ITALPACK

INSTRUCTION AND MAINTENANCE MANUAL

TT5/50

SERVICE DEPARTMENT

FIRST EDITION
January 1998

CERTIFICATE OF CONFORMITY
Nr. 172.002.0298

The company ITALPACK. srl, with offices located in SANTARCANGELO DI ROMAGNA (RN), Italia in Via del'Olmo, 10 , with Mr. Righetti, as its legal representative

DECLARES
on its own responsibility, that the Machine:

MODEL: TTS/50
SERIAL N°: 1758-1759

this declaration refers to complies with the law provisions which transpose the following directives:

89/392-CEE, 91/368-CEE,93/44-CEE, 93/68-CEE (Machines Directives)

89/336-CEE (Electromagnetic compatibility).

Besides, design and construction have been carried out in accordance with the following rules:

-EN 292-1	"Machines Safety- Basic concepts,design general principles: Terminology, methodology"
-EN 292-2	"Machines Safety- Basic concepts,design general principles: Principles, Techniques and Specifications"
-EN 294	"Machines Safety- Safety distances to prevent the upper limbs from reaching dangerous areas"
-EN 60-204	"Machines electrical equipment"
-EN 418	"Emergency stop"
-EN 349	"Machines safety- Minimum distances to prevent some parts of the body from being crushed"
-pr EN 811	"Machines safety- Safety distances to prevent the lower limbs from reaching dangerous areas"
-pr EN 894-1	"Machines safety- Ergonomics principles for the design of signalling and control devices- Part 1: Interaction between man and signalling and control devices"
-pr EN 894-2	"Machines safety- Ergonomics principles for the design of signalling and control devices- Part 2: Signalling devices"
-pr EN 894-3	"Machines safety- Ergonomics principles for the design of signalling and control devices- Part 3: Control members"
-pr EN 953	"Machines safety-General prescriptions for the design and the construction of protecting devices (fixed, movable)"
-pr EN 1050	"Machines safety- Risks assessment"
-pr EN 50099-1	"Machines safety-Principles of indication, marking and realization- Part 1: visual, audible and tactile signals"

Santarcangelo di Romagna, 29th October 1997

Mr. Righetti

IDENTIFICATION PAGE

MACHINE DATA	
CUSTOMER	MICHALCZYK
MACHINE	
MODEL	TTS/SO
SERIAL NUMBER	1758-1759
ELECTRIC SUPPLY	V. 380 Hz. 50 Aux.
MANUAL DATA	
DENTIFICATION CODE	139.001.0396
VERSION	First one
EDITING DATE	26.03.1996

This manual, which provides vital instructions relative to installation safety measures, use and maintenance of the machine is an integral part of the machine itself and must therefore be handed over to the customer, who shall keep it in good condition and consult it with due care and attention before using the machine.

WARNING:

- When using the manual, be careful not to damage any parts of its contents.
- Do not remove, tear out or rewrite parts of the manual for any reason whatsoever.
- Keep the manual in a safe place away from damp and heat sources.

C O N T E N T S

C O N T E N T S

INTRODUCTION

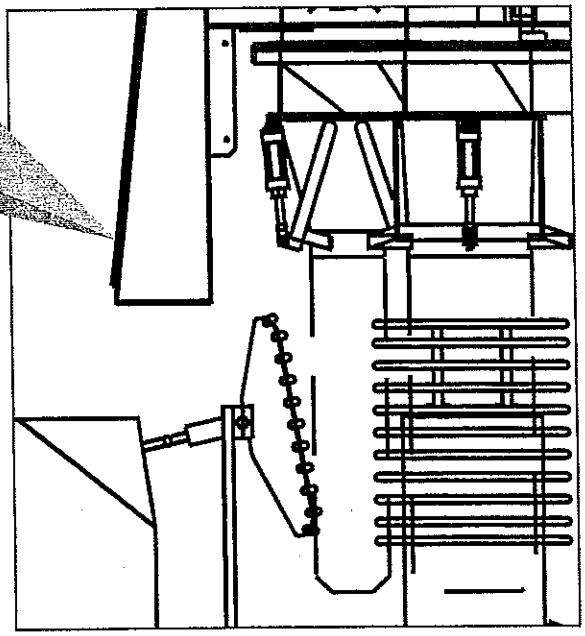
PART I

MARKINGE

The machine's identification plate is located on the front panel next to the start push button..

All the details necessary for identifying the machine are engraved on this plate and this data must always be quoted on any documents sent between the user and the manufacturing company, e.g. technical assistence requests or spare parts requests etc.

DO NOT UNDER ANY CIRCUMSTANCES REMOVE OR TAMPER WITH THE IDENTIFICATION PLATE.



The following details are engraved on the identification plate.

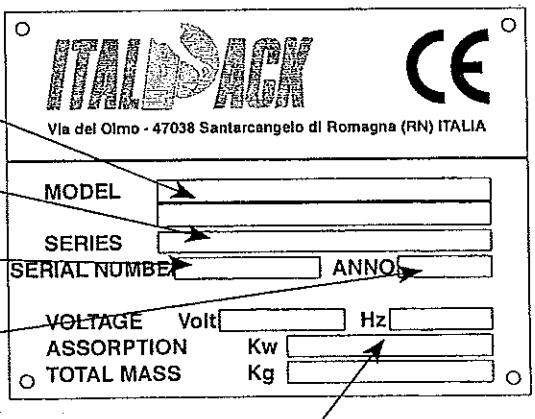
Vital details for communications between the user and the manufacturing company:

MODEL:
Identifies the model of the machine

SERIES:
Identifies the series number of the machine

SERIAL NUMBER:
Identifies the serial number of the machine

YEAR:
Identifies the year of manufacture of the machine:



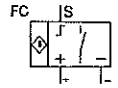
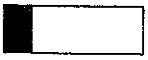
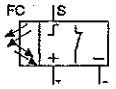
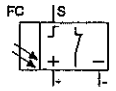
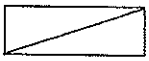
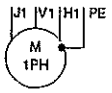
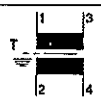
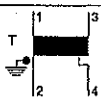
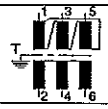
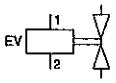
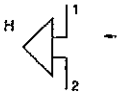
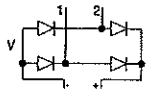
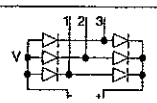
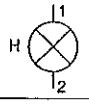
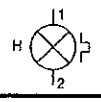
Important data for the installation and electrical connections, i.e.

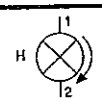
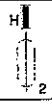
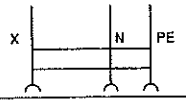
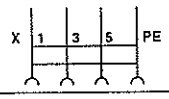
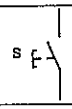
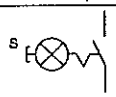
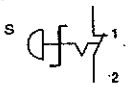
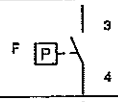
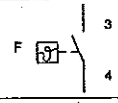
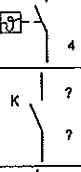
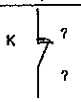
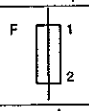
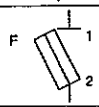
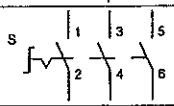
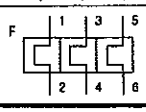
VOLTAGE, ABSORPTION AND TOTAL MASS OF THE MACHINE

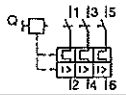
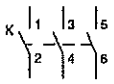
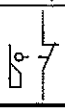
SYMBOLE

This manual contains some technical tables which were drawn to help identifying the various pieces of equipment requiring maintenance and/or adjustments.
The tables make use of symbols which identify the electric, electronic and electromechanical details.
The table below shows the graphic representation of the symbols and their meanings.

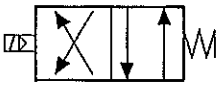
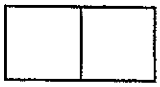
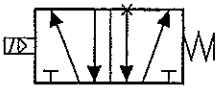
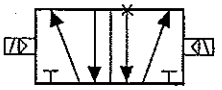
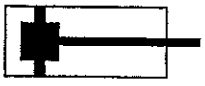
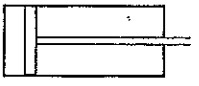
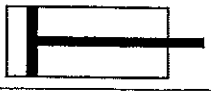
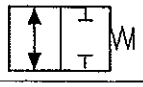
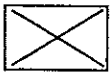
ELECTRIC SYMBOLS

STANDARDIZED SYMBOLS	DENOMINATION	**ITALPACK** SIMPLIFIED SYMBOLS
	Sensor	
	Reflection photocell	
	Receiver photocell	
	Motor	
	Fan	
	Single-phase transformer	
	Phototransformer	
	Three-phase transformer	
	Solenoid valve	
	Siren	
	Capacitor	
	Single-phase diode bridge	
	Three-phase diode bridge	
	Warning lamp	
	Flashing warning lamp	

STANDARDIZED SYMBOLS	DENOMINATION	ITALPACK SIMPLIFIED SYMBOLS
	Warning lamp	
	Neon	
	Single-phase socket	
	Three-phase socket	
	Terminal	
	Push button	P
	Illuminated push button	PL
	Emergency push button	PE
	Pressure switch	Pst
	Thermostatic switch contact	C tms
	N.O. contact	C N.A.
	N.C. contact	C N.C.
	Thermal contact	Ct
	Fuse	Fus
	Selector fuse	F sel
	Main switch	G
	Thermal relay	Rt

STANDARDIZED SYMBOLSTO	DENOMINATION	ITALPACK SIMPLIFIED SYMBOLS
	Magnetothermal switch	Mgtrm
	Contactor	Contat
	Coil	Bobina
	Microswitch open	Mi A
	Microswitch closed	Mi C

PNEUMATIC SYMBOLS

STANDARDIZED SYMBOLS	DENOMINATION	ITALPACK SIMPLIFIED SYMBOLS
	GFR Unit (Filter-Reducer-Lubricator) with pressure gauge	
	4/2 monostable solenoid valve	
	4/2 bistable solenoid valve	
	5/2 monostable solenoid valve	
	5/2 bistable solenoid valve	
	Silencer	
	Double-acting cylinder with adjustable declerators	
	Double-acting cylinder	
	Locking valve	
	Bidirectional capacity regulator	
	Unidirectional capacity regulator	
	Pressure regulator	

TECHNICAL FEATURES

The sacking plant being considered in this manual has been conceived and constructed in order to fill and sew open mouth sacks. The machine is semiautomatical, hence it constantly needs two operators who will be respectively in charge of positioning the sacks under the carousel sack-clamp and of sewing the sacks once they have been filled (fig.1).

In case the sewing line is completely automatic, the second operator being in charge of the sewing is not needed (Fig.2) and the operative cycle develops in the following way:

Position the empty sack under the sack-clamp in the clamping position (1) (such an operation is carried out manually), press the two sack-clamp arm closing limit switches simultaneously (2), and the carousel starts turning thus positioning the sack under the filling station (3).

Once the sack has reached the suitable position, a ready sack signal is transmitted to the weigher so that the previously dosed product is discharged.

Simultaneously the operator will position another empty sack under the following infeed.

The full sack is beaten by the sack beating device (4), (such an operation is carried out in the aim of compacting the product inside the sack as much as possible).

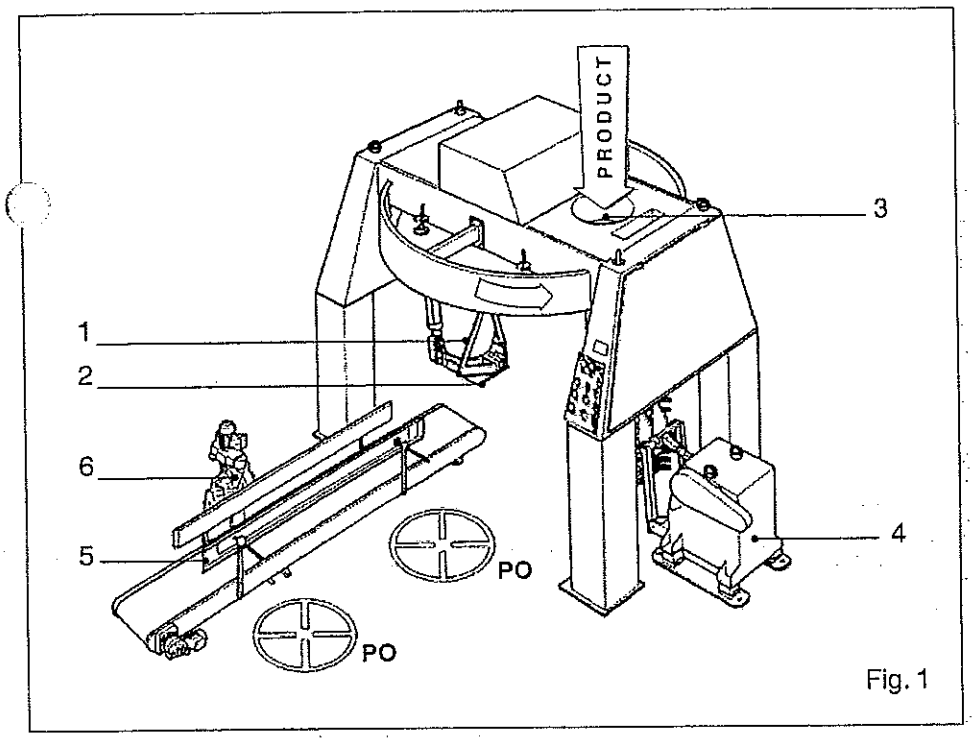
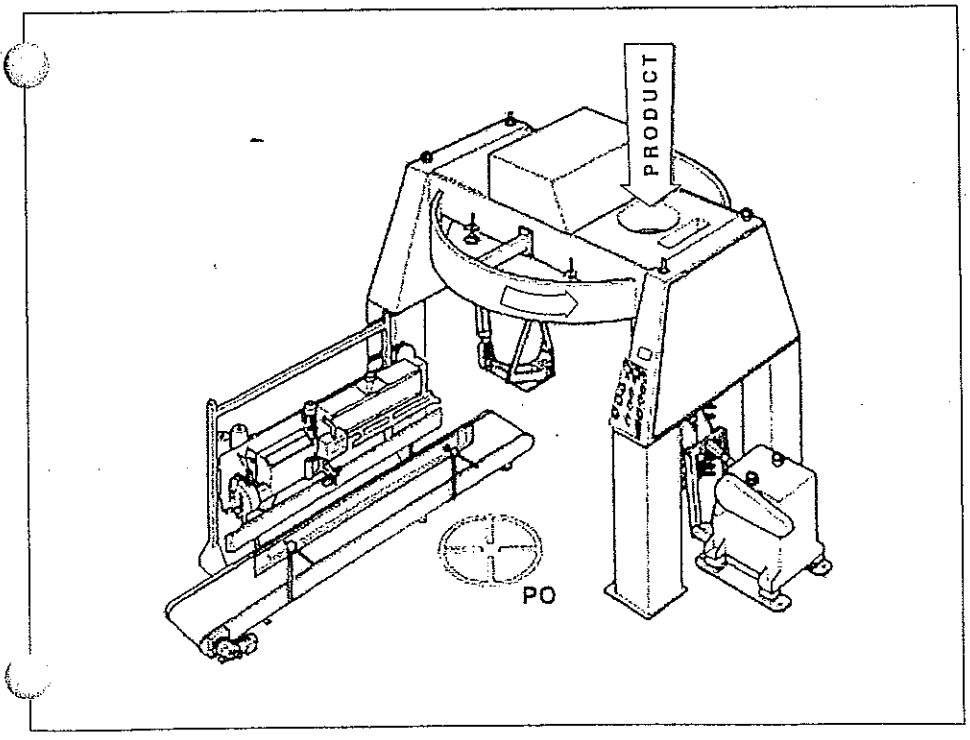


Fig. 1

By rotating the carousel shifts the full sack to the discharging position by automatically releasing and laying the full sack on the conveyor belt (5).

The sack, after being positioned on the conveyor belt, is conveyed to the sewing station (6) in order to be sewed.

This operation can be carried out either manually (Fig. 1) or automatically (Fig.2).



GENERAL PRECAUTIONS

The weighing machine is completely automatic so it needs no operators.

WARNING! Before operating the Bagging Machine, read this manual carefully.

OPERATORS

The weighing-sacking machine for valve sacks requires an operator suitable for the operation to be carried out. Please find below various professional levels the machine requires:

- Level 1 operator (qualification 0.1)
  This in an unqualified operator, without specific skills, able to carry out simple tasks, i.e. to handle the machine using the controls displayed on the push button keyboard, with the protective devices installed and active.
  He will load the empty bags on the bagging infeed and remove the full bags at the end of the work cycle.

- Mechanical maintenance engineer (qualification level 1)
  Qualified maintenance engineer able to run the machine in normal conditions, to make it work in manual mode with the protective devices disabled, to make all the necessary adjustments to the mechanical and pneumatic parts and to carry out maintenance and repair work.
  HE IS NOT QUALIFIED to carry out operations involving the electrical system.

- Electrical maintenance engineer (qualification level 2)
  Qualified maintenance engineer able to run the machine in normal conditions and to make it work in manualmode with the protective devices disabled. In addition, he is qualified to carry out adjustments, maintenance and repair work on the electrical system.
  HE IS NOT QUALIFIED to carry out operations involving the mechanical parts.

- Manufacturer's service engineer (qualification level 3)
  Qualified service engineer, at the manufacturer's disposal for the carrying out of complex operations in special circumstances or as agreed with the end user.

NUMBER OF OPERATORS

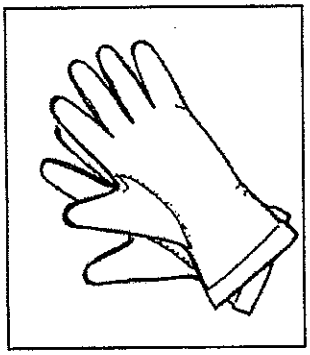
The operations described in this manual, dealing with the various phases of the machine's life cycle, have been analyzed by minute detail. Thus the number of operators recommended for each phase is the number required to ensure optimal results. The use of a lower or higher number of workers might either lead to the expected result not being attained or jeopardize the safety of the personnel involved.

Operation	N°. Operators	Qualification
Machine assembling	1 1	3 1
Electrical connection	1	2
Daily setting before starting up	1	0.1
Normal working conditions	1	0.1
Electrical maintenance	1	2
Mechanical maintenance	1	1
Pneumatic maintenance	1	1
Small adjustments	1	0.1
Special maintenance	1 1 1	3 1 2

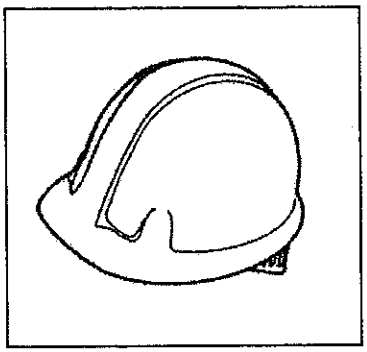
The table shows the number of operators required, their qualification and the types of operation involved.

PERSONAL MEANS OF PROTECTION

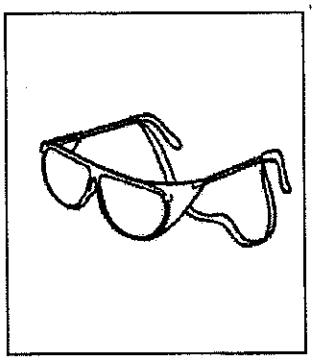
When working near the machine, on assembling or maintenance operations and/or making adjustments, it is essential to adhere strictly to the general accident prevention regulations, with particular regard to the following:



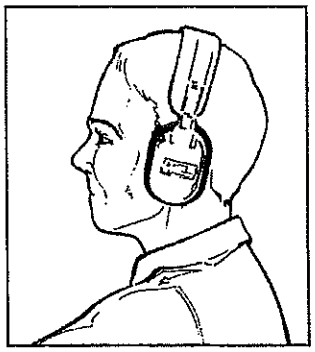
Never work with bare hands. Always wear gloves.



Always use a protective helmet.



Always use protective glasses.



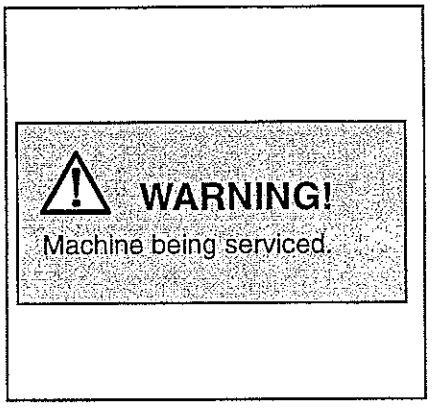
In work places with high noise level wear ear defenders.

GENERAL SAFETY REGULATIONS

SIGNS

The user must strictly adhere to the general accident prevention regulations. In addition, signs must be placed next to the machine to make personnel immediately aware of the potential danger. The following informative signs will therefore be required:

This signal must be displayed in potentially dangerous areas and in places where unauthorized persons must not enter



This sign must be placed on all of the machine's protective barriers each time maintenance is being carried out on it..

This sign must be hung on the mushroom-head general emergency button on the control panel.

It is also advisable to draw a yellow line on the ground outlining the perimeter of the machine.

These informative signs must be:

TRIANGULAR	to signal danger
ROUND	to signal what must and/or must not be done
RECTANGULAR	to give information

PROHIBITIONS

When operating the machine, always comply with the following prescriptions:

- Do not cross the conveyor belts.
- Do not cross the roller conveyors.
- Do not open the protective devices while the machine is operating.
- Do not inhibit the safety devices.
- Do not inspect the machine while it is operating in automatic mode.
- Do not sit or lean on the devices designed to protect the operators.
- Do not lean on the machine while it is operating.
- Do not sit or lean on the components of the machine.
- Do not use the machine, or parts of it, for purposes other than those listed in this manual.
- Adjusment operations must be carried out by one person only and while they are being done, access must be forbidden to non-authorized persons. Wherever possible, only one protective device should be opened at a time (with the machine in manual mode).
- After carrying out any adjustment operations on the machine with the protective devicesdisabled, be sure to re-enable them as soon as possible.
- Do not modify parts of the machine.
- Do not fit additional devices on the machine.
- Always clean the components of the machine, its panels and controls with soft, dry cloths.
- Do not use any kind of solvents, such as alcohol, petrol or diluents on any of the surfaces for cleaning purposes.
- Carry out controls on the machine as established at time of order.

WARNING! ITALPACK will not be held responsible for the consequences arising from malfunctioning due to failure to comply with the above.

HANDLING

PART II

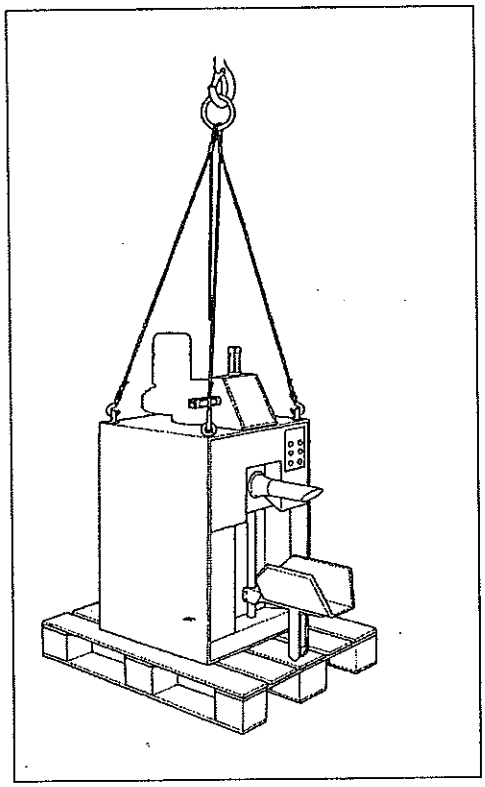
TRANSPORTING THE MACHINE

The machine is divided into different units in order to be transported; these parts are positioned onto a wooden pallet in order to ease their loading and unloading from the means of transport.
Please find here enclosed some tables explaining how to assemble the different units so as to carry out their installation.
To carry out the handling make sure you can use a crane with a capacity suitable to the weights to be handled.

All operations should be carried out using cables with safety hooks, and hoisting belts.

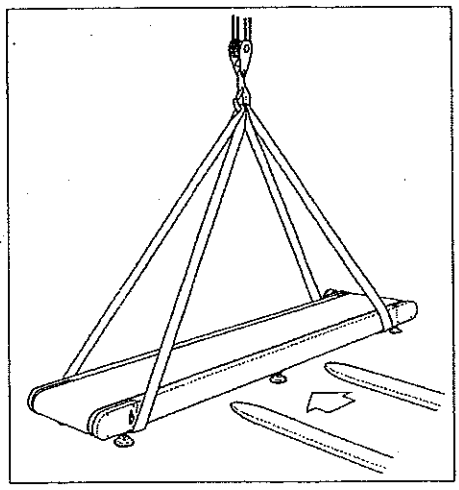
All loading and unloading operations must be carried out by skilled, authorized personnel in full observance of the accident prevention regulations in force.

HANDLING OF THE COMPONENT



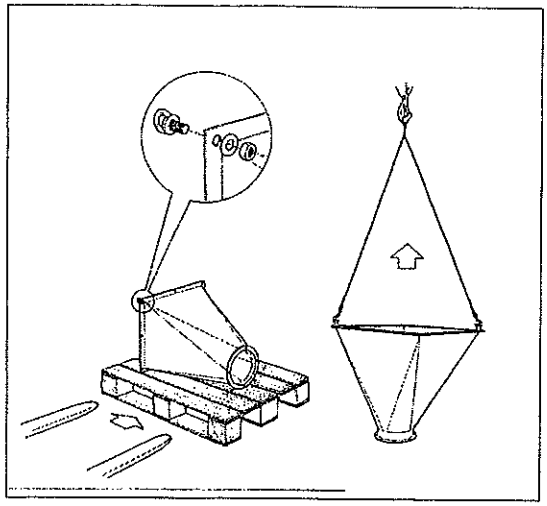
The machine is equipped with lifting eye-bolts; to lift the bagging machine, use steel wire ropes and a lifting hook.
The steel wire ropes must be able to lift 1000 kg.

Please find below the instructions to be followed in order to lift the different machine components correctly.



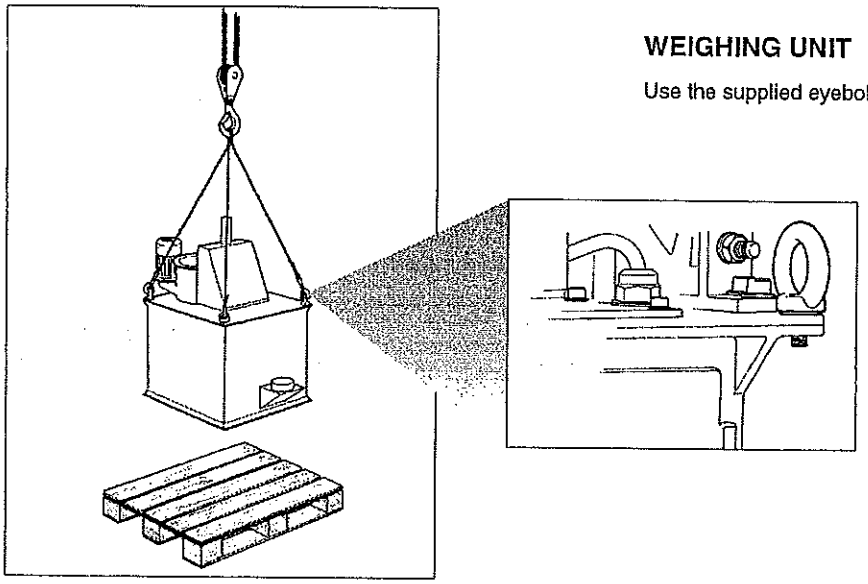
SHIFTING OF THE CONVEYOR BELT

It is carried out by using ropes or a lift truck equipped with forks.



CHARGING HOPPER

Screw some eyebolts to the holes for the hoppers fixing, then lift them by means of the cables being equipped with hooks.



WEIGHING UNIT

Use the supplied eyebolts.

For the loading, unloading, and shifting of the weighers, sacking machines, and various machines use the special eyebolts or hooks located on the machines themselves. Make sure that the machine lifting, mainly the weighers, is carried out in a plane position and not in a transversal one.

MASS OF THE COMPONENTS

The table shows the mass of the several components. It is important to examine these values for adjusting the capacity of the lifting machine.
You have to consider just the weight of the equipments marked by the star relevant to the components of the plant affected.

Components	Mass (kg)
*Charging hopper	50
*Weighing machine	250
Discharging hopper	80
*Electric board	100
*Output transfer	250
Valve sacking machine	500
Empty sacks magazine belt	300
Open nozzle sack-inserter	700
*SA. sewing line	1200
*Open nozzle turntable	2500
Sack-beater	500
Valve sacking-weighing machine	600
Open nozzle sacking-weighing mac.	500
Overall mass of the components	

STORING THE COMPONENTS

If the machine is not to be installed immediately but has to be temporarily stored, it must be kept under cover, in a dry environment. Moreover, it must be placed on suitable supports which keep it raised from the ground by 10-15 cm.

DISPOSAL OF THE COMPONENTS

At the end of its working life the machine will have to be demolished; its various parts will therefore have to be disassembled to enable it to be properly disposed of.

The machine does not have any parts which can seriously pollute the environment, apart from the oils used to lubricate its gearmotors. To dispose of these, simply empty the contents of the gearmotor cases into steel containers.

When disposing of material always adhere to the laws in force in the country where the machine is located. Store pollution-creating materials such as used oils and solvents in iron drums only.

MAIN MATERIALS USED TO CONSTRUCT THE MACHINE

MATERIAL	USE
PAINTED IRON	Structures, protective housings, inspection platforms
ZINC-PLATED STEEL	Rollers, pinions
STEEL	Chains, bearings, assembling elements, stems of pneumatic cylinders
CAST IRON	Support case, reduction gear case
ALLUMINIUM	Electric motor case, pneumatic cylinder case, solenoid valves
COPPER	Electric motor conductors, electric cables
PLASTIC	Electric cable coating, external sliding guides
PLASTIC (PVC)	Supporting feet
PLASTIC (LEXAN)	Protective housing
RUBBER	Sealing gaskets
VETRONITE	Electronic cards.
INTEGRATED CIRCUITS	Electronic cards
TRANSISTORS	Electronic cards
CONTACTS	Electric switchboards (contactors, remote control switches, relays etc.)
ELECTRIC PROTECTIONS	Electric switchboards (magnetothermal switches, thermal switches etc.)
TRANSFORMERS	Electric switchboards (magnetothermal switches, thermal switches etc.)
TERMINAL BOARDS	Electric switchboards (magnetothermal switches, thermal switches etc.)
BATTERIES	RAM supply in the PLC.

PROHIBITIONS

- Do not handle any parts of the equipment during delivery.
- Do not handle any parts of the equipment during assembling without being expressly asked to do so and without receiving instructions from the ITALPACK technical staff.
- Do not handle any parts or units of the machine from when this is first started up to its demolition.

INSTALLATION

PARTE III

POSITIONING OF THE COMPONENTS

The drawing below indicates all of the machine components, the number identifies the assembly sequence.

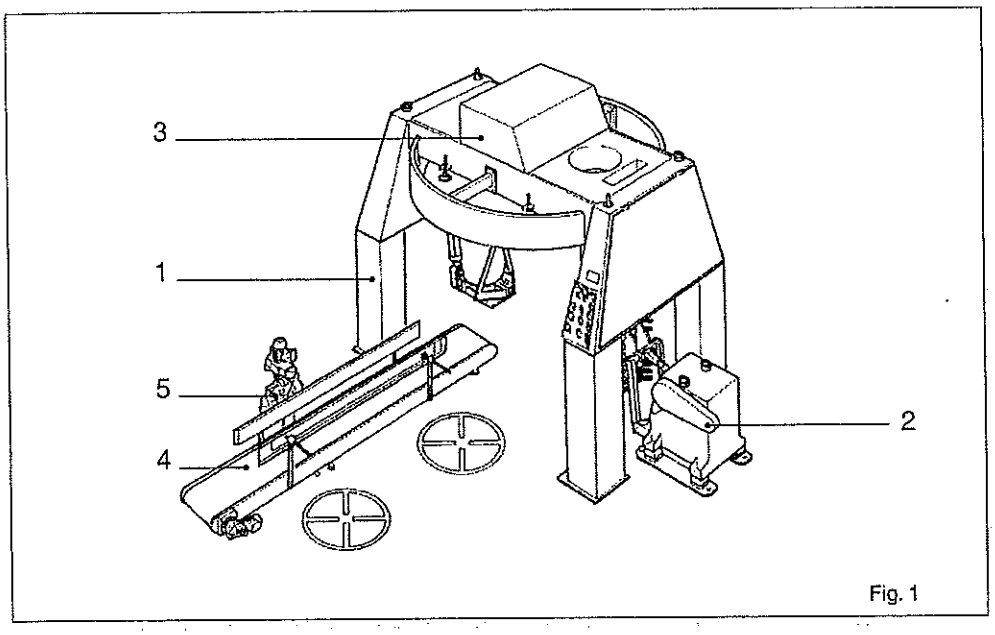


Fig. 1

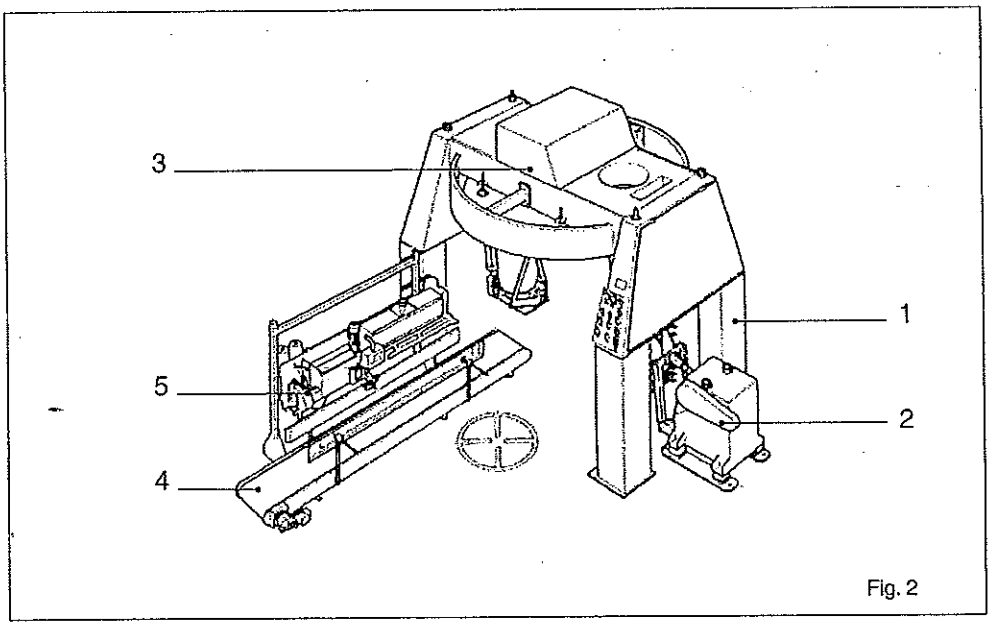
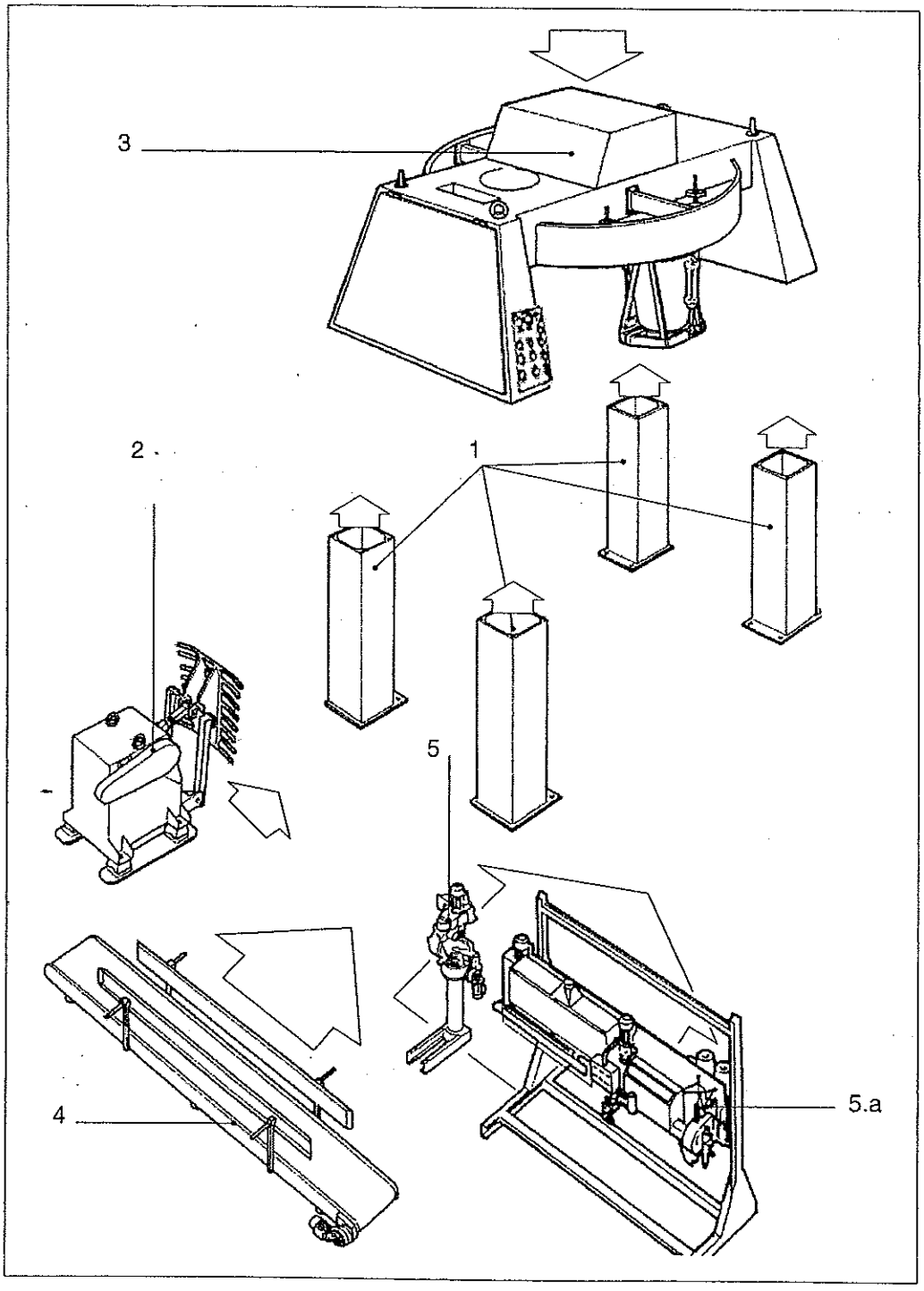


Fig. 2

DO NOT TRY TO ASSEMBLE THE MACHINE WITHOUT THE ASSISTANCE OF THE MANUFACTURER'S ENGINEER

INSTALLATION INSTRUCTIONS

In order to install the machine the connection of the various components is required.
To carry out a correct installation position the four supporting frames (1) for the carousel and the beating device (2) making sure it is correctly levelled on the supporting plane, position then the carousel(3) and the charging hopper.
Once the first installation phase has been completed position the conveying belt (4) and the manual sewing device (5) or the automatic sewing line (5a).
At the end of the positioning all of the electrical and pneumatic connections will have to be performed.



PRODUCT FEED

To ensure that all the weighers function accurately and correctly the product must be fed in at even and constant rate. Scrupulous observation of the following rules is therefore higly recommended. We cannot otherwise be held responsable for faulty functioning of the machines:

1a) For floury or powdery products, avoid overloading the food unit of the weigher (BELT, WORM SCREW, TURBINE) with excessive quantities of product. IDEAL SITUATION:2 weighings and the product should flow in as evenly as possible. If this is not the case, steps should be taken in order to render such a situation possible.
If the feed is irregular, feeder systems more suitable for the particular type of product to be weighed may be adopted.

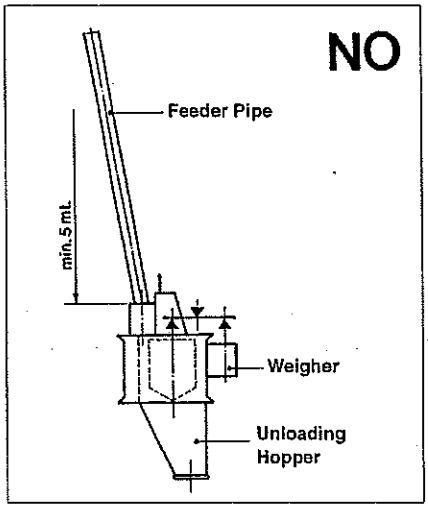
PRODUCTS: FLOURY OR POWDERY
- Feeder system: by tubolar worm screw
- Feeder system: by star valve
- Feeder system: by extractor

PRODUCTS: GRANULAR
- Feeder system: by conveyor belt
- Feeder system: by vibrating bottom

IMPORTANT: THE FLOW OF THESE VARIOUS FEEDER SYSTEMS SHOULD ALWAYS BE GREATER THAN THE OUTPUT OF THE WEIGHER.

