

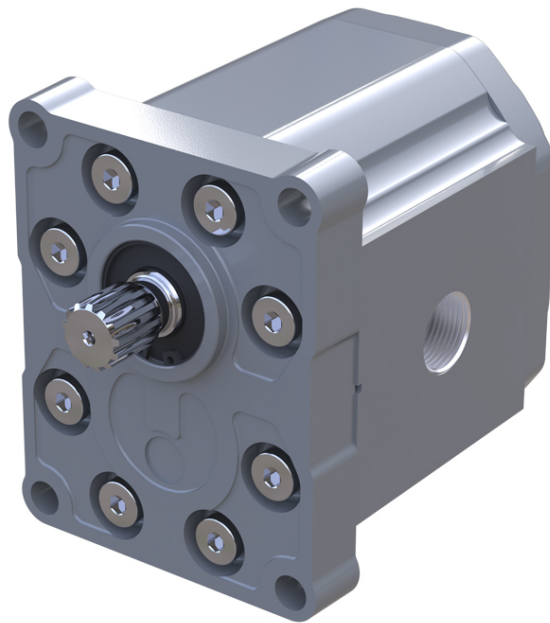
ENGINEERING  
TOMORROW



Technical Information

# Gear Pumps

## Group 3



**Revision history***Table of revisions*

| Date          | Changed  | Rev  |
|---------------|--|------|
| February 2020 | Obsolete pump removed; displacement values updated; other coding corrected | 0102 |
| October 2019  | First edition  | 0101 |

## Contents

### General Information

|  |   |
|--|---|
| Overview.....                            | 4 |
| Group 3 gear pumps' attributes.....      | 5 |
| Pump displacements.....                  | 5 |
| Technical data for SNP3NN.....           | 6 |
| Determination of nominal pump sizes..... | 6 |

### Product Coding

|                                       |    |
|---------------------------------------|----|
| Model code.....                       | 8  |
| A Family.....                         | 8  |
| B Displacement.....                   | 8  |
| C Rotation.....                       | 8  |
| D Project version.....                | 8  |
| E Mounting flange.....                | 8  |
| F Drive gear.....                     | 9  |
| G Rear cover.....                     | 9  |
| H Inlet size; I Outlet size.....      | 9  |
| J Ports positions & Special body..... | 11 |
| K Seals.....                          | 11 |
| L Screws.....                         | 11 |
| M Set valve.....                      | 11 |
| N Type mark.....                      | 11 |
| O Mark position.....                  | 11 |

### System Requirements

|                                |    |
|--------------------------------|----|
| Pressure.....                  | 12 |
| Speed.....                     | 12 |
| Hydraulic fluids.....          | 13 |
| Temperature and viscosity..... | 13 |
| Filtration.....                | 14 |
| Filters.....                   | 14 |
| Selecting a filter.....        | 14 |
| Reservoir.....                 | 14 |
| Line sizing.....               | 15 |
| Pump drive.....                | 15 |
| Pump drive data form.....      | 16 |
| Pump Life.....                 | 17 |
| Sound levels.....              | 17 |

### Pump Performance

|                              |    |
|------------------------------|----|
| Pump performance graphs..... | 19 |
|------------------------------|----|

### Product Options

|   |    |
|---|----|
| Shaft, flange, and port configurations..... | 22 |
| Mounting flanges.....                       | 24 |
| Shaft options.....                          | 24 |
| Port configurations.....                    | 25 |
| Porting.....                                | 26 |

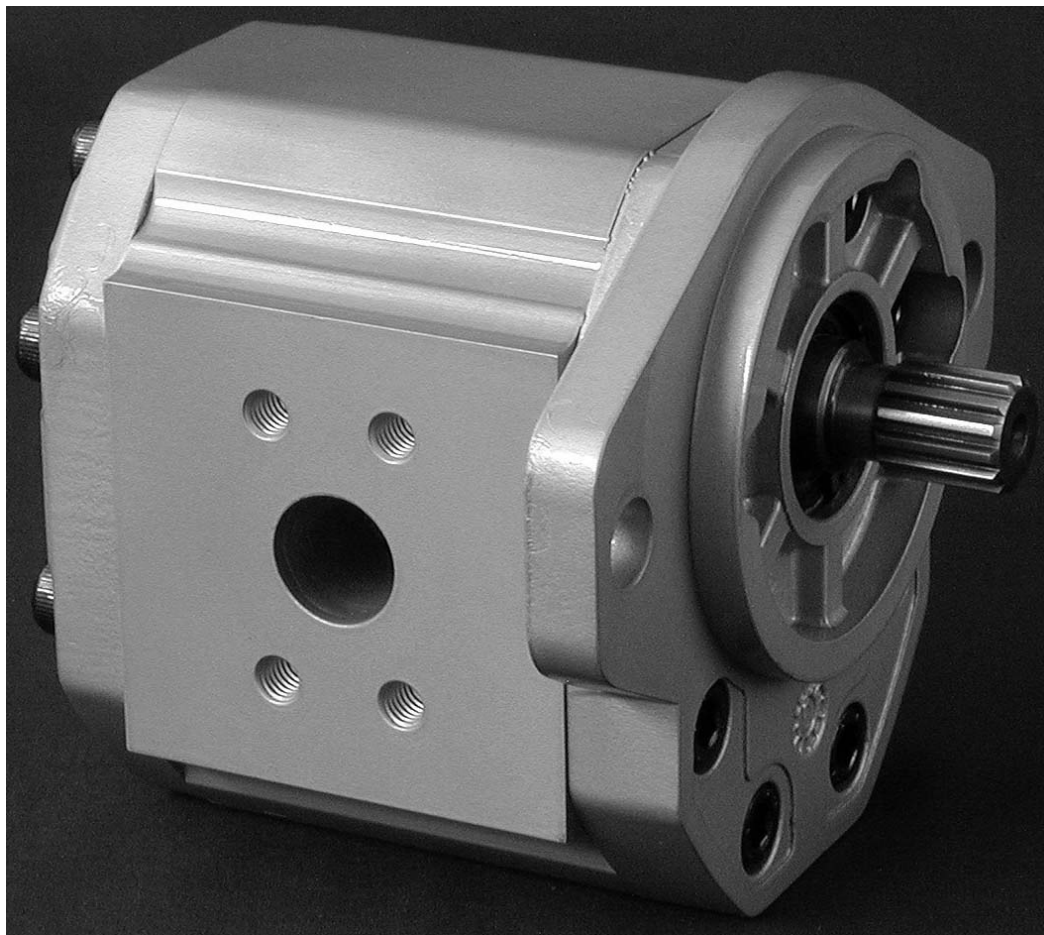
### Dimensions

|                                   |    |
|-----------------------------------|----|
| SNP3NN - 01FA, 01DA, 01BA.....    | 28 |
| SNP3NN - 02FA, 02DA and 02BA..... | 29 |
| SNP3NN - 03FB, 03BB.....          | 30 |
| SNP3NN - 06DD, 06AA.....          | 31 |
| SNP3NN - 07SA, 07GA.....          | 32 |

**General Information****Overview**

The Danfoss Group 3 is a range of peak performance fixed-displacement gear pumps. Constructed of a high-strength extruded aluminum body with aluminum cover and flange, all pumps are pressure-balanced for exceptional efficiency.

*SNP3NN 07SA*



## General Information

SNP3NN 01BA

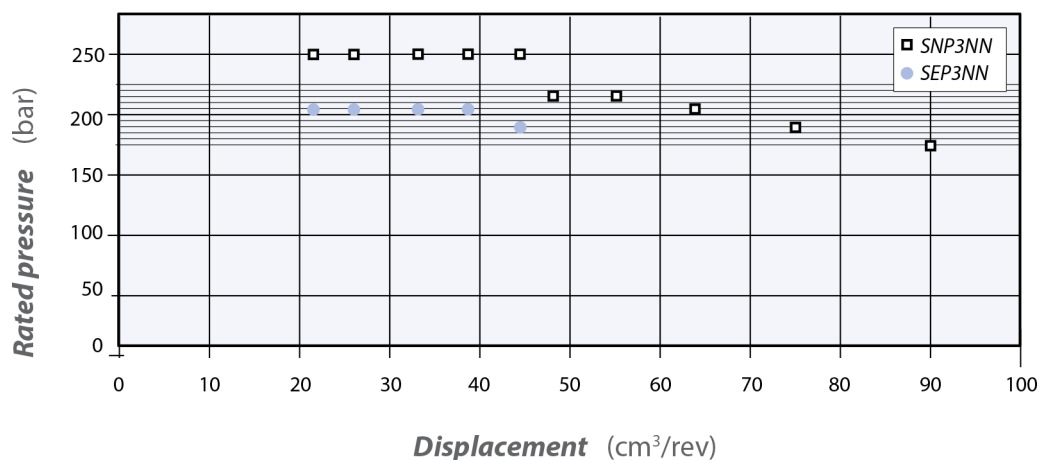


### Group 3 gear pumps' attributes

- Wide range of displacements from 22 to 90 cm<sup>3</sup>/rev [from 1.34 to 5.49 in<sup>3</sup>/rev]
- Continuous pressure rating up to 250 bar [3625 psi]
- Speeds up to 3000 min<sup>-1</sup> (rpm)
- SAE, DIN and European standard mounting flanges
- High quality case hardened steel gears
- Multiple pump configurations in combination with SNP1NN, SNP2NN and SNP3NN

### Pump displacements

*Quick reference chart for pump displacements vs. rated pressure*



## General Information

### Technical data for SNP3NN

| SNP3NN pump model    |  | Frame size     |                |                |                |                |                |                |                |                |                |
|----------------------|--|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                      |  | 022            | 026            | 033            | 038            | 044            | 048            | 055            | 063            | 075            | 090            |
| Displacement         | cm <sup>3</sup> /rev<br>[in <sup>3</sup> /rev] | 22.1<br>[1.35] | 26.2<br>[1.60] | 33.1<br>[2.02] | 37.9<br>[2.32] | 44.1<br>[2.69] | 48.3<br>[2.93] | 55.1<br>[3.36] | 63.4<br>[3.87] | 74.4<br>[4.54] | 88.2<br>[5.38] |
| Peak pressure        | bar [psi]                                      | 270<br>[3910]  | 270<br>[3910]  | 270<br>[3910]  | 270<br>[3910]  | 270<br>[3910]  | 250<br>[3625]  | 250<br>[3625]  | 230<br>[3350]  | 200<br>[2910]  | 170<br>[2465]  |
| Rated pressure       |  | 250<br>[3625]  | 250<br>[3625]  | 250<br>[3625]  | 250<br>[3625]  | 250<br>[3625]  | 230<br>[3350]  | 230<br>[3350]  | 210<br>[3045]  | 180<br>[2610]  | 150<br>[2175]  |
| Minimum speed        | min <sup>-1</sup> (rpm)                        | 800            | 800            | 800            | 800            | 800            | 800            | 800            | 600            | 600            | 600            |
| Maximum speed        |  | 3000           | 3000           | 3000           | 3000           | 3000           | 3000           | 2500           | 2500           | 2500           | 2500           |
| Weight               | kg [lb]  | 6.8<br>[15.0]  | 6.8<br>[15.0]  | 7.2<br>[15.8]  | 7.3<br>[16.1]  | 7.5<br>[16.5]  | 7.6<br>[16.8]  | 7.8<br>[17.3]  | 8.1<br>[17.9]  | 8.5<br>[18.7]  | 8.9<br>[19.6]  |
| Moment of inertia of | x 10 <sup>-6</sup><br>kg·m <sup>2</sup>        | 198            | 216            | 246            | 267,2          | 294,2          | 312,2          | 342,3          | 378,3          | 426,4          | 486,5          |
| rotating components  | [x 10 <sup>-6</sup><br>lb·ft <sup>2</sup> ]    | [4698]         | [5126]         | [5838]         | [6340]         | [6891]         | [7408]         | [8123]         | [8977]         | [10118]        | [11545]        |
| Theoretical flow at  | l/min  | 66.3           | 78.6           | 99.3           | 113.7          | 132.3          | 144.9          | 137.8          | 158.5          | 186            | 220.5          |
| maximum speed        | [US gal/min]                                   | [17.5]         | [20.8]         | [26.2]         | [30.0]         | [35.0]         | [38.3]         | [36.4]         | [41.8]         | [49.1]         | [58.3]         |

### ! Caution

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

## Determination of nominal pump sizes

Use these formula to determine the nominal pump size for a specific application:

