CSF

LIQUID RING PUMPS AS SERIES

CSF HYGIENE LIQUID RING PUMP AS

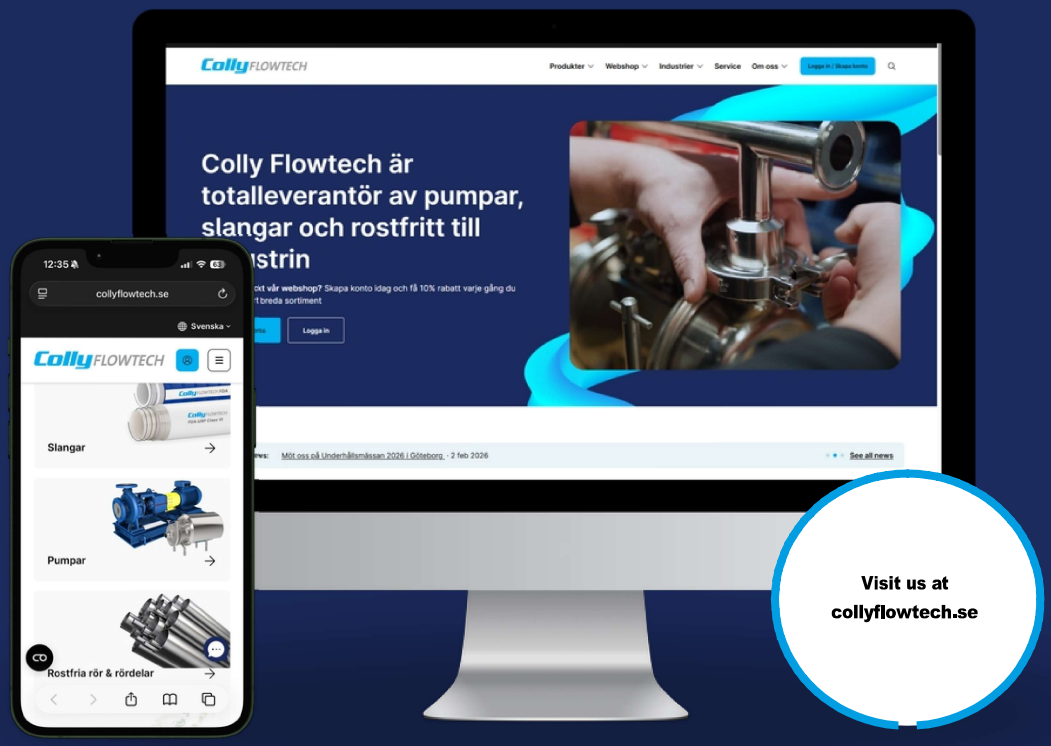
Instructions for assembly, installation, operation and maintenance



Colly FLOWTECH

Översättning av bruksanvisning original

Rev_1-2026



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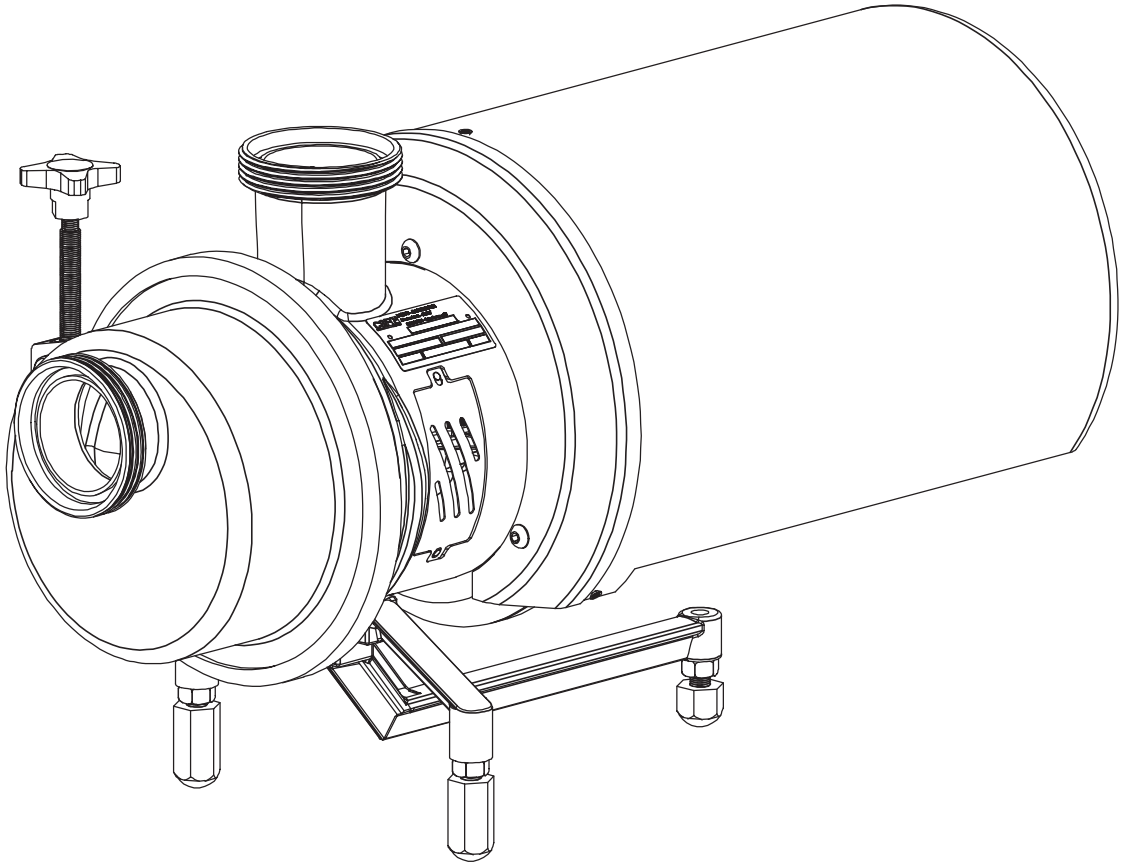
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CSFinoxGroup

FLOW TECHNOLOGY COMPONENTS

SELF-PRIMING PUMPS

AS Series



INSTALLATION INSTRUCTIONS,
OPERATION AND MAINTENANCE

CSF

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FOREWORD

This instruction manual is designed to provide the user with all the information needed to perform all use and maintenance activities concerning the pump throughout its entire service life.
Read the instructions carefully and keep them for future consultation.
C.S.F. Inox S.p.A. reserves the right to make any changes to the documentation it deems necessary without being obliged to update publications that have already been issued.

This Manual contains confidential technical data owned exclusively by the Manufacturer/ Constructor, consequently any copying of its contents and/or format (in their entirety or only partially) for any purposes other than those for which they were intended is prohibited without the Manufacturer's/Constructor's prior consent.

The official language chosen by the Manufacturer/Constructor is Italian. No liability shall be accepted for translations in other languages that do not match the original meaning.

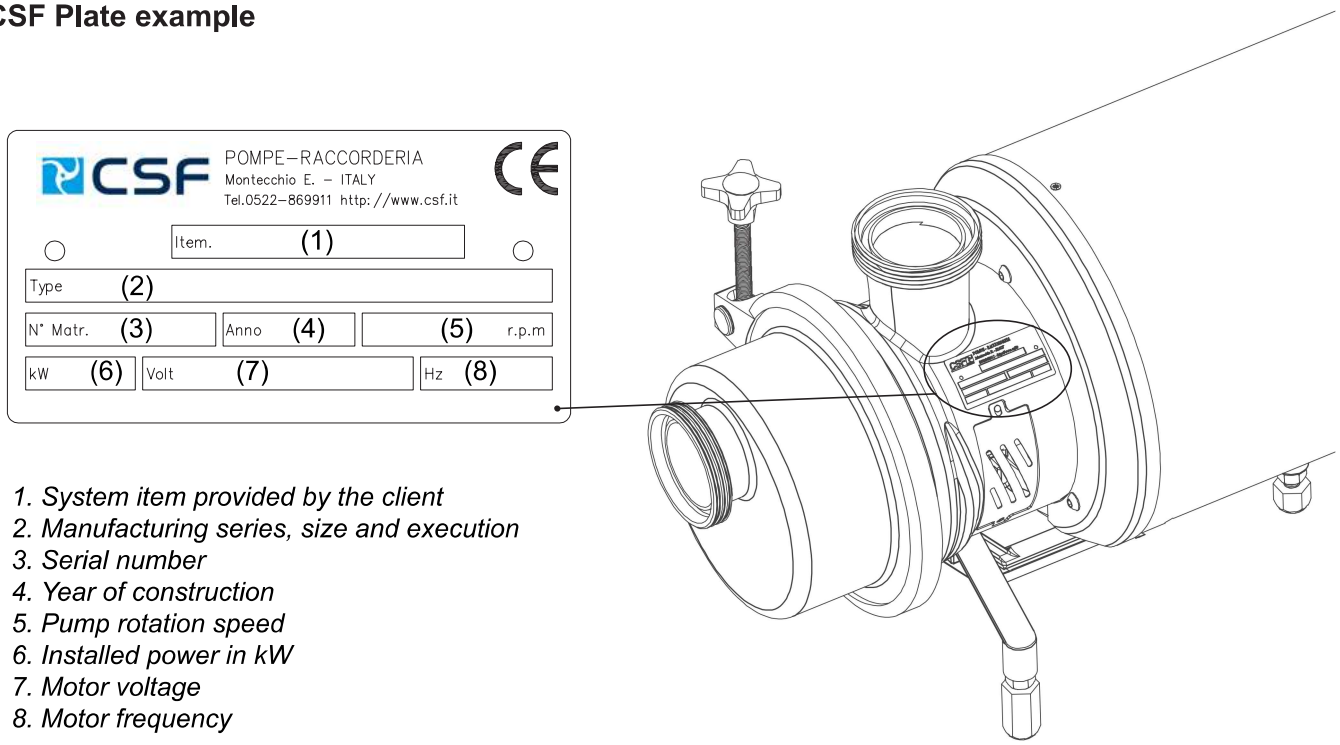
All operators must read the instructions carefully and keep them for future reference. Refer to paragraph 2.2 Operators and responsibilities.

