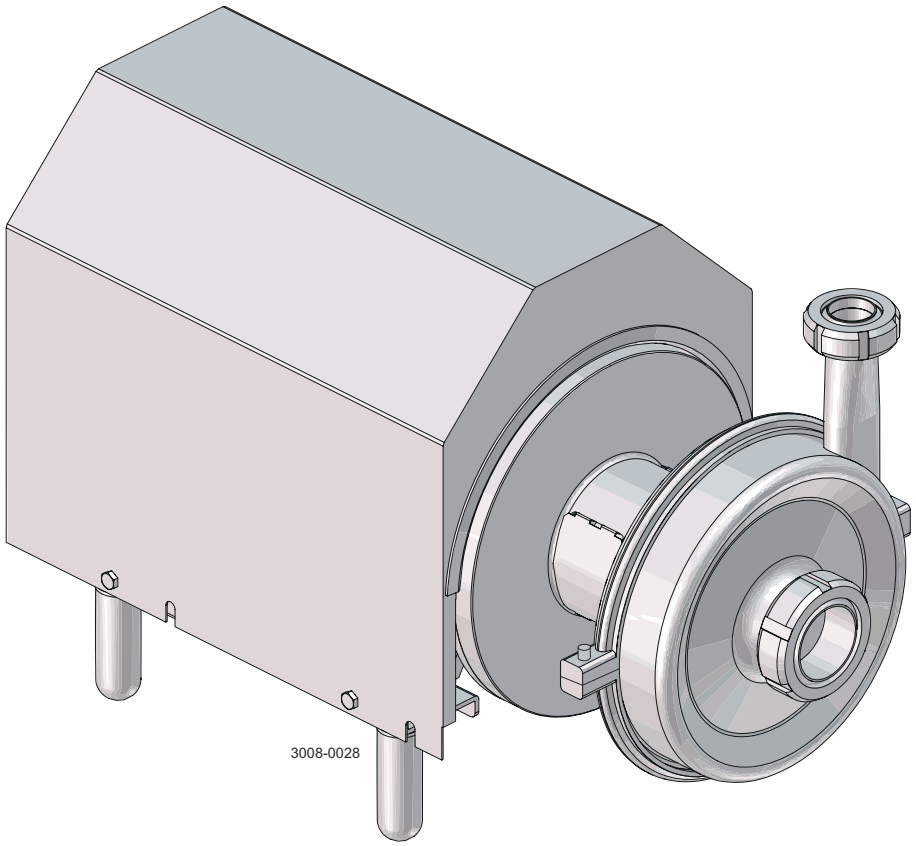
Alfa Laval SolidC

Centrifugal pumps



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Instruction Manual

BRITISH ENGLISH

Published by
Alfa Laval Kolding A/S
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The original instructions are in English

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1 Declaration of Conformity

1.1 EU Declaration of Conformity

The designated company

Alfa Laval Kolding A/S, Albuen 31, DK-6000 Kolding, Denmark, +45 79 32 22 00

Company name, address and phone number

Hereby declare that

Pump

Designation

SolidC-1, SolidC-2, SolidC-3, SolidC-4

Type

Serial number from 10.000 to 1.000.000

is in conformity with the following directives with amendments:

- Machinery Directive 2006/42/EC
- RoHS Directive 2011/65/EU and amendments

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

Vice President BU Hygienic Fluid Handling Head of Product Management	Mikkel Nordkvist
Title	Name
Kolding, Denmark	2024-04-01
Place	Date (YYYY-MM-DD)

Signature

DoC Revison_ 01_042024 / This Declaration of Conformity replaces Declaration of Conformity dated 2022-10-01

1.2 UK Declaration of Conformity

The designated company

Alfa Laval Kolding A/S, Albuen 31, DK-6000 Kolding, Denmark, +45 79 32 22 00

Company name, address and phone number

Hereby declare that

Pump

Designation

SolidC-1, SolidC-2, SolidC-3, SolidC-4

Type

Serial number from 10.000 to 1.000.000

is in conformity with the following directives with amendments:

- The Supply of Machinery (Safety) Regulations 2008
- The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

Signed on behalf of: Alfa Laval Kolding A/S.

Vice President BU Hygienic Fluid Handling Head of Product Management		Mikkel Nordkvist
Title		Name
Kolding, Denmark	2024-04-01	
Place	Date (YYYY-MM-DD)	Signature

DoC Revison_ 02_042024

2 Safety

Read this first

This Instruction Manual is designed for operators and service engineers working with the supplied Alfa Laval product.

Operators must read and understand the ***"Safety, Installation and Operating Instructions"*** of the supplied Alfa Laval product before carrying out any work or before you put the supplied Alfa Laval product into service!

Not following the instructions can result in serious accidents.

This documentation describes the authorized way to use the supplied Alfa Laval product. Alfa Laval will take no responsibility for injury or damage if the equipment is used in any other way.

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

The operator shall always read the ***"Safety"*** chapter first. Hereafter the operator can skip to the relevant section for the task to be carried out or for the information needed.

Always read the ***"Technical Data"*** thoroughly.

This is the complete Instruction Manual for the supplied Alfa Laval product.

NOTE

The illustrations and specifications in this Instruction Manual were effective at the date of printing. However, as continuous improvements are our policy, we reserve the right to alter or modify the Instruction Manual without prior notice or any obligation.

The English version of the Instruction Manual is the original manual. Alfa Laval cannot be held responsible for incorrect translations. In case of doubt, the English version applies.

2.1 Safety Signs

Mandatory Action Signs

	General mandatory action sign.
	Refer to instruction manual.
	Use eye protection - safety glasses.
	Use protective hand wear - safety gloves.
	Wear protective equipment - safety helmet.
	Use ear protection in noisy environments - noise protector.
	Wear protective equipment - safety shoes.

Warning Signs

	General warning.
	Corrosive substance.
	Hot surface and burning danger.
	Cutting danger.
	Heavy object lifting.

	Transportation with forklift truck or other industrial vehicles if heavy.
	Electricity.
	Sharp element.

2.2 Safety precautions

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 Supplied Alfa Laval Product is avoided.

General

To prevent unexpected start and contact with electrical live and moving parts.

Always disconnect the power supply safely:

- The power supply disconnecting device must be disconnected (in off position) and locked.
- In case the pump is capable of being plugged into an electrical supply, removal of the plug is sufficient, provided that the operator can check from any of the points to which he has access that the plug remains removed.

Transportation and Lifting

Never lift or elevate in any way other than described in this manual.

Always use the original packaging or similar during transportation.

Always use suitable transport device ie. forklift or pallet lifter.

Always ensure that personnel must have experience with lifting operations.

Always transport the pump in its upright position.

Always ensure that no leakage of lubricants can occur.

Always drain the pump head and accessories of any liquid.

Always ensure that compressed air is released.

Always use predesigned lifting points if defined. Ensure that the lifting equipment is suitable for the supplied Alfa Laval product.

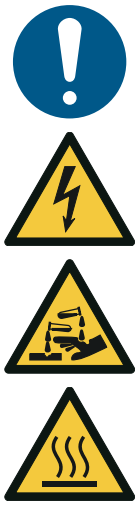
Always ensure that the unit is securely fixed during transportation.

Always ensure the lifting point to be in line with center of gravity. Adjust lifting point if necessary.

Always use appropriate lifting equipment for heavy parts when relevant. Use lifting logs when available.

Always keep an eye on the load and stay clear during the lifting operation.

Installation



If the local safety regulations prescribe that the installation has to be inspected and approved by responsible authorities before the supplied Alfa Laval product is put into service, consult with such authorities before installing the equipment and have the projected installation approved by them.

Always read the ***"Technical Data"*** thoroughly.

Always use a lifting crane when handling the pump.

Always ensure all pipe lines (product, air, and water) are depressurized and emptied before installation, inspection, assembling and disassembling.

