OPERATION AND MAINTENANCE INSTRUCTIONS

DESMI vertical "in-line" centrifugal pump

NSL Spacer

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Specialpumpe nr. .................
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1. PRODUCT DESCRIPTION
These operation and maintenance instructions apply to the DESMI NSL Spacer 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 120°C. 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 ø215/265 and ø330/415/418/525, as the designs of these two groups are different. The numbers refer to the standard impeller diameter of the pump. E.g.:

ø215/265: Pumps with ø215 or ø265 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.

ø330/415/418/525: Pumps with ø330, ø415, ø418 or ø525 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)  
16: Compact spacer  

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" are 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.

<table>
<thead>
<tr>
<th>Pump</th>
<th>Fy N</th>
<th>Fz N</th>
<th>Fx N</th>
<th>F</th>
<th>My Nm</th>
<th>Mz Nm</th>
<th>Mx Nm</th>
<th>Mt</th>
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<tbody>
<tr>
<td>NSL80-215</td>
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<td>950</td>
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<td>1860</td>
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<td>4370</td>
<td>3920</td>
<td>6840</td>
<td>3630</td>
<td>2500</td>
<td>2930</td>
<td>5300</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Pump</th>
<th>Weight in kg A / D-combination incl. base plate</th>
<th>Pump</th>
<th>Weight in kg A / D-combination incl. base plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSL80-215</td>
<td>186 / 201</td>
<td>NSL150-415</td>
<td>479 / 499</td>
</tr>
<tr>
<td>NSL80-265</td>
<td>195 / 212</td>
<td>NSL200-265</td>
<td>267 / 300</td>
</tr>
<tr>
<td>NSL80-330</td>
<td>301 / 306</td>
<td>NSL200-330</td>
<td>459 / 444</td>
</tr>
<tr>
<td>NSL100-215</td>
<td>197 / 214</td>
<td>NSL200-415</td>
<td>579 / 599</td>
</tr>
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<td>829 / 919</td>
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</tr>
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<td>NSL100-415</td>
<td>404 / 424</td>
<td>NSL250-330</td>
<td>539 / 529</td>
</tr>
<tr>
<td>NSL125-215</td>
<td>208 / 223</td>
<td>NSL250-415</td>
<td>659 / 664</td>
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<td>NSL125-265</td>
<td>214 / 235</td>
<td>NSL250-525</td>
<td>939 / 1054</td>
</tr>
<tr>
<td>NSL125-330</td>
<td>326 / 332</td>
<td>NSL300-415</td>
<td>759 / 759</td>
</tr>
<tr>
<td>NSL125-415</td>
<td>439 / 459</td>
<td>NSL300-418</td>
<td>1022 / 895</td>
</tr>
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<td>227 / 251</td>
<td>NSL300-525</td>
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</tr>
<tr>
<td>NSL150-265</td>
<td>232 / 257</td>
<td>NSL350-525</td>
<td>1608 / ---</td>
</tr>
<tr>
<td>NSL150-330</td>
<td>389 / 379</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.
5. DISMANTLING

5.1 ACCESS TO IMPELLER

The numbers in brackets refer to the position numbers on the assembly drawing.

Dismantle guard (69).

ø215/265
Remove Allen screws (77) between coupling part motor (71) and spacer (72) and the screws (76), which hold the flexible coupling (74) to the coupling part pump (70). It is not necessary to remove the screws (also 76) which hold the flexible coupling to the spacer. After a vertical pull downwards take out the spacer (72). Loosen the pointed screw (73) and pull the coupling part pump (70) off the shaft. Dismantle the copper pipe (58). Remove Allen screws (22) which hold the shaft seal cover (20) to the pump casing. Remove the shaft seal cover from the pump casing by means of the pointed screws (86). The bearing housing with shaft and impeller can now be lifted up from the pump as a unit, and the impeller can be inspected.

