ASSEMBLY AND MAINTENANCE INSTRUCTIONS

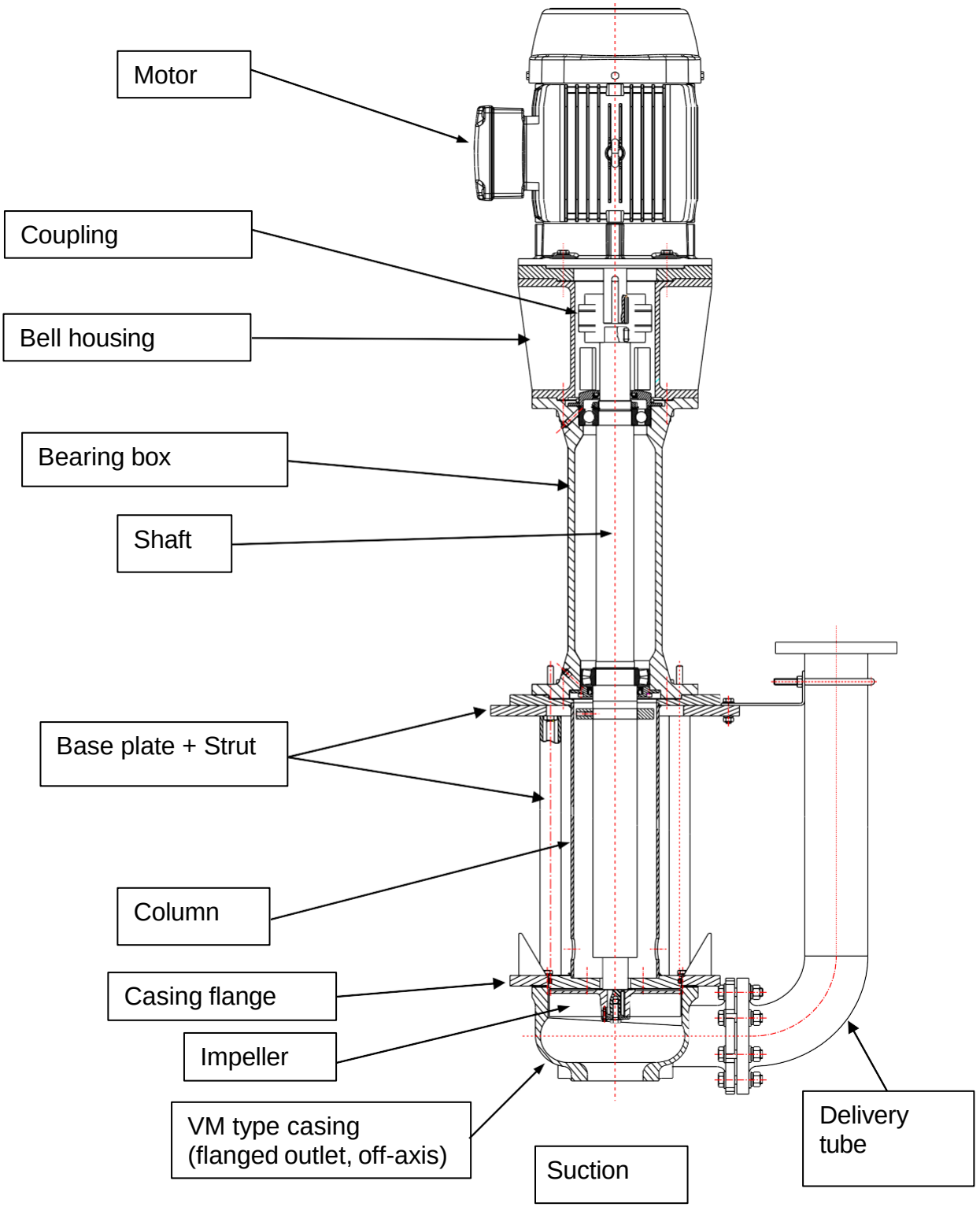
Pump Type VM-SCA DR / VMT-SCA DR / SVD-SCA DR