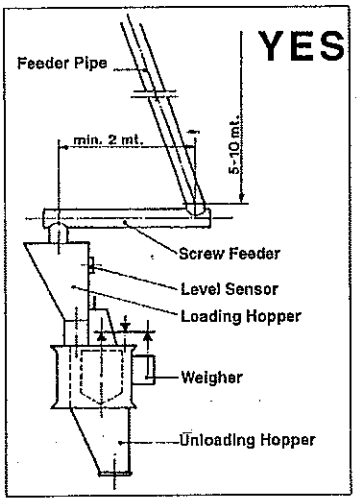
1b) For granular products on the other hand, the weigher can be positioned directly under a silo without any weighing problems arising.

FLOURY PRODUCTS

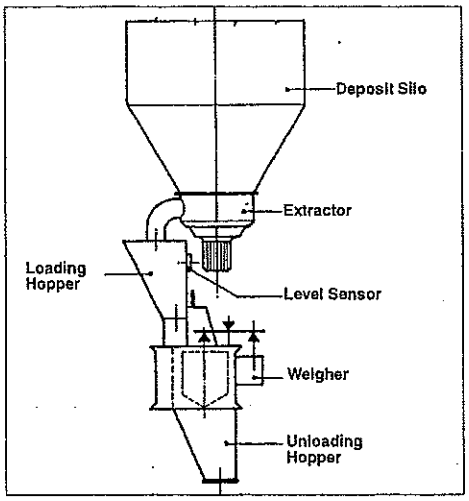


Examples of some incorrect feed methods:

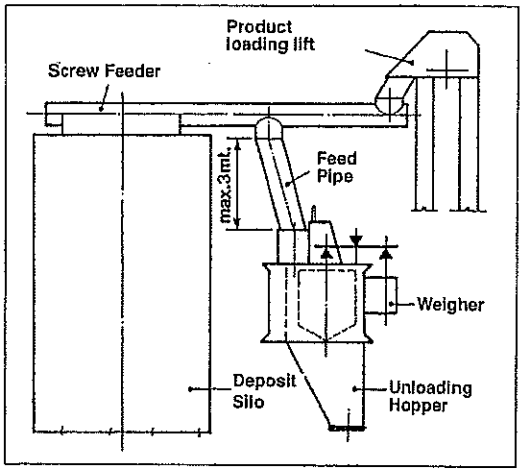
Maximum length of pipe with direct feeder: 2 mt.
Maximum diameter for 25-50 kg weigher: diam.180.
Maximum diameter for 10 kg weigher: diam.120 mm.



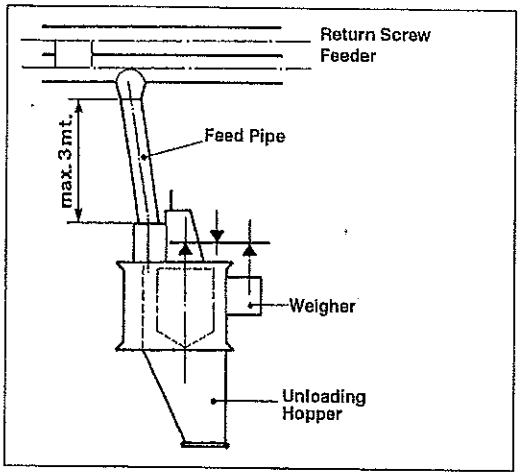
Examples of some correct feeder methods:
If the feeder pipe is located at a height of over 2 mt., fit a motorized worm screw with a flow adequate to the that of the weigher, with a minimum load-unload gap of 2000 mm. Alternatively, fit a star valve.
in this case, a lavel sensor which directly stops the motorization of the worm screw will be installed on the loading hopper of the weigher, when this is full of the product.



Weigher direct extractor feeder system (vibrating bottom).In this case a level sensor which directly stops the motorization of the extractor will be fitted on the loading hopper of the weigher when this is full of the product.



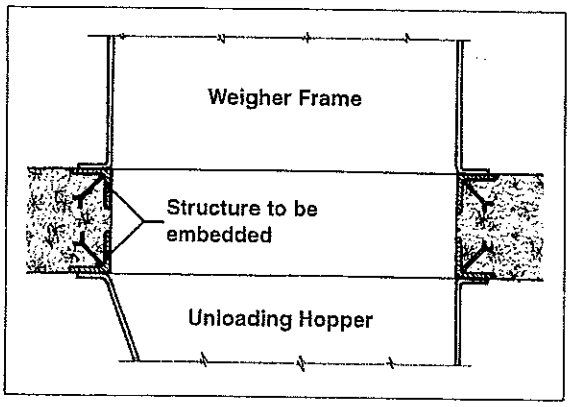
Weigher worm screw feeder with connecting pipe (diam. 180 mm, max. height 2mt.) (diam. 120 mm, max . height 3mt.). In this case, when the connecting pipe is full of the product, the screw feeder still continues to operate and unloads into the silo.



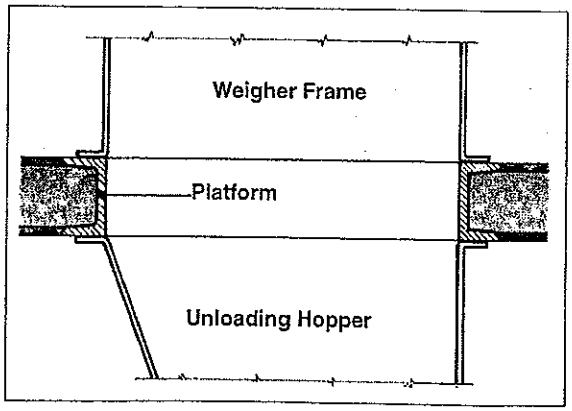
Return worm screw feeder system.
When the loading hopper or the connecting pipe is full, the srew feeder continues to operate discharging the product back into the flour basin.

POSITIONIG AND ASSEMBLING

1) In oder to assemble the weigher correctly it is vitally important for it to be in a perfectly level position. This should be ascertained by placing the level gauge an all the frames of the weighers, both electropneumatic, electronic, gross weight. The manufacturing company generally supplies technical drawings for installation and positionig of the machines. If you do not have such drawings, please proceed as follows:
If the weigher is to placed on the ground (it must be totally vibration free) a steel angle bar structure should be embedded in the upper layer of the ground itself.



- In order to secure the unloading hopper, proceed in the same way on the lower layer of the ground.



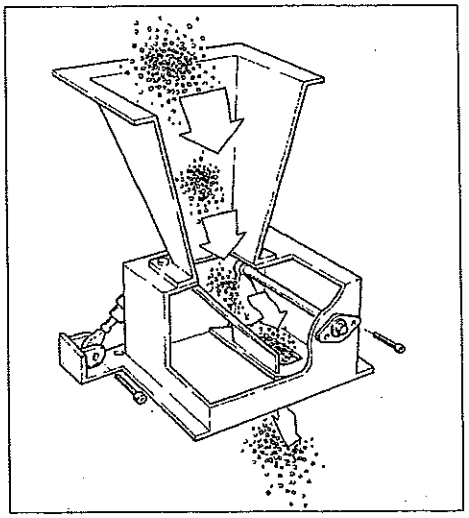
- Even if the sistem is already equipped with a casing or support shelves for the weigher, proceed nonetheless in the same manner.

TYPES OF FEEDERS

As previously specified, there are many types of feeders for weighers according to the products to be weighed and bagged; please find below the list and description of the types of feeders and the various weighing phases:

GRAVITY FEEDING UNIT FOR FREE SLIP DRY GRAIN PRODUCTS

- GRAIN
- GRAIN FERTILIZER (UREA, ETC.)
- PLASTIC GRAINS
- DRY SALT
- SUGAR

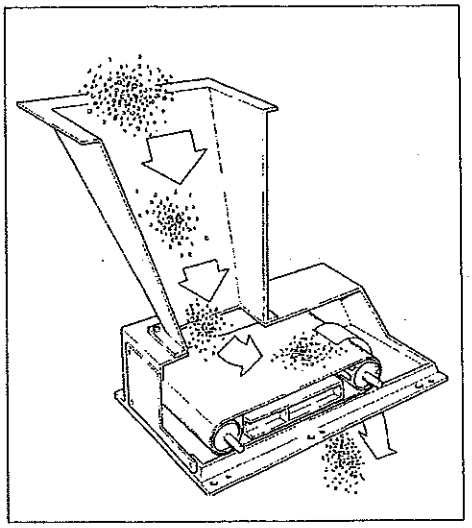


Free slip feeding system controlled by electropneumatic gate suitable for dry grain products.

It is equipped with a steel mechanic gate controlled by two jointed pneumatic cylinders.
When the weigher starts the weighing phases, the two pneumatic cylinders open thus allowing the product to reach the weighing container.
Once the set weight has been reached (90% of the desired weighing) one of the pneumatic cylinders closes (rough weighing cylinder) thus letting only a small quantity of the product reaching the container.
Once the desired weight has been reached the second pneumatic cylinder closes too (finishing cylinder) thus interrupting completely the product flow to the container.

BELT FEEDING UNIT FOR GRAIN AND POWDERED PRODUCTS:

- POWDERED AND CUBED FODDER
- POWDERED DETERGENTS
- CERAMIC FRITS - WET
- WET AND DRY SALT
- BRAN AND BY-PRODUCTS



Belt feeding system with pneumatic gate for mixed (grain or powdered) products shutting

It is equipped with a close ring belt controlled by its own control ratiomotor.
When the weigher starts the weighing phases the control motor too starts and the pneumatic gate regulating the product flow opens by rotating upward.
Once the set weight has been reached (90% of the desired weighing) one of the pneumatic cylinders closes (rough weighing cylinder) and the flow regulating pneumatic gate remains 30 mm higher than the belt upper surface thus letting a small quantity of product flow into the container.
Once the desired weight has been reached the control motor automatically stops thus interrupting the product flow to the weighing container.

BELT FEEDING UNIT FOR FLAKE PRODUCTS

- FLAKES

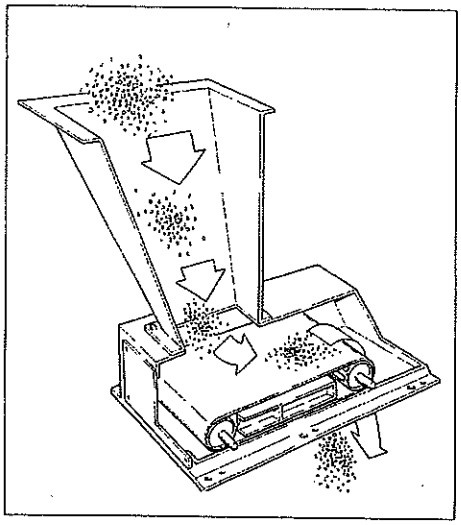
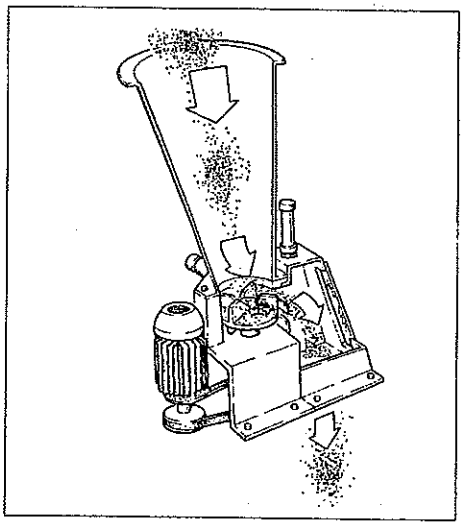


figura: belt feeding system with pneumatic gate for flake (flakes) products shutting

It is equipped with a close ring belt controlled by its own control ratiomotor.
When the weigher starts the weighing phases the control motor automatically starts at a high speed.
Once the set weight has been reached (90% of the desired weighing) the control motor changes automatically its speed, shifting from the initial high speed to the lower speed, so that a smaller quantity of product reaches the weighing container.
Once the desired weight has been reached the control motor automatically stops thus interrupting the product flow to the container.
In this case the flow regulating gate is fixed and it is adjusted only at the beginning of the operation so as to keep a constant product quantity.

TURBINE FEEDING UNIT FOR NON EMULSIFIABLE WITH THE AIR FLOUR PRODUCTS

-FLOUR
-BRAN AND BY-PRODUCTS



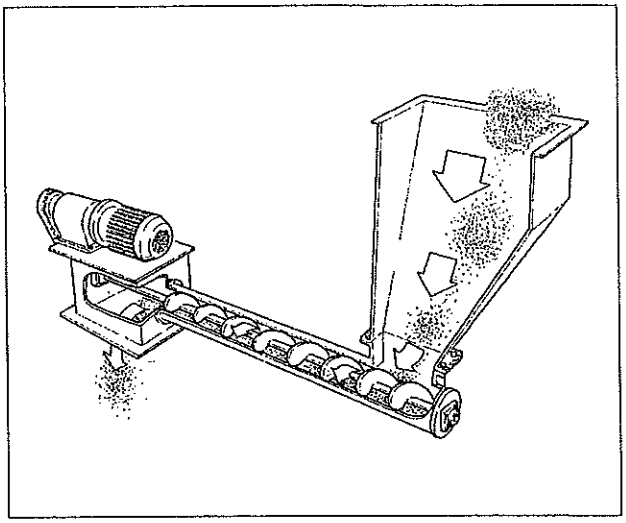
Turbine feeding system for flour and powder products non emulsifiable with the air

It is equipped with an aluminum turbine horizontally positioned controlled by and electric three-phase motor through a trapezoidal belts drive.
On the outlet turbine casing there are two gates, vertically and horizontally positioned respectively, controlled by pneumatic cylinders.
When the weighing machine starts the weighing phases, the control motor automatically starts and the two pneumatic gates open.
Once the set weight has been reached (90% of the desired weighing) the vertically positioned gate (rough weighing gate) closes thus obstructing the greatest quantity of product flowing to the weighing container.
Once the desired weight has been reached the horizontally positioned gate closes and the control motor stops thus stopping the product flow to the weighing container.

SINGLE ENDLESS SCREW FEEDING UNIT FOR FLOUR AND POWDER PRODUCTS:

- FLOUR
- PVC POWDER (EMULSION AND SUSPENSION)
- CALAMINE (BLASTING RESIDUE)
- ZINC OXIDE
- FODDERS INTEGRATORS

It is equipped with a ducted endless screw with a double-pitch spiral located horizontally to the machine axis and equipped with a two-speed control motor (for the two weighing phases) and with an end cycle pneumatically controlled gate.
When the weigher starts the weighing phases the pneumatic gate opens and the control motor starts at a high speed.
Once the set weight has been reached (90% of the desired weighing) the control motor changes automatically its speed, shifting from the initial high speed to the lower speed, so that a small quantity of product reaches the weighing container (finish phase).
Once the desired weight has been reached the end cycle pneumatic gate closes and the control motor stops.

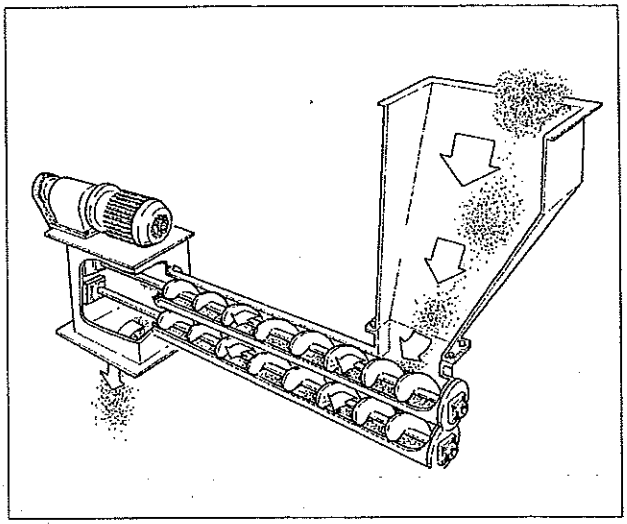


Single endless screw feeding system for flour and powder products having a hard slip

SINGLE ENDELESS SCREW FEEDING UNIT FOR FLOUR AND POWDER PRODUCTS:

- FLOUR
- FODDERS INTEGRATORS

It is equipped with two ducted endless screws (the one big, which is the rough weighing screw, and the other small, which is the finish screw) with variable pitch spirals located horizontally to the machine axis and equipped with a control motor each with chain pinion drive.
When the weigher starts the weighing phases the two endless screws start letting the product flow to the weighing container.
Once the set weight has been reached (90% of the desired weighing) the bigger screw, called the rough weighing screw, stops; only the finish screw goes on working so that a small quantity of product reaches the weighing container.
Once the desired weight has been reached the finish endless screw, controlled by a self-braking motor, stops completely letting no product flow into the weighing container.
The two endless screws can also be equipped with cycle end pneumatic gate to prevent the product from falling into the weighing container after the weighing phase has been completed, due to the motor inertia or to the product special features (it is indeed much fluidized).

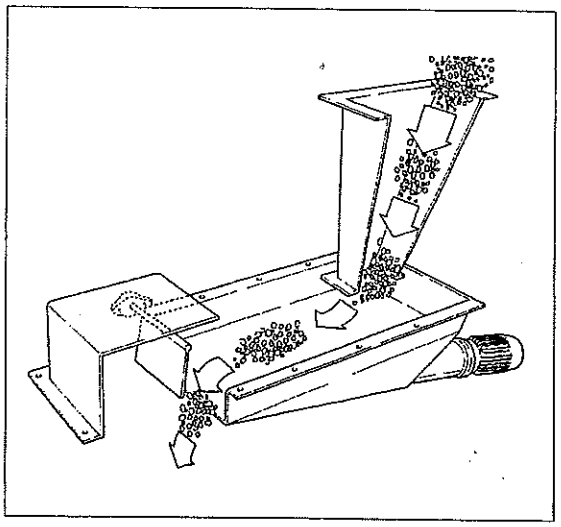


Double endless screw feeding system suitable to flour products and to the high volume productions that are requested.

SHAKING CHANNEL FEEDING UNIT FOR SPECIAL PRODUCTS:

- GRAIN COAL OF VARIONS SHAPES
- HARD WHEAT PASTA OF IRREGULAR DIMENSIONS
- CAUSTIC SODA

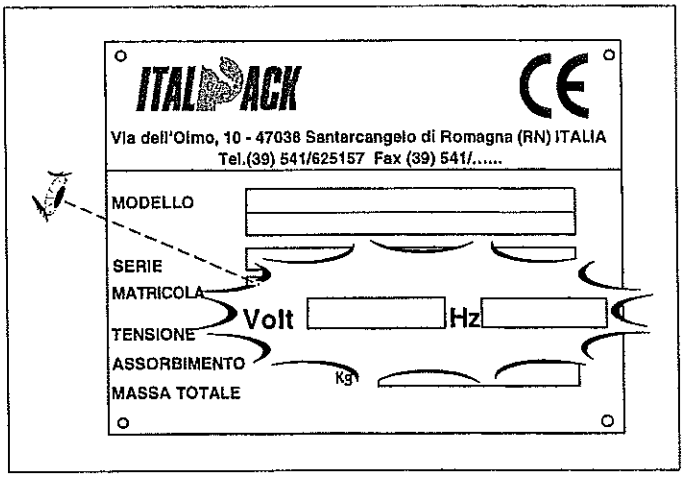
It is equipped with an electromagnetic shaking channel directly controlled by an electromagnet located on the casing of the shaking channel and it is equipped with a potentiometer for the vibration adjustment enabling to increase or decrease the vibrations and hence the machine speed.
A pneumatic gate is positioned on the plate channel. When the weigher starts the weighing phase the channel starts and the pneumatic gate opens.
Once the set weight has been reached (90% of the desired weighing) the pneumatic gate closes thus obstructing the product flow to the weighing container and letting only a small quantity of product flow.
Once the desired weight has been reached, the electromagnet stops vibrating thus preventing the product from reaching the container.



Shaking channel feeding system for special products having very variable features (chemical products)

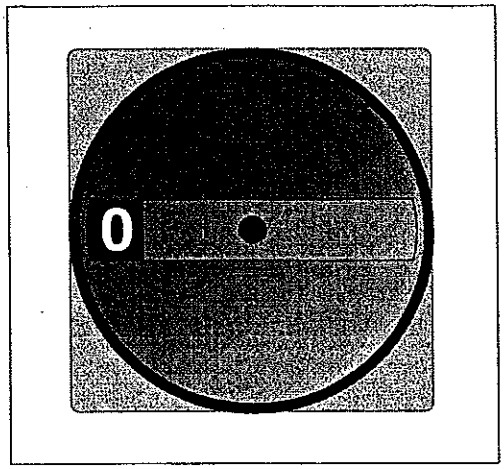
ELECTRICAL CONNECTION

GENERAL INSTRUCTIONS



Before carrying out any electrical connection operation, it is important to make sure that the mains voltage corresponds to the one being marked on the bundling machine plate.

Moreover the mains system must be equipped with a neutral wire and a grounded wire.



Before carrying out any electrical connection operation it is important to check that the machine is off and thus that the power supply main switch is positioned on the "0". The main switch is yellow with red borders and it is located on the panel on board of the machine.

ELECTRICAL CONNECTION

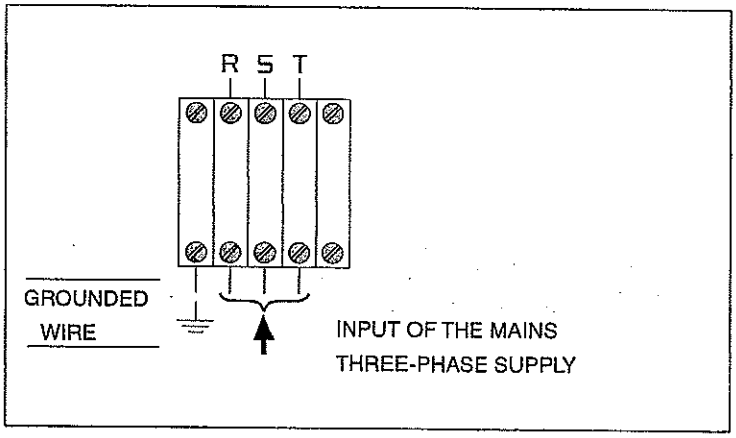
By directly connecting the supply cables to the board it is possible to supply tension to the machine.

T his operation has to be carried out by trained and authorized personnel only.

The electrical board is located on the side of the machine, its door can be opened by means of the keys the packing machine is equipped with and which will be kept by the plant director.

THREE-PHASE TENSION SUPPLY

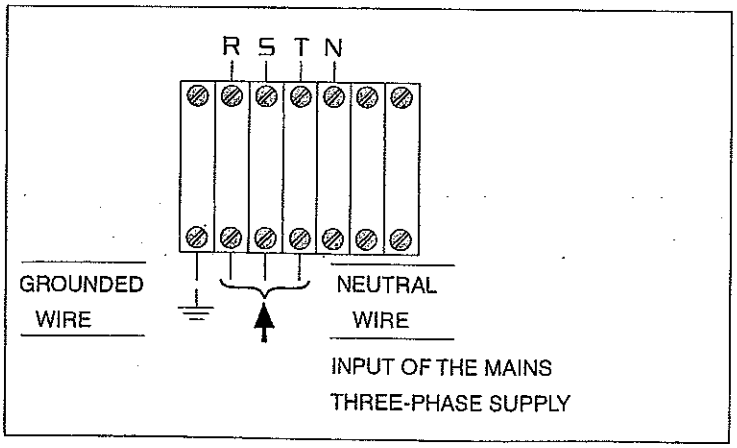
All of the electrical systems which are not equipped with a neutral wire (N) present the following terminals sheme:



The grounded wire has to be connected to the first terminal, the supply to the three following terminals.

THREE-PHASE TENSION SUPPLY PLUS NEUTRAL WIRE

On request it is possible to have an electrical system equipped with the neutral wire (N), in this case the terminals scheme is the following one:

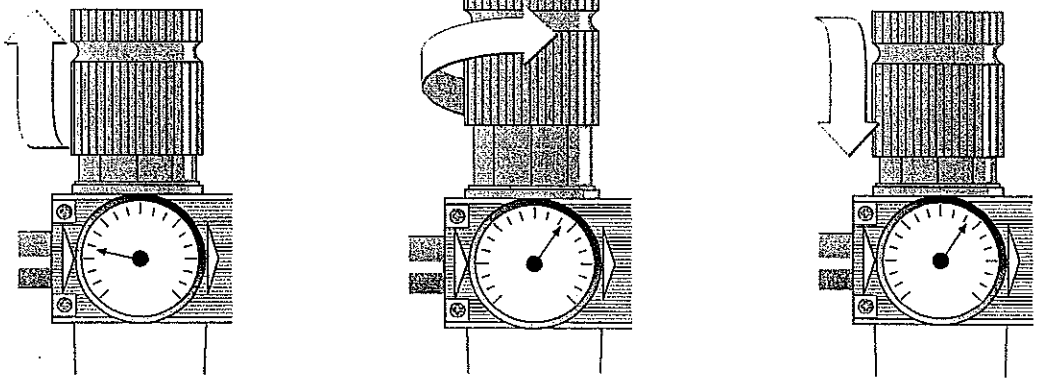


The grounded wire has to be connected to the first terminal, the supply to the three following terminals, the neutral wire to the fourth one.

AIR PRESSURE ADJUSTMENT

To carry out a correct oil adjustment follow the instructions below:

Lift the handle control and release it	Turn it until the manometer pointer shows a 6-bar pressure	Lock the handle control by pushing it down



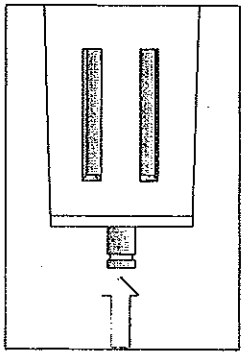
Never exceed a 6-bar pressure in the pneumatic plant.

STEAM TRAP

The steam trap evacuates the water collected by the air treatment unit.
It is equipped with a filter separating the air from any impurity.

It is important to check the filter efficiency periodically. A misfunctioning of this part can damage the solenoid valves and the pneumatic-cylinders.

HOW TO USE THE STEAM TRAP



The steam trap discharging cock can be used both in manual and in semiautomatic mode.
In ordinary circumstances the cock works in the semiautomatic mode; when under pressure, it keeps closed, while after the pressure stops its action, it opens thus draining the steam being inside the cup.
In case it is necessary to drain the steam when under pressure, that is during the ordinary working of the machine, it is sufficient to press the cock upward.

This operation must be carried out by skilled and authorised service engineers only.

By turning the push button counterclockwise the cock will be completely closed; in such circumstances the steam is never discharged from the cup.

PNEUMATIC CONNECTION

Connect the machine to the pneumatic plant by means of the special tap located near the Filter-Reducer-lubricating unit and adjust the pressure at 6 BAR.

The machine is equipped with a safety pressure gauge stopping the plant, putting the bundling machine in the emergency state when the pressure falls below 4,5 Bars.

This operation has to be carried out by an electrical service engineer and, afterwards, controlled by a skilled technician.

The packing machine is equipped with pneumatic controls, it thus requires a compressed air distribution line.
It is advisable to equip the air distribution line with a further steam trap, if not already present.

UTILIZATION OF THE AIR TREATMENT UNIT

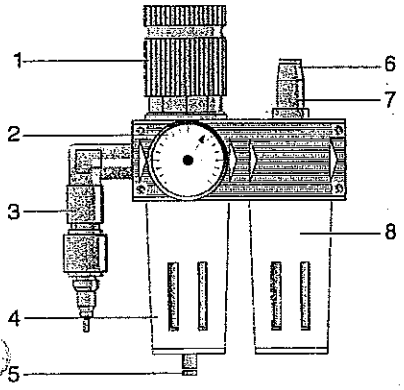
The air treatment unit allows to filter the air entering the machine, thus preventing impurities from damaging the cylinder and solenoid valve joints.

ITS MAIN FUNCTIONS ARE:

° Eliminate the steam, that is water particles being present in the compressed air produced by the compressors, by collecting it into the special basin.

° Spray the air with a correct quantity of oil in order to lubricate the cylinder movements.

The air treatment unit is composed by:



1: Air pressure adjustment handle control
2: Manometer to show the pressure value of the pneumatic circuit.
3: Gas pneumatic 3/8"connection to connect the pneumatic plant to the main network.
4: Steam collection basin.
5: Steam trap cock.
6: Oil adjustment screw, to regulate the oil quantity in the circuit.
7: Indicator of the oil injected into the air.
8: Lubricating oil basing

While using this device it is necessary to:

° Depressurize the unit before carrying out any maintenance interventions.

° Fill the basin with oil, until the level engraved on the container is reached.

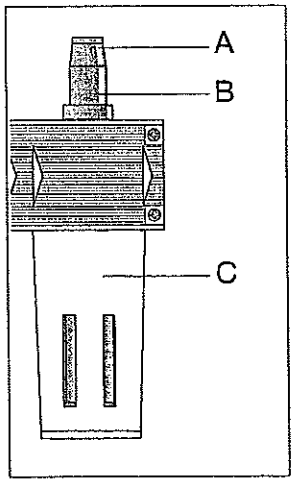
Use F class oils only, with 150 FD22 features.
Consult the oil correspondence table to find the correct oil denomination

IT IS PROHIBITED TO USE DETERGENTS, BRAKING CIRCUIT OILS, AND SOLVANTS. For cleaning only use suds.

The maximum permissible temperature is 40ÍC, at the maximum pressure.
-The maximum inlet pressure is 15 bars.

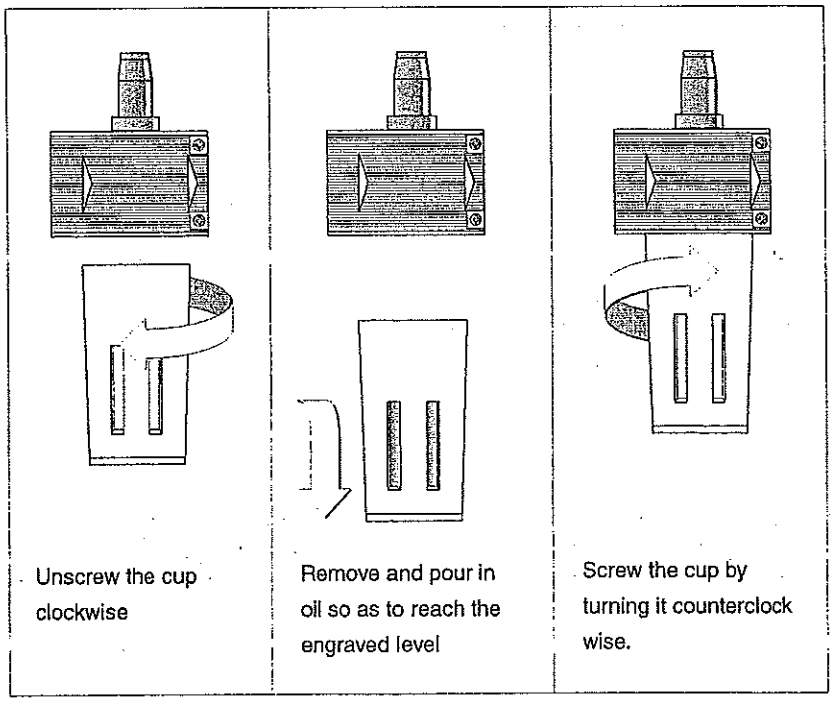
LUBRICATING UNIT

This component sprays with **F class** Oil the purified compressed air thus making it lubricating.
The air enters the pneumatic circuit conveying the oil through the components and hence it lubricates them.
By acting on the (A) screw which is located on the transparent dome the oil quantity being injected into the circuit will be optimized.
The correct oil quantity will have to correspond to "a drop every 15 seconds" and it will be possible to check it through the transparent dome (B).



Both the lack and the excess of oil cause an increase in the pneumatic system wear.

In order to restore the correct oil quantity for the air treatment unit it will be sufficient to unscrew the containing cup (C) clockwise.



Unscrew the cup clockwise

Remove and pour in oil so as to reach the engraved level

Screw the cup by turning it counterclock wise.

The oil cup will never have to be empty.

OPERATOR

Chapter 6

USE OF THE ELECTRONIC WEIGHING MACHINE AND OF PULS BUTTON

6.1 USING THE MACHINE

As we have already specified the machine is completely automatic, thus it needs no operators.

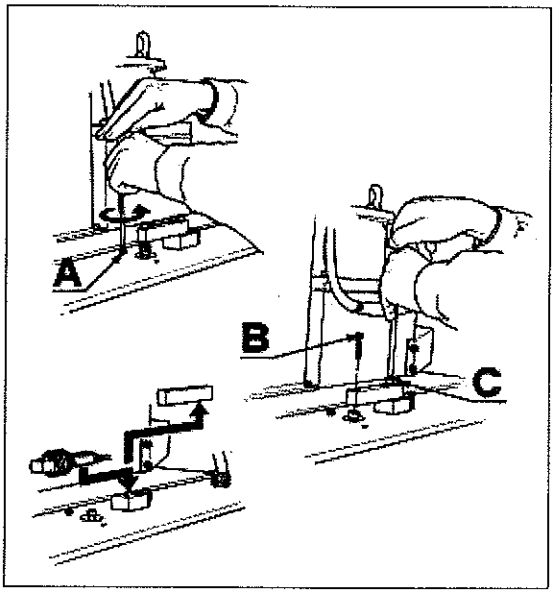
6.2 ELECTRONIC NET WEIGHT

The net weight weigher is divided into two different and distinct groups:
- feeder unit (already listed in the SECOND PART)
- the actual weighing unit which consists of:

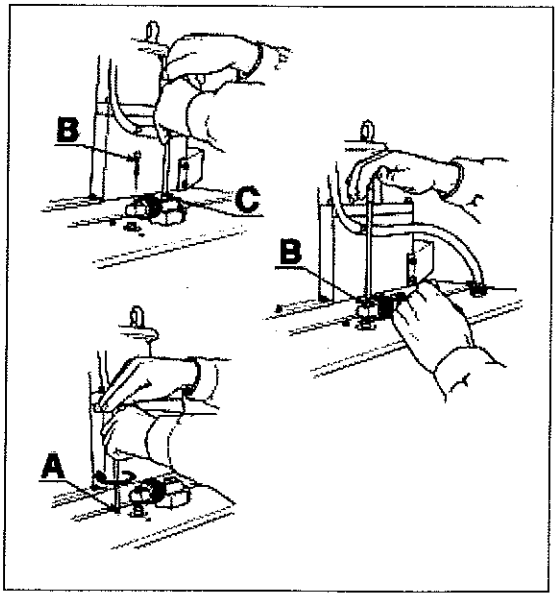
a) a internal vessel made of metal sheet into which the loose product flows.
b) 2 flexible loading cells which directly support the vessel and which transmit the data to an electronic power pack.
c) electronic microprocessor control equipment with keyboard for entering weighing parameters and with a four-digit display of the weight.

For trasportation, handling and assembly of the weighers themselves the two loading cells are remplaced by steel blocks which act as dummy cells to avoid breakage of the real cells. Once the weigher has been correcly installed, the loading cells must be immediately put back into position.

This should be done as follows:



a) Unscrew the middle screw (**A**) so as to be able to lift the vessel by 2-3 mm. The vessel will be held by this screw alone. Unscrew the 2 clamping screws (**C**) of the dummy cell from the frame of the weigher, then unscrew the screw (**B**) which attaches the dummy cell to the weighing vessel.

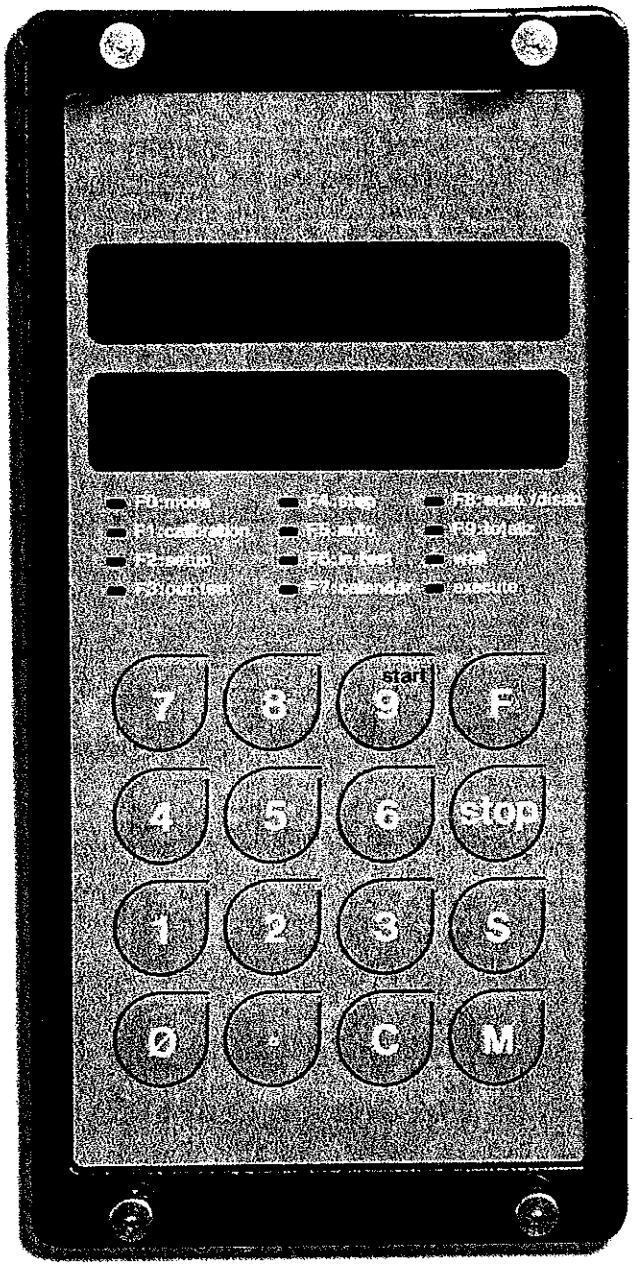


b) Take the real loading cell and screw the connecting screw (B), leaving the lower part of the head countersunk, to the weighing vessel. Position the loading cells correctly and then fix them with the 2 screws (C) to the frame of the weigher. Now, unscrew the middle screw (A) until the screw (B) directly touches the loading cell and thus connects the loading cell with the weighing vessel.

Follow the same procedure for the replacement of the other loading cell.

6.3 CONTROL BOARD

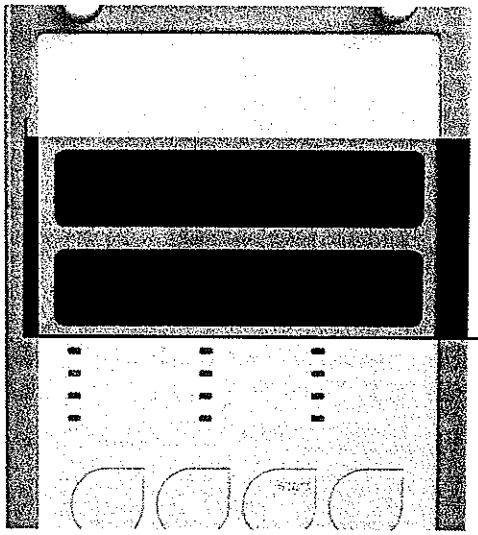
The NET WEIGHT ELECTRONIC BAGGING-WEIGHING MACHINES are equipped with a microprocessor control electronic system named TRIA 371 complete with keyboard for the setting of the weighing parameters and with digital display for weight displaying: by using this terminal all the machine operating conditions can be controlled. Before beginning to work with the weighing-bagging machine it is necessary to get to know the electronic control board functions.



6.4 TECHNICAL DESCRIPTION

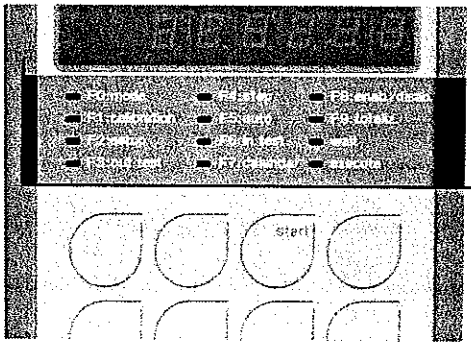
The electronic control board is named TRIA 371. It is manufactured by ESA/GV and represents the latest numerical control system generation. It is comprised of a single block unit holding the control logic, the supplying system and the field interface. It is able to manage up to three charging cell data acquisition channels simultaneously.

DISPLAYING UNIT



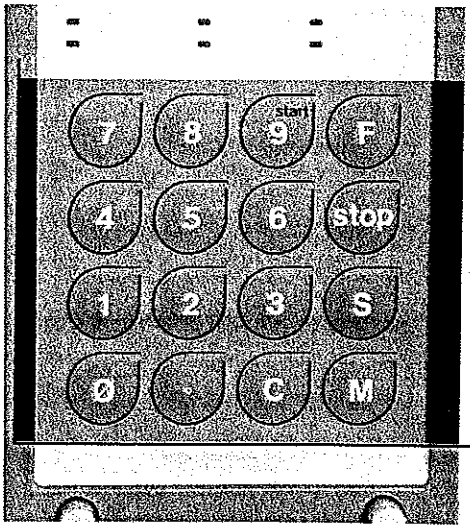
It is comprised of a double 7-segment 14 digits display.
It displays the set data and the answer messages of TRIA 371.

