SCM 010-130 SAE

SCM 010-130 SAE is a range of robust axial piston motors especially suitable for mobile hydraulics.

SCM 010-130 SAE is of the bent-axis type with spherical pistons. The design results in a compact motor with few moving parts, high starting torque and high reliability. It covers the entire displacement range 0.59 - 7.93 cu in/rev. at a maximum pressure of 5800 psi. It features double tapered roller bearings, which permits high shaft loads and gives superb speed performance. The high level of reliability is based on the choice of materials, hardening methods, surface structures and the quality assured manufacturing process. Sunfab also offers a two-bolt flange, SAE B2 010-034 in the SCM family.

Other advantages:

- High maximum speed
- Smooth operation over the entire speed range
- Available in many different configurations of shafts and connections
- High efficiency
- Speed sensor available as option
- Suitable for applications with high angular accelerations due to its high rotary stiffness

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Versions, main data

Example

SC	M	-	012	W	-	P	-	SB4	-	B13	-	S3	U	-	1	00
Line	1		2	3		4		5		6		7	8		9	10

Line

SC	Sunfab Compact, bent-axis design

1. Type

M	Motor

2. Displacement

010	012	017	025	034	040	047	056	064	084	090	108	130

3. Direction of rotation

W	Independent

4. Shaft seal

P	FPM

For low temperature applications, below -13 °F please contact Sunfab.

5. Mounting flange

SAE J-744		010	012	017	025	034	040	047	056	064	084	090	108	130
SB2	SAE B-2 hole	X	X	X	X	X	-	-	-	-	-	-	-	-
SB4	SAE B-4 hole	X	X	X	X	X	-	-	-	-	-	-	-	-
SC4	SAE C-4 hole	-	-	-	X	X	X	X	X	X	X	X	X	-
SD4	SAE D-4 hole	-	-	-	-	-	-	-	-	-	X	X	X	X

- = Not available
X = Standard, preferred

6. Shaft

		010	012	017	025	034	040	047	056	064	084	090	108	130
Spline ANSI B92.1 30° Class 5														
B13	13T 16/32***	X	X	X	X	X	-	-	-	-	-	-	-	-
C14	14T 12/24*	-	-	-	X	X	X	X	X	X	X	(X)	(X)	-
C21	21T 16/32*	-	-	-	-	-	X	X	X	X	X	X	X	-
D13	13T 8/16**	-	-	-	-	-	-	-	-	-	X	X	X	X
Key SAE J744														
B22	ø 22.22	X	X	X	-	-	-	-	-	-	-	-	-	-
B25	ø 25.4***	X	X	X	X	X	-	-	-	-	-	-	-	-
C32	ø 31.7*	-	-	-	-	-	X	X	X	X	(X)	(X)	(X)	-
D44	ø 44.45**	-	-	-	-	-	-	-	-	-	X	X	X	X

*Only with SC4 mounting flange
**Only with SD4 mounting flange
***Only with SB2/SB4 mounting flange

- = Not available
X = Standard, preferred
(X) = Limited maximum pressure, contact Sunfab

7. Connection cover

		010	012	017	025	034	040	047	056	064	084	090	108	130
S1	40° Mount flange vertical*	-	-	-	-	-	-	-	-	-	X	X	X	X
S2	40° Mount flange horizontal*	-	-	-	X	X	X	X	X	X	-	-	-	-
S3	40° Threaded connection	X	X	X	X	X	-	-	-	-	-	-	-	-
V1	90° Mount flange vertical*	-	-	-	-	-	-	-	-	-	X	X	X	X
V2	90° Mount flange horizontal*	-	-	-	X	X	X	X	X	X	X	X	X	X
R1	Side connections, flanged*	-	-	-	X	X	X	X	X	X	X	X	X	X
K3	Combicover 90° side conn. thread	X	X	X	X	X	-	-	-	-	-	-	-	-

*According to SAE J518 code 62

8. Connections

		010	012	017	025	034	040	047	056	064	084	090	108	130
G	ISO G*	X	X	X	X	X	-	-	-	-	-	-	-	-
M	Metric **	-	-	-	X	X	X	X	X	X	X	X	X	X
U	UN***	X	X	X	X	X	X	X	X	X	X	X	X	X

*Only threaded connections
**Only flanged connections
***Not available for K3

9. Additional

1	External drainage

10. Speed Sensor

		010	012	017	025	034	040	047	056	064	084	090	108	130
00	No Speed Sensor	X	X	X	X	X	X	X	X	X	X	X	X	X
P1	Prepared for Speed Sensor	X	X	X	X	X	X	X	X	X	X	X	X	X
S1	Fitted Speed Sensor type PNP*	X	X	X	X	X	X	X	X	X	X	X	X	X
S2	Fitted Speed Sensor type NPN*	X	X	X	X	X	X	X	X	X	X	X	X	X

*See separate brochure "Speed Sensor hall" for more information.

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SCM 010-130 SAE		010 SAE B	012 SAE B	017 SAE B	025 SAE B	025 SAE C	034 SAE B	034 SAE C	040 SAE C	047 SAE C	056 SAE C	064 SAE C	084 SAE C	084 SAE D	090 SAE C	090 SAE D	108 SAE C	108 SAE D	130 SAE D
Displacement																			
cu in/rev		0.59	0.77	1.04	1.55	1.55	2.09	2.09	2.51	2.87	3.46	3.88	5.10	5.10	5.53	5.53	6.59	6.59	7.93
Working pressure																			
psi	*max intermittent*	5800	5800	5800	5800	5800	5800	5800	5800	5800	5800	5800	5800	5800	5800	5800	5800	5800	5800
	max continuous	5075	5075	5075	5075	5075	5075	5075	5075	5075	5075	5075	5075	5075	5075	5075	5075	5075	5075
Revolutions																			
rpm	*max intermittent*	8250	8250	8250	6500	6500	6500	6500	5900	5900	5900	5900	4800	4600	4800	4600	4800	4600	4600
	max continuous	7500	7500	7500	5900	5900	5900	5900	5300	5300	5300	5300	4400	4200	4400	4200	4400	4200	4200
	min continuous	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
Max power																			
hp	*max intermittent*	55	67	94	107	107	147	147	161	181	221	241	268	255	288	275	342	328	342
	max continuous	20	27	34	54	54	74	74	80	87	107	121	134	134	148	148	174	174	181
Starting torque theoretical value																			
lb-ft/1000psi		8	10	14	20	20	27	27	33	38	45	51	68	68	73	73	87	87	104
Moment of inertia (x 10^{-3})																			
lb-ft-sec^2		0.7	0.7	0.7	0.8	0.8	0.8	0.8	1.9	1.9	1.9	1.9	4.7	5.5	4.7	5.5	4.7	5.5	5.5
Weight																			
lb		19.8	19.8	19.8	19.8	19.8	19.8	19.8	33.1	33.1	33.1	33.1	39.7	77.1	39.7	77.1	39.7	77.1	77.1

Data concerning RPM are based on maximum premitted peripheral velocity of the tapered roller bearing.
Max intermittent power data may vary dependent on application. For further information please contact Sunfab.
Continuous power data are based on maximum output power without external cooling of the motor housing.
Intermittent duty is defined as follows: max 6 seconds per minute, e g peak RPM when unloading or accelerating.

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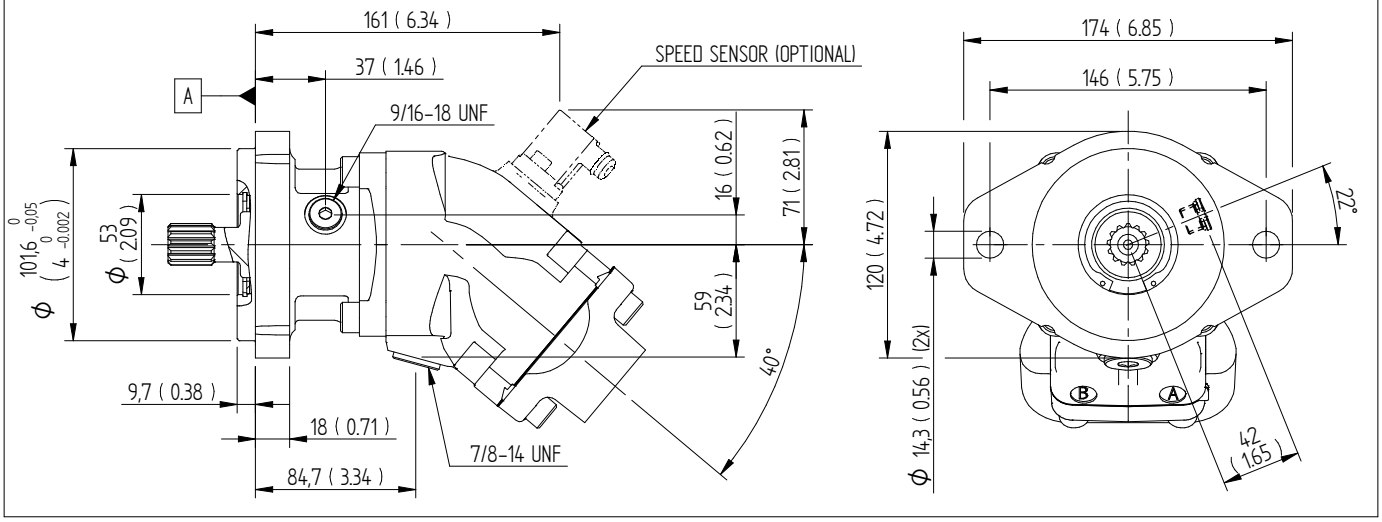
Dimensions SCM 010-034 SB2 & SB4

