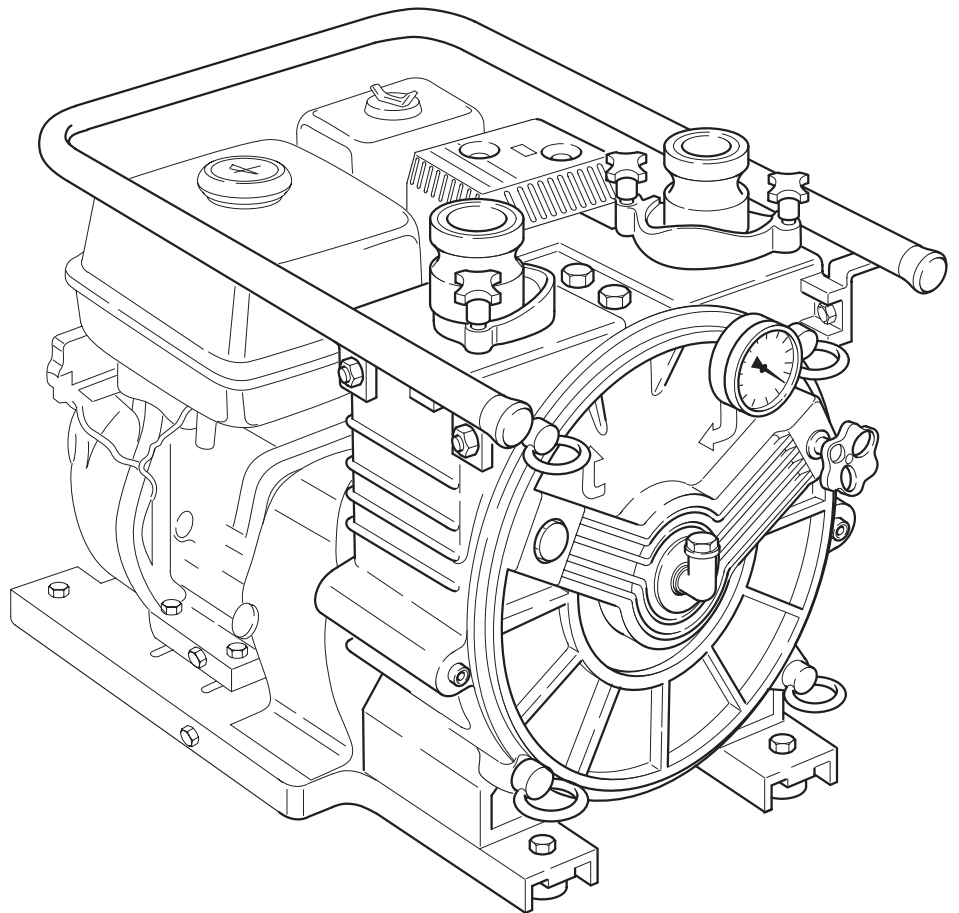


ELRO

Peristaltic pumps Series M300

Installation, Operation and Maintenance



CRANE



Declaration of Conformity

in compliance with the machine directive 98/37/EC

We hereby declare, that the pump units manufactured in series production

Designation: ELRO – Peristaltic Pump
Series: M300

Manufacturer: Crane Process Flow Technologies GmbH
Heerdter Lohweg 63-71
D-40549 Düsseldorf
Germany

Serial number: (see identification plate)

in the version delivered by us, is in compliance with the following applicable regulations:

EC-machine directive: Machine directive 98/37/EC
Low voltage directive 73/23/EC
EMC-directive 89/336/EC

Harmonised standards: EN 292 T 1 and T 2; EN 294, EN 809

Data / signature of manufacturer: 28.5.2002

Information on signatory: 
H.-D. Ptak, Managing Director

Declaration of Manufacturer

in compliance with the machine directive 98/37/EC

We hereby declare, that the pump units manufactured in series production

Designation: ELRO – Peristaltic Pump
Series: M300 (without drive)

Manufacturer: Crane Process Flow Technologies GmbH
Heerdter Lohweg 63-71
D-40549 Düsseldorf
Germany

Serial number: (see identification plate)

in the version delivered by us is to be installed in a machine and that any operation is prohibited, unless it has been confirmed that the machine to be fitted with this pump is in compliance with the EC machine directive, edition 93/44/EEC.

EC-machine directive: edition machine directive 98/37/EC

Harmonised standards: EN 292 T 1 and T 2; EN 294, EN 809

Data / signature of manufacturer: 28.5.2002

Information on signatory: 
H.-D. Ptak, Managing Director

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1.0 General

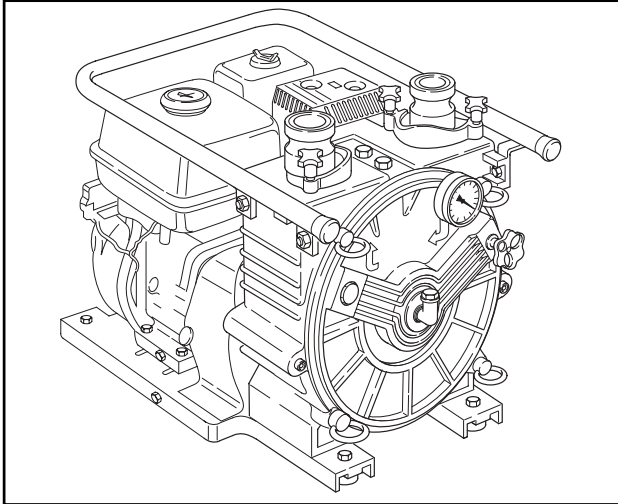


Fig. 1: Exemplary installation for peristaltic

The following instructions refer only to the peristaltic pump M300.

Since the pumps will be used in combination with other assemblies, such as combustion engines and electric motors, you must strictly observe and comply with the operating and maintenance instructions for these components as well as the corresponding notes on safe and reliable operation.

These on-hand instructions contain information for installation, operation and maintenance of ELRO pumps.

You should thoroughly read these instructions before use and always follow the information contained therein.

All personnel involved in activities on pump or equipment must have read this manual, especially the chapter "Safety" before starting work. This applies especially for persons who work on the pump only occasionally, e.g. for maintenance and cleaning work.

Each pump is subjected to stringent inspections and function tests before leaving the factory.

You should always bear in mind that the correct function, long lifetime and optimal operational reliability of the pump mainly depend on

- correct installation
- correct commissioning
- and proper maintenance.

Enquiries concerning service, spare parts or repairs should be addressed to the manufacturer or an authorized dealer.

Always provide the following information:

- Pump type
- Serial number of pump

This information is stamped on the identification plate on the base of the pump.

When returning pumps or pump parts to the manufacturer or an authorized dealer for repair or overhaul, the delivery must be accompanied by a certificate stating that the pump is free of product or other aggressive or hazardous substances.

1.1 Warranty

Each ELRO peristaltic pump is checked in the factory before shipment. The manufacturer assumes warranty for his product as specified in the effective terms of sales and delivery. Faults resulting from the non-compliance with the aforementioned regulations and notes can only be rectified at the cost of the customer.

1.2 Transport, storage

In order to avoid any problems you should

- check the delivered goods against the delivery note for completeness and correctness,
- make sure that for pumps with electric motor, combustion engine, water turbine, hydraulic motor or pneumatic motor the respective operating instructions for the drive are available.

Be careful when unpacking the pump and proceed as follows:

- Examine the packaging for transport damage.
- Take the pump carefully out of the packaging.
- Examine the pump for any visible damage.
- Remove all plugs from the pump ports.
- Make sure that accessories, such as seals and flushing lines, are free of damage.



Caution!

Consider the indicated weight before attempting to lift the pump. Use only lifting gear of appropriate capacity.

Do not step or stand under suspended loads.

Fasten the lifting gear so that the pump (or pump with drive unit) can be safely lifted (see example).

