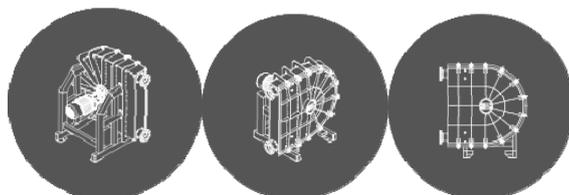


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# LSM • PUMPER



## MAINTENANCE GUIDE FOR LSM – PUMPS

### TYPE

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15

19

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32

40

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65

80

100

125

150

200

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## Preventive maintenance

The LSM pump is designed to have a minimum of service and maintenance.

A small number of simple preventive measures are, however, needed in order to insure a continuous and trouble free run of the pumps.

**Important:** it is very important, that the pump is maintained according to the guide below.

**Warning:** Never clean or repair the pump in service.

When cleaning or by maintenance or repair, the powersupply to the motor has to be disconnected by means of a keylocked switch.



**Never start the pump without it's front cover !  
Danger of crushing!**

## Lubrication

### Pump:

The housing of the pump is filled with glycerol in order to lower the friction between the hose and the Roller. The fluid level, should be checked on a weekly basis. This is done by looking through the sightglass in the front of the pump, closest to the ground. In case of low fluid level, add glycerol until the level is in the middle of the sightglass.

### Gear:

#### Pumpsizes 10 .. 50

Gearoil should be changed each 6000 hours or every 2. year, whatever appears first. In clean and dustfree Environments the interval can be up to doubled.

#### Pumpsizes 65 .. 200

These sizes usually comes with a planetary gear and by these has the following oilchange procedure :

After 100 hours change the oil for the first time.

After this it's recommended to change oil every 2.500 hours or once a year.

LSM pumps recommends the use of synthetic oil in all types of gears :

### **Shell Omala 220.**

#### **Variator:**

Planetary gear type : If the pump is fitted with a variator of the planetary gear type, oilchange is recommended after 400 hours and hereafter oilcheck every 1000 hours. No later than after 2000 hours is the oil to be changed.

Flat belt type: This type is practically maintenance free. It's recommended to vary the speed between hi and low on a regular basis within the first 400 hours of use.

**Important:** By both types of variators it's important only to change the speed setting of the variator while the pump is running!

#### **Motor:**

At some electrical motors above 30 kW, the bearings has to be greased every 500 hours. This is the case if the motor has greasenibbles.

LSM Pumps recommends the use of synthetic grease with high pressure additives.

### **Cleaning**

#### **Motor:**

Check the wiring for rupture or other defects every 6 months. Remove dust on the motor, it prevents efficient cooling of the motor. The cooling fan on the motor also has to be overlooked for any defects.

Please read the instructions of the motorsupplier for further information.

**Warning:** When repairing or lubricating the bearings on the motor, take care to prevent the motor from falling down, when dismantling it.

## Hose

The hose is checked for wear and signs of beginning rupture every 1500 hours.

### **Important :**

When receiving a new hose from LSM Pumps, the following should be observed :

Inner diameter

Hose material

Length of hose

Wall thickness of the hose (is to be measured with a Vernier gauge and noted down. The thickness is used in adjusting the rollers on the rotor. )

### **Warning:**

Never attempt to clean or repair the pump while it is in service.

When cleaning or by maintenance or repair, the powersupply to the motor has to be disconnected by means of a keylocked switch.

By potentially hazardous or in other ways dangerous medias, measures has to be taken to insure that the hose is washed through with a media, harmless to man and environment, before the hose is dismantled.

Be aware that there can be a significant pressure difference between the upper and the lower connection point. This can mean that while having vacuum in one connecting pipe there can be a large overpressure in the other connecting pipe.

It is therefore recommended to empty the pipeline going to and from the pump, whenever dismantling the hose.