Always have the pump electrically connected by authorised personnel. (See the motor instruction)

Never start in the wrong direction of rotation with liquid in the pump.

Operation

Always read the ***"Technical Data"*** thoroughly.

Always follow the instructions in the safety data sheets from the suppliers of cleaning agents, detergents, oils etc.

Never run the pump when partially installed or not completely assembled

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

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

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 the Alfa Laval pump selection program.

The Alfa Laval pump selection program can be acquired from your local Alfa Laval sales company.

Maintenance

In order to optimise the operation of the supplied Alfa Laval product and to minimize the down time due repair activities, the maintenance should consist of:

- Inspection and maintenance of the supplied Alfa Laval product: strictly follow the technical documentation
- **Preventive maintenance:** visual inspection of the supplied Alfa Laval product followed by necessary adjustments and planned periodic replacement of wear and tear parts
- **Repairs:** unscheduled break-down of a component, often causing the system to stop. Damaged components shall be replaced or repaired
- **Stock of Alfa Laval genuine spare parts:** Alfa Laval recommend keeping a stock of genuine spare parts facilitating preventive maintenance and reducing down time in case of unplanned break-downs

Always read the ***"Technical Data"*** thoroughly.

Never service the pump when it is hot.

Never service the pump if pressurised.

Always disconnect the power supply when servicing the pump.

Always use Alfa Laval genuine spare parts.

Motors with grease nipples:

Always lubricate according to motor manufactures recommended procedures.

Always locate and remove grease vent plugs, if provided, prior to adding grease.

Always check motor nameplate for grease type and lubrication intervals.

Storage

Alfa Laval recommend:

- Store the supplied Alfa Laval product as supplied in original packaging
- Port opening(s) should be protected against any ingress
- Bare steel (not stainless) should be lightly oiled/greased
- Store in a clean, dry place without direct sunlight or UV light
- Temperature range -5 °C to 40 °C (23 °F - 104 °F)
- Relative humidity less than 60%
- No exposure to corrosive substances (including contained air)

Noise

Under certain operating conditions pumps and/or drives and/or the systems within which they are installed can produce sound pressure levels in excess of 80dB[A]. When necessary, protection against noise should be taken.

Hazards

Burn Hazard

- Lubrication oil, machine parts and various machine surfaces can be hot and cause burns. Wear protective gloves

Corrosive Hazard

- **Always** handle cleaning liquids, lye and acid with great care and in accordance with separate instructions for those fluids
- When using chemical cleaning agents and lubricants, make sure you follow the general rules and suppliers recommendation regarding ventilation, personnel protection etc.

Cut Hazard

- Sharp edges, especially on bowl discs and threads, can cause cuts. Wear protective gloves
- Avoid placing hands into valve orifice pinch points

Safety check

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

Inspection acceptance criteria:

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

Procedure in case of non-acceptance:

- Fix and/or replace the protective device

2.3 Warning Signs in Text

Pay attention to the safety instructions in this Instruction Manual.

Below are definitions of the four grades of warning signs used in the text where there is a risk for injury to personnel or damage to the supplied Alfa Laval product.

DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate damage to the supplied Alfa Laval product.

NOTE

Indicates important information to simplify or clarify procedures.

2.4 Requirements of Personnel

Operators

The operators shall read and understand this Instruction Manual.

Maintenance personnel

The maintenance personnel shall read and understand this Instruction Manual. The maintenance personnel or technicians shall be skilled within the field required to carry out the maintenance work safely.

Trainees

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

People in general

The public shall not have access to the supplied Alfa Laval product.

In some cases, specially skilled personnel may need to be hired (i.e. electricians, welders). In some cases the personnel has to be certified according to local regulations with experience of similar types of work.

2.5 Recycling Information

Unpacking

Packing material may consist 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 (if used) and wear parts in the supplied Alfa Laval product should be replaced.

- Oil and all non-metal wear parts must be disposed of in accordance with local regulations
- Rubber and plastics should be burnt at a licensed waste incineration plant. If not available they should be disposed of in accordance with local regulations
- Bearings and other metal parts should be sent to a licensed handler for material recycling
- Seal rings and friction linings should be disposed of to a licensed land fill site. Check your local regulations
- All metal parts should be sent for material recycling
- Worn out or defected electronic parts should be sent to a licensed handler for material recycling

Scrapping

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

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.

3 Introduction

The Alfa Laval SolidC Centrifugal Pump is designed for basic transport of fluids in hygienic applications. It provides reliable, low-maintenance operation. With its hygienic design, cost-effective operation and quick, easy maintenance, the SolidC offers excellent value for money.

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4 Installation

4.1 Unpacking/delivery

NOTE

Always use a lifting crane when handling the pump (See *Technical Data* on page 43).

CAUTION

Alfa Laval cannot be held responsible for incorrect unpacking.

WARNING

Be aware that certain pump configurations can tilt, and therefore cause injuries to feet or fingers.

The pump should be supported underneath the adaptor, when not installed in the process line.

Check the delivery for:

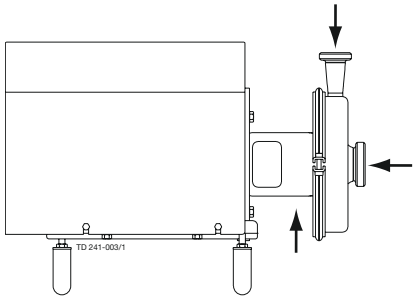
1. Complete pump.
2. Delivery note.
3. Motor instructions.
4. Test certificate, IF ORDERED!

1 Remove any packing materials from the inlet and the outlet.

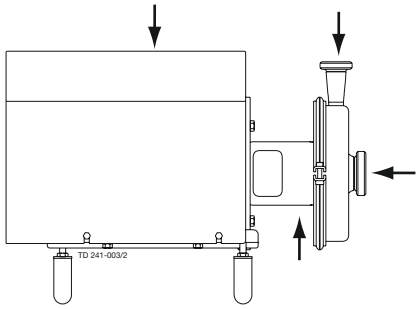
CAUTION

Avoid damaging the inlet and the outlet

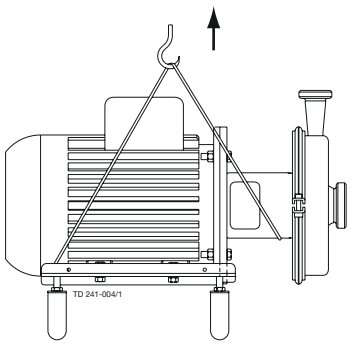
Avoid damaging the connections for flushing liquid, if supplied.



2 Inspect the pump for visible transport damage.



3 Always remove the shroud, if fitted, before lifting the pump.



4.2 Installation

NOTE

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

Always check the pump before operation. See *Pre-use check* on page 23.

Always read the technical data thoroughly. (See *Technical Data* on page 43)

The 3A standard requires minimum clearance between the lowest part of the base, pump, motor or drive and for the floor to be no less than 100mm (4 inch.)

CAUTION

Alfa Laval cannot be held responsible for incorrect installation.

The large pump sizes are very heavy. Alfa Laval therefore recommends the use of a lifting crane when handling the pump.

The pump does not prevent back flow when intentionally or unintentionally stopped. If back flow can cause any hazardous situations, precautions must be taken e.g. check valve to be installed in the system preventing above described.

If the pump has been stored for longer period of time there is a risk that the seal faces may stick together and consequently cause damage to the seal at start-up. Please ensure that the pump shaft can be rotated by hand before start-up.

WARNING

Always have the pump electrically connected by authorised personnel. (see the motor instructions).

Alfa Laval recommend the installation of a lockable repair breaker. If the repair breaker is to be used as an emergency stop, the colors of the repair breaker must be red and yellow.

Alfa Laval recommend the supply disconnecting device shall be in accordance with EN60204-1. Always disconnect the supply disconnecting device safely after installation before continuing the installation.

