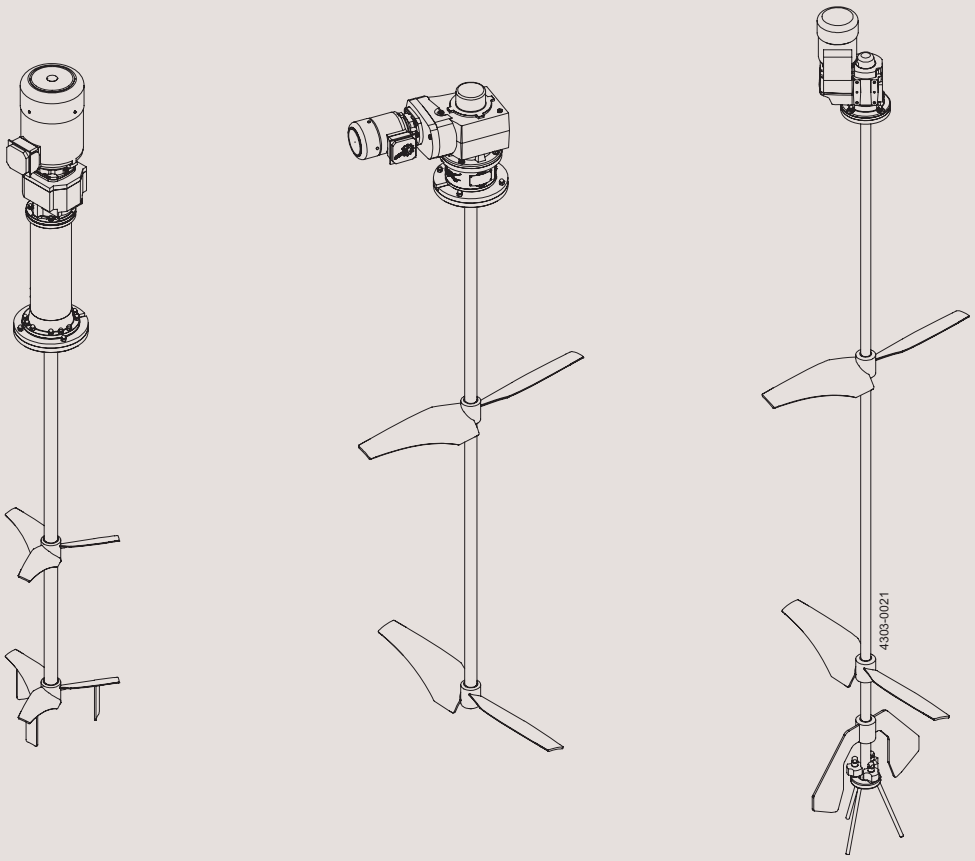
Instruction Manual

Alfa Laval Agitator - ALT / ALTB



ESE03504-EN2 2017-03

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

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

10.000 - 100.000
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	P125, P150, P175, P200, P225, P250, P300, P350, P400 P450, P500, P550, P600, P650, P700, P750, P800, P900, P1000, P1100, P1300, P1500, P1700, P1900
LXXXX =	L600, L800, L900, L1100, L1300, L1500, L1700
DY =	D2, D3
Y =	P, G
BSXX	BS1P, BS1G, BS2P, BS2G
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

2016-10-01
Date

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.

- 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 and may not be exceeded by all means.

[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.

3 Installation

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

3.1 Unpacking/delivery

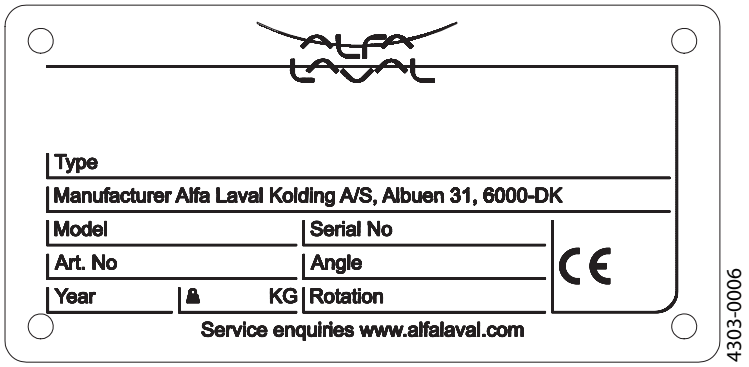
Always use lifting equipment when handling the Agitator (see step 3).

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

Step 1

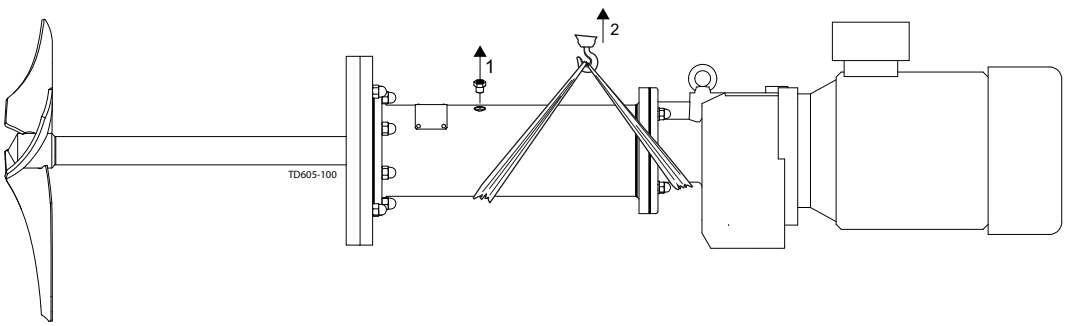
Inspect the delivery for visible transportation damages - all issues to be reported to carrier

Step 2
Check the delivery for:
1. Complete Agitator
2. Nameplate designations
3. Delivery note
4. Seperate instruction manuals from suppliers 8 Appendix

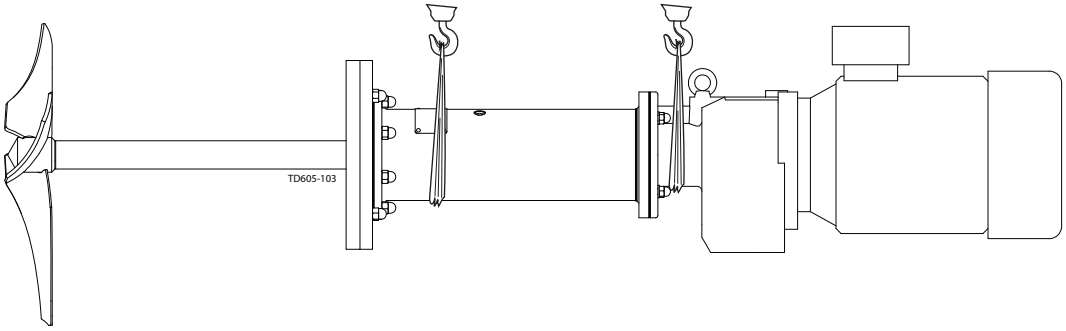


Step 3
Lifting instructions:

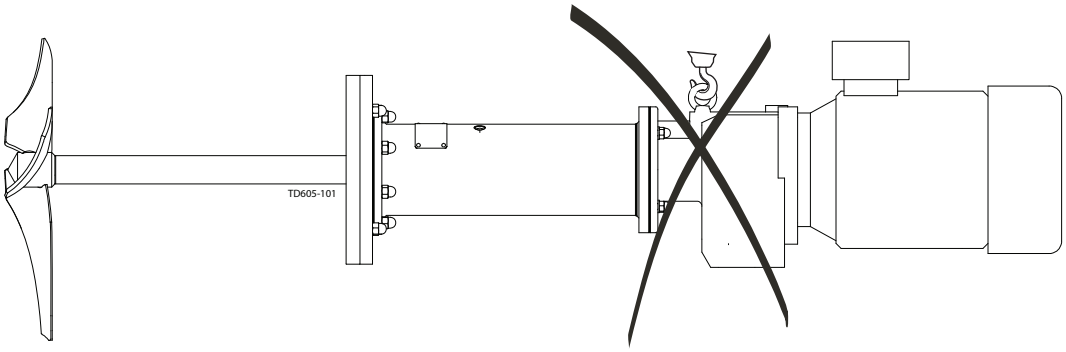
Always use the correct lifting equipment (see Agitator weight on name plate).
Locate Centre of gravity before moving the Agitator.



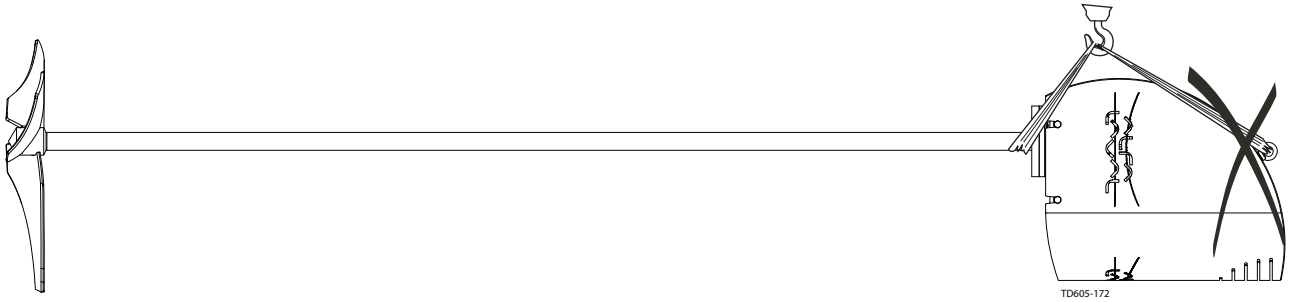
The instructions manual is part of the delivery.
Study the instructions carefully



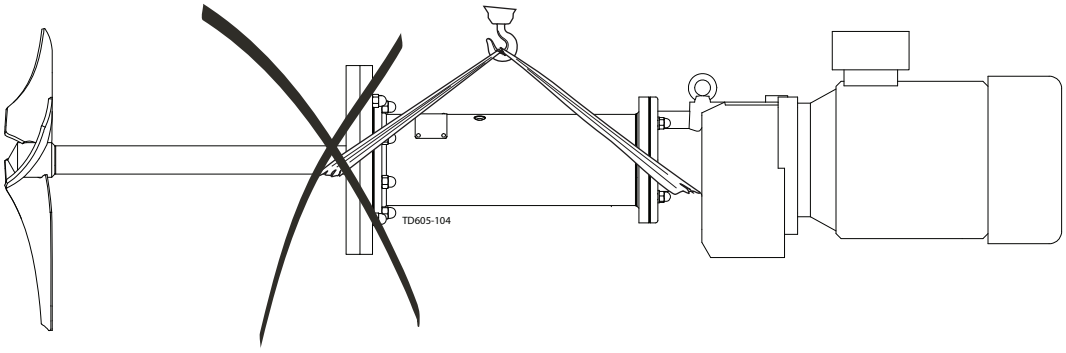
WARNING!
Do NOT use eye bolts on gear motor to lift the Agitator. They are only fir gear motor removal.



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



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



3 Installation

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

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

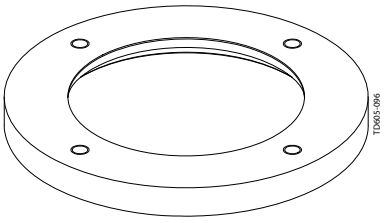
Always read the technical data thoroughly. (See chapter 6 Technical Data)
Only install this Agitator in mounting angle according to the name plate. (see chapter 6 Technical Data for illustration).
Always use lifting equipment when handling the Agitator. (See Step 3).
Always have safety elements removed 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.

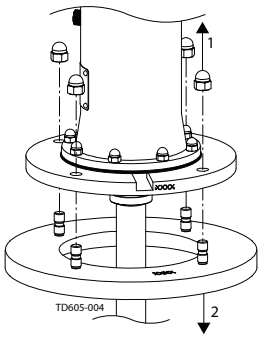
NOTE!
Alfa Laval highly recommend to install motor protection guard to protect the motor from overloading.
Never install a none Alfa Laval shroud on the agitator it can lead to a breakdown of the motor.
Alfa Laval highly recommends to use shaft retainer tool for installation of Agitator within a weight less than 500 kilogram and a shaft diameter between Ø30 and Ø60 (see section).

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.

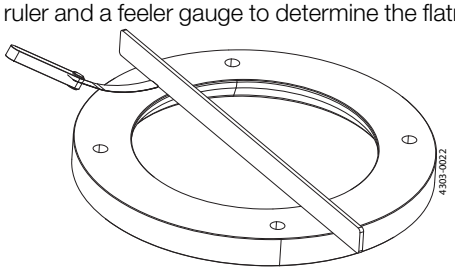


3 Installation

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 flange surface flatness tolerance equals 0,1. Use a solid straight ruler and a feeler gauge to determine the flatness.

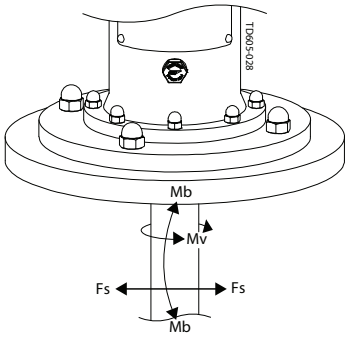


Step 3

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

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

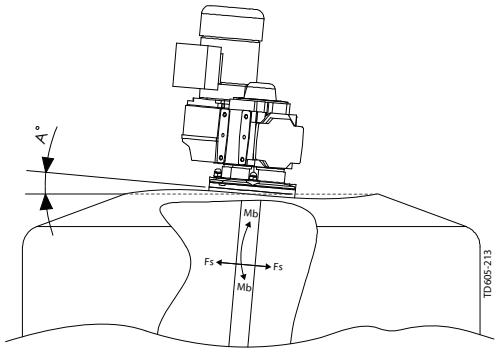
Mv = 23873 x P / n, [Nm]	P is the power of the motor in [KW] n is the speed of the shaft in [rpm]
Mb = Fs x S / 1000, [Nm]	S is the shaft length and is stated in the agitator type description as -Sxxxx-
Fs = 4,5 x M2 x 1000 / D, [N]	D is the impeller diameter and stated on the agitator type description as -Pxxxx…



Step 4

Ensure sufficient rigidity of the tank.
Ensure that the max. bending angle (A), at loads from Step 3 does not exceed according to below scheme

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



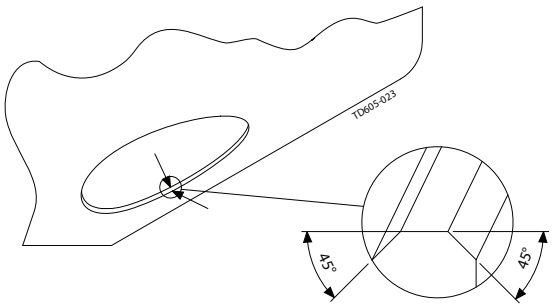
Guidelines for cutting hole in tank for Flat Shaped Welding Flange (FSWF)

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.

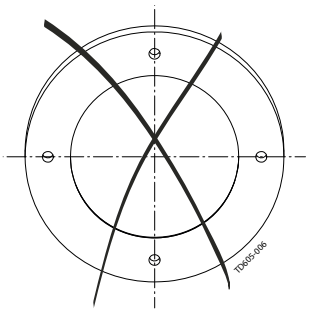


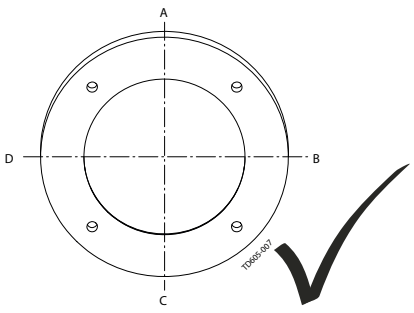
3 Installation

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.

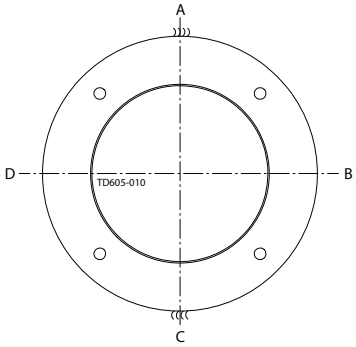
Welding procedure, flange (FSWF) without nose:

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

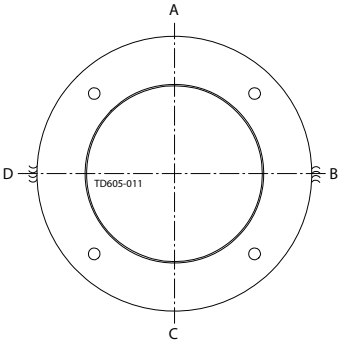




Step 2
Spot weld from outside.

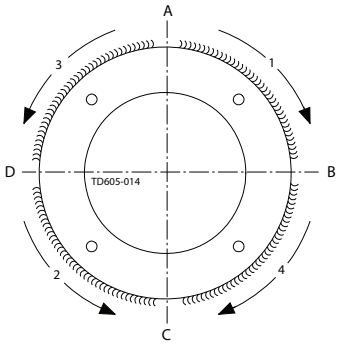


Adjust alignment!



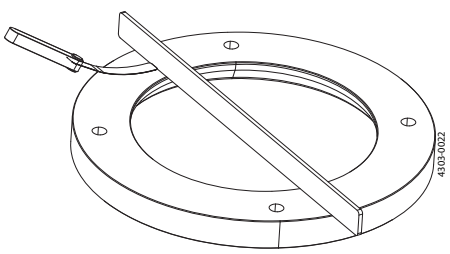
Step 3

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.



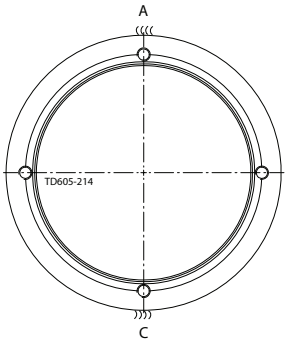
Study the instructions carefully and pay special attention to the warnings!
Always check the Agitator before operation - see section 3.3 Pre-use check.
The Agitator is for permanent fastening.
Make sure that the motor correspond to the environment.

Welding procedure, flange (FSWF) with nose:

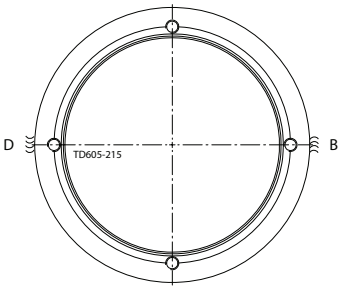
NOTE!
Alfa Laval recommend a welding tool to be made and fixed to the FSWF to ensure shape and form of the FSWF during welding and installation.

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.

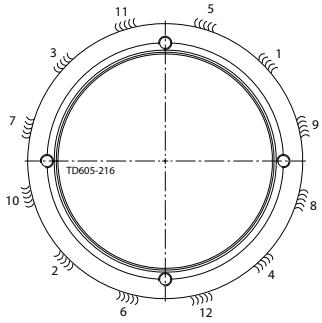


Adjust alignment!



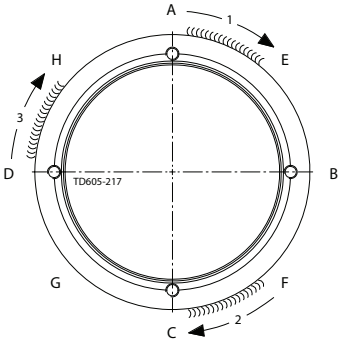
Step 3

Spot weld from inside



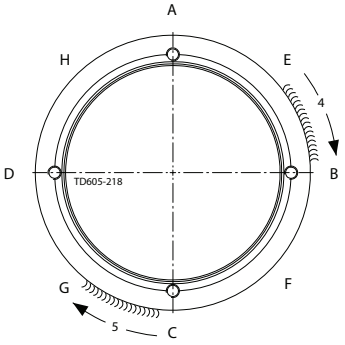
Step 4
Weld the following sections first from inside then from outside and cool to ambient temperature after each section has been welded

Step 1



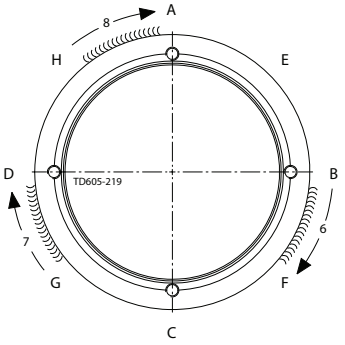
Cool with air!

Step 2



Cool with air!

Step 3



Cool with air!

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 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.

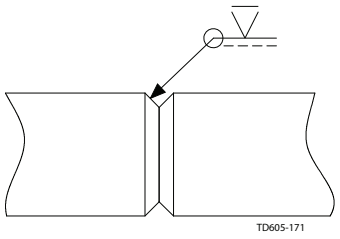
Welding procedure, shaft:

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 according to illustration and cool with air.



Step 4
Align the shaft according to shaft alignment instructions in section 6.1 Technical data.

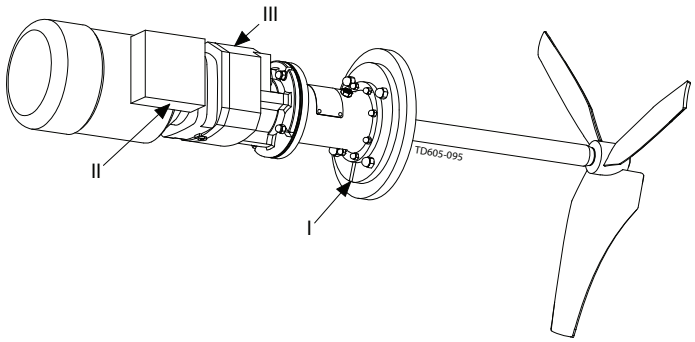
3 Installation

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 the assembly drawing in chapter 7 Part lists, part drawings and service kits.
Always refer to tightening torques in section 6.1 Technical datawhen tightening bolts.

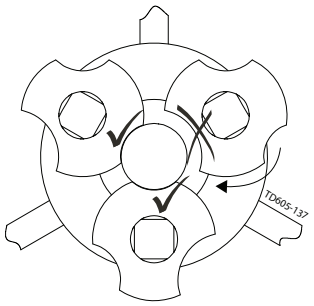
Step 1
Place impeller device(s) in the tank.
Ensure that tank and Agitator surfaces are clean
Ensure that drain (I) is pointing downwards.



Step 2
Mount the Agitator onto the tank.

NOTE!
Alfa Laval recommends using shaft retainer tool during mounting and dismantling. See section .

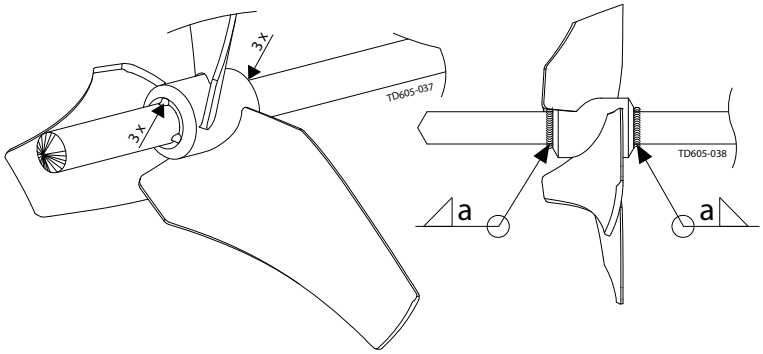
Step 3
(Only for ALTB machines with Intermediate steady bearing)
- Mount the intermediate steady bearing onto the shaft.
- Ensure before welding that the intermediate steady bearing is perpendicular to the mounting flange.