SUMMARY

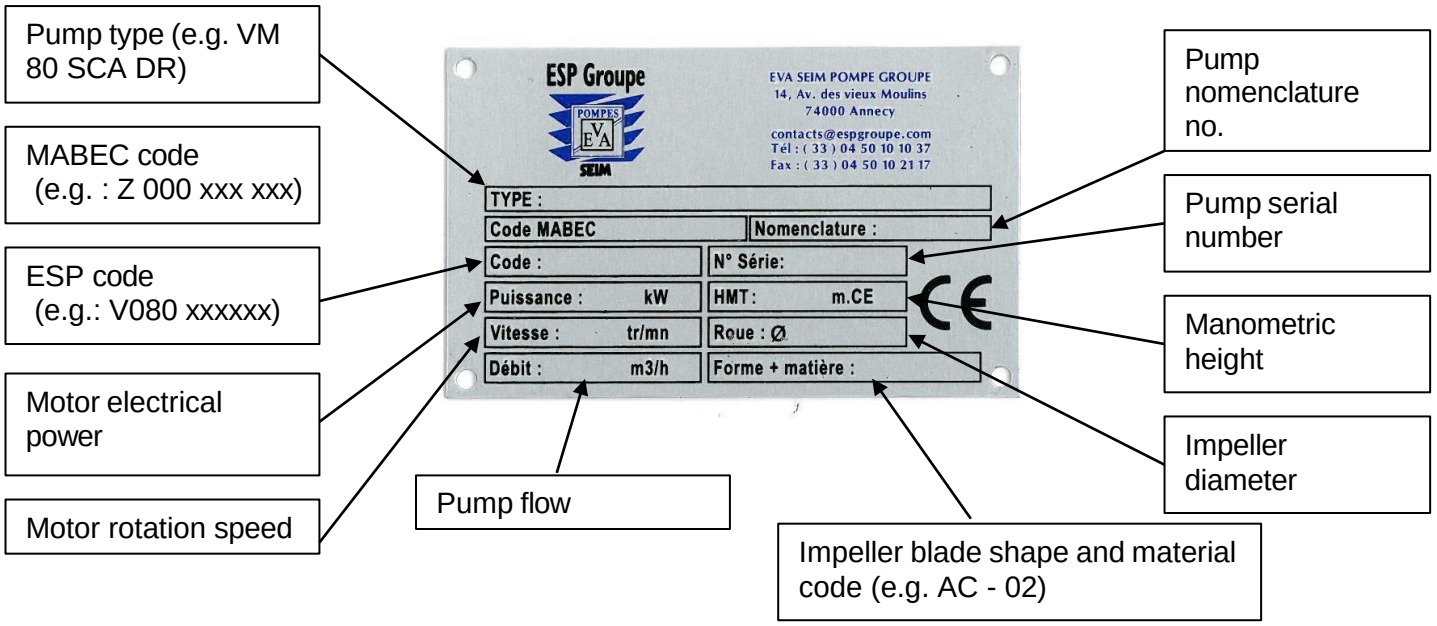
1. PRODUCT DESCRIPTION - OPERATING PRINCIPLE

- Vertical canned motor centrifugal pump with VORTEX impeller
- Dry running with no risk of damage
- Lifts loaded liquids

1.1 Pump construction detail



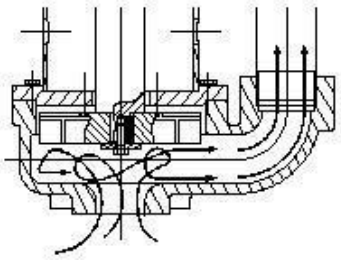
1.2 Nameplate



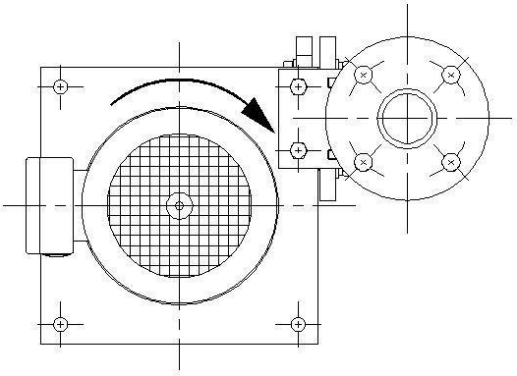
The information on the nameplate must be specified for all after-sales and/or spare parts requests.

1.3 Operating principle

Liquid suction through the VORTEX effect of the vane impeller.



Direction of rotation clockwise, seen from the motor side.



2. ASSEMBLY AND INSTALLATION INSTRUCTIONS

2.1 Storage

Store the pump preferably under cover, in its original packaging..

2.2 Handling

For handling and installation on the tank, sling the pump under the motor.

2.3 Installation

- Before installation, check that :
  - the surface on which the pan is to be installed is flat.
  - that the planter has been cleaned before being put into service..

2.4 Pipe connections

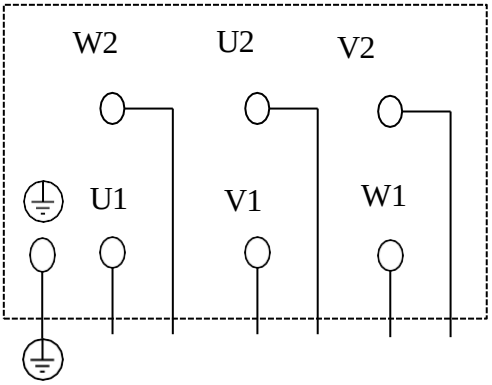
- - The diameter of the discharge pipe must not be less than the nominal diameter of the pump (especially when pumping large chips).
- The discharge pipework must be perfectly maintained and independent of the pump.
- **Under no circumstances must the pump withstand misalignment or weight stresses from the discharge pipework. This would lead to premature wear of the pump's mechanical parts.**
- The suction diameter must not be reduced.

