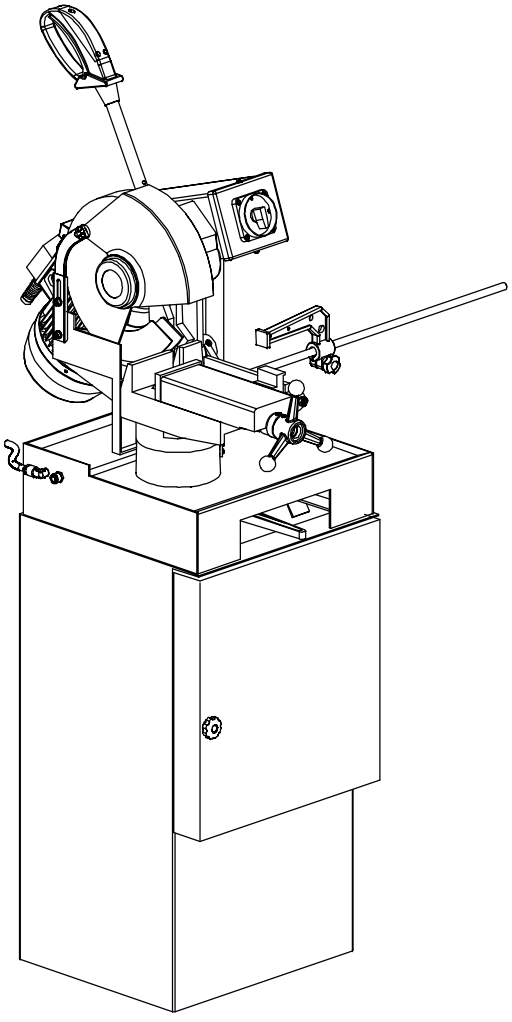
USE AND MAINTENANCE MANUAL

EN P 250

YEAR OF MANUFACTURE: _____



PREFACE

The machine **P 250** is a pendulum bench sawing machine for cutting metals.
The operation of the machine is manual: after clamping the material in the vice, the operator selects the cutting speed from the control panel, thus starting the disc and the lubrication and cooling system; the head is moved downwards manually by the operator using the head control lever so as to control the cutting of the material. Once the cut is complete, the cutting head is returned to position ready for a new cutting cycle.

TECHNICAL DATA

P 250	UNIT	VALUE
DISC BLADE		
External disc diameter for light hollow sections / hollow sections / solid bars	mm	250 / 225
Internal hole diameter	mm	32 / 32
Blade thickness	mm	2 / 1.9
CUTTING SPEED		
Speed 1 three-phase	rpm	45
Speed 1 single-phase	rpm	45
POWER AND CONSUMPTIONS		
Head spindle motor 1 speed three-phase	KW	0.9
Head spindle motor 1 speed single-phase	KW	0.5
Lubricant/coolant electric pump motor	KW	0,045
Maximum electrical installed power	KW	0.945
Oil for lubricant/coolant (conc. 5-6%)	capacity lt	4.5
Oil for transmission box	capacity lt	0.4

INTRODUCTION

This working tool has been designed to provide a simple and reliable solution to the various needs of workshops and factory departments that work with metals.
The **P 250** is a pendulum sawing machine that can perform cuts angled by 45° to the left. This capability, together with its high cutting capacity, makes the P 250 an extremely versatile and economic machine.

We congratulate you on your choice of the **P 250** 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:

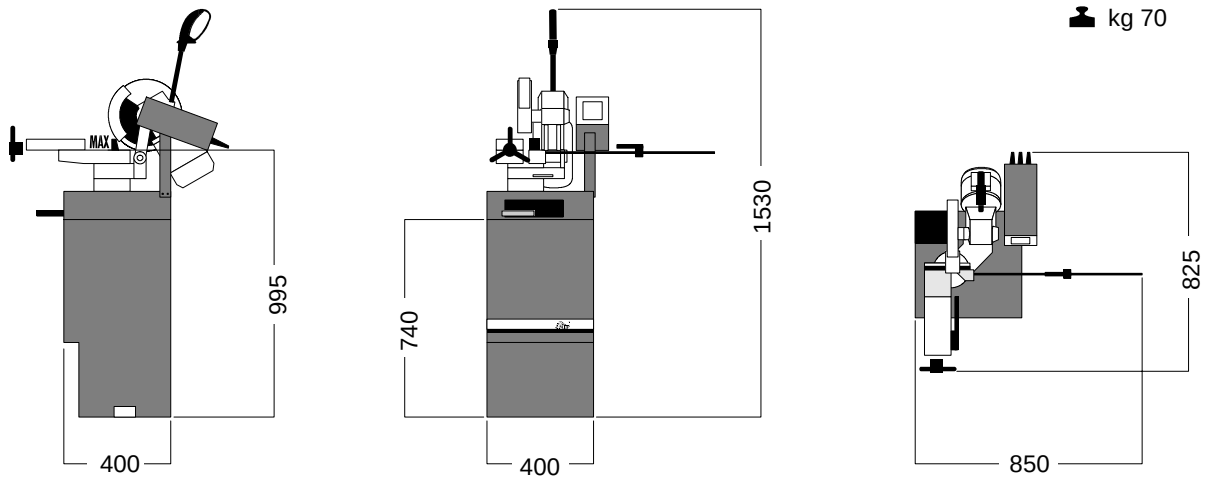
The anodised aluminium name plate is rivetted on the side of the machine.

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

HYD·MECH *The Rock Solid Solution*

model	**HYD-MECH**				
air pressure	bar		*oil pressure*	bar	
data code	– – – –				
1 PH	V	A	3 PH	V	A

DIMENSIONS:



CUTTING CAPACITY FOR HOLLOW SECTIONS OF THICKNESS < 5 mm:

Cross-section	Blade diameter	○	□	▭
0 degrees	**250**	70	60	90 x 50
45 degrees left	**250**	65	55	70 x 45

CUTTING CAPACITY FOR HOLLOW SECTIONS OF THICKNESS FROM 6 TO 10 mm AND SOLID BARS:

Cross-section	Blade diameter	■	▯
0 degrees	**225**	30	20 x 40
45 degrees left	**225**	20	20 x 30

Max vice opening: 100 mm.

DISC BLADE:

Dimensions: **HSS 250 x 32 x 2 mm** for hollow sections of thickness between 1 and 5 mm.
Dimensions: **HSS 225 x 32 x 1.9 mm** for hollow sections of thickness between 6 and 10 mm and for solid bars.

Cutting speed: standard 45 rpm.

SPINDLE MOTOR:

Spindle motor: asynchronous three-phase 4 poles; 50 Hz.
Characteristics:

	Voltage Volt	Absorption Amp.	Power kW	rpm
4 poles	230	2.8	0.9	1.400
4 poles	400	2	0.9	1.400

Stator winding in enamelled copper class H 200 °C;
Insulation class F (temperature limit T_L=155°C);
Example of class F insulation: in air-cooled machines at ambient temperature of 40°C (in accordance with CEI 2-3 and IEC 85), the allowable overtemperature is 100°C (where 100°C represents the allowable Δ T).
Protection rating IP54 (total protection against contact with live parts and against water sprayed from all directions).
Complies with CEI standards publication IEC 34 of 1st July 1985.

EXTRACTOR MOTOR (OPTIONAL):

Submerged electric pump for coolant/refrigerant fluid: single phase 48 Volt; 50 Hz.
Characteristics:

Voltage Volt	Absorption Amp.	Power watt	rpm
24	2.67	45	2.600

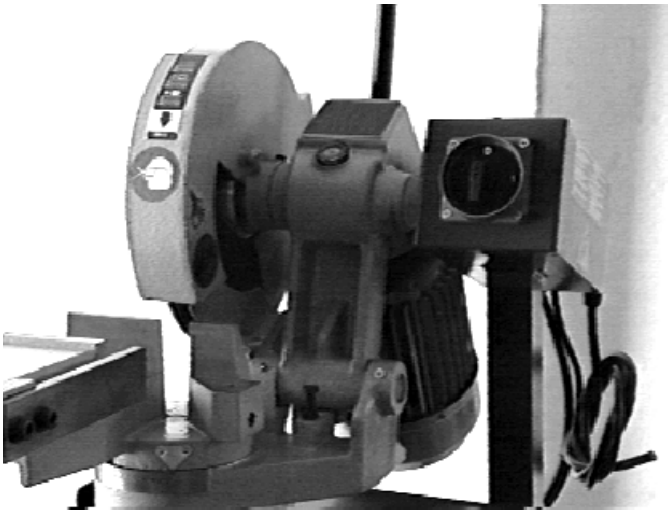
Complies with CEI Standards publication IEC 34 of 1 July 1985.

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.

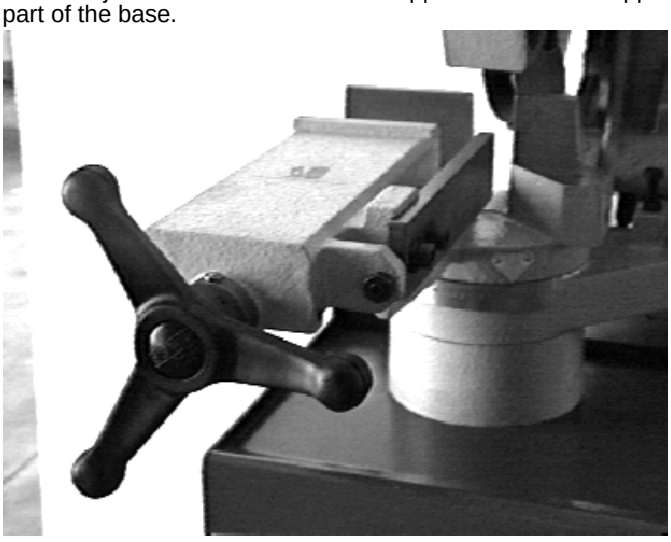
1.1 – Cutting head

The cutting head is the unit that actually performs the cut and consists of a cast iron section on which the following parts are mounted: the disc, the disc support units, the drive transmission unit and the spindle motor. The cutting head is fixed to the turntable by means of a hinge and performs a downward travel to cut the material. The upward and downward movements of the head are controlled manually by the operator.



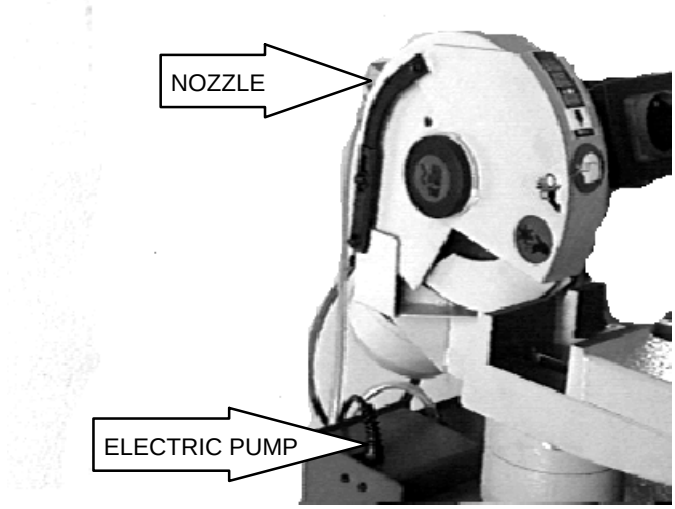
1.2 – Vice

The cutting vice is the unit that clamps the material during the cut. It consists of a vice support, on which the slide with the mobile jaw and fixed jaw are mounted. The vice support is fixed to the upper part of the base.



1.3 – Lubricant/coolant system

The lubricant/coolant system consists of a submerged electric pump located inside the base and an outflow nozzle fixed to the blade protective cover.



CHAPTER 2 - Safety and accident prevention

The **P 250** 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 **P 250** pendulum circular saw is designed to cut exclusively metal profiles. **Other types of materials and machining are not compatible with the specific characteristics of the machine.**

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

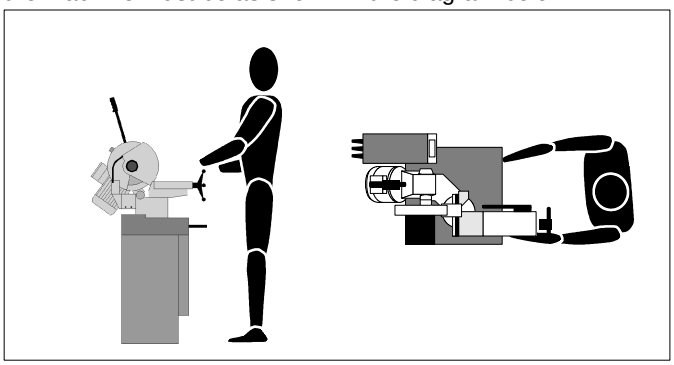
Check that the power supply cables and pneumatic feed system comply with the maximum machine absorption values listed in the "Machine Specification" tables; replace if necessary.

EARTHING SYSTEM

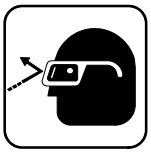
The installation of the earthing system must comply with the requirements of **IEC Standard 204**.

POSITION OF THE OPERATOR

The position of the operator controlling machining operations on the machine must be as shown in the diagram below.



2.3 – Advice for the operator



Always wear proper goggles or protective glasses.

Do not use the machine without the guards in position. Replace the polycarbonate windows , if subject to corrosion.

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.

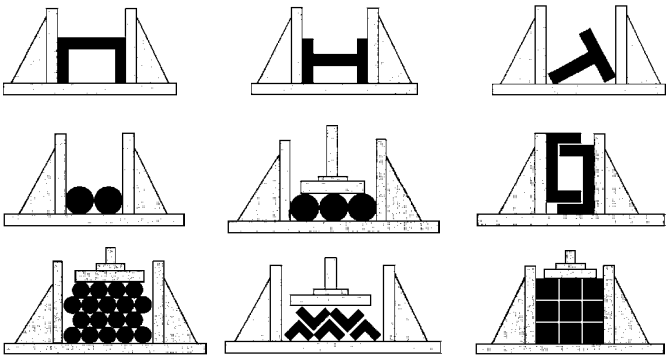
Before starting to cut, support the material adequately on both sides of the machine. Before removing the devices supporting and moving the material, fasten the latter in place using the machine's clamping devices or other suitable equipment.

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 for cutting pieces which exceed the cutting capacity described in the technical specifications or are less than 5mm

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 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 disc seizes while cutting, turn the machine off immediately. If it is difficult to free the disc, open the vice slowly, remove the workpiece and check that the disc or the teeth are not broken. If they are, replace the disc.

Before carrying out any repair works on the machine, consult the 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 P 250 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 No. 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.

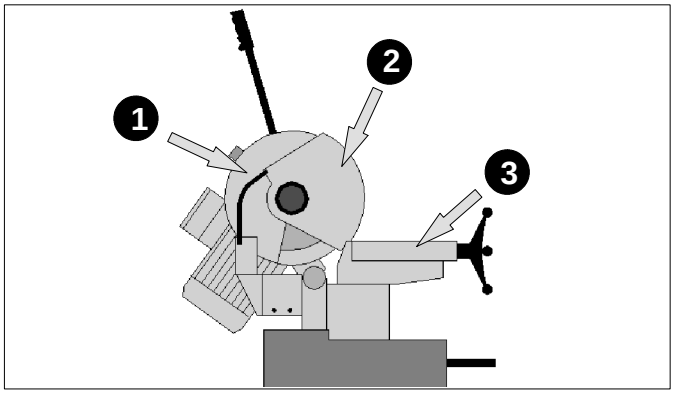
PERSONAL PROTECTION

- *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 Metal disc cover fixed to the cutting head;
2 mobile disc guard fixed to the cover and the lead nut body so as to ensure that the blade is covered and the only part of the disc exposed is that used for the actual cutting in accordance with DPR 547/55 art. 108;
3 vice with rag prevention device and double workpiece clamping to ensure optimum fixing of the material.

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 electrical parts restricted by screws;
- ❑ earthing of all parts the operator may come into contact with either during work or accidentally;
- ❑ power cut–out device constructed with a socket plug in accordance with 5.3.2 sub–section C.

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 **P 250** 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, UNI EN ISO 4871 (1998).**

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	P 250
Reference standard	ISO 3746

Results		
Test 1	**Description**	50x15 mm pipe in FE37 steel Disc blade HSS–DMO5 0 225 T6
	Results	**MEAN SOUND LEVEL (L_{eq}) 100.82 dB (A)** Environmental correction (K) 2.78 dB(A) Peak sound power (Lw) 111.16 dB(A)
Test 2	**Description**	35 mm Ø solid tube in FE37 steel. Disc blade HSS–DMO5 0 225 T6
	Results	**MEAN SOUND LEVEL (L_eq) 92.24 dB(A)** Environmental correction (K) 2.78 dB(A) Peak sound power (Lw) 101.98 dB(A)
Test 3	**Description**	20 mm Ø solid tube in FE37 steel. Disc blade HSS–DMO5 0 225 T6
	Results	**MEAN SOUND LEVEL (L_{eq}) 89.12 dB(A)** Environmental correction (K) 2.78 dB(A) Peak sound power (Lw) 97.85 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 70/23/CEE and 98/37/CEE. 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 P 250; Test report no. 061200.