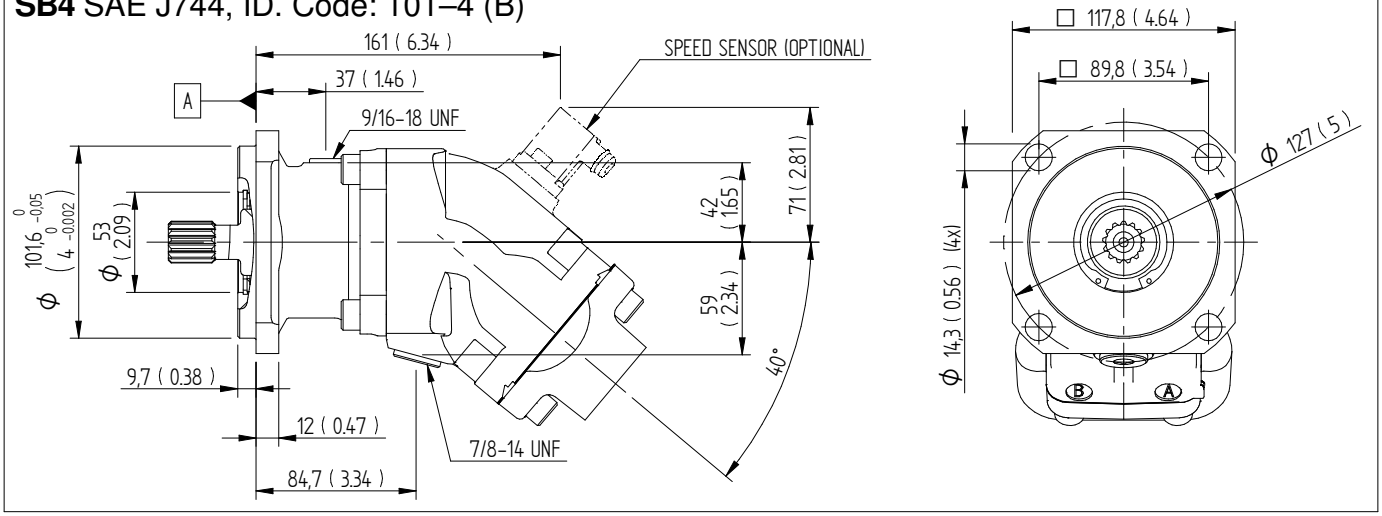
Flange & shafts

Millimeter (inch)

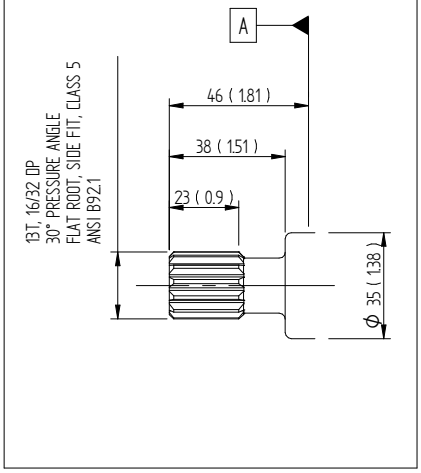
SB2 SAE J744, ID. Code: 101–2 (B)



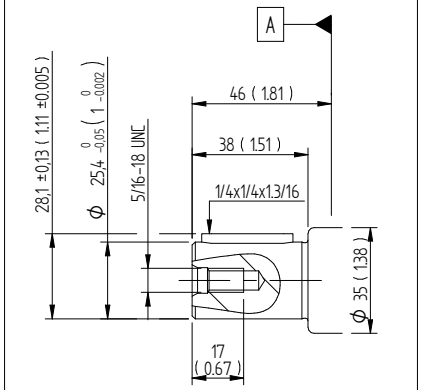
SB4 SAE J744, ID. Code: 101–4 (B)



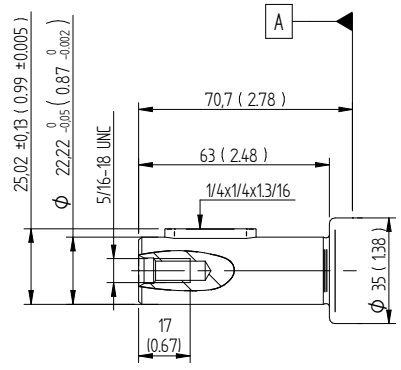
B13 SAE J744, ID. Code: 22–4 (B)



B25 SAE J744, ID. Code: 25–1 (B–B)



B22 SAE J744, ID. Code: 22–1 (B)
(010-017 ONLY)



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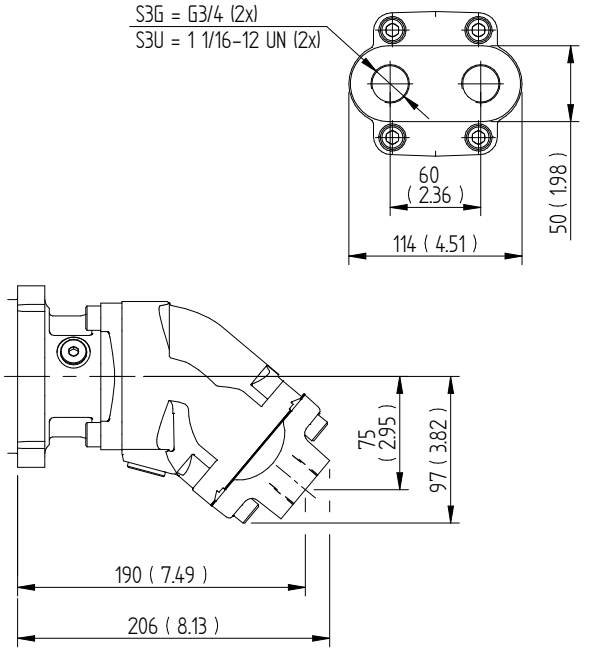
Dimensions SCM 010-034 SB2 & SB4

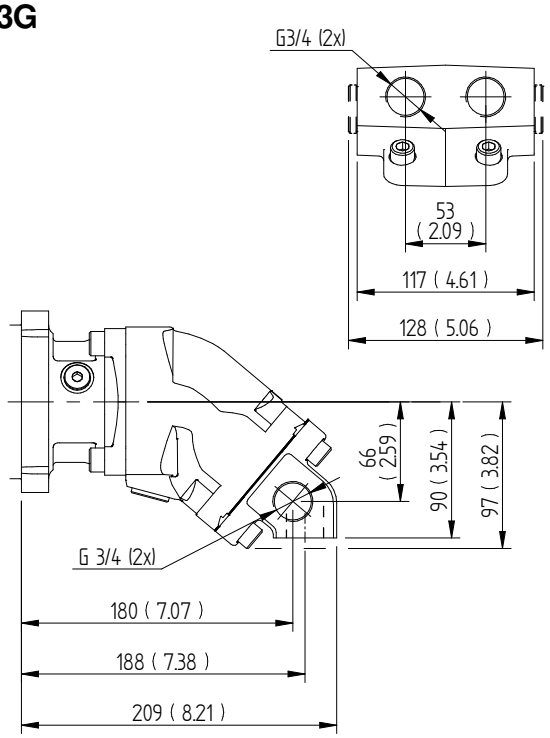
Connection cover

Millimeter (inch)