FUNCTIONS SIGNALLING LEDS



It is a set of twelve leds which signal the enabling of one of the corresponding functions to be selected by stroking the keys of the alphanumeric keyboard.

ALPHANUMERIC KEYBOARD



In order to select the FUNCTIONS stroke the "F" key and subsequently the digit corresponding to the wished function.

Example: in order to enable the F1 function stroke the "F" key first and then the "1" key.

6.5 WORKING CYCLE START

The machine productive cycle can be started through the keyboard;
In order to start the productive cycle it is absolutely necessary to set the weighing-bagging machine working conditions which can be divided into *ORDINARY PHASES* and *EXTRAORDINARY PHASES*.

The ORDINARY phases are the ordinary use ones and they relate to the machine ordinary working cycle according to the preset parameters. They include:

1. ADJUSTMENT AND CALIBRATION;
2. WORKING PROGRAMME RECALL.

The EXTRAORDINARY phases are related to the modification of the variours working programmes parameters.

They include:

1. WEIGHER SETTING;
2. ERROR DIAGNOSTIC.

6.6 ADJUSTMENT AND CALIBRATION

Please find below the TRIA 371 adjusting and calibrating procedure.
It can be divided into two parts:

1. an AUTOMATIC ADJUSTMENT allowing to orient the weigher operation range and to obtain the tare recovery (the hopper weight) by setting the full scale and the zero. Please note that TRIA anyway displays the "CALIBRATION" reading instead of the "ADJUSTMENT" reading.
2. a more accurate CALIBRATION that can also be obtained by weighing a standard weight.

AUTOMATIC ADJUSTMENT PROCEDURE

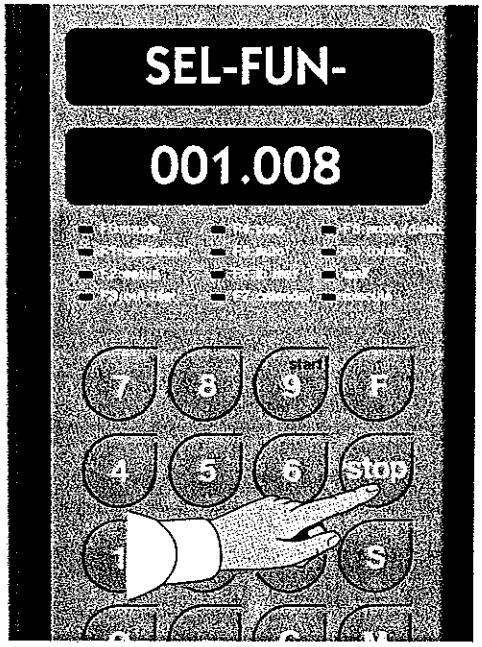
Before carrying it out make sure that:

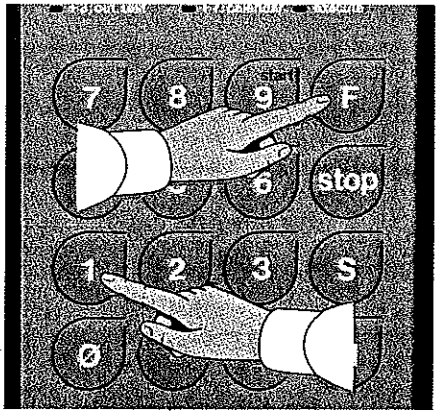
1. One of the Working Programmes has been selected;
2. There is no weights or products on the hopper

After switching on the TRIA 371,

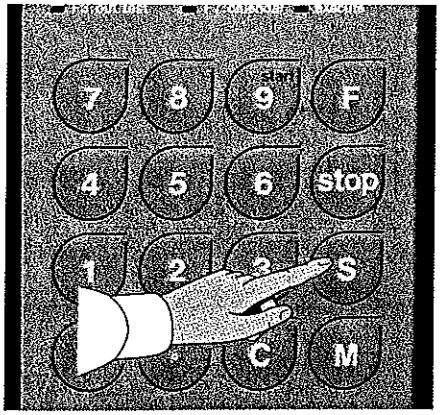
move the ESA selector from the AUT position to the MAN position;

the following screenpage will be displayed:



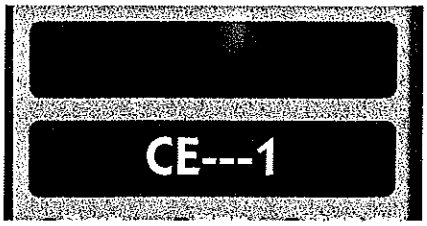


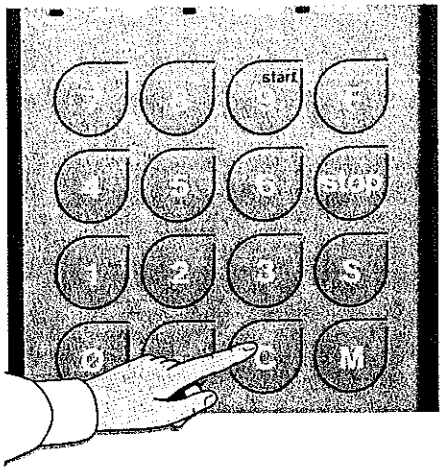
Stroke the "F" key and subsequently the "1" key; the following page will be displayed:



Stroke the "S" key; the screenpage aside will be displayed.

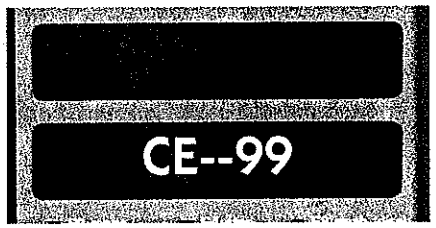
N.B.: a different value, even a four digits one, could be displayed.

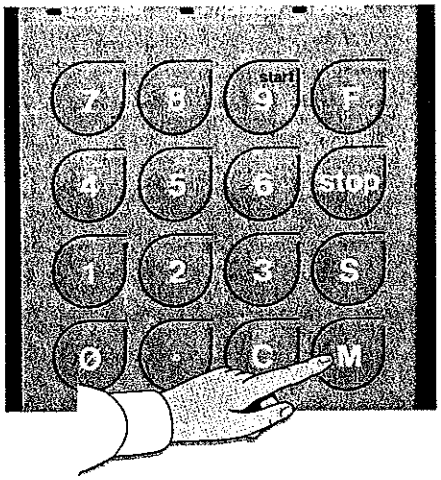




Stroke the "C" key and then the "99" number: the screenpage aside will be displayed.

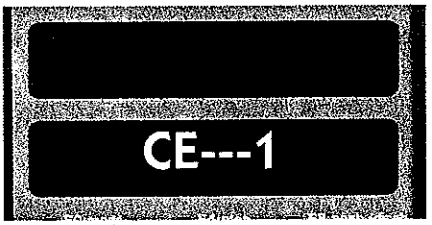
N.B.: this is a dummy cell enabling to enter the adjustment mode.

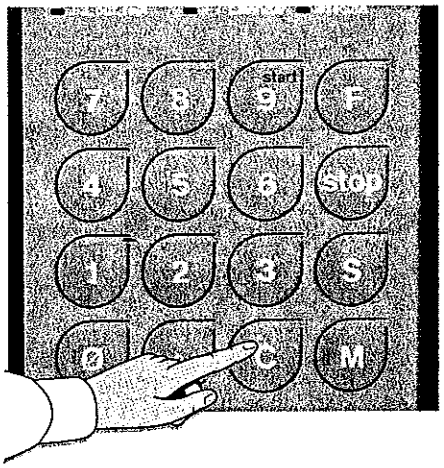




Stroke the "M" key; the screenpage aside will be displayed.

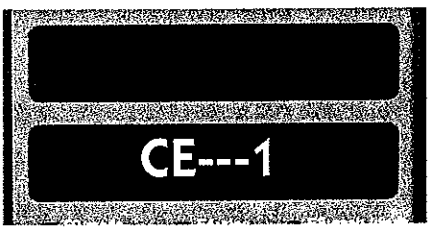
N.B.: it could be displayed a different value or any other number

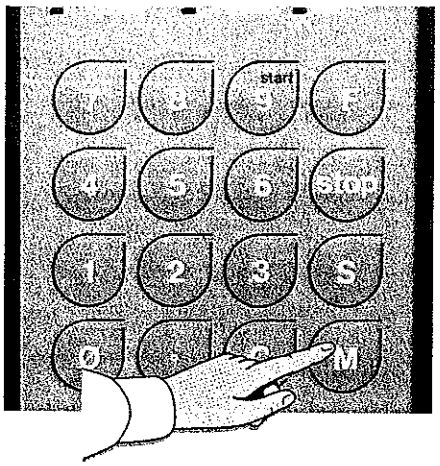




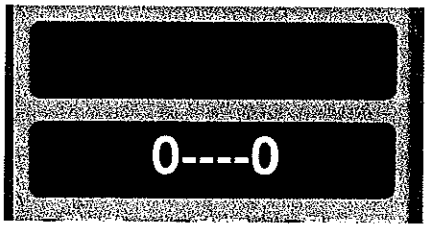
Stroke the "C" key and then keystroke the number of the cell which is to be used (usually the No.1); the screenpage aside will be displayed.

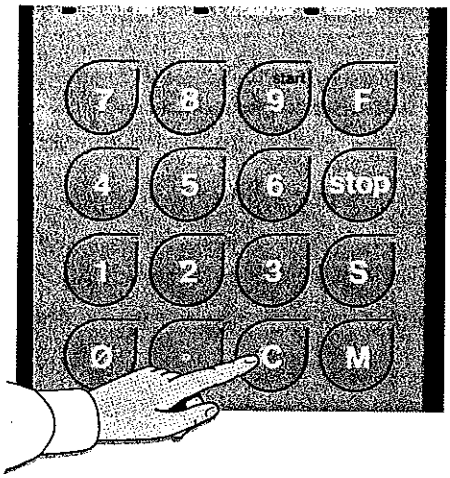
N.B.: even a different value could be displayed.



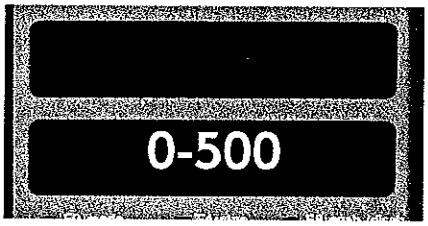


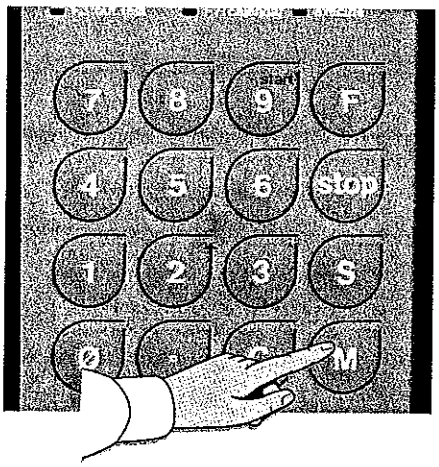
Stroke the "M" key; the screenpage aside will be displayed.



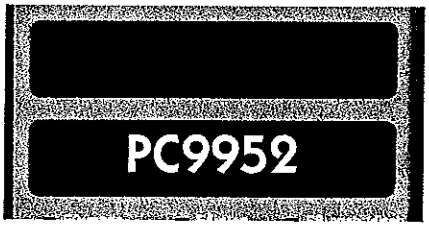


Stroke the "C" key and then keystroke the number of divisions while the hopper is empty (the value which is usually used is 1000); the screenpage aside will be displayed.

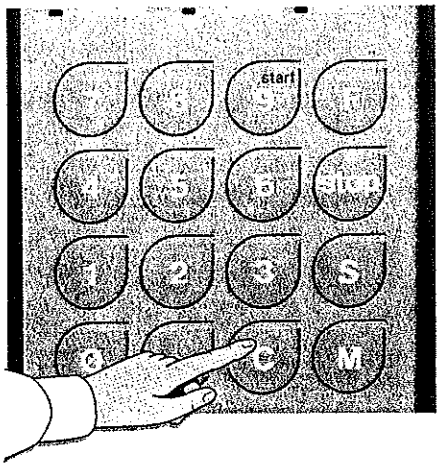




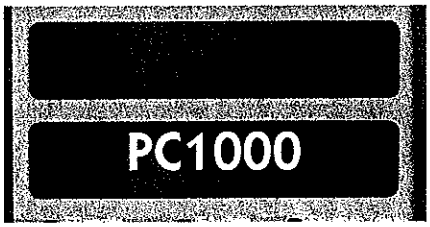
Stroke the "M" key: a value in divisions will be displayed (the displayed digit is to be regarded as an example):

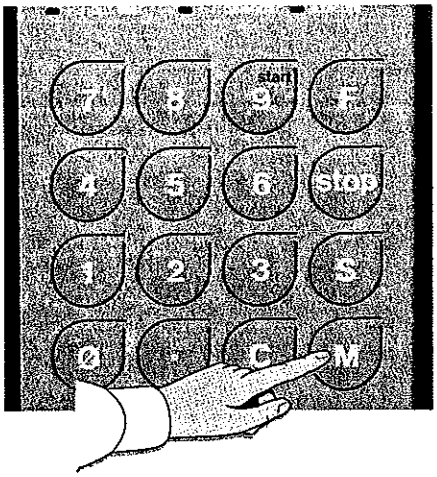


At this moment put the standard weight into the hopper (in the following example the standard weight will be 10 kg)



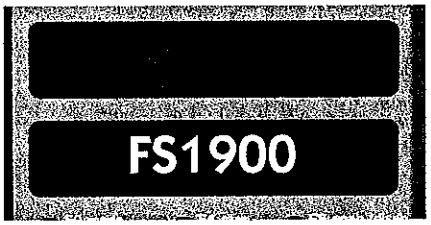
Stroke the "C" key and then keystroke the value of the standard weight in kg and in fractions, that is in the following way"....10.00" in order to indicate a 10 kg standard weight; the following screenpage will be displayed:

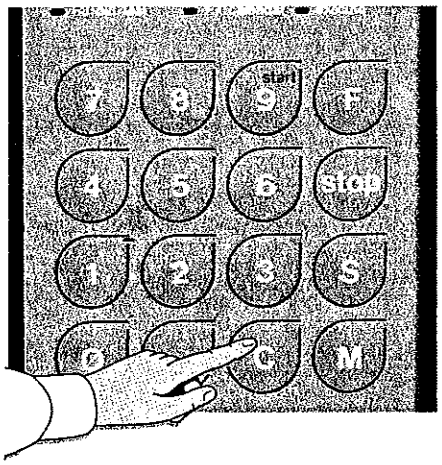




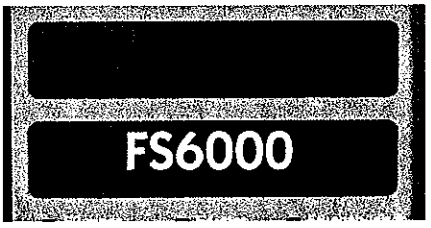
Stroke the "M" key; the message "FS" will be displayed (which stands for "Full Scale") together with a digit representing a number of divisions to be erased.

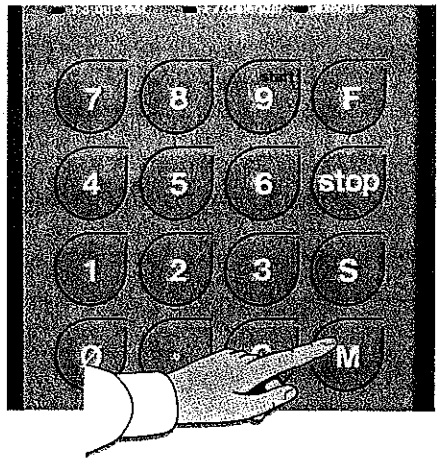
N.B.: the displayed digit is to be regarded as an example.





Stroke the "C" key and then keystroke the full scale cell setting weight value in Kg and fractions, or in the following way "——60.00" in order to indicate 60 kg, that is the maximum weight the weigher can process; the following screenpage will be displayed:



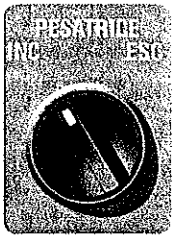


Stroke the "M" key and then the "Stop" key; the following screenpage will be displayed:

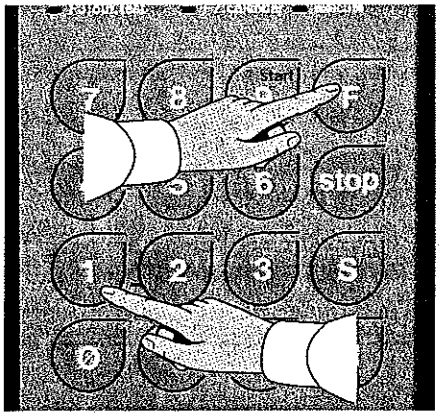
Remove the standard weight from the weighing unit, then continue with the following phase

CALIBRATION procedure

According to the previously explained procedure, move the ESA selector from the AUT position to the MAN position: the following screenpage will be displayed:

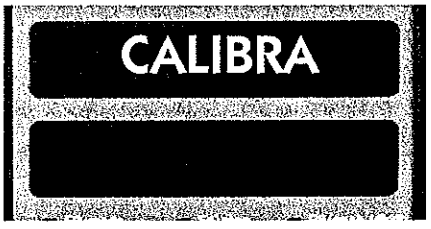


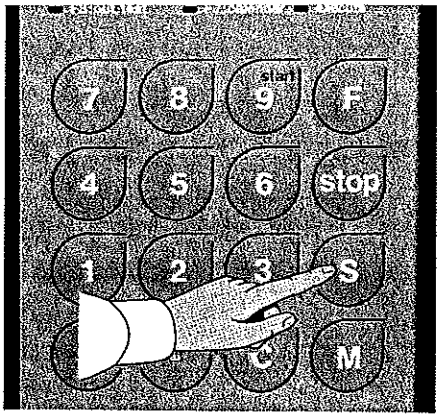
Stroke the "F" key and then the "1" key; the following screenpage will be displayed:



Stroke the "S" key; the screenpage aside will be displayed.

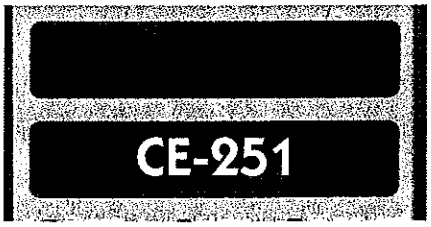
N.B.: a different value could be displayed.

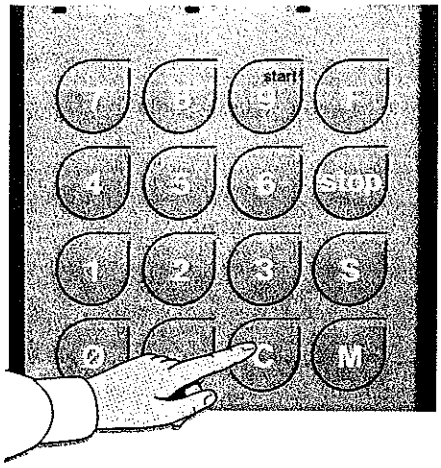




Stroke the "S" key; the screenpage aside will be displayed.

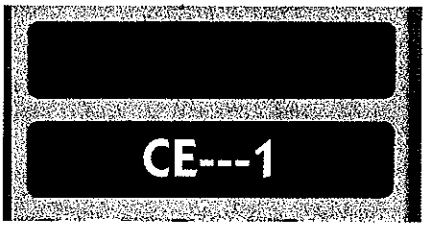
N.B.: a different value could be displayed.



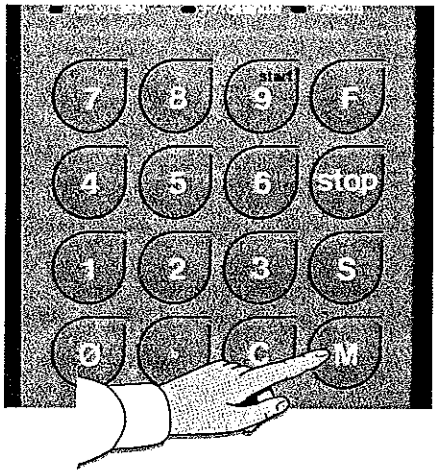


Press the "C" key and the "1" key;
The displayed cell is the one we ever use

N.B.: the digit displayed by the upper display is to be regarded as an example.

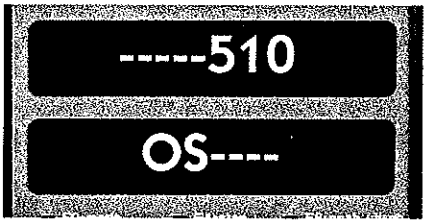


If you Want to calibrate the cell 1

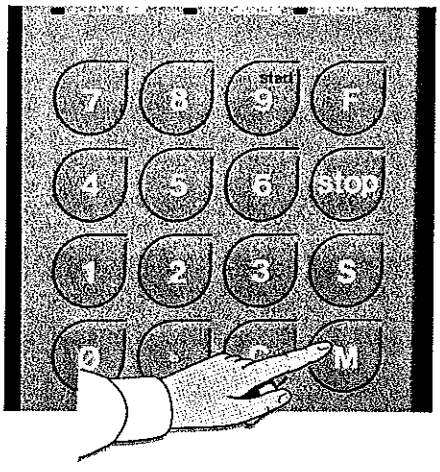


Stroke the "M" key; the screenpage aside will be displayed.

N.B.: the digit displayed by the upper display is to be regarded as an example.

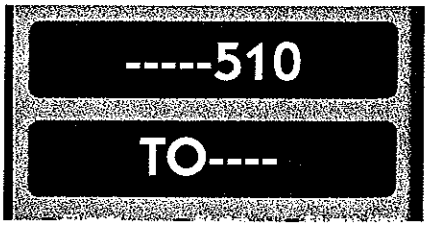


MAKE SURE THAT THE PRODUCT CONTAINER IS COMPLETELY EMPTY AND THAT THERE IS NO PRODUCT OR OTHER SUBSTANCES CLOTS POSSIBLY STICKING TO ITS WALLS.
IN ORDER TO CHECK THE CONTAINER MANUALLY ACT ON THE MANUAL CONRTROL SCREW LOCATED ON THE SOLENOID VALVE WHICH OPERATES THE CONTAINER OPENING AND CLOSING PNEUMATIC CYLINDER.

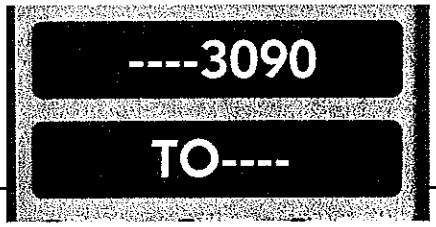


Press the "M" key to confirm; after about 3/4 seconds the screenpage aside will be displayed.

The upper digit does not represent a relevant with empy container.
As a reference, the value must be comprised between 400 and 1000.



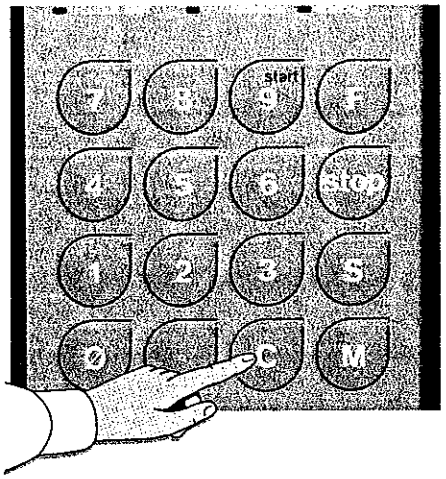
Put the standard weight into the hopper (which for instance could amount to 50 kg); the number of divisions must increase because it represents the divisions value at full recipient (with the wished weight).
The screenpage aside will be displayed.



ATTENZIONE

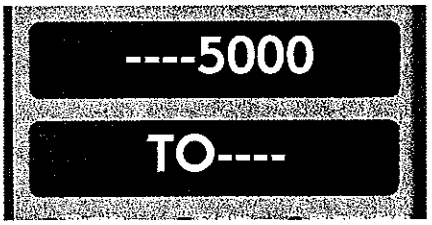
THE VALUE DOES NOT PASS 3800

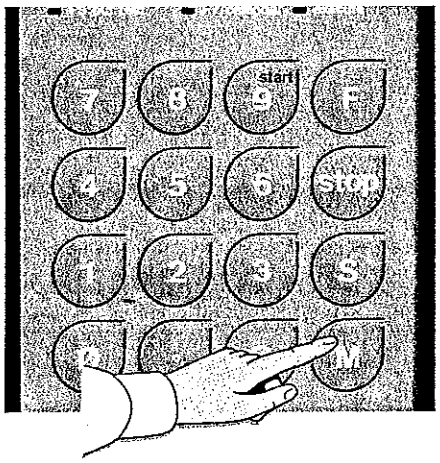
N.B.: the displayed digit is not a relevant value.



Stroke the "C" key and then keystroke the Standard Weight in kg and fractions (as already explained for the calibration procedure), which stand for the whole value:

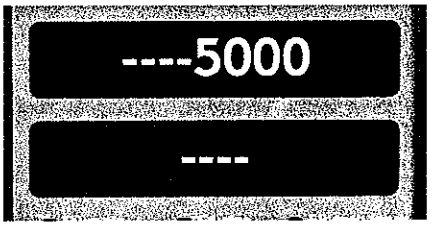
For istance Kg 50 = 5000
the following screenpage will be displayed



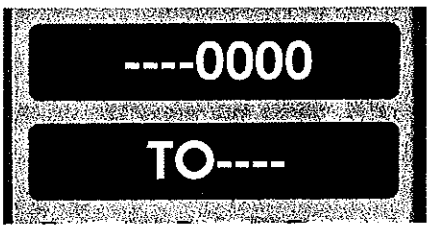


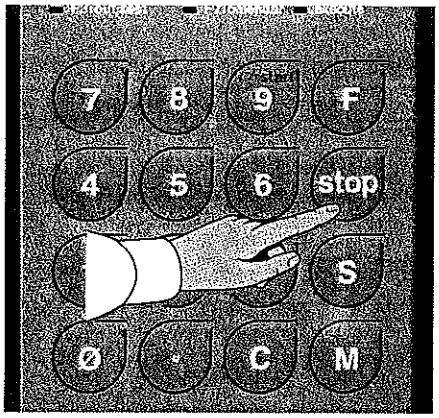
Stroke the "M" key to confirm:

a few seconds later the following screenpage will be displayed



Finally remove the Standard Weight and make sure that, after the hopper has been discharged, the ZERO value is displayed; if the procedure has been correctly carried out the folllowing screenpage will be displayed:





Stroke the "Stop" key in order to end the procedure; the initial screenpage will be displayed;

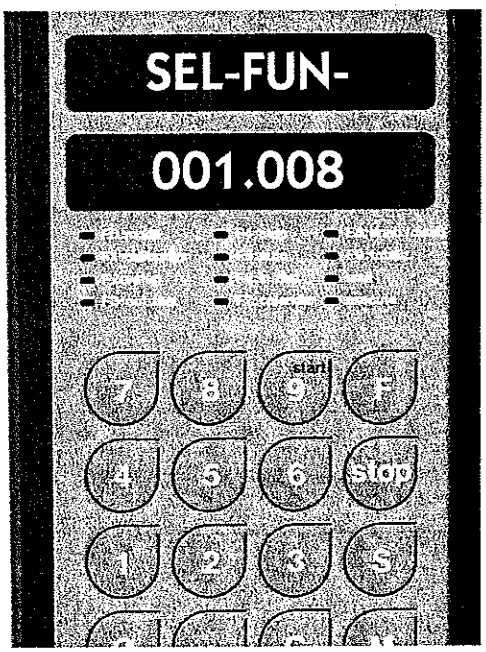
6.7 WORK PROGRAMME RECALL

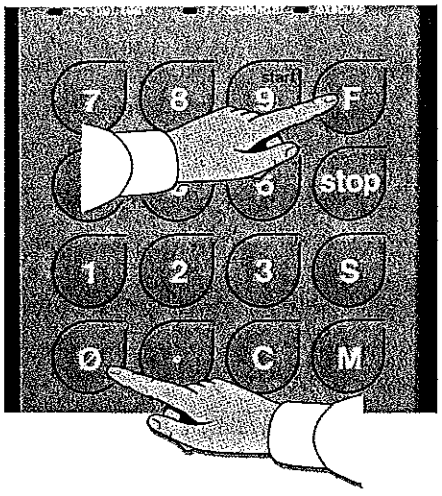
Before starting to use the weigher it is advisable to select and recall the correct work programme.

THIS OPERATION NEEDS TO BE CARRIED OUT AFTER THE PLANT SWITCHING OFF (HENCE EVERY MORNING AFTER THE PLANT SWITCHING OFF) OR WHENEVER THE ORDINARY PROGRAMME IS TEMPORARILY MODIFIED.

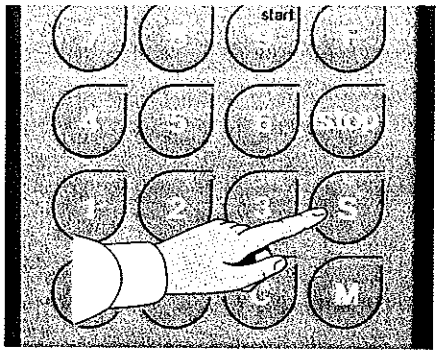
Move the "ESA" selector from the "AUT" position to the "MAN" position; the usual initial screenpage will be displayed:

Move the "ESA" selector from the "AUT" position to the "MAN" position; the usual initial screenpage will be displayed:

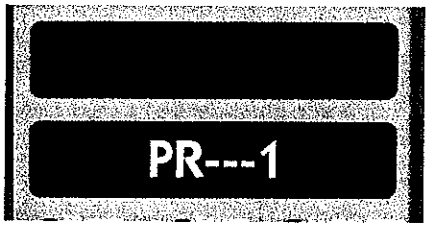


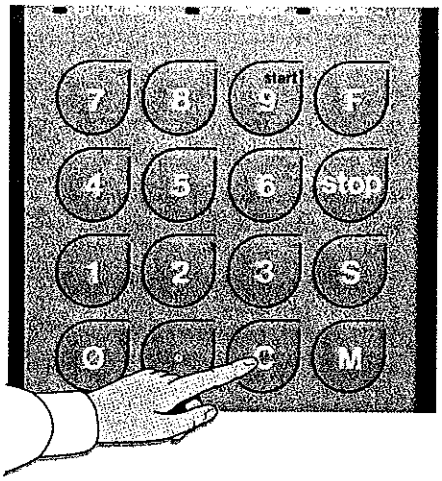


Stroke the "F" key and then the "Ø" key; the following screenpage will be displayed;

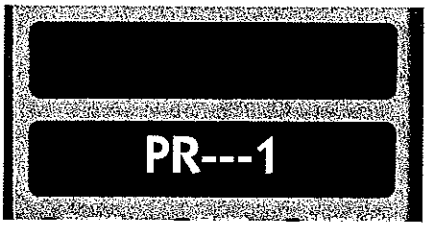


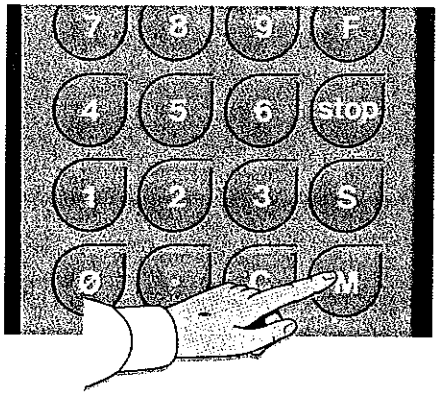
Stroke the "S" key; the screenpage aside will be displayed;



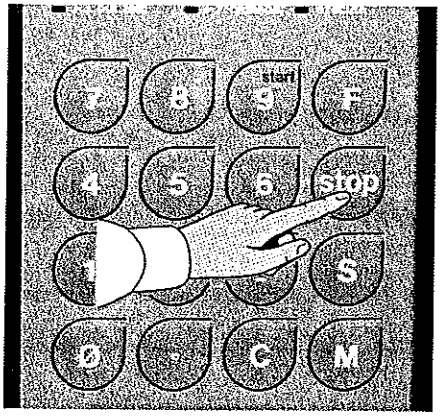


Stroke the "C" key and then keystroke the number of the wished programme, which will usually be "1" (this value is used in this example too); the screenpage aside will be displayed;





Stroke the "M" key to confirm: the programme recall screenpage will be displayed again:

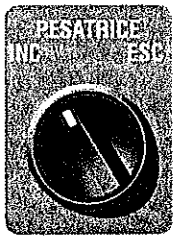


Stroke the "Stop" key to end the procedure;
the initial screenpage will be displayed:

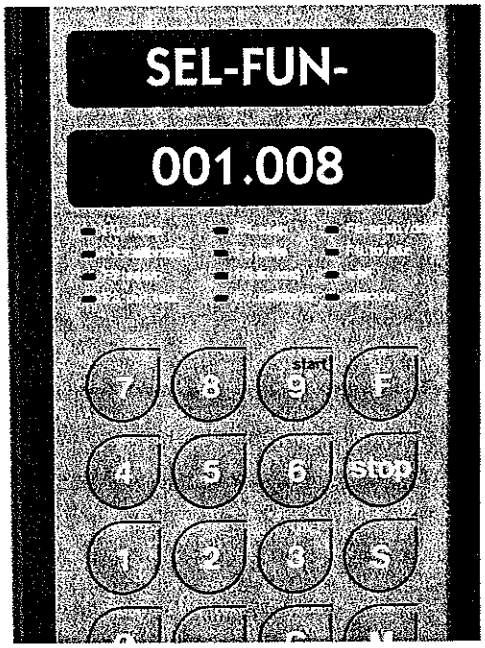
6.8 WEIGHER SET-UP

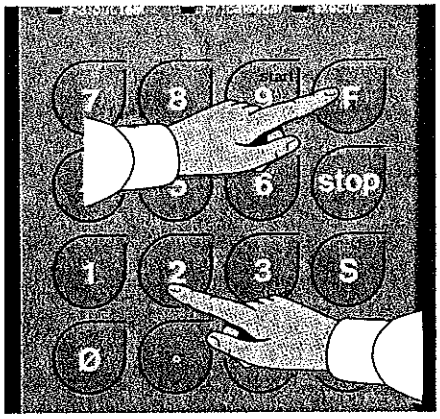
Please find below all of the steps of the weigher set-up procedure being necessary to set the parameters of one of the 20 available work programmes.

After switching on the TRIA 371 move the selector ESA from the AUT position to the MAN position;

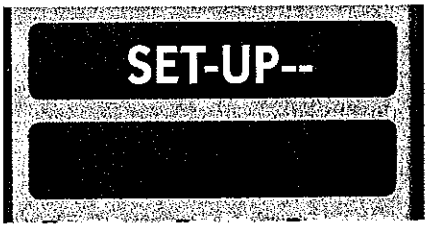


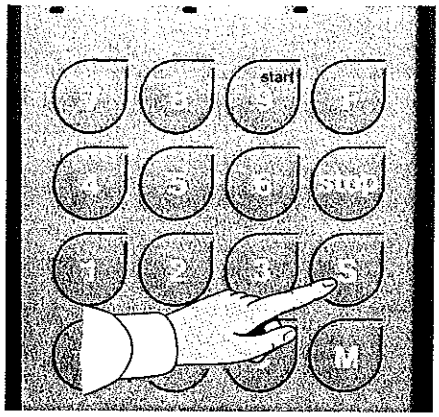
the initial screenpage will be displayed;





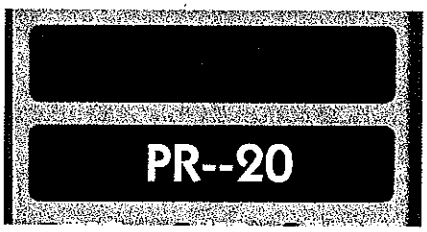
Stroke the "F" key and then the "2" key; the following screenpage will be displayed;

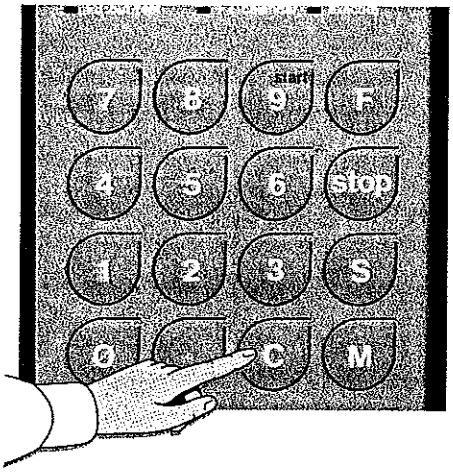




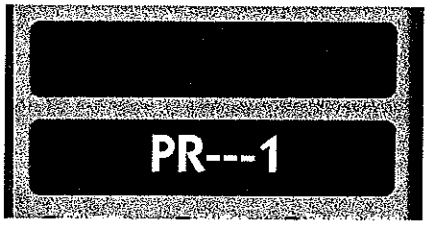
Stroke the "S" key; the screenpage aside will be displayed;

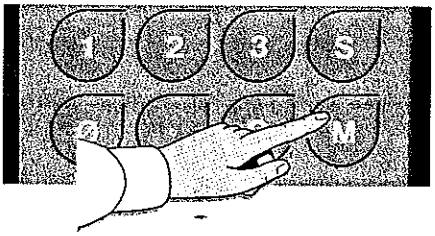
N.B.: a different value could be displayed.





Stroke the "C" key and keystroke the number of the programme to be modified or to be created, which can range from 0 to 20 (in this example the used programme number is "1"); the screenpage aside will be displayed;



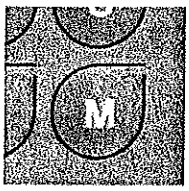


At this moment, after stroking the "M" key, it is possible to start setting up all of the parameters according to the table below.

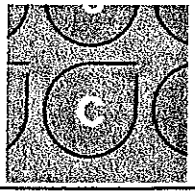
6.9 PARAMETERS SETUP TABLE

Please find listed in the table all the parameters that will be progressively displayed during the weigher set-up procedure

IN ORDER TO GO TO THE FOLLOWING PARAMETER ALWAYS STROKE THE "M" KEY

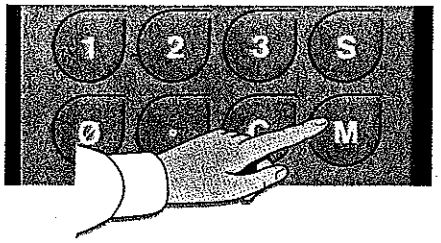


IN ORDER TO ERASE THE CURRENT VALUE AND ENTER A NEW VALUE ALWAYS STROKE THE "C" KEY



DESCRIPTION	VALUES TO BE SET-UP	PARAMETER
WORK CHANNEL	always stroke "1"	CH---1
WEIGHING SETTING	Keystroke the set value to be reached; for instance in order to set 50 kg it will be necessary to put in 5000 (——50.0, that is the kg whole value plus the tenths and hundredths).	S-5000
FINISHING MINIMUM TIME	It allows to work with finishing times that always exceed the set value. The value is expressed in tenths of a second; the value to be set usually is "30".	PF--30
GOAL MODIFICATION TOLERANCE	It is never displayed.	TO----
INITIAL POWDER FLIGHT	Value changing with the type of product; it ranges from 50 to 200. In this example the entered value is 180	SI-70
INITIAL PRESET *Gross weighing value*	It represents the real gross weighing value expressed in decigrams. For instance, if 50 kg weighings are to be processed,10 kg finishing are needed, hence the value to be entered will be obtained through the following subtraction: 50 -10=40 kg =4000 decigrams	PI4000
WEIGHING NUMBER PER PACKAGE	Always stroke "0"	NS---0
WEIGHING NUMBER PER PRINTOUT *N.B.: if it is displyed*	This value is to be set only if the printer is used; on the contrary it is not displayed.	SP---0
ALARM LOWER LIMIT *N.B.: if it is displyed*	In case the parameter is displayed it is necessary to set it to a value being lower than that of the "WEIGHING SETTING" parameter; for instance, if the parameter "WEIGHING SETTING" = 5000, the value that can be entered is "4980".	LI4980
ALARM HIGHER LIMIT *N.B.: if it is displyed*	In case the parameter is displayed it is necessary to set it to a value being higher than that of the "WEIGHING SETTING" parameter; for instance, if the parameter "WEIGHING SETTING" = 5000, the value that can be entered is "5020".	LS5020
NUMBER OF WEIGHINGS FOR SELF-TARING PER AUTOTARA	The value to be entered must range between 30 and 50 (for instance "40").	NA--40

DESCRIPTION	*VALUES TO BE SET-UP*	*PARAMETER*
DISCHARGING TIME	The value to be entered, expressed in tenths of a second, must range from 15 and 20 (for instance "17").	TA--17
NUMBER OF READINGS PER STEADY WEIGHT *N.B.: if it is displyed*	The set weight must always be "7"	OS---7
DELTA PER STEADY WEIGHT *N.B.: if it is displyed*	The set value must always be "2".	DS---2
TIMEOUT FOR END OF WEIGHING *N.B.: if it is displyed*	The value to be entered, expressed in tenths of a second, must range from 15 and 20 (for instance "17")	EP--18
FINISHING ONLY	Set "SF" = 0" if the double extraction is carried out or if the machine is operated at the double speed (usually for 20-25 kg weighing). Set "SF" = 1" if the slow extraction is carried out in stead (usually for 5-10 Kg weighing).	SF---0
GOALS ADJUSTMENT FREQUENCE	Always enter the "1" value.	FB---0
SHAKERS POWER	It is never displayed.	NN----
POWDER FLIGHT AND PRESET	Always stroke "0".	AA---0
RESIDUAL PRODUCT	The value to be entered must range from 200 and 300 (for instance "250")	RE-250



At this moment, after entering all of the parameters, stroke the "stop" key in order to bring TRIA back to its initial position.

