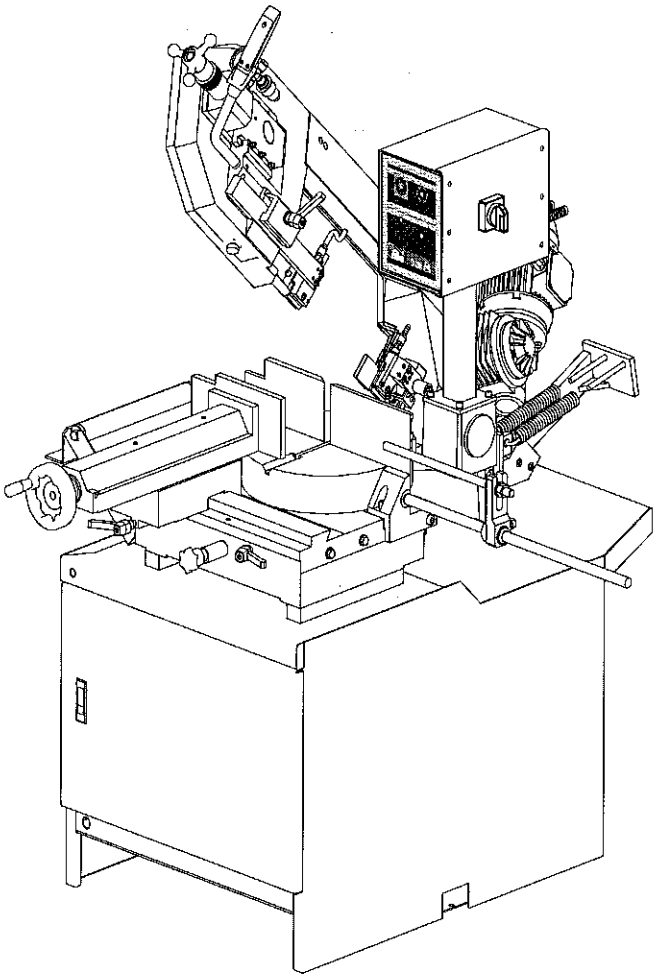
EN **DM10–2**

Year of manufacture: _____



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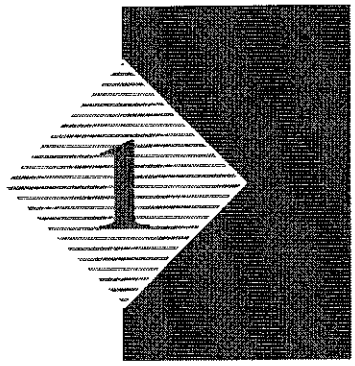
SECTION I

INTRODUCTION AND TECHNICAL SPECS

Introduction and technical specifications



Foreword

The company, in response to modern production techniques, has developed the new **DM10–2**.

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 EEC safety standards.

The **DM10–2** is structurally rigid, silent and safe: it produces a minimum of waste (1.2 mm) while its great versatility makes it suitable for cutting various materials such as stainless steel light alloys, aluminium, copper and bronze at high speed and with high precision.

Its high cutting capacity, combined with the possibility of making inclined cuts from 60° left to 45° right, make this model the ideal solution for satisfying the wide strange of cutting needs of machine shops, turneries, structural steel shops and engineering workshops.

We congratulate our clients on having chosen this product, which will give effective and faithful service for many years, especially if the instructions contained in this use and maintenance manual are carefully followed.

Warning This cutting machine has been designed and made specifically for cutting metallic materials.

CUTTING SPEEDS		
1st Slow Speed	mt/min	36
2nd Fast Speed	mt/min	72

Warning All models can be equipped with the Inverter, an optional device, which offers a range of speeds comprised between **20 and 90 mt/min** As the machine is predisposed for the Inverter, it can be installed by the client or factory pre-installed on request made during the ordering procedure.

BAND SAW		
Rated size	mm	2950 x 27 x 0,9
Max/min blade length	mm	2960÷2940
Blade height	mm	27
Blade width	mm	0,9
Band saw tension	bar/kg	70 / 900

Attention When choosing the cutting tool, if its dimensions do not correspond to those included in the "Rated size" section, check that the dimensions at least fall within the admissible max/min specifications.

RATED ELECTRICAL POWER		
Head spindle motor	kW	1,8/1,5
Electric coolant pump motor	kW	0,06
Max installed power	kW	1,86

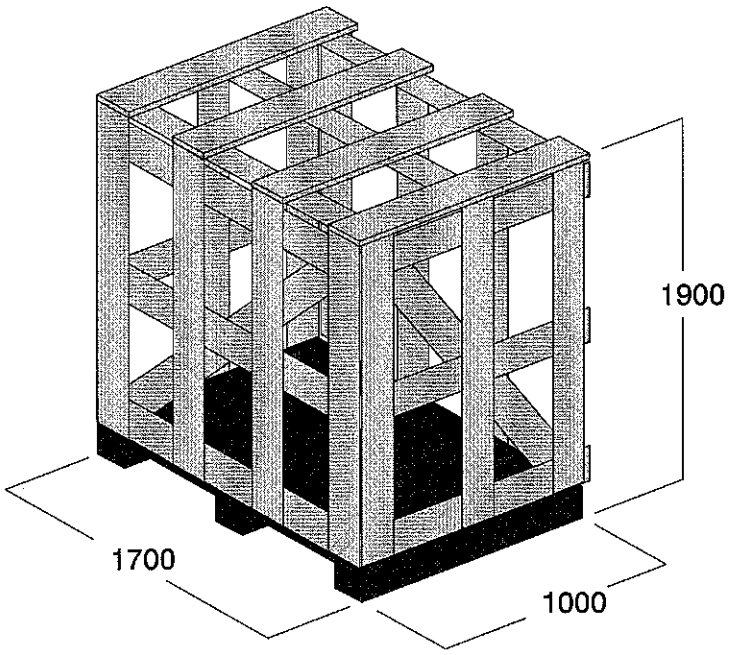
WORKING PRESSURE MODEL MA (Automatic Vice)		
Max. working pressure for opening/closing vice	Bar	6
Air consumption for a complete cycle	Nl/min	1,34

N.B. The "air consumption" value refers to standard conditions (temperature 0° and pressure 1.013 bar, i.e. density 1.3 x 10^{-3} Kg/l) where 1 Kg/min. = 772 Nl/min.

LUBRICANT/COOLANT FLUID AND OIL		
Oil for blade tensioner unit	V L	0,5
Oil for transmission box	capacità Kg	0,32
Oil for optional Cut Control System cylinder	capacità Lt.	0,7
Lubricant/coolant fluid (oil concentration 5–6%)	capacità Lt	13

VICE		
Vice max. opening	mm	285

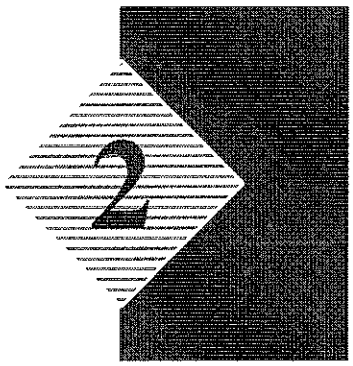
PACKED WEIGHT		
Wooden cage and pallet	kg	70
Wooden pallet	kg	20



SECTION 2

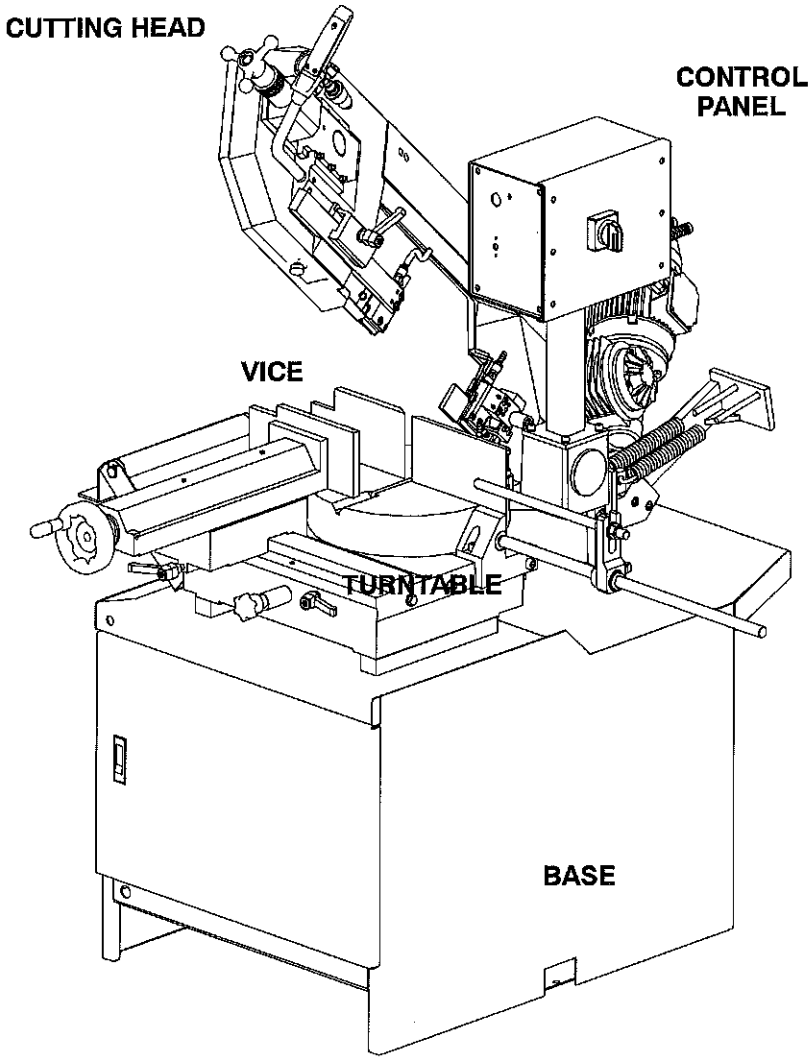
FUNCTIONAL PARTS

Functional parts



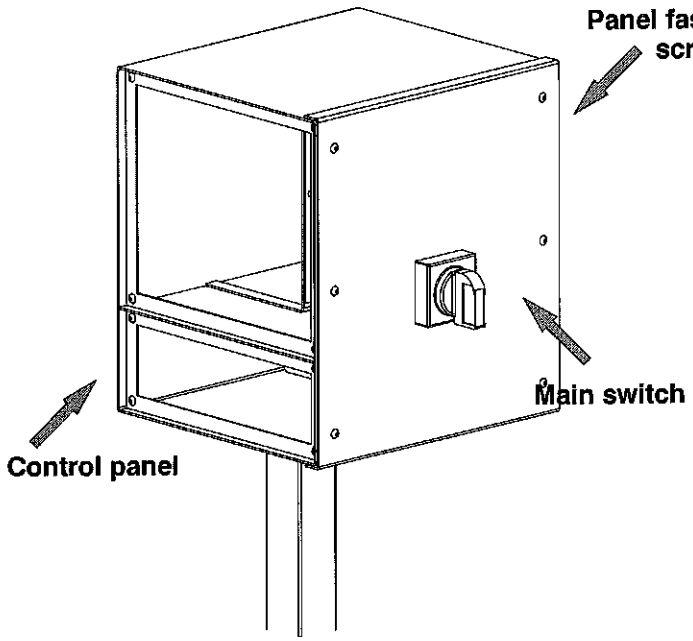
DM10-2 model

In order for the user to move towards a full understanding of how the machine works, which is described in detail in the chapter 5, this chapter deals with the main units and their locations.



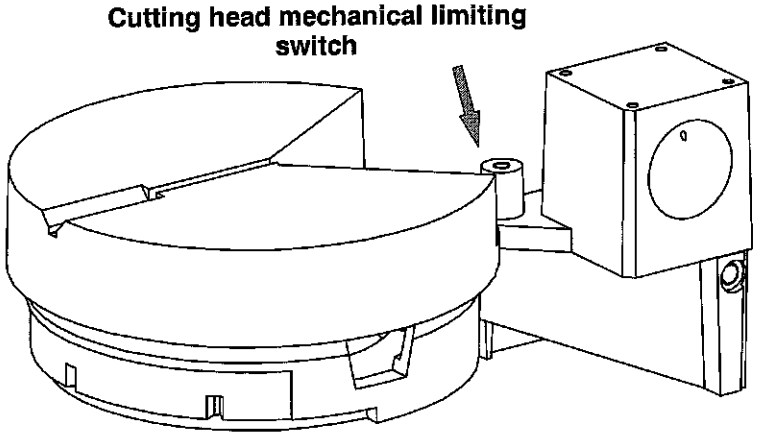
Control Panel

The control panel has a protection rating of IP 54 and contains the electrical equipment. Access is gained by removing the screws fastening a safety panel, while the operator's safety is guaranteed by a key–operated safety switch, designed to prevent any intentional interference with the unit. In order to remove the panel from its mounting, the main switch has to be shifted to 0 (OFF), which automatically cuts off the electrical supply.



Turntable

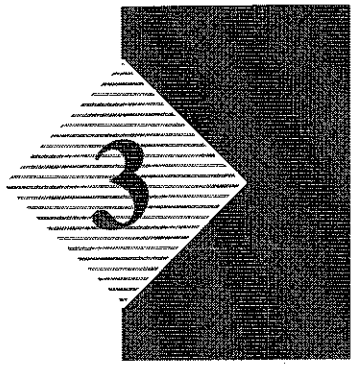
A cast iron casting forms the fulcrum for the cutting head, and the support for the work table and the control panel. Releasing the locking lever on the slideway allows the cutting head to be rotated to the right and to the left.



SECTION 3

SAFETY AND ACCIDENT PREVENTION

Safety and accident prevention



The **DM10–2** has been designed and produced in accordance with European standards. For the correct use of the machine we recommend that the instructions contained in this chapter are carefully followed.

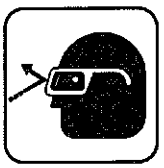
Use of the machine

The **DM10–2** band saw cutting machine is intended exclusively for cutting metallic materials, ferrous or non–ferrous, in section or solid.
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 MACHINES DIRECTIVE 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.

Attention The manufacturer declines any responsibility whatsoever, either civil or criminal, should there be 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 itself or if the machine is employed in a plant system and its proper function is thereby altered.

Recommendations to the operator



Always wear proper goggles or protective glasses.

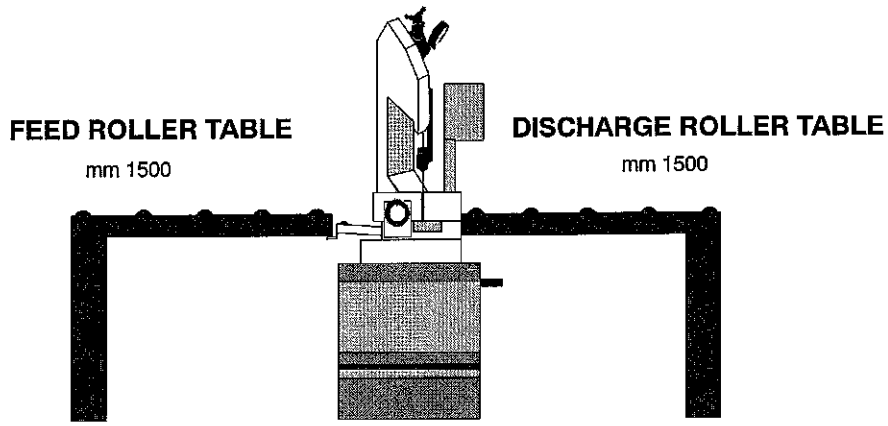
Do not use the machine without the guards in position. Replace the polycarbonate windows, if subject to corrosion.

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 cutting operations, support the material at both ends of the machine using the support arm – standard, or 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.

Before carrying out any repair work on the machine, consult the Technical Assistance Service: this can be done through a representative in the country of use of the machine.

Adjustment of the blade–guide head must only be carried out with the machine at a standstill.

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 **DM10–2** band saw.

Reference standards

MACHINE SAFETY

- EEC MACHINES DIRECTIVE 98/37/CE ;
- EEC directive no. 89/336 "EMC - Electromagnetic Compatibility";
- 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.

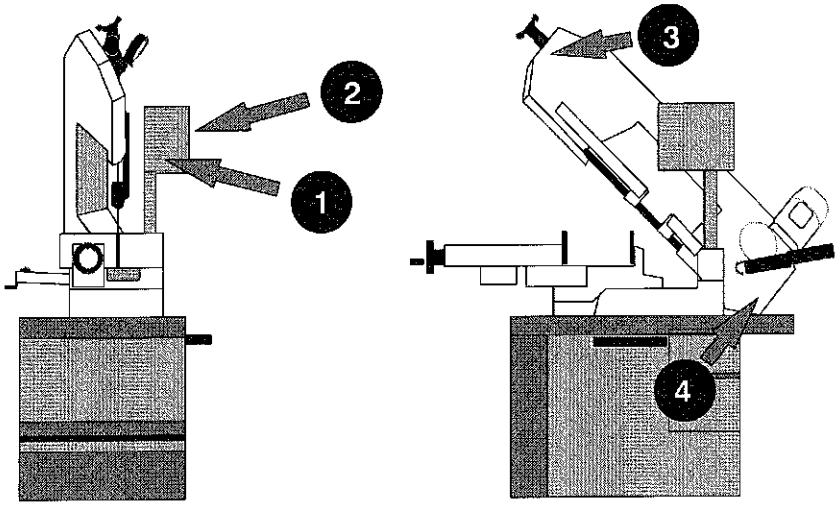
Emergency devices

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 the guards does not restart the functions, which must be reset».

...Emergency devices applicable to the DM10–2:

1. **Emergency stop**: a non–return mushroom–head pushbutton, colour red on yellow background, is located on the control panel of the machine. To release the pushbutton, the actuator must be rotated 45°. After the emergency situation has been resolved, the machine must be reset.
2. **Automatic thermal–magnetic cutout switch with thermal–magnetic relay:** the machine auto switch, located on the control panel, has two protection systems against voltage drops. In the case of a voltage drop, all electrical components are disengaged, the machine stops immediately, and automatic restart when the power supply returns is inhibited. Another function is that of resetting the thermal relay provided to protect against overcurrents.
3. **Pressure contact for monitoring blade tension:** the machine stops immediately if the blade breaks or if the tensioner cylinder pressure drops.
4. **Protective guard for blade:** a coded key microswitch is operated if the blade cover is accidentally or intentionally opened during the machine operating cycle, immediately shutting down all functions.



Vibration emission

This sawing machine complies with the norms EN1299 and EN1033, as the machine vibration emission on the devices controlled by the operator does not exceed the threshold of 2.5 m/s^2

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 **DM10–2**; Test report no. 061200.

Emissions

- CEI EN 61000-6-4 (2002) Electromagnetic Compatibility (EMC) - Generic standard regarding emissions. Part 6-4: 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.

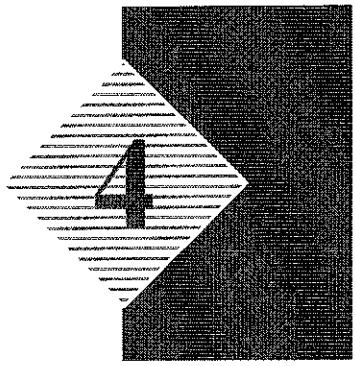
CONDUCTED EMISSIONS				
Gate A	**Freq. (MHz)**	**Q–peak limit (dBuV)**	**Mean value limit (dBuV)**	**Result**
A.C. power supply input	0.15 – 0.5	79 – 73 (linear reduction with log of frequency)	66 – 60 (linear reduction with log of frequency)	Complies
	0.5 – 5	73	60	
	5 – 30	73	60	

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

SECTION 4

MACHINE INSTALLATION

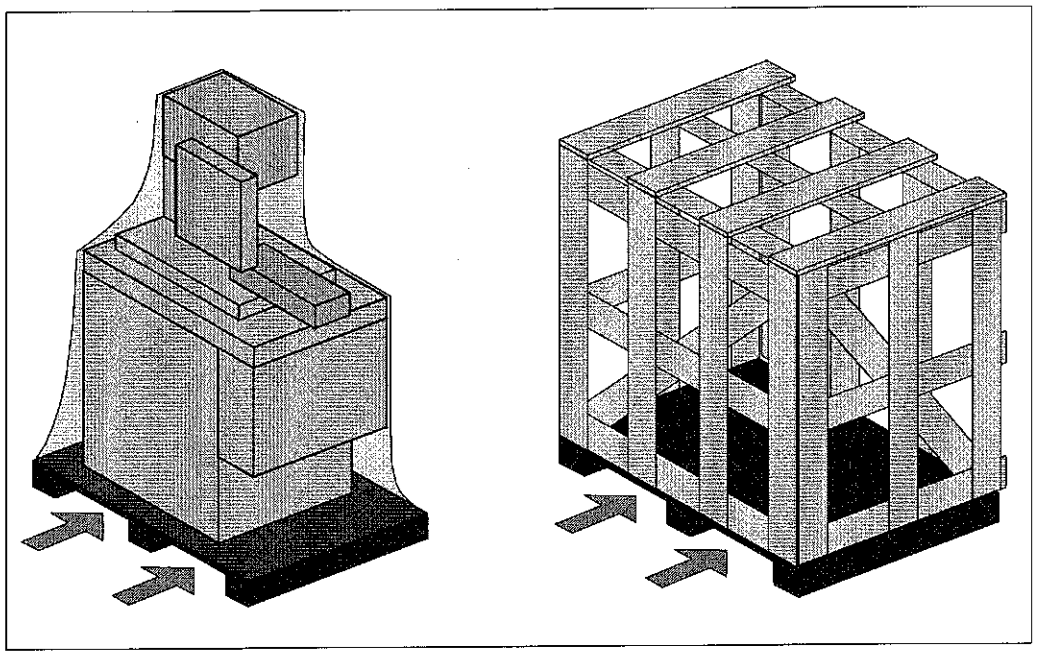
Machine installation



Packaging and storage

The company 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. Therefore the customer will receive the machine in one of two following ways:

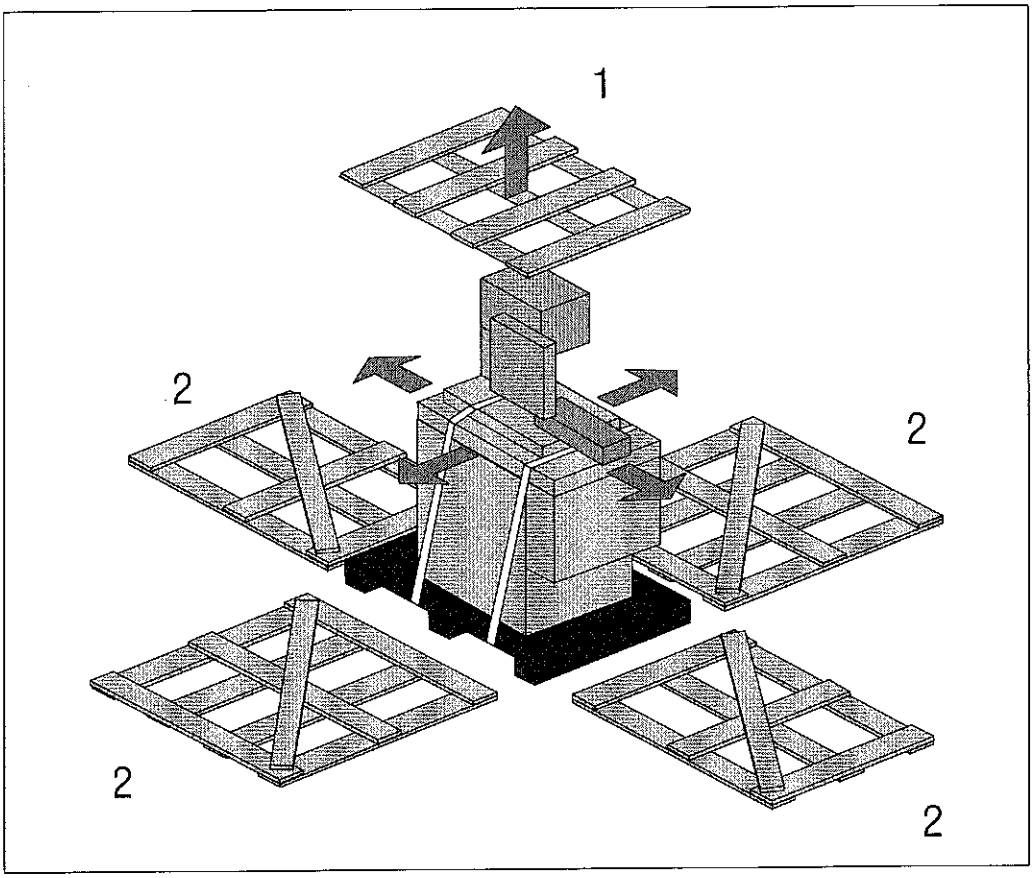


1. on a pallet with straps and heat–shrink plastic;
2. on a pallet with straps, heat–shrink plastic and a wooden crate.

