DESMI vertical "in-line" centrifugal pump
NSL Monobloc

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Special pump No. ..............................................
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1. PRODUCT DESCRIPTION

These operation and maintenance instructions apply to the DESMI NSL Monobloc pump.

The pump is a single-stage vertical "in-line" centrifugal pump (i.e. horizontal inlet and outlet on the same line) equipped with stainless steel shaft, mechanical shaft seal, and closed impeller.

The pump is suitable for the pumping of liquids with temperatures up to 80°C. With special shaft seal up to 100°C in Monobloc pumps with bearing (\(I\)-02 design) and up to 140°C in Monobloc pumps without bearing (\(I\)-12 design). For pumping of liquids with temperatures above 100°C DESMI recommends using nothing but ductile iron (for instance GGG40) for pump casing and rear cover. Max. working pressure and number of revolutions are indicated under Operating Data.

The pump is particularly suitable for the pumping of water in connection with cooling systems, cooling of diesel engines, as bilge pumps, ballast pumps, fire pumps, brine pumps, pumps for irrigation, fish farms, water works, district heating, salvage corps, army and navy, etc.

The descriptions in the operation and maintenance instructions are divided into two parts covering the groups \(\phi 215/265\) and \(\phi 330/415/418/525\), as the designs of these two groups are different. The numbers refer to the standard impeller diameter of the pump. E.g.:

\(\phi 215/265\): Pumps with \(\phi 215\) or \(\phi 265\) impellers:
The back of the impeller is equipped with relief blades to reduce the load on the bearings. The line through inlet and outlet is flush with the centre line of the shaft.

\(\phi 330/415/418/525\): Pumps with \(\phi 330\), \(\phi 415\), \(\phi 418\) or \(\phi 525\) impellers:
The back and the front of the impeller are equipped with sealing rings and relief holes to reduce the load on the bearings. The pump inlet and outlet are tangential i.e. the line through inlet and outlet is offset in relation to the centre line of the shaft.

1.1 DELIVERY
- Check on delivery that the shipment is complete and undamaged.
- Defects and damages, if any, to be reported to the carrier and the supplier immediately in order that a claim can be advanced.

2. TECHNICAL DATA

The pumps are manufactured in various material combinations which appear from the type number on the name plate. See below.

2.1 EXPLANATION OF THE TYPE NUMBER

All the NSL pumps are provided with a name plate. The type number indicated on the name plate is built up as follows:

NSLXXX-YYY-MR-Z

XXX: Pressure branch diameter, YYY: Standard impeller diameter
M: The material combination of the pump.
R: The assembly combination of the pump.
Z: Other variants
M may be the following:
A: Casing and shaft seal cover: Cast iron + cast iron alloy. Impeller and sealing rings: NiAlBz
B: Casing and shaft seal cover: Cast iron + cast iron alloy. Impeller and sealing rings: Stainless.
C: All cast iron
D: Casing and shaft seal cover: Bronze or NiAlBz. Impeller and sealing rings: NiAlBz or Stainless steel
E: Casing and shaft seal cover: NiAlBz and bronze alloy. Impeller and sealing rings: NiAlBz
S: Casing, shaft seal cover, impeller and sealing rings: SAF2507 and stainless steel alloy.
U: Nonmagnetic material

The pumps can be delivered in other material combinations according to agreement with the supplier.

R may be the following:
02: Monobloc, with bearing in the pump
12: Monobloc, without bearing in the pump
13: Spacer, light bearing housing
14: Spacer, heavy bearing housing
15: Spacer, heavy bearing housing and heavy motor bracket (special motor bracket)

Z may be the following:
i: PN16 flanges
j: PN25 flanges
k: Special flange
l: Other shaft seal
m: BS flanges
n: ANSI flanges
o: Shockproof design
p: Other design
q: JIS flanges

Any use of the pump is to be evaluated on the basis of the materials used in the pump. In case of doubt, contact the supplier.

Pumps in material combinations A and C are primarily used for fresh water.
Pumps in material combination D are primarily used for seawater.

If the pumps are designed for special purposes the following is to be indicated:

Pump No. :
Pump type :
Application :
Comment :

2.2 TECHNICAL DESCRIPTION
The noise level indicated is the airborne noise including the motor. The noise depends on the motor type supplied, as the noise from the pump can be calculated as the noise level of the motor + 2dB(A). The noise level is for pumps with electric motors.

The capacity of the pump appears from the name plate on the pump. If the pump has been delivered without motor, the pump capacity is to be indicated on the plate when mounting the motor.

The permissible loads on the flanges appear from the following table. The values apply to standard pumps in bronze (Rg5) and cast iron (GG20). As to pumps in SG iron (GGG40), NiAlBz or stainless steel the values are to be increased by factor 1.5.
In connection with the permissible loads on the flanges the following is to be observed:

\[
\left( \frac{\sum F \text{ calc}}{\sum F} \right)^2 + \left( \frac{\sum M \text{ calc}}{\sum M} \right)^2 < 2
\]

where index "calc" is the values calculated by the user.

At the same time none of the forces or moments may exceed the indicated figure multiplied by 1.4.
3. INSTALLATION

3.1 MOUNTING/FASTENING
The pump should be mounted and fastened on a solid base plate with a flat and horizontal surface to avoid distortion.

The max. permissible loads on the flanges stated in paragraph 2.2 are to be observed.

At installations pumping hot or very cold liquids, the operator must be aware that it is dangerous to touch the pump surface and, consequently, he must take the necessary safety measures.

3.2 WIRING

Wiring to be carried out by authorised skilled workmen according to the rules and regulations in force.

4. TRANSPORT/STORAGE

The weights of the pumps in A and D combination (without motor) are stated in the following table, and the pumps are to be lifted as shown below. The D12-combination is as standard only available in ø330/415/418/525.

