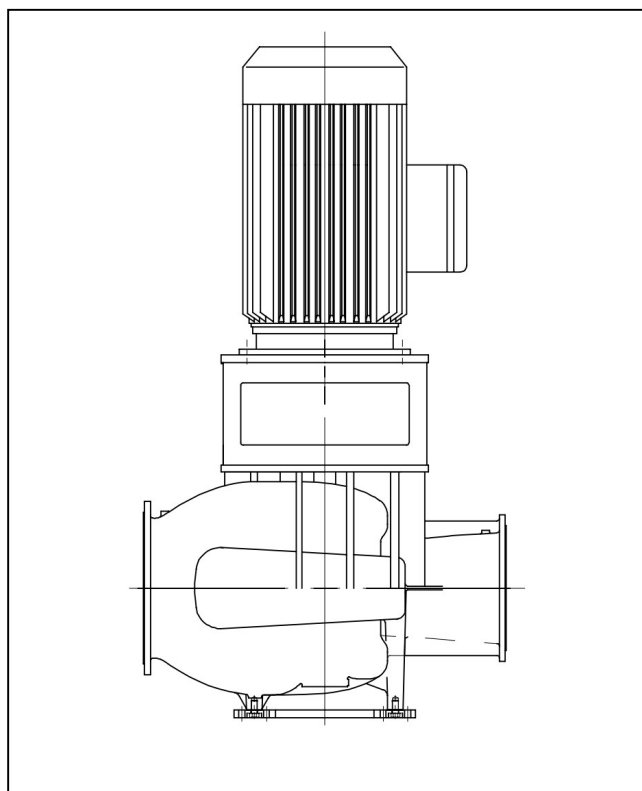


DESMI “in-line” centrifugal pump

Type DSL



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Special pump No.

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1. PRODUCT DESCRIPTION

These operation and maintenance instructions apply to the DESMI DSL-pump series, in spacer and compact design. The pumps are available in sizes ranging from 300 mm to 400 mm on the pressure flange. The suction flange is bigger than the pressure flange.

The DESMI DSL-pump is a 1-stage centrifugal pump with stainless steel shaft, mechanical shaft seals and closed impeller of the double-suction type.

The pump is a so-called "in-line" type, i.e. suction and pressure branches are mounted on the centre line. It is vertical with impeller of the double-suction type with double-curved blades, and it has a helical pump casing in one casting.

The pump is driven by an electric motor which may be a standard AC motor or a DC motor.

1.1 DELIVERY

- Check on delivery that the shipment is complete and undamaged.
- Defects and damages, if any, to be reported to the carrier or 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 paragraph 2.3.

2.1 ACCESSORIES

As extra equipment the pump may be mounted with a priming pump of the water ring type, complete with filter and feed water tank, or it may be delivered with an ejector pump.

Manometers are standard equipment.

2.2 SPACE AROUND THE PUMP

On the spacer pump it is possible to dismantle the impeller and the shaft without dismantling the electric motor. Therefore, no minimum distance is required above the electric motor. The ventilation of the motor should, however, be taken into consideration.

On the compact pump the motor and the motor bracket must be removed before dismantling shaft and impeller. This means that there is to be so much space above the motor that motor with bracket can be lifted abt. 250 mm up.

Generally, there is to be sufficient space in front of the pump to allow inspection of the shaft seal for leaks and dismantling of the coupling and the internal parts of the pump. It must also be possible to dismantle the entire pump, if required.

If the pump is equipped with a slide bearing at the bottom, there is to be a distance of abt. 100 mm under the middle of the pump measured from the pump feet for dismantling of the slide bearing. In the standard pump type, i.e. roller bearing and shaft seal at the bottom, this is not

necessary, but nevertheless it would be an advantage to provide space under the pump, as it would facilitate the servicing of the bottom bearing of the pump and the shaft seal considerably.

2.3 EXPLANATION OF THE TYPE NUMBER

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

DSL-XXX-YYY/M-R

XXX : Diameter DN (mm) of the pressure branch (300, 400)

YYY : Diameter (mm) of standard impeller (320, 465, 495).

M : The material combination of the pump.

R : The assembly combination of the pump.

R may be the following:

- | | |
|---|------------------------------|
| a : Spacer design. | l : Other shaft seal. |
| b : Spacer design without bottom bearing. | m : BS-flanges. |
| f : Compact design. | n : ANSI-flanges. |
| g : Compact design without bottom bearing. | o : Shock-proof combination. |
| i : With PN 16 flanges. | p : Other combination. |
| j : With PN 25 flanges. | q : JIS-flanges. |
| k : Identical suction and pressure Flanges. | |

M may be the following:

Material combination	A	C	D	Q
Pump casing	Cast iron	Cast iron	Bronze	See note 1)
Impeller	Alu-bronze	Cast iron	Alu-bronze	See note 1)
Sealing ring	Alu-bronze	Cast iron	Alu-bronze	See note 1)
Rear cover	Cast iron	Cast iron	Bronze	See note 1)
Shaft	Stainless steel	Stainless steel	Stainless steel	Stainless steel
Shaft seal	Mechanical	Mechanical	Mechanical	Mechanical
Elastomer	Nitrile	Nitrile	Nitrile	Nitrile

Note 1): The pumps are available in other material combinations at request.

Before putting a pump into operation, the suitability of the material combination of the pump must always be taken into consideration. In case of doubt, contact the supplier.

The pump is suitable for the pumping of liquids with temperatures up to 80°C. With special shaft seal

and bearings up to 140°C.

The pump is particularly suitable for the pumping of water in connection with the cooling of diesel engines and cooling units, as ballast pump, and for waterworks and district heating stations.

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

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

Pump No.: _____
 Pump type: _____
 Application: _____
 Comment: _____

2.4 TECHNICAL DESCRIPTION



The pumps are as a standard equipped with an electric motor with protection class IP 54. This means that the motor is protected against penetrating dust, and that splashes of water without pressure do not ruin the motor. If the pumps are installed in explosive areas they must be equipped with explosion-proof motors. The motors are designed for continuous operation at a max. ambient temperature of 40°C.

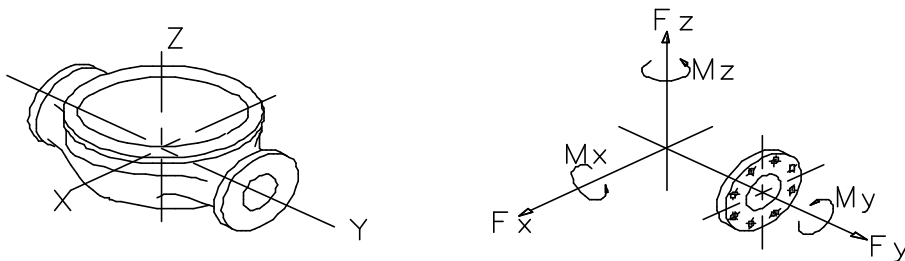
The following table indicates the max. permissible number of revolutions for the individual pump types:

Pump type	Motors: 6-pole / 50 Hz 6-pole / 60 Hz	Motors: 4-pole / 50 Hz 4-pole / 60 Hz
DSL 300-320		√
DSL 400-430	√	
DSL 400-495	√	

The noise level of the pump depends on the motor type supplied, as the noise from the pump can be calculated as the noise level of the motor + 2 dB (A).

The capacity of the pump appears on the name plate of 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 are stated in the table below:



Pump type	DN	Forces (N)				Torques (Nm)			
		F _y	F _z	F _x	Σ F	M _y	M _z	M _x	Σ M _t
DSL 300-320	300	3000	3750	3350	5860	2750	1900	2200	4000
DSL 400-430	400	4000	5000	4480	7820	4600	3200	3700	6720
DSL 400-495	400	4000	5000	4480	7820	4600	3200	3700	6720

In connection with the permissible loads on the flanges stated in the above table there is also the following limitation :

$$\left(\frac{\sum F_{calc}}{\sum F} \right)^2 + \left(\frac{\sum M_{calc}}{\sum M_t} \right)^2 < 2$$

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

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) or NiAlBz the values are to be increased by factor 1.5.

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 indicated in paragraph 2.4 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 authorized skilled workmen according to the rules and regulations in force.

4. TRANSPORT/STORAGE

The pumps are to be lifted as shown on the figure. The weight appears from the table below.

The pump is to be stored in a dry area.

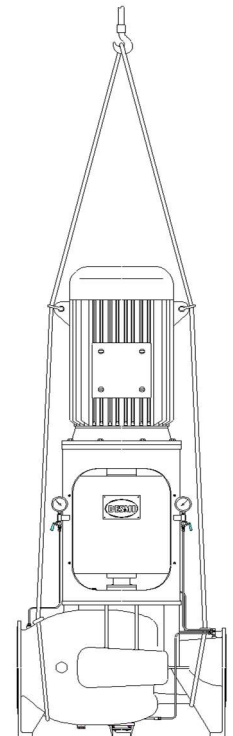
The centre of gravity of the pump is on the centre line of the shaft.

Before shipment the pump is to be fastened and supported securely on a pallet or the like.



The pump is to be lifted as follows:

The lifting straps must not bear against sharp edges and corners.



The pump weights do not include motor.

PUMP TYPE	WEIGHT IN KG SPACER	WEIGHT IN KG COMPACT A/D-COMBINATION
DSL 300-320	710/795	645/730
DSL 400-430	1360/1520	1240/1400
DSL 400-495	1366/1526	1246/1406

5. DISMANTLING

5.1 DISMANTLING MOTOR AND BRACKET

Normally, it will not be necessary to dismantle motor and bracket in the spacer pump, whereas it has to be done in the compact type. Remove the copper pipes to the manometers and the rear cover, then unscrew the nuts (920.1). Motor with bracket can now be lifted up and out. It is also possible to dismantle the motor only by removing the screws (901.1).

5.2 DISMANTLING COUPLING

The spacer shaft (860.1) can be taken out after the screws (914.5) have been removed. Pull the pump half off the shaft. In the compact pump the motor has to be removed before the coupling can be dismantled as described in paragraph 5.1.

5.3 DISMANTLING TOP BEARING AND SHAFT SEAL

Dismantle the bearing cover (360.1). Remove the circlip (932.1). Pull out carefully the bearing with bearing housing by means of the threads of the bearing housing (382.1). Press out the bearing from behind the bearing housing. Press out the ceramic ring of the shaft seal (433.1) from the cover, and pull up the remaining components of the shaft seal.

5.4 DISMANTLING BOTTOM BEARING

Dismantle the four screws (914.3). Pull down bearing housing (382.2) with outer ring and rollers. If the bearing has to be replaced, it is necessary to dismantle the inner ring. Remove the circlip (932.2) and heat the inner ring by means of a heating ring. Press out the outer ring from the bearing housing after the bearing cover has been removed.

The procedure is the same if the bottom bearing of the pump is a slide bearing with the only exception that instead of the outer ring it is the slide bearing (310.1) which follows the bearing housing. The shaft lining can be pulled off after the shaft nut (922.2) has been removed. If the slide bearing has to be replaced, it can be pressed out of the housing.