ø330/415/418/525
Remove Allen screws (76) at each end of the coupling, and remove the spacer (72). Loosen the pointed screw (73) and pull the coupling part pump (70) off the shaft. Dismantle the copper pipe (58). Remove set screws (22) with washers (23) which hold the shaft seal cover to the pump casing. Remove the shaft seal cover from the pump casing by means of the pointed screws (86). The shaft seal cover and the bearing housing with shaft and impeller can now be lifted up from the pump as a unit, and the impeller can be inspected.
5.2 DISMANTLING SHAFT SEAL

ø215/265
Remove nut (6). Pull off the impeller, and remove sunk key (9). Remove Allen screws (19), which hold the bearing housing to the shaft seal cover, pull shaft seal cover and bearing housing apart, by which the shaft seal (10) and water deflector (11) are pulled off the shaft.

ø330/415/418/525
Remove set screw (6). Pull off the impeller, and remove sunk key (9). Remove set screws (19), which hold the bearing housing to the shaft seal cover, pull shaft seal cover and bearing housing apart, 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.

5.4 DISMANTLING SHAFT WITH BEARINGS

Before dismantling the shaft with bearings, remove the sunk key (16). The shaft can now be pulled out of the bearing housing allowing inspection of the bearings.

5.5 INSPECTION

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

- Sealing rings/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.

6. ASSEMBLING

6.1 FITTING SEALING RINGS

When fitted, the sealing ring (4) in the pump casing (1) is to bear against the shoulder of the pump casing.

ø330/415/418/525
When fitted, the sealing ring (27) in the shaft seal cover (20) is to bear against the shoulder of the shaft seal cover.

6.2 FITTING SHAFT WITH BEARINGS

Lead shaft with bearings into the bearing housing. Fit sunk key (16).

ø330/415/418/525
Fit cover under bearing (26).
6.3 FITTING WATER DEFLECTOR

ø215/265
Assemble the bearing housing and the 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.

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 the bearing housing and the shaft seal cover.

6.4 FITTING SHAFT SEAL

Before fitting the seat, clean the recess in the shaft seal cover. 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 diameter of the slide ring rubber bellows with soapy water and push it over the shaft. The use of a 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 about 15 minutes, and until then tightness should not be expected. After start, check by viewing the leak hole at the bottom of the bearing housing 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 BEARING HOUSING AND SHAFT SEAL COVER

Place the O-ring (21) between pump casing and shaft seal cover on the shaft seal cover where it can be held 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 bearing housing and shaft seal cover. Screw the pointed screw (86) back into the shaft seal cover before tightening. Insert the copper pipe (58).

6.7 SHAFT

When the pump has been assembled, check that the shaft rotates freely.
6.8 FITTING COUPLING

Ø215/265

Fit the flexible coupling (74) to the spacer (72) by means of the Allen screws (76) which are tightened up with torque according to the table below. Check that the aluminum insert in the rubber part does not rotate during tightening as it may damage the coupling. To prevent this, apply a little grease to the bolts under the bolt head. The Allen screws (76) can be used again and up to 3 times before they are to be replaced by new original bolts to secure the locking function. Do not use Loctite as it will damage the rubber element.

Fix the spacer with the flexible coupling to the coupling part motor (71) by means of the Allen screws (77) and lock nuts (79), also with torque according to the table below. In order to secure the bolt connection fit a new lock nut or secure with a locking means.

Check that the distance, cf. the table below, between spacer and coupling part pump corresponds to the actual coupling size which appears from the coupling element itself. Fit the flexible coupling to the coupling part pump by means of the Allen screws (76) which are to be greased a little under the bolt head and tightened with the torque stated.

<table>
<thead>
<tr>
<th>Thread</th>
<th>Torque</th>
<th>Coupling element</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>M8</td>
<td>25 Nm</td>
<td>V1700-0832</td>
<td>4 mm</td>
</tr>
<tr>
<td>M10</td>
<td>50 Nm</td>
<td>V1700-1042</td>
<td>4 mm</td>
</tr>
<tr>
<td>M12</td>
<td>90 Nm</td>
<td>V1700-1242</td>
<td>6 mm</td>
</tr>
<tr>
<td>M14</td>
<td>140 Nm</td>
<td>V1700-1442</td>
<td>6 mm</td>
</tr>
</tbody>
</table>

Ø330/415/418/525

Check Allen screws (76) and coupling bushes (74) for damage and clean these with a cloth. Replace them in case of damage.

