1PH SERIES

LOW NOISE

HYDRAULIC HELICAL GEAR PUMPS

6 to 28.1 cm³/rev (0.366 to 1.715 in³/rev)
280 bar (4060 psi) peak pressure
1PH SERIES TECHNICAL DATA

OPERATING PARAMETERS

1PH Series pumps are designed to provide high performance levels and long life when operated within the parameters shown. For operation outside these parameters please consult your David Brown Hydraulics representative.

<table>
<thead>
<tr>
<th>MODEL</th>
<th>DISPLACEMENT (cm³/rev)</th>
<th>OUTLET PRESSURE</th>
<th>SPEED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rated - bar (psi)</td>
<td>Peak - bar (psi)</td>
<td>Minimum</td>
</tr>
<tr>
<td>1PH 060</td>
<td>6.0 (0.366)</td>
<td>250 (3625)</td>
<td>600</td>
</tr>
<tr>
<td>1PH 082</td>
<td>8.2 (0.500)</td>
<td>250 (3625)</td>
<td>600</td>
</tr>
<tr>
<td>1PH 095</td>
<td>9.5 (0.580)</td>
<td>250 (3625)</td>
<td>600</td>
</tr>
<tr>
<td>1PH 119</td>
<td>11.9 (0.726)</td>
<td>250 (3625)</td>
<td>600</td>
</tr>
<tr>
<td>1PH 140</td>
<td>14.0 (0.854)</td>
<td>250 (3625)</td>
<td>600</td>
</tr>
<tr>
<td>1PH 168</td>
<td>16.8 (1.025)</td>
<td>250 (3625)</td>
<td>600</td>
</tr>
<tr>
<td>1PH 190</td>
<td>19.0 (1.159)</td>
<td>250 (3625)</td>
<td>600</td>
</tr>
<tr>
<td>1PH 229</td>
<td>22.9 (1.397)</td>
<td>210 (3045)</td>
<td>600</td>
</tr>
<tr>
<td>1PH 281</td>
<td>28.1 (1.714)</td>
<td>170 (2465)</td>
<td>600</td>
</tr>
</tbody>
</table>

INLET CONDITIONS

It is essential that pumps are installed so that the pump can draw sufficient oil under all operating conditions. 1PH Series pump inlet porting is designed to facilitate full volume fill but the following machine design recommendations should be followed.

- Never run pumps dry - particular care should be taken to open any shut-off valves.
- Use large diameter pipes and fittings and avoid sharp bends and long lengths.
  Fluid velocity should not exceed 2.5 m/sec (8.0 ft/sec) calculated by:
  \[ V = \frac{21.22Q}{D^2} \text{ m/sec where } V = \text{velocity (m/sec)} \]
  \[ V = \frac{0.408Q}{D^2} \text{ ft/sec where } V = \text{velocity (ft/sec)} \]
  \[ Q = \text{flow rate (l/min)} \]
  \[ D = \text{bore diameter (mm)} \]

- If possible mount the pump below the lowest level of fluid in the tank. If necessary prime the pump on start-up.
- Ensure that inlet lines are airtight.
- Particular care should be taken where high speeds and/or high fluid viscosities are involved.

As a general rule pressure at the pump inlet should not be less than 0.93 bar absolute (2" Hg depression) at normal viscosity of 23 mm²/sec (110 SSU).
**1PH SERIES**

**INTRODUCTION**

**SUPER QUIET, HIGH PERFORMANCE HYDRAULIC PUMPS**

1PH pumps incorporate unique David Brown Hydraulics helical gear technology to give highest performance with lowest noise levels within an aluminium body.

Helical gears reduce pressure ripple by smoothing out small flow variations associated with gear pump technology and significantly reduces generated noise within the machine structure. Using appropriate shafts, bearings, and cast iron end plates within a rigid construction gives good life expectancy.

Component accuracy and pressure compensated side plates ensure that high performance is maintained.

**A RANGE OF SINGLE AND MULTIPLE PUMPS**

Pump elements are available with displacements from 6.0 to 22.9 cm³/rev (0.366 to 1.397 in³/rev) for maximum continuous operating pressures of 250 bar and peak operating pressures of 280 bar. Maximum inlet pressure is 2 bar.

