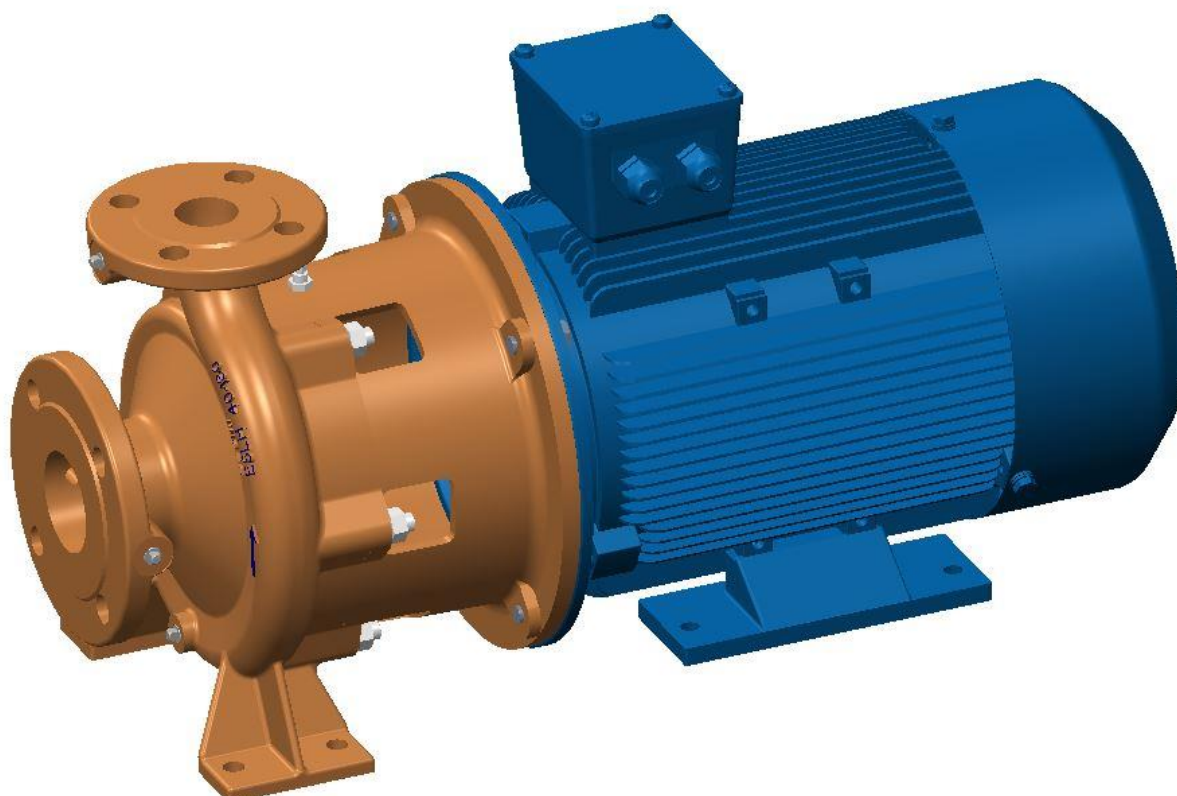


OPERATION AND MAINTENANCE INSTRUCTIONS

DESMI end suction centrifugal pump ESLH Monobloc



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Special pump No.

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1. PRODUCT DESCRIPTION

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

This pump is designed for horizontal mount. This pump is capable for vertical mount (with suction flange downwards) too according to agreement with the supplier.

The pump is a single-stage end suction centrifugal pump equipped with stainless steel shaft, mechanical shaft seal, and closed impeller.

The impeller is mounted on the motor shaft at a shaft extension. The pumps are equipped with a mechanical seal shaft and have holes in the bracket for inspection of leaks.

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

ESLHXXX-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: Bronze

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. Impeller and sealing rings: Bronze

S: Casing, shaft seal cover, impeller and sealing rings: SAF2507 and stainless steel alloy

E: Special materials

U: Nonmagnetic material

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

R may be the following:

12: Monobloc, without bearing in the pump

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:

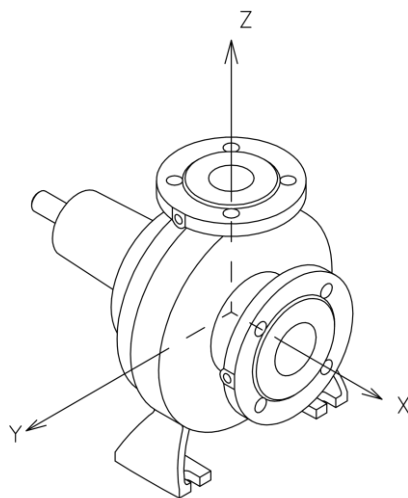
Pump No. :
Pump type :
Application :
Comment :

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/Rg10) 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.



