AP212 Gear Pumps
Standard and Low Noise series
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<td>Product identification plate</td>
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<td>Application form</td>
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1 General information

The product range of Bucher Hydraulics SpA includes single pumps 05-100-212-212HP-250-300 (corresponding with the common group denominations: 05-1-2-2.5-3) and several combinations of double pumps, triple pumps, and so on, that can be assembled together according to versions of displacement, flanging, and auxiliary valves.

External gear pumps are widely used in modern hydraulic systems due to their high performance, long service life and low purchase and maintenance costs. Here following we introduce you the new AP212 family range.

Product development of the new AP212 family has made it possible to achieve high operating pressures, excellent volumetric and mechanical efficiency and on specially developed units (LN – Low Noise) even lower noise levels. This has been possible by means of:

- new design of gear teeth and balancing areas
- use of high-performance materials
- carefully controlled heat treatments
- increasingly tight coupling tolerances and a high standard of surface finish
- continuous development in our semi-anechoic room

Bucher Hydraulics has so achieved these results by constantly improving its design, control and manufacturing techniques inline with the latest technological developments, while simultaneously enhancing our Quality Control System which ensures that every single product offers the same high standards.
1.1 External gear pumps components

1. Retaining ring
2. Shaft seal
3. Front cover
4. Balancing seal
5. Back up seal
6. Balancing block
7. Drive gear

8. Driven gear
9. Oil seal
10. Centering pin
11. Pump body
12. Back cover
13. Fixing screw and washer

1.1.1 Improvements (New AP212 vs AP200)

Front covers:
In addition to aluminium versions, complete new range of cast iron front covers

Balancing blocks:
New generation optimised and standardised balancing blocks

Gears:
New gears profile (12 teeth) with increased transmissible torque

Bodies:
New design pump bodies

Back covers:
Wide range of aluminium and cast iron back covers with/without integrated cartridge valves

GEAR PUMPS

- Fluid-borne noise
- Structural-borne noise
- Airborne noise

TARGET

- Flow pulsation reduction
- Vibration reduction
- Pump low noise level

HYDRAULIC CIRCUIT
1.2 Example of typical sound pressure level recorded in a semi-anechoic testing room

Noise reduction effects

Oil temperature: 40°C - Oil viscosity: 32 mm²/s
Distance between pump and sensor: 1 m
1.3 Technical data

### Features

<table>
<thead>
<tr>
<th>Operating fluid temperature range (mineral oil):</th>
<th>NBR</th>
<th>HNBR</th>
</tr>
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<tbody>
<tr>
<td>-15 / +80 °C (peak: -20 / +90 °C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-20 / +90 °C (peak: -30 / +110 °C)</td>
<td></td>
<td></td>
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</tbody>
</table>

| Recommended fluids                        | hydraulic mineral oil-based |

| Viscosity range:                  | Recommended |
|                                   | Permitted   |
|                                   | Permitted for starting |
| 20-120 mm²/s (cSt)                | 12- 700 mm²/s (cSt) |
| 2000 mm²/s (cSt)                  |               |

| Cleanliness:                                     | 20/18/15 ISO 4406 |
| recommended up to 140 bar (2000 PSI)             | 19/17/14 ISO 4406 |
| recommended up to 210 bar (3000 PSI)             | 17/15/12 ISO 4406 |
| recommended up to 275 bar (4000 PSI)             |               |

| Minimum storage temperature:                  | NBR |
|                                             | HNBR |
| NBR                                          |     |
| -25 °C                                        |     |
| HNBR                                         |     |
| -35 °C                                        |     |

| Standard seals material (valves not included) | NBR + HNBR standard (ISO1629) |

### Pressure

<table>
<thead>
<tr>
<th>Type</th>
<th>cm³/rev</th>
<th>Cu.In. P.R.</th>
<th>cm³/rev</th>
<th>Cu.In. P.R.</th>
<th>Max. pressure*</th>
<th>n min. P2 &lt; 100 bar</th>
<th>n min. 100&lt;n&lt;180 bar</th>
<th>n min. 180&lt;n&lt;P2</th>
<th>n max. rpm</th>
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<tr>
<td>AP/</td>
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<td>4.4</td>
<td>.269</td>
<td>4.5</td>
<td>.275</td>
<td>250</td>
<td>3630</td>
<td>280</td>
<td>4060</td>
</tr>
<tr>
<td>APR212</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>300</td>
<td>4350</td>
<td>600</td>
<td>1200</td>
</tr>
<tr>
<td>6.5</td>
<td>.391</td>
<td>6.6</td>
<td>.403</td>
<td>8.7</td>
<td>.531</td>
<td>250</td>
<td>3630</td>
<td>280</td>
<td>4060</td>
</tr>
<tr>
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<td>8.7</td>
<td>.531</td>
<td>11.5</td>
<td>.702</td>
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<td>3630</td>
<td>280</td>
<td>4060</td>
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<tr>
<td>11</td>
<td>.677</td>
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<td>.702</td>
<td>15.7</td>
<td>.958</td>
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<td>4060</td>
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<td>15</td>
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<td>15.7</td>
<td>.958</td>
<td>19.8</td>
<td>1.208</td>
<td>210</td>
<td>3040</td>
<td>240</td>
<td>3480</td>
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<td>1.172</td>
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<td>1.208</td>
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<td>1.355</td>
<td>23</td>
<td>1.404</td>
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<tr>
<td>22</td>
<td>2.22</td>
<td>23</td>
<td>1.404</td>
<td>26</td>
<td>1.599</td>
<td>27.1</td>
<td>1.654</td>
<td>170</td>
<td>2460</td>
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<td>26</td>
<td>2.62</td>
<td>27.1</td>
<td>1.654</td>
<td>22**</td>
<td>1.355</td>
<td>23</td>
<td>1.404</td>
<td>220</td>
<td>3190</td>
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<td>22**</td>
<td>26.2</td>
<td>27.1</td>
<td>1.654</td>
<td>200</td>
<td>2900</td>
<td>230</td>
<td>330</td>
<td>250</td>
<td>3630</td>
</tr>
</tbody>
</table>

* Referred to pumps with flanged ports. Utilising threaded ports, please consider a significantly de-rated performances.
** obtained with a specific balancing plate, please contact our Sales Center

The mechanical stress localised on threaded ports cause a reduced pump life performances

** IMPORTANT! ** Please consult Bucher Hydraulics if even one of the operating limits indicated in the table (temperature, pressure, rpm) is exceeded, as well as in the case of two or more maximum values at the same time, or for applications with particularly heavy-duty cycles

1.4 Pressure

Pressure levels:
P1 = continuous pressure
P2 = intermittent pressure
P3 = peak pressure

The recommended oil speed in the pressure pipes is:
v = 2 to 5 m/s

![Diagram of pressure levels](image)
1.5 Suction

The absolute suction pressure must be $P_{in} \leq 0.75$ bar (11 PSI); therefore, the following conditions must be avoided:

- large height differences between pump and tank
- long stretches of piping
- special features such as:
  - bends
  - reductions in diameter
  - quick couplings
  - etc.

It is also advisable to choose a filter of a suitable size to minimise any pressure drop and to take measures to prevent gradual clogging over time.

(Example 1)

In certain cases, the suction pressure can exceed 1 bar (14.3 PSI), or atmospheric pressure. Please contact our Sales Department, solution for $P_{in} \leq 3.5$ bar (50 PSI), are available.

If in a particular application the $P_{in}$ pressure is higher than the recommended value, contact our Sales Office.

The diameter of the suction pipe should ensure that the oil speed will fall within the range: $v = 0.6 - 1.2$ m/s.

(Example 2)

1.6 General precaution

In addition to the recommendations regarding fluids, filtration, coupling, etc., we suggest the following:

- Always check the rotation direction of the pump's drive shaft; it must be compatible with the rotation direction of the pump itself.
- Be particularly careful in cleaning and make sure, when connecting the suction and pressure piping, that no chips, rag threads, teflon tape, etc. get into the pump circulation system.
- Check the tightness of the suction and pressure fittings, the correct positioning of the O-Ring, and make sure there is no dirt between the flange and the pump body.
- The first pump start-up can be facilitated by manually filling the suction piping and the pump itself with oil. To facilitate air bleeding, start the pump with the circuit not pressurised.
- To ensure the best heat distribution inside the tank, make sure the return pipe is not too close to the pump's suction piping. The pipings themselves should be below oil tank level to prevent the formation of foam.
- Do not subject the pumps to operating conditions different from those indicated on section 1.3; for extreme operations, always contact our Technical Department.
- Never use fluids different from those indicated in section 1.3 and do not use fluids incompatible with the pump seals (i.e. HNBR)
- In the event of pump painting, do not use solvents or paints that are incompatible with the material of the seals. Do not bake paint with excessively high temperatures. Do not paint over the product identification plate.

1.6.1 Directives and standards

Atex

Attention: The equipment and protective systems of these catalogue ARE NOT intended for use in potentially explosive atmospheres.


Bucher Hydraulics S.p.A. is certified for research, development and production of directional control valves, gear pumps and motors, power units, electro pumps, cartridge valves and integrated manifolds for hydraulic applications.
1.7 Identifying the rotation direction

The rotation direction of a gear pump is identified by looking at the pump from the front and with the drive gear turned upwards (see figures below).

Pumps with clockwise rotation (D) have a drive gear which turns clockwise, with the suction port on the left and the pressure port on the right.

Pumps with counterclockwise rotation (S) have a drive gear which turns counterclockwise, with the suction port on the right and the pressure port on the left. The figure also shows the pressure flow inside the pumps as the oil is transferred from the suction port to the pressure port.

As regards reversible pumps (R), the ports are alternatively for suction and pressure.

Pumps with a unidirectional rotation (D or S) have the denomination AP.

Pumps with reversible rotation have the denomination APR.

Pumps with “Low Noise” components have the denomination LN.

1.8 Motor-pump coupling

Absolutely no radial or axial forces should be transmitted to the drive shaft in the motor-pump coupling.

Such forces cause rapid and irregular wear on the balancing surface of the bushings and gear support, with a consequent worsening in pump performance.

The coupling joint must be able to absorb any discrepancies in the coaxial alignment of the motor-pump shafts without placing any load on the pump shaft.

In the couplings between splined shafts, the connecting sleeve must be free to move along its axis.

The length of the sleeve must be sufficient to cover the splined sections of the motor-pump shafts completely in any position.

A clearance between shaft ends it is necessary.

Make sure that the splined coupling is suitably lubricated to protect it against rapid deterioration.

