

INSTALLATION, SERVICE AND MAINTENANCE INSTRUCTIONS

COUNTER-ROTATING AGITATOR

MCR



20.072.32.0016



Original Manual
20.072.30.01EN
(B) 2022/05

INOXPA S.A.U.

Telers, 60
17820 - Banyoles (Spain)

hereby declare under our sole responsibility that the

Machine: **COUNTER-ROTATING AGITATOR**

Model: **MCR**

Serial number: **IXXXXXXXXXX to IXXXXXXXXXX**
XXXXXXXXXXIINXXX to XXXXXXXXXXXXIINXXX

fulfils all the relevant provisions of the following directive:

Machinery Directive 2006/42/EC
Regulation (EC) n° 1935/2004
Regulation (EU) n° 10/2011
Regulation (EC) n° 2023/2006

and with the following harmonized standards:

EN ISO 12100:2010
EN 60204-1:2018
EN ISO 14159:2008
EN 1672-2:2005+A1:2009
EN ISO 13857:2019

The technical file has been prepared by the signer of this document.



David Reyero Brunet
Technical Office Manager
17th November 2021



Document: 20.072.30.02EN

Revision: (0) 2021/11

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fulfils all the relevant provisions of these regulations:

Supply of Machinery (Safety) Regulations 2008

and with the following designated standards:

EN ISO 12100:2010
EN 60204-1:2018
EN ISO 14159:2008
EN 1672-2:2005+A1:2009
EN ISO 13857:2019

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David Reyero Brunet
Technical Office Manager
17th November 2021

**UK
CA**

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1. Table of Contents

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2. Generalities

2.1. INSTRUCTIONS MANUAL

This manual contains information about the reception, installation, operation, assembly, disassembly and maintenance of counter-rotating agitator.

Carefully read the instruction prior to starting the agitator, familiarize yourself with the installation, operation and correct use of the agitator and strictly follow the instructions. These instructions should be kept in a safe location near the installation area.

The information published in the instruction manual is based on updated data.

INOXPA reserves the right to modify this instruction manual without prior notice.

2.2. COMPLIANCE WITH THE INSTRUCTIONS

Not following the instructions may impose a risk for the operators, the environment and the machine, and may result in the loss of the right to claim damages.

This non-compliance may result in the following risks:

- Failure of important machine/plant functions.
- Failure of specific maintenance and repair procedures.
- Possible electrical, mechanical and chemical hazards.
- Risk to the environment due to the type of substances released.

2.3. WARRANTY

The conditions of the warranty are specified in the General Sales Condition that has been delivered at the time of placing your order:



The machine may not undergo any modification without prior approval from the manufacturer.

For your safety, only use original spare parts and accessories. The usage of other parts will relieve the manufacturer of any liability.

Changing the service conditions can only be carried out with prior written authorization from INOXPA.

The non-compliance of the prescribed indications in this manual means misuse of this gear on the technical side and the personal safety and this, exempt INOXPA of all responsibility in case of accidents and personal injuries and/or property damage. Also, excluded from the warranty all breakdowns caused by improper use of the gear.

Please do not hesitate to contact us in case of doubts or if further explanations are required regarding specific data (adjustments, assembly, disassembly, etc.).

3. Safety

3.1. WARNING SYMBOLS



Safety hazard for people in general and/or for equipment



Electric hazard

ATTENTION

Important instruction to prevent damage to the equipment and its functions

3.2. GENERAL SAFETY INSTRUCTIONS



Read the instruction manual carefully before installing and starting the agitator. Contact INOXPA in case of doubt.

3.2.1. During the installation

The [Technical Specifications](#) of [chapter 9](#) should always be observed.

The installation and use of the agitator should always be in accordance with applicable regulations in regard to health and safety.



Before starting up the agitator, check that it is properly anchored and its shaft is perfectly aligned. Incorrect alignment and/or excessive stress during coupling can cause serious mechanical problems in the agitator.

Take all possible precautions when lifting the agitator. Always use properly attached slings when moving the agitator with a crane or other lifting device.



Keep the motor and the switchboard under control, particularly in areas where there is a risk of fire or explosion.

When cleaning, do not spray directly on the engine.

Do not disassemble the agitator until the switchboard has been disconnected. Remove the fuses and disconnect the power cable supplying the motor.

All electric work should be carried out by specialised personnel.

3.2.2. During operation



The [Technical Specifications](#) of [chapter 9](#) should always be observed. Under no circumstances can the specified limit values be exceeded.

Before starting up the agitator, remove all the tools used during the assembly.

Do not operate the agitator when the rotating parts are not equipped with their guards or are not properly assembled.



The agitator has rotating parts. Do not place hands or fingers in the agitator while it is operating. This may cause serious injuries.

Do not touch the parts of the agitator that are in contact with the fluid when in operation. When the agitator operates with hot fluids (temperatures above 50°C), there is a risk of skin burning. In such cases, collective-protection means (in this order or priority: separation, protective screen, heat-insulating material) or, in the absence of this, individual protection gear (gloves) must be used.



The agitator and its installation can generate sound levels above 85 dB(A) under unfavourable operating conditions. In such cases, the operators must use devices for protection against noise.

3.2.3. During maintenance



The [Technical Specifications](#) of [chapter 9](#) shall always be observed.

The agitator cannot operate without fluid. Standard agitators are not designed to work during the filling or emptying of tanks.

The maximum operating conditions of the agitator should not be exceeded. Nor should the operating parameters for which the agitator was initially designed be modified without written authorisations from INOXPA.



Do not leave loose parts on the floor.

Do not disassemble the agitator until the switchboard has been disconnected. Remove the fuses and disconnect the power cable supplying the motor.

All the electric work should be carried out by specialised personnel.

4. General Information

4.1. DESCRIPTION

The counter-rotating agitator series comprises a range of vertical agitators with a central propeller and anchor with scrapers in counter-rotating configuration. They use a sealing system through dry mechanical seal or Garlock lip seals.

4.2. PRINCIPLE OF OPERATION

This agitator consists of a concentric propeller and anchor driven by two superimposed geared motors through a hollow shaft for the anchor which turns in one direction at a relatively slow speed and a solid shaft for the propeller which goes inside the hollow shaft and turns in the opposite direction and at higher speed.

4.3. APPLICATION

Counter-rotating agitators are used for mixing and homogenizing dispersed products at a controlled temperature with an optimum performance, regardless of the product viscosity. These units are intended primarily for pharmaceutical, cosmetics, food and chemical industries.

They are ideal for processes which require heating, vacuum, premixing, additions, vigorous agitation, emulsion or dispersion, as well as pressure and temperature. Some examples of products that can be treated with these units are all kinds of creams, gels, sunscreens, depilatories, makeup, deodorants, sauces, pates, shoe creams, emulsions, paraffin mixtures, wax mixtures, carbopol dispersions, tooth pastes, products intended for drugstores and parapharmacies.



Each agitator has performance limits. The agitator was selected for a given set of mixing conditions when the order was placed. INOXPA shall not be held responsible for any damage that might be suffered or malfunctioning of the equipment if the information provided by the buyer is incomplete or incorrect. (e.g. nature of the fluids or installation details).

5. Installation

5.1. RECEPTION OF THE AGITATOR



INOXPA is not liable for any deterioration of the material caused by its transport or unpacking. Visually check that the packaging has not been damaged.



If the agitator is supplied without a drive or other element, the purchaser shall be responsible for its assembly, installation, start-up and operation.


When receiving the agitator, check the packaging and its content to ensure that it matches the delivery note. INOXPA packs the agitators in their fully assembled form or disassembled on a case-by-case basis. Ensure that the agitator has not been damaged in any way. If it is not in good condition and/or any parts are missing, the carrier must submit a report as soon as possible.

The following documentation is included with the agitator:

- shipping documents,
- instructions and Servicing manual for the agitator,
- instructions and Servicing manual for the gear-motor when the agitator is supplied with a motor by INOXPA.

5.2. IDENTIFICATION OF THE AGITATOR

The agitator is identified using a rating plate fixed onto the motor. The type of agitator and the serial number appear on the nameplate.



CE EAC

INOXPA S.A.U.
C. TELERS, 60 - 17820 BANYOLES
GIRONA (SPAIN) . www.inoxpa.com

Type

No

Year

Serial number →

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5.3. TRANSPORT AND STORAGE

ATTENTION



According to the model, the agitators are too heavy to be stored or installed manually. Use an appropriate mode of transport. Do not handle the agitator by the shaft as this may become deformed.

ATTENTION



Take all possible precautions when lifting the agitator. Always use properly attached slings when moving the agitator with a crane or other lifting device.

If the agitator is not to be installed immediately, it must be stored in an appropriate place. The shaft must be stored in a horizontal position and placed on wooden supports or a similar material. In this position, the shaft will not become deformed but it must not be subject to any type of load.

5.4. LOCATION

Place the agitator in such a way as to facilitate inspections and checks. Leave enough room around the agitator for service, disassembly and maintenance operations. It is very important to be able to access the electric connection device of the agitator, even when in operation.

5.5. ELECTRICAL INSTALLATION

Before connecting the electrical motor to the mains, check local regulations on electrical safety as well as the applicable standards.

Check the instructions manual of the manufacturer of the motor for information on how to connect it to the mains.



Take the connection of the electrical motors must be performed by qualified personnel.

Take the appropriate measures to prevent any fault.

The motor must be provided with devices for protection against power overload and short-circuits.

The agitator cannot be used in areas where there is a risk of fire or explosion when this has not been specified in the order.

5.6. ASSEMBLY

To locate and fix the agitator in the support flange of the tank, the propeller must be removed from the shaft. Once the base of the agitator is placed on the supporting flange, the fixing nuts and screws will be assembled in their corresponding holes, without being tightened. When this operation has been carried out, the agitator must be levelled using the following method:

1. Place a spirit level against the shaft.
2. Check 4 points at 90° to each other around the circumference of the shaft and at the same height.
3. Once the shaft is level, firmly tighten the fixing nuts and screws. Finally, the propeller is mounted on the end of the shaft. Be careful when assembling the shaft not to hit or strain it so as to avoid it being bent.

