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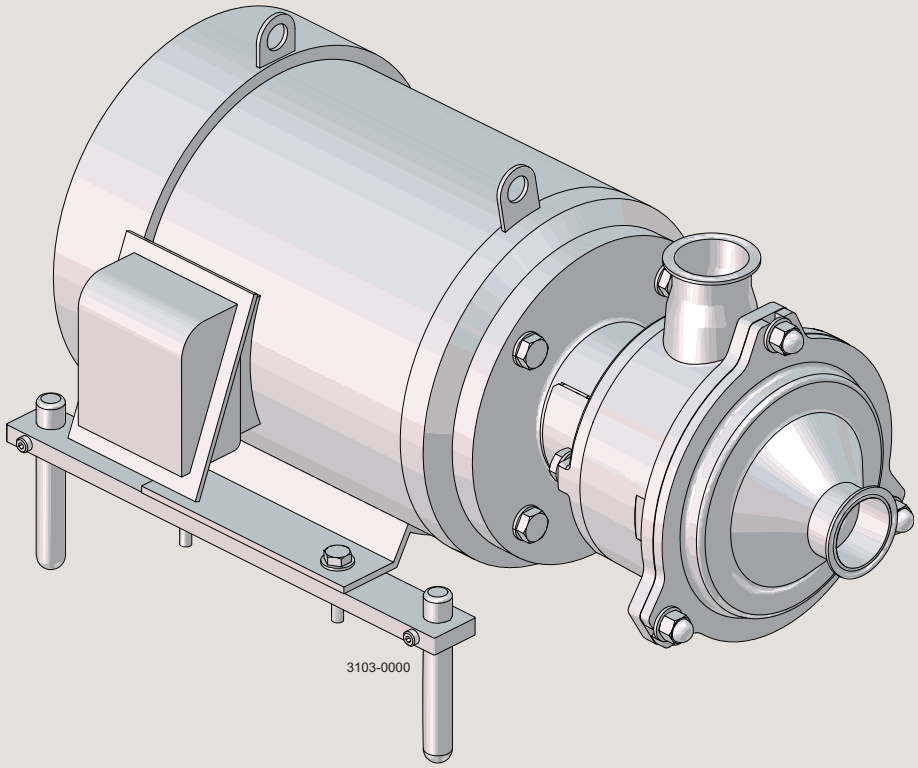
Instruction Manual

MR-166US, -185US, -200US Liquid-Ring Pump



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Original manual

Table of contents

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

1. Safety 4
1.1. Important information 4
1.2. Warning signs 4
1.3. Safety precautions 5

2. Installation 6
2.1. Unpacking/delivery 6
2.2. Installation/Pre-use check - MR-166US 7
2.3. Installation/Pre-use check - MR-185US, -200US 9
2.4. Recycling information 11

3. Operation 12
3.1. Operation/Control 12
3.2. Trouble shooting and repair 13
3.3. Recommended cleaning 14

4. Maintenance 15
4.1. General maintenance 15
4.2. Dismantling of pump MR-166US 17
4.3. Dismantling of pump MR-185US and MR-200US 20
4.4. Assembly of pump MR-166US 23
4.5. Assembly of pump MR-185US and MR-200US 27
4.6. Cleaning Procedure 30

5. Technical data 31
5.1. Technical data 31
5.2. Torque Specifications 32
5.3. Noise emission 33

6. Parts list and service kits 34
6.1. Drawings MR-166US 34
6.2. Drawings MR-185US, -200US 35
6.3. MR-166US 36
6.4. MR-185US, -200US 38

1 Safety

Unsafe practices and other important information are emphasized in this manual.
Warnings are emphasized by means of special signs. All warnings in the manual are summarized on this page.
Pay special attention to the instructions below so that severe personal injury or damage to the pump are avoided.

1.1 Important information

Always read the manual before using the pump!

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 pump.

NOTE
Indicates important information to simplify or clarify procedures.

1.2 Warning signs

General warning:

Dangerous electrical voltage:

Caustic agents:

Unsafe practices and other important information are emphasized in this manual.
Warnings are emphasized by means of special signs. All warnings in the manual are summarized on this page.
Pay special attention to the instructions below so that severe personal injury or damage to the pump are avoided.

1.3 Safety precautions

Installation:

Always read the technical data thoroughly. (See chapter 5 Technical data)
Never stick your fingers or any tool through the adaptor or the drain hole in the pump casing when the pump is running.
Never test the direction of rotation with liquid in the pump.

Always have the pump electrically connected by authorized personnel. (See the motor instruction)
Always disconnect the power supply when servicing the pump.

Operation:
Always read the technical data thoroughly. (See chapter 5 Technical data)
Never touch the pump or the pipelines when pumping hot liquids or when sterilizing.
Never run the pump with both the suction side and the pressure side blocked.
Never run the pump when partially installed or not completely assembled.
Necessary precautions must be taken if leakage occurs as this can lead to hazardous situations.

Always handle lye and acid with great care.
Never use the pump for products not mentioned in Alfa Laval pump selection program.
Alfa Laval pump selection program can be acquired from your local Alfa Laval sales company.

Maintenance:

Always read the technical data thoroughly. (See chapter 5 Technical data)
Never service the pump when it is hot.
Never service the pump if pressurized.
Always use Alfa Laval genuine spare parts.

Motors with grease nipples:
Remember lubrication according to information plate/label on the motor.

Always disconnect the power supply when servicing the pump.

Transportation:
Transportation of the pump or the pump unit:
Never lift or elevate in any way other than described in this manual
Always drain the pump head and accessories of any liquid
Always ensure that no leakage of lubricants can occur
Always transport the pump in it's upright position
Always ensure that the unit is securely fixed during transportation
Always use original packaging or similar during transportation

2 Installation

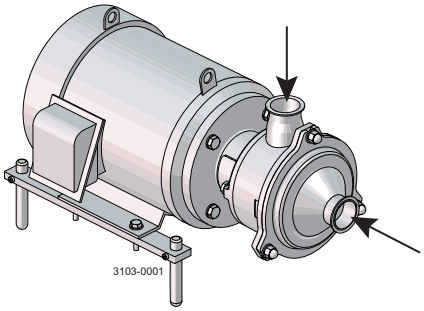
The instruction manual is part of the delivery. Study the instructions carefully. The pump is available in the following sizes, MR-166US, MR-185US and MR-200US.

2.1 Unpacking/delivery

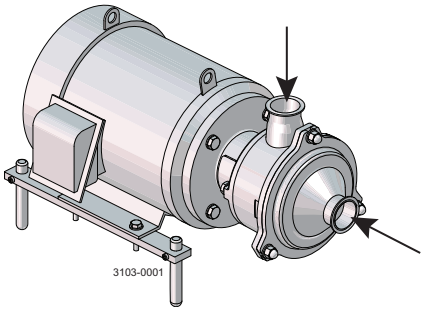
Step 1
NOTE
Alfa Laval cannot be held responsible for incorrect unpacking.
Inspect the pump for visible transport damages.

Check the delivery for:
1. Complete pump, MR-166US, MR-185US or MR-200US.
2. Delivery note.
3. Motor instructions.

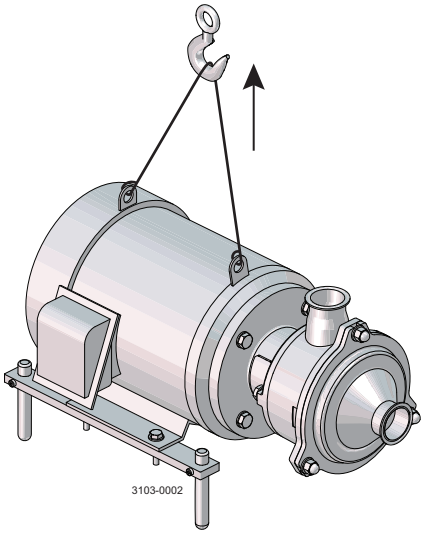
Step 2
Clean the inlet and the outlet from possible packing materials.



Step 3
Avoid damaging the inlet and the outlet.



Step 4
Always remove the shroud, if fitted, before lifting the pump.



Study the instructions carefully and pay special attention to the warnings!
The direction of rotation of the impeller can be checked by observing the direction of rotation of the motor fan.
- See the indication label on the pump.

2.2 Installation/Pre-use check - MR-166US

Step 1

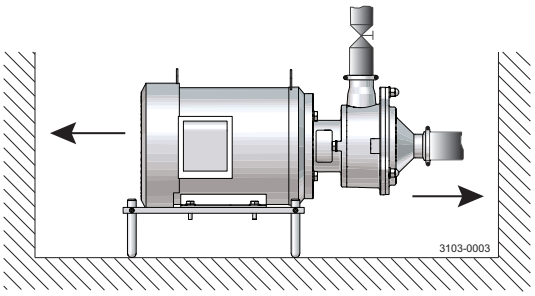
Always read the technical data thoroughly.
See chaper 4 Maintenance

The pump **must** be electrically connected by authorized (see the motor instructions)

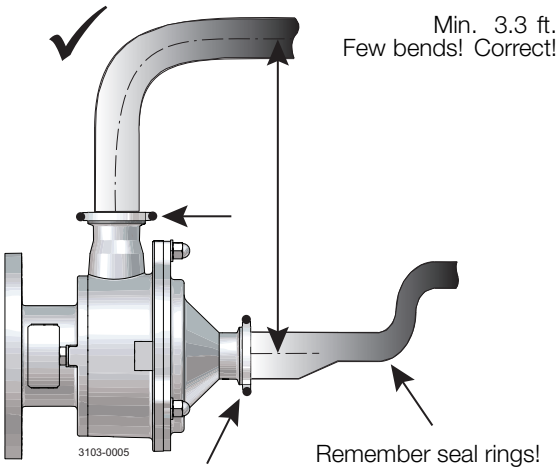
Never stick your fingers or any tool through the adaptor or the drain hole in the pump casing when the pump is running.

NOTE
Alfa Laval cannot be held responsible for incorrect installation.

Step 2
Ensure at least 1.64 ft clearance around the pump.