DN mm	Forces (N)				Torques (Nm)			
	F _y	F _z	F _x	∑ F	M _y	M _z	M _x	∑ M
25	250	320	250	480	300	150	260	420
32	320	400	320	620	300	150	260	420
40	400	500	400	750	400	200	300	550
50	500	600	550	1000	450	250	350	600
65	650	840	750	1340	510	310	380	700
80	800	950	850	1500	550	350	400	750
100	1000	1250	1150	2000	650	400	500	900

In connection with the permissible loads on the flanges the following is to be observed:

$$\left(\frac{\sum F_{calculated}}{\sum F_{Max.permissible}} \right)^2 + \left(\frac{\sum M_{calculated}}{\sum M_{Max.permissible}} \right)^2 < 2$$

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 or wall mounted frame so distortion is avoided.

When installing the pump check that it is earthed to avoid an electrical potential in the pump.

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.

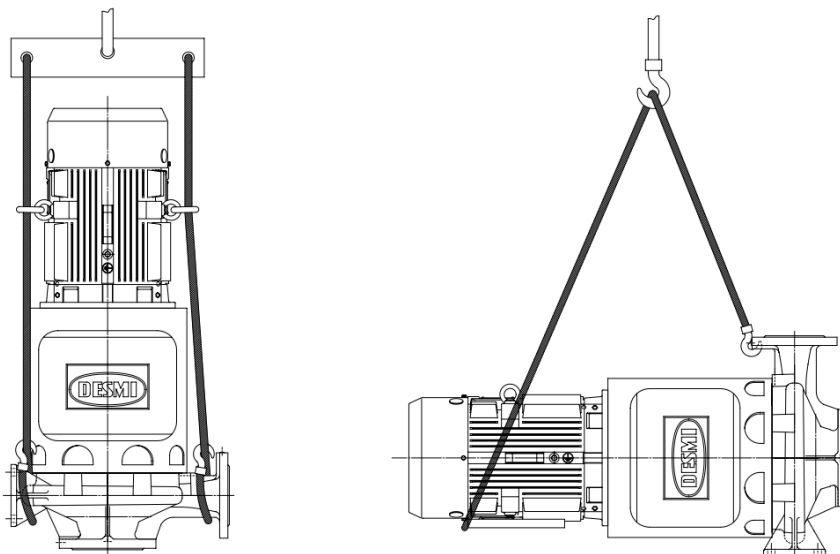
4. TRANSPORT/STORAGE

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.

Pump	Weight in kg A12 / D12 comb. without base plate
ESLH 25-180N	31/33
ESLH 32-180N	31/33
ESLH 40-180N	37/40
ESLH 50-180N	45/48
ESLH 65-180M	51/57
ESLH 80-180N	55/62
ESLH100-180N	55/62

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



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.

5.1 DISMANTLING OF ESLH25/32/40/50/80/100-180N, ESLH65-180M



Before dismantling



1. Remove nut (15)



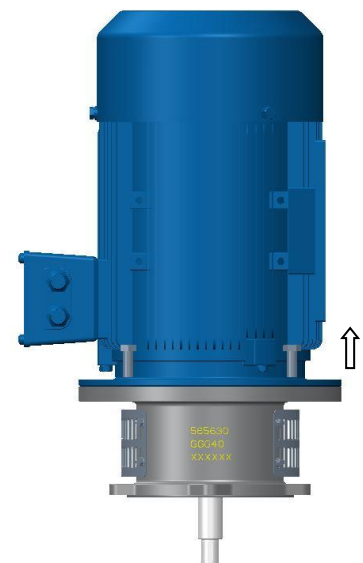
2. Remove screw (20) and washer (23)