If within a few seconds the "ERROR—" message is displayed, the parameters entering operation will have to be repeated because this means that a value exceeding the allowed limit has been entered.

ERROR---

6.10 DIAGNOSTIC AND ERRORS

TRIA provides for the detection of a certain quantity of errors while operating the weigher.
In case an error is generated the weigher passes to its standby status and an error code is created.
The detection (and the display) of certain errors can be altered by changing the "Confidental data" set-up.

The following errors are usually retrieved:

ERROR--1

Error due to Closed Hopper Imput Disabled

It can occur in the two cases below:
- The weigher container trapdoor gives
- Failure on the limit switch of the closed trapdoors

Check:
- the pressure in the circuit.
- the integrity of the closed trapdoors microswitch;
- possible giving in of the container and mainly of the cylinder.

ERROR--2

Tolerance error

ERROR--3

Slide error

ERROR--4

Stabilization error

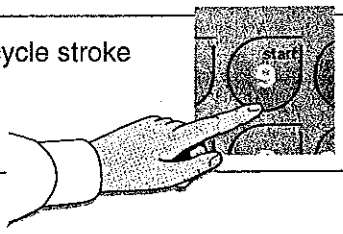
They can only be eliminated if they are enabled in the "CONFIDENTIAL DATA"
They usually are disabled

ERROR--5

Discharging error (it seldom occurs)

It occurs when the discharging cycle lasts more than the set time.

In order to restart the cycle stroke the "9" key:



ERROR--6

Overflow error

It occurs when the total weight exceeds the weigher capacity.

It is usually due to the presence of scales or deposits on the hopper.

Clean the hopper

It cal also be due to a wrong set-up;

Modify the set-up.

ERROR-10

Residual product error

An excessive quantity of residual product is sticking to the buckets and/or to the container walls.

Check if the container and/or the buckets are clean.

Mechanical giving in of the pneumatic cylinder or of the mechanical parts of the container.

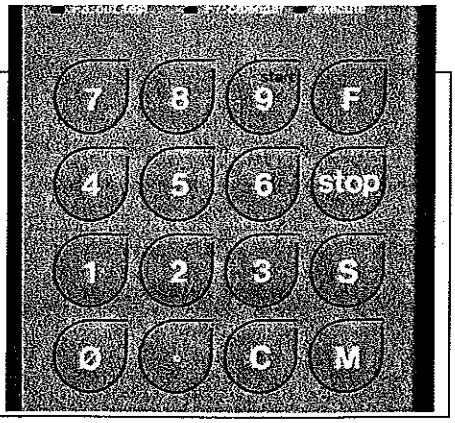
Check if some mechanical parts have given and, if this is the case, repair them.

ERROR-11

Goal error

The weigher does not manage to comply with the setting-up of the formulas (the programme)

Revise the formulas (the programmes) by entering the SET-UP mode by first stroking the "F" key and then the "2" key:



6.11 SUMMING UP TABLES

Please find below three tables summing up the parameters standard settings which are suitable to this kind of weigher.

The tables relate to three different weighings: 10 kg, 25kg and 50 kg.

10 KG WEIGHING SUMMING UP TABLE

AUTOMATIC CALIBRATION PARAMETERS	VALUE
Balance full scale	15
Empty hopper number of divisions	1000
Standard weight for calibration	5 kg
Full Scale	15.00

CALIBRATION PARAMETERS	VALUE
Balance Full Scale	10 kg

SET-UP PARAMETERS	VALUE
CH	1
S	10.00
PF	30
TO	-
SI	180
PI	08.00
NS	0
SP	-
LI	09.80
LS	10.20
NA	40
TA	15
OS	-
DS	-
EP	20
SF	-
FB	1
NN	-
AA	0
RE	250

25 KG WEIGHING SUMMING UP TABLE

AUTOMATIC CALIBRATION PARAMETERS	VALUE
Balance full scale	35
Empty hopper number of divisions	1000
Standard weight for calibration	5 kg
Full Scale	35.00

CALIBRATION PARAMETERS	VALUE
Balance Full Scale	25 kg

SET-UP PARAMETERS	VALUE
CH	1
S	25.00
PF	30
TO	-
SI	180
PI	20.00
NS	0
SP	-
LI	24.80
LS	25.20
NA	40
TA	15
OS	-
DS	-
EP	20
SF	-
FB	1
NN	-
AA	0
RE	250

50 KG WEIGHING SUMMING UP TABLE

AUTOMATIC CALIBRATION PARAMETERS	VALUE
Balance full scale	60
Empty hopper number of divisions	1000
Standard weight for calibration	10 kg
Full Scale	60.00

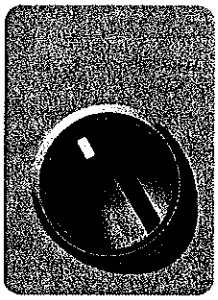
CALIBRATION PARAMETERS	VALUE
Balance Full Scale	50 kg

SET-UP PARAMETERS	VALUE
CH	1
S	50.00
PF	30
TO	-
SI	180
PI	40.00
NS	0
SP	-
LI	49.80
LS	50.20
NA	40
TA	17
OS	-
DS	-
EP	20
SF	0
FB	1
NN	-
AA	0
RE	250

6.12 ELECTRONICS'WEIGHING Push button panel

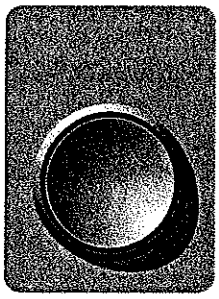
The machine further to the programming keyboard is also equipped with a series of electronic controls; these controls act on the following functions:

Weighing unit start ESC. / INC.:



It is a two-position selector.
If the qualifing weighing comand is in pos.of ESCLUSION (ESC.), the weighing machine is not qualified to the weighing cycle.
If the qualifing weighing comand is in pos.of INCLUSION (INC.), the weighing machine is planned to start the weighing cycle automatically.

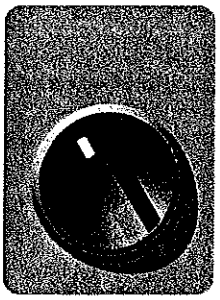
Weight ready / rest discharge:



It is a luminous push button.
When the weighing machine reaches the set weight, the lamp inside the push button lights up.It is a luminous sign indicating that the set weight is reached.

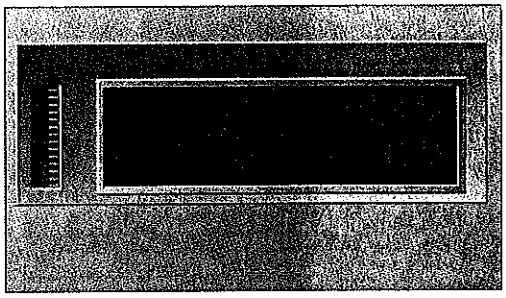
This push button is also usable to implement the unloading of rests.At the end of a productive cycle, or during the product's change, the quantity of product stocked inside the machine is different from the set one.Pushing this button it is ordered to the the weighing machine to unload the product.In this way it is simulated the comand "WEIGHT REACHING".

Weigher discharge ESC. / INC. :



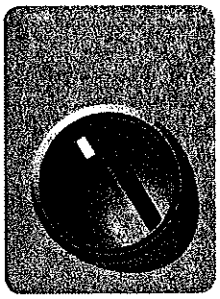
It is a two-position selector.
It is the comand that qualifies the weigh unloading implemented by the weighing machine.
If it is in position of ESCLUSION (ESC.), the weighing machine is not qualified to unload the weight.
If it is in position of INCLUSION (INC.), the weighing machine is qualified to unload the weight.

Tip - counter :



It is an electronic signal liquid crystal device implementing the progressive calculation of the weight made by the weighing machine. It serves to know the weight's quantity and, consequently, the sacks' quantity made in a fixed time.
It has a lateral reset push button to set at zero the calculation.

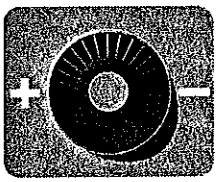
Level indicator ESC. / INC. :



It is a two-position selector.
If it is in the position of ESCLUSION,the weighing machine works without being coupled to the level indicator,and so it implements the weight even if the product level is under the indicator's level.
If it is in the position of INCLUSION, the weighing machine works being coupled with the level indicator,and implements a weight cycle,only if the product in the feed hopper is signalled by the level indicator.

Generally this selector is in the position of EXCLUSION when it is unloaded the melted product, that is even present in the weighing feed hopper).

Speed control potentiometer:



This comand operates on the inverter group.It regulates the delivery chute's speed of rotation or the strip's forward speed,in order to optimize weighing and sacking 's operations.

OPERATOR

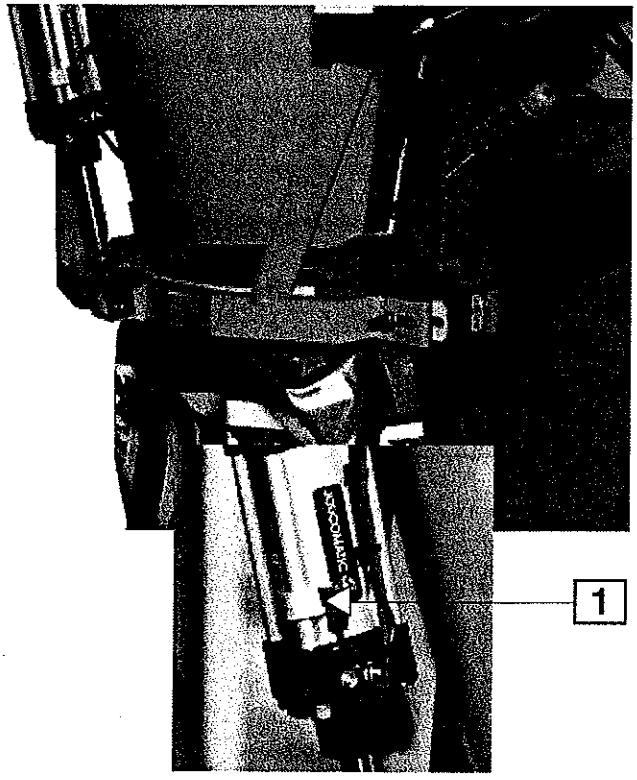
Section 5.B

USE OF THE FILLING SPOUT

5.B.1 MACHINE USE

The operator takes the empty bag manually and fits it into the spout, the operator's hands upper parts have to touch the two limit-switches with rubber rod that trigger the automatic closure of the the two bag clamping rolls. For safety reasons, the two rolls controlled by pneumatic cyclinders close only in case both the limit-switches are touched simultaneoulsy.

The pneumatic cylinder located in front of the operator houses a magnetic sensor equipped with red lamp. When rolls are closed, the lamp has to turn ON, to indicate that the filling spout is completely closed (FC CLOSED SPOUT) and the weigher can start weighing.



If the lamp of the magnetic limit-switch does not turn ON, there are two possible reasons :

1) Magnetic sensor (1) shorted (quite impossible since such sensor is multivoltage from 24 to 250 Volts).

2) Magnetic sensor (1) wrongly positioned. Indeed, the plastic element of this sensor, opposing the position of the red lamp, has to be in contact with the cylinder round part.

Act on the clamping screws, slightly shift the sensor, which has to remain in contact with the cylinder, up or down until the red lamp turns ON.

MAINTENANCE

PART V

MAINTENANCE INSTRUCTION

All maintenance must be carried out by skilled or specialized personnel.

All maintenance engineers must strictly adhere to accident prevention regulations and wear protective clothing. For details please refer to paragraph "GENERAL SAFETY PRECAUTIONS" in chapter one "INTRODUCTION" of this manual.

When the machine is being serviced the sign **"WARNING! MACHINE BEING SERVICED"** must be hung on the mushroom-head emergency push button.

In addition, the machine must be put into EMERGENCY MODE by pressing the mushroom-head push button on the general control panel which has a key.
Once the button has been pressed, the Head Maintenance Engineer will remove the safety key and keep it in his possession.

WARNING! THE SAFETY KEY must only be kept by the HEAD MAINTENANCE ENGINEER and/or a person acting on his express authority.

After servicing, the machine will be started up by the HEAD MAINTENANCE ENGINEER only, after having completed all the preliminary controls required.

MAINTENANCE OF THE MACHINE PARTS

All the machine's parts require perodical maintenance work and/or inspection. We have, therefore, drawn up the following table showing the intervals at which the various operations should be carried out.

We recommend that you photocopy pages 5.2 - 5.3 - 5.4, and that you record the date of the machine was last serviced together and the date the next one is due, signed by the maintenance engineer who carried out the operation.

By gathering this type of information, it should become easier to pinpoint the reasons why the machine breaks down.

MECHANICAL PARTS

PART / OPERATION	*Frequency*	Date of last inspection / Date of next inspection	Maintenance engineer's details / Signature
ROLLERSER			
CHECK WEAR	*EVERY 90 DAYS*		
LUBRICATE THE ROLLER SUPPORTS FITTED WITH GREASERS	*EVERY 7 DAYS*		
SUPPORTS			
CHECK WEAR	*EVERY 90 DAYS*		
LUBRICATE THE SUPPORTS FITTED WITH GREASERS	*EVERY 15 DAYS*		
CHAINS			
LUBRICATE	*EVERY 7 DAYS*		
CHECK TENSIONING	*EVERY 15 DAYS*		
CHECK WEAR	*EVERY 90 DAYS*		
BELTS			
CHECK TENSIONING	*EVERY 30 DAYS*		
CHECK WEAR	*EVERY 90 DAYS*		
CONVEYOR BELTS			
CHECK TENSIONING AND CENTRING WITH RESPECT TO THE ERS TIGHTENING THEM	*EVERY 30 DAYS*		
CHECK WEAR	*EVERY 90 DAYS*		
EXPANDING PULLEYS			
GREASE	*EVERY 30 DAYS*		
GEARS			
LUBRICATE	*EVERY 7 DAYS*		
CHAIN-PINION-CHAIN TIGHTENER GUIDE			
CHECK WEAR	*EVERY 90 DAYS*		
KEYS AND SECURITY DOWEL			
CHECK THE DOWEL TIGHTENING AND THE CLEARANCE OF THE PIECES FIXED BY MEANS OF KEYS	*EVERY 30 DAYS*		

PART / OPERATION	*Frequency*	date of last inspection / Date of next inspection	Maintenance engineer's details / Signature
REDUCTION GEARS			
OIL CHANGING (IF FITTED WITH BLOW-OFF PLUG)	*EVERY 3000 HOURS*		

ELECTRICAL PARTS

PART / OPERATION	Frequency	date of last inspection / Date of next inspection	Maintenance engineer's details / Signature
LIMIT SWITCHES (Microswitches)			
CHECK ELECTRICAL FUNCTIONING	*EVERY 90 DAYS*		
CHECK WEAR OF THE TRIGGERING DEVICE	*EVERY 30 DAYS*		
CHECK FOR CORRECT WORKING POSITION	*EVERY 30 DAYS*		
PHOTOCELLS			
CHECK THAT THE PROJECTOR IS CENTRED WITH RESPECT TO THE RECEIVER OR THE REFLEX REFLECTOR	*EVERY 7 DAYS*		
REMOVE DUST FROM RECEIVER AND REFLEX REFLECTOR	*EVERY 7 DAYS*		
SOLENOID VALVES			
CHECK TRIGGERING OF THE SOLENOID VALVE	*EVERY 30 DAYS*		
SELF-BRAKING MOTORS			
CLEAN THE BRAKING SYSTEM (WITH COMPRESSED AIR)	*EVERY 30 DAYS*		
CHECK THE WEAR OF THE BRAKE AND RESTORE THE MINIMUM CLEARANCE AMONG THE DRAGGING ELEMENTS OF THE BRAKE	*EVERY 30 DAYS*		
TERMINAL BOARDS			
CHECK TIGHTENING OF THE TERMINAL BOARD SCREWS	*EVERY 60 DAYS*		

PNEUMATIC PARTS

PART OPERATION	*Frequency*	Date of last inspection Date of next inspection	
FILTER-REDUCER-LUBRICATOR ASSEMBLY			
CHECK THAT THE OIL LEVEL INSIDE THE LUBRICATOR IS CORRECT	*EVERY 7 DAYS*		
CHECK THE DRIPPING FREQUENCY OF THE AIR LUBRICATING OIL DROPS (1 DROP EVERY 10 SECONDS)	*EVERY 7 DAYS*		
DRAIN THE CONDENSATION FROM THE AIR FILTER BOWL	*EVERY 7 DAYS*		
WASH THE OIL AND FILTER BOWLS WITH SOAPY WATER	*EVERY 90 DAYS*		
CLEAN THE INTERNAL FILTER WITH COMPRESSED AIR	*EVERY 90 DAYS*		
CYLINDER AND VALVE GASKETS			
REPLACE GASKETS	*EVERY 90 DAYS*		
CHECK FOR LEAKS IN THE PIPESI	*EVERY 30 DAYS*		
CHECK THAT THE VALVE DRAIN HOLES ARE NOT BLOCKED	*EVERY 7 DAYSI*		

DISASSEMBLY OF PARTS

We are now going to study in detail how to disassemble the parts which require this operation most often during the working life of the machine.

MECHANICAL PARTS

- Bearings
- Pinions
- Supports
- Chains and chain tighteners
- Coaxial gear motors
- Conical assembling elements

ELECTRICAL PARTS

- Photocells
- Proximity microswitches
- Lever microswitch

PNEUMATIC COMPONENTS

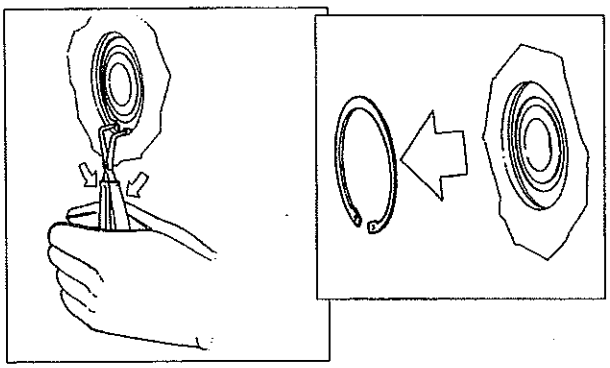
- Cylinders
- Air connections
- Solenoid valves

BEARINGS

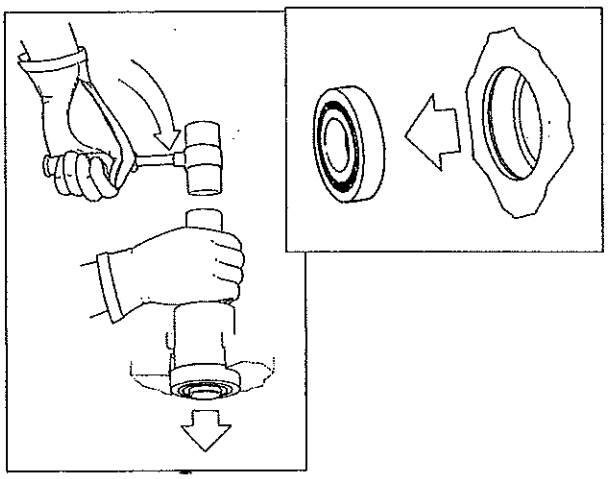
All of the bearings are sealed and do not require lubrication.
Since these parts are subject to heavy stress, they eventually wear out and require replacing.
To replace them, follow the instructions below.

Incorrect installation can damage this part, even before the machine is started up.

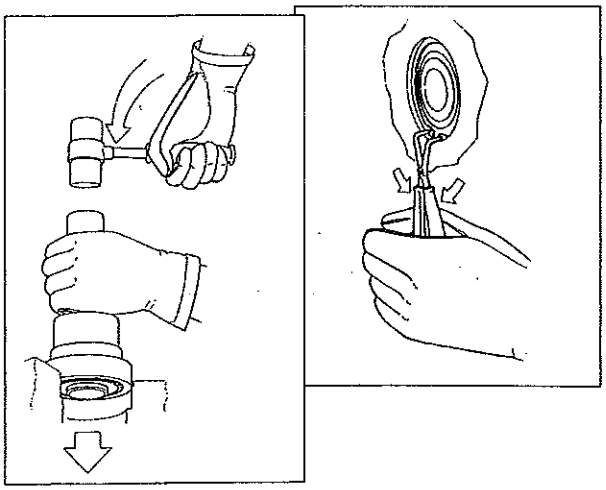
REPLACEMENT OF THE BEARINGS



Using the pincers provided, remove the snap ring from its groove in the housing of the bearing.



After removing the snap ring, proceed to disassemble the bearing, being extremely careful not to damage the housing of the component.
An extractor will be necessary to carry out this operation.
Put the extractor into position, first ensuring that the diameter of the tool is 2 mm narrower than the diameter of the bearing; then strike the extractor tool with a rubber hammer.
The bearing with come out of its housing.



In order to fit the bearing, you must:
1. Position the bearing in the housing.
2. By means of the same tool used for extracting the bearing and the rubber hammer, fit the bearing in the housing.

When fitting the bearing in its housing, ensure that the tool being used to install it is exactly perpendicular to the bearing.

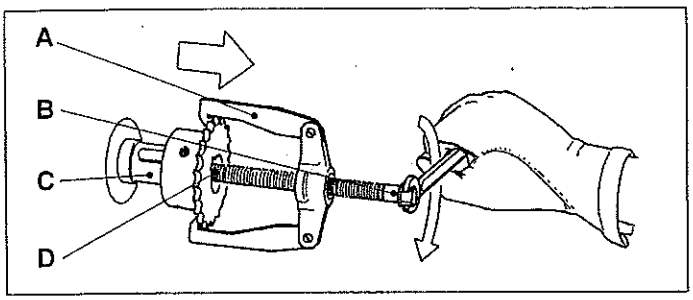
Striking in an uneven manner could cause irreparable damage to the bearing.

PINIONS

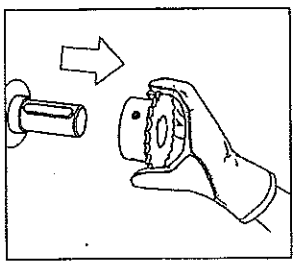
The pinions are parts which enable transmission of motion from the gear motors to the components and, given their function, they have to be periodically checked for wear and tear. During the servicing and/or inspection of the condition of the pinions, they might require to be replaced.
It is important to know that the pinions may be fitted in two ways:
The first system consists of joining the pinion to the pin by means of a key, and the second by means of a conical assembling element..
To disassemble, follow the instructions below.

REPLACE PINIONS

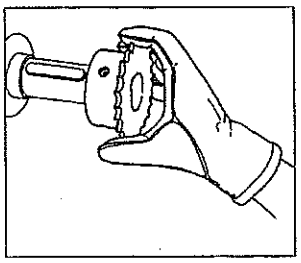
(Doubling with cotter)



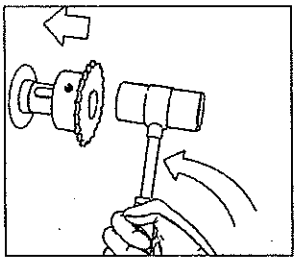
Loosen the security dowels, but without removing them completely. Then insert the extractor checking first that: the front head of the screw "**D**" is perfectly straight with respect to the pin "**C**" and that the gripping jaws have got a good hold on the crown of the pinion to be extracted. Finally we can proceed to the extraction of the pinion by turning the back head "**B**" of the extractor with a spanner.



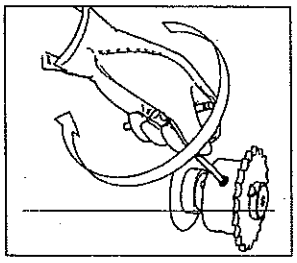
To prevent the pinion from falling to the ground, carry out the last part of the extraction operation manually.



If, on checking the condition of the key it is found to be worn, it must be replaced. To do so, position the the pinion on the pin without forcing it in, and ensure that the groove of the key is correctly positioned in the hub..



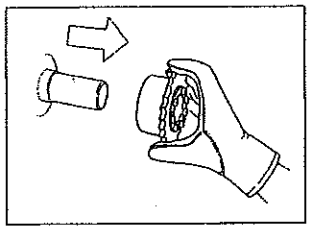
With a rubber hammer strike the hub with light, continuous strokes all round its circumference, ensuring that the pinion is always perfectly perpendicular to the pin.



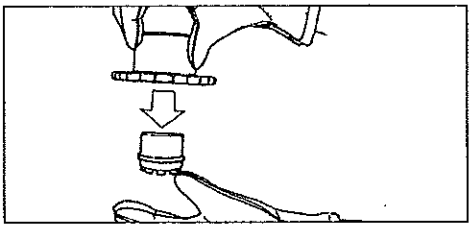
Once the pinion has been positioned on the pin at the required point, fit the security dowels and tighten them well using the appropriate key.

REPLACEMENT OF PINIONS

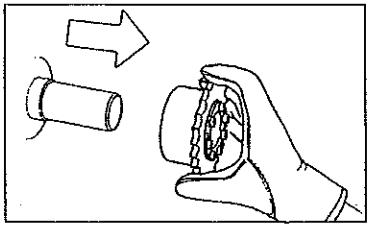
(coupling with conical assembling element)



Extract the pinion and the conical assembling element from the pin. This can be done without using tools.



Then remove the conical assembling element from the pinion, by simply turning the pinion upside down. Replace the pinion and insert the conical assembling element in the new part.

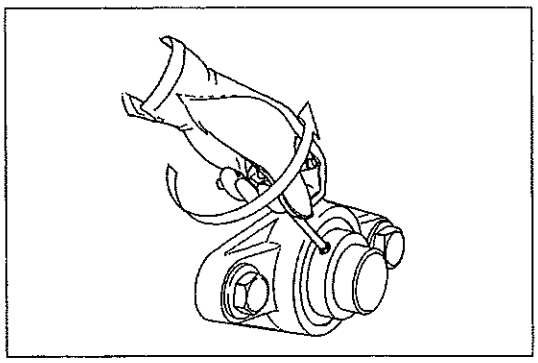


Now refit the pinion complete with conical assembling element onto the pin, adjusting until it moves into its previous working position.

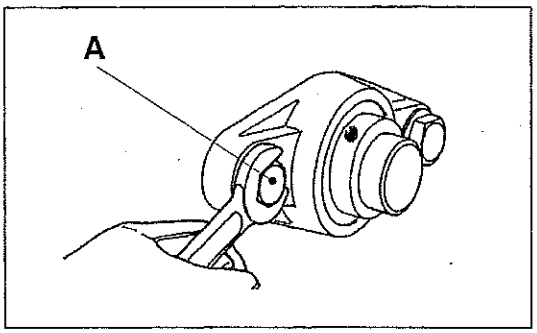
SOPPORT

During servicing and/or inspection of the condition of the supports, it might be found to be necessary to replace them.
To do so, follow the instructions below.

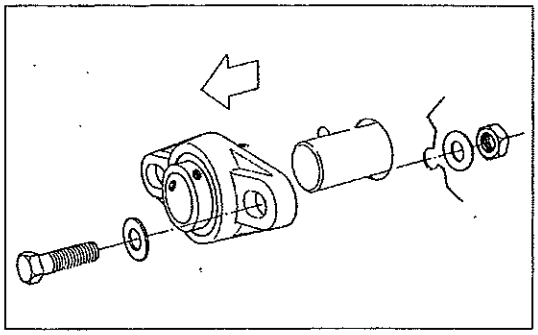
REPLACEMENT OF SUPPORTS



Loosen the security dowels without removing them completely.



Then loosen the screws "A".



Finally, after having taken the screws out, remove the support from the pin.

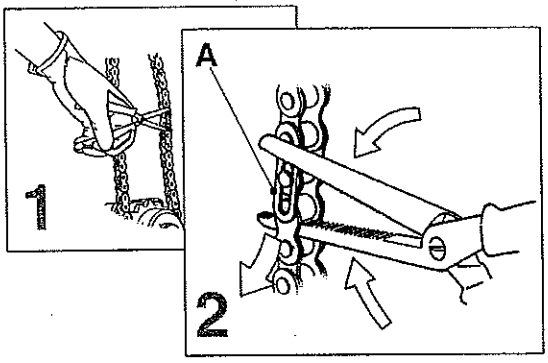
To fit the new support, follow the same steps in reverse order.

The diagrams on this page show a support with two holes. In actual fact, on the machine there are various types of support (with four holes and with feet). The disassembling method does not, however, change and is carried out as illustrated above.

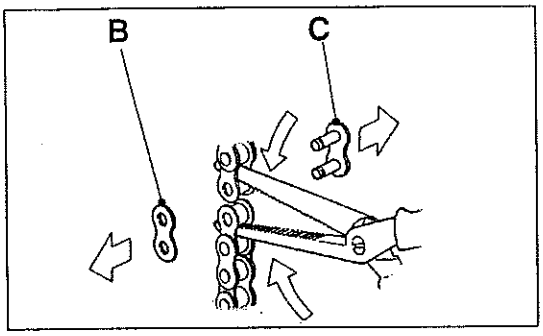
CHAINS AND CHAIN TIGHTENERS

During servicing and/or inspection of the condition of the parts, it might be found necessary to replace them. To do so, follow the illustrated instructions below.

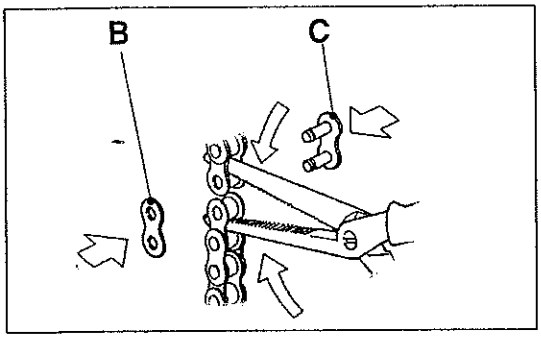
DISASSEMBLING THE CHAINS



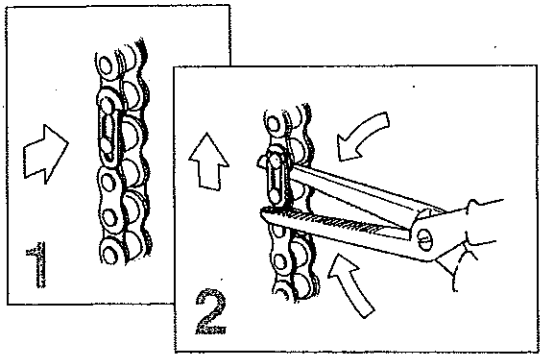
After loosening off the chain by adjusting the tightening pulley, look for a connecting link. Once this component has been singled out, remove the fork "A" securing it.
To do so use pincers, using their blades for leverage between upper part of the fork and a pin of the chain, as shown in the diagram.



Using the pincers, bring the chain as near as possible so that it unhooks from the connection link. Then, without relaxing the grip of the pincers, remove link "B" from the two pins of the counter-link "C", thus freeing the chain.

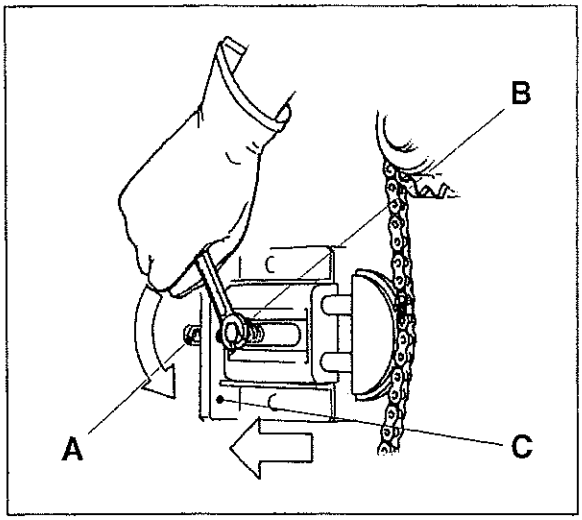


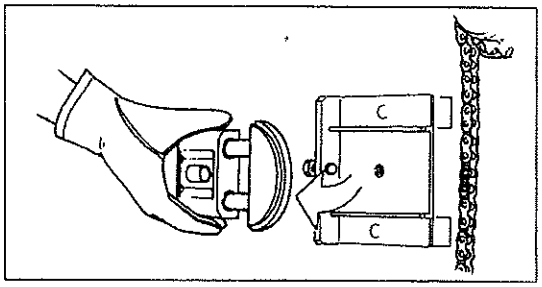
Once the chain has been replaced, the connection link must be re-assembled.
Do to so, follow the procedure illustrated in the diagrams:
Bring the parts of the chain to be joined near to one another using fine-bladed pincers.
Put on the counter-link "C" and secure it by hooking link "B" onto the appropriate pins.
Remove the pincers from the chain..



Let's now proceed to insert the securing fork "A" onto the connecting link, using pincers for leverage between the lower part of the fork and a pin of the chain as shown in the diagram.
Once the chain has been secured, it can then be tightened.

DISASSEMBLING THE CHAIN TIGHTENERS



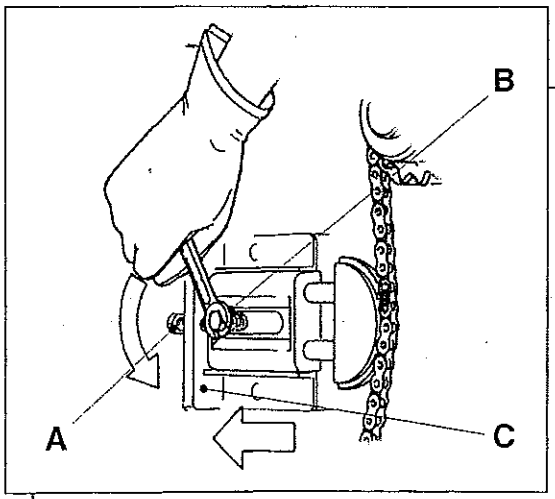


Before disassembling the chain tighteners, loosen the screw "**A**" on the back plate "**C**", and then slightly loosen the fastening screw "**B**" of the chain tighteners.
Immediately on loosening, the chain tightener will tend to move towards the plate "**C**", and when eventually the tightener no longer holds the chain taut, we can continue unloosening screw "**B**", and then remove the tightener from its housing.

To re-assemble the chain tighteners, follow the same steps in reverse order, taking care:

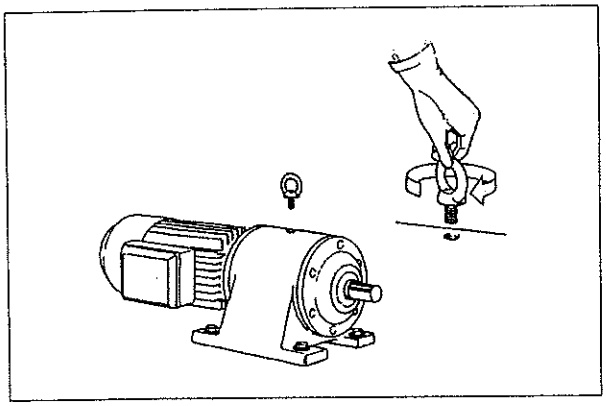
TO CLEAN THE CHAIN TIGHTENER GUIDES CAREFULLY.
THAT ALL SIDES OF THE TIGHTENER ARE LYING AGAINST THEIR RESPECTIVE METAL SHEET STRIKERS.
THAT THE CHAIN TIGHTENER SPRINGS HAVE ENOUGH CLEARANCE (so that the chains, when stretched, still move normally)

CHECKING THE TENSIONING OF THE CHAIN

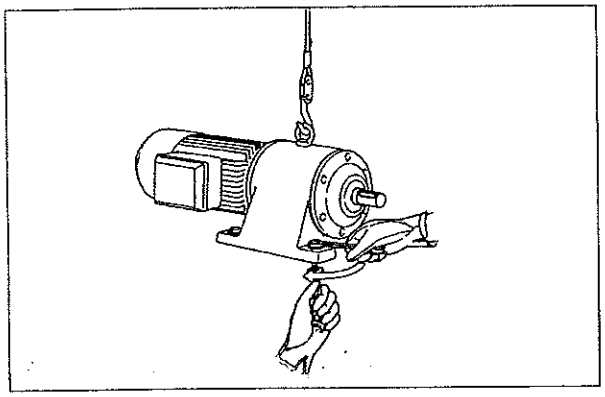


WARNING:
For this important driving component to work correctly and last well, correct tensioning of the chains is of fundamental importance.
The tighteners must, therefore, be periodically checked and must hold the chain in such a way as to allow it a normal degree of elasticity (we recommend a range from 6 to 8 mm.); this movement is determined by the springs inside the tightener itself which must not be compressed.
Using screw "A", with screw "B" loosened, we can either draw the tightener nearer to or distance it from the chain axis, until the required degree of elastic tensioning has been obtained.

COAXIAL GEAR MOTORS

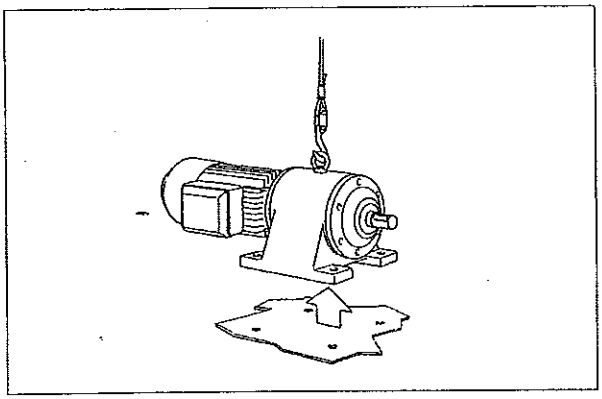


Before embarking upon any type of operation, first check that the reduction gear is equipped with the special coupling eyebolt. If this is missing, fit it into its threaded housing, which is usually on the upper part of the casting.



To remove the reduction gear from its housing, proceed as follows:

1 attach the hook of the hoisting cable to the ring of the eyebolt
2 next loosen the fastening screws on the foot of the reduction gear, using an appropriate spanner.



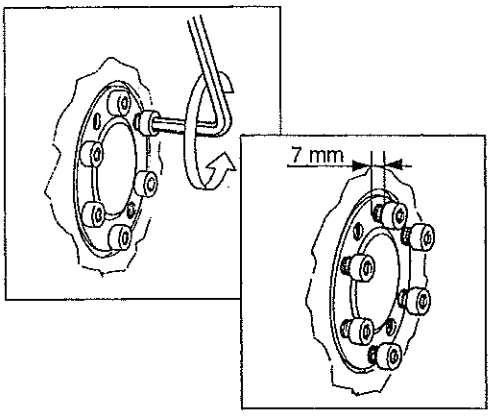
Now remove the fastening screws by withdrawing them completely from their holes in the base of the reduction gear block. Then raise the whole block and replace it.

To re-assemble follow the above steps in reverse order.

WARNING!

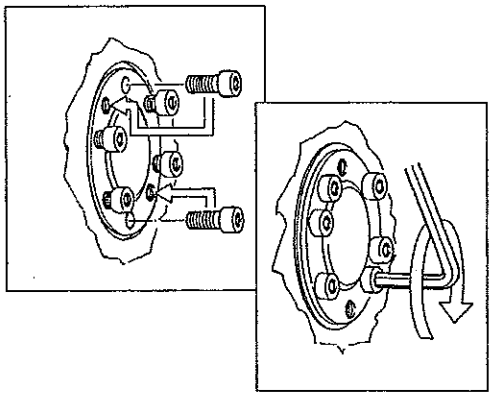
Never lift the gear motors using mere physical strength. Always use suitable lifting equipment.

CONICAL ASSEMBLING ELEMENTS



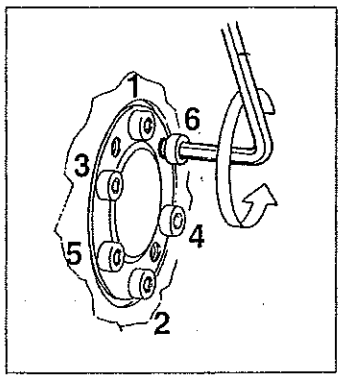
Using a setscrew wrench completely loosen the fastening screws on the external ring of the conical assembling element.

To carry out this operation properly, pay attention to the distance between the heads of the loosened screws and the front surface of the conical assembling element, which should not be less than 7 mm.



Togliere completamente alcune viti, tante quante sono i fori di estrazione filettati previsti sulla flangia dell'anello interno.

Serrare quindi, le viti di estrazione a intervalli di un giro di chiave per ciascuna, seguendo uno schema a croce, fino ad ottenere lo sbloccaggio completo del calettatore.



