PACO KP, KPV
Split case pump
60 Hz
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     - KP 4012-1/2 [2-pole]
     - KP 4012-7/8 [2-pole]
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     - KP 2013-5/6 [4-pole]
     - KP 3095-7/8 [4-pole]
     - KP 3014-7/8 [4-pole]
     - KP 4012-1/2 [4-pole]
     - KP 4012-7/8 [4-pole]
     - KP 4012-9/0 [4-pole]
     - KP 5012-7/8 [4-pole]
     - KP 5012-9/0 [4-pole]
     - KP 6012-3/4 [4-pole]
     - KP 6015-3/4 [4-pole]
     - KP 6019-7/8 [4-pole]
     - KP 6020-3/4 [4-pole]
     - KP 8012-5/6 [4-pole]
     - KP 8015-3/4 [4-pole]
     - KP 8020-5/6 [4-pole]
     - KP 1012-1/2 [4-pole]
     - KP 1012-3/4 [4-pole]
     - KP 1020-3/4 [4-pole]
     - KP 1024-3/4 [4-pole]
     - KP 1415-1/2 [4-pole]
     - KP 6019-7/8 [6-pole]
     - KP 6020-3/4 [6-pole]
     - KP 8015-3/4 [6-pole]
     - KP 8020-5/6 [6-pole]
     - KP 1012-1/2 [6-pole]
     - KP 1015-3/4 [6-pole]
     - KP 1020-3/4 [6-pole]
     - KP 1024-3/4 [6-pole]
     - KP 1220-5/6 [6-pole]
     - KP 1415-1/2 [6-pole]

8. Bare shaft pump
1. Features and benefits

The Paco KP horizontal split case pump and KPV vertical split case pump are single stage, centrifugal volute pumps with high energy efficiency and low lifecycle costs.

Ease of service and long-term reliability are two of the selling features of the KP pumps. The split case design enables removal and dismantling of the internal pump parts (bearings, wear rings, impeller, and shaft seals) without disturbing the motor or pipe work. The two-bearing design means less vibration and higher reliability. The separate bearing housings allow for inspection of the seals, sleeves and bearings without removing the top half of the casing.

The double-suction design reduces axial forces by directing flow into both sides of the impeller. The double-volute design, available on most models, reduces the radial load and minimizes noise and vibration. Shaft sleeves are used to protect the shaft from corrosion and wear, thus extending the overall life of the shaft and the pump.

KP pumps cover this performance range:
• Flow rate: 60 to 12000 gpm [10 to 2700 m³/h]
• Head: 15 to 700 ft [5 to 215 m]
• Motor (P2): 10 to 2000 hp

The pumps are non-self-priming, centrifugal volute pumps with radial suction and radial discharge ports and horizontal shaft. Impellers are hydraulically balanced.

Paco KP pumps are available in these different options:
• Pump with motor and base (see fig. 1).
• Bare shaft pump, i.e. pump without motor, with base (see fig. 2).
• Bare shaft pump, i.e. pump without motor, without base (see fig. 3).
• Or any combination requested by the customer

KPV pumps
• Same great features of KP, but in a vertical configuration for optimized space savings
• Optional lower sleeve bearing design for easier lower bearing maintenance.

Nameplate
2. Applications

The Paco KP pumps are used in these main fields of application:
• commercial systems
• industrial systems
• water distribution
• irrigation.

Commercial systems
Liquid transfer and pressure boosting in:
• air conditioning, primary and secondary chilled water systems
• water condensing systems and cooling towers
• boiler feed and condensate systems
• district heating plants and heating systems
• swimming pools
• fountains.

Industrial systems
Liquid transfer and pressure boosting in:
• process cooling and chilled water systems
• water condensing systems and cooling towers
• boiler feed and condensate systems
• industrial heating systems
• wash down and cleaning systems
• industrial processing systems (water, light chemicals, oils, etc).

Water distribution
Liquid transfer and pressure boosting in:
• public waterworks
• non-potable water systems.

Irrigation and aquaculture
Irrigation covers these applications:
• field irrigation (flooding)
• sprinkler irrigation
• drip-feed irrigation
• aqua farming.
# 3. Product range