2.6.1 - Emissions

❍ CEI EN 61000-6-4 (2002) Electromagnetic Compatibility (EMC) - Generic standard regarding emissions. Part 6-2: 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 (2002) 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	66 – 56 (linear reduction with log of frequency) 56 60	56 – 46 (linear reduction with log of frequency) 46 50	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

❍ CEI EN 61000-6-2 (2000) Electromagnetic Compatibility (EMC) - Generic standard on immunity. Part 6-2: Industrial Environment.

The EUT is deemed to fulfil the immunity requirements without testing, because it contains no electonic control circuitry.

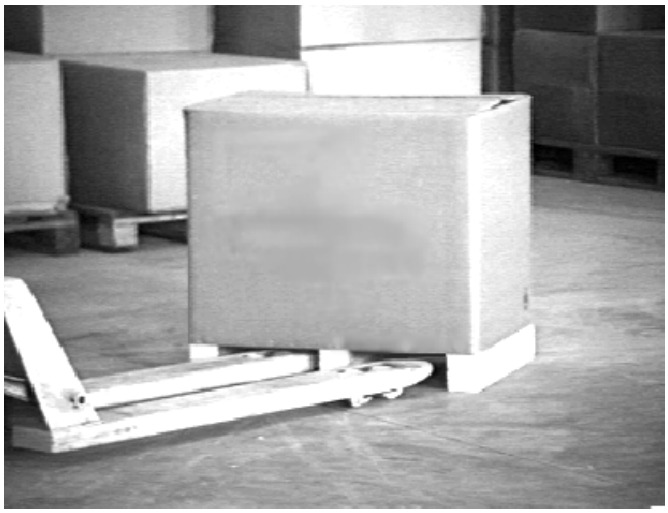
CHAPTER 3 - *Installation of the machine*

3.1 – Unpacking the machine

Hyd–Mech use packing materials that guarantee the integrity and protection of the machine during its transport to the customer.

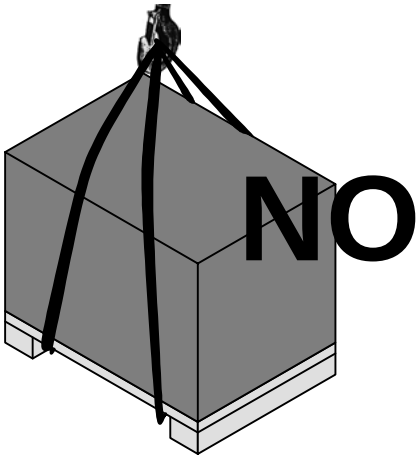
The type of packing differs according to the size, weight and destination. As a consequence, the customer will receive the machine in one of two following ways.

- packaging with pallet, straps and cardboard box with lid.



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 all the accessories, whether standard or optional, supplied with it. The basic version of the P 250 1–SPEED sawing machine is supplied complete with:

- pedestal with coolant liquid tank and turntable locking system;
- 48 V electric pump for the lubrication and cooling of the disc;
- head control lever;
- mobile guard to cover the part of the blade not being used for the cut;
- vice with rag prevention device and double workpiece clamping;
- option of performing cuts from 0° to 45° left;
- 1–speed electric motor;
- bag of accessories.

The bag of accessories is enclosed in the machine before it is packed and contains:

- 4 and 5 mm Allen keys;
- 13 mm open–end wrench;
- 19 mm open–end wrench;
- 20 mm diam. rod for cuts to measure with an 8 mm diam. ratchet fork and lever and VCE M8x35 Allen grub screw;
- this use and maintenance manual.

OPTIONAL

ACCESSORIES AVAILABLE ON REQUEST:

- metal pedestal with drawer;
- HSS DMo5/M2 D.250x32x2 circular blade for hollow sections;
- HSS DMo5/M2 D.225x32x1.9 circular blade for hollow sections and solid bars;
- 5 l 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.

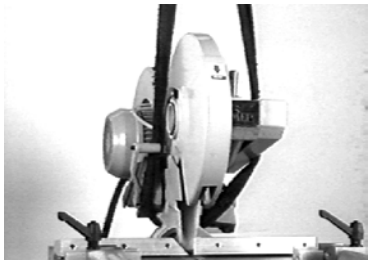
WARNING!

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%.

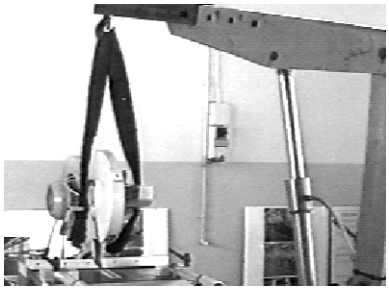
3.4 – Handling the machine

If the machine has to be moved from its seat, use a fork lift truck if the machine is mounted on a pallet or webbing and a crane if the machine is on the ground:

to lift and move the saw with belts, harness the machine as shown in the figure, right;



hook the belts to the lifting hook, making sure that the machine does not tilt.



3.5 – Connection to the power supply

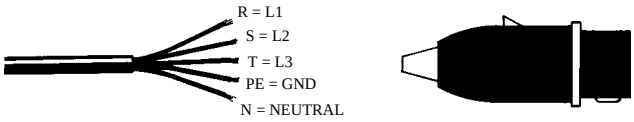
Before connecting the machine to the power supply, check that the socket is not connected in series with other machines. This requirement is fundamental for the good operation of the machine.

To connect the machine to the power supply, proceed as follows:

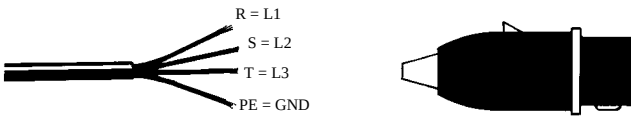
1 – connect the power supply cable of the machine to a plug which matches the socket to be used (EN 60204–1 § 5.3.2)

2 – Insert the plug in the socket, ensuring that the mains voltage is the same as that for which the machine has been setup.

*CONNECTION FOR "**5-CORE**" WIRE SYSTEMS WITH NEUTRAL*

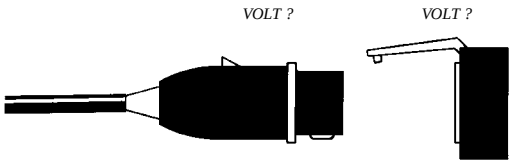


*CONNECTION FOR "**4-CORE**" WIRE SYSTEMS WITH NEUTRAL*



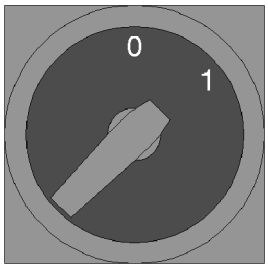
WARNING!

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.**

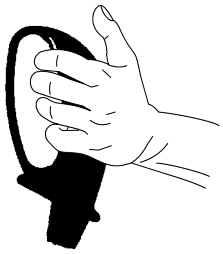


3 – Check that the motor turns in the correct direction. To do this, proceed as follows:

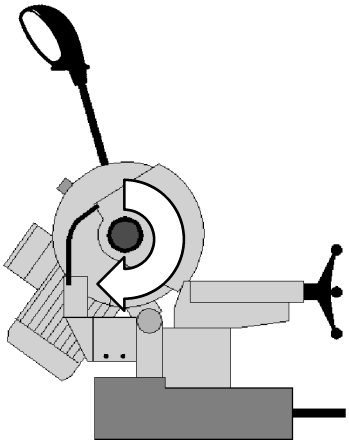
a) select 1 on the polarity switch located on the control panel.



b) Operate the jog pushbutton on the manual head control lever



c) if all the above operations have been carried out correctly, the blade motor will now start up and the disc will start to turn.



Make sure that the disc turns in the correct direction as shown in the above diagram. If it does not, simply reverse two of the phase wires on the machine's power supply input.

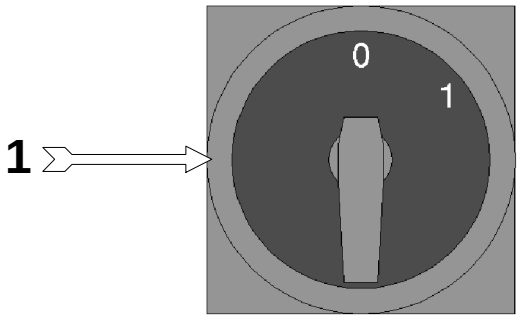
The sawing machine is now ready to start the work for which it was designed. Chapter four provides a detailed description of the various functions of the machine and its operating cycles.

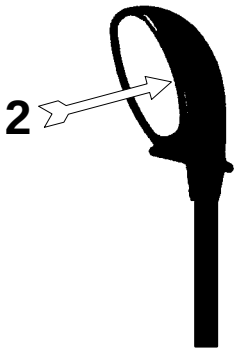
CHAPTER 4 - *Description of machine operation*

This chapter analyses all the machine's functions. We shall therefore start with a description of the pushbuttons and other components on the control panel.

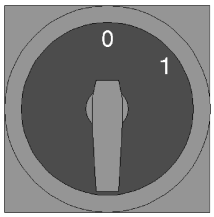
4.1 – Description of the control panel

The figure below show the components that make up the control panel of the P250;



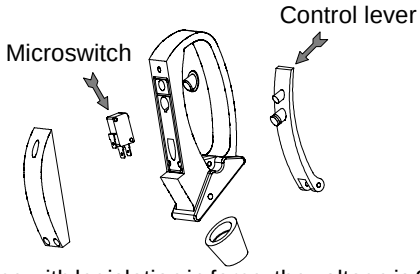


1 – SPEED SWITCH



On the small control panel the machine has a main switch which, when turned to the 1 position, provides electrical power to the machine.

2 – HEAD CONTROL LEVER MICROSWITCH

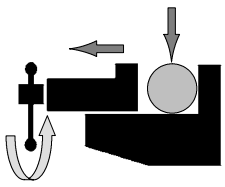


In accordance with legislation in force, the voltage is 24 V and the microswitch is assembled in an enclosure (blue handle) isolated from external agents such as dust and moisture to an IP 55 protection rating.

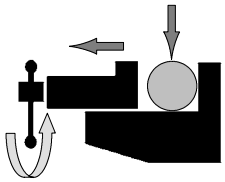
4.2 – Manual cycle

Sequence of operations for making a cut with the manual cycle:

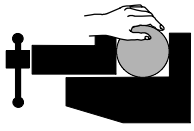
1) Connect the machine to a suitable electric power point (see chapter 3);
2) position the material in the vice and calculate the length of the cut (using the rods for cuts to measure).



3) Clamp the workpiece in the cutting vice.

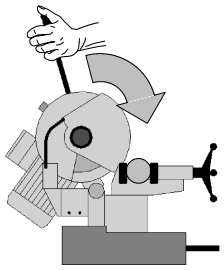


4) Make sure the workpiece is securely clamped in the vice by trying to move it manually.

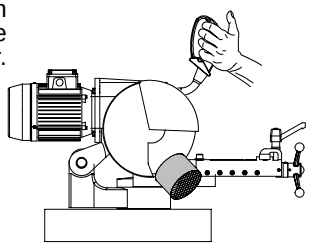


5) Select the cutting speed using the **Speed switch selector.**

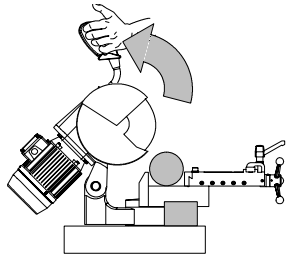
6) Grip the head control lever and start the disc turning by pressing the microswitch on the handgrip; the head descent speed is controlled manually by the operator. At the same time the coolant/lubricant fluid pump starts.



7) At the end of the cut the head can be raised; the springs behind the head make this operation easier.



8) Remove the workpiece from the vice using the handwheel. The machine is now ready for a new cutting operation.



CHAPTER 5 - Diagrams, exploded views and spare parts

This chapter contains functional diagrams of the machine and exploded views of the P 250. 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.

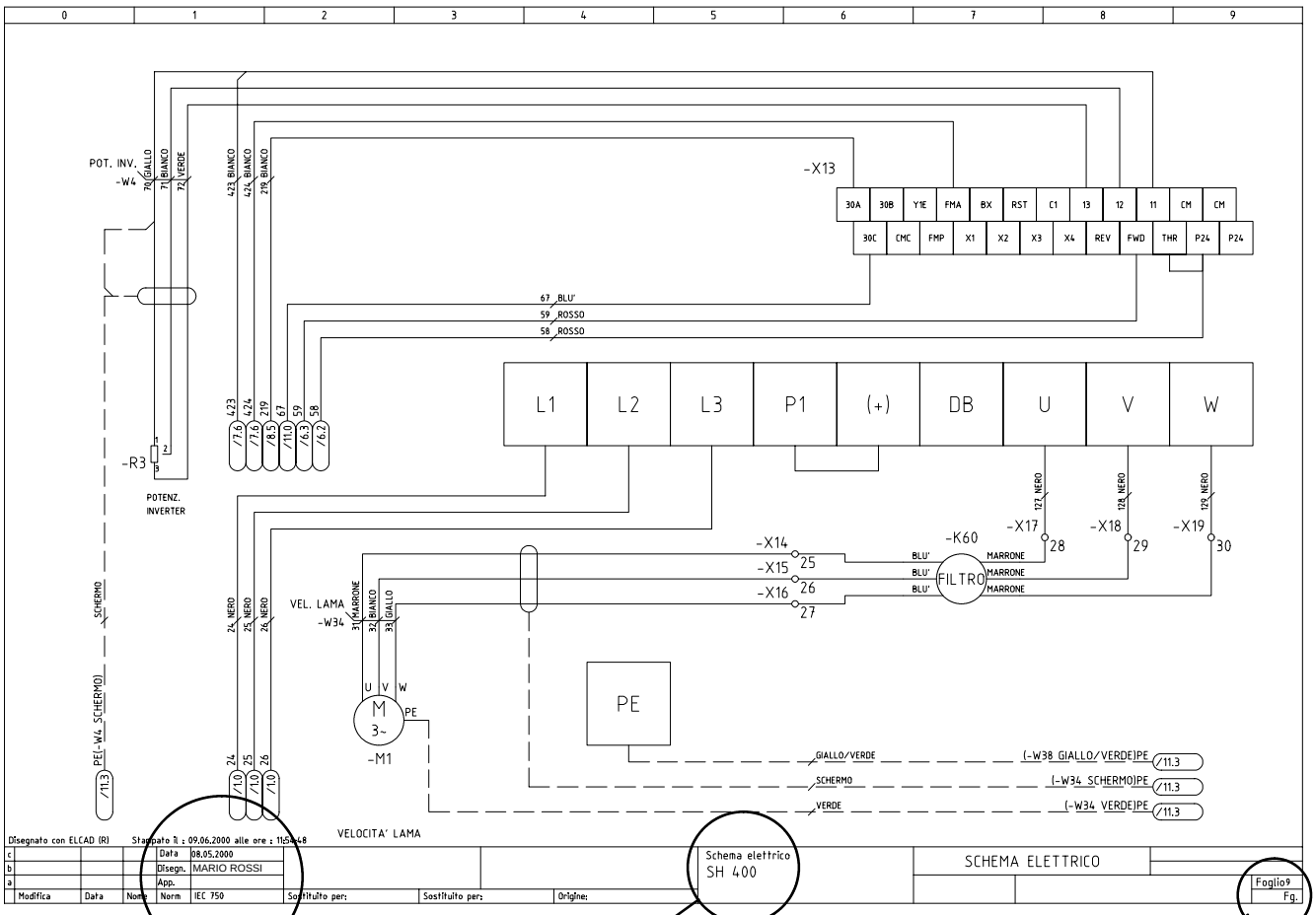
5.1 – Diagrams

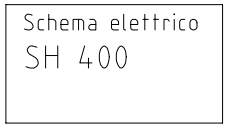
5.1.1 – Wiring diagrams

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:

