

Data sheet

## APP Pumps

APP 0.6-1.0 / APP 1.5-3.5 /  
APP (W) 5.1-10.2 / APP 11-13 /  
APP 16-22 / APP 21-46



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## Data sheet | APP 0.6-46 / APP (W) 5.1-10.2 pumps

### 1. Introduction

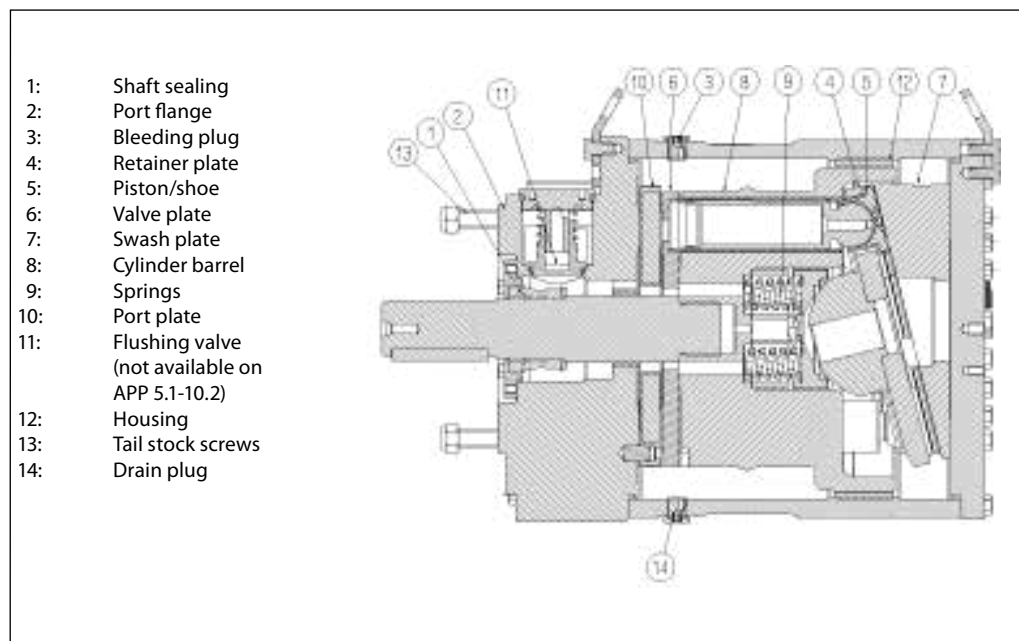
This data sheet is valid for APP pumps both non ATEX and ATEX certified. ATEX certified pumps are indicated by Ex in the type designation - example APP 0.6 Ex.

The Danfoss range of APP high-pressure pumps is designed according to EN 809 for use in RO applications with low viscosity and corrosive fluids such as:

- Sea water
- Brackish water
- Waste water (APP W)

Danfoss APP pumps are positive displacement pumps with axial pistons that move a fixed amount of water in each cycle. Flow is proportional to the number of input shaft revolutions (rpm). Unlike centrifugal pumps, they produce the same flow at a given speed no matter what the discharge pressure.

Below sectional drawing is an example of an APP pump. The sectional drawing for the specific pump sizes are to be found in the pump instruction.



### 2. Benefits

- **Zero risk of lubricant contamination:**
  - Oil lubricants are replaced with the pumped medium, water, so there is no contamination risk from the pump.
- **Low maintenance costs:**
  - Efficient design and all-stainless steel construction ensure exceptionally long life. When Danfoss specifications are met, service intervals of 8,000 hours can be expected. Service is easy, and can be carried out on-site due to the simple design and few parts.
- **Low energy costs:**
  - The highly efficient axial piston design provides the lowest energy consumption of any comparable pump on the market.
- **Easy installation:**
  - The most compact and lightest design available.
  - The pump can be installed vertically and horizontally.
  - No pulsation dampeners necessary due to extremely low pressure pulsation.
- Powered directly by electric motors or combustion engines (with special coupling).
- All pumps except APP (W) 5.1 - 10.2 are supplied with an integrated flushing valve that allows the fluid to flow from inlet to the outlet, when the pump is not running.
- **High reliability:**
  - All parts are made of high corrosion resistant materials e.g. Duplex (EN1.4462/ UNS S31803) and Super Duplex (EN1.4410/UNS S32750) stainless steel and carbon reinforced PEEK.
- **Certified quality:**
  - Pump available as ATEX certified: category 2, zone 1 or category 3, zone 2. For other certifications, please see data sheets for APP S (all super duplex) and APP S 674 (API).
  - Positive Material Identification (PMI) report available on request.
  - IATF 16949, ISO 9001, ISO 14001.

### 3. Application examples

Danfoss APP pumps are built into a broad range of RO desalination plants around the world:

- Containerized solutions for hotels, resorts and residences on islands and in coastal regions
- Mobile systems for humanitarian and military organizations
- Onboard systems for ships and yachts
- Offshore platforms for the oil and gas industry
- Municipal and regional waterworks

## 4 Technical data

### 4.1 APP 0.6-1.0

| Pump size                                             |                       | APP 0.6    | APP 0.8    | APP 1.0    |
|-------------------------------------------------------|-----------------------|------------|------------|------------|
| Code number APP                                       |                       | 180B3048   | 180B3037   | 180B3049   |
| Code number APP ATEX <sup>4)</sup>                    |                       | 180B3148   | 180B3137   | 180B3149   |
| Geometric displacement                                | cm <sup>3</sup> /rev. | 4.07       | 5.08       | 6.30       |
|                                                       | in <sup>3</sup> /rev. | 0.25       | 0.31       | 0.38       |
| <b>Pressure</b>                                       |                       |            |            |            |
| Max. outlet <sup>1)</sup> pressure continuous         | barg                  | 80         | 80         | 80         |
|                                                       | psig                  | 1160       | 1160       | 1160       |
| Min. outlet <sup>1)</sup> pressure                    | barg                  | 20         | 20         | 20         |
|                                                       | psig                  | 290        | 290        | 290        |
| Inlet pressure <sup>2)</sup> continuous               | barg                  | 0.5 - 5    | 0.5 - 5    | 0.5 - 5    |
|                                                       | psig                  | 7.3 - 72.5 | 7.3 - 72.5 | 7.3 - 72.5 |
| Max. inlet pressure peak                              | barg                  | 10         | 10         | 10         |
|                                                       | psig                  | 145        | 145        | 145        |
| <b>Speed</b>                                          |                       |            |            |            |
| Min. speed continuous                                 | rpm                   | 700        | 700        | 700        |
| Max. speed <sup>2)</sup> continuous                   | rpm                   | 3450       | 3450       | 3450       |
| <b>Typical flow - Flow curves available in item 5</b> |                       |            |            |            |
| 1000 rpm at max. pressure                             | m <sup>3</sup> /h     | 0.22       | 0.29       | 0.36       |
| 1500 rpm at max. pressure                             | m <sup>3</sup> /h     | 0.34       | 0.43       | 0.54       |
| 1200 rpm at max. pressure                             | gpm                   | 1.18       | 1.52       | 1.90       |
| 1800 rpm at max. pressure                             | gpm                   | 1.78       | 2.28       | 2.84       |
| <b>Technical specifications</b>                       |                       |            |            |            |
| Media <sup>3)</sup> temperature                       | °C                    | 2 - 50     | 2 - 50     | 2 - 50     |
|                                                       | °F                    | 36 - 122   | 36 - 122   | 36 - 122   |
| Ambient temperature                                   | °C                    | 0-50       | 0-50       | 0-50       |
|                                                       | °F                    | 32 - 122   | 32 - 122   | 32 - 122   |
| Weight (dry)                                          | kg                    | 5.2        | 5.2        | 5.2        |
|                                                       |                       | 11.5       | 11.5       | 11.5       |
| Sound pressure level, LPA 1m <sup>5)</sup>            | dB(A)                 | 74         | 74         | 74         |
| Footprint with IEC motor <sup>6)</sup>                | m <sup>2</sup>        | 0.1        | 0.1        | 0.14       |
|                                                       | foot <sup>2</sup>     | 1.08       | 1.08       | 1.51       |
| <b>Typical motor size</b>                             |                       |            |            |            |
| Max. speed at max. pressure                           | kW                    | 2.2        | 3.0        | 4.0        |
| 3000 rpm at max. pressure                             | HP                    | 3          | 5          | 5          |
| Torque at max. outlet pressure                        | Nm                    | 5.8        | 7.2        | 8.9        |
|                                                       | lbf-ft                | 4.2        | 5.3        | 6.6        |

<sup>1)</sup> For lower and higher pressure, please contact Danfoss.

<sup>2)</sup> For speeds above 3000 rpm the pump must be boosted at a pressure of 2-5 barg (29- 72.5 psig).

<sup>3)</sup> Dependent on the NaCl concentration - see chapter 8.

<sup>4)</sup> Category 2, Zone 1 or Category 3, Zone 2.

<sup>5)</sup> A-weighted sound pressure level at 1 m from the pump unit surfaces (reference box) acc. to EN ISO 20361 section 6.2. The noise measurements are performed acc. to EN ISO 3744:2010 on a motor-pump unit at max. pressure and speed.

<sup>6)</sup> Max. area covered with recommended motor configuration (excl. of space to service pump)

**4.2 APP 1.5-3.5**

| Pump size                                             |                       | APP 1.5                  | APP 1.8                  | APP 2.2                  | APP 2.5    | APP 3.0                  | APP 3.5    |
|-------------------------------------------------------|-----------------------|--------------------------|--------------------------|--------------------------|------------|--------------------------|------------|
| Code number APP                                       |                       | 180B3043                 | 180B3044                 | 180B3045                 | 180B3046   | 180B3030                 | 180B3032   |
| Code number APP ATEX <sup>4)</sup>                    |                       | 180B3143                 | 180B3144                 | 180B3145                 | 180B3146   | 180B3130                 | 180B3132   |
| Geometric displacement                                | cm <sup>3</sup> /rev. | 9.31                     | 10.04                    | 12.52                    | 15.35      | 17.70                    | 20.54      |
|                                                       | in <sup>3</sup> /rev. | 0.57                     | 0.61                     | 0.76                     | 0.94       | 1.08                     | 1.25       |
| <b>Pressure</b>                                       |                       |                          |                          |                          |            |                          |            |
| Max. outlet <sup>1)</sup> pressure continuous         | barg                  | 80                       | 80                       | 80                       | 80         | 80                       | 80         |
|                                                       | psig                  | 1160                     | 1160                     | 1160                     | 1160       | 1160                     | 1160       |
| Min. outlet <sup>1)</sup> pressure                    | barg                  | 20                       | 20                       | 20                       | 20         | 20                       | 20         |
|                                                       | psig                  | 290                      | 290                      | 290                      | 290        | 290                      | 290        |
| Inlet pressure continuous                             | barg                  | 0.5 - 5 <sup>2)</sup>    | 0.5 - 5 <sup>2)</sup>    | 0.5 - 5 <sup>2)</sup>    | 0.5 - 5    | 0.5 - 5 <sup>2)</sup>    | 0.5 - 5    |
|                                                       | psig                  | 7.3 - 72.5 <sup>2)</sup> | 7.3 - 72.5 <sup>2)</sup> | 7.3 - 72.5 <sup>2)</sup> | 7.3 - 72.5 | 7.3 - 72.5 <sup>2)</sup> | 7.3 - 72.5 |
| Max. inlet pressure peak                              | barg                  | 10                       | 10                       | 10                       | 10         | 10                       | 10         |
|                                                       | psig                  | 145                      | 145                      | 145                      | 145        | 145                      | 145        |
| <b>Speed</b>                                          |                       |                          |                          |                          |            |                          |            |
| Min. speed continuous                                 | rpm                   | 700                      | 700                      | 700                      | 700        | 700                      | 700        |
| Max. speed continuous                                 | rpm                   | 3450 <sup>2)</sup>       | 3450 <sup>2)</sup>       | 3450 <sup>2)</sup>       | 3000       | 3450 <sup>2)</sup>       | 3000       |
| <b>Typical flow - Flow curves available in item 5</b> |                       |                          |                          |                          |            |                          |            |
| 1000 rpm at max. pressure                             | m <sup>3</sup> /h     | 0.53                     | 0.57                     | 0.73                     | 0.90       | 1.02                     | 1.19       |
| 1500 rpm at max. pressure                             | m <sup>3</sup> /h     | 0.79                     | 0.86                     | 1.09                     | 1.34       | 1.54                     | 1.79       |
| 1200 rpm at max. pressure                             | gpm                   | 2.80                     | 3.03                     | 3.83                     | 4.73       | 5.41                     | 6.30       |
| 1800 rpm at max. pressure                             | gpm                   | 4.19                     | 4.55                     | 5.75                     | 7.09       | 8.12                     | 9.46       |
| <b>Technical specifications</b>                       |                       |                          |                          |                          |            |                          |            |
| Media <sup>3)</sup> temperature                       | °C                    | 2 - 50                   | 2 - 50                   | 2 - 50                   | 2 - 50     | 2 - 50                   | 2 - 50     |
|                                                       | °F                    | 36 - 122                 | 36 - 122                 | 36 - 122                 | 36 - 122   | 36 - 122                 | 36 - 122   |
| Ambient temperature                                   | °C                    | 0 - 50                   | 0 - 50                   | 0 - 50                   | 0 - 50     | 0 - 50                   | 0 - 50     |
|                                                       | °F                    | 32 - 122                 | 32 - 122                 | 32 - 122                 | 32 - 122   | 32 - 122                 | 32 - 122   |
| Weight (dry)                                          | kg                    | 8.6                      | 8.6                      | 8.6                      | 8.6        | 8.6                      | 8.6        |
|                                                       | lb                    | 17                       | 17                       | 17                       | 17         | 17                       | 17         |
| Sound pressure level <sup>5)</sup>                    | dB(A)                 | 77                       | 77                       | 77                       | 81         | 81                       | 81         |
| Footprint with IEC motor <sup>6)</sup>                | m <sup>2</sup>        | 0.15                     | 0.16                     | 0.21                     | 0.21       | 0.30                     | 0.30       |
|                                                       | foot <sup>2</sup>     | 1.61                     | 1.72                     | 2.26                     | 2.26       | 3.23                     | 3.23       |
| <b>Typical motor size</b>                             |                       |                          |                          |                          |            |                          |            |
| Max. speed at max. pressure                           | kW                    | 5.5                      | 5.5                      | 7.5                      | 7.5        | 11                       | 11         |
| 3000 rpm at max. pressure                             | HP                    | 7.5                      | 7.5                      | 10.0                     | 15.0       | 15.0                     | 15.0       |
| Torque at max. outlet pressure                        | Nm                    | 13.0                     | 13.9                     | 17.4                     | 21.3       | 24.5                     | 28.7       |
|                                                       | lbf-ft                | 9.6                      | 10.3                     | 12.8                     | 15.7       | 18.1                     | 21.2       |

<sup>1)</sup> For lower and higher pressure, please contact Danfoss.

<sup>2)</sup> For speeds above 3000 rpm the pump must be boosted at a pressure of 2-5 barg (29- 72.5 psig).

<sup>3)</sup> Dependent on the NaCl concentration - see chapter 8.

<sup>4)</sup> Category 2, Zone 1 or Category 3, Zone 2.

<sup>5)</sup> A-weighted sound pressure level at 1 m from the pump unit surfaces (reference box) acc. to EN ISO 20361 section 6.2. The noise measurements are performed acc. to EN ISO 3744:2010 on a motor-pump unit at max. pressure and speed.

<sup>6)</sup> Max. area covered with recommended motor configuration (excl. of space to service pump)

**4.3 APP (W) 5.1-10.2**

| Pump size                                             |                       | APP (W) 5.1 | APP (W) 6.5 | APP (W) 7.2 | APP (W) 8.2 | APP (W) 10.2 |
|-------------------------------------------------------|-----------------------|-------------|-------------|-------------|-------------|--------------|
| Code number APP                                       |                       | 180B3005    | 180B3006    | 180B3007    | 180B3008    | 180B3010     |
| Code number APP ATEX <sup>4)</sup>                    |                       | 180B3105    | 180B3106    | 180B3107    | 180B3108    | 180B3110     |
| Code number APP W                                     |                       | 180B3075    | 180B3076    | 180B3077    | 180B3078    | 180B3080     |
| Geometric displacement                                | cm <sup>3</sup> /rev. | 50.2        | 63.3        | 70.3        | 80.4        | 100.5        |
|                                                       | in <sup>3</sup> /rev. | 3.06        | 3.86        | 4.29        | 4.91        | 6.13         |
| <b>Pressure</b>                                       |                       |             |             |             |             |              |
| Max. outlet <sup>1)</sup> pressure continuous         | barg                  | 80          | 80          | 80          | 80          | 80           |
|                                                       | psig                  | 1160        | 1160        | 1160        | 1160        | 1160         |
| Min. outlet <sup>1)</sup> pressure                    | barg                  | 20          | 20          | 20          | 20          | 20           |
|                                                       | psig                  | 290         | 290         | 290         | 290         | 290          |
| Inlet pressure <sup>2)</sup> continuous               | barg                  | 0.5 - 5     | 0.5 - 5     | 0.5 - 5     | 0.5 - 5     | 0.5 - 5      |
|                                                       | psig                  | 7.3 - 72.5  | 7.3 - 72.5  | 7.3 - 72.5  | 7.3 - 72.5  | 7.3 - 72.5   |
| Max. inlet pressure peak                              | barg                  | 5           | 5           | 5           | 5           | 5            |
|                                                       | psig                  | 72.5        | 72.5        | 72.5        | 72.5        | 72.5         |
| <b>Speed</b>                                          |                       |             |             |             |             |              |
| Min. speed continuous                                 | rpm                   | 700         | 700         | 700         | 700         | 700          |
| Max. speed <sup>2)</sup> continuous                   | rpm                   | 1800        | 1800        | 1800        | 1800        | 1800         |
| <b>Typical flow - Flow curves available in item 5</b> |                       |             |             |             |             |              |
| 1000 rpm at max. pressure                             | m <sup>3</sup> /h     | 2.79        | 3.57        | 4.01        | 4.62        | 5.83         |
| 1500 rpm at max. pressure                             | m <sup>3</sup> /h     | 4.19        | 5.36        | 6.01        | 6.93        | 8.75         |
| 1200 rpm at max. pressure                             | gpm                   | 14.75       | 18.87       | 21.16       | 24.39       | 30.82        |
| 1800 rpm at max. pressure                             | gpm                   | 22.13       | 28.31       | 31.74       | 36.59       | 46.23        |
| <b>Technical specifications</b>                       |                       |             |             |             |             |              |
| Media <sup>3)</sup> temperature                       | °C                    | 2 - 50      | 2 - 50      | 2 - 50      | 2 - 50      | 2 - 50       |
|                                                       | °F                    | 35.6 - 122  | 35.6 - 122  | 35.6 - 122  | 35.6 - 122  | 35.6 - 122   |
| Ambient temperature                                   | °C                    | 0 - 50      | 0 - 50      | 0 - 50      | 0 - 50      | 0 - 50       |
|                                                       | °F                    | 32 - 122    | 32 - 122    | 32 - 122    | 32 - 122    | 32 - 122     |
| Weight (dry)                                          | kg                    | 30          | 30          | 30          | 30          | 30           |
|                                                       | lb                    | 66          | 66          | 66          | 66          | 66           |
| Sound pressure level <sup>5)</sup>                    | dB(A)                 | 78          | 78          | 78          | 78          | 78           |
| Footprint with IEC motor <sup>6)</sup>                | m <sup>2</sup>        | 0.32        | 0.33        | 0.33        | 0.35        | 0.43         |
|                                                       | foot <sup>2</sup>     | 3.44        | 3.55        | 3.55        | 3.77        | 4.63         |
| <b>Typical motor size</b>                             |                       |             |             |             |             |              |
| Max. speed at max. pressure                           | kW                    | 15.0        | 18.5        | 22          | 22          | 30           |
| 1200 rpm at max. pressure                             | HP                    | 20          | 20          | 20          | 20          | 25           |
| Torque at max. outlet pressure                        | Nm                    | 70          | 81          | 98          | 112         | 141          |
|                                                       | lbf-ft                | 52          | 65          | 73          | 83          | 104          |

<sup>1)</sup> For lower and higher pressure, please contact Danfoss.

