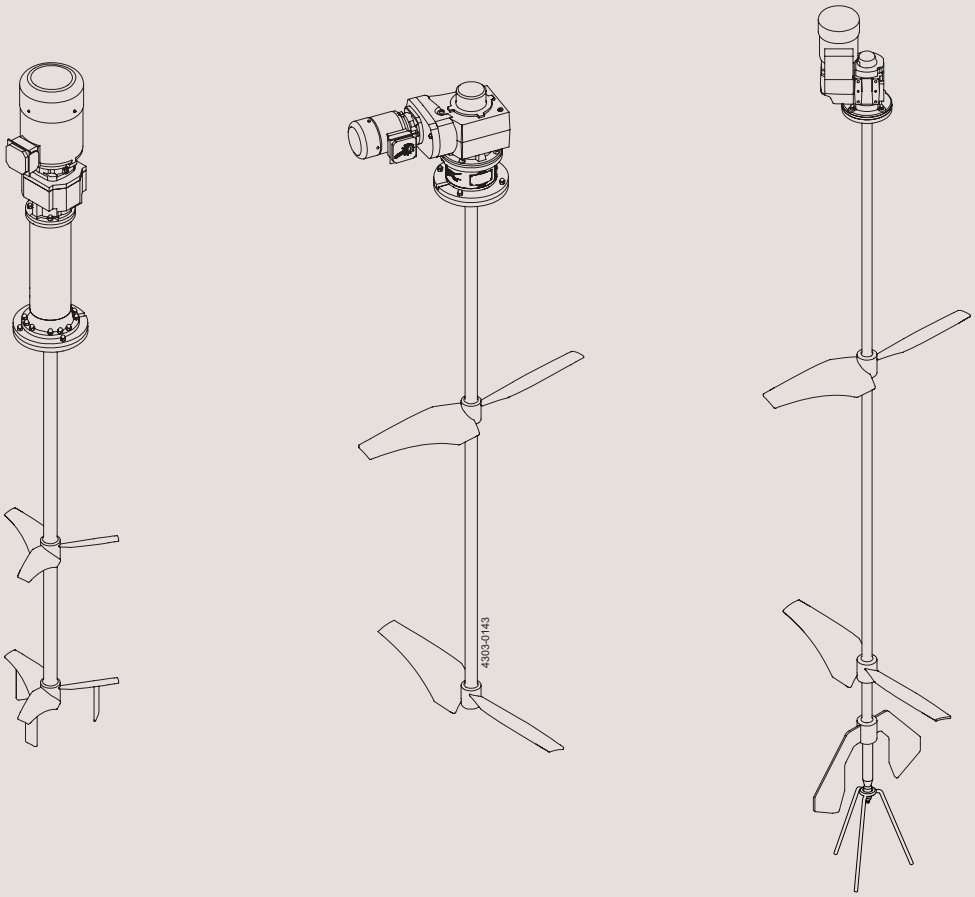
Instruction Manual

Alfa Laval Agitator - ALT / ALTB



ESE03504-EN9 2020-10

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: 2018-02-01

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

Agitator - EnSaFoil / EnSaFerm
Designation

Serial number from AAC000000001 to AAC999999999
Serial number from 10.000 to 100.000
Serial number from 100700000001 to 100799999999
Serial no(s)

ALT(B)-ME-(GX)-BC160D(H)/30(L)F-SX-SH-(n)(PXXXXDYY)(-PXXXXDYLY)(-LXXXXY)(-MSXX)(-BSXX)
ALT(B)-ME-(GX)-BC160/35(L)F-SX-SH-(n)(PXXXXDYY)(-PXXXXDYLY)(-LXXXXY)(-MSXX)(-BSXX)
ALT(B)-ME-(GX)-BXX/XX(L)F-SX-SH-(n)(PXXXXDYY)(-PXXXXDYLY)(-LXXXXY)(-MSXX)(-BSXX)
ALT(B)-ME-(GX)-BC160D(H)/30(L)F-D(C)-SH-(n)(PXXXXDYY)(-PXXXXDYLY)(-LXXXXY)(-MSXX)(-BSXX)
ALT(B)-ME-(GX)-BC160/35(L)F-D(C)-SH-(n)(PXXXXDYY)(-PXXXXDYLY)(-LXXXXY)(-MSXX)(-BSXX)
ALT(B)-ME-(GX)-BXX/XX(L)F-D(C)-SH-(n)(PXXXXDYY)(-PXXXXDYLY)(-LXXXXY)(-MSXX)(-BSXX)
ALT(B)-ME-(GX)-BC160D(H)/30(L)F-R-SH-(n)(PXXXXDYY)(-PXXXXDYLY)(-LXXXXY)(-MSXX)(-BSXX)
ALT(B)-ME-(GX)-BC160/35(L)F-R-SH-(n)(PXXXXDYY)(-PXXXXDYLY)(-LXXXXY)(-MSXX)(-BSXX)
ALT(B)-ME-(GX)-BXX/XX(L)F-R-SH-(n)(PXXXXDYY)(-PXXXXDYLY)(-LXXXXY)(-MSXX)(-BSXX)
ALT(B)-ME-(GX)-BC160D(H)/30(L)F-G-SH-(n)(PXXXXDYY)(-PXXXXDYLY)(-LXXXXY)(-MSXX)(-BSXX)
ALT(B)-ME-(GX)-BC160/35(L)F-G-SH-(n)(PXXXXDYY)(-PXXXXDYLY)(-LXXXXY)(-MSXX)(-BSXX)
ALT(B)-ME-(GX)-BXX/XX(L)F-G-SH-(n)(PXXXXDYY)(-PXXXXDYLY)(-LXXXXY)(-MSXX)(-BSXX)
ALT(B)-ME-(GX)-ZZ(L)F-SX-SH-(n)(PXXXXDYY)(-PXXXXDYLY)(-LXXXXY)(-MSXX)(-BSXX)
ALT(B)-ME-(GX)-ZZ(L)F-D(C)-SH-(n)(PXXXXDYY)(-PXXXXDYLY)(-LXXXXY)(-MSXX)(-BSXX)
ALT(B)-ME-(GX)-ZZ(L)F-R-SH-(n)(PXXXXDYY)(-PXXXXDYLY)(-LXXXXY)(-MSXX)(-BSXX)
ALT(B)-ME-(GX)-ZZ(L)F-G-SH-(n)(PXXXXDYY)(-PXXXXDYLY)(-LXXXXY)(-MSXX)(-BSXX)
ALT-ME-ZZF-V-SH-PXXXXDYY
Type

GX =	GC, GR or GP
BXX/XX =	B20, B25, B25/30, B35, B35/40, B45, B45/50, B55, B55/60
SX =	S, S3
SH =	S500-S15000
PXXXX	E125, E150, E175, E200, E225, E250, E300 E350, E400, E450, E500, E550, E600, E650 E700, E750, E800, E900, E1000, E1100 E1300, E1500, E1700, E1900 F450, F500, F550, F600, F650, F700, F750, F800, F900, F1000, F1100, F1300, F1500 F1700, F1900
LXXXX =	L600, L800, L900, L1100, L1300, L1500, L1700
DY =	D2, D3
Y =	P, G
BSXX	BS3P, BS3G
MSXX =	MS2P, MS2G
ZZ =	20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 90

Type variation

is in conformity with the following directives:

Machinery Directive 2006/42/EC++
Regulation (EC) 1935/2004

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

Global Product Quality Manager
Pumps, Valves, Fittings and Tank Equipment
Title

Lars Kruse Andersen
Name

Kolding
Place

2020-02-01
Date (YYYY-MM-DD)

Signature

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.

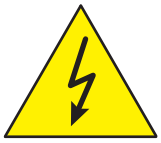
CAUTION
Indicates that special procedures must be followed to avoid damage to the agitator!

NOTE
Indicates important information to simplify or clarify procedures.

2.2 Warning signs

General warning:

Dangerous electrical voltage:



2.3 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 Name Plate and must be followed. Definitions on mounting angles can be seen in section 6.2 Mounting angle for top mounting agitator type ALT.

- 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 Name Plate and you will obtain the Alfa Laval quotation agreement.

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.

2.4 Safety precautions

Installation:

Always read the technical data thoroughly (see chapter 6 Technical Data).
Always follow installation instructions thoroughly (see chapter 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 chapter 6 Technical Data).
Always read supplier instructions thoroughly (see chapter 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 chapter 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 chapter 6 Technical Data).
Always follow the maintenance instruction thoroughly (see chapter 5 Maintenance).
Always follow the maintenance instruction from drive unit supplier (see chapter 8 Appendix).
Always study the parts list and assembly drawing carefully (see chapter 7 Part lists, part drawings 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.

Transportation:

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.

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).

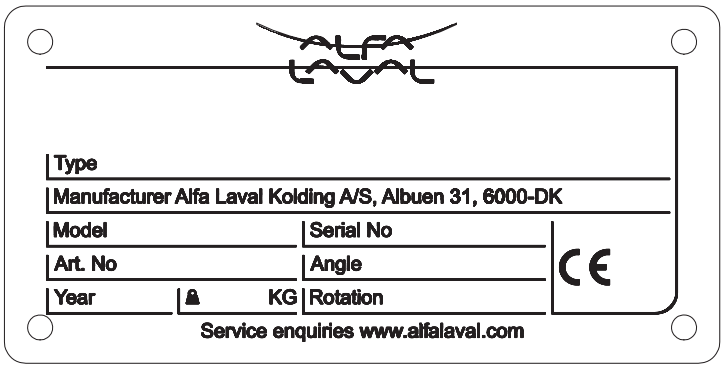
CAUTION

Alfa Laval cannot be held responsible for incorrect unpacking.

Step 1

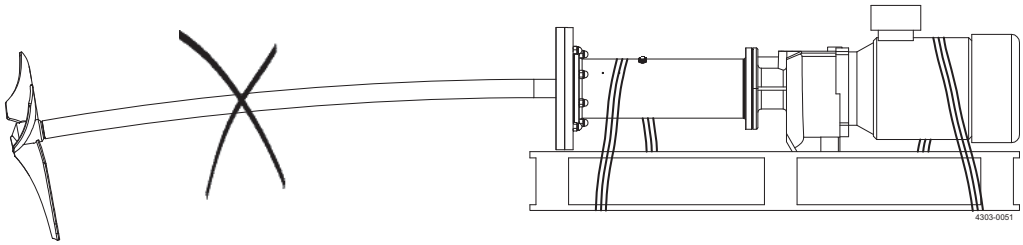
Inspect the delivery for visible transportation damages - all issues to be reported to carrier.

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

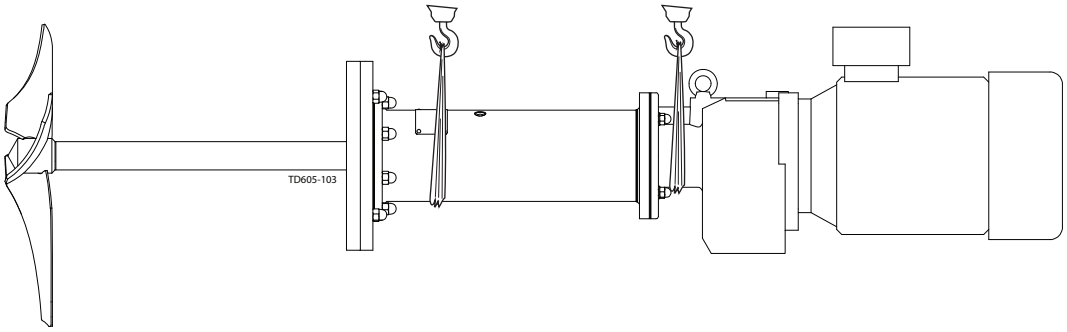


Step 3
Lifting instructions:

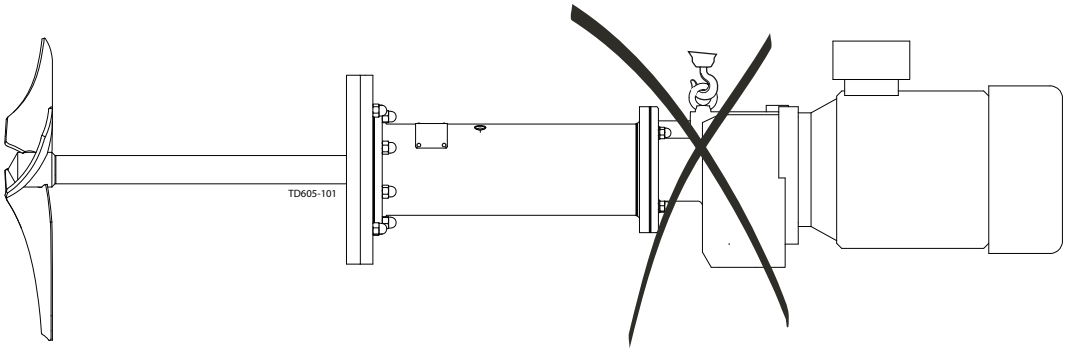
Always use the correct lifting equipment (see Agitator weight on name plate).
Locate Centre of gravity before moving the Agitator.



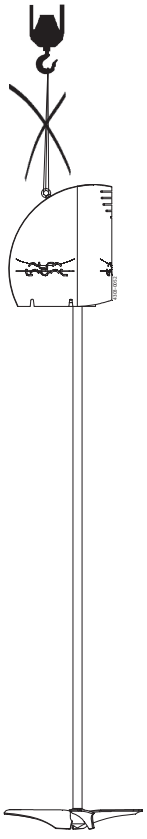
The instructions manual is part of the delivery.
Study the instructions carefully.



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



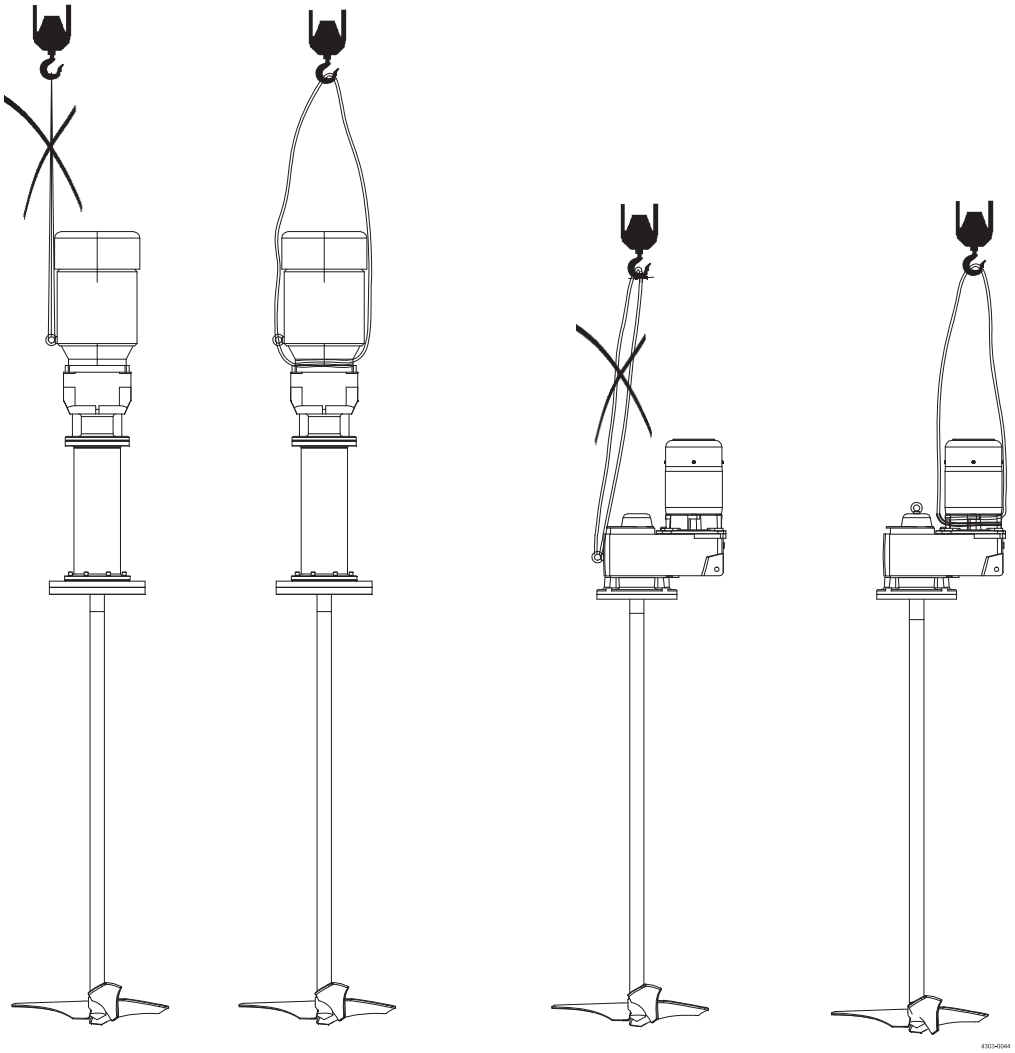
WARNING
Do NOT use eye bolts on shroud (if any) to lift the Agitator.
They are only for shroud removal.



3 Installation

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

CAUTION
Alfa Laval recommends **NOT** to use shaft as lifting point but long shafts must be supported adequately during lifting to protect shaft, bearings and seals arrangements.
Gear motor / motor may be used for lifting the assembled agitator.



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.

Study the instructions carefully and pay special attention to the warnings!
Always check the Agitator before operation - see section 3.3 Pre-use check.
The Agitator is for permanent fastening.
Make sure that the motor correspond to the environment.

3.2 Installation

Always read the technical data thoroughly (see chapter 6 Technical Data).
Only install this Agitator in mounting angle according to the name plate (see chapter 6 Technical Data).
Always use lifting equipment when handling the Agitator (see Step 2).
Always have safety elements removed by authorized personnel.
Never cover or remove the nameplate.

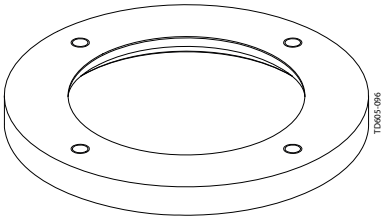
Never connect to power supply during installation or service.
Always have the Agitator connected to power supply by authorized personnel.

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.

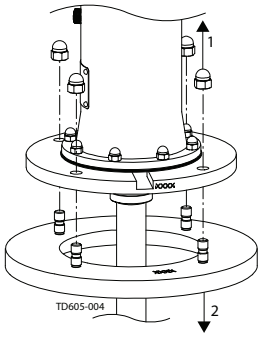
Alfa Laval highly recommends to use shaft retainer tool for installation of Agitator within a weight less than 500 kilogram and a shaft diameter between Ø30 and Ø60 (see section 7.15 Tools).

Welding flange - Flat Shaped Welding Flange (FSWF):

CAUTION
Only authorized personnel to weld in flanges.
Alfa Laval cannot be held responsible for incorrect installation.



Step 1
Dismantle the FSWF if fitted onto the Agitator.

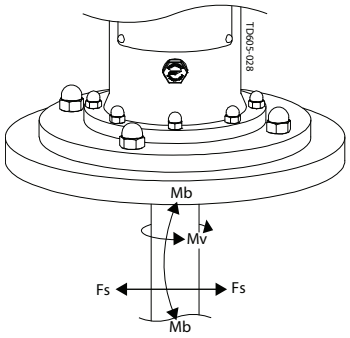


3 Installation

Study the instructions carefully and pay special attention to the warnings!
Always check the Agitator before operation - see section 3.3 Pre-use check.
The Agitator is for permanent fastening.
Make sure that the motor correspond to the environment.

Step 2

Ensure that the tank, where the welding flange are to be welded in, can handle the forces applied by the agitator: Torque Mv, Bending torque Mb and Side thrust Fs.



The values are depending on the Agitator configuration. The following information is required to calculate the forces:

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

The values can be calculated as follows:

Type ALT / ALTB:
Mv [Nm] = 23873 x P / n
Fs [N] = 4.5 x Mv x 1000 / D

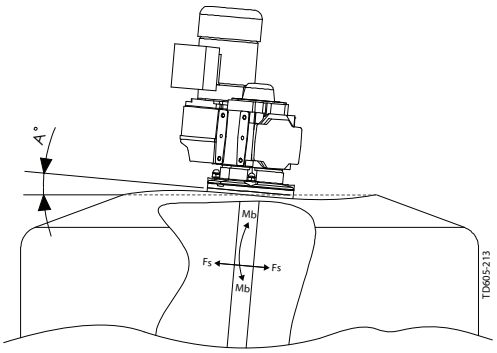
Type ALT:
Mb [Nm] = Fs x S / 1000

Type ALTB:
Mb [Nm] = Fs x S / 5333

Step 3

During the design phase of the tank, ensure sufficiently rigidity of the tank.
Ensure that the max. bending angle (A), at loads from Step 2 does not exceed according to below scheme

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

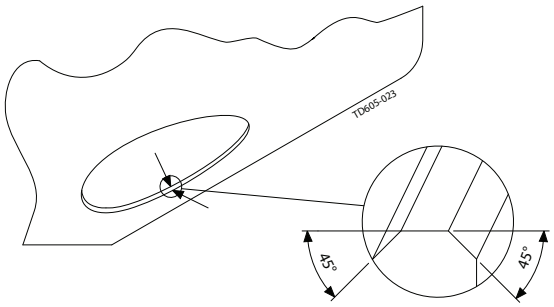


Study the instructions carefully and pay special attention to the warnings!
Always check the Agitator before operation - see section 3.3 Pre-use check.
The Agitator is for permanent fastening.
Make sure that the motor correspond to the environment.

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°.

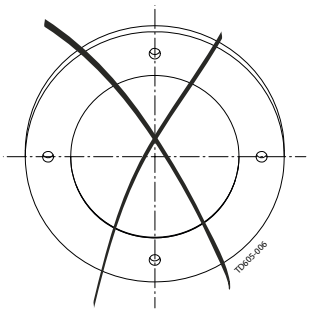


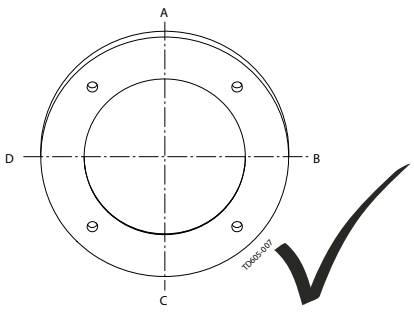
3 Installation

Study the instructions carefully and pay special attention to the warnings!
Always check the Agitator before operation - see section 3.3 Pre-use check.
The Agitator is for permanent fastening.
Make sure that the motor correspond to the environment.

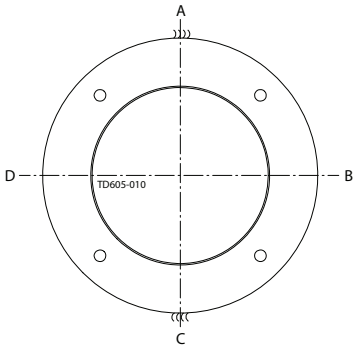
Welding procedure, flange (FSWF) without nose:

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

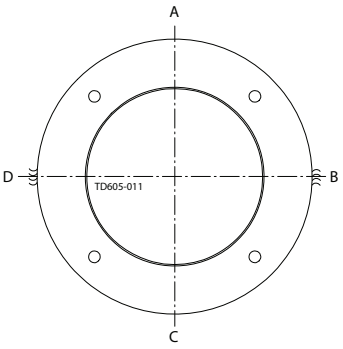




Step 2
Spot weld from outside.

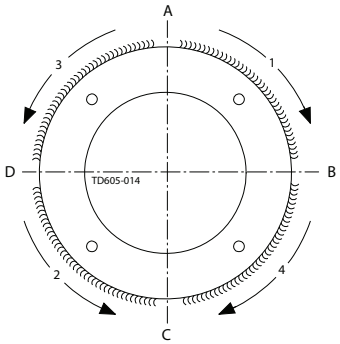


Adjust alignment!



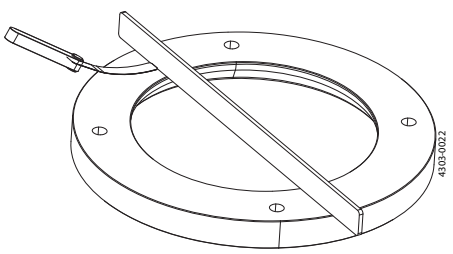
Step 3

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.



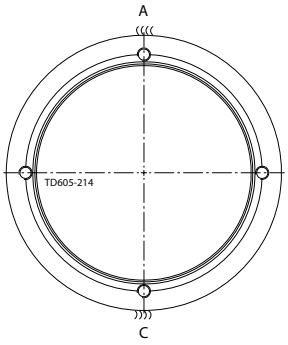
Study the instructions carefully and pay special attention to the warnings!
Always check the Agitator before operation - see section 3.3 Pre-use check.
The Agitator is for permanent fastening.
Make sure that the motor correspond to the environment.

Welding procedure, flange (FSWF) with nose:

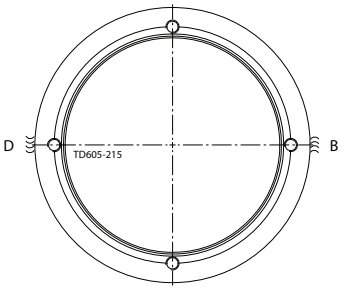
NOTE
Alfa Laval recommend a welding tool with, if possible, build in cooling by flowing water, to be made and fixed to the FSWF to ensure shape and form of the FSWF during welding and installation.
In general Alfa Laval recommend to weld the welding flange onto a bended rim of the tank bottom plate – this is to secure adequate flexibility at high loads, e.g. when the tank is filled. If a bended rim is impossible to obtain due to a high plate thickness, Alfa Laval recommend to weld the welding flange onto a cone shaped plate section.
If not following the above recommendations there will be a risk that the flange can deform, especially at high tank fillings, which can cause a leakage between the welding flange and the agitator mounting flange.

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

Step 2
Spot weld from outside.

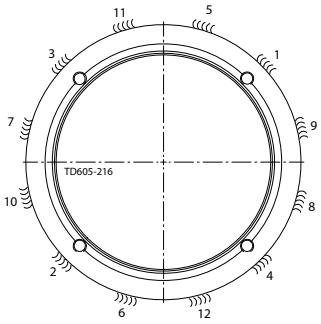


Adjust alignment!



Step 3

Spot weld from inside

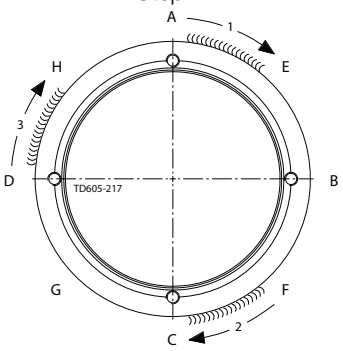


3 Installation

Study the instructions carefully and pay special attention to the warnings!
Always check the Agitator before operation - see section 3.3 Pre-use check.
The Agitator is for permanent fastening.
Make sure that the motor correspond to the environment.

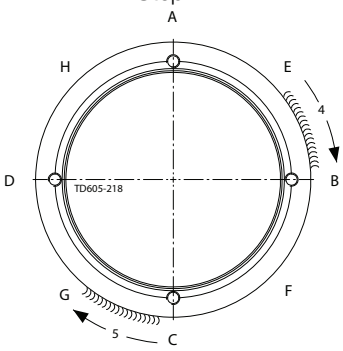
Step 4
Weld the following sections first from inside then from outside and cool to ambient temperature after each section has been welded

Step 1



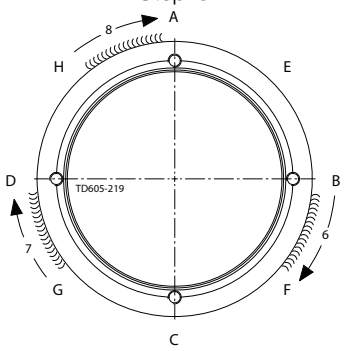
Cool with air!

Step 2



Cool with air!

Step 3



Cool with air!

Step 5
Remove the welding tool.
Ensure that the surface flatness tolerance equals ±0.1mm.
Grind and polish the welding flange.

Study the instructions carefully and pay special attention to the warnings!
Always check the Agitator before operation - see section 3.3 Pre-use check.
The Agitator is for permanent fastening.
Make sure that the motor correspond to the environment.

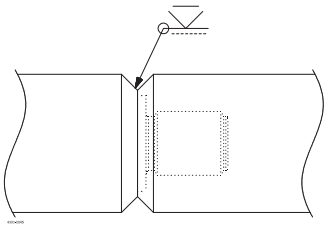
Welding procedure for divided shaft with thread connection:

NOTE
Only relevant for divided shafts prepared for welding.

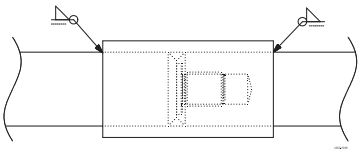
Step 1
Ensure that shaft ends are screwed completely together.

Step 2
Spot weld and cool with air.

Step 3
All-weld shaft connections with one welding seam at a time, cool with air and continue with one welding until welding is according to illustration. Use welding procedures which introduce as less tension and bending to the shaft as possible.



Step 4
If shaft sleeve is used weld as described in step 3.



Step 5
Align the shaft, using heat and or bending forces according to specifications in section 6.7 Shaft alignment.

3 Installation

Study the instructions carefully and pay special attention to the warnings!
Always check the Agitator before operation - see section 3.3 Pre-use check.
The Agitator is for permanent fastening.
Make sure that the motor correspond to the environment.

Mounting Agitator:

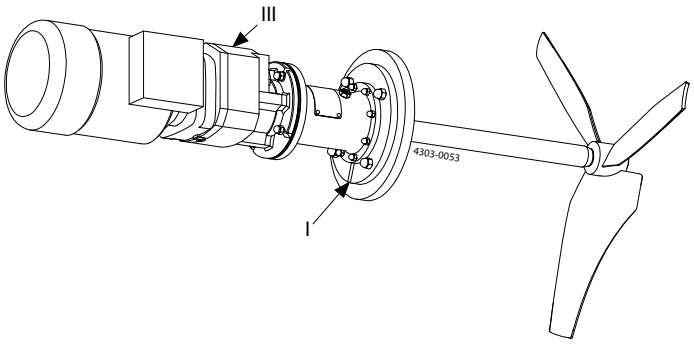
CAUTION

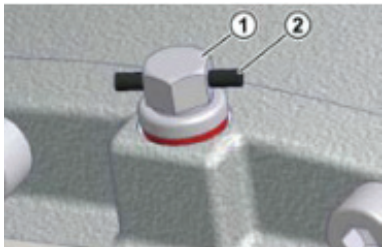
Always ensure that mounting is carried out according to description shown in section 6.2 Mounting angle for top mounting agitator type ALT and 6.3 Mounting angle for top mounting agitator type ALTB.

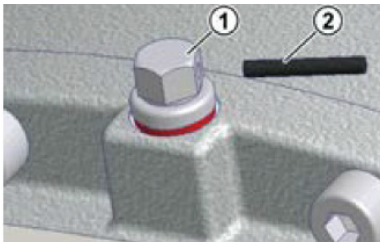
Always refer to tightening torques in section 6.6 Tightening torques for bolt connections when tightening bolts.

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 (III) 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.

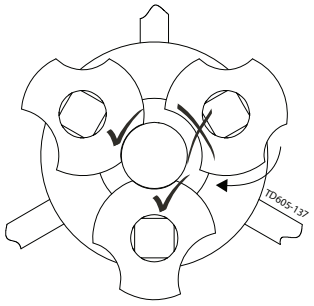
NOTE

Alfa Laval recommends using shaft retainer tool during mounting and dismantling (see section 7.15 Tools).