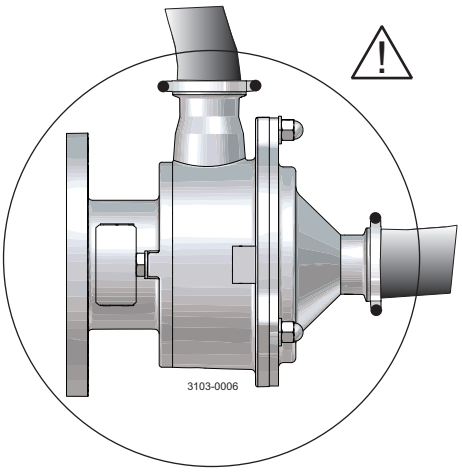
Step 3
1. Ensure that the pipelines are correctly routed.
2. Ensure that connections are tight.



2 Installation

Study the instructions carefully and pay special attention to the warnings!
The direction of rotation of the impeller can be checked by observing the direction of rotation of the motor fan.
- See the indication label on the pump.

Step 4
Avoid stressing the pump.
Pay special attention to:
- Vibrations.
- Thermal expansion of the tubes.
- Excessive welding.
- Overloading of the pipelines.

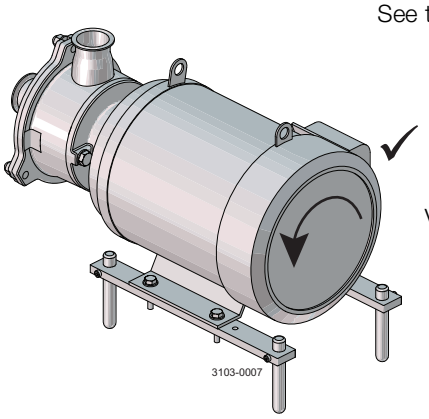


Risk of damage!

Step 5

Never test the direction of rotation with liquid in the pump.
Pre-use check:
1. Start and stop the motor momentarily.
2. Ensure that the direction of rotation of the motor is **counterclockwise** as viewed from the back of the motor.

See the indication label!
Correct!



View from rear end of motor

Study the instructions carefully and pay special attention to the warnings!
The direction of rotation of the impeller can be checked by observing the direction of rotation of the motor fan.
- See the indication label on the pump.

2.3 Installation/Pre-use check - MR-185US, -200US

Step 1

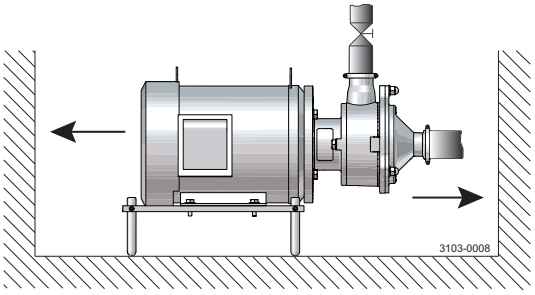
Always read the technical data thoroughly.

Never stick your fingers or any tool through the adaptor or the drain hole in the pump casing when the pump is running.

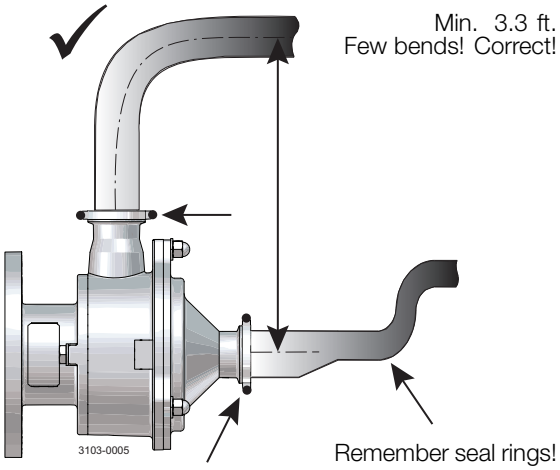
Always have the pump electrically connected by authorised personnel.

NOTE
Alfa Laval cannot be held responsible for incorrect installation.

Step 2
Ensure at least 1.64 ft clearance around the pump.



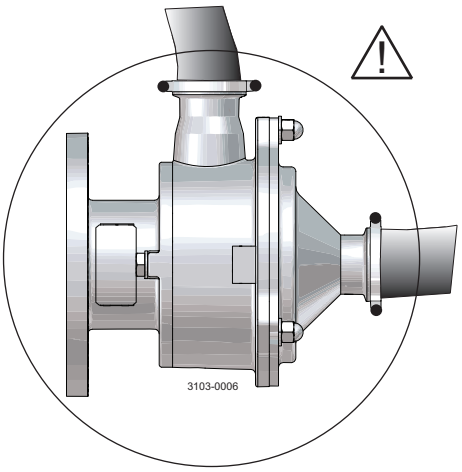
Step 3
1. Ensure that pipelines are routed correctly.
2. Ensure that connections are tight.



2 Installation

Study the instructions carefully and pay special attention to the warnings!
The direction of rotation of the impeller can be checked by observing the direction of rotation of the motor fan.
- See the indication label on the pump.

Step 4
Avoid stressing the pump.
Pay special attention to:
- Vibrations.
- Thermal expansion of the tubes.
- Excessive welding.
- Overloading of the pipelines.



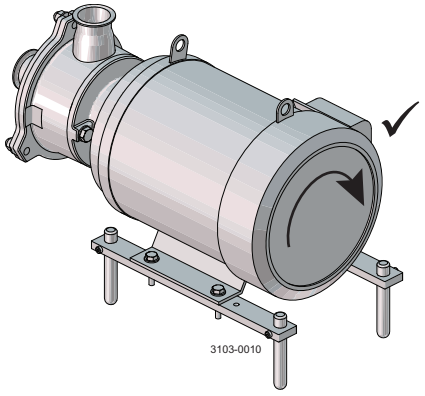
Risk of damage!

Step 5

Never test the direction of rotation with liquid in the pump.

Pre-use check:
1. Start and stop the motor momentarily.
2. Ensure that the direction of rotation of the motor is **clockwise** as viewed from the back of the motor.

Correct!



See the indication label!

View from rear end of motor

Study the instructions carefully and pay special attention to the warnings!
The direction of rotation of the impeller can be checked by observing the direction of rotation of the motor fan.
- See the indication label on the pump.

2.4 Recycling information

Recycling information

• Unpacking

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

• Maintenance

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

• Scrapping

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

3 Operation

Study the instructions carefully and pay special attention to the warnings!

3.1 Operation/Control

Step 1

Always read the technical data thoroughly.

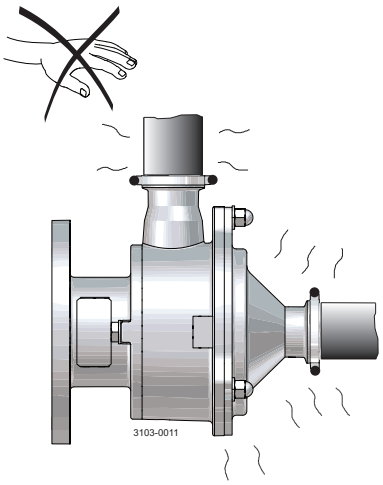
NOTE
Alfa Laval cannot be held responsible for incorrect operation/control.

Step 2

Never touch the pump or the pipelines when pumping hot liquids or when sterilising.

Never stick your fingers or any tool through the drain hole in the pump casing when the pump is running.

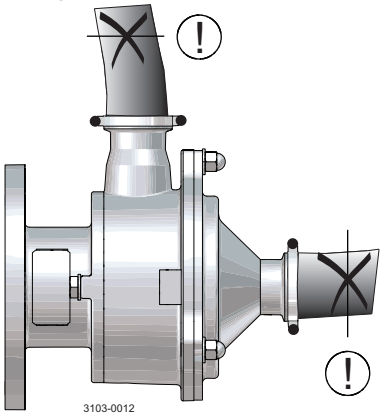
Danger of burns!
Rotating parts!



Step 3
Never run the pump with both the suction side and the pressure side blocked.

Danger of explosion!

See the warning label!

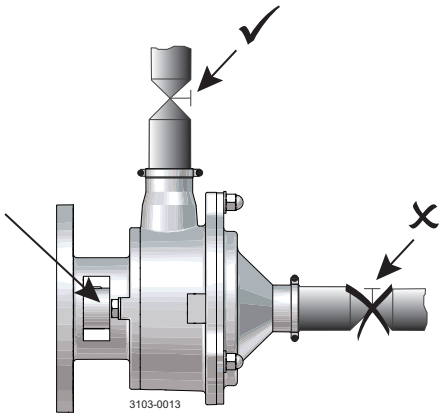


Step 4

CAUTION
The shaft seal must not run dry.

CAUTION
Never throttle the inlet side.
Control:
Reduce the capacity by means of:
- Throttling the pressure side of the pump.
- Speed control of the motor.

Do not allow to run dry



Correct!

Wrong!

Pay attention to possible faults.
Study the instructions carefully.

3.2 Trouble shooting and repair

Step 1
NOTE
Study the maintenance instructions carefully before replacing worn parts.

Problem	Cause/result	Repair
Leaking shaft seal	- Dry run	Replace: All wearing parts
	- Incorrect rubber grade	- Select a different rubber grade
	- Abrasive particles in the liquid	- Select stationary and rotating seal ring in Silicon Carbide/Silicon Carbide (only MR-185S, -200S)
Leaking O-ring seals	Incorrect rubber grade	Change rubber grade

3 Operation

The pump is designed for cleaning in place (CIP). CIP = Cleaning In Place.
Study the instructions carefully and pay special attention to the warnings!
NaOH = Caustic Soda.
HNO_3 = Nitric acid.

3.3 Recommended cleaning

Step 1

Always handle lye and acid with great care.

Caustic danger!

