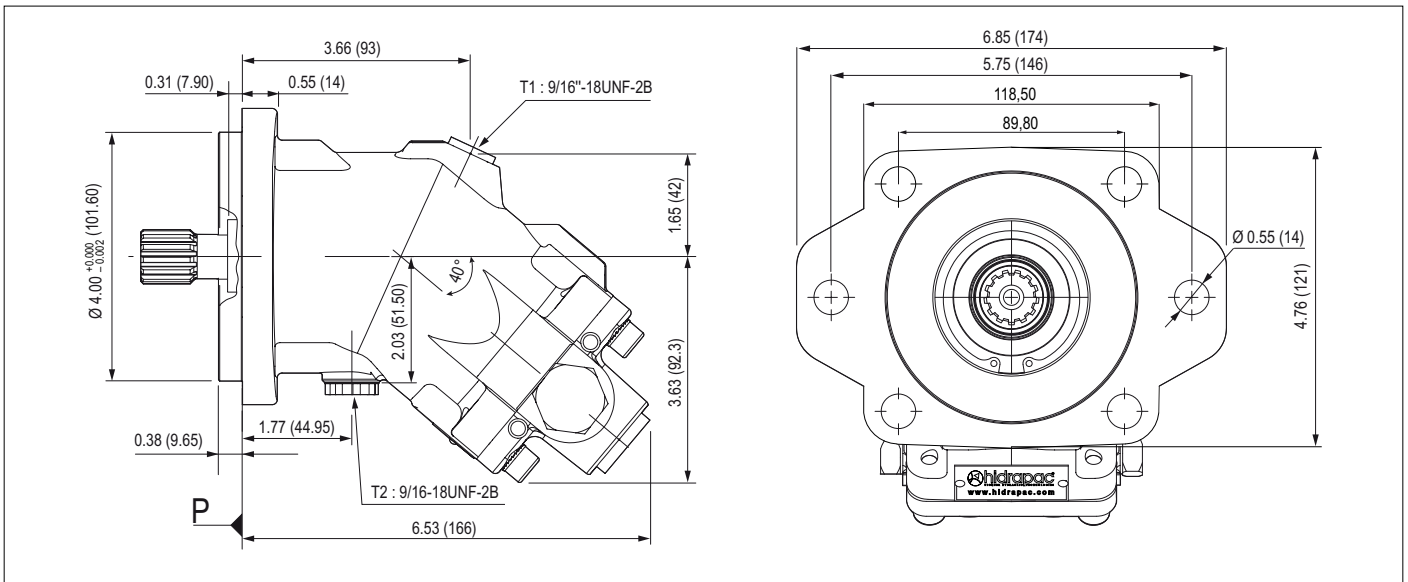
RS1 Side threaded ports A and B



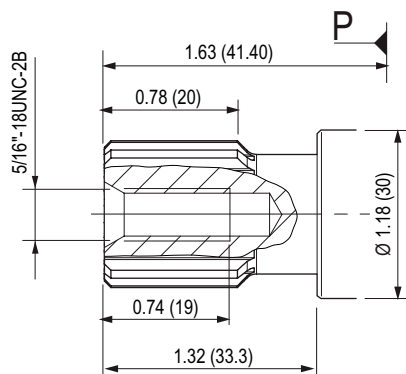
RS2 Rear threaded ports A and B



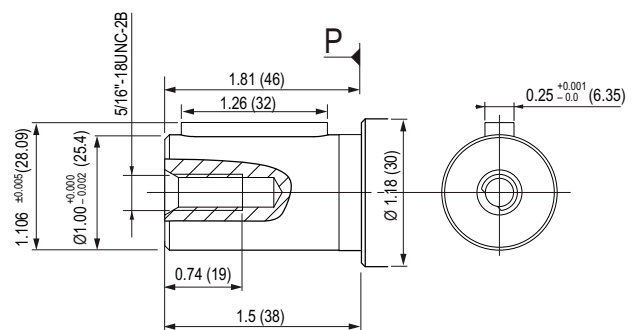
A2MS - 18 cc (SAE B) - 6 Bolt



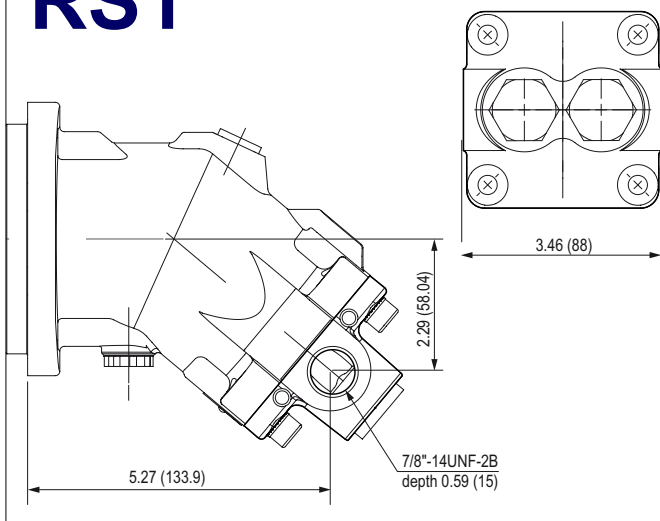
S13 Splined shaft 13T 16/32DP 7/8"



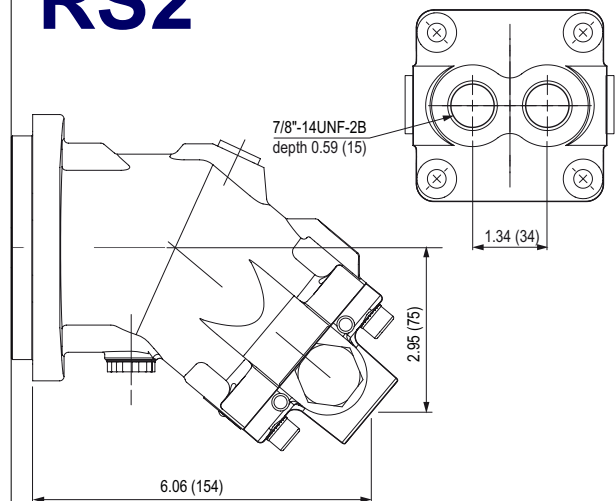
K25 Cylindrical keyed shaft Ø 1"



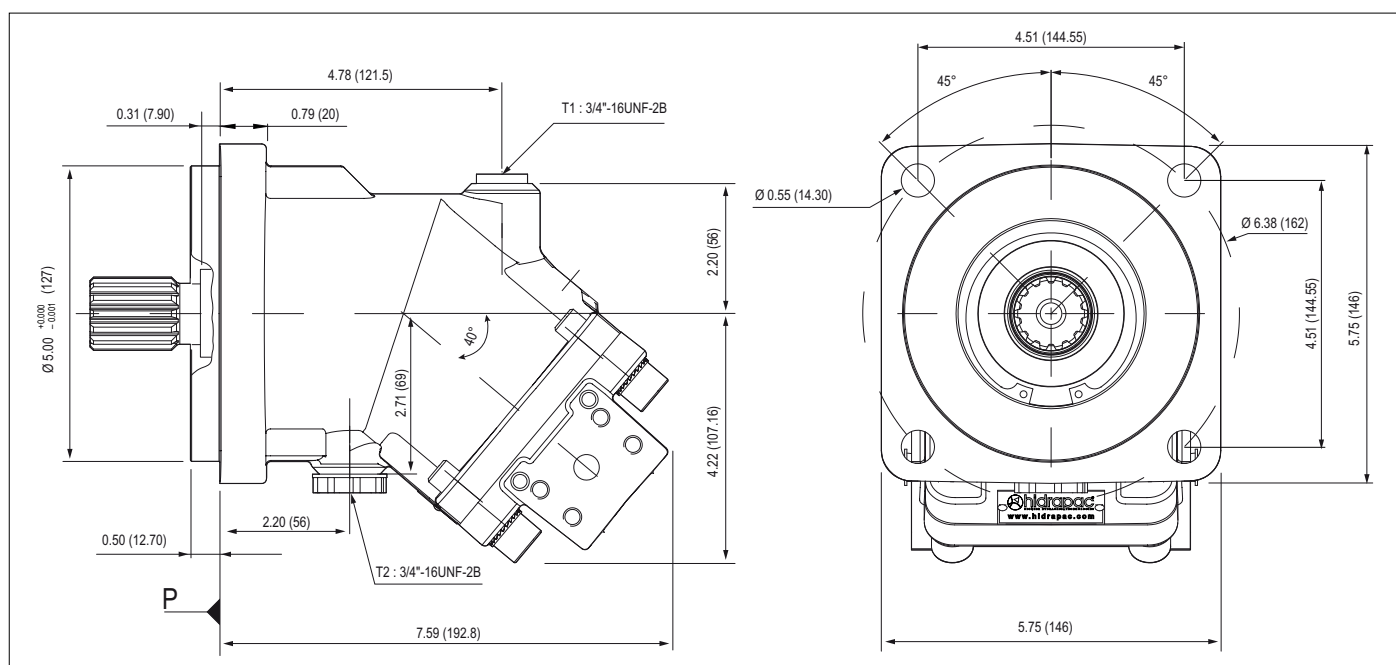
RS1 Side threaded ports A and B



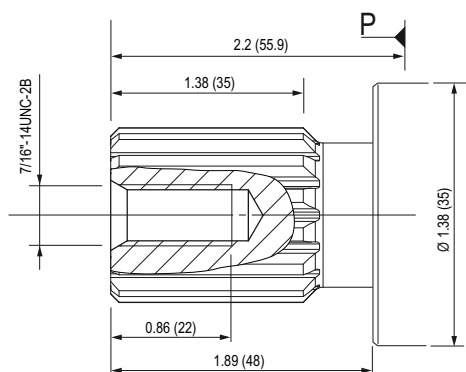
RS2 Rear threaded ports A and B



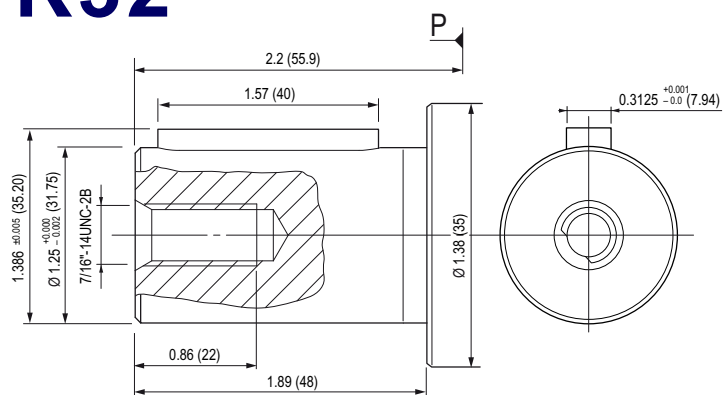
A2MS - 25 cc (SAE C) - 4 Bolt

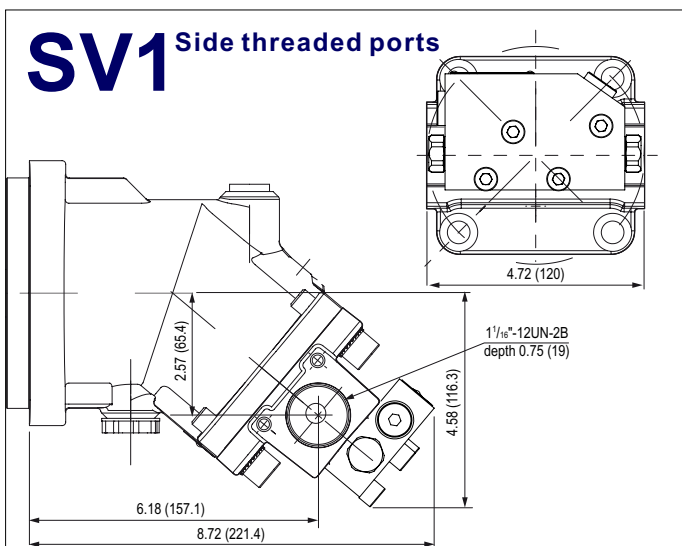
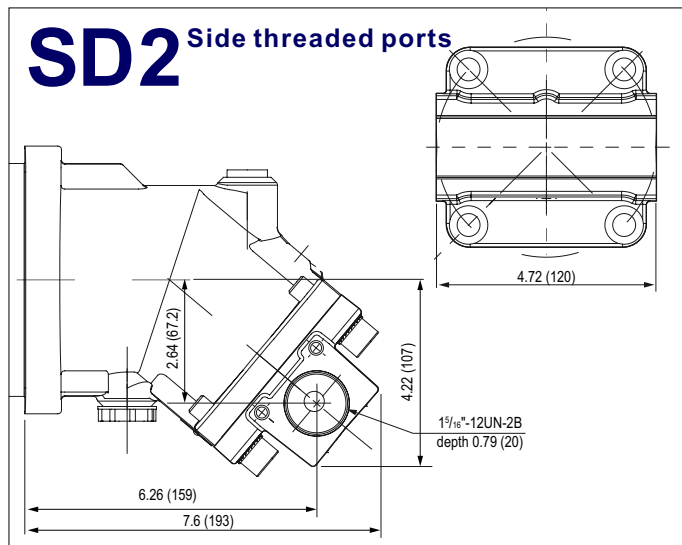
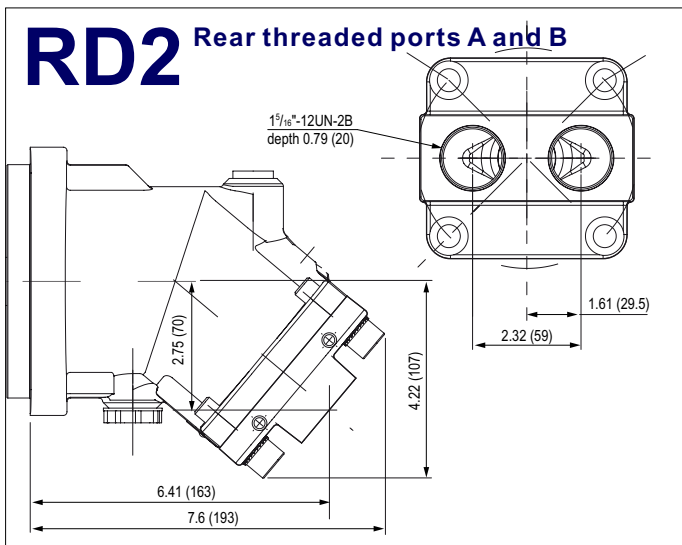
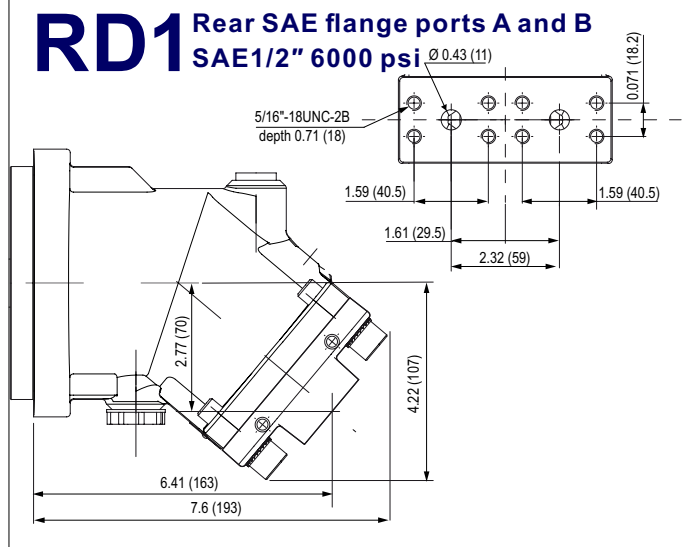
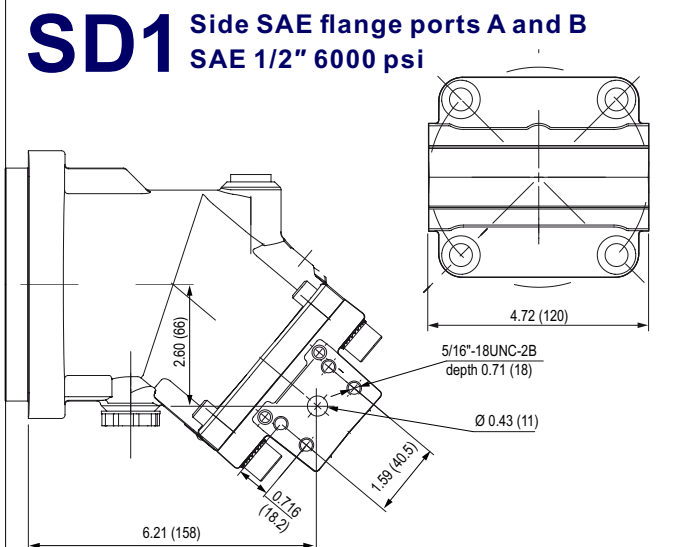


S14 Splined shaft 14T 12/24DP 1 1/4"

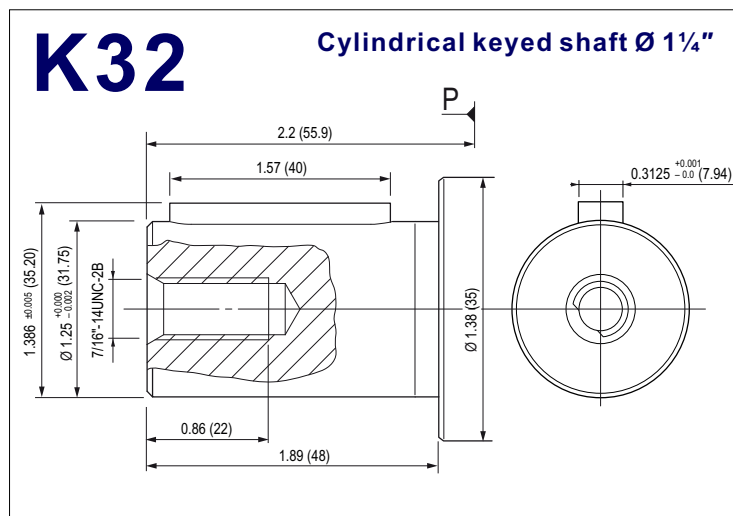
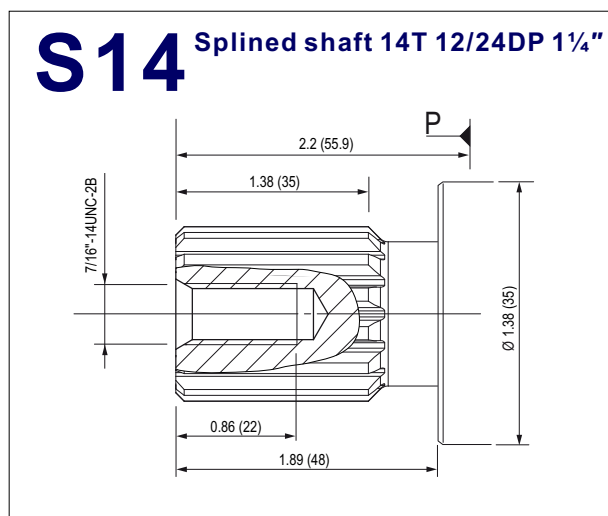
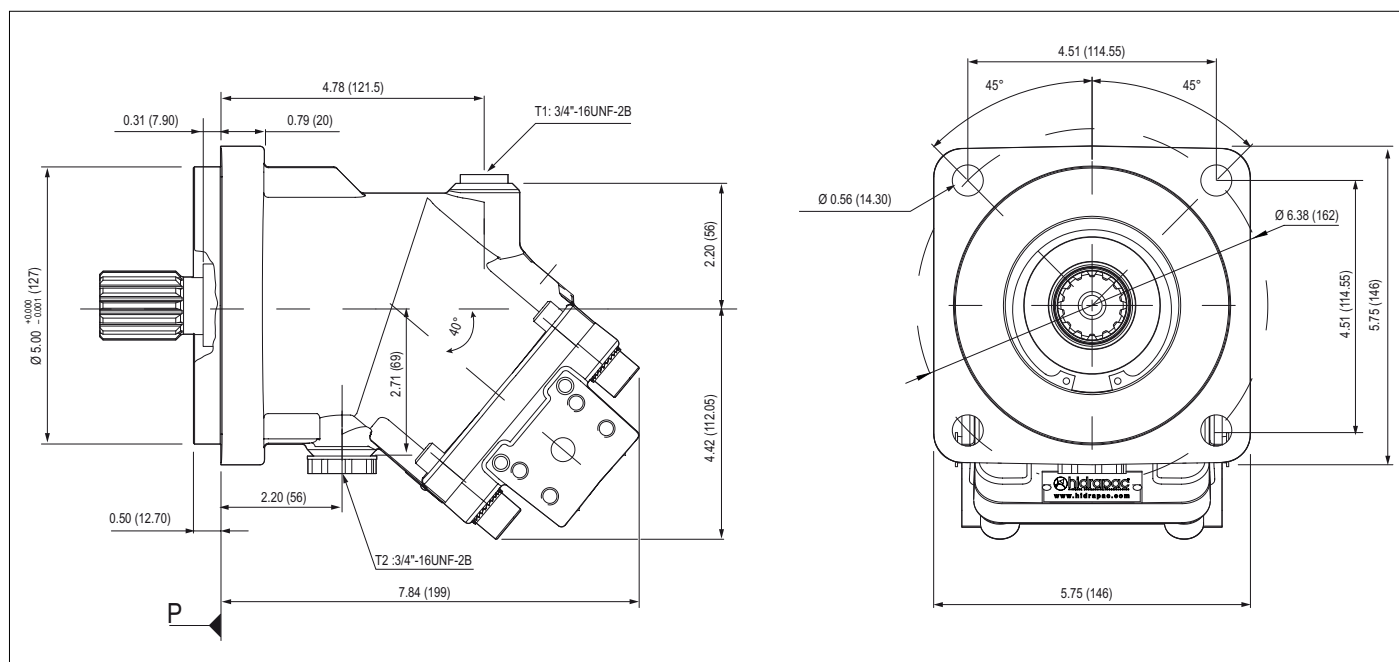


K32 Cylindrical keyed shaft Ø 1 1/4"