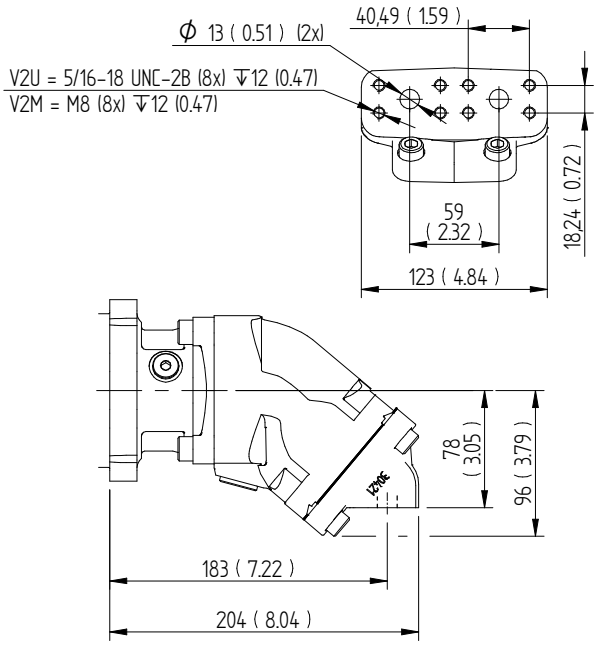
S3G/S3U



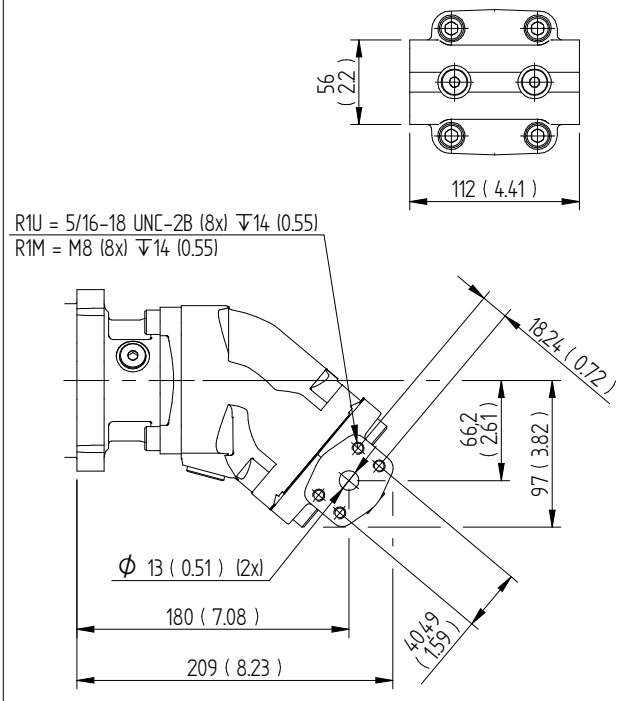
K3G



V2U/V2M 025-034 SAE J518, 1/2 in



R1U/R1M 025-034 SAE J518, 1/2 in



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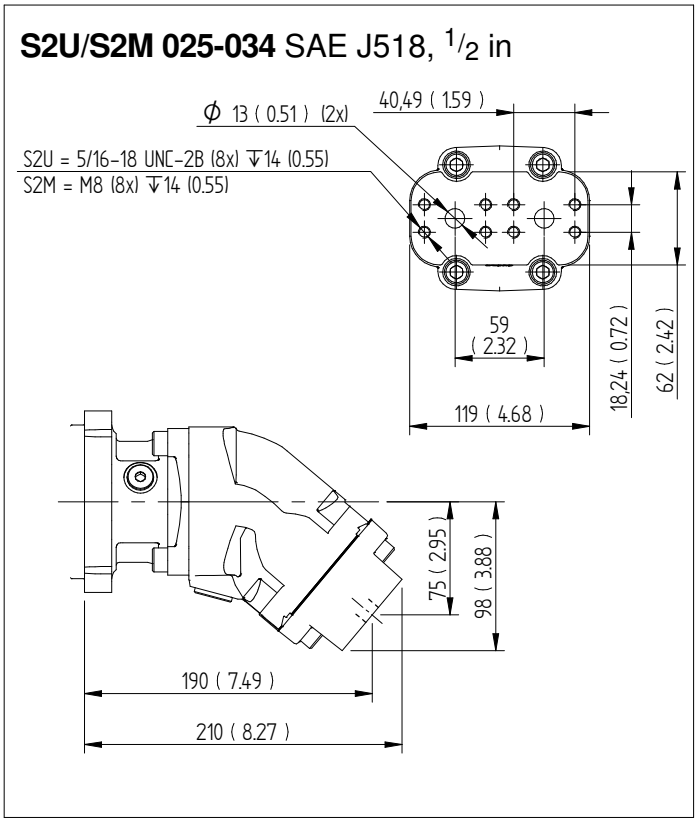
Dimensions SCM 010-034 SB2 & SB4

Connection cover

Millimeter (inch)

S2U/S2M 025-034 SAE J518, $^{1}/_{2}$ in



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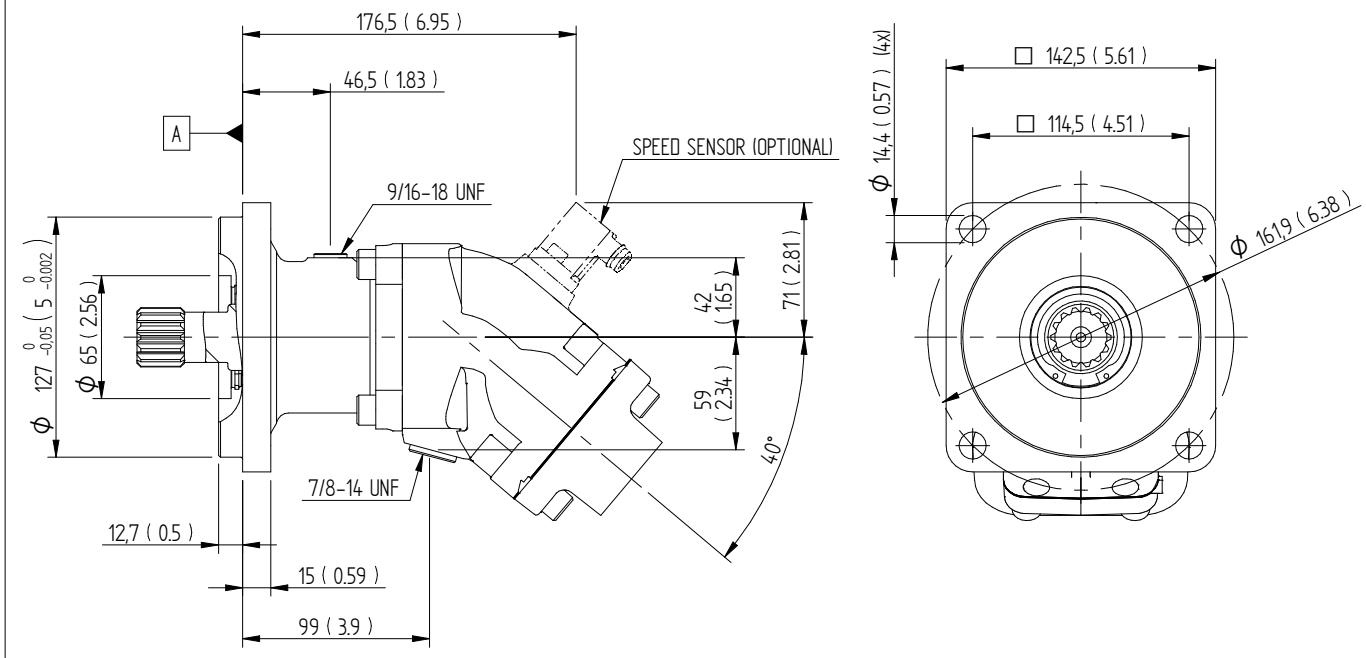
Dimensions SCM 025-034 SC4

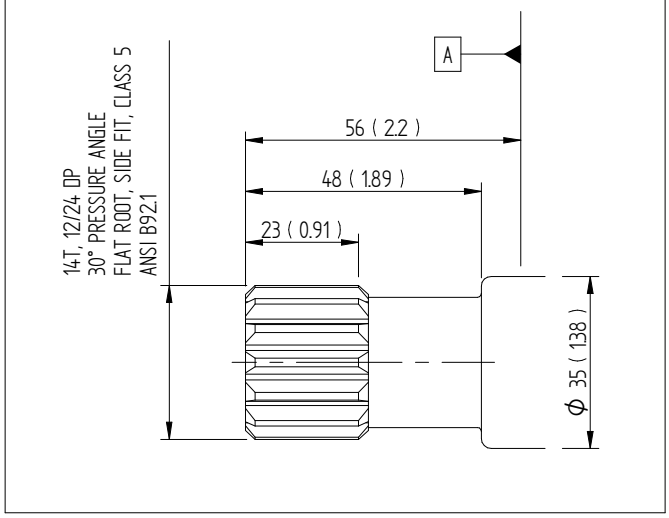
Flange & shafts

Millimeter (inch)

SC4 SAE J744, ID. Code: 127-4 (C)



C14 SAE J744, ID. Code: 32–4 (C)



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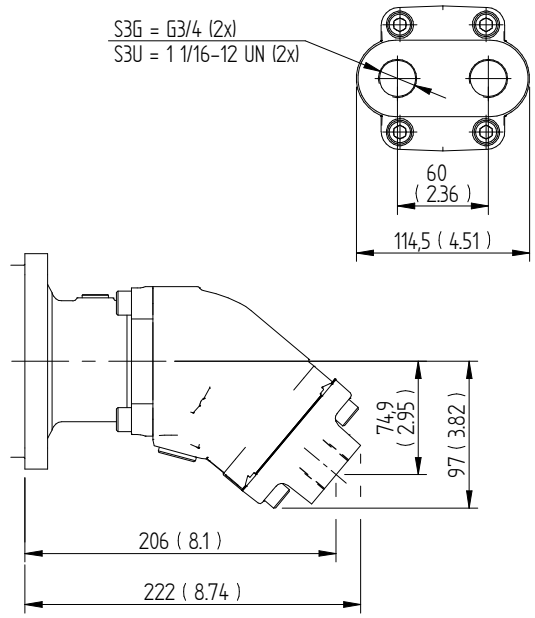
Dimensions SCM 025-034 SC4

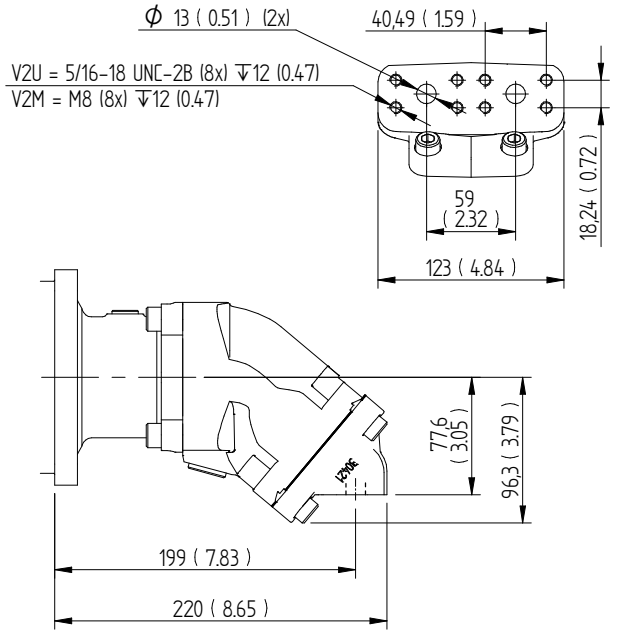
Connection cover

Millimeter (inch)