SIGNS AND DATA PLATES

The danger, warning and obligation signs illustrated in this manual are positioned on or near the equipment.
An exact description of the machine type, serial number and electrical voltage data will facilitate a rapid and effective response from the assistance service (when envisaged).
When requesting information, spare parts or assistance, always specify the pump type (2) and serial number (3) in order to ensure fast and efficient service: the complete code is given on the plate and in the purchase documents.

<u>This manual refers exclusively to the pump supplied.</u>

CSF Plate example



1. System item provided by the client
2. Manufacturing series, size and execution
3. Serial number
4. Year of construction
5. Pump rotation speed
6. Installed power in kW
7. Motor voltage
8. Motor frequency

1.0 - SYMBOLS USED ON THE EQUIPMENT AND IN THE MANUAL

	**CONSULT**	Consult the instructions before carrying out a specific operation.
	**THE USE AND MAINTENANCE MANUAL MUST BE READ**	It is mandatory to read the Use and Maintenance Manual before preforming any work on/with the machine.
	**GENERAL SAFETY WARNINGS/INFORMATION**	Indicates a warning or a note concerning key functions or useful information. Pay great attention to the text parts indicated by these symbols.
	**WARNING! DANGER**	Failure to observe the warnings may lead to serious injury and/or material damage.
	**ELECTRICAL HAZARD**	Only skilled personnel can carry out operations on electrical parts.
	**MOVING PARTS HAZARD**	Hazard caused by moving mechanical components during machine operation.
	**DANGER: HOT SURFACES**	Elements with a higher temperature than normal (xxxx zone).
	**GENERAL PROHIBITION**	Indicates a generic prohibition.
	**DO NOT REMOVE SAFETY DEVICES**	The removal of safeguards is prohibited.
	**DO NOT SERVICE MOVING PARTS**	Never perform maintenance on moving parts.
	**NO WATER JETS**	Do not use high pressure jets of water to clean the machine.
	**NO STEPPING**	Do not climb onto the pump.
	**NO SITTING**	Do not sit on the pump.
	**WEAR PROTECTIVE WORKWEAR**	Mandatory protective equipment.
	**WEAR PROTECTIVE GLOVES**	Hand protection must be worn: gloves.
	**WEAR SAFETY FOOTWEAR**	Foot protection must be worn: safety footwear.

2.0 - SAFETY WARNINGS

The pumps supplied are designed for professional use and are not intended to come into contact with the general public and minors.

Operators and maintenance personnel must read and comprehend the instruction manual.
Maintenance personnel must have adequate training and qualifications to carry out maintenance operations in compliance with safety standards.
Trainees may only carry out activities under the supervision of qualified, expert personnel.

The equipment must not be tampered with. In the event of tampering, the manufacturer shall decline all liability concerning incorrect operation or any damage/injury caused by the product.

Before using the equipment, make sure any situation which may represent a health and safety hazard has been eliminated.

Furthermore, it is essential for operators to take note of the warnings listed below:

	Do not use the machine when psychophysical state is impaired.
	Do not use the machine for purposes other than those for which it was designed.
	Do not remove or modify the signs affixed to the machine by the manufacturer.
	Do not try to remove or modify machine parts unless the operation is described in this manual.
	Never allow unauthorized personnel to work on or with the equipment.
	Do not stand or sit on the machine.
	Never leave the machine connected to power supplies when it is not being used/ supervised.
	Never open electrical equipment enclosures when the machine is connected to the electrical power supply.
	Before starting the machine, make sure there are no unauthorized persons in the work area.
	Before starting the machine, make sure all safety devices are working properly.
	Wear the personal protective equipment prescribed in this manual, based on the operations being carried out.
	Keep the equipment as a whole and the work area clean, tidy and free of foreign objects.
	Internal inspections, modifications and repairs must only be carried out by qualified technical personnel authorized by the Manufacturer.
	Periodically carry out all the operations described in the specific paragraph on maintenance.
	In the event of anomalies or damage that could compromise equipment operation and safety, it must immediately be removed from service.
	Notify a supervisor if any operating irregularity occurs.
	Make sure that all guards or other protective devices are in place and that all safety devices are installed and working effectively.

When the pump is working the following occurs:



- Mechanical parts are moving.



- Pump casing, pipelines and articulations are under internal pressure. Therefore do not remove any safeguard or locking, do not loosen screws or clamps, as this can cause serious damage to persons or objects.
- Non-observance of inspection and maintenance operations can cause damages to persons and objects, especially when dangerous or toxic liquids are pumped



- Live parts: all operations on electrical parts must be performed by expert personnel who are able to observe technical standards and laws and are duly authorized by the plant manager.



- When pumping liquids at a temperature over 60°C, adequate protection and warning signals are required.
- Installation must ensure an adequate ventilation, in order to cool the engine, as well as enough space for maintenance operations.

2.1 - DANGER ZONES

The pump described herein has been designed and built to be safely used by operators.

All operators must be provided with suitable Personal Protective Equipment for performing the relative operations, i.e. safety footwear, protective gloves and workwear as better specified in § 2.4.



Should any unauthorized personnel come into the work area near the equipment, the operator must immediately stop all operations.

2.2 - SAFEGUARDS



Any failure to use the personal protective equipment indicated in this heading exposes operators to unnecessary hazards.
The employer must provide all machine operators referred to in this manual with the relevant PPE.

Machine operators must wear the following PPE:



Protective workwear;



Gloves providing protection against cuts, abrasion and burns, and safety footwear.

The employer, following risk assessment and taking into consideration variations in the production processes, may deem the use of additional PPE necessary.

Inspect the condition of the guards and relative fasteners on a regular basis (at least every 12 months). If the guards are damaged, worn or have been removed or if the fastening devices have been removed or come loose, the user must immediately restore the condition of the guards and relative fastenings.

2.3 - OPERATORS AND RESPONSIBILITIES

SAFE WORK PROCEDURES

To reduce the potential consequences of the hazards set out in the previous headings, operators must abide by the following instructions:

- Always wear personal protective equipment as referred to in § 2.4;
- Supervise the danger zone, never start the machinery if other unauthorized persons are inside the danger zone or in the machine's immediate vicinity. Should any unauthorized person enter the aforementioned zone when an operating cycle is in progress, the operator must immediately stop all operations.

If particular maintenance, inspection or repair work on the machine requires the operator to completely or partially disable certain safety devices, it is his/her duty to restore operation of said devices as soon as the operations in question have been completed.

The responsibilities of the operators are given below:



To be done by the operator

- Use the machine for the purposes and in the operating conditions specified in this manual.
- Perform the periodic maintenance checks indicated in this User Manual and relative appendices.
- Regularly check elements subject to possible wear, in particular all moving mechanical parts (gear units, pumps) and piping containing pressurized fluids
- Check and keep all safety-related devices enabled and in good working order by periodically checking their operation (for example: regulators, control devices, indicators/gauges, etc.).
- Keep the operating area clean and tidy at all times.
- Stop the machine immediately if any malfunctions or anomalies arise that may affect safety during use.



To be done by the mechanical maintenance technician:

- Before carrying out any maintenance operations, always make sure the equipment has been disconnected from all power sources.
- Before carrying out any maintenance operations, to prevent inadvertent start-up by uninformed personnel, always put up one or more “MACHINE UNDER MAINTENANCE” signs in a clearly visible position.
- Always keep the maintenance area clean and dry.
- Never allow unauthorized personnel to work on or with the pump.
- Do not use petrol or flammable solvents as a cleaning detergent; always use authorized, non-hazardous commercial solvents only.
- Do not use compressed air to clean parts; if no other option is available, wear suitable eye protection with side shields and limit the pressure to a maximum of 2 bar.
- Never use naked flames as a light source when carrying out checks or maintenance operations.
- To avoid the risk of damaging the equipment and/or injuring personnel, after every maintenance or adjustment operation, always make sure no tools or foreign bodies are left on the machine or between moving parts.

Maintenance personnel are responsible for checking that all safety devices (guards, casings, etc.) have been correctly restored before authorizing machine use.

3.0 - GUARANTEE

All products manufactured by C.S.F. Inox S.p.A. are guaranteed to the purchaser, for one year from the date of purchase, against hidden defects in materials or manufacture, providing that they are installed and used according to instructions and recommendations of the manufacturer.
The guarantee does not cover wear parts or repairs for damage caused by improper use, abrasion, corrosion, negligence, defective installation, non-observance of inspection and maintenance operations, use of non-genuine spare parts, accidents or any work carried out by the purchaser designed to alter the machine's performance as indicated by the manufacturer.

Before returning to C.S.F. Inox S.p.A. any item to be substituted or repaired under guarantee, inform about the problem the Customer Assistance Office and follow instructions of the manufacturer. Returned items must be properly packed in order to avoid damages during transport and a technical report describing the defect and how it manifested itself must accompany the returned item/s.

Any item with a presumed fault should be returned to C.S.F. Inox S.p.A. at the customer's expense, accompanied by a Declaration of Decontamination (attached to page 36), unless otherwise agreed.
C.S.F. Inox S.p.A. will examine, repair and/or replace the returned piece and then send it back to the purchaser on ex-works basis.
Should the piece be found under warranty, no further costs will be owed by the purchaser. If, on the contrary, the fault is not found under warranty, all necessary reparations and replacements will be charged at normal cost to the purchaser.
C.S.F. Commercial parts incorporated in C.S.F. Inox products are guaranteed by their corresponding manufacturers.

3.1 - CERTIFICATION AND EC MARKING

The equipment was made in accordance with Machinery Directive 2006/42/EC and relevant EC directives applicable at the time of its placing on the market.

This Use and Maintenance Manual complies with Annex I point 1.7.4 of the aforementioned Directive as well as with standard UNI 10893 and ISO/IEC guide 37.

The list of Directives and standards applied is included in the Declaration of Conformity found in the manual of the pump supplied.

