

the Italian electrohydraulics



Assembly instructions

Machinery directive 2006/42/CE

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ANNEX	

1. TECHNICAL DOCUMENTATION AND EXPECTED USE

The assembly is designed to be used with hydraulic fluids of Group II according to art. 9 and to Annex I of Directive 97/23/EC. Recommended Hydraulic oils are according to DIN 51524 ... 535, ISO6743-4 norms with viscosity 15 / 100 mm²/s at 40 ° C (ISOVG15/100) ISO 3488.

Ambient temperatures (storage) allowed are between - 10 ° C and + 70 ° C.

The main technical data are contained in attachments: material list, overall drawing and hydraulic scheme.

2. GENERAL ADVICES

This manual contains important information about the supplied assembly and it must be read before the installation or commissioning.

The assembly in object is destined to be incorporated inside a machine to which the Machinery Directive 2006/42/CE applies, therefore its starting-up is prohibited before the machine, where it will be incorporated, has been declared in accordance with all provisions of the Directive

The assembly should never be used:

- With limits different from those indicated on section 1 and in the mentioned annexes
- In environments with potentially explosive atmosphere, aggressive atmosphere or with high concentration of dust or oily substances suspended in the air (unless Atex certified)
- In environments with high fire risk
- With highly polluted oils > ISO 18/15 to ISO 4406
- If it has not been properly connected in its entirety by qualified personnel.

Before leaving the factory, the assembly has been carefully checked and tested in all its functions.

The only allowed operations are the settings described in the "COMMISSIONING" and "MAINTENANCE" sections.

The content of this manual is exclusively referred to the assembly made by *Atos spa* and it does not provide for eventual risks which can be derived after the incorporation into the machine. It is responsibility of the manufacturer to prevent this kind of risks and to complete the instructions with the description of eventual residual risks.

- Do not smoke and do not approach flames during the fluid filling, replacement or top-up operations
- Do not weld with the assembly full of fluid
- Check the fluid level exclusively with proper visual indicator. Do not remove plugs or other components for the level inspection
- Strictly follow all the recommendations of the chosen hydraulic fluid contained in the relevant security schedule
- Use proper containers for the exhaust fluid
- After the maintenance operations or in case of fluid leakages, immediately remove the fluid stains from the surfaces on which people walk
- Carefully follow the commissioning instructions shown in the "COMMISSIONING" section
- Do not start-up the assembly before checking the correct fluid level into the tank
- The temperature of the fluid must not exceed 60 ° C inside the tank except in presence of special seals for temperatures up to 70 ° C.

2.1 List Of Residual Risks

General: see "Instructions for assembly"

Electric: see section 4, 5

Risks connected to the fluid:

- Flammability: see section 2;
- Toxicity: it is up to customer to demand to fluid supplier the safety data sheet of the selected product and to carefully follow the relevant handling instructions
- Overfilling: see section 2, 6;
- Water hammer shock: see section 5;
- Erosion, abrasion, occlusion: see section 5, 6;

Maintenance: see Chapter 6

Pressure:

- Heating, fire: see section 1, 2;
- Missing of fluid filling: see section 5;
- Discharge occlusion: see section 4, 5;
- Pulsing pressure: see section 4;
- Transitory conditions, fluid back: see section 4;

- Pumps: see section 6

High temperature:

- Valves failure: see section 1, 2, 4;

- Electrical heating: to the electrical heater it is always associated a thermal switch and/or a temperature indicator to prevent overheating of the same

External environment:

- Unexpected loads: the system is not designed to withstand external structural loads which have to be evaluated by the customer and properly sustained by means of suitable structures;

- Fixing and vibrations: see section 4;

- Explosion, fire, electrostatic charges: it is up to customer to evaluate and to adopt suitable solutions for protection.

3. TRANSPORT, STOCKING AND HANDLING

WARNING:



Before proceeding to the lifting, ensure that no persons are present within the working area. The indications about the operations to be performed must be only given by the person responsible for the lifting.

- Transport and handling must be performed ONLY with an empty tank



- The lifting points by forklifts are identified with the symbol at side



- The lifting points by eyebolts are identified with the symbol at side

3.1 Transport

Danger to life due to tumbling, falling or uncontrolled movement of the assembly!

