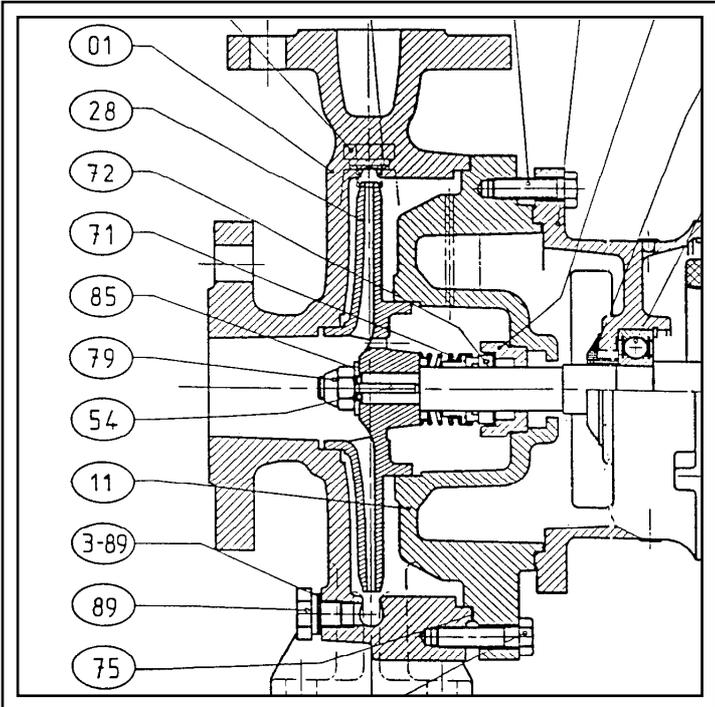


*This manual must be given
to the end user*



LS **Monocellular centrifugal** **electro-pumps** **Installation and maintenance**

LS Pumps

1 - GENERAL

The LS range of monobloc electro-pump units should be installed in accordance with the instructions in this manual. They must not be used in duty conditions other than those indicated in this document.

Should these instructions not be adhered to, or the equipment be modified in any way without LEROY-SOMER's approval, the guarantee is immediately rendered null and void.

LEROY-SOMER cannot be held responsible if the instructions contained in this document have not been followed.

This manual does not take account of existing safety recommendations and regulations which may be in force where the equipment is installed. It is the responsibility of the user to ensure that these are applied and adhered to.

2 - USE

The LS range of centrifugal, mono-cellular, monobloc electro-pump units is designed to carry water, and any other clear liquid which is non-contaminated, non-abrasive, non-corrosive, non-explosive and compatible with the material of which the pump is made.

For any other pumped liquid : please consult LEROY-SOMER.

- Maximum content of solid particles in suspension: 50 g/m³
- Maximum temperature of pumped liquid: 110 °C
- Minimum temperature of pumped liquid: - 10 °C
- Maximum ambient temperature: 40 °C
- Maximum duty pressure of the pump (on lift) : 16 bar
- Maximum pressure at intake : 10 bar
- Density of pumped liquid: 1
- Viscosity of pumped liquid: 1 mm²/s

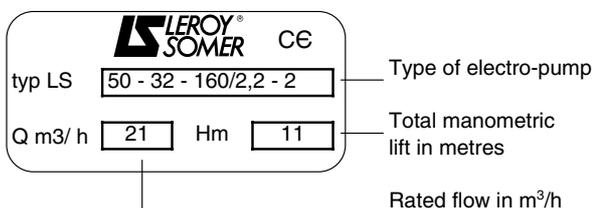
3 - CHARACTERISTICS

The dimensions of the pump body, intake and outlet openings and foot mountings conform to DIN 24255 and NFE 44111 standards.

Each electro-pump unit has two identification plates; one which defines the hydraulics, and the other the motor.