The numbers indicate the columns into which the entire drawing is divided





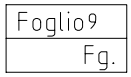
Indications of the model of machine

Data	08.05.2000
Disegn.	MARIO ROSSI
App.	
Norm	IEC 750

Indications of the date production started

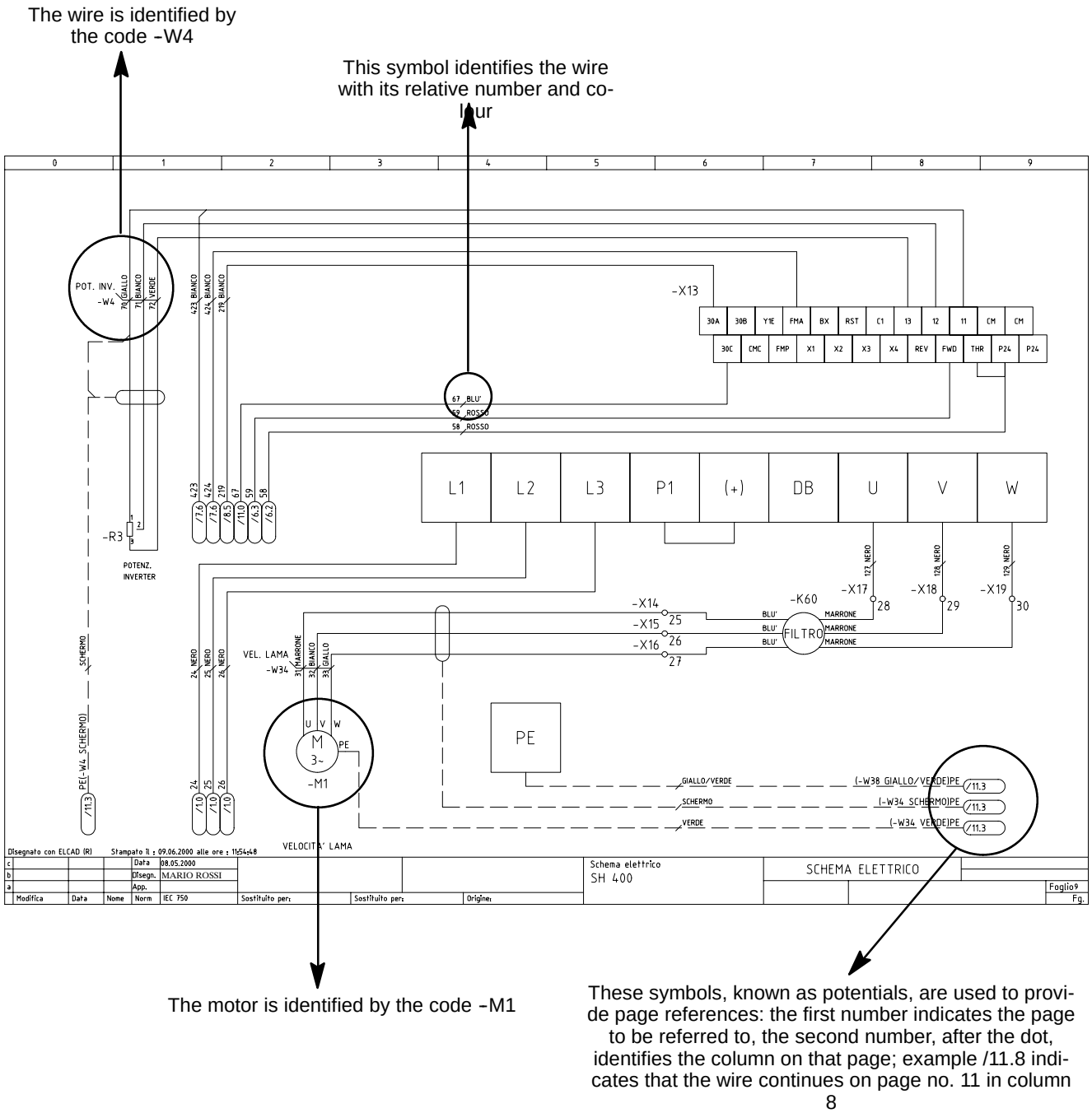
Identification of the Reference Standard

Identification of the designer



Indication of the page number

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+EMERGENCY	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

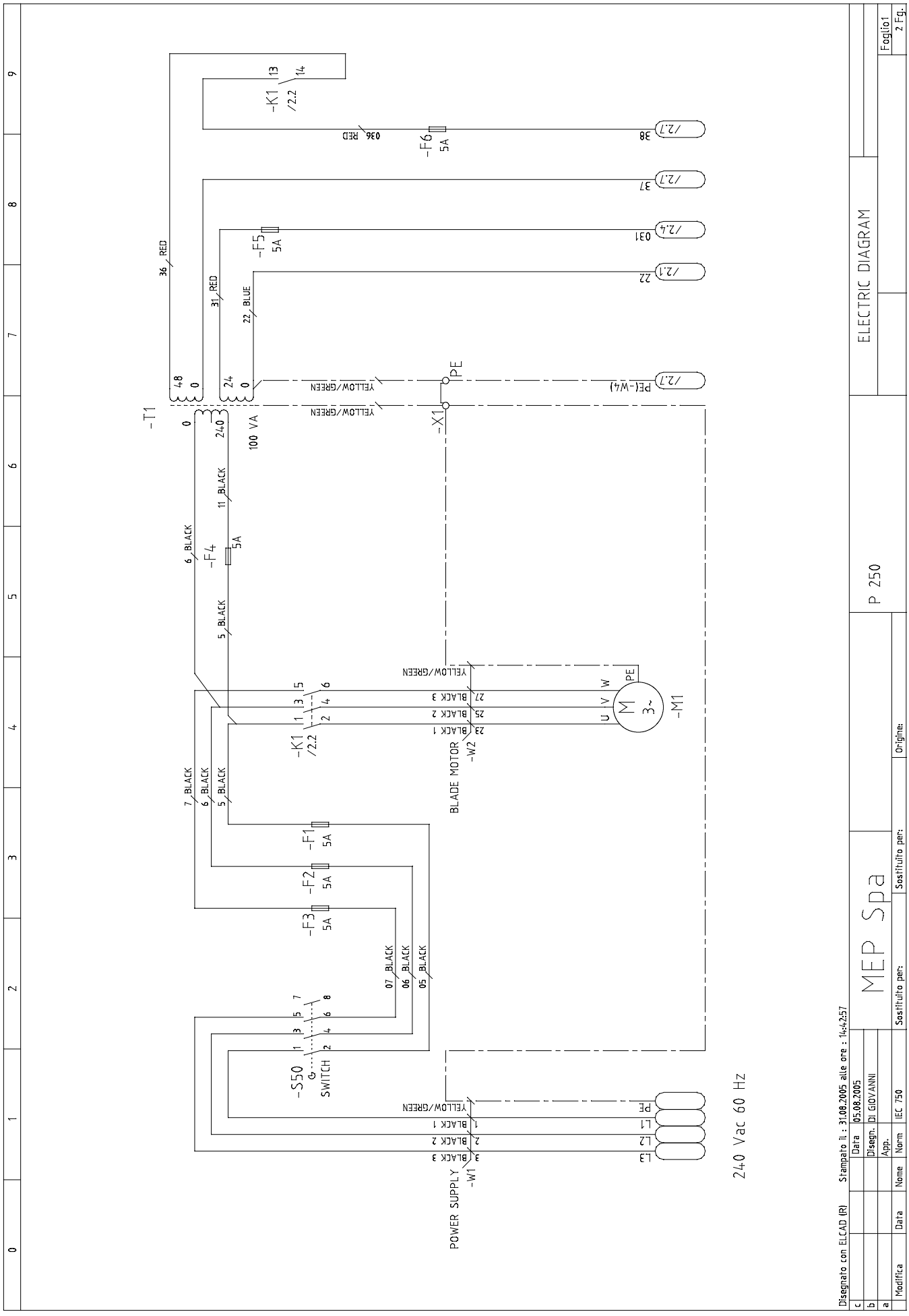
D2−Letter codes used to designate the type of component

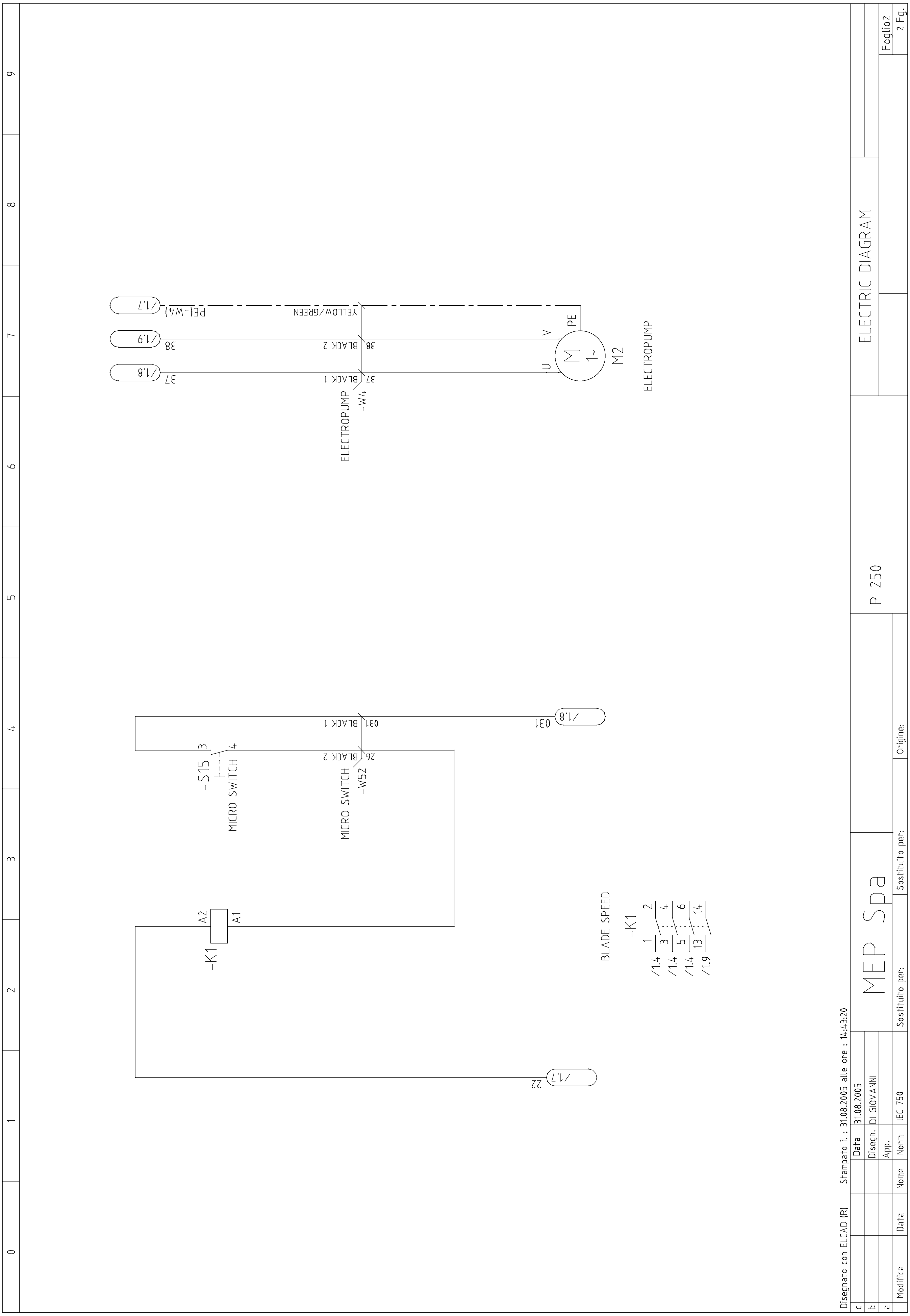
LETTER	TYPE OF COMPONENT	EXAMPLES	IDENTIFICATION OF THE APPLIANCE
A	Complex units	Laser Maser Regulator	A
B	Transducers converting a non electrical signal to an electrical signal and vice versa	Transistor amplifier IC amplifier Magnetic amplifier Valve amplifier Printed circuit board Drawer Rack	AD AJ AM AV AP AT AR
C	Capacitors		C
D	Binary operators, timing devices, 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
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

LETTER	TYPE OF COMPONENT	EXAMPLES	IDENTIFICATION OF THE APPLIANCE
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
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

LETTER	TYPE OF COMPONENT	EXAMPLES	IDENTIFICATION OF THE APPLIANCE
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

STANDARDISED WIRING DIAGRAMS (CENELEC STANDARD)




ELECTRIC DIAGRAM
P 250
MEP Spa
Foglio2
2 Fg.
ELECTROPUMP
-W4
ELECTROPUMP
M2
M
1~
U
V
PE
BLACK 1
BLACK 2
YELLOW/GREEN
PE(-W4)
37
38
/1.7
/1.8
/1.9
MICRO SWITCH
-W52
MICRO SWITCH
-S15
BLACK 1
BLACK 2
031
26
22
-K1
A1
A2
BLADE SPEED
-K1
/1.4
/1.4
/1.4
/1.9
Disegnato con ELCAD (R)
Stampato il : 31.08.2005 alle ore : 14:43:20
Data 31.08.2005
Disegn. DI GIOVANNI
App.
Norm IEC 750
Modifica
Data
Nome
Sostituito per:
Sostituito per:
Origine:

List of cables

Code	Cable	Description	Ø	No.	Colour	Start	End
022.0129	-W1	Power Supply	1	AWG 16	BLACK 1		-S50:1
022.0129	-W1	Power Supply	2	AWG 16	BLACK 2		-S50:3
022.0129	-W1	Power Supply	3	AWG 16	BLACK 3		-S50:5
022.0129	-W1	Power Supply		AWG 16	YELLOW/GREEN		-X1:PE
022.0129	-W2	Blade Motor	23	AWG 16	BLACK 1	-K1:2	-M1:U
022.0129	-W2	Blade Motor	25	AWG 16	BLACK 2	-K1:4	-M1:V
022.0129	-W2	Blade Motor	27	AWG 16	BLACK 3	-K1:6	-M1:W
022.0129	-W2	Blade Motor		AWG 16	YELLOW/GREEN	-X1/PE	-M1:PE
022.0130	-W4	Electropump	37	AWG 18	BLACK 1	-T1:0	-M2:U
022.0130	-W4	Electropump	38	AWG 18	BLACK 2	-F6	-M2:V
022.0130	-W4	Electropump		AWG 16	YELLOW/GREEN	-X1:PE	-M2:PE
022.0139	-W52	Micro Switch	031	AWG 20	BLACK 1	-F5	-S15:3
022.0139	-W52	Micro Switch	26	AWG 20	BLACK 2	-K1:A1	-S15:4
022.0134G/V	-W100	T1:PE/X1:PE		AWG 16	YELLOW/GREEN	-T1:PE	-X1/PE
022.0134G/V	-W101	T1:0(0-24)/X1:PE		AWG 16	YELLOW/GREEN	-T1:0(0-24)	-X1/PE
022.0134B	-W102	S50:2/F1	05	AWG 16	BLACK	-S50:2	-F1
022.0134B	-W103	S50:4/F2	06	AWG 16	BLACK	-S50:4	-F2
022.0134B	-W104	S50:6/F3	07	AWG 16	BLACK	-S50:6	-F3
022.0134B	-W105	F1/K1:1	5	AWG 16	BLACK	-F1	-K1:1
022.0134B	-W106	F2/K2:3	6	AWG 16	BLACK	-F2	-K1:3
022.0134B	-W107	F3/K1:5	7	AWG 16	BLACK	-F3	-K1:5
022.0134B	-W108	K1:1/F4	5	AWG 16	BLACK	-K1:1	-F4
022.0134B	-W109	K1:3/T1:0(0-240)	6	AWG16	BLACK	-K1:3	-T1.0(0-240)
022.0134B	-W110	F4/T1:240(0-2408	11	AWG16	BLACK	-F4	-T1:240(0-240
022.0133R	-W111	T1:48/K1:14	36	AWG20	RED	-T1:48	-K1:14
022.0133R	-W112	K1:13/F6	036	AWG20	RED	-K1:13	-F6
022.0133R	-W113	T1:24/F5	31	AWG20	RED	-T1:24	-F5
022.0133BL	-W114	T1:0(0-24)/K1:A2	22	AWG20	BLUE	-T1:0(0-24)	-K1:A2