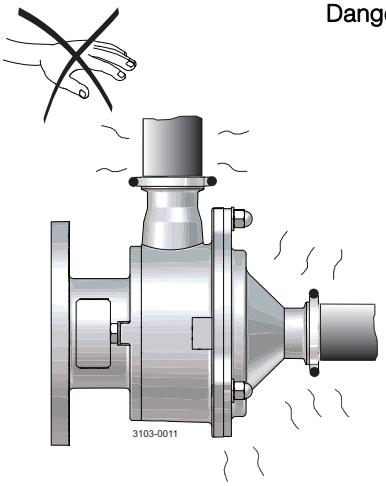
Always use rubber gloves!

Always use protective goggles!

Step 2

Never touch the pump or the pipelines when pumping hot liquids or when sterilising.

Danger of burns!



Step 3

Examples of cleaning agents: Use clean water, free from chlorides.

1. 1% by weight NaOH at 70°C (158°F).

1 kg (2.2 lb) NaOH	+	100 l (26.4 gal) water	= Cleaning agent.
2.2 l (0.6 gal) 33% NaOH	+	100 l (26.4 gal) water	= Cleaning agent.

2. 0.5% by weight HNO_3 at 70°C (158°F).

0.7 l (0.2 gal) 53% HNO_3	+	100 l (26.4 gal) water	= Cleaning agent.

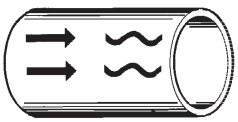
1. Avoid excessive concentration of the cleaning agent
   ⇒ Dose gradually!
2. Adjust the cleaning flow to the process.
   Sterilisation of milk/viscous liquids
   ⇒ Increase the cleaning flow!

Step 4

Always rinse well with clean water after using a cleaning agent.

NOTE
The cleaning agents must be stored/disposed of in accordance with current regulations/directives.

Always rinse!



Clean water Cleaning agent

Step 5

Always store/discharge cleaning agents in accordance with current rules/directives.

Maintain the pump carefully.
Study the instructions carefully and pay special attention to the warnings!
Always keep spare shaft seals and rubber seals in stock.
See separate motor instructions.

4.1 General maintenance

Step 1

Always read the technical data thoroughly.

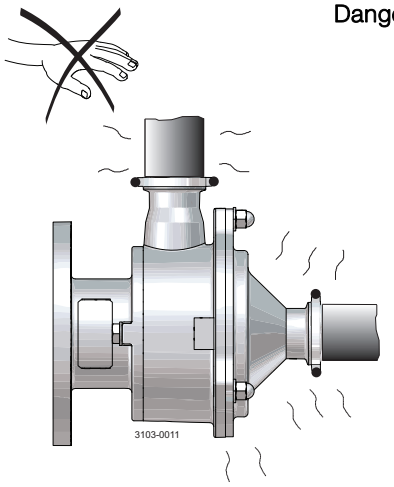
Always disconnect the power supply when servicing the pump.

NOTE
All scrap must be stored/discharged in accordance with current rules/directives.

Step 2

Never service the pump when it is hot.

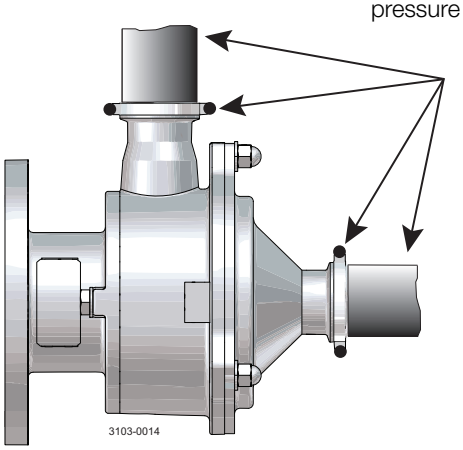
Danger of burns!



Step 3

The pump and the pipelines must **never** be pressurised when the pump is serviced.

Atmospheric pressure required!



4 Maintenance

Maintain the pump carefully.
Study the instructions carefully and pay special attention to the warnings!
Always keep spare shaft seals and rubber seals in stock.
See separate motor instructions.

Step 4
CAUTION
Always ensure that the impeller rotates smoothly after service.

CAUTION
Fit the electrical connections correctly if they have been removed from the motor during service.
Pay special attention to the warnings!

1. Rotate impeller (11) through the inlet.
2. Ensure that the impeller does not contact pump casing (9) or casing cover (10).
3. Adjust the impeller position if necessary (see section 4.4 Assembly of pump MR-166US and section 4.5 Assembly of pump MR-185US and MR-200US.

Recommended spare parts:
Order service kits from the service kits list
(see chapter 6 Parts list and service kits).

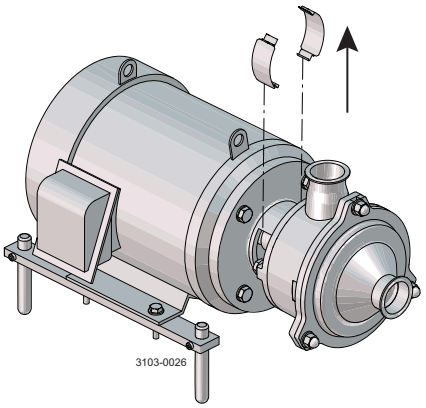
Ordering spare parts
Contact your local Alfa Laval sales company.

	Shaft seals	Rubber seals	Motor bearings
Preventive maintenance	**Replace after 12 months** (one-shift) Complete shaft seal	Replace when replacing the shaft seal	
Maintenance after leakage (leakage normally starts slowly)	Replace at the end of the day: Complete shaft seal	Replace when replacing the shaft seal	
Planned maintenance	- Regular inspection for leakage and smooth operation - Keep a record of the pump - Use the statistics for planning of inspections **Replace after leakage:** Complete shaft seal	Replace when replacing the shaft seal	Yearly inspection is recomm. - Replace complete bearing if worn - Ensure that the bearing is axially locked (See motor instructions)
Lubrication	**Before fitting** Lubricate the O-rings with silicone grease or silicone oil (not the sealing surfaces)	**Before fitting** Silicone grease or silicone oil	**None** The bearings are permanently lubricated

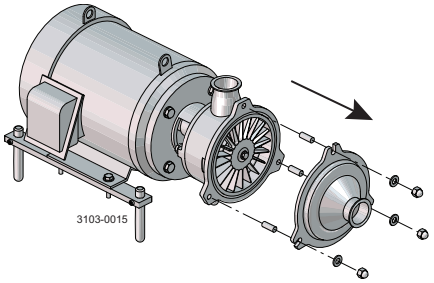
Study the instructions carefully.
The items refer to the parts list and service kits section.
Handle scrap correctly.

4.2 Dismantling of pump MR-166US

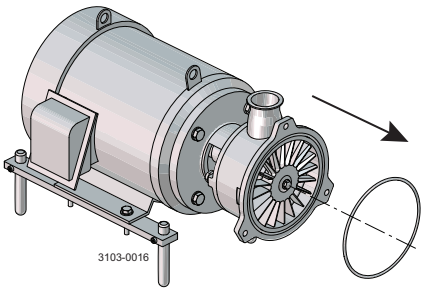
Step 1
Remove covers (2a)



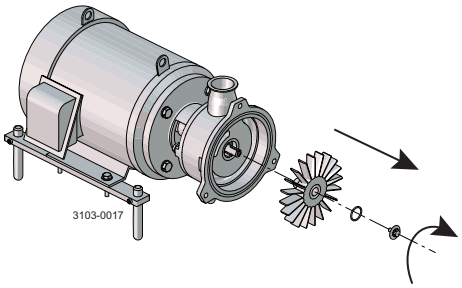
Step 2
Remove cap nuts (14), washers (15a) and casing cover (10).



Step 3
Remove O-ring (8) from pump casing (9).



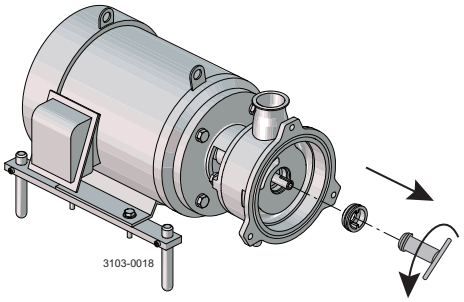
Step 4
1. Remove impeller nut **clockwise** (13), (counterhold stub shaft (3)).
2. Remove impeller (11) from the stub shaft.



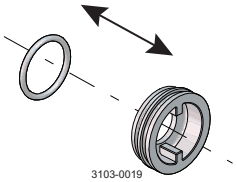
4 Maintenance

Study the instructions carefully.
The items refer to the parts list and service kits section.
Handle scrap correctly.

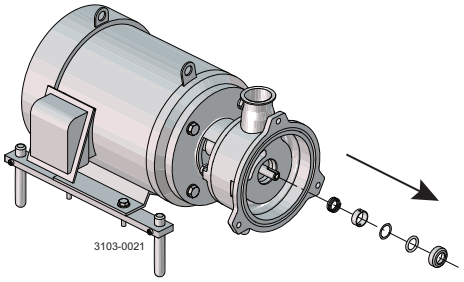
Step 5
Turn stationary seal ring (29) **counterclockwise** and remove it from pump casing (9) (use the tool supplied).



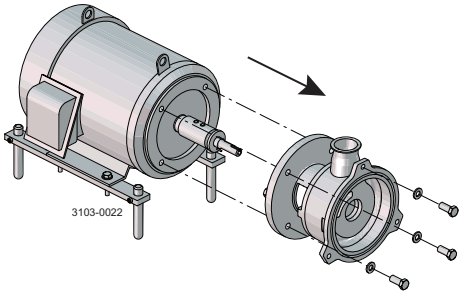
Step 6
Remove O-ring (30) from stationary seal ring (29).



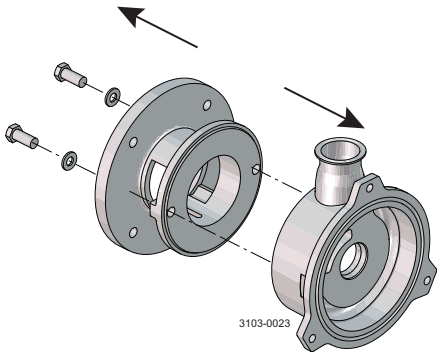
Step 7
Remove rotating seal ring (28), O-ring (27), washer (26), spacer ring (25) and spring (24) from stub shaft (3).
NOTE!
If necessary, place a screwdriver through the hole in pump casing (9) and push the seal parts out.