2.5 Electrical connection

- The cable glands provided for balancing the tensile or torsional forces must be used as intended. After loosening the screws or nuts, insert the supply wires between the lower parts and the pressure piece of the terminals.
- The stripped ends of the wires must fill the total length of the terminals, but must not exceed it. Check that the wires are in the correct position, then tighten the screws or nuts.
- Connect the protective wire to the neutral terminal inside the terminal box or, if there is a separate earth, connect it to the earth terminal.

- **Connection diagrams for three-phase squirrel-cage motors**

Delta connection

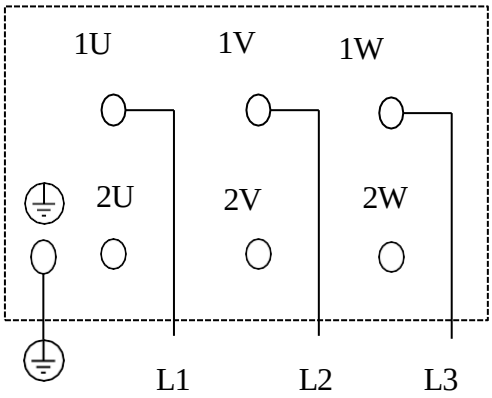


Connection with star-delta switch

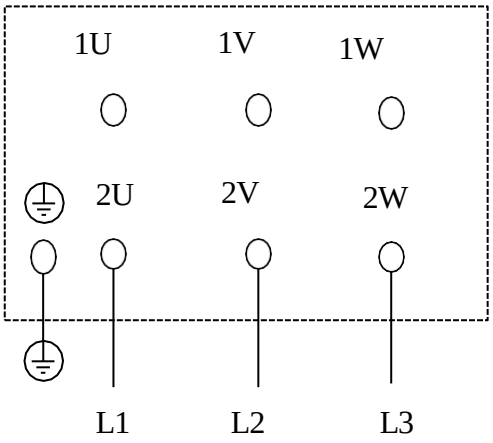
- **Connection diagrams for pole-changing three-phase motors**

2-speed motor with separate windings:

In the type designation, the lowest number of poles = high speed is mentioned first (e.g. AM 280 .. 4/8).



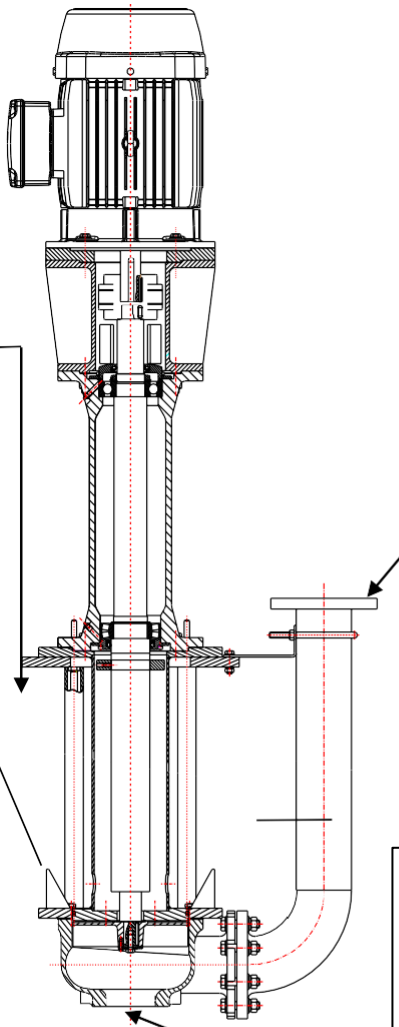
Low speed



High speed

Specific connection diagrams can be found in the terminal box cover or are supplied with the motor.

3. COMMISSIONING AND ADJUSTMENT INSTRUCTIONS



N max. liquid level under installation surface = 100 mm
The guarantee will not apply if this level is exceeded.

Priming level:
10 to 300 mm above the lower holes of the column depending on the percentage of air in the liquid.

Caution :

If the flow rate is too low, or if the liquid does not degas, the pump may operate abnormally in a transient phase (bubbling), which generates strong cavitation and vibrations.
It is strongly recommended that the pump is operated as close as possible to the nominal flow rate, otherwise the service life of the bearings will be adversely affected.

Delivery pipework :

Caution :

- In the case of swarf-laden liquids, make sure there are no obstacles in the pipework.

- If a "bell" is added to the suction, check that the discharge head is one metre higher than the suction head.

