

Fixed Displacement Bent Axis Piston Motors SCM Series



DIN



M2



SAE



ISO

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SCM 012-130 DIN



SCM 012-130 DIN is a series of axial piston motors particularly suitable for mobile hydraulics. SCM 012-130 DIN is of the bent-axis type with spherical pistons.

The design gives a compact motor with few moving parts, high starting torque and high operational reliability. It covers the entire displacement range 12-130 cm³/rev. with max. pressure 400 bar.

It's high level of reliability is due to the choice of materials, hardening methods, surface structures and the quality assured manufacturing process.

Other advantages:

- Smooth operation over the entire speed range
- High efficiency
- Suitable for applications with high angular accelerations due to its high rotary stiffness

Motor SCM 012-130 DIN		012	017	025	034	040	047	056	064	084	108	130
Displacement	cm ³ /rev	12.6	17.0	25.4	34.2	41.2	47.1	56.7	63.5	83.6	108.0	130.0
Working pressure												
max intermittent	MPa	40	40	40	40	40	40	40	40	40	40	33
max continuous		35	35	35	35	35	35	35	35	35	35	28
Revolutions												
max intermittent	rpm	3000	3000	3000	3000	2500	2500	2500	2500	2000	2000	2000
max continuous		2400	2400	2400	2400	2000	2000	2000	2000	1600	1600	1600
min continuous		300	300	300	300	300	300	300	300	300	300	300
Power												
max intermittent	kW	18	24	36	49	57	65	78	88	93	120	124
max continuous		14	19	29	39	46	52	62	70	74	96	99
Starting torque theoretical value	Nm/MPa	2.0	2.7	4.0	5.4	6.6	7.5	8.9	10.0	13.3	17.2	20.7
Moment of inertia (x 10 ⁻³)	kg m ²	0.9	0.9	1.1	1.1	2.6	2.6	2.6	2.6	7.4	7.4	7.4
Max intermittent housing pressure	MPa	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Weight	kg	8.4	8.4	8.6	8.6	13.0	13.0	13.0	13.0	18.2	18.2	18.2

Intermittent operation refers to a max of 6 seconds per minute, representing e.g. peaks in rotational speed during unloading and acceleration.

VERSIONS, MAIN DATA

Example

SC	M	-	012	W	-	N	-	DL4	-	L35	-	S3	G	-	1	00
Line	1		2	3		4		5		6		7	8		9	10

Line	
SC	Compact, bent-axis design

1. Type	
M	Motor

2. Displacement	
012 017 025 034 040 047 056 064 084 108 130	

3. Direction of rotation	
W	Independent

4. Sealing	
N	Nitrile

5. Mounting flange	
ISO 7653-D	
DL4	ø 80

6. Shaft	
DIN 5462 / ISO 14	
L35	8x32x34.9

X = Standard, preferred
(X) = Available, option
O = Contact our Tech Dpt.

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

* According to SAE J518 code 62

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

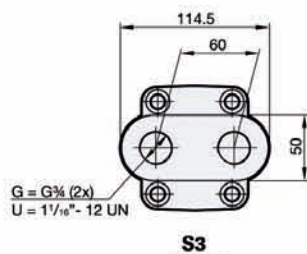
* Only threaded connections
** Only flanged connections
*** Only available for S covers

9. Additional	
1	External drainage

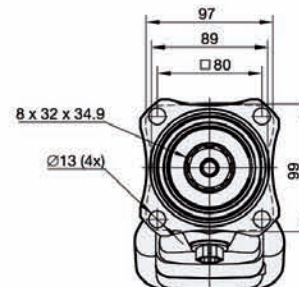
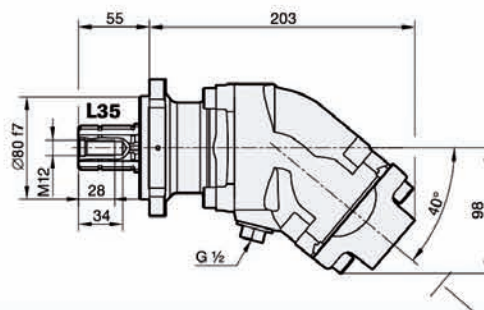
10. Speed sensor		012	017	025	034	040	047	056	064	084	108	130
00	No speed sensor	X	X	X	X	X	X	X	X	X	X	X
P1	Prepared for speed sensor	X	X	X	X	X	X	X	X	X	X	X
S1	Fitted speed sensor type PNP*	X	X	X	X	X	X	X	X	X	X	X
S2	Fitted speed sensor type NPN*	X	X	X	X	X	X	X	X	X	X	X

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

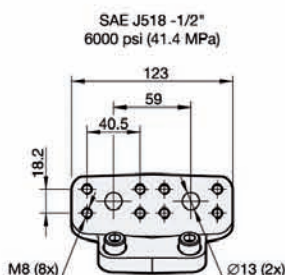
Dimensions SCM 012-034



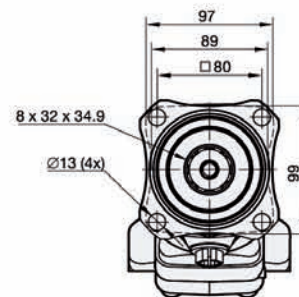
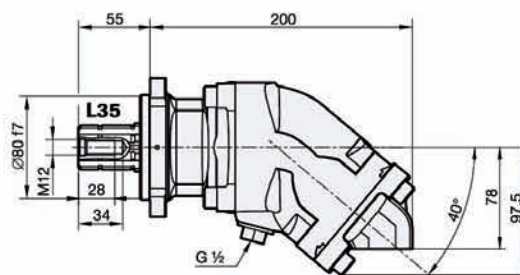
S3



DL4

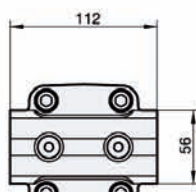


V2

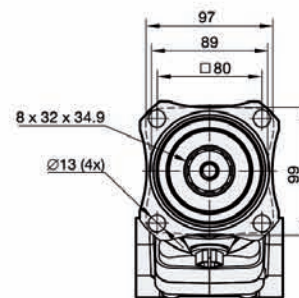
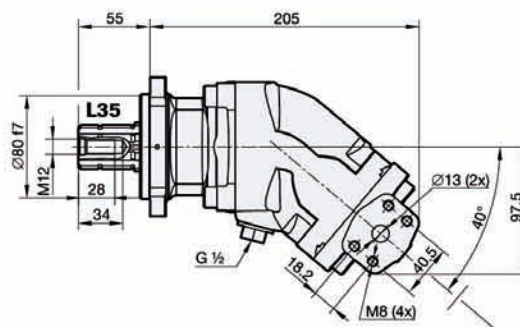


DL4

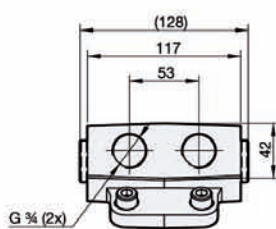
SAE J518 - 1/2"
6000 psi (41.4 MPa)



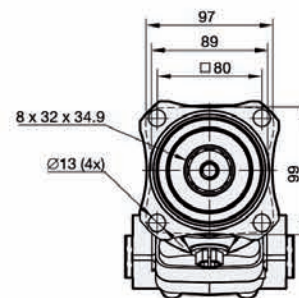
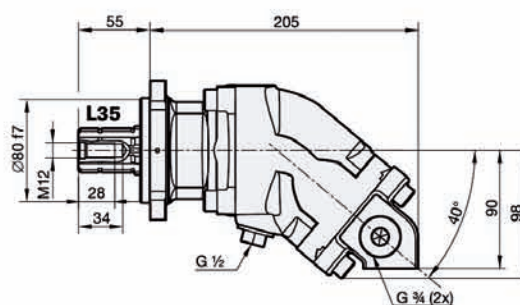
R1



DL4

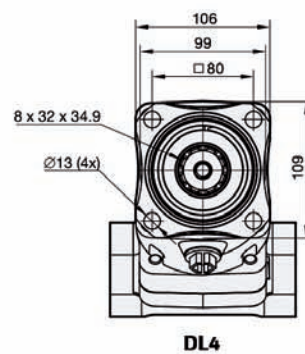
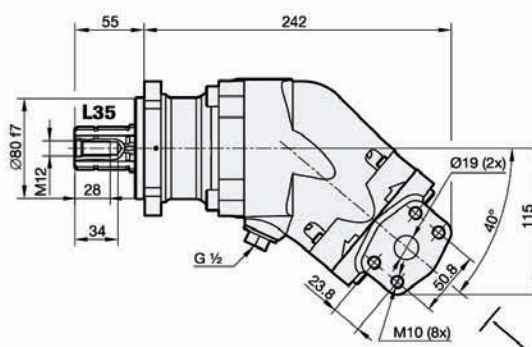
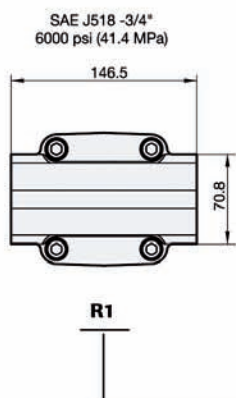
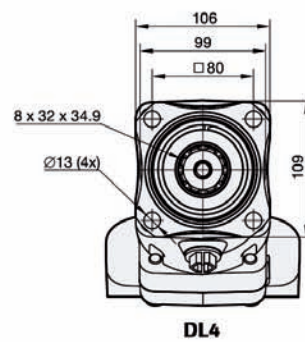
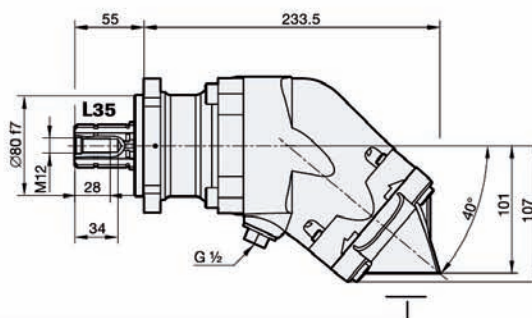
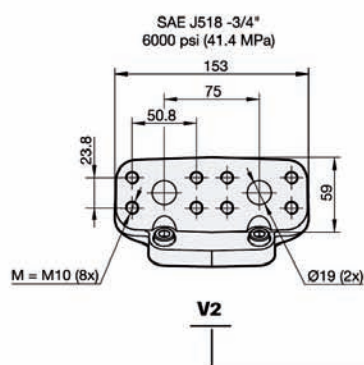
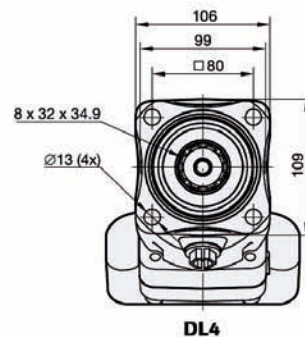
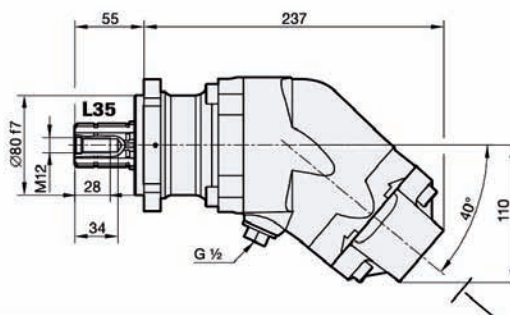
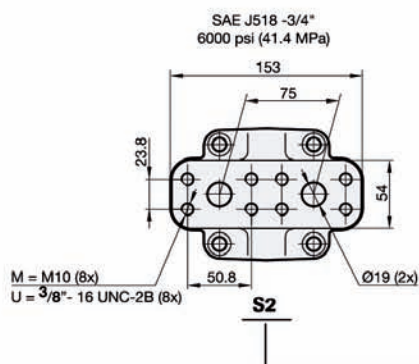