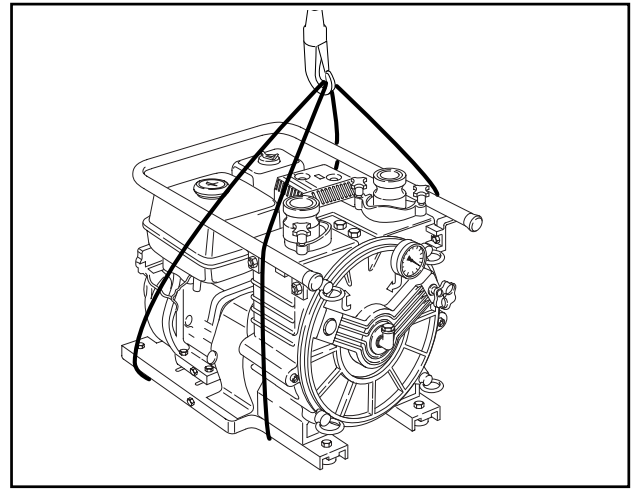


Fig. 2 - Attaching the lifting rope

1.3 Function

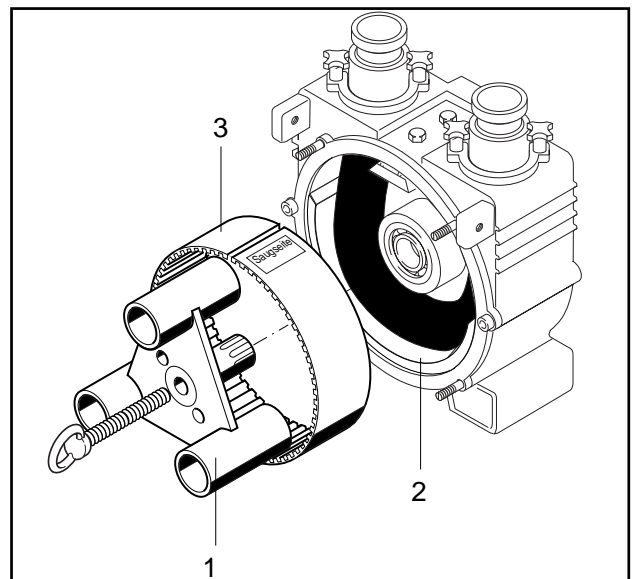


Fig. 3
1 Rotor
2 Support
3 Separating belt

The priming properties of the peristaltic pump are based on the vacuum backed restoring force of its hose. Due to its special design a vacuum is permanently generated inside the hose on the suction side of the pump. This vacuum always restores the hose to its original size.

Peristaltic pumps Series M300

The support 2 (Fig. 3) is an elastomer part and is installed in the pump section where the hose is the most compressed.

At the same time this support protects the pump housing against damage caused by solid particles in case of a hose breakage. In case of wear the support can be easily replaced.

The separating belt 3 (Fig. 3) separates the suction area from the inside of the pump and protects the pumping hose. In case of hose breakage it additionally protects the rotor 1 (Fig. 3) against damage caused by abrasive or coarse particle products. The separating belt can be replaced by simply unscrewing two screws.

The pump is filled with 1-2 litres of lubricating fluid (glycerine or silicone), which works as lubricant, barrier and coolant.

The vacuum gauge connected with the suction area (4, Fig. 4) not only shows the present suction lift of the pump, but has the additional function of a warning instrument for possible defects. If the vacuum gauge does not indicate a vacuum during operation, the pump needs to be serviced urgently.

Maintenance can be carried out without any special tools.

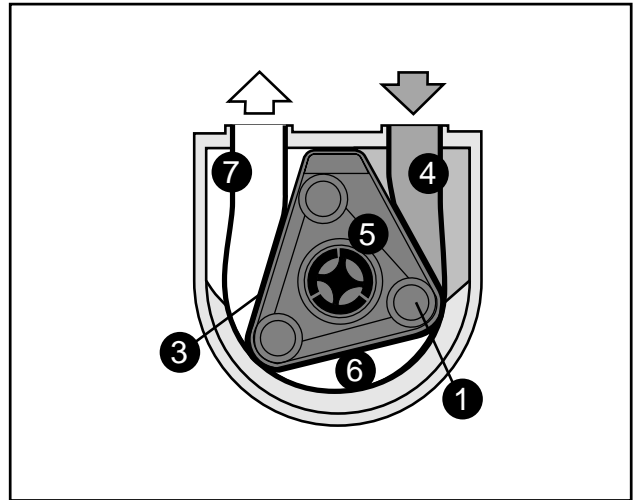


Fig. 4

1 Rotor	5 Inside of housing
3 Separating belt	6 Hose chamber
4 Suction area	7 Pressure area

Rotor 1 rotates inside the separating belt 3, which is tightly bolted to the housing. This separates the suction area 4 from the inside of the pump housing 5.

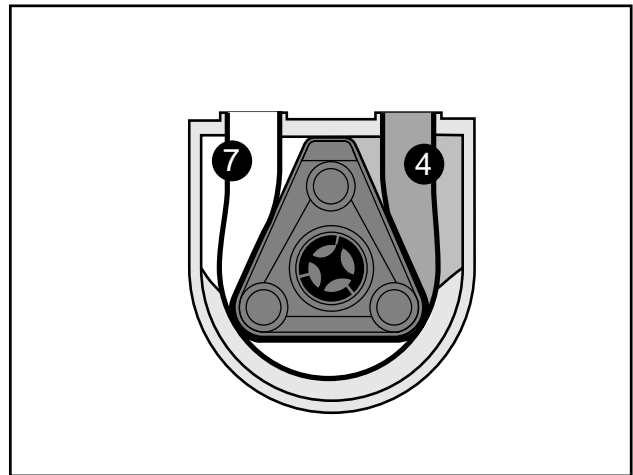


Fig. 5

4 Suction area
7 Pressure area

The sliding tube of the rotor enlarges the volume of the suction area (4). At the same time the pressure area (7) is decreased and the air is forced out through a channel in the pump cover.

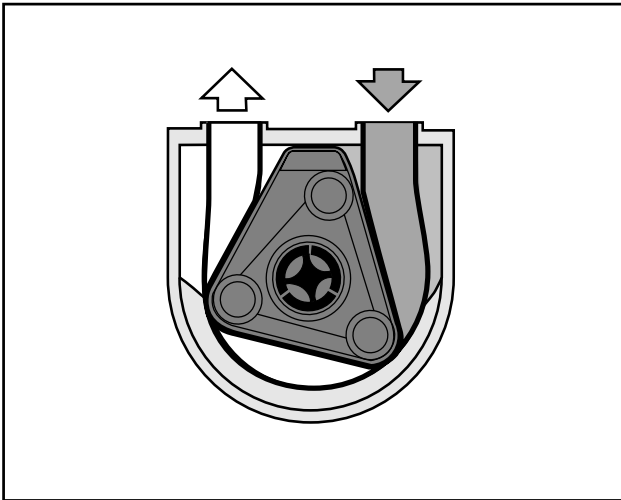


Fig. 6

As the rotor rotates further the suction area becomes bigger. The fast rotation of the rotor generates a permanent vacuum of down to -1 bar (Fig. 6). (33 fr. vacuum)

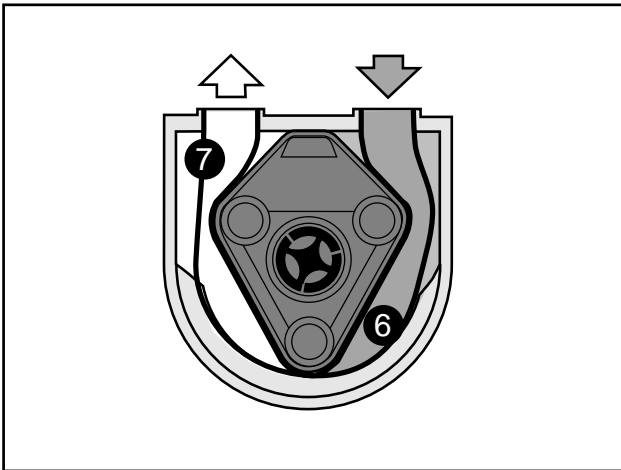


Fig. 7
 6 Hose chamber
 7 Pressure area

Since the hose chamber 6 remains constant, the pressure area 7 is decreased by the rotation of the rotor, which results in a volumetric pumping process (Fig. 7).