## **Replacing a hose :**

- Prior to replacing a hose, it is recommended to let the pump run with a media that is harmless to man and environment.
- Empty the lines to and from the pump.
- Disconnect the main Power supply to the pump by a padlock secured repair switch.
- Draw off the Glycerol in the pump housing, through the lowest plug in front of the pump.
- Dismantle the front of the pump.
- Check that the hose is not pressurised.
- Carefully loosen the hose clamps, starting with the ones at the bottom.
- Pull out the hose

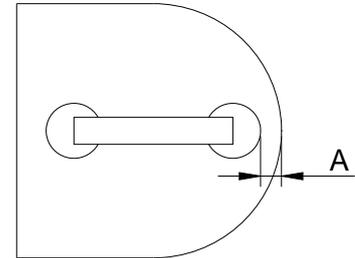
- In order to turn the rotor of the pump, dismantle the cover of the electrical motor fan, and turn the fan by hand.
- Check mechanical parts, such as Rollers, bushings and shafts for damage or wear. When ordering spareparts, please make reference to the serial number on the nameplate.
- Check that the replacing hose has the right diameter and length, before mounting it.
- Measure the exact thickness of the hose and note this down. This is needed for adjusting the rollers, see the next section.
- The rollers is adjusted to their right distance to the pump housing, see next section.
- The rotor is turned manually by the fan on the electrical motor, until the roller is at 3 and 9 o'clock.
- The hose is mounted on the connecting studs with hose clamps.
- The rotor is again turned manually, so that the hose can be pressed into place in the bottom of the pump housing.
- The seal on the pump housing is cheked and replaced if needed.
- The front of the pump is mounted.
- Mount the plug where the Glycerol was drawn off.
- Fill the pump housing with Glycerol, up until the middle of the lowest sight glass.
- Check the pump housing for leakage.
- Check the pump for unnormal vibrations and other irregularities such as unnormal noise.
- The pump is cheked for ability to create vacuum.

## Adjusting the rollers

The distance A between the inner surface of the pump, where the hose is supported, and the roller on the rotor is :

$$A = 2 * t - t_1$$

(at pressures 0 .. 5 bar)



**Figure 1 Distance between roller and pump housing.**

When the pressure exceeds 5 bar, subtract  $0,1 * t_1 * P_d$ .

| Variable             | Value  |
|----------------------|--|
| <b>A</b>             | Distance from roller to pump housing, see Figure 1 |
| <b>t</b>             | Thickness of the hose, see Figure 2                |
| <b>t<sub>1</sub></b> | Material dependent scalar, see Table below         |
| <b>P<sub>d</sub></b> | Nominal working pressure on the pump.              |

Example:

Hose thickness  $t = 20,3 \text{ mm}$

Hose material NBR  $\Rightarrow t_1 = 0,5 \text{ mm}$

Working pressure  $P_d = 9 \text{ bar}$

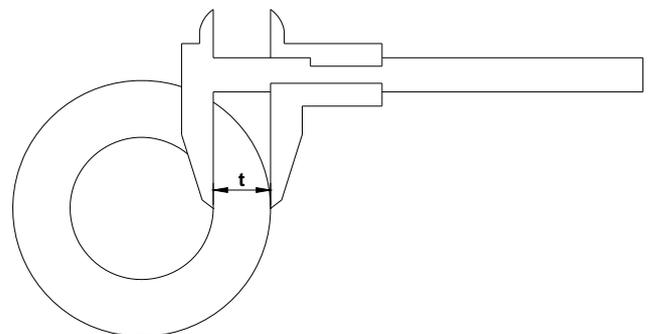
$$A = 2 * 20,3 - 0,5 = 40,1 \text{ mm}$$

Subtraction from higher working pressure :

$$0,1 * 0,5 * 9 = 0,45 \text{ mm}$$

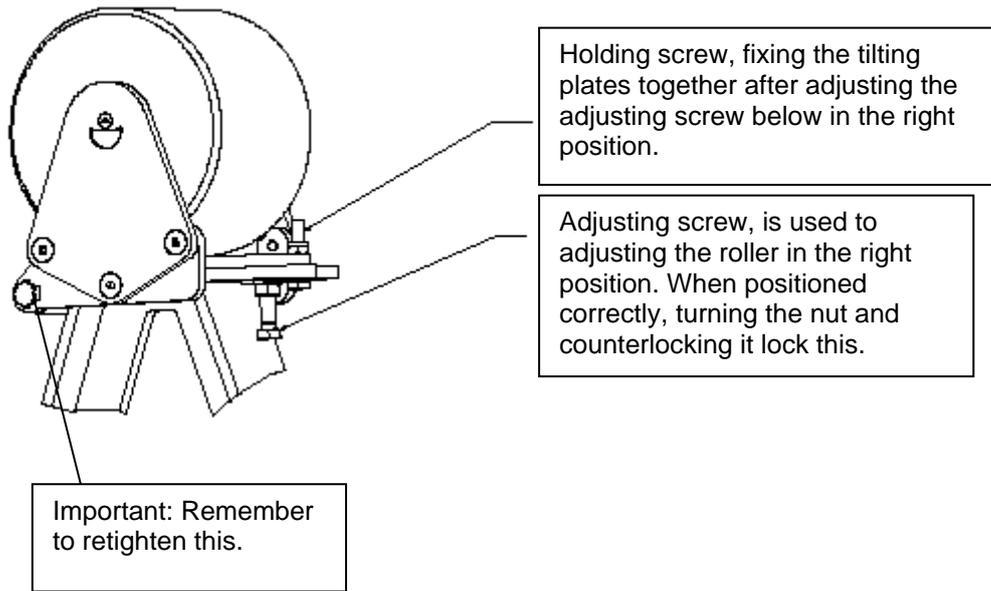
$$A = 40,1 \text{ mm} - 0,45 = \underline{39,65 \text{ mm}}$$