<table>
<thead>
<tr>
<th>Pump</th>
<th>Weight in kg A02 / D02 / A12 / D12 comb. incl. base plate</th>
<th>Pump</th>
<th>Weight in kg A02 / D02 / A12 / D12 comb. incl. base plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSL80-215</td>
<td>126 / 141 / 100 / ----</td>
<td>NSL150-415</td>
<td>454 / 474 / 404 / 424</td>
</tr>
<tr>
<td>NSL80-265</td>
<td>135 / 152 / 109 / ----</td>
<td>NSL200-265</td>
<td>207 / 240 / 181 / ----</td>
</tr>
<tr>
<td>NSL80-330</td>
<td>256 / 261 / 206 / 211</td>
<td>NSL200-330</td>
<td>409 / 394 / 359 / 344</td>
</tr>
<tr>
<td>NSL100-215</td>
<td>137 / 154 / 111 / ----</td>
<td>NSL200-415</td>
<td>529 / 549 / 479 / 499</td>
</tr>
<tr>
<td>NSL100-265</td>
<td>136 / 153 / 120 / ----</td>
<td>NSL200-525</td>
<td>699 / 789 / 629 / 719</td>
</tr>
<tr>
<td>NSL100-330</td>
<td>261 / 267 / 211 / 217</td>
<td>NSL250-265</td>
<td>301 / 341 / 296 / ----</td>
</tr>
<tr>
<td>NSL100-415</td>
<td>379 / 399 / 329 / 349</td>
<td>NSL250-330</td>
<td>489 / 479 / 439 / 429</td>
</tr>
<tr>
<td>NSL125-215</td>
<td>148 / 163 / 122 / ----</td>
<td>NSL250-415</td>
<td>609 / 614 / 559 / 564</td>
</tr>
<tr>
<td>NSL125-265</td>
<td>154 / 175 / 128 / ----</td>
<td>NSL250-525</td>
<td>809 / 924 / 739 / 854</td>
</tr>
<tr>
<td>NSL125-415</td>
<td>414 / 434 / 364 / 384</td>
<td>NSL300-418</td>
<td>927 / 735 / 807 / 685</td>
</tr>
<tr>
<td>NSL150-215</td>
<td>167 / 191 / 141 / ----</td>
<td>NSL300-525</td>
<td>870 / 1005 / 800 / 935</td>
</tr>
<tr>
<td>NSL150-265</td>
<td>172 / 197 / 146 / ----</td>
<td>NSL350-525</td>
<td>1408 / 1285 / 1270 / 1230</td>
</tr>
<tr>
<td>NSL150-330</td>
<td>339 / 329 / 289 / 279</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The weights of the pumps in E and S (without motor) are equivalent to pumps in A code.

The pump is to be stored in a dry area.

Before shipment the pump is to be fastened securely on pallets or the like.
The pump is to be lifted in the following way:

The lifting straps must not bear against sharp edges and corners

5. DISMANTLING

5.1 ACCESS TO IMPELLER
The numbers in brackets refer to the position numbers on the assembly drawing.

ø215/265 02-combination
Remove guards (28). Remove Allen screws (22) which hold the shaft seal cover (18) and the motor bracket (20) to the pump casing (1). Dismantle copper pipe (58). Remove motor bracket and motor. Loosen shaft seal cover (18) from pump casing by means of the two M12 bolts in the threaded holes in the shaft seal cover. The shaft seal cover with shaft and impeller can now be lifted up allowing inspection of the impeller.

ø215/265 12-combination
Remove guards (28). Remove Allen screws (22) which hold the motor bracket (20) to the pump casing (1). Stainless steel pumps have separate rear cover (18) and motor bracket (20), and use Allen screw (40) to connect. Dismantle copper pipe (58). The top piece can now be lifted up allowing inspection of the impeller.

ø330/415/418/525 02-combination
Remove guards (28). Remove set screws (64) which hold the motor bracket (20) to the pump casing (1). Dismantle copper pipe (58). Remove motor bracket and motor. Remove set screws (22) with washers (23), which hold the shaft seal cover (18) to the pump casing. Loosen the shaft seal cover from the pump casing by means of the pointed screws (86). The shaft seal cover with shaft and impeller can now be lifted up allowing inspection of the impeller.

ø330/415/418/525 12-combination
Remove guards (28). Remove set screws (64) which hold the motor bracket (20) to the pump casing (1). Dismantle copper pipe (58). Remove motor bracket and motor. Remove set screws (22) with washers (23), which hold the shaft seal cover (18) to the pump casing. Loosen the shaft seal cover from the pump casing by means of the pointed screws (86). The motor and motor bracket with shaft seal cover and shaft with impeller can now be lifted up allowing inspection of the impeller.
5.2 DISMANTLING SHAFT SEAL
Ø215/265 02-combination
Pull the shaft seal cover off the motor bracket, by which the coupling (19) is pulled off the motor shaft. Remove nut (6). Pull off the impeller (5) and remove sunk key (9). Remove Allen screws (16), which hold the bearing cover (15) to the shaft seal cover. Pull shaft seal cover and bearing cover apart, by which shaft seal (10) and water deflector (11) are pulled off the shaft.

Ø215/265 12-combination
Remove nut (6). Pull off the impeller (5) and remove sunk key (9). Remove set screws (71) and pull motor bracket and electric motor with shaft (17) apart, by which the shaft seal is pulled off the shaft.

Ø330/415/418/525 02-combination
Remove set screw (6). Pull off the impeller, and remove sunk key (9). Remove Allen screws (16), which hold the bearing cover (15) to the shaft seal cover. Pull shaft seal cover and bearing cover apart, by which the shaft seal (10) is pulled off the shaft.

Ø330/415/418/525 12-combination
Remove set screw (6). Pull off the impeller, and remove sunk key (9). Pull shaft seal cover out of motor bracket, by which the shaft seal (10) is pulled off the shaft.