5.5 DISMANTLING BOTTOM SHAFT SEAL

Dismantle the bearing housing as described in paragraph 5.4. Loosen the screws holding the shaft seal housing (441.1) and pull out the shaft seal housing. Remove intermediate ring (550.1 it is not found in all the pumps) and the water deflector from the housing. Press the ceramic ring of the shaft seal (433.2) out of the housing. Pull the remaining seal components off the shaft.

If the bottom bearing of the pump is a slide bearing, there is no mechanical shaft seal at the bottom.

5.6 DISMANTLING REAR COVER WITH SHAFT AND IMPELLER

This operation offers 3 different possibilities dependent on the aids available. First, dismantle coupling and bottom bearing/shaft seal as described in paragraphs 5.2, 5.4, and 5.5.

A. Crane/Lifting Hoist available and sufficient space above motor:

Remove motor with bracket as described in paragraph 5.1. It is not necessary to remove the motor bracket, if the rear cover can pass the top flange in the bracket. Remove the nuts (920.1) which hold the rear cover. Mount a lifting eye at the shaft end and lift up the complete arrangement. Loosen the pointed screw (904.3), remove the shaft nut (922.1), and pull the impeller off the shaft. Now check the sealing rings (502.1) for wear.

B. Lifting Hoist Available:

This possibility applies to the spacer pump only. Remove the nuts (920.3) which hold the rear cover. Dismantle the copper pipe to the rear cover. Mount lifting eyes in the rear cover and at the top of the motor bracket. Pull up the complete arrangement by means of hoists and tip it out through the opening of the motor bracket. Follow item A.

C. Limited Lifting Possibilities:

This possibility applies to the spacer design only. Dismantle the top bearing and the shaft seal as described in paragraph 5.3. Remove the nuts (920.3) which hold the rear cover. Dismantle the copper pipe to the rear cover. Dismantle the rear cover, e.g. by means of a pulley drawer. Pull up the shaft with impeller. Follow item A.

6. ASSEMBLING

6.1 FITTING SEALING RING AND IMPELLER

Press the sealing ring into place. It is to bear against the shoulders of pump casing and rear cover. Fit the keys (940.3) in the shaft, and lead the impeller towards the shoulder of the shaft. Tighten the shaft nut (922.1). Tighten the pointed screw (904.4). Lead the shaft with impeller into the rear cover (130.1).

6.2 FITTING TOP BEARING AND SHAFT SEAL

Before fitting the seat, clean the recess in the bearing housing (382.1). Dip the outer rubber ring of the seat into olive oil (or another neutral oil) or in silicone grease. Now press the seat into place with the fingers and check that it is correctly embedded. If it is necessary to use fitting tools, then protect the sliding surface of the seat to prevent it from being scratched or cut. Lubricate the inner diameter of the rubber bellows of the slide ring and the shaft piece under the rubber bellows with silicone grease. Lead the slide ring unit down over the shaft and make sure that the slide ring is protected. Push the slide ring down along the shaft until the spring locates over the thrust collar and contacts the shell. Push and compress the spring. When you let go of the seal, the slide ring unit is to move slowly across the shaft. 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. Push the O-ring (412.3) into place in the track of the bearing housing, then lead the bearing housing with the ceramic ring carefully down over the shaft. Tighten the screws (914.4). When using oil or silicone grease 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 that there are no leaks.

When replacing the shaft seal the bearing (321.1) should also be replaced. Lead the support disc (505.1) down over the shaft, and press the bearing (321.1) into place. Use pressing tools which are fitted by means of the thread in the shaft end. Lead down the other support disc, and fit the circlip (932.1). Fit the bearing cover.

6.3 FITTING REAR COVER WITH SHAFT AND IMPELLER

Fit the O-rings (412.1) and (412.4) in the rear cover and use a little grease. If there is only 1 O-ring in the rear cover, use the gasket (400.2) between rear cover and pump casing instead. Lower rear cover with shaft and impeller into the pump casing. Fit the rear cover by tightening the nuts (920.3), as there is resistance from the O-rings.

6.4 FITTING BOTTOM SHAFT SEAL

Before fitting the seat, clean the recess in the shaft seal housing (441.1). Dip the outer rubber ring of the seat in olive oil (or another neutral oil) or in silicone grease. Now press the seat into place with the fingers and check that it is correctly imbedded. If it is necessary to use fitting tools, then protect the sliding surface of the seat to prevent it from being scratched or cut. Lubricate the inner diameter of the rubber bellows of the slide ring and the shaft piece under the rubber bellows with silicone grease. Lead the slide ring unit over the shaft and make sure that the slide ring is protected. Push the slide ring along the shaft until the spring locates over the thrust collar and contacts the shell. Push and compress the spring. When you let go of the sealing the slide ring unit is to move slowly across the shaft. 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. Lead the O-ring or the gasket into place in the bearing housing (441.1). Lead the bearing housing carefully up over the shaft and tighten the screws (914.1). When using oil or silicone grease on the shaft the bellows will settle and seat in about 15 minutes, and until then tightness should not be expected. After start, check for leaks by viewing the leak hole.

6.5 FITTING BOTTOM BEARING

If a new bearing has to be mounted, heat the inner ring of the new bearing with a heating ring and lead the bearing into place on the shaft. Fit the circlip (932.2). Press the outer ring with rollers into place in the bearing housing. Tighten the bearing cover. Push up the water deflector (507.1) until it bears against the shoulder of the shaft. Fit the intermediate ring (550.1 is not found on all the pumps). Then fit the O-ring in the track of bearing housing. Lead bearing housing with outer ring and rollers into place and tighten.

Remember to fill the bearing completely and the bearing housing approx. 1/3 with grease during assembly

(Use approx. 40 grams of grease in DSL 300 and 60 grams in DSL 400).

If the pump is equipped with slide bearing at the bottom, and this has to be replaced, press a new slide bearing (310.1) into the bearing housing (382.2) until it bears against the shoulder. Lead the O-ring into place in the bearing housing. Fit the key (940.4) in the shaft and push the shaft lining (524.1) onto the shaft so that it catches the key. Tighten and secure the shaft nut (922.2) by means of the pointed screw (904.3). Lead the bearing housing with slide bearing up and see to it that the pin is guided into the little hole in the pump casing. Lead the O-ring (412.5) into place in the bottom cover (361.1). Tighten the cover and make sure that the pin is guided into the hole of the bearing housing.

6.6 FITTING COUPLING

Fit the key (940.2) in the shaft. Press the coupling half against the shoulder of the shaft and fasten it with the pointed screw (904.1).

If the pump is a spacer, proceed with the assembling as follows:

1. Inspect Allen screws (914.5) and coupling bushes (867.1) for damage and clean them with a cloth. Replace screws or bushes if damaged!
2. Degrease the screw threads with e.g. benzine and clean the threaded holes in the coupling half pump and coupling half motor with compressed air. If new coupling halves are mounted at the same time, clean the threaded holes with benzine as well.
3. Place the coupling bushes in the top holes of the spacer (860.1). The chamfering on the bushes to face downwards! Place the coupling bushes in the bottom holes of the spacer. The chamfering on the bushes is to face upwards.
4. Hold your hand under the spacer and the bottom coupling bushes, and push the spacer carefully into place.
5. Apply screw locking to the screws - LOCTITE type 242 is recommended as it allows dismantling -and fit and fasten all the screws with the hand. It might be necessary to push the spacer a little until the screws catch the thread and you feel that the spacer has found its right place.
6. Now tighten the screws with a torque wrench (5.3 kgm = 12 mm screws). As the shaft will rotate during this operation it is necessary to "lock" the spacer by wedging a mandrel or a piece of flat iron or the like in between the two following screw heads in order to lock the system while tightening the screws.
7. When the coupling guard and the copper pipe to the rear cover have been fitted, and the procedure in paragraph 6.1 has been followed, the pump is ready for start.

The fitting of the coupling in a compact pump is to be carried out just as carefully as described above, but in a slightly different order:

Place the coupling bushes in the coupling half (861.2). The chamfering on the bushes is to face downwards. Fit motor bracket and motor. Fit and fasten the screws (914.5) as described above. Fit the copper pipe to manometers and rear cover. Fasten the coupling guard.

6.7 COUPLING GUARD

Protect the coupling guard against unintentional access to shaft and coupling. The pump must not be started when the coupling guard (598.1) is dismantled. The coupling guard is either open below (spacer design) or perforated (compact design) to allow inspection of leaks at the shaft seal.

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. DISMANTLING



Before dismantling the pump make sure that it has stopped. Wiring to be dismantled by skilled workmen. Then 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 up to somewhat above the impeller.



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.

9.1 STARTING

On pumps not running the shaft shall be rotated (at least 2-3 revolutions) 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.

Before starting the pump check that

1. the shaft can rotate freely without jarring sounds.
2. pump and suction line are filled with liquid:
 - a. Pump with positive suction lift : Ventilate by means of the valve (741.1) of the rear cover.
 - b. Pump with priming unit : Check that the priming continues until liquid comes out.

The above is important as the liquid serves as coolant for the shaft seal.

3. Start the pump for a moment to check the direction of rotation. If the direction is correct (i.e. clockwise when viewed from above), the pump may be started.

NOTICE – for preventing premature failure of shaft seal and/or sliding bearing it is recommended:

- **For pumps with bottom roller bearing:** 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.
- **For pumps with bottom sliding bearing:** To run at least 500 rpm and use max. 1 minute on acceleration from 0 to 500 rpm and max. 1 minute on deceleration from 500 to 0 rpm.
Also pumps with bottom sliding bearing should not run with less than 0.5 bar differential pressure.

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.

10.1 FAULT-FINDING CHART

FAULT	CAUSE	REMEDY
The pump has no or too low capacity	<ol style="list-style-type: none"> 1. Wrong direction of rotation 2. Piping system choked 3. Pump choked 4. Suction line leaks/ Pump takes air 5. Suction lift too high 6. Pump and piping system wrongly dimensioned 7. The pump is not ventilated 	<p>Change direction of rotation to clockwise when viewed from above (the direction of the arrow)</p> <p>Clean or replace</p> <p>Clean the pump</p> <p>Find leakage, repair the fault, non-return valve not submerged</p> <p>Check data sheet Q/H curve and NPSH or contact DESMI</p> <p>As 5</p> <p>Ventilate the pump</p>

<p>The pump uses too much power</p>	<ol style="list-style-type: none"> 1. Counter-pressure too low 2. The liquid is heavier than water 3. Foreign body in pump 4. Electric motor is running on 2 phases 	<p>Insert orifice plate or check valve/Contact DESMI</p> <p>Contact DESMI</p> <p>Dismantle the pump, remove the cause</p> <p>Check fuses, cable connection, and cable</p>
<p>The pump makes noise</p>	<ol style="list-style-type: none"> 1. Cavitation in pump 	<p>Suction lift too high/ Suction line wrongly dimensioned/ Liquid temperature too high</p>

11. INSPECTION AND MAINTENANCE

11.1 INSPECTION DURING OPERATION

It is important to check at regular intervals that:

1. the pump pressure is as prescribed.
2. the pump does not vibrate, make noise or get hot.
3. there is no air in the pump.
4. no liquid is dripping from the drain holes for the shaft seals thus indicating leaks.