Pumps can be supplied as single, or double units. Triple, quadruple and add-on units to other pumps are available in a wide variety of combinations.

Please contact your David Brown Hydraulics representative for more information on possible combinations of triple and quadruple pumps.

**1PH SERIES**

**MODEL NUMBERS**

**SINGLE PUMPS**

**Code** | **Displacement**
---|---
060 | 6.0 cm³/rev (0.366 in³/rev)
082 | 8.2 cm³/rev (0.500 in³/rev)
095 | 9.5 cm³/rev (0.580 in³/rev)
119 | 11.9 cm³/rev (0.726 in³/rev)
140 | 14.0 cm³/rev (0.854 in³/rev)
168 | 16.8 cm³/rev (1.025 in³/rev)
190 | 19.0 cm³/rev (1.159 in³/rev)
229 | 22.9 cm³/rev (1.397 in³/rev)
281 | 28.1 cm³/rev (1.715 in³/rev)

**DRIVE SHAFT TYPE**

Refer to page 5 for details

**MOUNTING FLANGE TYPE**

Refer to page 4 for details

**REAR COVER**

Refer to page 6 for details

**OUTRIGGER BEARING**

Refer to page 6 for details

**OUTLET PORT TYPE**

Refer to page 6 for options

**INLET PORT TYPE**

(Use code 00 for No Port - applies to sections of multiple pumps only)
Please note: Other flanges may be available which are not displayed here. Please contact your local representative.
Please note: Other shafts may be available which are not displayed here. Please contact your local representative.
1PH SERIES  TECHNICAL DETAILS

PORT TYPES

TYPE 1

TYPE 2

TYPE 3

TYPE 4

<table>
<thead>
<tr>
<th>PORT TYPES</th>
<th>Flange Ports - Type 1</th>
<th>Flange Ports - Type 2</th>
<th>Threaded Ports - Type 3</th>
<th>Threaded Ports - Type 4</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>INLET A</td>
<td>INLET B</td>
<td>OUTLET C</td>
<td>INLET D</td>
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<tr>
<td>MODEL TYPE</td>
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<td>168</td>
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<td>190</td>
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<td></td>
</tr>
<tr>
<td>229</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

= Preferred option. Other port types may be available - consult your David Brown Hydraulics representative for further information

OUTRIGGER BEARINGS

Type 1: Mounting Flange Type ‘Y’
(hole centres as Code ‘S’)

Type 2: Mounting Flange Type ‘B’, ‘G’ or ‘S’

EFFICIENCY AND NOISE

TYPICAL PUMP EFFICIENCIES

TYPICAL NOISE LEVELS
1PH SERIES  INSTALLATION DATA

NOTE:
Width across port faces = 84 (3.307)

NOTE: Dimensions shown are for an SAE 82-2 (A-2Bolt) Flange. Please make an allowance when using other flange types.