For safety reasons the assembly is shipped with pressure set to 0 bar.

If not transported appropriately, the assembly may lose its stability and thus be knocked over, fall or move in an uncontrolled way.

To avoid risks please respect following recommendations:

- Check the weight and also the location of the center of gravity of the assembly
- Place the product on a suitable foundation / on suitable ground
- By means of additional suitable measures (e.g. by securing holding down points or with the use of cranes) provide for sufficient stability before removing any packing/transit materials or fixtures
- Only the intended locations and attachment points should be used for securing or lifting assembly
- Assemblies must never be attached to or lifted at the mounted components (piping, hoses, manifolds, electric motors, accumulators, etc.)
- Observe the maximum load-bearing capacity of the attachment devices
- Observe the maximum load-bearing capacity of the floor conveyors
- Ensure that no unauthorized persons are within the hazard zone.

3.2 Stocking

The assembly is properly packed and protected against accidental damages during transportation, at the reception check that there is no evidence of damages.

The stocking must be provided into a room without humidity and dust. The ambient temperature must be within -10° to +70°C and the relative humidity must be lower than 65%.

The system must be located far from the vehicle passages in order to avoid damages caused by collision. In case the assembly has to be moved inside the stock room, pay attention to not damage its protections.

After 8/10 stocking months the lubricating and anti-oxidation characteristics of the fluid used during the system testing are no more ensured, it is important to carefully follow the instructions enclosed in the "COMMISSIONING" section.

It is up to customer to provide the suitable equipments for the lifting of the hydraulic system.

For the system moving, use the lifting facilities if available, or a fork lift to be positioned under the tank.

Do not lift the system using the components installed on the tank.

3.3 Handling

3.3.1 Use of attachment points

Danger to life due to tumbling, falling or uncontrolled movement of the assembly when using unsuitable attachment points !

After a longer period of use, the attachment points may no longer be in place, be sufficiently stable or identifiable as such.

To avoid risks please respect following recommendations:

- Refer to the product-specific documentation for the intended attachment points and use only the ones identified therein
- Check the stability of the attachment points if you intend to transport the assembly after dismantling
- Replace missing and/or defective attachment points, if possible. This work should be carried out in a professional manner
- Insert the screw-in attachment points into the tapped hole and handtighten fully
- If necessary, mark any unrecognizable attachment points in a clearly visible color.

Attachment points are fixtures in the form of lugs, collars or shackles that are connected to the assembly by means of welded or threaded attachment. They are designed for lifting or holding down the assembly during transport and handling.

3.3.2 Manual transport

Risk of injury to persons undertaking manual lifting/handling due to overloading and incorrect posture!

In the case of lifting/handling, there is the risk of damage to health due to overloading and incorrect posture.

To avoid risks please respect following recommendations:

- The limits of the respective persons involved in manual lifting/handling must be realistically assessed. Muscular strength and constitution differs considerably among human beings
- Wherever possible, suitable lifting aids should be used such as e.g. carrying straps
- Always use appropriate techniques when lifting, setting down and moving products

3.3.3 Transport using forklifts and similar floor conveyors

If not transported appropriately, the assembly may be knocked, fall or move in an uncontrolled way.

To avoid risks please respect following recommendations:

- When using floor conveyors as a means of transport, ensure a stable center of gravity position
- The assembly must not deviate from its intended orientation
- Secure the assembly against any resulting acceleration forces as required.

When using floor conveyors, the assembly may only be transported by personnel who can prove to hold the relevant qualifications, including safety training, for the respective device.

3.3.4 Transport using cranes and similar lifting tools

If using cranes as a means of transport, attachment device e.g. lifting straps, harnesses or chains should be used. If not transported appropriately, the assembly unit may be knocked, fall or move in an uncontrolled way.