- No stress in the discharge pipework

Possibility of suction tulip:
This arrangement can be installed in the case of a deep pit. It allows the pit to be completely emptied (liquid and settled solids).
Caution :

- The diameter of the socket must be at least the same as the pump suction port.
- The length of the tube must not exceed 4 m.
- At each start-up, the liquid level must be above the pump body.

check the direction of rotation of the pump (clockwise as seen from the motor side)

Caution :

A VORTEX pump running in reverse will deliver around 80% of its rated flow, but will draw much more current (the lower amperage corresponds to the correct direction of rotation).

4. MAINTENANCE, UPKEEP AND SAFETY

Before carrying out any work, make sure that the pump has been switched off:
- Power supply disconnected.
- Hydraulic system isolated.

Use suitable personal protective equipment and tools.

4.1 Preventive checks and maintenance..

- **Cleaning :**

Clean the engine regularly using compressed air to avoid clogging the cooling ribs.

Never use liquid products

- Regular checks (minimum monthly) :

- Check the engine fan cowling fastenings.
- Check the condition of the various electrical and hydraulic connections.
- Check for abnormal noises, vibrations and any phenomena that could be the sign of deterioration of a pump or motor component or a failure in the support of the discharge pipework.
- Check lubrication if necessary.

- Checking and replacing the impeller :

To check and/or replace the impeller, the motor-pump assembly must be dismantled. For the dismantling procedure, see section 4.3, page 10.

- Semi-annual inspection for non-abrasive liquids.
- Quarterly check in the case of abrasive liquids.
- Immediate check if pump characteristics deteriorate.

4.2 Incidents and main causes

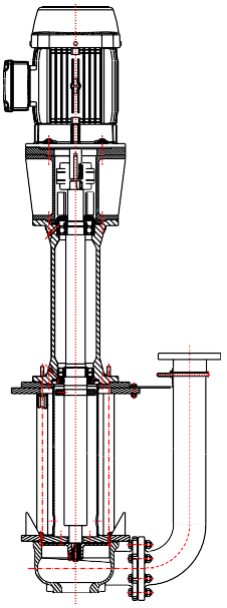
CORRECTIVE MAINTENANCE AND TROUBLESHOOTING

The motor runs but the pump does not :	- The coupling half plates are not correctly fitted.
The pump runs but does not discharge :	- The impeller is no longer on its shaft. - A plug is blocking the discharge circuit. - The HMT is higher than advertised.
The motor trips:	- A foreign object is blocking the turbine. - The HMT is lower than advertised. - The engine is running backwards. - The motor is not rotating at the correct speed. - The product density is higher than initially predicted.
The pump vibrates abnormally:	- The coupling is incorrectly locked. - The discharge pipe is putting stress on the pump. - The mounting plate is not fixed to a flat surface. - The HMT is lower than advertised. - The impeller is damaged (loss of balance).
The pump makes an abnormal noise :	- The motor fan is rubbing on the bonnet. - A bearing is damaged. - The impeller is rubbing in the pump casing.
The pump does not give the expected characteristics :	- The HMT is higher than initially predicted. - The viscosity of the product is different from that predicted. - A blockage has occurred in the discharge circuit. - The motor speed is incorrect. - The impeller diameter or shape is incorrect.

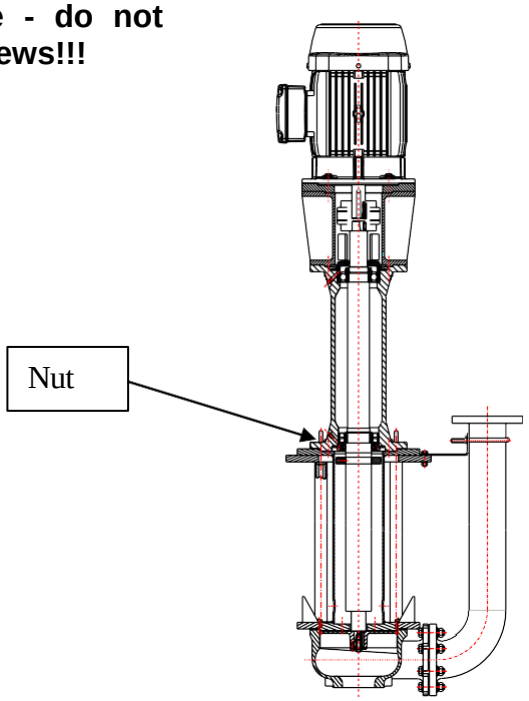
4.3 Dismantling the various pump components