Step 3

(Only for ALTB machines with Intermediate steady bearing)

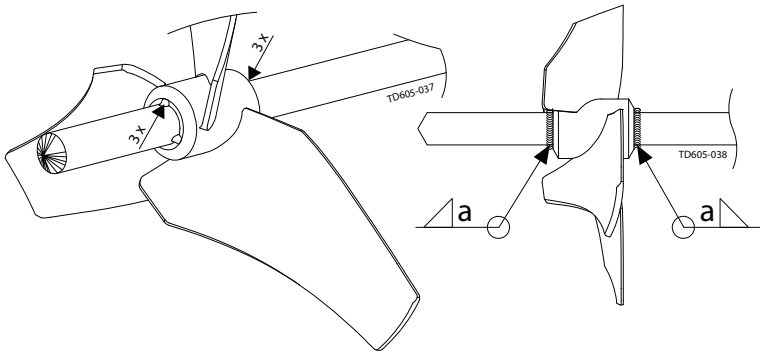
- Mount the intermediate steady bearing onto the shaft.
- Ensure before welding that the intermediate steady bearing is perpendicular to the mounting flange.
- Position wear bushings according to shaft diameter.



Study the instructions carefully and pay special attention to the warnings!
Always check the Agitator before operation - see section 3.3 Pre-use check.
The Agitator is for permanent fastening.
Make sure that the motor correspond to the environment.

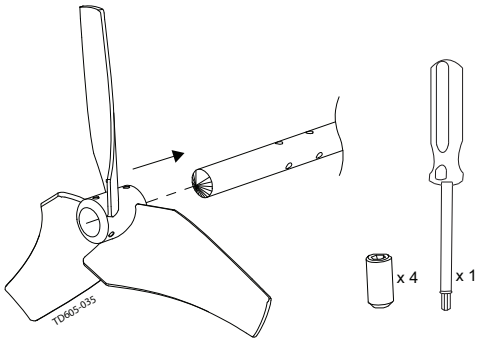
Step 4

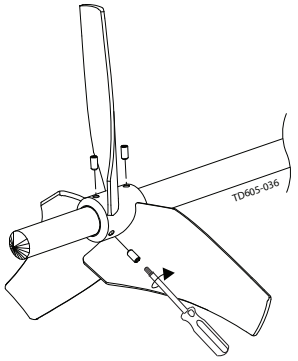
Mount impeller device(s) onto shaft.

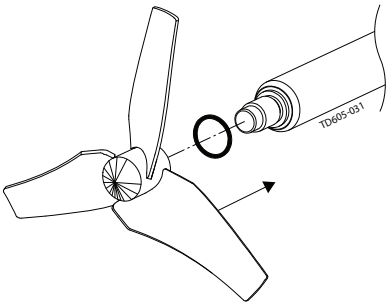


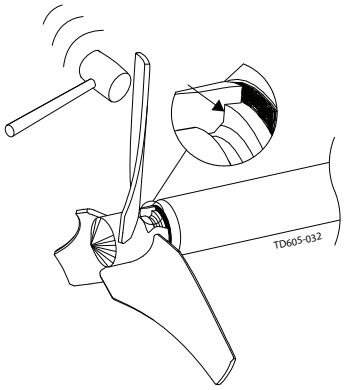
Hub diameter [mm]	a - dimension [mm]
Ø30	1,1
Ø40	1,8
Ø55, Ø80, Ø120	2,8

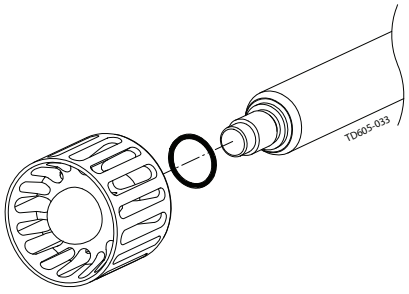
All-weld propeller to shaft with one welding seam at a time, cool with air and continue with one welding until welding is according to illustration. Use welding procedures which introduce as less heat, tension and bending to the shaft as possible.

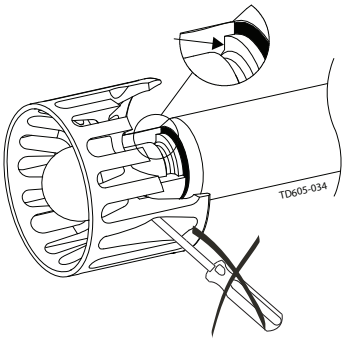












Step 5

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.

3 Installation

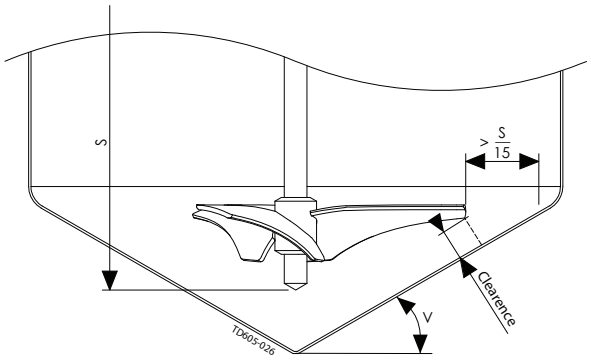
Study the instructions carefully and pay special attention to the warnings!
Always check the Agitator before operation - see section 3.3 Pre-use check.
The Agitator is for permanent fastening.
Make sure that the motor correspond to the environment.

Step 6

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

Further installation requirements regarding the position can be found in 6.2 Mounting angle for top mounting agitator type ALT and 6.3 Mounting angle for top mounting agitator type ALTB to ensure optimum performance.

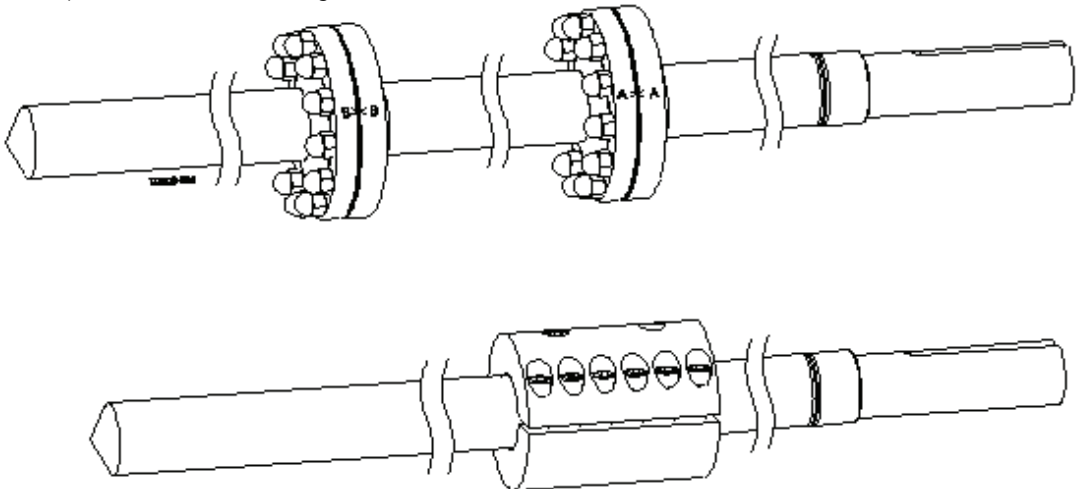
Clearance > S/15xsin(V)



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

Step 7

(Only when shaft is divided)
Assemble all shaft parts as shown on the figure.



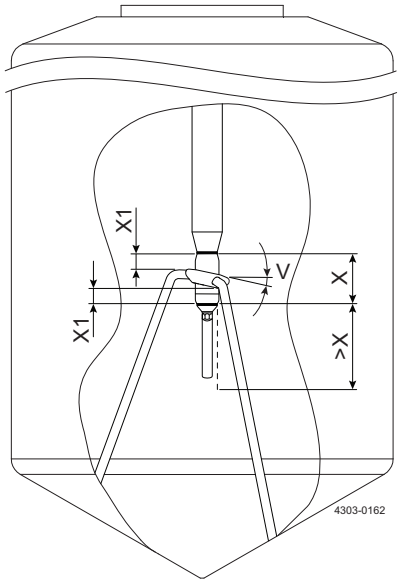
Step 8

Align the shaft, using heat and or bending forces according to specifications and instructions in section 6.7 Shaft alignment.

Study the instructions carefully and pay special attention to the warnings!
Always check the Agitator before operation - see section 3.3 Pre-use check.
The Agitator is for permanent fastening.
Make sure that the motor correspond to the environment.

Step 9
(Only for ALTB machines)

- Adjust legs according to tank bottom shape and position the bottom support in angle (V) according to horizontal of 12° +/- 1.5° as illustrated.



CAUTION
If the angle is not respected an increased risk for vibration can occur.

WARNING
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 3.3 Pre-use check).

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

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 2.3 Intended use, 6.2 Mounting angle for top mounting agitator type ALT and 6.3 Mounting angle for top mounting agitator type ALTB. Check the rotation direction before operation.

3.3 Pre-use check

Never install the Agitator in environments which deviate from those given in section 2.3 Intended use and 6.1 Technical data.
Always ensure that all alignment specifications given in section 6.7 Shaft alignment are followed.
Always make sure that the motor corresponds to the environment.

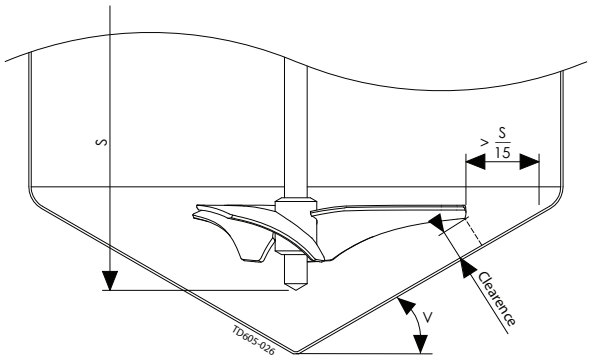
Step 1
Go through section 2.4 Safety precautions.

Step 2
Check the fastenings.

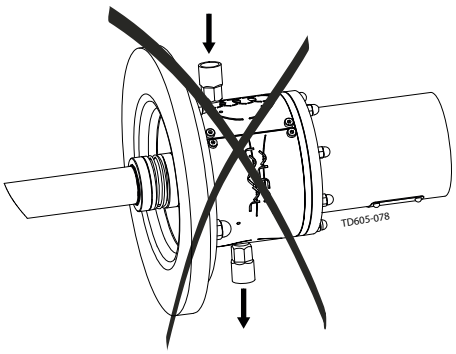
Step 3
Check o-ring and impeller are correctly fitted.

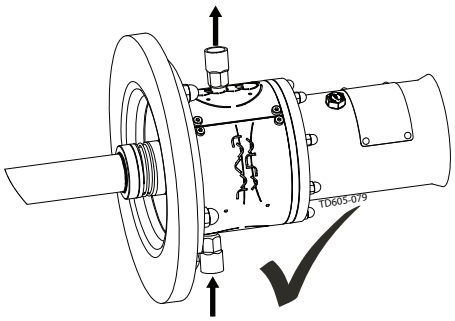
Step 4
Check impellers CANNOT collide with tank vessel at any point during a full rotation.
Clearance > S/15*sin(V)

NOTE
In special cases clearance can be reduced to 20mm+actual deflection, please advise with Alfa Laval.



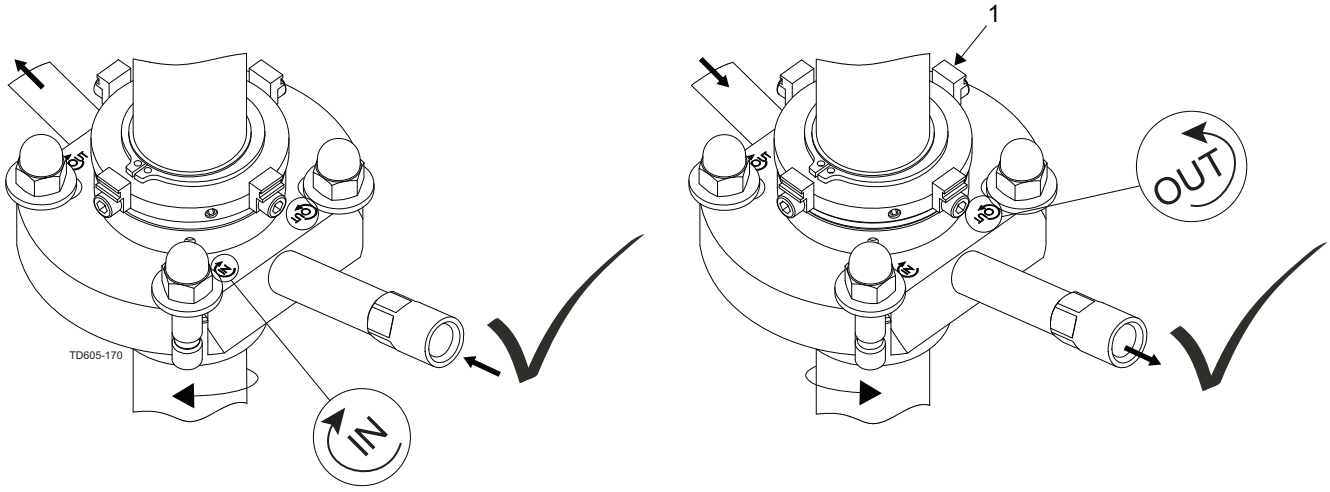
Step 5
Seal Type D
Ensure the sealing surfaces are not stuck together, by slowly turning shaft by hand.
Ensure that the seal never runs dry.
Ensure flush connections are installed in such way that air pockets are avoided.



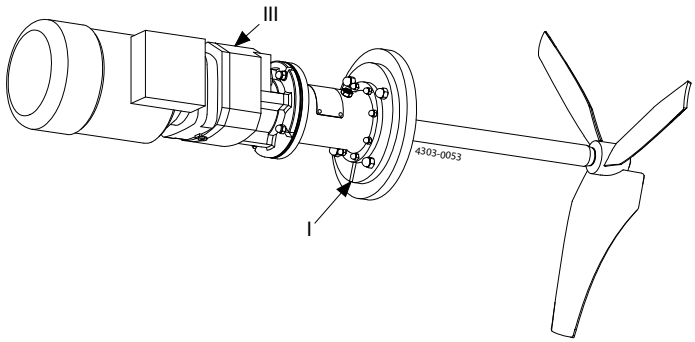


Study the instructions carefully and pay special attention to the warnings! Always check the Agitator before operation. The Agitator is only designed to operate according to data given in section 2.3 Intended use, 6.2 Mounting angle for top mounting agitator type ALT and 6.3 Mounting angle for top mounting agitator type ALTB. Check the rotation direction before operation.

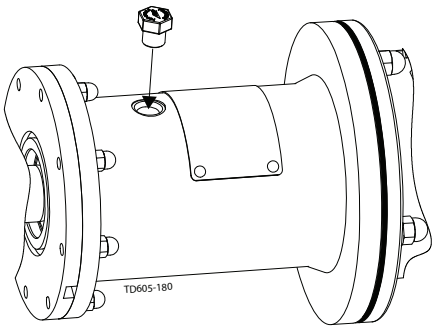
Step 6
Seal Type DC
Ensure the sealing surfaces are not stuck together, by slowly turning shaft by hand.
Ensure that the seal never runs dry.
Ensure flush connections are installed in such way that air pockets are avoided.
Ensure that the distance pieces (1) on the seal are mounted as shown on illustration.



Step 7
Ensure that drain (I) is pointing downwards.
For gears with vent screw, ensure the vent is pointing upwards and the rubber plug (III) is removed (see section 8.1 Drive unit instructions and mounting instructions in Step 1 on page 18.



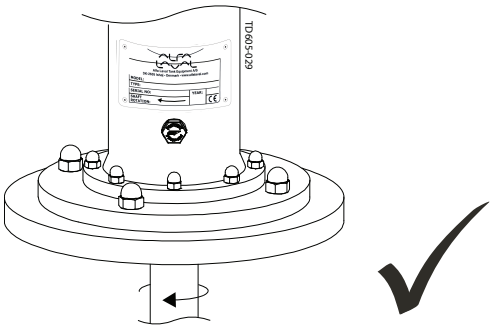
Step 8
(Only for agitators with bearing frame)
Ensure that the PreVent valve is refitted in the bearing frame.

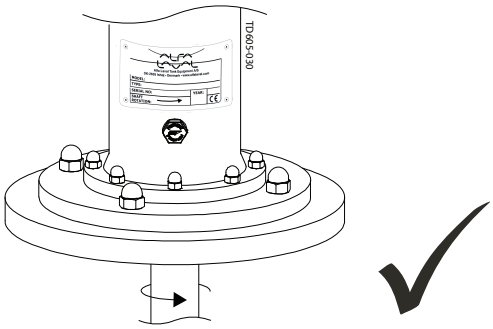


3 Installation

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 2.3 Intended use, 6.2 Mounting angle for top mounting agitator type ALT and 6.3 Mounting angle for top mounting agitator type ALTB. Check the rotation direction before operation.

Step 9
Ensure that the rotation direction is according to nameplate, before starting the Agitator.





Step 10
If frequency converter drive is used, it must be ensured NOT to operate continuously within +/-20% of critical oscillation speed (see section 2.3 Intended use and 6.1 Technical data).

Step 11
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 8 Appendix.
The ramp up and ramp down time should be about 2-5 seconds.

3.4 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.

Study the instructions carefully and pay special attention to warnings! ***Always*** *check the Agitator before operation (see section 3.3 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 chapter 8 Appendix).

4.1 Operation/Control

If deviation from normal operation and intended use shown in section 2.3 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 2.3 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				
Shaft seal				
- Radial seal: R		x		
- Gab seal: G				
- V-ring seal: V			x	
Mechanical seal				
- NOT flushed: S, S3			x	
- Flushed: DC, D			x	
Bearing frame				
Clean PreVent screw		x		
Check spider clearance				x
Check gaskets				x
Lubricate radial seals				x
Guidance				
Shaft rotation - radial movement < 5mm				
- Bushing: BS3				x
- Bushing: MS2			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 name plate.*

4 Operation

Study the instructions carefully and pay special attention to warnings! ***Always*** *check the Agitator before operation (see section 3.3 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 chapter 8 Appendix).

4.2 Troubleshooting

Problem	Cause/result	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 name plate Check frequency converter adjustment correspond to name plate
Agitator	- Obstructed	Check Agitator can rotate freely without stricking anything
Bearing frame		Ensure that retainer bolt has been removed
Vibrations		
Impeller device	- Damaged - Unbalanced impeller - Damage to shaft seal	Contact Alfa Laval Clean impeller device Replace sealing
Shaft	- Damaged - Large deflection	Contact Alfa Laval Check angle of bottom support type BS3 Check shaft alignment
Other	- Deviation from normal operation - Increased / decreased temperature	Operation circumstances must equal to those it was designed for [1]
Unusual noise		
Bearing frame	- Bearing gap - Wear or damaged bearings	Replace bearings and all gaskets in bearing frame immediately Replace bearings and all gaskets in bearing frame
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 are not flushed [2] - Seal surfaces stick together	Replace sealing Replace sealing and ensure that the seal never run dry [2] Separate surfaces carefully and clean them - ensure that seals are sufficient cleaned before still stand
Bottom support	- Regular knocking sound from the support - Irregular knocking sound from the support	Check shaft alignment. A small movement of the shaft is to be expected in normal operation. This is due to increased clearance for better hygienic and installation properties
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 2.3 Intended use.
[2] Type S and S3 are designed for dry running.

Study the instructions carefully and pay special attention to warnings! ***Always*** *check the Agitator before operation (see section 3.3 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 chapter 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).
CIP = Cleaning In Place. SIP = Sterilising In Place.

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.

For applications with bearing frame (not ATEX):
The highest allowable continuous temperature of the SHAFT that goes into the bearing frame 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 service interval and without reducing the lifetime of the bearings. If longer periods with exceeded application temperatures are required, the actual temperature of the bearings must be measured. The highest allowable bearing temperature, without changing the service interval, is 120°C.

For applications with bottom support:
The bottom support is designed for a continuous operating temperature up to 121°C with O-rings material EPDM and 150°C with O-rings material FPM. The temperature for the O-rings material EPDM may go as high as 150°C for a short period of time, but the increased temperature reduces the flexibility of the O-rings and ages them over time. In these cases it is recommended, due to sanitary reasons, regularly to inspect the O-rings for eventually leakage by disassembling the bushing from the shaft.

4 Operation

Study the instructions carefully and pay special attention to warnings! ***Always*** *check the Agitator before operation (see section 3.3 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 chapter 8 Appendix).

4.5 Pressure limits

The ALT and ALTB agitator can be equipped with different shaft seal types with different operating properties. The shaft seal is selected according to the application. In below table you will find the maximum allowable tank pressure during operation for the different seal types.

Seal type	Tank pressure [barg]		Designation
	Min.	Max.	
-R-	Atm.	Atm.	Radial seal, non-mechanical shaft seal
-G-	Atm.	Atm.	Gab seal, no sliding seal faces
-V-	Atm.	Atm.	Lip seal, non-mechanical shaft seal for direct drive only
-S-	-1.0	6.0	Single mechanical shaft seal, High pressure and medium speed
-S3-	-0.5	1.5	Single mechanical shaft seal, Medium pressure and low speed
-D-	-1.0	4.5	Double mechanical shaft seal w. flush. Medium pressure and high speed
-DC-	-1.0	6.0	Double mechanical shaft seal w. flush. High pressure and high speed

NOTE
Above pressures are not taking limitations on flange connections according to local pressure regulations into consideration.
Be aware that the operating pressure limits for the shaft seal can be lower than the tank design pressure.

For maintenance instructions from suppliers, see chapter 8 Appendix. ***Always*** *ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads.* ***Always*** *refer to tightening torques in section 6.6 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 chapter 8 Appendix.
Ensure totally clean surfaces during maintenance.

If possible, **always** dismount the Agitator from tank before dismantling it.
Otherwise it is recommended to purchase a shaft retainer tool (see section 7.15 Tools).
For lifting instruction, please refer to chapter 3 Installation.

Always read the technical data thoroughly (see chapter 6 Technical Data).
Always ensure that the mounting is according to agitator described in section 2.3 Intended use and chapter 6.1 Technical data.
Always refer to tightening torques in section 6.6 Tightening torques for bolt connections.
Always disconnect the power supply when servicing the Agitator.
Always use proper tools.
Always replace sealing elements before reassembling.

WARNING
Follow the dismantling and assembly instructions to the letter.
After maintenance, section 3.3 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.

PREVENTIVE MAINTENANCE
To ensure that your Alfa Laval machine operates efficiently, it is essential to follow a simple preventive maintenance programme, which will keep your machine in good working conditions. Good maintenance requires careful attention at regular intervals!
The following recommended preventive maintenance procedures are based on the average operating conditions of most Alfa Laval machines. However, you will appreciate that a machine, which is subject to rough and dirty conditions, will need more frequent attention than one working in ideal conditions. We trust that you will adjust your maintenance programme to meet the demands of your normal operating conditions.

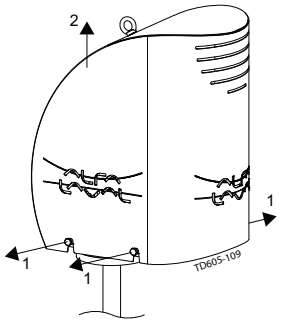
		Replace every:		
	3000 hour or yearly	3000 hour or every 3rd year	6000 hour or every 3rd year	10000 hour or every 3rd year
Sealing				
Shaft seal				
- Radial seal: R	x			
- Gab seal: G				x
- V-ring seal: V	x			
Mechanical seal				
-NOT flushed: S, S3		x		
-Flushed: DC, D				x
Bearing frame				
Spider type coupling (if any)				x
Static seals				x
Radial seals	x			
Bearings, rpm < 700				x
Bearings, rpm > 700			x	
Guidance				
Bushing: BS3			x	
Bushing: MS2	x			
Bushing: MS2		Replace if temperature > 100°C		

5 Maintenance

For maintenance instructions from suppliers, see chapter 8 Appendix. ***Always*** *ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads.* ***Always*** *refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

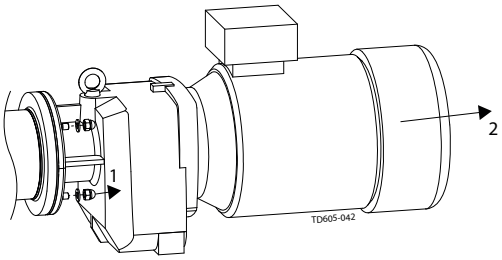
5.2 Replacement of drive unit with bearing frame

Step 1
Remove shroud, if any.



Step 2
Loosen cap nuts.

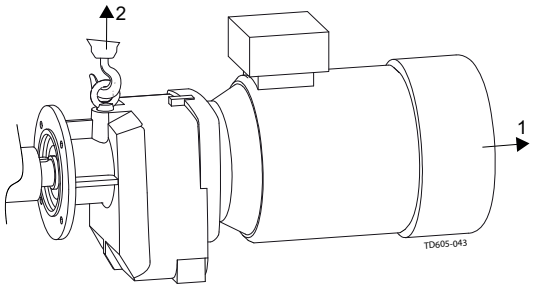
CAUTION
If dismantling motor from gear:
- Follow supplier instructions.
- Ensure that the gear oil is contained.
- A cog wheel may be mounted onto the motor shaft.



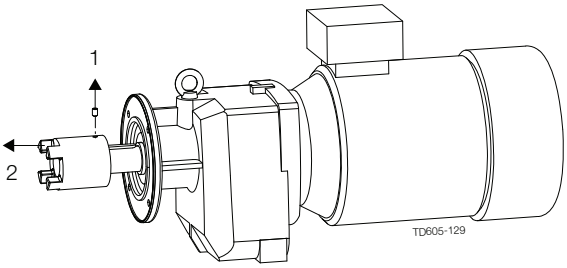
Step 3
Release the gear motor from the Agitator.

CAUTION
There is a spider type coupling mounted onto the gear motor shaft.

Step 4
Lift up the drive unit and pull it away.

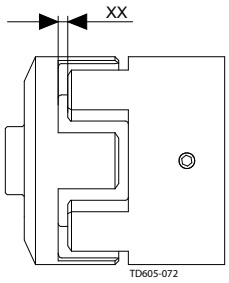


Step 5
1. Loosen coupling screws.
2. Pull the coupling of the gear motor shaft.



*For maintenance instructions from suppliers, see chapter 8 Appendix. **Always** ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads. **Always** refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

Step 6
Replace drive unit.
Mount coupling.



NOTE
Coupling part can be heated to 80-120°C for easier mounting onto gear motor shaft.

CAUTION
Ensure that the axial position of the coupling is according to illustration. The value XX is to be found in section 6.8 Spider coupling.

Step 7
Replace spider if necessary.
Use Loctite® 243 before fastening screws.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.

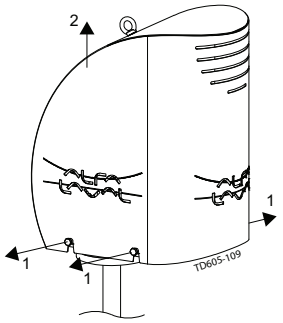
Step 8
Mount drive unit reverse as dismantling.

5 Maintenance

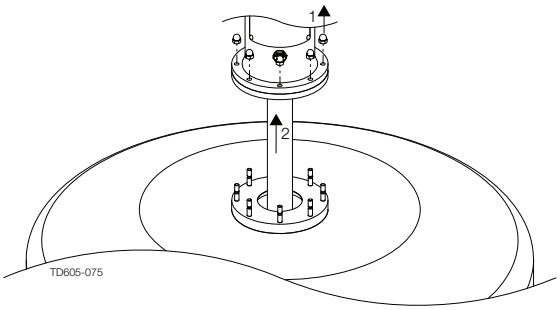
For maintenance instructions from suppliers, see chapter 8 Appendix. ***Always*** *ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads.* ***Always*** *refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

5.3 Replacement of drive unit

Step 1
Remove shroud, if any.

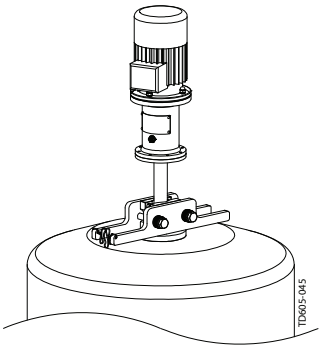


Step 2
1. Dismantle Agitator from welding flange.
2. Lift up Agitator.



Step 3
Support shaft using shaft retainer tool.

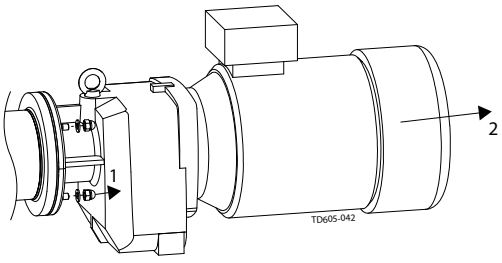
NOTE
Alfa Laval highly recommends to use shaft retainer tool for installation of Agitator within a weight less than 500 kilograms and a shaft diameter between Ø30 and Ø60 (see section 7.15 Tools).



Step 4
Before dismantling drive unit, please see instructions in 5.10 Replacement of shaft seal, type D to 5.13 Replacement of shaft seal, type S3, depending on seal type.

Step 5
Loosen cap nuts.

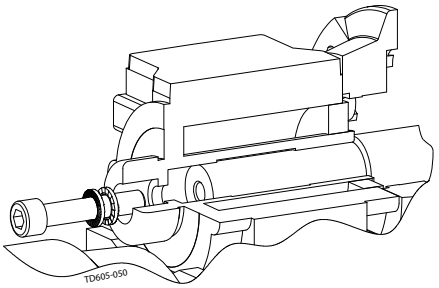
CAUTION
If dismantling motor from gear:
- Follow supplier instructions
- Ensure that the gear oil is contained
- A cog wheel may be mounted onto the motor shaft.



For maintenance instructions from suppliers, see chapter 8 Appendix. **Always** *ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads.* **Always** *refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

Step 6

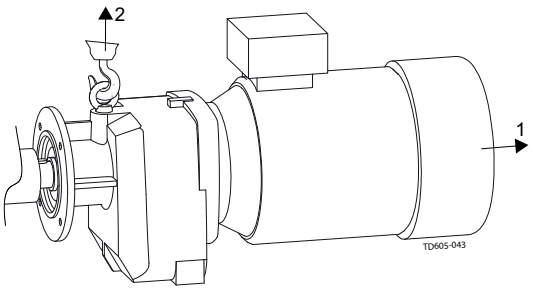
Release the gear motor from the Agitator. Refer to supplier instructions



CAUTION

There is a Nord-lock® washer mounted on the gear fastening the shaft.
The washer consists of two parts attached to each other with some silicone as shown on the picture. It is important that the two parts are positioned as shown.

Step 7
Lift up the drive unit and pull it away.



Step 8
Replacement drive unit.

Step 9
Use Loctite® 243 before fastening screws.
Always refer to tightening torques in section 6.6 Tightening torques for bolt connections.

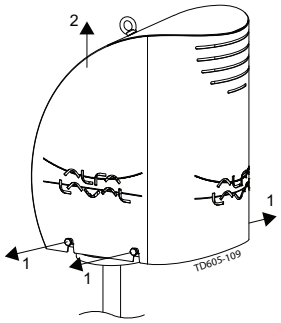
Step 10
Mount drive unit reverse as dismantling.

