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 10-130 cm³/rev. at a maximum pressure of 400 bar. It features double tapered roller bearings, permit 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 -25 °C 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)	-
T14	14T 12/24*	-	-	-	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																			
cm^3/rev		9.6	12.6	17.0	25.4	25.4	34.2	34.2	41.2	47.1	56.7	63.6	83.6	83.6	90.0	90.0	108.0	108.0	130.0
Working pressure																			
bar	*max intermittent*	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	350
	max continuous	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	300
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																			
kW	*max intermittent*	41	50	70	80	80	110	110	120	135	165	180	200	190	215	205	255	245	255
	max continuous	15	20	25	40	40	55	55	60	65	80	90	100	100	110	110	130	130	135
Starting torque theoretical value																			
Nm/bar		0.15	0.20	0.27	0.40	0.40	0.54	0.54	0.66	0.75	0.89	1.00	1.33	1.33	1.44	1.44	1.71	1.71	2.06
Mass moment of inertia (x 10^{-3})																			
$kg\,m^2$		0.9	0.9	0.9	1.1	1.1	1.1	1.1	2.6	2.6	2.6	2.6	6.3	7.4	6.3	7.4	6.3	7.4	7.4
Weight																			
kg		9.0	9.0	9.0	9.0	9.0	9.0	9.0	15.0	15.0	15.0	15.0	18.0	35.0	18.0	35.0	18.0	35.0	35.0

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.

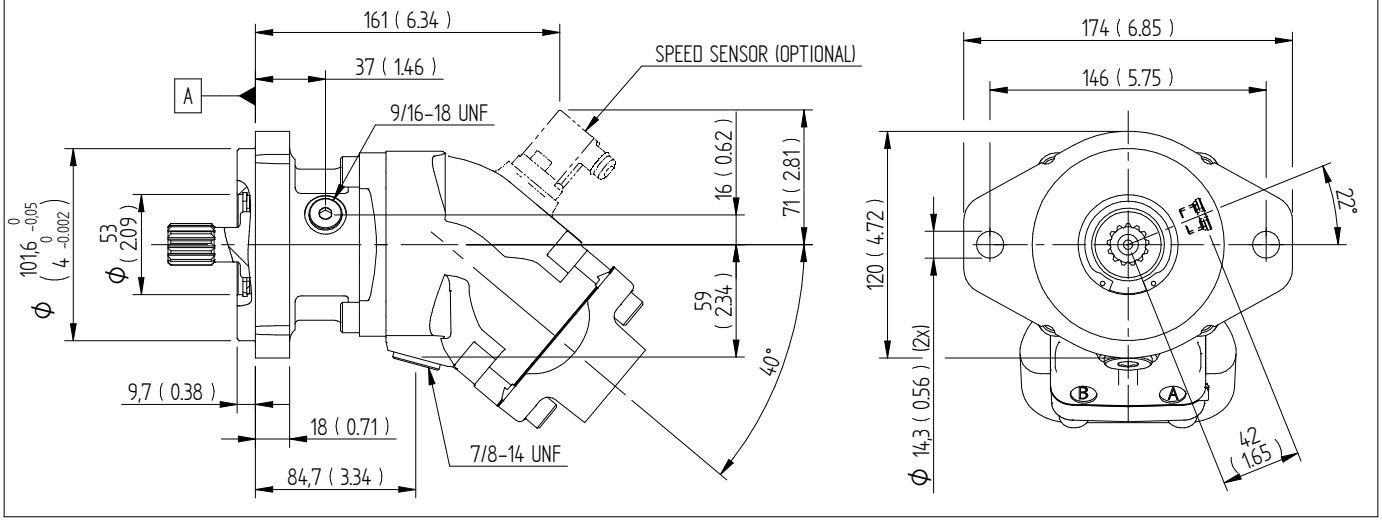
Sunfab Hydraulics AB, Box 1094, SE-824 12 Hudiksvall, Sweden.Tel: +46 650-367 00, E-mail: sunfab@sunfab.se Web: www.sunfab.com

Dimensions SCM 010-034 SB2 & SB4

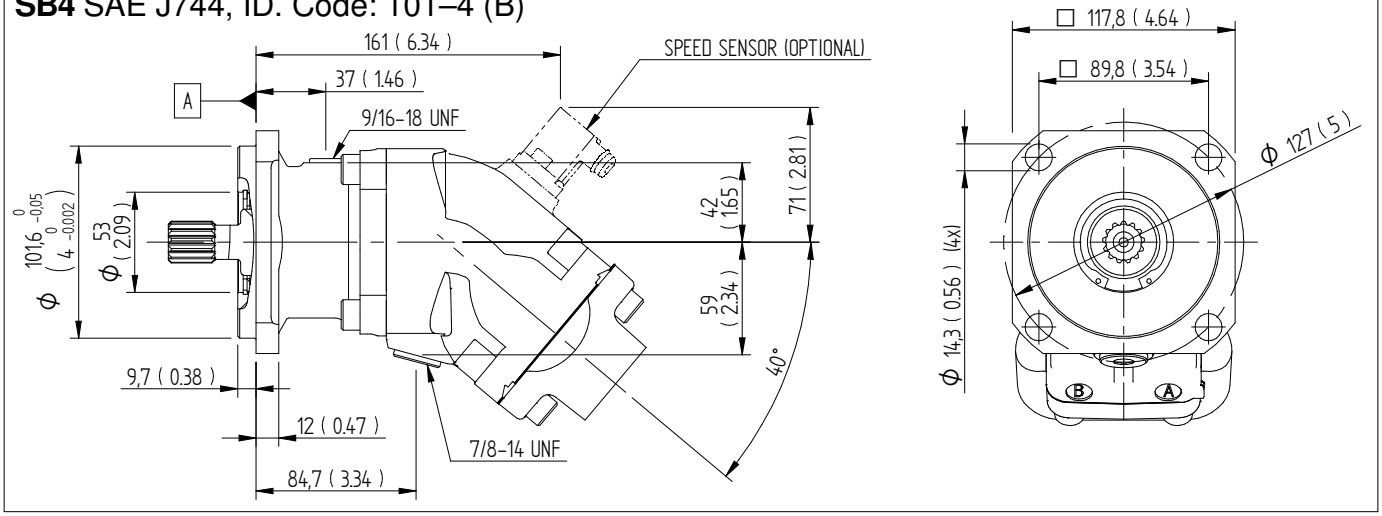
Flange & shafts

Millimeter (inch)

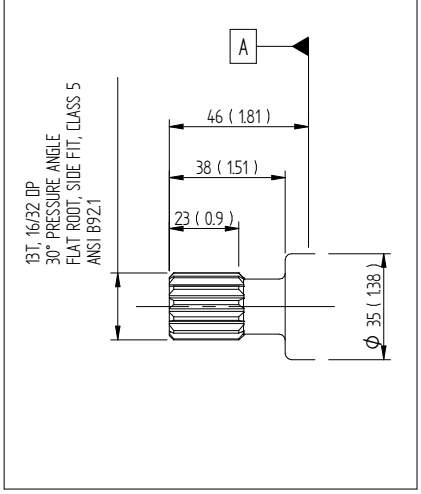
SB2 SAE J744, ID. Code: 101–2 (B)



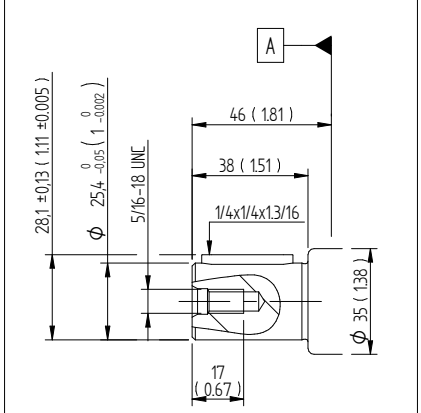
SB4 SAE J744, ID. Code: 101–4 (B)



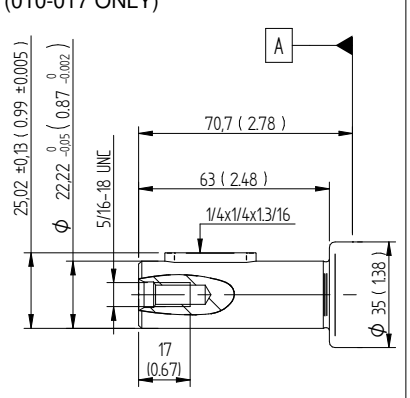
B13 SAE J744, ID. Code: 22–4 (B)



B25 SAE J744, ID. Code: 25–1 (B–B)



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



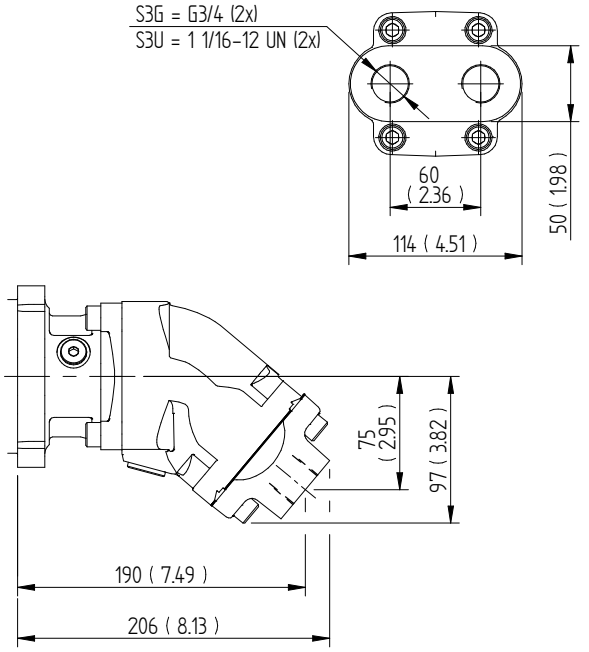
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Dimensions SCM 010-034 SB2 & SB4