To avoid risks please respect following recommendations:

- When using lifting tools, ensure a stable center of gravity position
- The assembly must not deviate from its intended orientation. If necessary, attach suitable safety and/or catch devices
- Use only the intended locations and attachment points when lifting
- Ensure that the built-on components of the assembly do not come into contact with the attachment device or lifting tools during transport
- Lift and lower the assembly slowly and carefully
- Only lift the device as far off the floor as necessary

4. INSTALLATION



WARNING:

- All activities of installation of the assembly must be conducted by competent and qualified staff
- Always depressurize the relevant part of the system before assembling the assembly.

The assembly is built to be installed protected by weather, except in cases where it is built with appropriate technical devices (stainless steel tank, protection cabinet, electrical components with proper IP)

If not otherwise indicated, the following conditions must be respected:

- altitude within 0 to 1000 m sea level;
- relative humidity lower than 65%;
- electrical voltage supply tolerance $V_{nom} \pm 10\%$;
- ambient temperature between -10° to $+70^{\circ}\text{C}$;

For the fixing, the assembly is normally provided with proper holes in the tank base, as an alternatively proceed to secure the system.

Verify that the surface prepared for fixing the assembly is capable of holding up the weight expected and reported (empty) on the unit plate. Also make sure that this surface is properly leveled. Ensure accessibility to the assembly at least on three sides, to allow easy maintenance.

If mobile parts of the machine are present close to the assembly, suitable protections (carters) must be provided to avoid dangerous situations for the maintenance operators.

For the selection of rigid pipes, flexible pipes and fitting/flanges to connect the assembly to the machine, make sure that the pressure and flow range are correct. Before assembly, the pipes must be carefully cleaned from the dirties and burrs, the pipes with welded end must be pickled.

Sealing materials (i.e. hemp) are not allowed because they can produce impurities causing functional problems. The steel pipes have to be held with proper supports, equally distanced; they never have to be forced or modified after their installation.

The use of steel pipes without welding, according to EN 10305-4, DIN 2391 is recommended. The fittings must be assembled according to the manufacturer recommendations.

The flexible pipes must be assembled according to the manufacturer recommendations, pay attention to their length because if too short, mechanical stress may occur at the pipe ends, they have to be locked and protect with a suitable carter depending to their dangerous level for the operators.

For the hydraulic connections between the assembly and the machine it is preferable that a section is made with flexible pipes to reduce transmitted vibrations and noise. Keep user connection closed with suitable plugs in order to avoid the entry of dust and dirties.

In case the pipes have to be disconnected during the machine shipment, they have to be properly identified with the same references reported on the hydraulic scheme to avoid that the wrong pipes re-connection can produce damages at the machine start-up.

The enclosed drawings contain all the information necessary to identify the connection points that are also identified through references on the assembly through the relevant alpha-numeric references.

All electrical connections must be made and monitored and assessed in accordance with applicable technical regulations or directives. For the electrical connections of the components refer to tables and technical advices of the manufacturer, in doubt contact Atos technical service.

Eventual predispositions are represented in the annexes.

Verify that the power unit source of potentially dangerous electrostatic charges, has been correctly connected to the ground circuit.

The electrical connection of motor, valves and others components must be performed by the customer.

The electrical power supply must be the same as specified on the motor nameplate data.

WARNING:



- The terminal box contains metallic connectors which can be under voltage; after carried out the connections always close the terminal box
- Always switch off the power supply to the relevant system component before assembling the product.



- The assembly must be connected to the ground !
- Assembly are supplied with connection for the external earthing system
- Potential equalization within the assembly will only occur if the electrical wiring of the components is included in the scope of delivery
- The earthing line and the lines for the potential equalization must have the minimum cross-section as per VDE regulations and a yellow-green sheath or labeling



- The electrical installation must be performed in accordance with the currently applicable rules of electrical engineering
- The electrical installation and connection must be performed by qualified personnel



- Make sure that the power supply is disconnected and also safeguarded against being switched on unintentionally
- The security key of the control panel and the switch gear control system must be operated only by persons duly trained and empowered to do interventions on these devices
- You should prevent this by i.e. using a warning sign to draw attention to issues regarding working on the electrics



- If the supply includes the control system of the machine and it is designed by the customer, it must be in accordance with the applicable community rules and especially with the Machinery Directive 2006/42/EC, DIN EN ISO 13849, DIN EN 60204 and DIN EN 60439 and including the provisions of national laws
- The control system must meet all the requirements safety instructions of this manual

When connecting to the water supply:

- The fittings must be tightened according to manufacturer specifications.
- Lay the lines to the water connections provided and connect them according to the circuit diagram.