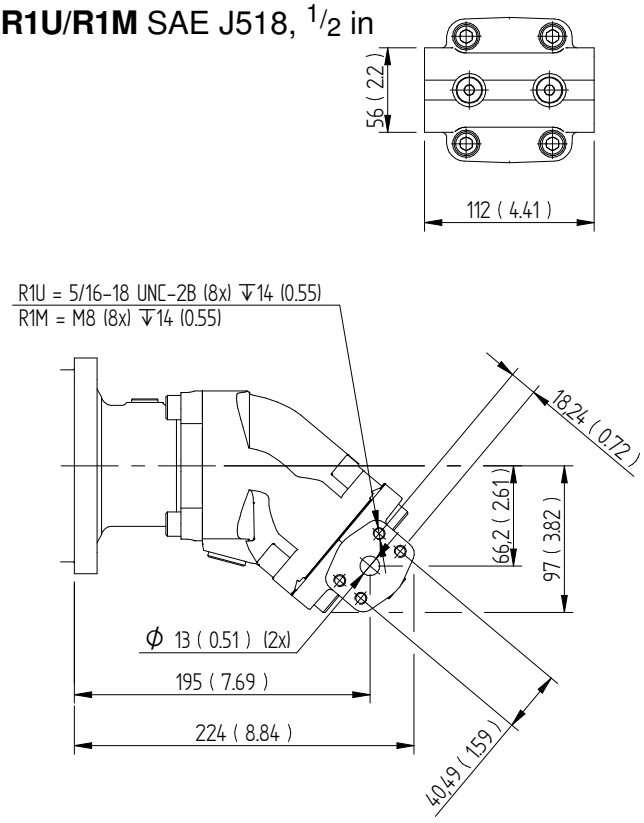
S3G/S3U



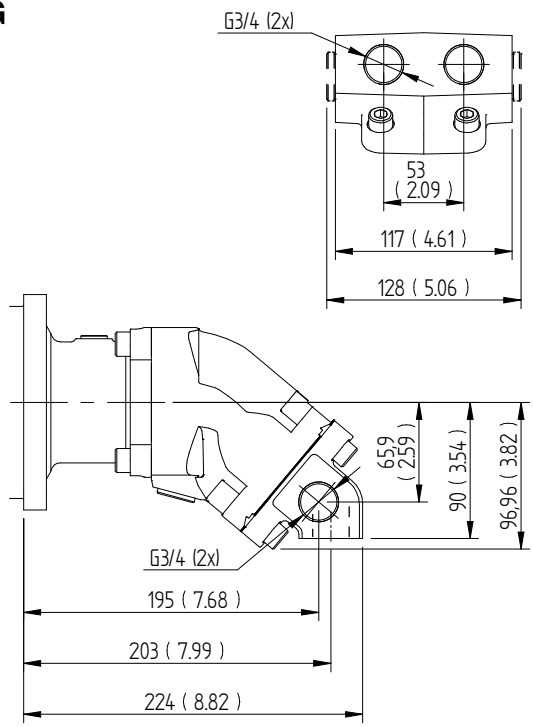
V2U/V2M SAE J518, 1/2 in



R1U/R1M SAE J518, 1/2 in



K3G



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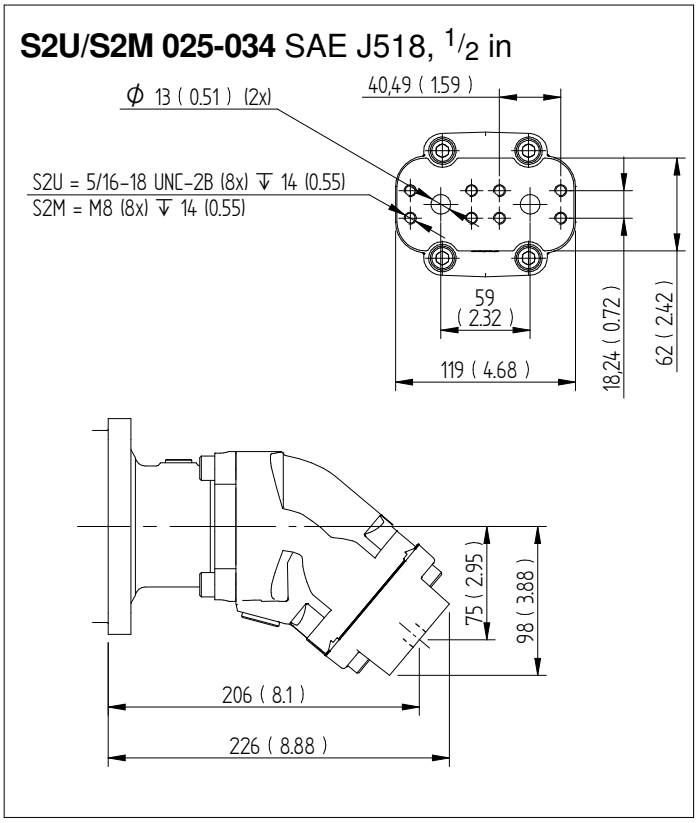
Dimensions SCM 025-034 SC4

Connection cover

Millimeter (inch)



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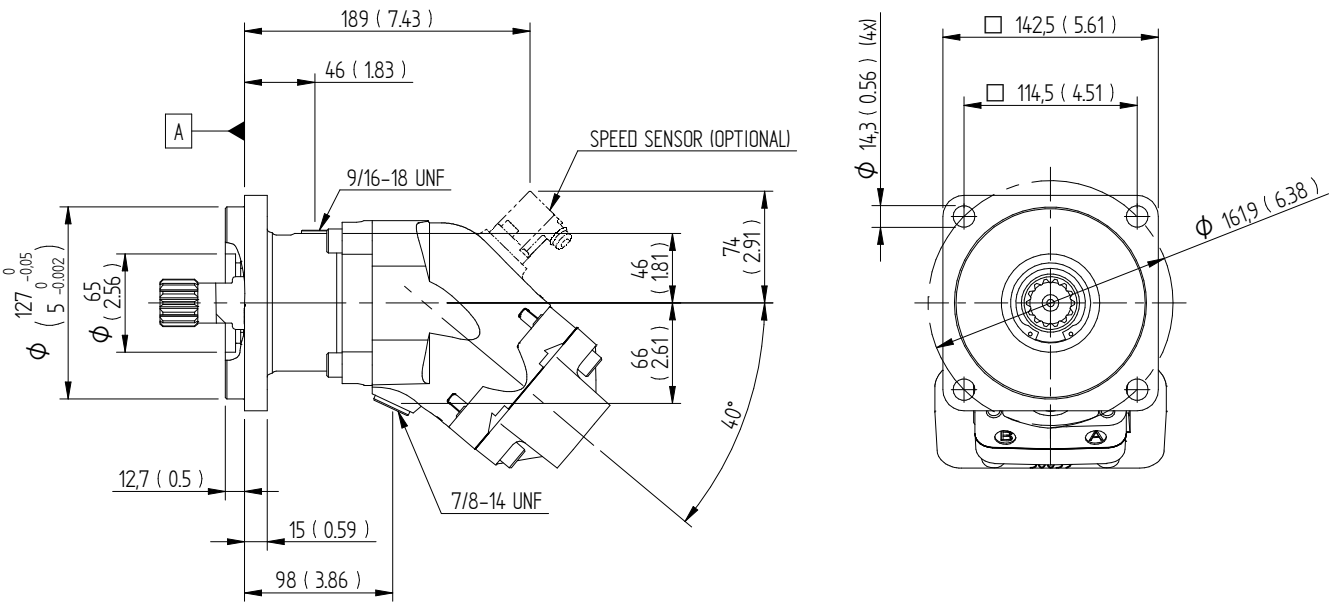
Dimensions SCM 040-064

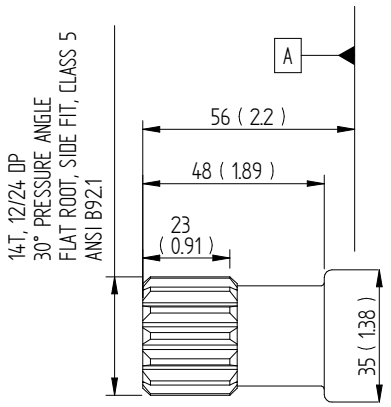
Flange & shafts

Millimeter (inch)

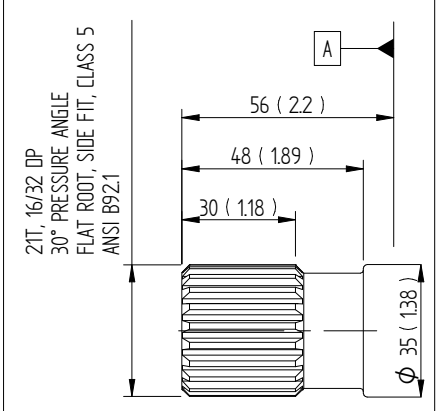
SC4 SAE J-744, ID. Code: 127-4 (C)



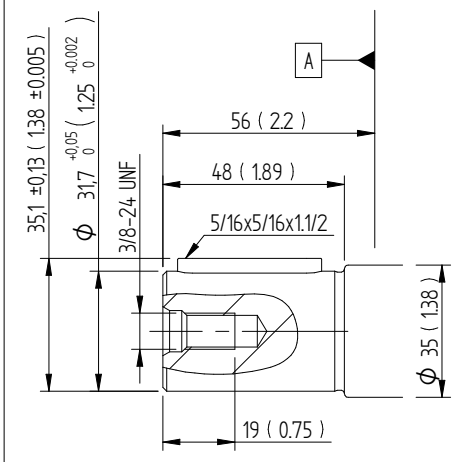
C14 SAE J744
ID. Code: 32–4 (C)



C21 SAE J744



C32 SAE J744
ID. Code: 32–1 (C)



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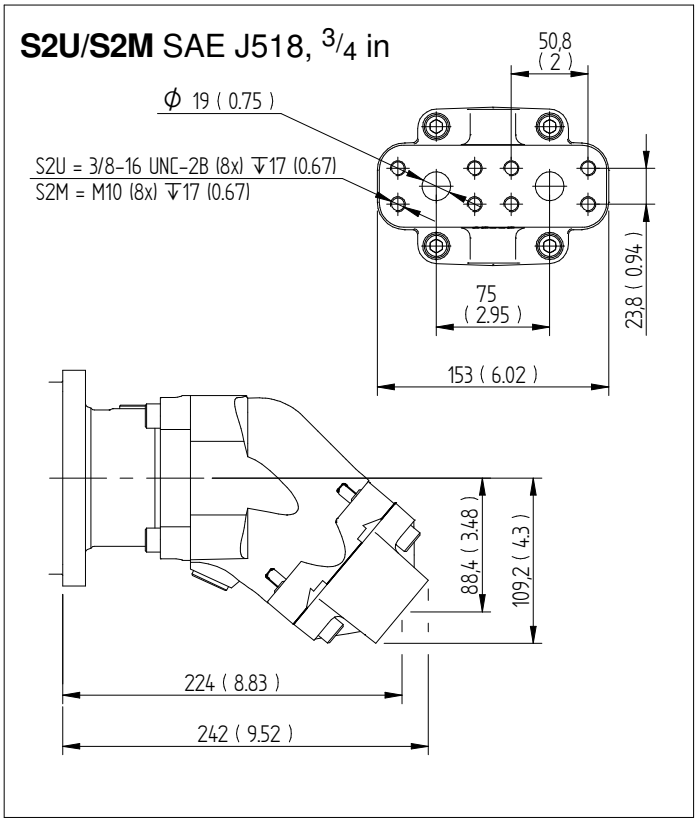
Dimensions SCM 040-064