5.3 DISMANTLING SEAT
Press out the seat from behind the shaft seal cover or motor bracket (Ø215/265 in 12-combination).

5.4 DISMANTLING BEARING (ONLY 02-COMBINATION)
Before dismantling bearing, remove ring lock (12). Pull the shaft/coupling out of the bearing cover and press the bearing out of the bearing cover.

5.5 INSPECTION
When the pump has been dismantled, check the following parts for wear and damage:

- Sealing ring/impeller: Max. clearance 0.4-0.5 mm measured in radius.
- Shaft seal/shaft seal cover: Check the seat for flatness and cracks. Check the rubber parts for elasticity.
- Bearings: Replace in case of wear and noise.

5.6 DISMANTLING COUPLING (02-COMBINATION) / SHAFT (12-COMBINATION)

It is not necessary to remove the coupling in the 02-combination or the shaft in the 12-combination during normal maintenance. However, in the 12-combination the shaft must be removed when the lower bearing in the electric motor is replaced.

02-combination:
Dismantle the coupling by removing the pointed screw (73) and pull off the coupling. If the coupling is removed on the assembled pump, take care that the bearing is not damaged by pulling too hard on the coupling. If the coupling is removed after dismantling the pump, fix the shaft at the thread at the opposite shaft end, while the coupling is pulled off. The coupling might be heated to facilitate dismantling.

12-combination:
Remove pointed screws (73). Pull off the shaft. The coupling might be heated to facilitate dismantling.
6. ASSEMBLING

6.1 FITTING SEALING RINGS
When fitted, the sealing ring (4) is to bear against the shoulder of the pump casing.

ø330/415/418/525
When fitted the sealing ring (27) is to bear against the shoulder of the shaft seal cover (20). And for ø418 secure it with countersunk screws (105)

6.2 FITTING BEARING (ONLY 02-COMBINATION)
Place the support disc (14) (grease valve ring in ø330/415/418/525 with angular ball bearings) in the bearing cover and press the bearing into place in the bearing cover. Lead the shaft through the bearing cover, support disc and bearing, and press the bearing into place up against the support disc. Fit ring lock (12).

ø330/415/418/525
Fit cover under bearing (26).

6.3 FITTING WATER DEFLECTOR (ONLY 02-COMBINATION)
ø215/265
Assemble bearing cover and shaft seal cover. Lead the water deflector (11) over the shaft until it touches the shaft seal cover and then further 1-1.5 mm into the shaft seal cover. Do not fasten bearing cover and electric motor until the motor has been mounted and the shaft can rotate freely without noise.

ø330/415/418/525
Lead the water deflector (11) over the shaft until it touches the cover under bearing (26) and then further 1-1.5 mm towards the cover under bearing. Assemble bearing cover and shaft seal cover. Do not fasten bearing cover and electric motor until the motor has been mounted and the shaft can rotate freely without noise.

6.4 FITTING SHAFT SEAL
For pumps with balanced shaft seal type ELK (="-L" included in pump code on name plate) please read appendix A.

Before fitting the seat, clean the recess in the shaft seal cover or the motor bracket (ø215/265 in 12-combination). When fitting the seat, remove the protective coating without scratching the lapped surface. Dip the outer rubber ring of the seat into soapy water. Now press the seat into place with the fingers and check that all parts are correctly imbedded.

If it is necessary to use tools for assembling, then protect the sliding surface of the seat to prevent it from being scratched or cut. Lubricate the inner surface of the slide ring rubber bellows with soapy water and push it over the shaft. The use of a conical fitting bush as shown on the assembly drawing is recommended to avoid that the rubber bellows is cut.

Push the slide ring over the shaft with the hand. If the rubber bellows is tight, use a fitting tool and take care that the slide ring is not damaged. If the carbon ring is not fixed, it is important to check that it is fitted correctly, i.e. the chamfered/lapped side is to face the seat. The carbon ring can be held by a little grease.

When using soapy water on the shaft, the bellows will settle and seat in abt. 15 minutes, and until then tightness should not be expected. After start, check by viewing the leak hole that there are no leaks.
6.5 FITTING IMPELLER
Fit the sunk key in the shaft and lead the impeller towards the shoulder of the shaft. Take care that the ring at the end of the shaft seal spring locates in the recess of the impeller. Secure the impeller with washers (7 and 8) and a nut (ø215/265/418) or a set screw (ø330/415/525).

6.6 FITTING SHAFT SEAL COVER OR MOTOR BRACKET (12-COMBINATION)
Place the O-ring (21) between pump casing and shaft seal cover (or motor bracket in ø215/265 12 combination) in the O-ring groove and hold it with a little grease. However, check the material of the O-ring first. As standard the material is nitrile, but it might be EPDM which will be damaged by mineral grease. Use soft soap or silicone grease for EPDM. Fit and fasten shaft seal cover or motor bracket, mounted with the electric motor, in the pump casing. Screw the pointed screws (86) back into the shaft seal cover before tightening. Fit copper pipe (58).

6.7 SHAFT
When the pump has been assembled, check that the shaft rotates freely. In case the shaft has been dismantled in the 12-combination, tap the shaft towards the shaft end of the electric motor by means of a plastic hammer, and fasten the pointed screws (first the middle screw) according to the below table. Check that the wobble, measured as close to the shaft end as possible, is within the limits indicated in the table.