4.0 - GOODS TRANSPORTATION, RECEIVING AND TRANSFERRING

4.1 - TRANSPORT

The packings of all pumps manufactured by C.S.F. Inox S.p.A. are defined when placing the order. Unless prior arrangements are made, goods will be packed for transit only and not for long-term storage; should it be necessary to store the pumps outside, waterproof covering must be provided to protect the electrical parts (motor) from rain, dust, humidity etc..

4.2 - DELIVERY

On delivery of the supply it is essential to make sure that the packaging has not been damaged during transport so that any claims can be made immediately to the carrier.

Should any damage be ascertained, the following procedure must be observed:
- Accept the goods with reserve
- Take photographic evidence of the damage
- Notify the carrier of the damage sustained via registered mail with the photographic evidence attached.

4.3 - SITE PREPARATION

It is the user's responsibility to:
- Prepare the installation sites as prescribed by local legislation governing health and safety in the workplace

- Make sure the electrical power supply is compliant with the legislation in force and possesses an efficient earthing system.

LIGHTING

The machine installation site must have adequate natural and/or artificial lighting in compliance with the legislation in force in the country of installation.

Lighting must be uniform, guarantee good visibility in every part of the machine and must not create hazardous reflections. It must also be such that commands on the control panels and emergency stop buttons can be clearly seen.

FLOORING

Flooring must be of industrial standard, smooth and even. For pumps with bearings housing, after securing the base to the floor, correct alignment of the joints must be checked.

4.4 - TRANSFERRING

The personnel involved must have adequate qualifications and experience in handling and lifting operations.
Use suitable and certified equipment for lifting and handling the machine supplied.

Carry the packed pumps as close as possible to the place of installation by means of appropriate lifting devices and unpack them. During this operation take care, as unsteady parts could fall down. Packing materials must be disposed of in accordance with the relative regulations in force in the country of use (see chapter 18.0).

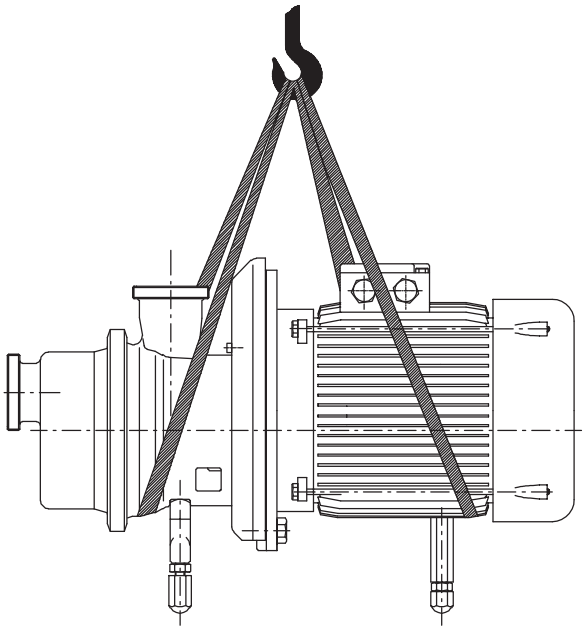
After unpacking the pump, use special lifting belts and move the pump-motor-set to the place of installation; never use the eyebolts on the motor to move the pump, as the eyebolts are for moving the motor only.

In versions complete with shroud, take the shroud off before moving the pump-motor-set, in order to avoid damages.

When lifting machinery the barycentre MUST always be in line with the lifting point

***N.B.: check the weight of the machine indicated on the data sheet attached to the instructions.**

Observe all relevant local health & safety regulations.



5.0 - RETURNS

- Empty the pump correctly.
- Wash and thoroughly clean the pump, especially in the case of harmful or explosive liquids.
- Thoroughly dry the pump.
- A duly compiled Declaration of Decontamination must accompany the pump (see page 36).

6.0 - DESCRIPTION

The AS series is made up of self-priming centrifugal pumps with side duct and star impeller. The ports are on the longitudinal axis with the suction port on the front cover. All models have threaded connections for fittings, made to DIN 11851 standards (unless otherwise requested), and the front cover is easily opened to facilitate cleaning operations. The seal is mechanical and the materials used for the components and the mechanical seal are chosen according to the liquid to be pumped.
Built in a close-coupled version with independent drive system, they are assembled with three-phase electric motors, B5 construction type, with IP 55 protection rating, unless otherwise specified in the order.
The pumps in question are used in all those cases where the liquid to be pumped, as well as for services in which no particular characteristics are required:
- Must not be polluted in any way
- Is at a temperature of between -20°C and + 100°C
- Must under no circumstances come into contact with the outside environment.
- Is chemically aggressive

6.1 - TECHNICAL DATA

- Maximum operating pressure: 6 bar
- Temperature range: -20°C ÷ 100°C

The operating temperature range is determined by the type of mechanical seal and the material of the elastomers used.
If there is any need to use the pump with different performance data and product characteristics to those indicated at the time of ordering, contact C.S.F. Inox S.p.A. to make sure the pump is suitable for your requirements.

6.2 - SOUND PRESSURE LEVEL

The sound pressure level of centrifugal pumps is the following (see table):

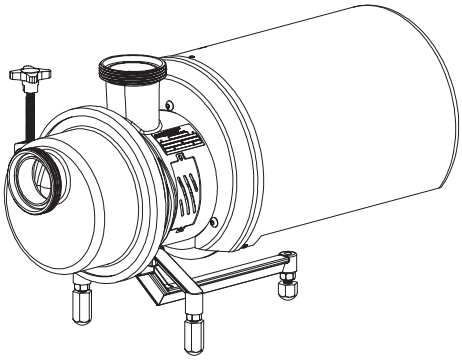
		Pump type			
Noise index dB(A)	< 80	AS 40			
	81 ÷ 85	AS 42	AS 50		
	86 ÷ 90	AS 52	AS 60	AS 65	AS 80

The measurement has been made by means of a phon-meter placed at 1 m distance from the pump and at a height of 1.6 m from the ground.
Preliminary condition is that the pump is fixed correctly; the above mentioned values do not take into account external noise sources (e.g. valves, abrupt hydraulic deflections).

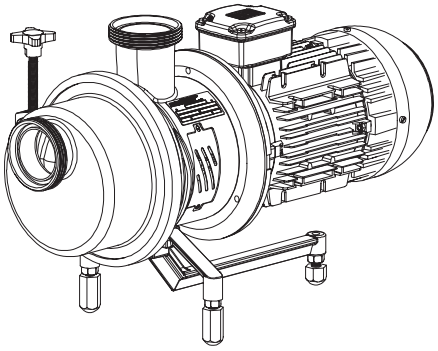
6.3 - WEIGHTS

The weight may vary depending on the execution (see types on following page), the make and/or model of the motor installed.
For information on the weight of the pump, see the data sheet provided as an appendix to the instructions.

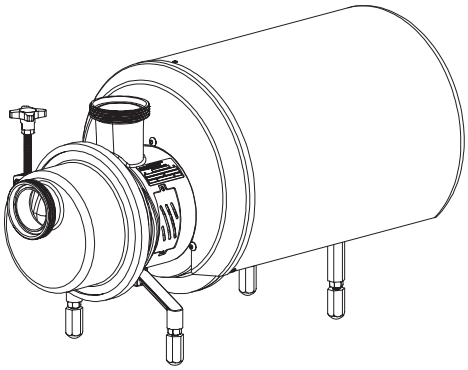
7.0 - SET-UPS



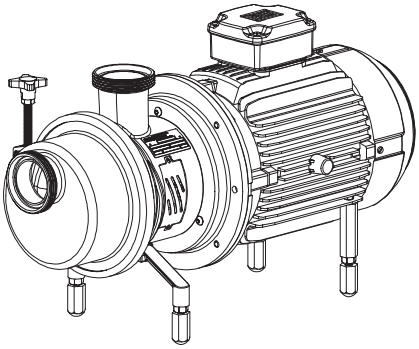
AS - shrouded exec. with adjustable feet from kW 1.1 to kW 4



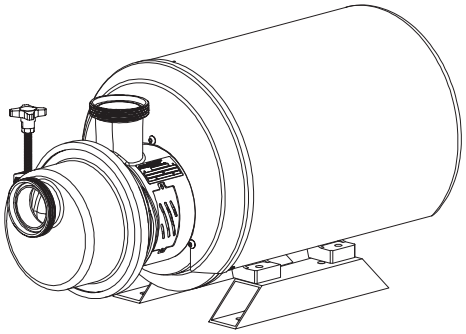
AS - shroudless exec. with adjustable feet, from 1.1 kW to 4 kW



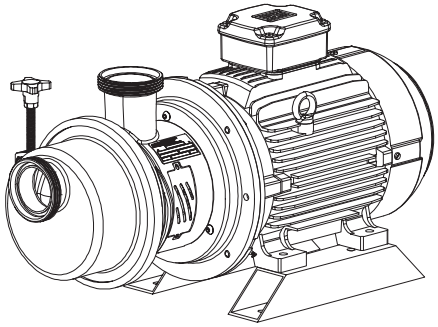
AS - shrouded exec. with adjustable feet from kW 5.5 to kW 22



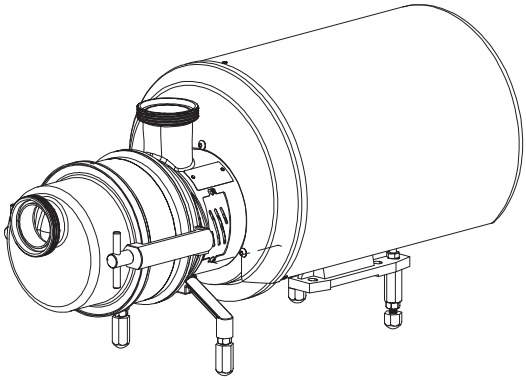
AS - shroudless exec. with adjustable feet, from 5.5 kW to 22 kW



AS - shroudless exec. with fixed feet, from 1.1 kW to 22 kW



AS - shroudless exec. with fixed feet, from 1.1 kW to 22 kW



AS -multistage shrouded version with adjustable feet Shroudless version also available

8.0 - INTENDED USE

8.1 - INTENDED USE

The machine and/or parts thereof must never be used for purposes other than those foreseen in this Use and Maintenance Manual. Observance and strict compliance with the conditions of use, repair and maintenance, as specified by the Manufacturer, constitute essential aspects of the equipment's intended use.
The equipment was designed and built for the uses indicated in chapter 6.0 "Description".