5. COMMISSIONING

WARNING:



- All operations of the assembly commissioning must be conducted by competent and qualified staff
- Before the commissioning of the assembly, ensure that the fluid is the correct one

5.1 Hydraulic circuit check-up

Check that all the components of the hydraulic circuit are correctly installed and ready for use. Check that all pipes are correctly connected and the fittings are correctly locked to avoid injury to persons or damages to other parts.

5.2 Tank inspection

At the assembly delivery from Atos, the tank is accurately cleaned. Before proceeding to the tank filling, ensure that the tank has not been contaminated by external particles or dirties. In this case a new internal cleaning has to be performed.

5.3 Accumulators pre-charge control

Check the accumulator pre-charge pressure. For the charge only NITROGEN must be used.

5.4 Checking electrical characteristics

Check the electrical connections according to guidelines or technical rules applicable.

Check that the voltages are the correct ones.

Observe the correct rotation of the electrical motor.

Never remove the fan protection from the electrical motor.

Do not operate heaters (if any) before performing tank filling.

5.5 Tank filling

It is important to filter the fluid before to fill it into the tank or to check the filtration class of the purchased fluid.

For the tank filling observe the following procedure:

- check the tank cleanliness;
- use a filling and filtering unit, like the Atos **GL-15** (see technical table SL-150 of Atos catalog). The filtration degree should be at least 25 microns or 10 microns in case the system is equipped with proportional valves. For the correct functioning of the hydraulic components, the fluid contamination level should never be higher than class ISO 18/15 provided by norm ISO 4406;
- connect the delivery pipe of the filtering unit to the filling hub of the assembly tank
- introduce the suction pipe of the filtering unit into the tank containing the new fluid;
- start the filtering unit and fill the assembly tank up to the max level shown on the level indicator;
- stop the filtering unit;
- close the tank putting the cap load back.

5.6 Fluxing

In new systems, although it has been complied with the above described prescriptions, it is impossible to eliminate completely the contaminants.

Therefore for a new system it is necessary to undergo a flushing operation beforehand.

To avoid that the contaminated oil damages the circuit components proceed as follow:

- fill the pump body with the working fluid trough the filling port, if this port is not available, use the pump delivery port, taking care to correctly lock the connection after the filling phase;
- the fluid introduced into the tank is the correct one;
- the fluid level in the tank is at max level.
- by-pass all users devices, hydraulic motors, cylinders and control valves;
- replace the valves with a fluxing plate;
- fully open the throttle valves and the restrictors assembled on the line;
- cut-off the accumulators from the circuit;

To filter the oil during the fluxing operations use the filter installed on the assembly, equipping them with 25 μ new cartridges elements (or 10 μ in case proportional valves are present).

The fluxing time cannot be defined as standard rule, anyway it shall not be less than 5 to 6 hours.

The fluxing operation has to be performed with fluid at warm temperature (about 40°C)

During the fluxing operation it is a good practice to take some fluid samples to check their contamination level. The fluxing operation can be terminated once the oil contamination level respects the class ISO 18/15 according to norm ISO 4406.

For big sized or important plants, a proper flushing assembly with its own pump, reservoir and filter can be used. The fluxing fluid has to be selected within good quality mineral oils and it must be compatible with the system seals and with the working fluid since it cannot be completely removed from the circuit after the fluxing has been completed.

The recommended flushing speed is 5-6 m/s.

The prescriptions above described for fluxing operation must be respected.

5.7 Final checks before start-up

Before starting-up the assembly, check that all the required documentation is available, in addition verify that the prescribed preliminary checks have been performed;

Before commissioning:

- if the customer has planned the use of big cylinders in the circuit, provide their fluid filling
- start the electric motor with intermittent pulses in order to facilitate the pump suction
- perform air bleeding operation because the presence of air can cause functional problems and accelerated wearing. Unlock the fittings located in the highers parts of the circuit, the air bleeding is highlighted by the presence of foam in the leakage from the fittings: when the fluid becomes clear and continuous this means that the air has been completely removed.