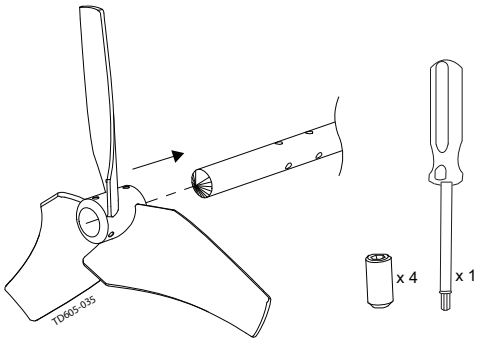
Study the instructions carefully and pay special attention to the warnings!
Always check the Agitator before operation - see section 3.3 Pre-use check.
The Agitator is for permanent fastening.
Make sure that the motor correspond to the environment.

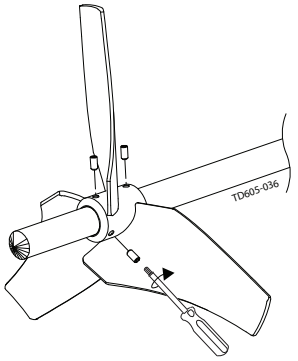
Step 4

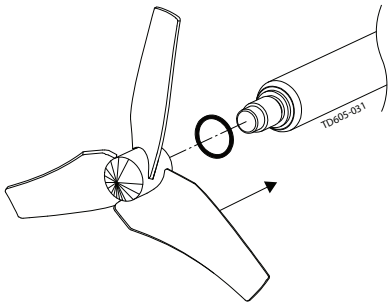
Mount impeller device(s) onto shaft.

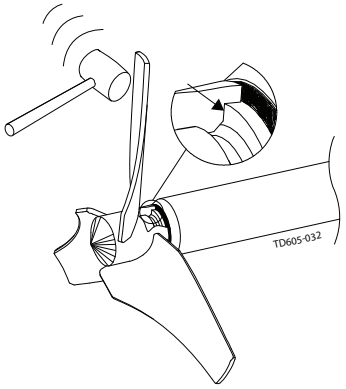


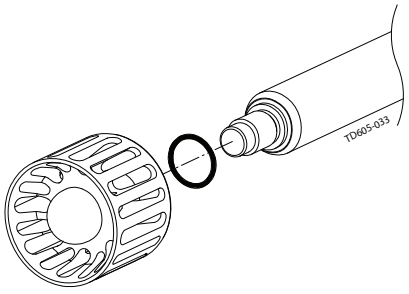
Hub diameter [mm]	a - dimension [mm]
Ø30	1,1
Ø40	1,8
Ø55, Ø80, Ø120	2,8

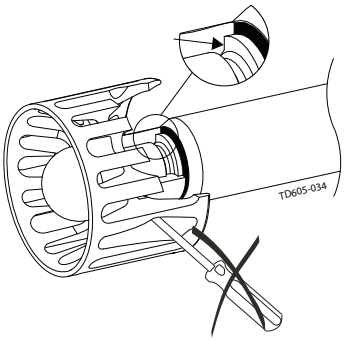












Step 5

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

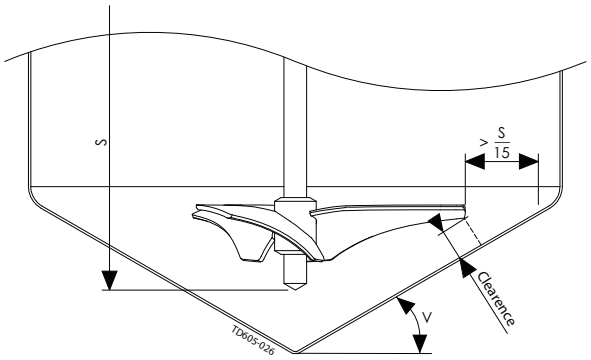
Study the instructions carefully and pay special attention to the warnings!
Always check the Agitator before operation - see section 3.3 Pre-use check.
The Agitator is for permanent fastening.
Make sure that the motor correspond to the environment.

Step 6

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

Further installation requirements regarding the position can be found in 6.1 Technical data to ensure optimum performance.

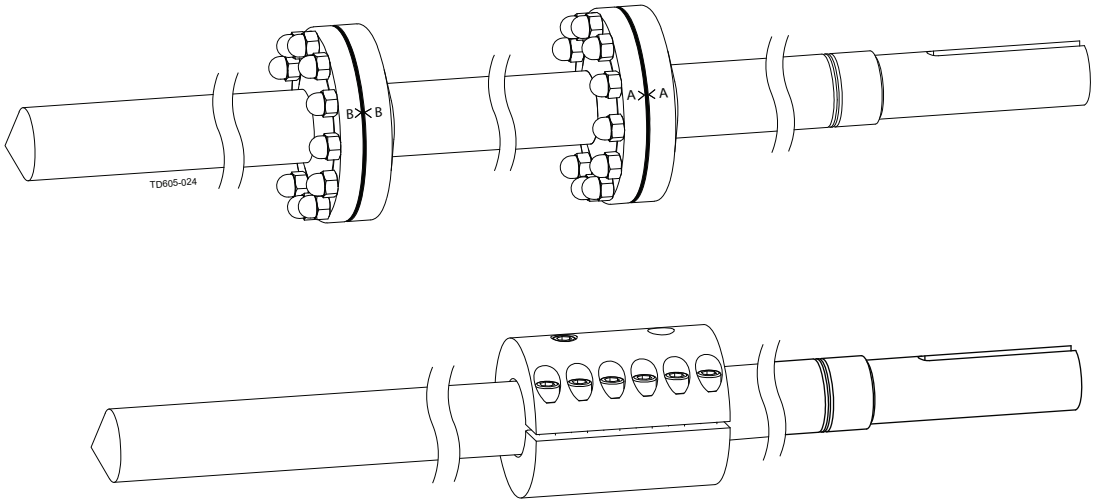
Clearence > S/15xsin(V)



NOTE!
In special cases Clearence 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

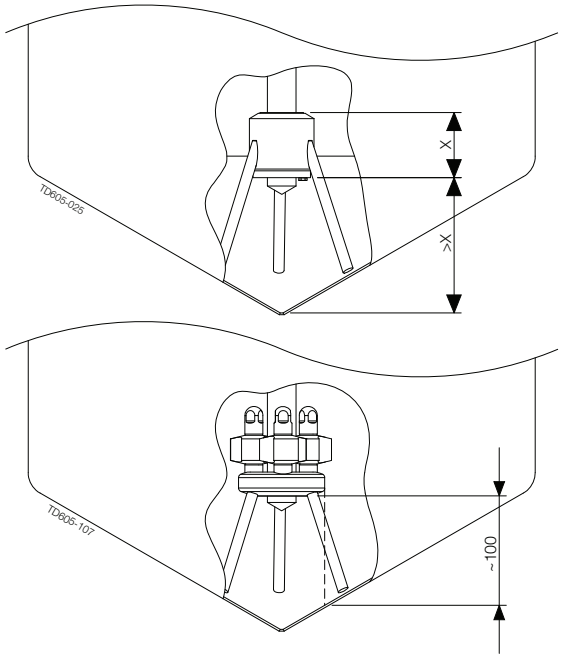
Align the shaft according to shaft alignment in section 6.1 Technical data.

NOTE!
When aligning shaft Alfa Laval offer guidance and direction.

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)

- Mount bottom steady bearing perpendicular to the mounting flange, according to tolerances given in Bottom steady bearing instructions section
- Ensure compliance with the dimensions according to the figure and technical data.



NOTE!
Alfa Laval recommends using a small plate for reinforcement below each leg before welding into tank.

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 6.1 Technical data
Check the rotation direction before operation

3.3 Pre-use check

Never install the Agitator in environments which deviate from those given in section 6.1 Technical data
Always ensure that all alignment instructions given in section 6.1 Technical data are followed
Always make sure that the motor corresponds to the environment

Step 1
Go through section 2.4 Safety precautions.

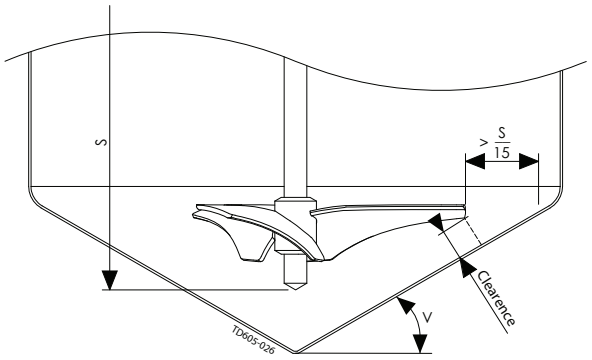
Step 2
Check the fastenings.

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

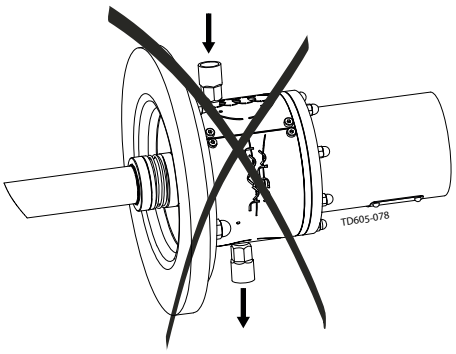
Step 4
Check impellers CANNOT collide with tank vessel at any point during a full rotation.

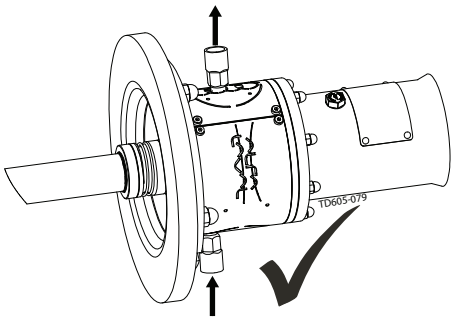
Clearence > S/15*sin(V)

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



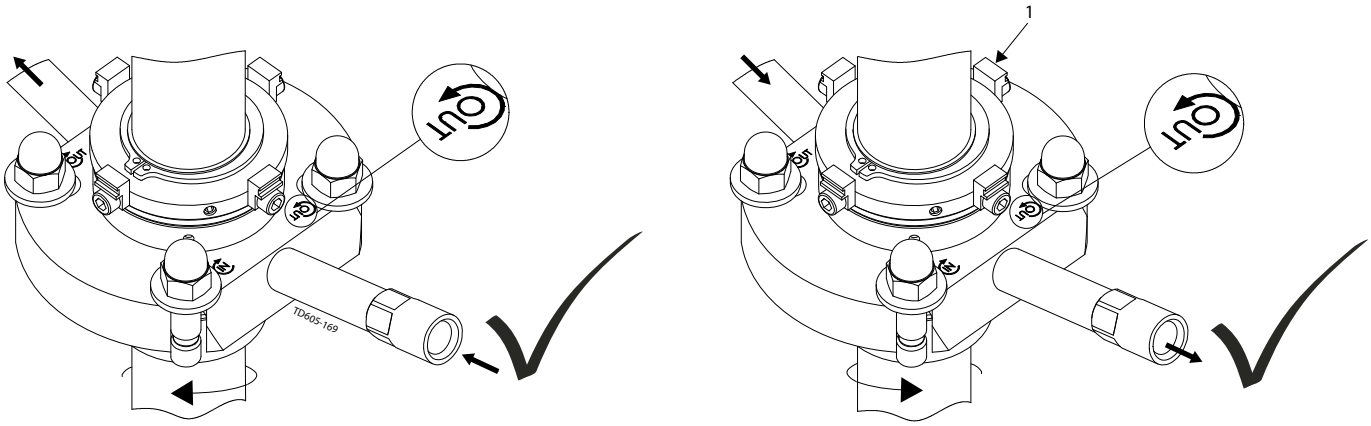
Step 5
Seal Type D
Ensure the sealing surfaces are not stuck together, by slowly turning shaft by hand.
Ensure that the seal never runs dry.
Ensure flush connections are installed in such way that air pockets are avoided.



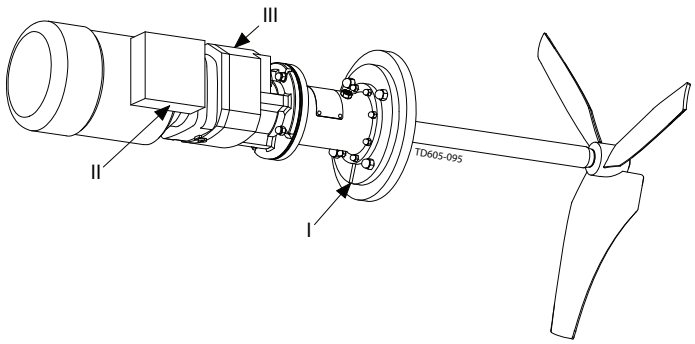


Study the instructions carefully and pay special attention to the warnings!
Always check the Agitator before operation.
The Agitator is only designed to operate according to data given in section 6.1 Technical data
Check the rotation direction before operation

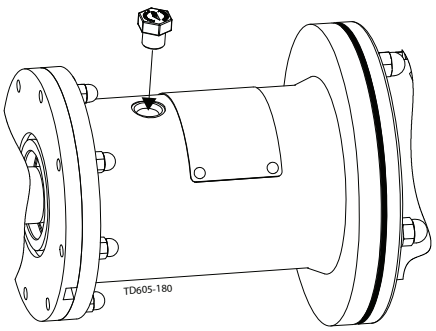
Step 6
Seal Type DC
Ensure the sealing surfaces are not stuck together, by slowly turning shaft by hand.
Ensure that the seal never runs dry.
Ensure flush connections are installed in such way that air pockets are avoided.
Ensure that the distance pieces on the seal are mounted as shown on illustration.



Step 7
Ensure that drain (I) is pointing downwards.
For gears with vent screw, ensure the vent is pointing upwards and the rubber plug is removed (III) (detail description see section 8.1 Drive unit instructions).
Position (II) refers to power cord entry location.



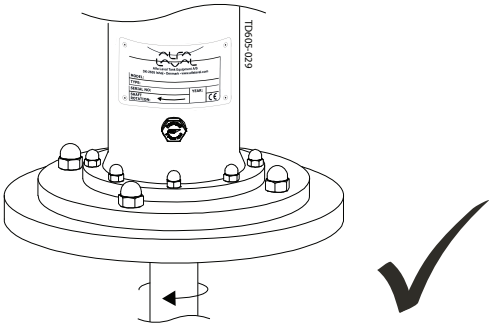
Step 8
(Only for agitators with bearing frame)
Ensure that the plug is refitted in the bearing frame

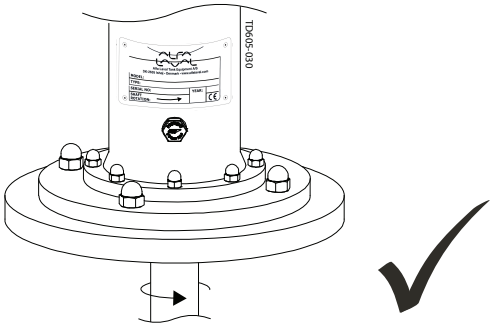


3 Installation

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 6.1 Technical data
Check the rotation direction before operation

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





Step 10
If frequency converter drive is used, it must be ensured NOT to operate continuously within +/-20% of critical oscillation speed. (The critical oscillation speed can be found in the supplied Alfa Laval quotation agreement. In any doubt please advise with Alfa Laval.)

Study the instructions carefully and pay special attention to warnings! ***Always*** *check the Agitator before operation. – See 3.3 Pre-use check.*
Alfa Laval recommend a soft starter for the Agitator to reduce the load on tank and Agitator. For operation instructions from suppliers see 8 Appendix.

4.1 Operation/Control

If deviation from normal operation 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. Please advise with Alfa Laval before during so.

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: S1, 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: BS1				x
- Bushing: BS2, MS2			x	
Abrasive media				
- Bushing: BS1			x	
Impeller device				
Sticky media				
- Clean impelle 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 for the Agitator to reduce the load on tank and Agitator. For operation instructions from suppliers see 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	Contact Alfa Laval
Other	- Deviation from normal operation - Increased / decreased temperature	Operation circumstances must equal to those it was designed for.[1]
Unuasual 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 - Seal surfaces stick together	Replace sealing Replace sealing and ensure that the seal never run dry Separate surfaces carefully and check correct rotating
Other	- Deviation from normal operation - Circuit overload	Operation circumstances must be equal to those it was designed for.[1] Operation cirucmstances 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 cirucmstances 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 cirucmstances must be equal to those it was designed for.[1]

[1] The circumstances the agitator is designed for can be found in the supplied Alfa Laval quotation agreement. Otherwise, please advise with Alfa Laval.

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 for the Agitator to reduce the load on tank and Agitator. For operation instructions from suppliers see 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.

5 Maintenance

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 for the Agitator to reduce the load on tank and Agitator. For operation instructions from suppliers see 8 Appendix

Maintenance of the Agitator should only be performed by authorized personnel
For maintenance instructions from suppliers see 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)
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 the assembly drawing in chapter 7 Part lists, part drawings and service kits.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts
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 checkmust 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.

For maintenance instructions from suppliers see 8 Appendix
***Always** ensure that mounting is according to assembly drawing in chapter 7 Part lists, part drawings and service kits.*
Ensure totally clean surfaces during mounting.
***Always** refer to tightening torques in section 6.1 Technical data when tightening bolts.*

5.1 General Maintenance

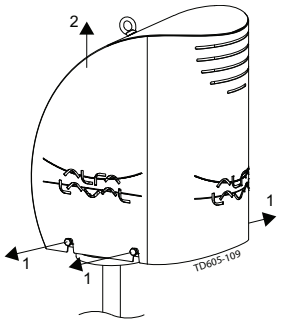
	Replace every:				
	500 hour or yearly	1000 hour or yearly	3000 hour or yearly	3000 hour or every 3rd year	6000 hour or every 3rd year
Sealing					
Shaft seal					
- Radial seal: R			x		
- Gab seal: G					x
- V-ring seal: V	x				
Mechanical seal					
-NOT flushed: **S, S3**				x	
-Flushed, rpm < 500: DC, D			x		
-Flushed, rpm > 500: 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: BS1					x
Bushing: BS2, MS2			x		
Bushing: BS1, BS2, MS2	Replace if temperature > 100°C				

5 Maintenance

For maintenance instructions from suppliers see 8 Appendix
***Always** ensure that mounting is according to assembly drawing in chapter 7 Part lists, part drawings and service kits.*
Ensure totally clean surfaces during mounting.
***Always** refer to tightening torques in section 6.1 Technical data when tightening bolts.*

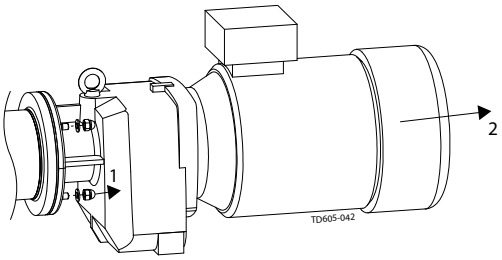
5.2 Replacement of drive unit (with bearing frame)

Step 1
Remove shroud, if any.



Step 2
Loosen cap nuts.

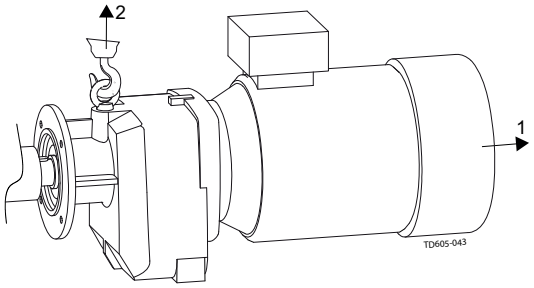
CAUTION!
If dismantling motor from gear:
Follow supplier instructions.
Ensure that the gear oil is contained.
A cog wheel may be mounted onto the motor shaft.



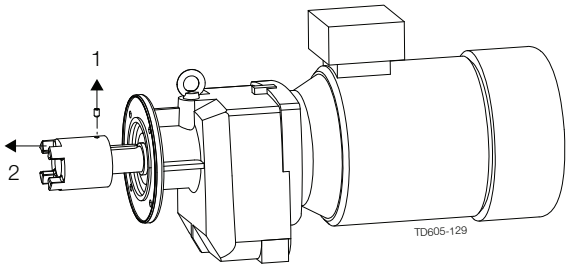
Step 3
Release the gear motor from the Agitator.

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.

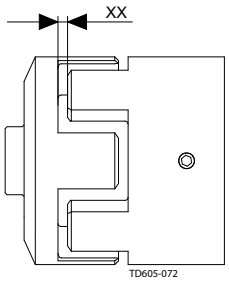


For maintenance instructions from suppliers see 8 Appendix
***Always** ensure that mounting is according to assembly drawing in chapter 7 Part lists, part drawings and service kits.*
Ensure totally clean surfaces during mounting.
***Always** refer to tightening torques in section 6.1 Technical data when tightening bolts.*

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 6.1 Technical data.



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.

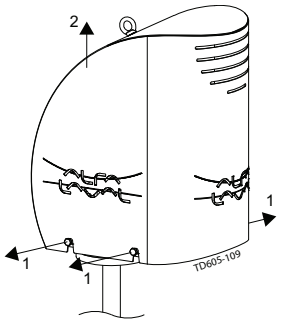
Step 8
Mount drive unit reverse as dismantling

5 Maintenance

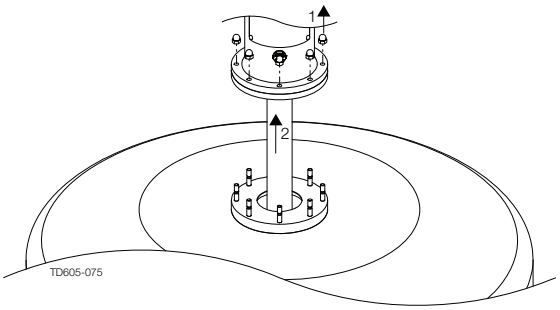
For maintenance instructions from suppliers see 8 Appendix
Always *ensure that mounting is according to assembly drawing in chapter 7 Part lists, part drawings and service kits.*
Ensure totally clean surfaces during mounting.
Always *refer to tightening torques in section 6.1 Technical data when tightening bolts.*

5.3 Replacement of drive unit (without bearing frame)

Step 1
Remove shroud, if any.

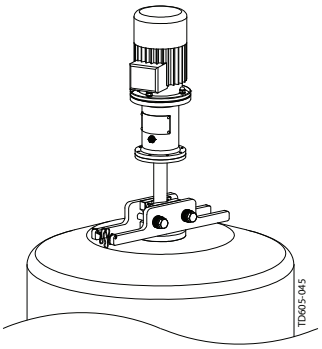


Step 2
1. Dismantle Agitator from welding flange.
2. Lift up Agitator.



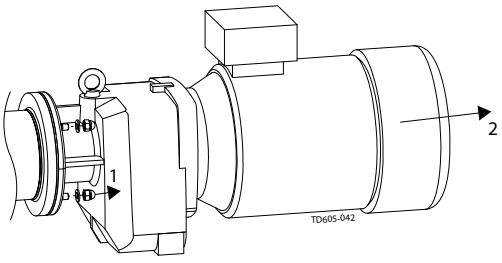
Step 3
Support shaft using shaft retainer tool.