8.2 - PROHIBITED USE



The machine MUST NOT be used:

- By personnel other than those indicated in the previous heading;
- For purposes other than those described in Chapter 6.0 and the previous paragraphs;
- With materials and fluids different to those indicated in the 'intended use' section of the pump manual;
- In atmospheres that are potentially explosive and/or constitute a fire risk;
- If it has not been installed correctly;
- If there are power supply faults;
- In the event of serious maintenance shortcomings;
- The pump must always be used in an environment appropriate to the level of protection of the motor. Always check this on the motor plate before installation



THE PUMP MAY NOT BE USED IN ENVIRONMENTS WHICH REQUIRE A HIGHER LEVEL OF PROTECTION OR A HIGHER SPECIFICATION MOTOR OR ELECTRICAL PARTS.

Components complying with relative safety standards must be used.

- In ambient conditions different to those indicated in Chapter 4.0.



For any use of the equipment different to that indicated herein, the manufacturer reserves the right to review the warranty conditions and validity of the equipment certification.

9.0 - NSTALLATION, HOOK-UP AND START-UP

The equipment is built and assembled on the Manufacturer's premises and is then delivered to the customer.

9.1 - HANDLING AND LIFTING PRECAUTIONS

Handling must be carried out in a manner that avoids any damage.

- When handling with a crane, always rig up the load using at least two ropes/belts.
- When handling with a forklift, the length of the tines must always be greater than the width of the machine and protrude from the opposite side of the load.
- All protective devices, guards and casings must be correctly secured in place.
- When transporting the machine, parts must be protected against possible impact and strain (pay particular attention to electrical components).
- The equipment must be lifted as per the procedures described in chapter 4.0.
- Secure cables and adequately protect connectors.

9.2 - TRANSPORT AND POSITIONING

The machine must be installed in observance of the minimum clearances required for safe use and comfortable manoeuvring of personnel and handling equipment.
The machine MUST be pushed manually, it must not be towed or pushed by any other means.
It must be moved on flat and sound surfaces. It must not be moved on ramps or slopes.

It is important to ensure that the machine is well levelled to avoid vibrations during operation.

Maximum permissible slope of floor: ± 2°.

For further information, see chapter 4.0 on page 12

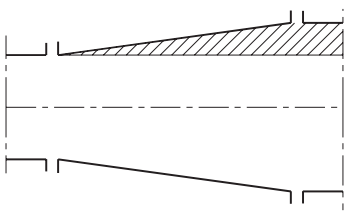
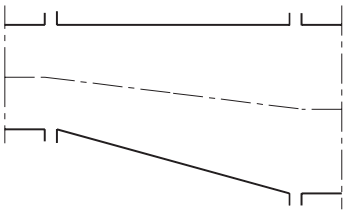
9.3 - SUCTION AND INFLOW CONDITIONS

(NPSH = Net Positive Suction Head)
NPSHa (NPSH available)
In order to ensure pump operation that is free from disturbances (cavitation), it is essential to observe the maximum permitted suction lift **ha geo max** or the minimum allowable head **hc geo min.**
NPSH of pump (available NPSH)
The centrifugal pumps can operate correctly only if vapour has not formed inside. For this reason the static head at the reference point for the NPSH is the centre of the impeller, that is the point of intersection of the pump shaft axis with the vertical plane that passes through the external points of the blade inlet corners.
NPSHr (required NPSH) is the value required by the pump, expressed in metres, obtained from the performance curve. In practice 0.5 m should be added to this value as a safety margin.

9.4 - PIPING

In order to prevent the creation of harmful stresses, the suction and discharge pipes must be connected to the pump ports without the use of force. These pipes must also be supported independently avoiding causing stresses on the pump. The internal diameter must be the same size as the pump connections. It must in any case not be smaller to avoid head loss and/or poor performances. Always use elbows with large radius.

If the pipe diameter changes along the line, use reduction cones, choosing the ones that are most suitable to avoid any formation of air pockets (Pict.1).

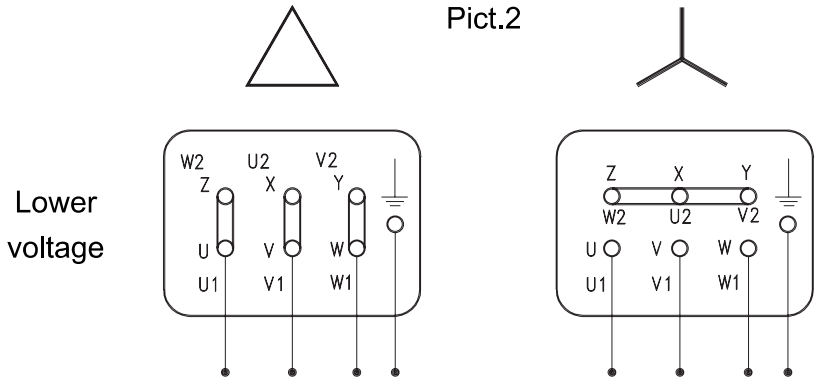
NO  **Pict. 1**  YES

The suction pipe must be as short as possible and rise as it moves towards the pump if it is sucking from a tank. If on the other hand the pump is below the level of the liquid, the pipe should descend slightly. If the pump is used for transporting hot liquids, fit expansion joints to compensate any expansion of the piping. The maximum velocity of the liquid in the suction pipe must not be greater than 3 m/s. Velocities between 1 and 2 m/s are recommended. The suction pipe must be designed in such a way as to prevent air from entering the pump.
For this reason, when sucking from a tank located at a lower level, the pipe must reach below the free surface of the liquid.
Avoid creating obstacles which could increase suction losses disrupting smooth fluid flow. Make sure that there are no restrictions, sharp turns or tight elbows on the discharge line, since these increase disturbance.

9.5 - ELECTRICAL CONNECTION

Make the electrical connection only after plumbing in has been completed; set up the motor control system in conformity with the technical standards and regulations in force (EN 60204-1): in particular a manual electric power switch must be installed with adequate breaking capacity.
In addition, devices for overcurrent and overload protection (e.g. fuses, circuit breakers, etc.) must also be fitted, plus, if necessary, a device to prevent accidental restarting.
Check that the main frequency and voltage and the available power are suitable for the motor installed. All the material used for the electrical connection (cables, cable clamps, switches and shielding) must have a suitable level of protection for the environment in which it is installed.
Be sure to use cables of sufficient cross-section for the current shown on the motor plate so as to prevent them from overheating.
Before doing anything else, make the motor's earth connection, using the terminal on the motor and a cable of sufficient cross-section. The cables may be connected to the terminal board using either a delta or star arrangement. Follow the data given on the motor plate for the main voltage, as shown in the diagram in pict.2; when starting, the motor's current absorption increases briefly to 5-6 times the nominal value. If the mains supply is unable to substain this increase in absorption, use a star-delta starter or other kind of device (e.g. an autotransformer).

Pict.2



C.S.F. Inox S.p.A. will accept no responsibility for damage to property and/or injury to persons caused by failure to comply with the technical standards and regulations in force.

10.0 - OPERATION

10.1 - PRELIMINARY OPERATIONS BEFORE START-UP

Before starting the machine, a series of checks and controls must be carried out to prevent any errors or accidents during the start-up phase.

• Check that the pump has not been damaged during transport, installation and handling.
• Check that all fixed guards are securely attached to the machine.

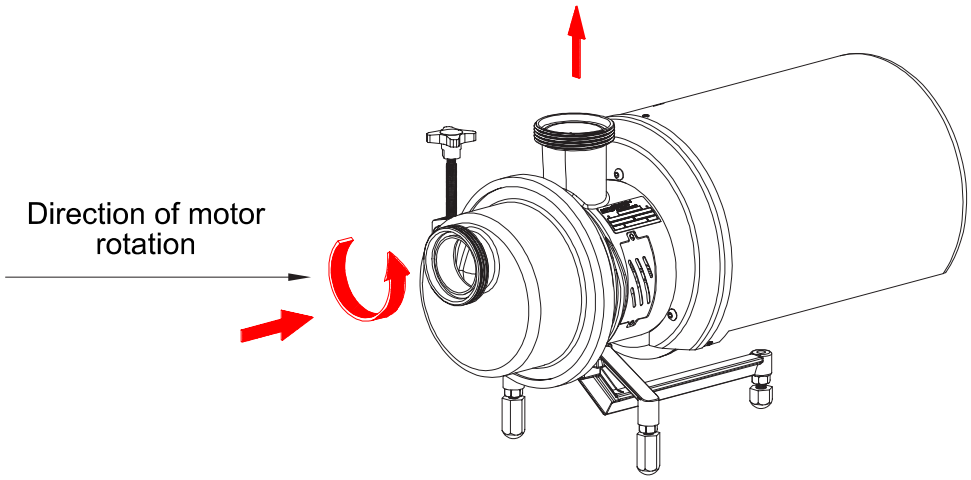
If ever the equipment does not appear suitable for correct and safe operation, TAKE IT OUT OF SERVICE until damaged parts have been repaired or replaced

For first start-up the pump must be filled with liquid to create the necessary vacuum for suction. For subsequent start-ups the quantity of liquid left in the pump will be sufficient for priming even if the piping is empty. Make sure that the pump does not empty completely, in the event of installation under a vacuum or to a siphon.
If necessary, install a check valve.

- Check that the pump turns freely under hand pressure
- Check that the clamp joining the pump casing and the cover is securely tightened; it should not be easily unscrewed by hand.

The clamp must be tightened using a wrench and NOT simply by hand.

- Check that the pump turns in the direction indicated on the pump, as shown in the figure (**counter-clockwise** as seen from the pump side).



- Check that any gate valves on the delivery and suction pipes are open.
- Start the pump and check the direction of rotation again; before restarting, it is very important to wait until the pump has stopped completely.