Remove grease from the screw threads by means of benzene, and clean the threaded holes in the coupling halves for pump and motor by means of pressure air. If new coupling halves are mounted, also remove grease from the threaded holes by means of benzene.

Place coupling bushes (74) in the top holes of the spacer (72), the chamfering on the bushes is to face downwards. Place the coupling bush in the bottom holes of the spacer, the chamfering on the bushes is to face upwards. Hold the hand under the spacer and the bottom coupling bushes and carefully push the spacer into place.

Apply Loctite type 242 on the Allen screws (Loctite 242 is recommended as it will allow dismantling) and tighten all screws with the hand. It might be necessary to push the spacer a little until the screws have located in the thread and you feel that the spacer has found the right position.

Tighten the screws with a torque wrench at 55 Nm. As motor/pump shaft will rotate during this operation it is necessary to hold the spacer by wedging a pin bolt, a piece of flat bar or the like between the two following screw heads in order to lock the system while the screws are tightened.

Fit guard (69).
7. FROST PROTECTION

Pumps that 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 STARTING

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 capacity</td>
<td>1. Wrong direction of rotation</td>
<td>Change direction of rotation to clockwise when viewed from shaft end (the direction of the arrow)</td>
</tr>
<tr>
<td></td>
<td>2. Piping system choked</td>
<td>Clean or replace</td>
</tr>
<tr>
<td></td>
<td>3. The pump is choked</td>
<td>Clean the pump</td>
</tr>
<tr>
<td></td>
<td>4. Suction line leaks</td>
<td>Find the leakage, repair the fault, non-return valve not submerged</td>
</tr>
<tr>
<td></td>
<td>Pump takes air</td>
<td>Check data sheet Q/H curve and NPSH or contact DESMI</td>
</tr>
<tr>
<td></td>
<td>5. Suction lift too high</td>
<td>As 5</td>
</tr>
<tr>
<td></td>
<td>6. Pump and piping system wrongly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>dimensioned</td>
<td></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 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 BEARINGS

ø215/265

The bearings are dimensioned for a nominal life of 25,000 working hours and are to be relubricated according to the below table.

Light bearing housing (combination 13):
The bearings are lubricated for life and require no attention but are to be replaced in case of noise or bearing wear. In connection with replacement, the lower bearing is to be mounted with an 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 (combination 14):
Only the upper bearing (15) is lubricated for life, whereas the lower is to be relubricated through the lubricator nipple (84) in accordance with the table below. The replacement of bearings to be made under the same conditions and according to the same procedure as for combination 13, however, the RS-sealing is not to be considered.

ø330/415/418/525

The bearings are dimensioned for a nominal life of 100,000 working hours and are to be relubricated according to the below table.

Light bearing housing (combination 13):
The bearings are relubricated through the lubricator nipples (84) at top and bottom of the bearing housing (18). 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 (combination 14):
Both bearings are relubricated through lubricator nipples (84) at top and bottom of the bearing housing (18). See instructions for ø215/265. The top bearing (15) is 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.
<table>
<thead>
<tr>
<th>Pump</th>
<th>Assembly</th>
<th>Interval</th>
<th>Quantity Bottom bearing (13)</th>
<th>Quantity Top bearing (15)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø215/265</td>
<td>Light bearing housing</td>
<td>Lubricated for life</td>
<td>40 g</td>
<td>Lubricated for life</td>
</tr>
<tr>
<td>Ø215/265</td>
<td>Heavy bearing housing</td>
<td>8000 hours</td>
<td>65 g</td>
<td>Lubricated for life</td>
</tr>
<tr>
<td>NSL80-330 NSL100-330</td>
<td>Light bearing housing</td>
<td>4500 hours</td>
<td>30 g</td>
<td>15 g</td>
</tr>
<tr>
<td>NSL125-330 NSL100-415</td>
<td>Heavy bearing housing</td>
<td>4500 hours</td>
<td>40 g</td>
<td>20 g</td>
</tr>
<tr>
<td>NSL125-415</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSL150-330 NSL200-330</td>
<td>Heavy bearing housing</td>
<td>4500 hours</td>
<td>50 g</td>
<td>25 g</td>
</tr>
<tr>
<td>NSL250-330 NSL150-415</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSL200-415 NSL250-415</td>
<td>Heavy bearing housing</td>
<td>4500 hours</td>
<td>80 g</td>
<td>35 g</td>
</tr>
<tr>
<td>NSL300-415 NSL300-415</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSL350-525 NSL300-525</td>
<td>Heavy bearing housing</td>
<td>4500 hours</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 pumps with frame size 280 motors and ø265 pumps with frame size 315 motor are only available in combination 15 (fire bracket).