K3

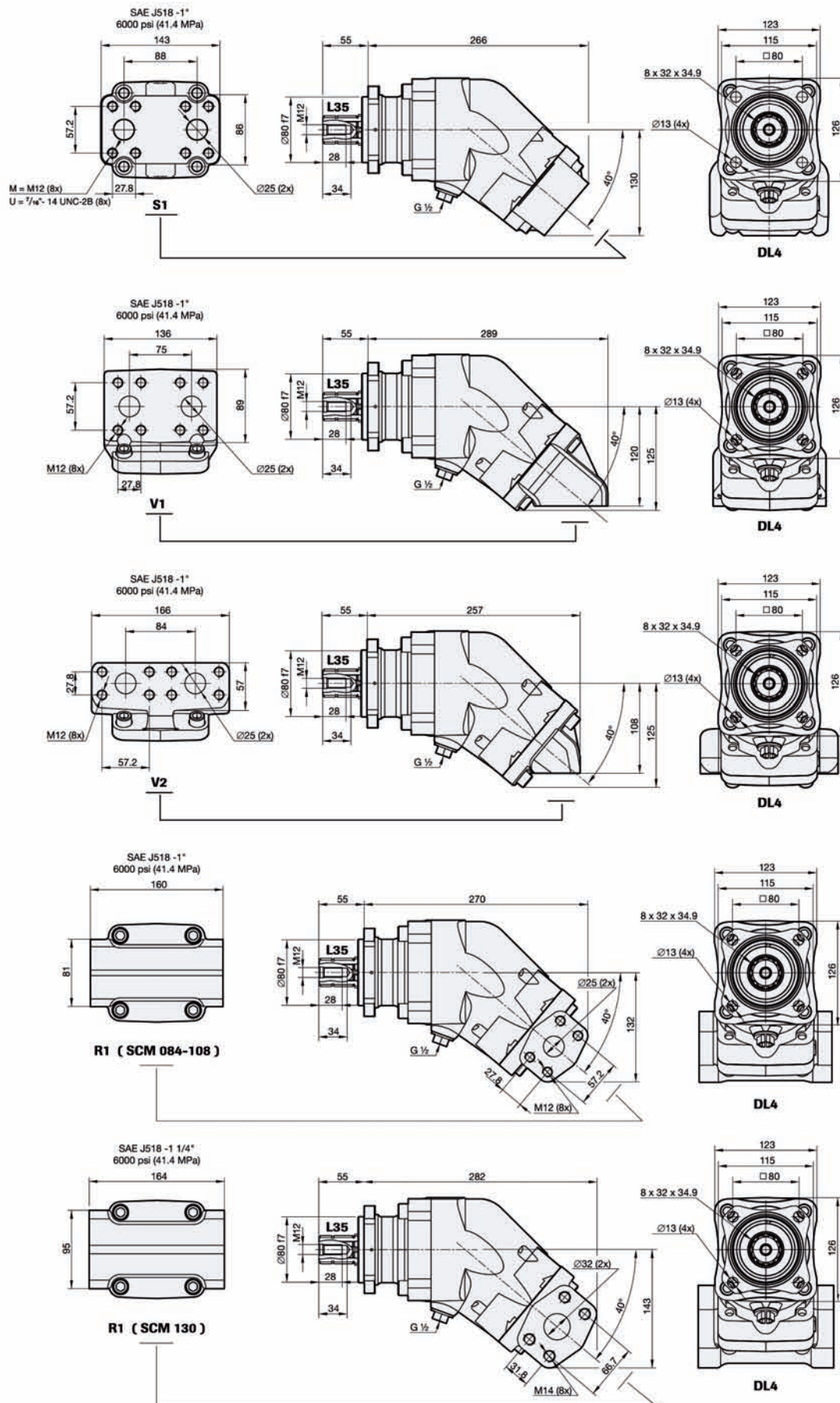


DL4

SCM 040-064



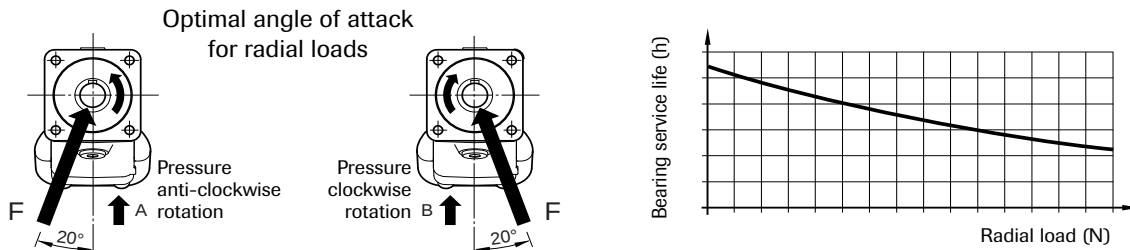
SCM 084-130



General instructions

Shaft loads

The service life of the motor largely depends on the service life of the bearings. These are affected by the operating conditions such as speed, pressure, oil viscosity and degree of purification.

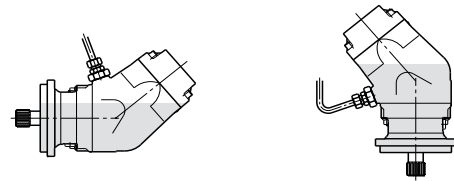


External loading of the shaft, its size, direction and location also affect the service life of the bearings.

If a calculation of bearing service life is required for special applications, contact our Tech Dpt.

Installation

The motor housing is filled with oil to at least 50% of the volume before start up. The drainage hose is connected to the drainage outlet positioned highest on the motor. The other end is connected below the oil level in the oil tank.



Hydraulic fluids

High performance oil meeting the specifications of ISO type HM, DIN 51524-2HLP or better must be used. Min. viscosity 10 cSt is required to guarantee lubrication. Ideal viscosity is 20 - 40 cSt.

Pipe dimensions

The recommended flow velocity in the pressure line is max 7 m/sec.

Filtering

Cleanliness ISO norm 4406, code 16/13 is recommended.

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, cm³/rev

n = revolutions, rev/min

P = power, kW

Q = flow, litre/min

η_v = volumetric efficiency

η_{hm} = hydromechanical efficiency

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

M = torque, Nm

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

SCM 025–108 M2



SCM 025-108 M2 is a range of robust axial piston motors with cartridge flange especially suitable for winch-, slewing-, wheel- and track drives.

SCM 025-108 M2 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. The SCM 025-108 M2 covers the entire displacement range 25-108 cm³/rev. at a maximum pressure of 400 bar.

It's well dimensioned, double tapered roller bearings permit high shaft loads and lead to excellent speed characteristics. It's high level of reliability is based on the choice of materials, hardening methods, surface structures and the quality assured manufacturing process.

Other advantages:

- High maximum speed
- Smooth operation over the entire speed range
- High efficiency
- Suitable for applications with high angular accelerations due to its high rotary stiffness

Motor SCM 025-108 M2		025	034	040	047	056	064	084	090	108
Displacement	cm ³ /rev	25.4	34.2	41.2	47.1	56.7	63.5	83.6	90.7	108.0
Working pressure										
max intermittent	MPa	40	40	40	40	40	40	40	40	35
max continuous		35	35	35	35	35	35	35	35	30
Revolutions										
max intermittent	rpm	7000	7000	6300	6300	6300	6300	5200	5200	5200
max continuous		6300	6300	5700	5700	5700	5700	4700	4700	4700
min continuous		300	300	300	300	300	300	300	300	300
Power										
max intermittent	kW	86	115	125	145	175	195	215	230	230
max continuous		40	55	60	65	80	90	100	110	110
Starting torque theoretical value	Nm/MPa	4.0	5.4	6.6	7.5	8.9	10.0	13.3	14.4	17.1
Moment of inertia (x 10 ⁻³)	kg m ²	1.1	1.1	2.6	2.6	2.6	2.6	7.4	7.4	7.4
Weight	kg	11.0	11.0	18.3	18.3	18.3	18.3	26.0	26.0	26.0

Data concerning RPM are based on maximum permitted peripheral velocity of the tapered roller bearing.
Max intermittent power data may vary dependent on application. For further information please contactur Tech Dpt.
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.

VERSIONS, MAIN DATA

Example

SC	M	-	025	W	-	N	-	M21	-	W30	-	V2	M	-	1	00
Line	1		2	3		4		5		6		7	8		9	10

Line

SC	Compact, bent-axis design
----	---------------------------

1. Type

M	Motor
---	-------

2. Displacement

025	034	040	047	056	064	084	090	108
-----	-----	-----	-----	-----	-----	-----	-----	-----

3. Direction of rotation

W	Independent
---	-------------

4. Sealing

N	Nitrile
H	High pressure, nitrile
V	Viton

5. Mounting flange

		025	034	040	047	056	064	084	090	108
M21	ø 135	X	X	-	-	-	-	-	-	-
M22	ø 160	-	-	X	X	X	X	-	-	-
M23	ø 190	-	-	-	-	-	-	X	X	X

6. Shaft

Spline DIN 5480		025	034	040	047	056	064	084	090	108
W30	W30x2x14x9g	X	X	X	X	X	X	-	-	-
W35	W35x2x16x9g	-	-	X	X	X	X	X	X	X
W40	W40x2x18x9g	-	-	-	-	-	-	X	X	X

X = Standard, preferred

(X) = Available, option

O = Contact our Tech Dpt.

