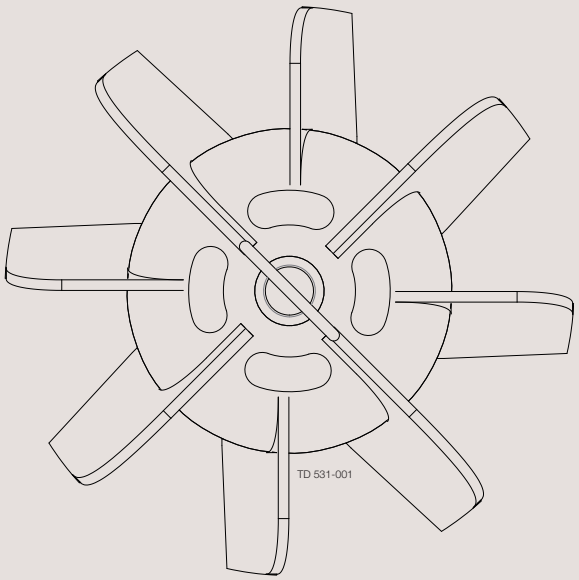
Instruction Manual

Magnetic Mixer MM UltraPure



ESE01696-EN5 2015-05

Original manual

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The information herein is correct at the time of issue but may be subject to change without prior notice

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1 EC Declaration of conformity

Revision of Declaration of Conformity 2009-12-29

The Designated Company

Alfa Laval Kolding A/S

Company Name

Albuen 31, DK-6000 Kolding, Denmark

Address

+45 79 32 22 00

Phone No.

hereby declare that

Magnetic Mixer

Designation

MM UltraPure

Type

From serial number 10.000 to 1.000.000

is in conformity with the following directive with amendments:
- Machinery Directive 2006/42/EC

The person authorised to compile the technical file is the signer of this document

Global Product Quality Manager Pumps, Valves, Fittings and Tank Equipment	Lars Kruse Andersen
Title	Name
Kolding	2013-12-03
Place	Date

Signature

2 Safety

Unsafe practices and other important information are emphasized in this manual.
Warnings are emphasized by means of special signs.
Always read the manual before using the mixer!

2.1 Important information

WARNING
Indicates that special procedures must be followed to avoid serious personal injury.

CAUTION
Indicates that special procedures must be followed to avoid damage to the mixer

NOTE
Indicates important information to simplify or clarify procedures.

2.2 Warning signs

General warning:

Dangerous electrical voltage:

Caustic agents:

2 Safety

All warnings in the manual are summarized on this page.
Pay special attention to the instructions below so that severe personal injury and/or damage to the mixer are avoided.

2.3 Safety precautions

Installation:

Always read this manual thoroughly.

Always have the mixer electrically connected by authorized personnel.
Incorrect installation, mounting and use, removal of security elements, lack of inspections and maintenance and improper connections may cause severe personal injury or property damage. Therefore it is important that the mixer is being transported, handled, installed, started, controlled, serviced and repaired correctly exclusively by qualified personnel.

Operation:

Always read this manual thoroughly.
Ultra Clean Mixer can run dry once it has been submerged, however it is not recommended to run dry above 50 rpm. Dry-running below 50 rpm is safe during a complete draining as well as during CIP. To avoid damage to the bearings when running dry, please do not exceed speeds of 50 rpm.

Make sure that the media is not boiling.

During processes: up to max. 90°C
Using non lubricating media (e.g. WFI) up to max 60°C and min. 2 bar pressurized.
During CIP: up to max 95°C – max. 50 rpm
During SIP: up to max 150°C - DO NOT RUN

Ensure that gear motor lubricate does not reach temperatures higher than 105°C during operation, CIP or SIP.

Always handle CIP and SIP lye and acids with great care.

Maintenance:

Always read this manual thoroughly.

Always disconnect the power supply when servicing the Mixer.

Transportation:

Always ensure that no leakage of lubricants can occur.
Always ensure that the unit is securely fixed during transportation.
Always use original packaging or similar during transportation.
Never leave drive unit attached to weld plate during transportation.

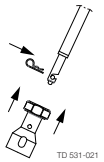
The instruction manual is part of the delivery.
Study the instructions carefully.