3.1 - Hydraulic characteristics

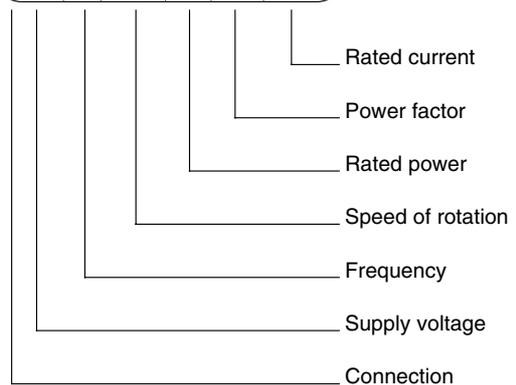
The hydraulic characteristics are guaranteed to conform to international standard ISO 2548 class C for mass-produced pumps.



3.2 - Electrical characteristics

| Mot 3 ~ DL 2,2 / 2 | | | | | | |
|--------------------|------|-------------------|-----|-------|------|--|
| N° 343566DG001 kg | | | | | | |
| IP 55 | cl F | °C 40 | S | S 1 | | |
| V | Hz | min ⁻¹ | kW | cos φ | A | |
| Δ 220 | 50 | 2845 | 2.2 | 0.87 | 8.50 | |
| Y 380 | | 2845 | | 0.87 | 4.90 | |
| Δ 230 | 50 | 2860 | 2.2 | 0.82 | 8.70 | |
| Y 400 | | 2860 | | 0.82 | 5.00 | |
| Δ 240 | 50 | 2870 | 2.2 | 0.77 | 9.00 | |
| Y 415 | | 2870 | | 0.77 | 5.20 | |

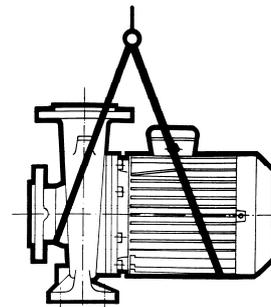
—— Type of motor
—— Electro-pump serial number



4 - HANDLING

Electro-pump units should be handled and unpacked with care.

We recommend the unit is handled as shown in the sketch below.



5 - STORAGE

In good storage conditions, our electro-pump units are not at risk of deterioration.

They should be stored in dry, enclosed areas, away from inclement weather conditions, dust, vibration, and shocks.

If there is a risk of freezing temperatures in the storage area, ensure that the pump has been drained.

Do not place units leaning against the motor fan cover. Before commissioning or re-commissioning an electro-pump unit, always read the instructions contained in this manual, and follow them carefully.

LS Pumps

6 - INSTALLATION

Electro-pump units must be installed by personnel suitably qualified to undertake this type of work.

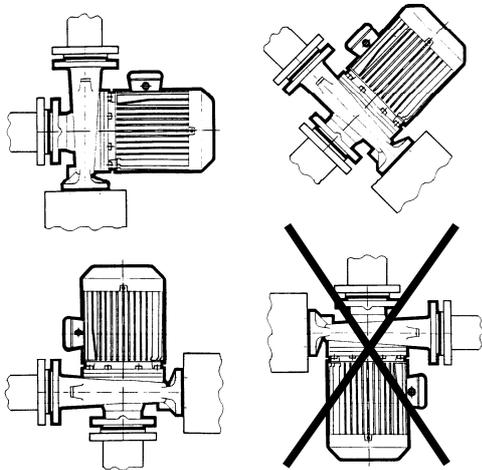
Install the unit as close as possible to the water supply in an easily accessible location.

The suction and delivery pipes must be fitted in such a way that they do not create any mechanical force on the body of the pump.

We recommend fixing the unit on a concrete pillar. If necessary, wedge it in position.

In some cases, the motor flange comes into contact with the mating surface before the foot mountings. It must then be wedged beneath both the pump and the motor.

The unit can be installed in a number of positions, but not with the motor under the pump (see sketch below).



The unit should be installed in a well-ventilated location, sheltered from inclement weather conditions.