5 Maintenance

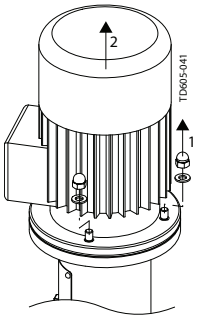
For maintenance instructions from suppliers, see chapter 8 Appendix. ***Always*** *ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads.* ***Always*** *refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

5.4 Replacement of drive unit (Motor and shaft unit)

Step 1
Remove shroud, if any.



Step 2
Loosen cap nuts.



Step 3
Release the motor from the Agitator.

CAUTION
Motor and shaft are one complete unit.

Step 4
Lift up the drive unit and pull it away.

Step 5
Replace drive unit.

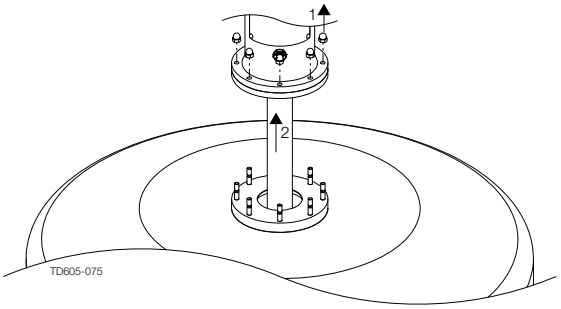
Step 6
Use Loctite® 243 before fastening screws.
Always refer to tightening torques in section 6.6 Tightening torques for bolt connections.

Step 7
Mount drive unit reverse as dismantling.

*For maintenance instructions from suppliers, see chapter 8 Appendix. **Always** ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads. **Always** refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

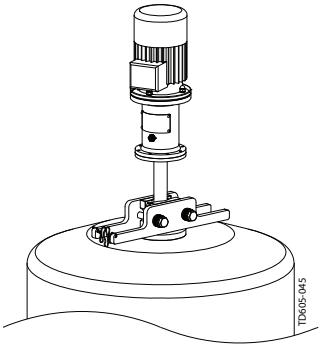
5.5 Dismantling and mounting shaft (with bearing frame except BC160)

Step 1
1. Dismantle Agitator from welding flange.
2. Lift up Agitator.

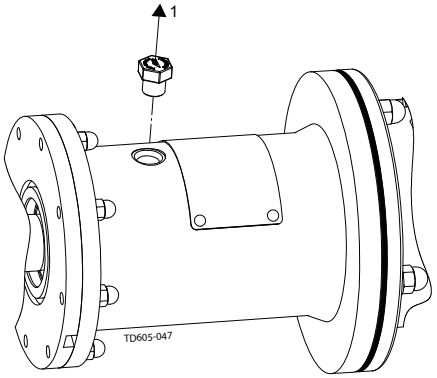


Step 2
Support shaft using shaft retainer tool.

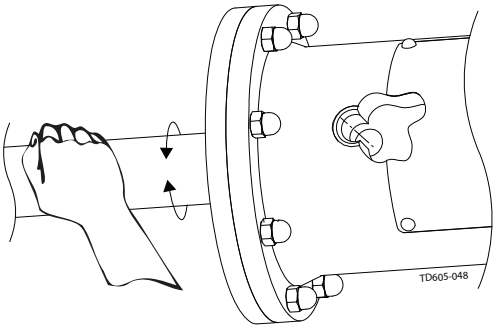
NOTE
Alfa Laval highly recommends to use shaft retainer tool for installation of Agitator within a weight less than 500 kilograms and a shaft diameter between Ø30 and Ø60 (see section 7.15 Tools).



Step 3
1. Dismantle drive unit as described in section 5.2 Replacement of drive unit with bearing frame.
2. Remove PreVent valve.



Step 4
Looking through the PreVent valve hole, rotate shaft until shaft locking hole aligns.

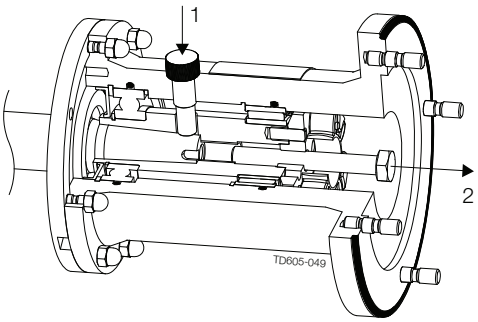


5 Maintenance

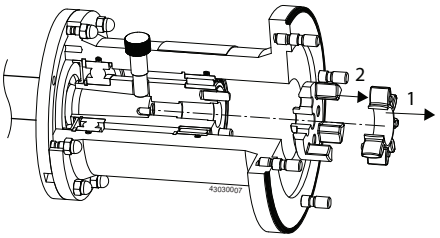
For maintenance instructions from suppliers, see chapter 8 Appendix. ***Always*** *ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads.* ***Always*** *refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

Step 5
1. Mount retainer bolt tool for shaft locking.
2. Remove centre bolt.

NOTE
Extra retainer bolt tool can be acquired if needed (see section 7.15 Tools) or Spare Part Manual.

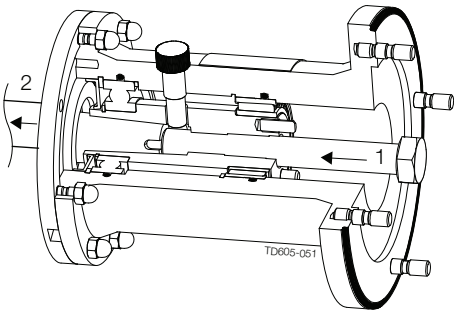


Step 6
Remove spider and coupling part.



Step 7
Dismantle shaft by mounting extractor bolt tool.
Keep turning extractor bolt until shaft is forced from the bearing frame.

NOTE
Extra extractor bolt tool can be acquired if needed (see section 7.15 Tools or Spare Part Manual).

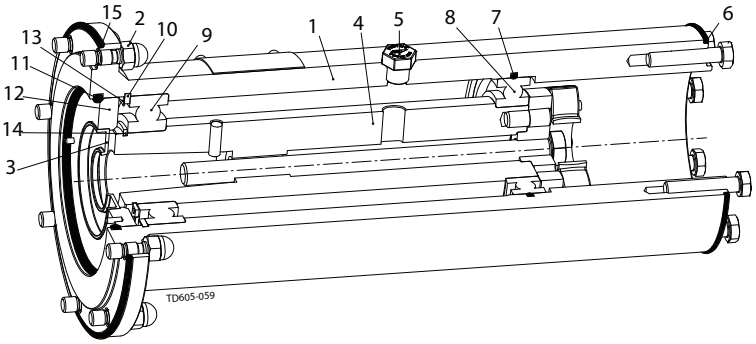


Step 8
Mount shaft reverse as dismantling

CAUTION
Ensure that oil trap ring, if any, is refitted correct during mounting.

*For maintenance instructions from suppliers, see chapter 8 Appendix. **Always** ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads. **Always** refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

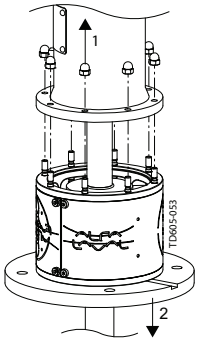
5.6 Replacement of bearings, type B20, B25, B25/30, B35, B35/40, B45, B45/50, B55, B55/60



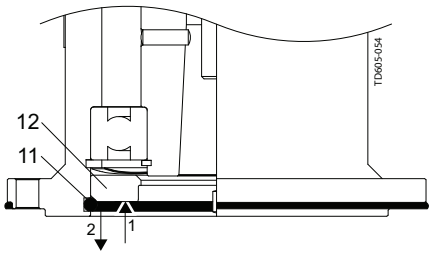
NOTE
Positions referred to in following instructions can be seen in the above illustration.

Step 1
1. Dismantle shaft as described in section 5.5 Dismantling and mounting shaft (with bearing frame except BC160).
2. Remove retainer bolt in step 5 in section 5.5 Dismantling and mounting shaft (with bearing frame except BC160).

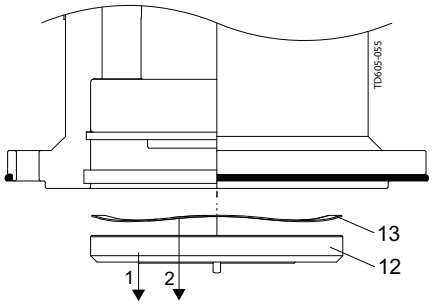
Step 2
1. Remove cap nuts (2).
2. Remove lantern or mounting flange if no lantern is used from bearing frame.



Step 3
1. Push cover (12) into bearing frame.
2. Remove o-ring (11).



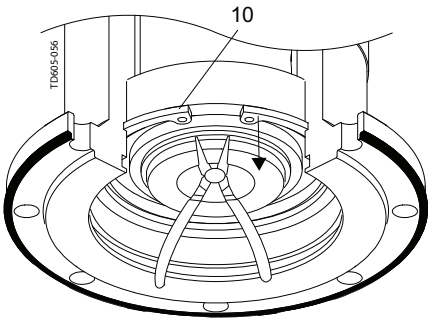
Step 4
Remove cover (12) including radial seal (3) and spring (13).



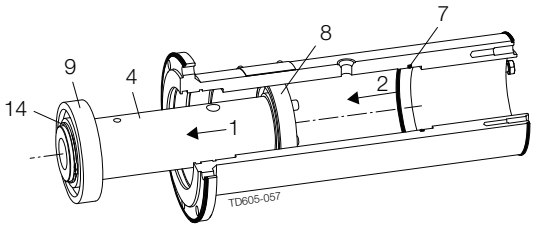
5 Maintenance

For maintenance instructions from suppliers, see chapter 8 Appendix. ***Always*** *ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads.* ***Always*** *refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

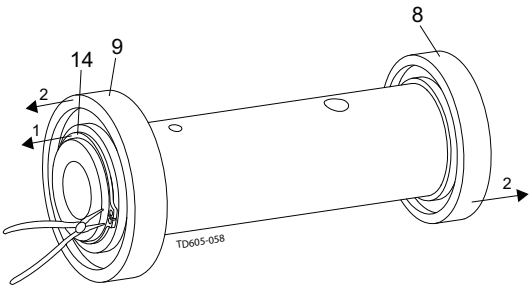
Step 5
Remove outer circlip (10) carefully. Use suited pliers.



Step 6
1. Pull out drive shaft (4) including bearings (8, 9).
2. Remove o-ring (7)



Step 7
1. Remove inner circlip (14) carefully. Use suited pliers.
2. Remover bearings (8, 9).

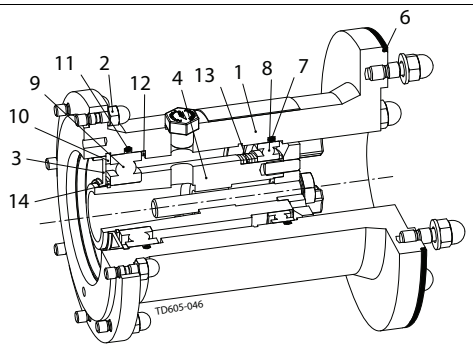


Step 8
1. Replace bearings (8, 9) and o-rings (6, 7, 11, 15).
2. Assembly of bearing frame is reverse as dismantling.

CAUTION
Only apply force to inner bearing rings when mounting bearings on drive shaft.
Only apply force to outer bearing rings when mounting drive shaft with bearings into bearing frame.

For maintenance instructions from suppliers, see chapter 8 Appendix. ***Always*** *ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads.* ***Always*** *refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

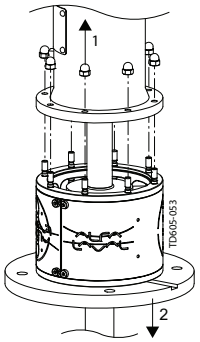
5.7 Replacement of bearings, type BC160DH



NOTE
Positions referred to in following instructions can be seen in the above illustration.

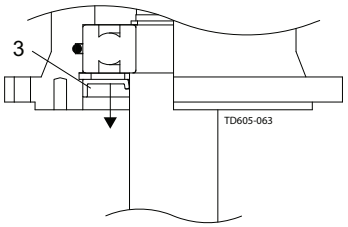
Step 1
Dismantle shaft as described in section 5.5 Dismantling and mounting shaft (with bearing frame except BC160).

Step 2
1. Remove cap nuts (2).
2. Remove lantern or mounting flange if no lantern is used from bearing frame.

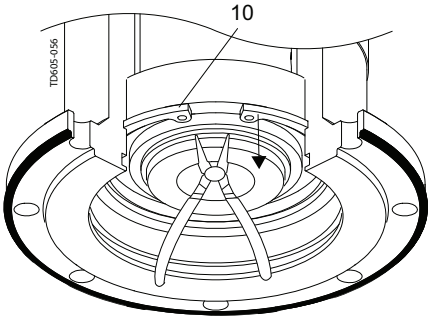


Step 3
Remove radial seal (3).

NOTE
Alfa Laval recommends replacing the radial seal.



Step 4
Remove outer circlip (10) carefully. Use suited pliers.

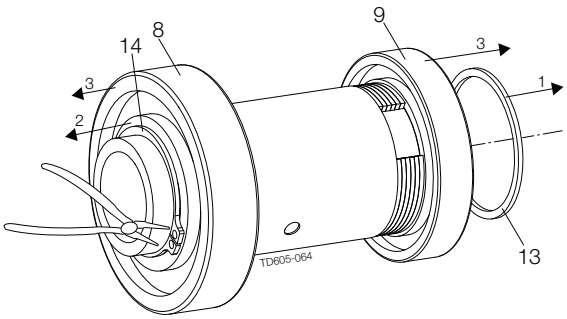


Step 5
1. Pull out drive shaft (4) including bearings (8, 9).
2. Remove O-rings, (7), (11).

5 Maintenance

For maintenance instructions from suppliers, see chapter 8 Appendix. ***Always*** *ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads.* ***Always*** *refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

Step 6
1. Remove spring ring (13).
2. Remove inner circlip (14) carefully. Use suited pliers.
3. Remove bearings (8, 9).

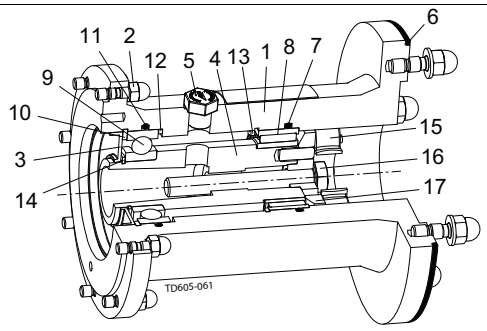


Step 7
1. Replace bearings (8, 9) and o-rings (6, 7, 11).
2. Assembly of bearing frame is reverse as dismantling.

CAUTION
Only apply force to inner bearing rings when mounting bearings on drive shaft.
Only apply force to outer bearing rings when mounting drive shaft with bearings into bearing frame.

*For maintenance instructions from suppliers, see chapter 8 Appendix. **Always** ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads. **Always** refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

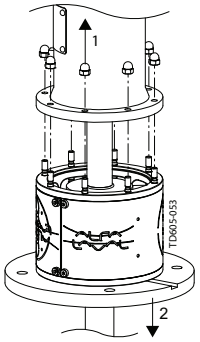
5.8 Replacement of bearing, type BC160D



NOTE
Positions referred to in following instructions can be seen in the above illustration.

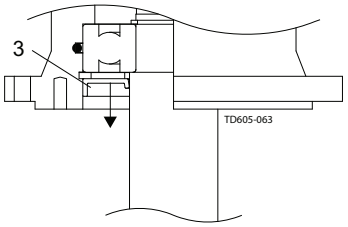
Step 1
Dismantle shaft as described in section 5.5 Dismantling and mounting shaft (with bearing frame except BC160).

Step 2
1. Remove cap nuts (2).
2. Remove lantern or mounting flange if no lantern is used from bearing frame

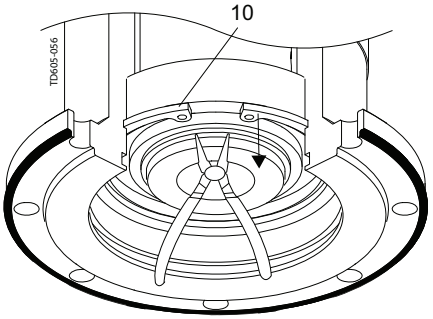


Step 3
Remove radial seal (3).

NOTE
Alfa Laval recommends replacing the radial seal.



Step 4
Remove outer circlip (10) carefully. Use suited pliers.

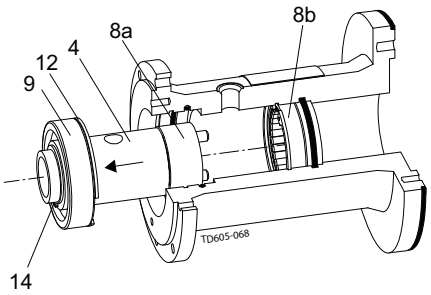


5 Maintenance

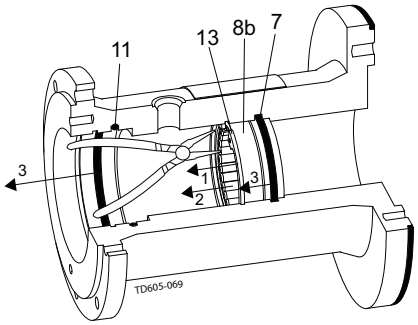
For maintenance instructions from suppliers, see chapter 8 Appendix. ***Always*** *ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads.* ***Always*** *refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

Step 5
1. Pull out drive shaft (4) including bearings (8a, 9).
2. Pull out circlip (12) or let it stay in bearing frame.

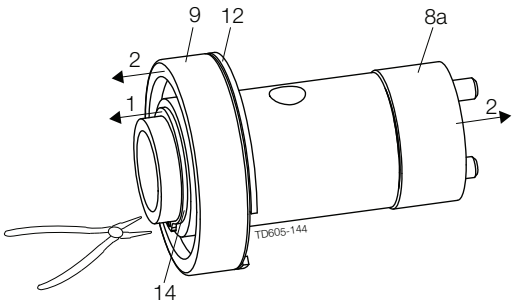
NOTE
Outer bearing ring (8b) should stay in bearing frame



Step 6
1. Remove upper circlip (13) carefully. Use suited pliers
2. Push out, using applicable tool, the outer bearing ring (8b).
3. Remove o-rings (7, 11).



Step 7
1. Remove inner circlip (14) carefully. Use suited pliers.
2. Remove bearings (8a, 9)

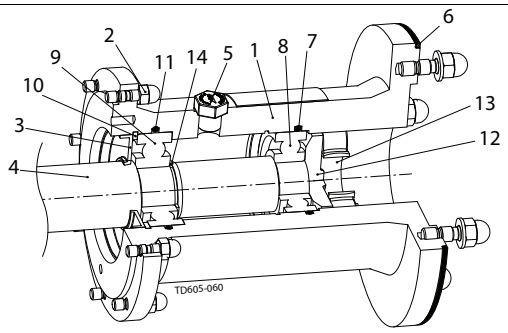


Step 8
1. Replace bearings (8a, 8b), (9) and o-rings (6, 7, 11).
2. Assembly of bearing frame is reverse as dismantling.

CAUTION
Only apply force to inner bearing rings when mounting bearings on drive shaft.
Only apply force to outer bearing rings when mounting drive shaft with bearings into bearing frame

*For maintenance instructions from suppliers, see chapter 8 Appendix. **Always** ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads. **Always** refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

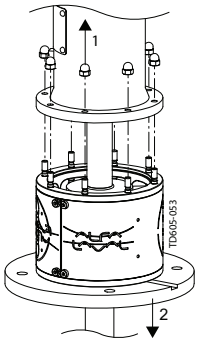
5.9 Replacement of bearings type BC160



NOTE
Positions referred to in following instructions can be seen in the above illustration.

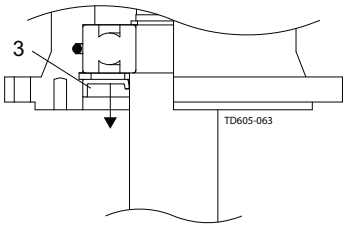
Step 1
Dismantle drive unit as described in section 5.2 Replacement of drive unit with bearing frame.

Step 2
1. Remove cap nuts (2).
2. Remove lantern or mounting flange if no lantern is used from bearing frame.

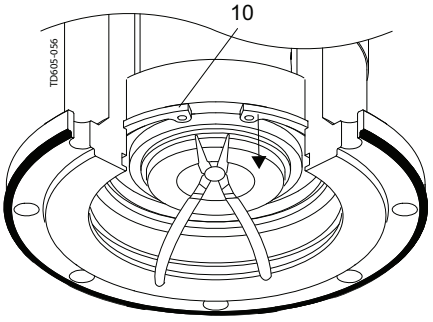


Step 3
Remove radial seal (3).

NOTE
Alfa Laval recommends replacing the radial seal.



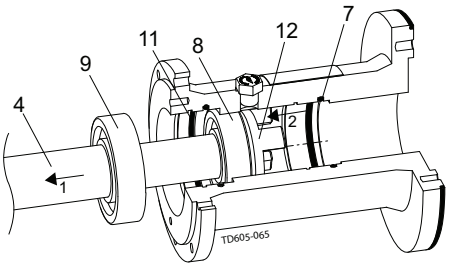
Step 4
Remove outer circlip (10) carefully. Use suited pliers.



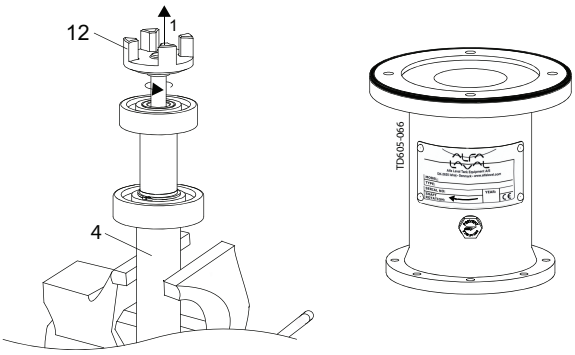
5 Maintenance

For maintenance instructions from suppliers, see chapter 8 Appendix. ***Always*** *ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads.* ***Always*** *refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

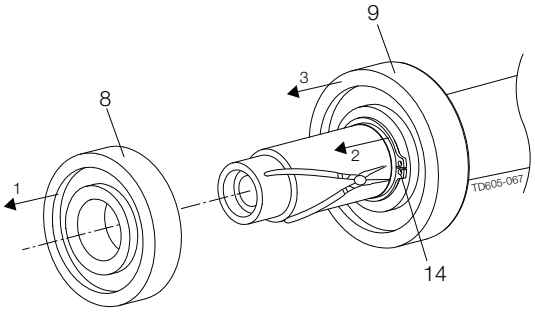
Step 5
1. Pull out shaft (4) including bearings (8, 9).
2. Remove o-rings (7, 11).



Step 6
1. Secure shaft (4), without causing surface damage to it.
2. Remove coupling (12) by turning it the opposite direction indicated by arrow on nameplate



Step 7
1. Remove bearing (8).
2. Remove inner circlip (14) carefully. Use suited pliers.
3. Remove bearing (9).

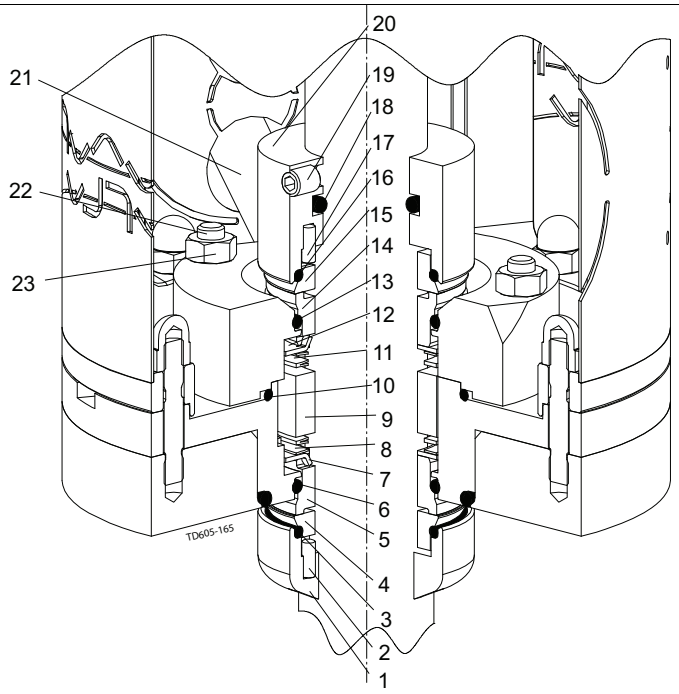


Step 8
1. Replace bearings (8, 9) and o-rings (6, 7, 11).
2. Assembly of bearing frame is reverse as dismantling.

CAUTION
Only apply force to inner bearing rings when mounting bearings on drive shaft.

For maintenance instructions from suppliers, see chapter 8 Appendix. ***Always*** *ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads.* ***Always*** *refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

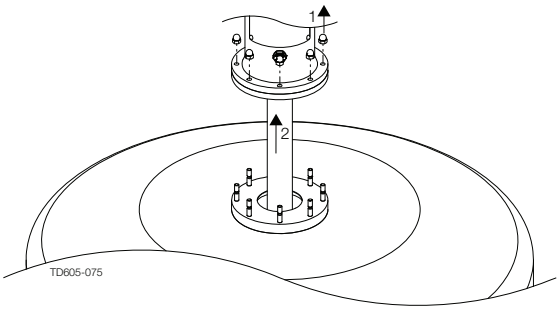
5.10 Replacement of shaft seal, type D



NOTE
To replace seals easier, use detergent.
Ensure subsequent to seal replacement, that all seal faces are totally clean, using alcohol.
Positions referred to in following instructions can be seen in the above illustration.

NOTE
If possible, **always** dismantle the Agitator from the tank before dismounting any parts.

Step 1
1. Dismantle Agitator from welding flange.
2. Lift up Agitator



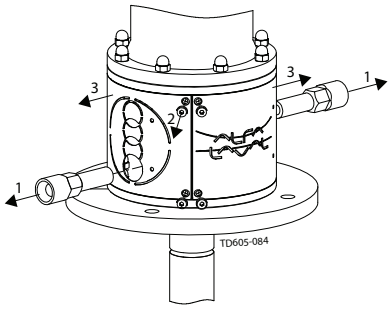
Step 2
Support shaft using shaft retainer tool.

NOTE
Alfa Laval highly recommends to use shaft retainer tool for installation of Agitator within a weight less than 500 kilograms and a shaft diameter between Ø30 and Ø60 (see section 7.15 Tools).

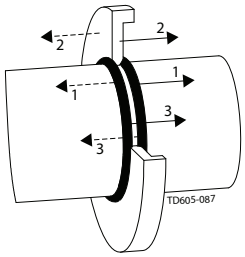
5 Maintenance

For maintenance instructions from suppliers, see chapter 8 Appendix. ***Always*** *ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads.* ***Always*** *refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

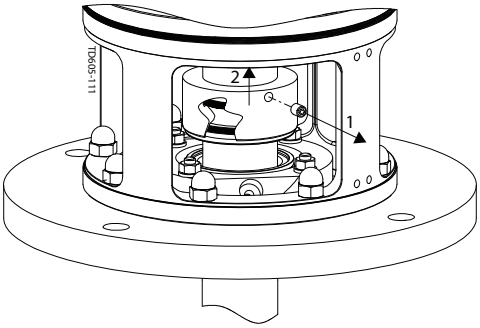
Step 3
1. Remove flush connections (21).
2. Remove guards from lantern.



Step 4
Move oil trap ring and o-rings, if any, along the shaft.



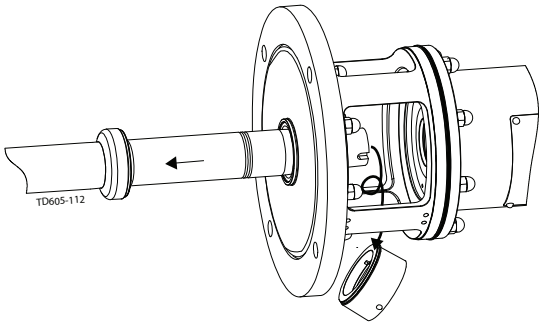
Step 5
1. Loosen pointed screw (19).
2. Move the rotary seal housing (20) and rotary seal part (15, 16, 18) carefully along the shaft.



Step 6
Dismantle drive unit as described in section 5.2 Replacement of drive unit with bearing frame.

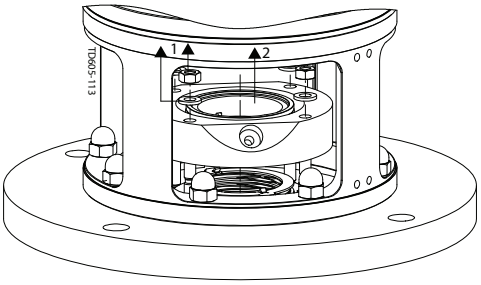
Step 7
1. Dismantle shaft as described in section 5.3 Replacement of drive unit or 5.5 Dismantling and mounting shaft (with bearing frame except BC160), depending on actual agitator type.
2. Remove shaft and rotary seal parts (3, 4) carefully, avoiding contact.

CAUTION
Ensure rotary seal housing and rotary seal part do **NOT** fall when shaft is removed.



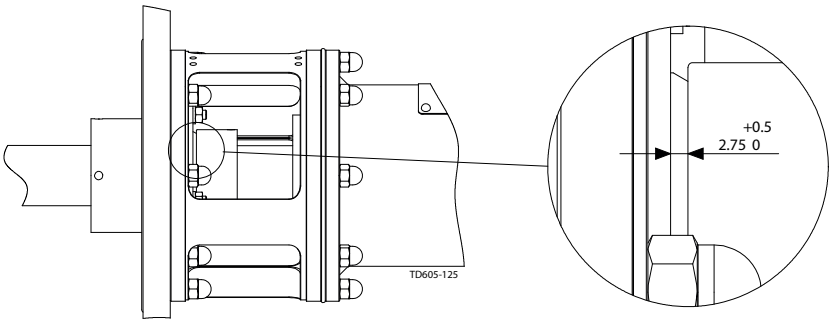
*For maintenance instructions from suppliers, see chapter 8 Appendix. **Always** ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads. **Always** refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

Step 8
1. Remove nuts (23) and washers, securing stationary seal housing.
2. Remove stationary seal housing.



Step 9
1. Replace all seal parts.
2. Assemble Agitator reverse as dismantling.

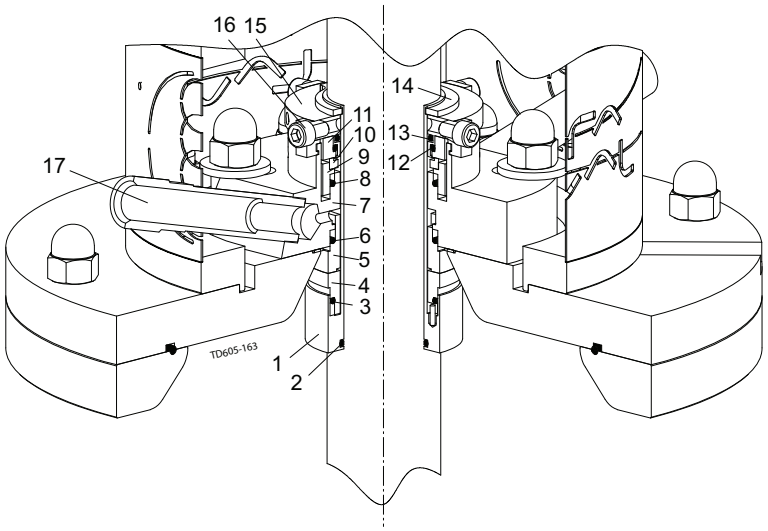
CAUTION
Ensure clearance between rotary and stationary seal housing is 2,75 mm.