7. Connection cover

		025	034	040	047	056	064	084	090	108
V1	90° Mount flange vertical *	-	-	-	-	-	-	X	X	X
V2	90° Mount flange horizontal *	X	X	X	X	X	X	X	X	X

* According to SAE J518 code 62

8. Connections

		025	034	040	047	056	064	084	090	108
M	Metric	X	X	X	X	X	X	X	X	X

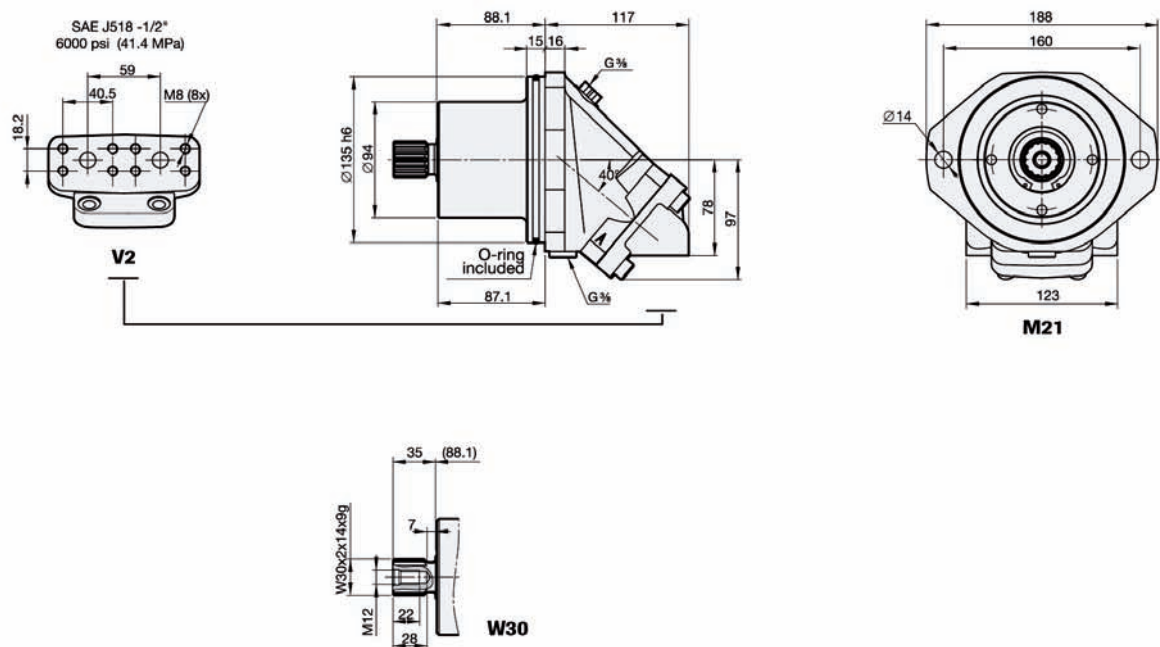
9. Additional

1	External drainage
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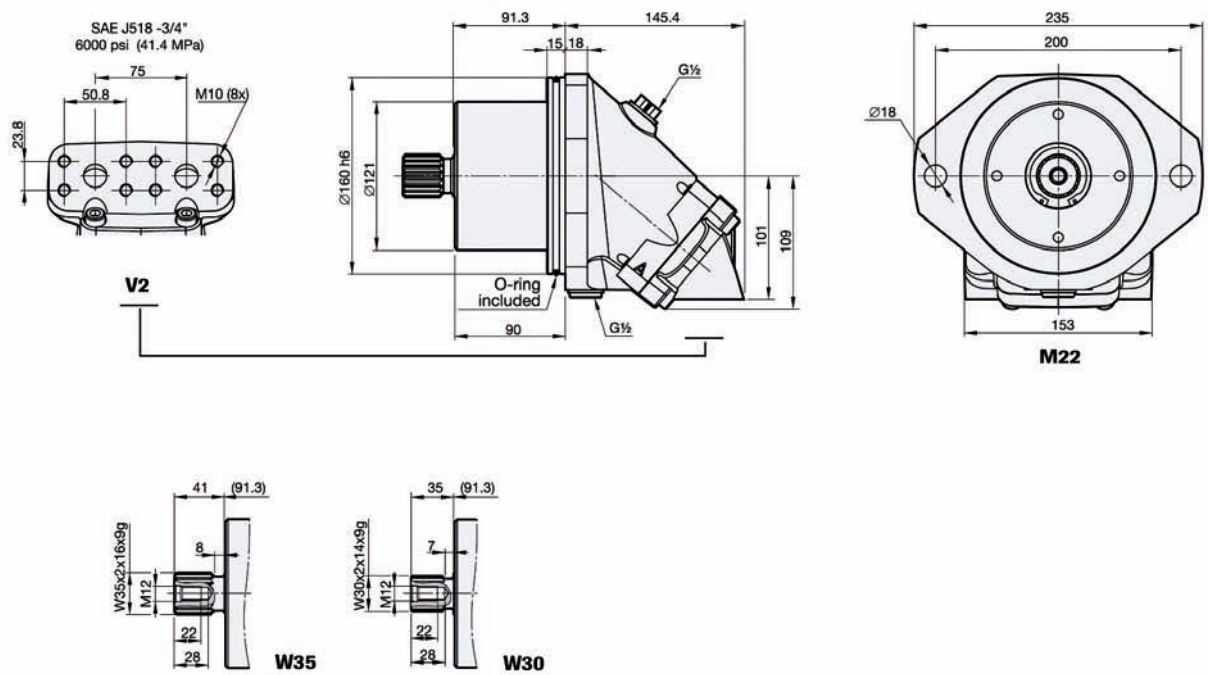
10. Accessories

00	No accessories available
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SCM 025-034 M2



SCM 040-064 M2



General instructions

Choice of shaft seal

Motor SCM	Code	Temp.	Max. housing pressure MPa at rpm						
		°C	1000	2000	3000	4000	5000	6000	7000
025-064	N	75	0.55	0.27	0.18	0.14	0.11	0.09	0.08
	H	75	2.46	1.23	0.82	0.61	0.49	0.41	0.35
	V	90	0.55	0.27	0.18	0.14	0.11	0.09	0.08
084-108	N	75	0.38	0.19	0.13	0.10	0.08	0.06	
	H	75	1.72	0.86	0.57	0.43	0.34	0.29	
	V	90	0.38	0.19	0.13	0.10	0.08	0.06	

Code according to page 2, Versions, main data

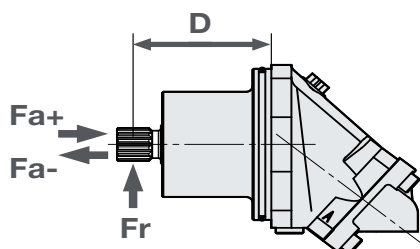
Factors affecting the choice of shaft seal include the hydraulic motor housing pressure and the drainage oil temperature.

The drainage oil should have a maximum temperature of 75 °C with a Nitrile shaft seal and 90 °C with a Viton shaft seal. These temperatures must not be exceeded.
The housing pressure must be equal to or greater than the external pressure on the shaft seal.

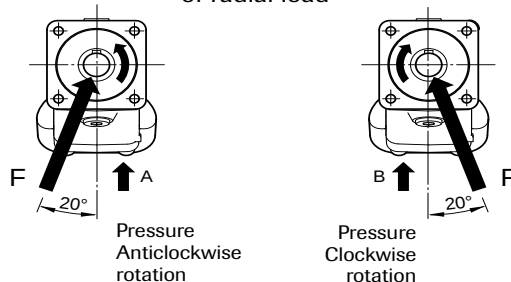
Shaft loads

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 M2 Max recommended shaft loads		025	034	040	047	056	064	084	090	108
Fr (radial) max ¹	kN	7.5	7.5	7.5	8	8.5	8.5	14.5	14.5	15
Distance D (to point of force)	mm	100	100	110	110	110	110	120	120	120
Fa (axial) + (at standstill/ 0 bar pressure) max	kN	3	3	4	4	4	4	5	5	5
Fa (axial) - (at standstill/ 0 bar pressure) max	kN	7	7	7	7	10	11	13	14	16
Fa (axial) + (at 400 bar pressure) max ²	kN	7	7	7	7	10	11	13	14	16
Fa (axial) - (at 400 bar pressure) max ²	kN	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

For other forces, please contact our Tech Dpt. for advice.

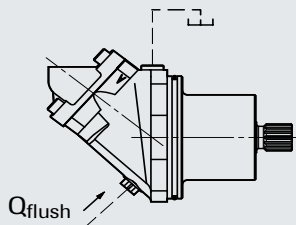
Temperatures/Housing cooling

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.

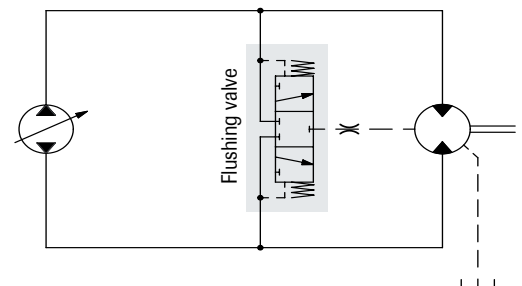
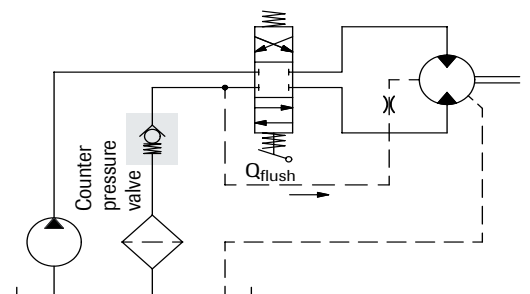
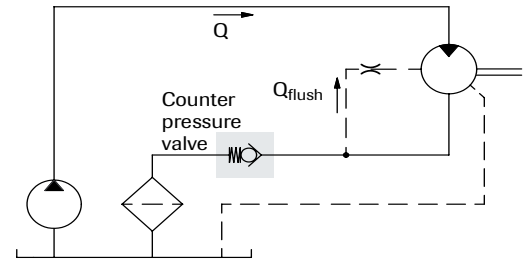
Cooling/flushing of the motor housing can be needed to keep the drain flow temperature at an acceptable level.

Suggested flow:

Motor SCM	Flushing l/min	Cont. RPM
025-034	2-8	≥ 2800
040-064	4-10	≥ 2500
084-108	6-12	≥ 2200



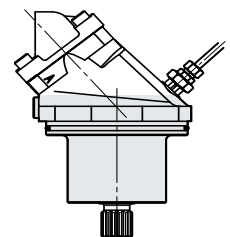
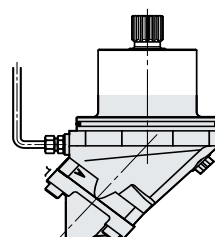
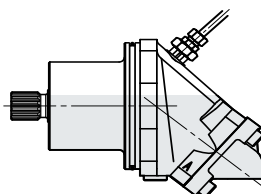
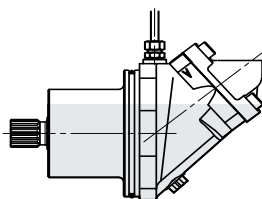
Housing flushing can be built up with the help of a flushing valve or taken directly from the return line. When the return pressure is too low this is compensated for by a counter pressure valve. The tank line is connected to the highest point as in the figure.



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.



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 our Tech Dpt.

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, cm³/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

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, 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.

We also offers a two-bolt flange, SAE B2 010- 034 in the SCM family. The design features double tapered roller bearings, which permits high shaft loads and gives superb speed performance.

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

Motor SCM 010-130 SAE		010	012	017	025	025	034	034	040	047	056	064	084	084	090	090	108	108	130
		SAE B	SAE B	SAE B	SAE B	SAE C	SAE B	SAE C	SAE C	SAE C	SAE C	SAE C	SAE C	SAE D	SAE C	SAE D	SAE C	SAE D	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	63.5	83.6	83.6	90.7	90.7	108.0	108.0	130.0
Working pressure																			
max intermittent	MPa	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	35
max continuous		35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	30
Revolutions																			
max intermittent	rpm	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
Power																			
max intermittent	kW	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/MPa	1.5	2.0	2.7	4.0	4.0	5.4	5.4	6.6	7.5	8.9	10.0	13.3	13.3	14.4	14.4	17.1	17.1	20.5
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 permitted peripheral velocity of the tapered roller bearing.
Max intermittent power data may vary dependent on application. For further information please contactur Tech Dpt.
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.