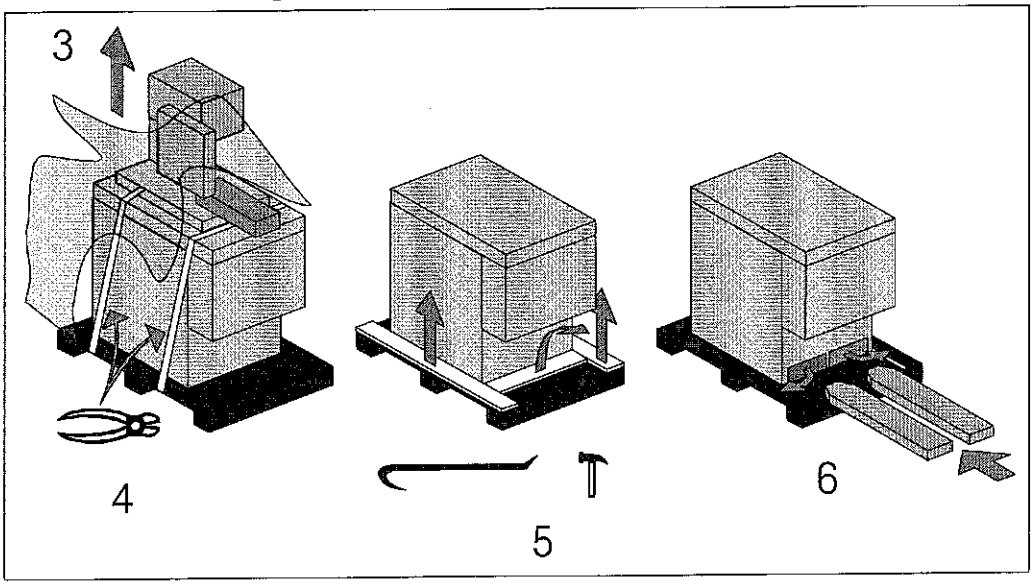
Warning In both cases, for correct balancing the machine must be handled using a fork-lift truck, inserting the tines at the points indicated by the arrows, using the reference marks on the crate itself.

Attention Before carrying out lifting operations, make sure that the weight of the machine, as indicated on the crating or other packaging, is within the forklift truck load limit.

1. remove nails and lift the top of the cage;
2. remove nails and lower walls;



3. remove heat–shrink covering;
4. remove the straps;
5. remove nails from pallet securing planks and remove planks;
6. remove the front panel and insert fork tines.



To locate the machine in the workplace, **the machine dimensions** and necessary operator working space, including **the spaces laid** down in safety standards, **must be taken into account.**

Check list

Before starting installation, check that all the accessories, whether standard or optional, supplied with the machine are present. The basic version of the **DM10–2** 2–SPEED machine is supplied complete with:

CHARACTERISTICS	STANDARD	OPTIONAL
Base with large swarf collection drawer, removable coolant tank and electropump for band saw lubrication/cooling	✓	
Double return spring for head upstroke	✓	
Hydraulic transducer for blade tension display	✓	
2.950x27x0.9 bimetal blade for solid and section materials	✓	
Right/left slide locking unit, with quick locking/release	✓	
Vice with rapid jaw positioning	✓	
Blade cleaning brush	✓	
Designed for transpallet handling systems	✓	
Electric control panel (totally identifiable cabling, stand–by, main switch with lockable panel–closing device, speed switch, emergency device, thermal–magnetic overload cutout, minimum voltage relay, voltage drop protection, 24 V low–voltage plant)	✓	
Blade protection behind and below blade guide heads	✓	
IP 55 handgrip	✓	
Precision stops for cuts at 0°, 45°, 60° left and 45° right	✓	
Accessory kit	✓	
Vice control pedal (only with MA version)*		✓
4/8 pole motor for 36/18 mt./min. speed*		✓
Automatic Vice kit (MA)		✓
2.950x27x0.9 M2/M42 bimetal band saw		✓
Cut Control System (CCS)		✓
Electronic speed control (inverter) 20 to 90 mt/min		✓
Ø 20 mm measuring rod for cuts to measure with ratchet wrench and lever		✓
Bar support		✓
K60/K100 roller table on supply side – kit 1500 mm		✓
Feed side roller table support		✓
Discharge side roller table adaptor		✓
K60/K100 roller table for discharge side, 1500÷6000 mm		✓
5 l can of emulsible oil		✓

***ACCESSORIES AVAILABLE ON REQUEST**

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

- 4 and 10 mm Allen keys;
- pipe wrench 10 mm;
- measuring rod for cuts-to-measure;

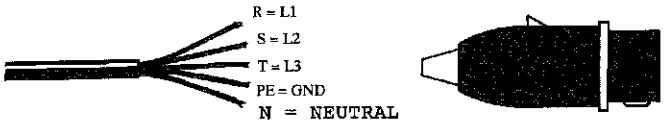
Connection to the power supply

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.

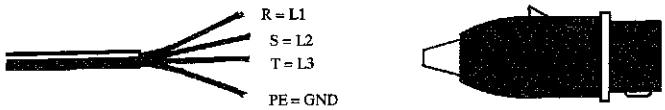
To connect the machine to the power supply, proceed as follows:

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

CONNECTION FOR "5-CORE" WIRE SYSTEMS WITH NEUTRAL

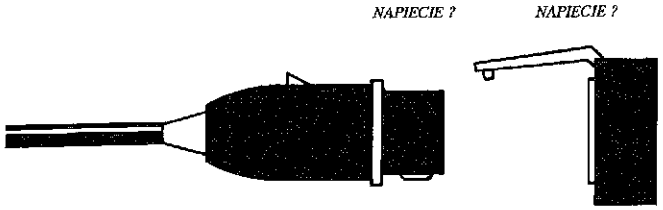


CONNECTION FOR "4-CORE" WIRE SYSTEMS WITH NEUTRAL

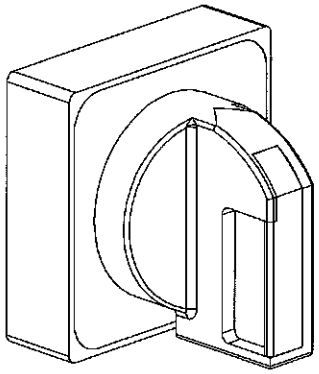


Attention When using systems with a neutral wire, special care must be taken when connecting the **blue** neutral wire, in that if it is connected to a phase wire it will discharge the **phase voltage** to the equipment connected for **voltage: phase-neutral.**

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



▶ Power up machine by rotating the main switch located on the right side of the control panel (The STAND BY LED lights up).

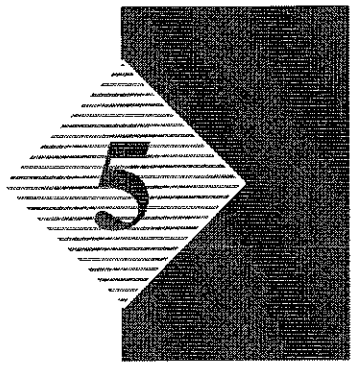


Check that the motor is rotating in the correct direction. For this check the following operations must be carried out:

SECTION 5

DESCRIPTION OF MACHINE OPERATION

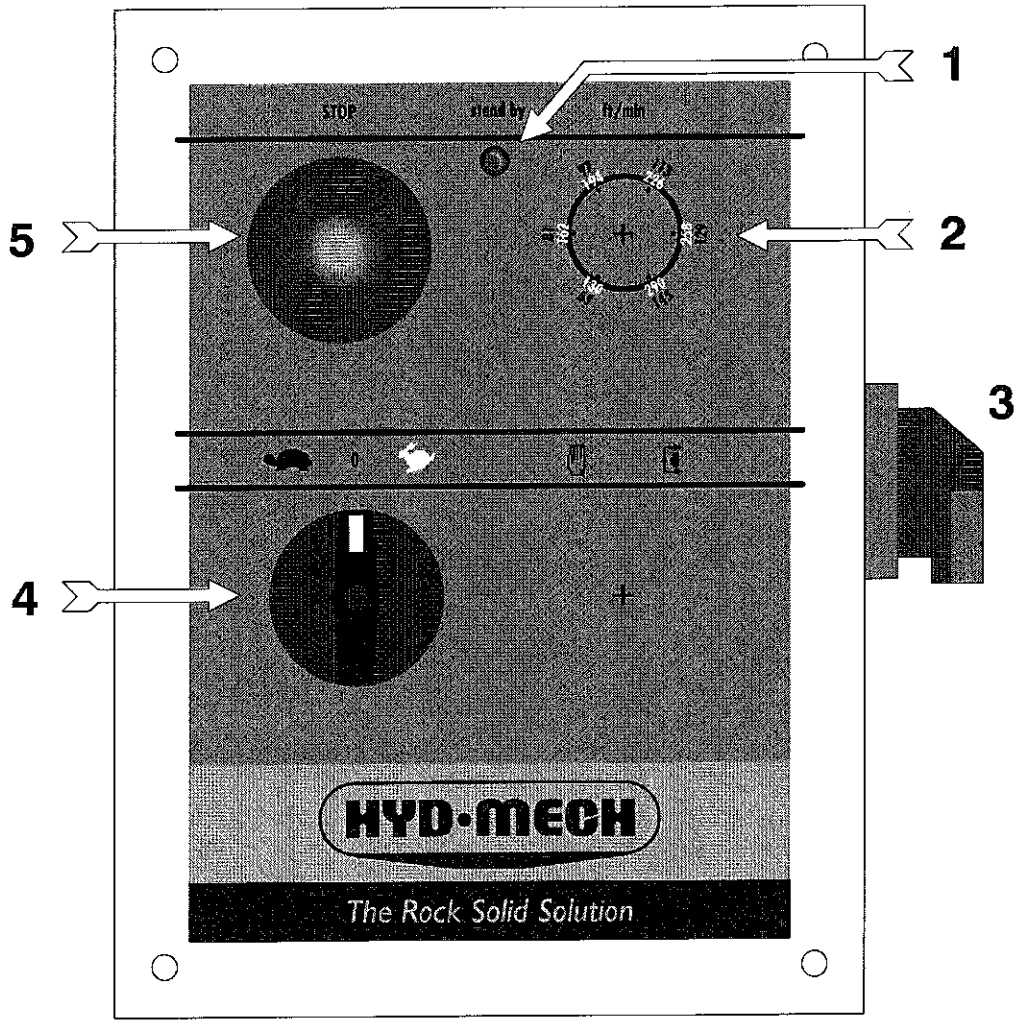
Description of machine operation



This chapter analyses all the machine functions. We begin with a description of the pushbuttons and other components on the control panel.

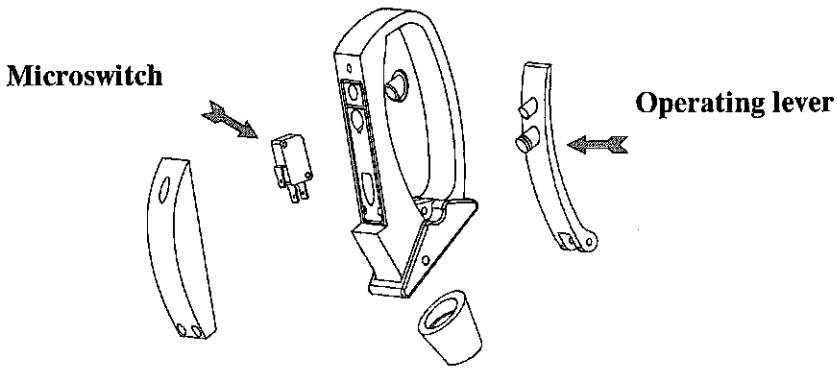
Description of the control panel

The components of the **DM10–2** control panel are shown in the diagram below. Each arrow has a number which corresponds to the descriptions that follow.



HEAD CONTROL LEVER MICROSWITCH

The grip of the manual head control lever incorporates a microswitch for manual control of the blade motor.

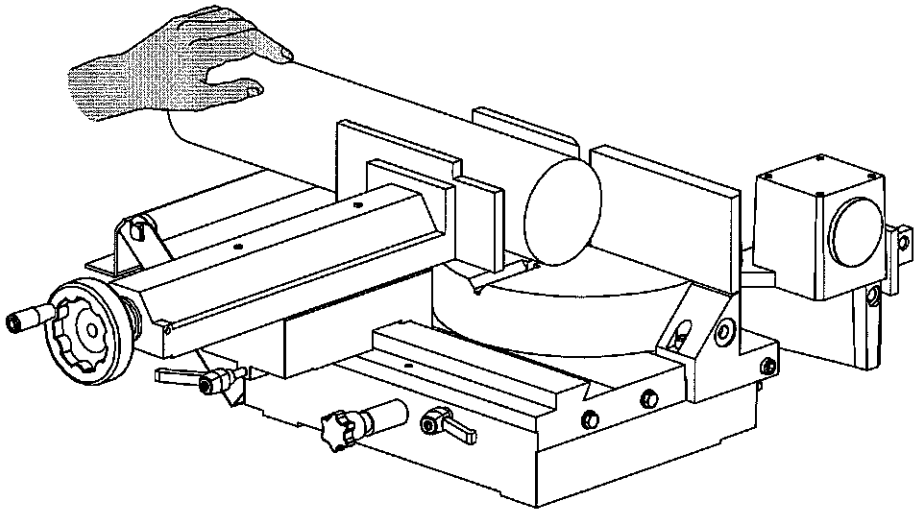


The microswitch is enabled when the machine is not in emergency state. In compliance with the relevant existing standards, voltage is 24V and the microswitch is installed in a housing (blue knob) sealed against external agents such as dust or moisture, with a protection rating of IP 55.

Clamping the work piece in the vice

In the basic version, the work piece is clamped in the vice by rotating the opening/closing handwheel (in a clockwise/anticlockwise direction), as shown:

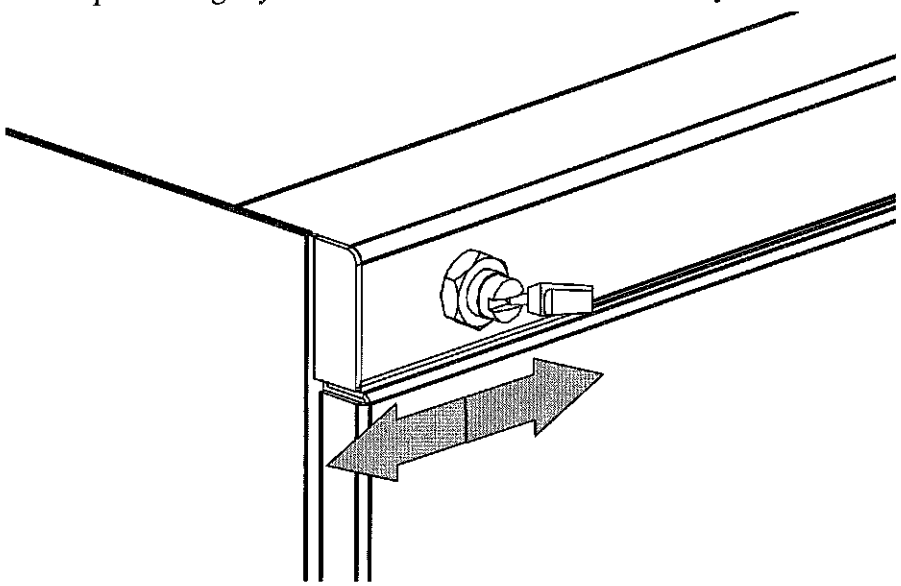
- each time the vice is closed make certain that the work piece is solidly clamped. This can be done manually.



Clamping the work piece in the Automatic Vice (MA version)

If the machine is equipped with the Automatic Vice optional device (MA), the opening and closing of the vice is performed by means of the manual valve switch located on the base, which activates the vice pneumatic cylinder device. An optional pedal unit is available as an alternative to the manual valve.

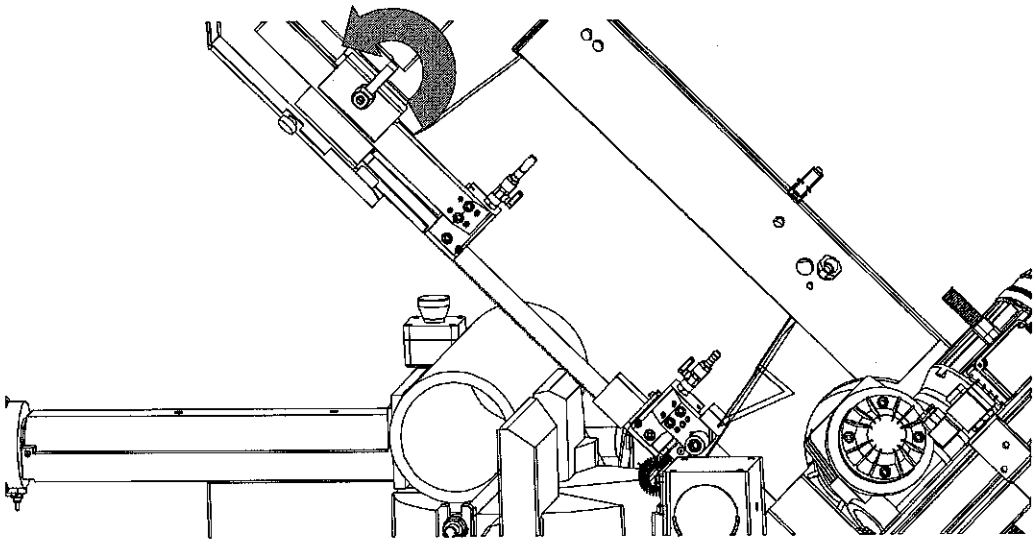
- Near the vice to within 2–3 mm from the work piece;
- close the vice using the manual valve situated on the base and make certain that the piece is tightly blocked. This can be done manually.



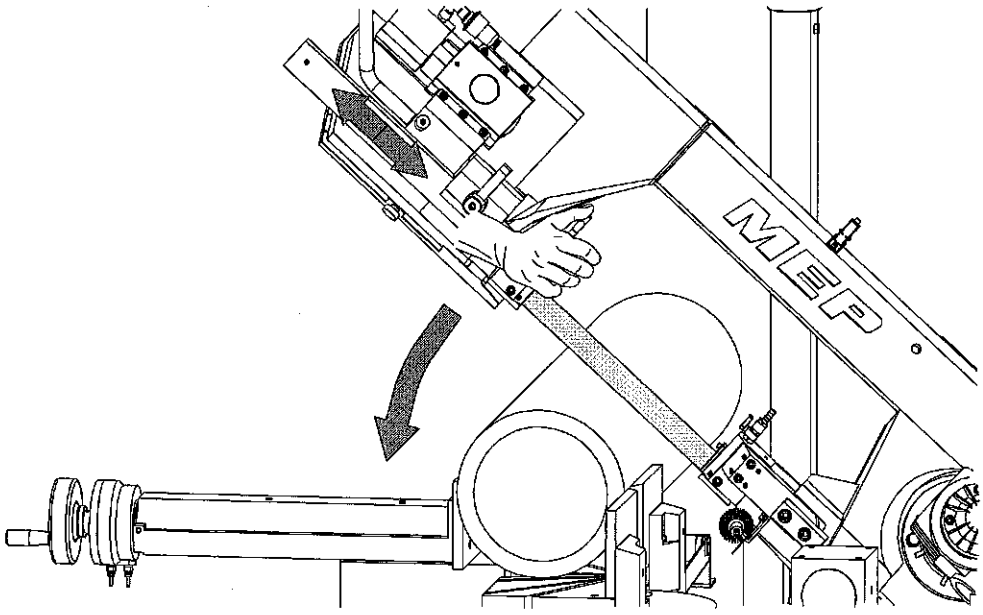
Width of cut

The machine is fitted with protections which protect the entire blade stroke, leaving exposed only the part of the blade required to make the cut itself as specified by current standards. The width of the cut is determined by the longitudinal section of the workpiece, so that only the part of the blade required to make the cut is actually exposed.

