

Operating and maintenance information for pumps




fixed and variable displacement

This operating and maintenance information apply to ATOS fixed vane, fixed piston and variable piston pumps, is intended to provide useful guidelines to avoid risks when the pumps are installed in a system.
It contains important information on the safe and proper installation, transport, commissioning, operation and maintenance of the products.
The prescriptions included in this document must be strictly observed to avoid damages and injury.
The respect of this operating and maintenance information grants an increased working life, trouble-free operation and thus reduced repairing costs.




1 SYMBOL CONVENTIONS

Following symbols are used in this documentation to evidence particular risks to be carefully avoided.
In the following are listed the symbol conventions with their meaning, in case of non-compliance with this operating and maintenance information.

 WARNING	Death or serious injury could occur	risk classes to ANSI Z535.6 / ISO 3864
 CAUTION	Minor or moderate injury could occur	
NOTICE	Property damage could occur	
	Information to be observed	

2 GENERAL NOTES

This document is intended for machine manufacturers, assemblers and system end-users.

 **WARNING**
Personal injury and property damage caused by incorrect use of the products!
The products have been designed for use in industrial environments and may only be used in the appropriate way.

Before using Atos pumps, the following requisites must be met to ensure appropriate use of the products:

- personnel who uses Atos pumps must first read and understand the operating and maintenance information, particularly the Safety Notes in section [4](#).
- the products must remain in their original state, no modifications are permitted
- damaged or faulty pumps must not be installed or put into operation
- make sure that the products have been installed as described in the relevant documentation

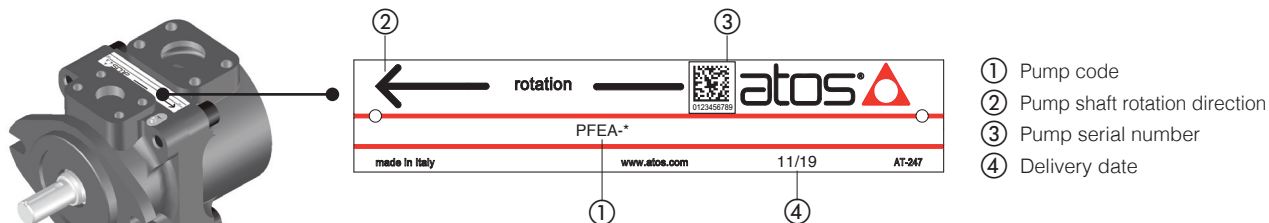
2.1 Warranty

The expiration of warranty results from the following operations:

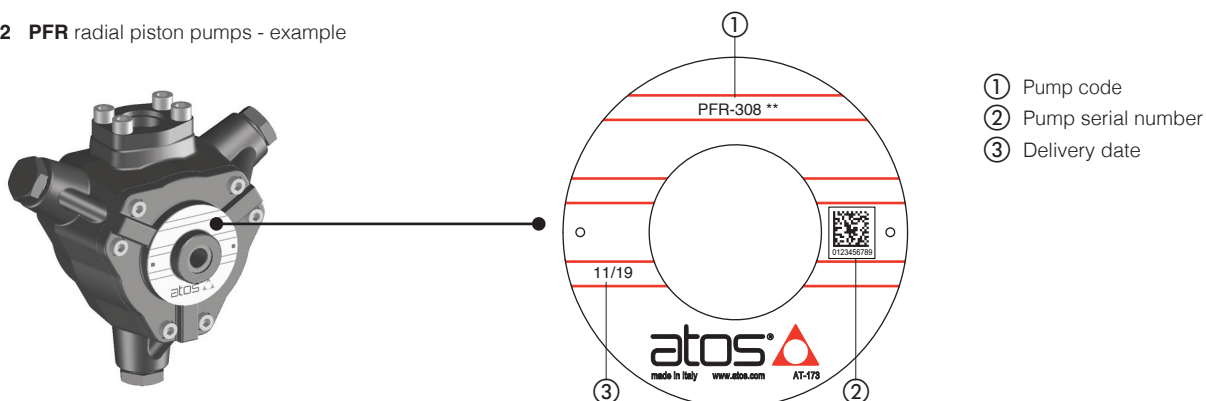
- incorrect assembly and commissioning
- improper use, see [4.2](#)
- improper handling and storage, see [6.4](#)
- modification of the original condition