2.0 Safety

2.1 General

Make sure that the pump is installed in compliance with all applicable national safety regulations.

Always observe all applicable accident prevention instructions and implementing regulations.

The following precautions must be applied before performing maintenance work. If the product to be pumped is a hazardous or noxious substance, the system must be neutralized and vented



Danger or burning

Depending on operating conditions the pump may reach temperatures too high to touch. You should therefore switch off the pump and let it cool down before touching it.

- Disconnect main drive unit and pump from the electric power supply.
- Depressurize the pump head.
- It is not permitted to run the pump after removing the pump cover. When cleaning the pump manually make sure that all necessary precautions have been applied.

All incorrectly installed, unprofessionally operated or insufficiently serviced machines and pumps are potential safety hazards.

Failure to comply with recommended safety measures may cause injury to operating personnel or damage to the pump. On pumps with protective covering and guards these must be properly installed again before restarting.

The pump must be shut down or should not be restarted if any defects are found which could affect the operating safety and reliability of the pump.

2.2 Intended use

The peristaltic pump of series M300 is designed for mobile use and for short-time operation (up to max. 5 hours).



Hazard!

Pumps without explosion proof drive must not be used in explosive environments.

Pumps without explosion proof drive must not be used to pump the following product:

- combustible gases or vapours mixed with air
- combustible fluids of danger class A + B, acc. to VbF
- combustible, fluid substances of class III a (appendix C to EVO)
- fluids with ignition temperatures below 200 °C / 224 °F.

2.2.1 Unintended use

The operating safety and reliability of the supplied pump can only be assured if it is used for the purpose it is intended for. The limits mentioned in the technical data sheet must not be exceeded under any circumstances.

2.3 Operation of pump

The pump must only be operated by trained, instructed and authorized persons. Any responsibilities must be clearly appointed before starting operation and should always be complied with.

Strictly observe the operating instructions for the drives in chapter "Appendix".

2.4 Conversions and alterations to the pump

Conversions and alterations to the pump are not recommended.

However, this does not include minor changes, which do not affect safety and reliability, or measures, which even enhance the safety. Safety installations must not be made ineffective or changed or used in a way contradicting their purpose.

2.5 Symbols and notes on safety



Hazard!

Note on danger, which, if not observed, may lead to severe injury or even death.



Warning!

Note on danger, which, if not observed, may lead to severe injury or even death.



Caution!

Note on danger, insecure handling and working procedures may cause injury or extensive damage to equipment and property.



Warning – dangerous electric voltage.

Contact with live parts can cause immediate death. Doors and covers (e.g. hoods and lids) marked with this sign must only

be opened by "qualified persons" after the respective operating voltage (input terminal voltage, operating voltage or external input voltage) has been switched off.



Operating safety of equipment at risk.

The non-observance of this note affects the operational reliability and can lead to pump damage.

Attention! In this manual the Attention symbol precedes all safety notes referring to instructions, regulations or work sequences, which must be strictly complied with.

In this manual these symbols are used to highlight notes on possible dangers.

2.6 Maintenance work

Maintenance work must only be performed by qualified persons. This applies particularly for all work on electric, hydraulic and pneumatic equipment.

Keep unauthorized persons away from the pump.

Mechanical and electrical repairs and maintenance work must only be carried out by qualified specialists.

Before starting repair and maintenance work the equipment must be switched off and shut down and secured against unintended or unauthorized restarting.

Before starting work on electrical systems and equipment make sure that the system is reliably de-energized.

Apart from this the pump/system must be reliably secured against unexpected restarting.

- Fully isolate from power source.

The customer (or an "authorized person" appointed by him) is responsible for the compliance with all accident prevention instructions applicable at the place of use.

As a measure to avoid injury all maintenance, adjustment and repair work should only be carried out using permitted and appropriate tools and working aids.

Blown fuses must not be repaired or bridged and may only be replaced by fuses of the same type.

Cooling facilities, such as ventilation slots, must not be made blocked.

Rotating or moving parts must be reliably stopped before starting work. It must be assured that these parts will not start to move while work is in progress.

Do not touch rotating parts and always keep a safe distance to avoid clothing or hair being caught.

Always wear protective clothing suitable for the job and the related dangers.

This applies especially for cleaning, maintenance and repair work. Depending on the type of work to be performed sufficient protection may be provided by e.g. wearing the following protective clothing: Protective goggles, ear defenders, working boots, safety gloves, etc.

If your face could come in contact with chemicals, metal splinters or dust during work, you should wear a full face protection with safety goggles.

Always wear safety boots if there is a risk of heavy objects tipping over, slipping or coming loose for any other reason, thereby causing danger for your feet.

2.6.1 Health and safety information on electric equipment

Depending on the version, the pumps may be equipped with electric accessories (controls, motor drives).

Severe damage to health and property can be caused by:

- unauthorized removal of covers
- unprofessional use of pump
- inadequate maintenance

Before starting installation work on electrical equipment this equipment must be reliably de-energized.

Cover non-insulated live power lines and plug connections against unintended contact.

Electric components stored and not used for a longer period of time should be carefully inspected before use, to ensure that the insulation is still intact.

On wet electric assemblies or components parts, which would be perfectly de-energized in dry condition, may still be live.

Before touching damp or wetted electric components check by measuring whether parts that could be touched are still live.

Do not attempt to insert any objects through the openings on pump or attached equipment. This may cause short circuit and electric shocks with danger to life.

2.6.2 Health and safety information for work on pressure lines

Always relieve the pressure before starting work on pressure lines.

- Close shut-off valves
- Vent lines



Be careful when checking for leaks on pressurized lines. Fluids or air escaping under pressure can penetrate clothes and skin.

Be careful when loosening or changing pressure lines; lines mixed up by mistake may reverse the function.

Take care when handling hazardous (caustic, harmful) fluids.

- Always wear your personal protective outfit (e.g. gloves, goggles, tight fitting clothes).
- In case of skin contact, inhalation of harmful vapours or eye injury you should immediately contact a physician.

2.6.3 Regulations and instructions on lubrication

(Only applicable if the pump is equipped with a lubrication facility)

Lubrication work must only be carried out by authorized personnel.

Unauthorized persons must not be permitted to work on machines or units or in their vicinity.

Lubricants and oils must not come in contact with open flames or glowing parts.

When working on assemblies and components (e.g. motor, gearbox) you must also consider the specific instructions and lubrication instructions for these assemblies and components (see chapter "Appendix").

The complete system must generally be switched off and secured against unintended and unauthorized restarting before starting lubrication work.

(Exception: Lubrication work that can only be performed when the system is running).

As a measure to avoid injury all lubrication work should only be carried out using permitted and appropriate tools and working aids.

Rotating or mobile parts must be shut down and reliably secured against restarting before starting work.

Do not touch rotating parts and always keep a safe distance to avoid clothing or hair being caught.

Strict cleanliness is of utmost importance during initial filling and when topping up or changing lubricant so that no foreign matter will enter through the lubrication point.

- Overfilling and spilling of oil must be avoided.
- Wipe off excess emerging grease.
- Avoid skin contact with oils and grease, wear protective clothes.

With certain lubricants, e.g. low flammability hydraulic fluids, the special safety instructions for these substances must be observed.

(See notes on packaging and instructions of manufacturer).

2.7 Noise

The noise in rooms with several pumps may be very high. Depending on the sound pressure level the following measures should be applied:

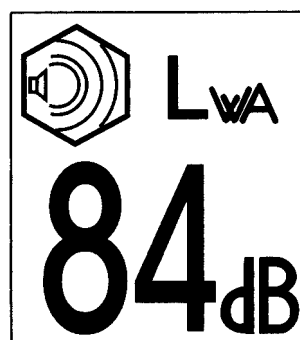
below 70 dB(A): No special measures

above 70 dB(A): Persons who are permanently in the room must wear hearing protection.

above 85 dB(A): Room with dangerous noise level! Each door must have a clearly noticeable warning sign to warn persons from entering the room without hearing protection.

Measured sound pressure level as per appendix.

All M300 pumps with motor delivered by the manufacturer have been subjected to a sound pressure measurement according to EC-directive 200/14/EG.