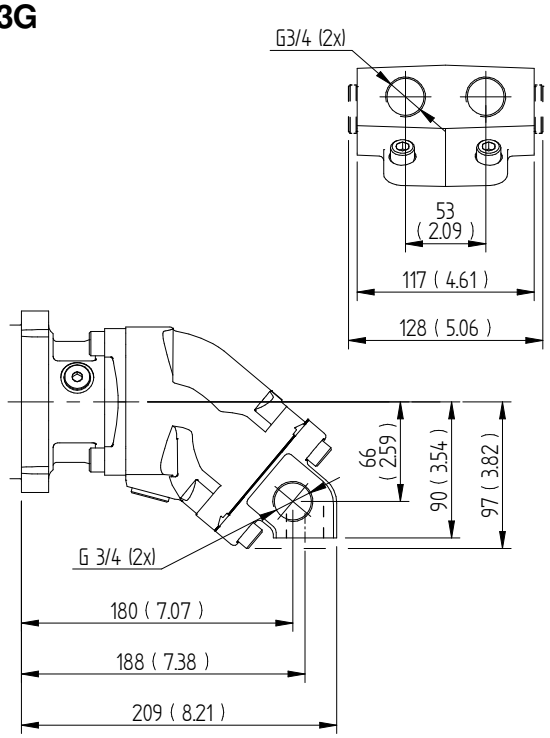
Connection cover

Millimeter (inch)

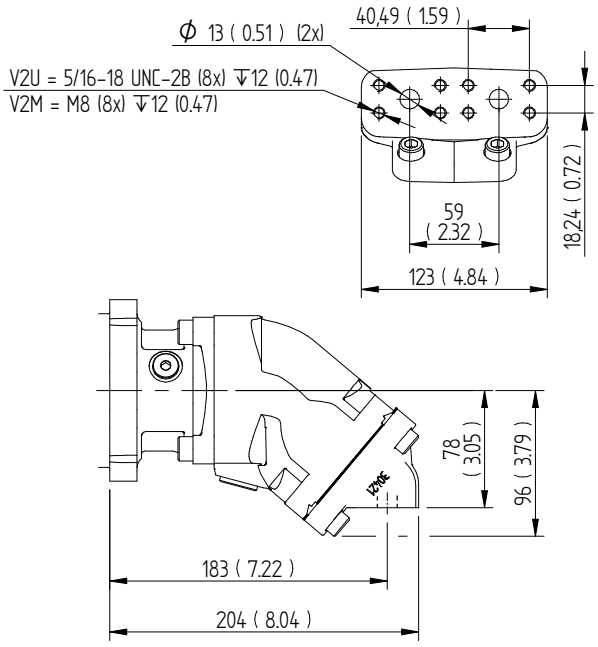
S3G/S3U



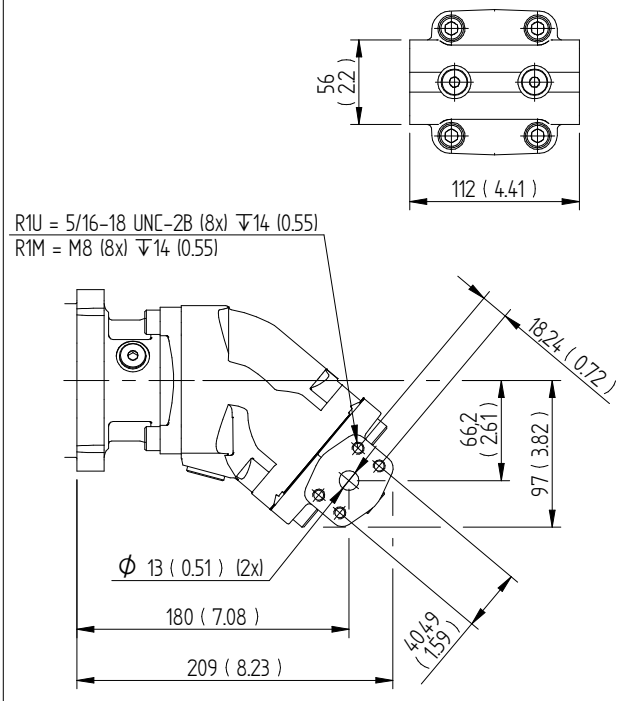
K3G



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



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



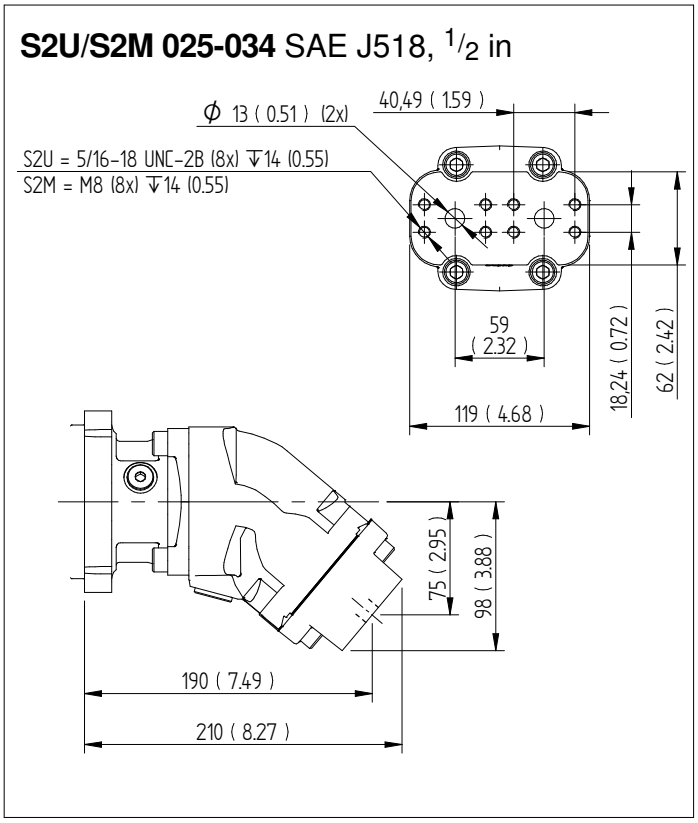
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Dimensions SCM 010-034 SB2 & SB4

Connection cover

Millimeter (inch)

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



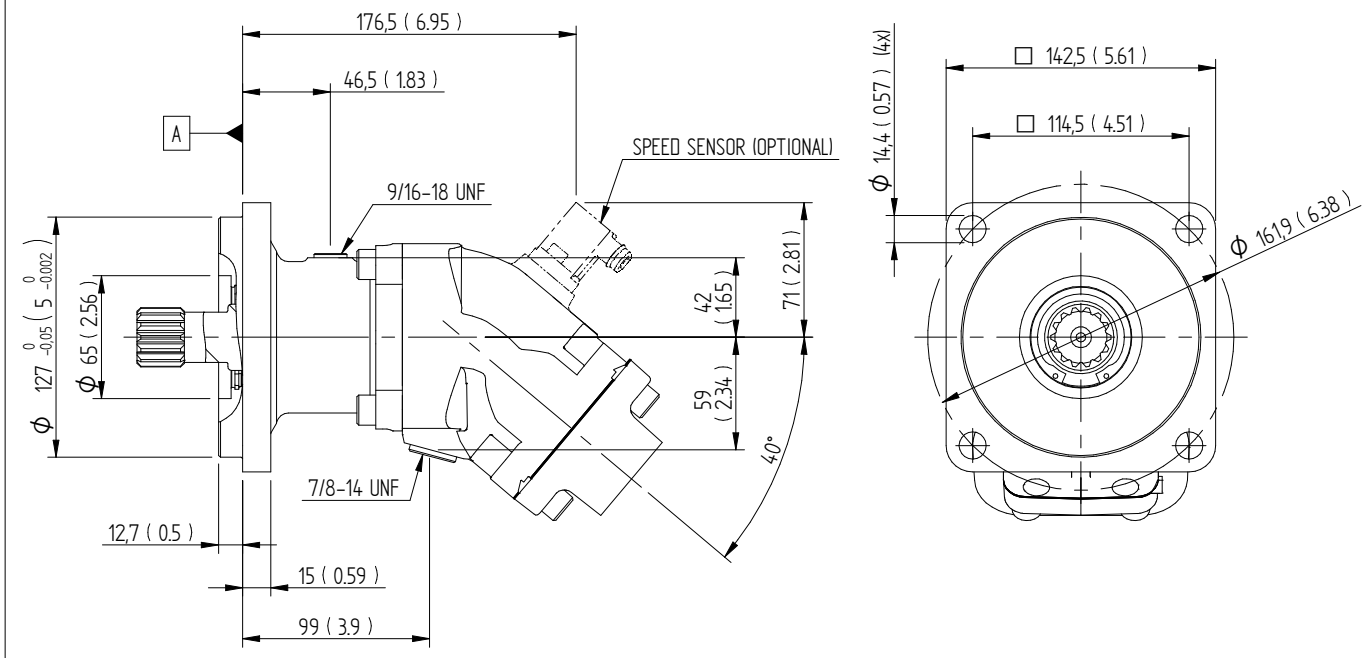
Sunfab Hydraulics AB, Box 1094, SE-824 12 Hudiksvall, Sweden.Tel: +46 650-367 00, E-mail: sunfab@sunfab.se Web: www.sunfab.com