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<th></th>
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<th></th>
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<tbody>
<tr>
<td>NSL80-265</td>
<td>14.5</td>
<td>25</td>
<td>1800 / 3600</td>
<td>NSL200-265</td>
<td>9</td>
<td>25</td>
<td>1800</td>
</tr>
<tr>
<td>NSL80-330</td>
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<td>25</td>
<td>3600 / -----</td>
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<td>1800</td>
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<td>1800 / 3600</td>
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<td>9 / 13</td>
<td>25</td>
<td>1800</td>
</tr>
<tr>
<td>NSL100-265</td>
<td>14.5</td>
<td>25</td>
<td>1800 / 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>1800 / -----</td>
<td>NSL250-265</td>
<td>10 / 10</td>
<td>25</td>
<td>1800</td>
</tr>
<tr>
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<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>NSL125-265</td>
<td>14.5</td>
<td>25</td>
<td>1800 / 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>1800 / -----</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>
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<td>1600</td>
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<td>25</td>
<td>1800</td>
</tr>
<tr>
<td>NSL150-265</td>
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<td>25</td>
<td>1800</td>
<td>NSL350-525</td>
<td>14</td>
<td>25</td>
<td>1600</td>
</tr>
<tr>
<td>NSL150-330</td>
<td>7 / 13</td>
<td>25</td>
<td>1800</td>
<td></td>
<td></td>
<td></td>
<td></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 Spacer 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>
</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 2014

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 AND SPARE PARTS LIST ø215/265

See ø330/415/525 pumps on the next page

1. Pump casing
2. Pipe plug
3. Pipe plug
4. Sealing ring
5. Impeller
6. Nut
7. Spring collar
8. Washer
9. Sunk key
10. Mech. shaft seal
11. Water deflector
12. Ring lock
13. Ball bearing
14. Support disc
15. Ball bearing
16. Sunk key
17. Shaft
18. Bearing housing
19. Allen screw
20. Shaft seal cover
21. O-ring
22. Allen screw
23. Copper pipe
24. Hexagon nipple
25. Set screw
26. Bracket
27. Set screw
28. Guard
29. Coupling part pump
30. Coupling part motor
31. Spacer
32. Pointed screw
33. Elastomer
34. Allen screw
35. Allen screw
36. Nut
37. Sealing washer
38. Lubricator nipple *)
39. Pointed screw
40. Set screw
41. Base plate
42. Lock washer
43. Manometer
44. Reducing nipple
45. Hexagon nipple
46. T-piece
47. Bulkhead connection
48. Screw cap
49. Copper pipe
50. Gauge valve
51. Pipe plug
52. Set screw
53. Manometer fitting

*) 84 only combination 14
17. ASSEMBLY DRAWING AND SPARE PARTS LIST ø330/415/525

1. Pump casing
2. Pipe plug
3. Pipe plug
4. Sealing ring
5. Impeller
6. Set screw
7. Spring collar
8. Washer
9. Sunk key
10. Mech. shaft seal
11. Water deflector
12. Ring lock
13. Ball bearing
14. Grease valve ring*
15. Ball bearing
16. Sunk key
17. Shaft
18. Bearing housing
19. Set screw
20. Shaft seal cover
21. O-ring
22. Set screw
23. Lock washer
24. Cover under bearing
25. Sealing ring 2
26. Copper pipe
27. Hexagon nipple
28. Set screw
29. Hexagon nipple
30. Bracket
31. Set screw
32. Guard
33. Coupling part pump
34. Coupling part motor
35. Spacer
36. Pointed screw
37. Coupling bush
38. Allen screw
39. Sealing washer
40. Lubricator nipple
41. Pointed screw
42. Set screw
43. Base plate
44. Lock washer
45. Manometer
46. Reducing nipple
47. Hexagon nipple
48. T-piece
49. Bulkhead connection
50. Screw cap
51. Copper pipe
52. Pipe plug
53. Gauge valve
54. Pipe plug
55. Set screw
56. Base plate
57. Lock washer
58. Manometer fitting