## Pump configurations

<table>
<thead>
<tr>
<th></th>
<th>Standard configuration</th>
<th>Optional configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pump casing</strong></td>
<td>Cast Iron</td>
<td>Ductile Iron</td>
</tr>
<tr>
<td><strong>Impeller</strong></td>
<td>Bronze</td>
<td>• Cast Iron</td>
</tr>
<tr>
<td><strong>Sleeve</strong></td>
<td>Bronze</td>
<td>• Aluminium bronze</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Stainless steel</td>
</tr>
<tr>
<td><strong>Coupling</strong></td>
<td></td>
<td>• Elastomeric</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Grid</td>
</tr>
<tr>
<td><strong>Shaft seal</strong></td>
<td>Mechanical seal:</td>
<td>Soft packing</td>
</tr>
<tr>
<td><strong>Flange</strong></td>
<td>ANSI 125</td>
<td>ANSI 250</td>
</tr>
<tr>
<td><strong>Flushing line</strong></td>
<td>None</td>
<td>• Nylon</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Copper</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Stainless Steel</td>
</tr>
<tr>
<td><strong>Wear rings</strong></td>
<td>Bronze</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td><strong>Shaft</strong></td>
<td>Steel</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td><strong>Motor efficiency class</strong></td>
<td>NEMA Premium</td>
<td>Others on request</td>
</tr>
<tr>
<td><strong>Pump direction of rotation</strong></td>
<td>CW - clockwise</td>
<td>CCW - counter clockwise</td>
</tr>
</tbody>
</table>

To a great extent the pumps can be adapted to the requirements of the individual customer. For customized solutions, contact your local Grundfos company.
4. Performance range

Paco KP pumps are available with 2-, 4- or 6-pole motors. 8 and 10 pole are available on request.
The next three pages show the performance range covered by these three motor types.
Knowing your required duty point, use the performance ranges like this:

1. Go into the relevant performance range chart.
2. Find your duty point.
3. Note which pump type covers your duty point.
4. Go to section "Product range" and then to "Performance curves and technical data" and find more detailed information on your chosen pump.

KP 2-pole
Performance range

KP 4-pole

1780 rpm, 60 Hz

Q [US GPM]

H [m]

H [ft]

Q [m³/h]

[ft]

[m]
KP 6-pole

Performance range

1180 rpm, 60 Hz

Q [US GPM]

H [ft]

[1m]

Q [m³/h]

H [m]

1024:34
1020:3/4
8012:5/6
1015:3/4
8015:3/4
1009:7/8
1220:5/8
1001:3/4
8020:3/4
1020:3/4
1025:3/4
1020:3/4
1012:1/2
8020:5/6
5. Construction

Paco KP horizontal split case pumps are available in several different construction types.

**KP pump, construction X2**

All four construction types are available with packing as an option.

*Sectional view*

![Sectional view, construction X2, with mechanical shaft seals](image-url)
KP pump, construction X4
Sectional view

Fig. 7  Sectional view, construction X4, with mechanical shaft seals
KP pump, construction X5 and X7

Sectional view

Fig. 8  Sectional view, construction X5/X7, with mechanical shaft seals
KP pump, construction XK and XV

Sectional view

Fig. 9  Sectional view, construction XK/XV, with mechanical shaft seals
KP pump, typical end view - Horizontal
(Non-drive end)

Fig. 10  Typical end view (non-drive end)
## Std. components and material specification

