

the Italian electrohydraulics



Maintenance handbook

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The user is obliged to comply with the maintenance program and monitoring as described on this handbook by filling in the handbook of repairs and maintenance.

The replacement of CE components must be submitted to ATOS written authorization. The use of non-original spare parts will void the warranty conditions (if they still exist) and Responsibilities of the Manufacturer.

HPU IDENTIFICATION SHEET

CUSTOMER:

DRAWING NR.:

SERIAL NUMBER:

MANUFACTURING MONTH/YEAR:

NOMINAL PRESSURE:

MAX PRESSURE PS:

NOMINAL FLOW:

MAINTENANCE MANAGER:

DATE OF COMMISSIONING:

1. MAINTENANCE

WARNING:



- All activities of maintenance must be conducted by competent and qualified staff only
- Always depressurize the relevant part of the system before any maintenance operation on the hydraulic power unit.

The correct installation of the hydraulic power pack ensures a long life without particular maintenance operations, except those ones planned in the preventive maintenance program. (see Table page 8) These operations, in order to be effective, have to be regularly performed along the time. It is therefore very important that all the check-up operations, even if simple, are programmed and reported on specific maintenance program schedules. Before the inspection, cleaning should be undertaken if necessary. Always ensure cleanliness when working on the hydraulic power unit.

WARNING:



- **Do not perform maintenance with the equipment functioning!**
- **Penetrating dirt and liquids will cause faults!**
Safe function of the hydraulic power unit/components is then no longer ensured. Always ensure excellent cleanliness when working on the hydraulic power unit.
- **Damage to the surface from solvents and aggressive cleaning agents!**
Aggressive detergents may damage the seals on the hydraulic power unit and make them age faster.
Never use solvents or aggressive detergents.
- **Damage to the hydraulic system and seals!**
The water pressure of a high-pressure cleaner can damage the seals of the hydraulic power unit.
Do not use a high-pressure cleaner.
Pay attention to prevent the detergents penetration into the hydraulic power unit.
Check that all seals and electrical plug connections are firmly fitted to prevent the penetration of detergents.

1.1 Filling level

The filling level should be checked at intervals during the first 8 operating hours. While the hydraulic power unit is in operation, the oil level will not remain constant. Level changes result from the different volume requirements of plunger and differential cylinder and/or the absorption/delivery of oil in hydraulic accumulators during a working cycle. Due to the variable conditions mentioned above, a complete working cycle of the machine must be observed when undertaking the visual inspection of the oil level. This will enable to determine whether the oil needs to be refilled or topped up. During operation, the oil level must neither exceed the upper mark nor fall below the lower mark. If the minimum filling level is undershot, there is a risk of pump failure due to cavitation.

1.2 Fluid top-up

It must be performed every time the fluid level falls below the minimum. The maintenance can be facilitated by the use of electric minimum level indicators with additional pump stop function. Do not ever top up the oil above the maximum level.

1.3 Fluid replacing

It has to be performed in accordance with fluid supplier prescriptions, as average every 2000-3000 working hours or, in case of seldom using, once a year; frequent checks of the fluid chemical-physical characteristics and of its contamination level allows to put in evidence the necessity of a prompt maintenance. When the fluid has to be replaced also the fluxing of the whole hydraulic system must be performed.

1.4 Fluid temperature control

The fluid deterioration due to the temperature is one of the causes of the system degradation. The formation of deteriorated products is influenced by the temperature. The oxidation rate can be considered constant up to 60°C; starting from this point it doubles for each 10°C of temperature increment.

1.5 Functional control

Pumps, solenoid valves and regulation components have to be separately handled by a qualified personnel. It is possible to organize a programmed series of checks which can help to prevent eventual failures. Starting from the commissioning, it is recommended that the system is provided with a complete series of spare parts.

1.6 Maintenance operations

In case of failure, after it has been identified, it is necessary to define if the repairing operation can be performed by the end user or by the manufacturer's qualified personnel.

1.7 Accumulator control

For correct accumulator functioning, the pre-charge pressure (P_0) has to be kept constant and it has to be checked every three months using proper equipment.



WARNING:

Before any maintenance operation, make sure that the accumulator is not under pressure. It's customer responsibility to maintain the accumulator and to register the information.

To modify the pre-charge pressure of the accumulators, always refer to qualified personnel. Accumulators must be pre-charged only with Nitrogen.

RISK OF PERSONAL INJURY AND DAMAGE TO PROPERTY!

Accumulators are a potential source of hazards. Leaking pressurized gas may result in serious injury or even death.

Particular care must be taken when working on hydraulic systems with accumulators, as inappropriate behavior may result in serious injury.

- Never perform welding or soldering work or any mechanical processing on accumulators!

If air or oxygen is used as means of accumulation, there is a high risk of explosion!

If uncleaned gases are used, the contaminating substances contained therein or the water content may lead to unforeseeable and uncontrollable behavior of the device.