If there are radial and/or axial loads on the drive shaft, such as when it is driven by a V-belt and pulley or pair of gear wheels, it should be fitted with a front cover with supporting bearings. (See examples in section 3.4.3)

Depending on the pump model concerned, these supports can replace the front cover of the pump or can be fitted in addition to and over the front cover.
1.9 Non-standard symbols used in the text

- Check nut
- Hexagonal-head screw (TE screw)
- O-Ring
- Lock washer
- Socket head screw (TCE screw)
- Woodruff key
- Dynamometric spanners
- Gear pump standard configuration: materials indication
- Square key

1.10 Calculating the specification of a gear pump

The following parameters are defined:

- \( V_c \) = (cm\(^3\)/rev) pump displacement;
- \( n \) = (rev/min) no. of rpms of the drive shaft;
- \( Q \) = (l/min) flow rate;
- \( p \) = (bar) operating pressure;
- \( T \) = (Nm) drive torque;
- \( N \) = (kW) Absorbed power;
- \( \eta_v \) = (%) volumetric efficiency;
- \( \eta_m \) = (%) mechanical efficiency;
- \( \eta_t \) = (%) total efficiency

\[
Q = \frac{V_c \cdot n}{100000} \cdot \eta_v
\]

\[
T = 1.59 \cdot \frac{p \cdot V_c}{\eta_m}
\]

\[
N = \frac{Q \cdot p}{6 \cdot \eta_t}
\]

Example

AP212/11  \( V_c \) = 11.1 cm\(^3\)/r  \( n \) = 1500 r/min  \( p \) = 200 bar  \( \eta_v \) = 94%  \( \eta_m \) = 90%  \( \eta_t \) = 84.6%

\[
Q = \frac{11.1 \cdot 1500}{100000} \cdot 94 = 15.65 \text{ l/min.}
\]

\[
T = 1.59 \cdot \frac{200 \cdot 11.1}{90} = 39.2 \text{ Nm}
\]

\[
N = \frac{15.65 \cdot 200}{6 \cdot 84.6} = 6.56 \text{ kW}
\]
1.11 Diagrams AP212

Oil viscosity: 37 mm²/s
Oil temperature: 40°C
2 Overview standard types

This pumps configuration are considered as "standard".

In the next pages, front, rear cover, and seals materials are listed for each pump series. For ordering purposes, it is enough to outline the complete pump description (for example: AP212/4.5 D 218).

In case of a different configuration request (or a combination of different features, such as port threads, front flange materials, etc.), the description configurator shown in section 3.1 can be easily used.

2.1 Standard configuration

<table>
<thead>
<tr>
<th>Port type</th>
<th>Aluminium front cover type</th>
<th>Drive shaft</th>
</tr>
</thead>
<tbody>
<tr>
<td>European 4 bolts flanged</td>
<td>European rectangular (Ø 36.5 mm - 1.44&quot;)</td>
<td>Tapered shaft 1:8</td>
</tr>
<tr>
<td>German 4 bolts flanged</td>
<td>German rectangular (Ø 80 mm - 3.15 inches)</td>
<td>Tapered shaft 1:5</td>
</tr>
<tr>
<td>BSPP Threaded ports</td>
<td>Through 2 bolts (Ø 50 mm - 1.97&quot;)</td>
<td>Tang drive 8 mm - 0.32 inches</td>
</tr>
<tr>
<td>SAE Threaded ports</td>
<td>Through 2 bolts (Ø 50 mm - 1.97&quot;)</td>
<td>9 Teeth external spline B17X14 DIN5482</td>
</tr>
<tr>
<td>NPTF Threaded ports</td>
<td>Through 2 bolts (Ø 52 mm - 2.045&quot;)</td>
<td>9 teeth external spline SAE J 498-9T 16/32 DP</td>
</tr>
<tr>
<td>Cast iron front cover type</td>
<td>SAE-A 2 bolts (Ø 82.55 mm - 3.25 inches)</td>
<td>Straight keyed Ø 15.85 mm - 0.62 inches</td>
</tr>
<tr>
<td></td>
<td>SAE-B 2 bolts (Ø 101.6 mm - 4 inches)</td>
<td>0</td>
</tr>
</tbody>
</table>
For reversible pumps alternative inlet and outlet ports have the same sizes as per inlet unidirectional rotation.
### Gear pump material

- Front cover: aluminium
- Body: aluminium
- Back cover: cast iron
- Seals: NBR + HNBR

### Type

<table>
<thead>
<tr>
<th>Type</th>
<th>Displacement cm³/rev</th>
<th>Dimensions</th>
<th>Suction</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP212</td>
<td>AP212LN</td>
<td>A mm inch</td>
<td>B mm inch</td>
<td>d mm inch</td>
</tr>
<tr>
<td>4.5</td>
<td>4.4</td>
<td>89</td>
<td>3.50</td>
<td>13.5</td>
</tr>
<tr>
<td>6.5</td>
<td>6.4</td>
<td>92</td>
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<td>8.5</td>
<td>8.4</td>
<td>95</td>
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<td>22</td>
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<td>116</td>
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<tr>
<td>26</td>
<td>26.2</td>
<td>122</td>
<td>4.80</td>
<td>13.5</td>
</tr>
</tbody>
</table>

### Clockwise rotation: D

- Standard: AP212/4.5 D 218
- Low Noise: AP212/4.5LN D 218
- Counter-clockwise rotation: S
- Standard: AP212/4.5 S 218
- Low Noise: AP212/4.5LN S 218
- Reversible pump External Drain
- Standard: APR212/4.5 ED 218
- Low Noise: APR212/4.5LN ED 218

### AP212

- Shaft max torque: see section 3.3
- Tightening torque: see section 3.5 - 3.6
### Gear pump material

- **Front cover:** aluminium
- **Body:** aluminium
- **Back cover:** cast iron
- **Seals:** NBR + HNBR

#### Shaft max torque: see section 3.3

**Tightening torque:** see section 3.5 - 3.6

<table>
<thead>
<tr>
<th>Type</th>
<th>Displacement cm^3/rev</th>
<th>Dimensions A (mm)</th>
<th>Dimensions B (mm)</th>
<th>Suction</th>
<th>Pressure</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>A (mm)</td>
<td>B (mm)</td>
<td>D (mm)</td>
<td>F (mm)</td>
</tr>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>AP212LN</td>
<td></td>
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<table>
<thead>
<tr>
<th>Clockwise rotation: D</th>
<th>Counter-clockwise rotation: S</th>
<th>Reversible pump External Drain</th>
</tr>
</thead>
<tbody>
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- **APR ED**

**Reversible pump External Drain**

**Serie 225**
### Gear Pump Material

- Front cover: aluminium
- Body: aluminium
- Back cover: cast iron
- Seals: NBR + HNBR

### Shaft Max Torque
- See section 3.3

### Tightening Torque
- See section 3.5 - 3.6

### Table: Type, Displacement, Dimensions, Suction, and Pressure

| Type  | Displacement cm³/rev | AP212 | AP212LN | A | B | D | F | d | Closest Size
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### Clockwise Rotation: D

- D

### Counter-clockwise Rotation: S

- S

### Reversible Pump External Drain

- ED

### AP212/4.5 D 227
- AP212/4.5LN D 227
- AP212/4.5 S 227
- AP212/4.5LN S 227
- APR212/4.5 ED 227
- APR212/4.5LN ED 227

### AP212/6.5 D 227
- AP212/6.5LN D 227
- AP212/6.5 S 227
- AP212/6.5LN S 227
- APR212/6.5 ED 227
- APR212/6.5LN ED 227

### AP212/8.5 D 227
- AP212/8.5LN D 227
- AP212/8.5 S 227
- AP212/8.5LN S 227
- APR212/8.5 ED 227
- APR212/8.5LN ED 227

### AP212/11 D 227
- AP212/11LN D 227
- AP212/11 S 227
- AP212/11LN S 227
- APR212/11 ED 227
- APR212/11LN ED 227

### AP212/15 D 227
- AP212/15LN D 227
- AP212/15 S 227
- AP212/15LN S 227
- APR212/15 ED 227
- APR212/15LN ED 227

### AP212/19 D 227
- AP212/19LN D 227
- AP212/19 S 227
- AP212/19LN S 227
- APR212/19 ED 227
- APR212/19LN ED 227

### AP212/22 D 227
- AP212/22LN D 227
- AP212/22 S 227
- AP212/22LN S 227
- APR212/22 ED 227
- APR212/22LN ED 227

### AP212/26 D 227
- AP212/26LN D 227
- AP212/26 S 227
- AP212/26LN S 227
- APR212/26 ED 227
- APR212/26LN ED 227
**Gear pump material**

Front cover: aluminium  
Body: aluminium  
Back cover: cast iron  
Seals: NBR + HNBR

Shaft max torque: see section 3.3  
Tightening torque: see section 3.5 - 3.6

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<th>Suction</th>
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**Clockwise rotation: D**  
**Counter-clockwise rotation: S**  
**Reversible pump External Drain**

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### Gear pump material

- Front cover: aluminium
- Body: aluminium
- Back cover: cast iron
- Seals: NBR + HNBR

**Shaft max torque:** see section 3.3

**Tightening torque:** see section 3.5 - 3.6

<table>
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### Reversible pump External Drain

- Standard
- Low Noise

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### Gear pump material

- **Front cover**: aluminium
- **Body**: aluminium
- **Back cover**: cast iron
- **Seals**: NBR + HNBR

**Shaft max torque**: see section 3.3

**Tightening torque**: see section 3.5 - 3.6

### Type Selection

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**Clockwise rotation**: D

#### Counter-clockwise rotation: S

#### Reversible pump External Drain

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Reversible pump
ED - External Drain

Serie 247

Gear pump material
Front cover: aluminium
Body: aluminium
Back cover: cast iron
Seals: NBR + HNBR

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Clockwise rotation: D
Counter-clockwise rotation: S
Reversible pump External Drain

Standard
AP212/4.5 D 247
AP212/6.5 D 247
AP212/8.5 D 247
AP212/11 D 247
AP212/15 D 247
AP212/19 D 247
AP212/22 D 247
AP212/26 D 247

Low Noise
AP212/4.5LN D 247
AP212/6.5LN D 247
AP212/8.5LN D 247
AP212/11LN D 247
AP212/15LN D 247
AP212/19LN D 247
AP212/22LN D 247
AP212/26LN D 247

AP212/4.5 S 247
AP212/6.5 S 247
AP212/8.5 S 247
AP212/11 S 247
AP212/15 S 247
AP212/19 S 247
AP212/22 S 247
AP212/26 S 247

AP212/4.5LN S 247
AP212/6.5LN S 247
AP212/8.5LN S 247
AP212/11LN S 247
AP212/15LN S 247
AP212/19LN S 247
AP212/22LN S 247
AP212/26LN S 247