<sup>2)</sup> For speeds above 1500 rpm the pump must be boosted at a pressure of 2-5 barg (29- 72.5 psig).

<sup>3)</sup> Dependent on the NaCl concentration - see chapter 8.

<sup>4)</sup> Category 2, Zone 1 or Category 3, Zone 2.

<sup>5)</sup> A- weighted sound pressure level at 1 m from the pump unit surfaces (reference box) acc. to EN ISO 20361 section 6.2. The noise measurements are performed acc. to EN ISO 3744:2010 on a motor-pump unit at max. pressure and speed.

<sup>6)</sup> Max. area covered with recommended motor configuration (excl. of space to service pump)

**4.4 APP 11-13**

| Pump size                                             |                       | APP 11/1200 | APP 11/1500 | APP 13/1200 | APP 13/1500 |
|-------------------------------------------------------|-----------------------|-------------|-------------|-------------|-------------|
| Code number APP                                       |                       | 180B3212    | 180B3211    | 180B3214    | 180B3213    |
| Code number APP ATEX <sup>3)</sup>                    |                       | 180B3222    | 180B3221    | 180B3224    | 180B3223    |
| Geometric displacement                                | cm <sup>3</sup> /rev. | 166.4       | 137.4       | 197.5       | 166.4       |
|                                                       | in <sup>3</sup> /rev. | 10.15       | 8.38        | 12.05       | 10.15       |
| <b>Pressure</b>                                       |                       |             |             |             |             |
| Max. outlet <sup>1)</sup> pressure continuous         | barg                  | 80          | 70          | 80          | 70          |
|                                                       | psig                  | 1160        | 1015        | 1160        | 1015        |
| Min. outlet <sup>1)</sup> pressure                    | barg                  | 10          | 10          | 10          | 10          |
|                                                       | psig                  | 145         | 145         | 145         | 145         |
| Inlet pressure continuous                             | barg                  | 2 - 5       | 2 - 5       | 2 - 5       | 2 - 5       |
|                                                       | psig                  | 29 - 72.5   | 29 - 72.5   | 29 - 72.5   | 29 - 72.5   |
| Max. inlet pressure, peak                             | barg                  | 10          | 10          | 10          | 10          |
|                                                       | psig                  | 145         | 145         | 145         | 145         |
| <b>Speed</b>                                          |                       |             |             |             |             |
| Min. speed continuous                                 | rpm                   | 700         | 700         | 700         | 700         |
| Max. speed continuous                                 | rpm                   | 1200        | 1500        | 1200        | 1500        |
| <b>Typical flow - Flow curves available in item 5</b> |                       |             |             |             |             |
| 1000 rpm at max. pressure                             | m <sup>3</sup> /h     | 9.22        | 7.50        | 11.07       | 9.23        |
| 1500 rpm at max. pressure                             | m <sup>3</sup> /h     |             | 11.25       |             | 13.84       |
| 1200 rpm at max. pressure                             | gpm                   | 48.71       | 39.61       | 58.51       | 48.75       |
| <b>Technical specifications</b>                       |                       |             |             |             |             |
| Media <sup>2)</sup> temperature                       | °C                    | 2 - 50      | 2 - 50      | 2 - 50      | 2 - 50      |
|                                                       | °F                    | 35.6 - 122  | 35.6 - 122  | 35.6 - 122  | 35.6 - 122  |
| Ambient temperature                                   | °C                    | 0 - 50      | 0 - 50      | 0 - 50      | 0 - 50      |
|                                                       | °F                    | 32 - 122    | 32 - 122    | 32 - 122    | 32 - 122    |
| Weight (dry)                                          | kg                    | 78          | 78          | 78          | 78          |
|                                                       | lb                    | 172         | 172         | 172         | 172         |
| Sound pressure level <sup>4)</sup>                    | dB(A)                 | 85          | 85          | 85          | 85          |
| Footprint with IEC motor <sup>5)</sup>                | m <sup>2</sup>        | 0.48        | 0.48        | 0.54        | 0.54        |
|                                                       | foot <sup>2</sup>     | 5.17        | 5.17        | 5.81        | 5.81        |
| <b>Typical motor size</b>                             |                       |             |             |             |             |
| Max. speed at max. pressure                           | kW                    |             | 30.0        |             | 37.0        |
| 1200 rpm at max. pressure                             | HP                    | 40.0        |             | 50.0        |             |
| Torque at max. outlet pressure                        | Nm                    | 229         | 166         | 274         | 204         |
|                                                       | lbf-ft                | 169         | 123         | 202         | 150         |

<sup>1)</sup> For lower and higher pressure, please contact Danfoss.

<sup>2)</sup> Dependent on the NaCl concentration - see chapter 8.

<sup>3)</sup> Category 2, Zone 1 or Category 3, Zone 2.

<sup>4)</sup> A-weighted sound pressure level at 1 m from the pump unit surfaces (reference box) acc. to EN ISO 20361 section 6.2. The noise measurements are performed acc. to EN ISO 3744:2010 on a motor-pump unit at max. pressure and speed.

<sup>5)</sup> Max. area covered with recommended motor configuration (excl. of space to service pump)

## Data sheet | APP 0.6-46 / APP (W) 5.1-10.2 pumps

### 4.5 APP 16-22

| Pump size                                      |                       | APP 16/1200 | APP 16/1500 | APP 17/1200 | APP 17/1500 | APP 19/1200 | APP 19/1500 | APP 22/1200 | APP 22/1500 |
|------------------------------------------------|-----------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Code number APP                                |                       | 180B3254    | 180B3250    | 180B3255    | 180B3251    | 180B3256    | 180B3252    | 180B3257    | 180B3253    |
| Code number APP ATEX <sup>3)</sup>             |                       | 180B3264    | 180B3260    | 180B3265    | 180B3261    | 180B3266    | 180B3262    | 180B3267    | 180B3263    |
| Geometric displacement                         | cm <sup>3</sup> /rev. | 234.6       | 188.3       | 253.3       | 197.5       | 272.3       | 219.7       | 310.6       | 253.3       |
|                                                | in <sup>3</sup> /rev. | 14.32       | 11.49       | 15.46       | 12.05       | 16.62       | 13.41       | 18.95       | 15.46       |
| Pressure                                       |                       |             |             |             |             |             |             |             |             |
| Max. outlet <sup>1)</sup> pressure continuous  | barg                  | 80          | 70          | 80          | 70          | 80          | 70          | 80          | 70          |
|                                                | psig                  | 1160        | 1015        | 1160        | 1015        | 1160        | 1015        | 1160        | 1015        |
| Min. outlet <sup>1)</sup> pressure             | barg                  | 10          | 10          | 10          | 10          | 10          | 10          | 10          | 10          |
|                                                | psig                  | 145         | 145         | 145         | 145         | 145         | 145         | 145         | 145         |
| Inlet pressure continuous                      | barg                  | 2 - 5       | 2 - 5       | 2 - 5       | 2 - 5       | 2 - 5       | 2 - 5       | 2 - 5       | 2 - 5       |
|                                                | psig                  | 29 - 72.5   | 29 - 72.5   | 29 - 72.5   | 29 - 72.5   | 29 - 72.5   | 29 - 72.5   | 29 - 72.5   | 29 - 72.5   |
| Max. inlet pressure peak                       | barg                  | 10          | 10          | 10          | 10          | 10          | 10          | 10          | 10          |
|                                                | psig                  | 145         | 145         | 145         | 145         | 145         | 145         | 145         | 145         |
| Speed                                          |                       |             |             |             |             |             |             |             |             |
| Min. speed continuous                          | rpm                   | 700         | 700         | 700         | 700         | 700         | 700         | 700         | 700         |
| Max. speed continuous                          | rpm                   | 1200        | 1500        | 1200        | 1500        | 1200        | 1500        | 1200        | 1500        |
| Typical flow - Flow curves available in item 5 |                       |             |             |             |             |             |             |             |             |
| 1000 rpm at max. pressure                      | m <sup>3</sup> /h     | 13.38       | 10.67       | 14.57       | 11.25       | 15.71       | 12.55       | 18.06       | 14.61       |
| 1500 rpm at max. pressure                      | m <sup>3</sup> /h     |             | 16.01       |             | 16.88       |             | 18.82       |             | 21.92       |
| 1200 rpm at max. pressure                      | gpm                   | 70.70       | 56.40       | 76.98       | 59.44       | 82.98       | 66.30       | 95.43       | 77.21       |
| Technical specifications                       |                       |             |             |             |             |             |             |             |             |
| Media <sup>2)</sup> temperature                | °C                    | 2 - 50      | 2 - 50      | 2 - 50      | 2 - 50      | 2 - 50      | 2 - 50      | 2 - 50      | 2 - 50      |
|                                                | °F                    | 35.6 - 122  | 35.6 - 122  | 35.6 - 122  | 35.6 - 122  | 35.6 - 122  | 35.6 - 122  | 35.6 - 122  | 35.6 - 122  |
| Ambient temperature                            | °C                    | 0 - 50      | 0 - 50      | 0 - 50      | 0 - 50      | 0 - 50      | 0 - 50      | 0 - 50      | 0 - 50      |
|                                                | °F                    | 32 - 122    | 32 - 122    | 32 - 122    | 32 - 122    | 32 - 122    | 32 - 122    | 32 - 122    | 32 - 122    |
| Weight (dry)                                   | kg                    | 78          | 78          | 78          | 78          | 78          | 78          | 78          | 78          |
|                                                | lb                    | 172         | 172         | 172         | 172         | 172         | 172         | 172         | 172         |
| Sound pressure level <sup>4)</sup>             | dB(A)                 | 84          | 84          | 84          | 84          | 84          | 84          | 84          | 84          |
| Footprint with IEC motor <sup>5)</sup>         | m <sup>2</sup>        | 0.54        | 0.58        | 0.59        | 0.59        | 0.76        | 0.76        | 0.80        | 0.80        |
|                                                | foot <sup>2</sup>     | 5.81        | 6.26        | 6.35        | 6.35        | 8.18        | 8.18        | 8.61        | 8.61        |
| Typical motor size                             |                       |             |             |             |             |             |             |             |             |
| Max. speed at max. pressure                    | kW                    |             | 37.0        |             | 37.0        |             | 45.0        |             | 55.0        |
| 1200 rpm at max. pressure                      | HP                    | 60.0        |             | 60.0        |             | 75.0        |             | 75.0        |             |
| Torque at max. outlet pressure                 | Nm                    | 316         | 223         | 343         | 234         | 372         | 263         | 426         | 305         |
|                                                | lbf-ft                | 233         | 165         | 253         | 173         | 275         | 194         | 314         | 225         |

<sup>1)</sup> For lower and higher pressure, please contact Danfoss.

<sup>2)</sup> Dependent on the NaCl concentration - see chapter 8.

<sup>3)</sup> Category 2, Zone 1 or Category 3, Zone 2.

<sup>4)</sup> A-weighted sound pressure level at 1 m from the pump unit surfaces (reference box) acc. to EN ISO 20361 section 6.2. The noise measurements are performed acc. to EN ISO 3744:2010 on a motor-pump unit at max. pressure and speed.

<sup>5)</sup> Max. area covered with recommended motor configuration (excl. of space to service pump)

## Data sheet | APP 0.6-46 / APP (W) 5.1-10.2 pumps

### 4.6 APP 21-30

| Pump size                                      |                       | APP 21/1200 | APP 21/1500 | APP 24/1200 | APP 24/1500 | APP 26/1200 | APP 26/1500 | APP 30/1200 | APP 30/1500 |
|------------------------------------------------|-----------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Code number APP                                |                       | 180B3051    | 180B3052    | 180B3054    | 180B3055    | 180B3056    | 180B3057    | 180B3060    | 180B3062    |
| Code number APP ATEX <sup>3)</sup>             |                       | 180B3151    | On request  | 180B3154    | 180B3155    | On request  | On request  | On request  | On request  |
| Geometric displacement                         | cm <sup>3</sup> /rev. | 308.5       | 256         | 362         | 282         | 389         | 308.5       | 444         | 362         |
|                                                | in <sup>3</sup> /rev. | 18.83       | 15.62       | 22.09       | 17.21       | 23.74       | 18.83       | 27.09       | 22.09       |
| Pressure                                       |                       |             |             |             |             |             |             |             |             |
| Max. outlet <sup>1)</sup> pressure continuous  | barg                  | 80          | 80          | 80          | 80          | 80          | 80          | 80          | 80          |
|                                                | psig                  | 1160        | 1160        | 1160        | 1160        | 1160        | 1160        | 1160        | 1160        |
| Min. outlet <sup>1)</sup> pressure             | barg                  | 10          | 10          | 10          | 10          | 10          | 10          | 10          | 10          |
|                                                | psig                  | 145         | 145         | 145         | 145         | 145         | 145         | 145         | 145         |
| Inlet pressure continuous                      | barg                  | 2 - 5       | 2 - 5       | 2 - 5       | 2 - 5       | 2 - 5       | 2 - 5       | 2 - 5       | 2 - 5       |
|                                                | psig                  | 29 - 72.5   | 29 - 72.5   | 29 - 72.5   | 29 - 72.5   | 29 - 72.5   | 29 - 72.5   | 29 - 72.5   | 29 - 72.5   |
| Max. inlet pressure peak                       | barg                  | 10          | 10          | 10          | 10          | 10          | 10          | 10          | 10          |
|                                                | psig                  | 145         | 145         | 145         | 145         | 145         | 145         | 145         | 145         |
| Speed                                          |                       |             |             |             |             |             |             |             |             |
| Min. speed continuous                          | rpm                   | 700         | 700         | 700         | 700         | 700         | 700         | 700         | 700         |
| Max. speed continuous                          | rpm                   | 1200        | 1500        | 1200        | 1500        | 1200        | 1500        | 1200        | 1500        |
| Typical flow - Flow curves available in item 5 |                       |             |             |             |             |             |             |             |             |
| 1000 rpm at max. pressure                      | m <sup>3</sup> /h     | 17.80       | 14.80       | 21.02       | 16.36       | 22.47       | 17.86       | 26.05       | 21.12       |
| 1500 rpm at max. pressure                      | m <sup>3</sup> /h     |             | 22.20       |             | 24.54       |             | 26.79       |             | 31.69       |
| 1200 rpm at max. pressure                      | gpm                   | 94.07       | 78.18       | 111.03      | 86.43       | 118.71      | 94.37       | 137.64      | 111.60      |
| Technical specifications                       |                       |             |             |             |             |             |             |             |             |
| Media <sup>2)</sup> temperature                | °C                    | 2 - 50      | 2 - 50      | 2 - 50      | 2 - 50      | 2 - 50      | 2 - 50      | 2 - 50      | 2 - 50      |
|                                                | °F                    | 35.6 - 122  | 35.6 - 122  | 35.6 - 122  | 35.6 - 122  | 35.6 - 122  | 35.6 - 122  | 35.6 - 122  | 35.6 - 122  |
| Ambient temperature                            | °C                    | 0 - 50      | 0 - 50      | 0 - 50      | 0 - 50      | 0 - 50      | 0 - 50      | 0 - 50      | 0 - 50      |
|                                                | °F                    | 32 - 122    | 32 - 122    | 32 - 122    | 32 - 122    | 32 - 122    | 32 - 122    | 32 - 122    | 32 - 122    |
| Weight (dry)                                   | kg                    | 105         | 105         | 105         | 105         | 105         | 105         | 105         | 105         |
|                                                | lb                    | 231         | 231         | 231         | 231         | 231         | 231         | 231         | 231         |
| Sound pressure level <sup>4)</sup>             | dB(A)                 | 85          | 85          | 85          | 85          | 85          | 85          | 85          | 85          |
| Footprint with IEC motor <sup>5)</sup>         | m <sup>2</sup>        | 0.76        | 0.76        | 0.80        | 0.80        | 0.83        | 0.83        | 0.83        | 0.83        |
|                                                | foot <sup>2</sup>     | 8.18        | 8.18        | 8.61        | 8.61        | 8.93        | 8.93        | 8.93        | 8.93        |
| Typical motor size                             |                       |             |             |             |             |             |             |             |             |
| Max. speed at max. pressure                    | kW                    | 55.0        | 75.0        | 55.0        | 75.0        | 75.0        | 75.0        | 90.0        | 90.0        |
| 1200 rpm at max. pressure                      | HP                    | 75.0        |             | 100.0       |             | 100.0       |             | 125.0       |             |
| Torque at max. outlet pressure                 | Nm                    | 418         | 355         | 490         | 388         | 527         | 426         | 608         | 498.68      |
|                                                | lbf-ft                | 308         | 262         | 361         | 286         | 389         | 314         | 449         | 367.81      |

<sup>1)</sup> For lower and higher pressure, please contact Danfoss.

<sup>2)</sup> Dependent on the NaCl concentration - see chapter 8.

<sup>3)</sup> Category 2, Zone 1 or Category 3, Zone 2.

<sup>4)</sup> A-weighted sound pressure level at 1 m from the pump unit surfaces (reference box) acc. to EN ISO 20361 section 6.2. The noise measurements are performed acc. to EN ISO 3744:2010 on a motor-pump unit at max. pressure and speed.

<sup>5)</sup> Max. area covered with recommended motor configuration (excl. of space to service pump)

#### 4.7 APP 38-46

| Pump size                                      |                       | APP 38/1500 | APP 46/1780      |
|------------------------------------------------|-----------------------|-------------|------------------|
| Code number APP                                |                       | 180B3071    | 180B3072         |
| Code number APP ATEX <sup>3)</sup>             |                       | On request  | Not available    |
| Geometric displacement                         | cm <sup>3</sup> /rev. | 444         | 444              |
|                                                | in <sup>3</sup> /rev. | 27.09       | 27.09            |
| Pressure                                       |                       |             |                  |
| Max. outlet <sup>1)</sup> pressure continuous  | barg                  | 80          | 70               |
|                                                | psig                  | 1160        | 1015             |
| Min. outlet <sup>1)</sup> pressure             | barg                  | 10          | 10               |
|                                                | psig                  | 145         | 145              |
| Inlet pressure continuous <sup>6)</sup>        | barg                  | 2 - 5       | 2.5/3.5- 5       |
|                                                | psig                  | 29 - 72.5   | 36.5/50.8 - 72.5 |
| Max. inlet pressure. peak                      | barg                  | 10          | 10               |
|                                                | psig                  | 145         | 145              |
| Speed                                          |                       |             |                  |
| Min. speed continuous                          | rpm                   | 700         | 700              |
| Max. speed continuous <sup>6)</sup>            | rpm                   | 1500        | 1700/1780        |
| Typical flow - Flow curves available in item 5 |                       |             |                  |
| 1000 rpm at max. pressure                      | m <sup>3</sup> /h     | 26.20       | 26.29            |
| 1500 rpm at max. pressure                      | m <sup>3</sup> /h     | 39.30       | 39.44            |
| 1200 rpm at max. pressure                      | gpm                   | 138.41      | 138.91           |
| Technical specifications                       |                       |             |                  |
| Media <sup>2)</sup> temperature                | °C                    | 2 - 50      | 2 - 50           |
|                                                | °F                    | 35.6 - 122  | 35.6 - 122       |
| Ambient temperature                            | °C                    | 0-50        | 0-50             |
|                                                | °F                    | 32 - 122    | 32 - 122         |
| Weight (dry)                                   | kg                    | 105         | 105              |
|                                                | lb                    | 231         | 231              |
| Sound pressure level <sup>4)</sup>             | dB(A)                 | 85          | 85.3             |
| Footprint with IEC motor <sup>5)</sup>         | m <sup>2</sup>        | 0.83        | 1.10             |
|                                                | foot <sup>2</sup>     | 8.93        | 11.84            |
| Typical motor size                             |                       |             |                  |
| Max. speed at max. pressure                    | kW                    | 110.0       | 110.0            |
| Torque at max. outlet pressure                 | Nm                    | 617         | 546              |
|                                                | lbf-ft                | 455         | 402              |

<sup>1)</sup> For lower and higher pressure, please contact Danfoss.

