

# Operating and maintenance manual

00008MGG



ORIGINAL INSTRUCTIONS

**TUBOMATIC**  
**H135 EL**  
**230V 60Hz 3ph.**

SERIAL N.

YEAR



**WARNING!**

For safety reasons these instructions must be carefully read by anyone who makes use this equipment.

# 1 - Introduction

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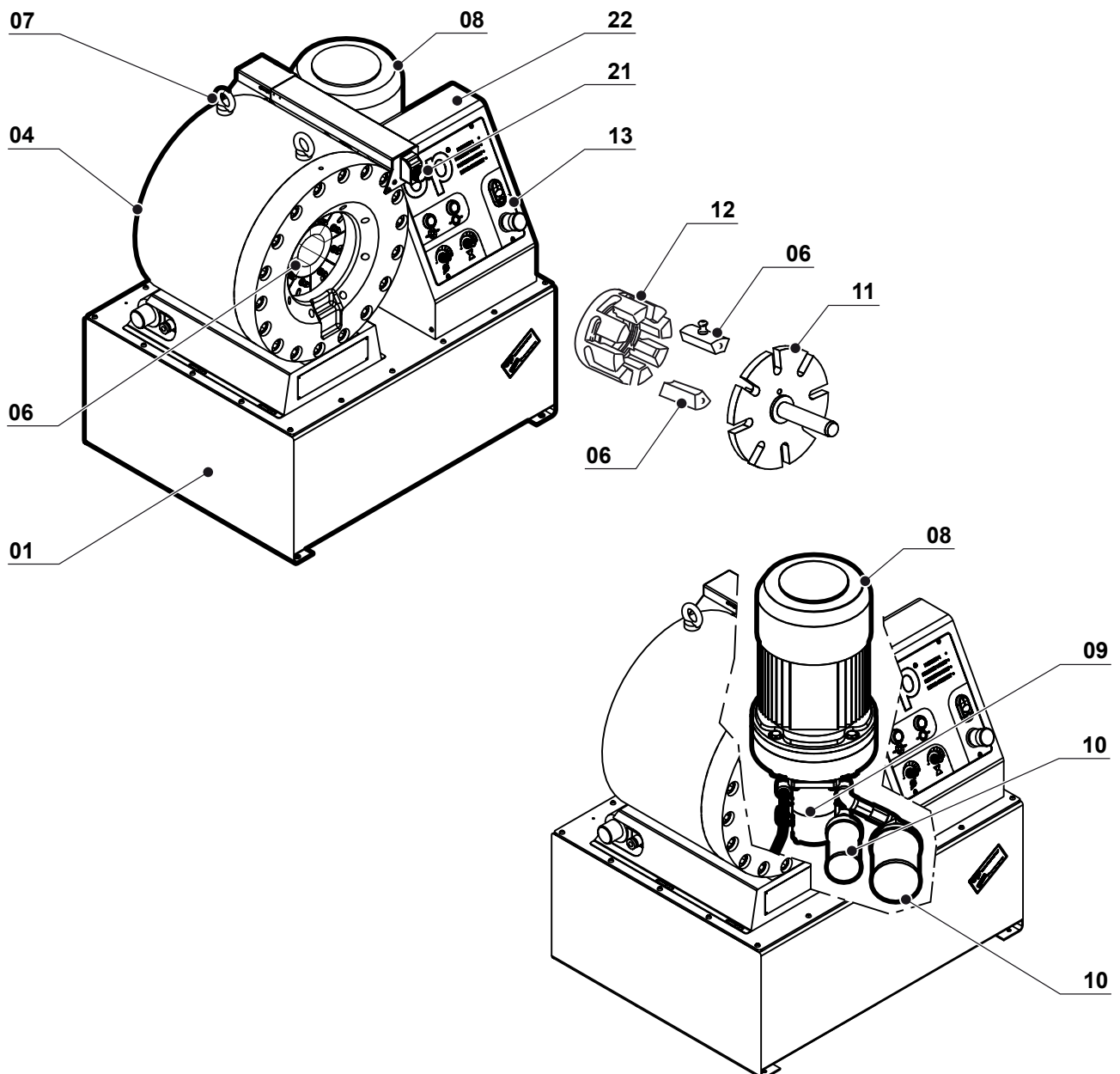
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## THE DOCUMENT AND INTENDED READERS

This document is intended to be read by professionals whose experience or qualifications allow them to work in conformity with the most common safety standards and specific skills. It is presupposed that each person has the basic knowledge required for their role.

The Client is to make sure that the operator has the capacity and training necessary for their duties.



**Reading of this manual is obligatory for all the professionals that are involved with the machine. They must also be informed of any RESIDUAL RISKS associated with the use of the machine or of the products it works with.**

The manual does NOT make up for educational or intellectual gaps that affect the professionals that work with the machine.

Personnel involved with operation, maintenance, and/or other operations relating to the machine must have specific experience with this type of machine or similar machines, or they must have specific professional training.



**The Client is responsible for all damage caused or suffered by personnel who has been authorised by the client himself to use the machine.**

Some general safety instructions provided may be excessive or even impossible to comply with under some infrequent situations (e.g. starting for the first time, specific maintenance tasks, tests without loads, faults or malfunctioning, etc.).

In these cases the operator, rigger or maintenance technician may act in a different way, provided:

- They are fully aware of what they are doing.
- They have adequate skill and training.
- They do not act in a way that deliberately causes injury to themselves.

### Scope and structure of the document

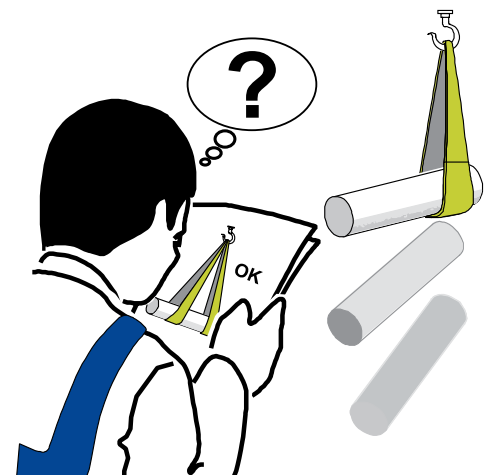
This scope of this document (OPERATING AND MAINTENANCE MANUAL) is to provide a valid guide that makes it possible to work safely and to carry out the operations that are necessary for maintaining the machine well.

All personnel that work with the machine are to read and understand everything described in this document.

This document was originally prepared in ITALIAN and so, if any incongruence or doubt arises ask for the "ORIGINAL INSTRUCTIONS" or further clarification from the manufacturer.

The indications given in this document do not replace the safety regulations and technical data for installation and operation that apply directly to the product, nor the rules dictated by common sense and safety rules in force in the country in which the machine is installed.

This document is broken down into CHAPTERS (INTRODUCTION, CHARACTERISTICS, etc.) as described in the CONTENTS. The chapters and information contained are in order of priority.



## Personnel characteristics

The person tasked with operating the machine must have received specific professional training or have adequate experience with machines of this type.

If, for any reason, when installing and/or starting the plant training has NOT been given the Client is obliged to ask for it and/or make sure that all the conditions described in this document are in place.



***In order to avoid damage to people or property, we suggest that the Client adequately inform the operators on any RESIDUAL RISKS resulting from use of the machine.***

Personnel tasked with operation or maintenance of the machine must be an expert, aware, and mature for the tasks described and they must be reliable when it comes to correctly interpreting the contents of this manual and to guaranteeing safety and scrupulous carrying out of the checks.

Involving personnel that are NOT qualified, handicapped, incapable, not sober, or drug users is specifically forbidden.  
The Client takes full responsibility for the qualifications and mental or physical state of the professionals involved.  
The Client or employer is civilly responsible for all damage caused or suffered by personnel that they have authorised to use the machine.

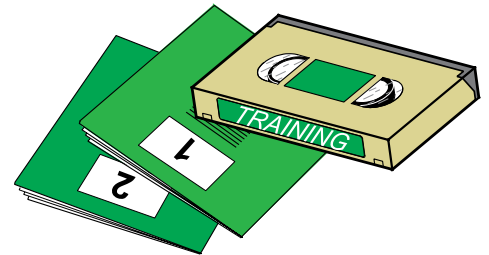
The assigned personnel used must fulfil the following requirements:

- Full use of their upper and lower limbs.
- Identification and knowledge of colours.
- Good eyesight and hearing.
- Know how to read and write.
- Know the danger and warning signals on the machine.
- Be able to operate completely autonomously on production plants and machinery that is similar to this.
- Be capable of running the work cycle, check the correct operations and the quality status of the product, and correct and report anomalies when necessary.
- Make the necessary notes in order to guarantee the assigned quality and proper efficiency of the plant.



***Use of the machine by people that use alcohol, medicines, and/or drugs is forbidden.***

Personnel that work with the machine must always use the personal protective equipment called for in the laws of the country in which it is used and anything else made available by their employer, such as: leather gloves, safety shoes, etc.



## SYMBOLS AND SIGNS

In some cases the danger zones are indicated in the manual and/or on the machine in some cases, using signs, plates, symbols, or icons that represent the danger or the obligation. For example, the obligation of consulting the document, which must be available for future use and must not be deteriorated in any way.

Operations or situations in which the personnel involved are to be very careful. General danger of hazardous voltage.

Operations that require the involvement of qualified and authorised professionals and/or the obligation to earth the plant.

Danger due to electromagnetic interference.

Hot zones: it indicates a danger due to the presence of heated areas or that involves parts at high temperatures (danger of scalding).

Crushing, cuts or grazes, and slipping: it indicates prohibitions or dangers that could cause injury to the operator.

Explosions: it indicates a potential risk of explosion or the need to ask for fireproof equipment.

Prohibition of removing the guards on the machine.

General prohibition: it indicates prohibition to access the zone examined or to carry out such operation of manoeuvre.

Obligation: it indicates the obligation to carry out the operations described using the clothing and/or personal protective equipment made available by the employer (overalls, leather gloves, safety shoes, etc.).

Prohibition of improper use. It is forbidden to use the spray gun targeting the spray to persons, animals and electrical equipment in operation.

CE Mark for identifying the obligation of disposing of electrical and electronic products via dumpsites that are suitable for the purpose and separate disposal to avoid environmental pollution.



## RANGE OF USE

OP s.r.l. does not accept any responsibility for any type of damage that may result from incorrect or imprudent operations.



***The machine MUST NOT be used by unskilled personnel or experts that do work on the machine that does not comply with the contents of this manual and the annexed documentation.***



***Using the machine for a purpose that does not comply with the range of use is completely forbidden as well as dangerous.***

### Normal envisaged use

The machine is intended to be operated by a single trained operator aware of the residual risks. When operating the operator's work zone or environment is in front of the machine, in which adequate space must be provided for working safely.

The machine documented in this manual was designed for:

**Joining, by means of a pressing system,  
metal hose fittings with high or low pressure  
oil-pneumatic hoses  
(the hose fittings and hoses must have specific  
characteristics and/or materials defined in the order  
and/or exclusively for the Client).**

The machine's extremely user-friendly electronic system makes it suitable for use by a vast range of Clients.

The electronic system (ES version only) has three work programs: manual, semi-automatic, and automatic, as well as numerous functions to facilitate and speed up hose crimping or pressing.



***The range of use of the machine must comply with the limits defined in the purchase contract and described in the "technical characteristics table" and the entire manual.***



***N.B. The operator is obliged to stay at a distance sufficiently close to the machine to carry out the operations required, but far enough away to exclude any possibility of involuntarily inserting the hands or parts of the body into the hose crimping or pressing zone.***

This manual lists and describes the RESIDUAL RISKS that it was not possible to eliminate during the design phase (see "Table: Residual risks").

For safety reasons, during working operations nobody other than the operator is allowed in the area around the machine. As a departure from this requirement maintenance personnel are allowed in the area, provided they are expressly authorised by the production manager.



### PLEASE NOTE!

If used incorrectly the equipment can be dangerous and may cause injury to parts of the body, which must never come into contact with or be put in the spaces affected by the machine's moving parts.

## Use not allowed

Using the machine or parts thereof for a purpose that does not comply with the range of use is completely forbidden.



**IT IS COMPLETELY FORBIDDEN TO:**



**- Use the machine or parts thereof without having read and correctly interpreted the contents of the operating and maintenance manual.**

- Machine material that is friable, fragile, or that does not conform to the range of use: ceramics, glass, etc.
- Use corrosive products that attack parts of the machine or may damage the operator's health.
- Modify work parameters that are not accessible to the common operator because they are password protected.
- Use the hydraulic unit and/or plant (if available), connecting them to other equipment.
- Use the machine with the safety devices not working or by-passed.
- Heat or dry rags or clothing on hot parts. In addition to be dangerous this will compromise ventilation and cooling of the components.
- Use the machine or parts thereof in environments that are particularly inflammable.
- Use the machine or parts thereof without authorisation by specialist personnel or qualified and authorised professionals.
- Use the machine or parts thereof at pressures higher than those set and established by the manufacturer.

**OP s.r.l.** does not accept any responsibility for any type of damage that may result from incorrect or imprudent operations.



***If used incorrectly the equipment can be dangerous, or can cause injury to parts of the body that must never come into contact with or be put into spaces affected by the machine's moving parts.***

## 2 - Characteristics

### GENERAL CONDITIONS



***The description of the machine's characteristics makes it possible to identify its main components and refine the technical terminology used in the manual.***

The technical terminology is covered in the CONTENTS AND INDEXES chapter. The CHARACTERISTICS chapter contains information on the composition of the machine, its characteristics, dimensions, and how it is identified.

Setting, operation, and maintenance are described below, based on the information contained in this chapter having been taken on board.



***In some cases it may be necessary to document operation of the machine's software separately or to annex additional documentation to this manual that is intended for qualified professionals.***



## MACHINE DESCRIPTION AND SETTINGS

### Technical characteristics

Pressing force..... 315 tonnes  
Die length ..... 100 mm  
Die opening ..... Ø + 43 mm  
(Add this value to the minimum diameter of the die you wish to use to obtain the maximum opening in the die)  
Working capacity on 6 spirals (2 piece).....2"  
Working capacity on industrial hose .....3"



#### **PRESSING VALUE (\*)**

**The maximum pressing diameter is 105 mm with Ø73 mm dies, and this value cannot be exceeded.**

motor **08** ..... 5.5 kW (7.5Hp)  
Power supply voltage .....(see labels on machine)  
Operator controls voltage ..... 24 Volt +/- 10%

Oil quantity..... 97 lt  
.....(25.6 US gal lqd / 21.34 imperial gal)

#### **WARNING!**

**For security reasons, fill the tank with a minimum of 97 lt of oil and keep the level controlled.**

Oil characteristics ..... (see chapter: Maintenance)

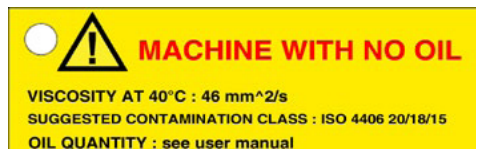
**The hydraulic unit 01 is delivered without oil**

Noise pressure level ..... < 70 dB(A)  
Overall dimensions of machine(L x D x H) ..... 820 x 660 x 820 mm  
..... (32.28" x 25.98" x 32.28")  
Weight of machine (static load) .....470 kg (1036 Lbs)



Number of operators..... 1 #

Maximum admissible ambient temperature..... from -5 to + 40 ° C  
Maximum admissible relative humidity .....80 %



(\*) This data depends on the type of machining.

## Drawing showing overall dimensions

The measurements are expressed in mm.



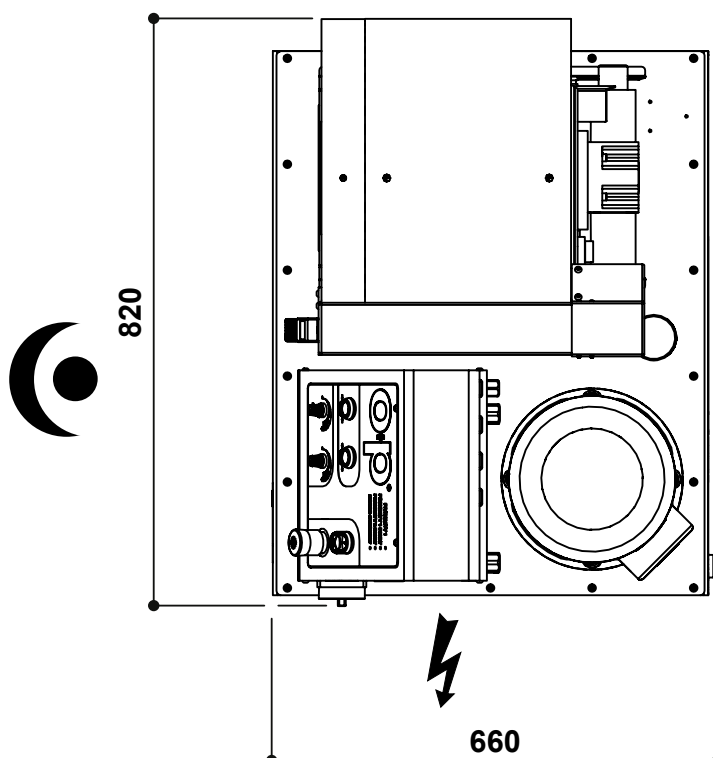
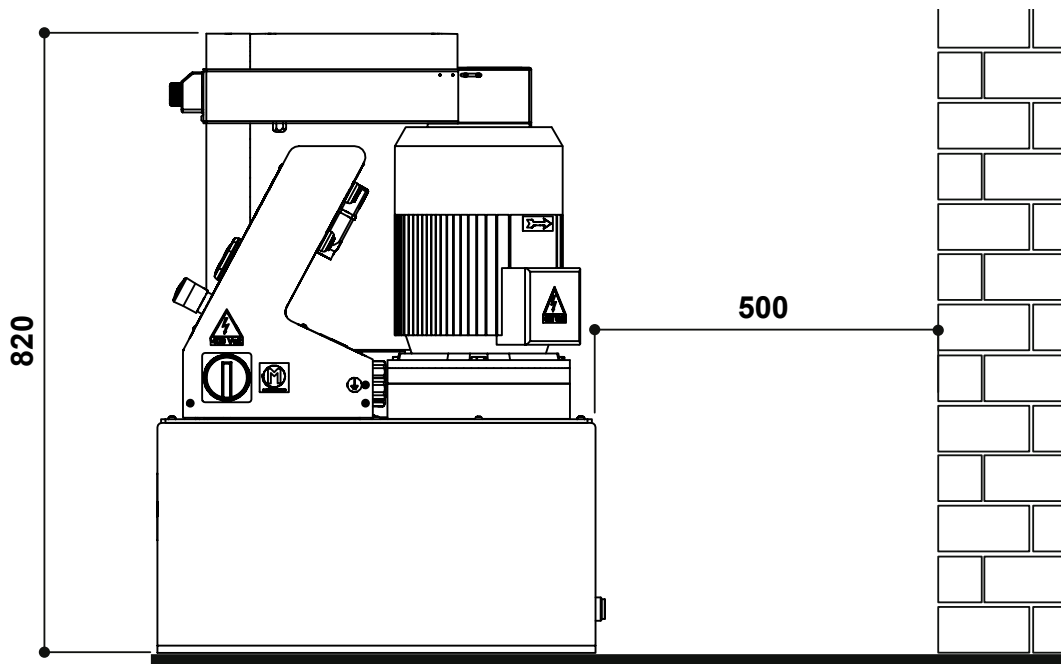
Electrical line connection entrance.



Operator's position or workstation.



The manual indicates the maximum measurements and where necessary the safety distances or spaces required for maintenance. The exact measurements of the machine and/or equipment are shown in the drawings that can be supplied if requested.