<table>
<thead>
<tr>
<th>Pos. no.</th>
<th>Component</th>
<th>Material</th>
<th>ASTM standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>6a</td>
<td>Pump casing, upper</td>
<td>Cast Iron</td>
<td>ASTM A48 CL35</td>
</tr>
<tr>
<td>6b</td>
<td>Pump casing, lower</td>
<td>Cast iron</td>
<td>ASTM A48 CL35</td>
</tr>
<tr>
<td>11</td>
<td>Key, impeller</td>
<td>Steel</td>
<td>C1018, cold drawn steel</td>
</tr>
<tr>
<td>11a</td>
<td>Key, coupling</td>
<td>Steel</td>
<td>C1018, cold drawn steel</td>
</tr>
<tr>
<td>17</td>
<td>Pipe plug</td>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Drain plug R 1/2</td>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>20a</td>
<td>Plug, drain outlet</td>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>20b</td>
<td>Plug, inlet</td>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>20c</td>
<td>Plug, outlet</td>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>20d</td>
<td>Plug, shaft seal flushing</td>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>20e</td>
<td>Plug, suction chamber</td>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Locking pin, wear ring</td>
<td>Steel</td>
<td>ANSI/ASME B18.8</td>
</tr>
<tr>
<td>26b</td>
<td>Roll pin</td>
<td>Steel</td>
<td>ANSI/ASME B18.8</td>
</tr>
<tr>
<td>26c</td>
<td>Screw</td>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>Wear ring</td>
<td>Bronze</td>
<td>ASTM B148, C95200</td>
</tr>
<tr>
<td>45b</td>
<td>Wear ring with groove for retaining ring</td>
<td>Bronze</td>
<td>ASTM B148, C95200</td>
</tr>
<tr>
<td>49</td>
<td>Impeller</td>
<td>Silicon bronze</td>
<td>ASTM B584, C87600</td>
</tr>
<tr>
<td>51</td>
<td>Shaft</td>
<td>Steel</td>
<td>AISI 1144 Stress proof</td>
</tr>
<tr>
<td>53</td>
<td>Ball bearing, drive end</td>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>54</td>
<td>Ball bearing, non-drive end</td>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>54c</td>
<td>Washer</td>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>54d</td>
<td>Retaining ring</td>
<td>Carbon Spring Steel</td>
<td>SAE 1060-1090</td>
</tr>
<tr>
<td>58</td>
<td>Seal cover</td>
<td>Grey Iron</td>
<td></td>
</tr>
<tr>
<td>58a</td>
<td>Screw</td>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>65</td>
<td>Retaining ring</td>
<td>Stainless steel, series 303</td>
<td>NBR</td>
</tr>
<tr>
<td>66</td>
<td>O-ring</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>67a</td>
<td>Impeller/shaft sleeve nut, right-hand thread</td>
<td>Bronze</td>
<td>III932, C89835</td>
</tr>
<tr>
<td>67b</td>
<td>Impeller/shaft sleeve nut, left-hand thread</td>
<td>Bronze</td>
<td>III932, C89835</td>
</tr>
<tr>
<td>72a</td>
<td>Gasket</td>
<td>Vegetable fiber (HYD-401)</td>
<td></td>
</tr>
<tr>
<td>76</td>
<td>Nameplate</td>
<td>Aluminum</td>
<td></td>
</tr>
<tr>
<td>79</td>
<td>Slinger</td>
<td>Neoprene</td>
<td></td>
</tr>
<tr>
<td>105</td>
<td>Shaft seal</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>109a</td>
<td>O-ring</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>110</td>
<td>O-ring</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>113</td>
<td>Bearing housing</td>
<td>Cast iron</td>
<td>ASTM A48, CL30</td>
</tr>
<tr>
<td>113c</td>
<td>Bearing cover, drive end</td>
<td>Cast iron</td>
<td>ASTM A48, CL30</td>
</tr>
<tr>
<td>113d</td>
<td>Bearing cover, non-drive end</td>
<td>Cast iron</td>
<td>ASTM A48, CL30</td>
</tr>
<tr>
<td>113e</td>
<td>Gasket</td>
<td>Vegetable fiber</td>
<td></td>
</tr>
<tr>
<td>113f</td>
<td>Lip seal, non-drive end bearing</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>113g</td>
<td>Lip seal, drive-end bearing</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>114</td>
<td>Screw</td>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>114a</td>
<td>Screw</td>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>114b</td>
<td>Screw</td>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>116</td>
<td>Shaft sleeve</td>
<td>Bronze</td>
<td>III932, C89835</td>
</tr>
<tr>
<td>116a</td>
<td>Shaft sleeve, drive end</td>
<td>Bronze</td>
<td>III932, C89835</td>
</tr>
<tr>
<td>116b</td>
<td>Shaft sleeve, non-drive end</td>
<td>Bronze</td>
<td>III932, C89835</td>
</tr>
<tr>
<td>116c</td>
<td>Shaft sleeve, inner</td>
<td>Bronze</td>
<td>III932, C89835</td>
</tr>
<tr>
<td>116d</td>
<td>Shaft sleeve, outer</td>
<td>Bronze</td>
<td>III932, C89835</td>
</tr>
<tr>
<td>116e</td>
<td>Set screw</td>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>124</td>
<td>Seal housing</td>
<td>Cast iron</td>
<td>ASTM A48 CL30</td>
</tr>
<tr>
<td>195</td>
<td>Lubricating nipple</td>
<td>Zinc coated steel</td>
<td></td>
</tr>
</tbody>
</table>
### Mechanical construction

**Pump casing**
The class 35 grey iron volute pump casing has radial suction port and radial discharge port. The pumps are of the inline (symmetric) design.

![Schematic drawing of an inline KP pump](fig11.png)

**Fig. 11** Schematic drawing of an inline KP pump

Flange Drillings are in accordance with ANSI #125 or #250.

![Upper and lower pump casing of KP pump](fig12.png)

**Fig. 12** Upper and lower pump casing of KP pump

**Shaft**
The shaft (pos. 51) is of the key and keyway type with one key for the impeller (pos. 11) and one key for the coupling (pos. 11a).
The shaft is supported by bearings at both the drive end and the non-drive end of the pump.

![KP pump shaft](fig13.png)

**Fig. 13** KP pump shaft

Shaft sleeves are attached to the pump shaft to prevent wear of the shaft and secure the position of the impeller.

### Bearings
KP pumps are fitted with two standard single-row deep-groove ball bearings. The bearings are of the open type permitting the bearings to be relubricated. The bearings are lubricated by Grundfos prior to delivery.

### Seal housings
All KP pumps have two seal housings (pos. 124), one at the drive end and one at the non-drive end of the pump shaft.