ATTENTION



Force should never be applied to the end of the agitator shaft, as it can easily suffer permanent damage.

ATTENTION



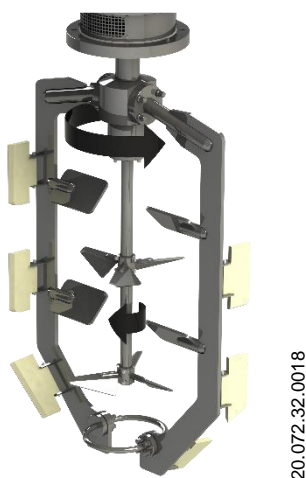
Check the alignment of the agitator shaft with the half shaft once its assembly is completed.

6. Start-up



The start-up of the agitator can be carried out provided the instructions indicated in the chapter 5. [Installation](#) have been followed.

- Check that the power supply matches the rating indicated on the motor plate.
- Check the alignment of the agitator shaft.
- Check the level of fluid in the tank. When not specified in the order, the agitator cannot be operated during the filling or emptying of the tank.
- All the guards must be in place.
- Start up the agitator.
- Check that the direction of rotation of the propellers is correct (it must rotate clockwise when seen from the drive side). See the next figure:



Follow the direction of rotation of the agitation components as indicated by the arrow attached to the engine. An incorrect direction of rotations results in a loss of agitation performance.

- Check the electrical power draw of the motor.

ATTENTION

Do not modify the operating parameters for which the agitator was initially designed without written authorisation from INOXPA (risk of damage and user hazard).



Follow the instructions for use and the safety requirements described in the instructions manual for the tank in which the agitator is mounted.

Mechanical risks (e.g. drag, shear, cutting, impact, flattening and pinching). If the agitation element is accessible from the top or the tank inspections hatch, then the user will be exposed to the above-mentioned risks.

The tank must be fitted with protective devices and safety equipment. Consult the manufacturer's instructions manual.

ATTENTION



Introducing an object or solid raw material may cause the agitation component and other mechanical parts to break and compromise its safety or guarantee.

7. Troubleshooting

The attached table lists solutions to problems that may arise while operating the agitator. It is assumed that the agitator has been properly installed and that it has been selected correctly for the specific application. Contact INOXPA if technical assistance is required.

Motor overload					
<div>↓</div> <ul style="list-style-type: none">••••••••••	Insufficient agitation				
	<div>↓</div> <ul style="list-style-type: none">•••••••••	Vibrations and noise			
		<div>↓</div> <ul style="list-style-type: none">••••••••••	Leaks		
			<div>↓</div> <ul style="list-style-type: none">•••••••••••	PROBABLE CAUSES	SOLUTIONS
				Viscosity of the liquid too high	Reduce the viscosity, e.g. by heating the liquid
				High density	Increase motor power
				Tank too big for the chosen agitator	Check with the technical department
				Wrong direction of rotation	Change direction of rotation
				Agitator speed too low	Increase the speed
				Liquid level insufficient or none	Check liquid level in the tank
Shaft bended	Replace the shaft				
Critical speed	Check with the technical department				
Worn bearings	Replace the bearings agitator				
Mechanical or lip seal worn or damaged	If the seal is worn, replace it. If the seal is damaged, consult the technical department.				
Damaged O-ring	Check with the technical department				



If the problems persist stop using the agitator immediately. Contact the agitator manufacturer or the representative.

8. Maintenance

8.1. GENERAL CONSIDERATIONS

This agitator, just like any other machine, requires maintenance. The instructions contained in this manual cover the identification and replacement of spare parts. The instructions are aimed at maintenance personnel and those responsible for the supply of spare parts.

Carefully read chapter [9. Technical Specifications](#).



Maintenance work can only be carried out by qualified personnel that are trained and equipped with the necessary resources to carrying out this work.

Before beginning maintenance work, ensure that the electric motor is disconnected and that the tank is empty.

All parts or materials that are replaced must be properly disposed of/recycled in accordance with the current directives applicable in each area.



Before beginning maintenance work, ensure that the agitator is disconnected.

8.2. MAINTENANCE

- Inspect the agitator regularly.
- Do not fail to keep the agitator clean.
- Check the state of the motor or the gear motor.
- Check the state of the bearings.
- Check the sealing: seal and/or lip seal.

Motor or gear motor maintenance shall be carried out in accordance with the manufacturer's instructions, see the instructions manual.

8.3. LUBRICATION

Follow the manufacturer's indications when lubricating the geared motor's bearings.

8.4. SPARE PARTS

To order spare parts it is necessary to indicate the type and serial number included on the agitator's characteristics plate, as well as the position and description of the part as found in chapter [9. Technical Specifications](#).

8.5. CONSERVATION

If the agitator is out of service for a considerable period of time, clean and treat the parts with VG46 mineral oil. The shaft must be stored in the horizontal position and on wooden supports or on supports of a similar material.

8.6. CLEANING



The use of aggressive cleaning products such as caustic soda and nitric acid may give raise to skin burns.

Use rubber gloves during cleaning procedures.

Always use protective goggles.

8.6.1. Automatic CIP (clean-in-place)

If the agitator is installed in a system with a CIP process its disassembly will not be required.

If the automatic cleaning process is not provided, proceed to disassemble the agitator as indicated in the chapter [8.7. Disassembly and assembly of the agitator](#).

Cleaning solutions for CIP processes:

Only use clear water (chlorine-free) to mix the cleaning agents:

- a. Alkaline solution: 1 kg by weight of caustic soda (NaOH) at 70°C (150°F)

1 kg NaOH + 100 l H₂O = cleaning solution

or

2,2 l NaOH at 33% + 100 l H₂O = cleaning solution

- b. Acid solution: 0,5% by weight of nitric acid (HNO₃) at 70°C (150°F)

0,7 l HNO₃ at 53% + 100 l H₂O = cleaning solution

ATTENTION

Check the concentration of the cleaning solutions. Incorrect concentrations may lead to the deterioration of the agitator.

To remove any traces of cleaning products ALWAYS perform a final rinse with clean water at the end of the cleaning process.

8.6.2. Automatic SIP (sterilization-in-place)

The process of sterilization with steam is applied to all the equipment including the agitator.



Do NOT start the agitator during the process of sterilization with steam.

The parts/materials suffer no damage if the indications specified in this manual are observed.

No cold liquid touches the agitator till the temperature of the agitator is lower than 60°C (140°F).

Maximum conditions during SIP process with steam or overheated water:

- a) Maximum temperature: 140°C / 284°F
- b) Maximum time: 30 min
- c) Cooling: sterile air or inert gas
- d) Materials: EPDM/PTFE (recommended)
FPM (not recommended)

8.7. DISASSEMBLY AND ASSEMBLY OF THE AGITATOR



The disassembly and assembly of the agitators should only be carried out by qualified personnel using only appropriate tools. Ensure that staff read these instructions manual attentively, particularly the instructions that relate to their work.



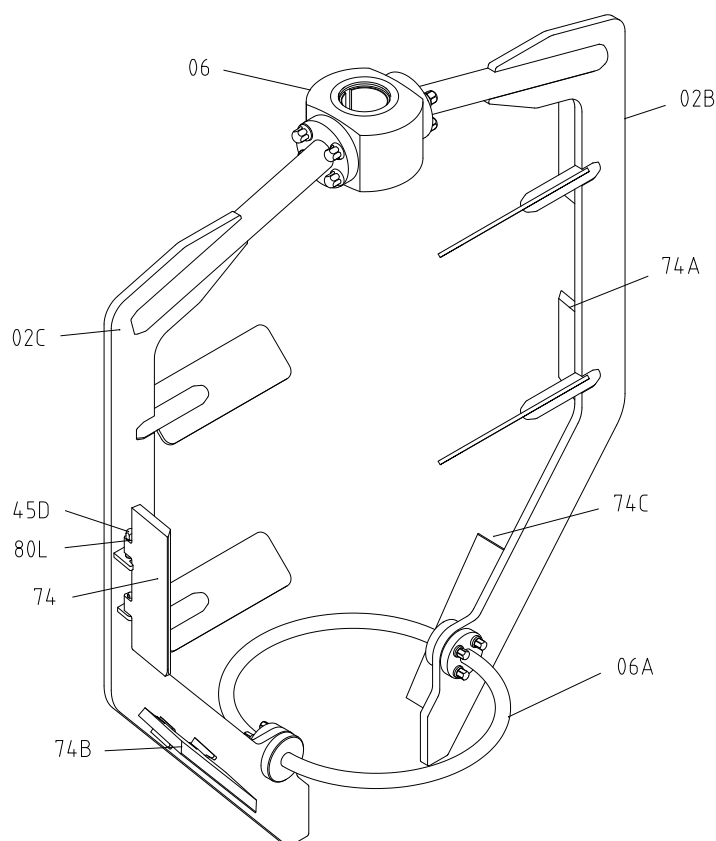
Stop the motor from starting up when carrying out assembly and disassembly work on the agitator.
Place the agitator switch in the “off” position.
Lock out the electrical switchboard or place a warning sign.
Remove the fuses and take them to the workplace.

8.7.1. Disassembly of the agitator

Once the motors have been disconnected, disassembly work on the agitator may begin:
Remove the cover of the agitator.

1. Remove the scrapers

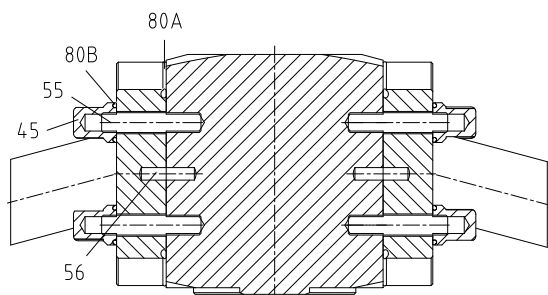
- Remove the scraper support nuts (45D).
- Remove the scrapers (74,74A,74B,74C).