### Based on SI units

$$\text{Output flow: } Q = \frac{Vg \cdot n \cdot \eta_v}{1000} \quad \text{l/min}$$

$$\text{Input torque: } M = \frac{Vg \cdot \Delta p}{20 \cdot \pi \cdot \eta_m} \quad \text{N·m}$$

$$\text{Input power: } P = \frac{M \cdot n}{9550} = \frac{Q \cdot \Delta p}{600 \cdot \eta_t} \quad \text{kW}$$

### Based on US units

$$Q = \frac{Vg \cdot n \cdot \eta_v}{231} \quad \text{[US gal/min]}$$

$$M = \frac{Vg \cdot \Delta p}{2 \cdot \pi \cdot \eta_m} \quad \text{[lb·ft·in]}$$

$$P = \frac{M \cdot n}{63.025} = \frac{Q \cdot \Delta p}{1714 \cdot \eta_t} \quad \text{[hp]}$$

|              |                       |   |
|--------------|-----------------------|---|
| <b>Vg =</b>  | Displacement per rev. | cm <sup>3</sup> /rev [in <sup>3</sup> /rev] |
| <b>pHD =</b> | Outlet pressure       | bar [psi]                                   |
| <b>pND =</b> | Inlet pressure        | bar [psi]                                   |
| <b>Δp =</b>  | pHD – pND             | bar [psi]                                   |
| <b>n =</b>   | Speed                 | min <sup>-1</sup> (rpm)                     |

**General Information**

|                              |  |  |
|------------------------------|--|--|
| <b><math>\eta_v</math> =</b> | Volumetric efficiency                        |  |
| <b><math>\eta_m</math> =</b> | Mechanical (torque) efficiency               |  |
| <b><math>\eta_t</math> =</b> | Overall efficiency ( $\eta_v \cdot \eta_m$ ) |  |

## Product Coding

### Model code

#### A Family

| A             |  | B | C | D | E | F | G | H | I | J | K | L |   | M | N | O |
|---------------|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| • • • • • • / |  |   |   |   |   |   |   |   |   |   |   |   | / |   |   |   |

|               |              |
|---------------|--------------|
| <b>SNB1NN</b> | Std Gr3 Pump |
|---------------|--------------|

#### B Displacement

| A |   | B     | C | D | E | F | G | H | I | J | K | L |   | M | N | O |
|---|---|-------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|   | / | • • • |   |   |   |   |   |   |   |   |   |   | / |   |   |   |

|            |         |
|------------|---------|
| <b>022</b> | 22,1 cc |
| <b>026</b> | 26,2 cc |
| <b>033</b> | 33,1 cc |
| <b>038</b> | 37,9 cc |
| <b>044</b> | 44,1 cc |
| <b>048</b> | 48,3 cc |
| <b>055</b> | 55,2 cc |
| <b>063</b> | 63,4 cc |
| <b>075</b> | 74,4 cc |
| <b>090</b> | 88,2 cc |

#### C Rotation

| A |   | B | C | D | E | F | G | H | I | J | K | L |   | M | N | O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|   | / |   | • |   |   |   |   |   |   |   |   |   | / |   |   |   |

|          |                |
|----------|----------------|
| <b>L</b> | Left rotation  |
| <b>R</b> | Right rotation |

#### D Project version

| A |   | B | C | D | E | F | G | H | I | J | K | L |   | M | N | O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|   | / |   |   | • |   |   |   |   |   |   |   |   | / |   |   |   |

|          |                        |
|----------|------------------------|
| <b>N</b> | Std Version of Project |
|----------|------------------------|

#### E Mounting flange

| A |   | B | C | D | E   | F | G | H | I | J | K | L |   | M | N | O |
|---|---|---|---|---|-----|---|---|---|---|---|---|---|---|---|---|---|
|   | / |   |   |   | • • |   |   |   |   |   |   |   | / |   |   |   |

| Code      | Description (Type of flange • Type of drive gear • Preferred ports for configuration) |
|-----------|---|
| <b>01</b> | European four bolt flange (98,4x128,1) - Pilot Ø50,8                                  |
| <b>02</b> | European four bolt flange (98,4x137) - Pilot Ø50,8                                    |
| <b>03</b> | European four bolt flange (114,3x149,5) - Pilot Ø60,3                                 |



## Product Coding

| Code | Description (Type of flange • Type of drive gear • Preferred ports for configuration)     |
|------|---|
| 06   | German four bolt flange (102,0x145,0) - Pilot Ø105  |
| 07   | SAE B-Pilot Ø101,6+2 holes  |
| 08   | SAE C-Pilot Ø127+4 holes  |
| 09   | SAE A-Pilot Ø82,55+2 holes  |
| 91   | Outrigger bearing with European four bolt flange Pilot Ø50,8 -Taper 1:8 M14x1,5 key 4x7,5 |
| D7   | SAE B-Pilot Ø101,6+2 holes+special for double shaft seal - Special                        |

### F Drive gear

| A | B | C | D | E | F   | G | H | I | J | K | L | M | N | O |
|---|---|---|---|---|-----|---|---|---|---|---|---|---|---|---|
| / |   |   |   |   | • • |   |   |   |   |   |   | / |   |   |

|    |   |
|----|---|
| AA | Taper 1:5-M16x1,5-Key 5   |
| BA | Taper 1:8-M14x1,5-Key 4   |
| BB | Taper 1:8-M16x1,5-Key 4,79  |
| BC | Taper 1:8-5/8-18UNF-2A-Key 6,375                                      |
| BP | Taper 1:8-5/8-18UNF-2A-Key 6,375 with NUT & WASHER (for SAE B flange) |
| CA | Tang 8xØ22,2 - Special  |
| DA | DIN 5482 B22x19 L=24 (for flange 01)                                  |
| DD | DIN 5482 B28x25 L28 (for flange 06)                                   |
| FA | ParallelØ20-Key 5x5 L30 (for flange 01-02)                            |
| FB | Parallel Ø22-Key 5x5 L40 (for flange 03)                              |
| GA | ParallelØ22,225 x L25,4-Key 6,375x6,375 L25,4                         |
| GB | Parallel Ø22,225xL25,4-Key 6,375x6,375x25,4+thd hole:1/4-20UNC-2B     |
| SA | SAE J498-13T-16/32-SAE B  |
| SB | SAE J498-13T-16/32-SAE A (for flange 09)                              |
| RA | SAEJ498-14T-12/24-SAE C-4 bolt (for flange 08)                        |
| SH | SAE J498-15T-16/32-SAE B - Special                                    |

### G Rear cover

| A | B | C | D | E | F | G   | H | I | J | K | L | M | N | O |
|---|---|---|---|---|---|-----|---|---|---|---|---|---|---|---|
| / |   |   |   |   |   | • • |   |   |   |   |   | / |   |   |

|    |                         |
|----|-------------------------|
| P1 | Standard cover for pump |
|----|-------------------------|

### H Inlet size; I Outlet size

| A | B | C | D | E | F | G | H       | I | J | K | L | M | N | O |
|---|---|---|---|---|---|---|---------|---|---|---|---|---|---|---|
| / |   |   |   |   |   |   | • • • • |   |   |   |   | / |   |   |

**Product Coding**

|           |                                    |  |
|-----------|------------------------------------|--|
| <b>A2</b> | 18,5x22,23x47,63x3/8-16UNC         |  |
| <b>A3</b> | 25x26,19x52,37x3/8-16UNC           |  |
| <b>A4</b> | 31x30,18x58,72x7/16-14UNC          |  |
| <b>A5</b> | 37,5/27x35,71x69,85x1/2-13UNC      |  |
| <b>B7</b> | 20x40xM6                           |  |
| <b>BA</b> | 18x55xM8                           |  |
| <b>BB</b> | 27x55xM8                           |  |
| <b>BC</b> | 36/27x55xM8                        |  |
| <b>C7</b> | 20x40xM8                           |  |
| <b>CA</b> | 27x51xM10                          |  |
| <b>CD</b> | 36x62xM10                          |  |
| <b>CZ</b> | 27x51xM10(2 Vert.Holes)            |  |
| <b>G7</b> | 20x40x5/16-18UNC - Special         |  |
| <b>GA</b> | 27x51x3/8-16UNC - Special          |  |
| <b>E5</b> | 7/8-14UNF                          |  |
| <b>E6</b> | 1-1/16-12UN                        |  |
| <b>E8</b> | 1-5/16-12UN                        |  |
| <b>E9</b> | 1-5/8-12UN                         |  |
| <b>EA</b> | 1-7/8-12UN                         |  |
| <b>H8</b> | M27x2-ISO6149                      |  |
| <b>H9</b> | M33x2-ISO6149                      |  |
| <b>F5</b> | BSP 3/4 GAS                        |  |
| <b>F6</b> | BSP 1 GAS                          |  |
| <b>F7</b> | BSP 1-1/4 GAS                      |  |
| <b>M5</b> | 25x52,37x26,19xM10                 |  |
| <b>M6</b> | 31x30,18x58,72xM10                 |  |
| <b>M7</b> | 37,5x35,71x69,85xM12               |  |
| <b>MF</b> | 25x52,37x26,19xM8 deep12 Horiz     |  |
| <b>MG</b> | 25/20x52,37x26,19xM10(=) - Special |  |
| <b>MH</b> | 31x30,18x58,72xM10 deep18 (=)      |  |
| <b>MN</b> | 31x30,18x58,72xM10 deep12 (=)      |  |
| <b>MR</b> | 37,5x35,71x69,85xM12 deep20 (=)    |  |

## Product Coding

### J Ports positions & Special body

| A |  | B | C | D | E | F | G | H | I | J | K | L |  | M | N | O |
|---|--|---|---|---|---|---|---|---|---|---|---|---|--|---|---|---|
|   |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |   |

|           |   |
|-----------|---|
| <b>NN</b> | Std from catalogue                        |
| <b>ZZ</b> | Port type Bx-Bx in the center of the body |

### K Seals

| A |  | B | C | D | E | F | G | H | I | J | K | L |  | M | N | O |
|---|--|---|---|---|---|---|---|---|---|---|---|---|--|---|---|---|
|   |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |   |

|          |  |
|----------|--|
| <b>N</b> | Standard NBR seals                         |
| <b>D</b> | NBR seals + VITON shaft seal with dust lip |
| <b>I</b> | Two opposite shaft seal                    |

### L Screws

| A |  | B | C | D | E | F | G | H | I | J | K | L |  | M | N | O |
|---|--|---|---|---|---|---|---|---|---|---|---|---|--|---|---|---|
|   |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |   |

|          |                      |
|----------|----------------------|
| <b>N</b> | Std burnished screws |
| <b>B</b> | Anticorrosion screws |

### M Set valve

| A |  | B | C | D | E | F | G | H | I | J | K | L |  | M | N | O |
|---|--|---|---|---|---|---|---|---|---|---|---|---|--|---|---|---|
|   |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |   |

|            |          |
|------------|----------|
| <b>NNN</b> | No valve |
|------------|----------|

### N Type mark

| A |  | B | C | D | E | F | G | H | I | J | K | L |  | M | N | O |
|---|--|---|---|---|---|---|---|---|---|---|---|---|--|---|---|---|
|   |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |   |

|          |  |
|----------|--|
| <b>N</b> | Standard Danfoss Marking               |
| <b>A</b> | Standard Danfoss Marking+Customer Code |
| <b>Z</b> | Without Marking                        |

### O Mark position

| A |  | B | C | D | E | F | G | H | I | J | K | L |  | M | N | O |
|---|--|---|---|---|---|---|---|---|---|---|---|---|--|---|---|---|
|   |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |   |

|          |  |
|----------|--|
| <b>N</b> | Std Marking position (on top)          |
| <b>A</b> | Special Marking position on the bottom |

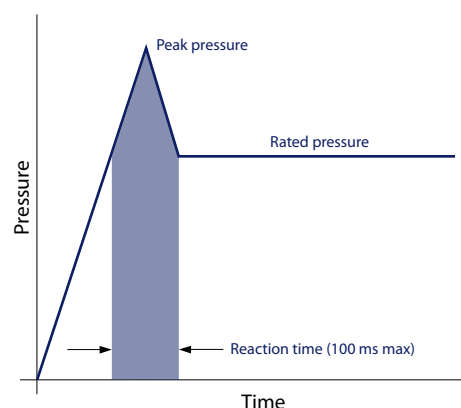
## System Requirements

### Pressure

The inlet vacuum must be controlled in order to realize expected pump life and performance. The system design must meet inlet pressure requirements during all modes of operation. Expect lower inlet pressures during cold start. It should improve quickly as the fluid warms.

|                                 |                   |            |
|---------------------------------|-------------------|------------|
| <b>Max. continuous vacuum</b>   | bar abs. [in. Hg] | 0.8 [23.6] |
| <b>Max. intermittent vacuum</b> |                   | 0.6 [17.7] |
| <b>Max. pressure</b>            |                   | 3.0 [88.5] |

**Peak pressure** is the highest intermittent pressure allowed. The relief valve overshoot (reaction time) determines peak pressure. It is assumed to occur for less than 100 ms. The accompanying illustration shows peak pressure in relation to rated pressure and reaction time (100 ms maximum).