## Machine identification and manufacturer

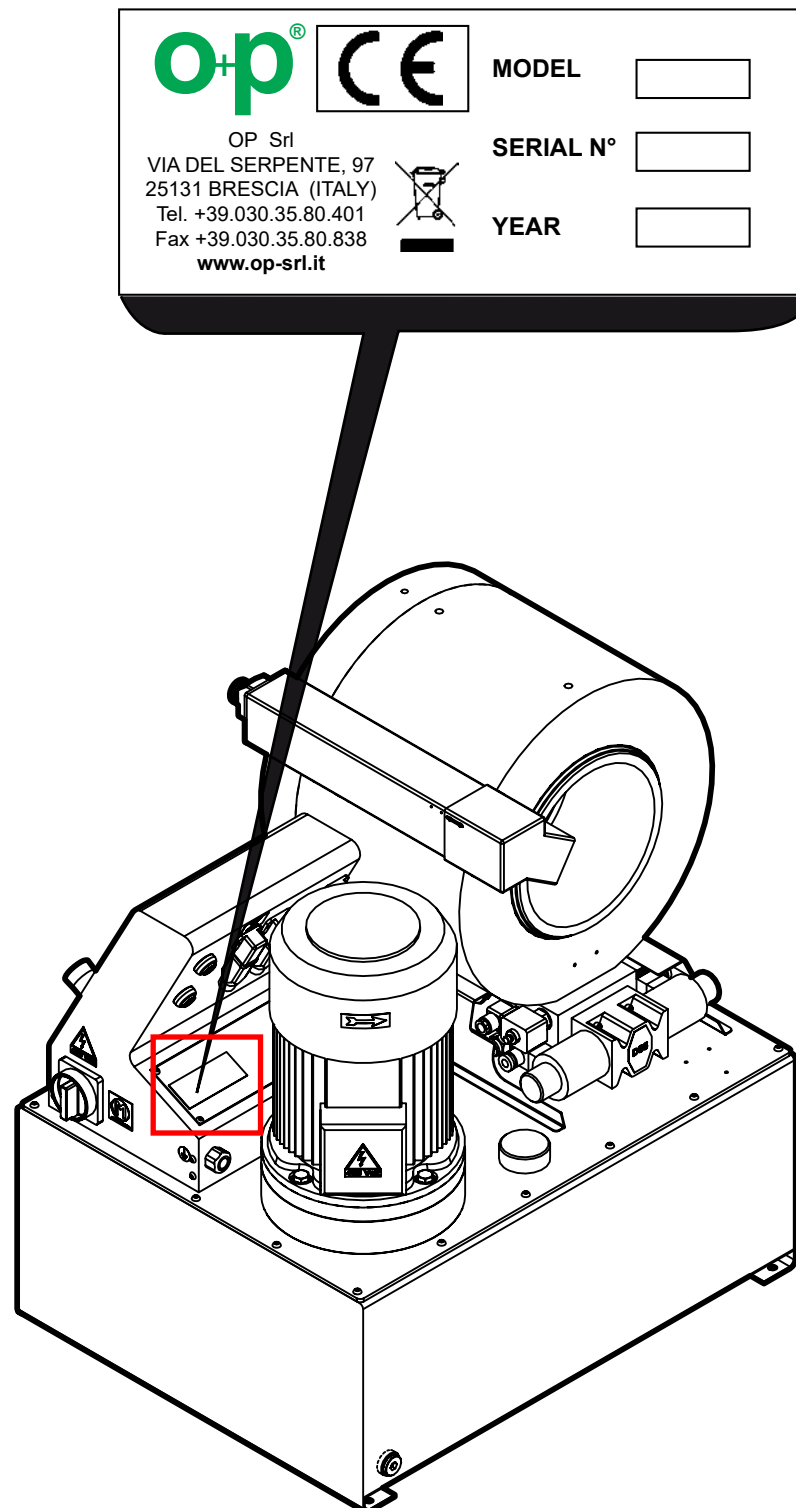


**The information plates on the machine must NOT be removed, damaged, dirtied, hidden, etc under any circumstances.**



The information plates must be cleaned periodically and always kept visible, that is, they must NOT be hidden by any objects or items (rags, boxes, equipment, etc.).

The technical details given in this manual do not replace those shown on the information plates on the machine.



## Machine and plant description

This machine uses a pressing system to join metal hosefittings to high and low pressure oil pneumatic pipes at a pressure that is suitable for the range of use and technical characteristics.

In essence the machine comprises:

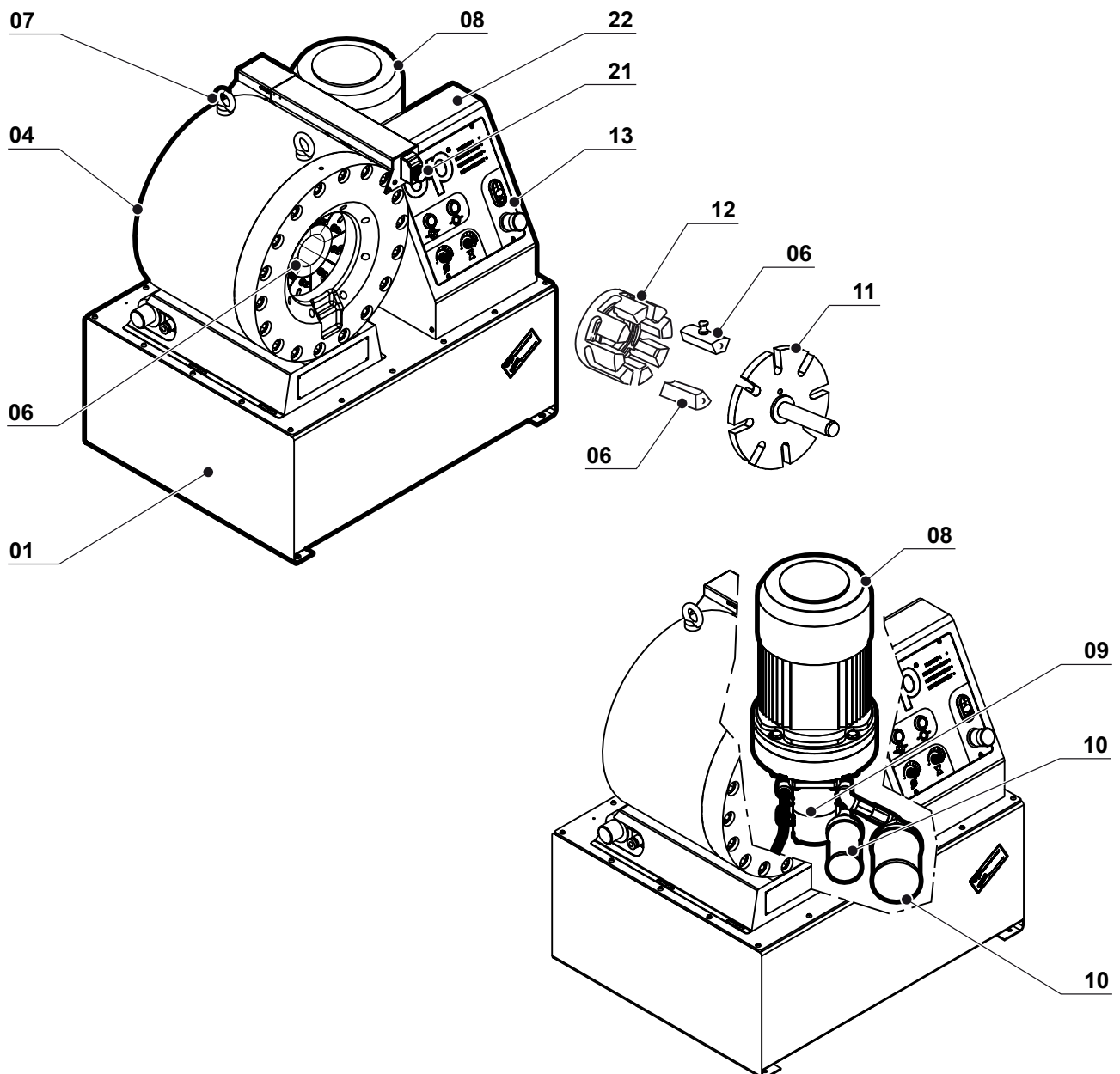
### - Pressing unit

The pressing unit is made up of a hydraulic cylinder **04** supported by a robust frame.

The lifting lugs **07** are anchored to oil hydraulic cylinder.

A vernier dial **21** located on the oil hydraulic cylinder is used to detect movements and therefore the strokes on the hydraulic cylinders.

The nucleus of the pressing unit is made up of the dies **06** laid out radially along the unit's circumference.



### - Hydraulic unit

The hydraulic unit **01** is housed on the lower part of the machine. This unit has a level gauge, filling cap, and oil draining cap. The oil hydraulic components, valves and solenoid valves are fitted on the cover, as well as the motor **08** to which the pumps **09** and related submerged filters **10** are connected.

### - Manual changes

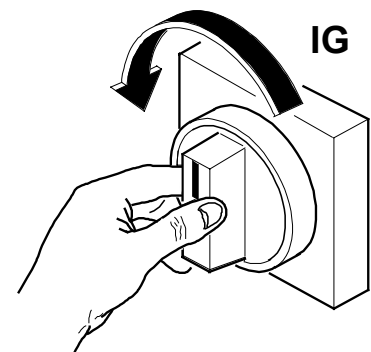
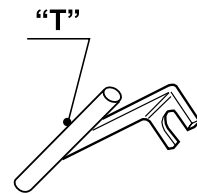
The machine has a system for manual changing of the dies **06** that is made up of a pincer "T" are used to change a single die at a time, as described in the OPERATING Chapter, under the "MANUAL DIES REPLACEMENT" heading.

### - Control panel

The branch box **22** is positioned ergonomically on the right side of the machine and it houses the control panel **13** where the buttons described in chapter 7 - OPERATION - are located. Starting the through the main switch **IG**, positioned on the side of the branch box **22**, allows actuating these buttons.

### - Accessories

The machine may also be supplied with some accessories, as described in the "INSTRUMENTATION" Chapter.



## 3 - Accident Prevention and Safety

### GENERAL CONDITIONS

This machine is built according to the most severe accident prevention standards and is fitted with safety devices that are suitable for protecting components and operators.



***For obvious reasons it is not possible to foresee the multitude of installations and environments in which the machine will be installed, and so the Client must provide the Manufacturer with adequate information on specific installation conditions.***

The indications given in this document do not replace the safety regulations and technical data for installation and operation that apply directly to the product, nor the rules dictated by common sense and safety rules in force in the country in which the machine is installed.



***It is essential that the operators be given correct information. It is therefore obligatory for them to read and comply with the technical information given in the manual and annexed documentation.***

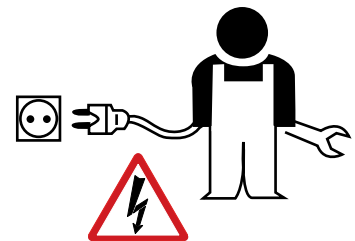
The manufacturer is available to provide training for professionals working with the machine, both on its own premises and in situ, on the basis of conditions to be defined contractually.

Handling and/or lifting heavy pieces or equipment (over 30 kg) must be done with the aid of suitable lifting equipment and using the specific lifting lugs fitted by the manufacturer.



***Do not use the machine if any operating anomaly is encountered. Avoid any precarious repairs. Repairs are only to be done using original spare parts that must be installed to suit the intended use.***

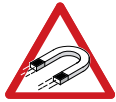
Responsibility for components bought on the market rests with the respective manufacturers.



## RISK ZONES AND OPERATIONS

### Installation conditions

This machine must not be installed out in the open or under adverse ambient conditions (sun, rain, wind, etc.). The safety distances must also be respected to avoid dangerous situations.



**Also make sure that there is no electromagnetic interference.**



**Standard machines are not equipped to work in environments that are particularly inflammable or explosive. Flameproofing is only supplied by request.**

The machine has been designed according to the standards for conserving energy and those in force on energy saving.

N.B. These conditions also apply to any subsequent installations.

### Maintenance works and safety devices

Guards, doors, or gates can only be removed using tools. In some cases they can be opened, but are protected by specific systems.



**Removal of guards or protective devices with the door open is only permitted for qualified personnel and only for extraordinary maintenance works.**



**Once this work has been completed the technician must reinstate the original conditions. The guards may be removed only after the power is switched off.**

Switches and / or emergency buttons that are placed directly on the machine or nearby are provided with locking devices to prevent accidental power on. In any case, make sure that nobody else can reset or start the machine. Maintenance technicians are to report any fault or deterioration due to wear or ageing.

The machine must be cleaned using suitable equipment and detergents that do not attack the machine's components in any way. Cleaning the machine with water jets is completely forbidden.

### Thermal danger



**The machine may have hot surfaces due to overheating (e.g. motors, coils, piping, etc.), so be careful where you touch it.**

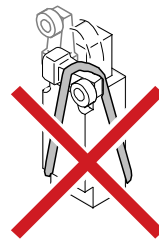
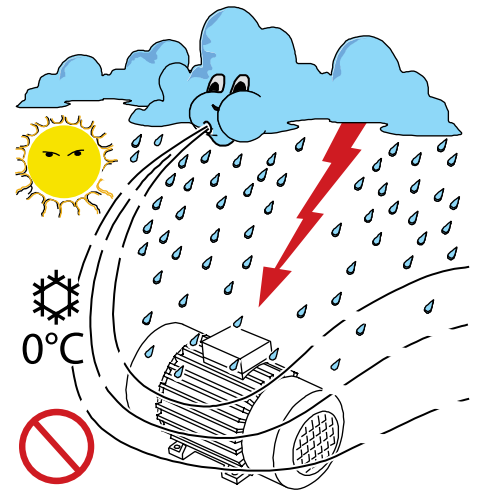
In case of fire use CO2 foam extinguishers and self-suctioning systems to fight the fire in closed environments.

### Personnel clothing

Personnel are NOT to go near the machine or equipment with bare feet or wet hands.

Personnel are not to wear clothing with long sleeves, laces, or belts that may hamper their personal safety.

Personnel are to wear the clothing and personal protective equipment made available by the employer: gloves, shoes, overalls, etc.





## Machine moving

When moving the machine poses a potential danger and so it is completely **FORBIDDEN** to run it empty, do maintenance, or clean it when the machine is running.



***When the machine is working of necessity it has pressing movements that can be seen and that for obvious operating reasons cannot be actively protected. Therefore, to avoid crushing it is necessary to take maximum care and concentrate when carrying out working operations.***

The operator must also pay attention to the work environment around them in order to guarantee sufficiently large space for escape routes.

## Machine stopped or switched off

Even when the machine is switched off it can pose a danger: guards, dies **06**, sharp edges, etc. are inevitably exposed and so care must be taken when entering the working area and when handling parts of the machine use suitable protective measures (gloves, shoes, etc.).



***Correct cleaning of the working environment can avoid accidents or superfluous risks. Even a small oil leak can prove dangerous.***

**Note:** Stores or dispensers can be provided of wheels; take great care and/or use the proper brakes.

## Lighting the workplace

The workplace must be correctly lit to guarantee the complete safety of all working and maintenance operations. The lighting must avoid stroboscopic or dazzling effects and stress of shadowy areas.

**Note:** On some models a mirror is mounted that makes easier to see the hosefitting when it is in the opposite part of the user

Use of the machine when good lighting is not available is forbidden.

## Noise

When running flat out, evaluated on its own and with correct maintenance, the machine generates a (noise) acoustic pressure level of less than 80 db(A) and so is completely harmless for the operator.

Where, as a result of the various and unforeseeable installation possibilities the noise threshold allowed by law in the country in which the machine is installed is exceeded, the Client must see to removing the causes or protect the operators by means of adequate personal equipment (ear muffs), as well as prior information to sensitise them to use and routine checking of their hearing.



## RESIDUAL RISKS

Despite the warnings and safety systems that the Manufacturer has adopted, there are still some residual risks that cannot be eliminated. These risks are listed in the table below, with some suggestions to avoid them.

**Table: Residual risks**

RISK ANALYSIS AND DESCRIPTION	SUGGESTED SOLUTION
<b>A risk of crushing</b> of the upper limbs is inevitably present and cannot be eliminated. Be very careful when using the machine. Respect any safety distances. Moreover, on magazines or dispensers can be mounted some wheels that cause crushing danger if not correctly blocked.	During pressing do not move your hands near to the dies and keep a minimum distance of 120 mm. Always use proper brakes.
<b>Leaks or seepage</b> with a danger of slipping and/or environmental pollution.	Clean the machine and workplace thoroughly.
<b>Noise pollution</b> due to the type of machining or wrong pressure setting conditions.	Check the settings and operation or provide additional insulation.
<b>Guards must only be opened</b> after working ended to avoid the risk of residual voltages and allow the temperature of hot components to diminish.	Do not open the guards before the time indicated has elapsed and make sure that the operating conditions are correct.
<b>Aggressiveness and toxicity of fluids or greases:</b> Hydraulic oil and some greases may attack the skin or mucous membranes.	Use personal protective equipment or wash any parts exposed to contact immediately.
<b>Cutting parts:</b> Any burrs on the stub hoses or bushing being machined, dies <b>06</b> or shells <b>12</b> damaged etc.	Use personal protective equipment and handle with care.
<b>The hydraulic system</b> may cause serious injury if used with excess pressure.	DO NOT use for purposes not described in the manual or change valve settings.
<b>Poor cleaning:</b> This makes it difficult to read the controls and safety signs and creates dangerous situations.	Clean the instrumentation, plates, and working environment thoroughly.
<b>External weather agents</b> such as infiltration of water, low or high temperatures, high humidity, etc.	See to maintaining ambient conditions that are suitable for the plant.
<b>Accumulation of energy:</b> Inside the control panel <b>13</b> or hydraulic or pneumatic accumulators (if fitted).	Make sure that the devices have released their energy before working on them.
<b>The main switch IG</b> and other devices (by request) are fitted with locking systems.	Lock them when necessary to avoid incorrect activation.
<b>Format change or Set-Up errors</b> with serious damage to the machine.	Make dies replacement using the suitable change tool (see chapter 7 - OPERATION -) and use expert, careful personnel for SETTING UP.
Poor or no <b>lighting</b> in the workplace.	Light correctly.
<b>Installation in small spaces</b> that do not allow adequate movements or correct escape routes from the workplace in case of danger.	Maintain the correct safety distances.
<b>Poor training</b> of personnel involved or professionals that work with the machine.	Ask the Manufacturer or their Agent for an additional course.

## 4 - Lifting and Transportation

### GENERAL CONDITIONS

#### Lifting

Where indicated and/or provided for, lugs **07** are inserted and/or can be inserted to which a hook or shackle (of correct size) can be anchored correctly, as shown in the figure.



**Lifting is only to be done by specialist personnel (riggers, crane operators, haulage contractors, etc.).**

The lifting means used (cables, polyester straps, chains) must be suitable for supporting the load imposed by the machine. The cables must form an opening angle of less than or equal to 90°.

The lifting cables must not damage the machine, if necessary protect it by means of rags or cardboard.

When handling check that the loads are correctly distributed on the cables and do not make any brusque or quick movements that may cause dangerous waving.

#### Transportation

Transporting the machine, especially by road, must be done using means and methods that are suitable for protecting the components (especially electronics) against violent impacts, humidity, vibrations, etc.

#### Unpacking and cleaning components

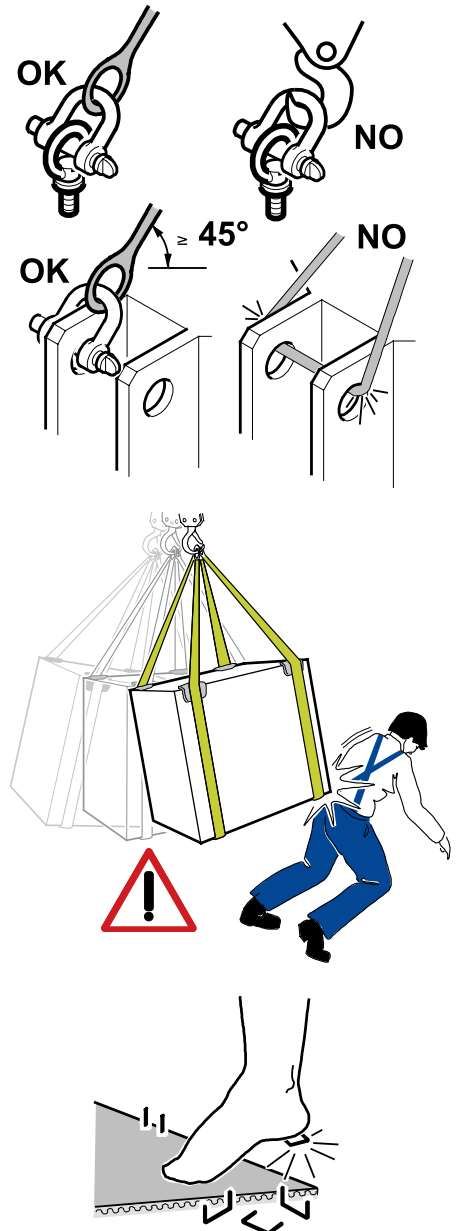
We wish to point out that packaging (wood, nails, cellophane, metal staples, adhesive tape, etc.) can pose a danger.

They must be removed using suitable means and not left within reach of irresponsible people (e.g. children). The same goes for tools used to remove packaging (scissors, hammers, tongs, etc.).