Step 8
1. Remove screws (45) and washers (46).
2. Remove bracket (2) together with pump casing (9).

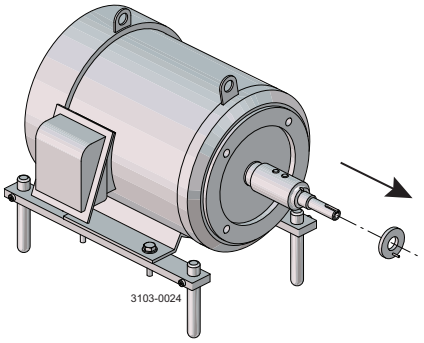


Step 9
1. Remove screws (40).
2. Remove pump casing (9) from bracket (2).

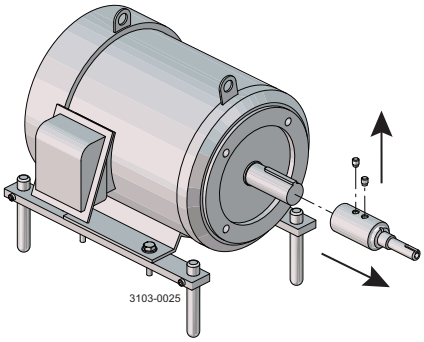


Study the instructions carefully.
The items refer to the parts list and service kits section.
Handle scrap correctly.

Step 10
Remove thrower (21) from stub shaft (3).



Step 11
1. Loosen screws (4)
2. Remove stub shaft (3).

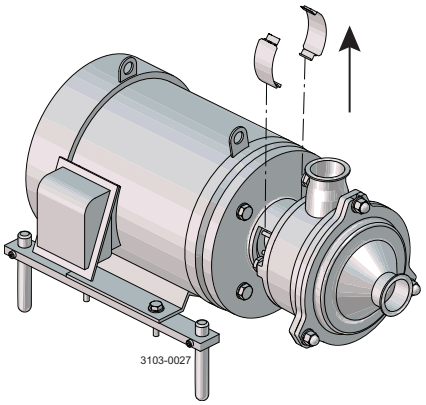


4 Maintenance

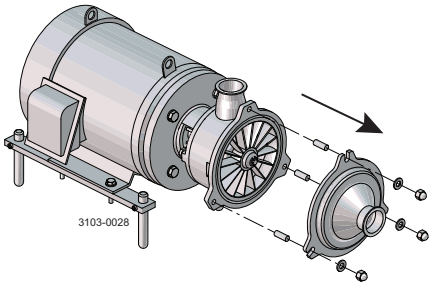
Study the instructions carefully.
The items refer to the parts list and service kits section.
Handle scrap correctly.

4.3 Dismantling of pump MR-185US and MR-200US

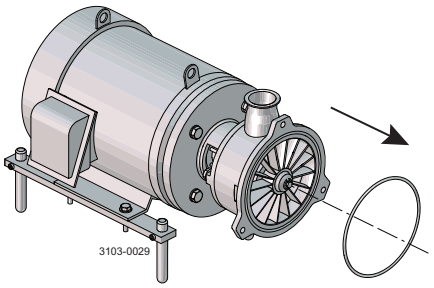
Step 1
Remove covers (2a).



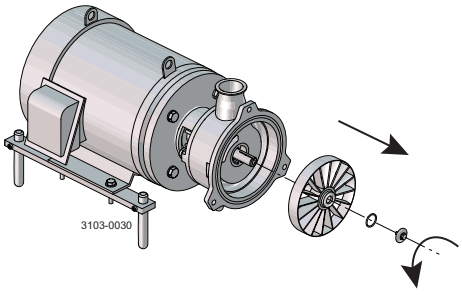
Step 2
Remove cap nuts (14), washers (15a) and casing cover (10).



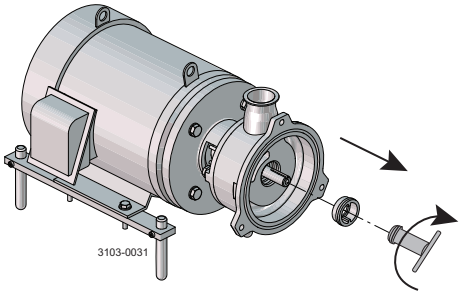
Step 3
Remove O-ring (8) from pump casing (9).



Step 4
1. Remove impeller nut (13) **counterclockwise**, (counterhold stub shaft (3)).
2. Remove impeller (11) from the stub shaft.

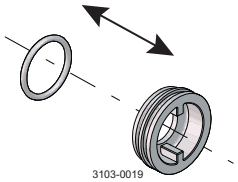


Step 5
Turn stationary seal ring (28) **clockwise** and remove it from pump casing (9) (use the tool supplied).



Study the instructions carefully.
The items refer to the parts list and service kits section.
Handle scrap correctly.

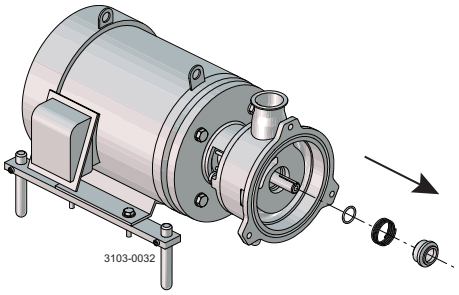
Step 6
Remove O-ring (29) from stationary seal ring (28).



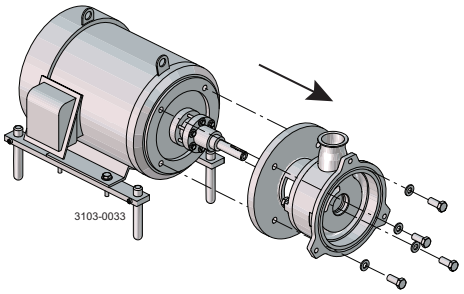
Step 7
Remove rotating seal ring (27), spring (25) and O-ring (26) from stub shaft (3).

NOTE!

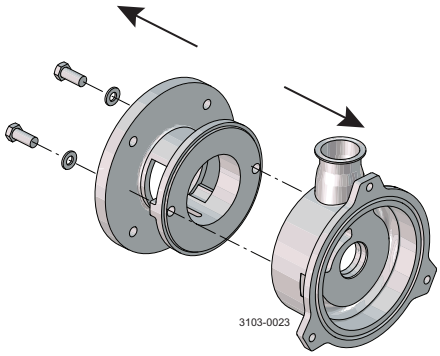
If necessary, place a screwdriver through the hole in pump casing (9) and push the seal parts out.



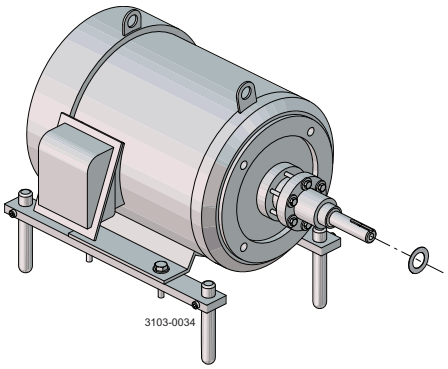
Step 8
1. Remove screws (6) and washers (7).
2. Remove adaptor (2) together with pump casing (9).



Step 9
1. Remove screws (16) and washers (17).
2. Remove pump casing (9) from adaptor (2).



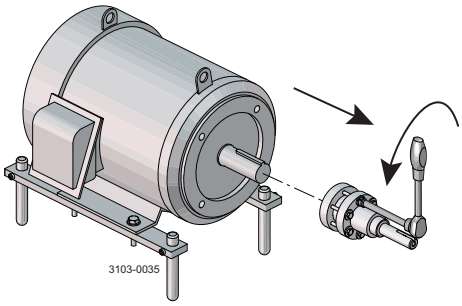
Step 10
Remove thrower (24) from stub shaft (3).



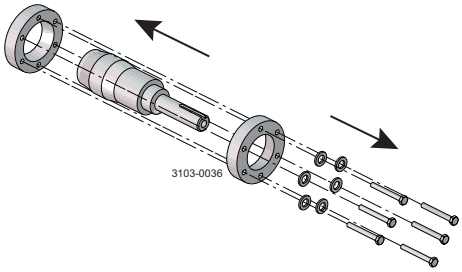
4 Maintenance

Study the instructions carefully.
The items refer to the parts list and service kits section.
Handle scrap correctly.

Step 11
1. Loosen screws (5).
2. Remove stub shaft (3) together with compression rings (4a+b).



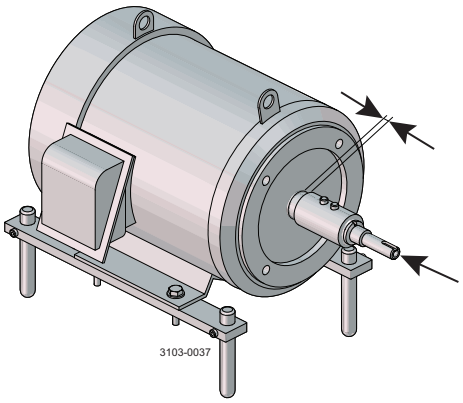
Step 12
Remove screws (5), washer (5a) and compression rings (4a+b) from stub shaft (3).



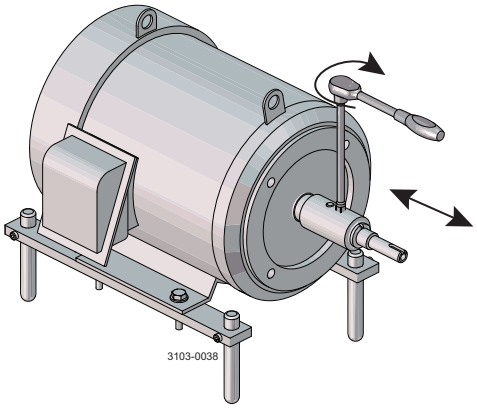
Study the instructions carefully. The items refer to the parts list and service kits section. Lubricate the rubber seals before fitting them.