- ▶ Position the workpiece on the work table in proximity to the blade downstroke trajectory and clamp it in the vice.
- ▶ loosen the ratchet lever on the sliding shaft of the front blade guide head;

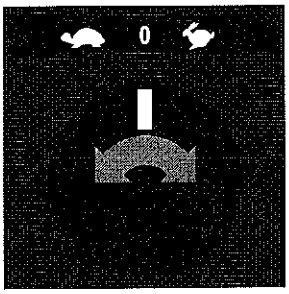


- ▶ the mobile front guide head must be positioned near to the material, leaving the downstroke trajectory free to reach beyond the sliding vice jaw;

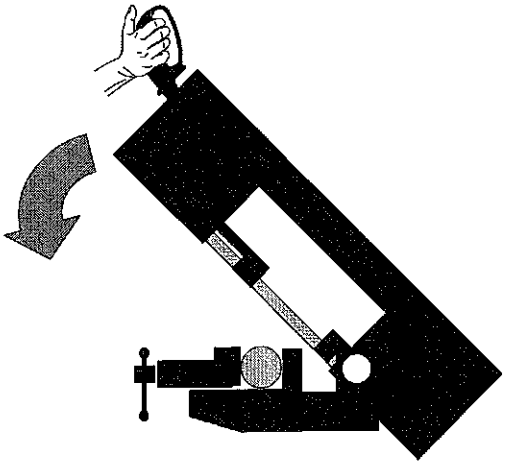


- ▶ Tighten the ratchet lever to lock the head slide.

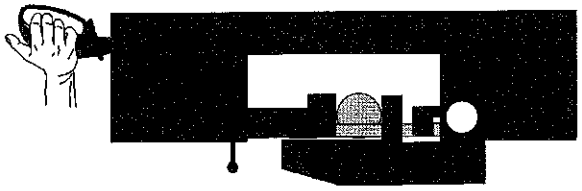
- Select the cut using the **polarity change switch** according to the type of the material to be cut (shape, thickness, hardness, etc.).



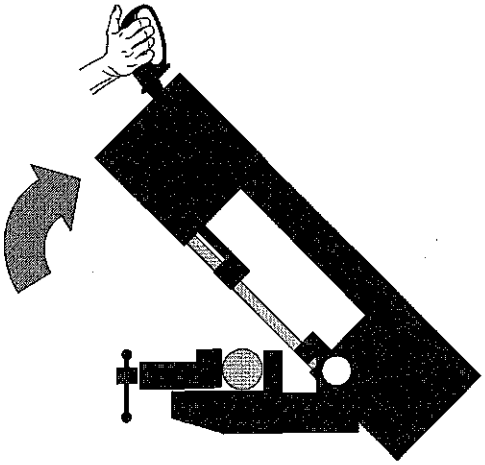
- Grip the head control lever and start the blade rotating by pressing the microswitch on the handgrip; the downstroke speed of the head is manually controlled by the operator.



- The motor starts up and sets the blade in rotary motion; the lubricant/coolant pump starts up at the same time.



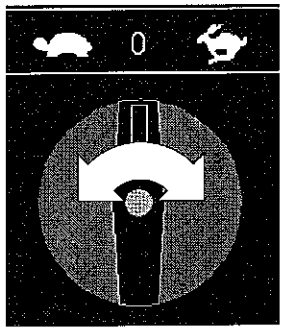
- At the end of the cutting operation, the head can be raised.



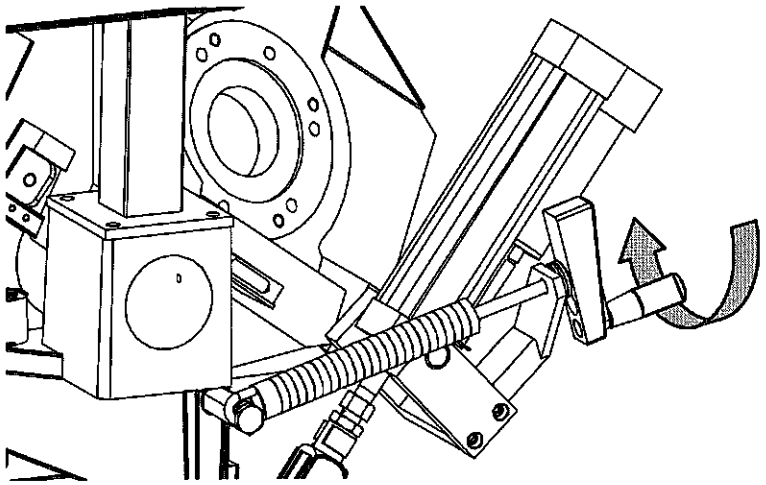
CCS (Cut Control System) functioning cycle

The Cut Control System is an optional enabling both a Manual and a Semiautomatic/Dynamic work cycle to be performed. Sequence of operations for carrying out a cut in Semiautomatic/Dynamic mode:

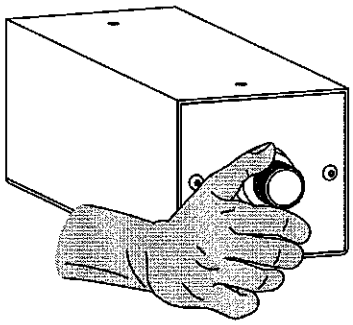
- power up the machine by turning the main switch;
- Position the material in the vice and calculate the cut lengths (using the measuring rod).
- Clamp the piece in the vice; **if the machine is the MA version,** bring the vice manually to within 2–3 mm. of the workpiece; close the vice using the special open/close button on the base of the machine or using the footpedal if equipped on the machine.
- Select the cut speed using the Polarity change switch.



- Set the tension on the head return spring using the appropriate crank so that the first turn is aligned with the Semi.automatic/Dynamic cycle notch.



- Set the head downstroke speed on the hydraulic panel. located below the machine control panel, according to the characteristics of the material to be cut.

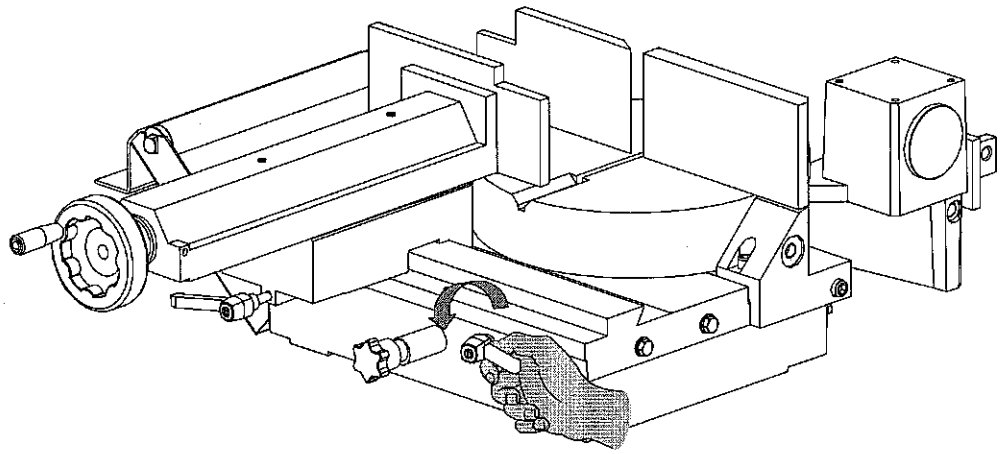


Angled cuts

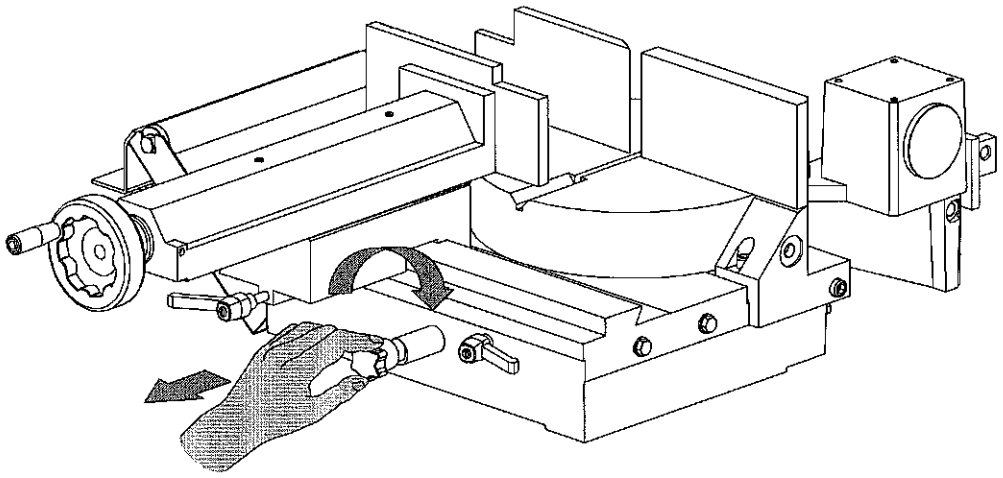
The machine can make angled cuts from 60° left to 45° right. Reference stops are mounted on the sides of the turntable to facilitate rapid 0°, 45° and 60° cuts to the left and 45° cuts to the right.

Angled cuts 45° to the left

- Make sure the vice is positioned to the left of the 0° cutting slot;
- slacken the turntable lock/release lever.



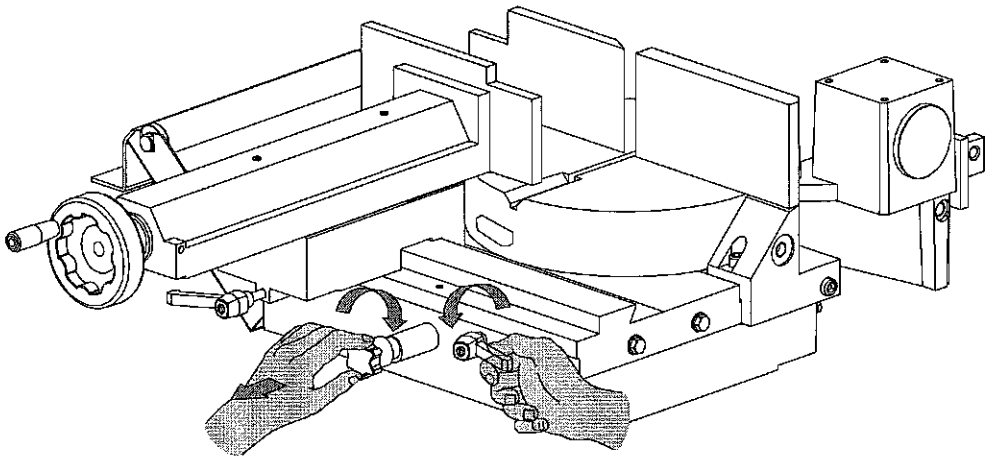
- Pull the eccentric pin knob towards you (0° reference stop) and rotate slightly to raise it.



Warning

The 0, 45 and 60° reference stops for cuts to the left and the 45° reference stop for cuts to the right facilitate rapid head positioning during turntable rotation. However, the eccentric pin is only correctly positioned if the initial rotation of the turntable when released is corrected.

- pull the eccentric pin knob towards you (0°reference stop) and rotate slightly to raise it;

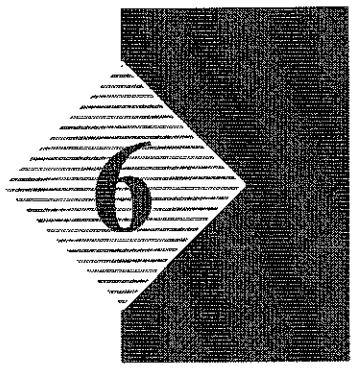


- swing the head from left to right until it is positioned at the required angle, as indicated by the graduated scale on the turntable;
- relock the turntable lock/release lever;
- make the cut in the required operating mode, following the preliminary safety instructions set out in this chapter.

SECTION 6

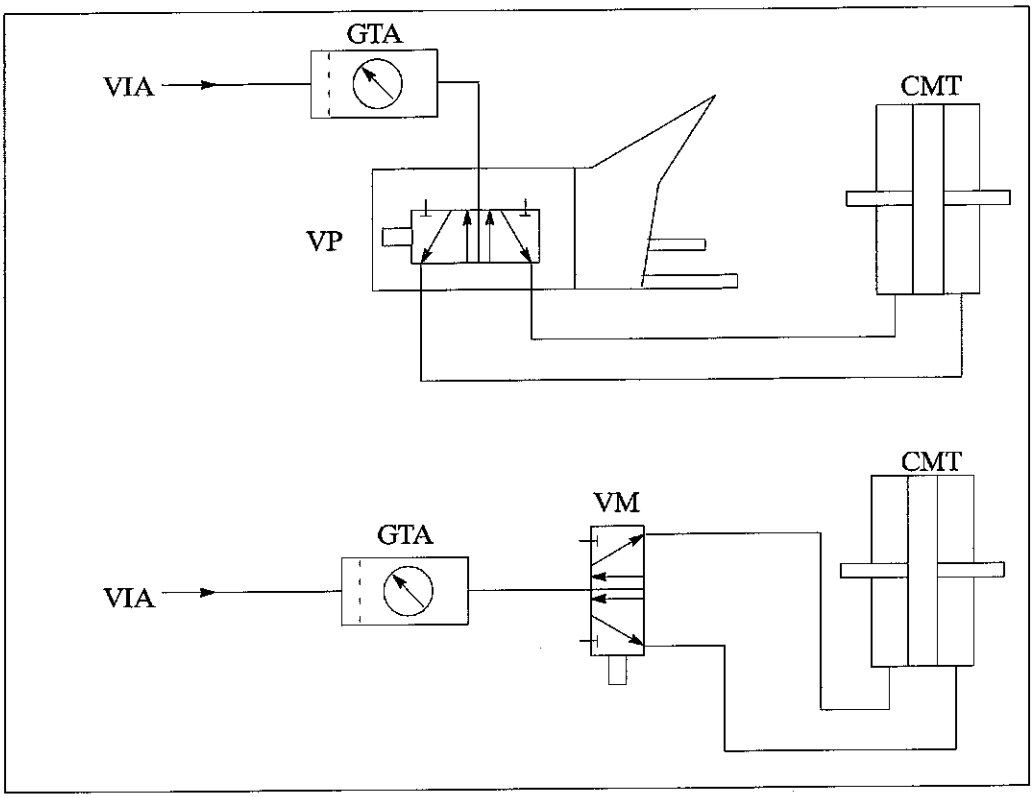
DIAGRAMS, EXPLODED VIEWS AND REPLACEMENT PARTS

Diagrams, exploded views and replacement parts



This chapter contains functional diagrams and exploded views of the **DM10–2**, including the MA version. This document is intended to help in identifying the location of the various components making up the machine, giving information useful in carrying out repair and maintenance operations; This chapter will also enable the user to order replacement parts with no risk of misunderstanding, as all parts are given codes.

Pneumatic diagram (MA version)

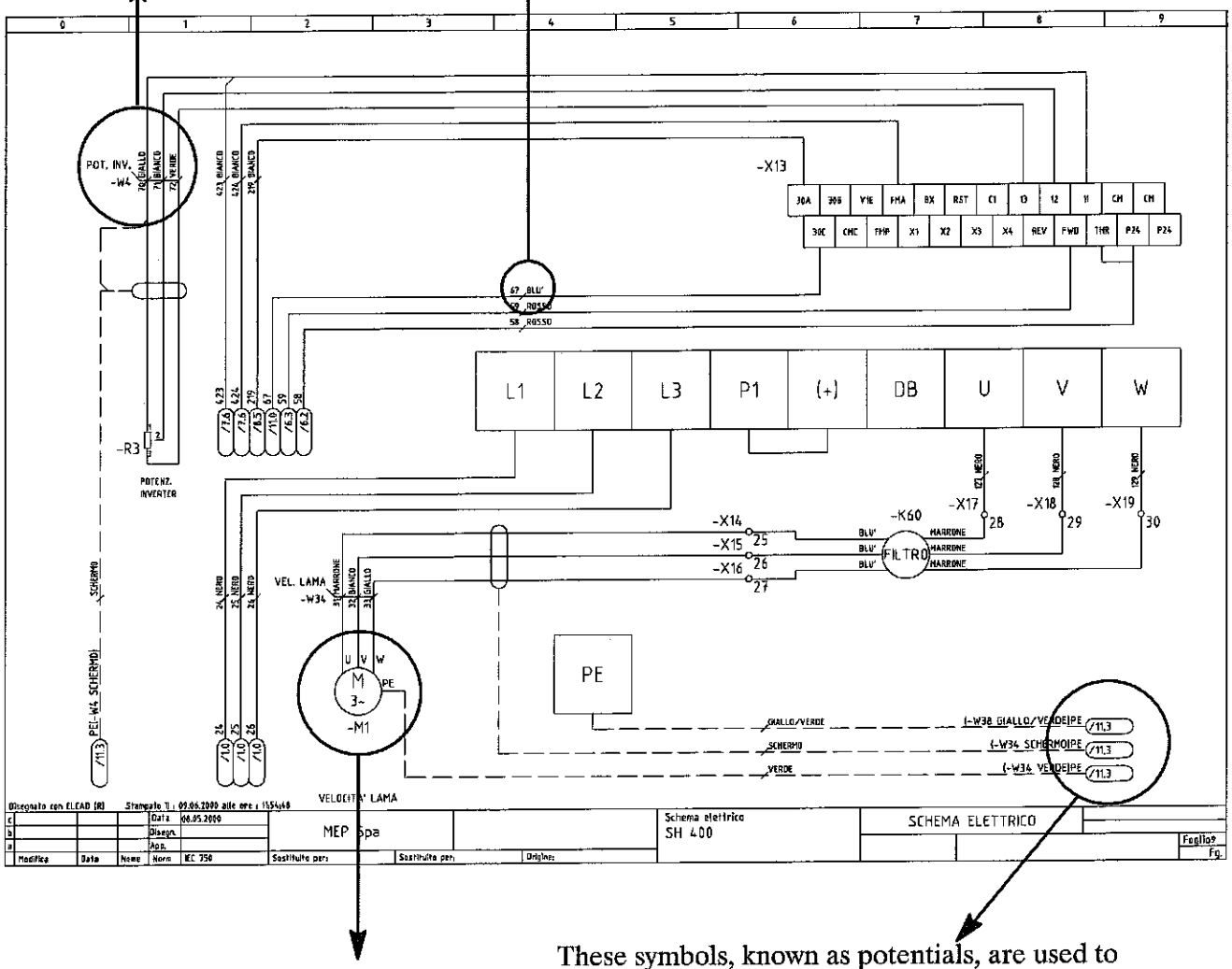


Pneumatic components key					
VIA	Air inlet valve	VP	Pedal valve	CMT	Cutter vice cylinder
GTA	Air treatment unit	VM	Manual valve	CPT	Head holder cylinder

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

The wire is identified by the code –W4

This symbol identifies the wire with its relative number and colour



The motor is identified by the code –M1

These symbols, known as potentials, are used to provide page references: the first number indicates the page to be referred to, the second number, after the dot, identifies the column on that page; example /11.8 indicates that the wire continues on page no. 11 in column 8