A seal housing has several functions:
- Supports the pump sealing system, whether it is a mechanical shaft seal or packing
- Supports the bearing housing thus transmitting both radial and axial forces from bearing and shaft to the upper and lower pump casing
- Has a connection for the flushing pipe.
The function of the flushing pipe is to ensure a flow of pumped liquid for cooling and lubricating the mechanical shaft seal or the packing

### Impeller
The KP impeller (pos. 49) is a closed double-suction impeller. The impeller has inflow of liquid from both sides and is locked in position by a threaded sleeve arrangement.

![Double-suction impeller](fig14.png)

**Fig. 14** Double-suction impeller

All impellers are dynamically balanced in accordance with ANSI/ISO 1940 Class G6.3 standard. Due to their design, the impellers are inherently hydraulically balanced and thus compensate for axial thrust.

All impellers are trimmed to the duty point required by the customer.

### Wear rings
KP pumps have wear rings (pos. 45) between impeller and pump casing. As the name indicates, the wear rings protect the pump casing against wear. The wear rings act as a seal between impeller and pump casing. When the wear rings become worn, the efficiency of the pump will be reduced and the wear rings should be replaced.

### Coupling
As standard, KP pumps are fitted with a flexible grid coupling or elastomeric coupling, depending or motor size. The grid coupling consists of two steel flanges horizontally split coupling halves.
The coupling design assists in reducing vibrations and cushions shock loads. The design also extends the life of the coupling itself. The flexible grid is standard for VFD driven pumps.

![Flexible grid coupling](image)

**Fig. 15** Flexible grid coupling

The elastomeric coupling has a flexible rubber section to absorb vibrations and minimizes negative affects of misalignment.

![Elastomeric coupling](image)

**Fig. 16** elastomeric coupling

**Mechanical shaft seal**
The material of the standard version is Buna Carbon/ceramic.

![Rubber bellows shaft seal](image)

**Fig. 17** Rubber bellows shaft seal

**Packing**
Includes graphite impregnated packing rings.

The packing rings consist of braided material which is effective for long service life for packing rings while protecting the shaft sleeve.

![Sectional view of packing with internal flushing liquid](image)

**Fig. 18** Sectional view of packing with internal flushing liquid

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Shaft sleeve</td>
</tr>
<tr>
<td>2</td>
<td>Gland</td>
</tr>
<tr>
<td>3</td>
<td>Packing ring</td>
</tr>
<tr>
<td>4</td>
<td>Lantern ring</td>
</tr>
<tr>
<td>A</td>
<td>Drilled hole for flushing liquid (pumped liquid)</td>
</tr>
</tbody>
</table>

**Base**
Pump and motor are mounted on a common base frame designed according to Hydraulic Institute standard, ANSI/HI 1.3-2000.

**Painting**
Prior to delivery to the customer, pump, motor and base are top coated with a blue paint (RAL 5015); coating thickness is 2 to 4 mils. The inside of the pump is primered for corrosion resistance. Standard units are not painted internally.
Test pressure
Pressure testing is made with water at ambient temperature. The standard hydrostatic test pressure is 1.5 times the flange rating pressure.

**KP Case working pressure limitations at 150 °F: Flat-face flanges**

**Chart A**

<table>
<thead>
<tr>
<th>Cass material</th>
<th>Class 125 lb flange drilling (psi)</th>
<th>Class 250 lb flange drilling (psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CWP</td>
<td>Hydro</td>
</tr>
<tr>
<td>Cast iron</td>
<td>175</td>
<td>265</td>
</tr>
<tr>
<td>Ductile iron</td>
<td>175</td>
<td>265</td>
</tr>
</tbody>
</table>

All sizes except as Chart B indicates

**Chart B**

<table>
<thead>
<tr>
<th>Maximum case working pressure (class 125 Flange)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump model number</td>
</tr>
<tr>
<td>Cast iron</td>
</tr>
<tr>
<td>Ductile iron</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maximum case working pressure (class 250 Flange)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump model number</td>
</tr>
<tr>
<td>Cast iron</td>
</tr>
<tr>
<td>Ductile iron</td>
</tr>
</tbody>
</table>

CWP: maximum Case Working Pressure based upon flange drilling. Maximum working pressure for a given application is determined by adding the maximum available suction pressure to the shut-off head of a given impeller diameter.

Hydro: Is the hydrostatic test pressure applied to the pump. Minimum hydrostatic test pressure is 1.5 times maximum allowable case working pressure.
6. Operating conditions

Ambient temperature and altitude

The ambient temperature and the installation altitude are important factors for the motor life, as they affect the life of the bearings and the insulation system. Ambient temperature must not exceed 104 °F [+ 40 °C]. If the ambient temperature exceeds 104 °F [+ 40 °C] or if the motor is installed more than 3280 ft [1000 m] above sea level, the motor must not be fully loaded due to the low density and consequently low cooling effect of the air. In such cases, it may be necessary to use a motor with a higher output, or use a motor that is designed for the specified ambient conditions.

