This instruction is valid for all D4 pump models shown on page 2

<table>
<thead>
<tr>
<th>Contents</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of components</td>
<td>2</td>
</tr>
<tr>
<td>Exploded view</td>
<td>3</td>
</tr>
<tr>
<td>Ordering code/Service intervals</td>
<td>4</td>
</tr>
<tr>
<td>Inspection of rotors/Sectional view</td>
<td>5</td>
</tr>
<tr>
<td>List of tools/Inspection of shaft seal</td>
<td>6</td>
</tr>
<tr>
<td>Dismantling/Reassembly</td>
<td>7</td>
</tr>
<tr>
<td>Pressure relief valve</td>
<td>11</td>
</tr>
</tbody>
</table>
Before commencing any work, read this instruction carefully!
Failure to comply with these instructions may cause damage and personal injury!

For more information about the pumps identification code, technical data and performance we refer to the D4 Product description.
For more information about the pumps installation, start-up and trouble shooting we refer to the IMO Installation and Start-up instruction for medium and high pressure pumps.

**List of components**

Valid for all D4 pumps in sizes: D4 025/032/038/045/052/060/070; Rotor diameter and Generation: L2/K2/N2

With version codes:

```
L  R  B  E
I  V  J  P
```

The version code is composed of the letters in the 4 columns. Also valid for pump options A101.

*Note: version NTBP is only available for sizes 025-038

---

**Example of pump designations**

**std:** D4 025L2 LRBE

**option:** D4 038 K2 LVBP A 101

---

### List of components

<table>
<thead>
<tr>
<th>Pos No</th>
<th>Denomination</th>
<th>Qty</th>
<th>G011</th>
<th>G012</th>
<th>G050</th>
<th>G057</th>
<th>P.E.</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Power rotor (CCW-rot.)</td>
<td>1</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>(x)</td>
<td></td>
</tr>
<tr>
<td>102</td>
<td>Power rotor (CW-rot.)</td>
<td>1</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>113</td>
<td>Key</td>
<td>1</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1030</td>
<td>Valve</td>
<td>1</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>124</td>
<td>Retaining ring</td>
<td>1</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>124A</td>
<td>Support ring</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>124B</td>
<td>Washer</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>139</td>
<td>Balancing washer</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>139A</td>
<td>Retaining ring</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>201</td>
<td>Idler rotor (CCW-rot.)</td>
<td>2</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td>(x)</td>
<td></td>
</tr>
<tr>
<td>202</td>
<td>Idler rotor (CW-rot.)</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>376</td>
<td>Balancing bush</td>
<td>2</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>382</td>
<td>Screw</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>391</td>
<td>Plate</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>395</td>
<td>Support plate</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>395A</td>
<td>Screw</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>401</td>
<td>Pump body</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>423</td>
<td>O-ring</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>427</td>
<td>Split flange</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>427A</td>
<td>Weld stud</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>428</td>
<td>Screw</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>428A</td>
<td>Washer</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>451</td>
<td>Screw</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>451A</td>
<td>Washer</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>453</td>
<td>Screw</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>453A</td>
<td>Washer</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>455</td>
<td>Screw</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>463</td>
<td>Plug</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>463A</td>
<td>Washer</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>489</td>
<td>Strainer</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>491</td>
<td>Nut</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>497</td>
<td>Valve seat</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>497A</td>
<td>O-ring</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>501</td>
<td>Front cover</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>506</td>
<td>O-ring</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>507</td>
<td>Washer</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>509</td>
<td>Shaft seal</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>520</td>
<td>Cover</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>520A</td>
<td>O-ring</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>521</td>
<td>Screw</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>521A</td>
<td>Washer</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>551, 5510</td>
<td>Inlet chamber</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>556</td>
<td>Gasket</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>557</td>
<td>Plug</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>601</td>
<td>Valve cover</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>602</td>
<td>Washer</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Pos No</td>
<td>Denomination</td>
<td>Qty</td>
<td>G011</td>
<td>G012</td>
<td>G050</td>
<td>G057</td>
<td>P.E.</td>
<td>Note</td>
</tr>
<tr>
<td>--------</td>
<td>-------------------------</td>
<td>-----</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>605</td>
<td>O-ring</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>608</td>
<td>Valve spindle</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>608A</td>
<td>Retaining ring</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>608B</td>
<td>Valve spindle</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>608C</td>
<td>Nut</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>608D</td>
<td>Pin</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>609</td>
<td>Washer</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>609A</td>
<td>Screw</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>611</td>
<td>Washer</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>612</td>
<td>Regulating nut</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>614</td>
<td>Valve piston</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>615</td>
<td>Spring</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11</td>
</tr>
</tbody>
</table>