<table>
<thead>
<tr>
<th>Motor size</th>
<th>Dimension Pointed screws</th>
<th>Torque Pointed screws</th>
<th>Max. wobble</th>
</tr>
</thead>
<tbody>
<tr>
<td>100/112</td>
<td>M6</td>
<td>10 Nm</td>
<td>70 μm</td>
</tr>
<tr>
<td>132</td>
<td>M8</td>
<td>24 Nm</td>
<td>70 μm</td>
</tr>
<tr>
<td>160</td>
<td>M10</td>
<td>40 Nm</td>
<td>70 μm</td>
</tr>
<tr>
<td>180</td>
<td>M12</td>
<td>55 Nm</td>
<td>70 μm</td>
</tr>
<tr>
<td>200</td>
<td>M12</td>
<td>75 Nm</td>
<td>70 μm</td>
</tr>
<tr>
<td>225</td>
<td>M16</td>
<td>160 Nm</td>
<td>70 μm</td>
</tr>
<tr>
<td>250</td>
<td>M16</td>
<td>160 Nm</td>
<td>70 μm</td>
</tr>
<tr>
<td>280</td>
<td>M16</td>
<td>160 Nm</td>
<td>70 μm</td>
</tr>
<tr>
<td>315</td>
<td>M16</td>
<td>160 Nm</td>
<td>70 μm</td>
</tr>
<tr>
<td>315 / 355</td>
<td>M20</td>
<td>320 Nm</td>
<td>70 μm</td>
</tr>
</tbody>
</table>
6.8 FITTING COUPLING (ONLY 02-COMBINATION)
Fit sunk key (76). If the coupling is fitted on the assembled pump, take care that you do not damage the bearing by pressing the coupling too hard. The coupling might be heated to facilitate the fitting. If the coupling is fitted before assembling the pump, the shaft must be supported at the opposite shaft end while the coupling is pressed into place. When the coupling bears against the shoulder of the pump shaft, fit the pointed screw.

7. FROST PROTECTION
Pumps which are not in operation during frost periods are to be drained to avoid frost damage. Remove the plug (3) at the bottom to empty the pump. Alternatively, it is possible to use anti-freeze liquids in normal constructions.

8. DISMANTLING

Before dismantling the pump make sure that it has stopped. Empty the pump of liquid before it is dismantled from the piping system. If the pump has been pumping dangerous liquids you are to be aware of this and take the necessary safety measures.

If the pump has been pumping hot liquids, take great care that it is drained before it is removed from the piping system.

9. START-UP

A centrifugal pump will not function until it has been filled with liquid between the foot valve and somewhat above the impeller of the pump. The liquid also serves as coolant for the shaft seal. In order to protect the shaft seal the pump must not run dry.

ATTENTION

For safety reasons the pump is only allowed to operate against closed discharge valve for a short time (max. 5 minutes and at a max. temperature of 80°C for standard pumps). Otherwise there is a risk of damage to the pump and, at worst, of a steam explosion. If the pump is not monitored, the installation of a safety device is recommended.

Check in the electric motor manual if the bearings in the actual motor shall be lubricated with grease before first start-up.

On pumps not running the shaft shall be rotated at least 2-3 times monthly to avoid standstill damage to shaft seal and bearings. If the pump is filled with liquid it can alternatively be started up shortly.

In special applications, it may require more frequent shaft rotation or start-up in order to avoid seizing of the impeller and/or the shaft seal.

In pressurized systems the shaft seal often leaks a bit during standstill – in most cases the leakage stops shortly after the pump is started up.
It is not recommended to lead liquid (either one way or the other) through a passively rotating pump, as this may damage the shaft seal.

For the sake of the shaft seal lifetime, it is recommended to run at least 300 rpm and use max. 1 minute on acceleration from 0 to 300 rpm and max. 1 minute on deceleration from 300 to 0 rpm.

9.1 START-UP
Before starting the pump check that:

- the shaft rotates freely without jarring sounds.
- the pump casing and the suction line are filled with liquid.

Start the pump for a moment to check the direction of rotation. If the direction is correct (i.e. in the direction of the arrow) the pump may be started.
10. SYSTEM BALANCING

It is often difficult to calculate a manometric delivery head in advance. It is, however, decisively important to the quantity of liquid delivered.

A considerably smaller delivery head than expected will increase the quantity of liquid delivered, causing increased power consumption and perhaps cavitation in pump and piping. In the pump the impeller may show signs of heavy erosion caused by cavitation (corrosion) which may at times render an impeller unfit for use in a very short time. Not unusually do similar erosions occur in pipe bends and valves elsewhere in the piping system.

Therefore, after start-up, it is necessary to check either the quantity of liquid delivered or the power consumption of the pump e.g. by measuring the current intensity of the connected motor. Together with a reading of the differential pressure the quantity of water delivered can be determined against the characteristics of the pump.

Should the pump not function as intended, please proceed according to the fault-finding list. Bear in mind, though, that the pump was carefully checked and tested at the factory and that the majority of faults stem from the piping system.

<table>
<thead>
<tr>
<th>FAULT</th>
<th>CAUSE</th>
<th>REMEDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>The pump has no or too low</td>
<td>1. Wrong direction of rotation</td>
<td>Change direction of rotation to clockwise when viewed from shaft end</td>
</tr>
<tr>
<td>capacity</td>
<td>2. Piping system choked</td>
<td>(the direction of the arrow)</td>
</tr>
<tr>
<td></td>
<td>3. The pump is choked</td>
<td>Clean or replace</td>
</tr>
<tr>
<td></td>
<td>4. Suction line leaks</td>
<td>Clean the pump</td>
</tr>
<tr>
<td></td>
<td>Pump takes air</td>
<td>Find the leakage, repair the fault, non-return valve not submerged</td>
</tr>
<tr>
<td></td>
<td>5. Suction lift too high</td>
<td>Check data sheet Q/H curve and NPSH or contact DESMI</td>
</tr>
<tr>
<td></td>
<td>6. Pump and piping system wrongly dimensioned</td>
<td>As 5</td>
</tr>
<tr>
<td>The pump uses too much power</td>
<td>1. Counter-pressure too low</td>
<td>Insert orifice plate or check valve/Contact DESMI</td>
</tr>
<tr>
<td></td>
<td>2. The liquid is heavier than water</td>
<td>Contact DESMI</td>
</tr>
<tr>
<td></td>
<td>3. Foreign body in pump</td>
<td>Dismantle the pump, remove the cause</td>
</tr>
<tr>
<td></td>
<td>4. Electric motor is running on 2 phases</td>
<td>Check fuses, cable connection, and cable</td>
</tr>
<tr>
<td>The pump makes noise</td>
<td>1. Cavitation in pump</td>
<td>Suction lift too high/ Suction line wrongly dimensioned/Liquid</td>
</tr>
<tr>
<td></td>
<td></td>
<td>temperature too high</td>
</tr>
</tbody>
</table>
11. INSPECTION AND MAINTENANCE

Inspect the shaft seal for leaks at regular intervals.