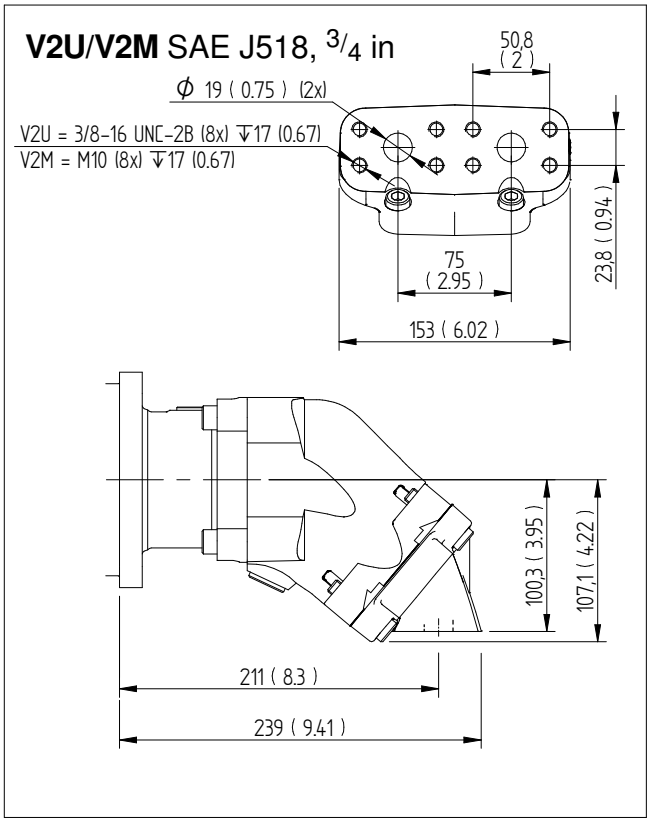
Connection cover

Millimeter (inch)

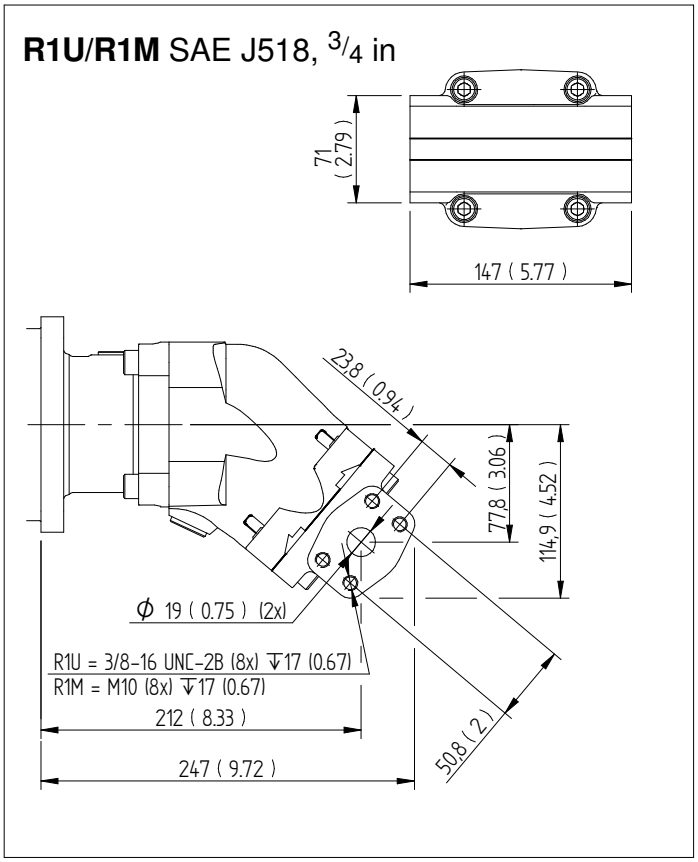
S2U/S2M SAE J518, 3/4 in



V2U/V2M SAE J518, 3/4 in



R1U/R1M SAE J518, 3/4 in



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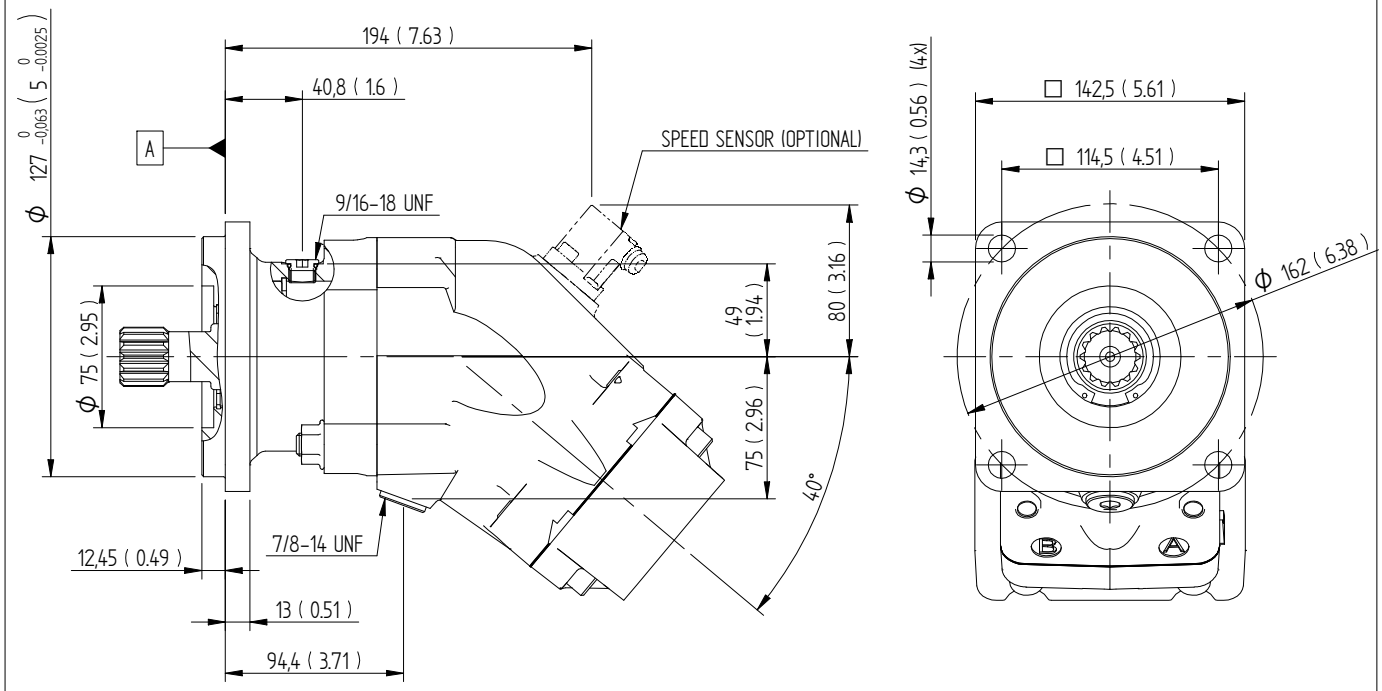
Dimensions SCM 084-108

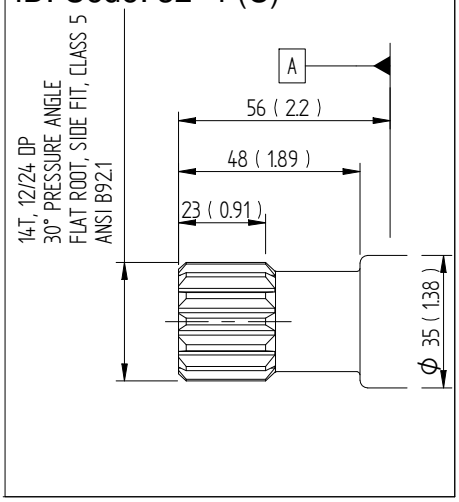
Flange & shafts

Millimeter (inch)

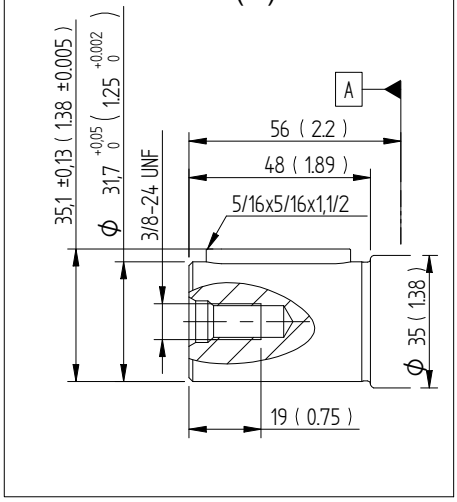
SC4 SAE J-744, ID. Code: 127-4 (C)



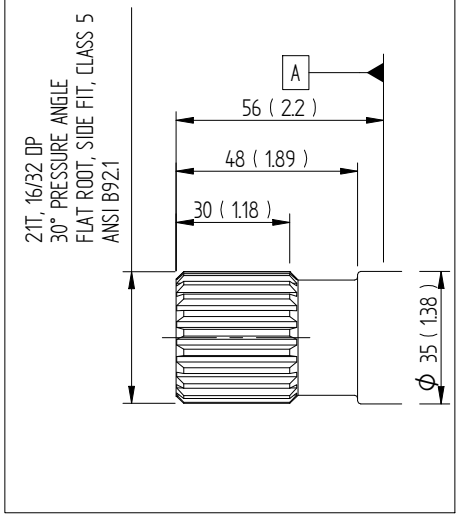
C14 SAE J744
ID. Code: 32–4 (C)