<table>
<thead>
<tr>
<th>PUMP MODEL</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>060</td>
<td>40.4 (1.590)</td>
<td>83.8 (3.299)</td>
<td>40.4 (1.590)</td>
<td>61.8 (2.434)</td>
<td>51.9 (2.043)</td>
<td>95.3 (3.752)</td>
</tr>
<tr>
<td>082</td>
<td>42.7 (1.681)</td>
<td>88.5 (3.484)</td>
<td>42.7 (1.681)</td>
<td>66.5 (2.618)</td>
<td>54.2 (2.134)</td>
<td>100.0 (3.937)</td>
</tr>
<tr>
<td>095</td>
<td>52.1 (2.051)</td>
<td>107.3 (4.224)</td>
<td>52.1 (2.051)</td>
<td>85.3 (3.357)</td>
<td>63.6 (2.504)</td>
<td>118.7 (4.673)</td>
</tr>
<tr>
<td>119</td>
<td>54.7 (2.153)</td>
<td>112.4 (4.425)</td>
<td>54.7 (2.153)</td>
<td>90.4 (3.557)</td>
<td>66.1 (2.602)</td>
<td>123.8 (4.874)</td>
</tr>
<tr>
<td>140</td>
<td>63.9 (2.516)</td>
<td>130.8 (5.150)</td>
<td>63.9 (2.516)</td>
<td>108.8 (4.284)</td>
<td>75.4 (2.969)</td>
<td>142.3 (5.602)</td>
</tr>
<tr>
<td>168</td>
<td>66.9 (2.634)</td>
<td>136.8 (5.386)</td>
<td>66.9 (2.634)</td>
<td>114.8 (4.518)</td>
<td>78.3 (3.083)</td>
<td>148.2 (5.835)</td>
</tr>
<tr>
<td>190</td>
<td>69.2 (2.724)</td>
<td>141.4 (5.567)</td>
<td>69.2 (2.724)</td>
<td>119.4 (4.702)</td>
<td>80.7 (3.177)</td>
<td>152.9 (6.020)</td>
</tr>
<tr>
<td>229</td>
<td>72.4 (2.890)</td>
<td>149.7 (5.894)</td>
<td>72.4 (2.890)</td>
<td>127.7 (5.028)</td>
<td>84.8 (3.339)</td>
<td>161.2 (6.346)</td>
</tr>
<tr>
<td>281</td>
<td>78.1 (3.075)</td>
<td>160.7 (6.328)</td>
<td>78.1 (3.075)</td>
<td>138.7 (5.462)</td>
<td>89.6 (3.527)</td>
<td>172.2 (6.781)</td>
</tr>
</tbody>
</table>

Please note: The lengths in this table are true for flange types B, C, G, H, & S. For flange types D, E, F, & J.
Please refer to page 4 of this catalogue for flange length variation.

1PH SERIES  SERVICING DATA

Before dismantling ensure that the external surfaces of the pump and any work surfaces are clean.

Identify parts as they are disassembled so that they can be rebuilt in the same order, i.e. wearplate position, gear mesh etc.

Examine metal parts for signs of degradation or wear, if there are any serious signs of wear on the gears, in the housing, or in the bearings, then the complete pump should be replaced.

If all metal parts are in good order the pump may be rebuilt using new seals throughout.

Bolt Torque = 47 Nm

Seal Repair Kit Part Number: SK1PH001

Items indicated are included in the repair kit

Typical exploded view of clockwise rotation pump assembly
1PN SERIES
HYDRAULIC GEAR PUMPS

4 to 28.1 cm³/rev (0.244 to 1.715 in³/rev)
280 bar (4060 psi) peak pressure
1PN SERIES TECHNICAL DATA

OPERATING PARAMETERS

1PN Series pumps are designed to provide high performance levels and long life when operated within the parameters shown. For operation outside these parameters please consult your David Brown Hydraulics representative.

Maximum port pressures see below.

<table>
<thead>
<tr>
<th>Speed Range</th>
<th>All models</th>
<th>see table below</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>Minimum at start-up</td>
<td>-40°C (-40°F)</td>
</tr>
<tr>
<td></td>
<td>Maximum continuous</td>
<td>+80°C (+176°F)</td>
</tr>
<tr>
<td></td>
<td>Maximum intermittent</td>
<td>+100°C (+212°F)</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Maximum at start-up</td>
<td>2000 mm²/sec</td>
</tr>
<tr>
<td></td>
<td>Maximum continuous</td>
<td>250 mm²/sec</td>
</tr>
<tr>
<td></td>
<td>Minimum continuous</td>
<td>10 mm²/sec</td>
</tr>
<tr>
<td></td>
<td>Optimum</td>
<td>15-25 mm²/sec</td>
</tr>
</tbody>
</table>

Fluid Cleanliness

To ISO4406 solid contaminant

<table>
<thead>
<tr>
<th>Start-up period</th>
<th>21/17</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum in service</td>
<td>19/15</td>
</tr>
<tr>
<td>Optimum</td>
<td>16/11</td>
</tr>
<tr>
<td>Maximum water</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

Fluid Velocity

Maximum in INLET line 2.5 m/sec (8 ft/sec)

Recommended in INLET line 1.5 m/sec (5 ft/sec)

Fluids

All data is quoted for mineral oils HM and HV.

For fire resistant and environmentally aware fluids please contact your David Brown representative.