5 Maintenance

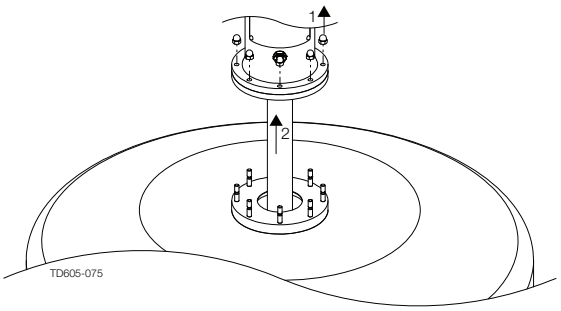
For maintenance instructions from suppliers, see chapter 8 Appendix. ***Always*** *ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads.* ***Always*** *refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

5.11 Replacement of shaft seal, type DC



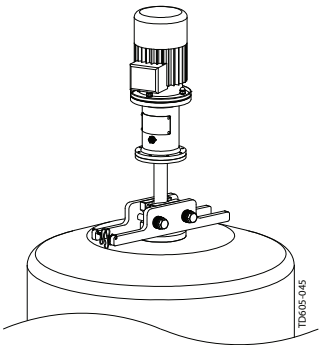
NOTE
To replace seals easier, use detergent. Ensure subsequent to seal replacement, that all seal faces are totally clean, using alcohol. Positions referred to in following instructions can be seen in the above illustration.

Step 1
1. Dismantle Agitator from welding flange.
2. Lift up Agitator.



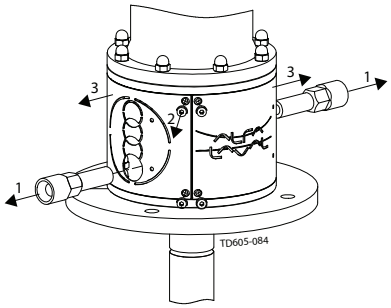
Step 2
Support shaft using shaft retainer tool.

NOTE
Alfa Laval highly recommends to use shaft retainer tool for installation of Agitator within a weight less than 500 kilograms and a shaft diameter between Ø30 and Ø60 (see section 7.15 Tools).

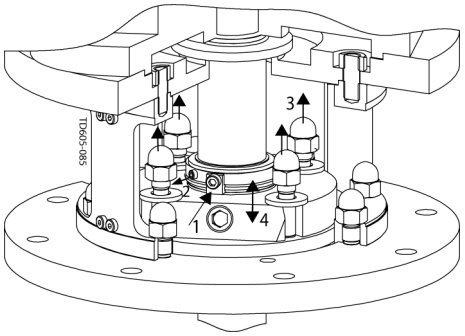


*For maintenance instructions from suppliers, see chapter 8 Appendix. **Always** ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads. **Always** refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

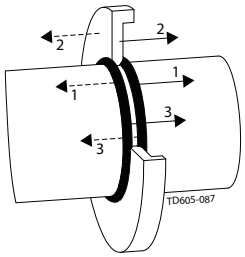
Step 3
1. Remove flush connections (17).
2. Remove guards from lantern.



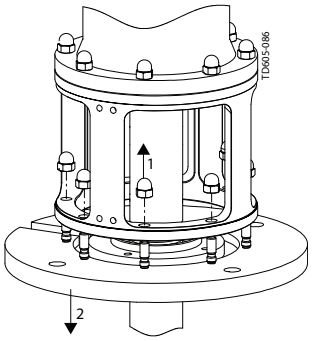
Step 4
1. Rotate distance pieces as shown in Step 10.
2. Loosen pointed screws (the pointed screws are not the screws that fasten the distance pieces).
3. Loosen cap nut, securing the seal
4. Ensure the seal can move along the shaft (up to 10 mm).



Step 5
Move oil trap ring and o-rings, if any, along the shaft.



Step 6
1. Remove cap nuts, securing mounting flange.



Step 7
Dismantle shaft, as described in section 5.3 Replacement of drive unit or 5.5 Dismantling and mounting shaft (with bearing frame except BC160) depending on agitator type and carefully remove lantern.

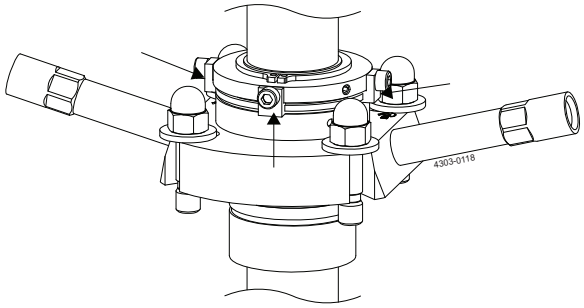
Step 8
Lift lantern and drive unit flange.

5 Maintenance

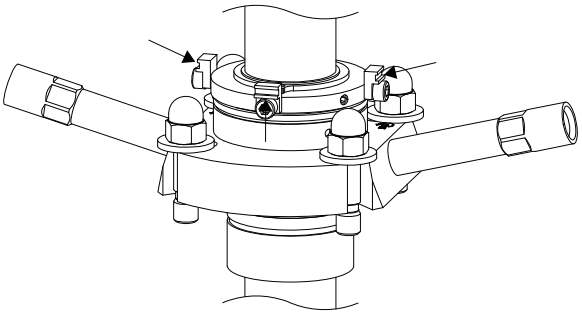
For maintenance instructions from suppliers, see chapter 8 Appendix. ***Always*** *ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads.* ***Always*** *refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

Step 9
Remove DC seal.

Step 10
1. Replace sealing.
2. Assemble Agitator reverse as dismantling.



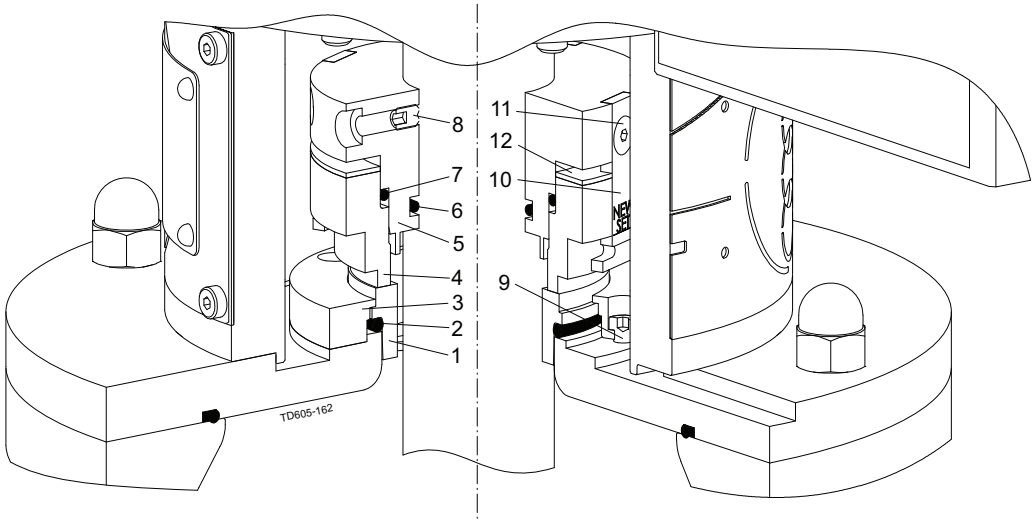
During mounting / dismounting


Before start

NOTE
Ensure distance pieces are oriented correctly during mounting or dismounting.

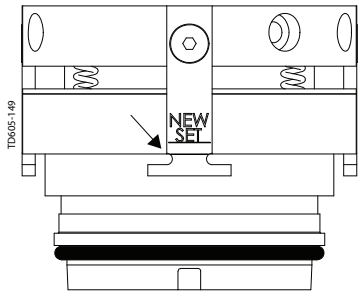
For maintenance instructions from suppliers, see chapter 8 Appendix. ***Always*** *ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads.* ***Always*** *refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

5.12 Replacement of shaft seal, type S (and type S with dust trap)

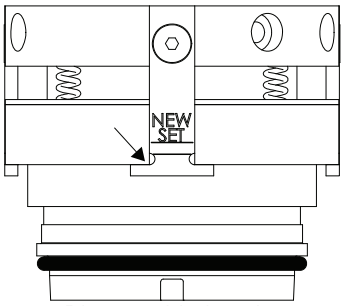


NOTE
To replace seals easier, use detergent.
Ensure subsequent to seal replacement, that all seal faces are totally clean, using alcohol.
Positions referred to in following instructions can be seen in the above illustration.

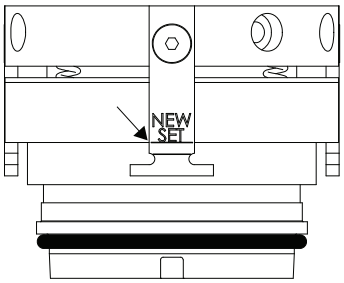
NOTE
Seal is designed for dry running, so a whining noise during operation is quite normal.



Change seal!



Disassembled seal



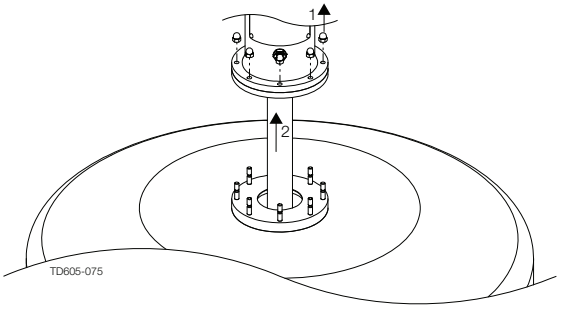
New seal after mounting

NOTE
If possible, **always** dismantle the Agitator from the tank before dismounting any parts.

5 Maintenance

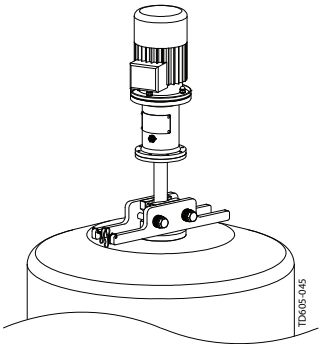
For maintenance instructions from suppliers, see chapter 8 Appendix. ***Always*** *ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads.* ***Always*** *refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

Step 1
1. Dismantle Agitator from welding flange.
2. Lift up Agitator.

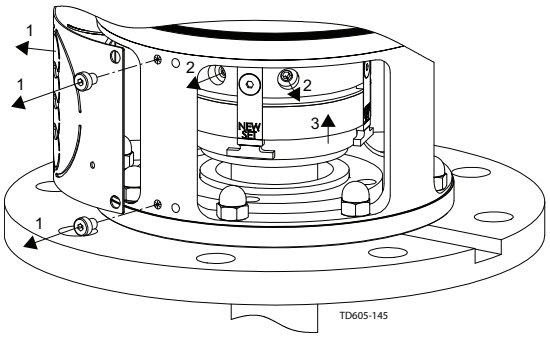


Step 2
Support shaft using shaft retainer tool.

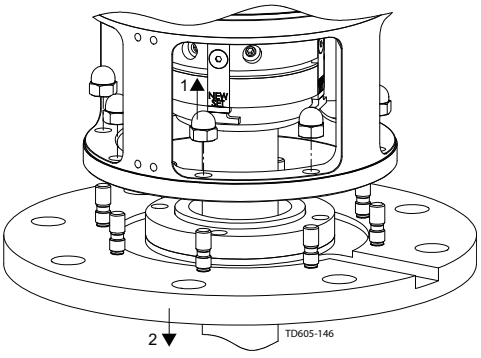
NOTE
Alfa Laval highly recommends to use shaft retainer tool for installation of Agitator within a weight less than 500 kilogram and a shaft diameter between Ø30 and Ø60 (see section 7.15 Tools).



Step 3
1. Remove guards from lantern.
2. Loosen screws, securing the rotating seal part onto the shaft.
3. Move the rotating seal part carefully along the shaft.



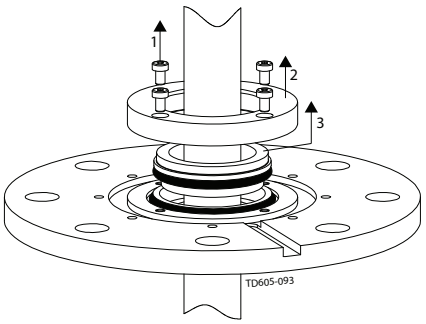
Step 4
1. Remove cap nuts.
2. Move the mounting flange, including stationary seal part, by pulling it carefully along the shaft, avoiding contact.



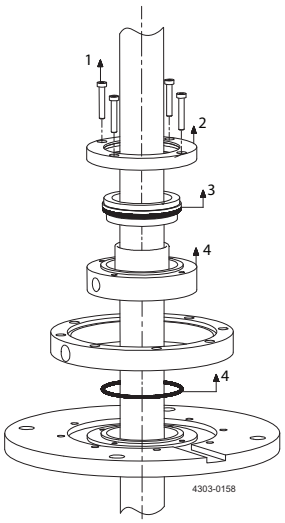
For maintenance instructions from suppliers, see chapter 8 Appendix. ***Always*** *ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads.* ***Always*** *refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

Step 5

5a
1. Remove screws (9).
2. Move retainer ring (3).
3. Move stationary seal part (1) and o-ring (2) from mounting flange.



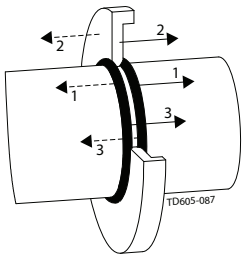
5b (only for dust trap option)
1. Remove screws.
2. Move retainer ring.
3. Move stationary seal part and o-ring from mounting flange.
4. Move dust trap and o-ring from mounting flange.



Step 6
If necessary, dismantle drive unit as described in section 5.2 Replacement of drive unit with bearing frame or 5.3 Replacement of drive unit depending on agitator type.

Step 7
If necessary, dismantle shaft as described in section 5.3 Replacement of drive unit or 5.5 Dismantling and mounting shaft (with bearing frame except BC160) depending on agitator type and remove lantern with bearing frame.

Step 8
Remove oil trap ring, if any.



Step 9
Remove rotary seal part (4, 5, 6, 7, 8, 10, 11), by pulling it carefully along the shaft.

Step 10
1. Replace all seal parts and o-rings (2, 6, 7).
2. Assemble the new rotary seal part on the shaft, by using plenty of detergent.

5 Maintenance

For maintenance instructions from suppliers, see chapter 8 Appendix. ***Always*** *ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads.* ***Always*** *refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

Step 11
Assemble oil trap ring, if any.

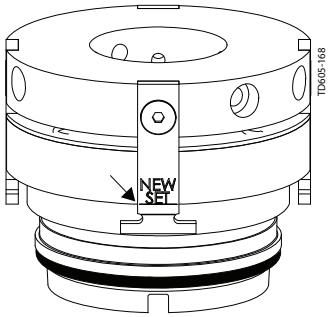
Step 12
CAUTION
Assemble the stationary seal into the mounting flange by following instructions to the letter.
1. Ensure that pins fit onto the groove in the seal.
2. Carefully press down the stationary seal part (1, 2) and retainer ring (3) into the mounting flange.
3. Use first: DIN7984 or DIN912 M5x12 screws during assembly and afterwards: DIN7984 M5x10, DIN7984 or DIN912 M5x10 screws during assembly – The procedure is used to ensure that the retainer ring (3) is ALWAYS parallel to the mounting flange
4. Remove the M5x10 screws and assemble with original fitted screws.

Step 13
Assemble mounting flange, shaft and drive unit, following the reverse procedure of dismantling.

Step 14
Move the rotating seal part towards the stationary seal part.

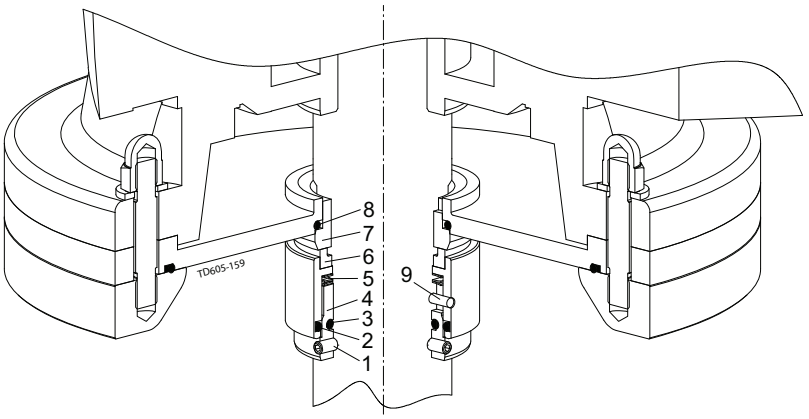
1. Tighten the screws (8) securing the seal onto the shaft.

CAUTION!
The new seal must be adjusted to the “NEW SET” line.



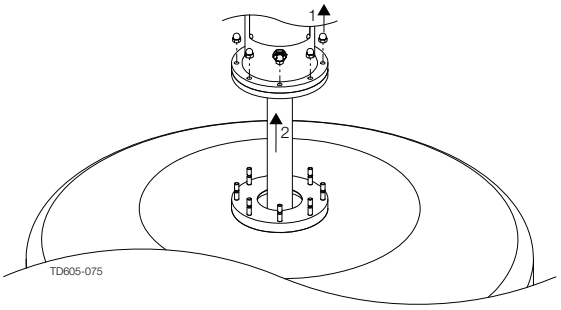
For maintenance instructions from suppliers, see chapter 8 Appendix. ***Always*** *ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads.* ***Always*** *refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

5.13 Replacement of shaft seal, type S3



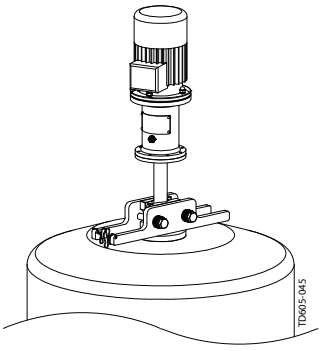
NOTE
To replace seals easier, use detergent.
Ensure subsequent to seal replacement, that all seal faces are totally clean, using alcohol.
If possible, **always** dismantle the Agitator from the tank before dismounting any parts.
The seal (see section 2.3 Intended use) is designed for dry running, so a whining noise during operation is quite normal.
Positions referred to in following instructions can be seen in the above illustration.

Step 1
1. Dismantle Agitator from welding flange.
2. Lift up Agitator



Step 2
Support shaft using shaft retainer tool.

NOTE
Alfa Laval highly recommends to use shaft retainer tool for installation of Agitator within a weight less than 500 kilograms and a shaft diameter between Ø30 and Ø60 (see section 7.15 Tools).



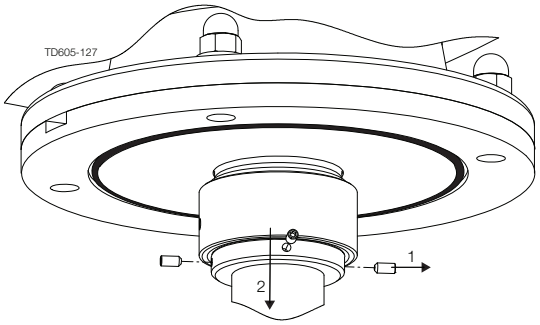
5 Maintenance

For maintenance instructions from suppliers, see chapter 8 Appendix. ***Always*** *ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads.* ***Always*** *refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

Step 3

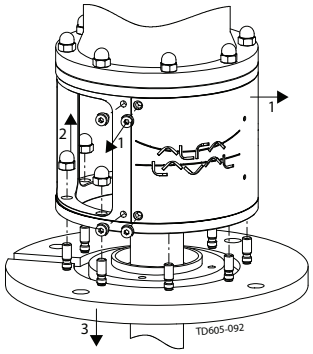
1. Loosen pointed screws (1), securing rotary seal housing onto the shaft.
2. Move the seal housing, including rotary seal part, by pulling it carefully along the shaft, avoiding contact.

NOTE
Use mild detergent to reduce friction.



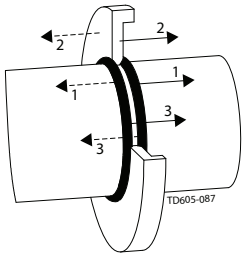
Step 4

1. Remove guards from lantern.
2. Remover cap nuts.
3. Move the mounting flange, including stationary seal ring, carefully along the shaft, avoiding contact.



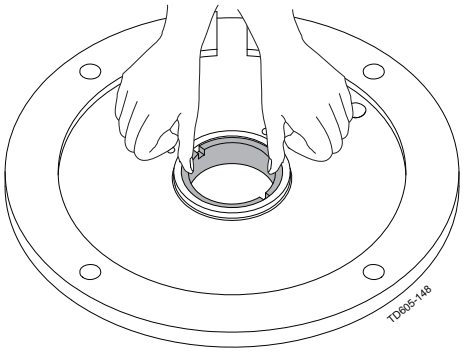
Step 5

Move oil trap ring and o-rings, if any, along the shaft.



Step 6

1. Push stationary seal ring (7) out of the mounting flange.



Step 7

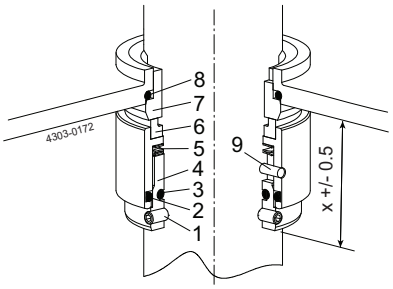
Remove all seal parts from shaft.

*For maintenance instructions from suppliers, see chapter 8 Appendix. **Always** ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads. **Always** refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

Step 8

1. Replace all seal parts.
2. Assemble Agitator reverse as dismantling and position the rotating seal element according measure x.

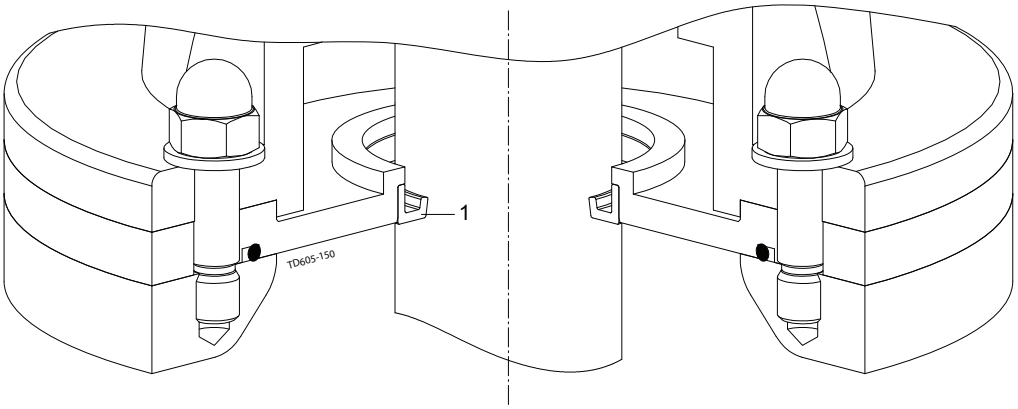
Shaft size:
Ø30-Ø35, x=37.5
Ø40-Ø45, x=40.0
Ø50-Ø55, x=42.5
Ø60-Ø65, x=47.5
Ø70-Ø75, x=55.0
Ø80, x=54.0
Ø90, x=59.0



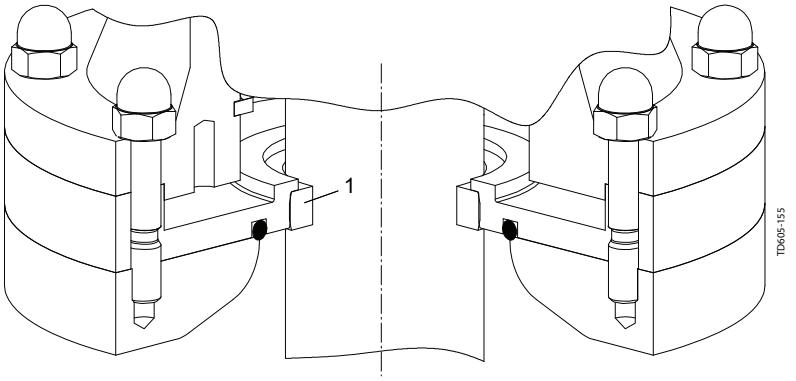
5 Maintenance

For maintenance instructions from suppliers, see chapter 8 Appendix. ***Always*** *ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads.* ***Always*** *refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

5.14 Replacement of shaft seal, type R or G



Shaft seal type R

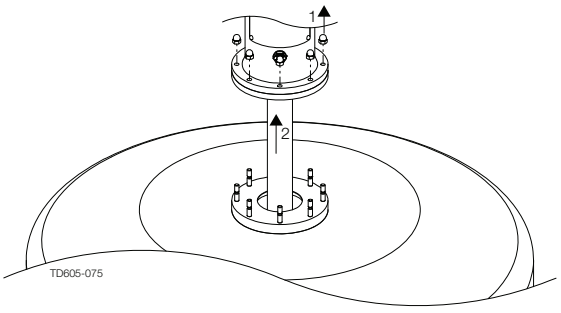


Shaft seal type G

NOTE
To replace seals easier, use detergent.
Ensure subsequent to seal replacement, that all seal faces are totally clean, using alcohol.
Positions referred to in following instructions can be seen in the above illustration.

NOTE
If possible, **always** dismantle the Agitator from the tank before dismounting any parts.

Step 1
1. Dismantle Agitator from welding flange.
2. Lift up Agitator.



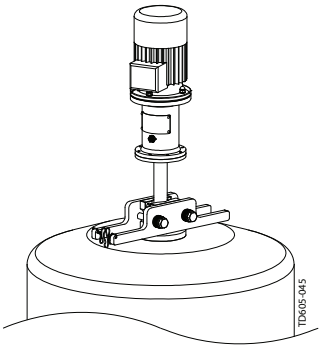
*For maintenance instructions from suppliers, see chapter 8 Appendix. **Always** ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads. **Always** refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

Step 2

Support shaft using shaft retainer tool.

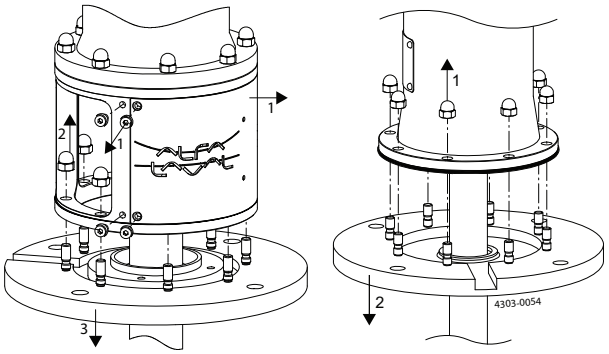
NOTE

Alfa Laval highly recommends to use shaft retainer tool for installation of Agitator within a weight less than 500 kilogram and a shaft diameter between Ø30 and Ø60 (see section 7.15 Tools).



Step 3

1. Remove guards from lantern, if any.
2. Remove cap nut from lantern or mounting flange depending on actual configuration.
3. Move the mounting flange including seal carefully along the shaft.

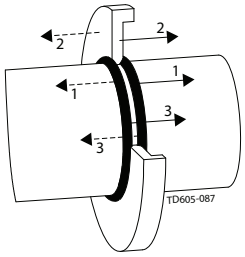


Step 4

If necessary, dismantle drive unit as described in section 5.2 Replacement of drive unit with bearing frame or 5.3 Replacement of drive unit and if required dismantle shaft as described in section 5.3 Replacement of drive unit or 5.5 Dismantling and mounting shaft (with bearing frame except BC160) depending on actual configuration.

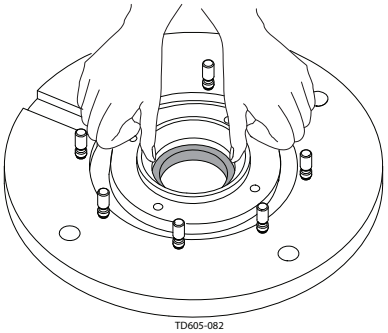
Step 5

Remove oil trap ring, if any.



Step 6

Push R/G seal (1) out of the mounting flange.



5 Maintenance

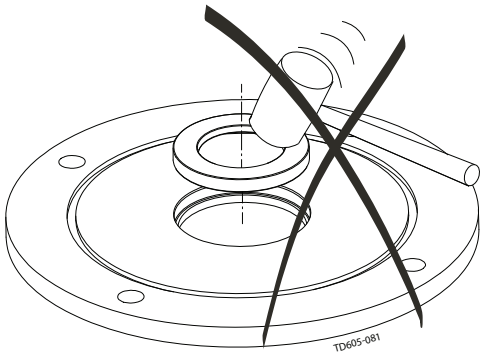
For maintenance instructions from suppliers, see chapter 8 Appendix. ***Always*** *ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads.* ***Always*** *refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

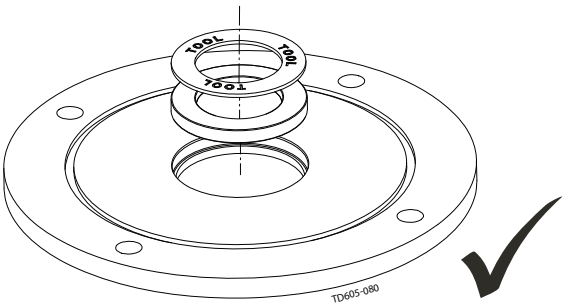
Step 7

1. Replace R/G seal (1) by pressing it evenly into mounting flange, using a proper tool.

NOTE!

Assure correct sealing orientation.





Step 8

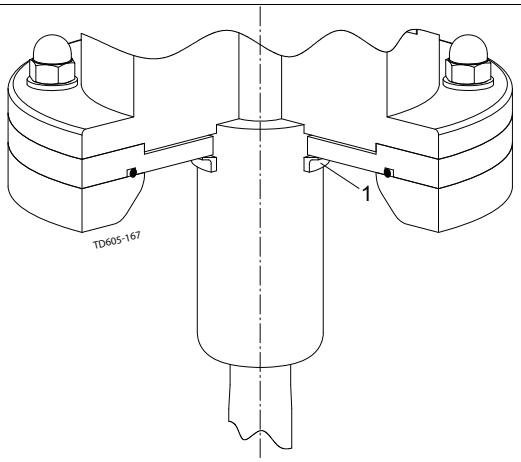
Apply some grease around the shaft at the position of the seal.

Step 9

Assemble Agitator reverse as dismantling.

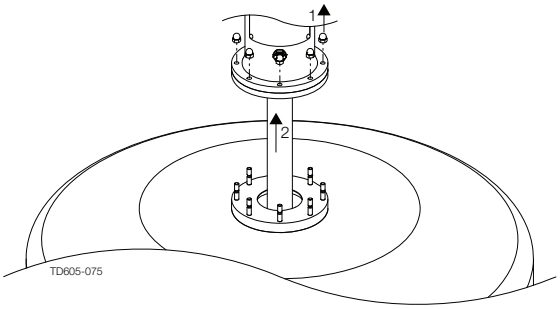
For maintenance instructions from suppliers, see chapter 8 Appendix. ***Always*** *ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads.* ***Always*** *refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

5.15 Replacement of shaft seal, type V



NOTE
To replace seals easier, use detergent.
Ensure subsequent to seal replacement, that all seal faces are totally clean, using alcohol.
If possible, **always** dismantle the Agitator from the tank before dismounting any parts.
Positions referred to in following instructions can be seen in the above illustration.