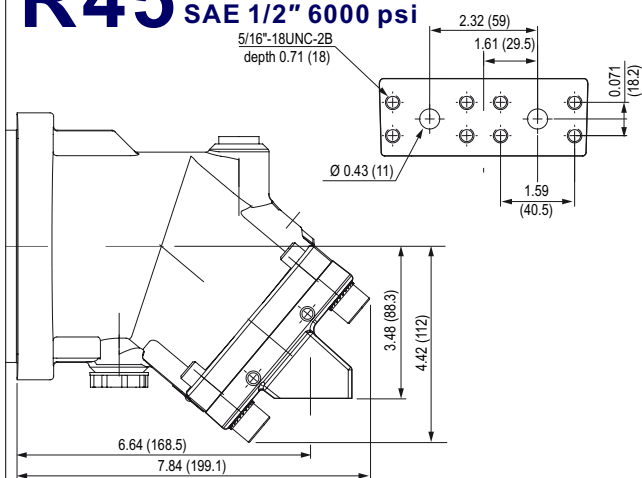




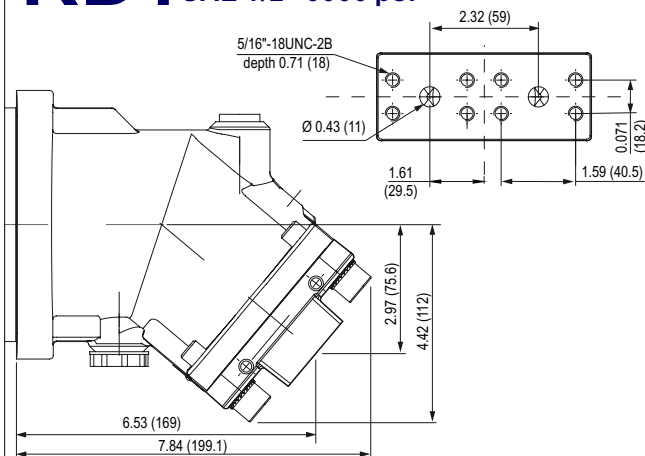
A2MS - 32 cc (SAE C) - 4 Bolt



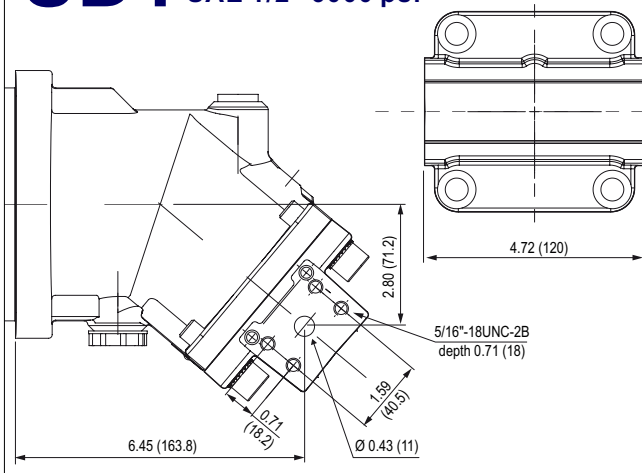
R45 SAE flange ports, bottom SAE 1/2" 6000 psi



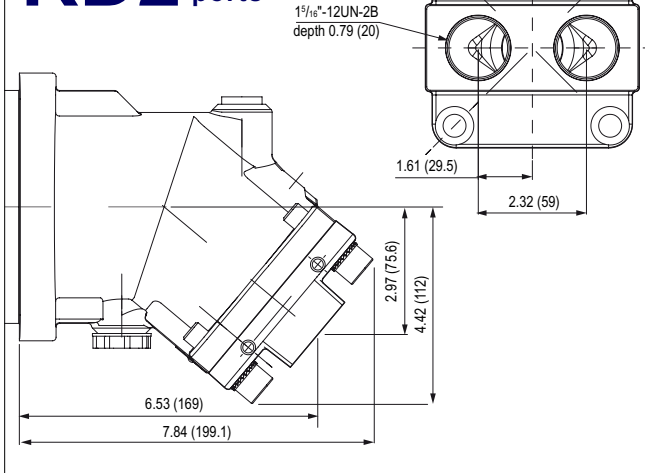
RD1 Rear flange ports SAE 1/2" 6000 psi



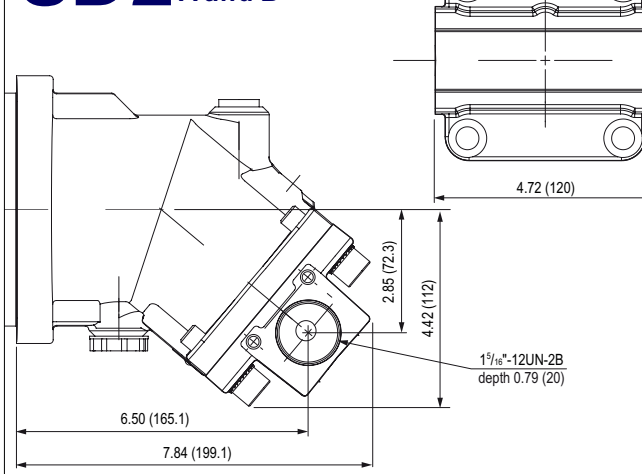
SD1 Side flange ports A and B SAE 1/2" 6000 psi



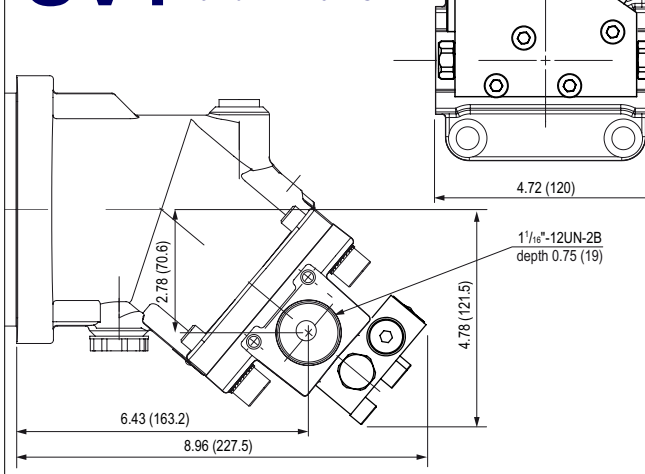
RD2 Rear threaded ports



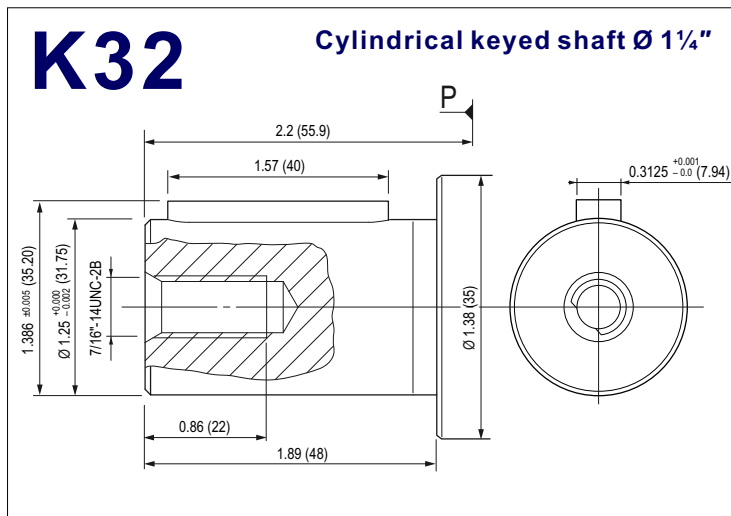
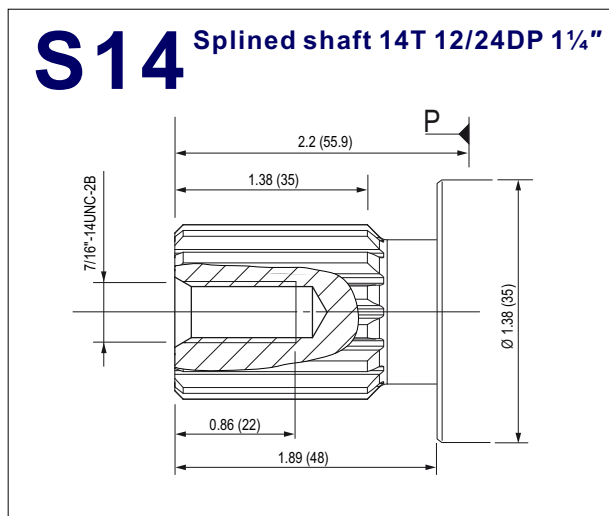
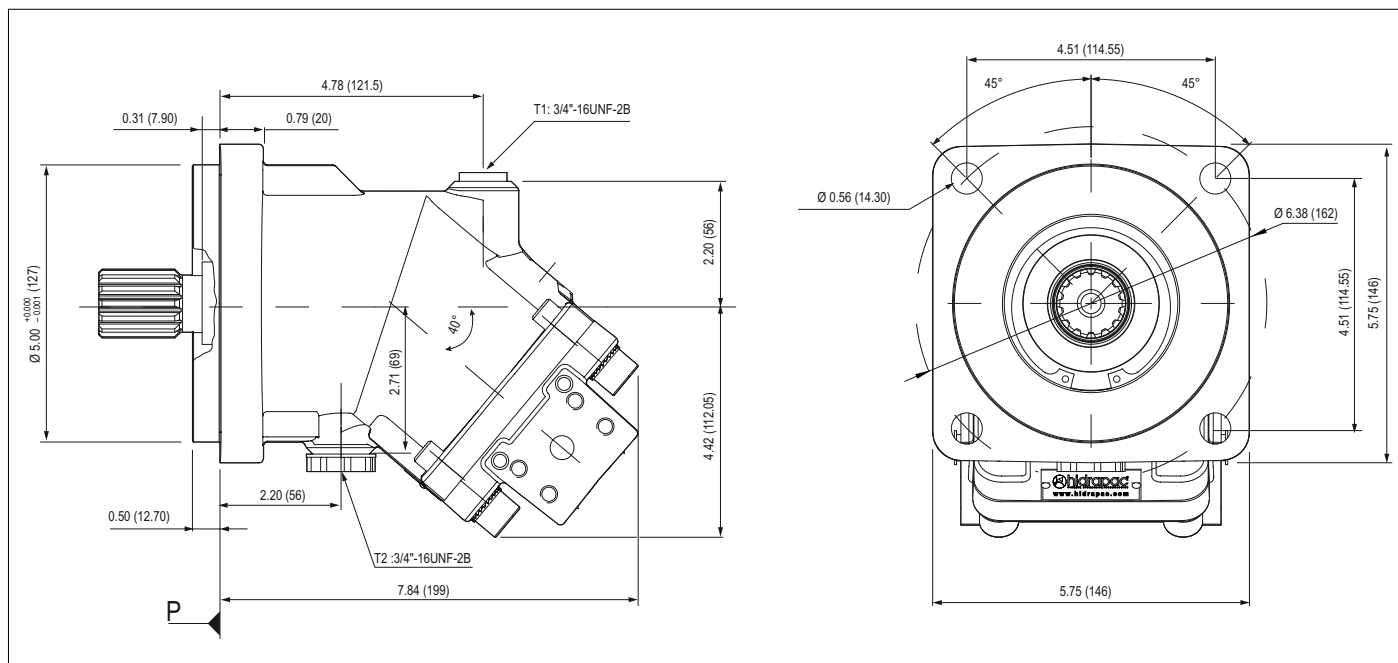
SD2 Side threaded ports A and B



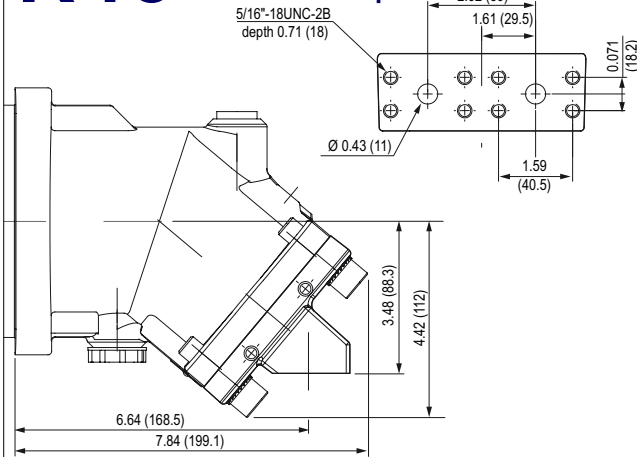
SV1 Side threaded ports A and B + valve



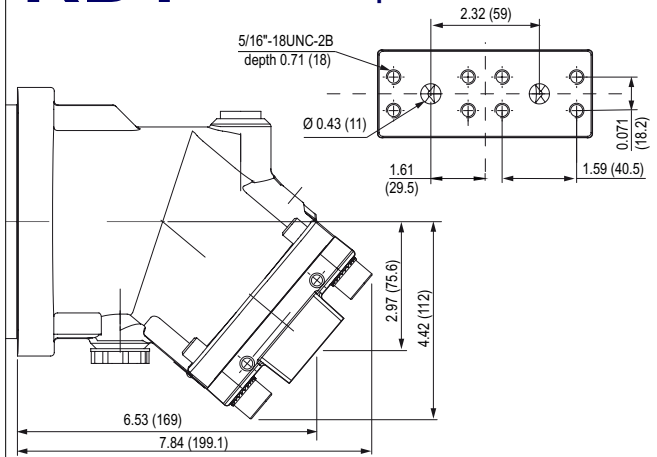
A2MS - 41 cc (SAE C) - 4 Bolt



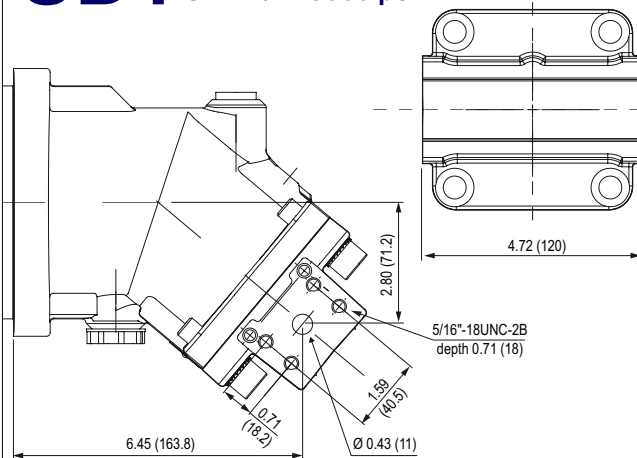
R45 SAE flange ports, bottom SAE 1/2" 6000 psi



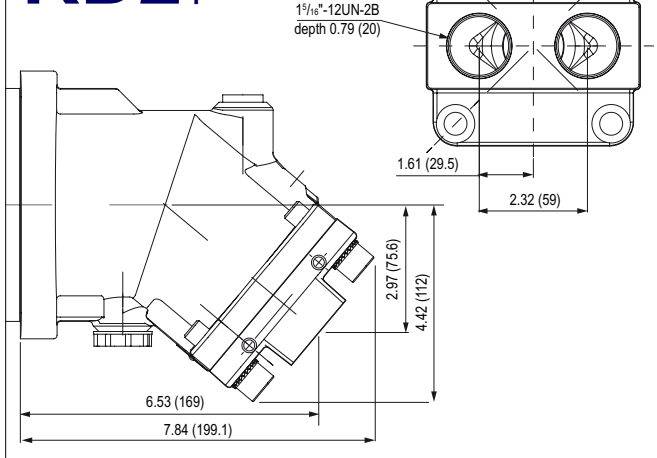
RD1 Rear flange ports SAE 1/2" 6000 psi



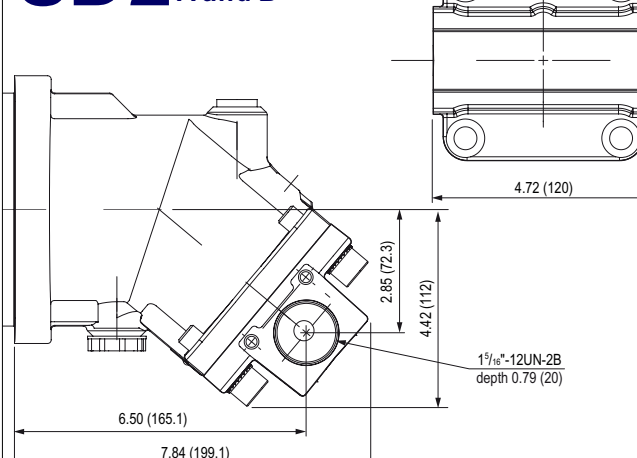
SD1 Side flange ports A and B SAE 1/2" 6000 psi



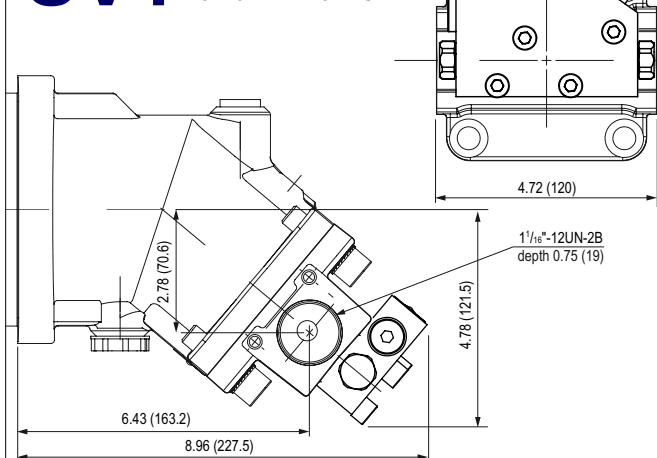
RD2 Rear threaded ports



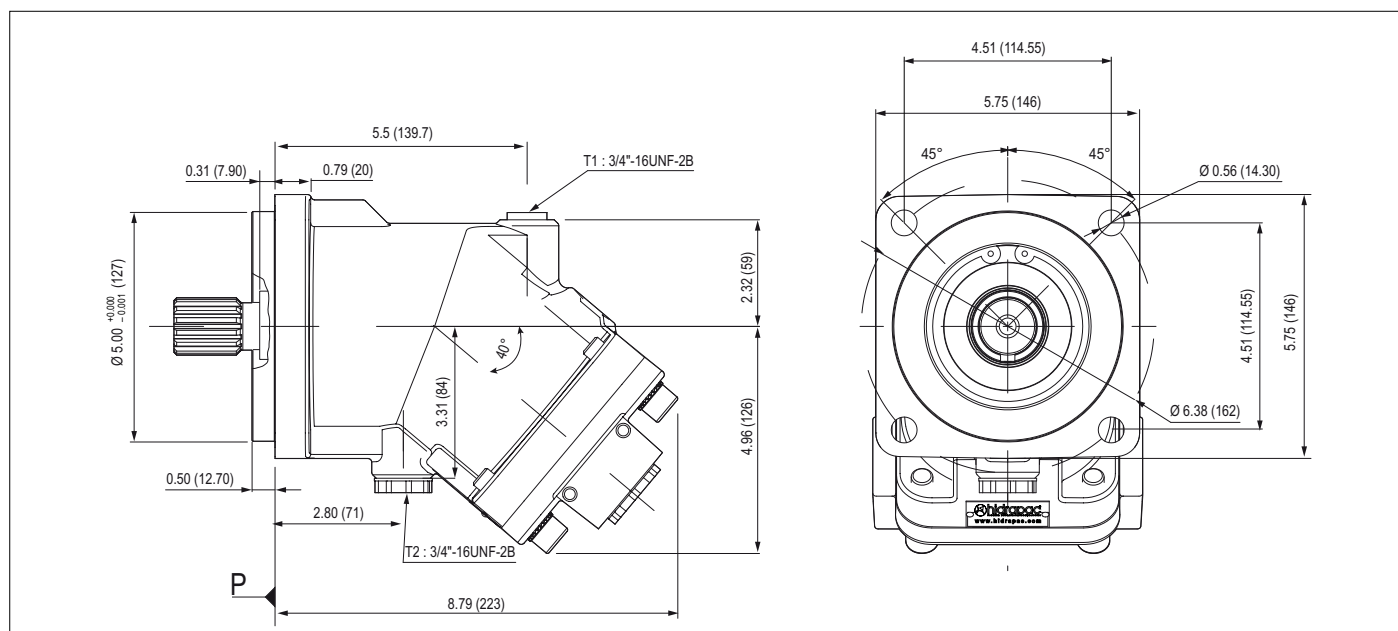
SD2 Side threaded ports A and B



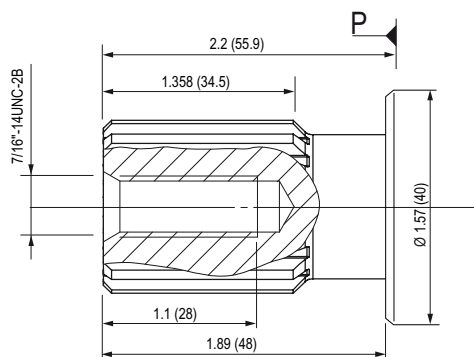
SV1 Side threaded ports A and B + valve



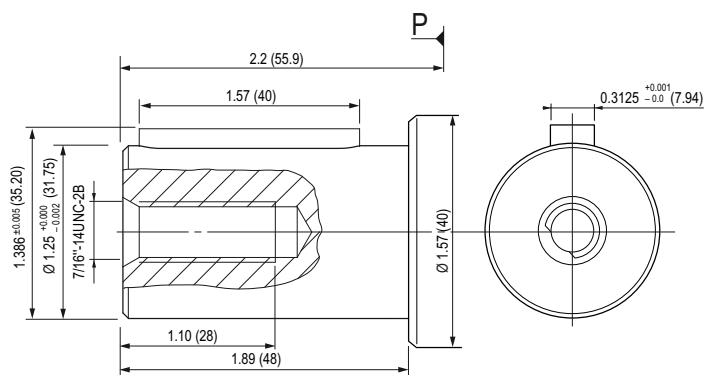
A2MS - 45 cc (SAE C) - 4 Bolt



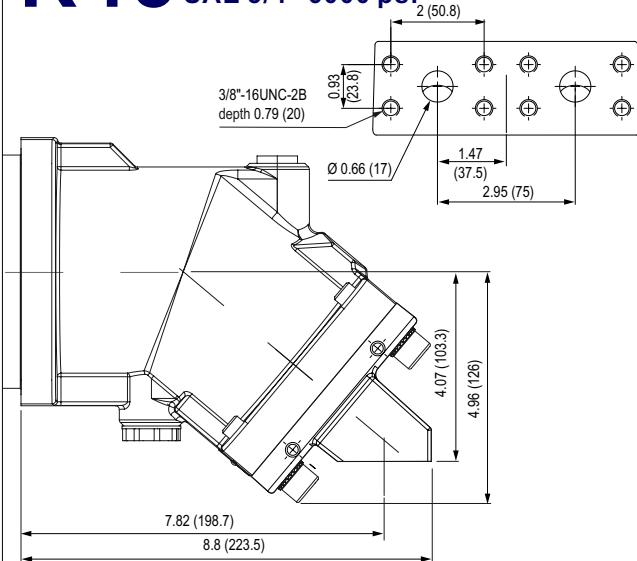
S14 Splined shaft 14T 12/24DP 1 1/4"