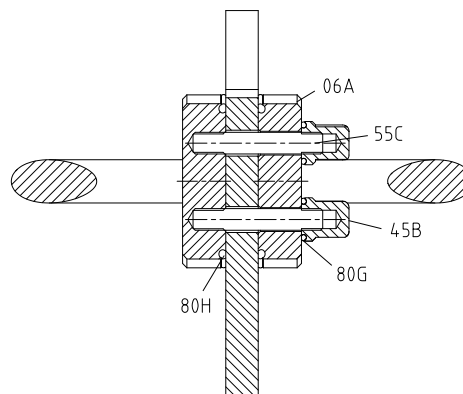
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2. Remove the anchor and propellers

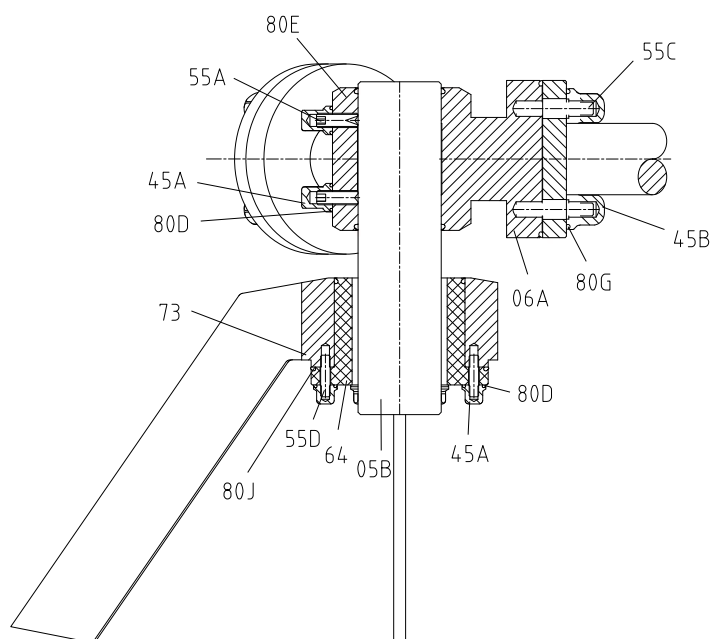
- If applicable, disassemble the lower support ring (or lower anchor hub in case of anchor tripod configurations) (06A) by removing the 8 nuts (45B), O-rings (80G) and threaded rods (55C). Carefully remove the four O-rings (80H).
- Individually remove both anchor arms (02B, 02C) by removing the 8 nuts (45), O-rings (80B), threaded rod (55) and studs (56).
- Remove the propellers (02A) and the seals (80E) unscrewing the 4 nuts (45C), O-rings (80D) and threaded rods (55A).



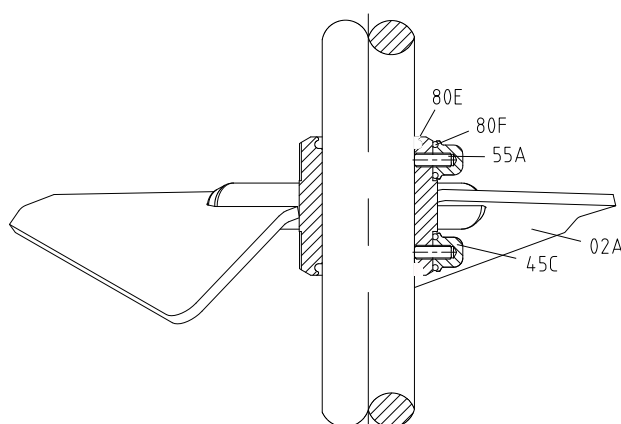
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20.072.32.0004



20.072.32.0005

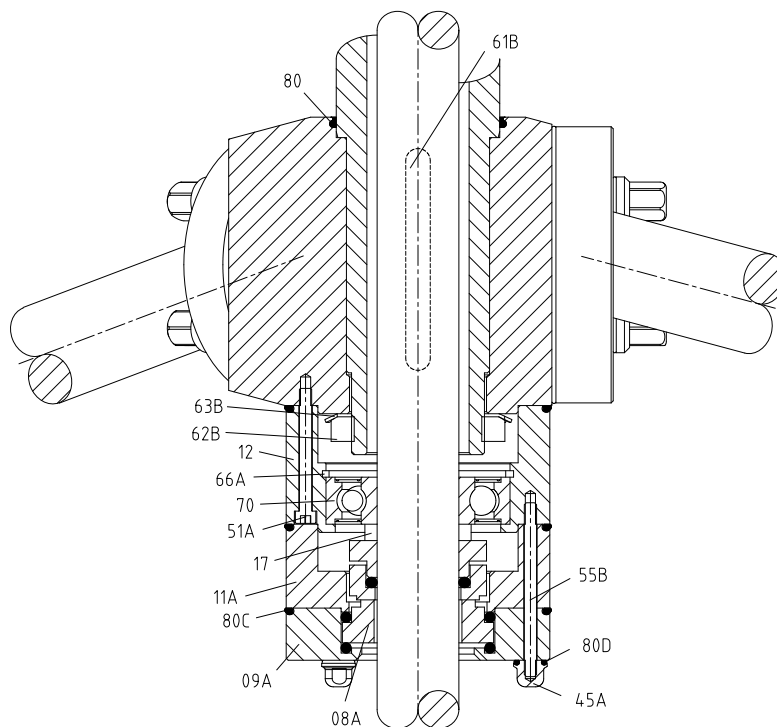


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3. Remove the bearing and the lower mechanical/lip seal

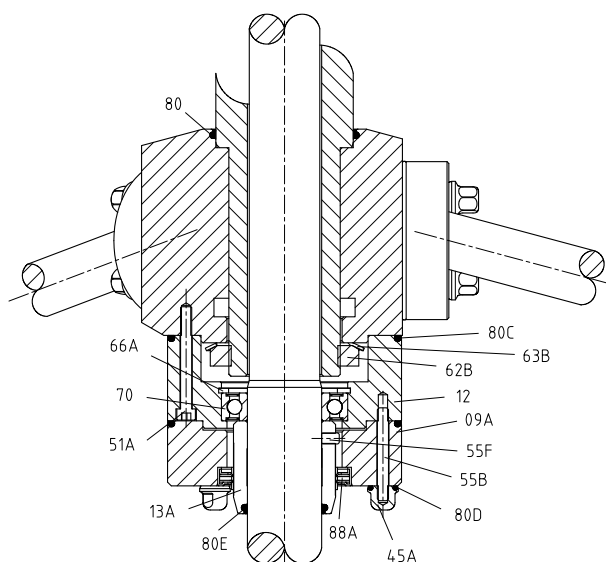
For agitators with mechanical seal:

- Remove the mechanical seal cover (09A) and back-cover (11) alongside the stationary part of the lower mechanical seal (08A) by removing the 4 nuts (45A) O-rings (80D) and threaded rods (55B). Slide the parts carefully along the shaft in order to not damage the mechanical seal.
- Remove the rotary part of the mechanical seal (08A) and the spacer ring (17) from the shaft by loosening its set screw and sliding it carefully along the shaft. If necessary, use soapy water for lubrication.
- Loosen and remove the screws (51A) and remove the bearing housing (12), and after that extract the retaining ring (66A) and the bearing (70).



For agitators with lip seals:

- Remove the seal cover (09A) alongside the lip seal (08A) by removing the 4 nuts (45A) O-rings (80D) and threaded rods (55B). Slide the parts carefully along the shaft. Use soapy water for lubrication.
- Loosen the set screws (55F) on the shaft sleeve (13A) and slide the sleeve off the shaft carefully. Use soapy water for lubrication.
- Loosen and remove the screws (51A) and remove the bearing housing (12), and after that extract the retaining ring (66A) and the bearing (70).



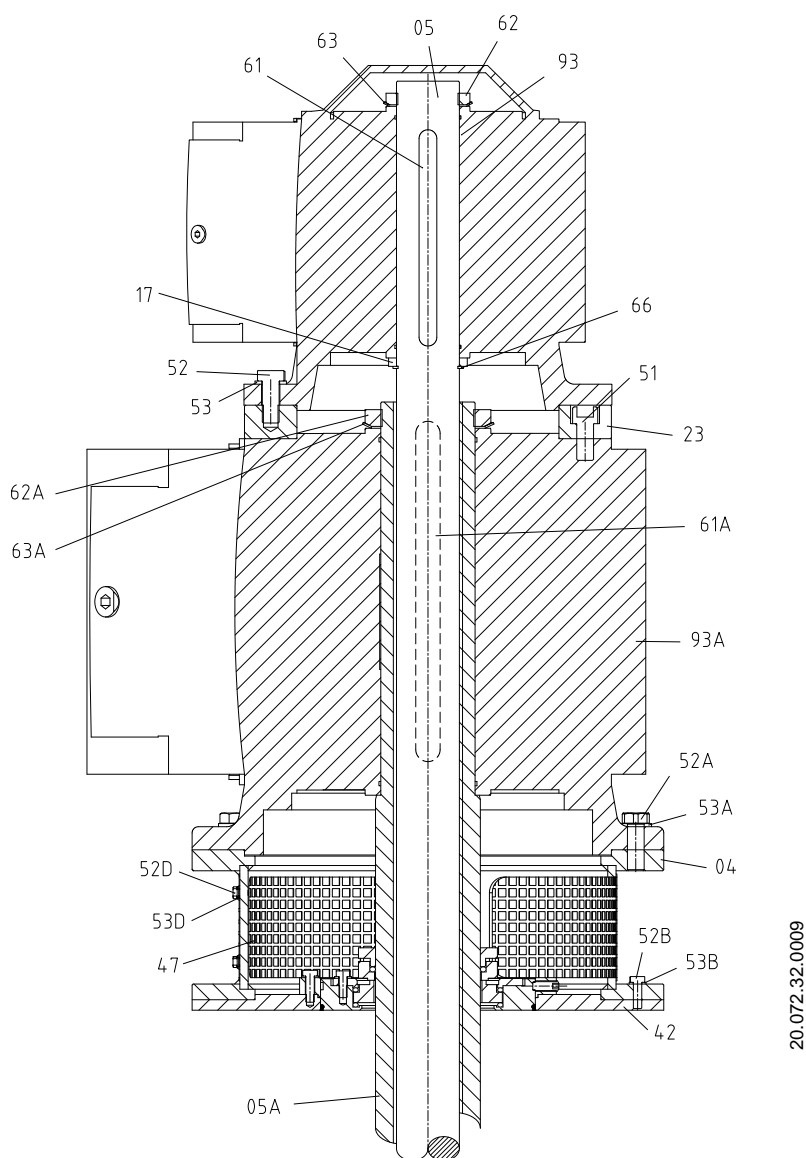
4. Remove the central shaft and gear motor