**Rated pressure** is the average, regularly occurring, operating pressure that should yield satisfactory product life. The maximum machine load demand determines rated pressure. For all systems, the load should move below this pressure.

**System pressure** is the differential of pressure between the outlet and inlet ports. It is a dominant operating variable affecting hydraulic unit life. High system pressure, resulting from high load, reduces expected life. System pressure must remain at, or below, rated pressure during normal operation to achieve expected life.

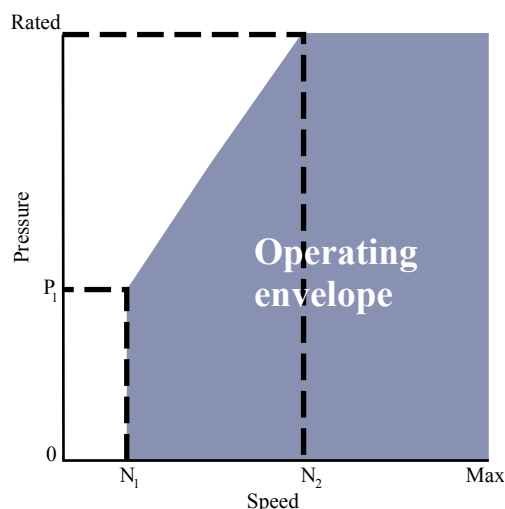
### Speed

**Maximum speed** is the limit recommended by Danfoss for a particular gear pump when operating at rated pressure. It is the highest speed at which normal life can be expected.

The lower limit of operating speed is the **minimum speed**. It is the lowest speed at which normal life can be expected. The minimum speed increases as operating pressure increases. When operating under higher pressures, a higher minimum speed must be maintained, as illustrated here.

## System Requirements

*Speed versus pressure*



Where:

$N_1$  = Minimum speed at 100 bar

$N_2$  = Minimum speed at 180 bar

## Hydraulic fluids

Ratings and data for SNP3NN and SHP3NN gear pumps are based on operating with premium hydraulic fluids containing oxidation, rust, and foam inhibitors. These fluids must possess good thermal and hydrolytic stability to prevent wear, erosion, and corrosion of internal components. They include:

- Hydraulic fluids following DIN 51524, part 2 (HLP) and part 3 (HVLP) specifications
- API CD engine oils conforming to SAE J183
- M2C33F or G automatic transmission fluids
- Certain agricultural tractor fluids

Use only clean fluid in the pump and hydraulic circuit.

### **Caution**

**Never mix hydraulic fluids.**

## Temperature and viscosity

**Temperature and viscosity requirements** must be concurrently satisfied. Use petroleum / mineral-based fluids.

High temperature limits apply at the inlet port to the pump. The pump should run at or below the maximum continuous temperature. The peak temperature is based on material properties. Don't exceed it.

Cold oil, generally, doesn't affect the durability of pump components. It may affect the ability of oil to flow and transmit power. For this reason, keep the temperature at 16 °C [60 °F] above the pour point of the hydraulic fluid.

Minimum (cold start) temperature relates to the physical properties of component materials.

Minimum viscosity occurs only during brief occasions of maximum ambient temperature and severe duty cycle operation. You will encounter maximum viscosity only at cold start. During this condition, limit speeds until the system warms up. Size heat exchangers to keep the fluid within these limits. Test regularly to verify that these temperatures and viscosity limits aren't exceeded. For maximum unit efficiency and bearing life, keep the fluid viscosity in the recommended viscosity range.

## System Requirements

### Fluid viscosity

|                             |                          |                |
|-----------------------------|--------------------------|----------------|
| <b>Maximum (cold start)</b> | mm <sup>2</sup> /s [SUS] | 1000 [4600]    |
| <b>Recommended range</b>    |                          | 12-60 [66-290] |
| <b>Minimum</b>              |                          | 10 [60]        |

### Temperature

|                             |         |          |
|-----------------------------|---------|----------|
| <b>Minimum (cold start)</b> | °C [°F] | -20 [-4] |
| <b>Maximum continuous</b>   |         | 80 [176] |
| <b>Peak (intermittent)</b>  |         | 90 [194] |

## Filtration

### Filters

Use a filter that conforms to Class 22/18/13 of ISO 4406 (or better). It may be on the pump outlet (pressure filtration), inlet (suction filtration), or reservoir return (return-line filtration).

### Selecting a filter

When selecting a filter, please consider:

- contaminant ingress rate (determined by factors such as the number of actuators used in the system)
- generation of contaminants in the system
- required fluid cleanliness
- desired maintenance interval
- filtration requirements of other system components

Measure filter efficiency with a Beta ratio ( $\beta_x$ ). For:

- suction filtration, with controlled reservoir ingress, use a  $\beta_{35-45} = 75$  filter
- return or pressure filtration, use a pressure filtration with an efficiency of  $\beta_{10} = 75$

$\beta_x$  ratio is a measure of filter efficiency defined by ISO 4572. It is the ratio of the number of particles greater than a given diameter ( "x" in microns) upstream of the filter to the number of these particles downstream of the filter.

### Fluid cleanliness level and $\beta_x$ ratio

|   |   |
|---|---|
| <b>Fluid cleanliness level (per ISO 4406)</b>                     | Class 22/18/13 or better                  |
| <b><math>\beta_x</math> ratio (suction filtration)</b>            | $\beta_{35-45} = 75$ and $\beta_{10} = 2$ |
| <b><math>\beta_x</math> ratio (pressure or return filtration)</b> | $\beta_{10} = 75$                         |
| <b>Recommended inlet screen size</b>                              | 100-125 $\mu$ m [0.004-0.005 in]          |

The filtration requirements for each system are unique. Evaluate filtration system capacity by monitoring and testing prototypes.

### Reservoir

The **reservoir** provides clean fluid, dissipates heat, removes entrained air, and allows fluid volume changes associated with fluid expansion and cylinder differential volumes. A correctly sized reservoir accommodates maximum volume changes during all system operating modes. It promotes deaeration of the fluid as it passes through, and accommodates a fluid dwell-time between 60 and 180 seconds, allowing entrained air to escape.

## System Requirements

**Minimum reservoir capacity** depends on the volume required to cool and hold the oil from all retracted cylinders, allowing for expansion due to temperature changes. A fluid volume of 1 to 3 times the pump output flow (per minute) is satisfactory. The minimum reservoir capacity is 125% of the fluid volume.

Install the suction line above the bottom of the reservoir to take advantage of gravity separation and prevent large foreign particles from entering the line. Cover the line with a 100-125 micron screen. The pump should be below the lowest expected fluid level. Put the return-line below the lowest expected fluid level to allow discharge into the reservoir for maximum dwell and efficient deaeration. A baffle (or baffles) between the return and suction lines promotes deaeration and reduces fluid surges.

## Line sizing

Choose pipe sizes that accommodate minimum fluid velocity to reduce system noise, pressure drops, and overheating. This maximizes system life and performance.

Design inlet piping that maintains continuous pump inlet pressure above 0.8 bar absolute during normal operation. The line velocity should not exceed the values in this table:

*Maximum line velocity*

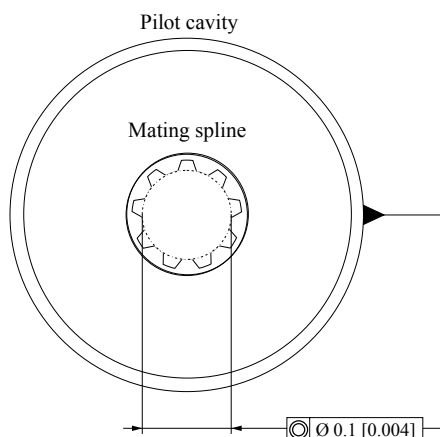
|               |              |            |
|---------------|--------------|------------|
| <b>Inlet</b>  | m/s [ft/sec] | 2.5 [8.2]  |
| <b>Outlet</b> |              | 5.0 [16.4] |
| <b>Return</b> |              | 3.0 [9.8]  |

Most systems use hydraulic oil containing 10% dissolved air by volume. Under high inlet vacuum conditions the oil releases bubbles. They collapse when subjected to pressure, resulting in cavitation, causing adjacent metal surfaces to erode. **Over-aeration** is the result of air leaks on the inlet side of the pump, and flow-line restrictions. These include inadequate pipe sizes, sharp bends, or elbow fittings, causing a reduction of flow line cross sectional area. This problem will not occur if inlet vacuum and rated speed requirements are maintained, and reservoir size and location are adequate.

## Pump drive

Shaft options for Group 3 gear pumps include tapered, tang, splined, or parallel shafts. They are suitable for a wide range of direct and indirect drive applications for radial and thrust loads.

**Plug-in drives**, acceptable only with a splined shaft, can impose severe radial loads when the mating spline is rigidly supported. Increasing spline clearance does not alleviate this condition.



Use **plug-in drives** if the concentricity between the mating spline and pilot diameter is within 0.1 mm [0.004 in]. Lubricate the drive by flooding it with oil. A 3-piece coupling minimizes radial or thrust shaft loads.

## System Requirements

### ! Caution

In order to avoid spline shaft damages it is recommended to use carburized and hardened steel couplings with 80-82 HRA surface hardness.

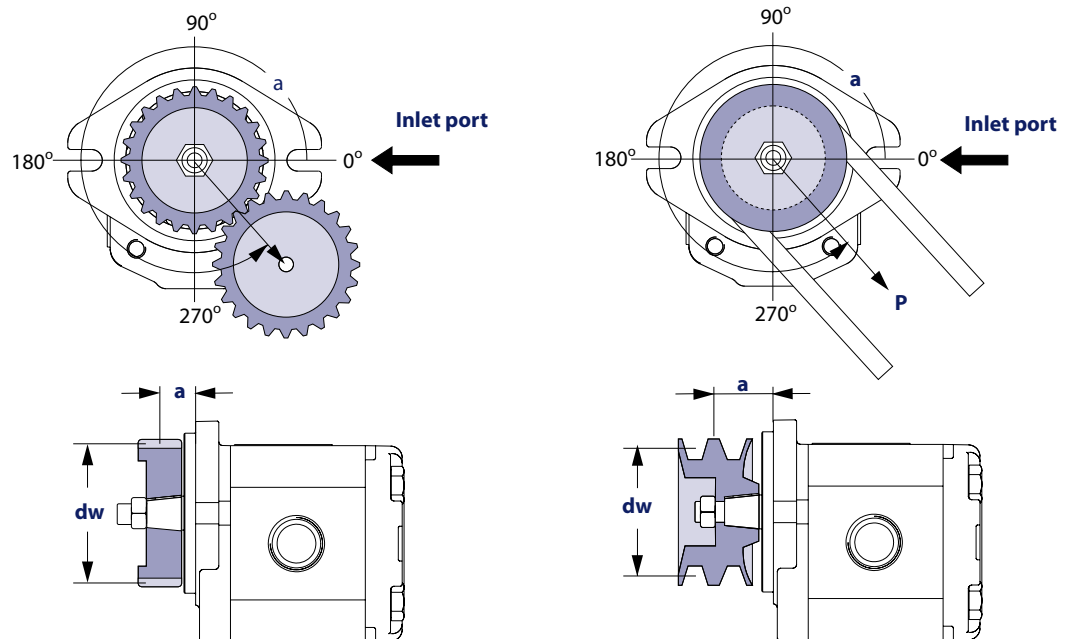
Allowable **radial shaft loads** are a function of the load position, load orientation, and operating pressure of the hydraulic pump. All external shaft loads have an effect on bearing life, and may affect pump performance.

In applications where external shaft loads can't be avoided, minimize the impact on the pump by optimizing the orientation and magnitude of the load. Use a tapered input shaft; don't use splined shafts for belt or gear drive applications. A spring-loaded belt tension-device is recommended for belt drive applications to avoid excessive tension. Avoid thrust loads in either direction.