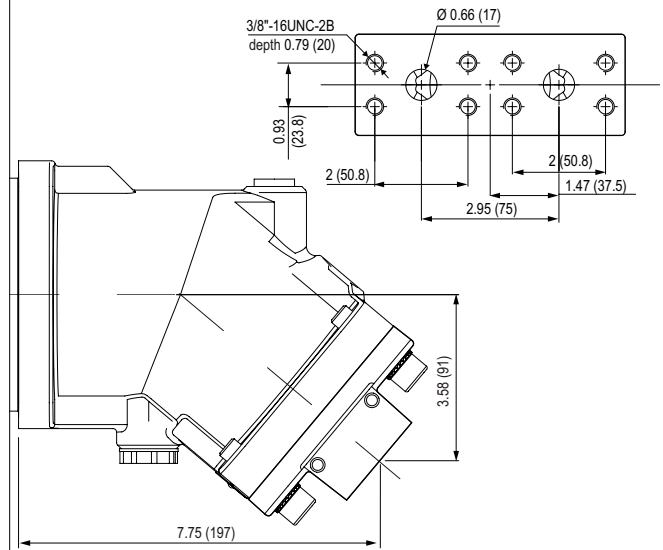
K32 Cylindrical keyed shaft $\varnothing 1 1/4"$



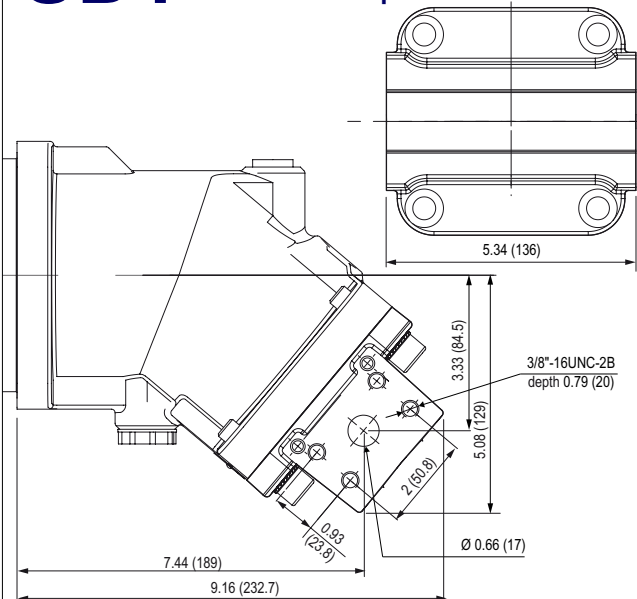
R45 SAE flange ports, bottom SAE 3/4" 6000 psi



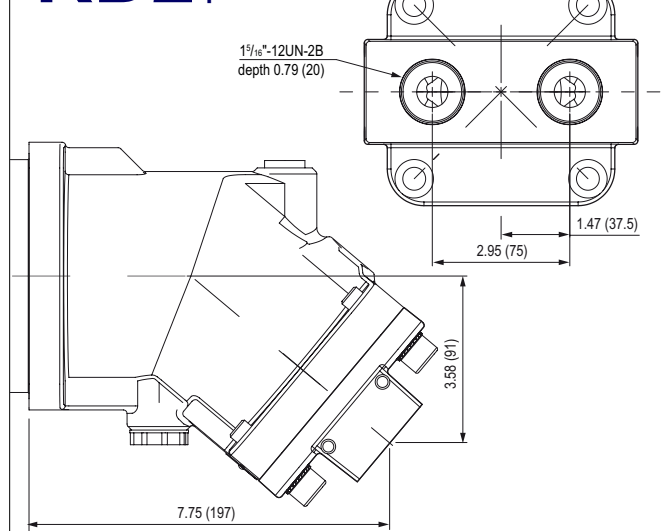
RD1 SAE flange ports, rear SAE 3/4" 6000 psi



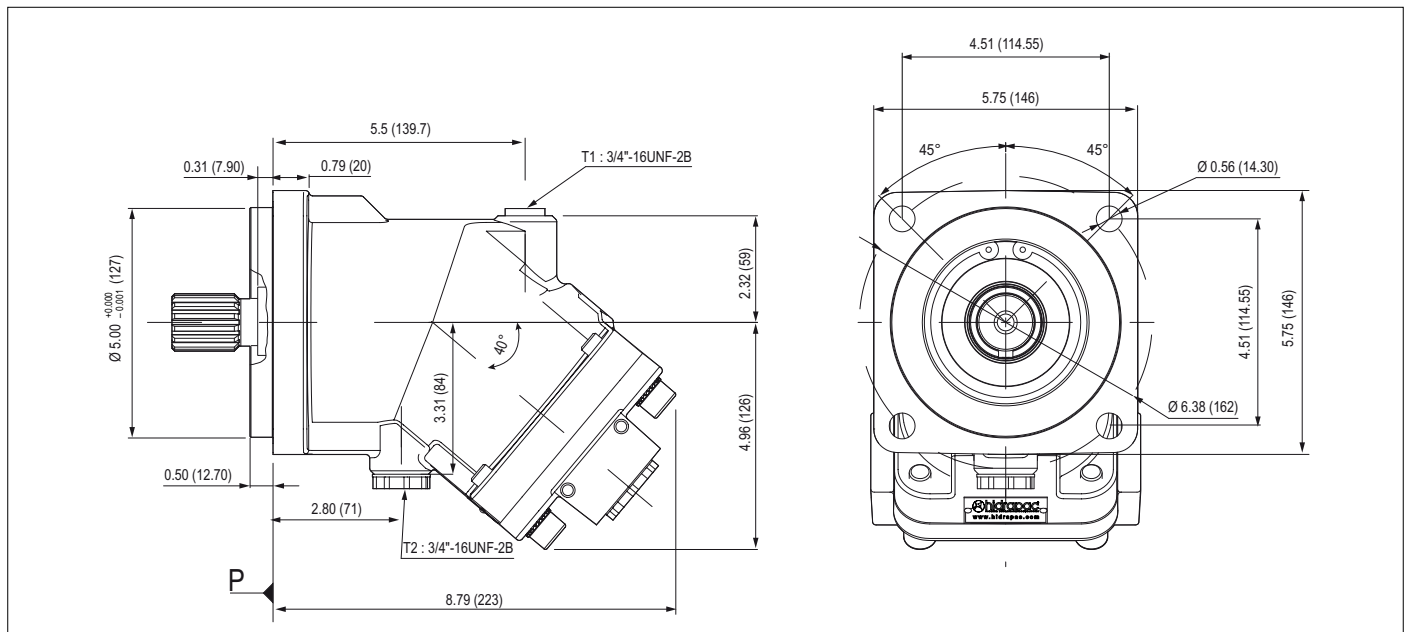
SD1 SAE flange ports, side A and B SAE 3/4" 6000 psi



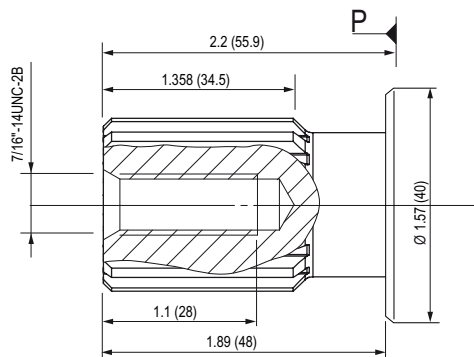
RD2 Rear threaded ports



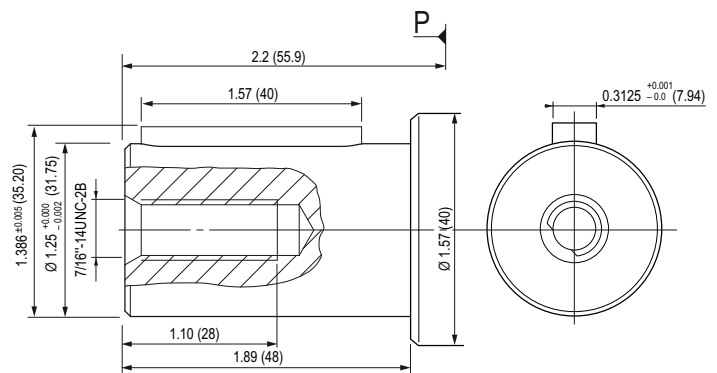
A2MS - 50 cc (SAE C) - 4 Bolt



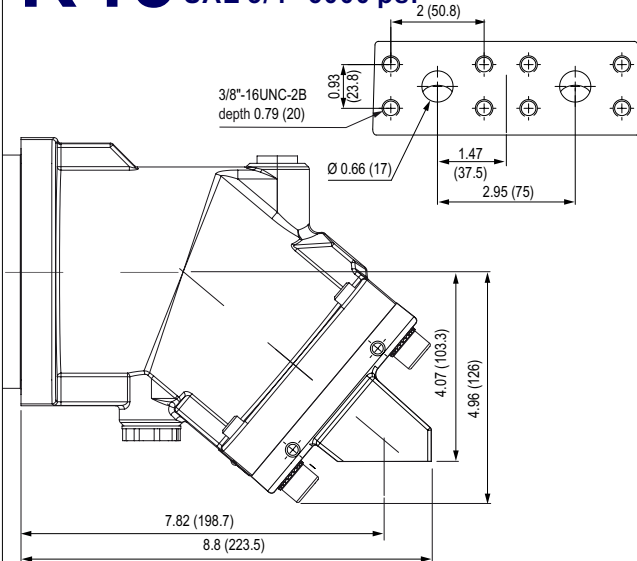
S14 Splined shaft 14T 12/24DP 1 1/4"



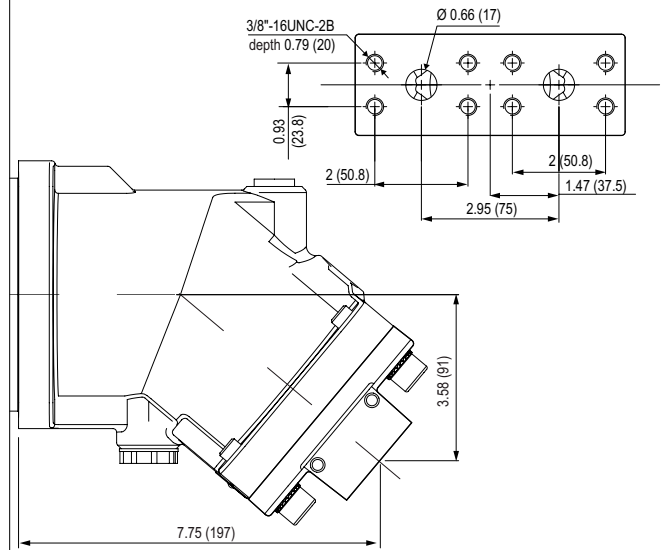
K32 Cylindrical keyed shaft Ø 1 1/4"



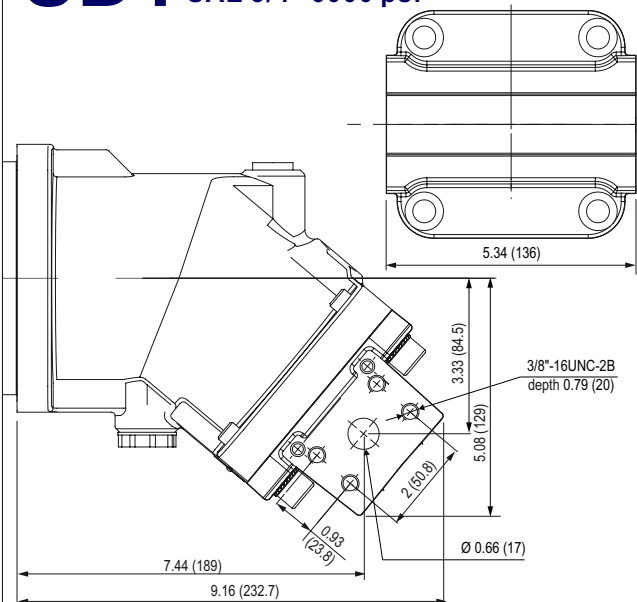
R45 SAE flange ports, bottom SAE 3/4" 6000 psi



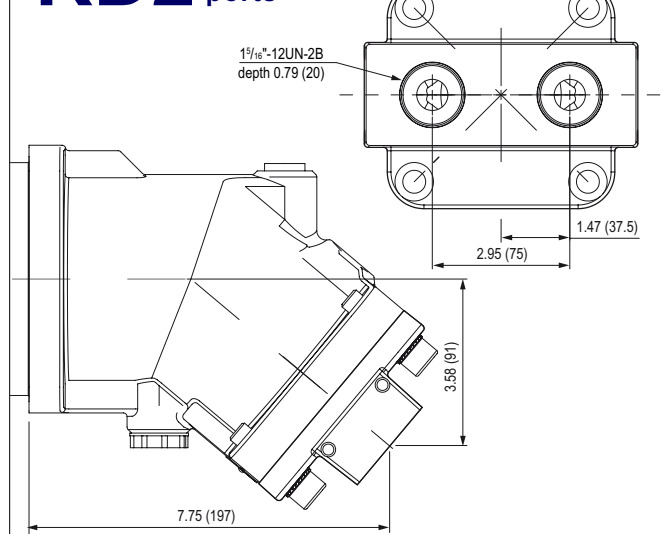
RD1 SAE flange ports, rear SAE 3/4" 6000 psi



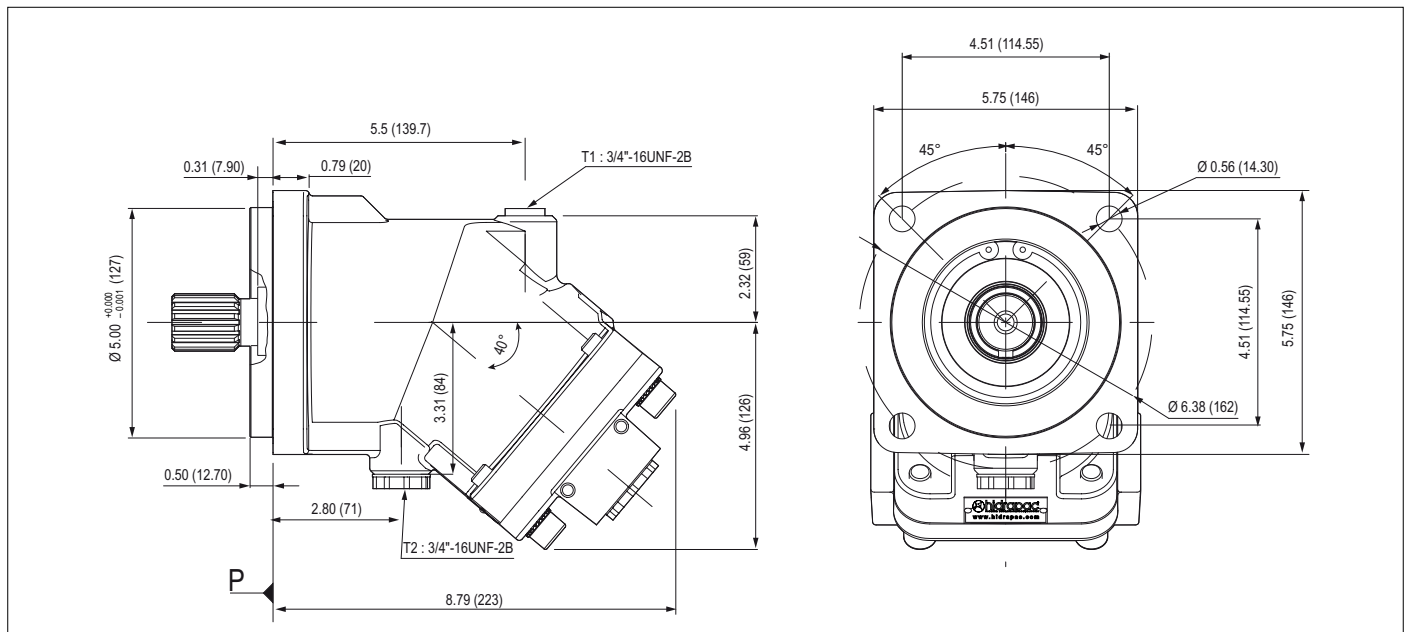
SD1 SAE flange ports, side A and B SAE 3/4" 6000 psi



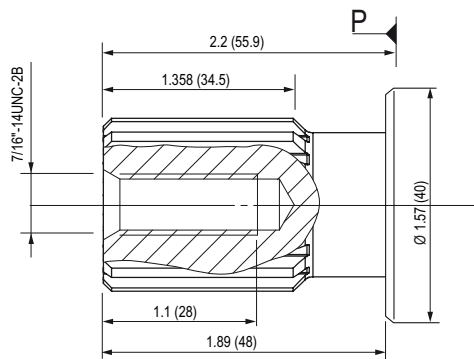
RD2 Rear threaded ports



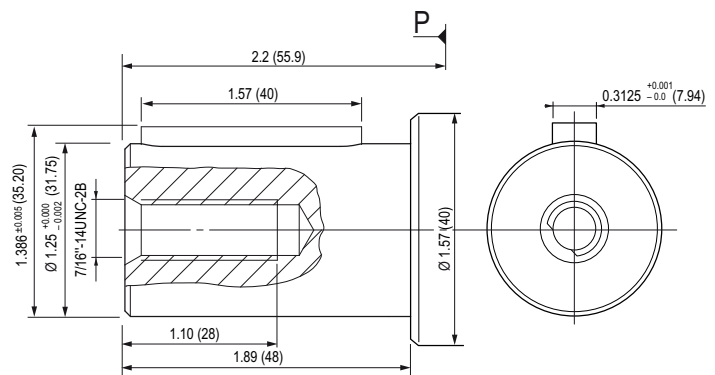
A2MS - 56 cc (SAE C) - 4 Bolt



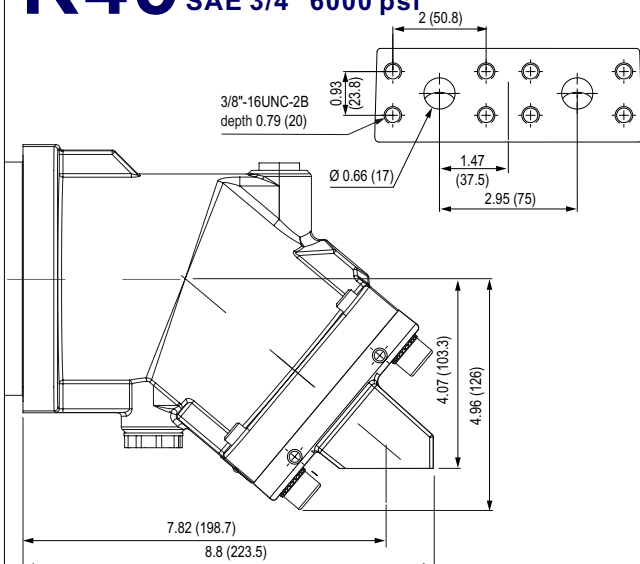
S14 Splined shaft 14T 12/24DP 1 1/4"



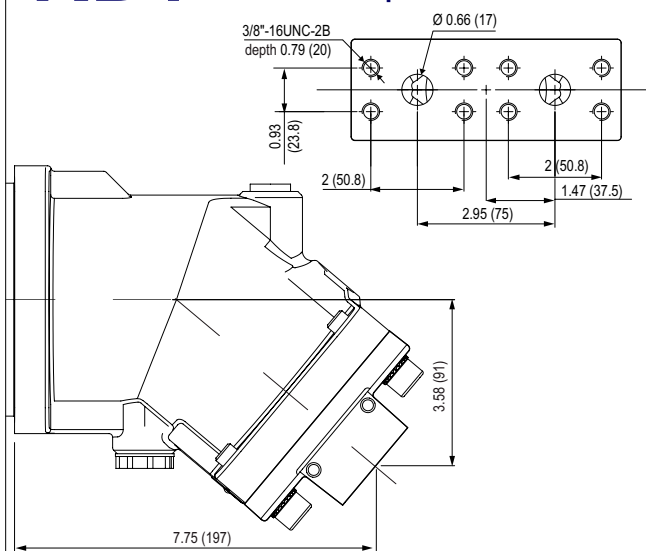
K32 Cylindrical keyed shaft Ø 1 1/4"



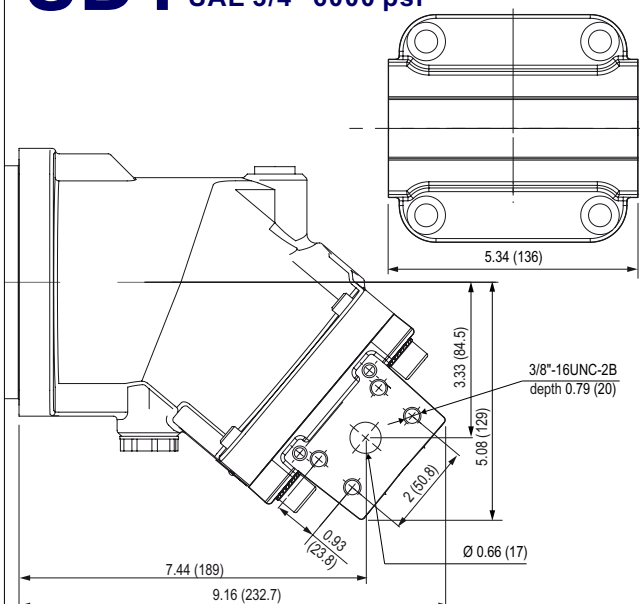
R45 SAE flange ports, bottom SAE 3/4" 6000 psi