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)



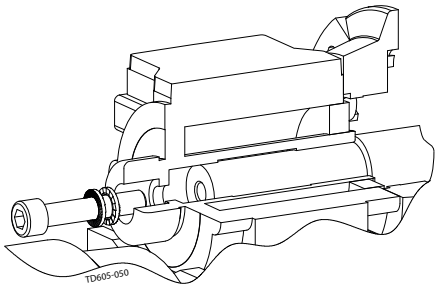
Step 4
Before dismantling drive unit, please see instructions in 5.10 Replacement of shaft seal, type D to 5.13 Replacement of shaft seal, type S3

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.

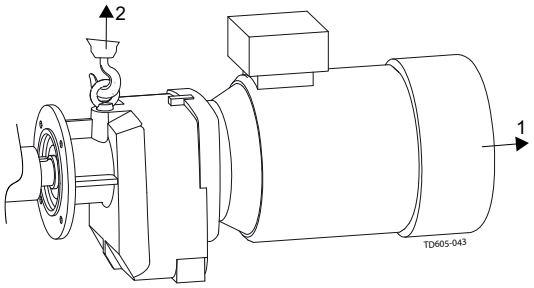


For maintenance instructions from suppliers see 8 Appendix
***Always** ensure that mounting is according to assembly drawing in chapter 7 Part lists, part drawings and service kits.*
Ensure totally clean surfaces during mounting.
***Always** refer to tightening torques in section 6.1 Technical data when tightening bolts.*

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



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 6.1 Technical data when tightening bolts.

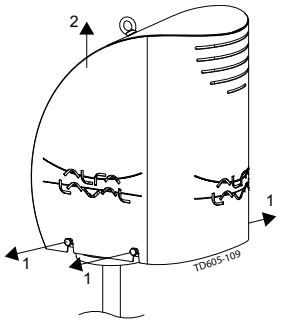
Step 10
Mount drive unit reverse as dismantling.

5 Maintenance

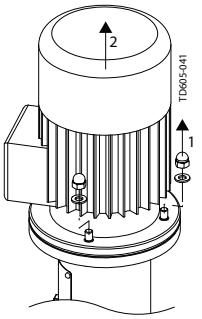
For maintenance instructions from suppliers see 8 Appendix
***Always** ensure that mounting is according to assembly drawing in chapter 7 Part lists, part drawings and service kits.*
Ensure totally clean surfaces during mounting.
***Always** refer to tightening torques in section 6.1 Technical data when tightening bolts.*

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.

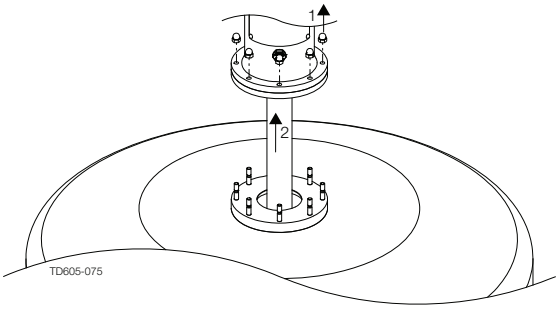
Step 6
Use Loctite® 243 before fastening screws.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.

Step 7
Mount drive unit reverse as dismantling.

Always ensure that mounting is according to assembly drawing in chapter 7 Part lists, part drawings and service kits
Ensure totally clean surfaces during mounting.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.
If possible, always dismantle the Agitator from the tank before dismounting any parts (go to Step 2).

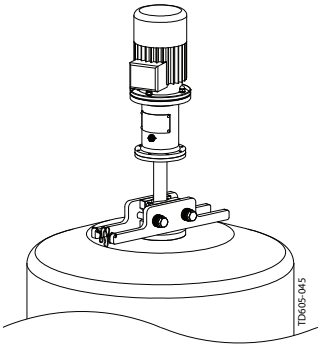
5.5 Dismantling and mounting shaft (only for bearing frame)

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

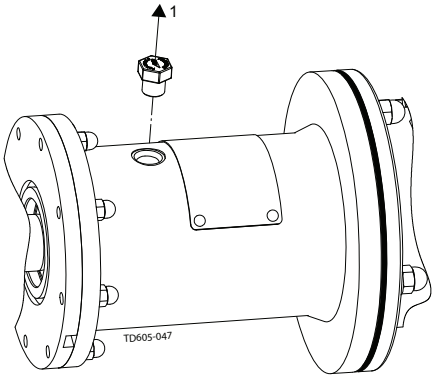


Step 2
Support shaft using shaft retainer tool.

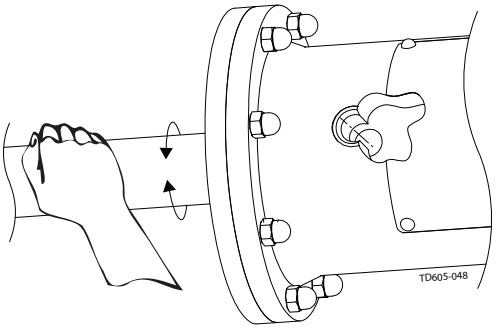
NOTE!
Alfa Laval highly recommends to use shaft retainer tool for installation of Agitator within a weight less than 500 kilograms and a shaft diameter between Ø30 and Ø60 (see section)



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 trough PreVent valve hole, rotate shaft until shaft locking hole aligns.



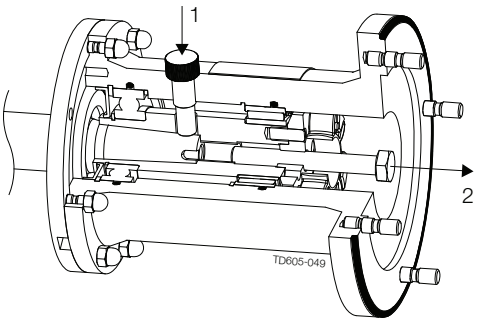
5 Maintenance

Always ensure that mounting is according to assembly drawing in chapter 7 Part lists, part drawings and service kits
Ensure totally clean surfaces during mounting.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.
If possible, always dismantle the Agitator from the tank before dismounting any parts (go to Step 2).

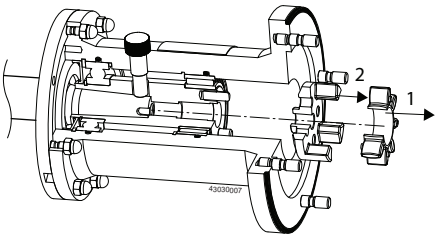
Step 5
1. Mount retainer bolt tool for shaft locking.
2. Remove centre bolt.

NOTE!

Extra retainer bolt tool can be acquired if needed. See section

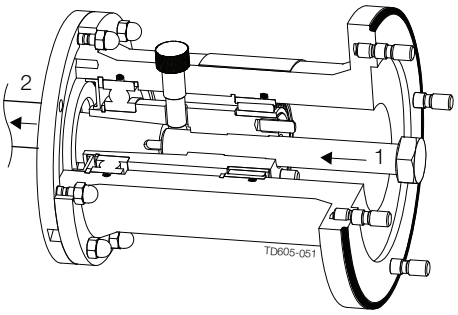


Step 6
Remove spider and coupling part.



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

NOTE!
Extra bolt tool can be acquired if needed. See section .

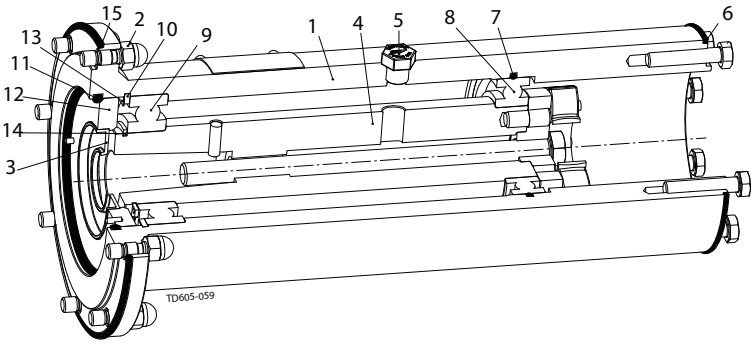


Step 8
Mount shaft reverse as dismantling

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

Always ensure that mounting is according to assembly drawing in chapter 7 Part lists, part drawings and service kits
Ensure totally clean surfaces during mounting.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.
If possible, always dismantle the Agitator from the tank before dismounting any parts (go to Step 2).

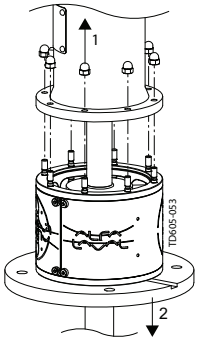
5.6 Replacement of bearings, type B20, B25, B25/30, B35, B35/40, B45, B45/50, B55, B55/60



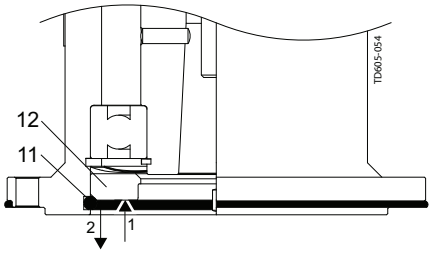
NOTE!
Positions referred to in following instructions can be seen in the above illustration.

Step 1
Dismantle shaft as described in section 5.5 Dismantling and mounting shaft (only for bearing frame).

Step 2
1. Remove cap nuts (2).
2. Remove lantern from bearing frame.



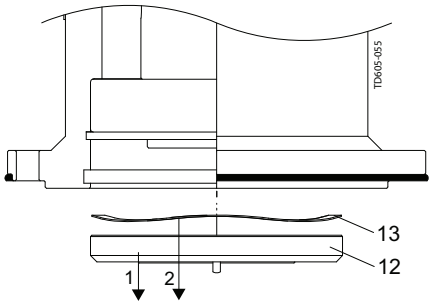
Step 3
1. Push cover (12) into bearing frame.
2. Remove o-ring (11).



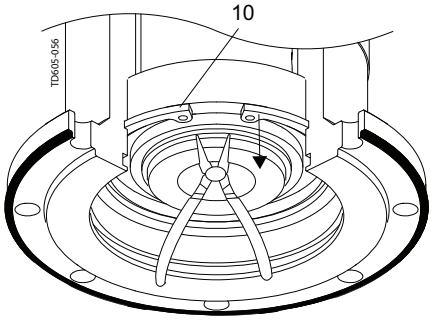
5 Maintenance

Always ensure that mounting is according to assembly drawing in chapter 7 Part lists, part drawings and service kits
Ensure totally clean surfaces during mounting.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.
If possible, always dismantle the Agitator from the tank before dismounting any parts (go to Step 2).

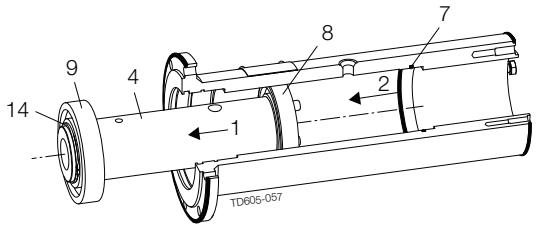
Step 4
Remove cover (12) including radial seal (3) and spring (13).



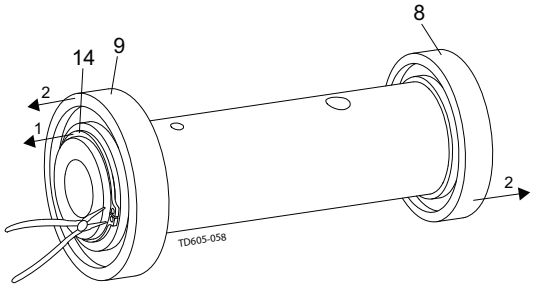
Step 5
Remove outer circlip (10) carefully. Use suited pliers.



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).

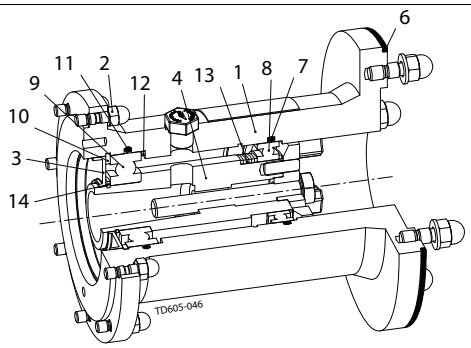


Step 8
1. Replace bearings (8, 9) and o-rings (6, 7, 11, 15).
2. Assembly of bearing frame is reverse as dismantling.

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

Always ensure that mounting is according to assembly drawing in chapter 7 Part lists, part drawings and service kits
Ensure totally clean surfaces during mounting.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.
If possible, always dismantle the Agitator from the tank before dismounting any parts (go to Step 2).

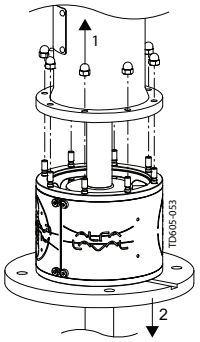
5.7 Replacement of bearings, type BC160DH



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

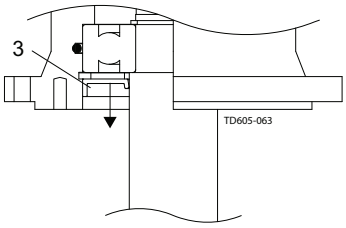
Step 1
Dismantle shaft as described in section 5.5 Dismantling and mounting shaft (only for bearing frame).

Step 2
1. Remove cap nuts (2).
2. Remove lantern from bearing frame

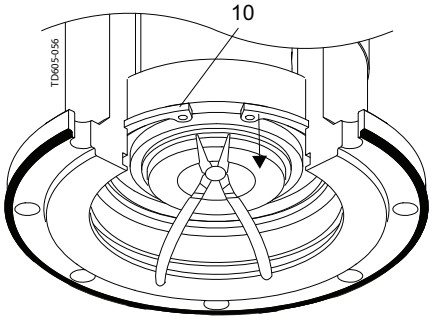


Step 3
Remove radial seal (3).

NOTE!
Alfa Laval recommends replacing the radial seal.



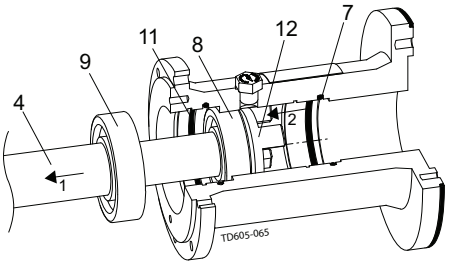
Step 4
Remove outer circlip (10) carefully. Use suited pliers.



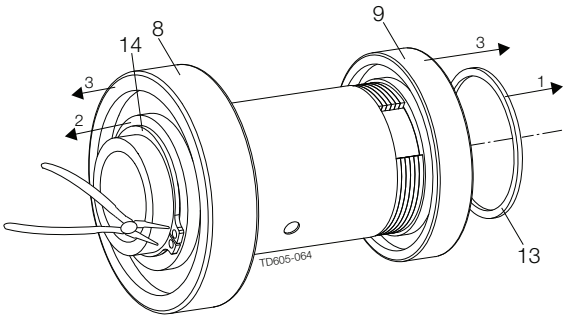
5 Maintenance

Always ensure that mounting is according to assembly drawing in chapter 7 Part lists, part drawings and service kits
Ensure totally clean surfaces during mounting.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.
If possible, always dismantle the Agitator from the tank before dismounting any parts (go to Step 2).

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



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

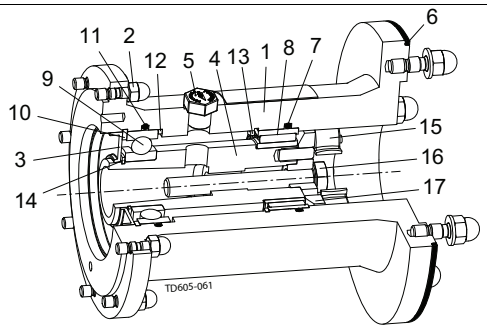


Step 7
1. Replace bearings (8, 9) and o-rings (6, 7, 11).
2. Assembly of bearing frame is reverse as dismantling.

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 in bearing frame.

Always ensure that mounting is according to assembly drawing in chapter 7 Part lists, part drawings and service kits
Ensure totally clean surfaces during mounting.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.
If possible, always dismantle the Agitator from the tank before dismounting any parts (go to Step 2).

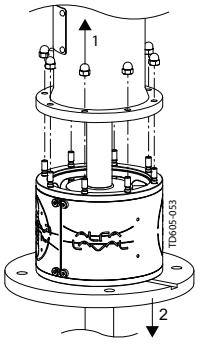
5.8 Replacement of bearing, type BC160D



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

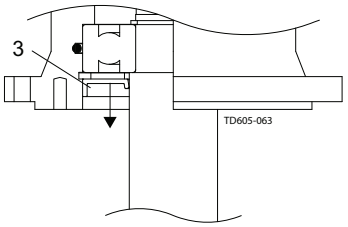
Step 1
Dismantle shaft as described in section 5.5 Dismantling and mounting shaft (only for bearing frame).

Step 2
1. Remove cap nuts (2).
2. Remove lantern from bearing frame

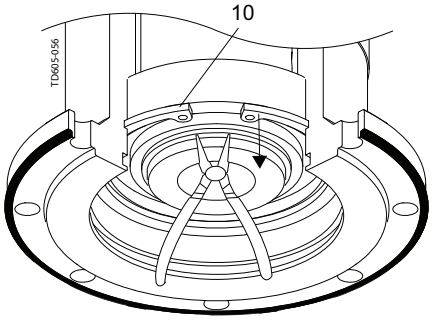


Step 3
Remove radial seal (3).

NOTE!
Alfa Laval recommends replacing the radial seal.



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

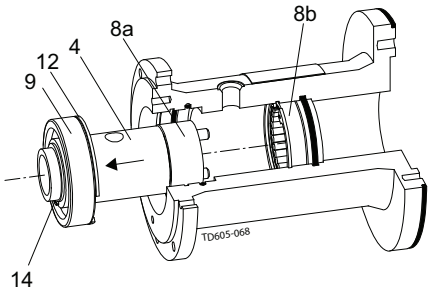


5 Maintenance

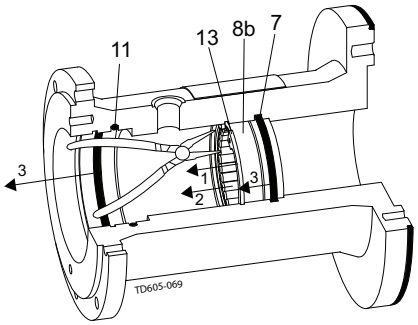
Always ensure that mounting is according to assembly drawing in chapter 7 Part lists, part drawings and service kits
Ensure totally clean surfaces during mounting.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.
If possible, always dismantle the Agitator from the tank before dismounting any parts (go to Step 2).

Step 5
1. Pull out drive shaft (4) including bearings (pos 8a, 9).

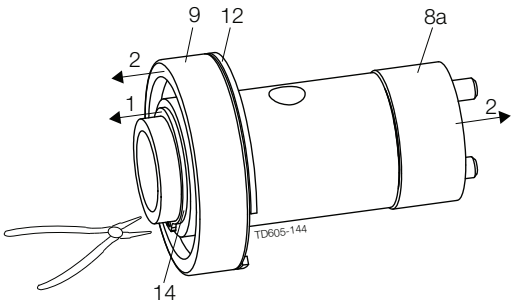
NOTE!
Outer bearing ring (8b) should stay in bearing frame



Step 6
1. Remove upper circlip (13) carefully. Use suited pliers
2. Pull out 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)

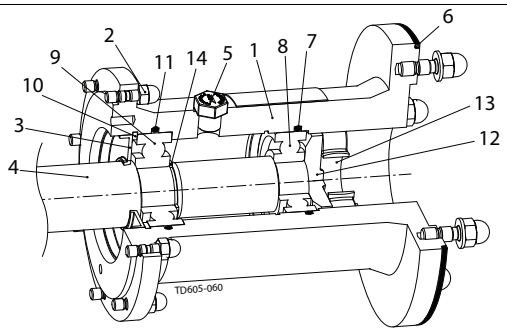


Step 8
1. Replace bearings (8, 9) and o-rings (6, 7, 11).
2. Assembly of bearing frame is reverse as dismantling.

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 in bearing frame

Always ensure that mounting is according to assembly drawing in chapter 7 Part lists, part drawings and service kits
Ensure totally clean surfaces during mounting.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.
If possible, always dismantle the Agitator from the tank before dismounting any parts (go to Step 2).

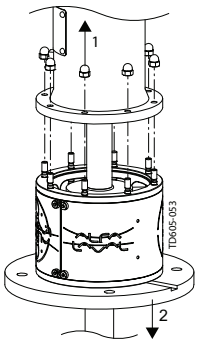
5.9 Replacement of bearings type BC160



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

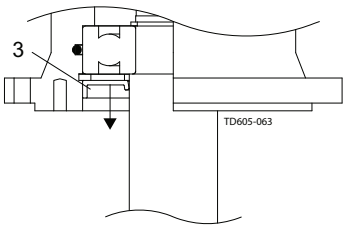
Step 1
Dismantle shaft as described in section 5.2 Replacement of drive unit (with bearing frame)

Step 2
1. Remove cap nuts (2).
2. Remove lantern from bearing frame

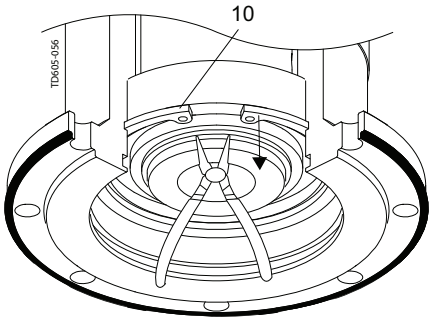


Step 3
Remove radial seal (3).

NOTE!
Alfa Laval recommends replacing the radial seal.



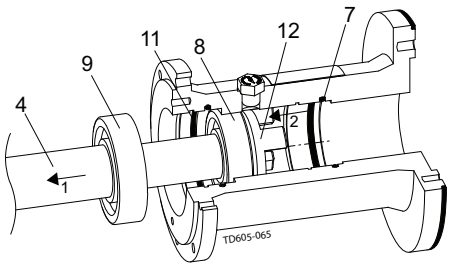
Step 4
Remove outer circlip (10) carefully. Use suited pliers.



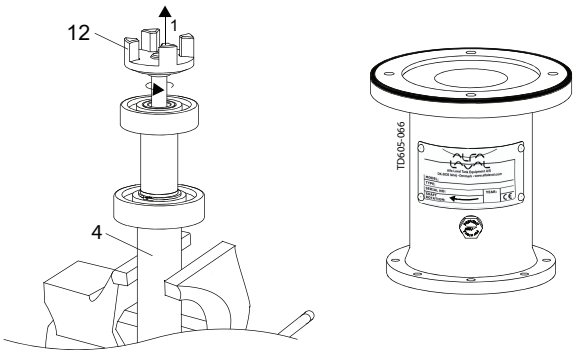
5 Maintenance

Always ensure that mounting is according to assembly drawing in chapter 7 Part lists, part drawings and service kits
Ensure totally clean surfaces during mounting.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.
If possible, always dismantle the Agitator from the tank before dismounting any parts (go to Step 2).