C32 SAE J744
ID. Code: 32–1 (C)



C21 SAE J744



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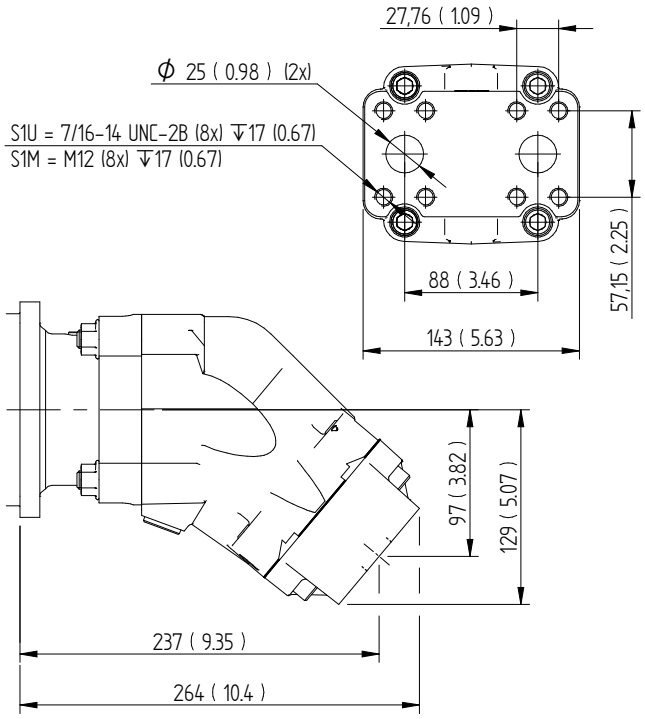
Dimensions SCM 084-108

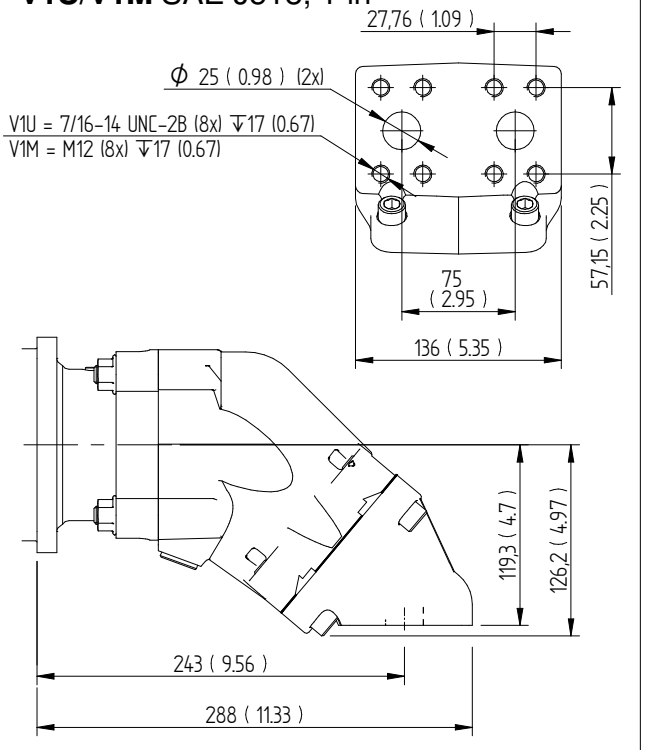
Connection cover

Millimeter (inch)

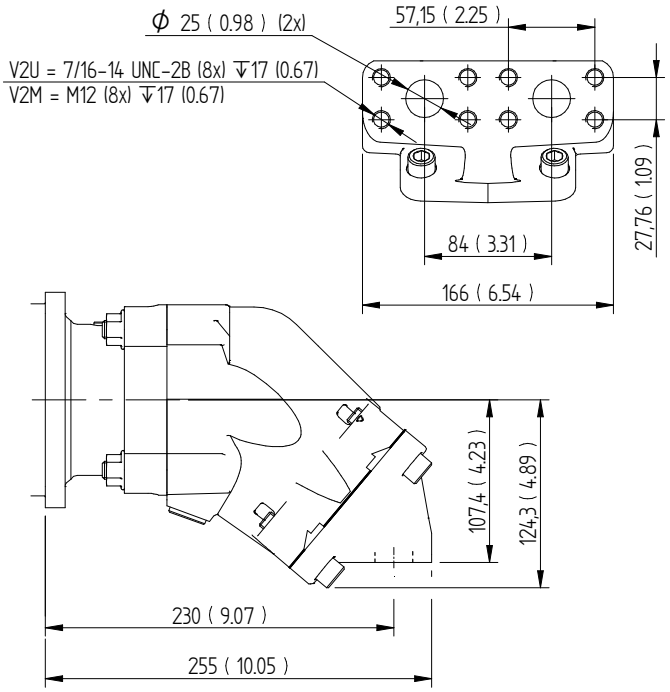
S1U/S1M SAE J518, 1 in



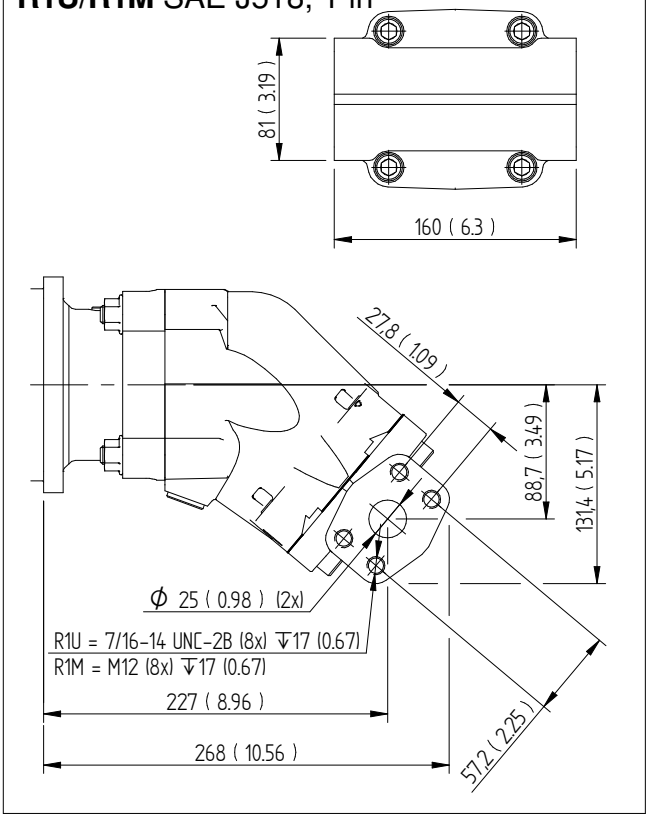
V1U/V1M SAE J518, 1 in



V2U/V2M SAE J518, 1 in



R1U/R1M SAE J518, 1 in



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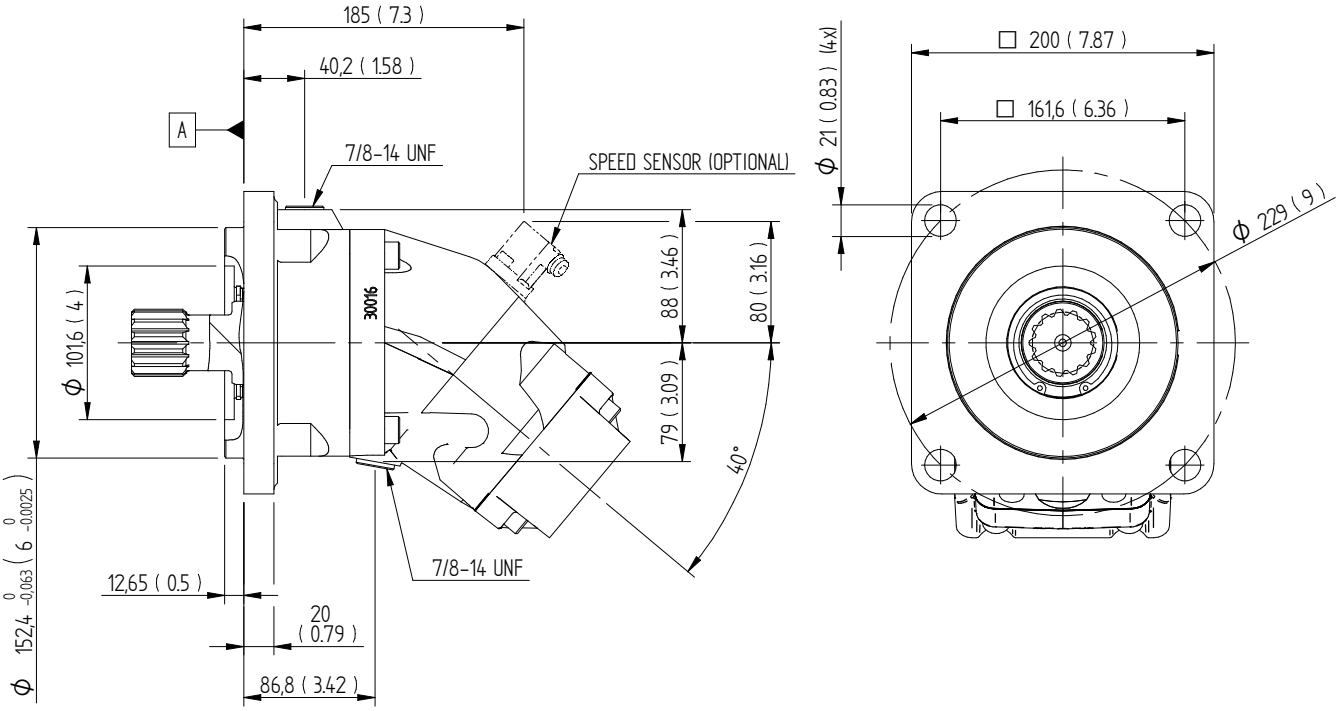
Dimensions SCM 084-130