Note 1: Valid for sizes 025-060 xxJE
Note 2: Only for xxBP size 060-070
Note 3: Only for xxBP size 025-032
Note 4: Only for xxBP size 038-052
Note 5: Not for xxBP
Note 6: Valid for xxBP size 025-032, 060-070
Note 7: Valid for xxTE
Note 8: Valid for xxTE, xxJE
Note 9: Not for xxTE
Note 10: Valid for xxJE
Note 11: Valid for xxBP
Note 12: Valid for xxBP sizes 025-052
Note 13: Valid for sizes 025

Exploded view

Fig. 1
Service intervals

The intervals for inspection and replacement of wear parts vary greatly with the properties of the pumped liquid and can only be determined by experience. All internal parts of the D4-pump are lubricated by the pumped liquid. Pumping a liquid containing abrasive materials, or a liquid that is corrosive, will significantly reduce service life and call for shorter service intervals. Wear in the pump may be indicated by:

- Vibration
- Noise
- Loss of capacity
- Reduction in flow or pressure
- Leakage

In installations where unplanned shut downs must be avoided, it is advisable to have a complete pump available for replacement, should any malfunction occur. Furthermore we recommend planned inspection and overhaul at regular intervals, not exceeding 3 years. It is recommended always to have the spares included in the minor spare part kit available.

Before any maintenance work, ensure that the driver is deenergized and the pump hydraulically isolated.

Connecting and disconnecting of electric cables must be done only by personnel authorized to do such work.

If the pumps operating temperature exceeds 60°C let the pump cool off before any service, maintenance or dismantling work is commenced to avoid burn injury.

All work carried out on the pump has to be performed in such a manner that risks for personal injury are observed!

When handling liquids that may harm skin use gloves and/or protective clothing.

When handling liquids which may involve fire hazards appropriate precautions to avoid danger are to be taken.

In case of failure for a system with elevated pressure, fluid jets may cause injury and/or damage.

Oil leakage may make the floor slippery and cause personal injury.
**Inspection of rotors**

If the pump is not able to maintain the pressure inspect the rotor parts by following the instructions in fig. 10-11.

Internal clearances in the pump, which are vital for its proper function, may have been affected by wear. Acceptable wear can be determined only by experience of the actual application. As a rule of thumb the following max clearance values may apply:

- Between rotor and bores or bushings: 0.2 mm
- Between rotor flanks: 0.2 mm

For light duties (low pressure, medium viscosity) even bigger clearances may be acceptable whilst for low visc./high pressure duties the limit will be lower. Also check if there are major scratches on these parts. If you find any of these problems, replace the whole pump element, otherwise reassemble the pump by following the instructions in fig. 12 and forward.

**Sectional view**

---

Fig. 2
List of tools necessary for dismantling/reassembly

![Tools Image]

**Fig. 3**

**O-rings**
All O-rings found to be hard or damaged shall be replaced.

**Inspection of shaft seal**
As the seal faces of a mechanical shaft seal are lubricated by the fluid, a certain leakage will always be present. Up to ten drops per hour can be considered as acceptable. An external visual inspection of the pump is advisable at least every two days to assure that the shaft seal is not leaking too much. Excessively leaking shaft seals should be changed without delay, as the leakage normally will grow worse and cause additional damage. Follow the instructions in the dismantling/reassembly session.

When working with a shaft seal, cleanliness is of utmost importance. Avoid touching the seal faces. If necessary, the seal faces should be cleaned immediately prior to assembly, using a dust free cloth and clean solvent.

Never use grease on the seal faces.