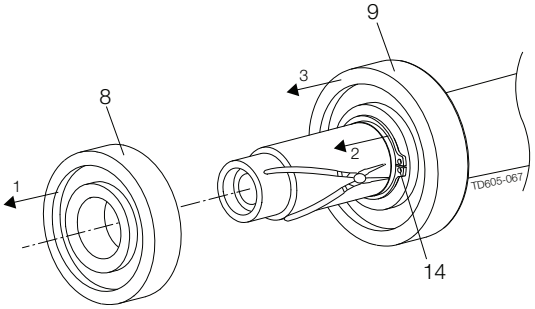
Step 5
1. Pull out drive shaft (4) including bearings (pos 8, 9).
2. Remove o-rings (7, 11).



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.

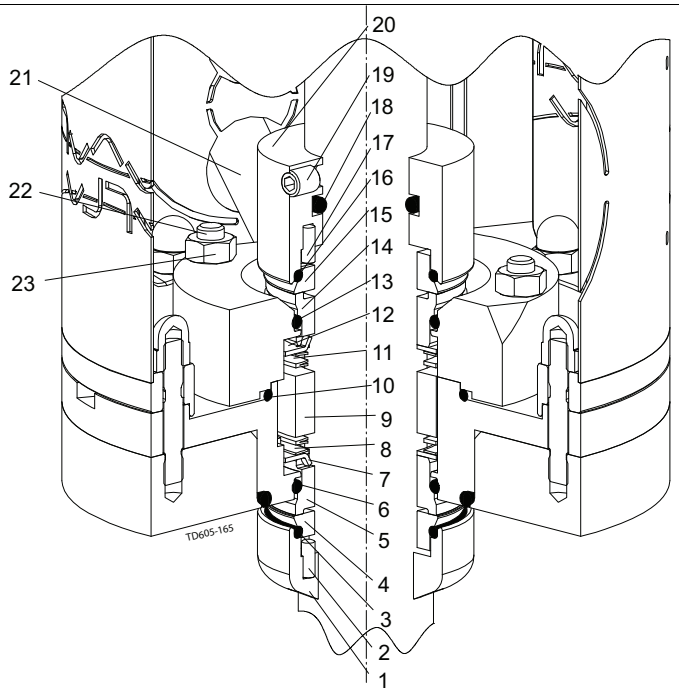


Step 8
1. Replace bearings (8, 9) and o-rings (6, 7, 11).
2. Assembly of bearing frame is reverse as dismantling.

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

Always ensure that mounting is according to assembly drawing in.
Ensure totally clean surfaces during seal replacement.
Always replace all surrounding gaskets during shaft seal replacement.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.

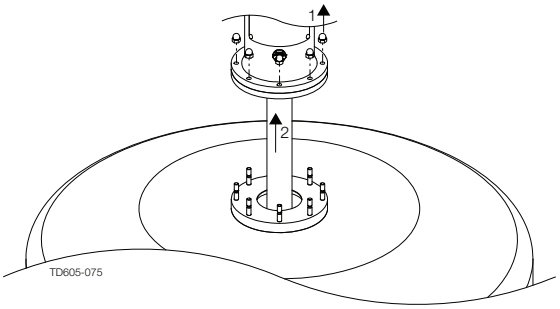
5.10 Replacement of shaft seal, type D



NOTE!
To replace seals easier, use detergent.
Ensure subsequent to seal replacement, that all seal faces are totally clean, using alcohol.

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



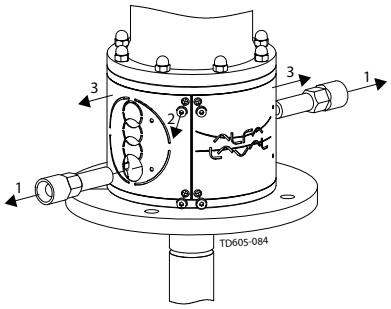
Step 2
Support shaft using shaft retainer tool.

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)

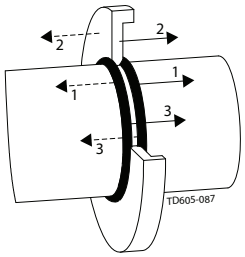
5 Maintenance

Always ensure that mounting is according to assembly drawing in.
Ensure totally clean surfaces during seal replacement.
Always replace all surrounding gaskets during shaft seal replacement.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.

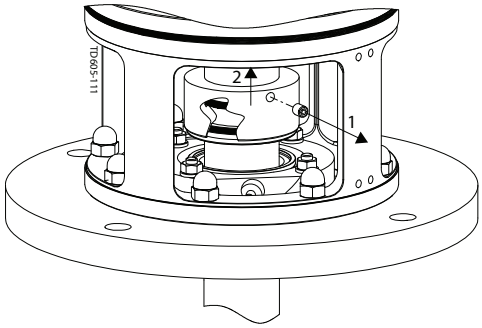
Step 3
1. Remove flush connections.
2. Remove guards from lantern.



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



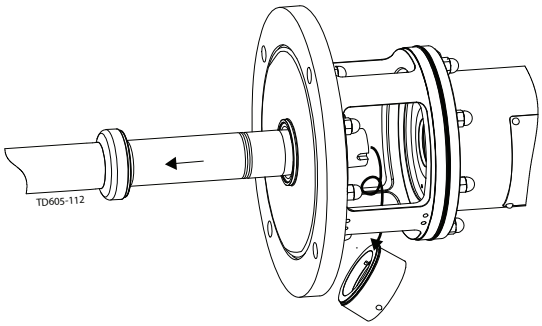
Step 5
1. Loosen pointed screw.
2. Move the rotary seal housing and rotary seal part carefully along the shaft.



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

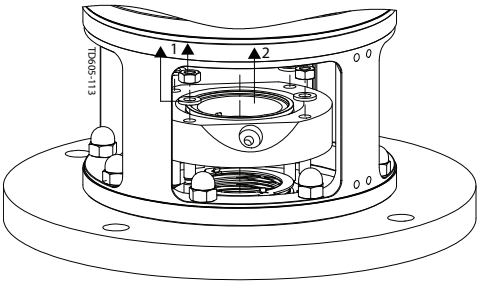
Step 7
1. Dismantle shaft as described in section 5.3 Replacement of drive unit (without bearing frame) or .
2. Remove shaft and rotary seal parts carefully, avoiding contact.

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



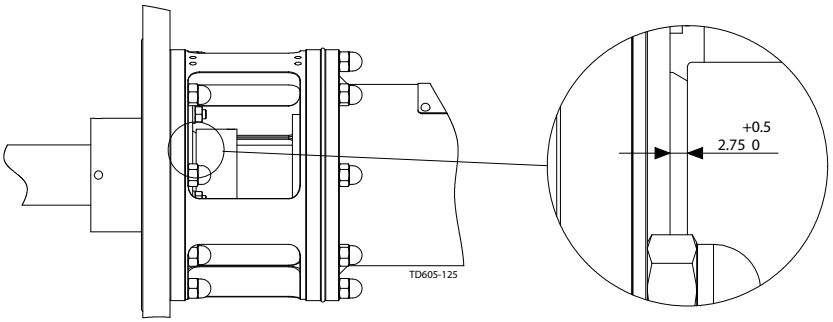
Always ensure that mounting is according to assembly drawing in.
Ensure totally clean surfaces during seal replacement.
Always replace all surrounding gaskets during shaft seal replacement.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.

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



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

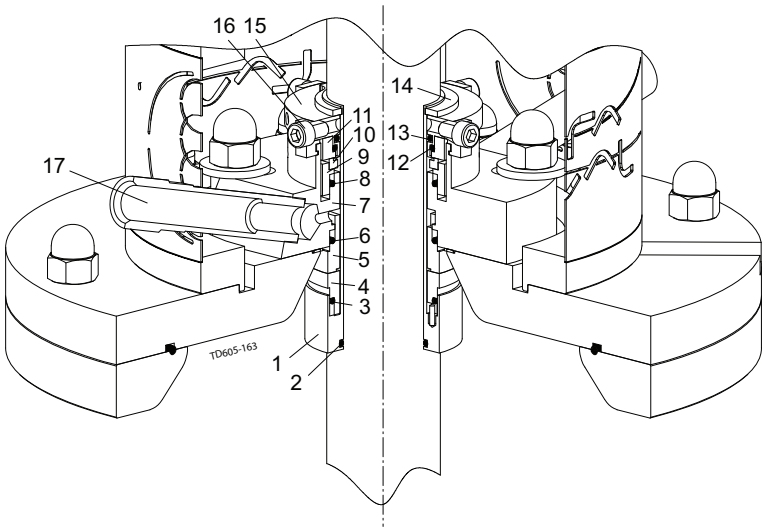
CAUTION!
Ensure clearance between rotary and stationary seal housing is 2,75 mm.



5 Maintenance

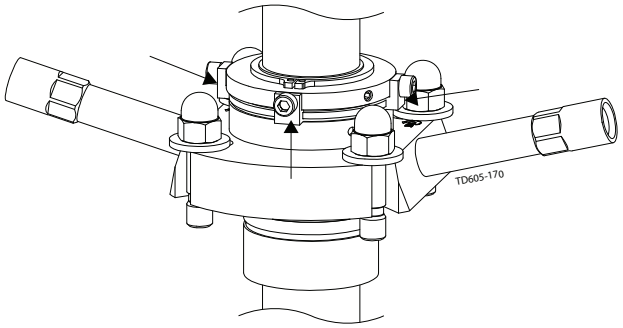
Always ensure that mounting is according to assembly drawing in.
Ensure totally clean surfaces during seal replacement.
Always replace all surrounding gaskets during shaft seal replacement.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.

5.11 Replacement of shaft seal, type DC

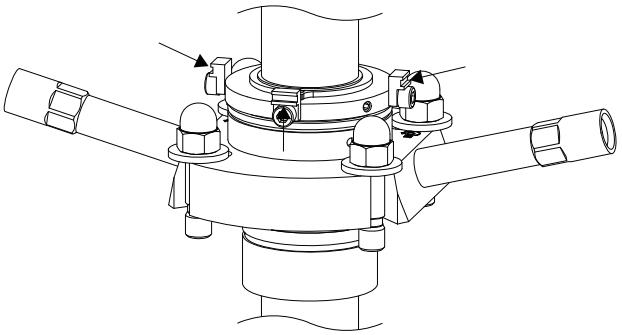


NOTE!
To replace seals easier, use detergent.
Ensure subsequent to seal replacement, that all seal faces are totally clean, using alcohol.

NOTE!
For seal renovation, please advise with Alfa Laval before during so. The renovation must be done by trained personnel in a clean environment.



During mounting/dismounting

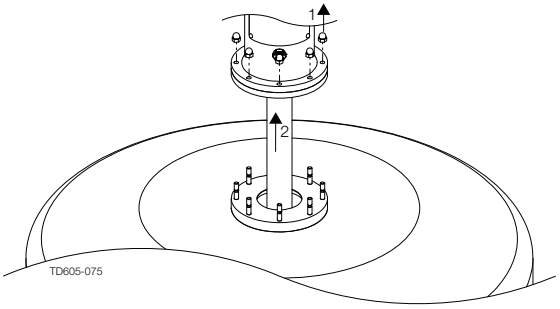


Before start

Always ensure that mounting is according to assembly drawing in.
Ensure totally clean surfaces during seal replacement.
Always replace all surrounding gaskets during shaft seal replacement.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.

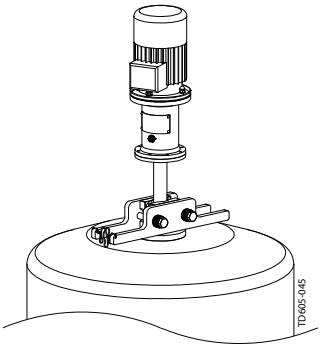
NOTE!
If possible, always dismantle the Agitator from the tank before dismounting any parts.

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

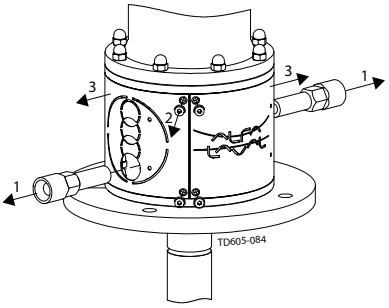


Step 2
Support shaft using shaft retainer tool.

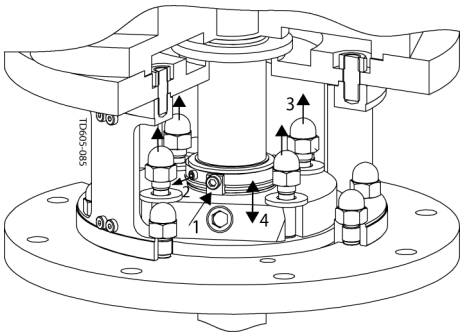
NOTE!
Alfa Laval highly recommends to use shaft retainer tool for installation of Agitator within a weight less than 500 kilograms and a shaft diameter between Ø30 and Ø60 (see section)



Step 3
1. Remove flush connections.
2. Remove guards from lantern.



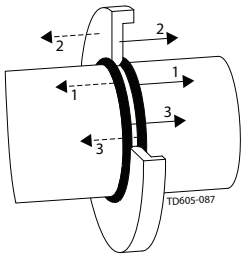
Step 4
1. Mount 4 off distance pieces.
2. Loosen pointed screws.
3. Loosen cap nut, securing the seal
4. Ensure the seal can move along the shaft (up to 10 mm).



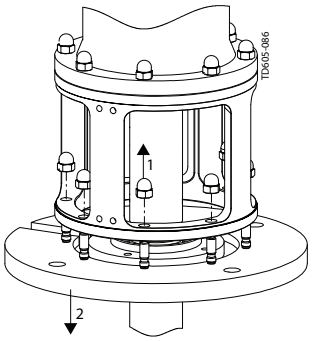
5 Maintenance

Always ensure that mounting is according to assembly drawing in.
Ensure totally clean surfaces during seal replacement.
Always replace all surrounding gaskets during shaft seal replacement.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.

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



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

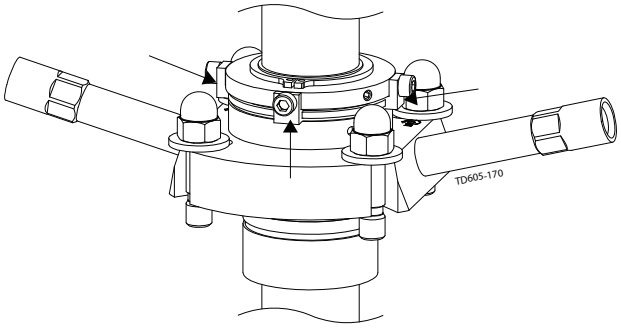


Step 7
Dismantle shaft, as described in section 5.3 Replacement of drive unit (without bearing frame) or 5.5 Dismantling and mounting shaft (only for bearing frame), and carefully remove lantern.

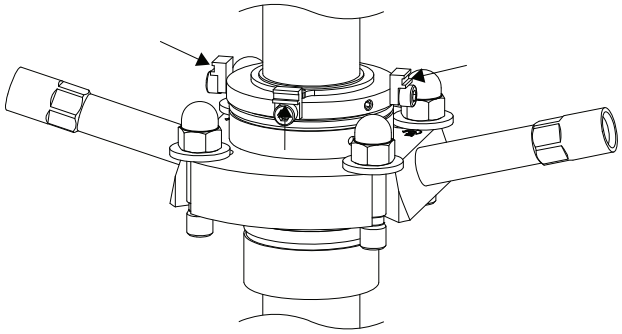
Step 8
Lift lantern and drive unit flange.

Step 9
Remove DC seal.

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



During mounting / dismounting

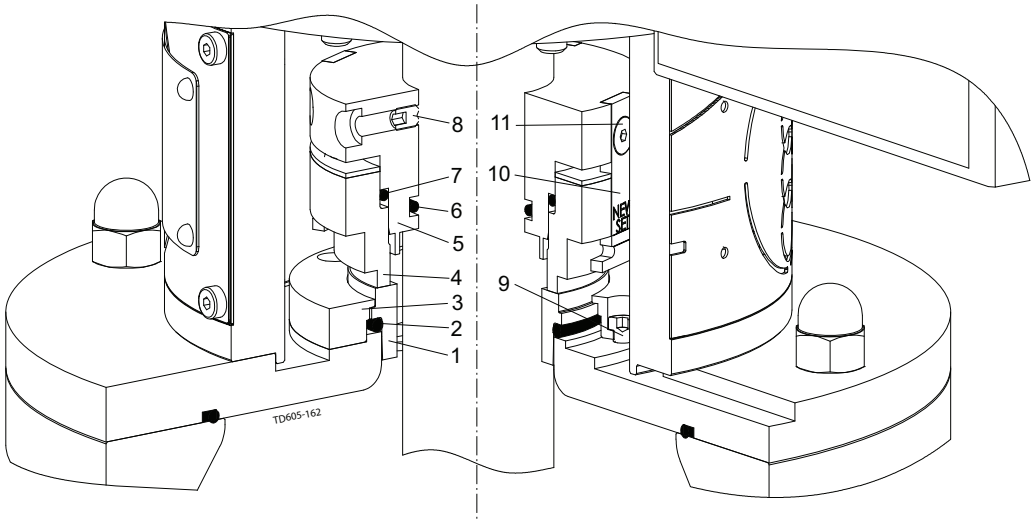


Before start

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

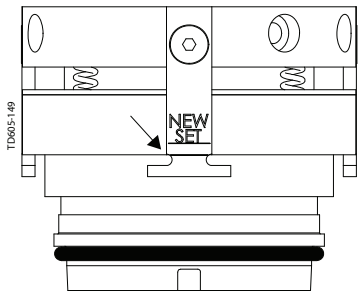
Always ensure that mounting is according to assembly drawing in.
Ensure totally clean surfaces during seal replacement.
Always replace all surrounding gaskets during shaft seal replacement.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.

5.12 Replacement of shaft seal, type S

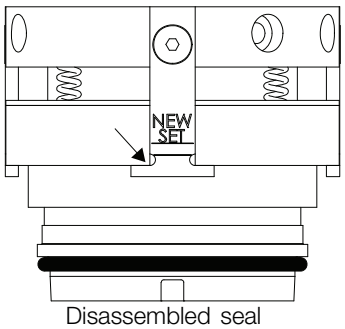


NOTE!
To replace seals easier, use detergent.
Ensure subsequent to seal replacement, that all seal faces are totally clean, using alcohol.

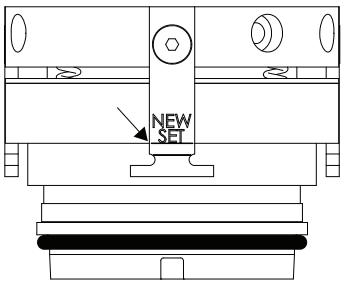
NOTE!
For seal renovation, see supplier instructions page , .
Seal is designed for dry running, so a whining noise during operation is quite normal.



Change seal!



Disassembled seal



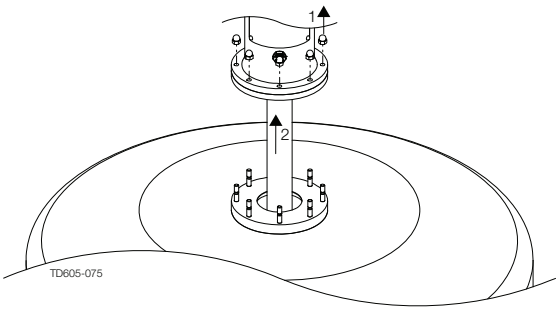
New seal after mounting

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

5 Maintenance

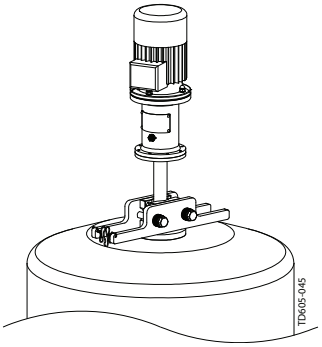
Always ensure that mounting is according to assembly drawing in.
Ensure totally clean surfaces during seal replacement.
Always replace all surrounding gaskets during shaft seal replacement.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.

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

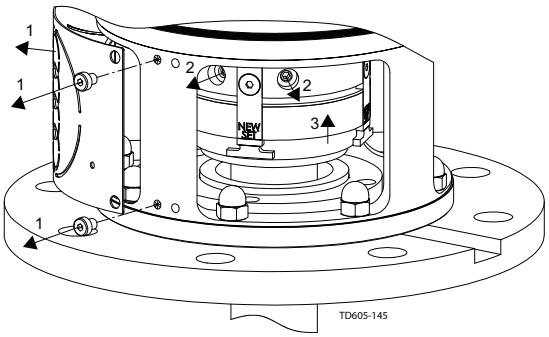


Step 2
Support shaft using shaft retainer tool.

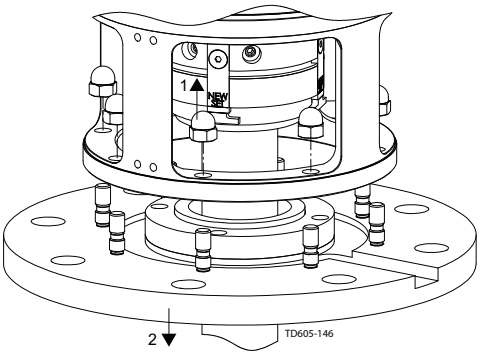
NOTE!
Alfa Laval highly recommends to use shaft retainer tool for installation of Agitator within a weight less than 500 kilogram and a shaft diameter between Ø30 and Ø60 (see section).



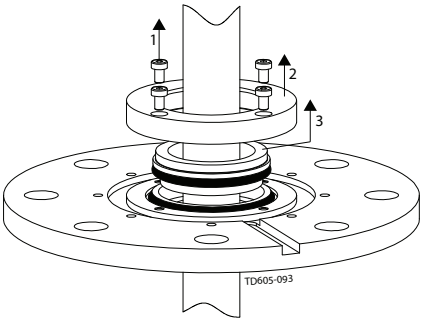
Step 3
1. Remove guards from lantern.
2. Loosen screws, securing the rotating seal part onto the shaft.
3. Move the rotating seal part carefully along the shaft.



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



Step 5
1. Remove screws.
2. Move retainer ring.
3. Move stationary seal part and o-ring from mounting flange.

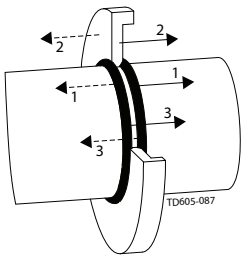


Always ensure that mounting is according to assembly drawing in.
Ensure totally clean surfaces during seal replacement.
Always replace all surrounding gaskets during shaft seal replacement.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.

Step 6
If necessary, dismantle drive unit as described in section 5.2 Replacement of drive unit (with bearing frame).

Step 7
If necessary, dismantle shaft as described in section 5.3 Replacement of drive unit (without bearing frame) and remove lantern with bearing frame.

Step 8
Remove oil trap ring, if any.



Step 9
Remove rotary seal part, by pulling it carefully along the shaft.

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

Step 11
Assemble oil trap ring, if any.