3 PRODUCT IDENTIFICATION EXAMPLES - nameplates

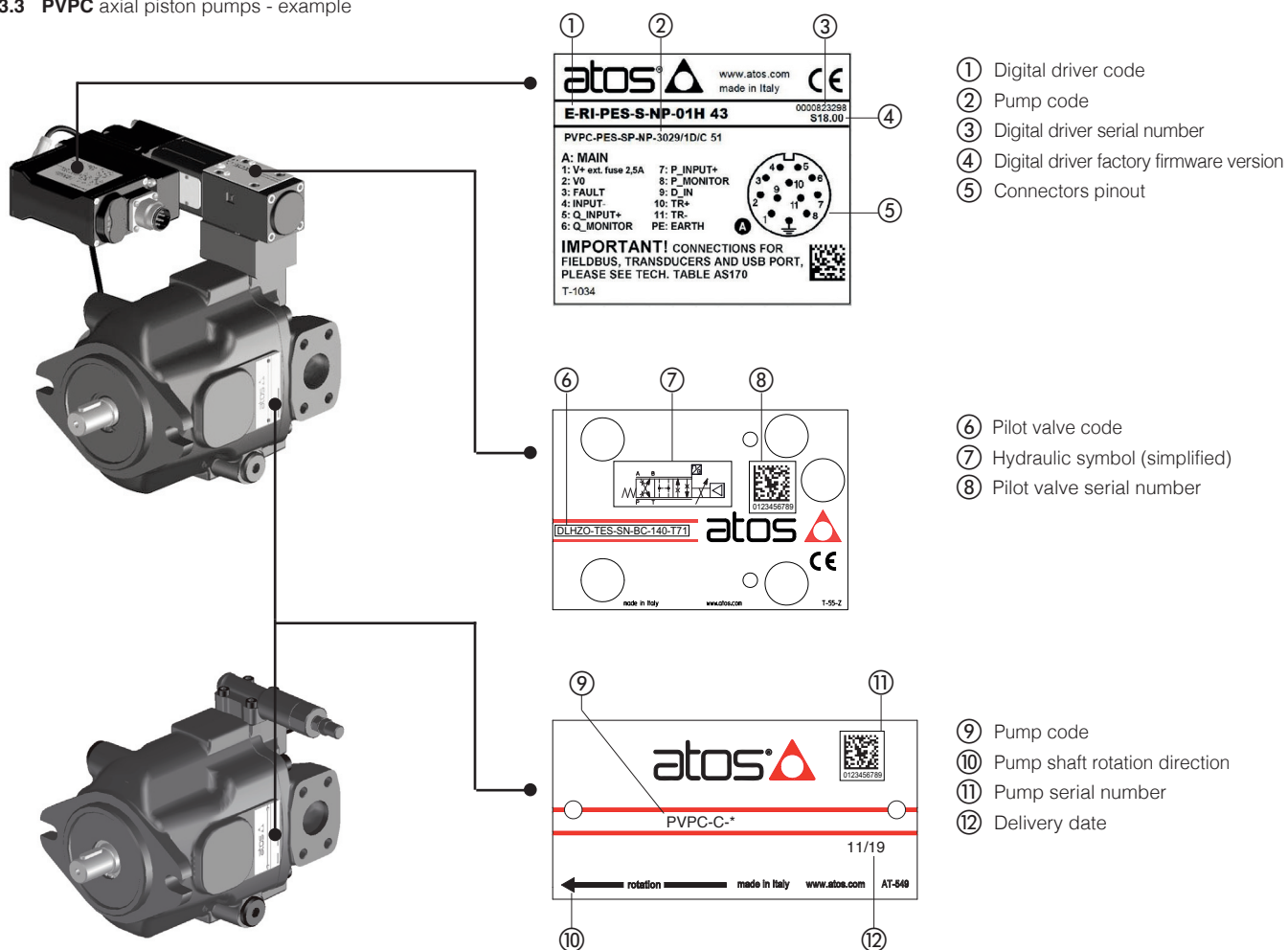
3.1 PFE vane pumps - example



3.2 PFR radial piston pumps - example



3.3 PVPC axial piston pumps - example



4 SAFETY NOTES

4.1 Intended use

Atos pumps are intended for integration in industrial systems and machines or for the assembly with other components to form a machine or a system.

They may only be operated under the operating condition described in the relevant technical table.

Pumps must be used observing following prescriptions:

- complying with the application and environmental conditions according to the relevant technical tables
- complying with operating conditions and performance limits specified in the relevant technical tables
- use in the original condition, without damage

4.2 Improper use

Any improper use of the pumps is not admissible.

Improper use of the product includes:

- use in explosive environments
- incorrect storage
- incorrect transport
- lack of cleanliness during storage and assembly
- incorrect installation
- use of inappropriate or non-admissible fluids
- operation outside the specified performance limits
- operation outside the approved temperature range

Atos spa does not assume any liability for damage caused by improper use.