Dimensions SCM 025-034 SC4

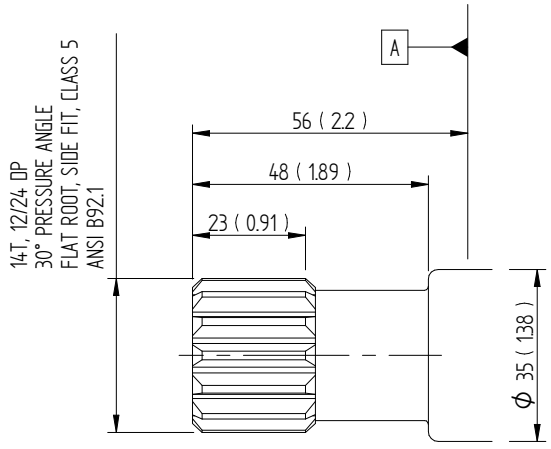
Flange & shafts

Millimeter (inch)

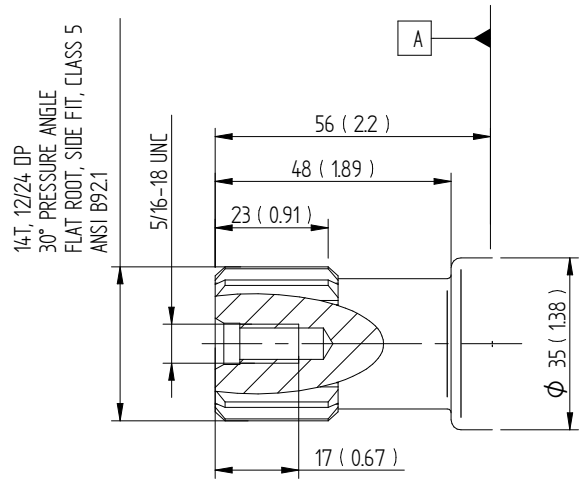
SC4 SAE J744, ID. Code: 127-4 (C)



C14 SAE J744, ID. Code: 32–4 (C)



T14 SAE J744, ID. Code: 32–4 (C)



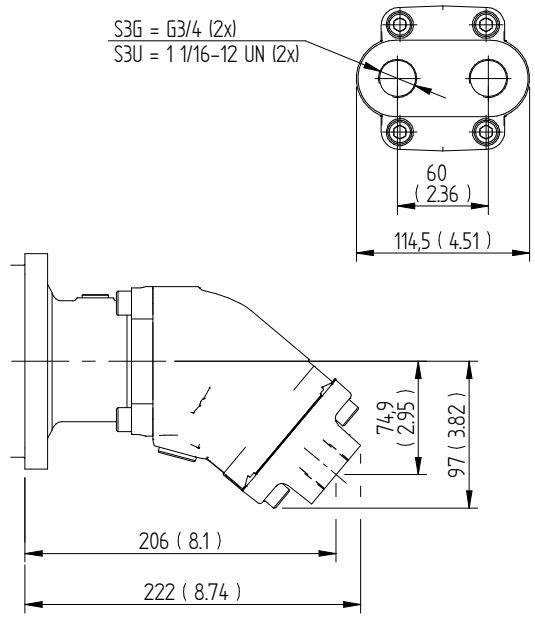
Sunfab Hydraulics AB, Box 1094, SE-824 12 Hudiksvall, Sweden.Tel: +46 650-367 00, E-mail: sunfab@sunfab.se Web: www.sunfab.com

Dimensions SCM 025-034 SC4

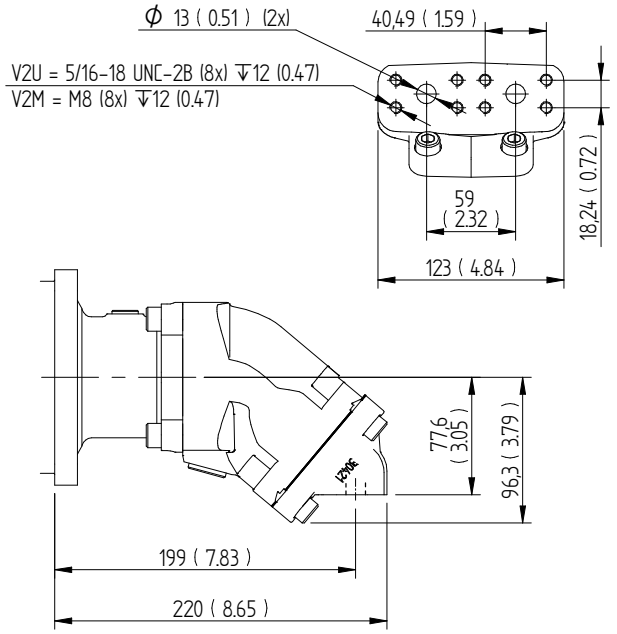
Connection cover

Millimeter (inch)

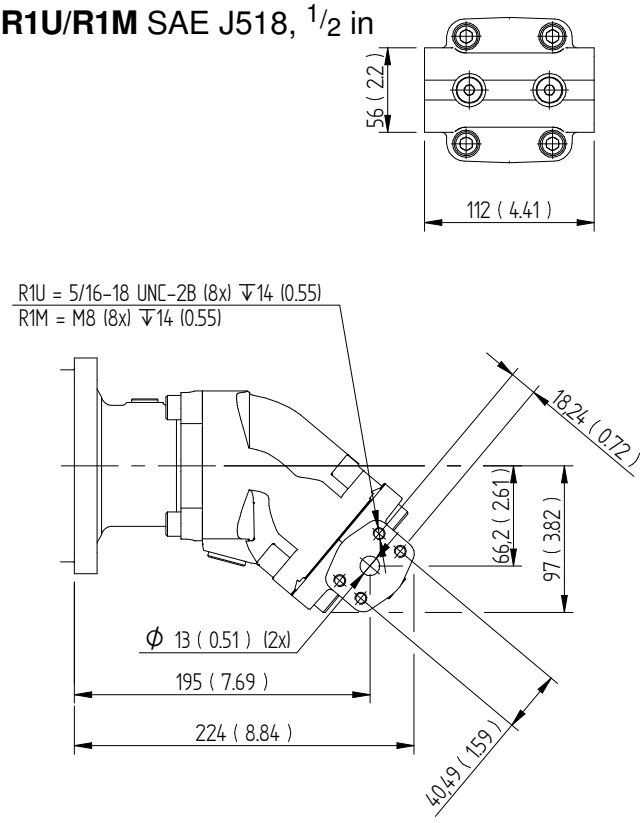
S3G/S3U



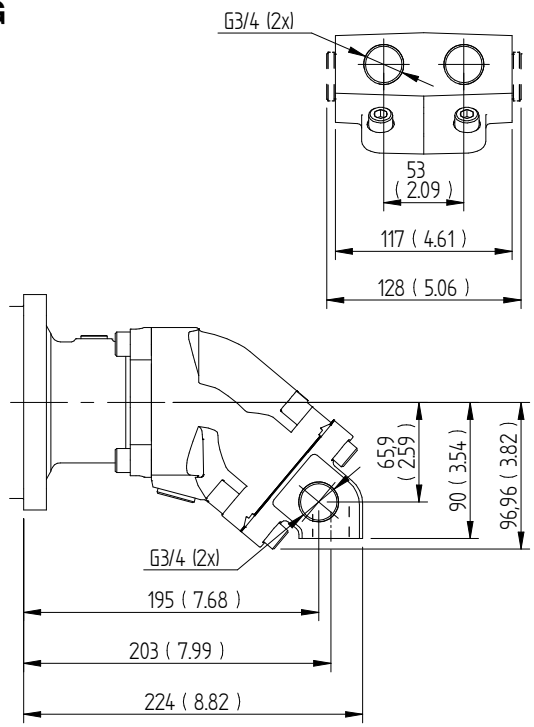
V2U/V2M SAE J518, 1/2 in



R1U/R1M SAE J518, 1/2 in



K3G

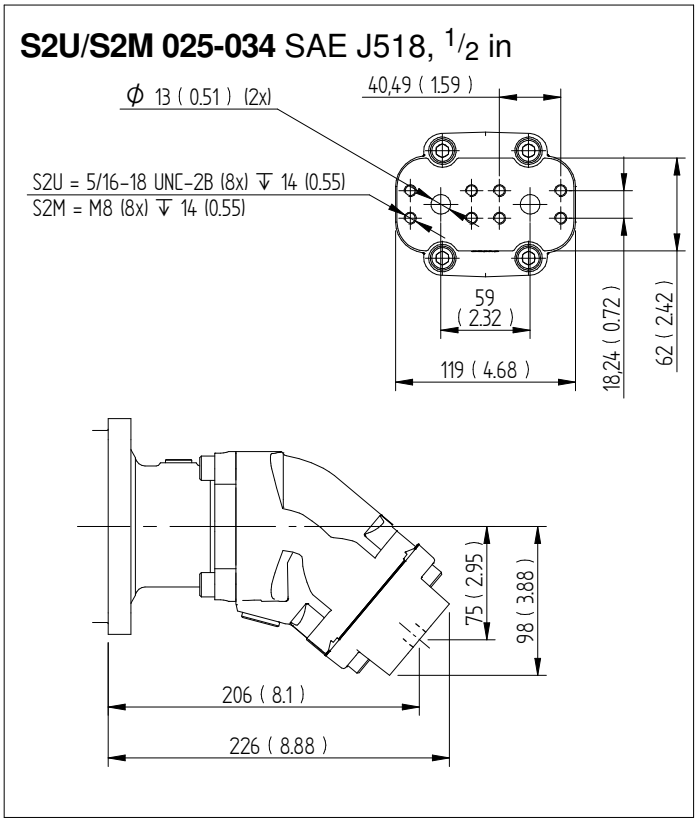


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Dimensions SCM 025-034 SC4

Connection cover

Millimeter (inch)