MP0329084-910

3.0 Notes on application

3.1 Points to be observed before use

The pump must only be used by professionals and in compliance with the safety regulations (see chapter 2).

1. Before start-up make sure that pump and drive unit are in perfect condition. The pump must only be operated in upright position with suction and pressure ports pointing up. Pipe lines must be routed in a way that the weight of the pipes does not rest on the pump.
2. The pump is delivered ready for operation.

In order to avoid friction heat and to save the pumping hose the pump is filled with 1-2 litres of sliding fluid. Silicone oil AK 350 is used as standard sliding fluid, but on request the pump may also be filled with glycerine, DAB10; 99,9%, ignition temperature 400 °C.

The filling quantity depends on the pump type. For the types M 5 E and M 10 E 1.5 to 2 litres of sliding fluid are required. All other M-types are filled with 1 litre.

3. Check the pump arrangement to ensure that suction lift and discharge head are not exceeded.

3.1.1 Pump suction power

1. If the fluid to be pumped contains solid particles with a size of more than 8 mm / 5/16 inch, a filter, e.g. flat suction box, suction strainer should be used. This filter must be monitored and cleaned when necessary.

3.2 Installation

The pump unit must be placed on a level base of sufficient load bearing capacity for the weight of the pump.

Since the pump is a positive displacement pump it must be assured that no shut-off elements are installed in the pressure side. Components reducing the cross-section of the piping or instable hoses, which could cause blockage of the piping system, must not be used. A device must be incorporated into the system or drive to prevent the pump from exceeding its stated duty pressure.

The pump is fitted with Camlock quick couplings DN 50 (male part) for the connection of hoses. Camlock couplings DN 50 (female part) with 2" external thread should be used as matching parts. It is recommended to continue with a 2" elbow each, in order to avoid buckling of suction and pressure hoses. Couplings normally used by the customers, such as

fire fighting couplings C (system Storz) (DIN 14307),

screw couplings DN 50 (DIN 11851)

or

tank truck couplings VK or MK 50 (DIN 28450) can then be connected to these elbows.

All connecting parts are available made of the following materials as standard:

Aluminium (AlMgSi), red brass (copper zinc alloy), plastic (PP), stainless steel (1.4571).

Pumps with electric drive motors are delivered from the factory with motor circuit breaker and connecting plug.

The necessary connecting line must be fitted with a matching socket.



Electrical installations and connections must only be made by a qualified electrician.



Warning!

Pumps and drives with combustion engines must only be started up by following the operating instructions of the engine manufacturer (see chapter Appendix).

4.0 Operating instructions

4.1 Points to be observed before commissioning

Please check:

- whether the pump is correctly installed and connected.
- whether the direction of pump rotation is correct. The direction of rotation is "clockwise" (when viewed from the drive). An arrow on the pump housing marks the direction of rotation.
- that a pump without explosion-proof drive is under no circumstances used in an explosive environment.
- whether the pumping hose inside the pump is suitable for the product to be pumped.
- whether the pump is properly earthed to avoid electro-static charging (especially recommended for combustible fluids).

4.2 Commissioning

The standard pump is designed for upright installation.

The vacuum gauge mounted to the pump housing shows the vacuum on the suction

side. After a short time running the vacuum gauge should indicate vacuum. If no vacuum is reached, check the pump for leak tightness (see chapter maintenance and troubleshooting).

Check the lubrication of the drive unit.

Make sure that all safety installations are fastened and fully functional.



The peristaltic pump must not be operated against closed shut-off valves.

The drive unit is to be started up in accordance with the respective operating instruction..

4.3 Taking out of service

Attention! Always observe the safety instructions in chapter 2 in this manual and the operating instructions for the drive unit in the chapter "Appendix".

The shut-down procedure for maintenance, installation or cleaning work must only be performed by authorized and trained personnel.

1. Switch off the electric power supply or the respective drive and secure against unintended restarting.
2. Close shut-off valves on suction and pressure side.
3. Relieve the pressure in suction and pressure lines.



Hazard!

Fluids escaping under pressure can cause severe injury.

Take care when loosening pressure fittings, wear protective clothing.

Be extremely careful when handling hazardous fluids.

You should immediately consult a doctor if you had contact with such substances.

4. Loosen suction and pressure fittings carefully. The system may still be under pressure or tension.
5. Disconnect suction and pressure lines from the pump and disassemble the rinsing line (if present).

If wear symptoms are detected when inspecting the pump, the respective parts must be replaced.

5.0 Maintenance

Attention! Always observe the safety regulations in chapter 2 when performing maintenance work!

Check all lines and fittings regularly for leaks and externally visible damage!
Eliminate any faults immediately!

Peristaltic pumps of series M300 require only little maintenance. The gear in the pump head is lifetime lubricated by low viscosity oil (oil level inspection through lateral plug, part-no. 1036).

The only wear items on the pump are:

Pumping hose, separating belt, support.