4.3.1 Dismantling the column and impeller assembly

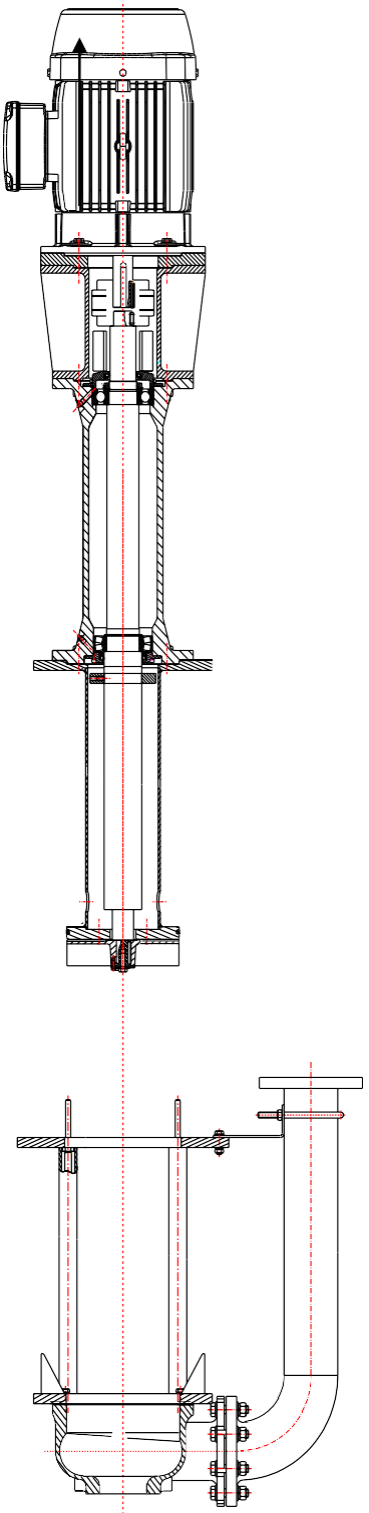
- **Pump in position on its tank**



- **Remove the 4 nuts securing the column to the pump mounting plate - do not touch the motor mounting screws!!!**

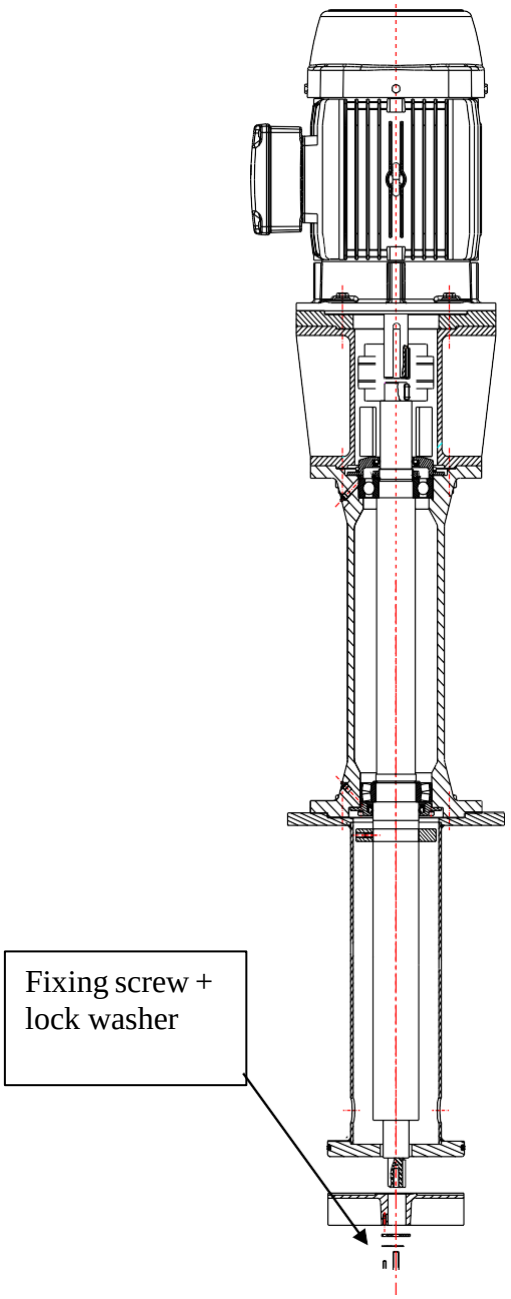


- **Using suitable lifting equipment, lift the motor + shaft + bearing box + column + impeller assembly in line with the pump (to avoid damaging the O-ring on the bottom of the column).**



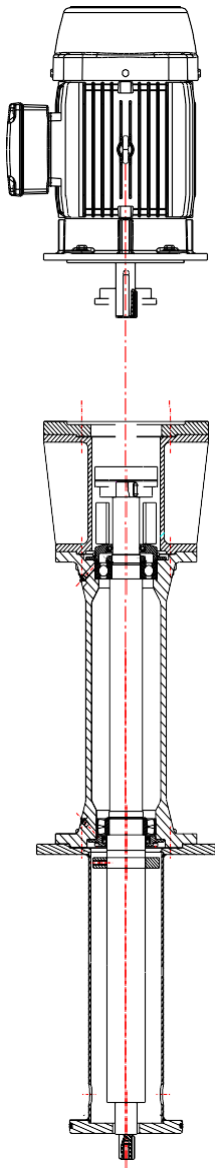
4.3.2 Dismantling the impeller

- Remove the impeller fixing screw.
- Remove the impeller lock washer fixing screw.
- Remove the impeller.