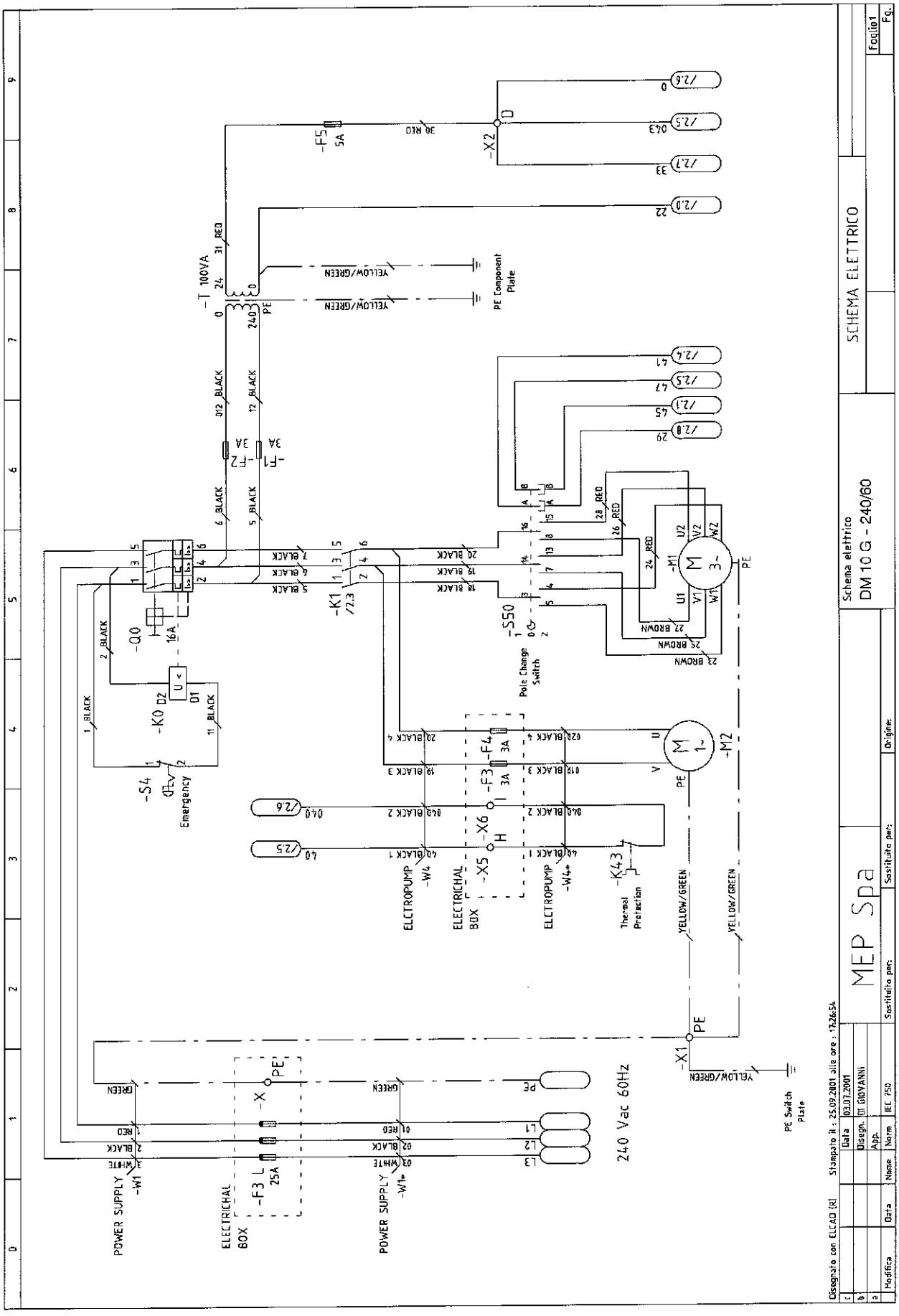
The pages following the wiring diagrams contain the following lists:

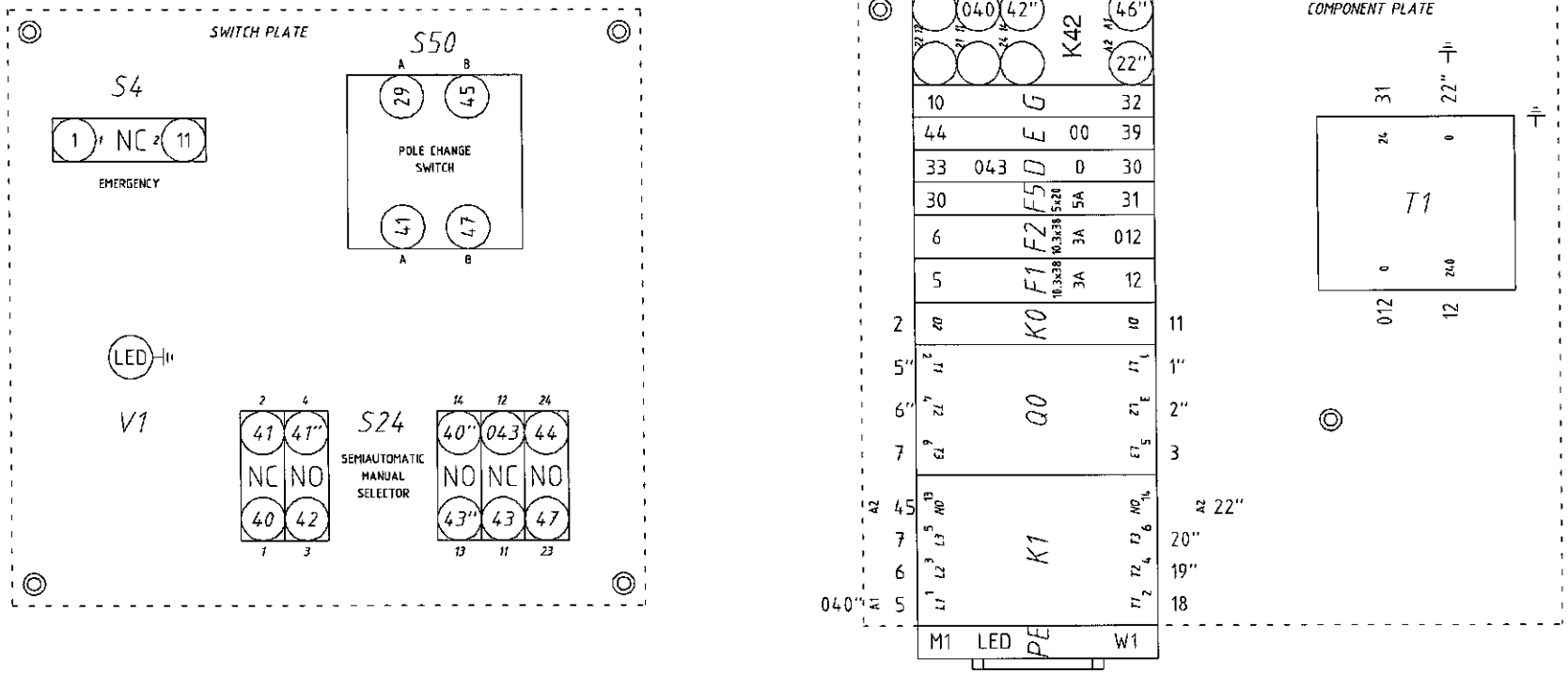
1. components list (list of all components) and terminals list (list of all the terminals) with the following information:
   - in–house article code;
   - identification code;
   - reference, no. of the page and column on which it can be found;
   - description;
   - manufacturer.

ART. COD.	ID	PRES. REF	DESCRIPTION	MANUFACTURER
022.2151	-B1	/5.2	STRAIN GAUGE	DELTATEC

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	I
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

Standard version electrical diagram 240V (CSA standard)





Disegnato con ELCAD (R) Stampato il : 25.09.2001 alle ore : 17:26:55

c				Data	03.04.2001	MEP Spa	Schema elettrico	SCHEMA ELETTRICO
b				Disegn.	DI GIOVANNI		DM 10 G - 240/60	
a				App.				Foglio 3
	Modifica	Data	Nome	Norm	IEC 750	Sostituito per:	Sostituito per:	Origine:		Fg.

List of cables

CODE	CABLE	TYPE	DESCRIPTION	WIRE	SEC.	COLOR	LENGTH	START	CABLE TERMINAL START	END	CABLE TERMINAL END
022.1901	-W1	S00W	POWER SUPPLY		AWG14	RED	2500mm	-F3L	022.0312* Tube terminal wire 2,5mm	-Q0:1	022.0312* Tube terminal wire 2,5mm
022.1901	-W1	S00W	POWER SUPPLY		AWG14	BLACK	2500mm	-F3L	022.0312* Tube terminal wire 2,5mm	-Q0:3	022.0312* Tube terminal wire 2,5mm
022.1901	-W1	S00W	POWER SUPPLY		AWG14	WHITE	2500mm	-F3L	022.0312* Tube terminal wire 2,5mm	-Q0:5	022.0312* Tube terminal wire 2,5mm
022.1901	-W1	S00W	POWER SUPPLY		AWG14	YELLOW/ GREEN	2500mm	-X1:P-E	022.0312* Tube terminal wire 2,5mm	-X:PE	022.0312* Tube terminal wire 2,5mm
022.1901	-W1*	S00W	POWER SUPPLY	01	AWG14	RED	2500mm	-F3L	022.0312* Tube terminal wire 2,5mm		
022.1901	-W1*	S00W	POWER SUPPLY	02	AWG14	BLACK	2500mm	-F3L	022.0312* Tube terminal wire 2,5mm		
022.1901	-W1*	S00W	POWER SUPPLY	03	AWG14	WHITE	2500mm	-F3L	022.0312* Tube terminal wire 2,5mm		
022.1901	-W1*	S00W	POWER SUPPLY		AWG14	YELLOW/ GREEN	2500mm	-X1:P-E	022.0312* Tube terminal wire 2,5mm		
022.0168	-W4	AWM	ELECTROPUMP	40	AWG20	BLACK 1	2500mm	-X5:H		-S24:14	022.0311 Tube terminal wire 0,50mm
022.0168	-W4	AWM	ELECTROPUMP	040	AWG20	BLACK 2	2500mm	-X6:I		-K1:A1	022.0311 Tube terminal wire 0,50mm
022.0168	-W4	AWM	ELECTROPUMP	19	AWG20	BLACK 3	2500mm	-F3	022.0311 Tube terminal wire 0,50mm	-K1:4	022.0311 Tube terminal wire 0,50mm
022.0168	-W4	AWM	ELECTROPUMP	20	AWG20	BLACK 4	2500mm	-F4	022.0311 Tube terminal wire 0,50mm	-K1:6	022.0311 Tube terminal wire 0,50mm
022.0168	-W4	AWM	ELECTROPUMP		AWG20	BLACK 5	2500mm				
022.0168	-W4	AWM	ELECTROPUMP		AWG20	YELLOW/ GREEN	2500mm				
022.0168	-W4	AWM	ELECTROPUMP		AWG20	SCREENING	2500mm				
022.0168	-W4*	AWM	ELECTROPUMP	40	AWG20	BLACK 1	3000mm	-X5:H		-K43	022.0311 Tube terminal wire 0,50mm
022.0168	-W4*	AWM	ELECTROPUMP	040	AWG20	BLACK 2	3000mm	-X6:I		-K43	022.0311 Tube terminal wire 0,50mm
022.0168	-W4*	AWM	ELECTROPUMP	019	AWG20	BLACK 3	3000mm	-F3	022.0311 Tube terminal wire 0,50mm	-M2:V	022.0300 Red Faston 1,5mm
022.0168	-W4*	AWM	ELECTROPUMP	020	AWG20	BLACK 4	3000mm	-F4	022.0311 Tube terminal wire 0,50mm	-M2:U	022.0300 Red Faston 1,5mm
022.0168	-W4*	AWM	ELECTROPUMP		AWG20	BLACK 5	3000mm				
022.0168	-W4*	AWM	ELECTROPUMP		AWG20	YELLOW/ GREEN	3000mm	-X1:P-E	022.0311 Tube terminal wire 0,50mm	-M2:P-E	022.0300 Red Faston 1,5mm
022.0168	-W4*	AWM	ELECTROPUMP		AWG20	SCREENING	3000mm				
022.0139	-W52	AWM	MICROSWITCH	00	AWG20	BLACK 1	3000mm	-X3:E		-S15	022.0300 Red Faston 1,5mm

CODE	CABLE	TYPE	DESCRIPTION	WIRE	SEC.	COLOR	LENGTH	START	CABLE TERMINAL START	END	CABLE TERMINAL END
022.0132B	-W113	AWM	Q0:2/K1:1		AWG14	BLACK	200mm	-K1:1	022.0312* Tube terminal wire 2,50mm	-Q0:2	022.0312* Tube terminal wire 2,50mm
022.0132B	-W116	AWM	Q0:4/K1:3		AWG14	BLACK	180mm	-K1:3	022.0312* Tube terminal wire 2,50mm	-Q0:4	022.0312* Tube terminal wire 2,50mm
022.0134B	-W117	AWM	Q0:4/F2		AWG16	BLACK	190mm	-F2	022.0312 Tube terminal wire 1,50mm	-Q0:4	022.0312 Tube terminal wire 1,50mm
022.0132B	-W118	AWM	Q0:6/K1:5		AWG14	BLACK	160mm	-K1:5	022.0312* Tube terminal wire 2,50mm	-Q0:6	022.0312* Tube terminal wire 2,50mm
022.0134B	-W119	AWM	F1/T1:240V(0-240)		AWG16	BLACK	260mm	-T1:240	022.0312 Tube terminal wire 1,50mm	-F1	022.0312 Tube terminal wire 1,50mm
022.0132B	-W120	AWM	K1:2/S50:3		AWG14	BLACK	430mm	-S50:3	022.0312* Tube terminal wire 2,50mm	-K1:2	022.0312* Tube terminal wire 2,50mm
022.0132B	-W121	AWM	K1:4/S50:14		AWG14	BLACK	520mm	-S50:14	022.0312* Tube terminal wire 2,50mm	-K1:4	022.0312* Tube terminal wire 2,50mm
022.0132B	-W122	AWM	K1:6/S50:16		AWG14	BLACK	520mm	-S50:16	022.0312* Tube terminal wire 2,50mm	-K1:6	022.0312* Tube terminal wire 2,50mm
022.0132BR	-W124	AWM	S50:5/M1:W1		AWG14	BROWN	1600mm	-S50:5	022.0312* Tube terminal wire 2,50mm	-M1:W1	022.0304 Red Eyeled 5mm
022.0132BR	-W125	AWM	S50:7/M1:V1		AWG14	BROWN	1600mm	-S50:7	022.0312* Tube terminal wire 2,50mm	M1:V1	022.0304 Red Eyeled 5mm
022.0132BR	-W126	AWM	S50:8/M1:U		AWG14	BROWN	1600mm	-S50:8	022.0312* Tube terminal wire 2,50mm	-M1:U1	022.0304 Red Eyeled 5mm
022.0132R	-W127	AWM	S50:4/M1:W2		AWG14	RED	1600mm	-S50:4	022.0312* Tube terminal wire 2,50mm	M1:W2	022.0304 Red Eyeled 5mm
022.0132R	-W128	AWM	S50:13/M1:V2		AWG14	RED	1600mm	-S5O:13	022.0312* Tube terminal wire 2,50mm	-M1:V2	022.0304 Red Eyeled 5mm
022.0132R	-W129	AWM	S50:15/M1:U2		AWG14	RED	1600mm	-S50:15	022.0312* Tube terminal wire 2,50mm	-M1:U2	022.0304 Red Eyeled 5mm
022.0133R	-W130	AWM	F5/X2:D		AWG20	RED	540mm	-X2:D		-F5	
022.0133R	-W131	AWM	T1:24Vac(0-24)/F5		AWG20	RED	280mm	-T1:24	022.0311 Tube terminal wire 0,50mm	-F5	
022.0133R	-W133	AWM	S24:14/S24:1		AWG20	RED	180mm	-S24:1	022.0311 Tube terminal wire 0,50mm	-S24:14	022.0311 Tube terminal wire 0,50mm
022.0133R	-W134	AWM	S24:12/X2:D	043	AWG20	RED	530mm	-S24:12	022.0311 Tube terminal wire 0,50mm	-X2:D	
022.0133R	-W135	AWM	S24:24/X3:E		AWG20	RED	530mm	-S24:24	022.0311 Tube terminal wire 0,50mm	-X3:E	
022.0133R	-W136	AWM	S24:2/S24:4	41	AWG20	RED	70mm	-S24:4	022.0312 Tube terminal wire 1,50mm	-S24:2	022.0311 Tube terminal wire 1,50mm
022.0133R	-W137	AWM	S24:4/S50:A	41	AWG20	RED	160mm	-S50:A	022.0311 Tube terminal wire 0,50mm	-S24:4	
022.0133R	-W138	AWM	K42:11/K1:A1	040	AWG20	RED	260mm	-K42:11	022.0311 Tube terminal wire 0,50mm	-K1:A1	022.0311 Tube terminal wire 0,50mm

CODE	DESCRIPTION	TYPE	CATALOG NUMBER	ID.	REF.	MANUFACTURER
019.1722	BLADE MOTOR	HP 2/2,5 2/4P 240 Vac		-M1	/1,5	CARPANELLI MOTORI
028.0283	ELCTROPUMP 240Vac	ELECTROPUMP EZC		-M2	/1,4	SAP
022.1288	MAIN-SWITCH OVER LOAD THERMAL PROTECTION	PKZM0 - 16A		-Q0	/1,5	KLOCKNER MOELLER
022.0043	ROTATING KNOB	RH - PKZO - MCC		-Q0	/1,5	KLOCKNER MOELLER
022.1242	EMERGENCY PUSH BUTTON	EMERGENCY		-S4	/1,4	ROCKWELL AUTOMATION
022.0037	LIMIT - SWITCH	ATO-11-1-ZB B275		-S8	/2,7	KLOCKNER MOELLER
022.0515	MICRO - SWITCH	MICRO - SWITCH		-S15	/2,8	HONEYWELL
034.1221	KNOB	KNOB		-S15	/2,8	BARDEGGIA
010.0928	SPRING	SPRING		-S15	/2,8	ADRIATICA MOLLE
025.0691	KNOB SEAL	KNOB SEAL		-S15	/2,8	BARDEGGIA
022.0962	SELECTOR 2P	QM 304 - N		-S24	/2,4	ROCKWELL AUTOMATION
022.0943	BLOCK V40 NC (RED)	BLOCK V40		-S24	/2,4	ROCKWELL AUTOMATION
022.0943	BLOCK V40 NC (RED)	BLOCK V40		-S24	/2,4	ROCKWELL AUTOMATION
022.0944	BLOCK V50 NO (GREEN)	BLOCK V50		-S24	/2,4	ROCKWELL AUTOMATION
022.0944	BLOCK V50 NO (GREEN)	BLOCK V50		-S24	/2,4	ROCKWELL AUTOMATION
022.0944	BLOCK V50 NO (GREEN)	BLOCK V50		-S24	/2,4	ROCKWELL AUTOMATION
043.0142	PRESSURE SWITCH BLADE	PRESSURE		-S25	/2,7	HERBIRGER
022.0506	HEAD DOWN LIMIT SWITCH	LIMIT SWITCH		-S28	/2,2	HONEYWELL
022,0023	POLE CHANGE SWITCH	SWITCH		-S50	/1.5	ROCKWELL AUTOMATION
022.0434	TRANSFORMER 0-240 Vac	TRANSFORMER		-T1	/1,7	E.R.C.
022.0862	SINGLE LED BOARD	LED		-V1	/2,6	METALAM

List of terminals

CODE	DESCRIPTION	TYPE	CATALOG NUMBER	ID.	REF.	MANUFACTURER
022.0377	SINGLE GROUND TERMINAL	USLKG 5	04 41 50 4	-X	/1.1	PHOENIX
022.0377	SINGLE GROUND TERMINAL	USLKG 5	04 41 50 4	-X	/1.1	PHOENIX
022.2247	QUADRUPLE GROUND TERMINAL	UKK 5-PE	27 74 21 1	-X1	/1.2	PHOENIX
022.2245	QUADRUPLE TERMINAL	ZFDK 2,5	30 01 89 9	-X2	/1.9	PHOENIX
022.2283	QUADRUPLE TERMINAL PLATE	D-ZFD 2,5	30 02 81 4	-X2	/1.9	PHOENIX
022.2244	TRIPLE TERMINAL	ZFK 2,5 - TWIN	30 01 81 5	-X3	/2.8	PHOENIX
022.2243	SINGLE TERMINAL	ZFK 2,5	30 03 21 1	-X4	/2:7	PHOENIX
022.2243	SINGLE TERMINAL	ZFK 2,5	30 03 21 1	-X5	/1.3	PHOENIX
022.2243	SINGLE TERMINAL	ZFK 2,5	30 03 21 1	-X6	/1.3	PHOENIX

MOTOR ASSY PARTS

Code	Description	U. of M.	Quantity
001.4254	DRIVING PULLEY	NR	1.000
007.4091	REDUCTOR SHAFT	NR	1.000
010.0355	SELF-LOCKING RING NUT 25X1,5	NR	1.000
010.0376	LOCKING NUT	NR	1.000
010.7111	8 X 7 X 32 KEY	NR	1.000
010.7112	8 X 7 X 35 KEY	NR	1.000
010.7604	0 8 WASHER	NR	4.000
101.7605	0 10 WASHER	NR	4.000
010.7891	TCEI 8 X 16 SCREW	NR	4.000
101.7963	TE 8 X 25 SCREW	NR	4.000
010.7975	TE 10 X 25 SCREW	NR	4.000
019.1706	HP 2/2,5 2/4P V.380 B14 FC90L	NR	1.000
022.0211	QUICK FITTING SEM PG 13,5	NR	1.000
022.2602	POLIFLEX SHEATH NW 14-1200143	MT	1.000
025.0078	BEARING 3207A-2RS1TN9	NR	1.000
025.0121	REDUCER MVF 63 FCO 1A38 90 B14	NR	1.000
025.0757	REDUCER MVF 62 “””IR”””	NR	1.000
025.0861	KEYER 0 35X60	NR	1.000
034.0418	REDUCER COVER	NR	1.000

Code	Description	U. of M.	Quantity
001.4254	DRIVING PULLEY	NR	1.000
010.7112	8 X 7 X 35 KEY	NR	1.000
010.7604	0 8 WASHER	NR	4.000
010.7605	0 10 WASHER	NR	6.000
010.7924	TCEI 10 X 30 SCREW	NR	6.000
010.7963	TE 8 X 25 SCREW	NR	4.000
019.1706	HP 2/2,5 2/4P V.380 B14 FC90L	NR	1.000
022.0211	QUICK FITTING SEN PG 13,5	MT	1.000
022.2602	POLIFLEX SHEATH NW 14-1200143	NR	1.000
025.0625	MOTOR GASKET	NR	1.000
025.0757	“REDUCER MVF 62 “”IR”””	NR	1.000
025.0861	KEYER 0 35 X 60	NR	1.000