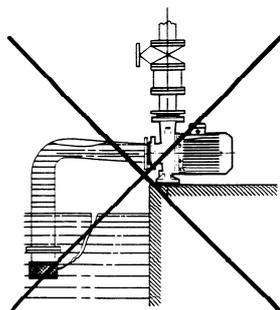
6.1 - Suction pipe

This pipe must be large enough in diameter to avoid significant loss of pressure. It must be absolutely watertight, capable of resisting depressurization and should not have any high points.

A watertight inlet filter valve must be fitted at the bottom end.

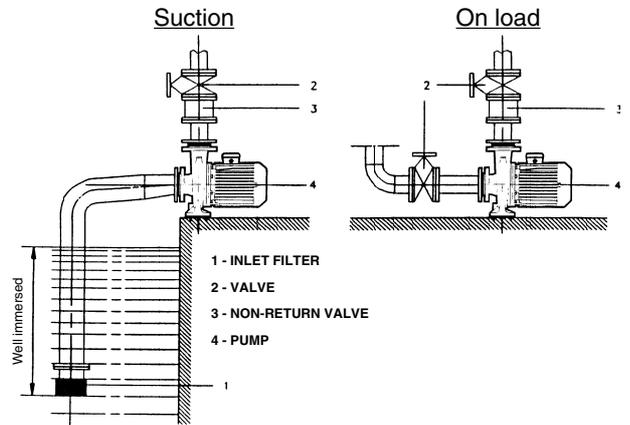
An incline of 2% rising towards the pump is advisable to ensure that no liquid remains in the pipe.

The inlet filter should not allow the passage of particles larger than 2 mm. It should be placed at a depth below the lowest water level so that outside air cannot be siphoned in, and kept away from the walls and the bottom of the well.



If the pump is working on load, the bottom valve is replaced by an isolation valve on the pump.

If the diameter of the suction pipe is greater than the nominal diameter of the pump intake, use a reducer to connect them.



6.2 - Delivery pipe

The diameter of this pipe should be chosen after first carefully calculating the installation pressure losses.

Place a flow-control valve on the pipe and a non-return valve upstream of this valve.

6.3 - Before commissioning

- Make sure that the electro-pump rotates freely without sticking.
- Fill the suction pipe and the pump, taking care not to let any air get in, by unscrewing the filler cap : part no. (90)
- Check that the bottom inlet filter valve is watertight and the water level has not dropped near to the opening : part no. (90)
- Screw the filler cap back on : part no. (90)

7 - ELECTRICAL CONNECTION

Electrical connection must be performed by a qualified electrician taking any existing regulations into account.

If the electro-pump unit has been stored in damp conditions, check the motor insulation resistance before commencing any electrical connection. This must be a minimum of 10 megohms in cold state at 500 volts for a period of 60 seconds.

7.1 - Power supply

Make sure that the supply voltage indicated on the motor identification plate corresponds to the actual electricity supply.

Check that the diameter of the meter incoming and outgoing conductors is adequate to supply the unit with the correct power.

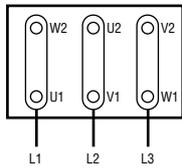
7.2 - Connections

The motors are delivered with the following connections :

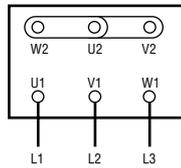
- Δ 230 / Y 400 V up to 2.2 kW inclusive at 50Hz
- Δ 400 V from 3 kW at 50 Hz

LS Pumps

Make absolutely sure that this type of connection corresponds to the mains supply voltage. It must be connected as shown in the diagram below, which appears on the terminal box lid.