- **Uncoupling the motor from the column :**

- Remove the 4 motor mounting screws.
- Remove the motor with the pump shaft.



- **Uncoupling the motor from the pump shaft:**

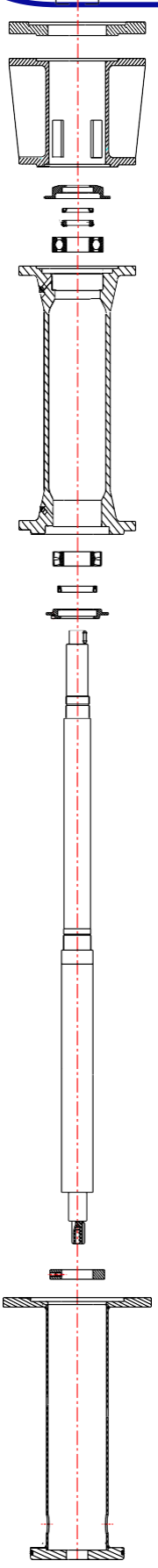
  - Remove the 4 motor mounting screws.
  - Remove the motor with its 1/2 coupling.

- **Uncoupling bearing box - column:**

- Remove the 4-bearing box fixing screws.
- Remove the bearing box and shaft assembly

- **Shaft - gearbox uncoupling:**

- Remove the engine counterflange or lantern, depending on assembly.
- Remove the deflector mounted on the shaft.
- Remove the bearing caps, locknuts or circlips as fitted.
- Remove the bearings using a hub puller.
- Check and, if necessary, remove any oxidation that may have formed on the motor shaft.

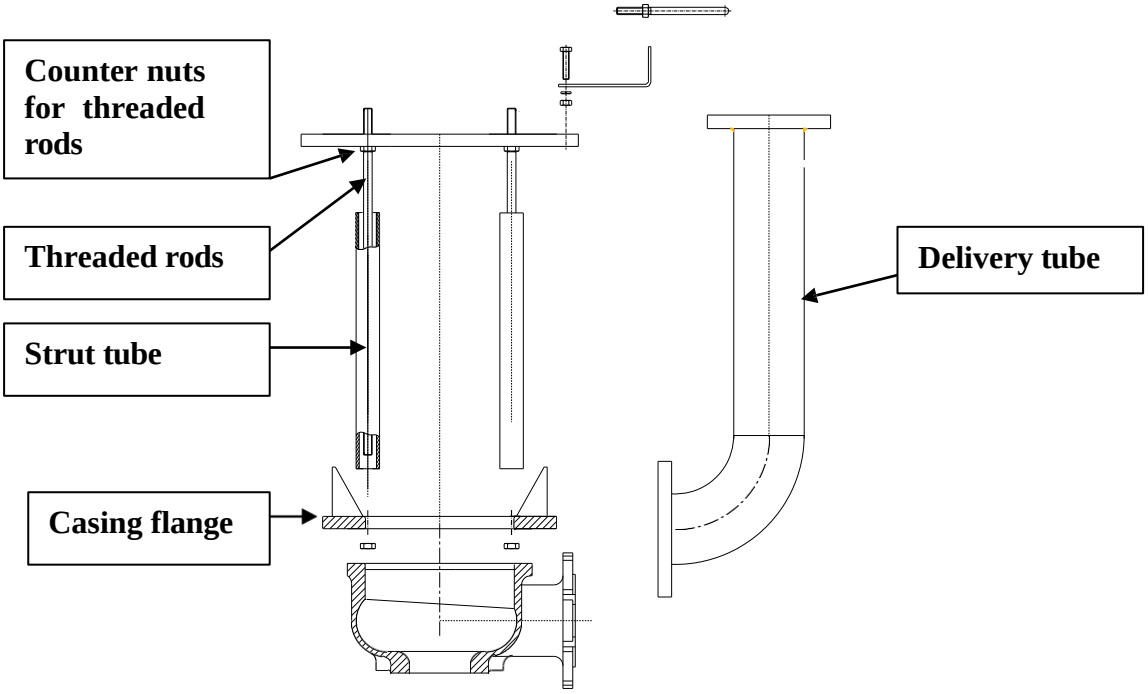


- **Reassembly:**

- Carry out the various operations in reverse order.

4.3.3 Dismantling under assembly Base plate + strut + pump casing

- Remove the tank sub-assembly
- Dismantle the discharge pipe + fixing bracket + clamp
- Remove the pump body after removing the fixing screws
- Remove the 4 nuts under the body flange - remove the flange + spacer tube
- Release the 4 lock nuts on the threaded rods.
- Unscrew the 4 threaded rods from the mounting plate.