*) Support disc in comb. 13.
18. ASSEMBLY DRAWING AND SPARE PARTS LIST NSL300-418

1. Pump casing
2. Pipe plug
3. Pipe plug
4. Sealing ring
5. Impeller
6. Cap nut
7. Spring collar
8. Inlet cone
9. Sunk key
10. Mech. shaft seal
11. Water deflector
12. Ring lock
13. Ball bearing
14. Grease valve ring
15. Ball bearing
16. Sunk key
17. Shaft
18. Bearing housing
19. Set screw
20. Shaft seal cover
21. O-ring
22. Set screw
23. Lock washer
24. Stud
25. Countersunk screw
26. Cover under bearing
27. Sealing ring 2
28. Copper pipe
29. Hexagon nipple
30. Set screw
31. Hexagon nipple
32. Bracket
33. Set screw
34. Set screw
35. Guard
36. Coupling part pump
37. Coupling part motor
38. Spacer
39. Pointed screw
40. Coupling bush
41. Allen screw
42. Sealing washer
43. Lubricator nipple
44. Point screw
45. Set screw
46. Base plate
47. Lock washer
48. Manometer
49. Reducing nipple
50. Hexagon nipple
51. T-piece
52. Bulkhead connection
53. Screw cap
54. Copper pipe
55. Pipe clamp
56. Allen screw
57. Gauge valve
58. Pipe plug
59. Set screw
60. Manometer fitting
19. ASSEMBLY DRAWING AND SPARE PARTS LIST NSL350-525

1. Pump casing
2. Pipe plug
3. Pipe plug
4. Sealing ring
5. Impeller
6. Cap nut
7. Spring collar
8. Inlet cone
9. Sunk key
10. Mech. shaft seal
11. Water deflector
12. Ring lock
13. Ball bearing
14. Grease valve ring
15. Ball bearing
16. Sunk key
17. Shaft
18. Bearing housing
19. Set screw
20. Shaft seal cover
21. O-ring
22. Set screw
23. Lock washer
24. Stud
25. Cover under bearing
26. Sealing ring 2
27. Guide plate
28. Countersunk screw
29. Guide plate
30. Allen screw
31. Washer
32. Copper pipe
33. Hexagon nipple
34. Set screw
35. Hexagon nipple
36. Bracket
37. Set screw
38. Set screw
39. Guard
40. Coupling part pump
41. Coupling part motor
42. Spacer
43. Pointed screw
44. Coupling bush
45. Allen screw
46. Sealing washer
47. Lubricator nipple
48. Point screw
49. Set screw
50. Base plate
51. Lock washer
52. Manometer
53. Reducing nipple
54. Hexagon nipple
55. T-piece
56. Bulkhead connection
57. Screw cap
58. Copper pipe
59. Pipe clamp
60. Allen screw
61. Gauge valve
62. Pipe plug
63. Set screw
64. Manometer fitting
20. DIMENSIONAL SKETCH ø215/265
See ø330/415/525 pumps on the next page

<table>
<thead>
<tr>
<th>Type</th>
<th>H</th>
<th>h1</th>
<th>h2</th>
<th>L</th>
<th>L1</th>
<th>W</th>
<th>DN</th>
<th>D</th>
<th>d2</th>
<th>k</th>
<th>X</th>
<th>Y</th>
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Manometer: 1/4" BSP. Drain: 3/8" BSP. Priming: 1/2" BSP
### 21. DIMENSIONAL SKETCH ø330/415/418/525

![Dimensional Sketch Image]

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