## Pump drive data form

Contact Danfoss if continuously applied external radial or thrust loads occur. Fill out this page and send the complete form to your Danfoss representative for an assistance in applying pumps with belt or gear drive. This illustration shows a pump with counterclockwise orientation:

### Optimal radial load position



### Application data

| Item                                     | Value    | Unit  |
|--|----------|---|
| Pump displacement                        |          | cm <sup>3</sup> /rev [in <sup>3</sup> /rev] |
| Rated system pressure                    |          | bar psi                                     |
| Relief valve setting                     |          |   |
| Pump shaft rotation                      |          | left right                                  |
| Pump minimum speed                       |          | min <sup>-1</sup> (rpm)                     |
| Pump maximum speed                       |          |   |
| Drive gear helix angle (gear drive only) |          | degree                                      |
| Belt type (gear drive only)              |          | V notch                                     |
| Belt tension (gear drive only)           | <b>P</b> | N lbf                                       |



## System Requirements

### Application data (continued)

| Item  |          | Value | Unit   |
|---|----------|-------|--------|
| Angular orientation of gear or belt to inlet port | $\alpha$ |       | degree |
| Pitch diameter of gear or pulley                  | $dw$     |       | mm in  |
| Distance from flange to center of gear or pulley  | $a$      |       |        |

## Pump Life

Pump life is a function of speed, system pressure, and other system parameters (such as fluid quality and cleanliness).

All Danfoss gear pumps use hydrodynamic journal bearings that have an oil film maintained between the gear/shaft and bearing surfaces at all times. If the oil film is sufficiently sustained through proper system maintenance and operating within recommended limits, long life can be expected.

[B<sub>10</sub> life expectancy number is generally associated with rolling element bearings. It does not exist for hydrodynamic bearings.](#)

High pressure, resulting from high loads, impacts pump life. When submitting an application for review, provide machine duty cycle data that includes percentages of time at various loads and speeds. We strongly recommend a prototype testing program to verify operating parameters and their impact on life expectancy before finalizing any system design.

## Sound levels

Fluid power systems are inherent generators of noise. As with many high power density devices, noise is an unwanted side affect. However, there are many techniques available to minimize noise from fluid power systems. To apply these methods effectively, it is necessary to understand how the noise is generated and how it reaches the listener. The noise energy can be transmitted away from its source as either fluid borne noise (pressure ripple) or as structure borne noise.

**Pressure ripple** is the result of the number of pumping elements (gear teeth) delivering oil to the outlet and the pump's ability to gradually change the volume of each pumping element from low to high pressure. In addition, the pressure ripple is affected by the compressibility of the oil as each pumping element discharges into the outlet of the pump. Pressure pulsations will travel along the hydraulic lines at the speed of sound (about 1400 m/s in oil) until affected by a change in the system such as an elbow fitting. Thus the pressure pulsation amplitude varies with overall line length and position.

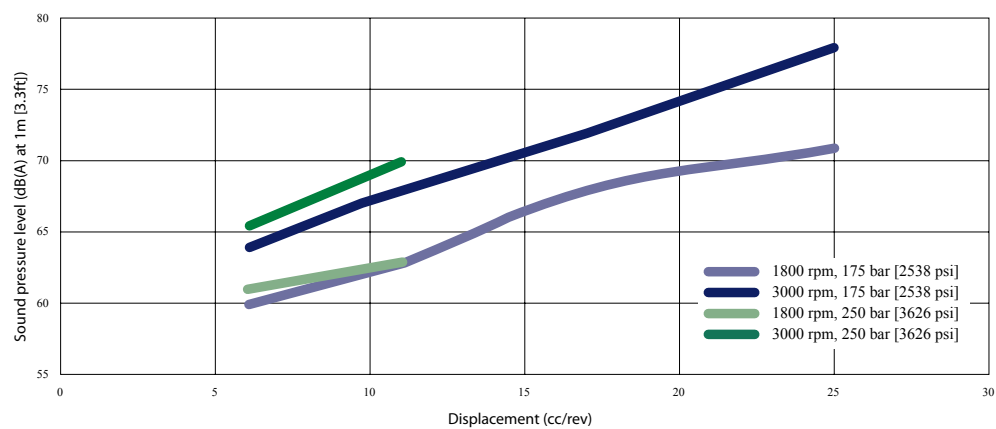
**Structure borne noise** may be transmitted wherever the pump casing is connected to the rest of the system. The manner in which one circuit component responds to excitation depends on its size, form, and manner in which it is mounted or supported. Because of this excitation, a system line may actually have a greater noise level than the pump. To reduce this excitation, use flexible hoses in place of steel plumbing. If steel plumbing must be used, clamping of lines is recommended. To minimize other structure borne noise, use flexible (rubber) mounts.

The accompanying graph shows typical sound pressure levels for SNP3NN pumps (with SAE A flange, and spline shaft in plug in drive) measured in dB (A) at 1 m [3.28 ft] from the unit in a semi anechoic chamber. Anechoic levels can be estimated by subtracting 3 dB (A) from these values.

[Contact your Danfoss representative for assistance with system noise control.](#)

## System Requirements

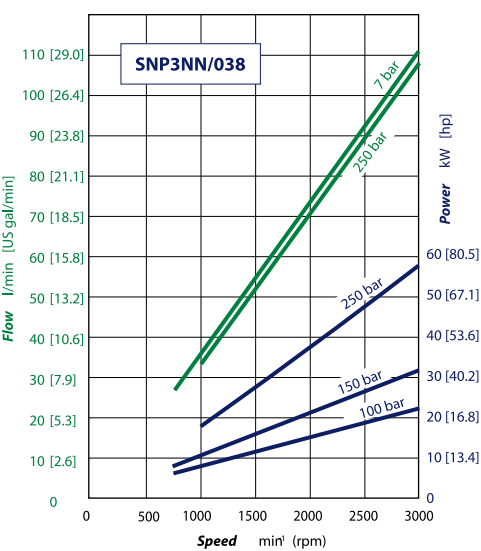
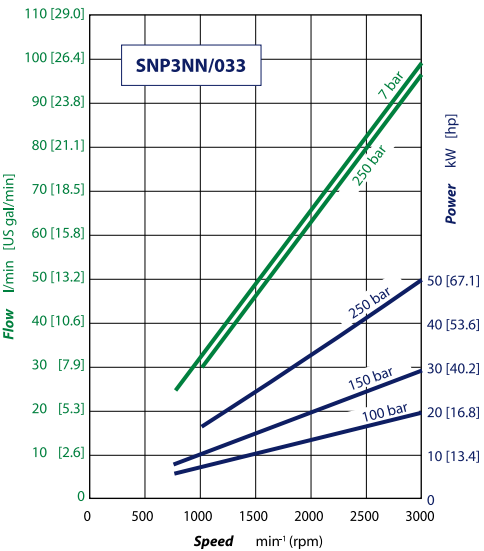
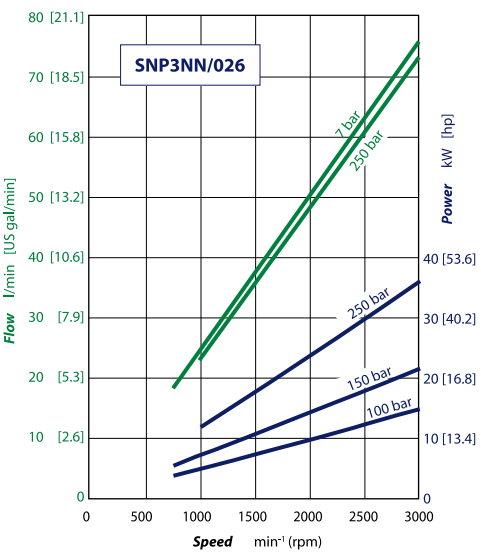
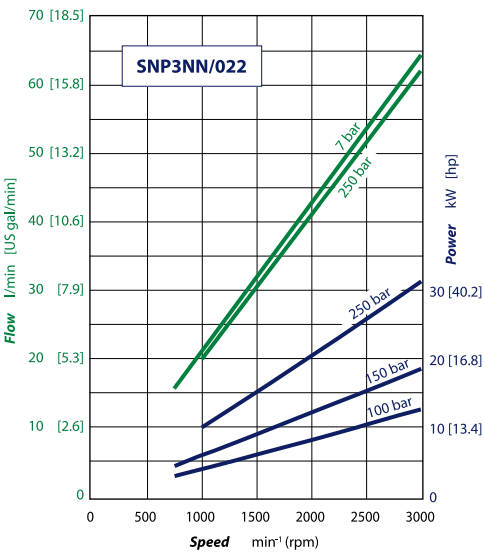
*Sound levels graph*



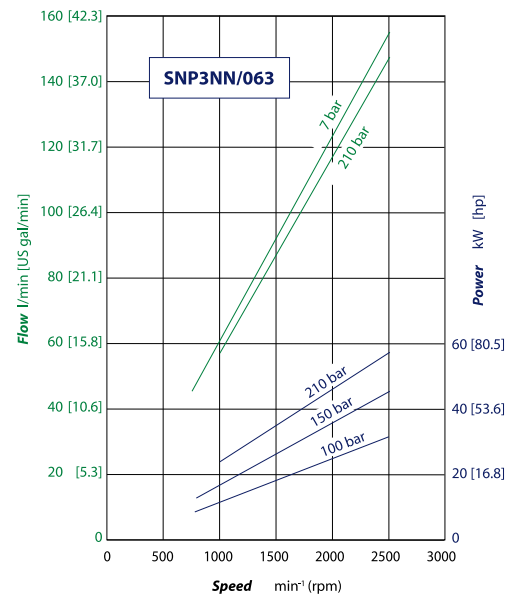
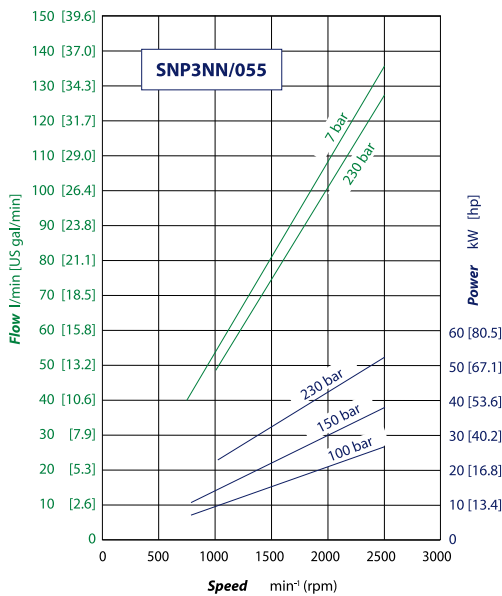
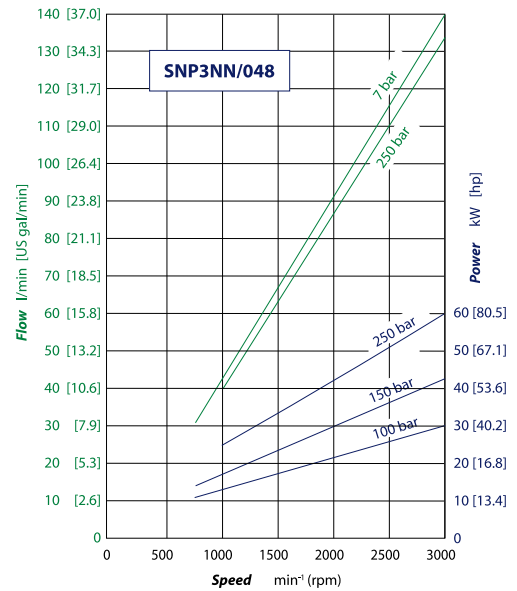
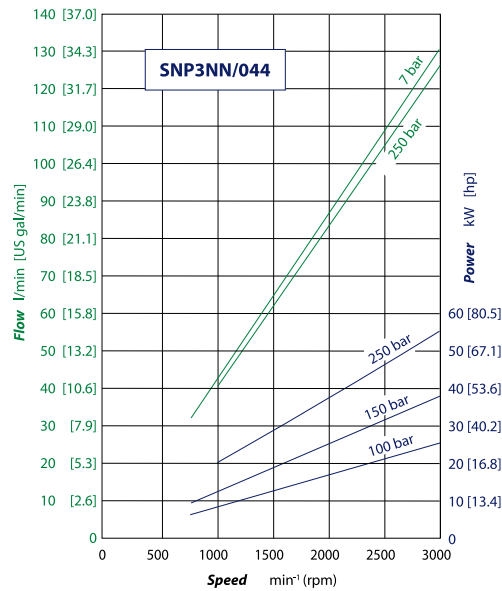
## Pump Performance