Δ connection



Y connection

7.3 - Protection

Connect to earth as required by current regulations. In order to benefit from the guarantee, it is essential to protect the motor electrically by placing a thermal magnetic circuit-breaker between the isolator and the motor. This circuit-breaker may also be fused. Before starting up the unit, the circuit-breaker should be set provisionally to the correct current (shown on the identification plate) for the corresponding mains supply voltage. Definitive setting should be performed as instructed in paragraph 8. So as not to subject the unit to excessive temperature rises, a maximum number of starts per hour as shown below should not be exceeded.

| Motor power | Max number of starts / hour |
|---------------|-----------------------------|
| ≤ 1.2 kW | 35 |
| 1.5 to 3.3 kW | 30 |
| 4 to 6.5 kW | 20 |
| 8.2 to 16 kW | 15 |
| > 16 kW | 10 |

This number of starts should be spread over the hour.

8 - STARTING THE PUMP UNIT

An electro-pump unit must never be run on empty. This is very important to ensure the mechanical seal remains watertight.

- Open the suction valve (for an on load pump).
- Fill the pump and suction pipe with the liquid to be pumped.
- Close the outlet flow-control valve.
- Make sure that the the direction of rotation is that indicated by the arrow on the unit (flange or fan cover) by running the motor for a couple of turns.
- If the direction of rotation is reversed, modify the connection to the motor terminal block by reversing 2 power supply wires.
- After starting, once the motor has reached its operating speed, make sure that the back pressure is normal, and not subject to significant fluctuations. If this is not the case, stop the pump and re-fill it. If the problem persists,

look for air getting into the suction pipe.

- If the motor is not running fast enough, check the connection.
- Gradually open the pressure valve until the desired flow or pressure is achieved.
- Take care not to leave the pressure valve closed for more than 5 minutes.
- With the unit operating normally, measure the maximum current drawn on each phase. Set the circuit-breaker definitively, for a slightly higher current than the maximum measured. The latter must never exceed the current indicated on the motor identification plate.
- Check that the voltage between phases at the motor terminals is correct.
- Any disruption to operation indicates abnormal pump unit operating conditions (voltage drop, broken phase, incorrect setting, foreign body in the pump, sludge, etc).
- The unit should turn smoothly without vibrating.
- Never run the unit with a closed valve (whether the intake or the pressure valve).

Running the pump unit on empty is absolutely prohibited

- The pump must not operate at a flow rate of less than 30 % of the rated flow shown on the unit identification plate.

Motor - Drain holes :

For draining condensates produced when the machine is cooling, holes have been made at the base of the housings or motor flanges according to their operating position. These holes are stopped up with plastic plugs, and should be periodically unplugged and replugged.

9 - STOPPING THE PUMP UNIT

- If the unit is not fitted with a non-return valve, close the pressure control valve to avoid water hammer.
 - Switch off the electrical supply to the motor.
 - In the event of prolonged stoppage and/or risk of freezing, drain the suction and delivery pipes as well as the pump itself, or take precautions against freezing by appropriate methods.
- To drain the pump, unscrew the special cap, part no. ⁽⁸⁹⁾

10 - SERVICING

- Practically no servicing is required.
- All motors, except 18.5 kW, 22 kW, 30 kW and 37 kW 2-pole motors (2900 min⁻¹) are fitted with bearings, which are greased for life and do not therefore require any attention.

LS Pumps

For 18.5 kW to 37 kW 2-pole motors (2900 min⁻¹), greasing intervals and the quantity of grease to be used are shown on the motor identification plate. They are as follows :

| 2900 min ⁻¹ motor | P (kW) | Greasing frequency in hours | Quantity of grease per grease nipple in grams |
|------------------------------|----------|-----------------------------|---|
| DL - 18.5 - 2 | 18,5 | 3750 | 15 |
| DL - 22 - 2 | 22 | 3750 | 15 |
| DL - 30 - 2 | 30 | 3750 | 15 |
| DL - 37 - 2 | 37 | 3750 | 15 |

Recommended grease : ESSO UNIMEX N3 or similar

- The mechanical seal will have been adjusted during assembly of the pump. It will remain watertight until noticeably worn and should then be changed.
- Pump units installed as backup equipment should be run for a short time once a week, to ensure that they are working properly.