3. Remove impeller (2) and key (19)



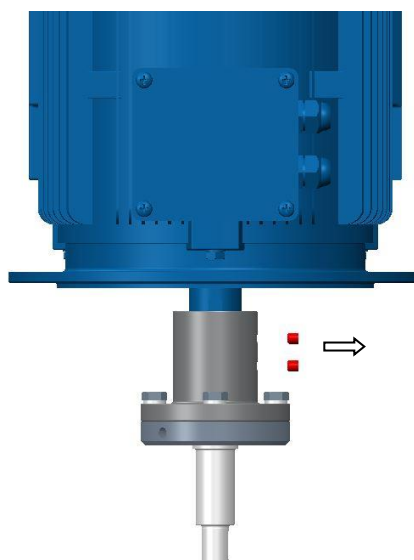
4. Remove shaft seal (22) and rear cover (4)



5. Remove set screw (10)



6. Remove motor bracket (7)



7. If necessary, remove the pointed screw (11 or 311) to pull off the motor coupling

5.2 INSPECTION

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

- Sealing ring/impeller: Max. clearance 0.3-0.6 mm measured in radius.
- Shaft seal/shaft seal cover: Check the seat for flatness and cracks.
Check the rubber parts for elasticity.

6. ASSEMBLING

Referring to the reverse process of dismantling.

6.1 FITTING SEALING RINGS

When fitted the wear ring (17, ESLH25/32 and ESLH40/50 don't have this part) is to bear against the shoulder of the pump casing (1).

When fitted the wear ring (16) is to bear against the shoulder of the casing cover (4).

6.2 FITTING SHAFT

Fit the motor coupling (8 or 108) with the shaft (6 or 206) in the motor, then fit the pointed screw (11 or 311).

6.3 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 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.

6.4 FITTING IMPELLER

Fit the sunk key in the shaft and lead the impeller towards the shoulder of the shaft. Secure the impeller with washers (23) and a screw (20) .

6.5 FITTING SHAFT SEAL COVER

Place the O-ring (3) between pump casing and shaft seal cover 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 back into the shaft seal cover before tightening.

6.6 FITTING MOTOE FOR ESLH25/32/40/50/80/100-180N AND ESLH 65-180M

Fit the motor coupling (8) to motor shaft and tighten the pointed screw (11 or 311) slightly, place motor onto bracket (7) and tighten the set screw (10). Add 2 shims (301) between motor coupling (8) and pump shaft flange (6), adjust the motor coupling to make it resist on the shims to ensure it is at the right axial position. Tighten the pointed screw (11) and remove the shims (301). Tighten the set screw (25) to lift up the impeller to a right position.

Regarding the tightening torque of pointed screw (11 or 311)

Motor Size	Dimension Point Screws	Torque Pointed Screws
71/80	M6	10Nm
90/100/112/132/160	M8	24Nm

6.7 SHAFT

When the pump has been assembled, check that the shaft rotates freely. In case the shaft has been dismantled in the 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.

Motor size	Dimension Pointed screws	Torque Pointed screws	Max. wobble
71	M6	10 Nm	70 µm
80	M6	10 Nm	70 µm
90	M8	24 Nm	70 µm
100/112	M8	24 Nm	70 µm
132	M10	40 Nm	70 µm
160	M12	75 Nm	70 µm

7. FROST PROTECTION

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

8. 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.

8.1 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.

In order to protect the shaft seal the pump must never run dry.

If there is a positive suction lift, open the valve on the suction side of the pump and evacuate the air through the air vent screw (5). If there is no positive suction lift, the plant must be equipped with a foot valve or a non-return valve on the suction side.

Prime the pump while the air vent screw (5) is kept open. When the pump has been filled with water, and the air has been evacuated, the system can be started. Check the direction of rotation. If the direction is incorrect interchange 2 of the power cords. The direction of rotation is indicated by an arrow. Make sure the bearings are running correctly and that they do not become warm.