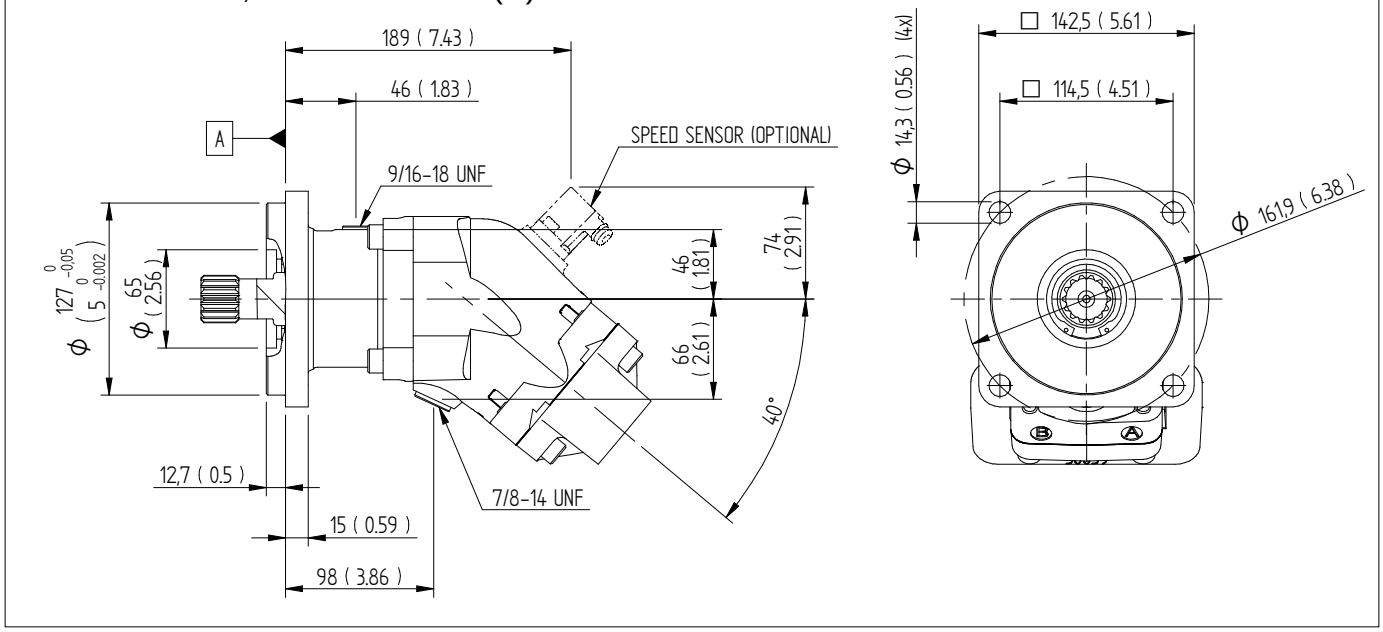
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Dimensions SCM 040-064

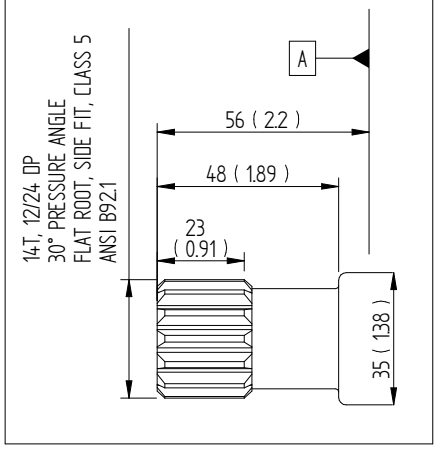
Flange & shafts

Millimeter (inch)

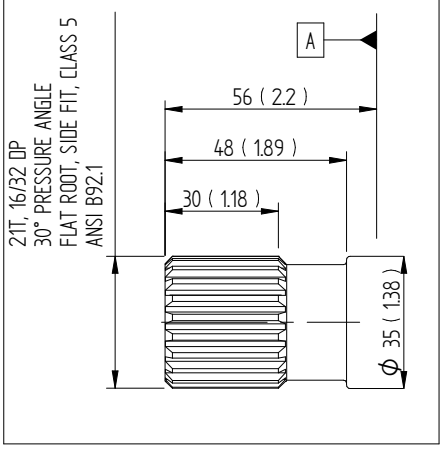
SC4 SAE J-744, ID. Code: 127-4 (C)



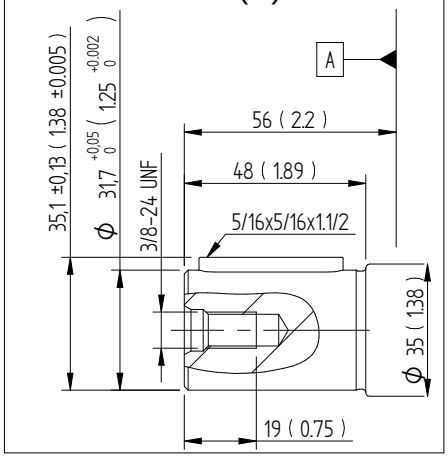
C14 SAE J744
ID. Code: 32–4 (C)



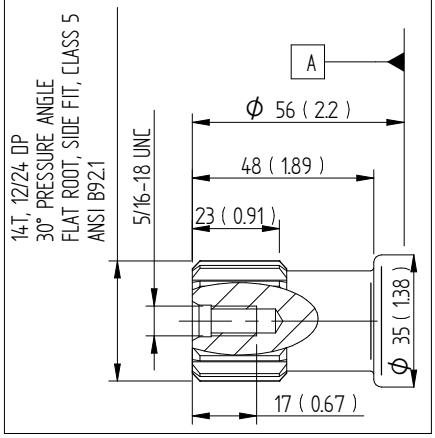
C21 SAE J744



C32 SAE J744
ID. Code: 32–1 (C)



T14 SAE J744
ID. Code: 32–4 (C)



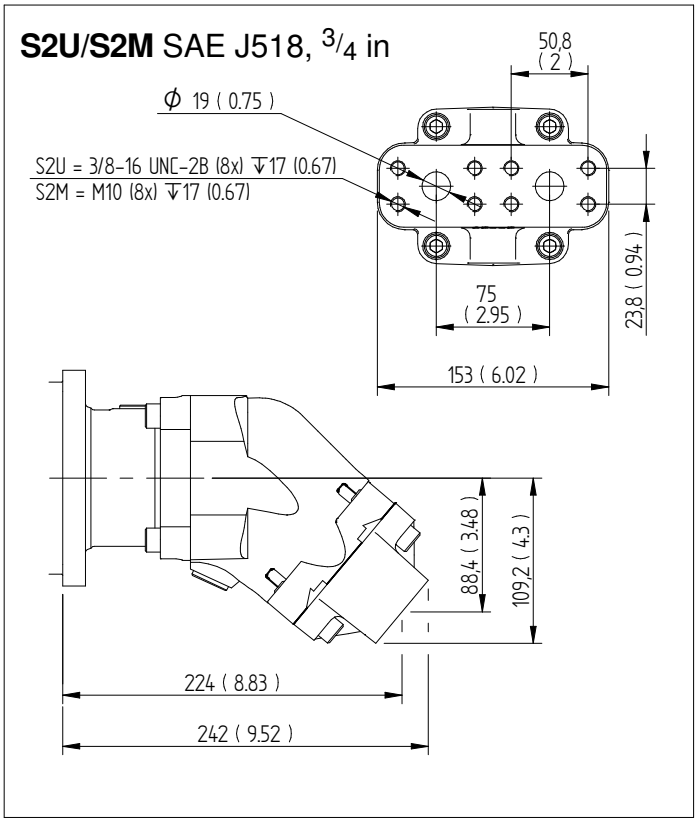
Sunfab Hydraulics AB, Box 1094, SE-824 12 Hudiksvall, Sweden.Tel: +46 650-367 00, E-mail: sunfab@sunfab.se Web: www.sunfab.com