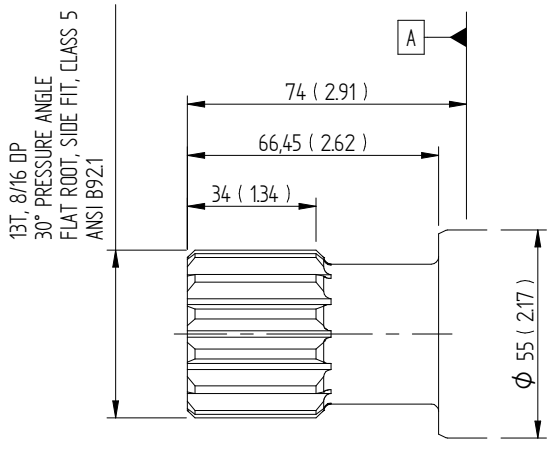
Flange & shafts

Millimeter (inch)

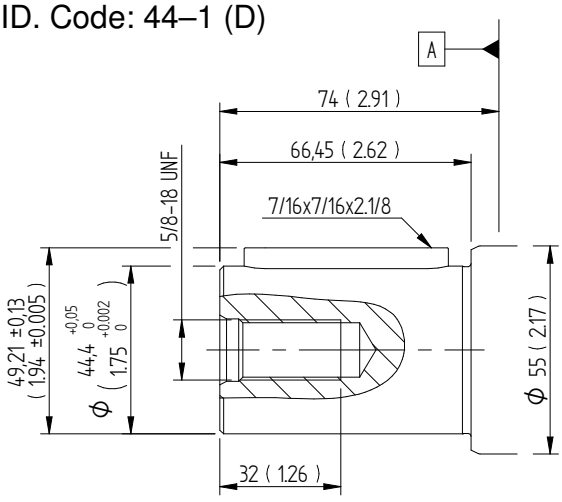
SD4 SAE J-744, ID. Code: 152-4 (D)



D13 SAE J744
ID. Code: 44–4 (D)



D44 SAE J744
ID. Code: 44–1 (D)



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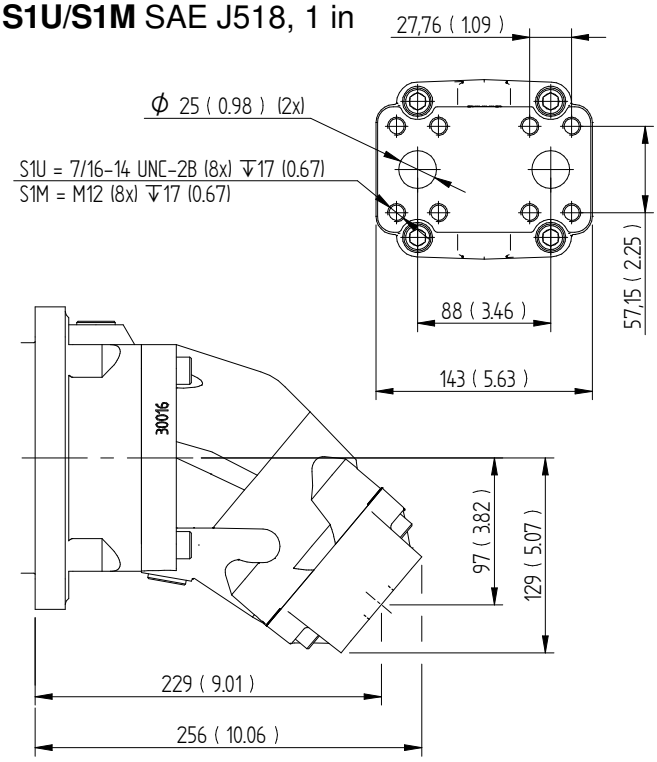
Dimensions SCM 084-130

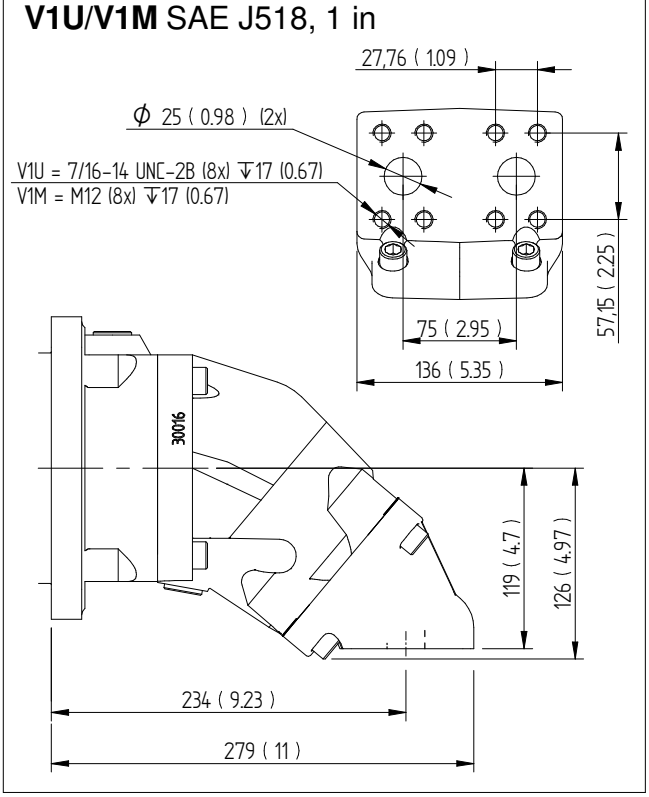
Connection cover

Millimeter (inch)

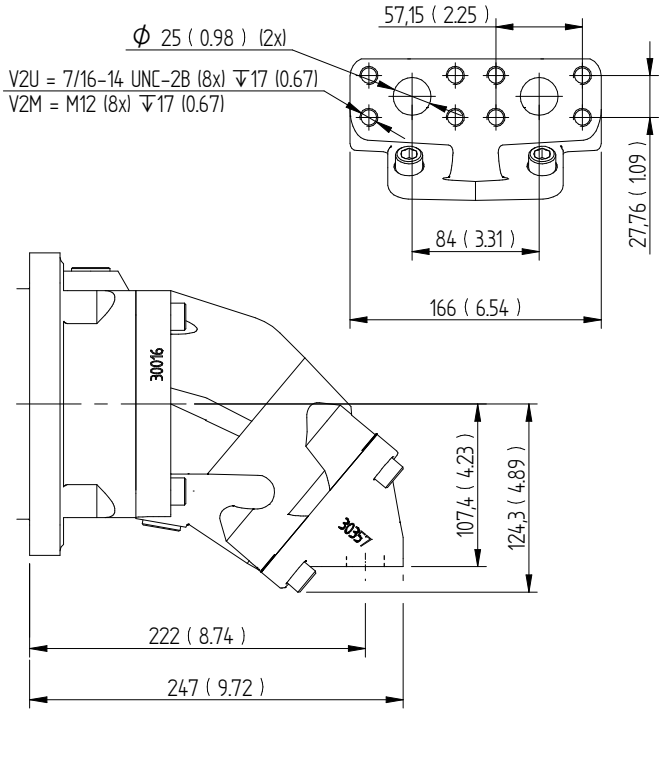
S1U/S1M SAE J518, 1 in



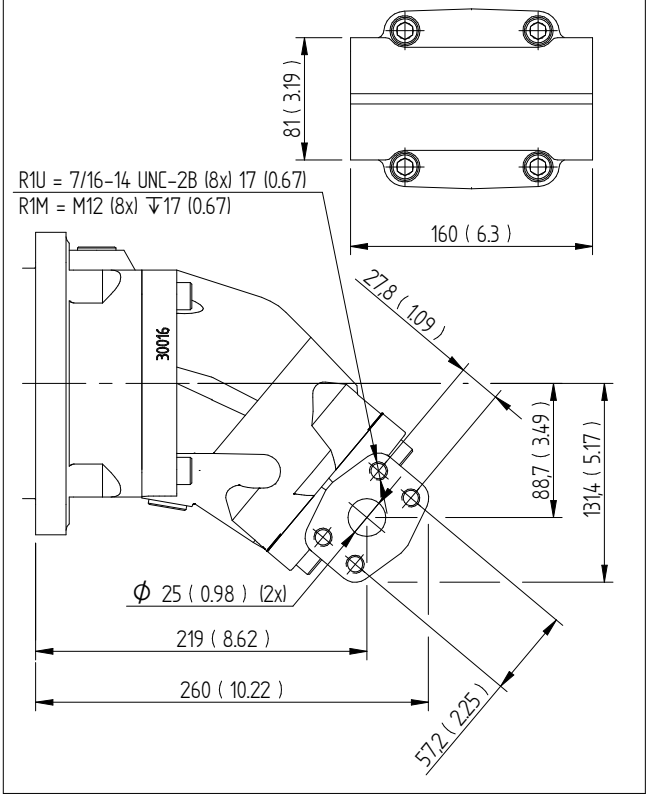
V1U/V1M SAE J518, 1 in



V2U/V2M SAE J518, 1 in



R1U/R1M 084-108 SAE J518, 1 in



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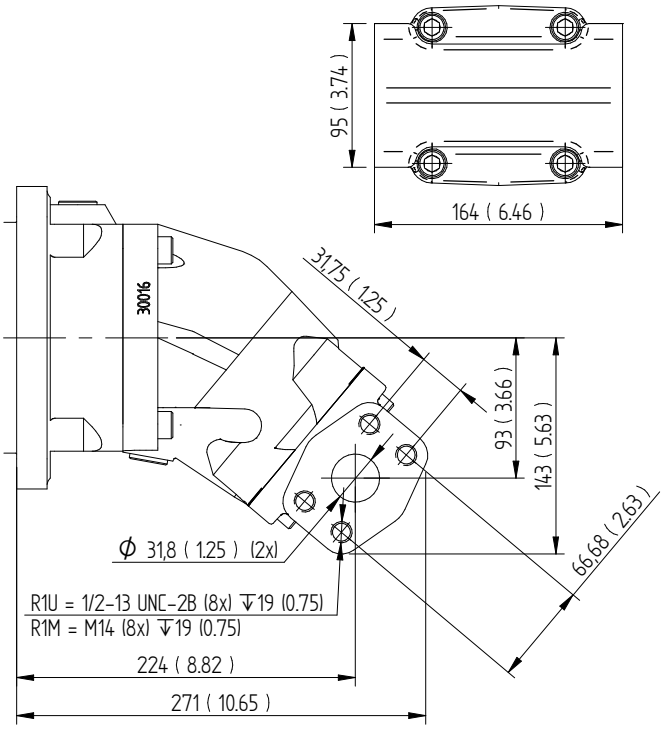
Dimensions SCM 084-130