In order to re-assemble, follow these indications:

1 Oil the conical assembling element
Do not use Molybdenum Disulphide

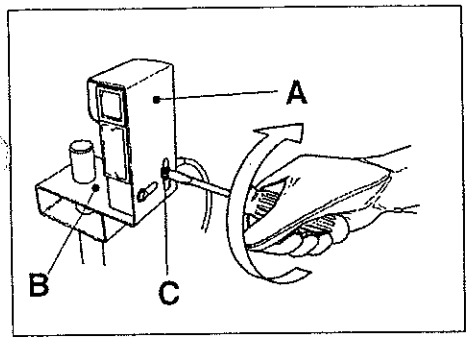
2 Insert the conical assembling element in its housing and tighten the screws slightly. Then carefully position the hub axially.

3 Start tightening the screws uniformly in a crossed pattern.

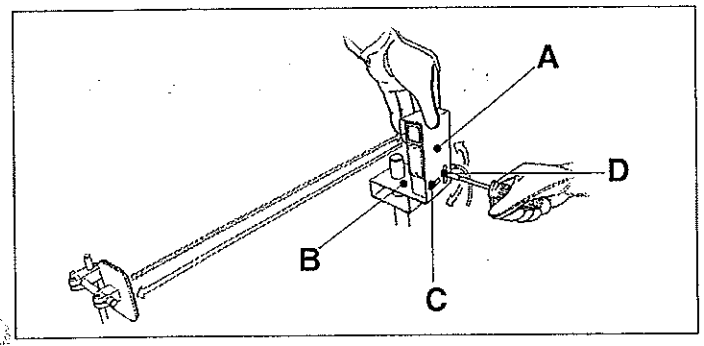
4 Check the driving torque MA and check all the screws one by one.

PHOTOCELLS

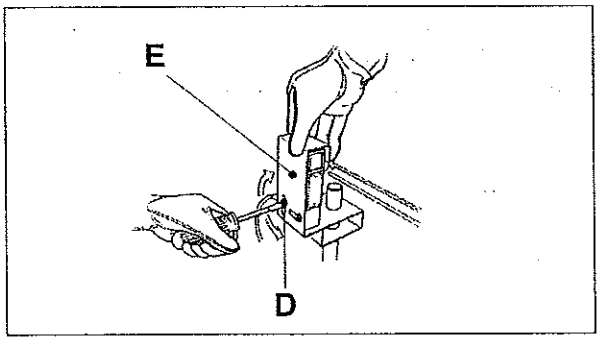
Proceed with caution when handling these components as they contain sophisticated electronic equipment.



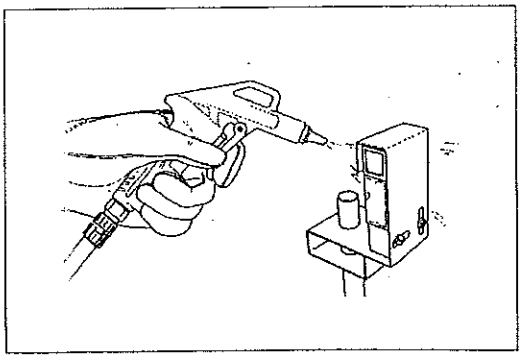
To disassemble and replace the photocells, proceed as follows:
Unscrew the two screws "C" in the lower part of the photocell "B" base with a screw-driver.
Remove the fastening screws completely, separating photocell "A" from support "B".



To re-assemble the photocell unit correctly, follow the directions below with due care and attention.
Fit photocell "A" back onto its special support "B" securing it with the front screw "C" alone:
Then, using the back screw "D", align the optics of transmitter "A" to its own reflector or, if different, to its own receiver.



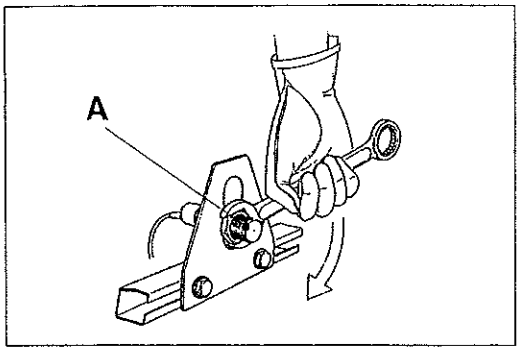
In order to assemble receiving unit "E", follow the same procedure used to assemble transmitter "A". Ensure that the two optics are well-aligned.
This adjustment must be carried out by means of the screw "D".
The alignment of transmitter photocell "A" with the receiver photocell "E" is correct when the red LED above the instrument goes out.

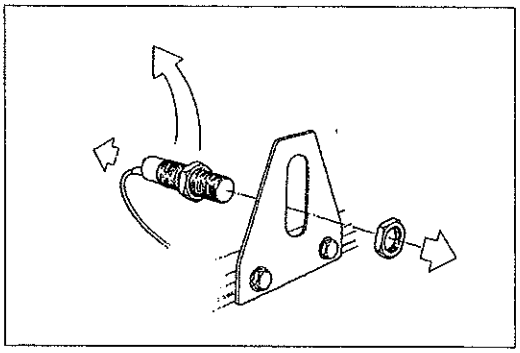


In order to ensure that these components work correctly, they must be perfectly clean. They should, therefore, be cleaned at regular intervals to remove any dirt or dust from the optics of the photocell, using a jet of compressed air or a clean cloth.

PROXIMITY MICROSWITCH

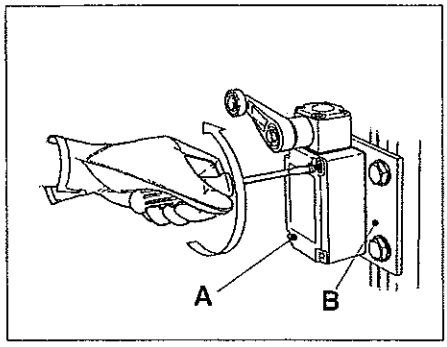
To disassemble and replace the proximity sensors proceed as follows:

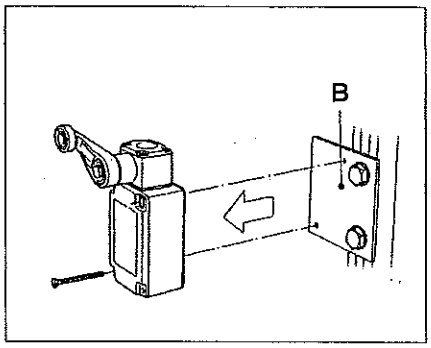




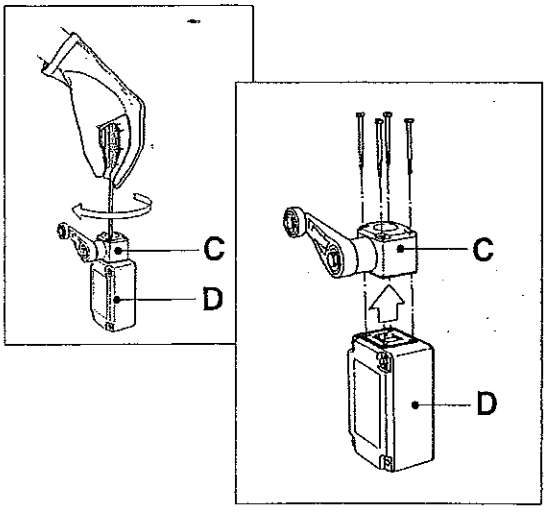
First of all loosen the check nut in the front part of the sensor "**A**", then unscrew the locking nut completely from the front part of the sensor. The sensor may now be extracted from its support.
Replace the sensor by following the above operations in reverse order, taking care to re-align it correctly, lining up the slot in its support with the cam on the moving part of the machine.

LEVER MICROSWITCH





To disassemble a microswitch, proceed as follows:
Loosen the fastening screws "**A**" of the microswitch from their support "**B**", using a screw-driver.
Completely remove the fastening screws of the microswitch, and remove the microswitch completely from the adjustable supporting bracket "**B**". Then proceed to replace it.



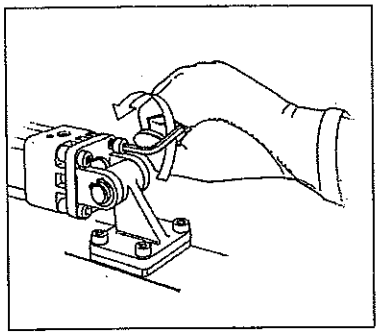
If only the head of the microswitch requires replacing, unscrew the four screws securing the head "**C**" to the central block "**D**" with a screwdriver.
Next, remove the fastening screws completely and extract the head "**C**" from the block "**D**".
Then proceed to replace it.

PNEUMATIC CYLINDERS

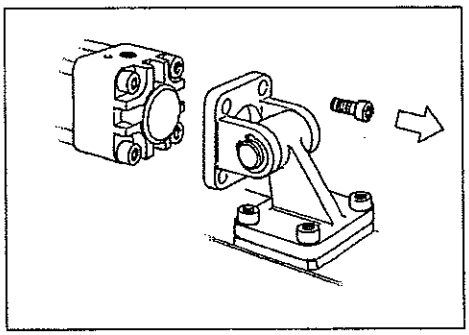
The pneumatic cylinders are accompanied by several accessories, which vary according to the function that the pneumatic component has to carry out and how it is assembled.
We shall analyse below the various types of operations required when disassembling the various systems.

REPLACING THE PNEUMATIC CYLINDERS AND THEIR ACCESSORIES

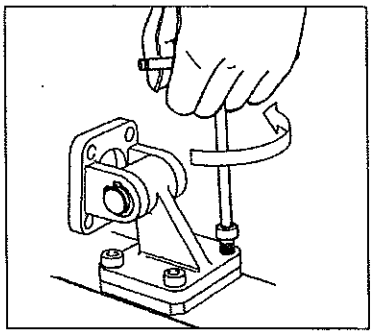
REAR HINGE



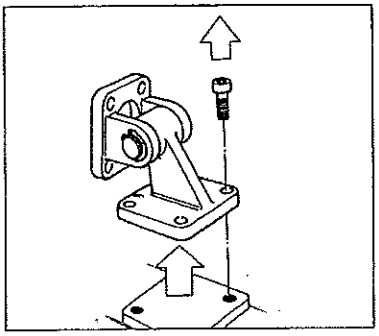
Use a spanner to loosen the fastening screws in the upper part of the hinge block, coupled to the rear head of the pneumatic cylinder.



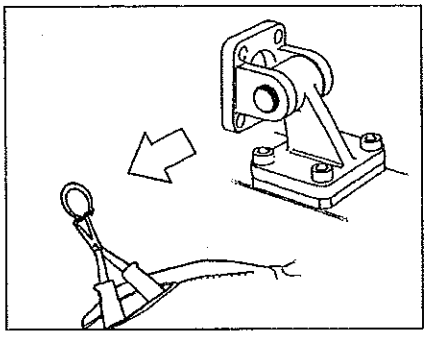
Then, separate the rear head of the cylinder from the rear hinge. In order to assemble the cylinder on the rear head, follow the same steps in reverse order.



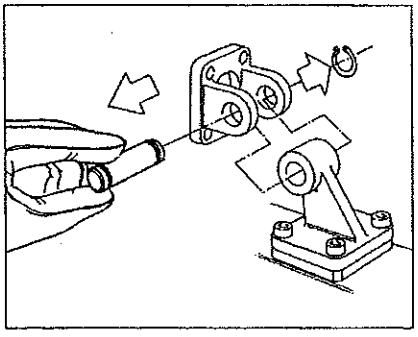
Loosen the four fastening screws on the lower base with a spanner.



Take out the fastening screws from the lower base removing it and, if damaged, replace it completely.



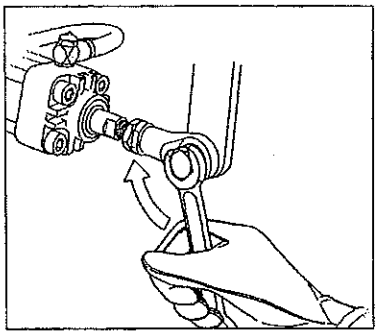
In order to separate the two components that make up the assembly of the rear hinge, proceed as follows.
Remove one of the two retaining rings blocking the central pin with a pair of pincers.



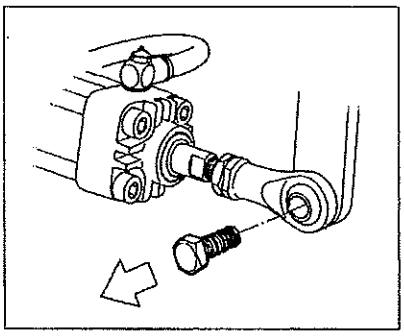
Then remove the central pin, extracting it completely from its housing thus separating the two components. Once they have been separated it is possible, if they are damaged, to replace them individually. To re-assemble, follow the same steps in reverse order.

FRONT HINGE

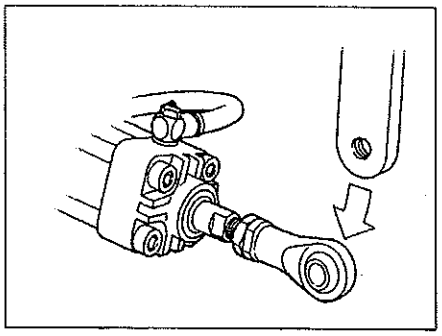
(With ball and socket joint)

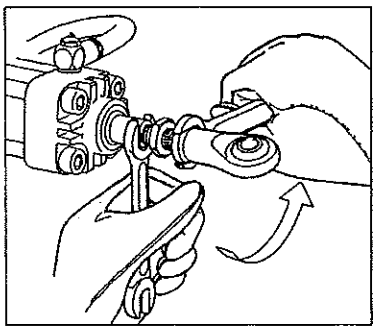


Use a suitable spanner to loosen the fastening screw found on the head of the ball joint.

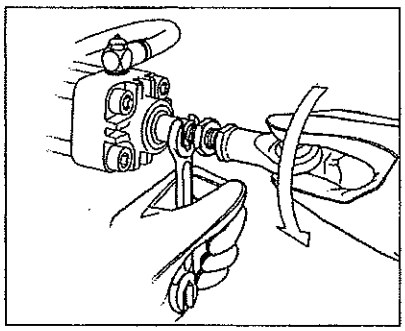


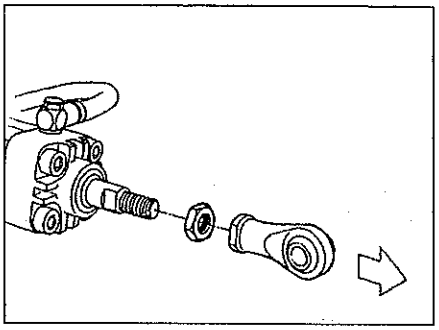
Use a suitable spanner to loosen the fastening screw found on the head of the ball joint.





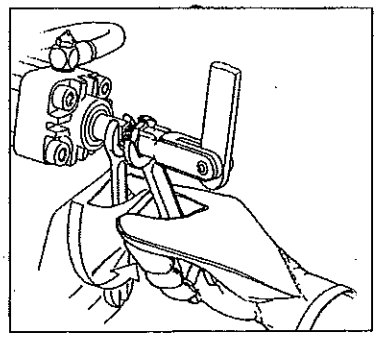
After loosening the counternut of the ball and socket joint, unscrew the ball joint from the stem of the cylinder.



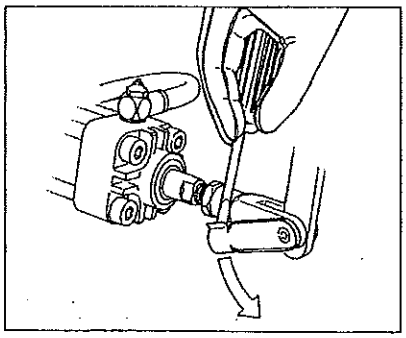


Now the ball and socket joint is no longer connected to the pneumatic cylinder.

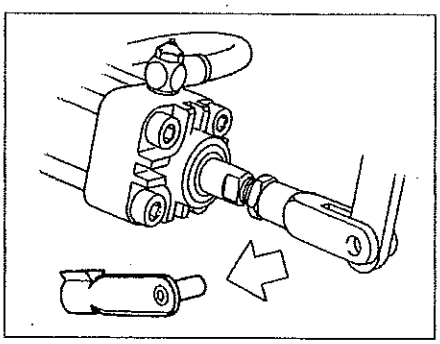
(Using a fork)

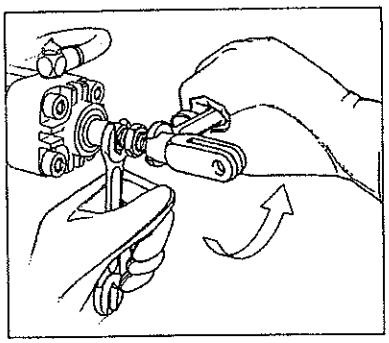


Using suitable spanners, loosen the lock nut which secures the fork and is located on the cylinder stem.

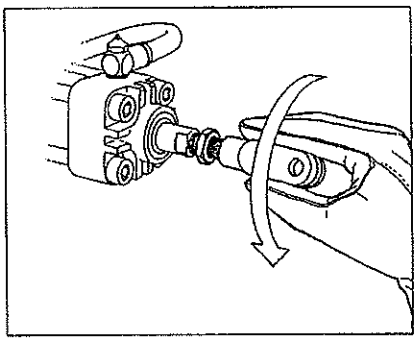


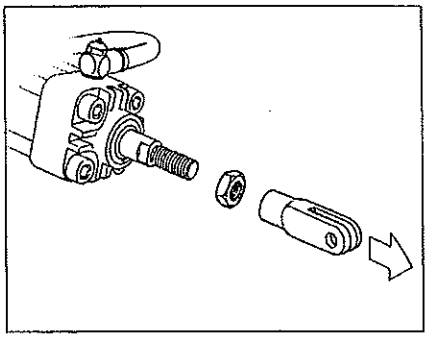
With the help of a screwdriver, release the clamping pin which holds the fork and the lever together; then remove the pin, taking care to support the cylinder with your hand.





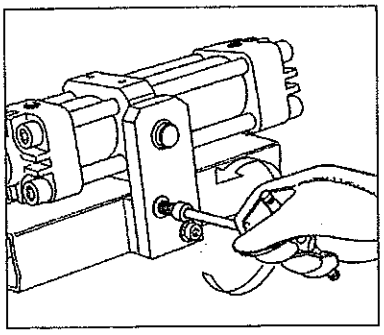
After loosening the lock nut of the fork, unscrew the fork from the cylinder stem.



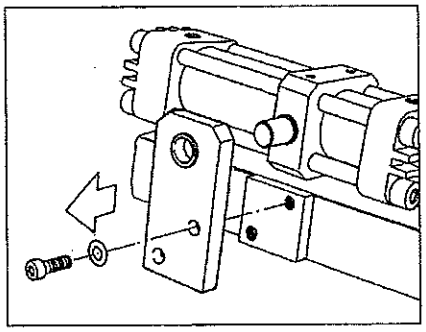


Now the fork is no longer connected to the pneumatic cylinder.

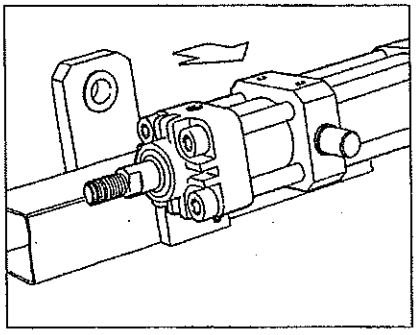
(With central connection)

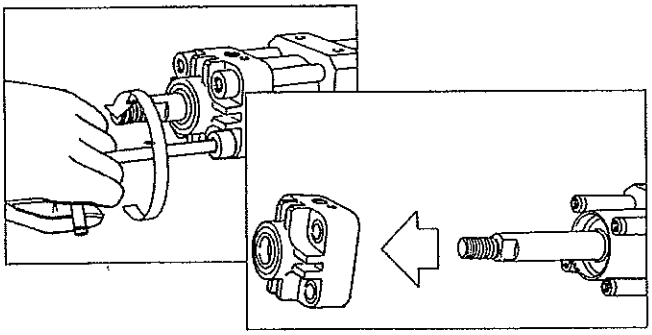


Loosen the screws of the lateral support.

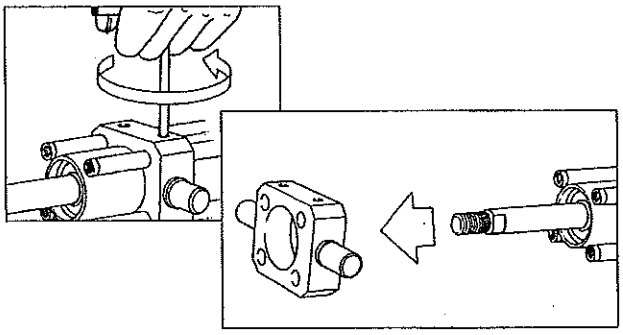


Remove the screws and the pneumatic cylinder.





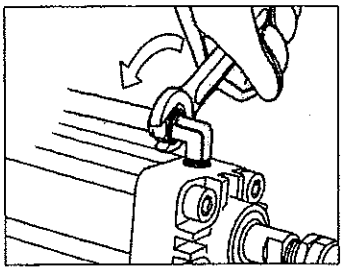
Loosen the screws of the front head, then extract it from its housing taking care to cover the internal part of the pneumatic cylinder with a cloth in order to protect it from dirt.



Then, loosen the dowels securing the front fork and remove it. To re-assemble the fork, follow the same steps in reverse order.

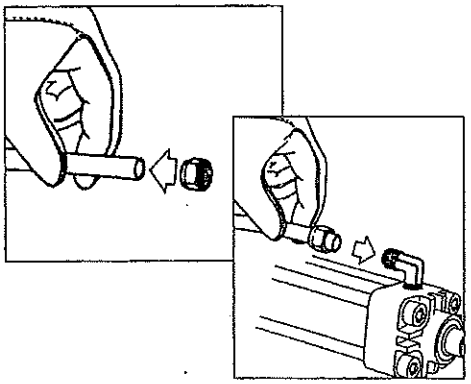
AIR CONNECTIONS

(With ring nut coupling)



Before disassembling the cylinder, the air infeed tubes must be removed, as follows:

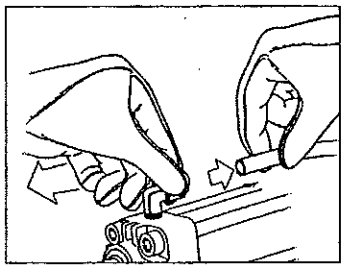
Using a spanner, unscrew the ring nut connecting the pipe fitting.



Then, remove the ring nut from the air tube. Carry out the required maintenance and/or replacement operations, then:

1 = Fit the ring nut on the air tube
2 = Fit the tube into the pipe fitting
3 = Screw the coupling ring nut

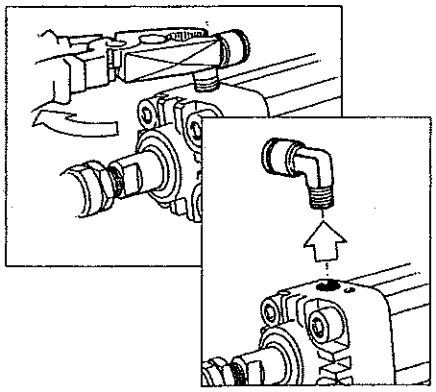
(Rapid connection)



Before disassembling the cylinder, the air infeed tubes must be removed, as follows:

Hold the upper head of the pipe fitting between your fingers and press the front ring inwards towards the inside of the pipe fitting.
At the same time, extract the air tube from the head of the pipe fitting with your other hand.

Remember: only remove your fingers from the ring of the head after the air infeed tube has been completely extracted.



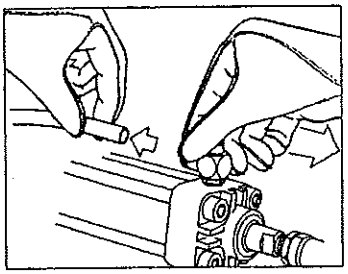
Once you have extracted the delivery tube from the pipe fitting, loosen the pipe fitting with a pair of pincers, taking care not to overforce the pipe fitting.

Take great care not to allow any type of dirt to enter the uncovered threaded hole on the head of the cylinder, as this could affect the performance of the component. (It is a good idea to run a clean cloth through the inlet holes).

When re-assembling, follow the above operations in reverse order and, before proceeding, line the threading of the pipe fitting with the special air-tight tape.

(With ring nut coupling and flow adjuster)

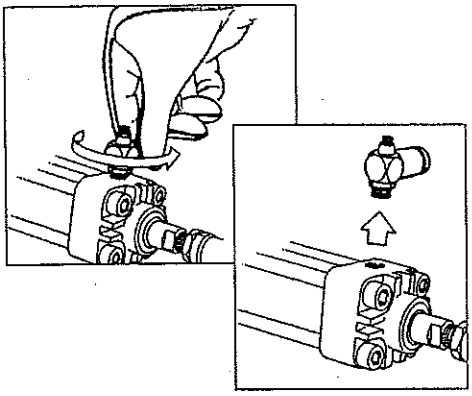
There is also a coupling system complete with flow adjuster, in which case disassembly should be carried out as follows:



Before proceeding with disassembly and/or servicing of the cylinder, remove the air infeed tubes as follows:

Hold the upper end of the pipe fitting between your fingers and press the front ring inwards towards the inside of the pipe fitting.
At the same time extract the air tube from the head of the pipe fitting with your other hand.

Remember: only remove your fingers from the ring of the head after the infeed tube has been completely extracted.



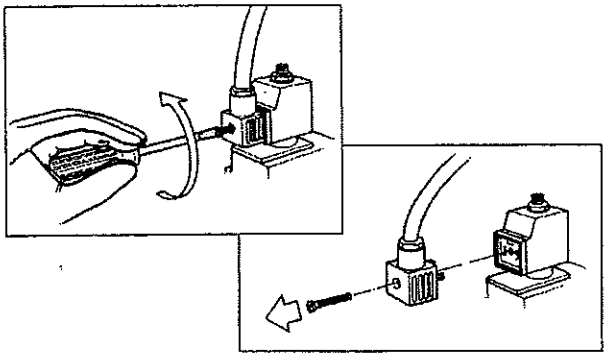
If the pipe fitting requires to be replaced, proceed as follows:
once you have extracted the delivery tube from the pipe fitting, loosen the pipe fitting with a spanner, then remove the pipe fitting completely from the head of the cylinder.

Take great care not to allow any type of dirt to enter the uncovered threaded hole on the head of the cylinder, as this could affect the performance of the component. (It is a good idea to run a clean cloth through the inlet holes).

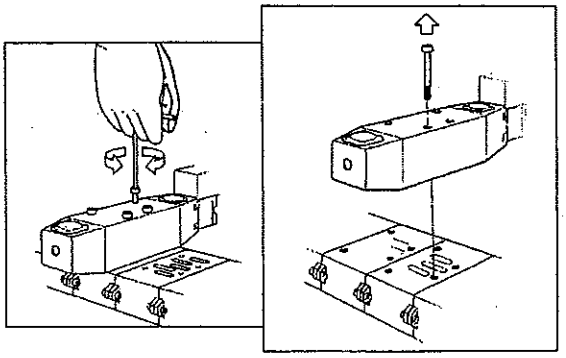
When re-assembling, follow the above procedure in reverse order and, before proceeding, line the thread of the pipe fitting with the special air-right tape.

SOLENOID VALVES

The solenoid valves are very important components for the correct functioning of the palletizer and require regular servicing. During the working life of the machine these components may need to be replaced; if so, proceed as follows:



Before disassembling the solenoid valves, disconnect from the pneumatic and electric controls.
In the case of the former proceed with the operations as described in the paragraph "Air connections"; for the latter, proceed as follows:
1 = Loosen the screw above the head of the coil with the screwdriver.
2 = Disconnect the connector from the coil of the solenoid valve



Subsequently, remove the solenoid valve by acting on the fastening screws and either service it or replace it.

ACTIONS

PART VI

ACTION GUIDELINES

The machine might stop or lose its setting during production. If this should happen, proceed as follows:

- Ask for the assistance of a maintenance engineer, a mechanic and an electrician; they are the only ones authorized to carry out maintenance if the machine is not working properly.
- The service engineer must determine what type of failure is involved. A reading of the next chapter will help him single out the fault and proceed to correct it..

The machine might suffer more serious damage than what has been allowed for in this manual. After determining the type of failure involved and read the possible solutions described in the paragraph ìACTIONSî, the service engineer will be in a position to evaluate the situation. If he feels that any maintenance operation within his power is unlikely to achieve good results, please contact the ITALPACK. Technical Assistance_ Service and ask for the help of the manufacturerís service engineer.

ACTIONS

Before attempting to single out the cause of the failure, check that:

- THE PHOTOCELLS ARE CORRECTLY AND SECURELY POSITIONED. This check is important because, while the machine is working, the fastening screws of the components can gradually loosen bringing the control instrumentation out of line. In this case, re-align the instrumentation and tighten the photocells (see chapter - paragraph).

- THE PROXIMITY MICROSWITCHES ARE CORRECTLY AND SECURELY POSITIONED. This check is important because, while the machine is working, the fastening nuts of the components can gradually loosen causing the control instrumentation to move out of place. In this case, put the microswitches back into position and tighten them (see chapter - paragraph).

- THAT THERE IS NO CONDENSATION IN THE PNEUMATIC CIRCUIT and, hence, in the solenoid valves and cylinders. To make this check, simply detach an air tube from a solenoid valve, energize it and see whether water comes out along with the air. If this is the case, an air drier will have to be fitted up line of the pneumatic circuit.

- That all the bolting is well tightened. If this is not the case, tighten all nuts and bolts firmly.

After verifying the above, carry out the checks listed in the troubleshooting guide which follows.

Chapter 6.1

Maintenance and repair

! This chapter presents information devoted to skilled personnel

6.1-2 GENERAL WARNINGS

- Maintenance and repair operations have to be performed by skilled and trained personnel only having the correct qualification, moreover the number interventions must correspond to that indicated in the intervention description card
- Do not lubricate the moving parts manually.
- Do not operate on running parts, not even by using objects or tools.
- Before performing operations on the power plant make sure that the voltage has been turned off.
- Interventions on mechanic parts have to be performed in a lack of pressure condition
- It is absolutely prohibited to tamper with, remove or modify the machine safety devices. In these cases the manufacturer declines any responsibility for the machine safety.
- Do not modify some machine parts to fit in other devices without previous authorization by ITALPACK; in case of unauthorized modifications ITALPACK will not be held responsible for consequences.

General procedure to perform the maintenance operations:

a) position the different moving parts of the machine in the most suitable condition to the maintenance intervention to be carried out;
b) disconnect the power and pneumatic supply;
c) remove the key located on the main board emergency device;
d) during maintenance and repair operations comply with the relevant descriptions being presented in this manual;
e) once the interventions have been completed connect the power and pneumatic supply and, before restarting the machine, make sure that:
   1) all safety devices are working
   2) all used tools have been arranged;
   3) all movable parts have been fixed;
   4) people have left danger zones;
f) check for the correct functioning of the machine before restarting it.

6.1 - 3 TYPE AND FREQUENCE OF CHECKS AND MAINTENANCE INTERVENTIONS

The systematic check of the functioning of some machine parts, mainly those more stressed and subject to wear, can avoid future working drawbacks and also contribute to keep the machine to its best production levels thus guaranteing a constant functioning over the time.

Maintenance means the planned interventions which have to be performed periodically and systematically on parts and machines.

The **routine maintenance** is comprised of:

1) check of the functioning condition of different parts, including also the recalibration of the control instruments
2) elimination or correction of anomalies, also of those which are not a current danger or technical problem but, if lasting over the time, could lead to damages.

The **extraordinary maintenance** is the complete replacement of parts or members of the machine which have reached their average life in order to prevent breaks causing the machine or the production stop.

Please find for each routine maintenance intervention the frequence, being calculated in working hours, the operator authorized to perform the intervention, the time being usually necessary and a detailed description of the intervention procedure.

The frequence and the time necessary to the intervention are simple indications allowing to plan your maintenance interventions. Only after a continuous maintenance service and after its precise analysis it is possible to determine the real needs complying with the company main needs.

Please find below two resuming tables presenting the various maintenance interventions, their relevant frequence and the possible presense of the unit on the machine.

6.1 - 4 ROUTINE MAINTENANCE

Pres.	CODE	TYPE OF INTERVENTION	INTERVENTION FREQUENCE (HOURS)			
			50	150	300	1000
		Mechanic interventions				
	OM1	Lubricate the parts equipped with lubricator		•		
	OM2	Check oil in gear motors				•
	OM3	Check roller chains			•	
	OM4	Check tension and centering of conveyors			•	
	OM5	Clean the compressed air filter		•		
	OM6	Clean the vacuum filter	•			
	OM7	Clean the feeler unit	•			
	OM8	Clean the motorized sack-positioning device			•	
	OM9	Check the ball joints and the screws			•	
	OM10	Check the sack suckers			•	
		Electric interventions				
	OE1	Inspection of photocells		•		
	OE2	Check the differential functioning			•	
	OE3	Check the contactors wear				
	OE4	Check the PLC batteries			•	
	OE5	Check the protection circuit				
	OE6	Check the feeler unit cable			•	

Intervention: OM1- LUBRICATE THE PARTS EQUIPPED WITH LUBRICATOR

FREQUENCE: 150 hours

AUTHORIZED OPERATOR: 1 mechanic maintenance engineer

NECESSARY TIME: 10 minutes

By the relevant lubricator pump 2 or 3 times a lubricant having the following features:

Base soap Lithium
NLGI ASTH grad. 2
penetration index 265-295
Additives EP
Dropping point 185° approx.

A table with examples of correspondence between the lubricants is enclosed at the end of the chapter.

(*) The used bearings are of the seal type and need no maintenance in case of ordinary loads, speeds and temperatures. However, the operator may decide to lubricate the parts periodically in case the machine environment is higly dusty or in case of heavy duty cycles (3 shifts at the highest speed)

OM2 Intervention: CHECK OIL IN THE GEARMOTORS

FREQUENCE: 1000 hours

AUTHORIZED OPERATOR: 1 mechanic maintenance engineer

NECESSARY TIME: 30 minutes

1) Check the oil level by unscrewing the special indication cap: the oil level has to be on that position.

2) Add the possible lacking oil through the upper cap by using lubricant having the specifications enclosed at the end of the chapter.
N.B.: synthetic oil has not to be mixed with other types even if the same brand.

3) Every 10000 working hours or every two years replace the oil (as to the type of lubricant see the tables enclosed); for this operation use the drain cap.
In case of synthetic lubricants the replacement interval can be double, that is 20000 hours or 4 yaers.

Intervention: OM3 - CHECK ROLLER CHAINS

FREQUENCE: 300 hours

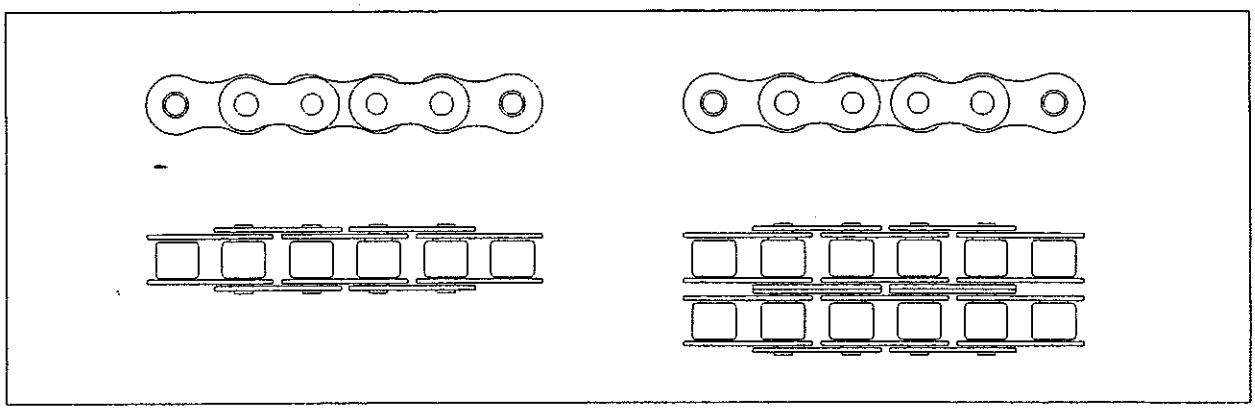
AUTHORIZED OPERATOR: 1 mechanic maintenance engineer

NECESSARY TIME: 10 minutes for each unit

1) Check the wear of rollers and strikers for each roller chain of the machine. In case of excessive wear or of elongation being higher than 2% replace the chain.

2) Check the relevant pinions (idle and driving ones) and the chains runners; replace the worn ones.

3) At the end, check the chains tension and if necessary adjust them by the special tensioning devices. The chain tension has to allow a regular functioning; as a matter of fact, on the one side the lack of a slight bending of the chain on the idle side causes the rapid wear due to the excessive tension, on the other side, an excessive bending may lead to a misfunctioning, for ex.: coming out of the chain, stop of the tooth on the pinion, oscillation, etc.



Intervention: OM4 - CHECK TENSION AND CENTERING OF CONVEYORS

FREQUENCE: 300 hours

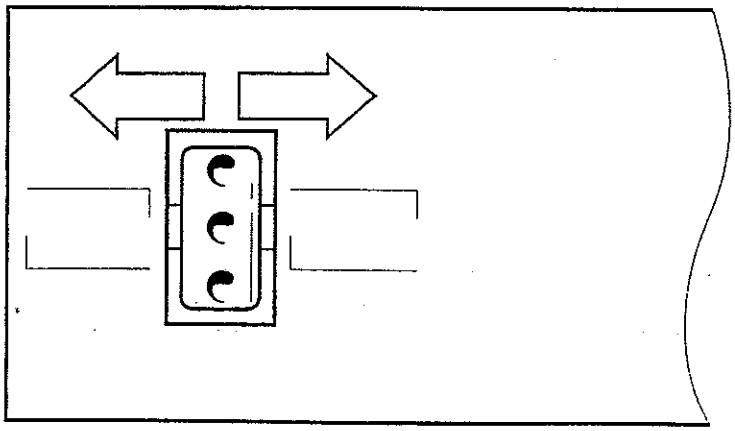
AUTHORIZED OPERATOR: 1 mechanic maintenance engineer

NECESSARY TIME: 5 minutes

1) Make sure the belt runs in the central part of the structure without oscillations nor skiddings.

2) If necessary, guide the belt by adjusting the drum through the special tensioning devices.

! Tension the belt uniformly along the whole width (the belt shifts to the less tensioned side) and with a tension equal to an elongation of about 1% by means of the special tensioning devices.



Intervention: OM5 - CLEAN THE COMPRESSED AIR FILTER

FREQUENCE: 150 hours

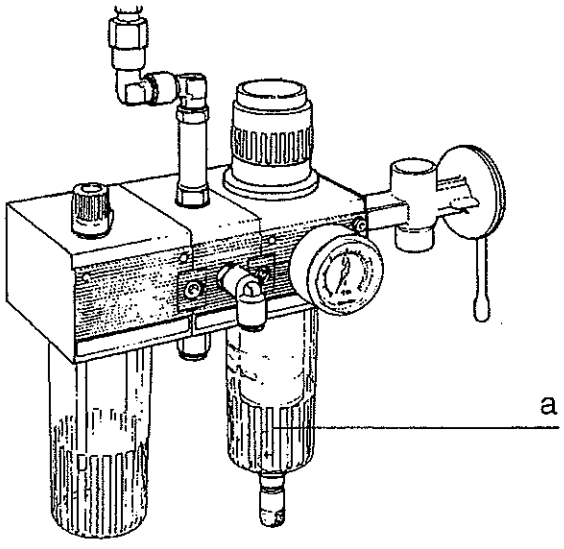
AUTHORIZED OPERATOR: 1 mechanic maintenance engineer

NECESSARY TIME: 5 minutes

1) Unscrew the cup (a) housing the air filter

2) Extract the filter and clean it with water and compressed air.

3) Remount the filter and screw the cup.



Intervention: OM6 - CLEAN THE VACUUM FILTER

FREQUENCE: 150 hours

AUTHORIZED OPERATOR: 1 mechanic maintenance engineer

NECESSARY TIME: 5 minutes

1) Unscrew the cup and remove the filter from the central unit.

2) Overturn the cup and extract the filter.

3) Clean the filter by a dry air jet.