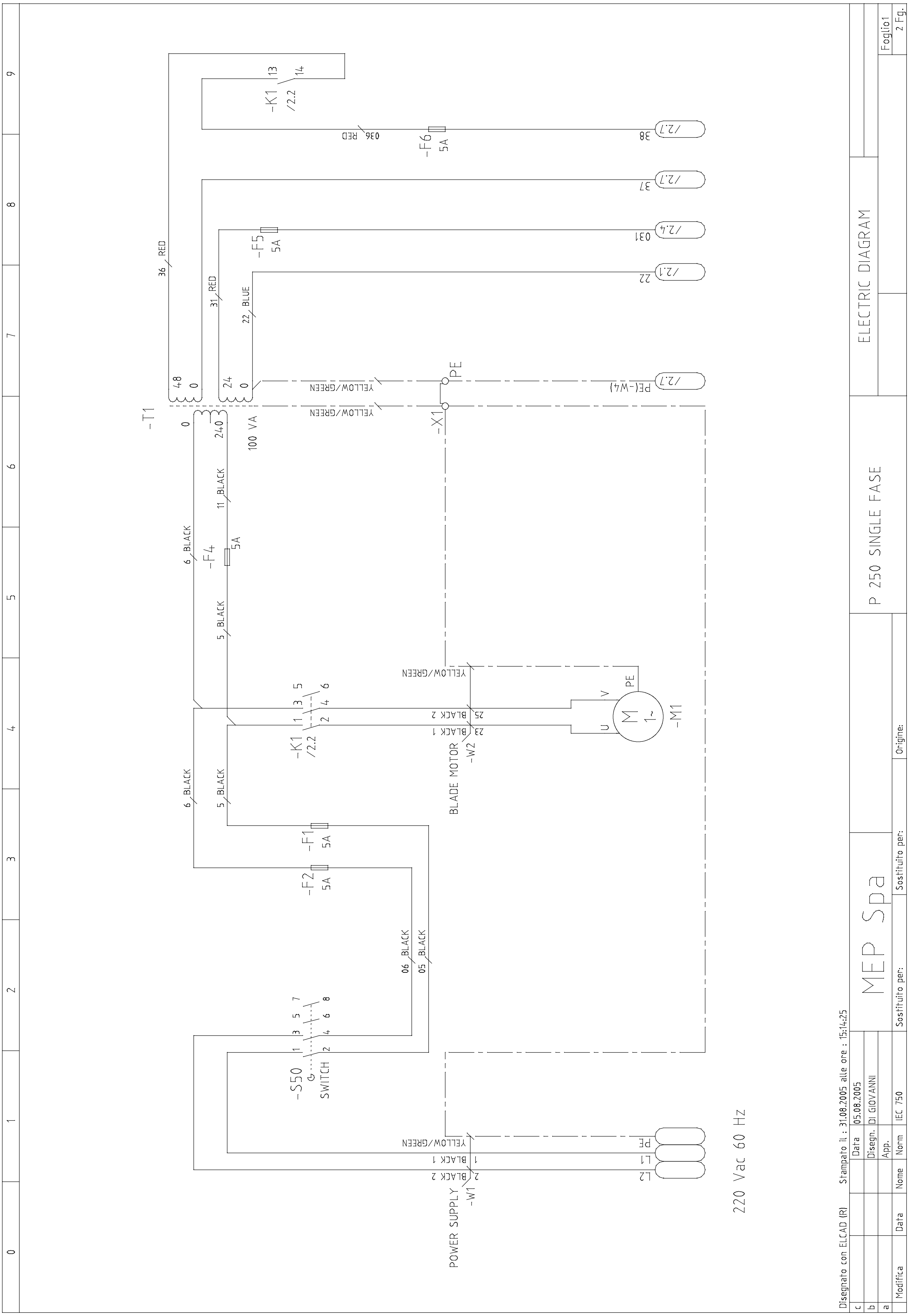
List of components

Code	ID	Rif	Description	Manufacturer
022.1136	-F1	1/3	FUSE 6,3X32 5A	COMAPEL SRL
022.2252	-F1	1/3	FUSE-HOLDER ST	PHOENIX
022.1136	-F2	1/3	FUSE 6,3X32 5A	COMAPEL SRL
022.2252	-F2	1/3	FUSE-HOLDER ST	PHOENIX
022.1136	-F3	1/3	FUSE 6,3X32 5A	COMAPEL SRL
022.2252	-F3	1/3	FUSE-HOLDER ST	PHOENIX
022.1136	-F4	1/5	FUSE 6,3X32 5A	COMAPEL SRL
022.2252	-F4	1/5	FUSE-HOLDER ST	PHOENIX
022.1136	-F5	1/8	FUSE 6,3X32 5A	COMAPEL SRL
022.2252	-F5	1/8	FUSE-HOLDER ST	PHOENIX
022.1136	-F6	1/8	FUSE 6,3X32 5A	COMAPEL SRL
022.2252	-F6	1/8	FUSE-HOLDER ST	PHOENIX
022.0093	-K1	2/2	CONTACTOR	ROCKEWELL AUTOMATION
019.1704	-M1	1/4	BLADE MOTOR 230VAC 60HZ	CARPANELLI MOTORI
028.0291	-M2	2/7	ELECTROPUMP SP/48 VAC 60HZ	SAP
034.1221	-S15	2/4	KNOB	BARDEGGIA
010.0928	-S15	2/4	SPRING	ADRIATICA MOLLE

Code	ID	Rif	Description	Manufacturer
025.0691	-S15	2/4	KNOB SEAL	BARDEGGIA
022.0023	-S50	1/1	POLE CHANGE SWITCH	ROCKWELL AUTOMATION
022.0440	-T1	1/6	TROANSFORMER 30+70W (0-240)SEC (0-24/0-48)	WAN

List of terminals

Code	ID	Rif	Description	Manufacturer
022.2247	-X1	1/6	QUADRUPLE GROUND TERMINAL	PHOENIX
022.2247	-X1	1/6	QUADRUPLE GROUND TERMINAL	PHOENIX



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MEP Spa
Foglio1
2 Fg.
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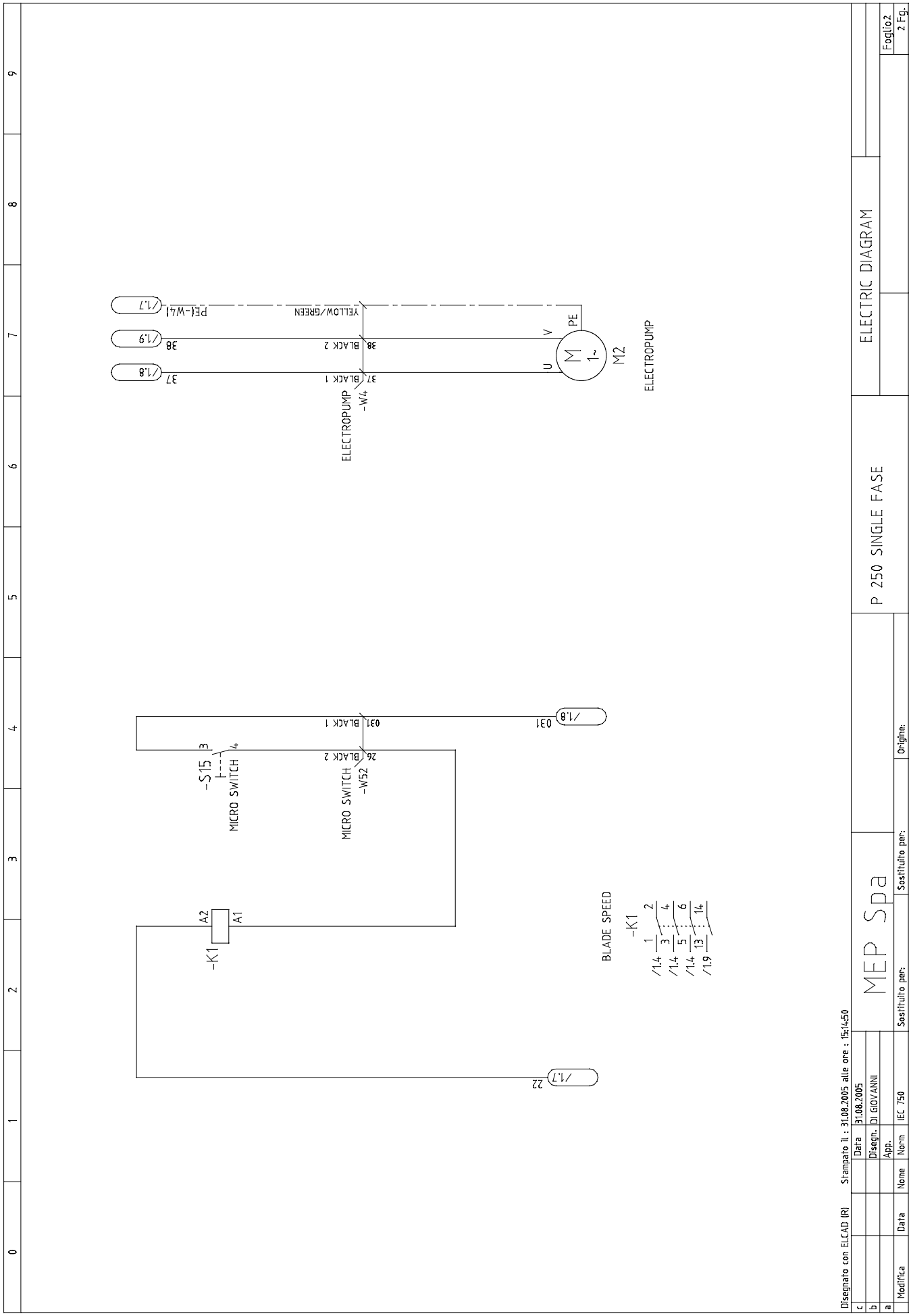
Data 05.08.2005
Disegn. DI GIOVANNI
App.
Norm IEC 750
Modifica
Data
Nome
Sostituito per:
Sostituito per:
Origine:
POWER SUPPLY
-W1
220 Vac 60 Hz
PE
L1
L2
YELLOW/GREEN
BLACK 1
BLACK 2
-S50
SWITCH
-F1
5A
-F2
5A
-F4
5A
-F5
5A
-F6
5A
-T1
100 VA
-K1
/2.2
-X1
-M1
M
1~
BLADE MOTOR
-W2
YELLOW/GREEN
BLACK 1
BLACK 2
6 BLACK
5 BLACK
06 BLACK
05 BLACK
11 BLACK
36 RED
31 RED
22 BLUE
036 RED
PE(-W4)
/2.7
/2.4
/2.1
38
37
031
22


ELECTRIC DIAGRAM
P 250 SINGLE FASE
MEP SpA
ELECTROPUMP
M2
PE
V
U
YELLOW/GREEN
BLACK 1
BLACK 2
ELECTROPUMP -W4
MICRO SWITCH -W52
MICRO SWITCH
-S15
MICRO SWITCH
-K1
BLADE SPEED
Disegnato con ELCAD (R)
Stampato il : 31.08.2005 alle ore : 15:14:50
Data 31.08.2005
Disegn. DI GIOVANNI
App.
Modifica
Nome
Norm IEC 750
Sostituito per:
Origine:
Foglio 2
2 Fg.

List of cables

Code	Cable	Description	Ø	No.	Colour	Start	End
022.0128	-W1	POWER SUPPLY	1	AWG 16	BLACK 1		-S50:1
022.0128	-W1	POWER SUPPLY	2	AWG 16	BLACK 2		-S50:3
022.0128	-W1	POWER SUPPLY		AWG 16	YELLOW/GREEN		-X1:PE
022.0128	-W2	BLADE MOTOR	23	AWG 16	BLACK 1	-K1:2	-M1:U
022.0128	-W2	BLADE MOTOR	25	AWG 16	BLACK 2	-K1:4	-M1:V
022.0128	-W2	BLADE MOTOR		AWG 16	YELLOW/GREEN	-X1/PE	-M1:PE
022.0130	-W4	ELECTROPUMP	37	AWG 18	BLACK 1	-T1:0	-M2:U
022.0130	-W4	ELECTROPUMP	38	AWG 18	BLACK 2	-F6	-M2:V
022.0130	-W4	ELECTROPUMP		AWG 16	YELLOW/GREEN	-X1:PE	-M2:PE
022.0139	-W52	MICRO SWITCH	031	AWG 20	BLACK 1	-F5	-S15:3
022.0139	-W52	MICRO SWITCH	26	AWG 20	BLACK 2	-K1:A1	-S15:4
022.0134G/V	-W100	T1:PE/X1:PE		AWG 16	YELLOW/GREEN	-T1:PE	-X1/PE
022.0134G/V	-W101	T1:0(0-24)/X1:PE		AWG 16	YELLOW/GREEN	-T1:0(0-24)	-X1/PE
022.0134B	-W102	S50:2/F1	05	AWG 16	BLACK	-S50:2	-F1
022.0134B	-W103	S50:4/F2	06	AWG 16	BLACK	-S50:4	-F2
022.0134B	-W105	F1/K1:1	5	AWG 16	BLACK	-F1	-K1:1
022.0134B	-W106	F2/K2:3	6	AWG 16	BLACK	-F2	-K1:3
022.0134B	-W108	K1:1/F4	5	AWG 16	BLACK	-K1:1	-F4
022.0134B	-W109	K1:3/T1:0(0-240)	6	AWG16	BLACK	-K1:3	-T1.0(0-240)
022.0134B	-W110	F4/T1:240(0-2408	11	AWG16	BLACK	-F4	-T1:240(0-240
022.0133R	-W111	T1:48/K1:14	36	AWG20	RED	-T1:48	-K1:14
022.0133R	-W112	K1:13/F6	036	AWG20	RED	-K1:13	-F6
022.0133R	-W113	T1:24/F5	31	AWG20	RED	-T1:24	-F5
022.0133BL	-W114	T1:0(0-24)/K1:A2	22	AWG20	BLUE	-T1:0(0-24)	-K1:A2

List of components

Code	ID	Rif	Description	Manufacturer
022.1136	-F1	1/3	FUSE 6,3X32 5A	COMAPEL SRL
022.2252	-F1	1/3	FUSE-HOLDER ST	PHOENIX
022.1136	-F2	1/3	FUSE 6,3X32 5A	COMAPEL SRL
022.2252	-F2	1/3	FUSE-HOLDER ST	PHOENIX
022.1136	-F4	1/5	FUSE 6,3X32 5A	COMAPEL SRL
022.2252	-F4	1/5	FUSE-HOLDER ST	PHOENIX
022.1136	-F5	1/8	FUSE 6,3X32 5A	COMAPEL SRL
022.2252	-F5	1/8	FUSE-HOLDER ST	PHOENIX
022.1136	-F6	1/8	FUSE 6,3X32 5A	COMAPEL SRL
022.2252	-F6	1/8	FUSE-HOLDER ST	PHOENIX
022.0093	-K1	2/2	CONTACTOR	ROCKEWELL AUTOMATION
019.3302	-M1	1/4	BLADE MOTOR 220VAC 60HZ	CARPANELLI MOTORI
028.0291	-M2	2/7	ELECTROPUMP 48VAC 60HZ	SAP
034.1221	-S15	2/4	KNOB	BARDEGGIA
010.0928	-S15	2/4	SPRING	ADRIATICA MOLLE
025.0691	-S15	2/4	KNOB SEAL	BARDEGGIA
022.0023	-S50	1/1	POLE CHANGE SWITCH	ROCKWELL AUTOMATION
022.0440	-T1	1/6	TROANSFORMER 30+70W (0-240)SEC (0-24/0-48)	WAN

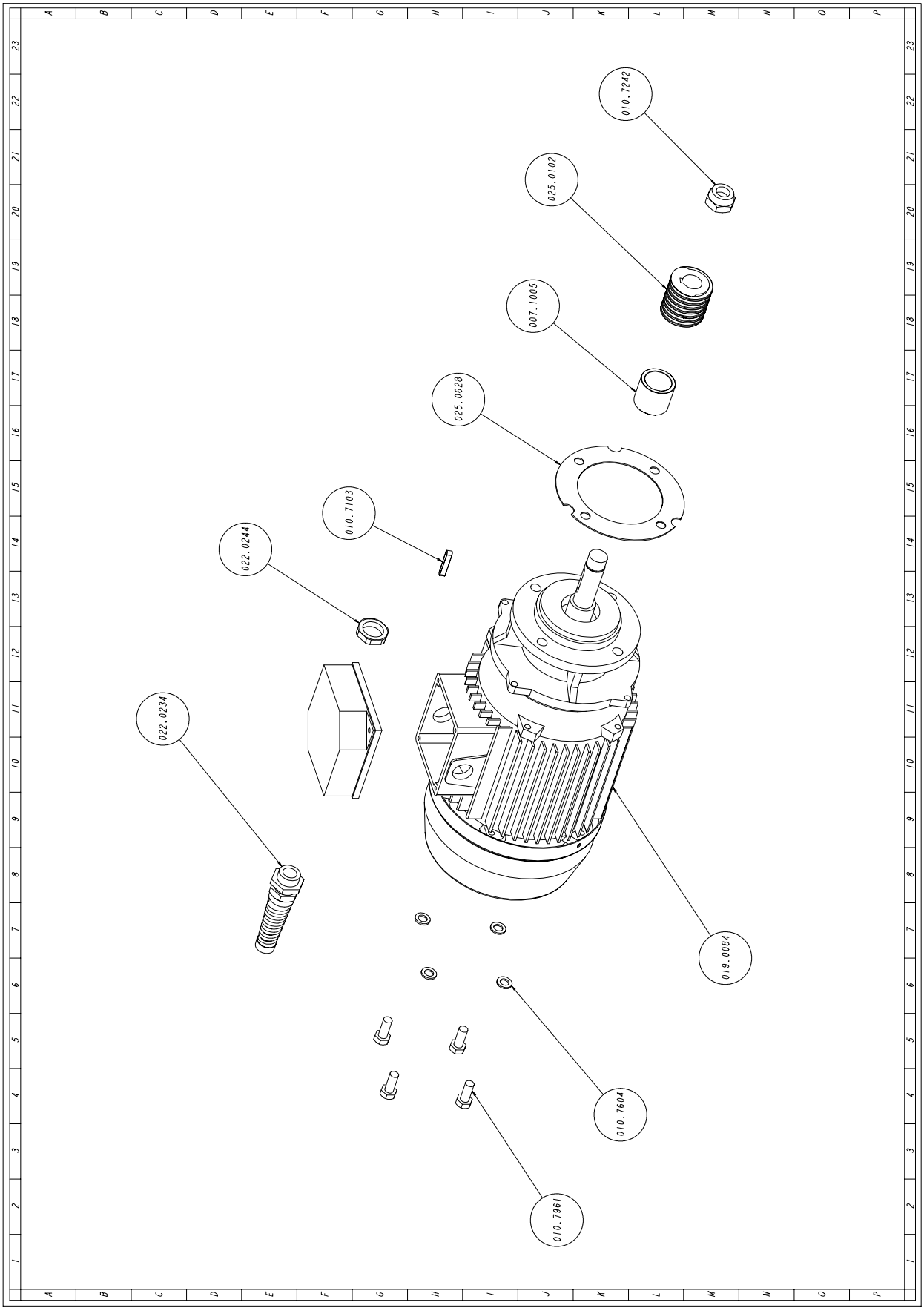
List of terminals

Code	ID	Rif	Description	Manufacturer
022.2247	-X1	1/6	QUADRUPLE GROUND TERMINAL	PHOENIX
022.2247	-X1	1/6	QUADRUPLE GROUND TERMINAL	PHOENIX

5.2 – Exploded diagrams

The following section provides the exploded diagrams, which are extremely detailed and may help you to gain familiarity with the machine.