Dimensions SCM 040-064

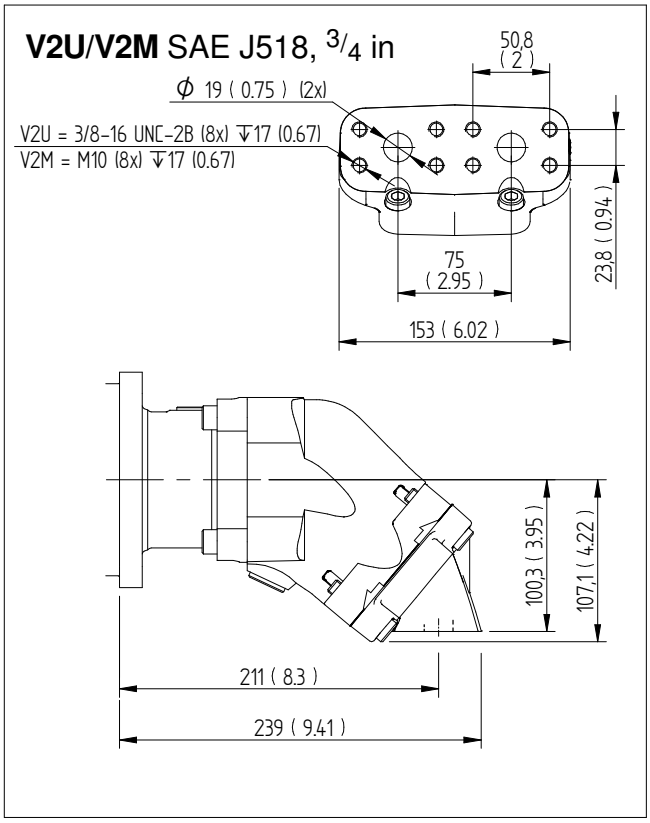
Connection cover

Millimeter (inch)

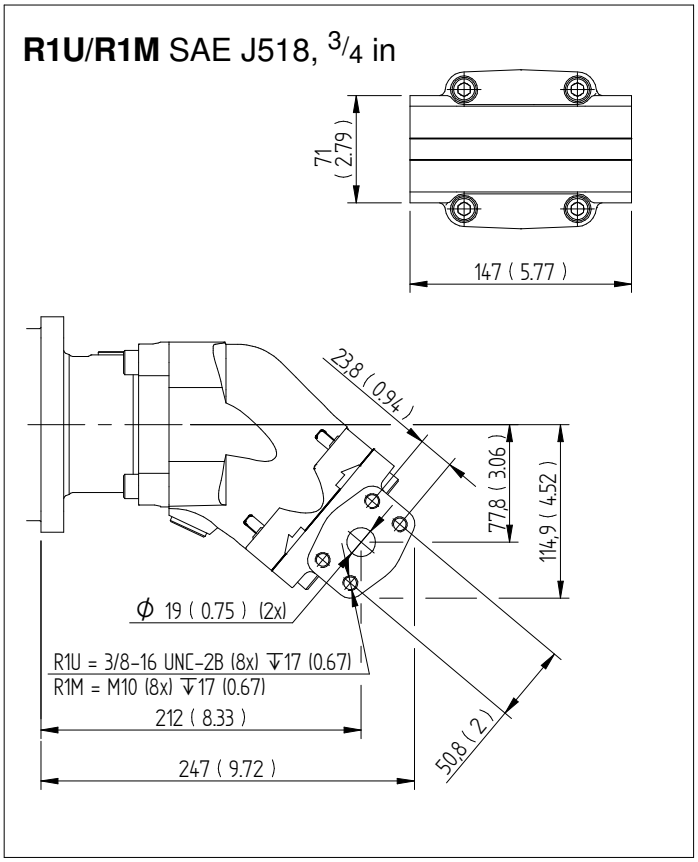
S2U/S2M SAE J518, 3/4 in



V2U/V2M SAE J518, 3/4 in



R1U/R1M SAE J518, 3/4 in



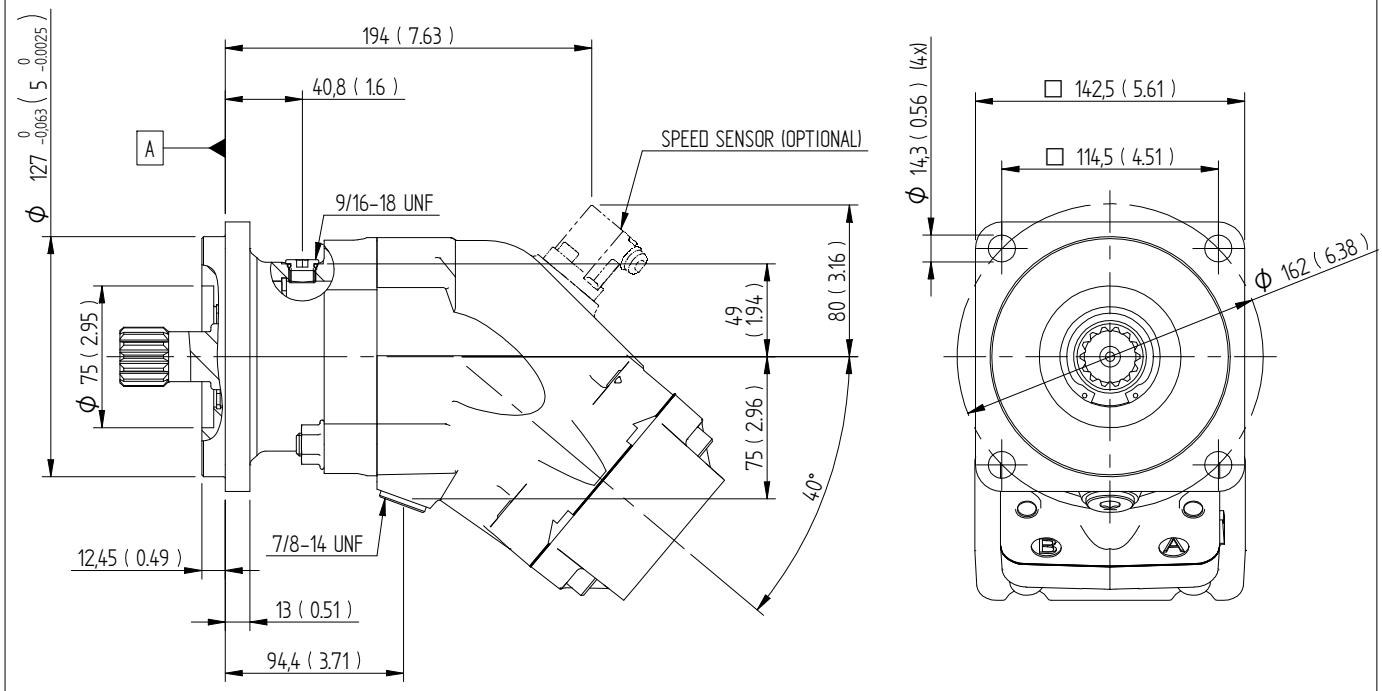
Sunfab Hydraulics AB, Box 1094, SE-824 12 Hudiksvall, Sweden.Tel: +46 650-367 00, E-mail: sunfab@sunfab.se Web: www.sunfab.com

Dimensions SCM 084-108

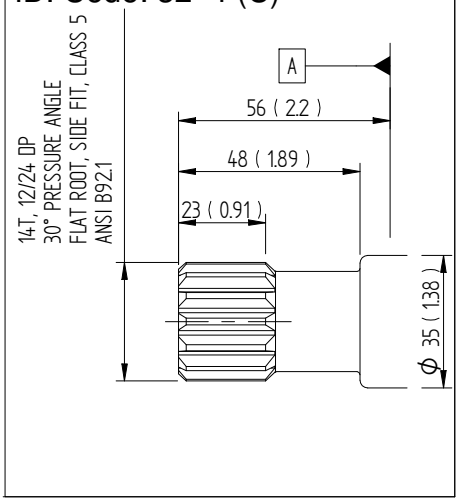
Flange & shafts

Millimeter (inch)

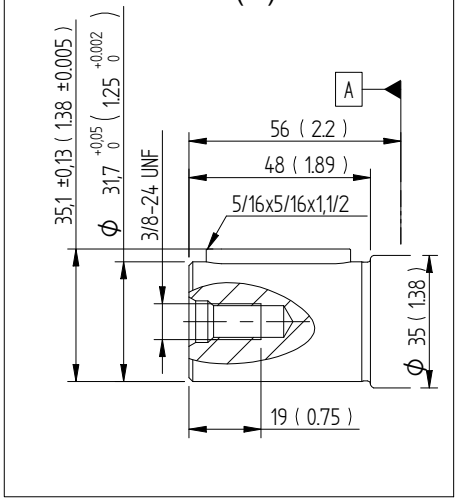
SC4 SAE J-744, ID. Code: 127-4 (C)