Rotation

Clockwise or Anti-clockwise viewed from shaft end (not reversible).

<table>
<thead>
<tr>
<th>MODEL</th>
<th>DISPLACEMENT cm³/rev (in³/rev)</th>
<th>OUTLET PRESSURE Rated - bar (psi)</th>
<th>Peak - bar (psi)</th>
<th>SPEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1PN 040</td>
<td>4.0 (0.244)</td>
<td>250 (3625)</td>
<td>280 (4060)</td>
<td>600</td>
</tr>
<tr>
<td>1PN 061</td>
<td>6.1 (0.372)</td>
<td>250 (3625)</td>
<td>280 (4060)</td>
<td>600</td>
</tr>
<tr>
<td>1PN 082</td>
<td>8.2 (0.500)</td>
<td>250 (3625)</td>
<td>280 (4060)</td>
<td>600</td>
</tr>
<tr>
<td>1PN 095</td>
<td>9.5 (0.579)</td>
<td>250 (3625)</td>
<td>280 (4060)</td>
<td>600</td>
</tr>
<tr>
<td>1PN 119</td>
<td>11.9 (0.726)</td>
<td>250 (3625)</td>
<td>280 (4060)</td>
<td>600</td>
</tr>
<tr>
<td>1PN 135</td>
<td>13.5 (0.823)</td>
<td>250 (3625)</td>
<td>280 (4060)</td>
<td>600</td>
</tr>
<tr>
<td>1PN 140</td>
<td>14.0 (0.854)</td>
<td>250 (3625)</td>
<td>280 (4060)</td>
<td>600</td>
</tr>
<tr>
<td>1PN 146</td>
<td>14.6 (0.890)</td>
<td>250 (3625)</td>
<td>280 (4060)</td>
<td>600</td>
</tr>
<tr>
<td>1PN 168</td>
<td>16.8 (1.025)</td>
<td>250 (3625)</td>
<td>280 (4060)</td>
<td>600</td>
</tr>
<tr>
<td>1PN 192</td>
<td>19.2 (1.171)</td>
<td>250 (3625)</td>
<td>280 (4060)</td>
<td>600</td>
</tr>
<tr>
<td>1PN 229</td>
<td>22.9 (1.397)</td>
<td>210 (3045)</td>
<td>250 (3625)</td>
<td>600</td>
</tr>
<tr>
<td>1PN 281</td>
<td>28.1 (1.714)</td>
<td>175 (2540)</td>
<td>210 (3045)</td>
<td>600</td>
</tr>
</tbody>
</table>

INLET CONDITIONS

It is essential that pumps are installed so that the pump can draw sufficient oil under all operating conditions. 1PN Series pump inlet porting is designed to facilitate full volume fill but the following machine design recommendations should be followed.

- Never run pumps dry - particular care should be taken to open any shut-off valves.
- Use large diameter pipes and fittings and avoid sharp bends and long lengths.
- Fluid velocity should not exceed 2.5 m/sec (8.0 ft/sec) calculated by:
  
  \[
  V = \frac{21.22Q}{D^2} \text{ m/sec where } V = \text{velocity (m/sec)} \\
  Q = \text{flow rate (l/min)} \\
  \frac{V}{Q} = \frac{0.408Q}{D^2} \text{ ft/sec where } V = \text{velocity (ft/sec)} \\
  Q = \text{flow rate (US gal/min)} \\
  \frac{D}{D} = \text{bore diameter (mm)} \\
  \frac{D}{D} = \text{bore diameter (inches)}
  \]

- If possible mount the pump below the lowest level of fluid in the tank. If necessary prime the pump on start-up.
- Ensure that inlet lines are airtight.
- Particular care should be taken where high speeds and/or high fluid viscosities are involved.

As a general rule pressure at the pump inlet should not be less than 0.93 bar absolute (2" Hg dpression) at normal viscosity of 23 mm²/sec (110 SSU).

David Brown Hydraulics' Engineers will be pleased to advise on any installation.
**1PN SERIES INTRODUCTION**

**A RANGE OF SINGLE AND MULTIPLE PUMPS**

Pump elements are available with displacements from 4.0 to 22.9 cm³/rev (0.244 to 1.397 in³/rev) for maximum continuous operating pressures of up to 250 bar and peak operating pressures of up to 280 bar. Maximum inlet pressure is 2 bar.