4.4 Assembly of pump MR-166US

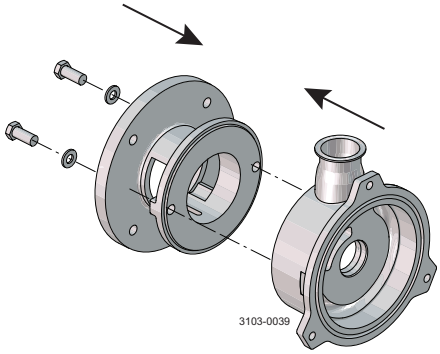
Step 1
1. Fit stub shaft (3) on the motor shaft.
2. Check the clearance between the end of the stub shaft and the motor flange 0.39-0.78 inch.



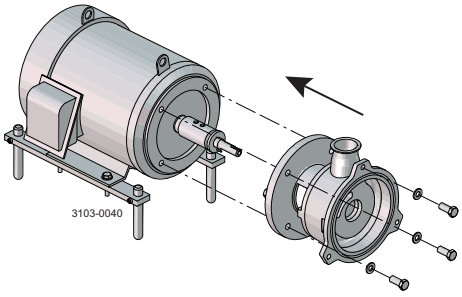
Step 2
1. Tighten screws (4) lightly and evenly.
2. Ensure the screws goes into the keyway of the motor shaft.
3. Ensure that the stub shaft (3) can be moved on the motor shaft.



Step 3
1. Fit pump casing (9) on bracket (2).
2. Fit washers (41) and screws (40).
3. Tighten the screws.



Step 4
1. Fit bracket (2) on the motor.
2. Fit washers (46) and screws (45).
3. Tighten the screws.

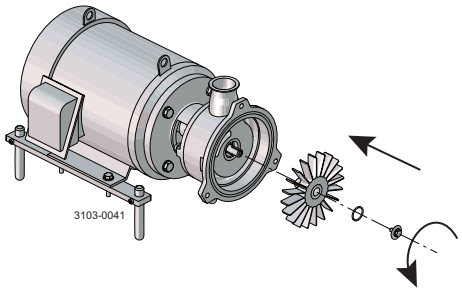


4 Maintenance

Study the instructions carefully. The items refer to the parts list and service kits section. Lubricate the rubber seals before fitting them.

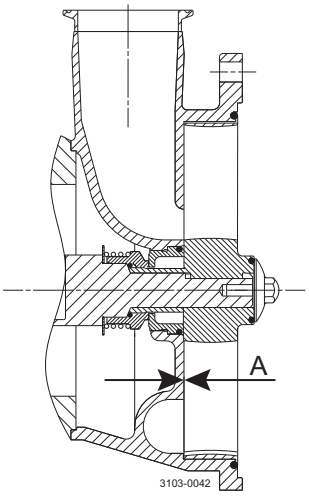
Step 5

1. Fit impeller (11) on stub shaft (3).
2. Fit impeller nut **counterclockwise** (13) on the shaft and tighten lightly.



Step 6

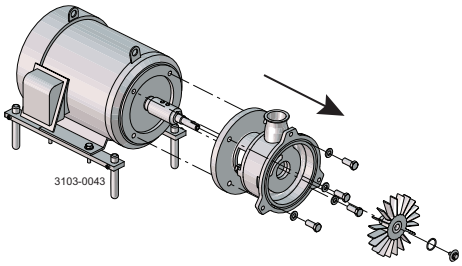
Ensure that the clearance between impeller (11) and pump casing (9) is 0.0078-0.012 inch. (tap gently with a plastic hammer).



A = 0.0078-0.012 inch.

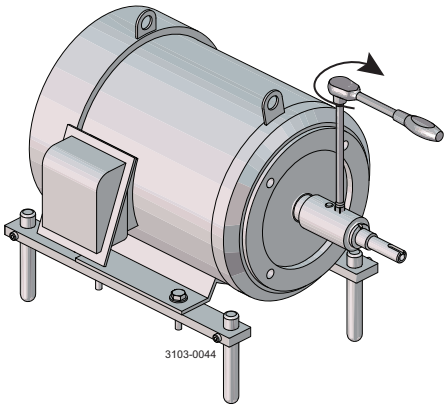
Step 7

Remove impeller (11), pump casing (9) and bracket (2) without moving stub shaft (3) on the motor shaft.



Step 8

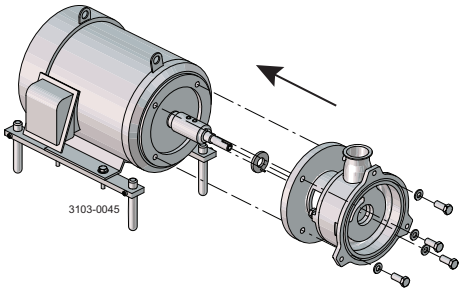
Torque tighten screws (4) evenly to 11.05 lbf-ft.



Study the instructions carefully. The items refer to the parts list and service kits section. Lubricate the rubber seals before fitting them.

Step 9

1. Fit thrower (21) on stub shaft (3).
2. Fit bracket (2) together with pump casing (9) on the motor.
3. Fit washers (46) and screws (45).

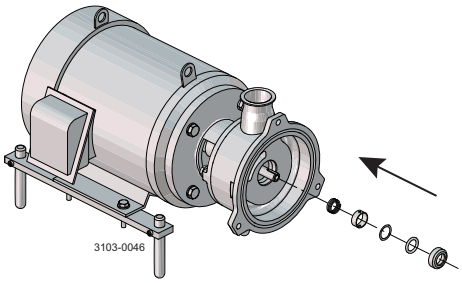


Step 10

CAUTION!

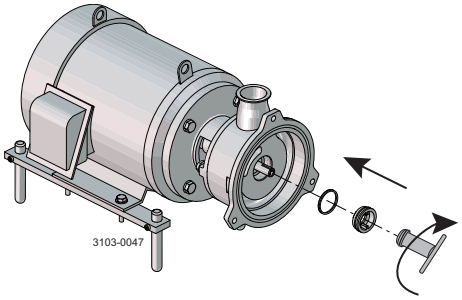
Ensure that the notch in the seal ring is opposite the driving pin on thrower (21).

1. Fit spring (24), spacer ring (25) and washer (26) on the stub shaft.
2. Lubricate O-ring (27) and fit it on the stub shaft.
3. Fit rotating seal ring (28) on the stub shaft.



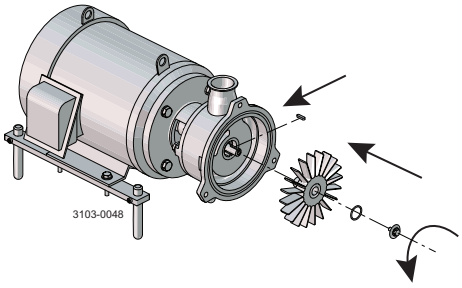
Step 11

1. Fit O-ring (30) on stationary seal ring (29).
2. Fit the seal ring in pump casing (9), turn it **clockwise** and tighten (use the tool supplied).



Step 12

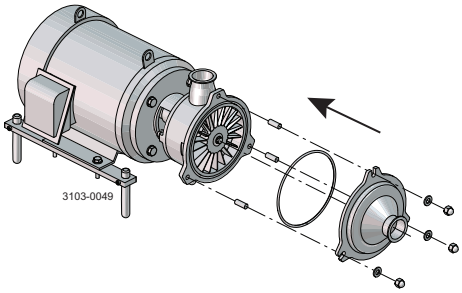
1. Place key (12) in the groove of stub shaft (13).
2. Fit impeller (11) on the shaft.
3. Fit and tighten impeller nut (13) **counterclockwise** on the shaft.
4. Check that the clearance between the impeller and the pump casing (9) is 0.0078-0.012 inch. (adjust if necessary).



Step 13

1. Fit O-ring (8) in pump casing (9).
2. Fit casing cover (10).
3. Fit washers (15a) and cap nuts (14).
4. Tighten the cap nuts firmly.
5. Ensure that impeller (11) rotates smoothly (see section 1.2).

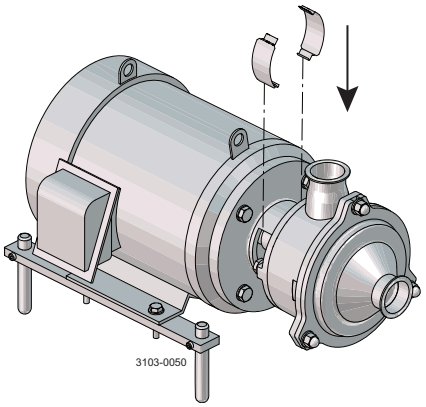
Note! Pay special attention to warnings.



4 Maintenance

Study the instructions carefully. The items refer to the parts list and service kits section. Lubricate the rubber seals before fitting them.

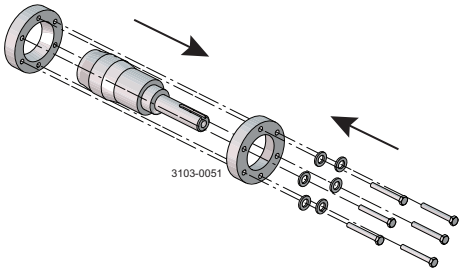
Step 14
Fit covers (2a)



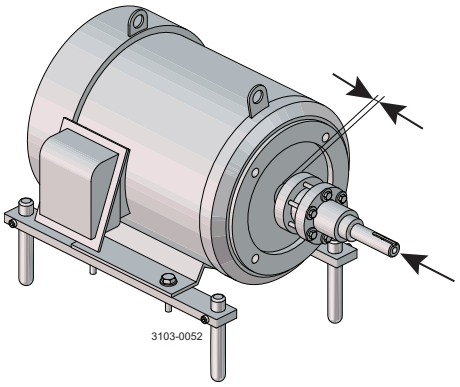
Study the instructions carefully. The items refer to the parts list and service kits section. Lubricate the rubber seals before fitting them.