APR212/4.5 ED 247
APR212/6.5 ED 247
APR212/8.5 ED 247
APR212/11 ED 247
APR212/15 ED 247
APR212/19 ED 247
APR212/22 ED 247
APR212/26 ED 247

APR212/4.5LN ED 247
APR212/6.5LN ED 247
APR212/8.5LN ED 247
APR212/11LN ED 247
APR212/15LN ED 247
APR212/19LN ED 247
APR212/22LN ED 247
APR212/26LN ED 247

Shaft max torque: see section 3.3
Tightening torque: see section 3.5 - 3.6
Shaft max torque: see section 3.3
Tightening torque: see section 3.5 - 3.6

<table>
<thead>
<tr>
<th>Gear pump material</th>
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</thead>
<tbody>
<tr>
<td>Front cover: aluminium</td>
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<tr>
<td>Body: aluminium</td>
</tr>
<tr>
<td>Back cover: cast iron</td>
</tr>
<tr>
<td>Seals: NBR + HNBR</td>
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</tbody>
</table>

### Pump side Joint Coupling side

**Max pressure (T max= 65 Nm)**

- **Pump side Joint Coupling side**
- **Max pressure (T max= 65 Nm)**

<table>
<thead>
<tr>
<th>Pump</th>
<th>bar (PSI)</th>
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<th>P2</th>
<th>P3</th>
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<td>210 - 3000</td>
<td>230 - 3300</td>
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<td>AP212/19</td>
<td>140 - 2000</td>
<td>165 - 2400</td>
<td>185 - 2650</td>
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<td>AP212/22</td>
<td>120 - 1700</td>
<td>145 - 2050</td>
<td>165 - 2350</td>
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<tr>
<td>AP212/26</td>
<td>100 - 1450</td>
<td>120 - 1750</td>
<td>140 - 2000</td>
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### Type

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<th>Suction</th>
<th>Pressure</th>
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### Clockwise rotation: D

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<tbody>
<tr>
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<td>AP212/6.5LN D 259</td>
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<td>AP212/11 S 259</td>
<td>AP212/11LN D 259</td>
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<td>AP212/15 D 259</td>
<td>AP212/15 S 259</td>
<td>AP212/15LN D 259</td>
</tr>
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<td>AP212/19 D 259</td>
<td>AP212/19 S 259</td>
<td>AP212/19LN D 259</td>
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<td>AP212/22 D 259</td>
<td>AP212/22 S 259</td>
<td>AP212/22LN D 259</td>
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<tr>
<td>AP212/26 D 259</td>
<td>AP212/26 S 259</td>
<td>AP212/26LN D 259</td>
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### Counter-clockwise rotation: S

<table>
<thead>
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<td>AP212/4.5 S 259</td>
<td>AP212/4.5LN S 259</td>
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<tr>
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<td>AP212/6.5 S 259</td>
<td>AP212/6.5LN S 259</td>
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<td>AP212/8.5 S 259</td>
<td>AP212/8.5LN S 259</td>
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<td>AP212/11 S 259</td>
<td>AP212/11LN S 259</td>
</tr>
<tr>
<td>AP212/15 D 259</td>
<td>AP212/15 S 259</td>
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<td>AP212/26 D 259</td>
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### Reversible pump External Drain

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<th>Low Noise</th>
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<td>APR212/4.5 LN ED 259</td>
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</tr>
<tr>
<td>APR212/6.5 ED 259</td>
<td>APR212/6.5 LN ED 259</td>
<td></td>
</tr>
<tr>
<td>APR212/8.5 ED 259</td>
<td>APR212/8.5 LN ED 259</td>
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</tr>
<tr>
<td>APR212/11 ED 259</td>
<td>APR212/11 LN ED 259</td>
<td></td>
</tr>
<tr>
<td>APR212/15 ED 259</td>
<td>APR212/15 LN ED 259</td>
<td></td>
</tr>
<tr>
<td>APR212/19 ED 259</td>
<td>APR212/19 LN ED 259</td>
<td></td>
</tr>
<tr>
<td>APR212/22 ED 259</td>
<td>APR212/22 LN ED 259</td>
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<td>APR212/26 ED 259</td>
<td>APR212/26 LN ED 259</td>
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</tbody>
</table>
**Gear pump material**

- Front cover: aluminium
- Body: aluminium
- Back cover: cast iron
- Seals: NBR + HNBR

** Shaft max torque: see section 3.3**

** Tightening torque: see section 3.5 - 3.6**

<table>
<thead>
<tr>
<th>Type</th>
<th>Displacement cm³/rev</th>
<th>Dimensions</th>
<th>Suction</th>
<th>Pressure</th>
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<tbody>
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<td>121</td>
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** Clockwise rotation: D**

- Standard
- Low Noise

** Counter-clockwise rotation: S**

- Standard
- Low Noise

** Reversible pump External Drain**

- Standard
- Low Noise

<table>
<thead>
<tr>
<th>Type</th>
<th>Clockwise rotation: D</th>
<th>Counter-clockwise rotation: S</th>
<th>Reversible pump External Drain</th>
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<td>AP212/19 S 887S</td>
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</table>
**Gear pump material**

- Front cover: aluminium
- Body: aluminium
- Back cover: cast iron
- Seals: NBR + HNBR

**Shaft max torque:** see section 3.3

**Tightening torque:** see section 3.5 - 3.6

<table>
<thead>
<tr>
<th>Type</th>
<th>Displacement cm³/rev</th>
<th>Dimensions</th>
<th>Suction G UNF</th>
<th>Pressure G UNF</th>
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<td>127.1</td>
<td>58.5</td>
<td>2.30</td>
</tr>
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</table>

**Clockwise rotation:** D

**Counter-clockwise rotation:** S

**Reversible pump External Drain**

- Standard
- Low Noise

**AP212/4.5 D 880**
- AP212/4.5 S 880
- SAE12 (SAE10)

**AP212/6.5 D 880**
- AP212/6.5 S 880

**AP212/8.5 D 880**
- AP212/8.5 S 880

**AP212/11 D 880**
- AP212/11 S 880

**AP212/15 D 880**
- AP212/15 S 880

**AP212/19 D 880**
- AP212/19 S 880

**AP212/22 D 880**
- AP212/22 S 880

**AP212/26 D 880**
- AP212/26 S 880
**Gear pump material**

- **Front cover:** aluminium
- **Body:** aluminium
- **Back cover:** cast iron
- **Seals:** NBR + HNBR

**Shaft max torque:** see section 3.3

**Tightening torque:** see section 3.5 - 3.6

---

**Type** | **Displacement cm³/rev** | **Dimensions** | **Suction** | **Pressure**
--- | --- | --- | --- | ---
**Type** | **AP212** | **AP212LN** | **mm** | **inch** | **mm** | **inch** | **G** | **NPTF** | **G** | **NPTF**
4.5 | 4.4 | 4.5 | 88.5 | 3.48 | 42.5 | 1.67 | 1/2” | 1/2”
6.5 | 6.4 | 6.6 | 91.5 | 3.60 | 44 | 1.73 | 3/4” | 1/2”
8.5 | 8.4 | 8.7 | 94.5 | 3.72 | 45.5 | 1.79 | 3/4” | 1/2”
11 | 11.1 | 11.5 | 98.5 | 3.88 | 47.5 | 1.87 | 3/4” | 1/2”
15 | 15.1 | 15.7 | 104.5 | 4.11 | 50.5 | 1.99 | 3/4” | 1/2”
19 | 19.2 | 19.8 | 110.5 | 4.35 | 53.5 | 2.11 | 3/4” | 1/2”
22 | 22.2 | 23 | 115 | 4.52 | 55.5 | 2.18 | 3/4” | 1/2”
26 | 26.2 | 27.1 | 121 | 4.76 | 58.5 | 2.30 | 3/4” | 1/2”

---

**Clockwise rotation: D**

<table>
<thead>
<tr>
<th>Standard</th>
<th>Low Noise</th>
<th>Standard</th>
<th>Low Noise</th>
<th>Standard</th>
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<tbody>
<tr>
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<td>AP212/4.5 LN D</td>
<td>AP212/4.5 S</td>
<td>AP212/4.5 LN S</td>
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<td>887S-NPTF</td>
<td>887S-NPTF</td>
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<td>887S-NPTF</td>
<td>887S-NPTF</td>
<td>887S-NPTF</td>
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</tbody>
</table>

**Counter-clockwise rotation: S**

<table>
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<th>Low Noise</th>
<th>Standard</th>
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<td>887S-NPTF</td>
<td>887S-NPTF</td>
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**Reversible pump External Drain**

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</tr>
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<td>APR212/4.5 LN ED</td>
</tr>
<tr>
<td>887S-NPTF</td>
<td>887S-NPTF</td>
</tr>
</tbody>
</table>

---

**Reversible pump**

- **ED - External Drain**
- **SAE J 498-9T**
- **16/32 DP**
- **FLAT ROOT SIDE FIT**
- **CLASS 1 FIT**

---

**Serie 887S-NPTF**

- **Inlet - Outlet**
- **ø 11.43” DIA**
- **ø 82.55 - 3.25” - 3.248” DIA**
- **Depth T3**
- **7/16” 20UNF**

---

**Type** | **Displacement cm³/rev** | **Dimensions** | **Suction** | **Pressure**
--- | --- | --- | --- | ---
**Type** | **AP212** | **AP212LN** | **mm** | **inch** | **mm** | **inch** | **G** | **NPTF** | **G** | **NPTF**
4.5 | 4.4 | 4.5 | 88.5 | 3.48 | 42.5 | 1.67 | 1/2” | 1/2”
6.5 | 6.4 | 6.6 | 91.5 | 3.60 | 44 | 1.73 | 3/4” | 1/2”
8.5 | 8.4 | 8.7 | 94.5 | 3.72 | 45.5 | 1.79 | 3/4” | 1/2”
11 | 11.1 | 11.5 | 98.5 | 3.88 | 47.5 | 1.87 | 3/4” | 1/2”
15 | 15.1 | 15.7 | 104.5 | 4.11 | 50.5 | 1.99 | 3/4” | 1/2”
19 | 19.2 | 19.8 | 110.5 | 4.35 | 53.5 | 2.11 | 3/4” | 1/2”
22 | 22.2 | 23 | 115 | 4.52 | 55.5 | 2.18 | 3/4” | 1/2”
26 | 26.2 | 27.1 | 121 | 4.76 | 58.5 | 2.30 | 3/4” | 1/2”
## Gear Pump Material

Front cover: aluminium  
Body: aluminium  
Back cover: cast iron  
Seals: NBR + HNBR