11 - DISMANTLING - REASSEMBLY

Dismantling and reassembly of an electro-pump unit must be performed by personnel qualified to carry out this type of work.

Where one or more components of an electro-pump unit are replaced (spare parts), it is essential that only parts supplied by LEROY-SOMER are used. Failure to comply with this instruction invalidates the guarantee, and relieves the manufacturer of responsibility for any malfunction. Any person who tampers with an electro-pump unit is responsible for the consequences.

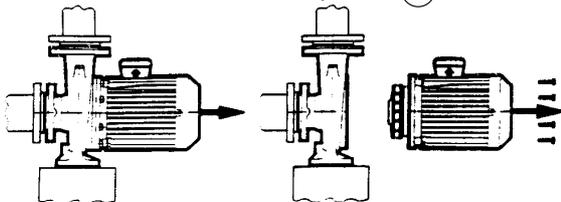
11.1 - Dismantling

Before commencing work on the unit :

- Disconnect the motor from the electrical supply.
- Close the intake and outlet valves.
- Check that the pump body is not under pressure.
- Drain the pump.
- Wait until the pump body has reached the ambient temperature.

- The electro-pump unit is designed such that the moving part can be removed with the motor, without detaching the pump body from the pipes.

To do this, unscrew the screws, part no. (83)



The unit should be dismantled as follows:

- Unscrew the pump body fixing screws, part no. (83) and remove the entire moving part-motor assembly.
- Loosen the turbine locking nut, part no. (79)
- Remove the washer, part no. (85)
- Take out the turbine, part no. (28)

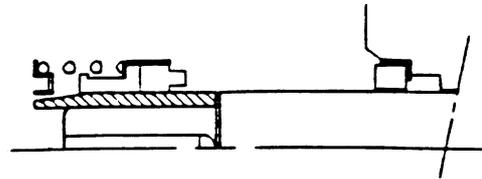
- Remove the key, part no. (54)
- Take off the revolving joint, part no. (71)
- Unscrew the screws, part no. (86) and remove the base, part no. (11)

For units with a motor power rating greater than or equal to 18.5 kW (at 2900 min⁻¹) and 15 kW (at 1450 min⁻¹) : remove screw, part no. (2-24) and take out the pump shaft, part no. (24)

11.2 - Dismantling and reassembling the mechanical seal

- Take out the spacer ring, part no. (72) from the base, part no. (11) using a mandrel. The housing for the spacer ring must be clean. Clean it and put in a new spacer ring, lubricating both the rubber ring and its housing with a solution of 10 % Teepol in clean water.
- Slip the spacer ring into its housing by exerting pressure with a plastic tubular mandrel.
- Make sure that the friction surface is dry and clean, and also that the part of the shaft against which the revolving joint, part no. (71) will slide.
- After refitting the base, part no. (11) onto the motor, tighten the machine bolts, part no. (86) and fit a revolving joint, part no. (71), using a clean removable taper shaft lubricated with the same solution, and a propulsion tube to position it.

Taper shaft



- When performing these various operations, take care not to damage the friction surfaces of the mechanical seal.

WARNING : For LS 80 - 65 - 125 and 100 - 80 - 160 electro-pumps, fit screws, part no. (83) with a sealing compound.

Note :

- Never use oil or grease when assembling the unit.
- Never oil or grease friction surfaces.
- Before locking the turbine onto the shaft, make sure that the mechanical seal is perfectly positioned.

11.3 - Reassembly

- To reassemble, carry out the dismantling procedure in reverse.
- Clean all parts carefully and change the gasket, part no. (75), which may have deteriorated.