OPERATING CHECKS

- If the pump does not generate the required discharge head rapidly, stop and repeat the priming operations.
- Check that motor absorption does not exceed the value indicated on the data plate.
- The pump must operate smoothly and without vibrations.
- Do not operate without liquid and avoid operation with the delivery valve closed.

WITH AS SERIES PUMPS, THE DELIVERY VALVE MUST NEVER BE CLOSED DURING OPERATION.

- Mechanical seal: check that there is no leakage along the shaft.

10.2 - EXTENDED STOP

If a period of prolonged inactivity is envisaged, refer to the storage operations described in § 4.3 (page 12) and take the following measures:

- Disconnect the electrical power supply;
- Disconnect the suction and delivery hoses from the pump;
- Store the machine in an indoor location, applying the brakes on the wheels;
- Grease any unpainted parts and make sure the machine does not come into contact with corrosive substances;
- Protect the machine from knocks and mechanical stress;

When stopping the pump for a longer time, empty the pump completely and wash it accurately in order to avoid the formation of scales and/or encrustations.

To return the machine to service after a prolonged period of inactivity, perform the initial controls for first start-up (previous heading).

10.3 - CLEANING THE PUMP

The pump does not require any special washing procedures. The washing cycles normally used for the plant in which it is installed are quite satisfactory. When using the pump for liquids that tend to harden or crystallize, always make sure it is washed before taking the machine out of operation. This will ensure durability of the seal and of the pump itself. It is the user's responsibility to ensure that the washing liquids are compatible with the process liquid and the pump.

For correct cleaning of the pump, please see the washing procedures described in heading 17.0 on page 34.

11.0 - SPARE PARTS

11.1 - RECOMMENDED SUPPLY

RECOMMENDED SPARE PARTS FOR TWO YEARS OF OPERATION FOR THE QUANTITY OF PUMPS INSTALLED IN ACCORDANCE WITH VDMA STANDARD					
Denomination	**NUMBER OF PUMPS** (including reserve)				
	1	**2**	**3**	**4**	**5**
MECHANICAL SEAL	1	2	3	4	4
PUMP BEARING	1	1	1	2	2
PUMP COVER O-RING SEAL	2	3	5	6	7
IMPELLER CAP NUT O-RING SEAL	2	3	5	6	7

C.S.F. Inox declines all responsibility for damage or injury resulting from the use of non-original spare parts

12.0 - OPERATING MALFUNCTIONS

All troubleshooting operations must be carried out by authorized and qualified personnel.

IMPORTANT: before resetting the machine, make sure that the cause behind the emergency stop has been eliminated.



Never carry out maintenance and/or repairs that alter the safety of the machine.

The purpose of this chapter is to provide solutions for the problems or malfunctions that are most likely to occur.
The list below is not exhaustive, if necessary contact the Manufacturer or relative service centre (if present).
We are herewith listing some of the possible working irregularities which may occur using the pumps, with a table helping to find out the possible causes and how to solve the problem

A) The pump does not prime

- Air has got into the suction piping; check the gaskets on the fittings and tighten them properly.
- Suction pipe not submerged in the liquid.
- Increased play between impeller/cover and impeller/ casing, check and rectify.
- No liquid in the pump; add liquid.
- Reduce suction losses, reduce suction height.
- Formation of air pockets; eliminate them by installing an air bleed valve on the delivery line if necessary.

B) Zero flow rate

- Pump not primed; (see point 8 and previous point).
- Incorrect direction of rotation.
- Suction port blocked.
- Shut-off valves (if present) closed.

C) Insufficient flow rate

- Greater system back pressure in delivery; increase piping diameter.
- Air intake via the mechanical seal; check the condition of the seal.
- Liquid viscosity higher than specified in the order; contact the manufacturer.
- Increased play between impeller/cover and impeller/ casing, check and rectify.

D) Loss of head

- System back pressure in delivery has dropped, throttle the delivery pipe.
- Increased play between impeller/cover and impeller/ casing, check and rectify.

E) Increase in absorbed power

- Flow rate is lower than envisaged.
- Greater pump rotation speed
- The impeller is not turning freely, check.
- Viscosity and/or specific weight are higher.
- Bearing no longer in good condition.

F) Increase in absorbed current

- The power required has increased (see previous point).
- Mains voltage value decreased.
- A fault has occurred in the electrical system.

13.0 - SEALS

All CSF Inox C.S.F. series pumps are fitted with mechanical seals with standardized seats in compliance with standards EN12756 and ISO 3069. The type of mechanical seal and material are chosen according to the liquid to be pumped.

Before using the pump for any liquids other than those specified when selecting and ordering, ensure that mechanical seals and gaskets are suitable for the new product.

MATERIAL CODES

METALS

X1 - Stainless steel Inox AISI 316L

RESINS

C1 - Normal PTFE
C4 - Loaded PTFE
F1 - O-RING FEP

ELASTOMERS

P1 - Nitrile (NBR)
E1 - Ethylene propylene (EPDM) (FDA-3A-USPVI)
Y6 - Special Fluorocarbon (FDA-3A-USP VI)
Y1 - Fluorocarbon (FPM-FKM)
W1 - FFPM-FFKM

METAL OXIDES

Z1 - Alumina ceramic

CARBONS

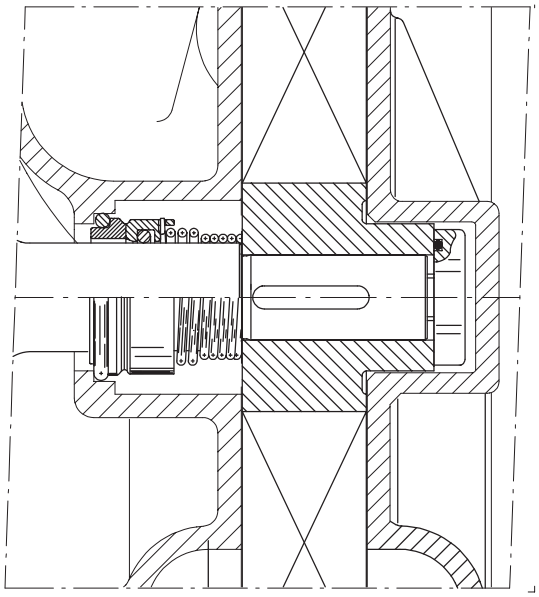
V1 - Normal carbon
V2 - Special carbon

METAL CARBONS

3X - Hard metal welded on stainless steel (TUC)
R1 - Integral hard metal hard metal (TUC)
K1 - Integral silicate carbon (SIC)

"T" EXECUTION- STANDARD MECHANICAL SEAL

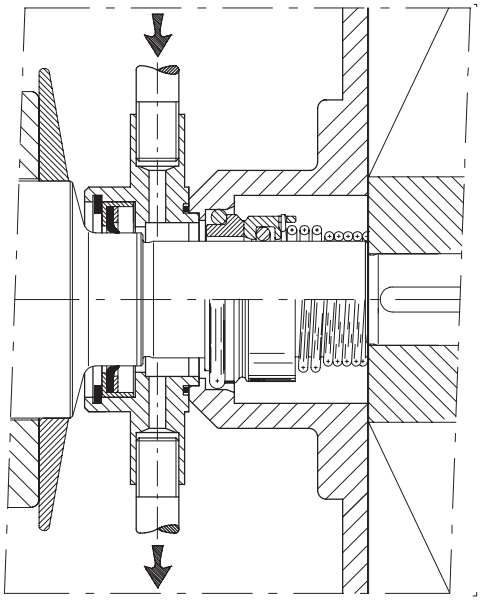
Standard execution foresees the assembly of an submerged internal mechanical seal on the product, housed behind the impeller in a specific tapered chamber so as to guarantee correct circulation conditions.





"V" EXECUTION- INTERNAL MECHANICAL SEAL

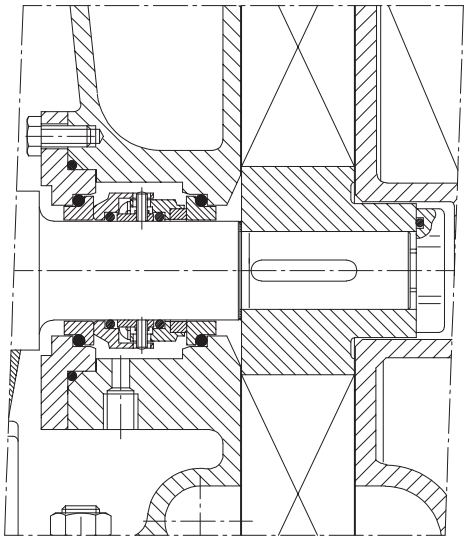
The external chamber for liquid circulation, prevents any damage to the electric motor or contamination of the environment caused by any aggressive or toxic substances leaked from the mechanical seal.





"Q" EXECUTION - COMPACT DOUBLE MECHANICAL SEAL

External double mechanical seal with circulation of washing and cooling liquid. It is used with products that tend to crystallise, to glue, to harden, to be highly abrasive, to reach high temperatures and whenever the seal life is limited. The function of flushing is to clean, lubricate and cool the seal; the circulating liquid must be clean. Any leaks from the seal can be spotted by the traces of handled product seen in the flushing liquid.





“Q” and "V” Exec. mechanical seal auxiliary flushing

At first start up, the filling of the pump must be guaranteed. Furthermore, you must guarantee the full filling of the auxiliary systems, if present, such as the lubrication circuit of the external dual seal (seal execution “Q”) or the external flushing circuit (seal execution “V”).
Lack of compliance with the present requirements causes the dry operation of the pump and of the mechanical seal; consequently the mechanical seal can be overheated and damaged.
The auxiliary services (optional) are the following:
- Flushing for the double external mechanical seal (“Q” execution)
- External flushing for the internal seal (“V” execution).