- Before inspection of a pump without guard check that the pump cannot be started unintentionally.

- The system is to be without pressure and drained of liquid.

- The repairman must be familiar with the type of liquid which has been pumped as well as the safety measures he is to take when handling the liquid.

11.1 DRAINING THE PUMP

When the piping system has been drained, note that there is still liquid in the pump. Remove the liquid by dismantling the pipe plug (3) at the bottom of the pump.

11.2 BEARING

In the 12-combination the life depends on the relubrication, size and quality of the bearing in the motor.

ø215/265 in 02-combination

The bearing in the 02-combination is dimensioned for a nominal life of 25,000 working hours. The bearing is lubricated for life and requires no attention but is to be replaced in case of noise or bearing wear.

ø330/415/418/525 in 02-combination

The bearing is dimensioned for a nominal life of 100,000 working hours and is to be relubricated according to the below table. The bearing is to be replaced in case of noise or bearing wear.

Light bearing housing (single-row ball bearing)

The bearing is to be relubricated through the lubricator nipple (84) in the bearing cover (15). In connection with replacement, the bearings are to be mounted with the RS - sealing facing downwards, fill the bearing itself with grease and place a grease bead on the bearing towards the shaft in a quantity corresponding to the table below.

Heavy bearing housing (two angular ball bearings)

The bearings are to be relubricated through the lubricator nipple (84) in the bearing cover (15). Fill the bearings with grease and place a grease bead on the bearing towards the shaft in a quantity corresponding to the table below.
<table>
<thead>
<tr>
<th>Pump</th>
<th>Assembly</th>
<th>Interval</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSL80-330</td>
<td>Light bearing</td>
<td>4500 hours</td>
<td>30 g</td>
</tr>
<tr>
<td>NSL100-330</td>
<td>housing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSL125-330</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSL100-415</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSL125-415</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSL150-330</td>
<td>Heavy bearing</td>
<td>4500 hours</td>
<td>40 g</td>
</tr>
<tr>
<td>NSL200-330</td>
<td>housing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSL250-330</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSL150-415</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSL200-415</td>
<td>Heavy bearing</td>
<td>4500 hours</td>
<td>50 g</td>
</tr>
<tr>
<td>NSL250-415</td>
<td>housing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSL300-415</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSL300-418</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSL200-525</td>
<td>Heavy bearing</td>
<td>4500 hours</td>
<td>80 g</td>
</tr>
<tr>
<td>NSL250-525</td>
<td>housing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSL300-525</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSL350-525</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If the pump liquid temperature is below 80°C the following types of grease are recommended:

<table>
<thead>
<tr>
<th>ESSO</th>
<th>Beacon 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP</td>
<td>Energrease LS EP 2</td>
</tr>
<tr>
<td>Shell</td>
<td>Gadus S5 V100 2</td>
</tr>
<tr>
<td>Mobil</td>
<td>Mobil lux grease EP 2 eller Mobil plex 47</td>
</tr>
<tr>
<td>Castrol</td>
<td>Spheerol AP 2</td>
</tr>
<tr>
<td>Texaco</td>
<td>Multifak EP 2</td>
</tr>
<tr>
<td>Q8</td>
<td>Rembrandt EP 2 eller Rubens</td>
</tr>
<tr>
<td>Statoil</td>
<td>Uniway Li 62</td>
</tr>
</tbody>
</table>

If the pump liquid temperature is above 80°C, high-temperature grease is recommended, e.g. SKF LGHP2.
12. REPAIRS

12.1 ORDERING SPARE PARTS
When ordering spare parts please always state pump type, serial No. (appears on the name plate of the pump), position No. on the assembly drawing and designation on the spare parts list.

13. OPERATING DATA

The following working pressures (pressure in piping incl. the pressure increase caused by the pump) and number of revolutions are allowed in standard pumps.

ø215/265
In the 02-combination the ø215 pumps are as standard available with motors up to frame size 225 (inclusive) and ø265 pumps with motors up to frame size 280 (inclusive).

In the 12-combination the ø215 pumps are as standard available with motors up to frame size 180 (inclusive) and ø265 pumps with motors up to frame size 200 (inclusive).

ø330/415/418/525
In the 02/12-combination the ø330 pumps are as standard available with motors up to frame size 315 (inclusive) and ø415/418 pumps with motors up to frame size 355 (inclusive).