<sup>2)</sup> Dependent on the NaCl concentration - see chapter 8.

<sup>3)</sup> Category 2, Zone 1 or Category 3, Zone 2.

<sup>4)</sup> A-weighted sound pressure level at 1 m from the pump unit surfaces (reference box) acc. to EN ISO 20361 section 6.2. The noise measurements are performed acc. to EN ISO 3744:2010 on a motor-pump unit at max. pressure and speed.

<sup>5)</sup> Max. area covered with recommended motor configuration (excl. of space to service pump)

<sup>6)</sup> For operation at speed below 1700 RPM, min. pressure can be reduced to 2.5 barg

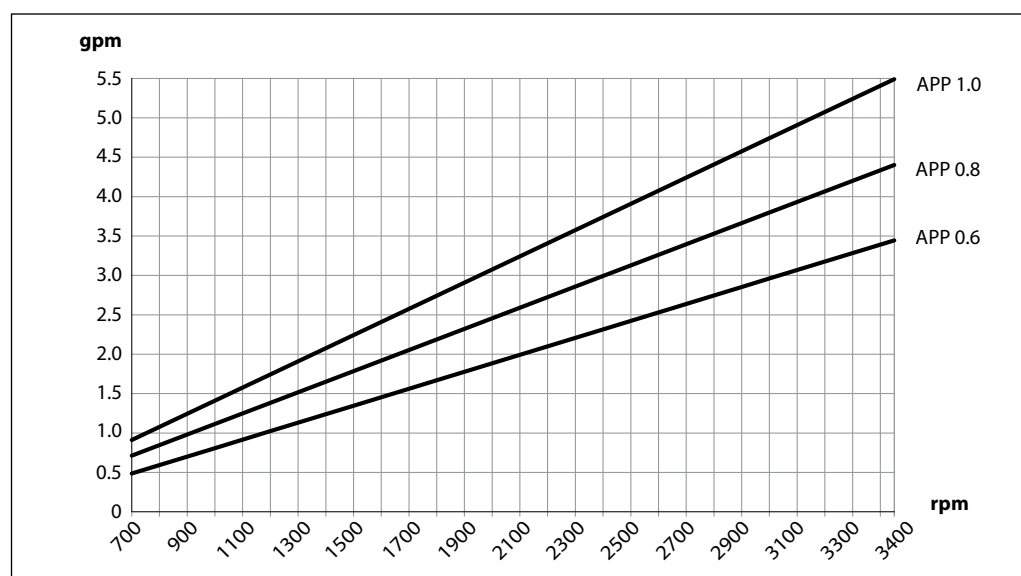
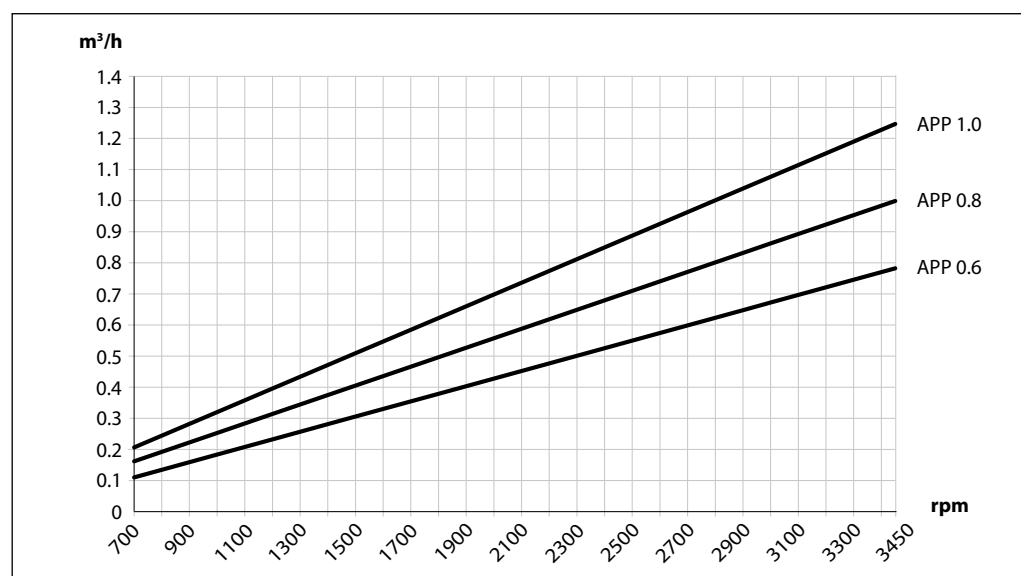
## 5. Flow at different rpm

If the flow required and the rotation speed (rpm) of the pump is known, it is easy to select the pump fitting the application best by using the diagrams below.

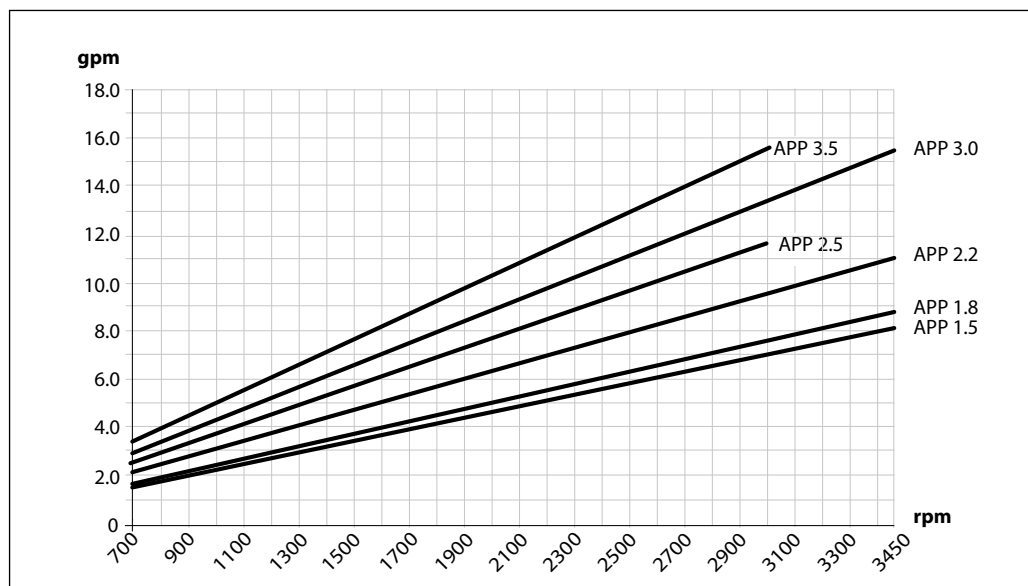
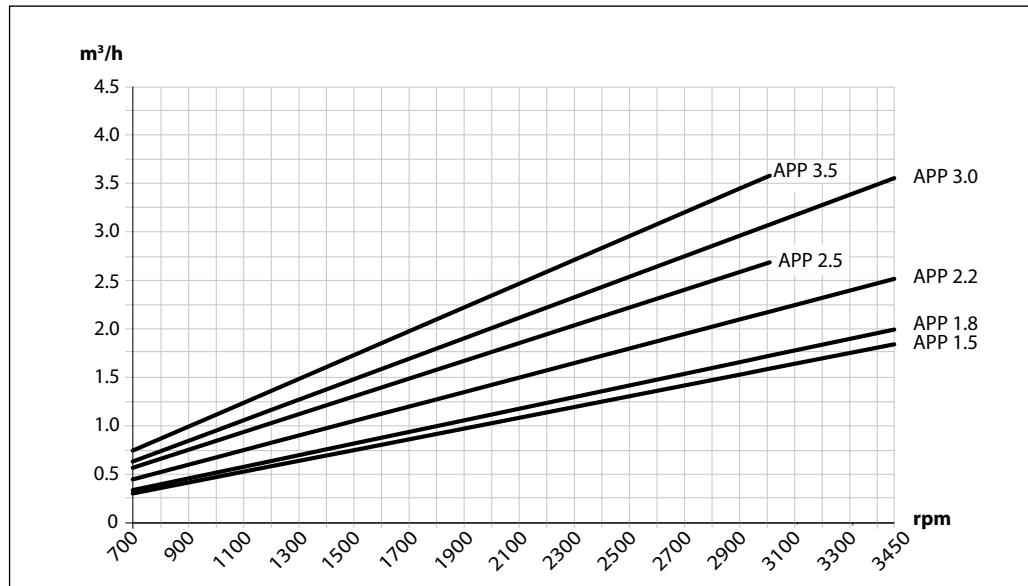
Furthermore, these diagrams shows that the flow can be changed by changing the rotation speed of the pump. The flow/rpm ratio is constant, and the "required" flow can be obtained by changing the rotation speed to a corresponding value. Thus, the required rpm can be determined as:

$$\text{Required rpm} = \frac{\text{Required flow} \times \text{Rated rpm}}{\text{Rated flow}}$$

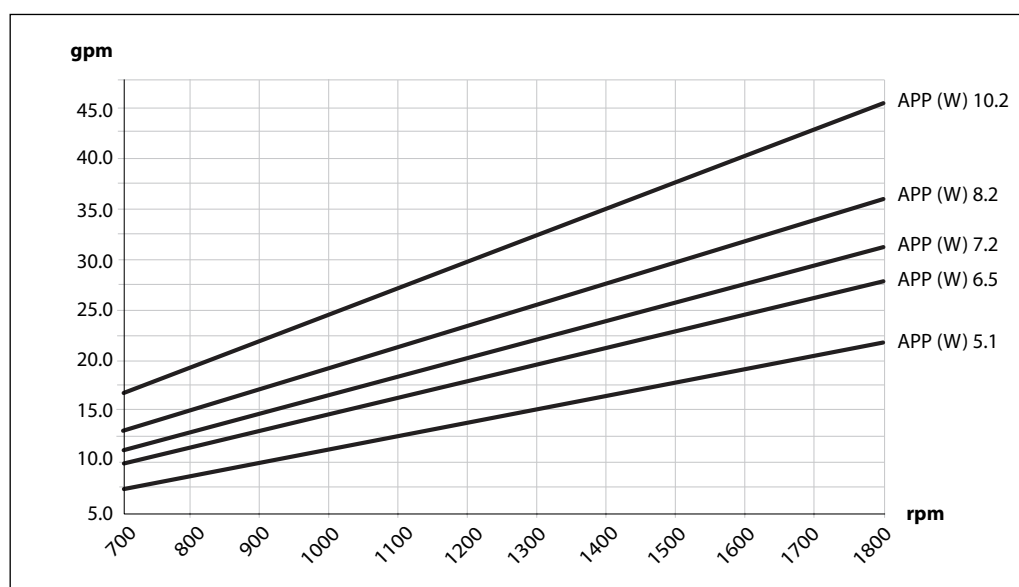
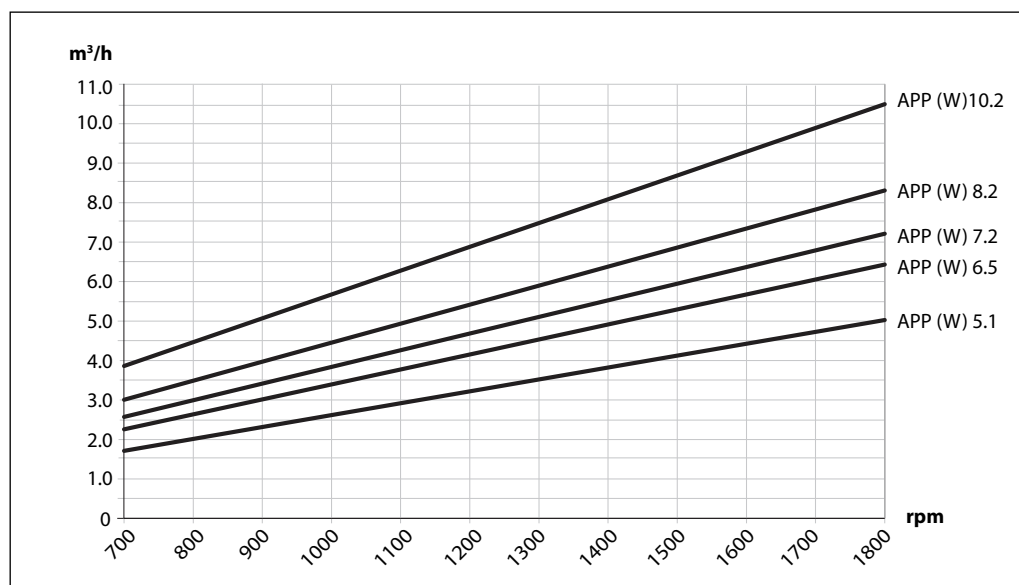
### 5.1 APP 0.6-1.0 flow curves measured at 80 barg ( 1160 psig )



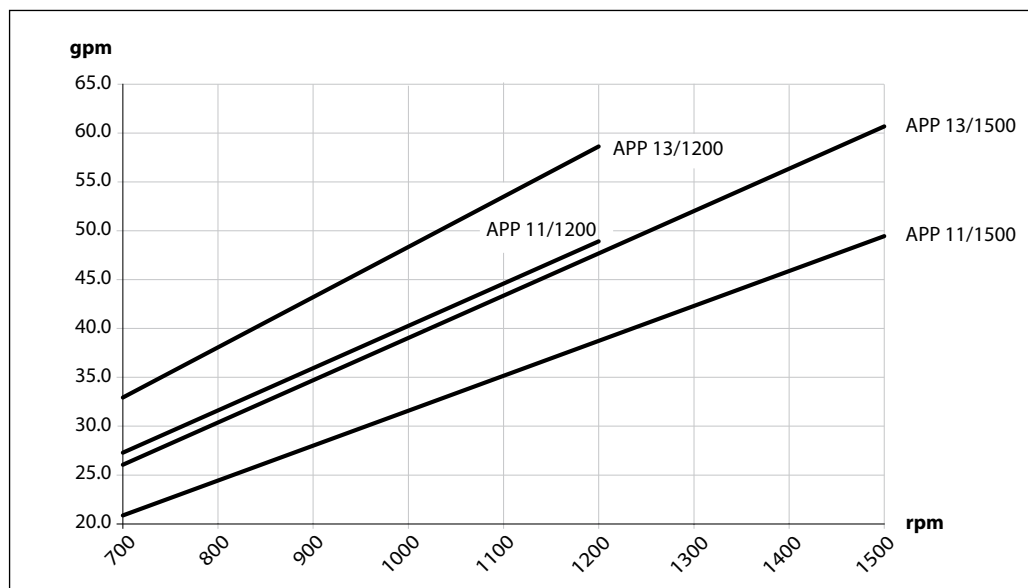
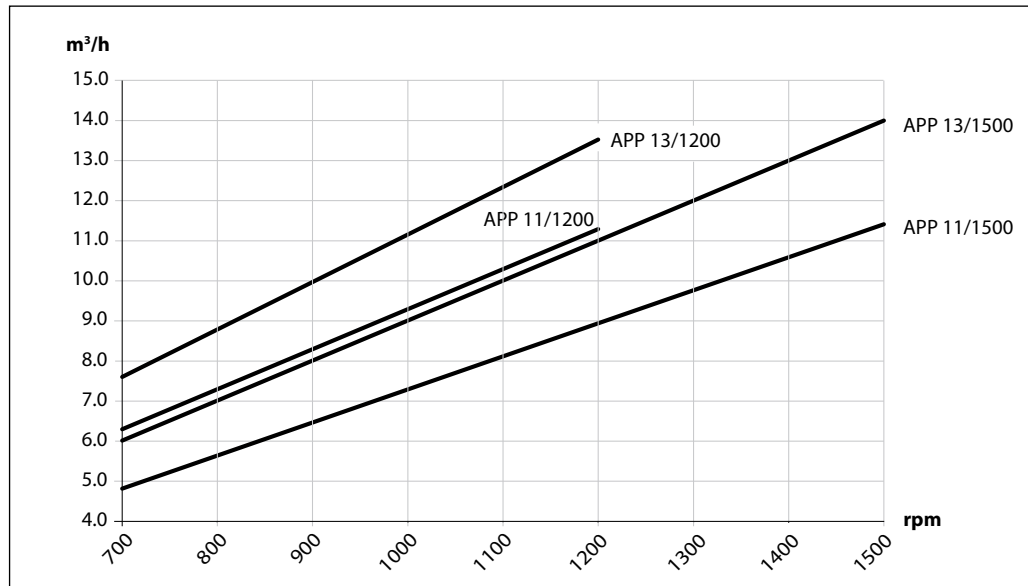
5.2 APP 1.5-3.5 flow curves at 80 barg (1160 psig)



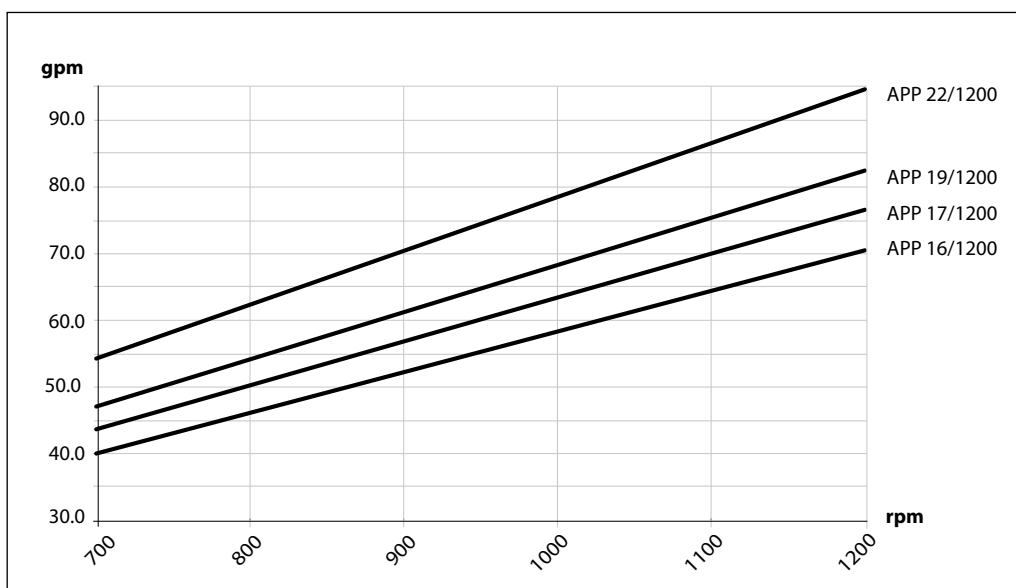
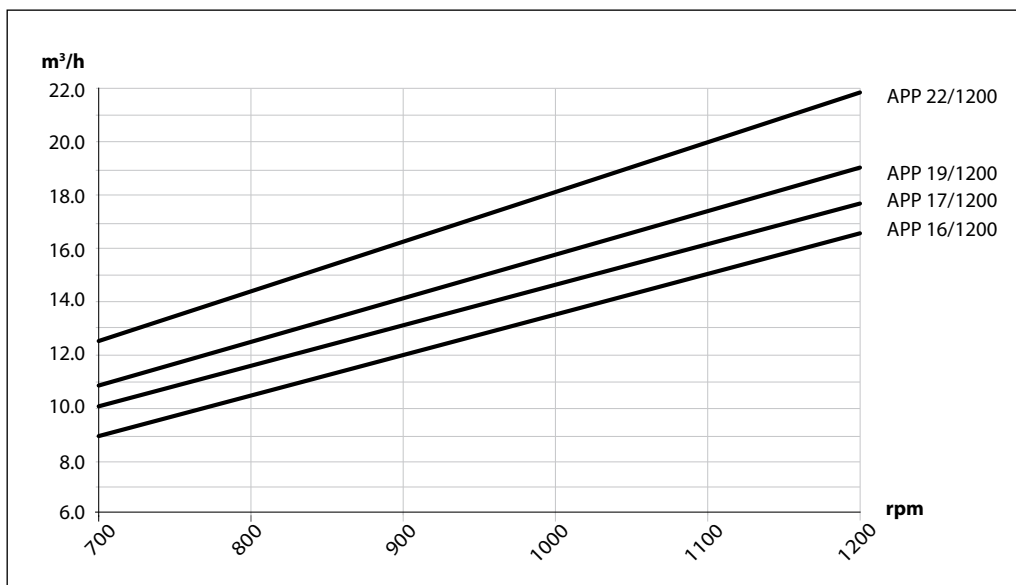
**5.3 APP (W) 5.1-10.2 flow curves at 80 barg (1160 psig)**