### Pump performance graphs

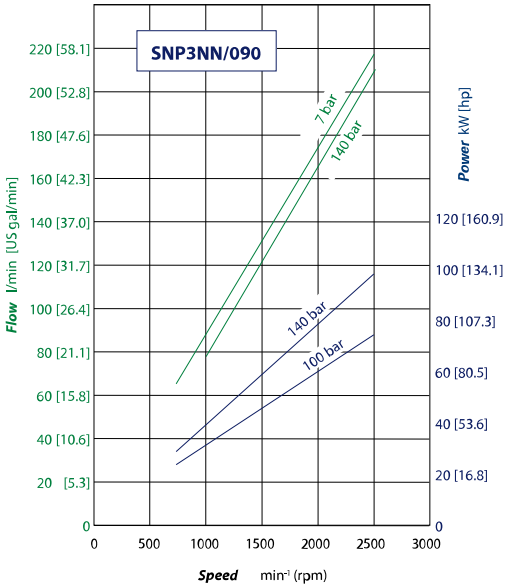
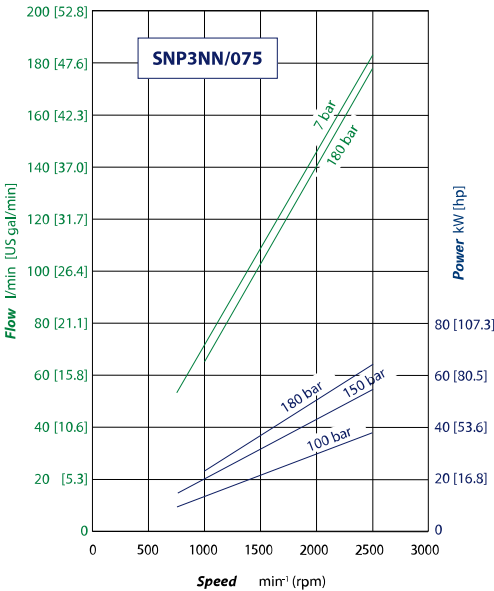
The following graphs provide typical output flow and input power for Group 3 pumps at various working pressures. Data were taken using ISO VG46 petroleum /mineral based fluid at 50 °C [122 °F] (viscosity = 28 mm<sup>2</sup>/s [132 SUS]).



## Pump Performance

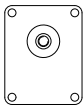
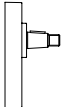
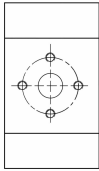
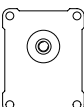
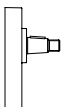
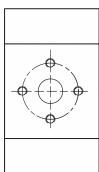
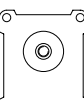
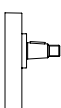
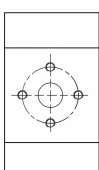

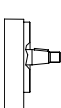
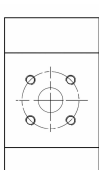


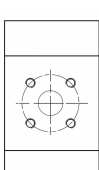
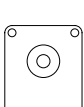
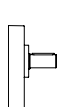
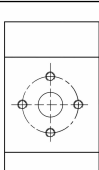
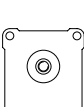
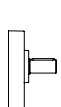
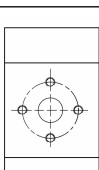


**Pump Performance**

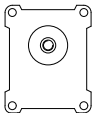

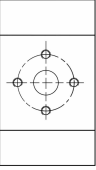
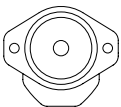
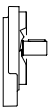
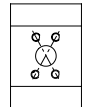
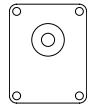
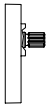
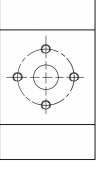
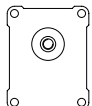
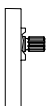
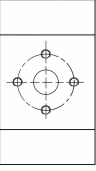
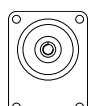

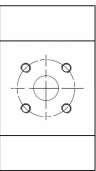
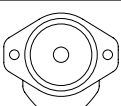
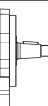
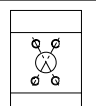
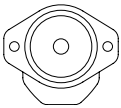
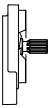
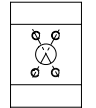

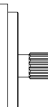
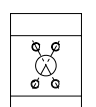


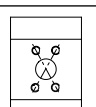


## Product Options

### Shaft, flange, and port configurations

| Pump   | Code | Flange   |   | Shaft                       |   | Port                            |   |
|--------|------|--|---|-----------------------------|---|---------------------------------|---|
| SNP3NN | 01BA | pilot Ø 50.8 mm<br>[2.0 in]<br>European 01, 4-bolt   |    | 1:8 tapered                 |    | European flanged port + pattern |    |
| SNP3NN | 02BA | pilot Ø 50.8 mm<br>[2.0 in]<br>European 02, 4-bolt   |    | 1:8 tapered                 |    | European flanged port + pattern |    |
| SNP3NN | 03BB | pilot Ø 60.3 mm<br>[2.374 in]<br>European 03, 4-bolt |    | 1:8 tapered                 |    | European flanged port + pattern |    |
| SNP3NN | 06AA | pilot Ø 105 mm<br>[4.133 in]<br>German, 4-bolt       |  | 1:5 tapered                 |  | German std ports port X pattern |  |
| SNP3NN | 06CA | pilot Ø 105 mm<br>[4.133 in]<br>German, 4-bolt       |  | Tang 8 x Ø 22,2             |  | German std ports port X pattern |  |
| SNP3NN | 01FA | pilot Ø 50.8 mm<br>[2.0 in]<br>European 01 4-bolt    |  | Ø 20 mm [0.787 in] parallel |  | European flanged port + pattern |  |
| SNP3NN | 02FA | pilot Ø 50.8 mm<br>[2.0 in]<br>European 02 4-bolt    |  | Ø 20 mm [0.787 in] parallel |  | European flanged port + pattern |  |

## Product Options

| Pump   | Code | Flange   |   | Shaft  |   | Port                            |   |
|--------|------|--|---|--|---|---------------------------------|---|
| SNP3NN | 03FB | pilot Ø 60.3 mm<br>[2.374 in]<br>European 03, 4-bolt |    | Ø 22 mm [0.866 in] parallel                          |    | European flanged port + pattern |    |
| SNP3NN | 07GA | pilot Ø 101.6 mm<br>SAE B, 2-bolt                    |    | Ø 22.225 mm [0.875 in] parallel                      |    | Vertical four bolt flanged port |    |
| SNP3NN | 01DA | pilot Ø 50.8 mm<br>[2.0 in]<br>European 01, 4-bolt   |    | Splined shaft<br>13T – m 1.60<br>DIN 5482 – B22 x 19 |    | European flanged port + pattern |    |
| SNP3NN | 02DA | pilot Ø 50.8 mm<br>[2.0 in]<br>European 02, 4-bolt   |   | Splined shaft<br>13T – m 1.60<br>DIN 5482 – B22 x 19 |   | European flanged port + pattern |   |
| SNP3NN | 06DD | pilot Ø 105 mm<br>[4.133 in]<br>German 4-bolt        |  | Splined shaft<br>15T – m 1.60<br>DIN 5482 – B28 x 25 |  | German std ports port X pattern |  |
| SNP3NN | 07BC | pilot Ø 101.6 mm<br>SAE B, 2-bolt                    |  | 1:8 tapered - 5/8 - 18 UNF - 2A                      |  | Vertical four bolt flanged port |  |
| SNP3NN | 07SA | pilot Ø 101.6 mm<br>SAE B, 2-bolt                    |  | Splined shaft<br>SAE J498 13T – 16/32DP              |  | Vertical four bolt flanged port |  |
| SNP3NN | 08RA | pilot Ø 127 mm<br>[5.0 in]<br>SAE C, 4-bolt          |  | Splined shaft<br>SAE J498<br>14T - 12/24DP           |  | Vertical four bolt flanged port |  |
| SNP3NN | 09SB | pilot Ø 82.55 mm [3.25 in]<br>SAE A, 2-bolt          |  | Splined shaft<br>SAE J498<br>13T - 16/32DP           |  | Vertical four bolt flanged port |  |

## Product Options

| Pump   | Code | Flange   |  | Shaft                                |  | Port                            |  |
|--------|------|--|--|--------------------------------------|--|---------------------------------|--|
| SNP3NN | 91BA | Outrigger bearing with European four bolt flange Pilot Ø50,8           |  | Taper 1:8 M14x1,5 key 4x7,5          |  | European flanged port + pattern |  |
| SNP3NN | D7SA | pilot Ø 101.6 mm [4.0 in] SAE B, 2-bolt, special for double shaft seal |  | Splined shaft SAE J498 13T - 16/32DP |  | Vertical four bolt flanged port |  |

## Mounting flanges

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

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

| Code | Description                        |
|------|------------------------------------|
| 01   | European 50.8 mm [2.0 in] 4-bolt   |
| 02   |                                    |
| 03   | European 60.3 mm [2.374 in] 4-bolt |
| 06   | German 105 mm [4.134 in] 4-bolt    |
| 07   | SAE B 2-bolt                       |
| 08   | SAE C 4-bolt                       |

## Shaft options

Direction is viewed facing the shaft. Group 3 pumps are available with a variety of splined, parallel, and tapered shaft ends. Not all shaft styles are available with all flange styles.

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

| Shaft |   | Mounting flange code with maximum torque in Nm [lb-in] |     |     |     |     |    |    |    |
|-------|---|--|-----|-----|-----|-----|----|----|----|
| Code  | Description   | 01   | 02  | 03  | 06  | 07  | 08 | 09 | D7 |
| AA    | Taper 1:5-M16x1,5-Key 5   |  |     |     | 300 |     |    |    |    |
| BA    | Taper 1:8-M14x1,5-Key 4   | 350  | 350 |     |     |     |    |    |    |
| BB    | Taper 1:8-M16x1,5-Key 4,79  |  |     | 500 |     |     |    |    |    |
| BC    | Taper 1:8-5/8-18UNF-2A-Key 6,375                                      |  |     |     |     | 300 |    |    |    |
| BD    | Taper 1:8-M14x1,5-Key 4 + thd hole M8 - Special                       |  |     |     |     | 300 |    |    |    |
| BP    | Taper 1:8-5/8-18UNF-2A-Key 6,375 with NUT & WASHER (for SAE B flange) |  |     |     |     | 300 |    |    |    |
| CA    | Tang 8xØ22,2 - Special  |  |     |     | 90  |     |    |    |    |
| DA    | DIN 5482 B22x19 L=24 (for flange 01)                                  | 290  | 290 |     |     |     |    |    |    |



## Product Options

| Shaft |   | Mounting flange code with maximum torque in Nm [lb-in] |     |     |     |     |     |     |     |
|-------|---|--|-----|-----|-----|-----|-----|-----|-----|
| Code  | Description   | 01   | 02  | 03  | 06  | 07  | 08  | 09  | D7  |
| DD    | DIN 5482 B28x25 L28 (for flange 06)   |  |     |     | 450 |     |     |     |     |
| FA    | Parallel Ø20-Key 5x5 L30 (for flange 01-02)                                   | 210  | 210 |     |     |     |     |     |     |
| FB    | Parallel Ø22-Key 5x5 L40 (for flange 03)                                      |  |     | 300 |     |     |     |     |     |
| GA    | Parallel Ø22,225 x L25,4-Key 6,375x6,375 L25,4                                |  |     |     |     | 230 |     |     |     |
| GB    | Parallel Ø22,225xL25,4-Key 6,375x6,375x25,4+thd hole:1/4- 20UNC-2B            |  |     |     |     | 230 |     |     |     |
| GC    | Parallel Ø22,225xL25,4-Key 6,375x6,375x25,4+thd hole:5/16- 18UNC-2B - Special |  |     |     |     | 230 |     |     |     |
| SA    | SAE J498-13T-16/32-SAE B  |  |     |     |     | 270 |     |     | 270 |
| SB    | SAE J498-13T-16/32-SAE A (for flange 09)                                      |  |     |     |     |     |     | 270 |     |
| RA    | SAE J498-14T-12/24-SAE C-4 bolt (for flange 08)                               |  |     |     |     |     | 400 |     |     |
| SH    | SAE J498-15T-16/32-SAE B - Special  |  |     |     |     | 400 |     |     |     |

Danfoss recommends mating splines conform to SAE J498 or DIN 5482. 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.

## Port configurations

Various port configurations are available on Group 4 pumps. They include:

- SAE split flange ports
- European standard flanged ports
- Gas threaded ports (BSPP)

For a table of dimensions see [Porting](#).