3.1 Male bearing

Step 1
It is assumed that the weld plate is installed in the tank - if not, see Instruction Manual for Weld Plate for Magnetic Mixer MM UltraPure.

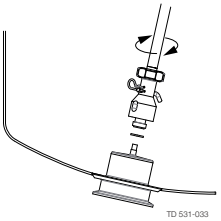
Step 2
Place the male bearing with gasket in the Bearing Socket and mount the Bearing Socket on the Removal Tool. Place the gasket in the male bearing groove.

Bearing Socket Removal Tool Rod



Step 3
Using the Bearing Socket and the Removal Tool Rod, place the male bearing and the gasket on the weld plate threaded stub and turn clockwise to install.
Note: For large tanks, Rod Extension may be needed to perform installation.

Bearing Socket Removal Tool Rod



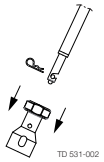
Step 4
Tighten bearing until a distinct mechanical stop is reached (torque approx. 2 Nm).
CAUTION
Do not over-tighten.

3 Installation

Warning: It is critical for the impeller to be mounted before installing the drive unit.
Caution: Always be sure that the weld plate is correctly installed in the tank and that it has not changed shape during welding – please see Weld Plate Manual.

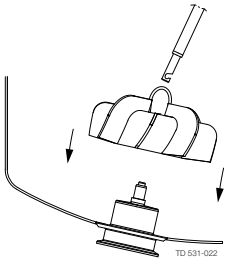
3.2 Impeller

Step 1
Always use the Removal Tool Rod. Male bearing may be damaged if another type of tool is used.
1. Remove Bearing Socket from the end of Removal Tool Rod, revealing a hook for handling the impeller.



Step 2
1. Hook the Removal Tool Rod onto the hoop on the top of the impeller.
2. Place the impeller carefully on the male bearing.
3. Rotate the impeller slowly by hand 360 degrees (one rotation) ensuring that there is no collision between the impeller and tank bottom / weld plate.

Note: Make sure the female/impeller bearing is fully set onto the male bearing.
Warning:
The impeller must be mounted before installing the drive unit in order not to damage the bearings.

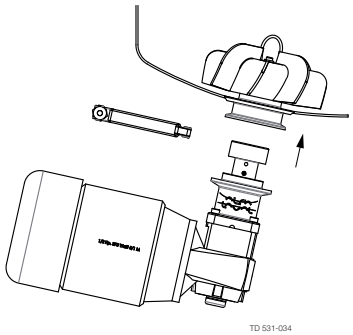


Warning: *It is critical for the impeller to be mounted before installing the drive unit.*
Caution: *Always be sure that the weld plate is correctly installed in the tank and that it has not changed shape during welding – please see Weld Plate Manual.*

3.3 Drive unit type MM338

Step 1
Ensure the bearing and impeller is mounted before mounting the drive unit.

Drive Unit

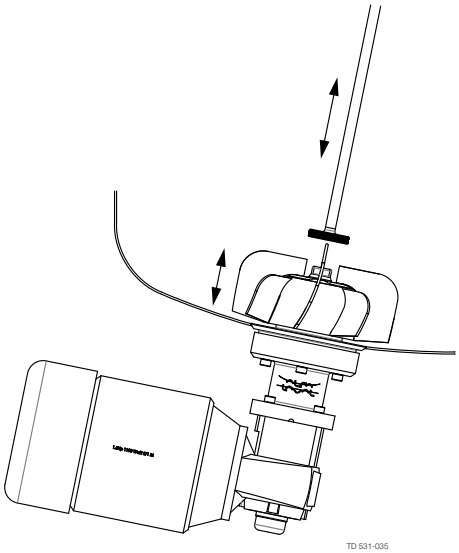


Step 2
Gripping the drive unit firmly, align the drive unit with the weld plate and apply the clamp ring, without tightening this fully.

Step 3
Gear motor orientation can be adjusted in order for this to clear tank legs.
Tighten clamp ring (torque 20 Nm).

Step 4
Ensure the upper part of the flange is flush with the lower side of the weld plate.

Step 5
CAUTION!
!!Check for levitation!!:
Push on the impeller hoop with Removal Tool Rod handle. Impeller should travel axially minimum 0,5 mm, otherwise it is NOT levitated. If so, ensure bearing is completely seated and flange is flush against the bottom of the weld plate. Lubricate the bearings with ie. water and recheck levitation.

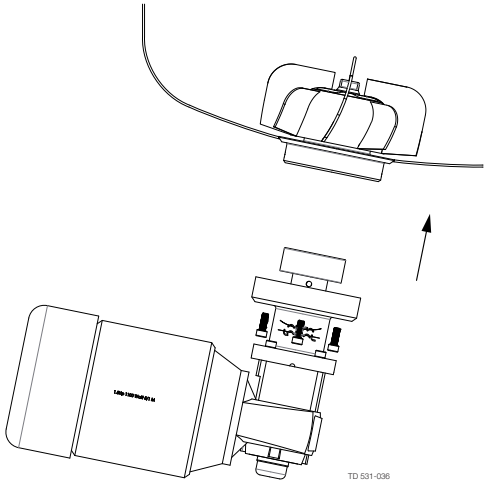


3 Installation

Warning: It is critical for the impeller to be mounted before installing the drive unit.
Caution: Always be sure that the weld plate is correctly installed in the tank and that it has not changed shape during welding – please see Weld Plate Manual.

3.4 Drive unit type MM434

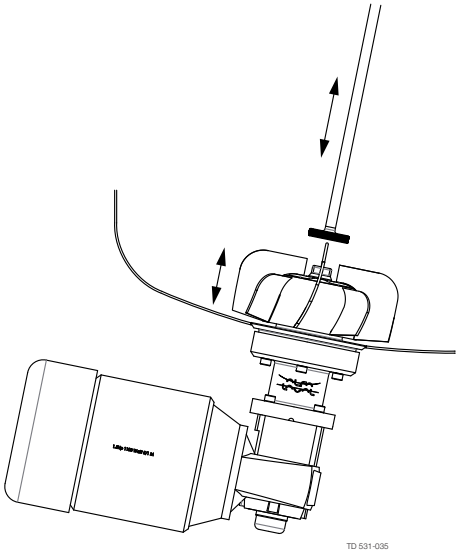
Step 1
Drive Unit
Ensure the bearing and impeller is mounted before mounting the drive unit.



Step 2
Gripping the drive unit firmly, align the drive unit with the weld plate. Adjust gear motor orientation in order for this to clear tank legs.

Step 3
Apply mounting bolts without tightening these fully.

Step 4
Making certain the weld plate and drive unit flange are completely flush, tighten the mounting bolts to secure (torque 26 Nm).
Caution:
!!Check for levitation!!:
Push on the impeller hoop with Removal Tool Rod handle. Impeller should travel axially 0.5-1.5 mm, otherwise it is NOT levitated. If so, ensure bearing is completely seated and flange is flush against the bottom of the weld plate. Lubricate the bearings with ie. water and recheck levitation.



It is recommended that the customer install an emergency stopping device and a service disconnect for their full tank/mixer processing system

3.5 Rotation Verification

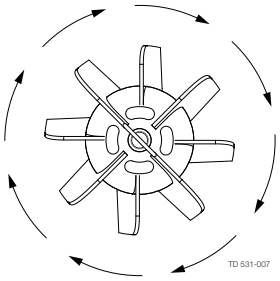
Step 1
After confirming the impeller is levitated, power up the drive unit.
Warning:
Ensure the correct power is used for the VFD and motor. Incorrect power supply can permanently damage components.

Step 2
Start up the mixer running slowly below 50 rpm and verify the impeller is rotating clockwise.
If the impeller is rotating counter-clockwise, the drive unit must be re-wired and re-installed so rotation is reversed.

NOISE OR VIBRATION:
If there is excessive noise or vibration please ensure:
- impeller is levitated.
- male bearing is seated correctly.
- motor flange is seated completely and flush to the tank.
- impeller is rotating clockwise.
- there is no contact between tank bottom and impeller.
- that male bearing has not come loose during eventual counterclockwise rotation.
- if the noise or vibration persists please contact your Alfa Laval representative.

CAUTION:
Always disconnect drive unit before working with the impeller or bearing.

Looking from top above mixer



3 Installation

The ultra clean mixer should only be operated when mounted in a tank.
Never place objects or tools inside the tank when operating the mixer.

3.6 Start up

Step 1
Alfa Laval requests using a variable frequency drive, VFD, to set the mixer´s rpm - please refer to the VFD´s manual provided with your equipment.

Step 2
If you are using your own VFD controller:
1. Always allow at least a 30 sec “soft start” during power up before reaching set speed.
2. Always run at least a 20 sec “slow stop” before coming to a full stop.

(These features are pre-programmed into controllers supplied by Alfa Laval.)
CAUTION:
The maximum rpm of the mixer is both product viscosity and tank size dependent.
Refer to quotation for max. rpm.

Step 3
Your Magnetic Mixer MM UltraPure is now installed and ready for operation.

The ultra clean mixer should only be operated when mounted in a tank.
Never place objects or tools inside the tank when operating the mixer.

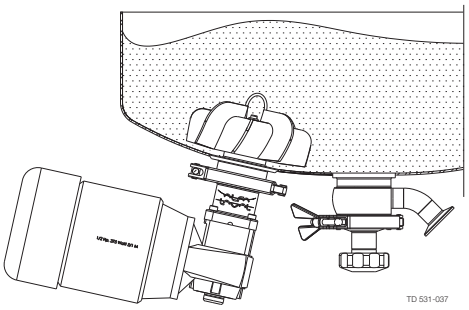
4.1 Mixing

Step 1
Verify the bottom valve is closed before tank is filled.

Step 2
Fill the tank with the desired amount and type of media.

Step 3
Start up the mixer according to your specific mixing requirements.

Tank With Media



4 Operation

The ultra clean mixer should only be operated when mounted in a tank.
Never place objects or tools inside the tank when operating the mixer.

4.2 Speeds

The allowable maximum speed for the impeller is depending on several factors such as fluid viscosity, tank dimensions, tank- and baffle design and geometry.

The recommended maximum speeds in a fully baffled tank - mixing products with water like viscosity - are:

6" impeller:	250 RPM
8" impeller:	200 RPM
10" impeller:	185 RPM

For 6” and 8” impellers it is often possible to go higher depending on the grade of turbulence or flow pattern around the mixing head during operation. So if a higher speed than the above is desirable, a test run (with water) must be done in the tank. During the test the axial movement of the head must be observed and the maximum speed is just before the mixing head starts to create excessively oscillating movements in axial direction.
Caution: During the test it is very important to increase the speed in small steps in order not to lose the magnetic coupling.

Excessive speeds may result in losing the magnetic coupling connection to the impeller head - recognized through vibrations and abnormal noise. In such cases the mixer must be stopped immediately to avoid damage.

4.3 Cleaning

Step 1
For optimal performance and service life of the mixer, proper CIP and SIP procedures should be followed.
The mixer is designed for use with CIP, please study the instructions carefully and pay special attention to warnings !

Always handle CIP and SIP lye and acids with great care.

Caustic danger!

Always use rubber gloves!

Always use protective goggles!

Step 2
The mixer can run at 50 rpm or less during cleaning processes. There is no need to run mixer during SIP - do NOT run the mixer during SIP.
NOTE:
If CIP or SIP temperatures are in excess of 150^{0}C (300^{0}F), it is important to remove the impeller, drive unit and male bearing. (See Section 3 for instructions on removing these components.)

It is critical that the drive unit is dismounted before dismounting the impeller.

5.1 Dismount drive unit

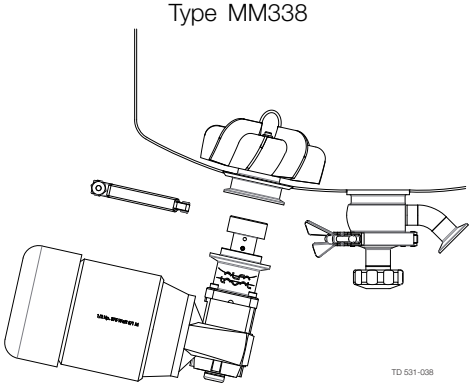
Step 1
Before maintenance, ensure the main power switch is off and power is disconnected.

Step 2
Type MM338: Loosen the clamp ring.
Type MM434: Loosen the mounting bolts.

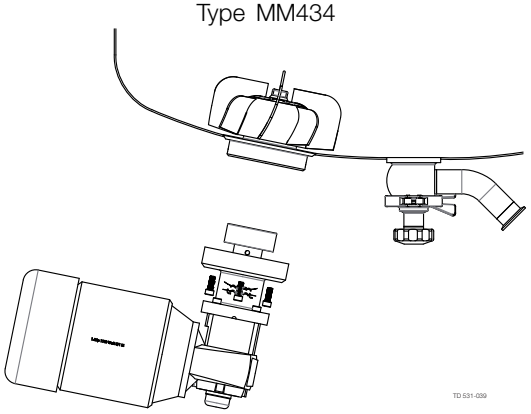
Step 3
Make preparations for supporting the drive unit before removing clamp ring/bolts completely.

CAUTION:
The drive unit may be heavier than expected. When it becomes loose, be careful not to let it fall, since it may very well become permanently damaged.

Type MM338



Type MM434



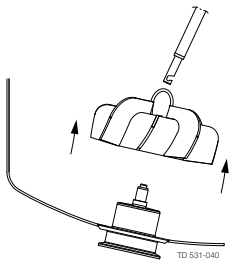
5 Maintenance

It is critical that the drive unit is dismounted before dismounting the impeller.

5.2 Dismount impeller

Step 1
Ensure the drive unit is removed.

Step 2
Use the Bearing Socket and Removal Tool Rod:
1. Remove Bearing Socket from the end of the Removal Tool Rod, revealing a hook for handling the impeller.
2. Hook the Removal Tool Rod onto the hoop on top of the impeller.
3. Lift the impeller off of its bearing carefully.



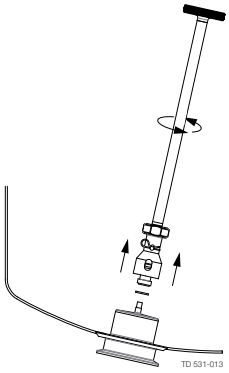
5.3 Dismount male bearing

Step 1
Re-install the Bearing Socket on the Removeal Tool Rod.

Step 2
Applying the tool, the socket groove should fit onto the bearing key (flat section on upper part of bearing).

Step 3
Make sure socket is firmly applied onto bearing before turning.

Step 4
Turn the Bearing Socket and Removal Tool Rod counter-clockwise to dismount the male bearing.



It is critical that the drive unit is dismounted before dismounting the impeller.

5.4 Inspection

Step 1
After a few days of operation listen for abnormal sounds. If any, dismount the mixer and check all parts for nicks and dents.
Alfa Laval recommends that the bearing and gasket should be checked for cleanability and wear after one month of operation. If there is abnormal wear on either components, contact Alfa Laval for further instructions.
After each CIP sequence check that the mixer and parts are clean - also look for wear, check the gasket ensuring that it is without tear or flat spots.

Step 2
Regular inspections should be performed at least every 6 months or as according to Preventative Maintenance plans.

Step 3
If any component is found damaged during inspection, please contact Alfa Laval for repair and/or replacement parts.

5.5 Replacement parts

All wear parts or damaged parts should be replaced only with Alfa Laval original components. Please contact Alfa Laval for any replacement components needed.

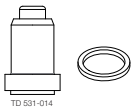
6 Troubleshooting

6.1 Troubleshooting

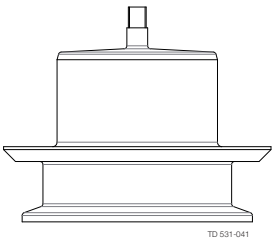
	Fault	Possible Causes	Action
1	The mixer does not start.	Fault in power supply.	Check power supply.
2	The impeller does not rotate.	Male bearing or magnetic drive not mounted.	Dismount the drive unit, detach the impeller and mount the male bearing, impeller, magnetic drive and drive unit.
3	Poor motor effect.	Motor incorrectly connected. Incorrect power is connected.	Check the motor connections and that the correct power is being used. Incorrect connections and power can cause the motor to burn.
4	Poor mixing.	Impeller rotating in wrong direction.	Check the installation. Check that the impeller rotates clockwise as seen from above.
5	Noise from mixer.	Incorrect installation of mixer, worn male bearing or male bearing not tightened correctly.	1. Check that the impeller is levitated. 2. Check that the male bearing is seated correctly. 3. Check that the motor flange is seated completely and flush to the bottom of the weld plate. 4. Check that the impeller is rotating clockwise.
6	Noise from mixer.	Squeaking noise from bearing.	1. Ensure the tank is pressurized to minimum 2 bar. 2. Lower temperature to maximum 60°C.
7	Noise from drive unit.	Humming sounds and a high pitch sound from the motor at lower Hertz is normal.	If there is any clinking, ticking or rattling sounds, please call Alfa Laval for further troubleshooting.
8	Magnetic coupling disconnected.	1. Mixer accelerating too quickly. 2. Speed too high for the current application.	1. Check start up (see Section 3.6). 2. Reduce maximum speed. Contact Alfa Laval for recommendations on maximum or see quotation.
9	Particles seated on the impeller.	Magnetic particles from associated media.	Check and take action with regard to the presence of particles or contents of associated media and raw materials. Magnetic particles are not removed during normal cleaning. The impeller must be removed and cleaned separately.
10	Insufficient cleaning of the impeller.	Poor fluid flow in impeller: 1. Due to low fluid level. 2. Due to low speed. 3. Too high speed.	1. Increase the fluid level. 2. Increase RPM. 3. Reduce RPM to prevent vortex.

7.1 Parts list

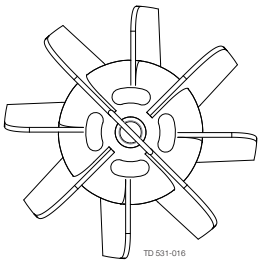
Male Bearing And Gasket



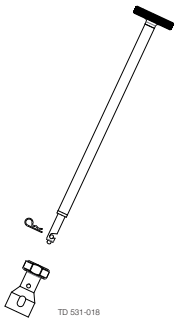
Weld Plate



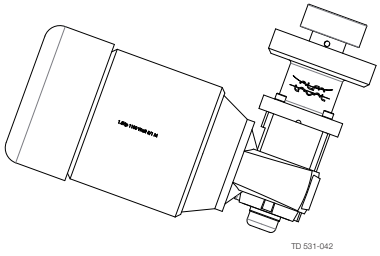
Impeller



Bearing Socket and Removal Tool Rod

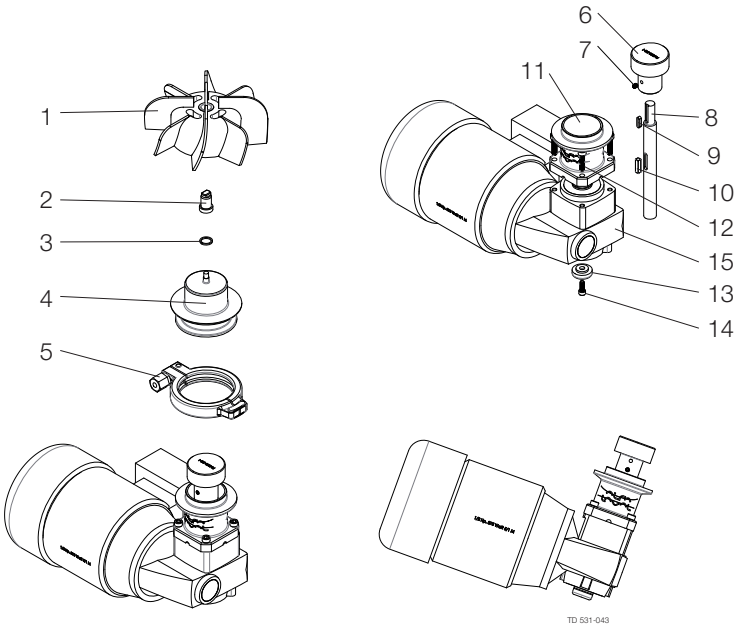


Drive Unit



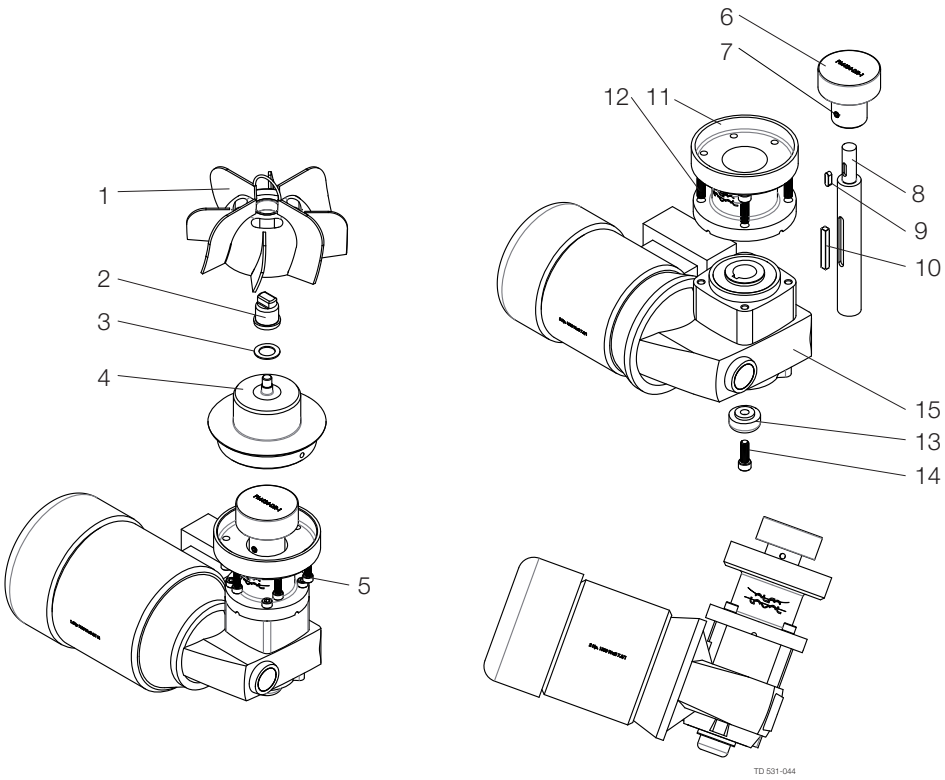
7 Parts list

MM338



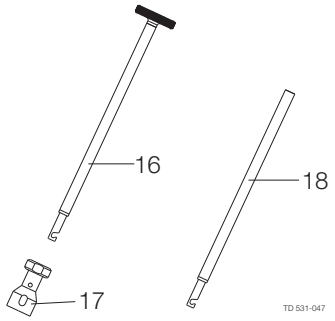
Pos	Denomination	Spare Parts Item number
1	Impeller	
2	Male bearing	9634086107
3	Gasket	9634086109
4	Weld Plate	
5	Clamp	
6	Drive Rotor	
7	Pointed Screw	
8	Shaft	
9	Parallel Key	
10	Parallel Key	
11	Flange	
12	Screw	
13	Fixing Element	
14	Screw	
15	Gear Motor	

MM434



Pos	Denomination	Spare Parts Item number
1	Impeller	
2	Male bearing	9634086143
3	Gasket	9634086145
4	Weld Plate	
5	Screw	
6	Drive Rotor	
7	Pointed Screw	
8	Shaft	
9	Parallel Key	
10	Parallel Key	
11	Flange	
12	Screw	
13	Fixing Element	
14	Screw	
15	Gear Motor	

7 Parts list



Pos	Denomination	MM338	MM434
		Item number	
16	Removal Tool Rod	9634086437	
17	Bearing Socket	9634086114	9634086147
18	Rod Extension	9634086352	

How to contact Alfa Laval
Contact details for all countries are
continually updated on our website.
Please visit www.alfalaval.com to access the information directly.

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