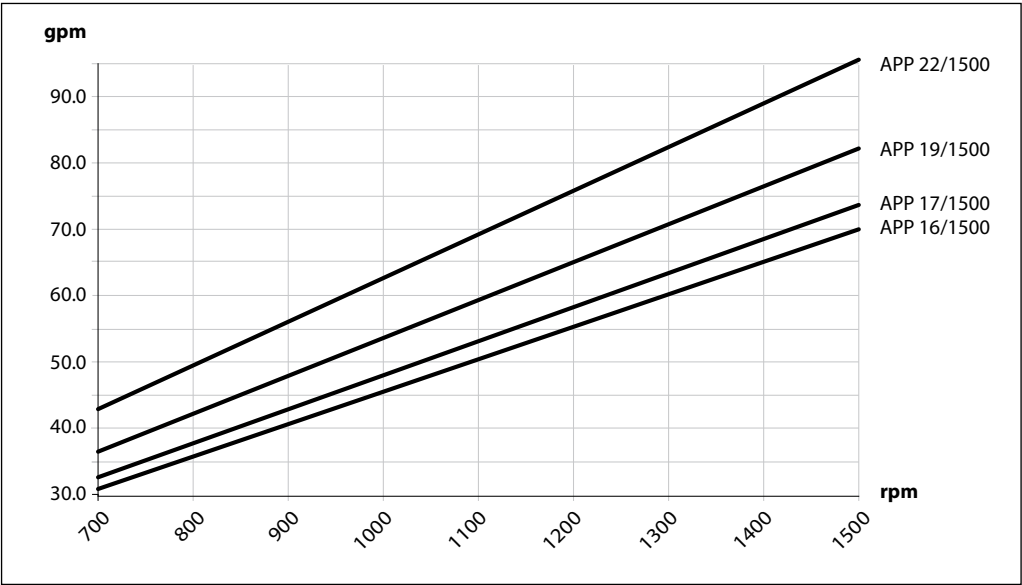
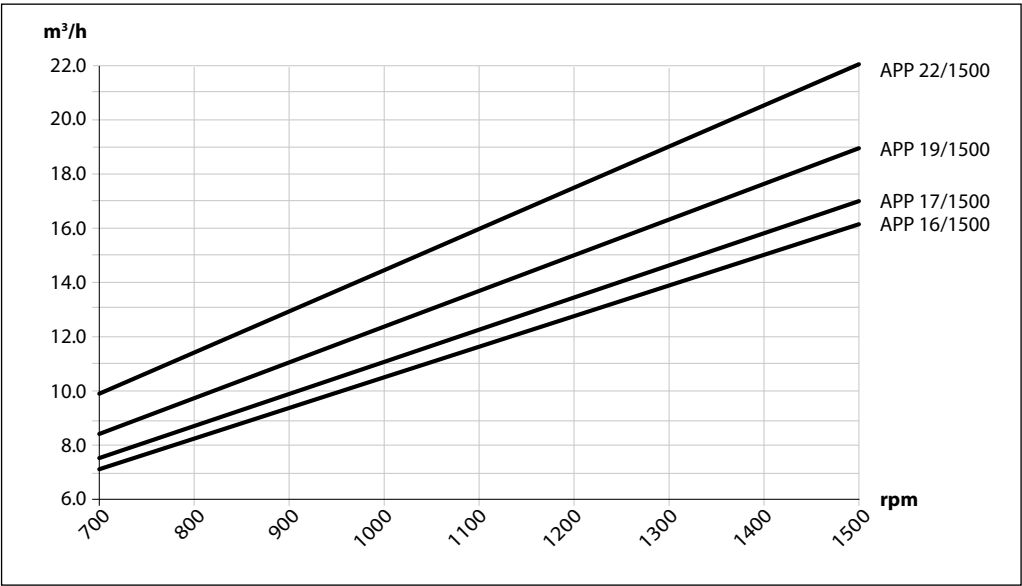
5.4 APP 11-13 flow curves at 60 barg (870 psig)



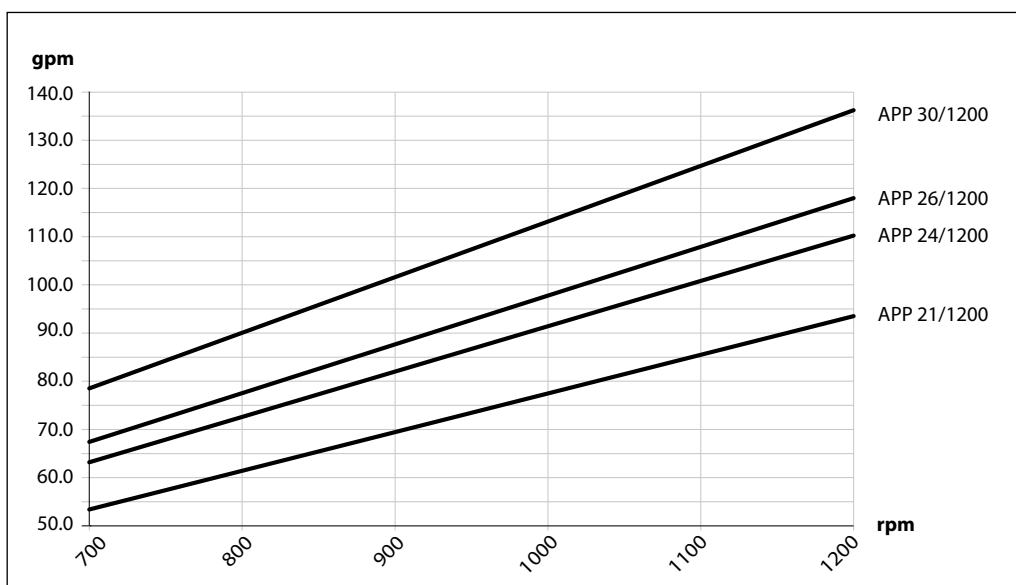
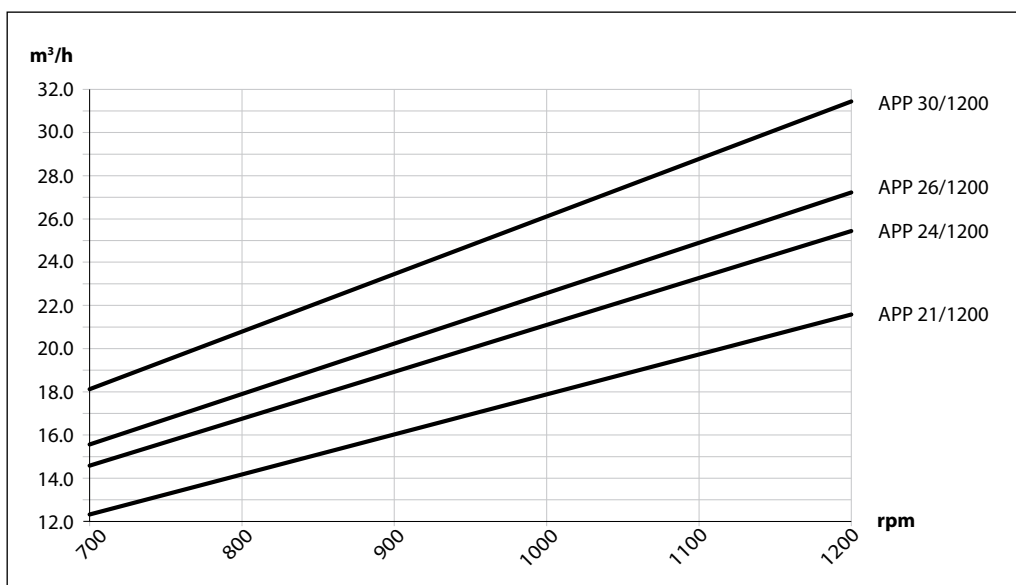
5.5 APP 16-22 flow curves at 60 barg (870 psig)



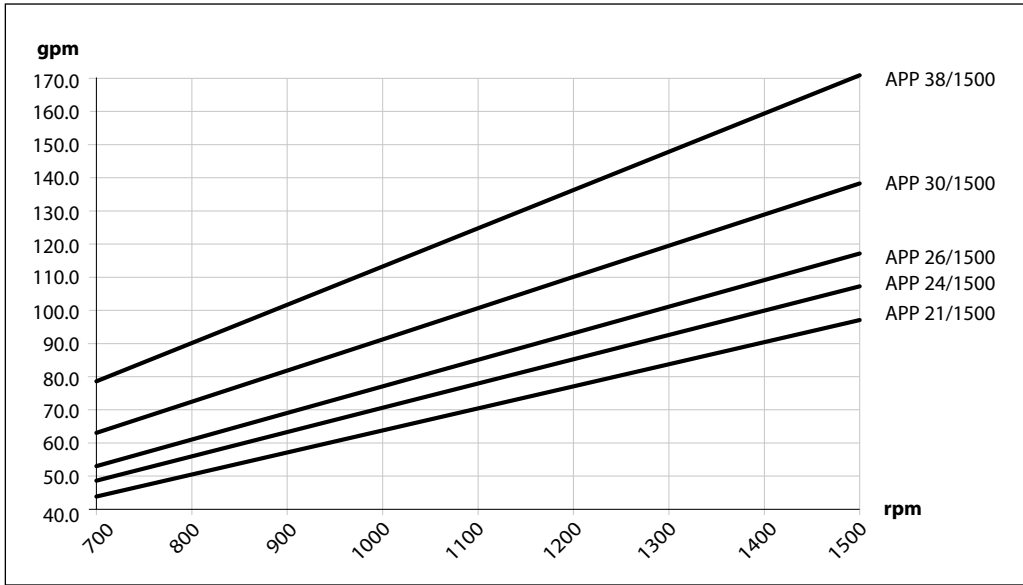
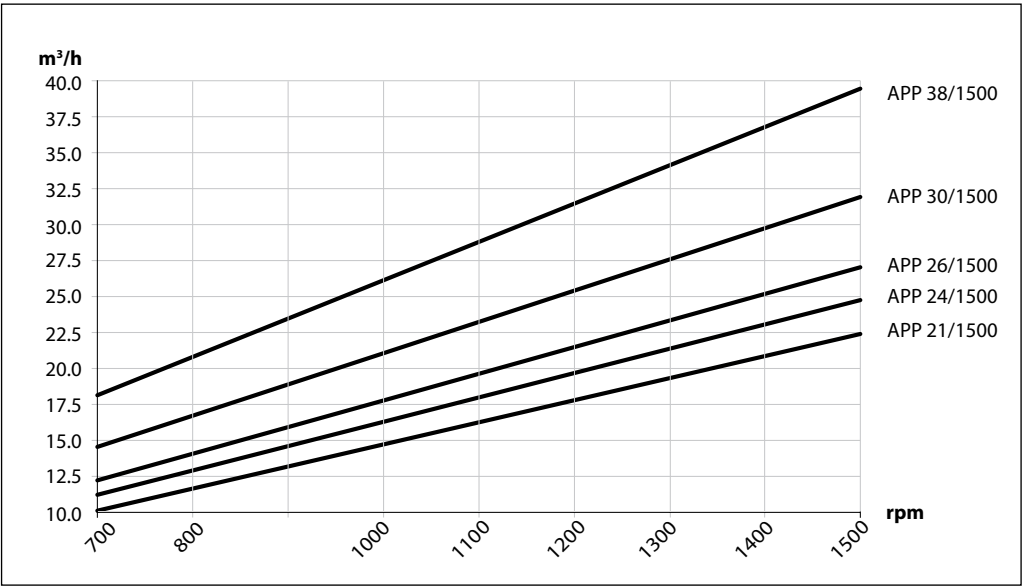
5.6 APP 16-22 flow curves at 60 barg (870 psig)



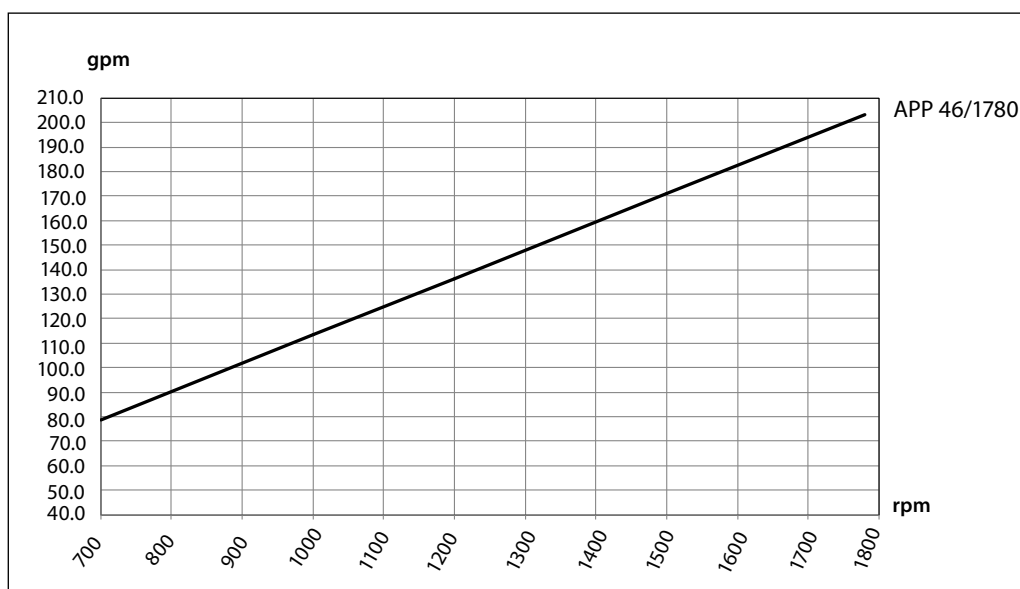
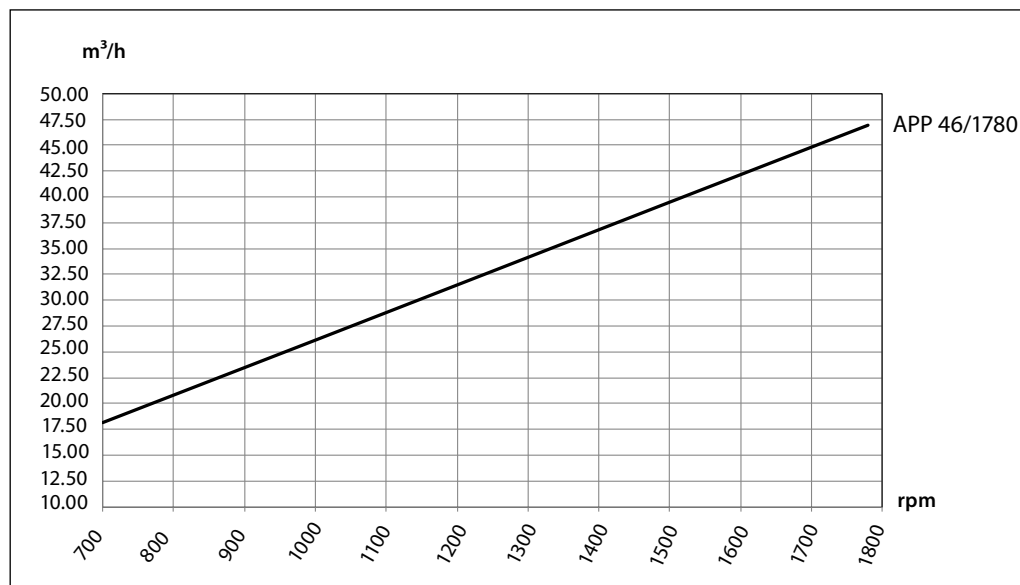
5.7 APP 21-30 flow curves at 60 barg (870 psig)



5.8 APP 21-38 flow curves at 60 barg (870 psig)

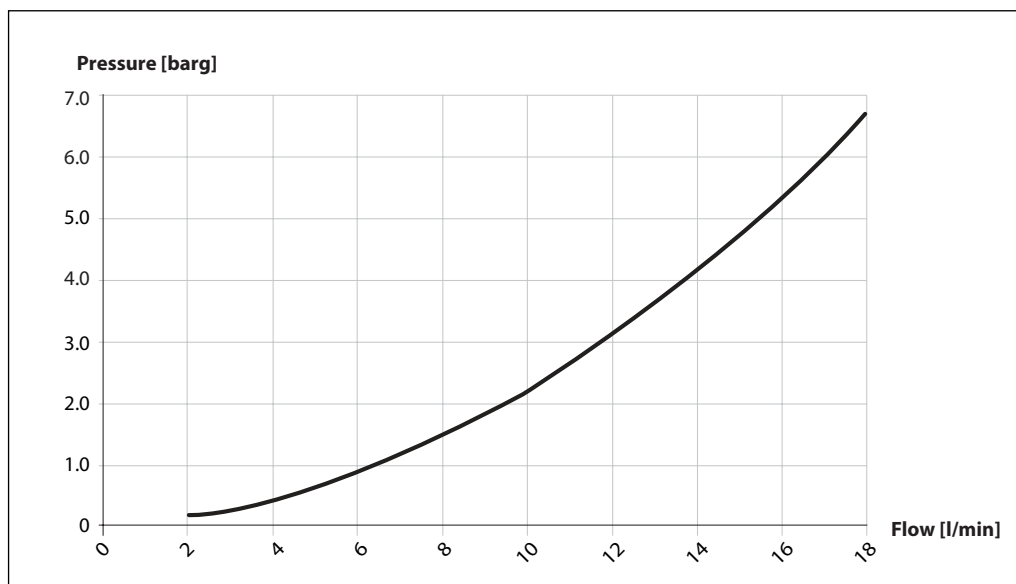


5.9 APP 46 flow curves 60 barg (870 psig)

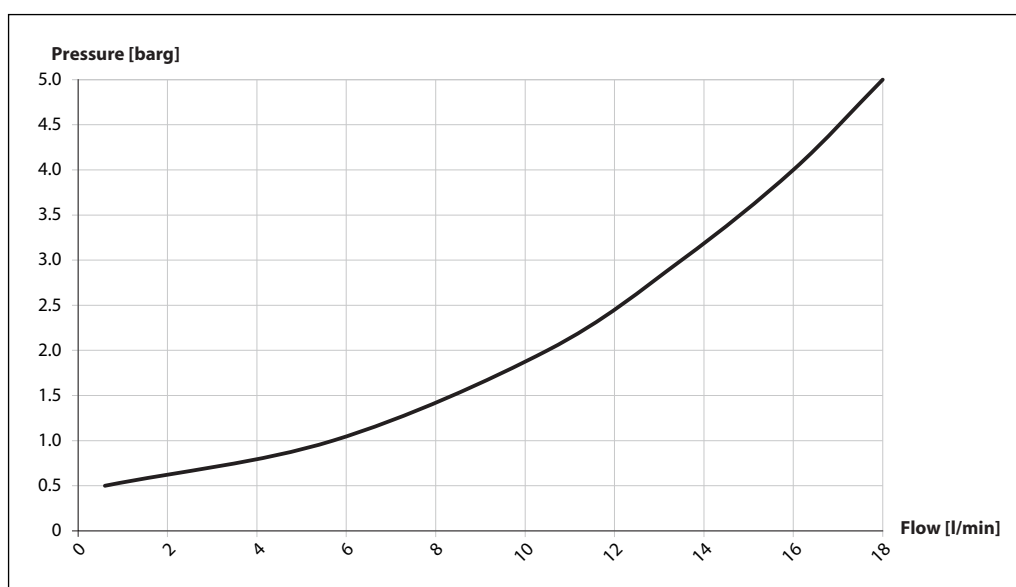


- 6 Flushing valve curves** All pumps except APP (W) 5.1 - 10.2 are supplied with an integrated flushing valve that allows the fluid to flow from inlet to the outlet, when the pump is not running.