If one of the above points is not satisfactory, stop the pump and repair the fault.

11.2 DRAINING THE PUMP

When the piping system has been drained, note that there is still liquid left in the pump. Remove most of the liquid by dismantling the pipe plug (912.1) at the bottom. Remove the remaining liquid by tilting the pump casing (102.1) towards one of the flanges.

11.3 INSPECTION

- Before any inspection of the pump check that the unit cannot be started unintentionally.
- The system is to be without pressure and drained of liquid.
- The repairman must be familiar with the liquid which has been pumped as well as the safety measures he is to take when handling the liquid.

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

- Sealing ring/impeller : Wear=max. 1.5 mm diameter difference.
- Shaft seal : Check seat for flatness and cracks.
Check rubber parts for elasticity.
- Bearings : Slackness or noise.
- Coupling parts : Screws and coupling bushes, see paragraph 6.6.
- Pipes from pressure side
to top and bottom shaft
seal : Cleanness.

11.4 LUBRICATING BEARINGS

The top bearing is a closed ball bearing which does not need lubrication.

If the bottom bearing is a cylindrical roller bearing, then the lubricating procedure is as follows:

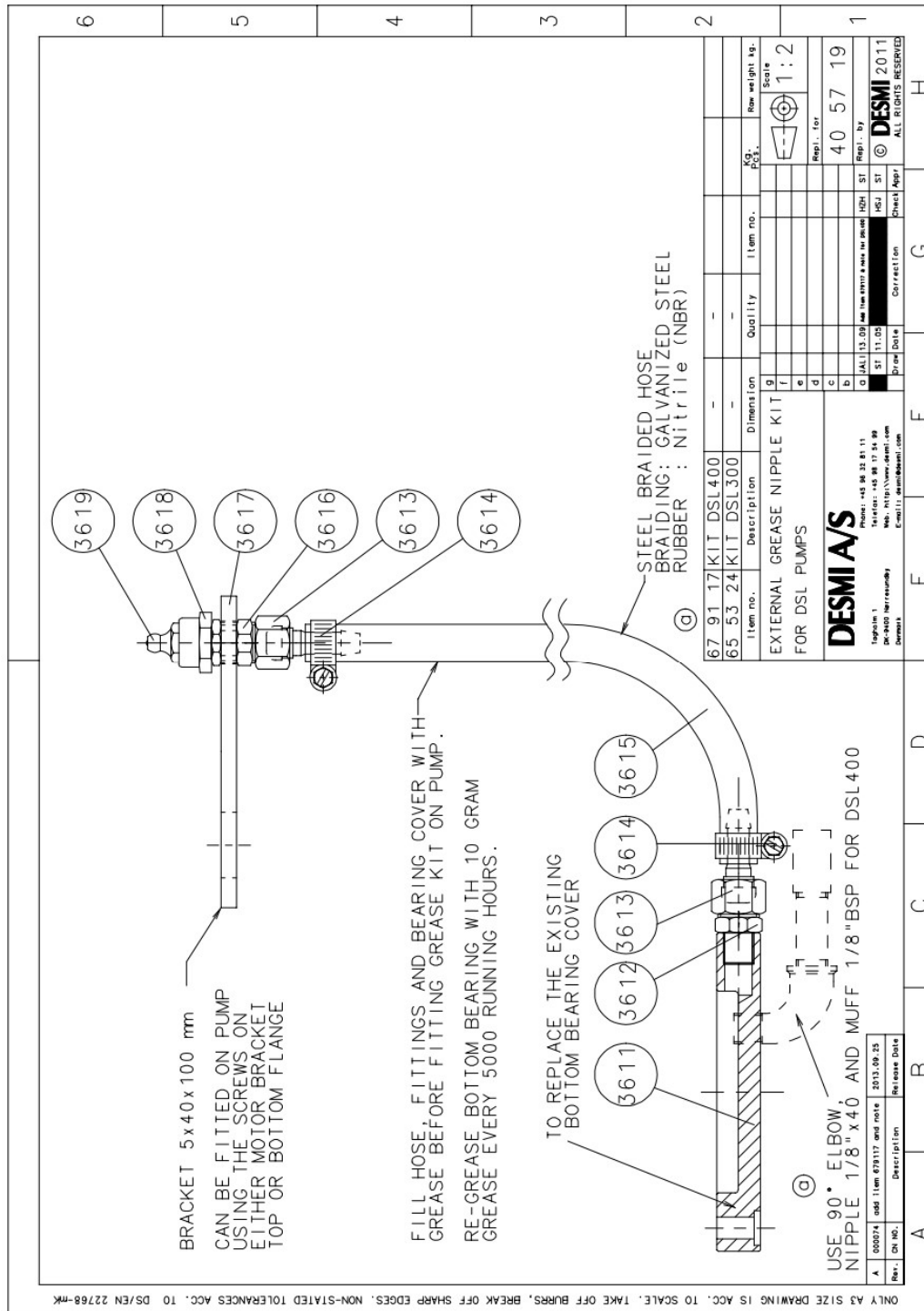
Pump without external grease kit:

1. Dismantle the bearing as described in paragraph 5.4.
2. Remove the old grease from bearing and bearing housing.
3. If the bearing has just been cleaned or if it is a new bearing, fill bearing completely and bearing housing approx. 1/3 with grease.
4. Use a recommended lithium-based grease, see the table below.

Pump with external grease kit:

Later models of the DSL pumps with roller bottom bearing are equipped with external grease kit. See drawing 405719 following.

On these pumps the bottom roller bearing shall be re-lubricated with 10 grams of grease every 5000 running hours through the external grease nipple mounted on the side of the pump casing.



Recommended types of grease:

ESSO	Beacon 2
BP	Energrease LS EP 2
Shell	Gadus S5 V100 2
Mobil	Mobil lux grease EP 2 and Mobil plex 47
Castrol	Spheerol AP 2
Texaco	Multifak EP 2
Q8	Rembrandt EP 2 and Rubens
Statoil	UniWay Li 62

5. The intervals between the lubrication of the bearings depend on the number of revolutions:
- Pump with 4-pole motor: 5000 hours
 - Pump with 6-pole motor: 6000 hours
 - Pump with 8-pole motor: 7000 hours

If the pump is equipped with slide bearing, the bottom bearing needs no lubrication. The bearing is lubricated and cooled by the liquid pumped via the pressure side of the pump.

12. REPAIRS

12.1 ORDERING SPARE PARTS

When ordering spare parts please always state pump type and serial No. See the name plate of the pump and the spare parts drawing with item Nos. See assembly drawing.

13. OPERATING DATA

Type	Max. power consumption KW 740/870/980/1170/ 1450 / 1750 rpm	Max. permissible working pressure (GG20 and RG5) bar	Max. permissible working pressure (NiAlBz and ductile iron GGG40) bar
DSL 300-320	- / - / 30 / 50 / 95 / 165	5	10
DSL 400-430	92 / 150 / 215 / 365 / - / -	5	8
DSL 400-495	92 / 150 / 215 / 365 / - / -	5	8

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 type DSL 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 13857:2008	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, March 05 2019



Henrik Mørkholt Sørensen
Managing Director

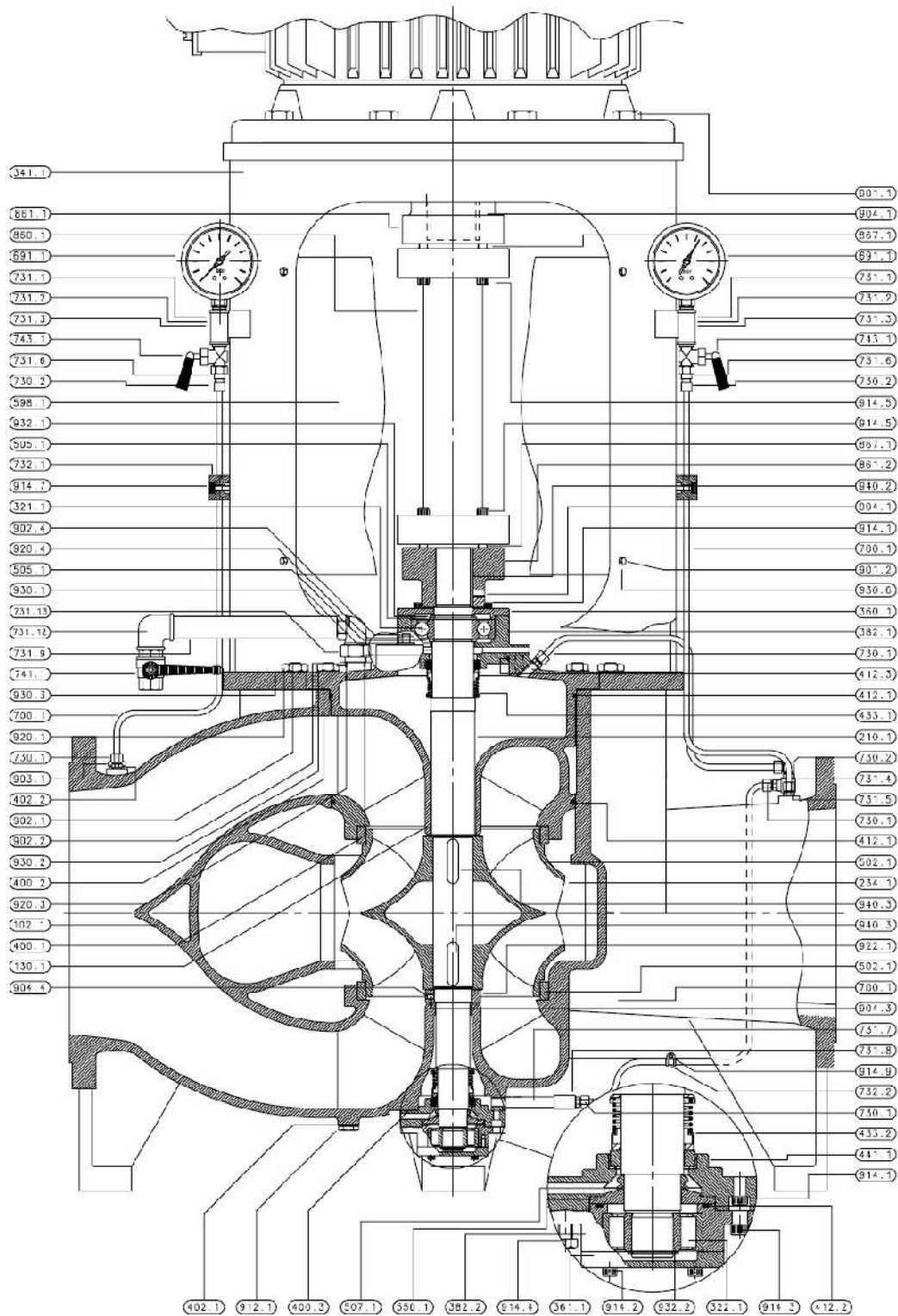
DESMI Pumping Technology A/S
Tagholm 1
9400 Nørresundby