The packaging is to be disposed of in compliance with the standards in force in the country in which the machine is installed.

When opening the package check the integrity and completeness of the machine and make sure there are no defects or deterioration. If necessary, stop work immediately and call the haulage contractor or transporter as well as informing the Manufacturer.

Remove any protective film and carry out meticulous cleaning using suitable products for the surfaces to be cleaned. Do not use petrol, trichloroethylene, solvents, or abrasive products.



## SPECIFIC LIFTING OF UNITS

Lifting is to be done according to the general conditions described previously and anchoring to the points indicated in the manual on the machine or the packaging.


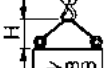


The machine is normally made up of a multiple unit or element that includes the hydraulic unit **01**, the hydraulic cylinder **04**, branch box **22** and control panel **13**.

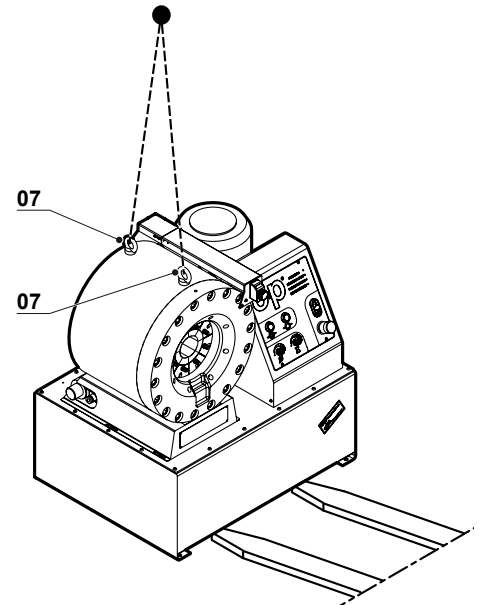
The table below shows the weight (mass) and other data of use for the lifting system.



**If there is a mobile base for the machine is recommended lifted using a forklift truck. In this case be careful not to bang the sides and crush any cables.**

**Tables: Lifting points**

Mass / Weight in kg	Lifting points	Minimum cable height	Lugs UNI2947	shackles UNI1947
	n°#			
470	2	1.000	12	12



## 5 - Installation

### GENERAL CONDITIONS

#### Means of installation

The machine must be installed to suit the Client's needs and the place in which the machine is to be installed.



***This operation must be carried out by specialist personnel. However, it is recommended to follow the indications given in this manual.***

The operating and maintenance manual CANNOT make up for any technical shortcomings among the installers. They must therefore be able to read and understand the diagrams annexed or provided beforehand to the Client.

#### Preliminary checks

- Check the foreseeable ambient conditions (explosive atmosphere, excessive ventilation, or high humidity level) and that the machine is not exposed to the weather (rain, wind, etc.).
- Avoid electromagnetic interference that may compromise correct functioning of the electronic equipment (**if present**).
- Position the machine in a room with safety distances that make it possible to carry out the normal working / maintenance operations. Positioning of the machine must be studied to avoid creating inconvenience or stress (windows or lighting lamps that may cause a glare, draughts, narrow spaces full of obstacles, etc.).
- Check that the floor is solid and suitable for supporting the weight of the machine.
- Check that the machine is stable and that it does not cause bothersome vibrations.

***Level out the machine and fix it with screws or bolts to the holes on the base and / or frame (if present).***

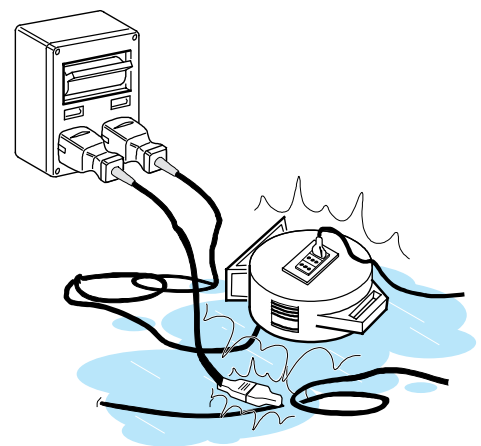
- Check for possible collision with other machines or moving equipment (e.g. overhead crane).
- Make sure that the power supply voltage is the same as that indicated on the information plates on the machine or in the manual.
- Check that the motors rotate in the correct direction.
- Install an adequate system on the electrical line to protect against overloads or short-circuits. We also recommend protection against excessively low voltages.

**The machine is supplied with cable connected up, but without plug.**

- Check that there is an adequate EARTHING.
- Make sure that the pneumatic line (**if used**) is protected against supplying compressed air at pressures exceeding 10 atm.
- Check the presence and quantity of hydraulic oil (**if present**).



***During installation operations, barriers and signs must be put up indicating "WORK IN PROGRESS".***



- The motor **08** doesn't work when the switch is connected :

1. Check whether the emergency button is locked.
2. Check whether the wall switch corresponds to the machine's switch poles.
3. Check whether the fuse of the wall switch is burnt.

## Installation procedure

The installation is done bearing in mind the comments made above, and following the procedure below in the order indicated:

- Position and level the machine.
- Clean especially the moving parts that rub against one another and lubricate if necessary as described in the MAINTENANCE chapter.
- Press the red mushroom shaped EMERGENCY button on the control panel **13**.
- Wire the compressed air line (if applicable).
- Check that there are no foreign objects on the machine and that no tools (dies **06**) have been fitted yet.
- Fill the tank for the hydraulic unit **01** (see the MAINTENANCE chapter for the type and technical characteristics table for the quantity of oil).



## 6 - Instrumentation

### GENERAL CONDITIONS

Full knowledge of the INSTRUMENTATION is one of the prime rules to avoid damage the machine and the operator.



***We therefore recommend reading this manual carefully and if there is any uncertainty or discrepancy in the information, ask the manufacturer for more specific information.***

**Do not use the machine if:**



- ***If you do not have sufficient training on this machine or similar machines.***
- ***If you are not able to understand how it works.***
- ***If you are not sure of the consequences of the manoeuvres to be used.***
- ***If you encounter any functioning anomaly.***
- ***If any doubts or contradictions arise between your own experience, the manual, and/or other operators.***

If any controversy should arise in the technical information provided, the "ORIGINAL INSTRUCTIONS" and original language in which the document was prepared – ITALIAN – shall take precedence.

The employer is to make sure that the conditions indicated above are respected and that those tasked with operating the machine have been adequately trained.

The Manufacturer does not accept any responsibility for damage caused by the machine and the operator if these are due to incompetence, poor preparation or a lack of training.

## Equipping

The machine can be equipped with (OPTIONAL) devices that facilitate preparation or machining, such as, for example:

- Change tool “N” for replacing the dies in economic mode. (OPTIONAL)
- the shell carrying dispenser “R” (OPTIONAL)
- the patented quick change tool **11** for changing the dies in rapid mode and the “M” magazine that collects the shells **12** (OPTIONAL)
- Kit for cleaning and greasing tubomatic “Q” (Vedi allegato: Istruzioni per il cambio filtro, lavaggio ed ingrassaggio) (OPTIONAL)
- the Mobile support “P” (OPTIONAL).
- the electrical pedal (OPTIONAL) **40**

### - Magazine and quick change tools

The machine has a system for quick changing of the dies **06** that is made up of a patented quick change tool **11** (OPTIONAL) and a magazine (OPTIONAL) that supports the shells **12** that are used to change all the dies in a single operation, as described in the OPERATING Chapter, under the “DIE REPLACEMENT WITH PATENTED QUICK CHANGE TOOL” heading.

A set of dies **06** is also supplied with the machine, as indicated in the **Table: Hose crimping dies** and defined when ordering to suit the Client's needs.

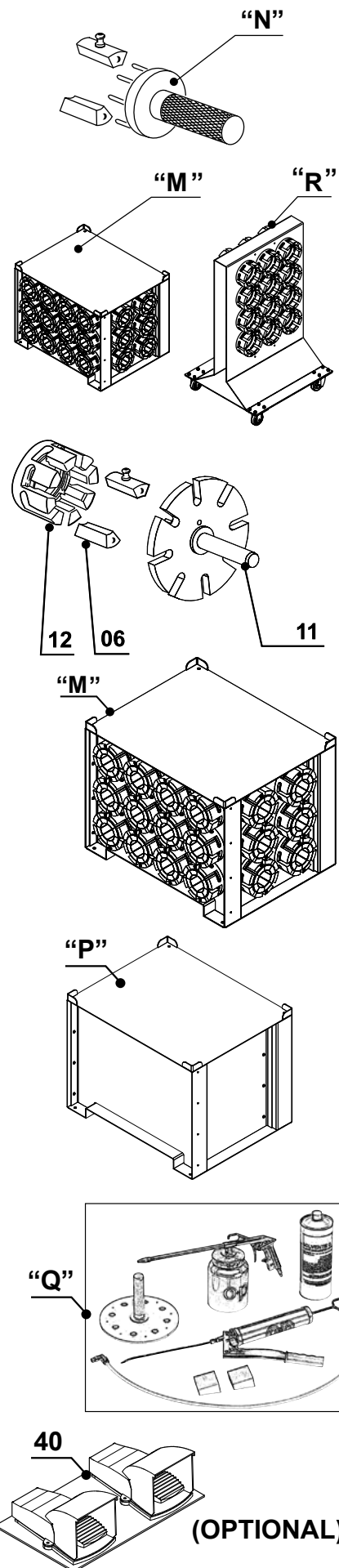
Upon request it is possible to supply dies with special nominal diameters.



**No equipment or devices made by other manufacturers may be used. If this is done the pre-requisites for honouring the guarantee lapse and the Client takes full responsibility for any damage.**

**Table: Hose crimping dies mm / inch**

Order code	Recommended hosefitting diameter			
	Ø min mm	Ø max mm	Ø min inch	Ø max inch
TUBH119D10	10	12	0,394	0,472
TUBH119D12	12	14	0,472	0,551
TUBH119D14	14	16	0,551	0,630
TUBH119D16	16	19	0,630	0,748
TUBH119D19	19	22	0,748	0,866
TUBH119D22	22	25	0,866	0,984
TUBH119D25	25	29	0,984	1,142
TUBH119D29	29	34	1,142	1,339
TUBH119D34	34	38	1,339	1,496
TUBH119D38	38	42	1,496	1,654
TUBH119D42	42	46	1,654	1,811
TUBH119D46	46	50	1,811	1,969
TUBH119D50	50	54	1,969	2,126
TUBH119D54	54	58	2,126	2,283
TUBH119D58	58	63	2,283	2,480
TUBH119D63	63	69	2,480	2,717
TUBH119D69	69	73	2,717	2,874
TUBH119D73	73	105	2,874	4,134



## 7 - Operation

### GENERAL CONDITIONS

Before starting to control the machine's movements and functions a series of essential checks must be carried out and a thorough knowledge must be gained of the INSTRUMENTATION chapter and the functions that are enabled by the commands, as well as the positioning of the STOP buttons and the EMERGENCY devices.



**Before doing any operation you must have read, interpreted, and correctly implemented all the conditions indicated previously in the manual and/or annexes.**

### Commissioning

- Connect the line to the Client's power supply.

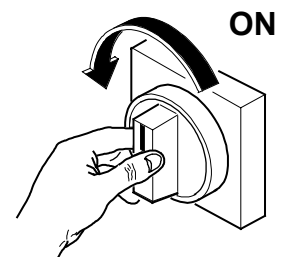


**When power is supplied to the machine some unexpected movement may occur, so stay at a safe distance.**

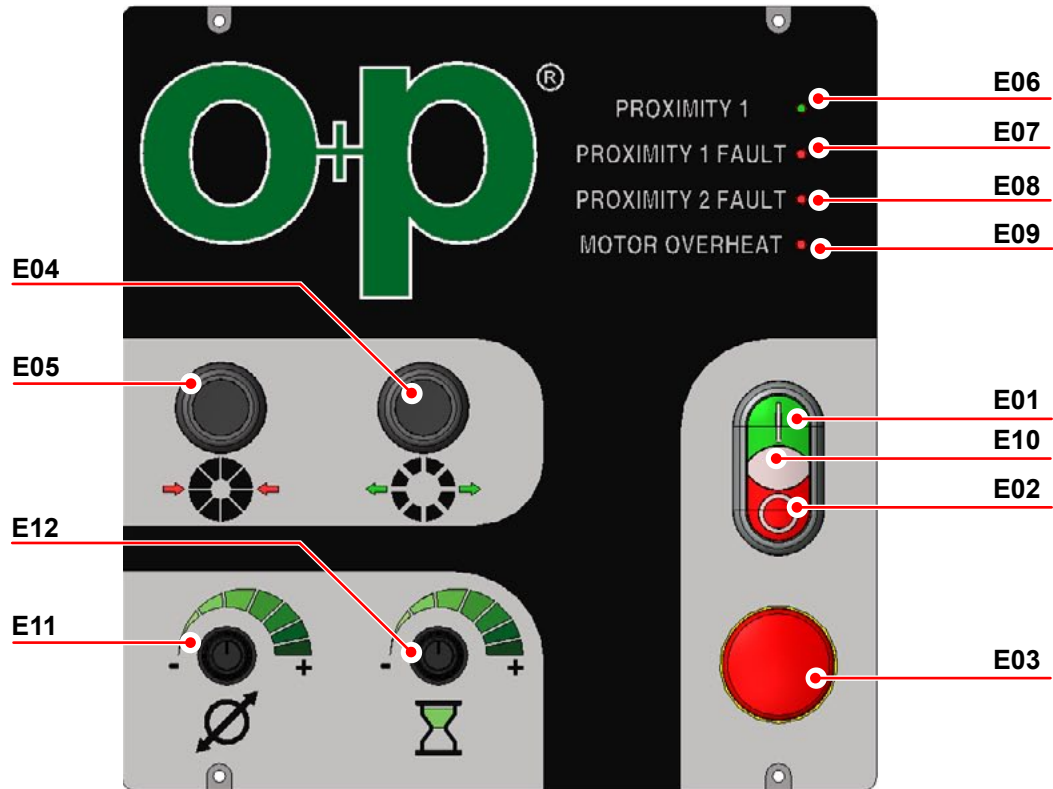
- Switch the power on for the machine using the main switch **IG** and the machine automatically sets itself up for working.
- Deactivate the EMERGENCY button activated previously.
- Check that the motor **08** rotates in the correct direction (see the arrow on the motor itself). If necessary invert the power supply phases and repeat the operation.
- Push the START button and then immediately the STOP (in some cases this is the same button with a dual function).

### Utilization

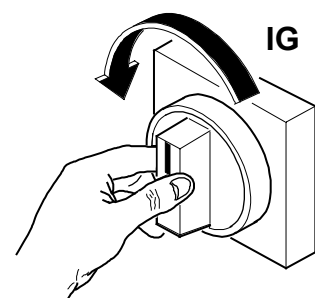
- Check that nobody is in the work zone that is not involved in the work.
- Switch the power on for the machine again using the main switch **IG**.
- Make sure that the safety devices work properly and that the conditions described are complied with (see the ACCIDENT PREVENTION chapter).
- Read about any RESIDUAL RISKS and take these into consideration.
- Make sure of the final hose crimping joining diameter (**the final hose crimping diameter is provided by the pipefitting manufacturer – follow their instructions**) and insert the most suitable set of dies **06**. See the dies choice table.
- Make all the settings and proceed with operating as documented below.



## CONTROL PANEL



E01	"START" BUTTON
E02	"STOP" BUTTON
E03	"EMERGENCY STOP"
E04	"OPEN" BUTTON
E05	"CLOSE" BUTTON
E06	GREEN LED - PROXIMITY 1 "WORKING DIMENSION"
E07	RED LED - PROXIMITY 1 FAILURE "SLOWDOWN"
E08	RED LED - PROXIMITY 2 FAILURE "WORKING DIMENSION"
E09	RED LED - MOTOR ENGINE OVERHEATED
E10	LAMP WHITE - MACHINE POWERED
E11	POTENTIOMETER FOR REOPENING REGULATION
E12	CRIMPING TIME POTENTIOMETER
IG	POWER SWITCH



## DESCRIPTION OF PANEL CONTROLS:

- **E01 - “START” BUTTON:** This button should be pressed to start working after an emergency stop or after a power outage.
- **E02 - “STOP” BUTTON:** When this button is pressed the fitting machine stops immediately.
- **E03 - EMERGENCY STOP.** When this button is pressed the fitting machine stops immediately. To restore operation, unlock the button by turning it in the direction of the arrows and press the “START” button.
- **E04 - “OPEN” BUTTON:** When this button is pressed the piston moves back and the dies open. When the button is released the piston stops.
- **E05 - “CLOSE” BUTTON:** When this button is pressed the piston advances and the dies grip the union.
- **E06 - GREEN LED - PROXIMITY 1 “WORKING”:** Once the crimping diameter has been reached, the indicator light on the front of the machine will come on. This LED blinks when E12 (crimping time potentiometer) is set on a value between – “and” +, for a selected period of time between 0 and 10 sec.
- **E07 - RED LED - PROXIMITY 1 FAILURE “SLOWDOWN”:** When the red indicator light is on, the proximity 1 “Slowdown” is not working.
- **E08 - RED LED - PROXIMITY 2 FAILURE “WORKING”:** When the red indicator light is on, the proximity 2 “Working” is not working.
- **E09 - RED LED “MOTOR ENGINE OVERHEATED”:** When the red indicator light is on, this means the engine is heating. Reset the machine with the start button when the light has switched off.
- **E10 - LAMP WHITE - MACHINE POWERED:** The lamp white indicates the presence of electricity in the machine.



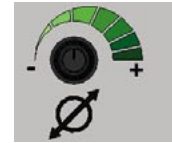
**E04**



**E05**

- **E11 – POTENTIOMETER FOR REOPENING REGULATION:** it sets the reopening of the machine.

*Note: When the potentiometer E11 is positioned on minus, the regulation is disabled.*



**E11**

- **E12 - CRIMPING TIME POTENTIOMETER:** it allows to define the crimping time. It can be set between 0 and 10 sec. and it starts once the crimping diameter is reached.

*Note: If E12 is positioned on minus, the counting of the crimping time is not performed.*



**E12**

- **IG - "POWER SWITCH":** Connects the machine to the power supply.

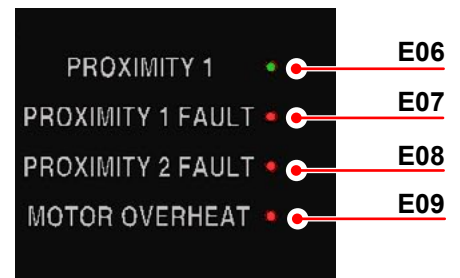


**WARNING**

*If the LED E07 lights up after having pushed the reopening button, it means that the slowdown proximity has failed.*

*If E08 LED is on, the machine does not closing and it will signal the failure of the proximity "Working"  
You can reopen the machine at any time.*

*If both LEDS 07 and 08 are on. both proximity do not work, During this process, the LED E06 is always turn on.*



## VERNIER DIAL CONTROLS

vernier dial **21**:

- Use the knurled adjusting ring nut to obtain the required diameter, turning it clockwise to reduce the swaging diameter or counterclockwise to increase it.
- Use the knurled flywheel to adjust the pressing diameter (pos. **D**) and the electronic position indicator display (pos. **E**).

*Example: in order to obtain a final diameter of 12 mm, use a die with size 10. Bearing in mind that the two diameters have a 2 mm difference, this value should be shown on the display.*

- the vernier dial group **21** is provided with an electronic position indicator (**E**) for detecting the absolute or incremental position of the vernier.

Characteristics:

- Convert the linear unit of measure: (mm, inches).

**The direct drive electronic position indicators (pos. E) is provided with its own use and maintenance manual (see CHAP. 10: "Annexes").**

Full knowledge of the INSTRUMENTATION is one of the prime rules to avoid damage the machine and the operator.