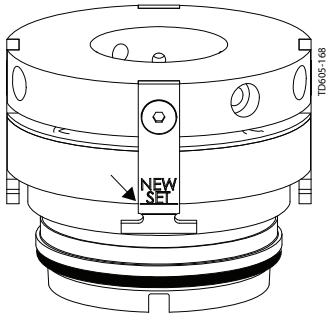
Step 12
CAUTION!
Assemble the stationary seal into the mounting flange by following instructions to the letter.
1. Ensure that pins fit onto the groove in the seal.
2. Carefully press down the stationary seal part and retainer ring into the mounting flange.
3. Use first: DIN7984 M5x12 screws and afterwards: DIN7984 M5x10 screws – Ensure the retainer ring 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 securing the seal onto the shaft.

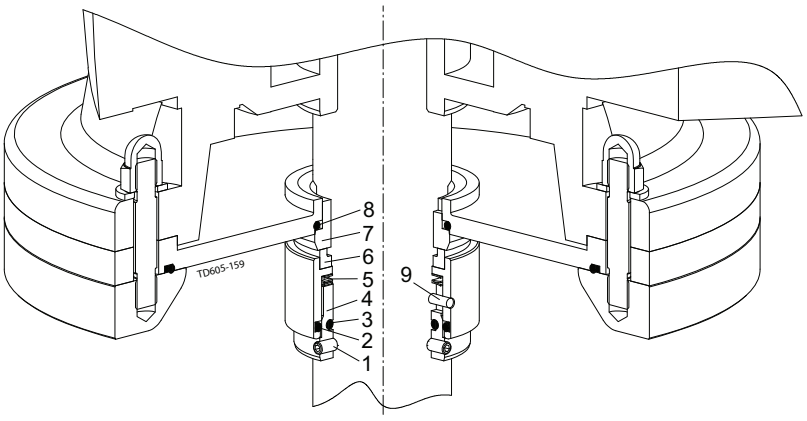
CAUTION!
The new seal must be adjusted to the “NEW SET” line.



5 Maintenance

Always ensure that mounting is according to assembly drawing in.
Ensure totally clean surfaces during seal replacement.
Always replace all surrounding gaskets during shaft seal replacement.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.

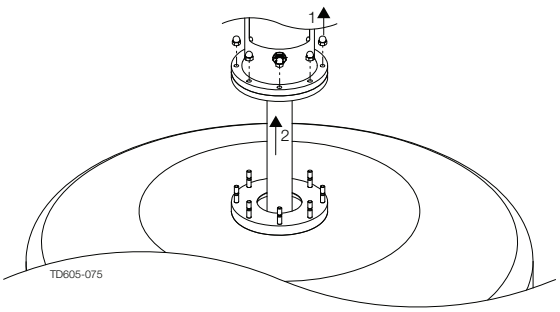
5.13 Replacement of shaft seal, type S3



NOTE!
To replace seals easier, use detergent.
Ensure subsequent to seal replacement, that all seal faces are totally clean, using alcohol.

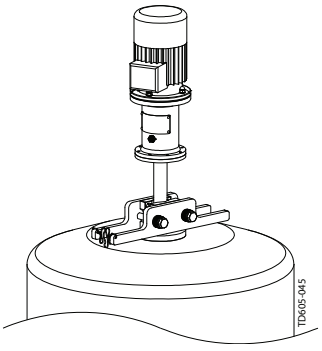
NOTE!
If possible, **always** dismantle the Agitator from the tank before dismounting any parts.

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



Step 2
Support shaft using shaft retainer tool.

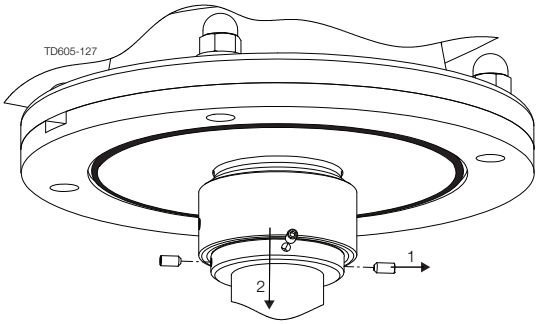
NOTE!
Alfa Laval highly recommends to use shaft retainer tool for installation of Agitator within a weight less than 500 kilograms and a shaft diameter between Ø30 and Ø60 (see section)



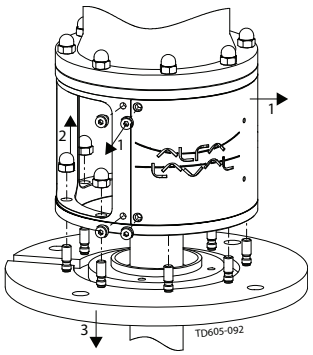
Always ensure that mounting is according to assembly drawing in.
Ensure totally clean surfaces during seal replacement.
Always replace all surrounding gaskets during shaft seal replacement.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.

Step 3
1. Loosen pointed screws, 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

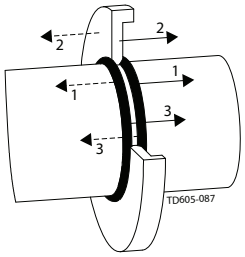
NOTE!
Use mild detergent to reduce friction.



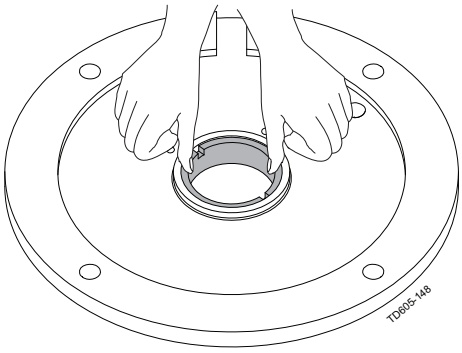
Step 4
1. Remove guards from lantern.
2. Remover cap nuts
3. Move the mounting flange, including stationary seal ring, carefully along the shaft, avoiding contact.



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



Step 6
1. Push stationary seal ring out of the mounting flange.



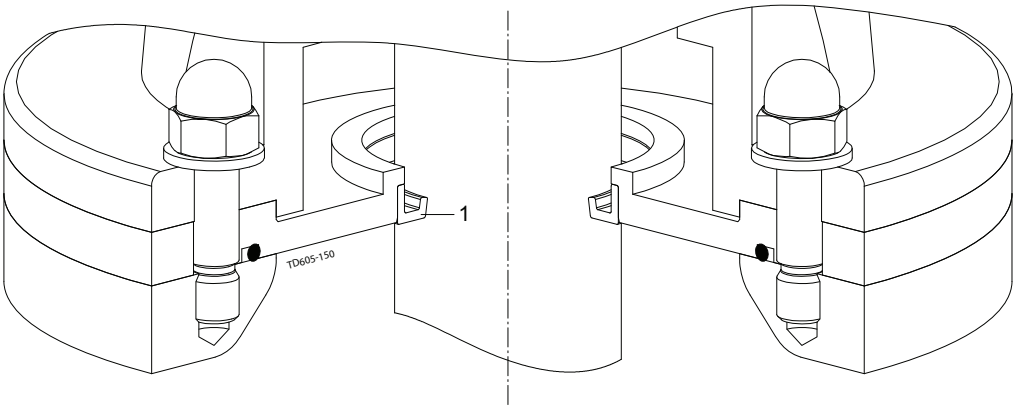
Step 7
Remove all seal parts from shaft.

Step 8
1. Replace all seal parts.
2. Assemble Agitator reverse as dismantling.

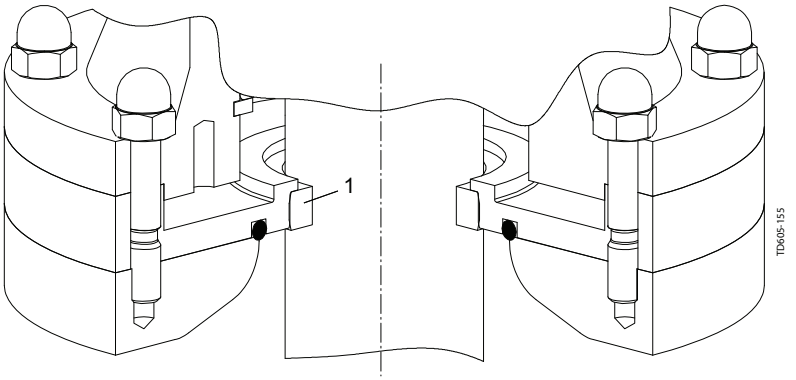
5 Maintenance

Always ensure that mounting is according to assembly drawing in.
Ensure totally clean surfaces during seal replacement.
Always replace all surrounding gaskets during shaft seal replacement.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.

5.14 Replacement of shaft seal, type R or G



Shaft seal type R

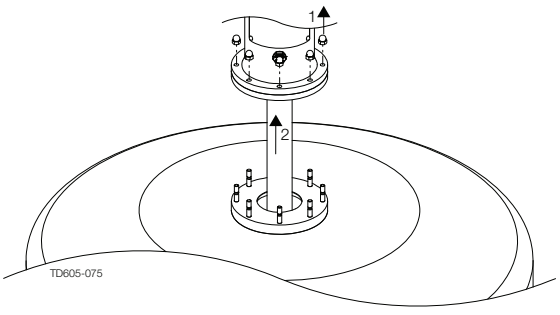


Shaft seal type G

NOTE!
To replace seals easier, use detergent.
Ensure subsequent to seal replacement, that all seal faces are totally clean, using alcohol.

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

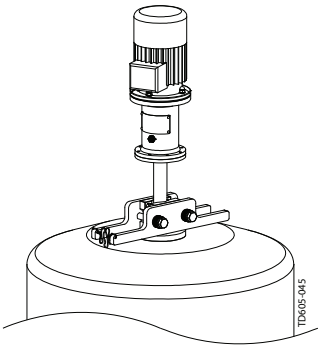
Step 1
1. Dismantle Agitator from welding flange.
2. Lift up Agitator.



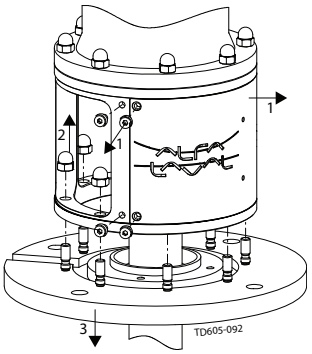
Always ensure that mounting is according to assembly drawing in.
Ensure totally clean surfaces during seal replacement.
Always replace all surrounding gaskets during shaft seal replacement.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.

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).

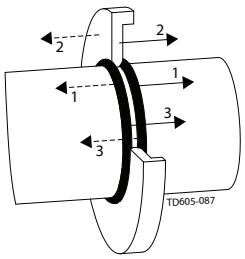


Step 3
1. Remove guards from lantern.
2. Remove cap nut.
3. Move the mounting flange including seal carefully along the shaft.

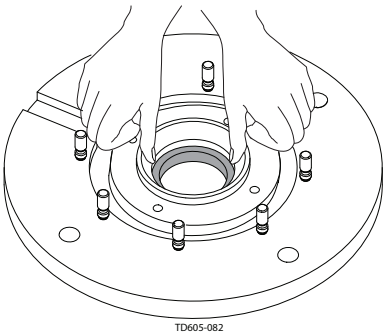


Step 4
If necessary, dismantle drive unit as described in section 5.2 Replacement of drive unit (with bearing frame).

Step 5
Remove oil trap ring, if any.



Step 6
Push R seal out of the mounting flange.

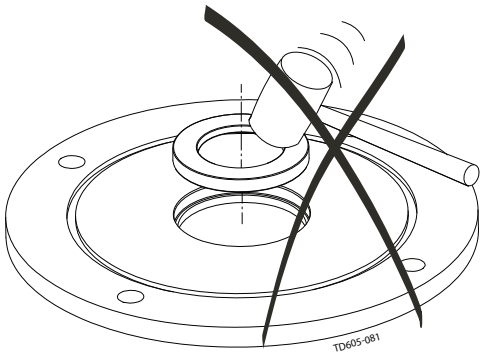


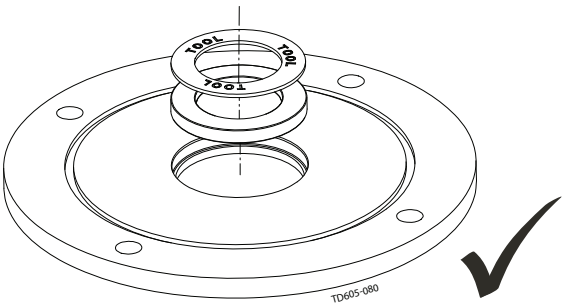
5 Maintenance

Always ensure that mounting is according to assembly drawing in.
Ensure totally clean surfaces during seal replacement.
Always replace all surrounding gaskets during shaft seal replacement.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.

Step 7
1. Replace R seal by pressing it evenly into mounting flange, using a proper tool.

NOTE!
Assure correct sealing orientation.



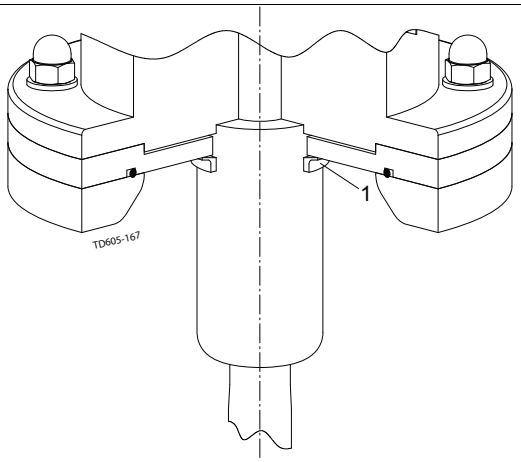


Step 8
Apply grease to the seal.

Step 9
Assemble Agitator reverse as dismantling.

Always ensure that mounting is according to assembly drawing in.
Ensure totally clean surfaces during seal replacement.
Always replace all surrounding gaskets during shaft seal replacement.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.

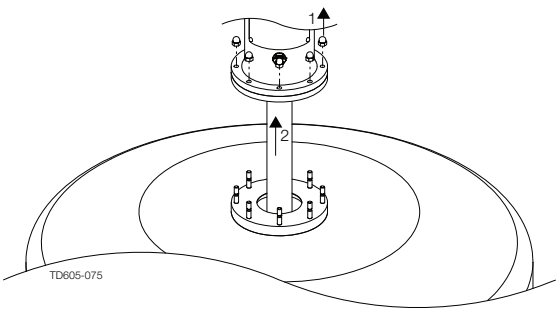
5.15 Replacement of shaft seal, type V



NOTE!
To replace seals easier, use detergent.
Ensure subsequent to seal replacement, that all seal faces are totally clean, using alcohol.

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

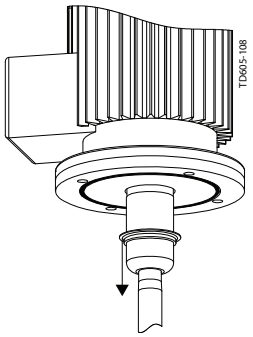


Step 2
Support shaft using shaft retainer tool.

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)

Always ensure that mounting is according to assembly drawing in.
Ensure totally clean surfaces during seal replacement.
Always replace all surrounding gaskets during shaft seal replacement.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.

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

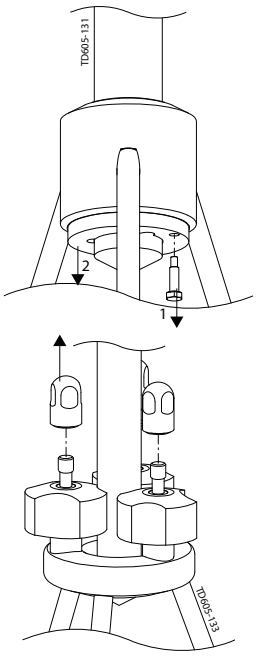


Step 4
1. Replace seal.
2. Assemble Agitator reverse as dismantling.

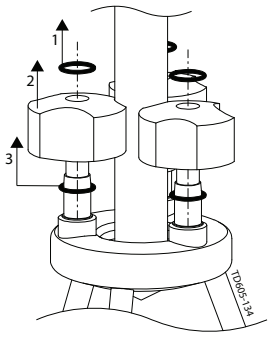
Always ensure that mounting is according to assembly drawing in.
Ensure totally clean surfaces during seal replacement.
Always replace all surrounding gaskets during shaft seal replacement.
Always refer to tightening torques in section 6.1 Technical data when tightening bolts.

5.16 Replacement of wear bushing

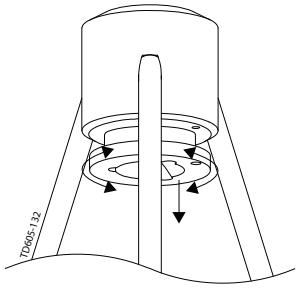
Step 1
Remove screw(s).
Remove cap nuts.



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



Step 3
Remove wear bushing by pulling it downwards while turning it from side to side.



Step 4
1. Replace wear bushing.
2. Replace wear bushings and o-rings.
3. Assemble reverse as dismantling.

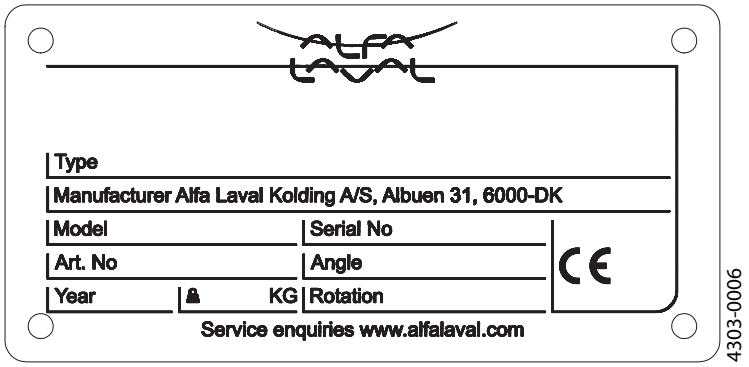
6 Technical Data

All dimenstions 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.

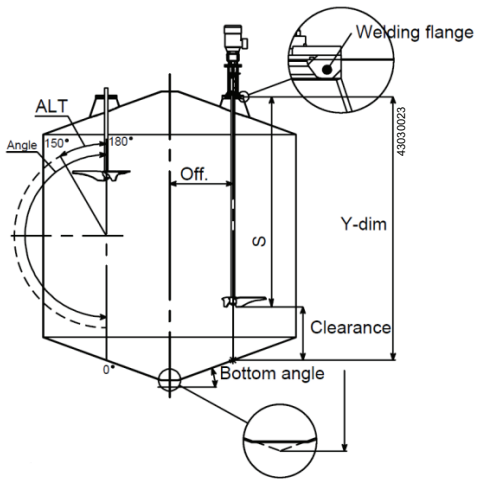


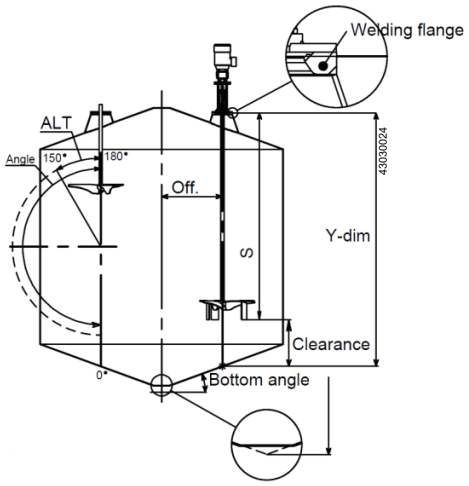
Mounting angle for top mounting agitator type ALT:

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.

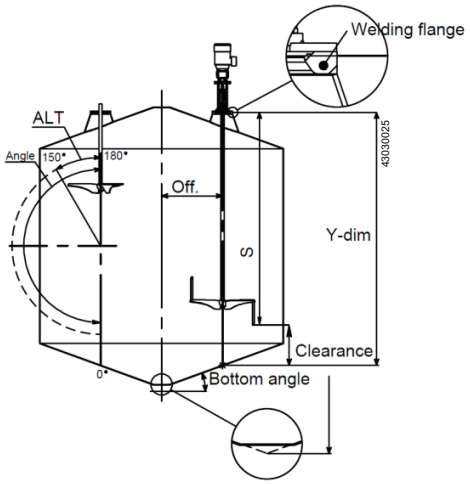
S: is the length of the agitator shaft including the impeller and is determined according to the Y-dim and the bottom angle to ensure as low agitation as possible.

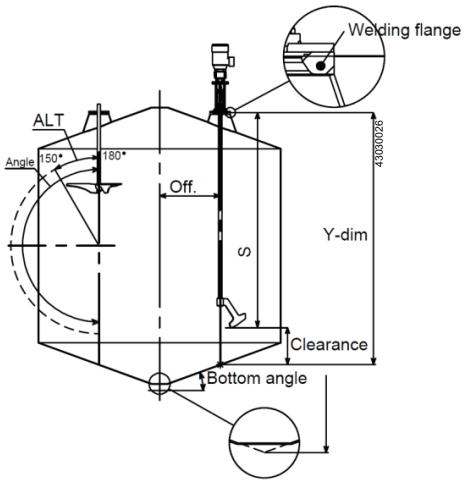
Y-dim: is the length from the welding flange face surface and to the tank bottom where the center line of the agitator intersects with the tank bottom line.





All dimenstions in mm unless otherwise stated.



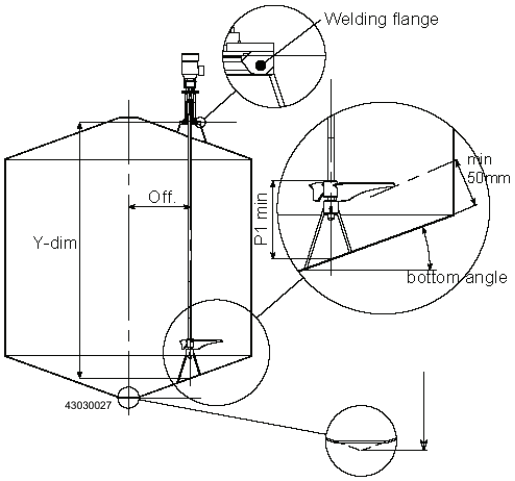


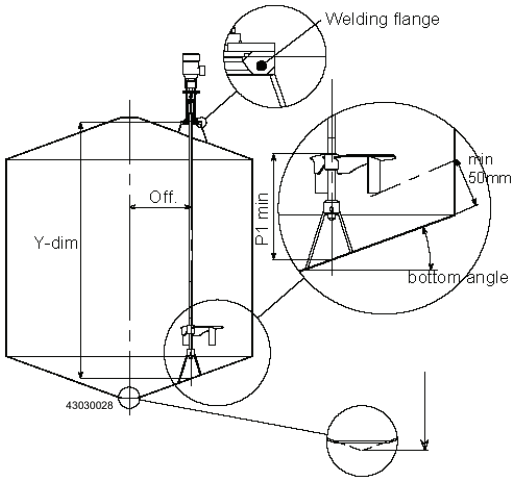
Mounting angle for top mounting agitator type ALTB:

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 the lower length of the first impeller and is determined according to the Y-dim and the bottom angle to ensure as low agitation as possible.