### 6.1 APP 0.6-1.0 integrated flushing valve

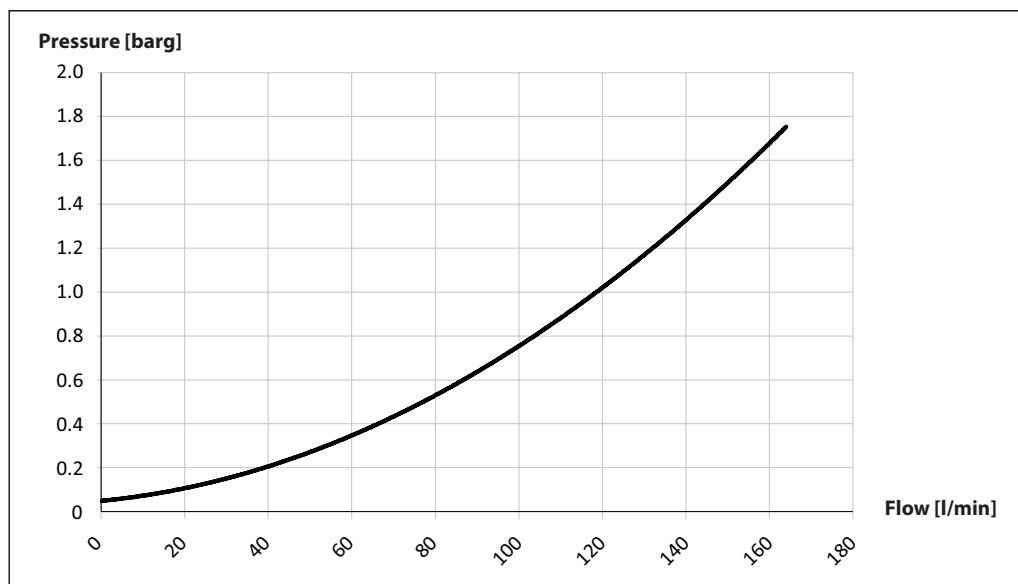


### 6.2 APP 1.5-3.5 integrated flushing valve

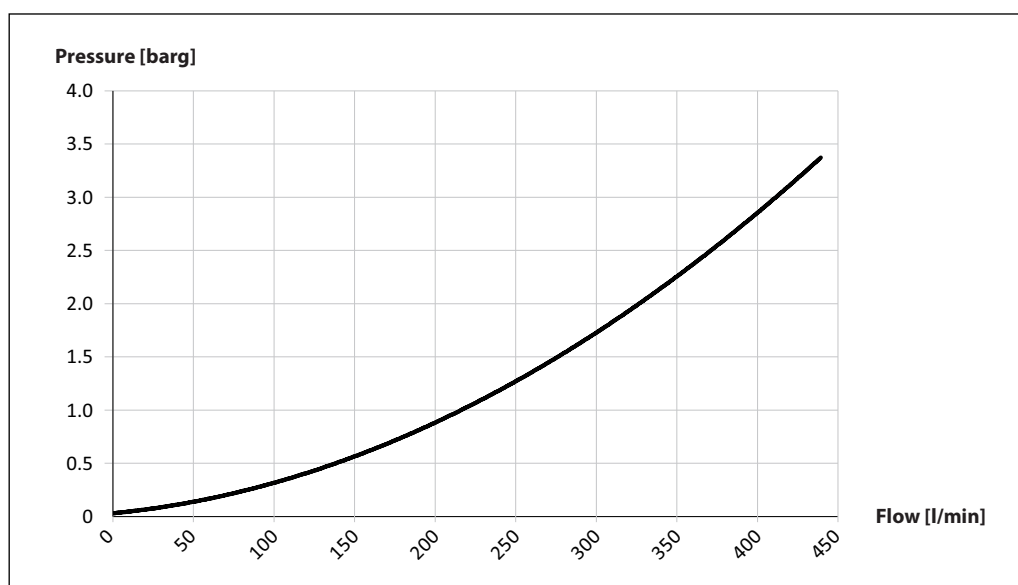


### 6.3 APP 5.1-10.2 Flushing valve not available

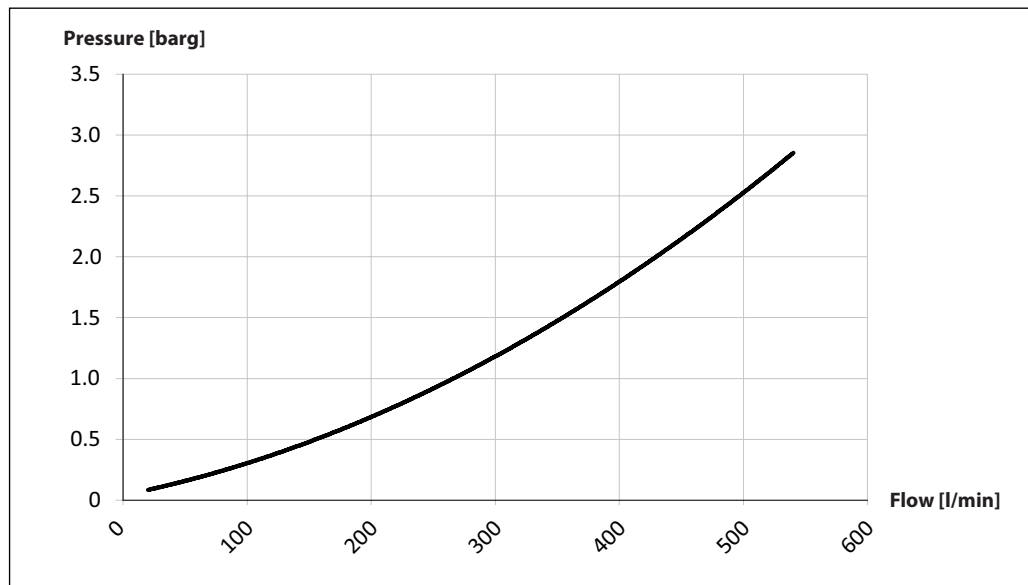
### 6.4 APP 11-13 integrated flushing valve



### 6.5 APP 16-22 integrated flushing valve



### 6.6 APP 21-46 integrated flushing valve



## Data sheet | APP 0.6-46 / APP (W) 5.1-10.2 pumps

### 7. Motor requirements

The power requirements can be determined using one of the following guiding equations:

$$\text{Required power} = \frac{\text{l/min} \times \text{barg}}{\text{Calc. factor}} \quad [\text{kW}] \quad \text{or} \quad \frac{16.7 \times \text{m}^3/\text{h} \times \text{barg}}{\text{Calc. factor}} \quad [\text{kW}] \quad \text{or} \quad \frac{0.35 \times \text{gpm} \times \text{psig}}{\text{Calc. factor}} \quad [\text{hp}]$$

|                     |   |                        |
|---------------------|---|------------------------|
| 1 hp                | = | 0.75 kW                |
| 1 gpm               | = | 3.79 l/min             |
| 1 m <sup>3</sup> /h | = | 4.40 gpm               |
| 1 kW                | = | 1.34 hp                |
| 1 l/min             | = | 0.26 gpm               |
| 1 gpm               | = | 0.23 m <sup>3</sup> /h |

#### 7.1 Calculation factor for APP 0.6-1.0

| Name    | rpm  | Calculation factor |
|---------|------|--------------------|
| APP 0.6 | 3450 | 496                |
| APP 0.8 | 3450 | 509                |
| APP 1.0 | 3450 | 512                |

#### 7.2 Calculation factor for APP 1.5-3.5

| Name    | rpm  | Calculation factor |
|---------|------|--------------------|
| APP 1.5 | 3450 | 519                |
| APP 1.8 | 3450 | 524                |
| APP 2.2 | 3450 | 532                |
| APP 2.5 | 3000 | 535                |
| APP 3.0 | 3450 | 532                |
| APP 3.5 | 3000 | 530                |

#### 7.3 Calculation factor for APP (W) 5.1-10.2

| Name         | rpm  | Calculation factor |
|--------------|------|--------------------|
| APP (W) 5.1  | 1800 | 506                |
| APP (W) 6.5  | 1800 | 514                |
| APP (W) 7.2  | 1800 | 518                |
| APP (W) 8.2  | 1800 | 523                |
| APP (W) 10.2 | 1800 | 528                |

#### 7.4 Calculation factor for APP 11-13

| Name   | rpm  | Calculation factor |
|--------|------|--------------------|
| APP 11 | 1200 | 513                |
| APP 11 | 1500 | 502                |
| APP 13 | 1200 | 516                |
| APP 13 | 1500 | 505                |

#### 7.5 Calculation factor for APP 16-22

| Name   | rpm  | Calculation factor |
|--------|------|--------------------|
| APP 16 | 1200 | 540                |
| APP 16 | 1500 | 533                |
| APP 17 | 1200 | 541                |
| APP 17 | 1500 | 536                |
| APP 19 | 1200 | 537                |
| APP 19 | 1500 | 531                |
| APP 22 | 1200 | 540                |
| APP 22 | 1500 | 535                |

#### 7.6 Calculation factor for APP 21-46

| Name   | rpm  | Calculation factor |
|--------|------|--------------------|
| APP 21 | 1200 | 543                |
| APP 21 | 1500 | 531                |
| APP 24 | 1200 | 547                |
| APP 24 | 1500 | 537                |
| APP 26 | 1200 | 543                |
| APP 26 | 1500 | 534                |
| APP 30 | 1200 | 545                |
| APP 30 | 1500 | 540                |
| APP 38 | 1500 | 541                |
| APP 46 | 1780 | 537                |

## 8. Temperature and corrosion

### 8.1 Temperature

Fluid temperature:  
Min. +2°C to max. +50°C  
(Min. +35.6°F to max. +122°F)

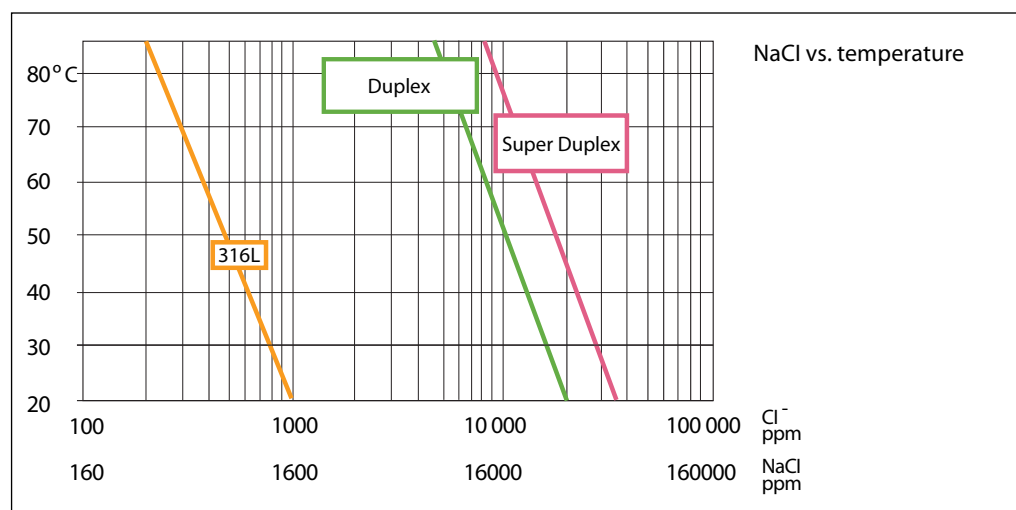
Ambient temperature:  
Min. +2°C to max. +50°C  
(Min. +35.6°F to max. +122°F)

In case of lower operating temperatures, please contact Danfoss High Pressure Pumps.operation

stop in order to minimize the risk of crevice corrosion.

The chart below illustrates the corrosive resistance of different types of stainless steel related to NaCl concentration and temperature. The APP water pump is made of Duplex and Super Duplex.

If the water pump is operated above the Duplex line, always flush water pump with fresh water at operation stop in order to minimize the risk of crevice corrosion.

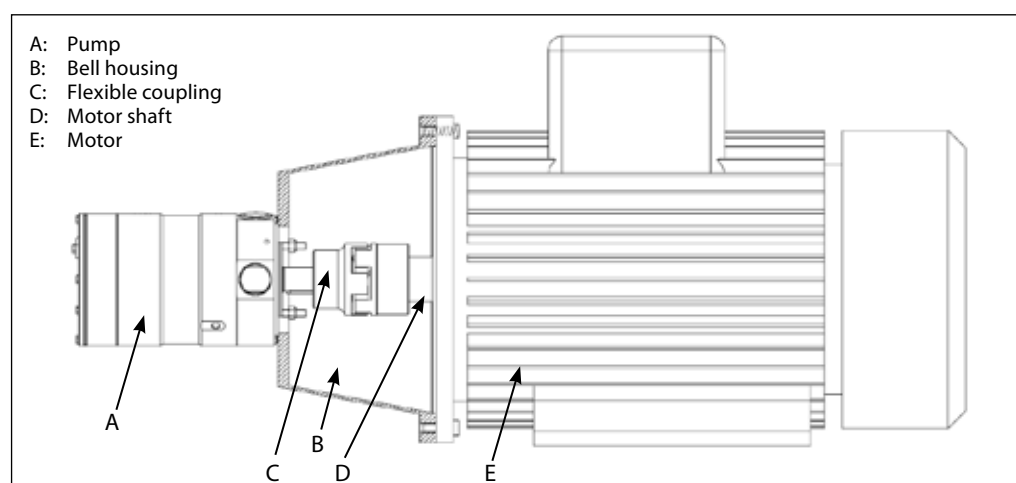


## 9. Installation

See example below on how to mount the pump and connect it to an electric motor or combustion engine (special coupling).

If alternative mounting is required, please contact your Danfoss sales representative for further information.

**Note: Do not add any axial or radial loads to the pump shaft.**



## 9.1 Filtration

**Proper filtration is crucial for the performance, maintenance and warranty of your pump.**

Protect your pump, and the application in which it is installed, and by always ensuring that all filtration specifications are met, and by always changing filter cartridges according to schedule.

Since water has very low viscosity, Danfoss APP pumps have been designed with very narrow clearances in order to control internal leakage rates and improve component performance.

**To minimize wear on the pump, it is therefore essential to filter inlet water properly.**

**The main filter must have a filtration efficiency of 99.98% at 10 µm. We strongly recommend that you always use precision depth filter cartridges rated 10µm abs.  $\beta_{10} \geq 5000$ .**

**Please note that we do not recommend bag filters or string-wound filter cartridges**, which typically have only 50% filtration efficiency. This means that out of the 100,000 particles that enter such filters, 50,000 particles pass right through; compare this to precision depth filters that are 99.98% efficient, and only allow 20 of the same 100,000 particles to pass through.

For more information on the importance of proper filtration, including explanation of filtration principles, definitions and guidance on how to select the right filter for your pump, please consult our Filtration information and specifications (Danfoss document number 521B1009).

## Noise

Since the pump unit is typically mounted on a frame or bell housing the overall noise level can only be determined for a complete system. To minimize vibrations and noise throughout the system, it is therefore very important to mount the pump unit correctly on a frame with anti-vibration-dampeners, and to use flexible hoses rather than metal pipes where possible.

The noise level is influenced by:

- **Pump speed:**  
High rpm generates more fluid/structure borne pulsations/vibrations than low rpm, because of higher frequency.
- **Discharge pressure:**  
High pressure generates more noise than low pressure.
- **Pump mounting:**  
Rigid mounting generates more noise than flexible mounting, because of structure-borne vibrations. Be sure to use dampers when mounting.
- **Connections to pump:**  
Pipes connected directly to the pump make more noise than flexible hoses, because of structure-borne vibrations.

- **Variable frequency drives (VFD):**  
Motors regulated by VFDs can produce more noise if the VFD does not have the right settings.

## 9.2 RO system with direct supply:

### Inlet line:

- a) Dimension the inlet line to obtain minimum pressure loss (large flow, minimum pipe length, minimum number of bends/connections, and fittings with low or no pressure losses). If relevant, please consult "Parallel coupled pumps and iSaves" (180R93549)

### Inlet filter:

- b) Install an inlet filter (1) in front of the APP pump (2). Please consult section 9.1, "Filtration" for guidance on how to select the right filter. Thoroughly clean pipes and flush system prior to start-up.

### Low pressure relief valve:

- c) Install a low pressure relief valve (9) in order to avoid system or pump damage in case the pump stops momentarily or is spinning backwards.

### Monitoring pressure switch:

- d) Install a monitoring pressure switch (3) between the filter (1) and the pump inlet. Set the minimum inlet pressure according to specifications described in item 4 about technical data. If the inlet pressure is lower than the minimum pressure set, the monitoring pressure switch must prevent the pump from starting or from running.

### Hoses:

- e) Use flexible hoses (4) to minimize vibrations and noise. Please consult the Danfoss Hoses and hose fittings data sheet (521B0909) for guidance.

### Inlet pressure:

- f) In order to eliminate the risk of cavitation and other pump damage, pump inlet pressure must always be maintained according to specifications described in item 4 about technical data.

### Flushing valve:

- g) For easy system filling and flushing, an integrated flushing valve (6) is in the APP pump (except APP (W) 5.1-10.2).

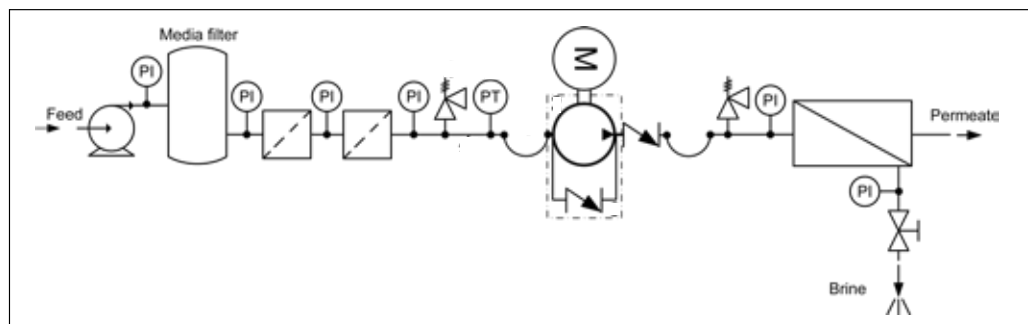
### Non-return valve:

- h) A non-return valve (7) in outlet can be installed in order to avoid backspin of the pump. The volume of water in the membrane vessel works as an accumulator and will send flow backwards in case of the pump stops momentarily.

- i) **High pressure safety or relief valve:**  
As the Danfoss APP pump begins to create pressure and flow immediately after start-up and regardless of any counter pressure, a safety or pressure relief valve (8) should be installed after the non-return valve to prevent system damage and to avoid high pressure peaks.