**We therefore recommend reading this manual carefully and if there is any uncertainty or discrepancy in the information, ask the manufacturer for more specific information.**

For any dispute regarding the indicated technical information, please make reference to the "ORIGINAL INSTRUCTIONS" of the instructions manual provided alongside the machine and reproduced in SECTION 10: Annexes



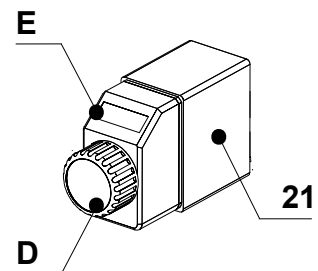
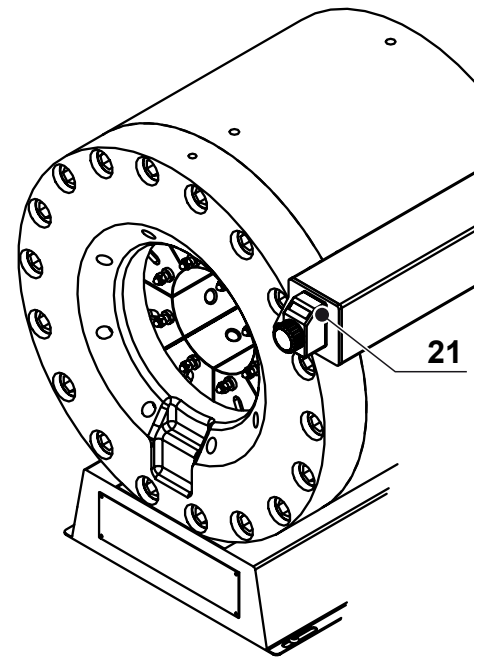
**WARNING:**  
**NEVER switch the direct drive electronic position indicator off.**

**In case of battery replacement, it is necessary to perform a "zero setting" of the machine; please contact O+P srl for this purpose.**

The low battery symbol is shown on the display when the battery replacement is required.

**WARNING:**  
**When this symbol is shown on the display:**

**ADJUST THE VERNIER DIAL TO ZERO and proceed to the replacement of the battery (remove the screw of the front cover using a TORX-TX6 tool)**



Flashing low battery symbol



## OPERATING PROCEDURE

1. Decide the final crimp diameter required (the final crimp diameter is supplied by the producers of the fittings; follow their instructions) and insert the proper set of dies (see chapter "INSTRUMENTATION")
2. Insert the hose with the fittings and bush, already prefitted, between the dies.
3. Turn the "Power switch" and press the "Start" button **E01**

***N.B. after turning the master switch, wait a few seconds while the power supply is loading***

4. Bear in mind that every millimeter of advancement of the knurled handwheel on the graduated rod corresponds to  $\pm 1$  millimetre of variation on the die closing. When the knurled handwheel is in position 0 on the graduated rod, the final diameter corresponds to the nominal diameter of the die which is printed on it. Each notch of the knurled handwheel corresponds to  $\pm 0.1$  mm on the diameter. Example: in order to obtain a final diameter of 12 mm, use a die with size 10. Considering that the difference between the two diameters is 2 mm, the knurled handwheel should be turned twice completely, so as to be positioned at no. 2 of the graduated rod.
5. Regulate the crimping time by means of the potentiometer E12 (it can be set between 0 and 10 sec. and it starts once the crimping diameter is reached).

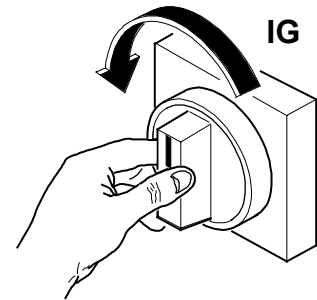
***Note: If E12 is positioned on minus, the counting of the crimping time is not performed.***

6. Regulate the reopening of the machine by means of the potentiometer E11.

***Note: If E11 is positioned on minus, the regulation is disabled.***

7. Once the crimping diameter, the crimping time and the reopening of the machine have been adjusted, press the E05 "Closing" button and wait for the piston stroke to automatically stop and the LED E06 to light on: this indicates that the quote has been reached (if the potentiometer E12 is set on a value between – "and" +, the LED E06 will blink for the same time set).
8. Press the "Open" button **E04** to make the piston back up, and remove the crimped hose.

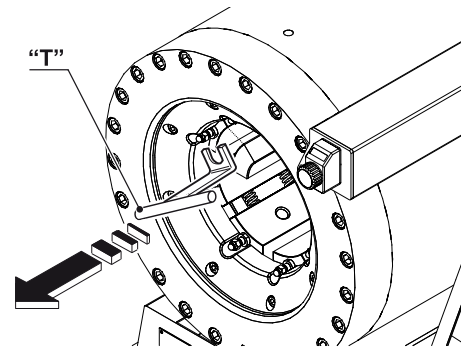
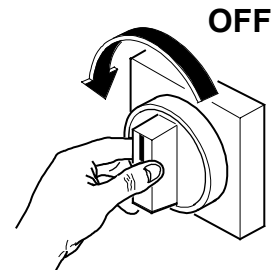
***Note: If not used, the switching off is automatic after 3 minutes***



## MANUAL DIES REPLACEMENT

### Insert and remove die with manual change tool

1. Open the machine completely, then stop the machine and disconnecting power with the "Power switch"
2. Insert the suitable wrench "T" hooking the front nut placed on the dieholder, draw frontally so as to unhook and release the die from its housing. Repeat the operation for the remaining dies **06**.
3. Still using wrench supplied "T" hook the front nut placed on the dieholder, draw frontally, insert the new die and release the wrench. Repeat the operation with the remaining dies.

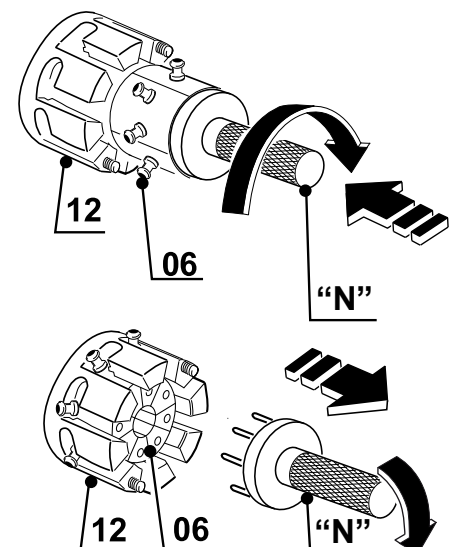
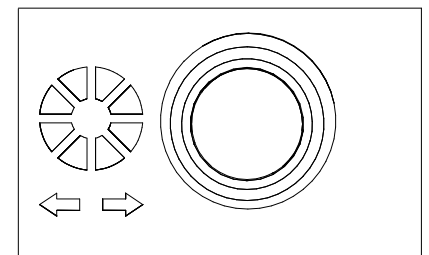
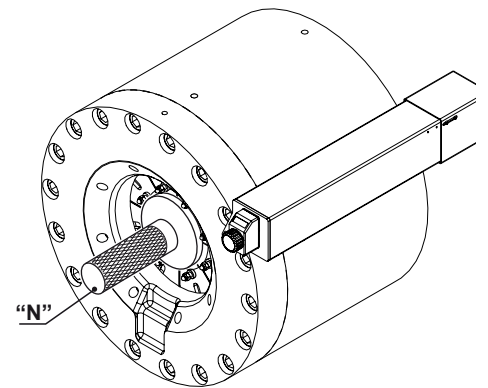
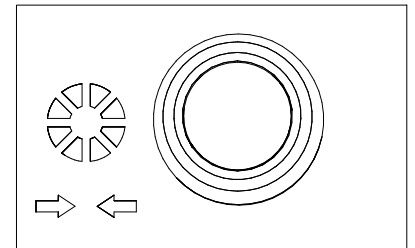


## DIE REPLACEMENT WITH STANDARD QUICK CHANGE TOOL

### Die removal with standard quick change tool

***N.B. Start the machine before beginning the quick change die process.***

1. Adjust the vernier dial **21** to zero.
2. Push the button **E05**. Make the piston move forward so as to arrive with the closed dies.
3. Use the standard quick change tool with eight pins inserting them into the holes which are positioned in the front of the dies **06**. Automatically the dies will hook on the relative pins through the magnets.
4. Taking the standard quick change tool firmly pressed, press the button **E04** making the piston move back till the end of the stroke; automatically the dies will remain constrained to the special quick change tool.
5. Insert the dies in the shell, considering that the pins should slide in the guide obtained on the same shells **12**, then rotate lightly clockwise.
6. Draw the standard quick change tool out lightly levering downward, automatically the dies will remain on the shell.



## DIE INSERTION WITH STANDARD QUICK CHANGE TOOL

**N.B.** This device, being without a centering guide, requires more attention by operator that must make sure that quick change is correctly positioned during insertion.

**N.B.** Start the machine before beginning the quick change die process.

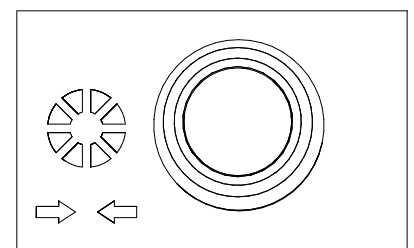
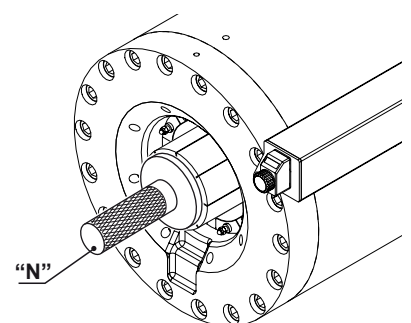
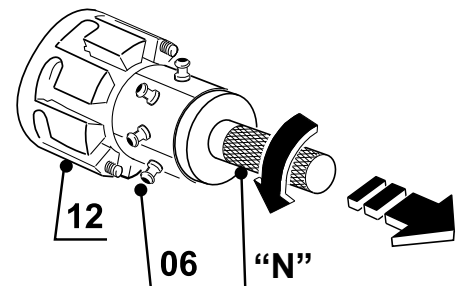
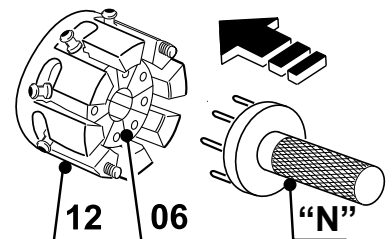
1. Verify that the machine is completely open with the vernier dial **21** set to zero.
2. Chose the new set of dies and then insert the standard quick change tool taking care that the 8 pins tally in the front holes of the dies **06**.
3. When the dies are hooked through the magnets, rotate the standard quick change tool lightly counterclockwise and draw the whole out of the shells **12**.
4. **Put the standard quick change tool between the dieholders, ensuring that the pins on the dies are aligned with the holes on the dieholder.** We are now positioned for the quick die insertion.

5. Press button **E05** make the piston move slowly forward till the end of the stroke so as to have the dieholder close, automatically the dies will hook.



**WARNING:**  
in the phases 4 make sure to align the pins on the dies and the holes on the dieholders, then press the short intermitence "close" button to prevent damage to the equipment or the operator.

6. Draw the standard quick change tool out of the holes of the dies, the replacement of the dies is now completed

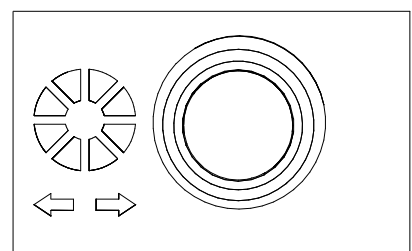
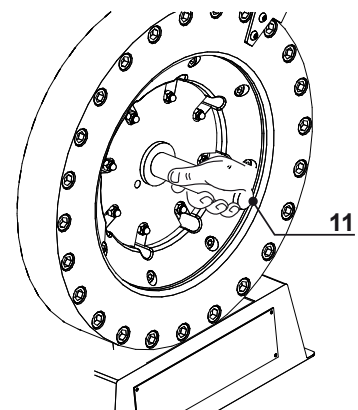
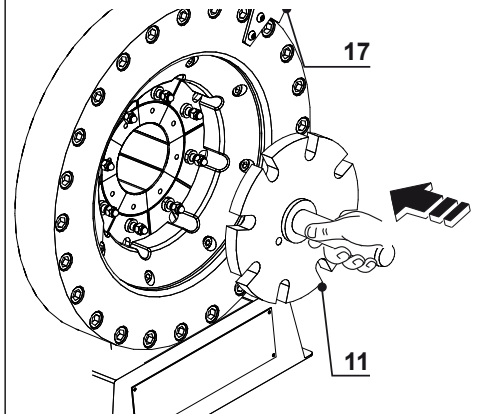
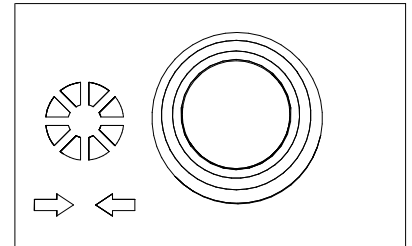


## DIE REPLACEMENT WITH PATENTED QUICK CHANGE TOOL

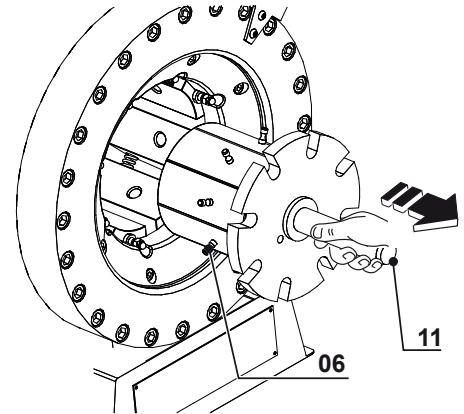
### Die removal with patented quick change tool

***N.B. Start the machine before beginning the quick change die process.***

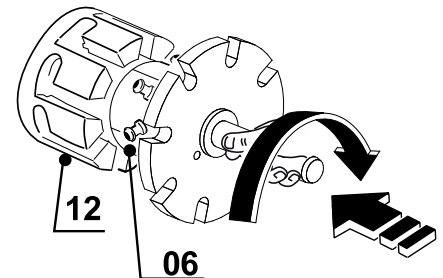
1. Adjust the vernier dial **21** to zero.
2. Push the button **E05**. Make the piston move forward so as to arrive with the closed dies.
3. Put in the hole of the front flange the patented quick change tool **11** provided with eight slots which serve as a guide and centering. The slots should be centered on the nuts that are on the front of the dieholders make sure to go into the mechanical sto. Automatically the dies **06** will hook on the relative pins through the magnets.
4. Push button **04** and make the piston move back till the end of the stroke; automatically the dies will remain constrained to the patented quick change tool.



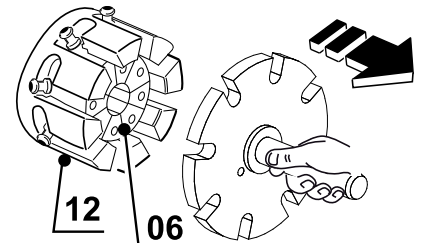
5. Draw the patented quick change tool out of the holes of the front flange.



6. Insert the dies in the shell, considering that the pins should slide in the guide obtained on the same shells **12**, then rotate lightly clockwise.



7. Draw the patented quick change tool **11** out lightly levering downward, automatically the dies will remain on the shell.



## DIE INSERTION WITH PATENTED QUICK CHANGE TOOL

**N.B. Start the machine before beginning the quick change die process.**

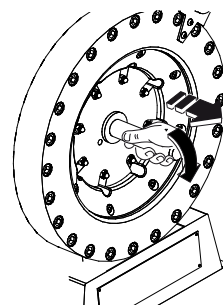
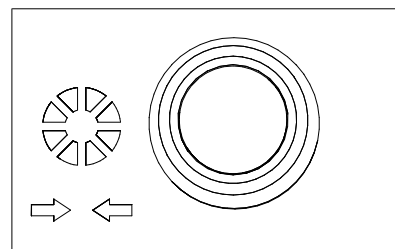
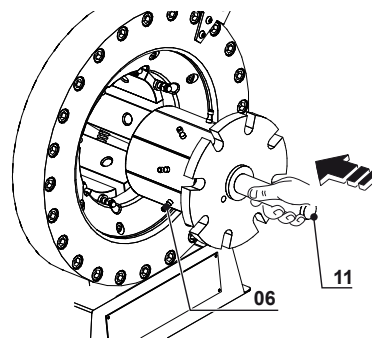
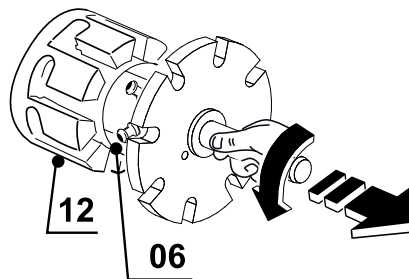
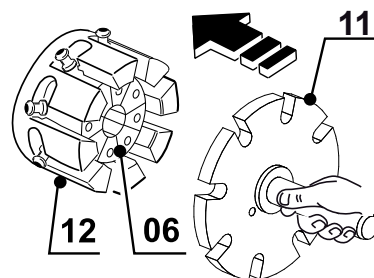
1. Verify that the machine is completely open with the vernier dial **21** set to zero.
2. Chose the new set of dies and then insert the patented quick change tool taking care that the 8 pins tally in the front holes of the dies **06**.
3. When the dies are hooked through the magnets, rotate the patented quick change tool lightly counterclockwise and draw the whole out of the shells **12**.
4. Put in the hole of the front flange the patented quick change tool **11** provided with eight slots which serve as a guide and centering. The slots should be centered on the nuts that are on the front of the dieholders make sure to go into the mechanical stop. We are now positioned for the quick die insertion.



### ATTENZIONE:

**In the phases 4 when the patented quick change tool are centered on the front holes of the flange, make sure to perfectly strike the ledge.**

5. Still with the end of the stroke at zero press intermittently the button **E04**, make the piston move slowly forward till the end of the stroke so as to have the dies close; automatically the dies will hook.
6. Draw the patented quick change tool out of the holes of the front flange, the replacement of the dies is now completed



## 8 - Maintenance

### GENERAL CONDITIONS

Maintenance and lubrication operations are to be carried out with the machine stopped and power supply switched off, unless otherwise indicated.



***Maintenance and lubrication operations are to be done by specialist service personnel.***

Check that the quantity and/or types of oil used correspond to the indications given. Never mix oils of different qualities or brands.

For cleaning do NOT use rags that leave lint or products that may pollute or alter the characteristics of the fluids.

Avoid any precarious repairs – repairs must only be done using original spare parts.

Always use the personal protective equipment made available by the employer (gloves, overalls, shoes, etc.).

The maintenance technician is to report any anomaly timeously: drips, abrasions, fraying, etc.

DO NOT allow the use of the machine should problems of any kind be encountered, and see to reinstating normal conditions correctly or make sure that this is done.

The Manufacturer does not accept any responsibility if the maintenance cycles indicated in this manual and the annexed documentation are not respected, or if maintenance is entrusted to incompetent personnel or if procedures or lubricants are used with characteristics that are not compatible with those indicated.



***Remember that the hydraulic oil, grease, and lubricants can generate dangerous situations (see the ACCIDENT PREVENTION chapter). The same applies to tools or accessories for using or maintaining the machine.***





## Routine maintenance

### DESCRIPTION OF MAINTENANCE AND CHECKS

### SYMBOLS AND FREQUENCY

- **Each day** clean the working environment and workplace, technical and accident prevention information plates, control panels and the whole machine in general (e.g. an oily or dirty handle may give rise to a dangerous situation).

Especially, use a jet of compressed air to remove dust deposits, water, or dirt from the shells **12** and dies **06**.



**24 h**

- **Each year** check and tighten all the bolts on the machine, applying adequate tightening torques.

Also check that the cable die on the electrical equipment is tight, as well as the integrity of the power supply cable and protective sheaths.



**2.000 h**

- **Each day** carry out a visual check of the safety systems and check their activation. **At the end of each shift** check that the main switch **IG** is working as well as the nearby switch installed by the Client.

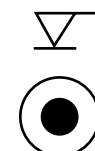


**24 h**

- **Each month** check the oil level in the hydraulic unit **01**.

Top up if necessary (see Table: Lubricants and symbols).

The hydraulic oil must be changed **every 2 years** or more frequently depending on how frequently it is used – check its viscosity. Change the gaskets on the hydraulic cylinder **04** and high pressure joined hoses **every 6 years** irrespective of leaks or cracks.



**200 h**  
**4.000 h**  
**12.000 h**

- **Each year** change or clean the submerged filters **10**. At the same time check the state and noise levels of the pumps **09**. Get them changed if pressure drops or excessive noise occur.



**2.000 h**

- **Each year** check the setting value for the pressure reducing valves as indicated in the hydraulic diagram. At the same time check the efficiency of the pressure gauges that provide the pressure readings.



**2.000 h**

- **Each day** check that there is no seepage from piping and hose fittings. Tighten the nuts and if the seepage persists change the hose fitting, hose, or gasket (if fitted).



**24 h**

- **Each month** check that when the oil is heated up it does not exceed the recommended maximum operating temperature of 50°C.



**200 h**

- **Every 6 months**, lubricate moving parts. For the type of grease recommended see Table: Lubricants and symbols



**1.200 h**

- When the machine has been working for about six years check and fully service the machine.