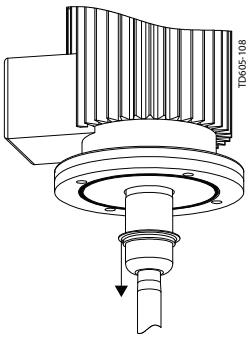
Step 1
1. Dismantle Agitator from welding flange.
2. Lift up Agitator



Step 2
Support shaft using shaft retainer tool.

NOTE
Alfa Laval highly recommends to use shaft retainer tool for installation of Agitator within a weight less than 500 kilograms and a shaft diameter between Ø30 and Ø60 (see section 7.15 Tools).

Step 3
1. Dismantle impeller device.
2. Pull V seal (1) along the shaft.



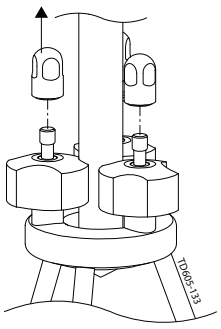
*For maintenance instructions from suppliers, see chapter 8 Appendix. **Always** ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads. **Always** refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

Step 4
1. Replace seal.
2. Assemble Agitator reverse as dismantling.

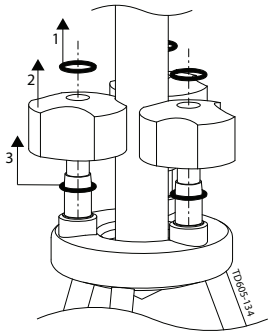
*For maintenance instructions from suppliers, see chapter 8 Appendix. **Always** ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads. **Always** refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

5.16 Replacement of wear bushing in intermediate bearing support

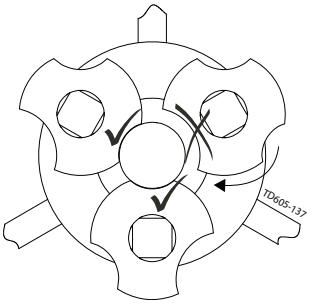
Step 1
Remove screw(s).
Remove cap nuts.



Step 2
1. Remove o-rings.
2. Remove wear bushings.
3. Remove o-rings.



Step 3
1. Replace wear bushing and O-rings (for MS2 type, position bushings according to shaft diameter).
2. Assemble reverse as dismantling.

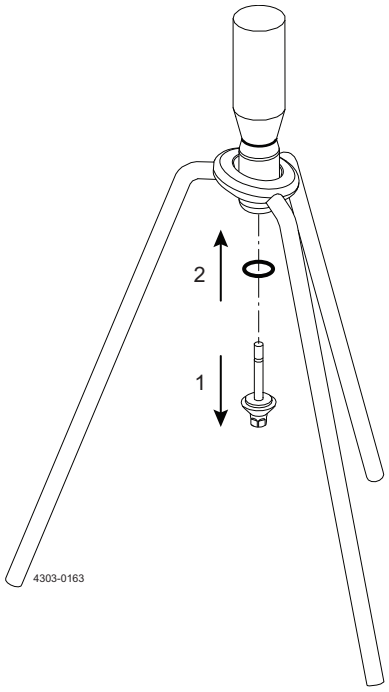


5 Maintenance

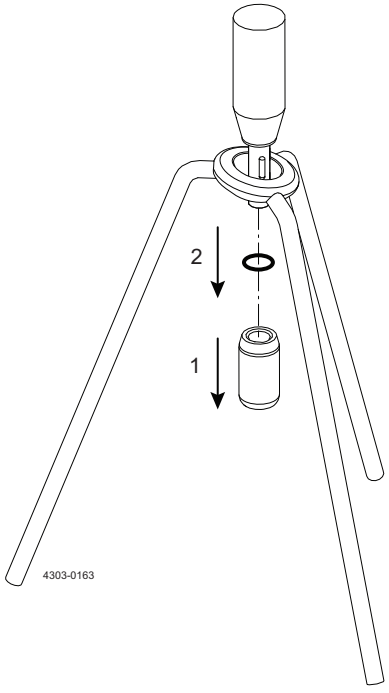
For maintenance instructions from suppliers, see chapter 8 Appendix. ***Always*** *ensure that mounting is according to chapter 6 Technical Data. Ensure totally clean surfaces during mounting - also remove remaining loctite residue on threads.* ***Always*** *refer to tightening torques in section 6.6 Tightening torques for bolt connections.*

5.17 Replacement of wear bushing in bottom support

Step 1
1. Remove screw and lower o-ring.
2. Replace o-ring.



Step 2
1. Remove wear bushing and upper o-ring.
2. Replace wear bushing and o-ring.
3. Assemble reverse as dismantling.



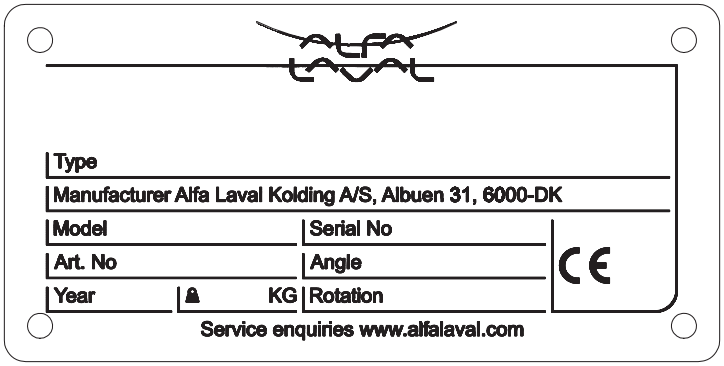
NOTE
Screw tightening torque max. 15Nm.

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 name plate as shown on the illustration.



6 Technical Data

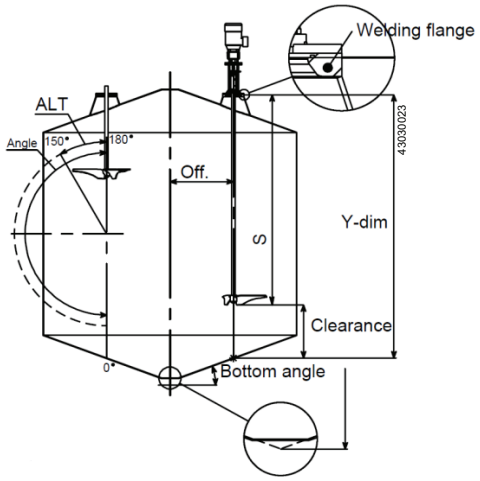
All dimensions in mm unless otherwise stated.

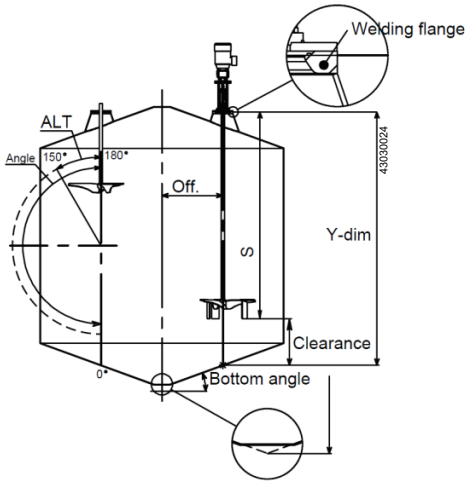
6.2 Mounting angle for top mounting agitator type ALT

To ensure optimal agitation the top mounted agitator must be installed in the mounting angle specified on the name plate as shown on the illustration and in the off center position required from the Alfa Laval quotation agreement.

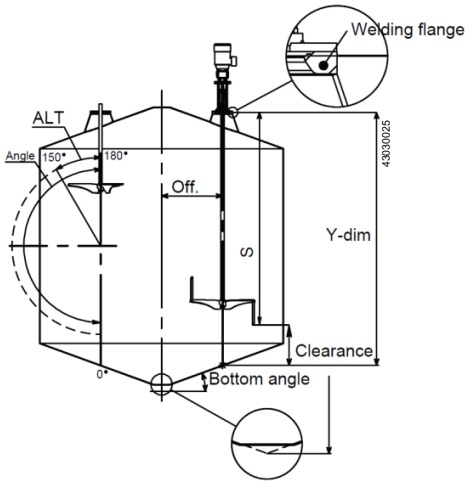
S: is the length of the agitator shaft including the impeller.

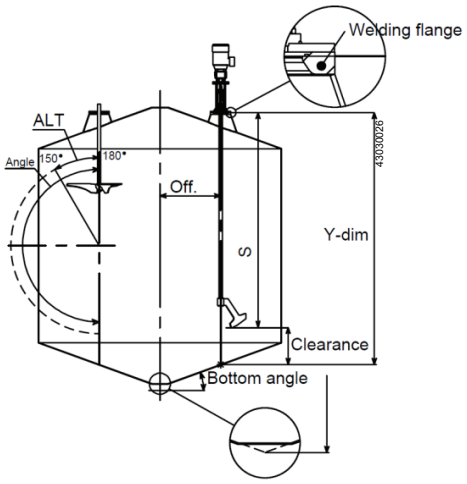
Y-dim: is the distance from the welding flange face surface and to the tank bottom where the center line of the agitator intersects with the tank bottom line.





All dimensions in mm unless otherwise stated.





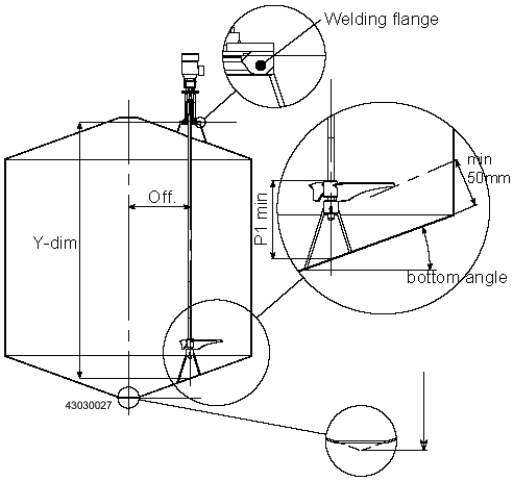
All dimensions in mm unless otherwise stated.

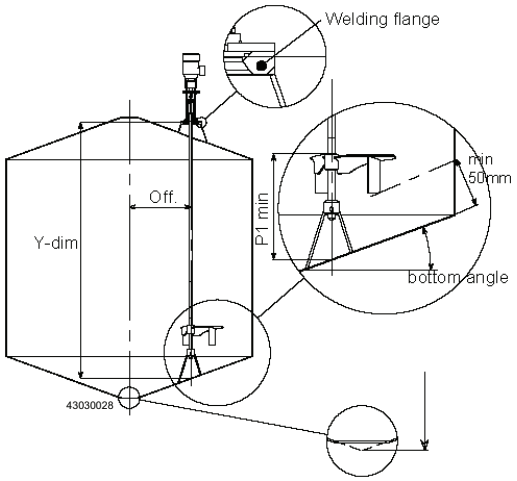
6.3 Mounting angle for top mounting agitator type ALTB

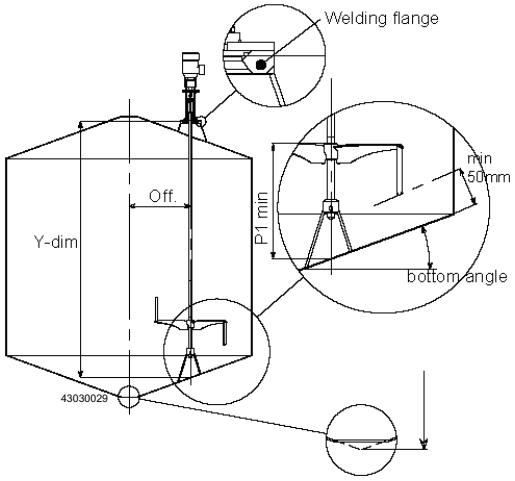
To ensure optimal agitation the top mounted agitator must be installed in the mounting angle specified on the name plate as shown on the illustration and in the off center position required from the Alfa Laval quotation agreement.

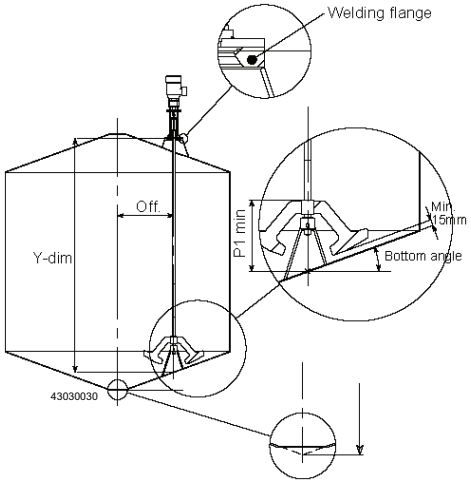
P1min: is a distance to position the lower impeller to ensure agitation to the lowest fluid level as possible / required for actual application.

Y-dim: is the distance from the welding flange face surface and to the tank bottom where the center line of the agitator intersects with the tank bottom line.









All dimensions in mm unless otherwise stated.

6.4 Connecting flush – Seal type D

Flush connection:
In and out: Male 1/2"-14 BSP (ISO 7/1-Rp)
Flushing pressure max. 2.0 bar(g)

Flush media pressure recommendation to prevent flush media contamination by the product media:
(flush media pressure > tank operating pressure)
- Flushing pressure ≥ (Tank operating pressure + 0.1 bar)

NOTE
Tank pressure cannot be higher than 1.9 bar(g) due to the maximum flushing pressure. If higher tank pressure is needed the next flush media pressure recommendation must be followed.

Flush media pressure recommendation to prevent product media contamination by the flush media:
(tank operating pressure > flush media pressure)
- Flushing pressure ≤ (Tank operating pressure – 0.1 bar)
- (Tank operating pressure – Flushing pressure) ≤ 2.5 bar

NOTE
If the tank pressure is more than 2,5 bar(g) greater than the flushing pressure, there will be a risk of dry running on the primary seal faces due to the atmosphere in the tank will push the flush media out of the primary seal faces.

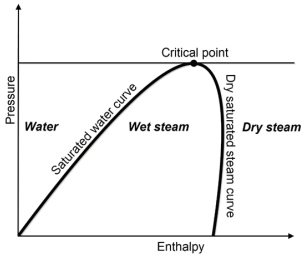
Flush media flow recommendation:
- Flushing flow rate > 0.25 ltr/min
- Lower flushing flow rate is allowed as long as the temperature difference between in- and outlet is < 10°C

Flush media type recommendation:
- White oils
- Water
- Wet steam
- Alcohol

6 Technical Data

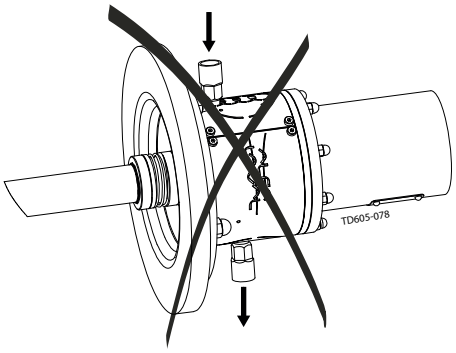
All dimensions in mm unless otherwise stated.

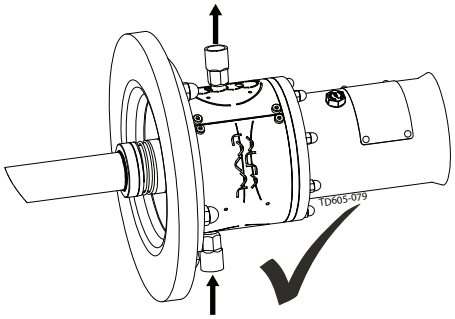
Flush media type recommendation:
- Always use appropriately in- and outlet temperatures given for current seal elastomers
- Inlet temperature to be 15°C below actual fluid boiling point (temperature and pressure dependent)
- Always use wet steam (H_2O) if steam is used as flushing fluid
- Inlet temperature ≤ 121°C



Sterile barrier at seal type D and DC:
- Use a sterile supply system with preferred sterilization temperature and water / wet steam as flush type and ensure that above recommendations are followed

Ensure flush connections are not installed or oriented in such way that air pockets will appear. In some cases initial air pockets near the seal surfaces (e.q. at bottom mounted agitators ALB) cannot be avoided. It has been tested and verified that an initial flow rate without air at 5 ltr/min lasting for 30 seconds while the agitator is running ensures that all air in seal and flushing chamber will be flushed out.





NOTE
Alfa Laval recommends installing a pressure relief valve to ensure pressure never exceed specifications.
Alfa Laval recommends installing a non-return valve onto the inlet connection, to ensure that the seal never runs dry.
If higher flushing pressure is desired, please contact Alfa Laval for advice.

All dimensions in mm unless otherwise stated.

6.5 Connecting flush – Seal type DC

Flush connection:
In and out: Male 1/2"-14 BSP (ISO 7/1-Rp)
Flushing pressure max. 7.0 bar(g)

Flush media pressure recommendation to prevent flush media contamination by the product media:
(flush media pressure > tank operating pressure)
- Flushing pressure ≥ (Tank operating pressure + 0.1 bar)

Flush media pressure recommendation to prevent product media contamination by the flush media:
(tank operating pressure > flush media pressure)
- Flushing pressure ≤ (Tank operating pressure – 0.1 bar)
- (Tank operating pressure – Flushing pressure) ≤ 2.5 bar

NOTE
If the tank pressure is more than 2.5 bar(g) greater than the flushing pressure, there will be a risk of dry running on the primary seal faces due to the atmosphere in the tank will push the flush media out of the primary seal faces.

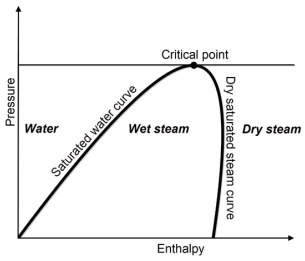
Flush media flow recommendation:
- Flushing flow rate > 0.25 ltr/min
- Lower flushing flow rate is allowed as long as the temperature difference between in- and outlet is < 10°C

6 Technical Data

All dimensions in mm unless otherwise stated.

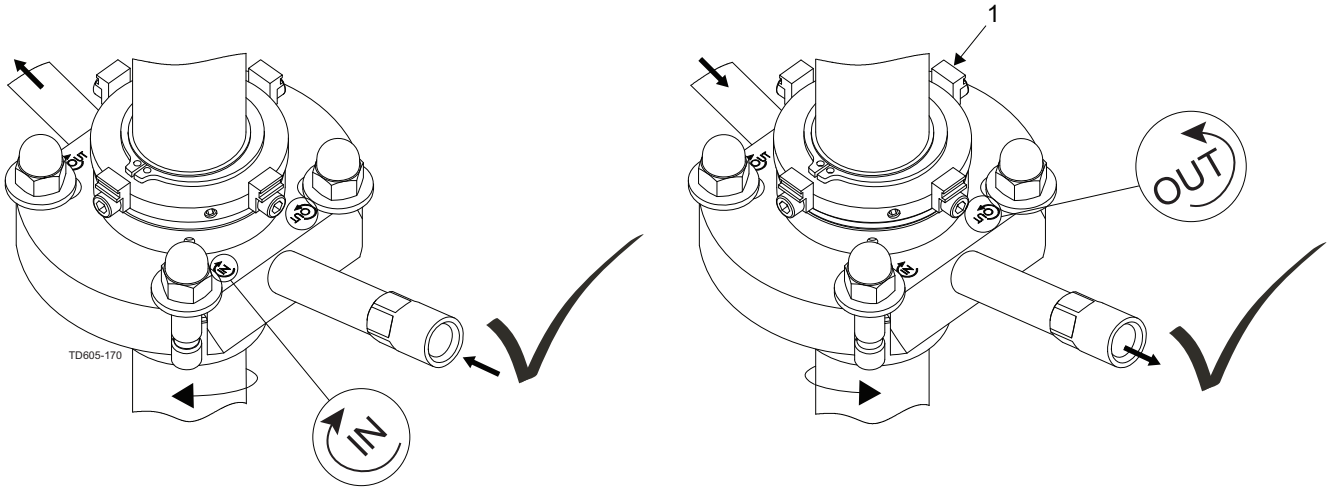
Flush media type recommendation:
- White oils
- Water
- Wet steam
- Alcohol

Flush media type recommendation:
- Always use appropriately in- and outlet temperatures given for current seal elastomers
- Inlet temperature to be 15°C below actual fluid boiling point (temperature and pressure dependent)
- Always use wet steam (H_2O) if steam is used as flushing fluid
- Inlet temperature ≤ 121°C



Sterile barrier at seal type D and DC:
- Use a sterile supply system with preferred sterilization temperature and water / wet steam as flush type and ensure that above recommendations are followed

Ensure that connection of outlet and inlet is correct, with regard to Agitator rotation direction!
Ensure that the distance pieces (1) on the seal are mounted as shown on illustration.



NOTE
Alfa Laval recommends installing a pressure relief valve to ensure pressure never exceed specifications.
Alfa Laval recommends installing a non-return valve onto the inlet connection, to ensure that the seal never runs dry.
If higher flushing pressure is desired, please contact Alfa Laval for advice.

All dimensions in mm unless otherwise stated.

6.6 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

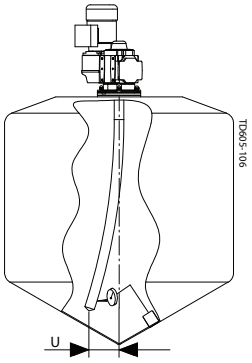
6 Technical Data

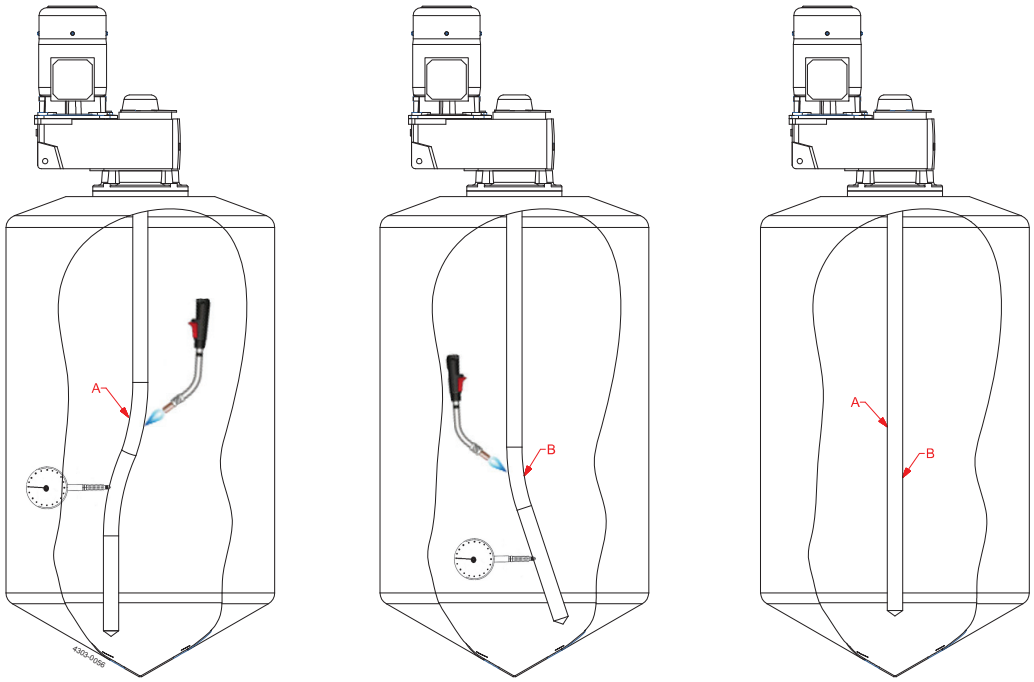
All dimensions in mm unless otherwise stated.

6.7 Shaft alignment

Shaft to be aligned in bearing frame or in gear motor.

RPM up to:	50	100	500	1000	2800
U (max radial tolerance, ALT)	0.4	0.3	0.2	0.1	0.05
U (max radial tolerance, ALTB)	2.0	1.5	1.0		





After propellers has been welded onto the shaft and / or two shaft parts has been welded together - the shaft must be aligned. If the shafts has been welded according to Alfa Lavals recommendations shown below – the required alignment will be very little as the amount of introduced heat to the shaft is minimized and due to the fact that all shafts has been aligned before delivery from Alfa Laval.

"All-weld shaft connections and propellers to shaft with one welding seam at a time, cool with air and continue with one welding until welding is according to illustration. Use welding procedures which introduce as less heat, tension and bending to the shaft as possible."

Required tool:
1. A gas-welding torch supplied with a mixture of Acetylene and Oxygen gas.
2. A dial indicator.

All dimensions in mm unless otherwise stated.

Procedure:

1. Alignment of the shaft is carried out in steps from the bearing frame / gear motor and down to the shaft end.
2. If the shaft has been exposed to uneven heat around “A” (due to welding of shaft connection or welding of propeller onto shaft) a possible bend can be introduced around “A”.
3. The dial indicator is located about 500-2000 mm below “A” (but above the next bend “B”) and the shaft is rotated until the shaft is pointing to the left as shown on the picture.
4. The welding torch is used on the opposite site of the bend (the right side of the shaft in this example) about 25-50 mm further up or down from the welding area “A”. The welding torch is positioned very near the shaft surface without moving it and the surface of the shaft is rapidly heated up (1-10 seconds depending on shaft bend) until a Ø2-10 mm red spot is observed. Observing the dial indicator the shaft will, during the heating process, bend even more to the wrong direction but during cooling it bends back to a “more” align position.
5. The shaft is cooled down with compressed air until the temperature of the part of the shaft around A is the same as the rest of the shaft and the surrounding temperature (2-10 minutes depending on amount of heat introduced).
6. Step 3), 4) and 5) are repeated until the alignment is according the specified “U” (which is a function of speed and agitator type).
7. The next position “B” where the shaft has been exposed to uneven heat is located (due to welding of shaft connection or welding of propeller onto shaft).
8. The dial indicator is located 500-2000 mm below “B” (but above the next bend) or at the shaft end if the shaft does not have any other bends and the shaft is rotated until the shaft is pointing to the right as shown on the picture.
9. The welding torch is used on the opposite site of the bend (the left side of the shaft in this example) about 25-50 mm further up or down from the welding area. The welding torch is positioned very near shaft surface without moving it and the surface of the shaft is rapidly heated up (1-10 seconds depending on shaft bend) until a Ø2-10 mm red spot is observed.
10. The shaft is cooled down with compressed air until the temperature of the part of the shaft around A is the same as the rest of the shaft and the surrounding temperature (2-10 minutes depending on amount of heat introduced).
11. Step 8), 9) and 10) are repeated until the alignment is according the specified “U” (which is a function of speed and agitator type).
12. The spot areas where the shaft has been heated and aligned using the welding torch must be cleaning using chemical pickling and or mechanical abrasive polishing.

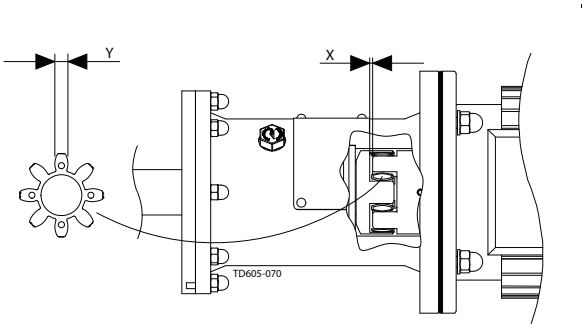
6 Technical Data

All dimensions in mm unless otherwise stated.

6.8 Spider coupling

Axial alignment and tooth thickness [mm]:

	Bearing frame type:				
	BC160/35 BC160D/30 BC160DH/30	B20 B25 B25/30	B35 B35/40	B45 B45/50	B55 B55/60
X:	2	2	2.5	3	3.5
Ynew:	8.5	8.5	10.9	13.3	17.7
Ymin:	5.6	5.6	7.9	10.3	13.7



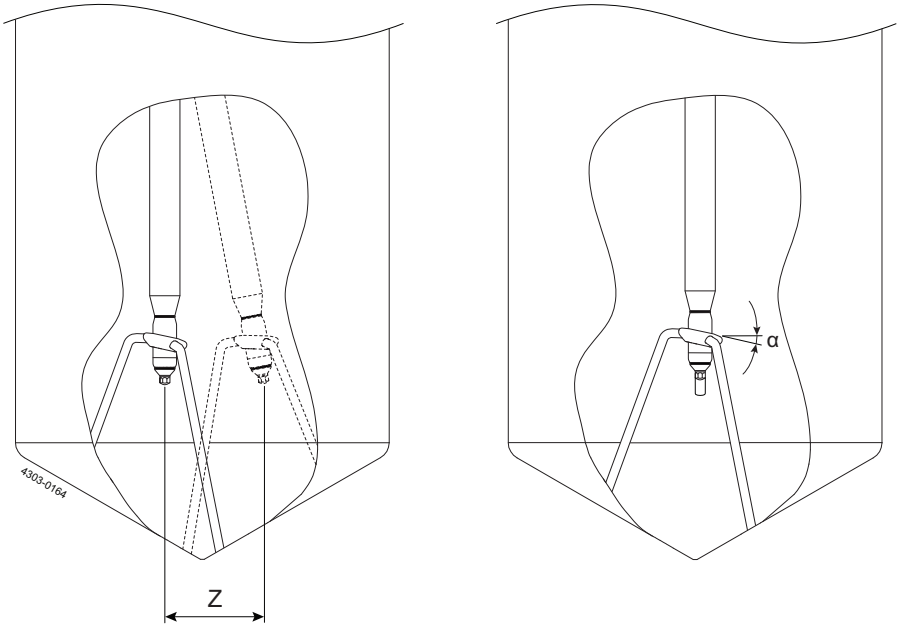
CAUTION
During check of spider ensure that all dust is removed before reassembly.

All dimensions in mm unless otherwise stated.

6.9 Bottom support alignment

Shaft alignment (radial and angle misalignment) must be according to values shown in table below.

Shaft length, [mm]	500-1000	2000	3000	4000	5000	6000	7000	7001-15000
Z, [mm], (max)	4	8	10	12	15	22	30	40
α, [°], (+/- 1.5°)	12	12	12	12	12	12	12	12



6 Technical Data

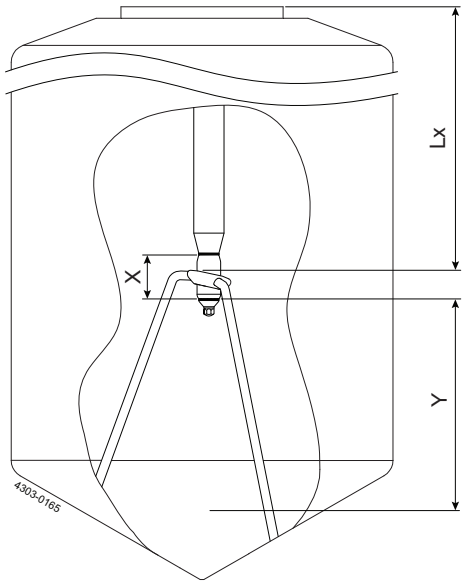
All dimensions in mm unless otherwise stated.