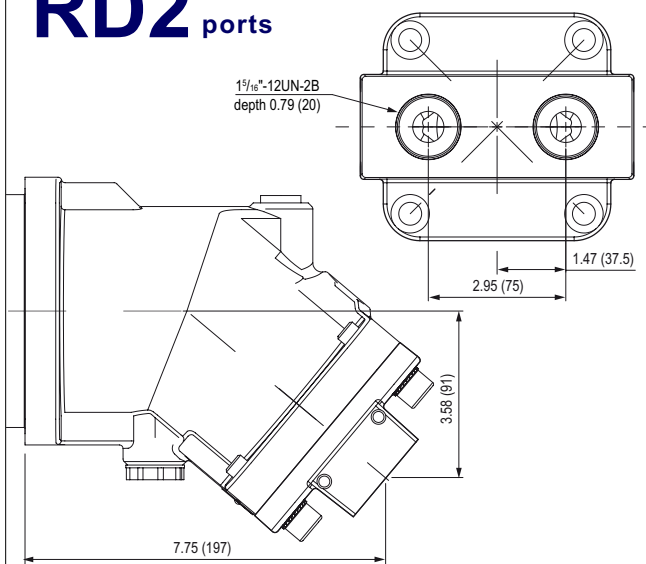
RD1 SAE flange ports, rear SAE 3/4" 6000 psi



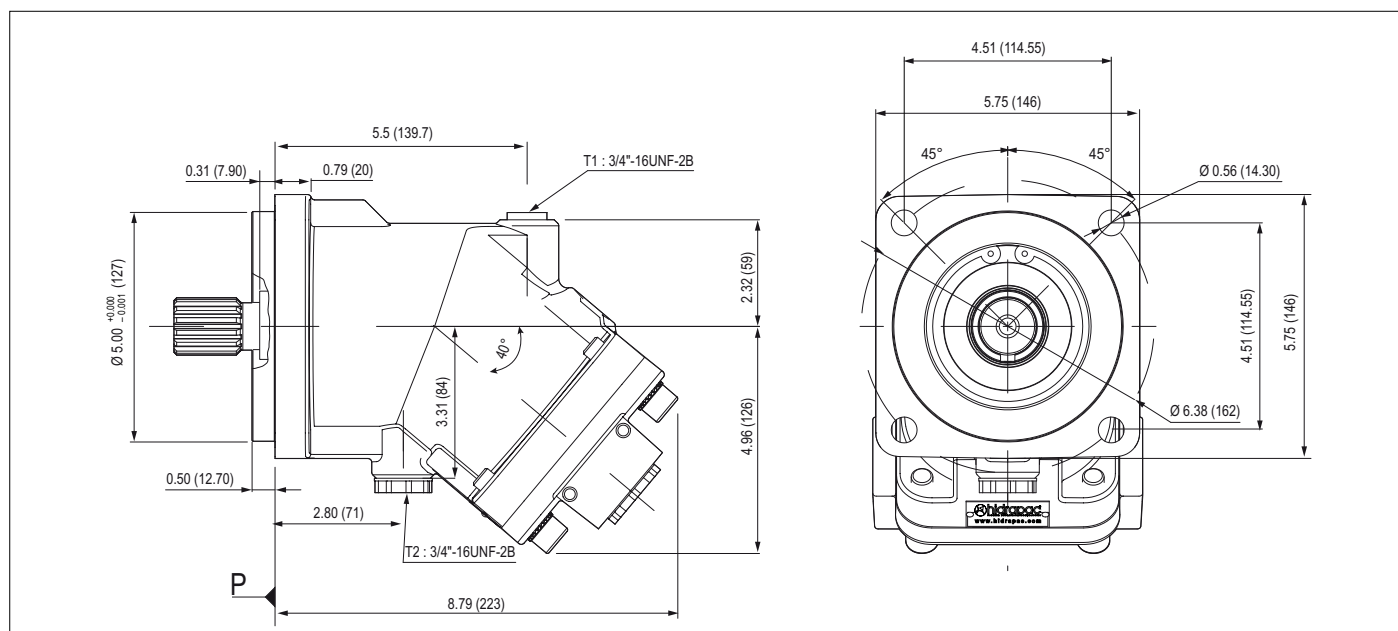
SD1 SAE flange ports, side A and B SAE 3/4" 6000 psi



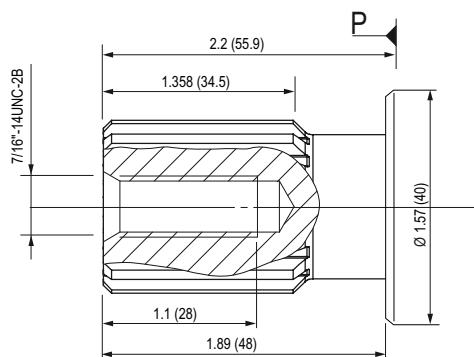
RD2 Rear threaded ports



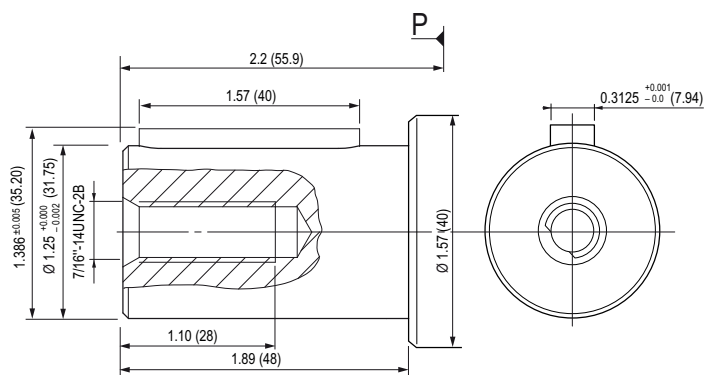
A2MS - 63 cc (SAE C) - 4 Bolt



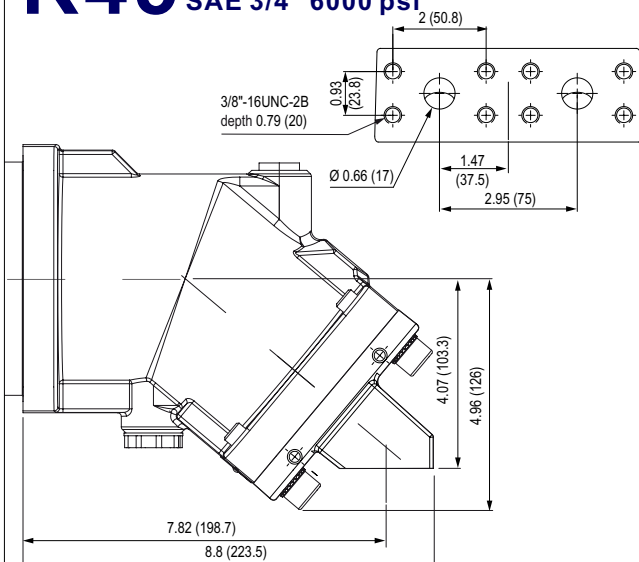
S14 Splined shaft 14T 12/24DP 1 1/4"



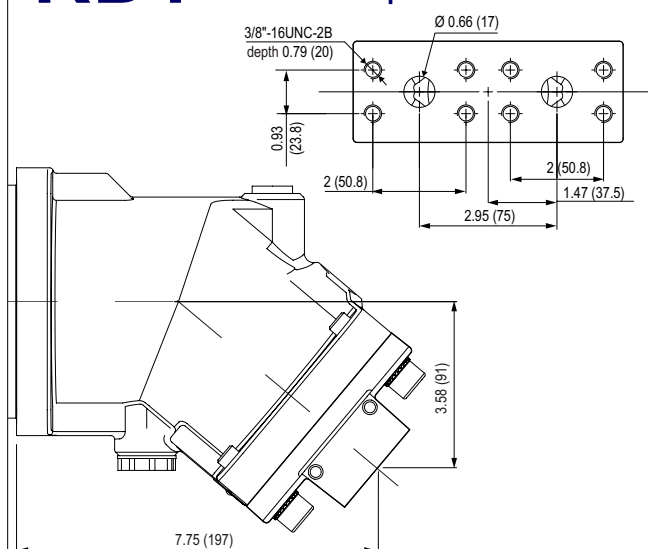
K32 Cylindrical keyed shaft Ø 1 1/4"



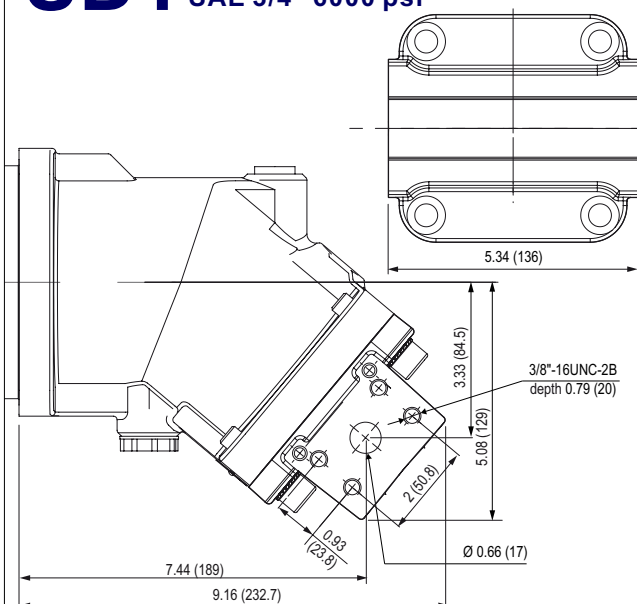
R45 SAE flange ports, bottom SAE 3/4" 6000 psi



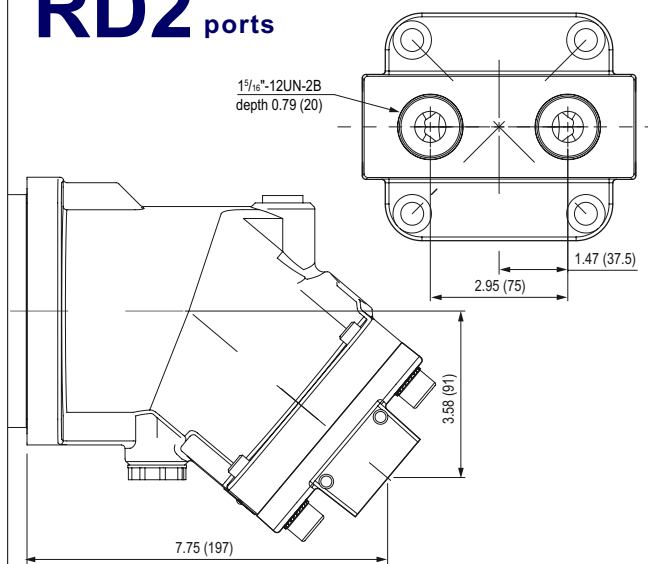
RD1 SAE flange ports, rear SAE 3/4" 6000 psi



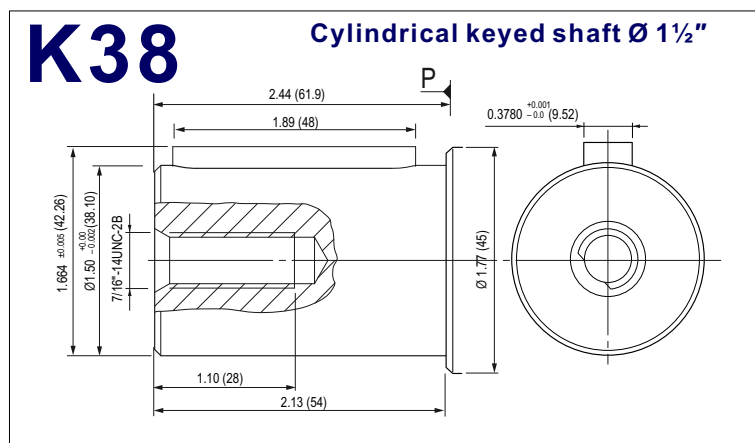
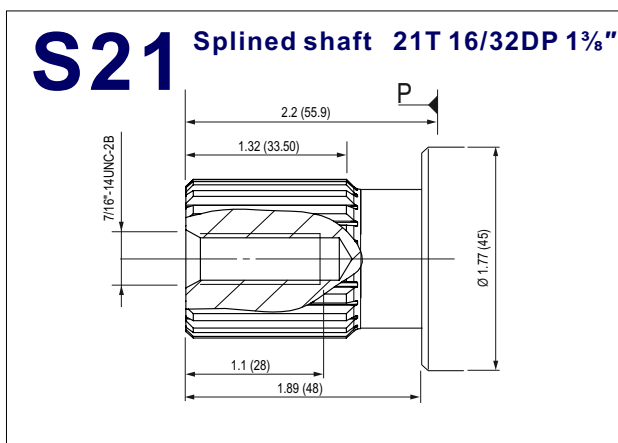
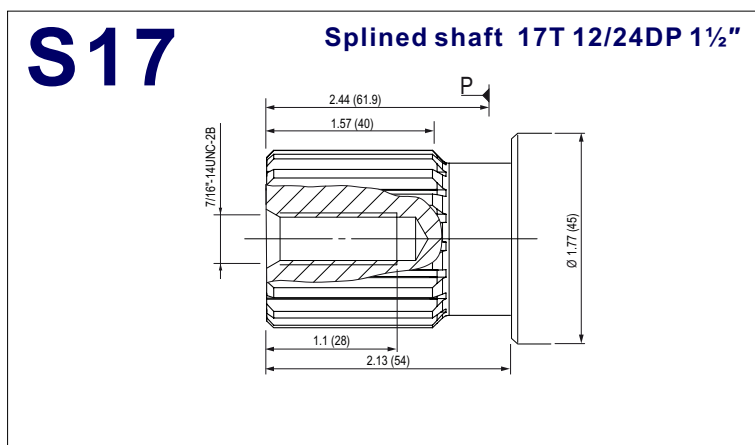
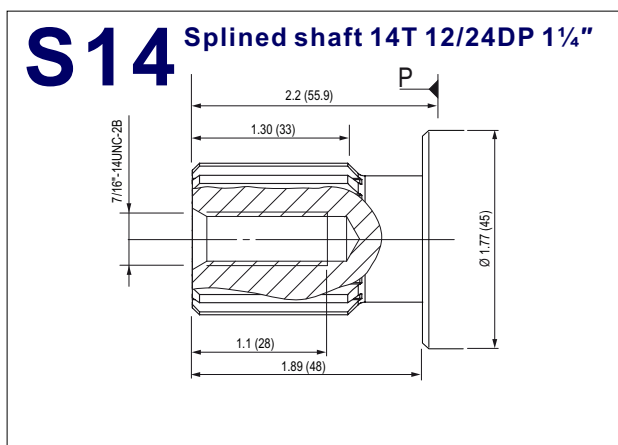
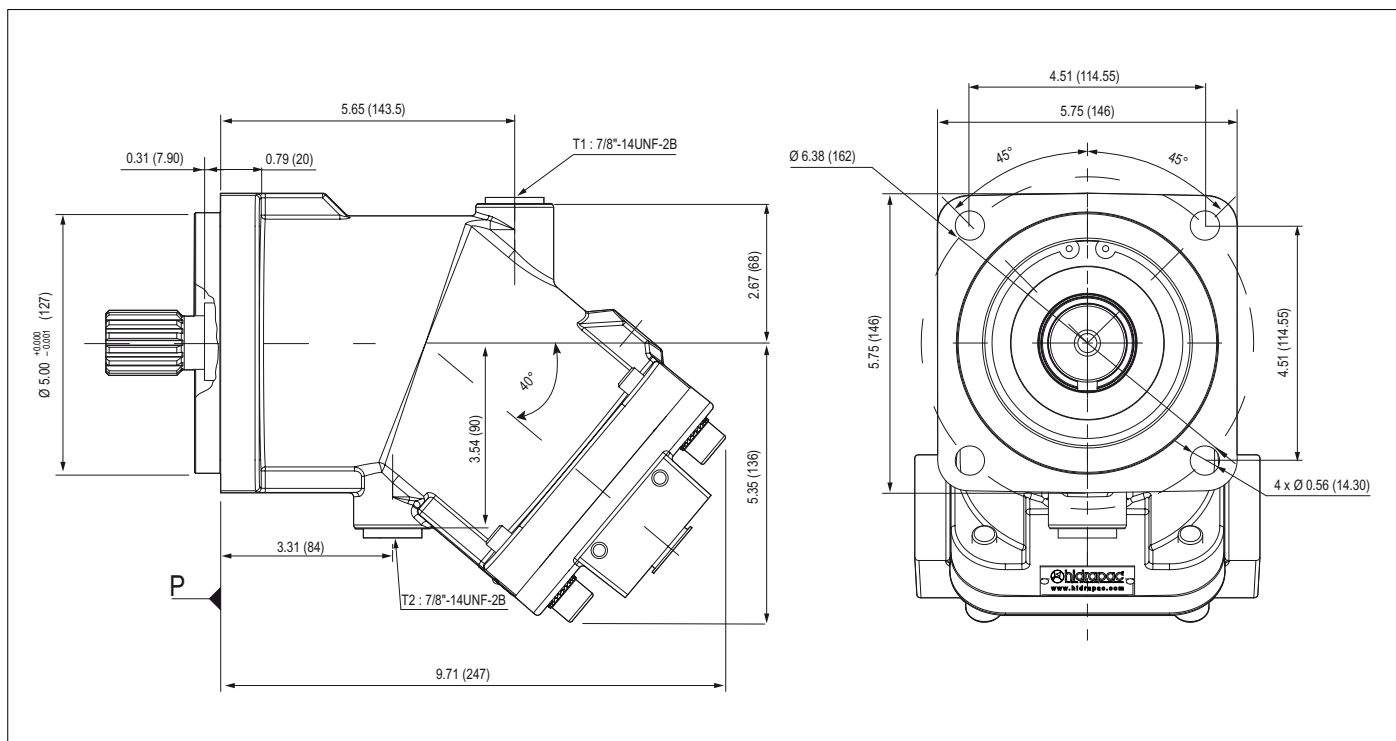
SD1 SAE flange ports, side A and B SAE 3/4" 6000 psi



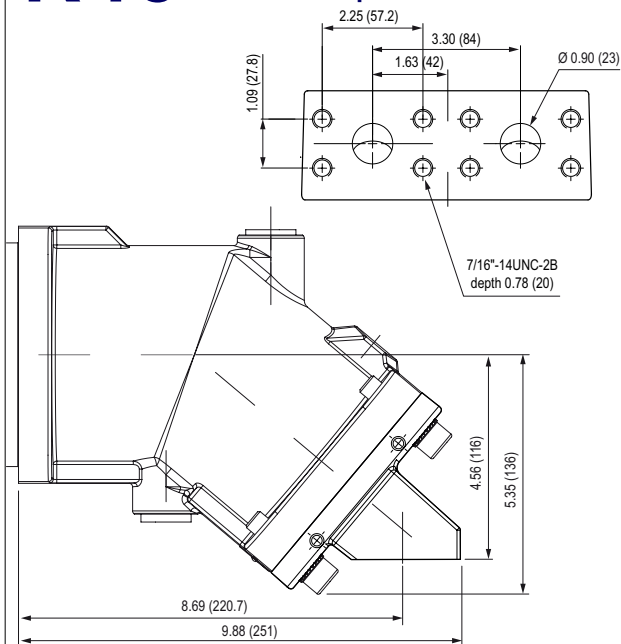
RD2 Rear threaded ports



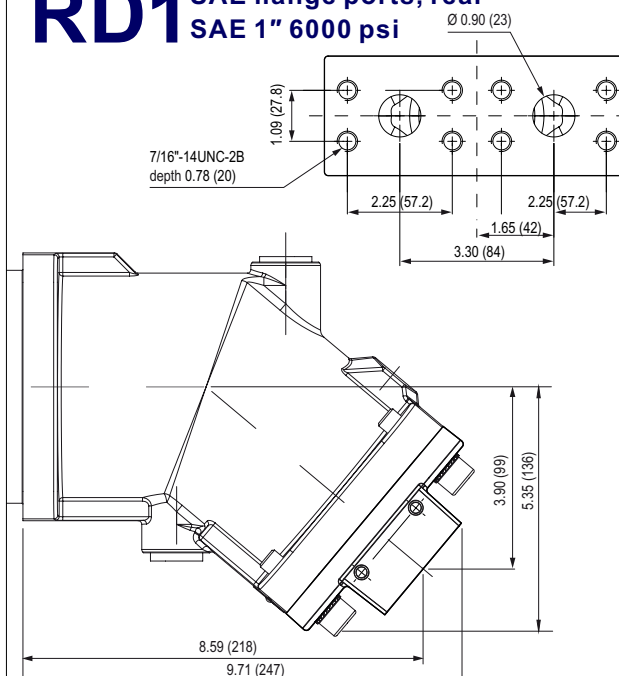
A2MS - 80 cc (SAE C) - 4 Bolt



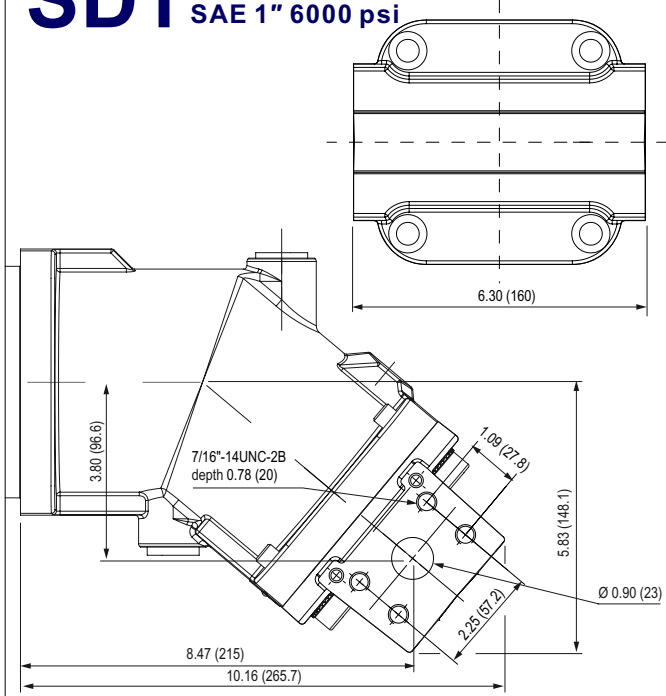
R45 SAE flange ports, bottom SAE 1" 6000 psi