FRONT FLYWHEEL ASSY PARTS

Code	Description	U. of M.	Quantity
001.4018	BLADE TENSIONER SLIDE	NR	1.000
001.4208	STAFFA BLOCCAGGIO GIREVOLE TESTA	NR	1.000
001.4255	IDLER PULLEY	NR	1.000
001.4260	BOW UNIT, IDLER WHEEL SECTION	NR	1.000
007.3811	HANDWHEEL SPACER	NR	1.000
007.3825	BLADE TENSIONING REGULATING PIN	NR	1.000
007.3843	FREE FLYWHEEL SHAFT	NR	1.000
007.3861	TENSIONING CYLINDER	NR	1.000
007.3869	BLADE TENSIONING PISTON	NR	1.000
007.3884	GIB SLIDE BLADE TIGHTENER	NR	2.000
007.4007	FRONT BLADE GUIDE BRACKET	NR	1.000
010.0352	SELF-LOCKING RING NUT 35 X 1,5	NR	1.000
010.0915	BELLVILLE WASHER 50 X 18,4 X 3	NR	6.000
010.1712	FRONT BLADE GUIDE 1 INSERT	NR	1.000
010.1714	FRONT BLADE GUIDE 21 INSERT	NR	1.000
010.1721	BLADE PUSHER	NR	1.000
010.1909	BT/NOT-AUS HEAD COMMAND LEVER	NR	1.000
010.2381	BLADE GUIDE SUPPORT	NR	1.000
010.7203	M6 SCREW NUT	NR	6.000
010.7402	6 X 12 CYLINDRICAL POINT VCE GRUB SCREW	NR	5.000
010.7410	8 X 16 CYLINDRICAL POINT VCE GRUB SCREW	NR	1.000
010.7456	8 X 16 CONICAL POINT VCE GRUB SCREW	NR	1.000
010.7461	6 X 25 LEVEL POINT VCE GRUB SCREW	NR	6.000
010.7491	10 X 60 LEVEL POINT VCE GRUB SCREW	NR	1.000
010.7603	0 6 WASHER	NR	6.000
010.7606	0 12 WASHER	NR	1.000
010.7764	EALSTIC PIN DIA M. 6 X 20	NR	4.000
010.7767	EALSTIC PIN DIA M. 6 X 35	NR	1.000
010.7868	TCEI 6 X 12 SCREW	NR	1.000
010.7890	TCEI 8 X 12 SCREW	NR	2.000
010.7893	TCEI 8 X 20 SCREW	NR	2.000
010.7894	TCEI 8 X 25 SCREW	NR	4.000
010.7942	TCEI 12 X 40 SCREW	NR	4.000
010.7943	TCEI 12 X 45 SCREW	NR	1.000
016.0261	FRONT BLADE COVER	NR	1.000
025.0069	BEARING 32007X	NR	2.000
025.0235	GAS RING NI 150 18-25-4,5	NR	2.000
025.0236	GAS RING NI 150 45-55-7	NR	1.000
025.0272	GUARD RING NILOS 32007	NR	2.000
028.0130	FITTING 1/4-9 CL 2601	NR	1.000

MOTOR FLYWHEEL ASSY PARTS

Code	Description	U. of M.	Quantity
001.4222	REDUCTOR GEAR IDLER PULLEY SECTION BOW	NR	1.000
007.3812	HEAD PIVOT BEARING SPACER	NR	1.000
007.3813	BOW SPACER	NR	1.000
007.3822	HEAD PIVOT SUPPORT PIN	NR	1.000
007.4006	REAR BLADE GUIDE BRACKET	NR	1.000
007.4057	HEAD DOWN BUSH	NR	1.000
010.0315	HEX HEAD 8.8 T.E. 10X120 BOLT	NR	1.000
010.0356	SELF - LOCKING RING NUT 45X1,5	NR	1.000
010.0914	HEAD RETURN SPRING	NR	1.000
010.0934	SPRING FOR BLADE CLEANER	NR	1.000
010.1542	CYLINDER SUPPORT BRACKET	NR	1.000
010.1711	REAR BLADE GUIDE INSERT	NR	1.000
010.1713	REAR BLADE GUIDE INSERT	NR	1.000
010.1721	BLADE PUSHER	NR	1.000
010.1801	"SH GALVANISED ""D"" CLOSURE LEVEL"	NR	1.000
010.2208	BLADE BRUSH HOLDER	NR	1.000
010.2304	COOLANT BLOCK	NR	1.000
010.2383	BLADE GUIDE SUPPORT	NR	1.000
010.1574	BLADE BRUSH FIXING BRACKET	NR	1.000
010.7010	0 45 US.010.1201 SNAP RING	NR	1.000
010.7226	M6 SELF - THREADING SCREW NUT	NR	2.000
010.7402	6 X 12 CYLINDRICAL POINT VCE GRUB SCREW	NR	5.000
010.7601	0 4 WASHER	NR	1.000
010.7603	0 6 WASHER	NR	1.000
010.7605	0 10 WASHER	NR	1.000
010.7830	BUTON 5 X 10 SCREW	NR	4.000
010.7850	TCEI 4 X 8 SCREW	NR	2.000
010.7852	TCEI 4 X 12 SCREW	NR	1.000
010.7854	TCEI 6 X 12 SCREW	NR	2.000
010.7871	TCEI 6 X 20 SCREW	NR	2.000
101.7875	TCEI 6 X 45 SCREW	NR	1.000
010.7890	TCEI 8 X 12 SCREW	NR	2.000
010.7893	TCEI 8 X 20 SCREW	NR	2.000
010.7923	TCEI 10 X 25 SCREW	NR	2.000
010.7927	TCEI 10 X 60 SCREW	NR	1.000
010.7993	TSPEI 5 X 12 SCREW	NR	2.000
016.0248	BAND COVER	NR	1.000
016.1752	REAR BLADE COVER	NR	1.000
016.0296	CYLINDER EXTERNAL BRACKET	NR	1.000
016.1223	BOW SAFETY SWITCH FIX PLATE	NR	1.000
022.0037	FR 690 SH SAFETY SWITCH	NR	1.000
022.0211	QUICK FITTING SEM PG 13,5	NR	1.000
022.0234	FLEXIBLE CABLE PRESSER 3246 BLACK PG 13	NR	1.000
025.0075	BEARING 32009X	NR	2.000
025.0225	GAS RING OR 171-68,26	NR	1.000
025.0238	GAS RING OR 149-44,45X3,53	NR	1.000
025.0275	GUARD RING NILOS 32009X	NR	2.000
025.0552	BLADE CLEANER BRUSH 6 X 25 030	NR	1.000
025.0803	GRAPHITIZED BUSH L. 10 DIA M. 6	NR	2.000
028.0121	FITTING 3/8 - 17 CL 2601	NR	1.000
028.0130	FITTING 1/4 - 9 CL 2601	NR	3.000
043.0229	MF 1/4 - CL 2520 REDUCTOR	NR	1.000
043.0652	1/4 F.M. CAP		1.000

CUTTING HEAD COVER PARTS

Code	Description	U. of M.	Quantity
010.7601	0 4 WASHER	NR	2.000
010.7850	TCEI 4 X 8 SCREW	NR	2.000
010.7990	TSPEI 4 X 8 SCREW	NR	2.000
010.7993	TSPEI 5 X 10 SCREW	NR	4.000
016.0250	BOW COVER	NR	1.000
016.1224	SAFETY COVER SWITCH FIX PLATE	NR	1.000
034.1107	O 30 M6 X 20 HANDWHEEL	NR	2.000

VISE ASSY PARTS

Code	Description	U. of M.	Quantity
001.4007	SLIDING VICE	NR	1.000
001.4037	VICE SUPPORT	NR	1.000
007.3824	QUICK CLAMPING VICE LOCKING PIN	NR	1.000
007.3839	VICE GIB	NR	1.000
007.4058	CAM BUSHING	NR	1.000
007.4081	UNLOCKING LOWER VICE PINION	NR	1.000
010.0244	VISE SCREW	NR	1.000
010.0549	MOVABLE VISE JAW	NR	1.000
010.0918	LEAD SCREW VICE RETURNING ACTION SPRING	NR	1.000
010.1202	SPHERICAL DIA M. 8 OILER	NR	2.000
010.2372	45> BRONZE LEAD SCREW	NR	1.000
010.7203	M6 SCREW NUT	NR	7.000
010.7427	8 X 12 CYLINDRICAL POINT VCE GRUB SCREW	NR	1.000
010.7454	8 X 8 CONICAL POINT VCE GRUB SCREW	NR	1.000
010.7456	8 X 16 CONICAL POINT VCE GRUB SCREW	NR	5.000
010.7463	6 X 35 CONICAL POINT VCE GRUB SCREW	NR	7.000
010.7491	10 X 60 LEVELO POINT VCE SCREW	NR	1.000
010.7603	0 6 WASHER	NR	7.000
010.7859	5 X 12 TCEI SCREW	NR	4.000
010.7860	5 X 15 TCEI SCREW	NR	6.000
010.7893	8 X 20 TCEI SCREW	NR	1.000
010.7894	TCEI 8 X 25 SCREW	NR	2.000
025.0203	SEAL RING 35 X 25 X 7	NR	1.000
034.0205	VPRA/125 MR HANDWHEEL	NR	1.000
034.1002	10 MA RATCHET LEVER	NR	1.000
034.1003	12 MA RATCHET LEVER	NR	1.000

BASE ASSY PARTS

Code	Description	U. of M.	Quantity
010.1806	DOOR LOCK FOR BASE	NR	1.000
010.1881	BASE DOOR PIVOT	NR	2.000
010.7206	M16 WASHER	NR	1.000
010.7603	0 6 WASHER	NR	2.000
010.7606	0 12 WASHER	NR	2.000
010.7868	TCEI 6 X 12 SCREW	NR	2.000
010.7871	TCEI 6 X 20 SCREW	NR	2.000
010.7972	TE 16 X 60 SCREW	NR	1.000
010.7988	TE 12 X 60 SCREW	NR	2.000
013.0177	BASE	NR	1.000
016.0164	BOW WATER COLLECTOR	NR	1.000
022.0321	FAIRLEADS 12 INC. M M.2	NR	1.000
022.0324	FAIRLEADS 24 INC. M M.2.5	NR	1.000
028.0099	"NONRETURN VALVE 3/8"""	NR	1.000
028.0121	FITTING 3/8 - 17 CL 2601	NR	1.000
028.0157	SCREENED TUBE DIA M. 13 - 19	KG	0.600
028.0271	ELECTRIC PUMP EZ/C V. 220 - 380	NR	1.000
043.0252	MF 3/8 CL 2020 ELBOW	NR	1.000
043.0253	M. M 3/8 CL 2010 ELBOW	NR	1.000

CONTROL PANEL PARTS

Code	Description	U. of M.	Quantity
101.7604	0 8 WASHER	NR	4.000
010.7830	5 X 10 BUTTON SCREW	NR	10.000
010.7893	TCEI 8 X 20 SCREW	NR	4.000
016.0708	LVD COMMAND PANEL	NR	1.000
022.0211	QQUICK FITTING SEM PG 13,5	NR	2.000
022.0234	FLEXIBLE CABLE PRESSER 3246 BLACK PG 13	NR	2.000
022.0244	LOCK NUT 3217B GREY PG 13	NR	4.000
031.3328	“””LVD”” SWITCH NAME PLATE”	NR	1.000

HANDGRIP PARTS

Code	Description	U. of M.	Quantity
010.0928	SPRING FOR MEP DIS.1189559 HANDLE	NR	1.000
010.7409	8 X 10 CYLINDRICAL POINT VCE GRUB SCREW	NR	1.000
010.7700	CYLINDRICAL PIN DIA M.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	GASKET SERIES FOR MEP HANDGRIP	NR	1.000
034.1221	MEP DESIGN HANDGRIP	NR	1.000

REDUCTION GEAR PARTS

Code	Description	U. of M.	Quantity
001.4261	62 REDUCTOR GEAR HOUSING	NR	1.000
001.4262	62 REDUCTOR GEAR PLUG	NR	1.000
001.4625	REDUCTOR GEAR MOTOR FLANGE	NR	1.000
001.4627	REDUCTOR GEAR BEARING COVER	NR	1.000
007.4008	62 REDUCTOR SPINDLE SHAFT	NR	1.000
010.0352	SELF - LOCKING RING NUT 35 X 1,5	NR	2.000
010.7005	0 17 SNAP RING	NR	1.000
010.7117	10 X 8 X 35 KEY	NR	1.000
010.7456	8 X 16 CONICAL POINT VCE GRUB SCREW	NR	1.000
010.7860	TCEI 5 X 15 SCREW	NR	4.000
010.7870	TCEI 6 X 16 SCREW	NR	6.000
025.0067	BEARING 3207	NR	1.000
025.0068	BEARING 6203	NR	1.000
025.0069	BEARING 32007X	NR	2.000
025.0192	GAS RING 62 X 42 X 10	NR	1.000
025.0240	GAS RING OR 189	NR	1.000
025.0629	REDUCER COVER GASKET	NR	1.000
025.0695	REDUCER BEARING COVER GASKET	NR	1.000
025.1020	HELICAL WORM REDUCTOR GEAR MFV 62	NR	1.000
025.1021	WORM REDUCTOR GEAR MVF 62	NR	1.000
034.0901	"1/2"" GAS. OIL LEVEL CAP"	NR	1.000
034.0902	"SPF 1/2"" RED OIL CAP"	NR	1.000
034.0905	"TAO/3 1/2"" BLACK OIL CAP"	NR	1.000

FIXED WORKTABLE & TURNTABLE PARTS

Code	Description	U. of M.	Quantity
001.3111	STOP SPACER	NR	1.000
001.4705	FIXED PLATFORM SH270	NR	1.000
001.4702	TURNTABLE	NR	1.000
002.0101	FIXED LEFT VICE JAW	NR	1.000
002.0102	FIXED RIGHT VICE JAW	NR	1.000
007.3819	CENTRE PIN	NR	1.000
007.3827	BUSHING FOR STOP	NR	1.000
007.3895	BUSH 0 38 FOR ROLLER	NR	2.000
007.3900	CUT TO MEASURE ROD	NR	1.000
007.4021	TURNTABLE LOCKING PIN	NR	1.000
007.4031	SUPPLEMENTARY BAR SUPPORT SH 270	NR	1.000
007.4536	FIXED POINT PIN	NR	1.000
007.4601	FIXED POINT PIN	NR	1.000
007.4611	STOP FOR 60> RIGHT - LEFT SH200	NR	1.000
010.0352	SELF - LOCKING RING NUT 35 X 1,5	NR	1.000
010.0370	RING NUT 5S 30 X 1,5	NR	1.000
010.0451	CUT TO MEASURE STOP TIE ROD	NR	1.000
010.0805	D38/15 T.15.05 CARBONITRIDED ROLLER	NR	1.000
010.0902	FIXED POINT HEAD SPRINGS	NR	1.000
010.0914	HEAD RETURN SPRING	NR	1.000
010.1204	M 6 LUBRICATOR	NR	2.000
010.1464	SPRING BRACKET COUPLER	NR	1.000
010.1656	PIN TO SPRING SLEEVE	NR	1.000
010.3148	STOP SUPPORT	NR	1.000
010.7009	0 30 SNAP RING	NR	1.000
010.7204	M8 SCREW NUT	NR	5.000
101.7206	M12 SCREW NUT	NR	1.000
010.7208	M16 SCREW NUT	NR	2.000
010.7480	8 X 30 LEVEL POINT VCE GRUB SCREW	NR	2.000
010.7481	8 X 35 LEVEL POINT VCE GRUB SCREW	NR	2.000
010.7491	10 X 60 LEVEL POINT VCE GRUB SCREW	NR	1.000
010.7604	0 8 WASHER	NR	2.000
010.7605	0 10 WASHER	NR	6.000
010.7607	0 16 WASHER	NR	2.000
010.7759	ELASTIC PIN DIA M. 3 X 16	NR	1.000
010.7761	ELASTIC PIN DIA M. 4 X 20	NR	1.000
010.7870	TCEI 6 X 16 SCREW	NR	1.000
010.7876	TCEI 6 X 45 SCREW	NR	2.000
010.7893	TCEI 8 X 20 SCREW	NR	2.000
010.7894	TCEI 8 X 25 SCREW	NR	2.000
010.7940	TCEI 12 X 30 SCREW	NR	2.000
010.7942	TCEI 12 X 40 SCREW	NR	2.000
010.7964	TE 8 X 30 SCREW	NR	1.000
010.7965	TE 8 X 35 SCREW	NR	1.000
010.7969	TE 8 X 50 SCREW	NR	1.000
010.7975	TE 10 X 25 SCREW	NR	4.000
010.7976	TE 10 X 30 SCREW	NR	2.000
010.7988	TE 12 X 60 SCREW	NR	1.000
016.1038	BAR SUPPORT ARM	NR	1.000
025.0080	AXIAL CAGE WITH ROLLERS AXK 3552	NR	1.000
025.0082	FIFTH WHEEL AS 3552	NR	2.000
025.0245	O RING 3275-69,52	NR	1.000
025.0452	ROLLERS 6 X 6 AISI 420	NR	50.000
034.0398	HEAD PIVOT COVER	NR	1.000
034.1001	8 MA PK55 RATCHET LEVER	NR	1.000
034.1002	10 MA RATCHET LEVER	NR	1.000
034.1003	NS. HANDGRIP M10 DESIGN	NR	1.000

OPTIONAL CUT CONTROL SYSTEM PARTS

Code	Description	U. of M.	Quantity
007.4209	CYLINDER EXTENSION	NR	1.000
010.0899	HEAD RETURN SPRING	NR	1.000
010.1103	16 X 1,5 RATCHET FORK	NR	1.000
010.1463	CYLINDER SUPPORT BRACKET	NR	1.000
010.1464	SPRING BRACKET COUPLER	NR	1.000
010.1502	CUT CONTROL FIX BRACKET	NR	1.000
010.1656	PIN TO SPRING SLEEVE	NR	1.000
010.7203	M6 SCREW NUT	NR	2.000
010.7605	0 10 WASHER	NR	2.000
010.7661	WASHER THICKNESS M. 6 X 3	NR	2.000
010.7830	5 X 10 BUTTON SCREW	NR	6.000
010.7860	TCEI 5 X 15 SCREW	NR	2.000
010.7870	TCEI 6 X 16 SCREW	NR	2.000
010.7871	TCEI 6 X 20 SCREW	NR	2.000
010.7923	TECI 10 X 25 SCREW	NR	2.000
010.7976	TE 10 X 30 SCREW	NR	2.000
016.0296	EXTERNAL CYLINDER BRACKET	NR	1.000
016.1210	HEAD DESCENT REGULATOR FIXED HOUSING	NR	1.000
022.0235	FLEXIBLE CABLE PRESSER 3243 BLACK PG 11	NR	2.000
022.0245	LOCK NUT 3213B GREY PG11	NR	2.000
022.0506	HEAD STROKE STOP D4C-1901 2M FEEDER	NR	1.000
025.0070	BEARING 51103	NR	1.000
031.3303	HEAD DESCENT ADJUSTMENT ALUMINUM NAME PLATE	NR	1.000
034.1115	SCT SPRING ADJUSTMENT HANDWHEEL	NR	1.000
043.0045	HEAD DESCENT REGULATOR CYLINDER	NR	1.000

SUPPLEMENTARY PNEUMATIC VISE PARTS

Code	Description	U. of M.	Quantity
010.0244	576 X 24 VICE SCREW	NR	1.000
010.7410	M8 X 16 VCEI CYLINDRICAL POINT SCREW	NR	1.000
010.7455	M8 X 10 VCEI CONICAL POINT SCREW	NR	1.000
010.7893	TCEI 8 X 20 SCREW	NR	1.000
016.1214	PNEUNATIC PANEL SH280-320	NR	1.000
034.0205	VPRA/125 MR HANDWHEEL	NR	1.000
034.0417	COVER FOR PNEUMATIC FOOT PEDAL 354-925	NR	1.000
043.0044	100-8 CIRCULAR VOLAMPRESS CYLINDER	NR	1.000
043.0204	8 X 1/4 - CL 6521 ELBOW ATTACHMENT	NR	3.000
043.0205	8 X 1/4 - CL 6510 HEXAGONAL ATTACHMENT	NR	1.000
043.0206	4 X 1/8 - CL 6511 HEXAGONAL ATTACHMENT	NR	6.000
043.0228	1/4 - 1/8 - CL 2531 REDUCTOR	NR	2.000
043.0290	1/4 GHIOTTO 13/A QUICK CLUTCH	NR	2.000
043.0301	RILSAN TUBE 8 X 6 WHITE	NR	1.000
043.0302	RILSAN TUBE 4 X 2.7 WHITE	NR	4.000
043.0471	WS8N 1/8 SILENCER	NR	2.000
043.0474	1/4" BRASS SILENCER	NR	2.000
043.0503	5 WAY 354-925 X MA FOOT PEDAL	NR	1.000
043.0552	MANOMETER	NR	1.000
043.0564	FR 1/4 20-08	NR	1.000
043.0601	VMS 114 - 1/4 08 VALVE	NR	1.000
043.0604	358/990 VALVE	NR	1.000

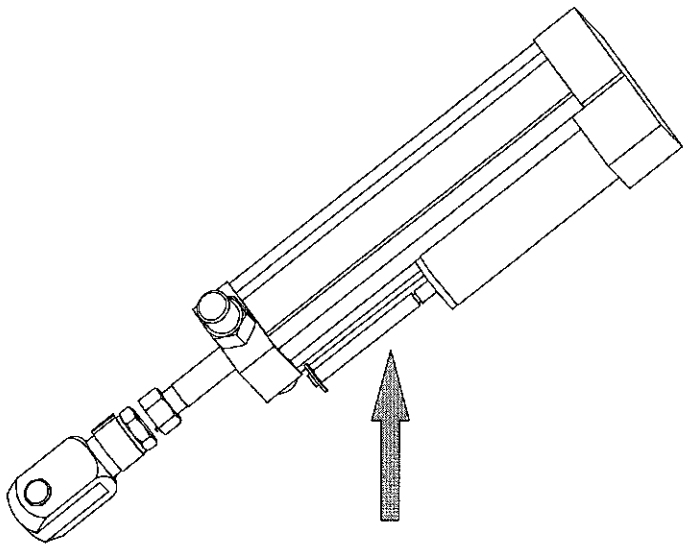
SECTION 7

ADJUSTMENTS

Topping up and bleeding the cylinder (Cut Control System optional)

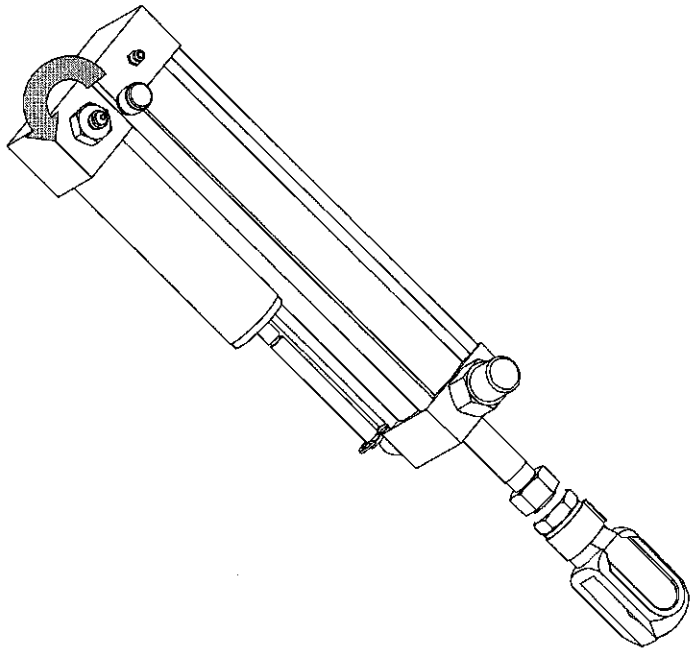
Topping up the head cylinder

This operation is done when the oil in the hydraulic cylinder compensator tank is low. First the cylinder head is brought to the FCTI (Head Up Limiter) position so that the oil level in the compensation tank (see photograph below) can be checked using the rod. If the rod upper ring location is not visible, the oil level is insufficient.