The following conditions are recommended:

Execution	Speed	Flow rate l/min	Pressure bar
"Q"	1450 - 1750	0.5 - 1.0	1 ÷ 3
"V"	1450 - 1750	0.2 - 0.5	0.5

Exec. "Q": in case of leaks from the process seal (pump side) the flushing liquid comes into contactwith the pump fluid; always use a flushing liquid that is compatible with the process liquid.
The mixing of incompatible liquids can cause strong exothermic reactions with the development of heat.
In the presence of dangerous liquids and /or use of flushed seals (execution “Q”-“V”) the presenceof the flushing liquid must be monitored by means of a system that can intervene to stop the pumpin case of flushing liquid absence.
In the presence of liquids dangerous to health and/or the environment, it is advisable to insert a monitoring device of the seal flushing liquid that can intervene to stop the pump or as an alarm sign, in case of contamination of the flushing liquid.

Operation checks

Verify the presence of flushing of the mechanical seal (execution “Q”-“V”).
Verify the absence of leaks from the auxiliary service connections of the seal (if present).

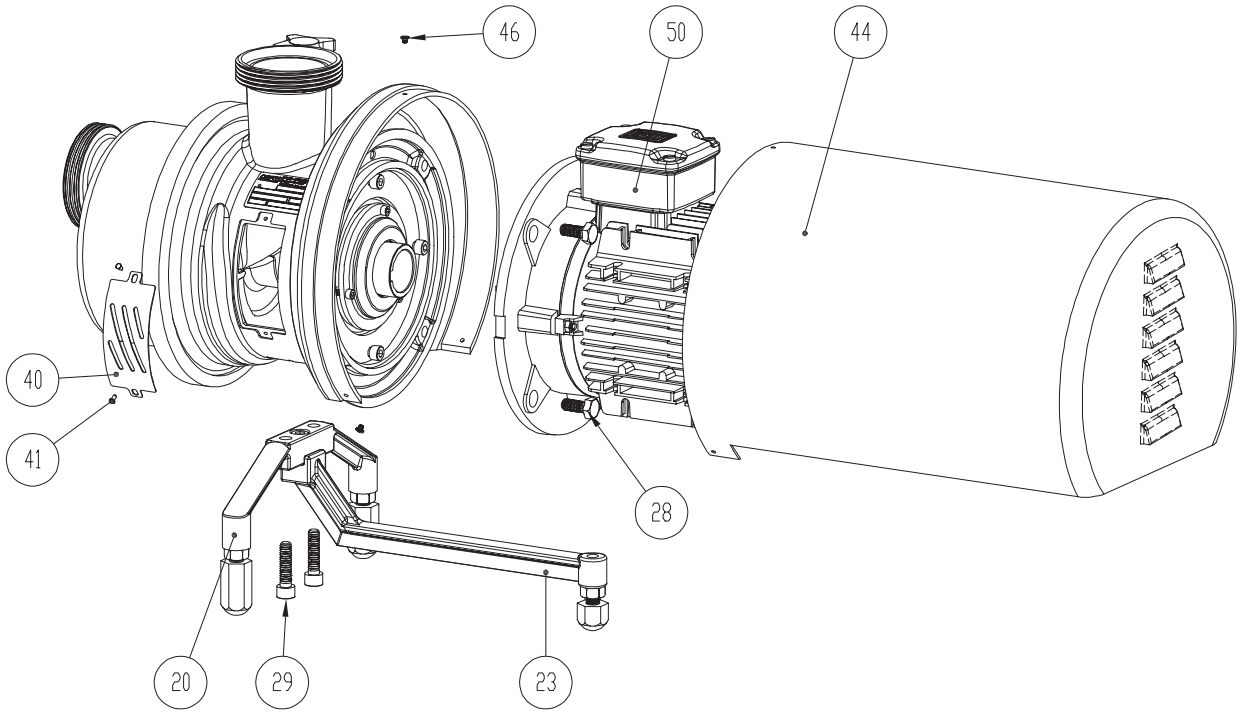
Flushing liquid requirements

The flushing liquid must be compatible with the pumped liquid. It is advisable to use one of the following liquids:
- Water with electrical conductivity of 100 ÷ 800 µs/cm
- Water and glycol mixture
- Glycerine

14.0 - PUMP DISASSEMBLY

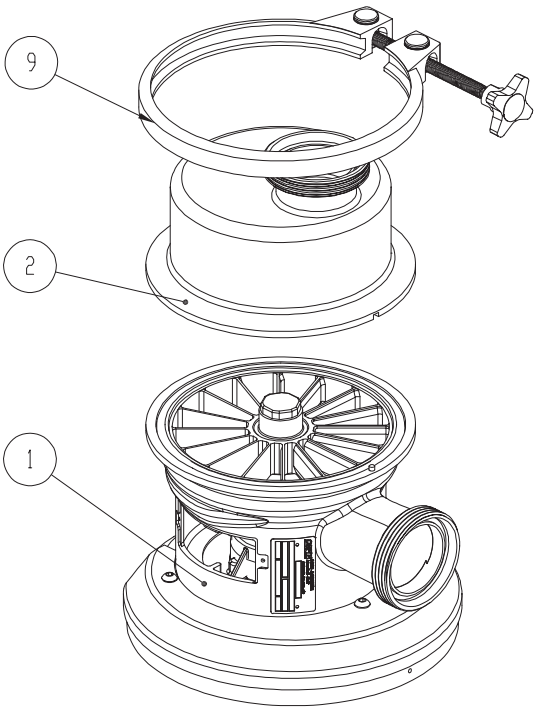
14.1 - DISASSEMBLY OF PUMP - "T" EXEC. (version with single internal mechanical seal)

1. Remove the screws (43-41) to disassemble shroud (44) and protections (40). Now free the motor (50) by unfastening the screws (28) and taking it off the pump. Disassemble the front (20) and rear (23) foot by removing the screws (29).

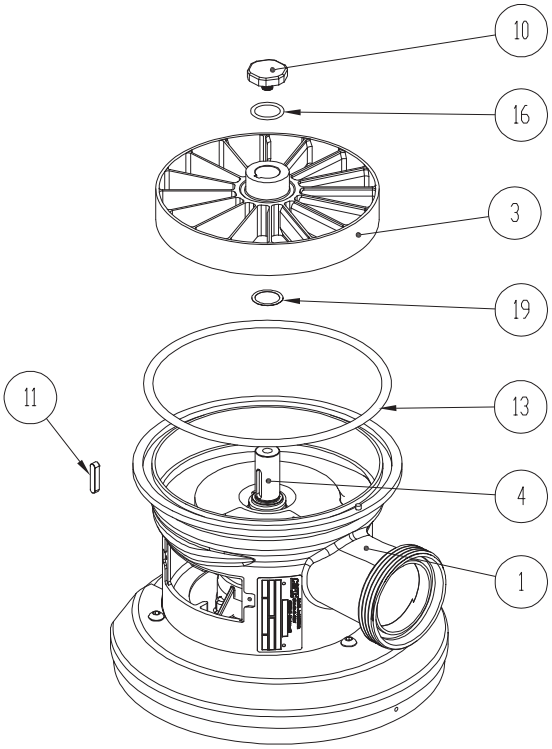


N.B.: THE FOLLOWING OPERATIONS MUST BE CARRIED OUT PLACING THE PUMP UPRIGHT.

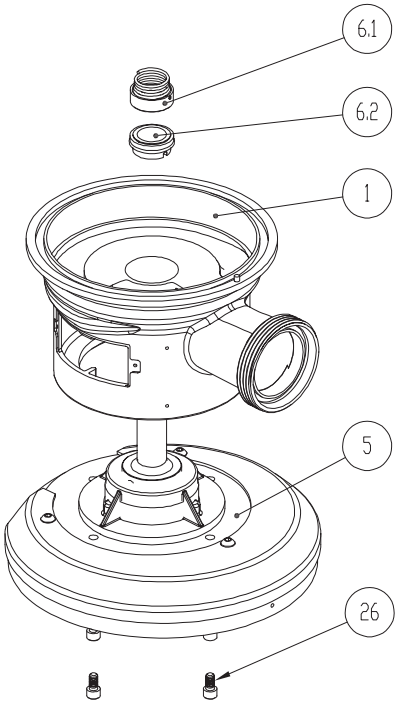
2. Loosen and remove the clamp (9) to separate the cover (2) from the casing (1).



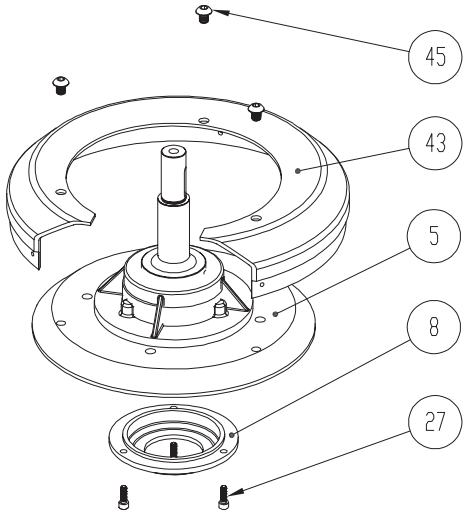
3. Remove the nut (10) (by turning it anti-clockwise) and take off the O-ring (16). This operation can be performed using an air ratchet or hand wrench, blocking the shaft on the motor side. Take apart the casing (1), impeller (3), shims (19) (that ensure the correct assembly clearance) and O-ring (13) and remove the key (11) from the shaft (4).



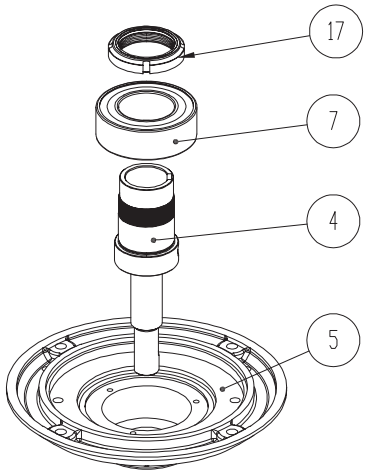
4. Extract the rotary part of the mechanical seal (6.1) turning the spring anti-clockwise. Turn it over to get to the screws (26) which allow you to separate the casing (1) from the support (5). Extract the fixed part of the seal (6.2) from the casing (1).