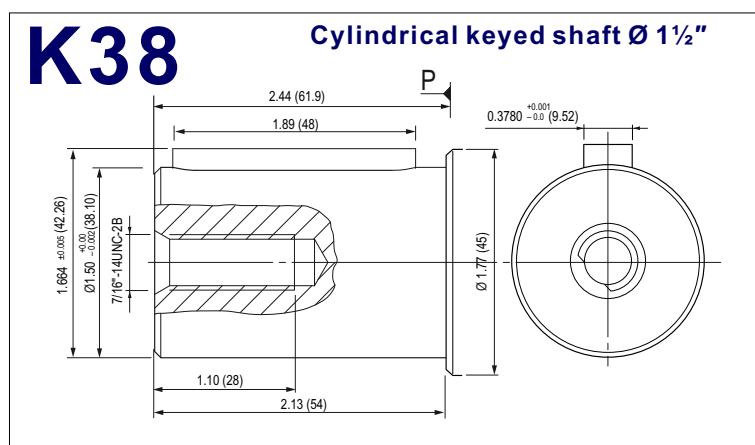
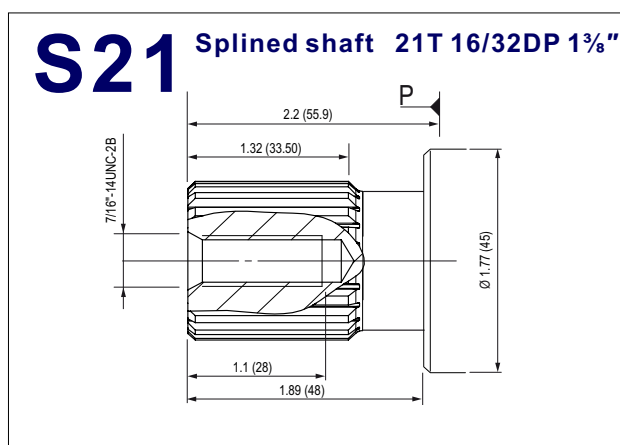
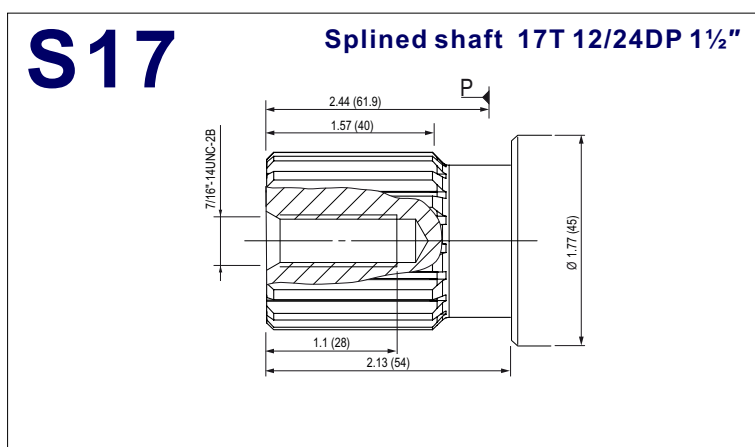
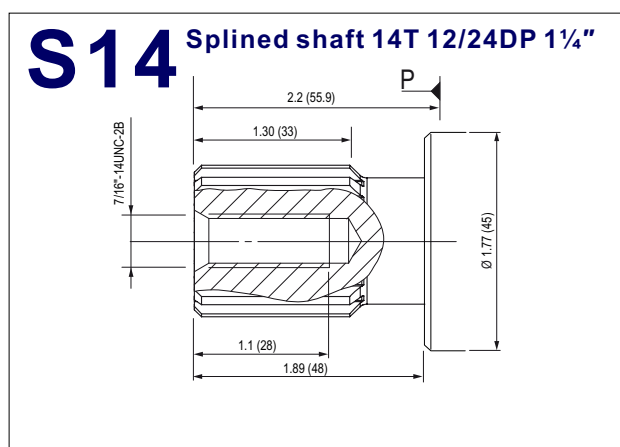
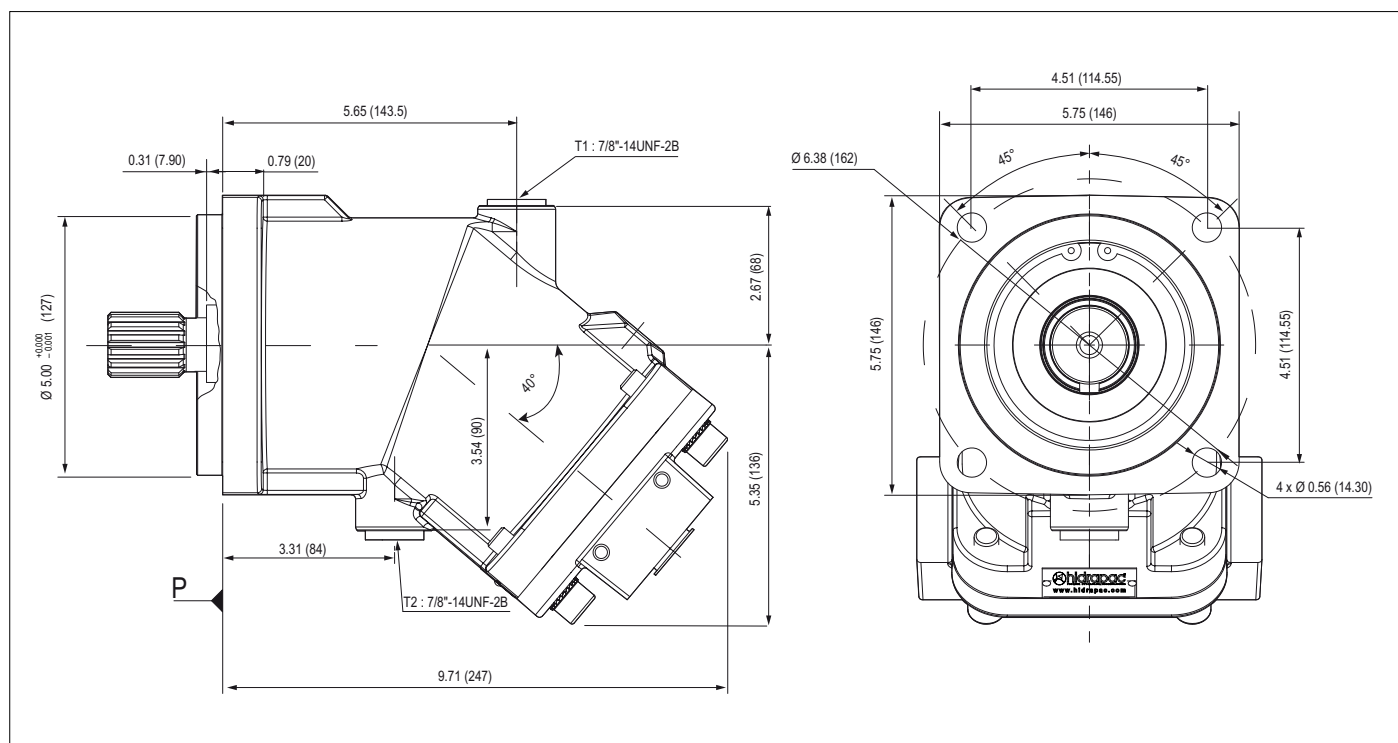
RD1 SAE flange ports, rear SAE 1" 6000 psi



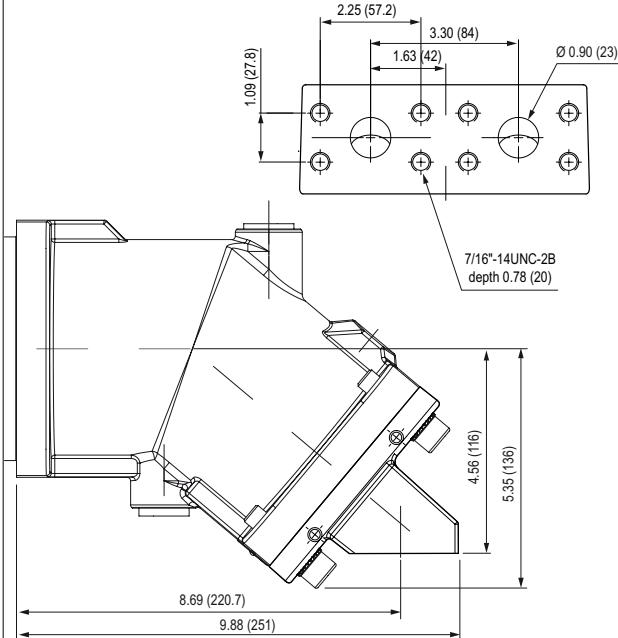
SD1 SAE flange ports, side A and B SAE 1" 6000 psi



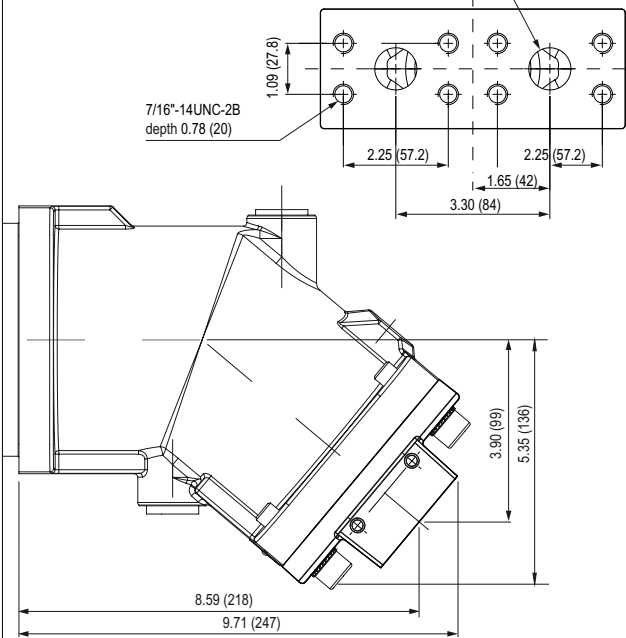
A2MS - 90 cc (SAE C) - 4 Bolt



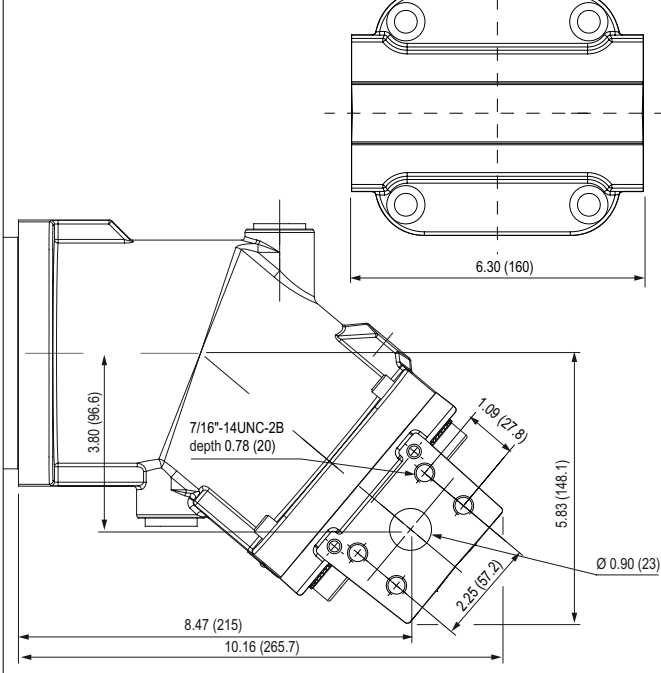
R45 SAE flange ports, bottom
SAE 1" 6000 psi



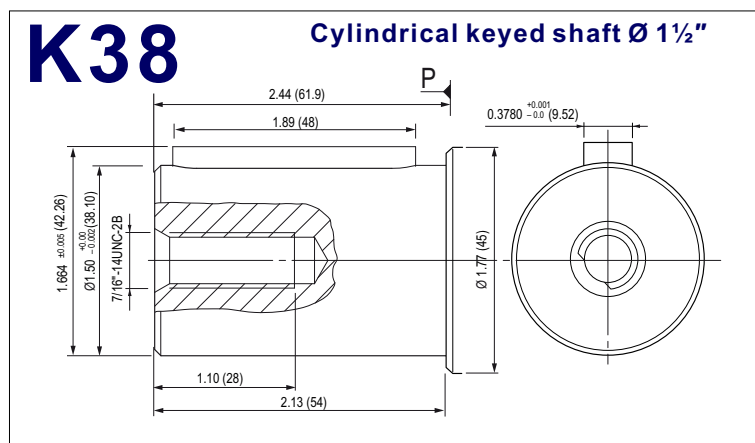
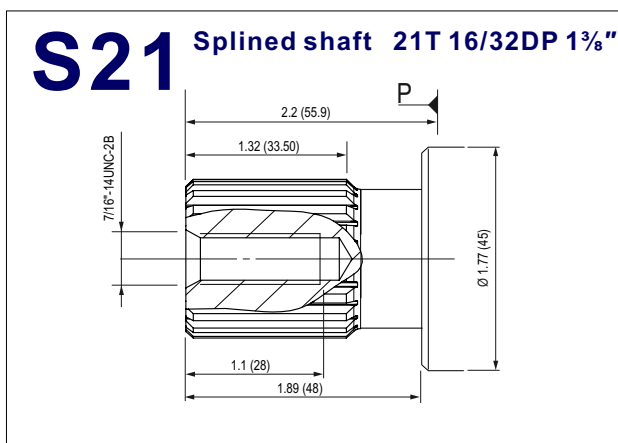
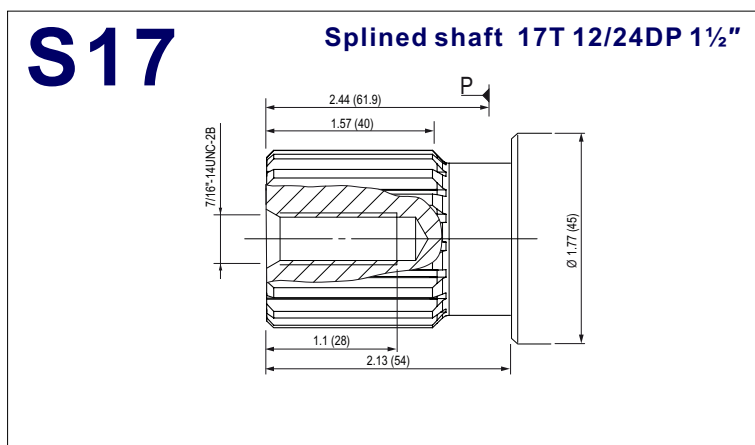
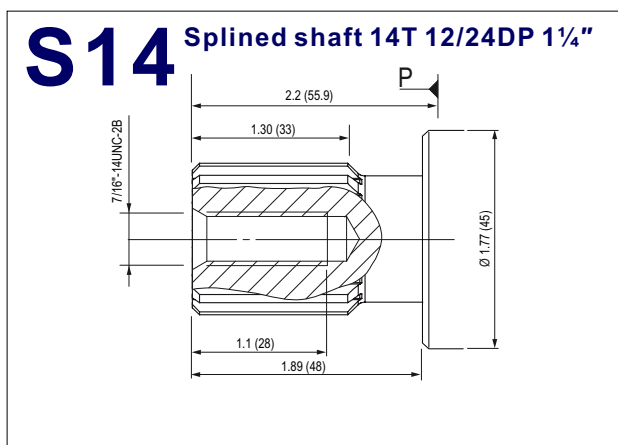
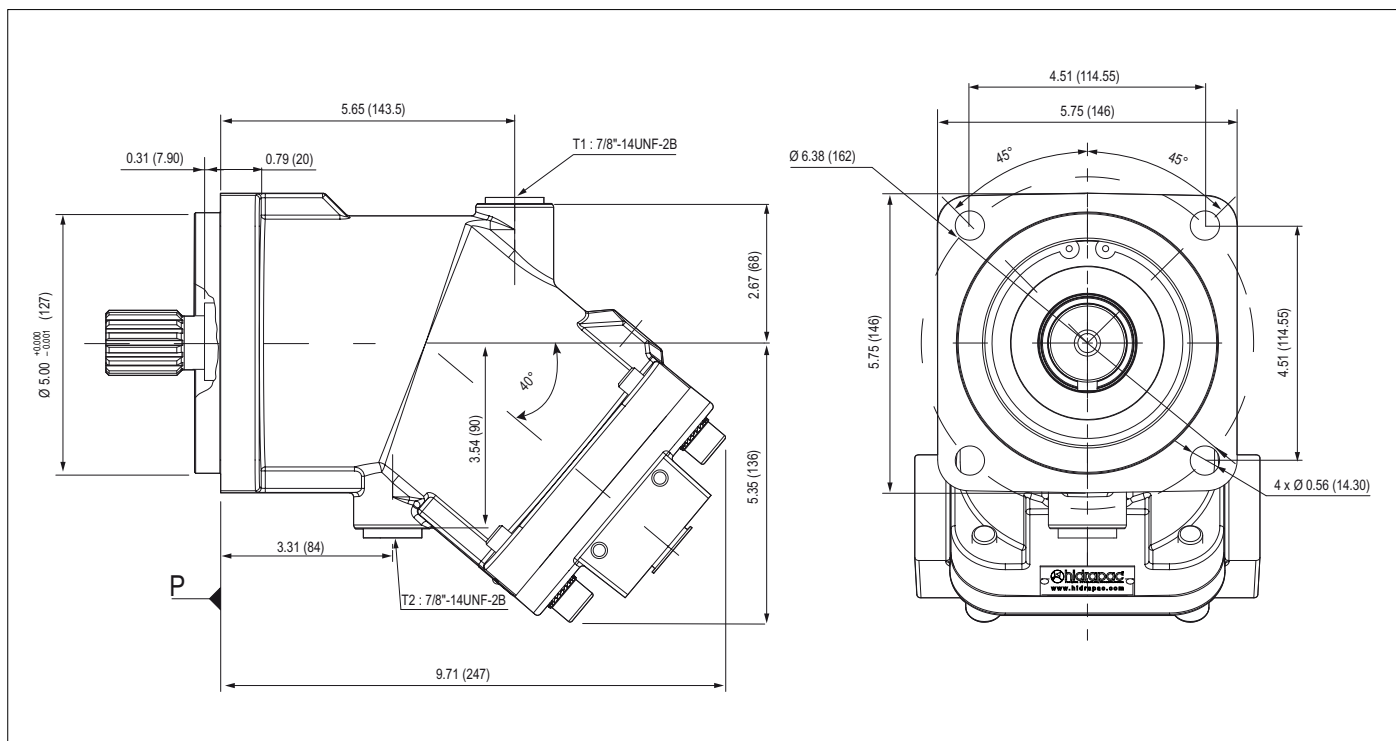
RD1 SAE flange ports, rear
SAE 1" 6000 psi

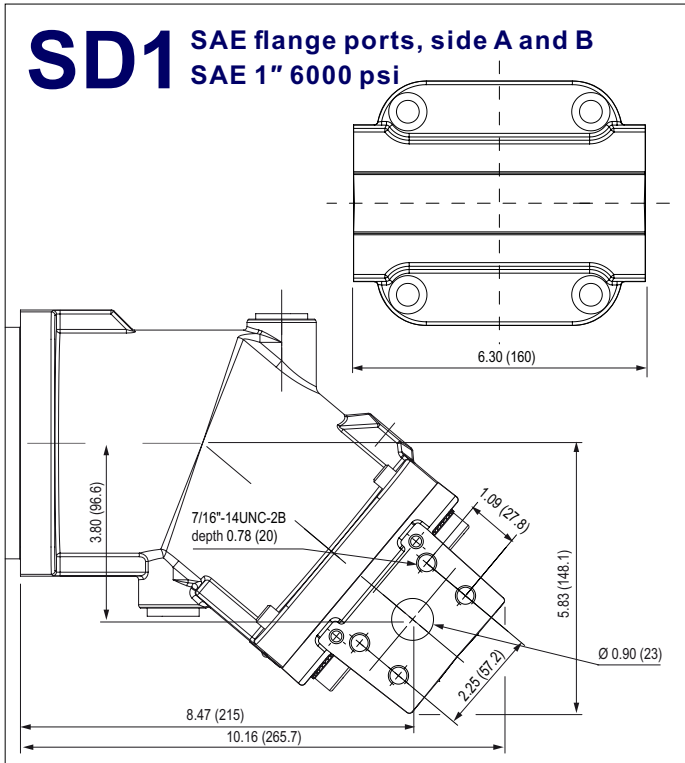
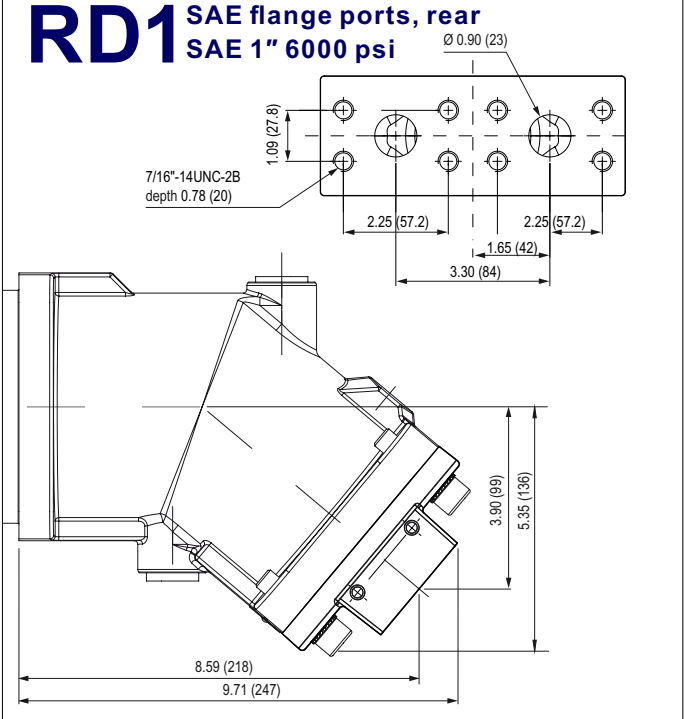
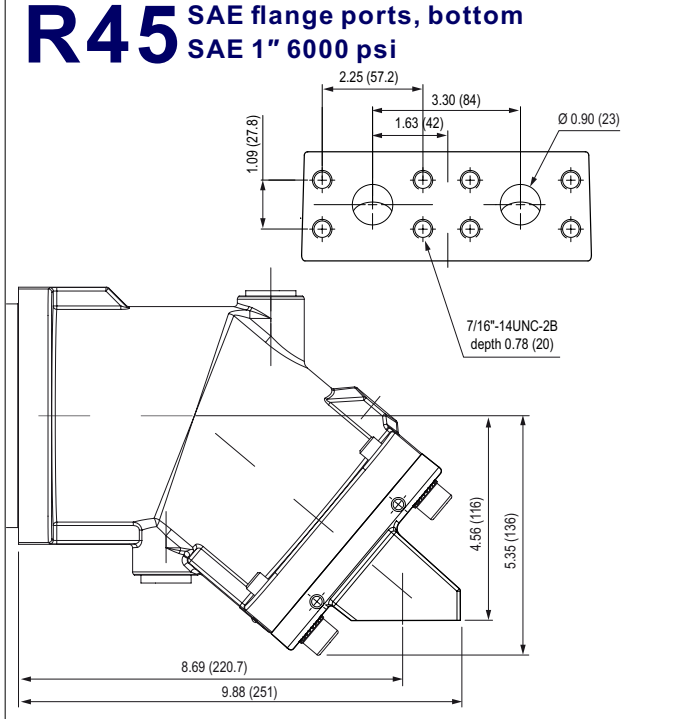