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

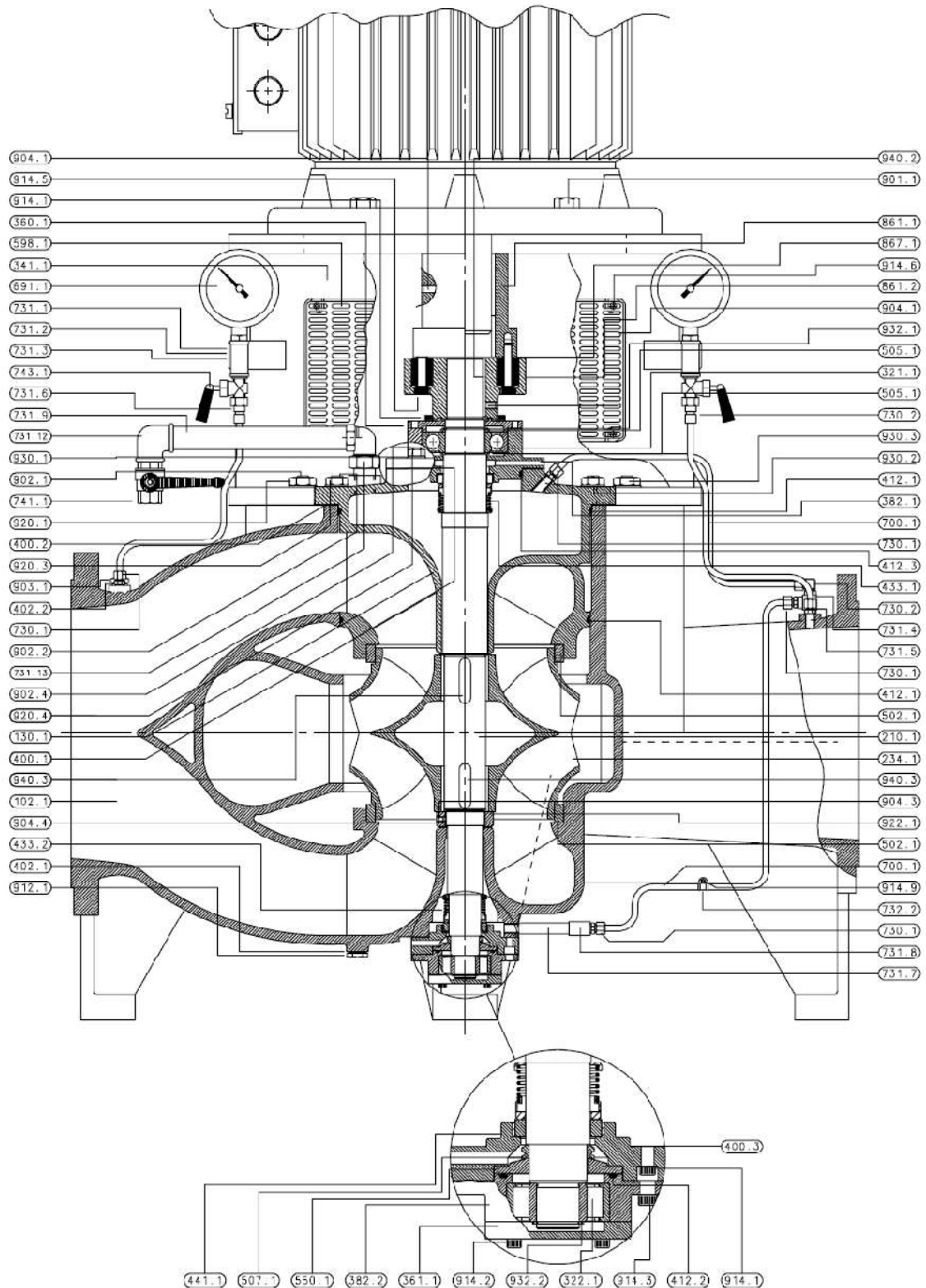
16.1 DSL300 SPACER DESIGN WITH BOTTOM ROLLER BEARING



PARTS LIST

Pos.	Designation	Pos.	Designation
102.1	Pump casing	731.12	Fitting
130.1	Rear cover	731.13	Fitting
210.1	Shaft	732.1	Fitting
234.1	Impeller	732.2	Fitting
321.1	Ball bearing	741.1	Ball valve
322.1	Roller bearing	743.1	Gauge valve
341.1	Motor bracket	860.1	Spacer shaft
360.1	Bearing cover	861.1	Coupling half-motor
361.1	Bearing end cover	861.2	Coupling half-pump
382.1	Bearing housing	867.1	Coupling bush
382.2	Bearing housing	901.1	Hexagon head screw
400.1	Gasket	901.2	Hexagon head screw
400.2	Gasket	902.1	Stud
400.3	Gasket	902.2	Stud
402.1	Plastic seal	902.4	Stud
402.2	Plastic seal	903.1	Plug
412.1	O-ring	904.1	Pointed screw
412.2	O-ring	904.3	Pointed screw
412.3	O-ring	904.4	Ball
433.1	Mech. shaft seal	912.1	Bottom plug
433.2	Mech. shaft seal	914.1	Allen screw
441.1	Shaft seal housing	914.2	Allen screw
502.1	Seal Ring	914.3	Screw
505.1	Support disc	914.4	Screw
507.1	Water deflector	914.5	Allen screw
550.1	Intermediate ring	914.7	Allen screw
598.1	Coupling guard	914.9	Allen screw
691.1	Manometer	920.1	Nut
700.1	Pipe	920.3	Nut
730.1	Fitting	920.4	Nut
730.2	Fitting	922.1	Shaft nut
731.1	Fitting	930.1	Washer
731.2	Fitting	930.2	Washer
731.3	Fitting	930.3	Washer
731.4	Fitting	930.6	Washer
731.5	Fitting	932.1	Snap ring
731.6	Fitting	932.2	Snap ring
731.7	Fitting	940.2	Key
731.8	Fitting	940.3	Key
731.9	Fitting		

16.2 DSL300 COMPACT DESIGN WITH BOTTOM ROLLER BEARING



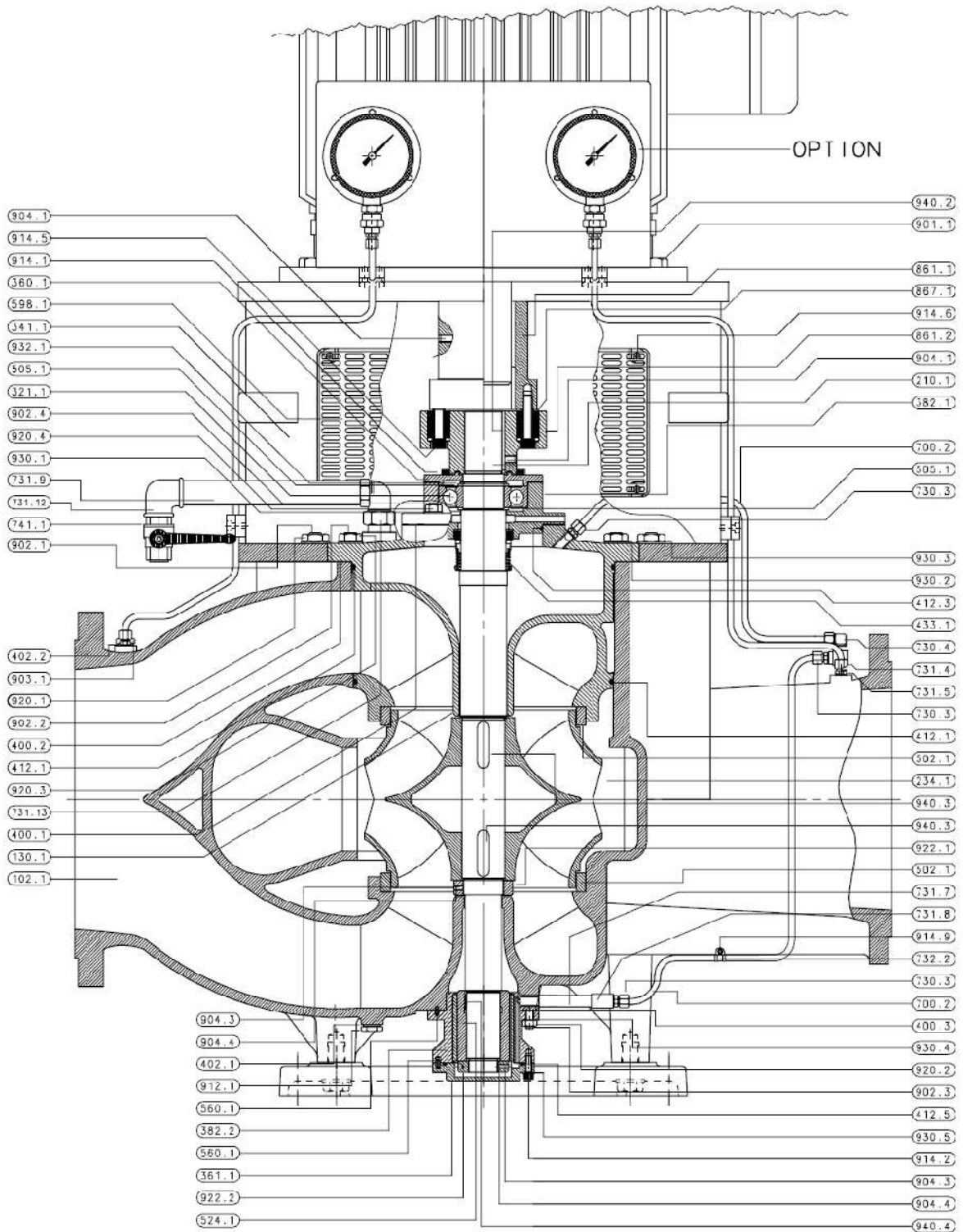
PARTS LIST

Pos.	Designation	Pos.	Designation
102.1	Pump casing	731.7	Fitting
130.1	Rear cover	731.8	Fitting
210.1	Shaft	731.9	Fitting
234.1	Impeller	731.12	Fitting
321.1	Ball bearing	731.13	Fitting
322.1	Roller bearing	732.2	Fitting
341.1	Motor bracket	741.1	Ball valve
360.1	Bearing cover	743.1	Gauge valve
361.1	Bearing end cover	861.1	Coupling half-motor
382.1	Bearing housing	861.2	Coupling half-pump
382.2	Bearing housing	867.1	Coupling bush
400.1	Gasket	901.1	Hexagon head screw
400.2	Gasket	902.1	Stud
400.3	Gasket	902.2	Stud
402.1	Plastic seal	902.4	Stud
402.2	Plastic seal	903.1	Plug
412.1	O-ring	904.1	Pointed screw
412.2	O-ring	904.3	Pointed screw
412.3	O-ring	904.4	Ball
433.1	Mech. shaft seal	912.1	Bottom plug
433.2	Mech. shaft seal	914.1	Allen screw
441.1	Shaft seal housing	914.2	Allen screw
502.1	Seal Ring	914.3	Screw
505.1	Support disc	914.5	Allen screw
507.1	Water deflector	914.6	Allen screw
550.1	Intermediate ring	914.9	Allen screw
598.1	Coupling guard	920.1	Nut
691.1	Manometer	920.3	Nut
700.1	Pipe	920.4	Nut
730.1	Fitting	922.1	Shaft nut
730.2	Fitting	930.1	Washer
731.1	Fitting	930.2	Washer
731.2	Fitting	930.3	Washer
731.3	Fitting	932.1	Snap ring
731.4	Fitting	932.2	Snap ring
731.5	Fitting	940.2	Key
731.6	Fitting	940.3	Key