9. 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

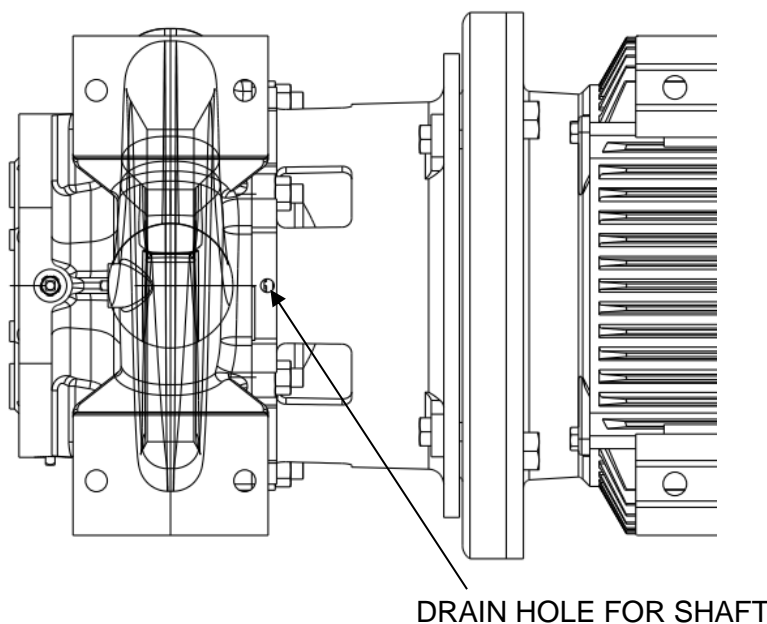
FAULT	CAUSE	REMEDY
The pump has no or too low capacity	1. Wrong direction of rotation	Change direction of rotation to clockwise when viewed from shaft end (the direction of the arrow)
	2. Piping system is choked	Clean or replace the piping system
	3. The pump is choked	Clean the pump
	4. Suction line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

10. 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.

On Monobloc pumps, the drain hole at the mechanical shaft seal must be inspected regularly (see drawing example below). Clean the drain hole as needed.



10.1 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 (18 or 26) at the bottom of the pump.

11. REPAIRS

11.1 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.

The following parts are exposed to wear: Shaft seal (22), impeller (2)/(7), seal rings (16 and 17) and the ball bearings of the motor.

11.2 REPLACING THE IMPELLER

Close the valves on both sides of the pump. Loosen the nuts (15) and dismantle the top piece from the pump casing. Remove the screw (20) and take off the impeller (2)/(7). Fit the new impeller.

11.3 REPLACING SEAL RINGS

When motor and pump have been separated, the seal ring (16,17 and ESLH25/32/40/50 has not this part) in the pump casing (1) can be pulled out.

In order to replace the upper seal ring (16) it is necessary first to dismantle the impeller. Press the new seal rings into place with an even push all over the face of the ring. Normal diameter difference between seal ring and impeller 0.3-0.4 mm.

11.4 REPLACING SHAFT SEAL (22)

Dismantling as described in paragraph 5.1.

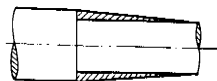
When the impeller has been dismantled, remove the key (19) The sealing element itself can now be pulled off the shaft.

Remove the seat ring from the top piece by pressing with a pair of screwdrivers or the like under the collar off the seat. If the seat cannot be removed, dismantle the top piece from the motor to permit pressing from the back.

Clean the bore for seat and shaft thoroughly of dirt and rust. Remove persistent coatings, if any, by grinding the shaft lightly with very fine emery cloth.

Grease the new seat ring and the inserted O-ring well with glycerine – not oil – and press it into place in the casing. Check that the seat is fitted correctly by knocking lightly with a piece of wood. The seat ring is to be treated very carefully to prevent the sliding surface from being scratched.

It is necessary to use a conical bush as shown below to prevent the rubber bellows from being damaged during mounting.



Grease the back of the carbon ring with glycerine to ensure that it stays in its correct place during the mounting. Grease the shaft, the conical bush and the rubber bellows amply with glycerine.

Press the shaft seal on to the shaft until it resists. Press the driving ring only,

When the pump has been mounted, ventilate the pump casing carefully before putting the pump into operation.

When the pump has been running for 1-2 min., ventilate it again, after which it can start normal operation.

Do not forget to check the direction of rotation if there is a risk that the power cords to motor have been exchanged.

11.5 REPLACING BALL BEARINGS IN MOTOR

The ball bearing in the front bearing of the motor can be replaced without disassembling the pump.