The user assumes all risks involved with improper use.

4.3 Installation

Installation must be performed following the recommendations contained in the relevant technical tables and in section **5** of this document.



WARNING: hot surface

The pumps may heat up during operation.

Allow the pump to cool down sufficiently before touching it.

During operation, touch the valve solenoid only by using protective gloves.

Please also observe ISO 13732-1 and EN 982.



CAUTION

Use of the pumps outside the approved temperature range may lead to functional failures like overheating and seizure.

Only use the valve within the specified fluid temperature range.



CAUTION: penetrating water and humidity - for PVPC pumps with proportional controls

In case of use in humid or wet environments, water or humidity may penetrate at electrical connectors or into the valve electronics.

This may lead to malfunctions at the pump and to unexpected movements in the hydraulic system which may result in personal injury and damage to property:

- only use the pumps within the intended IP protection class
- ensure that all seals and caps of the plug-in connections are tight and intact

NOTICE: impact

Impact or shock may damage the pumps. Never use the pump as step.

NOTICE: dirt and foreign particles

Penetrating dirt and foreign particles lead to wear, malfunction and seizure

During assembly, be careful to prevent foreign particles such as metal chips getting into the pump or into the hydraulic system

Do not use linting fabric for cleaning, it may release contamination.



Environmental protection

Hydraulic fluids are harmful to the environment.

Leaking hydraulic fluid may lead to environmental pollution.

In case of fluid leakage immediately act to contain the problem.

Dispose of the hydraulic fluid in accordance with the currently applicable national regulations in your country.

Atos components do not contain substances hazardous for the environment.

The materials contained in Atos components are mainly: Copper, Steel, Aluminium, Electronic components, Rubber

Due to the high content of reusable metals, the main components of Atos can be completely recycled after disassembling of the relevant parts.

5 HYDRAULIC AND MECHANICAL INSTALLATION

General:

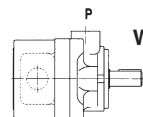
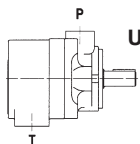
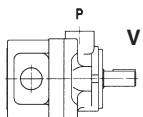
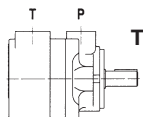
- Before start up make sure that the pump is always filled with the working fluid.
- The pump must never be operated with "OUT" port closed; in order to limit the maximum working pressure a relief valve must be installed on the pressure line.
- Make sure that the maximum working conditions shown in relevant technical tables are not exceed

5.1 Installation position and port orientation

The installation must ensure that the pump remains always filled with the working fluid.

- For PFE:

the pump can operate in any position, the available orientation of the oil ports is according to the below pictures. In the ordering code must be specified the selected orientation.



- For PFR:

- The pumps can be installed in horizontal or in vertical position. In case of vertical position it is advisable to install on the outlet pipe a proper valve for air bleeding (consult our technical dept.).
- These pumps are not self-priming therefore their installation under oil level is recommended. Installation above oil level requires foot valve on inlet line and pump central point located no more than 150 mm above minimum oil level.
- The shaft of the pump has an eccentric cam which rotates with the shaft generating the stroke of the pistons and thus generating the flow rate. For best functioning a balanced coupling should be provided between the shaft of the motor and the shaft of the pump.

- For PVPC:

- The pumps can be installed in horizontal or in vertical position. In case of vertical position the pump shaft must be oriented upward.
- The drain pipe must be oriented so that the pump body always remains filled with the fluid, specially when not working. For this reason the pump is provided with 2 drain connections located in opposite side of the body, so that, depending to the pump orientation, the optimal drain piping can be arranged
- Before the commissioning, the pump body must be filled with the working fluid through one of the drain connections.
- The connection with the electric motor must be performed by means of proper elastic coupling.

5.2 Shaft loads

PFE, PFR: axial and radial loads acting on shaft are not permitted.

PVPC: axial and radial loads acting on shaft are permitted, max permissible loads are indicated in the table A160, section **2**.

The coupling with the electric motor must be sized to absorb the power peaks.

The coupling alignment between the motor and pump shaft must ensured

5.3 Shaft rotation

The direction of shaft rotation (D = clockwise, S = counterclockwise, viewed from the shaft end) must be the same of the arrow on the nameplate.

5.4 Oil level

Make sure that the pump is always filled with fluid. The installer / end user has to provide a level meter to verify the presence of fluid inside the power unit tank.

