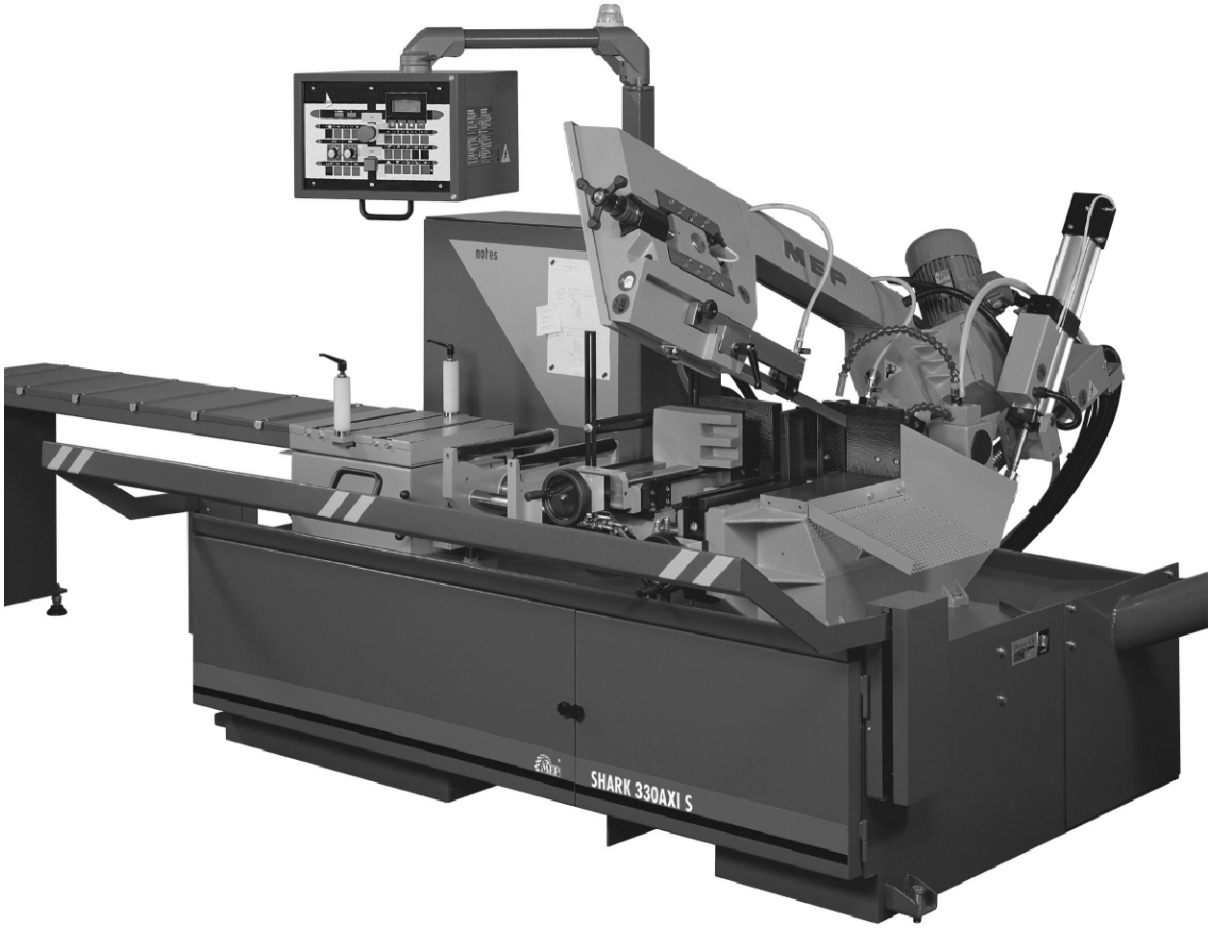


USE AND MAINTENANCE MANUAL

EN SHARK 330 AXI-S

YEAR OF MANUFACTURE: _____

"CE" CONFORMITY DECLARATION

(according to machine directive 98/37/CE, annex II A)

The manufacturer:

MEP® SPA

SEGATRICI
Via Papa Giovanni XXIII, 49
61045 Pergola (PS) ITALIA
Tel. 0721/73721 - Fax 0721/734533

hereby declares that the bandsawing machine:

Machine model:	**SHARK 330 AXI-S**
Serial number:	
Year of manufacture:	

is in specification with the following directives:

- **DIREC… …/CE "MACHINE DIRECTIVE"**
- **DIR…TIVE …/23 "LVD"**
- **D…RE…IVE …89/336 "EMC"**
- **DPR …96**

FAC SIMILE

Amministr…re …legato
(William …ometti)

Pergola, lì _____

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Use and manteinance manual for SHARK 330 AXI-S

PREFACE

The **SHARK 330 AXI-S** has been specifically designed and constructed for cutting metals.

Machine operation can be either SEMI-AUTOMATIC or AUTOMATIC: after clamping the material in the vice, the operator starts the cycle; as the cutting head moves down from the high position to the low one, the material is cut to the pre-set length. Once the cut has been made, the cutting head returns to the high position, ready for the next cutting cycle.

TECHNICAL DATA

SHARK 330 AXI-S	UNIT	VALUE
BLADE		
Nominal dimensions	mm	3320x27x0.9
Max./Min. blade length	mm	3350/3290
Blade width	mm	0,9
Blade tension	bar / Kg	70 / 900
CUTTING SPEED		
Speed 1 Slow	mt/min	40
Speed 2 Fast	mt/min	80
POWER AND CONSUMPTIONS		
Head spindle motor	KW	1.8 / 1.5
Electric coolant pump motor	KW	0.13 x 2
Hydraulic unit motors	KW	0.22 x 4
Valve step actuator motor	KW	0.09
Blade brush and swarf remover motor (opt.)	KW	0.05 x 2
Max. installed electric power	KW	3.13
Max. vice opening	mm	335
Max working pressure open/close vice	Bar	25
Cutting working pressure	Bar	20
Head return working pressure	Bar	20
Oil for transmission box	capacity KG	2.5
Hydraulic oil (feeder unit)	capacity Lt.	8.5
Coolant	capacity Lt.	50

INTRODUCTION

MEP S.p.A. has developed the new **SHARK 330 AXI-S** bandsaw in response to modern production techniques.
This work tool has been designed to satisfy the wide range of cutting needs of a modern workshop with simplicity and reliability, while at the same time complying with all UE, EFTA, Swiss, UL and CSA safety standards.
The considerable cutting capacity at 0° - with a maximum waste of 70mm - which can be exploited both for single pieces and bundles, means that this model can provide solutions for various cutting requirements: machining and turning shops; structural steel shops (for cutting beams), and workshops in general.
The **SHARK 330 AXI-S** is a multi-microprocessor machine with twin-axes control that can run 10 programs (numbered from 0 to 9 inclusive); the number of pieces to be cut and the number of passes of the feeding unit can be stored for each of them. The programming console and LCD graphic display of diagnostic messages enable the limits of cutting head travel to be programmed on the basis of the dimensions of the bars to be cut. It has a sturdy structure, silent and safe operation; it is capable of cutting with minimum waste (1.2 mm) and great versatility in applications with different materials such as stainless steel, lightweight alloys, aluminium, copper and bronze, allowing a high level of both speed and precision.

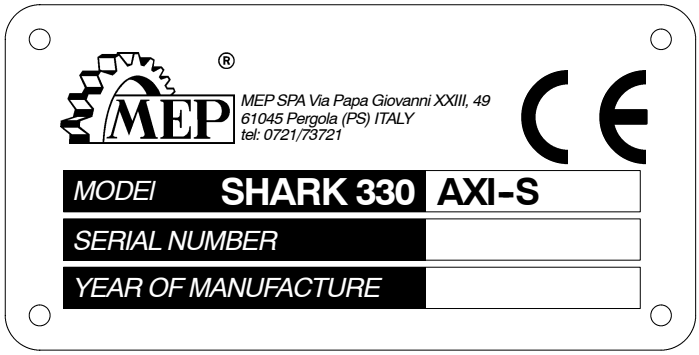
We congratulate you on your choice of the **SHARK 330 AXI-S** which, together with careful following of the operating and maintenance instructions in this manual, will provide you with first class results for many years to come.

MACHINE SPECIFICATION

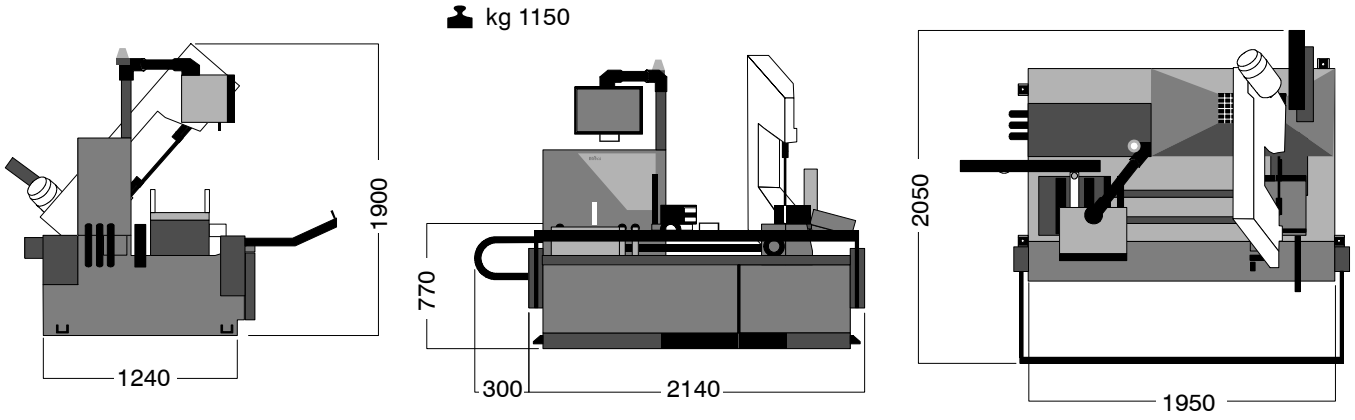
NAME PLATE:

The anodised aluminium name plate is rivetted on the side of the machine.

IMPORTANT: when communicating with the Technical Service department, the model, serial number and year of manufacture of the machine must be quoted.



DIMENSIONS:



CUTTING CAPACITY:

Cross-section	●	■	▬
0 degrees	280	250	330x240

BLADE:

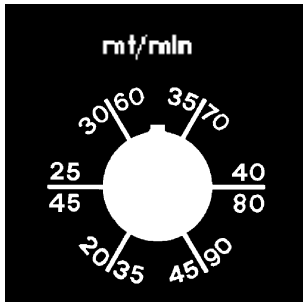
Dimensions: 3.320 x 27 x 0.9 mm
Blades can be used with lengths between 3290 and 3350 mm
Blade tension: 60 bar = 800 Kg
Cutting speed: Speed 1, 40 m/min; Speed 2, 80 m/min.

Inverter: frequency converter
Characteristics:

Power	- Power of the largest motor installed kW 2.2 - Max. simple harmonic output 65 Amp. - Max. power output kVA 4.22
Power supply	- Supply voltage: three phase 3 x 380 V (plus or minus 10%) - Supply frequency: 50/60 Hz (plus or minus 5%)
Output	- Wave form: sine - Output voltage: three phase from 0 to 380 V - Output frequency: from 2.5 to 100 Hz - Frequency stability: plus or minus 1% - Efficiency: 88% at maximum load
Protections	- Mechanical overload protection (current limiter) - Phase-phase short circuit protection - Earth-phase short circuit protection - Protection against overheating - Regenerative charge voltage surge protection - Protection against voltage surges in power supply for less than 1 msec - Protection against inadequate power supply or micro-failures - Short circuit protection between potentiometer terminals

Cutting speed with INVERTER:

speed 1 20 to 45
speed 2 35 to 90



SPINDLE MOTOR:

Spindle motor: 2-4 pole three-phase asynchronous, 50 Hz
Characteristics:

	Voltage volts	Absorption. Amp.	Power Kw	RPM
2 pole	230/400	8,6/5,7	1,8	2.855
4 pole	230/400	8/4,4	1,5	1.415

Stator windings in copper, enamelled class H 200˚C;
Class F insulation (temperature limit TL 155˚C);
Example of class F insulation: in air-cooled machines at an ambient temperature of 40˚C(according to CEI 2-3 and IEC 85), the allowable overtemperature is 100˚C (where 100˚ represents the allowable ΔT).
Protection rating IP 54 (total protection against contact with live components and against water sprayed from all directions).
Complies with CEI standards, IEC 34 publication of 1st July 1985.

ELECTRIC PUMP MOTOR:

Coolant pump: single phase 230/400 V, 50 Hz.
Characteristics:

Pumpe capacity
11 L/min
Available head
1,5 m

Voltage volts	Absorption. Amp.	Power Kw	RPM
230	0.53	0.1	2.800
400	0.34	0.1	2.800

Protection rating IP 55.
Complies with CEI standards, IEC 34 publication of 1st July 1985.

HYDRAULIC UNIT MOTOR:

Unit motor: 230/400 single phase; 50/60 Hz
Characteristics:

Voltage volts	Absorption. Amp.	Power Kw	RPM
230	1.7	0.24	1.620
400	1	0.24	1.350

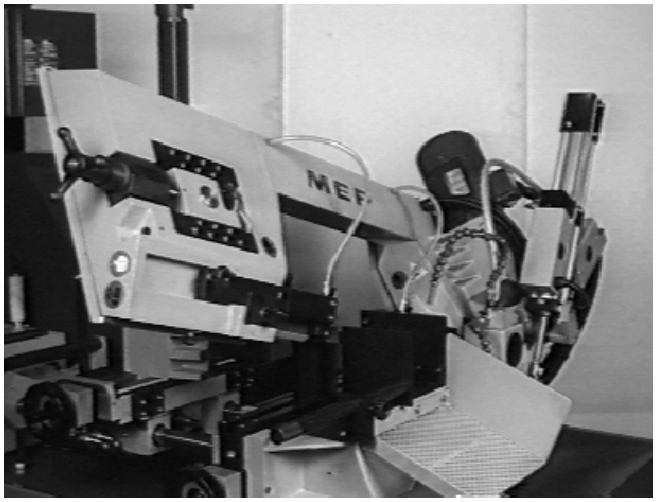
Class F insulation 155°C
Protection class IP 55
Conform to CEI standards, publication IEC 34 of 1st July 1985.

CHAPTER 1 - Main functional parts of the machine

In order to fully understand how the machine works, described in detail in the chapter "MACHINE CYCLES", lets first consider the main units and their relative location.

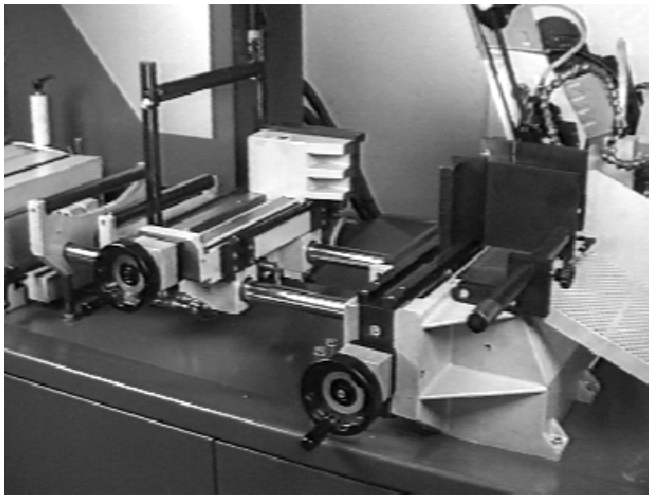
1.1 - Cutting head

The cutting head is the unit that actually cuts the material and is made of cast iron and includes: the blade (see Par. 6.7), the blade guides (see Par. 6.6), the belt tensioner, the transmission box and the spindle motor. Movement of the cutting head is limited by the articulated joint on the platform, and the vertical movement from the high position to the low one can be programmed from the control panel.



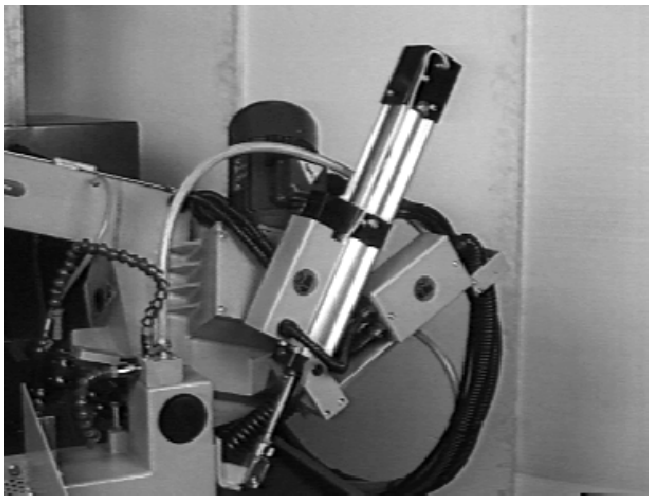
1.2 - The cutting and feeder vices

The cutting vice holds the workpiece during cutting, while the feed vice clamps the material so that the material can be fed under the head. They both consist of a vice support, commonly known as a "lead nut" and a lead screw on which the mobile jaw is mounted. The vices are both operated manually by a handwheel, or by a hydraulic cylinder.
OPTIONAL: vertical hydraulic vice to cut bundles.



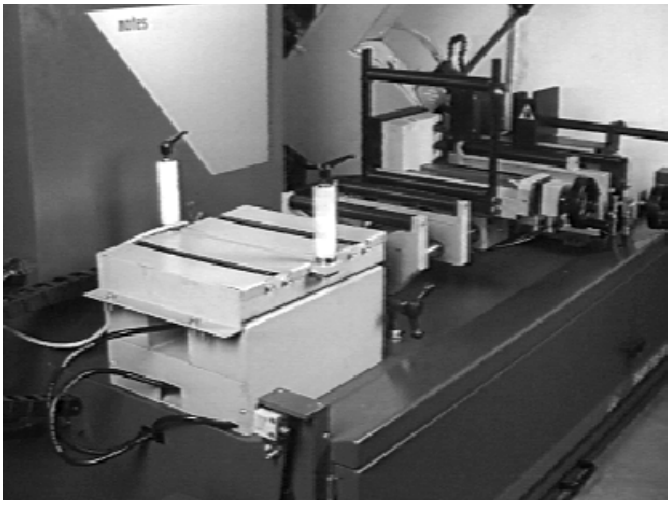
1.3 - Hydraulic cylinder

The hydraulic cylinder controls the movement of the head, and through the potentiometer control of the valve actuator, found on the control panel, regulates the downward movement of the head from its starting position to the end of the cut. The return movement of the head, in the manual cutting cycle, is made by a tensioned spring. The cylinder is solidly locked to the head by a shaft and its connecting rod is connected to the worktop.



1.4 - The Material Feeder

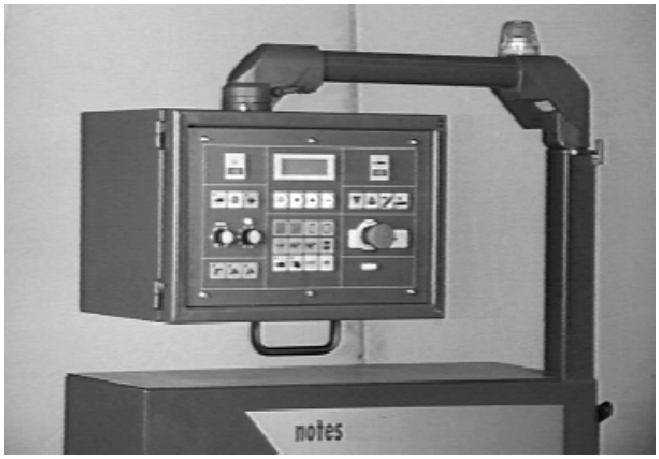
The material is positioned under the blade by a feeder trolley that clamps the material in a hydraulic vice, and transports it along a precision slide.



The feeder trolley is operated by a hydraulic unit commanded by the new MEP 18 controller.

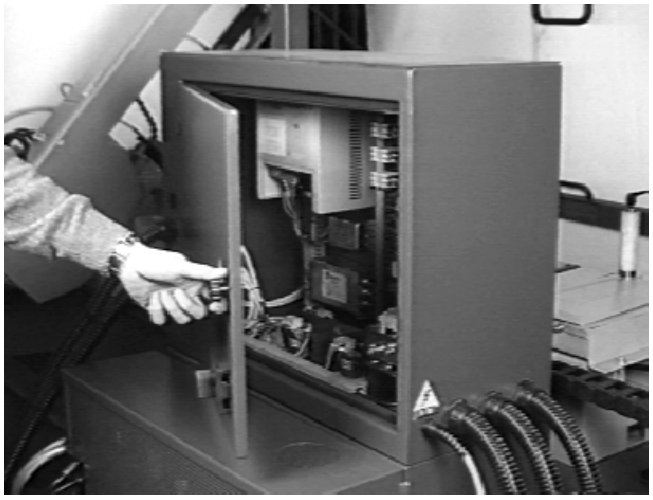
1.5 -The control panel

The control panel has a housing with total electric and electro-mechanical protection, and a highly resistant keyboard. The LCD display shows the messages regarding the working parameters and diagnostic. The 24 volt logic commands are designed in conformance with existing legislation.



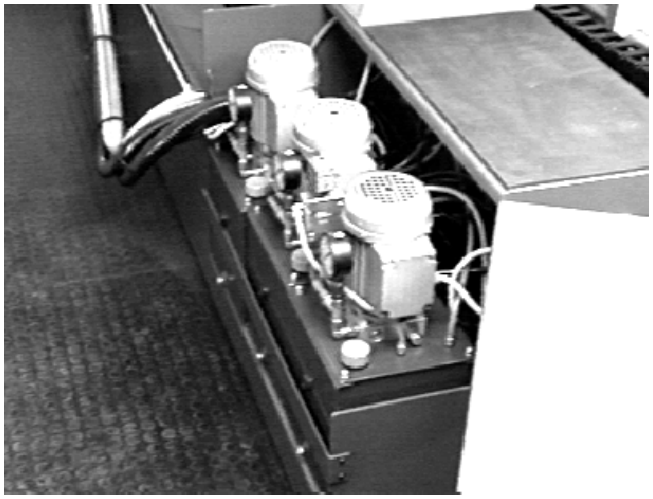
1.6 - Switchboard

The machine control panel can be accessed by opening the rear door of the bedplate. The electric components are wired on tracking so that it slides along two runners to make viewing easy for the operator. Access is restricted by a door with a padlockable handle designed to prevent all forms of intentional tampering.



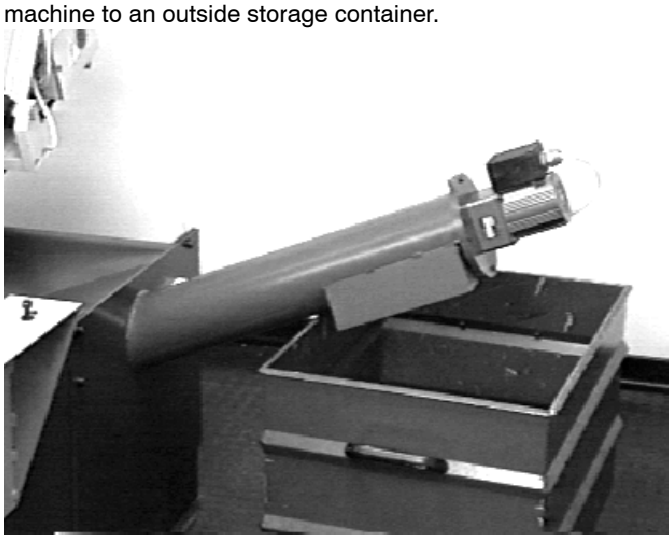
1.7 - Hydraulic unit

The hydraulic group that operates the vices and the head can be found at the rear of the machine under a metal cover. The oil exchange in the circuits is actuated by solenoid valves piloted by the machine controller.



1.8 - The swarf remover (optional)

This accessory has been created to satisfy the needs of high production rates. It consists of a three phase motor coupled to a scroll that drives the swarf from the collector drawer inside the machine to an outside storage container.



1.9 - The motorised blade brush (optional)

An accessory created to prolong the blade's working life and to ensure that cuts are always made at maximum performance.



CHAPTER 2 - Safety and accident prevention

The **SHARK 330 AXI-S** has been designed and produced in accordance with European standards.

For the **correct use of the machine** we would recommend that the instructions contained in this chapter are carefully followed.

2.1 - Use of the machine

The **SHARK 330 AXI-S** band saw is designed to cut exclusively ferrous and non-ferrous profiles and solid metal sections. **Other types of material and machining are not compatible with the specific characteristics of the saw**.

The employer is responsible for instructing the personnel who, in turn, are obliged to inform the operator of any accident risks, safety devices, noise emission and accident prevention regulations provided for by international standards and national laws regarding the use of the machine. **The operator must be perfectly aware of the position and function of all the machine's controls**.

The instructions, warnings and accident prevention standards in this manual must be respected without question by all those concerned.

The following definitions are those provided for by **EEC DIRECTIVE ON MACHINERY No. 98/37/CE**:

- **"Danger zone":** any zone in and/or around a machine in which the presence of a person constitutes a risk for the safety and health of that person.
- **"Person exposed":** any person finding himself either completely or partly in a danger zone.
- **"Operator":** the person or persons given the responsibility of installing, operating, adjusting, maintaining, cleaning, repairing or transporting the machine.

WARNING!

The manufacturer declines any responsibility whatsoever, either civil of criminal, in the case of unauthorised interference or replacement of one or more parts or assemblies on the machine, or if accessories, tools and consumable materials are used that are different from those recommended by the manufacturer himself or if the machine is inserted in a plant system and its proper function is altered.

2.2 - General requirements

LIGHTING

Insufficient lighting for the types of operation envisaged could constitute a safety hazard for the persons concerned. For this reason, the user of the machine must provide lighting in the working zone sufficient to eliminate areas in shadow and prevent dazzling light sources. (Reference standard ISO 8995-89 "Lighting in working environments").

CONNECTIONS

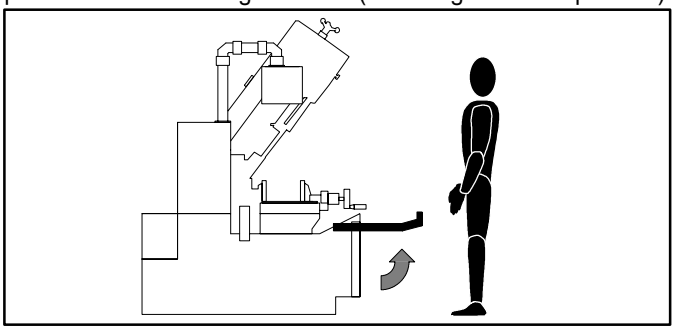
Check that the power supply cables and pneumatic feed system comply with the maximum machine absorption values listed in the "Machine Specification" tables; replace if necessary.

EARTHING SYSTEM

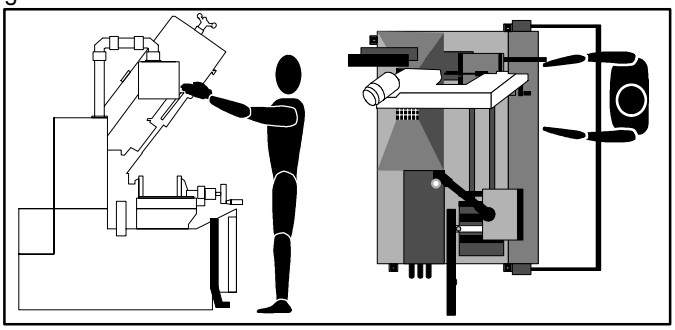
The installation of the earthing system must comply with the requirements of **IEC Standard 204**.

POSITION OF THE OPERATOR

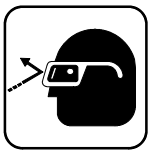
When working with the machine the operator must stand in the position shown in the figure below (with the guard rail in position).



The figure below, instead, illustrates the operator's position when programming and setting the working parameters. When the guard rail is lowered all the machine's functioned are blocked.



2.3 - Advice for the operator



Always wear proper goggles or protective glasses



Do not use the machine without the guards in position.



Do not allow hands or arms to encroach on the cutting zone while the machine is in operation.



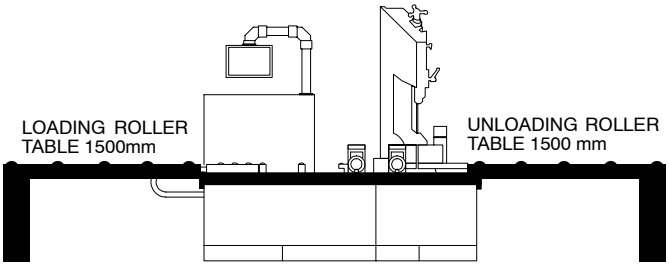
Do not wear oversize clothing with long sleeves, oversize gloves, bracelets, necklaces or any other object that may become entangled in the machine during working; long hair must be tied back and bunched.



Always disconnect the power supply to the machine before carrying out any maintenance work whatsoever, including in the case of abnormal operation of the machine.



Before starting cutting operations, support the material at both ends of the machine using, if required OPTIONAL accessories such as the feed and discharge roller tables shown in the diagram below. Before removing the devices supporting and moving the material, fasten the latter in place using the machine's clamping devices or other suitable equipment.





Any maintenance work on the hydraulic or pneumatic systems must be carried out only after the pressure in the system has been released.



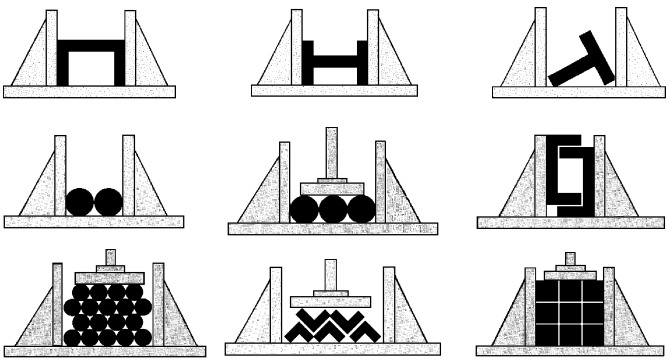
The operator **MUST NOT** perform any risky operations or those not required for the machining in course (e.g. remove swarf or metal shavings form the machine while cutting).



Remove equipment, tools or any other objects from the cutting zone; always keep the working area as clean as possible.



Before starting any cutting operations, ensure that the workpiece is securely held in the vice and the machine has been set correctly. A number of examples of how to clamp the different profiles correctly in our machines are shown below.





Do not use the machine to cut pieces that exceed the capacity of the machine as listed in the technical specifications.



Never move the machine while it is cutting.



Do not use blades of different sizes to those recommended in the machine's specifications.



When cutting very short pieces, make sure that they are not dragged behind the support shoulder, where they could jam in the blade.



When using the pneumatic vice (version MA) check that the jaws actually move right up to and effectively block the piece, as the maximum travel in only 8 mm, and check that the clamping pressure is correct.



When working on the bandsaw, only wear gloves when handling materials and tool change or adjustment operations. Only carry out one operation at a time and do not hold more than one item or operate more than one device simultaneously. Keep hands as clean as possible.



Warning: if the blade jams in the cut, press the emergency stop pushbutton immediately. If this does not free the blade, slowly release the vice, remove the piece and check that the blade or its teeth for damage, if need be replace the blade.



Before carrying out any repair works on the machine, consult the MEP Technical Service; this can also be done through an agency in the country in which the machine is being used.

2.4 - Machine safety devices

This use and maintenance manual is not intended as purely a guide for the use of the machine in a strictly productive environment, it is instead an instrument providing information on how to use the machine correctly and safely. The following standards are those specified by the EEC Committee in the directives regarding safety of machinery, health and safety at work, personal protection and safeguarding of the environment. These standards have been applied to the SHARK 330 AXI-S band saw.

2.4.1 - Reference standards

MACHINE SAFETY

- *EEC Directive No. 98/37/CE* of 14.06.1989 known as **"Machines directive"**.
- *EEC Directive No. 91/368 - 93/44 - 93/68* which modifies EEC Directive 98/37/CE relating to machine safety.
- *EEC Directive No. 73/23* known as **"Low voltage directive"**

HEALTH AND SAFETY AT WORK

- *EEC Directive No. 80/1107; 83/477;86/188;88/188; 88/642* for the protection of workers against risks caused by exposure to physical, chemical and biological agents during working.
- *EEC Directive No. 89/391* and Special EEC Directives No. 89/654 and No. 89/655 for improvements in health and safety at work.
- *EEC Directive No. 90/394* for the protection of workers against risks deriving from exposure at work to carcinogenic substances.
- *EEC Directive No. 77/576 and No. 79/640* on safety signs at work.

PERSONAL PROTECTION

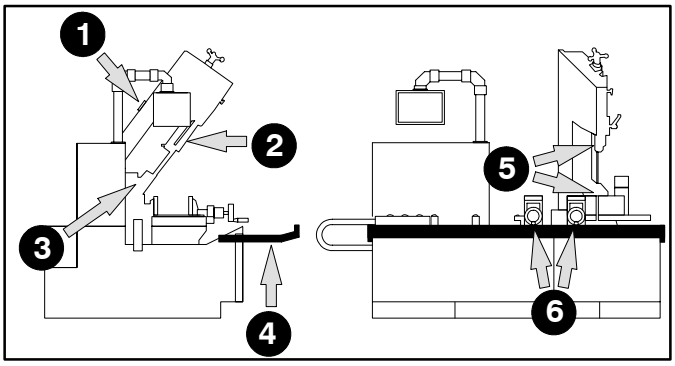
- *EEC Directive No. 89/656 and No. 89/686* on the use of personal protection devices.

ENVIRONMENTAL PROTECTION

- *EEC Directive No. 75/442* on waste disposal.
- *EEC Directive No. 75/439* on the disposal of used oil.

2.4.2 - Protection against accidental contact with the blade

1. Hinged blade cover fitted with locking catches.
2. Metal guard screwed to the front blade guide head (operator side), forming an integral part of the head to ensure that when fully open, the only part of the blade exposed is that used for the actual cutting in accordance with DPR 547/55 art. 108.
3. Metal guard screwed to the rear blade guide head (machine side).
4. Guard rail on front of machine to ensure that the operator maintains the safety distance from moving parts.
5. Blade guide plates completely covering blade teeth.
6. Both the vice and the feeding unit are powered by a hydraulic power pack, with a maximum opening of 8mm. The piece clamping jaw must close on the piece being worked at a distance of 2 - 3mm from the piece.



2.4.3 - Electrical equipment

In accordance with Italian standard CEI 60204-1, September 1993, derived from European Standard EN 60204-1 publication IEC 204-1, 1992:

- Access to the control panels switchboard is guarded by screws and a locking switch;
- Access to the switchboard is guarded by screws and a locking switch;
- The actuators are commanded by a 24 Vac supply, in accordance with chapter 6 of the European standard "Command and signal circuits" paragraph 2 "Command circuits" comma 1 "Preferential voltage values for command circuits"
- Plant protected against short circuits by quick blowing fuses and earthing of all work and accidental contact parts.
- Protection from accidental start-up by a minimum voltage relay in the case of power failure.

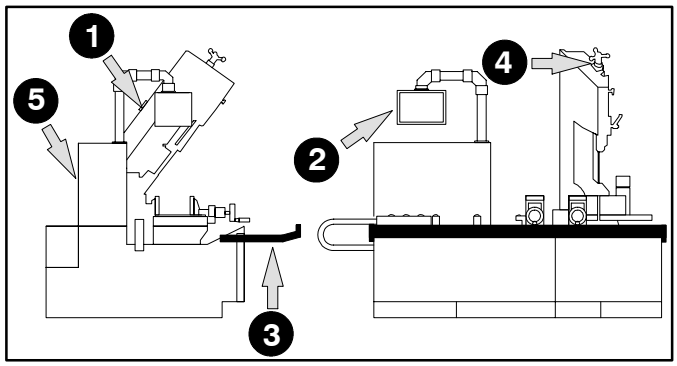
2.4.4 - Emergency devices

In accordance with Standard CEI 204-1.

- **Chapter 5 Section 6 Sub-section 1 "Emergency stop device":**
  «the emergency stop device immediately stops all the dangerous and other functions of the machine».
- **Chapter 6 Section 2 Sub-section 4 Point 7 "Protective guards":**
  «the removal of protective guards designed to prevent access to dangerous parts or zones causes the machine to stop immediately; replacing these guards does not restart the functions which must be reset».

.....Emergency devices applicable to the SHARK 320 CNC-FE:

1. **Protective blade cover:** a microswitch is operated if the blade cover is accidentally or intentionally opened during the machine's operating cycle, immediately stopping all the functions.
2. **Emergency stop:** a non-return mushroom-head push-button, colour red on yellow background, is located on the control panel of the machine. To release the push-button, the actuator must be rotted 45°. After the emergency situation has been resolved, the machine must be reset.
3. **Guard rail microswitch safety:** If the operator needs to access the machine's work zone the guard rail must be lowered. This trips a microswitch which stops all the functions.
4. **Pressure transducer for monitoring the blade tension:** the machine stops immediately if the blade breaks or the tensioner cylinder pressure drops.
5. **Base door inter-lock switch:** the base door must be opened to access the switchboard. When this is done the travel limit switch cuts off the power, stopping all the machine's functions.



2.5 - Noise level of the machine

Noise can cause hearing damage and represents one the problems faced by many countries who adopt their own standards. In accordance with the EEC Machine Directive 98/37/CE, we are listing the standards that specify noise levels for machine tools. This chapter also reports the noise levels produced by the **SHARK 330 AXI-S** during its various operating phases and the methods used for measuring these levels. The Italian standard governing this aspect is **D.M.n.277/91** drawn from **EEC Directives 80/1107, 82/605, 83/477, 86/188, 88/642.**

2.5.1 - Noise level measurement

Noise levels are measured using an instrument known as an **Integrator noise-meter** which registers the equivalent continuous acoustic pressure level at the work station.

The damage caused by noise depends on three parameters: level, frequency and duration. The equivalent level concept Leq combines the three parameters and supplies just one indication. The Leq is based on the principle of equal energy, and represents the continuous stationary level containing the same amount of energy, expressed in dBA, as that actually fluctuating over the same period of time.

This calculation is made automatically by the integrator noise-meter. The measurements are taken every 60 seconds, in order to obtain a stabilised value. The reading stays on the display for a sufficient time to enable a reading to be taken by the operator.

Measurements are taken by holding the instrument at approximately 1 metre from the machine at a height of 1.60 metres above the platform at the operator's work station. Two measurements are taken: the first while the machine operates without cutting anything, the second while cutting in manual mode.

2.5.2 - Noise level values

Identification	
Machine type	Band saw for metal applications
Model	SHARK 330 AXI S
Reference standard	ISO 3746

Results		
Test 1	**Description**	52x80 mm pipe in C40 steel 3320x27x0,9 bi-metal blade S.VGLB Z 4/6
	Results	**MEAN SOUND LEVEL (L_{eq}) 80.26 dB (A)** Environmental correction (K) 6.80 dB(A) Peak sound power (Lw) 90.76 dB(A)
Test 2	**Description**	150 mm Ø solid tube in C40 steel. 3320x27x0,9 bi-metal blade M42 Z 3/4
	Results	**MEAN SOUND LEVEL (L_eq) 74.98 dB(A)** Environmental correction (K) 6.80 dB(A) Peak sound power (Lw) 85.32 dB(A)
Test 3	**Description**	90 mm Ø solid tube in INOX. 3320x27x0,9 bi-metal blade S.VGLB Z 4/6
	Results	**MEAN SOUND LEVEL (L_{eq}) 79.94 dB(A)** Environmental correction (K) 6.80 dB(A) Peak sound power (Lw) 90.14 dB(A)

2.6 - Electromagnetic compatibility

As from 1 January 1996 all electrical and electronic appliances bearing the CE marking that are sold on the European market must conform to Directive 89/336/EEC and decree law no. 476/92 concerning electromagnetic compatibility, i.e. the compatibility of electrical/electronic devices and systems with the electromagnetic environment in which they are located. The prescriptions regard two specific aspects in particular:
1 "EMISSIONS: during its operation, the appliance or system must not emit spurious electromagnetic signals of such magnitude as to contaminate the surrounding electromagnetic environment beyond clearly prescribed limits";
2 "IMMUNITY: the appliance or system must be able to operate correctly even when it is placed in an electromagnetic environment that is contaminated by disturbances of defined magnitude".
The following text contains a list of the applied standards and the results of the electromagnetic compatibility testing of machine model Shark 330 AXI-S; Test report no. 150201.

2.6.1 - Emissions

- EN 50081-2 (1994) Electromagnetic Compatibility - Generic standard regarding emissions. Part 2: Industrial Environment.
- EN 55011 (1999) Industrial, scientific, and medical radio frequency appliances (ISM). Characteristics of radio frequency disturbance - Limits and methods of measurement.
- EN 55014-1 + A2 (1998-1999) Electromagnetic Compatibility - Prescriptions for domestic appliances, electric power tools, and similar equipment. Part 1: Standard Emission in relation to product family.

CONDUCTED EMISSIONS				
Gate A	**Freq. (MHz)**	**Q-peak limit (dBuV)**	**Mean value limit (dBuV)**	**Result**
A.C. power supply input	0.15 – 0.5 0.5 – 5 5 – 30	79 – 73 (linear reduction with log of frequency) 73 73	66 – 60 (linear reduction with log of frequency) 60 60	Complies

CONDUCTED EMISSIONS – ANALYSIS OF INTERMITTENT DISTURBANCES	
Gate	**Result**
A.C. power supply input	Not applicable

IRRADIATED EMISSIONS			
Gate	**Freq. (MHz)**	**Q-peak limit (10 m) (dBuV/m)**	**Result**
Enclosure	30 – 230 230 – 1000	40 47	Complies

2.6.2 - Immunity

- EN 50082-2 (1995) Electromagnetic Compatibility - Generic standard on immunity. Part 2: Industrial Environment.
- EN 61000-4-2 + A1 (1996-1999) Electromagnetic Compatibility (EMC) - Part 4: Test and measurement techniques - Section 2: Electrostatic discharge immunity tests - Basic publication.
- IEC 801-3 (1984) Electromagnetic Compatibility for industrial process measuring and control equipment. Part 3: Prescriptions relative to irradiated electromagnetic fields.
- EN 61000-4-4 (1996) Electromagnetic Compatibility (EMC) - Part 4: Test and measurement techniques - Section 4: Fast transients/bursts immunity tests - Basic publication.
- EN 61000-4-6 (1995) Electromagnetic Compatibility (EMC) - Part 4: Test and measurement techniques - Section 6: Immunity to conducted interference, induced by radio frequency fields.
- ENV 50204 (1996) Electromagnetic field irradiated from digital wireless telephones.

IMMUNITY TO ELECTROSTATIC DISCHARGES			
Gate	**Test levels**	**Evaluation criterion**	**Result**
Enclosure	contact 4 kV steel plate 4 kV in air 8 kV	B	Complies

IMMUNITY TO VOLTAGE (BURSTS)			
Gate	**Test levels**	**Evaluation criterion**	**Result**
A.C. power supply input	2 kV	B	Complies

IMMUNITY TO CONDUCTED ELECTROMAGNETIC FIELDS			
Gate	**Test levels**	**Evaluation criterion**	**Result**
A.C. power supply input	10V	A	Complies

IMMUNITY TO IRRADIATED ELECTROMAGNETIC FIELDS			
Gate	**Test levels**	**Evaluation criterion**	**Result**
Enclosure	10 V/m	A	Complies

CHAPTER 3 - *Installation of the machine*

3.1 - Unpacking the machine

MEP S.p.A use packing materials that guarantee the integrity and protection of the machine during its transport to the customer.

The type of packing differs according to the size, weight and destination. As a consequence, the customer will receive the machine in one of two following ways.

- on a pallet with straps and heat-shrink plastic

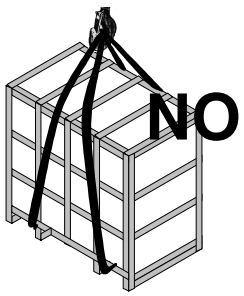


-on a pallet with straps, heat-shrink plastic and a wooden crate



In both cases, the machine must be handled using a fork-lift truck, inserting the forks at the points indicated by the arrows in the photo and the marks on the crate.

WARNING! Do not handle the packed machine using slings.



To install the machine, first remove the packing, paying particular attention not to cut any electric wires or hydraulic hoses; if necessary use pincers, a hammer and cutters. To install the machine at the work station, follow the procedures indicated in paragraph 3.4. When selecting the site, take into account the **overall dimensions of the machine**, stated previously, and the **necessary space** required for the operator to work in complete **safety**.

3.2 - Check list

Before starting to install the machine, check that all the accessories, whether standard or optional, supplied with the machine are present. The basic version of the SHARK 330 AXI-S 2 SPEED machine is supplied complete with:

- programming and control console with LCD showing diagnostic messages (24V logical controls);
- control panel programming of the cutting arm travel limits depending on the dimensions of the bar stock be cut;
- electronic control of band tensioning;
- control of band rotation, including stopping in real time in the event of a blockage;
- control adapts itself depending on the force of the cut;
- hydraulic feeding unit 500mm x (1 99 passes) with decimal vernier scale;
- console housing panel entirely protected against electrical or electro-mechanical phenomena;
- robust one-piece electro-welded structural steel assembly for movement by means of fork-lift truck or manual pallet truck;
- ammeter for displaying motor power consumption and for checking blade wear;
- feeding trolley fitted with recirculating ball bearing couplings running on hardened and ground steel guides;
- blinking illuminated warning in the event of a machine stop;
- radio disturbance filter on the power cable;
- 3320 x 0.9 x 27 bimetallic blade for solid bar stock and profiles;
- blade cleaning brush;
- pre-arranged for fitting roller table on the loading side;
- designed for manual pallet truck handling;
- kit pouch

The kit pouch, stowed inside the machine, contains:

- 4 mm hexagonal spanner;
- 10 mm hexagonal spanner;
- this User and Maintenance Manual;
- hand pump for charging the cylinder.