| Hose material  | Scalar: <b>t<sub>1</sub></b> |
|----------------|------------------------------|
| Natural rubber | 1,0 mm                       |
| NBR            | 0,5 mm                       |
| EPDM           | 0,5 mm                       |

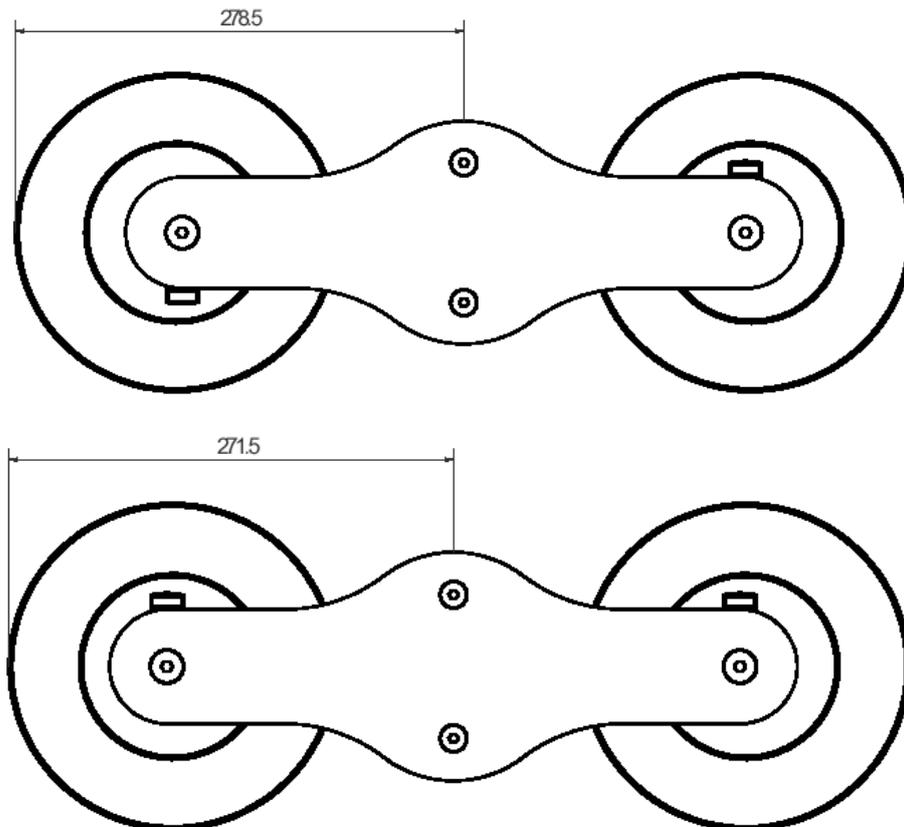


**Figure 2 Thickness of the hose**

LSM50 .. 150



On the smaller rotors, adjusting the rollers is done simply by loosening the screw by the roller, turning the excentrical shaft in the wanted position and then retightening the screw again. The example below is from an LSM 40 pump:



**Changing motor or gear.**

When dismantling the motor or gear, the center of gravity of the pump will be changed drastically.

Before dismanteling a motor or gear, it is important to check that the pump is securely fastend to its underlying support.

To dismantle the gear, it is in many cases nessasary to dismantle the rotor first.