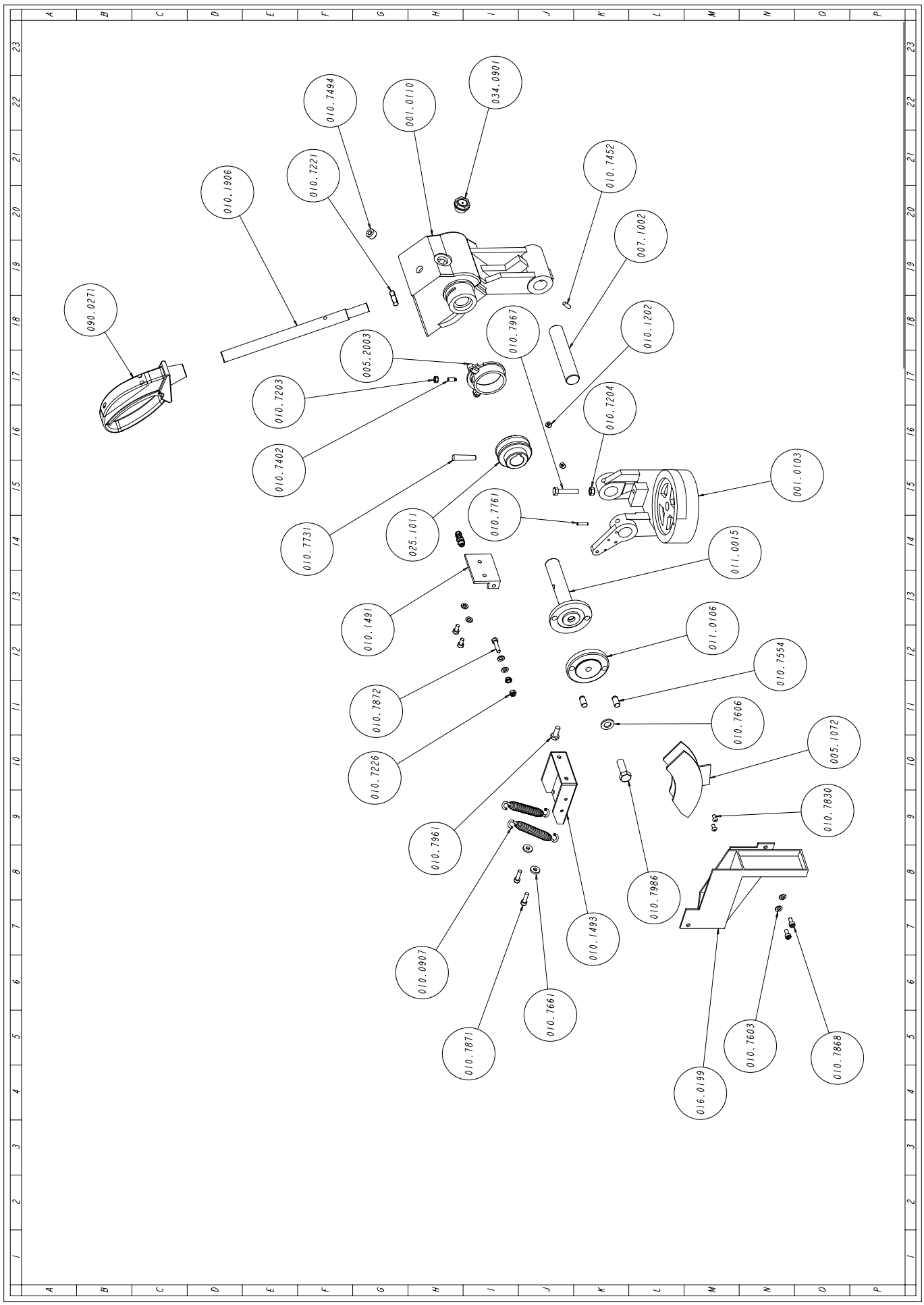
5.2.1 – Motor unit



Spare parts

Code	Description	U. of M.	Quantity
007.1005	WORM SCREW SPACER	NR	1,000
010.7103	5 X 5 X 30 KEY	NR	1,000
010.7242	M17 LOW SELF-LOCKING SCREW NUT	NR	1,000
010.7604	0 8 WASHER	NR	4,000
010.7961	TE 8 X 20 SCREW	NR	4,000
019.0084	KW 0,5 4P.B5 0 120 V. 220-380	NR	1,000
022.0234	CORD PRESSER	NR	1,000
022.0244	LOCK NUT 3217B GREY PG 13,5	NR	1,000
025.0102	WORM SCREW 08/1	NR	1,000
025.0628	MOTOR GASKET	NR	1,000

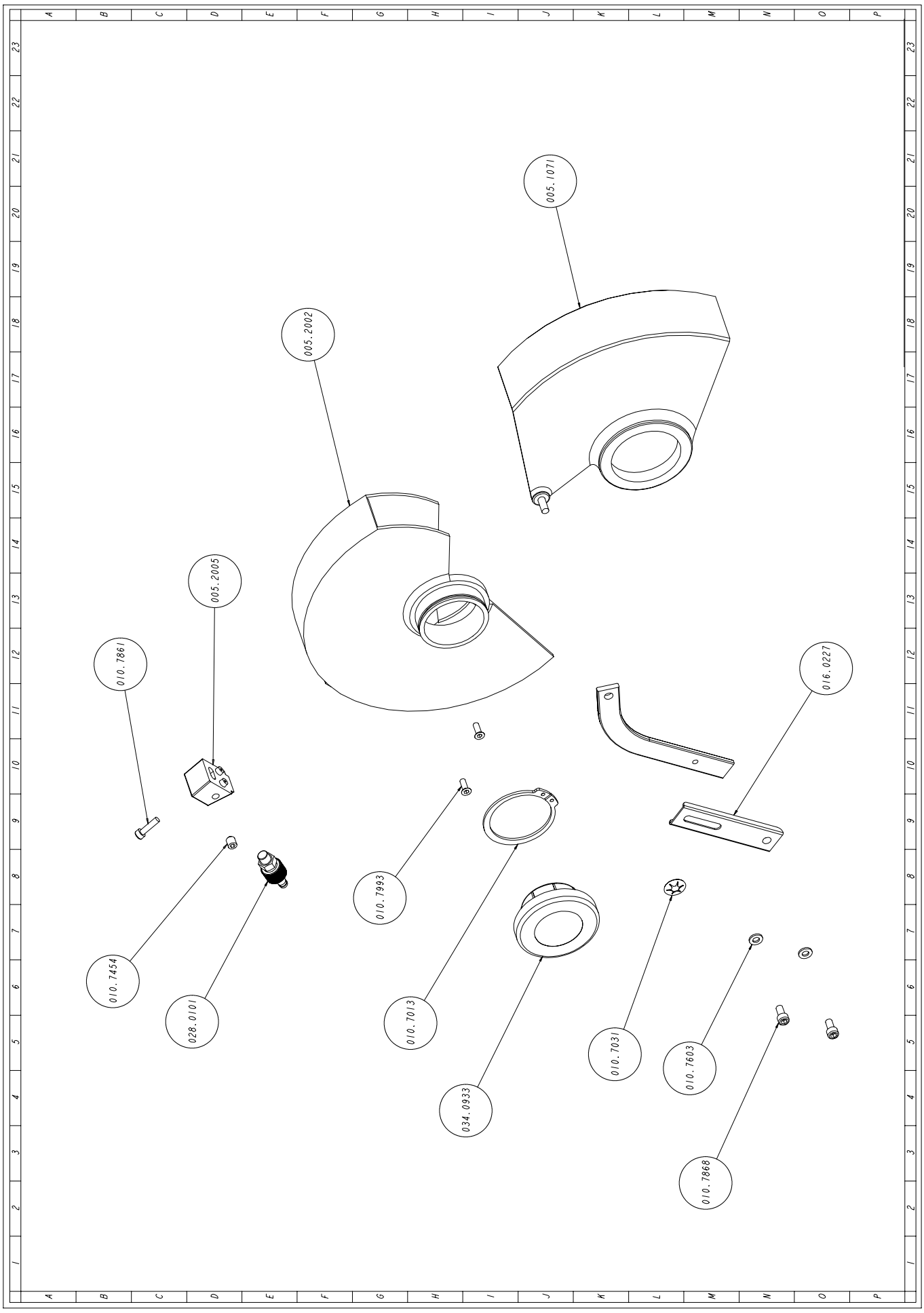
5.2.2 – Transmission unit



Spare parts

Code	Description	U. of M.	Quantity
001.0103	ROTATING TABLE	NR	1,000
001.0110	GEAR BOX MOD.1010	NR	1,000
005.1072	FIXED PROTECTION	NR	1,000
005.2003	RING NUT	NR	1,000
007.1002	PIN	NR	1,000
010.0907	HEAD RETURN SPRING	NR	2,000
010.1202	OIL FILLER DIAM.8	NR	2,000
010.1491	SPRING FIXING BRACKET PUCK	NR	1,000
010.1493	SPRING FIXING BRACKET	NR	1,000
010.1906	BT/NOT-AUS LEVER	NR	1,000
010.7203	M6 SCREW NUT	NR	3,000
010.7204	M8 SCREW NUT	NR	1,000
010.7221	M16 LOW SCREW NUT	NR	1,000
010.7226	M6 SELF-LOCKING SCREW NUT	NR	2,000
010.7402	6 X 12 CYLIND.POINT VCE GRUB SCREW	NR	1,000
010.7452	6 X 16 CONICAL POINT VCE GRUB SCREW	NR	1,000
010.7494	16 X 10 FLAT POINT VCE GRUB SCREW	NR	1,000
010.7554	10 X 20 FEEDING PIN	NR	2,000
010.7603	0 6 WASHER	NR	8,000
010.7606	0 12 WASHER	NR	1,000
010.7661	THICKNESS WASHER DIAM. 6 X 3	NR	2,000
010.7731	CONIC PIN DIAM. 8 X 45	NR	1,000
010.7761	ELASTIC PIN DIAM. 4 X 20	NR	1,000
010.7830	5 X 10 BUTON SCREW	NR	2,000
010.7868	TCEI 6 X 12 SCREW	NR	4,000
010.7871	TCEI 6 X 20 SCREW	NR	2,000
010.7872	TCEI 6 X 25 SCREW	NR	2,000
010.7961	TE 8 X 20 SCREW	NR	1,000
010.7967	TE 8 X 40 SCREW	NR	1,000
010.7986	TE 12 X 35 SCREW	NR	1,000
011.0013	BLADE SHAFT	NR	1,000
011.0106	OUTER FLANGE	NR	1,000
016.0199	GUARD FIXED SUPPORT	NR	1,000
025.0203	SEAL 35X25X7	NR	1,000
025.1011	_ NR	NR	1,000
034.0901	1/2"GAS. OIL LEVEL CAP	NR	1,000
090.0271	COMPLETE MEP HANDLE	NR	1,000

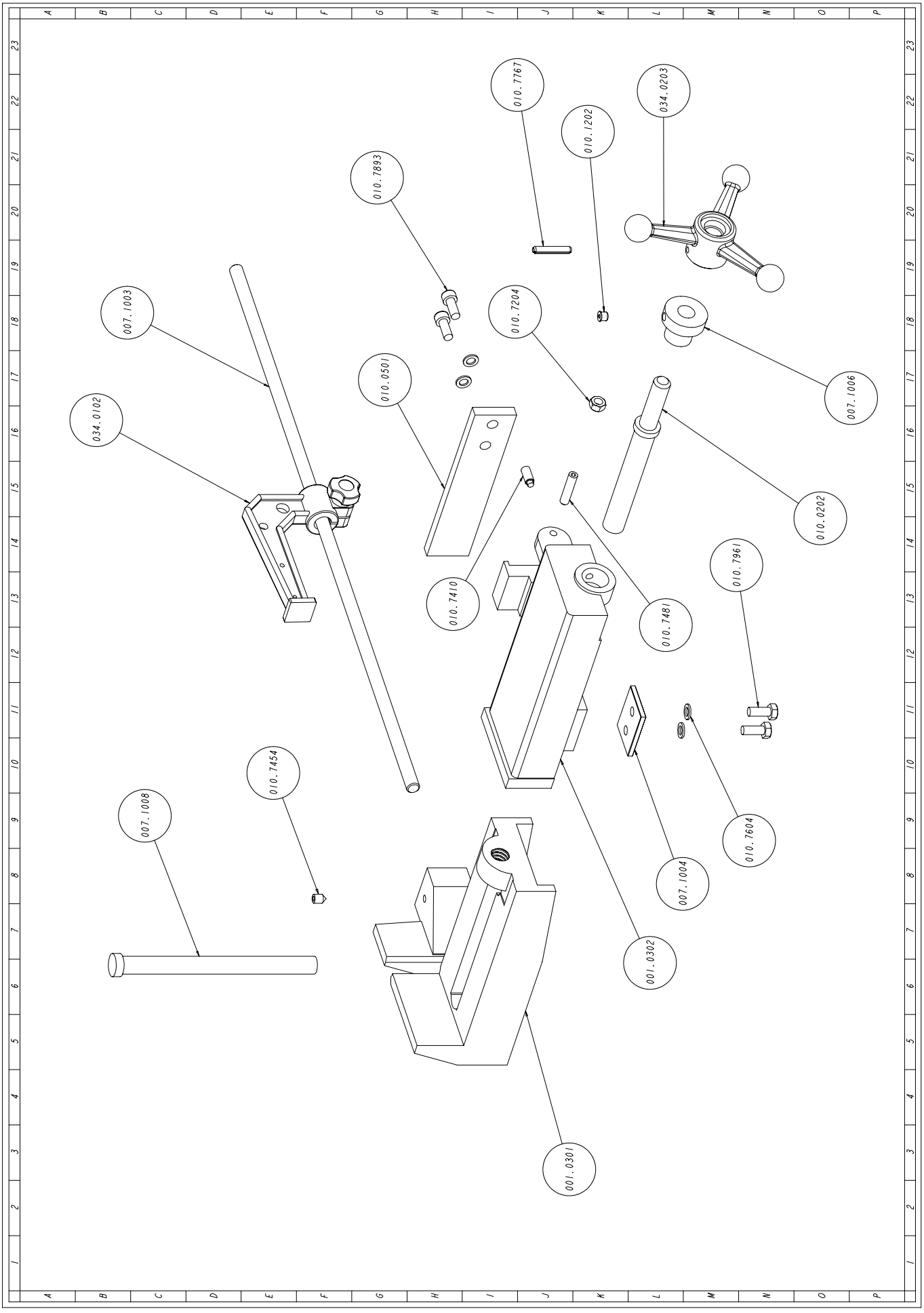
5.2.3 – Carter group



Spare parts

Code	Description	U. of M.	Quantity
005.1071	MOVING PROTECTION	NR	1,000
005.2002	BLADE COVER	NR	1,000
005.2005	TAP SPRAYER	NR	1,000
010.7013	0 62 SEEGER RING	NR	1,000
010.7031	SK 0 8 SEEGER RING	NR	1,000
010.7454	8 X 8 CONICAL POINT VCE GRUB SCREW	NR	1,000
010.7603	0 6 WASHER	NR	2,000
010.7861	TCEI 5 X 20 SCREW	NR	1,000
010.7868	TCEI 6 X 12 SCREW	NR	2,000
010.7993	TSPEI 5 X 12 SCREW	NR	2,000
016.0227	GUARD BRACKET	NR	1,000
028.0101	TAP REGULATOR 8 X 1/4	NR	1,000
034.0933	BLADE COVER TAP	NR	1,000