OPTIONAL

OPTIONALS WITH SURCHARGE

- blade speed 20/40 m/min.;
- motorised blade cleaning brush;
- special waste saving vice;

ACCESSORIES AVAILABLE ON REQUEST:

- motorised swarf remover;
- electronic rpm control (inverter type) 20-45/35-90 m/min;
- bundle cutting device;
- 3320 x 0.9 x 27 M2 bimetallic blade;
- 3320 x 0.9 x 27 M42 bimetalic blade;
- bar support;
- K100 modular roller table for feed side, 1500 mm.;
- feed side roller table support;
- discharge roller table adapter;
- K100 roller table for discharge side, 1500 mm.;
- K100 roller table for discharge side, 3000 mm.;
- K100 roller table for discharge side, 4500 mm.;
- K100 roller table for discharge side, 6000 mm.;
- 5 lt can of emulsible oil.

3.3 - Minimum requirements

In order for the machine to function correctly, the room in which it is to be installed must satisfy the following requirements:

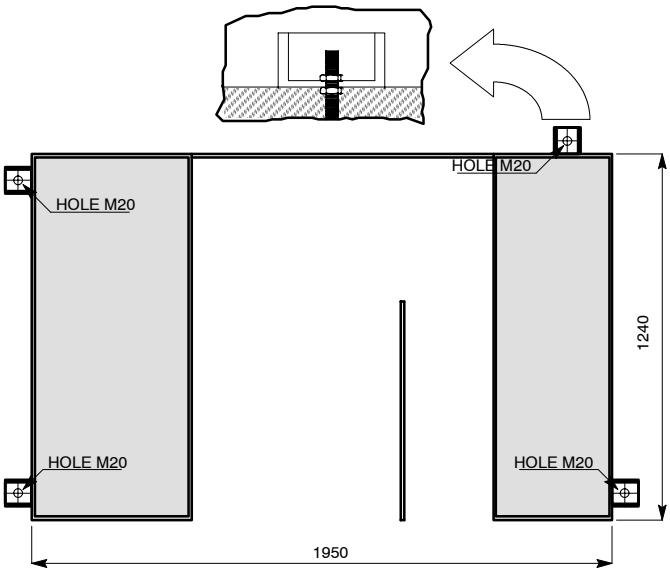
- power supply voltage/frequency: refer to the values on the spindle motor rating plate.
- ambient temperature: from -10 to +50 degrees C.
- relative humidity: not more than 90%.
- lighting: not less than 500 LUX.

WARNING!

The machine is already protected against voltage variations occurring at the installation; However, the machine will only run trouble-free if the variations do not exceed ±10%.

3.4 - Anchoring and handling the machine

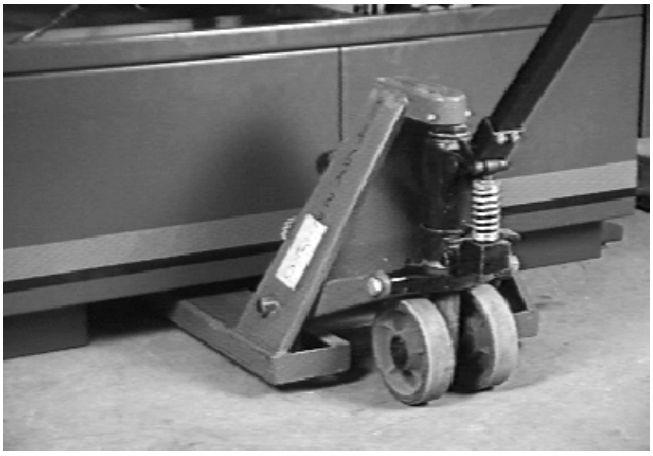
The base of the machine is anchored to the floor by studs. These studs are screwed into nuts previously set into the concrete and then tightened from above with lock-nuts. When positioning the machine refer to the overall dimensions given in the diagram in the section MACHINE SPECIFICATION.



If the machine has to be moved from its seating, use a fork-lift truck:



slide the forks under the machine and lift to carry out the manoeuvres (always account for the machine weight stated in the section MACHINE SPECIFICATION).



3.5 - Connection to the power supply

Before connecting the machine to the power supply, check that the socket is not connected in series with other machines. This requirement is fundamental for the good operation of the machine.
The rear view shown in the photo below highlights the main machine switch and provides data on the machine's main power cable.

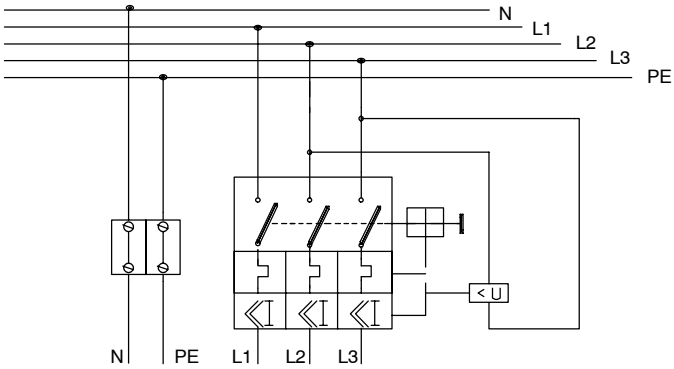


CARATTERISTICHE

- cavo 5x1,5 mmq.
- lunghezza 2 mt. circa
- corrente max 15,2 amp.
- caduta di tensione inferiore al 5% del valore nominale della corrente.

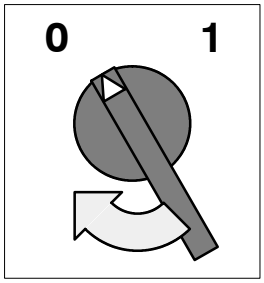
Before connecting the machine to the mains distribution the following operations must be made:

1 - connect the machine power cable to the workshop switchboard as shown in the diagram below, ensuring that the mains voltage is conform to the machine requirements.



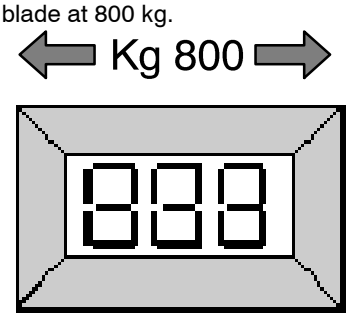
WARNING!
When using systems with a neutral wire, special care must be taken when connecting the **blue** neutral wire, in that if it is connected to a phase wire it will discharge the **phase voltage** to the equipment connected for **voltage: phase-neutral.**

2 - Turn the machine's main switch/door lock to position 1:



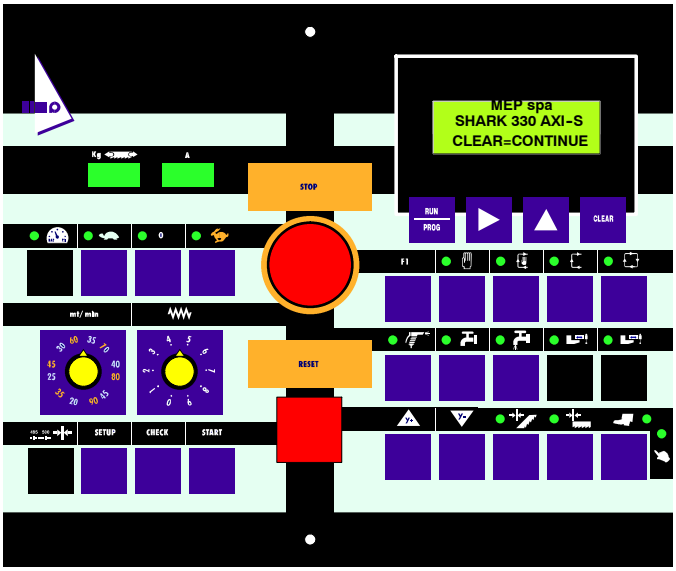
3 – Ensure that the mains supply is **correct**.
To make this check, proceed as follows:

a) tension the blade at 800 kg.

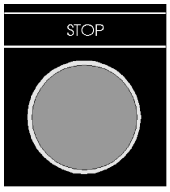


The machine does not work if the belt is loose.
Above all this guarantees that the blade doesn't exit the guides, that the cuts are straight and the life of the blade itself is prolonged. Keep these essential considerations in mind during all work activities.

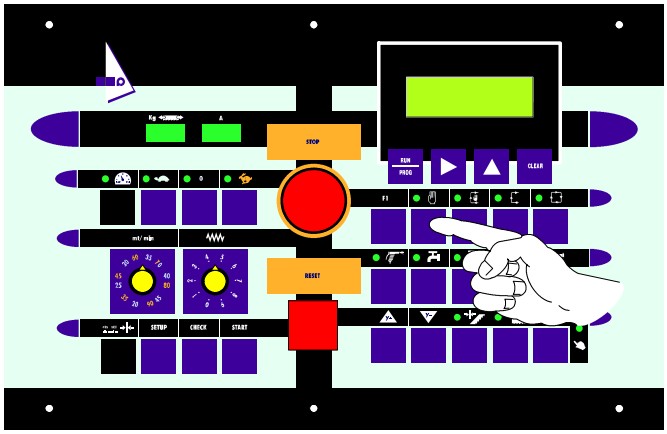
b) From the initial screen press RESET to access the second screen.



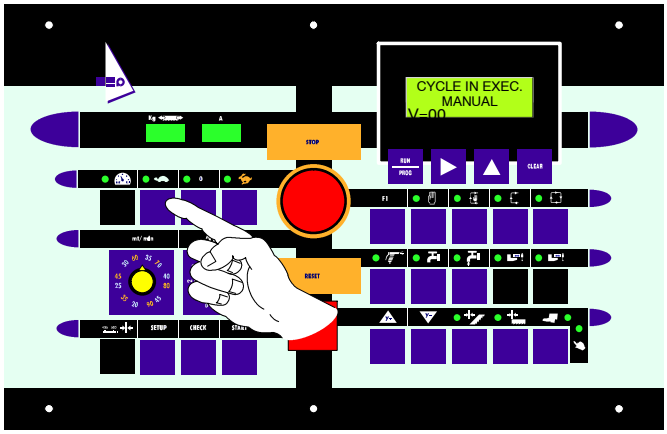
c) Make sure that the machine is not in an emergency condition (red mushroom-head pushbutton released).



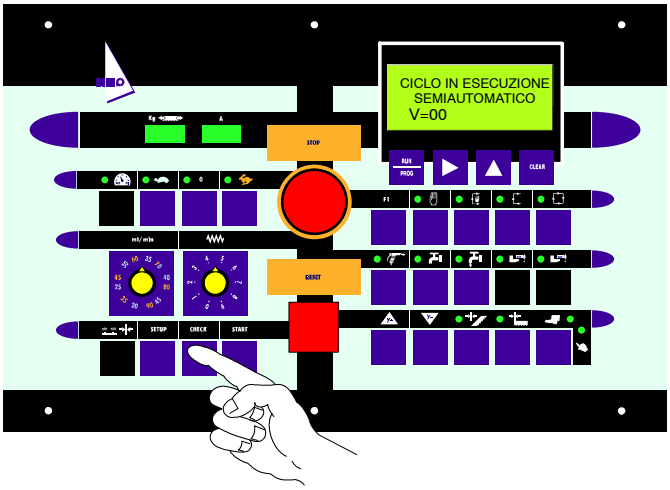
d) After the introductory screen the machine offers the last programme executed, press the manual cycle key.



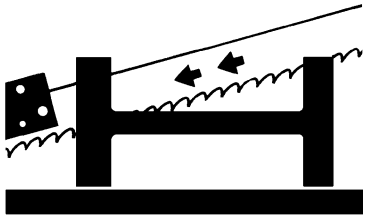
e) At this point, to check that the connection has been made correctly, select a cutting speed.



f) Press the START button on the control panel;



g) If all the above operations have been carried out correctly, the blade motor will start-up and the blade will start moving.

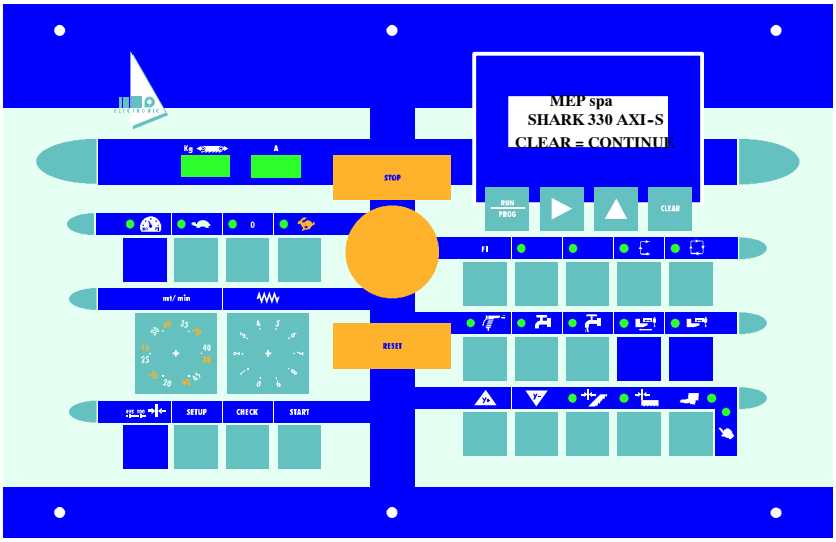


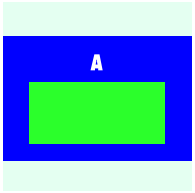
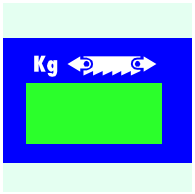
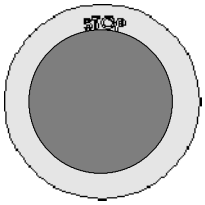
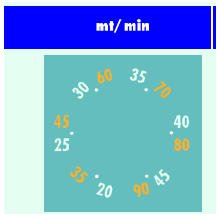
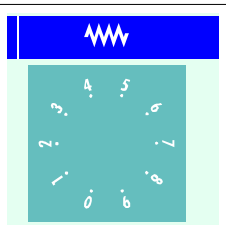
Ensure that the blade moves in the correct direction as shown in the above figure. If it does not, simply reverse two of the phase wires on the machine's power supply input.

The sawing machine is now ready to start the work for which it was designed. Chapter four provides a detailed description of the various functions of the machine and its operating cycles.

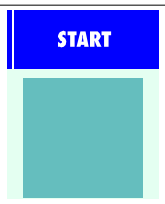
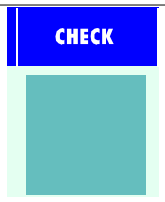
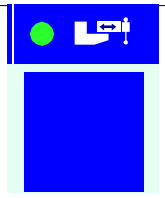
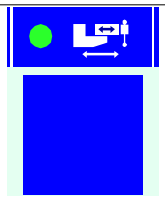
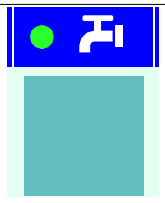
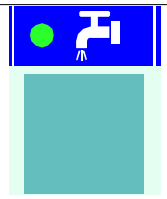
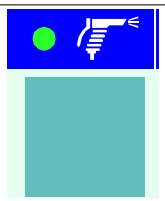
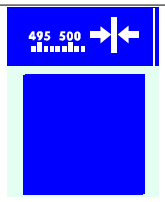
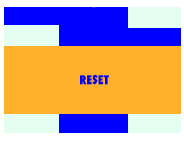
CHAPTER 4 - A description of the operation cycles and their programming

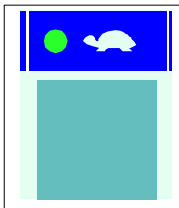
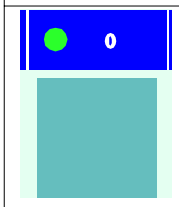
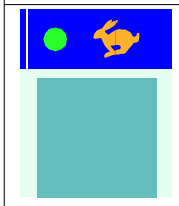
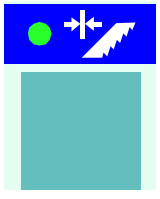
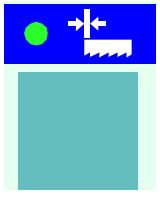
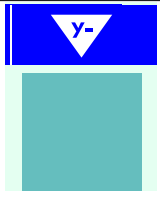
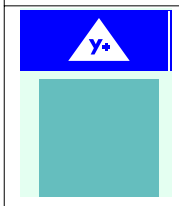
4.1 - Description of the command and programming console

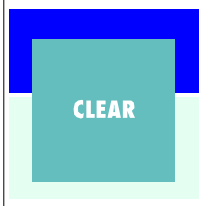
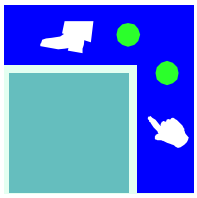
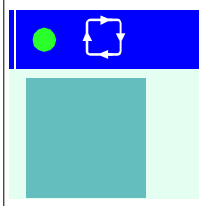
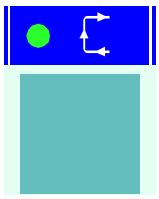
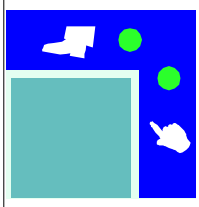


	AMMETER GIVING THE ABSORBED CURRENT OF THE BLADE MOTOR.
	BLADE TENSION METER
	EMERGENCY STOP BUTTON
	POTENTIOMETER FOR MACHINES EQUIPPED WITH LINEAR CONTROL OF CUTTING SPEED BY INVERTER.
	POTENTIOMETER FOR HEAD DOWNWARD SPEED CONTROL

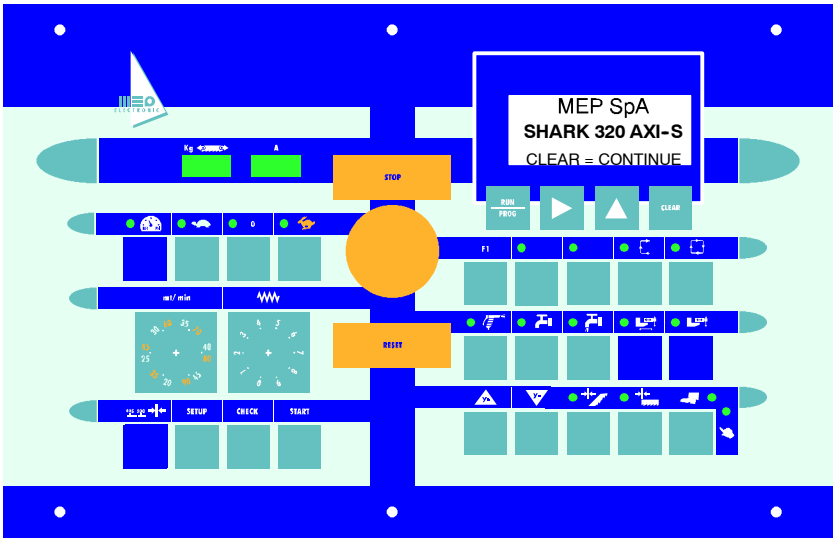
4.1.1 - Description of control functions

	START – START COMMAND FOR WORK CYCLE SEMIAUTOMATIC AND AUTOMATIC
	CHECK – BUTTON TO ENTER DIAGNOSTIC
	OPEN – CLOSE CUTTING VICE
	OPEN – CLOSE FEEDER VICE
	UNSELECT COOLANT
	SELECT COOLANT IN AUTOMATIC
	SELECT COOLANT IN MANUAL FOR MACHINE CLEANING
	LOCK – UNLOCK MEASURING CYLINDER
	RESET EMERGENCY

	SELECT LOW BLADE SPEED 40 m/min. (IF THE MACHINE IS EQUIPPED WITH INVERTER THE BUTTON SELECTS THE SPEED RANGE 20/45 m/min.)
	UNSELECT BLADE SPEED
	SELECT HIGH BLADE SPEED 80 m/min. (IF THE MACHINE IS EQUIPPED WITH INVERTER THE BUTTON SELECTS THE SPEED RANGE 35/90 m/min.)
	MEMORISE HEAD RISE LIMIT
	MEMORISE HEAD DOWN LIMIT
	MANUAL CUTTING HEAD DOWN
	MANUAL CUTTING HEAD RISE

	**LH ARROW** = FUNCTION KEY a) value increase from 0 to 9		**CLEAR** =FUNCTION KEY a) In AUTOMATIC cycle it cancels the last programme executed. b) In PROGRAMMING cycle it cancels existing data or errors
	**RH ARROW** = FUNCTION KEY a) RECALL PROGRAMME N. b) CURSOR SCROLL c) MEMORISE DATA d) MEMORISE PROGRAMMES e) SELECT PROGRAMMES		**RUN/PROG** =FUNCTION KEY a) In AUTOMATIC cycle it swaps between PROGRAMMING and RUN
	SELECT START FROM KEYBOARD		SELECT AUTOMATIC CUTTING CYCLE
	SELECT SEMIAUTOMATIC CUTTING CYCLE		SELECT START FROM FOOT PEDAL

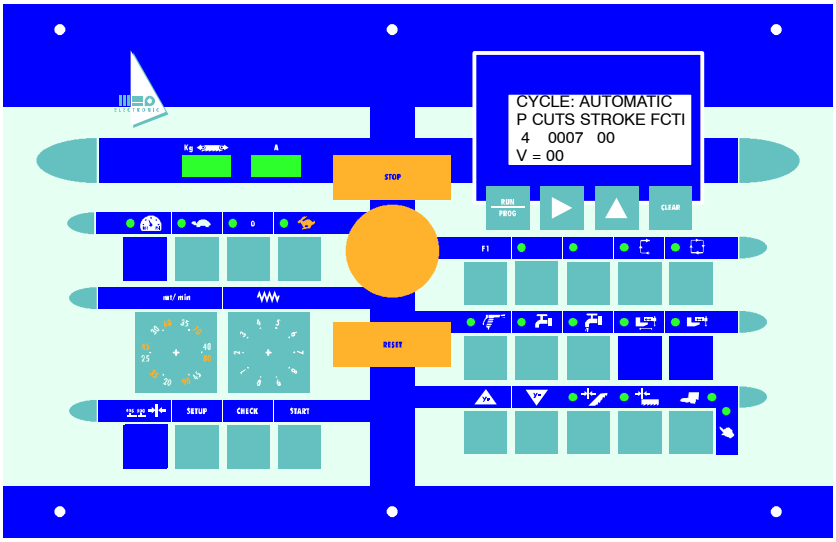
4.2 - Initialisation



1st SCREEN

At start-up the display will show the introductory SCREEN

Press CLEAR to continue

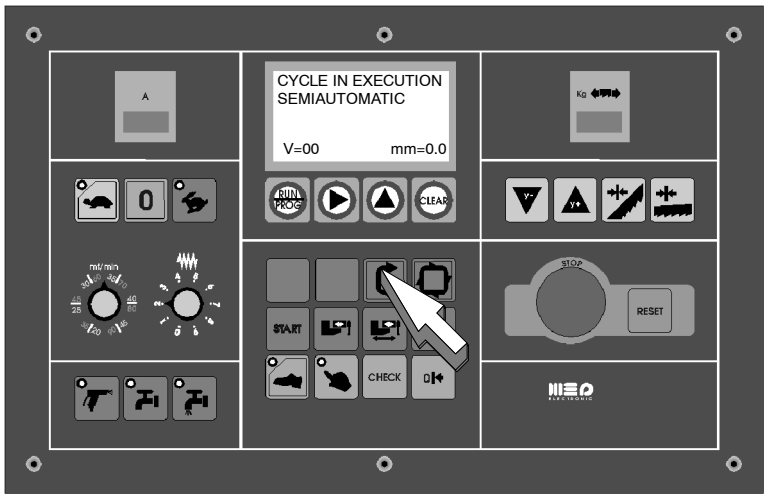


2nd SCREEN

The display proposes the last programme that was used

Now the machine is ready to perform one of the four work cycles, each amply described in the following paragraphs.

4.3 - Semiautomatic operating cycle



8th SCREEN

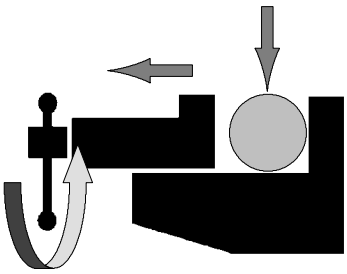
Press to enter the SEMIAUTOMATIC cycle, the display will show this message.

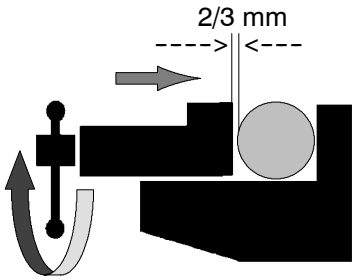
SEMIAUTOMATIC CYCLE: SCREEN OF WORK - OPERATING PARAMETERS		
CYCLE IN EXECUTION SEMIAUTOMATIC V=00 mm=0.0	CYCLE IN EXECUTION SEMIAUTOMATIC	The SEMIAUTOMATIC cycle consists of the following operations in automatic: START → CLOSE CUTTING VICE → START BLADE → LOWER CUTTING HEAD TO FCTA → STOP BLADE → RETURN CUTTING HEAD TO FCTI → OPEN CUTTING VICE
	MACHINE CONTROL PARAMETERS	V= 00 -->cutting speed m/min A= 0.0 --> absorbed current of belt motor Kg= 000 --> blade tension in Kg mm= 0.0 --> feeder stroke in mm (active only with Encoder OPT.) T= 00:00 -->cutting time TT= 000:00 --> total cutting time of machine

WORK CYCLE: **SEMIAUTOMATIC** *SEQUENCE OF OPERATIONS*

4.3.1 - Clamping the piece

1) OPEN THE VICE BY TURNING THE HANDWHEEL ANTI-CLOCK-WISE, AND POSITION THE MATERIAL IN THE JAWS.





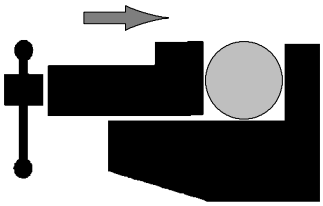
2) TURN THE HANDWHEEL CLOCKWISE TO CLOSE THE MOBILE JAW TO 2-3 mm FROM THE MATERIAL.

3) PRESS THE HYDRAULIC OPEN/CLOSE CUTTING VICE BUTTON TO CLAMP THE PIECE.

OPEN-CLOSE CUTTING VICE BUTTON--->



4) CHECK THAT THE PIECE IS FIRMLY CLAMPED, IF NOT REPEAT THE OPERATION.
N.B. the piece may be badly clamped if the hydraulic piston of the vice was already in the closed position.
Therefore the operation must be repeated:
OPEN THE VICE WITH THE O/C BUTTON

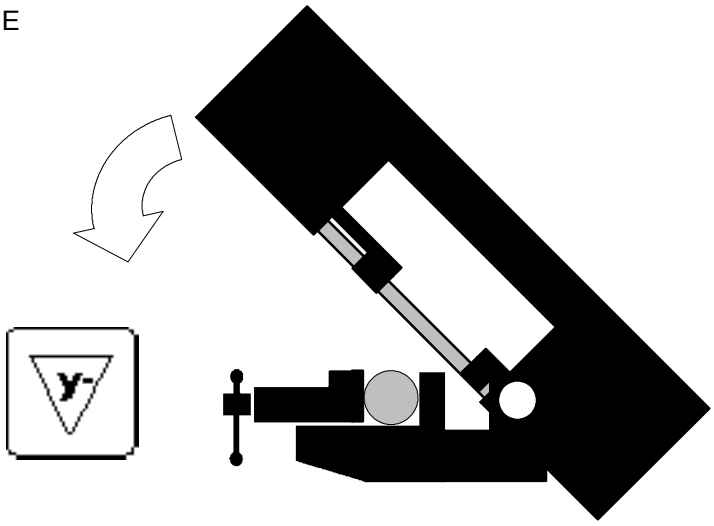


MOVE THE MOBILE JAW UP TO THE PIECE

CLAMP WITH THE O/C BUTTON

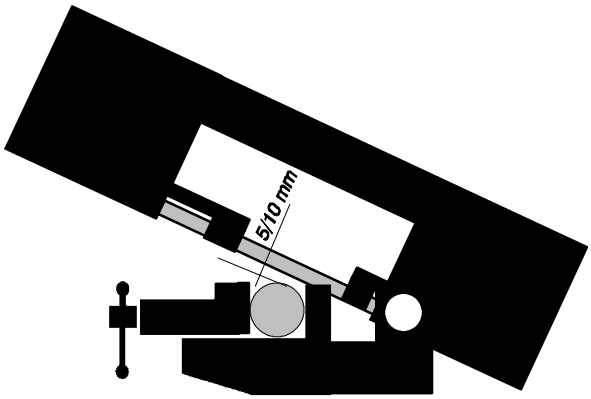
4.3.2 - Adjusting the cutting stroke

1) AFTER HAVING CLAMPED THE PIECE, ADJUST THE CUTTING STROKE.
PRESS THE HEAD DOWN BUTTON, WHICH LOWERS THE HEAD AUTOMATICALLY.



DOWN CUTTING HEAD BUTTON--->

KEEP IT PRESSED UNTIL THE BLADE IS AT ABOUT 5-10 mm FROM THE PIECE.



2) MEMORISE THIS POSITION AS FCTI = HEAD RISE LIMIT.
TO DO THIS PRESS:

MEMORISE HEAD RISE LIMIT--->



YOU ARE NEARLY READY TO GIVE THE GO-AHEAD AND START PRODUCTION....
. . . . . THE SWARF!!! PLEASE BE PATIENT FOR JUST A MOMENT, THANK YOU.

4.3.3 - Preparing the cut

1) SELECT A CUTTING SPEED, OR A SPEED RANGE, IF THE MACHINE HAS A SPEED CONTROL

LOW SPEED BUTTON -------->



NO SPEED BUTTON ------>



HIGH SPEED BUTTON ---------->



IF THE HIGH SPEED “HARE” IS CHOSEN,THE LED ON THE BUTTON WILL LIGHT UP TO CONFIRM YOUR SELECTION.

2) DON’T FORGET THE COOLANT, WHICH IS NECESSARY.
SELECT ONE OF THE COOLANT WORK CYCLES

NO COOLANT BUTTON -------------->



AUTOMATIC COOLANT BUTTON---------->



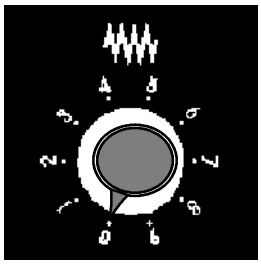
COOLANT FOR MACHINE CLEANING BUTTON--->



SELECT THE COOLANT FOR OPERATION IN AUTOMATIC BY PRESSING THE CORRESPONDING BUTTON.
THE SELECTION IS CONFIRMED BY THE LED THAT LIGHTS UP ON THE CORRESPONDING BUTTON.

3) SET THE HEAD DOWN SPEED CONTROL TO “0” TO AVOID A SUDDEN START-UP SPEED.

POTENTIOMETER CONTROL FOR SPEED ADJUSTMENT OF DOWN MOVEMENT OF CUTTING HEAD--->



4.3.4 - Cutting

1) NOW THE START BUTTON CAN BE PRESSED TO BEGIN THE CUTTING CYCLE.

START BUTTON--->



AT THIS POINT THE MACHINE STARTS-UP THE BLADE, PRESSURISES THE CUTTING CYLINDER AND STARTS TO PUMP COOLANT.
HAVE YOU REMEMBERED TO OPEN THE COOLANT VALVE ?

2) ONCE AGAIN, PRESS THE DOWN CUTTING HEAD BUTTON, THIS WILL CANCEL THE
FCTA = HEAD DOWN LIMIT MEMORISED EARLIER.

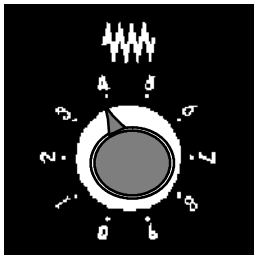
DOWN CUTTING HEAD BUTTON---------->



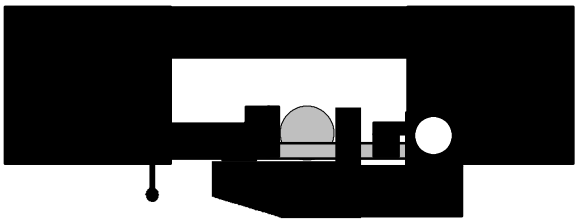
THE "FCTA" HEAD DOWN LIMIT WILL BE RESTORED WHEN YOU ARE AT END CUTS.

3) SET THE HEAD DOWN SPEED CONTROL AT "4" AND CONTROL THAT THE SPEED IS RIGHT, HOW? AN EXPERT EYE IS WORTH MORE THAN ANY OTHER CONTROL.

POTENTIOMETER SPEED CONTROL OF THE DOWN CUTTING HEAD--->



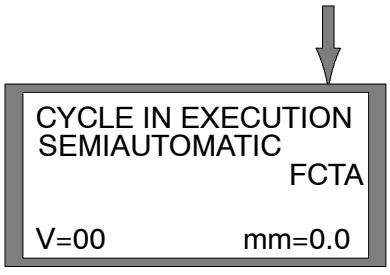
4) WHEN THE MACHINE REACHES END CUT MEMORISE THE POSITION AS:
FCTA=HEAD DOWN LIMIT.
TO DO THIS PRESS THE BUTTON:



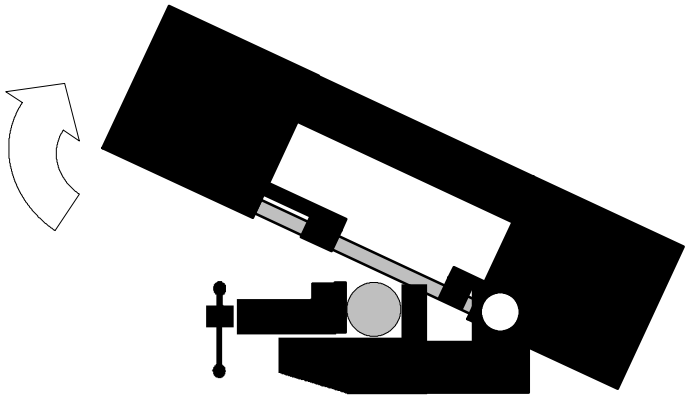
MEMORISE HEAD DOWN LIMIT--->



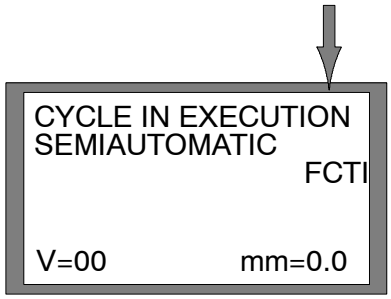
AFTER PRESSING "MEM. FCTA" THE DISPLAY WILL SHOW THE CORRESPONDING CODE THAT CONFIRMS MEMORISATION.



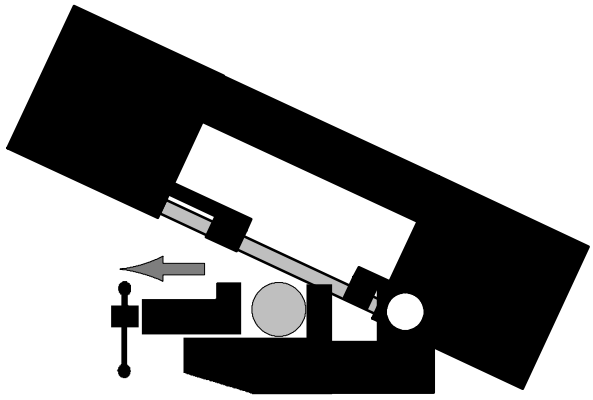
THE BLADE WILL STOP AND THE CUTTING HEAD WILL RETURN TO ITS STARTING POSITION “FCTI”



WHEN THE MACHINE REACHES THE START CUT POSITION THE DISPLAY WILL SHOW THE MESSAGE CORRESPONDING TO THE HEAD POSITION IN ALTO “FCTI”

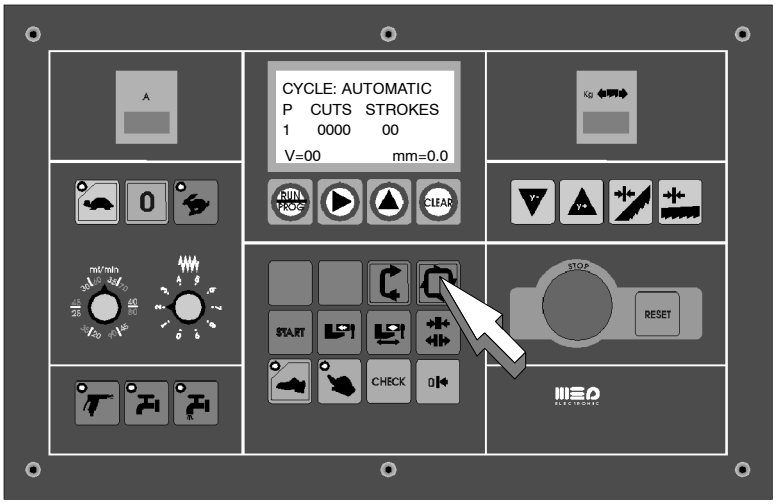


THE NEXT OPERATION PERFORMED BY THE MACHINE WILL BE TO OPEN THE VICE.



THE MACHINE IS NOW READY TO RUN A NEW WORK CYCLE

4.4 - Automatic operating cycle

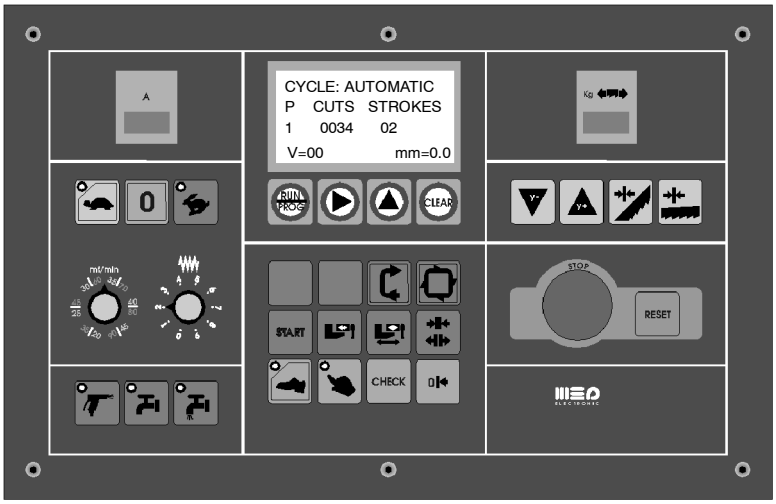


9th SCREEN



Press to enter the AUTOMATIC cycle, the display will show the message illustrated to the side.

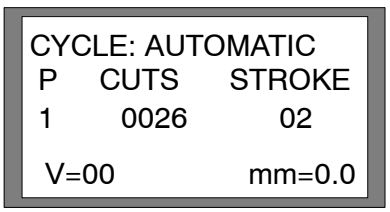
The AUTOMATIC screen shows the parameter settings for the last work cycle.

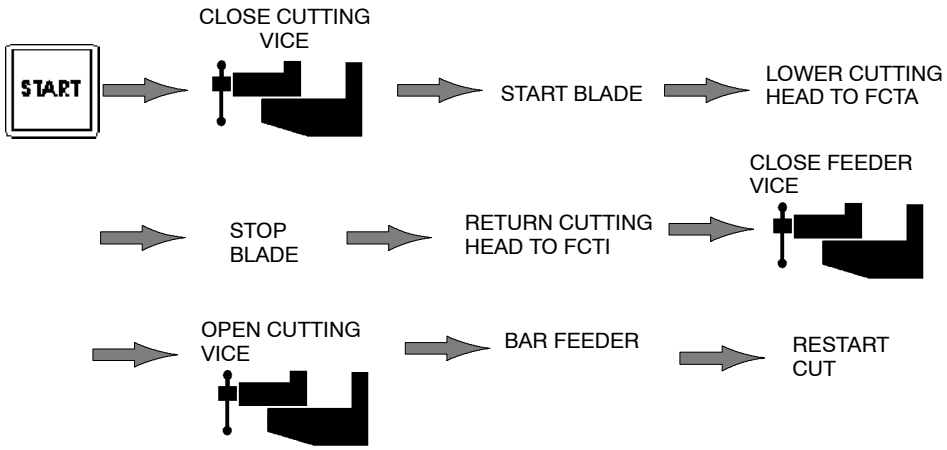


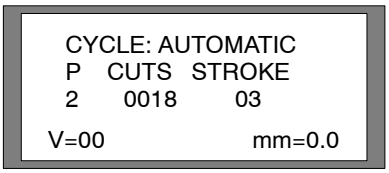
10th SCREEN

The Automatic cycle can memorise 10 programmes (from 0 to 9 inclusive), and for each programme allows the setting of the number of pieces in total (cuts), and the number of feeder strokes.

The AUTOMATIC cycle consists of the following sequence of automatic operations:







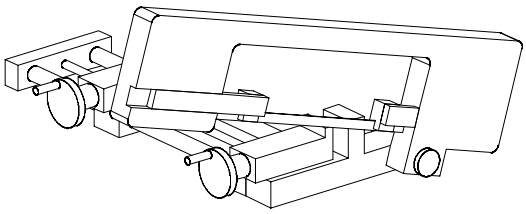
PROGRAM DATA	**P 2** = When the screen AUTOMATIC cycle is accessed the programme number shown refers to the last programme memorised, regardless of whether it's execution was complete, partial or only memorised. The control memory has space for 10 programmes to be memorised. **CUTS 9999** = Even for the number of "CUTS" ..... the same considerations as above are valid. For each programme up to a maximum of 9999 cuts can be set. **STROKES 02** = the number of "STROKES" displayed refers to the strokes that the pneumatic 02 feeder must perform. The feeder has a 500 mm stroke which can be fitted with an encoder measurement system that displays the feeder position on the control panel.In the standard version, the feeder is set and read directly on the millimetre scale set into the cylinder.
MACHINE OPERATING CONTROL PARAMETERS	V= 00 --> cutting speed m/min A= 0.0 --> absorbed current of belt motor Kg= 000 --> blade tension in Kg mm= 0.0 -->feeder stroke in mm (active only with Encoder OPT.) P= 0 --> programme number selected or in execution CUTS = 0000--> number of cuts STROKES=00--> number of feeder runs T= 00:00 --> cutting time TT= 000:00 --> total cutting time of machine

WORK CYCLE: **AUTOMATIC** *SEQUENCE OF OPERATIONS*

4.4.1 - Introducing and clamping the piece

1) THE FIRST SERIES OF OPERATIONS TO BE MADE IS TO PREPARE THE MACHINE TO RECEIVE THE MATERIAL.

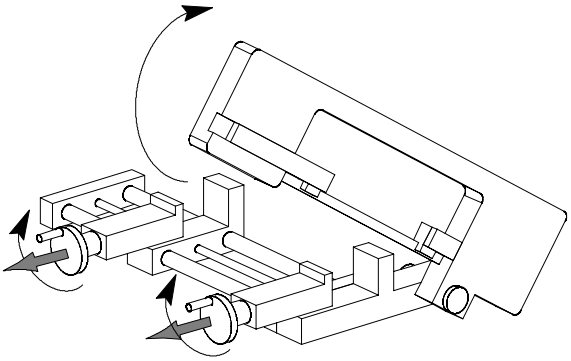
THE MACHINE WILL INITIALLY BE FOUND IN ANY CONFIGURATION.
FROM THIS SITUATION MOVE THE CUTTING HEAD TO THE MECHANICAL HEAD RISE LIMIT WITH THE MANUAL HEAD RISE BUTTON.



MANUAL HEAD RISE BUTTON--->



NOW OPEN THE CUTTING VICE AND THE FEEDER VICE WITH THE HANDWHEELS.



AFTER THIS, CHECK THAT THE HYDRAULIC PISTON IS SET TO OPEN.
TO DO THIS USE THE OPEN/CLOSE CUTTING AND FEEDER VICES

OPEN-CLOSE CUTTING VICE BUTTON-------->



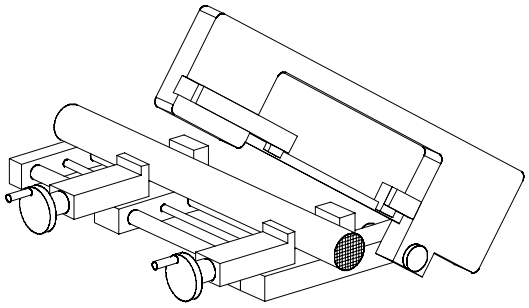
OPEN-CLOSE FEEDER VICE BUTTON--->



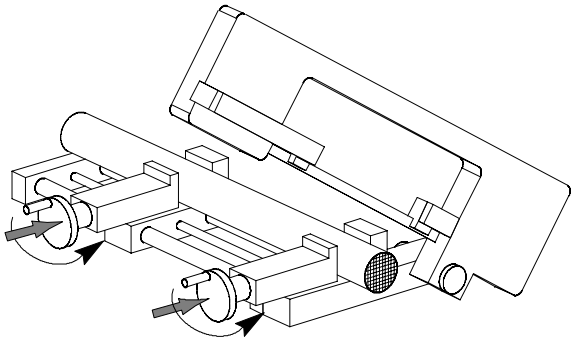
IT IS ADVISABLE TO TEST THE USE OF THE BUTTONS A NUMBER OF TIMES TO GET ACQUAINTED WITH THEIR OPERATION.