## Shaft Max Torque

 Shaft max torque: see section 3.3

## Tightening Torque

Tightening torque: see section 3.5 - 3.6

## Type

<table>
<thead>
<tr>
<th>Type</th>
<th>Displacement cm³/rev</th>
<th>Dimensions</th>
<th>Suction</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP212</td>
<td>4.5</td>
<td>4.4</td>
<td>4.5</td>
<td>1/2&quot;</td>
</tr>
<tr>
<td>AP212 LN</td>
<td>4.5</td>
<td>6.4</td>
<td>6.6</td>
<td>3/4&quot;</td>
</tr>
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<td>AP212</td>
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<td>8.4</td>
<td>8.7</td>
<td>11</td>
</tr>
<tr>
<td>AP212 LN</td>
<td>8.5</td>
<td>10.1</td>
<td>10.5</td>
<td>19</td>
</tr>
<tr>
<td>AP212</td>
<td>15</td>
<td>11.1</td>
<td>11.5</td>
<td>19</td>
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<td>15.7</td>
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<td>AP212</td>
<td>22</td>
<td>22.2</td>
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<td>26</td>
</tr>
<tr>
<td>AP212 LN</td>
<td>22</td>
<td>26.2</td>
<td>27.1</td>
<td>26</td>
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## Clockwise Rotation: D  
Counter-Clockwise Rotation: S

<table>
<thead>
<tr>
<th>Standard</th>
<th>Low Noise</th>
<th>Standard</th>
<th>Low Noise</th>
<th>Standard</th>
<th>Low Noise</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP212/4.5 D 880-NPTF</td>
<td>AP212/4.5 LN D 880-NPTF</td>
<td>AP212/4.5 S 880-NPTF</td>
<td>AP212/4.5 LN S 880-NPTF</td>
<td>APR212/4.5 ED 880-NPTF</td>
<td>APR212/4.5 LN ED 880-NPTF</td>
</tr>
<tr>
<td>AP212/6.5 D 880-NPTF</td>
<td>AP212/6.5 LN D 880-NPTF</td>
<td>AP212/6.5 S 880-NPTF</td>
<td>AP212/6.5 LN S 880-NPTF</td>
<td>APR212/6.5 ED 880-NPTF</td>
<td>APR212/6.5 LN ED 880-NPTF</td>
</tr>
<tr>
<td>AP212/8.5 D 880-NPTF</td>
<td>AP212/8.5 LN D 880-NPTF</td>
<td>AP212/8.5 S 880-NPTF</td>
<td>AP212/8.5 LN S 880-NPTF</td>
<td>APR212/8.5 ED 880-NPTF</td>
<td>APR212/8.5 LN ED 880-NPTF</td>
</tr>
<tr>
<td>AP212/11 D 880-NPTF</td>
<td>AP212/11 LN D 880-NPTF</td>
<td>AP212/11 S 880-NPTF</td>
<td>AP212/11 LN S 880-NPTF</td>
<td>APR212/11 ED 880-NPTF</td>
<td>APR212/11 LN ED 880-NPTF</td>
</tr>
<tr>
<td>AP212/15 D 880-NPTF</td>
<td>AP212/15 LN D 880-NPTF</td>
<td>AP212/15 S 880-NPTF</td>
<td>AP212/15 LN S 880-NPTF</td>
<td>APR212/15 ED 880-NPTF</td>
<td>APR212/15 LN ED 880-NPTF</td>
</tr>
<tr>
<td>AP212/19 D 880-NPTF</td>
<td>AP212/19 LN D 880-NPTF</td>
<td>AP212/19 S 880-NPTF</td>
<td>AP212/19 LN S 880-NPTF</td>
<td>APR212/19 ED 880-NPTF</td>
<td>APR212/19 LN ED 880-NPTF</td>
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<tr>
<td>AP212/22 D 880-NPTF</td>
<td>AP212/22 LN D 880-NPTF</td>
<td>AP212/22 S 880-NPTF</td>
<td>AP212/22 LN S 880-NPTF</td>
<td>APR212/22 ED 880-NPTF</td>
<td>APR212/22 LN ED 880-NPTF</td>
</tr>
<tr>
<td>AP212/26 D 880-NPTF</td>
<td>AP212/26 LN D 880-NPTF</td>
<td>AP212/26 S 880-NPTF</td>
<td>AP212/26 LN S 880-NPTF</td>
<td>APR212/26 ED 880-NPTF</td>
<td>APR212/26 LN ED 880-NPTF</td>
</tr>
</tbody>
</table>
287S-B

Serie

Reversible pump
ED - External Drain

Clockwise rotation: D
Counter-clockwise rotation: S
Reversible pump External Drain

Front cover: aluminium
Body: aluminium
Back cover: cast iron
Seals: NBR + HNBR

Shaft max torque: see section 3.3
Tightening torque: see section 3.5 - 3.6

<table>
<thead>
<tr>
<th>Type</th>
<th>Displacement cm³/rev</th>
<th>Dimensions</th>
<th>Suction</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AP212</td>
<td>AP212LN</td>
<td>A (mm)</td>
<td>B (mm)</td>
</tr>
<tr>
<td>4.5</td>
<td>4.4</td>
<td>4.5</td>
<td>88.5</td>
<td>3.48</td>
</tr>
<tr>
<td>6.5</td>
<td>6.4</td>
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<td>8.5</td>
<td>8.4</td>
<td>8.7</td>
<td>94.5</td>
<td>3.72</td>
</tr>
<tr>
<td>11</td>
<td>11.1</td>
<td>11.5</td>
<td>98.5</td>
<td>3.88</td>
</tr>
<tr>
<td>15</td>
<td>15.1</td>
<td>15.7</td>
<td>104.5</td>
<td>4.11</td>
</tr>
<tr>
<td>19</td>
<td>19.2</td>
<td>19.8</td>
<td>110.5</td>
<td>4.35</td>
</tr>
<tr>
<td>22</td>
<td>22.2</td>
<td>23</td>
<td>115.5</td>
<td>4.52</td>
</tr>
<tr>
<td>26</td>
<td>26.2</td>
<td>27.1</td>
<td>121</td>
<td>4.76</td>
</tr>
</tbody>
</table>

Clockwise rotation: D
Counter-clockwise rotation: S
Reversible pump External Drain

<table>
<thead>
<tr>
<th>Type</th>
<th>Displacement cm³/rev</th>
<th>Dimensions</th>
<th>Suction</th>
<th>Pressure</th>
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<tbody>
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<td>AP212/6.5 D</td>
<td>287S-B</td>
<td>AP212/6.5 S</td>
<td>287S-B</td>
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<tr>
<td>19</td>
<td>AP212/19 D</td>
<td>287S-B</td>
<td>AP212/19 S</td>
<td>287S-B</td>
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</tbody>
</table>
# Gear pump material

- **Front cover**: aluminium
- **Body**: aluminium
- **Back cover**: cast iron
- **Seals**: NBR + HNBR

**Shaft max torque**: see section 3.3

**Tightening torque**: see section 3.5 - 3.6

## Type

<table>
<thead>
<tr>
<th>Type</th>
<th>Displacement cm³/rev</th>
<th>Dimensions</th>
<th>Suction</th>
<th>Pressure</th>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AP212LN</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.5</td>
<td>4.4</td>
<td>4.5</td>
<td>88.5</td>
<td>42.5</td>
</tr>
<tr>
<td>6.5</td>
<td>6.4</td>
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<td>91.5</td>
<td>45.5</td>
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<td>8.5</td>
<td>8.4</td>
<td>8.7</td>
<td>94.5</td>
<td>47.5</td>
</tr>
<tr>
<td>11</td>
<td>11.1</td>
<td>11.5</td>
<td>98.5</td>
<td>47.5</td>
</tr>
<tr>
<td>15</td>
<td>15.1</td>
<td>15.7</td>
<td>104.5</td>
<td>50.5</td>
</tr>
<tr>
<td>19</td>
<td>19.2</td>
<td>19.8</td>
<td>110.5</td>
<td>53.5</td>
</tr>
<tr>
<td>22</td>
<td>22.2</td>
<td>23</td>
<td>115</td>
<td>55.5</td>
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<tr>
<td>26</td>
<td>26.2</td>
<td>27.1</td>
<td>121</td>
<td>58.5</td>
</tr>
</tbody>
</table>

### Clockwise rotation: D

- **AP212/4.5 D 280-B**
- **AP212/6.5 D 280-B**
- **AP212/8.5 D 280-B**
- **AP212/11 D 280-B**
- **AP212/15 D 280-B**
- **AP212/19 D 280-B**
- **AP212/22 D 280-B**
- **AP212/26 D 280-B**

### Counter-clockwise rotation: S

- **AP212/4.5 S 280-B**
- **AP212/6.5 S 280-B**
- **AP212/8.5 S 280-B**
- **AP212/11 S 280-B**
- **AP212/15 S 280-B**
- **AP212/19 S 280-B**
- **AP212/22 S 280-B**
- **AP212/26 S 280-B**

### Reversible pump External Drain

- **AP212/4.5 ED 280-B**
- **AP212/6.5 ED 280-B**
- **AP212/8.5 ED 280-B**
- **AP212/11 ED 280-B**
- **AP212/15 ED 280-B**
- **AP212/19 ED 280-B**
- **AP212/22 ED 280-B**
- **AP212/26 ED 280-B**

**APR212/4.5LN D 280-B**

**APR212/6.5LN D 280-B**

**APR212/8.5LN D 280-B**

**APR212/11LN D 280-B**

**APR212/15LN D 280-B**

**APR212/19LN D 280-B**

**APR212/22LN D 280-B**

**APR212/26LN D 280-B**

**APR212/26LN ED 280-B**

**APR212/4.5LN S 280-B**

**APR212/6.5LN S 280-B**

**APR212/8.5LN S 280-B**

**APR212/11LN S 280-B**

**APR212/15LN S 280-B**

**APR212/19LN S 280-B**

**APR212/22LN S 280-B**

**APR212/26LN S 280-B**

**APR212/26LN ED 280-B**
Gear pump material

Front cover: cast iron
Body: aluminium
Back cover: cast iron
Seals: NBR + HNBR

Shaft max torque: see section 3.3
Tightening torque: see section 3.5 - 3.6

Attention! It is not possible to change the rotation direction. Please order always with the right code.