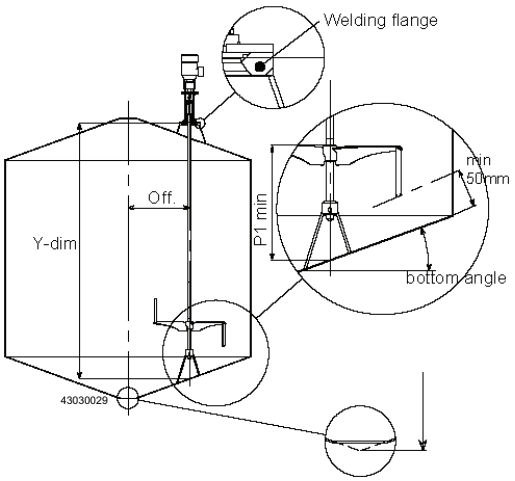
Y-dim: is the length from the welding flange face surface and to the tank bottom where the center line of the agitator intersects with the tank bottom line.

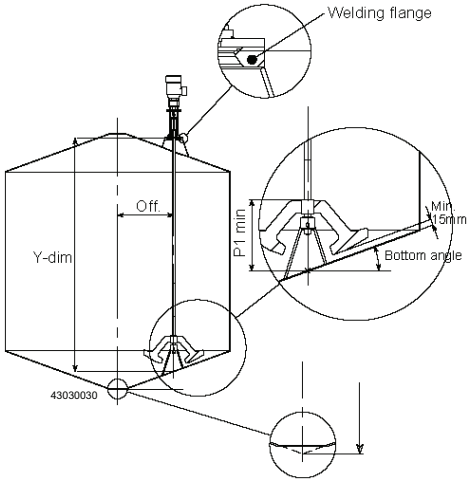




6 Technical Data

All dimenstions in mm unless otherwise stated.





All dimenstions in mm unless otherwise stated.

Connecting flush - Seal type D:

Step 1
CAUTION!

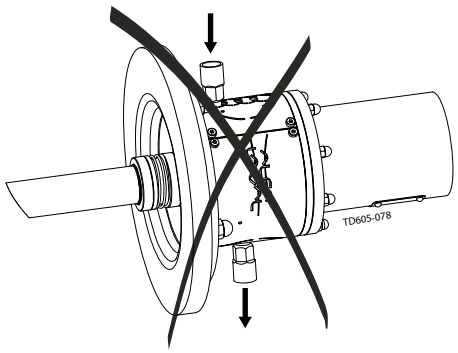
Flush media pressure recommendation to prevent flush media contamination by the product media:
- Flushing pressure max. 6.1 bar(g)
- Tank pressure max. 6.0 bar(g)
- (Tank pressure + 0.1 bar) ≤ Flushing pressure ≤ (Tank pressure + 2 bar)

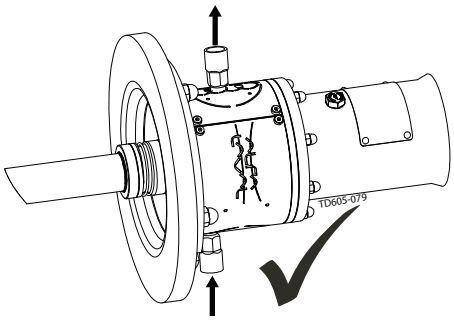
Flush media pressure recommendation to prevent product media contamination by the flush media:
- Flushing pressure max 6.1 bar(g)
- Tank pressure max 6 bar(g)
- Flushing pressure ≤ (Tank pressure - 0,1 bar)

Flush media flow recommendation:
- Flushing flow rate > 0.25 l/min.
- Or Temperature difference between in- and outlet < 10°C.
Always use partly condensed steam, when steam is used as flushing fluid.

Flush media temperature recommendation:
- Inlet temperature during operation < 80°C.
- Inlet temperature during cleaning with Agitator running < 121°C.
- Inlet temperature during cleaning with Agitator in standstill < 143°C.
- Always use appropriately in- and outlet temperatures given for current seal elastomers.
- During operation and with product in the tank, never use continuously higher inlet flush temperature than appropriated for the combination of the current stainless steel type and product media (seal housing is heated up by the flushing temperature and exposed to product media).

Step 2
CAUTION!
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) can not be avoided it has been tested and verified that an initial flow rate without air at 5 ltr/minute 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.

6 Technical Data

All dimenstions in mm unless otherwise stated.

Connecting flush - Seal type DC:

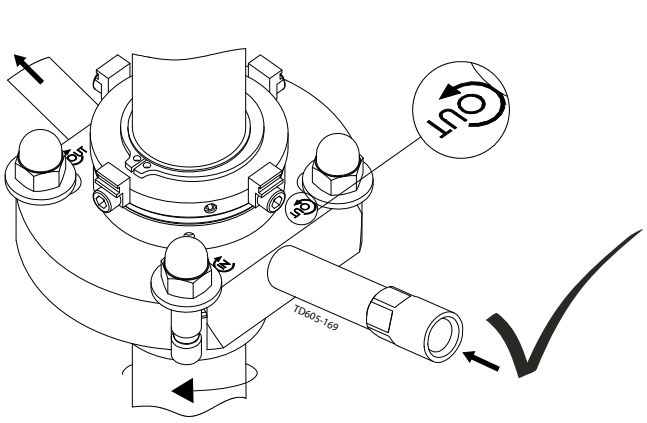
Step 1
Flush media pressure recommendation to prevent flush media contamination by the product media:
- Tank pressure max. 6.0 bar(g)
- Ensure flushing pressure ≥ (Tank pressure + 2 bar)

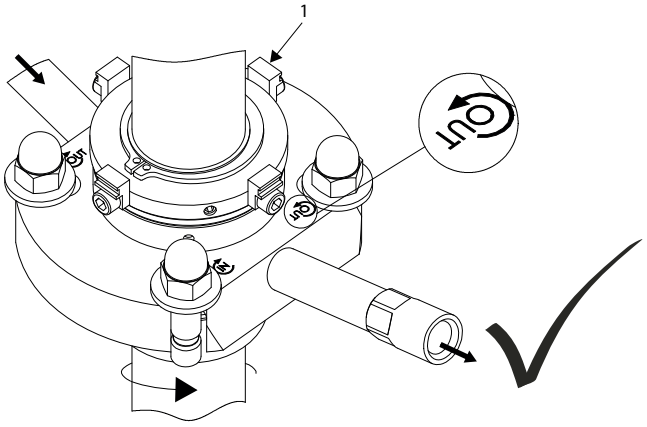
Flush media pressure recommendation to prevent product media contamination by the flush media:
- Tank pressure max 6.0 bar(g)
- Ensure flushing pressure ≤ (Tank pressure - 0,5 bar)

Flush media flow recommendation:
- Flushing flow rate > 0.25 l/min
- Or Temperature difference between in- and outlet < 10°C.

Flush media temperature recommendation:
- Inlet temperature during operation < 60°C.
- Inlet temperature during cleaning with Agitator running < 60°C. (Higher inlet temperature during operation can lead to dry running)
- Inlet temperature during cleaning with Agitator in standstill < 121°C.
- Always use appropriately in- and outlet temperatures given for current seal elastomers.
- During operation and with product in the tank, never use continuously higher inlet flush temperature than appropriated for the combination of the current stainless steel type and product media (seal housing is heated up by the flushing temperature and exposed to product media).

Step 2
CAUTION!
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.





All dimenstions in mm unless otherwise stated.

Tightening torques for **bolt** connections:

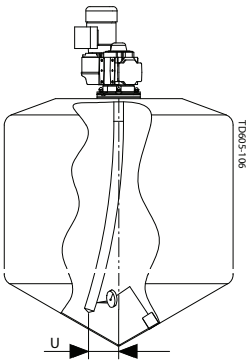
CAUTION!
Use Loctite® before fastening.
Do NOT use air powered tools.

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

Shaft alignment:

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

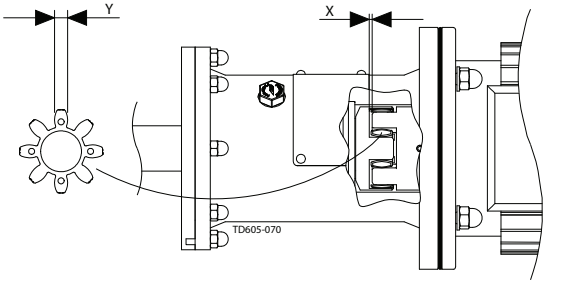
RPM up to:	50	100	500	1000	2800
U (max radial tolerance, ALT)	0.4	0.3	0.2	0.1	0.05
U (max radial tolerance, ALTB)	0.6	0.5	0.4	0.3	



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



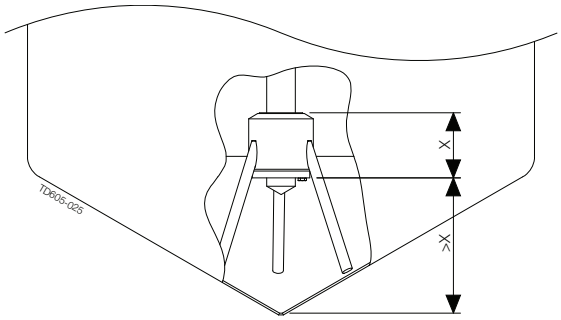
CAUTION!
During check of spider ensure that all dust is removed before reassembly.

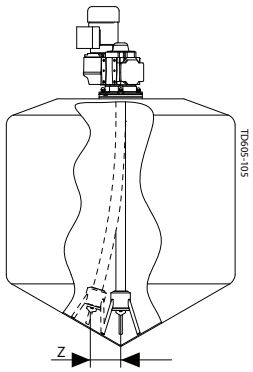
6 Technical Data

All dimenstions in mm unless otherwise stated.

Bottom steady bearing, type BS1:

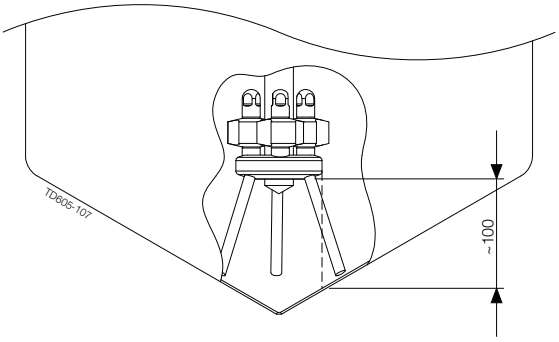
Shaft diameter up to:	35	45	55	65
X (bushing length)	120	140	150	170

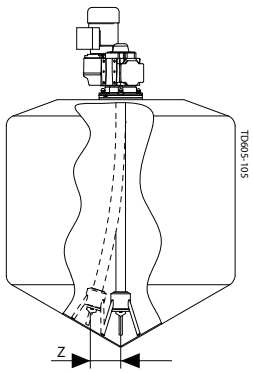




Shaft length up to:	1000	2000	3000	4000	5000	6000	7000	7001-15000
Z (max. radial tolerance)	0.3	1.4	3.4	6.2	9.9	14.5	20	25

Bottom steady bearing, type BS2:





Shaft length up to:	1000	2000	3000	4000	5000	6000	7000	7001-15000
Z (max. radial tolerance)	0.3	1.4	3.4	6.2	9.9	14.5	20	25

All dimenstions in mm unless otherwise stated.

6.2 Storage

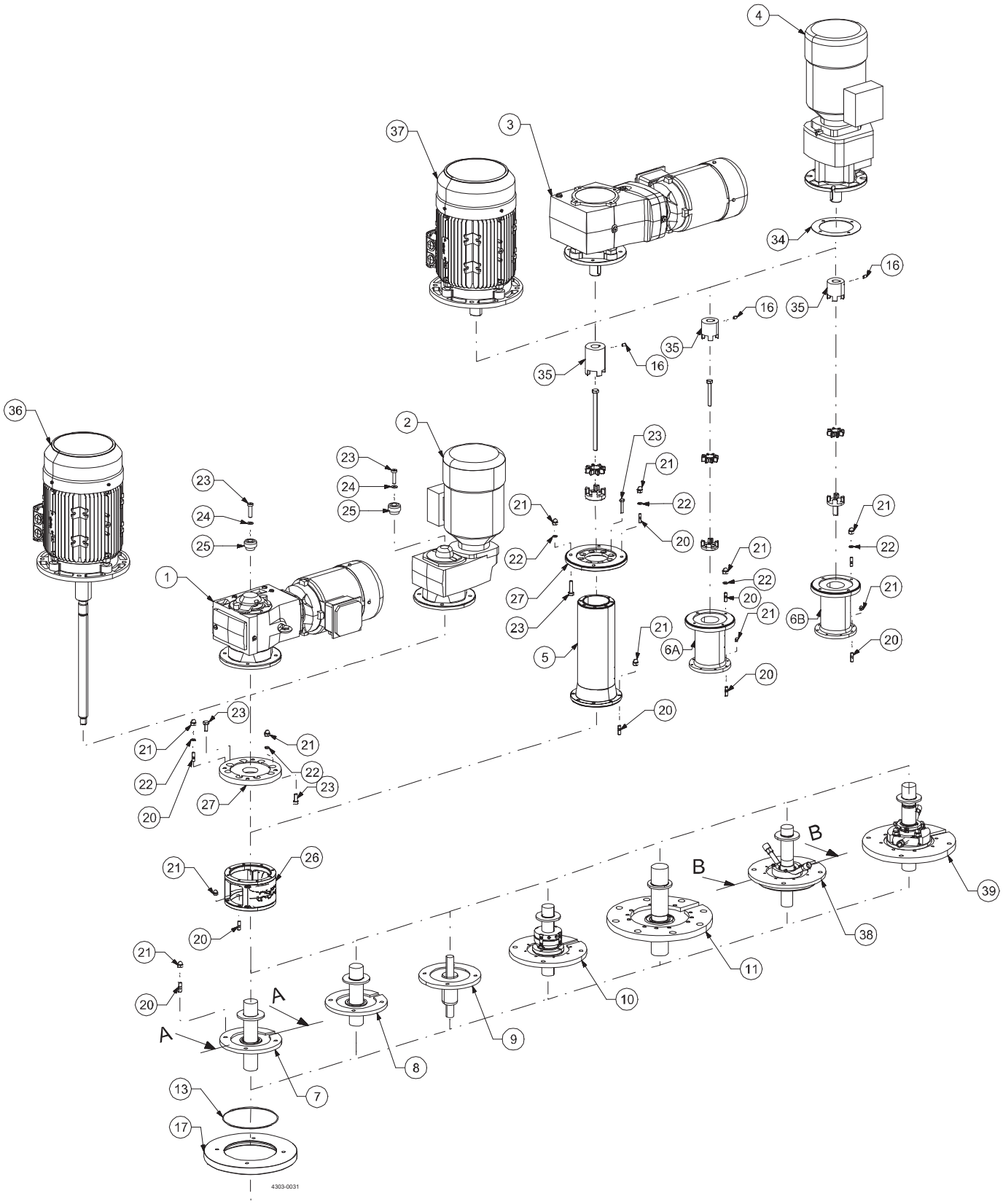
Store the Agitator in dry and clean environments.

Rotate shaft every second week to ensure seal not seizing up.

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

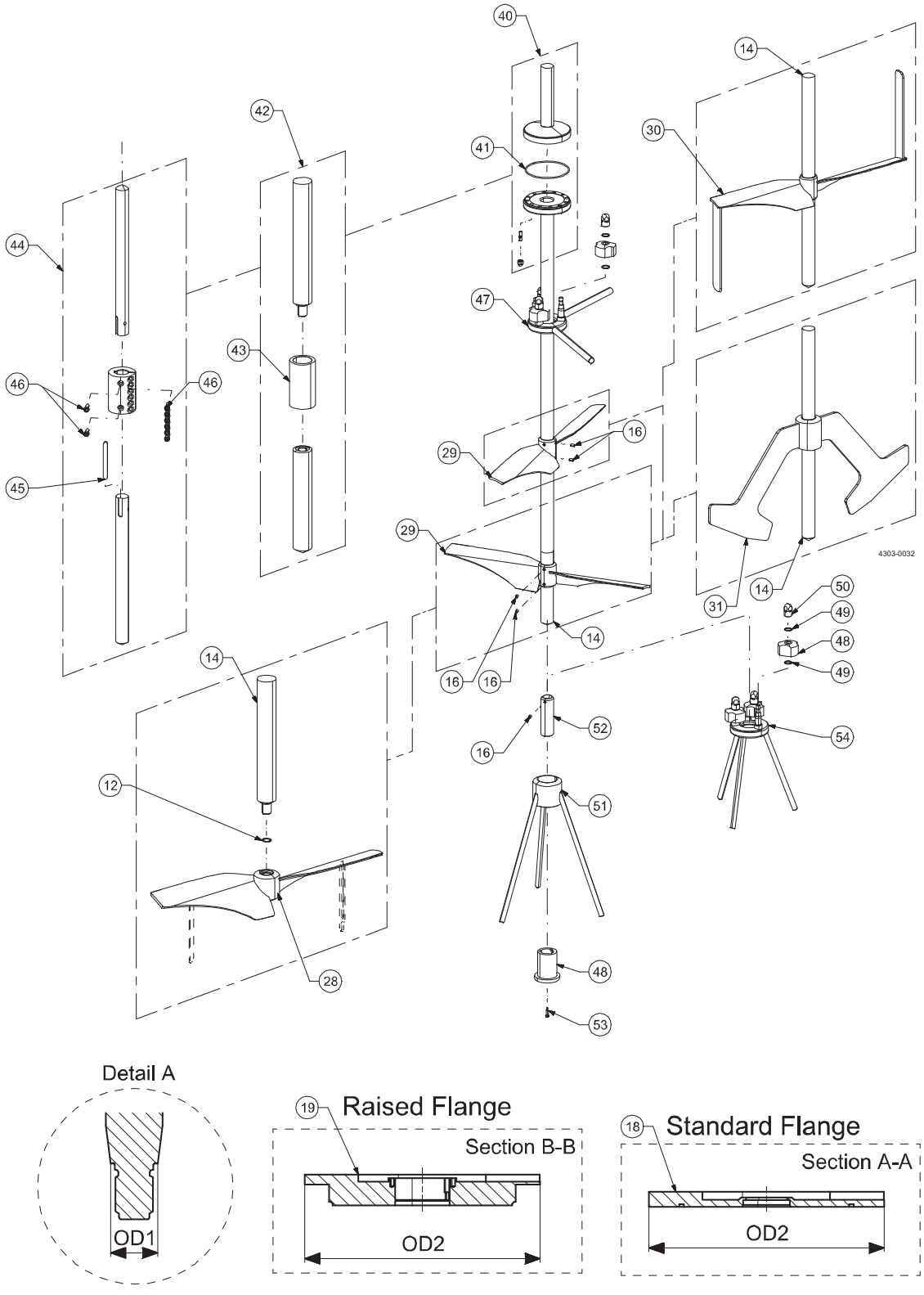
Parts list

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	□		Screw
17	□	1	Welding flange
18	□	1	Mounting flange, standard
19	□	1	Mounting flange, raised
20	□		Stud
21	□		Cap nut
22	□		Washer
23	□		Screw
24	□	1	Washer, Nord Lock
25	□	1	Fixing element
26	□	1	Lantern, complete
27	□	1	Drive unit flange
34	□	1	Disc spacer
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 ESE03505, available from the on-line Alfa Laval product catalogue Anytime or the Close at hand spare part catalogue.

7.2 Agitator Main Components, Wet end



Agitator type ALT / ALTB, main components - Wet end

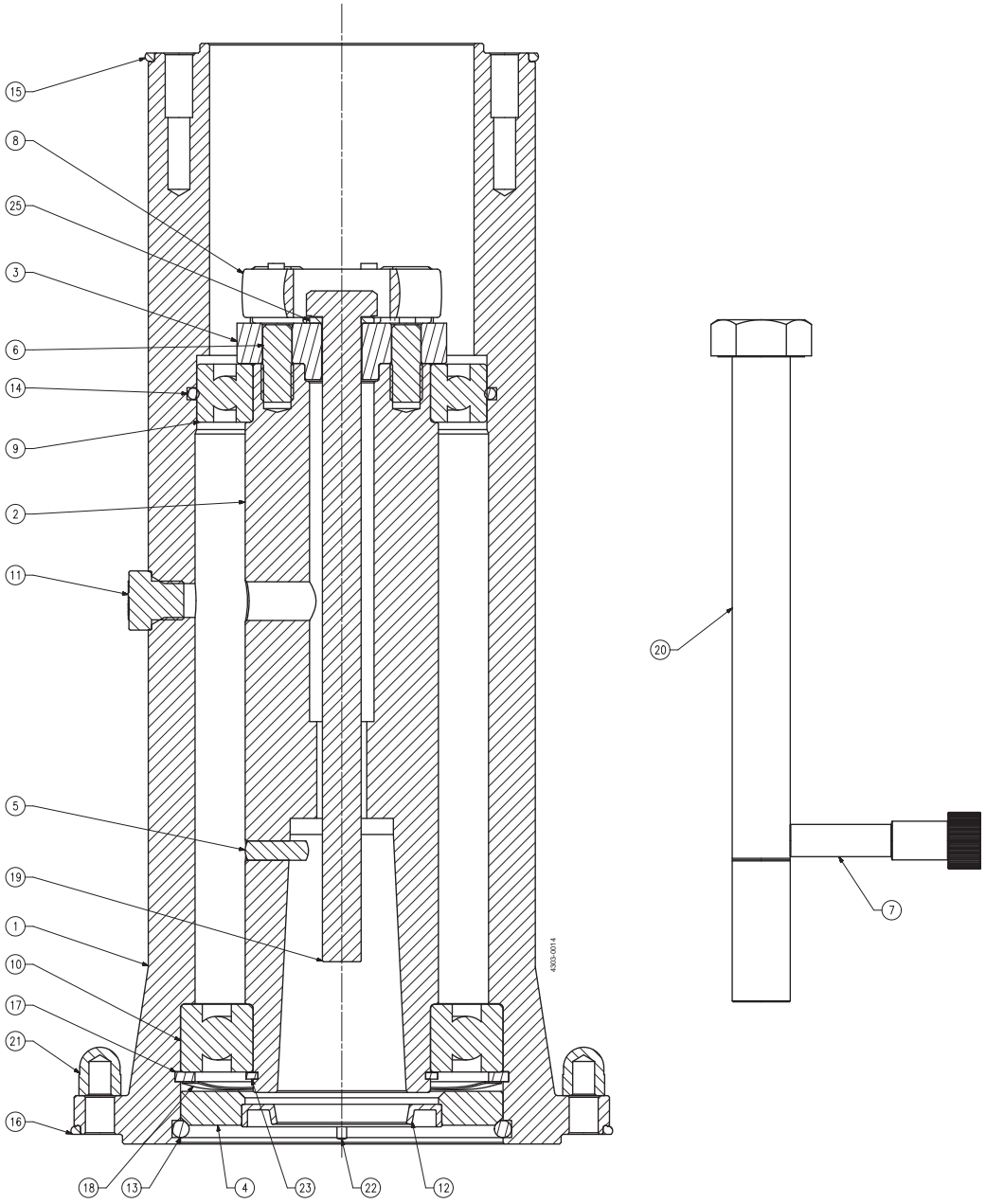
Parts list

Pos.		Qty	Denomination
12		1	O-ring
14	□	1	Shaft
15	□	1	Parrallel key
16	□		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
		1	O-ring
42	□		Welded shaft coupling
43	□		Sleeve for welded shaft coupling
44	□		Sleeve coupling
45	□		Parrallel key for sleeve coupling
46	□		Screw
47	◆		Intermediate steady bearing support
48	◆		Bushing
49	◆		O-ring
50	◆		Nut
51	◆		Bottom steady bearing support, type 1
52	◆		Wear sleeve
53	◆		Screw
54	◆		Bottom steady bearing support, type 2