**Shaft seal – assembly drawing**

![Shaft Seal Drawing]

**Fig. 4**

**ATTENTION**
Be careful to mount these parts in right order and in right direction!
Look carefully at this drawing!
Dismantling

A.

- Turn the electricity OFF.
- Close the valves.
- Remove the pump from the system.

**ATTENTION**
Use appropriate vessels to collect oil spillage when removing and opening the pump.

Fig. 5

B.

- Note the axial position of the shaft coupling.
- Release the stop screw.
- Remove the shaft coupling with a puller.

Fig. 6

C.

- Remove the key 113.
- Remove the screws 521A.
- Use two screw drivers to carefully pull off the seal cover 520.

Fig. 7

D.

- Remove the seal seat S1 and O-ring S2 from the seal cover 520.

**ATTENTION**
Protect the face of S1.

Fig. 8
E.

- Remove the screws 451 and washers 451A.
- Carefully loosen the front cover 501 from the pump body 401 with a plastic mallet.
- Remove the front cover 501 and rotor set in one move.

**ATTENTION**

Protect the face of S4.

Fig. 9

F.

- Remove the screws 451 and washers 451A.
- Carefully loosen the front cover 501 from the pump body 401 with a plastic mallet.
- Remove the front cover 501 and rotor set in one move.

Fig. 10

G.

- Inspect the rotors, balancing bushes 376 and O-ring 506 by separating them.

Fig. 11

H.

- Separate the front cover 501 and the power rotor 102.

**ATTENTION**

Be careful not to make scratches in the surfaces of the balancing piston bore.

Fig. 12
Reassembly

A.

- Check prior to assembly – by mounting the balancing bushes (376) in the pump body (401) and by placing a ruler over their end faces – that the balancing bushes extend 0,0 - 0,25 mm above the end face on the pump body. If not, replace the balancing bushes.

B.

- Fit the O-ring 506.
- Lubricate it with bearing grease if it is difficult to keep it in place.

C.

- A nick has been filed on the power rotor thread on the outer diameter at the discharge end. This marked power rotor thread should be fitted into the female thread on the idler rotors marked in the same manner.

D.

- Fit the power rotor 102 in the front cover 501. (See fig. 12).
- Lubricate the rotor set.
- Assemble it including balancing bushes 376.

E.

- Carefully insert the rotor set into the pump body 401.
- Watch the position of O-ring 506.
- Make sure the bolt holes match.
- Fit the screws 451 and the washers 451A. Tight the screws crosswise.
F.

- Lubricate and fit the O-ring 520A on the seal cover 520. Fit the seal cover onto the power rotor shaft 102.
- Fit the screws 521 and tighten them carefully.
- Fit the shaft key 113.

Fig. 20

G.

- Fit the O-ring S2 in the seal seat S1.
- Fit the seat S1 in the seal cover 520.

ATTENTION
Do not use dirty fingers on the seal face. Keep it clean and dry.

Fig. 19

H.

- Lubricate the power rotor shaft, the bellows unit S5 and the seal ring S4.
- Fit the bellows unit S5 into the front cover 501.
- Fit the seal ring S4. Note the position of the drive notches on S4 and S5. They need to fit together.

Fig. 18

I.

- Fit the coupling half back into place and lock with locking screw.
- Check that the axial position is the same as before dismantling. (See fig. 6).
- Put the pump back into the system and proceed according to instructions under "Start-up" in the installation manual.

Fig. 21
Pressure relief valve D4xxBP

Dismantle
- Remove the valve unit from the pump.
- Release spring force by turning the spindle CCW.

025-052
- Loosen cover 601 and remove it together with the nut by using the valve spindle.
- Remove retainer 608A or C.
- Pull out the valve spindle (608 or 608B) and replace the O-ring (605).

060-070
- Remove cover (601) by removing screws (455) and remove spring washer (611).
- Remove screw (609A) and washer 609.
- Unwind the spindle (608). Replace the O-ring (605).
- Remove spring (615) and valve piston (614).
- Replace valve piston if it is damaged.
- If the valve seat is damaged the whole inlet chamber (5510) has to be replaced.
- Reassemble in reversed order.