VERSIONS, MAIN DATA

Example

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

Line	
SC	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. Sealing	
N	Nitrile
H	High pressure, nitrile
V	Viton

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 X -
SD4	SAE D-4 hole - - - - - - - - - X X X X

6. Shaft	
	010 012 017 025 034 040 047 056 064 084 090 108 130
Spline SAE J498b 30° Class 5	
B13	13T 16/32 X X X X X - - - - - - - -
C14	14T 12/24* - - - X X X X X X X O O -
C21	21T 16/32* - - - - - X X X X X X X -
D13	13T 8/16** - - - - - - - - - X X X X
Key SAE J744	
B25	ø 25.4 X X X X X - - - - - - - -
C32	ø 31.7* - - - - - X X X X O O O -
D44	ø 44.45** - - - - - - - - - X X X X

* Only with SC4 mounting flange
** Only with SD4 mounting flange

X = Standard, preferred
(X) = Available, option
O = Contact our Tech Dpt.

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 - - - -
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 X
R1	Side connections, flanged *	- - - X 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 X
U	UN***	X X X X X X X X X X X X X

* Only threaded connections
** Only flanged connections
*** Only available for S covers

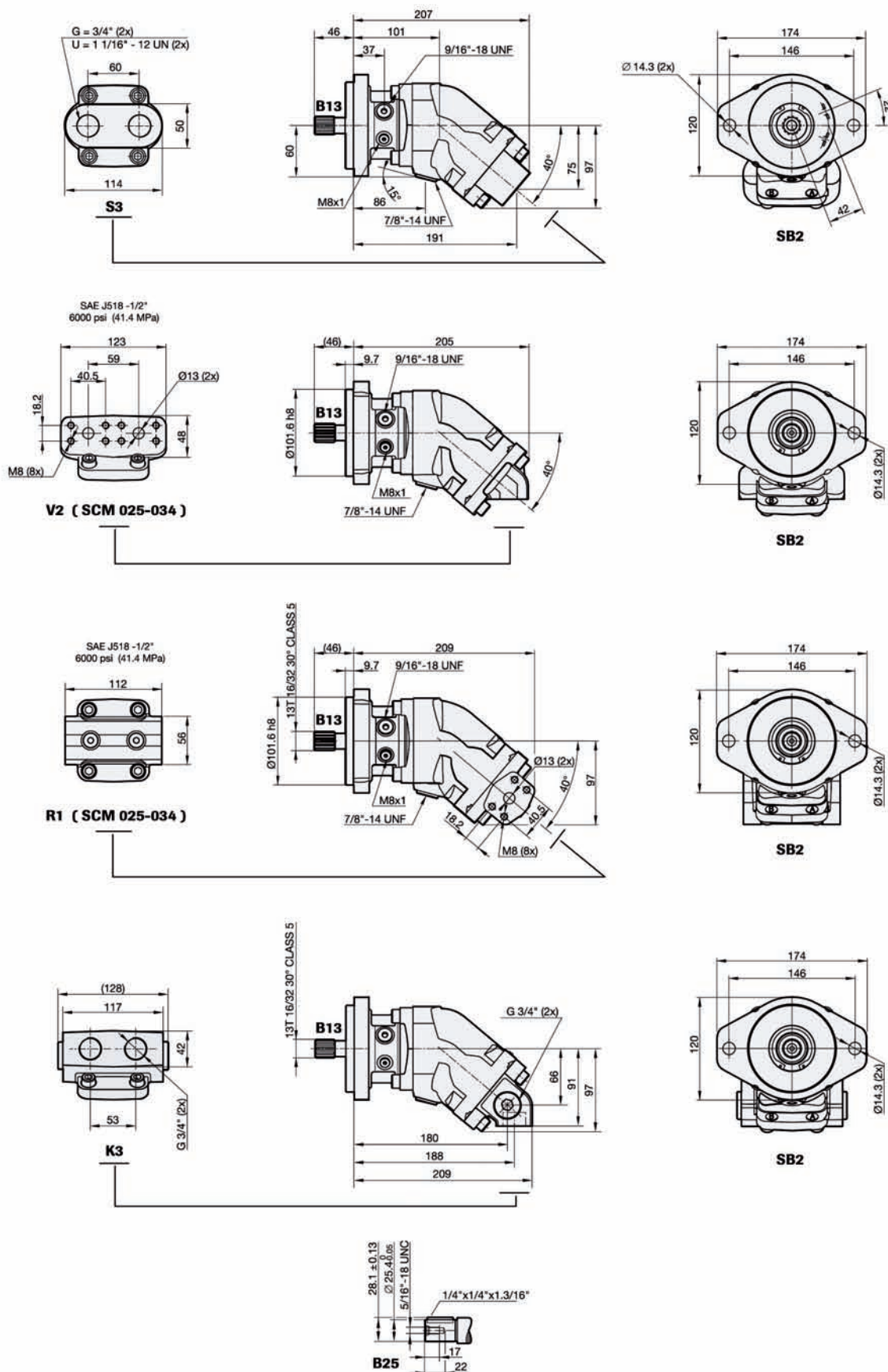
9. Additional	
1	External drainage

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

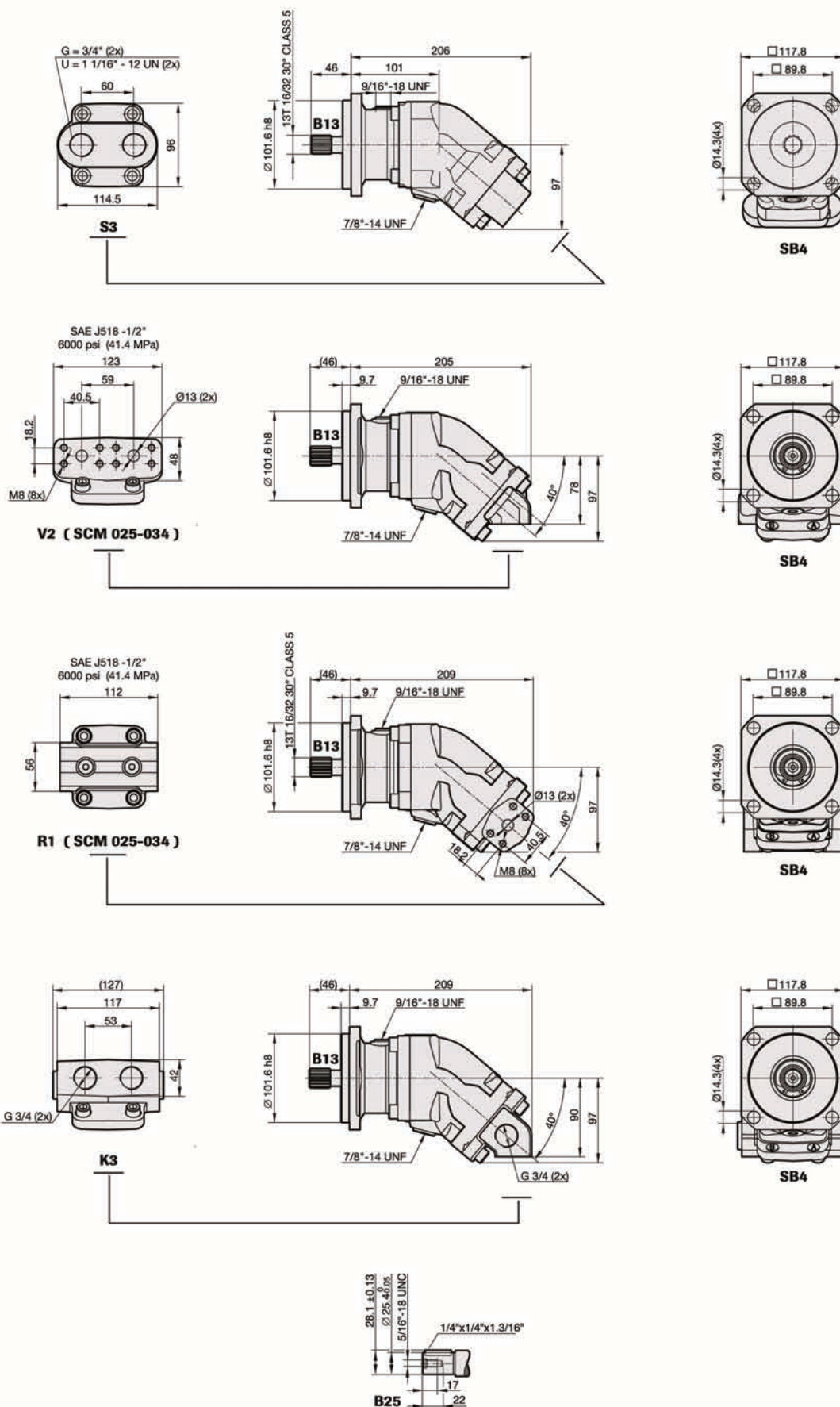
* See separate brochure "Speed sensor hall" for more information.