If the ball bearing in the rear bearing of the motor is to be replaced, it is necessary to disassemble the pump and dismantle the pump shaft (as described in paragraph 5.1):

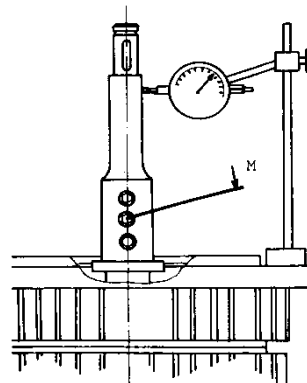
Dismantle the top piece from the motor .Remove the pointed screws (11) in the pump shaft (6), the pump shaft can now be pulled off the motor shaft.

When assembling the pump again, check the motor shaft for damages in the form of marks, burrs, or upsetting of the shaft end.

Damages, if any, are to be remedied by means of a file and fine emery cloth. This work has to be done very carefully, especially on new motors, the shaft ends of which are often damaged during transport. If this is not done carefully, the throw will be bigger than permitted and/or the pump shaft will scratch the motor shaft when fitted.

Normally, the pump shaft is to go relatively smoothly on the motor shaft (manually or by means of light strokes with a plastic hammer).

Tighten the pointed screws (the one in the middle first) in accordance with the torque indicated in the table and finally check that the throw stays within the indicated limits by means of an indicator clock.



12. 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.

Pump	Max. working pressure[bar] Bronze /Cast iron	Max. working pressure[bar] SG-iron	Max.RPM
ESLH25-180N	10	16	3600
ESLH32-180N	10	16	3600
ESLH40-180N	10	16	3600
ESLH50-180N	10	16	3600
ESLH65-180M	10	16	3600
ESLH80-180N	10	16	3600
ESLH100-180N	10	16	3600

The max. working pressure for NiAlBz and stainless steel pumps is 1.5 times max. working pressure for bronze (RG5/RG10).

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.

13. EU & UK DECLARATION OF CONFORMITY

DESMI Pumping Technology A/S, hereby declare that our pumps of the ESLH 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:

EN/ISO 13857:2019	Safety of machinery. Safety distances to prevent danger zones being reached by the upper limbs
EN 809:1998 + A1:2009	Pumps and pump units for liquids – Common safety requirements
EN12162:2001+A1:2009	Liquid pumps – Safety requirements – Procedure for hydrostatic testing
EN 60204-1:2006/A1:2009	Safety of machinery – Electrical equipment of machines (item 4, General requirements)
Ecodesign Directive (2009/125/EC)	Water pumps: Commission Regulation No 547/2012. Applies only to water pumps marked with the minimum efficiency index MEI. See pump nameplate.

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, August 24 2021



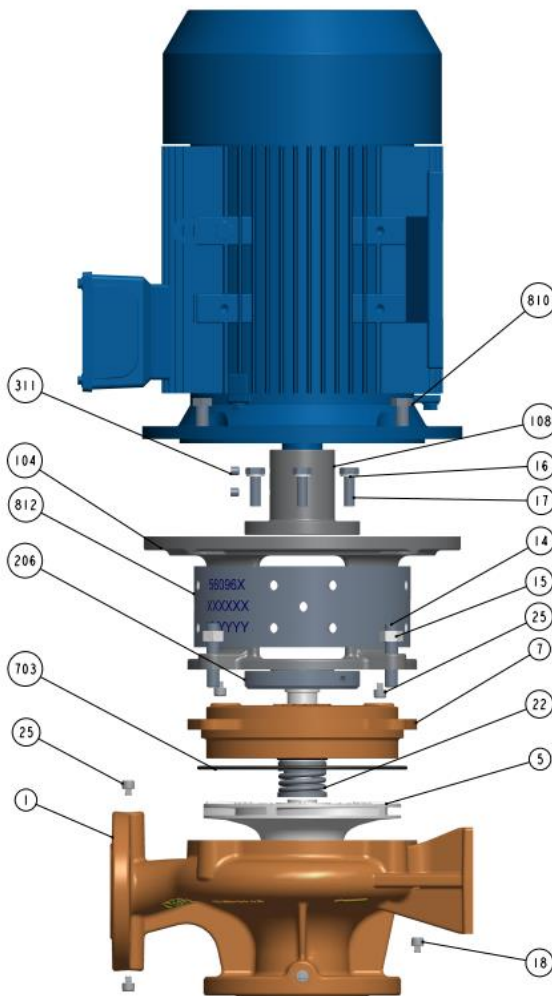
Henrik Mørkholt Sørensen
Managing Director