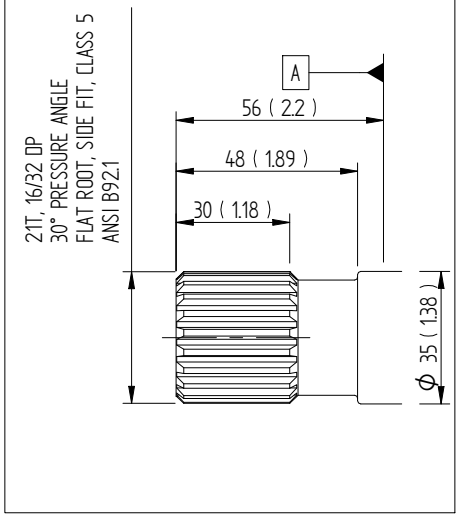
C14 SAE J744
ID. Code: 32–4 (C)



C32 SAE J744
ID. Code: 32–1 (C)



C21 SAE J744



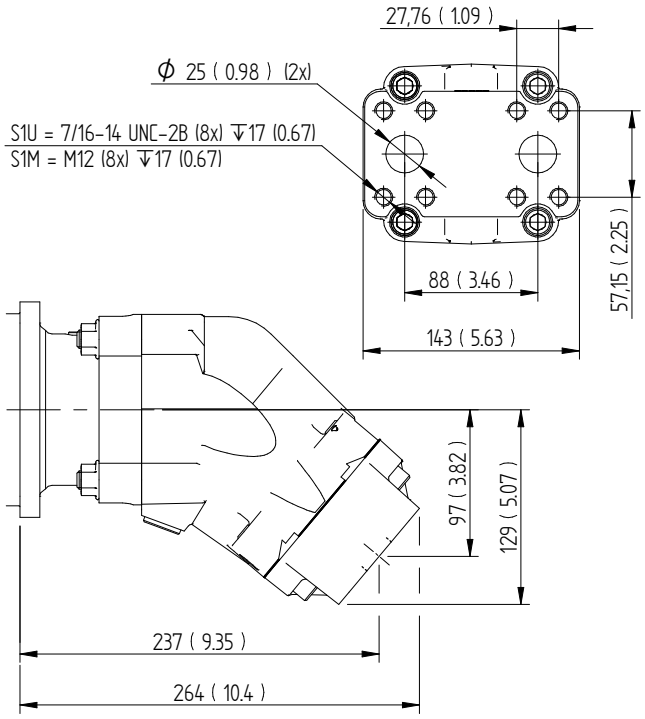
Sunfab Hydraulics AB, Box 1094, SE-824 12 Hudiksvall, Sweden.Tel: +46 650-367 00, E-mail: sunfab@sunfab.se Web: www.sunfab.com

Dimensions SCM 084-108

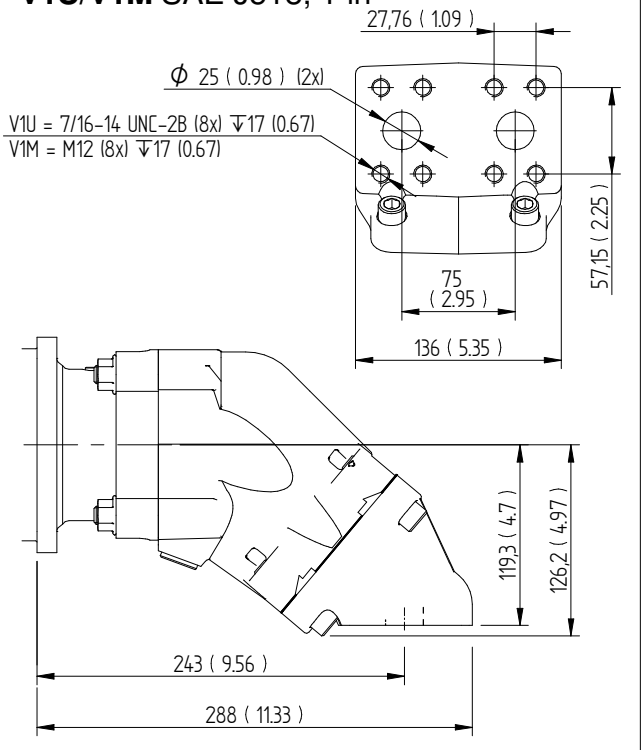
Connection cover

Millimeter (inch)

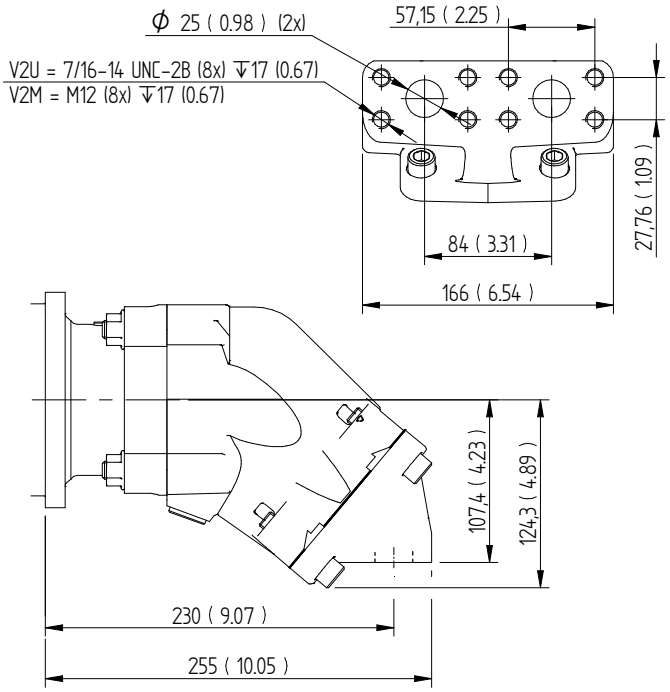
S1U/S1M SAE J518, 1 in



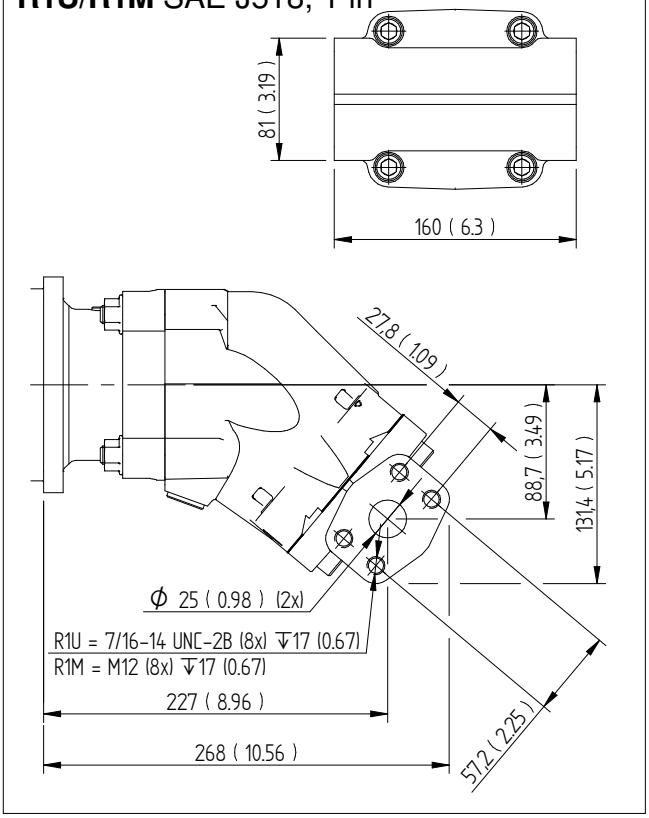
V1U/V1M SAE J518, 1 in



V2U/V2M SAE J518, 1 in



R1U/R1M SAE J518, 1 in



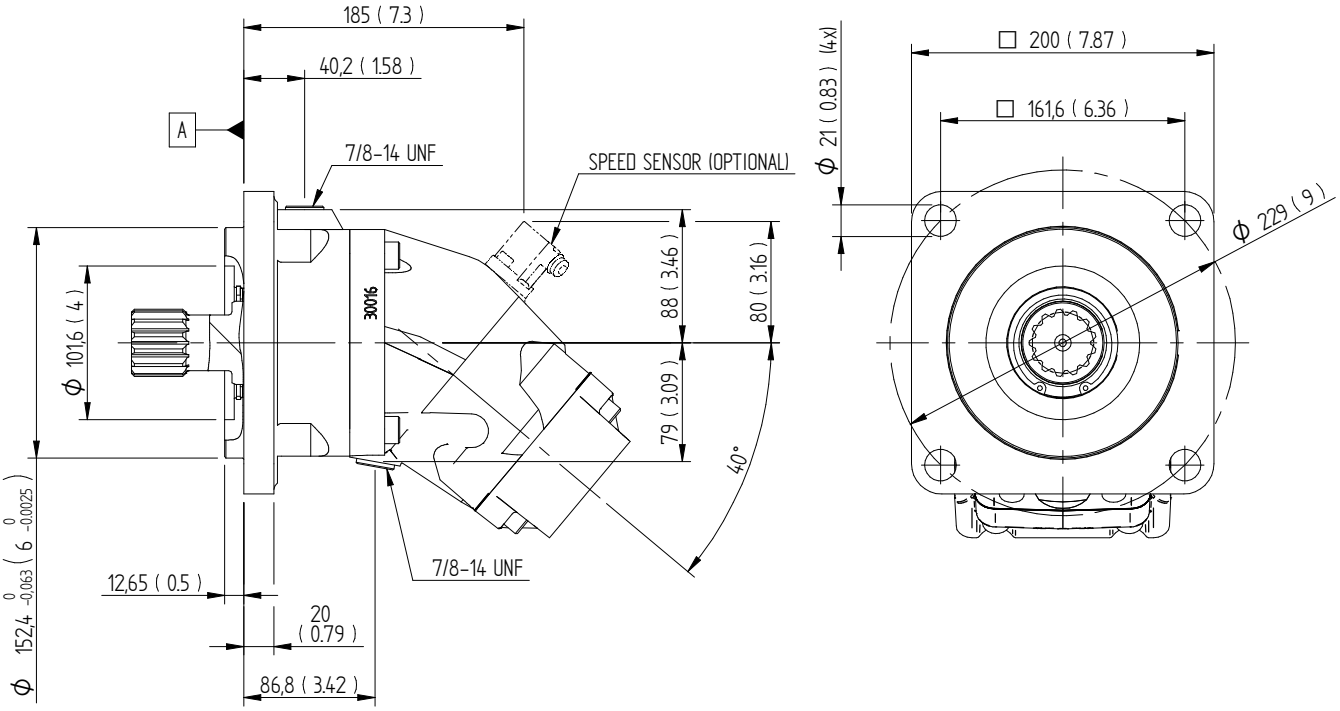
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Dimensions SCM 084-130