**12.000 h**

**For this task contact the Manufacturer or their Agent.**

## Lubricants and symbols

**Table: lubricant e symbols**

Description	Lubricant	Ref. UNI 7164 ISO 34978	Symbol	
			DIN 30600 ISO 7000	ICON
OIL Hydraulic	MOBIL OIL DTE 25 AGIP OSO 46	HM46		
OIL Lubricating for guide	MOBIL VACTRA 4 AGIP EXIDIA HG320	G220		
OIL For lubrication	TELLUS SHELL 22			
SOLVENT For cleaning	SOLVENT Q UNI EN ISO 9001/2000			
GREASE For general use	KLUBER STABURAGS NBU 30		DIN 1102	
CLEANING			DIN 484 ISO 423	
CHECK LEVELS			DIN 691 ISO 159	
CHECK FOR LEAKS OR SEEPAGE			DIN 257 ISO 29	
CHECK FILTERS			DIN 668 ISO 114	
GENERAL CHECK ANOMALIES AND FAULTS			DIN 1279 ISO 421	
WARNING ! DO NOT REMOVE OR DAMAGE ANY PART OF THIS DOCUMENT			DIN 1677 ISO 81	
GENERAL DANGER	Maintenance is to be done with the machine switched off by train- ed personnel,unless otherwise indicated in the operating and maintenance manual,which must be consulted.		DIN 1008 ISO 434	
PERSONNEL CLOTHING	Always use personal protective equipment.		UNI 7543 CEE 92/58 DPR 524	



## STORAGE AND DISASSEMBLY

### Storing the machine or prolonged stoppage

If the machine is not to be used immediately or is to be stored for long periods of time, check that it is packed correctly. It must be stored in closed spaces that are well ventilated and that do not present characteristics that are harmful to the machine's components, especially the electronic parts. Protect unpainted parts against corrosion using suitable grease or sprays. If necessary store it with dehydrating salts.



***In any case after long periods of inactivity the machine needs to be checked and inspected by specialist personnel, but this cannot be described here - ask the Manufacturer for instructions.***

If the machine is stopped for a relatively long period of time it is good practice to run the hydraulic system for short periods and then discharge the pressure, to ensure lubrication.

The stems on the cylinders must preferably be in the retracted position, otherwise they must be covered with anti-corrosion products.

When starting again after a long stoppage check the quality of the fluid in the hydraulic unit and replace if necessary.

### Decommissioning, dismantling, or scrapping of the machine

- Disconnect the energy supply lines: electrical, pneumatic, etc.
- Empty the tanks and components that contain harmful substances.
- Discharge any pressure vessels to make them harmless.
- Eliminate any stored voltages and/or residual energy.
- Dispose of the various types of materials that make up the parts of the machine via dumpsites that are suitable for this purpose:

**Table: Disposal of products**

COMPONENT .....	.....CONSTRUCTION MATERIAL
Buffer battery .....	.....Nickel/Lithium/Lead/Acids
PC Monitor and/or Display.....	.....Glass/Copper/Pressurised Gas
Frame .....	.....Arc welded FE37 steel
Guard.....	.....Painted and treated Steel/Plating
Paint .....	.....RAL.....
Motors.....	.....Steel/Cast Iron/Copper
Reducers .....	.....Steel/Cast Iron
Bushings or anti-friction materials .....	.....Bronze/Brass/Teflon/Silicone
Supports .....	.....Cast Iron/Steel/FE52
Bearings .....	.....Steel
Gaskets .....	....Rubber/Teflon/Viton/Vulkolan/Kevlar
Electric cables .....	.....Copper/Rubber
Flexible hoses (low pressure).....	.....Nylon
Flexible hoses (high pressure) .....	.....Steel/Rubber
Resistances .....	.....Copper/Steel/Ceramics
Printed circuits .....	.....Copper/Tin/Acids/Resin



Users must see to disposing of the equipment in such a way as to avoid causing pollution, and are to take them to a collection point approved for recycling electrical and electronic equipment.

The manufacturer does not accept any responsibility for damage caused to the environment and for the systems used for disposing of the materials: machine parts, lubricants, and anything else is to be disposed of according to the law.

***Ensure that the in inoperative or stored machine is completely open and without any parts stretched (e.g. springs, cylinders etc).***

## 9 - Spare Parts Catalog

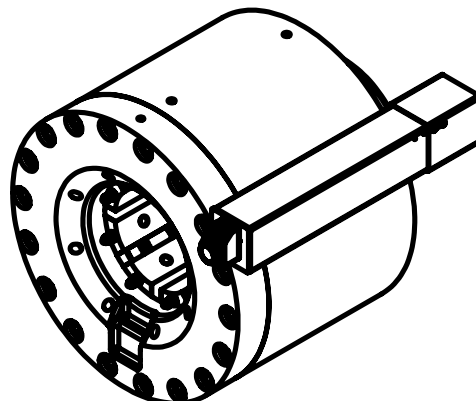
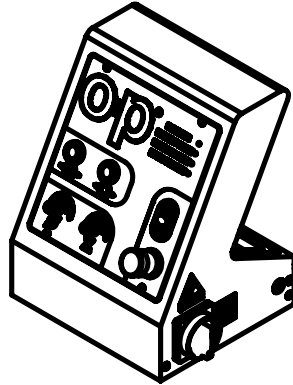
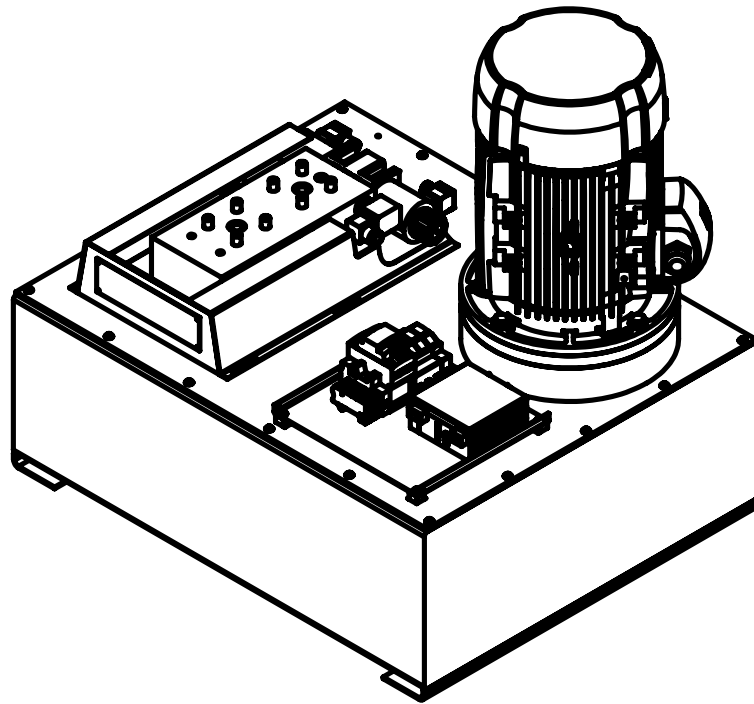
### GENERAL CONDITIONS

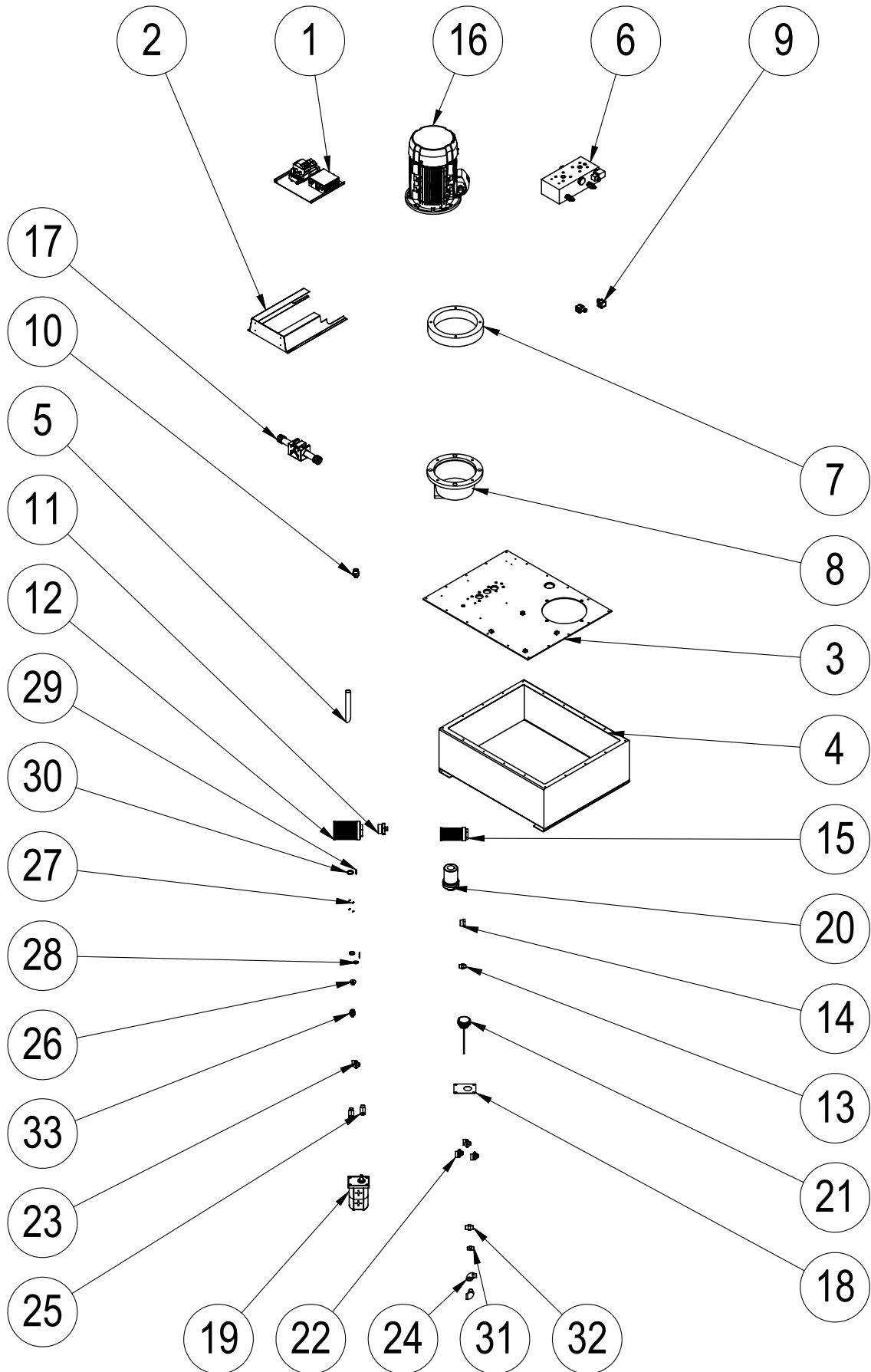
By request for spare parts please mention:

- Type of machine
- Serial number
- Part number of the spare part
- Page number
- Item description
- Required quantity
- For the electric material please mention in addition:  
the voltage (Volt) and the frequency (Hz)

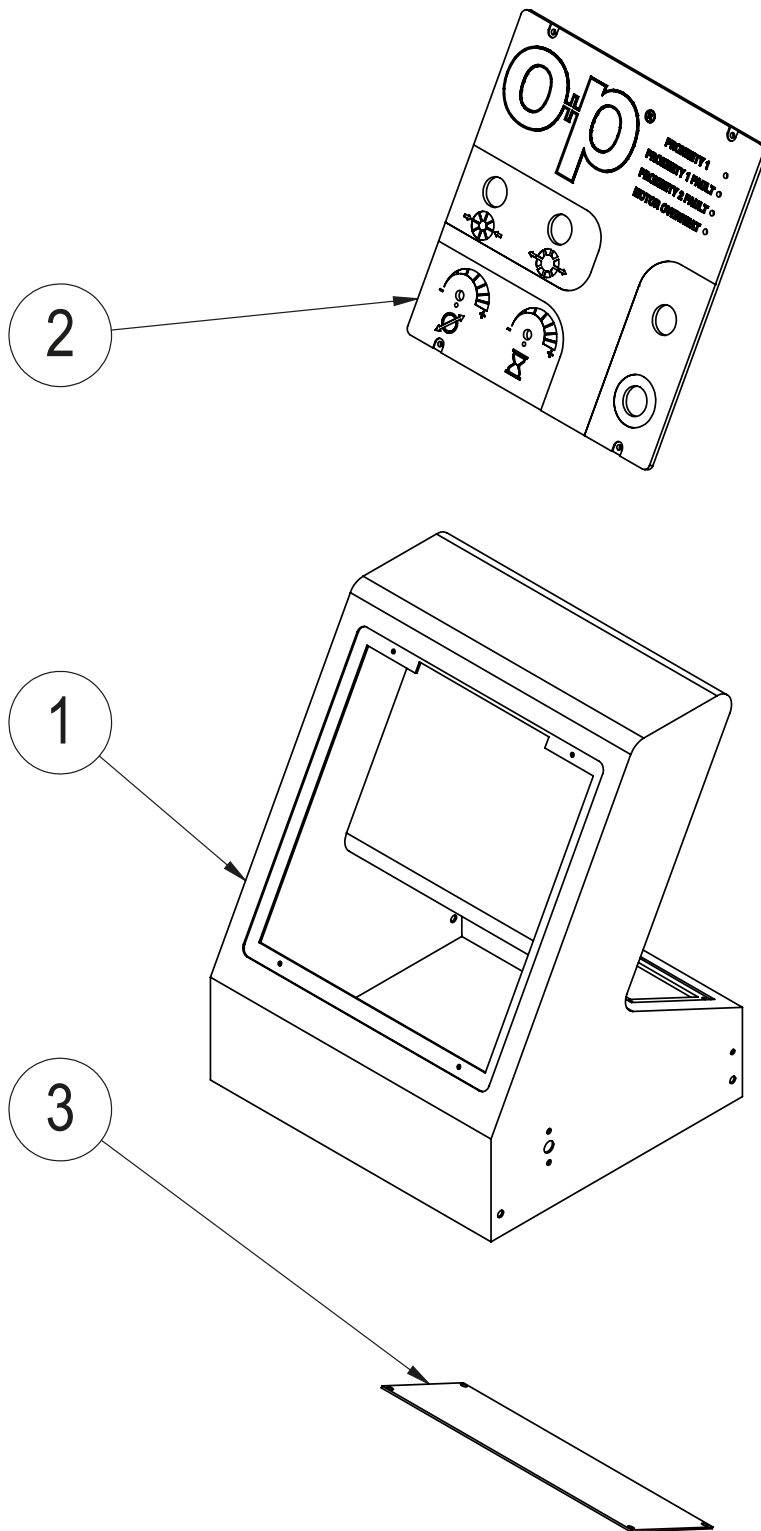


***For warranty coverage purposes only original spare parts must be used.***





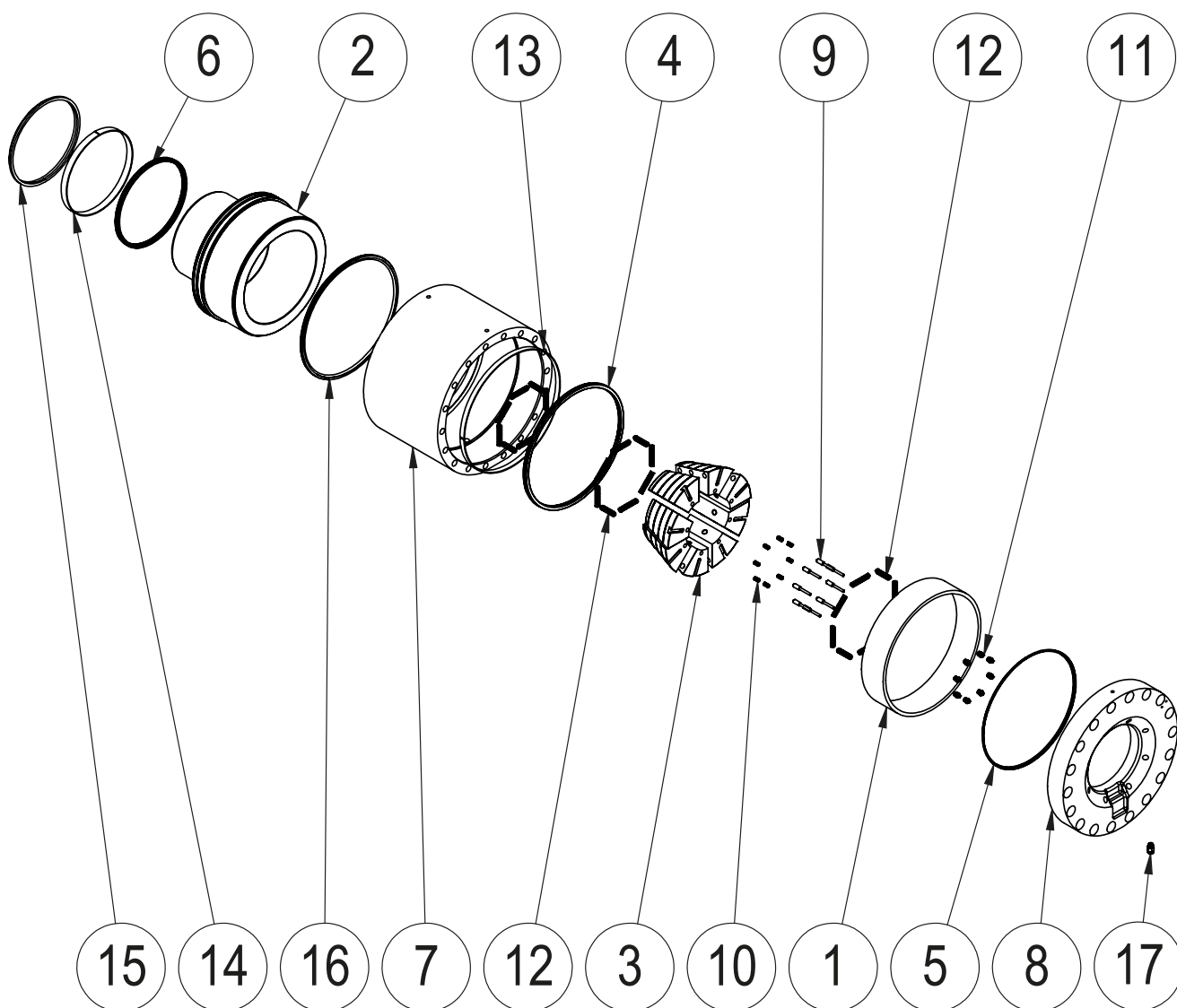
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1	TUBH130ELS23712	18	GUARNIPOMPA001
2	TUBH130ELS23715	19	POMPAINGR94
3	TUBH135ELS23417	20	OMTND16
4	TUBH135ELS23418	21	TAPPOCAR112000
5	TUBH144ELS19434	22	OMTRG14
6	MASSELLO014	23	OMTRG13
7	OMTA300	24	V92Z004
8	OMTLS300	25	RACCRIGIDO026
9	CONSOL000	26	BOCCOLA1018318
10	N021208	27	FERV02405
11	NIPPLOCIL029	28	PP012D
12	FILTROASP008	29	RONDBONDED38000
13	NIPPLOCON003	30	RONDBONDED34000
14	RACCRIGIDO025	31	NIPPLOCIL000
15	FILTROASP004	32	NIPPLOCIL010
16	ME075HP007	33	NIPPLOCIL021
17	DUDS5S7C		