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Tagholm 1
9400 Nørresundby

14. INFORMATION RELEVANT FOR DISASSEMBLY OR DISPOSAL AT END-OF-LIFE

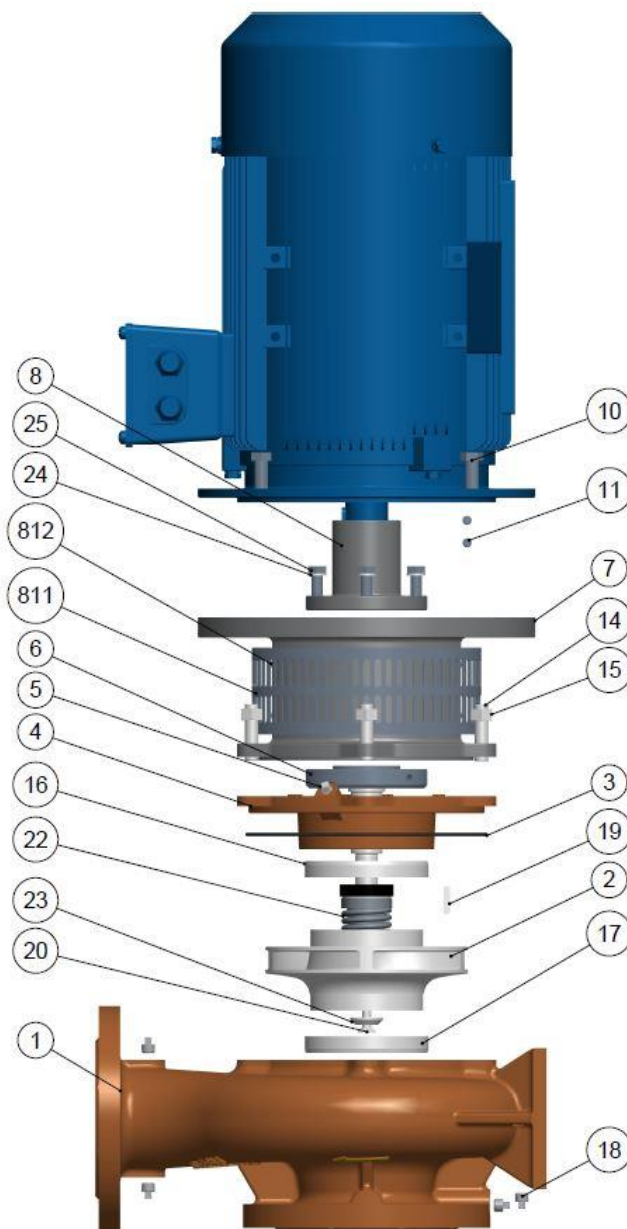
No damage materials are used in DESMI pumps – please refer to DESMI Green Passport (can be sent on request – contact a DESMI sales office) – i.e. common recycling companies can handle the disposal at end-of-life. Alternatively the pump and motor can be returned to DESMI at end-of-life for safe recycling.

15. ASSEMBLY DRAWING ESLH25/32-180N,ESLH40/50-180N-12-COMB



1	Pump casing
5	Impeller
7	Rear cover
14	Stud
15	Nut
16	Washer
17	Set screw
18	Plug
22	Shaft seal
25	Plug
104	Motor bracket
108	Motor coupling
206	Shaft with flange
311	Point screw
703	O-ring
810	Set screw
812	Guard

16. ASSEMBLY DRAWING ESLH/80/100-180N/-12, ESLH65-180M/-12 -COMB



1	Pump casing
2	Impeller
3	O-ring
4	Rear cover
5	Plug
6	Shaft w. flange
7	Motor bracket
8	Motor coupling
10	Set screw
11	Pointed screw
14	Stud
15	Nut
16	Wear ring
17	Wear ring
18	Plug
19	Key
20	Screw
22	Mechanical shaft seal
23	Washer
24	Washer
25	Set screw
811	Guard
812	BH-Screw

22. DIMENSIONAL SKETCH

Please require a dimensional sketch of the actual pump from DESMI.

Connection holes on pump: Manometer: 1/4" BSP. Drain: 1/4" BSP. Air vent: 1/8" BSP.