2) THE SECOND SERIES OF OPERATIONS REGARDS THE INTRODUCTION OF THE MATERIAL TO BE CUT.

INSERT THE MATERIAL BETWEEN THE JAWS OF THE VICE AND MOVE ONE END UNDER THE BLADE TO MAKE A LEAD CUT TO START THE CUTS.



AFTER HAVING INSERTED THE MATERIAL “ADJUST THE MOBILE JAWS” OF THE CUTTING VICE AND THE FEEDER VICE TO 2-3 mm FROM THE PIECE.



NOW CLAMP THE PIECE BY OPERATING THE PNEUMATIC JAWS WITH THE TWO O/C VICE BUTTONS DESCRIBED EARLIER.

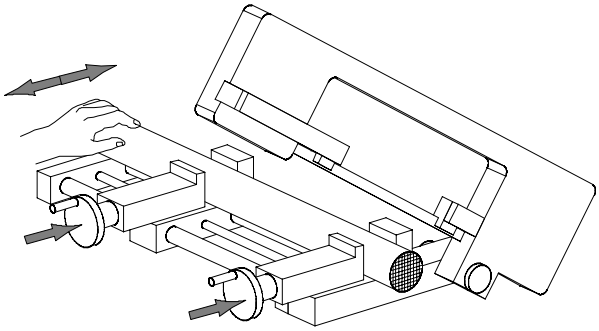
OPEN-CLOSE CUTTING VICE BUTTON--->



OPEN-CLOSE FEEDER VICE BUTTON--->

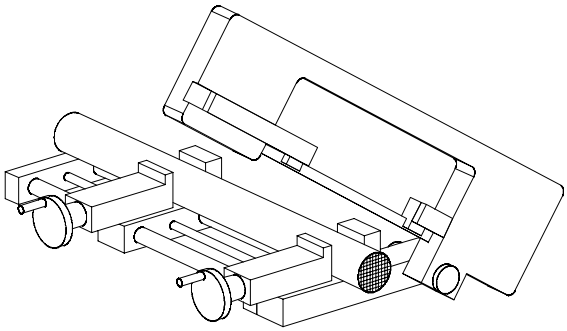


CHECK THAT THE PIECE IS FIRMLY CLAMPED!!!



4.4.2 - Preparing the cut

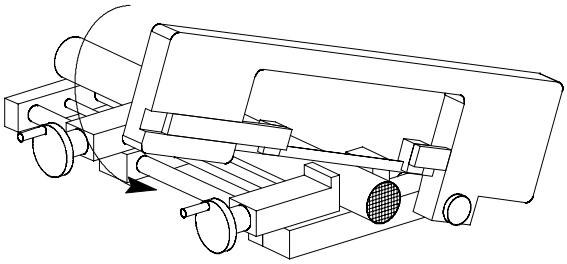
1) NOW THAT THE PIECE HAS BEEN CLAMPED, THE CUTTING STROKE MUST BE ADJUSTED.
FIRST MEMORISE THE POSITION OF THE CUT START FCTI.
TO DO THIS MOVE THE CUTTING HEAD TO THE PIECE WITH THE MANUAL HEAD DOWN CONTROL BUTTON.



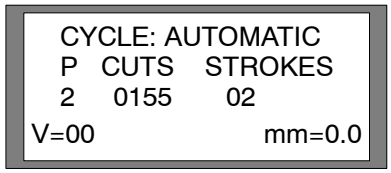
CUTTING HEAD DOWN BUTTON-------->



2) WE MUST MEMORISE THE CUT START POSITION AS FCTI: HEAD RISE LIMIT.
TO ACHIEVE THIS PRESS THE MEMORISE HEAD RISE LIMIT.



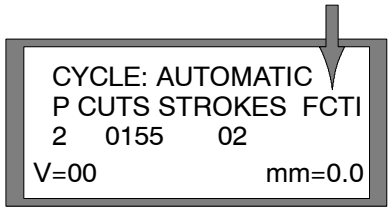
AT THIS POINT THE MACHINE'S DISPLAY WILL NO LONGER GIVE A SETTING FOR THE CUTTING STROKE LIMITS.



MEMORISE HEAD RISE LIMIT--->



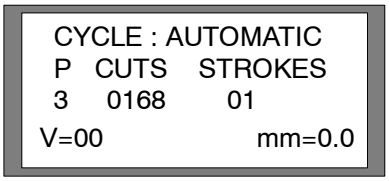
AFTER HAVING PRESSED THE "MEM . FCTI" BUTTON THE DISPLAY WILL SHOW THE CORRESPONDING MESSAGE THAT CONFIRMS IT IS MEMORISED.



WE WILL LEAVE THE PREPARATION OF THE CUT FOR A MOMENT TO EXPLAIN THE PROGRAMMING.

4.4.3 - Cut programming

AT THIS POINT THE MATERIAL HAS BEEN INSERTED AND CLAMPED, AND THE CUTTING HEAD IS POSITIONED AT THE START CUT LIMIT. NOW THE REQUIRED CUT LENGTH AND NUMBER OF PIECES MUST BE SET.
IN PRACTICE WE MUST NOW ENTER THE CUT PROGRAMMING PHASE.



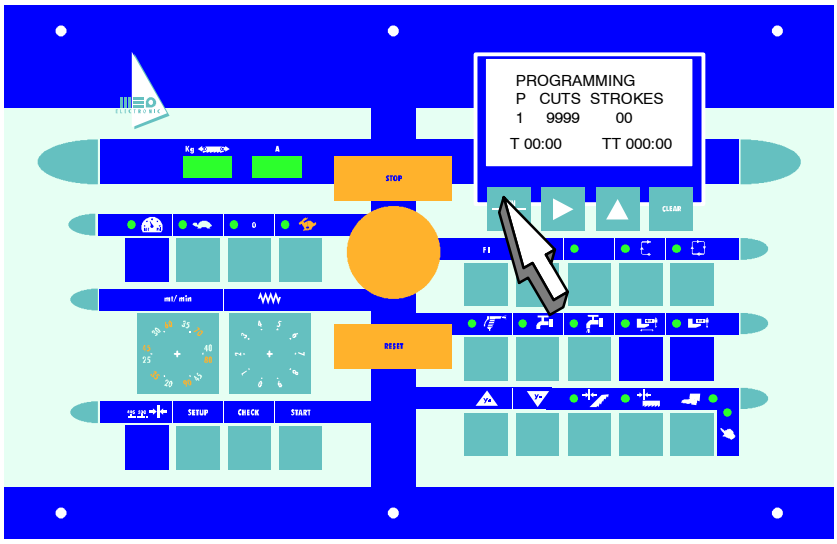
PROGRAMME= THE CUT PROGRAMME IS CORRESPONDS TO THE INPUT OF THE FOLLOWING PARAMETERS:

P = PROGRAMME NUMBER: This can be set, in the case where you need to specify number for future reference, which can be recalled to re-use a previously recorded programme, if not, accept the number that the control proposes.

STROKES= NUMBER OF STROKES: this number indicates the feeder strokes, seeing as there is a maximum of 500 mm for each stroke. The number of strokes is modified using the arrow keys.

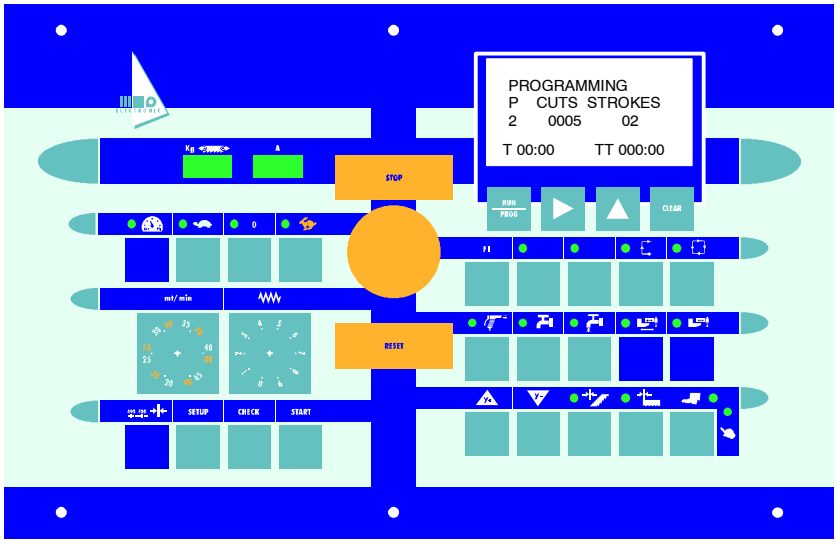
CUTS = QUANTITY OF PIECES: This quantity indicates the number of pieces that must be cut, and is modified with the arrow keys and is specific to the selected PROG. N.

IF WE GO BACK TO THE CONTROL PANEL WE CAN SEE HOW TO USE THE COMMANDS.



11th SCREEN

To enter automatic cycle programming press the RUN/PROG key on the control panel.
This screen will be shown, with the cursor flashing over the programme number.



12th SCREEN

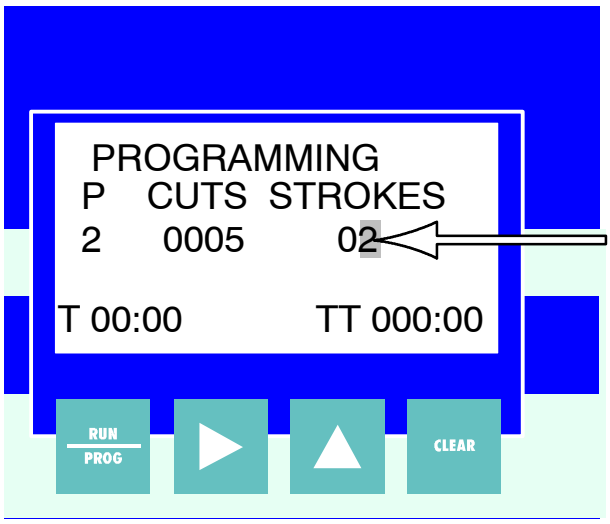
You may now begin programming the automatic cycle, starting from the programme number.
SHARK 320 AXI can save up to 10 different programmes, from 0 to 9 inclusive.



For example, assign the number 2 to the programme you are about to set up, to do this press the arrow key shown to the left, until the desired number appears under the cursor.



Now press this key to perform two tasks, first it memorises the earlier setting, and second it scrolls the cursor to the right over the next figure.



13th SCREEN

After the programme number, the cursor moves to the first digit of the CUTS in thousands (take it to zero), press the cursor movement key (▶) again to move to the second digit (change to zero). In this way you can set the machine to perform 5 cuts, and 2 feeder strokes. The display will appear as shown in the figure to the side.

BEFORE CONTINUING LET US LOOK AT HOW TO SET THE FEEDER STROKES

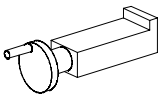
CASE A : *THE STROKE IS LESS THAN 500 MM.*

To set a 400mm stroke, first of all free the feeder trolley with the appropriate button on the control panel and adjust the trolley knob, turning it until the zero notch on the ninth decimal fixed to the trolley is aligned with the 400mm notch. CAUTION, don't forget to include the blade waste in the cut calculation, which is usually 1.2 mm. Add this to the 400mm length to give a total of 401.2mm. Now the feeder must be adjusted a further 1.2 mm. to cut a 400mm long piece. When this is done, lock the feeder trolley by pressing the lock/unlock feeder trolley. THE STROKE HAS BEEN SET !!!

LOCK/UNLOCK FEEDER TROLLEY BUTTON -->



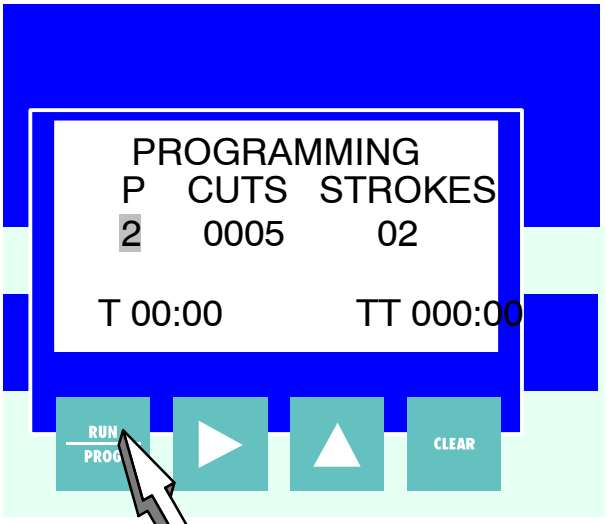
CASE B : *THE STROKE IS OVER 500 mm.*



To set a stroke of 700 mm, first free the feeder trolley with the appropriate button on the control panel and adjust the trolley knob, turning it until 350.6 mm is read. This is exactly half of the length 700 + 1.2 = 701.2, divided by two gives 350.6 mm. This setting includes the blade waste (1.2 mm), so now just programme the machine to perform two strokes with the feeder to have pieces cut at 700 mm. LOCK THE TROLLEY, otherwise when the cycle START is pressed, the machine will give the message that the cylinder has not been locked.

In the same way, if the measure exceeds the quota of 1 metre the advance of the bar must be divided in three equal parts, remembering to add the blade waste to the length you want to cut, before dividing the length into strokes.

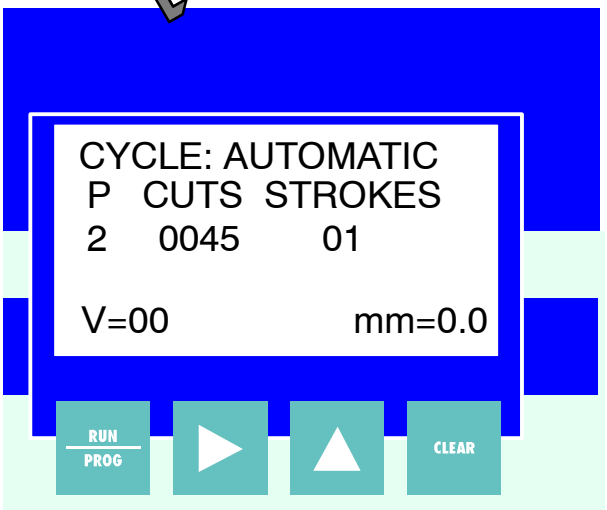
WE CAN NOW RETURN TO CYCLE PROGRAMMING:



14th SCREEN

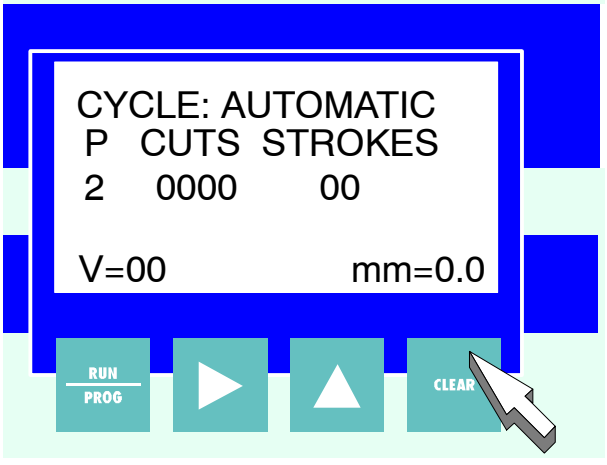


At this point It is fundamental that the new programme is memorised.
To save the programme just move the cursor to the programme number with the (▶) key and exit programming with the RUN–PROG key.



15th SCREEN

The moment RUN–PROG is pressed the AUTOMATIC cycle is restored, which will have programme number 2 open, which you have just set–up; while the value readings on display regarding the strokes and cuts refer to the last cycle made by the machine.



16th SCREEN

So press CLEAR to zero the values regarding the cuts and strokes; after this the display will appear as shown.

NOW, BEFORE GIVING THE “START” LET’S GO BACK TO: PREPARING THE CUT

3) SELECT A CUTTING SPEED, OR A SPEED RANGE, IF THE MACHINE HAS A SPEED CONTROL.

LOW SPEED BUTTON ----->



NO SPEED BUTTON --->



HIGH SPEED BUTTON ------->



IF THE MACHINE HAS AN INVERTER, ELECTRONIC LINEAR SPEED CONTROL, THE CUTTING SPEED BUTTONS SELECT A “SPEED RANGE”:

LOW SPEED BUTTON: 20/45 m/min
HIGH SPEED BUTTON: 35/90 m/min

THIS SPEED CAN BE VARIED BY SIMPLY TURNING THE POTENTIOMETER DIAL: ”CUTTING SPEED”.



SELECT THE HIGH SPEED “HARE”.
THE SELECTION IS CONFIRMED BY THE LED THAT LIGHTS UP ON THE CORRESPONDING BUTTON.

4) DON’T FORGET THE COOLANT, WHICH IS ABSOLUTELY NECESSARY.
SELECT ONE OF THE COOLANT WORK CYCLES

NO COOLANT BUTTON ---------->



AUTOMATIC COOLANT BUTTON --------->



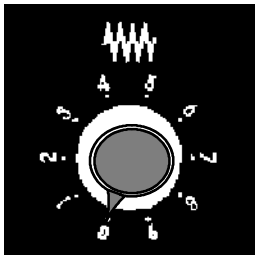
COOLANT FOR MACHINE CLEANING BUTTON --->



SELECT THE COOLANT FOR OPERATION IN AUTOMATIC BY PRESSING THE CORRESPONDING BUTTON.
THE SELECTION IS CONFIRMED BY THE LED THAT LIGHTS UP ON THE CORRESPONDING BUTTON.

5) SET THE HEAD DOWN SPEED CONTROL TO “0” TO AVOID A SUDDEN START-UP SPEED.

POTENTIOMETER CONTROL FOR SPEED ADJUSTMENT OF DOWN/ DOWNWARD MOVEMENT OF CUTTING HEAD--->



4.4.4 - Cutting

1) NOW THE START BUTTON CAN BE PRESSED TO BEGIN THE CUTTING CYCLE.



START BUTTON--->

AT THIS POINT THE MACHINE STARTS-UP THE BLADE, PRESSURISES THE CUTTING CYLINDER AND STARTS TO PUMP COOLANT.
HAVE YOU REMEMBERED TO OPEN THE COOLANT VALVE ?

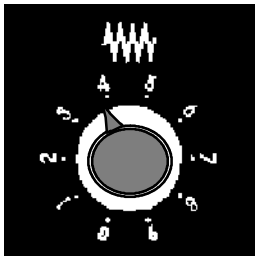
2) ONCE AGAIN, PRESS THE DOWN CUTTING HEAD BUTTON, THIS WILL CANCEL THE FCTA=HEAD DOWN LIMIT MEMORISED EARLIER.



CUTTING HEAD DOWN BUTTON--->

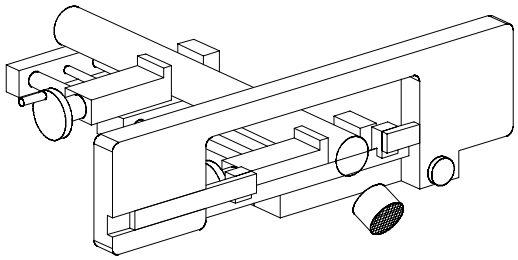
THE “FCTA” HEAD DOWN LIMIT WILL BE RESTORED WHEN YOU ARE AT END CUTS.

3) SET THE HEAD DOWN SPEED CONTROL AT “4” AND CONTROL THAT THE SPEED IS RIGHT, HOW? AN EXPERT EYE IS WORTH MORE THAN ANY OTHER CONTROL.



POTENTIOMETER SPEED CONTROL OF THE DOWN CUTTING HEAD--->

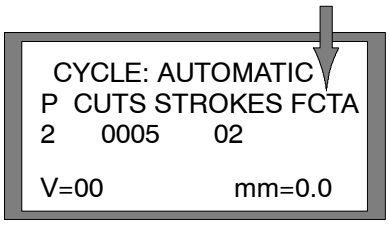
4) WHEN THE MACHINE REACHES END CUTS MEMORISE THE POSITION AS:
FCTA=HEAD DOWN LIMIT.
TO DO THIS PRESS THE BUTTON:



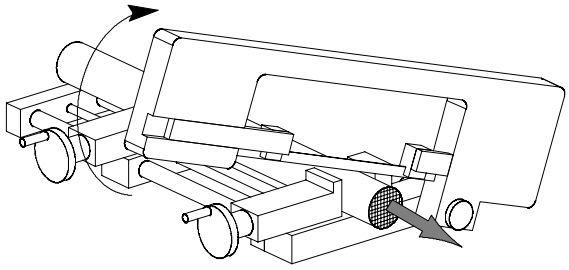


MEMORISE HEAD DOWN LIMIT--->

AFTER PRESSING “MEM. FCTA” THE DISPLAY WILL SHOW THE CORRESPONDING CODE THAT CONFIRMS MEMORISATION.



THE MACHINE WILL THEN RETURN THE CUTTING HEAD TO ITS STARTING POSITION “FCTI” AND FEEDER THE MATERIAL TO MAKE THE CUTS, WITH THE SET PROCEDURE.



N.B. EACH TIME THE MACHINE FINISHES A CUT THE NUMBER OF “CUTS” IS UPDATED BY ONE UNIT. THE LEAD CUT AND THE CUTS MADE IMMEDIATELY AFTER RESETTING AN EMERGENCY STOP ARE NOT COUNTED.

THE MACHINE HAS TWO AUTOMATIC SYSTEMS OF STOPPING THE PROGRAMME:

END OF BAR

END OF CUTS

IN BOTH CASES, THE PROGRAMME CAN BE RESET BY PRESSING:

RESET

AFTER WHICH THE MACHINE WILL BE READY TO RESTART THE CUTS WITH NEW BAR OR NEW PROGRAMME. IN BOTH CASES THE MESSAGE IS CLEARLY SHOWN ON DISPLAY.





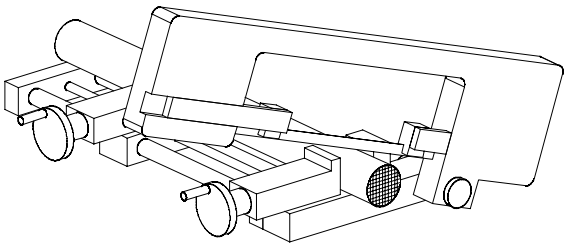
RETURNING TO: CUT PROGRAMMING

YOU HAVE REACHED THE END OF THE CUTS PROGRAMMED ON THE “SINGLE PROG”.

THE DISPLAY WILL SHOW THE MESSAGE---->



THE MACHINE STOPS IN THE START CUT POSITION.



PRESS RESET TO RETURN TO THE WORK SCREEN AND VIEW THE DATA REGARDING THE PROGRAMME THAT HAS BEEN RUN.



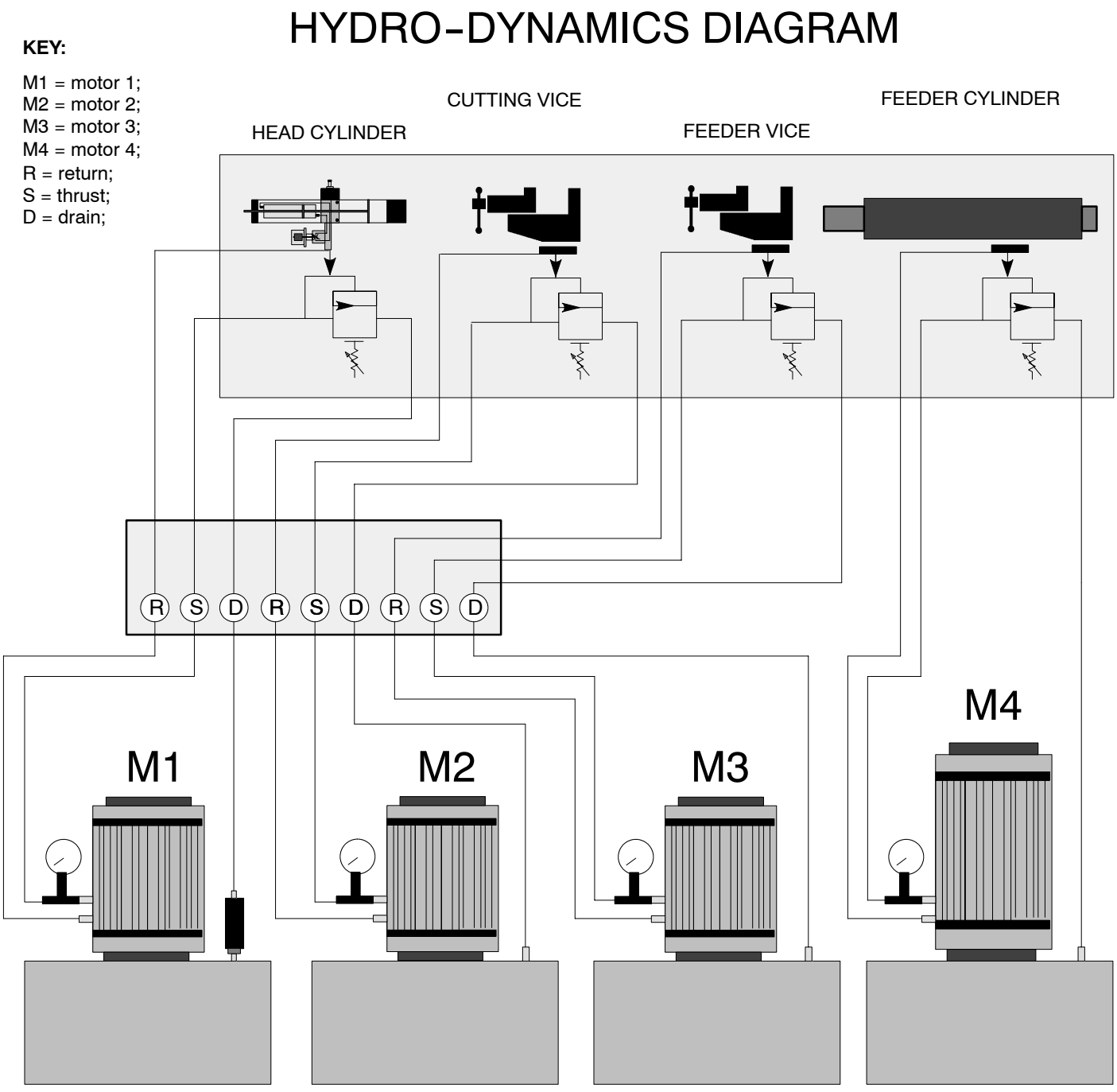
.....WITH THIS YOU HAVE FINISHED WORK

CHAPTER 5 - Diagrams, exploded views and spare parts

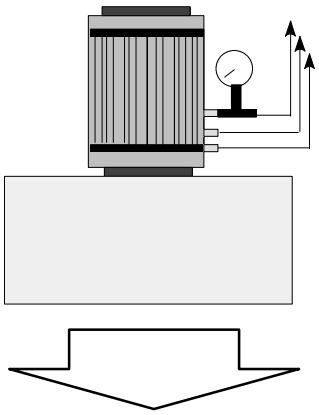
This chapter contains functional diagrams of the machine and exploded views of the SHARK 330 AXI-S. This document will allow you to identify the location of the various components making up the machine, thus enabling repairs and/or maintenance work to be carried out. In addition, this document will also enable you to order spare parts, correctly identifying them by part number and position number.

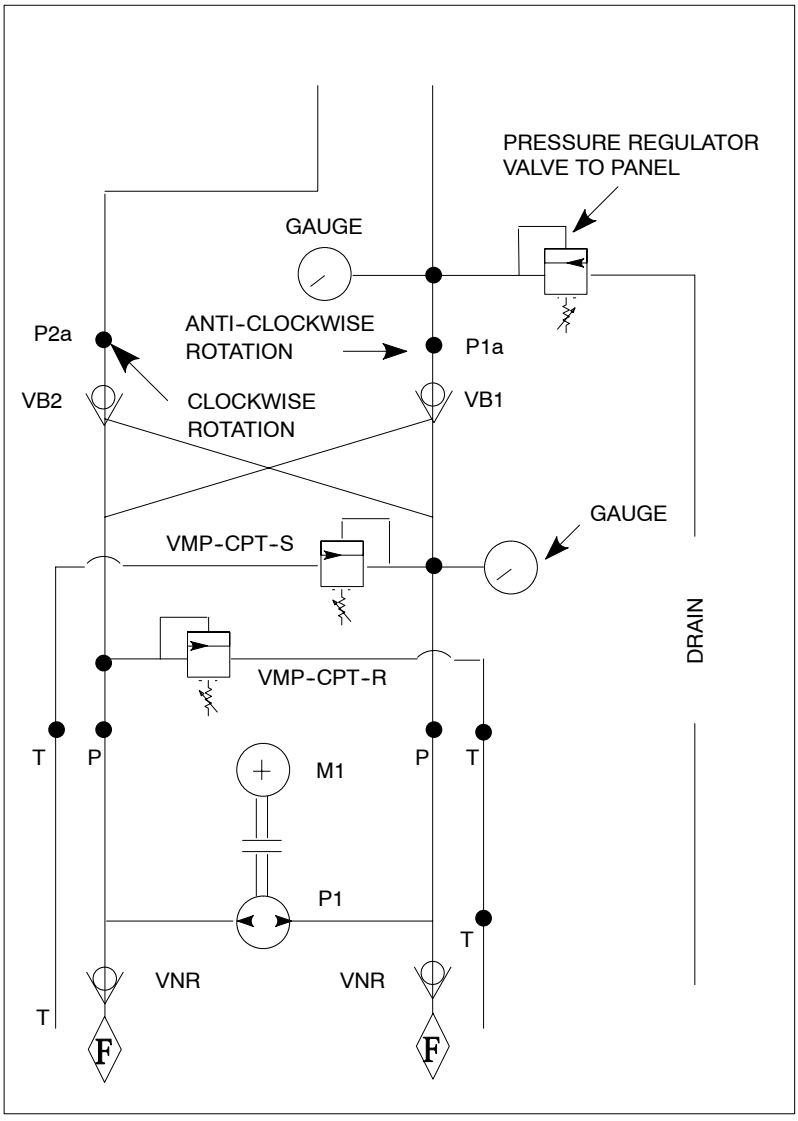
5.1 - Diagrams

5.1.1 - Hydraulic diagrams



M1 = Pump motor 1

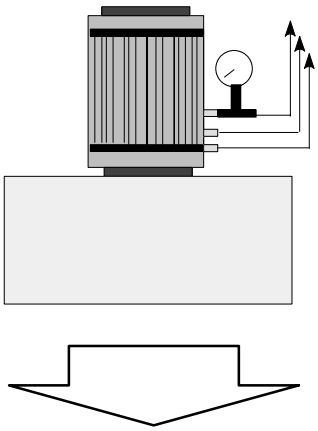


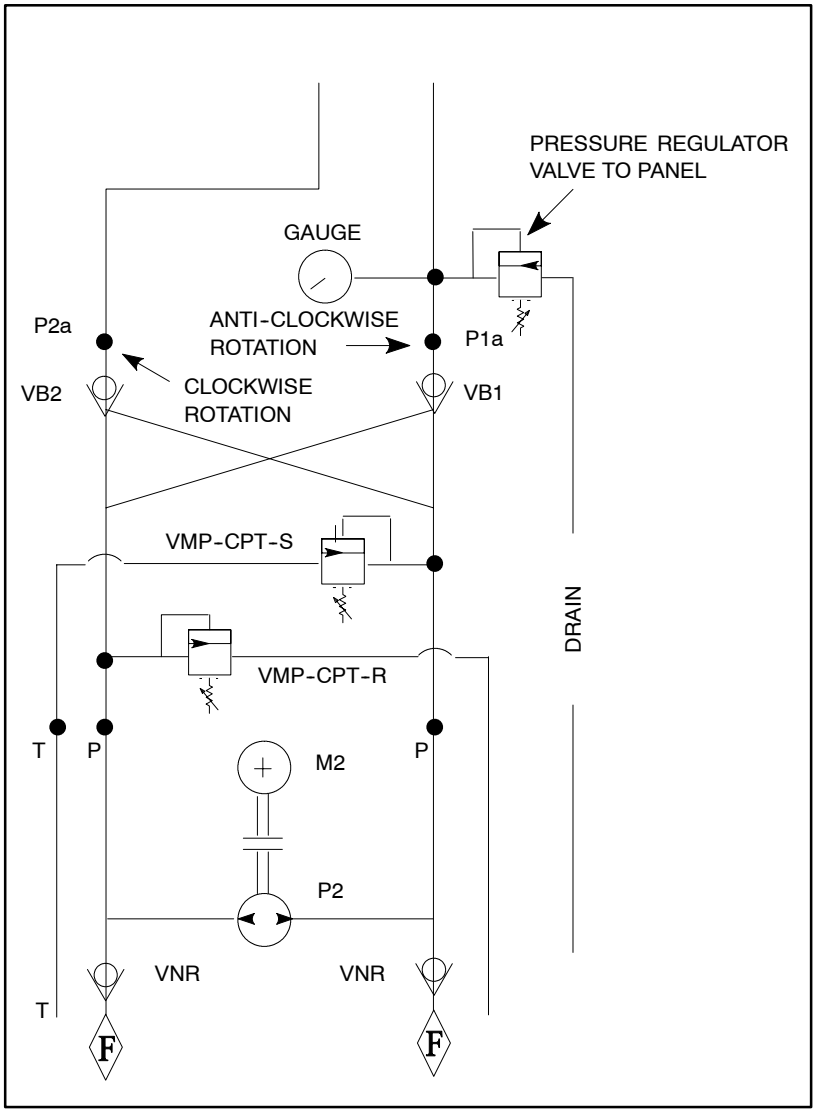


Component key

VB . . . . . Cross-linked hydraulic pilot shut-off valve;
VMP-CPT-S . . . . Max CPT thrust pressure valve: P = 20 bar;
VMP-CPT-R . . . . Max CPT return pressure valve: P = 20 bar;
M1 . . . . . Multi-volt dual frequency pump motor, power: 0.24 kW;
P1 . . . . . 2 way pump;
VNR . . . . . Non return valve;
F . . . . . Filters.

M2 = Pump motor unit 2

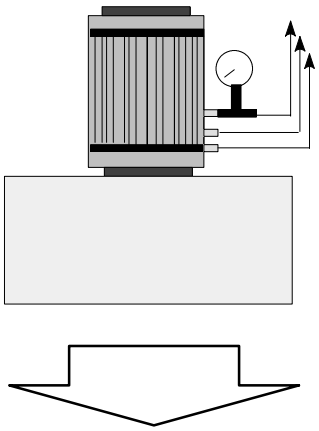


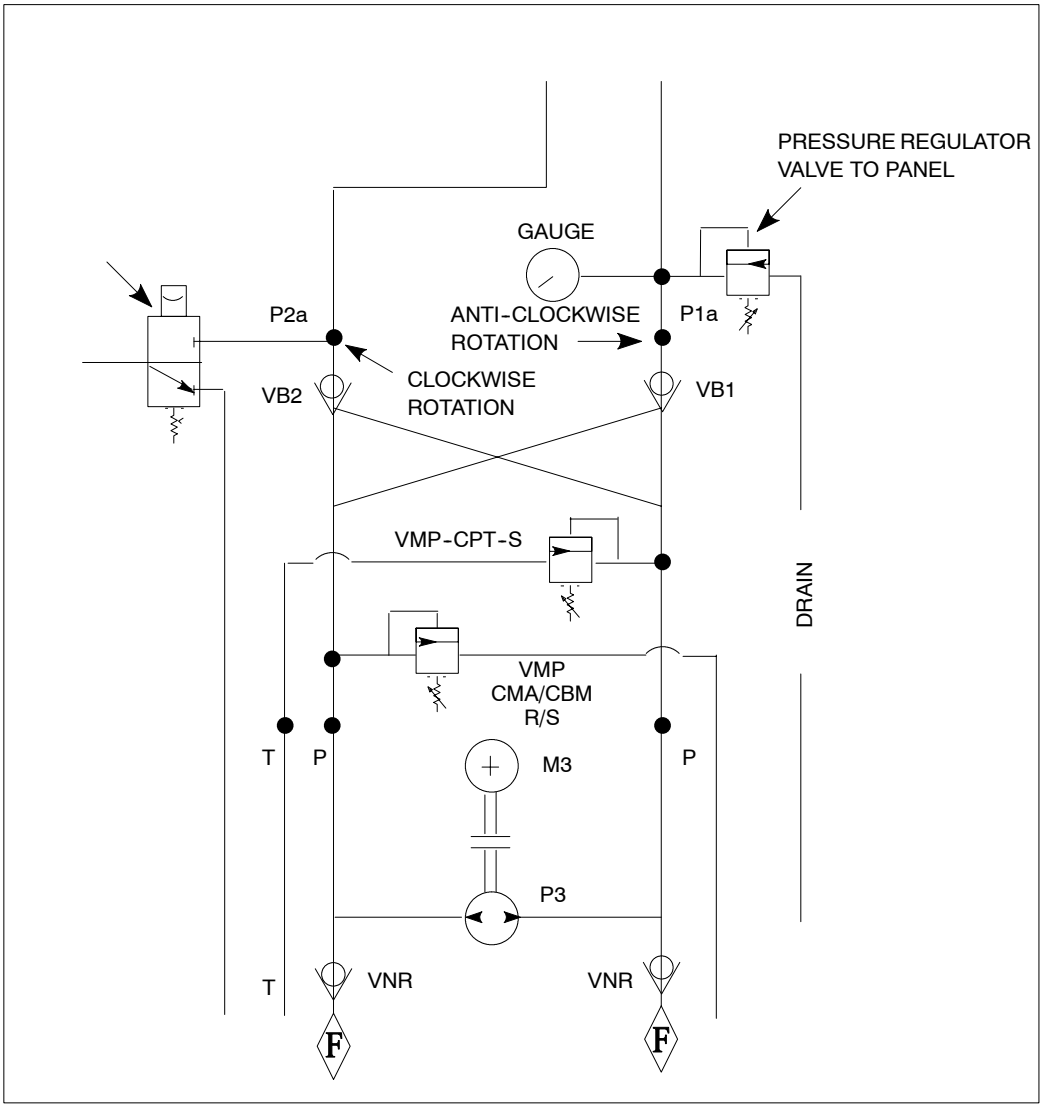


Component key

VB . . . . . Cross-linked hydraulic pilot shut-off valve;
VMP-CPT-S . . . . Max CPT thrust pressure valve: P = 25 bar;
VMP-CPT-R . . . . Max CPT return pressure valve: P = 25 bar;
M1 . . . . . Multi-volt dual frequency pump motor, power: 0.24 kW;
P1 . . . . . 2 way pump;
VNR . . . . . Non return valve;
F . . . . . Filters.

M3 = Pump motor unit 3

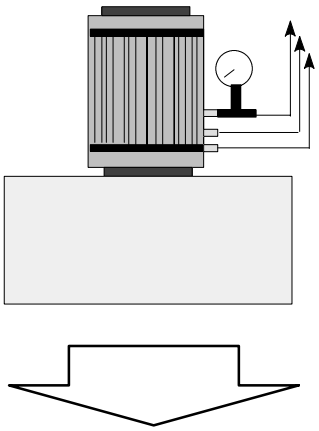


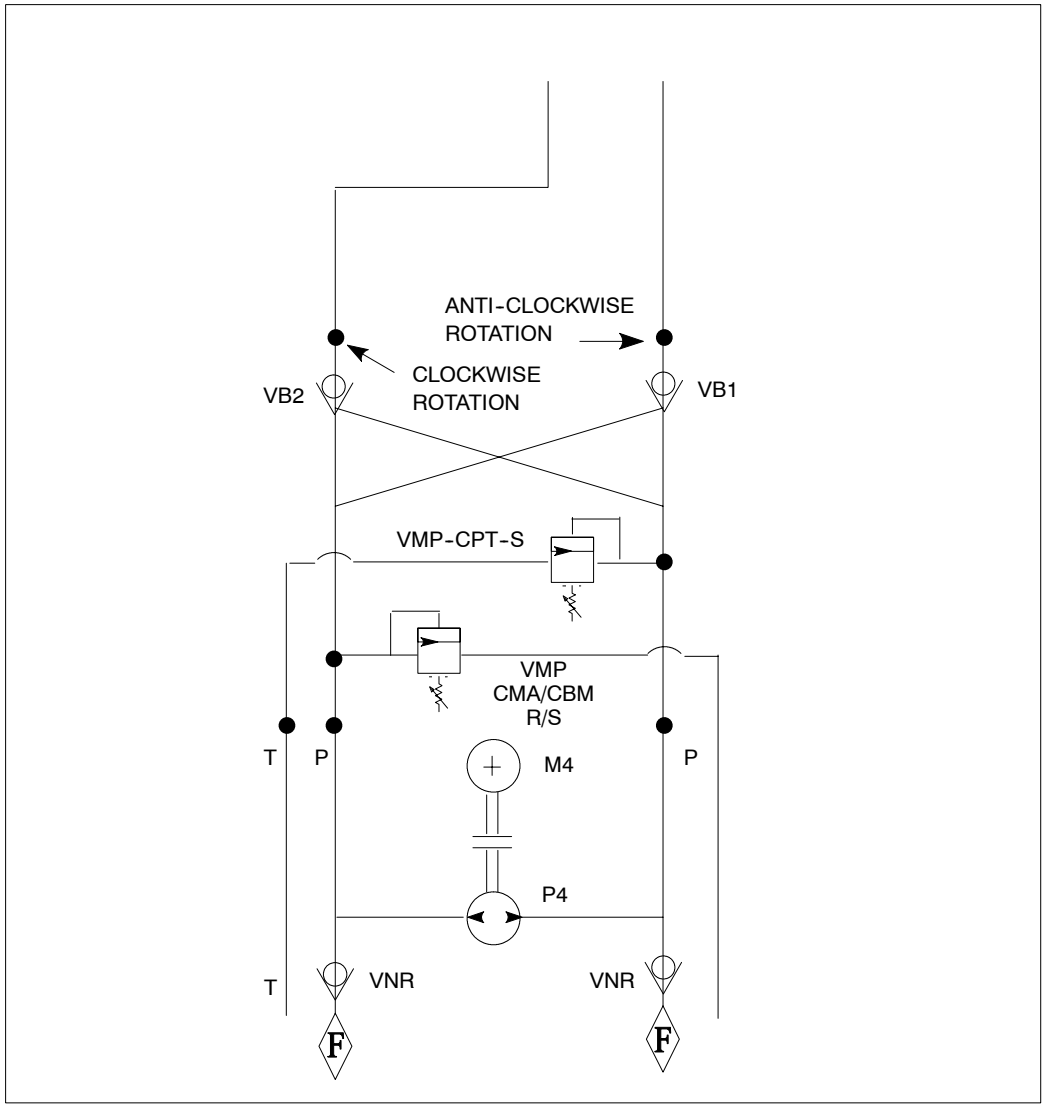


Component key

VB . . . . . Cross-linked hydraulic pilot shut-off valve;
VMP-CPT-S . . . . . Max CPT thrust pressure valve: P = 25 bar;
VMP-CPT-R . . . . . Max CPT return pressure valve: P = 25 bar;
M1 . . . . . Multi-volt dual frequency pump motor, power: 0.24 kW;
P1 . . . . . 2 way pump;
VNR . . . . . Non return valve;
F . . . . . Filters.

M4 = Pump motor unit 4





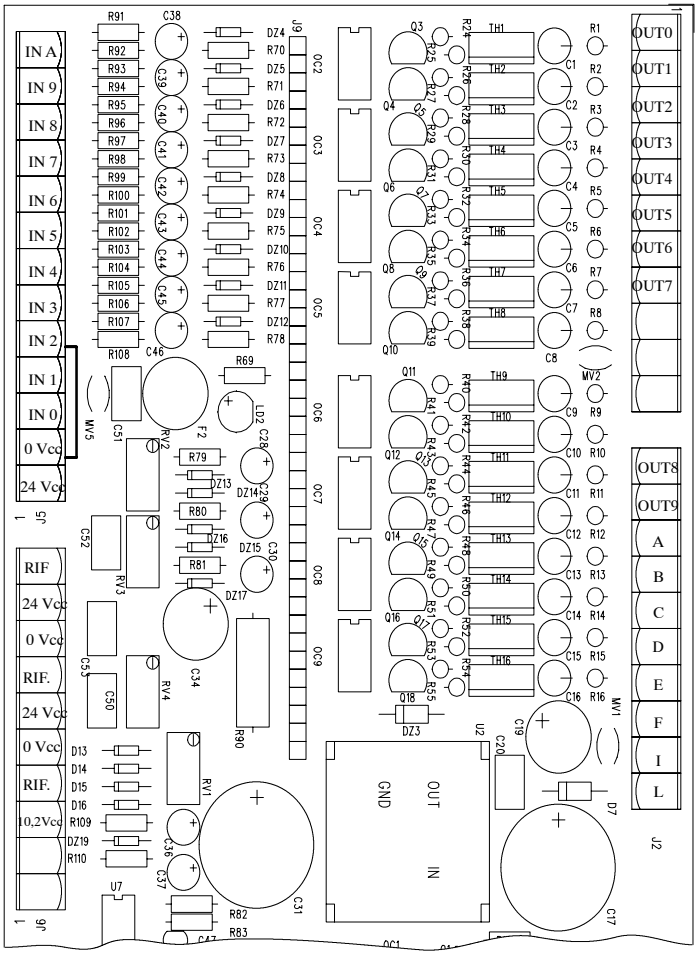
Component key

VB . . . . . Cross-linked hydraulic pilot shut-off valve;
VMP-CPT-S . . . . . Max CPT thrust pressure valve: P = 28 bar;
VMP-CPT-R . . . . . Max CPT return pressure valve: P = 28 bar;
M1 . . . . . Multi-volt dual frequency pump motor, power: 0.37 kW;
P1 . . . . . 2 way pump;
VNR . . . . . Non return valve;
F . . . . . Filters.