PARTS LIST

Pos.	Designation	Pos.	Designation
102.1	Pump casing	860.1	Spacer shaft
130.1	Rear cover	861.1	Coupling half-motor
210.1	Shaft	861.2	Coupling half-pump
234.1	Impeller	867.1	Coupling bush
321.1	Ball bearing	901.1	Hexagon head screw
341.1	Motor bracket	901.2	Hexagon head screw
360.1	Bearing cover	902.1	Stud
361.1	Bearing end cover	902.2	Stud
382.1	Bearing housing	902.3	Stud
382.2	Bearing housing	902.4	Stud
400.1	Gasket	903.1	Plug
400.2	Gasket	904.1	Pointed screw
400.3	Gasket	904.3	Pointed screw
402.1	Plastic seal	904.4	Ball
402.2	Plastic seal	912.1	Bottom plug
412.1	O-ring	914.1	Allen screw
412.3	O-ring	914.2	Allen screw
412.5	O-ring	914.5	Allen screw
433.1	Mech. shaft seal	914.9	Allen screw
502.1	Seal Ring	920.1	Nut
505.1	Support disc	920.2	Nut
524.1	Sleeve	920.3	Nut
560.1	Pin	920.4	Nut
598.1	Coupling guard	922.1	Shaft nut
700.2	Pipe	922.2	Shaft nut
730.3	Fitting	930.1	Washer
730.4	Fitting	930.2	Washer
731.4	Fitting	930.3	Washer
731.5	Fitting	930.4	Washer
731.7	Fitting	930.5	Washer
731.8	Fitting	930.6	Washer
731.9	Fitting	932.1	Snap ring
731.12	Fitting	940.2	Key
731.13	Fitting	940.3	Key
732.2	Fitting	940.4	Key
741.1	Ball valve		

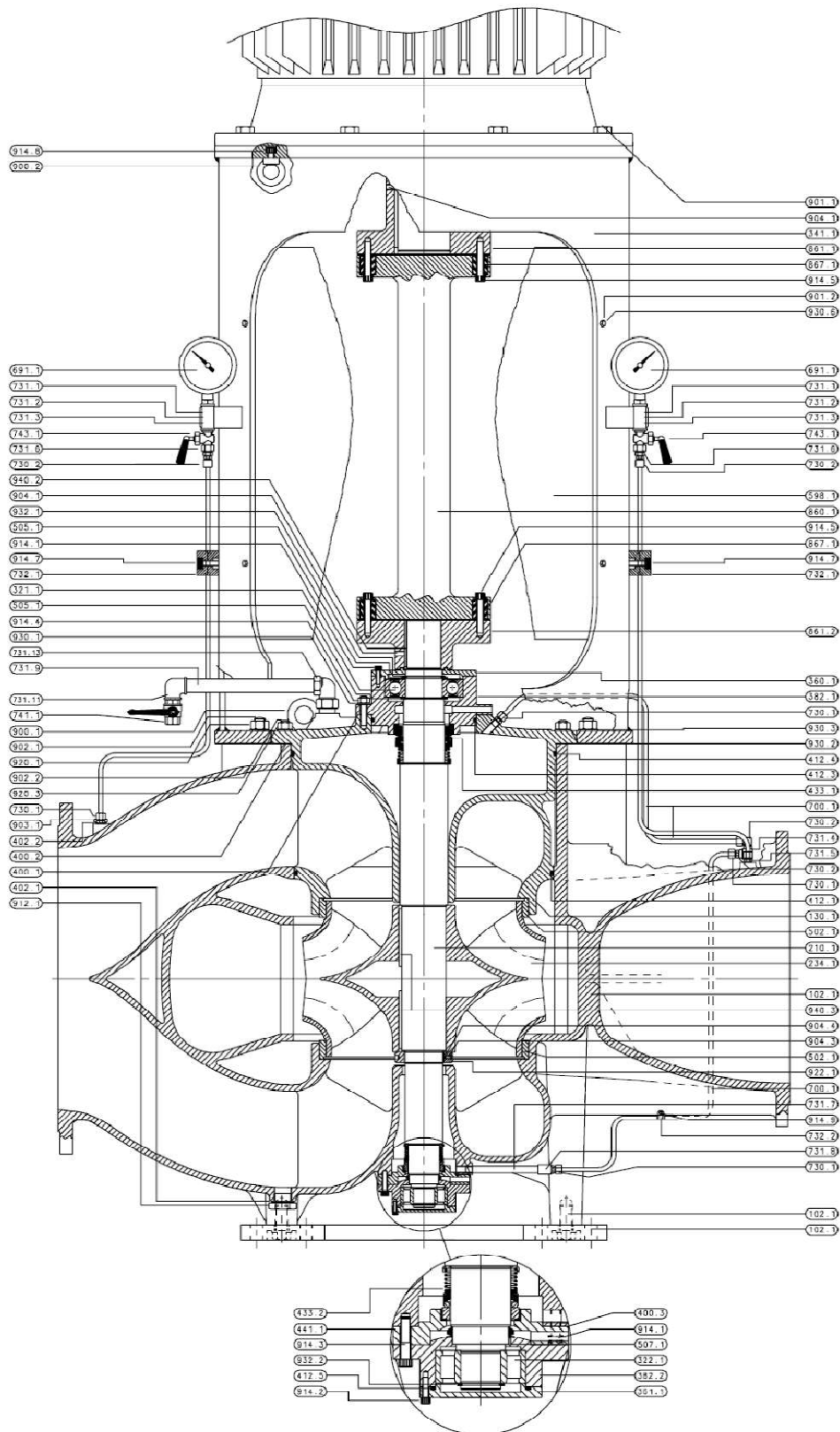
16.4 DSL300 COMPACT DESIGN WITH BOTTOM SLIDING BEARING



PARTS LIST

Pos.	Designation	Pos.	Designation
102.1	Pump casing	741.1	Ball valve
130.1	Rear cover	861.1	Coupling half-motor
210.1	Shaft	861.2	Coupling half-pump
234.1	Impeller	867.1	Coupling bush
321.1	Ball bearing	901.1	Hexagon head screw
341.1	Motor bracket	902.1	Stud
360.1	Bearing cover	902.2	Stud
361.1	Bearing end cover	902.3	Stud
382.1	Bearing housing	902.4	Stud
382.2	Bearing housing	903.1	Plug
400.1	Gasket	904.1	Pointed screw
400.2	Gasket	904.3	Pointed screw
400.3	Gasket	904.4	Ball
402.1	Plastic seal	912.1	Bottom plug
402.2	Plastic seal	914.1	Allen screw
412.1	O-ring	914.2	Allen screw
412.3	O-ring	914.5	Allen screw
412.5	O-ring	914.6	Allen screw
433.1	Mech. shaft seal	914.9	Allen screw
502.1	Seal Ring	920.1	Nut
505.1	Support disc	920.2	Nut
524.1	Sleeve	920.3	Nut
560.1	Pin	920.4	Nut
598.1	Coupling guard	922.1	Shaft nut
700.2	Pipe	922.2	Shaft nut
730.3	Fitting	930.1	Washer
730.4	Fitting	930.2	Washer
731.4	Fitting	930.3	Washer
731.5	Fitting	930.4	Washer
731.7	Fitting	930.5	Washer
731.8	Fitting	932.1	Snap ring
731.9	Fitting	940.2	Key
731.12	Fitting	940.3	Key
731.13	Fitting	940.4	Key
732.2	Fitting		