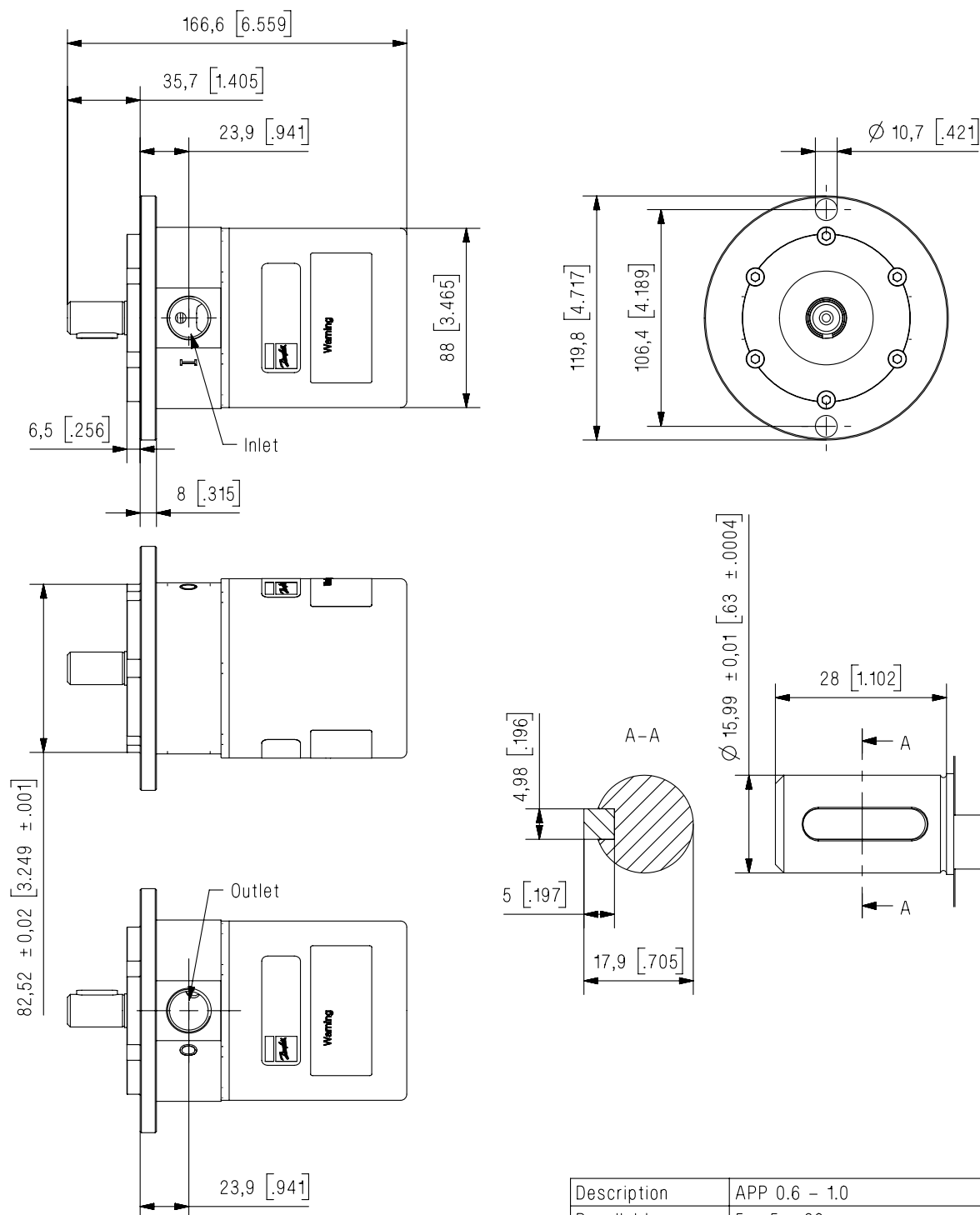
Note: If a non-return valve is mounted in the inlet line, a low-pressure relief valve is also required between the non-return valve and pump as protection against high-pressure peaks.

Preferred design - see section 9.2



# 10. Dimensions and connections

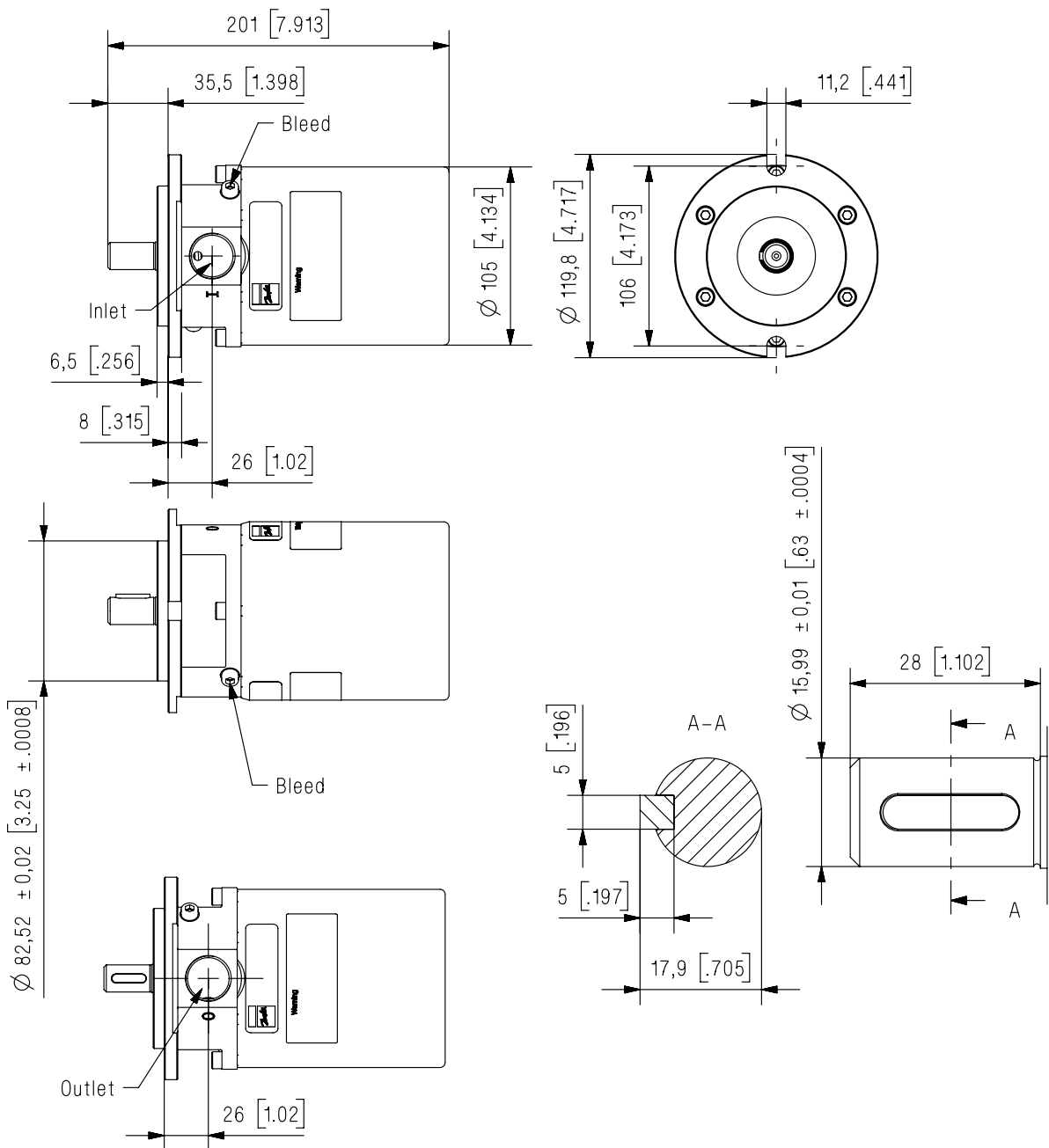
## 10.1 APP 0.6-1.0



Dimensions without tolerances acc. To ISO 2768-1 designation C.

|                          |                                        |
|--------------------------|----------------------------------------|
| Description              | APP 0.6 - 1.0                          |
| Parallel key<br>Din 6885 | 5 x 5 x 20 mm<br>0.2 x 0.2 x 0.79 inch |
| Inlet                    | G 1/2"; depth 13 mm                    |
| Outlet                   | G 1/2"; depth 13 mm                    |

10.2 APP 1.5-3.5

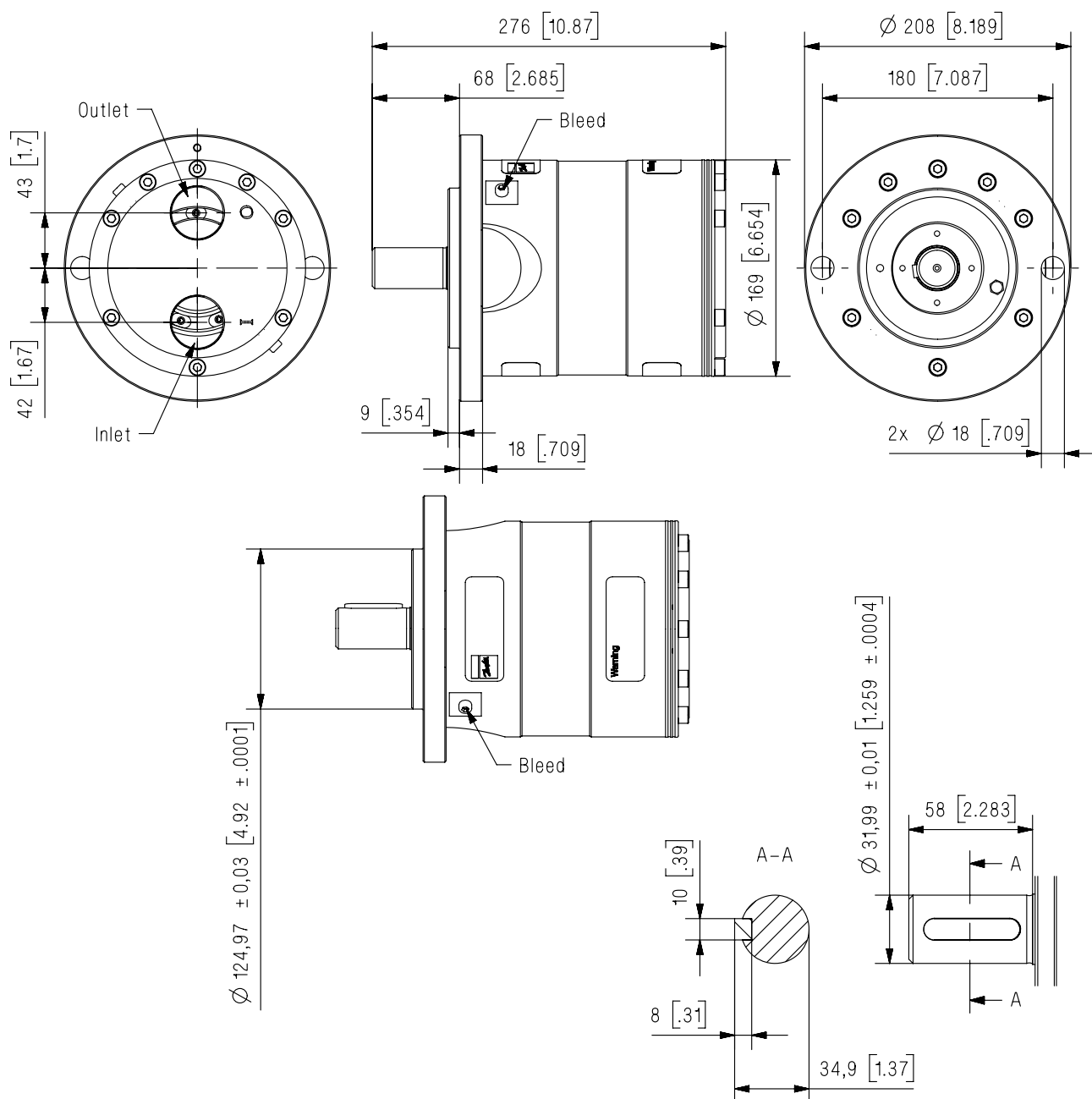


Dimensions without tolerances acc. To ISO 2768-1 designation C.

|                          |                                        |
|--------------------------|----------------------------------------|
| Description              | APP 1.5-2.5<br>APP 3.0-3.5             |
| Parallel key<br>DIN 6885 | 5 x 5 x 20 mm<br>0.2 x 0.2 x 0.79 inch |
| Bleed                    | M6 hex key 5 mm                        |
| Inlet                    | G 3/4"; depth 16 mm                    |
| Outlet                   | G 3/4"; depth 16 mm                    |

### 10.3 APP (W) 5.1-10.2

Accessories see section 12. For more details on the accessories, please contact the Danfoss High Pressure Pumps sales organisation.

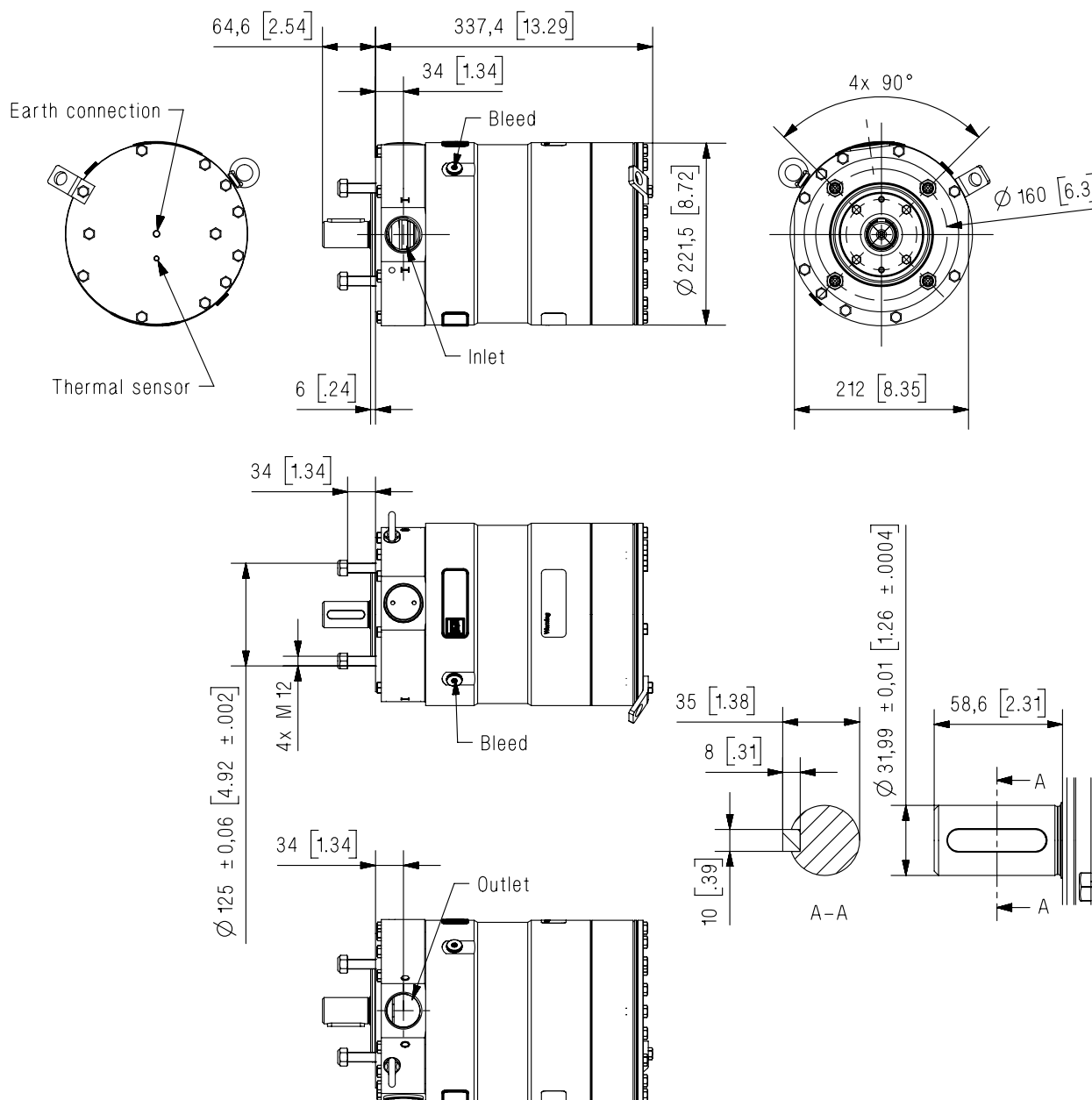


Dimensions without tolerances acc. To ISO 2768-1 designation C.

| Description               | APP 5.1-10.2                              |
|---------------------------|-------------------------------------------|
| Parallel key.<br>DIN 6885 | 10 x 8 x 45 mm<br>0.39 x 0.31 x 1.77 inch |
| Bleed                     | M6 hex key 5 mm                           |
| Inlet port                | M42x1.5; depth 13 mm                      |
| Outlet port               | M42x1.5; depth 13 mm                      |
| Mounting flange           | ISO 3019-2 125AHW                         |

# **10.4 APP 11-13**

Accessories see section 12. For more details on the accessories, please contact the Danfoss High Pressure Pumps sales organisation.

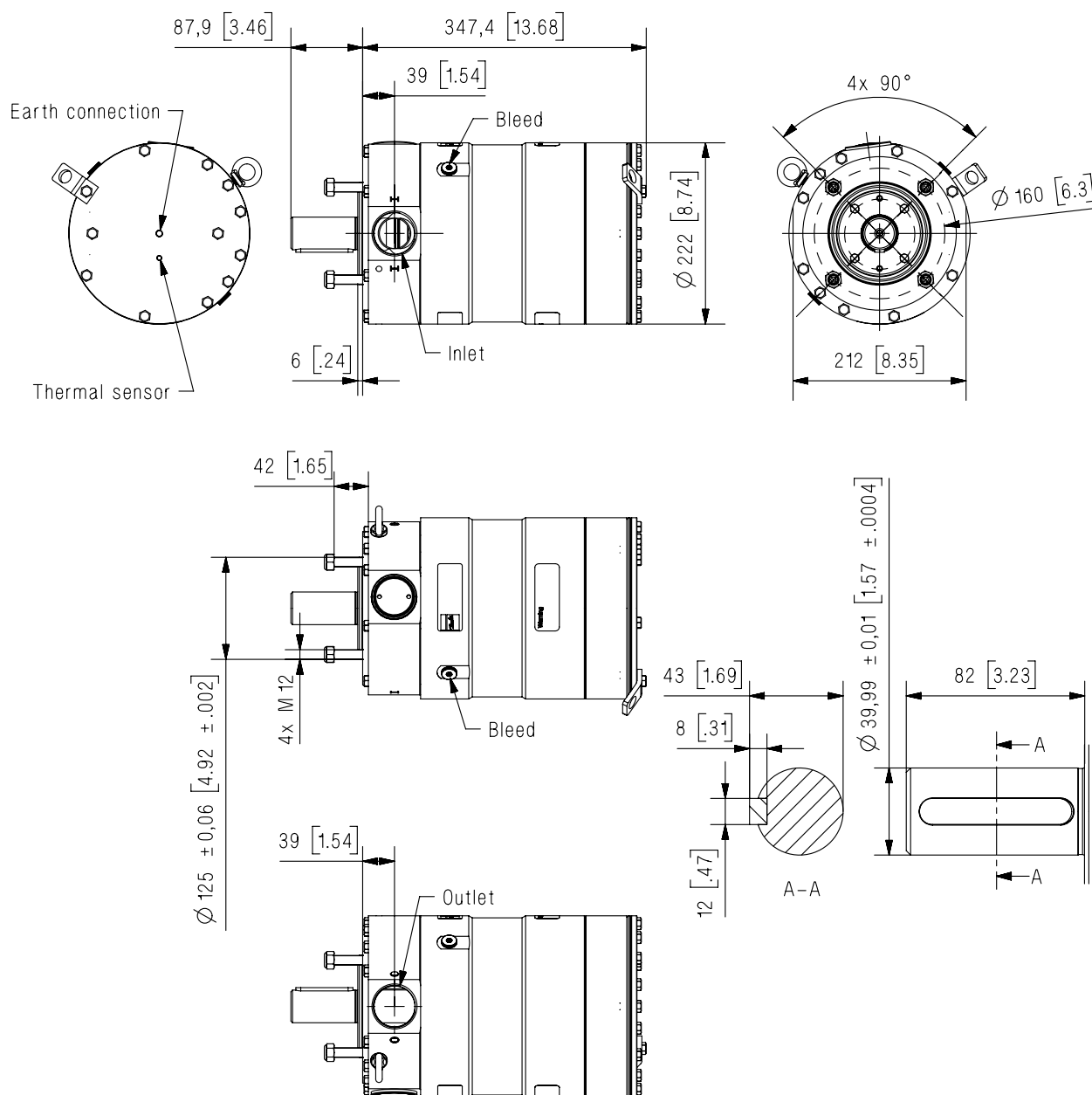


| Description            | APP 11-13                                 |
|------------------------|-------------------------------------------|
| Parallel key, DIN 6885 | 10 x 8 x 45 mm<br>0.39 x 0.31 x 1.77 inch |
| Bleed                  | G 1/4", hex key 6 mm                      |
| Inlet port             | M42x1.5; depth 17 mm                      |
| Outlet port            | M42x1.5; depth 17 mm                      |
| Earth connection       | M8, depth 8 mm                            |
| Thermal sensor         | M6, depth 8 mm                            |

Dimensions without tolerances acc. to ISO 2768-1 designation C.