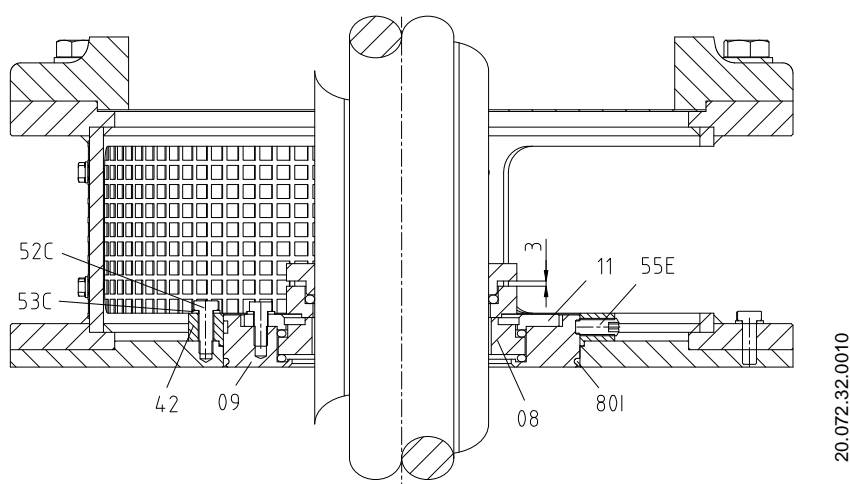
- Strongly secure the shaft from the bottom.
- Remove the upper geared motor (93) unscrewing the safety nut (62) and washer (63) and removing the hexagonal nut (52), and washer (53).
- Remove the distancing washer (17) and circlip (66) and remove the central shaft (05).

5. Remove the anchor shaft, geared motor and upper mechanical or lip seal

For agitators with mechanical seal:

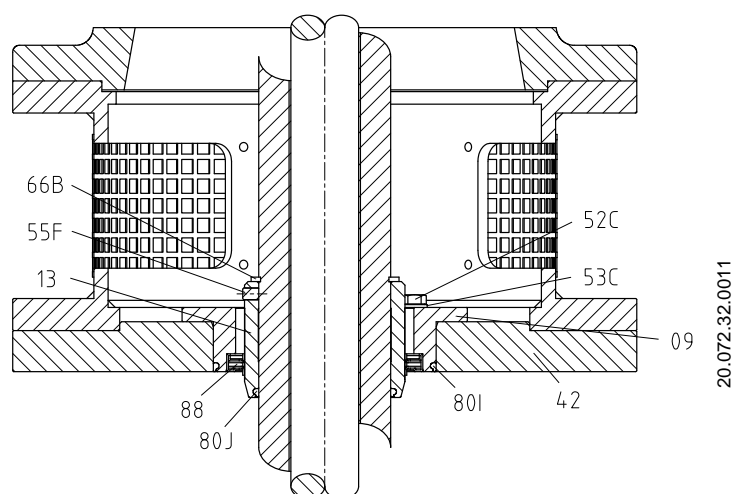
- Remove the bearing (70) and the bottom mechanical seal (08A) as explained in section 3.
- Remove the anchor hub (06) by unscrewing the safety nut (62B) and washer (63B).
- Loosen the set screws (55E) on the upper mechanical seal fixing ring (15) and carefully slide down along the hollow shaft.
- Remove the screws (52C) and washers (53C) of the seal cover (11) and extract the fixed part of the mechanical seal (08).
- Loosen the set screws on the rotary part of the mechanical seal (08) and slide down along the hollow shaft (05A) using soapy water for lubrication.





For agitators with lip seal:

- Remove the bearing (70) and the bottom seal (08A) as explained in section 3.
- Remove the anchor hub (06) by unscrewing the safety nut (62B) and washer (63B).
- Strongly secure the hollow shaft from the bottom.
- Remove the safety nut and washer (62A,63A).
- Remove the screw (52A), the washer (53A) and the bottom geared motor (93A).
- Remove the anchor's shaft (05A).
- Access the inside of the lantern from the top or by removing the side protections (47) secured by the nut (52D) and washer (53D). Remove the screws (52C) and washers (53C) and remove the seal cover (09) and the lip seal (88).



6. Gear motors and shafts removal

- Strongly secure the hollow shaft (05A) from the bottom.
- Remove the safety nut and washer (62A,63A).
- Remove the anchor's shaft (05A).
- Remove the screw (52A), the washer (53A) and the bottom geared motor (93A).

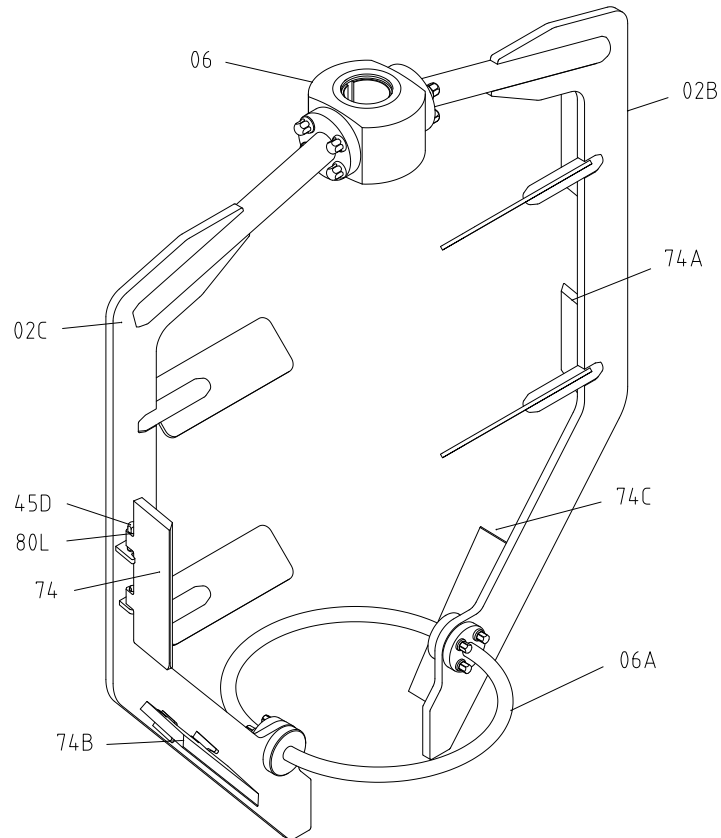
7. Tripod option removal

- If the agitator has a central shaft tripod, remove the nuts (45A) and O-rings (80D) to extract the bushing (64).

8.7.2. Assembly of the agitator

1. Assembly of the anchor arms

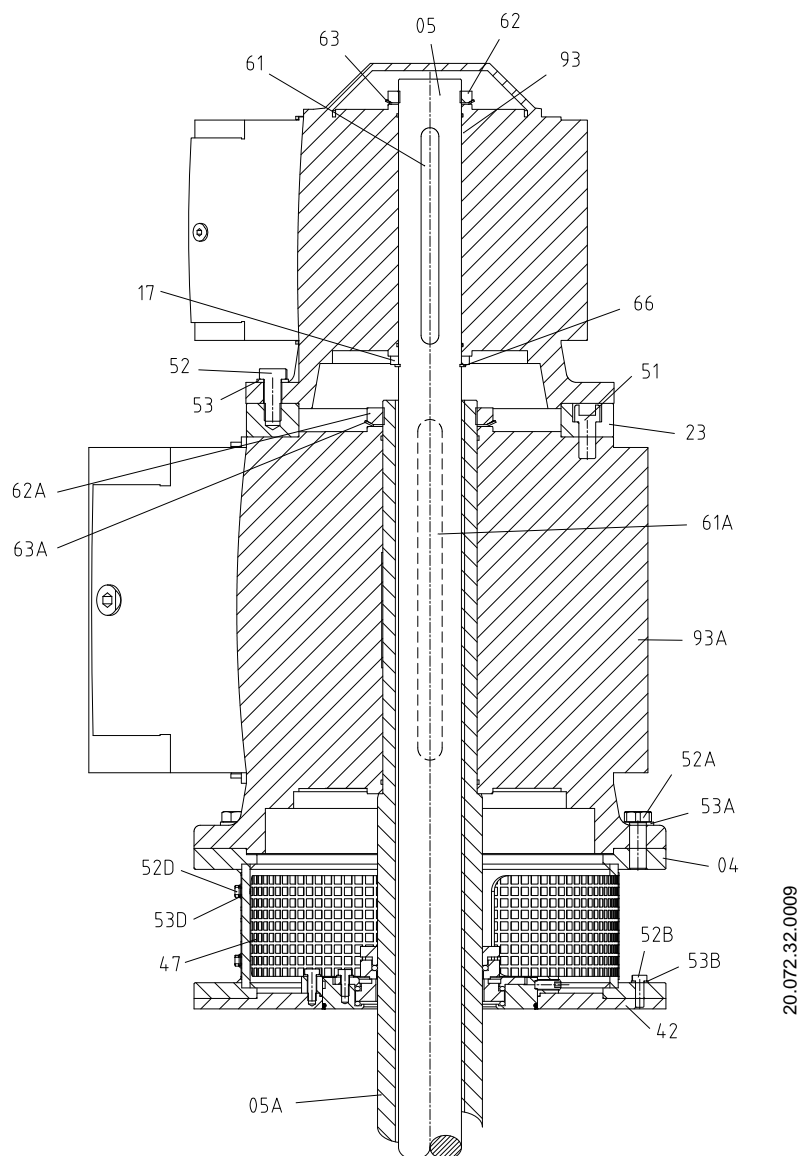
- Place the scrapers (74, 74A, 74B, 74C) into place according the positions shown in the following image.
- Turn the scraper to the maximum open position and place the O-rings (80L) on the scraper supports and secure them with the nuts (45D).
- Check the scraper range of motion and make sure they reach the maximum and minimum positions.