6.10 Bottom support positioning

Shaft diameter, [mm]	Ø30-Ø65	Ø70-Ø90
X, Bushing height	65	75

Ensure that bushing can be removed after position and welding-in steady bearing stand: Y>X (also depending on tank bottom angle).

The distance Lx can be found in the Alfa Laval quotation agreement.



All dimensions in mm unless otherwise stated.

6.11 Storage

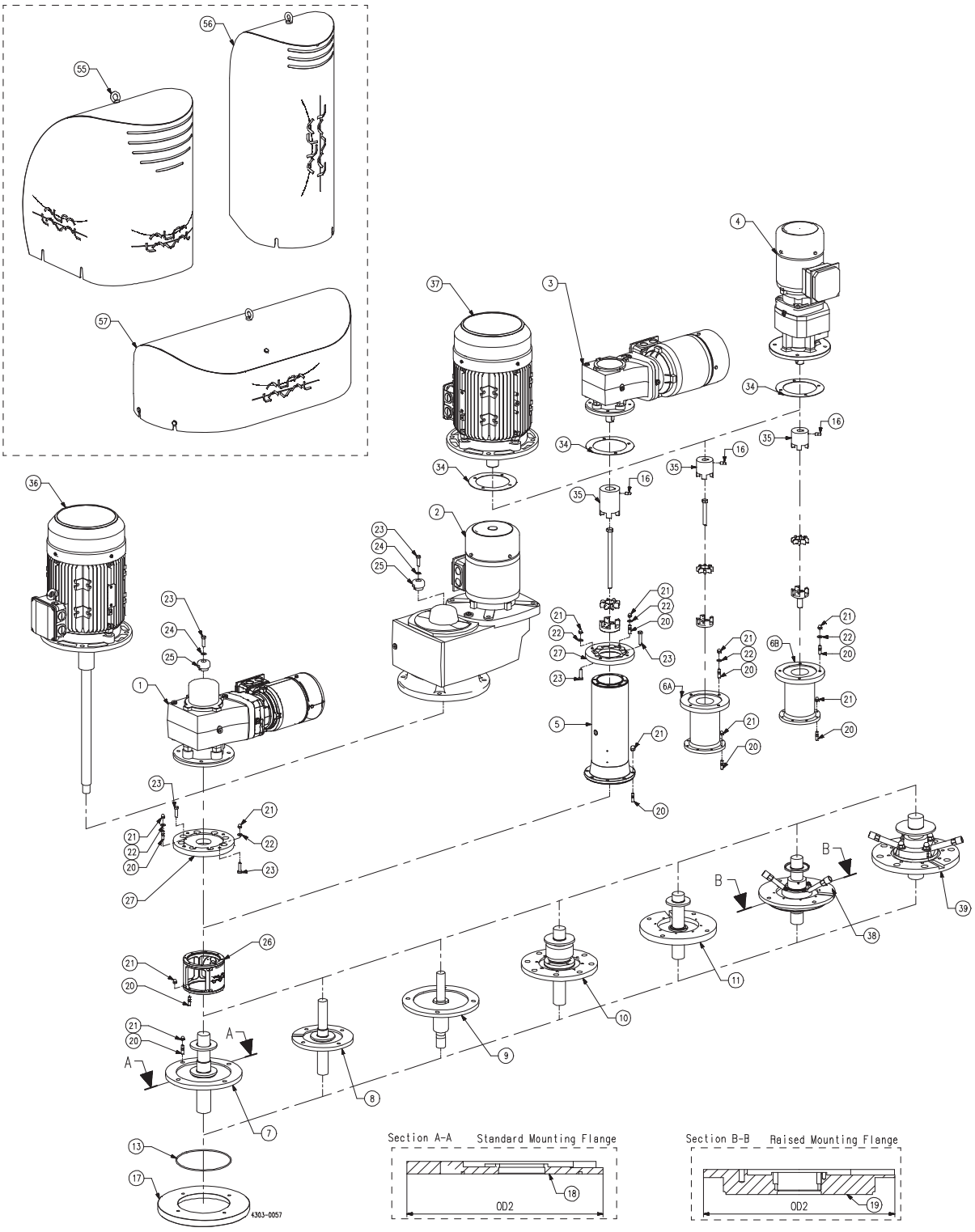
Store the Agitator in dry and clean environments.

Rotate shaft every second week to ensure seal faces do not stick together.

7 Part lists, part drawings and service kits

Agitator type ALT / ALTB, main components - Drive end

7.1 Agitator Main Components, Drive end



Agitator type ALT / ALTB, main components - Drive end

Parts list

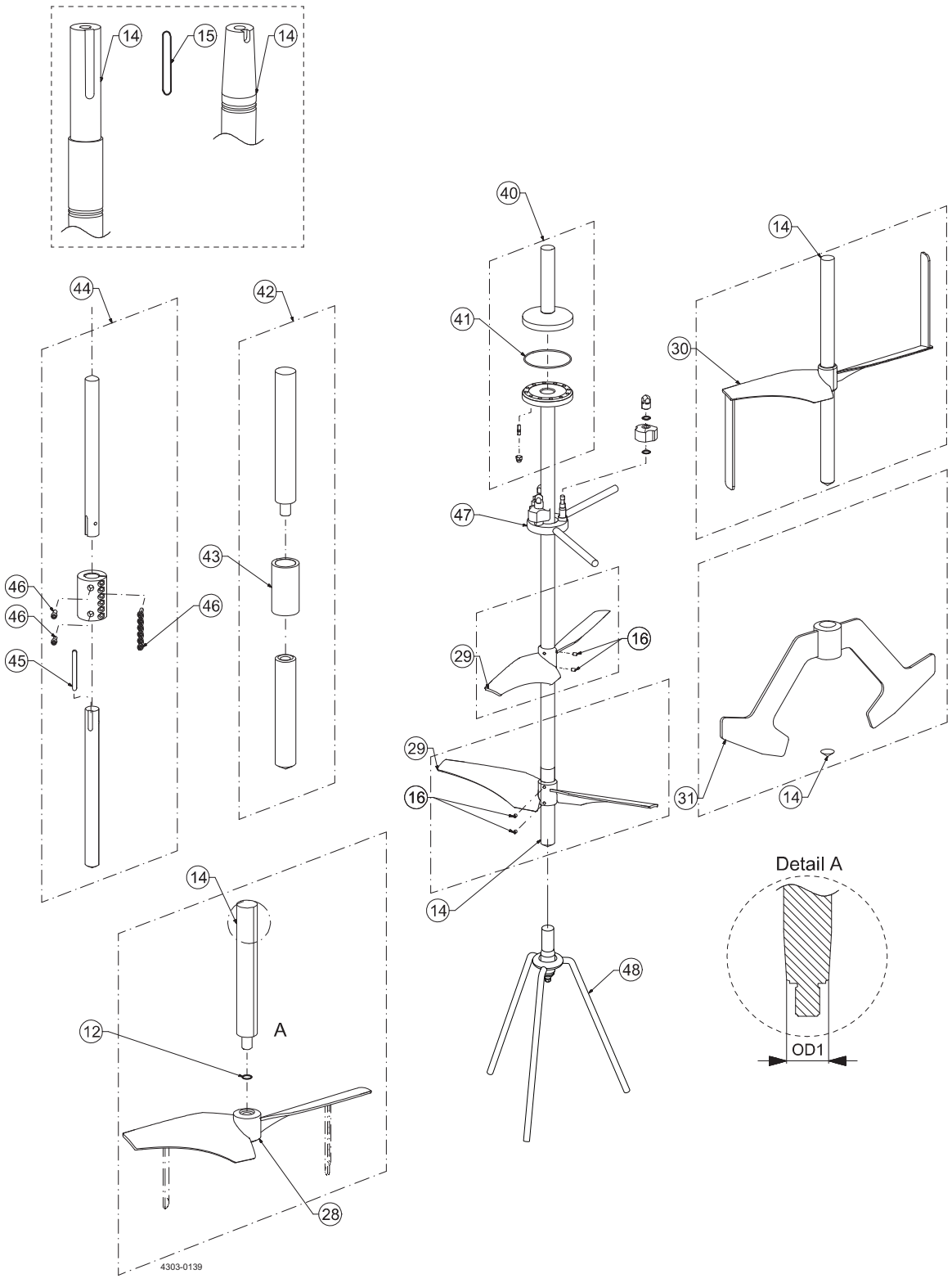
Pos.		Qty	Denomination
1	□	1	GR gear motor, hollow shaft
2	□	1	GP gear motor, hollow shaft
3	□	1	GR gear motor, output shaft
4	□	1	GC gear motor, output shaft
5	◆	1	Bearing frame B20, B25, B25/30, B35, B35/40, B45, B45/50, B55, B55/60
6	◆	1	Bearing frame, BC160/35, BC160D/30, BC160DH/30
7	◆	1	Shaft seal type R
8	◆	1	Shaft seal type G
9	◆	1	Shaft seal type V
10	◆	1	Shaft seal type S
11	◆	1	Shaft seal type S3
13		1	O-ring
16	□	X	Screw
17	□	1	Welding flange
18	□	1	Mounting flange, standard
19	□	1	Mounting flange, raised
20	□	X	Stud
21	□	X	Cap nut
22	□	X	Washer
23	□	X	Screw
24	□	1	Washer, Nord Lock
25	□	1	Fixing element
26	□	1	Lantern, complete
27	□	1	Drive unit flange
34	□	1	Flat gasket
35	□	1	Coupling
36	□	1	Motor and shaft unit
37	□	1	Motor
38	◆	1	Shaft seal type D
39	◆	1	Shaft seal type DC

□ Article number available upon request by serial number or article number of the agitator.

◆ Article number is to be found in the Spare part manual available from the on-line Alfa Laval product catalogue Anytime or the Close at hand spare part catalogue.

X Quantity may vary depending on Agitator type, will be informed upon request.

7.2 Agitator Main Components, Wet end



Agitator type ALT / ALTB, main components - Wet end

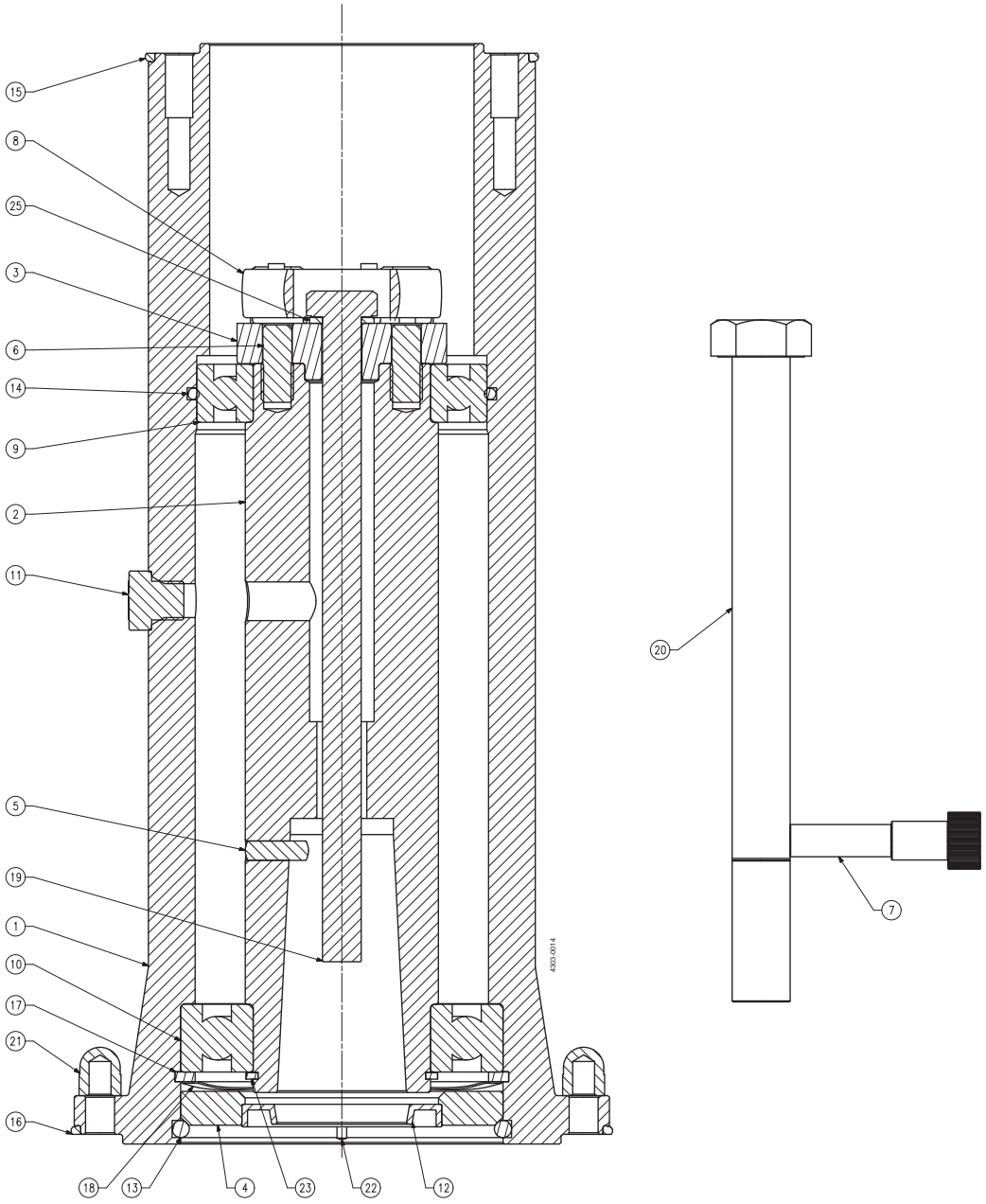
Parts list

Pos.		Qty	Denomination
12	♦	1	O-ring
14	□	1	Shaft
15	□	1	Parrallel key
16	□	X	Screw
28	□	1	Impeller device, EnSaFoil (ESF or ESFL), w. thread
29	□	1-10	Impeller device, EnSaFoil, (ESF or ESFL), w. screws or welded
30	□	1-10	Impeller device, EnSaFerm, (ESFm), w. screws or welded
31	□	1	Impeller device, Low level, (LLI), w. screws or welded
40	♦	1	Shaft and coupling unit
41		1	O-ring
42	□	X	Welded shaft coupling
43	□	X	Sleeve for welded shaft coupling
44	□	X	Sleeve coupling
45	□	X	Parrallel key for sleeve coupling
46	□	X	Screw
47	♦		Intermediate support
48	♦		Bottom support, type 3

□ Article number available upon request by serial number or article number of the agitator.

♦ Article number is to be found in the Spare part manual available from the on-line Alfa Laval product catalogue Anytime or the Close at hand spare part catalogue.

7.3 Bearing frame, B20, B25, B25/30, B35, B35/40, B45, B45/50, B55, B55/60



Bearing frame, B20, B25, B25/30, B35, B35/40, B45, B45/50, B55, B55/60

Parts list

Pos.		Qty	Denomination
1		1	Bearing frame - housing
2		1	Drive shaft
3		1	Coupling
4		1	Cover
5		1	Pin
6		2	Pin
7		1	Tool, retainer bolt
8	□	1	Spider
9	□	1	Bearing
10	□	1	Bearing
11	□	1	PreVent Valve
12	□	1	Seal, radial
13	□	1	O-ring
14	□	1	O-ring
15	□	1	O-ring
16	□	1	O-ring
17		1	Circlip, inner
18		1	Spring, wave
19		1	Screw
20		1	Extractor bolt
21		8	Cap nut
22		2	Pin
23		1	Circlip, outer
25		1	Washer

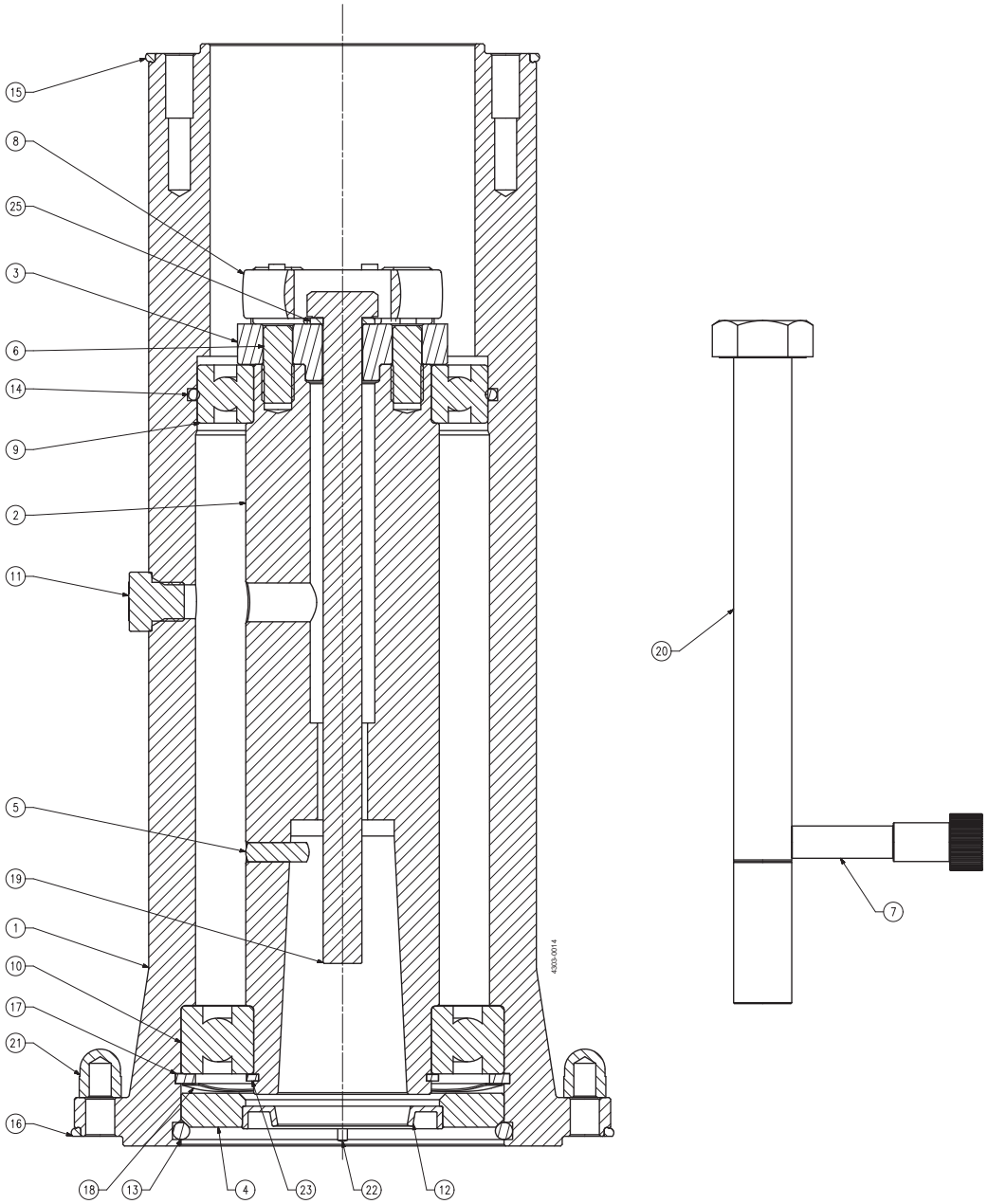
Service kits

	Denomination	B20	B25	B25/30	B35
Assembly Kit					
□	**Assembly Kit, Bearing frame B20, B25, B25/30, B35**	TE261301266B	TE261301267B	TE2613066880	TE261301269C

◆ Article number is to be found in the Spare part manual available from the on-line Alfa Laval product catalogue Anytime or the Close at hand spare part catalogue.

7 Part lists, part drawings and service kits

Bearing frame, B20, B25, B25/30, B35, B35/40, B45, B45/50, B55, B55/60



Bearing frame, B20, B25, B25/30, B35, B35/40, B45, B45/50, B55, B55/60

Parts list

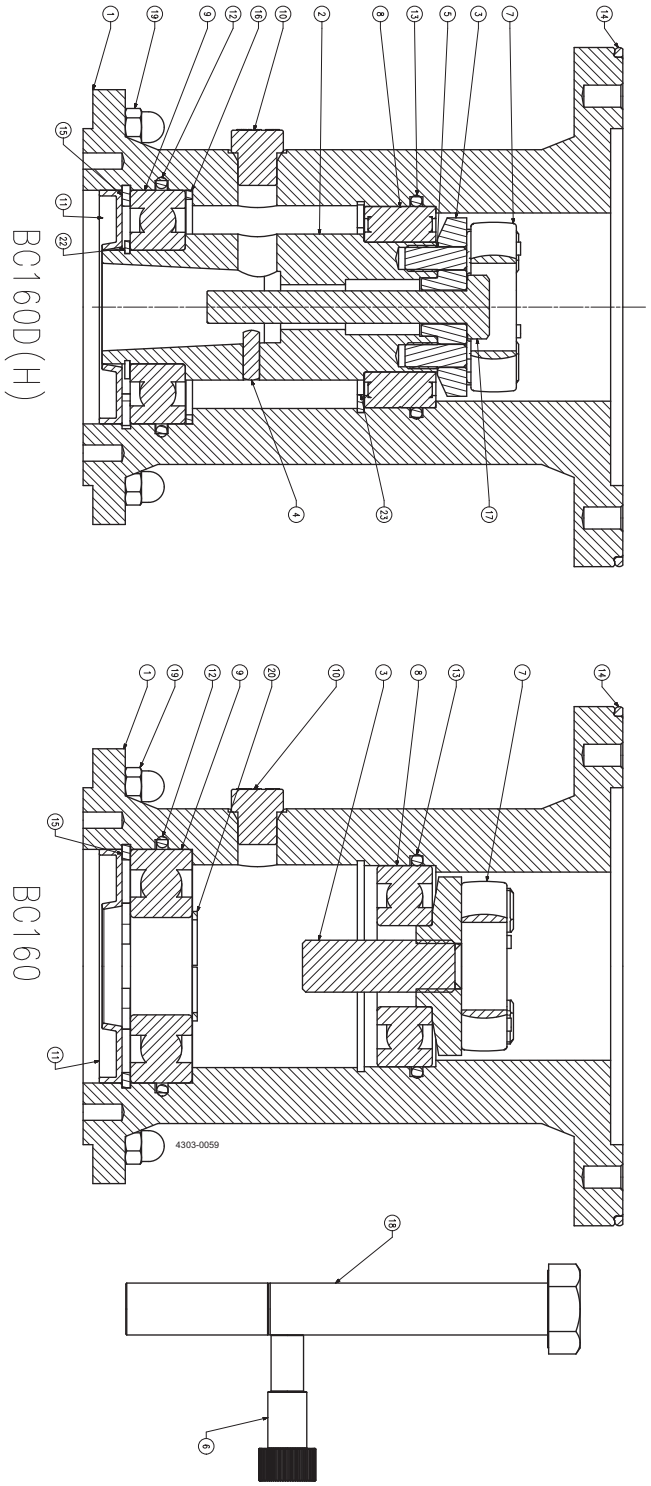
Pos.		Qty	Denomination
1		1	Bearing frame - housing
2		1	Drive shaft
3		1	Coupling
4		1	Cover
5		1	Pin
6		2	Pin
7		1	Tool, retainer bolt
8	□	1	Spider
9	□	1	Bearing
10	□	1	Bearing
11	□	1	PreVent Valve
12	□	1	Seal, radial
13	□	1	O-ring
14	□	1	O-ring
15	□	1	O-ring
16	□	1	O-ring
17		1	Circlip, inner
18		1	Spring, wave
19		1	Screw
20		1	Extractor bolt
21		8	Cap nut
22		2	Pin
23		1	Circlip, outer
25		1	Washer

Service kits

	Denomination	B35/40	B45	B45/50	B55	B55/60
Assembly Kit						
□	**Assembly Kit, Bearing frame B35/40, B45, B45/50, B55, B55/60**	TE261304566B	TE261301100B	TE261305434A	TE261301102B	TE2613065530

◆ Article number is to be found in the Spare part manual available from the on-line Alfa Laval product catalogue Anytime or the Close at hand spare part catalogue.

7.4 Bearing frame BC160/35, BC160D/30, BC160DH/30



Bearing frame BC160/35, BC160D/30, BC160DH/30

Parts list

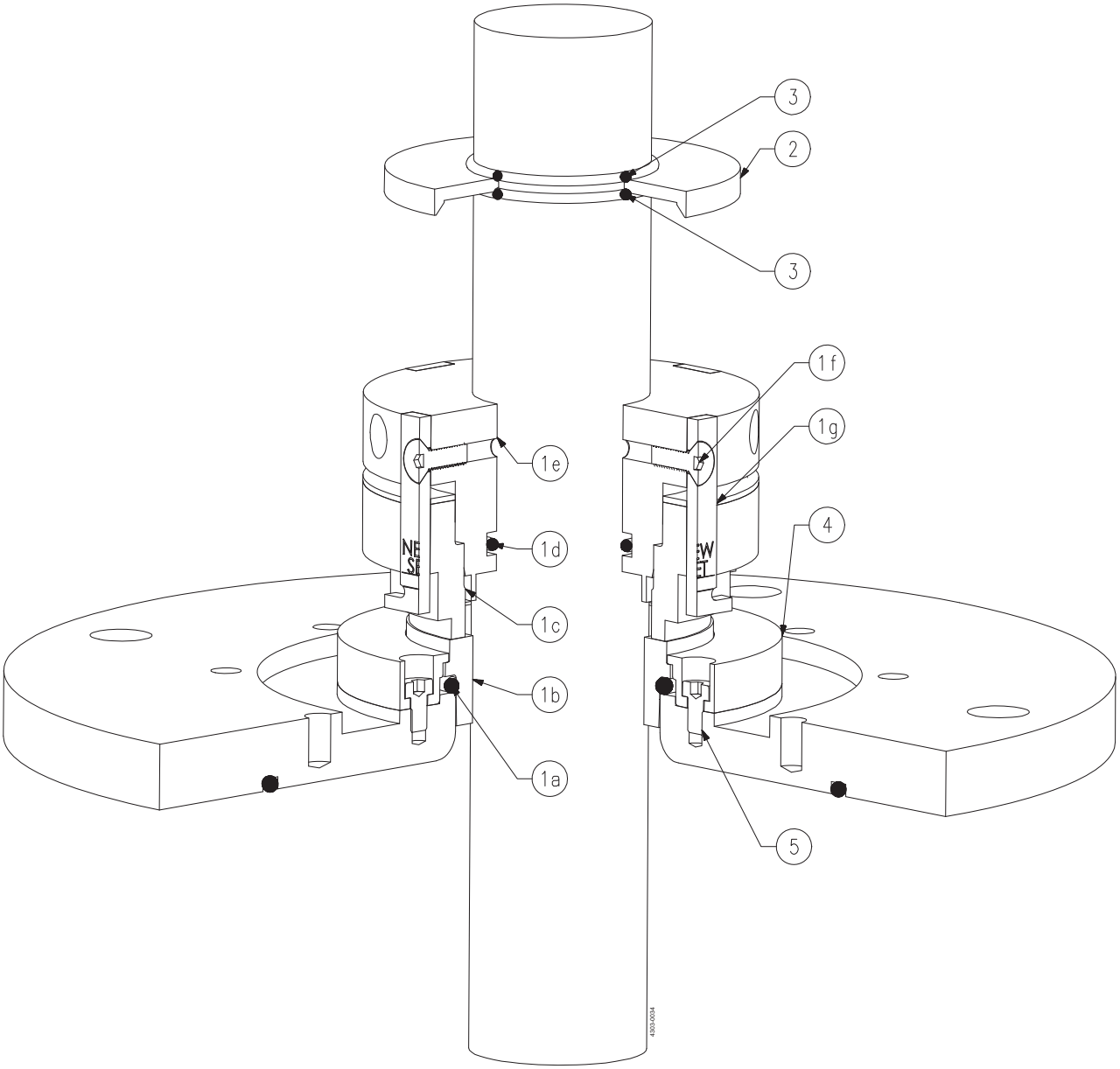
Pos.		Qty	Denomination
1		1	Bearing frame - housing
2		1	Drive shaft
3		1	Coupling
4		1	Pin
5		2	Pin
6		1	Tool, retainer bolt
7	□	1	Spider
8	□	1	Bearing
9	□	1	Bearing
10	□	1	PreVent valve
11	□	1	Seal, radial
12	□	1	O-ring
13	□	1	O-ring
14	□	1	O-ring
15		1	Circlip, inner
16		1	Seeger ring
17		1	Screw
18		1	Extractor bolt
19		8	Cap nut
20		1	Circlip, outer
22		7	Circlip, outer
23		1	Circlip, inner

Service kits

	Denomination	BC160/35 (right)	BC160/35 (left)	BC160D/30	BC160DH/30
Assembly Kit					
□	**Assembly Kit, Bearing frame BC160/35, BC160D/30, BC160DH/30**	TE261303783B	TE261303783B	TE261303672B	TE2613071680

◆ Article number is to be found in the Spare part manual available from the on-line Alfa Laval product catalogue Anytime or the Close at hand spare part catalogue.