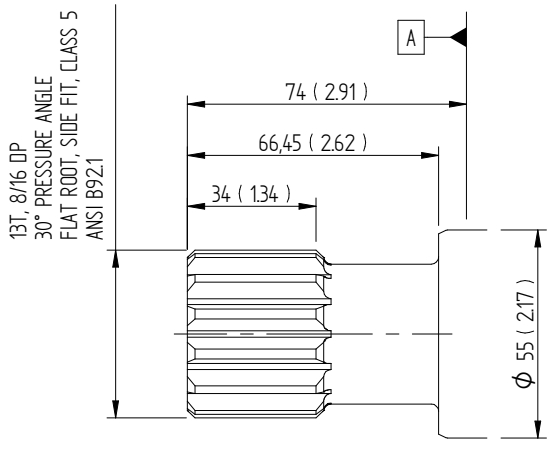
Flange & shafts

Millimeter (inch)

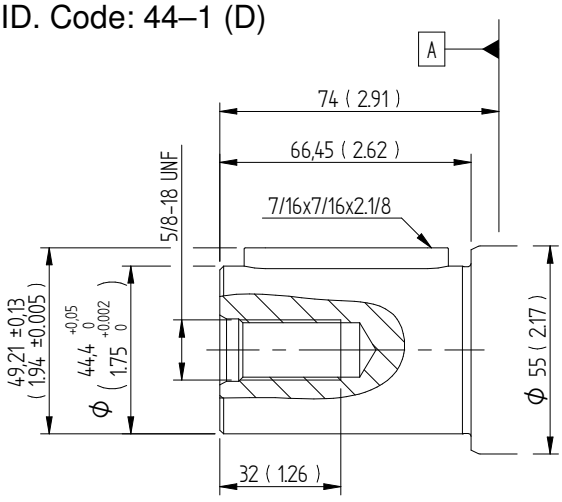
SD4 SAE J-744, ID. Code: 152-4 (D)



D13 SAE J744
ID. Code: 44–4 (D)



D44 SAE J744
ID. Code: 44–1 (D)



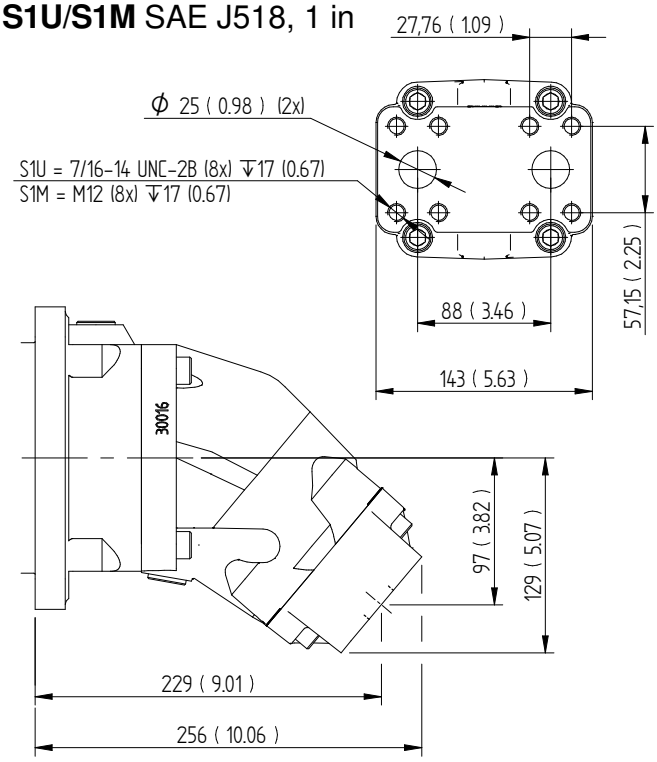
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Dimensions SCM 084-130

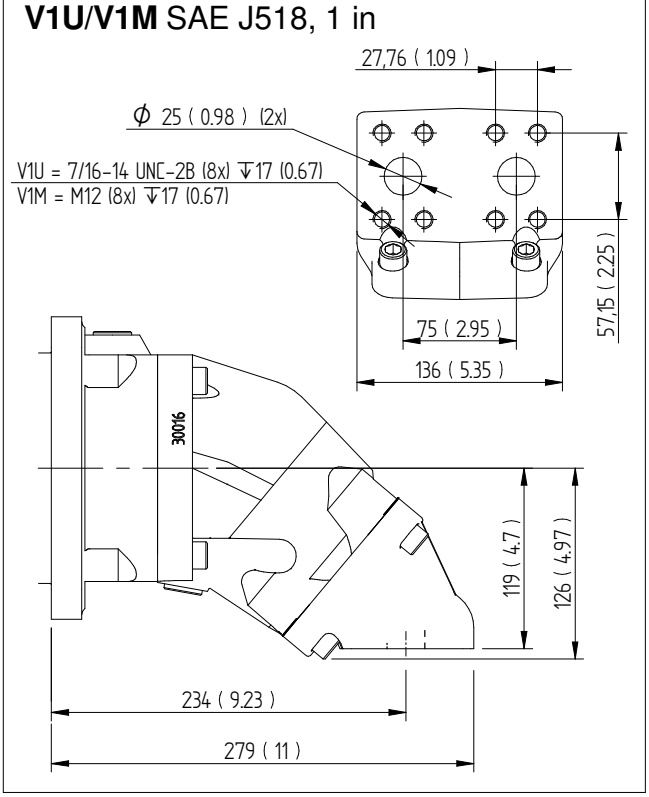
Connection cover

Millimeter (inch)