SD1 SAE flange ports, side A and B
SAE 1" 6000 psi

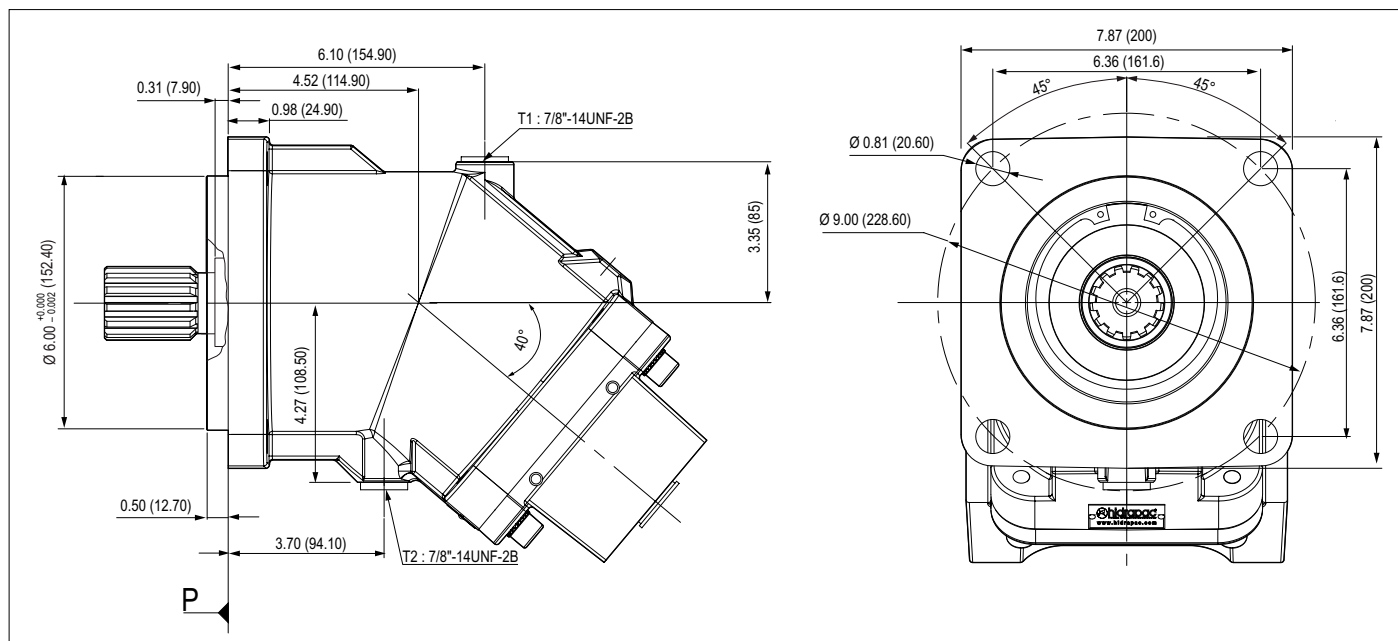


A2MS - 108 cc (SAE C) - 4 Bolt

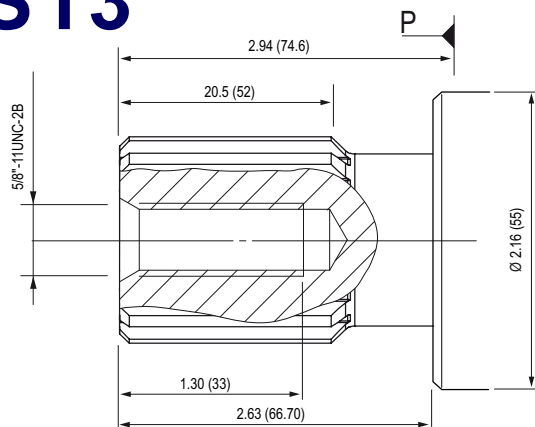




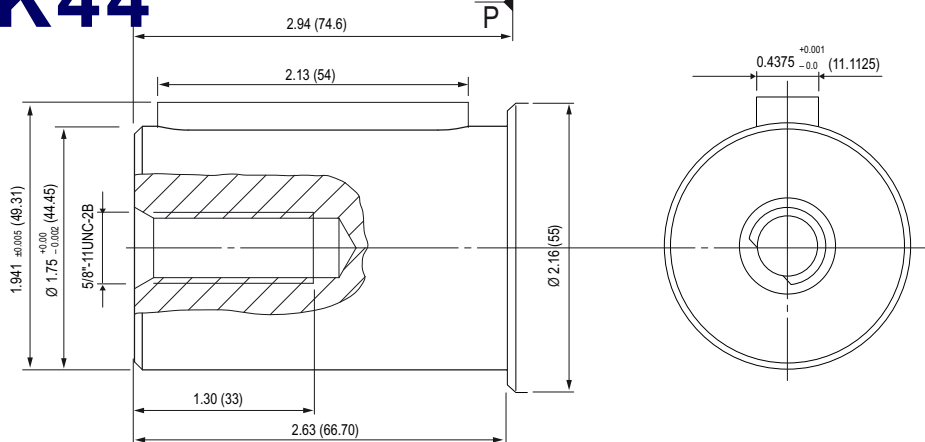
A2MS - 108 cc (SAE D) - 4 Bolt



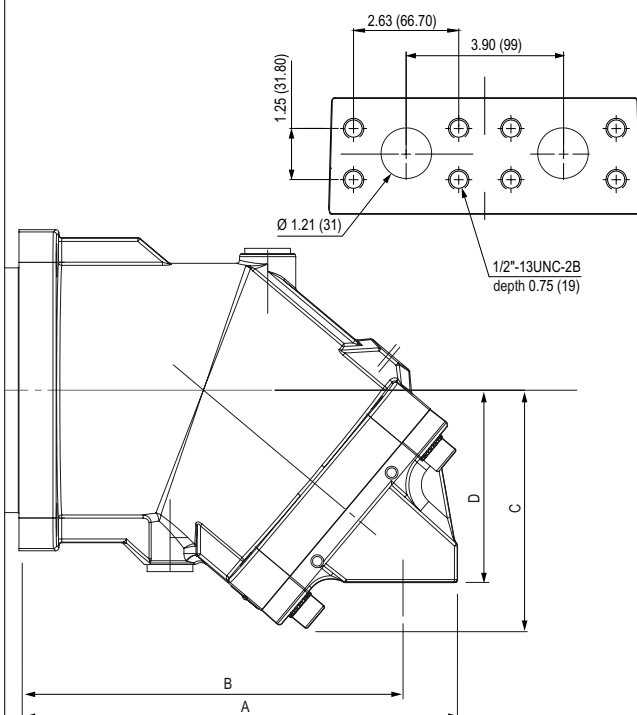
S13 Splined shaft 13T 8/16DP 1 3/4"



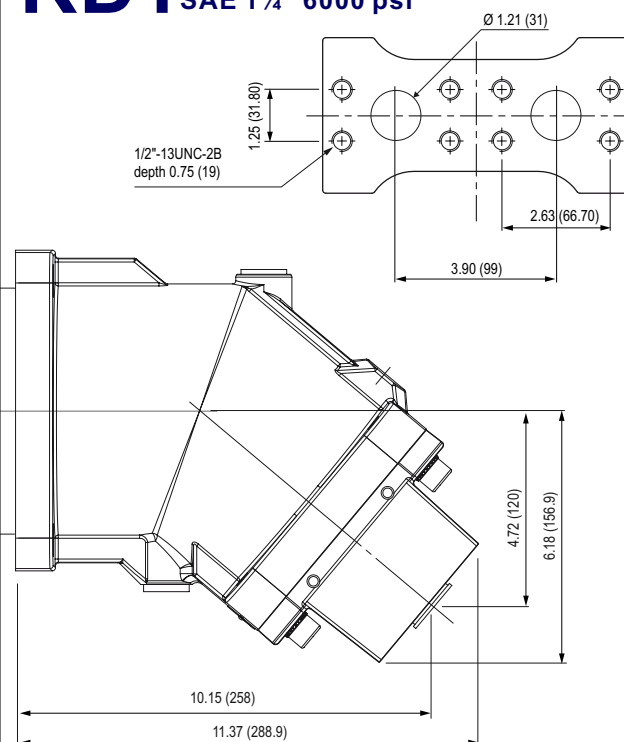
K44 Cylindrical keyed shaft Ø 1 3/4"



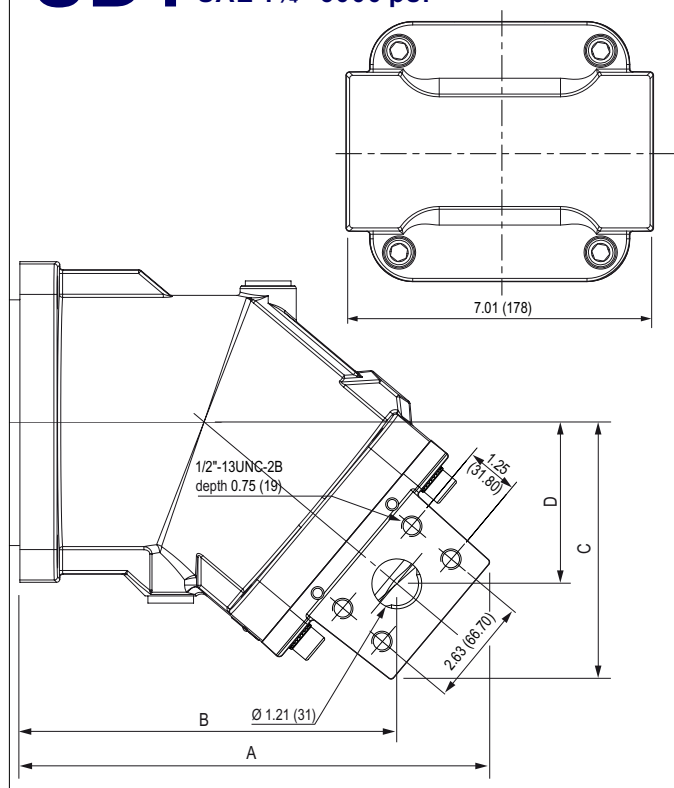
R45 SAE flange ports, rear SAE 1 1/4" 6000 psi



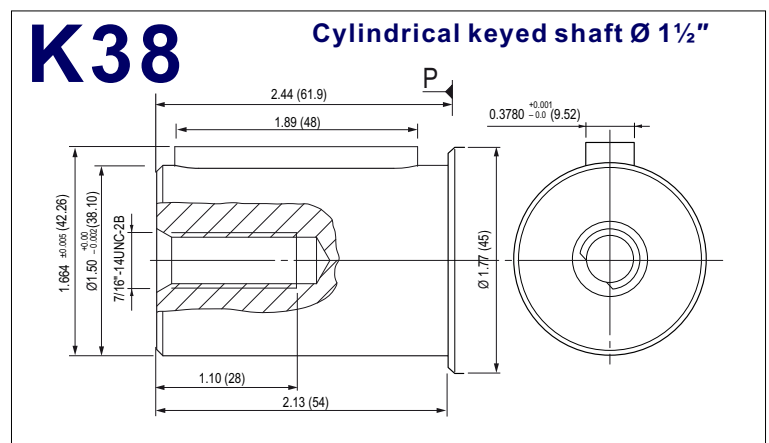
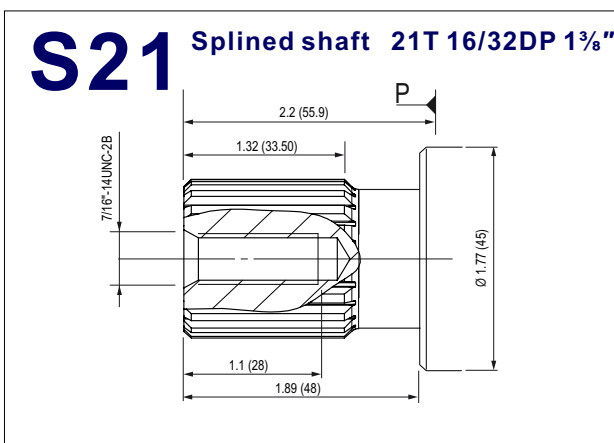
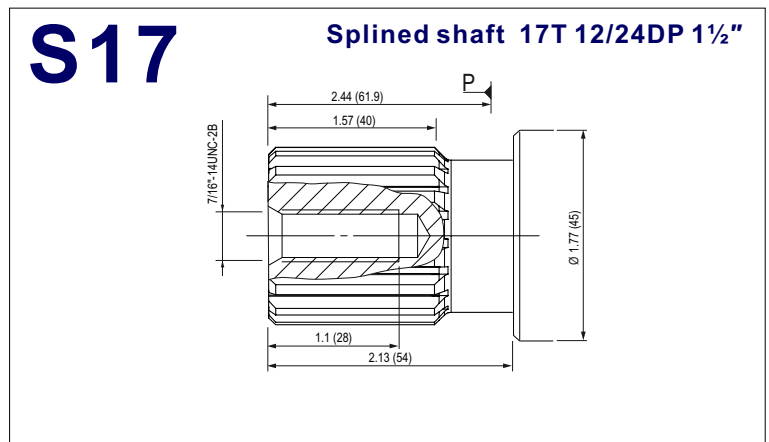
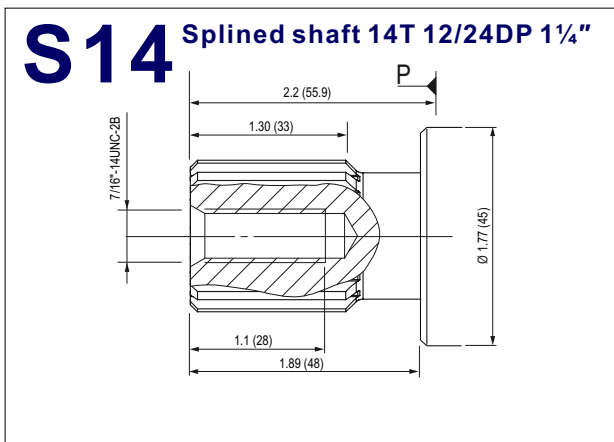
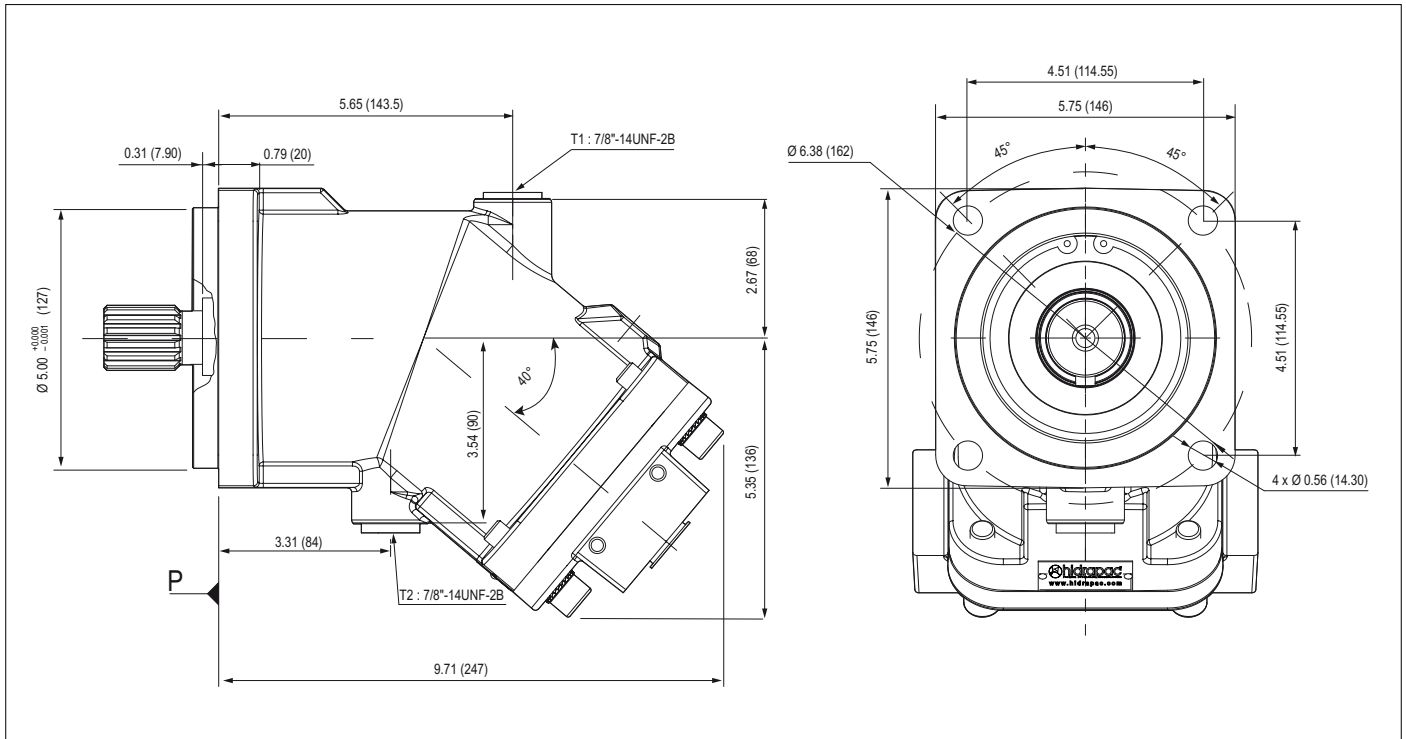
RD1 SAE flange ports, bottom SAE 1 1/4" 6000 psi



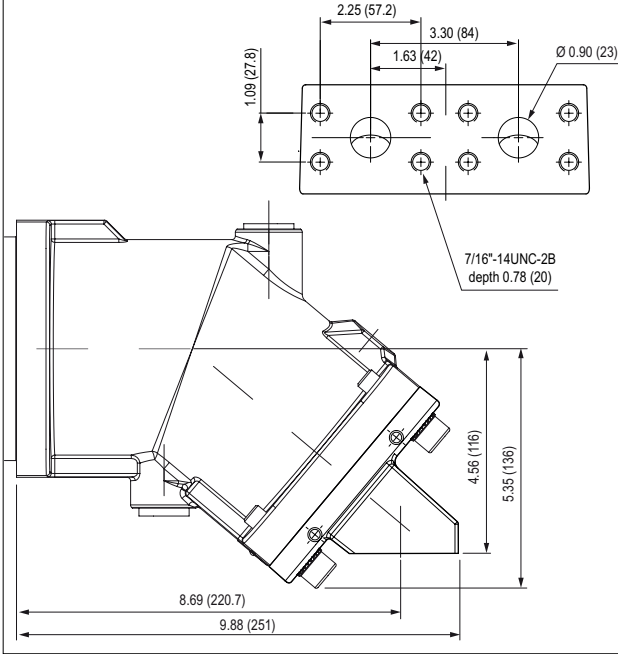
SD1 SAE flange ports, side A and B SAE 1 1/4" 6000 psi



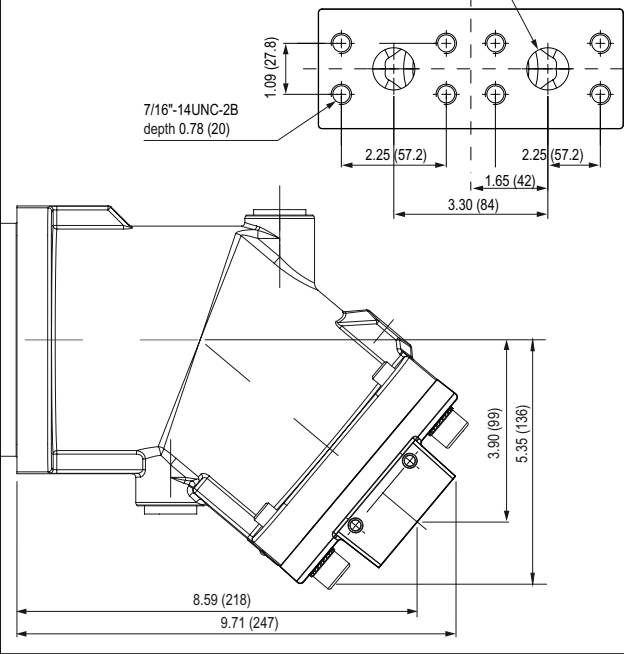
A2MS - 125 cc (SAE C) - 4 Bolt



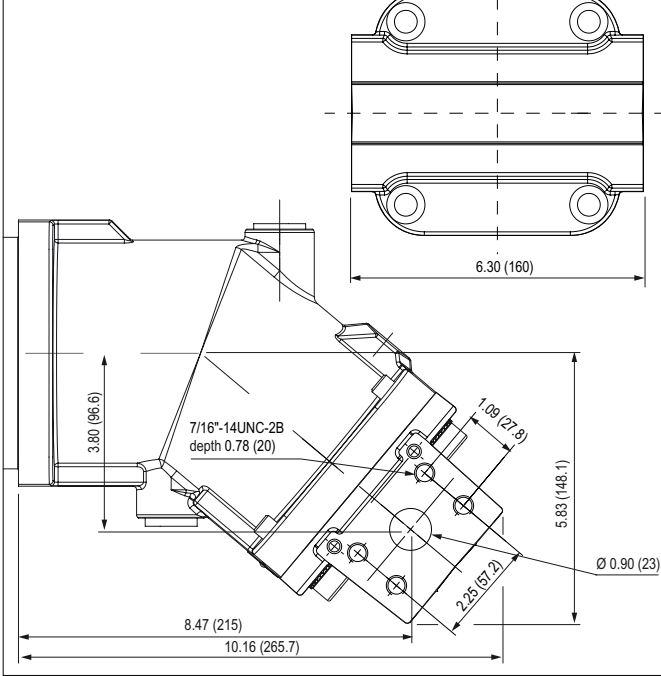
R45 SAE flange ports, bottom
SAE 1" 6000 psi