Liquid temperatures and shaft seals

The maximum liquid temperature marked on the pump nameplate depends on the mechanical shaft seal used:

- Temperature range for Buna - standard): 32 °F to 212 °F [0 °C to +100 °C].
- Temperature range for Viton 54 °F to 212 °F [+15 °C to +100 °C].
- Temperature range for EPDM 54 °F to 275 °F [+15 °C to +135 °C].

Shaft seal

The materials of the shaft seal types used in KP pumps have certain characteristics. These characteristics may be of importance when choosing the shaft seal for the pump.

Carbon/Ceramic

The seal has the following features:
- Brittle material requiring careful handling.
- Worn by liquids containing solid particles.
- Limited corrosion resistance, 5 < pH < 9, depending on ceramic type.
- The carbon of the seal offers properties very similar to the carbon/tungsten carbide seal. However, compared to the carbon/tungsten carbide seal, the pressure and temperature ranges are limited.

Carbon/silicon carbide

Seals with one carbon seal face have the following features:
- Brittle material requiring careful handling
- Worn by liquids containing solid particles
- Good corrosion resistance
- The self-lubricating properties of carbon make the seal suitable for use even with poor lubricating conditions (high temperatures) without generating noise. However, such conditions will cause wear of the carbon seal face leading to reduced seal life.

Buna

NBR (nitrile) rubber covers a wide range of liquids at temperatures below 212 °F [*+100 °C].
- Good mechanical properties
- Standard material

Viton

FKM rubber covers a very wide range of liquids and temperatures.
- Poor mechanical properties at low temperatures
- Resistant to water up to 275 °F [*+135 °C]
- Resistant to mineral oils and vegetable oils
- Not resistant to alkaline liquids at high temperatures.

EPDM

EPDM Rubber covers a wider range of liquids up to a max temperature of 275 °F [135 °C].
- Good mechanical properties.

Pressure

Maximum inlet pressure

Inlet pressure + pump pressure must always be lower than maximum pressure of the pump.

Minimum inlet pressure

The minimum inlet pressure must correspond to the NPSH curve for the pump.
Flow

Minimum flow rate
The pump must not run against a closed discharge valve, as this will cause an increase in temperature/formation of steam in the pump. This may cause shaft damage, impeller erosion, short life of bearings, stuffing boxes with packing rings or mechanical seals due to stress or vibration.

The minimum, continuous flow rate must be at least 25% of the flow rate at best-efficiency point (BEP).

KP Impeller Max Sphere Size

<table>
<thead>
<tr>
<th>Split Case Model</th>
<th>Max Sphere Size [inches]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2095-1/2</td>
<td>0.19</td>
</tr>
<tr>
<td>2013-5/6</td>
<td>0.16</td>
</tr>
<tr>
<td>3095-7/8</td>
<td>0.31</td>
</tr>
<tr>
<td>3014-7/8</td>
<td>0.31</td>
</tr>
<tr>
<td>4012-1/2</td>
<td>0.38</td>
</tr>
<tr>
<td>4012-7/8</td>
<td>0.75</td>
</tr>
<tr>
<td>4015-9/0</td>
<td>0.25</td>
</tr>
<tr>
<td>5012-7/8</td>
<td>0.63</td>
</tr>
<tr>
<td>5015-9/0</td>
<td>0.75</td>
</tr>
<tr>
<td>6012-3/4</td>
<td>1.00</td>
</tr>
<tr>
<td>6015-3/4</td>
<td>0.81</td>
</tr>
<tr>
<td>6019-7/8</td>
<td>0.75</td>
</tr>
<tr>
<td>6020-3/4</td>
<td>0.75</td>
</tr>
<tr>
<td>8012-5/6</td>
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</tr>
<tr>
<td>8015-3/4</td>
<td>1.00</td>
</tr>
<tr>
<td>8020-5/6</td>
<td>1.03</td>
</tr>
<tr>
<td>1012-1/2</td>
<td>1.00</td>
</tr>
<tr>
<td>1015-5/4</td>
<td>1.25</td>
</tr>
<tr>
<td>1020-3/4</td>
<td>1.20</td>
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<tr>
<td>1024-3/4</td>
<td>1.17</td>
</tr>
<tr>
<td>1220-5/6</td>
<td>1.87</td>
</tr>
<tr>
<td>1415-1/2</td>
<td>1.25</td>
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</tbody>
</table>
**KP model number and construction code**

<table>
<thead>
<tr>
<th>Example</th>
<th>29</th>
<th>60123</th>
<th>140001</th>
<th>1852</th>
</tr>
</thead>
</table>