Pumps can be supplied as single, or as multiple units. Pumps can also be used as add-on units to other pumps types in a wide variety of combinations.

Please contact your David Brown Hydraulics representative to discuss your specific requirement or for more information on possible combinations of triple and quadruple pumps.

**SINGLE PUMPS**

**DOUBLE PUMPS**

**ADD ON TO OTHER PUMPS**

Triple, quad and other combinations are also available, please consult your DB Hydraulics representative for details.

---

**1PN SERIES MODEL NUMBERS**

<table>
<thead>
<tr>
<th>Code</th>
<th>Displacement</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>cm³/rev</td>
<td>in³/rev</td>
</tr>
<tr>
<td>040</td>
<td>4.0</td>
<td>0.244</td>
</tr>
<tr>
<td>061</td>
<td>6.1</td>
<td>0.372</td>
</tr>
<tr>
<td>082</td>
<td>8.2</td>
<td>0.500</td>
</tr>
<tr>
<td>095</td>
<td>9.5</td>
<td>0.579</td>
</tr>
<tr>
<td>119</td>
<td>11.9</td>
<td>0.726</td>
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<td>1.025</td>
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<td>192</td>
<td>19.2</td>
<td>1.171</td>
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<td>22.9</td>
<td>1.397</td>
</tr>
<tr>
<td>281</td>
<td>28.1</td>
<td>1.714</td>
</tr>
</tbody>
</table>

**Outrigger bearing**

- **Code**: O
- **Description**: Required
- **Code**: S
- **Description**: Not required

Refer to page 6 for details.

**Rear cover**

- **Code**: S
  - **Description**: Standard
- **Code**: R
  - **Description**: Ports in rear cover
- **Code**: L
  - **Description**: With load sensing valve
- **Code**: V
  - **Description**: With relief valve
- **Code**: Y
  - **Description**: With priority flow valve
- **Code**: Z
  - **Description**: With flow control valve

Refer to your local David Brown Hydraulics representative for details of availability of codes L, Y & Z.

**Outlet port type**

Refer to page 6 for options.

**Inlet port type**

Refer to page 6 for options. (Use code 00 for No Port - applies to sections of multiple pumps only.)
Please note: Other flanges may be available which are not displayed here. Please contact your local representative.
Please note: Other shafts may be available which are not displayed here. Please contact your local representative.
1PN SERIES  TECHNICAL DETAILS

PORT TYPES

<table>
<thead>
<tr>
<th>MODEL TYPE</th>
<th>PORT TYPE</th>
<th>Flange Ports - Type 1</th>
<th>Flange Ports - Type 2</th>
<th>Threaded Ports - Type 3</th>
<th>Threaded Ports - Type 4</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A B C</td>
<td>D F D</td>
<td>H J H</td>
<td>M N M</td>
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<td>190</td>
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<tr>
<td>229</td>
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<td>■ ■ ■</td>
<td>■ ■ ■</td>
<td>■ ■ ■</td>
<td>■ ■ ■</td>
</tr>
</tbody>
</table>

■ = Preferred option. Other port types may be available - consult your David Brown Hydraulics representative for further information.

OUTRIGGER BEARINGS

PUMP EFFICIENCY

TYPICAL PUMP EFFICIENCIES
Before dismantling ensure that the external surfaces of the pump and any work surfaces are clean.

Identify parts as they are disassembled so that they can be rebuilt in the same order, i.e. wearplate position, gear mesh etc.

Examine metal parts for signs of degradation or wear, if there are any serious signs of wear on the gears, in the housing, or in the bearings, then the complete pump should be replaced.

If all metal parts are in good order the pump may be rebuilt using new seals throughout.
From our headquarters in the UK and subsidiary companies in Europe and Australia, together with other associated companies throughout the world, David Brown Hydraulics is able to offer global sales and service support for its mobile hydraulics products.

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David Brown Hydraulics’ Engineers have years of experience of working with customers to establish optimum hydraulic circuits. Where possible standard products are specified but, if applicable, customised or special designs can be produced.

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