- **Reassembly:**

  - Carry out the various operations in reverse order.

5. WARRANTY CONDITIONS

Our pumps are guaranteed for parts and labour if they are found to be defective by our after-sales service (equipment returned to our workshops).

Warranty exclusions:

- Abnormal operation.
- Service other than that provided for in the order.
- Lack of inspection and maintenance.
- Worn parts**.**

Wear parts:

- Impeller

ANNEXES

6.1 Type of lubricant.

SKF offers a choice of six types of grease, covering 90% of the practical applications where grease is recommended as a lubricant. This simplifies the selection of the correct grade. Stocks are available throughout the SKF sales network. These greases are homogeneous and stable, conforming to DIN 51825 specifications, parts 1 to 3. Their quality is continuously monitored by practical operating, physical and chemical tests. The table below shows the technical characteristics of the SKF grease range.

SKF lubricating greases							
Properties	**Designation of greases**						
	LGMT 2	**LGMT 3**	**LGEP 2**	**LGEM 2**	**LGEV 2**	**LGLT 2**	**LGHT 3**
Lithium thickener	Lithium soap	Lithium soap	Lithium soap	Lithium soap	Lithium/calcium soap	Lithium soap	Lithium complex
Oil base	mineral	mineral	mineral	mineral	mineral	mineral	mineral
Working temperature, °C (continuous operation)	-30 to +120	-30 to +120	-30 to +120	-30 to +120	-30 to +120	-30 to +120	-30 to +120
Kinematic viscosity of the oil base mm2/s to 40°C	91	120	195	510	1020	16	110
Viscosity of the oil base mm2/s to 100°C	10	12	15	32	58	3,8	13
Consistancy (NGLI)	2	3	2	2	2	2	3

SKF LGMT 2
All-purpose grease for general and industrial use. Specially adapted to small and medium-sized bearings, even in difficult conditions. LGMT 2 has excellent water-repellent properties and offers good protection against corrosion. Typical applications: agricultural machinery, motor vehicle wheels, small electric motors, conveyors, etc.

SKF LGMT3
All-purpose grease for general industrial applications. With a slightly higher viscosity than LGMT 2, this grade is suitable for medium and large bearings, even in difficult conditions. LGMT 3 has excellent water-repellent properties and offers outstanding protection against corrosion. It is therefore particularly recommended for use in assemblies where water and moisture could reach the bearings, for example in pumps, agricultural machinery, electric motors, truck wheels and fans operating at normal ambient temperatures.

SKF LGEP 2
High-performance grease for very demanding applications, suitable for medium and large bearings, particularly spherical roller bearings. This grade offers excellent resistance to water and good protection against corrosion, even in difficult applications. Typical areas of use: rolling mills, grinding mills, paper machines and pulp preparation.

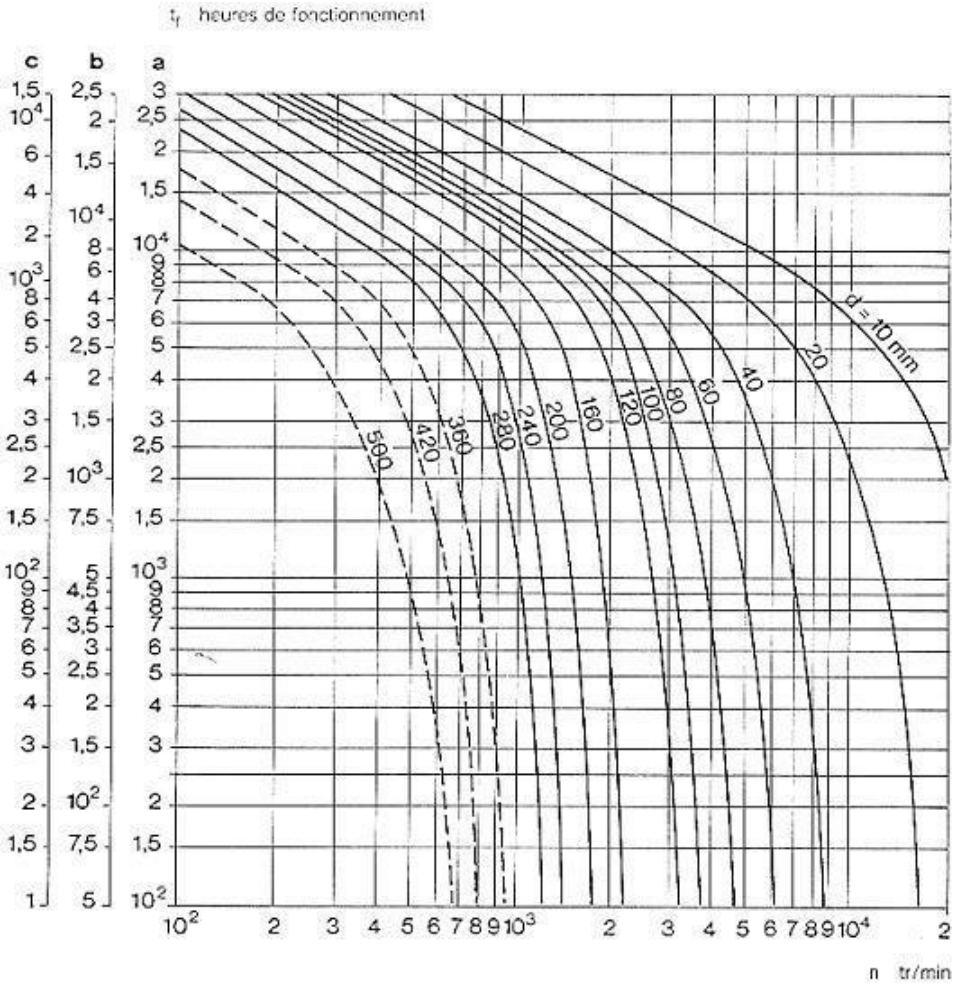
SKF LGEM 2
Grease with molybdenum disulphide additive for bearings subjected to high loads and heavy shocks, particularly in the event of slow rotation or oscillating movement. Also suitable for steel/steel spherical plain bearings. LGEM offers excellent water resistance and remarkable protection against corrosion. Typical applications: mills, converters, support rollers and equipment for the construction industry.