5. Remove the screws (45-27) to respectively remove the eccentric shroud (43) and bearing cover (8) from the support (5).

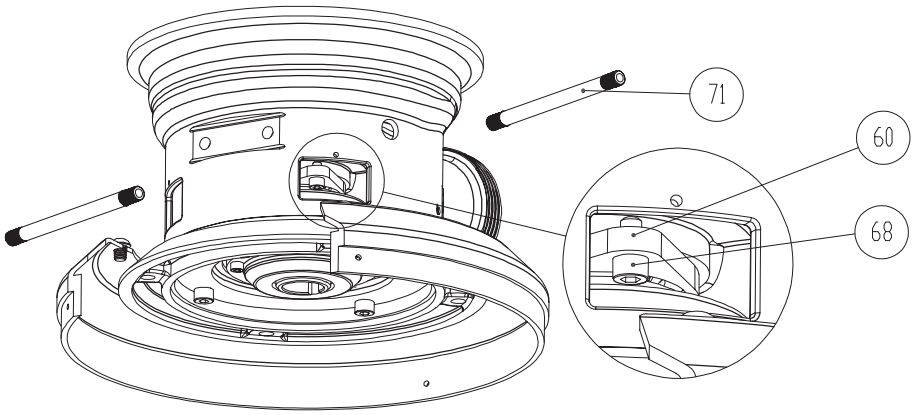


6. Extract the shaft (4), bearing (7) and ring nut (17) from the support (5). Unscrew the ring nut (17) and take the bearing (7) off the shaft (4).

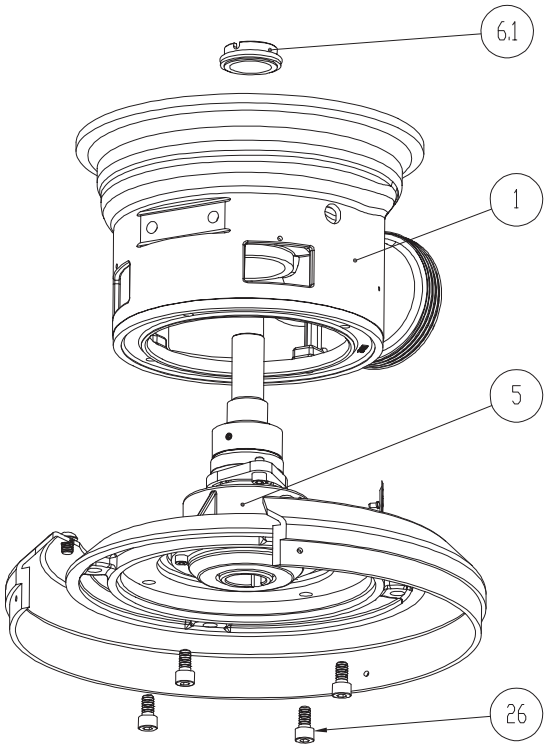


14.2 - DISASSEMBLY OF PUMP "Q" EXEC. (Version with double mechanical flushed seal)

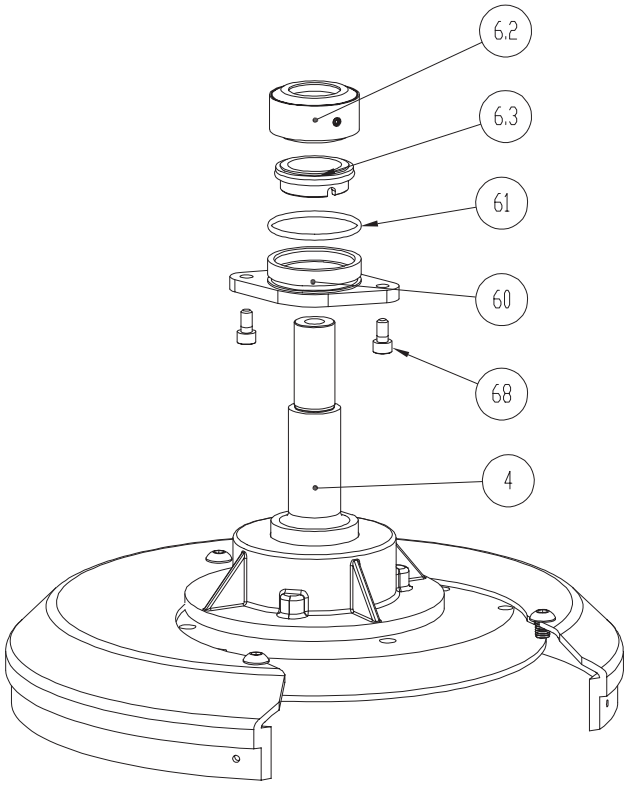
1. Perform the operations 1, 2 and 3 as described in the previous heading 14.1.
2. Unscrew the flushing pipes (71), remove the screws (68) and pull back the mechanical seal cover (60).



3. Remove the fixing screws (26) to separate the casing (1) from the support (5). Remove the internal fixed part of the seal (6.1) from the casing (1).



4. After loosening the fixing grub screws, remove the rotary part (6.2) and the cover (60) with the O-ring (61) and the screws (26) from the shaft (4). Then separate the external fixed part of the seal (6.3) from the cover (60).



5. Perform the operations 5 - 6 as in the previous heading 14.1.

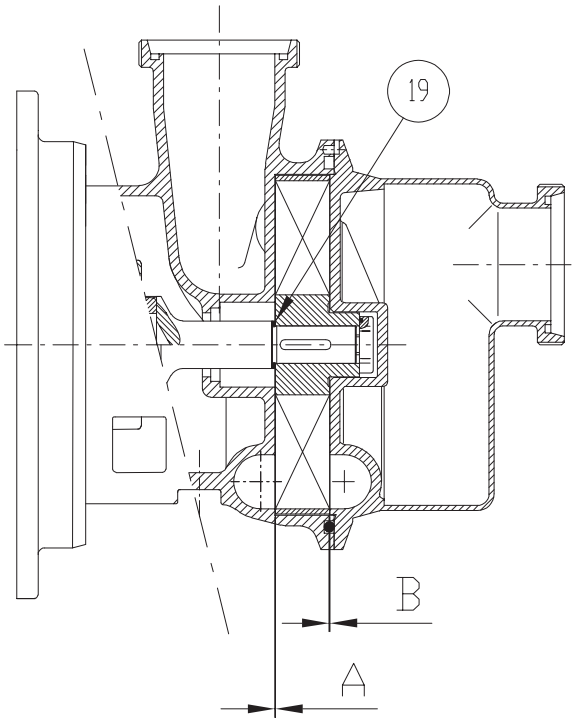
15.0 - PUMP ASSEMBLY

15.1 - DISASSEMBLY OF PUMP "T" EXEC. (Version with single internal mechanical seal)

Carry out the assembly operations described in the previous heading 14.1 in reverse order to obtain the sequence of steps needed to assemble the pump.

N.B.: To observe assembly allowances, see the table below:
value **A** refers to the impeller/casing assembly allowance, achieved using shims (19), whereas value **B** represents the assembly allowance between the impeller and the cover.

Pump	Dimensions	
	A	B
AS 40	0.15	0.15
AS 50	0.15	0.15
AS 60	0.2	0.2
AS 65	0.2	0.2
AS 80	0.3	0.3
AS 42	0.15	0.15
AS 52	0.15	0.15

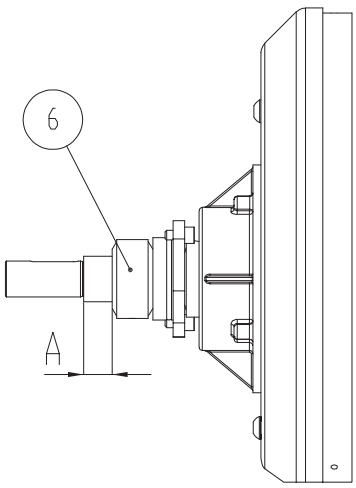


15.2 - ASSEMBLY OF PUMP "Q" EXEC. (version with double mechanical flushed seal)

Carry out the assembly operations described in the previous heading 14.2 in reverse order to obtain the sequence of steps needed to assemble the pump.

N.B.: the position of the rotary part of the seal (6) must observe value "A" indicated in the table below.

Pump	Value "A" mm
AS 40-42	16
AS 50-52	17.5
AS 60-65	15.5
AS 80	19.5



16.0 - MAINTENANCE

SAFETY DURING MAINTENANCE OPERATIONS

When carrying out maintenance and/or repair work, always observe the following instructions:

- Before carrying out any type of maintenance or repair work, always isolate the machine from all power supplies (see chapter 9.0 on installation).
- Before starting work, put up a "MACHINE UNDER MAINTENANCE" sign where it is clearly visible.
- Do not use solvents or flammable products for cleaning.
- Take maximum care not to disperse lubricating oils or grease into the environment.



Maintenance/repair work must be carried out ONLY AND EXCLUSIVELY by qualified, trained personnel.



Repairing or cleaning moving parts is strictly forbidden.

When carrying out maintenance or repair work, it is advisable to abide by the following:



- When handling the products, wear protective gloves against mechanical and chemical risks, overalls (trousers must always be worn outside safety shoes) and safety glasses.
- Check the product safety data sheets and the manuals for the machine/component on which you are working to see if there are any special PPE requirements.
- At the end of maintenance operations, always restore any safety devices/guards that may have been removed/opened and check that the machine can resume normal operating conditions.
- In the event of an anomaly, find the cause and resolve it before putting the machine back into operation (see previous chapter).

16.1 - BEARINGS MAINTENANCE FOR AS SERIES PUMPS

In AS series pumps up to motor size 132 (5.5 – 9.2 kW) the bearings installed are shielded and consequently do not need to be lubricated.

16.2 - BEARINGS MAINTENANCE - AS PUMPS WITH SUPPORT, SIZE 160-180

The bearings of AS series pumps are sized for an operational life of 20,000 service hours or more. The life of the bearing and feasible re-lubrication interval may be reduced in the following cases: harsh working conditions (high ambient temperature and humidity, dust, aggressive atmosphere), use with frequent starting and stopping cycles and/or at variable loads and extended periods of inactivity. Maintenance intervals are therefore to be established according to the conditions of use and based on acquired experience.