7.5 Shaft seal, type S



Shaft seal, type S

Parts list

Pos.		Qty	Denomination
1	□	1	S seal
	♦	1	S seal
2		1	Oil trap
3	□♦	2	O-ring
4		1	Ring, retainer
5		4	Screw

Service kits

	Denomination	size: Ø30	size: Ø35	size: Ø40	size: Ø45
Seal Kits					
□	Seal kit, S, C/SiC, EPDM	TE2613000040	TE2613000041	TE2613000042	TE2613000043
♦	Seal kit, S, C/SiC, FPM	TE2613000031	TE2613000032	TE2613000033	TE2613000034

Parts list

Pos.		Qty	Denomination
1	□	1	S seal
	♦	1	S seal
2		1	Oil trap
3	□♦	2	O-ring
4		1	Ring, retainer
5		4	Screw

Service kits

	Denomination	size: Ø50	size: Ø60	size: Ø70	size: Ø80
Seal Kits					
□	Seal kit, S, C/SiC, EPDM	TE2613000045	TE2613000046	TE2613000047	TE2613000038
♦	Seal kit, S, C/SiC, FPM	TE2613000035	TE2613000036	TE2613000037	TE2613000048

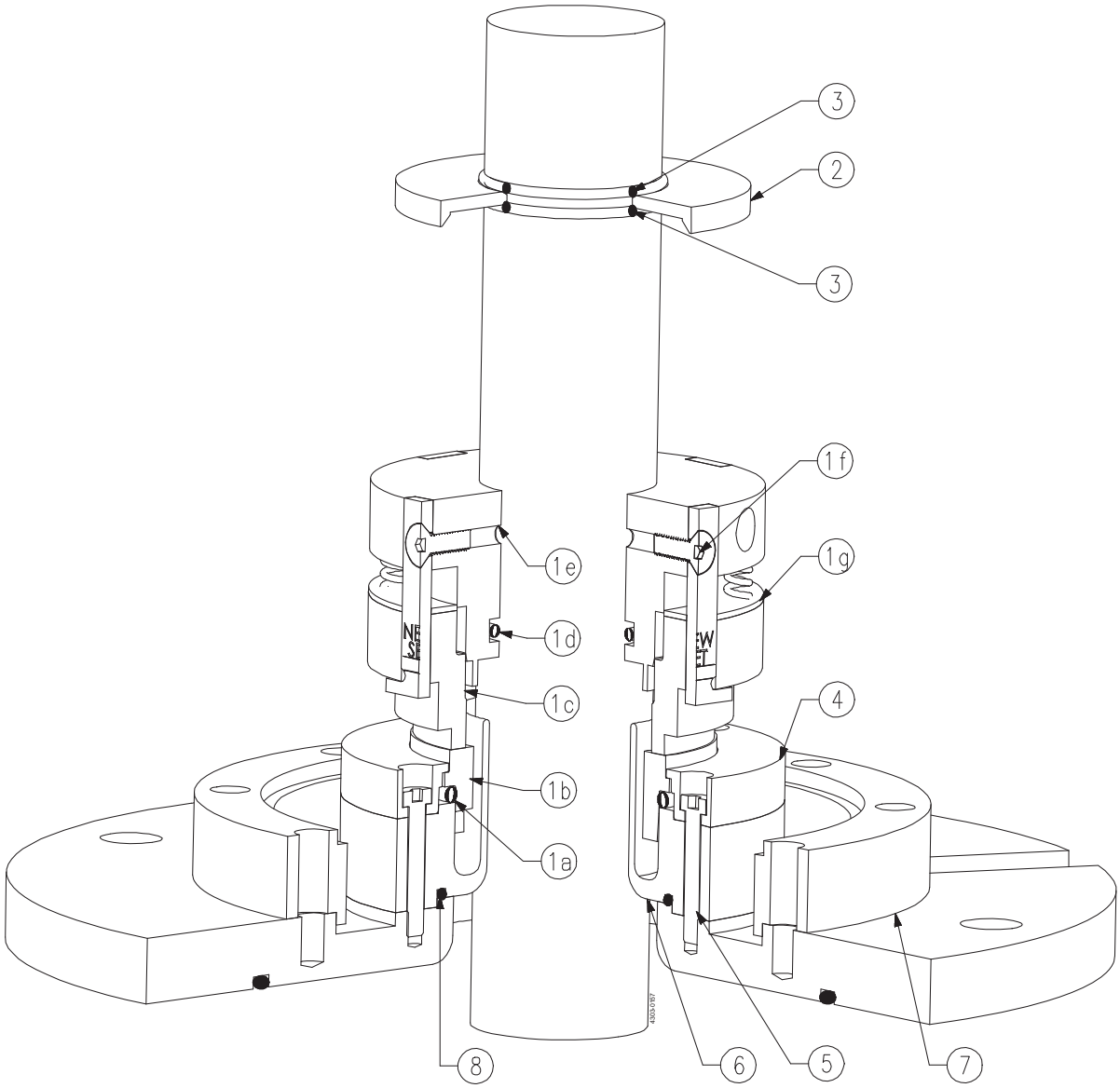
Parts list

Pos.		Qty	Denomination
1	□	1	S seal
	♦	1	S seal
2		1	Oil trap
3	□♦	2	O-ring
4		1	Ring, retainer
5		4	Screw

Service kits

	Denomination	size: Ø90
Seal Kits		
□	Seal kit, S, C/SiC, EPDM	TE2613000049
♦	Seal kit, S, C/SiC, FPM	TE2613000039

7.6 Shaft seal, type S with dust trap



Shaft seal, type S with dust trap

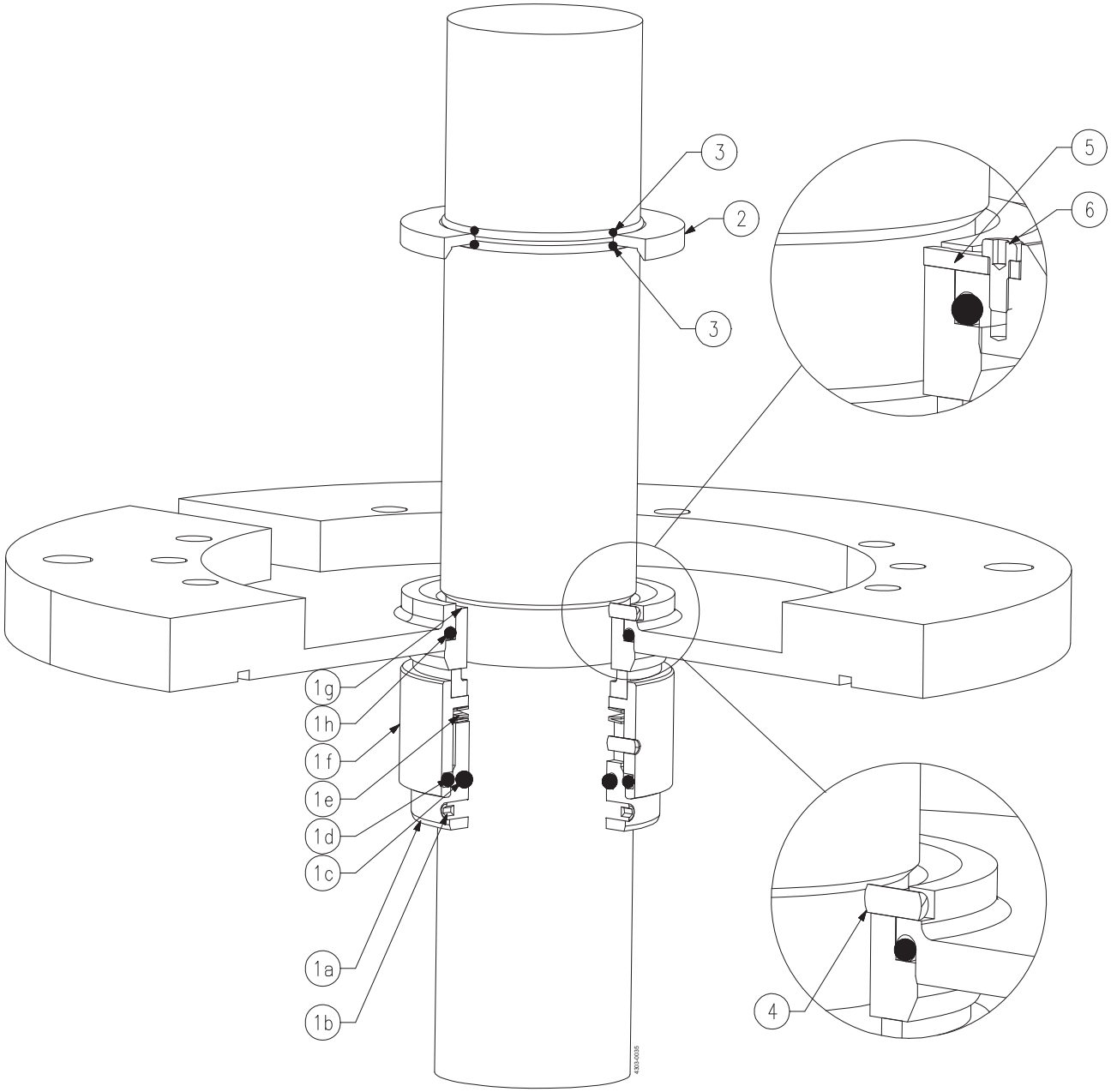
Parts list

Pos.		Qty	Denomination
1	□	1	S seal
	♦	1	S seal
2		1	Oil trap
3	□♦	2	O-ring
4		1	Ring, retainer
5		4	Screw
6		1	Dust trap
7		1	Spacer ring
8		1	O-ring

Service kits

	Denomination	size: Ø30	size: Ø40	size: Ø50
Seal Kits				
□	Seal kit, S, C/SiC, EPDM	TE2613000040	TE2613000042	TE2613000045
♦	Seal kit, S, C/SiC, FPM	TE2613000031	TE2613000033	TE2613000035

7.7 Shaft seal, type S3



Shaft seal, type S3

Parts list

Pos.		Qty	Denomination
1	□	1	S3 seal
	♦	1	S3 seal
2		1	Oil trap
3	□♦	2	O-ring
4		1	Locking pin
5		1	Locking plate
6		1	Screw

Service kits

	Denomination	size: Ø30	size: Ø35	size: Ø40	size: Ø45
Seal Kits					
□	Seal Kit, S3, C/SiC, EPDM	TE2613000087	TE2613000090	TE2613000091	TE2613000093
♦	Seal Kit, S3, C/SiC, FPM	TE2613000104	TE2613000106	TE2613000107	TE2613000108

Parts list

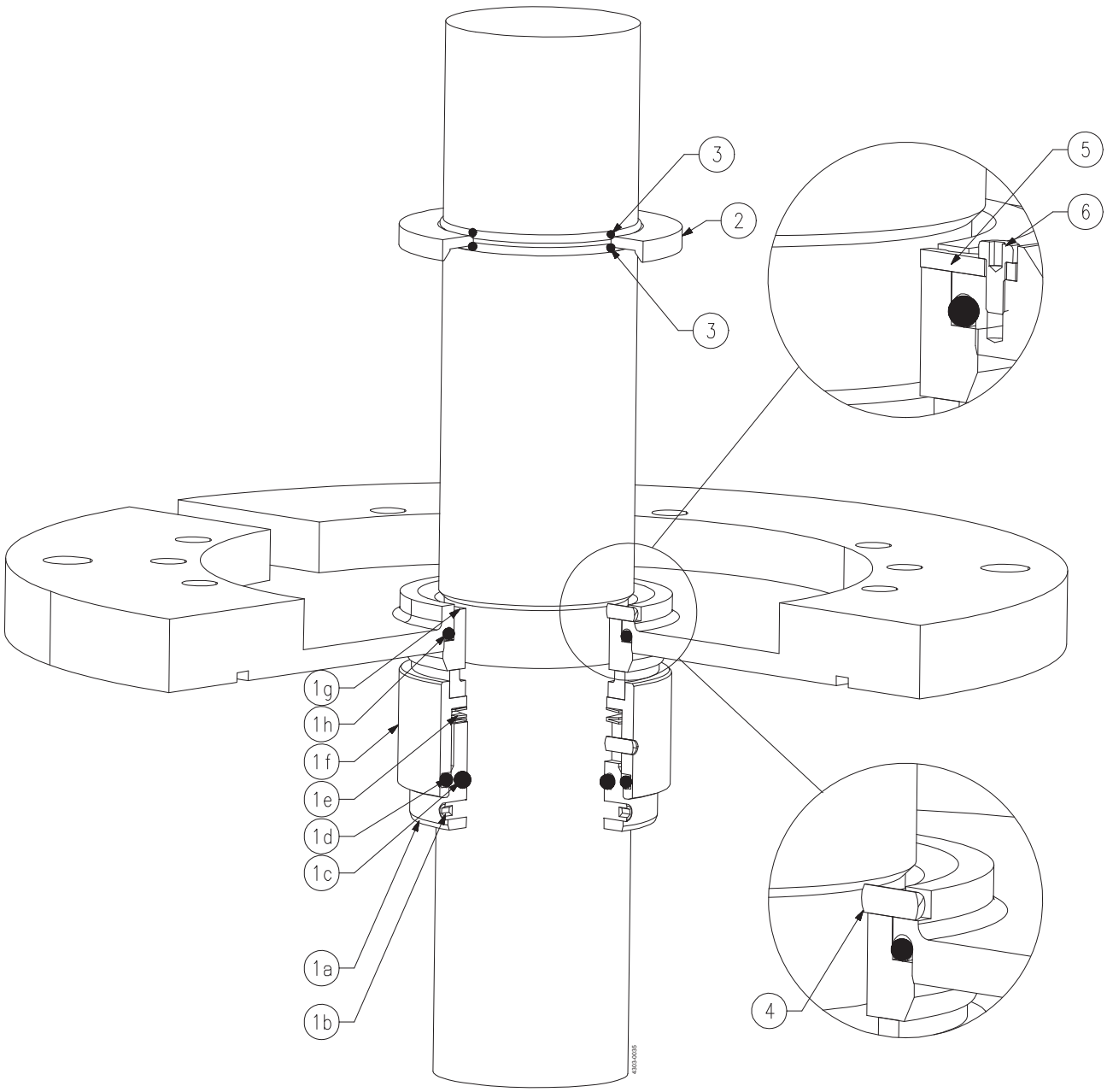
Pos.		Qty	Denomination
1	□	1	S3 seal
	♦	1	S3 seal
2		1	Oil trap
3	□♦	2	O-ring
4		1	Locking pin
5		1	Locking plate
6		1	Screw

Service kits

	Denomination	size: Ø50	size: Ø55	size: Ø60	size: Ø65
Seal Kits					
□	Seal Kit, S3, C/SiC, EPDM	TE2613000095	TE2613000096	TE2613000098	TE2613000099
♦	Seal Kit, S3, C/SiC, FPM	TE2613000109	TE2613000110	TE2613000112	TE2613000113

7 Part lists, part drawings and service kits

Shaft seal, type S3



Shaft seal, type S3

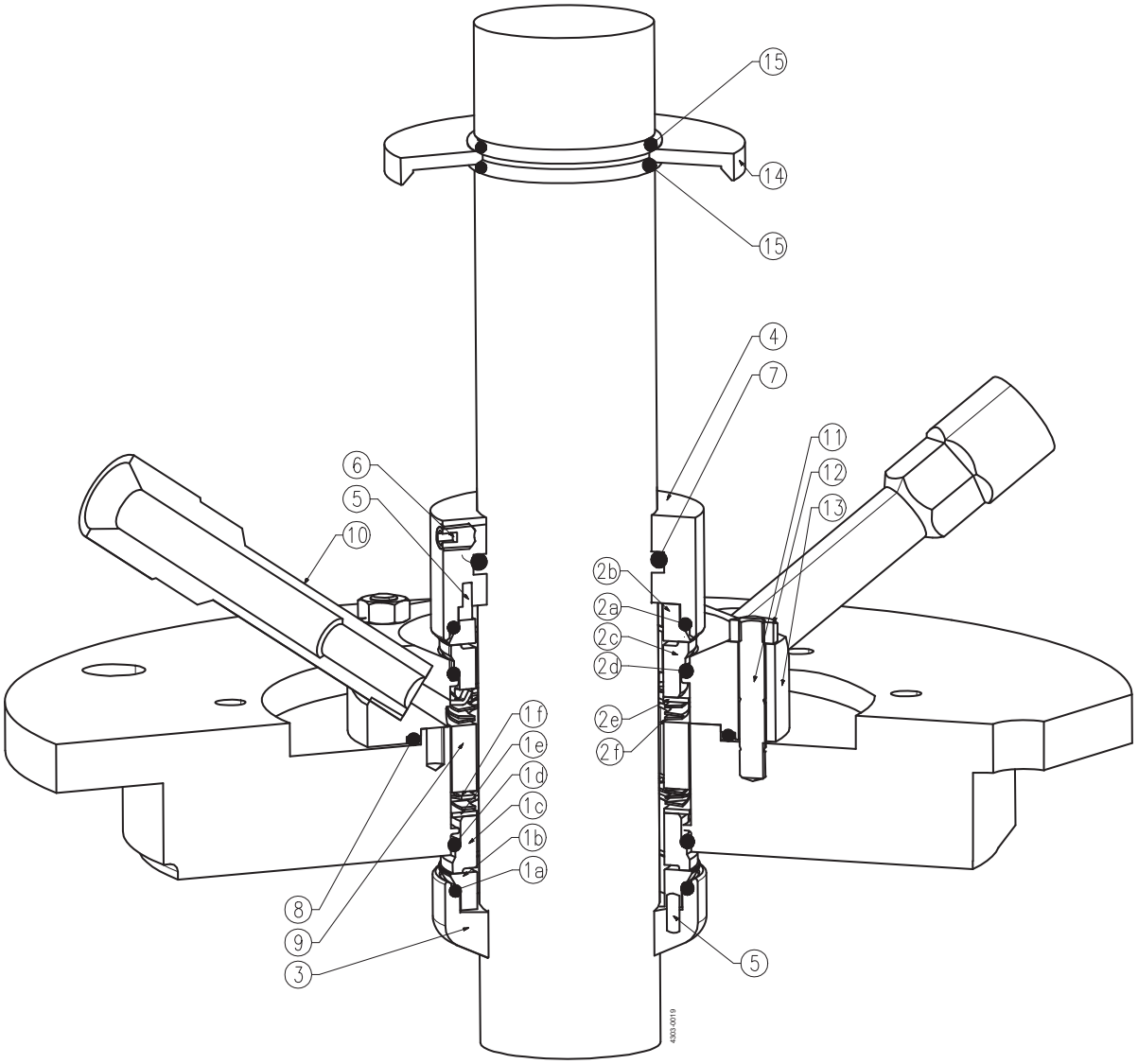
Parts list

Pos.		Qty	Denomination
1	□	1	S3 seal,
	♦	1	S3 seal
2		1	Oil trap
3	□♦	2	O-ring, FPM
4		1	Locking pin
5		1	Locking plate
6		1	Screw

Service kits

	Denomination	size: Ø70	size: Ø75	size: Ø80	size: Ø90
Seal Kits					
□	Seal Kit, S3, C/SiC, EPDM	TE2613000100	TE2613000101	TE2613000102	TE2613000103
♦	Seal Kit, S3, C/SiC, FPM	TE2613000116	TE2613000117	TE2613000118	TE2613000120

7.8 Shaft seal, type D



Shaft seal, type D

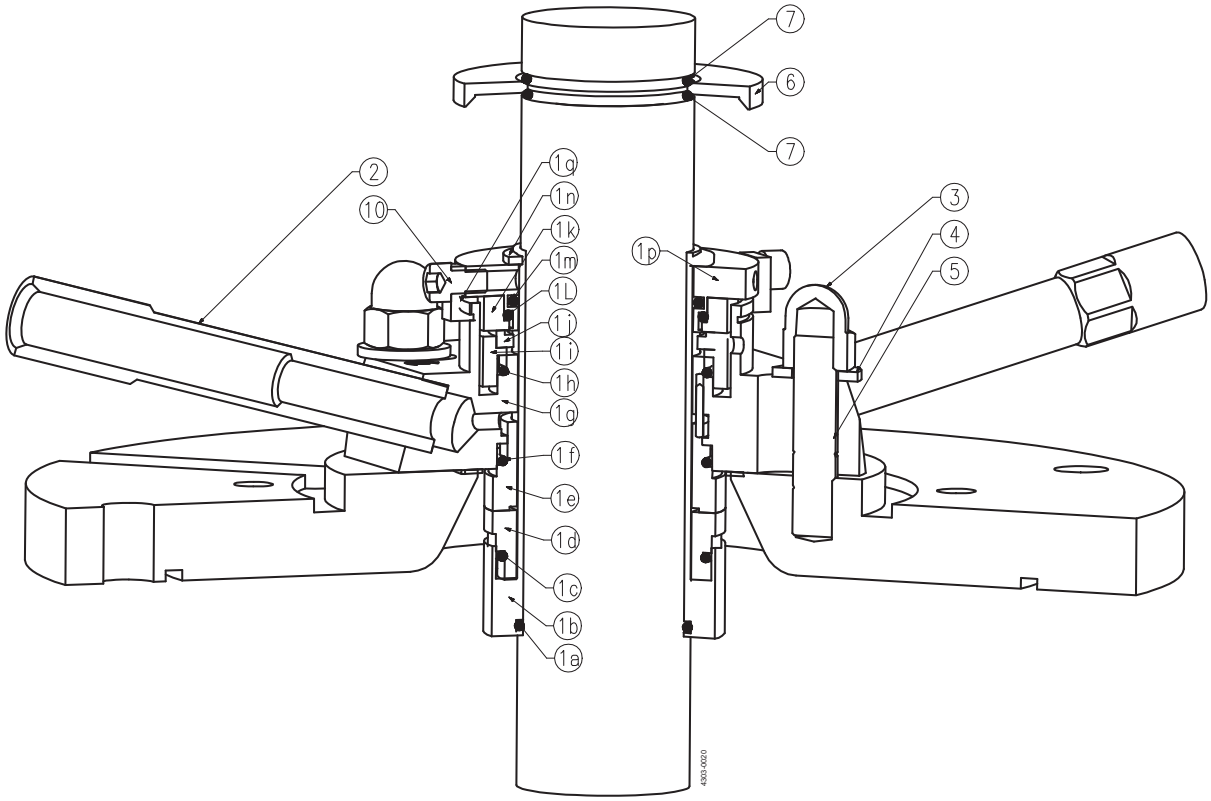
Parts list

Pos.		Qty	Denomination
1	♦	1	Seal
	★	1	Seal
	□	1	Seal
	○	1	Seal
2	♦★	1	Seal
	□○	1	Seal
3		1	Ring, counter**
4		1	Ring, counter
5		4	Pin
6		1	Screw
7	□○	1	O-ring
	♦★	1	O-ring
8	□○	1	O-ring
	♦★	1	O-ring
9		1	Spacer
10		2	Flush, connection 1/2"-14 BSP
11		4	Stud
12		4	Nut
13		1	Seal housing
14		1	Oil trap
15	□♦○★	2	O-ring, FPM

Service kits

	Denomination	Ø30	Ø40
Seal kits			
□	Seal Kit, D, C/SiC-C/SiC, FPM	TE2613000121	TE2613000122
♦	Seal Kit, D, C/SiC-C/SiC, EPDM	TE2613000123	TE2613000124
○	Seal Kit, D, SiC/SiC-C/SiC, FPM	TE2613000125	TE2613000126
★	Seal Kit, D, SiC/SiC-C/SiC, EPDM	TE2613000127	TE2613000128

7.9 Shaft seal, type DC



Shaft seal, type DC

Parts list

Pos.		Qty	Denomination
1	□	1	DC seal
	♦	1	DC seal
	○	1	DC seal
	★	1	DC seal
2		2	Flush
3		4	Cap nut
4		4	Washer
5		4	Stud
6		1	Oil trap
7	□♦○★	2	O-ring

Service kits

	Denomination	size: Ø30	size: Ø35	size: Ø40	size: Ø45
Seal kits					
□	Seal Kit, DC, C/SiC-C/SiC, EPDM	TE2613000137	TE2613000138	TE2613000139	TE2613000140
♦	Seal Kit, DC, C/SiC-C/SiC, FPM	TE2613000144	TE2613000145	TE2613000146	TE2613000147
○	Seal Kit, DC, SiC/SiC-C/SiC, EPDM	TE2613000151	TE2613000152	TE2613000153	TE2613000154
★	Seal Kit, DC, SiC/SiC-C/SiC, FPM	TE2613000158	TE2613000159	TE2613000160	TE2613000161

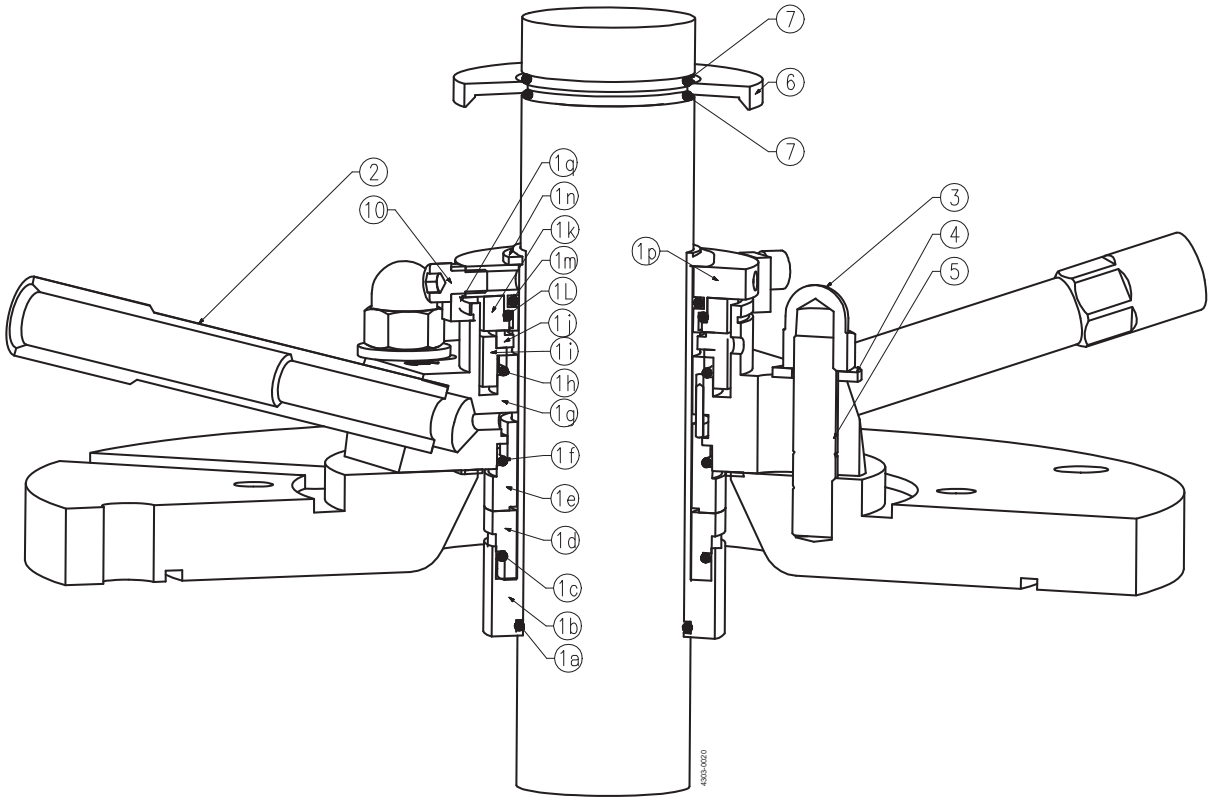
Parts list

Pos.		Qty	Denomination
1	□	1	DC seal
	♦	1	DC seal
	○	1	DC seal
	★	1	DC seal
2		2	Flush
6		1	Oil trap
7	□♦○★	2	O-ring

Service kits

	Denomination	size: Ø50	size: Ø55	size: Ø60	size: Ø70
Seal kits					
□	Seal Kit, DC, C/SiC-C/SiC, EPDM	TE2613000141	TE2613000142	TE2613000143	9615478601
♦	Seal Kit, DC, C/SiC-C/SiC, FPM	TE2613000148	TE2613000149	TE2613000150	9615478701
○	Seal Kit, DC, SiC/SiC-C/SiC, EPDM	TE2613000155	TE2613000156	TE2613000157	9615478801
★	Seal Kit, DC, SiC/SiC-C/SiC, FPM	TE2613000162	TE2613000163	TE2613000164	9615478901

Shaft seal, type DC



Shaft seal, type DC

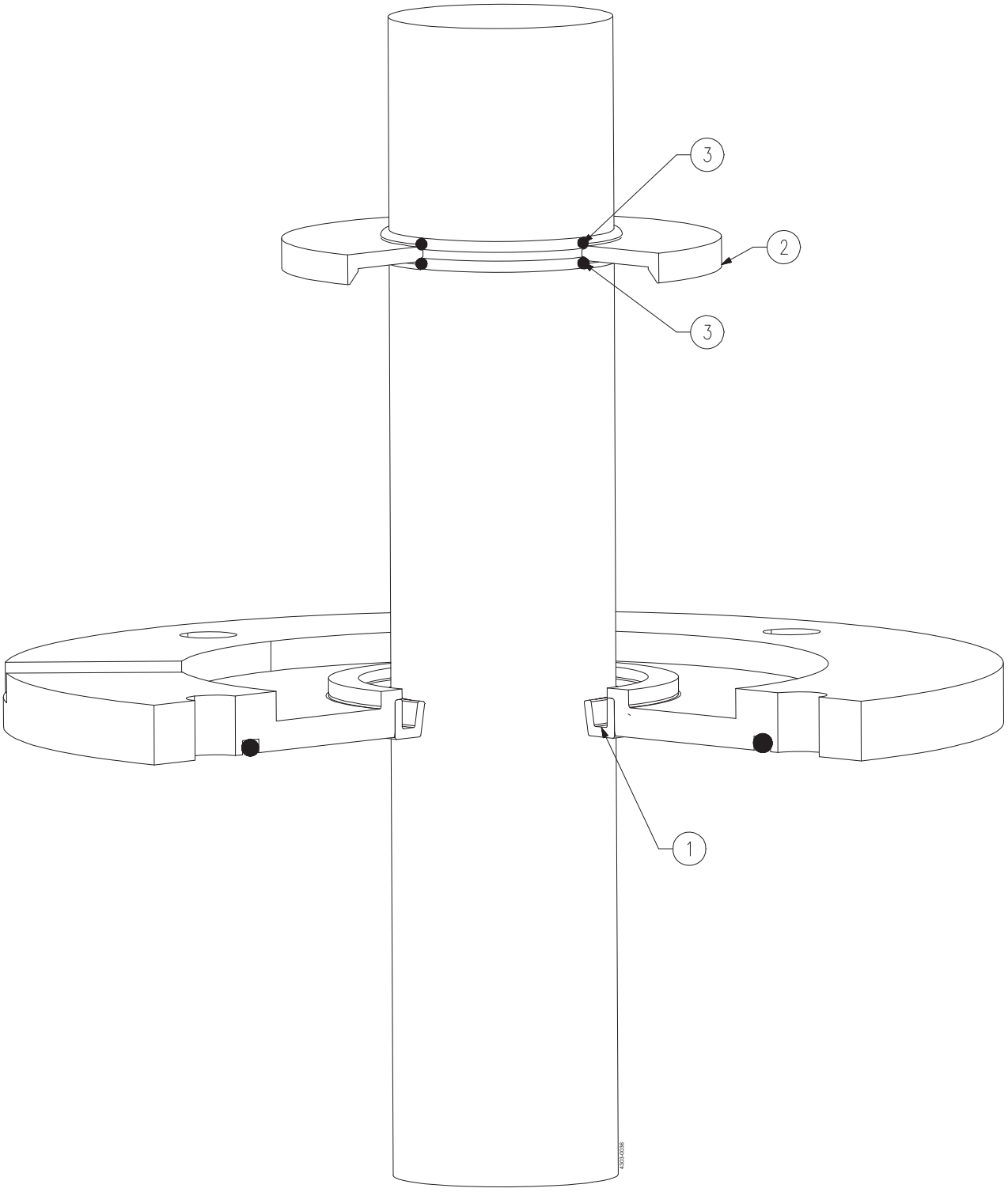
Parts list

Pos.		Qty	Denomination
1	□	1	DC seal
	♦	1	DC seal
	○	1	DC seal
	★	1	DC seal
2		2	Flush
3		4	Cap nut
4		4	Washer
5		4	Stud
6		1	Oil trap
7	□♦○★	2	O-ring

Service kits

	Denomination	size: Ø80	size: Ø90
Seal kits			
□	Seal Kit, DC, C/SiC-C/SiC, EPDM	9615479001	9615479401
♦	Seal Kit, DC, C/SiC-C/SiC, FPM	9615479101	9615479501
○	Seal Kit, DC, SiC/SiC-C/SiC, EPDM	9615479201	9615479601
★	Seal Kit, DC, SiC/SiC-C/SiC, FPM	9615479301	9615479701

7.10 Shaft seal, type R



Shaft seal, type R

Parts list

Pos.		Qty	Denomination
1	□	1	Radial seal
	♦	1	Radial seal
2		1	Oil trap
3	□♦	2	O-ring, FPM

Service kits

	Denomination	size: Ø20	size: Ø25	size: Ø30	size: Ø35
Seal kits					
□	**Seal Kit, Radial, FPM**	TE2613000001	TE2613000002	TE2613000003	TE2613000004
♦	**Seal Kit, Radial, FPM**				TE2613000190