Connection cover

Millimeter (inch)

R1U/R1M 130 SAE J518, 1 1/4 in



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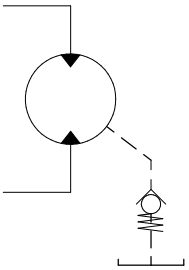
General instructions

Shaft seal

		Max. housing pressure psi at RPM				
Motor SCM	Code	*1500*	*3000*	*5200*	*6300*	*8800*
010-034	P	102	102	58	51	36
040-064	P	102	87	51	44	-
084-130	P	102	58	44	-	-



Code according to page 2. Versions main data.

For low temperature applications, below -13 °F please contact Sunfab.

The drainage oil should have a maximum temperature of 239 °F with the P shaft seal. This temperature must not be exceeded.

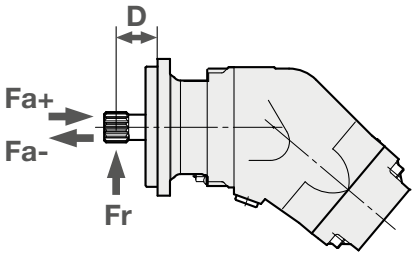
The housing pressure must be equal to or greater than the external pressure on the shaft seal.

To ensure the function of the shaft seal and lubrication of the motor, we recommend a min. housing pressure of 7 psi. If needed, a spring loaded check valve of 7 psi can be installed on the housing drain line.

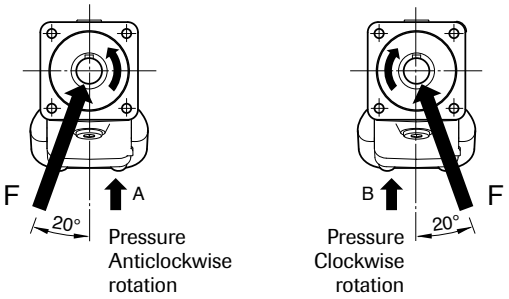
Shaft loads

The life of the motor is highly dependent on the bearing life. The bearings are affected by operating conditions such as speed, pressure, oil viscosity and filtration.

External load on the shaft, as well as its size, direction and location also affects the bearing life.



Optimal force direction of radial load



SCM SAE Max recommended shaft loads		010 SAE B	012 SAE B	017 SAE B	025 SAE B	025 SAE C	034 SAE B	034 SAE C	040 SAE C	047 SAE C	056 SAE C	064 SAE C	084 SAE C	084 SAE D	108 SAE C	108 SAE D	130 SAE D
Fr (radial) max[1]	lbf	1460	1460	1575	1685	1685	1685	1575	1900	1900	1900	2025	2025	2025	2250	2250	2350
Distance D (to point of force)	in	1.57	1.57	1.57	1.57	1.77	1.57	1.77	1.77	1.77	1.77	1.77	1.77	2.36	1.77	2.36	2.36
Fa (axial) + (at standstill/ 0 PSI pressure) max	lbf	675	675	675	675	675	675	675	110	110	110	110	220	220	220	220	220
Fa (axial) - (at standstill/ 0 PSI pressure) max	lbf	900	900	1125	1575	1575	1575	1575	1575	1575	2250	2475	2925	2925	3600	3600	4275
Fa (axial) + (at 5800 PSI pressure) max[2]	lbf	900	900	1125	1575	1575	1575	1575	1575	1575	2250	2475	2925	2925	3600	3600	4275
Fa (axial) -(at 5800 PSI pressure) max[2]	lbf	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[1]) Fr (radial) max; Calculation based on running conditions: 4350 PSI / 2000 rpm
[1]) Fr (radial) max; Calculation based on optimal force direction (Fr max will be lower in other force directions)
[1]) Fr (radial) max; In running conditions higher than 4350 PSI and / or 2000 rpm the max limits for Fr (radial) max will be lower

[2]) Fa (axial) + Will increase bearing life
[2]) Fa (axial) - Will decrease bearing life

For other forces, please contact Sunfab for advice.

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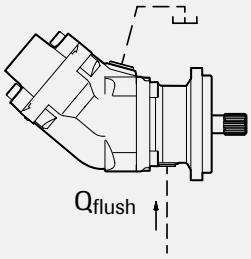
Temperatures/Housing cooling

Excessive system temperature reduces the life of the shaft seal and can lower the oil viscosity below the recommended level. A system temperature of 140 °F and a drain flow temperature of 239 °F must not be exceeded.

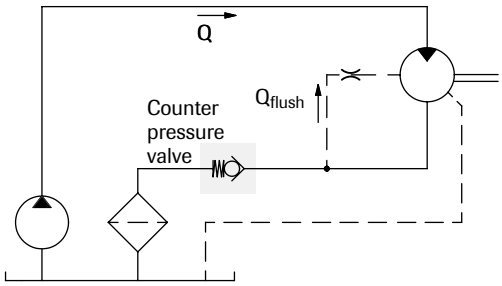
Cooling/flushing of the motor housing can be needed to keep the drain flow temperature at an acceptable level.

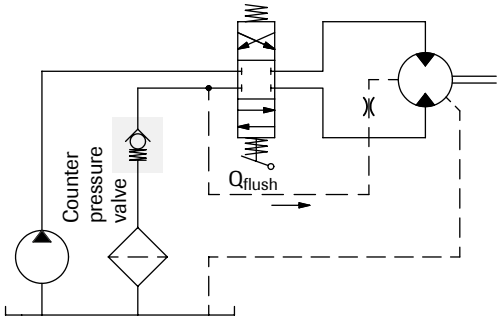
Suggested flow:

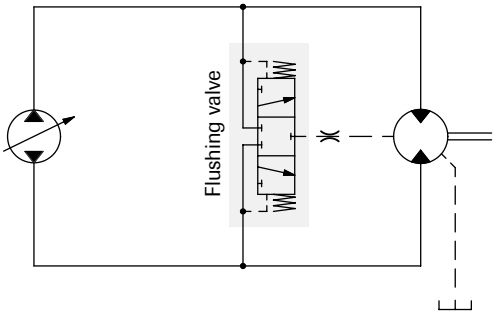
Motor SCM	Flushing GPM	Cont. RPM
012-034	0.5-2.1	≥ 2800
040-064	1.1-2.7	≥ 2500
084-130	1.6-3.2	≥ 2200



Housing flushing can be built up with the help of a flushing valve or taken directly from the return line. When the return pressure is too low this is compensated for by a counter pressure valve.
The tank line is connected to the highest point as in the figure.







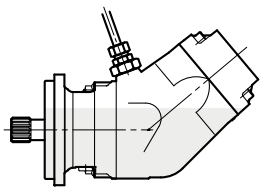
Simplified circuits

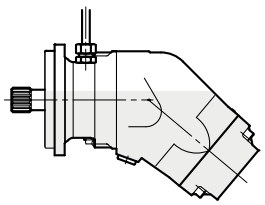
Installation

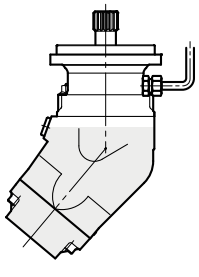
- The motor housing should be filled with oil to at least 50% before starting.

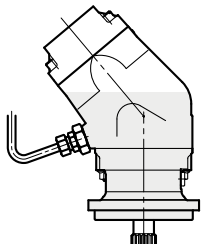
- The drainage pipe should be connected to topmost drainage outlet.

- The other end of the pipe should be connected to the oil tank at a point below the oil level.









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Piping

Recommended oil velocity in pressure line max. 23 ft/s.

Filtering

Cleanliness according to ISO norm 4406, code 16/13.

Hydraulic fluids

High performance oils meeting ISO specifications – such as HM, DIN 51524-2 HLP, or better – must be used.

A min. viscosity of 10 cSt is required to keep the lubrication at a safe level.

The ideal viscosity is 20 - 40 cSt.

Additional technical data

Noise levels and bearing life calculations available on request. Please contact Sunfab!

Useful formulaes

Required flow rate $Q = \frac{D \times n}{231 \times \eta_v}$ GPM

Speed $n = \frac{Q \times 231 \times \eta_v}{D}$ RPM

Torque $M = \frac{D \times \Delta p \times \eta_{hm}}{75.6}$ lb-ft

Power $P = \frac{Q \times \Delta p \times \eta_t}{1714}$ hp

D = displacement, cu in/revolution

n = speed, RPM

P = power, hp

Q = flow rate, GPM

η_v = volumetric efficiency

η_{hm} = hydraulic-mechanical efficiency

η_t = overall efficiency = $\eta_v \times \eta_{hm}$

M = torque, Nm

Δp = pressure difference between the hydraulic motor inlet and outlet, psi

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WARNING!

When the motor is in use:

1. Do not touch the pressure pipe
2. Watch out for rotating parts
3. The motor and pipes can reach high temperatures

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