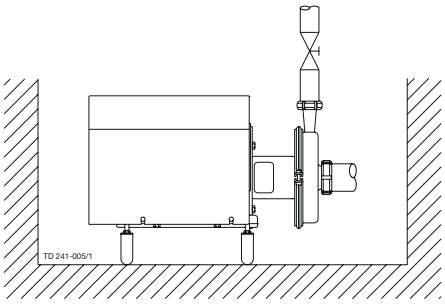
NOTE

In case of shaft seal leakage, the media will drip from the slot in the bottom of the adaptor. In case of shaft seal leakage, Alfa Laval recommends placing a drip tray underneath the slot for collecting the leakage.

1. Ensure that there is sufficient clearance around the pump (min. 0.5 m)(1.64 ft).

NOTE

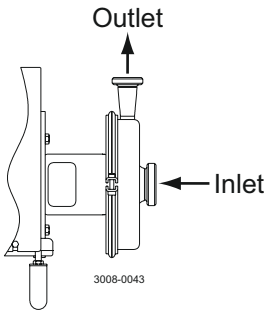
Ensure the floor/frame is able to support the weight of the pump. See *Technical Data* on page 43 and other environment requirements. Ensure the pump is supported by all four feet equally.



NOTE

US pumps have no shroud

2. Check that the flow direction is correct.

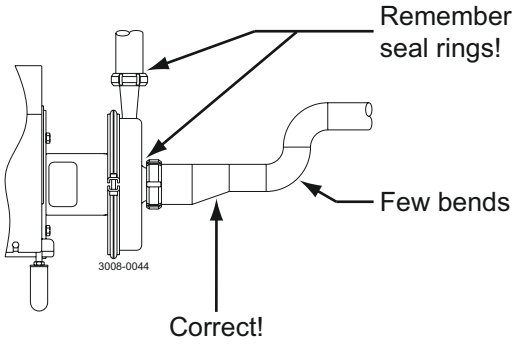


Correct!

3

a) Ensure that the pipelines are routed correctly.

b) Ensure that the connections are tight.

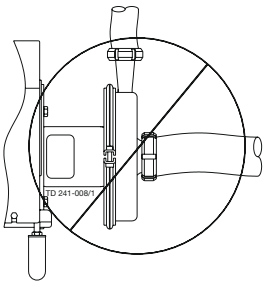


4 Avoid stressing the pump.

Piping system must be self-supported.

Pay special attention to:

- Vibrations
- Thermal expansion of the tubes
- Excessive welding
- Overloading



Avoid bending pipelines

4.3 Pre-use check

NOTE

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

SolidC comes with impeller screw as standard.

Check the direction of rotation of the impeller before operation. - See the indication label on the pump.

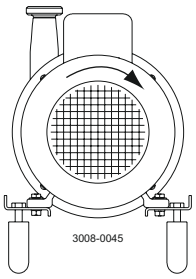
WARNING

Never start in the wrong direction of rotation with liquid in the pump.

1

a) Start and stop the motor momentarily.

b) Ensure that the direction of rotation of the motor fan is clockwise as viewed from the rear end of the motor.



Rear view of motor

See indication label!

Correct

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5 Operation

5.1 Operation/Control

NOTE

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

Always read the technical data thoroughly. (See *Technical Data* on page 43.

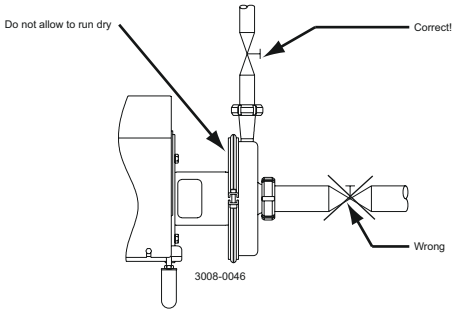
CAUTION

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

CAUTION

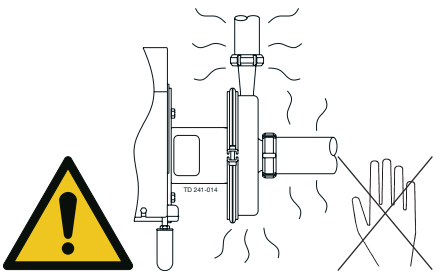
The shaft seal must not run dry.

Never throttle the inlet side.



DANGER **Danger of burns!**

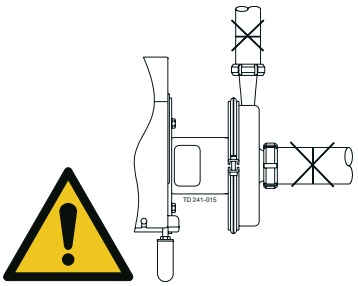
Never touch the pump or the pipelines when pumping hot liquids or when sterilising.



DANGER **Danger of explosion!**

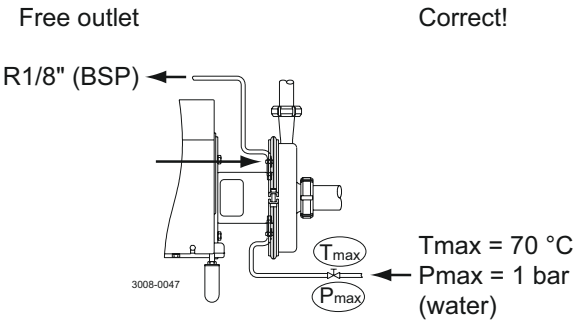
See the warning label!

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



Flushed shaft seal

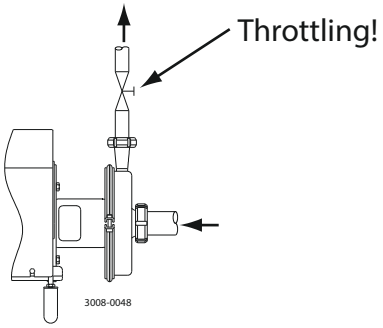
1. Connect the inlet of the flushing liquid correctly.
2. Regulate the water supply correctly.



Control

Reduce the capacity and the power consumption by means of:

- Throttling the pressure side of the pump
- Reducing the impeller diameter
- Reducing the speed of the motor



5.2 Trouble shooting

NOTE

Pay attention to possible faults.

Study the instructions carefully.

NOTE

Study the maintenance instructions carefully before replacing worn parts.

Problem	Cause/result	Remedy
Overloaded motor	• Pumping of viscous liquids • Pumping of high density liquids • Low outlet pressure (counter pressure) • Lamination of precipitates from the liquid	• Larger motor or smaller impeller • Higher counter pressure (throttling) • Frequent cleaning
Cavitation: • Damage • Pressure reduction (sometimes to zero) • Increasing of the noise level	• Low inlet pressure • High liquid temperature	• Increase the inlet pressure • Reduce the liquid temperature • Reduce the pressure drop before the pump • Reduce speed
Leaking shaft seal	• Dry run • Incorrect rubber grade • Abrasive particles in the liquid	Replace: All wearing parts If necessary: • Change rubber grade • Select stationary and rotating seal ring in silicon carbide/silicon carbide
Leaking O-ring seals	Incorrect rubber grade	Change rubber grade

5.3 Recommended Cleaning

NOTE

The supplied product is designed for cleaning in place (CIP).

NaOH = Caustic soda.

HNO_3 = Nitric acid.

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

CAUTION

Never touch the supplied product or the pipelines when sterilizing.

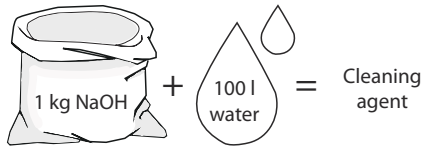
Always handle lye and acid with great care.