❑ 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 ESE03505, 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	Air vent 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	Screw
21		8	Cap nut
22		2	Pin
23		1	Circlip, outer
24		4	Rivet
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

7 Part lists, part drawings and service kits

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	Air vent 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	Screw
21		8	Cap nut
22		2	Pin
23		1	Circlip, outer
24		4	Rivet
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

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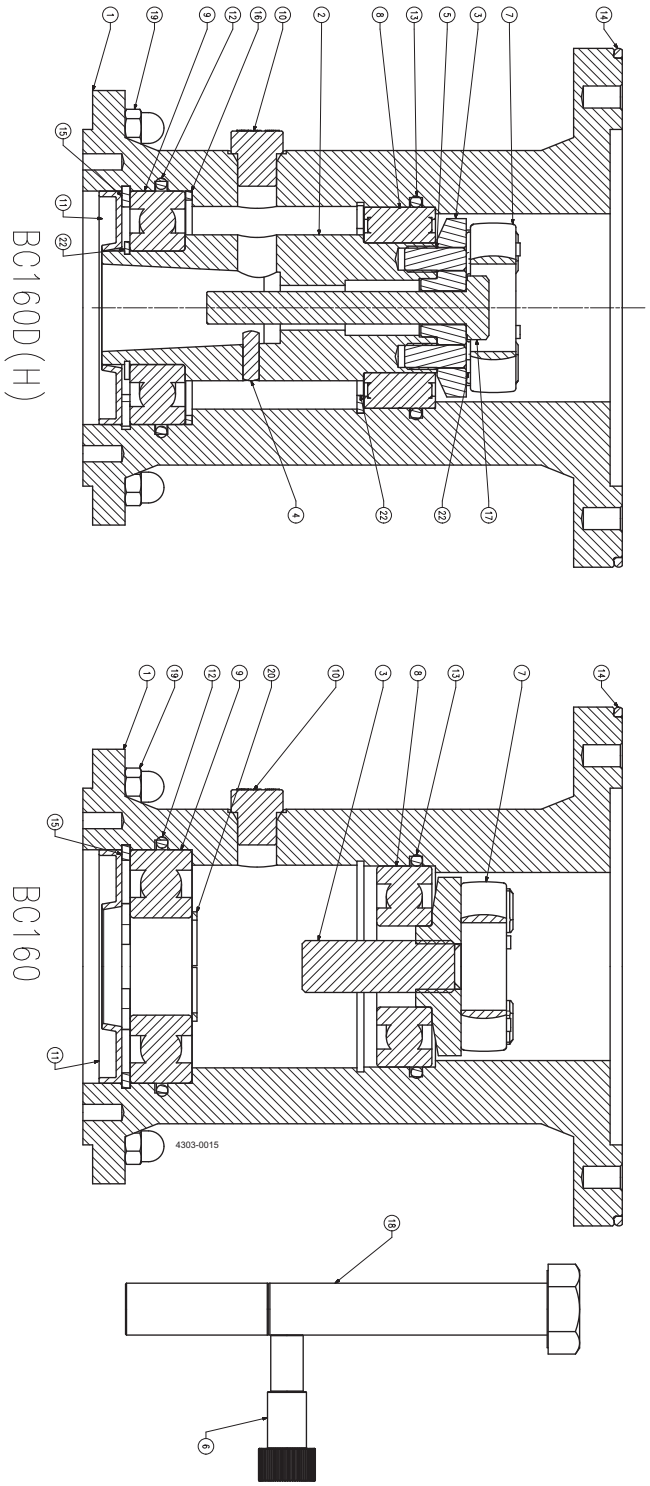
7.5 Bearing frame BC160/35, BC160D/30, BC160DH/30



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

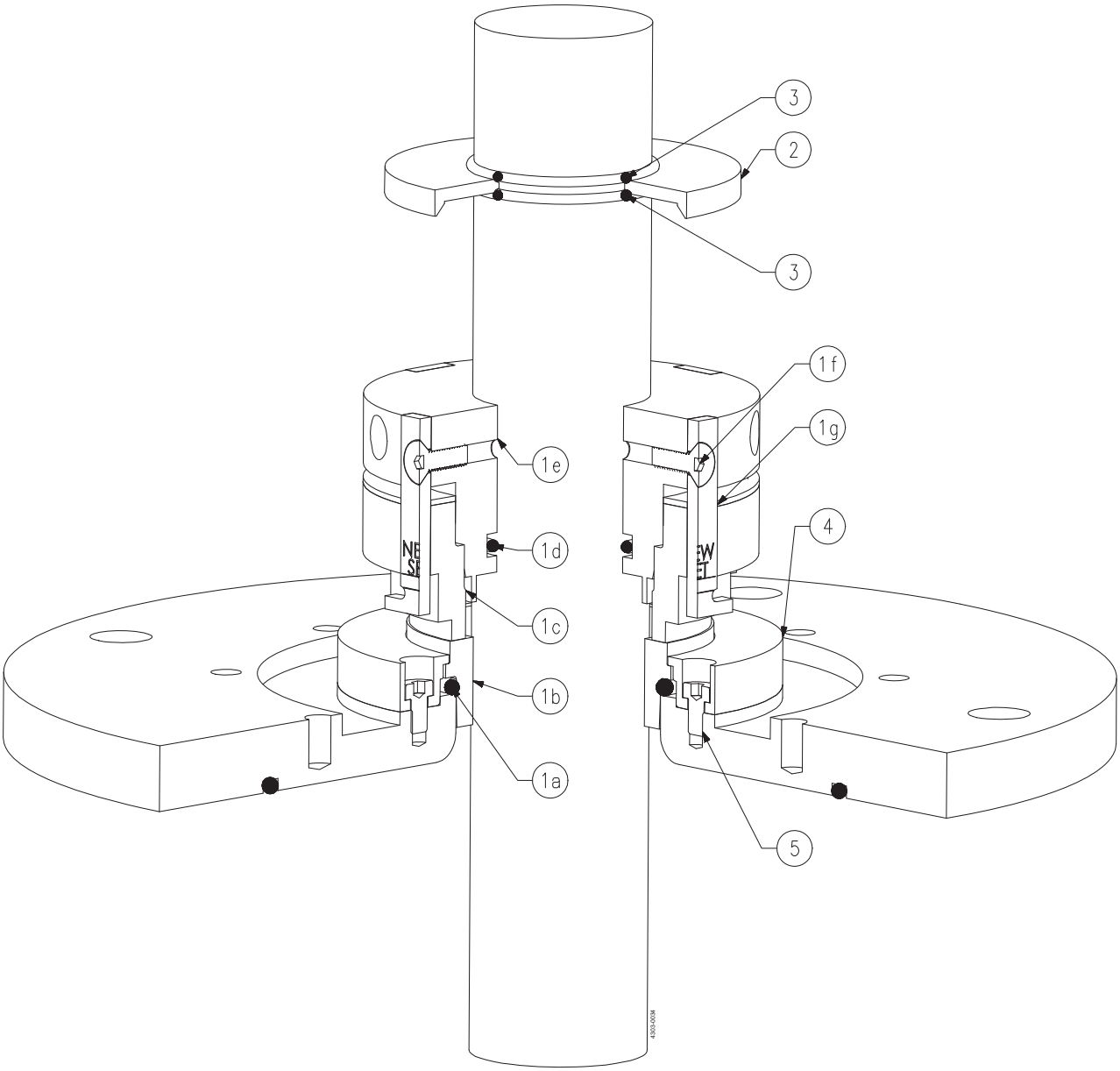
Parts list

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	Air vent 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	Screw
19		8	Cap nut
20		1	Circlip, outer
21		4	Rivet
22		7	Seeger ring
		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

7.6 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

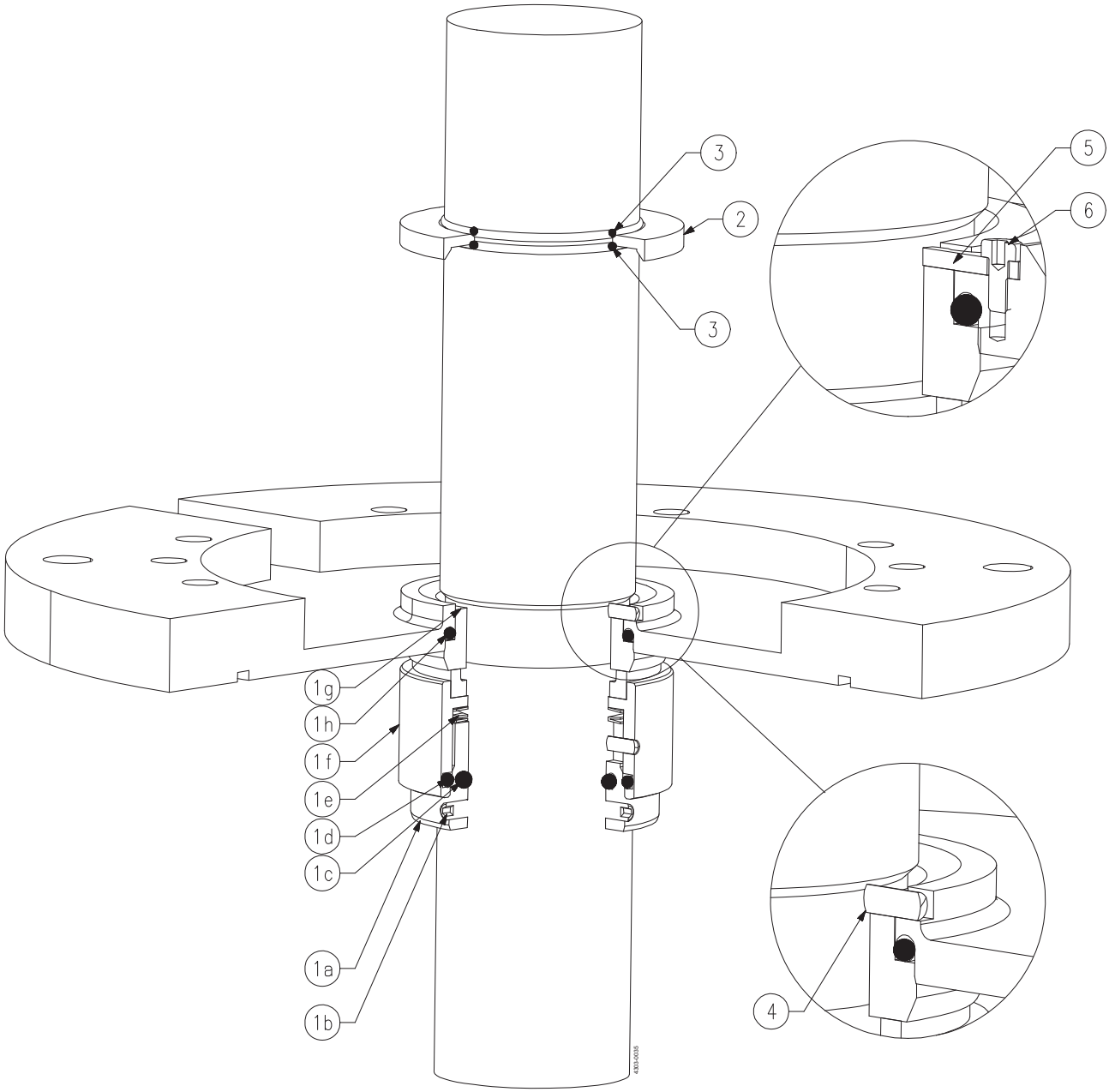
Parts list

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

7.7 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

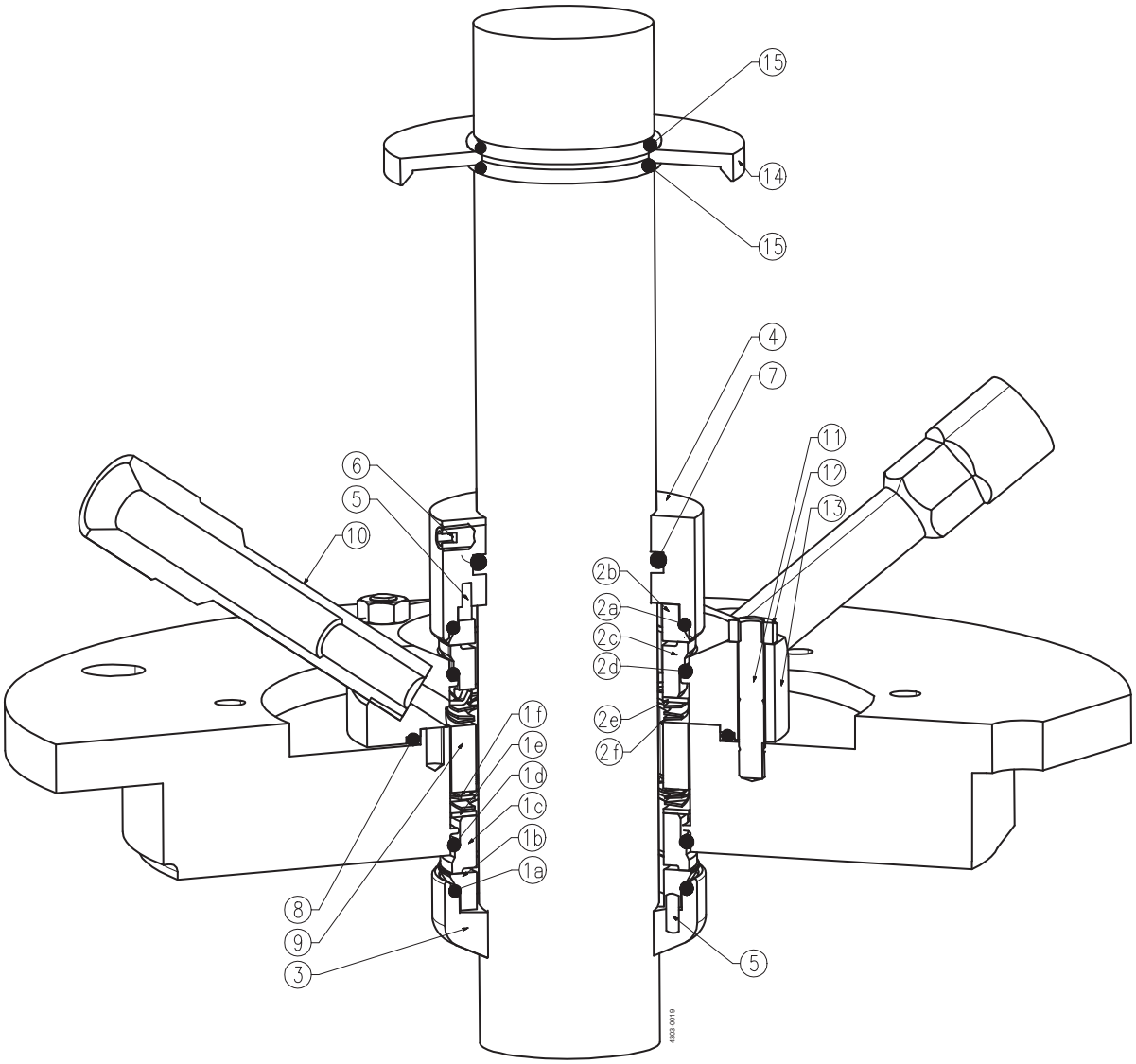
Parts list

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: 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

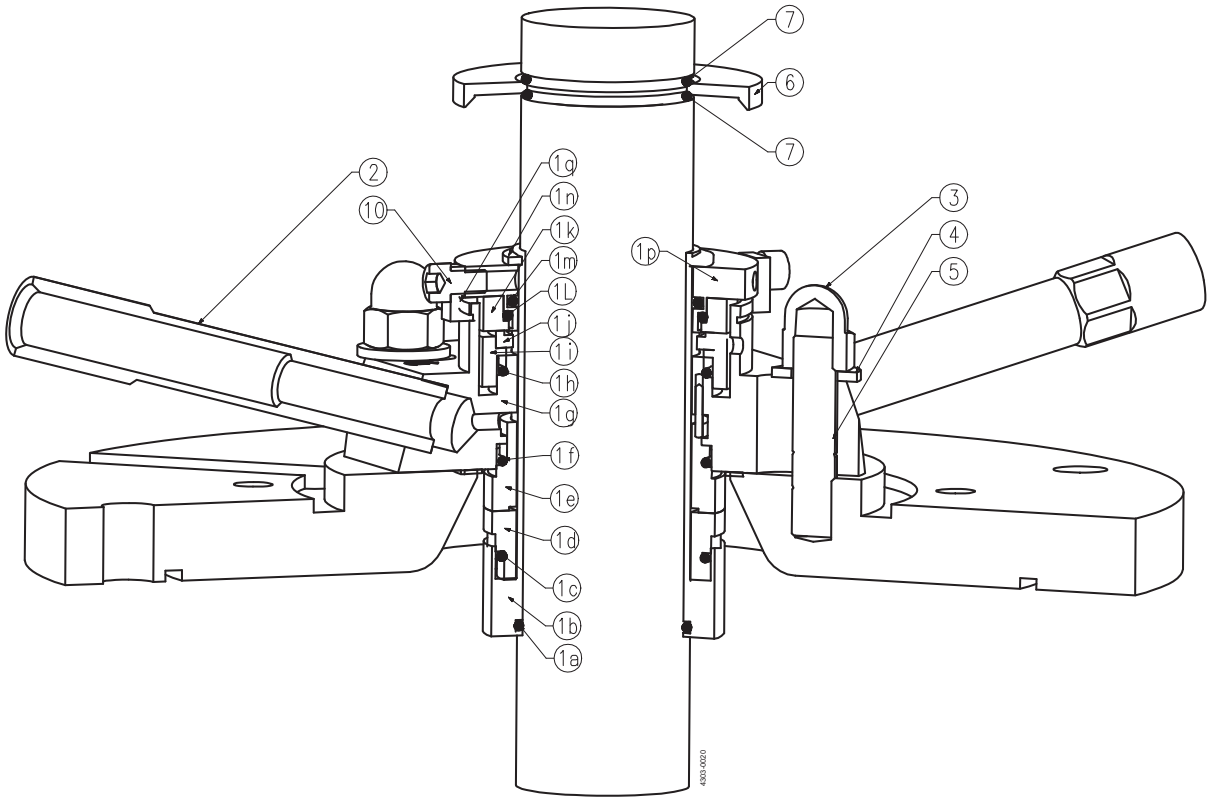
Parts list

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
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, connection
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

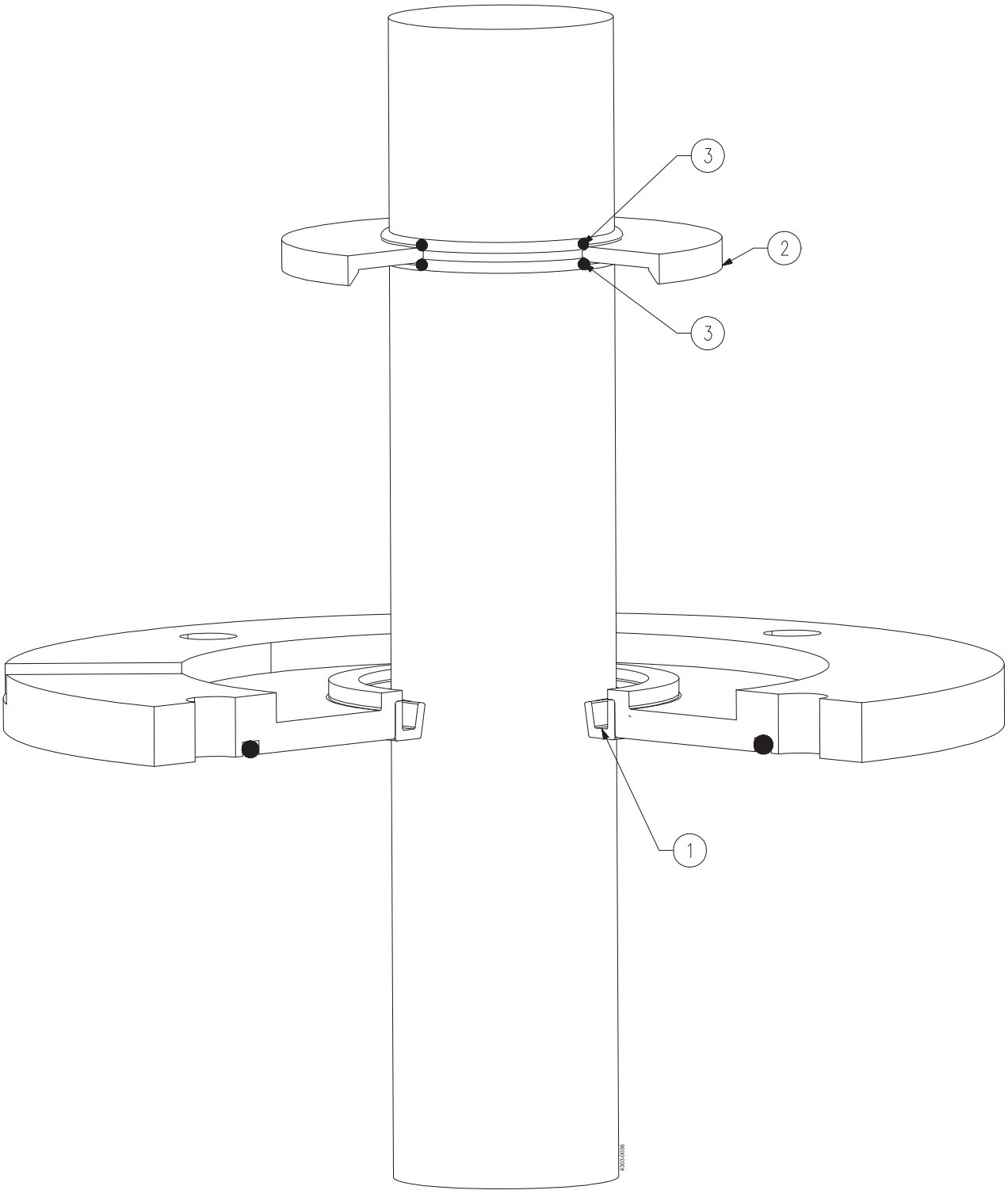
Parts list

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

Service kits

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

7.10 Shaft seal, type R



Shaft seal, type R

Parts list

Pos.		Qty	Denomination
1	□	1	Radial seal
	□	1	Radial seal (Ø35xØ62x7)
	♦	1	Radial seal (Ø35xØ47x7)
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 (Ø40xØ72x7)
	♦	1	Radial seal (Ø40xØ62x7)
	□	1	Radial seal (Ø45xØ72x7)
	♦	1	Radial seal (Ø45xØ62x7)
	□	1	Radial seal (Ø50xØ72x7)
	♦	1	Radial seal (Ø50xØ62x7)
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	