**Product code**

**Model code**

**Materials of construction**

**Motor code**

**Production code** 29

29: Split case

**Model code** 60 12 3

**Pump discharge**

- 20 = 2"  
- 30 = 3"  
- 40 = 4"  
- 50 = 5"  
- 60 = 6"  
- 80 = 8"  
- 10 = 10"  
- 12 = 12"  
- 14 = 14"

**Nominal maximum impeller diameter**

- 95 = 9.5"  
- 12 = 12"  
- 13 = 13"  
- 14 = 14"  
- 15 = 15"  
- 19 = 19"  
- 20 = 20"  
- 24 = 24"

**Impeller design**

Clockwise rotation:

- 1, 3, 5, 7, 9  
- Counter clockwise rotation:
  - 0, 2, 4, 6, 8

**Materials of construction**

<table>
<thead>
<tr>
<th>ID of packing or seal</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>Std.</td>
</tr>
<tr>
<td>01</td>
<td>Dbl- wear rings</td>
</tr>
<tr>
<td>02</td>
<td>Oil lube brgs</td>
</tr>
<tr>
<td>03</td>
<td>(01) + (02)</td>
</tr>
<tr>
<td>04</td>
<td>(01) + (05)</td>
</tr>
<tr>
<td>05</td>
<td>Recirc lines</td>
</tr>
<tr>
<td>20</td>
<td>Dbl Ext Shaft</td>
</tr>
<tr>
<td>21</td>
<td>Dbl Wear Rings</td>
</tr>
<tr>
<td>22</td>
<td>Recirc Lines</td>
</tr>
</tbody>
</table>

**General configuration (horizontal)**

<table>
<thead>
<tr>
<th>Code no</th>
<th>Item</th>
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</thead>
<tbody>
<tr>
<td>24</td>
<td>(21) + (22)</td>
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<tr>
<td>30</td>
<td>Dbl Ext Shaft</td>
</tr>
<tr>
<td>31</td>
<td>Dbl Wear Rings</td>
</tr>
</tbody>
</table>

**General configuration (vertical)**

<table>
<thead>
<tr>
<th>Code no</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>Recirc Lines</td>
</tr>
<tr>
<td>34</td>
<td>(31) + (32)</td>
</tr>
<tr>
<td>70</td>
<td>250 lb. Flange</td>
</tr>
<tr>
<td>71</td>
<td>Dbl Wear Rings</td>
</tr>
<tr>
<td>72</td>
<td>(71) + (73)</td>
</tr>
<tr>
<td>90</td>
<td>250 lb. Flange</td>
</tr>
<tr>
<td>91</td>
<td>Dbl Wear Rings</td>
</tr>
</tbody>
</table>

**Shaft/Sleeve Metallurgy**

- 0 = Steel/Bronze  
- 1 = Steel/S.S.  
- 3 = S.S./Bronze*  
- 6 = S.S./S.S. or S.S./no sleeves  
- 7 = SS/Hard. SS  
- A = 316 SS/Ni Al Bz  
- B = Type 1, Single Seal, Ceramic Seat, EPDM  
- X = Special

**Pump Metallurgy**

- 1 = Brz. Fitted  
- 2 = Std. All Bronze  
- 5 = All Iron  
- 8 = Ductile Iron/Brz. Fitted  
- X = Special

**Motor code** 1 78 2

**Enclosure**

- 1 = ODP  
- 2 = TECF  
- 3 = explosion proof

**Voltage**

<table>
<thead>
<tr>
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<th>1 phase 115/230 V</th>
<th>200 V</th>
<th>230/460 V</th>
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<tbody>
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<td>21</td>
<td>23</td>
<td>24</td>
</tr>
<tr>
<td>1/2</td>
<td>29</td>
<td>31</td>
<td>32</td>
</tr>
<tr>
<td>3/4</td>
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<td>37</td>
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</tr>
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<td>41</td>
<td>43</td>
<td>44</td>
</tr>
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<td>49</td>
<td>50</td>
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<td>53</td>
<td>55</td>
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<td>68</td>
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<tr>
<td>7-1/2</td>
<td>71</td>
<td>73</td>
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<td>76</td>
<td>77</td>
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<td>--</td>
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<tr>
<td>200</td>
<td>--</td>
<td>--</td>
<td>96</td>
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<tr>
<td>250</td>
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<td>--</td>
<td>97</td>
</tr>
<tr>
<td>300</td>
<td>--</td>
<td>--</td>
<td>98</td>
</tr>
</tbody>
</table>

**RPM**

- 1 = 3500  
- 2 = 1750  
- 3 = 1150
7. Curve charts and technical data

How to read the curve charts

Reference the Express Suite selection tool for selections in additional speeds.
Curve conditions

The guidelines below apply to the curves shown in the performance charts.