After performing the filling and the air bleeding operations, check the fluid level into the tank and eventually re-fill it, then progressively pressurize the circuit and proceed with the setting of the pressure relief valves according to the values shown in the hydraulic scheme. Complete the valves settings and lock their regulations.

It is recommended to perform the valve setting with the fluid at nominal stabilized temperature.

Check the eventual presence of foam in the tank; this would witnesses the presence of air income into the pump suction line. In this case check the fluid level into the tank and the correct assembling of tubes and fitting of the suction line.

It is oportune that the calibration and tuning of the valves is performed by qualified staff.

6. MAINTENANCE

The correct installation of the assembly ensures a long life without particular maintenance operations, except those ones planned in the preventive maintenance program. (see Table page 15)

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 (maintenance handbook).

Before the inspection, cleaning should be undertaken if necessary.

Always ensure cleanliness when working on the assembly.

WARNING:



- **Do not perform maintenance with the equipment functioning!**

- **Penetrating dirt and liquids will cause faults!**

Safe function of the assembly/components is then no longer ensured.

Always ensure excellent cleanliness when working on the assembly.

- **Damage to the surface from solvents and aggressive cleaning agents!**

Aggressive detergents may damage the seals on the assembly 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 assembly.

Do not use a high-pressure cleaner.

Pay attention to prevent the detergents penetration into the assembly.

Check that all seals and electrical plug connections are firmly fitted to prevent the penetration of detergents.

6.1 Filling level

The filling level should be checked at intervals during the first 8 operating hours.

While the assembly 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.

6.2 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.

6.3 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.

6.4 Fluid temperature control

The fluid deterioration due to the temperature is one of the causes of the system degradation.
The formation of deterioration 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.

6.5 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.

6.6 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.

6.7 Accumulator control

For correct accumulator functioning, the pre-charge pressure (Po) 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 ambient 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 15)

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.

6.8 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.

6.9 Air filter control

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

6.10 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 might be 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.

6.11 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.

6.12 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

6.13 External cleaning

To be performed every three months at least.
It facilitates an easy identification of external leakages and thus an immediate corrective action.

6.14 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.

6.15 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 assembly 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.

7. DECOMMISSIONING



- All operations of the assembly decommissioning must be conducted by competent and qualified staff

7.1 Preparing for decommissioning

You must provide a collecting tank that is large enough to accommodate the total oil volume.
The total volume of the assembly comprises the volumes of the tank, the line system, the drives, etc.
Unless otherwise specified in these operating instructions, you should complete the following steps:

- Avoid dangers caused by adjacent machines.
- Do not allow uninvolved persons to remain in the area concerned.
- Loads should be lowered or safely supported

7.2 Decommissioning

Switch off the electrical power and ensure that it cannot be switched on (shortcircuit - bridge the supply side).

Switch off and secure the hydraulic pressure supply.

Depressurize the accumulator on the oil side .

Drain the oil into the collecting tank provided. In this connection, ensure complete draining of the lines and actuators. If necessary, carry out bleeding measures.

8. DISASSEMBLY

Only disassemble the component parts as far as is necessary to undertake the required work. As a basic principle, all disassembled parts should be professionally reassembled at the intended place. Before starting disassembling operations, complete the decommissioning as described in Chapter 7 of these operating instructions.

- All operations of the assembly decommissioning must be conducted by competent and qualified staff

- Serious injury due to the assembly falling over or from uncontrolled movements!



Ensure sufficient stability of the assembly.

Regarding the question as to whether the stability is sufficient, please refer to the product-specific documentation.

Only loosen the fixings of the assembly, if applicable, if stability has been ensured in another way.

When the unit is full, movements of the oil will cause displacement of the center of gravity, which may result in the assembly losing its stability.

Before dismantling, drain the oil from the assembly as described in Chapter 7 "Decommissioning".

-Serious injury or even death when undertaking the disassembly under pressure and with electrical voltage applied!

If the hydraulic system is not depressurized, high-pressure oil will leak while dismantling. If the electrical voltage of the system is not switched off, there is a risk of electric shock.