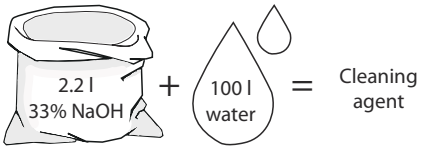
Examples of cleaning agents

Use clean water free from chlorides

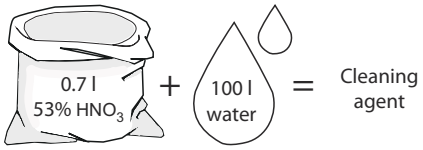
Metric System

1. 1% by weight NaOH at 70°C



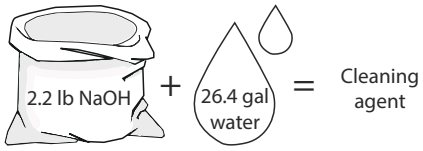


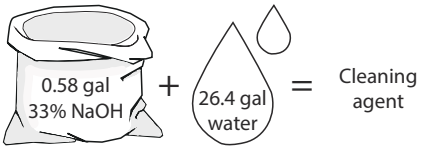
2. 0.5% by weight HNO_3 at 70°C



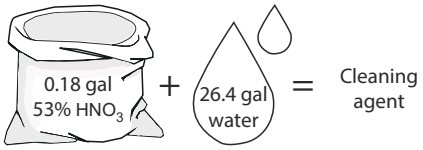
Imperial System

1. 1% by weight NaOH at 158°F





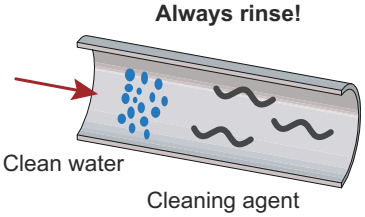
2. 0.5% by weight HNO_3 at 158°F



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

CAUTION

Always rinse well with clean water after the cleaning.



6 Maintenance

6.1 General maintenance

NOTE

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.

Check the pump for smooth operation after service.

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

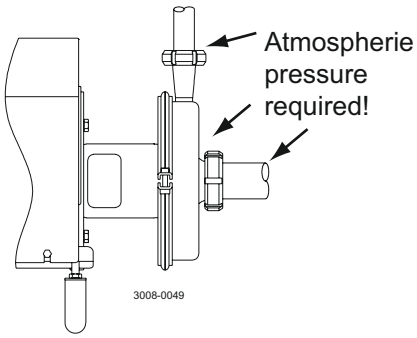
Always read the technical data thoroughly. (See *Technical Data* on page 43.

CAUTION

Never service the pump with pump if pressurised.

Fit the electrical connections correctly if they have been removed from the motor during service.

Pay special attention to the warnings!

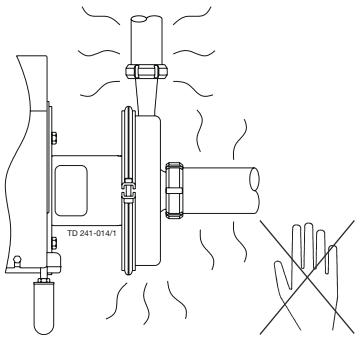


WARNING

Always disconnect the power supply when servicing the pump.

DANGER **Danger of burns!**

Never service the pump when it is hot.



Recommended spare parts:

Order service kits from the service kits list (see).

Ordering spare parts

Contact your local Alfa Laval sales company.

NOTE

If the pump is supplied with FEP O-rings, Alfa Laval recommends that the casing O-ring is replaced during pump maintenance.

	Shaft seal	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 inspection planning **Replace after leakage:** Complete shaft seal	Replace when replacing the shaft seal	Yearly inspection is recommended • 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	**Before fitting** Silicone grease or silicone oil	The bearings are permanently lubricated

Pre-use check

CAUTION

Fit the electrical connections correctly if they have been removed from the motor during service. (See *Pre-use check* on page 23).

1. Start and stop the motor momentarily
2. Ensure that the pump operates smoothly

6.2 Cleaning Procedure

Cleaning procedure for soiled impeller screw tapped hole:

1. Remove stub shaft (7) as per section 4 of the 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 (7) in acid sanitiser 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 to 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 (7).

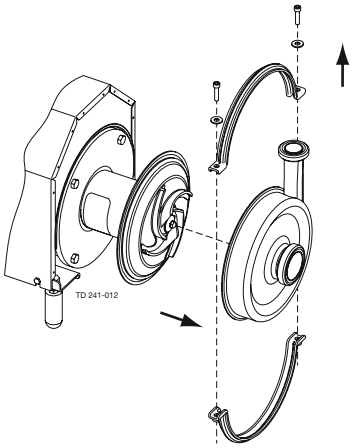
6.3 Dismantling of pump/shaft seals

NOTE

Study the instructions carefully. The items refer to *Parts List and Exploded View* on page 49

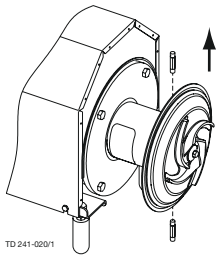
Handle scrap correctly

1. Remove screws, spring washers, clamps (55) and pump casing (29).



2. **Flushed shaft seal:**

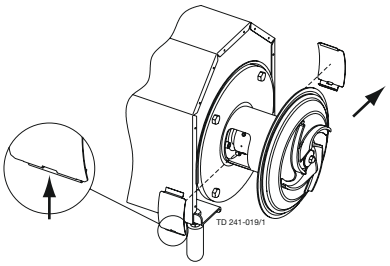
   Unscrew tubes (42) using a spanner.



1

3. Remove covers (22).

   This is easily done by lifting out the covers, for example, using a screwdriver.



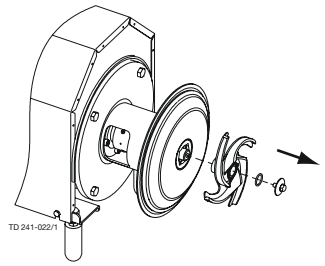
1 Relates to the shaft seal.

4

a) Remove impeller screw (36)

b) Remove impeller (37). If necessary, loosen the impeller by tapping gently on the impeller vanes. The shaft can be fixed with a screwdriver in the compression ring

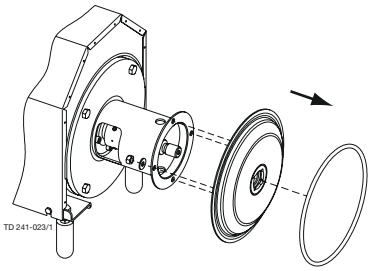
c) Remove the O-ring (38) from the impeller



5

a) Pull off the O-ring (26) from back plate (25)

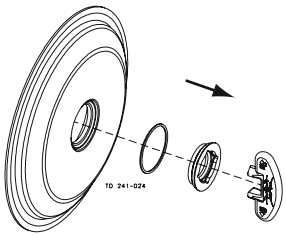
b) Unscrew nuts (20) and remove washers (21) and the back plate



6

a) Remove the stationary seal ring (11)

b) Remove the O-ring (12) from stationary seal ring (11)



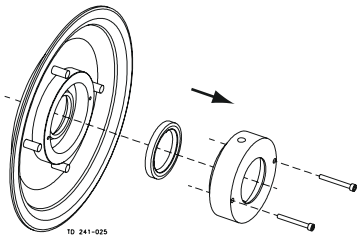
Use the tool supplied left-hand thread

1

7 Flushed shaft seal:

a) Remove screws (41) and seal housing (40)

b) Pull out lip seal (43) from the seal housing

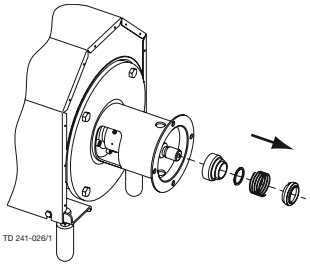


1

8

a) Remove the complete shaft seal from stub shaft (7)

b) Remove spring (13) and rotating seal ring (14) from the drive ring (10)

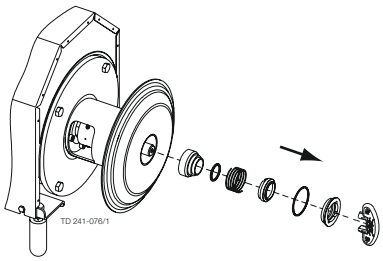


1

Alternative dismantling of single shaft seal - Front loading

1. Complete steps 1 to 4
2. Remove stationary seal ring
3. Remove O-ring (12) from stationary seal ring (11)
4. Remove complete shaft seal from stub shaft
5. Remove spring (13) and rotating seal ring (14) from the drive ring (10)

[1] Relates to the shaft seal.



