

TECHNICAL SERVICE
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AIR OPERATED PISTON PUMPS

PA Series



**INSTRUCTIONS FOR INSTALLATION,
OPERATION AND MAINTENANCE**

"Translation of the original instructions"

INDEX

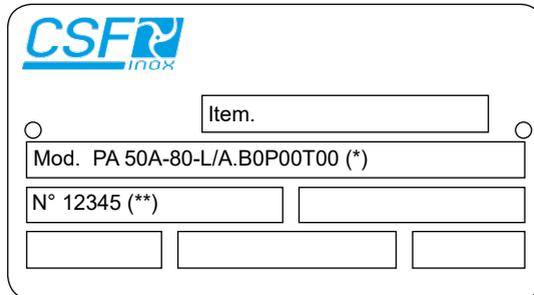
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FOREWORD

- 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.
- When requesting information, spare parts or assistance, always specify the pump type (*) and serial number (**) in order to ensure fast and efficient service: the complete code is given on the plate and in the purchase documents.



The image shows a rectangular plate with rounded corners. At the top left is the logo for CSFR inox, with 'CSFR' in blue and 'inox' in a smaller blue font below it. Below the logo is a rectangular field labeled 'Item.' with a small circle to its left. Underneath that is a larger rectangular field containing the text 'Mod. PA 50A-80-L/A.B0P00T00 (*)'. Below this is another rectangular field containing 'N° 12345 (**)' with a small circle to its left. At the bottom of the plate, there are three empty rectangular boxes arranged horizontally.

Plate example

1 SYMBOLS

	<i>Pay great attention to the text parts indicated by this symbol.</i>
	<i>Danger: the non-observance of instructions can cause serious damages to persons and/or objects.</i>

2 SAFETY WARNINGS

When the pump is working the following occurs:



- Mechanical parts are moving.
 - Pump body, pipelines and articulations are under internal pressure.
 - Do not loosen or remove guards, fasteners or screws during operation since this may result in serious injury to personnel or damage to property.
 - Watch out for leaks from the seal, the suction port or above all the discharge port when pumping hazardous or toxic liquids. Install adequate monitoring and liquid recovery systems and provide a suitable hazard notice.
 - It is the user's responsibility to mark the pump as an "overheated area" or to use suitable guarding when used to pump liquids at a temperature higher than 60°C.
 - The pump must not be moved during operation.
 - Installation must ensure an adequate space for maintenance operations.
- Before carrying out any operation which requires to disassemble the pump (inspection, cleaning, seal replacement, etc.), the following preliminary operations have to be carried out:
- close the compressed air inlet tap and disconnect the supply pipe to the motor;
 - close valves on suction and outlet pipelines, in order to avoid the risk of inundation;
 - use adequate protections for hands and face, if the pump contains liquids which are injurious to health (for example acids, solvents, etc.);
 - consider if the liquid which flows out of the pump when disassembling is dangerous and arrange for adequate safety measures.

3 GUARANTEE

All products manufactured by C.S.F. Inox 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. Excluded from the guarantee other than distinctive wear and tear are repairs to damage caused by improper use, abrasion, corrosion, negligence, defect of installation, non-observance of inspection and maintenance, use of non-genuine spare parts, cause of accident or fortuity and from any action carried out by the purchaser not according to the normal instructions of the manufacturer.

WARNING 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. Any item must be properly packed in order to avoid damages during the transferring and **a technical report explaining the fault occurred, must accompany the returned item/s.**

Any item with a presumed fault should be returned to C.S.F. Inox S.p.A. with shipment costs at purchaser's charge, unless different agreements are given.

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 debit 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. Commercial parts incorporated in C.S.F. products are guaranteed by their corresponding manufacturers.

4 GOODS TRANSPORTATION, RECEIVING AND TRANSFERRING

4.1 TRANSPORTATION

The packings of all pumps manufactured by C.S.F. Inox - S.p.A. are defined when placing the order. Unless prior arrangements are given, goods will be packed only for transit conditions and not for long-term storage; in case it should be necessary to store the pumps outside, you are requested to cover the pumps appropriately in order to protect the air-motor parts from rain, dust, humidity etc.

4.2 RECEIVING

WARNING By goods receiving, the wholeness of packing must be verified, in order to identify possible damages to the content occurred during transferring and to claim them immediately to the carrier. Should any damage be ascertained, the following procedure must be observed:

- collect the goods with reservation;
- take the necessary pictures showing the damages;
- notify the suffered damages, by registered airmail, to the carrier by sending at the same time the pictures taken to show the damaged pieces.

4.3 TRANSFERRING



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.

The material used for packing (wood, paper, cellophane, etc.) should be properly got rid, according to the corresponding rules in force in receiver' s country.