**Rotor**

A large part of the rotors in the LSM Pumps has a Taperlock bushing between the gearshaft and the rotor. This is a description of how to install and remove these:

To install

1. Clean shaft, bore and outside of bush, and bore of hub. Remove any oil, laquer or dirt. Place bush in hub and match half holes to make complete holes (each complete hole will be threaded on one side only).
2. Oil thread and point of set screws, or thread and under head of screws loosely in holes that are threaded on hub side.
3. Make sure bush is free in hub. Slip assemly onto shaft and locate in position desired.
4. Tighten screws alternaely and evenly until all are pulled up vevry tighty. Use a piece af pipe on a wrench to increase leverage (See table for wrench torque).
5. Hammer against large end af bush using hammer and block or sleeve to avoid damage. Screws can now be turned a little more using the specified wrench torque. Repeat this alternate hammering and screw re-tightning until the specified wrench torque no longer turns the screws after hammering. Fill other holes with grease to exclude dirt.

To Remove

1. Remove all screws. Oil thred and point of set screws, or thread and under head of cap screws.
2. Insert screws in holes that are threaded on bush side. In sizes where washers are found under screw heads, be sure to use these washers. Note that one screw in each hub is left and is not used in this loosening operation.
3. Tighten screws alternately until bush is loosened in hub. If bush does not loosen immediatly, tab on hub.

| LSM | Taperlock bush | Wrench torque |
|-----|----------------|---------------|
| 100 | 4040           | 192.1 Nm      |
| 80  | 3020           | 90.4 Nm       |
| 65  | 3020           | 90.4 Nm       |
| 50  | 2517           | 48.6 Nm       |

## Troubleshooting guide

| Problem                                  | Probable cause(s)   | Suggested remedy  |
|--|---|---|
| The pump does not start when turned on.  | Motor defect  | Check fuses.<br>Check motor protection switch.<br>Make sure that all 3 phases has the required voltage.   |
|  | Key in gear or rotor defect.                              | Exchange key.   |
|  | Taper-lock connection defect                              | Make sure that a key is mounted and that all surfaces of friction are clean and undamaged. The hub is tensioned to a specific torque, see rotor section.    |
|  | Driveshaft damaged.                                       | Exchange gear.  |
|  | Hose blocked.   | Reverse the pumps rotation and remove any obstacles. If this is not possible, the pump needs to be disassembled and obstacles removed.                      |
| Pump runs but there is no flow of media. | Pump rotating reverse.                                    | Turn rotating direction of the motor.   |
|  | Pipeline on suction side of the pump is clogged.          | Clean pipeline, valves, filters ao.   |
|  | The pump is taking in air                                 | Localize the source of air intake and exchange seals or gaskets.  |
|  | Rollers are not adjusted correctly.                       | Adjust the rollers, see section on how to adjust the rollers.   |
| Flow is less than calculated             | Pumpen is running too slow.                               | Turn up the speed. If there is no frequencyinverter on the pump, this can be installed. Also it is possible to exchange the gear to a different gear ratio. |
|  | The pump is taking in air                                 | Localize the source of air intake and exchange seals or gaskets.  |
|  | Kinematic viscosity is too high.                          | Turn down the pump speed and / or utilize a bigger pump.  |
|  | Rollers are not adjusted sufficiently onto the hose.      | Adjust the rollers closer to the hose, see section on how to adjust the rollers.  |
|  | Backpressure is too high.                                 | Change the pipeline on the pressure side of the pump.   |
| Noise                                    | Pump cavitating.  | Lower the speed or utilize a bigger pump or change the pipelines.   |
|  | Air or gas in the pipelines.                              | Seal of possible air intakes.   |
|  | Rotor touching the frontplate.                            | Adjust the rotor in place.  |
|  | Pressure too high.  | Change the pipelines, lower the pumping speed.  |
|  | Gearwheels or bearings worn out.                          | Workshop overhaul of pump needed.   |
|  | Hose damaged.   | Exchange the hose.  |
| Pump draws too much current.             | Pressure too high.  | Ændre rørsystem på trykside, sænk hastigheden.  |
|  | Sedimentation of solid substance when not using the pump. | Empty the pump after use, flush the pump with clean water after use. Install a heating element.   |
|  | Fluid or particle buildup in or by the motor.             | Clean the motor.  |
| Pumpe slides hurtigt                     | Hose deterring chemically.                                | Reassess the choise of material for the hose.   |
|  | Hose wearing mecanically on the outside.                  | Rollers are tensioned too tight onto the hose.  |
|  | Hose wearing mecanically on the inside.                   | Reassess the choise of material for the hose.   |
|  | Rotor bearings (bushings) wears down quickly.             | Rollers are tensioned too tight onto the hose.  |