Use the tool supplied. Left-hand thread

[1]

6.4 Assembly of pump/single shaft seal

NOTE

Study the instructions carefully. The items refer to *Parts List and Exploded View* on page 49.

Handle scrap correctly.

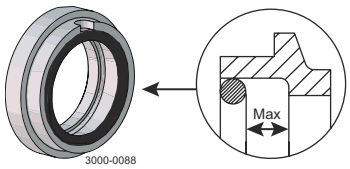
1

a) Remove spring (13)

b) Lubricate O-ring (15) and fit it in rotating seal ring (14)

NOTE

Make sure that O-ring (15) has max. clearance from the sealing surface.



1

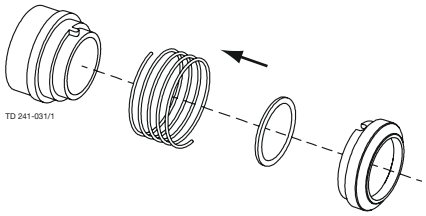
2

a) Refit spring (13) on rotating seal ring (14)

b) Fit the spring and the rotating seal ring on drive ring (10)

CAUTION

Ensure that the driver on the drive ring enters the notch in the rotating seal ring.

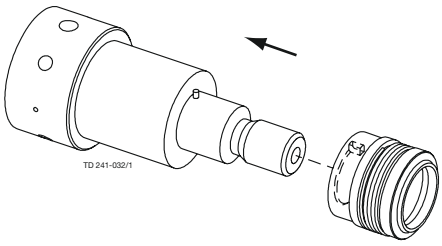


1

3 Fit the complete shaft seal on stub shaft (7).

NOTE

Make sure that the Connex pin on the stub shaft enters the notch in drive ring (10).



1

4

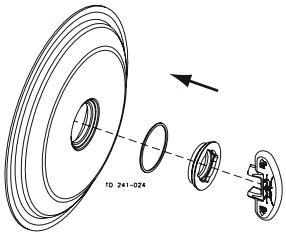
a) Fit O-ring (12) on stationary seal ring (11) and lubricate

b) Screw the stationary seal ring into back plate (25)

CAUTION

Only tighten by hand to avoid deforming the stationary seal ring.

(Max. 7Nm).



Use the tool supplied Left-hand thread

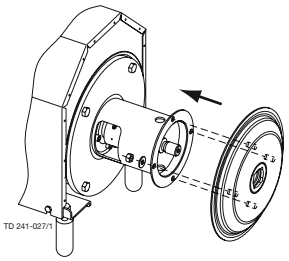
1

5

a) Clean the sealing surfaces with contact cleaner before fitting back plate (25)

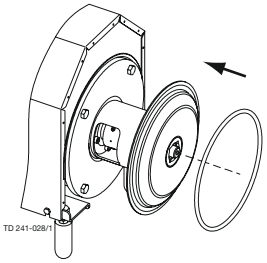
b) Carefully guide the back plate onto adaptor (16)

c) Fit washers (21) and nuts (22)



1

6 Lubricate O-ring (26) and slide it onto back plate (25).



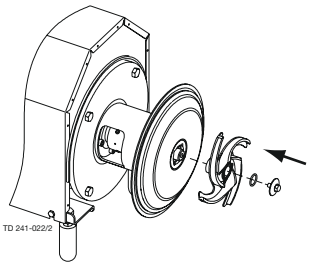
7

a) Lubricate O-ring (38) and fit it in impeller (37)

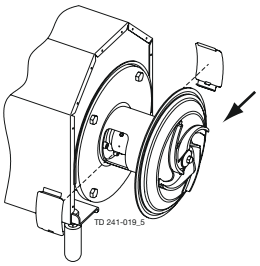
b) Lubricate impeller hub with silicone grease or oil

c) Screw the impeller onto stub shaft (7)

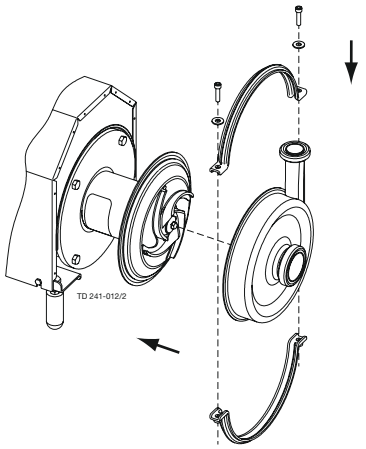
d) Fit impeller screw (39) and tighten 20 Nm (7.4 lbf-ft)



8 Fit covers (22).

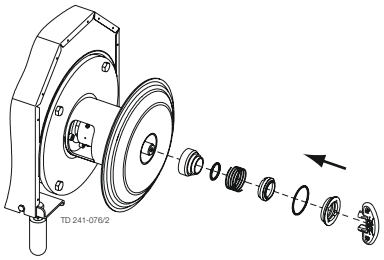


9 Fit pump casing (29), clamps, spring washer and tighten screws (55).



Alternative assembly of single shaft - front loading

1. Fit rotating seal ring (14) and spring (13) on drive ring (10)
2. Fit complete shaft seal on stub shaft
3. Fit O-ring (12) onto stationary seal ring (11)
4. Fit stationary seal ring
5. Complete steps 4 to 1



Use the tool supplied Left-hand thread

1

[1] Relates to the shaft seal.

CAUTION

Ensure that the driver on the drive ring enters the notch in the rotating seal ring.

6.5 Assembly of pump/flushed shaft seal

NOTE

Study the instructions carefully. The items refer to *Parts List and Exploded View* on page 49.

Lubricate the rubber seals before fitting them.

1

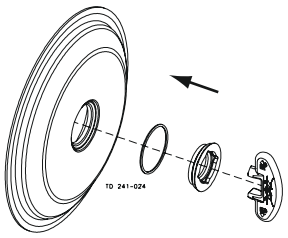
a) Fit O-ring (12) on stationary seal ring (11) and lubricate

b) Screw the stationary seal ring into back plate (25)

CAUTION

Only tighten by hand to avoid deforming the stationary seal ring.

(Max 7Nm).



Use the tool supplied Left-hand thread

1

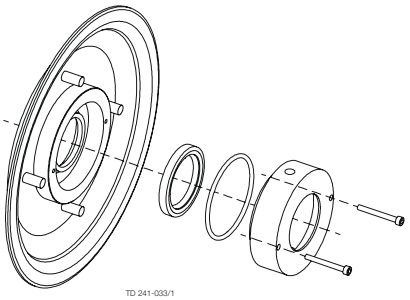
2

Flushed shaft seal:

a) Fit lip seal (43) in seal housing (40)

b) Lubricate O-ring (44) and slide onto the seal housing (40)

c) Fit the seal housing on back plate (25) and tighten screws (41)



1

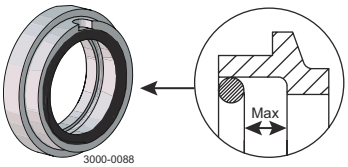
3

a) Remove spring (13)

b) Lubricate O-ring (15) and fit it in rotating seal ring (14)

NOTE

Make sure that O-ring (15) has max. clearance from the sealing surface.