5.1.2 - IUV and IUD PCB's, MEP 23 controller

IUD – Inputs and Outputs, DIGITAL

Emergency		
Reset		
CAB PC upstroke		108
CAB PC downstroke		107
Protect. bar limitswitch		106
Blade sp. proxi.switch		105
EV Bar in CMT		104
Inverter failure		103
Blade casing limitswitch		102
Bar presence PC		101
Foot pedal start	M	100
0 Vcc (-) Proximity		99
24 Vcc COM-IN	R	98



70		Speed 1
69		Speed 2 - CS
68		Speed 2 (hare)
67		CPT down
66		CMT closing
65		Elettropomp
64		CPT up
63		CMT opening
62	R	Fuse
60	L	TR

060		Not used
134		CM unl./lock EV
133		CMA closing
132	L	Feed CAB
131		Back CAB
130		CMA opening
129		Chip discharge unit
128		Spazzola motorizzata
		Not used
		Not used

Not used

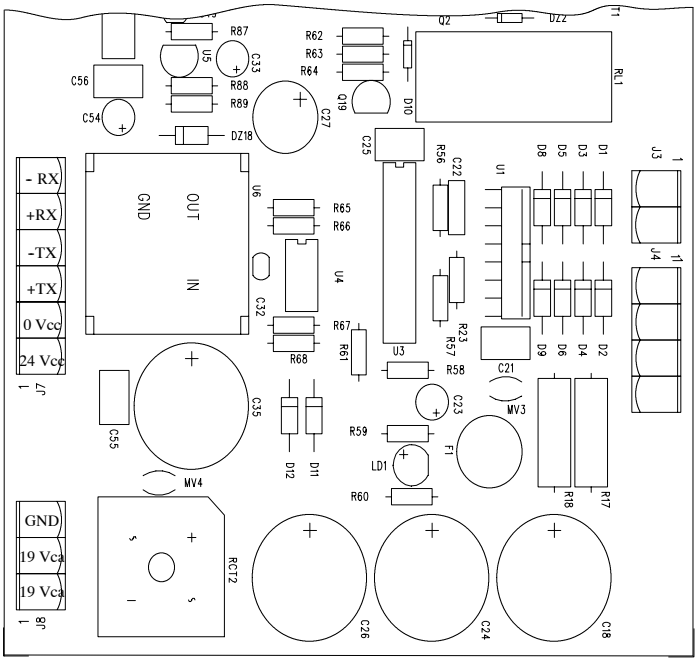
Blade tension

Head position

Current transformer

Press.switch		209
24 Vcc COM		
	S	94
	H-S	93
	H	92
	B	91
	G	90
	V	89
Curr. transf.		88
Curr. transf.		87

IUV – Inputs and Outputs, SUNDRY



Key to abbreviations of components	
CMA	Feeder clamp cylinder
CM	Measurement cylinder
CAB	Bar feed cylinder
FC	Travel limiter
CMT	Cutter clamp cylinder
CPT	Tool head cylinder
CS	Star point
BV	Solenoid valve

Serial communication with control panel

	B	86
	M	85
	V	84
	G	83
	L	82
	R	81

Start Inverter

80	C	
79	C	

Step motor

78	B	
77	V	
76	G	
75	M	

Earthed

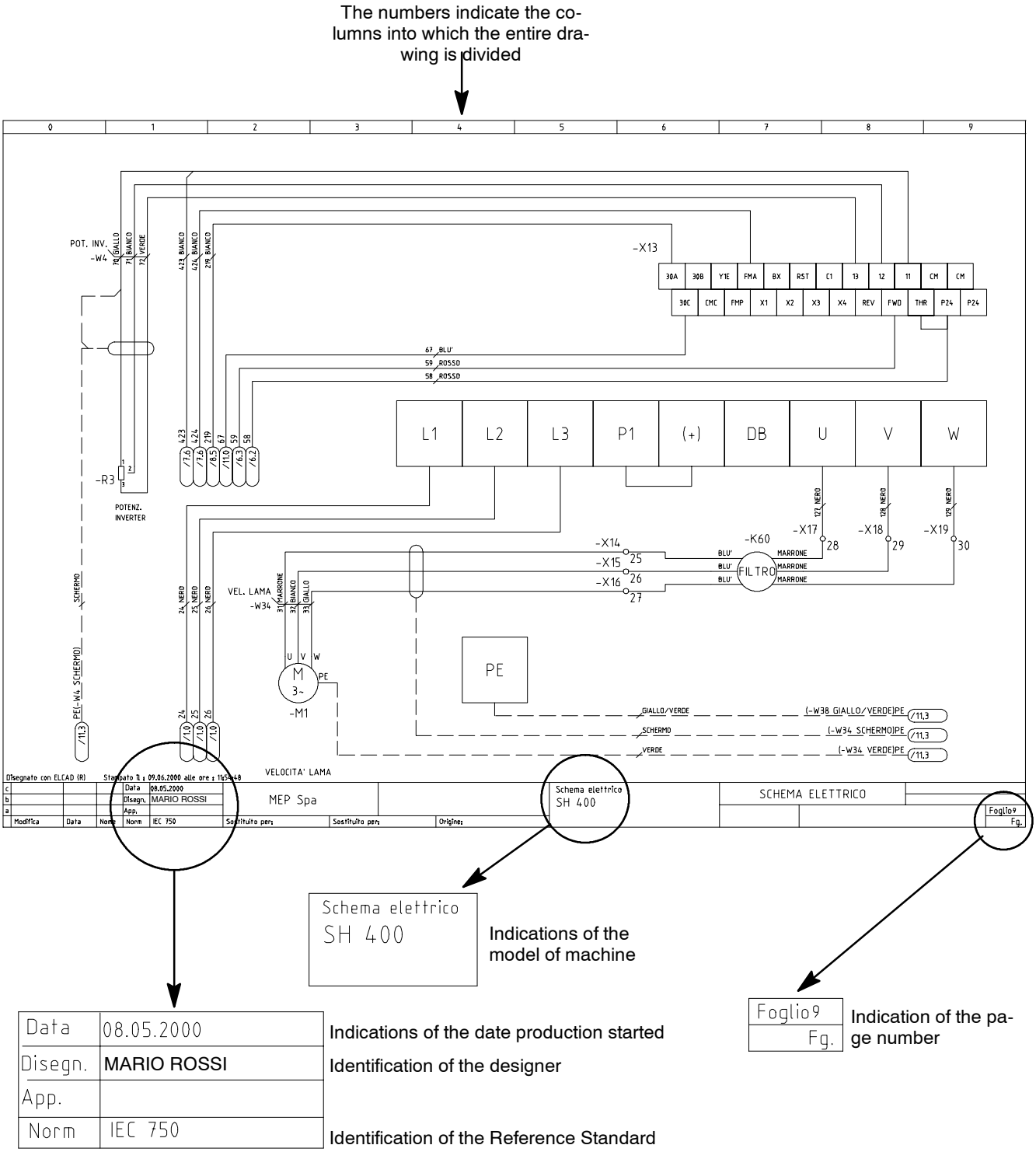
	GV	
TR	L	58
Fuse	R	57

Key to wiring colours	
A - blue	M - brown
B - white	N - black
C - orange	R - red
G - yellow	S - pink
H - grey	V - green
L - blue	Z - violet

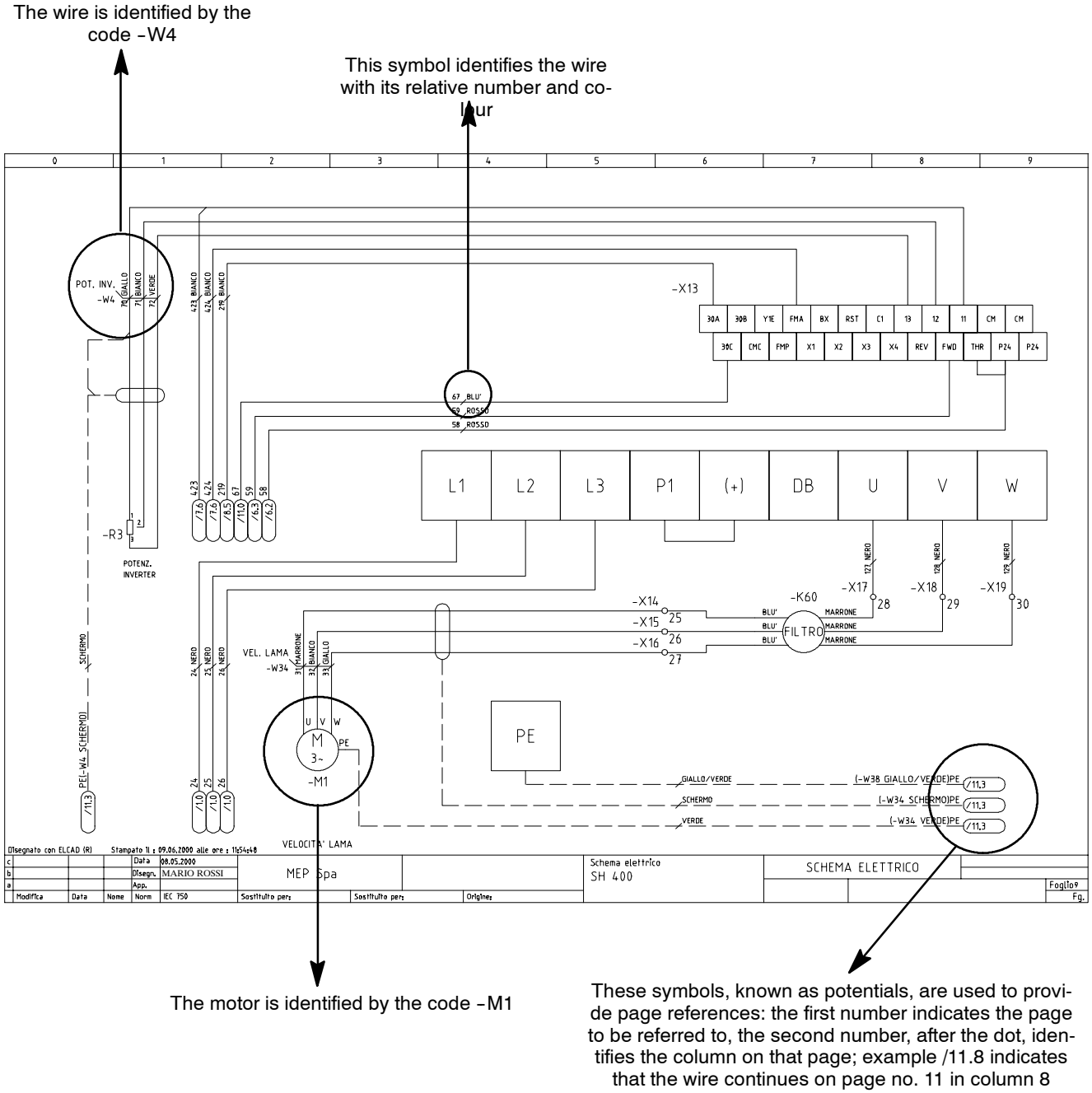
How to read the wiring diagrams

With the introduction of the new standardised wiring diagrams, the following gives an illustration of the way in which they have been drawn up.

Each sheet of the project contains a box which gives the following information:



Each component in the wiring diagram is identified by a unique alphanumeric identification code, in compliance with regulations:



The pages following the wiring diagrams contain the following lists:

1. components list (list of all components) and terminals list (list of all the terminals) with the following information:
   - in-house article code;
   - identification code;
   - reference, no. of the page and column on which it can be found;
   - description;
   - manufacturer

ART. COD.	ID	PRES.REF	DESCRIPTION	MANUFACTURER
022.2151	-B1	/5.2	Strain gauge	Deltatec

2. wires list (list of all wires) with the following information:
   - in-house article code;
   - identification code;
   - description
   - section of wire (mm^2);
   - colour of wire;
   - start: indicates the component (identification code and contact number) at which the wire starts;
   - end: indicates the component (identification code and contact number) at which the wire ends;
   e.g.

CODE	CABLE	DESCRIPTION	SECTION	NO.	COLOUR	START		END	
022.0141	-W7	RESET+EMERGEN-CY	0.50	317	WHITE	-S3	4	-K10	14

In this example, wire no. 317 white, identified as −W7, starts from contact no. 4 on component −S3, and ends at contact no. 14 on component −K10.

Enclosed below is Appendix D2 to European Standard EN 60204−1

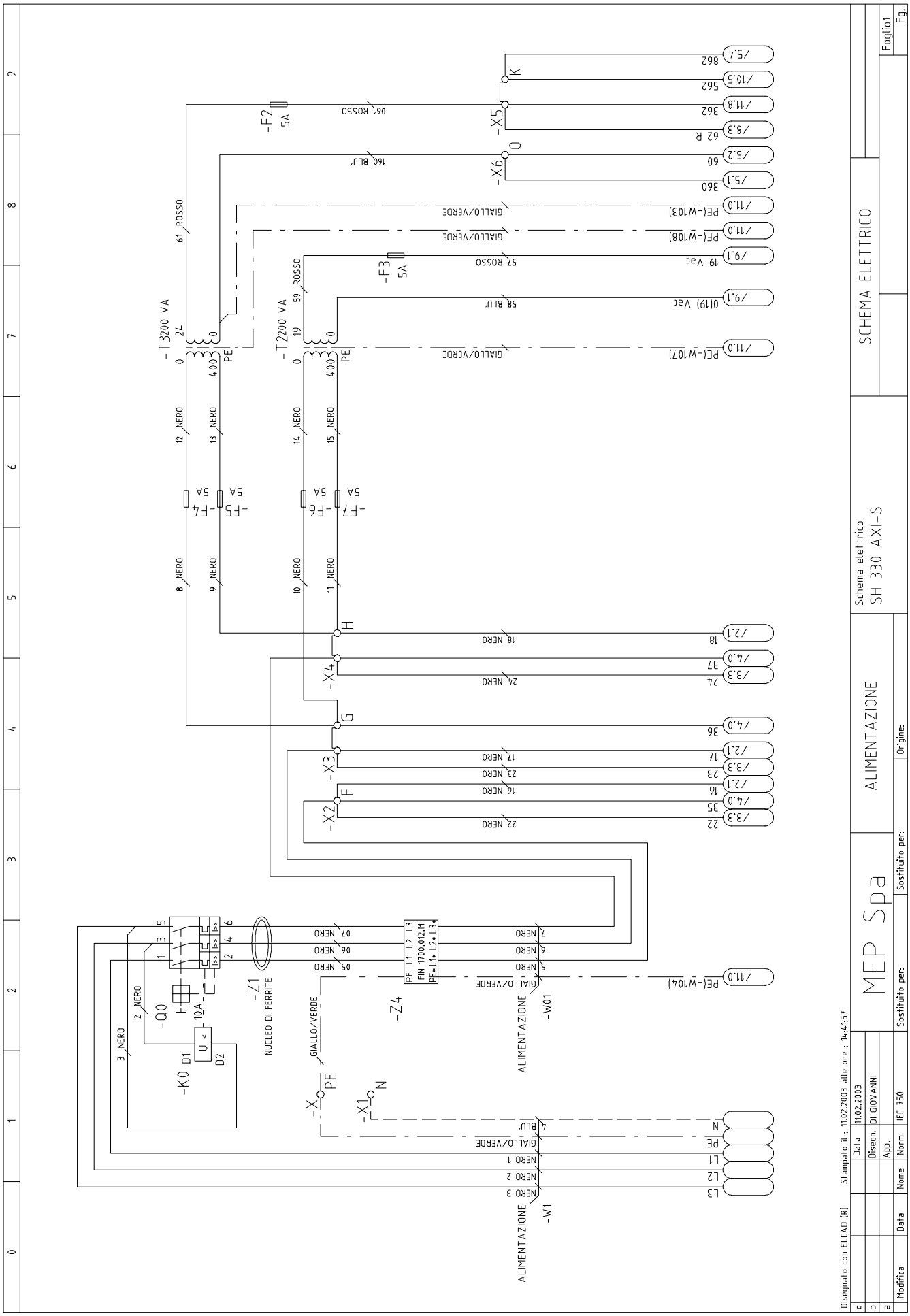
D2−Letter codes used to designate the type of component

LETTER	TYPE OF COMPONENT	EXAMPLES	IDENTIFICATION OF THE APPLIANCE
A	Complex units	Laser Maser Regulator	A
B	Transducers converting a non electrical signal to an electrical signal and vice versa	Transistor amplifier IC amplifier Magnetic amplifier Valve amplifier Printed circuit board Drawer Rack	AD AJ AM AV AP AT AR
C	Capacitors		C
D	Binary operators, timing devi-ces, storage devices	Digital integrated circuits and devices: Delay line Bistable element Monostable element Recorder Magnetic memory Tape or disk recorder	D
E	Various materials	Devices not specified in this table	E

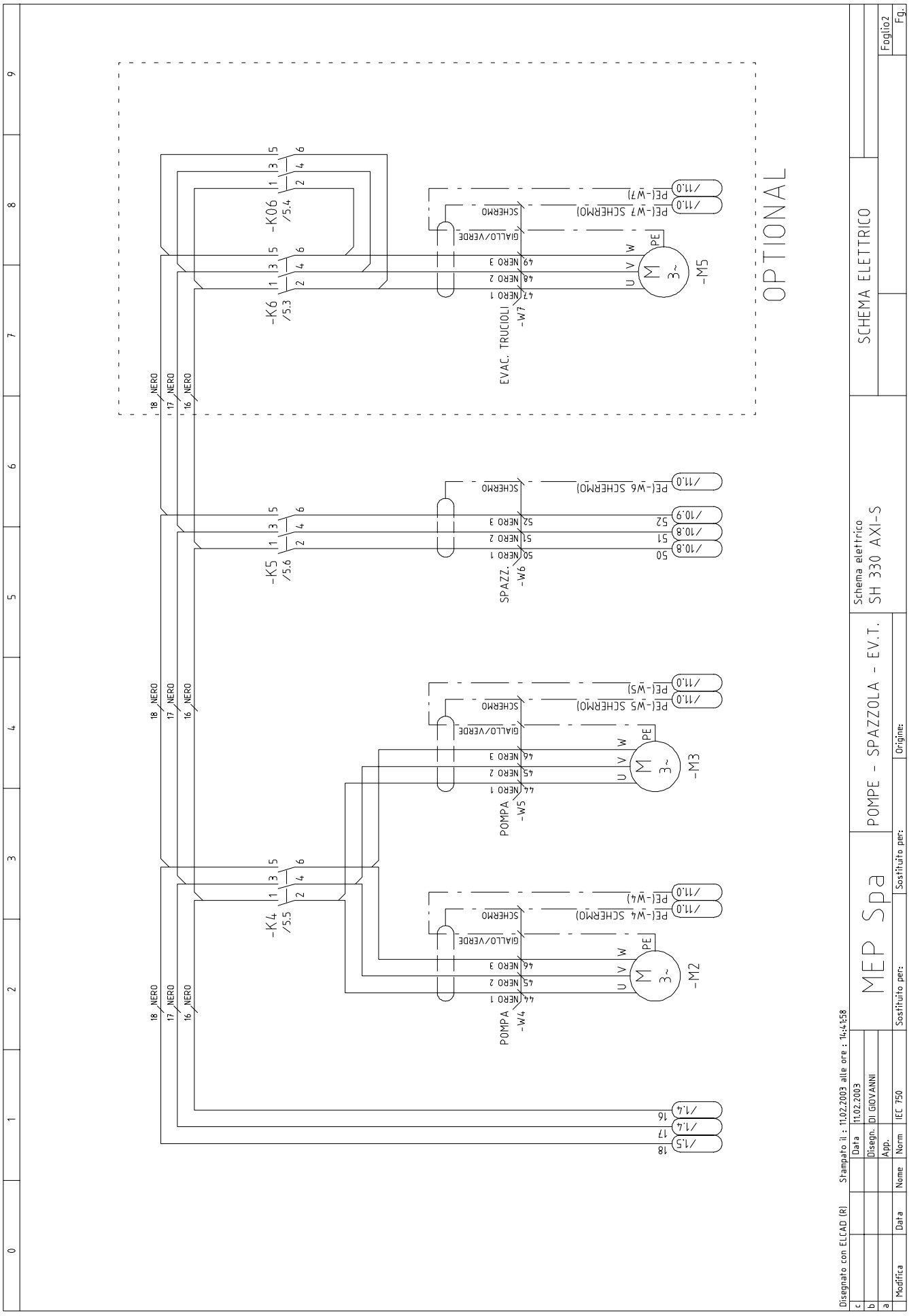
LETTER	TYPE OF COMPONENT	EXAMPLES	IDENTIFICATION OF THE APPLIANCE
F	Protective Devices	Lightning protectors Arrestors	F
		Instant action current threshold protector Delayed action current threshold protector Instant and delayed action current threshold protector Fuse Voltage threshold protector	FA FR FS FU FV
G	Generators, feeders	Rotating generators Crystal oscillators	G
		Accumulator battery Rotating or static frequency converter Power feeder	GB GF GS
H	Signaling Devices	Buzzer Optical signal, indicator light device	HA HL
J			
K	Relays, Contactors	Instant all or nothing relays or instant contactors Bistable relays or interdependent contactors (All or nothing contactors with mechanical contact or permanent magnet etc.) Contactors Polarised relays Reed relays All or nothing timed relays (timers)	KA KL KM KP KR KT
L	Inductors, reactors	Inductor Stop coil Reactor	L
M	Motors		M
N	Analogue intgrated circuits	Operational amplifiers Hybrid analog/digital appliances	N
P	Measurement equipment, test devices	Indicator, recorder and integrator measurement devices Signal generators	P
Q	Power circuit switching appliances	Automatic switch Engine saver switch Knife switch	QF QM QS
R	Resistors	Fixed or variable resistor (rheostat)	R

LETTER	TYPE OF COMPONENT	EXAMPLES	IDENTIFICATION OF THE APPLIANCE
S	Command or control devices	Selector or switch Button (including electronic proximity switch) Numerical all or nothing sensors (single step) of mechanical and electronic type: – Liquid level sensor –Pressure sensor Position sensor (including proximity) –Rotation sensor –Temperature probe	SA SB SL SP SQ SR ST
T	Transformers	Current transformer Control circuit supply transformer Power transformer Magnetic stabiliser Voltage transformer	TA TC TM TS TV
U	Modulators, converters	Discriminator Demodulator Frequency converter Coder Converter Inverter Telegraphic repeater	U
V	Electronic pipes, semiconductors	Electronic pipe Gas discharge pipe Diode Transistor Thyristor	V
W	Transmission lines, wave guides, antennas	Conductor Cable Bar Wave guide Wave guide directional coupler Dipole Parabolic antenna	W
X	Terminals, sockets, plugs	Connector bar Test plug Plug Socket Terminal connector band	XB XJ XP XS XT
Y	Electrically operated mechanical appliances	Electromagnet Electromagnetic brake Electromagnetic clutch Magnetic table spindle Electromagnetic valve	YA YB YC YH YV
Z	Transformers, impedence adapters, equalizers, band limiters	Line equalizer Compresser Crystal filter	Z

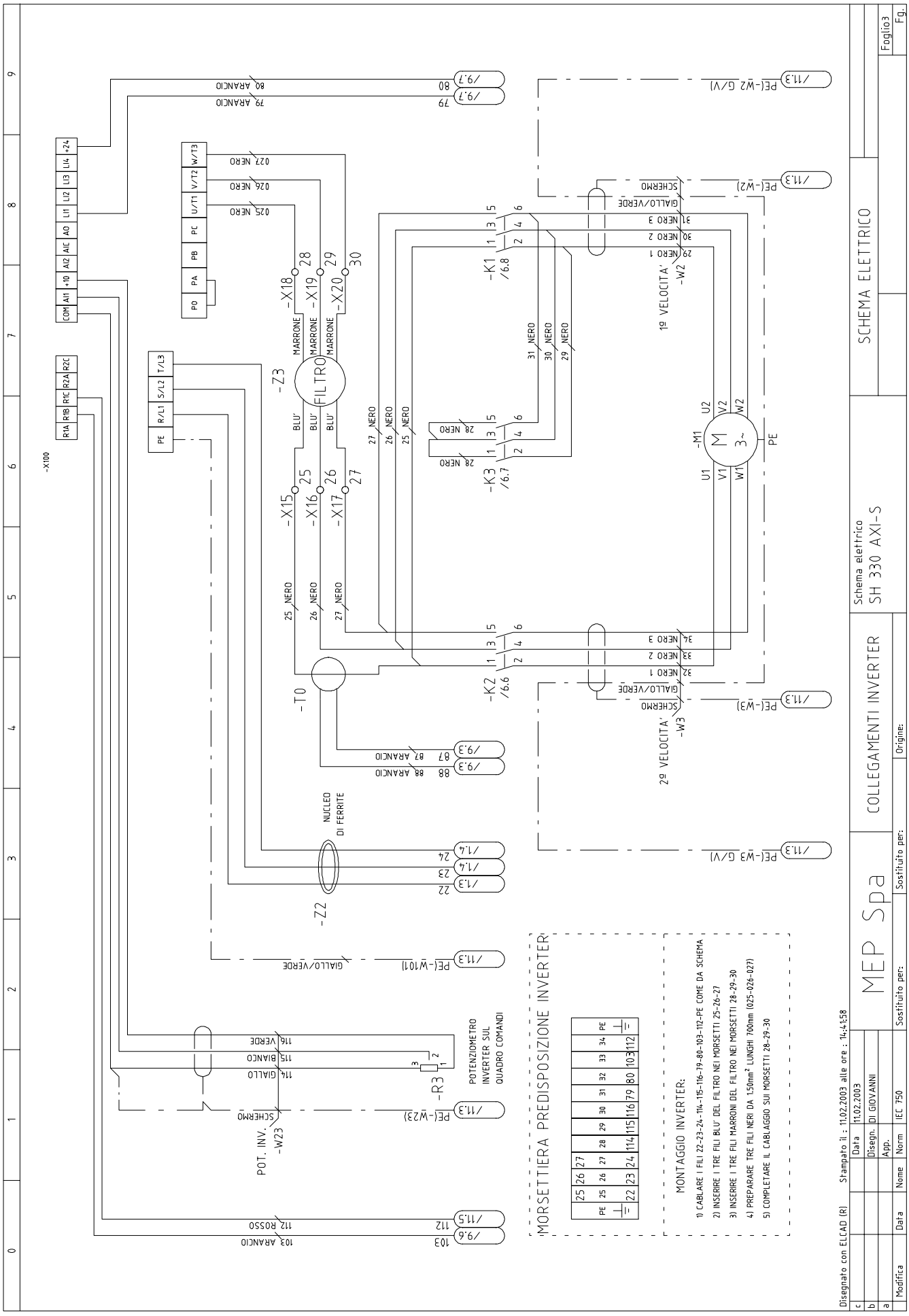
5.1.3 - Standardised wiring diagrams (CEI standards)