### 10.5 APP 16-22

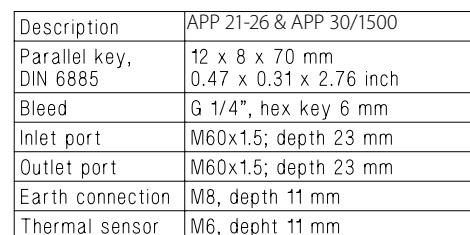
Accessories see section 12. For more details on the accessories, please contact the Danfoss High Pressure Pumps sales organisation.



Dimensions without tolerances acc. to ISO 2768-1 designation C.

| Description            | APP 16-22                                 |
|------------------------|-------------------------------------------|
| Parallel key, DIN 6885 | 12 x 8 x 70 mm<br>0.47 x 0.31 x 2.76 inch |
| Bleed                  | G 1/4", hex key 6 mm                      |
| Inlet port             | M52x1.5; depth 21 mm                      |
| Outlet port            | M52x1.5; depth 21 mm                      |
| Earth connection       | M8, depth 8 mm                            |
| Thermal sensor         | M6, depth 8 mm                            |

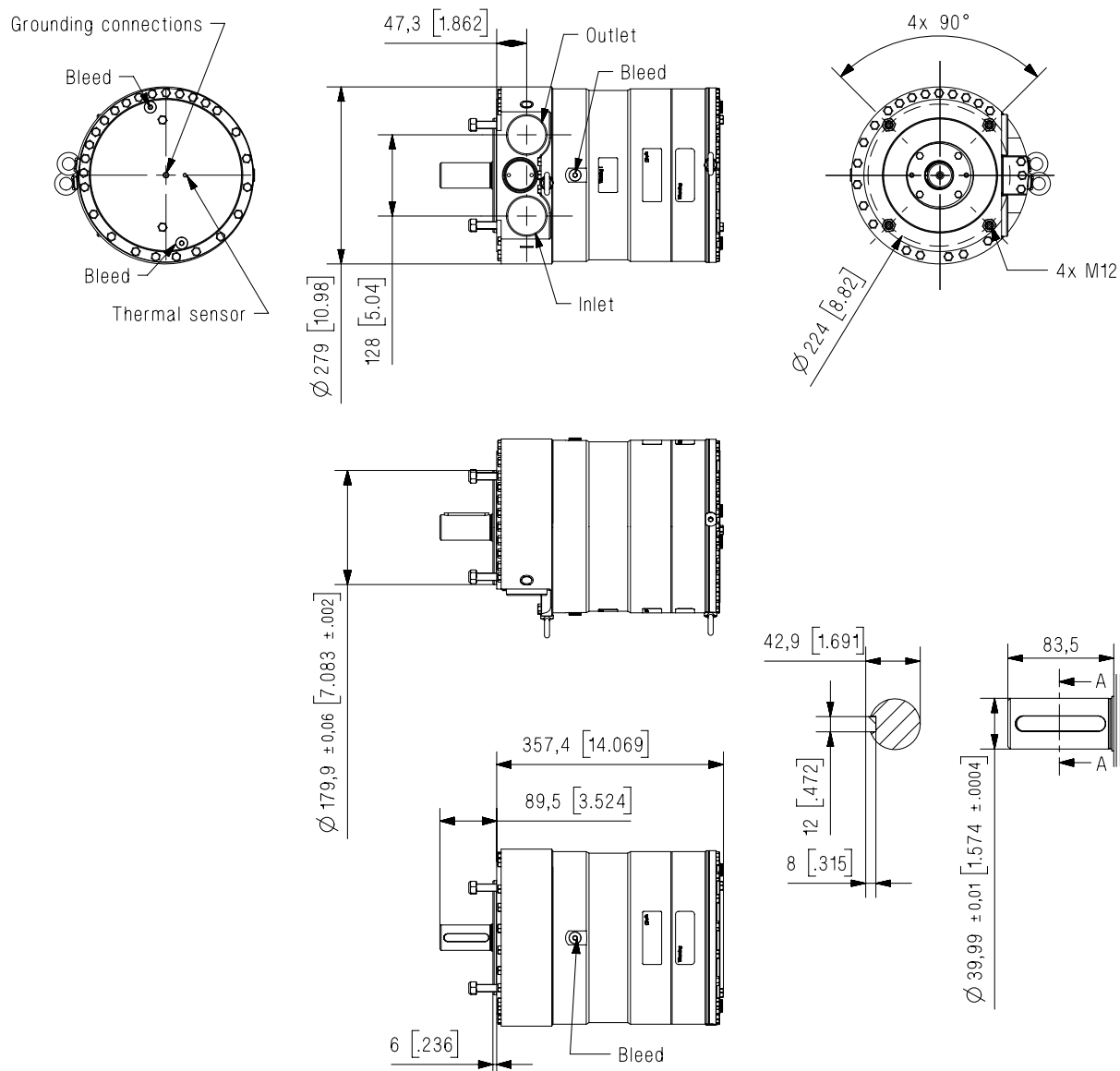
Accessories see section 12. For more details on the accessories, please contact the Danfoss High Pressure Pumps sales organisation.



Dimensions without tolerances acc. To ISO 2768-1 designation C.

### 10.7 APP 30/1200 and APP 38-46

Accessories see section 12. For more details on the accessories, please contact the Danfoss High Pressure Pumps sales organisation.

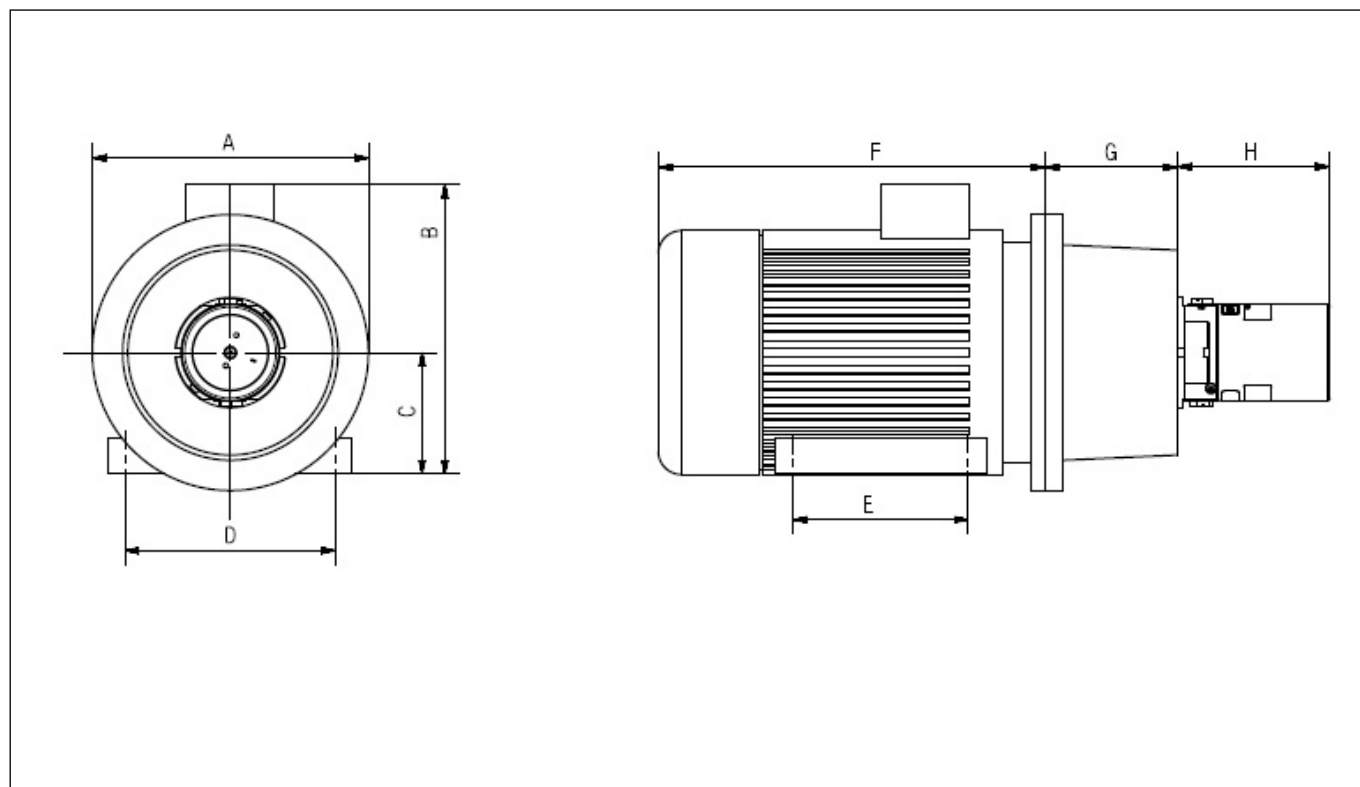


Dimensions without tolerances acc. To ISO 2768-1 designation C.

| Description            | APP 30/1200 & APP 38-46                   |
|------------------------|-------------------------------------------|
| Parallel key, DIN 6885 | 12 x 8 x 70 mm<br>0.47 x 0.31 x 2.76 inch |
| Bleed                  | G 1/4", hex key 6 mm                      |
| Inlet port             | M60x1.5; depth 23 mm                      |
| Outlet port            | M60x1.5; depth 23 mm                      |
| Grounding connection   | M8, depth 11 mm                           |
| Thermal sensor         | M6, depth 11 mm                           |

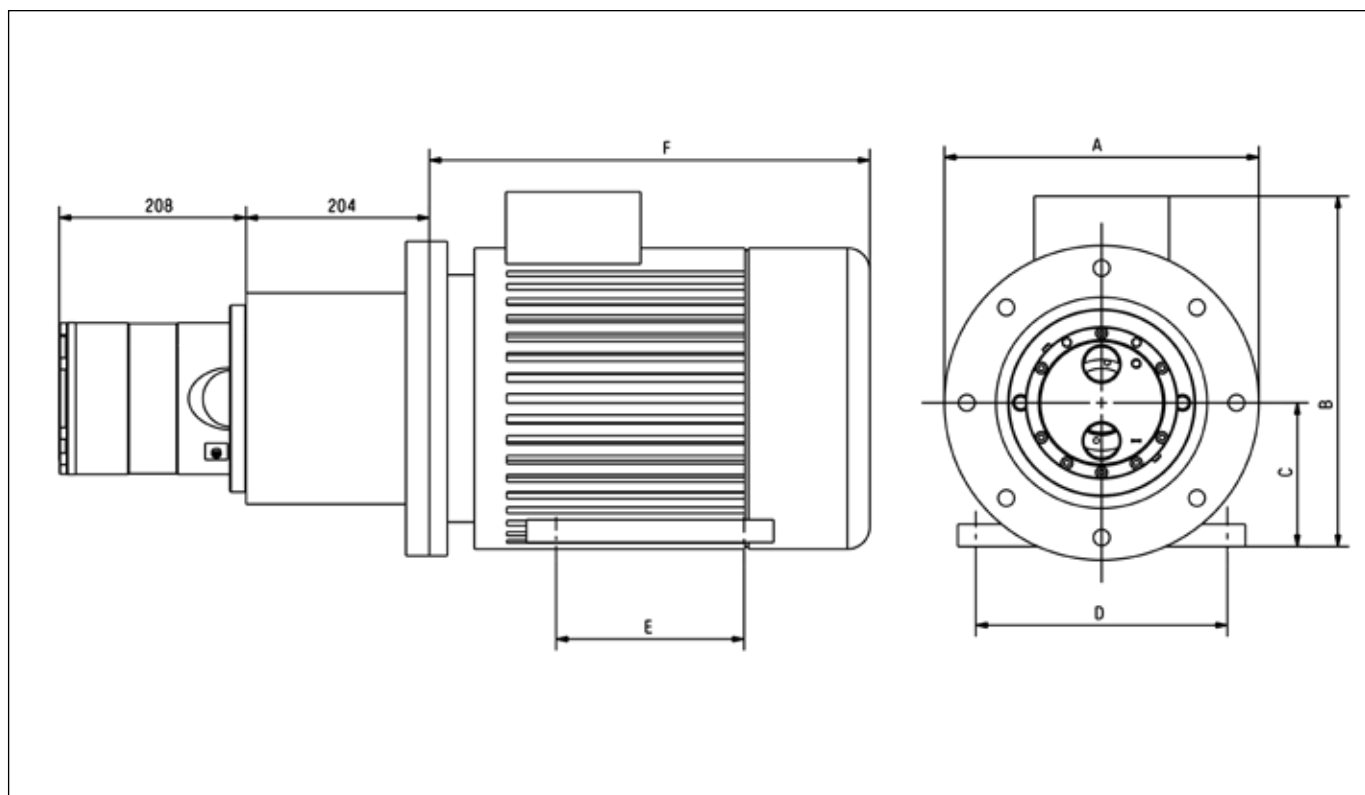
# 11. Dimensions with motor 11.1 APP 0.6-3.5 unit

The examples of assemblies with motor are only for IEC motors and couplings. Please make sure to check required motor power and dimensions when selecting size of pump and motor. For advice and calculation tool, please contact Danfoss.



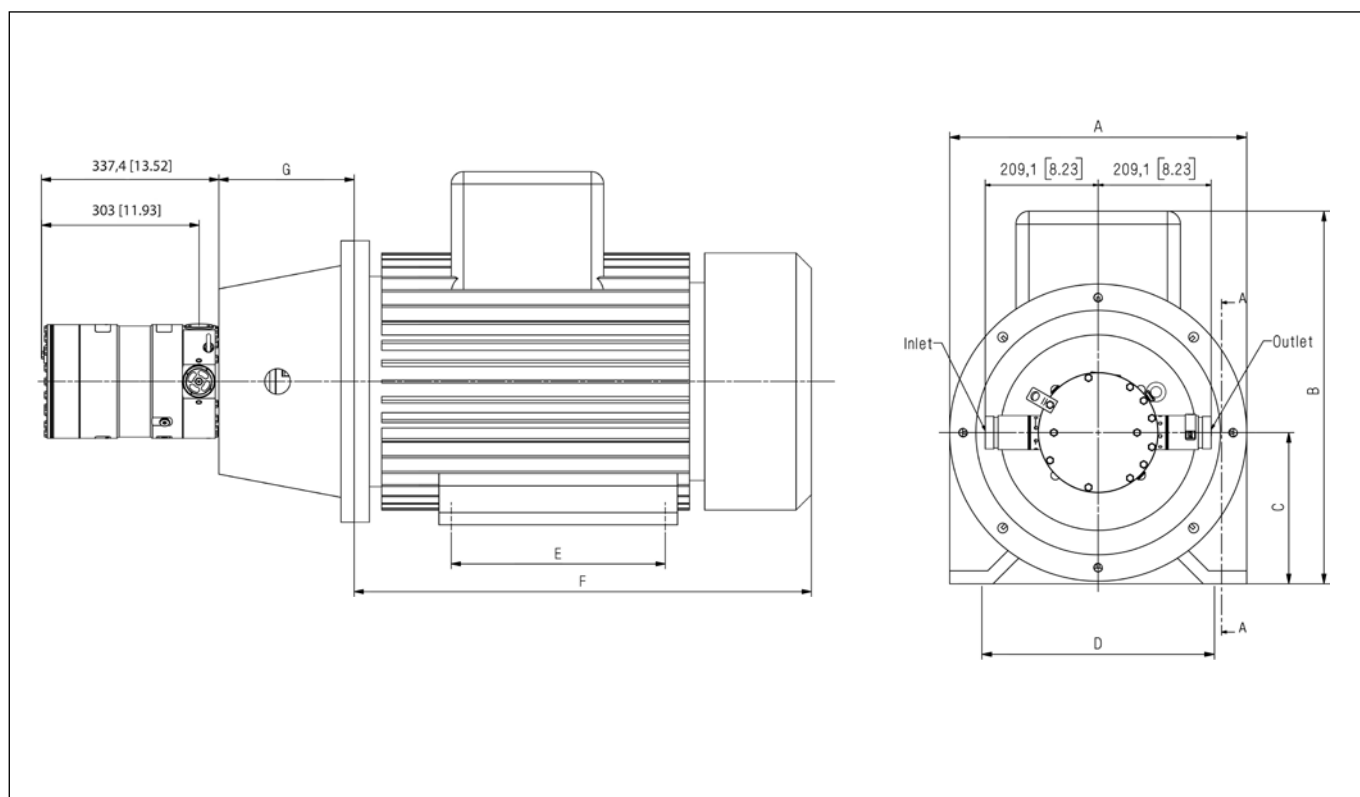
| Pump    | A mm<br>(inch) | B mm<br>(inch) | C mm<br>(inch) | D mm<br>(inch) | E mm<br>(inch) | F mm<br>(inch) | G mm<br>(inch) | H mm<br>(inch) | IEC Electric motor  |
|---------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|---------------------|
| APP 0.6 | 200<br>(7.87)  | 245<br>(9.64)  | 90<br>(3.54)   | 140<br>(5.51)  | 100<br>(3.94)  | 265<br>(10.43) | 100<br>(3.94)  | 131<br>(5.16)  | 1.5 kW, IEC 90S-2   |
| APP 0.8 | 200<br>(7.87)  | 245<br>(9.64)  | 90<br>(3.54)   | 140<br>(5.51)  | 125<br>(4.92)  | 290<br>(11.42) | 100<br>(3.94)  | 131<br>(5.16)  | 2.2 kW, IEC 90L-2   |
| APP 1.0 | 250<br>(9.84)  | 260<br>(10.23) | 100<br>(3.94)  | 160<br>(6.30)  | 140<br>(5.51)  | 325<br>(12.80) | 120<br>(4.72)  | 131<br>(5.16)  | 3.0 kW, IEC 100L-2  |
| APP 1.5 | 250<br>(9.84)  | 260<br>(10.23) | 100<br>(3.94)  | 160<br>(6.30)  | 140<br>(5.51)  | 325<br>(12.80) | 120<br>(4.72)  | 166<br>(6.54)  | 3.0 kW, IEC 100L-2  |
| APP 1.8 | 250<br>(9.84)  | 290<br>(11.42) | 112<br>(4.41)  | 190<br>(7.48)  | 140<br>(5.51)  | 340<br>(13.39) | 120<br>(4.72)  | 166<br>(6.54)  | 4.0 kW, IEC 112M-2  |
| APP 2.2 | 300<br>(11.81) | 338<br>(13.31) | 132<br>(5.20)  | 216<br>(8.50)  | 140<br>(5.51)  | 403<br>(15.87) | 144<br>(5.67)  | 166<br>(6.54)  | 5.5 kW, IEC 132S1-2 |
| APP 2.5 | 300<br>(11.81) | 338<br>(13.31) | 132<br>(5.20)  | 216<br>(8.50)  | 178<br>(7.01)  | 403<br>(15.87) | 144<br>(5.67)  | 166<br>(6.54)  | 7.5 kW, IEC 132S2-2 |
| APP 3.0 | 350<br>(13.78) | 422<br>(17.40) | 160<br>(6.30)  | 254<br>(10.0)  | 210<br>(8.27)  | 505<br>(19.88) | 188<br>(7.40)  | 166<br>(6.54)  | 11 kW, IEC 160M1-2  |
| APP 3.5 | 350<br>(13.78) | 422<br>(17.40) | 160<br>(6.30)  | 254<br>(10.0)  | 210<br>(8.27)  | 505<br>(19.88) | 188<br>(7.40)  | 166<br>(6.54)  | 11 kW, IEC 160M1-2  |