### Available port configurations

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   | • | • | • | • |   | / |   |   |

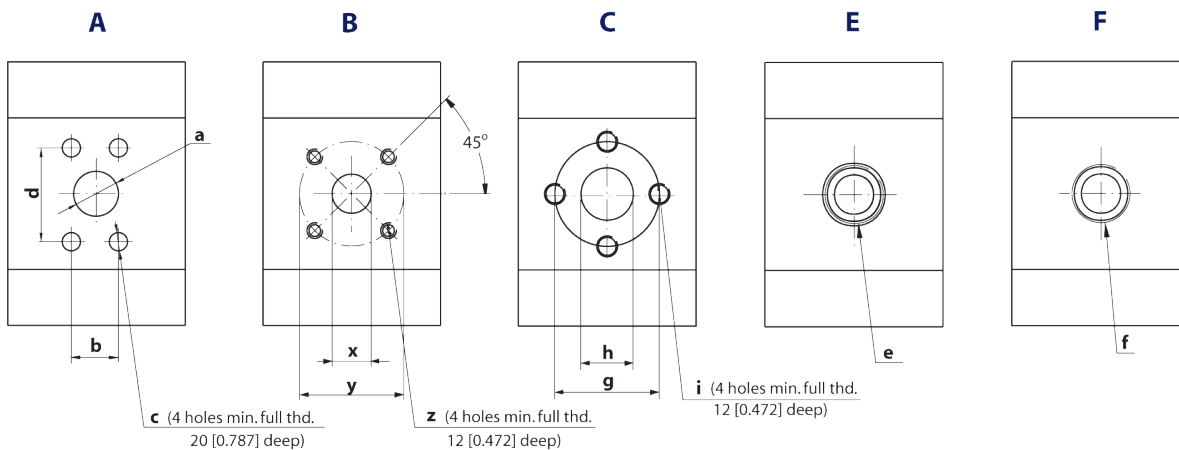
| Code | Description                |
|------|----------------------------|
| A4   | 31x30,18x58,72x7/16-14UNC  |
| A5   | 37,5x35,71x69,85x1/2-13UNC |
| A6   | 50x42,88x77,77x1/2-13UNC   |

SAE flanged port

## Product Options

|           |                   |  |
|-----------|-------------------|--|
| <b>CB</b> | 30x56xM10         | Flanged port with thd holes in + pattern           |
| <b>CC</b> | 32x62xM10         |  |
| <b>CD</b> | 36x62xM10         |  |
| <b>CE</b> | 32x62xM12         |  |
| <b>CF</b> | 38x72,5xM12       |  |
| <b>CG</b> | 40x72,5xM12       |  |
| <b>CH</b> | 45x72,5xM12       |  |
| <b>CK</b> | 48x72,5xM12       |  |
| <b>CL</b> | 56x92xM12         |  |
| <b>F7</b> | 1-1/4 GAS         | Threaded GAS (BSPP)                                |
| <b>F8</b> | 1-1/2 GAS         |  |
| <b>F9</b> | 1-3/4 GAS         |  |
| <b>GE</b> | 32x62x7/16-14UNC  | Flanged port with the holes in + pattern UN thread |
| <b>GF</b> | 38x72,5x1/2-13UNC |  |
| <b>GK</b> | 48x72,5x1/2-13UNC |  |

## Porting



# Technical Information

## Gear Pumps Group 3 Technical Information

### Product Options

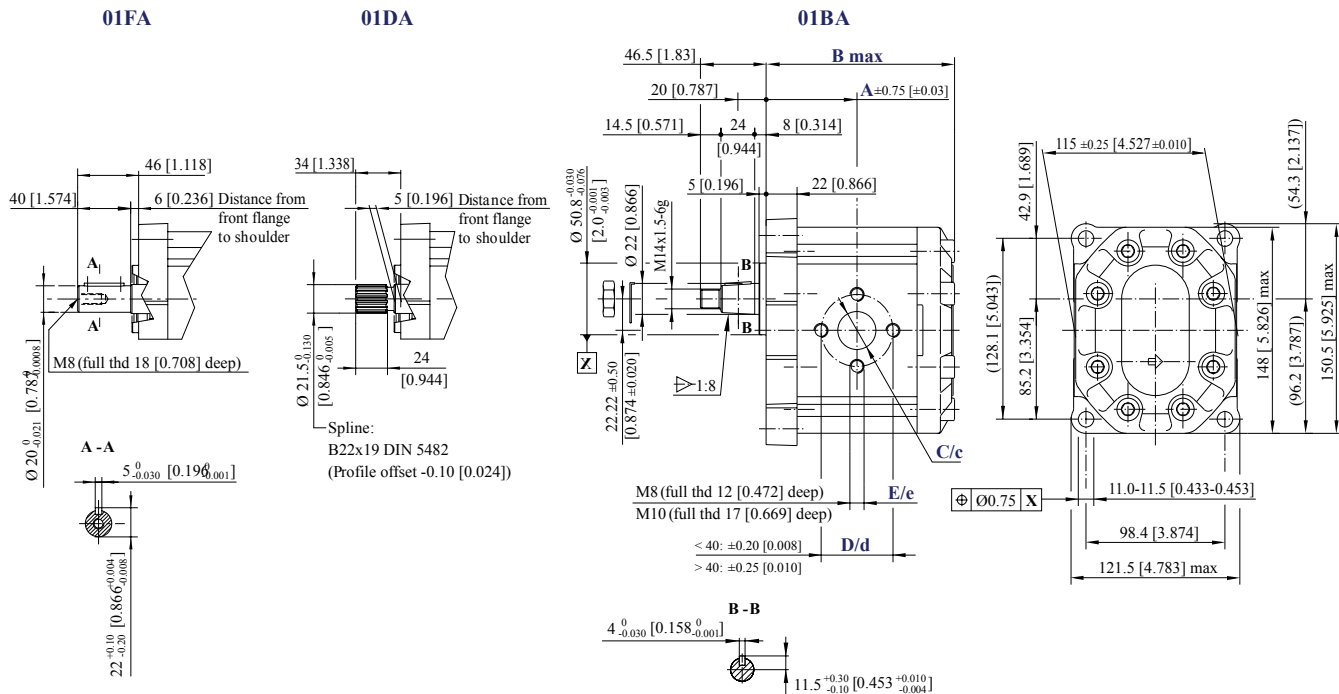
#### Ports dimensions

| Port type           |     |        |                 |                  |                  |               |               |               |    |               |               |     |               |               |
|---------------------|-----|--------|-----------------|------------------|------------------|---------------|---------------|---------------|----|---------------|---------------|-----|---------------|---------------|
| Dimensions          |     |        | a               | b                | d                | c             | x             | y             | z  | g             | h             | i   | e             | f             |
| Type (displacement) | 022 | Inlet  | 25.4<br>[1.000] | 26.19<br>[1.031] | 52.37<br>[2.062] | 3/8–16UNC–2B  | 27<br>[1.063] | 55<br>[2.165] | M8 | 40<br>[1.575] | 20<br>[0.787] | M8  | 15/16–12UN–2B | ¾ Gas (BSPP)  |
|                     |     | Outlet | 19.1<br>[0.752] | 22.23<br>[0.875] | 47.63<br>[1.875] | 3/8–16UNC–2B  | 18<br>[0.709] | 55<br>[2.165] | M8 | 40<br>[1.575] | 20<br>[0.787] | M8  | 11/16–12UN–2B | ¾ Gas (BSPP)  |
|                     | 026 | Inlet  | 25.4<br>[1.000] | 26.19<br>[1.031] | 52.37<br>[2.062] | 3/8–16UNC–2B  | 27<br>[1.063] | 55<br>[2.165] | M8 | 40<br>[1.575] | 20<br>[0.787] | M8  | 15/16–12UN–2B | ¾ Gas (BSPP)  |
|                     |     | Outlet | 19.1<br>[0.752] | 22.23<br>[0.875] | 47.63<br>[1.875] | 3/8–16UNC–2B  | 18<br>[0.709] | 55<br>[2.165] | M8 | 40<br>[1.575] | 20<br>[0.787] | M8  | 11/16–12UN–2B | ¾ Gas (BSPP)  |
|                     | 033 | Inlet  | 31.8<br>[1.252] | 30.18<br>[1.188] | 58.72<br>[2.312] | 7/16–14UNC–2B | 27<br>[1.063] | 55<br>[2.165] | M8 | 51<br>[2.008] | 27<br>[1.063] | M10 | 15/8–12UN–2B  | 1 Gas (BSPP)  |
|                     |     | Outlet | 25.4<br>[1.000] | 26.19<br>[1.031] | 52.37<br>[2.062] | 3/8–16UNC–2B  | 18<br>[0.709] | 55<br>[2.165] | M8 | 40<br>[1.575] | 20<br>[0.787] | M8  | 15/16–12UN–2B | ¾ Gas (BSPP)  |
|                     | 038 | Inlet  | 31.8<br>[1.252] | 30.18<br>[1.188] | 58.72<br>[2.312] | 7/16–14UNC–2B | 27<br>[1.063] | 55<br>[2.165] | M8 | 51<br>[2.008] | 27<br>[1.063] | M10 | 15/8–12UN–2B  | 1 Gas (BSPP)  |
|                     |     | Outlet | 25.4<br>[1.000] | 26.19<br>[1.031] | 52.37<br>[2.062] | 3/8–16UNC–2B  | 18<br>[0.709] | 55<br>[2.165] | M8 | 40<br>[1.575] | 20<br>[0.787] | M8  | 15/16–12UN–2B | ¾ Gas (BSPP)  |
|                     | 044 | Inlet  | 31.8<br>[1.252] | 30.18<br>[1.188] | 58.72<br>[2.312] | 7/16–14UNC–2B | 27<br>[1.063] | 55<br>[2.165] | M8 | 51<br>[2.008] | 27<br>[1.063] | M10 | 15/8–12UN–2B  | 1 Gas (BSPP)  |
|                     |     | Outlet | 25.4<br>[1.000] | 26.19<br>[1.031] | 52.37<br>[2.062] | 3/8–16UNC–2B  | 18<br>[0.709] | 55<br>[2.165] | M8 | 51<br>[2.008] | 27<br>[1.063] | M10 | 15/16–12UN–2B | 1 Gas (BSPP)  |
|                     | 048 | Inlet  | 31.8<br>[1.252] | 30.18<br>[1.188] | 58.72<br>[2.312] | 7/16–14UNC–2B | 27<br>[1.063] | 55<br>[2.165] | M8 | 51<br>[2.008] | 27<br>[1.063] | M10 | 15/8–12UN–2B  | 1 Gas (BSPP)  |
|                     |     | Outlet | 25.4<br>[1.000] | 26.19<br>[1.031] | 52.37<br>[2.062] | 3/8–16UNC–2B  | 18<br>[0.709] | 55<br>[2.165] | M8 | 51<br>[2.008] | 27<br>[1.063] | M10 | 15/16–12UN–2B | 1 Gas (BSPP)  |
|                     | 055 | Inlet  | 38.1<br>[1.500] | 35.71<br>[1.406] | 69.85<br>[2.750] | ½–13UNC–2B    | 27<br>[1.063] | 55<br>[2.165] | M8 | 51<br>[2.008] | 27<br>[1.063] | M10 | 17/8–12UN–2B  | 1 Gas (BSPP)  |
|                     |     | Outlet | 31.8<br>[1.252] | 30.18<br>[1.188] | 58.72<br>[2.312] | 7/16–14UNC–2B | 18<br>[0.709] | 55<br>[2.165] | M8 | 51<br>[2.008] | 27<br>[1.063] | M10 | 15/8–12UN–2B  | 1 Gas (BSPP)  |
|                     | 063 | Inlet  | 38.1<br>[1.500] | 35.71<br>[1.406] | 69.85<br>[2.750] | ½–13UNC–2B    | 36<br>[1.417] | 55<br>[2.165] | M8 | 62<br>[2.441] | 36<br>[1.417] | M10 | 17/8–12UN–2B  | 1¼ Gas (BSPP) |
|                     |     | Outlet | 31.8<br>[1.252] | 30.18<br>[1.188] | 58.72<br>[2.312] | 7/16–14UNC–2B | 27<br>[1.063] | 55<br>[2.165] | M8 | 51<br>[2.008] | 27<br>[1.063] | M10 | 15/8–12UN–2B  | 1 Gas (BSPP)  |
|                     | 075 | Inlet  | 38.1<br>[1.500] | 35.71<br>[1.406] | 69.85<br>[2.750] | ½–13UNC–2B    | 36<br>[1.417] | 55<br>[2.165] | M8 | 62<br>[2.441] | 36<br>[1.417] | M10 | 17/8–12UN–2B  | 1¼ Gas (BSPP) |
|                     |     | Outlet | 31.8<br>[1.252] | 30.18<br>[1.188] | 58.72<br>[2.312] | 7/16–14UNC–2B | 27<br>[1.063] | 55<br>[2.165] | M8 | 51<br>[2.008] | 27<br>[1.063] | M10 | 15/8–12UN–2B  | 1 Gas (BSPP)  |
|                     | 090 | Inlet  | 38.1<br>[1.500] | 35.71<br>[1.406] | 69.85<br>[2.750] | ½–13UNC–2B    | 36<br>[1.417] | 55<br>[2.165] | M8 | 62<br>[2.441] | 36<br>[1.417] | M10 | 17/8–12UN–2B  | 1¼ Gas (BSPP) |
|                     |     | Outlet | 31.8<br>[1.252] | 30.18<br>[1.188] | 58.72<br>[2.312] | 7/16–14UNC–2B | 27<br>[1.063] | 55<br>[2.165] | M8 | 51<br>[2.008] | 27<br>[1.063] | M10 | 15/8–12UN–2B  | 1 Gas (BSPP)  |

## Dimensions

### SNP3NN - 01FA, 01DA, 01BA

The drawing shows the SNP3NN standard porting for 01FA, 01DA and 01BA.