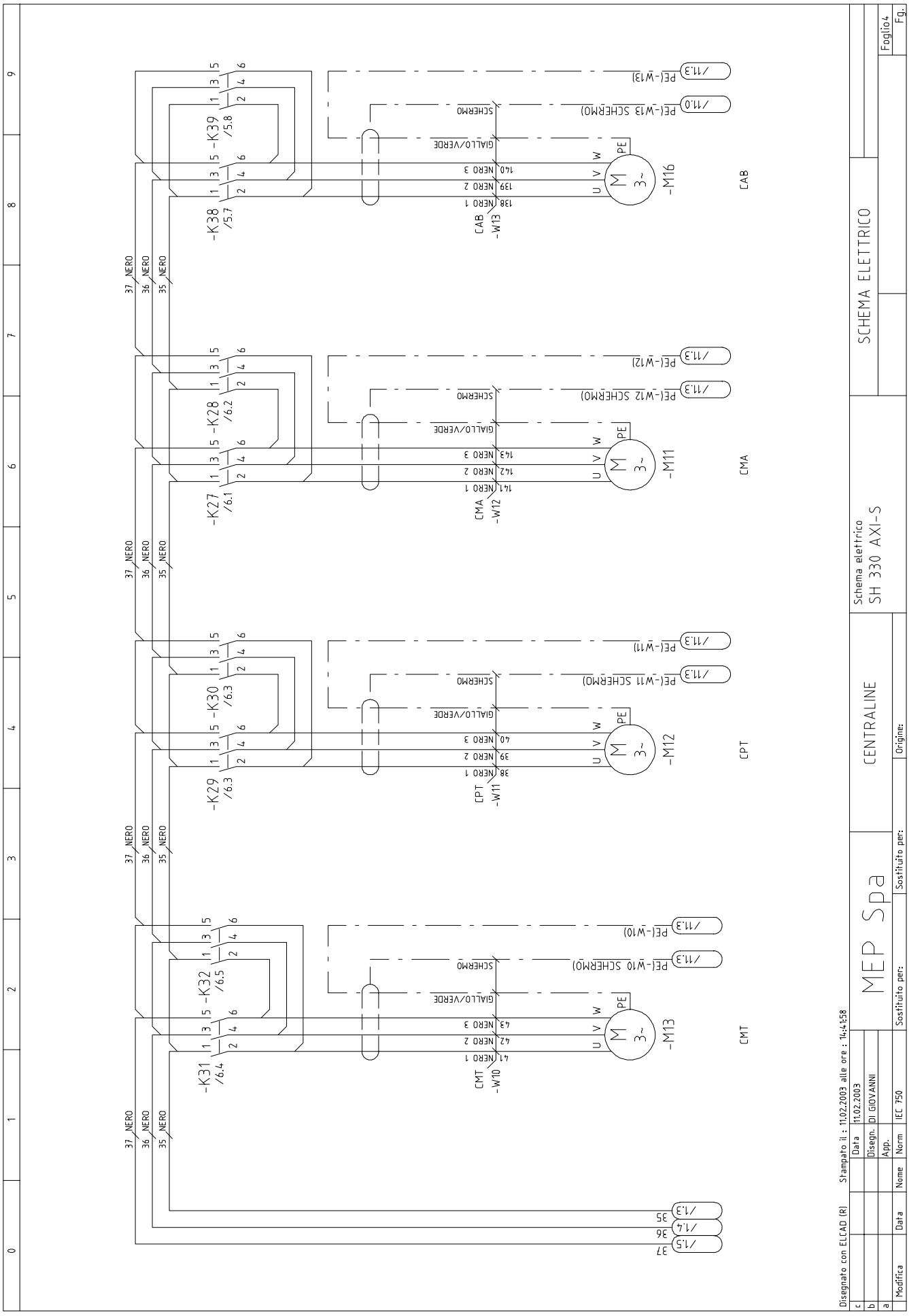
(cont.d) Standardised wiring diagrams



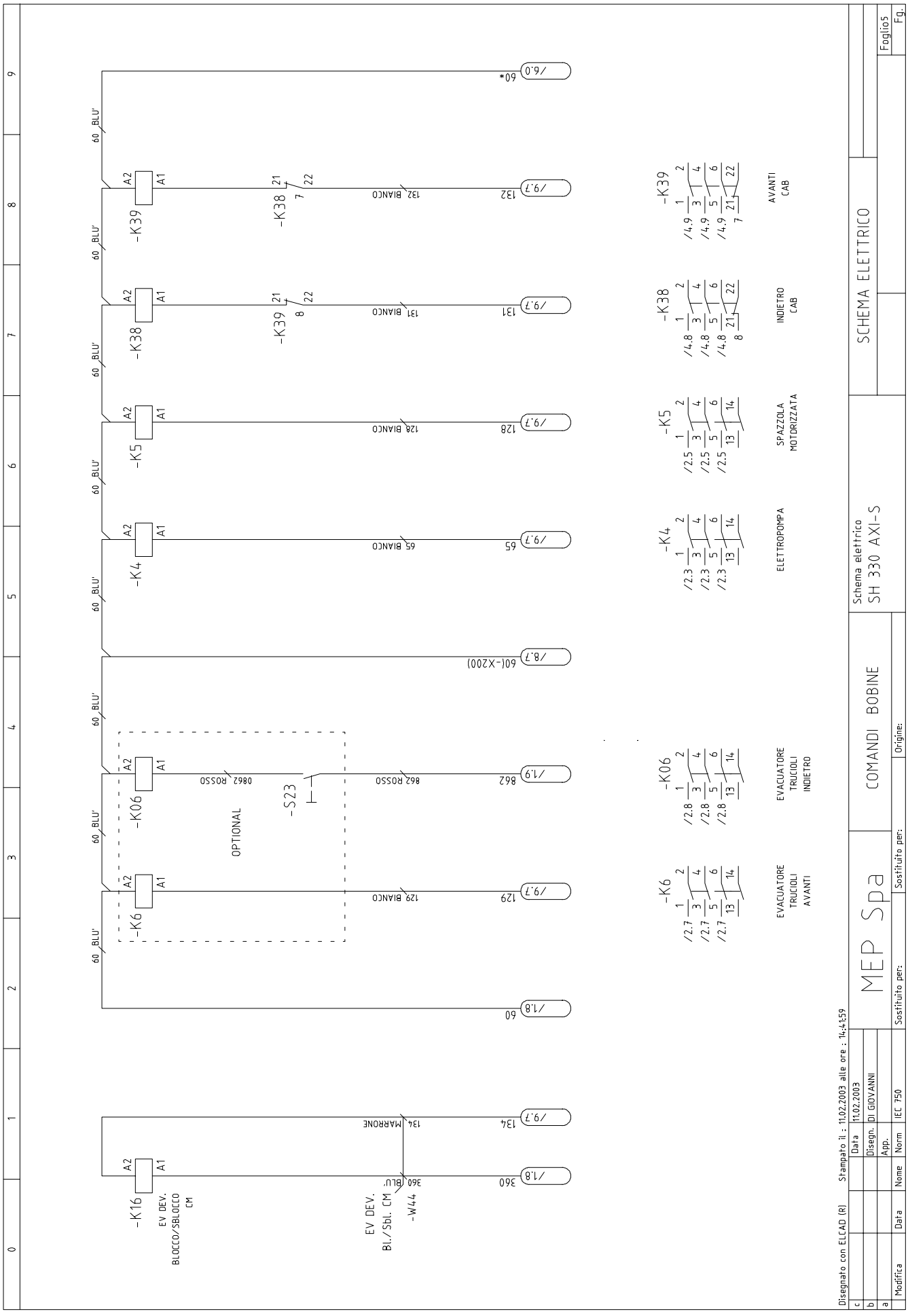
(cont.d) Standardised wiring diagrams



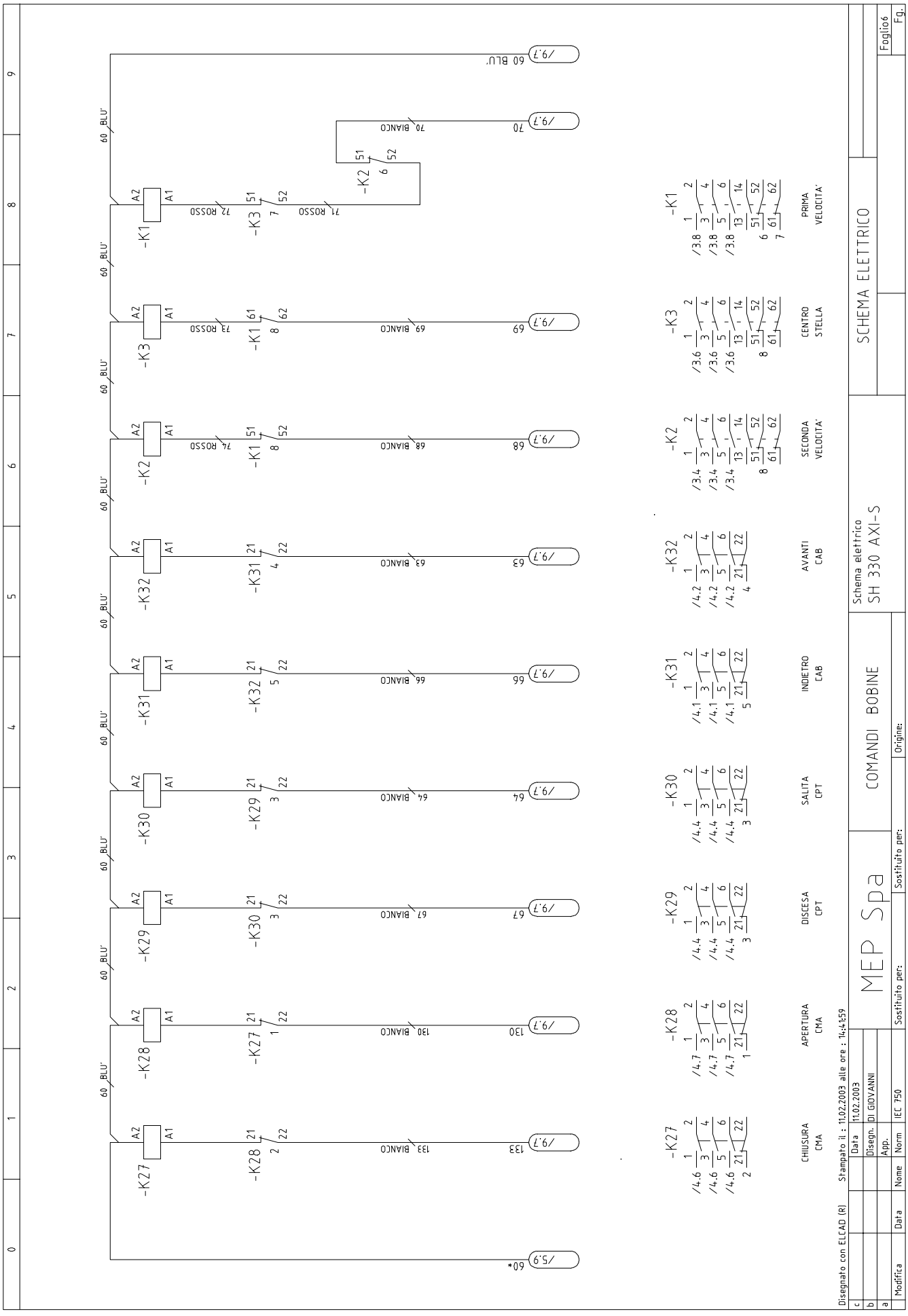
(cont.d) Standardised wiring diagrams



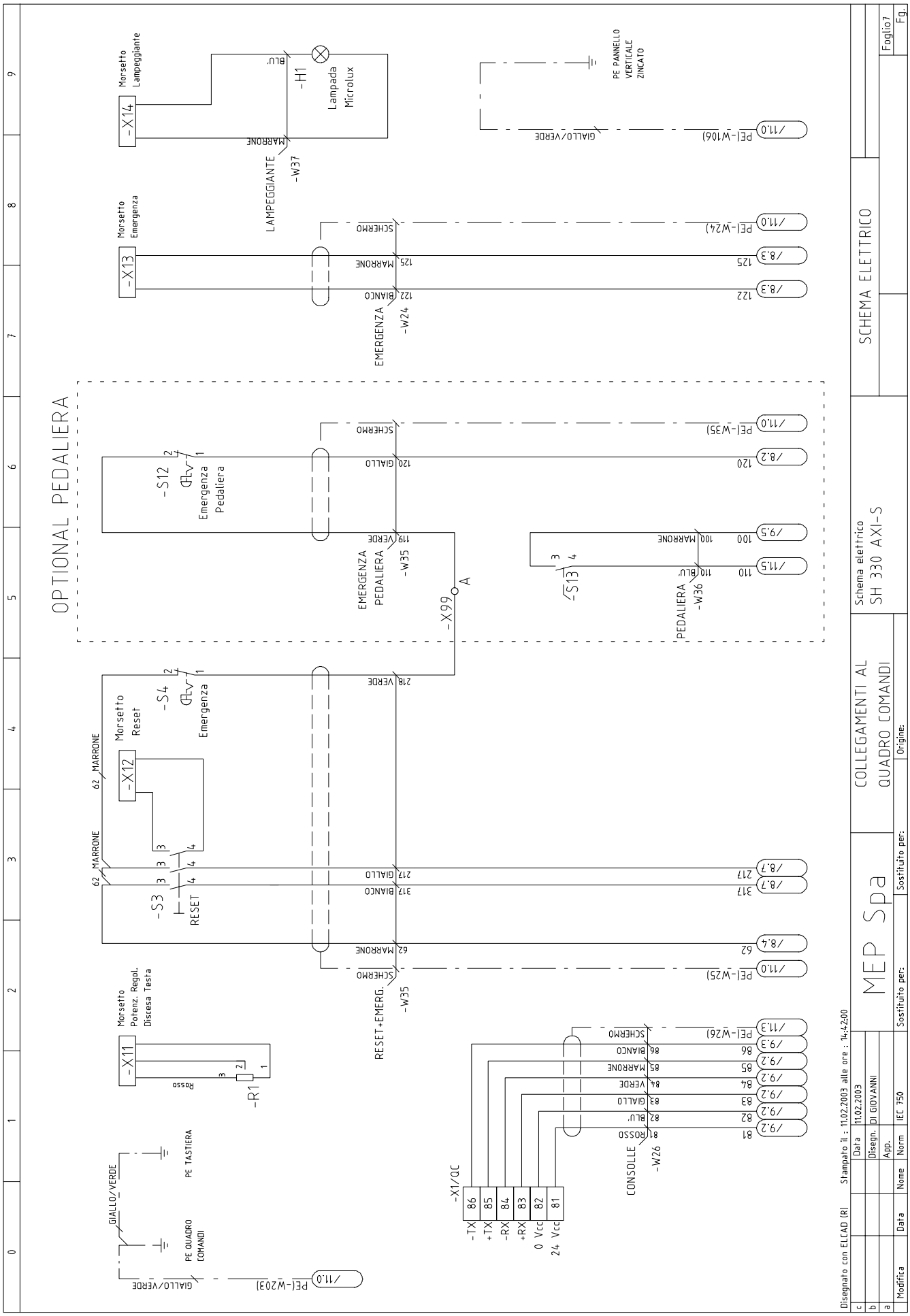
(cont.d) Standardised wiring diagrams



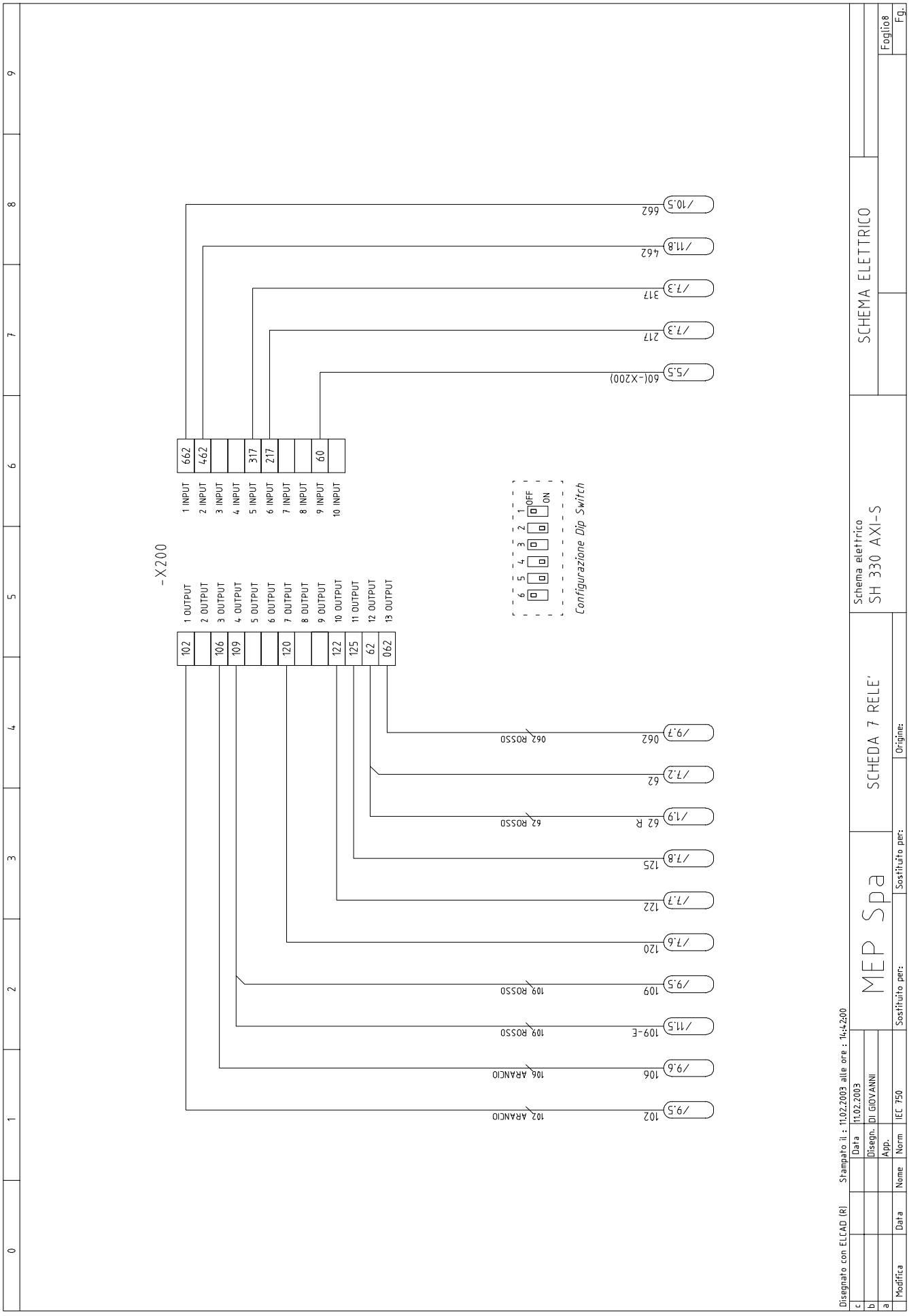
(cont.d) Standardised wiring diagrams



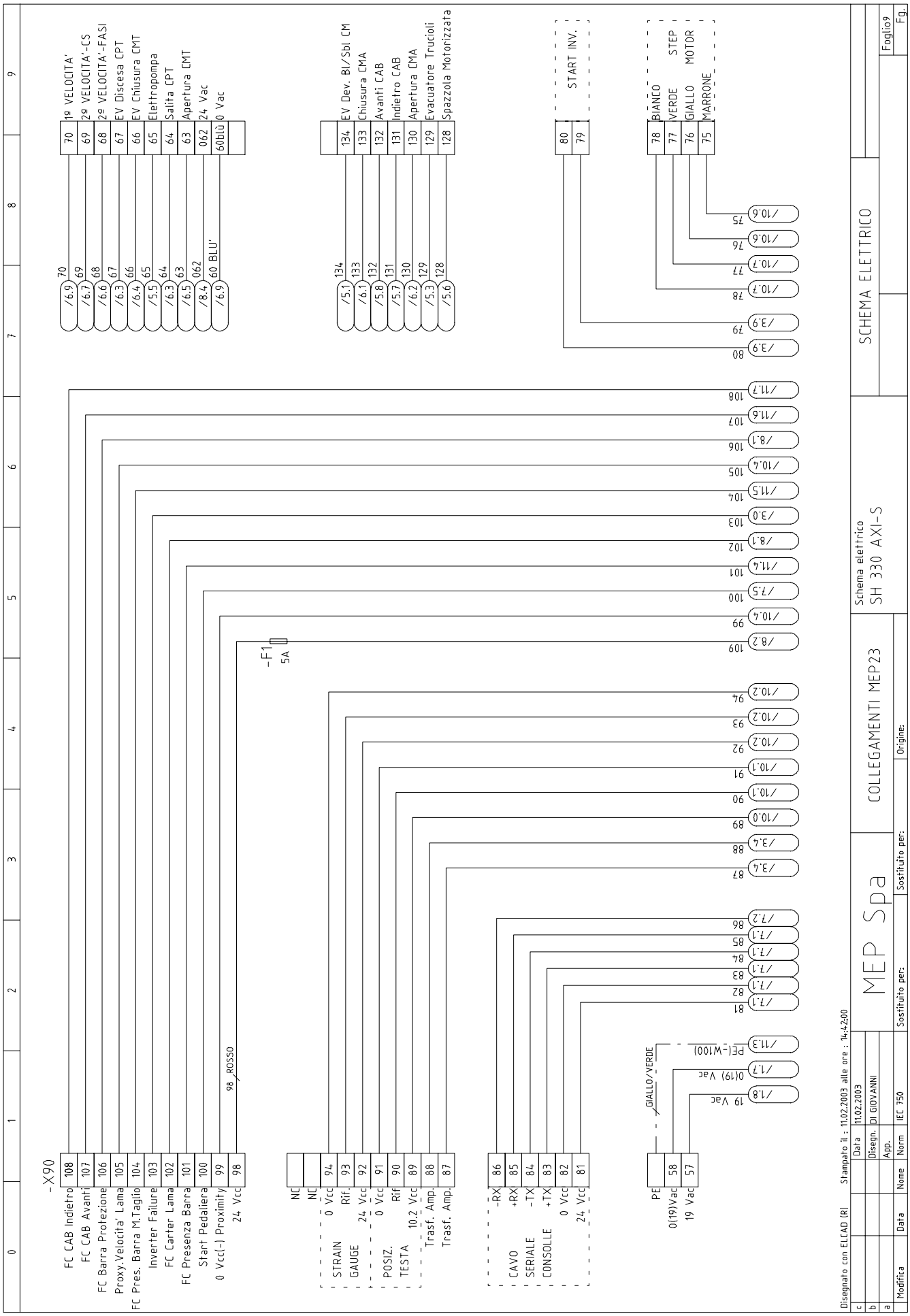
(cont.d) Standardised wiring diagrams



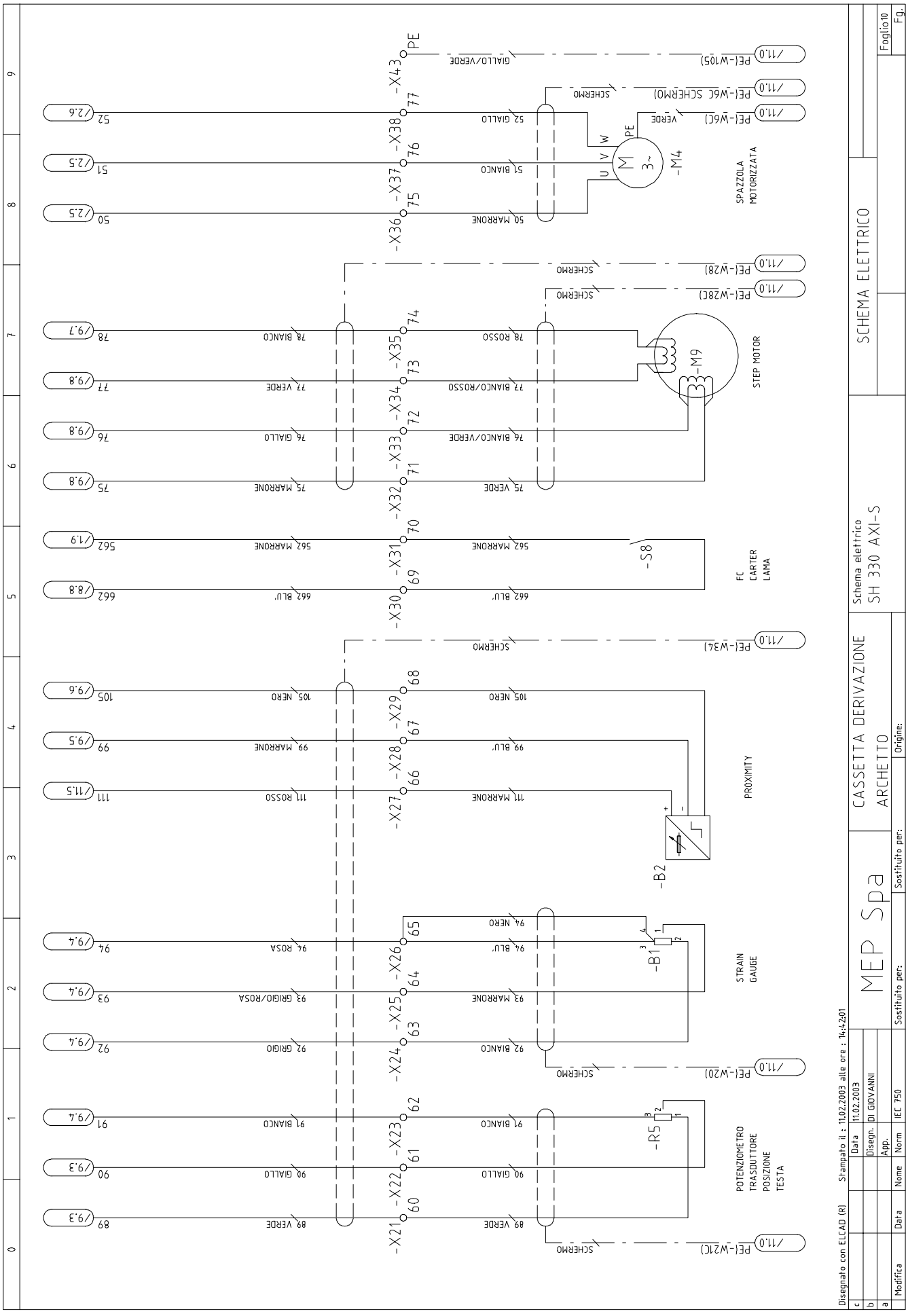
(cont.d) Standardised wiring diagrams



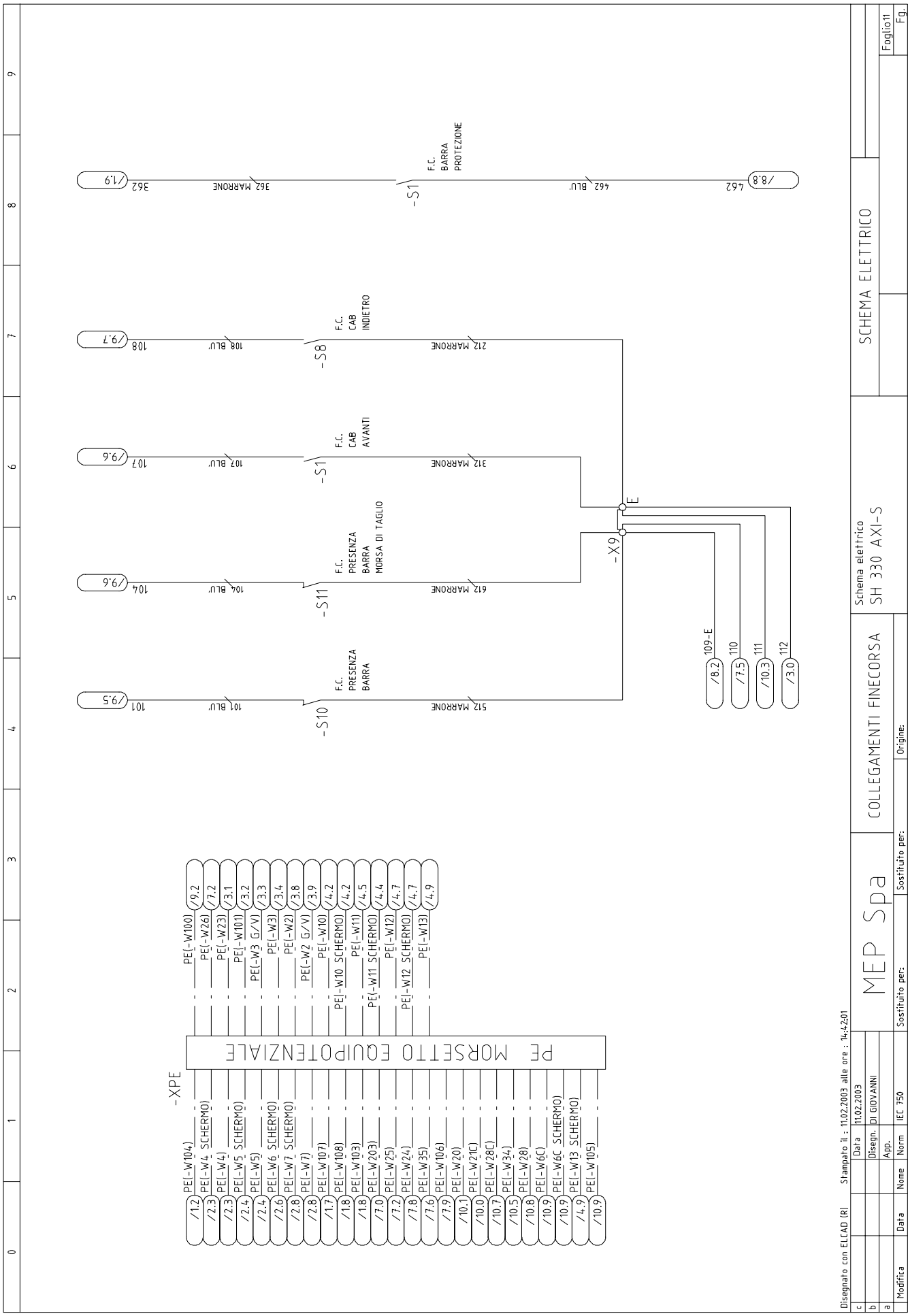
(cont.d) Standardised wiring diagrams



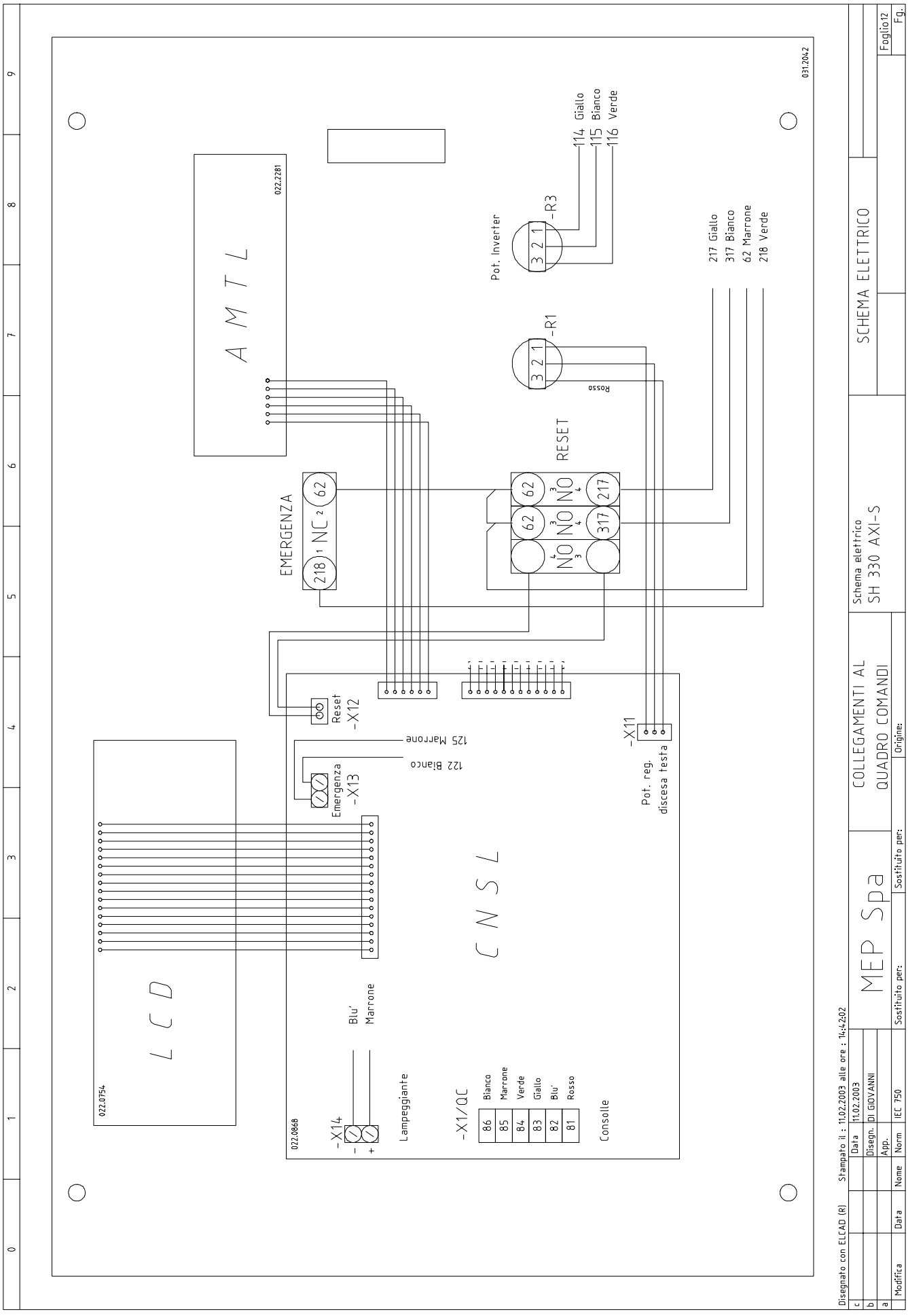
(cont.d) Standardised wiring diagrams



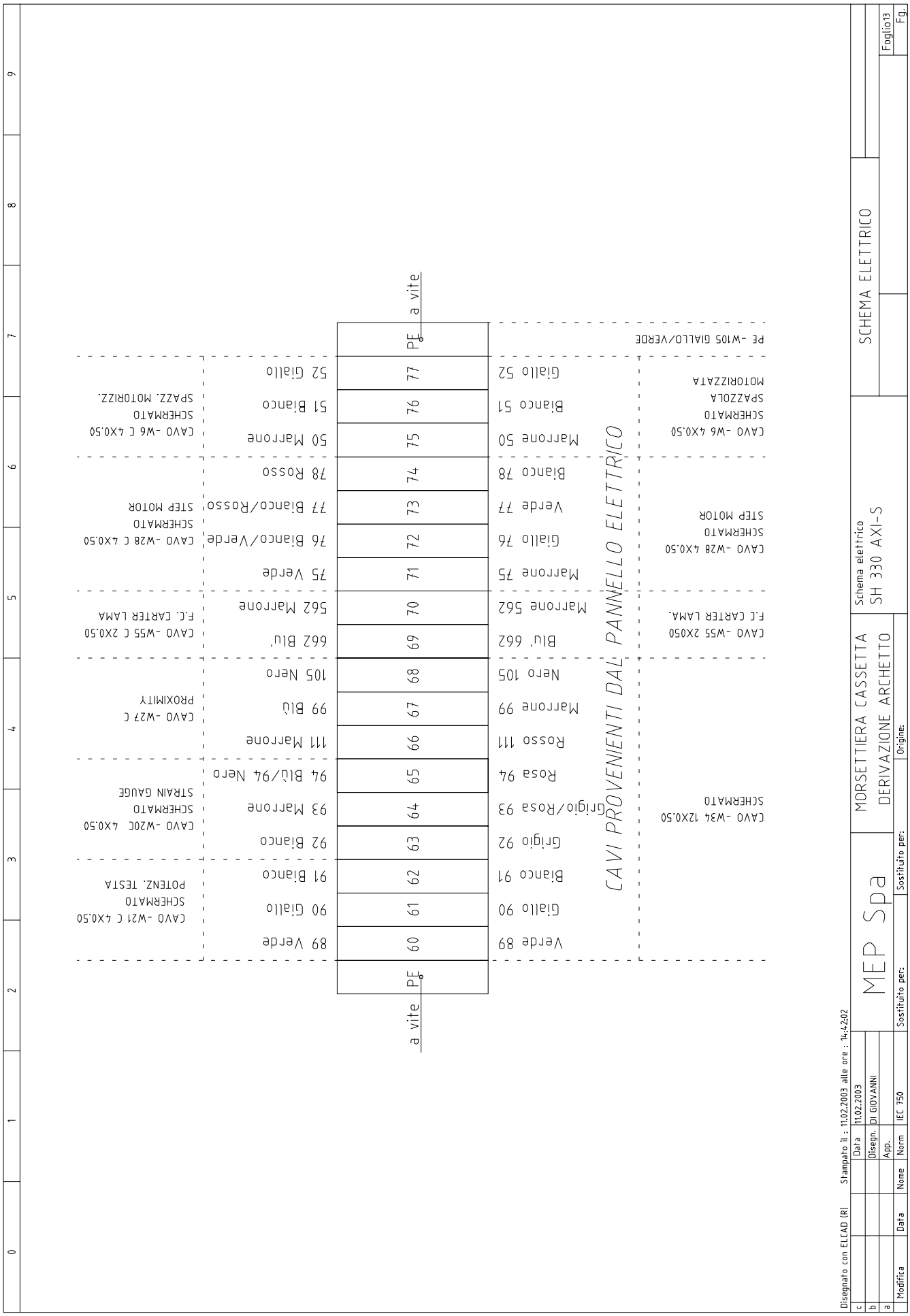
(cont.d) Standardised wiring diagrams



(cont.d) Standardised wiring diagrams



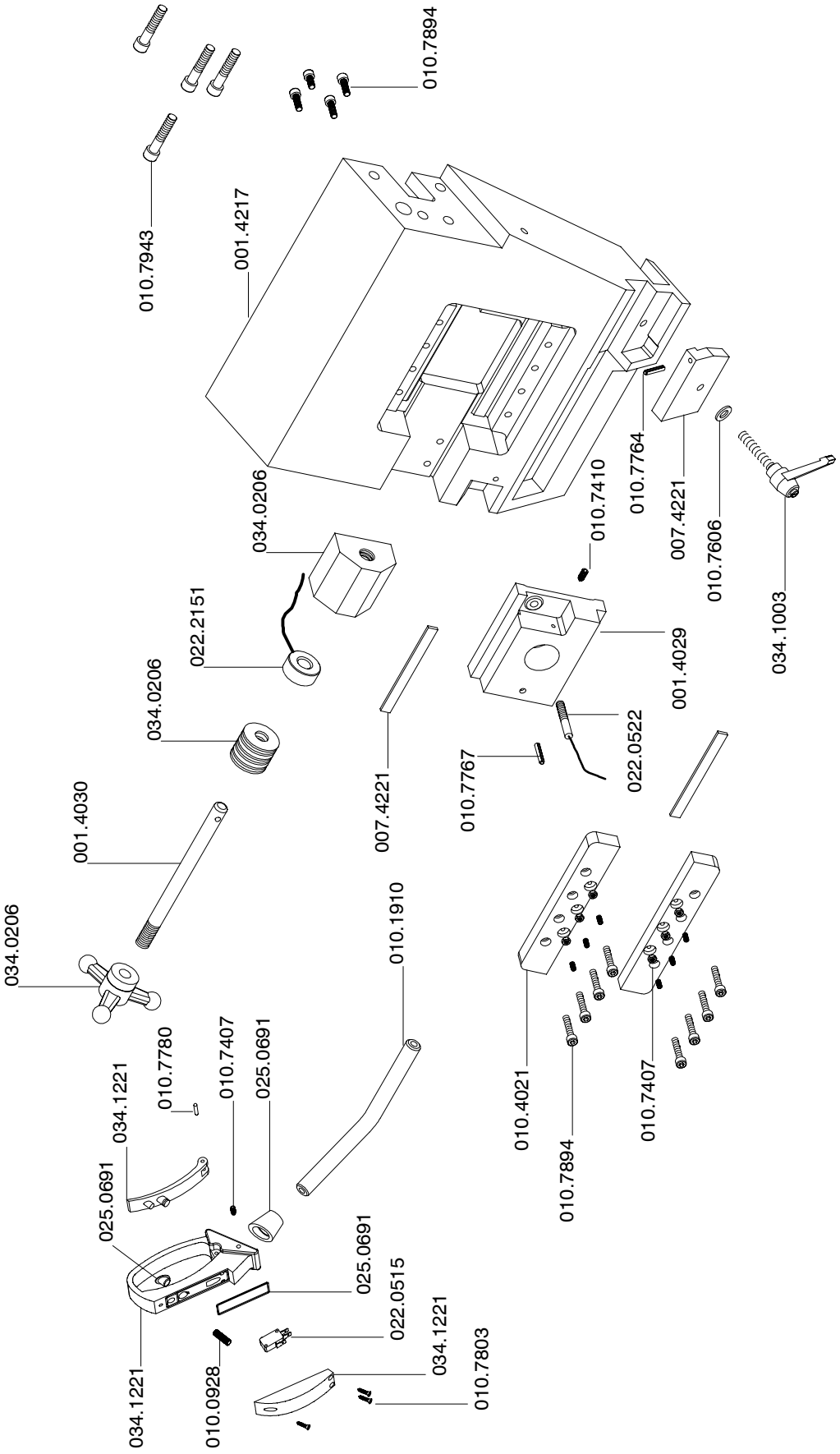
(cont.d) Standardised wiring diagrams



5.2 - Exploded views

This part of the manual contains the exploded views of the SHARK 330 AXI-S which will assist in gaining a thorough knowledge of the machine.

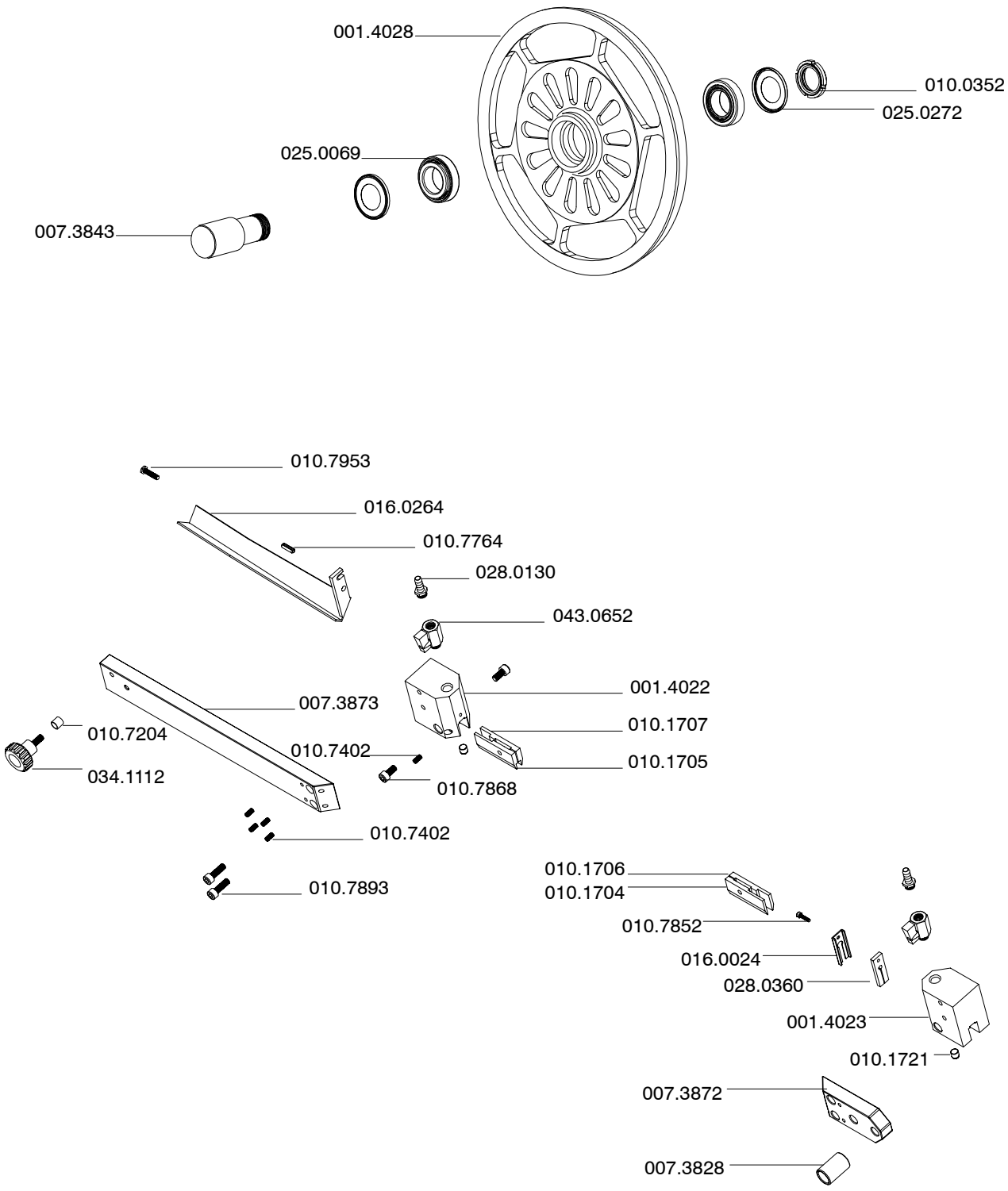
5.2.1 - Head unit



Spare parts

Codice	Descrizione	U.M.	Q.tà
CODICI DI GRUPPO			
090.0267	IMPUGNATURA COMPLETA	NR	1,000
090.0271	IMPUGNATURA COMPLETA TIPO MEP	NR	1,000
090.0621	GRUPPO TENSIONAMENTO LAMA	NR	1,000
CODICI DEI COMPONENTI			
001.4029	SLITTA TENDILAMA ARCHETTO	NR	1,000
001.4217	ARCHETTO SEZIONE VOLANO LIBERO	NR	1,000
007.3825	PERNO REGISTRO TENSIONAMENTO LAMA	NR	1,000
007.3861	CILINDRO TENSIONAMENTO	NR	1,000
007.3869	PISTONE TENSIONAMENTO LAMA	NR	1,000
007.4221	STAFFA BLOCCAGGIO GUIDA TESTINA	NR	2,000
007.4241	LARDONE SLITTA TENDILAMA	NR	2,000
010.0915	MOLLA A TAZZA 50X18,4X3	NR	6,000
010.0928	MOLLA X IMPUGNATURA MEP	NR	1,000
010.1910	LEVA COMANDO TESTA BT	NR	1,000
010.4021	PIASTRA REGOLAZIONE SLITTA LARDONE	NR	2,000
010.7407	GRANO VCE P.CIL. 6 X 25	NR	1,000
010.7410	GRANO VCE P.CIL. 8 X 16	NR	1,000
010.7606	RONDELLA DIAM. 12	NR	1,000
010.7764	SPINA ELASTICA DIAM. 6 X 20	NR	1,000
010.7767	SPINA ELASTICA DIAM. 6 X 35	NR	1,000
010.7780	SPINA TEMP. RETT. DIAM. 5 X 25	NR	1,000
010.7803	VITE AUTOFIL. 3,9 X 15	NR	3,000
010.7894	VITE TCEI 8 X 25	NR	12,000
010.7943	VITE TCEI 12 X 45	NR	4,000
022.0515	MICROINTERRUTTORE V-213-1C6	NR	1,000
025.0235	ANELLO TENUTA NI 150 18-25-4,5	NR	2,000
025.0236	ANELLO DI TENUTA NI 150 45-55-7	NR	1,000
025.0691	SERIE GUARNIZIONI X IMPUGNATURA MEP	NR	1,000
034.0206	VOLANTINO TENSIONAMENTO LAMA	NR	1,000
034.1003	LEVA A SCATTO 12 MA	NR	1,000
034.1221	IMPUGNATURA DIS. MEP	NR	1,000
043.0142	PRESSOSTATO OLIO	NR	1,000
043.0222	RACCORDO A CROCE CL 2033 1/4	NR	1,000
043.0260	TAPPO TTE4 1/4 - CL 2611	NR	1,000
043.0275	NIPPLO CONICO A2-1/4 - CL 2500	NR	1,000
043.0350	GUARNIZIONE GFV 1/4	NR	1,000
043.0556	MANOMETRO DIAM.50 0-60 X TENS.LAMA	NR	1,000

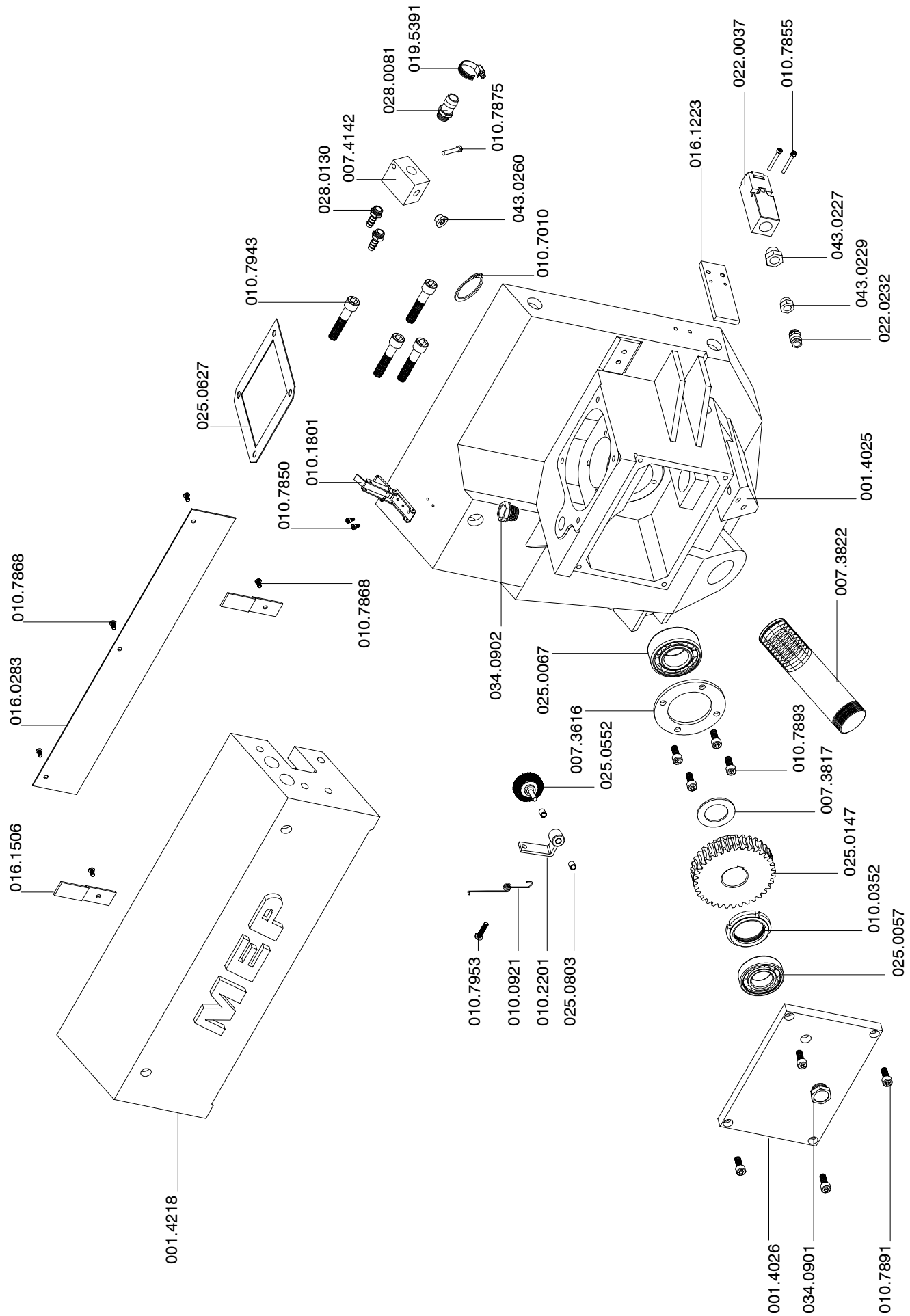
Head unit (contd.)



Spare parts

Codice	Descrizione	U.M.	Q.tà
CODICI DI GRUPPO			
090.1202	SERIE COMPLETA PLACCHETTE GUIDALAMA	NR	1,000
CODICI DEI COMPONENTI			
001.4022	TESTINA GUIDALAMA ANTERIORE	NR	1,000
001.4023	TESTINA GUIDALAMA POSTERIORE	NR	1,000
001.4028	VOLANO LIBERO ARCHETTO	NR	1,000
007.3828	BOCCOLA BATTUTA FINECORSA	NR	1,000
007.3843	ALBERO VOLANO LIBERO	NR	1,000
007.3872	SUPPORTO TESTINA POSTERIORE	NR	1,000
007.3873	SUPPORTO TESTINA ANTERIORE	NR	1,000
010.0352	GHIERA AUTOBLOCCANTE 35X1,5	NR	1,000
010.1704	GUIDALAMA 1 INSERTO POSTERIORE	NR	1,000
010.1705	GUIDALAMA 1 INSERTO ANTERIORE	NR	1,000
010.1706	GUIDALAMA 2 INSERTI POSTERIORE	NR	1,000
010.1707	GUIDALAMA 2 INSERTI ANTERIORE	NR	1,000
010.1721	PREMILAMA	NR	1,000
010.7204	DADO M8	NR	1,000
010.7402	GRANO VCE P.CIL. 6 X 12	NR	5,000
010.7764	SPINA ELASTICA DIAM. 6 X 20	NR	1,000
010.7852	VITE TCEI 4 X 12	NR	1,000
010.7868	VITE TCEI 6 X 12	NR	2,000
010.7893	VITE TCEI 8 X 20	NR	2,000
010.7953	VITE TE 6 X 25	NR	1,000
016.0264	PROTEZIONE LAMA ANTERIORE	NR	1,000
025.0069	CUSCINETTO 32007X	NR	2,000
025.0272	ANELLO DI PROTEZIONE NILOS 32007	NR	2,000
028.0130	RACCORDO 1/4-9 CL 2601	NR	1,000
028.0360	GOMMINO PULILAMA	NR	1,000
034.1112	VOLANTINO DIAM.40 M8	NR	1,000
043.0652	RUBINETTO 1/4 F.M.	NR	1,000

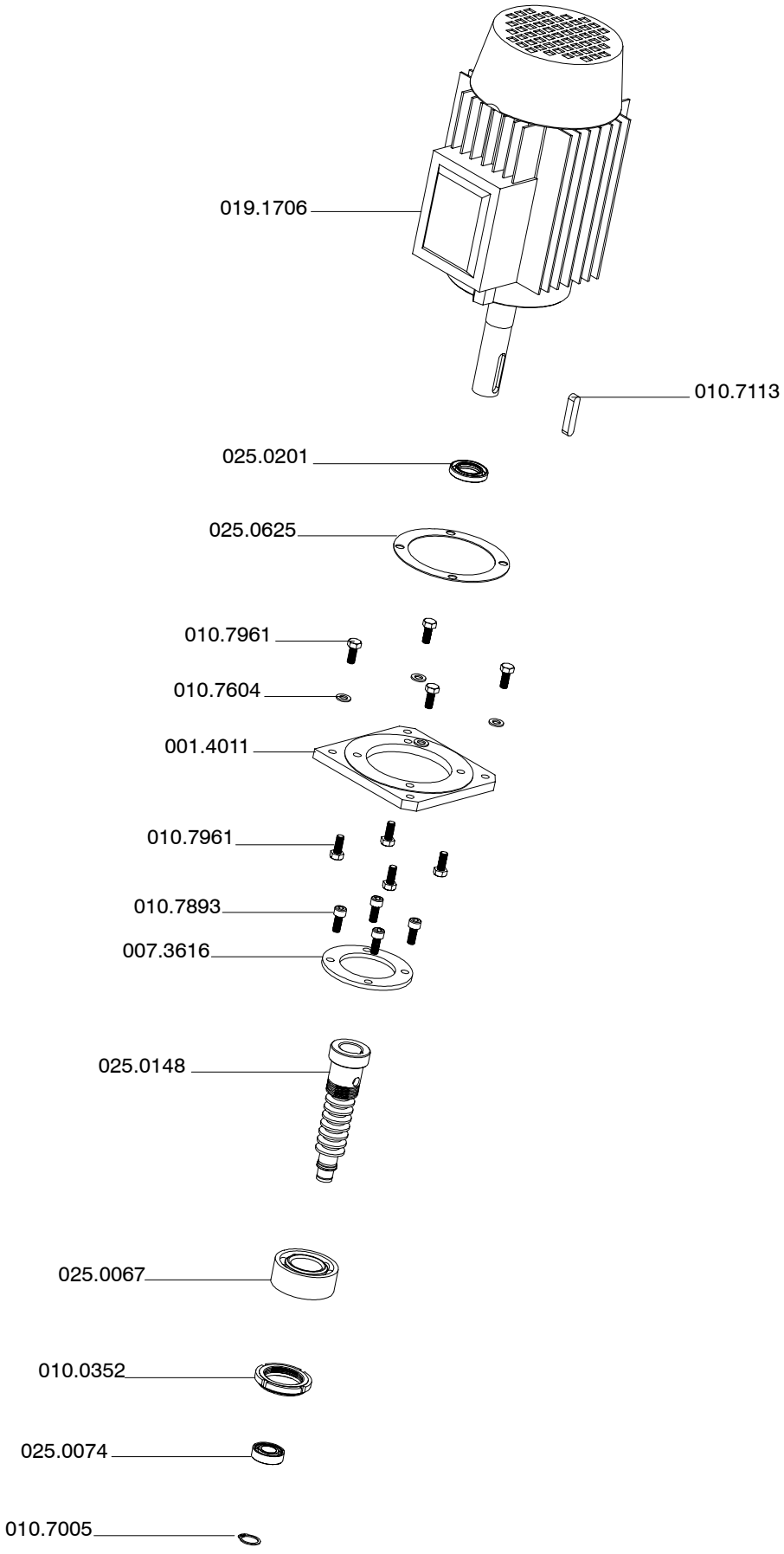
Head unit (contd.)



Spare parts

Codice	Descrizione	U.M.	Q.tà
CODICI DI GRUPPO			
090.0631	DISPOSITIVO PULILAMA	NR	1,000
CODICI DEI COMPONENTI			
001.4025	ARCHETTO SEZIONE VOLANO MOTORE	NR	1,000
001.4026	COPERCHIO RIDUTTORE ARCHETTO	NR	1,000
001.4218	TRAVE DELL'ARCHETTO	NR	1,000
007.3616	GHIERA FIX CUSCINETTO	NR	1,000
007.3817	DISTANZIALE CORONA ELICOIDALE	NR	1,000
007.3822	PERNO SUPPORTO SNODO TESTA	NR	1,000
007.4142	SQUADRETTO PER LIQUIDO	NR	1,000
010.0352	GHIERA AUTOBLOCCANTE 35X1,5	NR	1,000
010.0921	MOLLA X PULILAMA	NR	1,000
010.1801	CHIUSURA LEVA "D" ZINCATA	NR	1,000
010.2201	PORTASPAZZOLA PULILAMA	NR	1,000
010.7010	ANELLO SEEGER DIAM. 45	NR	1,000
010.7850	VITE TCEI 4 X 8	NR	2,000
010.7855	VITE TCEI 4 X 30	NR	2,000
010.7868	VITE TCEI 6 X 12	NR	5,000
010.7875	VITE TCEI 6 X 40	NR	1,000
010.7891	VITE TCEI 8 X 16	NR	4,000
010.7893	VITE TCEI 8 X 20	NR	4,000
010.7943	VITE TCEI 12 X 45	NR	4,000
010.7953	VITE TE 6 X 25	NR	1,000
016.0283	PROTEZIONE CAVI	NR	1,000
016.1223	PIASTR.FIX INTERR.SICUR.ARCHETTO	NR	1,000
016.1506	STAFFA DI FERMO	NR	2,000
019.5391	FASCETTA MINUS GT	NR	1,000
022.0037	INTERRUTTORE DI SICUREZZA FR 690	NR	1,000
022.0232	PRESSACAVO IN OTTONE 1/4 BM 2450	NR	1,000
025.0057	CUSCINETTO 62.06	NR	1,000
025.0067	CUSCINETTO 3207	NR	1,000
025.0147	CORONA ELICOIDALE SH 330/C INVERTER	NR	1,000
025.0552	SPAZZ.PULILAMA 1053 6X25 DIAM. 30	NR	1,000
025.0627	GUARNIZIONE COPERCHIO PORTA MOTORE	NR	1,000
025.0803	BOCCOLA GRAFITATA L. 10 DIAM. 6	NR	2,000
028.0081	RIDUZIONE FM 1/2-3/8 - CL 2531	NR	1,000
028.0130	RACCORDO 1/4-9 CL 2601	NR	2,000
034.0901	TAPPO LIVELLO OLIO 1/2 "GAS.	NR	1,000
034.0902	TAPPO OLIO SFP 1/2" ROSSO	NR	1,000
043.0227	RIDUZIONE 3/8-1/4 MF - CL 2531	NR	1,000
043.0229	RIDUZIONE MF 1/4 - CL 2520	NR	1,000
043.0260	TAPPO TTE4 1/4 - CL 2611	NR	1,000

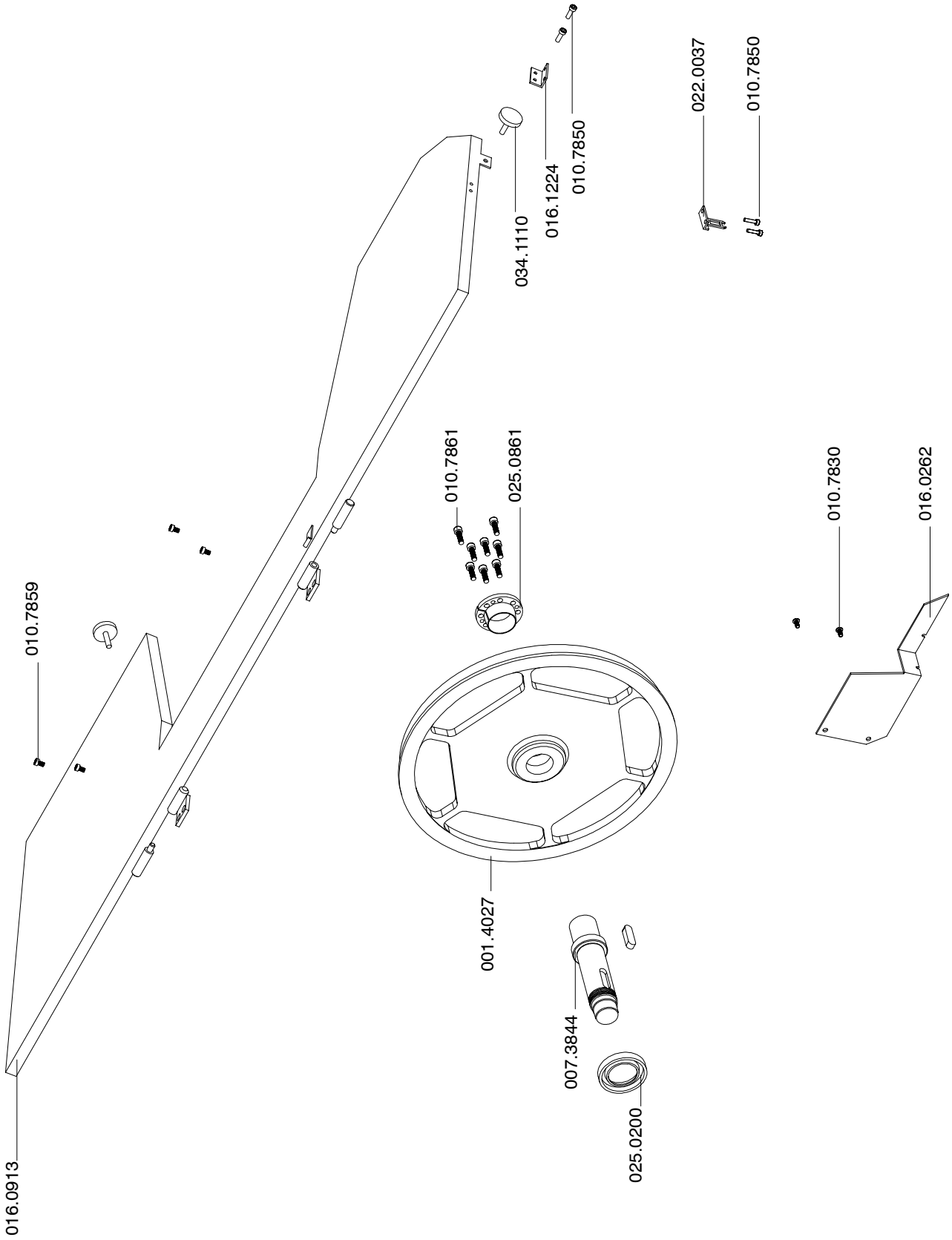
Head unit (contd.)