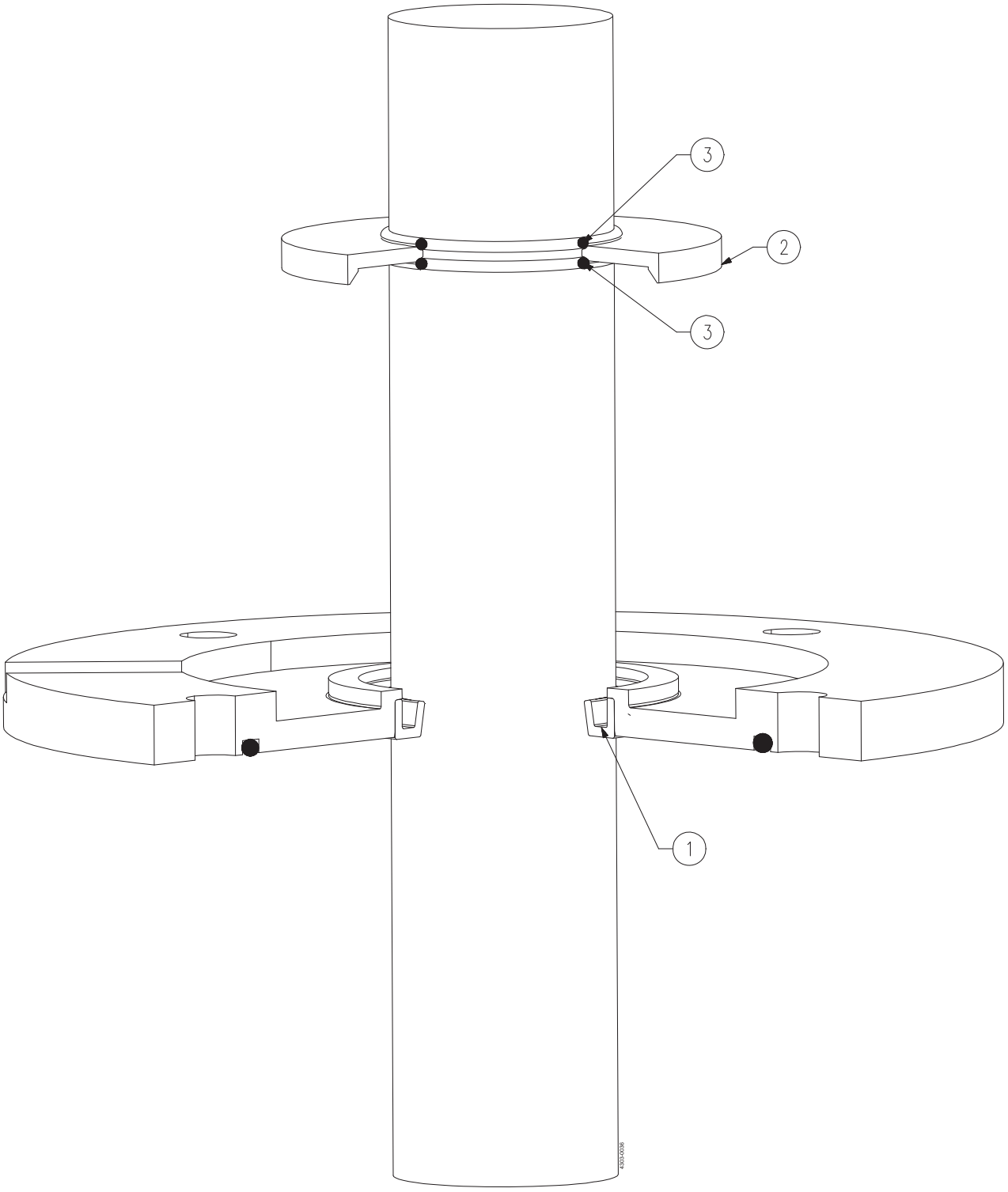
Parts list

Pos.		Qty	Denomination
1	□	1	Radial seal
	♦	1	Radial seal
2		1	Oil trap
3	□♦	2	O-ring

Service kits

	Denomination	size: Ø40	size: Ø45	size: Ø50	size: Ø55
Seal kits					
□	**Seal Kit, Radial, FPM**	TE2613000005	TE2613000006	TE2613000194	TE2613000008
♦	**Seal Kit, Radial, FPM**	TE2613000192	TE2613000193	TE2613000007	

Shaft seal, type R



Shaft seal, type R

Parts list

Pos.		Qty	Denomination
1	□	1	Radial seal
2		1	Oil trap
3	□	2	O-ring

Service kits

	Denomination	size: Ø60	size: Ø65	size: Ø70	size: Ø75
Seal kits					
□	**Seal Kit, Radial, FPM**	TE2613000009	TE2613000010	TE2613000011	TE2613000012

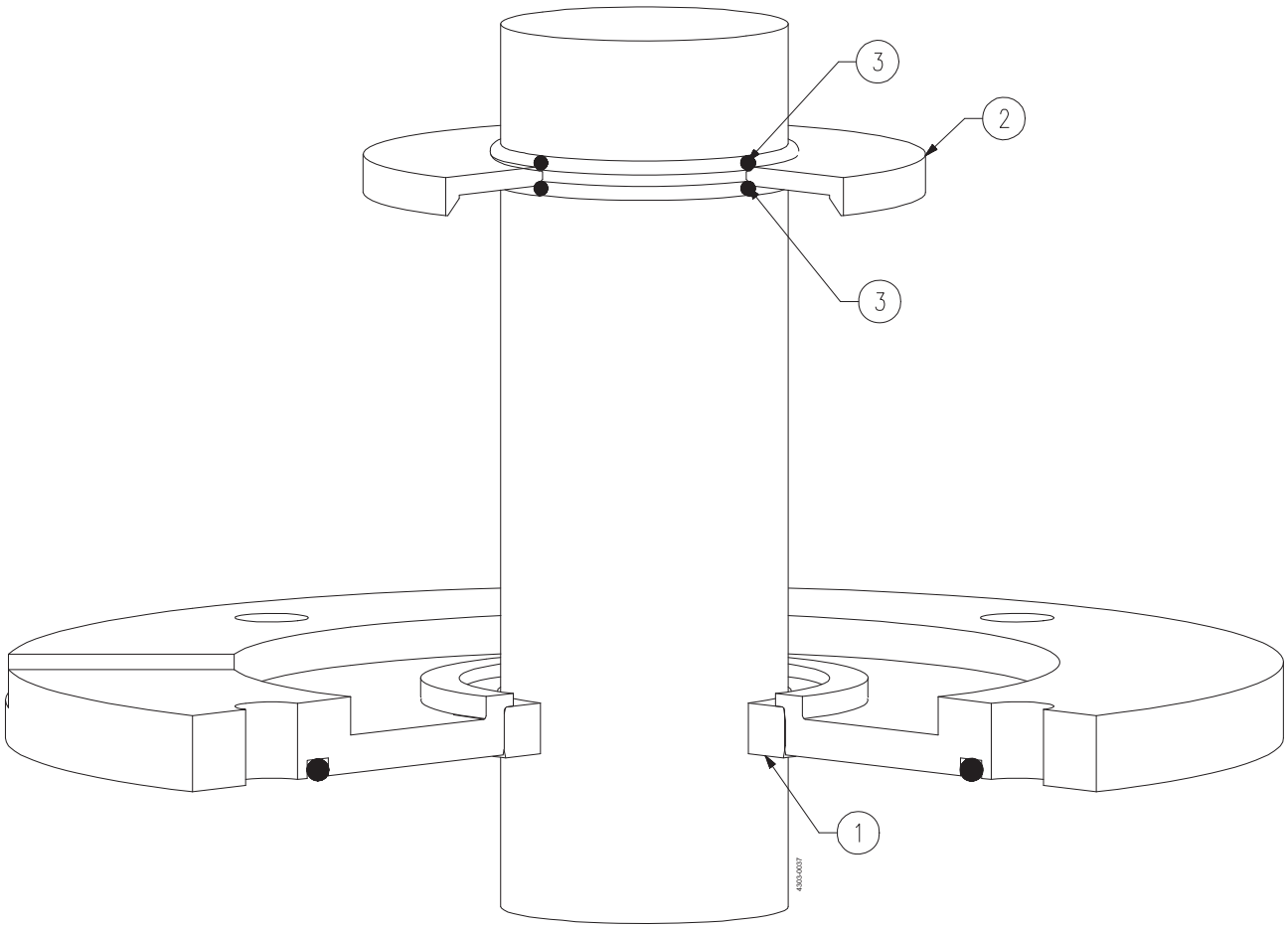
Parts list

Pos.		Qty	Denomination
1	□	1	Radial seal
2		1	Oil trap
3	□	2	O-ring

Service kits

	Denomination	size: Ø80	size: Ø90
Seal kits			
□	**Seal Kit, Radial, FPM**	TE2613000013	TE2613000014

7.11 Shaft seal, type G



Shaft seal, type G

Parts list

Pos.		Qty	Denomination
1	□	1	Gab seal
	♦	1	Gab seal
2		1	Oil trap
3	□♦	2	O-ring

Service kits

	Denomination	size: Ø20	size: Ø25	size: Ø30	size: Ø35
Seal kits					
□	**Seal Kit, Gap, PTFE**	TE2613000015	TE2613000016	TE2613000017	TE2613000018
♦	**Seal Kit, Gap, PTFE**				TE2613000195

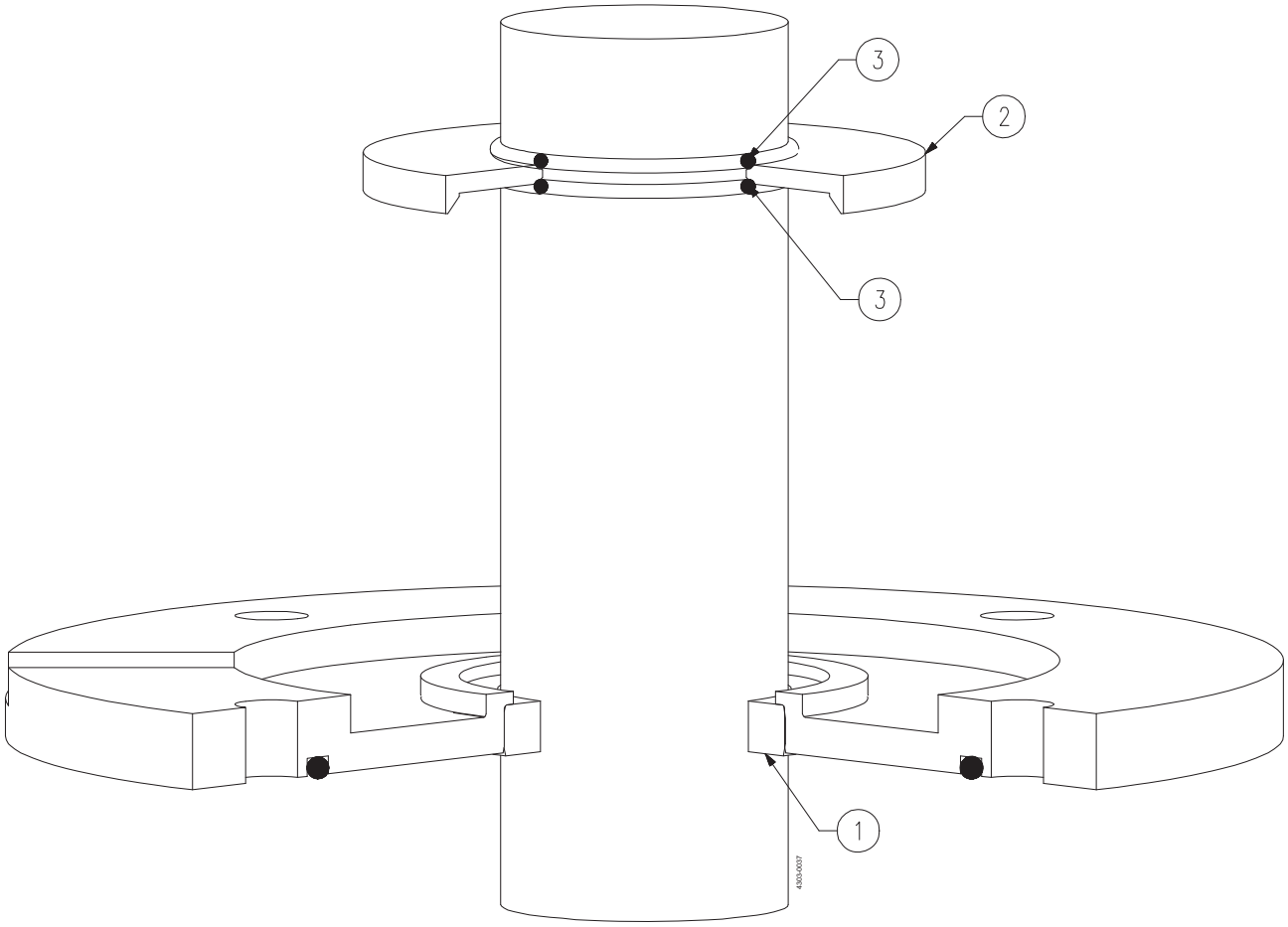
Parts list

Pos.		Qty	Denomination
1	□	1	Gab seal
	♦	1	Gab seal
2		1	Oil trap
3	□♦	2	O-ring

Service kits

	Denomination	size: Ø40	size: Ø45	size: Ø50	size: Ø55
Seal kits					
□	**Seal Kit, Gap, PTFE**	TE2613000019	TE2613000020	TE2613000198	TE2613000022
♦	**Seal Kit, Gap, PTFE**	TE2613000196	TE2613000197	TE2613000021	

Shaft seal, type G



Shaft seal, type G

Parts list

Pos.		Qty	Denomination
1	□	1	Gab seal
2		1	Oil trap
3	□	2	O-ring

Service kits

	Denomination	size: Ø60	size: Ø65	size: Ø70	size: Ø75
Seal kits					
□	**Seal Kit, Gap, PTFE**	TE2613000023	TE2613000024	TE2613000025	TE2613000026

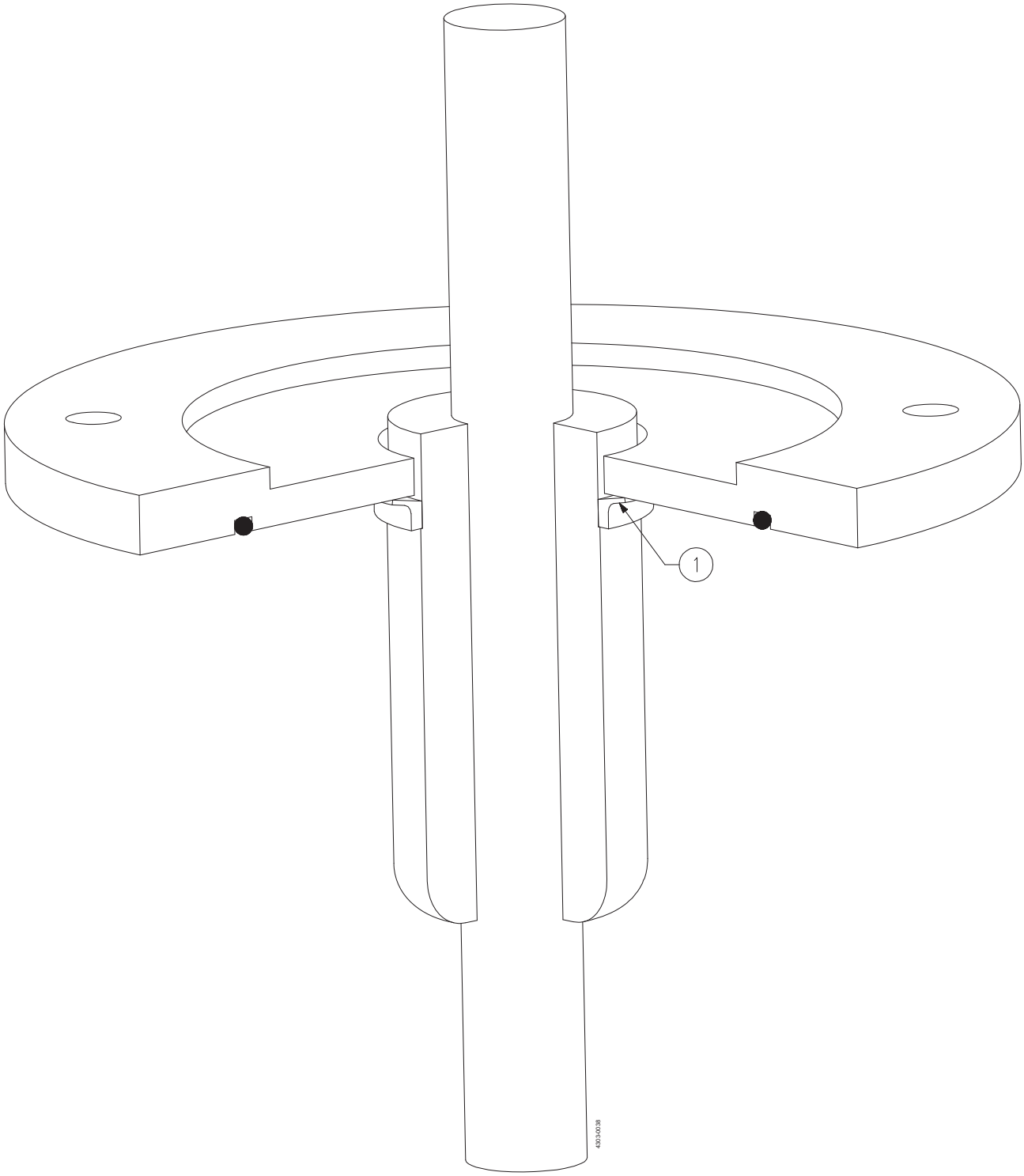
Parts list

Pos.		Qty	Denomination
1	□	1	Gab seal, PTFE
2		1	Oil trap
3	□	2	O-ring, FPM

Service kits

	Denomination	size: Ø80	size: Ø90
Seal kits			
□	**Seal Kit, Gap, PTFE**	TE2613000027	TE2613000028

7.12 Shaft seal, type V



Shaft seal, type V

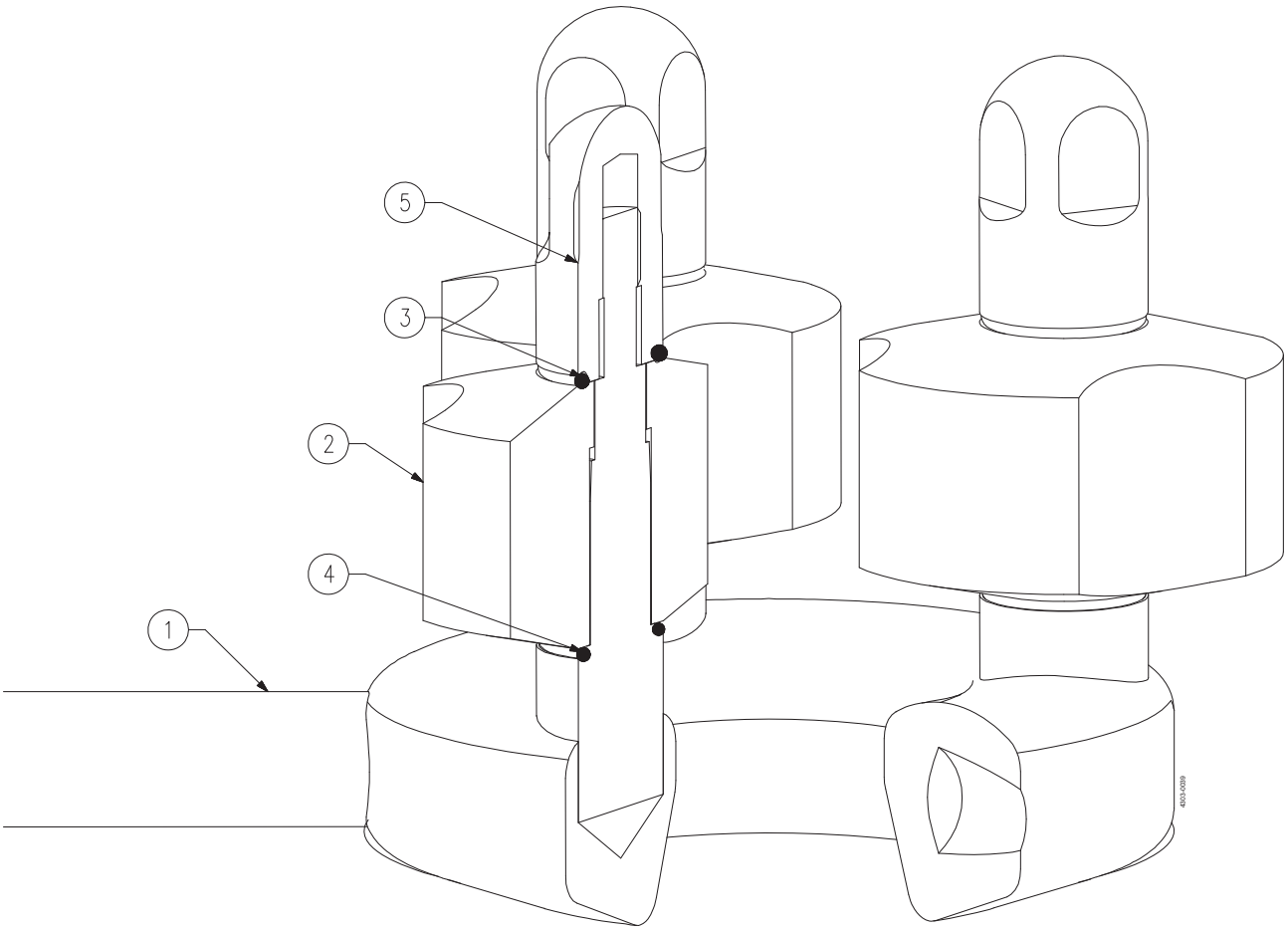
Parts list

Pos.	Qty	Denomination
1	1	Lib seal (V)

Service kits

Denomination	size: Ø20	size: Ø25	size: Ø35
Service kits			
Lip seal (V), FPM	TE2601000229	TE2601000229	TE2601000363

7.13 Intermediate support



Intermediate support

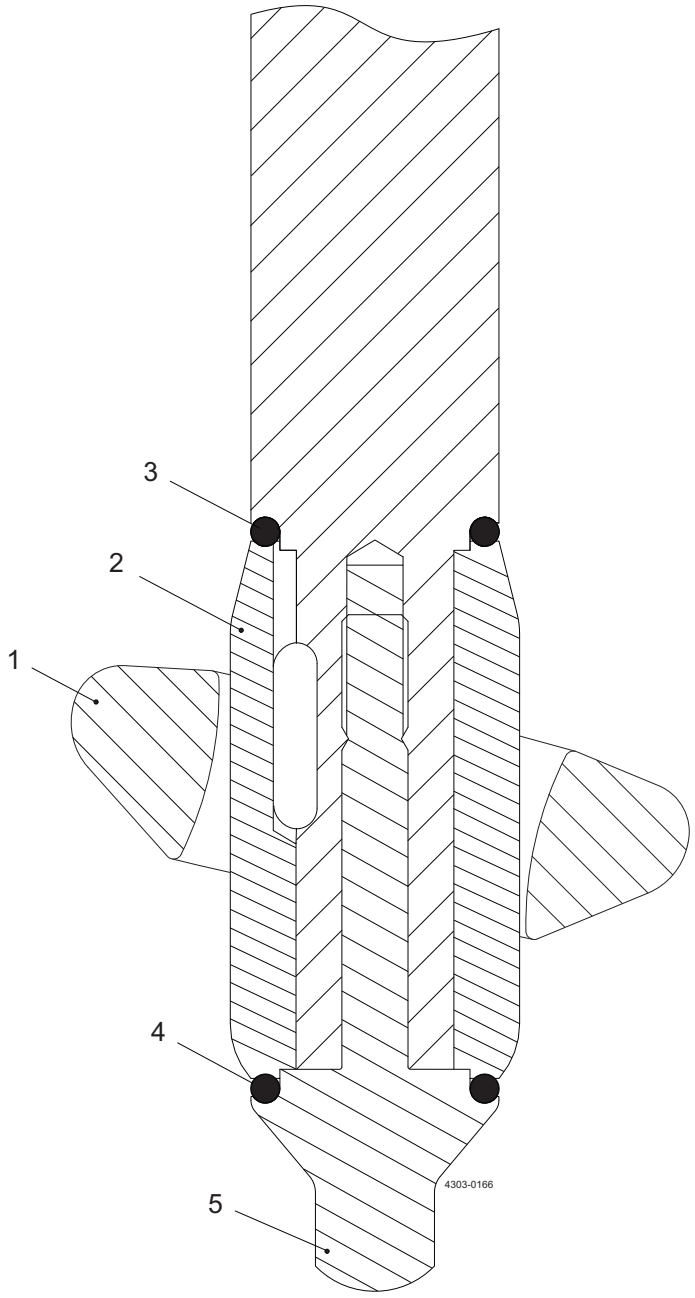
Parts list

Pos.		Qty	Denomination
1		1	Intermediate steady support
2	□	3	Bushing
3	□	3	O-ring
4	□	3	O-ring
5		3	Nut

Service kits

	Denomination	size: Ø35/Ø40/Ø50	size: Ø55/Ø65/Ø75	size: Ø60/Ø70/Ø80
Spare part kits				
□	**Spare part kit, ISB, EPDM/FPM**	TE2613079680	TE2613222920	TE2613222930

7.14 Bottom support, type 3



Bottom support, type 3

Parts list

Pos.		Qty	Denomination
1		1	Bottom support
2	□♦	1	Bushing
3	□	1	O-ring
	♦	1	O-ring
4	□	1	O-ring
	♦	1	O-ring
5		1	Screw

Service kits

	Denomination	size: Ø30/Ø35/ Ø40Ø45	size: Ø50/Ø55/ Ø60/Ø65	size: Ø70/Ø75/ Ø80/Ø90
□	Spare part kit, BS3, FPM	9615411604	9615411605	9615411606
♦	Spare part kit, BS3, EPDM	9615411601	9615411602	9615411603

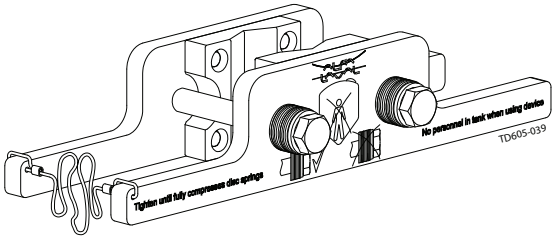
7.15 Tools

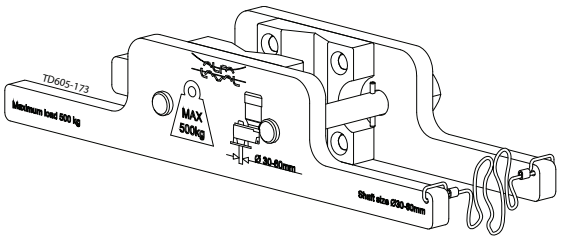
To assist installation and maintenance of the Agitator, an original Alfa Laval Shaft Retainer is available. Once the bolts are tightened the shaft is retained by a well-defined torque leaving no doubt about safety. The amterial used protects the polished surface against scratching.

A very useful tool during maintenance of the Agitator.

Designed to support Agitator at a weight up to 500 kilogram.

Description	Item no.
Shaft diameter between Ø30 and Ø60	TE2608084880

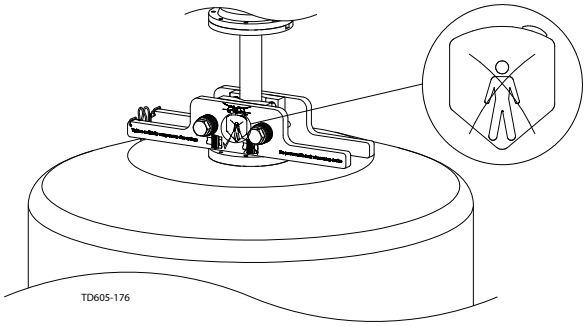




Shaft retainer - mounting instructions:

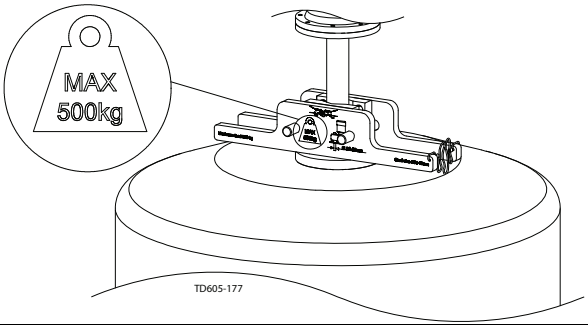
WARNING

Ensure no personnel inside tank.



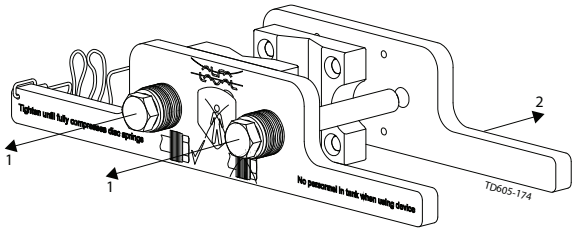
CAUTION

Ensure weight of Agitator is no higher than 500 kilogram.



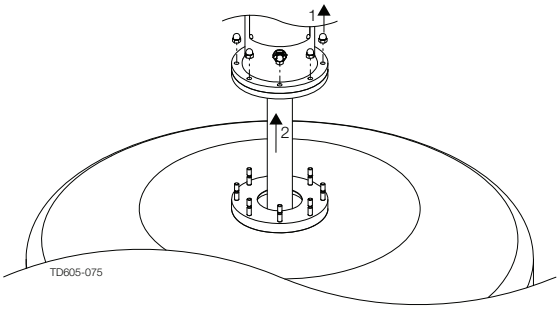
Step 1

Dismantle back plate by loosen both screws on the shaft retainer.



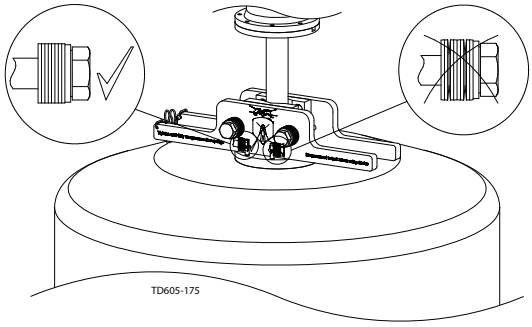
Tools

Step 2
1. Dismantle Agitator from welding flange.
2. Lift up Agitator.



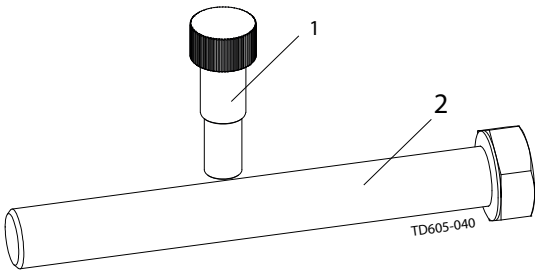
Step 3
Tighten both of the screws on the shaft retainer tool equal.

CAUTION
Ensure that the springs are completely compressed.



Retainer bolt and extractor bolt for bearing frame

Pos	Denomination	BC160D(H)/30	B25, B25/30	B35, B35/40	B45, B45/50	B55, B55/60
		Item no.	Item no.	Item no.	Item no.	Item no.
1	Retainer bolt	TE2604036760	TE2604010700	TE2604010100	TE2604010890	TE2604010900
2	Extractor bolt	TE2601000331	TE2601000331	TE2601000336	TE2601000334	TE2601000334



8 Appendix

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/manuals.jsp
and select document "Gear Units and Geared Motor B1000".

For agitators with direct drive (motor only) please find the motor instruction manual by below link:
http://www.hoyermotors.com/Catalogues-30304.htm

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