Dimensions

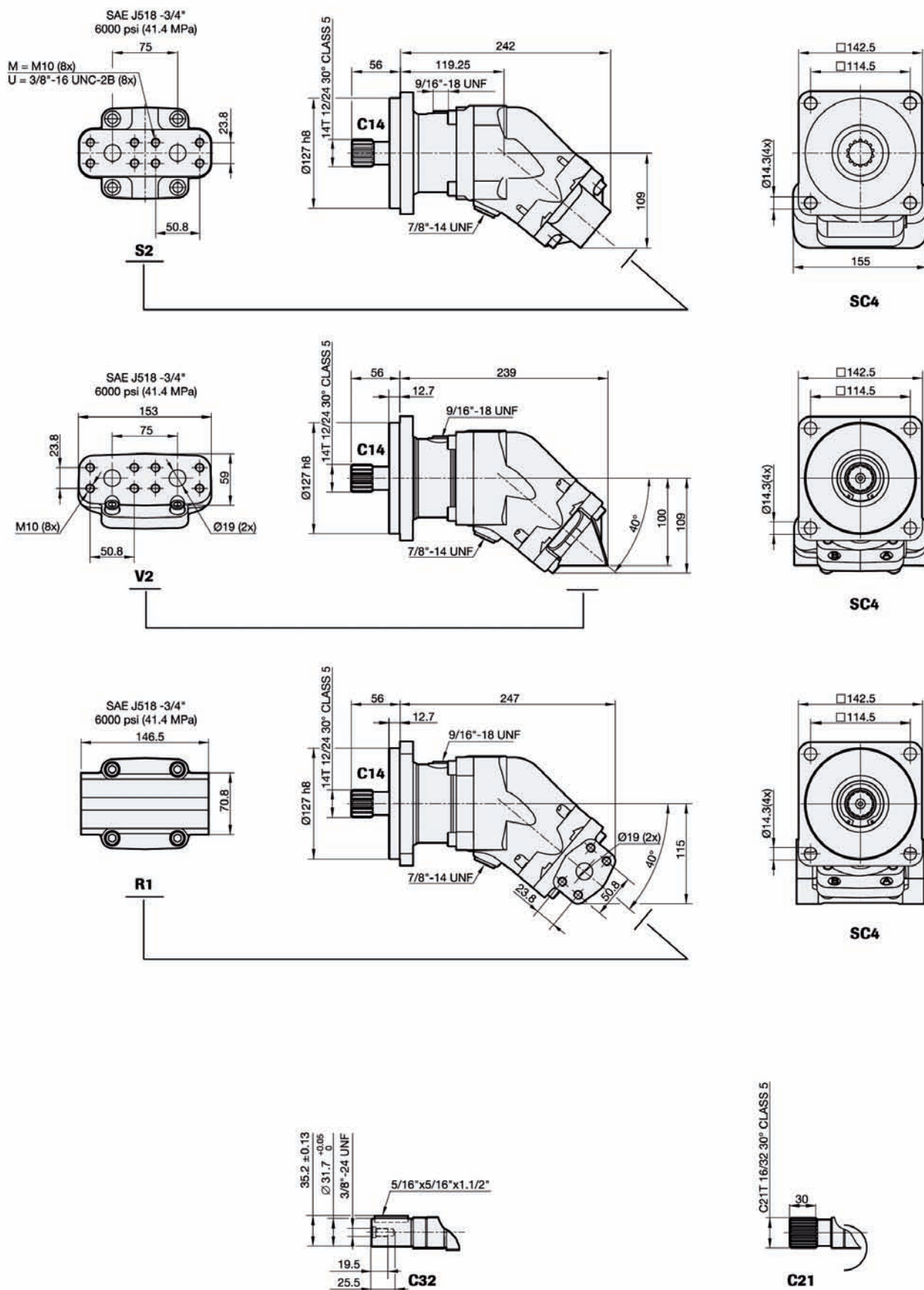
SCM 010-034 SAE B2



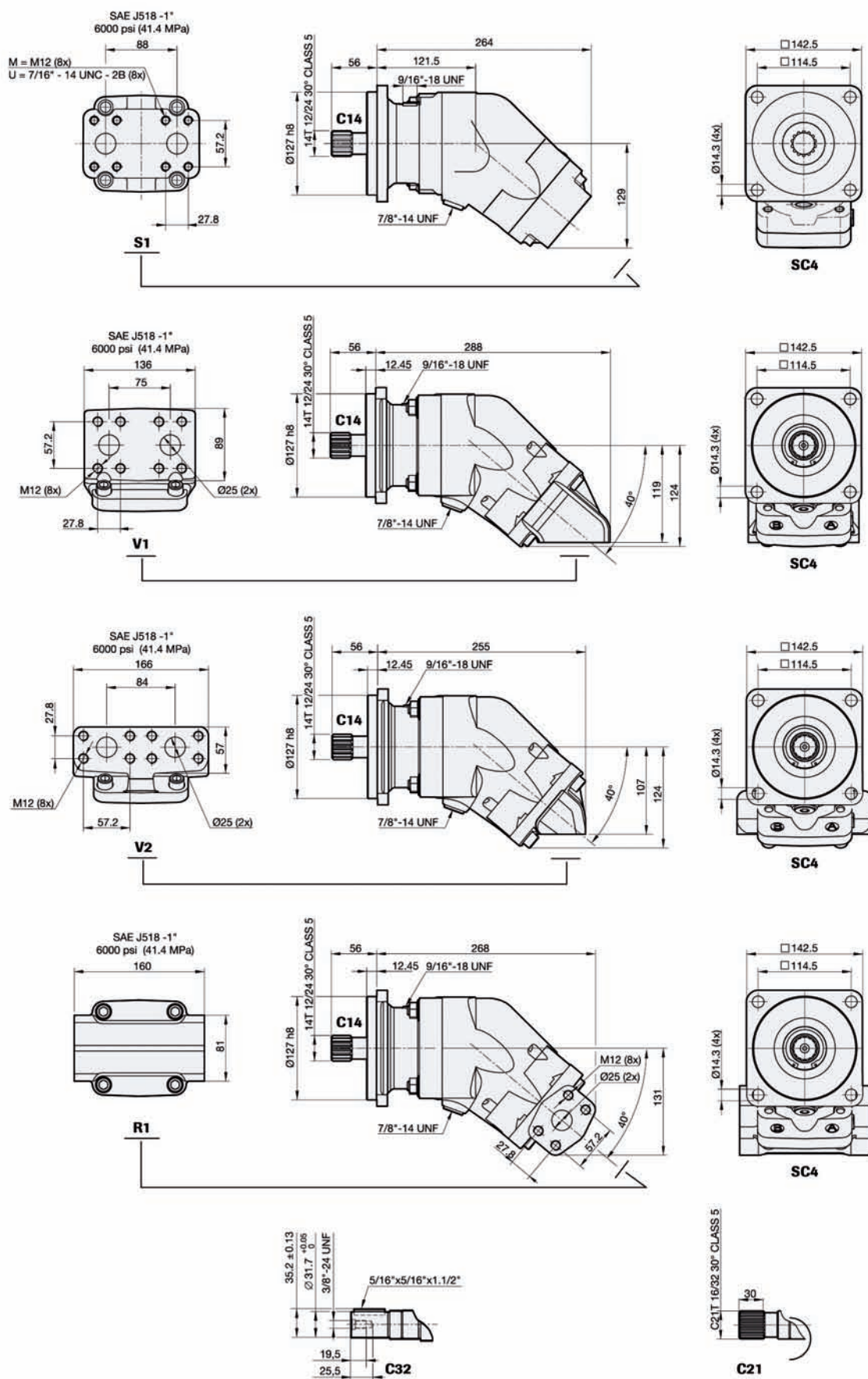
SCM 010-034 SAE B4



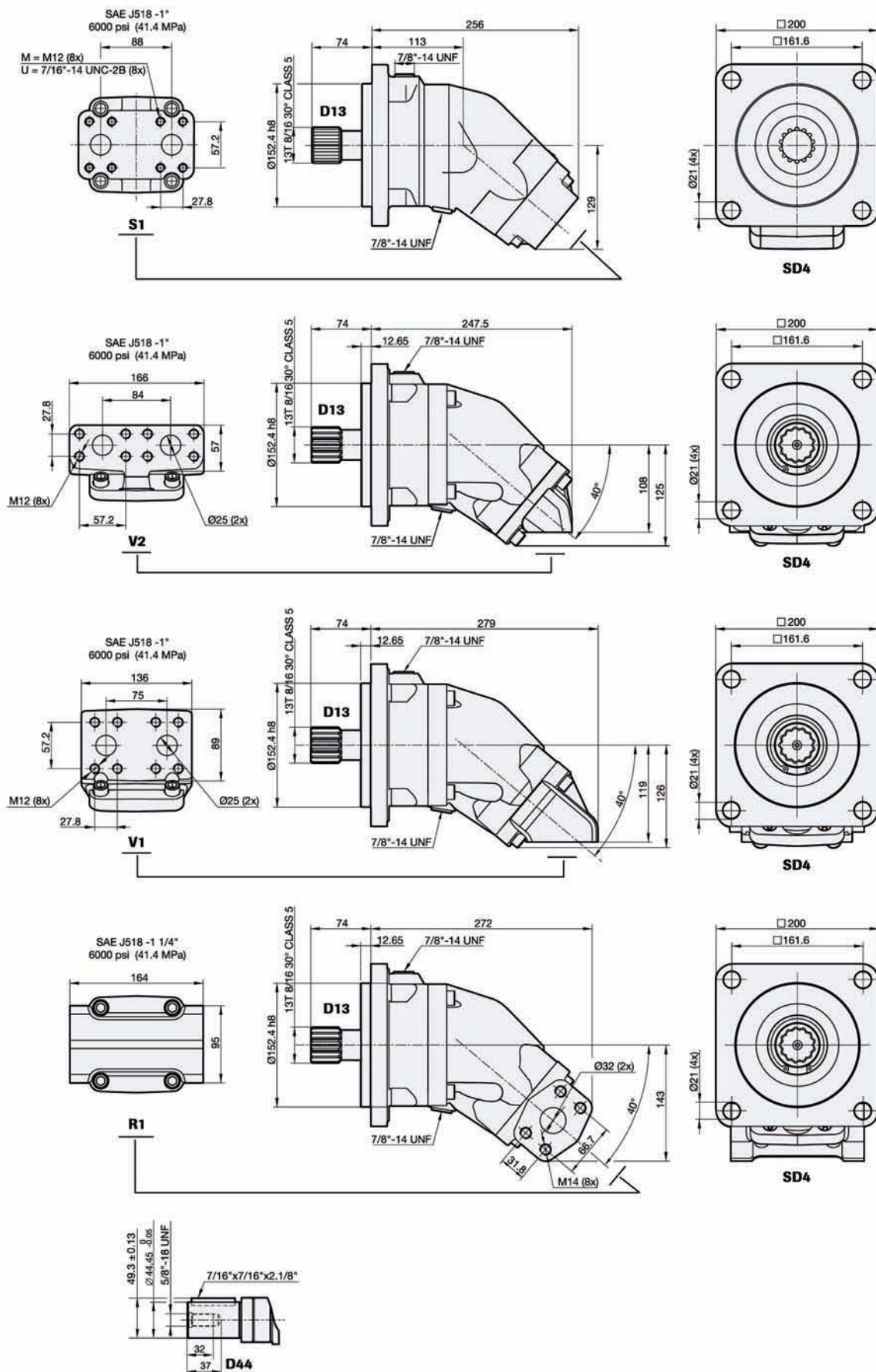
SCM 040-064 SAE C



SCM 084-108 SAE C



SCM 084-130 SAE D



General instructions

Choice of shaft seal

Motor SCM	Code	Temp.	Max. housing pressure MPa at rpm				
		°C	1000	2000	3000	4000	5000
010-034 B	N	75	0.55	0.27	0.18	0.14	0.11
	H	75	2.46	1.23	0.82	0.61	0.51
	V	90	0.55	0.27	0.18	0.14	0.11
040-108 C	N	75	0.55	0.27	0.18	0.14	0.11
	H	75	2.46	1.23	0.82	0.61	0.51
	V	90	0.55	0.27	0.18	0.14	0.11
084-130 D	N	75	0.35	0.17	0.12		
	H	75	1.56	0.78	0.52		
	V	90	0.35	0.17	0.12		

Code according to page 2, Versions, main data

Factors affecting the choice of shaft seal include the hydraulic motor housing pressure and the drainage oil temperature.

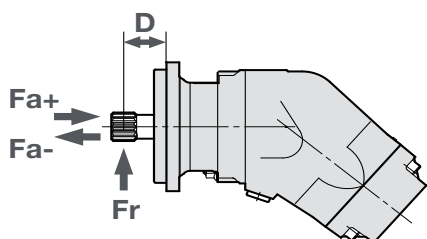
The drainage oil should have a maximum temperature of 75 °C with a Nitrile shaft seal and 90 °C with a Viton shaft seal. These temperatures must not be exceeded.

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

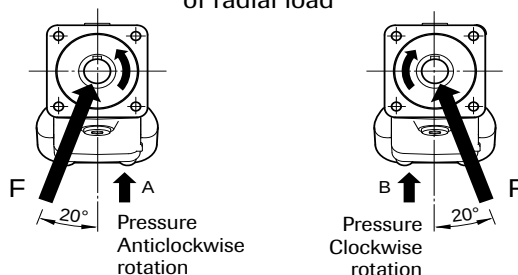
Shaft loads

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		010	012	017	025	025	034	034	040	047	056	064	084	084	108	108	130
Max recommended shaft loads		SAE B	SAE B	SAE B	SAE B	SAE C	SAE B	SAE C	SAE C4	SAE C	SAE C	SAE C	SAE C	SAE D	SAE C	SAE D	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 our Tech Dpt. for advice.

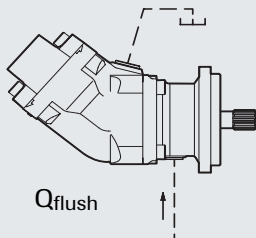
Temperatures/Housing cooling

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.

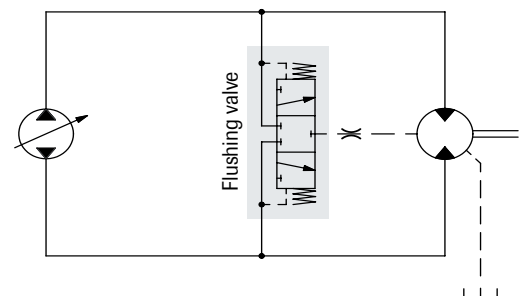
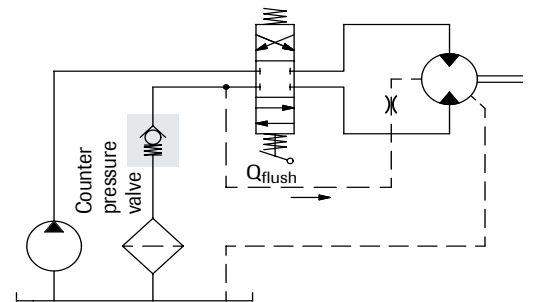
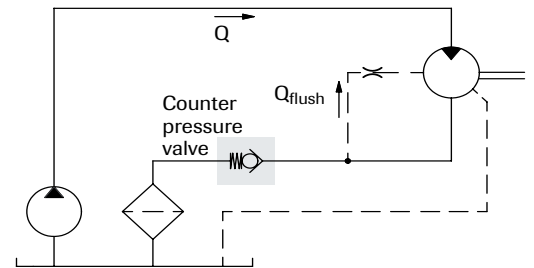
Suggested flow:

Motor SCM	Flushing l/min	Cont. RPM
012-034	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.

Additional technical data

Noise levels and bearing life calculations available on request. Please contact our Tech Dpt.

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.

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, cm³/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

SCM 010-130 ISO



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

SCM 010-130 ISO 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's well dimensioned, double tapered roller bearings permit high shaft loads and lead to excellent speed characteristics. The motor's high level of reliability is based on the choice of materials, hardening methods, surface structures and the quality assured manufacturing process.

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

Motor SCM 010-130 ISO		010	012	017	025	034	040	047	056	064	084	090	108	130
Displacement	cm ³ /rev	9.6	12.6	17.0	25.4	34.2	41.2	47.1	56.7	63.5	83.6	90.7	108.0	130.0
Working pressure	MPa	40	40	40	40	40	40	40	40	40	40	40	40	35
max intermittent		35	35	35	35	35	35	35	35	35	35	35	35	30
max continuous														
Revolutions	rpm	8800	8800	8800	7000	7000	6300	6300	6300	6300	5200	5200	5200	5200
max intermittent		8000	8000	8000	6300	6300	5700	5700	5700	5700	4700	4700	4700	4700
max continuous		300	300	300	300	300	300	300	300	300	300	300	300	300
min continuous														
Power	kW	41	54	74	86	115	125	145	175	195	215	230	275	285
max intermittent		15	20	25	40	55	60	65	80	90	100	110	130	135
max continuous														
Starting torque theoretical value	Nm/MPa	1.5	2.0	2.7	4.0	5.4	6.6	7.5	8.9	10.0	13.3	14.4	17.1	20.5
Moment of inertia (x 10 ⁻³)	kg m ²	0.9	0.9	0.9	1.1	1.1	2.6	2.6	2.6	2.6	7.4	7.4	7.4	7.4
Weight	kg	8.5	8.5	8.5	9.5	9.5	16.5	16.5	16.5	16.5	28.0	28.0	30.5	30.5

Data concerning RPM are based on maximum permitted peripheral velocity of the tapered roller bearing.
Max intermittent power data may vary dependent on application. For further information please contact our Tech Dpt.
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.

VERSIONS, MAIN DATA

Example

SC	M	-	010	W	-	N	-	I41	-	W25	-	K3	G	-	1	00
Line	1		2	3		4		5		6		7	8		9	10

Line	
SC	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. Sealing	
N	Nitrile
H	High pressure, nitrile
V	Viton

5. Mounting flange	
ISO 3019-2	010 012 017 025 034 040 047 056 064 084 090 108 130
I41	ISO 4-h ø80
I42	ISO 4-h ø100
I43	ISO 4-h ø125
I44	ISO 4-h ø140
I45	ISO 4-h ø160

6. Shaft	
	010 012 017 025 034 040 047 056 064 084 090 108 130
Spline DIN 5480	
W20	W20x1.25x14x9g
W25	W25x1.25x18x9g
W30	W30x2x14x9g
W32	W32x2x14x9g
W35	W35x2x16x9g
W40	W40x2x18x9g
W45	W45x2x21x9g
Key DIN 6885	
K20	ø 20 k6
K25	ø 25 k6
K30	ø 30 k6
K35	ø 35 k6
K40	ø 40 k6
K45	ø 45 k6

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 - - - -
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 X
R1	Side connections, flanged *	- - - X 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 X
U	UN***	- X X X X X X X X X X X X X