Spare parts

Codice	Descrizione	U.M.	Q.tà
CODICI DEI COMPONENTI			
001.4011	COPERCHIO PORTA MOTORE	NR	1,000
007.3616	GHIERA FISSAGGIO CUSCINETTO	NR	1,000
010.0352	GHIERA AUTOBLOCCANTE 35X1,5	NR	1,000
010.7005	ANELLO SEEGER DIAM. 17	NR	1,000
010.7113	CHIAVETTA 8 X 7 X 40	NR	1,000
010.7604	RONDELLA DIAM. 8	NR	8,000
010.7893	VITE TCEI 8 X 20	NR	4,000
010.7961	VITE TE 8 X 20	NR	8,000
019.1706	HP 2/2,5 2/4P V.380 B14 FC90L	NR	1,000
025.0067	CUSCINETTO 3207	NR	1,000
025.0074	CUSCINETTO 6003	NR	1,000
025.0148	ALBERO VITE SENZA FINE	NR	1,000
025.0201	ANELLO TENUTA 25X42X7	NR	1,000
025.0625	GUARNIZIONE MOTORE	NR	1,000

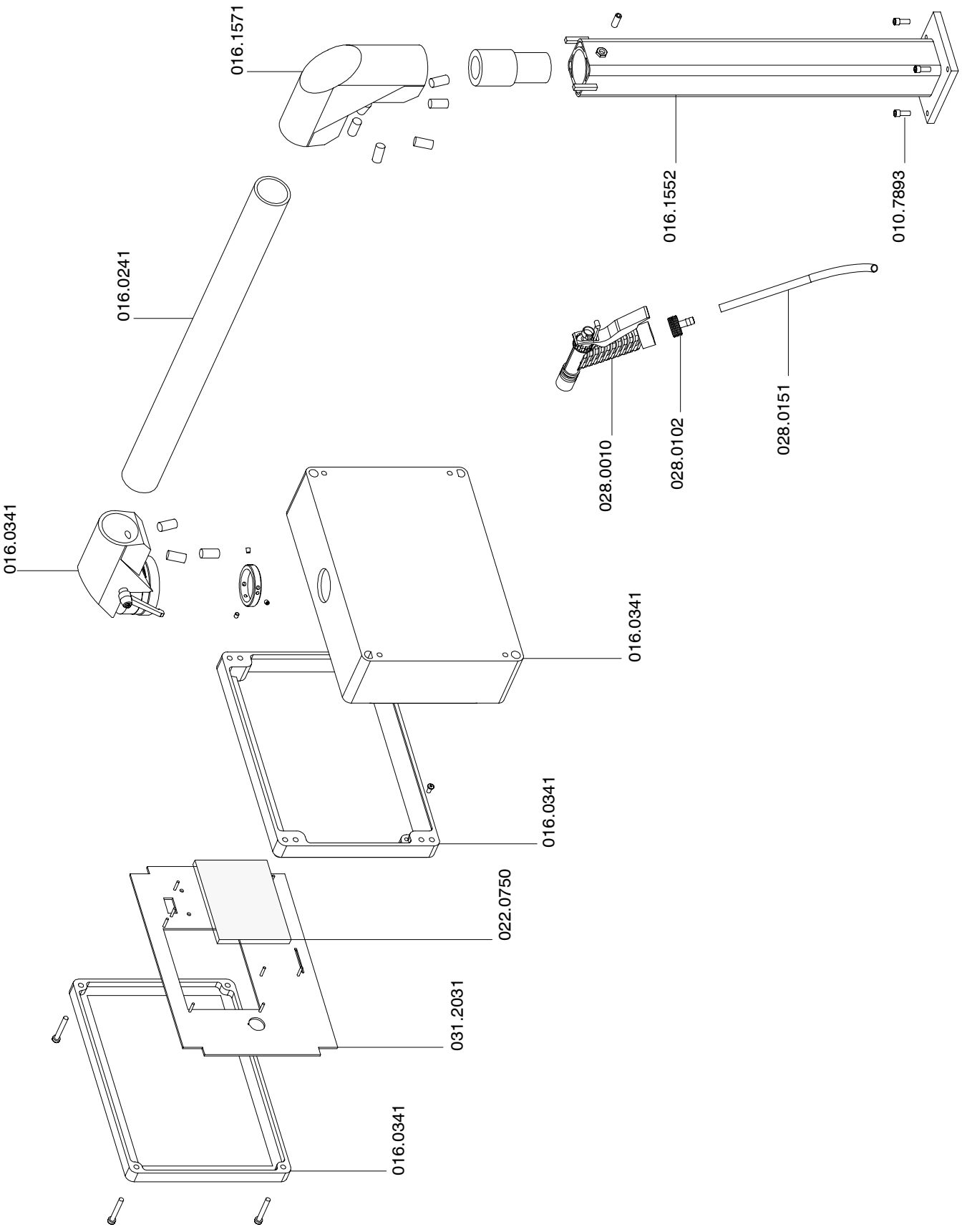
Head unit (contd.)



Spare parts

Codice	Descrizione	U.M.	Q.tà
CODICI DEI COMPONENTI			
001.4027	VOLANO MOTORE ARCHETTO	NR	1,000
007.3844	ALBERO MOTORE	NR	1,000
010.7830	VITE BUTON 5 X 10	NR	2,000
010.7850	VITE TCEI 4 X 8	NR	4,000
010.7859	VITE TCEI 5 X 12	NR	4,000
010.7861	VITE TCEI 5 X 20	NR	8,000
016.0262	PROTEZIONE LAMA POSTERIORE	NR	1,000
016.0913	COPERCHIO ARCHETTO	NR	1,000
016.1224	PIASTR.FIX INTER.SICUR.COPERCHIO	NR	1,000
022.0037	INTERRUTTORE DI SICUREZZA FR 690	NR	1,000
025.0200	ANELLO TENUTA 62X45X10	NR	1,000
025.0861	CALETTATORE DIAM. 35X60	NR	1,000
034.1110	VOLANTINO DIAM.30 M6 X 9	NR	1,000

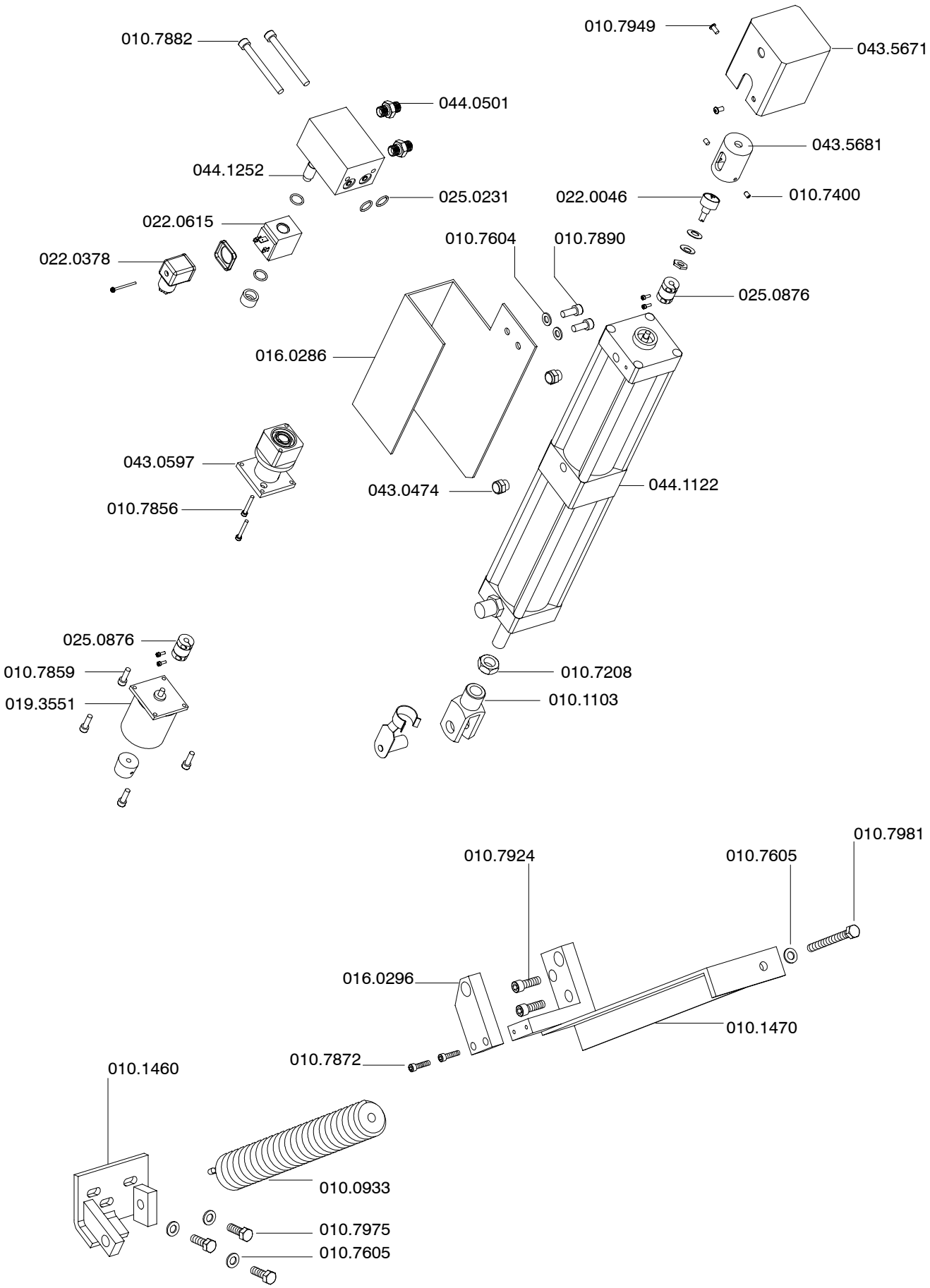
5.2.2 - Programming and control console



Spare parts

Codice	Descrizione	U.M.	Q.tà
CODICI DEI COMPONENTI			
010.7893	VITE TCEI 8 X 20	NR	4,000
016.0241	ASTA MOBILE PER CONSOLLE	NR	1,000
016.0341	KIT COMMANDER	NR	1,000
016.1552	COLONNA PER ASTA MOBILE	NR	1,000
016.1571	MANICOTTO PER ANGOLO COMMANDER	NR	1,000
022.0750	DISPLAY G-1120LYE	NR	1,000
028.0010	PISTOLA	NR	1,000
028.0102	RACCORDO CON RONDELLA	NR	1,000
028.0151	TUBO PLASTIFICATO 07-11	NR	1,000
021.2031	CONSOLLE DI PROGRAMMAZIONE	NR	1,000

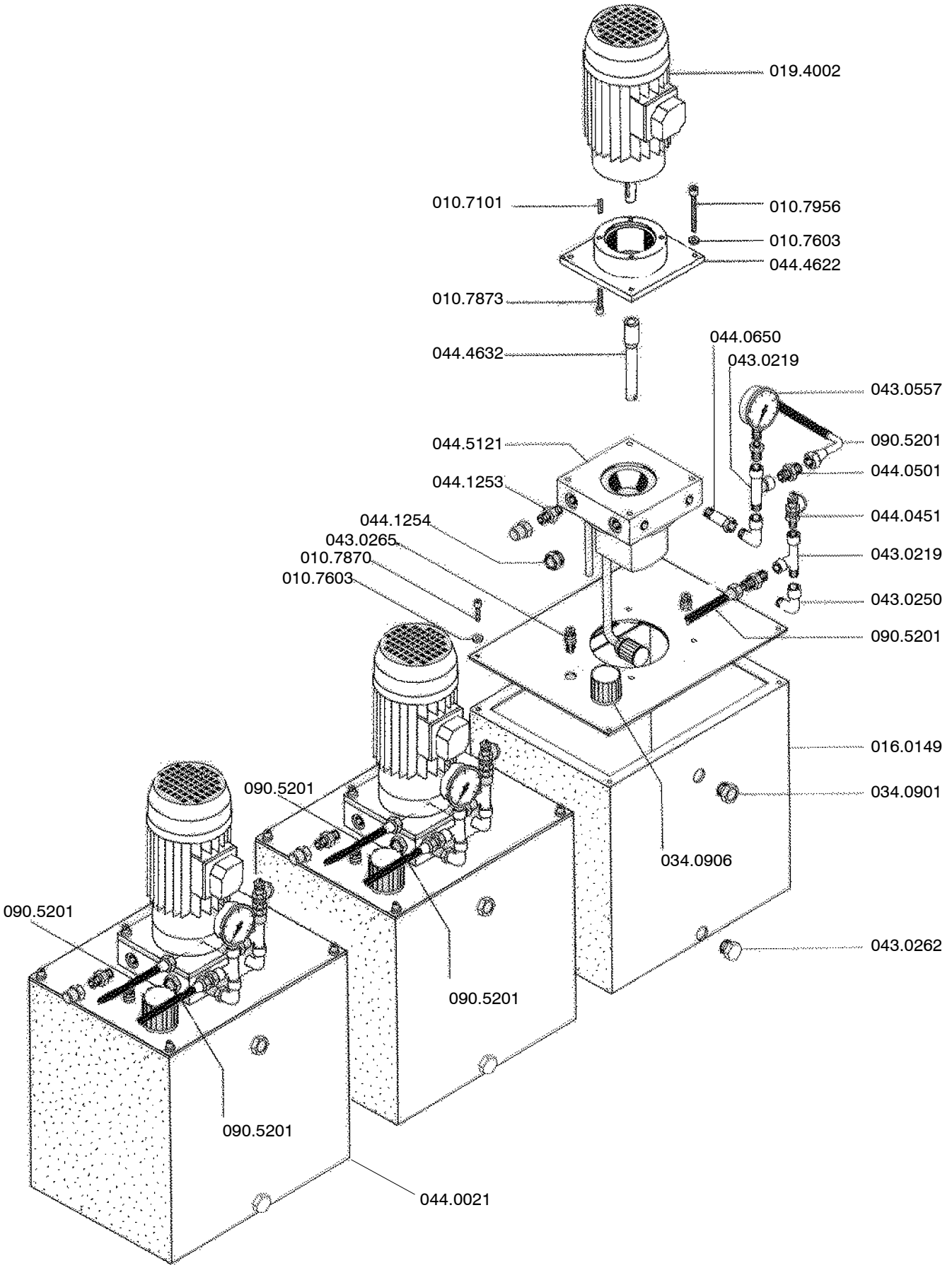
5.2.3 - Hydraulic cylinder



Spare parts

Codice	Descrizione	U.M.	Q.tà
CODICI DEI COMPONENTI			
010.0933	MOLLA RICHIAMO TESTA	NR	1,000
010.1103	FORCELLA 16 MA	NR	1,000
010.1460	STAFFA AGGANCIO MOLLA	NR	1,000
010.1470	STAFFA SUPPORTO CILINDRO	NR	1,000
010.7208	DADO M16	NR	1,000
010.7400	GRANO VCE P.CIL. 5 X 5	NR	2,000
010.7605	RONDELLA DIAM. 10	NR	3,000
010.7790	COPPIGLIA PER SERBATOIO	NR	1,000
010.7840	VITE TCEI 3 X 10	NR	2,000
010.7872	VITE TCEI 6 X 25	NR	2,000
010.7924	VITE TCEI 10 X 30	NR	2,000
010.7949	VITE TE 6 X 10	NR	2,000
010.7975	VITE TE 10 X 25	NR	3,000
010.7981	VITE TE 10 X 100	NR	1,000
016.0296	STAFFA ESTERNA CILINDRO	NR	1,000
022.0046	POTENZIOMETRO 6639S-001-202	NR	1,000
022.0378	CONNETTORE X BOBINA VALVOLA RIGEN.	NR	2,000
022.0615	BOBINA X VALVOLA RIGENERATRICE	NR	2,000
025.0231	ANELLO DI TENUTA OR 3062-15,54	NR	2,000
025.0876	GIUNTO WA 6-6 MM.28 X CILINDRO	NR	1,000
043.0204	ATTACCO A GOMITO 8X1/4 - CL 6521	NR	2,000
043.0266	RACCORDO A GOMITO M.8/6X1/4 -CL1500	NR	2,000
043.0804	UNITA' IDROPN. DIAM. 63 C.150+BYP	NR	1,000
043.5671	PROTEZIONE POTENZIOMETRO CILINDRO	NR	1,000
043.5681	SUPPORTO POTENZIOMETRO CILINDRO	NR	1,000
044.1252	VALVOLA RIGENERATRICE CILINDRO	NR	2,000

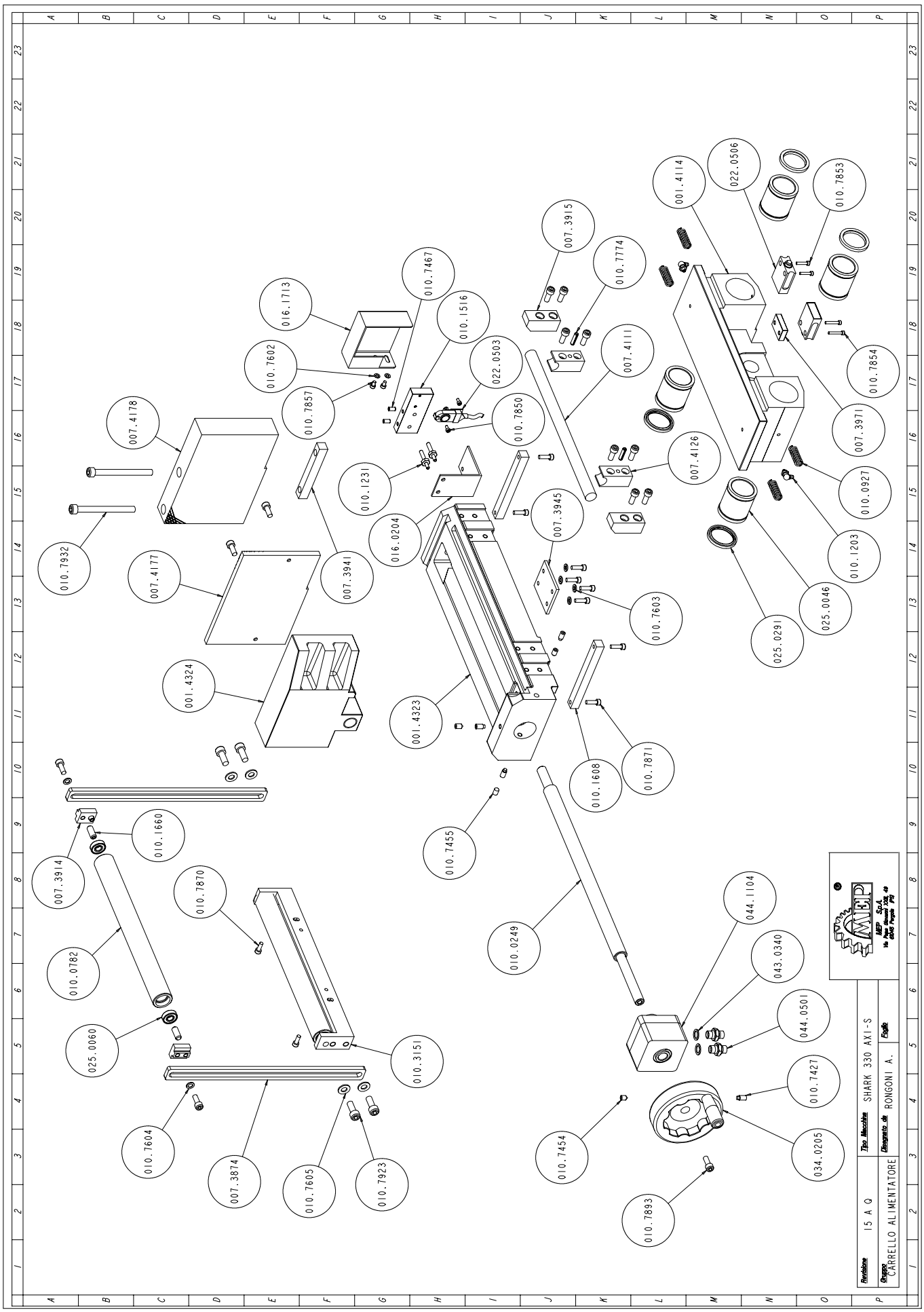
5.2.4 - Hydraulic units



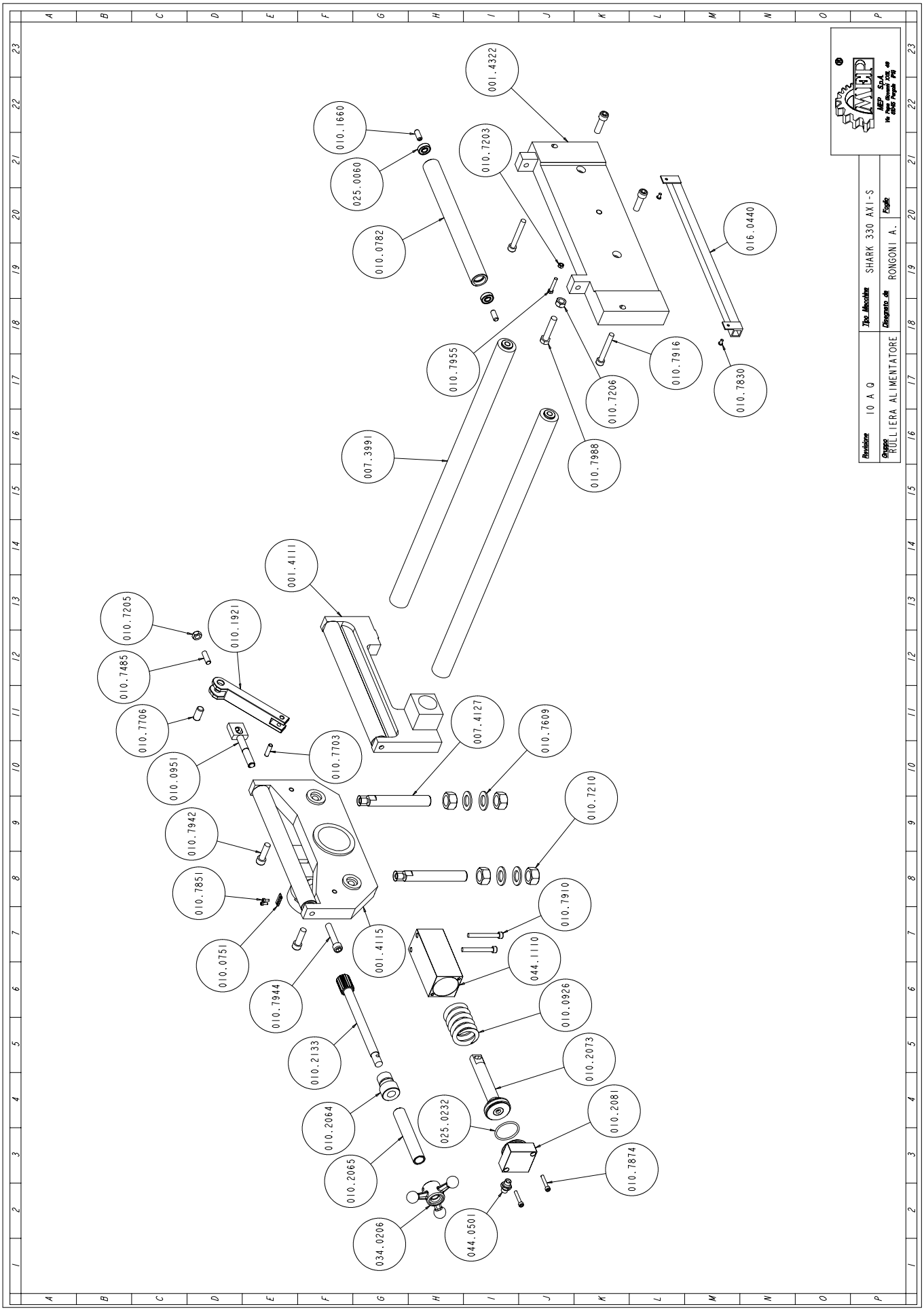
Spare parts

Codice	Descrizione	U.M.	Q.tà
CODICI DEI COMPONENTI			
010.7101	CHIAVETTA 4 X 6 X 15	NR	3,000
010.7603	RONDELLA DIAM. 6	NR	24,000
010.7870	VITE TCEI 6 X 16	NR	12,000
010.7873	VITE TCEI 6 X 30	NR	12,000
010.7956	VITE TE 6 X 40	NR	12,000
016.0149	VASCHETTA X MONOCENTRALINA	NR	3,000
019.4002	MOTORE CENTRALINA IDRAULICA	NR	3,000
034.0901	TAPPO LIVELLO OLIO 1/2 "GAS.	NR	3,000
034.0906	TAPPO OLIO CENTRALINA IDRAULICA	NR	3,000
043.0219	RACCORDO A"T" MFF 1/4" CL-2070	NR	6,000
043.0250	GOMITO M.F. 1/4 CL 2020	NR	6,000
043.0262	TAPPO SCARICO OLIO 1/4"	NR	3,000
043.0265	RACCORDO DIRITTO 8/6 X 1/4 C1	NR	6,000
043.0557	MANOMETRO 0-60 WIKA	NR	3,000
044.0148	TUBO CENTR.MM 3000 1X90ø	NR	4,000
044.0149	TUBO CENTR.MM 3200 1X90ø	NR	1,000
044.0154	TUBO CENTR.MM 3500 2X90ø	NR	2,000
044.0451	INNESTO RAPIDO 1/4 CL 5051	NR	3,000
044.0501	NIPPLO NP 1/4 IDRAULICO	NR	6,000
044.0650	PROLUNGA 1/4 MF ES.36 MM.	NR	6,000
044.1253	VALVOLA DI MASSIMA MR 5-50 BAR	NR	6,000
044.1254	VALVOLA DI RITEGNO MR 05	NR	6,000
044.4622	LANTERNA ACCOPPIAMENTO MOTORE-POMPA	NR	3,000
044.4632	GIUNTO COLLEGAMENTO MOTORE-POMPA	NR	3,000
044.5121	COLLETTORE CENTRALINA CON POMPA	NR	3,000

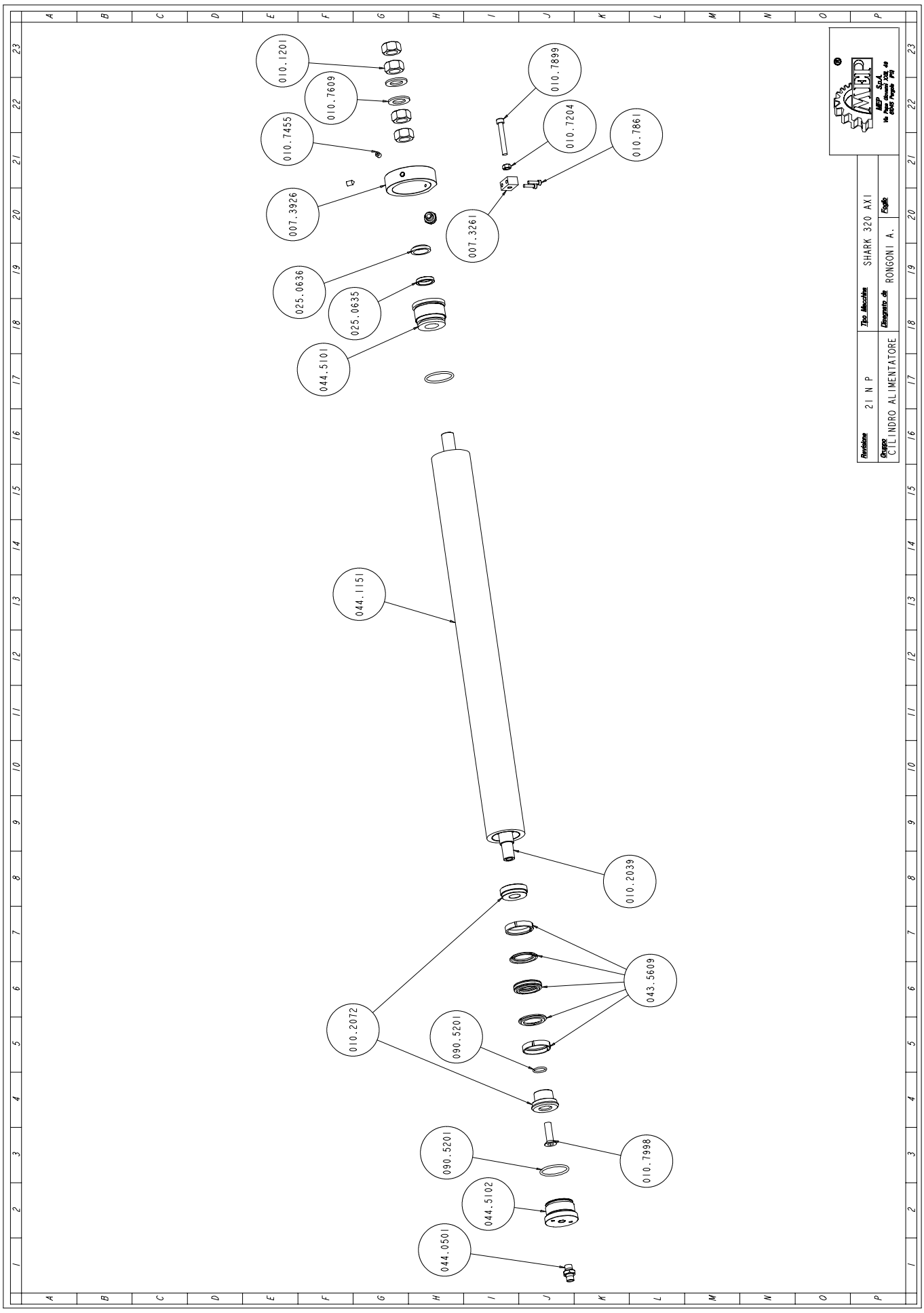
5.2.5 - The material feeder



The material feeder (cont'd)



The material feeder (cont'd)



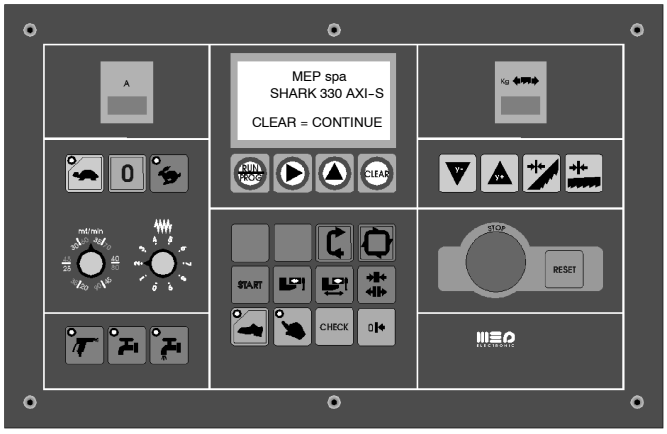
CHAPTER 6 - Controls and adjustments

This chapter illustrates the adjustment operations of the electronic, pneumatic and mechanical systems, for a correct use of SHARK 330 AXI-S. These few simple explanations will enable you to personalise your machine to the type of cuts you require, optimising the work times for all the operations.

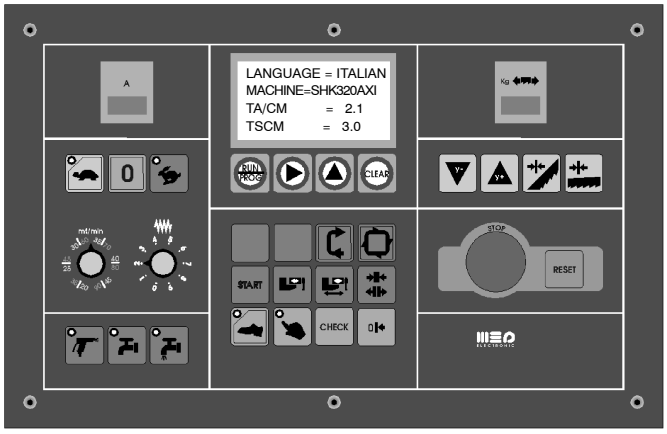
6.1 - Access and modifications to set-up parameters

Through the set-up parameters we can configure the machine directly from the control panel.

Power the machine by turning the main switch on the left side. The console display will show the main screen that sakes you to press CLEAR, *do not press it.*



Instead, press the keys 0|◂ and CHECK together to access the machine set-up, and the following screen will be displayed.



The display shows the SET UP of the machine, where it gives: the language for the messages; the type of sawing machine that you are using; the open/close time of the cutting vice; the lock/unlock time of the measuring cylinder.
The cursor is initially found over the first letter of the language selection. Use the ▲ arrow to change language, or the ▶ arrow to move to the next item.

LIST OF ITEMS FOUND IN THE MACHINE SET UP:

LANGUAGE = Italian or English depending on the country of use.
MACHINE = Select the type that you are currently working
V O/C T = Vice open/close time
M C U T = Measuring cylinder un/lock timel
NCH/MM = Select unit measure
ENCODER = Confirm encoder present or not
INVERTER = Confirm speed control present or not
2nd SPEED = Confirm if 2nd speed is present or not
MAX I Spd 1 = Max absorption at first speed
MAX I Spd 2 = Max absorption at second speed
MIN BLADE TEN = Minimum blade tension
DOWN SP.HEAD CYL = Head cylinder downward movement speed
HEAD POSITION = Fractioning of the blade head's run (from 0 to 255)

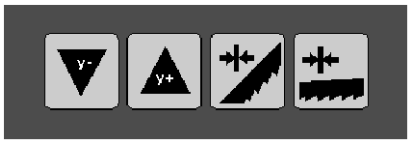
To return to the initial screen press RUN-PROG.

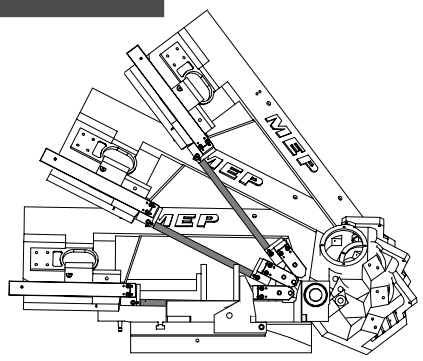
6.2 - The electronic systems

The definition of the machine functions is often made through the electronic equipment. The following paragraphs give the main adjustments that give the operator the possibility of working at his/her best.

6.2.1 - Operating head stroke

The operating head stroke is set through the machine's control panel. The figure below illustrates the console keys regarding the movement of the operating head (marked with Y ±) and the memorising of the positions FCTI start cut (blade up) and FCTA end cut (lama down).



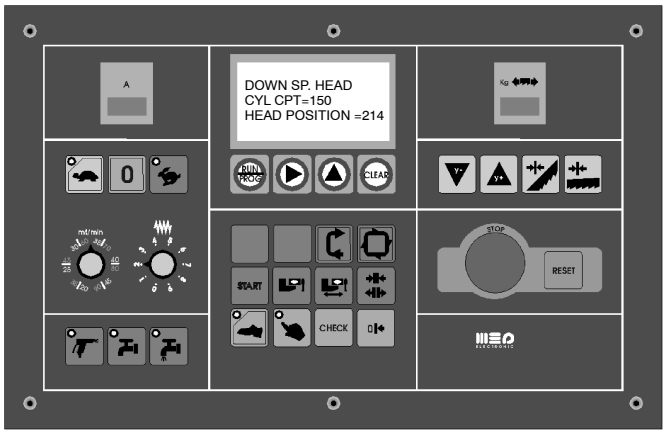


To set the cut stroke see paragraphs 4.4.2, 4.4.3 and 4.4.4.

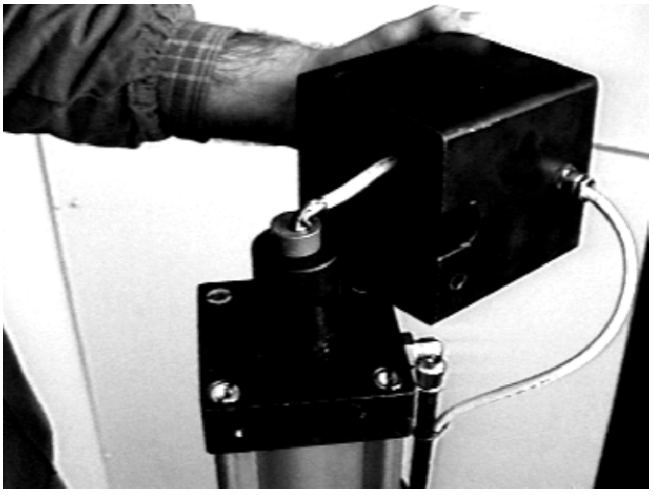
6.2.2 - Set-up of head transducer calibration

The operating head travels the space between the top position and the down with a HEAD DOWN SPEED that can be specified in the fourth screen of set-up. The setting can range from 1 to 190. In any case check that the head completely covers the cutting field between the two points from the head rise limit (FCTI) to the head down limit (FCTA). Under the item regarding the head down speed we will find the relative head position in that moment.

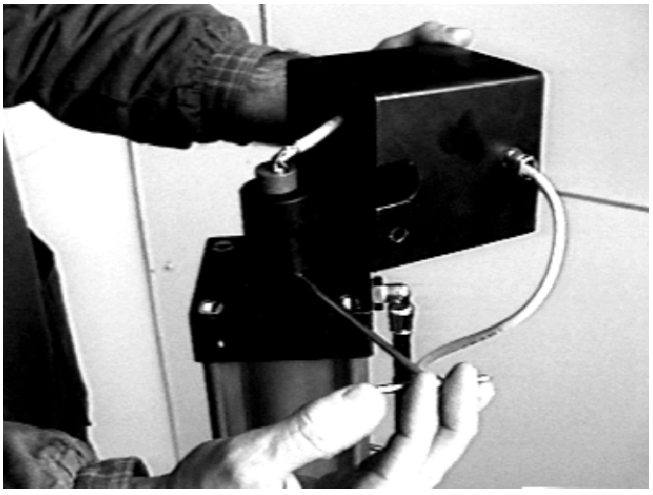
The scope of this adjustment is to set the values of the head positions FCTI (rise limit 250–255) and FCTA (down limit 1–12).



To achieve this result two adjustments must be made: one on the hydraulic cylinder and the other on the IUV card of the MEP 18 controller.
Keeping pressed the relative head down key (Y–), position the head in the FCTA point. Remove the fixing bolts on the cylinder's black box with an Allen key.



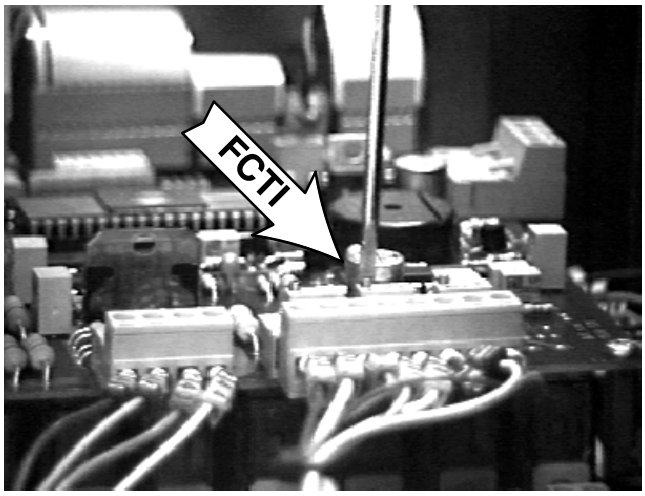
Having unscrewed the bolts, Raise the protective box of the potentiometer taking care not to tug the cable connections.
With the same Allen key loosen the fixing stud of the rod, leaving the potentiometer body free.



Turn the body of the potentiometer until the reading on the display of the actual calibration value is within between 9 and 12.
Lock with the stud the fixing support of the potentiometer. Close the cylinder box with the bolts.



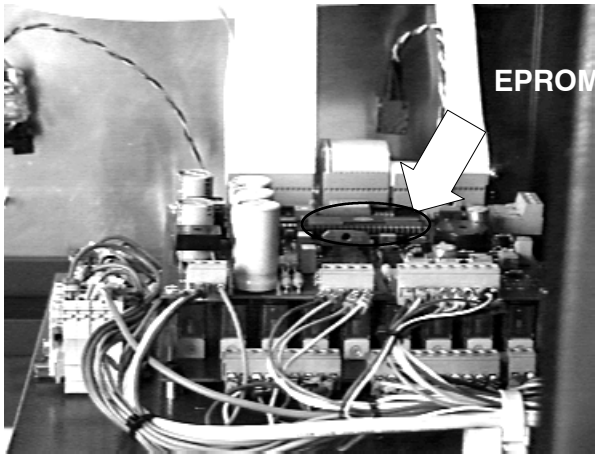
Now, the FCTI point can be set–up, moving the head completely up with the relative head rise button. Open the control panel and locate the MEP 18 controller to make the adjustment on the potentiometer that is found on the top IUV card (indicated by the arrow).



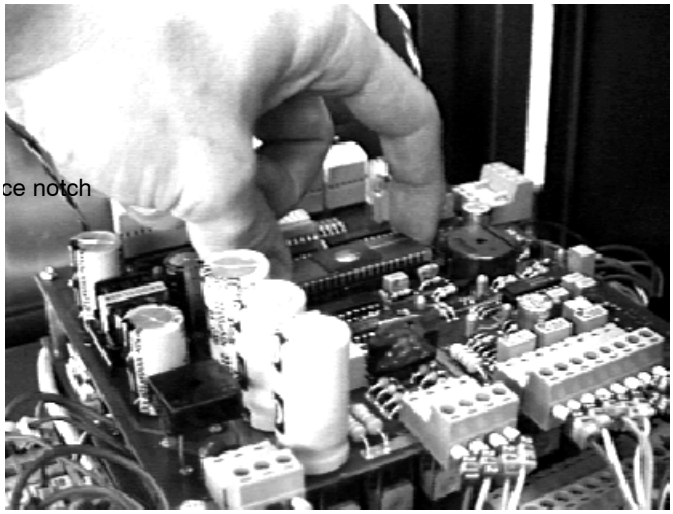
The IUV board has three adjacent potentiometers. Use a screwdriver to set the regulating screw of the central potentiometer at 255; the value is displayed on the LCD of the machine console. Set up the machine for normal working and check that it functions correctly.

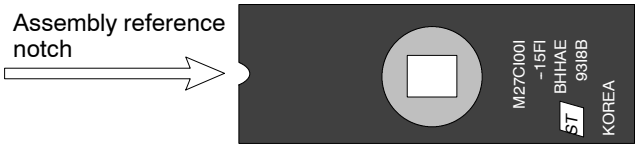
6.2.3 - Replacement of the chip in the MEP 18 controller

To carry out this operation the power to the machine must first be cut–off, then open the front panel of the control panel that gives access to the switchboard, where the MEP 18 controller is fitted. The chip is mounted on the IUV card in the top section (see the arrow in the photo).



Disconnect the chip from its shoe and replace it with a new one in the right direction (see photo below). Extreme care must made against the static charge damaging the microchip (e.g. avoid rubber soled shoes, woollen clothing, etc.). Close the control panel and run a test on the machine.

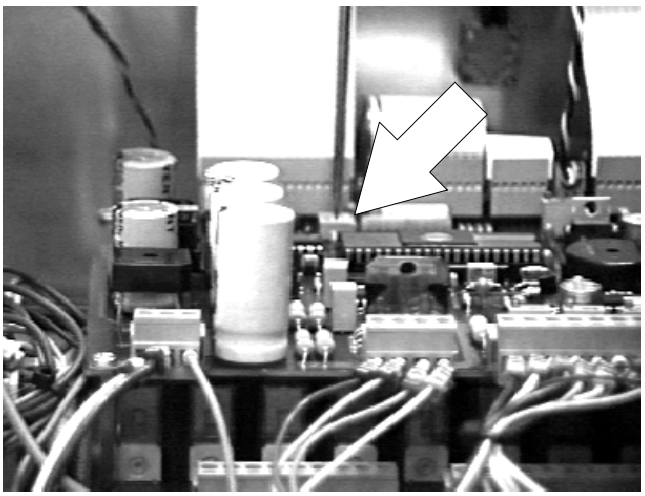




6.3 - Console brightness adjustment

When external influences, for example a change in the location lighting where the machine is installed, the brightness of the command and programming console must be adjusted. This operation is important for the operator who must always have a sharp view of the messages on the console.

- remove the fixing screws on the front panel of the console;
- the photo to the side shows the inside of the console, an arrow indicates the brightness potentiometer;



- use a screwdriver to turn the trimmer and check the variation in brightness on the display;
- terminated the adjustment, close the console panel.