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2. Main assembly

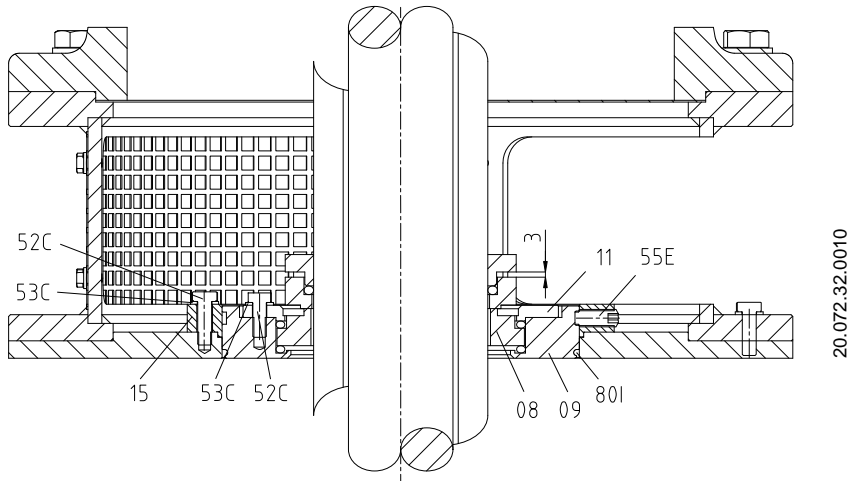
- Install the base plate (42) on the tank flange.
- Install the fixing ring (15) on to the base plate (42) using the screws (52C) and washers (53C).
- Place the lantern (04) on the base plate (42) and secure with the screws (52B) and washers (53B).
- Place the bottom geared motor (93A) on the lantern (42) and fix with the screws (52A) and the washers (53A).



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For agitators with mechanical seal:

- Assemble the key (61A) on the hollow shaft (05A)
- Install the hollow shaft (05A) through the bottom part of the assembly.
- Place the stationary part of the mechanical seal (08) on the seal support (09) and fix with the seal cover (11) and the screws (52C) and washers (53C).
- Slide the rotary part of the mechanical seal (08) through the bottom part of the hollow shaft (05A) and fix temporarily above the base plate (42) with the included set screws.
- Place the O-ring (80I) on the housing in the seal support (09) and slide the assembly along the hollow shaft (05A) and carefully insert in the base plate (42) ensuring the O-ring (80I) is properly inserted and is flush with the bottom face of the base plate (42). Fix the rotary part in place using the set screws (55E) through the fixing ring (15) and apply the torque specified on the table.
- Fix the rotatory part of the mechanical seal (08) to the shaft ensuring the measure H specified on the table.

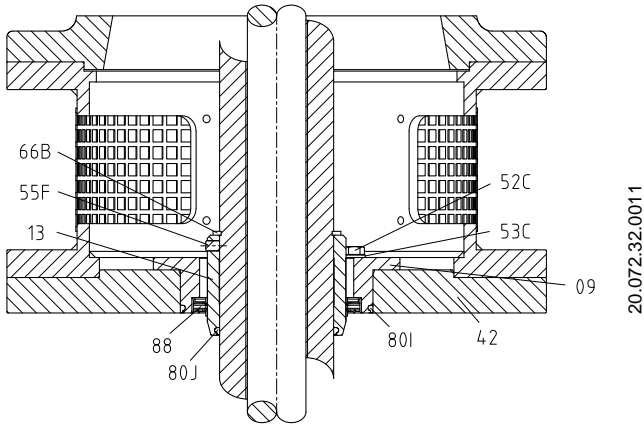


	MCR-1	MCR-2	MCR-3	MCR-4	MCR-5	MCR-6	MCR-7	MCR-8
H (mm)	2	2	2	2	2	3	3	3

	M8	M10
T (Nm)	6	12

For agitators with lip seal:

- Place the shaft sleeve (13) in position with the O-ring (80J) in the housing and tighten the set screws (55F).
- Carefully fit the upper lip seal (88) in the seal cover (09). Use press if possible, to ensure a good seating and use soapy water as lubricant.
- From inside the lantern, install the seal cover (09) with the lip seal (08) on the base plate (42).
- Assemble the key (61A) on the hollow shaft (05A)
- Install the hollow shaft (05A) through the bottom part of the assembly and fix it from the upper part of the geared motor with the security nut (62A) and washer (63A).
- Place the keys (61B) on the hollow shaft (05A) and then assemble the hub (06) with the O-ring (80) and secure it with the security nut (62B) and washer (63B).



3. Anchor assembly

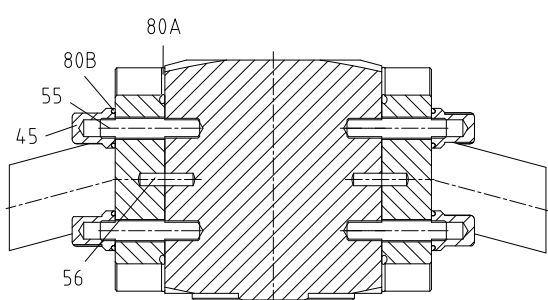
- Install the scrapers as described in step 1.
- Install both anchor arms (02B) and (02C) making sure to use the O-rings (80A) on the fixing plate and fix with the 8 nuts (45) and O-rings (80B).

For agitators with lower support ring:

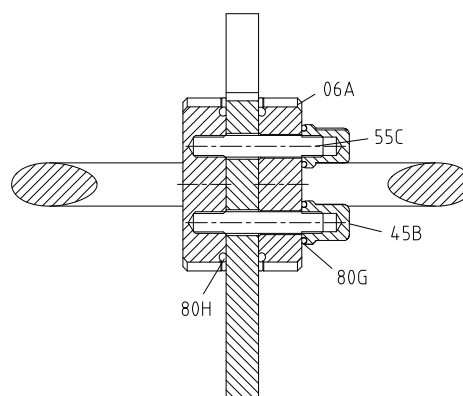
- Place the O-rings (80H) on the fixing plates and assemble both parts (06A) by installing the 8 nuts (45B), O-rings (80G) and threaded rods (55C).

For agitators with anchor tripod:

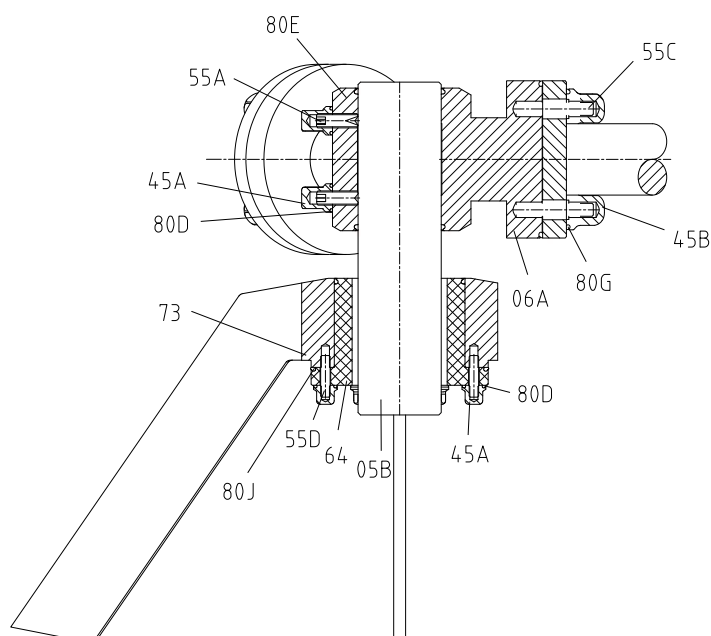
- Install the bushing (64) on the welded tripod using the nuts (45A) and O-rings (80D).
- Insert the tripod shaft (05B) in the bushing (64).
- Place the O-rings (80H) on the fixing plates and on the hub (06A). Insert the hub in the tripod shaft (05B) and assemble the hub (06A) on the anchor by installing the 8 nuts (45B), O-rings (80G) and threaded rods (55C).



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4. Assembly of the central shaft and geared motor

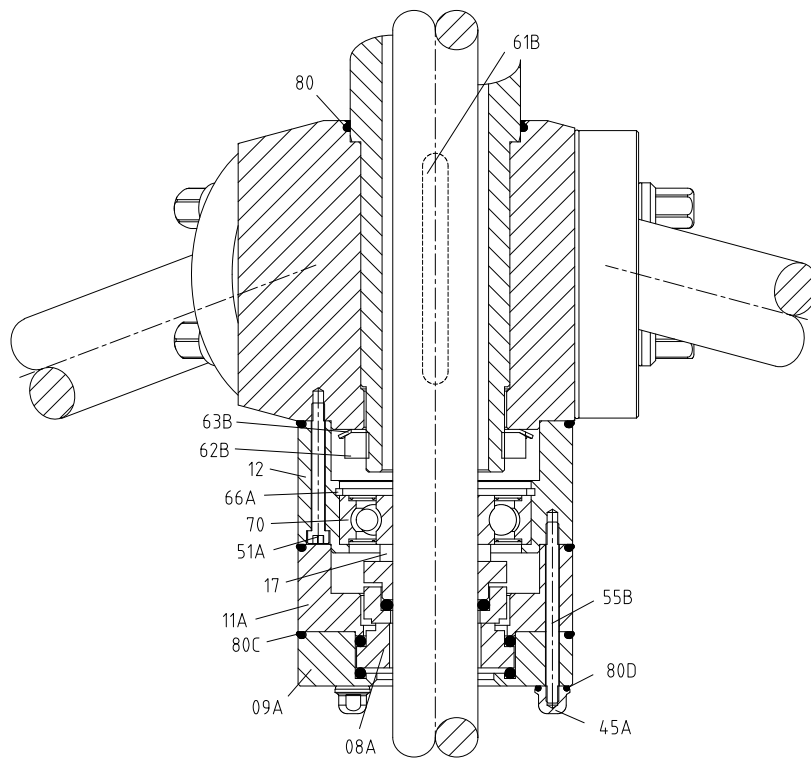
- Place the back cover (23) on top of the bottom geared motor and fix it with the screws (51).
- Introduce the shaft (05) through the hollow shaft (05A) and secure it. Mount the elastic ring (66), the spacer ring (17) and the key (61).
- Place the upper geared motor (93) on the back cover and fix it with the screws (52) and the washers (53).
- Fix the shaft (05) with the safety nut (62) and washer (63).