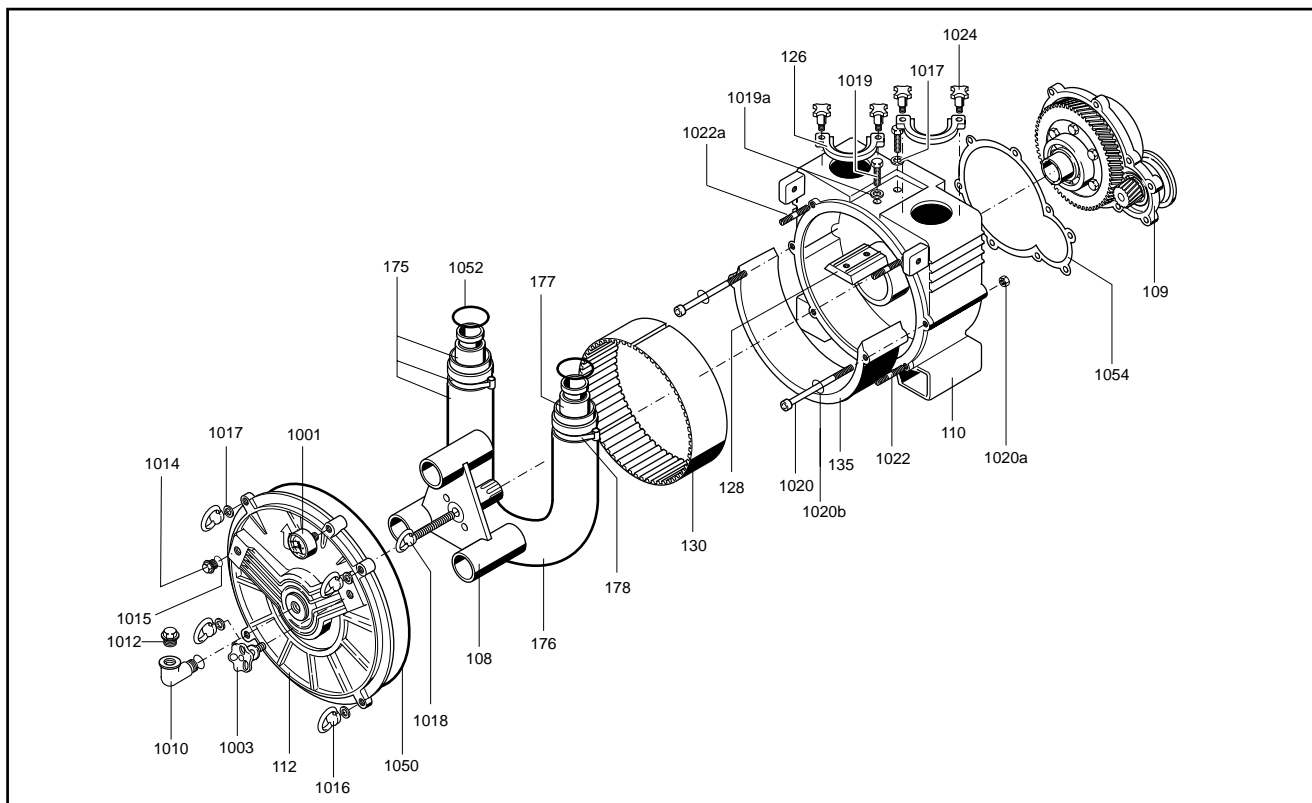


Fig. 12 – Standard design (spare parts) – pump head

Spare parts for pump

Qty. No.	Part-no.	Description	Qty. No.	Part-no.	Description
1	108	MP0302010-002 Rotor	1	1001	EL807-100-000 Vacuum gauge -1/0 bar
1	109	MP0303601-BG Gearbox complete	1	1003	EL823-300-320 Dosing valve 1/2" Ms
1	110	MP0300003-400 Pump housing	1	1010	930050-05 Elbow R 1/2" , male/female
1	112	MP0301003-400 Pump cover	1	1012	EL823-300-001 Ventilation valve R 1/2"
2	126	MP0304104-110 Holding brackets V4A	1	1014	905106-05 Plug R 1/2", DIN910
1	128	MP0305101-410 Bracket for separating belt	1	1015	922601-53 Flat seal ring PA, A 21x27, DIN7603
1	130	MP0305002-580 Separating belt M300 720+2 mm	4	1016	901400105 Eye bolt DIN582, M10
1	130	MP0305003-580 Separating belt M300 724+/-1 mm	4	1017	902000305 Washer 10, DIN125
1	130	MP0305004-580 Separating belt M300 726+/-1 mm	1	1018	MP0302902-001 Rotor screw
1	130	MP0305005-580 Separating belt M300 730+/-2 mm	2	1019	900160011 Hexagon screw M10x40, DIN931
1	130	MP0305006-580 Separating belt M300 733+3 mm	2	1019a	902001111 Washer 10, DIN125
1	135T	MP0305401-500 Support 15 mm	2	1020	900210791 Socket head cap screw M8x160, DIN912
1	135T	MP0305402-500 Support 22 mm for PUR hose	2	1020a	901040011 Hexagon nut M8, DIN985
Pumping hose without connections			2	1020b	922101-24 Flat seal ring A 8x12, DIN7603, Cu
1	176B	MP0306020-510 - Nitrile NBR	2	1022	910300091 Stud M10x30, DIN538
1	176C	MP0306022-560 - Hypalon CSM	2	1022a	900162691 Socket head cap screw M10x40, DIN933
1	176J	MP0306021-550 - Butyle IIR	4	1024	MP0300901-BG Holding bracket fastening screw
1	176N	MP0306023-530 - Natural rubber NR	1	1050	920014741 O-ring NBR, 285x3, DIN3770
1	176P	MP0306019-580 - Polyurethane PUR	2	1052	920014841 O-ring NBR, 50x6, DIN3770
			1	1054	EL120-001-920 Paper gasket
Connections KL-male					
2	177A	MP0304411-310 - Aluminium			
2	177K	MP0304413-700 - Plastic polypropylene			
2	177R	MP0304412-430 - Red brass			
2	177S	MP0304414-110 - Stainless steel 1.4571			
2	178	EL740-004-001 Hose clamp			

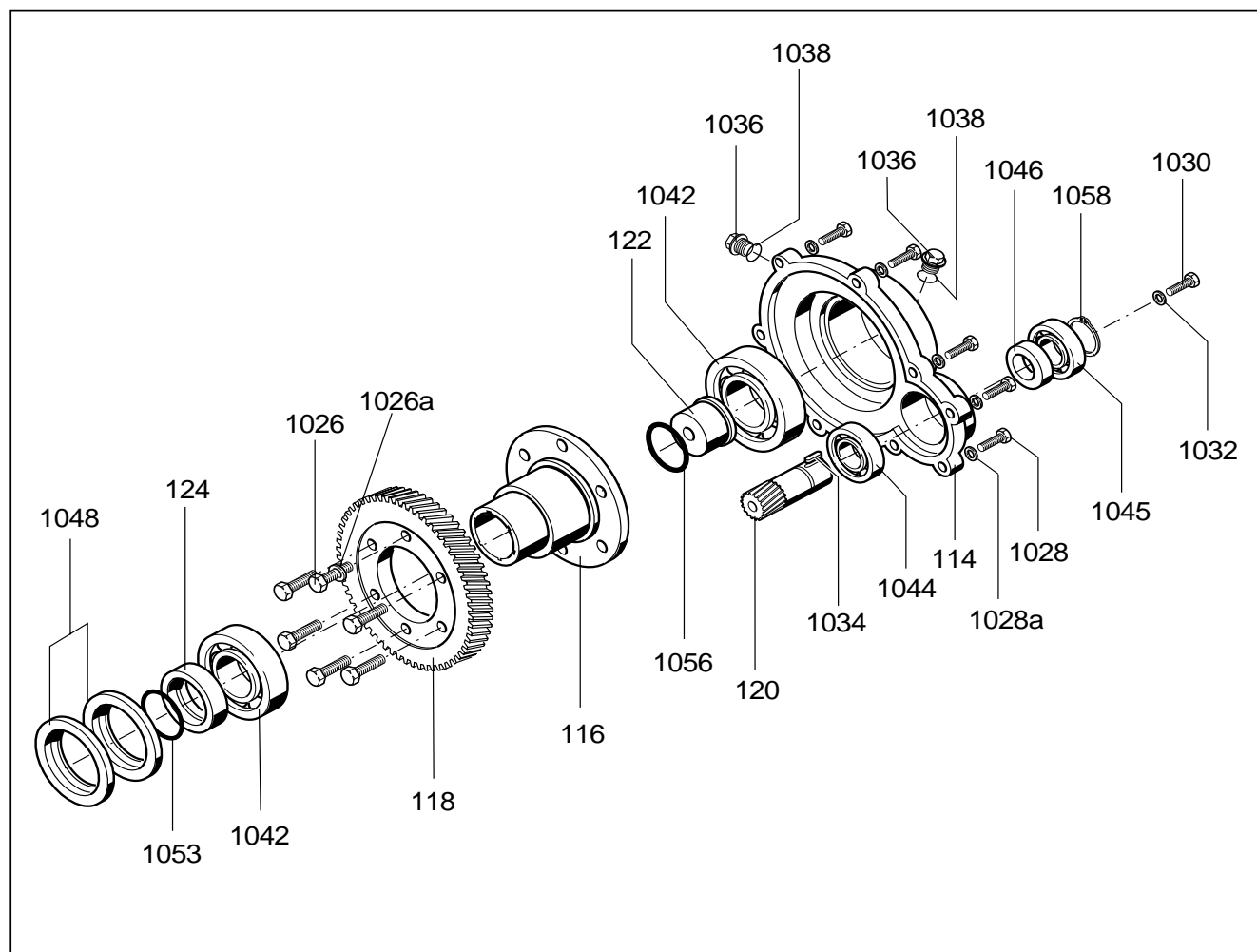


Fig. 13 – Standard design (spare parts) – gear unit

Spare parts gearbox 109

Qty.	No.	Part-no.	Description	Qty.	No.	Part-no.	Description
1	114	MP0301103-420	Gearbox cover	2	1042	EL2001003-010	Grooved ball bearing 6210, DIN625, 50x90x20
1	116	MP0303401-400	Ring gear carrier	1	1044	EL2001007-010	Grooved ball bearing 6305, DIN625, 25x62x17
1	118	MP0303301-040	Ring gear	1	1045	EL2001008-010	Grooved ball bearing 6305-2RS1, DIN625, 25x62x17
1	120	MP0303501-040	Pinion	1	1046	EL104-004-510	Radial seal NBR, DIN3760, 25x52x10
2	122	MP0303201-010	Retaining nut	2	1048	EL104-005-510	Radial seal NBR, DIN3760, 65x85x10
1	124	MP0303101-030	Inner ring	1	1053	920014641	O-ring NBR, 48x3, DIN3770
6	1026	60690612	Socket head cap screw M8x25, DIN933	1	1056	920014541	O-ring NBR, 30x3, DIN3770
6	1026a	902100309	Lock washer 8, DIN 127	1	1058	902220606	Circlip DIN471, 25x2
8	1028	60690614	Socket head cap screw M8x35, DIN933				
8	1028a	902000205	Washer 8, DIN125				
1	1030	900165091	Locking screw M8x20				
1	1032	902040305	Washer 9.5, DIN440				
1	1034	EL040-513-020	Fitting key A8x7x25, DIN6885				
2	1036	905109-05	Plug M12x1.5, DIN908				
2	1038	922103-24	Flat seal ring A 12x16, DIN7603, Cu				