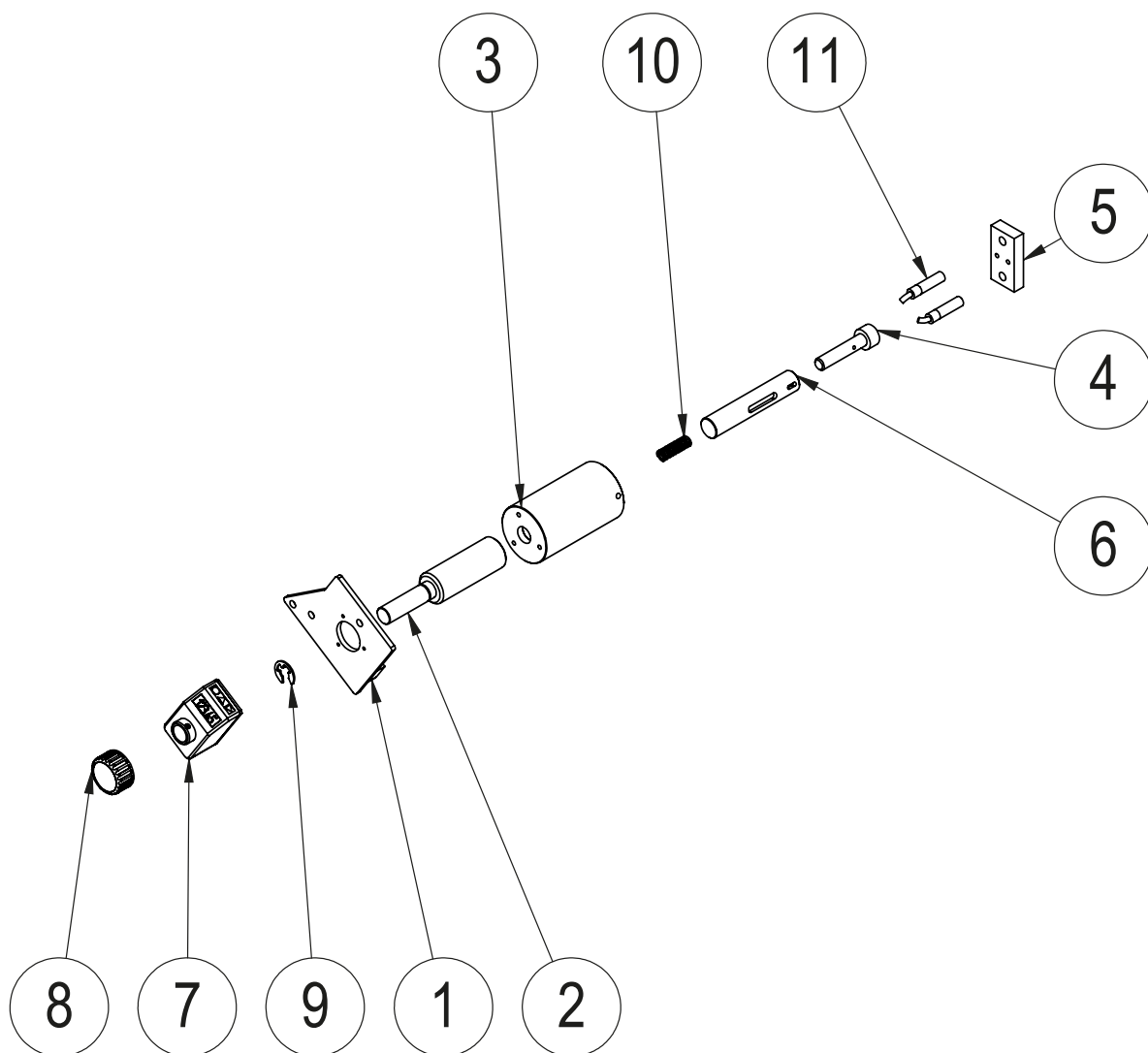
Pos.	Code/CODICE
1	TUBH130ELS23734
2	TUBH130ELS23757
3	TUBH130ELS23735



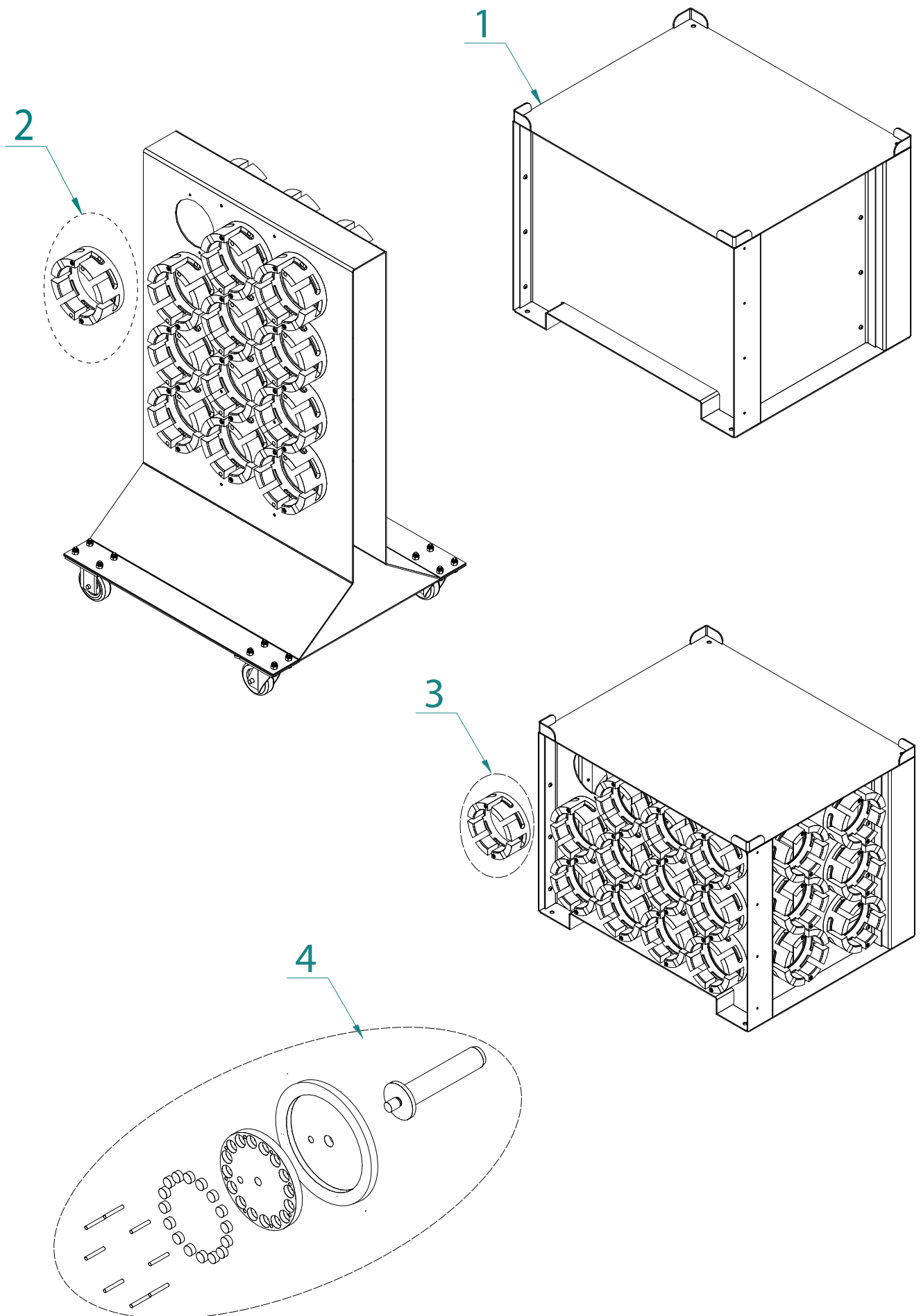
This document is the property of the Manufacturer and/or its Agent and must not be tampered with or changed, reproduced or provided to others without written consent.

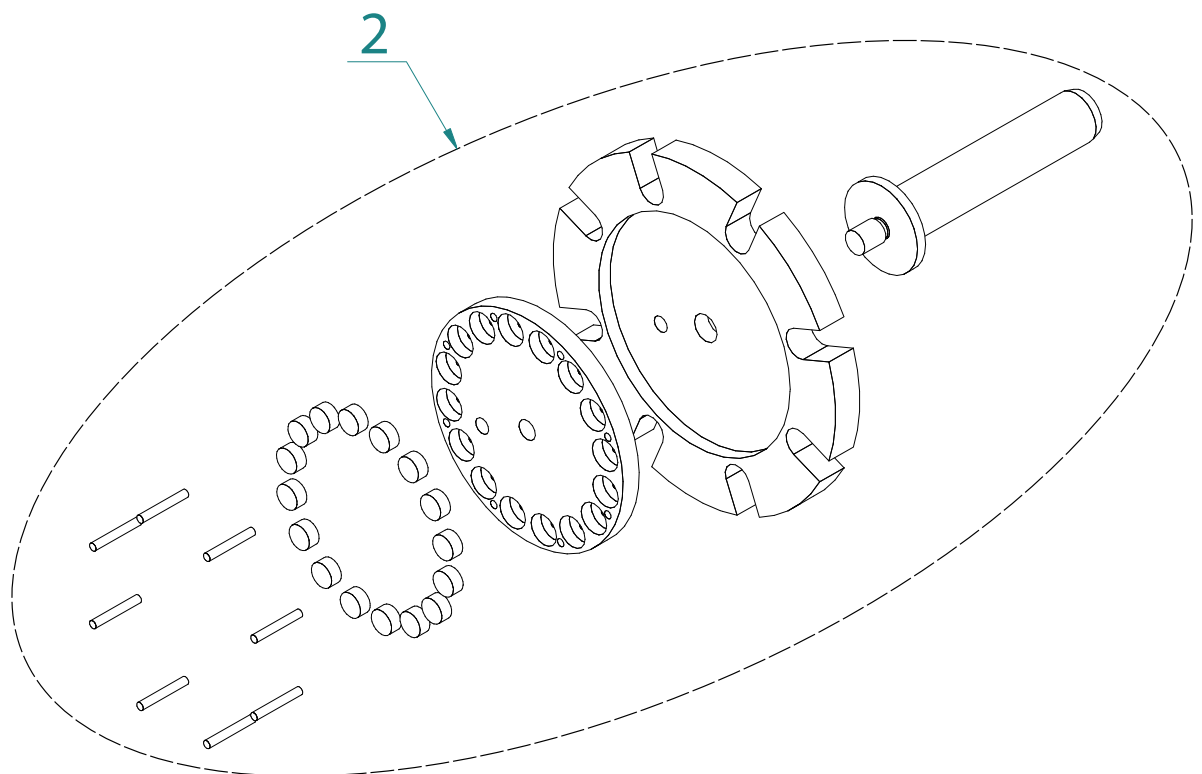
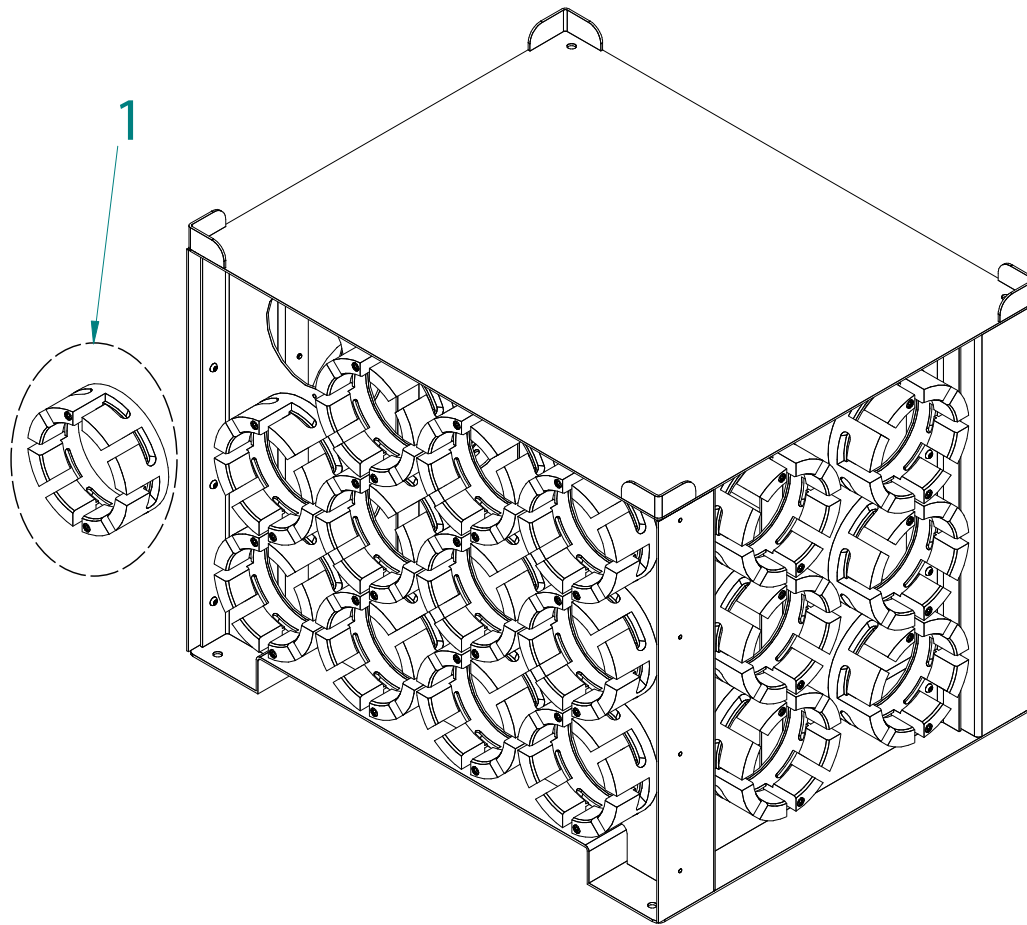


Pos.	Code/CODICE	Pos.	Code/CODICE	Pos.	Code/CODICE
1	TUBH135ELS23403	7	TUBH130ELS23701	13	FASCIAG370000
2	TUBH135ELS23405	8	TUBH130ELS23784	14	FASCIAG250003
3	TUBH135ELS23404	9	TUBH80S13503	15	RASCHIA250001
4	TUBH135ELS23406	10	TUB265S001013	16	GUARNI370000
5	TUBH135ELS23407	11	TUBH80ELS13502	17	RACCPNE10000
6	TUBH135ELS23408	12	TUBH144ELS19405		



Pos.	Code/CODICE	Pos.	Code/CODICE
1	TUBH135ELS23410	7	INDICATOREPOS003
2	TUBH135ELS23413	8	MANOPOLAMD51
3	TUBH135ELS23416	9	FE107434
4	TUBH130ELS23722	10	MOLLA92533125
5	TUBH130ELS23726	11	ELXS1N08PB340
6	TUBH130ELS23728		





## 10 - List of annexes

In addition to this operating and maintenance manual, the following documentation is supplied as annexes and/or upon request (if applicable):

- Wiring diagrams
- Hydraulic diagrams
- Pneumatic diagrams
- Declaration of conformity
- Instruction on how to change the supply voltage
- Instruction on how to change the filter and for cleaning and greasing ( H Version)
- Manuals and/or technical/commercial catalogues for machines or part-machines fitted on your model.



***This documentation is intended to be read by professionals and/or specialist personnel. Also only the documentation that is specifically used for your machine model is provided.***



***The manual and its annexes cannot make up for any shortcomings in training or professionalism of operators and so the Client must make sure that they are able to correctly interpret the contents of the documentation.***



**PLEASE NOTE!**

***The information provided in this document is partly taken from original documents from the various suppliers. This document contains only the information deemed necessary for using and routine maintenance of the machine.***



**DICHIARAZIONE DI CONFORMITA'**  
**DECLARATION OF CONFORMITY**

**2006/42/CE Nuova direttiva per la marcatura CE**  
( Abrogazione della direttiva 98/37/CE ex 89/392/CEE )

**2006/42/CE New machinery directive for the CE**  
( Abrogation of Directives 98/37/CE ex 89/392/CEE )

NOI - WE  
**OP S.r.l.**

( Nome del fabbricante o del suo mandatario stabilito nella comunità - Supplier's name)

Via del Serpente, 97 - 25131 BRESCIA  
( Indirizzo completo - Address)

DICHIARIAMO SOTTO LA NOSTRA ESCLUSIVA RESPONSABILITA' CHE IL PRODOTTO :  
DECLARE UNDER OUR SOLE RESPONSIBILITY THAT THE PRODUCT :

**TUBOMATIC H135 EL**

( nome - name, tipo - type, modello - model / n° di serie - serial number )

- **La macchina non rientra nell'elenco contenuto nell'Al. IV della Direttiva Macchine 2006/42/CE**

The machine is not part of the list included in Ann. IV Machinery Directive 2006/42/CE.

- **La macchina rispetta i requisiti essenziali di sicurezza indicati sulla Direttiva Macchine e successive modifiche:**

The machine follows the safety requirements included in the Machinery Directive and its following modifications:

**2006/42/CE**  
2006/42/EC

**DIRETTIVA MACCHINE**  
MACHINE DIRECTIVE

**2014/35/EU**  
2014/35/UE

**DIRETTIVA BASSA TENSIONE**  
LOW VOLTAGE DIRECTIVE (LVD)

**2014/30/EU**  
2014/30/UE

**DIRETTIVA COMPATIBILITA' ELETTROMAGNETICA**  
ELECTROMAGNETIC COMPATIBILITY (EMC)

- **La macchina è provvista di marcatura CE**

The machine is provided with EC mark

- **Norme di riferimento applicate:**

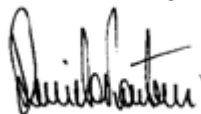
Applied references normative:

**UNI EN ISO 12100:2010**  
UNI EN ISO 12100:2010

**CEI EN 60204-1**  
CEI EN 60204-1

Brescia, li

DANIELE PIANTONI



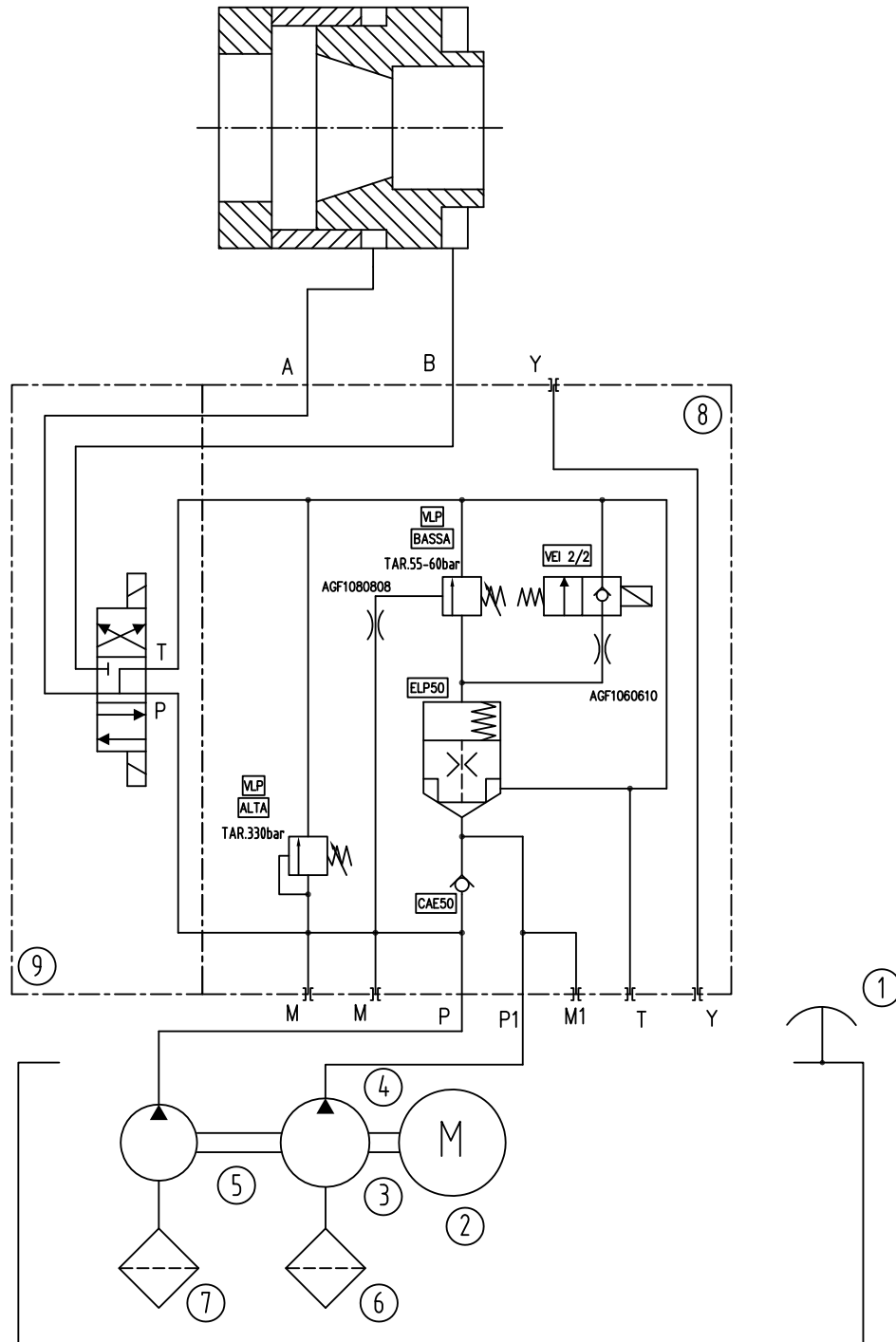
(nome e firma o timbratura della persona autorizzata)  
(name and signature or equivalent marking of authorized person)