4.5 Assembly of pump MR-185US and MR-200US

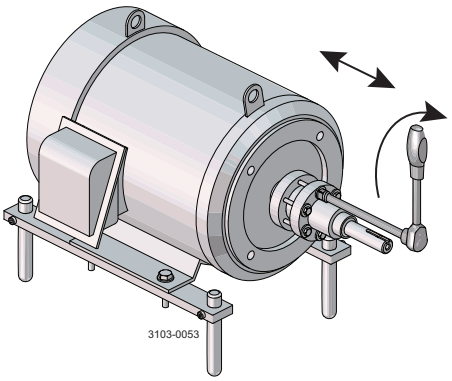
Step 1
Fit compression rings (4a+b), screws (5) and washer (5a) correctly on stub shaft (3).



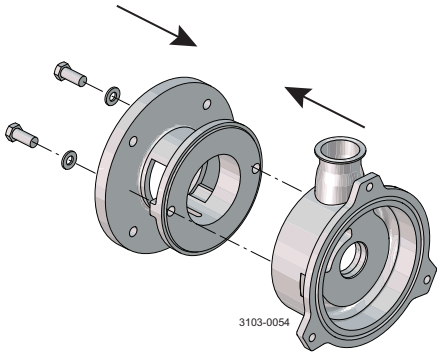
Step 2
1. Fit stub shaft (3) on the motor shaft.
2. Check the clearance between the end of the stub shaft and the motor flange 0.39-0.78 inch.



Step 3
1. Tighten screws (5) lightly and evenly.
2. Ensure that stub shaft (3) can be moved on the motor shaft.



Step 4
1. Fit pump casing (9) on adaptor (2).
2. Fit washers (17) and screws (16).
3. Tighten the screws.

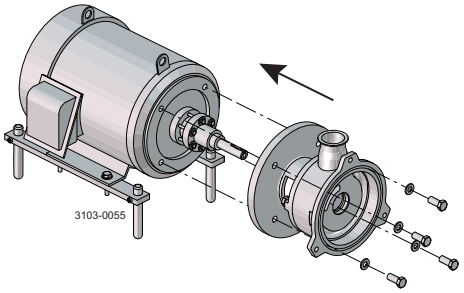


4 Maintenance

Study the instructions carefully. The items refer to the parts list and service kits section. Lubricate the rubber seals before fitting them.

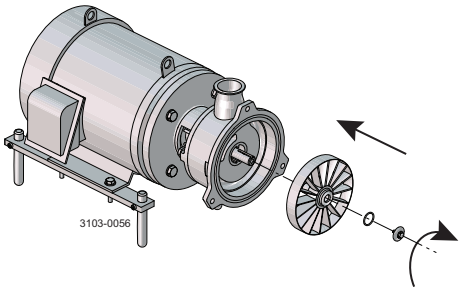
Step 5

1. Fit adaptor (2) on the motor.
2. Fit washers (7) and screws (6).
3. Tighten the screws.



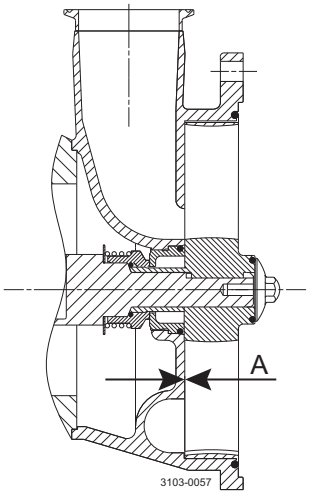
Step 6

1. Fit impeller (11) on stub shaft (3).
2. Fit impeller nut (13) **clockwise** on the shaft and tighten lightly.



Step 7

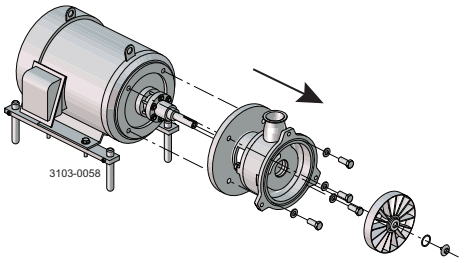
Ensure that the clearance between impeller (11) and pump casing (9) is 0.0056-0.0078 inch. (tap gently with a plastic hammer).



A = 0.0056-0.0078 inch.

Step 8

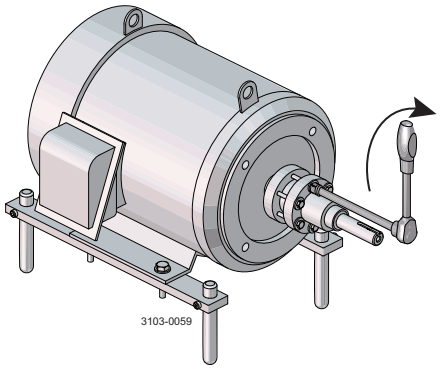
Remove impeller (13), pump casing (11) and adaptor (2) without moving stub shaft (3) on the motor shaft.



Study the instructions carefully. The items refer to the parts list and service kits section. Lubricate the rubber seals before fitting them.

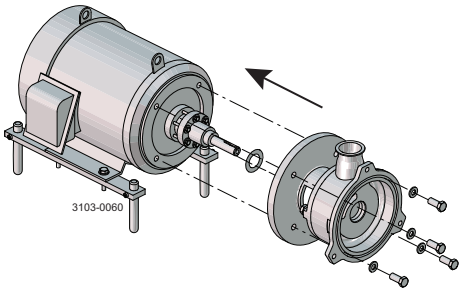
Step 9

Torque tighten screws (5) evenly to 11.05 lbf-ft (counterhold stub shaft (3)).



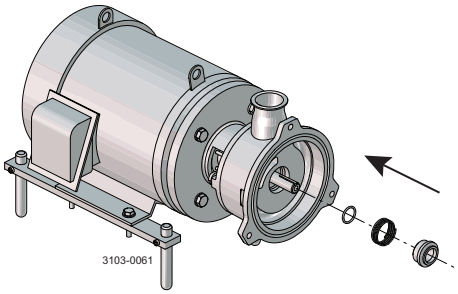
Step 10

1. Fit thrower (24) on stub shaft (3).
2. Fit adaptor (2) together with pump casing (9) on the motor.
3. Fit washers (7) and screws (6).



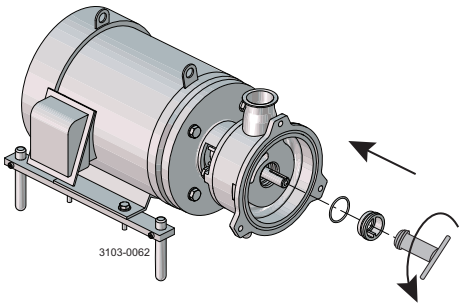
Step 11

1. Lubricate O-ring (26) and push it on stub shaft (3) and position it correctly.
2. Place spring (25) on rotating seal ring (27).
3. Push the seal ring over the O-ring as far as possible against the shoulder.



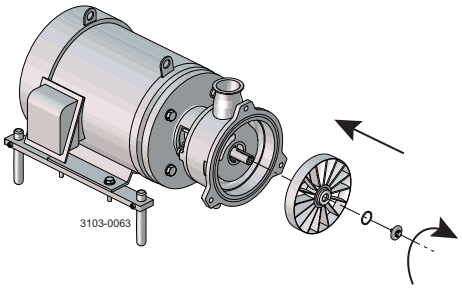
Step 12

1. Fit O-ring (29) on stationary seal ring (28).
2. Fit the seal ring in pump casing (9), turn **counterclockwise** and tighten (use the tool supplied).



Step 13

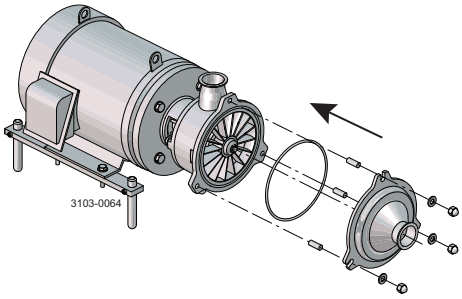
1. Fit impeller (11) and impeller nut (13) on the shaft.
2. Tighten the nut **clockwise**.



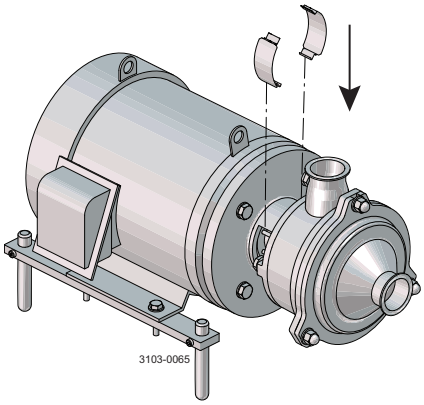
4 Maintenance

Study the instructions carefully. The items refer to the parts list and service kits section. Lubricate the rubber seals before fitting them.

Step 14
1. Fit O-ring (8) in pump casing (9).
2. Fit casing cover (10).
3. Fit washers (15a) and cap nuts (14).



Step 15
Fit covers (2a).



4.6 Cleaning Procedure

Cleaning Procedure for Soiled Impeller Screw Tapped Hole:

1. Remove stub shaft (3) per section 5 of Service manual.
2. Submerge and soak Stub Shaft for 5 minutes in COP tank with 2% caustic wash
3. Scrub the blind tapped impeller screw hole vigorously by plunging a clean 1/2” diameter sanitary bristle pipe brush in and out of the hole for two minutes while submerged.
4. Soak Stub Shaft (3) in acid sanitizer for 5 minutes, then scrub blind tapped hole as described in step 3 above.
5. Rinse well with clean water and blow-dry blind tapped hole with clean air.
6. Swab test the inside of the tapped hole to determine cleanliness.
7. Should the swab test fail, repeat steps 2 thru 6 above until swab test is passed.

Should swab testing continue to fail, or time is of the essence, install a new (spare) Stub Shaft (3).

It is important to observe the technical data during installation, operation and maintenance.
Inform the personnel about the technical data.