### Table: Types and Specifications

<table>
<thead>
<tr>
<th>Type</th>
<th>Displacement cm³/rev</th>
<th>Dimensions</th>
<th>Suction</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A (mm)</td>
<td>B (mm)</td>
<td>d (mm)</td>
</tr>
<tr>
<td>19</td>
<td>AP212 19.2</td>
<td>110.5</td>
<td>4.35</td>
<td>53.5</td>
</tr>
<tr>
<td>22</td>
<td>AP212LN 19.8</td>
<td>115</td>
<td>4.53</td>
<td>55.5</td>
</tr>
<tr>
<td>26</td>
<td>AP212 22.2</td>
<td>121</td>
<td>4.76</td>
<td>58.5</td>
</tr>
<tr>
<td></td>
<td>AP212LN 23</td>
<td>124</td>
<td>5.24</td>
<td>59.5</td>
</tr>
</tbody>
</table>

Clockwise rotation: D
Counter-clockwise rotation: S

For availability of other displacements bodies please contact our Sales Center.
In this section, a single AP212 pump can be configured and customized.

AP212 wide availability of covers, bodies, gears and seals sets provides great flexibility to AP212 pump range and allows several different pump configurations.

In order to simplify the selection of the desired pump combination, a 'configurator form' is available and, by filling it out, it will guide you in the pump creation process.
3.1 Single pump customised versions order example

| Function          | AP = single gear pump - unidirectional
|                   | APR = single gear pump - reversible

| Series           | 212

| Displacement     | 4.5 = 4.4 cm³/rev
|                  | 6.5 = 6.4 cm³/rev
|                  | 8.5 = 8.4 cm³/rev
|                  | 11 = 11.1 cm³/rev
|                  | 15 = 15.1 cm³/rev
|                  | 19 = 19.2 cm³/rev
|                  | 22 = 22.2 cm³/rev
|                  | 26 = 26.2 cm³/rev

| Version          | Omitted if 12 teeth standard
|                  | LN = 12 teeth Low Noise version

| Rotation         | S = left-hand rotation
|                  | D = Right-hand rotation
|                  | Omitted if reversible version

| Shaft end code   | see section 3.3

| Shaft seal material type code | see section 3.4.1

| Front cover series/material with/without bearing code | see section 3.4.2 and 3.4.3

| Type of ports code | see section 3.5

| Inlet/outlet port size code combination | see section 3.5

| Body material + seal material code | see section 3.5.1

| Back cover type | see section 3.6

| BHRE section : Version - Progressive number (omitted) |
### 3.2 Single pump dimensions

<table>
<thead>
<tr>
<th>Pump size</th>
<th>A</th>
<th>C*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>inches</td>
</tr>
<tr>
<td>AP212/4.5</td>
<td>24.3</td>
<td>0.96</td>
</tr>
<tr>
<td>AP212/6.5</td>
<td>25.8</td>
<td>1.02</td>
</tr>
<tr>
<td>AP212/8.5</td>
<td>27.3</td>
<td>1.08</td>
</tr>
<tr>
<td>AP212/11</td>
<td>29.3</td>
<td>1.54</td>
</tr>
<tr>
<td>AP212/15</td>
<td>32.3</td>
<td>1.27</td>
</tr>
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<td>AP212/19</td>
<td>35.3</td>
<td>1.39</td>
</tr>
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<td>AP212/22</td>
<td>37.6</td>
<td>1.48</td>
</tr>
<tr>
<td>AP212/26</td>
<td>40.6</td>
<td>1.60</td>
</tr>
</tbody>
</table>

C*: dimensions with standard cast iron back cover with tie rod + nut. For other back covers dimension see section 3.6.

#### 3.2.1 Front cover dimensions

<table>
<thead>
<tr>
<th>Front cover type</th>
<th>x</th>
<th>Front cover type</th>
<th>x</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>inches</td>
<td>mm</td>
</tr>
<tr>
<td>German rectangular</td>
<td>20</td>
<td>0.79</td>
<td>European rectangular</td>
</tr>
<tr>
<td>Bearing support German version</td>
<td>48.5</td>
<td>1.91</td>
<td>Through 2 bolts</td>
</tr>
<tr>
<td>SAE-A 2 bolts</td>
<td>18</td>
<td>0.71</td>
<td>SAE-B 2 bolts</td>
</tr>
</tbody>
</table>
### 3.3 Shaft end code

<table>
<thead>
<tr>
<th>Shaft end shape</th>
<th>Shaft end ordering code</th>
<th>Max torque</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Tang drive" /> 8 mm - 0.32 inches</td>
<td>M</td>
<td>T max = 65 Nm</td>
</tr>
<tr>
<td><img src="image" alt="Straight keyed" /> Ø 15.85 mm - 0.62 inches</td>
<td>S</td>
<td>T max = 65 Nm</td>
</tr>
<tr>
<td><img src="image" alt="Tapered shaft 1:5" /></td>
<td>G</td>
<td>T max = 135 Nm</td>
</tr>
<tr>
<td><img src="image" alt="Tapered shaft 1:8" /></td>
<td>E</td>
<td>T max = 135 Nm</td>
</tr>
<tr>
<td><img src="image" alt="9 Teeth external spline" /> B17X14 DIN5482</td>
<td>D</td>
<td>T max = 110 Nm</td>
</tr>
<tr>
<td><img src="image" alt="9 teeth external spline" /> SAE J 498-9T 16/32 DP</td>
<td>A</td>
<td>T max = 90 Nm</td>
</tr>
<tr>
<td><img src="image" alt="11 teeth external spline" /> SAE J 498-11T 16/32 DP</td>
<td>T</td>
<td>T max = 140 Nm</td>
</tr>
<tr>
<td><img src="image" alt="13 teeth external spline" /> SAE J 498-13T 16/32 DP</td>
<td>B</td>
<td>T max = 270 Nm</td>
</tr>
<tr>
<td><img src="image" alt="Bearing application 1:5" /></td>
<td>See section 3.4.3</td>
<td>T max = 100 Nm</td>
</tr>
<tr>
<td><img src="image" alt="Bearing application Straight" /> 22 mm - 0.87 inches</td>
<td>See section 3.4.3</td>
<td>T max = 100 Nm</td>
</tr>
</tbody>
</table>
3.4 Front cover

3.4.1 Shaft seal material

<table>
<thead>
<tr>
<th>Shaft seal Type/material</th>
<th>Ordering code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shaft seal pump NBR (standard)</td>
<td>0</td>
</tr>
<tr>
<td>Shaft seal pump HNBR</td>
<td>1</td>
</tr>
<tr>
<td>FPM (VITON)</td>
<td>2</td>
</tr>
<tr>
<td>Shaft seal front bearing application</td>
<td>see section 3.4.3</td>
</tr>
</tbody>
</table>
### 3.4.2 Front cover type

<table>
<thead>
<tr>
<th>Type</th>
<th>Aluminium</th>
<th>Cast iron</th>
<th>Cast iron + bearing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Shape</td>
<td>Ordering code</td>
<td>Shape</td>
</tr>
<tr>
<td>German rectangular (Ø 80 mm - 3.15 inches)</td>
<td>A</td>
<td></td>
<td>B</td>
</tr>
<tr>
<td>European rectangular (Ø 36.5 mm - 1.44&quot;)</td>
<td>D</td>
<td></td>
<td>E</td>
</tr>
<tr>
<td>Through 2 bolts (Ø 50 mm - 1.97&quot;)</td>
<td>G</td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>Through 2 bolts (Ø 50 mm - 1.97&quot;)</td>
<td>L</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>Through 2 bolts (Ø 52 mm - 2.045&quot;)</td>
<td>O</td>
<td></td>
<td>P</td>
</tr>
<tr>
<td>SAE-A 2 bolts (Ø 82.55 mm - 3.25 inches)</td>
<td>R</td>
<td></td>
<td>S</td>
</tr>
<tr>
<td>SAE-B 2 bolts (Ø 101.6 mm - 4 inches)</td>
<td>V</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Aluminium and cast iron front cover dimensions: see standard pumps data sheet

* Please contact our Sales Department
3.4.3 Front bearing application

Front bearing should be utilized in presence of radial and/or axial load. If there are radial and/or axial loads on the drive shaft, such as when it is driven by a V-belt and pulley or pair of gear wheels, it should be fitted with a front cover with supporting bearings. (See example 1 and 2)

Depending on the pump model concerned, these supports can replace the front cover of the pump or can be fitted in addition to and over the front cover.

Shaft seal material: HNBR

Front bearing should be utilized in presence of radial and/or axial load. If there are radial and/or axial loads on the drive shaft, such as when it is driven by a V-belt and pulley or pair of gear wheels, it should be fitted with a front cover with supporting bearings. (See example 1 and 2)
### 3.5 Body

For reversible pumps alternative inlet and outlet ports have the same sizes as per inlet unidirectional rotation.

<table>
<thead>
<tr>
<th>Port type</th>
<th>Ordering code</th>
<th>Displacement</th>
<th>Dimension (mm - inch)</th>
<th>Ordering code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Suction</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pressure</td>
<td></td>
</tr>
<tr>
<td>without</td>
<td>0</td>
<td>All</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19**-22**-26**</td>
<td></td>
<td>D</td>
</tr>
</tbody>
</table>

#### Port type

**Port type** | **Ordering code** | **Displacement** | **Dimension (mm - inch)** | **Ordering code** |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>metric</td>
<td>1</td>
<td>4.5-6.5-8.5</td>
<td>Suction: 3/8”</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11-15</td>
<td>Pressure: 3/8”</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19-22-26</td>
<td></td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19**-22**-26**</td>
<td></td>
<td>C</td>
</tr>
<tr>
<td>BSPP threaded ports</td>
<td>4</td>
<td>4.5-6.5-8.5</td>
<td>Suction: 3/4”</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11-15</td>
<td>Pressure: 1/2”</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19-22-26</td>
<td></td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19**-22**-26**</td>
<td></td>
<td>D</td>
</tr>
</tbody>
</table>

At pressure P2 > 210 bar limited service life.
<table>
<thead>
<tr>
<th>Port type</th>
<th>Ordering code</th>
<th>Displacement</th>
<th>Dimension (mm - inch)</th>
<th>Ordering code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAE threaded ports</td>
<td>8</td>
<td>all</td>
<td>1-1/16&quot; 12UNF (SAE12)</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.5-6.5-8.5</td>
<td>7/8&quot; 14UNF (SAE10)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>19**-22**-26</td>
<td>7/8&quot; 14UNF (SAE10)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NPTF threaded ports</td>
<td>6</td>
<td>4.5-6.5-8.5</td>
<td>1/2&quot;</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11-15-19-22-26</td>
<td>3/4&quot;</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19**-22**-26</td>
<td>3/4&quot;</td>
<td>D</td>
</tr>
<tr>
<td>European 4 bolt</td>
<td>3</td>
<td>4.5-6.5-8.5</td>
<td>13.5 - .53 (d)</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>30 - 1.18 (D)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>M6 (F)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>11-15</td>
<td>19 - .75 (d)</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>40 - 1.58 (D)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>M8 (F)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>19-22-26</td>
<td>19 - .75 (d)</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>40 - 1.58 (D)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>M8 (F)</td>
<td></td>
</tr>
</tbody>
</table>