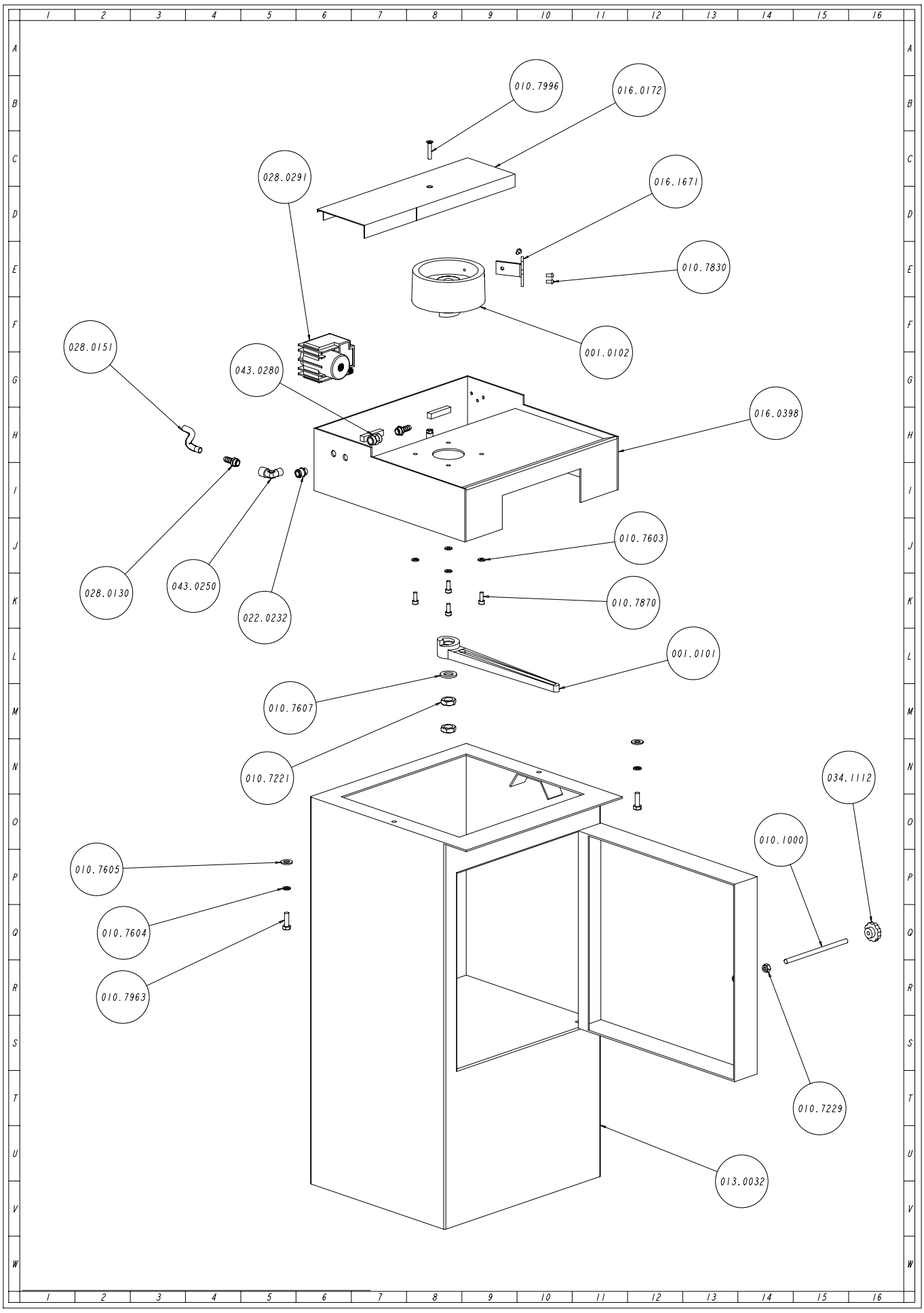
5.2.4 – Vice unit



Spare parts

Code	Description	U. of M.	Quantity
001.0301	LOWER VICE	NR	1,000
001.0302	UPPER VICE	NR	1,000
007.1003	ROD	NR	1,000
007.1004	UPPER VICE PLATE	NR	1,000
007.1006	VICE SCREW BUSHING	NR	1,000
007.1008	CENTRE PIN	NR	1,000
010.0202	VICE SCREW 190X20	NR	1,000
010.0501	ANTI BURR JAW	NR	1,000
010.1202	OIL FILLER DIAM.8	NR	1,000
010.7204	M8 SCREW NUT	NR	1,000
010.7410	8 X 16 CYLIND.POINT VCE GRUB SCREW	NR	1,000
010.7454	8 X 8 CONICAL POINT VCE GRUB SCREW	NR	1,000
010.7481	8 X 35 FLAT POINT VCE GRUB SCREW	NR	1,000
010.7604	0 8 WASHER	NR	4,000
010.7767	ELASTIC PIN DIAM. 6 X 35	NR	1,000
010.7893	TCEI 8 X 20 SCREW	NR	2,000
010.7961	TE 8 X 20 SCREW	NR	2,000
034.0102	SMALL CUT TO MEASURE STOP	NR	1,000
034.0203	MEDIUM VICE HANDWHEEL	NR	1,000

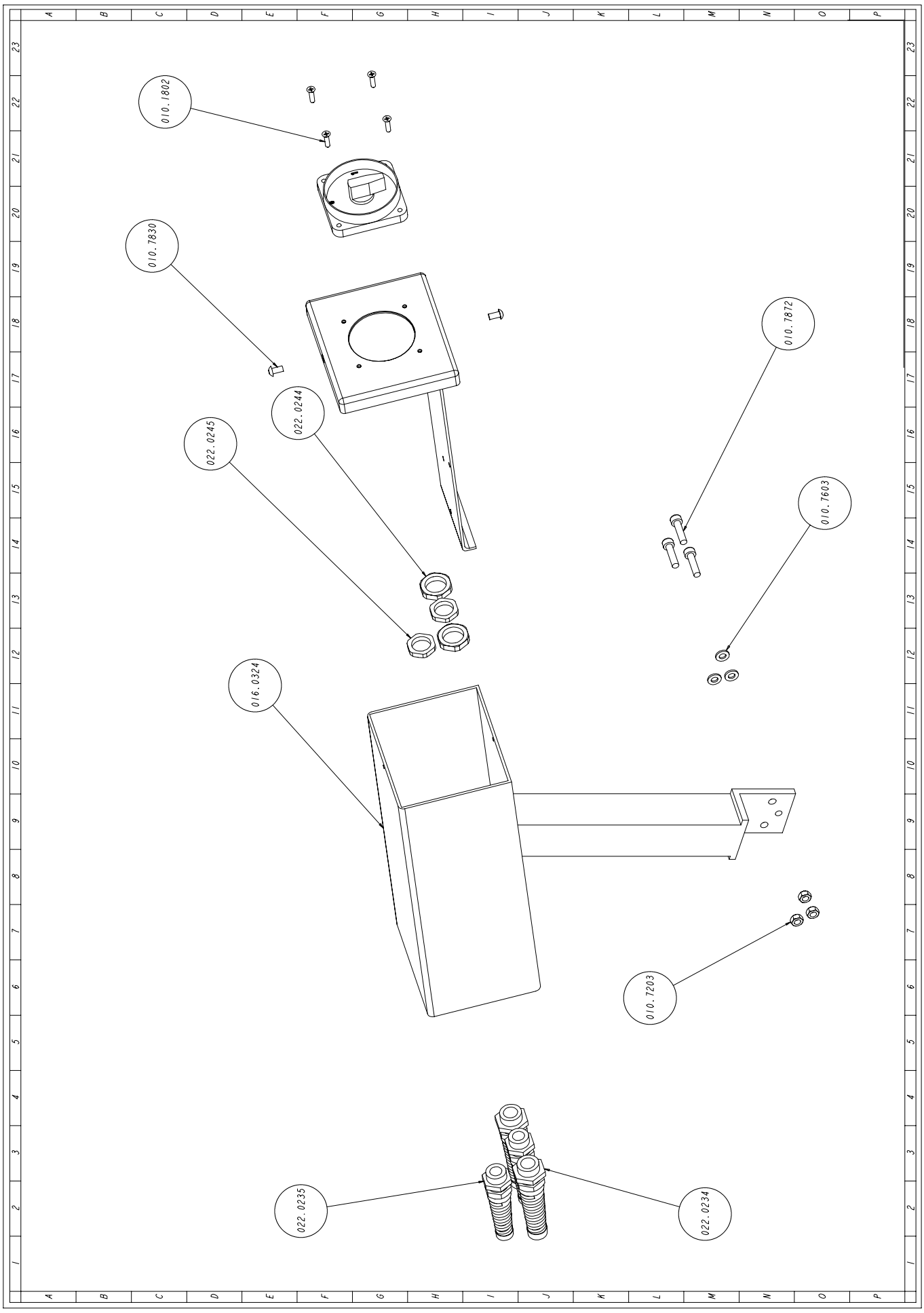
5.2.5 – Base assembly



Spare parts

Code	Description	U. of M.	Quantity
001.0101	VICE CLAMPING LEVER	NR	1,000
001.0102	BASE PLATE	NR	1,000
010.1000	8 MA THREADED BAR	MT	1,000
010.7203	M6 SCREW NUT	NR	1,000
010.7221	M16 LOW SCREW NUT	NR	2,000
010.7229	M8 SELF-LOCKING SCREW NUT	NR	1,000
010.7603	0 6 WASHER	NR	4,000
010.7604	0 8 WASHER	NR	2,000
010.7605	0 10 WASHER	NR	2,000
010.7607	0 16 WASHER	NR	1,000
010.7830	5 X 10 BUTON SCREW	NR	3,000
010.7870	TCEI 6 X 16 SCREW	NR	4,000
010.7963	TE 8 X 25 SCREW	NR	2,000
010.7996	TSPEI 6 X 30 SCREW	NR	1,000
013.0032	STEEL BASE	NR	1,000
016.0172	TANK COVER	NR	1,000
016.0398	BASE	NR	1,000
016.1671	ROTATING TABLE STOP	NR	1,000
022.0232	BRASS CABLE PRESSER 1/4 BM 2450	NR	1,000
028.0130	JOINT 1/4-9 CL 2601	NR	2,000
028.0151	PLASTIC HOSE 07-11	KG	0,120
028.0291	SUBMERGED PUMP SP/48 V.48.50	NR	1,000
034.1112	O 40 M8 HANDWHEEL X STEEL BASE	NR	1,000
043.0250	M.F. ELBOW 1/4 CL 2020	NR	1,000
043.0280	1/4 M 4/4 - CL 2543 SLEEVE	NR	1,000

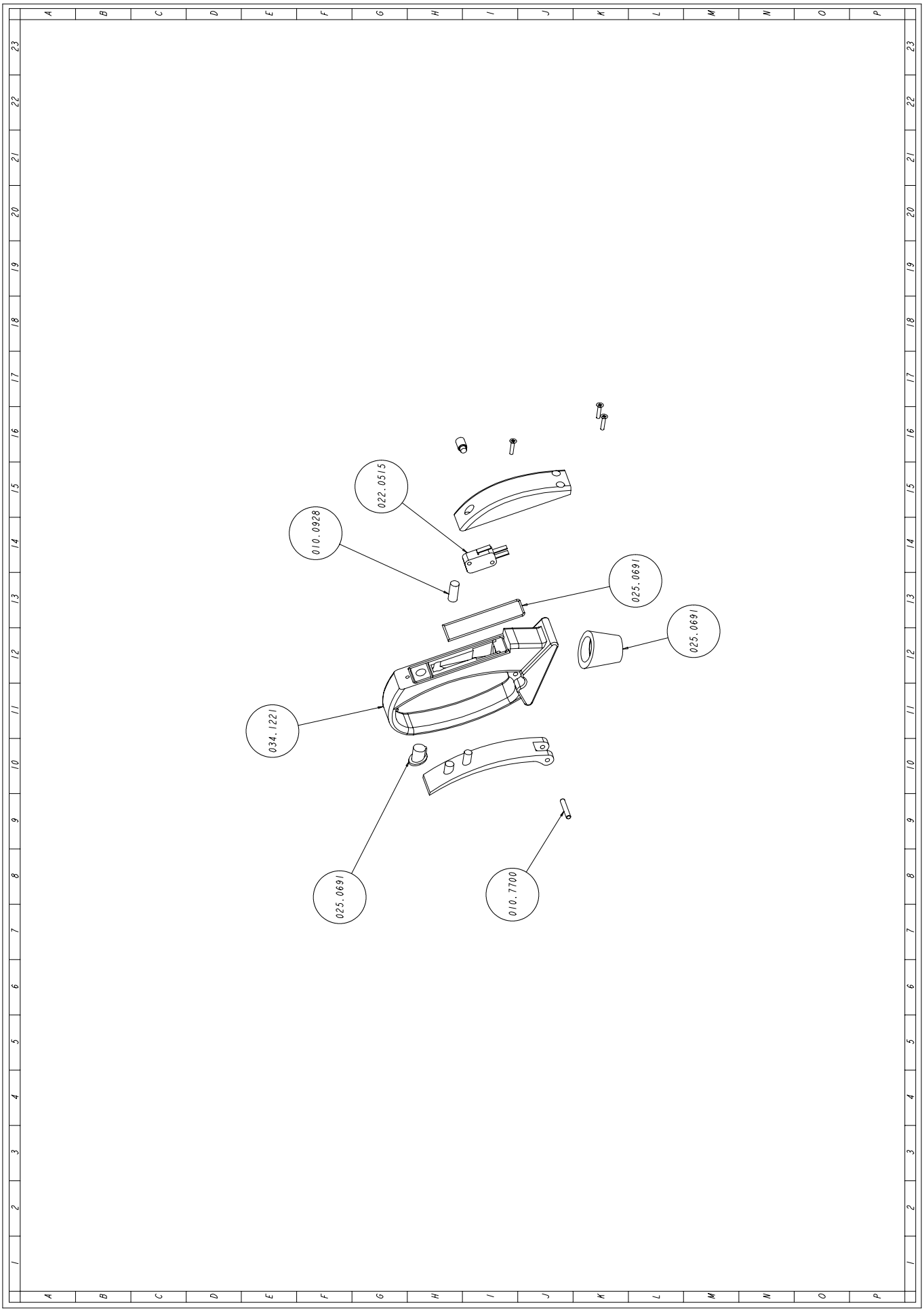
5.2.6 – Control panel



Spare parts

Code	Description	U. of M.	Quantity
010.7203	M6 SCREW NUT	NR	3,000
010.7603	0 6 WASHER	NR	3,000
010.7830	5 X 10 BUTON SCREW	NR	2,000
010.7872	TCEI 6 X 25 SCREW	NR	3,000
016.0324	CONTROL PANEL	NR	1,000
022.0234	CORD PRESSER	NR	2,000
022.0235	CORD PRESSER	NR	2,000
022.0244	LOCK NUT 3217B GREY PG 13,5	NR	2,000
022.0245	LOCK NUT 3213B GREY PG 11	NR	2,000

5.2.7 – Handgrip



Spare parts

Code	Description	U. of M.	Quantity
010.0928	MEP HANDLE SPRING	NR	1,000
010.7409	8 X 10 CYLIND.POINT VCE GRUB SCREW	NR	1,000
010.7700	CYLINDRICAL PIN DIAM. 4 X 24	NR	1,000
010.7800	2,9 X 15 SELF–THREADING SCREW	NR	3,000
022.0515	MICROSWITCH V–21–1C6	NR	1,000
025.0691	GASKETS FOR MEP HANDLE	NR	1,000
034.1221	MEP HANDLE	NR	1,000
090.0011	VICE GROUP	NR	1,000
090.0262	COMPLETE HANDLE	NR	1,000

CHAPTER 6 – *Adjustments*

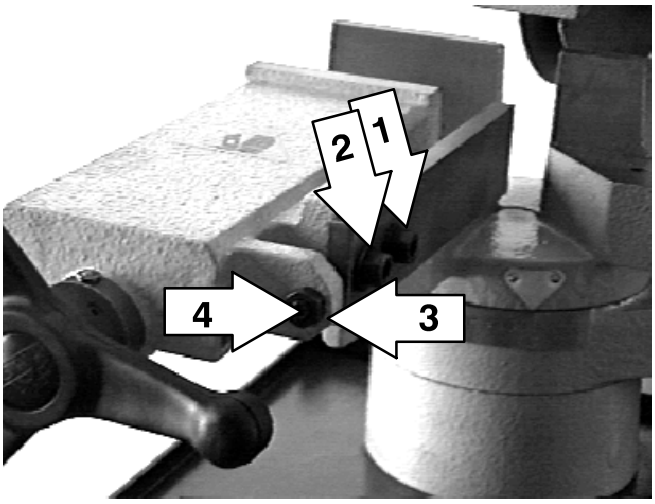
This chapter describes the operations needed to adjust the mechanical, hydraulic and pneumatic systems enabling the P 250 to be used properly. These instructions will enable you to ”customise” your machine to suit the type of cuts being carried out, optimising the time required to complete them.