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NSL80-265</td>
<td>14.5</td>
<td>25</td>
<td>3600</td>
<td>NSL200-265</td>
<td>9</td>
<td>25</td>
<td>1800</td>
</tr>
<tr>
<td>NSL80-330</td>
<td>15 / 15</td>
<td>25</td>
<td>3600</td>
<td>NSL200-330</td>
<td>7 / 13</td>
<td>25</td>
<td>1800</td>
</tr>
<tr>
<td>NSL100-215</td>
<td>13</td>
<td>25</td>
<td>3600</td>
<td>NSL200-415</td>
<td>9 / 13</td>
<td>25</td>
<td>1800</td>
</tr>
<tr>
<td>NSL100-265</td>
<td>14.5</td>
<td>25</td>
<td>3600</td>
<td>NSL200-525</td>
<td>14</td>
<td>25</td>
<td>1800</td>
</tr>
<tr>
<td>NSL100-330</td>
<td>8 / 14</td>
<td>25</td>
<td>3000</td>
<td>NSL250-265</td>
<td>10 / 10</td>
<td>25</td>
<td>1800</td>
</tr>
<tr>
<td>NSL100-415</td>
<td>10 / 12,5</td>
<td>25</td>
<td>1800</td>
<td>NSL250-330</td>
<td>7 / 12</td>
<td>25</td>
<td>1800</td>
</tr>
<tr>
<td>NSL125-215</td>
<td>10</td>
<td>25</td>
<td>3600</td>
<td>NSL250-415</td>
<td>9 / 12</td>
<td>25</td>
<td>1800</td>
</tr>
<tr>
<td>NSL125-265</td>
<td>14.5</td>
<td>25</td>
<td>3600</td>
<td>NSL250-525</td>
<td>14</td>
<td>25</td>
<td>1800</td>
</tr>
<tr>
<td>NSL125-330</td>
<td>7 / 12</td>
<td>25</td>
<td>3000</td>
<td>NSL300-415</td>
<td>9 / 12</td>
<td>25</td>
<td>1800</td>
</tr>
<tr>
<td>NSL125-415</td>
<td>9 / 13</td>
<td>25</td>
<td>1800</td>
<td>NSL300-418</td>
<td>6 / 16</td>
<td>25</td>
<td>1800/1600</td>
</tr>
<tr>
<td>NSL150-215</td>
<td>8</td>
<td>25</td>
<td>1800</td>
<td>NSL300-525</td>
<td>14</td>
<td>25</td>
<td>1800</td>
</tr>
<tr>
<td>NSL150-265</td>
<td>7</td>
<td>25</td>
<td>1800</td>
<td>NSL350-525</td>
<td>10 / 16</td>
<td>25</td>
<td>1600</td>
</tr>
<tr>
<td>NSL150-330</td>
<td>7 / 13</td>
<td>25</td>
<td>1800</td>
<td>NSL350-525</td>
<td>10 / 16</td>
<td>25</td>
<td>1600</td>
</tr>
</tbody>
</table>

Notice: Some pump combinations allow higher speeds than stated in the table – see actual pump name plate.

The max. working pressure for NiAlBz and stainless steel pumps is 1.5 times max. working pressure for bronze (RG5).

The above-mentioned max. working pressure is a design value – delivered pumps are pressure tested according to actual application requirements and actual flange standards.

For instance the above-mentioned max. working pressure is NOT valid for pumps approved by a classification society. Pumps approved by classification societies have been pressure tested.
according to the requirements of these societies, i.e. a test pressure of 1.5 x the permissible working pressure. The test pressure is stated in the test certificate and stamped into the discharge flange of the pump.
14. EU DECLARATION OF CONFORMITY

DESMI PUMPING TECHNOLOGY A/S, hereby declare that our pumps of the NSL Monobloc type are manufactured in conformity with the following essential safety and health requirements in the COUNCIL DIRECTIVE 2006/42/EC on machines, Annex 1.

The following harmonized standards have been used:

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN/ISO 13857:2008</td>
<td>Safety of machinery. Safety distances to prevent danger zones being reached by the upper limbs</td>
</tr>
<tr>
<td>EN 60204-1:2006/A1:2009</td>
<td>Safety of machinery – Electrical equipment of machines (item 4, General requirements)</td>
</tr>
<tr>
<td>Ecodesign Directive (2009/125/EC)</td>
<td>Water pumps: Commission Regulation No 547/2012. Applies only to water pumps marked with the minimum efficiency index MEI. See pump nameplate</td>
</tr>
</tbody>
</table>

Pumps delivered by us connected with prime movers are CE-marked and comply with the above requirements.

Pumps delivered by us without prime movers (as partly completed machinery) must only be used when the prime mover and the connection between prime mover and pump comply with the above requirements.

Nørresundby, March 05 2019

Henrik Mørkholt Sørensen
Managing Director

DESMI Pumping Technology A/S
Tagholm 1
9400 Nørresundby
15. INFORMATION RELEVANT FOR DISASSEMBLY OR DISPOSAL AT END-OF-LIFE

No damage materials are used in DESMI pumps – please refer to DESMI Green Passport (can be sent on request – contact a DESMI sales office) – i.e. common recycling companies can handle the disposal at end-of-life. Alternatively the pump and motor can be returned to DESMI at end-of-life for safe recycling.

16. ASSEMBLY DRAWING ø215/265 02-COMB.
17. SPARE PARTS LIST ø215/265 02-COMB.
See ø330/415/525 pump on the next pages

1 Pump casing
2 Pipe plug
3 Pipe plug
4 Sealing ring
5 Impeller
6 Nut
7 Spring washer
8 Washer
9 Sunk key
10 Shaft seal
11 Water deflector
12 Ring lock
13 Ball bearing
14 Support disc
15 Bearing bearing
16 Allen screw
17 Shaft
18 Shaft seal cover
19 Coupling
20 Motor bracket
21 O-ring
22 Allen screw
28 Guard
58 Copper pipe
59 Hexagon nipple
70 Allen screw
71 Set screw
72 Intermediate flange
73 Pointed screw
75 INSEX-screw
76 Sunk key
81 Sealing washer
93 Set screw
94 Base plate
95 Lock washer
96 Manometer
97 Nipple
98 Sleeve
107 Pipe plug
18. ASSEMBLY DRAWING Ø215/265 12-COMB.

See stainless steel pump on the next pages

19. SPARE PARTS LIST Ø215/265 12-COMB.

1 Pump casing
2 Pipe plug
3 Pipe plug
4 Sealing ring
5 Impeller
6 Nut
7 Spring washer
8 Washer
9 Sunk key
10 Mech. shaft seal
17 Shaft
20 Motor bracket
21 O-ring
22 Allen screw
28 Guard
58 Copper pipe
59 Hexagon nipple
71 Set screw
73 Pointed screw
75 INSEX-screw
81 Sealing washer
93 Set screw
94 Base plate
95 Lock washer
96 Manometer
97 Nipple
98 Sleeve
107 Pipe plug
Stainless steel pump ø215/265 12-COMB

1. Pump casing
2. Pipe plug
3. Pipe plug
4. Sealing ring
5. Impeller
6. Nut
7. Spring washer
8. Washer
9. Sunk key
10. Mech. shaft seal
11. Shaft
12. Rear cover
13. Motor bracket
14. O-ring
15. Allen screw
16. Guard
17. Copper pipe
18. Allen screw
19. Hexagon nipple
20. Allen screw*)
21. Set screw
22. Interm. flange*)
23. Pointed screw
24. INSEX-screw
25. Sealing washer
26. Set screw
27. Base plate
28. Lock washer
29. Manometer
30. Nipple
31. Sleeve
32. Pipe plug
*) Only if motor flange is bigger than bracket
21. SPARE PARTS LIST Ø330/415/525 02-COMB.