To top up the oil in the tank, the instructions are as follows:

- keep the head in the HUL position (fully up) by closing the head descent regulator;
- unscrew the filler valve cap;

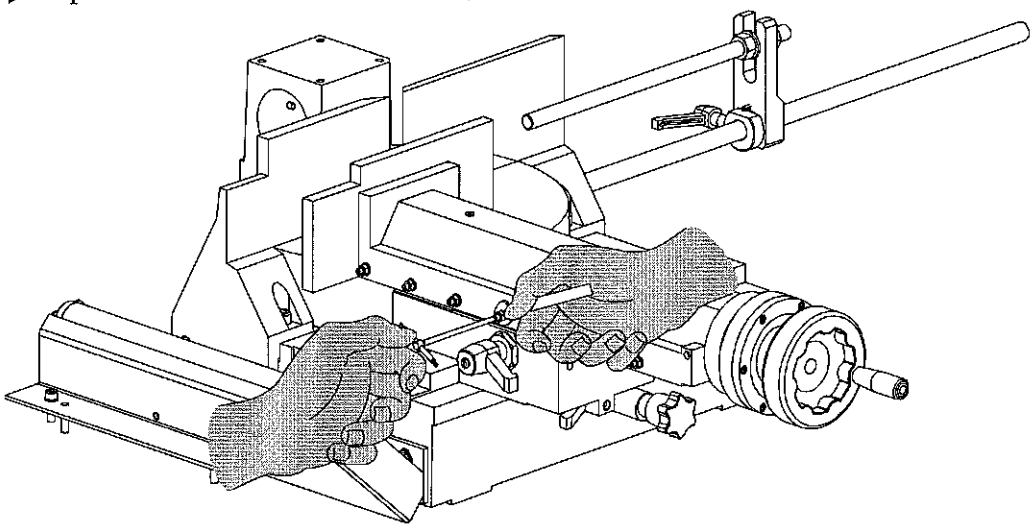


Vice

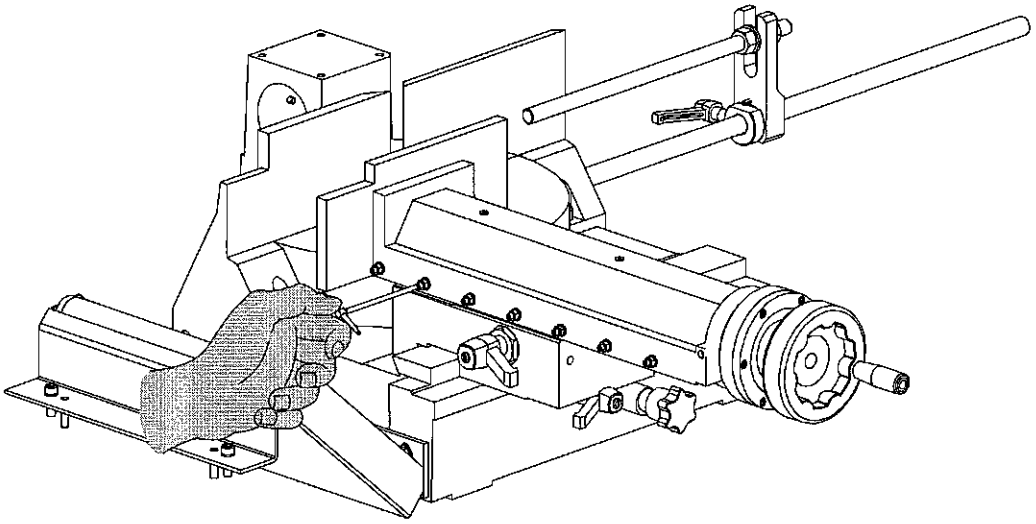
Vice play adjustment

Any play that develops between the slideway and the slide gib on the vice must be compensated by adjusting the grub screws regulating the distance between the gib and the lead screw, proceeding as follows:

- slacken all the locknuts on the grub screws, using a hexagonal key to hold the screws still;
- open the vice to its full extension;



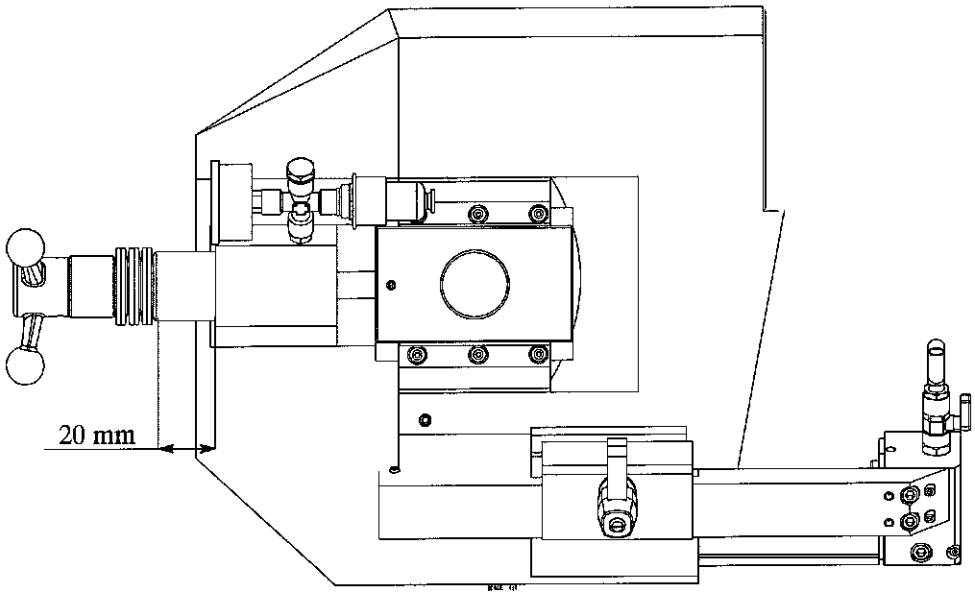
- adjust the slight pressure exerted by the grub screws on the gib, starting with the first two in contact with the lead screw;
- after adjusting the two grub screws, tighten the locknut, holding the grub screws with the hexagonal key;



- close the vice until two more grub screws are in the same position as the first two previously;
- repeat the operation on the gib grub screws on all the slideway grub screws;

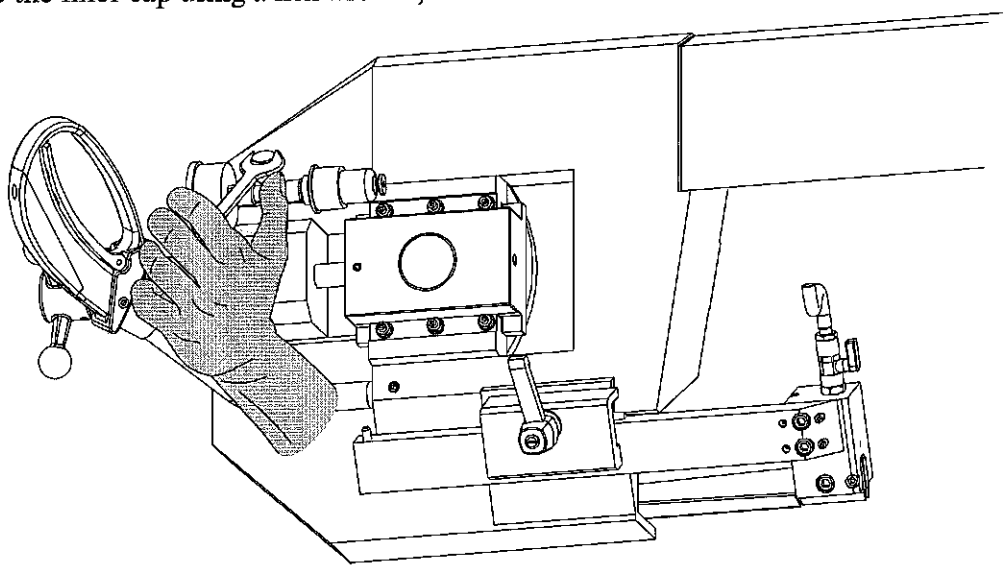
Blade tensioning unit

The blade tensioning unit on these models is hydraulic. This means that the oil level in the tensioning cylinder must be replenished whenever needed to ensure correct operation of the unit. To replenish the blade tensioning cylinder, follow the steps illustrated in the figures below.
When the piston protrudes from the blade tensioning cylinder by just 20 mm as illustrated below, the cylinder must be topped up.



Topping up sequence:

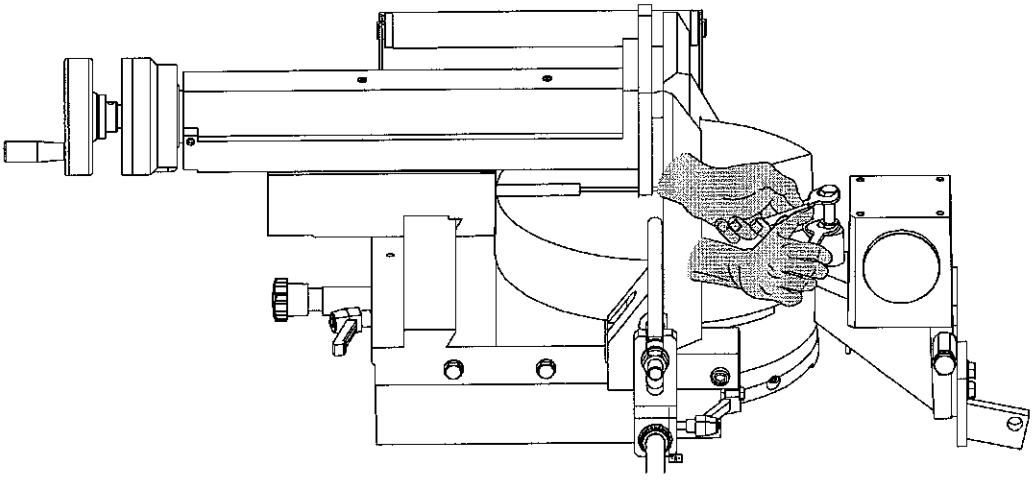
- lower the head;
- slacken the blade tensioning handwheel;
- remove the filler cap using a hex wrench;



Adjusting operating head travel

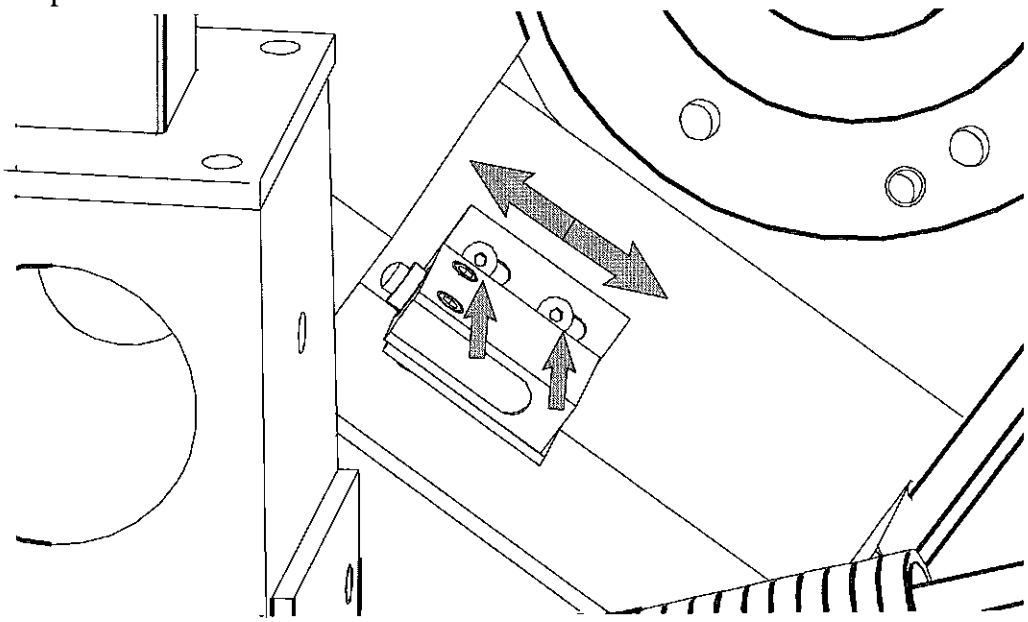
During the cutting cycle the cutting head stroke is limited by the FCTI (Head Upstroke Limit) and FCTA (Head Downstroke Limit), set electronically on the control panel, as described on Page 5. The cutting head has a mechanical limiting switch that determines its downstroke:

▶ to change this setting, two hexagonal spanners must be used, one to keep the nut in position, and the other to tighten and loosen the stop screw.

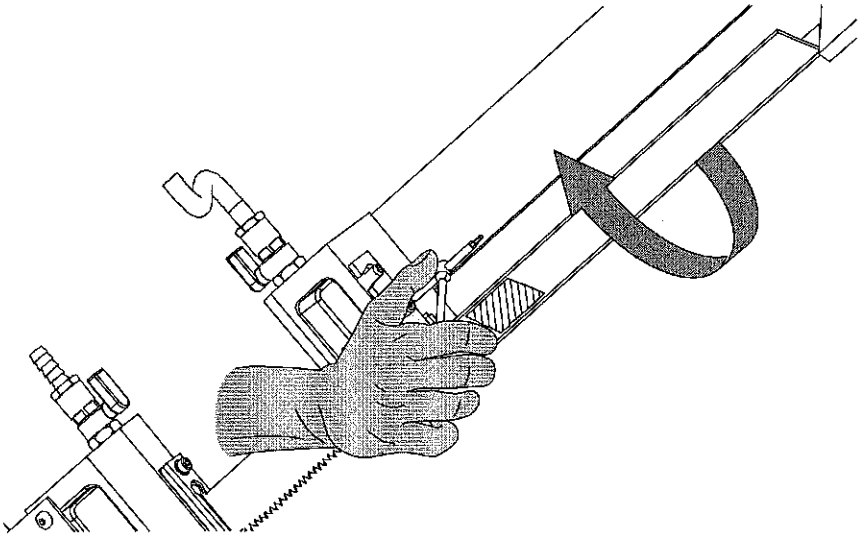


Warning If the machine is equipped with the Cut Control System (CCS), regulation of the FCTA is done as follows.

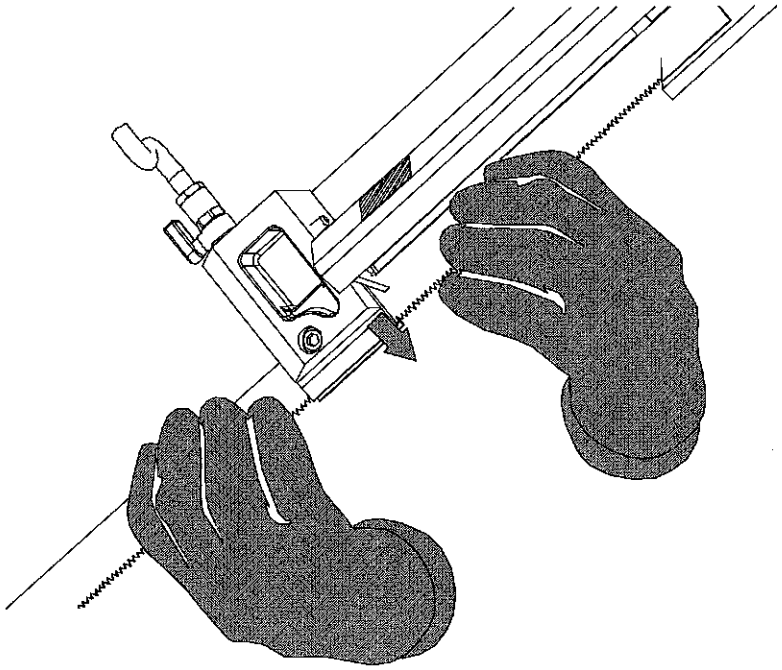
▶ The CCS has an electrical limiter, functioning as HDL, located on the back of the machine; according to the type of work cycle to be carried out, the distance of the limiter from the striker can be regulated by adjusting the support plate screws.



- slacken the blade tension using the handwheel;
- open the front blade guard by undoing the fixing screw and rotating it as illustrated in the figure below;



- wear protective gloves when making this adjustment;
- make sure there is a small amount of play between the blade and guide plate inserts;



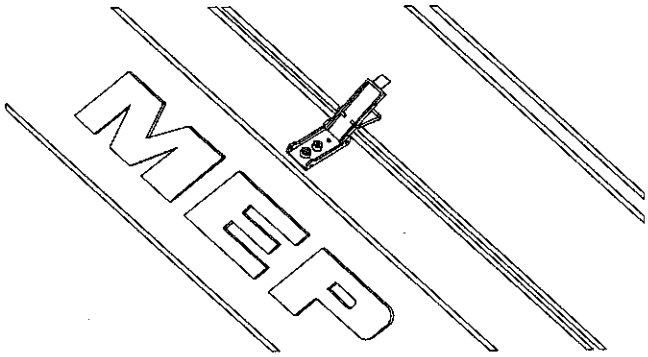
Blade

The adjustments required to ensure correct operation of the blade are described below. For further information about band saw blades, refer to Chapter 9 which provides a more detailed description of the different types of blade.

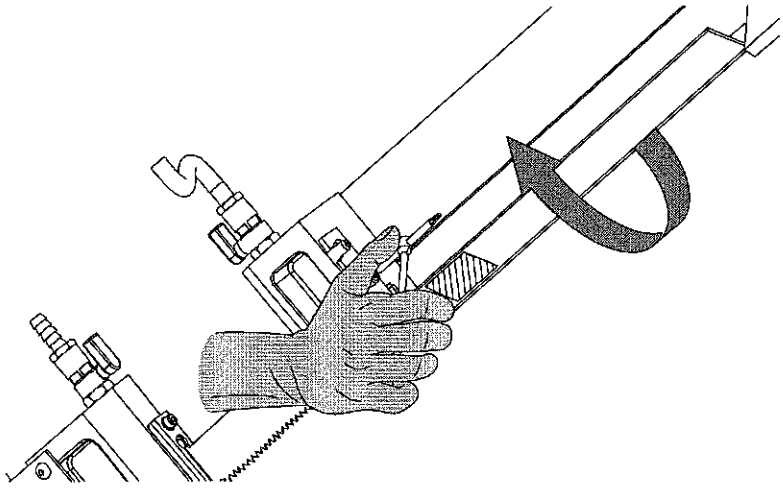
Tool change

Optimum working conditions both enhance operator safety and extend the tool's service life. The cutting tool should in any case be replaced when poor cutting performance starts to affect productivity. The tool changeover procedure is described as follows:

- disconnect the machine from the power supply;
- slacken the blade tension using the handwheel;
- open the cutting head cover by unscrewing the two knobs and hooking it onto the galvanised lever on the back of the head;



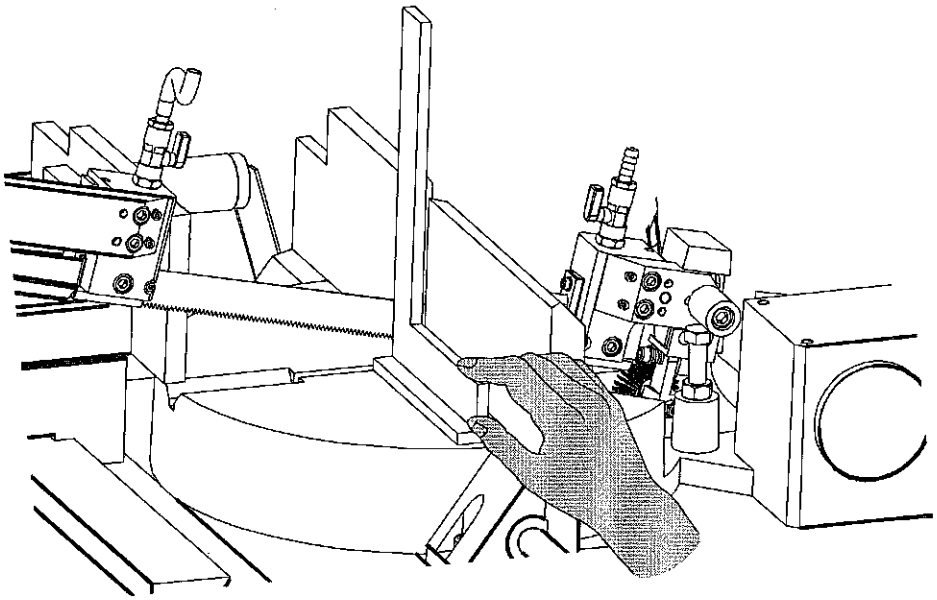
- open the front blade guard by undoing the fixing screw and rotating it as illustrated in the figure below;



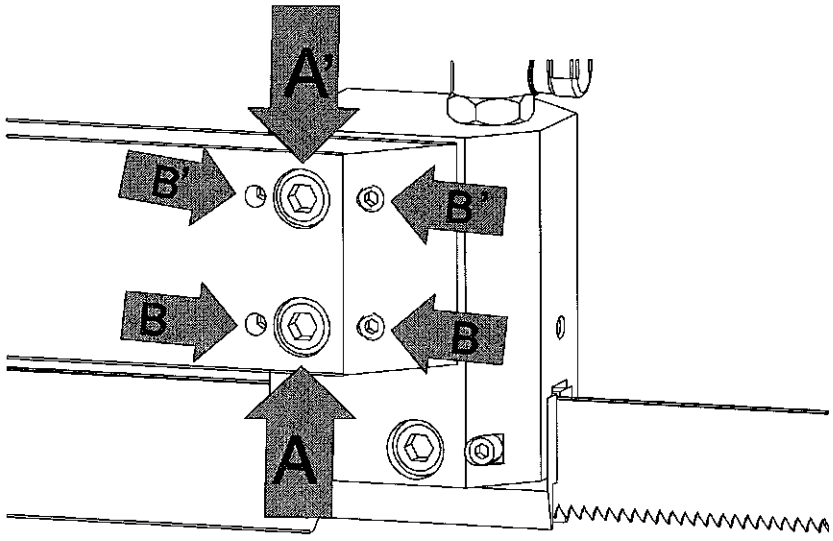
Blade perpendicularity

The perpendicularity of the blade to the work surface, and also the blade tension, are vital for achieving straight cuts. This adjustment is carried out with the help of a workshop square, which should be placed adjacent to the blade resting on the work surface.