After unpacking the pump, use special lifting belts and move the pump-motor-set to the place of installation.

5 DESCRIPTION

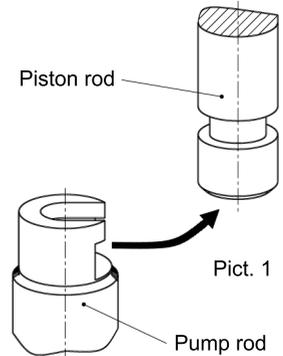
The PA series pumps are operated by compressed air with a double-acting piston. They are intended for professional use and are constructed in two different versions:

PA...I series - industrial version

PA...A series - hygienic version

They consist of a compressed air motor, a connecting support that holds the pump body, a cylinder that contains the pumping piston and the valves. The suction port is located in the bottom section of the cylinder while the discharge port is situated on the side of the pump body.

The pump and the motor are coupled by a threaded connection in the PA...I version and with quick-release clamps in the PA...A version in order to facilitate disassembly and allow for rapid cleaning and washing. Piston rod and pump rod are connected by a bayonet-type coupling (Pict.1).



5.1 SEALS

Various types of seal can be fitted on air operated pumps.

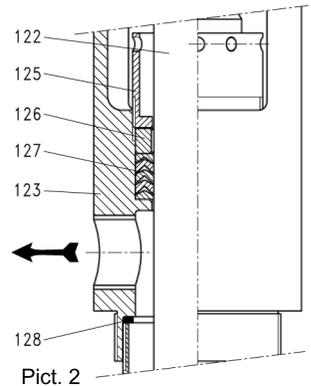
The choice of design and material will depend on the type of liquid being pumped, the operating conditions, temperatures, pressures, etc.

5.1.1 CHEVRON SEALS

The CHEVRON SEALS consist of a number of inverted V-section rings enclosed between the bottom and top ring (Pict.2). Screw down the pressure ring to obtain the pressure needed to seal the rings against the shaft.

WARNING WHEN FIRST STARTING, ADJUST THE PRESSURE RING TO OBTAIN OPTIMAL CONDITIONS.

If, during operation, there is a leakage of liquid, stop the pump in order to check the tightening of the nut, and, in case, provide with the nut registration. If it is too tight, it can slow down the operation of the pump and lead to overheating and rapid wear of the rings and the shaft. **WARNING** DO NOT OVERTIGHTEN THE SEAL.



5.1.2 "DI" SEALS

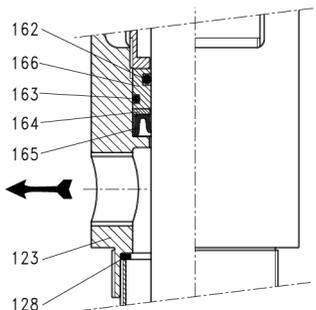
The "DI" SEALS consist of lipseal rings and O-rings enclosed in the housings created in the DI holding rings (Pict.3).

The fit of the rings to the shaft and the seal chamber is determined by the working tolerances, so these seals REQUIRE NO ADJUSTMENTS.

5.1.3 "H" SEALS

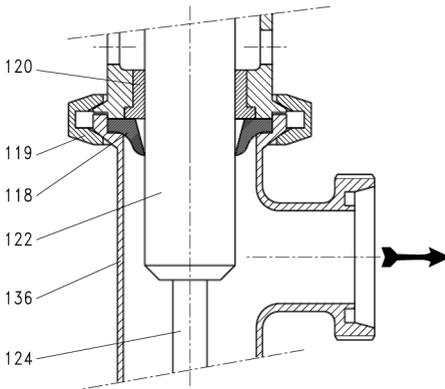
The "H" seal consists of a scraper ring clamped between two members with a tolerance fit onto the shaft (Pict.4).

The working pressure is determined by the construction dimensions. This type of seal can be mounted on its own or combined with CHEVRON seals (Pict. 5) or "DI" seals

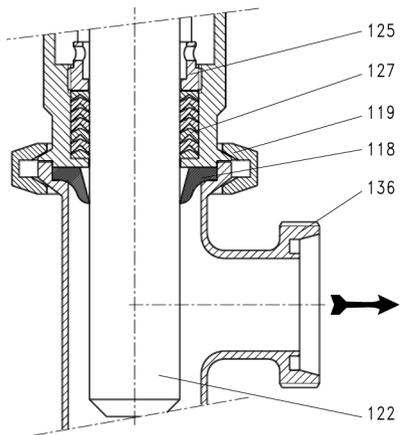


Pict. 3

WARNING All seal types are produced in different materials depending on the liquid to be pumped.