Ensure that the relevant parts of the hydraulic system are depressurized and de-energized.



- Danger to life due to tumbling, falling or uncontrolled movement of the assembly when using unsuitable attachment points!

After a longer period of use, the attachment points may no longer be in place, or sufficiently stable or no longer identifiable as such more.

Refer to the product-specific documentation for the intended attachment points and only use the ones mentioned there.

Check the stability of the attachment points if you intend transporting the assembly after dismantling.

Replace missing and/or defective attachment points, if possible. This work should be carried out in a professional manner.

Insert the screw-in attachment points into the tapped hole and handtighten fully.

If necessary, mark the unrecognizable attachment points using easily visible color.

When disassembling you should perform the following work steps:

- Depressurize the oil circulation system
- On hydraulic systems with hydraulic accumulators please release system pressure down to zero
- Bleed off hydraulic fluid through the oil drain plugs
- Ensure voltage-free status of the electrical system by:
 - Disconnecting from power supply
 - Securing against restart
 - Grounding and shorting
 - Isolating adjacent elements under power supply
- Screw off hose lines from the flanged connections and close off openings
- Loosen ground fastening elements of the system

Despite prior draining of the oil, some oil will still seep out of the hydraulic line system of the assembly and/or the hydraulic system. All line outlets should therefore be closed using suitable plugs.

After disassembly is complete, you should observe the information in Chapter 3 regarding safe transportation.

9. DISPOSAL

Careless disposal of the assembly, its components and the oil can lead to pollution of the environment. Please therefore observe the following points:

- Dispose of the product/components in accordance with the national regulations in your country and/or your company-internal specifications.
- Dispose of oil according to the currently applicable safety data sheets.

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 assembly 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.

10. EXTENSION AND CONVERSION

You will be considered responsible for any extensions to or conversions of the product.

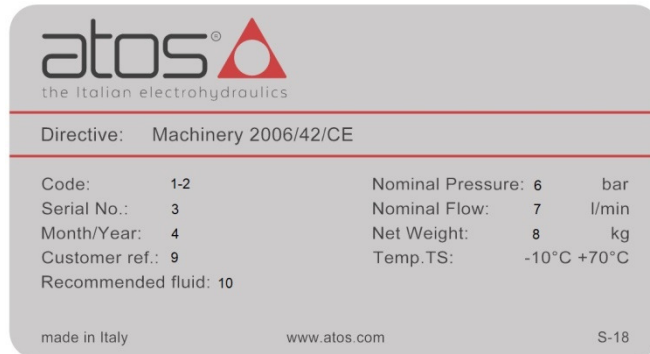
If you undertake any extensions to or conversions of the product marketed by Atos, this means you are changing the condition of the product as supplied. Any statements made by Atos regarding this product will then become invalid.

This means the following:

Hydraulic power units are partly completed machinery in terms of CE Machinery Directive 2006/42/CE. Together with the product-specific documentation, you have received a declaration of incorporation for these products. In the case of extension to or conversion of the hydraulic power unit, this declaration will become invalid.

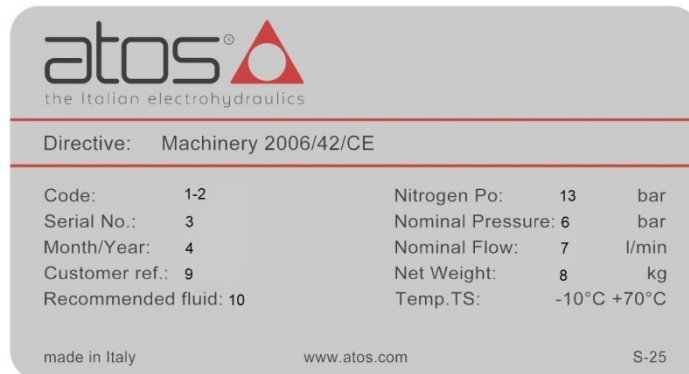
11. IDENTIFICATION

Name plate for HPU



- | | |
|-----------------------|-----------------------|
| 1-2: Code | 7: Nominal flow |
| 3: Serial number | 8: Net weight |
| 4: Manufacturing year | 9: Customer reference |
| 6: Nominal pressure | 10: Recommended fluid |