5. Assembly of the bearing and lower mechanical seal

- Place the bearing (70) on the support (12) and fix it with the retaining ring (66A). Place the O-ring (80C) in the groove and slide the bearing support (12) with the bearing through the shaft and fix it to the hub (06) with the four screws (51A).

For agitators with mechanical seal:

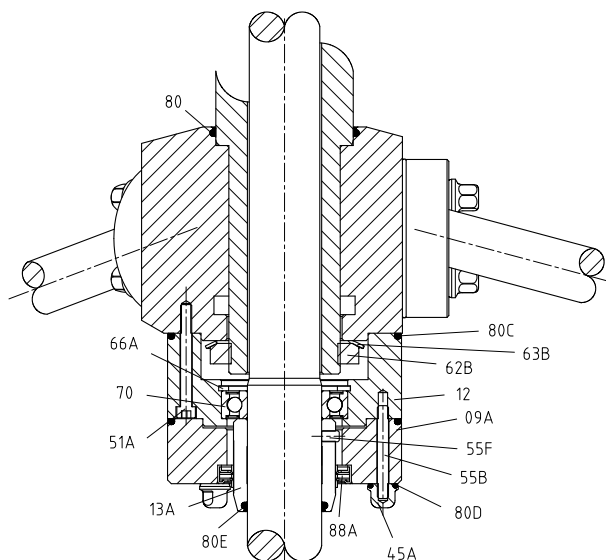
- Place the spacer ring (17) and fix the rotating part of the mechanical seal (08A) on the shaft (05) using the set screws.
- Insert the O-ring (80C) on the mechanical seal's cover (09A) and back cover (11A).
- Place the stationary part of the mechanical seal (08A) on the cover (09A) and place the back cover (11A) on top of the cover (09A).
- Mount the assembly in position and fix it to the bearing support (12) with the threaded rods (55B), the nuts (45A) and the O-rings (80D).



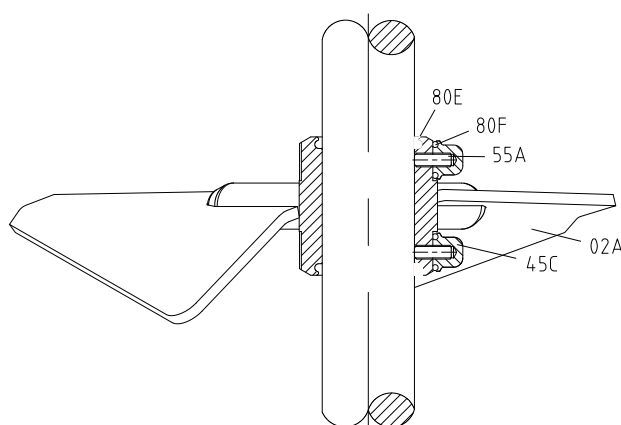
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For agitators with lip seal:

- Insert the O-ring (80C) on the lip seal's cover (09A).
- Insert the shaft sleeve (13A) with O-rings (80E) in position and tighten the set screws (55D).
- Place the lip seal (08A) on the cover (09A). If possible, use a press to ensure proper seating. Use soapy water as lubricant.
- Mount the assembly in position and fix it to the bearing support (12) with the threaded rods (55B), the nuts (45A) and the O-rings (80D).

**6. Assembly of the impellers**

- Place one of the O-rings (80E) on the hub's top housing and carefully insert the shaft in the hub half way taking care to not damage the O-ring. Then place the other O-ring on the bottom housing and slide the propeller to its position on the shaft.
- Fix the propeller in position with the threaded rods (55A), the nuts (45C) and the O-rings (80F).



9. Technical Specifications

9.1. MATERIALS

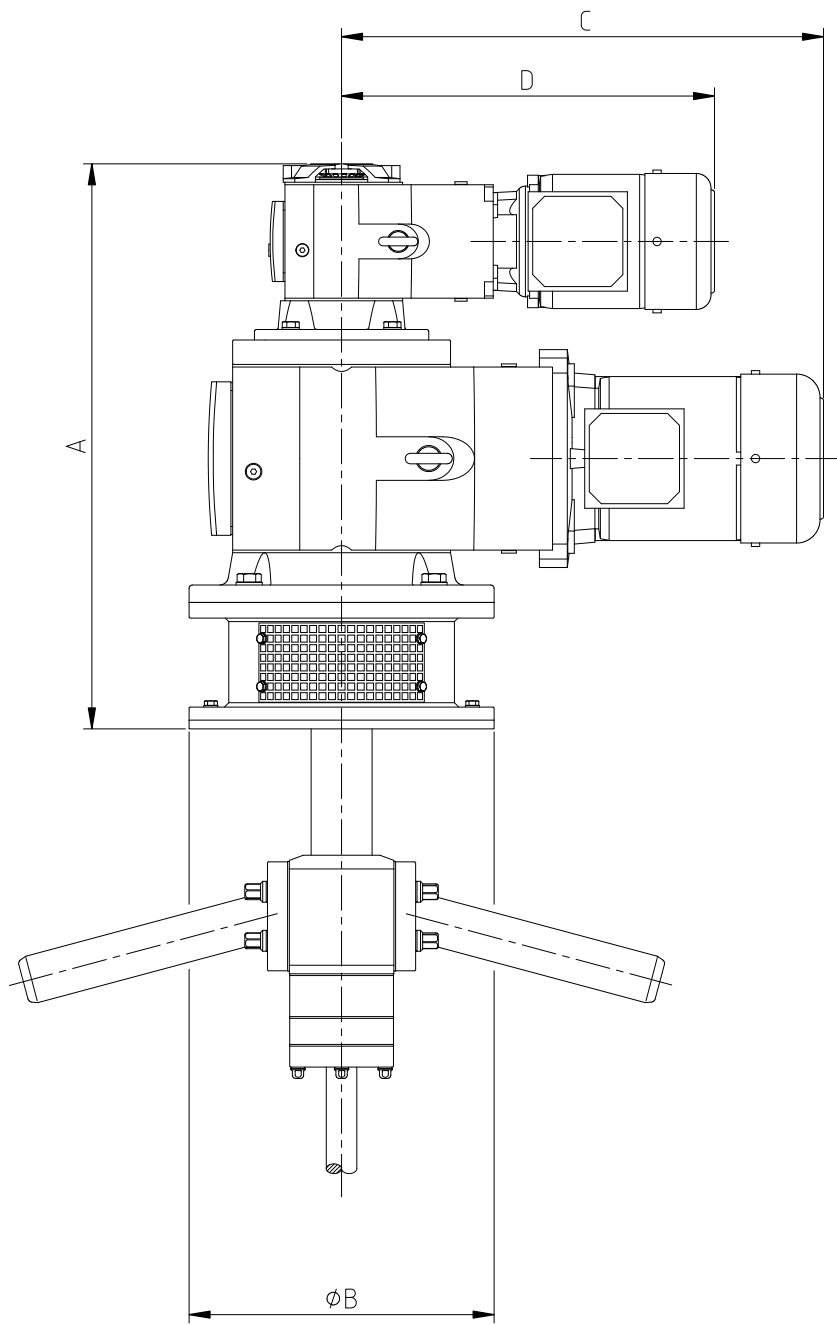
Parts in contact with the product	1.4404 (AISI 316L)
Other steel parts	1.4307 (AISI 304L)
Elastomers	EPDM / FPM
Scrapers	PTFE
Sealing system	SiC/SiC EDV mechanical seal / PTFE Gylon lip seal
Surface finish	Ra ≤ 0,8 µm (0.4 µm available special order)
Working pressure	-1 ... 6 bar
Working temperature	-10 ... 120 °C

9.2. OTHER FEATURES

	MCR-1	MCR-2	MCR-3	MCR-4	MCR-5	MCR-6	MCR-7	MCR-8
Anchor power (kW)	0,12-4	0,12-4	0,25-9.2	1,1-22	1,1-30	2,2-30	5,5-30	5,5-30
Max torque (Nm)	370	550	1500	3000	4200	6600	15500	24500
Central shaft power (kW)	0,12-0,75	0,12-1,5	0,12-4	0,12-4	0,12-4	1,1-22	1,1-30	1,1-30
Tank flange Ø (mm)	200	250	300	350	400	450	550	660
Ø Upper seal (mm)	40	45	55	70	80	100	125	125
Ø Lower seal (mm)	20	25	30	35	40	60	70	70
Head unit Weight* (Kg)	120-140	145-192	155-330	265-440	370-700	670-1905	1200-1700	1375-1945

*Note: Header weights without anchor or accessories. Final weight will depend on configuration and tank size