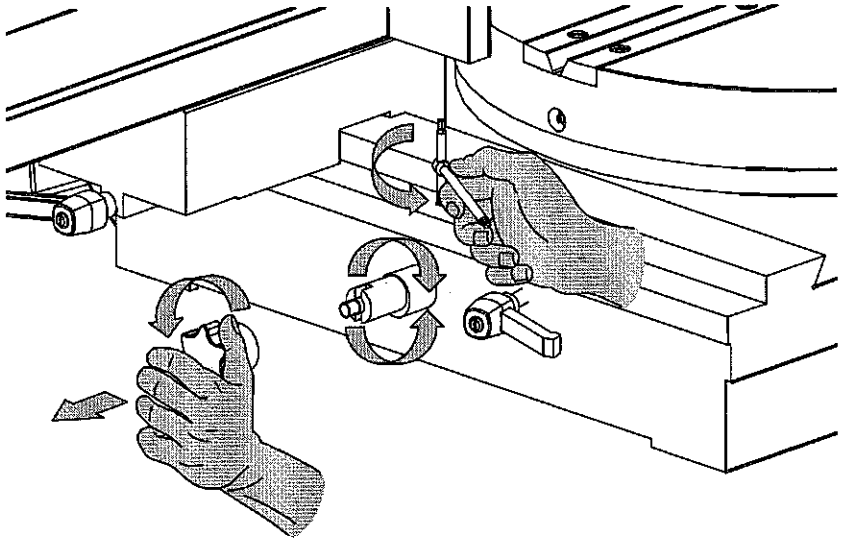
▶ Position the square on the cleaned work surface and rest it against the blade, close to the right vice jaw at a point where the blade teeth do not prevent contact.



▶ Slacken the TCEI head fixing screw (A) and adjust the two grub screws (B) if the blade touches the square at its lower part. If the point of contact is at the upper part, slacken the TCEI screw (A') and tighten grub screws (B') equally until the blade is perpendicular to the square.

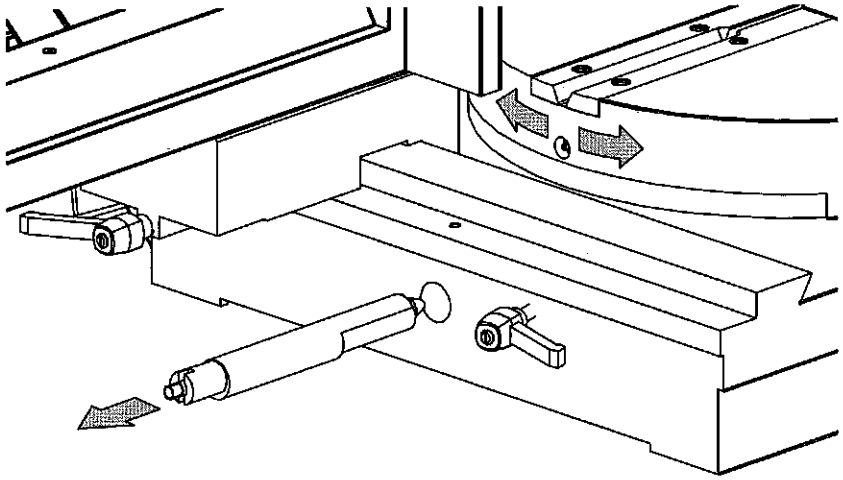


- using an Allen key, slacken the eccentric pin grub screw and rotate it until the error is corrected;



If instead, the degree of error read on the goniometer is greater than 1 degree, proceed as follows:

- remove the eccentric pin completely;
- turn the head until the error is corrected;



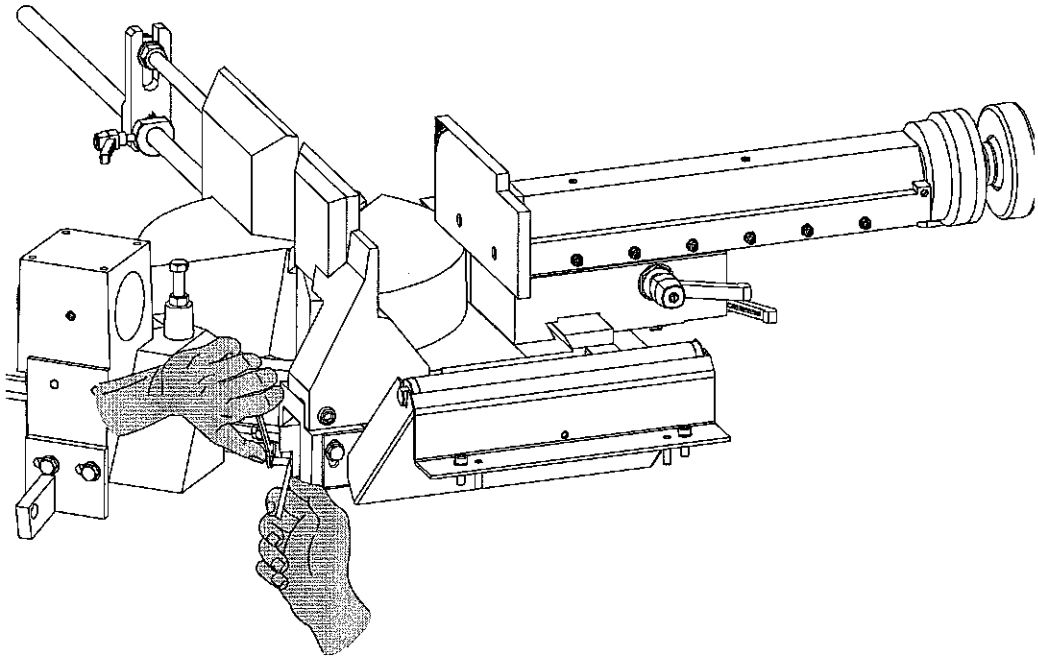
- refit the eccentric pin, tighten down the grub screw and remount the knob;
- lock the turntable using the lever.

Warning To adjust the 45° and 60° fixed points, you will need a workshop goniometer or an instrument that can measure the exact angle of the blade. This operation can also be performed to adjust the blade to 45° right, since a head angle control pin is also mounted on the left hand side of the work table.

Operation sequence for blade adjustment to 45 degrees:

- slacken the turntable lock/release lever;
- turn the head to 45 degrees (left or right);

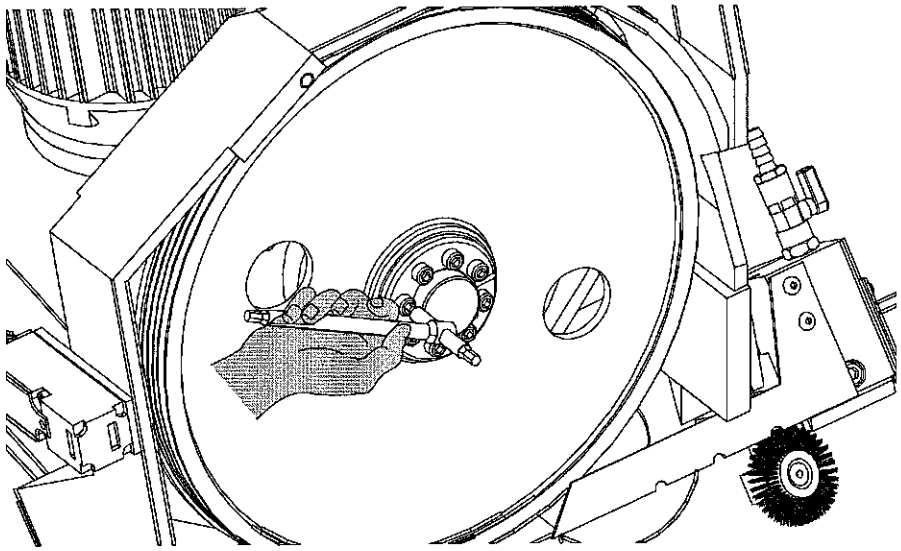
To adjust the blade to **60 degrees left**, proceed as described above for a 45 degree angle, this time however, adjusting the stop indicated in the drawing below.



Motor flywheel

Rear flywheel alignment is closely linked to adjustment of the front flywheel. As before, the purpose of this adjustment is to ensure that the back of the blade remains about 1 mm from the edge of the wheel during rotation.

▶ To adjust, slacken all the locking screws on the flywheel and manually move it in or out until the blade is correctly distanced from the edge of the wheel. Retighten the screws and check alignment by rotating the blade a few times. If necessary, readjust.



SECTION 8

MAINTENANCE AND CHOICE OF CONSUMABLES

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 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.

General maintenance

Daily

The daily maintenance operations to carry out on the machine are as follows:

- remove all swarf from the machine (preferably with a non–fibrous cloth);
- empty the swarf drawer (this is located on the right side of the base);
- top up the lubricant/coolant level;
- check state of blade wear and replace if necessary;
- check the blade cleaning brush, clean and relocate; if worn, replace;
- at the end of the working day, slacken the blade to 5 Bar (70 Kg) tension to prevent unnecessary and damaging stress on the machine.

Weekly

The weekly maintenance operations are as follows:

- remove all swarf;
- clean the vice and lubricate all joints and sliding surfaces with a good quality oil;
- check the position of the blade–tensioning rod, which should project by 44 mm. from the blade tensioning cylinder; if this is not so, proceed to top up the cylinder as described in Chapter 7;
- check vice sliding; if it is not precise and has transversal play, adjust as instructed in Chapter 7.

Oils for Cut Control System hydraulic circuit

The machine is equipped with a worm gear which is permanently lubricated and therefore maintenance–free. The box has no filler cap, level checker and drain, as it already contains the correct quantity of synthetic oil, guaranteeing perpetual lubrication of the crown and worm gear. Below is a short list of synthetic oils for permanent lubrication:

Cut Control System:
– tank capacity Lt. 0.2

Oil for transmission box

The machine can be equipped with a worm gear which is permanently lubricated and therefore maintenance–free. This gear type has no filler cap, level checker and drain, as it already contains the correct quantity of synthetic oil, guaranteeing perpetual lubrication of the crown and worm gear. Otherwise, the machine can be equipped with a worm gear having filler cap, level checker and drain to top the oil up if necessary. Below, there is a short list of synthetic oils for permanent lubrication:

BP Energol SG XP220 – KLUBER Syntheso D220EP – ESSO Glycolube Range 220 – IP CT614 – SHELL Tivela Oil SC 320 – FINA Girans.

– transmission box capacity Lt. 0.320

Oil for lubricant/coolant fluid

The oil used for the machine lubricant/coolant fluid is CASTROL Syntolin TFX. Though there are no specific standards for these types of oils, the company considers that the above product has the best price/quality rapport. The following oils can also be said to have similar characteristics and are therefore compatible:

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

Finally, a lubricant/coolant guaranteed and distributed by a band saw manufacturer (LENOX) is BAND–ADE SAWING FLUID LENOX.

– tank capacity Lt. 13
– oil concentration 5–6 %

Oils for spray mist system (optional)

The used oil type for the optional spray mist system is BLASER Vascomill 22. The following oils can also be said to have similar characteristics and are therefore compatible:

UNIST Coolube 2210 – FUCHS Plantocut Micro Plus 27

– tank capacity Lt. 1

SECTION 9

CUTTING SPEED AND CHOICE OF TOOLS

Machine with Inverter (optional)

The inverter is an electronic instrument fitted to the **DM10–2** for varying spindle motor rpm. The inverter makes life easier for the operator carrying out special cutting tasks by enabling a changing of rotation speed to suit the kind of material being cut. Blade use can thus be optimised, inasmuch as a blade not especially suitable for cutting a certain material can be adjusted all the same to the task, and premature wear is avoided.

The characteristics of this instrument will now be described and illustrated, as in the "Machine specifications" section.

- 1st speed from 20 to 45 m/min
- 2nd speed from 35 to 90 m/min

Inverter nominal specifications	
Protection rating	IP 31
Vibration and shock resistance (EN50178)	0.6 gn from 10 to 50 Hz 2 gn from 50 to 150 Hz
Max. relative humidity	93% without condensation or drop-forming
Acceptable Temperature Range (EN 50178)	For warehouse storing: from -25°C to +65°C For operating purposes: from -10°C to +40°C
Max. altitude	1000mt. with no derating
Supply	- single phase: 200V - 15% to 240V + 10%
	- three phase: 200V - 15% to 230V + 10% 380V - 15% to 460V + 10%
Frequency	50/60 Hz ± 5%
Output voltage	Maximum voltage equal to the supply voltage
Output frequency range	0,5 przy 320 Hz
Max. transients	150% of electronic speed control rated current for 60 secs.
Frequency resolution	- Display: 0.1 Hz - Analog inputs: 0.1 Hz per 100 Hz max.
Switching frequency	Adjustable from 2.2 to 12 Hz max.
Electronic speed control protection and safety devices	Galvanic insulation between power and control panel
	Short circuit protection: - of available internal supplies; -between U-V-W output phases between phase and earth for calibres from 5.5 to 15Kw
Motor protections	Thermal protection against overheating and overcurrents
Motor protections	Protection integrated in the electronic speed control with 1^2t calculation
	Protection integrated in the electronic speed control with 1^2t calculation
Motor protections	Protection integrated in the electronic speed control with 1^2t calculation

Cutting speed and downstroke speed

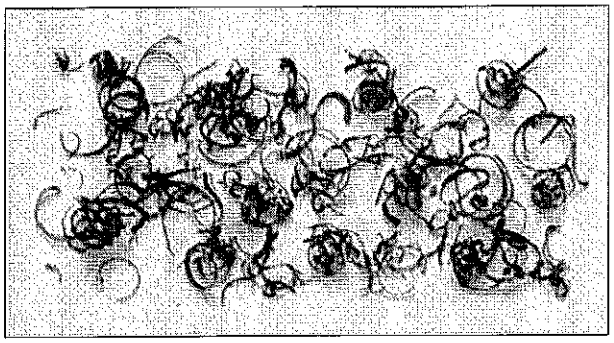
The cutting speed (m/min) and the downstroke speed (cm^2/min) are limited by the heat generated around the points of the teeth. If the downstroke speed is too high, the cut will not be straight, either vertically or horizontally.

The cutting speed depends, as indicated above, on the tensile strength of the material (kg/mm^2), its hardness (HRB) and the thickness of largest sections. The downstroke speed depends on the material thickness. Therefore, large–section, solid or thick–walled materials (s > 5 mm), can be cut at high speeds, providing there is sufficient swarf removal from the blade; thin–walled materials, such as slim piping or profiles, must be cut using low and especially constant downstroke speeds.

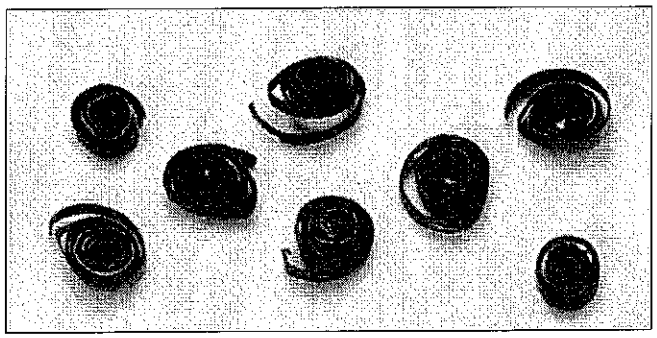
A new blade must be worn in, which in effect means lowering the downstroke speed to about half that of normal (from 60 to 70 cm^2/min on normal steels), equal to a removed surface area of about 300 – 600 cm^2.

Types of swarf:

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



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

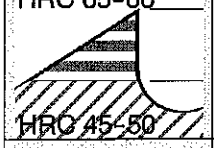
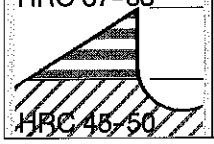


Blade structure

The most commonly used blades are the bimetal types, i.e. manufactured with a silicon steel body and having a high fatigue strength, and super high–speed steel teeth; the two parts are welded by electronic or laser–welding.

Standardised teeth types are termed M2 and M42; the difference being that M42 teeth are harder due to the addition of cobalt to the steel used to make the teeth.

Key									
Mo	Molybdenum	Ni	Nickel	Si	Silicon	V	Vanadium	W	Tungsten
Al	Aluminium	C	Carbon	Co	Cobalt	Cr	Chromium	Mn	Manganese

TYPE OF BLADE	C	Mn	Si	Cr	W	Mo	V	Ni	Co	Al	HRC
	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

N.B. The numbers in the columns indicate the % content of the element in the steel.

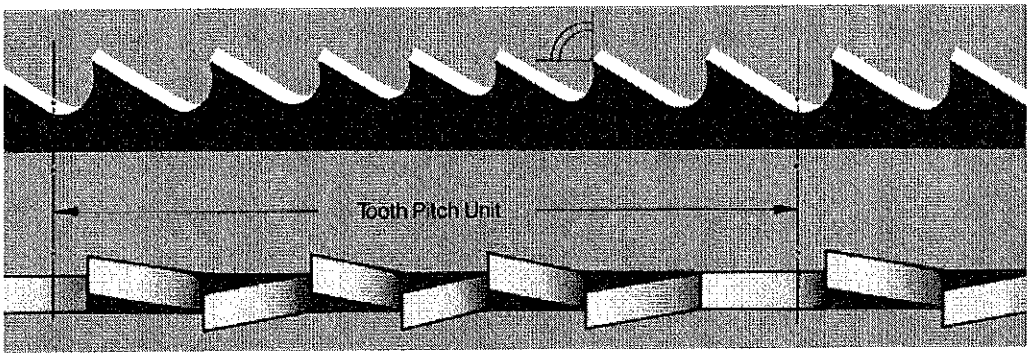
Blade types

The blades mounted on the **DM10–2** are 2.950 x 27 x 0.9 mm.; the length can vary between 2.960 mm. and 2.940 mm., thanks to the blade tensioner device. The blades, however, apart from size and tooth pitch, are differentiated by other geometrical characteristics which determine their specialised uses:

- tooth cutting angle (rake), can be 0 or positive;
- the tooth pitch can be constant or variable;
- the set, i.e. the various teeth alignments, have many possible configurations.

Variable pitch blades with 0° cutting angle

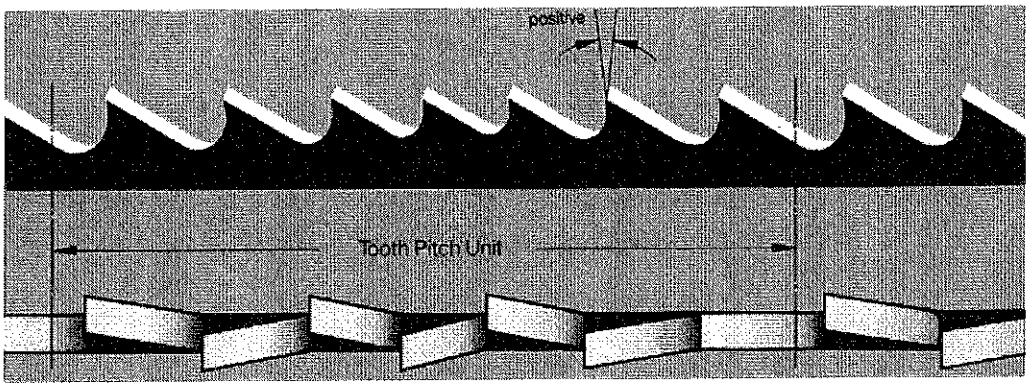
This type of tooth formation is ideal for cutting single pipes or medium size bundles, in accordance with the capacity of the machine.



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

Variable pitch with positive rake (from 9 to 10 degrees)

This toothing type is the most suitable for cutting large dimension pipes and profiles, including large sections, as well as for cutting solid sections up to the machine capacity limit.



