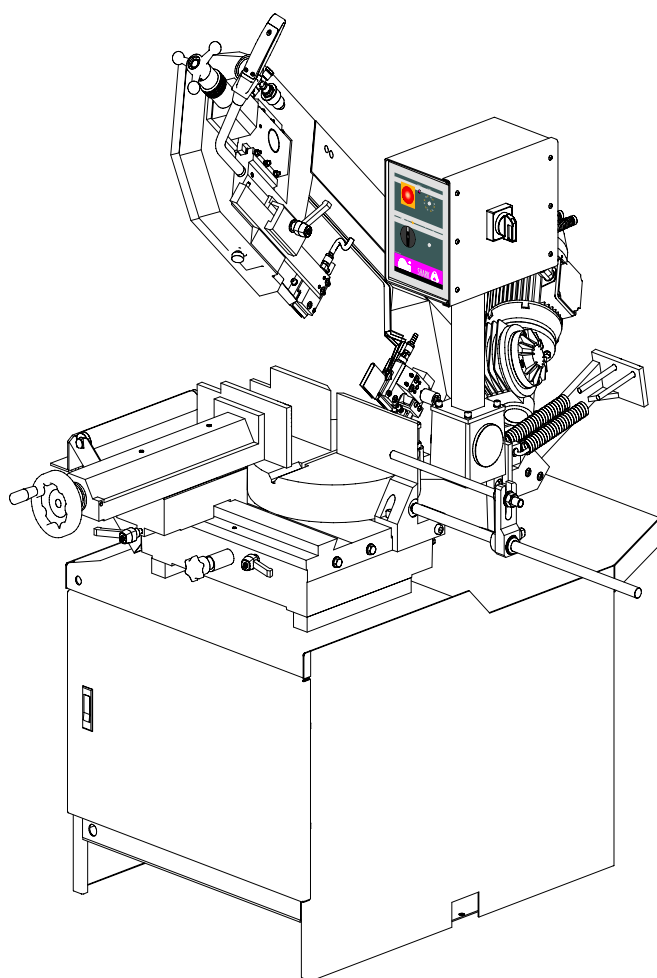




DM10-2

Year of manufacture: _____

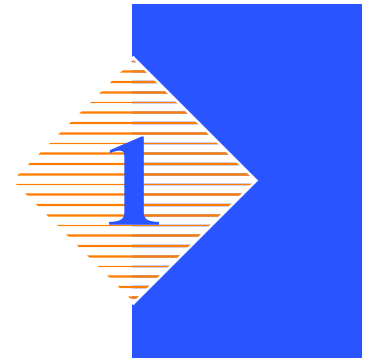


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Introduction and technical specifications



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 range 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.

Machine presentation

Functioning is completely manual: the operator, after having checked the workpiece in the vice, grips the control lever and presses the bandsaw start microswitch; with a downwards movement, the material is cut to the preset length; the cutting head returns up at the end of the cutting operation, ready to start a new work cycle.

In the **MA** version (Automatic Vice), a pneumatic cylinder applied on the vice blocks the material between the jaws: the open/close control is located on the base of the machine.

With the **CCS** accessory (Cut Control System), the machine can also perform a semi-automatic work cycle. The operator, after using the selector located on the control panel to choose the semi-automatic work cycle, clamps the material in the vice and presses the button on the cutting head handgrip to start up the bandsaw; the saw begins turning and the head commences its downstroke, the speed of which can be adjusted using the control valve (head downstroke speed regulator) located on the control panel. The head performs the cutting operation; once the cut has been made, a limiter stops the cutting cycle, after which the head is manually returned to its upper position so that, when a new workpiece is in place, a new cycle can be started using once more the handgrip button.


Warning

Both the **Automatic Vice** and the **Cut Control System** are **optional** for the **DM10-2** model; they can be factory installed on request made during the ordering procedure, or may be installed by the user after the machine has been bought.

Machine specification

Name plate

The anodised aluminium name plate is riveted on the side of the machine; the same data are reproduced on the declaration of conformity included with this use and maintenance manual.

		<i>The Rock Solid Solution</i>			
<i>model</i>		HYD-MECH			
<i>air pressure</i>		bar		<i>oil pressure</i>	bar
<i>data code</i>		- - - -			
1 PH	V	A	3 PH	V	A

N.B. When communicating with the Technical Service department, the model, serial number and year of manufacture of the machine must be quoted.

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 1.3×10^{-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

SPINDLE MOTOR					
No.of poles	Current (Volts)	Absorption (Amps)	Power (Kw)	rpm	Band saw speed
2/4	400	5,6/4	1,8/1,5	2.860/1400	72/36 mt/min
4/8 optional	400	3,1/2,7	1,1/0,55	680/1330	36/18 mt/min
Stator wound with enamelled copper wire, class H 200° C.					
Class F insulation (limit temperature TL 155° C).					
IP 55 protection rating (total against contact with live parts, water sprayed from all directions, with shaft oil seal).					
Conforming to CEI norms, publication: IEC 34 of 01/07/1985.					

N.B. Example of class F insulation: in air-cooled machines at an ambient temperature of 40° C (according to CEI 2-3 and IEC 85), the allowable overtemperature is 100° C (where 100 C represents the allowable DT).

Warning




The machine is supplied with a 2/4 pole three phase motor giving 2 band saw speeds:

– 1^a speed (4 poles) = 36 mt/min

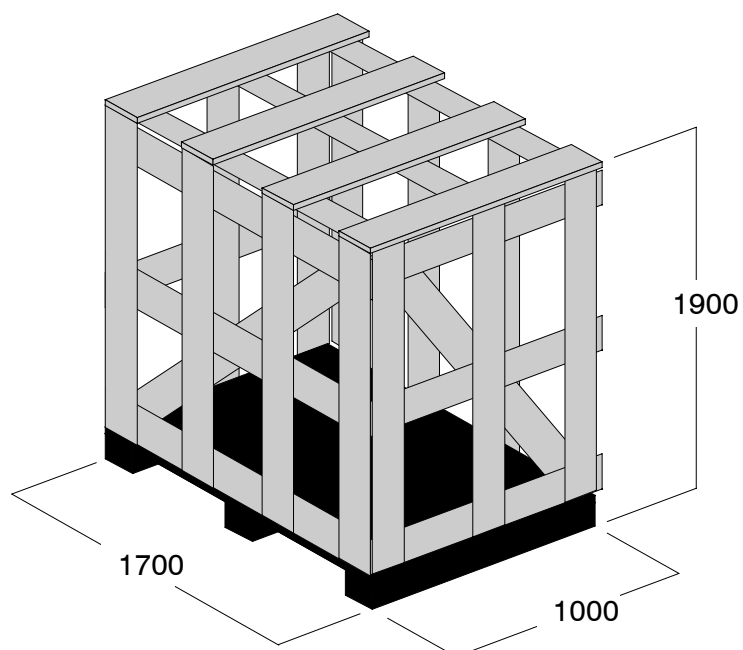
– 2^a speed (2 poles)= 72 mt/min;

The OPTIONAL 4/8 pole motor gives speeds of 36/18 mt./min.

ELECTROPUMP MOTOR					
Single phase; Frequency 50 Hz.					
Voltage (Volts)	Absorption (Amps)	Power (Kw)	rpm	Delivery rate lt/min	Head (mt.)
230	0,40	0,06	2800	11	1,5
400	0,20	0,06	2800	11	1,5
Protection rating IP 55.					
Conforming to CEI norms, publication: IEC 34 of 01/07/1985.					

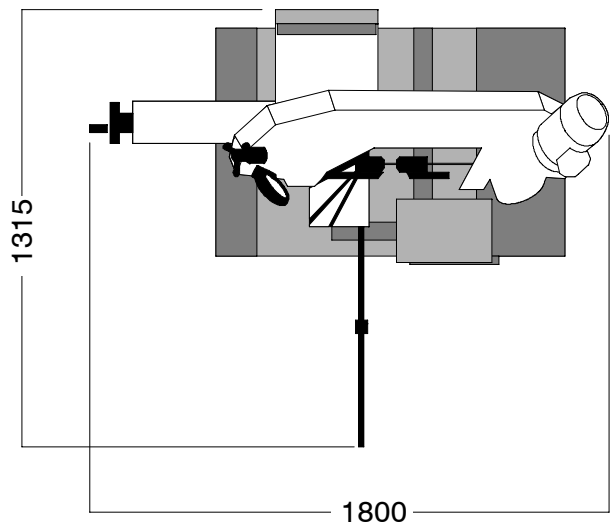
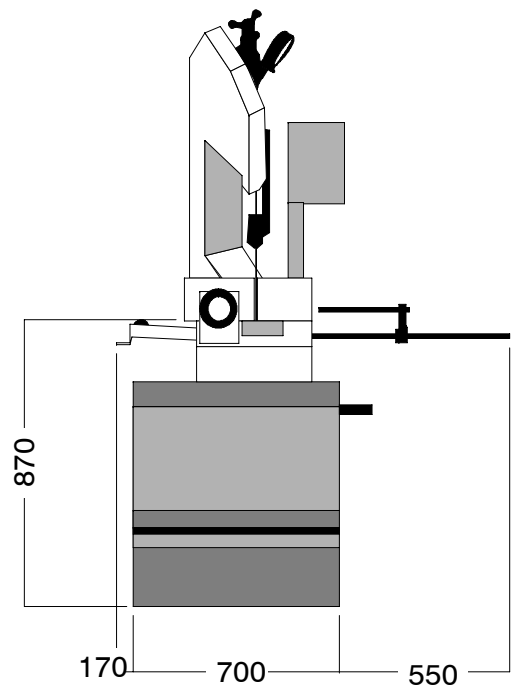
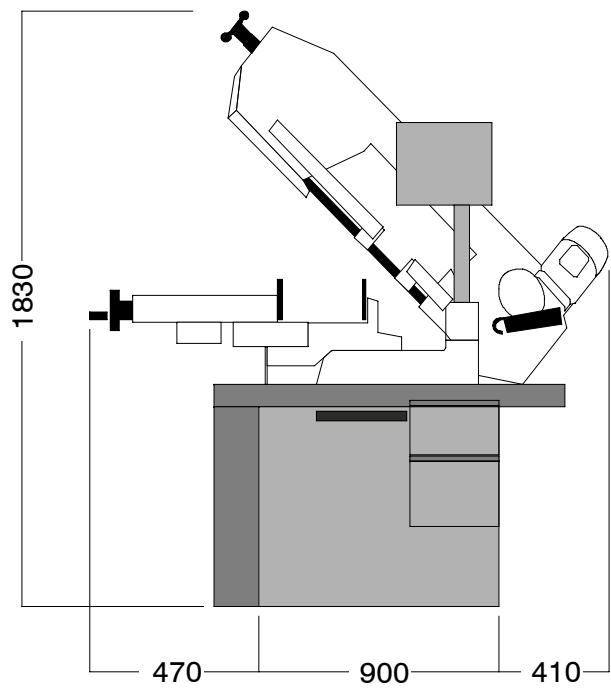
CUTTING CAPACITY			
Section			
0°	250	220	280 x 220
45° ↙	230	200	220 x 200
60° ↙	120	80	140 x 80
45° ↘	200	170	200 x 140

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



Dimensions

MACHINE INSTALLED		
Work table height	mm	870
Weight	kg	440



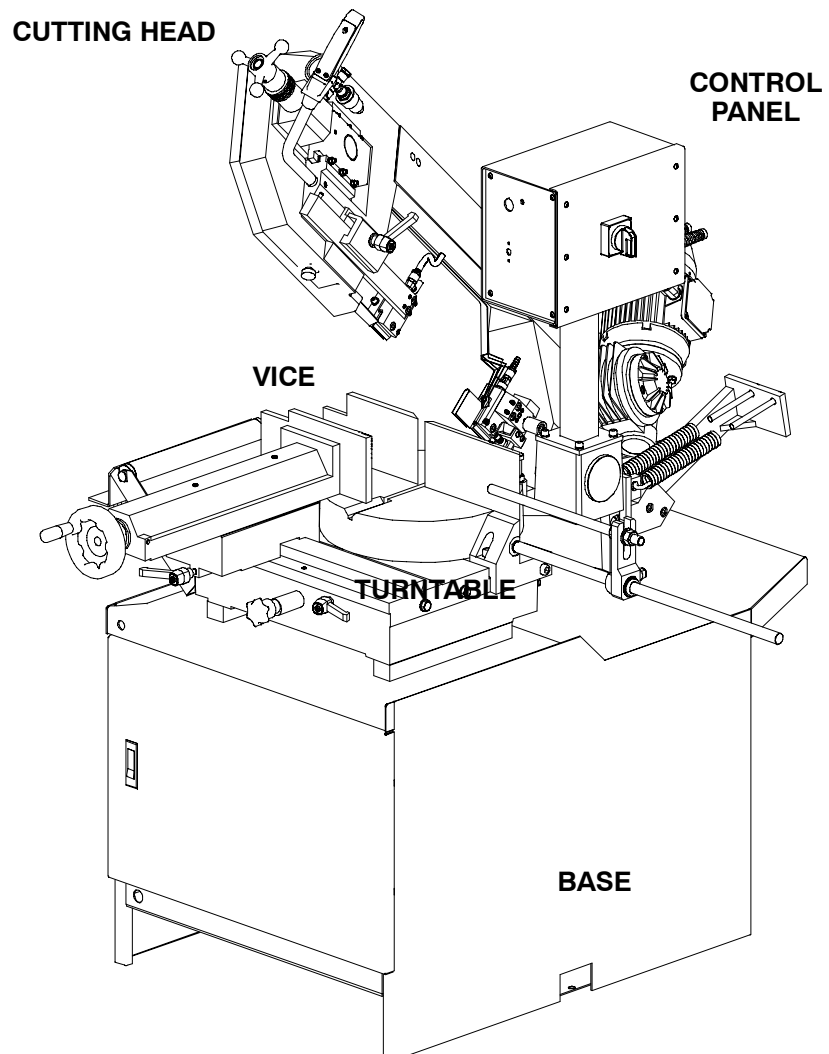
Functional parts



2

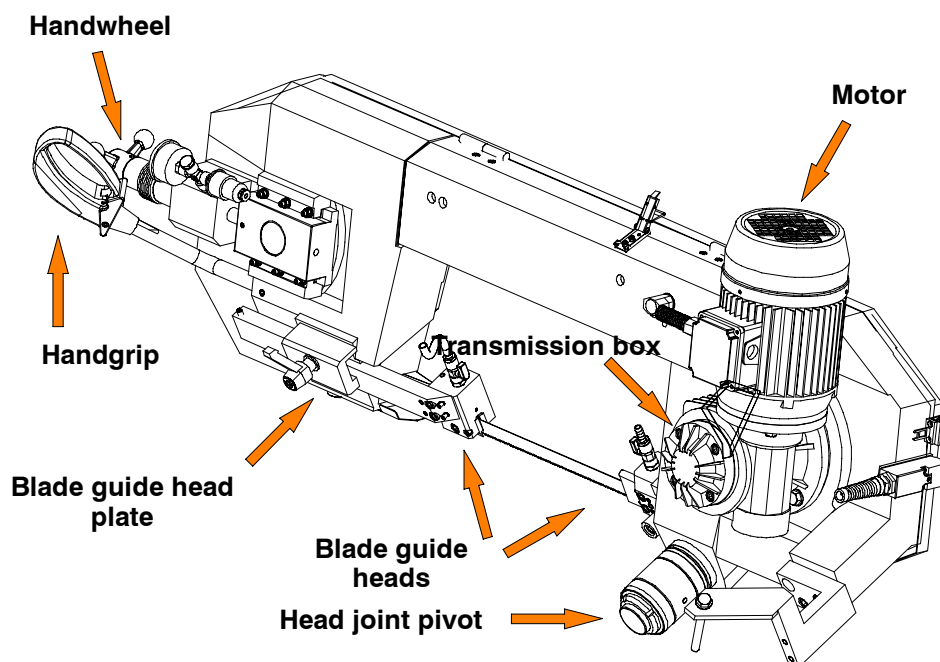
DM10-2 model

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.



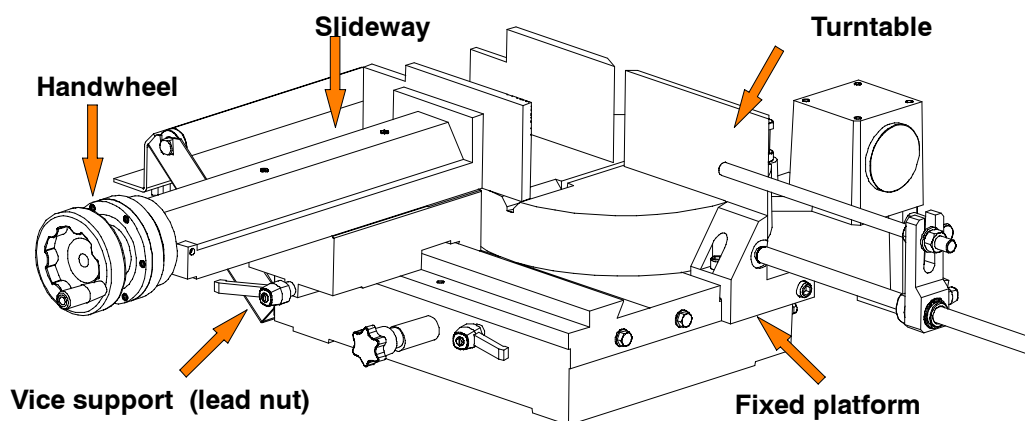
Cutting head

The cutting head is the unit that cuts the material. It consists of a cast iron head on which the following are mounted: the band saw, the blade guide components, the blade tensioner components, the transmission box and the spindle motor. The cutting head is limited in its movements by the joint on the work table, and its cutting stroke is manually guided by the operator.



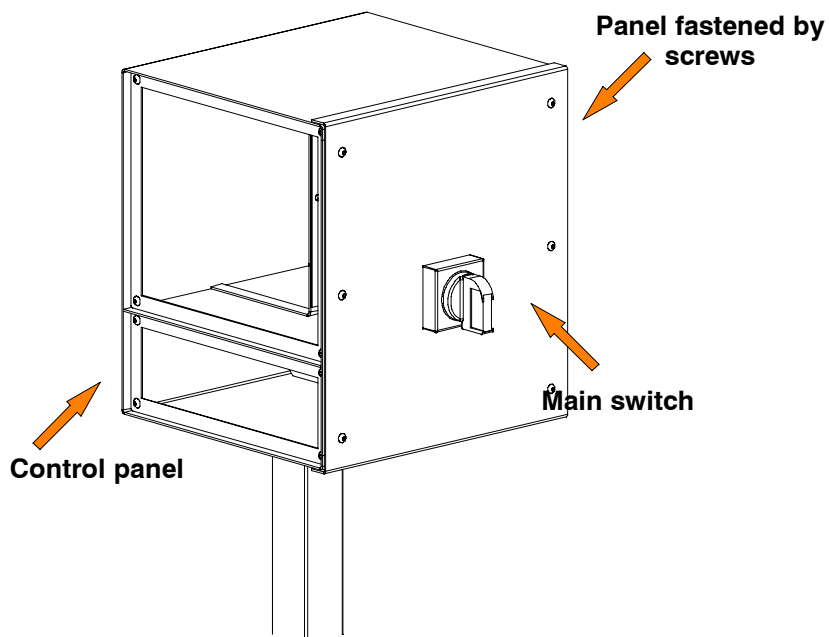
Vice

The vice is the unit that clamps the workpiece in place during cutting; it consists of a vice support, commonly known as a lead nut, fixed to the work table, and a lead screw with a slideway on which the mobile jaw is mounted. The vice is operated manually by a handwheel, or by a pneumatic cylinder in the MA version (optional).



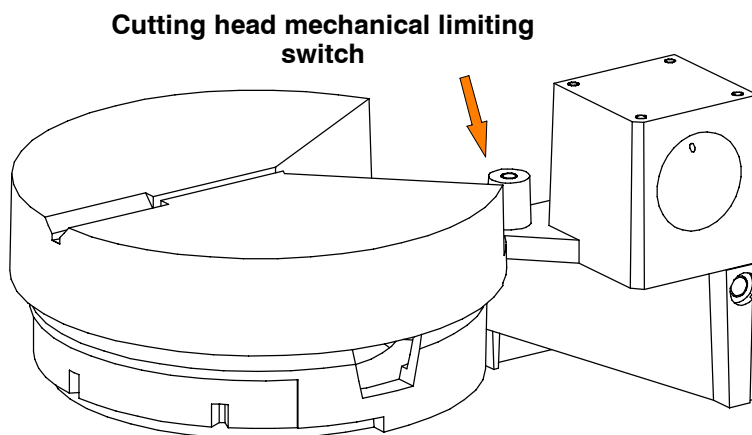
Control Panel

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.



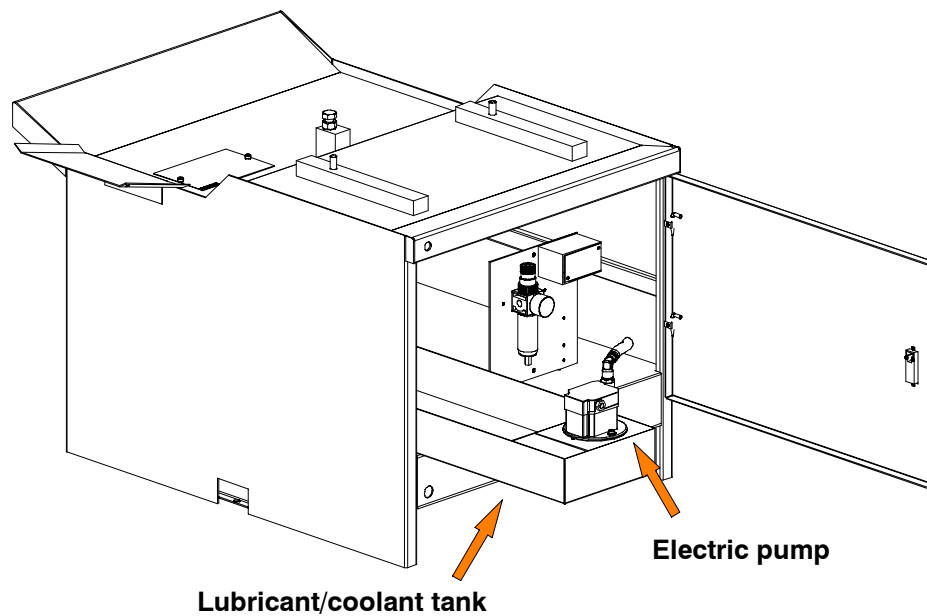
Turntable

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.



Base

On opening the door in the base, you will find the air treatment unit (optional extra only on versions with MA automatic vice) and the drawer with the coolant, complete with electric pump.



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.

General recommendations

LIGHTING

Insufficient lighting for the types of operation envisaged could constitute a safety hazard for the persons concerned. For this reason, the machine user must provide lighting in the working area sufficient to eliminate all shadowy areas while also avoiding any blinding light concentrations. (Reference standard ISO 8995–89 “Lighting in work environments”).

CONNECTIONS

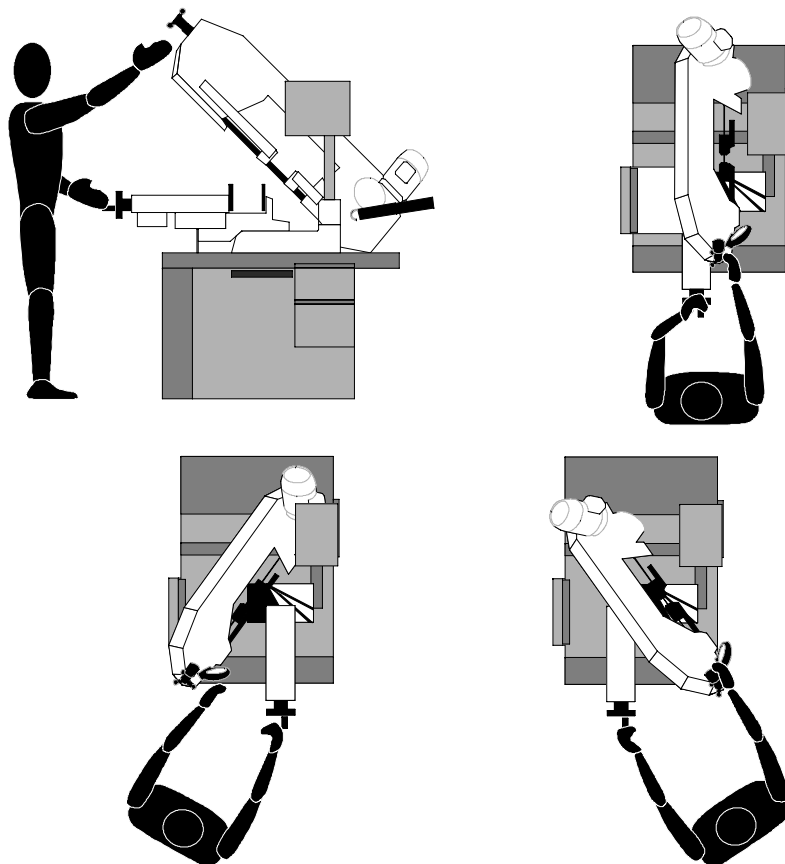
Check that the power supply cables and pneumatic feed systems comply with the maximum machine absorption values listed in the “Machine Specification” tables; replace if necessary.

EARTHING

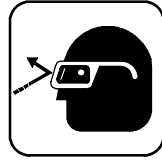
The installation of the earthing system must comply with the requirements set out in IEC STANDARD 204.

OPERATOR POSITION

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



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.



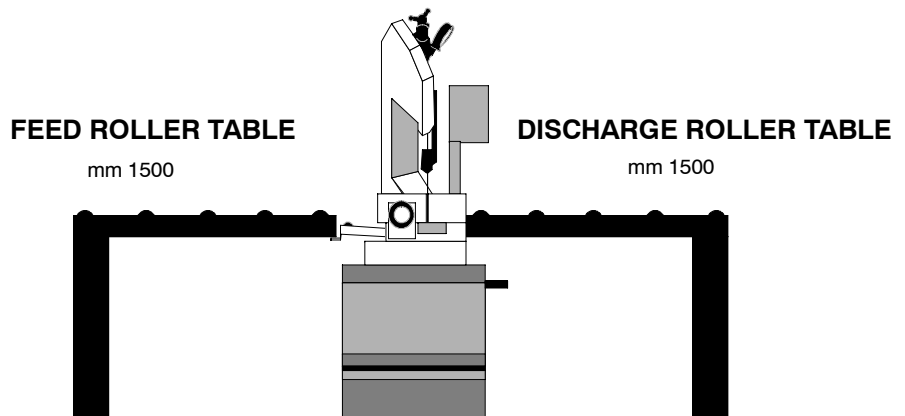
Do not wear oversize clothing with long sleeves, oversize gloves, bracelets, necklaces or any other object that may become entangled in the machine during working; long hair must be tied back and bunched.



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.



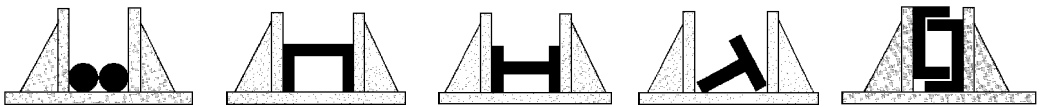
The operator must not perform any risky operations or operations not required for the machining operation under way (e.g. remove swarf or metal shavings from the machine while cutting).



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



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



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



Never move the machine while it is cutting.



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



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



When using the pneumatic vice (MA version) check that the jaws move right up to and effectively clamp the workpiece, as the maximum travel is only 8 mm, and check that the clamping procedure is correct.



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



Warning: if the blade jams in the cut, press the emergency stop push – button immediately. If this does not free the blade, slowly loosen the vice, remove the piece and check the blade or blade teeth for breakage. Replace the blade if necessary.



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

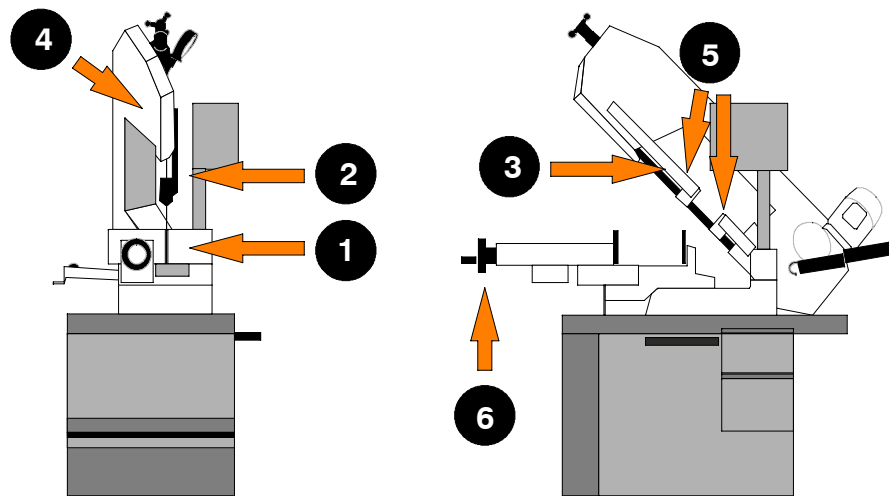
- EEC Directive No. 89/656 and No. 89/686 on the use of personal protection devices.

ENVIRONMENTAL PROTECTION

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

Protection against accidental contact with the blade

1. Metal guard screwed to the rear blade guide head (machine side);
2. metal guard screwed to the front blade guide head (operator side);
3. front head sliding support: when the head is at maximum aperture, the support ensures that the blade is covered, leaving free only the part of the blade engaged in the actual cutting, in accordance with Presidential Decree no. 547/55, art. 108;
4. hinged protective cover over blade, fitted with “removable” closing devices;
5. blade guide plates completely covering the blade teeth;
6. the cutting vice is activated by pneumatic devices, with a maximum stroke of 8 mm. The jaw that locks the workpiece in position, must be brought to within $2 \div 3$ mm of the workpiece.



Electrical equipment

In accordance with Italian standard CEI 60204–1, April 1998, derived from European Standard EN 60204–1 publication IEC 204–1, 1997:

- Access to electrical control panel limited by screws and panel–lock device, allowing panel to be opened only after the electricity supply has been turned off;
- 24 Vac Control voltage for actuators, in accordance with chapter 6 or European Standard “Control and indication circuits”, paragraph 2 “Control Circuits” sub–section 1 “Preferential voltage values for control circuits”;
- plant short–circuit protection by means of rapid fuses, earthing of all plant parts connected with work as well as all foreseeable accidental contact; a thermal–magnetic overload cutout switch shuts down the motor;
- protection from accidental start–up by a minimum voltage relay in case of power failure.

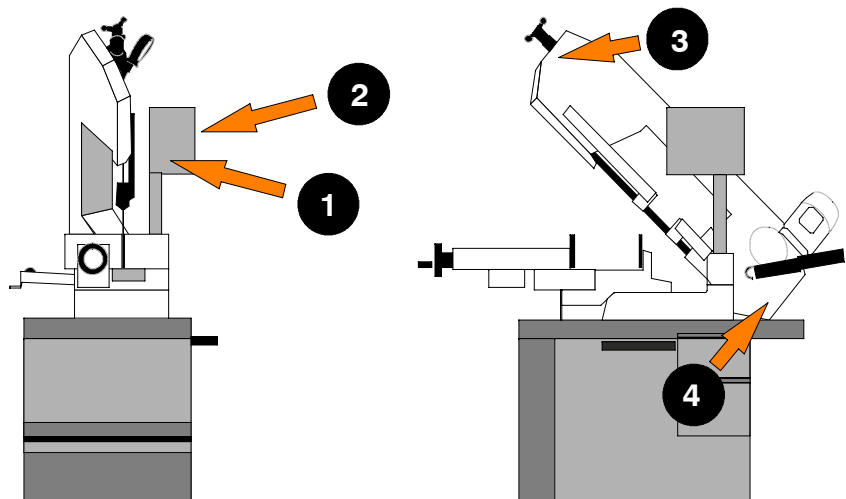
Emergency devices

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.



Noise level of the machine

Noise can cause hearing damage and represents one of the problems faced by many countries who adopt their own standards. In accordance with the **EEC MACHINES DIRECTIVE 98/37/CE**, we are listing the standards that specify noise levels for machine tools. This chapter also reports the noise levels produced by the **DM10–2** during its various operating phases and the methods used for measuring these levels. The Italian standard governing this aspect is D.M.n.277/91 drawn from EEC Directives 80/1107, 82/605, 83/477, 86/188, 88/642, UNI EN ISO 4871 (1998).

Noise level measurement

Noise levels are measured using an instrument known as an Integrator noise–meter which registers the equivalent continuous acoustic pressure level at the work station. The damage caused by noise depends on three parameters: level, frequency and duration. The equivalent level concept L_{eq} combines the three parameters and supplies just one indication. The L_{eq} is based on the principle of equal energy, and represents the continuous stationary level containing the same amount of energy, expressed in dBA, as that actually fluctuating over the same period of time. This calculation is made automatically by the integrator noise–meter. The measurements are taken every 60 seconds, in order to obtain a stabilised value. The reading stays on the display for a sufficient time to enable a reading to be taken by the operator. Measurements are taken by holding the instrument at approximately 1 metre from the machine at a height of 1.60 metres above the platform at the operator's work station. Two measurements are taken: the first while the machine operates without cutting anything, the second while cutting in manual mode.

Noise level values

Identification	
Machine type	Band saw for metal applications
Model	DM10–2
Reference standard	ISO 3746

Results		
Test 1st	Description	C 40 steel cut – pipe 50x82 mm Bimetal band 2950x27x09 S.GLB Z 5/7
	Results	Mean sound level (L_{eq}) 79,65 dB (A) Environmental correction (K) 3,71 dB(A) Peak sound power (L_w) 91,27 dB(A)
Test 2nd	Description	C 40 steel cut – solid rod 150 mm dia. Ø Bimetal band 2950x27x09 M42 Z 3/4
	Results	Mean sound level (L_{eq}) 78,43 dB(A) Environmental correction (K) 3,71 dB(A) Peak sound power (L_w) 88,64 dB(A)
Test 3rd	Description	34CND6 material cut – pipe 140x130 mm Bimetal band 2950x27x09 S.GLB Z 10/14
	Results	Mean sound level (L_{eq}) 78,57 dB(A) Environmental correction (K) 3,71 dB(A) Peak sound power (L_w) 89,32 dB(A)

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

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

Immunity

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

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

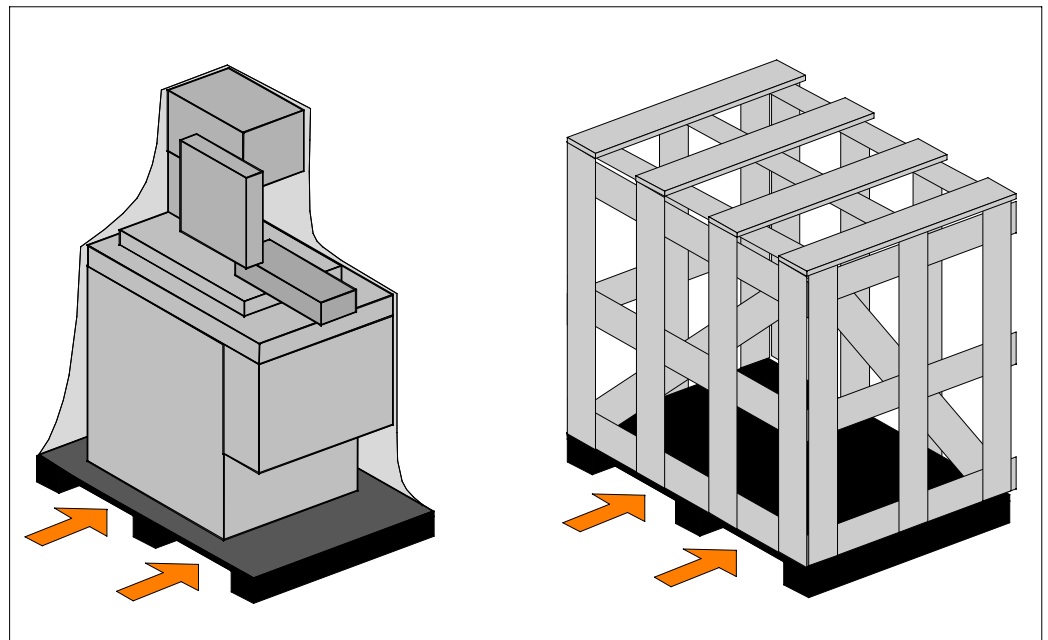
Machine installation

4

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

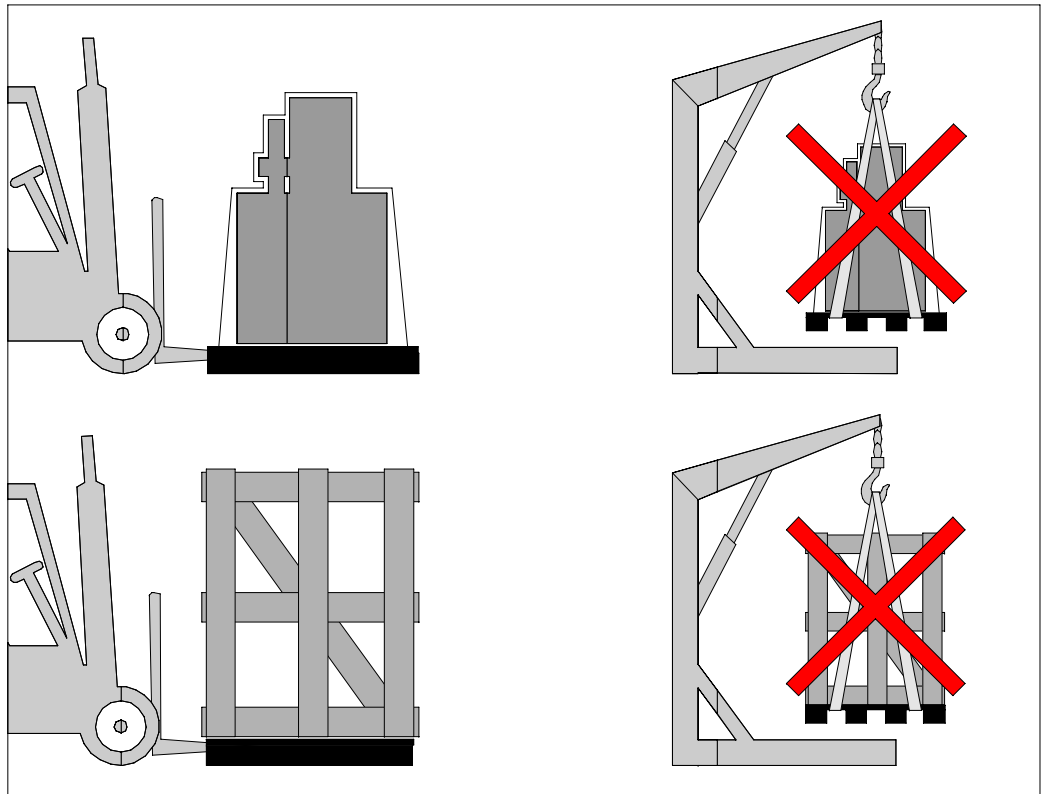
In both cases, for correct balancing the machine must be handled using a fork-lift truck, inserting the tines at the points indicated by the arrows, using the reference marks on the crate itself.

Attention

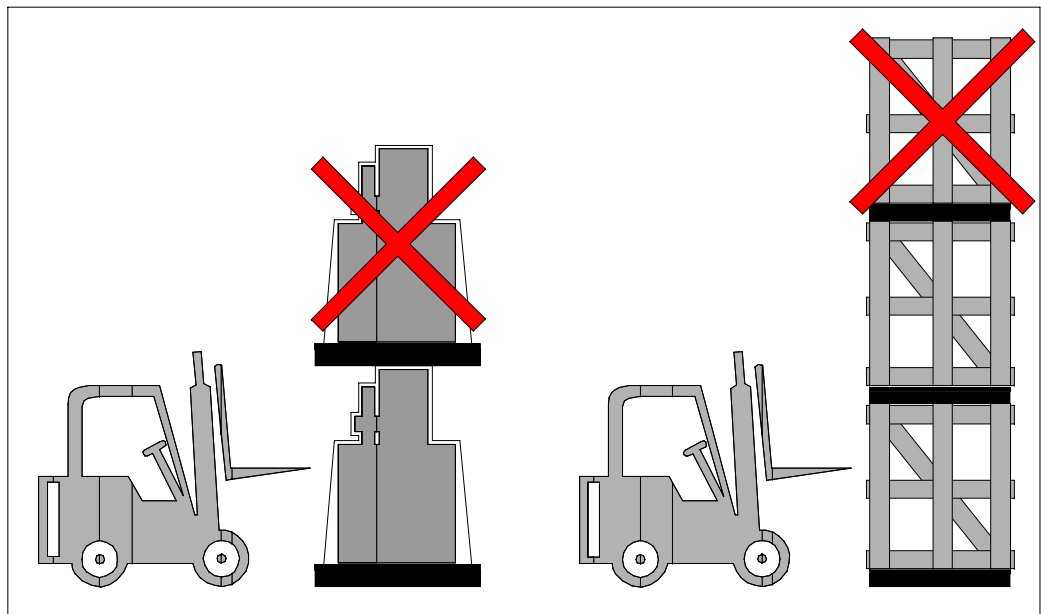
Before carrying out lifting operations, make sure that the weight of the machine, as indicated on the crating or other packaging, is within the forklift truck load limit.

Attention

Do not handle the packed machine using slings.

**Attention**

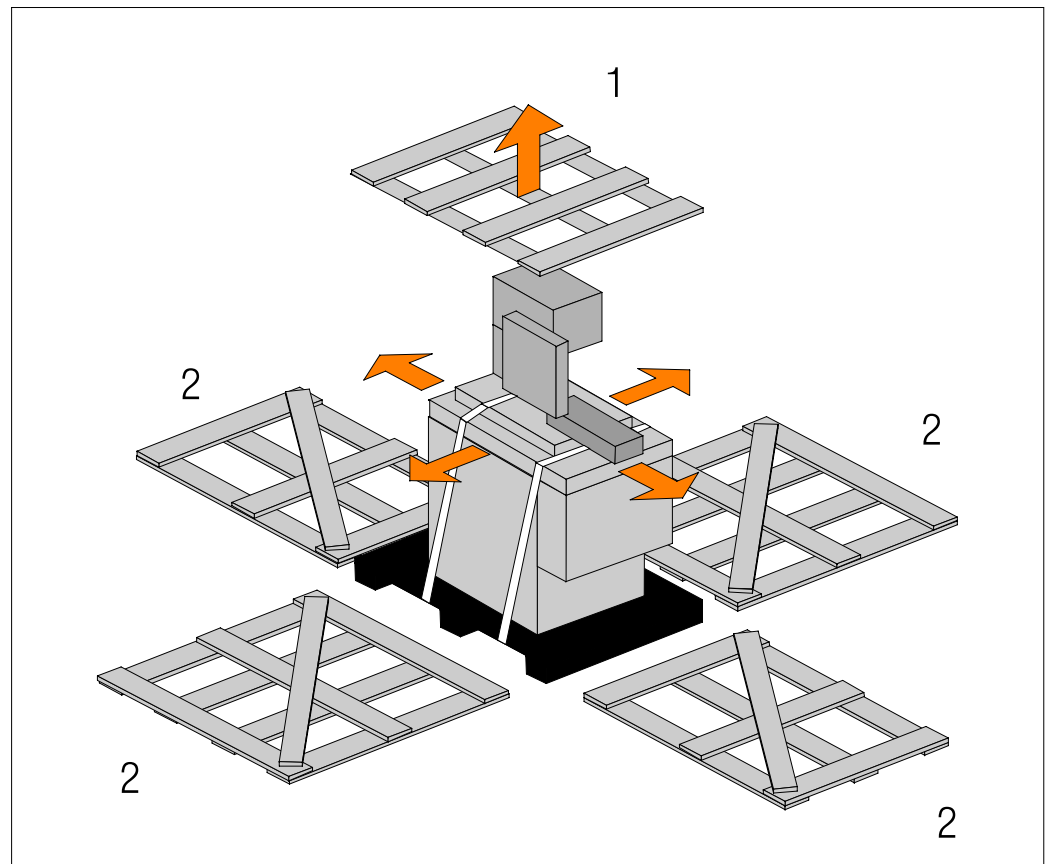
When storing, machines palletized and shrink-wrapped must not be stacked two high, and machines palletized and crated must not be stacked three high.



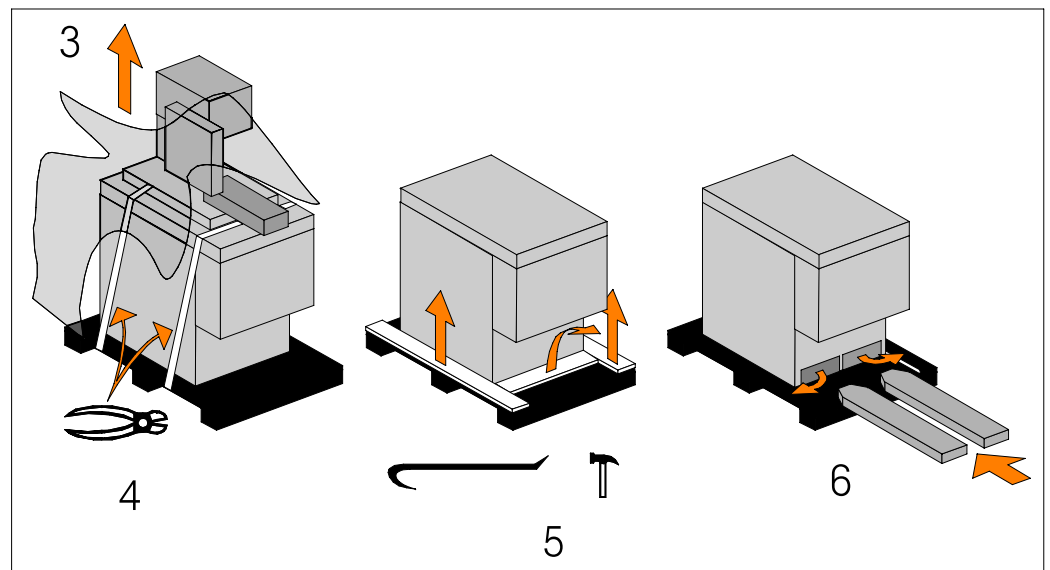
To install the machine, first remove the packing, paying particular attention not to cut any electric wires or hydraulic hoses; if necessary use pliers, a hammer and a cutter.

Open crate in the illustrated order:

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



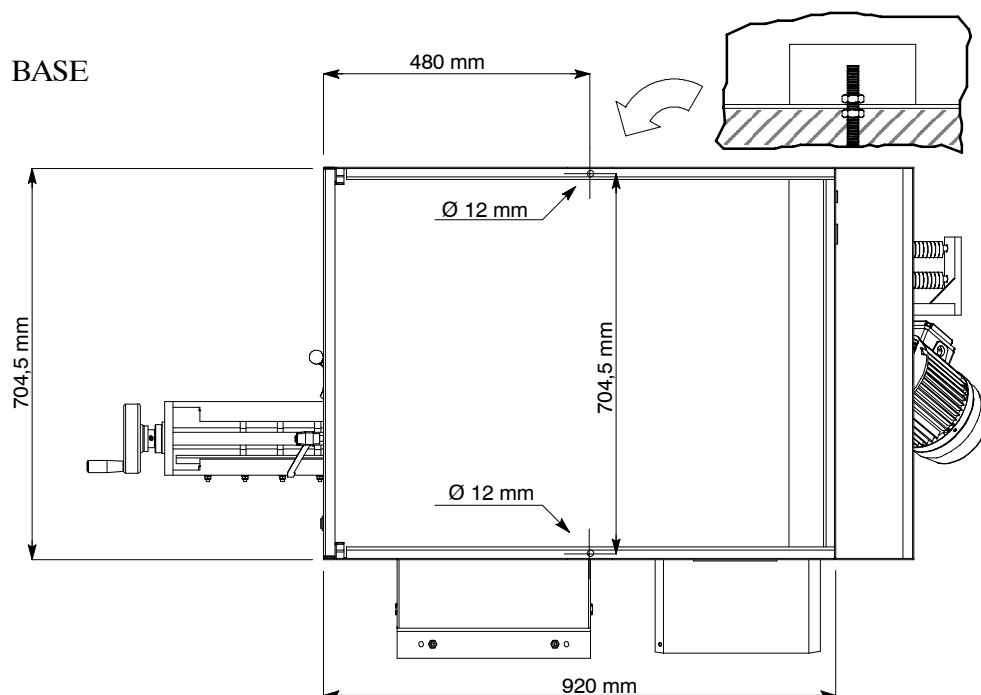
3. remove heat-shrink covering;
4. remove the straps;
5. remove nails from pallet securing planks and remove planks;
6. remove the front panel and insert fork tines.



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.**

Anchoring the machine

The base of the machine is anchored to the floor by two permanent studs located on the sides of the base. The studs are screwed into nuts previously sunk into the concrete, and tightened from above with lock nuts. The schematic specifications set out in Chapter 1 should be taken into account when positioning the machine.



Minimum requirements

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

- power supply voltage/frequency: refer to the values on the rating plate;
- working pressure (MA version) not less than 6 Bar and not greater than 8 Bar;
- temperature of machine location: from -10 to $+50^{\circ}\text{C}$;
- relative humidity: not more than 90%;
- lighting: not less than 500 Lux.

Warning

The machine is already protected against voltage variations, but will only run trouble-free if the variations do not exceed $\pm 10\%$.

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

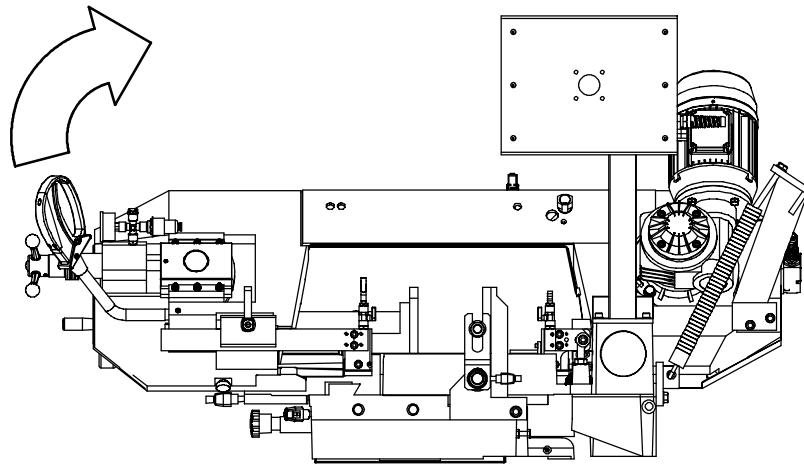
The bag of accessories is enclosed in the machine before being packed and contains:

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

- arm with roller on which the bars to be cut rest and for fitting the feed side roller tables;
- manual pump for topping up the oil in the pneumatic cylinder;
- Use and Maintenance manual, including order form for parts in relevant user language.

Balancing the cutting head

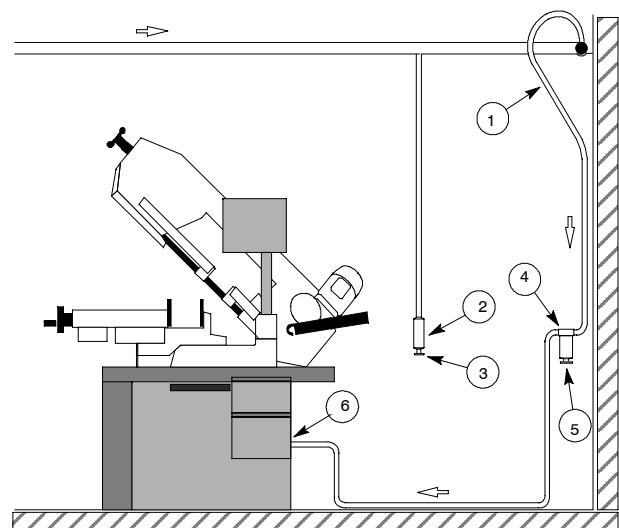
Before making the electrical and pneumatic connections (MA version), the head return springs must be tensioned to balance the cutting head weight. Using a 10 mm. wrench, tighten the screws until the distance between the first coil of the spring and the bracket is 8 mm.



Connection to the compressed-air supply (MA version)

The MA version (automatic vice) is supplied with an air treatment unit for the vice closing system, controlled by a pneumatic cylinder. To ensure perfect performance and long service life we advise that the machine be connected to a compressed air system having the characteristics illustrated in the following diagram.

- KEY
- 1 - DOWN PIPE
 - 2 - CONDENSATE COLLECTOR
 - 3 - DRAIN COCK
 - 4 - AIR FILTER
 - 5 - DRAIN COCK
 - 6 - CONNECTING HOSE



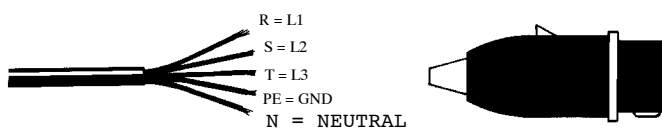
Connection to the power supply

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.

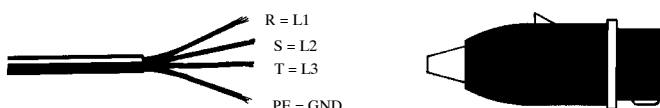
To connect the machine to the power supply, proceed as follows:

- 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



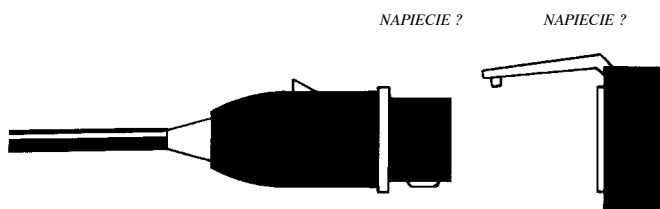
CONNECTION FOR "4-CORE" WIRE SYSTEMS WITH NEUTRAL



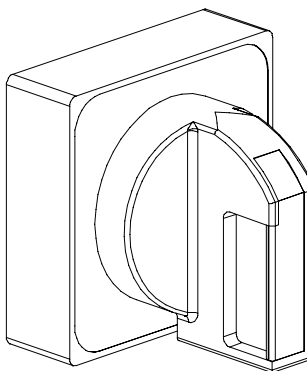
Attention

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.

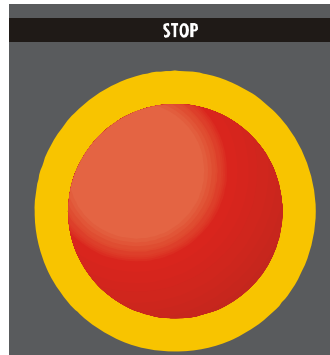


- Power up machine by rotating the main switch located on the right side of the control panel (The STAND BY LED lights up).

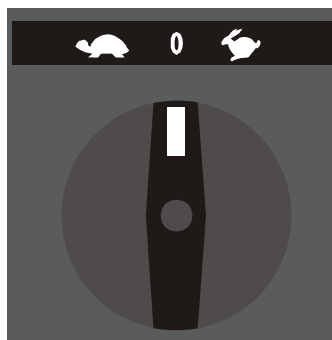


Check that the motor is rotating in the correct direction. For this check the following operations must be carried out:

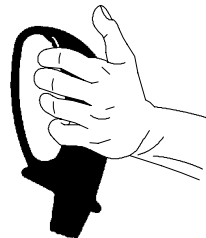
- ▶ set the blade tension to 70 BAR;
- ▶ make sure the cover is properly closed: at the back of the cutting head there is a bayonet limiter for correct cover closure;
- ▶ make sure that the machine is not in an emergency condition (red mushroom –head pushbutton released);



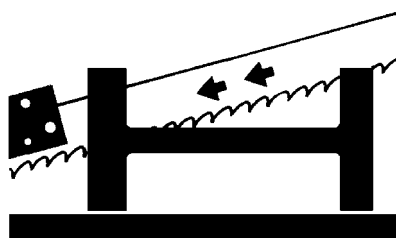
- ▶ select a cutting speed using the polarity change switch;



- ▶ operate the jog button on the manual head control lever;



- ▶ if all the above operations have been carried out correctly, the blade motor will start up and the blade will start rotating.



Attention

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

The sawing machine is now ready to start the work for which it was designed. Chapter 5 provides a detailed description of the various functions of the machine and its operating cycles.

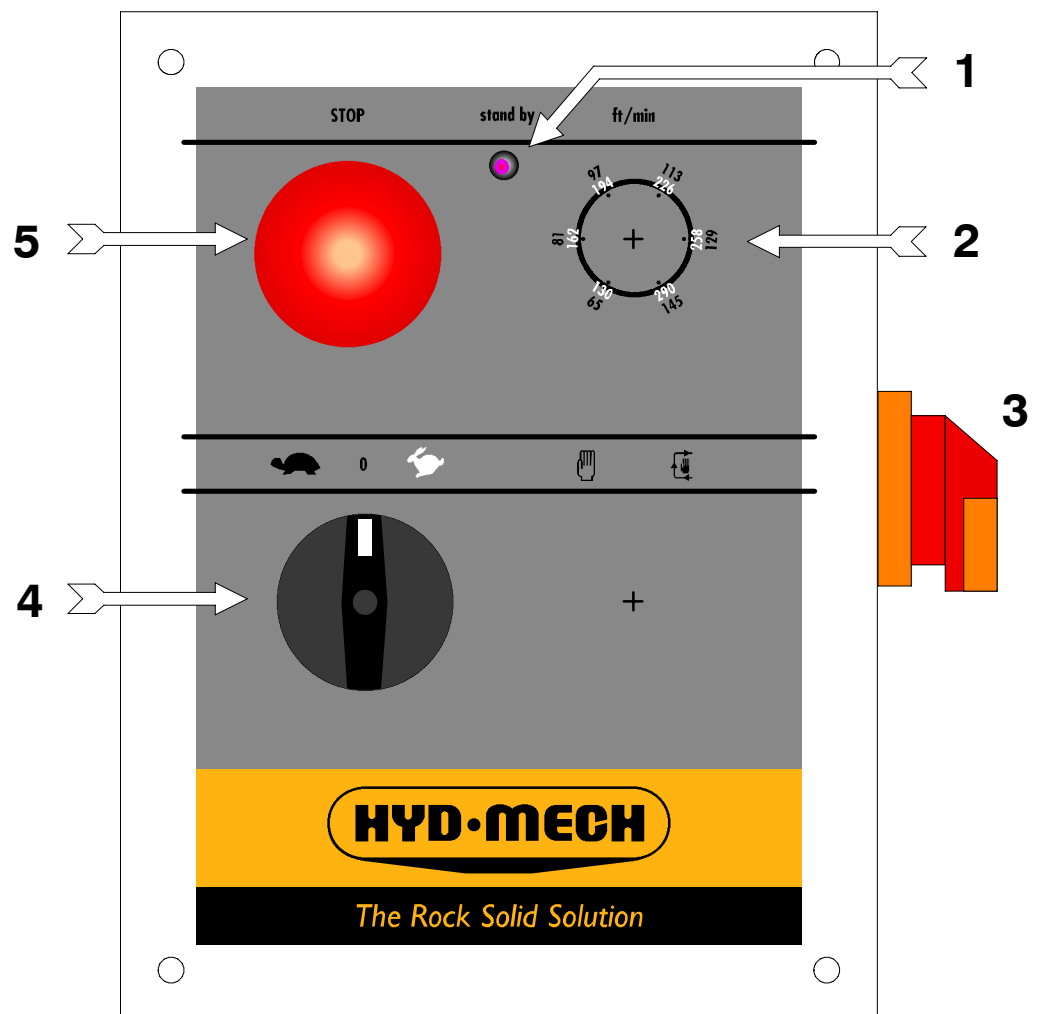
Description of machine operation



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.



1 - LED STAND BY

This either confirms machine start up or indicates an emergency state to the operator.

2 - PREDISPOSITION FOR INVERTER (OPTIONAL)

Selects the blade cutting speed range: from 20 to 45 mt/min. for the 1st speed and from 35 to 90 mt/min. for the second speed. This model has been designed for the installation of a frequency converter (inverter) and is set up for both the electrical wiring and converter control potentiometer, which must be housed in the machine control panel.

3 - AUTOMATIC THERMAL-MAGNET CUTOFF WITH MINIMUM VOLTAGE RELAY AND HATCH LOCKING DEVICE

The machine is provided on the right of the control panel with a main switch with a locking device which, when set in the ON position (1), powers up the machine by resetting the minimum-voltage relay and the blade motor thermal magnet cutoff. This device has three protection systems against power failure. When there is a power failure the electrical devices are all shut down, instantly shutting down the machine and preventing automatic restoring of power on power return. A further function is to reset the thermal relay, which protects against overcurrents.

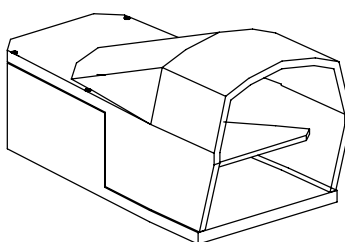
4 - POLARITY CHANGE SWITCH

This selects the blade cutting speed, 36/72 mt/min. on the standard 2-speed machine.

5 - EMERGENCY STOP MUSHROOM BUTTON

Pressing this button immediately stops machine operation. The emergency button, designed to conform to all safety standards, is positioned so that it is easily accessible at any time and is clearly visible – being a red button on a yellow background. To reset the emergency button, rotate actuator by 45°.

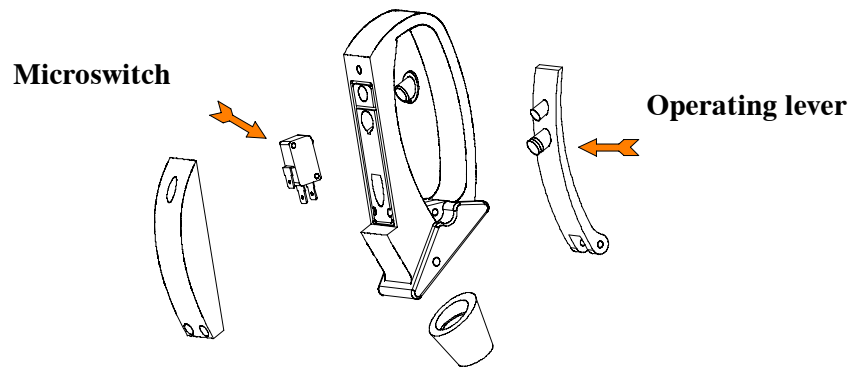
OPTIONAL PEDAL FOR VERSION WITH AUTOMATIC VICE (MA)



The foot pedal opens and closes the vice during normal machine operation.

HEAD CONTROL LEVER MICROSWITCH

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

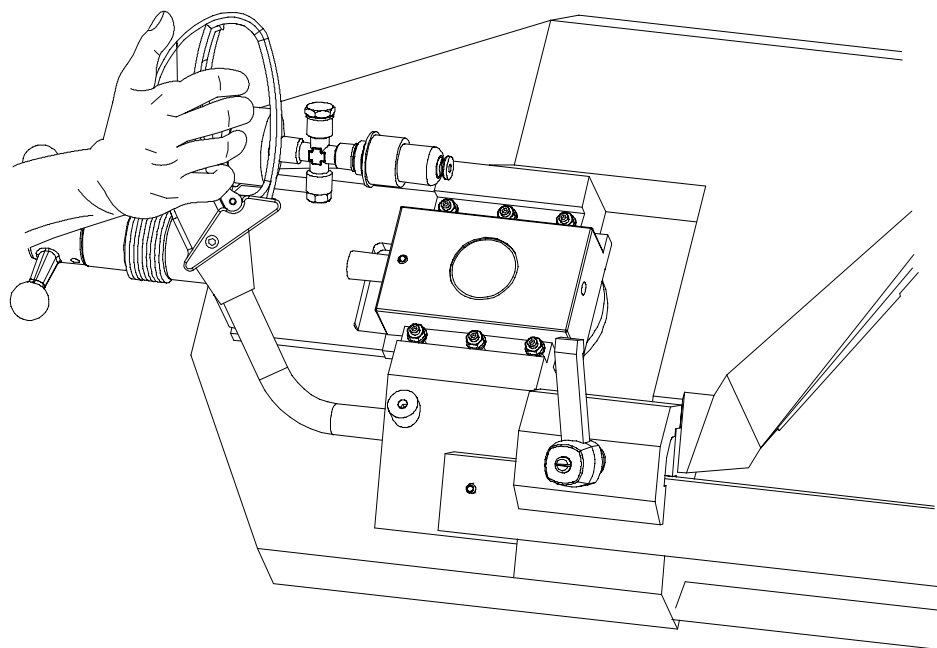


The microswitch is enabled when the machine is not in emergency state. In compliance with the relevant existing standards, voltage is 24V and the microswitch is installed in a housing (blue knob) sealed against external agents such as dust or moisture, with a protection rating of IP 55.

Basic instructions for carrying out a cutting operation cycle

Manoeuvring the cutting head

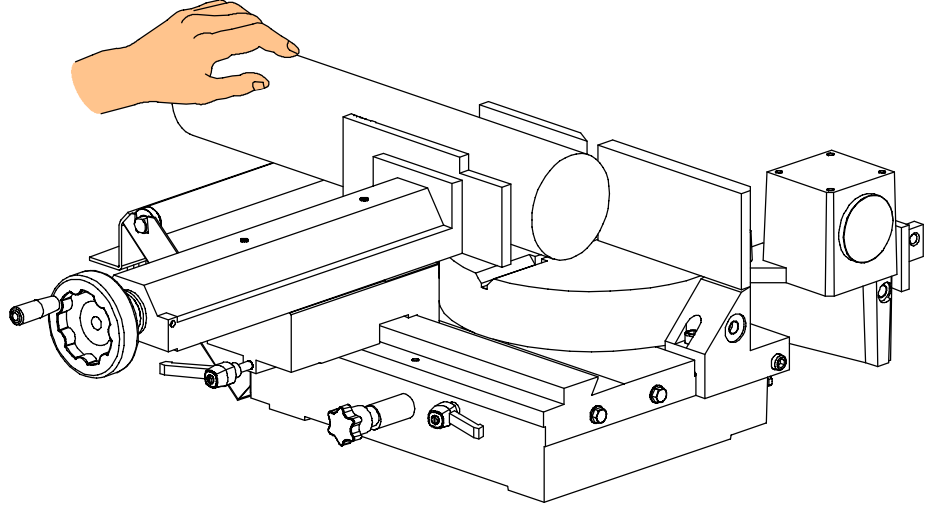
Cutting head movement is facilitated by perfect balancing of the head weight, thanks to the traction force exerted by the two return springs located at the back of the machine. Also, the grip on the head control lever enables the operator to achieve a firm grip in order to start up band saw rotation by pressing the microswitch start lever, located in the handle itself.



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:

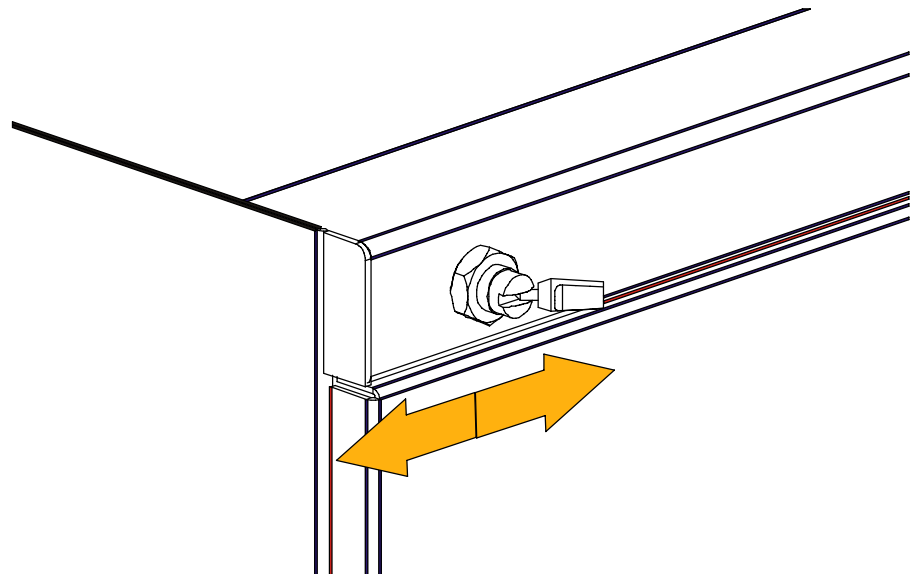
- each time the vice is closed make certain that the work piece is solidly clamped. This can be done manually.



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.

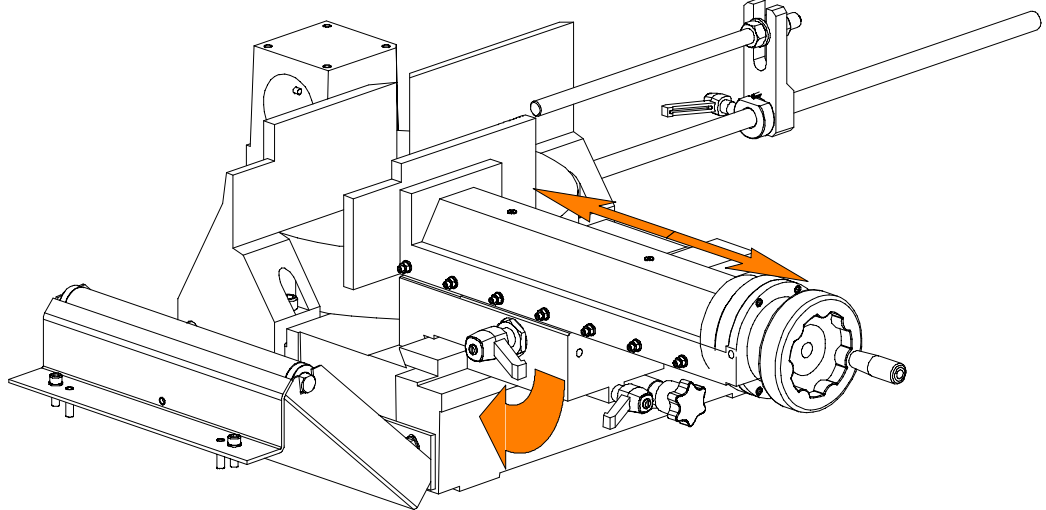
- Near the vice to within 2–3 mm from the work piece;
- close the vice using the manual valve situated on the base and make certain that the piece is tightly blocked. This can be done manually.



Rapid vice positioning

By means of a simple device the vice can be slid back and forth to accelerate vice opening and closing operations.

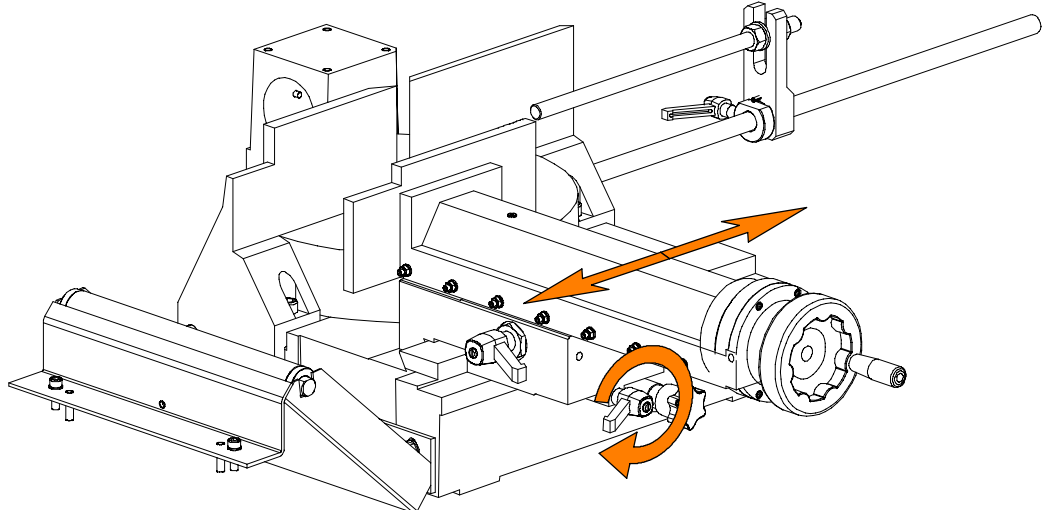
- Grip the lever illustrated in the figure below and rotate in a clockwise direction: the vice is now free to slide back and forth to the required position. Once positioned, release the lever to lock the vice in place.



Rapid translation of the vice

For inclined cuts move the vice to the left or right, sliding it on the sliding guide.

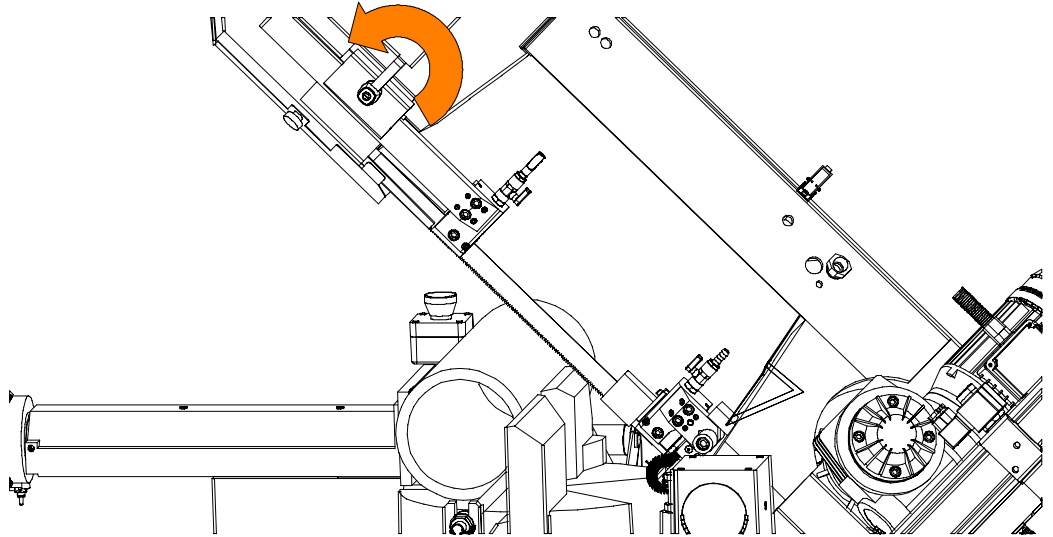
- Loosen the locking lever as indicated in the figure;
- position the vice to the right or left and tighten the locking lever;



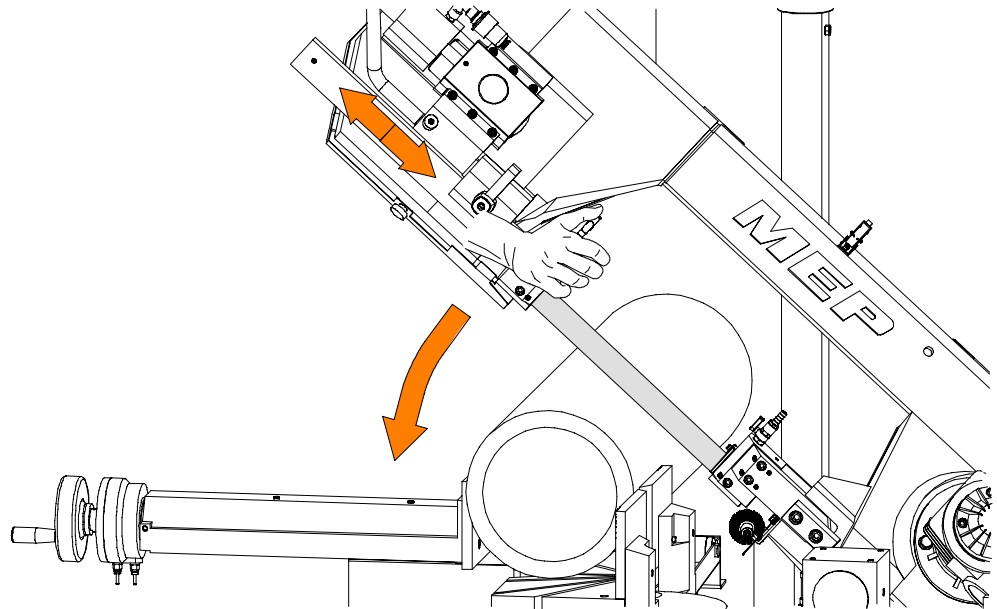
Width of cut

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.

Preliminary check list for cutting operation

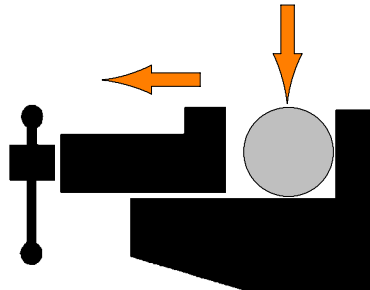
To guarantee complete safety during cutting cycles, the operator should work through a check list of the entire apparatus, checking:

- ▶ blade tension;
- ▶ that the blade guide head bracket is locked in the correct position;
- ▶ that the cutting angle is correct and the cutting head is locked;
- ▶ that the work piece is properly clamped in place;
- ▶ that the blade teeth are correct for the job to be begun;
- ▶ that the speed selected is right for the kind of piece to be cut;
- ▶ that all protections are in place and correctly locked;
- ▶ the level of lubricant/coolant and that the electropump is activated;
- ▶ that the blade downstroke speed and the cutting pressure are correct.

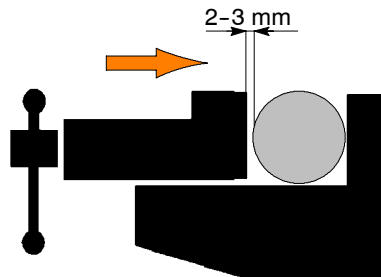
Manual operating cycle

Sequence of operations for performing a cut:

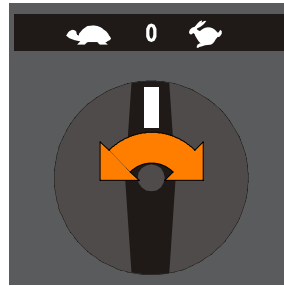
- ▶ power up the machine by pressing the reset button.
- ▶ Position the workpiece in the vice and calculate the length of cut (using the measuring rod for cuts to measure).



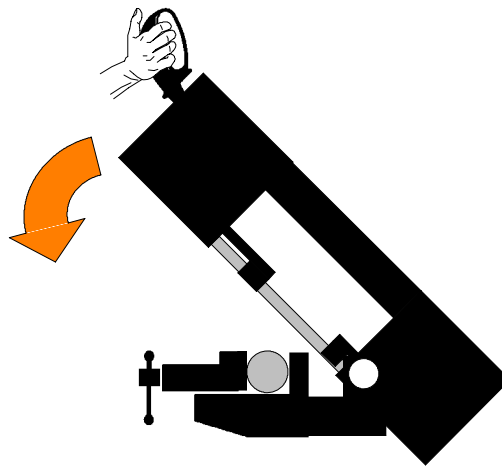
- ▶ Clamp the workpiece in the vice; **If the machine is the MA version**, bring the vice manually to within 2–3 mm. of the workpiece ; tighten the vice using the special open/close button on the base or using the foot–pedal if equipped.



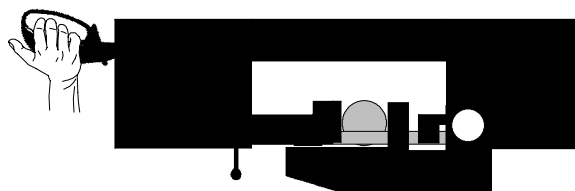
- Select the cut using the **polarity change switch** according to the type of the material to be cut (shape, thickness, hardness, etc.).



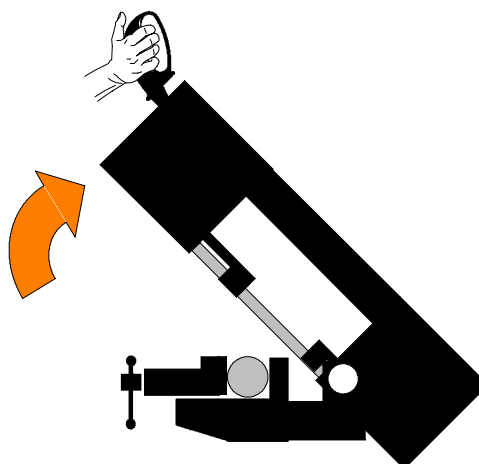
- Grip the head control lever and start the blade rotating by pressing the microswitch on the handgrip; the downstroke speed of the head is manually controlled by the operator.



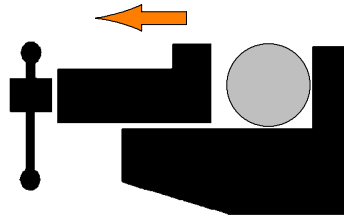
- The motor starts up and sets the blade in rotary motion; the lubricant/coolant pump starts up at the same time.



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

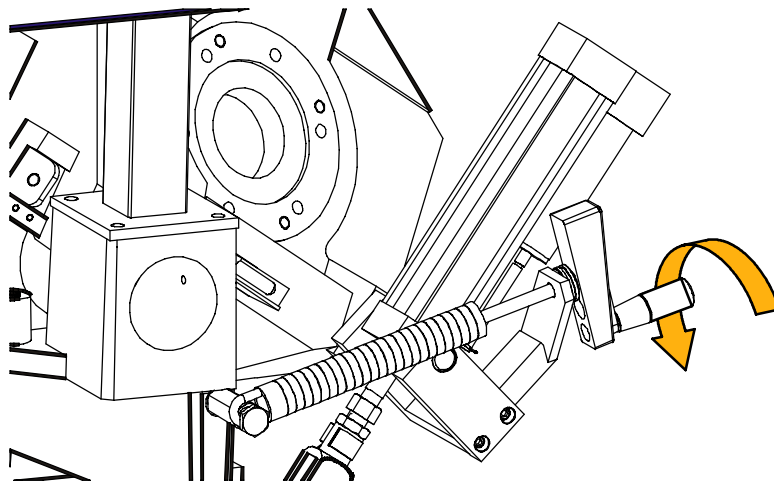


- Remove the piece from the vice; in the MA version the vice is opened using the open/close button, or by manually turning the vice handwheel.



Warning

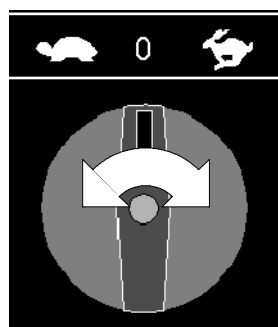
If the machine is equipped with the Cut Control System, make sure that the function selector switch is positioned on Manual and that the head return spring is tensioned in the Manual position.



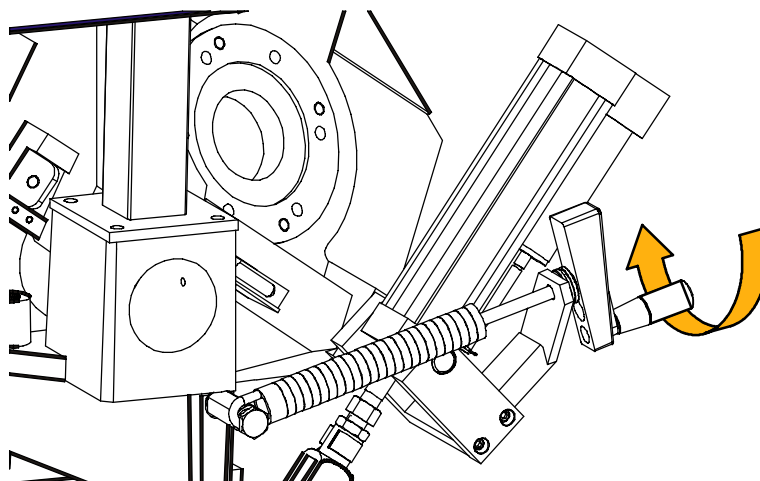
CCS (Cut Control System) functioning cycle

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:

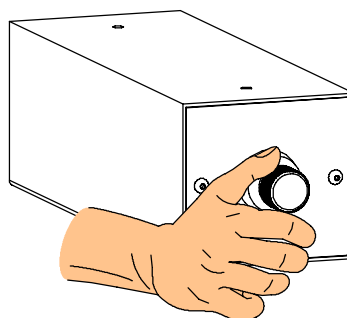
- ▶ power up the machine by turning the main switch;
- ▶ Position the material in the vice and calculate the cut lengths (using the measuring rod).
- ▶ Clamp the piece in the vice; **if the machine is the MA version**, bring the vice manually to within 2–3 mm. of the workpiece; close the vice using the 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.



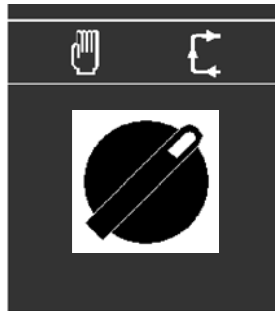
- ▶ Set the tension on the head return spring using the appropriate crank so that the first turn is aligned with the Semi.automatic/Dynamic cycle notch.



- ▶ 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.



-
- ▶ Grip the head control lever and move the blade in the proximity of the material to be cut: when you reach a distance of approx. 10 mm select function type: Semi-automatic or Dynamic and then press microswitch on the handgrip to start up blade rotation.



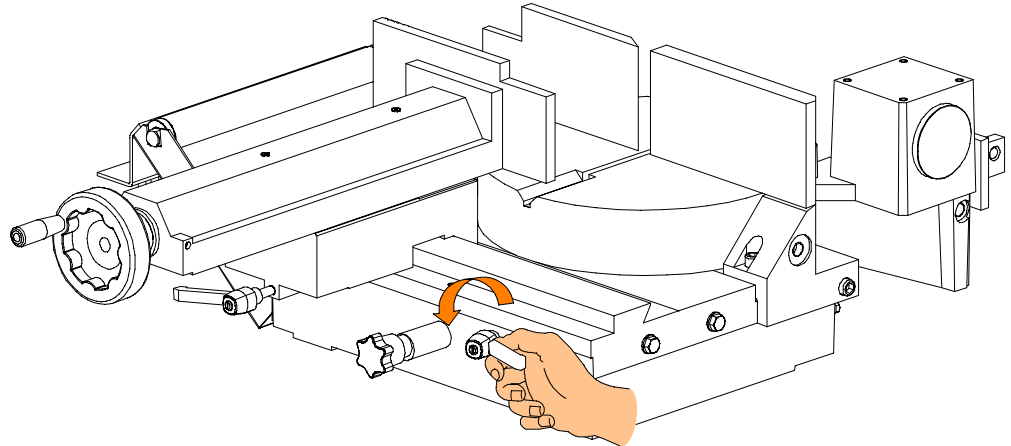
- ▶ The operating head will now perform cutting until it reaches HDL (Head Downstroke Limit) at which point the motor will stop.

Angled cuts

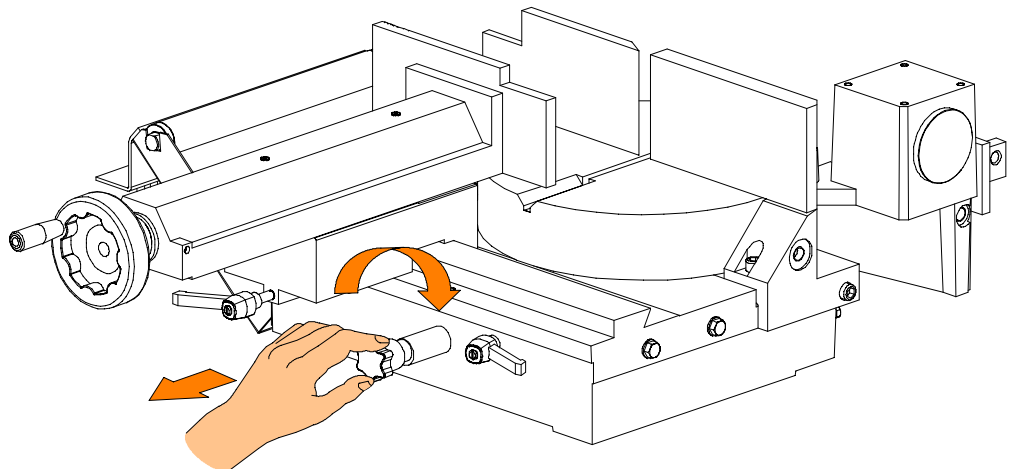
The machine can make angled cuts from 60° left to 45° right. Reference stops are mounted on the sides of the turntable to facilitate rapid 0°, 45° and 60° cuts to the left and 45° cuts to the right.

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.



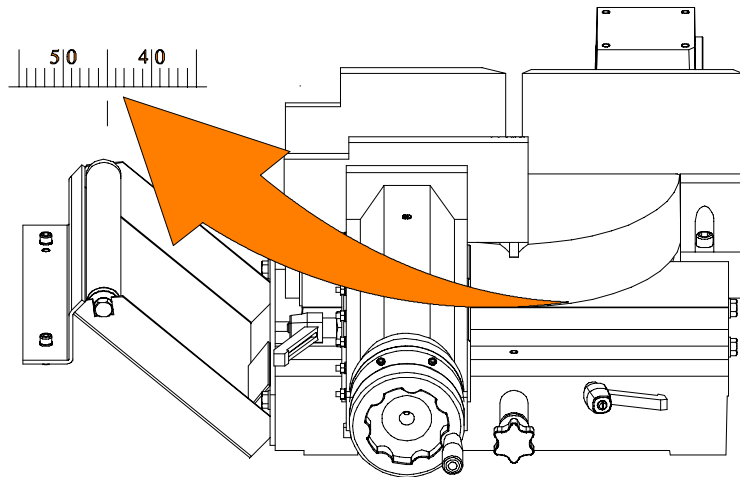
- ▶ Pull the eccentric pin knob towards you (0° reference stop) and rotate slightly to raise it.



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.

- Swing the head from left to right until it is positioned at the required angle, as indicated by the graduated scale on the turntable.



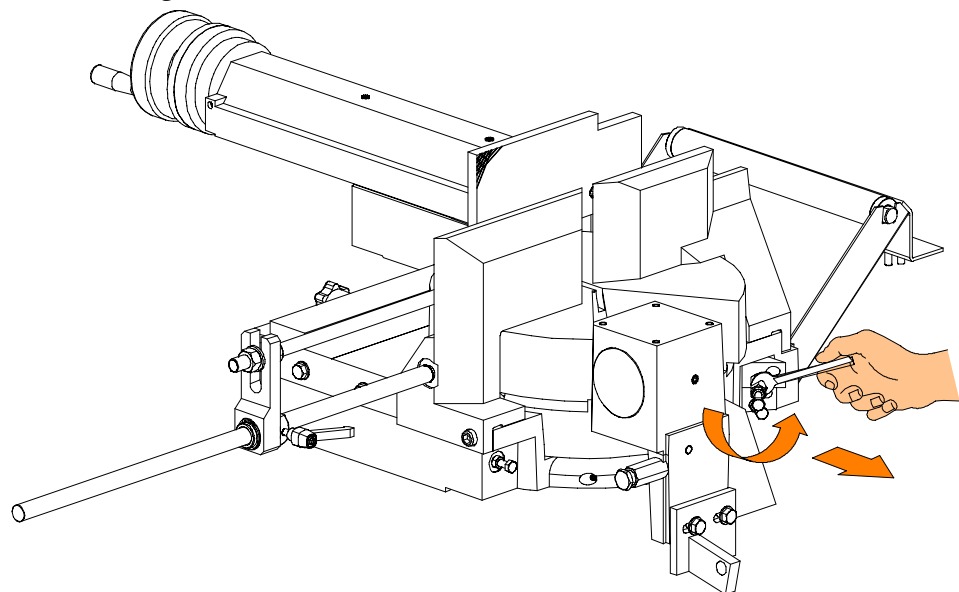
Attention

Always rotate the head when it is in the upper position to avoid blade collision with the moving jaw on the clamp.

- Relock the turntable lock/release lever.
- Make the cut in the required operating mode, following the preliminary safety instructions set out in this chapter.

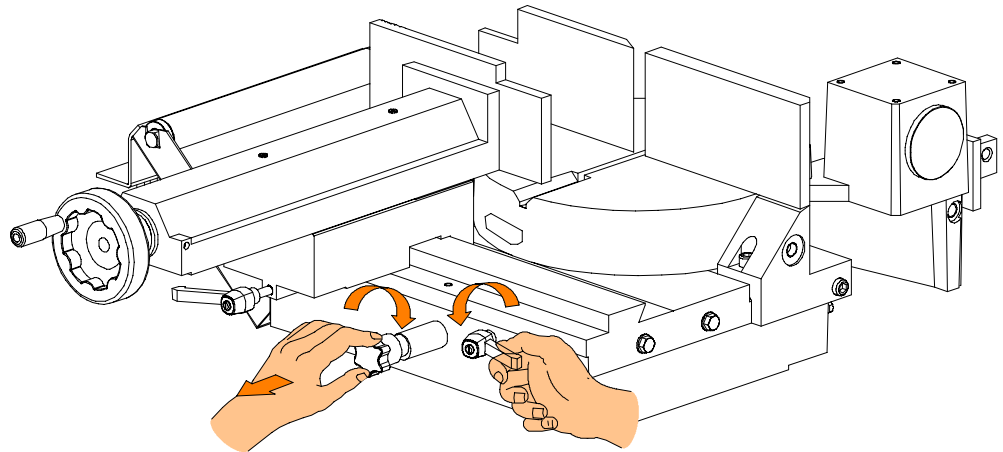
Angled cuts 60° to the left

- Undo the bush on the 45° left reference stop, as illustrated in the figure below, using a 36 mm wrench;



- Slacken the turntable lock/release lever;

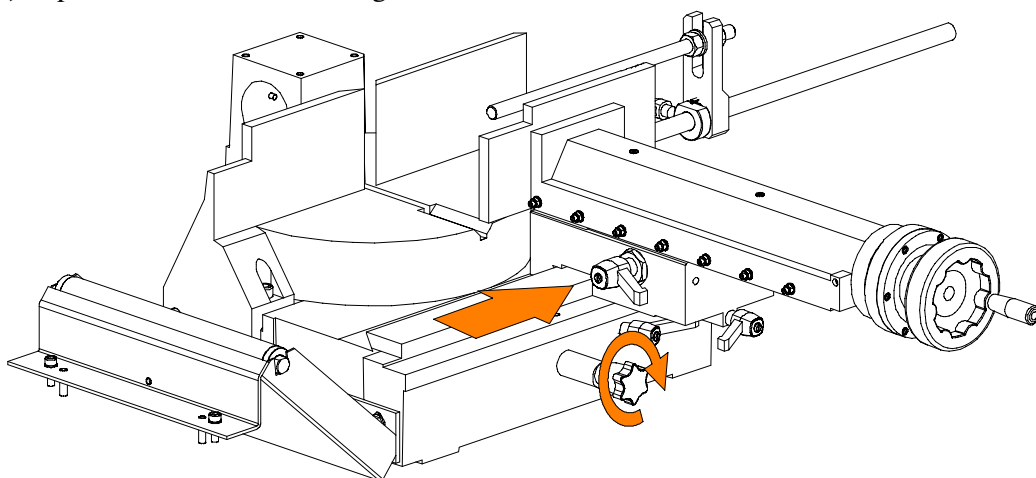
- ▶ pull the eccentric pin knob towards you (0° reference stop) and rotate slightly to raise it;



- ▶ 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.

Angled cuts 45° to the right

- ▶ Make sure the vice is positioned to the right of the 0° cutting slot.
- ▶ slacken the locking lever as shown in the figure below;
- ▶ position the vice to the right and lock the lever.

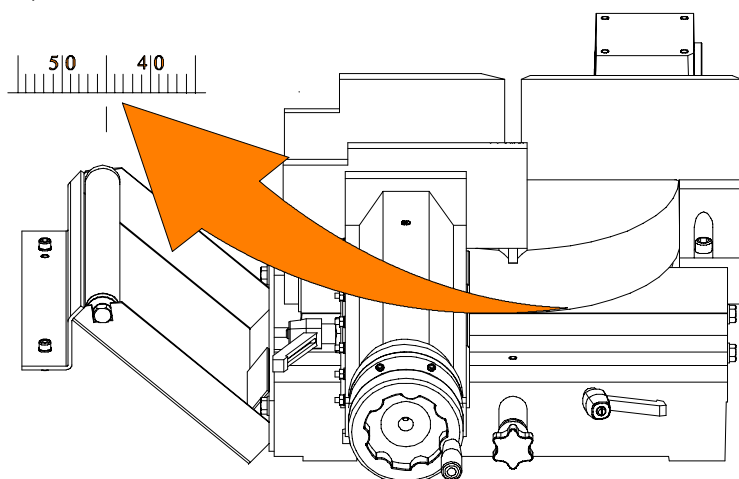


Attention

When positioning the vice to the left or right, make sure the moving jaw is beyond the 0° cutting slot to avoid any risk of collision with the blade downstroke.

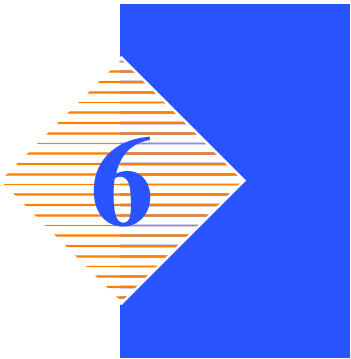
Following the same procedure described above for 45° cuts to the left, now position the head for 45° cuts to the right:

- ▶ slacken the turntable lock/release lever;
- ▶ pull the eccentric pin knob towards you (0° reference stop) and rotate slightly to raise it;



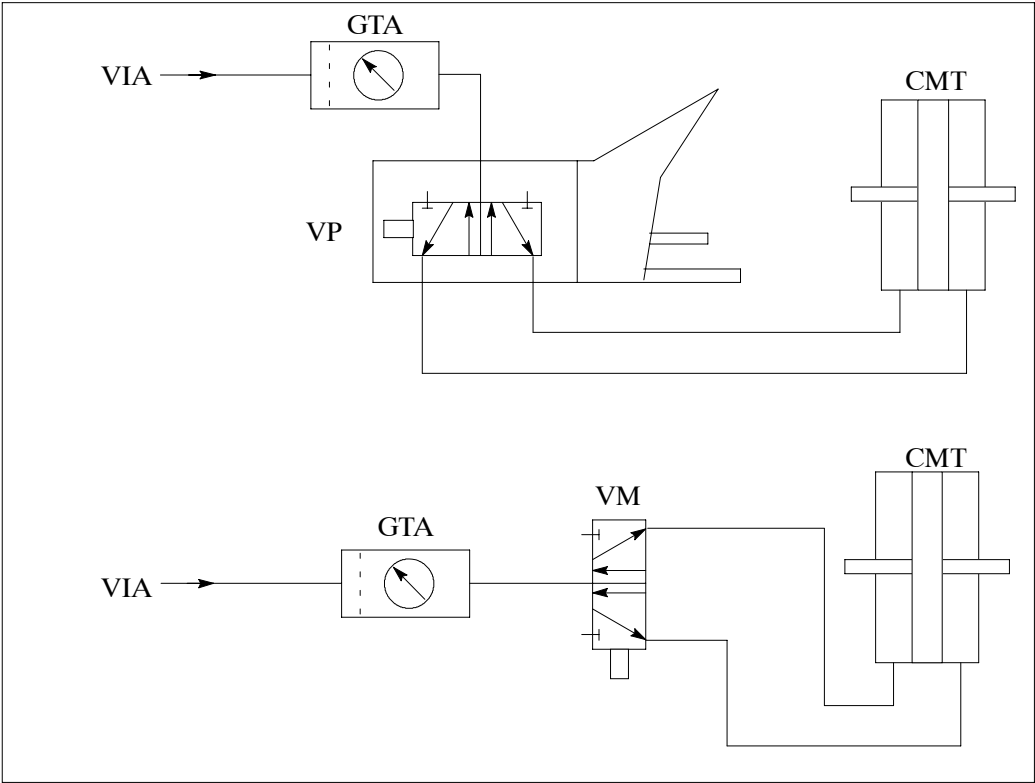
- ▶ swing the head from left to right until it is positioned at the required angle, as indicated by the graduated scale on the turntable;
- ▶ relock the turntable lock/release lever;
- ▶ make the cut in the required operating mode, following the preliminary safety instructions set out in this chapter.

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)



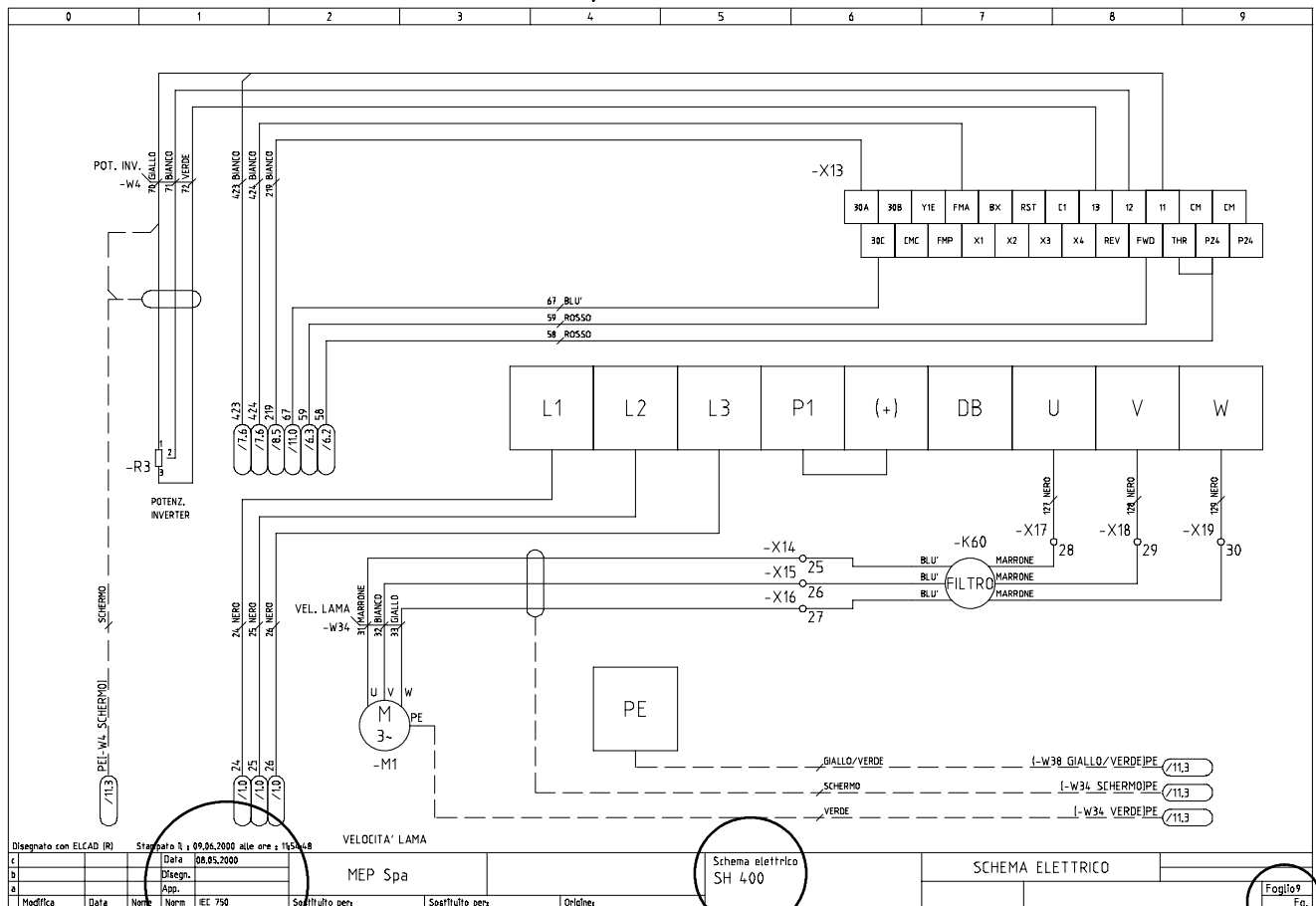
Pneumatic components key					
VIA	Air inlet valve	VP	Pedal valve	CMT	Cutter vice cylinder
GTA	Air treatment unit	VM	Manual valve	CPT	Head holder cylinder

How to read the wiring diagrams

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

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

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



Schema elettrico
SH 400

Indications of the
model of machine

Data	08.05.2000
Disegn.	MARIO ROSSI
App.	
Norm	IEC 750

Indications of the date production
started

Identification of the designer

Identification of the Reference Standard

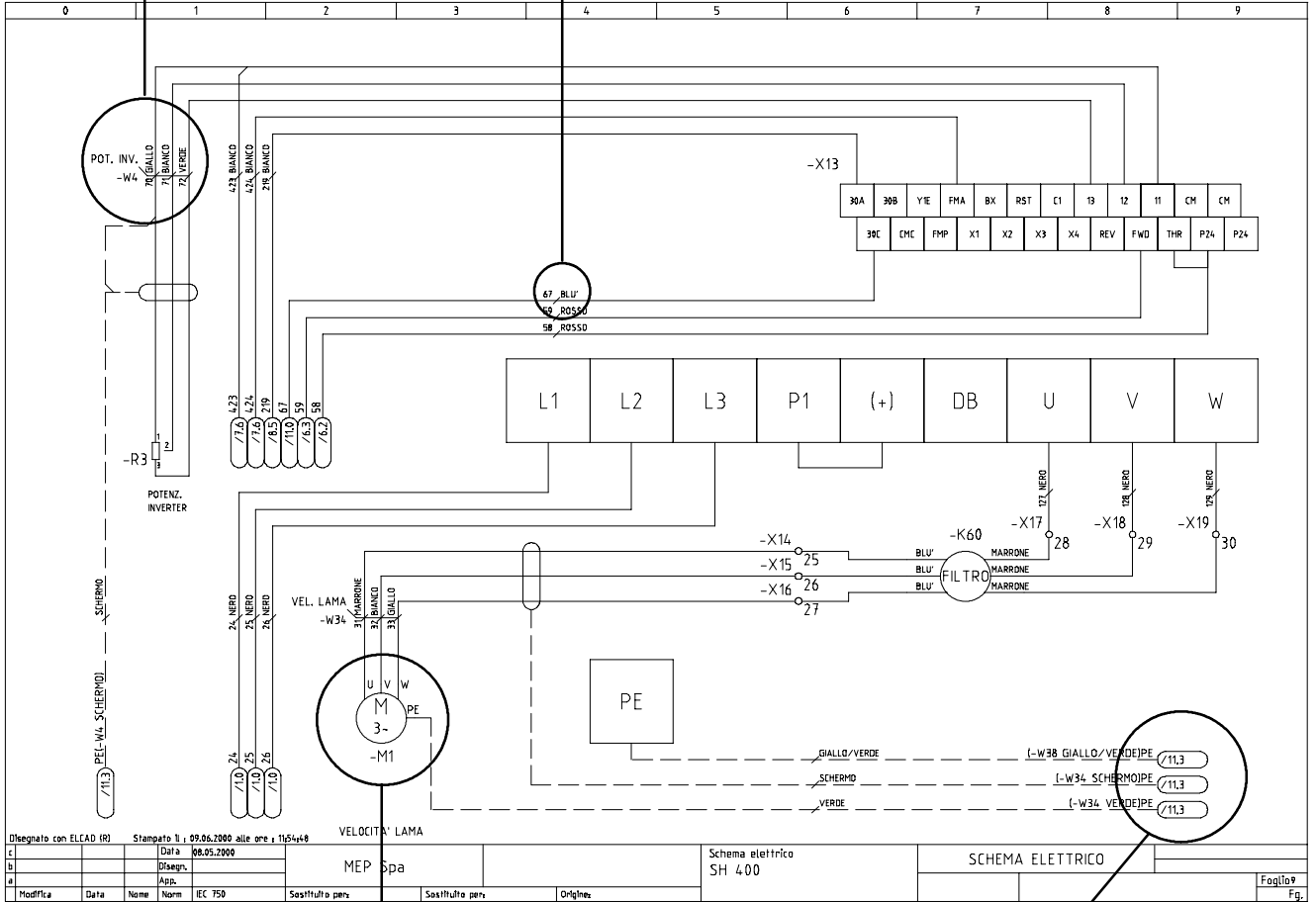
Foglio 9
Fg.

Indication of the
page number

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

2. wires list (list of all wires) with the following information:

- ✓ in-house article code;
- ✓ identification code;
- ✓ description;
- ✓ section of wire (mm²);
- ✓ colour of wire;
- ✓ start: indicates the component (identification code and contact number) at which the wire starts;
- ✓ end: indicates the component (identification code and contact number) at which the wire ends; e.g.

CODE	CABLE	DESCRIPTION	SECTION	NO.	COLOUR	START		END	
022.0141	-W7	RESET+EMER-GENZA	0.50	317	BIANCO	-S3	4	-K10	14

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

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

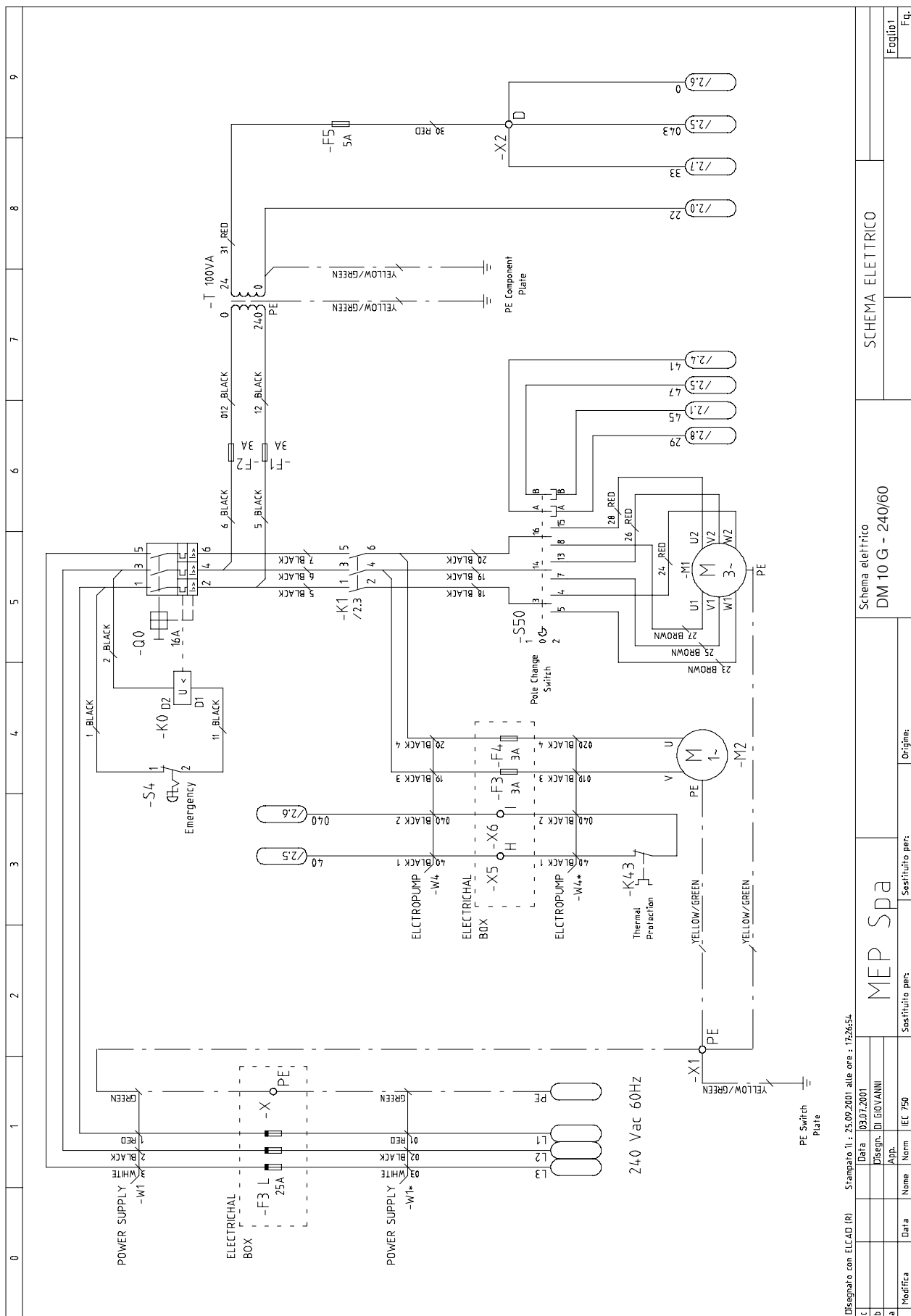
D2-Letter codes used to designate the type of component

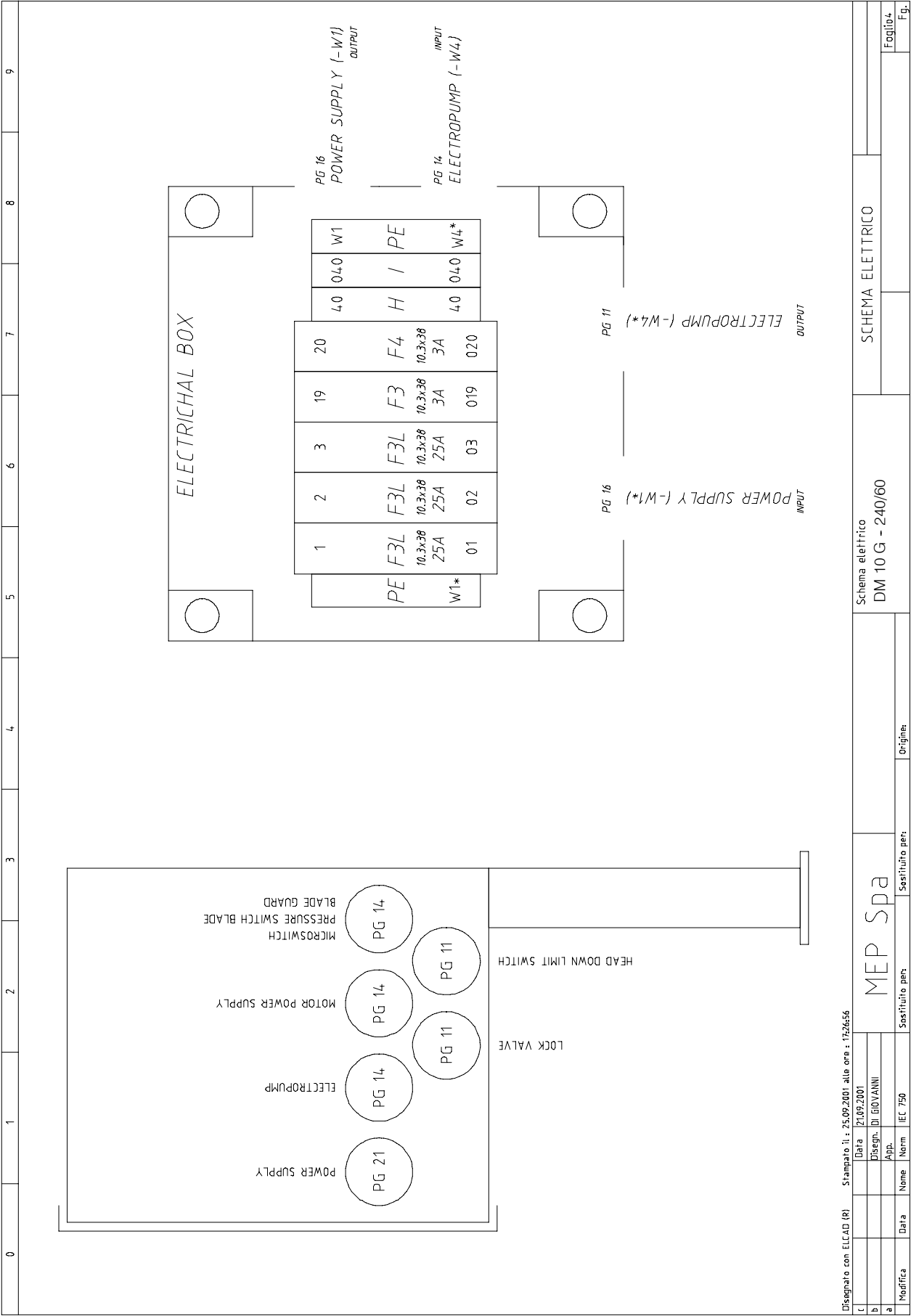
LETTER	TYPE OF COMPONENT	EXAMPLES	IDENTIFICATION OF THE APPLIANCE
A	Complex units	Laser Maser Regulator	A
B	Transducers converting a non electrical signal to an electrical signal and vice versa	Transistor amplifier IC amplifier Magnetic amplifier Valve amplifier Printed circuit board Drawer Rack	AD AJ AM AV AP AT AR
C	Capacitors		C
D	Binary operators, timing devices, storage devices	Digital integrated circuits and devices: Delay line Bistable element Monostable element Recorder Magnetic memory Tape or disk recorder	D
E	Various materials	Devices not specified in this table	E
F	Protective Devices	Lightning protectors Arrestors	F
		Instant action current threshold protector	FA
		Delayed action current threshold protector	FR
		Instant and delayed action current threshold protector	FS
		Fuse	FU
		Voltage threshold protector	FV

LETTER	TYPE OF COMPONENT	EXAMPLES	IDENTIFICATION OF THE APPLIANCE
G	Generators, feeders	Rotating generators Crystal oscillators	G
		Accumulator battery Rotating or static frequency converter Power feeder	GB GF GS
H	Signaling Devices	Buzzer Optical signal, indicator light device	HA HL
J			
K	Relays, Contactors	Instant all or nothing relays or instant contactors Bistable relays or interdependent contactors (All or nothing contactors with mechanical contact or permanent magnet etc.) Contactors Polarised relays Reed relays All or nothing timed relays (timers)	KA KL KM KP KR KT
L	Inductors, reactors	Inductor Stop coil Reactor	I
M	Motors		M
N	Analogue integrated circuits	Operational amplifiers Hybrid analog/digital appliances	N
P	Measurement equipment, test devices	Indicator, recorder and integrator measurement devices Signal generators	P
Q	Power circuit switching appliances	Automatic switch Engine saver switch Knife switch	QF QM QS
R	Resistors	Fixed or variable resistor (rheostat)	R
S	Command or control devices	Selector or switch Button (including electronic proximity switch) Numerical all or nothing sensors (single step) of mechanical and electronic type: – Liquid level sensor – Pressure sensor Position sensor (including proximity) – Rotation sensor – Temperature probe	SA SB SL SP SQ SR ST

LETTER	TYPE OF COMPONENT	EXAMPLES	IDENTIFICATION OF THE APPLIANCE
T	Transformers	Current transformer Control circuit supply transformer Power transformer Magnetic stabiliser Voltage transformer	TA TC TM TS TV
U	Modulators, converters	Discriminator Demodulator Frequency converter Coder Converter Inverter Telegraphic repeater	U
V	Electronic pipes, semiconductors	Electronic pipe Gas discharge pipe Diode Transistor Thyristor	V
W	Transmission lines, wave guides, antennas	Conductor Cable Bar Wave guide Wave guide directional coupler Dipole Parabolic antenna	W
X	Terminals, sockets, plugs	Connector bar Test plug Plug Socket Terminal connector band	XB XJ XP XS XT
Y	Electrically operated mechanical appliances	Electromagnet Electromagnetic brake Electromagnetic clutch Magnetic table spindle Electromagnetic valve	YA YB YC YH YV
Z	Transformers, impedance adapters, equalizers, band limiters	Line equalizer Compressor Crystal filter	Z

Standard version electrical diagram 240V (CSA standard)





List of cables

CODE	CABLE	TYPE	DESCRIPTION	WIRE	SEC.	COLOR	LENGTH	START	CABLE TERMINAL START	END	CABLE TERMINAL END
022.190 1	-W1	S00 W	POWER SUPPLY		AWG14	RED	2500mm	-F3L	022.0312* Tube terminal wire 2,5mm	-Q0:1	022.0312* Tube terminal wire 2,5mm
022.190 1	-W1	S00 W	POWER SUPPLY		AWG14	BLACK	2500mm	-F3L	022.0312* Tube terminal wire 2,5mm	-Q0:3	022.0312* Tube terminal wire 2,5mm
022.190 1	-W1	S00 W	POWER SUPPLY		AWG14	WHITE	2500mm	-F3L	022.0312* Tube terminal wire 2,5mm	-Q0:5	022.0312* Tube terminal wire 2,5mm
022.190 1	-W1	S00 W	POWER SUPPLY		AWG14	YELLOW W/ GREEN	2500mm	-X1:P- E	022.0312* Tube terminal wire 2,5mm	-X:PE	022.0312* Tube terminal wire 2,5mm
022.190 1	-W1*	S00 W	POWER SUPPLY	01	AWG14	RED	2500mm	-F3L	022.0312* Tube terminal wire 2,5mm		
022.190 1	-W1*	S00 W	POWER SUPPLY	02	AWG14	BLACK	2500mm	-F3L	022.0312* Tube terminal wire 2,5mm		
022.190 1	-W1*	S00 W	POWER SUPPLY	03	AWG14	WHITE	2500mm	-F3L	022.0312* Tube terminal wire 2,5mm		
022.190 1	-W1*	S00 W	POWER SUPPLY		AWG14	YELLOW W/ GREEN	2500mm	-X1:P- E	022.0312* Tube terminal wire 2,5mm		
022.016 8	-W4	AWM	ELECTROP MP	40	AWG20	BLACK 1	2500mm	-X5:H		-S24:1 4	022.0311 Tube terminal wire 0,50mm
022.016 8	-W4	AWM	ELECTROP MP	040	AWG20	BLACK 2	2500mm	-X6:I		-K1:A1	022.0311 Tube terminal wire 0,50mm
022.016 8	-W4	AWM	ELECTROP MP	19	AWG20	BLACK 3	2500mm	-F3	022.0311 Tube terminal wire 0,50mm	-K1:4	022.0311 Tube terminal wire 0,50mm
022.016 8	-W4	AWM	ELECTROP MP	20	AWG20	BLACK 4	2500mm	-F4	022.0311 Tube terminal wire 0,50mm	-K1:6	022.0311 Tube terminal wire 0,50mm
022.016 8	-W4	AWM	ELECTROP MP		AWG20	BLACK 5	2500mm				
022.016 8	-W4	AWM	ELECTROP MP		AWG20	YELLOW W/ GREEN	2500mm				
022.016 8	-W4	AWM	ELECTROP MP		AWG20	SCREEN ING	2500mm				
022.016 8	-W4*	AWM	ELECTROP MP	40	AWG20	BLACK 1	3000mm	-X5:H		-K43	022.0311 Tube terminal wire 0,50mm
022.016 8	-W4*	AWM	ELECTROP MP	040	AWG20	BLACK 2	3000mm	-X6:I		-K43	022.0311 Tube terminal wire 0,50mm
022.016 8	-W4*	AWM	ELECTROP MP	019	AWG20	BLACK 3	3000mm	-F3	022.0311 Tube terminal wire 0,50mm	-M2:V	022.0300 Red Faston 1,5mm
022.016 8	-W4*	AWM	ELECTROP MP	020	AWG20	BLACK 4	3000mm	-F4	022.0311 Tube terminal wire 0,50mm	-M2:U	022.0300 Red Faston 1,5mm
022.016 8	-W4*	AWM	ELECTROP MP		AWG20	BLACK 5	3000mm				
022.016 8	-W4*	AWM	ELECTROP MP		AWG20	YELLOW W/ GREEN	3000mm	-X1:P- E	022.0311 Tube terminal wire 0,50mm	-M2:P- E	022.0300 Red Faston 1,5mm
022.016 8	-W4*	AWM	ELECTROP MP		AWG20	SCREEN ING	3000mm				
022.013 9	-W52	AWM	MICROSWIT CH	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
022.013 9	-W52	AWM	MICROSWITCH		AWG20	BLACK 2	3000mm	-S50:A	022.0301 Tube terminal wire 0,50mm	-S15	022.0300 Red Faston 1,5mm
022.013 9	-W55	AWM	Blade Guard L/S		AWG20	BLACK 1	2000mm	-S8	022.0311 Tube terminal wire 0,50mm	-X4:G	
022.013 9	-W55	AWM	Blade Guard L/S		AWG20	BLACK 2	2000mm	-X3:E		-S8	022.0311 Tube terminal wire 0,50mm
022.013 9	-W65	AWM	LOCK VALVE		AWG20	BLACK 1	1200mm	-K40:A 2	022.0311 Tube terminal wire 0,50mm	-K42:A 2	022.0311 Tube terminal wire 0,50mm
022.013 9	-W65	AWM	LOCK VALVE		AWG20	BLACK 2	1200mm	-K40:A 1	022.0311 Tube terminal wire 0,50mm	-S24:1 3	022.0311 Tube terminal wire 0,50mm
022.013 9	-W67	AWM	Press. Sw. Blade		AWG20	BLACK 1	2800mm	-X4:G		-S25	022.0300 Red Faston 1,5mm
022.013 9	-W67	AWM	Press. Sw. Blade		AWG20	BLACK 2	2800mm	-X2:D		-S25	022.0300 Red Faston 1,5mm
022.086 2	-W74	AWM	LED	0	AWG20	RED	750mm	-X2:D		-V1	
022.086 2	-W74	AWM	LED		AWG20	BLACK	750mm	-K1:A2	022.0311 Tube terminal wire 0,50mm	-V1	
022.050 6	-W75	AWM	Head Down L/S	42	AWG20	BLACK 1	1400mm	-K42:1 4	022.0311 Tube terminal wire 0,50mm	-S28	
022.050 6	-W75	AWM	Head Down L/S	46	AWG20	BLACK 2	1400mm	-S28		-K42:A 1	022.0311 Tube terminal wire 0,50mm
022.050 6	-W75	AWM	Head Down L/S		AWG20	BLEU	1400mm				
022.050 6	-W75	AWM	Head Down L/S		AWG20	BROWN	1400mm				
022.050 6	-W75	AWM	Head Down L/S		AWG20	YELLOW W/ GREEN	1400mm				
022.013 4Y/G	-W100	AWM	PE/Screen- ing:T1		AWG16	YELLOW W/ GREEN	80mm	-T1:P- E	022.0304 Red Eyelet 5mm	PE	022.0304 Red Eyelet 5mm
022.013 4Y/G	-W101	AWM	PE/ T1:0Vac(0-24)		AWG16	YELLOW W/ GREEN	150mm	PE	022.0304 Red Eyelet 5mm	-T1:0	022.0312 Tube terminal wire 1,50mm
022.013 2Y/G	-W102	AWM	X1:PE/M1:PE		AWG14	YELLOW W/ GREEN	1500mm	-X1:P- E	022.0312* Tube terminal wire 2,50mm	-M1:P- E	022.0304 Red Eyelet 5mm
022.013 4Y/G	-W103	AWM	X1:PE/PE Sw.Plac		AWG16	YELLOW W/ GREEN	470mm	-X1:P- E	022.0312 Tube terminal wire 1,50mm	PE	022.0303 Blue Eyelet 8mm
022.013 4B	-W104	AWM	F2/T1:0Vac(0 -240)	012	AWG16	BLACK	260mm	-T1:0	022.0312 Tube terminal wire 1,50mm	-F2	022.0312 Tube terminal wire 1,50mm
022.013 4B	-W109	AWM	Q0:1/S4:1	1	AWG16	BLACK	600mm	-S4:1	022.0312 Tube terminal wire 1,50mm	-Q0:1	022.0312 Tube terminal wire 1,50mm
022.013 4B	-W110	AWM	Q0:3/K0:D2	2	AWG16	BLACK	370mm	-K0:D 2	022.0312 Tube terminal wire 1,50mm	-Q0:3	022.0312 Tube terminal wire 1,50mm
022.013 4B	-W111	AWM	S4:2/K0:D1		AWG16	BLACK	550mm	-S4:2	022.0312 Tube terminal wire 1,50mm	-K0:D 1	022.0312 Tube terminal wire 1,50mm
022.013 4B	-W112	AWM	Q0:2/F1		AWG16	BLACK	170mm	-F1	022.0312 Tube terminal wire 1,50mm	-Q0:2	022.0312 Tube terminal wire 1,50mm

CODE	CABLE	TYPE	DESCRIPTION	WIRE	SEC.	COLOR	LENGTH	START	CABLE TERMINAL START	END	CABLE TERMINAL END
022.013 2B	-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
022.013 2B	-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
022.013 4B	-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
022.013 2B	-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
022.013 4B	-W119	AWM	F1/T1:240V(0 -240)		AWG16	BLACK	260mm	-T1:24 0	022.0312 Tube terminal wire 1,50mm	-F1	022.0312 Tube terminal wire 1,50mm
022.013 2B	-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
022.013 2B	-W121	AWM	K1:4/S50:14		AWG14	BLACK	520mm	-S50:1 4	022.0312* Tube terminal wire 2,50mm	-K1:4	022.0312* Tube terminal wire 2,50mm
022.013 2B	-W122	AWM	K1:6/S50:16		AWG14	BLACK	520mm	-S50:1 6	022.0312* Tube terminal wire 2,50mm	-K1:6	022.0312* Tube terminal wire 2,50mm
022.013 2BR	-W124	AWM	S50:5/M1:W1		AWG14	BROWN	1600mm	-S50:5	022.0312* Tube terminal wire 2,50mm	-M1:W 1	022.0304 Red Eyed 5mm
022.013 2BR	-W125	AWM	S50:7/M1:V1		AWG14	BROWN	1600mm	-S50:7	022.0312* Tube terminal wire 2,50mm	M1:V1	022.0304 Red Eyed 5mm
022.013 2BR	-W126	AWM	S50:8/M1:U		AWG14	BROWN	1600mm	-S50:8	022.0312* Tube terminal wire 2,50mm	-M1:U 1	022.0304 Red Eyed 5mm
022.013 2R	-W127	AWM	S50:4/M1:W2		AWG14	RED	1600mm	-S50:4	022.0312* Tube terminal wire 2,50mm	M1:W2	022.0304 Red Eyed 5mm
022.013 2R	-W128	AWM	S50:13/M1:V 2		AWG14	RED	1600mm	-S50: 13	022.0312* Tube terminal wire 2,50mm	-M1:V 2	022.0304 Red Eyed 5mm
022.013 2R	-W129	AWM	S50:15/M1:U 2		AWG14	RED	1600mm	-S50:1 5	022.0312* Tube terminal wire 2,50mm	-M1:U 2	022.0304 Red Eyed 5mm
022.013 3R	-W130	AWM	F5/X2:D		AWG20	RED	540mm	-X2:D		-F5	
022.013 3R	-W131	AWM	T1:24Vac(0-2 4)/F5		AWG20	RED	280mm	-T1:24	022.0311 Tube terminal wire 0,50mm	-F5	
022.013 3R	-W133	AWM	S24:14/S24:1		AWG20	RED	180mm	-S24:1	022.0311 Tube terminal wire 0,50mm	-S24:1 4	022.0311 Tube terminal wire 0,50mm
022.013 3R	-W134	AWM	S24:12/X2:D	043	AWG20	RED	530mm	-S24:1 2	022.0311 Tube terminal wire 0,50mm	-X2:D	
022.013 3R	-W135	AWM	S24:24/X3:E		AWG20	RED	530mm	-S24:2 4	022.0311 Tube terminal wire 0,50mm	-X3:E	
022.013 3R	-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
022.013 3R	-W137	AWM	S24:4/S50:A	41	AWG20	RED	160mm	-S50:A	022.0311 Tube terminal wire 0,50mm	-S24:4	
022.013 3R	-W138	AWM	K42:11/K1:A1	040	AWG20	RED	260mm	-K42:1 1	022.0311 Tube terminal wire 0,50mm	-K1:A1	022.0311 Tube terminal wire 0,50mm

CODE	CABLE	TYPE	DESCRIPTION	WIRE	SEC.	COLOR	LENGTH	START	CABLE TERMINAL START	END	CABLE TERMINAL END
022.013 3R	-W139	AWM	K42:A1/K1:14	46	AWG20	RED	270mm	-K1:14	022.0311 Tube terminal wire 0,50mm	-K42:A1	022.0311 Tube terminal wire 0,50mm
022.013 3R	-W140	AWM	S24:13/S24:11	43	AWG20	RED	70mm	-S24:11	022.0311 Tube terminal wire 0,50mm	-S24:13	022.0311 Tube terminal wire 0,50mm
022.013 3R	-W141	AWM	S24:3/K42:14	42	AWG20	RED	570mm	-K42:14	022.0311 Tube terminal wire 0,50mm	-S24:3	022.0311 Tube terminal wire 0,50mm
022.013 3R	-W142	AWM	S24:23/S50:B	47	AWG20	RED	200mm	-S24:23	022.0311 Tube terminal wire 0,50mm	-S50:B	022.0311 Tube terminal wire 0,50mm
022.013 3R	-W143	AWM	K1:13/S50:B	45	AWG20	RED	460mm	-K1:13	022.0311 Tube terminal wire 0,50mm	-S50:B	022.0311 Tube terminal wire 0,50mm
022.013 3BL	-W149	AWM	T1:0V(0-24)/K42:A2	22	AWG20	BLUE	210mm	-K42:A2	022.0311 Tube terminal wire 0,50mm	-T1:0	022.0311 Tube terminal wire 0,50mm
022.013 3BL	-W150	AWM	T1:0V(0-24)/K1:A2	22	AWG20	BLUE	350mm	-K1:A2	022.0311 Tube terminal wire 0,50mm	-T1:0	

List of components

CODE	DESCRIPTION	TYPE	CATALOG NUMBER	ID.	REF.	MANUFACTURER
022.1140	FUSE ATM 3A 10,3X38	FUSE 3A		-F1	/1,6	ELETTROITALIA
022.2255	FUSE-HOLDER USM 1 FOR FUSE 10,3X38	FUSE-HOLDER		-F1	/1,6	ELETTROITALIA
022.1140	FUSE ATM 3A 10,3X38	FUSE 3A		-F2	/1,6	ELETTROITALIA
022.2255	FUSE-HOLDER USM 1 FOR FUSE 10,3X38	FUSE-HOLDER		-F2	/1,6	ELETTROITALIA
022.1140	FUSE ATM 3A 10,3X38	FUSE 3A		-F3	/1,4	ELETTROITALIA
022.2255	FUSE-HOLDER USM 1 FOR FUSE 10,3X38	FUSE-HOLDER		-F3	/1,4	ELETTROITALIA
022.1139	FUSE ATM 25A 10,3X38	FUSE 25A		-F3L	/1,1	ELETTROITALIA
022.0139	FUSE ATM 25A 10,3X38	FUSE 25A		-F3L	/1,1	ELETTROITALIA
022.0139	FUSE ATM 25A 10,3X38	FUSE 25A		-F3L	/1,1	ELETTROITALIA
022.2254	FUSE-HOLDER USM 3 FOR FUSE 10,3X38	FUSE-HOLDER		-F3L	/1,1	ELETTROITALIA
034.0723	ELECTRICAL BOX	BOX	34250	-F3L	/1,1	WEIDMULLER
022.1140	FUSE ATM 3A 10,3X38	FUSE 3A		-F4	/1,4	ELETTROITALIA
022.2255	FUSE-HOLDER USM 1 FOR FUSE 10,3X38	FUSE-HOLDER		-F4	/1,4	ELETTROITALIA
022.2246	FUSE-HOLDER ZFK	ZFK 4-HESI	30 25 45 1	-F5	/1,9	PHOENIX
022.1128	FUSE 5X20 5A	FUSE 5A		-F5	/1,9	COMAPEL
022.0553	LOW TENSION RELAY 240 Vac	U-PKZO		-K0	/1,4	KLOCKNER MOELLER
022.0087	CONTACTOR	DILOOM -10 (01) 24Vac		-K1	/2,3	KLOCKNER MOELLER
022.0592	LOCK VALVE RELAY	RELAY		-K40	/2,5	TECNAIR
022.0412	CONNECTOR LOCK VALVE	CONNECTOR		-K40	/2,5	TECNAIR
044.1258	LOCK VALVE	VALVE		-K40	/2,5	TECNAIR
022.0992	RELAY 24 Vac	RELAIS 171 G2		-K42	/2,1	SIEI PETERLONGO

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	ELECTROPUMP 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	HERBIGER
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

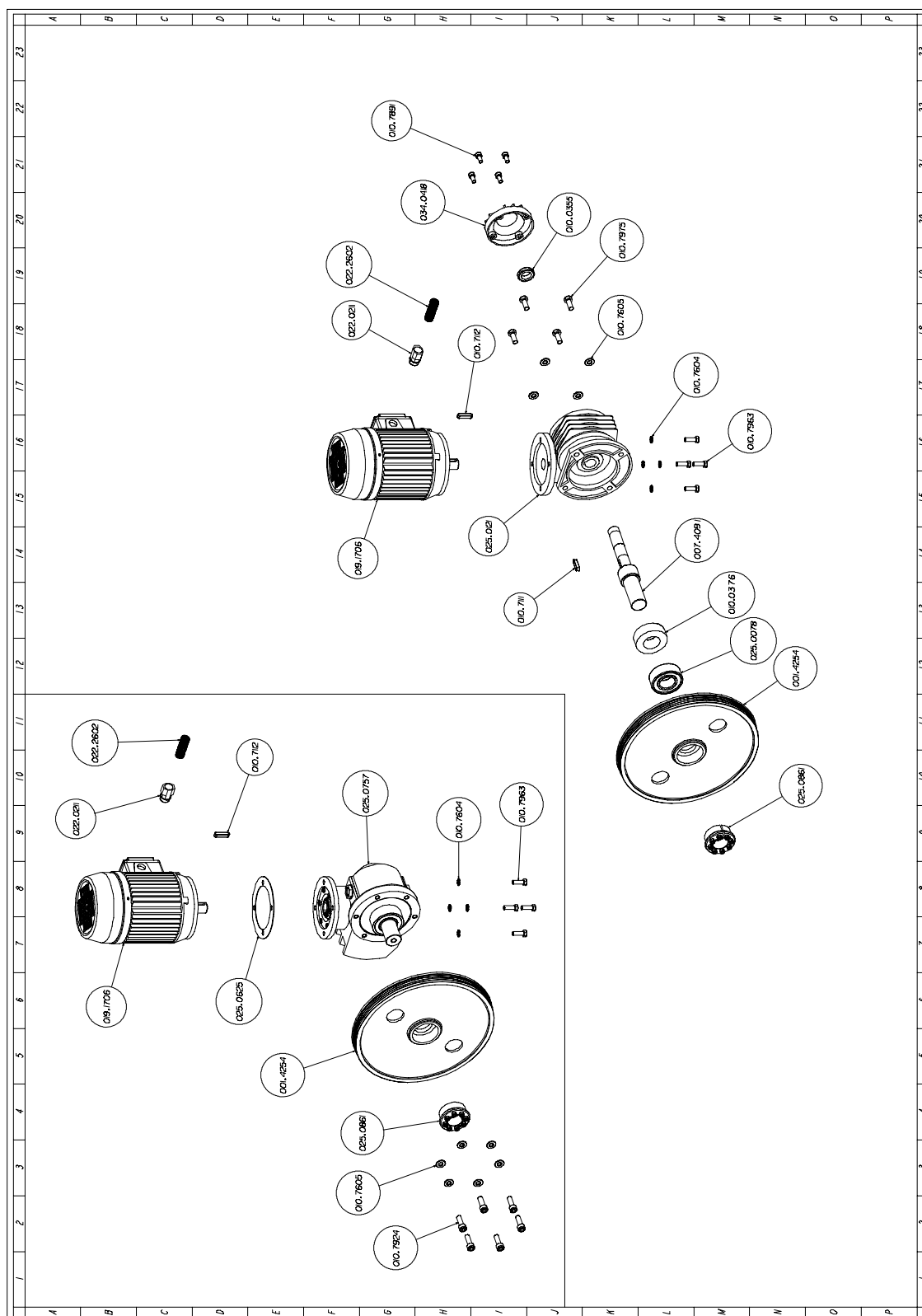
List of terminals

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

Exploded views

This part of the manual contains detailed exploded views of the machine which can help to gain a deeper knowledge of how it is made.

Motor assembly

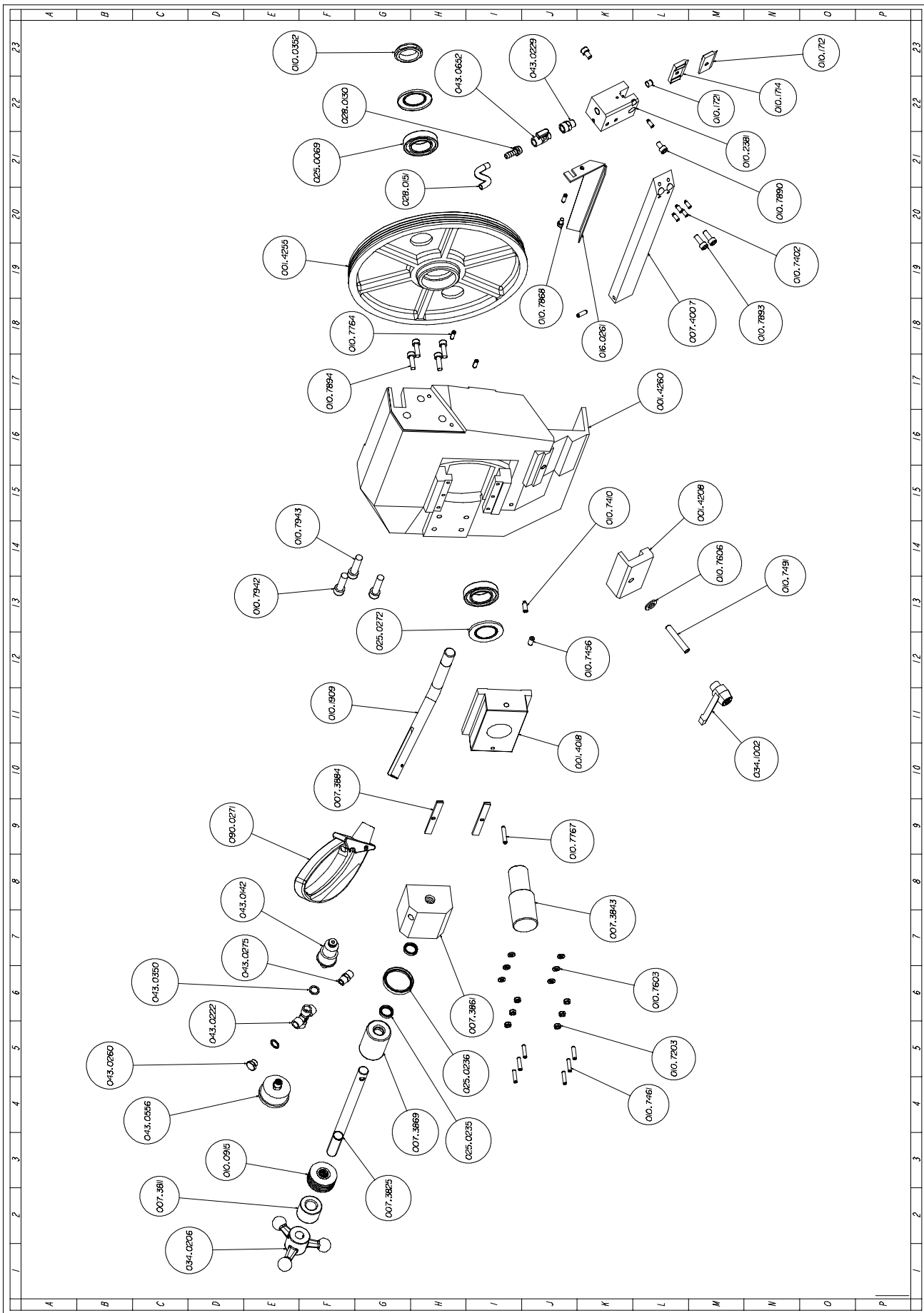


MOTOR ASSY PARTS

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

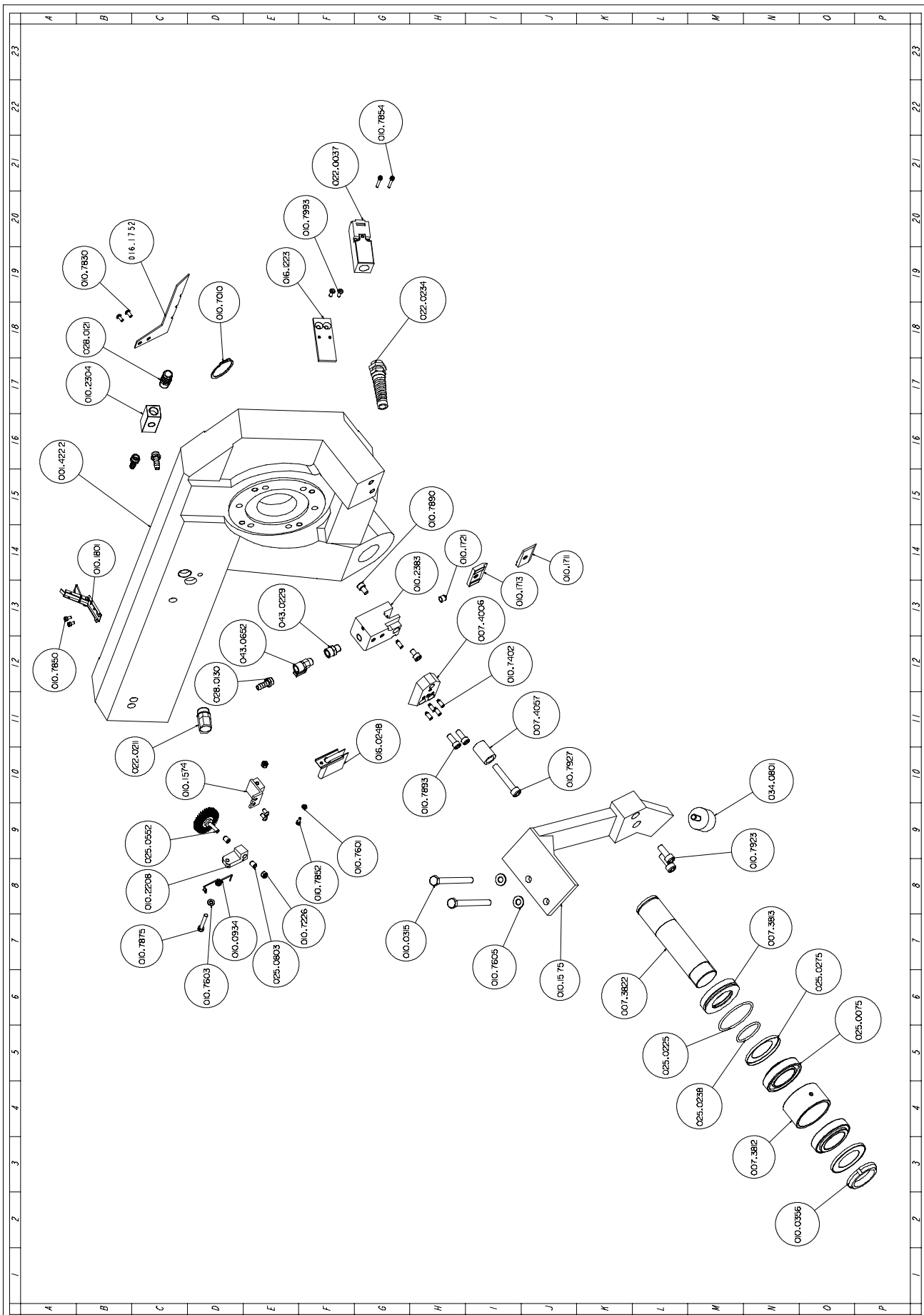
Sezione puleggia folle



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

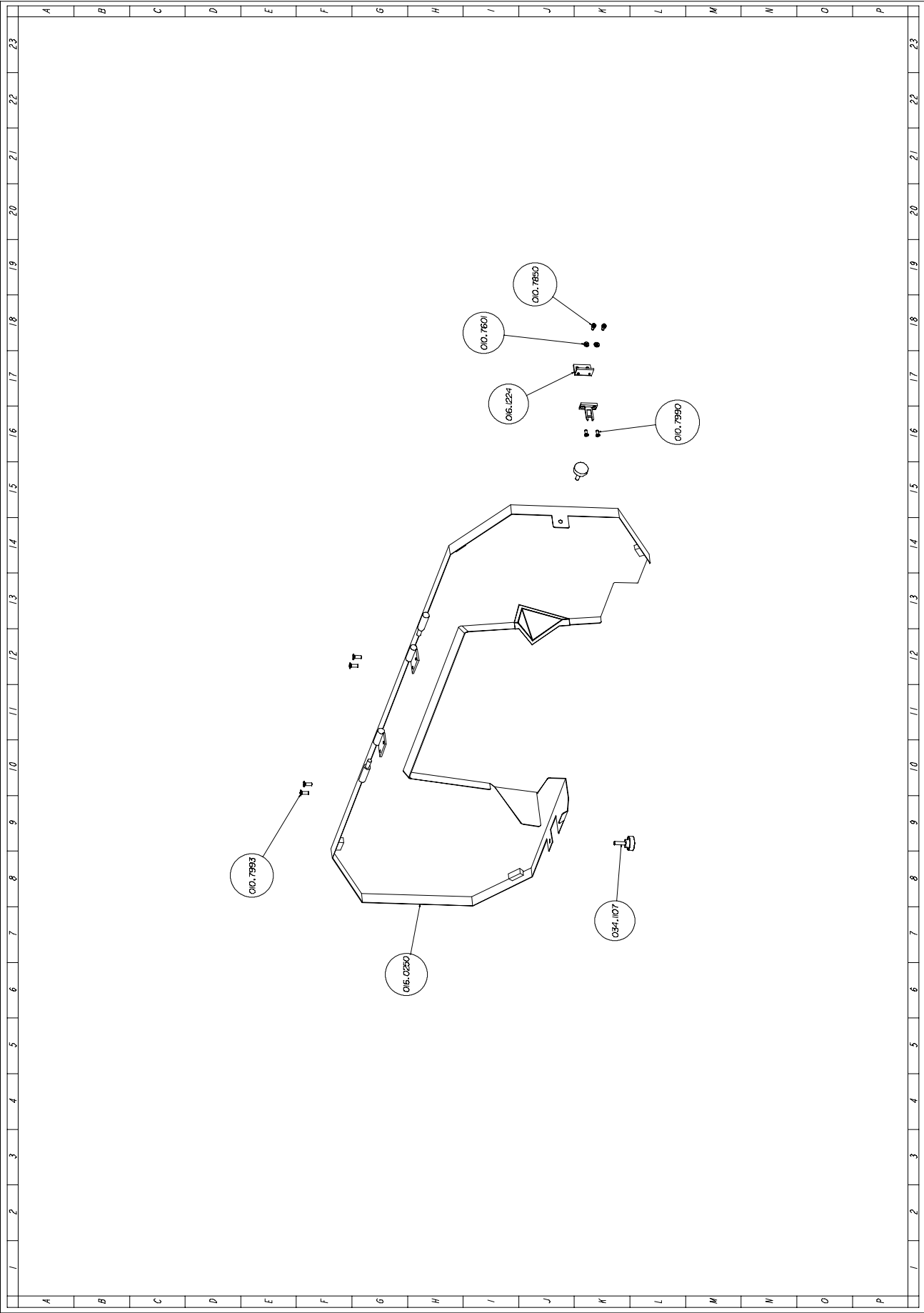
Sezione puleggia motrice



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 PUSHES	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	O 45 US.O10.1201 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	O 4 WASHER	NR	1.000
010.7603	O 6 WASHER	NR	1.000
010.7605	O 10 WASHER	NR	1.000
010.7830	BUTTON 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
010.7875	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

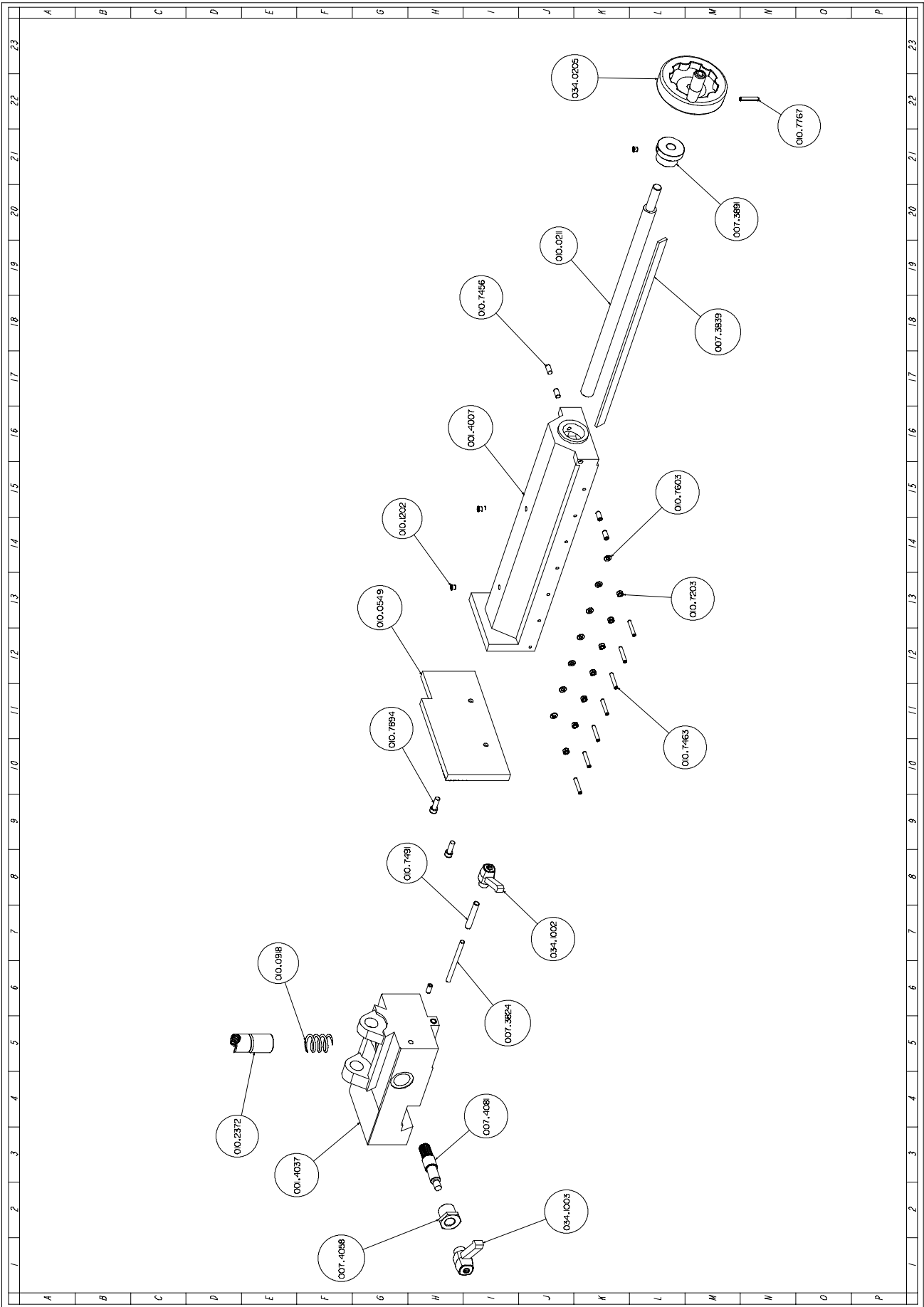
Cutting head cover



CUTTING HEAD COVER PARTS

Code	Description	U. of M.	Quantity
010.7601	O 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

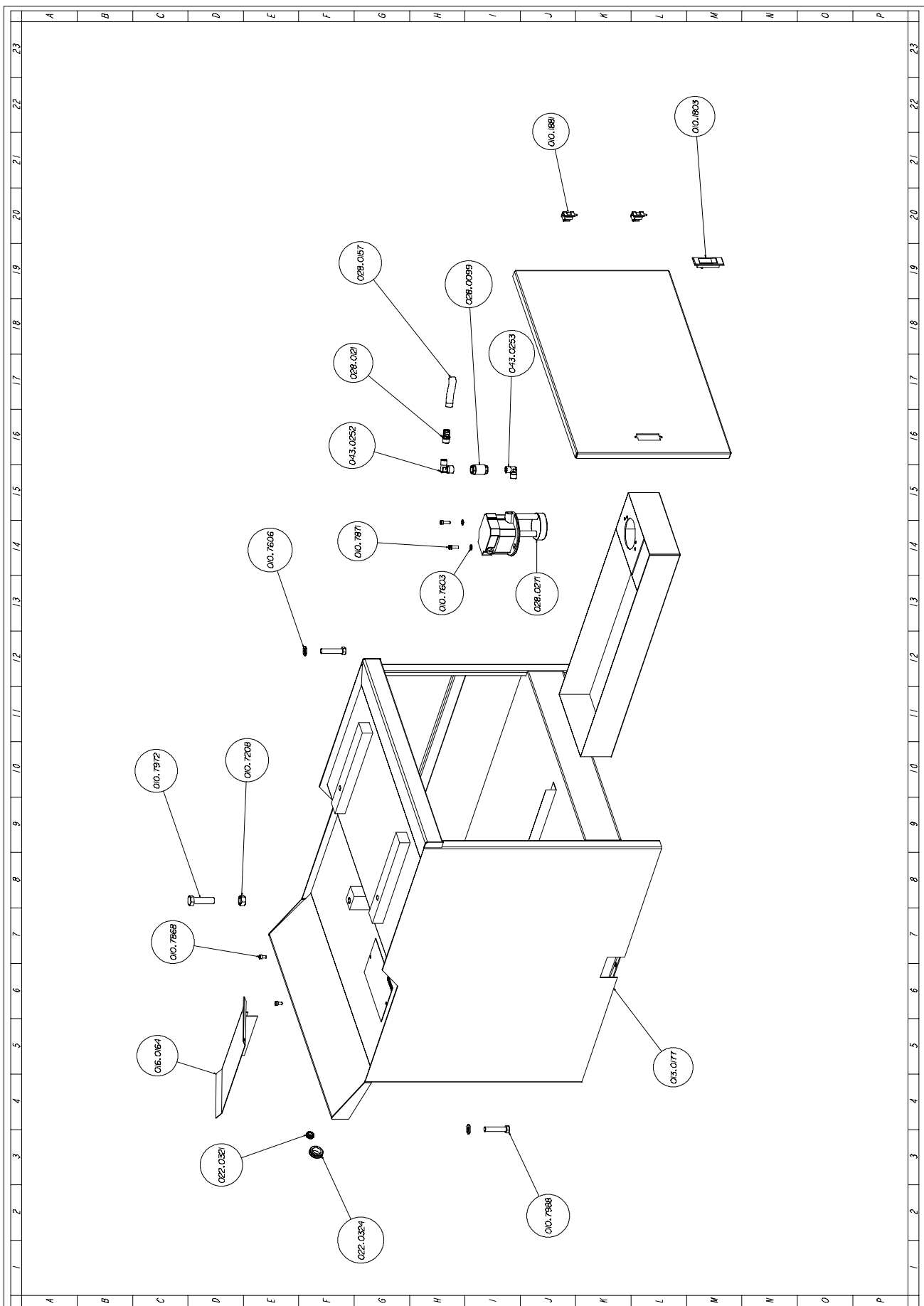
Vice assembly



VICE 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	VICE SCREW	NR	1.000
010.0549	MOVABLE VICE 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