Name plate for accumulator group



- | | |
|-----------------------|-----------------------|
| 1-2: Code | 7: Nominal Flow |
| 3: Serial number | 8: Net weight |
| 4: Manufacturing year | 9: Customer ref. |
| 6: Nominal pressure | 13: Nitrogen Po |
| | 10: Recommended fluid |

Name plate for groups and manifolds



THE REPLACEMENT OF CE COMPONENTS MUST BE SUBMITTED TO ATOS SPA WRITTEN AUTHORIZATION

Additional information are enclosed in the attached technical tables P002

12. TROUBLESHOOTING



WARNING:

Depending on the system, troubleshooting may give rise to a wide range of potential hazards.

Troubleshooting must only be undertaken when the safety equipments are active! You must proceed with extreme caution if you have to deactivate the safety equipments in order to search for errors/faults. If possible, you should operate the machine in set-up mode with reduced performance data when identifying faults!

For effective troubleshooting, the circuit diagrams (hydraulic and electrical, if applicable), parts lists and any other functional diagram must be available.

The following list is meant as an aid, but does not claim to be comprehensive.

MALFUNCTION	POSSIBLE CAUSES	REMEDY
PRESSURE TOO LOW or pressure below the correct circuit value	1) pressure relief valve half open	a) setting pressure too low b) wear of sealing seats c) contaminant matter under seats d) spring broken
	2) pump faulty	see point 5 to 11
	3) excessive internal leak	a) worn seals in cylinders or in hydraulic motors b) wear of valves and distributors c) too low oil viscosity
	4) excessive pressure drop	a) too high oil viscosity b) poor sizing of oil paths c) oil paths partially stopped
PUMP FAULTY for zero or poor delivery compared to standard values	5) intake throttled	a) intake filter too little or clogged b) intake pipe stopped c) intake pipe too small or wound
	6) air inlet	a) at intake port in the reservoir b) in intake fittings c) at the seal on the pump shaft d) for intake of oil with foam
	7) reservoir sealproof	air bleed in the reservoir clogged
	8) drive faulty	a) check the coupling b) too high or too low speed
	9) too high oil viscosity	see pump prescriptions
	10) fault inside the pump	a) internal seals broken b) seized vanes, cheekplates or pistons c) pump head not tightened d) broken internal parts to replace
	11) pump worn out	pump to be replaced
	12) cavitation	a) intake throttled: see point 5 b) high viscosity: see point 9
	13) air inlet	see point 6
	14) internal wear	too high backlash in the supports and cheekplates
	PUMP NOISY unusually (e.g. some gear pumps are always quite noisy)	15) maximum pressure too high
16) useless engaged power		a) cutoff valve operation faulty b) shutting at cycle end not operating c) hydraulic circuit to be modified
17) excessive internal leak		see point 3
18) excessive pressure drop		see point 4
19) oil capacity not enough		make oil capacity bigger
20) cooling not enough		a) add more cooling b) cooling media not efficient
21) excessive friction		a) faulty internal assembly of the pump b) lack of lubricating where required c) poorly lubricating oil
WRONG MOVEMENTS of the parts moved hydraulically than stated in the cycle	22) air in the circuit	a) vent air bubbles in higher located parts b) eliminate air inlet see point 6
	23) valves blocked	a) valves blocked at closing by rubbers or other matter b) valves halfopen due to contaminant matter
	24) cylinders blocked	a) cylinders internal assembly faulty b) loads perpendicular to the axis not allowed c) seizing of connecting pivots
	25) pressure drops too high	see point 4
	26) variable pressure in the accumulators	a) accumulators capacity poor b) higher request by the circuit owing to internal leakage
EXCESSIVE WEAR that is, too fast compared with the actual operation time	27) oil containing wear agents	a) oil too old b) filters not efficient
	28) poor lubrication	a) oil of poor quality b) oil too fluid at the operation temperature
	29) high operation pressure	in relation to the maximum permissible for the pumps and valves
	30) faulty couplings	unnormal loads on shafts or on rods