1. Pump casing
2. Pipe plug
3. Pipe plug
4. Sealing ring
5. Impeller
6. Set screw
7. Spring washer
8. Washer
9. Sunk key
10. Mech. shaft seal
11. Water deflector
12. Ring lock
13. Ball bearing
14. Grease valve ring*
15. Bearing cover
16. Set screw
17. Shaft
18. Shaft seal cover
19. Coupling
20. Motor bracket
21. O-ring
22. Set screw
23. Lock washer
24. Cover under bearing
25. Sealing ring 2
26. Guard
27. Copper pipe
28. Hexagon nipple
29. Hexagon nipple
30. Set screw
31. Allen screw
32. Set screw
33. Intermediate flange
34. Pointed screw
35. INSEX-screw
36. Sunk key
37. Sealing washer
38. Lubricator nipple
39. Pointed screw
40. Set screw
41. Base plate
42. Lock washer
43. Manometer
44. Nipple
45. Sleeve
46. Pipe plug

*) Support disc in light bearing housing
22. ASSEMBLY DRAWING Ø330/415/525 12-COMB.

23. SPARE PARTS LIST Ø330/415/525 12-COMB.

1. Pump casing
2. Pipe plug
3. Pipe plug
4. Sealing ring
5. Impeller
6. Set screw
7. Spring washer
8. Washer
9. Sunk key
10. Mech. shaft seal
17. Shaft
18. Shaft seal cover
20. Motor bracket
21. O-ring
22. Set screw
23. Lock washer
27. Sealing ring 2
28. Guard
58. Copper pipe
59. Hexagon nipple
64. Set screw
71. Set screw
73. Pointed screw
75. INSEX-screw
81. Sealing washer
86. Pointed screw
93. Set screw
94. Base plate
95. Lock washer
96. Manometer
97. Nipple
98. Sleeve
107. Pipe plug
24. ASSEMBLY DRAWING NSL300-418 02-COMB.

25. SPARE PARTS LIST NSL300-418 02-COMB.

1. Pump casing
2. Pipe plug
3. Pipe plug
4. Sealing ring
5. Impeller
6. Cap nut
7. Spring washer
8. Inlet cone
9. Sunk key
10. Mech. shaft seal
11. Water deflector
12. Ring lock
13. Ball bearing
14. Grease valve ring
15. Bearing cover
16. Set screw
17. Shaft
18. Shaft seal cover
19. Coupling
20. Motor bracket
21. O-ring
22. Set screw
23. Lock washer
24. Stud
26. Cover under bearing
27. Sealing ring 2
28. Guard
58. Copper pipe
59. Hexagon nipple
61. Hexagon nipple
64. Set screw
70. Allen screw
71. Set screw
72. Intermediate flange
73. Pointed screw
75. INSEX-screw
76. Sunk key
81. Sealing washer
84. Lubricator nipple
86. Pointed screw
93. Set screw
94. Base plate
95. Lock washer
96. Manometer
97. Nipple
98. Sleeve
105. Countersunk screw
107. Pipe plug
26. ASSEMBLY DRAWING NSL300-418 12-COMB.

27. SPARE PARTS LIST NSL300-418 12-COMB.

1 Pump casing
2 Pipe plug
3 Pipe plug
4 Sealing ring
5 Impeller
6 Cap nut
7 Spring washer
8 Inlet cone
9 Sunk key
10 Mech. shaft seal
11 Shaft
12 Shaft seal cover
13 Motor bracket
14 O-ring
15 Set screw
16 Lock washer
17 Stud
18 Sealing ring 2
19 Guard
20 Copper pipe
21 Hexagon nipple
22 Hexagon nipple
23 Set screw
24 Set screw
25 Pointed screw
26 INSEX-screw
27 Sealing washer
28 Pointed screw
29 Set screw
30 Set screw
31 Base plate
32 Lock washer
33 Manometer
34 Nipple
35 Sleeve
36 Countersunk screw
37 Pipe plug
### 28. ASSEMBLY DRAWING NSL350-525 02-COMB.

![Assembly Drawing](image)