## 11.2 APP (W) 5.1-10.2



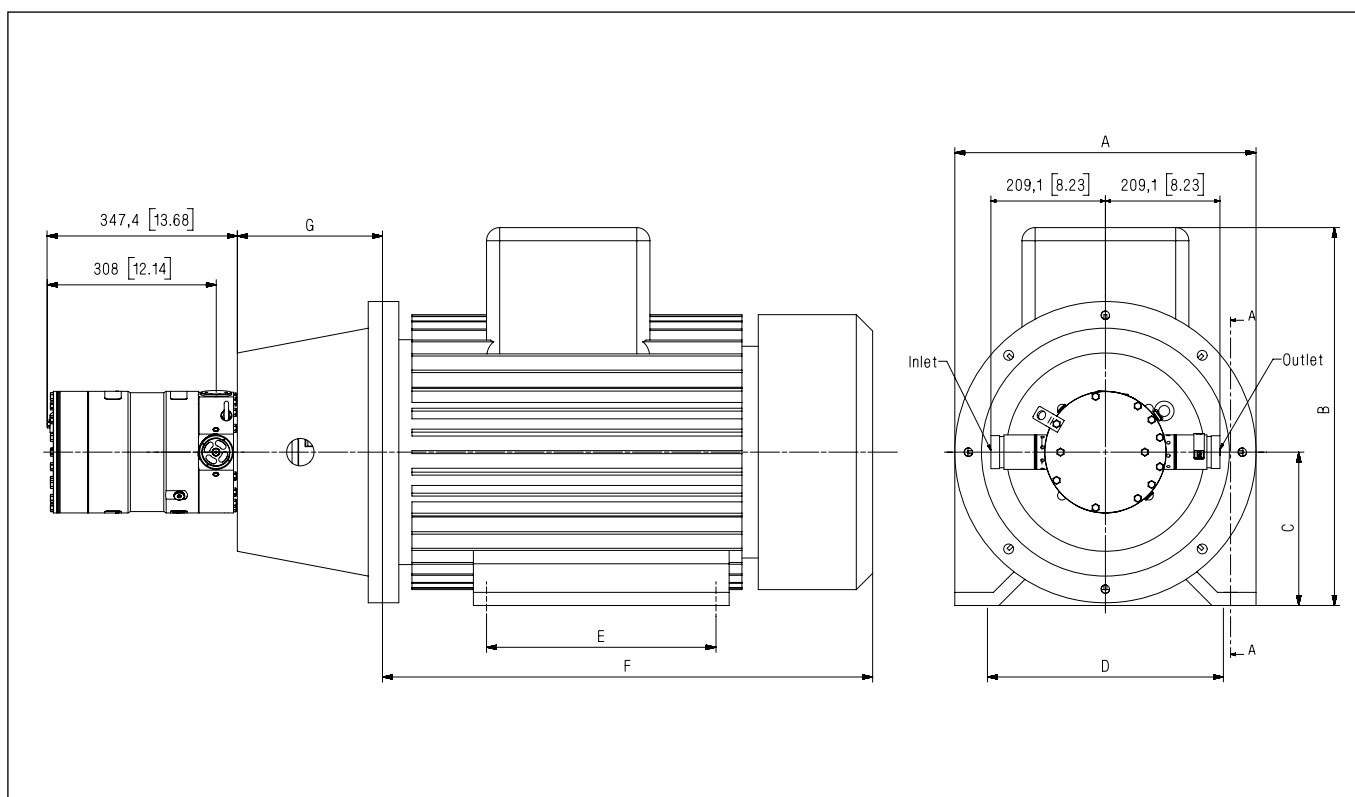
| Pump     | A mm<br>(inch) | B mm<br>(inch) | C mm<br>(inch) | D mm<br>(inch) | E mm<br>(inch) | F mm<br>(inch) | IEC Electric motor    |
|----------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------------|
| APP 5.1  | 350<br>(13.78) | 437<br>(17.20) | 160<br>(6.30)  | 254<br>(10.0)  | 210<br>(8.27)  | 498<br>(19.61) | 11 kW, HUC2 160 M-4   |
| APP 6.5  | 350<br>(13.78) | 437<br>(17.20) | 160<br>(6.30)  | 254<br>(10.0)  | 254<br>(10.0)  | 542<br>(21.34) | 15 kW, HUC2 160 L-4   |
| APP 7.2  | 350<br>(13.78) | 437<br>(17.20) | 160<br>(6.30)  | 254<br>(10.0)  | 254<br>(10.0)  | 542<br>(21.34) | 15 kW, HUC2 160 L-4   |
| APP 8.2  | 350<br>(13.78) | 473<br>(18.62) | 180<br>(7.09)  | 279<br>(10.98) | 241<br>(9.49)  | 578<br>(22.76) | 18.5 kW, HUC2 180 M-4 |
| APP 10.2 | 350<br>(13.78) | 473<br>(18.62) | 180<br>(7.09)  | 279<br>(10.98) | 279<br>(10.98) | 616<br>(24.25) | 22 kW, HUC2 180 L-4   |
| APP 10.2 | 400<br>(15.75) | 513<br>(20.20) | 200<br>(7.87)  | 318<br>(12.52) | 305<br>(12.01) | 659<br>(25.94) | 30 kW, HUC2 200 L-4   |

11.3 APP 11.0-13.0



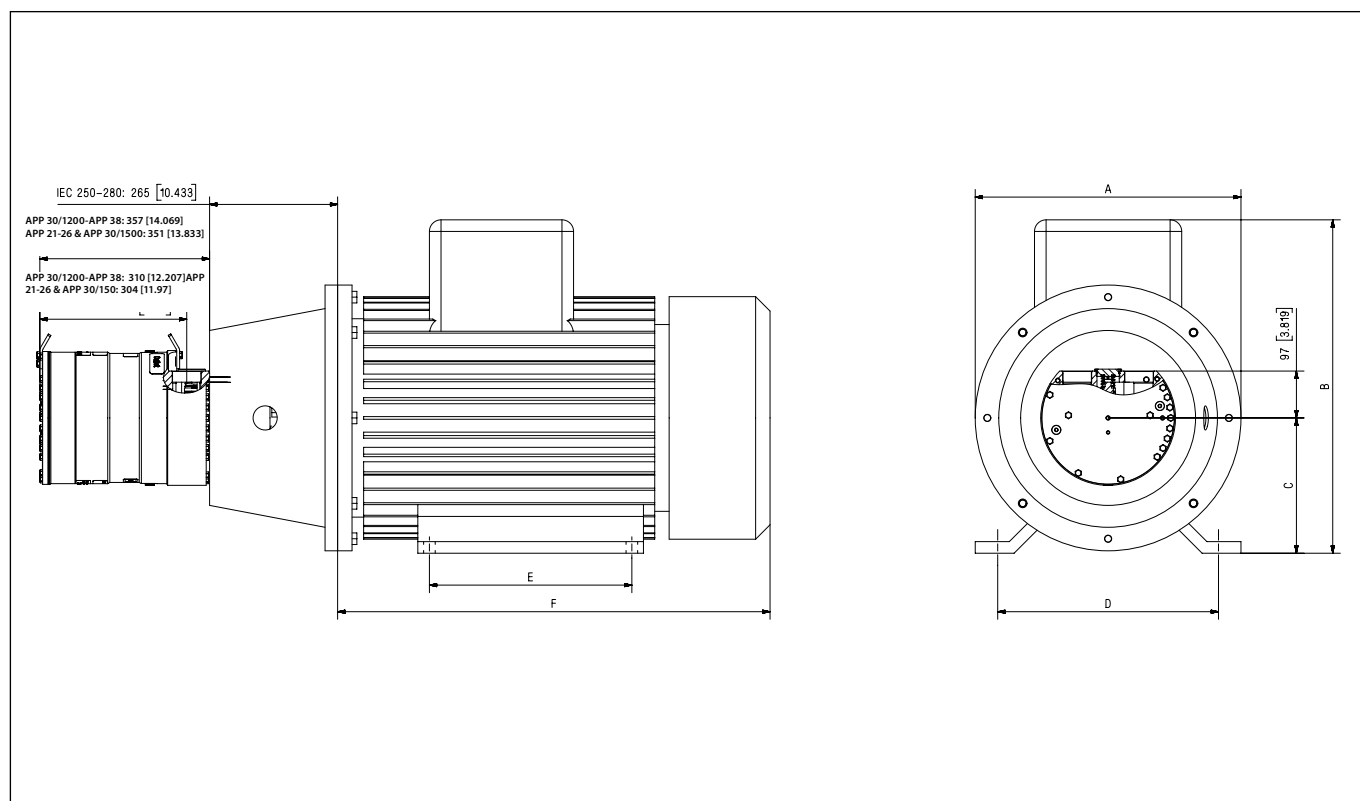
| Pump   | A mm<br>(inch) | B mm<br>(inch) | C mm<br>(inch) | D mm<br>(inch) | E mm<br>(inch) | F mm<br>(inch) | G mm<br>(inch) | IEC Electric motor |
|--------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|--------------------|
| APP 11 | 350<br>(13.78) | 473<br>(18.62) | 180<br>(7.09)  | 279<br>(10.98) | 241<br>(9.49)  | 578<br>(22.76) | 204<br>(8.03)  | 22 kW, IEC 180L-4  |
| APP 11 | 400<br>(15.75) | 513<br>(20.20) | 200<br>(7.87)  | 318<br>(12.52) | 305<br>(12.01) | 659<br>(25.94) | 204<br>(8.03)  | 30 kW, IEC 200L-4  |
| APP 13 | 450<br>(17.72) | 561<br>(22.09) | 225<br>(8.86)  | 356<br>(14.02) | 286<br>(11.26) | 667<br>(26.26) | 234<br>(9.21)  | 37 kW, IEC 225S-4  |

11.4 APP 16.0-22.0



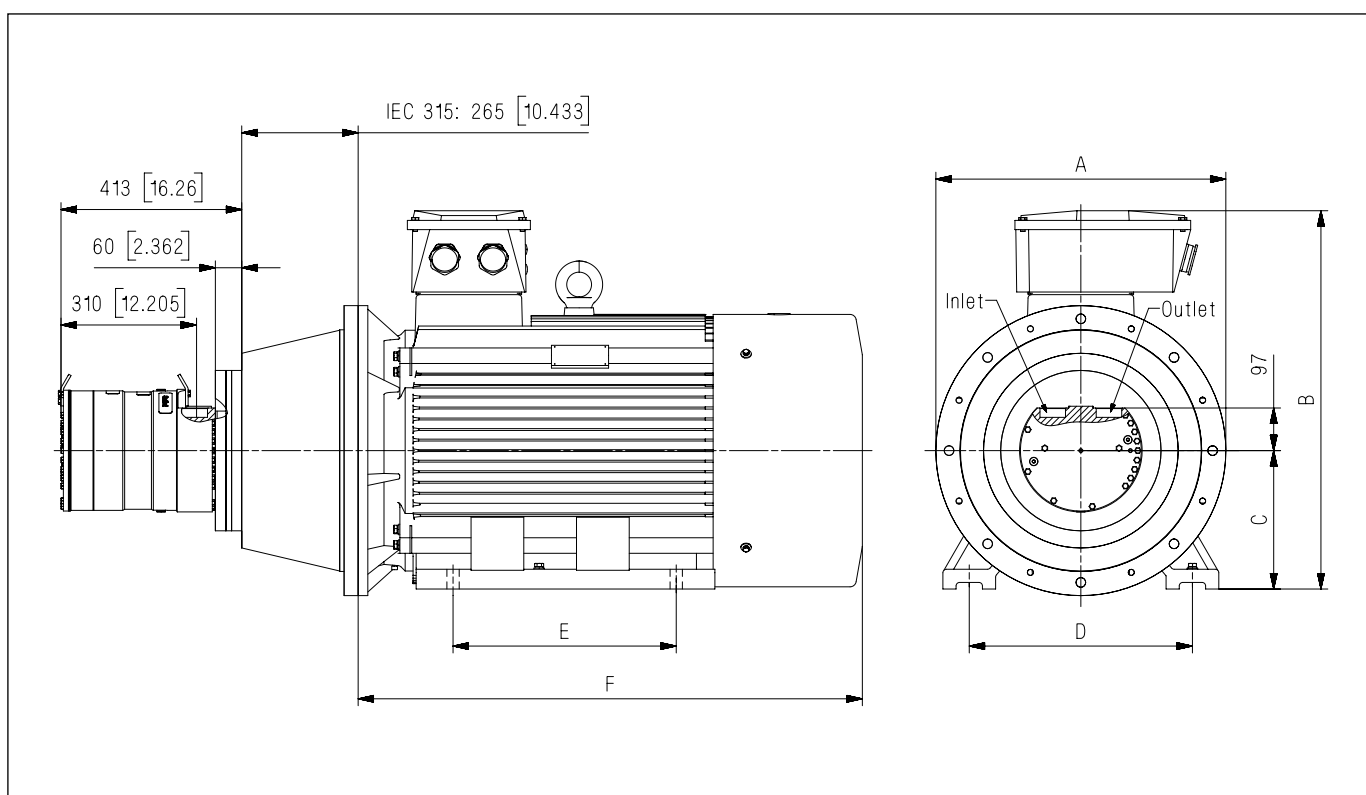
| Pump   | A mm<br>(inch)<br>[P] | B mm<br>(inch)<br>[HD] | C mm<br>(inch)<br>[H] | D mm<br>(inch)<br>[A] | E mm<br>(inch)<br>[B] | F mm<br>(inch)<br>[LB] | G mm<br>(inch) | IEC Electric motor |
|--------|-----------------------|------------------------|-----------------------|-----------------------|-----------------------|------------------------|----------------|--------------------|
| APP 16 | 450<br>(17.72)        | 560<br>(22.05)         | 225<br>(8.86)         | 356<br>(14.02)        | 286<br>(11.26)        | 675<br>(26.57)         | 262<br>(10.31) | 37 kW, IEC 225 S4  |
| APP 17 | 450<br>(17.72)        | 560<br>(22.05)         | 225<br>(8.86)         | 356<br>(14.02)        | 311<br>(12.24)        | 705<br>(27.76)         | 262<br>(10.31) | 45 kW, IEC 225 M4  |
| APP 19 | 550<br>(21.63)        | 615<br>(24.22)         | 250<br>(9.84)         | 406<br>(15.98)        | 349<br>(13.74)        | 775<br>(30.51)         | 265<br>(10.43) | 55 kW, IEC 250 M4  |
| APP 22 | 550<br>(21.63)        | 680<br>(26.77)         | 280<br>(11.02)        | 457<br>(17.99)        | 368<br>(14.48)        | 835<br>(32.87)         | 265<br>(10.43) | 75 kW, IEC 280 S4  |

# 11.5 APP 21.0-38.0



| Pump      | A mm<br>(inch) | B mm<br>(inch) | C mm<br>(inch) | D mm<br>(inch) | E mm<br>(inch) | F mm<br>(inch) | IEC Electric motor |
|-----------|----------------|----------------|----------------|----------------|----------------|----------------|--------------------|
| APP 21-24 | 550<br>(21.65) | 635<br>(25.0)  | 250<br>(9.84)  | 406<br>(15.98) | 349<br>(13.74) | 770<br>(30.31) | 55 kW, IEC 250 M-4 |
| APP 24-26 | 550<br>(21.65) | 693<br>(27.28) | 280<br>(11.02) | 457<br>(17.99) | 368<br>(14.49) | 845<br>(33.27) | 75 kW, IEC 280 S-4 |
| APP 26-38 | 550<br>(21.65) | 693<br>(27.28) | 280<br>(11.02) | 457<br>(17.99) | 419<br>(16.50) | 895<br>(35.24) | 90 kW, IEC 280 M-4 |

### 11.6 APP 46



| Pump   | A mm<br>(inch) | B mm<br>(inch) | C mm<br>(inch) | D mm<br>(inch) | E mm<br>(inch) | F mm<br>(inch)  | IEC Electric motor  |
|--------|----------------|----------------|----------------|----------------|----------------|-----------------|---------------------|
| APP 46 | 660<br>(25.98) | 861<br>(33.90) | 315<br>(12.40) | 508<br>(20.00) | 406<br>(15.98) | 1038<br>(40.87) | 110 kW, IEC 315 S-4 |

Due to the design and dimensions of an APP 46 pump, bell housing and IEC motor, a dampening flange on the bell housing is standard when an IEC 315 motor is selected.

If this dampening flange for some reason is deselected, an extension for the non-return valve may be needed in order to mount the pipe or hose with Victaulic clamps. For details and relevant accessories, please contact Danfoss.

## 12. Accessories

### 12.1 Accessories for APP (W) 5.1-10.2

| Accessories                      | Type                | Code No. |
|----------------------------------|---------------------|----------|
| 1" outlet hose - 0.66m (26")     | 1½" Victaulic       | 180Z0228 |
| 1" outlet hose - 1.16m (45.7")   | 1½" Victaulic       | 180Z0229 |
| 1½" inlet Vic. Duplex            | M42 - 1½" Victaulic | 180B3202 |
| 2" inlet hose kit - 2m (79")     | 2" Victaulic        | 180Z0298 |
| 2" inlet Vic. Super Duplex       | M42 - 2" Victaulic  | 180Z0166 |
| Non-return valve (outlet) Duplex | M42 - 1½" Victaulic | 180H0049 |

### 12.2 Accessories for APP 11-13

| Accessories                            | Type                | Code No. |
|----------------------------------------|---------------------|----------|
| 2" inlet hose kit - 2m (79")           | 2" Victaulic        | 180Z0298 |
| 1½" outlet hose - 1.16m (45.7")        | 1½" Victaulic       | 180Z0167 |
| 2" inlet Vic. Super Duplex             | M42 - 2" Victaulic  | 180Z0166 |
| Non-return valve (outlet) Super Duplex | M42 - 1½" Victaulic | 180H0053 |

### 12.3 Accessories for APP 16-22

| Accessories                            | Type               | Code No. |
|----------------------------------------|--------------------|----------|
| 2" inlet hose kit - 2m (79")           | 2" Victaulic       | 180Z0298 |
| 2" outlet hose - 1.25m (49")           | 2" Victaulic       | 180Z0140 |
| 2" inlet Vic. Super Duplex             | M52 - 2" Victaulic | 180Z0165 |
| Non-return valve (outlet) Super Duplex | M52 - 2" Victaulic | 180H0256 |

### 12.4 Accessories for APP 21-46

| Accessories                                      | Type                 | Code No. |
|--------------------------------------------------|----------------------|----------|
| 3" inlet hose kit - 2m (79")                     | 3" Victaulic         | 180Z0144 |
| 2" outlet hose APP 21-38                         | 1.78m (70")          | 180Z0263 |
|                                                  | 1m (39.4")           | 180Z0280 |
| 2 ½" outlet hose APP 46                          | 1m (39.4")           | 180Z0618 |
|                                                  | 1.78m (70")          | 180Z0619 |
| 2 ½" inlet connector APP 21-24                   | M60 - 2 ½" Victaulic | 180B3206 |
| 3" inlet connector APP 21-46                     | M60 - 3" Victaulic   | 180B3208 |
| Non-return valve (outlet) Super Duplex APP 21-46 | M60 - 2 ½" Victaulic | 180H0055 |

**13. Service****Warranty**

Danfoss APP pumps are designed for long operation, low maintenance and reduced lifecycle costs.

Provided that the pump has been running according to the Danfoss specifications, Danfoss guarantees 8,000 hours service-free operation, however, max. 18 months from date of production.

If Danfoss recommendations concerning system-design are not followed, it will strongly influence the life of the APP pumps. Other factors that affect pump performance and lifetime include:

- Running the pump at speed outside specifications.
- Supplying the pump with water at temperature higher than recommended.
- Running the pump at inlet pressure outside specifications.
- Running the pump at outlet pressure outside the specifications.

**Maintenance**

Periodic inspections are required to ensure worn parts (if any), are replaced in due time. Operational conditions such as water quality should be taken into consideration when determining the frequency of the inspections. Danfoss recommends yearly inspections.

It is recommended to order the purpose-designed tool kit.

**Pump shutdown:**

The APP pumps are made of Duplex/Super Duplex materials with excellent corrosion properties. It is, however, always recommended to flush the pump with freshwater when the system is shut down.

**Repair assistance**

In case of irregular function of the APP pump, please contact Danfoss High Pressure Pumps.

**Danfoss A/S**