6.1 – Cutting vice

The cutting vice, mounted as standard on the P 250, is fitted with a rag prevention device and a 3–spoke opening/closing handwheel.

6.1.1 – Rag prevention device

The vice is fitted as standard with a rag prevention device that serves to support the material and prevent the formation of ragged edges at the end of the cut.
The vice is fitted as standard with a rag prevention device which serves both to support the material and to prevent the formation of a ragged edge at the end of the cut.



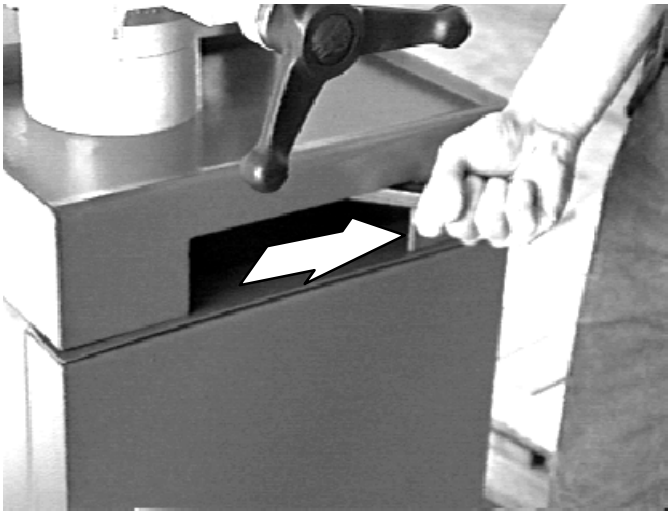
To adjust the longitudinal position of the vice jaw, proceed as follows:
- tighten the cutting vice completely;
- slacken the two screws located to the side of the rag prevention device (1–2);
- slacken the nut that locks the grub screw (3);
- adjust the longitudinal position of the rag prevention vice jaw by slackening or tightening the grub screw (4) until the position of the rag prevention jaw is aligned with that of the cutting jaw;
- hold the grub screw steady using the Allen key and tighten the locking nut.

6.2 – Disc

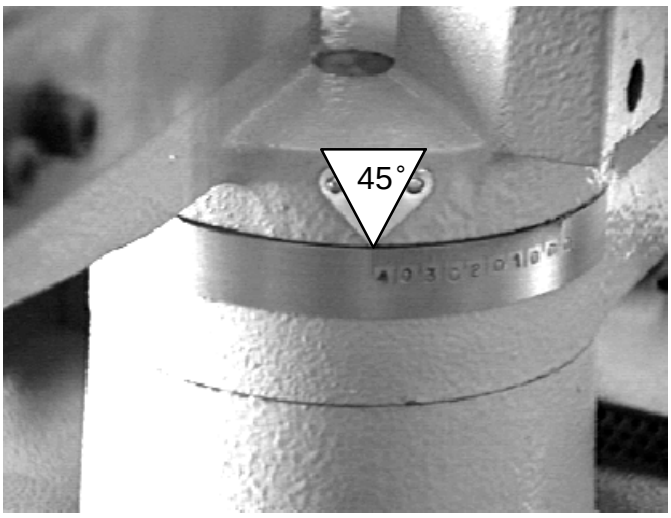
The HSS cutting discs can be used for any kind of cut since they combine good levels of toughness and elasticity thanks to various coatings, along with a good cutting resistance.
The discs are made of a single piece of Tungsten–Molybdenum super–rapid steel with a hardness of about 64 ± 1 HRC. A special characteristic of the discs during cutting is the excellent finish of the cut surfaces.

6.2.1 – Making angled cuts

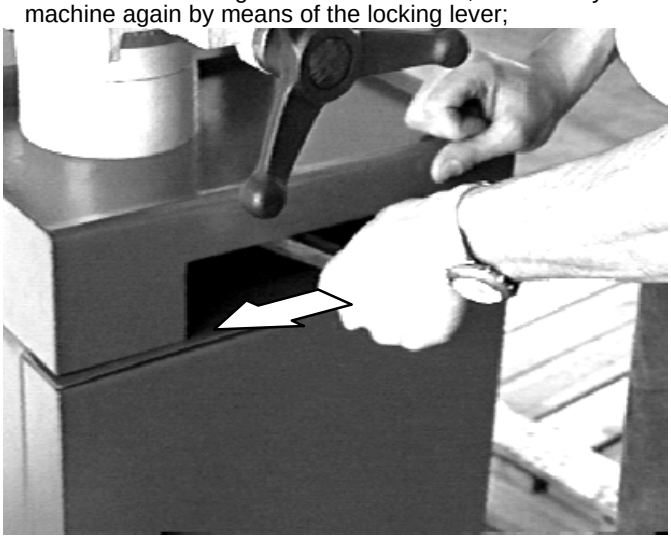
The P 250 can make cuts angled at 45° to the left. Carry out the following procedures to make a cut angled at 45° to the left.
- Release the turntable by means of the locking lever located on the front section of the base;



- with the turntable free, turn the body of the machine to the desired angle (45°), reading off the position on the graduated scale located on the front section of the turntable body. In the specific case of 45°, it is possible to use the fixed stops on the lead nut rotating table.



- once the desired angle has been reached, fix the body of the machine again by means of the locking lever;

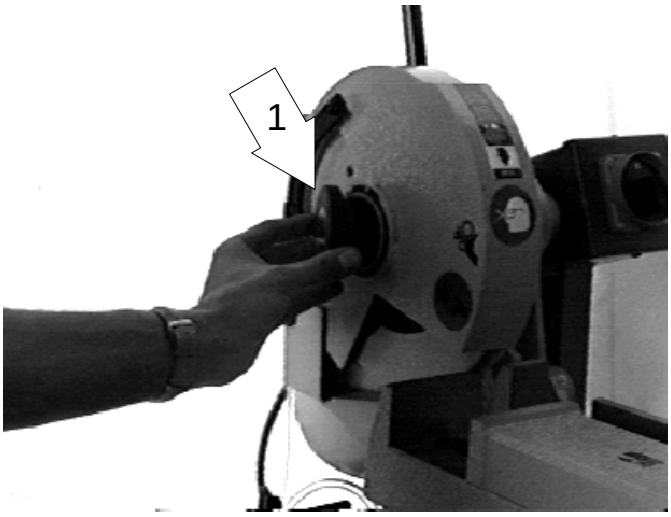


- the machine is now ready for making angled cuts.

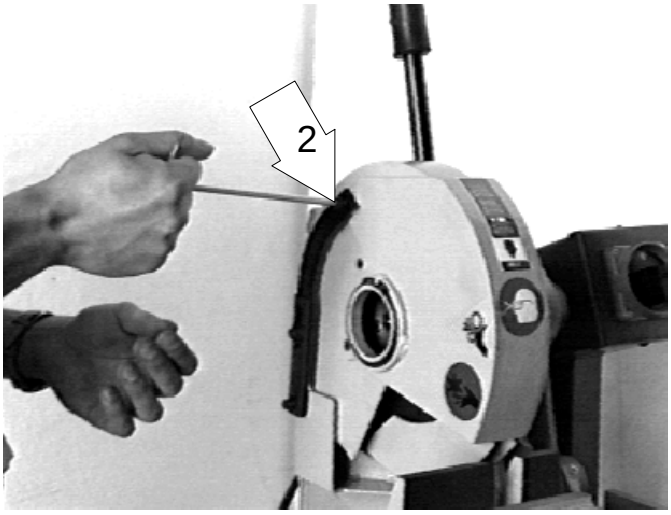
6.3 – Changing the blade

As we have already said, this machine uses different kinds of blades according to the material to be cut. The procedures described below, however, also apply in the event of wear or breakage of the blade.

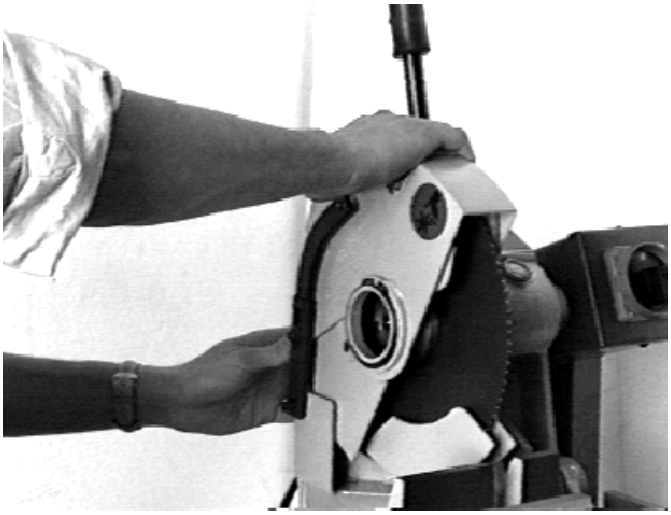
To replace, proceed as follows:
- switch the machine off;
- remove the plastic cap from its seat (1);



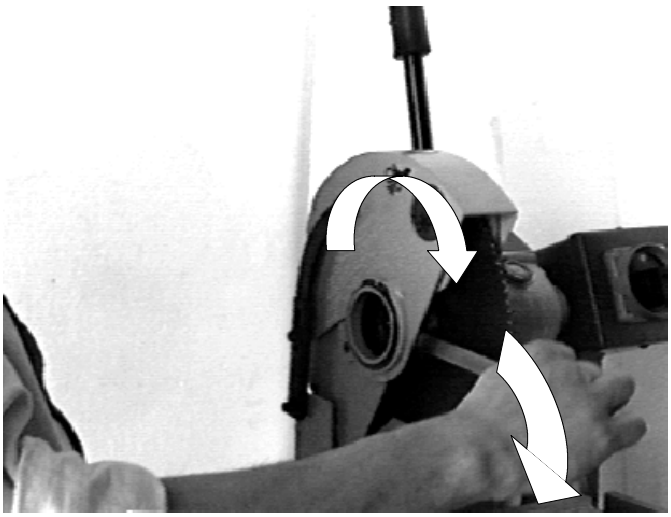
- free the mobile disc guard from the eccentric rod by removing the screw (2) shown in the figure;



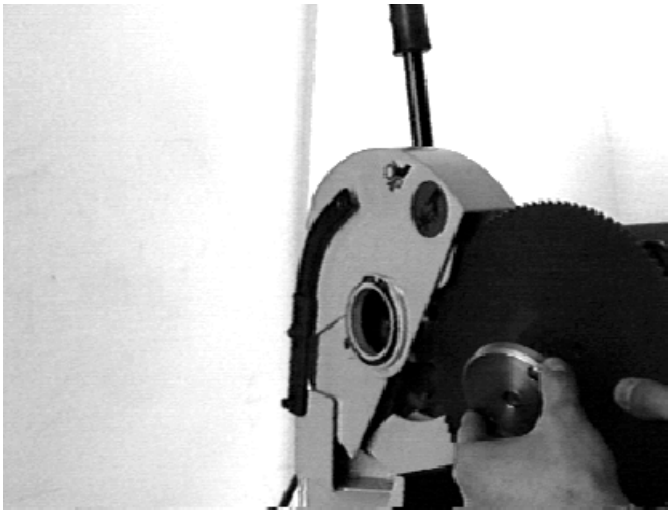
- move the mobile guard above the fixed guard so as to facilitate removal and refitting of the disc;



- now you can take off the blade using the tube key 40mm which is inside the machine's tool kit; the nut unscrews in the same direction of the blade's rotation;



- remove the worn or damaged disc and insert a new disc. Carry out the above procedure in reverse.



The procedure described above for changing the disc is the same irrespective of whether the disc is worn or broken.

Do not carry out the operations described above without first switching off the machine!

Before blocking, the disc must be put in traction on the trascinamento pins turning it in the opposite direction to that of the disc rotation.

CHAPTER 7 - Cutting speed

The cutting speed is determined by the speed of rotation of the disc and the head speed. While the head speed is controlled by the movement of the head and is manual, the disc rotation speed is fixed. This chapter describes the cutting speed available in the standard version of the machine with the 4 pole three-phase or single-phase motor (optional).

7.1 - Standard machine

The standard version of the P 250 is supplied with the following cutting speed:

Disc speed = 45 r.p.m.

This speed is selected using the polarity change switch on the control panel. The cutting speed must be set before starting the cutting cycle as described in paragraph 4.2 in this manual.

7.2 - Machine with 4 pole single-phase motor

OPTIONAL

The P 250 can be equipped with either a single- or three-phase 4 pole motor:

Characteristics of OPTIONAL spindle motor:
asynchronous *single-phase* 4 poles, 50 Hz.

	Voltage Volt	Absorp. Amp	Power kW	rpm
4 poles	230	5,2	0,5	1.360

Stator winding in enamelled copper class H 200 °C;
Insulation class F (limit temperature TL=155°C);
Example of class F insulation: in air-cooled machines at ambient temperature of 40°C (in accordance with CEI 2-3 and IEC 85), the allowable overtemperature is 100°C (where 100°C represents the allowable Δ T).
Protection rating IP54 (total protection against contact with live parts and against water sprayed from all directions).
Complies with CEI standards publication IEC 34 of 1st July 1985.

CHAPTER 8 - Maintenance and choice of consumables

The P 250 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 routine and special maintenance operations must be carried out with the plug disconnected from the electric power socket.

❑ To guarantee perfect operation, all spare parts must be **Hyd-Mech** 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 or preferably thread-free cloth;
- top up the coolant level;
- check the wear of the blade and change if necessary.

8.3.2 - Weekly

This paragraph lists the operations to be carried out for weekly maintenance of the machine:
- clean the machine of all swarf;
- clean the vice and lubricate all the joints and sliding surfaces, preferably using good quality oil.
- check the oil level in the transmission box; if necessary top up with oil through the filler plug.

8.3.3 - Monthly

This paragraph lists the operations to be carried out for monthly maintenance of the machine:
- check that the machine performs cuts perpendicular to the work surface; if not contact our technical service department;
- check that the blade is orthogonal to the workpiece rest shoulder; if adjustment is necessary, contact our technical service department;
- thoroughly clean the water tank and the electric pump filter.

8.4 - Maintenance of working parts

During maintenance work on the P 250, special attention should be paid to operating units such as the transmission box.

8.4.1 - Transmission box

Transmission box maintenance:
- after the **first 100 working hours**, drain the transmission box through the drain plug located in the rear lower section of the unit 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 operation.

8.5 - Consumable materials

It is essential to use specific oils for the pneumatic and lubricant/coolant circuits. The oils suitable for each of these circuits are listed below.

8.5.1 - Oils for transmission box

The machine is supplied with AGIP BLASIA 460 oil, ISO and UNI symbol CC460. However the following oils can be regarded as compatible or with 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 0,4 litres.

8.5.2 - 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, Hyd-Mech 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 4,5 litres
- oil concentration 5-6%

CHAPTER 9 – Blades

When using the P 250, 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

❑ *FINE TOOTH PITCH* – for thin wall materials such as sheet steel, tubes and profiles;
❑ *COARSE TOOTH PITCH* – for large cross-sections;
– for soft materials (aluminium alloys and soft alloys in general).

9.1.1 – Tooth pitch

The choice of the most suitable tooth pitch depends on various factors:

a) the size of the section;
b) the hardness of the material;
c) wall thickness.

Solid sections call for discs with a coarse tooth pitch, while small cross-sections require blades with finer teeth. This is because when cutting walls of small cross-section (1-7 mm) profiles, it is important that the number of teeth actually making the cut should not be too small, otherwise the effect obtained will be one of tearing rather than of swarf removal, leading to a large increase in shearing stress.

On the other hand, when cutting thick materials or solid sections using an excessively fine tooth pitch, the swarf collects as a spiral inside the gullet, and since fine tooth pitches have small gullets, the accumulated swarf will exceed the gullet capacity and press against the walls of the workpieces, resulting in poor cutting (same situation with soft materials), greater shearing stress and hence breakage of the blade.