12 - SPARE PARTS

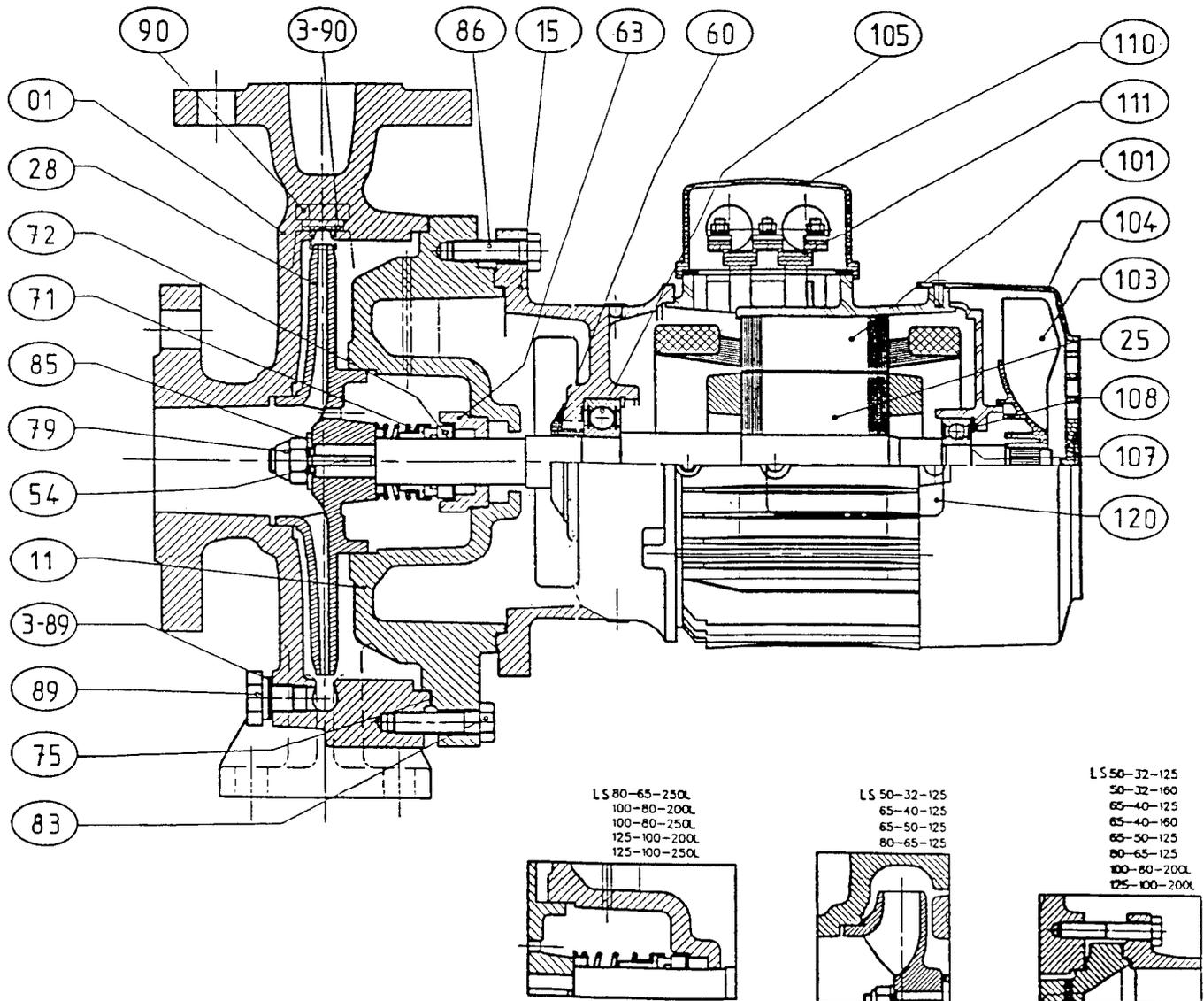
To order spare parts, please specify :

- the type of electro-pump.
- the serial number of the motor.
- the description of the part with its part number, as shown on the diagram and on the parts list in this document.