At pressure P2 > 210 bar limited service life

---

**SAE thread**: 8 threaded ports

- **Pressure**: 55+5 Nm
- **Port**: 1/2" NPTF
- **Dimension**: 1.26"
- **Metric**: 8+4 Nm

**NPTF thread**: 6 threaded ports

- **Pressure**: 60+5 Nm
- **Port**: 1/2" NPTF
- **Dimension**: .10"

**European**: 3 bolt

- **Pressure**: 8+4 Nm
- **Port**: M6x1-6H
- **Dimension**: 20+5 Nm

---

**Note**: All dimensions are in millimeters (mm) and inches (inch) as indicated.
<table>
<thead>
<tr>
<th>Type</th>
<th>Ordering code</th>
<th>Displacement</th>
<th>Dimension (mm - inch)</th>
<th>Ordering code</th>
</tr>
</thead>
<tbody>
<tr>
<td>German 4 bolt flanged</td>
<td>2</td>
<td>4.5-6.5-8.5</td>
<td>Suction: 15 - .59 (d) 11-15-19-22-26</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pressure: 40 - 1.58 (D)</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Suction: 20 - .79 (d) 19-22-26 (287-S SAEB)</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pressure: 40 - 1.58 (D) 19**-22**-26**</td>
<td>D</td>
</tr>
<tr>
<td>Other ports</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body and seal materials</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body material</td>
<td>Seal material</td>
<td>Ordering code</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aluminium alloy</td>
<td>NBR (standard)</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aluminium alloy</td>
<td>HNBR</td>
<td>H</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.6 Back covers

3.6.1 Cast iron back cover - Standard version for unidirectional pump

<table>
<thead>
<tr>
<th>Type</th>
<th>Ordering code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back cover, standard version, cast iron material</td>
<td>GH</td>
</tr>
</tbody>
</table>

3.6.2 Cast iron back cover with drain port - Standard version for bidirectional pump

<table>
<thead>
<tr>
<th>Type</th>
<th>Thread</th>
<th>Tightening torque</th>
<th>Ordering code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back cover with external drain line, cast iron material for reversible pump</td>
<td>1/4&quot; BSP</td>
<td>30 ±7 Nm</td>
<td>G1 (Standard)</td>
</tr>
<tr>
<td></td>
<td>SAE4</td>
<td>20 ±5 Nm</td>
<td>G2</td>
</tr>
<tr>
<td></td>
<td>M12x1.5</td>
<td>30 ±7 Nm</td>
<td>G3</td>
</tr>
</tbody>
</table>
3.6.3 Cast iron back cover with relief valve VI

<table>
<thead>
<tr>
<th>Type</th>
<th>Ordering code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cast iron back cover with relief valve. Return to internal pump suction</td>
<td>VI**</td>
</tr>
</tbody>
</table>

** pressure set value (bar) - in example: VI15 = 150 bar

Attention: Please take care that when the relief valve open, oil temperature increase quickly. These conditions have effect in the pump performances and life

3.6.4 Cast iron back cover with relief valve VE

<table>
<thead>
<tr>
<th>Type</th>
<th>Ordering code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cast iron back cover with relief valve. Return to external pump tank</td>
<td>VE**</td>
</tr>
</tbody>
</table>

** pressure set value (bar) - in example: VE06 = 60 bar
3.6.5 Pressure relief valve: **VM01C**

**VI** and **VE** pressure setting range

Direct acting
Balanced piston
Adjustable setting
Four setting ranges

Max. Pressure   350 bar***
Max flow rate   60 l/min.
Temperature range   -20/+100 °C
Weight: 0.155 Kg.

The valve can be sealed against tampering

Option: plastic tamper proof cap code 200678400561

---

The purpose of a relief valve is to keep the maximum system pressure at a safe level. When the external gear pump is supplied with pressure relief valves, the correct calibration is provided by Bucher Hydraulics S.p.A. and there are no reasons to change this value.

When ordering, state in full the sheath part number, and, if the valve is to be supplied with sheath already fitted, the relief pressure setting required.

---

Pressure viscosity characteristic 46 cSt at 40°C

Max internal leakage 200 cm/min at 80% of nominal pressure setting

Oil viscosity 12 to 400 cSt

Oil temperature -20 to 100 °C

Recomended filtration 21/19/16 (10 NAS 1638)

Marking info: Printed code and date

---

<table>
<thead>
<tr>
<th>Spring</th>
<th>Spring code</th>
<th>Setting range</th>
<th>Standard setting</th>
<th>Q max (l/min)</th>
<th>Type</th>
<th>Relief valve only code</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>-</td>
<td>Plugged</td>
<td>Without valve</td>
<td>-</td>
<td>00VC00</td>
<td>200978400140</td>
</tr>
<tr>
<td>02</td>
<td>200662403160</td>
<td>5 - 30 bar</td>
<td>20 bar</td>
<td>30 (*)</td>
<td>02VM01C</td>
<td>200787403600</td>
</tr>
<tr>
<td>05</td>
<td>200662403080</td>
<td>30 - 95 bar</td>
<td>50 bar</td>
<td>60</td>
<td>05VM01C</td>
<td>200787403480</td>
</tr>
<tr>
<td>12</td>
<td>200662403050</td>
<td>96 - 220 bar</td>
<td>120 bar</td>
<td>60</td>
<td>12VM01C</td>
<td>200787403420</td>
</tr>
<tr>
<td>15</td>
<td>200662403070</td>
<td>150 - 250 bar</td>
<td>150 bar</td>
<td>60</td>
<td>15VM01C</td>
<td>200787403470</td>
</tr>
<tr>
<td>23</td>
<td>200662403060</td>
<td>221 - 350 bar</td>
<td>230 bar</td>
<td>60</td>
<td>23VM01C</td>
<td>200787403430</td>
</tr>
</tbody>
</table>

Pressure setting valve referred to 5 l/min
3.6.6  Aluminium back cover with priority valve VP

** flow set value (l/min) - in example: VP02= 2.5 l/min

<table>
<thead>
<tr>
<th>Type (Pmax= 210 bar)</th>
<th>Ordering code</th>
<th>Standard setting value +15% / -10% (l/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminium back cover with priority valve</td>
<td>VP**</td>
<td>2.5 3.5 5 6 8.5 10.5 13 16 20 24</td>
</tr>
</tbody>
</table>

3.6.7  Aluminium back cover with flow regulator valve QI

** flow set value (l/min) - in example: QI02= 2 l/min

<table>
<thead>
<tr>
<th>Type (Pmax= 210 bar)</th>
<th>Ordering code</th>
<th>Standard setting value -10% (l/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminium back cover with flow regulator valve, internal drain</td>
<td>QI**</td>
<td>2 3.5 5 6 7.5 9 12 16 19 23</td>
</tr>
</tbody>
</table>

3.6.8  Aluminium back cover with flow regulator valve QE

** flow set value (l/min) - in example: QE06= 6 l/min

<table>
<thead>
<tr>
<th>Type (Pmax= 210 bar)</th>
<th>Ordering code</th>
<th>Standard setting value +15% (l/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminium back cover with flow regulator valve, external drain</td>
<td>QE**</td>
<td>2 3.5 5 6 7.5 9 12 16 19 23</td>
</tr>
</tbody>
</table>
4 Multiple gear pumps

The multiple external gear pumps standard version includes an intermediate cover without shaft seal between the pumps.

If needed, it is possible to order a customised version with intermediate seal, see section 4.3.

4.1 Drive torque

\[
T_{\text{max}} = T_1 + T_2 <\text{see section 3.3}>
\]

Drive gear 1st pump

\[
T_1 = 1.59 \cdot \frac{p_1 \cdot V_{c1}}{\eta_{m1}}
\]

Drive gear 1st pump

\[
T_2 = 1.59 \cdot \frac{p_2 \cdot V_{c2}}{\eta_{m2}}
\]

Intermediate coupling

\[
T_{\text{max}} = 100 \text{ Nm}
\]

Drive gear 2nd pump

Example: AP212/19 + AP212/15

\[
T_{\text{max}} = 1.59 \cdot \frac{19.2 \cdot 200}{90} + 1.59 \cdot \frac{15.1 \cdot 100}{90} = 68 + 26.7 = 94.7 \text{ Nm}
\]

\[
T_{\text{max}} = 94.7 \leq 130 \text{ Nm} \quad (\text{taper 1:8})
\]

\[
T_2 = 26.7 \leq T_{\text{max}} 100 \text{ Nm}
\]
4.2 Tandem pumps dimensions (standard version without shaft seal between the pumps)

<table>
<thead>
<tr>
<th>Pump size</th>
<th>A</th>
<th>B</th>
<th>C*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>inches</td>
<td>mm</td>
</tr>
<tr>
<td>AP212/4.5</td>
<td>24.3</td>
<td>0.96</td>
<td>30.1</td>
</tr>
<tr>
<td>AP212/6.5</td>
<td>25.8</td>
<td>1.02</td>
<td>31.6</td>
</tr>
<tr>
<td>AP212/8.5</td>
<td>27.3</td>
<td>1.08</td>
<td>33.1</td>
</tr>
<tr>
<td>AP212/11</td>
<td>29.3</td>
<td>1.14</td>
<td>35.1</td>
</tr>
<tr>
<td>AP212/15</td>
<td>32.3</td>
<td>1.27</td>
<td>38.1</td>
</tr>
<tr>
<td>AP212/19</td>
<td>35.3</td>
<td>1.39</td>
<td>41.1</td>
</tr>
<tr>
<td>AP212/22</td>
<td>37.6</td>
<td>1.48</td>
<td>43.4</td>
</tr>
<tr>
<td>AP212/26</td>
<td>40.6</td>
<td>1.60</td>
<td>46.4</td>
</tr>
</tbody>
</table>

C*: dimensions with standard cast iron back cover with tie rod + nut. For other back covers dimension see section 3.6.

4.2.1 Standard versions, dimensions example

Example
Total length: 189 mm = 20 + 35.3 + 41.1 + 32.3 + 32.3 + 28 (X + A + B + A + A + C)
Port position: 128.7 mm = 20 + 35.3 + 41.1 + 32.3 (X + A + B + A)
55.3 mm = 20 + 35.3 (X + A)
4.3 Tandem pumps dimensions (special version with shaft seal between the pumps)

<table>
<thead>
<tr>
<th>Pump size</th>
<th>A</th>
<th>B</th>
<th>C*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>inches</td>
<td>mm</td>
</tr>
<tr>
<td>AP212/4.5</td>
<td>24.3</td>
<td>0.96</td>
<td>46.6</td>
</tr>
<tr>
<td>AP212/6.5</td>
<td>25.8</td>
<td>1.02</td>
<td>48.1</td>
</tr>
<tr>
<td>AP212/8.5</td>
<td>27.3</td>
<td>1.08</td>
<td>49.6</td>
</tr>
<tr>
<td>AP212/11</td>
<td>29.3</td>
<td>1.54</td>
<td>51.6</td>
</tr>
<tr>
<td>AP212/15</td>
<td>32.3</td>
<td>1.27</td>
<td>54.6</td>
</tr>
<tr>
<td>AP212/19</td>
<td>35.3</td>
<td>1.39</td>
<td>57.6</td>
</tr>
<tr>
<td>AP212/22</td>
<td>37.6</td>
<td>1.48</td>
<td>59.9</td>
</tr>
<tr>
<td>AP212/26</td>
<td>40.6</td>
<td>1.60</td>
<td>62.9</td>
</tr>
</tbody>
</table>

C*: dimensions with standard cast iron back cover with tie rod + nut.
For other back covers dimension see section 3.6.

4.3.1 Special version, dimensions example

Example
Total length: 187.5 mm = 18 + 32.3 + 54.6 + 27.3 + 27.3 + 28 (X + A + B + A + A + C)
Port position: 132.2 mm = 18 + 32.3 + 54.6 + 27.3 (X + A + B + A)
50.3 mm = 18 + 32.3 (X + A)
4.4 Triple pumps dimensions (standard version without shaft seal between the pumps)

<table>
<thead>
<tr>
<th>Pump size</th>
<th>A</th>
<th>B</th>
<th>C*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>inches</td>
<td>mm</td>
</tr>
<tr>
<td>AP212/4.5</td>
<td>24.3</td>
<td>0.96</td>
<td>30.1</td>
</tr>
<tr>
<td>AP212/6.5</td>
<td>25.8</td>
<td>1.02</td>
<td>31.6</td>
</tr>
<tr>
<td>AP212/8.5</td>
<td>27.3</td>
<td>1.08</td>
<td>33.1</td>
</tr>
<tr>
<td>AP212/11</td>
<td>29.3</td>
<td>1.54</td>
<td>35.1</td>
</tr>
<tr>
<td>AP212/15</td>
<td>32.3</td>
<td>1.27</td>
<td>38.1</td>
</tr>
<tr>
<td>AP212/19</td>
<td>35.3</td>
<td>1.39</td>
<td>41.1</td>
</tr>
<tr>
<td>AP212/22</td>
<td>37.6</td>
<td>1.48</td>
<td>43.4</td>
</tr>
<tr>
<td>AP212/26</td>
<td>40.6</td>
<td>1.60</td>
<td>46.4</td>
</tr>
</tbody>
</table>

C*: dimensions with standard cast iron back cover with tie rod + nut.
For other back covers dimension see section 3.6.

4.4.1 Standard versions, dimensions example

Example:
Total length: \(243.4 \text{ mm} = 20 + 35.3 + 41.1 + 32.3 + 38.1 + 24.3 + 24.3 + 28 \) (\(X + A + B + A + B + A + A + C\))
Port position: \(191.1 \text{ mm} = 20 + 35.3 + 41.1 + 32.3 + 38.1 + 24.3 \) (\(X + A + B + A + B + A\))
\(128.7 \text{ mm} = 20 + 35.3 + 41.1 + 32.3 \) (\(X + A + B + A\))
\(55.3 \text{ mm} = 20 + 35.3 \) (\(X + A\))
4.5 Triple pumps dimensions (special version with shaft seal between the pumps)

<table>
<thead>
<tr>
<th>Pump size</th>
<th>A</th>
<th>B</th>
<th>C*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>inches</td>
<td>mm</td>
</tr>
<tr>
<td>AP212/4.5</td>
<td>24.3</td>
<td>0.96</td>
<td>46.6</td>
</tr>
<tr>
<td>AP212/6.5</td>
<td>25.8</td>
<td>1.02</td>
<td>48.1</td>
</tr>
<tr>
<td>AP212/8.5</td>
<td>27.3</td>
<td>1.08</td>
<td>49.6</td>
</tr>
<tr>
<td>AP212/11</td>
<td>29.3</td>
<td>1.54</td>
<td>51.6</td>
</tr>
<tr>
<td>AP212/15</td>
<td>32.3</td>
<td>1.27</td>
<td>54.6</td>
</tr>
<tr>
<td>AP212/19</td>
<td>35.3</td>
<td>1.39</td>
<td>57.6</td>
</tr>
<tr>
<td>AP212/22</td>
<td>37.6</td>
<td>1.48</td>
<td>59.9</td>
</tr>
<tr>
<td>AP212/26</td>
<td>40.6</td>
<td>1.60</td>
<td>62.9</td>
</tr>
</tbody>
</table>

C*: dimensions with standard cast iron back cover with tie rod + nut.
For other back covers dimension see section 3.6.

4.5.1 Special version, dimensions example

Example
Total length: 258.4 mm = 18 + 32.3 + 54.6 + 27.3 + 49.6 + 24.3 + 24.3 + 28 (X + A + B + A + B + A + A + C)
Port position: 206.1 mm = 18 + 32.3 + 54.6 + 27.3 + 49.6 + 24.3 (X + A + B + A + B + A)
### 4.6 How to order tandem pumps (with or without shaft seal between the pumps)

<table>
<thead>
<tr>
<th>1st PUMP</th>
<th>2nd PUMP</th>
<th>1st BODY</th>
<th>2nd BODY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
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<td>8</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
</tr>
</tbody>
</table>

**Function**
- AP = single gear pump - unidirectional
- APR = single gear pump - reversible

**Series**
- 212

**Displacement**
- 4.5 = 4.4 cm³/rev
- 6.5 = 6.4 cm³/rev
- 8.5 = 8.4 cm³/rev
- 11 = 11.1 cm³/rev
- 15 = 15.1 cm³/rev
- 19 = 19.2 cm³/rev
- 22 = 22.2 cm³/rev
- 26 = 26.2 cm³/rev

**Version**
- Omitted if 12 teeth standard
- LN = 12 teeth Low Noise version

**Rotation**
- S = left-hand rotation
- D = Right-hand rotation
- Omitted if reversible version

**Shaft end code**
- see section 3.3

**Shaft seal material type code**
- see section 3.4.1

**Front cover series/material with/without bearing code**
- see section 3.4.2 and 3.4.3

**Type of ports code**
- see section 3.5

**Inlet/outlet port size code combination**
- see section 3.5

**Body material + seal material code**
- see section 3.5.1

**Back cover type / Valve setting value**
- see section 3.6

**For Tandem or multiple pumps with or without shaft seal between the pumps**
- Omitted if without shaft seal between the pumps (standard versions)
- P = with shaft seal between the pumps (special versions)

### 4.7 How to order triple pumps (with or without shaft seal between the pumps)

<table>
<thead>
<tr>
<th>1st PUMP</th>
<th>2nd PUMP</th>
<th>3rd PUMP</th>
<th>1st BODY</th>
<th>2nd BODY</th>
<th>3rd BODY</th>
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</thead>
<tbody>
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<td>4</td>
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<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>

**Function**
- AP = single gear pump - unidirectional
- APR = single gear pump - reversible

**Series**
- 212

**Displacement**
- 4.5 = 4.4 cm³/rev
- 6.5 = 6.4 cm³/rev
- 8.5 = 8.4 cm³/rev
- 11 = 11.1 cm³/rev
- 15 = 15.1 cm³/rev
- 19 = 19.2 cm³/rev
- 22 = 22.2 cm³/rev
- 26 = 26.2 cm³/rev

**Version**
- Omitted if 12 teeth standard
- LN = 12 teeth Low Noise version

**Rotation**
- S = left-hand rotation
- D = Right-hand rotation
- Omitted if reversible version

**Shaft end code**
- see section 3.3

**Shaft seal material type code**
- see section 3.4.1

**Front cover series/material with/without bearing code**
- see section 3.4.2 and 3.4.3

**Type of ports code**
- see section 3.5

**Inlet/outlet port size code combination**
- see section 3.5

**Body material + seal material code**
- see section 3.5.1

**Back cover type / Valve setting value**
- see section 3.6

**For Tandem or multiple pumps with or without shaft seal between the pumps**
- Omitted if without shaft seal between the pumps (standard versions)
- P = with shaft seal between the pumps (special versions)
4.8 Tandem pumps dimensions AP212 + AP100 (with shaft seal between the pumps)

\[ T_{\text{max}} = 30 \text{ Nm} \]

**Intermediate coupling**

<table>
<thead>
<tr>
<th>AP212 Pump size</th>
<th>A (mm)</th>
<th>A (inches)</th>
<th>B (mm)</th>
<th>B (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP212/4.5</td>
<td>24.3</td>
<td>0.96</td>
<td>50.6</td>
<td>1.99</td>
</tr>
<tr>
<td>AP212/6.5</td>
<td>25.8</td>
<td>1.02</td>
<td>52.1</td>
<td>2.05</td>
</tr>
<tr>
<td>AP212/8.5</td>
<td>27.3</td>
<td>1.08</td>
<td>53.6</td>
<td>2.11</td>
</tr>
<tr>
<td>AP212/11</td>
<td>29.3</td>
<td>1.15</td>
<td>55.6</td>
<td>2.19</td>
</tr>
<tr>
<td>AP212/15</td>
<td>32.3</td>
<td>1.27</td>
<td>58.6</td>
<td>2.31</td>
</tr>
<tr>
<td>AP212/19</td>
<td>35.3</td>
<td>1.39</td>
<td>61.6</td>
<td>2.43</td>
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<tr>
<td>AP212/22</td>
<td>37.6</td>
<td>1.48</td>
<td>63.9</td>
<td>2.52</td>
</tr>
<tr>
<td>AP212/26</td>
<td>40.6</td>
<td>1.60</td>
<td>66.9</td>
<td>2.63</td>
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</tbody>
</table>

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<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
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<tbody>
<tr>
<td>AP100/1.2</td>
<td>1.2</td>
<td>.073</td>
<td></td>
<td>21.6</td>
<td>.85</td>
<td>210</td>
<td>3000</td>
<td>250</td>
<td>3600</td>
<td>280</td>
<td>4000</td>
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<tr>
<td>AP100/1.7</td>
<td>1.7</td>
<td>.103</td>
<td></td>
<td>22.6</td>
<td>.89</td>
<td>210</td>
<td>3000</td>
<td>250</td>
<td>3600</td>
<td>280</td>
<td>4000</td>
</tr>
<tr>
<td>AP100/2.5</td>
<td>2.5</td>
<td>.152</td>
<td></td>
<td>24.2</td>
<td>.95</td>
<td>210</td>
<td>3000</td>
<td>250</td>
<td>3600</td>
<td>280</td>
<td>4000</td>
</tr>
<tr>
<td>AP100/3.5</td>
<td>3.5</td>
<td>.213</td>
<td></td>
<td>26.4</td>
<td>1.04</td>
<td>210</td>
<td>3000</td>
<td>230</td>
<td>3300</td>
<td>250</td>
<td>3600</td>
</tr>
<tr>
<td>AP100/4.3</td>
<td>4.3</td>
<td>.262</td>
<td></td>
<td>28.2</td>
<td>1.11</td>
<td>210</td>
<td>3000</td>
<td>230</td>
<td>3300</td>
<td>250</td>
<td>3600</td>
</tr>
<tr>
<td>AP100/5</td>
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<td>29.6</td>
<td>1.17</td>
<td>210</td>
<td>3000</td>
<td>230</td>
<td>3300</td>
<td>250</td>
<td>3600</td>
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<td>32.1</td>
<td>1.26</td>
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<td>220</td>
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<td>240</td>
<td>3400</td>
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<tr>
<td>AP100/8</td>
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<td>34.9</td>
<td>1.37</td>
<td>180</td>
<td>2600</td>
<td>210</td>
<td>3000</td>
<td>230</td>
<td>3300</td>
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<td>AP100/10</td>
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<td>150</td>
<td>2150</td>
<td>180</td>
<td>2600</td>
<td>200</td>
<td>2900</td>
</tr>
</tbody>
</table>

**IMPORTANT!**: Common suction not available

Attention: (* ) The max pressure is function of max admitted intermediate torque
### 4.8.1 AP100 port types available

<table>
<thead>
<tr>
<th>Port type</th>
<th>Ordering code</th>
<th>Ø Diameter</th>
<th>Dimension (mm - inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>German 4 bolt flanged</td>
<td>2</td>
<td>d</td>
<td>12 -.47”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D</td>
<td>30 - 1.18”</td>
</tr>
<tr>
<td>BSPP Threaded ports</td>
<td>4</td>
<td>3/8” (Depth 13-.50”)</td>
<td>3/8” (Depth 13-.50”)</td>
</tr>
<tr>
<td>SAE Threaded ports</td>
<td>8</td>
<td>3 /4” - 16 UNF-2B (SAE8)</td>
<td>9/16” - 18 UNF-2B (SAE6)</td>
</tr>
</tbody>
</table>

### 4.9 How to order tandem pumps AP212 + AP100 (with shaft seal between the pumps)

<table>
<thead>
<tr>
<th>1st PUMP</th>
<th>2nd PUMP</th>
<th>1st BODY</th>
<th>2nd BODY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Function</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AP= single gear pump - unidirectional</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>APR = single gear pump - reversible</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Series</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>212 and 100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Displacement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AP212</td>
<td>AP100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.5= 4.4 cm³/rev</td>
<td>1.2= 1.2 cm³/rev</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.5= 6.4 cm³/rev</td>
<td>1.7= 1.7 cm³/rev</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.5= 8.4 cm³/rev</td>
<td>2.5= 2.5 cm³/rev</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11= 11.1 cm³/rev</td>
<td>3.5= 3.5 cm³/rev</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15= 15.1 cm³/rev</td>
<td>4.3= 4.3 cm³/rev</td>
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</tr>
<tr>
<td>19= 19.2 cm³/rev</td>
<td>5.0= 5.0 cm³/rev</td>
<td></td>
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</tr>
<tr>
<td>22= 22.2 cm³/rev</td>
<td>6.5= 6.5 cm³/rev</td>
<td></td>
<td></td>
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<tr>
<td>26= 26.2 cm³/rev</td>
<td>8= 7.8 cm³/rev</td>
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<td>10= 10.0 cm³/rev</td>
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<tr>
<td>4 AP212 version</td>
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<tr>
<td>Omitted if 12 teeth standard</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LN= 12 teeth Low Noise version</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Rotation</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>S = left-hand rotation</td>
<td></td>
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<tr>
<td>D = Right-hand rotation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Omitted if reversible version</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>6 AP212 shaft end code</td>
<td></td>
<td></td>
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<tr>
<td>see section 3.3</td>
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<td></td>
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<tr>
<td>7 AP212 shaft seal material type code</td>
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<tr>
<td>see section 3.4.1</td>
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<tr>
<td>8 AP212 front cover series/material with/without bearing code</td>
<td></td>
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<td>see section 3.4.2 and 3.4.3</td>
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<tr>
<td>9 AP212 type of ports code</td>
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<td>see section 3.5</td>
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<tr>
<td>10 AP212 inlet/outlet port size code combination</td>
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<tr>
<td>see section 3.5</td>
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</tr>
<tr>
<td>11 AP212 body material + seal material code</td>
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<tr>
<td>see section 3.5.1</td>
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<td>12 AP100 type of ports code</td>
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<td>see section 4.8.1</td>
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</table>
## 5 Circuits/valves option

For Technical features and availability please contact our Sales Department

### 5.1 Load sensing circuits

#### 5.1.1 Load sensing valve rear cover assembly position

<table>
<thead>
<tr>
<th>Hydraulic scheme</th>
<th>Family</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Hydraulic scheme]</td>
<td>STATIC</td>
<td>Static LS signal</td>
<td>LSB01</td>
</tr>
<tr>
<td>![Hydraulic scheme]</td>
<td>DYNAMIC</td>
<td>Dynamic LS signal</td>
<td>LDB01</td>
</tr>
<tr>
<td>![Hydraulic scheme]</td>
<td>STATIC</td>
<td>Static LS signal + check valve on CF line</td>
<td>LSB02</td>
</tr>
<tr>
<td>![Hydraulic scheme]</td>
<td>DYNAMIC</td>
<td>Dynamic LS signal + check valve on CF line</td>
<td>LDB02</td>
</tr>
<tr>
<td>![Hydraulic scheme]</td>
<td>STATIC</td>
<td>Static LS signal + relief valve on LS signal</td>
<td>LSB03</td>
</tr>
<tr>
<td>![Hydraulic scheme]</td>
<td>DYNAMIC</td>
<td>Dynamic LS signal + relief valve on LS signal</td>
<td>LDB03</td>
</tr>
<tr>
<td>![Hydraulic scheme]</td>
<td>STATIC</td>
<td>Static LS signal + check valve on CF line and relief valve on LS signal</td>
<td>LSB04</td>
</tr>
<tr>
<td>![Hydraulic scheme]</td>
<td>DYNAMIC</td>
<td>Dynamic LS signal + check valve on CF line and relief valve on LS signal</td>
<td>LDB04</td>
</tr>
</tbody>
</table>
5.1.2 Load sensing valve lateral assembly position

<table>
<thead>
<tr>
<th>Hydraulic scheme</th>
<th>Family</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Hydraulic scheme 1" /></td>
<td>STATIC</td>
<td>Static LS signal</td>
<td>LSS01</td>
</tr>
<tr>
<td><img src="image2" alt="Hydraulic scheme 2" /></td>
<td>DYNAMIC</td>
<td>Dynamic LS signal</td>
<td>LDS01</td>
</tr>
<tr>
<td><img src="image3" alt="Hydraulic scheme 3" /></td>
<td>STATIC</td>
<td>Static LS signal + check valve on CF line</td>
<td>LSS02</td>
</tr>
<tr>
<td><img src="image4" alt="Hydraulic scheme 4" /></td>
<td>DYNAMIC</td>
<td>Dynamic LS signal + check valve on CF line</td>
<td>LDB02</td>
</tr>
</tbody>
</table>
6 Rotation changing instructions

For the AP212 pumps with unidirectional left (S) or right (D) rotation (not for 287S-SAEB pump) it is possible to change the rotation direction of the entire range without having to replace any component. To ensure a good technical result, we recommended in any case that such inversion should be carried out at our factory.

Following we represented a procedure for the pump rotation inversion, here in example a counter-clockwise rotation pump (S). To obtain an clockwise-rotation (D) see the following pictures/instructions.

Picture -1-

Picture -2-

Picture -3-

Initial configuration “Left” (S)

To ensure a good technical result, we recommended in any case that such inversion should be carried out at our factory.

Picture -1-

Picture -2-

Picture -3-

To be protected

Tight with appropriate torque (see 3.6) and tighten with torque wrench
7 Pumps seal kit NBR standard type

The seal Kit code includes:
OR and shaft seal

<table>
<thead>
<tr>
<th>Type</th>
<th>Code</th>
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<tbody>
<tr>
<td>AP/APR212</td>
<td>200974001570</td>
</tr>
<tr>
<td>Tandem AP212 + AP212 NBR (without shaft seal between the pumps)</td>
<td>200974001580</td>
</tr>
<tr>
<td>Tandem AP212 + AP212 + PAR NBR (with shaft seal between the pumps)</td>
<td>200974001590</td>
</tr>
</tbody>
</table>

Minimum kit order quantity is requested: please contact our Sales Center.
Single pumps approximate weights

<table>
<thead>
<tr>
<th>Pump</th>
<th>Weight Kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP-APR212/4.5</td>
<td>2.5</td>
</tr>
<tr>
<td>AP-APR212/6.5</td>
<td>2.6</td>
</tr>
<tr>
<td>AP-APR212/8.5</td>
<td>2.7</td>
</tr>
<tr>
<td>AP-APR212/11</td>
<td>2.8</td>
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<tr>
<td>AP-APR212/15</td>
<td>3.0</td>
</tr>
<tr>
<td>AP-APR212/19</td>
<td>3.2</td>
</tr>
<tr>
<td>AP-APR212/22</td>
<td>3.3</td>
</tr>
<tr>
<td>AP-APR212/26</td>
<td>3.4</td>
</tr>
</tbody>
</table>

N.B.: The weight refers to pumps with aluminium front cover and standard cast iron back cover.

Manufacturing months

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<tr>
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<th></th>
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<td>5A</td>
<td>6A</td>
<td>7A</td>
<td>8M</td>
<td>9M</td>
<td>0M</td>
<td>1M</td>
</tr>
<tr>
<td>February</td>
<td>4B</td>
<td>5B</td>
<td>6B</td>
<td>7B</td>
<td>8N</td>
<td>9N</td>
<td>0N</td>
<td>1N</td>
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## Application form

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### External gear pump general data

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### Additional notes: