PUMP DESIGN

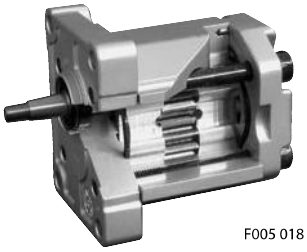
SEP1

SEP1 is available in a limited displacement range. In addition to European flange and shaft configurations (code SC01, CO01, and FR03), the range includes special shafts and flanges for power pack applications. SEP1 has a lower pressure rating than SNP1 and SKP1.

SNP1

SNP1 is available in a limited displacement range but with higher-pressure ratings than the SEP1. This is because of DU bushings used in its design. SNP1 pumps only include European flange and shaft configurations *(code CO01, SC01, and FR03)*.

SNP1 CO01 (cut away)



F005 018

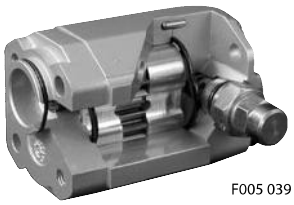
SKP1

SKP1 has a larger diameter shaft than either the SEP1 or SNP2. It spans the complete displacement range at higher pressures than the SEP1 and SNP1. Configurations include European and SAE flanges and shafts *(code CO02, CI02, SC06, and CI06)*.

SNI1

Sauer-Danfoss offers an optional integral relief valve integrated in the rear cover. It is drained internally and directs all flow from the pump outlet to the inlet when the outlet pressure reaches the valve setting. SNI1 pumps only include European flange and shaft configurations *(code CO01, SC01, and FR03)*.

SNI1 FR03 (cut away)



F005 039

TECHNICAL DATA

Specifications for the SNP1, SEP1 and SKP1 Group 1 gear pumps.

		Pump model										
		1.2	**1.7**	**2.2**	**2.6**	**3.2**	**3.8**	**4.3**	**6.0**	**7.8**	**10.0**	**12.0**
Displacement	cm^3/rev [in^3/rev]	1.18 [0.072]	1.57 [0.096]	2.09 [0.128]	2.62 [0.160]	3.14 [0.192]	3.66 [0.223]	4.19 [0.256]	5.89 [0.359]	7.59 [0.463]	9.94 [0.607]	12.00 [0.732]
SNP1 – 01 and 03 configuration												
Peak pressure	bar [psi]	270 [3915]	270 [3915]	270 [3915]	270 [3915]	270 [3915]	270 [3915]	270 [3915]	210 [3045]	170 [2465]	–	
Rated pressure	bar [psi]	250 [3625]	250 [3625]	250 [3625]	250 [3625]	250 [3625]	250 [3625]	250 [3625]	190 [2760]	150 [2175]		
Minimum speed at 0-150 bar	min^{-1} (rpm)	800	800	600	600	600	600	500	500	500		
Min. speed at 150 bar to rated pressure	min^{-1} (rpm)	1200	1200	1000	1000	1000	1000	800	800	800		
Maximum speed	min^{-1} (rpm)	4000	4000	4000	4000	4000	4000	3000	3000	3000		
SEP1 – 01 and 03 configuration												
Peak pressure	bar [psi]	230 [3335]	230 [3335]	230 [3335]	230 [3335]	230 [3335]	230 [3335]	230 [3335]	190 [2760]	160 [2320]	–	
Rated pressure	bar [psi]	210 [3045]	210 [3045]	210 [3045]	210 [3045]	210 [3045]	210 [3045]	210 [3045]	170 [2465]	140 [2030]		
Minimum speed at 0-150 bar	min^{-1} (rpm)	800	800	600	600	600	600	500	500	500		
Min. speed at 150 bar to rated pressure	min^{-1} (rpm)	1200	1200	1000	1000	1000	1000	800	800	800		
Maximum speed	min^{-1} (rpm)	4000	4000	4000	4000	4000	4000	3000	3000	3000		
SKP1* – 02 and 06 configuration												
Peak pressure	bar [psi]	270 [3915]	270 [3915]	270 [3915]	270 [3915]	270 [3915]	270 [3915]	270 [3915]	250 [3625]	220 [3190]	170 [2465]	140 [2030]
Rated pressure	bar [psi]	250 [3625]	250 [3625]	250 [3625]	250 [3625]	250 [3625]	250 [3625]	250 [3625]	230 [3335]	200 [2900]	150 [2175]	120 [1740]
Minimum speed at 0-150 bar	min^{-1} (rpm)	800	800	800	800	800	800	600	600	600	600	600
Min. speed at 150 bar to rated pressure	min^{-1} (rpm)	1200	1200	1000	1000	1000	1000	1000	800	800	800	–
Maximum speed	min^{-1} (rpm)	4000	4000	4000	4000	4000	4000	3000	3000	3000	2000	2000
All (SNP1, SEP1, SKP1)												
Weight	kg [lb]	1.02 [2.26]	1.05 [2.31]	1.09 [2.40]	1.11 [2.45]	1.14 [2.51]	1.18 [2.60]	1.20 [2.65]	1.30 [2.87]	1.39 [3.06]	1.55 [3.42]	1.65 [3.64]
Moment of inertia of rotating components	x 10^{-6} kg m^2 [x 10^{-6} lb•ft^2]	3.2 [77]	3.7 [89]	4.4 [105]	5.1 [120]	5.7 [136]	6.4 [152]	7.1 [168]	9.3 [220]	11.4 [271]	14.6 [347]	17.1 [407]
Theoretical flow at maximum speed	l/min [US gal/min]	4.72 [1.25]	6.28 [1.66]	8.36 [2.21]	10.48 [2.77]	12.56 [3.32]	14.64 [3.87]	12.57 [3.32]	17.67 [4.67]	22.77 [6.02]	19.88 [5.25]	24 [6.34]

* SKP1 is a special version of the SNP1. It is designed to accommodate an SAE 9T 20/40 DP-tooth splined shaft for higher torque applications.

Caution

The rated and peak pressure mentioned are for pumps with flanged ports only.
When threaded ports are required a de-rated performance has to be considered.
To verify the compliance of an high pressure application with a threaded ports pump apply to a Sauer-Danfoss representative.

MODEL CODE

A					B		C	D							
S	N	P	1	/	1	7	D	C	O	0	1					

A *Type*

Code	Description
SNP1	Standard gear pump
SKP1	High torque gear pump
SEP1	Medium pressure gear pump
SNI1	Gear pump with integral relief valve

B *Displacement*

Code	Description	SNP1	SKP1	SEP1	SNI1
1.2	1.18 cm^3/rev [0.072 in^3/rev]	●	●	●	●
1.7	1.57 cm^3/rev [0.096 in^3/rev]	●	●	●	●
2.2	2.09 cm^3/rev [0.128 in^3/rev]	●	●	●	●
2.6	2.62 cm^3/rev [0.160 in^3/rev]	●	●	●	●
3.2	3.14 cm^3/rev [0.192 in^3/rev]	●	●	●	●
3.8	3.66 cm^3/rev [0.223 in^3/rev]	●	●	●	●
4.3	4.19 cm^3/rev [0.256 in^3/rev]	●	●	●	●
6.0	5.89 cm^3/rev [0.359 in^3/rev]	●	●	●	●
7.8	7.59 cm^3/rev [0.463 in^3/rev]	●	●	●	●
10.0	0.94 cm^3/rev [0.607 in^3/rev]	–	●	–	–
12.0	12.0 cm^3/rev [0.732 in^3/rev]	–	●	–	–

C *Direction of rotation*

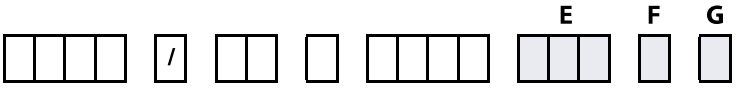
Code	Description	SNP1	SKP1	SEP1	SNI1
D	Right (Clockwise)	●	●	●	●
S	Left (Counterclockwise)	●	●	●	●

D *Shaft/mounting flange/port configuration*

Code	Description	SNP1	SKP1	SEP1	SNI1
CO01	Tapered shaft 1:8/European 4-bolt flange/European flanged ports	●	–	●	●
CO02	Tapered shaft 1:8/European 4-bolt flange/European flanged ports	–	●	–	–
CI02	Parallel shaft 12.0 mm/European 4-bolt flange/European flanged ports	–	●	–	–
CI06	Parallel shaft 12.7 mm/SAE A-A flange/SAE O-ring boss ports	–	●	–	–
SC01	DIN splined shaft/European 4-bolt flange/European flanged ports	●	–	●	●
SC06	SAE splined shaft/SAE A-A flange/SAE O-ring boss ports	–	●	–	–
FR03	Sauer-Danfoss tang shaft/threaded metric ports	●	–	●	●

Legend:
● = Standard
❍ = Optional
– = Not Available

MODEL CODE (continued)



E *Variant code (3-letter code describes variants to standard configuration)*

Code	Description
LAN	FR03 (configuration without shaft seal)
V**	Integral relief valve/Pressure setting/Pump speed for relief valve setting (min^{-1} [rpm]) see section *Variant codes, page 23*