LS Pumps

| Fault | Cause | Remedy |
|----------------------------|---|--|
| The motor will not start. | <ul style="list-style-type: none"> - Circuit-breaker faulty or incorrectly set. - The supply voltage is correct but the voltage at the motor terminals is too low. - The motor is not properly connected. | <ul style="list-style-type: none"> - Check the circuit-breaker. - Redo the unit power supply line, increasing the diameter of the wires. - Comply with the wiring diagram (connection to the motor). |
| The pump will not start. | <ul style="list-style-type: none"> - Pump body not filled sufficiently. - The inlet filter valve is not sufficiently immersed. - Direction of rotation reversed (3-phase motor). - Intake manometric lift too great. - The suction pipe is not watertight or has a counter-slope where an air pocket forms. - The valve is stuck. | <ul style="list-style-type: none"> - Fill up the pump. - Check the depth of immersion. - Reverse 2 cables on the motor terminal block. - Reduce the lift (minimize pressure losses). - Check the suction pipe. - Check the valve. |
| Inadequate performance. | <ul style="list-style-type: none"> - Direction of rotation reversed (3-phase motor). - Total manometric lift is greater than expected. - Intake manometric lift too high. - The pump, intake valve or inlet filter valve are partially obstructed. - Counter-slope on intake where an air pocket forms. - Air entering on intake. | <ul style="list-style-type: none"> - Reverse 2 cables on the motor terminal block. - Use a more sophisticated pump or minimize the pressure losses. - Reduce the geometric intake lift. - Minimize the pressure losses on the suction pipe. - Clean them and remedy the problem. - Make sure the suction pipe has a minimum upward slope of 2 cm per metre. - Check that the suction pipe is airtight. - Check the depth of immersion of the inlet filter valve. |
| The circuit-breaker trips. | <ul style="list-style-type: none"> - Permanent overload due to inadequate HMV, resulting in too high a flow. - Permanent overload due to excessive viscosity or density of the liquid being pumped. - Excessive voltage drop. - Operation with 2 phases (3-phase motor). | <ul style="list-style-type: none"> - Fit a control valve on the pump discharge pipe to slow down the flow. - Please consult LEROY-SOMER. - Increase the voltage or the cable diameter. - Inspect the supply cables and connection terminals. |
| Leaking mechanical seal. | <ul style="list-style-type: none"> - Faulty mechanical seal. | <ul style="list-style-type: none"> - Check and replace all the components of the mechanical seal (never run on empty). |
| Unit vibration. | <ul style="list-style-type: none"> - Conformity of the various points indicated above. - Abnormal restriction on the flanges. - Faulty motor bearings. | <ul style="list-style-type: none"> - Check these points. - Check the connection of the pipes to the pump flanges and remove any restrictions (reposition pipes or fit flexible collars). - Check and change the bearings (with same size and type). |