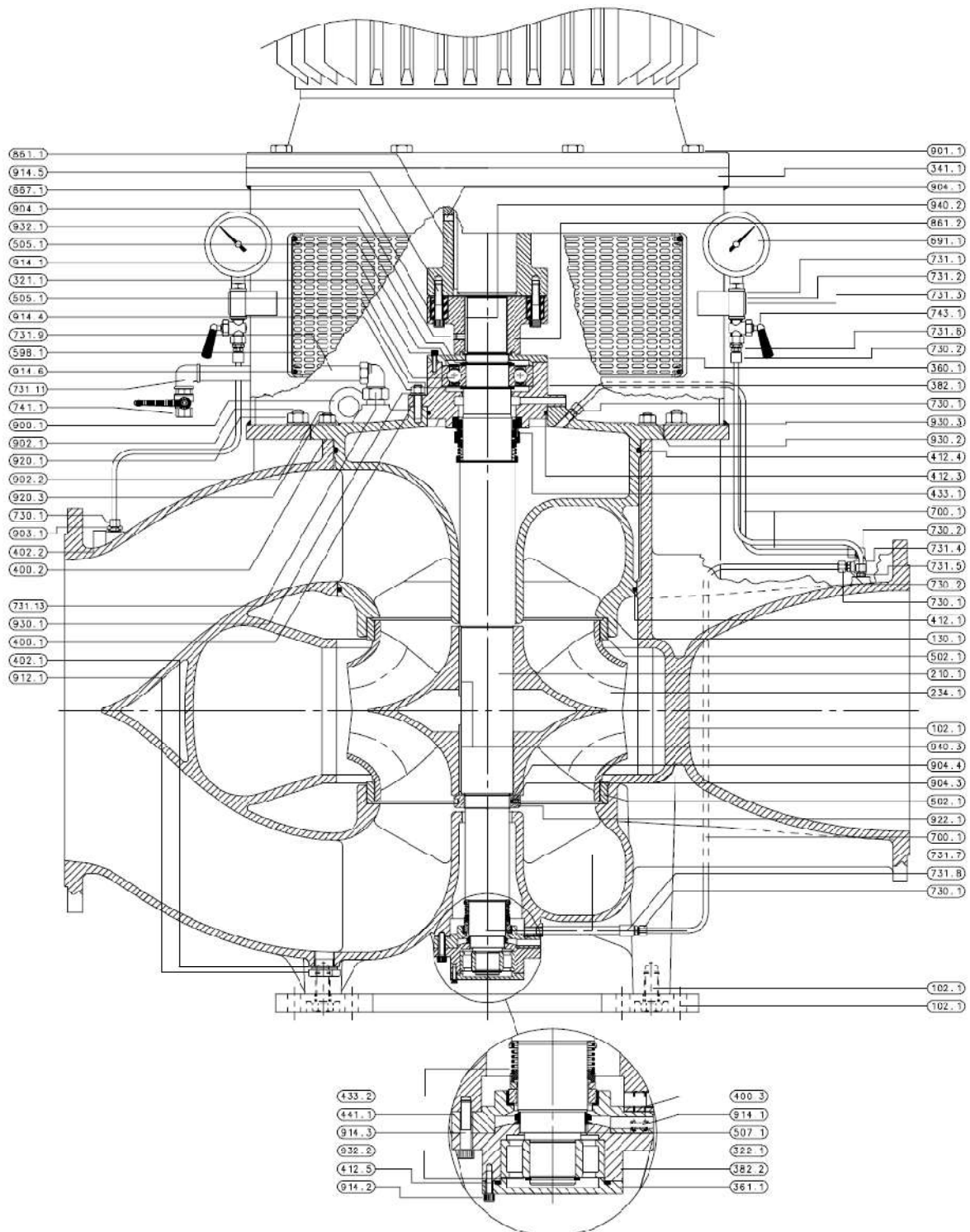
16.5 DSL400 SPACER DESIGN WITH BOTTOM ROLLER BEARING



PARTS LIST

Pos.	Designation	Pos.	Designation
102.1	Pump casing	731.13	Fitting
130.1	Rear cover	732.1	Fitting
210.1	Shaft	732.2	Fitting
234.1	Impeller	741.1	Ball valve
321.1	Ball bearing	743.1	Gauge valve
322.1	Roller bearing	860.1	Spacer shaft
341.1	Motor bracket	861.1	Coupling half-motor
360.1	Bearing cover	861.2	Coupling half-pump
361.1	Bearing end cover	867.1	Coupling bush
382.1	Bearing housing	900.1	Eye bolt
382.2	Bearing housing	900.2	Eye bolt
400.1	Gasket	901.1	Hexagon head screw
400.2	Gasket	901.2	Hexagon head screw
400.3	Gasket	902.1	Stud
402.1	Plastic seal	902.2	Stud
402.2	Plastic seal	902.4	Stud
412.1	O-ring	903.1	Plug
412.3	O-ring	904.1	Pointed screw
412.4	O-ring	904.3	Pointed screw
412.5	O-ring	904.4	Ball
433.1	Mech. shaft seal	912.1	Bottom plug
433.2	Mech. shaft seal	914.1	Allen screw
441.1	Shaft seal housing	914.2	Allen screw
502.1	Seal Ring	914.3	Screw
505.1	Support disc	914.4	Nut
507.1	Water deflector	914.5	Allen screw
598.1	Coupling guard	914.7	Allen screw
691.1	Manometer	914.8	Allen screw
700.1	Pipe	914.9	Allen screw
730.1	Fitting	920.1	Nut
730.2	Fitting	920.3	Nut
731.1	Fitting	922.1	Shaft nut
731.2	Fitting	930.1	Washer
731.3	Fitting	930.2	Washer
731.4	Fitting	930.3	Washer
731.5	Fitting	930.6	Washer
731.6	Fitting	932.1	Snap ring
731.7	Fitting	932.2	Snap ring
731.8	Fitting	940.2	Key
731.9	Fitting	940.3	Key
731.11	Fitting		

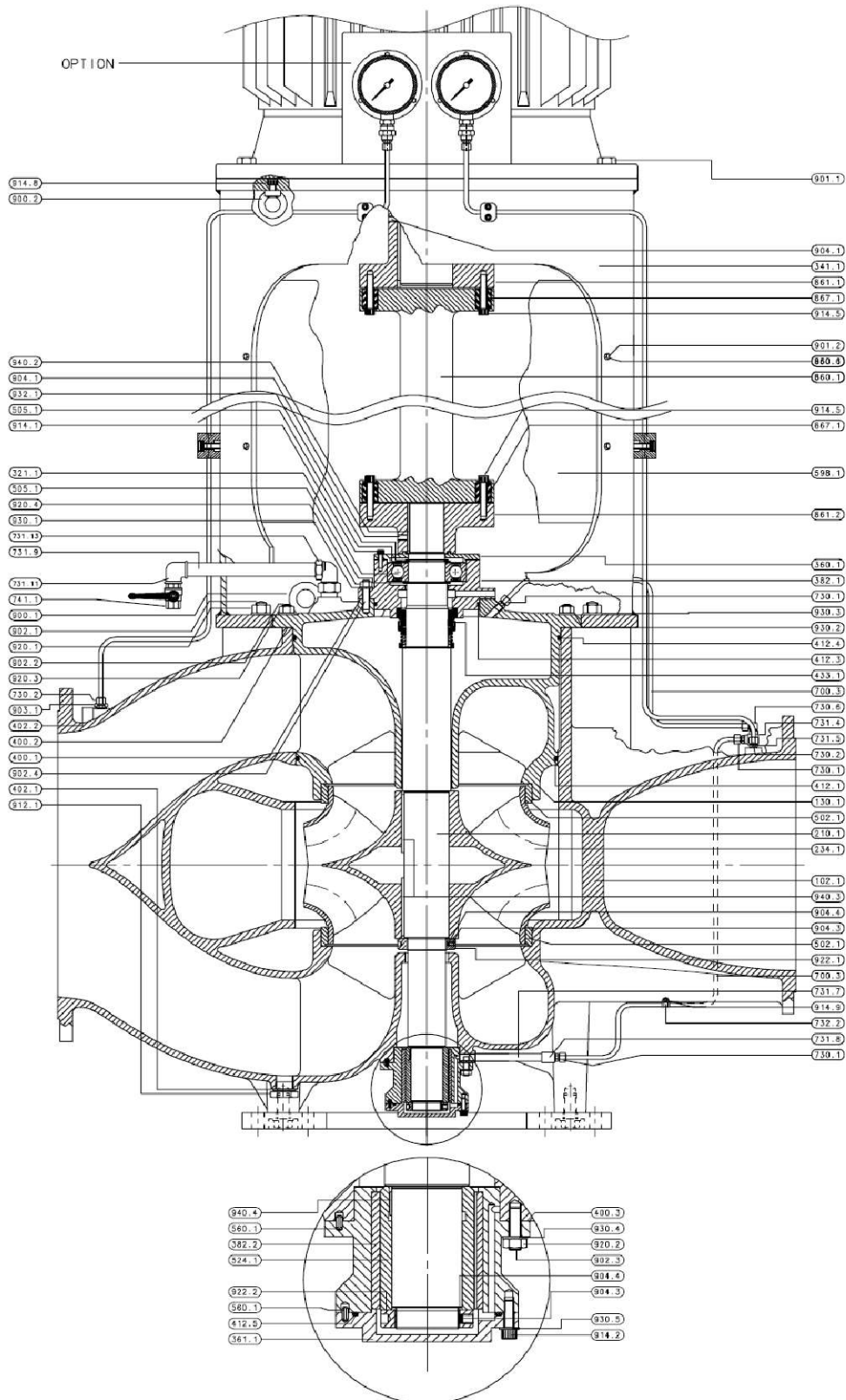
16.6 DSL400 COMPACT DESIGN WITH BOTTOM ROLLER BEARING



PARTS LIST

Pos.	Designation	Pos.	Designation
102.1	Pump casing	731.7	Fitting
130.1	Rear cover	731.8	Fitting
210.1	Shaft	731.9	Fitting
234.1	Impeller	731.11	Fitting
321.1	Ball bearing	731.13	Fitting
322.1	Roller bearing	741.1	Ball valve
341.1	Motor bracket	743.1	Gauge valve
360.1	Bearing cover	861.1	Coupling half-motor
361.1	Bearing end cover	861.2	Coupling half-pump
382.1	Bearing housing	867.1	Coupling bush
382.2	Bearing housing	900.1	Eye bolt
400.1	Gasket	901.1	Hexagon head screw
400.2	Gasket	902.1	Stud
400.3	Gasket	902.2	Stud
402.1	Plastic seal	902.4	Stud
402.2	Plastic seal	903.1	Plug
412.1	O-ring	904.1	Pointed screw
412.3	O-ring	904.3	Pointed screw
412.4	O-ring	904.4	Ball
412.5	O-ring	912.1	Bottom plug
433.1	Mech. shaft seal	914.1	Allen screw
433.2	Mech. shaft seal	914.2	Allen screw
441.1	Shaft seal housing	914.3	Screw
502.1	Seal Ring	914.4	Nut
505.1	Support disc	914.5	Allen screw
507.1	Water deflector	914.6	Allen screw
598.1	Coupling guard	920.1	Nut
691.1	Manometer	920.3	Nut
700.1	Pipe	922.1	Shaft nut
730.1	Fitting	930.1	Washer
730.2	Fitting	930.2	Washer
731.1	Fitting	930.3	Washer
731.2	Fitting	932.1	Snap ring
731.3	Fitting	932.2	Snap ring
731.4	Fitting	940.2	Key
731.5	Fitting	940.3	Key
731.6	Fitting		