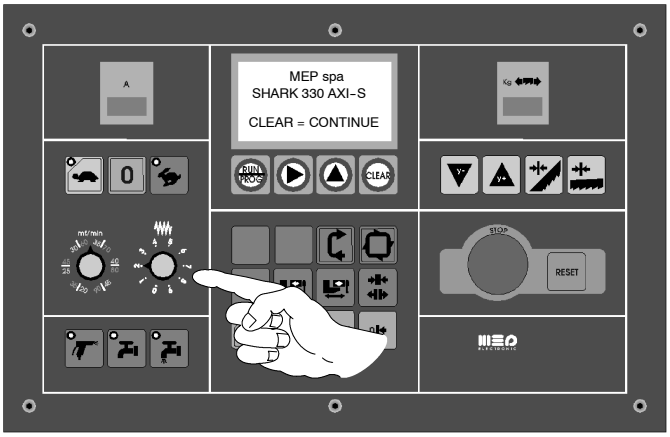
6.4 - Hydraulic systems

The made is completely electro-hydraulically operated, so after having examined the possible electronic settings, we shall deal with the adjustments on the head and vice movement components, effected by hydraulic cylinders controlled from the hydraulic unit.

6.4.1 - Working pressure of head

The head is operated by a hydraulic cylinder, which in turn is managed by the hydraulic unit indicated by the M2 symbol. It has a working pressure of 14 bar during the cutting phase (head in downward movement), and 20 bar during the head rise phase. They can be adjusted with the maximum valve as shown later on in this chapter

The operating head cuts the material by the push of the hydraulic cylinder with a downward speed set by the oil flow regulator on the hydraulic panel found on the right-hand door of the base. The regulator has a scale from 0 to 9 and is marked by the symbol  : turn clockwise to reduce the downward speed, anticlockwise to increase.

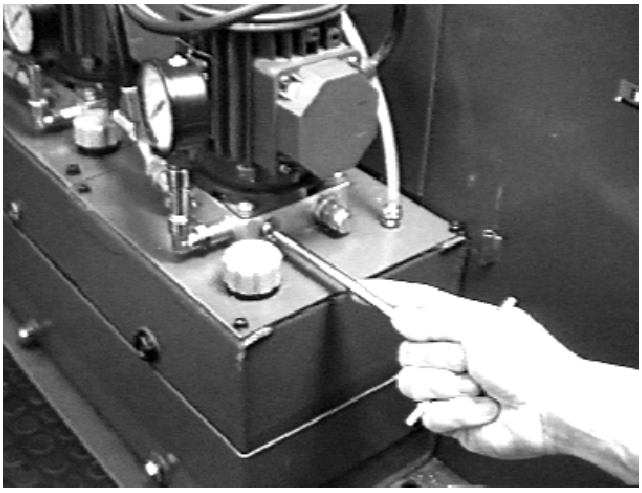


6.4.2 - Working pressure of vices

The pressure with which the vices for cutting and feeding the material grip the piece can be adjusted by using a screwdriver to regulate the control unit's cut-off valve, as described later in this manual. The operating pressure is normally 25 bar, but the operator may change this value if there is a risk of the material being damaged, or if the material is not gripped tightly enough during the cut. In all cases, before closing them, the vices are positioned 2 - 3mm from the piece.

6.4.3 - Units adjustment

The hydraulic unit are composed of a motor coupled to a two-way drain pump for the hydraulic oil contained in an 8.5 litre tank. They operate the cutting vice cylinder, the feeder vice cylinder, the head movement cylinder and the bar feeder cylinder.
The pressure can be adjusted according to the type of work (e.g. with easily deformed materials) by setting the clamping pressure on the oleodynamic panel. If the unit is no longer calibrated with the initial settings, use an 8 mm Allen key to adjust the stud shown in the figure. Adjustment is made on the maximum valve relative to the pump force.



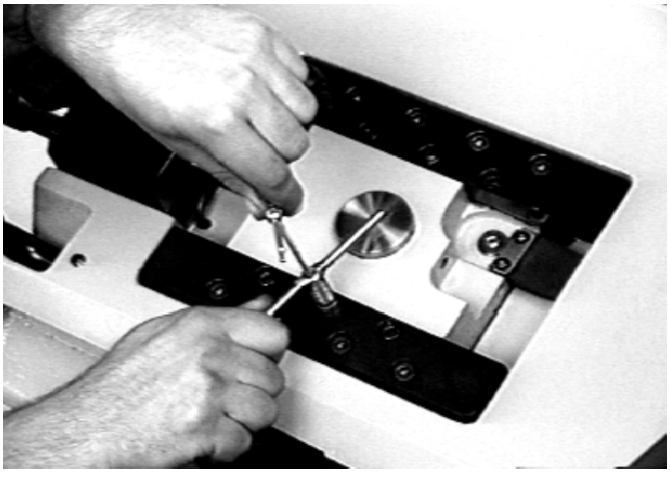
If the unit model does not correspond to the figure, unscrew the plug found in the same position and adjust the valve with a screwdriver.

6.5 - Mechanical systems

This section shall explain the adjustments made on the mechanical components such as the vice, head or feeder.

6.5.1 - Blade tensioner slide play adjustment

In order to reduce the play between the blade tensioner slide and the slide gibs, the grub screws separating the gibs from the slide must be adjusted as follows:
- remove the blade from the flywheels.
- move the slide backwards and forwards to identify the positions of any rubbing of play.
- slacken the nuts while keeping the grub screws still with a hexagonal box spanner.
- adjust as necessary by tightening the screws in the case of play or unscrewing them in the case of rubbing.



6.6 - Blade guides

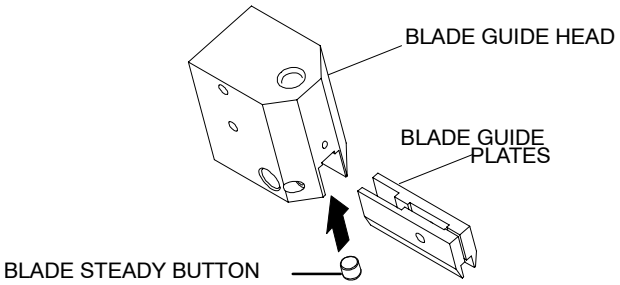
Band saw blade guides offer enormous advantages where the cutting process in concerned, without requiring any special attention by the operator. The blade guide adjustments necessary to ensure that the blade operates correctly are described below.

6.6.1 - Blade guide heads

Blade guide heads are used to carry out a part of the blade adjustment, and include the blade guide plates to control the longitudinal setup, blade steady buttons which limit the vertical flexing and the coolant feed taps.

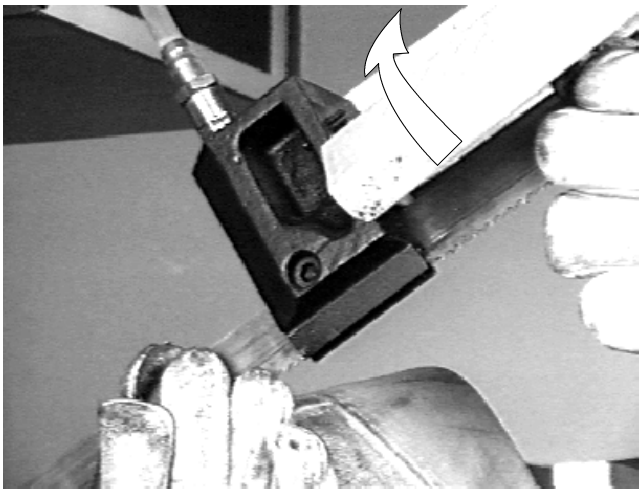
6.6.2 - Blade steady buttons

The blade steady buttons prevent the blade from flexing upwards due to the vertical component of the cutting force. These devices do not require any adjustment and are a part of the front and rear guide heads.

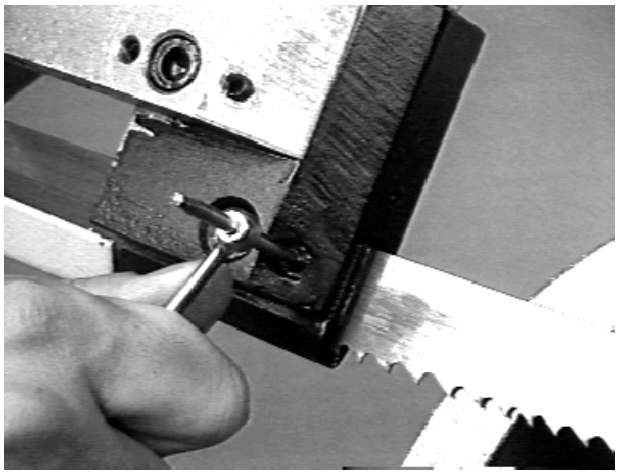


6.6.3 - Blade guide plates

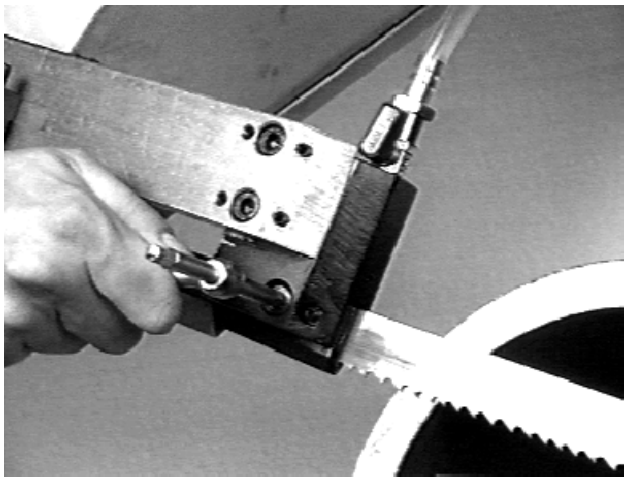
The contact area of these plates features widia inserts which guide the blade longitudinally. There must be a minimum amount of play between them and the blade to ensure that the blade itself runs smoothly and perpendicular to the work surface.
Thanks to the widia inserts, the working life of the guides is practically the same as that of the machine.
Nevertheless, if they need to be adjusted due to wear or a new blade thickness, proceed as follows:
- switch off the machine.
- release the blade tension using the handwheel.
- wear protective gloves.
- open the front blade guard by slackening the fixing screws and rotating the guard as shown in the illustration.



- check that there is a minimum of play between the blade and guides. If there is insufficient play for the blade to run normally, adjust the pressure by adjusting the two grub screws;



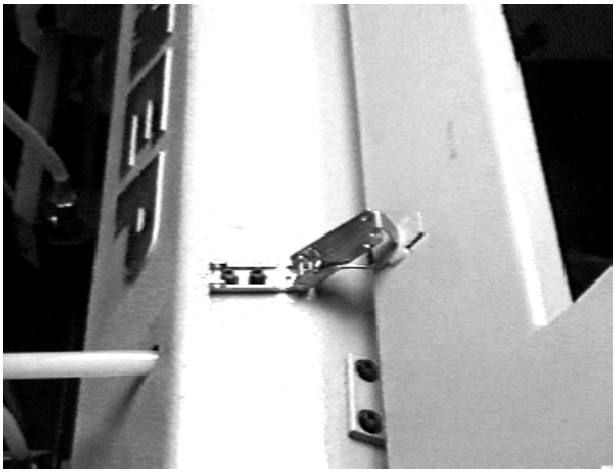
- if necessary, replace worn plates by removing the plate fixing screws.
- repeat the operation for the rear blade guide head.
- replace the front blade guard.
- tension the blade.
- close the cutting head cover and switch on the machine.



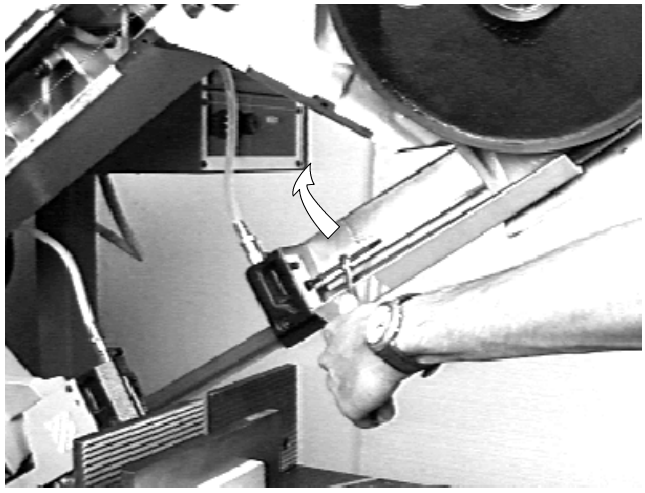
6.6.4 - Blade changing

Working under perfect conditions helps to safeguard the wellbeing of the operator and is one of the ways of ensuring long blade life. The blade, however, must be changed when its cutting power reduces and adversely affects production. The procedures for changing the blade are reported below:

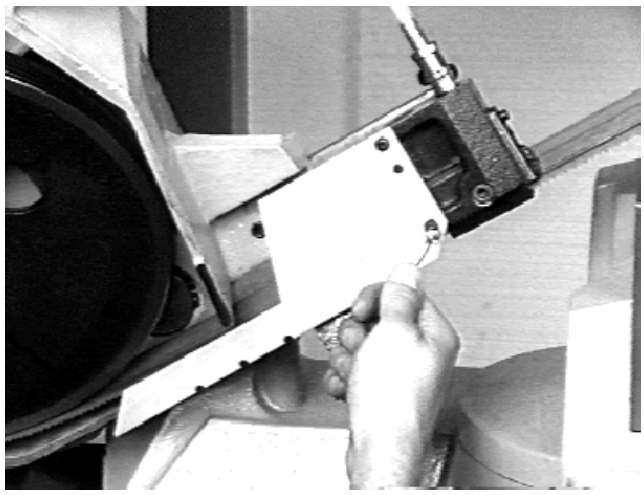
- switch off the machine.
- release the blade tension using the handwheel.
- wear protective gloves.
- open the cutting head cover by unscrewing the two knobs and hooking the head onto the galvanised lever on the back of the head itself;



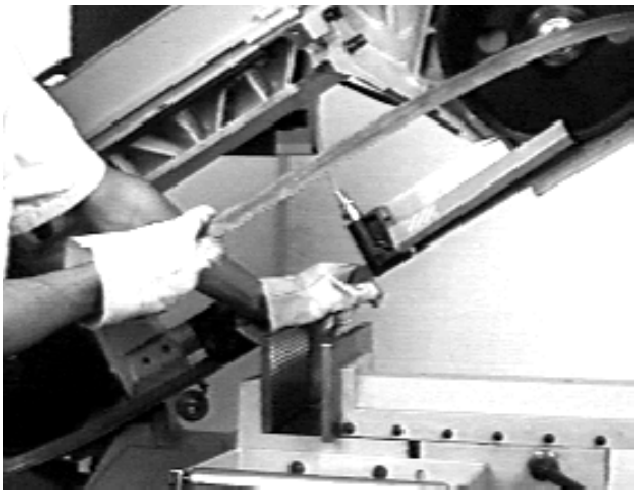
- open the front blade guard by unscrewing the fixing screws and rotating it as indicated in the illustration;



- remove the rear blade guard by unscrewing the fixing screws using an Allen key;

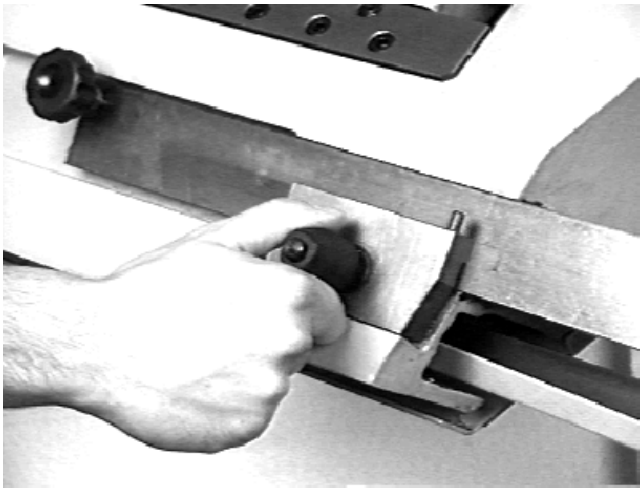


- remove the blade by sliding it off the flywheels and front and rear heads.
- take the new blade and slide it into the front blade guide head.
- check that there is minimum play between the blade and plates (refer to the explanations in the column alongside for plate adjustment).
- repeat the operation for the rear blade guides.
- position the blade over the flywheels and replace the rear and front guards.
- tighten up the blade
- close the cutting head cover and switch on the machine.

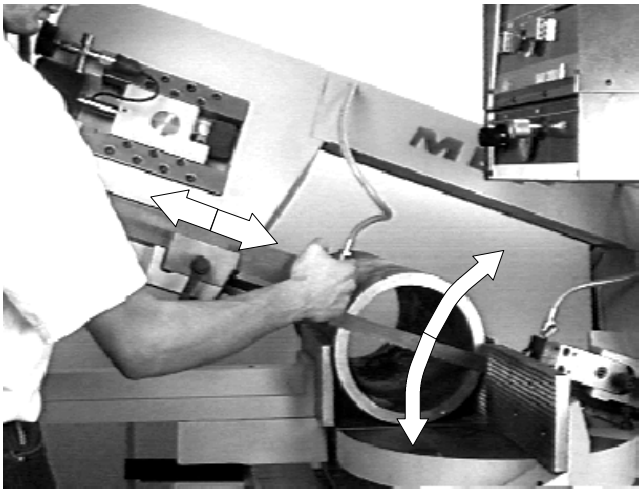


6.6.5 - Cutting length

In accordance with ”Health and Safety at Work” standards currently in force, the machine is fitted with guards that cover the entire travel of the blade. The cutting length must be determined on the basis of the section of the material being worked, such that only the cutting part of the blade is left exposed.
The procedure for determining this distance is described below:
- switch off the machine.
- position the material on the work table as near as possible to the vertical part of the blade.
- bring the blade to its cutting position near the material to cut.
- slacken the ratchet lever on the sliding shaft of the front blade guide head;



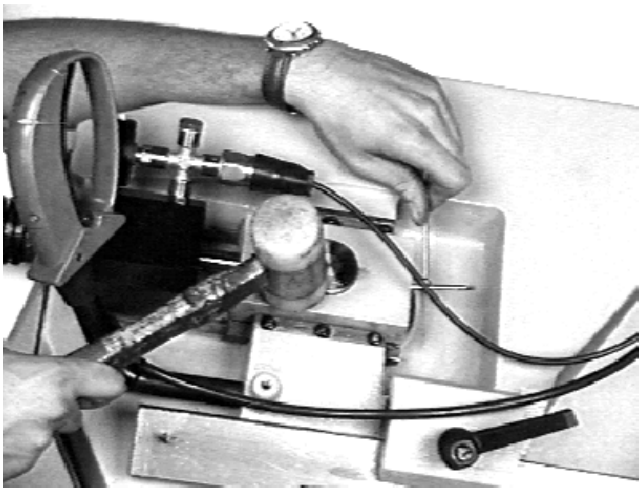
- the mobile front guide head must be positioned near to the material, leaving the downward path free to beyond the sliding jaw of the vice.
- tighten the ratchet lever to block the sliding head.
- proceed with the normal working cycle.



6.6.6 - Front flywheel

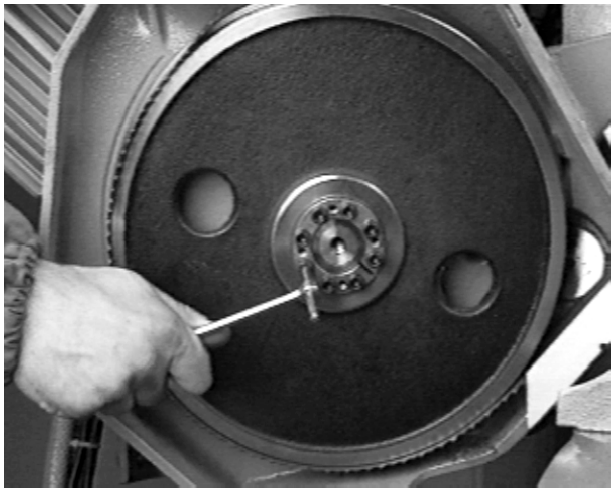
The only adjustment required on the front flywheel is to ensure that it is coplanar with the motor flywheel. This will ensure that the blade runs smoothly, keeping the back of the blade itself approximately 1 mm from the edge of its seating on the flywheel, preventing the friction with the flywheel edge from causing cracks and deterioration in the blade.

The sequence of operations is as follows:
- open the cutting head cover.
- slacken the grub screw.
- use a mallet to move the shaft a little at a time (in or out).
- close the cover and move the blade.
- check the distance between the blade and its seating on the flywheel.



6.6.7 - Motor flywheel

The coplanar adjustment of the motor flywheel is closely linked to that of the front flywheel. The purpose of the adjustment is to maintain a distance of 1 mm between the blade and the edges of the blade seating on the flywheels while they are rotating.
The adjustment is carried out by slackening all the locking screws on the flywheel and manually moving it either out or in. Retighten the screws and check that the flywheel is coplanar. If necessary repeat the operation.



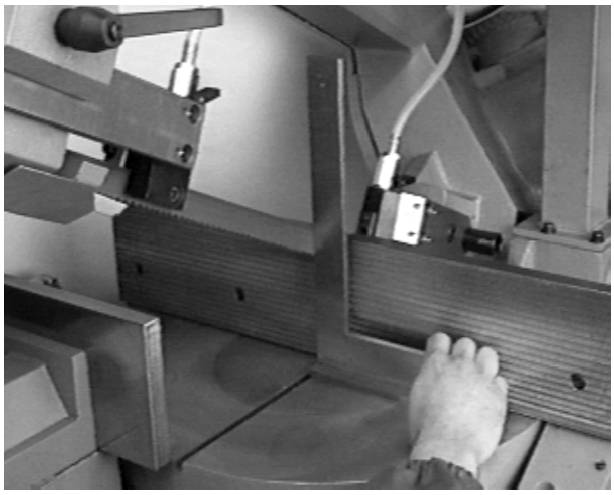
6.7 - Blade

Band saw blades offer enormous advantages in working, without requiring any particular attention by the operator. The adjustments necessary to ensure the blade is used correctly are described below. Further details on the subject of the blade can be found in chapter 9.

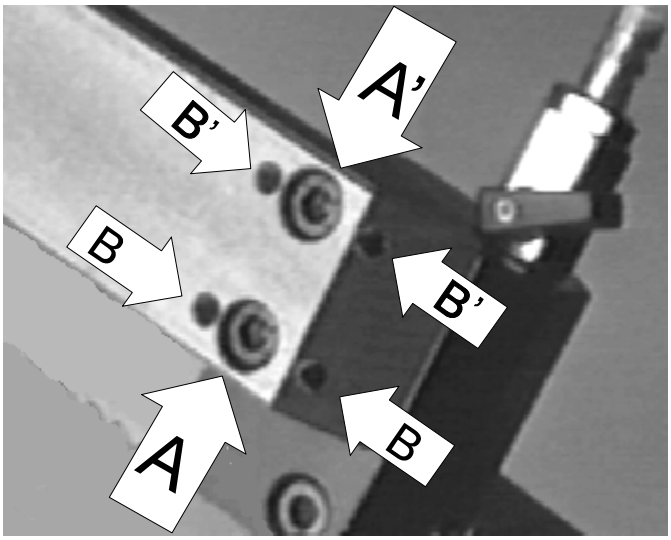
6.7.1 - Perpendicularity of the blade

Together with the tension, the perpendicularity of the blade to the work surface is of fundamental importance in obtaining straight cuts. This adjustment is carried out with the help of a workshop square which is placed on the work surface adjacent to the blade.

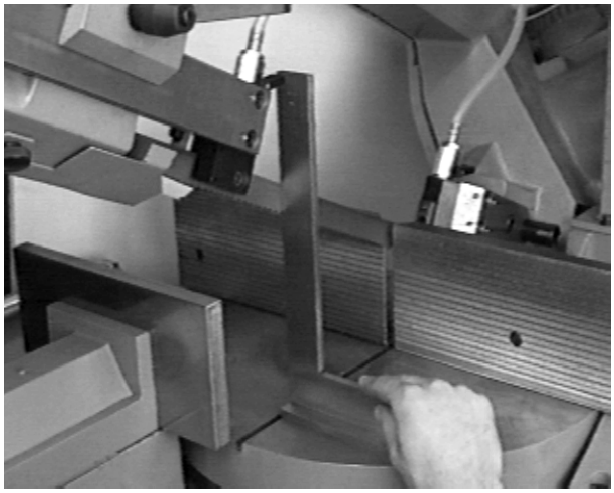
Sequence of operations:
- position the square on the work surface, after having thoroughly cleaned it, and move it up against the blade close to the right vice jaw at a point where the teeth of the blade do not prevent contact.



- slacken the two head fixing screws TCEI (A) and adjust the grub screws (B), if the blade touches the square at the lower part. If the point of contact is on the upper part, slacken screws TCEI (A') and uniformly tighten grub screws (B') in order to ensure that the blade is perpendicular to square.



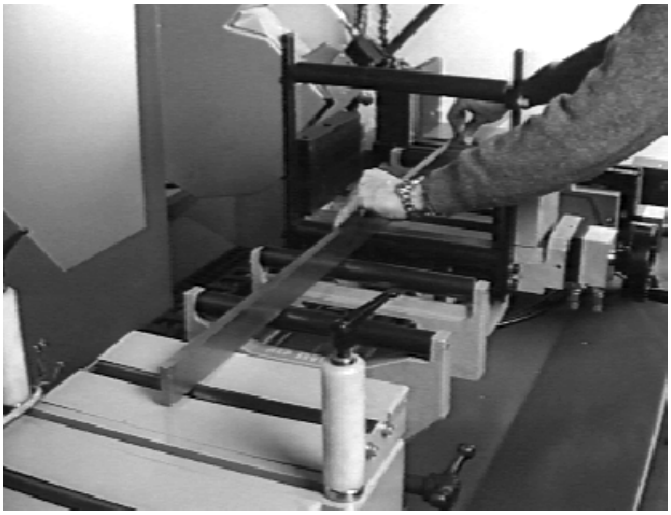
- Position the square on the work table near to the front blade guide head.
- repeat the operation described above for this guide head, slackening screws A and A' and grub screws B and B'.



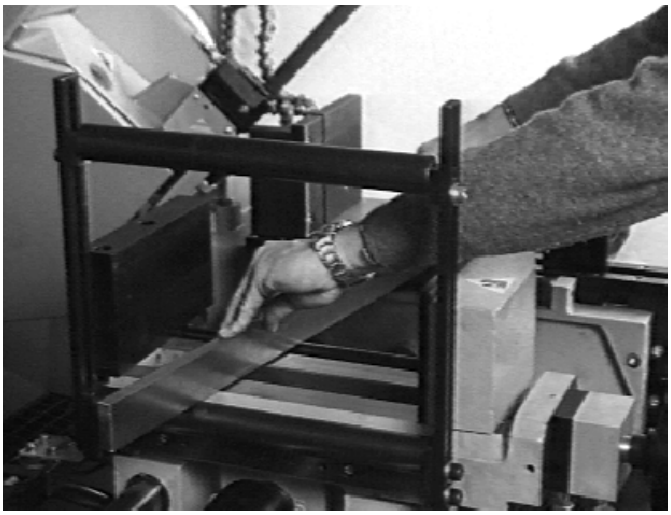
6.7.2 - Adjustment of the feeder - cutting table plane alignment

In the event that, as time goes on, the feeder looses its longitudinal misalignment to the cutting table, it must be reset with the levellers, both on the machine side and the feed table side.

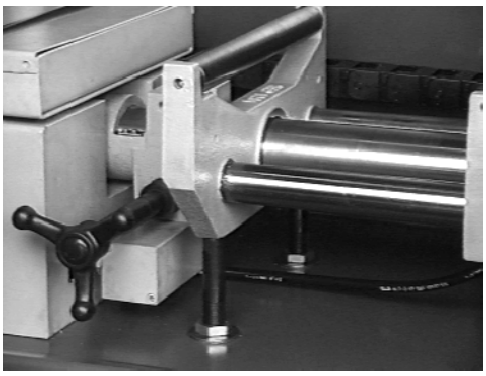
Measure the misalignment between cutting table and material feed table with a precision ruler, or a straight profile. Rest the ruler on the cutting table as a reference.

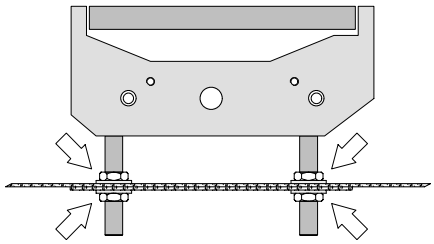


The material must only stroke and not drag along the machine$s worktop, check that the machine feed side is at least 0.5 mm higher than the cutting table.

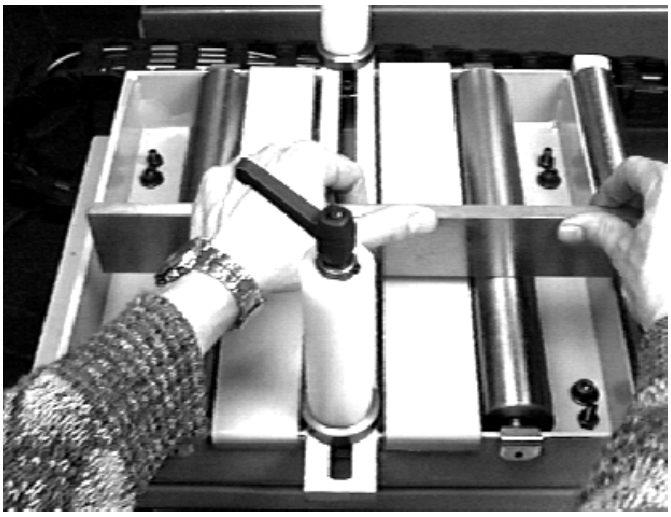


On the feeder loading side, make the height adjustment in the following way: open the left hatch of the base to access the adjustment collar of the support feet. With the same ruler control the plane alignment of the feeder by screwing or unscrewing the top or bottom nuts on the feet.





In the event that the defect is found in the height of the feeder extension rollers, the studs in the extension must be adjusted.



Remove the cover as shown in the photo:



slacken the nut and stud of the stop;



adjust the extension height by regulating the studs with an Allen key, using the precision ruler as reference.



Restore the alignment of the extension, tighten the stop stud and nut.

CHAPTER 7 - *Cutting speed*

The cutting speed is determined by the blade speed and head feed speed. While the head speed is provided by the downstroke movement of the head and can be regulated by adjusting the head downward movement, the blade rotation speed can either be fixed or variable. This chapter describes the cutting speeds possible by the machine in its standard version, and the speeds for which the optional electronic speed controller (inverter) is necessary.

7.1 - Standard machine

The standard version of the SHARK 330 AXI-S is supplied with the following two cutting speeds:

- Speed 1 = 40m/min
- Speed 2 = 80 m/min

OPTIONAL: 4 pole motor

- 1st speed = 20 m/min
- 2nd speed = 40 m/min

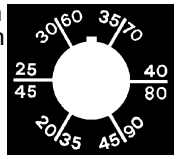
These speeds are always selected by means of the polarity switch on the control panel.

7.2 - Machine with inverter

OPTIONAL

The inverter is an electronic instrument fitted to the SHARK 330 AXI-S which allows the rpm of the spindle motor to be varied. This instrument makes life easier for the person carrying out special cutting operations by adjusting the speed for a specific material. The advantage is that of being able to optimise the blade usage, in that it can adapt a blade not having the correct teeth to a specific type of material and prevent premature wear.
The characteristics of this instrument (as previously explained in the "Machine Specifications" chapter) are as follows:

Cutting speed: 1st speed, from 20 to 45 m/min
2nd speed, from 35 to 90 m/min



The figure on the right shows the speeds that can be selected by the inverter control potentiometer located on the machine's control panel.

Inverter: frequency converter:
Characteristics:

Power	- Power of the most powerful motor KW 2.2 - Maximum sinusoidal output current Amps 6.5 - Maximum power output KVA 4.22
Supply	- Supply voltage: three-phase 3 x 380 V (+/-10%) - Supply frequency: 50/60 Hz (+/-5%)
Output	- Waveform: sinusoidal - Output voltage: three-phase from 0 to 380 V - Output frequency: from 2.5 to 100 Hz - Frequency stability: +/-1% - Output: 88% of peak power
Protections	- Protected against mechanical overload (current limiter) - Protected against phase/phase short circuit - Protected against phase/earth short circuit - Protected against overtemperatures - Protected against overvoltages caused by regenerative loads - Protected against peak supply overvoltages of duration less than 1 ms - Protected against insufficient power supply or micro-interruptions in current - Protected against short circuits between potentiometer terminals

CHAPTER 8 - *Maintenance and choice of consumables*

The SHARK 330 AXI-S is a machine that has strength and long-life. In fact, no particular maintenance is required, even if, as with other machine tools, it may deteriorate in time especially if wrongly used or no maintenance at all is carried out.
This chapter therefore serves as a guide to those who wish to preserve the characteristics of the machine for as long as possible.

8.1 - The role of the operator

The person **operating** and **maintaining** the machine must follow these instructions for his own safety and that of the others, in addition to safeguarding the production of the machine.

❑ check that his own work and that of the other operators of the machine always complies with the relevant safety standards. Therefore, check that the safety devices are in position and work perfectly and that personal safety requirements are complied with.

❑ ensure that the working cycle is efficient and guarantees maximum productivity, checking:
- the functions of the main components of the machine
- the sharpness of the blade and coolant flow
- the optimum working parameters for the type of material.

❑ check that the quality of the cut is that required and that the final product does not have any machining defects.

8.2 - Maintenance requirements

❑ All ordinary and extraordinary maintenance must be carried out with the power switched off and the machine in emergency condition.

❑ To guarantee perfect operation, all spare parts must be **MEP S.p.A** originals.

❑ On completion of maintenance works, ensure that the replaced parts or any tools used have been removed from the machine before starting it up.

❑ Any behaviour not in accordance with the instructions for using the machine may create risks for the operator.

❑ Therefore, **read and follow** all the instructions for use and maintenance of the machine and those on the product itself.

8.3 - General maintenance

8.3.1 - Daily

The daily maintenance operations to carry out on the machine are as follows:
- remove all swarf from the machine (using compressed air orpreferably thread-free cloth.
- empty the swarf-drawer (the swarf collection drawer is located in the base and is accessible through the front opening panel).
- top-up the coolant level (the tank is inside the base).
- check the wear of the blade and change if necessary.
- check the blade cleaning brush, clean it and reposition it: if worn, replace.
- control the oil level of the hydraulic unit and top up whenever necessary. Check for oil leaks in the hydraulic couplings and that no pipes have been badly bent by accident.
- at the end of the working day, slacken the blade to 5 bar tension to prevent unnecessary and damaging stresses.

8.3.2 - Weekly

The weekly maintenance operations are as follows:
- remove all swarf, including any residue inside the blade cover;
- clean the vice and lubricate all the joints and sliding surfaces using a good quality oil;
- control the blade tension that should be 800 Kg (60 Bar) for the machine to work efficiently;
- check the oil level in the transmission box: if necessary top-up with oil through the filler plug while keeping the head in the horizontal position;
- clean the air duct to the switchboard, remove the fan and clean the air filter with compressed air.

8.3.3 - Monthly

This section lists the operations to be carried out for the monthly maintenance of the machine.
- check that the blade is perpendicular to the work surface. In necessary, adjust as described in para. 6.7.1.
- check that the 0 degree notch on the fixed work table is in line with the graduation on the turntable; if not, adjust using the eccentric pin, then re-check that the blade is perpendicular to the work surface and orthogonal to the shoulder;
- check the precision of the 45° and 60° left stops. If out-of-adjustment, follow the procedure in para. 6.7.2.
- check the condition of the widia inserts and blade steady button and replace if worn or chipped. Check their positions and adjust if necessary (see para. 6.6.3).
- thoroughly clean the bottom of the water tank and the electro-pump filter.

8.4 - Maintenance of operating parts

During maintenance work on the SHARK 330 AXI-S, special attention should be paid to operating units such as the transmission box and the oleopneumatic cylinder, which we have already covered in the Adjustments - loading chapter.

8.4.1 - Transmission box

Transmission box maintenance:
- after the **first 100 working hours**, drain the transmission box through the drain plug located on the bottom of the cutting head and refill with new oil. If, in addition to the yellow filings from the bronze rim, there are other impurities in the drained oil, remove the cover and thoroughly wash the inside. The washing should be carried out using flushing oil, avoiding the use of cotton or threadbare rags for drying. Refill the transmission box.
- after **every 2000 working hours**, repeat the oil change operations.

When cleaning the transmission box, observe the following instructions:
- never use cotton or threadbare rags;
- use flushing oil for cleaning;
- fill up using the specified oil.

8.4.2 - Hydraulic units

Maintenance on the hydraulic units:
- after the **first 100 working hours**, completely flush out the tank and circuit with cleaning oil and filter the initial oil charge. This will eliminate all foreign bodies that are worn away during the “running in” period.
- after **every 3000 working hours**, after a period of normal work, clean the tank and change the oil.

When cleaning the unit, the following recommendations should be respected:
- never use cotton or ropy rags;
- empty the system, clean or change the filters, clean the tank;
- run the machine without load for about half an hour to ensure that the oil circulates to every part;
- drain thoroughly the cleaning oil, control the condition of the tank and filters;
- fill with specified oil.

8.5 - Consumable materials

It is essential to use specific oils for the hydro-pneumatic, hydraulic, pneumatic and lubrication/coolant circuits. The oils suitable for each of these circuits are listed below.

8.5.1 - Oils for the hydraulic circuit

The machine is supplied with FOX YE 32 oil which is used by the head cylinder and hydraulic power packs. The following oils may also be regarded as compatible or having equivalent specifications:

API Cis 32 - ARAL Vitam GF 32 - CASTROL Hyspin AWS 32 ESSO Nuto H 32 / HP 32 - IP Hydrus oil 32 - TOTAL Azolla ZS 32 VALVOLINE Hydraulic HLP 32 - MOBIL DTE 24 / 25 / 26 MOBIL Vacuoline Oil 1405 - FIAT HTF 32 - Q8 Haydn 32 SHELL Tellus oil 32 - BP Energol HLP 32.

Blade tensioning group:
- reservoir capacity: 0.6 l
- oil volume: 0.5 l

Hydraulic unit:
- tank capacity 8.5 l

8.5.2 - Oils for transmission box

The machine is supplied with AGIP BLASIA 460 oil, ISO and UNI symbol CC460. The following oils can be regarded as compatible or of equivalent characteristics:

API DT 460 - CASTROL Alpha SP 460 - ARAL Degol BG 460 - ARCO PENNANT NL 460 - BP Energol GR/XP 460 - ELF Reductelf SP 460 - ESSO Spartan EP 460.

Transmission box:
- capacity 2.5 litres

8.5.3 - Oils for lubrication/coolant liquid

The oil used for the lubrication/coolant fluid in the machine is CASTROL Syntolin TFX. Though there are no specific standards for these types of oils, MEP considers that CASTROL Syntolin TFX is the best product available with regard to quality:price ratio. Nevertheless, the following oils of similar characteristics can be said to be compatible:

AGIP NB 200 - SHELL Lutem TT - IP Utens Fluid-F

Finally, one particular blade manufacturer (LENOX) recommends and supplies a coolant under the name of LENOX BAND-ADE SAWING FLUID.

Coolant tank
- tank capacity 50 litres
- oil concentration 5-6%.

CHAPTER 9 - Blades

When using the SHARK 330 AXI-S, it is important to select the correct type of blade for the material to be cut. This chapter explains the limitations and specific applications of the different types of blades.

9.1 - Choice of blade

An important aspect when using bandsaws to cut metals is the choice of tooth pitch, i.e. the number of teeth per inch (25.4 mm), which must be suitable for the material to cut. The following recommendations may be taken as general guidelines:

❑ thin wall materials such as sheet steel, tubes and profiles require a dense tooth pitch. From 3 to 6 teeth must be in contact with the metal at any one time.
❑ large cross-sections require a course tooth pitch due to the higher quantity of swarf produced and for better penetration of the teeth in the material.
❑ soft materials (aluminium alloys, soft bronze, etc.) also require course pitch teeth.

9.1.1 - Tooth pitch

The choice of the most suitable number of teeth per inch thus depends on a number of different factors:
a) the size of the section
b) the hardness of the material
c) wall thickness
Very large dimensions require course teeth, while small dimensions require fine teeth. Whatever the case, ensure that there are always six teeth actually making the cut, with the thinnest wall vertical and transverse to the blade as the reference.
For Shark type machines, the following general distinction can be made with regard to material hardness:

	MILD STEELS < 61 HRC < 55 Kg/mm^2	HARD STEELS > 65 HRC > 65 Kg/mm^2
	No. TEETH PER INCH	No. TEETH PER INCH
MINIMUM	3 / 4	5 / 8
OPTIMUM	4 / 6	6 / 10
MAXIMUM	8 / 12	10 / 14

9.1.2 - Cutting speed and downstroke speed

The cutting speed, in m/min, and the downstroke speed, in cm^2/min, are limited by the amount of heat generated near to the points of the teeth. If the downstroke speed is too high, the cut is not straight, neither in the horizontal nor vertical plane. The cutting speed, as stated above, depends on the strength (Kg/mm^2) and hardness (HRC) of the material and the dimensions of the thickest section. The downstroke speed depends on the section of the material. Solid or thick-walled materials (thickness>5mm), therefore, can be cut at high speed providing there is sufficient swarf removal by the blade, while thin-walled materials such as tubes or thin profiles must be cut with a low, and above all constant, downstroke speed.

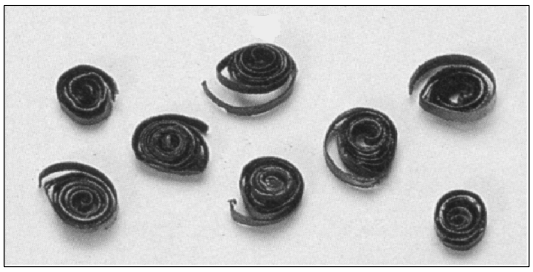
A new blade requires a wearing-in period at approximately one half of its normal downstroke speed (from 60 to 70 cm^2/min on normal steel) for a removed surface area of approximately 300 - 600 cm^2.

Types of swarf:

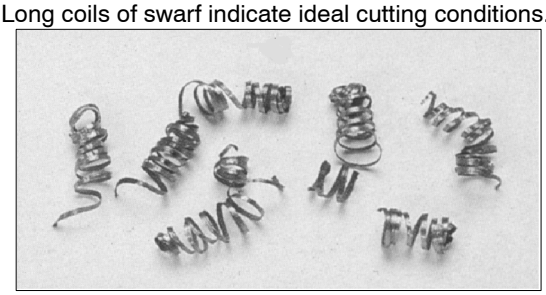
A - Very fine or fragmented swarf indicates that the downstroke speed and/or cutting pressure is too low.



B - Thick and/or blue swarf indicates that the blade is overloaded.



C - Long coils of swarf indicate ideal cutting conditions.



9.1.3 - Lubricant/coolant

The lubricating/cooling fluid must ensure that the blade teeth and material in the area of the cut do not overheat. Furthermore, the quantity and pressure must be sufficient to remove the swarf from the cutting zone. The fluid must be an excellent lubricant, such that prevents abrasion of the teeth and welding of the swarf to the teeth themselves (seizing).

9.1.4 - Blade structure

The most frequently used blades are the bimetallic type, i.e. manufactured with a silicon steel body, with high fatigue strength, and super-high-speed steel. The two parts are joined together using electronic or laser type welding systems. The two standard types of teeth are **M2** and **M42**: the difference being that the M42 teeth are harder due to the addition of cobalt to the steel making up the teeth.

BLADE TYPE	C	Mn	Si	Cr	W	Mo	V	Ni	Co	Al	HRC
BLADE BODY	0,47	0,75	0,22	1,00		1,00	0,12	0,52		0,08	45-50
HSS M2 HRC 65-66 / HRC 45-50	0,85	0,25	0,30	4,15	6,37	5,00	1,92				64-66
HSS M42 HRC 67-68 / HRC 45-50	1,07	0,25	0,20	3,75	1,50	9,50	1,15		8,00		67-69

KEY:

Al = Aluminium
C = Carbon
Co = Cobalt
Cr = Chrome
Mn = Manganese
Mo = Molybden
Ni = Nickel
Si = Silicon
V = Vanadium
W = Tungsten

The numbers in the columns indicate the %ge of the element present in the steel

9.1.5 - Types of blades

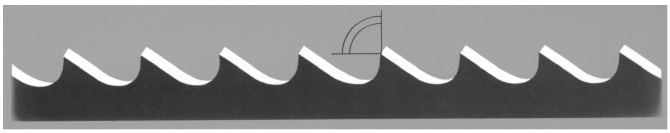
The blades fitted to the SHARK 330 AXI-S are of size 3320 x 27 x 0.9 mm; their length may vary from 3290 mm to 3350 mm thanks to the blade tensioning device. In addition to the size and pitch of the teeth, the blades also have other geometric characteristics that vary according to their particular use:

- **tooth cutting angle (rake)** which may be 0° or positive
- **pitch** of the teeth, which may be constant or variable
- **set**, i.e. the different alignment of the teeth, and of which there are many configurations.

Tooth shape:

CONVENTIONAL RAKE

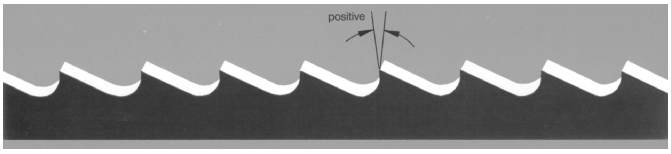
Cutting angle 0 degrees, constant pitch.



For general use, cutting small or medium size cast iron, steel and rolled materials both straight or angled.