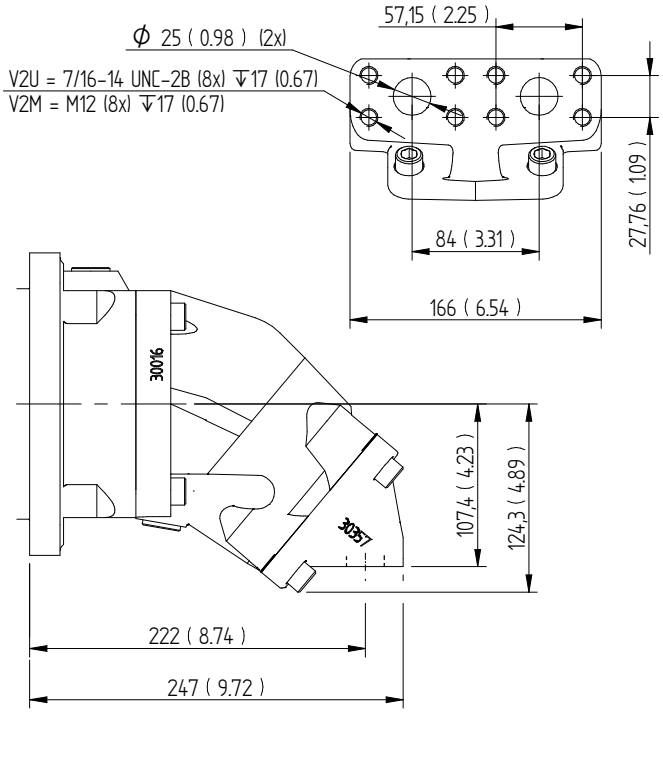
S1U/S1M SAE J518, 1 in



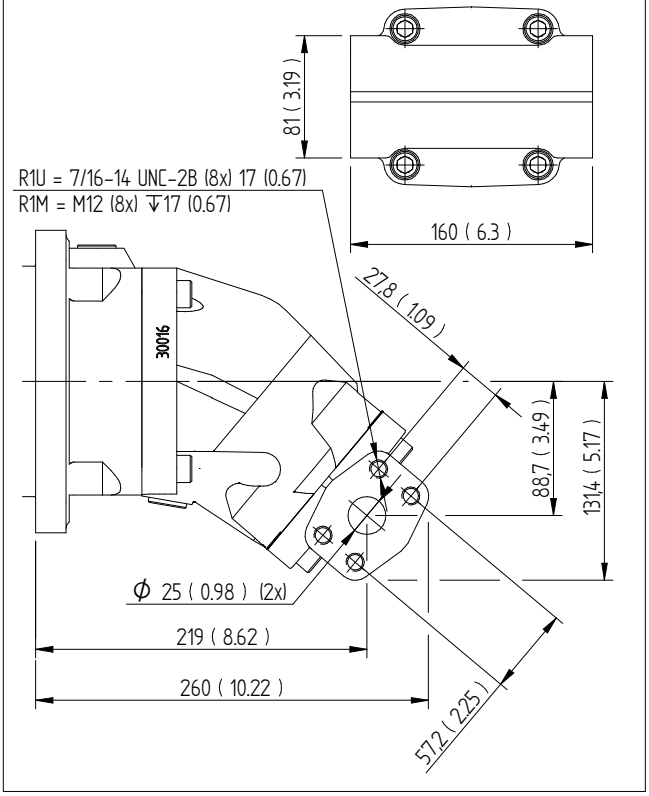
V1U/V1M SAE J518, 1 in



V2U/V2M SAE J518, 1 in



R1U/R1M 084-108 SAE J518, 1 in



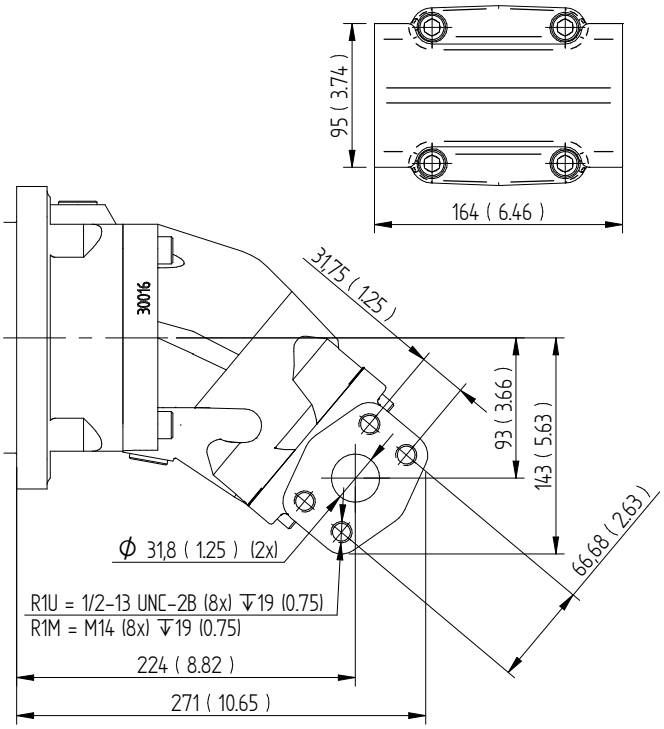
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Dimensions SCM 084-130

Connection cover

Millimeter (inch)

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

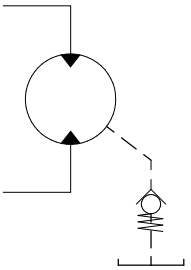


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General instructions

Shaft seal

		Max. housing pressure bar at rpm				
Motor SCM	Code	1500	3000	5200	6300	8250
010-034	P	7	7	4	3.5	2.5
040-064	P	7	6	3.5	3	-
084-130	P	7	4	3	-	-



Code according to page2. Versions main data.

For low temperature applications, below -25 °C please contact Sunfab.

The drainage oil should have a maximum temperature of 115 °C with the P shaft seal. This temperature must not be exceeded.

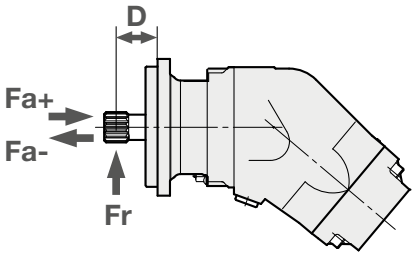
The housing pressure must be equal to or greater than the external pressure on the shaft seal.

To ensure the function of the shaft seal and lubrication of the motor, we recommend a min. housing pressure of 0,5 bar. If needed, a spring loaded check valve of 0,5 bar can be installed on the housing drain line.

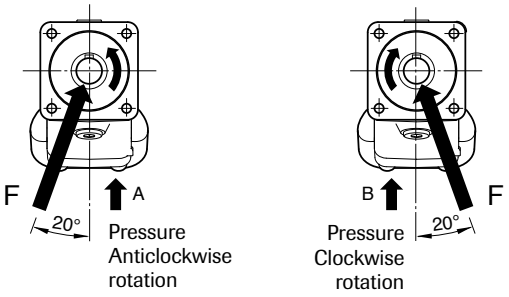
Shaft loads

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 C4	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]	kN	6.5	6.5	7	7.5	7.5	7.5	7	8.5	8.5	8.5	9	9	9	10	10	10.5
Distance D (to point of force)	mm	40	40	40	40	45	40	45	45	45	45	45	45	60	45	60	60
Fa (axial) + (at standstill/ 0 bar pressure) max	kN	3	3	3	3	3	3	3	0,5	0,5	0,5	0,5	1	1	1	1	1
Fa (axial) - (at standstill/ 0 bar pressure) max	kN	4	4	5	7	7	7	7	7	7	10	11	13	13	16	16	19
Fa (axial) + (at 400 bar pressure) max[2]	kN	4	4	5	7	7	7	7	7	7	10	11	13	13	16	16	19
Fa (axial) - (at 400 bar pressure) max[2]	kN	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: 300 bar / 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 300 bar 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
[2]) When having a (high) axial force (Fa+) a sudden fall in pressure can negatively affect bearing life due to lack of compensating load and, if extreme, could lead to bearing failure.

For other forces, please contact Sunfab for advice.

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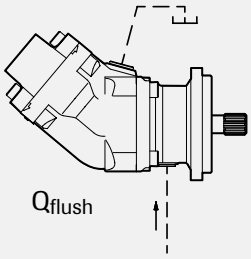
Temperatures/Housing cooling

Excessive system temperature reduces the life of the shaft seal and can lower the oil viscosity below the recommended level. A system temperature of 60 °C and a drain flow temperature of 90 °C must not be exceeded.

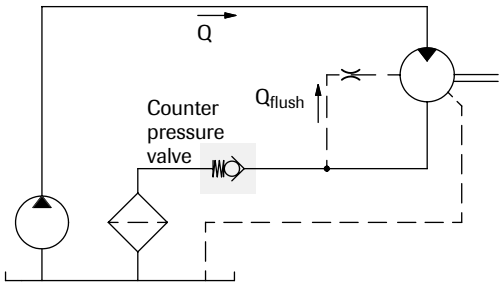
Cooling/flushing of the motor housing can be needed to keep the drain flow temperature at an acceptable level.

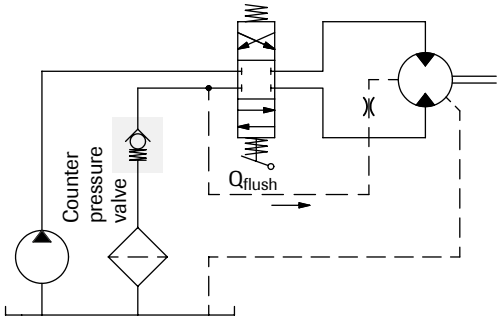
Suggested flow:

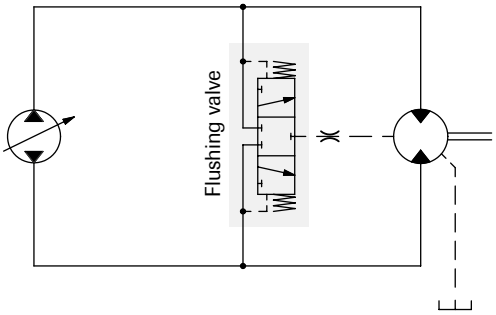
Motor SCM	Flushing l/min	Cont. RPM
010-034	2-8	≥ 2800
040-064	4-10	≥ 2500
084-130	6-12	≥ 2200



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.



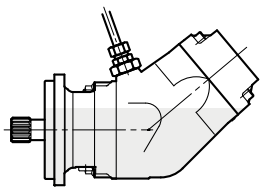


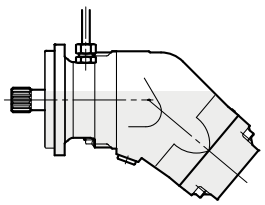


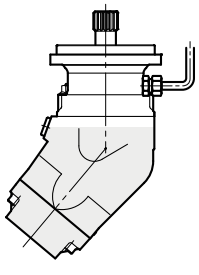
Simplified circuits

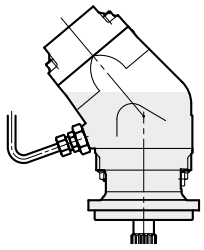
Installation

- 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. 7 m/sec

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 $Q = \frac{D \times n}{1000 \times \eta_v}$ litres/min.

Speed $n = \frac{Q \times 1000 \times \eta_v}{D}$ RPM

Torque $M = \frac{D \times \Delta p \times \eta_{hm}}{6.3}$ Nm

Power $P = \frac{Q \times \Delta p \times \eta_t}{60}$ kW

D = displacement, cm^3/revolution

n = speed, revolution/min

P = power, kW

Q = flow rate, litres/min

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, MPa

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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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