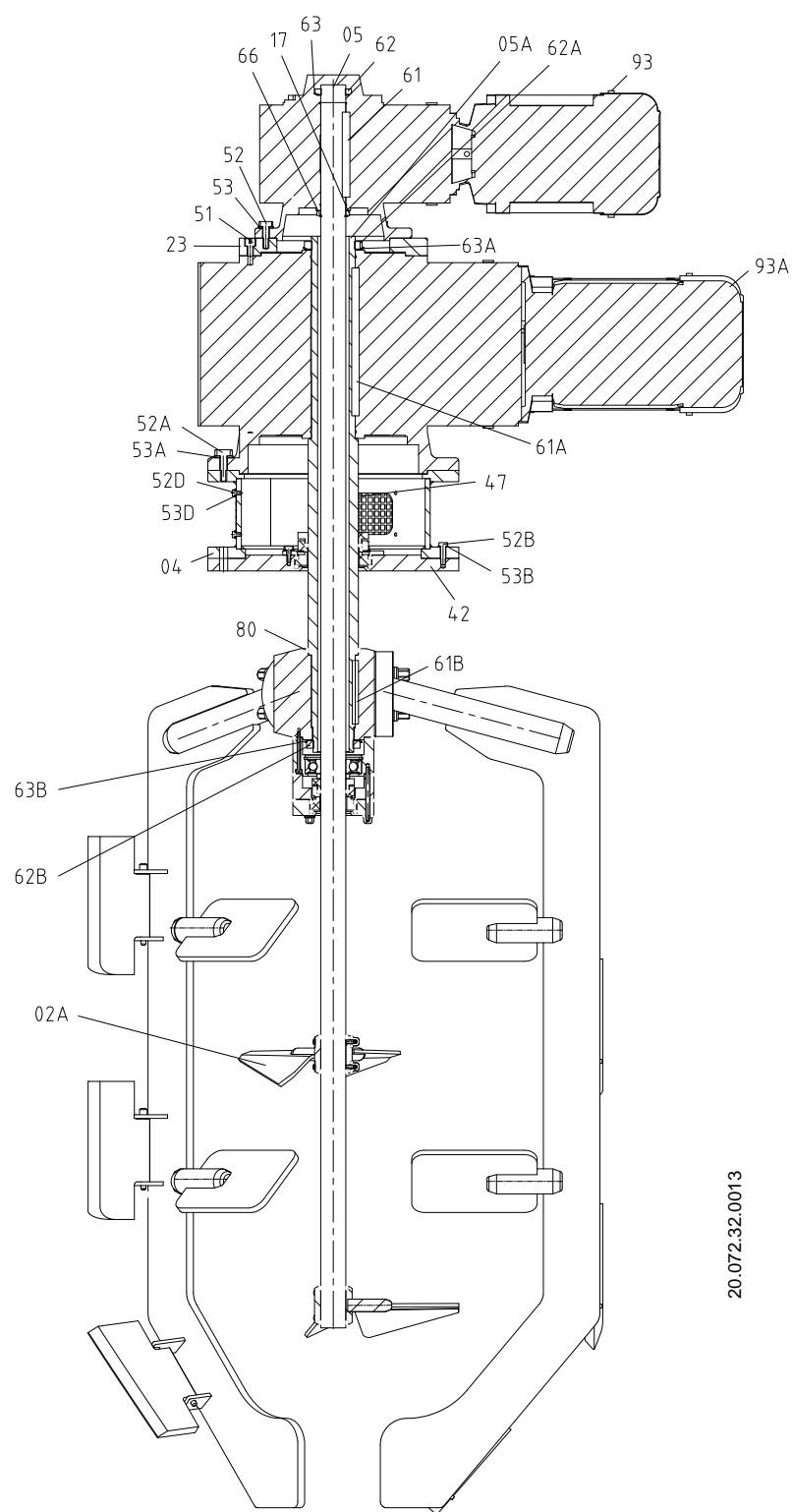
9.3. DIMENSIONS



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	MCR-1	MCR-2	MCR-3	MCR-4	MCR-5	MCR-6	MCR-7	MCR-8
A (mm)	475	525	600	670	780	910	1050	1175
ØB (mm)	200	250	300	350	400	450	550	660
Cmax (mm)	547	570	642	881	936	1092	1420	1586
Dmax (mm)	380	415	494	547	570	881	936	936

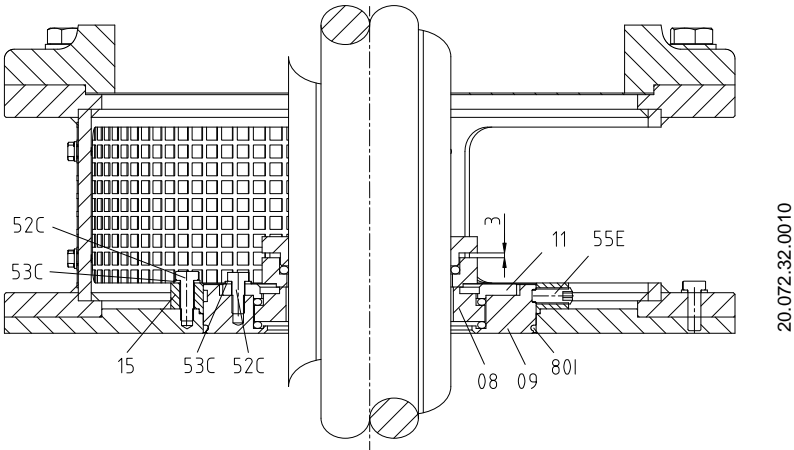
9.4. PARTS LIST



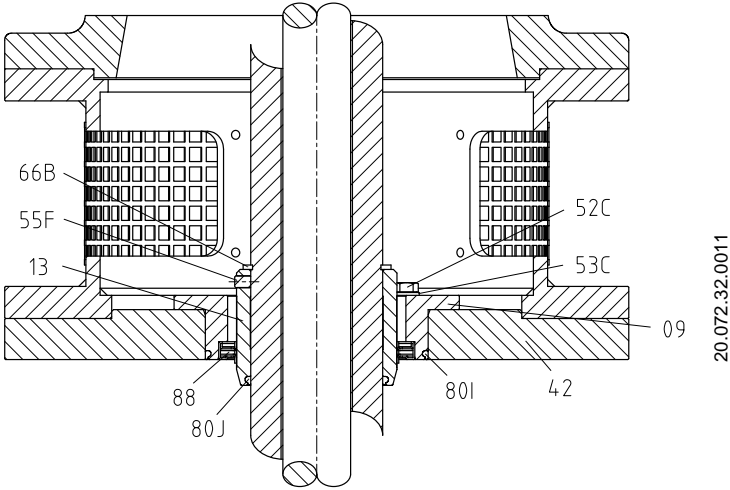
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Position	Description	Quantity	Material
02A	Impeller ¹	-	1.4404 (AISI 316L)
04	Lantern	1	1.4307 (AISI 304L)
05	Shaft	1	AISI 316L
05A	Hollow shaft	1	AISI 316L
23	Back cover	1	1.4307 (AISI 304L)
42	Base plate	1	AISI 316L
47	Lantern protection	2	PETP
51	Screw	4	A2
52	Screw	4	A2
52A	Screw	4	A2
52B	Screw	2	A2
52D	Screw	4	A2
53	Washer	4	A2
53A	Washer	4	A2
53B	Washer	2	A2
53D	Washer	8	A2
61	Key	1	1.4404 (AISI 316L)
61A	Key	1	1.4404 (AISI 316L)
61B	Key	2	1.4404 (AISI 316L)
62	Lock nut	1	Steel
62A	Lock nut	1	Steel
62B	Lock nut	1	Steel
63	Lock washer	1	Steel
63A	Lock washer	1	Steel
63B	Lock washer	1	Steel
80	O-ring	1	EPDM
93	Gear motor	1	-
93A	Gear motor	1	-

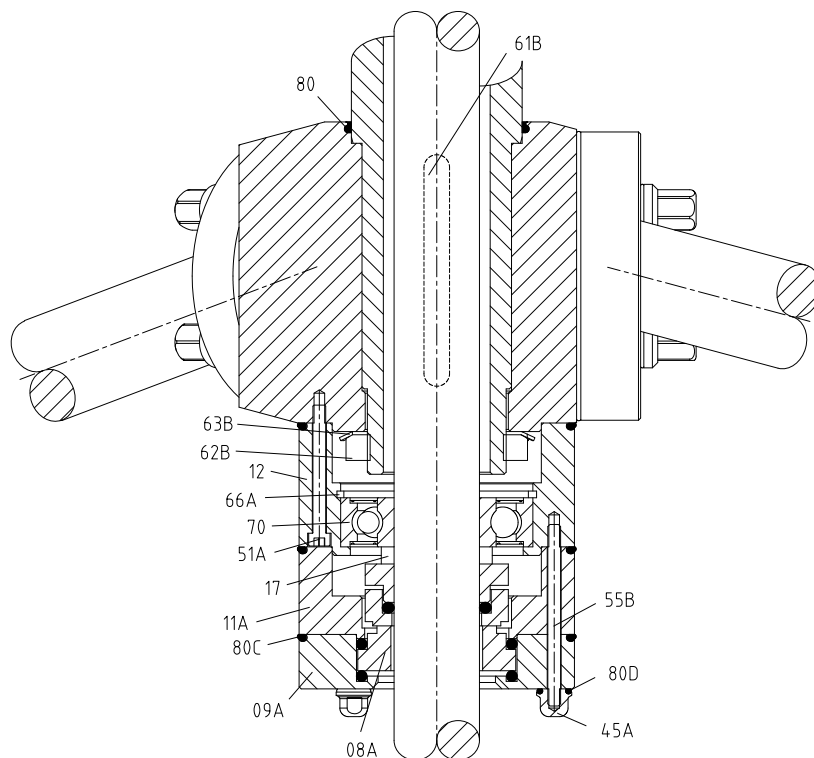
¹⁾ Impeller quantity depends on agitator configuration



Position	Description	Quantity	Material
08	Upper mechanical seal	1	SiC/SiC/EPDM
09	Upper seal cover	1	1.4404 (AISI 316L)
11	Upper seal back cover	1	1.4307 (AISI 304L)
15	Mechanical seal cover retention ring	1	1.4307 (AISI 304L)
52C	Screw	8	A2
53C	Washer	8	A2
55E	Set screw	2	A2
80I	O-ring	1	EPDM

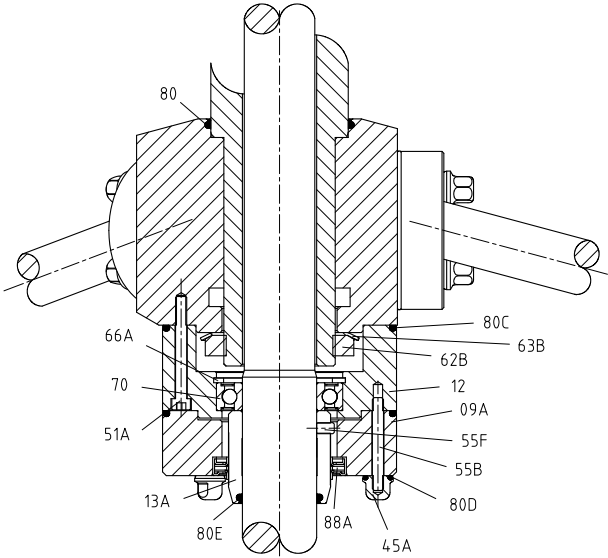


Position	Description	Quantity	Material
09	Upper seal cover	1	1.4404 (AISI 316L)
13	Shaft sleeve	1	1.4404 (AISI 316L)
42	Base plate	1	1.4404 (AISI 316L)
52C	Screw	4	A2
53C	Washer	4	A2
55F	Set screw	1	A2
66B	Retaining ring	1	A2
80I	O-ring	1	EPDM
80J	O-ring	1	EPDM
88	Upper lip seal	1	1.4404 (AISI 316L)