Intervention: OM7 - CLEAN THE FEELER UNIT

FREQUENCE: 50 hours

AUTHORIZED OPERATOR: 1 mechanic maintenance engineer

NECESSARY TIME: 15 minutes

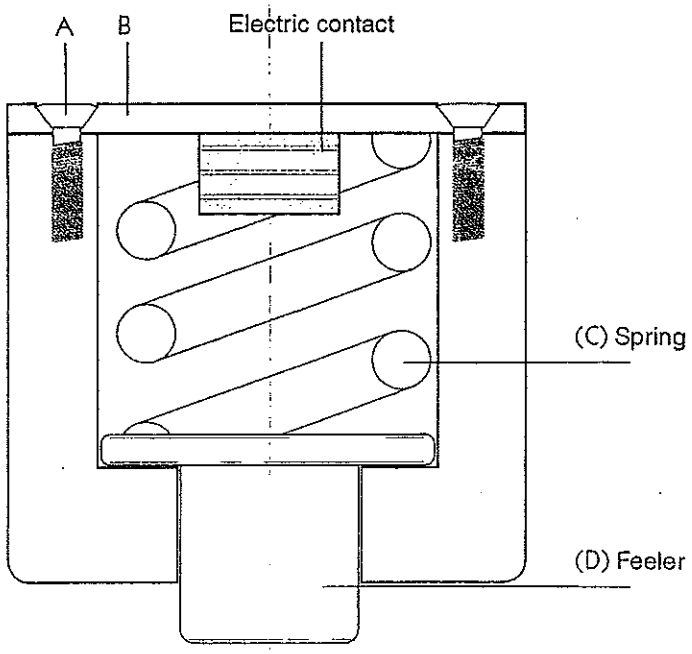
1) Unscrew the screws (a) and remove the cover with the electric contact (b).

2) Unscrew the spring (c) and the feeler pin (d).

3) Remove the dust from components

3) Clean the spring housing and the passage hole of the feeler pin

3) Reassemble the unit making sure that the cable is correctly connected



Intervention OM8 - CLEAN THE MOTORIZED SACK-POSITIONING DEVICE

FREQUENCE: 300 hours

AUTHORIZED OPERATOR: 1 mechanic maintenance engineer

NECESSARY TIME: 10 minutes

1) Clean the rack with a jet of compressed air

2) Lubricate the sliding pinion

3) Adjust the copper screws for the centering of the sliding column; keep a 90° axis.

Intervention: OM9 - CHECK THE BALL JOINTS AND THE SCREWS

FREQUENCE: 300 hours

AUTHORIZED OPERATOR: 1 mechanic maintenance engineer

NECESSARY TIME: 15 minutes

1) Visually check the ball joints wear condition;

2) Check their tightening;

3) Visually check the screws wear condition;

4) Check their tightening.

Intervention: OM10 - CHECK THE SACK SUCKERS

FREQUENCE: 300 hours

AUTHORIZED OPERATOR: 1 mechanic maintenance engineer

NECESSARY TIME: 5 minutes

1) Visually check the wear condition

2) Check their suction during functioning

3) In case of replacement just extract the component by pulling it and fit the new one into the special housing

LIST OF LUBRICANTS SUGGESTED BY ITALPACK

Application	Symbol	Type	ISO grade	Viscosity 40°C cST min. - max.	Notes
Oil for gearmotors		mineral oil ISO-L-CL DIN 51517-CLP	220	198-242	I.V. ≥ 95 AGIP - BLASIA 220 (Ad. EP)
		synthetic oil ISO VG	220	235	AGIP - BLASIA 220
Hydraulic oil for pneumatic plant lubrication		mineral oil ISO-L-HL DIN 51524-HLP	32	28.8 - 35.2	AGIP - OSO 32
Oil for lubrication of the centering device central unit		mineral oil ISO-L-HL DIN 51524-HLP	68	61.2 - 74.8	I.V. ≈ 100 AGIP - OSO 68

Intervention: OE1 - INSPECTION OF PHOTOCELLS

FREQUENCE: 150 hours

AUTHORIZED OPERATOR: 1 electric maintenance engineer

NECESSARY TIME: 5 minutes each unit

1) Check and clean the photocells with a jet of dry compresed air

2) By interrupting the light beam with your hand make sure that the led located on the component turns off and on at each hand passage.

Intervention: OE2 - CHECK THE DIFFERENTIAL FUNCTIONING

FREQUENCE: 1000 hours

AUTHORIZED OPERATOR: 1 electric maintenance engineer

NECESSARY TIME: 5 minutes

1) Open the electric board

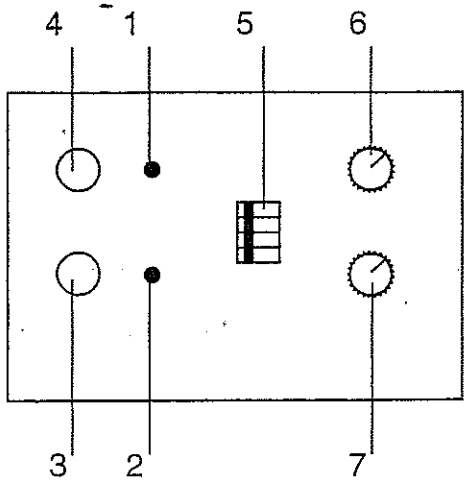
2) Reset the electric board supply by the main switch.

3) Press the test button on the differential.

4) Make sure that the differential relay operates.

5) In case the relay does not operate, replace the differential with a new one having the same features.

6) Reset by the special button.



CAPTION

1- Auxiliary supply voltage presence announciator (green led)
2- Operated differential relay announciator (red led)
3- TEST button
4- Manual RESET button
5- Microswitches to select the delay current range, and manual-automatic RESET
6- Current intervention threshold adjustment
7- Intervention time adjustment

Intervention: OE3 - CHECK THE CONTACTORS WEAR

FREQUENCE: 1000 hours

AUTHORIZED OPERATOR: 1 electric maintenance engineer

NECESSARY TIME: 15 minutes

1) Open the electric board containing the contactors.

2) Reset the electric board supply by the main switch.

3) Put the machine in the automatic running mode and check the contactors during their functioning.

4) Replace the "sparking" contactors with contactors having the same features.

Intervention: OE4 - CHECK THE PLC BATTERY

FREQUENCE: 1000 hours

AUTHORIZED OPERATOR: 1 electric maintenance engineer

NECESSARY TIME: 5 minutes

1) Open the electric board containing the PLC

2) Make sure that the "battery low" led of the PLC is off; in case it is on replace the battery with an identical one.

Intervention: OE5 - CHECK THE PROTECTION CIRCUIT

FREQUENCE: 1000 hours

AUTHORIZED OPERATOR: 1 electric maintenance engineer

NECESSARY TIME: 30 minutes

1) Perform a visual inspection of the groundings, both inside the electric board and on the different parts of the machine, and make sure that everything is ok.

2) Perform an instrument check of the protection circuit, by methods and instruments complying with the Rule in force in the machine use country.
In case this standard is missing see CEI 17-13/1 par.8.3.3.

Intervention: OE6 - CHECK THE FEELER UNIT CABLE

FREQUENCE: 50 hours

AUTHORIZED OPERATOR: 1 electric maintenance engineer

NECESSARY TIME: 10 minutes

1) Check the correct connection of the supply cable of the feeler unit; when it touches the sacking machine nozzle without the sack the machine does not have to unload;

2) Simulate an unload without any product to confirm it.

The feeler units are conductive electric sensors, feeling the presence of the sack on the nozzle. Their functioning is the following one:
when the feeler is pushed against the nozzle and get in contact with a metal material it does not interrupt the electric flow (Fig.A), thus indicating the absence of the sack and stopping the machine.
When the feeler is pushed against the nozzle and get in contact with an insulating material (sack paper) it interrupts the electric flow (Fig.B) thus indicating the sack presence which is followed by the product unload.
In case of wrong connection of the cable or in case of its disconnection from the feeler, the presence of the sack on the nozzle is signalled thus allowing the machine to perform the product unload operation even if the sack is not present.

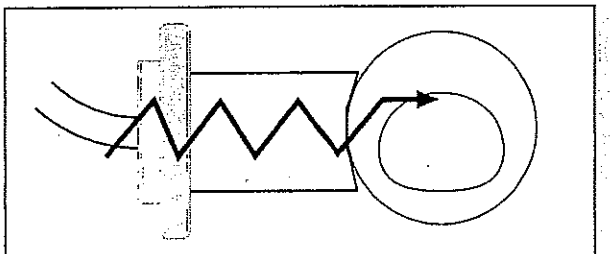


Fig.A=the contact is not interrupted

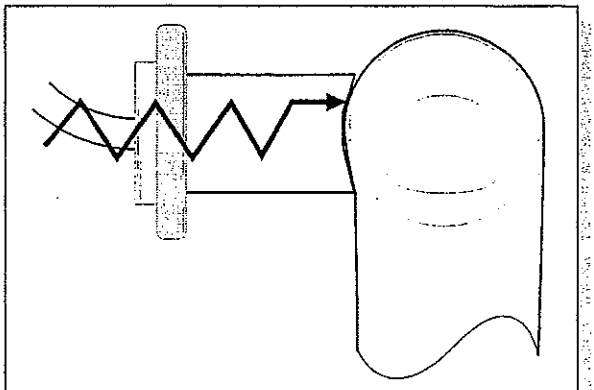


fig.B=the contact is interrupted by the paper

Chapter 6.2

Diagnostic

6.2 -2 Warnings

6.2 - 3 Flow diagrams

Possible malfunctions

6.2-2 GENERAL WARNINGS

Most of the anomalies and of the problems occuring during the machine functioning are promptly signalled by the machine itself automatically:

- signallings are just indications the machine sends the operator while keeping its running status;
- alarms or emergencies stop the machine and make the red alarm lamp on the electric board turn on; to restart the machine after eliminating the problem which has caused the emergency state it is necessary to:
- press the alarm reset button
- put the man/aut switch to the automatic mode
- press the start button and hold it down for some seconds

Ordinary operator: performs a first search of the damage and, if he is authorized, eliminates the anomaly causes and resets the machine correct functioning.
Electric/mechanic maintenance engineer: his intervention is necessary in case the ordinary operator has not identified the problem cause or in case the reset of the machine correct functioning implies the performance of operations he is not authorised to carry out.

Please find below:

a) **general methods of intervention:** it is a guide to face the malfunctions which may occur during the machine functioning by an organized and systematic approach. As a mater of fact, a correct procedure to search the damage favours the detection of the causes and reduces the necessary time.

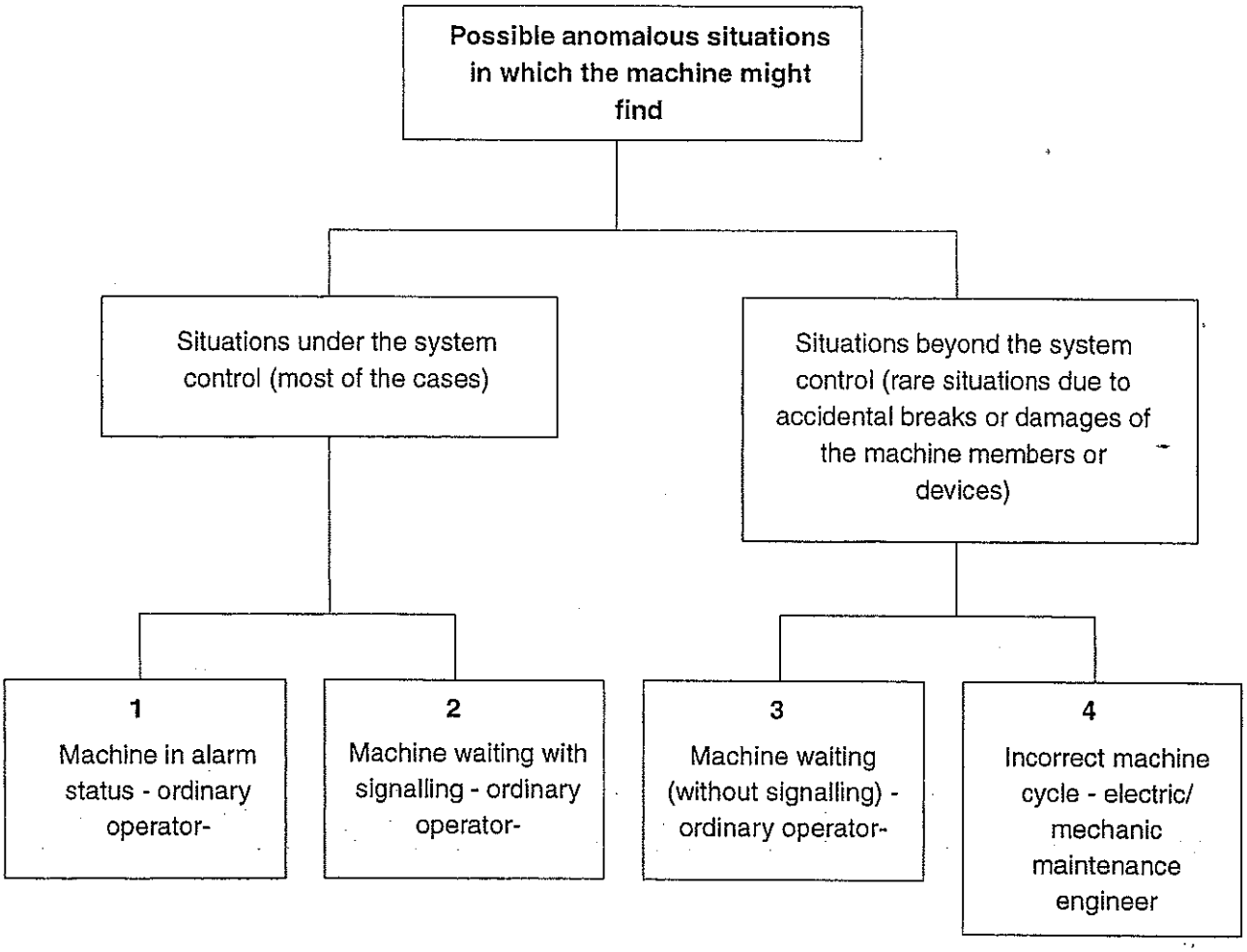
b) **tables of signallings and alarms:** complete list of all signallings and alarms accompanied by the possible causes, possible solutions and a list of authorized operators.

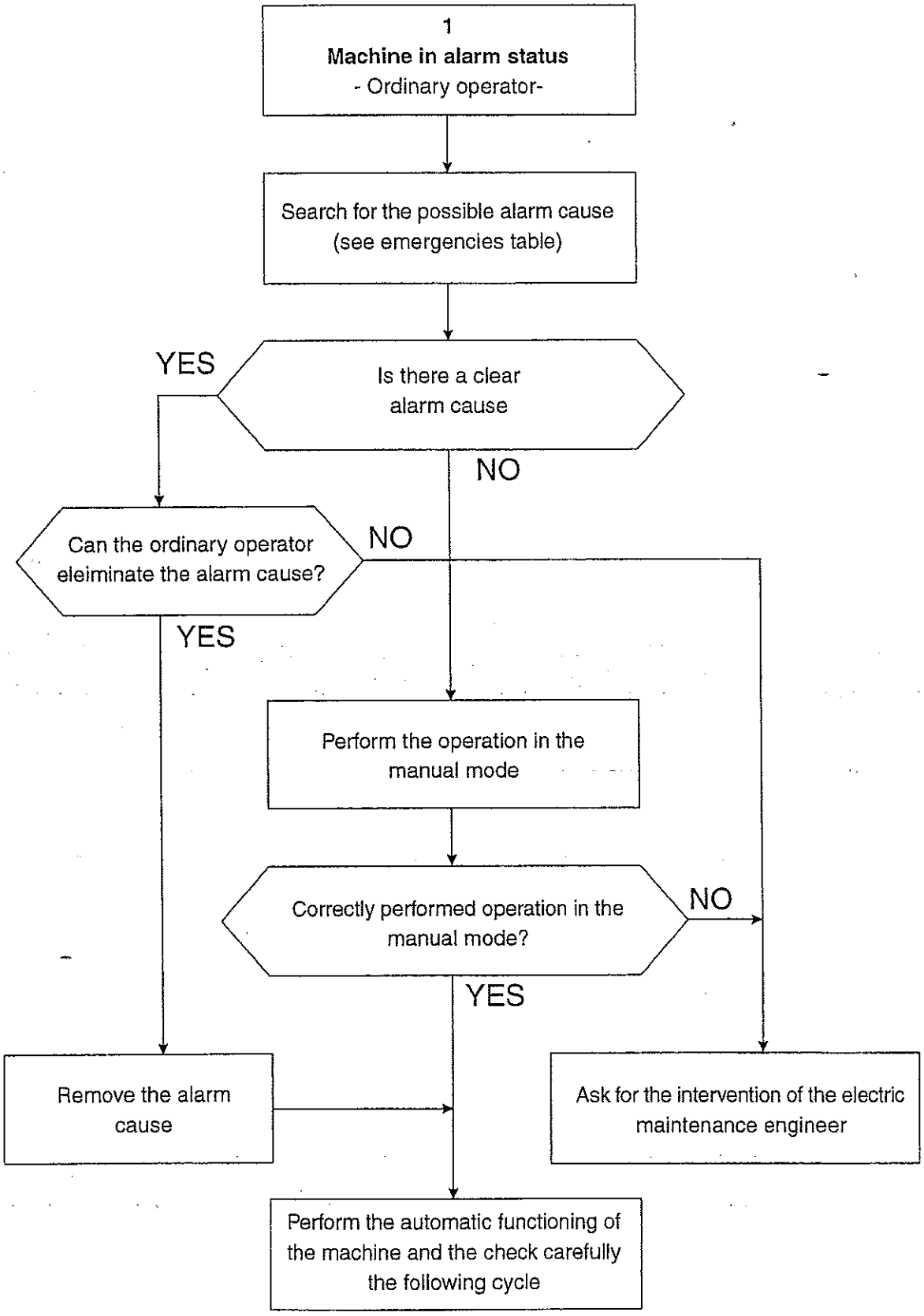
c) **malfunctions list:** this list reports some malfunctions which, on the basis of the past experience, sometimes have occured on similar machines. Each malfunction is accompanied by possible causes and solutions.

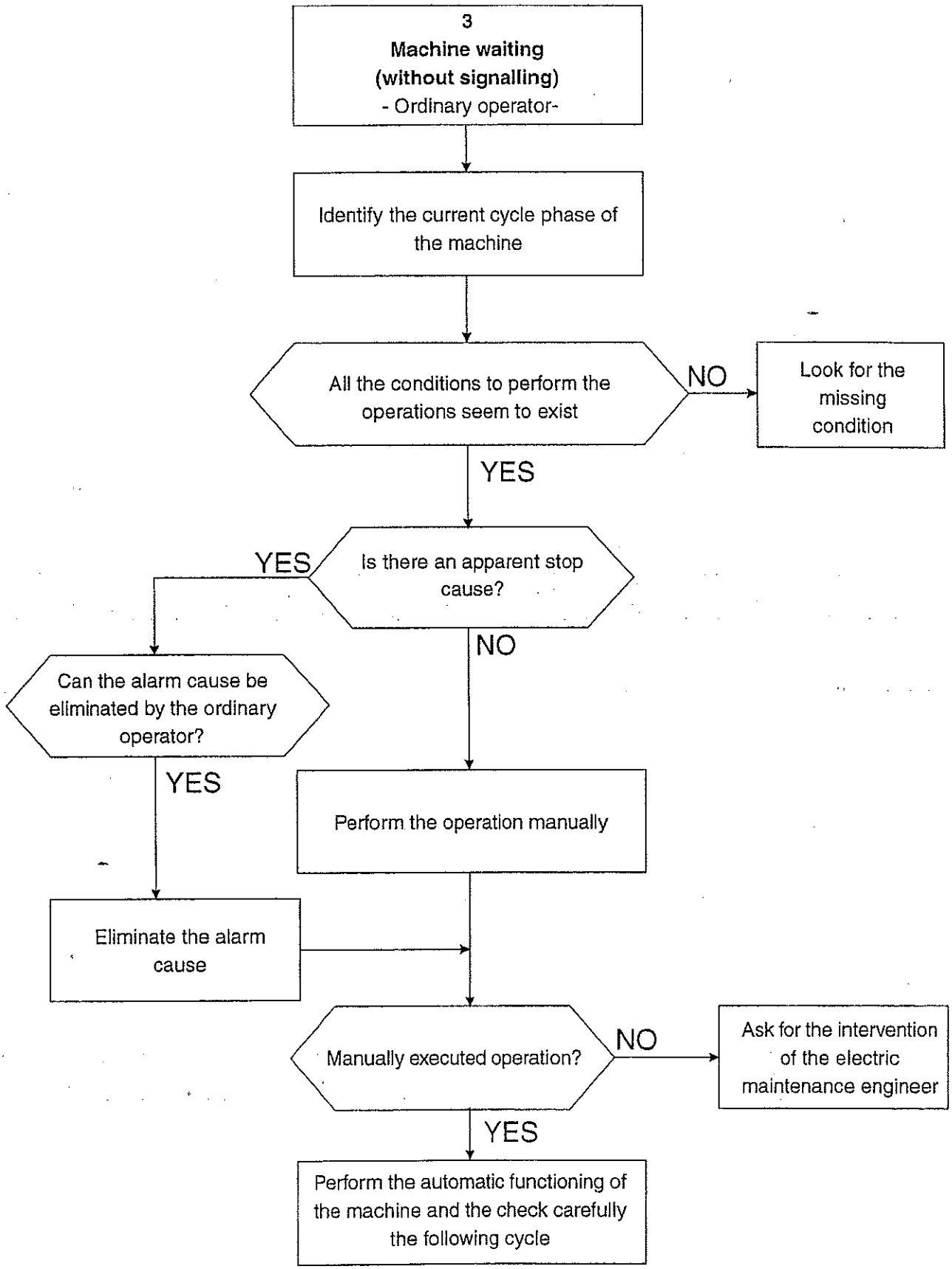
The use of sacks in good condition and complying with what agreed in the machine delivery contract is very important for the machine good functioning. The non-compliance with this rule is often the cause of malfunctions.

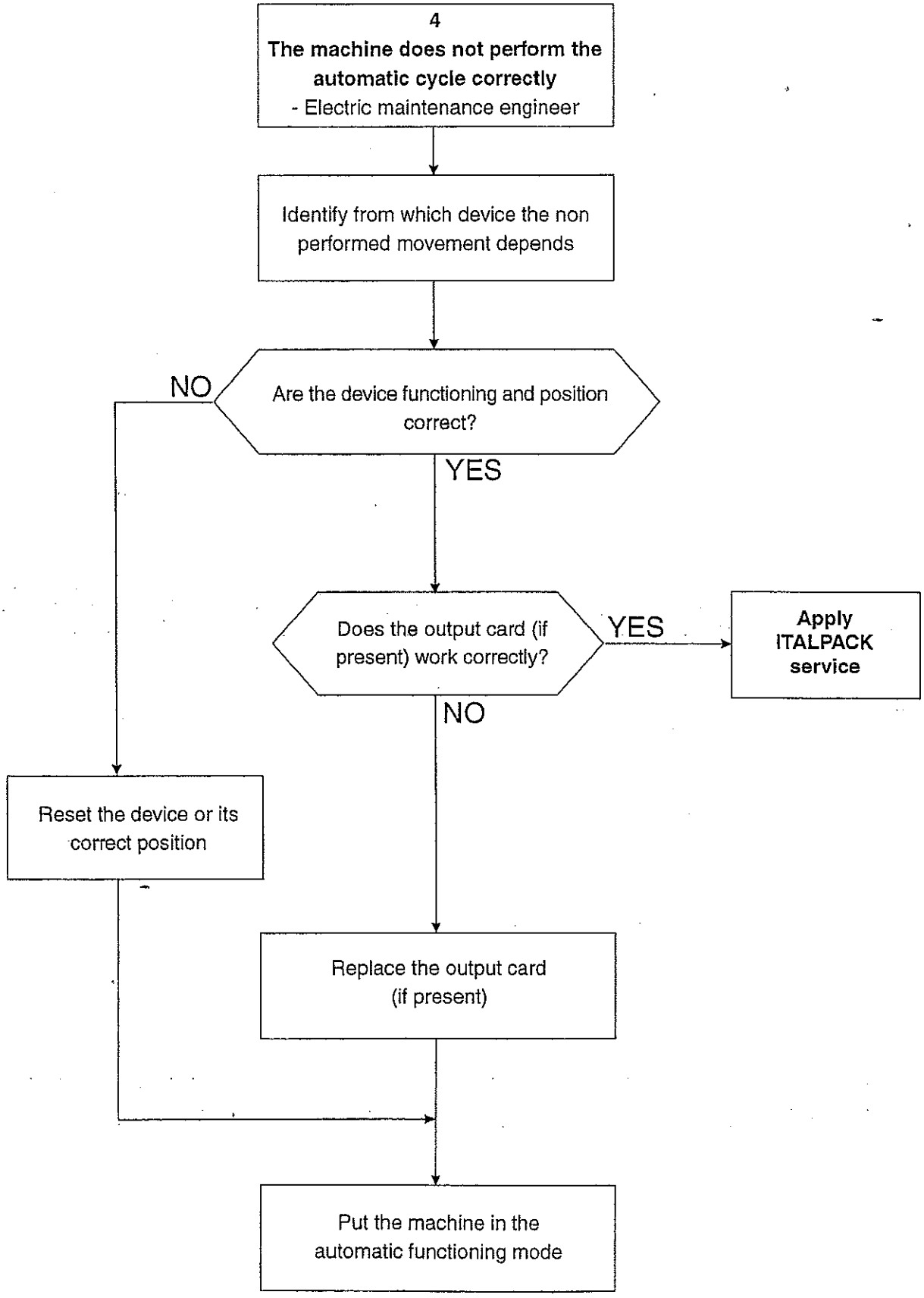
In any case, if after performing the suggested operations the machine correct functioning has not been reset please apply to ITALPACK service.

6.2 - 3 FLOW DIAGRAMS

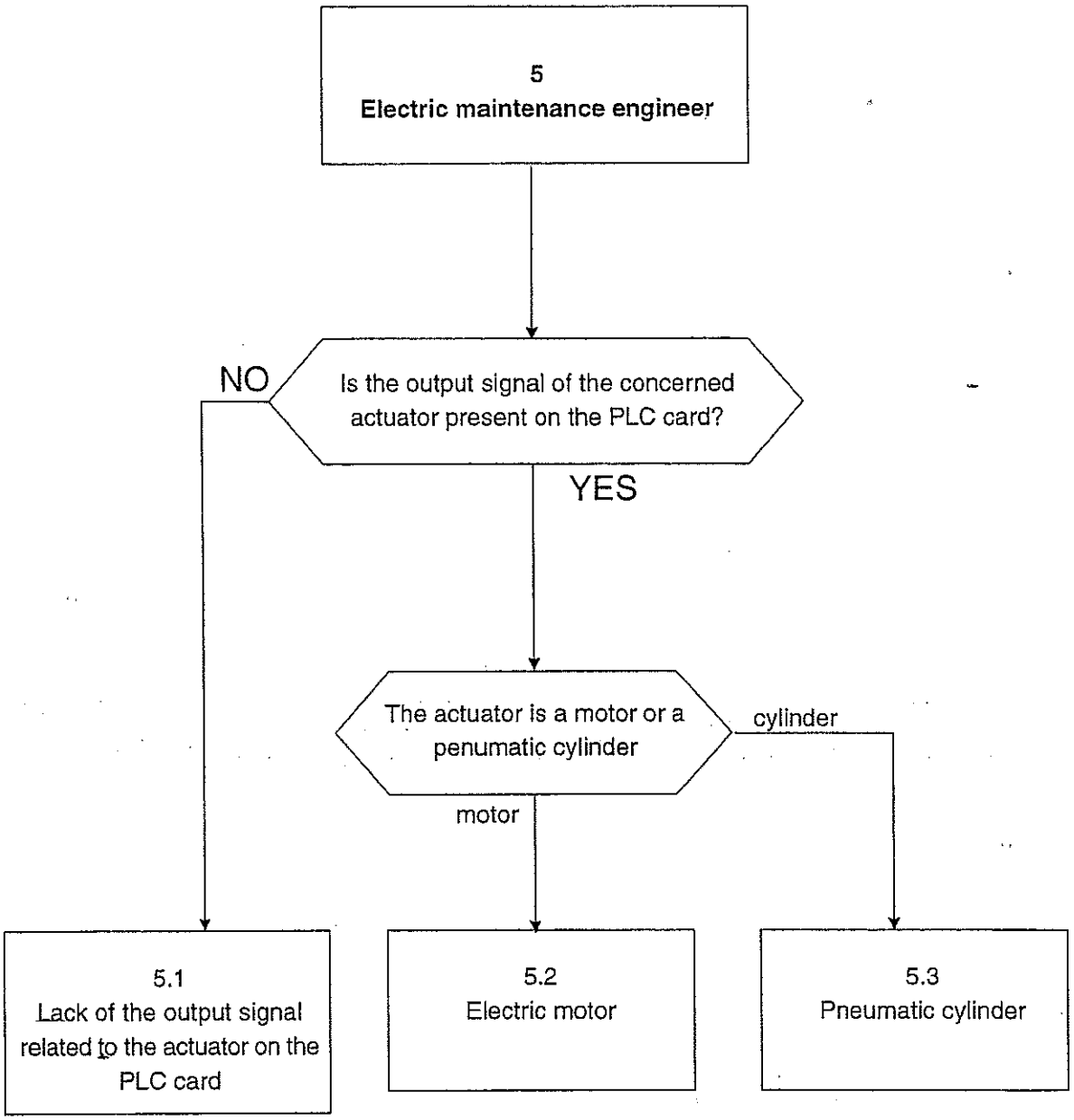

Possible anomalous situations in which the machine might find
Situations under the system control (most of the cases)
Situations beyond the system control (rare situations due to accidental breaks or damages of the machine members or devices)
1
Machine in alarm status - ordinary operator-
2
Machine waiting with signalling - ordinary operator-
3
Machine waiting (without signalling) - ordinary operator-
4
Incorrect machine cycle - electric/ mechanic maintenance engineer

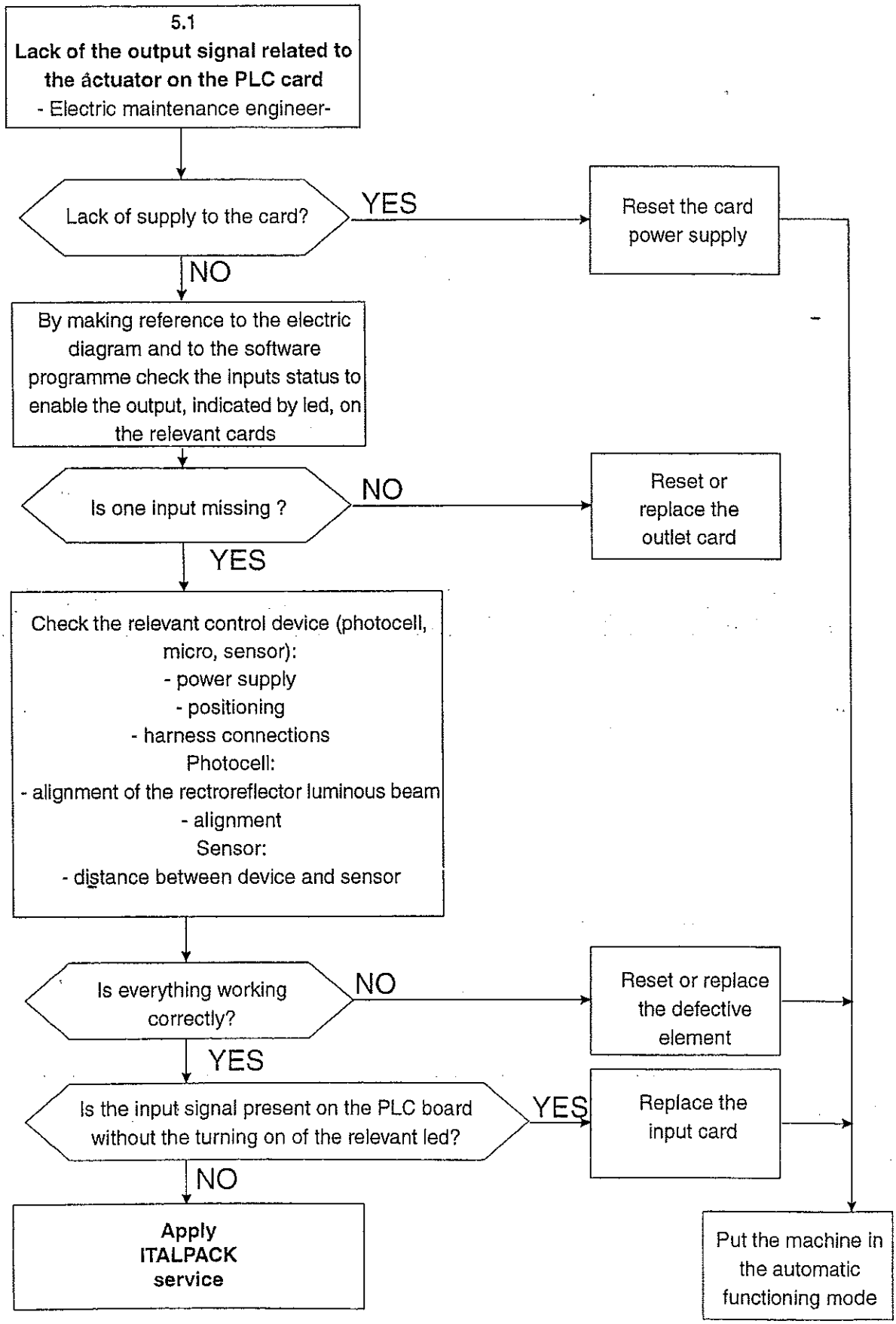

1
Machine in alarm status
- Ordinary operator-
Search for the possible alarm cause
(see emergencies table)
YES
Is there a clear
alarm cause
NO
Can the ordinary operator
eleiminate the alarm cause?
NO
YES
Perform the operation in the
manual mode
Correctly performed operation in the
manual mode?
NO
YES
Remove the alarm
cause
Ask for the intervention of the electric
maintenance engineer
Perform the automatic functioning of
the machine and the check carefully
the following cycle

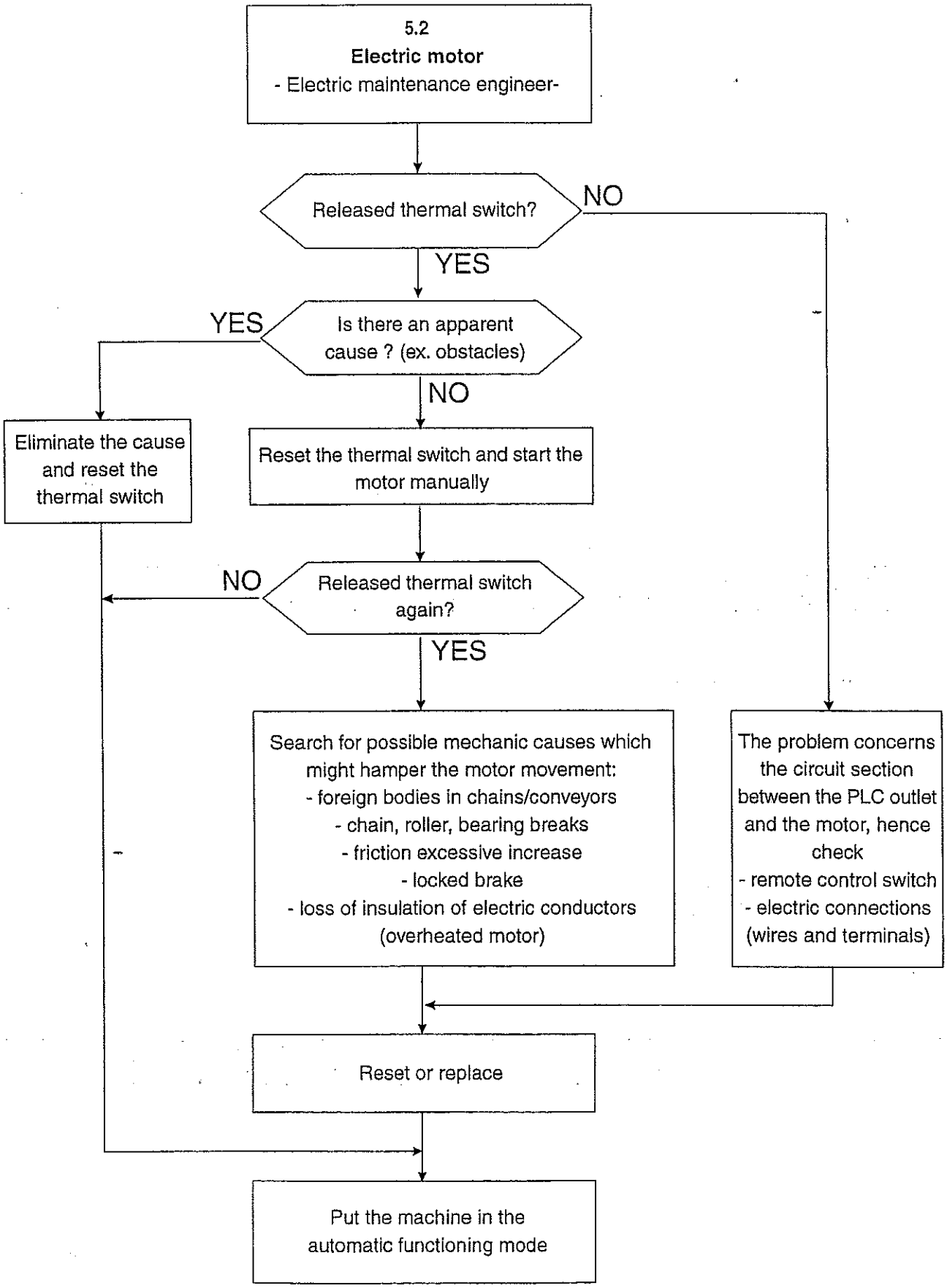

3
Machine waiting
(without signalling)
- Ordinary operator-
Identify the current cycle phase of the machine
All the conditions to perform the operations seem to exist
NO
Look for the missing condition
YES
Is there an apparent stop cause?
YES
NO
Can the alarm cause be eliminated by the ordinary operator?
YES
Perform the operation manually
Eliminate the alarm cause
Manually executed operation?
NO
Ask for the intervention of the electric maintenance engineer
YES
Perform the automatic functioning of the machine and the check carefully the following cycle

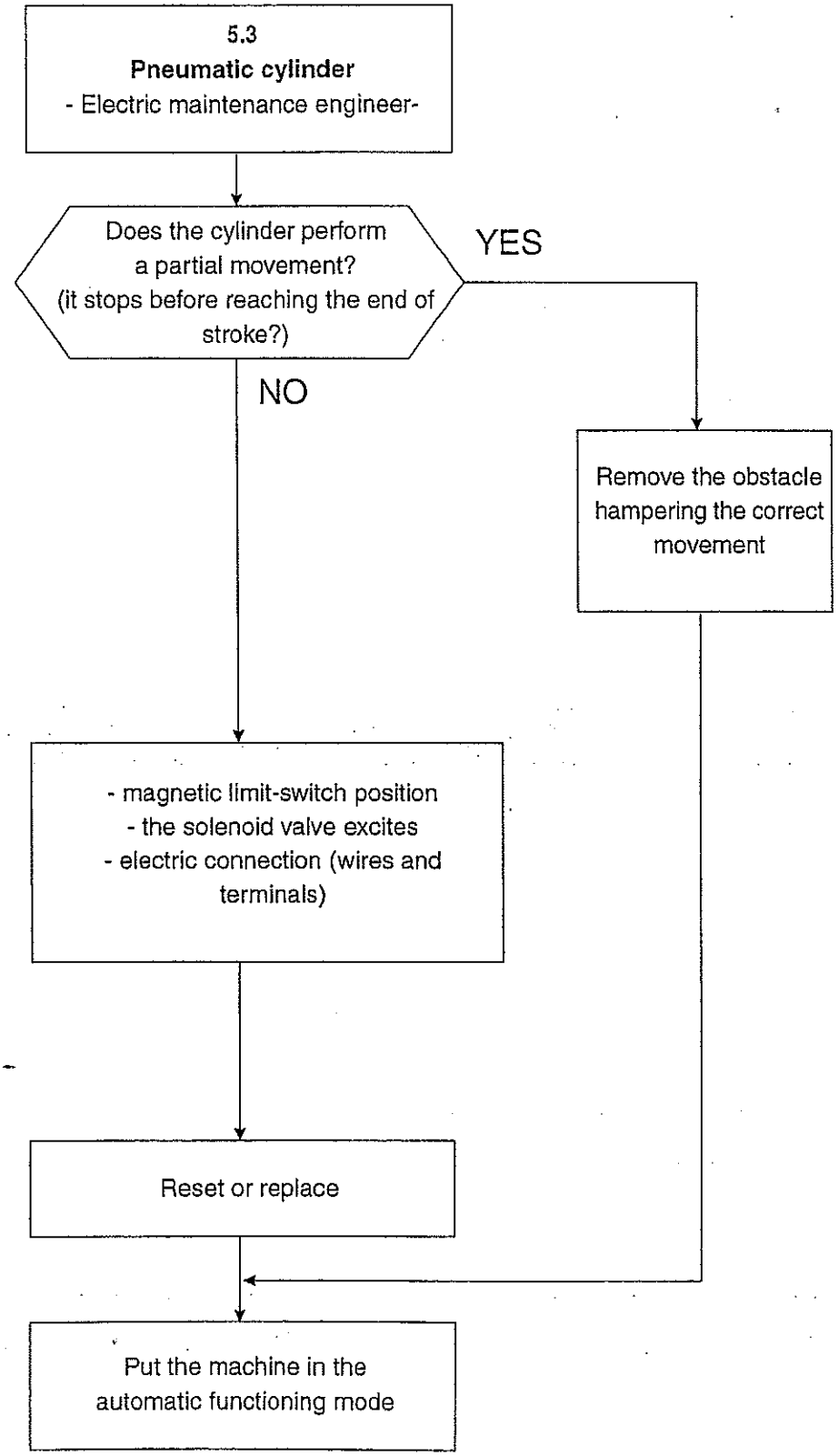

4
The machine does not perform the automatic cycle correctly
- Electric maintenance engineer
Identify from which device the non performed movement depends
NO
Are the device functioning and position correct?
YES
Does the output card (if present) work correctly?
YES
Apply ITALPACK service
NO
Reset the device or its correct position
Replace the output card (if present)
Put the machine in the automatic functioning mode