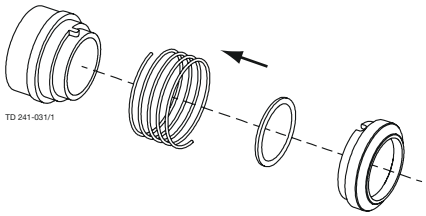


1

4

a) Lubricate O-ring (45) and fit it in drive ring (10)

b) Fit spring (13) and rotating seal ring (14) on the drive ring

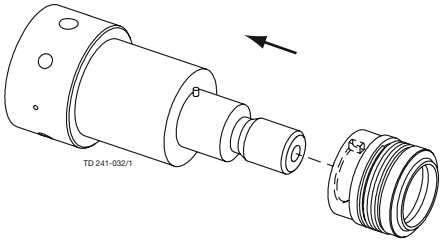


1

> **CAUTION**
>
> Ensure that the driver on the drive ring enters the notch in the rotating seal ring.

5

Fit complete shaft seal on stub shaft (7) so that Connex pin on the stub shaft enters the notch in drive ring (10).



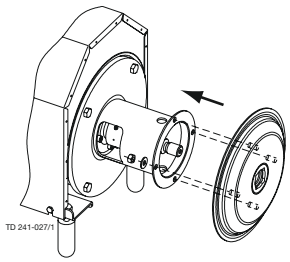
1

6

a) Carefully guide back plate (25) onto adaptor (16)

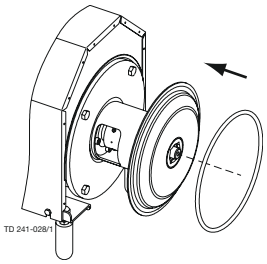
b) Fit washers (21) and tighten nuts (20)

> **NOTE**
>
> **Make sure that holes in the seal housing are in a vertical position**



7

Lubricate O-ring (26) and slide it onto back plate (25).



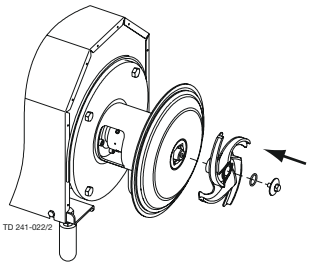
8

a) Lubricate O-ring (38) and fit it in impeller (37)

b) Lubricate the impeller hub with silicone grease or oil

c) Screw impeller (37) onto stub shaft (7)

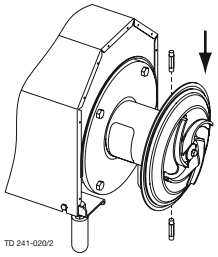
d) Fit impeller screw (39) and tighten to 20 Nm (7.4 lbf-ft)



9

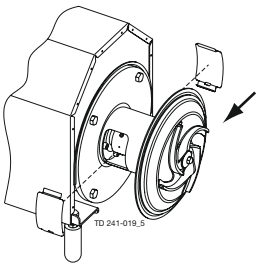
a) Screw tubes (42) into seal housing (40)

b) Tighten with a spanner

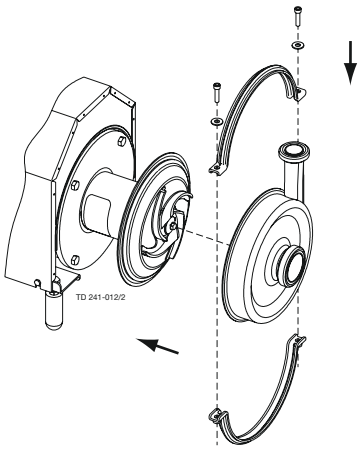


1

10 Fit covers.



11 Fit pump casing (29), clamps, spring washers and tighten screws (55).



6.6 Adjustment of shaft

NOTE

Study the instructions carefully. The items refer to *Parts List and Exploded View* on page 49.

Lubricate the rubber seals before fitting them.

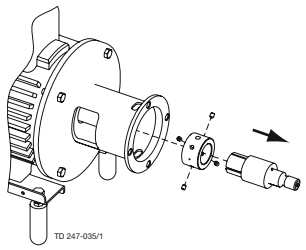
1

a) Loosen screws (61)

b) Pull off stub shaft (7)

NOTE

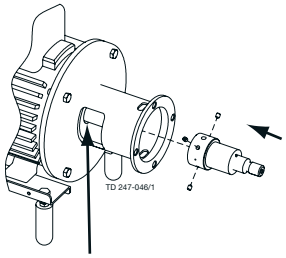
Always use Alfa Laval genuine parts and ensure screws do not protrude from shaft.



2

a) Push stub shaft (7) onto the motor shaft

b) Check that the clearance between the end of the stub shaft and the motor flange is 10-20 mm (0.4-0.8")



10-20 mm (0.4-0.8")

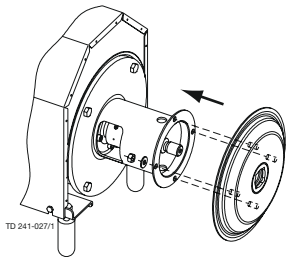
3

a) Tighten screws (61) lightly and evenly

b) Ensure that stub shaft (7) can be moved on the motor shaft

4

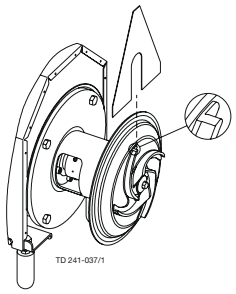
Fit back plate (25), washers (20) and nuts (21) and tighten.



5

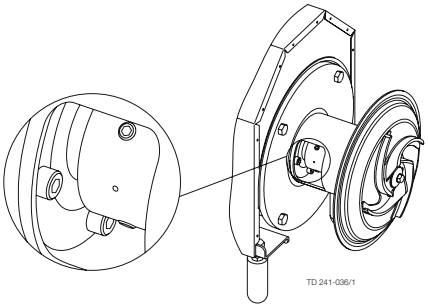
a) Fit impeller (37) on stub shaft (7)

b) Ensure that the clearance between the impeller and back plate (25) is correct by using the tool supplied ((1 mm). 0.039")



6

Tighten screws (61) evenly to 18 Nm (13.3 lbf-ft).



7 Technical Data

NOTE

Technical data must be observed during installation, operation and maintenance.

All personnel should be informed about the technical data.

7.1 Technical Data

The SolidC pump is designed for standard duty applications, like pumping CIP (Cleaning in Place) solutions, utilities, water (processing, hydrating, cooling), washing machines, simple transport duty within working range. SolidC is suitable for use in the food, dairy, beverage, personal care, pharmaceutical, light chemical and water industries.

The SolidC is available in the following sizes SolidC-1, SolidC-2, SolidC-3 and SolidC-4.

Materials	
Product wetted steel parts:	W. 1.4404 (AISI 316L and AISI 329L)
Other steel parts:	Stainless steel (AISI 304)
Inside surface finish:	Standard blasted (3A polish Ra 32 µin)
Product wetted elastomers:	EPDM
Rotary seal face:	Carbon
Stationary seal face:	Silicon Carbide
Finish	Semi-bright
Other O-rings	EPDM (standard)
Alternative seals	Nitrile (NBR), fluorinated rubber (FPM) and FEP

Shaft seal	
Seal types	External single or flushed
Material, stationary seal ring (ROW)	Acid-resistent steel with sealing surface of silicon carbide
Material, O-rings	EPDM (standard)
Alternative material, O-rings	Nitrile (NBR), fluorinated rubber (FPM) and FEP

Motor
Foot-flanged motor according to the IEC metric standard, 2 poles = 3000/3600 rpm at 50/60 Hz, 4 poles = 1500/1800 rpm at 50/60 Hz, IP 55 (with drain hole with labyrinth plug), insulation class F.
Standard C-faced, foot mounted motor according to NEMA standard. 3500 rpm or 1750 rpm. Premium efficiency, Class F. Note frame size per horsepower.