### SNP3NN – 01FA, 01BA, 01DA

| Frame size |   | 022           | 026           | 033           | 038          | 044           | 048           | 055           | 063           | 075           | 090           |
|------------|---|---------------|---------------|---------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Dimension  | A | 63 [2.480]    | 64.5 [2.539]  | 67 [2.637]    | 68.8 [2.708] | 71 [2.795]    | 72.5 [2.854]  | 75 [2.952]    | 78 [3.07]     | 82 [3.228]    | 87 [3.425]    |
|            | B | 132.5 [5.216] | 135.5 [5.334] | 140.5 [5.531] | 144 [5.669]  | 148.5 [5.846] | 151.5 [5.964] | 156.5 [6.161] | 162.5 [6.397] | 170.5 [6.712] | 180.5 [7.106] |
| Inlet      | C | 20 [0.787]    |               | 27 [1.063]    |              |               |               | 36 [1.417]    |               |               |               |
|            | D | 40 [1.575]    |               | 51 [2.007]    |              |               |               | 62 [2.441]    |               |               |               |
|            | E | M8            |               | M10           |              |               |               |               |               |               |               |
| Outlet     | c | 20 [0.787]    |               |               |              | 27 [1.063]    |               |               |               |               |               |
|            | d | 40 [1.575]    |               |               |              | 51 [2.001]    |               |               |               |               |               |
|            | e | M8            |               |               |              | M10           |               |               |               |               |               |

### Model code examples and maximum shaft torque

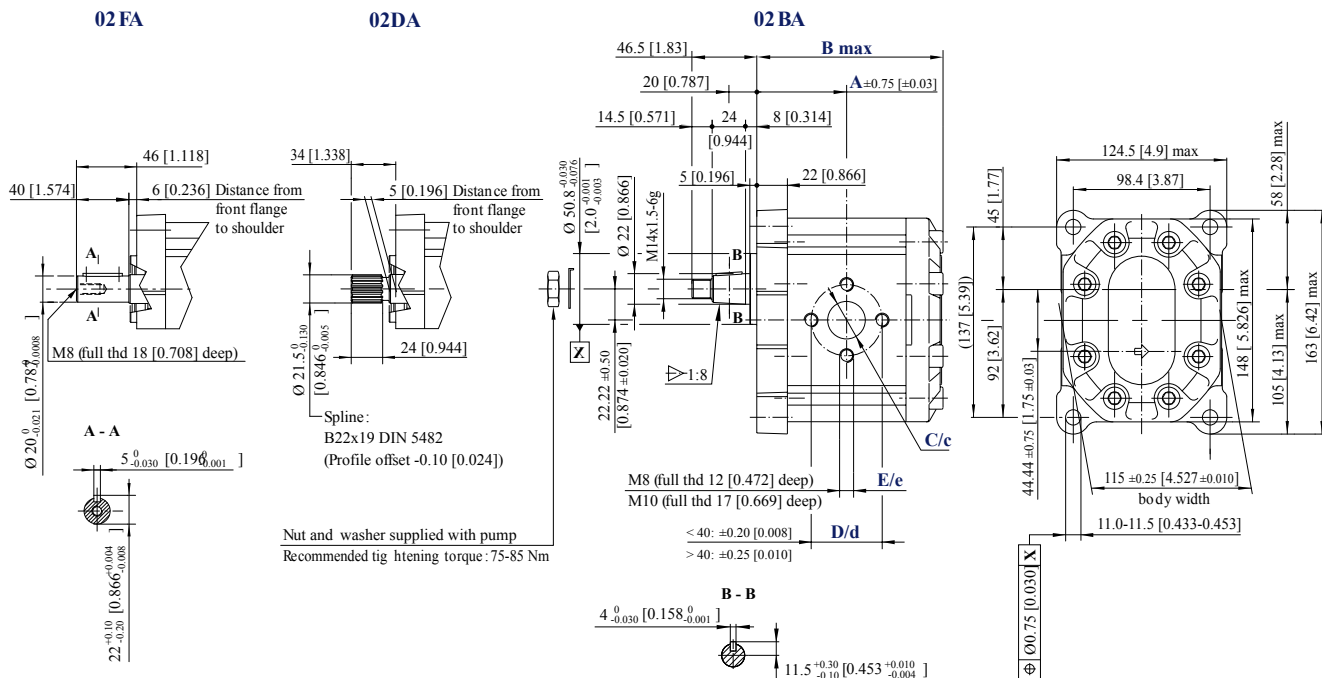
| Flange/drive gear | Model code example               | Maximum shaft torque |
|-------------------|----------------------------------|----------------------|
| 01DA              | SNP3NN/075LN01DAP1CDCANNNN/NNNNN | 290 N·m [2566 lb·in] |
| 01FA              | SNP3NN/033RN01FAP1CAC7NNNN/NNNNN | 210 N·m [1858 lb·in] |
| 01BA              | SNP3NN/022RN01BAP1C7C7NNNN/NNNNN | 350 N·m [3097 lb·in] |

For further details on ordering, see [Model code](#) on page 8.

## Dimensions

### SNP3NN - 02FA,02DA and 02BA

This drawing shows the standard porting for 02FA, 02DA and 02BA.



### SNP3NN - 02FA, 02DA AND 02BA dimensions

| Frame size |   | 022              | 026              | 033              | 038             | 044              | 048              | 055              | 063              | 075              | 090              |
|------------|---|------------------|------------------|------------------|-----------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Dimension  | A | 63<br>[2.480]    | 64.5<br>[2.539]  | 67<br>[2.637]    | 68.8<br>[2.708] | 71<br>[2.795]    | 72.5<br>[2.854]  | 75<br>[2.952]    | 78<br>[3.07]     | 82<br>[3.228]    | 87<br>[3.425]    |
|            | B | 132.5<br>[5.216] | 135.5<br>[5.334] | 140.5<br>[5.531] | 144<br>[5.669]  | 148.5<br>[5.846] | 151.5<br>[5.964] | 156.5<br>[6.161] | 162.5<br>[6.397] | 170.5<br>[6.712] | 180.5<br>[7.106] |
| Inlet      | C | 20 [0.787]       |                  | 27 [1.063]       |                 |                  |                  | 36 [1.417]       |                  |                  |                  |
|            | D | 40 [1.575]       |                  | 51 [2.007]       |                 |                  |                  | 62 [2.441]       |                  |                  |                  |
|            | E | M8               |                  | M10              |                 |                  |                  |                  |                  |                  |                  |
| Outlet     | c | 20 [0.787]       |                  |                  |                 | 27 [1.063]       |                  |                  |                  |                  |                  |
|            | d | 40 [1.575]       |                  |                  |                 | 51 [2.001]       |                  |                  |                  |                  |                  |
|            | e | M8               |                  |                  |                 | M10              |                  |                  |                  |                  |                  |

### Model code examples and maximum shaft torque

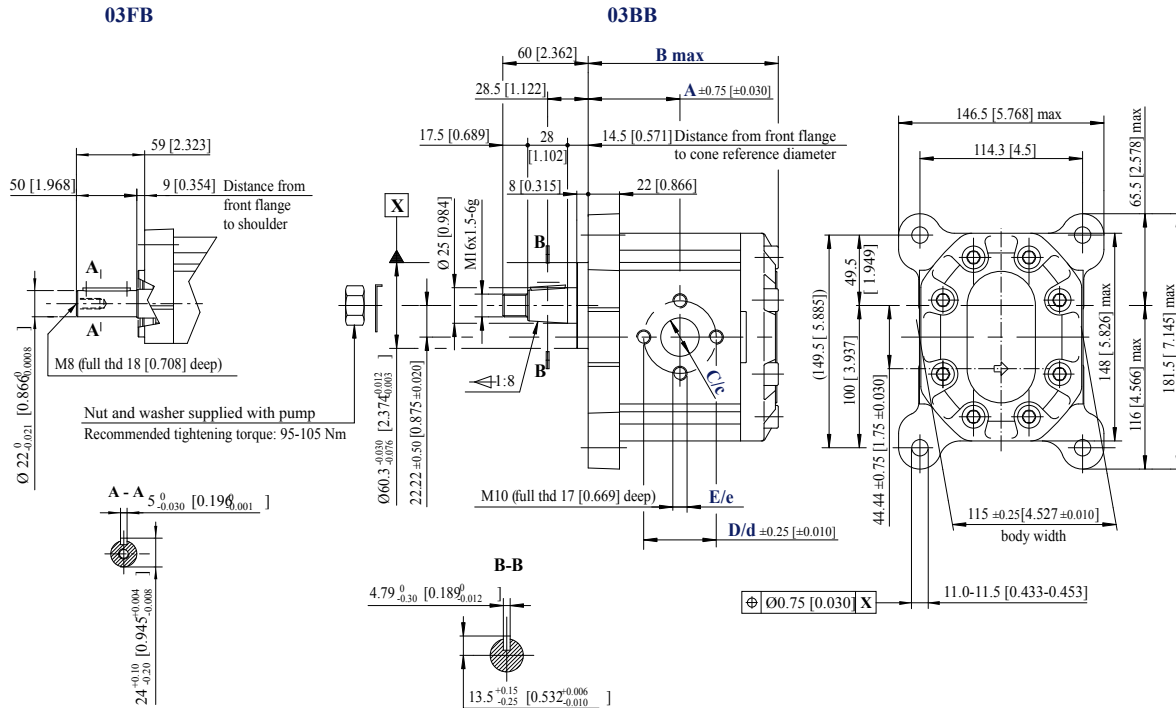
| Flange/drive gear configuration | Model code example               | Maximum shaft torque<br>N•m [lb•in] |
|---------------------------------|----------------------------------|-------------------------------------|
| <b>02FA</b>                     | SNP3NN/044RN02FAP1CACANNNN/NNNNN | 210 [1858]                          |
| <b>02DA</b>                     | SNP3NN/033RN02DAP1CAC7NNNN/NNNNN | 290 [2566]                          |
| <b>02BA</b>                     | SNP3NN/026LN02BAP1C7C7NNNN/NNNNN | 350 [3097]                          |

For further details on ordering, see [Model code](#) on page 8.

## Dimensions

### SNP3NN - 03FB, 03BB

This drawing shows the standard porting for 03FB and 03BB.