F *Version (value representing a change to the initial project)*

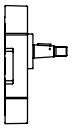
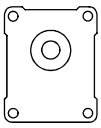
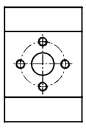
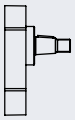
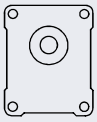
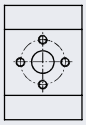
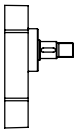
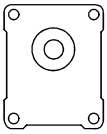
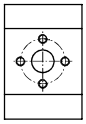
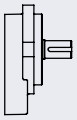
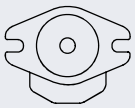
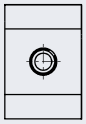
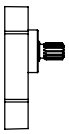
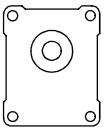
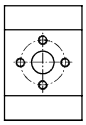
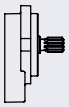
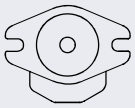
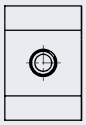
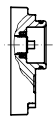
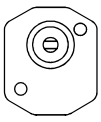
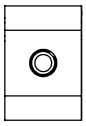
Code	Description
.	Initial project [*LEAVE BLANK]
1÷9 or **A÷Z**	It should be reserved to Sauer-Danfoss

G *Port type (if other than standard)*

Code	Description
.	Standard port for the flange type specified [*LEAVE BLANK]
B	Flanged port with threaded holes in **X** pattern (German standard ports), centered on the body
C	Flanged port with threaded holes in + pattern (European standard ports)
D	Threaded metric port
E	Threaded SAE O-ring boss port
F	Threaded GAS (BSPP) port

SHAFT, FLANGE, AND PORT CONFIGURATIONS

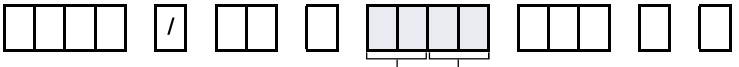
Shaft, flange and port configurations

Pump	Code	Shaft	Flange	Port
SEP1 **SNP1**	**CO01**	1:8 tapered 	25.4 mm [1.0 in] pilot Ø European 4-bolt 	European flanged port + pattern 
SKP1	**CO02**	1:8 tapered 	30 mm [1.181] pilot Ø European 4-bolt 	European flanged port + pattern 
SKP1	**CI02**	12 mm [0.472 in] parallel 	30 mm [1.181] pilot Ø European 4-bolt 	European flanged port + pattern 
SKP1	**CI06**	12.7 mm [0.5 in] parallel 	SAE A-A 2-bolt 	Threaded SAE O-ring boss 
SEP1 **SNP1**	**SC01**	15-teeth splined m = 0.75 α = 30° 	25.4 mm [1.0 in] pilot Ø European 4-bolt 	European flanged port + pattern 
SKP1	**SC06**	9-teeth splined SAE A-A 	SAE A-A 2-bolt 	Threaded SAE O-ring boss 
SEP1 **SNP1**	**FR03**	Sauer-Danfoss tang 	Sauer-Danfoss tang 	Threaded metric port 

SHAFT OPTIONS

Direction is viewed facing the shaft. Group 1 pumps are available with a variety of tang, splined, parallel, and tapered shaft ends. Not all shaft styles are available with all flange styles. Valid combinations and nominal torque ratings include:

Shaft availability and torque capability



Shaft		Mounting flange code with maximum torque in Nm [lbf•in]			
Code	**Decription**	**01**	**02**	**03**	**06**
CO	Taper 1:8	25 [221]	50 [442]	-	-
SC	Spline T-15, m=0.75, alfa=30°	35 [310]	-	-	-
SC	SAE spline J 498-9T-20/40DP	-	-	-	34 [301]
CI	Parallel 12 mm [0.47 in]	-	24 [212]	-	-
CI	Parallel 12.7 mm [0.50 in]	-	-	-	32 [283]
FR	Sauer-Danfoss tang	-	-	14 [124]	-

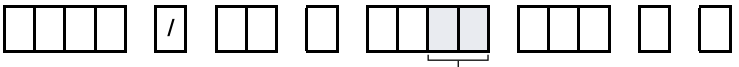
Sauer-Danfoss recommends mating splines conform to SAE J498 or DIN 5480. Sauer-Danfoss external SAE splines have a flat root side fit with circular tooth thickness reduced by 0.127 mm [0.005 in] in respect to class 1 fit. Dimensions are modified to assure a clearance fit with the mating spline.

Caution

Shaft torque capability may limit allowable pressure. Torque ratings assume no external radial loading. Applied torque must not exceed these limits, regardless of stated pressure parameters. Maximum torque ratings are based on shaft torsional fatigue strength.

MOUNTING FLANGES

Sauer-Danfoss offers many types of industry standard mounting flanges. This table shows order codes for each available mounting flange and its intended use:



Flange code	Intended use
01	European 25.4 mm 4-bolt
02	European 30 mm 4-bolt
03	Sauer-Danfoss standard tang drive
06	SAE A-A