### 29. SPARE PARTS LIST NSL350-525 02-COMB.

<table>
<thead>
<tr>
<th>No.</th>
<th>Part Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pump casing</td>
</tr>
<tr>
<td>2</td>
<td>Pipe plug</td>
</tr>
<tr>
<td>3</td>
<td>Pipe plug</td>
</tr>
<tr>
<td>4</td>
<td>Sealing ring</td>
</tr>
<tr>
<td>5</td>
<td>Impeller</td>
</tr>
<tr>
<td>6</td>
<td>Cap nut</td>
</tr>
<tr>
<td>7</td>
<td>Spring washer</td>
</tr>
<tr>
<td>8</td>
<td>Inlet cone</td>
</tr>
<tr>
<td>9</td>
<td>Sunk key</td>
</tr>
<tr>
<td>10</td>
<td>Mech. shaft seal</td>
</tr>
<tr>
<td>11</td>
<td>Water deflector</td>
</tr>
<tr>
<td>12</td>
<td>Ring lock</td>
</tr>
<tr>
<td>13</td>
<td>Ball bearing</td>
</tr>
<tr>
<td>14</td>
<td>Grease valve ring</td>
</tr>
<tr>
<td>15</td>
<td>Bearing cover</td>
</tr>
<tr>
<td>16</td>
<td>Set screw</td>
</tr>
<tr>
<td>17</td>
<td>Shaft</td>
</tr>
<tr>
<td>18</td>
<td>Shaft seal cover</td>
</tr>
<tr>
<td>19</td>
<td>Coupling</td>
</tr>
<tr>
<td>20</td>
<td>Motor bracket</td>
</tr>
<tr>
<td>21</td>
<td>O-ring</td>
</tr>
<tr>
<td>22</td>
<td>Set screw</td>
</tr>
<tr>
<td>23</td>
<td>Lock washer</td>
</tr>
<tr>
<td>24</td>
<td>Stud</td>
</tr>
<tr>
<td>25</td>
<td>Guard under bearing</td>
</tr>
<tr>
<td>26</td>
<td>Sealing ring 2</td>
</tr>
<tr>
<td>27</td>
<td>Guard</td>
</tr>
<tr>
<td>28</td>
<td>Guard plate</td>
</tr>
<tr>
<td>29</td>
<td>Countersunk screw</td>
</tr>
<tr>
<td>30</td>
<td>Guard Plate</td>
</tr>
<tr>
<td>31</td>
<td>Screw</td>
</tr>
<tr>
<td>32</td>
<td>Washer</td>
</tr>
<tr>
<td>33</td>
<td>Copper pipe</td>
</tr>
<tr>
<td>34</td>
<td>Hexagon nipple</td>
</tr>
<tr>
<td>35</td>
<td>Hexagon nipple</td>
</tr>
<tr>
<td>36</td>
<td>Set screw</td>
</tr>
<tr>
<td>37</td>
<td>Set screw</td>
</tr>
<tr>
<td>38</td>
<td>Pointed screw</td>
</tr>
<tr>
<td>39</td>
<td>INSEX-screw</td>
</tr>
<tr>
<td>40</td>
<td>Sunk key</td>
</tr>
<tr>
<td>41</td>
<td>Sealing washer</td>
</tr>
<tr>
<td>42</td>
<td>Lubricator nipple</td>
</tr>
<tr>
<td>43</td>
<td>Pointed screw</td>
</tr>
<tr>
<td>44</td>
<td>Set screw</td>
</tr>
<tr>
<td>45</td>
<td>Base plate</td>
</tr>
<tr>
<td>46</td>
<td>Lock washer</td>
</tr>
<tr>
<td>47</td>
<td>Manometer</td>
</tr>
<tr>
<td>48</td>
<td>Nipple</td>
</tr>
<tr>
<td>49</td>
<td>Sleeve</td>
</tr>
<tr>
<td>50</td>
<td>Pipe plug</td>
</tr>
</tbody>
</table>

---

DESMI Pumping Technology A/S
Tagholm 1
9400 Nørresundby – Denmark
Tlf. nr.: +45 98 32 81 11 Fax +45 98 17 54 99
E-mail: desmi@desmi.com www.desmi.com
1. Pump casing
2. Pipe plug
3. Pipe plug
4. Sealing ring
5. Impeller
6. Cap nut
7. Spring washer
8. Inlet cone
9. Sunk key
10. Mech. shaft seal
11. Shaft
12. Shaft seal cover
13. Motor bracket
14. O-ring
15. Set screw
16. Lock washer
17. Stud
18. Sealing ring 2
19. Guard
20. Guard plate
21. Countersunk screw
22. Guard Plate
23. Screw
24. Washer
25. Copper pipe
26. Hexagon nipple
27. Hexagon nipple
28. Set screw
29. Pointed screw
30. INSEX-screw
31. Sealing washer
32. Pointed screw
33. Set screw
34. Base plate
35. Lock washer
36. Manometer
37. Nipple
38. Sleeve
39. Pipe plug
32. DIMENSIONAL SKETCH ø215/265 02-COMBINATION
See ø330/415/418/525 pumps on the next pages

Manometer: 1/4" BSP. Drain: 3/8" BSP. Priming: 1/2" BSP

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Manometer: 1/4” BSP. Drain: 3/8” BSP. Priming: 1/2” BSP

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34. DIMENSIONAL SKETCH Ø330/415/418/525 02-COMBINATION

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Base plate holes: Ø33 instead of Ø22 for NSL350-525

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### Dimensional Sketch Ø330/415/418/525 12-Combination

**Manometer:** 1/4” BSP. **Drain:** 3/4” BSP. **Priming:** 1/2” BSP

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APPENDIX A

Check length from motor shaft end to motor flange being within +/- 0.5mm of the nominal length (like 60, 80, 110, 140 and 170 mm).

If the motor shaft is too short then fit a pointed screw glued into the motor shaft end to adjust the pump shaft to correct mounting position – in order to ensure correct build in length for the ELK shaft seal.

If the motor shaft is too long then it has to be machined / milled to nominal length.

It has to be checked if the shaft sealing have the correct length when mounted on the pump shaft as shown below. I.e. there shall always be 44.5 +/- 0.5mm from sliding surface on the seat to the end of the rotating part, on the sizes of ELK sealing used by DESMI. Please observe that the rotating part protrudes 2 mm beyond the shoulder on the pump shaft as shown below.

Also make sure that the electric motor is with locked bearing in the drive end – i.e. there must not be forced axial stroke of the electric motor.

Notice! Never use mineral oil / fat as grease, as rubber parts as standard are in EPDM.

Notice! Never put grease on the sliding surfaces! They must be completely dry, dust-free and clean during the mounting procedure. Also any fingerprints shall be removed with alcohol or another suitable solvent.

Notice: ELK shaft seals must be turned after installation ... so O-rings, springs and sliding surfaces can slip into right placement before pressure testing. This is done by mounting the seal as described and later turn the shaft about 10 revolutions - with water in the pump - but without adding pressure. Then pressure test the pump as normally done.