* Only threaded connections

** Only flanged connections

*** Only available for S covers

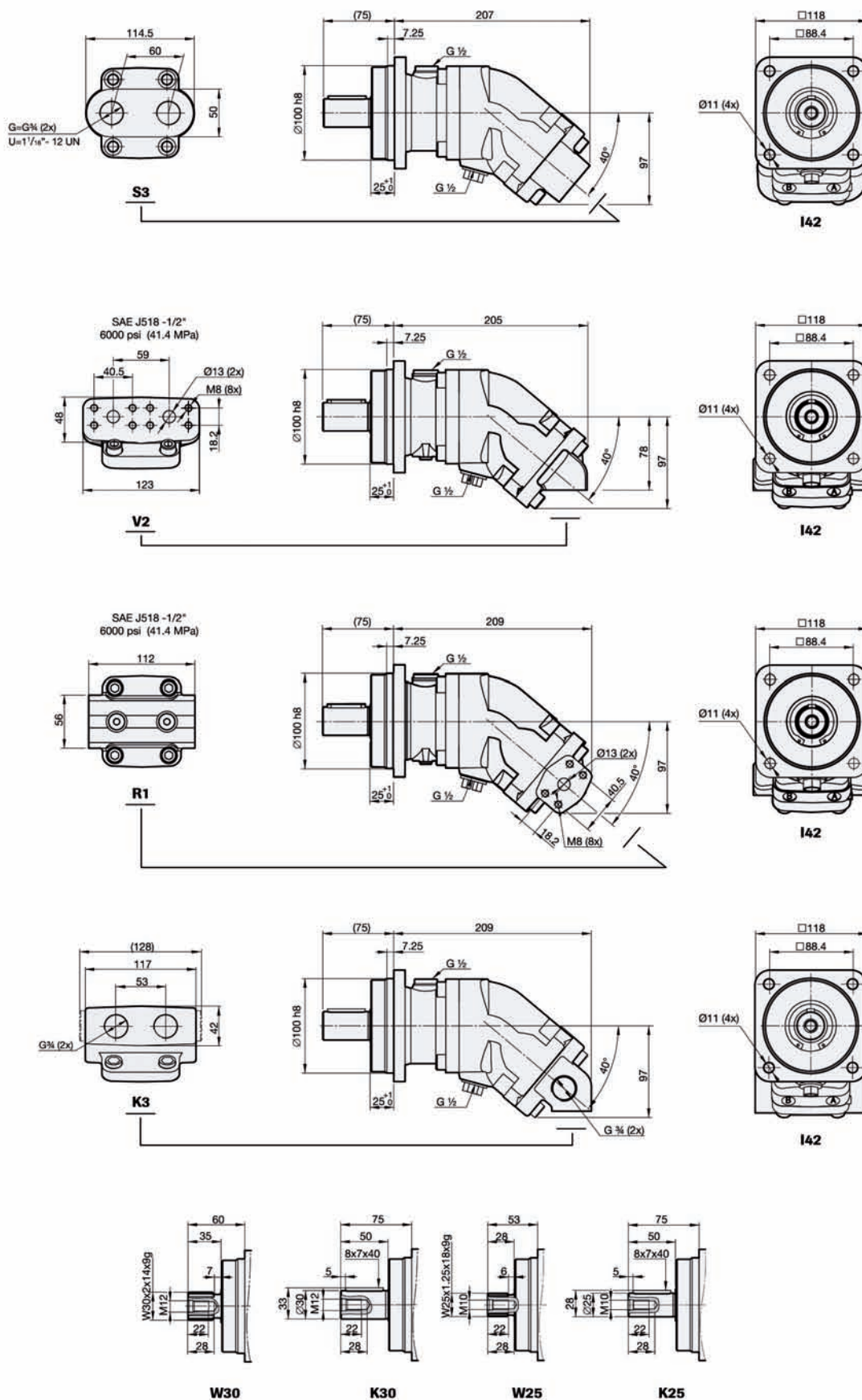
9. Additional	
1	External drainage

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

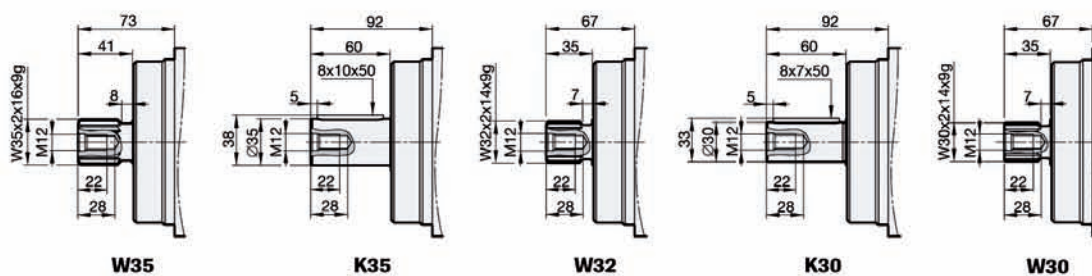
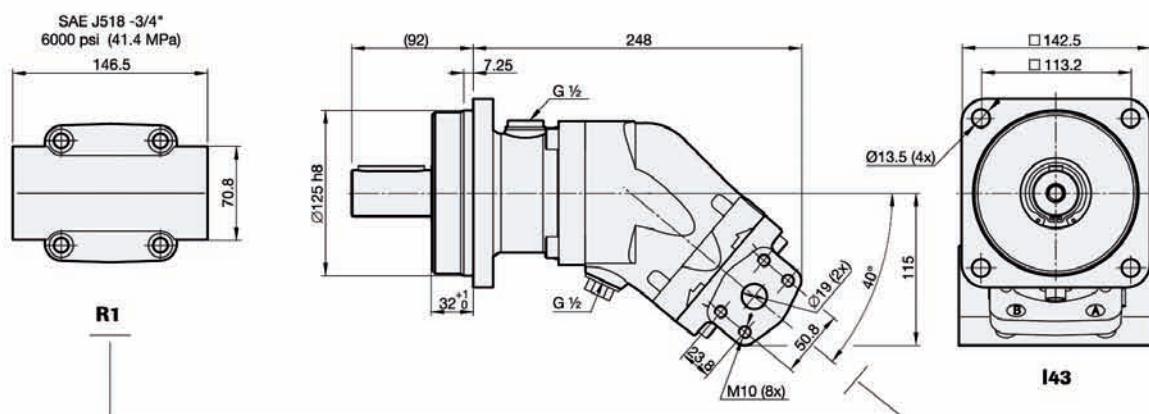
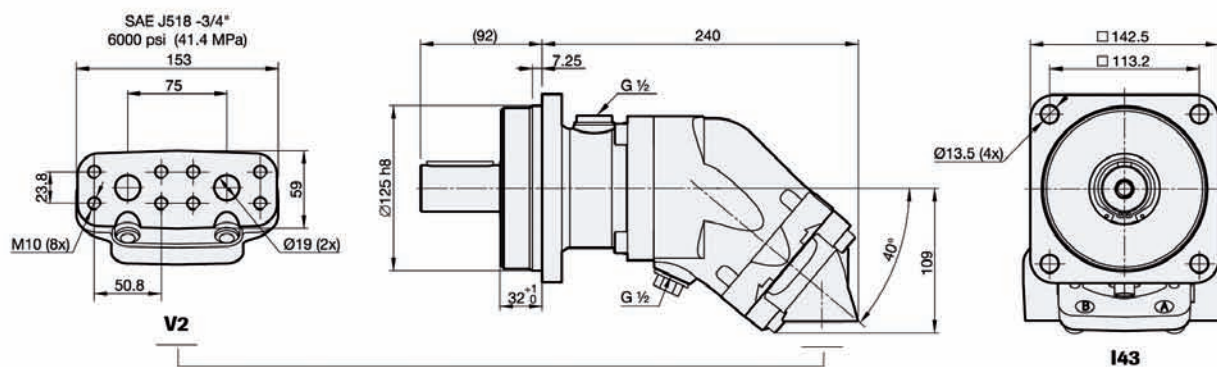
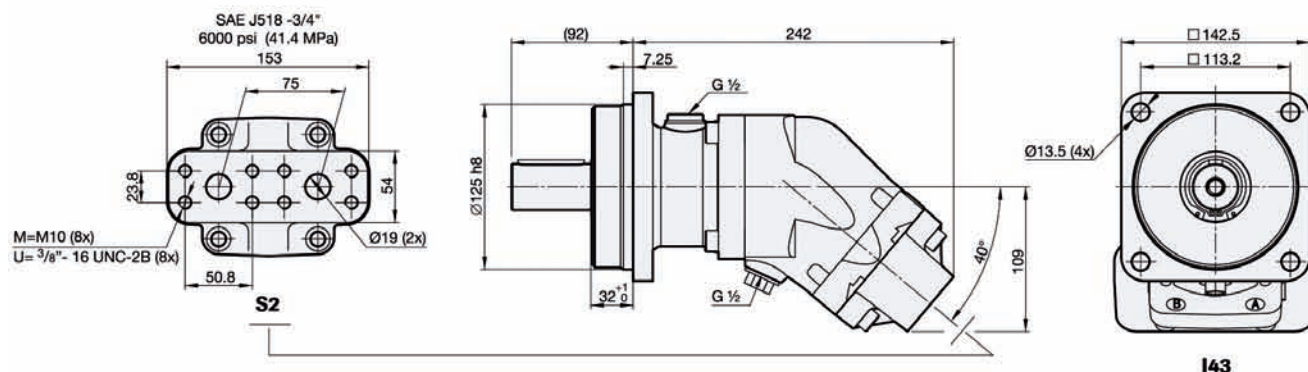
* See separate brochure "Speed sensor hall" for more information.

X = Standard, preferred
O = Contact our Tech Dpt.