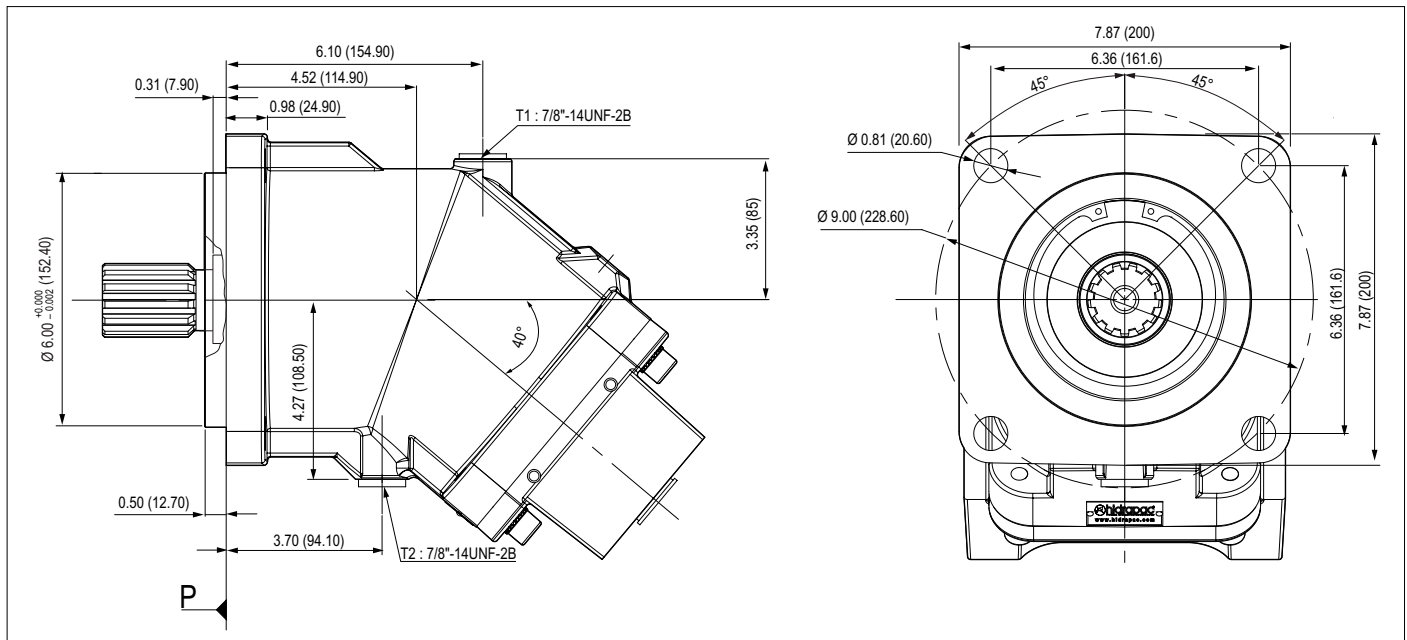
RD1 SAE flange ports, rear
SAE 1" 6000 psi



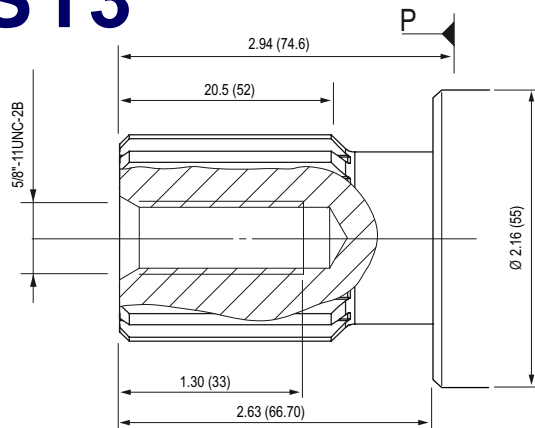
SD1 SAE flange ports, side A and B
SAE 1" 6000 psi



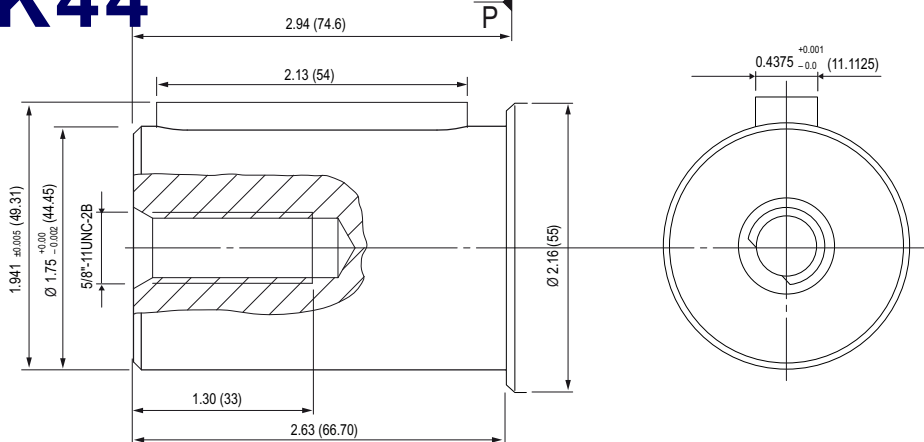
A2MS - 125 cc (SAE D) - 4 Bolt



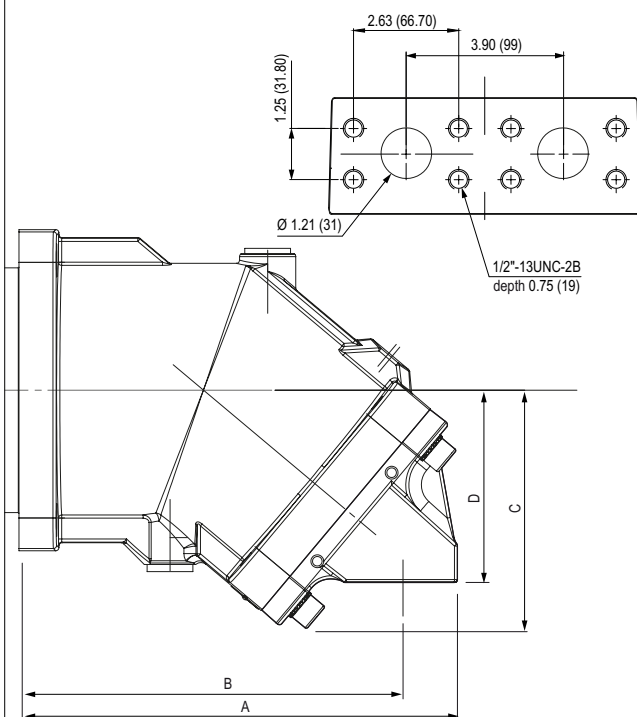
S13 Splined shaft 13T 8/16DP 1 3/4"



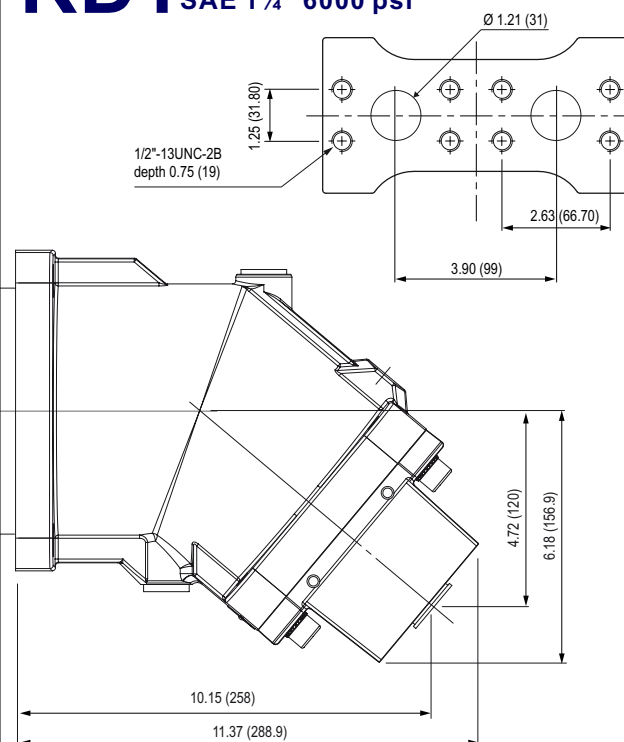
K44 Cylindrical keyed shaft Ø 1 3/4"



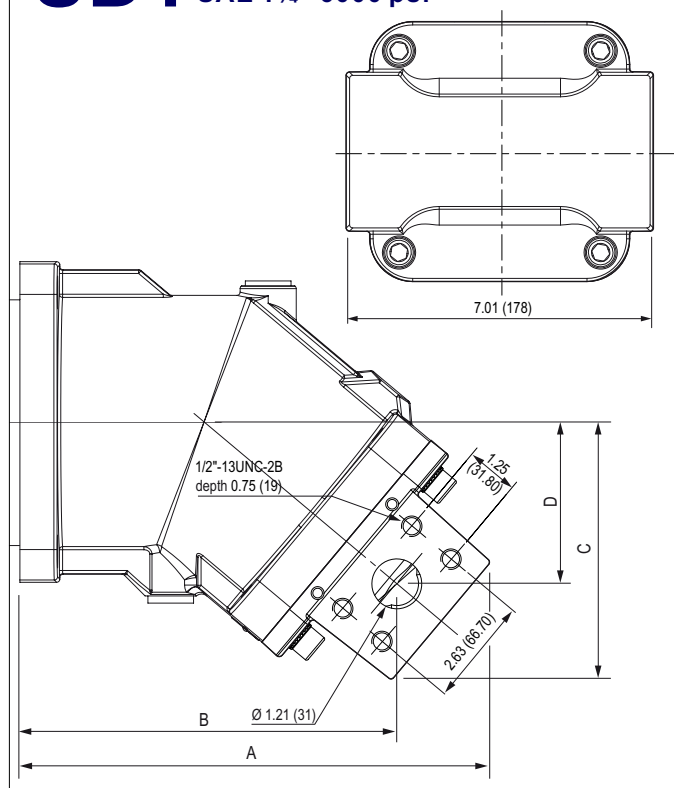
R45 SAE flange ports, rear SAE 1 1/4" 6000 psi



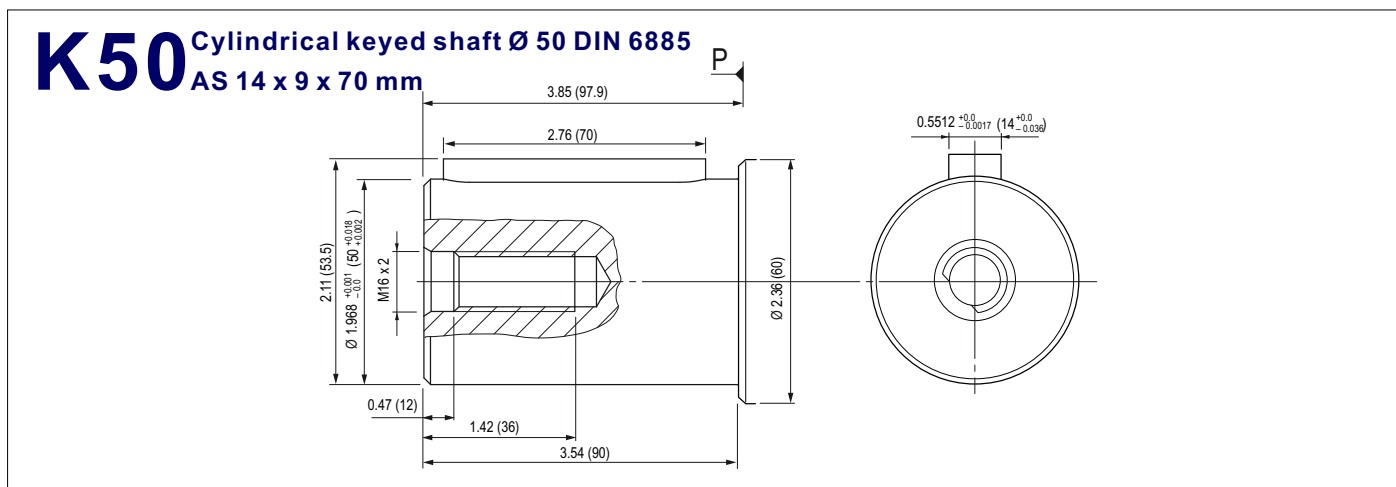
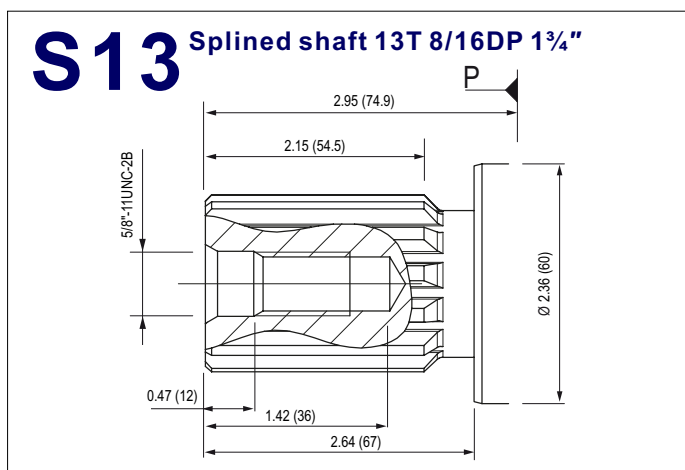
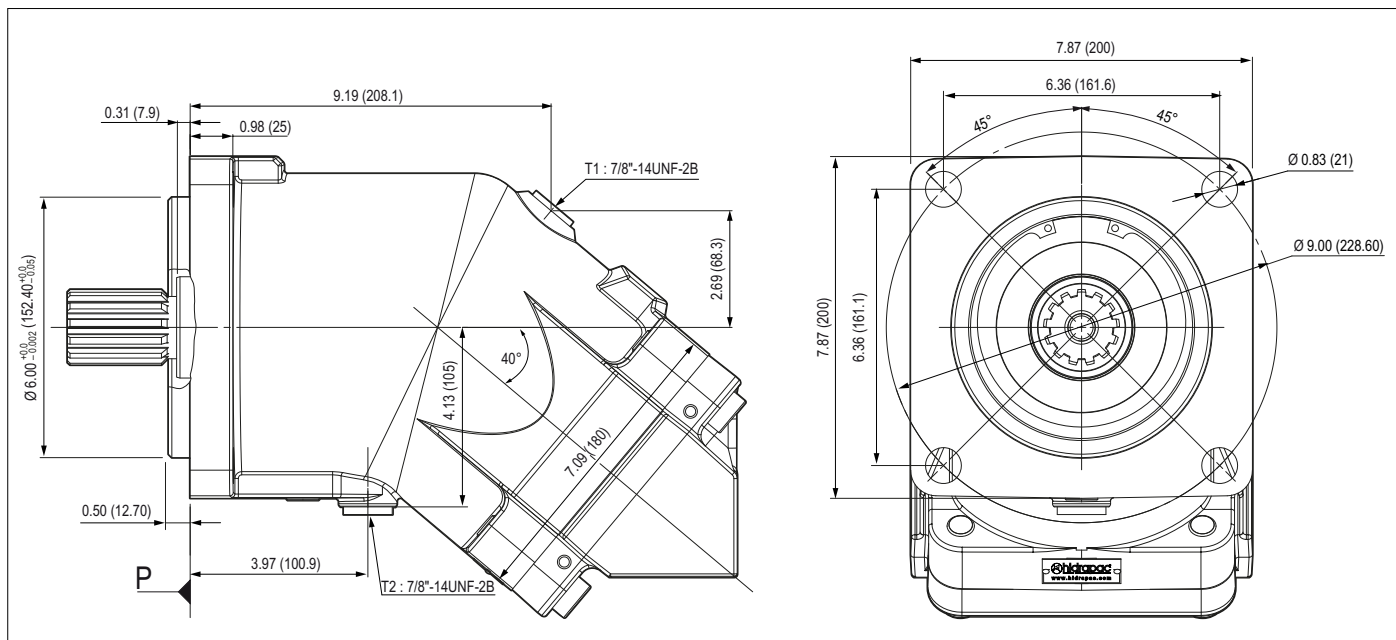
RD1 SAE flange ports, bottom SAE 1 1/4" 6000 psi



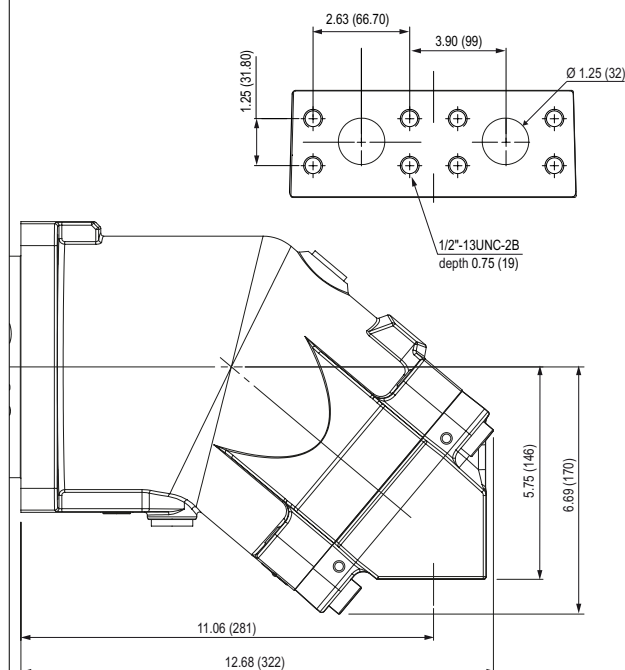
SD1 SAE flange ports, side A and B SAE 1 1/4" 6000 psi



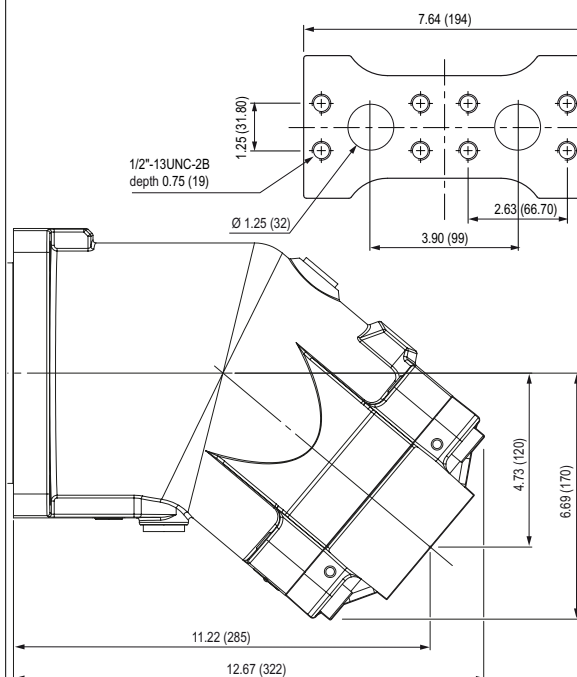
A2MS - 160 cc (SAE D) - 4 Bolt



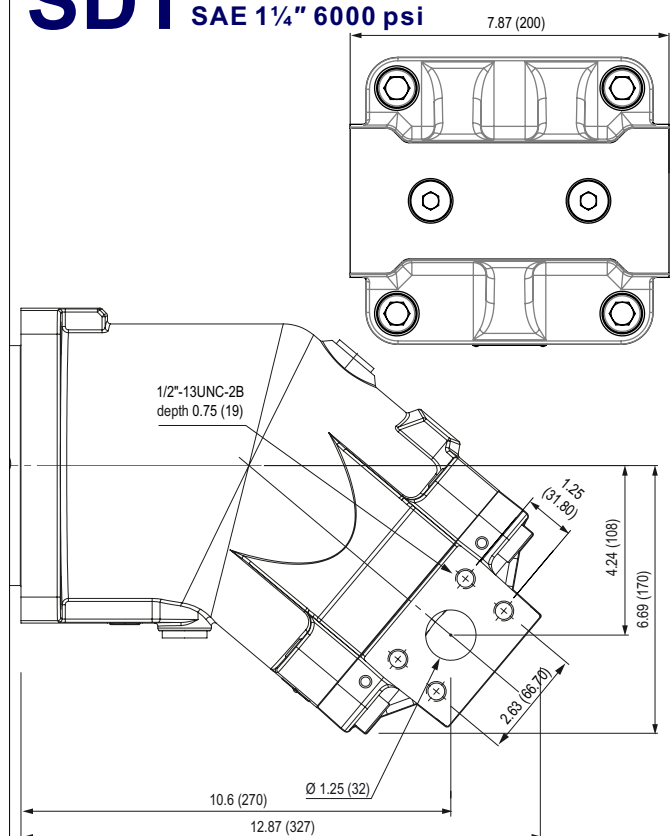
R45 SAE flange ports, rear SAE 1 1/4" 6000 psi