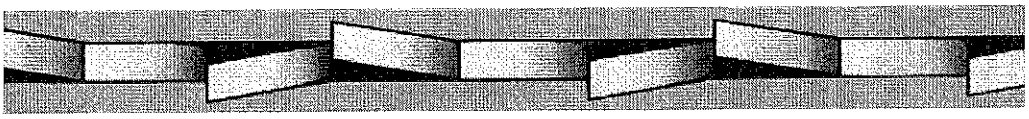
Pitches available: 3–4 / 4–6.

Set:

The term set refers to the section of material removed by the blade during the cutting operation, i.e. relating to width of cut and the offset position of the teeth with respect to the blade back.

Standard or splayed set

This term is used to describe an alternated angling of the teeth: one to the right, one to the left and one straight.



Blade selection table relating to cutting speed and downstroke speed

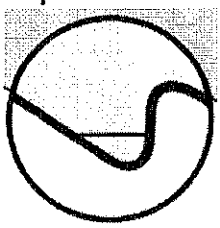
Cutting material	Cutting speed mt./min	Dimensions of the cutting section S (mm) S10	10S30	30S50	50S80	80S120	120S230	Lubrication	sq. mt./min. cut
Structural steel Casehardened steel Steel for turning Mild steel	50 / 70	14 10 / 14	10 10 / 14	8 6 / 10	6 5 / 8	4 4 / 6	3 3 / 4	Emulsible oil Cutting fluid	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
Aluminium	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

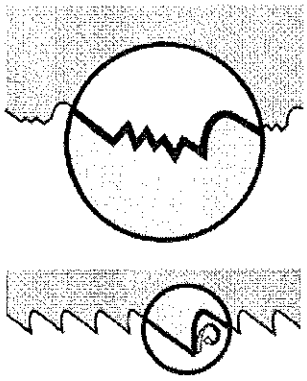
Blade pitch — **Number of teeth per inch**

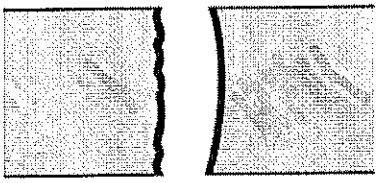
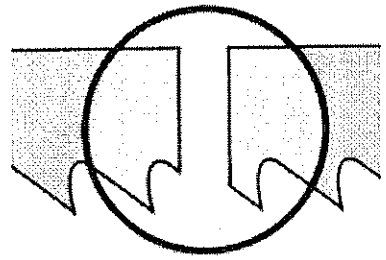
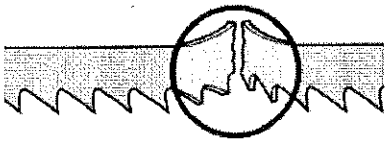
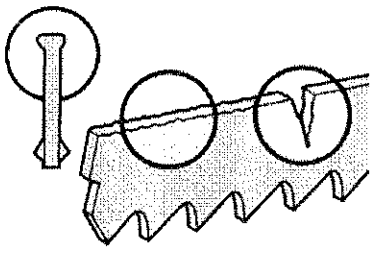
Material						
Carbon steels	1311 1572	1015 - 1035	C 22 - C 35 20 Mn 5 - 28 Mn 6 CK 22 - CK 50	050 A 20 080 M 46 - 50 120 M 19 150 M 28	C 15 - C 35 C 22 Mn C 28 Mn	XC 18 XC 38 H 1 20 M 5
Carbon steels	1650 1880	1040 - 1064 1770 - 1880	CK 60 - CK 101 36 Mn 5 Cm 45 - Cm 55	060 A 40 - 060 A 96 070 M 55 080 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 steel	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 typu 6 i 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 steel	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 steel	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

SECTION 10

TROUBLESHOOTING

PROBLEM	PROBABLE CAUSE	SOLUTION
Rapid tooth wear 	◗ Teeth pointing in the wrong direction	☞Set teeth in correct direction
	◗ Blade worn in wrongly	☞With a new blade cutting should be done at half-speed and with downstroke speed also at half normal speed. After the blade has been worn in (about 300 cm^2 of work for hard cutting materials and about 1000 cm^2 for soft cutting materials) the cutting and downstroke speeds can be brought up to rated levels
	◗ Material too hard	☞Check cutting speed, downstroke speed and blade pressure, as well as type of band saw being used
	◗ Material defective	☞Surface defects: oxides, sand, surface hardening. Hardened inclusions in section. Reduce cutting and downstroke speeds or clean surface.
	◗ Cutting speed too high	☞The teeth slide on the material without cutting: reduce cutting speed
	◗ Head downstroke speed too slow	☞The band saw runs over the material without removing it: increase downstroke speed
	◗ Insufficient coolant	☞Check coolant level and clean pipes and jets
	◗ Incorrect fluid concentration	☞Check and use the correct concentration
	◗ New blade inserted into a partially-made cut	☞The cutting surface might have been subject to a localised heat-induced alteration, making it harder: recommence cut using a slower cutting and downstroke speed. There may be a broken tooth from the old blade lodged in the cut: check and remove before recommencing work
	◗ Flutter	☞Blade tension too low: tighten. Tooth shape or pitch unacceptable: change type of blade used. Widia blade steady buttons too far from the blade back: adjust guide heads, rotating them slightly to bring them closer to the blade back.

PROBLEM	PROBABLE CAUSE	SOLUTION
Broken teeth 	◗ Cutting pressure too high	☞Check and set to correct pressure
	◗ Tooth pitch unsuitable	☞Teeth too close together: change blade for one with a coarser tooth pitch
	◗ Swarf welded to teeth and gullets	☞Check 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 tooth breakage
	◗ Swarf welded to teeth and gullets	☞Check blade-cleaning fluid jets. Check 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 the teeth to break.
	◗ Material defects	☞The material may have altered surface areas, such as oxides or sand, or subcooled inclusions in the section. These areas are much harder than the blade and will cause the teeth to break: scrap or clean these materials.
	◗ Workpiece not clamped	☞The blade may break if the workpiece moves during cutting: check the vice, jaws and clamping pressure
	◗ The blade stops in the cut	☞Cutting pressure too high: check and restore to rated pressure. Downstroke speed too fast: reduce speed. Cutting speed too slow: increase. The blade slips on the flywheels: either the wheels are worn and need to be replaced or the blade tension is incorrect (too low) and must be re-adjusted.
	◗ New blade inserted in a partially made cut	☞The cutting surface may have been subjected to a localised heat-induced alteration, making it harder: recommence cut using a slower cutting and downstroke speed. A tooth from the old blade may be left in the cut: check and remove before restarting work.

PROBLEM	PROBABLE CAUSE	SOLUTION
Blade path fault 	◗ Front flywheel position incorrect	☞Check that the band saw is correctly positioned on the flywheel. Adjust the position of the flywheel under the blade, moving the shaft of the flywheel
	◗ Flywheels worn	☞Replace
	◗ Gaps full of swarf	☞Clean inside machine using blown air.
	◗ Blade guide head alignment	☞Check and adjust
Blade broken    	◗ Cutting speed too high	☞Reduce cutting speed
	◗ Head downstroke too fast	☞Reduce head downstroke speed
	◗ Cutting pressure too high	☞Check and set to correct pressure
	◗ Tooth pitch unsuitable	☞Teeth too close together: change the blade for one with coarser tooth spacings
	◗ Workpiece not clamped properly	☞The blade may break if the workpiece moves during cutting: check the vice, jaws and clamping pressure.
	◗ Widia inserts positioned incorrectly	☞Adjust inserts position, especially the width, since blade thickness can exceed the manufacturer's declared tolerance ratings
	◗ 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 wrongly welded (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 at which a blade is welded is its most critical point; problems could be caused by welds which are not aligned perfectly or have inclusions or blowholes

Troubleshooting machine faults

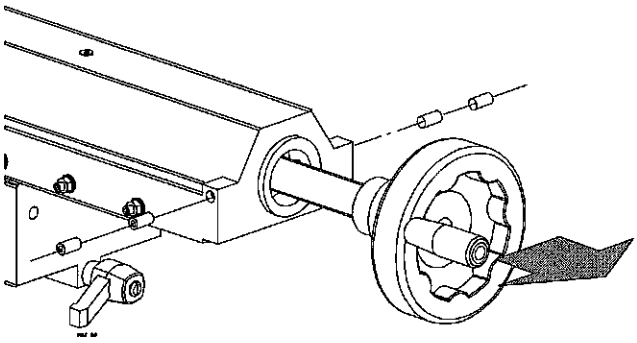
PROBLEM	PROBABLE CAUSE	SOLUTION
The main switch does not work	◗ Electrical supply	☞Check: phases, cables, plug, socket
	◗ Minimum voltage relay	☞Check that it is correctly supplied and not burnt out
The STAND BY LED does not come on	◗ LED burnt out	☞Replace
	◗ Electrical supply	☞Check: phases, cables, plug, socket
	◗ Minimum voltage relay	☞Check that it is correctly supplied and not burnt out
	◗ Transformer supply	☞Check transformer input fuses 1 and 2. Check transformer 24 V secondary output. Check 24V output fuse.
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.
	◗ Motor contactor	☞Check input and output phases and check whether when supplying A1 and A2 relay the contactor closes.
	◗ Polarity change switch	☞Check input and output phases
	◗ Head control lever microswitch	☞Check that it is functioning; if broken, replace
	◗ Blade tensioning	☞If the blade is not correctly tensioned to 60 Bar, the pressure contact does not close and the machine is in EMERGENCY state
	◗ Blade protection cover	☞Check that the closure is correct and the limit stop pressed
	◗ Current drop	☞Check connections on the handgrip switch, the blade protection limiter and the pressure gauge on the blade tensioner group

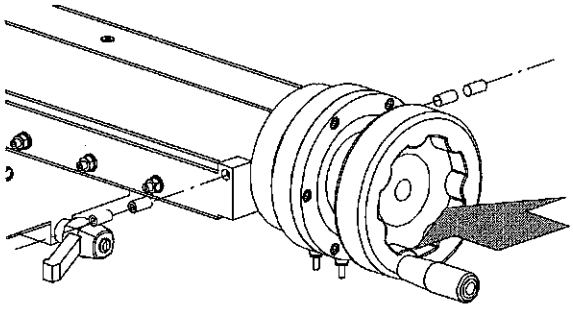
PROBLEM	PROBABLE CAUSE	SOLUTION
The CCS optional is not working	◗ Minimum voltage relay	☞Check that it is correctly supplied and not burnt out
	◗ Selector switch	☞Check connections. Replace if defective
	◗ Lock valve	☞Check for impurities preventing correct functioning. Replace if defective.
	◗ Regulator	☞Check that input and output pipes are free of kinks and obstructions.
	◗ Spring	☞Check that the spring is correctly tensioned
	◗ Cylinder	☞Check that hydraulic circuit oil level is sufficient.
	◗ Limiter	☞Check connections and functioning
	◗ Head control lever microswitch	☞Check connections and functioning

SECTION 11

ACCESSORY INSTALLATION

- remove the security dowel and collar from the vice screw bushing as shown in the figure;





- remove the vice screw unit, the bushing and the crank handle from the slide and insert the vice screw unit with the volampress and crank handle included in the kit;
- insert the volampress in its seating and drill two dead holes to tie up with the fixing holes on the slide, and reinsert the dowel and collar;
- connect the pipes and couplings from the kit and check that they are working.

Blade

The blades that can be used on this machine include:

- 2950x27x0.9 bimetal blade for solid and section materials;
- 2950x27x0.9 bimetal blade for solid and section materials;

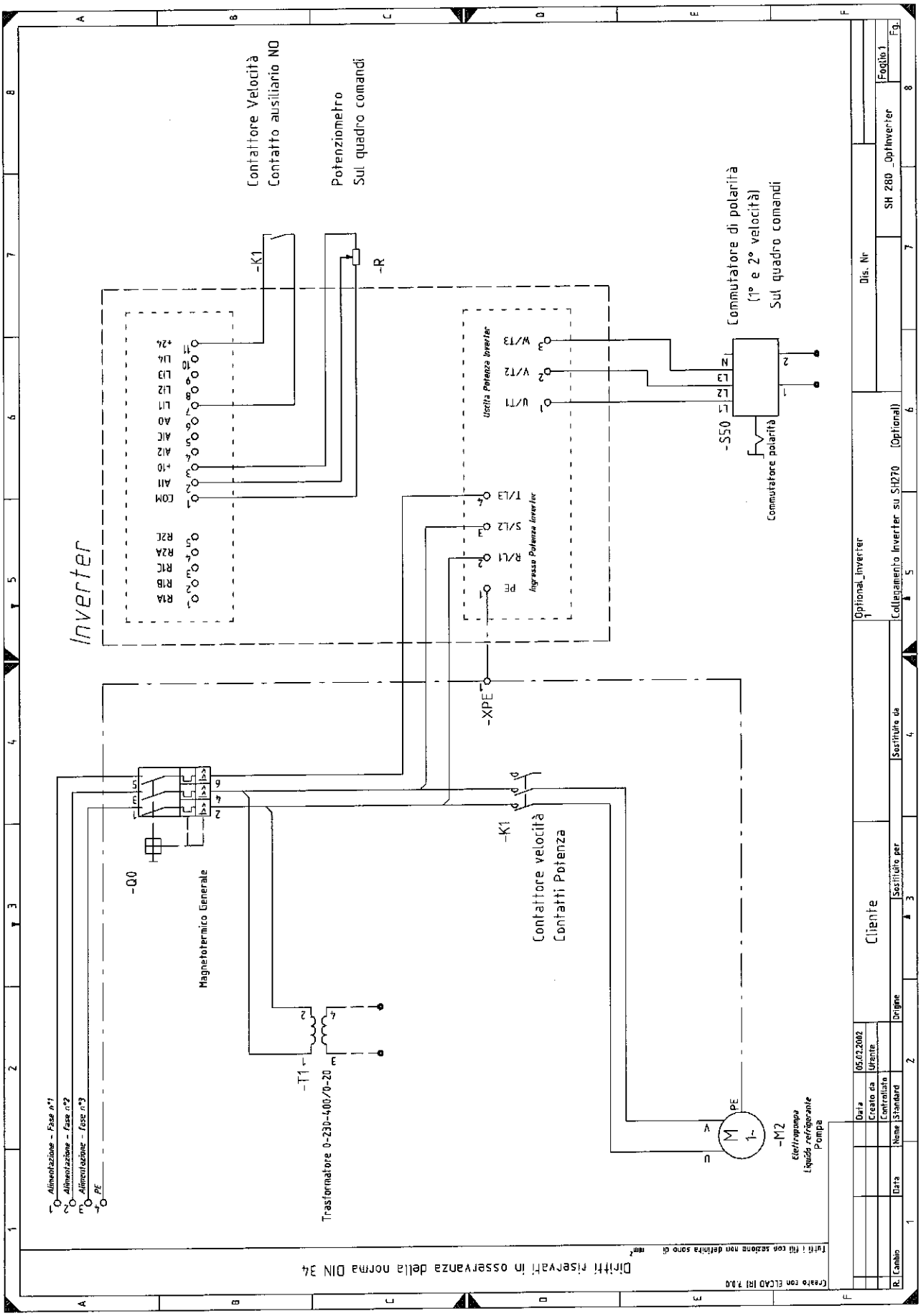
See chapter 7 of this manual for belt installation instructions.

Cut Control System

This accessory allows you to run a Semi–automatic / Dynamic work cycle as described in Chapter 5 of this manual.

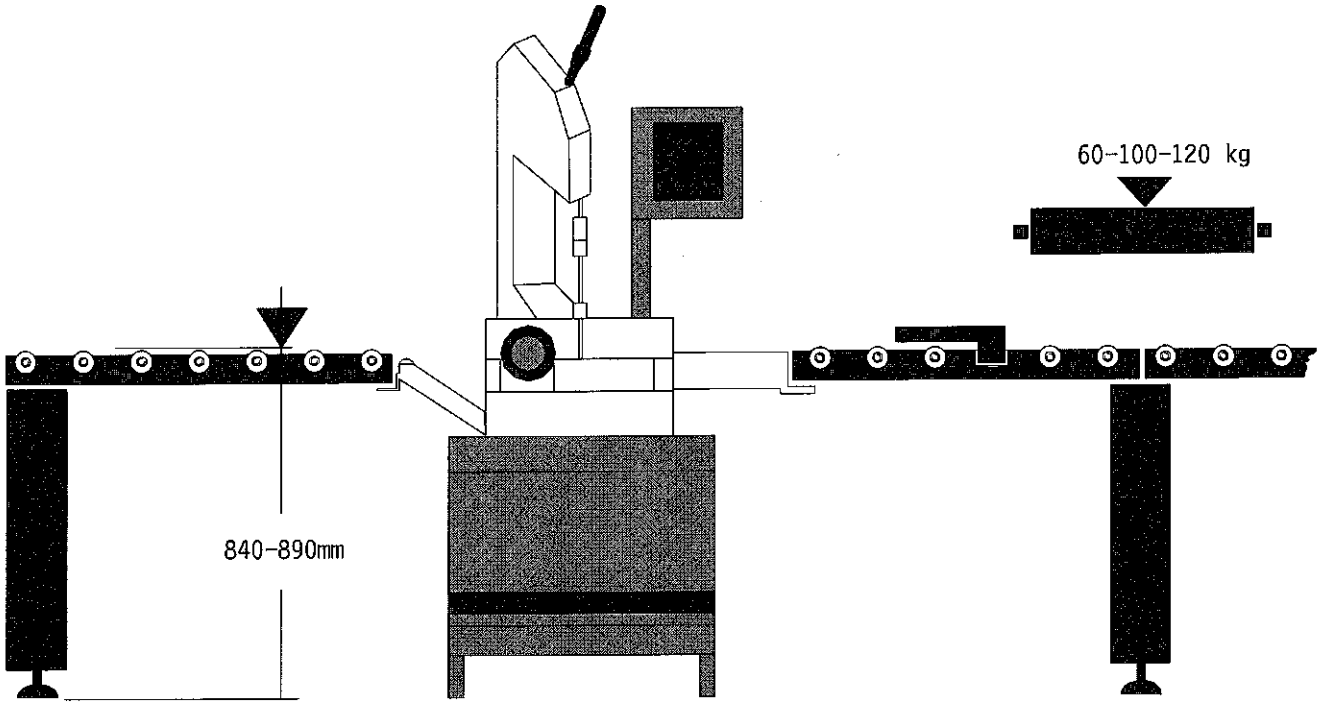
- An instruction book is supplied with the kit to explain how to install this optional unit.

- form the connections as shown in the layout below:



Roller table

- K60/K100/K120 roller table module for feed side, 1500 mm;

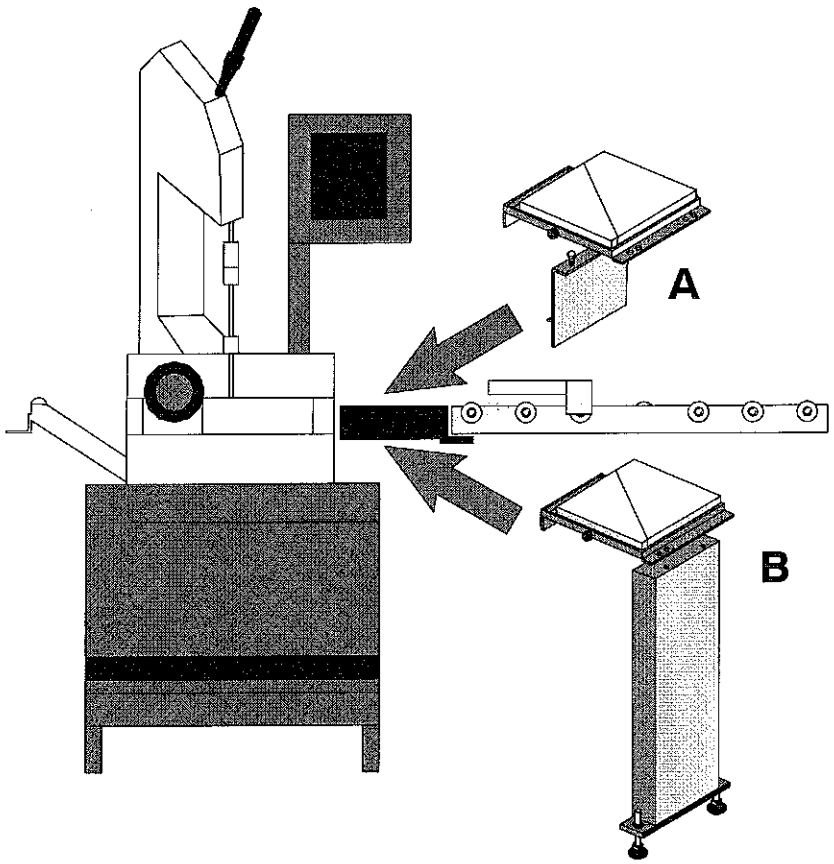


- K60/K100/K120 roller table for discharge side, 1500÷6000 mm;
- K60R/K100R roller table for discharge side, 1500÷6000 mm;
- To fit the roller loading platform on the loading side, the machine has a bar-support arm that one end of the roller-way can be positioned on and then screwed in place.
- To install the roller loading platform on the discharge side an adapter must be used, with or without a support, as explained in the paragraphs that follow.

Discharge side roller table adaptorAdattatore pianale a rulli lato scarico

Two adaptors are available for this model of machine that differ in terms of the load capacity. The installation operations are given below:

- remove the two TE screws from the right side of the slideway;
- install adaptor "A", fixing the plate to the fixed platform after having removed the bolts, and fit the support under the plate, resting it on the machine base;
- install adaptor "B", fixing the plate to the fixed platform after having removed the bolts, and fit the support to the end of the plate, using two of the four holes in the upper part of the support, leaving the other two free for attaching the roller–way.



- Attach the outfeed rolling deck by fixing it with the screws supplied.

The Rock Solid Solution

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HYD - MECH GROUP LIMITED
1079 Parkinson Road, P.O. BOX 1030
Woodstock, Ontario, Canada N4S 8A4
Sales toll free: 1-877-276-SAWS (7297)
Telephone: (519) 539-6341
Fax: (519) 539-5126