- Only use nitrogen as gas in the accumulator (Nitrogen Class 4.0 purest; N₂: 99.99 Vol-%)!

When draining the nitrogen from the accumulator, the composition of the air is changed.

In very small rooms, this may result in fainting or even suffocation.

- Before discharging the nitrogen accumulator pressure, the doors and windows of the room, in which the accumulator is located, must be opened.

The draining of the nitrogen from the accumulator may result in an excessive increase in pressure.

- Before discharging the nitrogen accumulator pressure, the doors and windows of the room, in which the accumulator is located, must be opened.

There are legally prescribed inspections for accumulators, which have to be undertaken at defined intervals. This is the responsibility of the customer.

In order for the accumulator to function as intended, the gas pre-charge is to be checked periodically according to the information in the preventive maintenance program. (see Table page 9)

Due to the fast discharge of the gas pressure, the components and component parts affected will be subjected to extreme cooling. In extreme cases, contact with unprotected skin may even result in supercooling in the form of burns!

- You should wear thermal gloves and avoid contact with the supercooled components. Wait for a reasonable period of time until the supercooled components have reached ambient temperature once more.

1.8 Heat exchanger control

The heat exchangers have to be cleaned about every six months, the maintenance frequency depends from the quality of the used water in case of water/fluid exchangers and to the environmental conditions (high density of dust) in case of the air/fluid exchangers.

The daily check of the fluid temperature is useful to put in evidence the progressive deterioration of the thermal exchange and the consequent necessity of maintenance.

1.9 Air filter control

To be monthly performed with the eventual replacement of the filtering cartridge.

1.10 Oil filters control

Effective contamination control can be assured by the correct use of clogging indicators (optical or electrical).

This operation is of the maximum importance and shall be performed at least weekly.

In case an electrical indicator is present, the fault signal is directly indicated on the control panel, so that automatic sequences to block the circuit can be set up.

Considering that the cartridges shall be replaced every time the filters clogging indicators indicate this need, it is however highly recommended to replace the cartridges at least once a year.

1.11 Leakages removing

The leakages from pipes are usually removed by tightening the fittings that could self-unlock due to the vibrations and/or system temperatures.

In case of leakages from the mounting surfaces, the relevant seals must be replaced with new ones.

Replace the O-Ring seals of mounting surfaces every time that the valve is removed from its mounting position.

1.12 Piping

The piping consists of the pipes and the connection elements.

Connection types:

- Form-type fitting
- Flare-type fitting
- Welded fitting
- Compression joint
- Flange connection

The piping must be checked at least once every six months (or more frequently depending on operating conditions and use).

In order to allow for a visual inspection, prior cleaning may be required.

There is an inspection for:

- Corrosion
- Crack formation
- Leaks
- Indication of the application of external force

1.13 External cleaning

To be performed every three months at least.

It facilitates an easy identification of external leakages and thus an immediate corrective action.

1.14 External inspection of tanks and steel components

The external inspection is a visual one and must be undertaken at least once every six months (or more frequently depending on operating conditions and use).

In order to allow for a visual inspection, prior cleaning may be required.

There is a visual inspection for:

- Leaks
- Crack formation
- Corrosion
- Dents due to the application of external force.

1.15 Exhaust fluid disposal

The exhaust fluid have to be stocked in sealed containers to be located in insulated areas.



WARNING:

It is forbidden to store the containers outdoor and on absorbing land.
Exhausted fluid should be withdrawn only by specialized companies for disposal in strict observance of the laws in force in the country.
Accumulators and nitrogen bottle must be preventively discharged.

At the time of decommissioning and disposal, in addition to the above mentioned warnings, it is important to separate the plastic parts that have to be sent to collection in accordance with the regulations.

The metal parts of the power unit can be sent to recycling for melting. The decommissioning/disposal does not present special risks, as long as it is carried out by sufficiently prepared staff, equipped with adequate means.

2. PREVENTIVE MAINTENANCE PROGRAM

Inspection / Replacement	Frequency					
	Every Day	Every Week	Every Month	*Every Three Months	*Every Six Months	*Every Year
Fluid level	C					
Fluid temperature		C				
Fluid Contamination					CC	
Clogging indicators		C				
Suction filters						R
Pressure Filter's cartridges						R
Return Filter's cartridges						R
Air Filters			C			R
Heat exchanger					C	
Calibration of working pressures			C			
Calibration of pump's flow						C
Accumulators Pre-Charge pressure (if present)				C		CF
Pipes (Leakage or damage)					C	
Flexible Pipes (Leakage or damage)					C	
Elastic insert junction motor/pump					C	R

LEGEND C: check
 CC: contamination control
 R: replace
 CF: check by mean of dedicated instrument

Program planned for non-stop working cycles 24 hours a day

*Registration of quarterly, semi-annual and annual inspections/replacements is mandatory within warranty period