POSITIVE RAKE

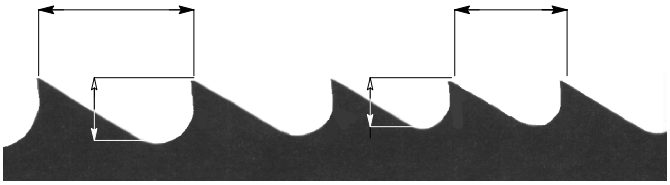
Positive cutting angle 9 - 10 degrees, constant pitch.



Can be used for cutting all types of materials, and is particularly suited to low-carbon and non-ferrous steels. Used for cutting very large sections and diameters.

VARIABLE PITCH

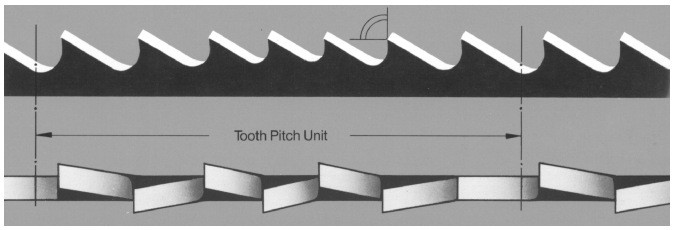
These blades have groups of teeth with different pitches and, as a consequence, different tooth dimensions and different relief radii. These are also available in types M2 and M42 with zero and positive rakes. The alternation of the different types of teeth helps to prevent vibration and noise. The elimination of the vibration increases the life of the blade and improves the cut surface finish.



A further advantage in using these types of blades lies in the fact that a wide range of different material types and dimensions can be cut with the same blade.

VARIABLE PITCH BLADES WITH CUTTING ANGLE AT 0 DEGREES (0 RAKE)

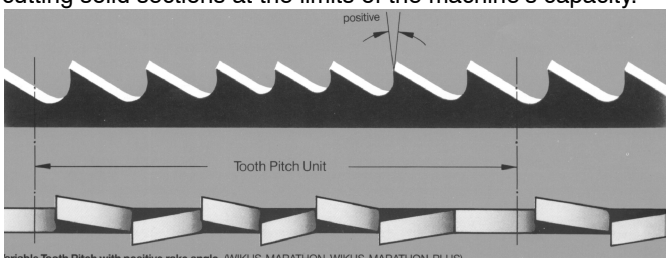
This type of tooth formation is ideal for cutting single tubes or medium size bundles, in accordance with the capacity of the machine.



Pitches available: 3-4 / 4-6 / 5-7 / 5-8 / 6-10 / 8-12 / 10-14

VARIABLE PITCH BLADES WITH POSITIVE CUTTING ANGLE (between 9° and 10° RAKE)

This tooth formation is the most suitable for cutting large dimension tubes and profiles, including of heavy section, and for cutting solid sections at the limits of the machine's capacity.



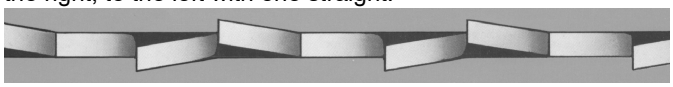
Pitches available: 3-4 / 4-6

Set:

The **set** of a blade refers to the section of material removed during the cutting operation, i.e. the width of the cut, due to the effect of the offset position of the teeth with respect to the back of the blade.

STANDARD OR SPLAYED SET

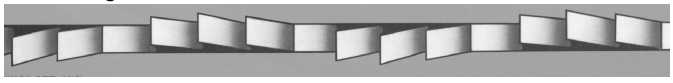
This term is used to describe the alternate angling of the teeth to the right, to the left with one straight.



For general use on materials over 5 mm thick. Suitable for cutting steel, castings and hard non-ferrous metals.

UNDULATED SET

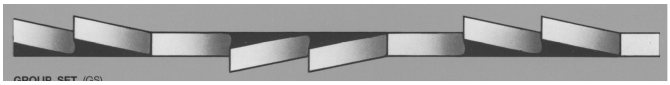
Used to describe groups of teeth undulating alternatively to the left and right.



This type of set is used with very fine teeth for cutting thin wall tubes and profiles (from 1 to 3 mm).

ALTERNATE GROUP SETTINGS

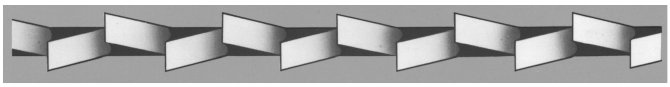
This refers to a blade with groups of teeth angled to the right, followed by a straight tooth and then a group angled to the left, and so on.



This type of set is used with very fine teeth for cutting very thin sections (less than 1 mm).

ALTERNATING TEETH SET

Refers to a tooth angled to the right and the next to the left, and so on.



This type of set is used for soft non-ferrous metals, plastics and wood.

9.1.6 - Blade selection table with respect to cutting speed and downstroke speed

Material	Cutting speed m/min	Dimension of section to cut S (mm) S<10		10<S<30		30<S<50		50<S<80		80<S<120		120<S<230		Coolant	cmq/min
Structural steel Case-hardened steel Steel for turning Mild steel	50 / 70	14	10 / 14	10	10 / 14	8	6 / 10	6	5 / 8	4	4 / 6	3	3 / 4	Emulsible oil Cutting fluid	60 - 70
High-duty cast iron Rolled steel Spring steel	40 / 50	14	10 / 14	10	10 / 14	8	6 / 10	6	5 / 8	4	4 / 6	3	3 / 4	Emulsible oil	50 - 60
Alloy steel Tool steel Valve steel	30 / 40	14	10 / 14	10	10 / 14	8	6 / 10	6	5 / 8	4	4 / 6	3	3 / 4	Emulsible oil Cutting fluid	15 - 20
Stainless steel Nodular cast iron	30 / 40	14	10 / 14	10	10 / 14	8	6 / 10	6	5 / 8	4	4 / 6	3	3 / 4	Emulsible oil	15 - 20
Copper Soft bronze	90 / 150	14	10 / 14	10	10 / 14	6	5 / 8	4	4 / 6	3	3 / 4	3	3 / 4	Emulsible oil	75 - 90
Brass	90 / 300	14	10 / 14	10	10 / 14	6	5 / 8	4	4 / 6	3	3 / 4	3	3 / 4	Emulsible oil	80 - 90
Hard bronze	20 / 40	14	10 / 14	10	10 / 14	6	5 / 8	4	4 / 6	3	3 / 4	3	3 / 4	Emulsible oil	25 - 40
Alluminium	80 / 800	14	10 / 14	6	10 / 14	4	4 / 6	3	3 / 4	3	3 / 4	3	3 / 4	Emulsible oil	70 - 80
Plastics	90 / 400	14	10 / 14	6	10 / 14	4	4 / 6	4	4 / 6	3	3 / 4	3	3 / 4	Emulsible oil	80 - 90
		Blade pitch						No. of teeth per inch							

9.2 - Classification of steels

The tables on this page provide users with information on materials to cut, enabling their classification with respect to hardness and consequently the correct blade to use.

Types of steel				Hardness		
UNI	**DIN**	**BS**	**AISI**	**Brinel HB**	**Rockw.**	**Kg/mm²**
C 22 - C 35	CK 22 - CK 3	En 2 C - En 6	1022 - 1035	160 - 170	34 - 87	55 - 59
C 45	CK 45	En 8	1040	160 - 180	84 - 89	55 - 61
C 10 - C 15	CK 10 - CK 15	En 32 A - En 328	1010 - 1015	150 - 175	81 - 87	51 - 59
C 60	CK 60	En 9	1060	160 - 180	84 - 89	55 - 61
		4360 - 50 A		160 - 180	84 - 89	55 - 61
	17100	3706 - 1.2.3.	ASTMA - 36/68	160 - 180	84 - 89	55 - 61
45 Cr Si 9	17115	4360		160 - 180	84 - 89	55 - 61
		En 20 A		190 - 215	91 - 97	64 - 73
34 Cr Mo 5	17221	970 - 1955	1065	180 - 205	89 - 94	61 - 69
		En 18 B	5135 - 5145	180 - 200	89 - 93	61 - 67
35 Cr Mo 4	34 Cr Mo	En 19 B	4135	200 - 230	93 - 99	67 - 77
	36 Ni Cr 6	En 111	3135	190 - 230	91 - 99	64 - 77
		En 36	3310 - 3315	200 - 230	93 - 99	67 - 77
20 Nc Cr Mo 2		En 362	4315	200 - 225	93 - 98	67 - 75
		En 100 D	8645	190 - 220	91 - 97	64 - 74
	1880 X C 95	DX	W 1	150 - 190	80 - 91	51 - 64
100 Cr 6	100 Cr 6	En 31	52100	210 - 230	96 - 99	71 - 77
		B 2	L 6	190 - 230	91 - 99	64 - 77
52 Nc Cr Mo KU	56 Ni Cr Mo V 7			217 - 248	97 - 102	73 - 83
	2750 (280W18)	18 % W	T 1	217 - 248	97 - 102	73 - 83
		1507 - 825	1310	160 - 220	84 - 91	55 - 64
		A 2	M 13	200 - 230	93 - 99	67 - 77
	210 Cr 46	A 1	D 3	215 - 240	97 - 101	73 - 81
	4845	En 58 G	309 S	150 - 200	80 - 93	51 - 67
X 12 Cr 13	4001	En 56 A	410	150 - 200	80 - 93	51 - 67
X 6 Cr Ni 1810	4301	En 58 E	304	130 - 170	74 - 86	45 - 58
X Cr Ni 1910						
X 8 Cr Ni Mo 1713	4401	1501 - 845	316	160 - 200	84 - 93	55 - 67
Phosphor bronze				60 - 100	56,5	36
Aluminium bronze				70 - 90	49	32
Manganese bronze				95 - 120	51 - 69	34 - 42
Silicon bronze				70 - 100	56,5	36

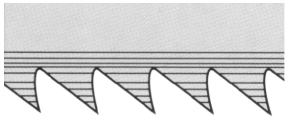
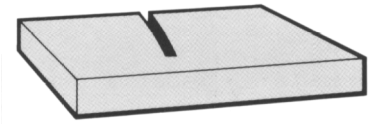
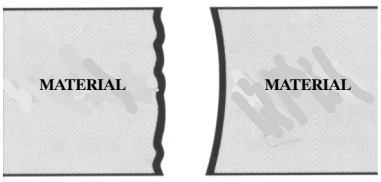
9.2.1 - Steel nomenclature table

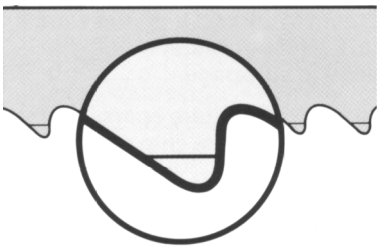
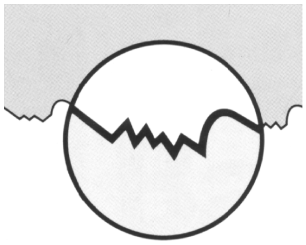
Material	SS Sweden	AISI U.S.A.	DIN Germany	BS Great Britain	UNI Italy	AFNOR France
Carbon steels	1311 1572	1015 - 1035	C 22 - C 35 20 Mn 5 - 28 Mn 6 CK 22 - CK 50	050 A 20 080 M 46 - 50 120 M 19 150 M 28	C 15 - C 35 C 22 Mn C 28 Mn	XC 18 XC 38 H 1 20 M 5
Carbon steels	1650 1880	1040 - 1064 1770 - 1880	CK 60 - CK 101 36 Mn 5 Cm 45 - Cm 55	060 A 40 - 060 A 96 070 M 55 080 A 40 - 080 A 62	C 45 - C 60	XC 60 - XC 75 40 M 5 XC 42 H 1 XC 55 H 1
Alloy steels	2120 2255	1335 - 1345 4130 - 4140	25 Cr Mo 4 - 42 Cr Mo 4	1717 CDS 110 708 A 37 708 M 40	25 Cr Mo 4 - 42 Cr Mo 4	25 CD 4 42 CD 4
Alloy steels	2541 2230 2258	4337 - 4340 50100 - 52100 6145 - 6152 8630 - 8645	40 Ni Cr Mo 6 40 Ni Cr Mo 73 34 Cr Ni Mo 6, 100 Cr 6	735 A 50, 534 A 99 817 M 40 311 tipo 6 e 7	40 Ni Cr Mo 2 - 40 Ni Cr Mo 7 30 Ni Cr Mo 8 - 35 Ni Cr Mo 6 KB 50 Cr V 4, 100 Cr 6	35 NCD 6 50 CV 4 100 C 6
Tool steels	2310 - 12 2754 - 55	D - 2, D - 3	X 210 Cr 12 X 155 Cr V Mo 121	BD 2, BD 3	X 205 Cr 12 KU X 155 Cr V Mo 121 KU	Z 160 CVD 12 Z 200 C 12
Tool steels	2550 2710	S - 1	60 W Cr V 7 55 Ni Cr Mo V 6	BS 1	55 W Cr V 8 Ku 55 Ni Cr Mo V 6	55 NCVD 7
Stainless steels	2324 2333	201, 202 302, 304	X 2 Cr Ni 189 X 5 Cr Ni 189 G - X 2 Cr Ni 189	304 S 15 304 C 12 304 S 12	X 2 Cr Ni 18.11 X 5 Cr Ni 18.10 G - X 2 Cr Ni 19.10	Z 2 CN 18.10 Z 6 CN 18.09 Z 3 CN 19.10
Stainless steels	2343 2353	314, 316 317	X 15 Cr Ni Si 2520 X 5 Cr Ni Mo 1812 X 5 Cr Ni Mo 1713	316 S 16 317 S 16	X 16 Cr Ni Si 2520 X 5 Cr Ni Mo 1713 X 5 Cr Ni Mo 1815	Z 12 CNS 25.20 Z 6 CND 17.12

CHAPTER 10 - Troubleshooting tables

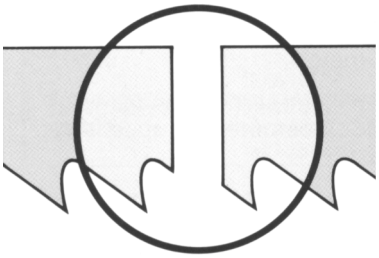
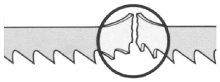
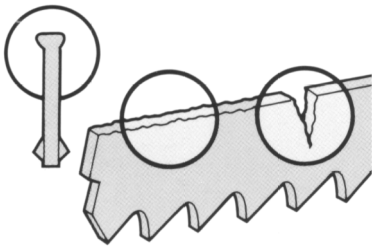
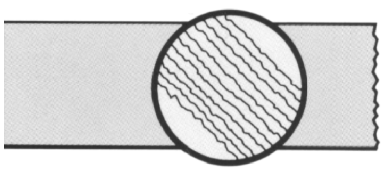
This chapter describes the inspection and troubleshooting procedures for the SHARK 330 AXI-S. Regular inspections and efficient maintenance are essential to ensure your machine gives you a long, trouble-free service life. The chapter is divided into two sections: the first being dedicated specifically to TROUBLESHOOTING BLADE AND CUTTING PROBLEMS, while the second TROUBLE-SHOOTING section concerns troubleshooting general machine operating faults. Taken together they form a comprehensive trouble-shooting guide which will enable you to follow a methodical procedure for solving any problem.

10.1. - Troubleshooting blade and cutting problems

PROBLEM	*PROBABLE CAUSE*	*SOLUTION*
Blade scored or scratched 	Widia inserts chipped or worn	Change them
	Widia inserts loose or tight	Adjust them
	Widia inserts dirty	Clean and set up correctly
Cuts not at 90 degrees or angled 	Headstroke downspeed too fast	Reduce head downstroke speed
	Widia inserts worn	Change them
	Widia inserts loose	Adjust width
	Position of blade guide head incorrect	Move mobile head up to the piece to be cut using the bracket to leave free only that part of the blade actually needed to make the cut.
	Orthogonality of blade to workpiece rest shoulder	Check and re-align the blade guide heads, then adjust the position of the blade so that it is at right angles to the workpiece rest shoulder using the 0° adjuster pin; then set the stops at 45° right and left using the appropriate screws.
	Perpendicularity of blade to work surface	Check and re-align the blade guide heads then adjust the blade using the appropriate screws so that it is perpendicular to the work surface.
	Blade tension incorrect	Set the pressure to 60 Bar.
	Blade worn	Change the blade.
	Tooth pitch unsuitable	You are probably using a blade with too many teeth per inch; use a blade with sparser teeth.
	Cutting speed too low	Increase the cutting speed
	Coolant incorrect	Check the water and oil emulsion; check that none of the holes or hoses are blocked; direct the nozzles correctly.
	Broken teeth	Check the hardness of the material being cut.
Blade path fault (cuts bellied both vertically and horizontally) 	Front flywheel position incorrect	Check the blade is in the correct position on the flywheel. Adjust the position of the flywheel under the blade, moving the shaft of the flywheel.
	Flywheels worn	Change them.
	Gaps full of swarf	Clean inside machine with compressed air.
	Alignment of guides	Check and adjust.

PROBLEM	PROBABLE CAUSE	SOLUTION
Rapid tooth wear 	Teeth pointing in the wrong direction	Fit blade so teeth point in the right direction.
	Blade worn-in incorrectly	With a new blade it is necessary to start cutting at half the cutting and downstroke speeds. The cutting speed and head downstroke speed can be brought up to normal values when this wearing in period has been completed (approx 300 cm2 for hard materials and approx. 1000 cm2 for soft cutting surface materials).
	Material too hard	Check the cutting speed, downstroke speed and pressure on the blade, as well as the parameters of the blade type used.
	Material defective	Surface defects: oxides, sand, surface hardening. Hardened inclusions in section. Reduce the cutting speed and downstroke speed or clean the surface.
	Cutting speed too high	The teeth slide over the material without cutting it: reduce the cutting speed.
	Head downstroke speed too slow	The blade runs over the material without removing it: increase the downstroke speed.
	Insufficient coolant	Check the coolant level and clean the clean the passages, piping and nozzles
	Incorrect fluid concentration	Check and use the correct concentration.
	New blade inserted in a partially completed cutl	The surface of the cut may have undergone a local thermal alteration, making it harder: use a lower cutting speed and head downstroke speed when starting work again. A tooth from the old blade may be left in the cut: check and remove before starting work again.
	Vibration	Blade tension too low: increase. Tooth shape or pitch unsuitable; change the type of blade being used. Widia blade steady buttons too far from the back of blade: adjust the blade guide heads, rotating them a small amount to bring them closer to the back of the blade.
Teeth broken 	Cutting speed too high	Reduce the cutting speed.
	Head downstroke speed too fast	Reduce the head downstroke speed.
	Cutting pressure too high	Check the pressure and set it to the correct value.
	Tooth pitch unsuitable	Teeth too close: change the blade for one with teeth further apart.
	Tooth reliefs full of swarf	Check the blade-cleaning coolant jets. Check the blade-cleaning brush.
	Swarf welded to teeth and in reliefs	Check the blade-cleaning coolant jets. Check the blade-cleaning brush. If the swarf is not removed from the blade it will be drawn back into the cut and weld to the teeth, causing them to break.
	Material defective	The material may have altered areas on the surface, such as oxides or sand, and in the section, such as subcooled inclusions. Being much harder than the blade, areas like this can cause broken teeth: scrap or clean any materials with these problems.
	Workpiece not clamped firmly in place	Any movement of the workpiece during cutting can cause broken teeth: check the vice, jaws and clamping pressure.

PROBLEM	PROBABLE CAUSE	SOLUTION
(continued)	The blade stops in the cutl	Cutting pressure too high: check the pressure and set to the rated pressure. Head downstroke too fast: reduce it. Cutting speed too low: increase it. The blade slips on the flywheels: either the flywheels are worn and therefore need to be replaced, or the blade tension is incorrect (too low) and should therefore be set back to the correct value.
	New blade inserted in a partially completed cut	The surface of the cut may have undergone a local thermal alteration, making it harder: when starting work again, use a lower cutting speed and head downstroke speed. A tooth from the old blade may be left in the cut: check and remove before starting work again.
	Widia inserts positioned incorrectly	Adjust the position of the inserts, particularly the width, since blade thicknesses can exceed the manufacturer's declared tolerance values.
	Widia blade steady buttons	The two widia buttons which press on the back of the blade to transmit the cutting pressure are located in the top part of the blade guide heads. If these buttons are too far from the blade, the blade itself may suffer from an up and down undulating movement or abnormal vibration, liable to cause broken teeth: adjust the position of the heads, rotating them downwards to bring the blade steady buttons up against the back of the blade.
	Sections with large variations in thickness	The cutting speed and downstroke speed must be chosen to suit the most critical part of the cut.
	Blade worn-in incorrectly	With a new blade it is necessary to start cutting at half the cutting and downstroke speeds. The cutting speed and head downstroke speed can be brought up to normal values when this wearing in period has been completed (approx. 300 cm2 for hard materials and approx. 1000 cm2 for soft cutting surface materials).
	Vibration	Blade tension too low: increase. Widia blade steady buttons too far from the back of the blade: adjust the blade guide heads, rotating them a small amount to bring them closer to the back of the blade.Workpiece vibrates in the vice: check gib has been adjusted correctly; check clamping pressure and adjust if necessary.
	Insufficient coolant	Check the coolant level and clean the passages, piping and nozzles.
	Incorrect fluid concentration	Check and use the correct concentration.
	Teeth pointing in the wrong direction	Fit blade so teeth point in the right direction.
	Blade tension too high or too low	Check and set to rated values.
	Blade worn in incorrectly	With a new blade it is necessary to start cutting at half the cutting and downstroke speeds. The cutting speed and head downstroke speed can be brought up to normal values when this wearing in period has been completed (approx. 300 cm2 for hard materials and approx. 1000 cm2 for soft cutting surface materials).

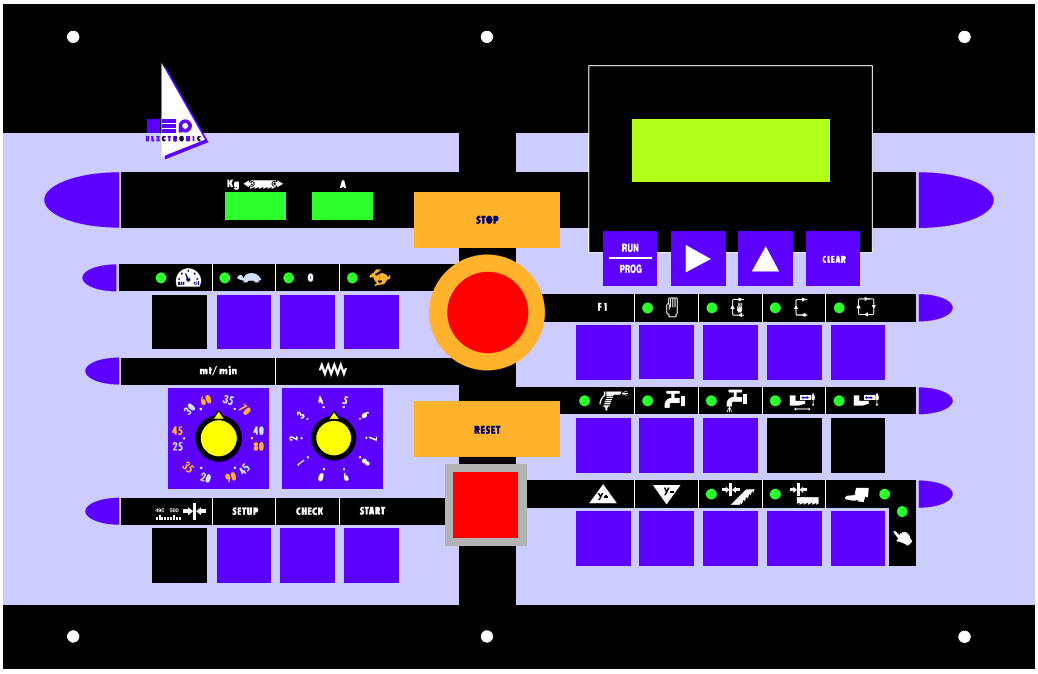
PROBLEM	PROBABLE CAUSE	SOLUTION
Blade broken 	Cutting speed too high	Reduce the cutting speed
	Head downstroke too high	Reduce the head downstroke speed
	Cutting pressure too high	Check the pressure and set back to the correct value
	Tooth pitch unsuitable	Teeth too close together: change the blade for one with teeth spaced further apart.
	Workpiece loose 	The blade may break if the workpiece moves during cutting: check the vice, jaws and clamping pressure.
	Widia inserts positioned incorrectly	Adjust the position of the inserts, particularly the width, since blade thickness can exceed manufacturer's declared tolerance values.
	Widia blade steady buttons	Can have a milling action on the back of the blade if worn or chipped, causing cracks from the back towards the teeth.
	Position of blade on flywheels incorrect	The blade may be scraping on the edges of the flywheels: this problem is generally caused by blades which are deformed or have been welded incorrectly (conical). Adjust the position of the front flywheel by moving the pin or change the blade.
	Blade tension incorrect	If the blade tension is too high or too low, the blade will be subjected to abnormal stress: set the tension back to the rated value.
	Blade weld fault	The point where the blade is welded is its most critical point; problems could be caused by welds which are not aligned perfectly, or have inclusions or blowholes.
	Blade guide head free	The head is too far away from the piece: move it up using the bracket so as to leave free only that part of the blade actually needed to make the cut.
	Teeth in contact with the material before starting the cut	Always check the position of the blade before starting a new job, especially when in the semiautomatic work cycle.
	Widia inserts	If worn, can score blade so badly that it breaks. If they are too far apart, the blade will whip both against the inserts and the material. Change or adjust.
	Insufficient coolant	Check the coolant level and clean the passages, piping and nozzles.
	Incorrect fluid concentration	Check and use the correct concentration.
	The blade stops in the cut	Cutting pressure too high: check the pressure and set to the rated pressure. Head downstroke speed too fast: reduce it.Cutting speed too slow: increase it. The blade slips on the flywheels: blade tension is incorrect or low, set to correct level or increase.
Cutting surfaces scored 	Blade teeth worn	Change the blade.
	Head downstroke speed too fast	Reduce the downstroke speed.
	Cutting speed too slow	Increase the cutting speed.
	Blade teeth too wide	Change for blade with narrower teeth.
	Free blade guide head too far away	Move the blade guide head closer so as to leave free only that part of the blade actually needed to make the cut.
	Blade tension low	Set the tension to its rated value.
	Blade teeth broken	Check and change the blade.

10.2 - Troubleshooting (diagnostic with command console)

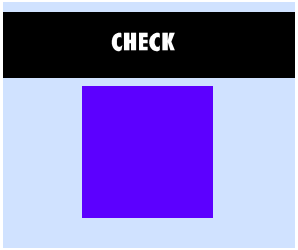
This section deals with the problems which may occur during machine operation. The MEP 23 controller allows you to test all the machine's electric and electronic devices by checking the status of the input and output signals on the IUD/IUV card.

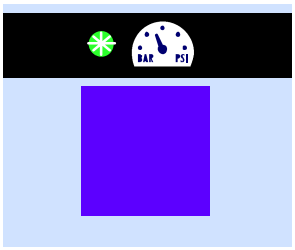
Displaying the diagnostics menu

▶ Power up the machine by rotating the main switch on the left hand side of the base.



▶ Sequentially and simultaneously press the CHECK and BAR/PSI keys to enter the machine diagnostics.

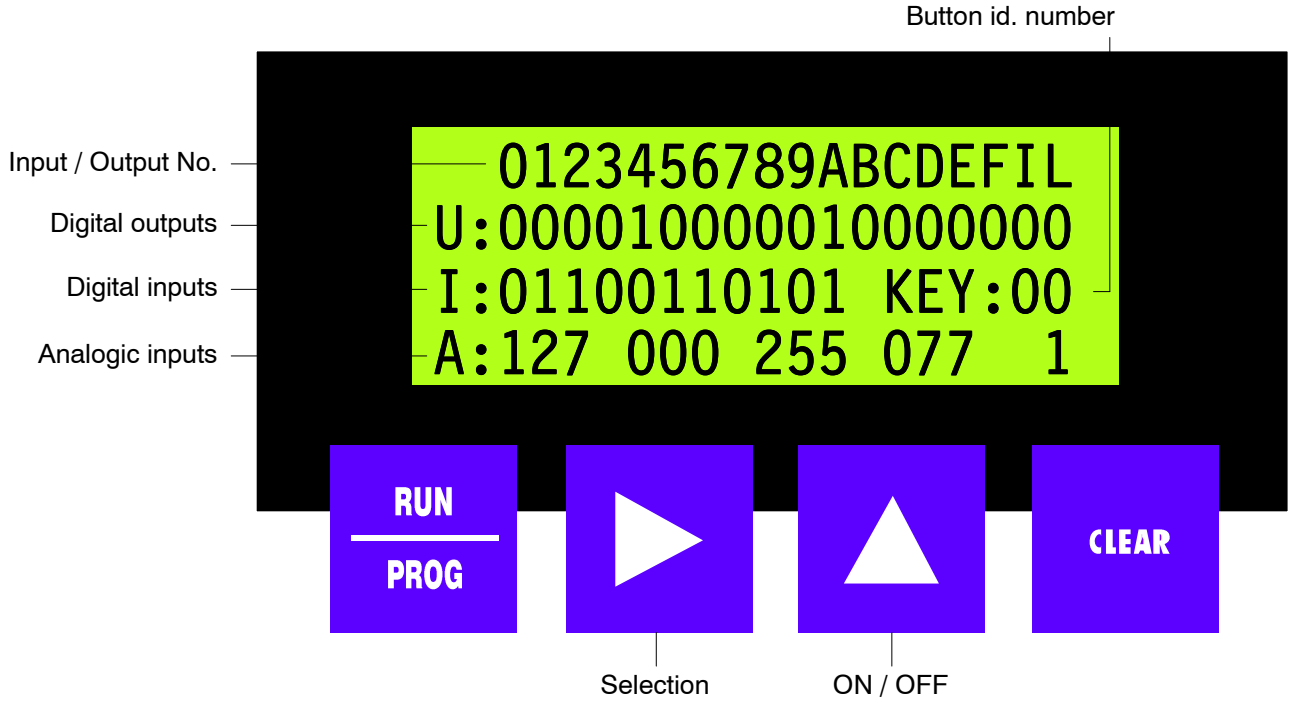




▶ Press RESET button to activate functioning of outputs.

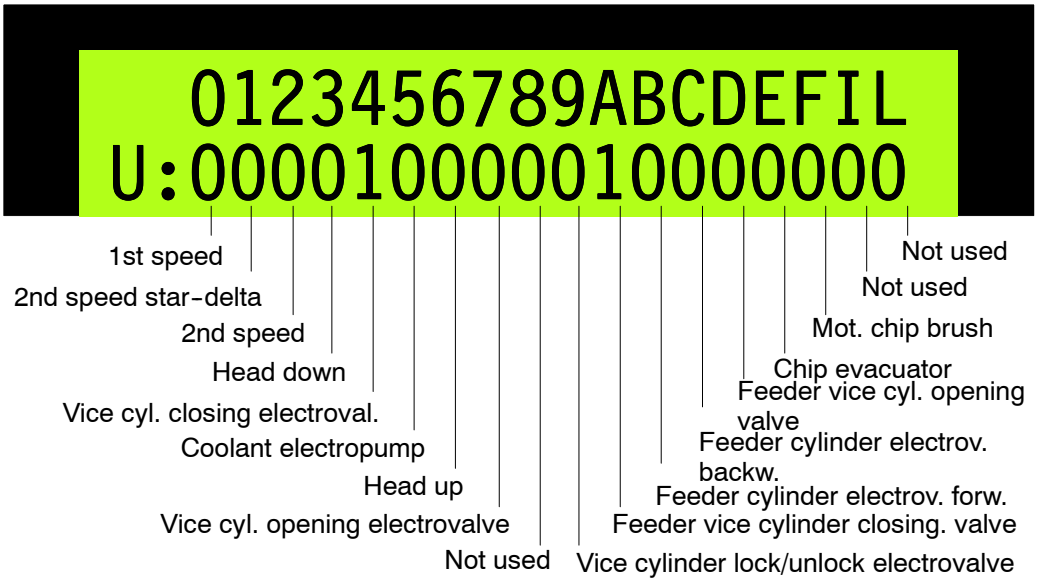
Diagnostics

Once you have entered the diagnostics menu, a set of digits, each corresponding to an INPUT or OUTPUT signal on the MEP 23 controller, is displayed.



List of DIGITAL OUTPUTS IUD-IUV board

The IUD/IUV card is mounted on the electrical panel inside the machine base. Hereunder we list signals relative to digital outputs:



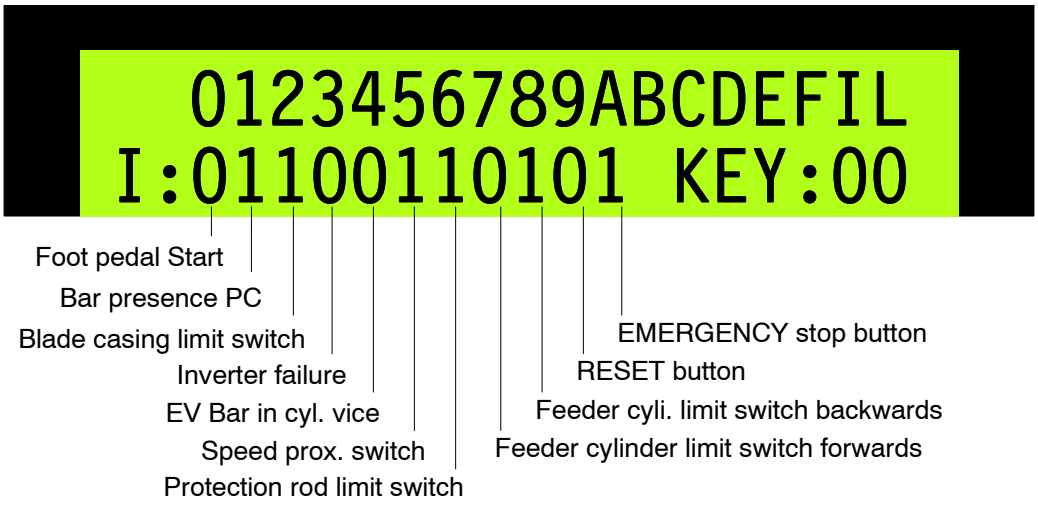
▶ Digits 0 and 1 indicate the OFF (0) or ON (1) status of each output.

At this point, by pressing Selection button ▶, then button ▲, we can check their functioning.

Important!

When you check functioning of 2nd speed, **it's very important** to set the Star-Delta contactor to ON (1), then the button relative to the 2nd speed.

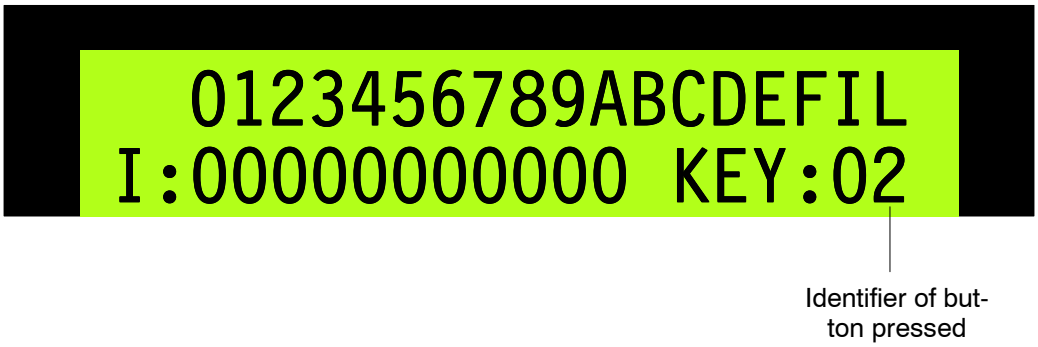
List of DIGITAL INPUTS IUD-IUV board



▶ Digits 0 and 1 refer to OFF (0) or ON (1) status of every single input; by activating or releasing devices relative to inputs, their functioning can be checked.

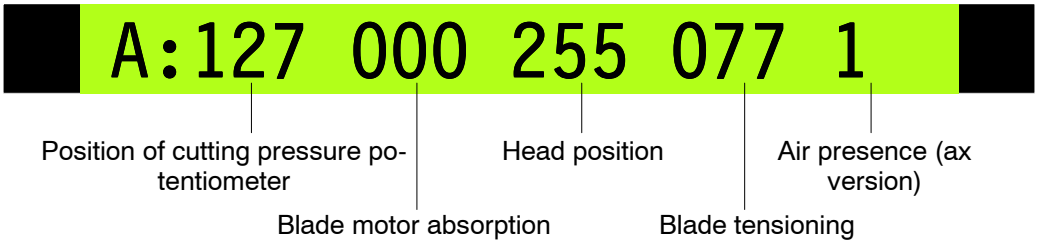
Checking of control console of the keypad

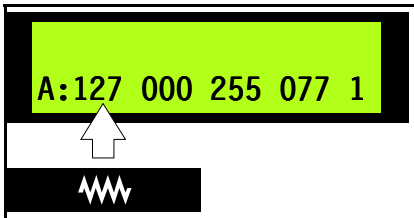
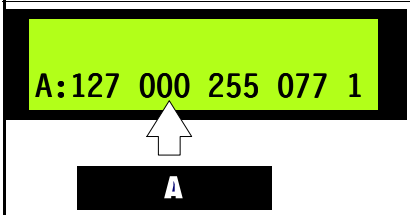
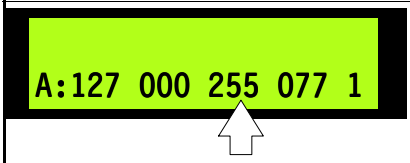
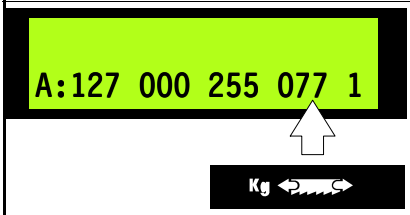
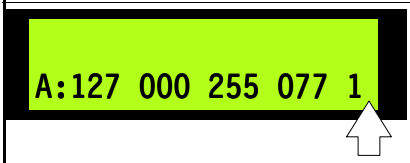
Every single button of the console has an identification number which appears, in diagnostic screen, after the word ”KEY”, when we press it. For instance, if you press the button relative to the 2nd speed (RABBIT button), next to the word “KEY” the digit 02 will appear:



if value KEY doesn’t change by pressing RABBIT button, the cause can be due to console button which doesn’t work properly; when such button is closed, it doesn’t conduct electricity.

List of ANALOGIC INPUTS IUD-IUV board



 Position of cutting pressure potentiometer	**POTENTIOMETER FOR CONTROLLING STEP MOTOR (SERVOVALVE OF CUTTING HEAD CYLINDER)** This value of diagnostic allows to check if the fault is due to the potentiometer, wiring or problems of the IUV board. To carry out checking, rotate the potentiometer and verify if the number composed by three digits changes when regulator position changes.
 Blade motor absorption	**AMMETER TRANSFORMER FOR CHECKING BLADE MOTOR ABSORPTION** If the display of blade motor absorption doesn't visualise the current values any longer, it's possible to check if the fault is relative to "AMMETER TRANSFORMER", to visualisation, to wiring, or to input of IUV board.
 Head position	**POTENTIOMETER OF HEAD CYLINDER TRANSDUCER (CUTTING HEAD POSITION)** If, by moving the head upwards or downwards, the value visualised doesn't change, you can check if the problem is due to the transducer potentiometer, to connections or to problems of the IUV. Move the head manually and check that the value changes on the display.
 Blade tension	**STRAIN GAUGE FOR BLADE TENSIONING TRANSDUCER (ELECTRONIC BLADE TENSIONER)** In case, by rotating blade tensioning handwheel, blade tensioning value doesn't give any indication, you can check if the problem is due to tensioning device, to visualisation, or to IUV board. So as to be able to carry out checking, tension and release the blade and verify if the value changes on the display.
 Air presence	**PRESSURE SWITCH FOR SURVEYING PRESENCE OF COMPRESSED AIR (AX VERSION)** To reduce dangerous situations, if there's absence of air, a pressure switch inhibits all machine functions, safeguarding safety of operator from residual risks. If the visualised vale is 0 (OFF), it means that there's no pressure or that compressed air is disconnected.

10.3 - Error messages

This section covers the finding of faults or inconveniences that could arise during operation of your SHARK 330 AXI-S.

EMERGENCY
EMERGENCY STOP PRESSED

PRESS RESET

The EMERGENCY BUTTON message is given when an operation is started without having cancelled the emergency stop, restore to normal and press reset.

EMERGENCY
FEEDER JAMMED

PRESS RESET

The cause of this feeder malfunction could be mechanical, electrical or electronic.
Press reset to regain control of the manual commands.

CHECK:
1) FOR MECHANICAL JAMS
2) FEEDER FWD LIMIT
3) THE CONNECTIONS

EMERGENCY
FEEDER COVER OPEN

PRESS RESET

This message usually occurs when new material is being introduced.
Press reset to regain control of the manual commands.

CHECK:
1) THE FEEDER COVER IS CLOSED
2) THE SAFETY STROKE LIMIT
3) INPUT 4 ON MEP 18
4) THE CONNECTIONS

EMERGENCY
BLADE NOT TENSIONED

PRESS RESET

The problems regarding blade tension could be mechanical, electrical or electronic.
Press reset to regain control of the manual commands.

CHECK:
1) THE BLADE TENSION - 2) THE BLADE GUIDES
3) THE TENSIONER SLIDE MOVEMENT
4) THE BLADE PULLEY ALIGNMENT
5) THE STRAIN GAUGE IUV INPUT
6) THE BLADE$S CONDITION - 7) THE CONNECTIONS

EMERGENCY
BLADE COVER OPEN

PRESS RESET

This message usually occurs when the blade is being replaced.
Press reset to regain control of the manual commands.

CHECK:
1) THE BLADE COVER IS CLOSED
2) THE SAFETY STROKE LIMIT
3) INPUT 3 ON MEP 18
4) THE CONNECTIONS

EMERGENCY
BLADE JAMMED IN CUT

PRESS RESET

This type of problem is mainly linked to the use of the machine and choice of the wrong tool.
Press reset to regain control of the manual commands.

CHECK:
1) THE CUTTING SPEED
2) THE HEAD DOWN SPEED
3) THE PROXIMITY INPUT 2 - IUD
4) THE PIECE IS PROPERLY CLAMPED

EMERGENCY
INVERTER BLOCKED

PRESS RESET

This control is always in line whenever the system is used.
Press reset to regain control of the manual commands.

CHECK:
1) THE INVERTER CONTACTOR
2) THE INVERTER PHASES AND VOLTAGE
3) THE BLADE MOTOR PHASES AND VOLTAGE
4) INPUT 8 ON IUD CARD
5) THE 1.2 CS MOTOR CONTACTOR
6) THE CONNECTIONS

EMERGENCY
HEAD JAMMED

PRESS RESET

This control is always in line whenever the system is used.
Press reset to regain control of the manual commands.

CHECK:
1) MECHANICAL BLOCKS
2) VALVE ACTUATOR
3) VALVE ACTUATOR CONTROL
4) PNEUMATIC CIRCUIT

ENDS CUTS

PRESS RESET

This message is given when the machine has completed the automatic cutting cycle.
It advises the operator that the cycle is finished.
Press reset to regain control of the manual commands.

END OF BAR

PRESS RESET

This message is given when the bar has run out during a normal automatic cutting cycle.

It warns the operator that the material has run out.
Press reset to regain control of the manual commands. Having introduced a new bar, press start and the programme will continue form where it was interrupted.

COMMAND INHIBITEDHEAD NOT AT FCTI **PRESS RESET** This occurs when START is pressed without the heat in the FCTI position. Move the head to the FCTI before starting the cycle.	**COMMAND INHIBITEDMEASURING CYLINDERNOT LOCKED** **PRESS RESET**  This message is given when START is pressed without locking the feeder$s measuring cylinder. Lock the feeder cylinder with the appropriate key and then press START.
COMMAND INHIBITEDCUTTING SPEEDNOT SELECTED **PRESS RESET**  This message is given when START is pressed before selecting a cutting speed or inverter range. Select a speed.	**COMMAND INHIBITEDTWO OR MORE COMMANDS** **PRESS RESET** This message is given when two commands are pressed simultaneously, just press RESET to restore control of the console.
MEMORISATION ATTEMPTFCTI UNDER FCTAFCTA ABOVE FCTI **PRESS RESET**  This message is given when the cutting limits are changed. It may occur that the start cut position is found below the previous end cut position. Both values settings be changed.	**MEASURING CYLINDERLOCKING IN EXECUTION**  This message is given when the measuring cylinder is being locked with the appropriate button. After about 1 sec. the previous screen is restored.
MEASURING CYLINDERUNLOCKING IN EXEC.  This message is given when the measuring cylinder is unlocked by the appropriate button. After about 3 sec.'s the previous screen is restored.	**STOCKFEED REQUEST** **PRESS RESET** This message appears when the head does not reach the head rise limit.
CUT-OFF OVERABSORPTION BLADE MOT **PRESS RESET** This message is given when an excessive cutting force causes the motor to exceed the absorption limit. The system automatically shuts the head down regulator (to zero).	**MEASURING FAILED** **PRESS RESET** CHECK: 1) CONTROL SET-UP 2) ENCODER FAILURE 3) IUV INPUTS 4) SIGNAL TRANSMISSION OR RECEPTION This message is linked to the feeder Encoder (optional) and signals that the console is not receiving the encoder impulses. If necessary, exclude the encoder through the system set up and reset.


MEP