5.1 Technical data

Data	
Max. inlet pressure	58 psi
Temperature range	14°F to +284°F (EPDM)
Materials	
Product wetted steel parts	AISI 316L
Other steel parts	Stainless steel
Adaptor	Cast iron, zinc sprayed and coated with two-component laquer
Product wetted seals	EPDM (standard)
Alternative seals	Nitrile (NBR) and flourinated rubber (FPM)
Finish	Standard blasted
Shaft seal	
Seal type	Mechanical single seal
Material, stationary seal ring	Acid resistant steel, duplex grade (standard) or acid resistant steel, duplex grade with sealing surface of silicon carbide*
Material, rotating seal ring	Carbon (standard) or silicon carbide*
Material, O-rings	EPDM (standard)
Alternative material, O-rings	Nitrile (NBR) and flourinated rubber (FPM)
Motor	
Standard foot-flanged motor according to Nema standard 4 pol = 1800 rpm. at 60 Hz IP55 (with drain holes with labyrinth plug), insulation class F	
Voltage and frequency	3~, 60 Hz; 270/460 V
NEMA motors (Hp)	
Motor sizes, 60 Hz	3 (MR-166US)
Motor sizes, 60 Hz	7.5 (MR-185US)
Motor sizes, 60 Hz	15 (MR-200US)
* Only MR-185US and MR-200US.	

5 Technical data

It is important to observe the technical data during installation, operation and maintenance.
Inform the personnel about the technical data.

5.2 Torque Specifications

Below table specifies the tightening torques for the screws, bolts and nuts in this pump.
Always use below torques if no other values are stated. This can be a matter of personal safety.

Size	Tightening torque	
	Nm	lbf-ft
M8	20	14.8
M10	40	29.5
M12	67	49.0
M14	110	81.0

It is important to observe the technical data during installation, operation and maintenance.
Inform the personnel about the technical data.

5.3 Noise emission

Pump Type	Sound pressure level (dBA)
LKH-5	60
LKH-10	69
LKH-15	72
LKH-20	70
LKH-25	74
LKH-35	71
LKH-40	75
LKH-45	70
LKH-50	75
LKH-60	77
LKH-70	88
LKH-75	79
LKH-85	86
LKH-90	75
LKH-112	70
LKH-113	69
LKH-114	68
LKH-122	75
LKH-123	77
LKH-124	80
SolidC-1	68
SolidC-2	72
SolidC-3	73
SolidC-4	72
MR-166	76
MR-185	82
MR-200	81
MR-300	82
GM	54
FM-OS	61

The above LKH noise levels are the same for LKHPF, LKHI, LKH UltraPure, LKH Evap, LKHex.
The above SolidC noise levels are the same for SolidC UltraPure.

The noise measurements have been carried out with original motor and shroud, approximately at the Best Efficiency Point (BEP) with water at ambient temperature and at 50 Hz.

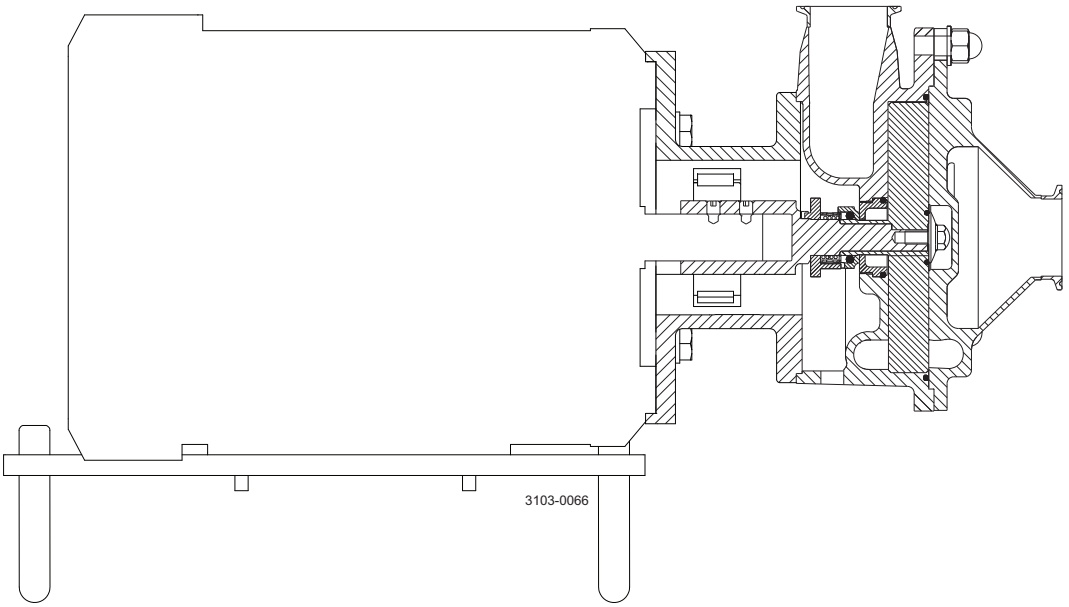
Very often the noise level generated by the flow through the process system (e.g. valves, pipes, tanks etc.) is much higher than what is generated by the pump itself. Therefore it is important to consider the noise level from the total system and take the necessary percussions with regards to personal safety if required.

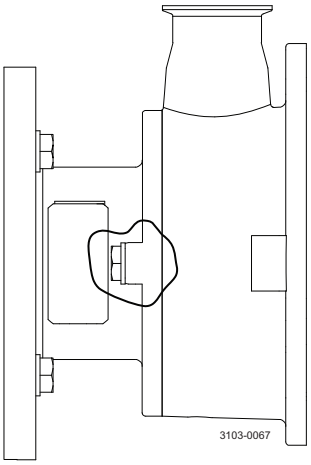
6 Parts list and service kits

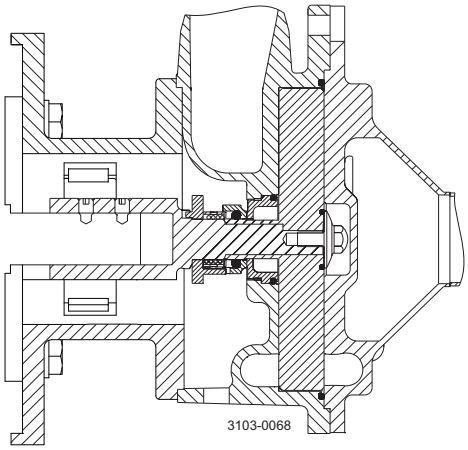
The drawings show MR-166US, -185US, -200US and include all items.

6.1 Drawings MR-166US

For further information see parts list section 6.3



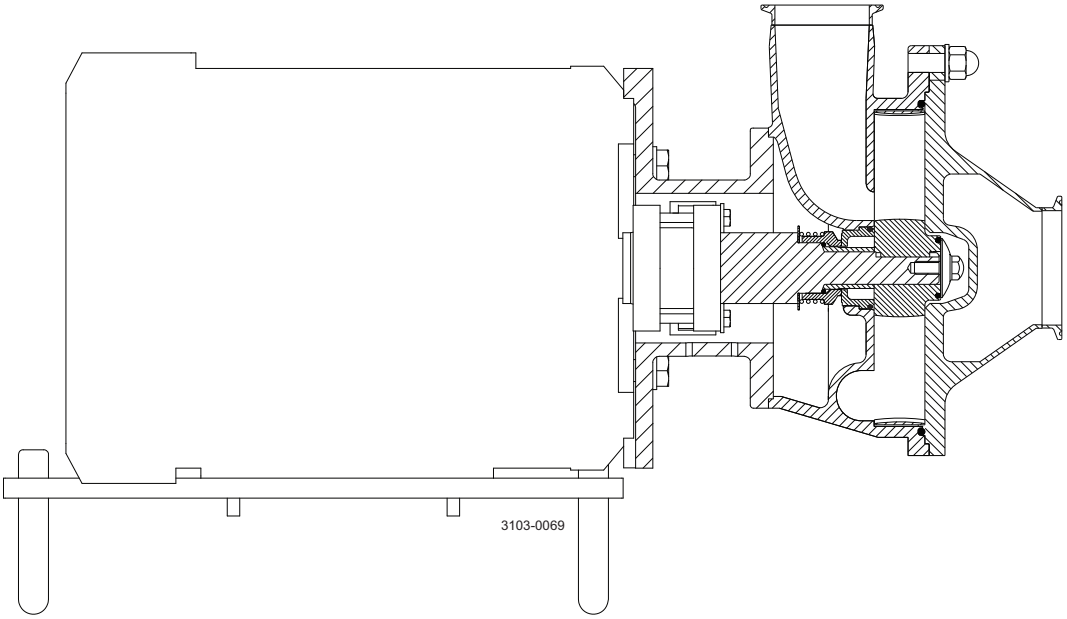


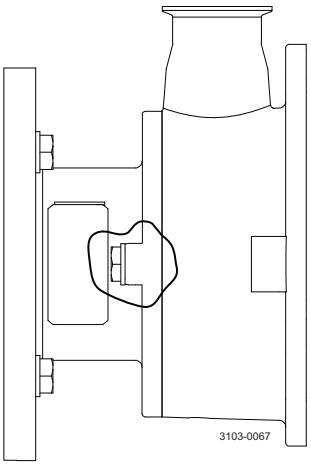


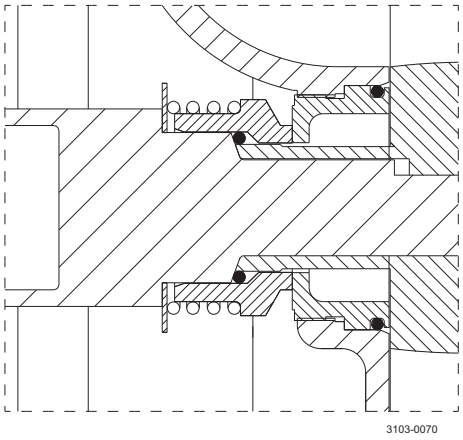
The drawings show MR-166US, -185US, -200US and include all items.