Motor sizes	
Motor sizes (kW), 50 Hz	1.1 - 22 kW
Motor sizes (kW), 60 Hz	1.1 - 22 kW
Motor sizes (Hp), 60 Hz	1, 1½, 2, 3, 5, 7.5, 10, 15, 20, 25, 30 Hp.

Min/max motor speed	
2 poles:	900 - 4000 rpm
4 poles:	900 - 2200 rpm

Warranty
Extended 3-years warranty on SolidC pumps. The warranty covers all non wear parts on the condition that genuine Alfa Laval Spare Parts are used.

For further information - see PD sheet.

7.2 Operating Data

Max inlet pressure	
SolidC 1 - 4:	400kPa (58 PSI)(4 bar)

Temperature	
Temperature range:	-10 °C to +120 °C (14 °F to +248 °F) (EPDM)
Flush media:	Max 70 °C (Max 158 °F)

Flushed shaft seal	
Water pressure inlet:	Max. 1 bar (14.5 PSI)
Water consumption:	0.25 - 0.5 l/min (4 - 8 usgph)

Connections for flushed shaft seal	
SolidC 1 - 4:	1/8" G

7.3 Relubrication intervals

NOTE

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

Inform personnel about the technical data.

Motor bearings are permanently lubricated.

7.4 Torque Specifications

The table below specifies the tightening torques for the screws, bolts and nuts in this pump.

Always use the torques below 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

7.5 Weight (kg)

Pump Type: SolidC, SolidC UltraPure

Size	Motor									
	90		100	112	132		160			180
	1.5kW	2.2kW	3kW	4kW	5.5kW	7.5kW	11kW	15kW	18.5kW	22kW
1	61	63	73	85						
2			76	87	108	120	173			
3					115	127	180	190	212	
4					117	129	179	189	211	267

Weight can vary depending of configuration. Weight is only to be seen as a reference value during handling, transporting and packaging.

7.6 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 Prime 10	69
LKH Prime 20	74
LKH Prime 40	77
LKH-112	70
LKH-113	69
LKH-114	68
LKH-122	75
LKH-123	77
LKH-124	80

Pump Type	Sound pressure level (dBA)
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 and LKHex.

The above LKH Prime is the same for LKH Prime UltraPure.

The above SolidC noise levels are the same for SolidC UltraPure.

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

Often the noise level generated by the flow through the process system (eg. valves, pipes, tanks etc.) is much higher than that generated by the pump itself. Therefore it is important to consider the noise level from the whole system and take the necessary precautions with regard to personal safety, if required.

8 Spare Parts

For every delivered Alfa Laval Product, a spare part list is available.

This spare part list contains a range of the most common wear parts for the machinery. If any component not mentioned is required, please contact your local Alfa Laval representative for availability.

You can find our spare part catalogue at *https://hygienicfluidhandling-catalogue.alfalaval.com*.

Always use Alfa Laval genuine spare parts. The warranty of Alfa Laval products is dependent on use of Alfa Laval genuine spare parts.

8.1 Ordering Spare Parts

When ordering spare parts, please always state:

1. Serial number (if available)
2. Item number/spare part number (if available)
3. Capacity or other relevant identification

8.2 Alfa Laval Service

Alfa Laval is represented in all larger countries of the world.

Do not hesitate to contact your local Alfa Laval representative, with any questions or requirement of spare parts for Alfa Laval equipment.

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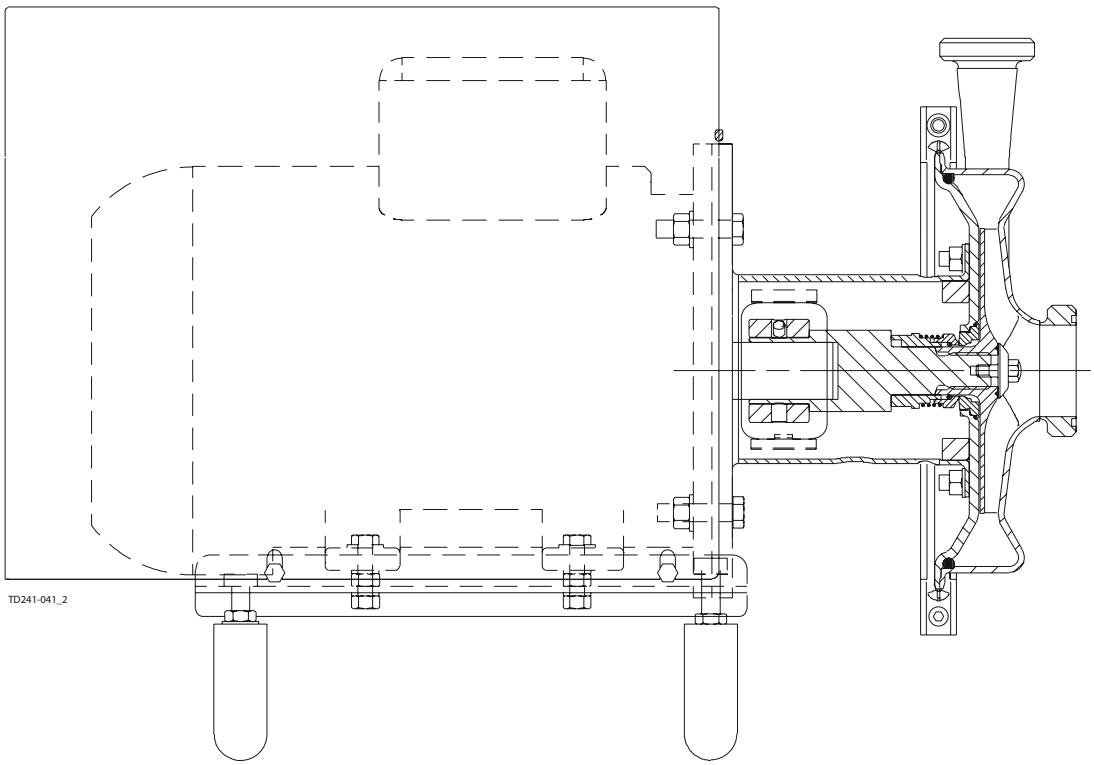
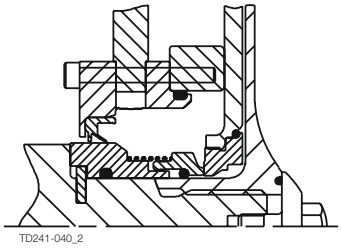
9 Parts List and Exploded View

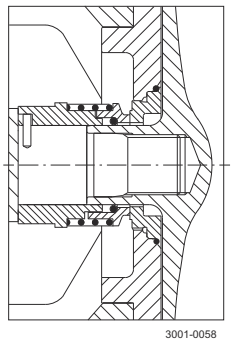
9.1 Drawing



US legs are different to the ones shown. For further information, see spare parts catalogue.