5.5 Important notes

- A pressure relief valve must be installed on the pressure line near the pump outlet port.
- The piping have to be sized according to the max pressure and max flow rate
- All pipes and surfaces must be cleaned from dirt before mounting
- Make sure that connections are sealed before giving pressure to the system
- Ensure to not exchange the pump IN/OUT ports when connecting the pipes
- Ensure that the pump installation allows an easy acces for maintenance purpose

5.6 Hydraulic fluids and operating viscosity range

Mineral oils type HLP having high viscosity index are recommended.

The hydraulic fluids must be compatible with the selected seals.

The type of fluid has to be selected in consideration of the effective working temperature range, so that the fluid viscosity remains at the optimal level.

Note: for PVPC the temperature of the fluid contained in the pump body (drain line) is always higher than the tank temperature, specially if the pump is working for long time in null flow conditions and at high pressure.

Fluid viscosity: 10 mm²/s for short periods at max fluid temperature on drain line
24 to 100 mm²/s during normal operation
1000 mm²/s for short periods at cold start-up (800 mm²/s for PVPC)

Hydraulic fluid	Suitable seals type	Classification	Ref. Standard
Mineral oils	NBR, FKM, HNBR	HL, HLP, HLPD, HVLP, HVLDP	DIN 51524
Flame resistant without water	FKM	HFDR, HFDR	ISO 12922
Flame resistant with water	NBR, HNBR	HFC	

Fluid viscosity: 15 ÷ 100 mm²/s - max allowed range 2,8 ÷ 500 mm²/s



CAUTION: easily inflammable hydraulic fluid

In connection with fire or other hot sources, leaking hydraulic fluid may lead to fire or explosions.

5.7 Filtration

The correct fluid filtration ensures a long service life of the pumps and it prevent anomalous wearing or sticking. Contamination in the hydraulic fluid may cause functional failures e.g. loss of efficiency and increased noise level. In the worst case, this may result in heavy damages and breakages. Ensure adequate hydraulic fluid cleanliness according to the cleanliness classes of the pumps over the entire operating range.

Max fluid contamination level:

- normal operation: **PFE, PFR** = ISO4406 class 21/19/16 NAS1638 class 10;
- longer life: **PFE, PFR** = ISO4406 class 19/17/14 NAS1638 class 8;

PVPC = ISO4406 class 20/18/15 NAS1638 class 9
PVPC = ISO4406 class 18/16/13 NAS1638 class 7

Note: see also filter section at www.atos.com or KTF catalog

6 MAINTENANCE



Maintenance must be carried out only by qualified personnel with a specific knowledge of hydraulics and electrohydraulics.

6.1 Ordinary Maintenance

Service work performed on the valve by end user or not qualified personnel invalidates the certification

- Cleaning the external surfaces using a wet cloth to avoid accumulation of dust layer over 5 mm
- Don't use compressed air for cleaning to avoid any dangerous dust dispersion on the surrounding atmosphere
- Any sudden increment in temperature requires the immediate stop of the system and the inspection of the relevant components
- The pump does not require other maintenance operations except for front shaft seal, and vane cartridge (for PFE)

6.2 Repairing

In case of incorrect functioning or beak-down it is recommended to send the valve back to Atos or to Atos authorized service centers which will provide for the reparation.

Unauthorized opening of the valves during the warranty period invalidates the warranty.

6.3 Transport

Observe the following guidelines for transportation of pumps:

- Pumps should be transported using a forklift or a lifting gear ensuring a stable position of the pump
- Use soft lifting belts to move or lift the pumps in order to avoid damages
- Before any movement check the pumps weight specified in the relevant technical table



WARNING

The valve may fall down and cause damage and injuries, if transported improperly.

Use personal protective equipment, such as: gloves, working shoes, safety goggles, working clothes, etc.

6.4 Storage

Valves are boxed using a VpCi protective packing system, offering best protection to oxidation during components sea transport or long storage in humid environments.

PFE and PFR surface is protected with zinc coating which guarantees a corrosion resistance over 200h in salt spray test.

PVPC corrosion protection is achieved with surface painting.

Additionally all pumps are tested with mineral oil ISO 46; the oil film left after testing ensure the internal corrosion protection.

For the pumps transporting and storing always observe the environmental conditions specified in the relevant technical tables. Improper storage may damage the product.

The pumps can be stored for up to 12 months under the following conditions:

- If there is no specific information in the components technical tables, comply with a storage temperature of -20°C to $+50^{\circ}\text{C}$
- Do not store the pumps outdoors
- Protect the pumps against water and humidity in case of storage in open air
- Store the pumps in the shelf or on a pallet
- Store the pumps in the original packaging or comparable packaging in order to protect them from dust and dirt
- Remove the plastic covers from the valves mounting surface only before the assembly

In case of storage period longer than 12 months please contact our technical office