Spare parts kit

Consists of the following positions:

1 x pumping hose M 300 connected with

2 x connections

1 x ltr. silicone or glycerine

1 x set of O-rings (incl. 1 x O-ring for pump cover and 2 x O-rings for connecting sockets)

Description	Lubricant	Quantity	Part-no.
hose material			
Connection ALUMINIUM			
Nitrile NBR	Silicone	1 Set	ESK-M-ABS
Nitrile NBR	Glycerine	1 Set	ESK-M-ABG
Hypalon - CSM	Silicone	1 Set	ESK-M-ACS
Hypalon - CSM	Glycerine	1 Set	ESK-M-ACG
Butyl - IIR	Silicone	1 Set	ESK-M-AJS
Butyl - IIR	Glycerine	1 Set	ESK-M-AJG
Natural rubber - NR	Silicone	1 Set	ESK-M-ANS
Natural rubber - NR	Glycerine	1 Set	ESK-M-ANG
Polyurethane - PUR	Silicone	1 Set	ESK-M-APS
Polyurethane - PUR	Glycerine	1 Set	ESK-M-APG
Connection POLYPROPYLENE			
Nitrile NBR	Silicone	1 Set	ESK-M-KBS
Nitrile NBR	Glycerine	1 Set	ESK-M-KBG
Hypalon - CSM	Silicone	1 Set	ESK-M-KCS
Hypalon - CSM	Glycerine	1 Set	ESK-M-KCG
Butyl - IIR	Silicone	1 Set	ESK-M-KJS
Butyl - IIR	Glycerine	1 Set	ESK-M-KJG
Natural rubber - NR	Silicone	1 Set	ESK-M-KNS
Natural rubber - NR	Glycerine	1 Set	ESK-M-KNG
Polyurethane - PUR	Silicone	1 Set	ESK-M-KPS
Polyurethane - PUR	Glycerine	1 Set	ESK-M-KPG
Connection BRONZE			
Nitrile NBR	Silicone	1 Set	ESK-M-RBS
Nitrile NBR	Glycerine	1 Set	ESK-M-RBG
Hypalon - CSM	Silicone	1 Set	ESK-M-RCS
Hypalon - CSM	Glycerine	1 Set	ESK-M-RCG
Butyl - IIR	Silicone	1 Set	ESK-M-RJS
Butyl - IIR	Glycerine	1 Set	ESK-M-RJG
Natural rubber - NR	Silicone	1 Set	ESK-M-RNS
Natural rubber - NR	Glycerine	1 Set	ESK-M-RNG
Polyurethane - PUR	Silicone	1 Set	ESK-M-RPS
Polyurethane - PUR	Glycerine	1 Set	ESK-M-RPG
Connection STAINLESS STEEL			
Nitrile NBR	Silicone	1 Set	ESK-M-SBS
Nitrile NBR	Glycerine	1 Set	ESK-M-SBG
Hypalon - CSM	Silicone	1 Set	ESK-M-SCS
Hypalon - CSM	Glycerine	1 Set	ESK-M-SCG
Butyl - IIR	Silicone	1 Set	ESK-M-SJS
Butyl - IIR	Glycerine	1 Set	ESK-M-SJG
Natural rubber - NR	Silicone	1 Set	ESK-M-SNS
Natural rubber - NR	Glycerine	1 Set	ESK-M-SNG
Polyurethane - PUR	Silicone	1 Set	ESK-M-SPS
Polyurethane - PUR	Glycerine	1 Set	ESK-M-SPG



Pumps with electric drive must be switched off and disconnected from the electric power supply before starting maintenance work!



Warning!

On pumps with combustion engines the spark plug socket must be pulled off after the engine has been shut down.



Caution!

Danger of chemical burns.

If the pump is used for aggressive, caustic or toxic media, the pump must generally be flushed with a neutral agent (water) before opening the pump housing.



Caution!

Danger of burning

Depending on operating conditions the pump may reach temperatures too high to touch. You should therefore switch off the pump and let it cool down before touching it.

5.1 Cleaning

General notes:

Wherever possible mechanical cleaning procedures should be preferably used, rather than cleaning with chemical aids.



Caution!

Always wear protective clothing when working with solvents or cleansing agents.

Housing, cooling fins, openings and covers on equipment components are very often not just protections, but have additional functions such as cooling, insulation, noise reduction, splash protection, etc.

Some of these functions can be impaired or may become totally ineffective by excessive deposits of dirt.

Some advice on how to remove dirt.

- Dried on dirt can be removed by scratching, scraping or brushing
- Minor dirt deposits, such as layers of dust and fine deposits can be wiped off, cleaned off with a vacuum cleaner, removed with a brush or broom



Caution!

Danger of injury

Loose dirt should not fall on rotating parts, from which it could be thrown away.

Non-observance may cause injury to persons or damage to property.

Do not touch pump or pipes.



Caution!

Danger of burning!

Always wear your personal protective outfit when handling chemicals.

Always flush the system thoroughly after cleaning.

Always observe applicable regulations when storing or handing out chemicals.

5.2 Replacing the pumping hose (see also Fig. 9-12, page 23)

Peristaltic pumps may be fitted with hoses of various types, depending on the application.

The following materials are available:

- Natural rubber (NR)
- Nitrile rubber (NBR)

- Butyl rubber (IIR)
- Hypalon (CSM)
- Polyurethane (PUR)

Before installing a new hose you should make sure that the hose material suits the intended application (see appendix: Materials for pumping hoses). If the hose inside the pump has not been damaged by normal mechanical wear, but by chemical attack, you should use a hose of different material.

1. Completely empty the pumping hose, for this purpose lay the pump on its side with the pressure side down.
 2. Stand the pump with the pump cover facing forward.
 3. Place a container to collect the lubricating fluid.
 4. Loosen and unscrew four nuts (part-no.1016, Fig. 8) from the pump cover. Take off the washers.
 5. Take the pump cover carefully off, let the lubricating fluid flow into the container.
- Attention!** If the pumping hose is damaged, pumped product and lubricating fluid may have mixed. In this case the inside of pump housing and cover must be cleaned. After changing the hose the lubricating fluid must be changed.
6. Unscrew the rotor retaining screw (part-no. 1018, Fig. 8). If necessary force the rotor off by turning the fastening screw into the jackscrew bore M 10 (Fig. 9).
 7. Loosen and remove both holding clamps and pumping hose (Fig. 10).

8. Pull the pumping hose on the pressure side back into the housing, then pull it back on the suction side and take it out (Fig. 11 and Fig. 12).
9. The connecting sockets must be fastened to the hose by means of a hose assembly unit.

Special hose clamps can be delivered instead of the clamping strap.

The hose must be pushed onto the socket, so that the end of the hose touches the collar around the complete circumference. Each socket is fastened with one hose clamp.

In order to achieve an optimal clamping force the clamping strap must be placed around the hose twice and tightened. After assembly the strap must be parallel to the end of the hose, on side of the loop (buckle) must be flush with the end of the hose.

Please make sure that the loops of the socket fastening on the hose are on the same side.

In the pump the sockets must be assembled so that the loops are always furthest away from the rotor.

Notes on the correct use of the hose assembly unit can be found in the respective operating instructions.

10. Slide the O-rings over both connecting sockets.
11. Install the new pumping hose into the housing.
12. Stand the pump with the pump head facing upward. Fill the housing with 1-2 litres of sliding fluid. Attach the pump cover with the new O-ring and fasten it with washers and nuts.

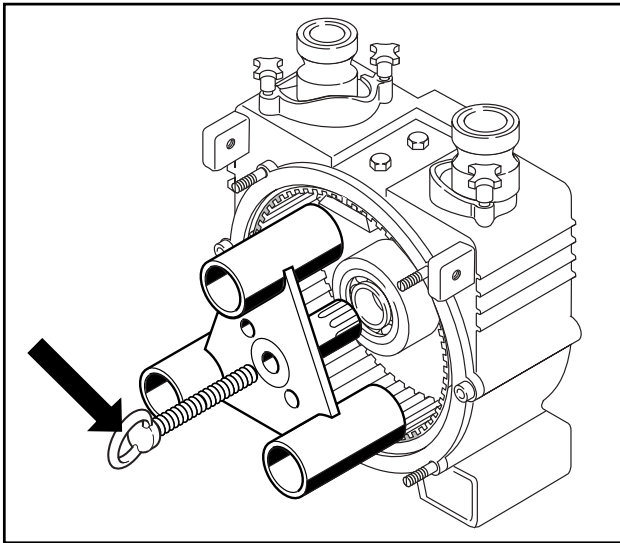


Fig. 9

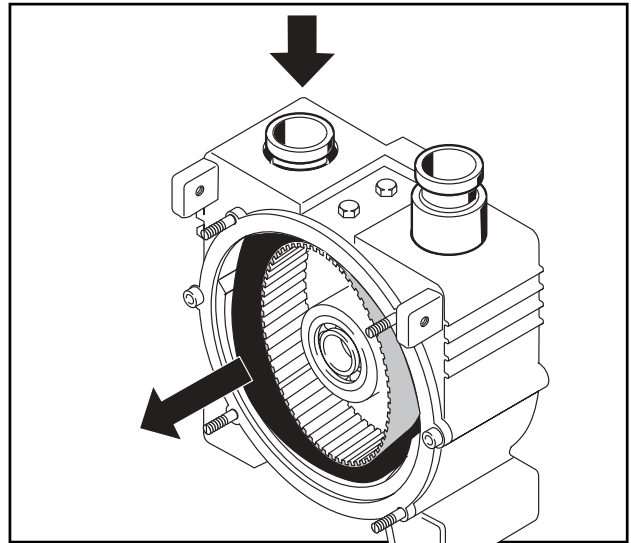


Fig. 11

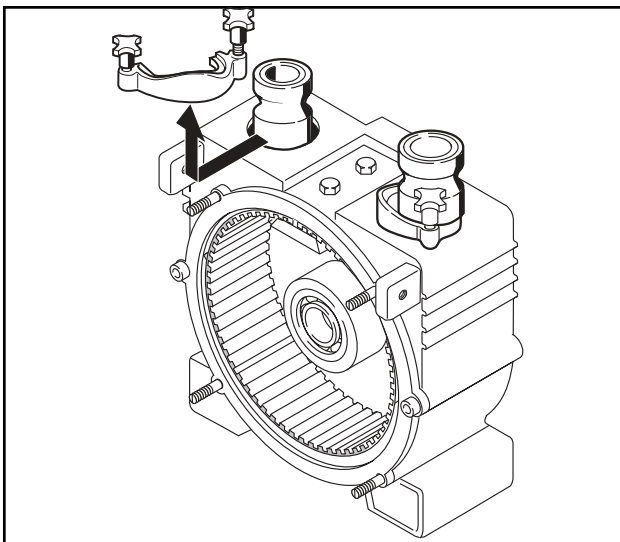


Fig. 10

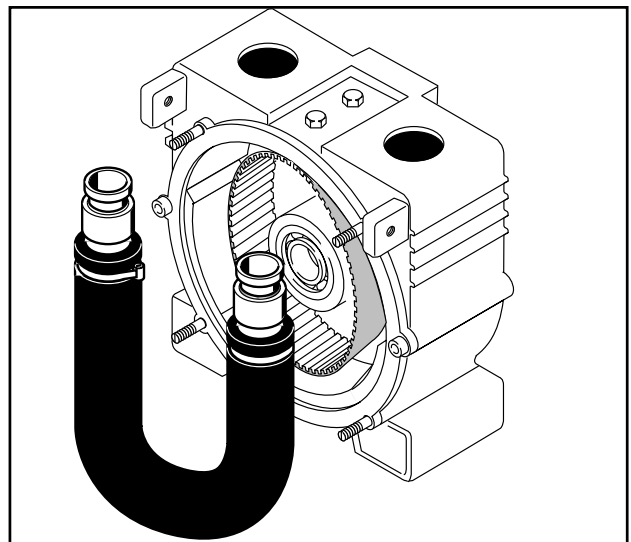


Fig. 12



The O-rings at the hose ends must be properly in their grooves. The pumping hose must not be twisted around its longitudinal axis.

Attach and tighten both holding brackets.
Assemble and tighten the rotor. If sliding fluid has been lost: fill in the missing amount. Close the pump cover and tighten the screws crosswise.

5.3 Replacement of separating part

The installed separating belt has the function of creating the vacuum in the pump housing and provides a protective layer between rotor and pumping hose. When changing a hose the separating belt should always be examined for possible damage. This should be done before installing the hose. If damaged it must also be replaced.

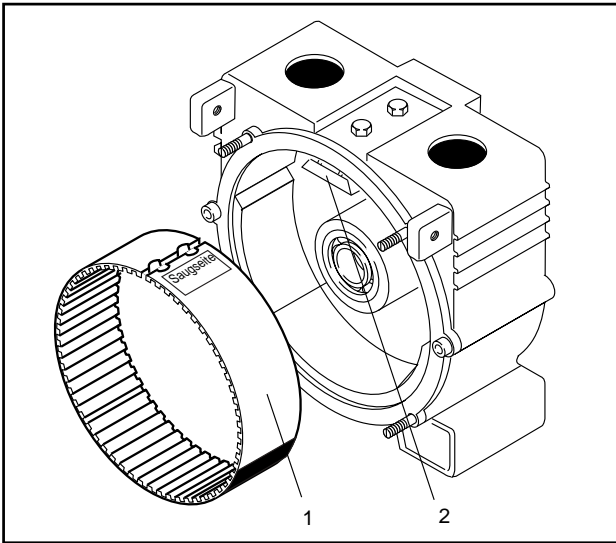


Fig. 13 1 Separating belt
2 Holder for separating belt

1. After removing the pumping hose loosen both hexagon screws (part-no. 1019, Fig. 8) on top of the pump so far that the split separating belt can be taken out of the holder.

2. Insert the new separating belt into the holder with the teeth towards the inside (Fig. 13).

Make sure that the separating belt neatly rests against the housing wall and is flush at the joint.

3. Tighten by hand to allow the separating belt to align itself.

Fasten the holder only after the pump cover has been assembled.



Important:

The separating belt must rest properly against pump cover and back wall of housing.

5.4 Replacement of support

When replacing the hose you should also examine the support for damage.

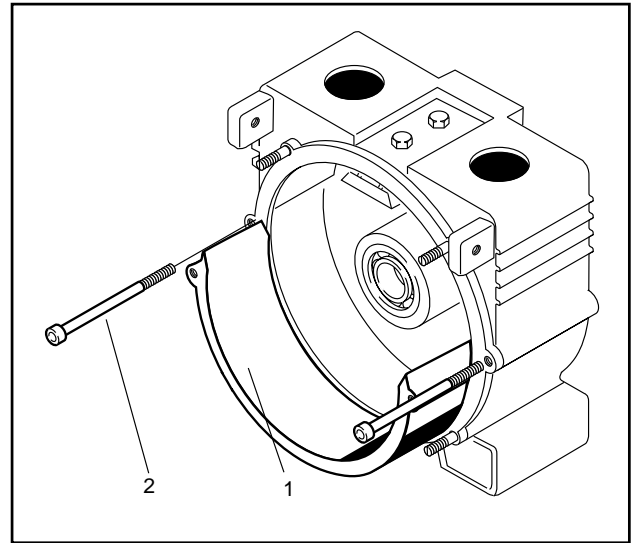


Fig. 14 1 Support
2 Line fastening screws

If the polyurethane (PUR) hose is replaced with a hose of different material, the support must also be changed.

Please note that support are available with two different dimensions, i.e the line for the PUR hose is approx. 5 mm thicker than the support for all other hose materials.

1. Remove both side plates (if present).

2. Unscrew both support fastening screws (part-no.1020, Fig. 8) and lift the support out of the housing (Fig. 14).



Clean the housing thoroughly before assembling the new support.

Do not forget to assemble the support fastening screws with copper washers.

5.5 Checking the V-belt tension

Depending on the version the pump may be driven by a V-belt.

The installed V-belt has been designed for a power transfer of up to 3 kW under permanent operation.

If the V-belt tension slackens (V-belt can be depressed for more than 1 cm), the V-belt needs to be tightened.

1. Remove both side plates from the pump (if present).
2. Loosen four fastening screws on the motor foot.
3. Loosen the counter nut on the V-belt tensioning device and tighten the tensioning screw until the correct V-belt tension is achieved.
4. Lock the tensioning screw with the counter nut.
5. Tighten the fastening screws on the motor foot and make sure that the V-belt is properly aligned.
6. Reassemble the side plates.

5.6 Oil change, oil qualities

5.6.1 Pump housing:

The pump housing is filled with 1-2 litres of lubrication fluid. The oil should be changed at intervals of 3 years.

5.6.2 Gearbox:

The gearbox is lifetime lubricated by 0.25 litres of low viscosity oil.

The oil only needs to be changed in case of an oil loss.

The housing is fitted with a filler plug and a control plug.

5.6.3 Oil types:

We recommend to use the following oils:

Pump: Silicone AK 350 Wacker-Chemie Burghausen

Glycerine oil DAB10 99,9%

Gearbox: SAE 80 W Geartex EP, DEA (PUR).

6.0 Troubleshooting

Fault	Possible cause	Remedy
No pump flow	Pressure and suction valves closed	Open valves
	Wrong direction of rotation	Reverse rotation
	Suction line blocked	Remove blockage
	Leaks in suction pipe (entering of air)	Find and eliminate leaks
	Suction lift too high	Change pump arrangement
	No operating voltage	Connect to voltage supply
Pump loses suction power or insufficient pumping capacity	Excessive back-pressure	Change pump arrangement, if necessary use different hose cross-sections
	Leaks in suction pipe	Find and eliminate leaks
	Speed too low	Check speed and electric wiring
	Suction line blocked	Remove blockage
	Insufficient suction pressure	Change pump arrangement
	Pump parts worn	Replace these parts
	Dosing valve open	Close dosing valve
Pump runs very loud	Oil level in pump too low	Fill up oil
	Pump worn or defective	Examine, if necessary replace defective parts
Drive heats up or is overloaded	A certain heating of electric motors is normal	Check current consumption as a measure of safety
	Discharge pressure too high	Change pump arrangement

7.0 Technical data

Assembly Specification Series M300

Type	Weight [kg]		Motor ³⁾			Belt pulley [mm]		Transmission ratio			Speed [min ⁻¹]	Belt [mm]	Separating belt mm / inches	Noise [dB]		
	"T" ¹⁾	"F" ²⁾	U [V]	P [kW]	I _N [A]	n ₁ [min ⁻¹]	Motor d ₁	Pump d ₂	i ₁₂	i ₂₃				i ₁₃	n ₂	n ₃
M	72	77	230/400	1.5	7.0/4.0	935	ø 80x28	ø 150x25	1.88	7.25	13.59	499	69	720 / 28.4	67	80
5 E	62	67	230/400	2.2	9.0/5.15	1400	ø 80x28	ø 150x25	1.88	7.25	13.59	747	103	724 / 28.5	67	80
7.5 E	65	70	230/400	2.2	9.0/5.15	1400	ø 80x28	ø 125x25	1.56	7.25	11.33	896	124	724 / 28.5	67	80
10 E	65	70	230/400	2.0	8.1/4.55	1400	ø 80x28	ø 125x25	1.56	7.25	11.33	896	124	724 / 28.5	67	80
10 Ex	65	70	230 (1-)	1.5	12.25	1400	ø 80x24	ø 125x25	1.56	7.25	11.33	896	124	724 / 28.5	71	84
10 EW	62	67	230/400	1.1/1.6	3.43/3.37	750/1400	ø 80x28	ø 125x25	1.56	7.25	11.33	480/896	66/124	724 / 28.5	67	80
15 E	60	65	230/400	2.2	8.0/5.4.6	2800	ø 80x24	ø 140x25	1.75	7.25	12.69	1600	221	726 / 28.6	67	80
15 Ex	65	70	230/400	2.5	6.35/3.65	2800	ø 80x28	ø 140x25	1.75	7.25	12.69	1600	221	726 / 28.6	67	80
15 R	n.a.)	96	230/400	3.0	9.0/5.2	310-2000	ø 100x24	ø 125x25	1.25	7.25	9.06	248-1600	34-221	726 / 28.6	67	80
15/7.5 E	77	80	230/400	2.6/3.1	5.7/6.4	1400/2800	ø 80x28	ø 140x25	1.75	7.25	12.69	800/1600	110/221	726 / 28.6	67	80
20 E	63	67	230/400	3.0	10.8/6.25	2800	ø 80x28	ø 125x25	1.56	7.25	11.33	1791	247	730 / 28.7	67	80
20 Ex	65	70	230/400	2.5	6.35/3.65	2800	ø 80x28	ø 125x25	1.56	7.25	11.33	1791	247	730 / 28.7	67	80
20/10 E	62	67	230/400	2.6/3.1	5.7/6.4	1400/2800	ø 80x28	ø 125x25	1.56	7.25	11.33	896/1791	124/247	724 / 28.4	67	80
20/10 Ex	n.a.)	89	230/400	2.1/2.75	4.4/5.7	1400/2800	ø 80x28	ø 125x25	1.56	7.25	11.33	896/1791	124/247	724 / 28.4	67	80

M	"T"	"F"	Type	P [kW]	Manufacturer	n ₁ [min ⁻¹]	Belt pulley		Transmission ratio			Speed	Belt	Separating belt	Noise	
							Motor d ₁	Pump d ₂	i ₁₂	i ₂₃	i ₁₃				n ₂	n ₃
15 D	n.a.)	77	Diesel	3.5	Yanmar	3600	ø 80x20	ø 140x25	1.75	7.25	12.69	2057	284	733 / 28.9	91	104
20DF	n.a.)	104	Diesel	3.5	Fayrmanm	3600	ø 80x20	ø 140x25	1.75	7.25	12.25	2057	284	733 / 28.9	91	104
20 D	n.a.)	85	Diesel	4.15	Hatz	3600	ø 80x30	ø 140x25	1.75	7.25	12.69	2057	284	733 / 28.9	91	104
20HD	n.a.)	98	Diesel	5.5	Honda	3600	ø 80x25	ø 140x25	1.75	7.25	12.69	2057	284	733 / 28.9	91	104
20 B	57	62	petrol	4.0	Honda	4000	ø 80x20	ø 140x25	1.75	7.25	12.69	2286	315	733 / 28.9	83	96

M	"T"	"F"	Type	P [kW]	V [min ⁻¹] / [psi]	n ₁ [min ⁻¹]	Belt pulley		Transmission ratio			Speed	Belt	Separating belt	Noise	
							Motor d ₁	Pump d ₂	i ₁₂	i ₂₃	i ₁₃				n ₂	n ₃
20 H	55	60	Hydraulic	3.0	16.5 / 130	3000	ø 80x25	ø 125x25	1.56	7.25	11.33	1919	285	730 / 28.7	71	84
20 W	55	60	W. turbine	3.5	590 / 8.5	3600	ø 80x34"	ø 125x25	1.56	7.25	11.33	2303	318	733 / 28.9	71	84
20 L	88	93	Pneumatic	3.0	400000 / 6	2000	ø 80x9/8"	ø 125x25	1.56	7.25	11.33	1280	177	733 / 28.9	101	114

- 1.) Version with standard carrier frame "T"
- 2.) Version with 4-handle carrier frame for fire fighters "F"
- 3.) Electric Motor Specifications not applicable in USA

8.0 Appendix

1. Please observe also the operating instructions for the respective drive unit.

M300 pump series:

Electric motor

Electric motor explosion proof

Gasoline engine

Diesel engine

Water turbine

Hydraulic motor

Pneumatic motor

**Please consult your local ELRO distributor
for application and pump selection assistance.**

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We reserve the right to modifications to all technical specifications.