- **Tolerances according to**: Hydraulic Institute.
- The curves show pump performance with different impeller diameters at the nominal speed.
- The **bold** part of the curves show the **recommended** operating range.
- Do not operate the pump along the thin parts of the curves. If your duty point lies here, you should select a smaller or larger pump type.
- Do not use the pumps at minimum flows below 0.1 x Q_max stated on the pump name plate because of the risk of overheating of the pump.
- The curves apply to the pumping of airless water at a temperature of 77 °F [+20 °C] and a kinematic viscosity of 1 cSt [1 mm²/s].
- **ETA**: The lines show values of the hydraulic efficiency of the pump for the different impeller diameters.
- **NPSH**: The curves show average values measured under the same conditions as the performance curves. When sizing the pump, add a safety margin of at least 1.6 ft [0.5 m].
- In case of other densities than 62.3 lb/ft³ [1000 kg/m³] the discharge pressure is proportional to the density.
- When pumping liquids with a specific gravity higher than 1.0, motors with correspondingly higher outputs must be used.

**Calculation of total head**

The total pump head consists of the height difference between the measuring points + the differential head + the dynamic head.

\[ H_{\text{total}} = H_{\text{geo}} + H_{\text{stat}} + H_{\text{dyn}} \]

<table>
<thead>
<tr>
<th><strong>Symbol</strong></th>
<th><strong>Description</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>H_{geo}</td>
<td>Height difference between measuring points.</td>
</tr>
<tr>
<td>H_{stat}</td>
<td>Differential head between suction and the discharge side of the pump.</td>
</tr>
<tr>
<td>H_{dyn}</td>
<td>Calculated values based on the velocity of the pumped liquid on the suction and the discharge side of the pump.</td>
</tr>
</tbody>
</table>

Performance tests

Requested tests are performed according to Hydraulic Institute. Performance tests are only completed when ordered with the pump.

Witness test

When the pumps are being tested it is possible for the customer to witness the testing procedure according to Hydraulic Institute.

If the customer wants to witness the pump test this request must be submitted with the order.
KP 3095-7/8 [2-pole]

**KP 3095-7/8**

60 Hz, n = 3550 rpm

---

**Q [US GPM]**

- 0, 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 220, 240, 260, 280, 300, 320, 340, 360, 380, 400

**H [m]**

- 0, 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 220, 240, 260, 280, 300, 320, 340, 360, 380, 400

**NPSH [ft]**

- 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100

**NPSH [m]**

- 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100

**P2 [hp]**

- 0, 50, 100, 150, 200

**Eff [%]**

- 0, 10, 20, 30, 40, 50, 60, 70, 80, 90

**Q [m³/h]**

- 0, 20, 40, 60, 80, 100, 150, 200, 250, 300, 350, 400, 450, 500, 550, 600, 650, 700, 750, 800, 850, 900, 950, 1000

**P2 [kW]**

- 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100

---

**Curve charts and technical data**
KP 4012-1/2 [2-pole]

Curve charts and technical data

KP 4012-1/2
60 Hz, n = 3550 rpm

Q [US GPM]

H [m]

H [ft]

NPSH [ft]

NPSH [m]

P2 [kW]

P2 [hp]

Eff [%]

Q [m³/h]

Q [US GPM]

Q [m³/h]
KP 4012-7/8 [2-pole]

KP 4012-7/8
60 Hz, n = 3550 rpm

H [m] H [ft]
[.9.4] [.310.0]
[.8.8] [.290.0]
[.8.2] [.270.0]
[.7.6] [.260.0]
[.7.0] [.250.0]
[.7.6] [.240.0]
[.8.8] [.230.0]
[.9.4] [.220.0]

NPSH [ft] [m]
[0] [0]
[10] [3]
[20] [6]
[30] [9]
[40] [12]
[50] [15]
[60] [18]
[70] [21]
[80] [24]
[90] [27]
[100] [30]
[110] [33]
[120] [36]

Q [US GPM]
0 200 400 600 800 1000 1200 1400 1600 1800 2000

P [hp]
0 50 100 150 200 250 300 350 400

Eff [%]
0 10 20 30 40 50 60 70 80

P2 [kW]
0 100 200 300 400
KP 2095-1/2 [4-pole]

KP 2095-1/2
60 Hz, n = 1780 rpm

Q [US GPM] vs. H [m] or [ft]

NPSH [ft] or [m] vs. Q [US GPM]

P2 [hp] vs. Q [US GPM]

Eff [%] vs. Q [US GPM]

P2 [kW] vs. Q [m³/h]
KP 2013-5/6 [4-pole]

KP 2013-5/6
60 Hz, n = 1780 rpm

H [m] / H [ft]

NPSH [ft] / NPSH [m]

Q [US GPM]

P2 [kW] / P2 [hp] / Eff [%]

Q [m³/h]
KP 3095-7/8 [4-pole]
KP 3014-7/8 [4-pole]

KP 3014-7/8
60 Hz, n = 1780 rpm

H [m]  [ft]
70  [14.0]
60  [13.0]
50  [12.0]
40  [11.0]
30  [10.0]
20
10
0

NPSH [ft] [m]
60
40
20
10
5
0

Q [US GPM]
0 100 200 300 400 500 600 700 800

P2 [kW] [hp]
100
70
50
30
10
0

Eff [%]
70
60
50
40
30
20
10
0

Q [US GPM]
0 100 200 300 400 500 600 700 800

Q [m³/h]
200
150
100
50
0
KP 4012-1/2 [4-pole]

**Curve charts and technical data**

KP 4012-1/2
60 Hz, n = 1780 rpm

H [m] vs. Q [US GPM]

H [ft] vs. Q [US GPM]

NPSH [ft] vs. Q [US GPM]

NPSH [m] vs. Q [US GPM]

P2 [kW] vs. Q [US GPM]

P2 [hp] vs. Q [US GPM]

Eff [%] vs. Q [US GPM]

Eff [%] vs. Q [m³/h]
KP 4012-7/8 [4-pole]

KP 4012-7/8
60 Hz, n = 1780 rpm

H [m]
0 10 20 30 40 50 60 70 80 90 100 110

H [ft]
0 100 200 300 400 500 600 700 800 900 1000

Q [US GPM]
0 100 200 300 400 500 600 700 800 900 1000

NPSH [ft]
0 10 20 30 40

NPSH [m]
0 2 4 6 8 10 12

P2 [kW]
0 10 20 30 40 50 60 70 80

P2 [hp]
0 10 20 30 40 50 60 70 80

Eff [%]
0 10 20 30 40 50 60 70 80
KP 4015-9/0 [4-pole]

Curve charts and technical data

KP 4015-9/0
60 Hz, n = 1780 rpm
Curve charts and technical data

KP 8012-5/6 [4-pole]

KP 8012-5/6
60 Hz, n = 1780 rpm

Q [US GPM]

NPSH [ft] [m]

P2 [kW] [hp]

Eff [%]

Q [US GPM]

H [m] [ft]
KP 8015-3/4 [4-pole]
KP 8020-5/6 [4-pole]

KP 8020-5/6
60 Hz, n = 1780 rpm
KP 1012-1/2 [4-pole]
KP 1020-3/4 [4-pole]

H [m] vs Q [US GPM]

NPSH [ft] vs Q [US GPM]

P2 [kW] vs Q [US GPM]

Eff [%] vs Q [US GPM]
KP 1024-3/4 [4-pole]

60 Hz, n = 1780 rpm

Q [US GPM]

H [m]

NPSH [ft]

Eff [%]
KP 1415-1/2 [4-pole]
KP 6019-7/8 [6-pole]

- **H** [m] vs. **Q [US GPM]**
- **P2 [kW]** vs. **Q [m³/h]**
- **Eff [%]** vs. **Q [US GPM]**

Curve charts and technical data

60 Hz, n = 1180 rpm

KP 6019-7/8
KP 1015-3/4 [6-pole]
KP 1024-3/4 [6-pole]

Curve charts and technical data

KP 1024-3/4
60 Hz, n = 1180 rpm

NPSH [ft] [m]

Q [US GPM]

P2 [kW] [hp]

Eff [%]

Q [m³/h]

GRUNDFOS ✠
KP 1415-1/2 [6-pole]
8. Bare shaft pump

Dimensional sketch

![Diagram of bare shaft pump]

Dimensions
All dimensions are in inches.

<table>
<thead>
<tr>
<th>Pump size</th>
<th>DNd</th>
<th>DNs</th>
<th>HZ</th>
<th>A</th>
<th>AE</th>
<th>D</th>
<th>BP</th>
<th>B</th>
<th>DH/SH</th>
<th>W</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
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<td>2-1/2</td>
<td>12-1/4</td>
<td>12</td>
<td>10-1/4</td>
<td>7</td>
<td>7</td>
<td>8-3/4</td>
<td>3-1/2</td>
<td>12</td>
<td>11-16</td>
</tr>
<tr>
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<td>11-16</td>
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<td>12</td>
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<tr>
<td>3014-7/8</td>
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<td>16-5/8</td>
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<td>5</td>
<td>16-1/8</td>
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<td>10-1/4</td>
<td>10-1/8</td>
<td>9-1/4</td>
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<td>17-5/8</td>
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<td>18-1/4</td>
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Dimensional sketch

Dimensions

All dimensions are in inches.

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