Dichiariamo che il Fascicolo Tecnico è costituito presso OP s.r.l. Via del Serpente 97, 25131 BRESCIA  
We declare that the technical documentation is established c/o OP s.r.l. Via del serpente 97, 25131 BRESCIA  
La persona responsabile del fascicolo tecnico è il Sig. Massimo Ziliani Resp. Ufficio Tecnico.  
Our technical manager, Mr. Massimo Ziliani, is responsible for the technical dossier



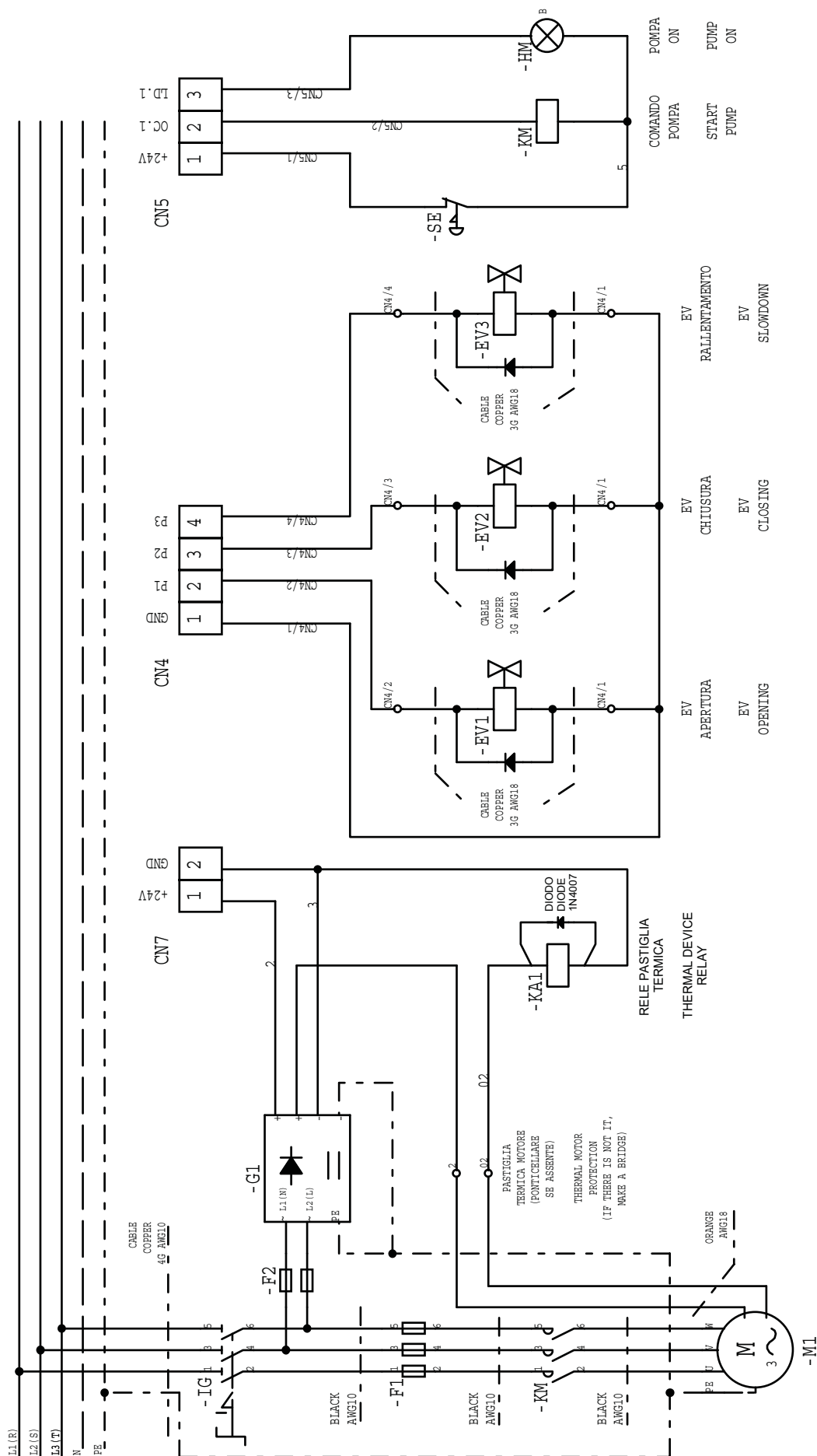


**SCHEMA IDRAULICO  
HYDRAULIC SYSTEM DIAGRAM**

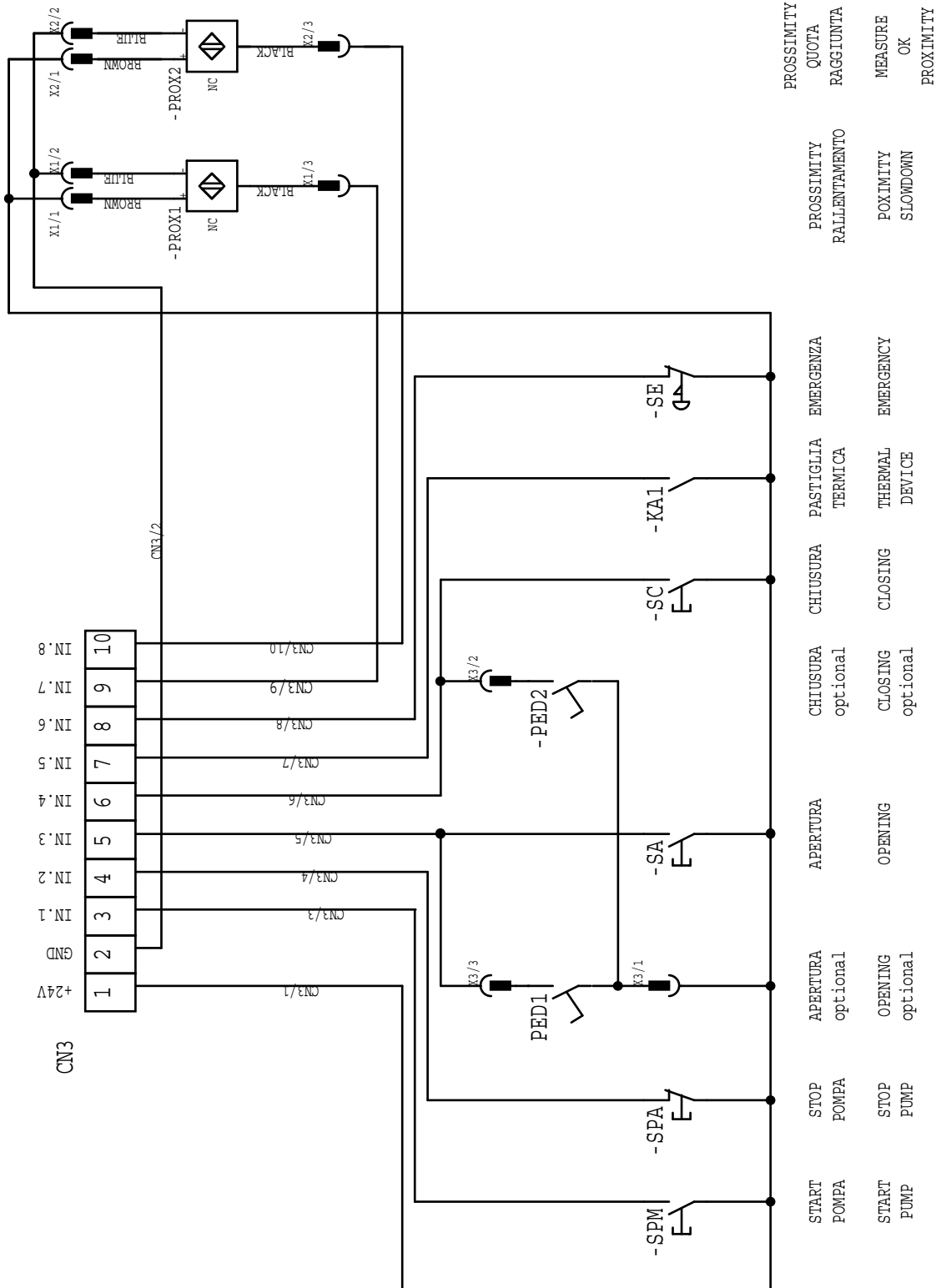


9	ELETTOVALVOLA	SOLENOID VALVE
8	MASSELLO	MANIFOLD
7	FILTRO	FILTER
6	FILTRO	FILTER
5	POMPA DOPPIA	PUMP
4	GIUNTO ELASTICO	JOINT
3	LANTERNA	STRAINER
2	MOTORE	MOTOR
1	TAPPO DI CARICO	FILLING CAP WITH DIPSTICK
	DESCRIZIONE	DESCRIPTION

**SCHEMA ELETTRICO  
ELECTRIC SYSTEM DIAGRAM**



**SCHEMA ELETTRICO  
ELECTRIC SYSTEM DIAGRAM**



**SCHEMA ELETTRICO  
ELECTRIC SYSTEM DIAGRAM**

<b>CODICE CODE</b>	<b>DESCRIZIONE - DESCRIPTION</b>
<b>-IG</b>	INTERRUTTORE GENERALE - MAIN DISCONNECT SWITCH
<b>-F1</b>	PORTAFUSIBILE TRIPOLARE - FUSE HOLDER 3P
<b>-F2</b>	PORTAFUSIBILE BIPOLARE - FUSE HOLDER 2P
<b>-KM</b>	CONTATTORE - CONTACTOR
<b>-KA1</b>	RELE' AUSILIARIO PASTIGLIA TERMICA - AUX RELAY
<b>-G1</b>	ALIMENTATORE SWITCHING BIFASE - POWER SUPPLY
<b>-SE</b>	PULSANTE A FUNGO CON BLOCCO - EMERGENCY PUSH BUTTON
<b>-SPM/SPA/HM</b>	PULSANTE LUMINOSO DOPPIO - DUOBLE BRIGHT PUSH BUTTON
<b>-S4+H4</b>	PULSANTE CHIUSURA - PUSH BUTTON
<b>-S5+H5</b>	PULSANTE APERTURA - PUSH BUTTON
<b>-PROX 1</b>	PROXIMITY RALLENTAMENTO - SLOWDOWN PROXIMITY
<b>-PROX 2</b>	PROXIMITY RAGGIUNGIMENTO QUOTA - MESURE OK PROXIMITY
<b>-X1-X2</b>	PRESA 4 POLI+T - SOCKET 4P + T
<b>-X3</b>	PRESA 3 POLI+T - PLUG 3P+T



## ISTRUZIONI PER IL LAVAGGIO ED INGRASSAGGIO TUBOMATIC

## INSTRUCTIONS FOR CLEANING AND GREASING TUBOMATIC

1. Regolare il fine corsa sullo zero.
2. Chiudere la macchina facendo avanzare il pistone.
3. Agganciare la pinza ai dadi posti sul porta morsetti.

1. Set stop at position zero.
2. Close the machine pushing the piston forward.
3. Dock the clip to the bolts on the die holder.

4. Aprire la macchina facendo retrocedere il pistone. Automaticamente il porta morsetti resterà vincolato alla pinza.

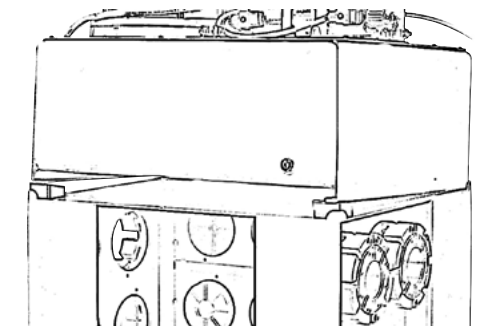
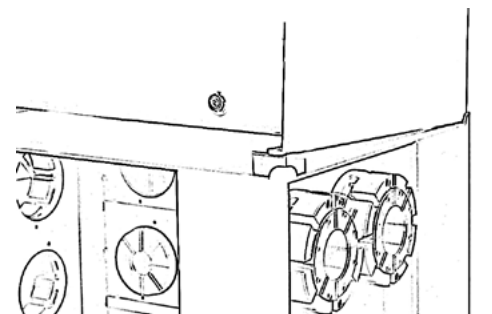
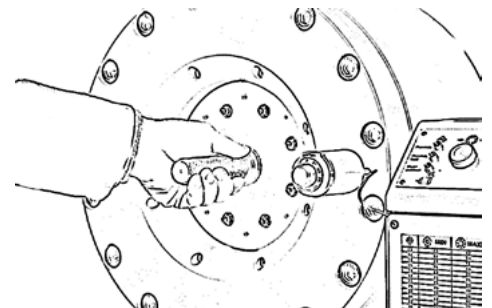
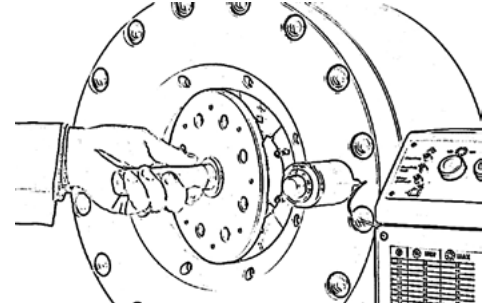
4. Open the machine pulling the piston backwards. The die holder shall automatically remain engaged to the clip.

- 5 Posizionare gli spessori. In questo modo la macchina è inclinata.

- 5 Position the wedges. In this way, the machine will be leaning.

- 6 Riempire il serbatoio della pistola con il solvente " Q " in dotazione.

- 6 Fill the pump tank with solvent " Q " supplied.





- 7 Collegare l'aria compressa Max 7 bar alla pistola.
- 8 Togliere carter frontale.

- 7 Connect the compressed air Max 7 bars per pump.
- 8 Remove the front safety guard.

- 9 Svitare raccordo posizionato sotto flangia.

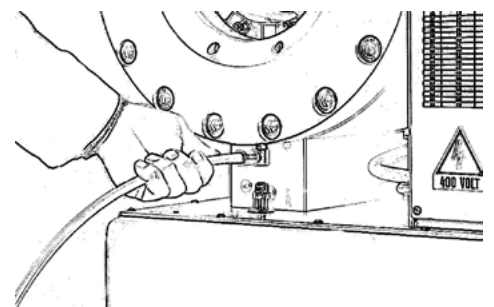
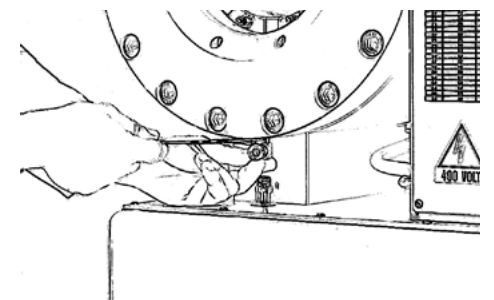
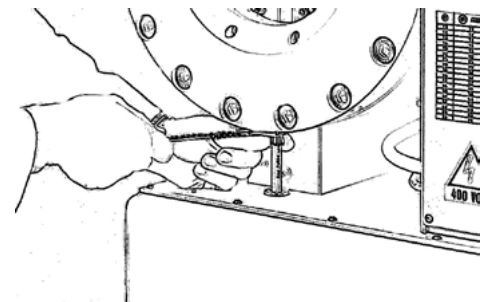
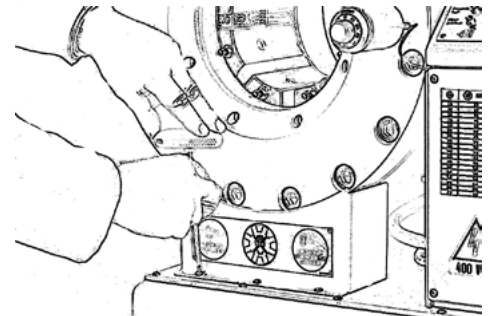
- 9 Unfasten fitting located under the flange.

- 10 Avvitare il raccordo a 90°.

- 10 Fasten the fitting at 90°.

- 11 Inserire il tubo in dotazione e posizionarlo all' interno di un recipiente.

- 11 Fit the hose supplied and position it in a container.



12 Lavare dalla parte posteriore l'interno della macchina.

12 Clean the inner part of the machine from the rear side.

13 Soffiare.

13 Blow.

14 Ripetere l'operazione n°12 e n°13 fino a che non si noterà una fuoriuscita di liquido di lavaggio di colore chiaro quindi il più pulito possibile dal raccordo frontale della flangia anteriore.

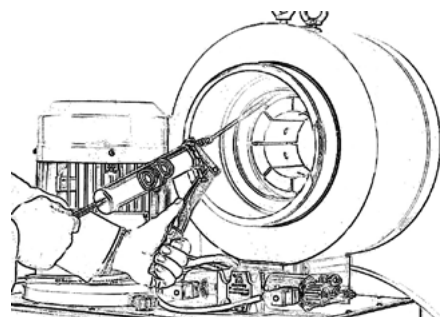
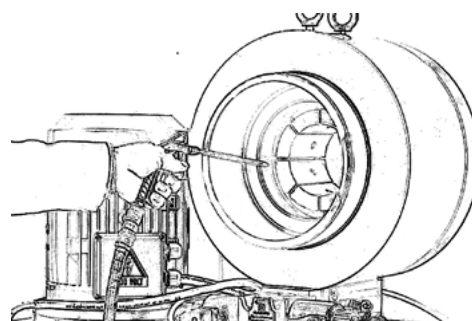
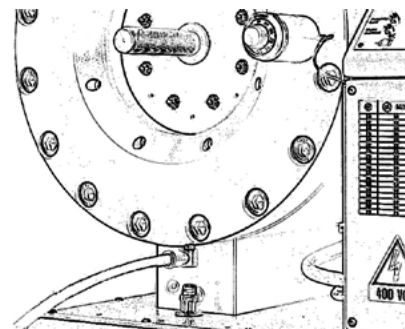
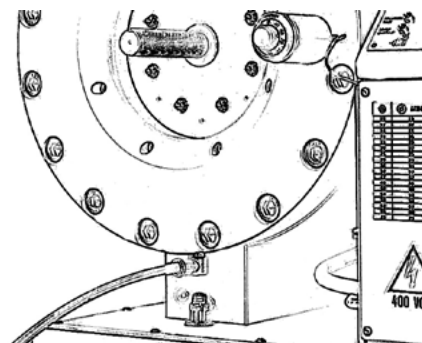
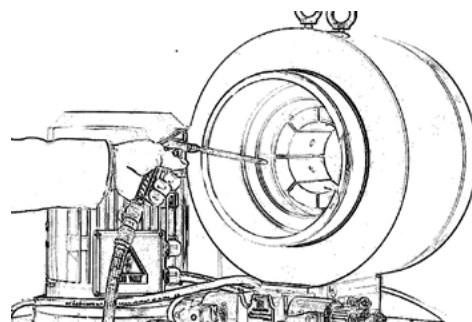
14 Repeat operations n° 12 and n° 13 until the fluid flowing out of the machine from the front fitting of the front flange is clear and thus cleanest possible.

15 Soffiare per circa due minuti in modo da asciugare completamente l'interno della macchina.

15 Blow for about two minutes so as to dry the inner part of the machine completely.

16 Ingrassare i 4 porta morsetti superiori direttamente. Per i 4 porta morsetti inferiori onde evitare che il grasso scivoli via, ingrassare la porzione di pistone sottostante su cui scorrono gli stessi, utilizzando il grasso in dotazione " KLUBER STABURAGS NBV 30 ".

16 Grease the 4 upper die holders directly. To avoid losing grease, regarding the 4 lower die holders, grease the part of the piston beneath on which the die holders slide, using " KLUBER STABURAGS NBV 30 " grease supplied.



- 17 Ad ingrassaggio terminato chiudere la macchina.
- 17 Sfilare la pinza facendo leva leggermente verso il basso.
- 17 Togliere i 2 spessori.
- 17 Ingrassare gli otto settori anteriori del portamorsetti.
- 17 Fare un paio di cicli d'apertura e chiusura macchina a vuoto

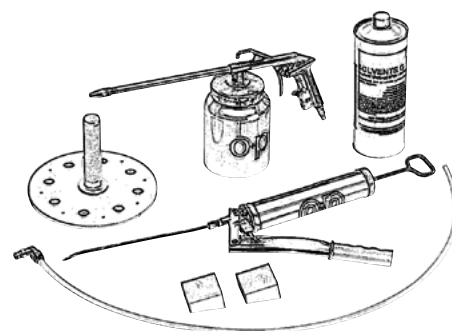
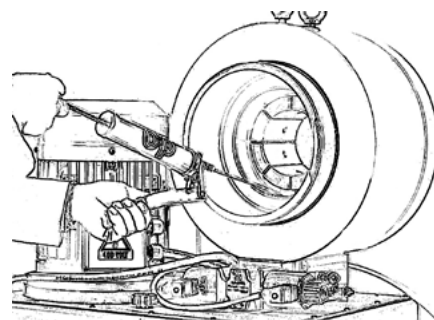
- 17 Once through with greasing, close the machine.
- 17 Remove the clip pressing it slightly downwards.
- 17 Remove the two wedges.
- 17 Grease the eight die holders front areas.
- 17 Perform a couple of opening and closure operations with machine empty.