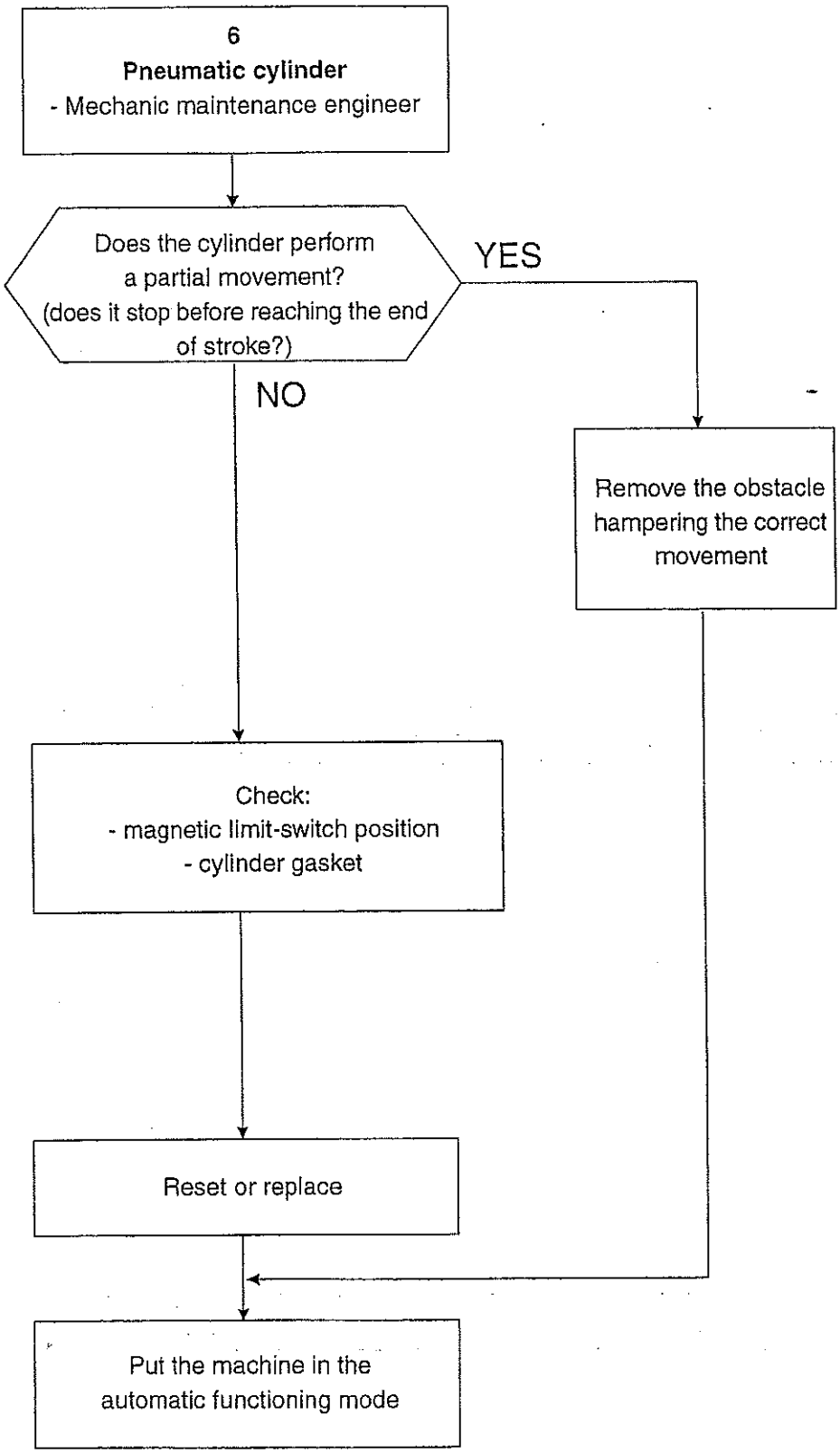
if with PLC


5
Electric maintenance engineer
NO
Is the output signal of the concerned actuator present on the PLC card?
YES
The actuator is a motor or a penumatic cylinder
cylinder
motor
5.1
Lack of the output signal related to the actuator on the PLC card
5.2
Electric motor
5.3
Pneumatic cylinder


5.1
Lack of the output signal related to the âctuator on the PLC card
- Electric maintenance engineer-
Lack of supply to the card?
YES
Reset the card power supply
NO
By making reference to the electric diagram and to the software programme check the inputs status to enable the output, indicated by led, on the relevant cards
Is one input missing ?
NO
Reset or replace the outlet card
YES
Check the relevant control device (photocell, micro, sensor):
- power supply
- positioning
- harness connections
Photocell:
- alignment of the rectroreflector luminous beam
- alignment
Sensor:
- distance between device and sensor
Is everything working correctly?
NO
Reset or replace the defective element
YES
Is the input signal present on the PLC board without the turning on of the relevant led?
YES
Replace the input card
NO
Apply ITALPACK service
Put the machine in the automatic functioning mode


5.2
Electric motor
- Electric maintenance engineer-
Released thermal switch?
NO
YES
Is there an apparent cause ? (ex. obstacles)
YES
NO
Eliminate the cause and reset the thermal switch
Reset the thermal switch and start the motor manually
Released thermal switch again?
NO
YES
Search for possible mechanic causes which might hamper the motor movement:
- foreign bodies in chains/conveyors
- chain, roller, bearing breaks
- friction excessive increase
- locked brake
- loss of insulation of electric conductors (overheated motor)
The problem concerns the circuit section between the PLC outlet and the motor, hence check
- remote control switch
- electric connections (wires and terminals)
Reset or replace
Put the machine in the automatic functioning mode


5.3
Pneumatic cylinder
- Electric maintenance engineer-
Does the cylinder perform a partial movement? (it stops before reaching the end of stroke?)
YES
NO
Remove the obstacle hampering the correct movement
- magnetic limit-switch position
- the solenoid valve excites
- electric connection (wires and terminals)
Reset or replace
Put the machine in the automatic functioning mode


6
Pneumatic cylinder
- Mechanic maintenance engineer
Does the cylinder perform a partial movement? (does it stop before reaching the end of stroke?)
YES
NO
Remove the obstacle hampering the correct movement
Check:
- magnetic limit-switch position
- cylinder gasket
Reset or replace
Put the machine in the automatic functioning mode

SPARE PARTS

PART VII

ITALPACK

SPARE PARTS ORDER FORM

Spett.le
ITALPACK. S.n.C.
After-Sales Service
Via dell'Olmo
47038 SANTARCANGELO DI ROMAGNA (RN)
ITALIA

TAX DETAILS FOR INVOICING PURPOSES

Company: _____

Address: _____

VAT Registration No.: _____

Payment: _____

Bank through which payments are made: _____

SPARE PARTS DESTINATION

Plant: _____

Address: _____

Department: _____

Name of responsible person: _____

Delivery date: _____

IDENTIFICATION DETAILS OF THE MACHINE (stated in the CE plate)

Model: _____

Serie: _____

Serial number: _____

An Year: _____

SPARE PARTS REQUESTED:

Unit	Q.ty	Piece No.	Description

Date: _____ Signature and Companyís Stamp: _____

This form must be photocopied, filled in with all the details required, and sent to the ITALPACK. After-Sales Service, where your order will be dealt with.

SPARE PARTS REQUESTED (continued):

U.M.	Q.ty	Code	Description

Date: ____________________ Signature and Companyís Stamp: ____

This form must be photocopied, filled in with all the details required, and sent to the ITALPACK. Afer-Sales Service, where your order will be dealt with.

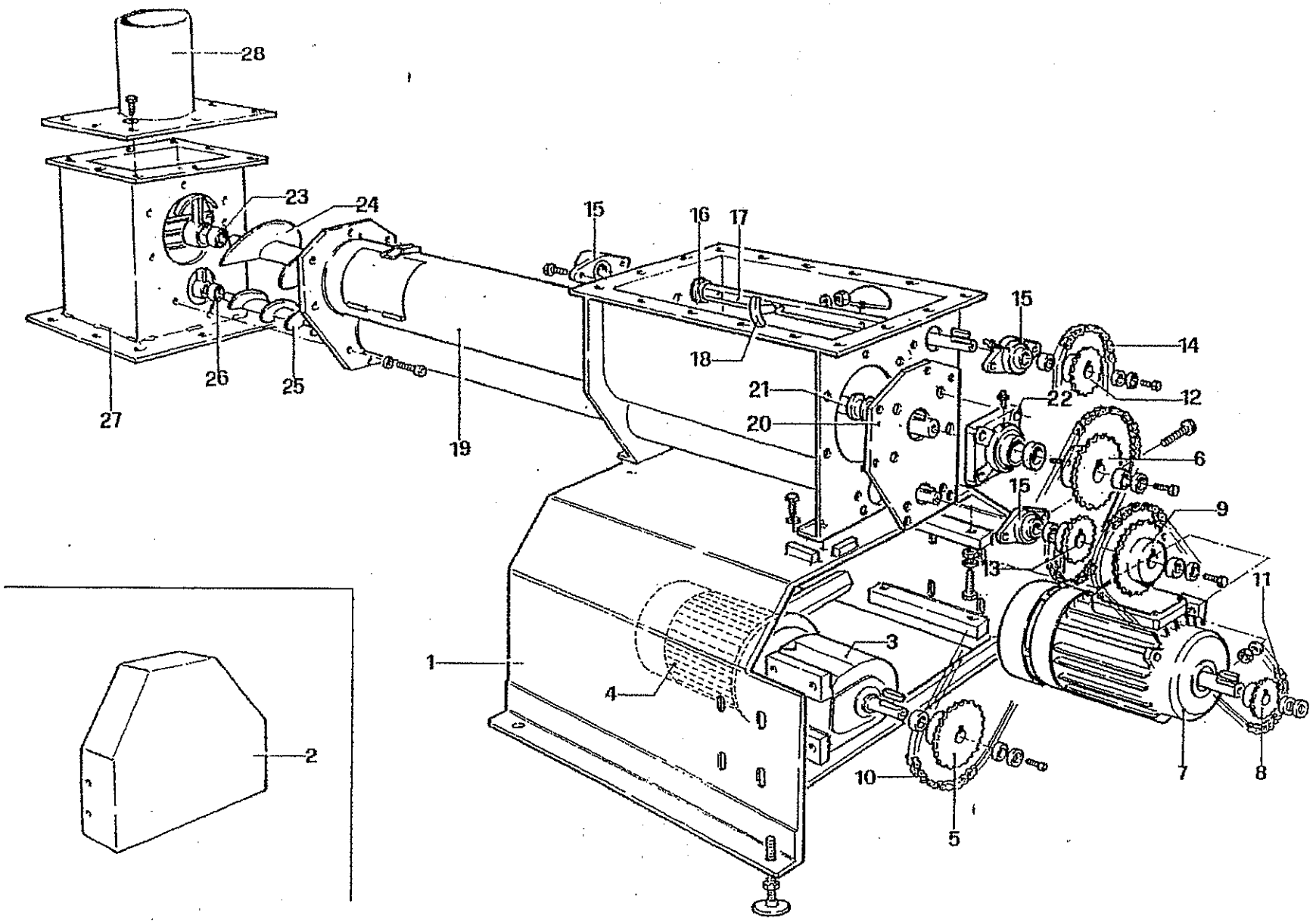
RECOMMENDED SPARE PARTS

Q.ty	Code	Description	Replace after:

ITALPACK

Alimentatore a doppia coclea - *Double screw feeding*

APDC

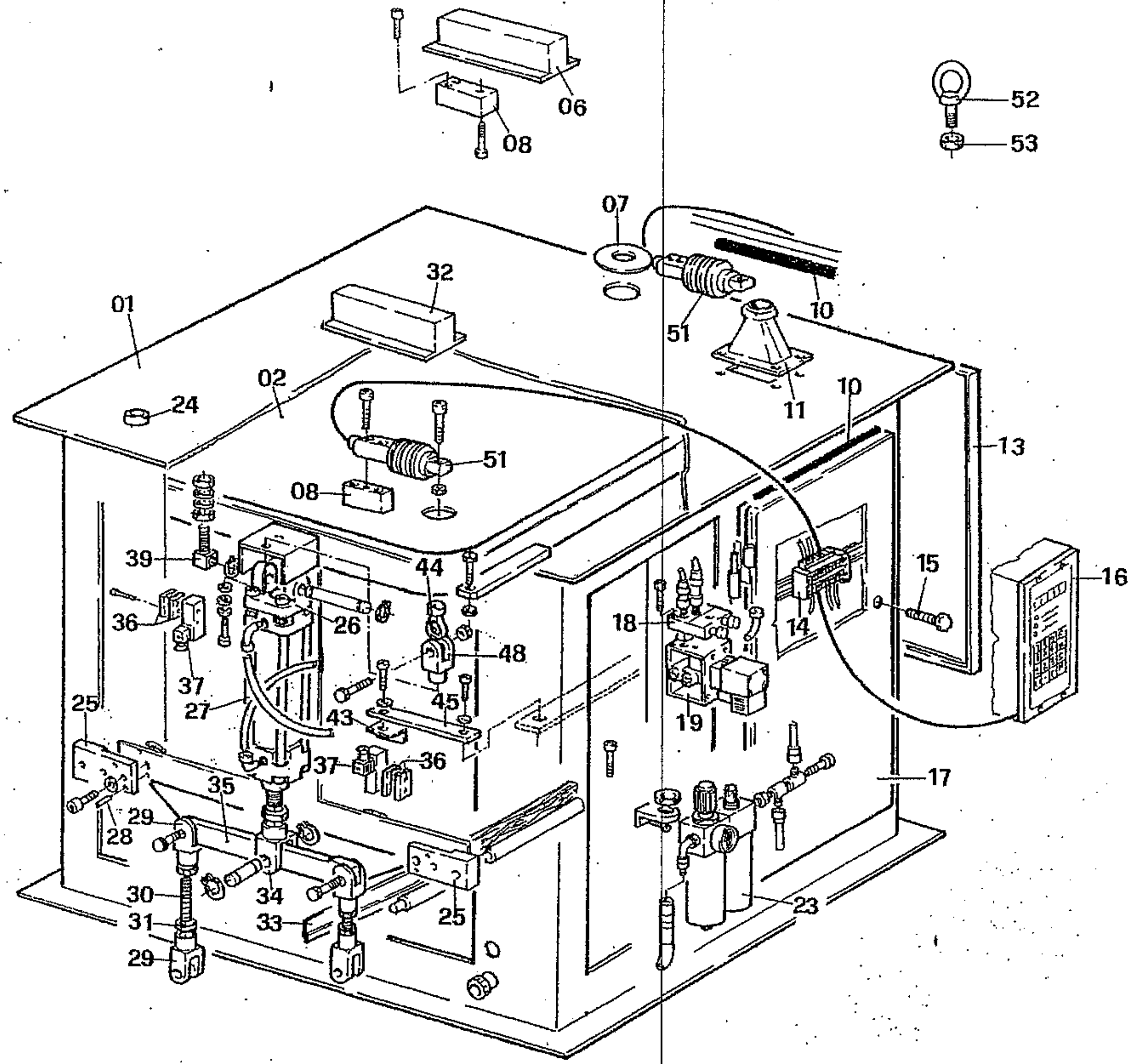


ITALPACK

Alimentatore a doppia coclea - *Double screw feeding*

APDC

Pos.	Descrizione	Description	Cod.	Q.
01	BASAMENTO MOTORIZZAZIONE	FRAME		01
02	CARTER PROTEZIONE	CHAIN GUARD		01
03	RIDUTTORE COCLEA SGROSSATURA	FULL FEED SCREW REDUCER		01
04	MOTORE COCLEA SGROSSATURA	FULL FEED SCREW MOTOR		01
05	PIGNONE MOTORE SGROSSATURA	FULL FEED DRIVING PINION		01
06	PIGNONE CONDOTTO SGROSSATURA	FULL FEED DRIVEN PINION		01
07	MOTORE COCLEA FINITURA	DRIBBLE FEED SCREW MOTOR		01
08	PIGNONE MOTORE FINITURA	DRIBBLE FEED DRIVING PINION		01
09	PIGNONE CONDOTTO FINITURA	DRIBBLE FEED DRIVEN PINION		01
10	CATENA SGROSSATURA	FULL FEED CHAIN		mt. 1
11	CATENA FINITURA	DRIBBLE FEED CHAIN		mt. 1
12	PIGNONE CONDOTTO ASPO	COILER DRIVEN PINION		01
13	PIGNONE MOTORE ASPO	COILER DRIVING PINION		01
14	CATENA ASPO	COILER CHAIN		mt. 1
15	SUPPORTO SNODATO	SUPPORT		03
16	ANELLO DI GOMMA W-RING	W-RING		03
17	ALBERO ASPO	COILER SHAFT		01
18	PALETTE ASPO AGITATORE	AGITATOR COILER BLADES		09
19	COCLEE TUBOLARI	SCREWS		01
20	FLANGIA ANTERIORE	FRONT FLANGE		01
21	ANELLO DI GOMMA W-RING	W-RING		01
22	SUPPORTO SNODATO	SUPPORT		01
23	CUSCINETTO ANTERIORE	ANTERIOR BEARING		01
24	SPIRALE COCLEA SGROSSATURA	FULL FEED SCREW		01
25	SPIRALE COCLEA FINITURA	DRIBBLE FEED SCREW		01
26	CUSCINETTO ANTERIORE	ANTERIOR BEARING		01
27	CANALE ANTERIORE	FRONT GUARD		01
28	CUSCINETTO ANTERIORE	FRAME FOR HOSE		01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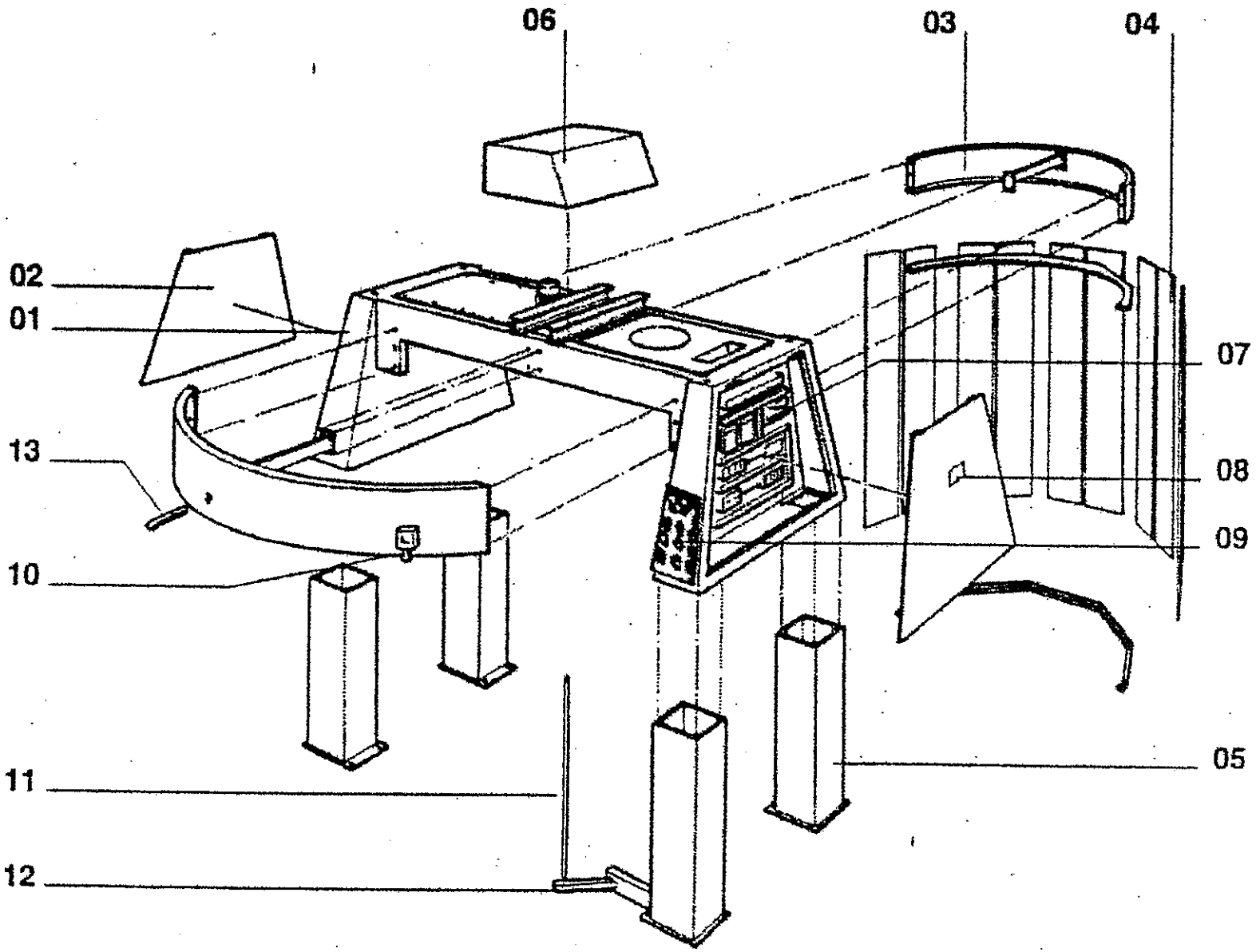
ITALPACK

Pesatrice elettronica - *Eletronic weigher*

PE

Pos.	Descrizione	Description		Cod.	Q.
01	TELAIO PESATRICE	WEIGHER FRAME			01
02	RECIPIENTE	CONTAINER			01
06	COPERTURA CELLA DI CARICO	LOWER CELL IRON SHEETING			02
07	RONDELLA PARAPOLVERE	DEDUSTING WASHER			02
08	SUPPORTO FISSAGGIO CELLA DI CARICO	LOAD CELL SUPPORT			02
10	PROTEZIONE PANNELLI	PANELS PROTECTION			mt. 8
11	CONO ILME	ILME CONE			01
13	PANNELLO LATERALE	SIDE PLATES			02
14	CASSETTA ELETTRICA	ELECTRIC BOX			01
15	POMELLO	KNOB			08
16	APPARECCHIATURA ELETTRONICA	ELECTRONIC EQUIPMENT			01
17	PANNELLO POSTERIORE	FRONT PLATES			02
18	REGOLATORE DI FLUSSO	FLOW REGULATOR			01
19	ELETTROVALVOLA	SOLENOID			03
23	GRUPPO FILTRO	FILTER GROUP			01
24	BOLLA DI LIVELLO	LEVEL BUBBLE			01
25	RIGHETTA TENUTA BOTOLE	DOOR SUPPORT PLATES			02
26	CERNIERA POSTERIORE	CYLINDER FIXAGE HINGE			01
27	CILINDRO PNEUMATICO	PNEUMATIC CYLINDER			01
28	SPINA CONICA	CONIC			04
29	FORCELLA	LATERAL FORKS			04
30	BARRA FILETTATA	TIE-RODS FOR OPENING DOORS			02
31	DADO ESAGONALE	NUT			04
33	BOTOLA DI FONDO	BOTTOM DOORS			02
34	FORCELLA	FORK			01
35	RIGHETTA APERTURA BOTOLE	DOOR OPENING PLATES			01
36	STAFFA FISSAGGIO SENSORE	MAGNETIC SENSOR SUPPORT			02
37	SENSORE MAGNETICO	MAGNETIC SENSOR			02
39	TIRANTE FISSAGGIO CILINDRO	BIN RETAINER PIN			01
43	RIGHETTA FISSAGGIO MOLLA	TIE-RODS CONNECTION SUPPORT			02
44	UNIBALL	MAGNETIC SENSOR			02
45	MOLLA FISSAGGIO RECIPIENTE	SPHERIC HINGE			02
48	FORCELLA FISSAGGIO UNIBALL	HORIZONTAL TIE-ROD			02
51	CELLA DI CARICO	SPHERIC HINGE SUPPORT FORK LOAD CELL			02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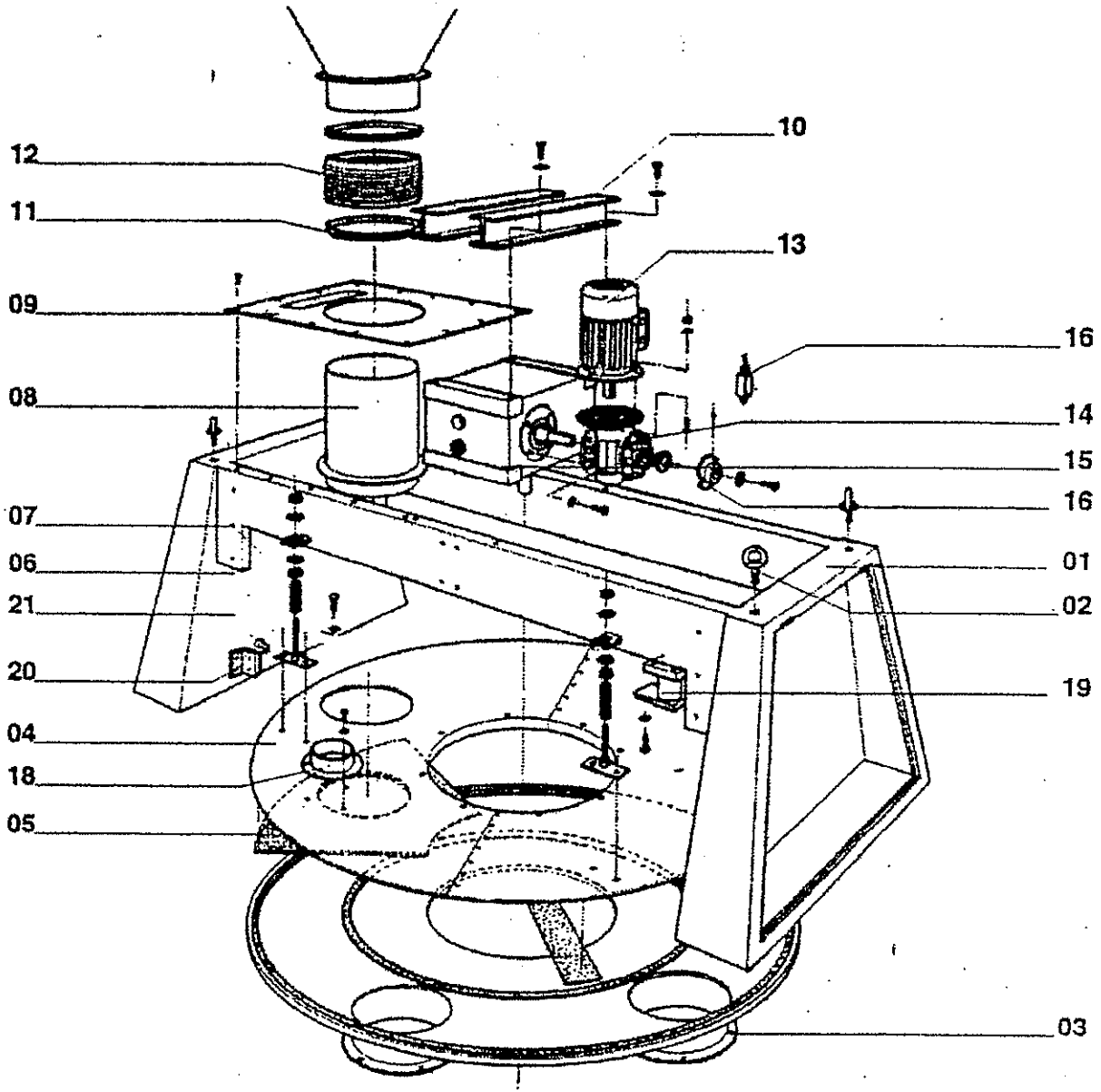
ITALPACK

Telaio - *Frame*

CR .1

Pos.	Descrizione	Description		Cod.	Q.
01	TELAIO SUPERIORE CAROSELLO	CAROUSEL FRAME			01
02	PANNELLO LATERALE	LATERAL SIDE			02
03	SOSTEGNO MANTELLO DI PROTEZIONE	PROTECTION SUPPORT			02
04	PLEXIGLAS DI PROTEZIONE LARGH. 300	PROTECTION PLEXIGLAS			MT
05	GAMBA DI SOSTEGNO	SUPPORT LEGS			18
06	CARTER PROTEZIONE INTERMETTITORE	MOVING GUARD			04
07	AUADRO ELETTRICO	ELECTRIC PANEL			01
08	INTERRUTTORE QUADRO ELETTRICO	GENERAL SWITCH BOARD ELECTRIC PANEL			01
09	PULSANTLERA DI COMANDO	SWITCH BOARD			01
10	FINECORSA DL EMERGENZA	EMERGENCY LIMIT SWITCH			01
11	FUNE A STRAPPO	TEAR CABLE			01
12	STAFFA FISSAGGIO FUNE	FKASK FOR CABLE FIXING			01
13	FINECORSA CHIUSURA BOCCASACCO	BAG-CLAMP CLOSED LIMIT SWICHT			01
					01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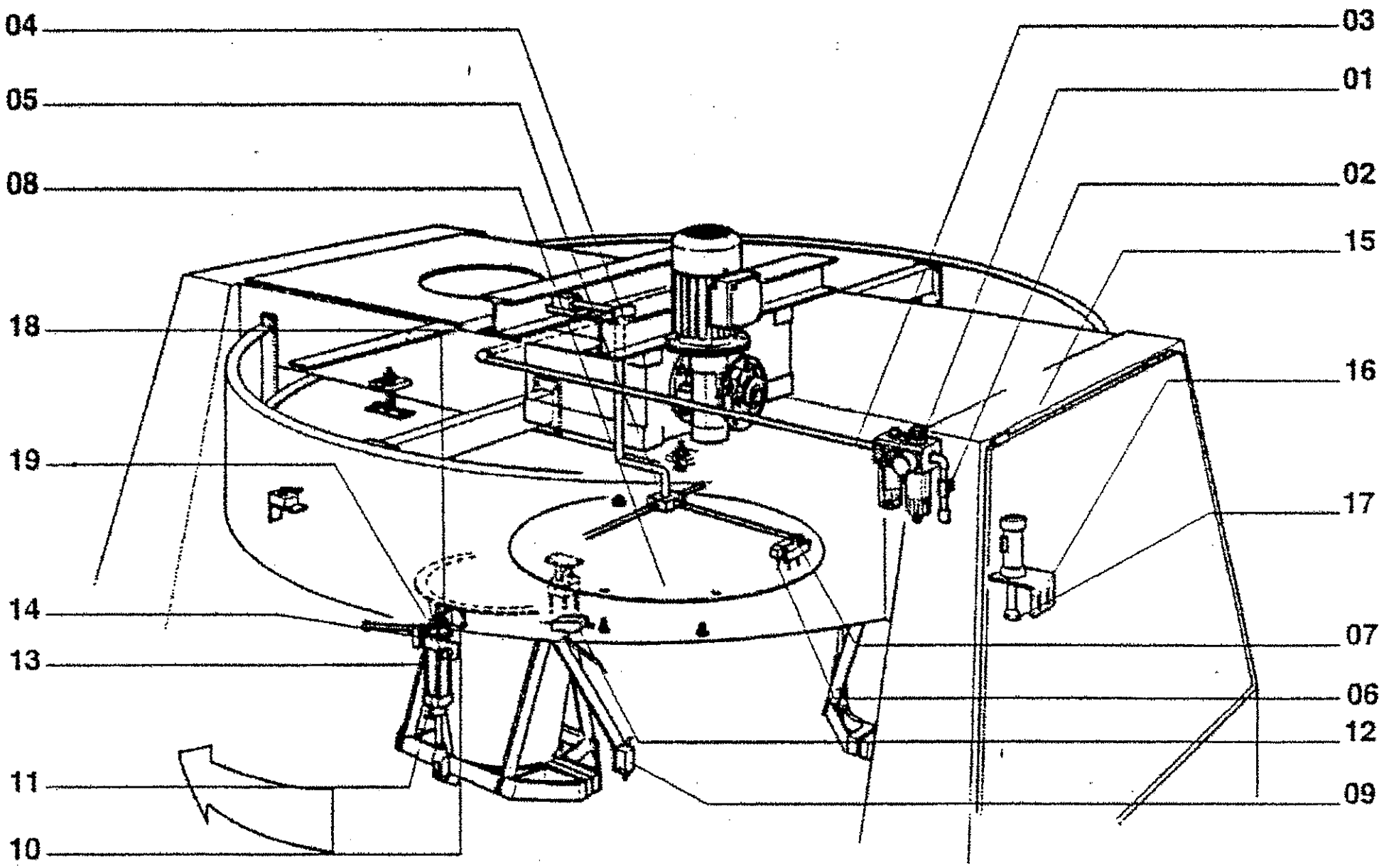
ITALPACK

Motorizzazione e guarnizioni - *Motorization and gaskets*

CR. 2

Pos.	Descrizione	Description	Cod.	Q.
01	TELAIO SUPERIORE CAROSELLO	CAROUSEL FRAME	0861	01
02	GOLTARI DI SOLLEVAMENTO	LIFTING HOOKS		04
03	DISCO PORTA BOCCASACCO	ROTATING DISK	0862	01
04	DISCO FISSO	FIXING DISK	0863	01
05	FELTRO DI TENUTA	FELT GUARD		01
06	PIEDINO PRESSA DISCO	DISK PRESSING DEVICE FOOT		04
07	MOLLA	SPRING THE ROD		04
08	CANALE CONVOLGLIAMENTO PRODOTTO	PRODUCT CONVEYING CHANNEL		01
09	LAMIERA SUPERIORE CHIUSURA	CLOSING UPPER PLATE		
10	MENSOLA SOSTEGNO INTERMETTITORE	INDEXER SUPPORT PLATE	0865	02
11	FASCIETTA METALLICA	METALLIC CLIPS		02
12	ANELLO IN GOMMA	RUBBER RING		01
13	MOTORE DI COMANDO AUTOFRENANTE	AUTOBRAKE DRIVE MOTOR		01
14	RIDUTTORE	REDUCER	MVF86	01
15	INTERMETTITORE	INDEXER		01
16	FINECORSA SU CAMMA	CAM LIMIT SWITCH	FC315	01
17	CAMMA TAVOLA ROTANTE	ROTATING TABLE CAM	0892	01
18	PRESA ASPIRAZIONE SUPERIORE	UPPER SUCTION HOOD	1280	03
19	STAFFA SICUREZZA DISCO PORTA	SALETY LLASK LOR IHE SACKINLEED HOLDING		
	BOCCASACCHI	DISCK		
20	FOTOCELLULA	PHOTOCELL		
21	PULITORE PER TOTOCELLULA	POLISHER FOR PHOTOCELL		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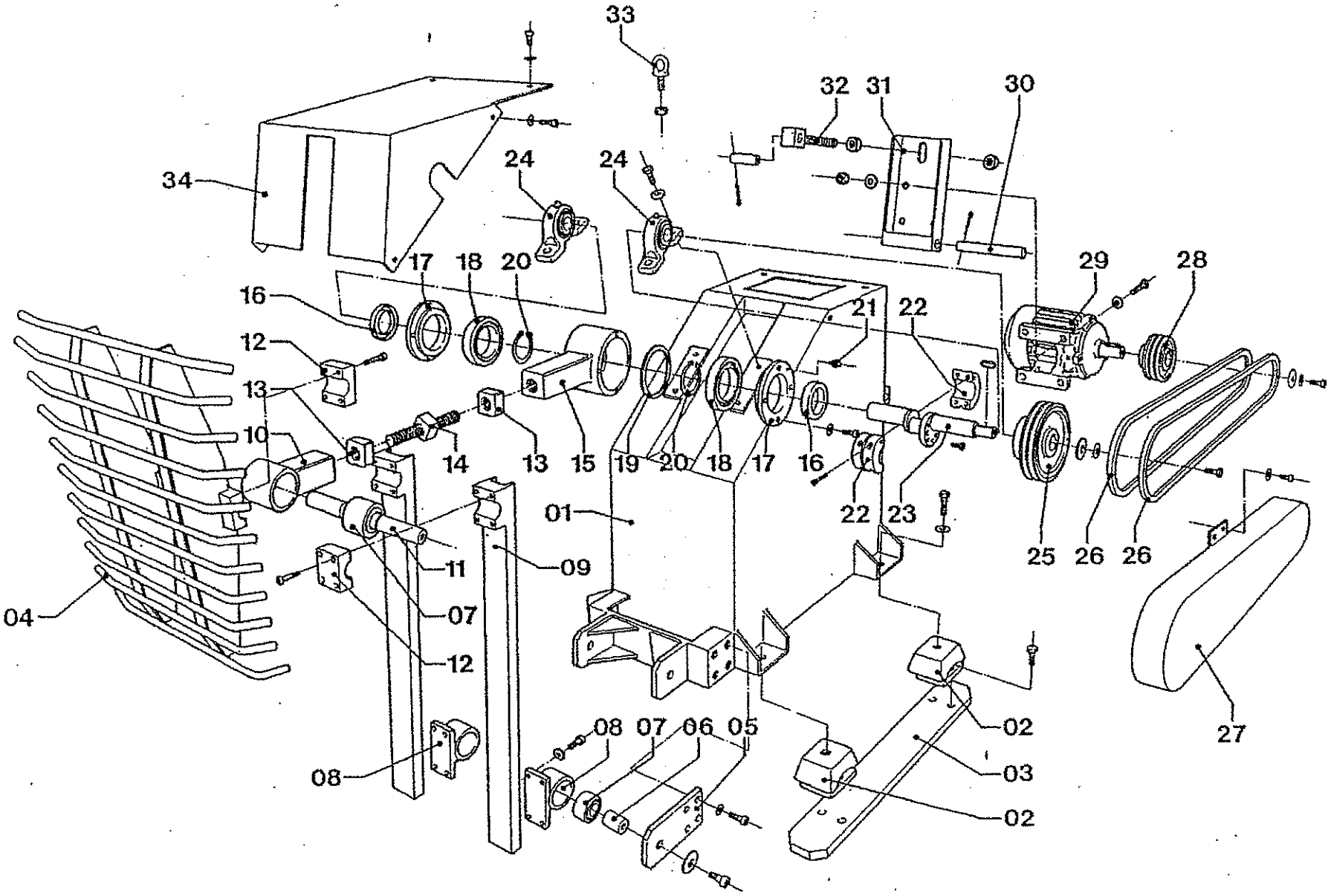
ITALPACK

Filtri e protezioni - *Filters and protections*

CR. 3

Pos.	Descrizione	Description	Cod.	Q.
01	GRUPPO TILTRO LUBRIFICATORE	LUBRIFICATOR FILTER GROUP	FR+L 1/2	01
02	RUBINETTO IDRAULICO	HYDRAULIC COCK		01
03	TUBO CONNESSIONE ARIA COMPRESSA	AIR-PRESSURE CONNECTION PIPE		01
04	TUBO CONNESSIONE ARIA COMPRESSA	AIR- PRESSURE CONNECTION PIPE		01
05	PRESA PNEUMATICA ROTANTE	ROTATING PNEUMATIC CONNECTION		01
06	ELETTROVALVOLA IS01	SOLENOID IS01	54101019	01*
07	BASE ELETTROVALVOLA IS01	SOLENOID BASE IS01	35500061	01*
08	CARTER DI PROTEZIONE	PROTECTION GUARD		01
09	FINECORSA CHIUSURA BOCCASACCO	LIMIT SWITCH BAG-CLAMP CLOSING	30800030	01*
10	STAFFA PULSANTE EMERGENZA	EMERGENCY SWITCH PLASE	0888	01*
11	PULSANTE EMERGENZA A FUNGO	EMERGENCY SWITCH PLATE	88130705	01*
12	DISTRIBUTORE PNEUMATICO	PNEUMATIC COLLECTOR		01*
13	STAFFA FINECORSA SCARICO SACCO	BAG-DISCHARGE LIMIT SWITCH PLATE	0885	01*
14	FINECORSA SCARICO SACCO	BAG-DISCHARGE LIMIT SWITCH	30800017	01*
15	CILINDRO APERTURA BOCCASACCO	BAG-CLAMP OPENING CYLINDER	C25AS50	
16	STAFFA FISSAGGIO CILINDRO	CYLINDER FIXING PLATE		
17	TAMPONE IN GOMMA	RUBBER PLATE		
18	STAFFA CONSENSO ROTAZ. DISCO.	ROTATING DISK SIGNAL PLATE		01*
	PORTASACCHI			01*
19	CAMMA SENSORE CONSENSO ROTAZIONE	ROTATING DISK SIGNAL CAM		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ITALPACK

Sbattisacco - *Bag beater*

CR. 4

Pos.	Descrizione	Description	Cod.	Q.
01	TELAIO SBATTISACCO	SACK BEATER FRAME	0253	01
02	ANTIVIBRANTE STHAL-GUMMI	ANTI-VIBRATION DEVICE STHAL-GUMMI	350 ANT	04
03	PIASTRA DI FISSAGGIO	CLAMPING PLATE	STAGUM	02
04	RASTRELLIERA	RACK	0271	01
05	PIASTRA FISSAGGIO SILENT-BLOCK	CLAMPING PLATE-SLLENT BLOCK	0254	02
06	PERNO PER SILENT-BLOCK	SILENT BLOCK PIN	0267	02
07	SILENT-BLOCK	SILENT BLOCK	0259	03
08	SUPPORTO SILENT-BLOCK INFERIORE	LOWER SILENT BLOCK SUPPORT	350 BC 75-40-70	02
09	SBRACCIO PORTA RASTRELLIERA	RACK HOLDER RANGE	0258	02
10	BIELLA SUPERIORE	UPPER CONNECTING ROD	0268	01
11	ALBERO SUPERIORE	UPPER SHAFT	0266	01
12	BLOCCHETTO FISSAGGIO ALBERO SUPERIORE	UPPER SHAFT CLAMPING BLOCK	0261	04
13	DADO PER BIELLA	CONNECTING ROD NUT	0256	02
14	VITE REGOLAZIONE BIELLA	CONNECTING ROD ADJUSTING SCREWS	0265	01
15	BIELLA CENTRALE	CENTRAL CONNECTING ROD	0264	01
16	PARAOLIO	OIL SPLASH GUARD	0262	02
17	FLANGIA PER BIELLA CENTRALE	CENTRAL CONNECTING ROD FLANGE	350 PA 80-100-10	02
18	CUSCINETTO NON PROTETTO 6016	UNPROTECTED BEARING 6016	0263	02
19	ANELLO DISTANZIALE	SPACER RING	350 6016 NP FAG	01
20	SEEGER ESTERNO D80	OUTER DIA. 80 SIEGER RING	0270	02
21	RACCORDO SFOGO ARIA	AIR VENT PIPE FITTING	350 SE 80 EST	01
22	BOCCOLA ECCENTRICA PER SBATTISACCO	SACK BEATER ECCENTRIC BÙSH		01
23	ALBERO ECCENTRICO SBATTISACCO	SACK BEATER ECCENTRIC SHAFT	0260	01
24	SUPPORTO UCP 207	UCP 207 SUPPORT	0257	02
25	PULEGGIA CONDOTTA 160 2A	160 2A DRIVEN PULLEY	350 UCP 207	01
26	CINCHIA TRAPEZOIDALE A 62	A 62 "V" BELT	350 160 2A 288	02
27	CARTER COPRICINGHIE	BELT COVERING HOUSING	350 A 62 CIN	01
28	PULEGGIA MOTRICE 90 2A	90 2A MOTIVE PULLEY	0269	01
29	MOTORE COMANDO KW 0,75	0,75 KW CONTROL MOTOR	350 90 2A 248	01
30	PERNO BANDIERA MOTORE	MOTOR LUG PIN	15000 M 006	01
31	BANDIERA MOTORE	MOTOR LUG	0035	01
32	ATTACCO REGOLAZIONE MENSOLA	BRACKET ADJUSTMENT CONNECTION	0247	01
33	GOLFARE SOLLEVAMENTO	LIFTING EYEBOLT	0013	02
34	CARTER SUPERIORE	UPPER HOUSING		01
35	CHIAVE ECCENTRICO	ECCENTRIC KEY	0255	01

ATTACHMENTS

PART VIII

TABLE SHOWING UNI 7164 AND ISO 3498 STANDARD CODES WITH REFERENCE TO THE LUBRICANTS OF THE COMPANIES LISTED BELOW

CLASS	ISO AND UNI CODES	AREAS OF USE.	AGIP	API	ARAL	ARCO	BARELLI	BELLINI	BERGOLINE	BP	BRYTOL	CASTROL
A	AN 68	Disposable lubricants	RADULA 68 ACER 68	API MF-68	ARAL DURAL MR 68	GASCON 68	MIN 68	TRASMISSION 68	ACCA 68	M 68	TRM 68	MAGNA 68
C	CB 32	Moderately loaded gears	ACER 32	API MF-32 API CIS-32	ARAL DURAL MR 46 ARAL VITAM GF 32	RUBILENE 32	NT/AOS 32	SPRINTER AS 32	BERGOFLUID 32	ENERGOL HP 32	CM 32	MAGNA 32
	CB 68		ACER 68	API MF-68 API CIS-68	ARAL DURAL MR 68 ARAL VITAM GF 68	RUBILENE 68	NT/AOS 68	SPRINTER AS 68	BERGOFLUID 68	ENERGOL HP 68	CM 68	MAGNA 68
	CB 150		ACER 150	API MF-150 API CIS-150	ARAL DURAL MR 150 ARAL DEGOL TU 150	RUBILENE 150	NT/AOS 150	SPRINTER AS 150	BERGOFLUID 150	ENERGOL CS 150	CM 150	MAGNA 150
	CC 150	Heavily loaded gears	BLASIA 150	API DT-150	ARAL DEGOL BG 150	PENNANT NL 150	G.E.P. 150	RED R/4 150	BERGOLED EP 150	ENERGOL GR-XP 150	DENTOL EP 150	ALPHA SP 150
	CC 320		BLASIA 320	API DT-320	ARAL DEGOL BG 320	PENNANT NL 320	G.E.P. 320	RED R/4 320	BERGOLED EP 320	ENERGOL GR-XP 320	DENTOL EP 320	ALPHA SP 320
	CC 460		BLASIA 460	API DT-460	ARAL DEGOL BG 460	PENNANT NL 460	G.E.P. 460	RED R/4 460	BERGOLED EP 460	ENERGOL GR-XP 460	DENTOL EP 460	ALPHA SP 460
F	FD 5	Spindles, bearings and coupled clutches	OSO 10	API CIS-5	ARAL DURAL SR 5	DURO OIL 10	VELOS A 10	SPRINTER ADPV 5		ENERGOL HP 5	MOVOIL 5	MAGNA AB 5
	FD 10		OSO 10	API CIS-10	ARAL DURAL SR 10	DURO OIL 10	VELOS A 10	SPRINTER ADPV 10	BERGOSPIN 10	ENERGOL HP 10	MOVOIL 10	HYSPIN AWS 10
	FD 22		OSO 15	API CIS-22	ARAL DURAL SR 22	DURO OIL 22	TIA/RO 22	SPRINTER ADPV 22	BERGOSPIN 22	ENERGOL HLP 22	MOVOIL 22	HYSPIN AWS 22
G	G 32	Guides	EXIDIA 32	API MX-32		TRUSLIDE 32	TIA/RO BK 32	WAY 32	ENGINE K 32	ENERGOL GHL 32	VAITAK 32 HYDRO D 32	MAGNA GC 32
	G 68		EXIDIA 68	API MX-68	ARAL DEGANIT B 68	TRUSLIDE 68	M.P. 68	WAY 68	ENGINE K 68	MACCURAT 68 ENERGOL GHL 68	VAITAK 68	MAGNA BD 68 MAGNA BDX 68
	G 220		EXUDIA 220	API MX-220	ARAL DEGANIT B 220	TRUSLIDE 220	M.P. 220	WAY 220	ENGINE K 220	MACCURAT 220 ENERGOL GHL 220	VAITAK 220	MAGNA CF 220 MAGNA CFX 220
H*	HM 32	Hydrostatical systems	OSO 32	API CIS -32 API CIS-32 AW	ARAL VITAM GF 32	DURO OIL AW 32	TIA/RO 32	SPRINTER ADPV 32	PARATER S 32 PARAVIS HLP 32	ENERGOL HLP 32 ENERGOL HLP-D 32	AROS 32 HYDRO D 46	HYSPIN AWS 32
	HM 46		OSO 46	API CIS-46 API CIS-46 AW	ARAL VITAM GF 46	DURO OIL AW 46	TIA/RO 46	SPRINTER ADPV 46	PARATER S 46 PARAVIS HLP 46	ENERGOL HLP 46 ENERGOL HLP-D 46	AROS 46 HYDRO D 46	HYSPIN AWS 46
	HM 68		OSO 68	API CIS-68 API CIS-68 AW	ARAL VITAM GF 68	DURO OIL AW 68	TIA/RO 68	SPRINTER ADPV 68	PARATER S 68 PARAVIS HLP 68	ENERGOL HLP 68 ENRGOL HLP-D 68	AROS 68 HYDRO D 68	HYSPIN AWS 68
	HG 32	Hydraulic systems and guides	EXIDIA 32	API CIS-32 EP		TRUSLIDE 32	TIA/RO BK 32	WAY SI 32	ENGINE K 32	ENERGOL GHL 32	VIATAK 32 HYDRO D 32	MAGNA GC 32
	HG 68		EXIDIA 68	API CIS-68 EP	ARAL DEGANIT B 68	TRUSLIDE 68	TIA/RO BK 68	WAY SI 68	ENGINE K 46	ENERGOL GHL 68	VIATAK 68 HYDRO D 68	MAGNA AX 68
X	XM 1	Multi-purpose greases	GR MU EP 1	APIGREASE PGX-1	ARAL ARALUB HL 1	LITHOLINE H EP GR. 1	LITIO EP 1	GREASE LI EP 1	RULTEN 900 EP 1	GREASE LTX1 GREASE LTX1-EP	BRYGREASE LT 1	SPHEEROL APT 1 SPHEEROL EPL 1
	XM 2		GR MU EP 2	APIGREASE LT-S APIGREASE PGX-2	ARAL ARALUB HL 2	LITHOLINE H EP GR. 2	LITIO EP 2	GREASE LI EP 2	RULTEN 900 N. 2-EP 2	GREASE LTX2 GREASE LTX2-EP	BRYGREASE LT 2	SPHEEROL APT 2 SPHEEROL EPL 2
	XM 3		GR MU EP 3	APIGREASE CR-S APIGREASE PGX-3	ARAL ARALUB LF 3	LITHOLINE H EP GR. 3	PILMUT 3	GREASE LI EP 3	RULTEN 900 N. 3	GREASE LTX3	BRYGREASE LT 3	SPHEEROL APT 3 SPHEEROL EPL 3

TABLE SHOWING UNI 7164 AND ISO 3498 STANDARD CODES WITH REFERENCE TO THE LUBRICANTS OF THE COMPANIES LISTED BELOW

CLASS	ISO AND UNI CODES	AREAS OF USE.	COMLUBE	ELF	ESSO	EURAL	FINA	FUCHS	IGLEA	IP	ISADIL	KLUBER
A	AN 68	Disposable lubricants	LG AN 68	MOVIXA 68	NURAY 68	ERAL 68	ARIAN 68	RENOLIN 68	BEARING 68	IP HADRIA OIL 68	CIRCULATING OIL 68	CRUCOLAN 68
C	CB 32	Moderately loaded gears	OLEOL HH CB 32	POLYTELIS 32	TERESSO 32 NUTO 32	BRIGHT 32	SOLNA 32	RENOLIN 32	FILETE V 32 PRESTAN 32	IP HERMEA OIL 32 IP HYDRUS OIL 32	CIRCULATING OIL 46	CRUCOLAN 32
	CB 68		OLEOL HH CB 68	POLYTELIS 68	TERESSO 68 NUTO 68	BRIGHT 68	SOLNA 68	RENOLIN 68	FILETE V 68 PRESTAN 68	IP HERMEA OIL 68 IP HYDRUS OIL 68	CIRCULATING OIL 68	CRUCOLAN 68
	CB 150		OLEOL HH CB 150	POLYTELIS 150	NUTO 150	BRIGHT 150	SOLNA 150	RENOLIN 150	FILETE V 150 PRESTAN 150	IP HERMEA OIL 150 IP HYDRUS OIL 150	CIRCULATING OIL 150	CRUCOLAN 150
	CC 150	Heavily loaded gears	OLGEAR EP CC 150	REDUCTELF SP 150	SPARTAN EP 150	ELTON EP 150	GIRAN 150	RENEP COMPOUND 104	RILEN EP 150	IP MELLANA OIL 150	NL GEAR COMPOUND 150	LAMORA 150
	CC 320		OLGEAR EP CC 320	REDUCTELF SP 320	SPARTAN EP 320	ELTON EP 320	GIRAN 320	RENEP COMPOUND 108 RENEP SUPER 6	RILEN EP 320	IP MELLANA OIL 320	NL GEAR COMPOUND 320	LAMORA 320
	CC 460		OLGEAR EP CC 460	REDUCTELF SP 460	SPARTAN EP 460	ELTON EP 460	GIRAN 460	RENEP COMPOUND 110 RENEP SUPER HO	RILEN EP 460	IP MELLANA OIL 460	NL GEAR COMPOUND 460	LAMORA 460
F	FD 5	Spindles, bearings and coupled clutches	OLEOL HM FD 5	SPINELF 5	NUTO H 5	NEDEL 5	HYDRAN 10	RENOLIN MR 1	FILETE V 5	IP HYDRUS OIL 05		CRUCOLAN 5
	FD 10		OLEOL HM FD 10	SPINELF 10	SPINESSO 10	NEDEL 10	HYDRAN 10	RENOLIN MR 10	FILETE V 10	IP HYDRUS OIL 10	SPINDLE OIL 10 X	CRUCOLAN 10
	FD 22		OLEOL HM FD 22	SPINELF 22	SPINESSO 22	NEDEL 22	HYDRAN 22	RENOLIN MR 5	FILETE V 22	IP HYDRUS OIL 22	SPINDLE OIL 22 X	CRUCOLAN 22
G	G 32	Guides	WAY LUBE EP G 32	MOGLIA 32	FEBIS K 32	ARIF T 32	ARTAC EP 32	RENOLIN MR 10	NODROP V 32	IP BANTIA OIL HG 32	HWS 280	LAMORA SUPER POLADD 32
	G 68		WAY LUBE EP G 68	MOGLIA 68	FEBIS K68	ARIF T 68	ARTAC EP 68	RENEP 2	NODROP V 68	IP BANTIA OIL HG 68	WAY OIL 68	LAMORA SUPER POLADD 68
	G 220		WAY LUBE EP G 220	MOGLIA 220	FEBIS K 220	ARIF T 220	ARTAC EP 220	RENEP 5	NODROP V 220	IP BANTIA OIL G 220	WAY OIL 220	LAMORA SUPER POLADD 220
H*	HM 32	Hydrostatical systems	OLEOL HM 32	ELFOLINA 32	NUTO H 32 NUTO HP 32	HYDER 32	HYDRAN 32	RENOLIN B 32	FILETE V 32	IP HYDRUS OIL 32 IP HYDRUS OIL X 32	EP HYDRAULIC OIL 32	LAMORA 32
	HM 46		OLEOL HM 46	ELFOLINA 46	NUTO H 46	HYDER 46	HYDRAN 46	RENOLIN B 46	FILETE V 46	IP HYDRUS OIL 46 IP HYDRUS OIL X 46	EP HYDRAULIC OIL 46	LAMORA 46
	HM 68		OLEOL HM 68	ELFOLINA 68	NUTO H 68 NUTO HP 68	HYDER 68	HYDRAN 68	RENOLIN B 68	FILETE V 68	IP HYDRUS OIL 68 IP HYDRUS OIL X 68	EP HYDRAULIC 68	LAMORA 68
	HG 32	Hydraulic systems and guides	OLEOL HG 32	HYGLISS 32	FEBIS K 32	TERCAL 32	HYDRAN CIN 32	RENOLIN MR 10	FILETE VE 32	IP BANTIA OIL HG 32	HWS 280	LAMORA 32
	HG 68		OLEOL HG 68	HYGLISS 68	FEBIS K 68	TERCAL 68	HYDRAN CIN 68	RENOLIN MR 20 RENEP 2	FILETE VE 68	IP BANTIA OIL HG 68		LAMORA 68
X	XM 1	Multi-purpose greases	LHITGREASE XM 1	ROLEXA 1 EPEXA 1	BEACON EP 1	UTNER EP 1	MARSON EPL 1	RENOLIT 1	VEGA 1	IP ATHESIA GR 1 IP ATHESIA GR EP 1	DURALITH GREASE EP 1	CENTOPLEX 1 CENTOPLEX 1 EP
	XM 2		LHITGREASE XM 2	ROLEXA 2 EPEXA 2	BEACON 2 ESSO GP GREASE	UTNER EP 2	MARSON EPL 2	RENOLIT 2 RENOLIT FEP 2	VEGA 2	IP ATHESIA GR 2 IP ATHESIA GR EP 2	DURALITH GREASE EP 2	CENTOPLEX 2 CENTOPLEX 2 EP
	XM 3		LHITGREASE XM 3	ROLEXA 3	BEACON 3	UTNER EP 3	MARSON EPL 3	RENOLIT 3 RENOLIT FEP 3	VEGA 3	IP ATHESIA GR 3	DURALITH GREASE EP 3	CENTOPLEX 3 CENTOPLEX 3 EP

TABLE SHOWING UNI 7164 AND ISO 3498 STANDARD CODES WITH REFERENCE TO THE LUBRICANTS OF THE COMPANIES LISTED BELOW

CLASS	ISO AND UNI CODES	CAMPO AREAS OF	TAMOIL	TENNEX	TEXACO	TOTAL	VABRIOL	VALVOLINE	VANGUARD	VISCOL	WEBER
A	AN 68	Disposable lubricants	TAMLUBE OIL 68	HYDROLIN 68 VERTEX 68	OMNIS 68 ALCAID OIL 60	CORTIS 68	METIX 68	CIR 68	KOMOL ST 68	SIGNAL TR 68 (S)	WEBER WEBCON 68
C	CB 32	Moderately loaded gears	INDUSTRIAL OIL 32	CONTEX 32 VERTEX 32	OMNIS 32 RANDO OIL HD 32	CORTIS 32 AZOLLA ZS 32	METRA 32	CIR 32	KOMOL ST 32	SIGNAL VL 32 (3) SIGNAL NU 32 (3)	WEBER WA 32
	CB 68		INDUSTRIAL OIL 68	CONTEX 68 VERTEX 68	OMNIS 68 RANDO OIL HD 68	CORTIS 68 AZOLLA ZS 68	METRA 68	CIR 68	KOMOL ST 68	SIGNAL VL 68 (5) SIGNAL NU 68 (5)	WEBER WA 68
	CB 150		INDUSTRIAL OIL 150	CONTEX 150 VERTEX 150	OMNIS 150 RANDO OIL HD 150	CORTIS 150 AZOLLA ZS 150	METRA 150	CIR 150	KOMOL ST 150	SIGNAL VL 150 (10) SIGNAL NU 150 (10)	WEBER WA 150
	CC 150	Heavily loaded gears	CARTER EP LUBRIC 150	FACTOR 150	MEROPA 150	CARTER EP 150	GEARLUBE EP 150	GEAR EP 150	GEARING EP 150	SIGNAL VL/EP 150 (10)	WEBER FARGO E.P.150
	CC 320		CARTER EP LUBRIC 320	FACTOR 320	MEROPA 320	CARTER EP 320	GEARLUBE EP 320	GEAR EP 320	GEARING EP 320	SIGNAL VL/EP 320 (22)	WEBER FARGO E.P. 320
	CC 460		CARTER EP LUBRIC 460	FACTOR 460	MEROPA 460	CARTER EP 460	GEARLUBE EP 460	GEAR EP 460	GEARING EP 460	SIGNAL VL/EP 460 (31)	WEBER FARGO E.P. 460
F	FD 5	Spindles, bearings and coupled clutches		ECTON 5 VELOX 5	300 OIL 5	AZOLLA ZS 5	RINOL 5	ETC 5	KOMOL SRV 5	SIGNAL ELROS 5 (12)	WEBER W.L. 10
	FD 10		TAMSPINDLE OIL 10	ECTON 10 VELOX 10	SPINTEX OIL 10	AZOLLA ZS 10	RINOL 10	ETC 10	KOMOL SRV 10	SIGNAL CO 10 (1)	WEBER W.L. 15
	FD 22		TAMSPINDLE OIL 22	ECTON 22 VELOX 22	SPINTEX OIL 22	AZOLLA ZS 22	RINOL 22	ETC 22	KOMOL SRV 22	SIGNAL CO 22 (2)	WEBER W.L. 22
G	G 32	Guides	TAMWAY OIL 32	BARTON 11		DROSERA MS 32	METRA K 32	GES 32	C.O. SPECIAL 32	SIGNAL VL/U 32 (3)	WEBER WEBSTICK 32
	G 68		TAMWAY OIL 68	BARTON 20	WAY LUBRICANT 68	DROSERA MS 68	METRA K 68	GES 68	STOL 68	SIGNAL VL/SG 68 (5)	WEBER WEBSTICK 68
	G 220		TAMWAY OIL 220	BARTON 44	WAY LUBRICANT 220	DROSERA MS 220	METRA K 220	GES 220	STOL 220	SIGNAL VL/SG 220 (12)	WEBER WEBSTICK 220
H*	HM 32	Hydrostatical systems	HYDRAULIC OIL 32	ECTON 32 VELOX 32	RANDO OIL HD 32	AZOLLA ZS 32	GAMMA X 32	HYDRAULIC HLP 32	HYDRAULIC 32	SIGNAL CO 32 (3)	WEBER WL 32 WEBER WL HP 32
	HM 46		HYDRAULIC OIL 46	ECTON 46 VELOX 46	RANDO OIL HD 46	AZOLLA ZS 46	GAMMA X 46	HYDRAULIC HLP 46	HYDRAULIC 46	SIGNAL CO 46 (4)	WEBER WL 46
	HM 68		HYDRAULIC OIL 68	ECTON 68 VELOX 68	RANDO OIL HD 68	AZOLLA ZS 68	GAMMA X 68	HYDRAULIC HLP 68	HYDRAULIC 68	SIGNAL CO 68 (5)	WEBER WL 68 WEBER WL HP 68
	HG 32	Hydraulic systems and guides	TAMWAY OIL 32	BARTON 11	CLEARTEX D RANDO OIL HD 32	DROSERA MS 32	METRA K 32 METRAT 32	GES 32	C.O. SPECIAL 32	SIGNAL VL/U 32 (3)	WEBER WEBSTICK 32
	HG 68		TAMWAY OIL 68	BARTON 20		DROSERA MS 68	METRA K 68 METRAT 68	GES 68	C.O. SPECIAL 68	SIGNAL VL/U 68 (5)	WEBER WEBSTICK 68
X	XM 1	Multi-purpose greases	TAMLITH GREASE 1 EP	GRASSO C-1 SPECIAL GRASSO MR 180/1	MULTIFAK EP 1 MARFAK 1	MULTIS EP 1 MULTIS 1	CS/MPL 1 GREASE CS/EP 1 GREASE	L 1 GREASE L 1 EP GREASE	LIKO 1 LIKO EP 1	SIGNAL ROLSFER EP 1	WEBERGREASE MP E.P. 1
	XM 2		TAMLITH GREASE 2 TAMLITH GREASE 2	GRASSO C-2 SPECIAL GRASSO MR 180/2	MULTIFAK EP 2 MULTIFAK MP 2	MULTIS EP 2 MULTIS 2	CS/MPL 2 GREASE CS/EP 2 GREASE	L 2 GREASE L 2 EP GREASE	LIKO 2 LIKO EP 2	SIGNAL ROLSFER EP 2	WEBERGREASE MP E.P. 2
	XM 3		TAMLITH GREASE 3	GRASSO C-3 SPECIAL GRASSO MR 180/3	MARFAK HD 3	MULTIS EP 3 MULTIS 3	CS/MPL 3 GREASE CS/EP 3 GREASE	L 3 GREASE L 3 EP GREASE	LIKO 3 LIKO EP 3	SIGNAL ROLSFER EP 3	WEBERGREASE MP 3

TABLE SHOWING UNI 7164 AND ISO 3498 STANDARD CODES WITH REFERENCE TO THE LUBRICANTS OF THE COMPANIES LISTED BELOW

CLASS	ISO AND UNI CODES	AREAS OF USE.	LUBRA	MILLOH	MOBIL	OLEOBLITZ	OLIO FIAT	PERSIAN OIL	Q8	ROL	SHELL	SINOL
A	AN 68	Disposable lubricants	INDUSTRIAL 68	MACHNERY 68	RUBREX 400	OLIO EHT 15	T 68	TECNOL 68	VERDI 68	LEMANIA 68	CARNEA OIL P 68	TRM 6
C	CB 32	Moderately loaded gears	OLNEO 32	MILLIVIS 32	MOBIL VACTRA OIL LIGHT	OLIO EHT 13	R 32	VITROL 32	VERDI 32	ARM 32-V	VITREA OIL 32 TELLUS OIL C32	SINOLUBE GR
	CB 68		OLNEO 68	MILLIVIS 68	MOBIL VACTRA OIL HEAVY MEDIUM	OLIO EHT 15	R 68	VITROL 68	VERDI 68	ARM 68-V	VITREA OIL 68 TELLUS OIL C68	SINOLUBE GR 5
	CB 150		OLNEO 150	MILLIVIS 150	MOBIL VACTRA OIL EXTRA HEAVY	OLIO BIVISCOLINA 120	R150	VITROL 150	VERDI 150	ARM 150-V	VITREA OIL 150 TELLUS OIL C150	SINOLUBE GR 12
	CC 150	Heavily loaded gears	DATCA EP 150	GEAR OIL EP 150	MOBILGEAR 629	OLIO ERPOL 150	EPZ 150	REDOIL EP 150	GOYA 150	EP 150	OMALA OIL 150	SINTREX EP 12
	CC 320		DACTA EP 320	GEAR OIL EP 320	MOBILGEAR 632	OLIO ERPOL 320	EPZ 320	REDOIL EP 320	GOYA 320	EP 320	OMALA OIL 320	SINTREX EP 24
	CC 460		DACTA EP 460	GEAR OIL EP 460	MOBILGEAR 634	OLIO ERPOL 460	EPZ 460	REDOIL EP 460	GOYA 460	EP 460	OMALA OIL 460	SINTREX EP 32
F	FD 5	Spindles, bearings and coupled clutches	OLEODIN 5	MILLIVIS 5	MOBIL VELOCITE Oil No. 4	OLIO EHT 10	HTF 5	IDROL 10	PUCCINI 4P		TELLUS OIL C5	SINOLUBE HV 50
	FD 10		OLEODIN 10	MILLIVIS 10	MOBIL VELOCITE OIL E MOBIL DTE 21	OLIO EHT 10	HTF 9	IDROL 10	HAYDN 10	LR 10	TELLUS OIL C10	SINOLUBE HV 100
	FD 22		OLEODIN 22	MILLIVIS 22	MOBIL VELOCITE OIL D MOBIL DTE 22	OLIO EHT 12	HTF 22	HTF 22	HAYDN 22	LR 22	TELLUS OIL C22 TELLUS OIL 22	SINOLUBE HV 200
G	G 32	Guides	SLEDOL 32	OLG 32	MOBIL VACTRA Oil No. 4	OLIO TRAX 13	GS 32	AROIL S 32	WAGNER 32		TONNA OIL T32	SINOLUBE GS 3
	G 68		SLEDOL 68	OLG 68	MOBIL VACTRA Oil. No. 2	OLIO TRAX 15	GS 68	AROIL S 68	WAGNER 68	ARM 68-EP	TONNA OIL T68	SINOLUBE GS 5
	G 220		SLEDOL 220	OLG 220	MOBIL VACTRA Oil. No. 4	OLIO ANTIGOCCIA 1450	GS 220	AROIL S 220	WAGNER 220	ARM 220-EP	TONNA OIL T220	SINOLUBE GS 14
H*	HM 32	Hydrostatical systems	OLEODIN 32	TELEDINAX 32 TELEDINAX HVI 32	MOBIL DTE 24	OLIO EHT 13 H	HTF 32	IDROL 32	HAYDN 32	LI 32	TELLUS OIL 32 HYDRAULIC OIL 32	SINOLUBE 3
	HM 46		OLEODIN 46	TELEDINAX 46 TELEDINAX HVI 46	MOBIL DTE 25	OLIO EHT 14 H	HTF 46	IDROL 46	HAYDN 46	LI 46	TELLUS OIL 46 HYDRAULIC OIL 46	SINOLUBE 4
	HM 68		OLEODIN 68	TELEDINAX 68 TELEDINAX HVI 68	MOBIL DTE 26	OLIO EHT 15 H	HTF 68	IDROL 68	HAYDN 68	LI 68	TELLUS OIL 68 HYDRAULIC OIL 69	SINOLUBE 5
	HD 32	Hydraulic systems and guides	SLEDOL GC 32	TELEDINAX EP 32	MOBIL VACUOLINE OIL 1405	OLIO DYN 32	RCS 32	AROIL S 22	WAGNER 32	LI 32-EP	TONNA OIL T32	SINOLUBE MB3
	HC 68		SLEDOL GC 68	TELEDINAX EP 68	MOBIL VACUOLINE OIL 1409	OLIO DYN 68	RCS 68	AROIL S 32	WAGNER 68	LI 68-EP	TONNA OIL T68	SINOLUBE MB5
X	XM 1	Multi-purpose greases	ROLLER EP 1	UNIVERSAL GREASE 1 UNIVERSAL GREASE EP 1	MOBILPLEX 46	GRASSO SFERUL LF	LAMBDA 1 EP	LT GREASE 1	REMBRANDT EP 1	LITEX/EP 1	ALVANIA EP GREASE 1 SUPER GREASE EP 1	BEARING EP 1
	XM 2		ROLLER EP 2	UNIVERSAL GREASE 2 UNIVERSAL GREASE EP 2	MOBILPLEX 47	GRASSO SFERUL LC	JOTA 2/S	LT GREASE 2	REMBRANDT EP 2	LITEX/EP 2	ALVANIA GREASE R2 SUPER GREASE R2	BEARING EP 2
	XM 3		ROLLER EP 3	UNIVERSAL GREASE 3 UNIVERSAL GREASE EP 3	MOBILPLEX 48	GRASSO SFERUL LD	JOTA 3 FS	LT GREASE 3	REMBRANDT EP 3	MERCURY 3	ALVANIA GREASE R3 SUPER GREASE R3	BEARING EP 3

General Conversion Tables

PRESSURE CONVERSION TABLE

BAR	KPa	PSI	Kg/cm^2	BAR	KPa	PSI	Kg/cm^2
0,1	10	1,450	0,102	11	1100	159,50	11,22
0,2	20	2,900	0,204	12	1200	174,00	12,24
0,3	30	4,350	0,306	13	1300	188,50	13,26
0,4	40	5,800	0,408	14	1400	203,00	14,28
0,5	50	7,250	0,510	15	1500	217,50	15,30
0,6	60	8,700	0,612	16	1600	232,00	16,32
0,7	70	10,150	0,714	17	1700	246,50	17,34
0,8	80	11,160	0,816	18	1800	261,00	18,36
0,9	90	13,050	0,918	19	1900	275,50	19,38
1,0	100	14,500	1,020	20	2000	290,00	20,04
1,5	150	21,750	1,530	25	2500	362,50	25,50
2,0	200	29,000	2,040	30	3000	435,00	30,60
2,5	250	36,250	2,550	35	3500	507,50	35,70
3,0	300	43,500	3,060	40	4000	580,00	40,80
3,5	350	50,750	3,570	45	4500	652,50	45,90
4,0	400	58,000	4,080	50	5000	725,00	51,00
4,5	450	65,250	4,590	55	5500	797,50	56,10
5,0	500	72,500	5,100	60	6000	870,00	61,20
5,5	550	79,750	5,610	65	6500	942,50	66,30
6,0	600	87,000	6,120	70	7000	1015,00	71,40
7,0	700	101,500	7,140	75	7500	1087,50	76,50
8,0	800	116,000	8,160	80	8000	1160,00	81,60
9,0	900	130,500	9,180	90	9000	1305,00	91,80
10,0	1000	145,000	10,200	100	10000	1450,00	102,00

As per the following equivalences:
1 Bar = 100 Kpa
1 Bar = 14,5 PSI
1 Bar = 1,02 kg/cm^2

UNITS OF MEASURE AND CONVERSIONS

Units	Abbrev.	SI Unit	Conversion factor
Units of length			
1 inch =	in	2,54 cm	0,393701
1 foot = 12 in = 3 hands	ft	30,48 cm	0,0328084
1 yard = 3 feet = 4 spans	yd	0,9144 m	1,09361
1 mile (Landmile)	mi	1,609 km	0,62137
1 nautical mile (internat.)	n mi. NM	1,852 km	0,539957
Units of surface			
1 square inch	sq in	6,4516 cm^2	0,155000 10^{-3}
1 square foot = 144 sq in	sq ft	929,03 cm^2	1,0764=10
1 square yard = 9 sq ft	sq yd	0,83613 m^2	1,19599
1 square mile = 640 acres	sq mi	2,5900 km^2	0,38610
Units of volume			
1 cubic inch	cu in	16,387 cm^3	0,061024
1 cubic foot = 1728 cu in	cu ft	28,317 dm^3	0,035315
1 cubic yard = 27 cu ft	cu yd	0,76455 m^3	1,30795
1 register ton = 100 cu ft		2,8317 m^3	0,35314
1 shipping ton		1,13268 m^3	0,88286
1 fluid once (GBr)	fl oz	0,028413 dm^3	35,1950
1 fluid once (USA)	fl oz	0,029574 dm^3	33,8138
1 pint = 4 gills (GBr)	(liq) pt	0,56826 dm^3	1,75975
1 pint = 4 gills (USA)	liq pt	0,47318 dm^3	2,11336
1 dry pint	dry pt	0,55061 dm^3	1,81616
1 quart = 2 pints (GBr)	(liq) qt	1,13652 dm^3	0,87988
1 quart = 2 pints (USA)	liq qt	0,94636 dm^3	1,05668
1 dry quart	dry qt	1,10123 dm^3	0,908077
1 gallon = 2 pottles (GBr)	gal	4,54609 dm^3	0,219969
1 gallon (USA)	gal	3,78543 dm^3	0,264170
1 bushel = 4 pecks (GBr)	bu	36,3687 dm^3	0,0274962
1 bushel = 4 pecks (USA)	bu	35,2393 dm^3	0,0283774
1 dry barrel		115,628 dm^3	0,0086484
1 petroleum barrel		158,762 dm^3	0,0062987
Units of force			
1 pound-weight	lb wt	4,448221 N	0,2248089
1 pound-force	LB, lbf	4,448221 N	0,2248089
1 poundal	pdl	0,138255 N	7,23301
1 kilogramme-force	kgf, kgp	9,80665 N	0,1019716
1 short ton-weight	Sh tn wt	8,896444 kN	0,1124045
1 long ton-weight	ltn wt	9,964015 kN	0,1003611
1 ton-force	Ton, tonf	9,964015 kN	01003611

Units	Abbrev.	SI Unit	Conversion factor
Units of pressure (force/surface)			
1 pound-weight	lb wt/sq in	6,8948 kN/ cm^2	0,145038
per square inch	ppsi, psi	68,948 mbar	0,0145038
1 pound-weight	lb wt/sq ft	47,880 N/m^2	0,0208854
per square foot	ppsf, psf	0,47880 mbar	2,08854
1 kilogramme-force/sq in	kgf/sq in	1,52003 N/m^2	0,657880
1 short ton-weight/sq in		13,7895 N/mm^2	0,072552
1 ton-force/sq in	Ton/sq in	15,4443 N/mm^2	0,064749
1 foot of water	ft H_2O	0,029891 bar	33,455
1 inch of Hg	in Hg	0,033864 bar	29,530
Units of work and energy			
1 foot pound-weight	ft lb wt	1,355821 J	0,737561
1 foot pound-force	ft Lb, ft lbf	1,355817 J	0,737563
1 foot-poundal	ft pdl	0,0421401 J	23,7304
1 British Thermal Unit	Blu, BTU	1,055056 kJ	0,947817
(internat. steam table)	B. tn. u.	0,293071 Wh	3,412141
1 horse-power hour	hph, H Phr	2,6845 Mj	0,37251
	h. p. hr.	0,74570 kWh	1,34102
Units of power (work/time)			
1 foot pound-weight/s	ft lb wt/s	1,355821 W	0,737561
1 British thermal unit/s	Btu/s	1,055056 kW	0,947817
1 British thermal unit/h	Btu/h	0,293071 W	3,41214
1 horse-power	hp, h.p.	0,74570 kW	1,34102
Units of mass			
1 grain	gr	64,7989 mg	0,0154324
1 dram	dr	1,77185 g	0,564383
1 once = 16 dreams	oz	28,3495 g	0,0352739
1 pound = 16 oz	lb	0,453592 kg	2,204622
1 quarter = 28 lb (lbs)		12,7006 kg	0,078737
1 hundredweight = 112 lb	cwt	50,8024 kg	0,0196841
1 long hundredweight	l cwt	50,8024 kg	0,0196841
1 short hundredweight	sh cwt	45,3592 kg	0,0220462
1 ton = 1 long ton	tn, l tn	1,016047 t	0,984206
1 short ton = 2000 lb	sh tn	0,907185 t	1,102311

General information on stress and consumption for cylinders

Stress expressed in N (0.102 kp)

Ø		Working pressure in bar								
mm.	inches	2	3	4	5	6	7	8	9	10
8		10	15	20	25	30	35	40	45	50
10		16	23	31	39	47	55	62	70	78
12		22,5	34	45	56,5	68	79	90,5	102	113
16		40	60	80	100	120	140	160	180	200
20		63	94	125	157	188	220	251	283	314
25		98	147	196	245	294	343	392	441	490
32	1 1/4"	158	238	317	397	476	555	635	714	793
40		250	377	506	628	753	879	1005	1130	1256
44,5	1 3/4"	311	466	622	777	933	1088	1244	1399	1555
50	2"	392	589	786	982	1178	1375	1571	1768	1964
63	2 1/2"	623	935	1247	1559	1870	2182	2494	2805	3117
76,2	3"	912	1368	1824	2280	2736	3192	3648	4104	4560
80		1500	1508	2010	2513	3016	3518	4021	4523	5026
100	4"	1570	2355	3140	2925	4710	5495	6280	7055	7850
125	5"	2454	3681	4908	6136	7363	8590	9817	11044	12271
152,4	6"	3648	5472	7696	9121	10945	12769	14594	16417	18241
160		4021	6032	8042	10053	12064	14074	16085	18095	20106
200	8"	6280	9420	12560	15700	18840	21980	25120	28260	31400
250	10"	10134	15201	20268	25335	30402	35469	40536	45630	50670
304,8	12"	14593	21890	29185	36483	43779	51066	58372	65669	72965
355,6	14"	19863	29795	29726	49657	59588	69520	79451	89383	99314

The stress is purely theoretical. In practice, it is advisable to increase the above values by 25%.

Air consumption in Nl/min for 1 cm of the stroke at working pressures (bar)

Cyl. Ø	Working surface		Working pressure (bar)									
(mm)	for	cm^2	1	2	3	4	5	6	7	8	9	10
32	thrust	qs 8,0384	0,016	0,024	0,032	0,040	0,048	0,056	0,064	0,072	0,082	0,088
	traction	qt 6,9080	0,014	0,021	0,028	0,035	0,042	0,049	0,056	0,063	0,070	0,076
40	thrust	qs 12,560	0,025	0,038	0,050	0,063	0,076	0,088	0,100	0,113	0,126	0,188
	traction	qt 10,020	0,020	0,030	0,040	0,050	0,060	0,070	0,080	0,090	0,100	0,110
50	thrust	qs 19,625	0,039	0,059	0,079	0,098	0,118	0,137	0,157	0,177	0,196	0,216
	traction	qt 17,082	0,034	0,051	0,068	0,085	0,102	0,120	0,137	0,154	0,170	0,188
63	thrust	qs 31,156	0,062	0,093	0,125	0,156	0,187	0,218	0,249	0,280	0,312	0,343
	traction	qt 27,258	0,055	0,072	0,109	0,136	0,164	0,191	0,218	0,245	0,273	0,300
80	thrust	qs 50,240	0,100	0,150	0,200	0,250	0,301	0,351	0,402	0,452	0,502	0,552
	traction	qt 46,441	0,093	0,139	0,186	0,232	0,279	0,325	0,372	0,418	0,464	0,510
100	thrust	qs 78,500	0,157	0,236	0,314	0,382	0,471	0,549	0,628	0,706	0,785	0,862
	traction	qt 71,435	0,143	0,214	0,286	0,357	0,429	0,500	0,571	0,643	0,714	0,786
125	thrust	qs 122,656	0,245	0,368	0,490	0,613	0,736	0,859	0,981	1,104	1,226	1,349
	traction	qt 115,591	0,231	0,346	0,462	0,578	0,694	0,809	0,925	1,040	1,156	1,272
160	thrust	qs 200,960	0,402	0,603	0,804	1,005	1,206	1,407	1,608	1,809	2,010	2,211
	traction	qt 188,400	0,377	0,565	0,754	0,942	1,130	1,319	1,507	1,696	1,884	2,672
200	thrust	qs 314,000	0,628	0,942	1,256	1,570	1,884	2,198	2,512	2,826	3,140	3,454
	traction	qt 301,440	0,603	0,904	1,206	1,507	1,809	2,110	2,412	2,713	3,014	3,316

To obtain the air consumption, use the following formula:

$Q = H \times (qs+qt) \times h$ where Q = air consumption in Nl/min
qs = air consumption for cm of stroke (thrust)
qt = air consumption for cm of stroke (traction)
h = number of cycles for minute
H = cylinder stroke in cm