SNP3NN – 03FB and 03BB dimensions

| Type (displacement) |   | 022              | 026              | 033              | 038              | 044              | 048              | 055              | 063              | 075              | 090              |
|---------------------|---|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Dimension           | A | 63.0<br>[2.480]  | 64.5<br>[2.539]  | 67.0<br>[2.637]  | 68.8<br>[2.708]  | 71.0<br>[2.795]  | 72.5<br>[2.854]  | 75.0<br>[2.952]  | 78.0<br>[3.070]  | 82.0<br>[3.228]  | 87.0<br>[3.425]  |
|                     | B | 132.5<br>[5.216] | 135.5<br>[5.334] | 140.5<br>[5.531] | 144.0<br>[5.669] | 148.5<br>[5.846] | 151.5<br>[5.964] | 156.5<br>[6.161] | 162.5<br>[6.397] | 170.5<br>[6.712] | 180.5<br>[7.106] |
| Inlet               | C | 20 [0.787]       |                  | 27 [1.063]       |                  |                  |                  | 36 [1.417]       |                  |                  |                  |
|                     | D | 40 [1.575]       |                  | 51 [2.007]       |                  |                  |                  | 62 [2.441]       |                  |                  |                  |
|                     | E | M8               |                  | M10              |                  |                  |                  |                  |                  |                  |                  |
| Outlet              | c | 20 [0.787]       |                  |                  |                  | 27 [1.063]       |                  |                  |                  |                  |                  |
|                     | d | 40 [1.575]       |                  |                  |                  | 51 [2.001]       |                  |                  |                  |                  |                  |
|                     | e | M8               |                  |                  |                  | M10              |                  |                  |                  |                  |                  |

Model code examples and maximum shaft torque

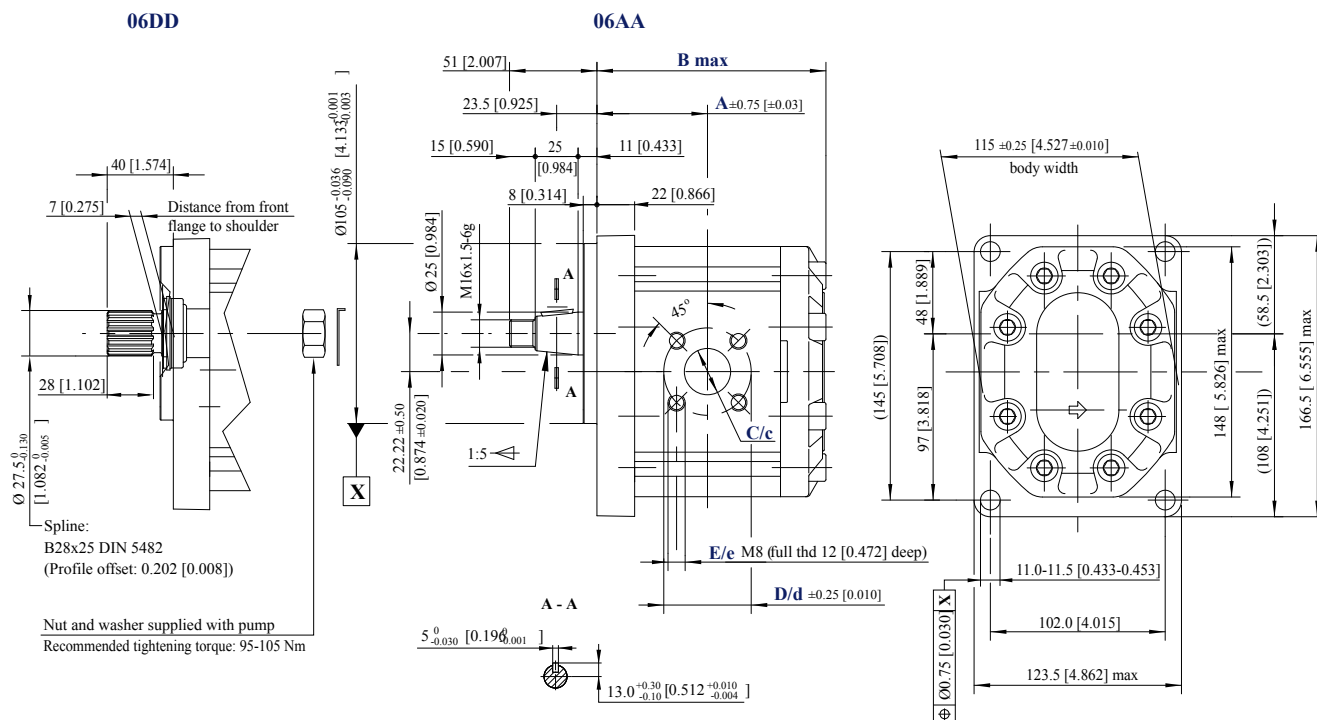
| Flange/drive gear configuration | Model code example               | Maximum shaft torque N·m [lb·in] |
|---------------------------------|----------------------------------|----------------------------------|
| 03FB                            | SNP3NN/044LN03FBP1CACANNNN/NNNNN | 300 [2655]                       |
| 03BB                            | SNP3NN/090RN03BBP1CDCANNNN/NNNNN | 500 [4425]                       |

For further details on ordering, see [Model code](#) on page 8.

## Dimensions

**SNP3NN - 06DD, 06AA**

This drawing shows the standard porting for 06DD and 06AA.



*SNP3NN – 06DD and 06AA dimensions*

| Type (displacement) |   | 022              | 026              | 033              | 038              | 044              | 048              | 055              | 063              | 075              | 090              |
|---------------------|---|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Dimension           | A | 63.0<br>[2.480]  | 64.5<br>[2.539]  | 67.0<br>[2.637]  | 68.8<br>[2.708]  | 71.0<br>[2.795]  | 72.5<br>[2.854]  | 75.0<br>[2.952]  | 78.0<br>[3.070]  | 82.0<br>[3.228]  | 87.0<br>[3.425]  |
|                     | B | 132.5<br>[5.216] | 135.5<br>[5.334] | 140.5<br>[5.531] | 144.0<br>[5.669] | 148.5<br>[5.846] | 151.5<br>[5.964] | 156.5<br>[6.161] | 162.5<br>[6.397] | 170.5<br>[6.712] | 180.5<br>[7.106] |
| Inlet               | C | 27 [1.063]       |                  |                  |                  |                  |                  |                  | 36 [1.417]       |                  |                  |
|                     | D | 55 [2.165]       |                  |                  |                  |                  |                  |                  |                  |                  |                  |
|                     | E | M8               |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| Outlet              | c | 18 [0.708]       |                  |                  |                  |                  |                  |                  | 27 [1.063]       |                  |                  |
|                     | d | 55 [2.165]       |                  |                  |                  |                  |                  |                  |                  |                  |                  |
|                     | e | M8               |                  |                  |                  |                  |                  |                  |                  |                  |                  |

### Model code examples and maximum shaft torque

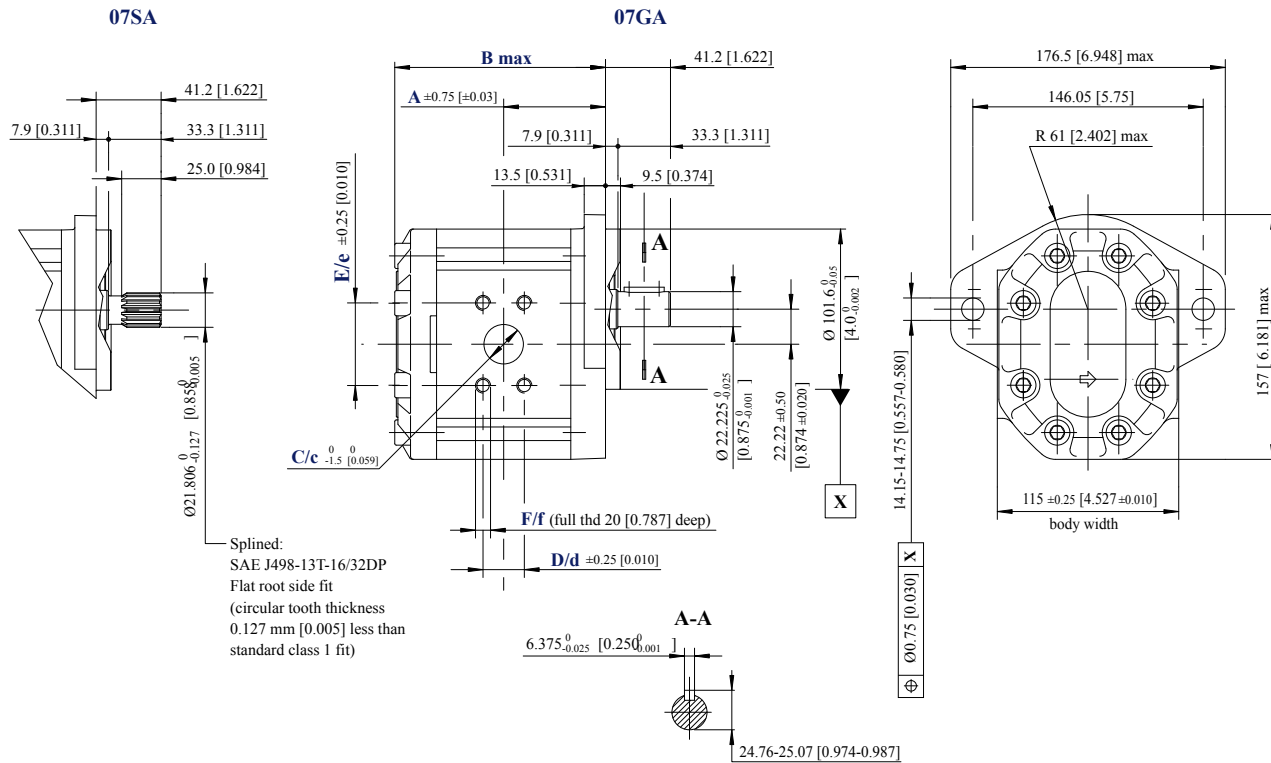
| Flange/drive gear configuration | Model code example               | Maximum shaft torque<br>N·m [lb·in] |
|---------------------------------|----------------------------------|-------------------------------------|
| <b>06DD</b>                     | SNP3NN/044RN06DDP1BBBANNNN/NNNNN | 450 [3982]                          |
| <b>06AA</b>                     | SNP3NN/026LN06AAP1BBBANNNN/NNNNN | 300 [2655]                          |

For further details on ordering, see [Model code](#) on page 8.

## Dimensions

### SNP3NN - 07SA, 07GA

The drawing shows the SNP3NN standard porting for 07SA and 07GA.



SNP3NN – 07SA and 07GA dimensions

| Type (displacement) |   | 022              | 026              | 033              | 038              | 044              | 048              | 055              | 063              | 075              | 090              |
|---------------------|---|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Dimension           | A | 63.0<br>[2.480]  | 64.5<br>[2.539]  | 67.0<br>[2.637]  | 68.8<br>[2.708]  | 71.0<br>[2.795]  | 72.5<br>[2.854]  | 75.0<br>[2.952]  | 78.0<br>[3.070]  | 82.0<br>[3.228]  | 87.0<br>[3.425]  |
|                     | B | 132.5<br>[5.216] | 135.5<br>[5.334] | 140.5<br>[5.531] | 144.0<br>[5.669] | 148.5<br>[5.846] | 151.5<br>[5.964] | 156.5<br>[6.161] | 162.5<br>[6.397] | 170.5<br>[6.712] | 180.5<br>[7.106] |
| Inlet               | C | 25.4 [1]         |                  | 31.8 [1.251]     |                  |                  |                  | 38.1 [1.5]       |                  |                  |                  |
|                     | D | 26.19 [1.031]    |                  | 30.18 [1.188]    |                  |                  |                  | 35.71 [1.405]    |                  |                  |                  |
|                     | E | 52.37 [2.061]    |                  | 58.72 [2.311]    |                  |                  |                  | 69.85 [2.75]     |                  |                  |                  |
|                     | F | 3/8-16UNC-2B     |                  | 7/16-14UNC-2B    |                  |                  |                  | 1/2-13UNC-2B     |                  |                  |                  |
| Outlet              | c | 19.1 [0.751]     |                  | 25.4 [1.0]       |                  |                  |                  | 31.8 [1.251]     |                  |                  |                  |
|                     | d | 22.23 [0.875]    |                  | 26.19 [1.031]    |                  |                  |                  | 30.18 [1.188]    |                  |                  |                  |
|                     | e | 47.63 [1.875]    |                  | 52.37 [2.061]    |                  |                  |                  | 58.72 [2.311]    |                  |                  |                  |
|                     | f | 3/8-16UNC-2B     |                  | 3/8-16UNC-2B     |                  |                  |                  | 7/16-14UNC-2B    |                  |                  |                  |

Model code examples and maximum shaft torque

| Flange/drive gear configuration | Model code example               | Maximum shaft torque<br>N·m [lb·in] |
|---------------------------------|----------------------------------|-------------------------------------|
| 07SA                            | SNP3NN/063LN07SAP1A5A4NNNN/NNNNN | 270 [2389]                          |
| 07GA                            | SNP3NN/026LN07GAP1A3A2NNNN/NNNNN | 230 [2035]                          |

For further details on ordering, see [Model code](#) on page 8.



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