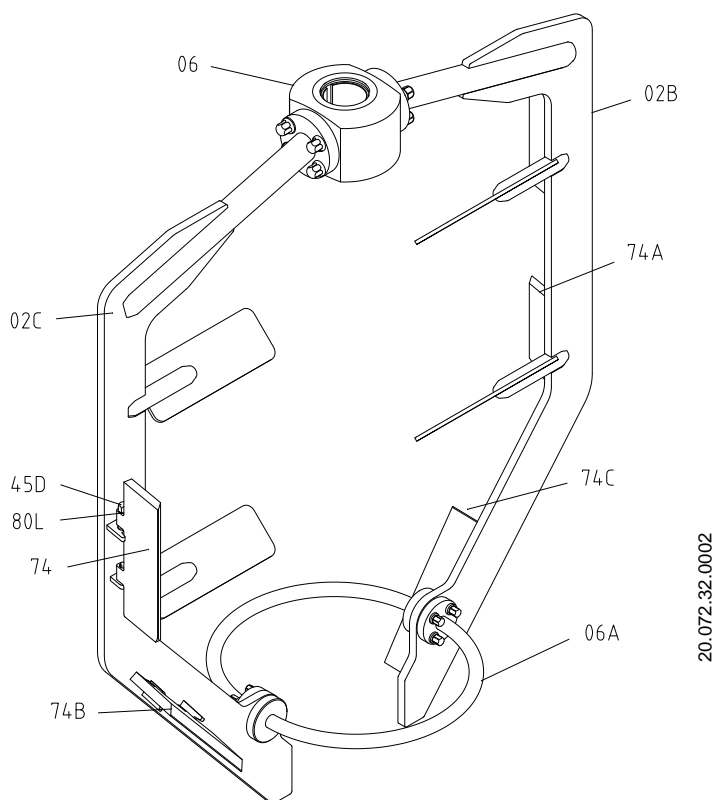
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Position	Description	Quantity	Material
08A	Lower mechanical seal	1	SiC/SiC/EPDM
09A	Lower seal cover	1	1.4404 (AISI 316L)
11A	Seal back cover	1	1.4404 (AISI 316L)
12	Bearing cover	1	1.4404 (AISI 316L)
17	Separator ring	1	1.4404 (AISI 316L)
45A	Sanitary nut	1	1.4404 (AISI 316L)
51A	Screw	4	A2
55B	Threaded rod	4	A2
61B	Key	1	1.4404 (AISI 316L)
62B	Lock nut	1	1.4307 (AISI 304L)
63B	Lock washer	1	1.4307 (AISI 304L)
66A	Retaining ring	1	1.4307 (AISI 304L)
70	Bearing	1	Stainless steel
80	O-ring	1	EPDM
80C	O-ring	3	EPDM
80D	O-ring	4	EPDM

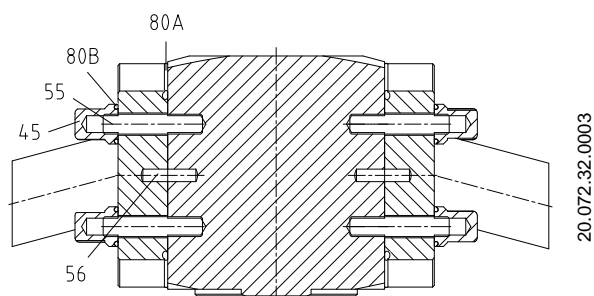


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Position	Description	Quantity	Material
09A	Lower lip seal cover	1	1.4404 (AISI 316L)
12	Bearing cover	1	1.4404 (AISI 316L)
13A	Central shaft sleeve	1	1.4404 (AISI 316L)
45A	Nut	1	1.4404 (AISI 316L)
51A	Screw	4	A2
55B	Threaded rod	4	A2
55F	Set screw	1	A2
62B	Lock nut	1	1.4307 (AISI 304L)
63B	Lock washer	1	1.4307 (AISI 304L)
66A	Retaining ring	1	1.4307 (AISI 304L)
70	Bearing	1	Stainless steel
80C	O-ring	2	EPDM
80D	O-ring	4	EPDM
80E	O-ring	1	EPDM
88A	Lower lip seal	1	1.4404 (AISI 316L)



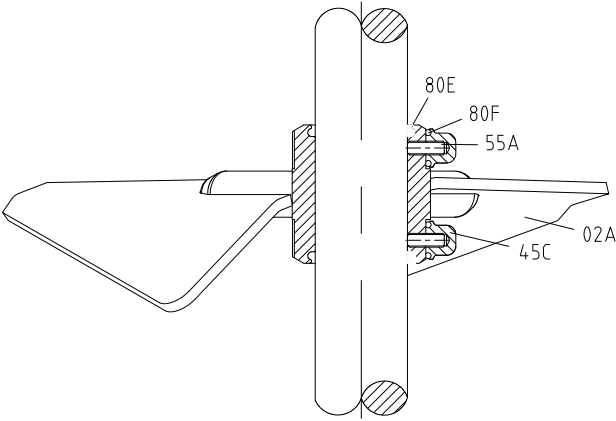
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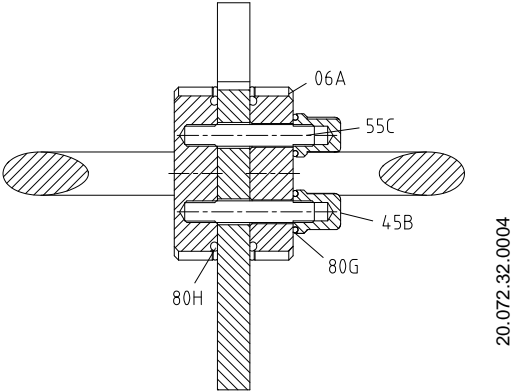
Position	Description	Quantity	Material
02B	Anchor arm n°1	1	1.4404 (AISI 316L)
02C	Anchor arm n°2	1	1.4404 (AISI 316L)
06	Anchor hub	1	1.4404 (AISI 316L)
06A	Anchor support ring/tripod hub	2	1.4404 (AISI 316L)
45D	Scraper nut	-1	1.4404 (AISI 316L)
45	Sanitary nut	8	1.4404 (AISI 316L)
55	Threaded rod	8	A2
56	Stud	4	A2
74	Scraper n° 1	-1	PTFE FDA
74A	Scraper n° 2	1	PTFE FDA
74B	Scraper n° 3	1	PTFE FDA
74C	Scraper n° 4	1	PTFE FDA
80A	O-ring	2	EPDM
80B	O-ring	8	EPDM
80L	O-ring	-1	EPDM

1) quantity-dependent on the size reactor

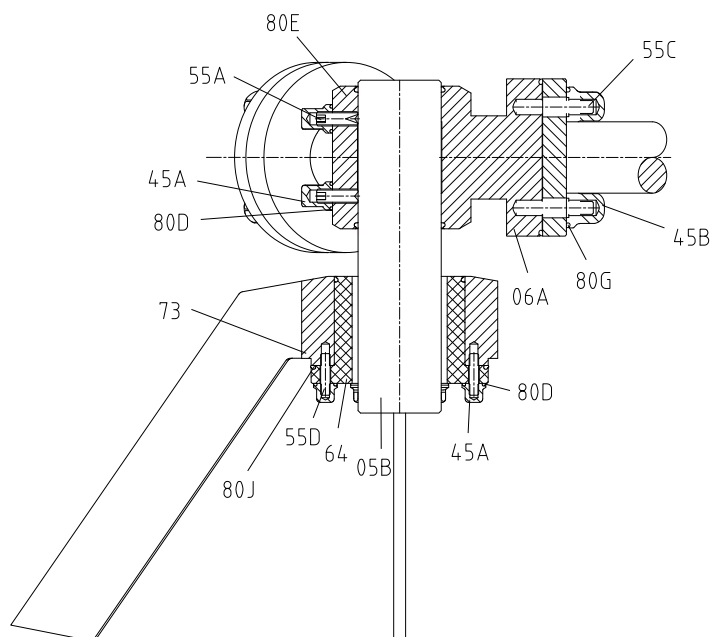


Position	Description	Quantity	Material
02A	Impeller	- ¹	1.4404 (AISI 316L)
45C	Sanitary nut	4 ²	1.4404 (AISI 316L)
55A	Threaded rod	4 ²	A2
80E	O-ring	2 ²	EPDM
80F	O-ring	4 ²	EPDM

- 1) quantity-dependent on the size reactor
 2) Quantity per unit of impeller



Position	Description	Quantity	Material
06A	Anchor support ring	2	1.4404 (AISI 316L)
45B	Sanitary nut	8	1.4404 (AISI 316L)
55C	Threaded rod	8	A2
80G	O-ring	8	EPDM
80H	O-ring	4	EPDM



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Position	Description	Quantity	Material
05B	Tripod shaft	1	1.4404 (AISI 316L)
06A	Tripod hub	1	1.4404 (AISI 316L)
45A	Nut	6	1.4404 (AISI 316L)
45B	Nut	4	1.4404 (AISI 316L)
55A	Set screw	4	A2
55C	Threaded rod	8	A2
55D	Threaded rod	6	A2
64	Tripod bearing	1	PTFE FDA
73	Tripod	1	1.4404 (AISI 316L)
80D	O-ring	10	EPDM
80E	O-ring	2	EPDM
80G	O-ring	2	EPDM
80J	O-ring	1	EPDM

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