Pict. 4



Pict. 5

6 APPLICATIONS

These pumps are designed to meet the widest range of requirements for the handling of liquids, including those with extremely high viscosity.

They are used to transfer liquids from one container to another, for feeding, spraying, for circulation systems and applications requiring an adjustable flow rate. With the compressed air motor they are also suitable for dangerous and hazardous environments (explosion proof).

7 NON-PERMITTED USES

WARNING If the air operated pumps are used for flammable and/or explosive products, always check that the pressure to be generated by the pump is lower than the product's self-combustion level.

8 INSTALLATION AND STARTING

8.1 CONNECTING TO THE COMPRESSED AIR SUPPLY

Connect the compressed air supply to the pneumatic motor input using a \varnothing 1/2" gas pipe.

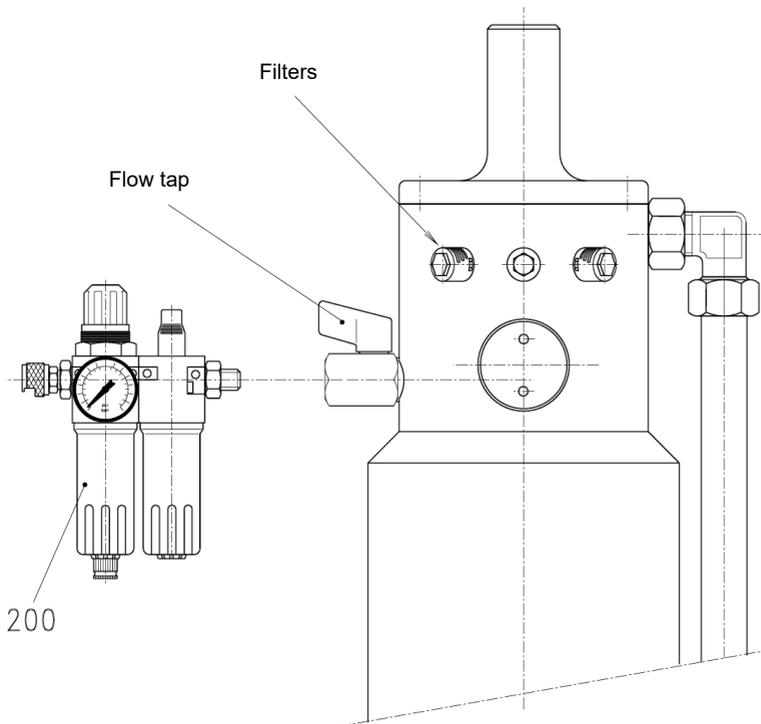
If the compressed air from the supply is not lubricated, install an oil filter nebulizer (art.200) unit between the pump and the air supply in order to ensure maximum durability of the motor unit seals.

The lubrication oil in the nebulizer must be suitable for pneumatic cylinders, it should be extremely fluid (density about 10 SAE) and in compliance with regulations regarding accidental contact with food (e.g. approved in accordance with NSF H1 certification). The quantity of oil to be vaporized into the air should be regulated by means of the screw located on the nebulizer so that a drop can be seen to fall approximately once a minute. The PA series pumps are fitted with a flow tap and air discharge silencer filters onto the holes on the motor.

WARNING The supply pressure must be between 3 and 8 bar depending on the back pressure.

8.2 HYDRAULIC CONNECTION

Connect the suction and discharge pipes, inserting suitable seals for the type of fitting and the type of product to be pumped. Run the pump briefly to check that there is a perfect seal.



Pict. 6

Take great care because the pneumatic pumps are capable of generating pressures of up to 150 bar. Always use discharge pipes of an appropriate size for the pump model.

8.3 FLOW ADJUSTMENT

Use the flow tap to adjust the flow rate of the pump, closing the air supply to a certain degree. This changes the number of pumping cycles and consequently varies the flow rate. Since this is a piston pump, the product flow pulsates. If necessary it can be linearized by using an air-cushion damper on the discharge (art.52). The discharge pipe can be throttled using a control valve and can even be closed completely. In this case the pump will be in a state of equilibrium and hence stop.

8.4 MOUNTING THE PUMP

The short type pump can be fitted to a wall bracket (art.55) or mounted on a fixed or movable trolley (art.53), connecting the suction port to the pipe or hose immersed in the liquid. With the standard long type pump, the pump itself must be immersed in the liquid through the drum or tank lid and held in place by a clamp (art.50 and 51) or installed on a fixed or trolley-mounted column (art.54) so that it can be raised or lowered when changing the tanks. Other customized applications are possible depending on the type of installation required.

9 MAINTENANCE AND INSPECTION

- 1) Drain the water frequently from the filter separator to prevent water from entering the motor cylinder chamber, as it would freeze due to the frequent compression and expansion cycles during operation locking the pneumatic motor.
- 2) Avoid immersing the drive head in solvents since air could enter and enable the solvent to dissolve the synthetic rubber parts of the motor piston and the O-rings.

3) Ensure that the pump is thoroughly washed before being put back, especially if pumped products are prone to hardening, such as plaster, resin, paint, etc., as the solidified product could lock the pump shaft to its seal or the piston ring to the cylinder.

4) Fill the packing nut with solvents, in presence of sticking products, to avoid seal wear. Check the level periodically and top up if necessary.

9.1 EXTENDED STOP

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. When starting the pump again, please follow the above-mentioned instructions.

9.2 CLEANING THE PUMP

Wash the pump carefully after pumping particularly viscous or corrosive products in order to prevent vital parts from locking:

1) push on the bottom valve (with a tool) to drain the lower section of the pump.

2) Turn the pump upside down and drain out the rest of the liquid through the discharge port.

3) Place the pump in a tank containing a suitable solvent or cleaning liquid and operate the pump.

Allow the washing liquid to flow until you are sure that the pump is perfectly clean.

4) For more thorough cleaning, take off the cylinder port and wash the entire unit.

10 DISASSEMBLY AND ASSEMBLY

If you have to carry out work on the pump, close the compressed air inlet tap and disconnect the supply pipe to the motor.

Disconnect the pump from the motor and check whether the rod (122) is blocked. If the rod and the ring (131) are blocked due to solidification of the previously pumped products, introduce solvent through the suction port and shake the pump, waiting for the solvent effect.

Unscrew the casing (123) from the cylinder (136) so as to expose the pumping piston.

Remove the port (140-145-146) from the cylinder and the ring nut (125) and the seal (127) from the casing (123). Remove the rod with the piston, then take off the piston parts (114-131-132-133-134-135-141) from the rod/stud bolt (122-124).

Clean carefully to bring the valve surfaces and seats back to good condition. Replace worn components. Then reassemble, starting from the casing (123) with the seal (126) and the ring nut (125), applying light pressure to tighten. Set up the rod (122) with the stud bolt (124) and the complete piston, tightening the lock nuts (113-114) (check that the stud bolt does not protrude more than 1-2 mm inside the piston). Where there is no lock nut, use Loctite or a similar semi-locking product.

Lubricate the rod with neutral oil so that it slides easily on the seal, then insert it into the sleeve.

Set up the gasket (128) and add the cylinder (136), taking great care when inserting the lipseal rings (134). Push the cylinder as far as it will go and screw the sleeve down tightly.

Always use neutral oil to facilitate sliding. Finish with the suction port (140-145-146) fitted with valve (139, 147-160) and stop pin (137), interposing the gasket (138).

Connect the pump and the motor and screw down tightly (for the hygienic type there are quick-release clamps).

When first starting, adjust the pressure ring.

11 WORKING IRREGULARITIES

11.1 THE PUMP DOES NOT START

- 1) Check that there is an adequate air supply to the pneumatic motor.
- 2) Check that the air flow regulator at the inlet is not obstructed, as this would prevent air from being supplied to the motor.
- 3) Check that the pipe has no closed valves and that it is not obstructed by hardened product.
- 4) Check whether the fault is caused by the motor or the pump. (Disconnect the motor and try running it on its own).
- 5) Check the pump (without the motor) if it has locked.

11.2 THE PUMP RECIPROCATES BUT THERE IS NO FLOW:

- 1) Short type pump: the flexible suction hose has a hole or is not immersed in the product and the pump sucks air.
- 2) If a filter is fitted on the suction port, it is clogged.
- 3) Some foreign matter has come in between the valve (132-139) and its seat and this prevents it from closing properly. Remove the material.
- 4) The piston rings (134) are very worn, preventing the pump from generating the pressure drop required for suction. Replace the piston rings with new ones.
- 5) The upper part of the piston (131) has come unscrewed, leaving the piston blocked at the bottom and the stud bolt (124) moves freely without pumping. Screw it back on as it was originally, tightening it properly and applying Loctite or a similar semi-locking product onto the thread to prevent it from coming unscrewed again.

12 DISPOSAL OF THE PUMP

For disposing the pump please observe the following instructions:

- close the compressed air inlet tap and disconnect the supply pipe to the motor; 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, cylinder, rod, stud bolt, piston S.S. Aisi 304 - S.S. Aisi 316
- Elastomers NBR - EPDM - FLUOROCARBON (FPM) - TEFLON
- Motor Aluminium

Components made from amianthus or lead are not used in our production.

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



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