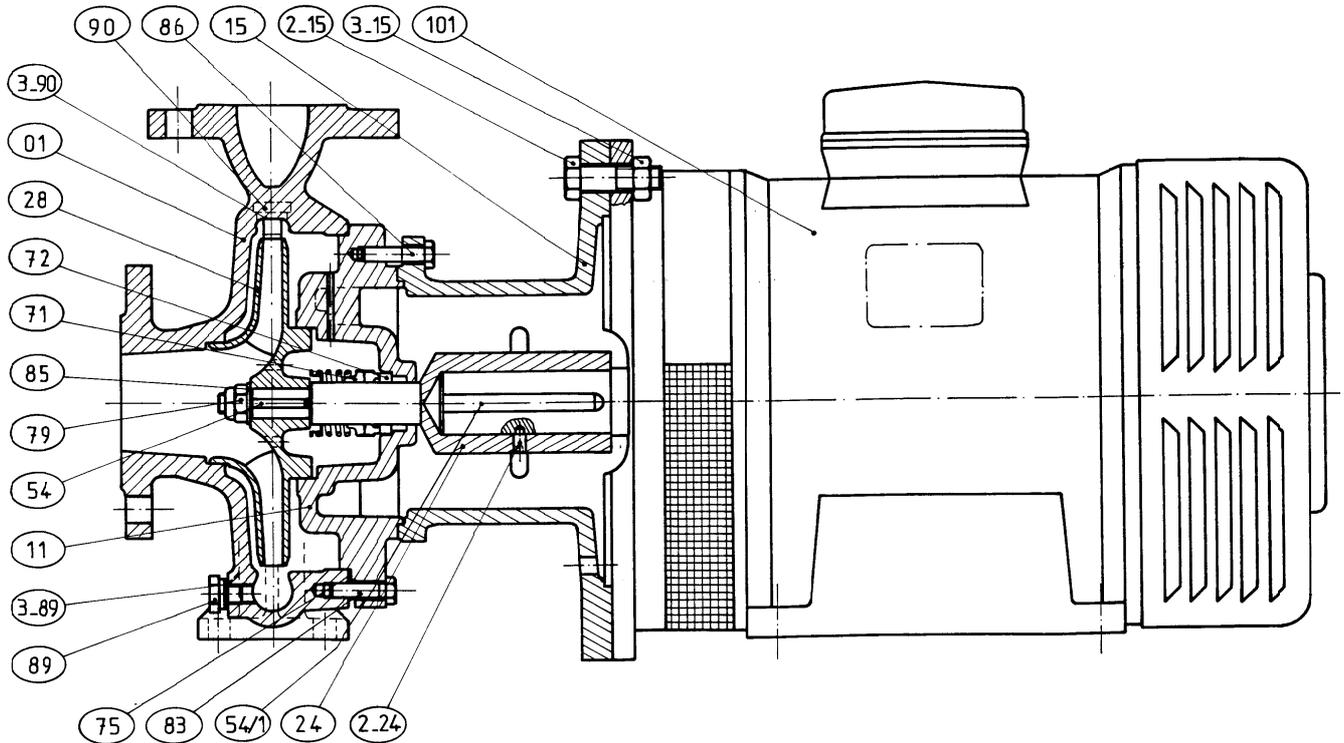
LS Pumps



IP 55 motor - Power up to 16 kW with 2 poles (2900 min⁻¹) and up to 12 kW with 4 poles (1450 min⁻¹)

| Part no. | Description | Part no. | Description |
|----------|---------------------|----------|----------------------|
| 01 | Pump body | 86 | Base fixing screw |
| 11 | Base | 89 | Drain plug |
| 15 | Front motor flange | 3-89 | Plug seal |
| 25 | Rotor | 90 | Filler cap |
| 28 | Turbine | 3-90 | Cap seal |
| 54 | Key | 101 | Full stator |
| 60 | Deflector | 103 | Fan |
| 63 | Spacer part | 104 | Fan cover |
| 71 | Revolving joint | 105 | Bearing on pump end |
| 72 | Spacer ring | 107 | Bearing on fan end |
| 75 | Gasket | 108 | Flexible washer |
| 79 | Turbine locking nut | 110 | Terminal box |
| 83 | Body fixing screw | 111 | Terminal block |
| 85 | Turbine washer | 120 | Identification plate |

LS Pumps



IP 23 motor - Power of 18.5 kW or higher with 2 poles (2900 min⁻¹) and 15 kW or higher with 4 poles (1450 min⁻¹)

| Part no. | Description | Part no. | Description |
|----------|-------------------|----------|---------------------|
| 01 | Pump body | 72 | Spacer ring |
| 11 | Base | 75 | Gasket |
| 15 | Spacer flange | 79 | Turbine locking nut |
| 2-15 | Screw | 83 | Body fixing screw |
| 3-15 | Nut | 85 | Turbine washer |
| 24 | Pump shaft | 86 | Base fixing screw |
| 2-24 | Roundheaded screw | 89 | Drain plug |
| 28 | Turbine | 3-89 | Plug seal |
| 54 | Pump key | 90 | Filler cap |
| 54/1 | Motor key | 3-90 | Cap seal |
| 71 | Revolving joint | 101 | Motor |



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