In AS series pumps with housing size 160 – 180 the bearings must be lubricated periodically; to ensure correct lubrication, the bearing must be disassembled, cleaned thoroughly and lubricated with fresh grease, making sure only to fill the crowns to half their volume. They can be topped-up with grease periodically via the grease nipple on the bearing housing (see pict. 3).

Each time the bearing is disassembled, replace the grease lip sealing gasket (pos.33), making sure the ring sealing seat is not worn.

To lubricate the bearings correctly, we recommend using high performance grease SKF LGHP2 with temperature range -30°C/150°C.

Pict.3



The following table provides indications on the re-lubrication interval on the amount of grease to be used and the type of bearing on the pump:

AS Pump	Bearings	Lubrication interval (service hours)	Q.ty grease (grams)
Motor IEC 160	3212 A C3	5000	20
Motor IEC 180	3214 A C3	5000	20

17.0 - CLEANING PROCEDURE

Use suitable personal protective equipment during cleaning operations.

17.1 - EXTERNAL CLEANING

Periodically clean the external parts of the pump and motor to prevent dust and deposits building up which could reduce heat dissipation and/or damage the external surfaces.

17.2 - CLEANING OF INTERNAL PARTS

Before performing any maintenance work which requires disassembly of the pumping parts, carry out internal cleaning by running the pump with washing fluids compatible with the pumped fluid and the pump itself.
If the pump needs to be sent back to C.S.F. Inox for maintenance/repair work, fill in the Declaration of Decontamination (page 36).

17.3 - CLEANING OF FOOD-CONTACT PUMPS

When a pump is intended to handle food products, it must be perfectly clean before it is put into operation.

This can be achieved by performing a CIP (cleaning in place) washing procedure or by disassembling the pumping part for manual cleaning.

It is up to the user to choose the most suitable cleaning method based on the type of food product being handled and the processing stage in which the pump is used.
In the case of CIP, the user is responsible for selecting the necessary detergents, operating temperatures and detergent product concentrations based on the type of food product being pumped.

The duration of each step in the CIP washing cycle depends on the type of dirt/residue that needs removing.
It is important to check the compatibility of the chemical products and operating temperatures used in the washing cycle with the pump components specified in the data sheet (elastomers, mechanical seal).

The cleaning process must also be carried out in the following situations:
- Before a long period of non-use
- Before any disassembly operations for maintenance work and after subsequent reassembly if worn parts have been replaced.
- Before restarting after a long period of non-use.
- At intervals established by the user based on the characteristics of the pumped products and the type of process in which the pump is used, in order to guarantee food product hygiene.

It is the user's responsibility to verify the effectiveness of the cleaning procedure adopted.

Alkaline detergents:

A sodium hydroxide/water solution may be used at concentration 1-3% at a temperature of 70-90°C; a surfactant could be added to increase the rinse cleaning.

Acid solution:

It is used to neutralize alkaline residual and for the passivation of the stainless steel surface; a solution of nitric acid at 1-2,5% could be used at ambient temperature up to 45°C.
Other acid solution could be: citric acid and water (0,5-3% at 70°C) and phosphoric acid at 0,5% with a temperature up to 45°C (with inhibitor of corrosion).

17.4 - CIP WASHING PROCEDURE

A typical example of a CIP washing procedure is described below:

a) Prerinse with cold water (15-25°C) for 10-15 minutes to remove any residue.
b) Warm prerinse with water at 45-60°C for 10 minutes.
c) Rinse with alkaline solution at 70-80°C for 20-30 minutes.
d) Intermediate rinse with water (warm or cold) up to 60°C for 5-10 minutes.
e) Rinse with acid solution like nitric acid for 10 – 15 minutes at ambient temperature.
f) Final rinse with cold water for 10-15 minutes or until any traces of cleaning agent have been removed.

Warnings:

a) During the CIP process there are thermal expansion: take care that there are not rapid temperature variations.
b) Chemical agents at high temperature can cause potential health risk: respect the safety regulation and use personal protective equipment.
c) Control the concentrations and temperature of chemical agents during the CIP.
d) Store the cleaning agents in compliance with the safety regulations.

Sterilization:

If requested, a sterilization can be carried out by means of hot water or steam; the pump must be stopped during the sterilization process with steam.
See the admissible temperature for sterilization depending on gasket compound

Elastomers / temperature limits	Steam/hot water	Chemical bactericidal
EPDM	121°C	82°C
FPM/FKM	149°C	82°C

Impeller cap nut cleaning and sterilization:

1) The dismantled cap nut must be cleaned before assembly (internal thread).
2) Clean the cap nut with an ultrasonic cleaning system or detergent followed by rinsing with clean water.
3) Sterilize the cap nut using steam at 143°C for 30 minutes in an autoclave or using chemicals (for example glutaraldehyde-based solutions). Do not use chlorine solutions because stainless steel could be damaged by corrosion.

DECLARATION OF DECONTAMINATION

In observance of the legal provisions in force and to protect the health and safety of our personnel, you must fill in, sign and return this declaration to us before we can processyour order. Please make sure that the same declaration is attached to the outside of the packaging.

Shipping address: **C.S.F INOX S.p.a.** Strada per Bibbiano, 7 42027 Montecchio E. (RE), Italy	**For information contact:**

***Mandatory fields**

* Pump: _ *Serial Number: _

Commissioning date: _

* Field of application: _

Fluid handled: _

Process data: Temperature: _ _ _ _ _ _ _ _ _ _ _ _ [°C] Pressure: _ _ _ _ _ _ _ _ _ _ _ _ _ _ [bar]

Flow rate:_ _ _ _ _ _ _ _ _ _ _ _ [m^3/h] Viscosity:_ _ _ _ _ _ _ _ _ _ _ _ [mm^2/s]

*** Product and warnings:**

	Product/ concentration	Flammable	Toxic	Corrosive	Hazardous/ irritant	Other**	Harmless
Processing product		☐	☐	☐	☐	☐	☐
Cleaning product		☐	☐	☐	☐	☐	☐
Parts cleaned by		☐	☐	☐	☐	☐	☐

**** Explosive; oxidant; harmful for the environment; biological risk; radioactive.**
Please mark the appropriate warning, include the material safety data sheet and, if necessary, any further specific warnings.

*** Reason for returningitem/s:**

_ _

_ _

* ☐ Particular safety precautions for further handling are not required

* ☐ The following precautions are required in the case of cleaning liquids, fluid residues and disposal:

_ _

_ _

Company details:

Company: _ Phone no.: _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

Contact: _ Fax: _

Address: _ Email: _

Your order number:_ _

‘ We hereby certify that this form has been filled in to the best of our knowledge and in accordance with the legal provisions in force. Furthermore, we certify that the parts have been carefully cleaned and to the best of our knowledge are free from residues in quantities which could be deemed harmful. ’

Place, date ……

Name, department ……..

Signature

……

18.0 - WASTE DISPOSAL AND DECOMMISSIONING



The pump, complete with electrical drive system, is a plant component which must be disposed of in accordance with regulations governing the disposal of waste derived from professional electrical and electronic equipment.

Neither the pump nor any of its parts may be disposed of with household waste.

18.1 - PACKAGING MATERIALS

The packaging material consists of wooden or cardboard boxes, polyethylene shrink-wrap covers and polyurethane foam, galvanized steel screws, polyester belts.
Wooden or cardboard boxes and screws can be recycled or sent to authorized waste disposal facilities.
The remaining packaging materials must be sent to authorized waste disposal facilities.

18.2 - WASTE RESULTING FROM MAINTENANCE OPERATIONS

All materials replaced during maintenance operations must be disposed of in compliance with current regulations and sent to an authorized waste disposal facility.
Consult the pump's bill of materials, supplied with this manual, to identify the materials used to make the replacing components.
All replaced metal parts must be sent to metal recycling centres; plastic or elastomeric parts and spent lubricants must be disposed of at authorized waste disposal facilities.

18.3 - DISPOSAL OF THE PUMP

For disposing the pump please observe the following instructions:
- Disconnect electrical and hydraulic connections according to technical rules and laws in force.
- Disassemble all components of the pump for separate dismantling; wash the components and clean the structure accurately.

The main components of the pump are made from the following materials:
- Pump casing, cover, impeller, shaft, impeller nut: AISI 316L stainless steel (for special alloy pumps, see the bill of materials)
- Elastomers/Polymers NBR-EPDM-FKM-FFKM-PTFE
- Support and external parts: AISI 304, cast iron with corrosion proof treatment
- Other components: composite mechanical seals, stainless steel and elastomers, ball and roller bearings.
- Motor: Aluminium - Cast Iron - Copper (consult the manual supplied by the manufacturer)
- Spend oils and greases

For further details, consult the pump's bill of materials, supplied with this manual, to identify the materials used to make the various components.

There are no components containing asbestos, cadmium or lead, PBB or PBDE.

The components of the pump should be properly got rid, according to the corresponding rules in force in receiver's country.

DECLARATION OF CONFORMITY

The company: **C.S.F. Inox S.p.A.**

based in: **Strada per Bibbiano, 7**
Montecchio Emilia (R.E.)
ITALIA

hereby declares, under its sole responsibility that the pump:

SELF-PRIMING PUMP

Type XXX

Serial no. XXX Year XXX

CE Declaration of Conformity (Ann. II.A, 2006/42/EC)

to which this declaration refers, is in conformity with safety requirements according to Directive 2006/42/EC.

Name and address of the person authorized to compile the technical file:
C.S.F. Inox S.p.A. Strada per Bibbiano 7 - 42027
Montecchio Emilia (RE) ITALY

Applied Regulations:

EN 12100 2010
EN 809 2009

Food products-contact suitability declaration

is made with materials suitable to come in contact with food
according to the regulation (EC) no. 1935/2004.

2014/35/EU : electrical material intended for use within certain voltage limits.

Montecchio Emilia, XXX

The Chairman Mr. Rolando Paterlini

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