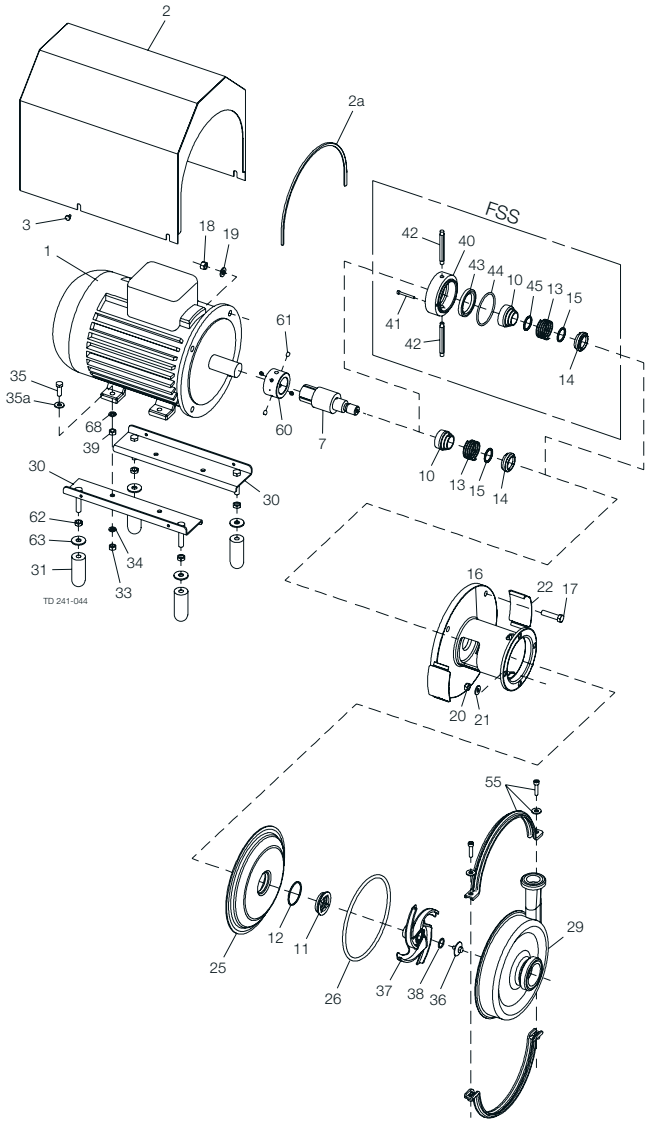


Flushed shaft seal



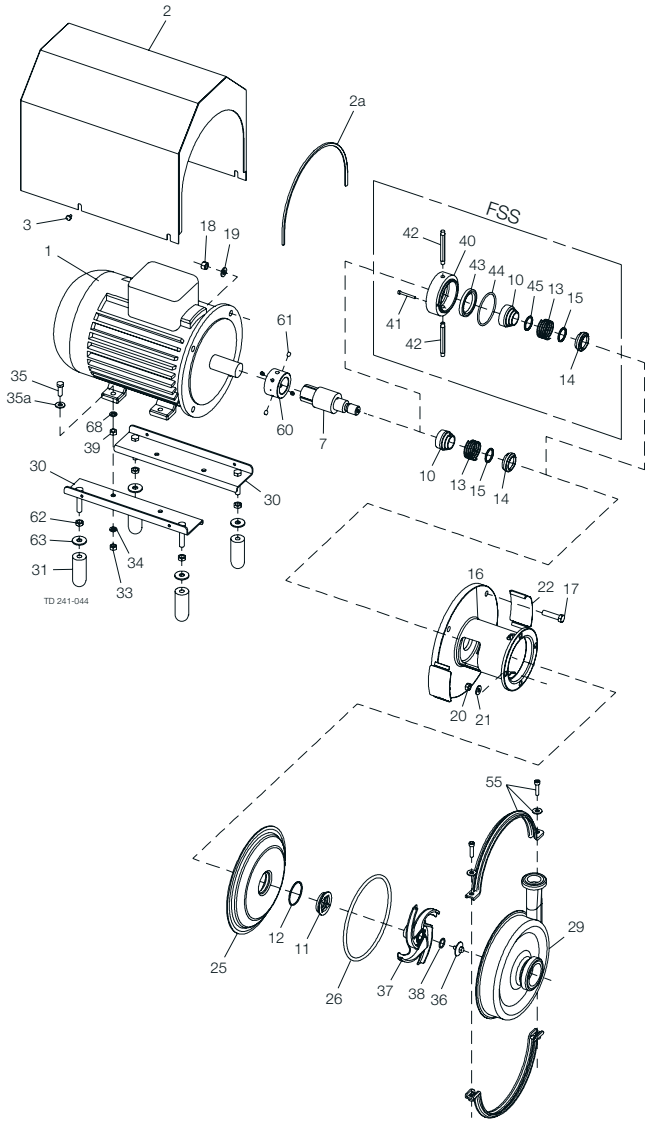
Single shaft seal

9.2 SolidC - Wet end



Pos.	Qty.	Denomination
20	4	Nut
21	4	Washer
25	1	Back plate
26	1	O-ring for casing
29	1	Pump casing
36	1	Impeller screw
37	1	Impeller
38	1	O-ring for impeller screw
55	1	Clamp set

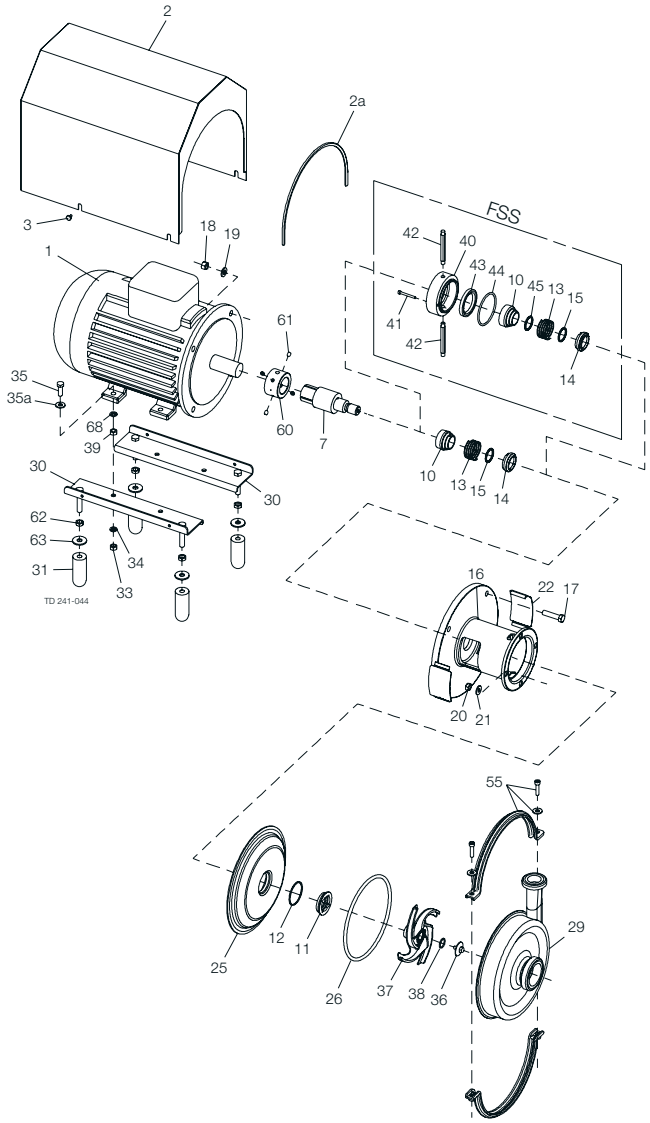
9.3 SolidC - Motor-dependent parts



Pos.	Qty.	Denomination
1	1	Motor WEG 3000rpm
2	1	Shroud
2a	1	Edge list for shroud
3	4	Screw for shroud
7	1	Shaft
16	1	Adaptor
17	4	Screw for adaptor
18	4	Nut for adaptor
19	4	Washer for adaptor
22	2	Covers
30	2	Bracket

Pos.	Qty.	Denomination
31	4	Legs
33	4	Nut for legs
34	4	Spring washer for legs
35	4	Screw for legs
35a	4	Washer for legs
39	4	Spacer for legs
60	1	Comp. ring
61	4	Screw for comp. ring
62	4	Nut for legs
63	4	Washer for legs
68	4	Washer for legs

9.4 SolidC - Shaft seal



Pos.	Qty.	Denomination
10	1	Drive ring
11	1	Stationary seal ring
12	1	O-ring
13	1	Spring
14	1	Rotating seal ring
15	1	O-ring

Pos.	Qty.	Denomination
40	1	Seal housing
41	2	Screw for seal housing
42	2	Tube
43	1	Lip seal
44	1	O-ring for seal housing
45	1	O-ring for drive ring