### ACCESSORI

- Pinza per bloccaggio porta morsetti.
- N°2 spessori per inclinazione macchina.
- Solvente " Q " litro 1.
- Grasso " kluber staburags nbv 30 ".
- Utensile di ingrassaggio a vite.
- Pistola di lavaggio.

### ACCESSORIES

- Die holder blocking clip.
- 2 wedges to lean machine.
- Solvente " Q " 1 litre.
- "Kluber staburags nbv 30 " grease.
- Pin equipped greasing tool.
- Cleaning pump.



## **CAMBIO FILTRO E OLIO FILTER AND OIL CHANGE**

### **CAMBIO FILTRO**

1. Quando si sostituiscono i filtri è consigliabile cambiare anche l'olio.
2. Sollevare il coperchio del serbatoio come nella prossima figura.
3. Svitare i filtri indicati e rimuoverli.
4. Smaltire i filtri usati: Operare secondo le vigenti disposizioni legislative nazionali e/o comunitarie.
5. Applicare del teflon sul raccordo.
6. Avvitare i nuovi filtri

### **FILTER CHANGE**

1. You should always change the oil when you change the filter
2. Open the tank plug as shown in the next picture
3. Unscrew the filter indicated by arrow and remove it
4. Dispose of used filter according to the national and/or EC legislative provisions in force
5. Put some Teflon tape on the fitting
6. Screw the new filter up.

### **CAMBIO OLIO**

Cambiare l'olio ogni 3000 ore di funzionamento

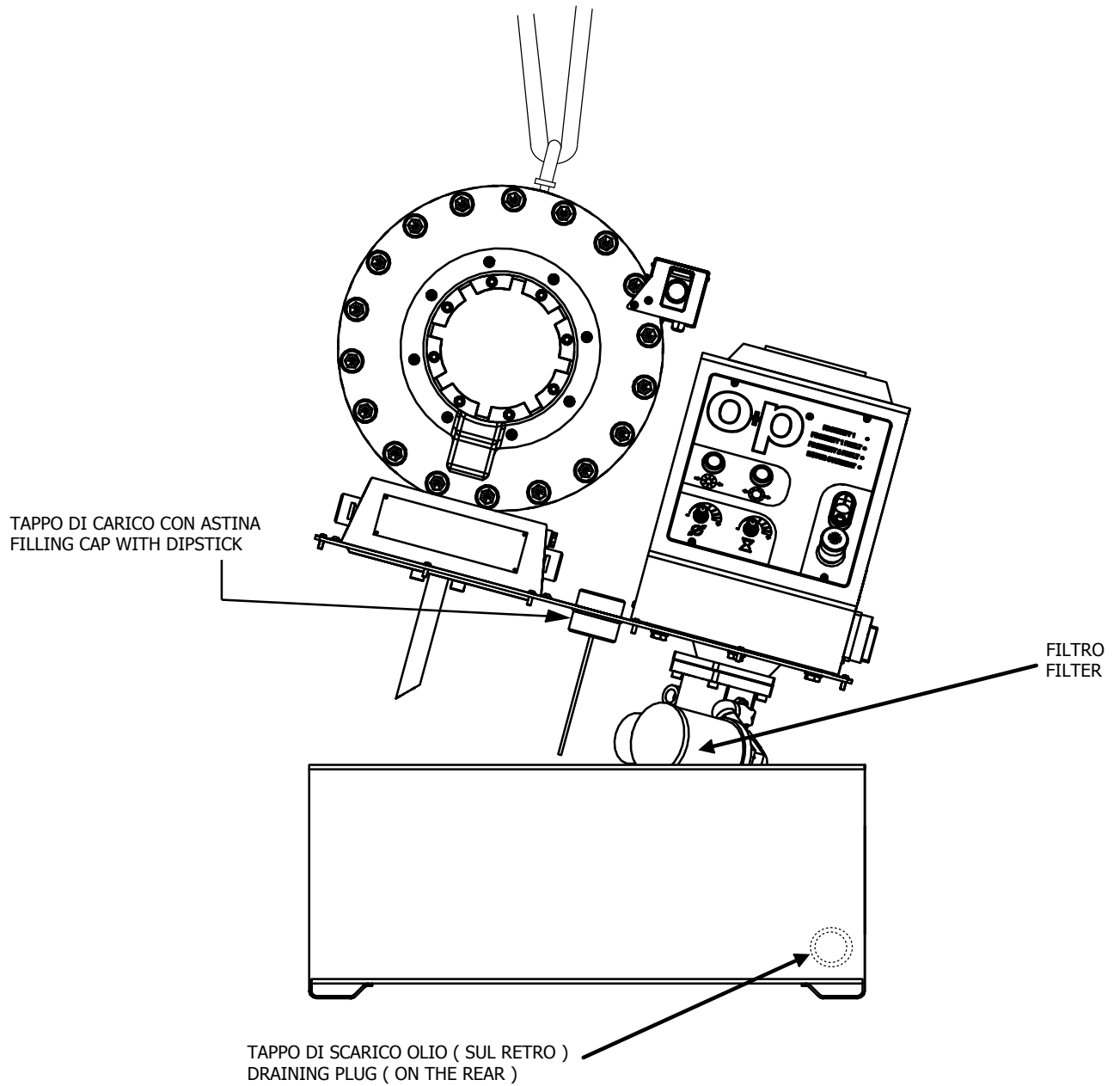
1. Svuotare il serbatoio dell'olio attraverso il tappo di scarico posto sul retro del serbatoio. (Inclinare leggermente il serbatoio per la completa fuoriuscita dell'olio)
2. Smaltire l'olio esausto: Operare secondo le vigenti disposizioni legislative nazionali e/o comunitarie.
3. Chiudere il tappo di scarico.
4. Riempire il serbatoio tramite il tappo di carico, con nuovo olio con caratteristiche indicate nel capitolo Manutenzione.
5. Quantità di olio da immettere: vedere paragrafo "DESCRIZIONE MACCHINA E REGOLAZIONI"

### **OIL CHANGE**

Change the oil every 3000 working hours

1. Drain the oil tank using the drain plug placed on the back of the tank. Tilt the tank a bit to allow the oil to come out completely
2. Dispose of used oil according to the national and/or EC legislative provisions in force
3. Close the drain plug
4. Top the tank up through the filler cap. Use only oil with characteristics indicated at chapter Maintenance
5. Quantity of oil to fill: see chapter "MACHINE DESCRIPTION AND SETTINGS".

**SCHEMA PER CAMBIO OLIO E FILTRO  
OIL AND FILTER CHANGE DIAGRAM**



## DIRECT DRIVE ELECTRONIC POSITION INDICATOR



# DD51-E

Direct drive electronic position indicators

## INSTRUCTIONS FOR USE

**elesa**<sup>®</sup>

## DD51-E

## Direct drive electronic position indicators

### 1. Safety Instructions

The product has been designed and manufactured in accordance with the current regulations.

The product leaves the factory ready for use and complies with the safety standards.

To maintain the product in this state, it is necessary that it is assembled and used properly, in the closest compliance with this instruction manual and with the following specific safety precautions.

Ensure that the user has read and understood the instruction manual and in particular the chapter "Safety Instructions".

In addition to the instruction manual, all the rules of law must be observed, in regard to accident prevention and environmental protection.

This manual is intended as an indispensable supplement to the existing documentation (catalogues, data sheets and assembly instructions).

The use without complying with the descriptions / specific parameters, in combination with systems / machines / processes to be controlled, it can lead to a malfunction of the product, causing:

- health hazards,
- environmental hazards,
- damage to the product and its proper functionality.



Do not open nor modify the case of the indicator.

Tampering with this product may endanger the correctness and accuracy of its operation.

In case of malfunction, do not attempt any repairs to the units and contact Elasa sales office.

### 2. System description

DD51-E position indicators, with battery power supply, can be used on passing through shafts in any position to provide the reading of the absolute or incremental positioning of a machine component.

#### Mechanical and electrical characteristics

Power supply	Lithium battery CR2450 3.0 V
Battery life	5 years
Display	5-digit LCD of 8 mm height and special characters
Reading scale	-19999; 99999
Number of decimal digits	programmable <sup>(1)</sup>
Unit of measure	mm, inches, degrees programmable <sup>(1)</sup>
Rotation max. speed	300/600/1000 r.p.m. <sup>(2)</sup> programmable <sup>(1)</sup>
Precision	10.000 impulses/revolution
Protection level	IP65 or IP67
Working temperature	0° C ÷ +50° C
Storing temperature	-20° C ÷ +60° C
Relative humidity	max. 95% to 25° C without condensation
Interference	IEC 61000-4-2

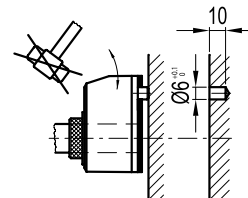
(1) See paragraph 8.2

(2) Default: 600 r.p.m.

Higher rotation speeds to 600 r.p.m. can be maintained for short periods of time.  
The value of the max speed affects the battery life.

### 3. Assembly

1. Drill a Ø 6x10 mm hole in the body of the machine with a 22 mm centre distance from the shaft to fit the rear referring pin.
2. Fit the indicator onto the shaft and make sure that the referring pin fits into the hole.
3. Clamp the bushing to the shaft by tightening the grub screw with hexagon socket and cup end, according to UNI 5929-85.





### 4. Turning on the system

After you have read and understood the section "Safety Instructions", proceed by switching on the indicator.

To turn the indicator on hold  while pressing the key . The display will light up and the indicator will be ready to be used.

#### 4.1 Turning off the system (only for storage)

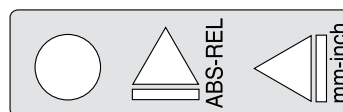
To turn the system off enter the programming mode, select the **rESEt** parameter then press the key . At this point, press the button  for 5 seconds; the display will turn off and the indicator will go into low power mode of the battery.




### 5. Symbols on the display



1. Absolute / incremental mode
2. Battery
3. Unit of measure (mm/inch/degrees)

### 6. Key function



FUNCTION		
KEY	Operating mode	Programming mode
	Access to the programming mode	Parameter selection / Confirm of parameter change
	Absolute or incremental mode selection	Digit increase / programming mode exit
	Unit of measure selection	Scroll for parameters / digit selection



## DD51-E

## Direct drive electronic position indicators

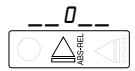
### 7. Operating mode

#### 7.1 Absolute / incremental measuring mode selection

Press the key to select the absolute or incremental measuring mode.

The measuring mode selected is shown on the display by the symbols:

- **ABS**: absolute measuring mode
- **REL**: incremental measuring mode



It is possible to change the key function by setting the parameter **\_\_\_D\_\_\_**.

The available options are:

- **ArCLR** (default): passing from **ABS** to **REL** the counter is set to zero.
- **Ar**: passing from **ABS** to **REL** the counter is not set to zero. In this case, the counter is set to zero by pressing + .
- **OFF**: the key is disabled and does not allow changing the selected measuring mode.

To program the parameters listed above, see paragraph 8.2.

#### 7.2 Unit of measure selection

Press the key to select the unit of measure needed. The options available are millimeters, inches and degrees.

The measuring mode selected is shown on the display by the symbols:

- **mm**: millimeters
- **INCH**: inches
- **D**: degrees



It is possible to change the key function by setting the parameter **\_\_\_D\_\_\_**.

The available options are:

- **ALL** (default): of measure that can be selected: mm, inch, D
- **noDEG**: of measure that can be selected: mm, inch
- **OFF**: the key is disabled and does not allow changing the selected measuring mode.

To program the parameters listed above, see paragraph 8.2.

#### 7.3 Setting the absolute reference

After having selected the absolute measuring mode and stopped the shaft in the starting position or in the reference position, press the key combination to set the absolute value to the sum of the values of the parameters **0rG** (absolute value of reference) and **OFFS** (compensation value).

The value of compensation (offset) allows you to adjust the value shown on the display in such a way that takes into account, for example, wear or tool change. The system allows you to store up to 10 values of compensation. Press the key

combination + . The screen will display the last compensation value used (eg **OFFS D**). Choose the desired compensation value by pressing the key , and then press the key to confirm.

Then the screen will display the absolute value to the sum of the values of the parameters **0rG** and **OFFS**.

To program the offset values, see parameter **OFFS** of paragraph 8.2.



It is possible to change the function of the keys combination by setting the parameter **D\_0\_0\_**.

The available options are:

- **L\_0rG**: the reference value and the compensation value are set as shown above. Choose the desired offset among the 10 available values, then press the key to confirm;
- **OFF**: the keys combination + is not associated to any function in the operating mode

For programming the parameters listed above see paragraph 8.2.

#### 7.4 Direct programming of the absolute reference value (source)

- of the compensation value (offset)
- of the reading after one revolution

The function of the keys combination allows direct access to the programming of one of the following parameters, depending on the value assigned to parameter **D\_0\_0\_**.

The available options are:

- **P\_0rG**: direct programming of the absolute reference value (**0rG** parameter)
- **P\_StP**: direct programming of the reading after one revolution (**StP** parameter)
- **P\_0FS**: direct programming of the compensation value (**0FFS** parameter)
- **OFF**: the keys combination + is not linked to any function in the operating mode

For programming the parameters listed above see parameter **D\_0\_0\_** of paragraph 8.2.

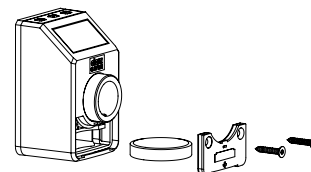
#### 7.5 Battery replacement

The internal lithium CR2450 - 3.0V battery ensures over 5 years battery life.

The symbol is shown on the display when the battery replacement is required.

The replacement is made by simply removing the front cover without disassembly of the indicator from the control shaft and keeping unchanged all the configuration parameters.

To simply remove the battery from the battery compartment, we recommend the use of a magnet.








## DD51-E

## Direct drive electronic position indicators


### 8. Programming mode

Press the key  for 3 seconds to enter the programming mode. Depending on the setting of **PASS** parameter, the system may require you to enter a password.


Press the key  to scroll through the list of parameters.

Press the key  to exit the programming mode. The programming mode is automatically dropped after 30 seconds of inactivity.

#### 8.1 Programming parameters with numeric values

Press the key  to increase the flashing digit.

Press the key  to select the next digit.

Press the key  to confirm the value and go back to the list of parameters.




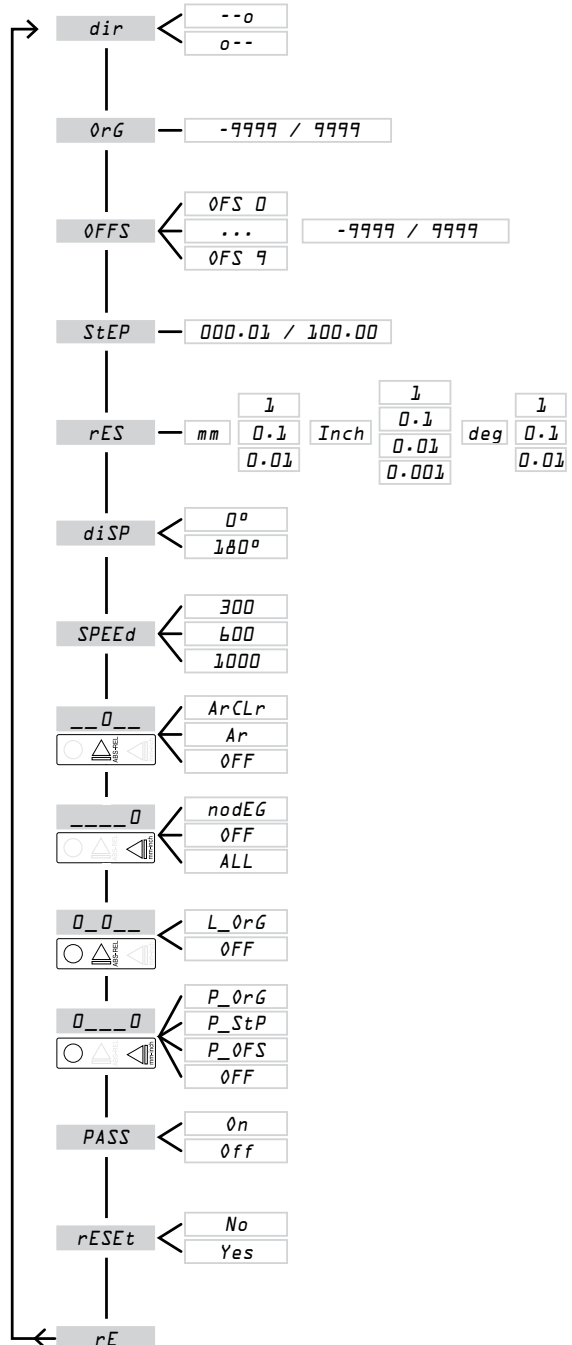
The numeric values of the parameters must be inserted taking into account the selected unit of measure

### 8.2 Programming parameters

Press the key  for 3 seconds

Enter the password 22011 (only if **PASS** = 0n)





Press the key  to scroll through the list of parameters



## DD51-E


## Direct drive electronic position indicators

The available parameters and their descriptions are listed in the following table.

Parameter	Description	Available options	Standard value
<i>dir</i>	Rotation direction	- - 0 clockwise 0 - - counterclockwise	- - 0
<i>OrG</i>	Absolute reference value	- 9999; 9999 The parameter value depends on the unit of measure selected.	0
<i>OFFS</i>	Compensation values (Offset)	- 9999; 9999 The system allows you to store up to 10 compensation values: 0FS 0 ... 0FS 9 The parameter value depends on the unit of measure selected.	0
<i>StEP</i>	Reading after one revolution	0.01; 100.00	001.00
<i>rES</i>	Resolution	mm: 1; 0.1; 0.01 inches: 0.001; 0.01; 0.1; 1 degrees: 0.01; 0.1; 1	mm: 0.1 inches: 0.01 degrees: 1
<i>diSP</i>	Display orientation	0°: display right 180°: display reverse	0°
<i>SPEED</i>	Reading max speed [rpm]	300; 600; 1000	600
	Key function	<i>ArCLR</i> : switching from <i>ABS</i> to <i>REL</i> the counter is set to zero. <i>Ar</i> : switching from <i>ABS</i> to <i>REL</i> the counter is not set to zero. <i>OFF</i> : the key is not assigned to any function in the operating mode	<i>ArCLR</i>
	Key function	<i>ALL</i> : selectable units of measure: mm, inch, D <i>noDEG</i> : selectable units of measure: mm, inch <i>OFF</i> : the key does not allow the unit of measure conversion	<i>ALL</i>
	Key combination function	<i>L_OrG</i> : the key combination sets the absolute value to the sum of <i>OrG</i> + <i>OFFS</i> parameters <i>OFF</i> : the key combination is not assigned to any function in the operating mode	<i>L_OrG</i>
	Key combination function	The key combination activates the direct programming of the following parameters: <i>P_OrG</i> : parameter <i>OrG</i> <i>P_StP</i> : parameter <i>StEP</i> <i>P_0FS</i> : parameter <i>OFFS</i> <i>OFF</i> : the key combination is not assigned to any function in the operating mode	<i>P_OrG</i>
<i>PASS</i>	Password	<i>ON</i> : the system requires the password 22011 to enter the programming mode <i>OFF</i> : the system does not require a password to enter the programming mode	<i>OFF</i>

Parameter	Description	Available options	Standard value
<i>rESet</i>	Setting of Parameters to standard values	<i>YES</i> : the parameters are set to the standard values <i>NO</i> : the parameters maintain the values set by the user	<i>NO</i>
<i>rE</i>	Software version	The software version is shown on the display.	

### 9. Problem solving

Message on the display	Description	Action
- - - - -	Exceeding the reading scale (-19999;99999) The value cannot be shown on the display.	The system continues to measure displacements; the value will be shown on the display again if re-included in the reading scale.
<i>S_Err</i>	The shaft speed has exceeded the max system speed.	Press the key to go back to the value reading and re-set the absolute reference.
	Low Battery	Replace the battery (see paragraph 7.5).