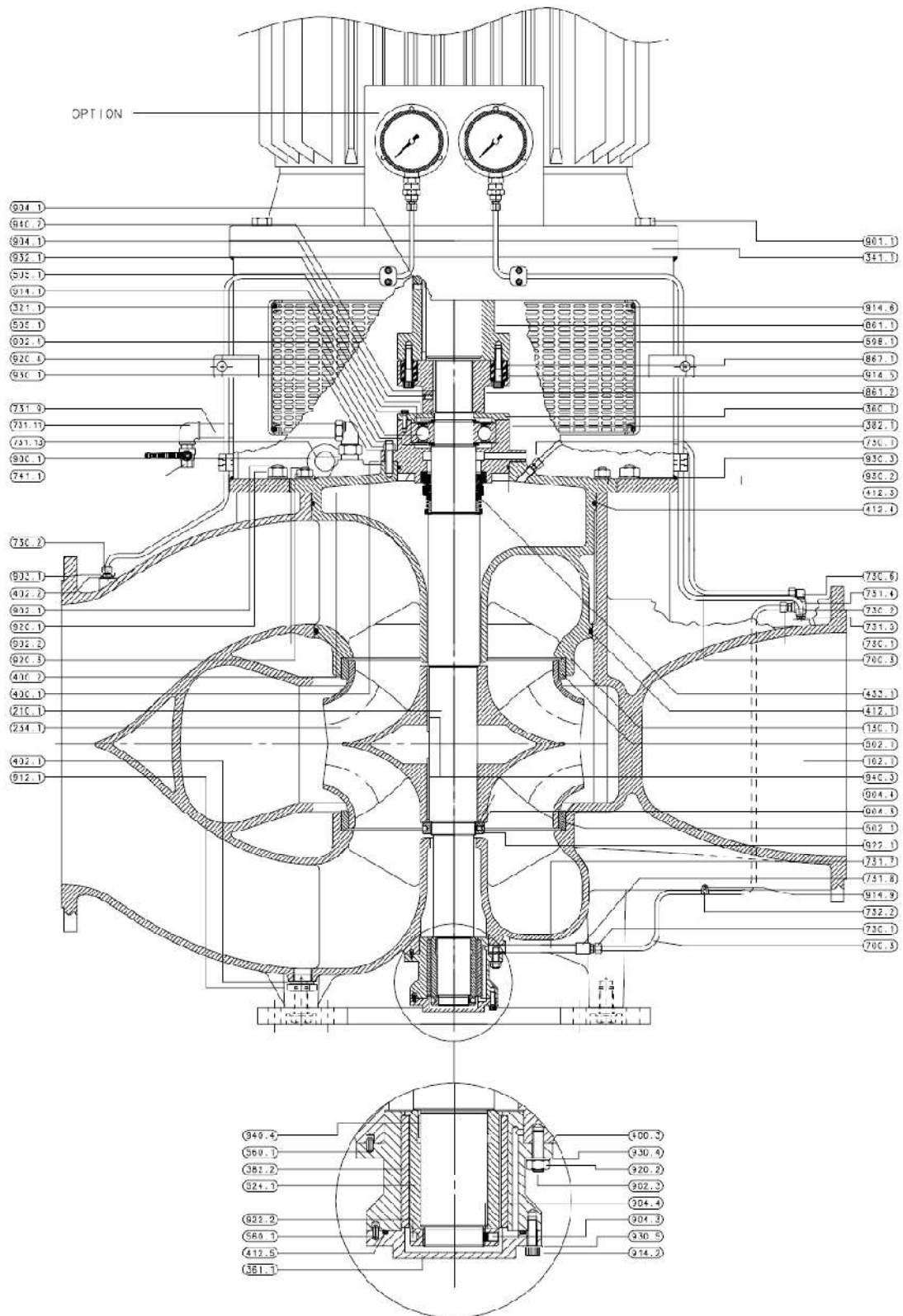
16.7 DSL400 SPACER DESIGN WITH BOTTOM SLIDING BEARING



PARTS LIST

Pos.	Designation	Pos.	Designation
102.1	Pump casing	860.1	Spacer shaft
130.1	Rear cover	861.1	Coupling half-motor
210.1	Shaft	861.2	Coupling half-pump
234.1	Impeller	867.1	Coupling bush
321.1	Ball bearing	900.1	Eye bolt
341.1	Motor bracket	900.2	Eye bolt
360.1	Bearing cover	901.1	Hexagon head screw
361.1	Bearing end cover	901.2	Hexagon head screw
382.1	Bearing housing	902.1	Stud
382.2	Bearing housing	902.2	Stud
400.1	Gasket	902.3	Stud
400.2	Gasket	902.4	Stud
400.3	Gasket	903.1	Plug
402.1	Plastic seal	904.1	Pointed screw
402.2	Plastic seal	904.3	Pointed screw
412.1	O-ring	904.4	Ball
412.3	O-ring	912.1	Bottom plug
412.4	O-ring	914.1	Allen screw
412.5	O-ring	914.2	Allen screw
433.1	Mech. shaft seal	914.5	Allen screw
502.1	Seal Ring	914.8	Allen screw
505.1	Support disc	914.9	Allen screw
524.1	Sleeve	920.1	Nut
560.1	Pin	920.2	Nut
598.1	Coupling guard	920.3	Nut
700.3	Pipe	920.4	Nut
730.1	Fitting	922.1	Shaft nut
730.2	Fitting	922.2	Shaft nut
730.6	Fitting	930.1	Washer
731.4	Fitting	930.2	Washer
731.5	Fitting	930.3	Washer
731.7	Fitting	930.4	Washer
731.8	Fitting	930.5	Washer
731.9	Fitting	930.6	Washer
731.11	Fitting	932.1	Snap ring
731.13	Fitting	940.2	Key
732.2	Fitting	940.3	Key
741.1	Ball valve	940.4	Key
743.1	Gauge valve		

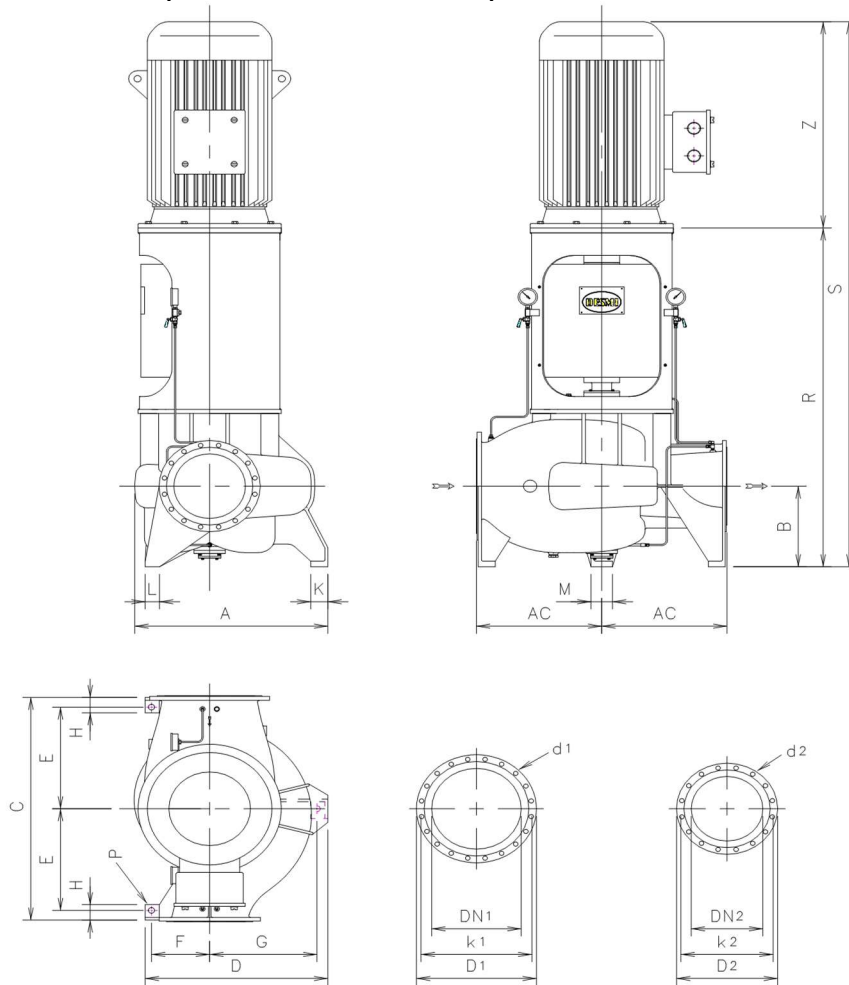
16.8 DSL400 COMPACT DESIGN WITH BOTTOM SLIDING BEARING



PARTS LIST

Pos.	Designation	Pos.	Designation
102.1	Pump casing	732.2	Fitting
130.1	Rear cover	741.1	Ball valve
210.1	Shaft	861.1	Coupling half-motor
234.1	Impeller	861.2	Coupling half-pump
321.1	Ball bearing	867.1	Coupling bush
341.1	Motor bracket	900.1	Eye bolt
360.1	Bearing cover	901.1	Hexagon head screw
361.1	Bearing end cover	902.1	Stud
382.1	Bearing housing	902.2	Stud
382.2	Bearing housing	902.3	Stud
400.1	Gasket	902.4	Stud
400.2	Gasket	903.1	Plug
400.3	Gasket	904.1	Pointed screw
402.1	Plastic seal	904.3	Pointed screw
402.2	Plastic seal	904.4	Ball
412.1	O-ring	912.1	Bottom plug
412.3	O-ring	914.1	Allen screw
412.4	O-ring	914.2	Allen screw
412.5	O-ring	914.5	Allen screw
433.1	Mech. shaft seal	914.6	Allen screw
502.1	Seal Ring	914.9	Allen screw
505.1	Support disc	920.1	Nut
524.1	Sleeve	920.2	Nut
560.1	Pin	920.3	Nut
598.1	Coupling guard	920.4	Nut
700.3	Pipe	922.1	Shaft nut
730.1	Fitting	922.2	Shaft nut
730.2	Fitting	930.1	Washer
731.4	Fitting	930.2	Washer
731.5	Fitting	930.3	Washer
731.6	Fitting	930.4	Washer
731.7	Fitting	930.5	Washer
731.8	Fitting	932.1	Snap ring
731.9	Fitting	940.2	Key
731.11	Fitting	940.3	Key
731.13	Fitting	940.4	Key

17. DIMENSIONAL SKETCH (DESIGN BEFORE 2006)



	A	B	AC	C	D	E	F	G	H	K	L	M	R	Z	S	P
DSL 300-320	820	400	550	1072	750	490	111	450	75	70	65	90	1506 (1) 1099 (2)	(3)	R+Z	ø 28
DSL 400-430	1078	500	700	1380	1020	630	325	600	95	95	80	120	2100 (1) 1401 (2)	(3)	R+Z	ø 35
DSL 400-495	1078	500	700	1380	1020	630	325	600	95	95	80	120	2100 (1) 1401 (2)	(3)	R+Z	ø 35

(1 : Spacer design.