Choice of tooth pitch T as a function of cross-section to be cut for light alloy solid pieces and profiles

			
S in mm.	Pitch T	S and sp in mm.	Pitch T
10	6	10 sp=0.5	3-4
30	8	30 sp=1.5	4-5
50	10	50 sp=2.5	6-7
70	12	70 sp=3.5	8-9
90	14	90 sp=4.5	8-9
130	18	130 sp=6.5	10

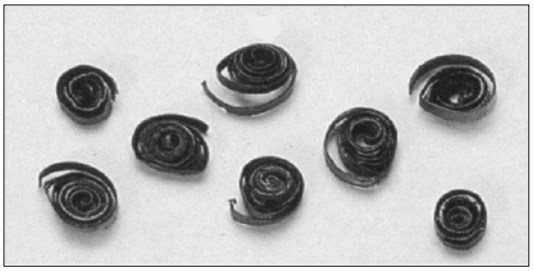
KEY:
s = diameter or width of the solid piece to be cut in mm.
sp = thickness of the wall to be cut in mm.
T = tooth pitch in mm.

A larger pitch should be chosen when, as a result of the shape of the piece to be cut, the cross-section at any given point exceeds the average cross-section given above.

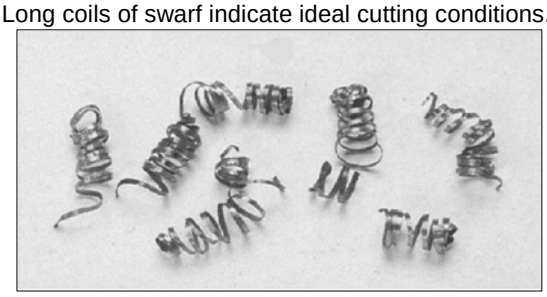
Types of swarf:

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.



9.1.2 – Cutting and feeding speed

The cutting speed, in m/min, and the head feeding speed, in cm^2/min, are limited by the amount of heat generated near to the points of the teeth. If the head feeding speed is too high, the cut will not be straight in either the vertical or the horizontal plane. As we have already said, the cutting speed depends on the strength (kg/mm^2) and hardness (HRC) of the material and the dimensions of the thickest section. The feeding speed depends on the cross-section of the material. Solid or thick-walled materials (thickness>5mm) can therefore 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 feeding speed. A new blade requires a wearing-in period, during which time a feeding speed of about half normal speed should be used.

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 circular blades most frequently used for cutting–off machines are HSS–DMo5/M2 consisting of a single piece and characterised by a high level of toughness and a good cutting resistance. With non–ferrous materials it is normal to use circular blades with brazed hard metal (HM) cutting edges, which offer excellent resistance to wear but low resistance to impact, which in any case is not generally a problem with non–ferrous materials.

CHEMICAL COMPOSITION:

TYPE OF BLADE	***C***	***Cr***	***W***	***Mo***	***V***	***Co***	***HRC***
HSS-DMo5/M2	0.85	4.15	6.37	5.00	1.92		64+/–1

KEY:

C = Carbon Co = Cobalt Cr = Chromium
Mo = Molybdenum W = Tungsten V = Vanadium

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

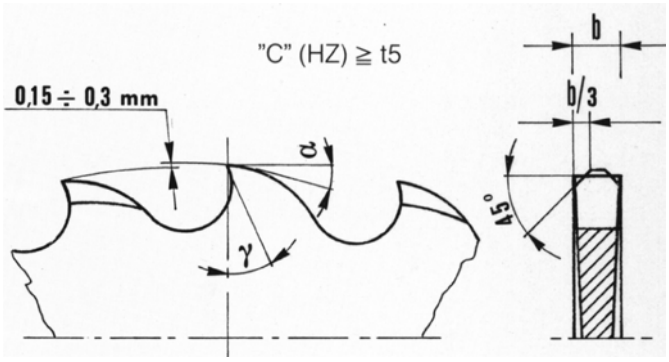
9.1.5 – Types of blades

The P 250 uses discs of dimensions 250x32x2 and 225x32x1.9 made of HSS DMo5 and with type C sharpened teeth for cutting hollow sections, while for solid bars it uses HSS discs; however the tooth pitch is also important, as shown in the table below. In addition to the size and pitch of the teeth, the blades also have other geometric characteristics according to their particular use:
❑ **tooth sharpening**, which in this case may be BW with alternate raked tooth or C with roughing tooth raked on both sides and non–raked finishing tooth;
❑ **tooth pitch**, the distance between the crests of two subsequent teeth (tooth pitch = T).

Tooth shape:

"C" TYPE SHARPENING (HZ)

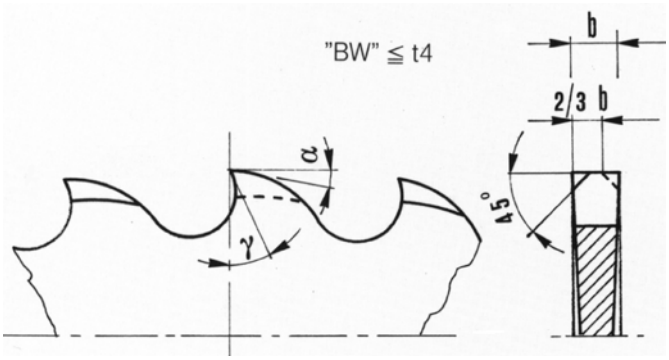
Coarse toothing with roughing tooth raked on both sides and non–raked finishing tooth. The roughing tooth is about 0.3 mm higher.



Coarse toothing with roughing tooth and finishing tooth. Used in saws with pitch greater than or equal to 5 mm for cutting ferrous and non–ferrous materials with solid or solid–profiled sections.

"BW" TYPE SHARPENING DIN 1838–UNI 4014

Coarse toothing with teeth alternately raked to the right and left.



Toothing generally used on cutting–off machines for cutting ferrous and alloy materials with tubular and profiled sections.

The blades fitted to the P 250 are of dimensions 250x2x32 and 225x32x1.9 and are made of HSS DMo5 since the machine is designed for cutting ferrous materials. In addition to the size and pitch of the teeth, the blades also have different geometric characteristics according to their different uses:

Disc selection table for PUCK machine. Other disc characteristics are: dimensions: internal hole diam. 32 mm, distance between fixing holes 63 mm, tooth shape type C.

PUCK	Hollow sections with thickness from 1 to 5 mm			Hollow sections with thickness from 5 to 10 mm			Solid bars with dimensions not exceeding the cutting capacity		
	D.	T	Z	D.	T	Z	D.	T	Z
250	250	4	200	225	6	120	225	8	88

This table can be used to facilitate the choice of toothing since it takes into account both the size of the material to be cut and the diameter of the disc to be used.

	D. 200		225		250		275		300		315		350		370		400		425		450		500	
SOLID SECTIONS	S	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z
	10	5 130	6 100	5 140	6 120	5 160	6 128	5 180	6 140															
	30	6 100	8 80	6 120	8 80	6 128	8 100	6 140	8 110	6 160	8 120	7 140	8 120											
	50			8 90	10 70	8 100	10 80	8 110	10 90	8 120	10 90	8 120	10 100	9 120	10 110	10 110	11 100								
	70							10 90	12 70	10 90	12 80	10 100	12 80	11 100	12 90	11 100	12 90	10 120	12 100	10 130	12 110	10 140	12 120	10 150	12 130
	90									12 80	14 70	12 80	14 70	12 90	14 80	12 90	14 80	12 100	14 90	12 110	14 94	12 120	14 100	12 130	14 110
	110											12 80	14 70	12 90	14 80	12 90	14 80	12 100	14 90	12 110	14 94	12 120	14 100	12 130	14 110
	130													14 80	16 70	14 80	16 70	14 90	16 80	14 94	16 84	14 100	16 90	14 110	16 100
	150																	14 90	16 80	14 94	16 84	14 100	16 90	14 110	16 100
HOLLOW SECTIONS S=0,005xD	D																								
	10	3 200	3 200	3 220	3 220	3 250	3 250	3 280	3 280																
	30	4 160	5 130	4 180	5 140	4 200	5 160	4 220	5 180	4 220	5 180	4 240	5 200												
	50			5 140	6 120	5 160	6 128	5 180	6 140	5 180	6 160	5 200	6 160	5 200	6 180	5 220	7 160								
	70							6 140	8 110	6 160	8 120	6 160	7 140	6 180	7 160	7 160	8 140	6 200	7 180	6 220	7 190	6 230	7 200	6 260	7 220
	90									8 120	10 100	7 140	8 120	7 160	8 140	7 160	8 140	7 180	8 160	7 190	8 160	7 200	8 180	7 220	8 200
	110											8 120	10 100	8 140	9 120	8 140	9 120	8 160	9 140	8 160	9 150	8 180	9 160	8 200	9 170
	130													9 120	10 110	9 120	10 110	9 140	10 120	9 150	10 130	9 160	10 140	9 170	10 150
	150															9 120	10 110	9 140	10 120	9 150	10 130	9 160	10 140	9 170	10 150

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

RECOMMENDED CUTTING PARAMETERS	CUTTING ANGLE		CUTTING SECTION (IN MM)																					RECOMMENDED LUBRICANTS
	α	γ	10–20			20–40			40–60			60–90			90–110			110–130			130–150			
			T mm	Vt m/1'	Av mm/1'	T mm	Vt m/1'	Av mm/1'	T mm	Vt m/1'	Av mm/1'	T mm	Vt m/1'	Av mm/1'	T mm	Vt m/1'	Av mm/1'	T mm	Vt m/1'	Av mm/1'	T mm	Vt m/1'	Av mm/1'	
Mild steel R = 350–500 N/mm^2	20	8	5	50	160	7	45	150	10	45	140	12	40	130	14	40	110	16	35	100	18	30	90	Emulsion – Cutting oil
Medium steel R = 500–700 N/mm^2	18	8	4	30	130	6	30	120	9	25	110	12	25	110	14	20	100	16	20	90	16	15	80	
Hard steel R = 750–950 N/mm^2	15	8	4	20	110	6	20	110	8	18	100	11	17	50	14	15	80	16	14	70	16	12	60	
Super hard steel R = 950–1000 N/mm^2	12	6	3	15	60	4	15	60	6	14	50	9	14	50	12	13	45	14	13	45	14	12	40	
Hardened and tempered steel R = 950–1300 N/mm^2	10	6	2	9	35	3	9	33	4	9	30	6	8	28	8	8	25	10	7	25	12	7	22	
Austenitic stainless steel R = 500–800 N/mm^2	12	8	4	20	50	6	19	45	8	18	45	11	17	40	14	15	40	16	14	35	16	12	35	
Martensitic stainless steel R = 500–800 N/mm^2	15	6	4	20	50	6	19	45	8	18	45	11	17	40	14	15	40	16	14	35	16	12	35	
Grey iron	12	8	4	25	100	6	23	100	8	22	90	11	20	80	14	19	880	16	17	70	16	16	60	
Aluminium and alloys R = 200–400 N/mm^2	22	10	6	1100	1800	8	1000	1700	12	900	1600	16	800	1400	18	700	1300	20	600	1100	20	500	900	
Aluminium and alloys R = 350–500 N/mm^2	20	8	5	200	400	7	180	400	10	160	350	12	160	300	14	140	300	16	130	250	16	130	250	
Copper R = 300–500 N/mm^2	20	10	6	400	600	8	350	600	11	300	550	14	250	550	17	200	500	18	150	500	20	120	400	
Hard bronze R = 600–900 N/mm^2	15	8	5	400	800	7	400	700	10	350	700	12	300	600	14	250	600	16	200	500	18	150	400	
Phosphor bronze R = 400–600 N/mm^2	12	8	4	120	160	8	110	150	8	100	140	10	90	130	12	70	110	14	60	100	16	50	90	
Brass R = 200–400 N/mm^2	16	16	5	600	1100	6	600	1100	10	550	1000	12	550	900	16	500	900	18	500	800	18	450	800	Cutting oil
Alloyed brass R = 400–700 N/mm^2	12	16	5	500	700	7	400	600	10	350	600	12	350	500	16	300	500	18	300	400	18	200	400	
Titanium and alloys R = 300–800 N/mm^2	18	8	4	50	160	4	45	150	6	45	140	10	45	130	12	40	110	14	35	100	16	30	90	
Profiles and tubes with wall thickness 0.05 D R = 300–600 N/mm^2	18	8	3	19	130	4	18	120	5	18	110	6	17	110	6	16	100	8	16	90	10	15	80	Emulsion
Profiles and tubes with wall thickness 0.25 D R = 300–600 N/mm^2	15	8	2	35	130	3	33	120	4	30	110	5	30	110	5	28	100	6	26	90	6	24	80	

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

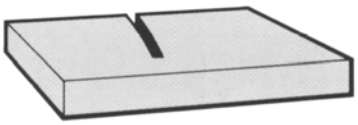
9.2.1 – Steel nomenclature table

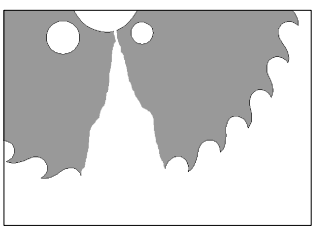
Material	SS Sweden	AISI U.S.A.	DIN Germany	BS Great Britain	UNI Italy	AFNOR France
Carbon steels	1311 1572	1015 – 1035	C 22 – C 35 20 Mn 5 – 28 Mn 6 CK 22 – CK 50	050 A 20 080 M 46 – 50 120 M 19 150 M 28	C 15 – C 35 C 22 Mn C 28 Mn	XC 18 XC 38 H 1 20 M 5
Carbon steels	1650 1880	1040 – 1064 1770 – 1880	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 P 250. 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 TROUBLESHOOTING section concerns troubleshooting general machine operating faults. Taken together they form a comprehensive troubleshooting 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*
Cuts not at 90 degrees or angled 	Head speed too high	Reduce head speed
	Disc with worn teeth	Replace disc
	Orthogonality of disc to workpiece rest shoulder	If this is not the case, contact our technical service department.
	Perpendicularity of disc to work surface	If this is not the case, contact our technical service department.
	Broken teeth	Check the hardness of the material being cut.
Teeth breaking 	Incorrect lubricant/coolant fluid	Check the water and oil emulsion; check that the holes and hoses are not blocked; direct the nozzles correctly.
	Material too hard	Check the cutting speed, feed speed and disc pressure parameters and the type of disc you are using.
	Disc not worn–in correctly	With a new disc it is necessary to start cutting at half feeding speed. After the wearing–in period (a cutting surface of about 300 cm^2 for hard materials and about 1000 cm^2 for soft materials) the cutting and feed speeds can be brought up to normal values.

PROBLEM	PROBABLE CAUSE	SOLUTION
	Disc with excessively fine tooth pitch	The swarf wedges into the bottom of the teeth causing excessive pressure on the teeth themselves.
	New blade inserted in a partially completed cut.	The surface of the cut may have undergone local thermal alteration, making it harder: when starting work again, use a lower cutting speed and head feed speed. A tooth from the old blade may be left in the cut: check and remove before starting work again.
	Workpiece not clamped firmly in place	If the workpiece moves during cutting it can cause the teeth to break: check the vice, the jaws and the pressure with which the workpiece is clamped.
	Vibration	The workpiece vibrates in the clamp: check that the slide is adjusted correctly; check the pressure with which the workpiece is clamped.
Rapid tooth wear	Head speed too slow	The blade runs over the material without removing it: increase head speed.
	Cutting pressure too high	Reduce the cutting pressure.
	Insufficient coolant	Check the coolant level and clean piping and nozzles.
	Incorrect fluid concentration	Check and use the correct concentration.
	Material defective	The materials may present altered zones either on the surface, such as oxides or sand, or in section, such as under-cooled inclusions. These zones, which are much harder than the blade, cause the teeth to break: discard or clean these materials.
Broken blade	Head speed too high	Reduce head speed.
	Teeth in contact with material before starting the cut	Always check the position of the blade before starting a new job.
	Insufficient coolant	Check the coolant level and clean piping and nozzles.
	Vibrations	The workpiece vibrates in the clamp: check that the slide is adjusted correctly; check the pressure with which the workpiece is clamped and if necessary increase.

10.2 – Troubleshooting machine faults

This section of the chapter concentrates on troubleshooting any machine faults or operating problems which may occur during work with the P 250.

PROBLEM	*PROBABLE CAUSE*	*SOLUTION*
Spindle motor will not turn	Electrical power supply	Check: the phases; the cables; the plug; the socket. Also check that the motor connections are in place.
	Contactor	Check that the phases in it are present both on the input and output, that it is not jammed, that it closes when powered and that it is not causing short circuits. Change if any of these problems are found.
	General switch	Check that the phases are present on both the input and output. If not, replace.
	Motor	Check that it has not burnt out, that it turns freely and that there is no moisture in the connection terminal board box. The winding can be rewound or replaced.

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Hyd-Mech Group warrants each new Cold Saw to be free from failure resulting from defective material and workmanship under proper use and service for a period of one year following the date of shipment to the user. Hyd-Mech's sole obligation under this warranty is limited to the repair or replacement without charge, at Hyd-Mech's factory, warehouse, or approved repair shop, of any part or parts which Hyd-Mech's inspection shall disclose to be defective. Return freight must be prepaid by the user.

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