6.2 Drawings MR-185US, -200US

For further information see parts list section 6.4



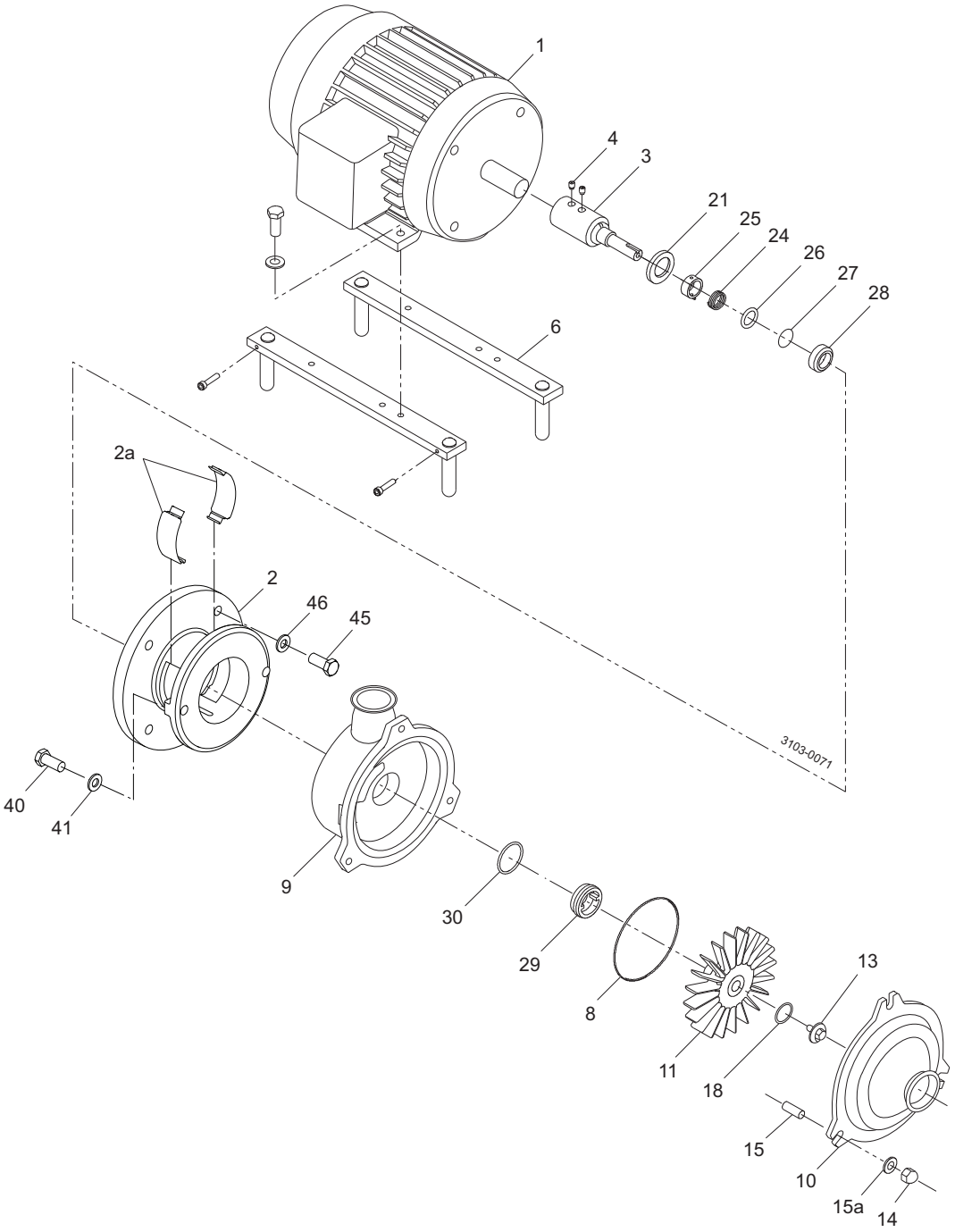




6 Parts list and service kits

The drawings show MR-166US and include all items.

6.3 MR-166US



6 Parts list and service kits

The drawings show MR-166US and include all items.

Parts list

Pos.		Qty	Denomination
1		1	Motor 3 Hp
2		1	Bracket
2a		2	Bracket cover
3		1	Shaft
4		2	Screw
6		1	Bracket set stainless steel
8	▲	1	O-ring
9		1	Pump casing
10		1	Casing cover
11		1	Impeller
13		1	Impeller screw
14		3	Cap nut
15		3	Stud bolt
15a		3	Washer
18	▲	1	O-ring for impellerscrew
21		1	Thrower
24		1	Spring
25		1	Spacer ring
26		1	Washer
27		1	O-ring
28		1	Rotating seal ring
29		1	Stationary seal ring
30		1	O-ring
40		2	Screw
41		2	Spring washer
45		4	Screw
46		4	Washer

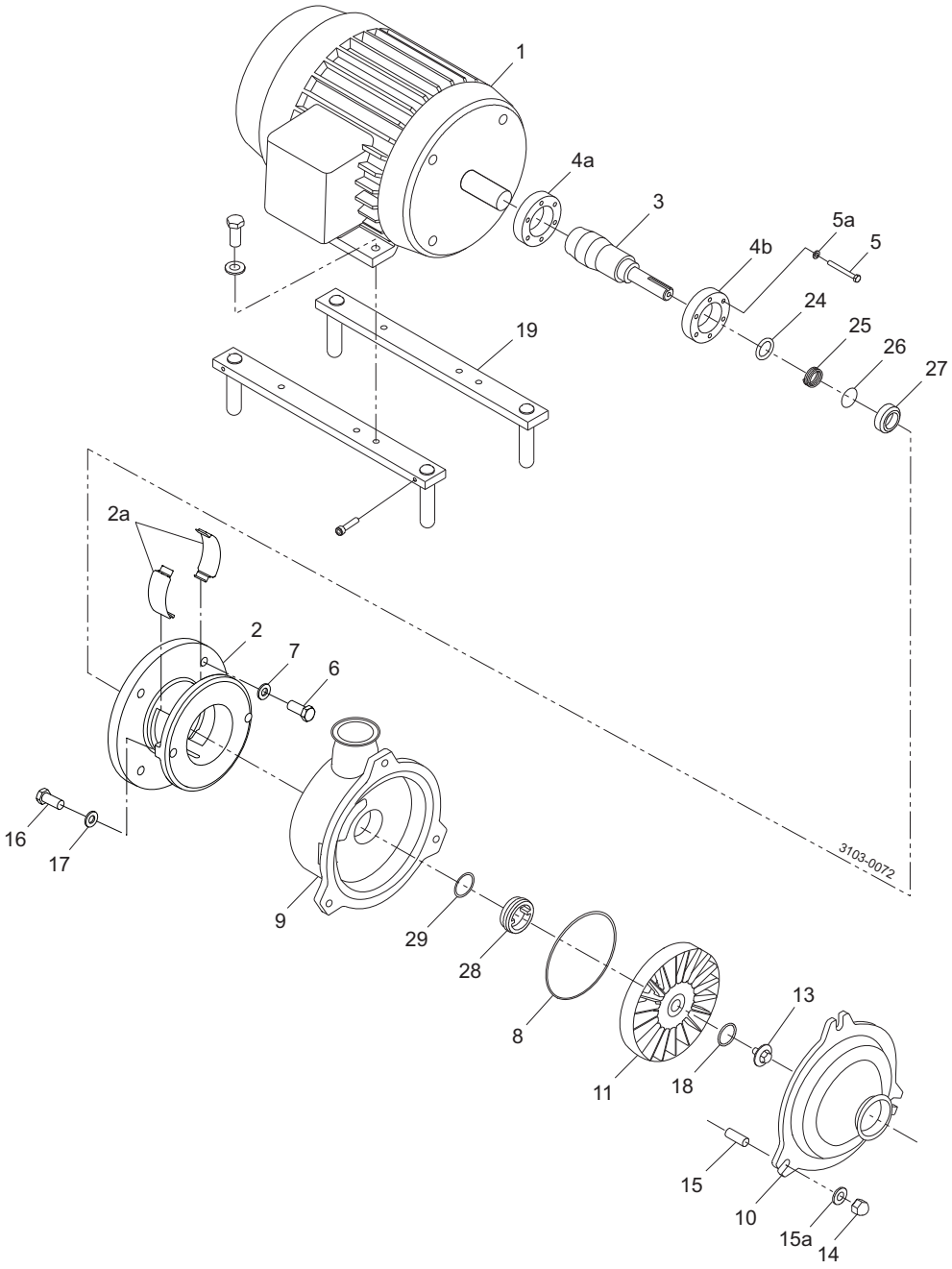
Service kits

Denomination	C/SS
Service kit, EPDM	9611-92-1946
Service kit, NBR	9611-92-1947
Service kit, FPM	9611-92-1948

6 Parts list and service kits

The drawings show MR-185US, -200US and include all items.

6.4 MR-185US, -200US



The drawings show MR-185US, -200US and include all items.

Parts list

Pos.		Qty	Denomination
		1	Spanner for stationary seal ring
	▲		Shaft seal
1		1	Motor
2		1	Bracket
2a		2	Bracket cover
3		1	Shaft
4a		1	Compression ring
4b		1	Compression ring
5		6	Screw
5a		6	Washer
6		4	Screw
7		4	Washer
8	▲⊙	1	O-ring
9		1	Pump casing
10		1	Casing cover
11		1	Impeller
13		1	Impeller screw
14		3	Cap nut
15		3	Stud bolt
15a		3	Washer
16		2	Screw
17		2	Washer
18	▲⊙	1	O-ring for impellerscrew
19		1	Bracket set
24		1	Thrower
25		1	Spring
26		1	O-ring
27		1	Rotating seal ring
28		1	Stationary seal ring
29		1	O-ring

Service kits

Denomination	C/SS	SIC/SIC
Service kit, EPDM.....	9611-92-1949	9611-92-1952
Service kit, NBR	9611-92-1950	9611-92-1953
Service kit, FPM.....	9611-92-1951	9611-92-1954

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