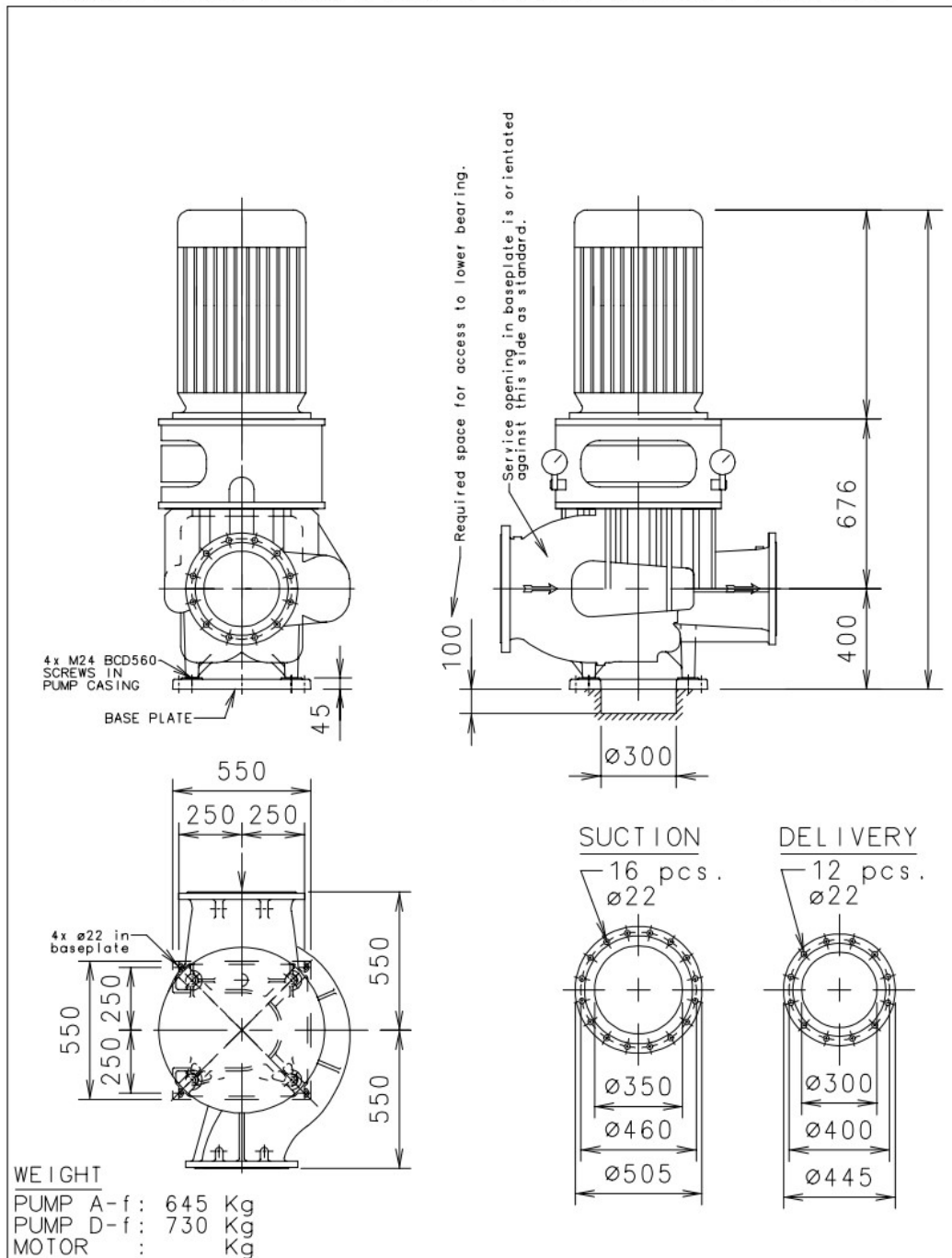
(2 : Compact design,

(3 : Dependent on motor.

PUMP	DNI	KI	DI	DI	DN2	k2	D2	d2
DSL300-320	350	460	505	16 pcs ø22	300	400	445	12 pcs ø22
DSL 400-430	500	620	670	20 pcs ø26	400	515	565	16 pcs ø26
DSL 400-495	500	620	670	20 pcs ø26	400	515	565	16 pcs ø26

18. DIMENSIONAL SKETCH (DESIGN AFTER 2006)

WHERE MEASUREMENTS ARE CRITICAL REQUEST DRAWINGS

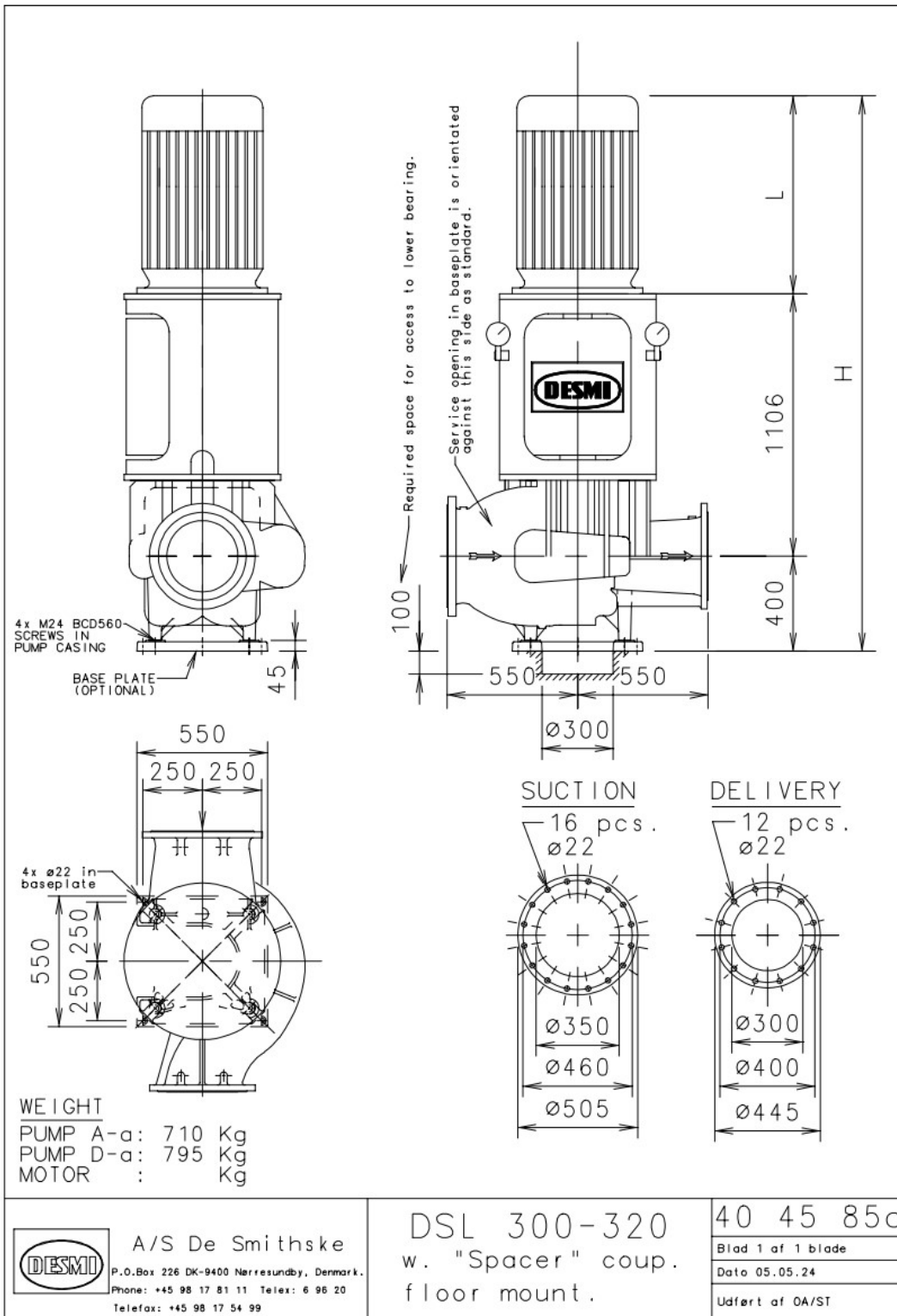


 <p>A/S De Smithske P.O.Box 226 DK-9400 Nørresundby, Denmark. Phone: +45 98 17 81 11 Telex: 6 96 20 Telefax: +45 98 17 54 99</p>	DSL 300-320/-f	40 45 59b
	WITH "Compact" coup.	Blad 1 af 1 blade
	floor mount	Data 05.05.24
		Udført af OA/ST

Subject to alterations

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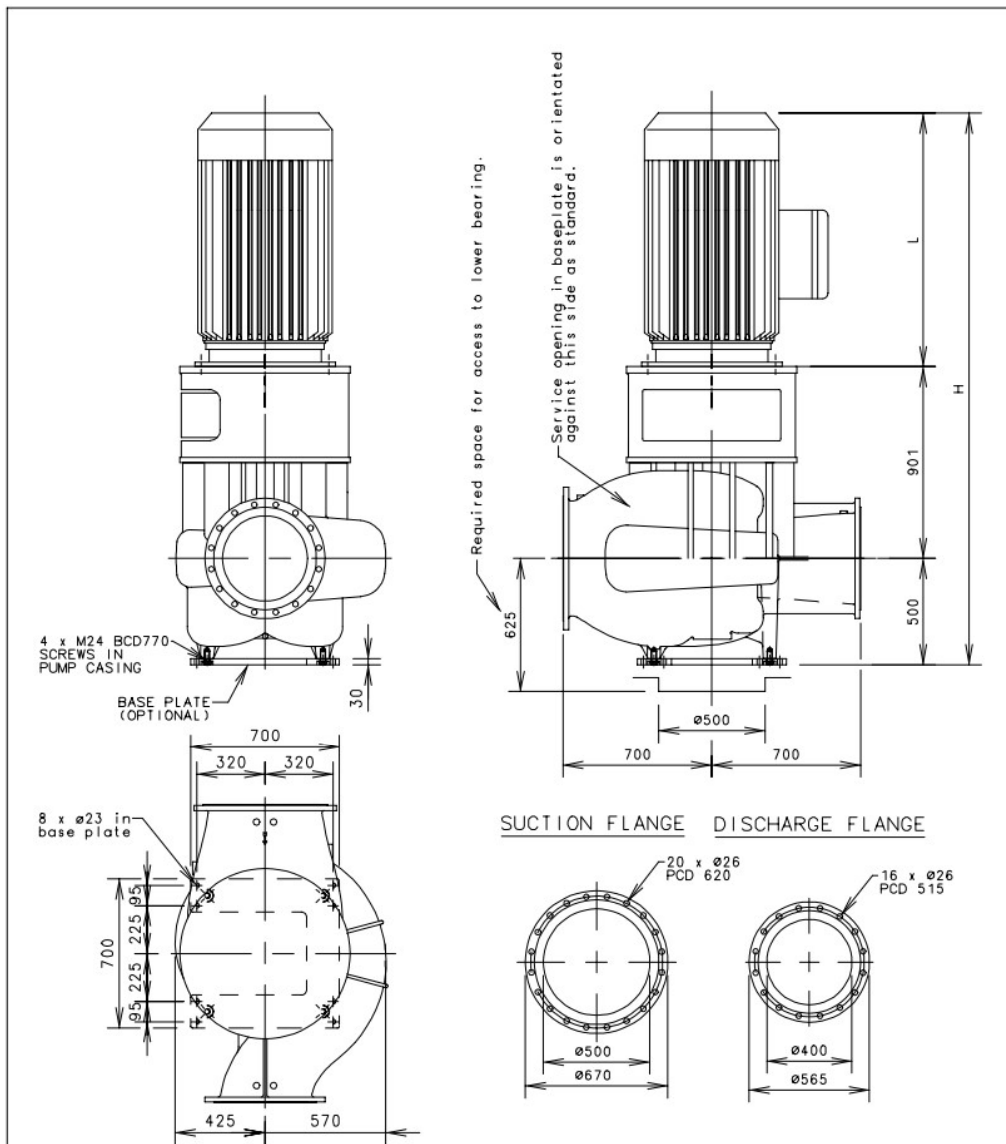
WHERE MEASUREMENTS ARE CRITICAL REQUEST CERTIFIED DRAWINGS



Subject to alterations

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WHERE MEASUREMENTS ARE CRITICAL REQUEST CERTIFIED DRAWINGS



WEIGHT

PUMP A-f	: 1240 Kg
PUMP D-f	: 1400 Kg
MOTOR	: Kg



A/S De Smithske

P.O.Box 226 DK-9400 Nørresundby, Denmark.
Phone: +45 98 17 81 11 Telex: 6 96 20
Telefax: +45 98 17 54 99

DSL 400-4 x x
w. "Compact" coup.
floor mount

40 40 92b

Blad 1 af 1 blade

Dato 05.05.24

Udført af JKJ/ST

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