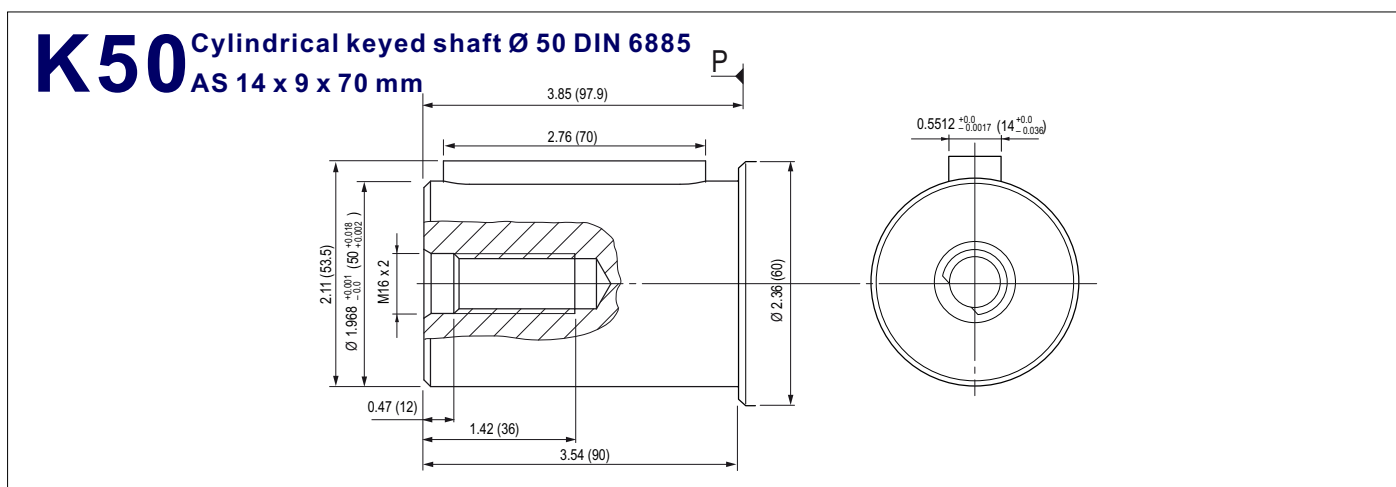
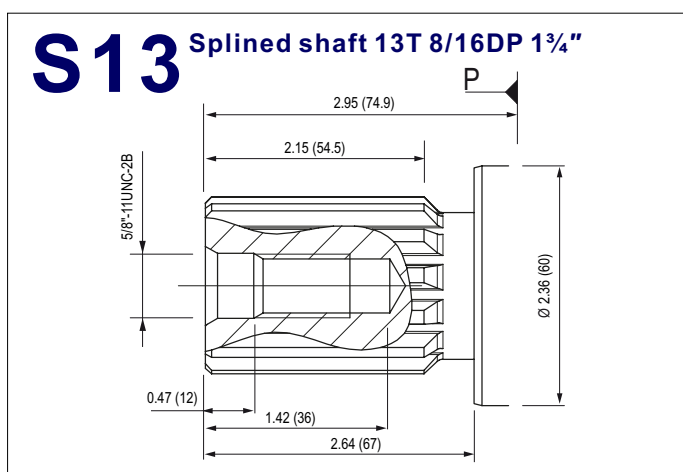
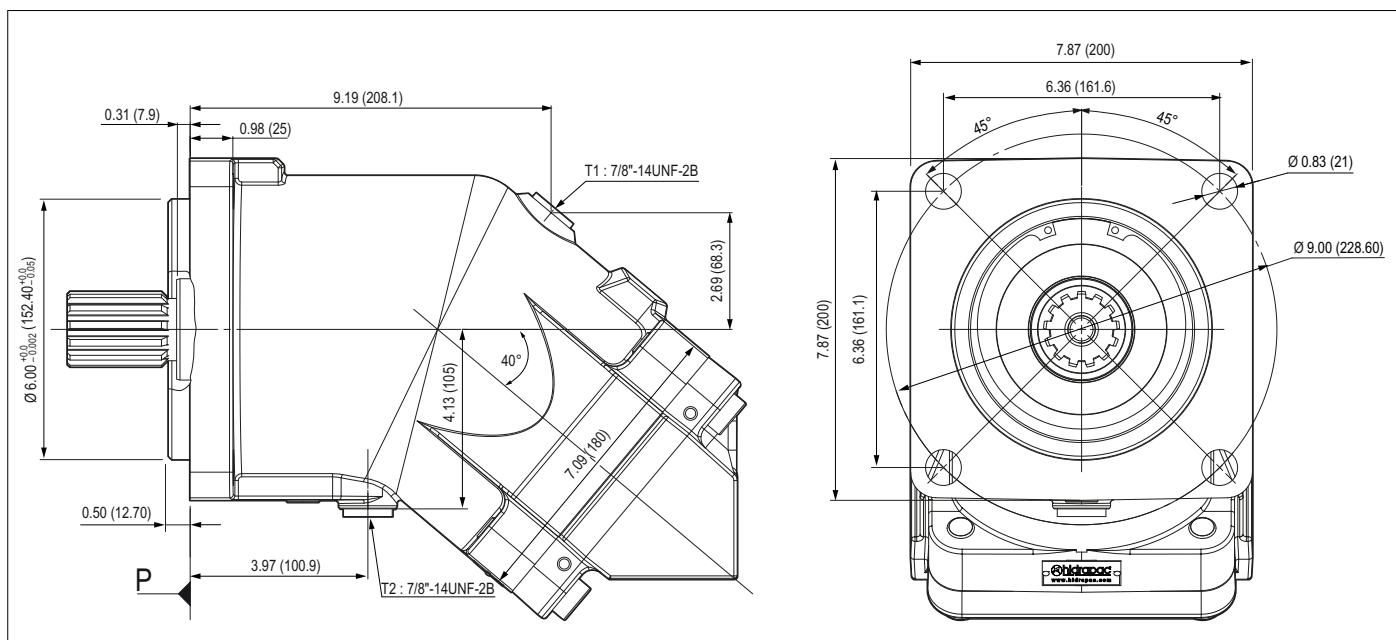
RD1 SAE flange ports, bottom SAE 1 1/4" 6000 psi



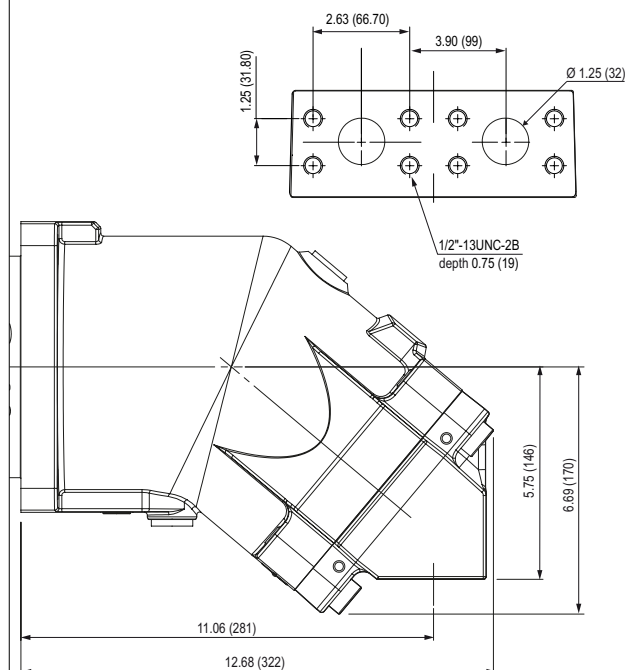
SD1 SAE flange ports, side A and B SAE 1 1/4" 6000 psi



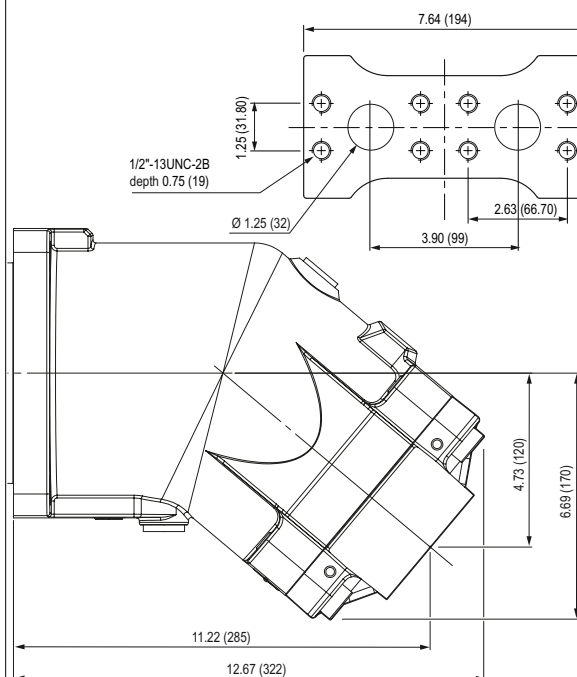
A2MS - 180 cc (SAE D) - 4 Bolt



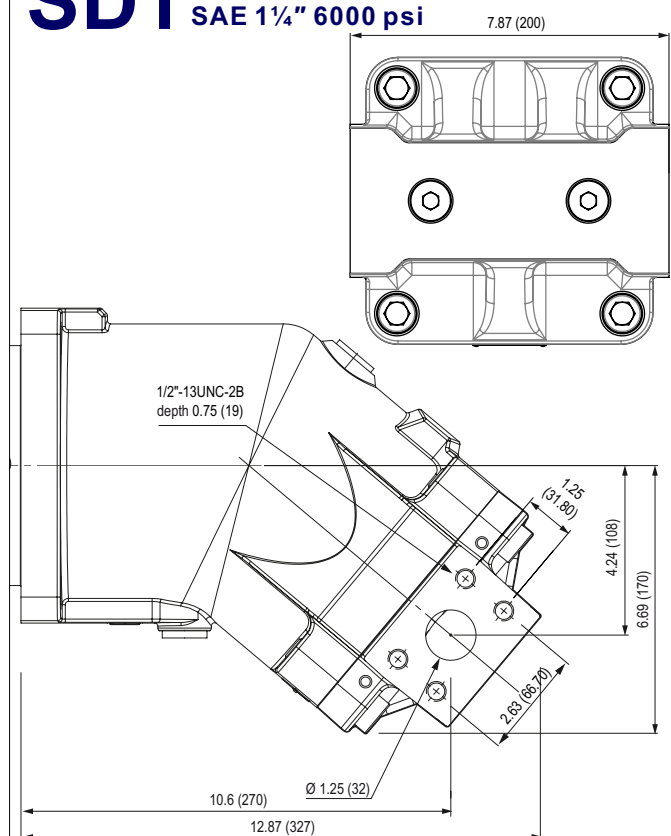
R45 SAE flange ports, rear SAE 1 1/4" 6000 psi



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

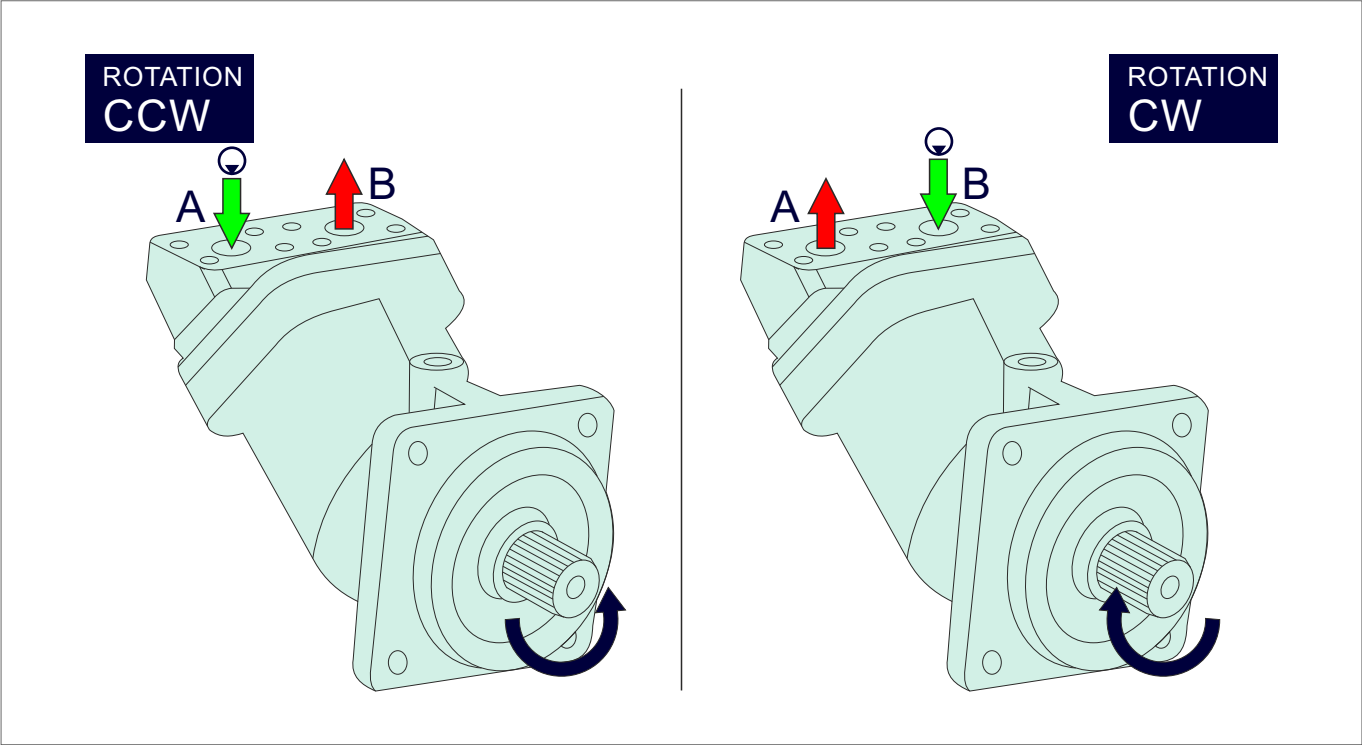


SD1 SAE flange ports, side A and B SAE 1 1/4" 6000 psi



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	$Displmnt\ (in.^3 / rev.) = Flow\ Rate\ (GPM) \times 231 / Pump\ RPM$	$CIPR = GPM \times 231 / RPM$
Pump Torque	T	Torque = Horsepower $\times 63025 / RPM$	$T = 63025 \times HP / RPM$
		Torque = Pressure (PSIG) $\times$ Pump Displacement (CIPR) / 2π	$T = P \times CIPR / 6.28$

- 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.

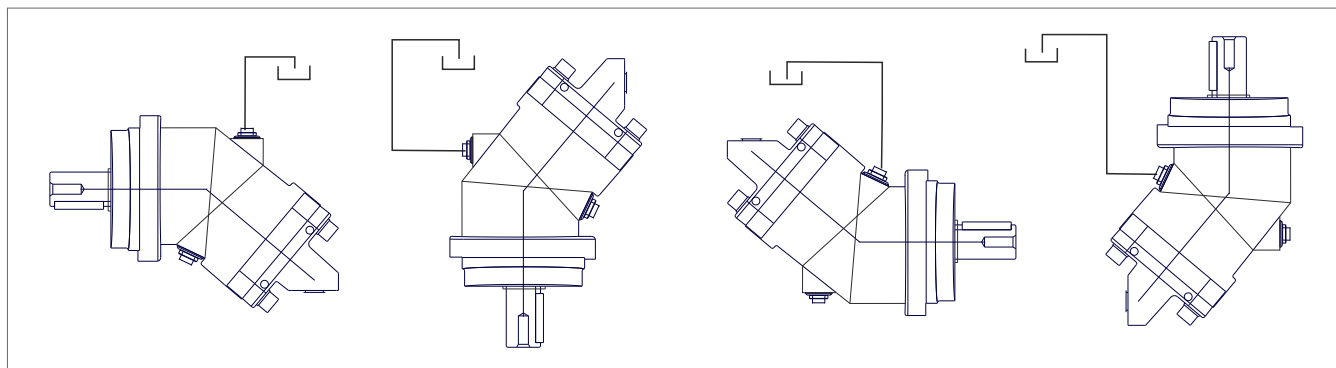
DIRECTION OF ROTATION

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.

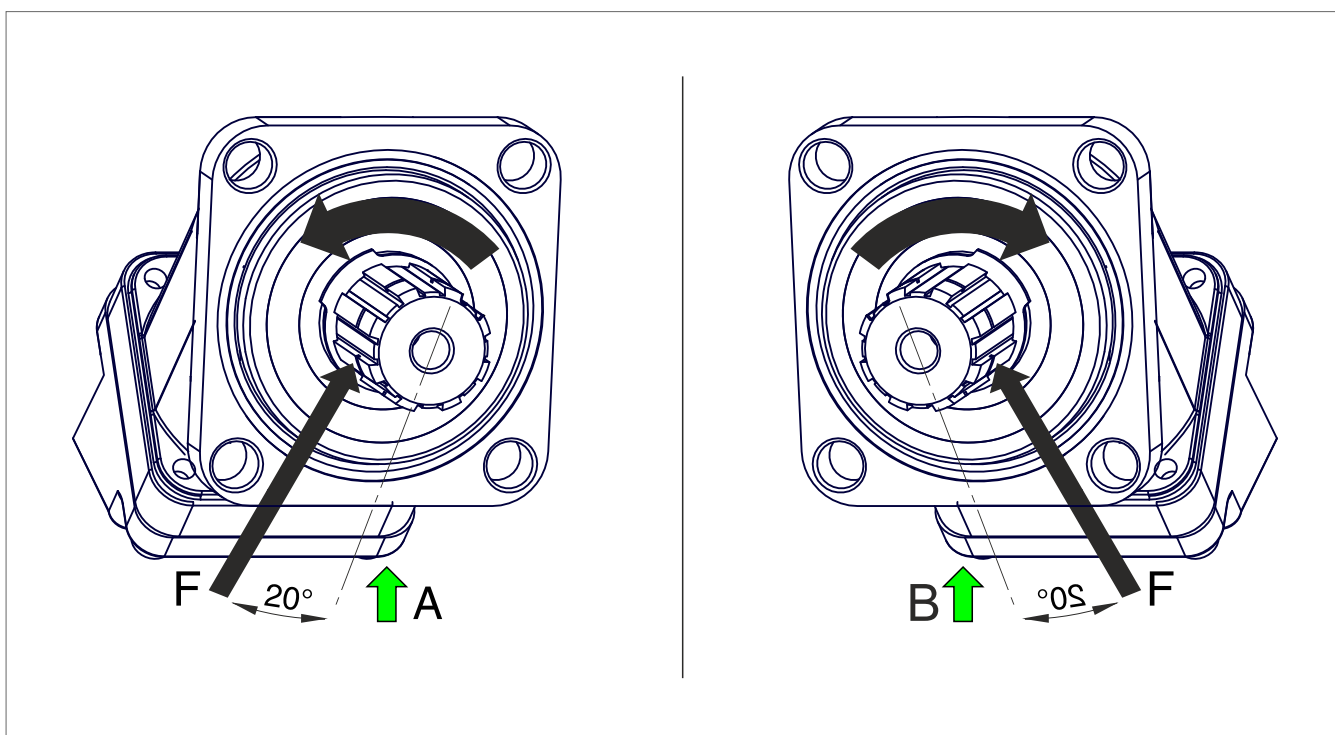


HYDRAULIC FLUID

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

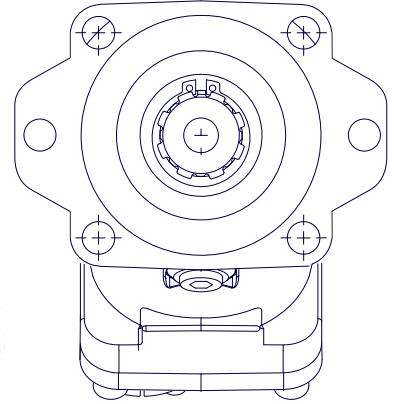
$$P = \frac{2\pi \cdot M \cdot n}{60000} = \frac{M \cdot n}{9549} = \frac{Q \cdot \Delta p \cdot \eta_t}{600} \text{ (kw)}$$

Speed

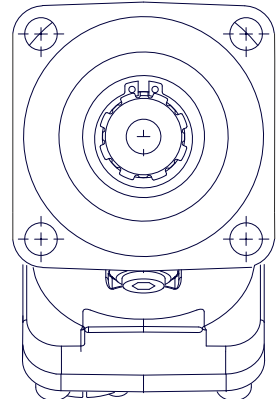
$$n = \frac{1000 \cdot Q \cdot \eta_v}{V_s} \text{ (rpm)}$$

- V_s = Displacement (ccm/rev.)
 p = Diff. pressure (bar)
 n = Speed (rpm)
 Q = Flow (lpm)
 η_v = Volumetric efficiency
 η_{mh} = Mechanical-hydraulic efficiency
 η_t = Total efficiency ($\eta_t = \eta_v \times \eta_{mh}$)

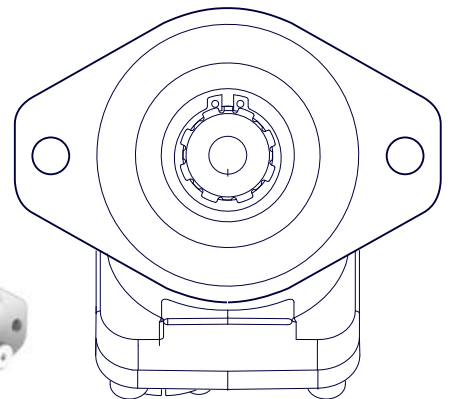
SAE B 6 Bolt Version



SAE C 4 Bolt Version



SAE B 2 Bolt Version



Hydraulic Pumps



K2FA (DIN)

BENT AXIS PISTON PUMPS



K2FL (DIN)

ALUMINUM BODY
BENT AXIS PISTON PUMPS



A2FD (DIN)

DUAL FLOW
BENT AXIS PISTON PUMPS



A2FO (ISO)

BENT AXIS PISTON PUMPS



A2FS (SAE)

BENT AXIS PISTON PUMPS



AXVP Series

VARIABLE DISPLACEMENT
PISTON PUMPS



A3PP Series

AXIAL PISTON PUMPS



A3PH Series

HIGH PRESSURE
PISTON PUMPS



ByPass Valve

FOR
BENT AXIS PISTON PUMPS



LS Adapters

FOR
VARIABLE PISTON PUMPS

Hydraulic Motors



K2FM (DIN)

BENT AXIS PISTON MOTORS



A2FM (ISO)

BENT AXIS PISTON MOTORS



A2MS (SAE)

BENT AXIS PISTON MOTORS



A2FE (FixedPlug)

BENT AXIS PISTON MOTORS



Anti Cavitation

VALVE
BENT AXIS PISTON MOTORS

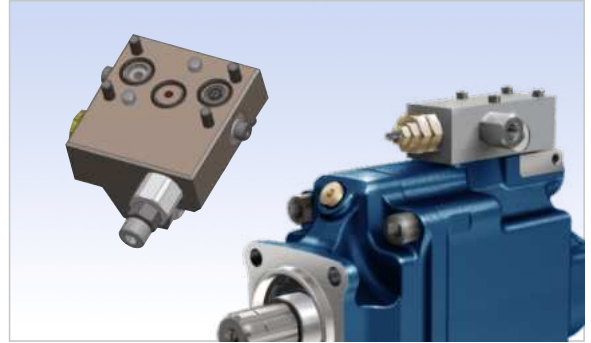
ByPass Valve

for Bent Axis Piston Pumps



LS Adapter

for Variable Displacement Piston Pump



Suction Fittings

for Bent Axis Piston Pumps



Flushing Valve

for Bent Axis Piston Motors



Adapter

for Bent Axis Piston Pumps



Flange, Couplar

for Bent Axis Piston Pumps



Hydraulic Pumps, Hydraulic Motors

Bent Axis Hydraulic Piston Pumps, Bent Axis Piston Motors,
Dual Flow Hydraulic Piston Pumps, Variable Displacement Piston Pumps,
High Pressure Piston Pumps, Straight Axial Piston Pumps..



Address;

HIDRAPAC HYDRAULIC PUMP & MOTORS

Address; (PRODUCTION)

Fevzicakmak Mah. Sila Cad. Kobisan 3 San. Sit.
No: 73 / C Karatay – Konya, PO Code; 42050, Turkiye

Address; (ASSEMBLE, SHIPMENT)

Fevzicakmak Mah. Sila Cad. Kobisan 3 San. Sit.
No: 71 / AD Karatay – Konya, PO Code; 42050, Turkiye

Phone; +90 551 111 77 44