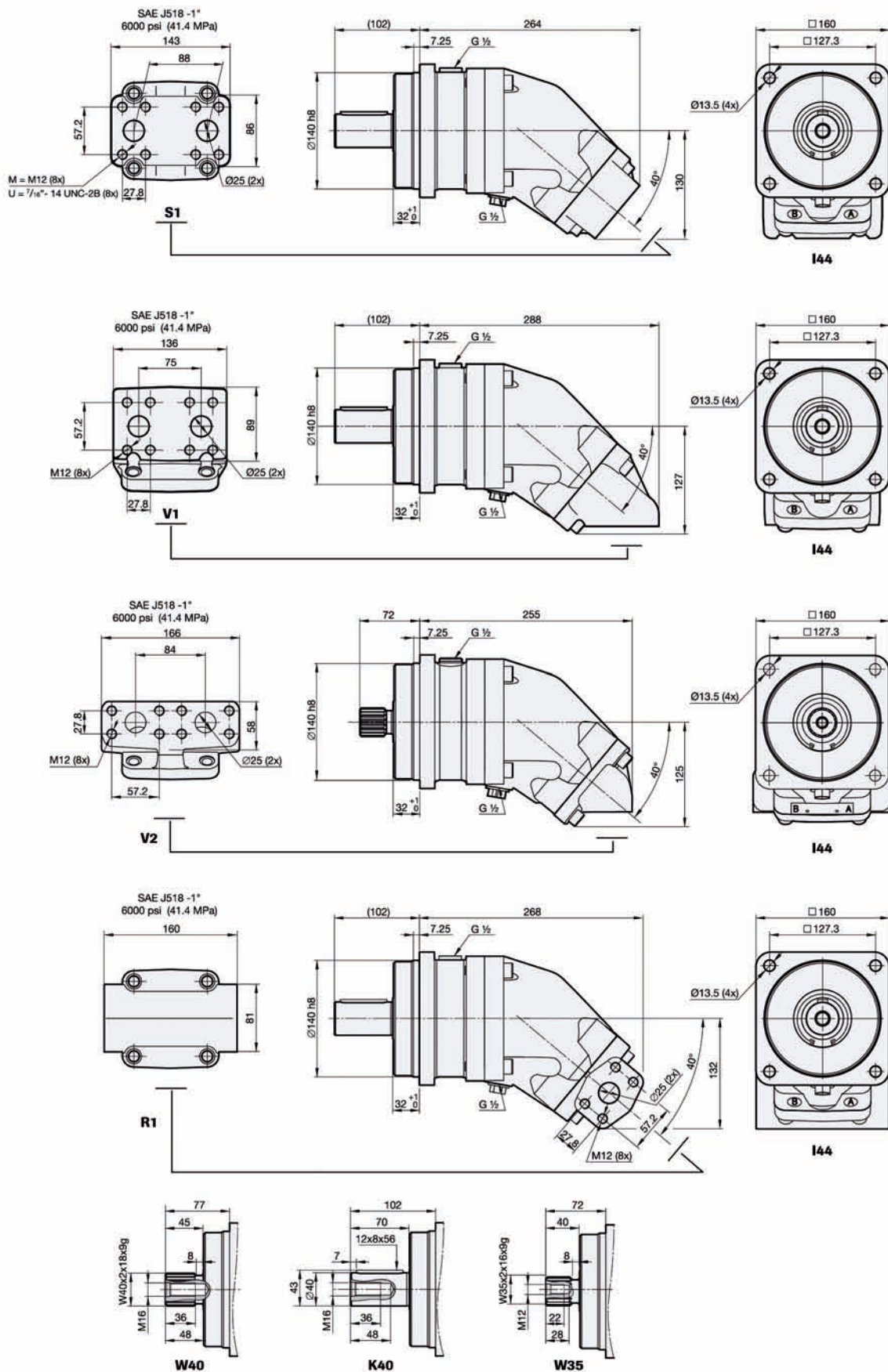
SCM 025-034



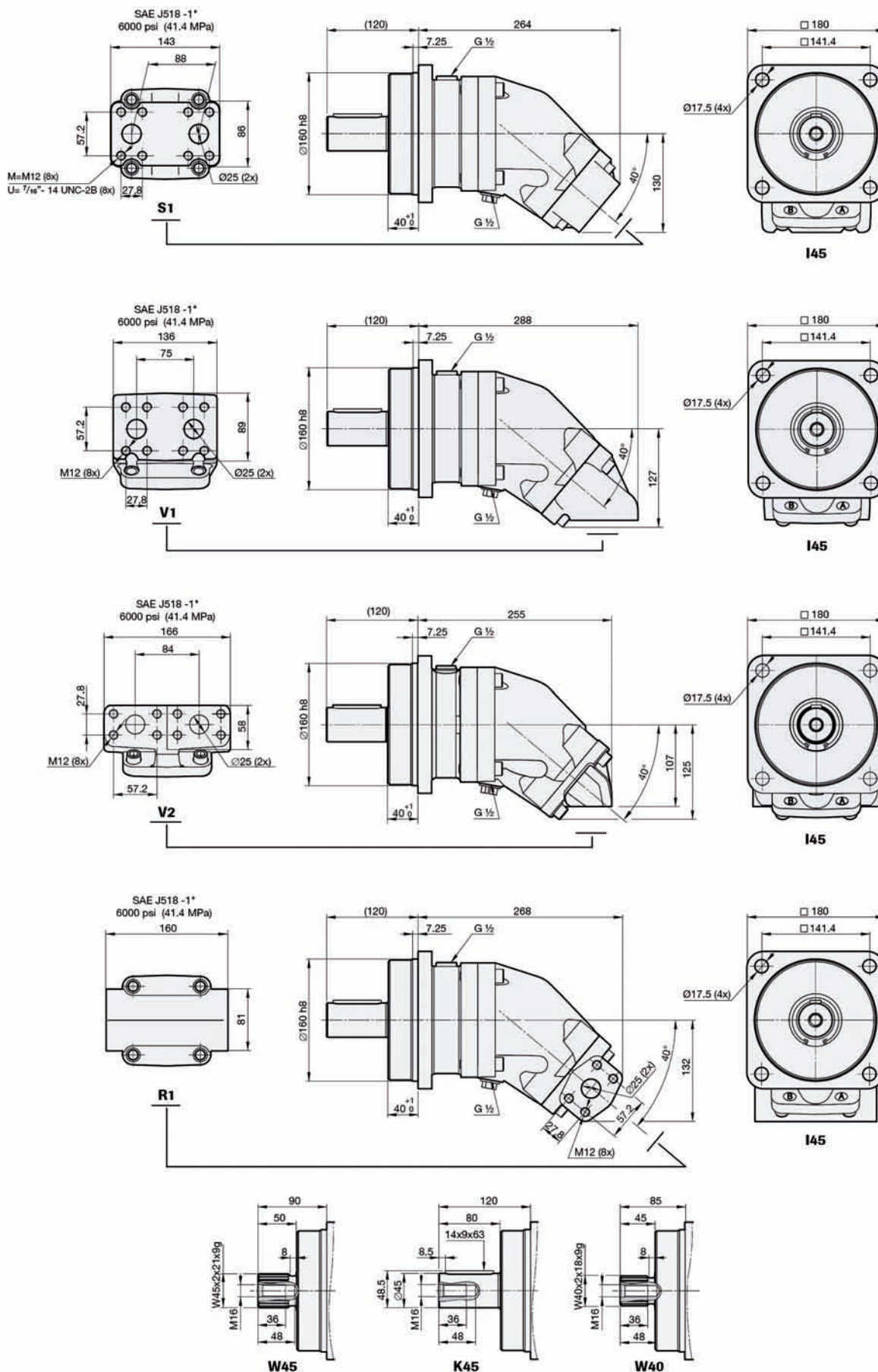
SCM 040-064



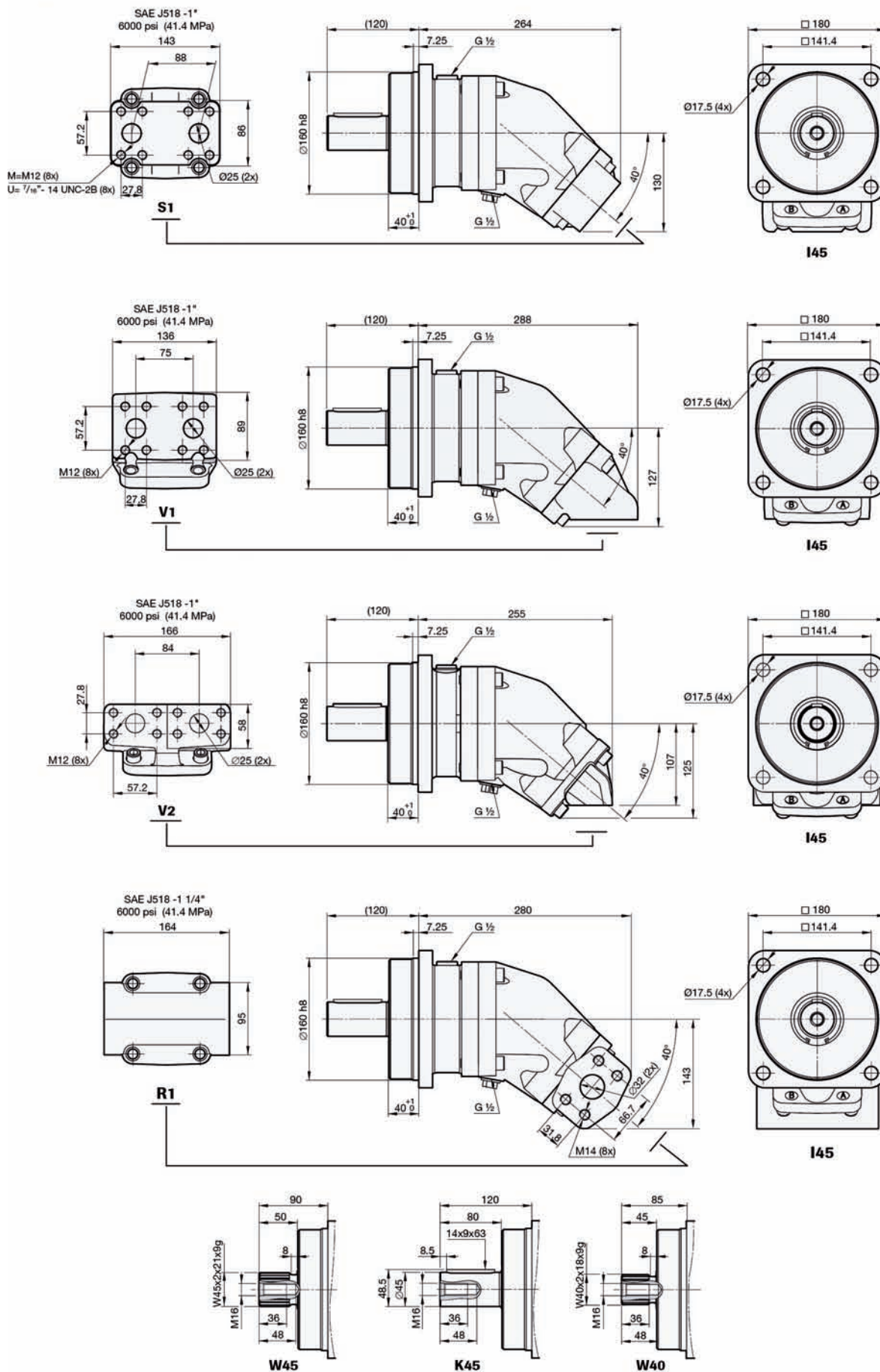
SCM 084-090



SCM 108



SCM 130



General instructions

Choice of shaft seal

Motor SCM	Code	Temp.	Max. housing pressure bar at rpm								
		°C	1000	2000	3000	4000	5000	6000	7000	8000	9000
010-034	N	75	5.5	2.7	1.8	1.4	1.1	0.9	0.8	0.7	0.6
	H	75	24.6	12.3	8.2	6.1	4.9	4.1	3.5	3.1	2.7
	V	90	5.5	2.7	1.8	1.4	1.1	0.9	0.8	0.7	0.6
040-064	N	75	5.5	2.7	1.8	1.4	1.1	0.9	0.8		
	H	75	24.6	12.3	8.2	6.1	4.9	4.1	3.5		
	V	90	5.5	2.7	1.8	1.4	1.1	0.9	0.8		
084-130	N	75	3.8	1.9	1.3	1.0	0.8	0.6			
	H	75	17.2	8.6	5.7	4.3	3.4	2.9			
	V	90	3.8	1.9	1.3	1.0	0.8	0.6			

Code according to page 2, Versions, main data

Factors affecting the choice of shaft seal include the hydraulic motor housing pressure and the drainage oil temperature.

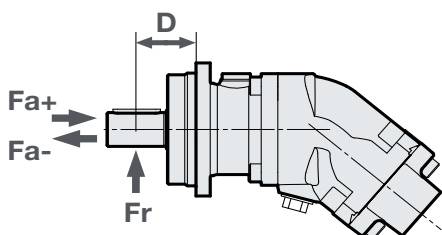
The drainage oil should have a maximum temperature of 75 °C with a Nitrile shaft seal and 90 °C with a Viton shaft seal. These temperatures must not be exceeded.

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

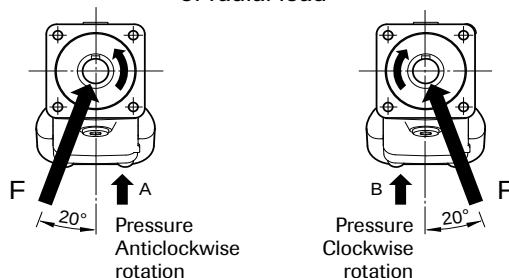
Shaft loads

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 ISO Max recommended shaft loads		010	012	017	025	034	040	047	056	064	084	090	108	130
Fr (radial) max ¹⁾	kN	7	7	7	8	8	8.5	8.5	9	9	12	12.5	12.5	13
Distance D (to point of force)	mm	45	45	45	50	50	60	60	60	60	65	65	70	70
Fa (axial) + (at standstill/ 0 bar pressure) max	kN	3	3	3	3	3	4	4	4	4	5	5	5	5
Fa (axial) - (at standstill/ 0 bar pressure) max	kN	4	4	5	7	7	7	7	10	11	13	14	16	19
Fa (axial) + (at 400 bar pressure) max ²⁾	kN	4	4	5	7	7	7	7	10	11	13	14	16	19
Fa (axial) - (at 400 bar pressure) max ²⁾	kN	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

For other forces, please contact our Tech Dpt. for advice.

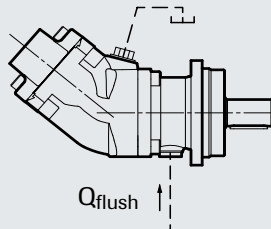
Temperatures/Housing cooling

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.

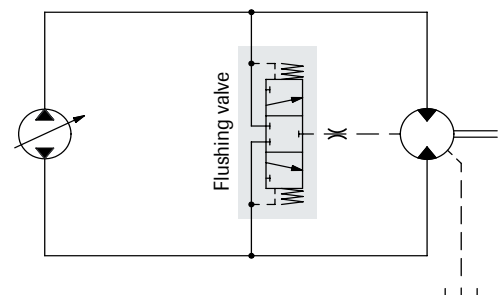
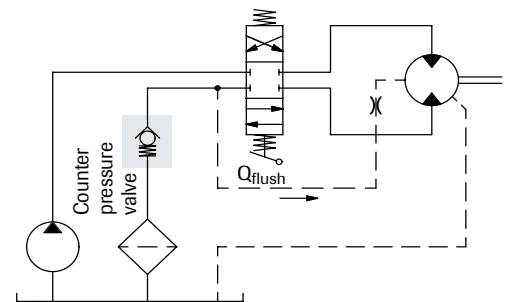
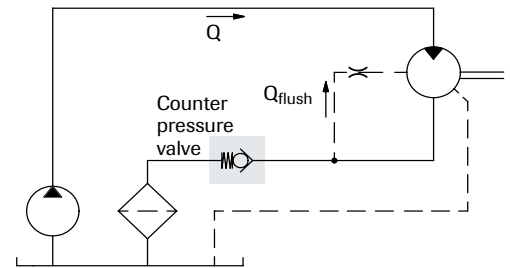
Cooling/flushing of the motor housing can be needed to keep the drain flow temperature at an acceptable level.

Suggested flow:

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



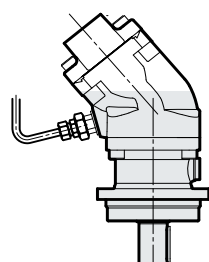
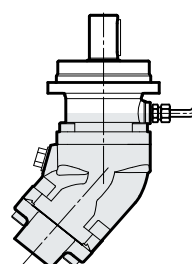
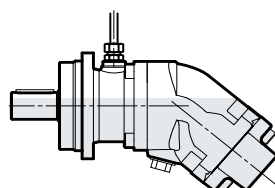
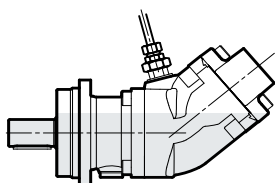
Housing flushing can be built up with the help of a flushing valve or taken directly from the return line. When the return pressure is too low this is compensated for by a counter pressure valve. The tank line is connected to the highest point as in the figure.



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.



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 our Tech Dpt.

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, cm³/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

As HANSA-TMP has a very extensive range of products and some products have a variety of applications, the information supplied may often only apply to specific situations.

If the catalogue does not supply all the information required, please contact HANSA-TMP.

In order to provide a comprehensive reply to queries we may require specific data regarding the proposed application.

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