7 Part lists, part drawings and service kits

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

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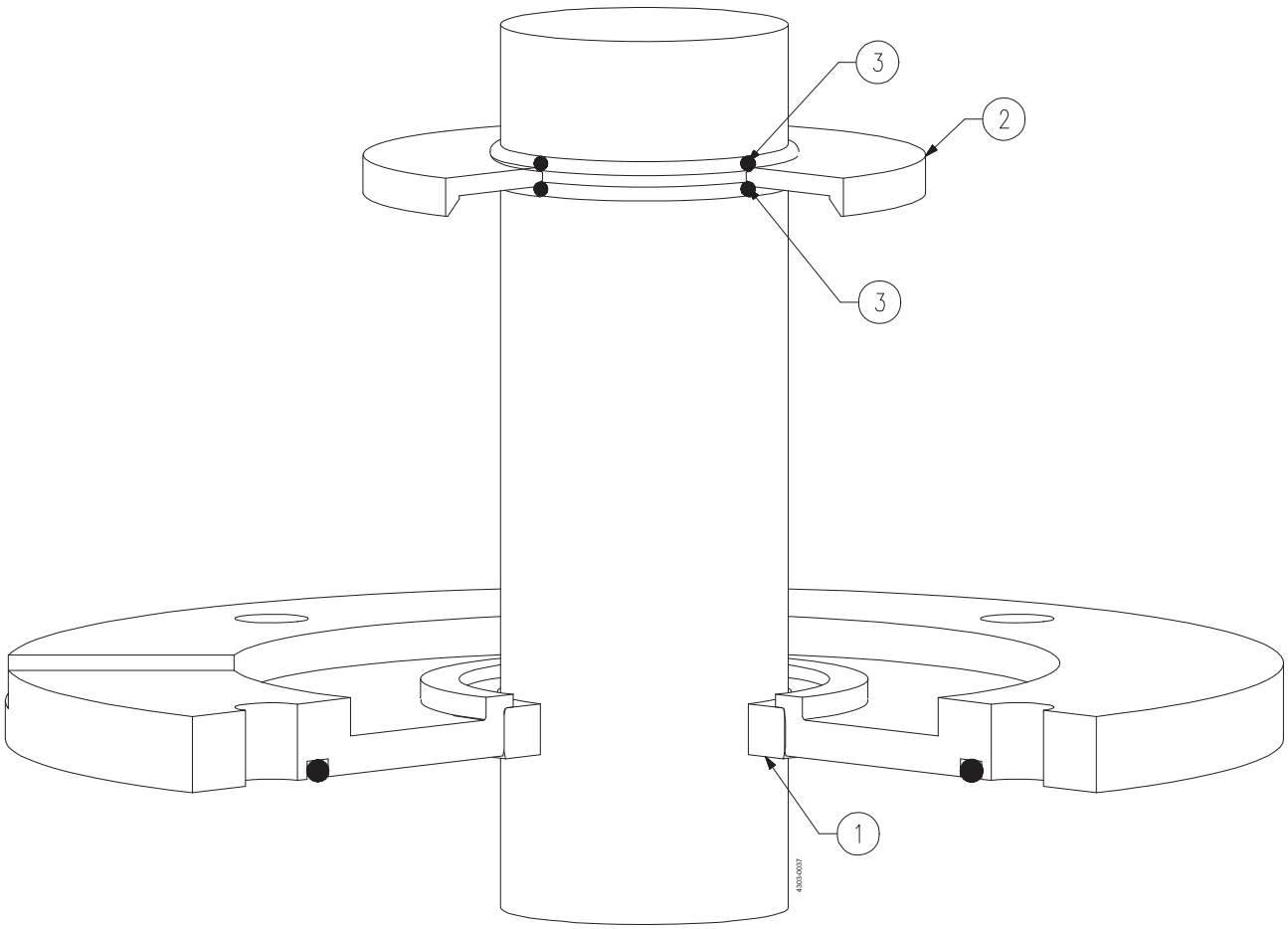
7.12 Shaft seal, type G



Shaft seal, type G

Parts list

Pos.		Qty	Denomination
1	□	1	Gab seal
	□	1	Gab seal (Ø62,50xØ36x8)
	♦	1	Gab seal (Ø47,50xØ36x8)
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 (Ø72,50xØ41x8)
	♦	1	Gab seal (Ø62,50xØ41x8)
	□	1	Gab seal (Ø72,50xØ46x8)
	♦	1	Gab seal (Ø62,50xØ46x8)
	□	1	Gab seal (Ø72,50xØ51x8)
	♦	1	Gab seal (Ø62,50xØ51x8)
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	

7 Part lists, part drawings and service kits

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

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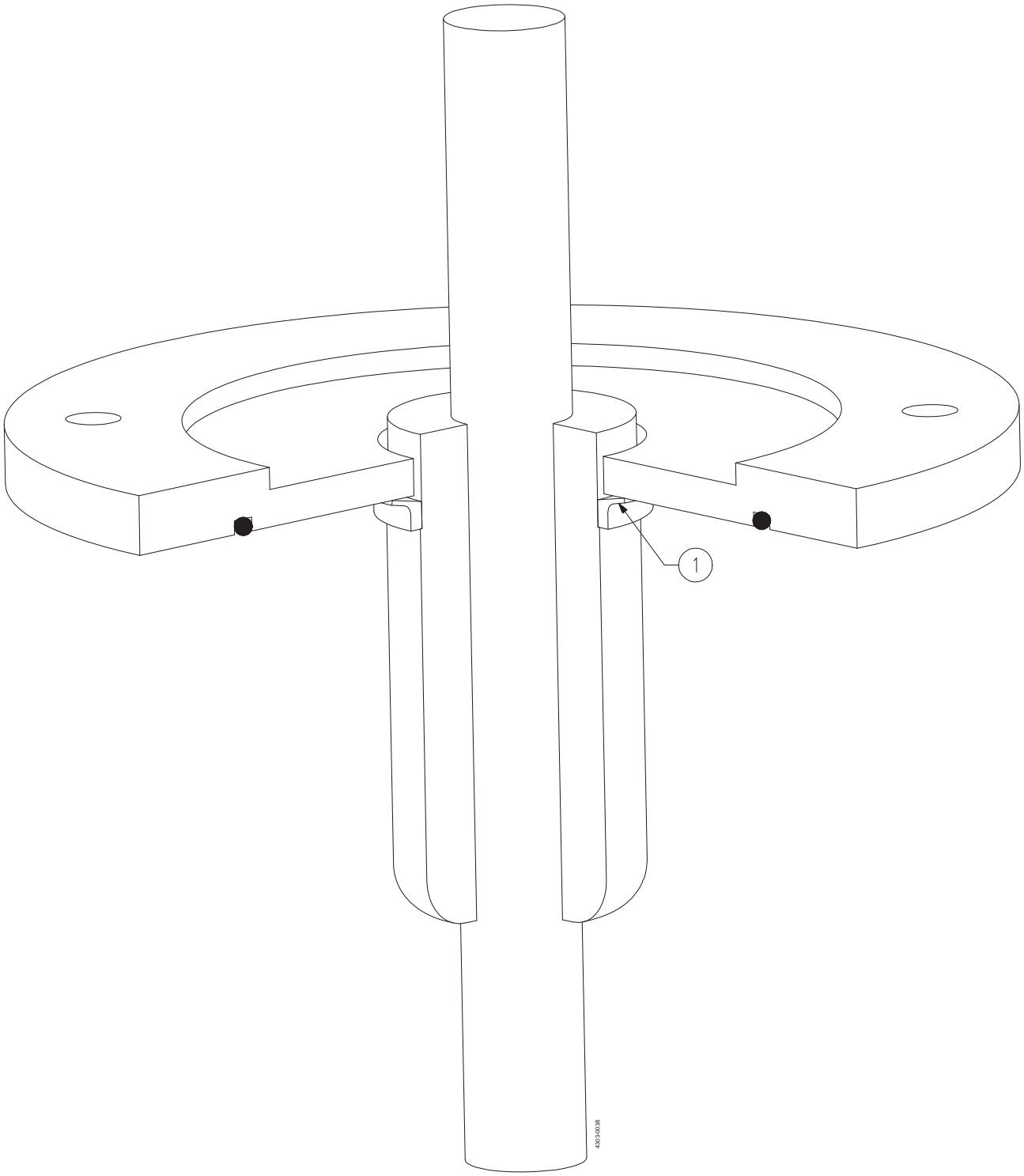
7.14 Shaft seal, type V

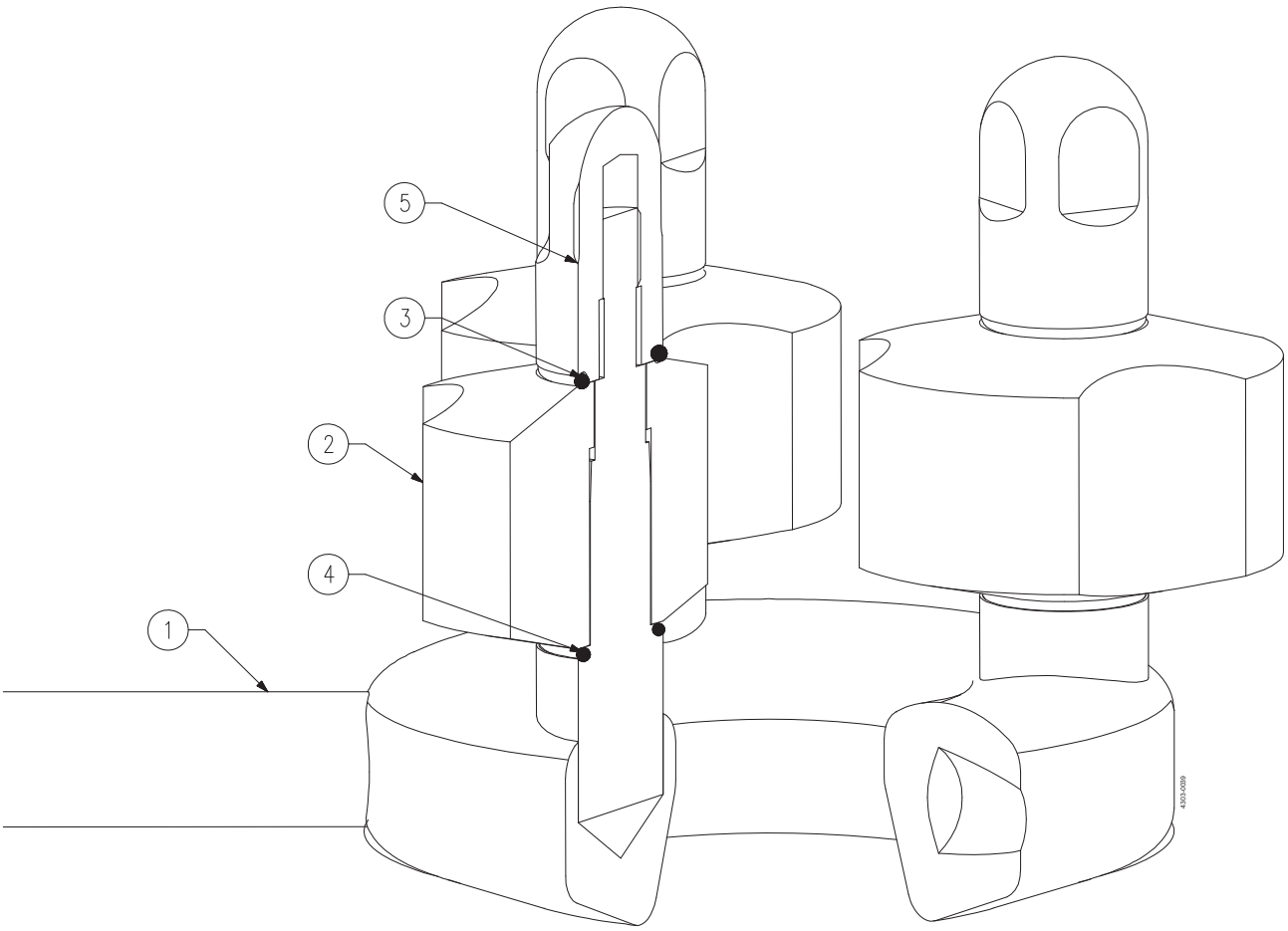


Shaft seal, type V

Parts list

Pos.	Qty	Denomination
1	1	Lib seal (V)

7.15 Intermediate steady bearing support



Intermediate steady bearing support

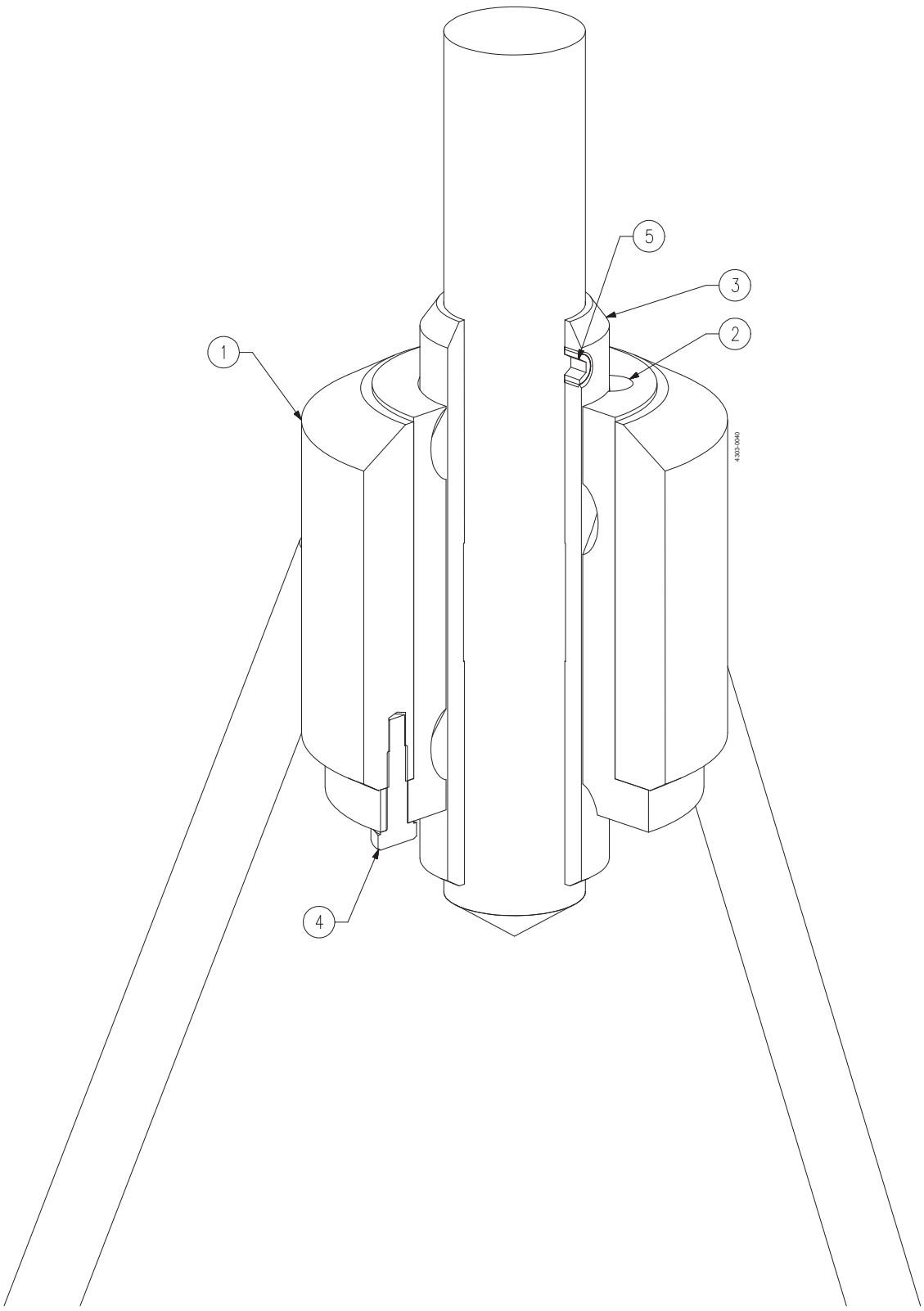
Parts list

Pos.		Qty	Denomination
1		1	Intermediate steady support
2	□	3	Bushing
3	□	3	O-ring (Ø18,72x2,62)
	□	3	O-ring (Ø18,72x2,62)
4	□	3	O-ring (Ø18,72x2,62)
	□	3	O-ring (Ø23,16x5,33)
	□	3	O-ring (Ø18,72x2,62)
	□	3	O-ring (Ø23,16x5,33)
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

7.16 Bottom steady bearing support, type 1



Bottom steady bearing support, type 1

Parts list

Pos.		Qty	Denomination
1		1	Bottom steady support (without wear sleeve)
		1	Bottom steady support
2	□	1	Bushing (without wear sleeve)
	♦	1	Bushing (with wear sleeve)
3	♦	1	Wear sleeve
4		1	Screw
5		2	Screw

Service kits

	Denomination	size: Ø25	size: Ø30	size: Ø35	size: Ø40
Spare part kits					
□	Spare part kit, BS1	TE2613000133	TE2613000134	TE2613000135	TE2613000136
♦	Spare part kit, BS1 + wear sleeve	TE2613000165	TE2613000166	TE2613000167	TE2613000168

Parts list

Pos.		Qty	Denomination
1		1	Bottom steady support (without wear sleeve)
		1	Bottom steady support (with wear sleeve)
2	□	1	Bushing (without wear sleeve)
	♦	1	Bushing (with wear sleeve)
3	♦	1	Wear sleeve
4		1	Screw
5		2	Screw

Service kits

	Denomination	size: Ø45	size: Ø50	size: Ø55	size: Ø60
Spare part kits					
□	Spare part kit, BS1	TE2613000029	TE2613000030	TE2613000178	TE2613000179
♦	Spare part kit, BS1 + wear sleeve	TE2613000169	TE2613000170	TE2613000171	TE2613000172

Parts list

Pos.		Qty	Denomination
1		1	Bottom steady support (without wear sleeve)
		1	Bottom steady support (with wear sleeve)
2	□	1	Bushing (without wear sleeve)
	♦	1	Bushing (with wear sleeve)
3	♦	1	Wear sleeve
4		3	Screw
5		2	Screw

Service kits

	Denomination	size: Ø65	size: Ø70	size: Ø75	size: Ø80
Spare part kits					
□	Spare part kit, BS1	TE2613000180	TE2613000186	TE2613000187	TE2613000188
♦	Spare part kit, BS1 + wear sleeve	TE2613000173	TE2613000174	TE2613000175	TE2613000177

7 Part lists, part drawings and service kits

Bottom steady bearing support, type 1

Parts list

Pos.		Qty	Denomination
1		1	Bottom steady support (without wear sleeve)
2	□	1	Bushing (without wear sleeve)
4		3	Screw

Service kits

	Denomination	size: Ø90
Spare part kits		
□	Spare part kit, BS1	TE2613000189

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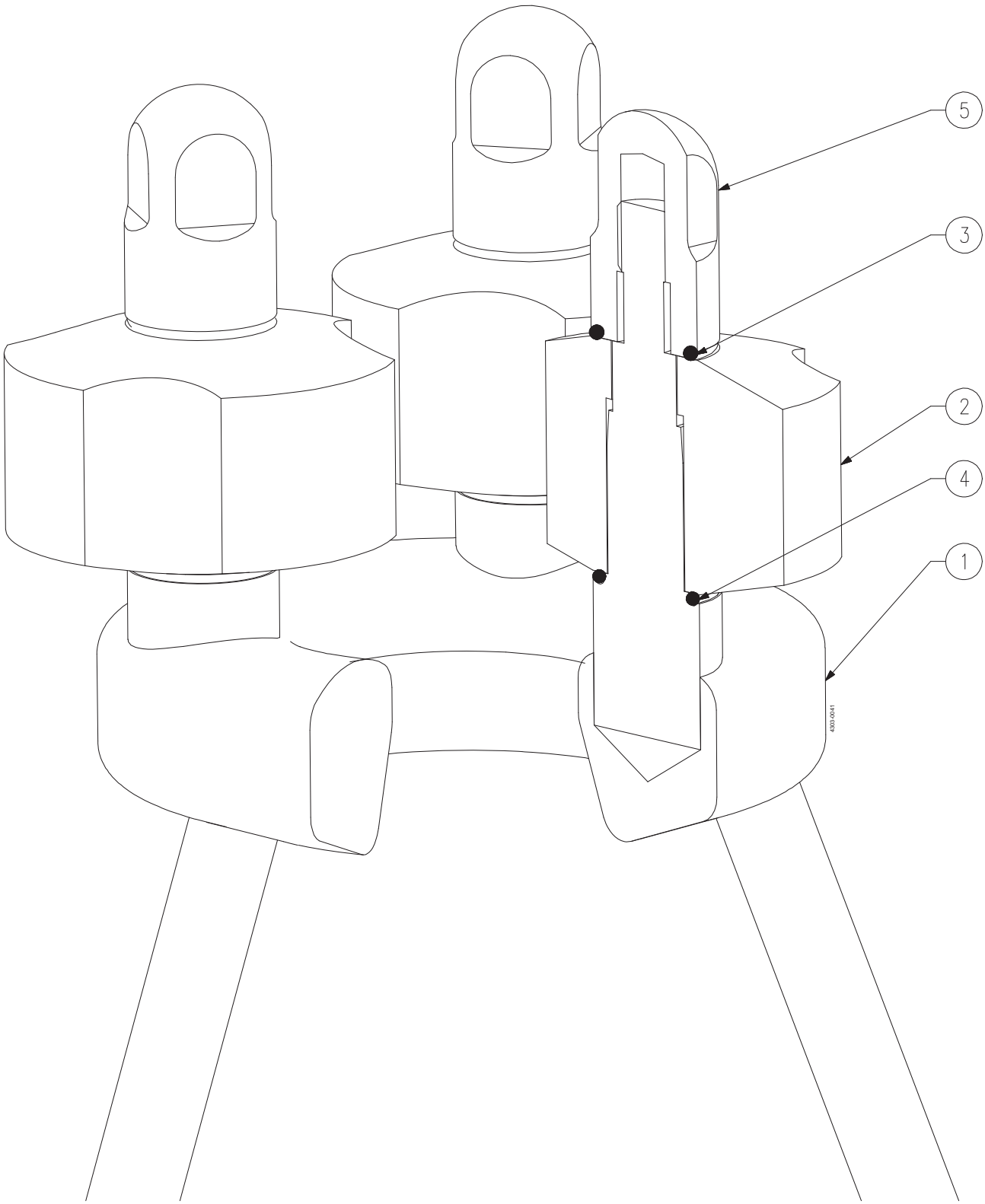
7.18 Bottom steady bearing support, type 2



Bottom steady bearing support, type 2

Parts list

Pos.		Qty	Denomination
1		1	Bottom steady support
2	□♦	3	Bushing
3	□	3	O-ring (Ø18,72x2,62)
	♦	3	O-ring (Ø18,72x2,62)
4	□	3	O-ring (Ø18,72x2,62)
	□	3	O-ring (Ø23,16x5,33)
	♦	3	O-ring (Ø18,72x2,62)
	♦	3	O-ring (Ø23,16x5,33)
5		3	Nut

Service kits

	Denomination	size: Ø35/Ø40/Ø50	size: Ø55/Ø65/Ø75	size: Ø60/Ø70/Ø80
Spare part kits				
□	Spare part kit, BS2, FPM	TE2613209210	TE2613222900	TE2613222910
♦	Spare part kit, BS2, EPDM	TE2613026830	TE2613222740	TE2613222840

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/details_1139/detail_42075.jsp

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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