SKF LGEV2
Specially developed for very heavy loads. It has a thick base oil and contains EP additives. It also contains molybdenum disulphide and graphite-based safety lubricants. It is ideally suited to spherical roller bearings subject to high loads and slow rotation or oscillation.
Typical applications: high-pressure roller mills, friction rollers, drums, support rollers, thrust rollers, etc.

SKF LGLT 2
Suitable for small, lightly loaded bearings where low operating temperatures and smooth running are required. This grade can be used in high-speed, low-temperature applications such as instruments, control systems, machine tool spindles and textile machinery.

SKF LGHT 3
High temperature grease for bearings up to +150 °C. With a regular, periodic lubrication schedule, temperatures of up to +175°C can be tolerated. Typical applications: fans operating above 100°C, kiln cars and disc brake systems**.**

6.2 Lubrication frequency



Echelle a: roulements à billes radiaux
Echelle b: roulements à rouleaux cylindriques, roulements à aiguilles
Echelle c: roulements à rotule sur rouleaux, roulements à rouleaux coniques, butées à billes;
roulements à rouleaux cylindriques jointifs (0,2 t_f);
roulements à rouleaux cylindriques croisés avec cage (0,3 t_f);
butées à rouleaux cylindriques, butées à aiguilles, butées à rotule sur rouleaux (0,5 t_f)

The SKF diagram is based on the use of a normal quality grease, resistant to ageing, and gives the lubrication interval in operating hours. It is valid for stationary machines, normal bearing loads and operating temperatures up to +70°C, measured on the outer ring of the bearing. For each 15°C increase above +70°C the lubrication interval taken from the diagram should be halved, but the upper temperature limit of the grease should not be exceeded. Assemblies where the grease is likely to become contaminated quickly or needs to protect against water should be topped up with lubricant at closer intervals than those shown in the diagram.

6.3 Quantity of lubricant required.

Without special instructions, the quantity of grease to be used can be obtained from the following equation:

G= 0.005 D B

G: quantity of grease in grams
D: outside diameter of bearing in mm
B: bearing width in mm

6.4 Spare parts list

When requesting spare parts, it is essential to quote all the information on the nameplate.

- Impeller
- Pump body
- Pump shaft
- Ring-block ring
- Motor

6.5 CE certificate of conformity

CE

DECLARATION OF CONFORMITY TO THE MACHINERY DIRECTIVE (Directive 98/37/EC of 22 June 1998) and the regulations taken for its transposition

EQUIPMENT SUBJECT TO SELF-CERTIFICATION

The manufacturer:

14, Avenue des Vieux Moulins
Z.I de Vovray
74000 ANNECY
Tél. (+33) 04 50 10 10 40

declares that the machine designated below

VERTICAL VORTEX EFFECT MONOBLOC PUMP

Type VM – SCA DR / VMT – SCA DR / SVD – SCA DR

- complies with the provisions of the Machinery Directive (Directive 89/392/EEC as amended) and the national legislation transposing it,
- complies with the provisions of the following Harmonised European Standards CEN / TC 197 / SC1 N 36 E (pr EN 809)
  Transposed into French law by the N° 91 1414 (décrets N°92-765, 92-766 et 92-767 du 29.07.1992).

Signed in ANNECY, the 21.10.2023

Name of signatory: S.CHENAL

Signature: