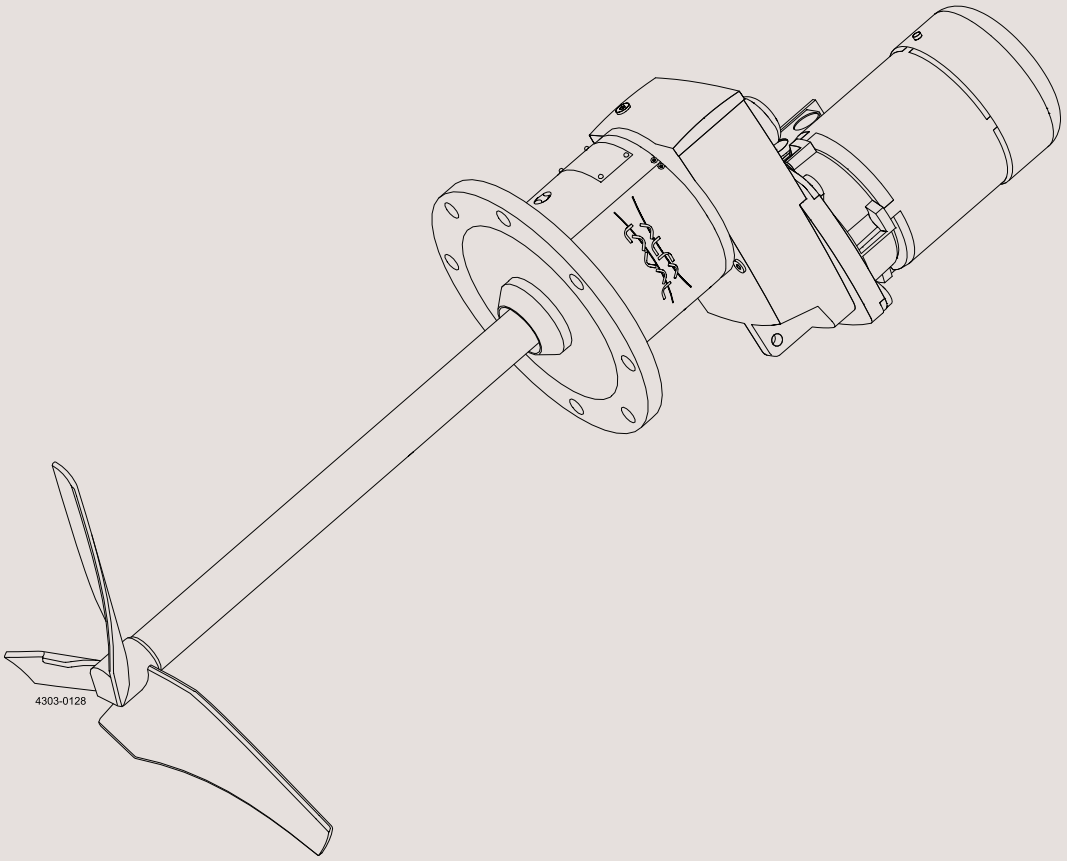
Instruction Manual

Alfa Laval Agitator – ALS Shut Down Seal



100000047-EN5 2022-12

Original manual

Table of contents

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

1 Declarations of Conformity

EU Declaration of Conformity

The Designated Company

Alfa Laval Kolding A/S, Albuen 31, DK-6000 Kolding, Denmark, +45 79 32 22 00
Company name, address and phone number

Hereby declare that

Agitator - EnSaFoil	Serial number from AAC000000001 to AAC999999999 Serial number from 10.000 - 100.000 Serial number from 100700000001 to 100799999999
Designation	Serial no(s)

ALS-ME-GP-50LF-S3SD-S700-P550D3G
ALS-ME-GP-50LF-S3SD-S700-P600D3G
ALS-ME-GP-50LF-S3SD-S700-P650D3G
ALS-ME-GP-50LF-S3SD-S700-P700D3G
ALS-ME-GP-50LF-S3SD-S700-P750D3G
Type

is in conformity with the following directives with amendments:
- Machinery Directive 2006/42/EC
- RoHS Directive 2011/65/EU and amendments

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

Global Product Quality Manager		Lars Kruse Andersen
Title		Name
Kolding, Denmark	2022–12-06	
Place	Date (YYYY-MM-DD)	Signature

This Declaration of Conformity replaces Declaration of Conformity dated 2020-02-01

UK Declaration of Conformity

The Designated Company

Alfa Laval Kolding A/S, Albuen 31, DK-6000 Kolding, Denmark, +45 79 32 22 00
Company name, address and phone number

Hereby declare that

Agitator - EnSaFoil Designation	Serial number from AAC000000001 to AAC999999999 Serial number from 10.000 - 100.000 Serial number from 100700000001 to 100799999999 Serial no(s)

ALS-ME-GP-50LF-S3SD-S700-P550D3G
ALS-ME-GP-50LF-S3SD-S700-P600D3G
ALS-ME-GP-50LF-S3SD-S700-P650D3G
ALS-ME-GP-50LF-S3SD-S700-P700D3G
ALS-ME-GP-50LF-S3SD-S700-P750D3G
Type

is in conformity with the following directives with amendments:
- The Supply of Machinery (Safety) Regulations 2008
- The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

Signed on behalf of: Alfa Laval Kolding A/S

Global Product Quality Manager Title		Lars Kruse Andersen Name
Kolding, Denmark Place	2022–12-06 Date (YYYY-MM-DD)	 Signature

DoC Revision_01_122022

2 Safety

Unsafe practices and other important information are emphasised in this manual.
Warnings are emphasised by means of special signs.
Always read the manual before using the Agitator!
Illustrations are only to illustrate the problem and is NOT a drawing of the current Agitator!

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 Agitator!

NOTE
Indicates important information to simplify or clarify procedures.

The English version of the instruction manual is the original manual. We make reservations in regard to possible mistranslations in language versions of the instruction manual. In case of doubt, the English version of the instruction manual applies.

This Instruction manual is designed to provide the user with the information to perform tasks safely for all phases in the lifetime of the product supplied.

The user shall always read the safety section first. Hereafter the user can skip to the relevant section for the task to be carried out or for the information needed.

This is the complete manual for the supplied product.

2.2 Personnel skills

Operators
The operators shall read and understand the instruction manual for the supplied product.

Maintenance personnel
The maintenance personnel shall read and understand the instruction manual.
The maintenance personnel or technicians shall be skilled within the field required to carry out the maintenance work safely.

Trainees
Trainees can perform tasks under the supervision of an experienced employee.

People in general
The public shall not have access to the supplied product.

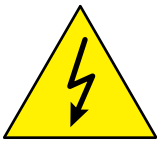
How to contact Alfa Laval
Contact details for all countries are
continually updated on our website.
Please visit www.alfalaval.com to access the information directly.

Unsafe practices and other important information are emphasised in this manual.
Warnings are emphasised by means of special signs.
Always read the manual before using the Agitator!
Illustrations are only to illustrate the problem and is NOT a drawing of the current Agitator!

2.3 Warning signs

General warning:

Dangerous electrical voltage:



2.4 Intended use

- The Alfa Laval Agitator is only for mixing/stirring of liquids in a tank.
- The Agitator is only for mounting positions as specified on the nameplate by the first group of letters of the type designation.

ALT(B)- is for top mounting, ALS- is for side mounting and ALB- is for bottom mounting.
The exact mounting angle is specified on the nameplate and must be followed. Definitions on mounting angles can be seen in section 6 Technical data.

- The different duties and operation data like pressure, speed and media temperature, which the Agitator is designed for, can be found in the Alfa Laval quotation agreement[1)] and may not be exceeded by all means.
- If the Agitator is installed in pressurized tanks local regulations and legislations must be met.

[1)] The Alfa Laval quotation agreement has been exchanged during the quote process between a technical purchaser and Alfa Laval. If you are not in hold of the Alfa Laval quotation agreement, please get through to your local Alfa Laval contact, inform the Agitator serial number and article number which is stated on the nameplate and you will obtain the Alfa Laval quotation agreement.

2 Safety

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

2.5 Safety precautions

GENERAL:
Always ensure that personnel must have experience with lifting operations.
Always ensure the lifting point to be in line with center of gravity. Adjust lifting point if necessary.
Always keep an eye on the load and stay clear during the lifting operation.
Always ensure that the lifting equipment is suitable for the specific supplied product.
Always use appropriate lifting equipment for heavy parts when relevant. Use lifting logs when available.

INSTALLATION:
Always read the technical data thoroughly (see sect6 Technical data).
Always follow installation instructions thoroughly (see section 3 Installation).
Never expose the Agitator to undue vibrations or shocks.
Never start Agitator in the wrong rotation direction.
Ensure that the tank media is not corrosive to the Agitator.
Only install the Agitator in environments within temperature limit: -20°C and +40°C.
Only install the Agitator in altitudes less than 1000 m above sea level.

Never touch the moving parts while the Agitator is connected to the power supply.

OPERATION:
Always read the technical data thoroughly (see section 6 Technical data).
Always read supplier instructions thoroughly (see section 8 Appendix).
Never start Agitator in the wrong rotation direction.
Always rinse well with clean water after cleaning.
Beware of temperature limitations.
Beware of Agitator in operation can produce sound levels in excess of 85dB(A).
Never operate continuously within 20% of critical oscillation speed (see section 6 Technical data).

Never touch the moving parts while the Agitator is connected to the power supply.

MAINTENANCE:
Always read the technical data thoroughly (see section 6 Technical data).
Always follow the maintenance instruction thoroughly (see section 5 Maintenance).
Always follow the maintenance instruction from drive unit supplier (see section 8 Appendix).
Always study the parts list and assembly drawing carefully (see section 7 Parts lists and service kits).

Never touch the moving parts while the Agitator is connected to the power supply.
Always disconnect the power supply while servicing the Agitator.

Ensure correct rotation direction of impeller before startup and after any maintains there might have impact on the direction.

TRANSPOR TATION:
Always transport the Agitator in original packaging.
Always support the shaft adequately, to protect shaft and bearings.
Never expose the Agitator to undue vibrations or shocks.
Control for oil leakage on gears with vent screw.

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

STORAGE:
Ideally, as a guide Alfa Laval recommend:

- Store supplied product as supplied in original packaging
- Port opening should be protected against any ingress
- Bare steel (not stainless) should be lightly oiled/greased
- Store in a clean, dry place without direct sunlight or UV light
- Rotate shaft every second week to ensure seal not seizing up
- Temperature range -5 to 40°C
- Relative humidity less than 60%
- No exposure to corrosive substances (also air contained).

3 Installation

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

3.1 Unpacking/delivery

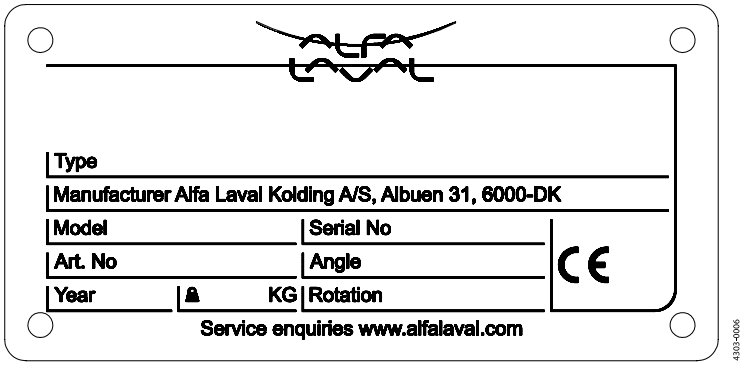
Always use lifting equipment when handling the Agitator (see Step 3 below).

CAUTION!
Alfa Laval cannot be held responsible for incorrect unpacking.

Step 1

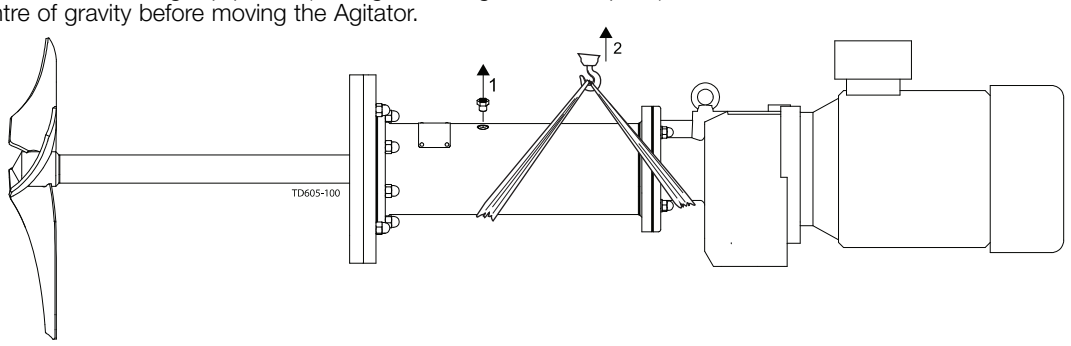
Inspect the delivery for visible transportation damages - all issues to be reported to carrier.

Step 2
Check the delivery for:
1. Complete Agitator
2. Nameplate designations
3. Delivery note
4. Separate instruction manuals from suppliers (see section 8 Appendix)

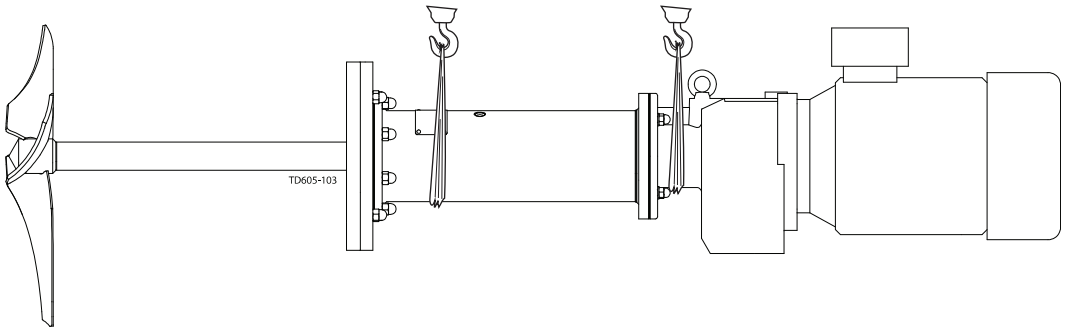


Step 3
Lifting instructions:

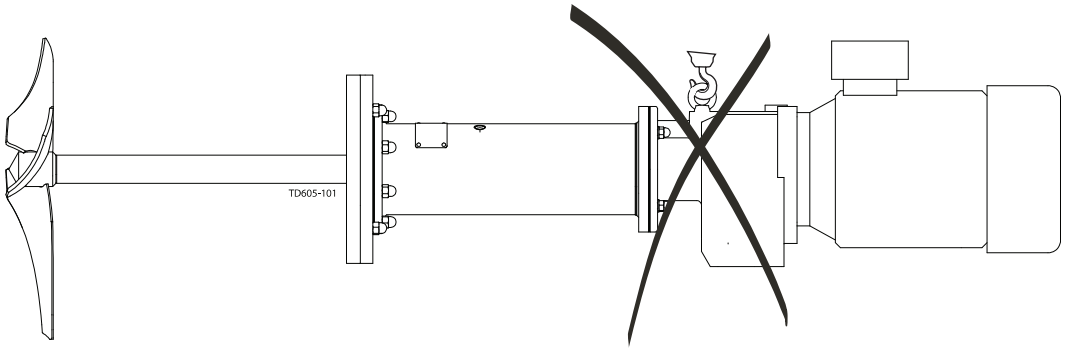
Always use the correct lifting equipment (see Agitator weight on nameplate).
Locate Centre of gravity before moving the Agitator.



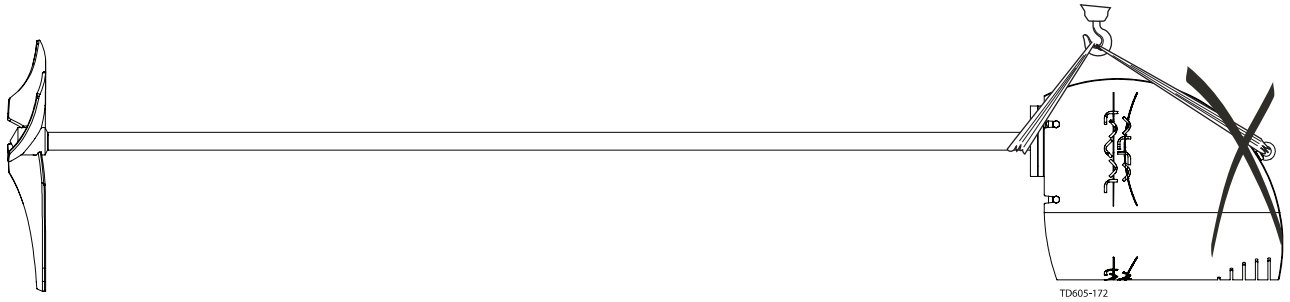
The instructions manual is part of the delivery.
Study the instructions carefully.



Do NOT use eye bolts on gear motor to lift the Agitator. They are only for gear motor removal.



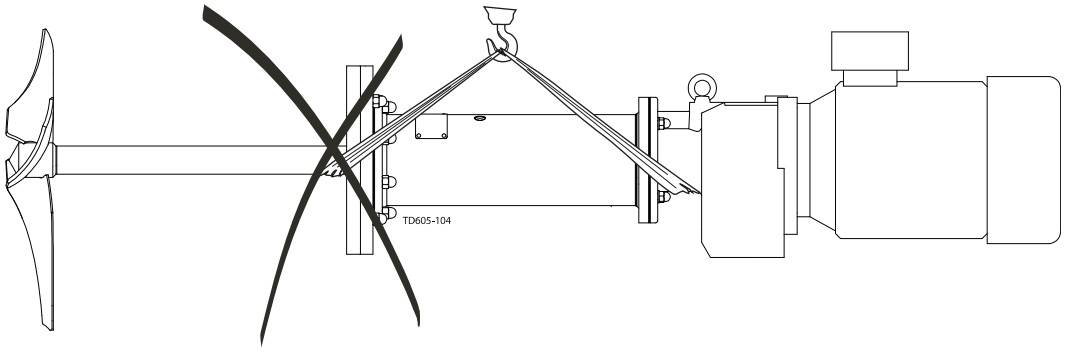
Do NOT use eye bolts on shroud (if any) to lift the Agitator. They are only for shroud removal.



3 Installation

Study the instructions carefully and pay special attention to the warnings!
Always check the Agitator before operation - see section 3.6 Pre-use check.
The Agitator is for permanent fastening.
Make sure that the motor correspond to the environment.

CAUTION!
Alfa Laval highly recommend **NOT** to use shaft as lifting point.



NOTE!
If possible, lift the Agitator in horizontal position, and in two points.

Step 4
During transportation

1. **Always** support the shaft adequately, to protect shaft and bearings.
2. **Never** expose the Agitator to undue vibrations or shocks.
3. Control for oil leakage on gears with vent screw.

3.2 Installation

Always read the technical data thoroughly (see section 6 Technical data).
Only install this Agitator in mounting angle according to the nameplate (see section 6 Technical data).
Always use lifting equipment when handling the Agitator (see Step 3 in section 3.1 Unpacking/delivery).
Always have safety elements removed by authorized personnel.
Never cover or remove the nameplate.

Never connect to power supply during installation or service.
Always have the Agitator connected to power supply by authorized personnel.

NOTE!
Alfa Laval highly recommend to install motor protection guard to protect the motor from overloading.
Never install a none Alfa Laval shroud on the Agitator as it can lead to overheat and a breakdown of the motor.

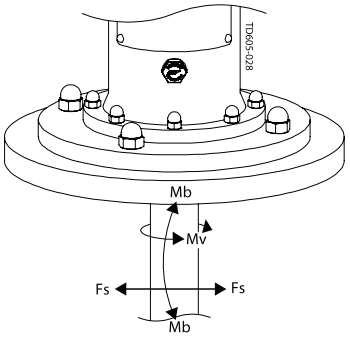
Study the instructions carefully and pay special attention to the warnings!
Always check the Agitator before operation - see section 3.6 Pre-use check.
The Agitator is for permanent fastening.
Make sure that the motor correspond to the environment.

Step 1
Ensure that the flange will accept forces applied by the drive unit.
Torque Mv, Bending torque Mb and Side thrust Fs.

The values are depending on the chosen configuration of impeller diameter, shaft length and the torque. The values can be calculated as follows:

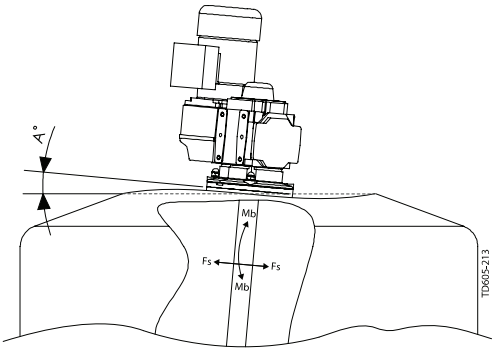
P: Power of the motor in [kW]
n: Speed of shaft in [RPM]
S: Shaft length according to Agitator type designation -Sxxxx- in [mm]
D: Impeller diameter according to Agitator designation -Pxxx- in [mm]

Mv [Nm] = 23873 x P / n
Fs [N] = 4.5 x Mv x 1000 / D
Mb [Nm] = Fs x S / 1000



Step 2
Ensure sufficient rigidity of the tank.
Ensure that the max. bending angle (A), at loads from Step 1 does not exceed according to below scheme

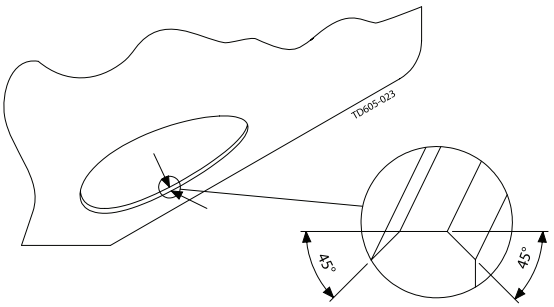
RPM:	<100	>100
A° (max bending angle at applied loads):	0.1	0.05



3.3 Guidelines for cutting hole in tank for Flat Shaped Welding Flange (FSWF)

CAUTION!
Alfa Laval recommend that all other welding tasks on the tank are finished before cutting the hole for the flange.

Chamfer inner and outer hole edge 45°.

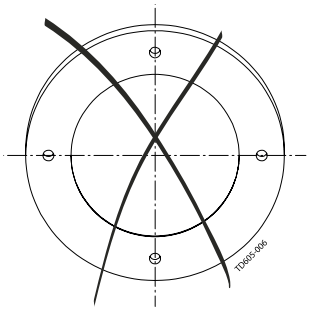


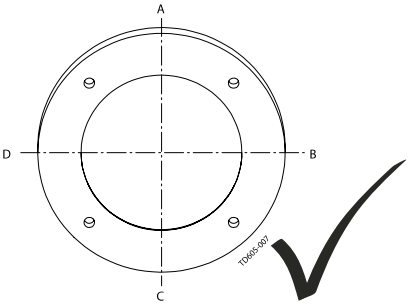
3 Installation

Study the instructions carefully and pay special attention to the warnings!
Always check the Agitator before operation - see section 3.6 Pre-use check.
The Agitator is for permanent fastening.
Make sure that the motor correspond to the environment.

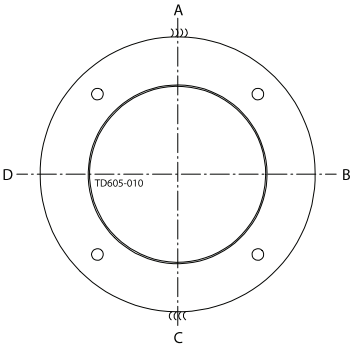
3.4 Guidelines for welding procedure for flange (FSWF)

Step 1
Always allow flange to cool to ambient temperature after each section has been welded.
Position the flange correctly.

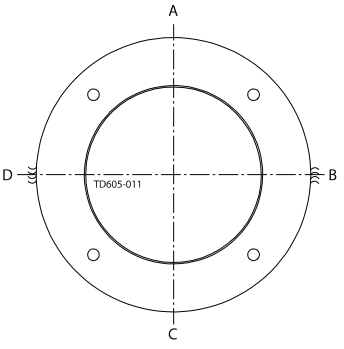




Step 2
Spot weld from outside.

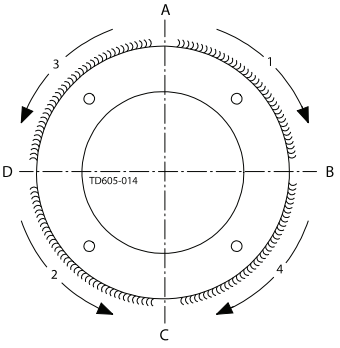


Adjust alignment!



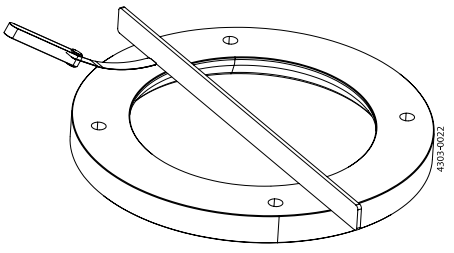
Step 3

Weld the following sections first from outside then from inside, and cool with air between each section.



Step 4

Ensure that the surface flatness tolerance equals 0,25 after welding.
Grind and polish the welding flange.
Use a solid straight ruler and a feeler gauge to determine the flatness.

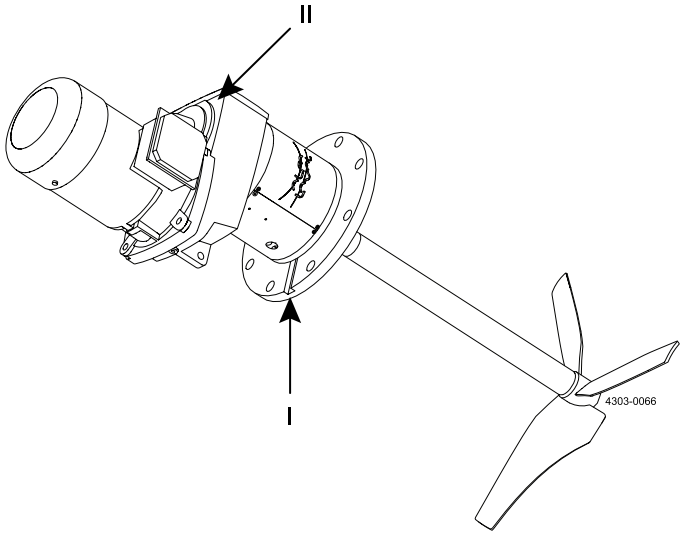


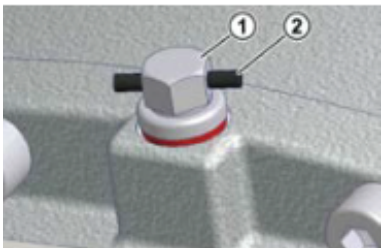
Study the instructions carefully and pay special attention to the warnings!
Always check the Agitator before operation - see section 3.6 Pre-use check.
The Agitator is for permanent fastening.
Make sure that the motor correspond to the environment.

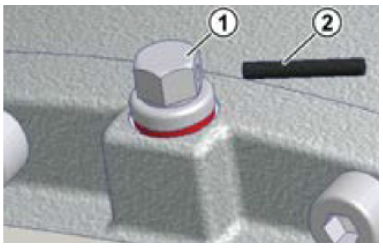
3.5 Mounting Agitator

CAUTION!
Always ensure that mounting is carried out according to description shown in section 6 Technical data.
Always refer to tightening torques in section 6.2 Tightening torques for bolt connections when tightening bolts.

Step 1
Place impeller device(s) in the tank.
Ensure that tank and Agitator surfaces are clean.
Ensure that drain (I) is pointing downwards.
For gears with vent screw, ensure the vent is pointing upwards and the rubber plug (II) is removed (see section 8.1 Drive unit instructions).







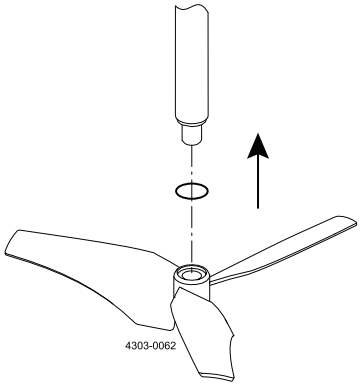
1) Standard vent plug
2) Transport securing device

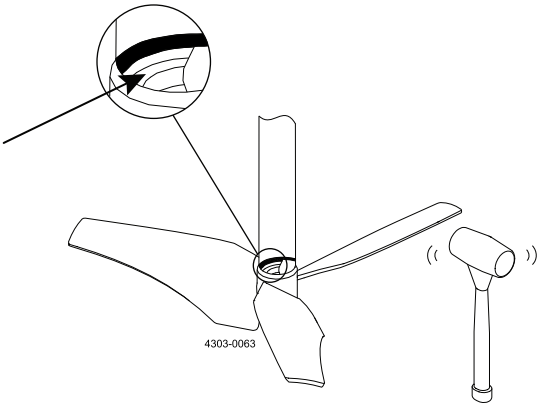
Step 2
Mount the Agitator onto the tank.

3 Installation

Study the instructions carefully and pay special attention to the warnings!
Always check the Agitator before operation - see section 3.6 Pre-use check.
The Agitator is for permanent fastening.
Make sure that the motor correspond to the environment.

Step 3
Mount impeller device onto shaft.



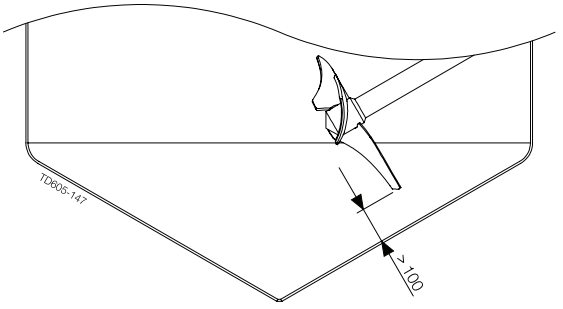


Step 4
Ensure the impeller device orientation is correct according to the direction of the desired flow. The direction is determined by the letter "D" or "U" in the last part of the Agitator type description. E.g. -P400D3P has the letter "D" which means the flow direction is away from the drive unit. -P400U3P has the letter "U" which means the flow direction is towards the drive unit.

Step 5

Ensure the impeller is positioned, keeping minimum radial distance to the tank.

Further installation requirements regarding the position can be found in section 6 Technical data to ensure optimum performance.



NOTE!
In special cases clearence can be reduce to 20mm+actual deflection, please advice with Alfa Laval.

Do **NOT** connect the power supply until installation is completed.

CAUTION!
Follow instructions in section 8.1 Drive unit instructions.
Ensure that the rotation direction is according to nameplate.
Always perform pre-use check before operation (see section 3.6 Pre-use check).

NOTE!
On closed tanks, Alfa Laval recommend installing a manhole circuit breaker, cutting power supply if hatch is open.

Study the instructions carefully and pay special attention to the warnings! Always check the Agitator before operation.
The Agitator is only designed to operate according to data given in section 6 Technical data
Check the rotation direction before operation.

3.6 Pre-use check

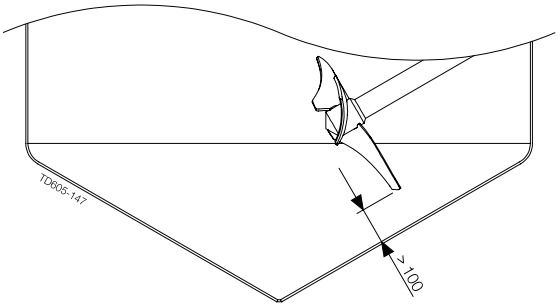
Never install the Agitator in environments which deviate from those given in section 6 Technical data.
Always ensure that all alignment specifications given in section 6 Technical data are followed.
Always make sure that the motor corresponds to the environment.

Step 1
Go through section 2.5 Safety precautions.

Step 2
Check the fastenings.

Step 3
Check O-ring and impeller are correctly fitted.

Step 4
Check impellers CANNOT collide with tank vessel at any point during a full rotation.

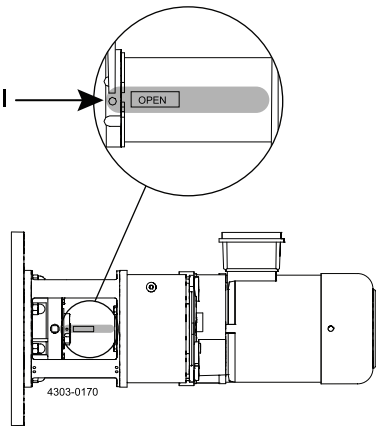


Step 5
Check that the pointed screw (I) is aligned with the marking "OPEN".

CAUTION
Pointed screw indicates if the device is OPEN (ready for operation) or CLOSED (ready for maintenance).

WARNING
DO NOT run the Agitator if pointed screw is aligned with the marking "CLOSED".

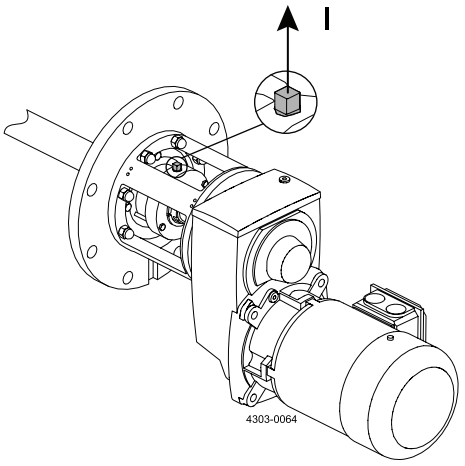
If the Agitator is closed, please follow Step 11 on page 34 to reopen the device.

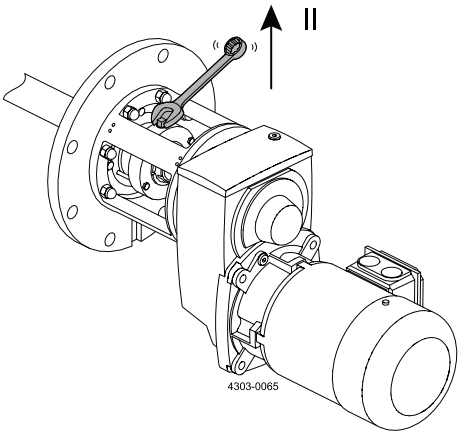


3 Installation

Study the instructions carefully and pay special attention to the warnings! Always check the Agitator before operation.
The Agitator is only designed to operate according to data given in section 6 Technical data
Check the rotation direction before operation.

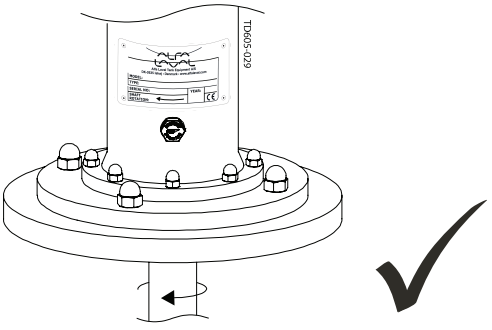
Step 6
Ensure the sealing surfaces are not stuck together, by slowly turning shaft by hand.
Ensure that the seal never runs dry.
Ensure hole and plug are facing upwards (I).
Ensure end plug is installed in such way that air pockets are avoided (II).

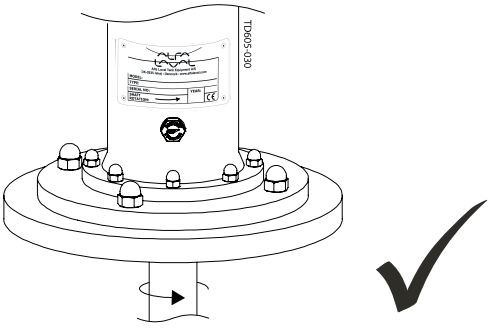




Step 7
When tank is filled for the first time with media - the end plug (aeration plug) must be opened to evacuate trapped air inside seal housing.

Step 8
Ensure that the rotation direction is according to nameplate before starting the Agitator.
Start and stop the Agitator momentarily.





Step 9
If frequency converter drive is used, it must be ensured NOT to operate continuously within +/-20% of critical oscillation speed. (The critical oscillation speed can be found in the supplied Alfa Laval quotation agreement. In case of any doubt, please advise with Alfa Laval).

Study the instructions carefully and pay special attention to the warnings! Always check the Agitator before operation.
The Agitator is only designed to operate according to data given in section 6 Technical data
Check the rotation direction before operation.

3.7 Recycling information

- **Unpacking**

- Packing material consists of wood, plastics, cardboard boxes and in some cases metal straps.
- Wood and cardboard boxes can be re-used, recycled or used for energy recovery.
- Plastics should be recycled or burnt at a licensed waste incineration plant.
- Metal straps should be sent for material recycling.

- **Maintenance**

- During maintenance, oil and wear parts in the machine are replaced.
- All metal parts should be sent for material recycling.
- Worn out or defective electronic parts should be sent to a licensed handler for material recycling.
- Oil and all non-metal wear parts must be disposed of in accordance with local regulations.

- **Scrapping**

- At the end of use, the equipment must be recycled according to the relevant, local regulations. Besides the equipment itself, any hazardous residues from the process liquid must be considered and dealt with in a proper manner. When in doubt, or in the absence of local regulations, please contact your local Alfa Laval sales company.

4 Operation

Study the instructions carefully and pay special attention to warnings! ***Always*** *check the Agitator before operation (see section 3.6 Pre-use check).*
Alfa Laval recommend a soft starter or a frequency converter for the Agitator to reduce the load on tank and Agitator. For operation instructions from suppliers see section 8 Appendix.

4.1 Operation/Control

If deviation from normal operation and intended use shown in section 2.4 Intended use, immediately switch off the Agitator and find the cause of failure (see section 4.2 Troubleshooting).
The Agitator is designed to max 5 starts per hour.
The Agitator is normally constructed for use with the lower impeller adequately submerged in the liquid. However, the Agitator can be dimensioned for use while emptying the tank completely (see section 2.4 Intended use).

Inspect the Agitator regularly

	Inspect / Clean / Lubricate			
	Supplier instruction	Weekly	Monthly	Half-yearly
Drive unit				
Motor	x			
- Clean surfaces - to avoid overheating		x		
Gear	x			
- Clean vent screw (if any)		x		
- Check for oil leakage		x		
Flange				
Clean drain			x	
Sealing				
Mechanical seal				
- S3SD			x	
Impeller device				
Sticky media				
- Clean impeller device			x	
Abrasive media				
- Check blade thickness*			x	
- Check fastening of pointed set screws			x	

** If any suspicion of reduction in blade thickness, contact Alfa Laval and inform serial no. stated on the nameplate.*

Study the instructions carefully and pay special attention to warnings! ***Always*** *check the Agitator before operation (see section 3.6 Pre-use check).*
Alfa Laval recommend a soft starter or a frequency converter for the Agitator to reduce the load on tank and Agitator. For operation instructions from suppliers see section 8 Appendix.

4.2 Troubleshooting

Problem	Cause/r esult	Remedy
Not starting		
Drive unit	- Defect - Fault at power supply	Dismantle drive unit, check for correct rotation. Replace drive unit Check power supply connection Check voltage and frequency correspond with nameplate Check frequency converter adjustment correspond to nameplate
Agitator	- Obstructed	Check Agitator can rotate freely without striking anything
Vibrations		
Impeller device	- Damaged - Unbalanced impeller - Damage to shaft seal	Contact Alfa Laval Clean impeller device Replace sealing
Shaft	- Damaged	Contact Alfa Laval
Other	- Deviation from normal operation - Increased / decreased temperature	Operation circumstances must equal to those it was designed for [1)]
Unusual noise		
Drive unit	- Defect - Bearing gap - Increased / decreased power - No grease	Replace drive unit Renovate or change the drive unit immediately Switch of power supply Replace drive unit
Sealing	- Wear sealing - Seal surfaces stick together	Replace sealing Separate surfaces carefully and clean them - ensure that seals are sufficient cleaned before still stand
Other	- Deviation from normal operation - Circuit overload	Operation circumstances must be equal to those it was designed for [1)] Operation circumstances must be equal to those it was designed for [1)]
Leakage		
Gear	- Oil leakage	Renovate or change the gear immediately
Sealing	- CIP fluid or other	Replace sealing
Continuously breakdown		
Drive unit	- Defect - Too high frequency	Replace motor Regulate frequency down
Other	- Deviation from normal operation	Operation circumstances must be equal to those it was designed for [1)]
Performance		
Drive unit Agitator Other	- Wrong frequency - Reverse direction - Deviation from normal operation	Check frequency connection Inspect the Agitator carefully Operation circumstances must be equal to those it was designed for [1)]

[1)] See section 2.4 Intended use.

4 Operation

Study the instructions carefully and pay special attention to warnings! ***Always*** *check the Agitator before operation (see section 3.6 Pre-use check).*
Alfa Laval recommend a soft starter or a frequency converter for the Agitator to reduce the load on tank and Agitator. For operation instructions from suppliers see section 8 Appendix.

4.3 Cleaning - recommendations

Ensure the drain in flange is not clogged up, by cleaning drain regularly.

Ensure that all surfaces in contact with product are totally clean in order not to contaminate the product.
Pay special attention to:
- Impeller device surfaces
- Surfaces between impeller devices and shaft
- Surfaces around sealing
- Surfaces around weldings

CAUTION!
Mechanical seals are designed for cleaning in place (CIP) and sterilising in place (SIP).

Always rinse well with clean water after cleaning.

4.4 Temperature limits

The highest allowable ambient temperature is 40ºC.

For applications without bearing frame (not ATEX):
The highest allowable continuous temperature of the SHAFT that goes into the gear motor is 105°C. Shorter periods with higher application temperatures, eg. 10-20 minutes during a sterilization phase or the like, can be allowed and accepted without changing the oil service interval and without reducing the lifetime of the gear motor.
If longer periods with exceeded application temperatures are required, the actual temperature of the oil in the gear motor must be measured. The highest allowable oil temperature is 140°C and the oil service interval, which at 70°C is about 40.000 hours, will be reduced by 50% for each 15K the oil temperature is increased above the 70°C.

Read the instructions carefully. ***The items refer to the parts lists in section 7.3 and service kit section****.*
For maintenance instructions from suppliers, see section 8 Appendix. ***Always*** *ensure that mounting is according to section 6 Technical data. Ensure totally clean surfaces during mounting - also remove remaining Loctite residue on threads.*
Always *refer to tightening torques in section 6.2 Tightening torques for bolt connections.*

5.1 General maintenance

Maintenance of the Agitator should only be performed by authorized personnel.
For maintenance instructions from suppliers, see section 8 Appendix.
Ensure totally clean surfaces during maintenance.

If possible, **always** dismount the Agitator from tank before dismantling it.
For lifting instruction, please refer to section 3 Installation.

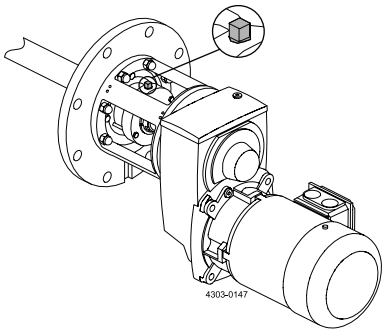
Always read the technical data thoroughly (see section 6 Technical data).
Always ensure that the mounting is according to Agitator described in section 2.4 Intended use and section 6 Technical data.
Always refer to tightening torques in section 6.2 Tightening torques for bolt connections.
Always disconnect the power supply when servicing the Agitator.
Always use proper tools.
Always replace sealing elements before reassembling.

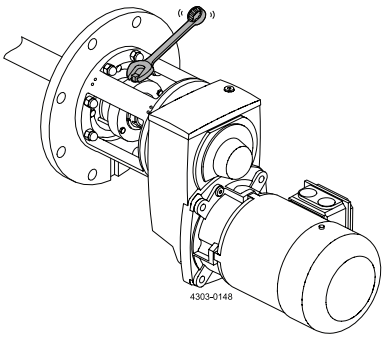
Follow the dismantling and assembly instructions to the letter.
After maintenance, section 3.6 Pre-use check must be read thoroughly before operation.

NOTE!
All scrap must be stored/disposed of in accordance with current rules/directives.
Use original Alfa Laval spare parts.

	Replace every:				
	500 hour or yearly	1000 hour or yearly	3000 hour or yearly	3000 hour or every 3rd year	6000 hour or every 3rd year
Sealing					
Mechanical seal					
- S3SD				X	

Media perishability
Alfa Laval recommend to use the end plug (aeration plug) to get fresh media inside the seal housing while operating.
Loosen the plug and let the media drain down.
Refreshing is carried out as required and depends on the media inside the tank. The volume of the media inside the seal housing is approx. 0,1 L.





5 Maintenance

Read the instructions carefully. ***The items refer to the parts lists in section 7.3 and service kit section****.*
For maintenance instructions from suppliers, see section 8 Appendix. ***Always*** *ensure that mounting is according to section 6 Technical data. Ensure totally clean surfaces during mounting - also remove remaining Loctite residue on threads.*
Always *refer to tightening torques in section 6.2 Tightening torques for bolt connections.*

Safety check
A visual inspection of any protective device (shield, guard, cover or other) on the supplied product shall be carried out at least every 12 months.
If the protective device is lost or damaged, especially when this leads to deterioration of safety performance, it shall be replaced.
The fixing of the protective device should only be replaced with fixings of the same or an equivalent type.

Inspection acceptance criteria:

- It should not be possible to reach moving parts originally protected by a protective device.
- The protective device must be securely mounted.
- Ensure that screws for the protective device are securely tightened.

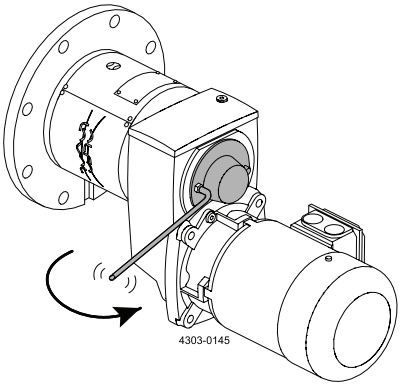
Procedure in case of non-acceptance:

- Fix and/or replace the protective device.

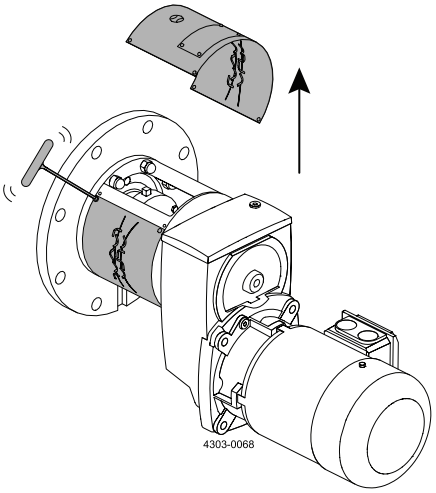
Read the instructions carefully. ***The items refer to the parts lists in section 7.3 and service kit section****.*
For maintenance instructions from suppliers, see section 8 Appendix. ***Always*** *ensure that mounting is according to section 6 Technical data. Ensure totally clean surfaces during mounting - also remove remaining Loctite residue on threads.*
Always *refer to tightening torques in section 6.2 Tightening torques for bolt connections.*

5.2 Replacement of drive unit

Step 1
Ensure motor is turned off.
Remove cover from gear.

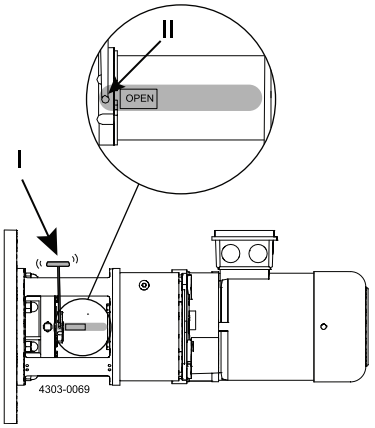


Step 2
Remove guards from lantern.



Step 3
Loosen pointed screw (I).

CAUTION!
Marking on the shaft indicate that the shut down device is open when the OPEN-marking is aligned with the pointed screw (II).



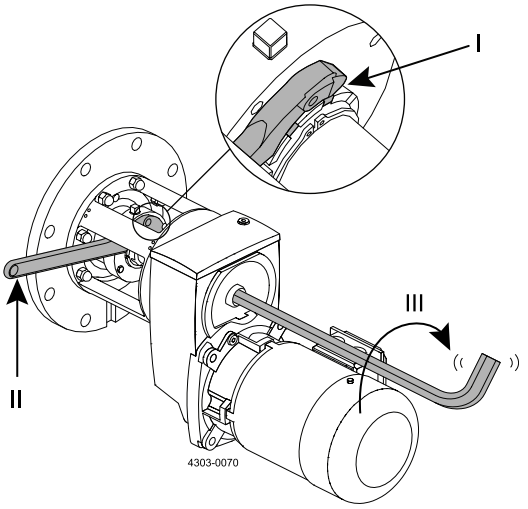
5 Maintenance

Read the instructions carefully. ***The items refer to the parts lists in section 7.3 and service kit section****.*
For maintenance instructions from suppliers, see section 8 Appendix. ***Always*** *ensure that mounting is according to section 6 Technical data. Ensure totally clean surfaces during mounting - also remove remaining Loctite residue on threads.*
Always *refer to tightening torques in section 6.2 Tightening torques for bolt connections.*

Step 4
Activate shut-down device.

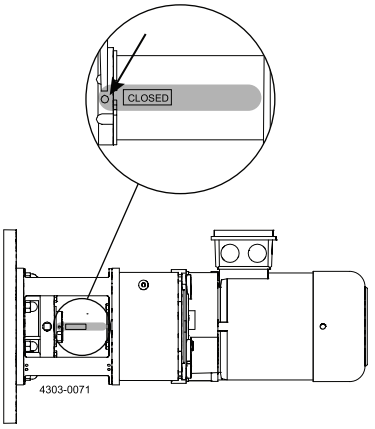
1. Place the tool, hook wrench with pin on the sleeve-device – and **NOT** on the pin-holes on the shaft (I)!
2. Hold or clamp the tool (II) to the lantern edge and rotate the shaft **clockwise** from the gear (III).

NOTE!
Rotate until it stops. The device is shut-down after approx. 5-6 rotations.



Step 5
The seal parts are isolated from the tank when the sleeve part is turned around until it stops.

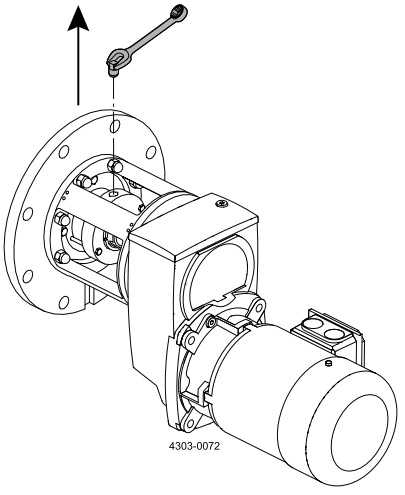
NOTE!
Access to the tank is shut-down when the pointed-screw hole is aligned with the CLOSED-marking.



Step 6
Loosen the special plug (1).
The items position number (1) refers to the part list in section 7.3 Shaft seal, type S3SD.

NOTE!
A small amount of media will drain out.

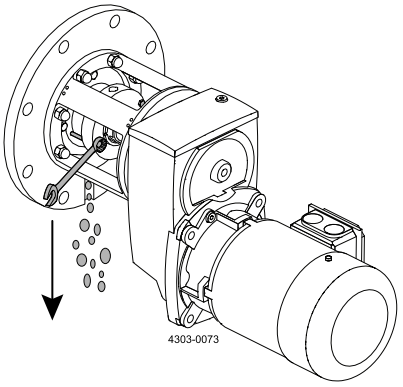
CAUTION!
If the media continues to drain, then the shut-down device is not activated, please repeat from step 4.



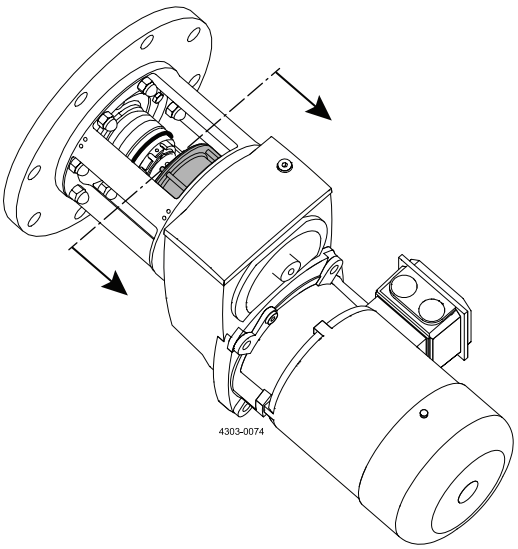
Read the instructions carefully. ***The items refer to the parts lists in section 7.3 and service kit section****.*
For maintenance instructions from suppliers, see section 8 Appendix. ***Always*** *ensure that mounting is according to section 6 Technical data. Ensure totally clean surfaces during mounting - also remove remaining Loctite residue on threads.*
Always *refer to tightening torques in section 6.2 Tightening torques for bolt connections.*

Step 7
Loosen screws on the seal housing (8).

NOTE!
The media in the seal housing will drain down.

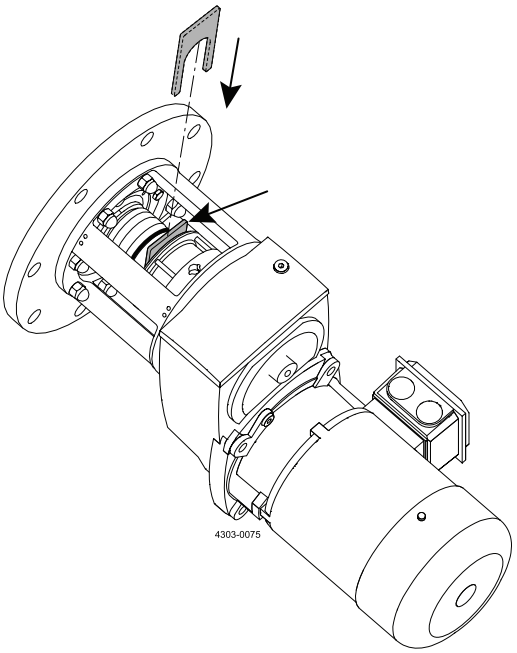


Step 8
Lift seal housing (7) and O-ring (11) carefully up.



Step 9
Insert the flat tool between the circlip (5) on the shaft and the lifted seal housing (7).

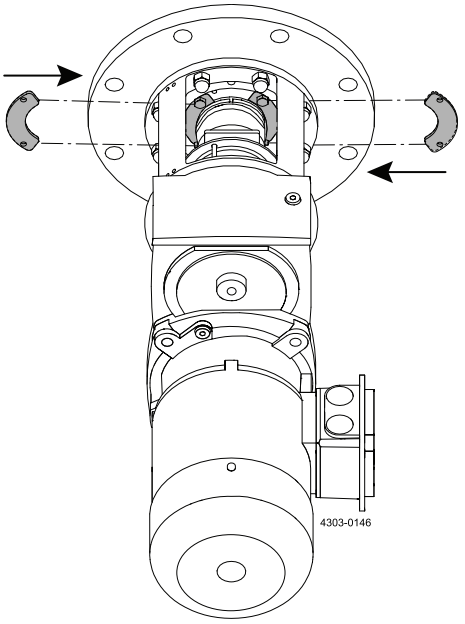
NOTE!
Even if the device is shut-down it may drain a small amount of media out because of the gap to the sealing point.



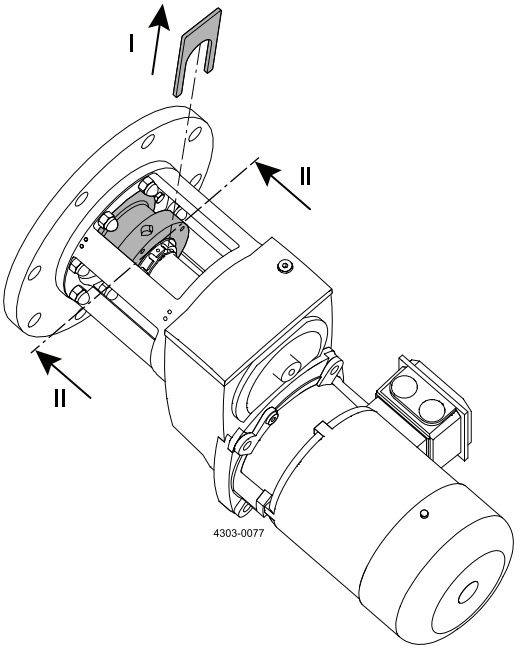
Read the instructions carefully. ***The items refer to the parts lists in section 7.3 and service kit section****.*
For maintenance instructions from suppliers, see section 8 Appendix. ***Always*** *ensure that mounting is according to section 6 Technical data. Ensure totally clean surfaces during mounting - also remove remaining Loctite residue on threads.*
Always *refer to tightening torques in section 6.2 Tightening torques for bolt connections.*

Step 10
Mount the retainer tool.

CAUTION!
DO NOT remove the retainer tools throughout the service!



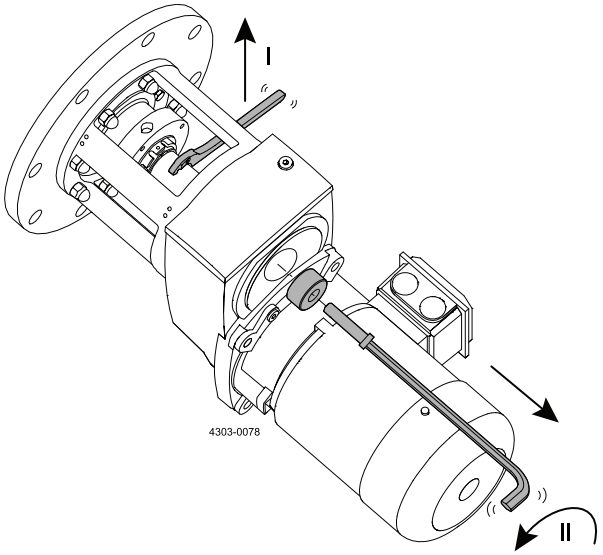
Step 11
Remove flat tool (I) and move the seal housing carefully back (II) on the retainer tools.



Read the instructions carefully. ***The items refer to the parts lists in section 7.3 and service kit section****.*
For maintenance instructions from suppliers, see section 8 Appendix. ***Always*** *ensure that mounting is according to section 6 Technical data. Ensure totally clean surfaces during mounting - also remove remaining Loctite residue on threads.*
Always *refer to tightening torques in section 6.2 Tightening torques for bolt connections.*

Step 12
Loosen shaft from the gear motor.

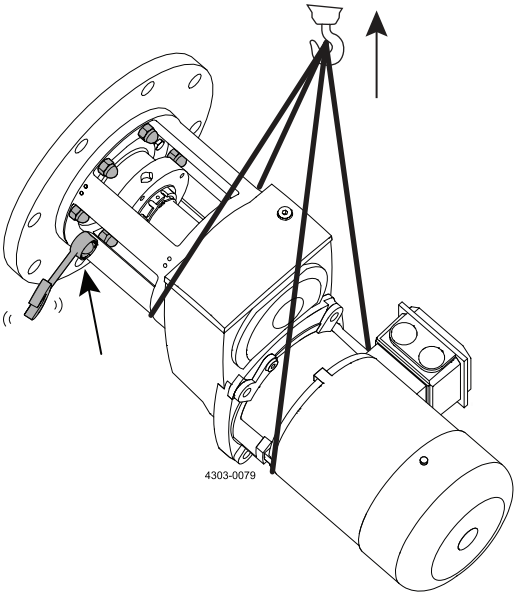
1. Place the tool, hook wrench with pin, on the pin-holes on the shaft.
2. Lock the shaft by holding with hand or support the tool (I) to the lantern edge.
3. Turn the screw **counter clockwise** to loosen the shaft from the gear motor (II).



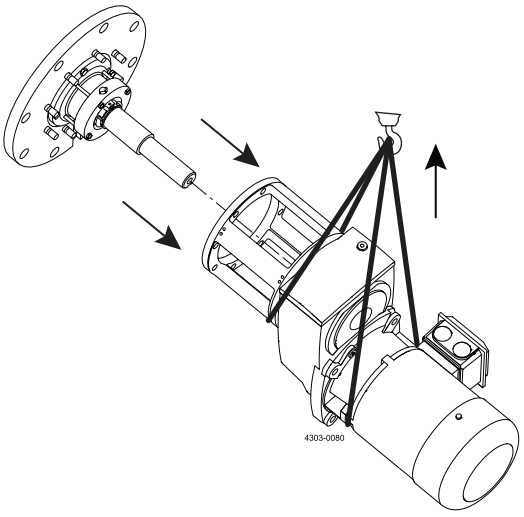
Step 13
Dismantle lantern and gear motor.

1. Locate centre of gravity between lantern and gear motor.
2. Loosen cap nuts.

CAUTION!
Always use the correct lifting equipment.



Step 14
Lift up the lantern and gear motor and pull it carefully away.



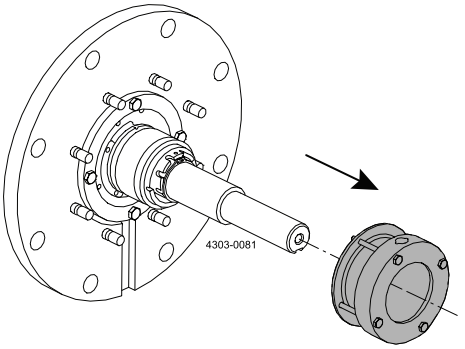
5 Maintenance

Read the instructions carefully. ***The items refer to the parts lists in section 7.3 and service kit section****.*
For maintenance instructions from suppliers, see section 8 Appendix. ***Always*** *ensure that mounting is according to section 6 Technical data. Ensure totally clean surfaces during mounting - also remove remaining Loctite residue on threads.*
Always *refer to tightening torques in section 6.2 Tightening torques for bolt connections.*

Step 15
Remove seal housing (7) carefully, avoiding contact.
Remove O-ring (11).

CAUTION!
DO NOT remove the retainer tools throughout the service!

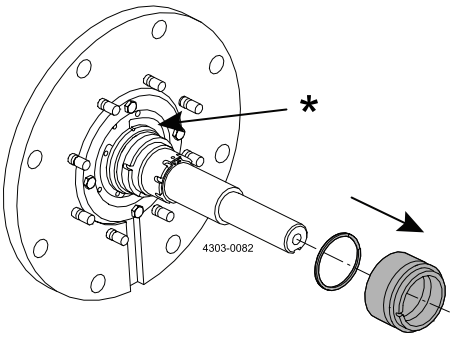
Clean all surfaces.



Step 16
Remove rotary seal part (3d) and spring (3c) carefully.

CAUTION!
***DO NOT** remove the retainer tools throughout the service!

Clean all surfaces.



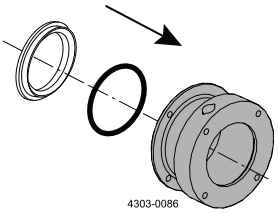
Read the instructions carefully. ***The items refer to the parts lists in section 7.3 and service kit section****.*
For maintenance instructions from suppliers, see section 8 Appendix. ***Always*** *ensure that mounting is according to section 6 Technical data. Ensure totally clean surfaces during mounting - also remove remaining Loctite residue on threads.*
Always *refer to tightening torques in section 6.2 Tightening torques for bolt connections.*

5.3 Replacement of shaft seal, type S3SD

Step 1
Dismantle Agitator as described in section 5.2 Replacement of drive unit.

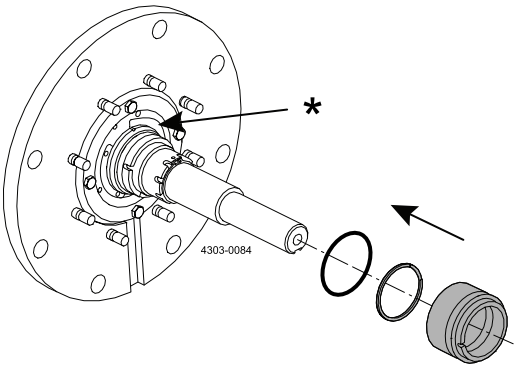
Step 2
Carefully remove the stationary seal ring (3b) and the O-ring (3a) in the seal housing (7) and replace with new.

NOTE!
Ensure all seal surfaces are totally clean, using alcohol.



Step 3
Mount the new rotary seal (3c, 3d, 3e) part carefully on the shaft, avoiding contact.

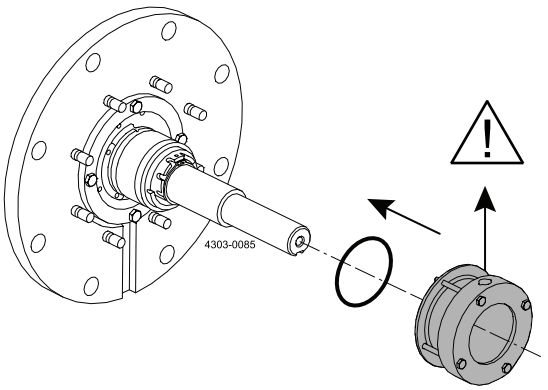
NOTE!
Ensure all seal surfaces are totally clean, using alcohol.
***DO NOT** remove the retainer tools throughout the service!



Step 4
Place new O-ring (11) and seal housing (7) carefully on the shaft.

CAUTION!
Ensure air vent hole is facing upward.

CAUTION!
DO NOT remove the retainer tools throughout the service.



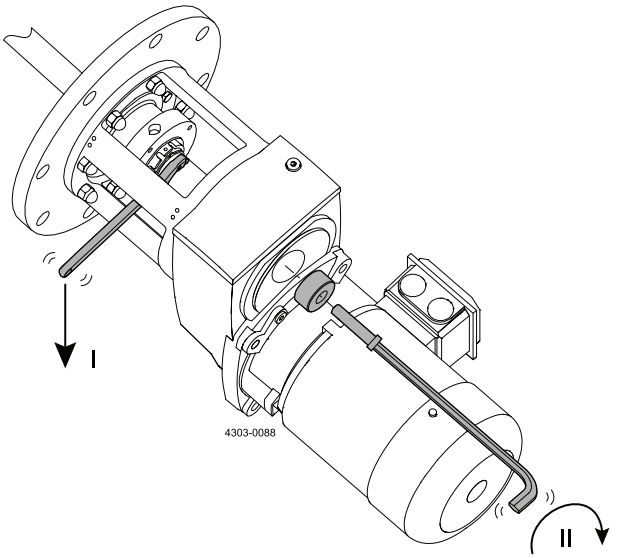
Step 5
Replace lantern and gear motor.
Mount cap nuts
Loosen the gear motor from the lifting equipment.

Tool: Wrench key 19mm

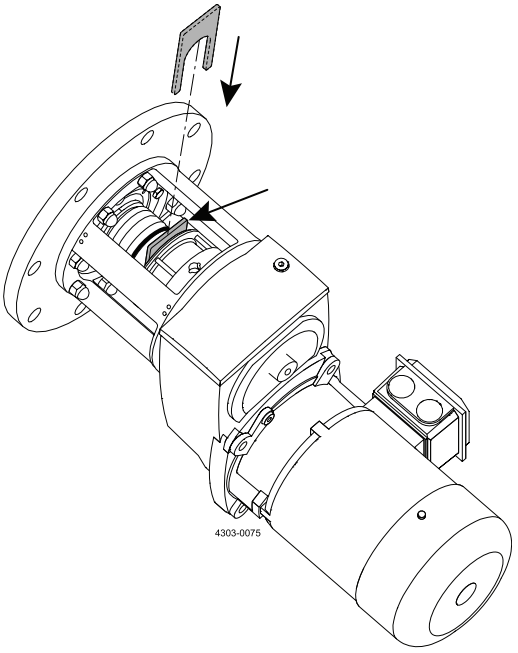
5 Maintenance

Read the instructions carefully. ***The items refer to the parts lists in section 7.3 and service kit section****.*
For maintenance instructions from suppliers, see section 8 Appendix. ***Always*** *ensure that mounting is according to section 6 Technical data. Ensure totally clean surfaces during mounting - also remove remaining Loctite residue on threads.*
Always *refer to tightening torques in section 6.2 Tightening torques for bolt connections.*

Step 6
Lock the shaft with the hook wrench (I) while mounting the fastening element and screw (II).

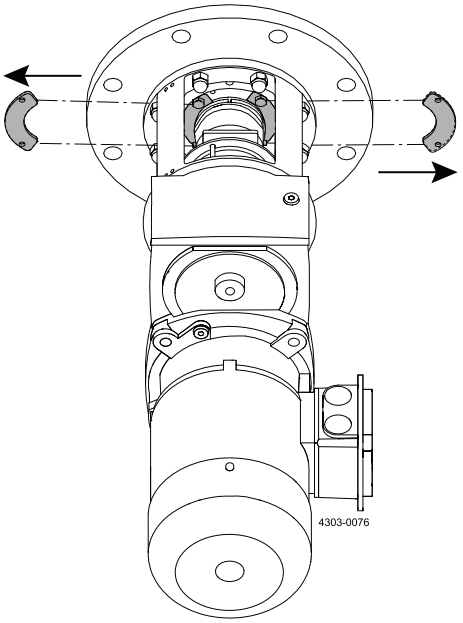


Step 7
Lift seal housing (7) and insert the flat tool on the shaft.



Read the instructions carefully. ***The items refer to the parts lists in section 7.3 and service kit section****.*
For maintenance instructions from suppliers, see section 8 Appendix. ***Always*** *ensure that mounting is according to section 6 Technical data. Ensure totally clean surfaces during mounting - also remove remaining Loctite residue on threads.*
Always *refer to tightening torques in section 6.2 Tightening torques for bolt connections.*

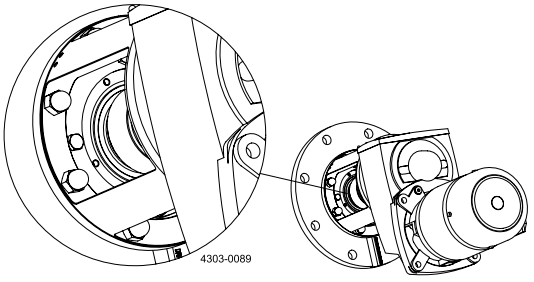
Step 8
Dismount the retainer tools.



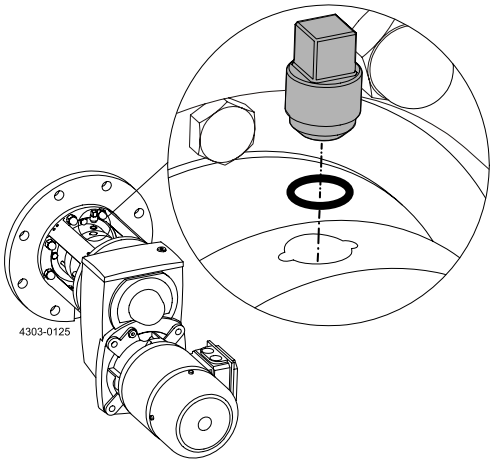
Step 9
Ensure new O-ring (11) is in the groove.

Remove the flat tool and move seal housing (7) carefully back.
Mount the seal housing (7).

NOTE!
Ensure air vent hole is facing upward.



Step 10
Place the O-ring (2) and the end plug (1) - but do not fasten it!



5 Maintenance

Read the instructions carefully. ***The items refer to the parts lists in section 7.3 and service kit section****.*
For maintenance instructions from suppliers, see section 8 Appendix. ***Always*** *ensure that mounting is according to section 6 Technical data. Ensure totally clean surfaces during mounting - also remove remaining Loctite residue on threads.*
Always *refer to tightening torques in section 6.2 Tightening torques for bolt connections.*

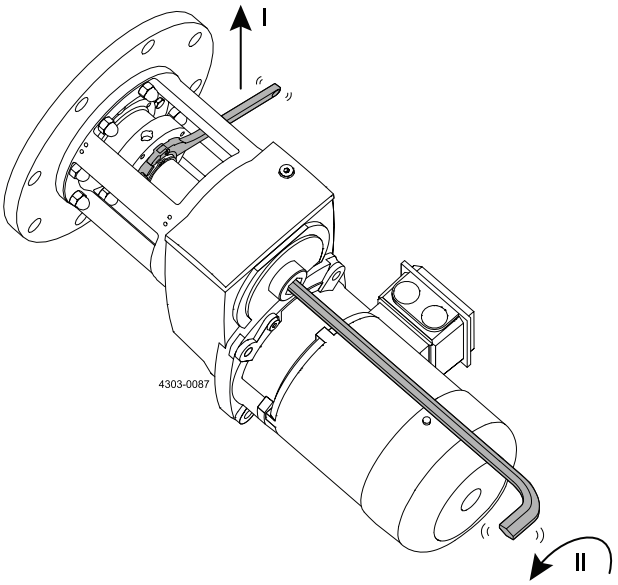
Step 11
Opening the shut-down device

Place the hook wrench tool on the sleeve device (I) and rotate the shaft (II).

CAUTION!
Media from the tank is flowing into the seal housing. Ensure seal housing is filled with media - avoid air pockets before completely mounting the end plug.

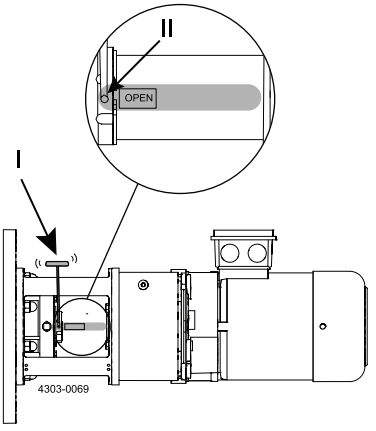
Continue to rotate till stop (until the device is fully open).

NOTE!
The device is fully open after approx. 5-6 full rotations.



Step 12
Mount pointed screw (6) (I).

NOTE!
Hole for pointed screw should be aligned with the marking “OPEN” (II).



Step 13
Clean all surfaces.

Start the motor.

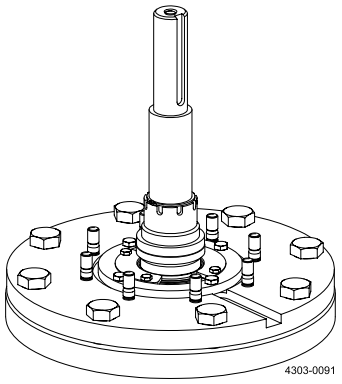
Mount the guards on lantern.

Mount cover on gear motor.

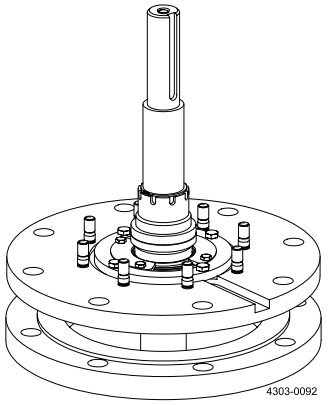
Read the instructions carefully. ***The items refer to the parts lists in section 7.3 and service kit section****.*
For maintenance instructions from suppliers, see section 8 Appendix. ***Always*** *ensure that mounting is according to section 6 Technical data. Ensure totally clean surfaces during mounting - also remove remaining Loctite residue on threads.*
Always *refer to tightening torques in section 6.2 Tightening torques for bolt connections.*

5.4 Replacement of sealing parts, complete

Step 1
Dismantle Agitator as described in section 5.2 Replacement of drive unit.

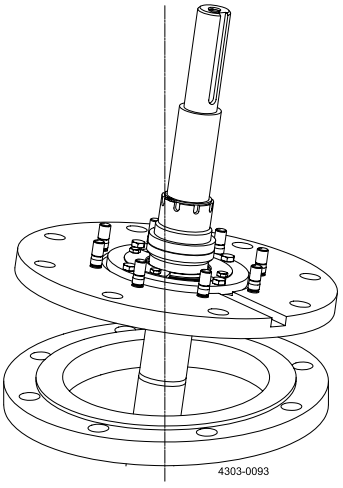


Step 2
Dismantle Agitator from welding flange.



Step 3
Lift up Agitator from welding flange and place it off-center from hole.

NOTE!
Protect the shaft against edge of tank.



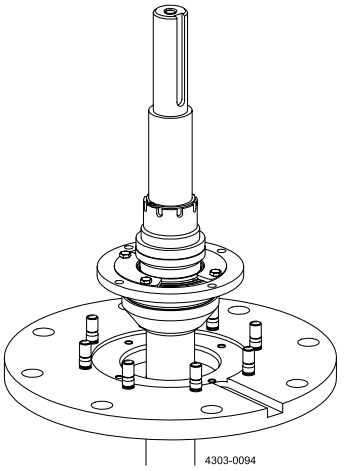
Step 4
Dismantle impeller device from shaft.

Step 5
Remove Agitator from tank.

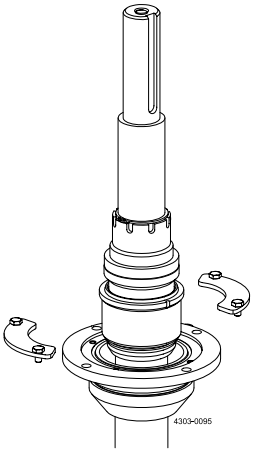
5 Maintenance

Read the instructions carefully. ***The items refer to the parts lists in section 7.3 and service kit section****.*
For maintenance instructions from suppliers, see section 8 Appendix. ***Always*** *ensure that mounting is according to section 6 Technical data. Ensure totally clean surfaces during mounting - also remove remaining Loctite residue on threads.*
Always *refer to tightening torques in section 6.2 Tightening torques for bolt connections.*

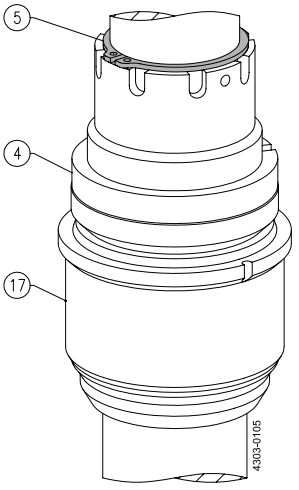
Step 6
Remove screws and dismantle the mounting flange.



Step 7
Remove retainer tools and dismantle supporting flange.

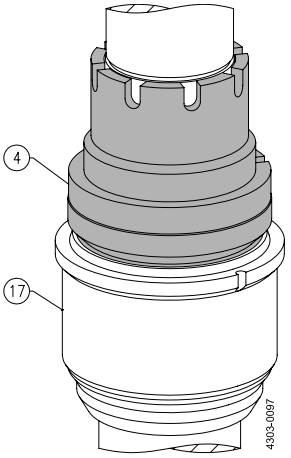


Step 8
Remove circlip (5) carefully. Use suited pliers.

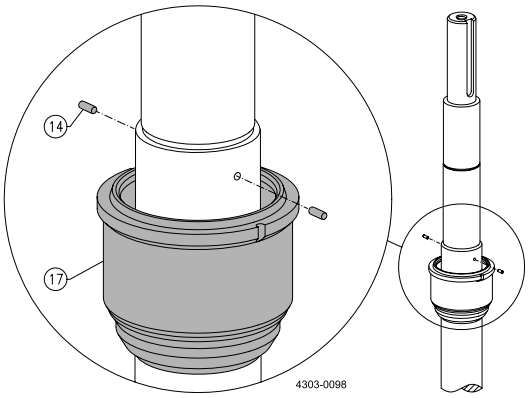


Read the instructions carefully. ***The items refer to the parts lists in section 7.3 and service kit section****.*
For maintenance instructions from suppliers, see section 8 Appendix. ***Always*** *ensure that mounting is according to section 6 Technical data. Ensure totally clean surfaces during mounting - also remove remaining Loctite residue on threads.*
Always *refer to tightening torques in section 6.2 Tightening torques for bolt connections.*

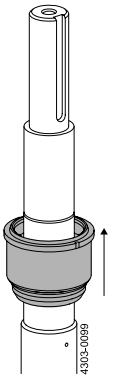
Step 9
Loosen sleeve inner (4) part.



Step 10
Push the sleeve outer part (17) down.
Remove the pins (14).



Step 11
Move the sleeve outer part (17) along the shaft.

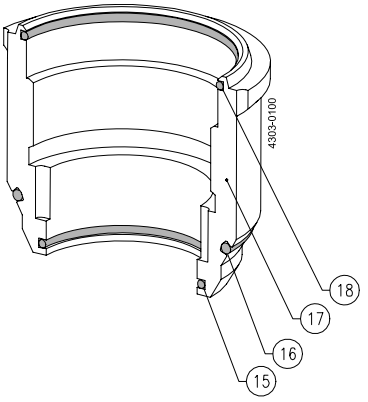


5 Maintenance

Read the instructions carefully. ***The items refer to the parts lists in section 7.3 and service kit section****.*
For maintenance instructions from suppliers, see section 8 Appendix. ***Always*** *ensure that mounting is according to section 6 Technical data. Ensure totally clean surfaces during mounting - also remove remaining Loctite residue on threads.*
Always *refer to tightening torques in section 6.2 Tightening torques for bolt connections.*

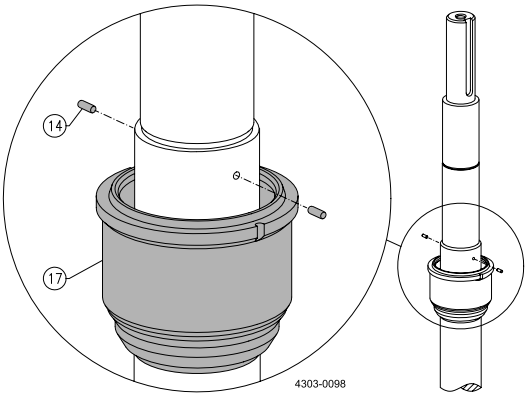
NOTE!
Ensure totally clean surfaces during seal replacement.
Lubricate the O-rings with FDA approved grease.

Step 12
Replace O-rings (15, 16, 18).



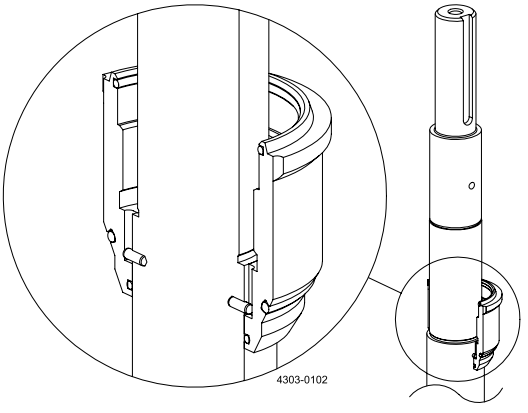
Step 13
Move sleeve outer part (17) below the holes for pins.

Place the pins (14) in the holes.



Step 14
Pull sleeve outer part up so the pins are in the grooves.

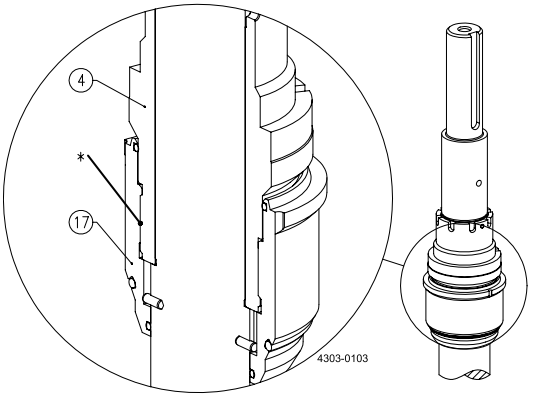
CAUTION!
Groove and pin must be aligned. The pins must be located in grooves.



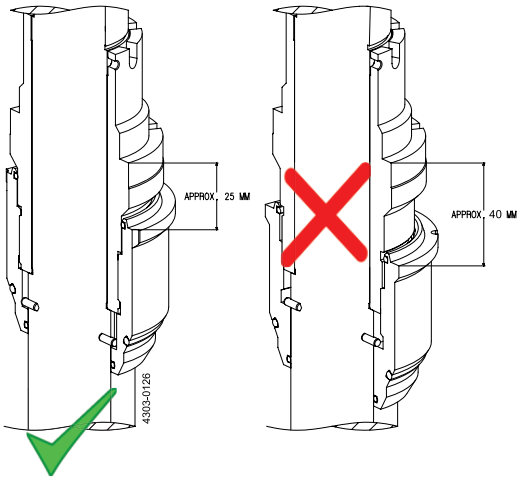
Read the instructions carefully. ***The items refer to the parts lists in section 7.3 and service kit section****.*
For maintenance instructions from suppliers, see section 8 Appendix. ***Always*** *ensure that mounting is according to section 6 Technical data. Ensure totally clean surfaces during mounting - also remove remaining Loctite residue on threads.*
Always *refer to tightening torques in section 6.2 Tightening torques for bolt connections.*

Step 15
Lubricate inner surface and thread with grease (*) on sleeve inner part (4).

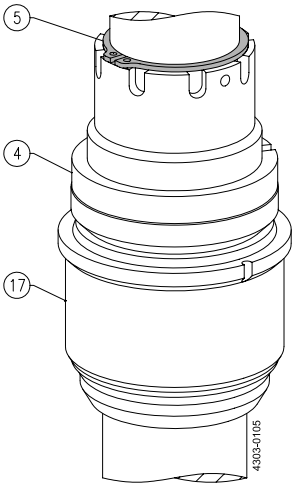
Move sleeve inner part (4) along shaft and screw it down into the sleeve outer part (17) while pulling it (17) upwards against (4) ensuring that the pins stays inside the grooves.



Step 16
Measure check - ensure pins are inside the grooves.



Step 17
Replace carefully circlip (5).
Use suited pliers.

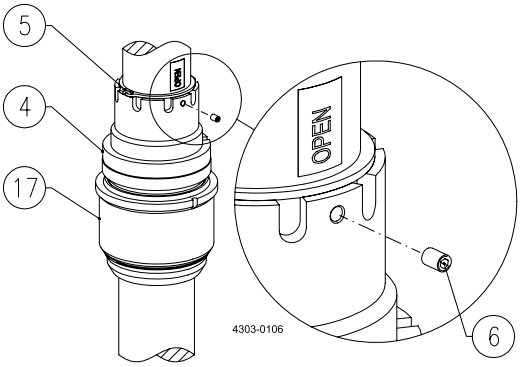


5 Maintenance

Read the instructions carefully. ***The items refer to the parts lists in section 7.3 and service kit section****.*
For maintenance instructions from suppliers, see section 8 Appendix. ***Always*** *ensure that mounting is according to section 6 Technical data. Ensure totally clean surfaces during mounting - also remove remaining Loctite residue on threads.*
Always *refer to tightening torques in section 6.2 Tightening torques for bolt connections.*

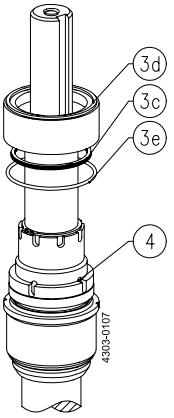
Step 18
Mount pointed screw (6).

NOTE!
Pointed screw should be aligned with the marking “OPEN”.



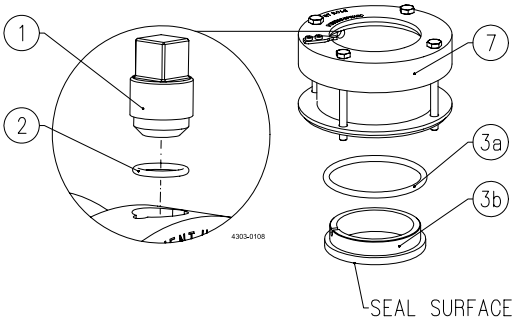
Step 19
Mount rotary seal part (3c, 3d, 3e) on sleeve part (4).

NOTE!
Ensure seal surface is totally clean, using alcohol.



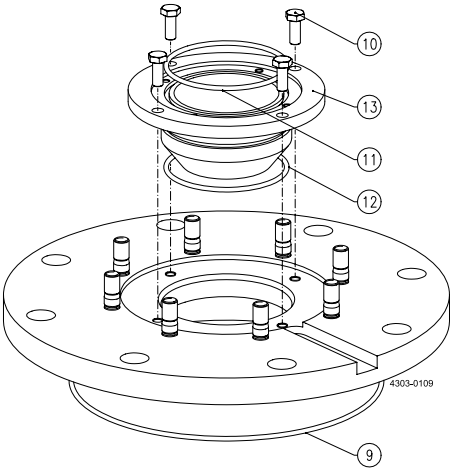
Step 20
Mount stationary seal part (3a, 3b) in seal housing (7).
Place O-ring (2).

NOTE!
Ensure seal surface is totally clean, using alcohol.



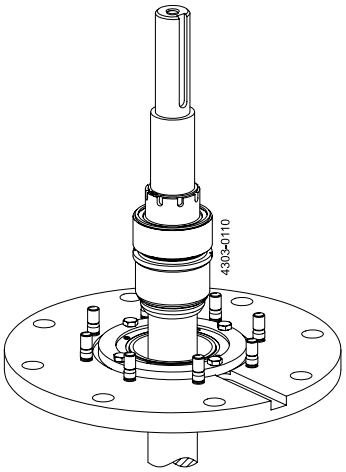
Step 21
Replace O-rings (9, 11, 12).

Mount supporting flange (13) on mounting flange.



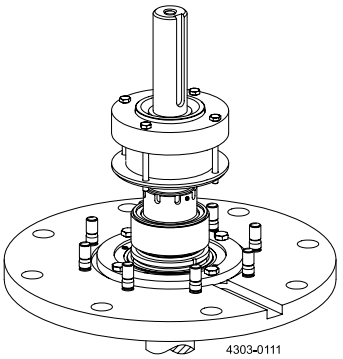
Read the instructions carefully. ***The items refer to the parts lists in section 7.3 and service kit section****.*
For maintenance instructions from suppliers, see section 8 Appendix. ***Always*** *ensure that mounting is according to section 6 Technical data. Ensure totally clean surfaces during mounting - also remove remaining Loctite residue on threads.*
Always *refer to tightening torques in section 6.2 Tightening torques for bolt connections.*

Step 22
Replace shaft parts into flange parts.



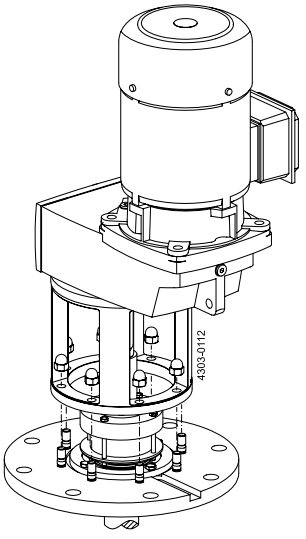
Step 23
Mount seal housing.

CAUTION!
Place seal housing according to section 3.6 Pre-use check (step 5) / section 5.3 Replacement of shaft seal, type S3SD (step 4).



Step 24
Mount lantern and gear motor onto mounting flange.

CAUTION!
Mount lantern and gear motor according to section 3 Installation step 1.

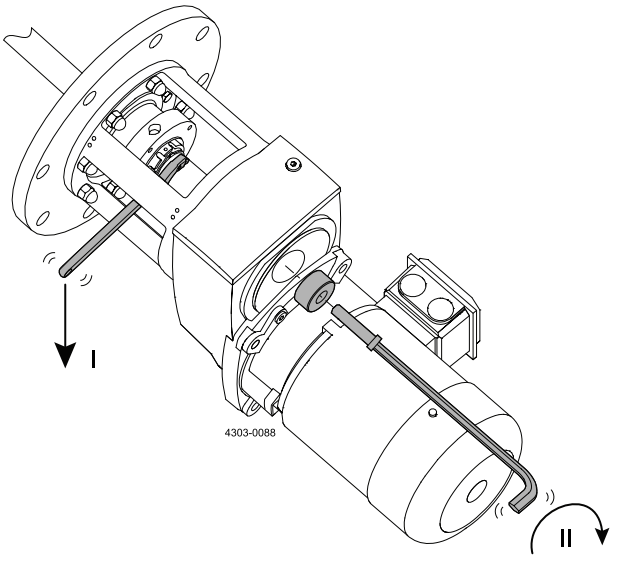


5 Maintenance

Read the instructions carefully. ***The items refer to the parts lists in section 7.3 and service kit section****.*
For maintenance instructions from suppliers, see section 8 Appendix. ***Always*** *ensure that mounting is according to section 6 Technical data. Ensure totally clean surfaces during mounting - also remove remaining Loctite residue on threads.*
Always *refer to tightening torques in section 6.2 Tightening torques for bolt connections.*

Step 25
Pull the shaft up and fasten into the gear motor.

Lock the shaft with the hook wrench (I) while fastening the screw securing the shaft in the gear motor (II).



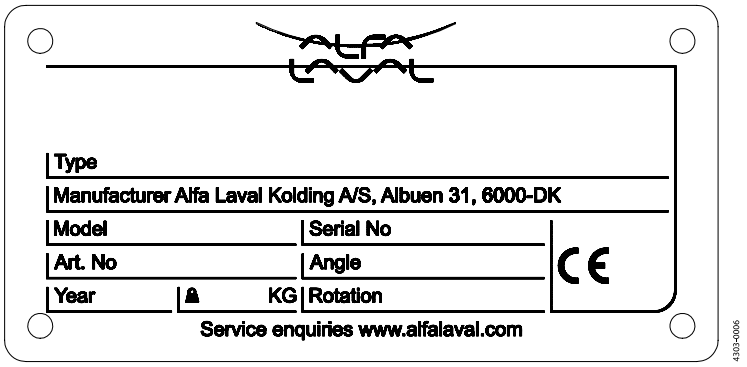
Step 26
Assemble Agitator onto the tank as described in section 3.5 Mounting Agitator.

All dimensions in mm unless otherwise stated.

6.1 Technical data

The Alfa Laval Agitator is available in various configurations and is configured to solve the specific application. Therefore, specific information like weight, size, critical oscillation speed and duties can be found in the supplied Alfa Laval quotation agreement.

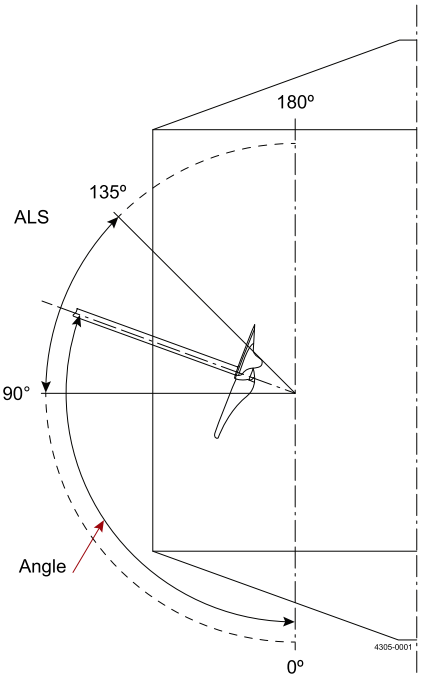
Important installation information about weight and mounting angle can be found on the supplied Agitator nameplate as shown on the illustration.



Mounting angle for side mounting Agitator type ALS-SD:

Agitator mounting angle between 90-135°.

To ensure optimal agitation the side mounted Agitator must be installed in the mounting angle specified on the nameplate as shown on the illustration.



6 Technical data

All dimensions in mm unless otherwise stated.

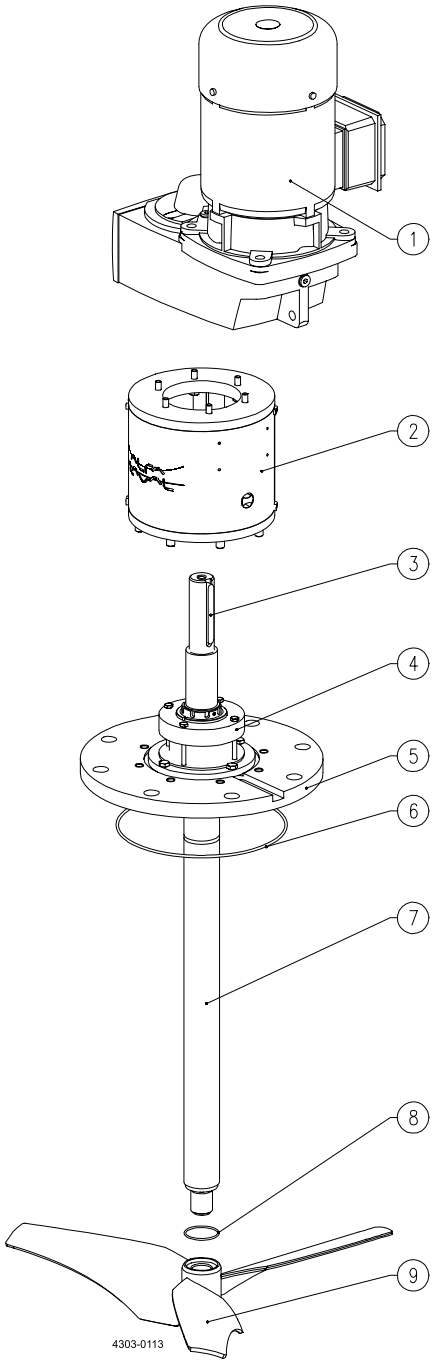
6.2 Tightening torques for bolt connections

CAUTION!
Use Loctite® before fastening.
Do **NOT** use air powered tools.

M4	M5	M6	M8	M10	M12	M14	M16*	M18	M20	M22	M24
3Nm	6Nm	11Nm	26Nm	51Nm	88Nm	141Nm	218Nm	308Nm	439Nm	582Nm	724Nm

*Maximum tightening torque for shaft, M16 using hook wrench tool 100 Nm.

7.1 Main components



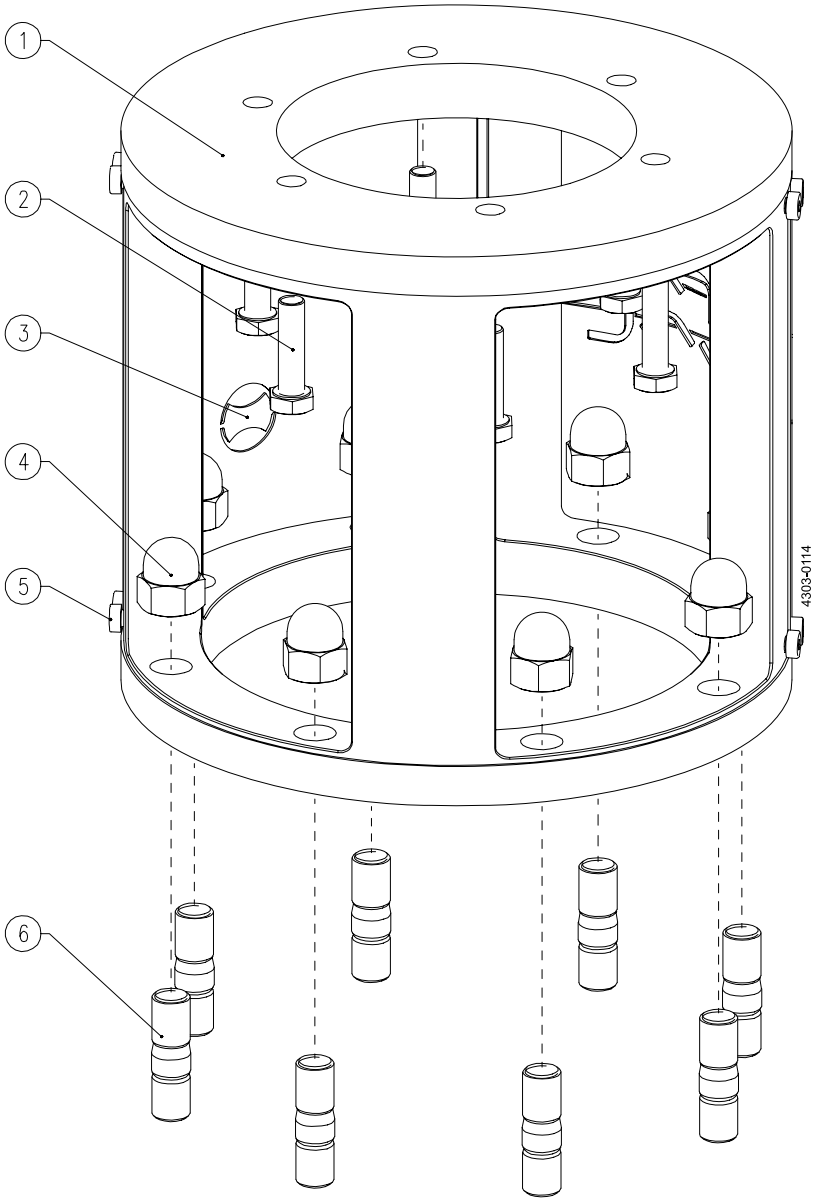
Main components

Parts list

Pos.	Qty	Denomination
1	1	GP Gear motor
2	1	Lantern, complete
3	1	Parallel key
4	1	Shaft seal, type S3SD
5	1	Flange, mounting
6	1	O-ring (for flange)
7	1	Shaft
8	1	O-ring (for shaft)
9	1	Impeller device, EnSaFoil

Article numbers are to be found in the Spare part manual 1000000046, available from the online Alfa Laval product catalogue Anytime or the Close at hand spare part catalogue.

7.2 Lantern, complete

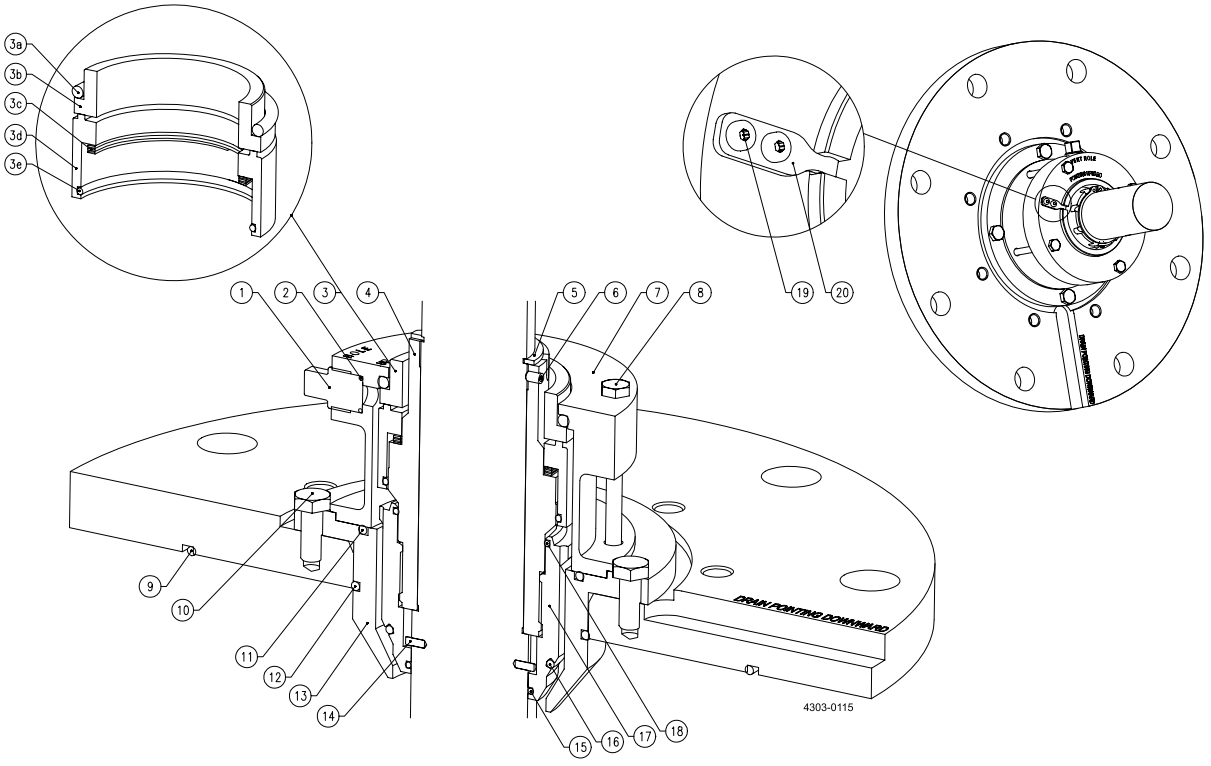


Lantern, complete

Parts list

Pos.	Qty	Denomination
1	1	Lantern, ext.
2	6	Screw
3	2	Guard, ext.
4	8	Nut, cap
5	8	Screw
6	8	Stud

7.3 Shaft seal, type S3SD



Shaft seal, type S3SD

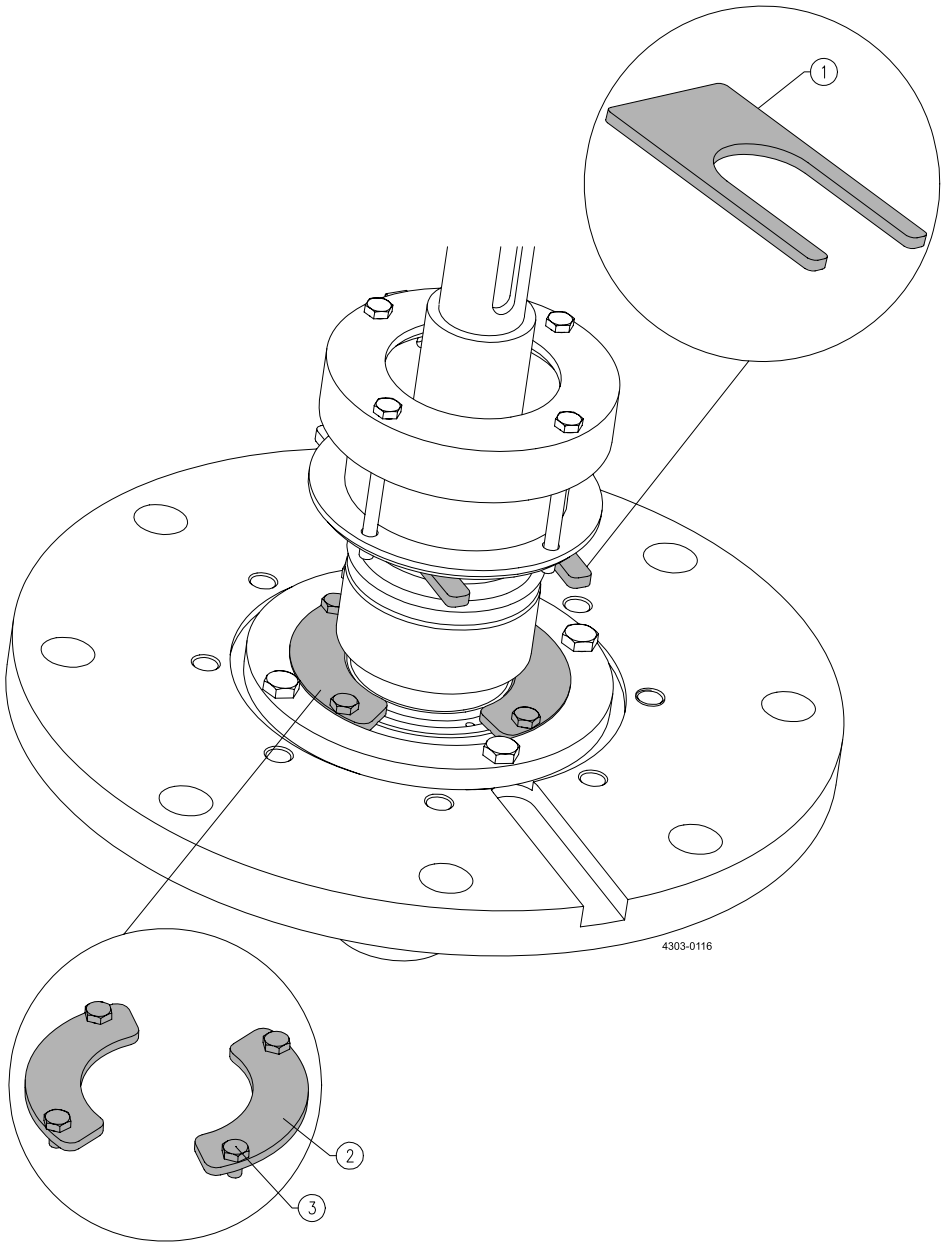
Parts list

Pos.		Qty	Denomination
1		1	End Plug
2	□◆	1	O-ring
3	□◆	1	S3SD Seal
4		1	Sleeve, inner
5		1	Circlip
6		1	Screw, pointed
7		1	Seal housing
8		4	Screw
9	◆	1	O-ring (for flange, mounting)
10		4	Screw
11	□◆	1	O-ring
12	◆	1	O-ring
13		1	Flange, support
14		2	Locking pin
15	◆	1	O-ring
16	◆	1	O-ring
17		1	Sleeve, outer
18	◆	1	O-ring
19		2	Screw
20		1	Plate, retainer S3SD

Service kits

Denomination	Item no.
Seal Kits for shaft seal, type S3SD	
□ **Seal Kit, In-place**	**9615364501**
◆ **Seal Kit, Complete**	**9615364601**

7.4 Tools



Tools

Parts list

Pos.		Qty	Denomination
-	◆	1	Hook wrench with pin
1	◆	1	Tool, flat
2	◆	2	Tool, retainer
3	◆	4	Screw

Service kits

	Denomination	Item no.
Seal kit, Tools		
◆	**Seal kit, Tools**	**9615364701**

8 Appendix

Tools

8.1 Drive unit instructions

The drive unit is supplied by sub supplier and all important installation requirement is transferred to the Agitator instruction manual. For further information regarding maintenance and storage of the drive unit please find the drive unit instruction manual by below links

For Agitators with gears please find the drive unit instruction manual by below link:
https://www.nord.com/cms/en/documentation/manuals/details_1139/detail_42075.jsp

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.