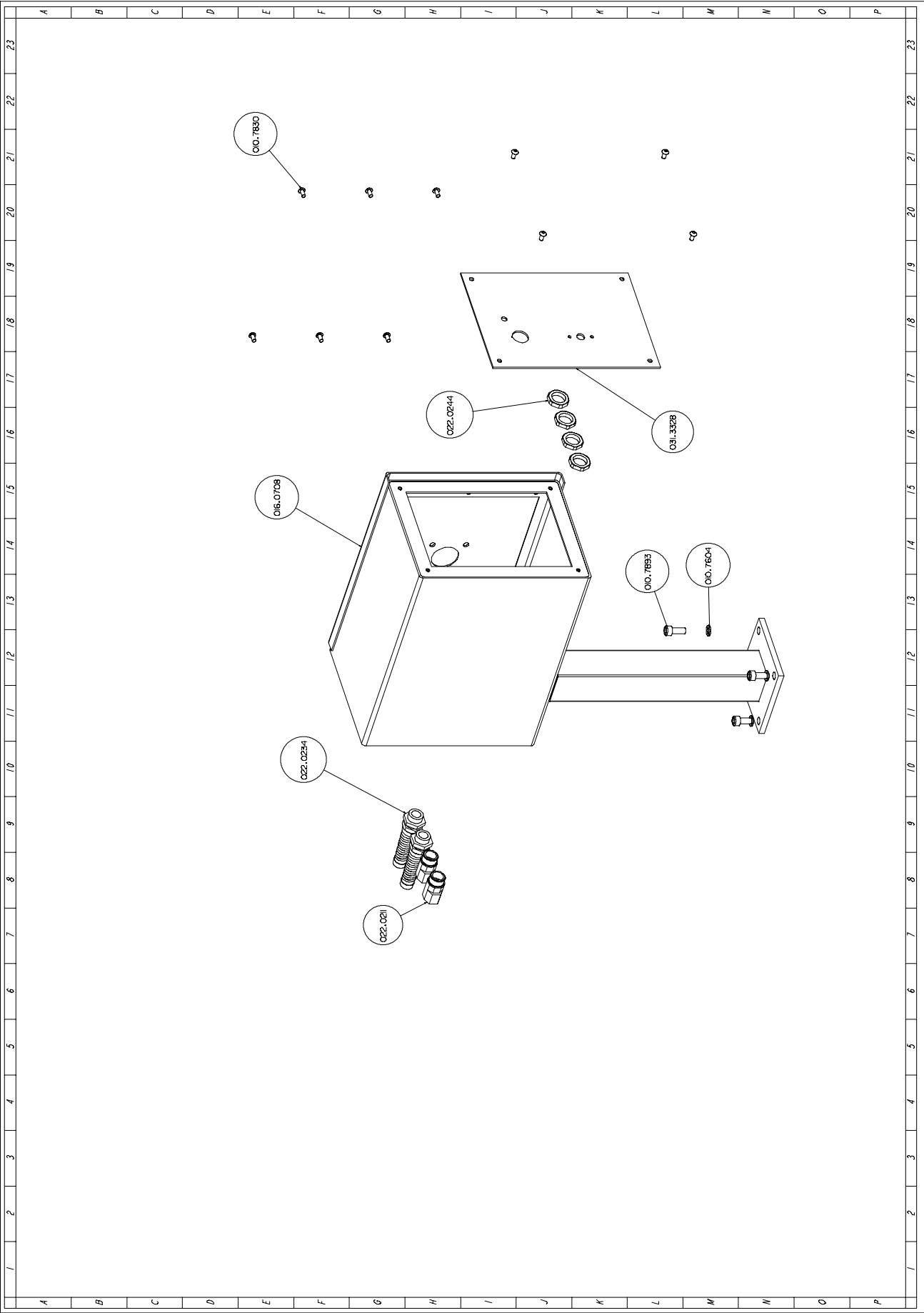
Base assembly



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

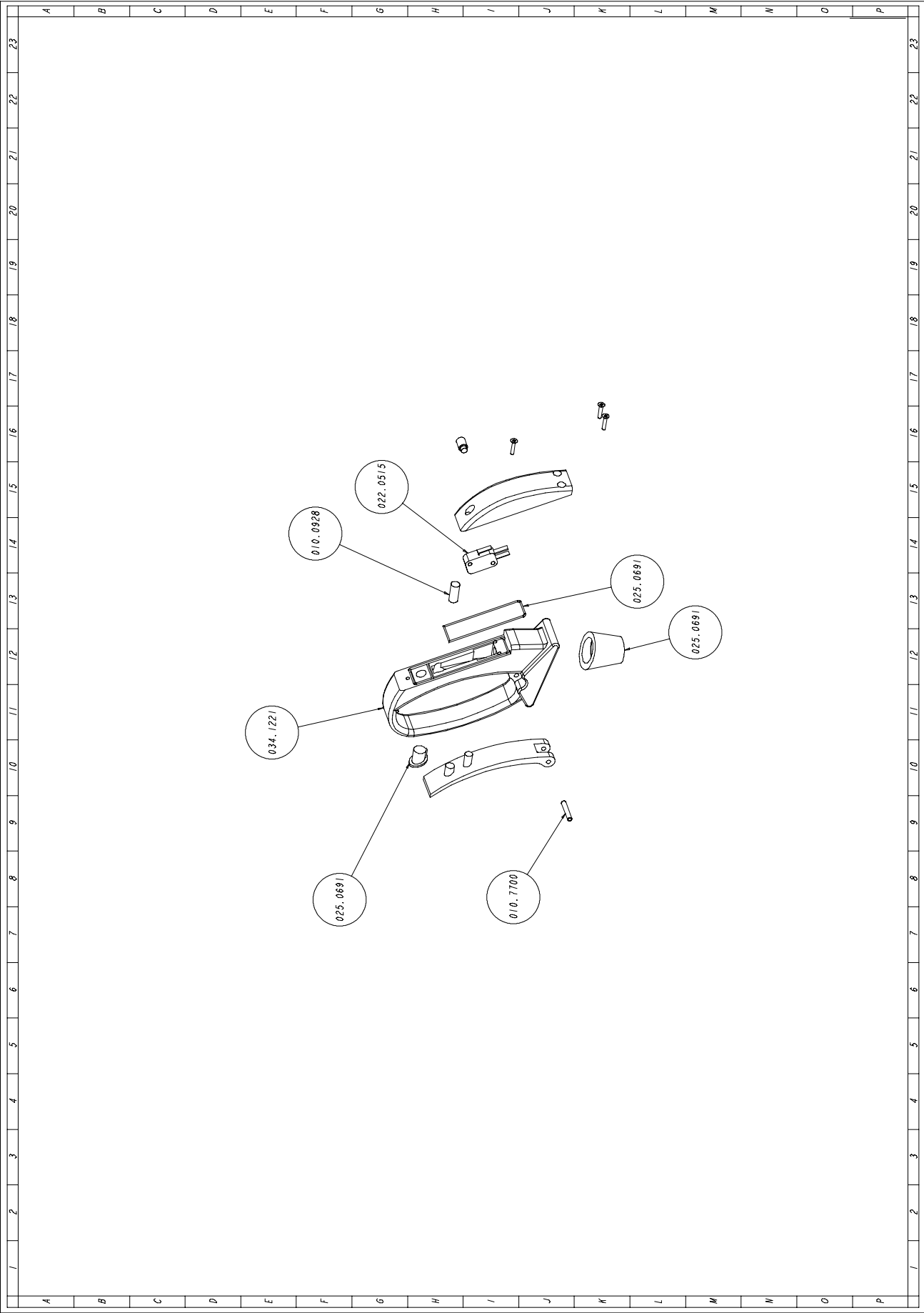
Control panel



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

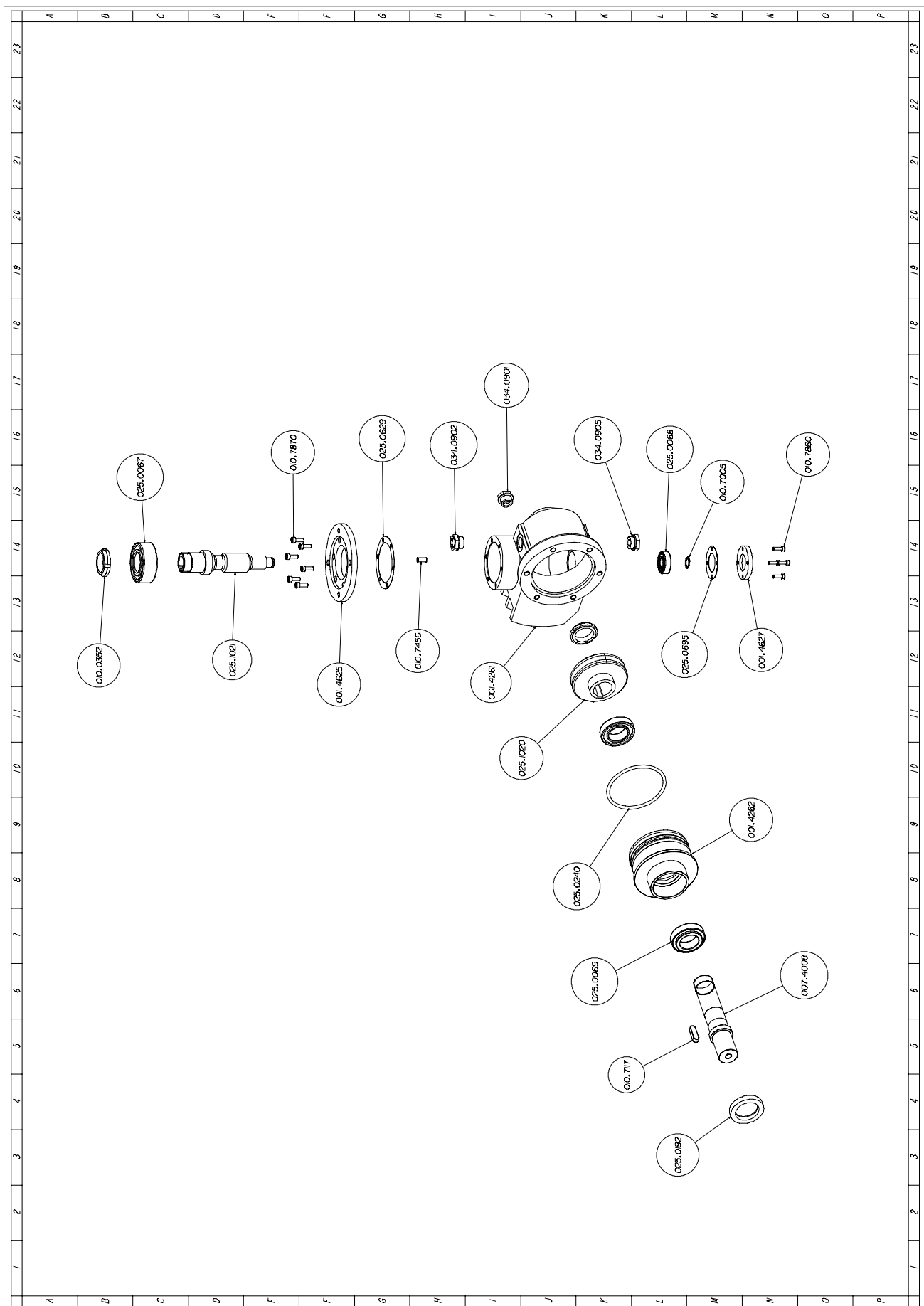
Handgrip



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



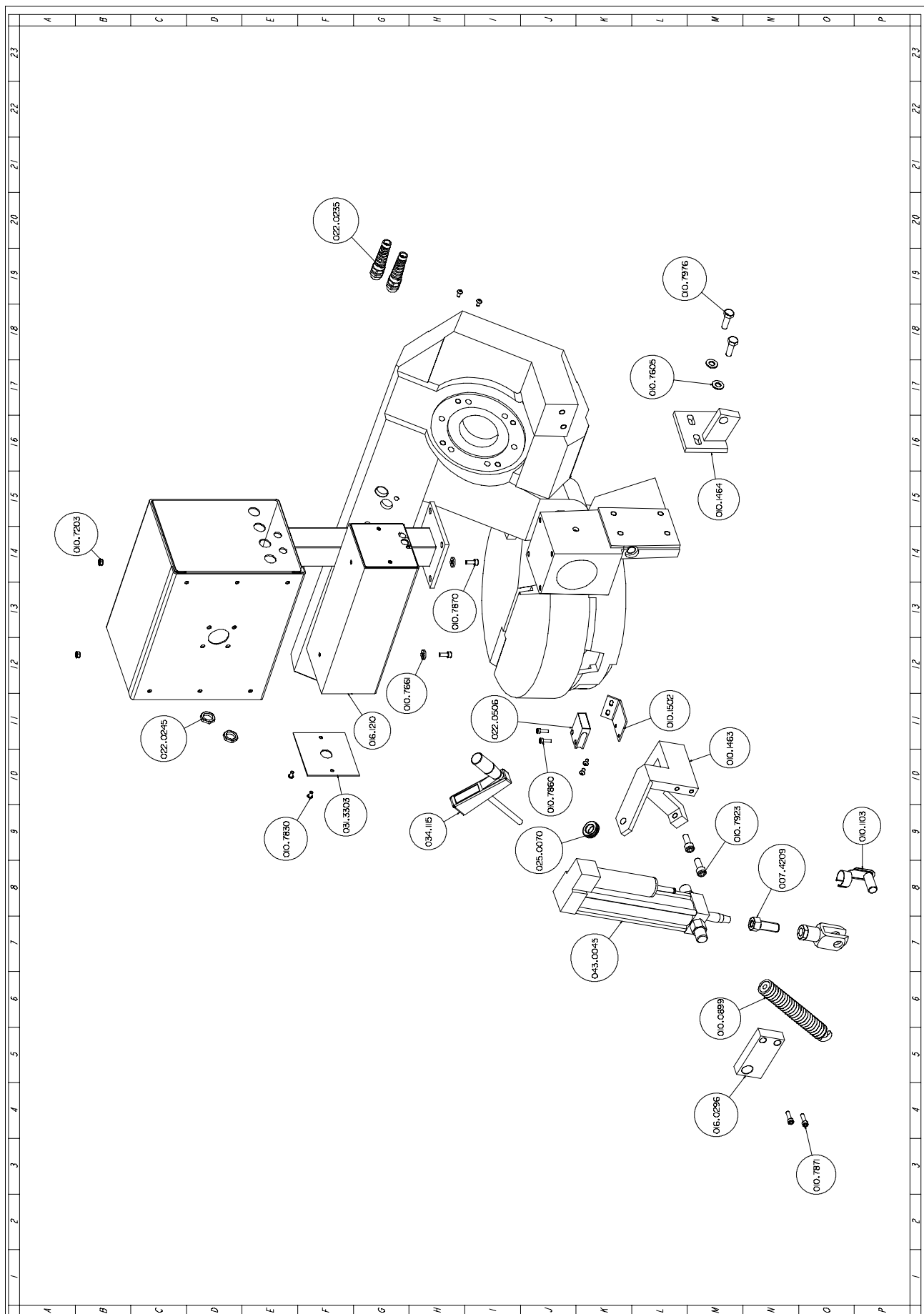
REDUCTION GEAR PARTS

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

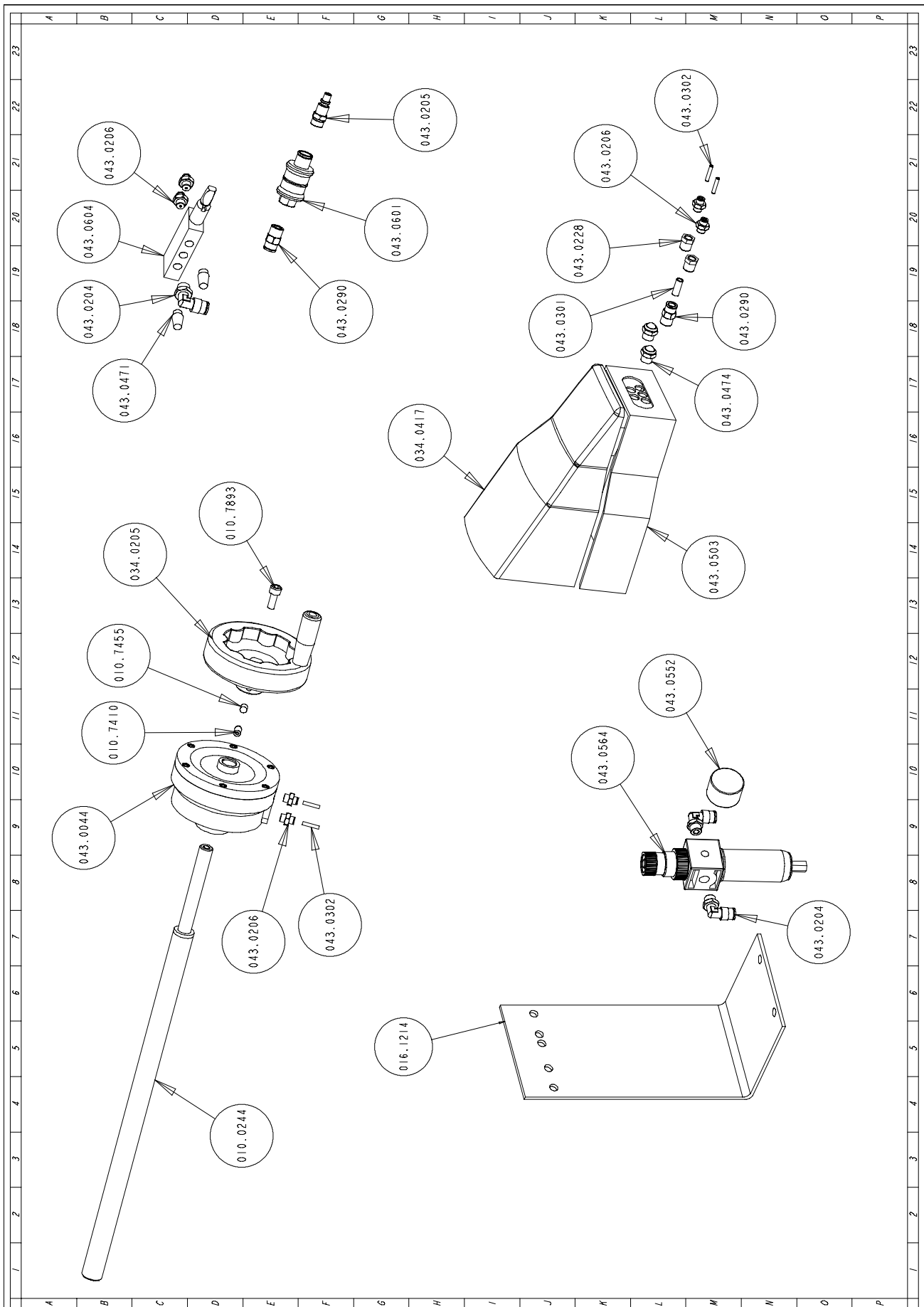
Optional Cut Control System



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 vice



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

Adjustments



This chapter illustrates the regulations and adjustments of the mechanical systems (pneumatic systems in the MA version) for correct use of **DM10–2**. These instructions will enable you to “customise” your machine to suit the type of cuts you want, optimising the time required to complete them.

Air treatment unit (MA version)

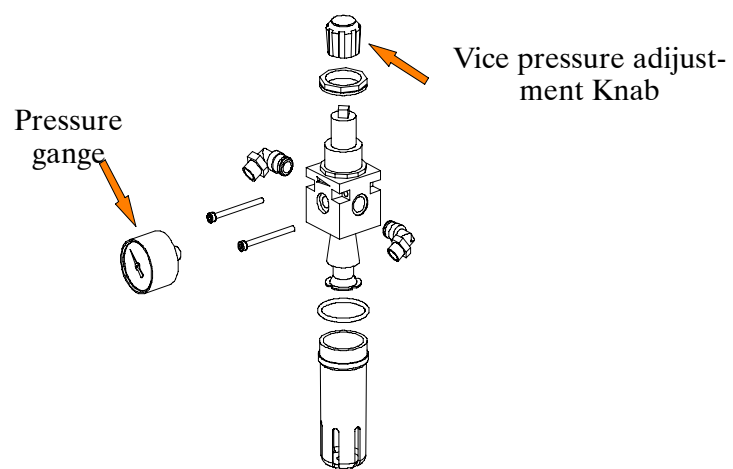
In the MA version of the **DM10–2**, the machine’s pneumatic circuit actuates the vice by means of a pneumatic cylinder.

The compressed air is treated and purified at the inlet to the system by an air treatment unit, which, if so calibrated, regulates the pressure at about 6 Bar, irrespective of the pressure in use in the factory circuit.

The pressure can in any case be set should the workpiece be subject to deforming stress or is unstable during the cutting process; the vice should be positioned at $2 \div 3$ mm from the piece before final clamping.

The user is requested to have available in the workshop a plant having the characteristics described in CHAPTER 4.

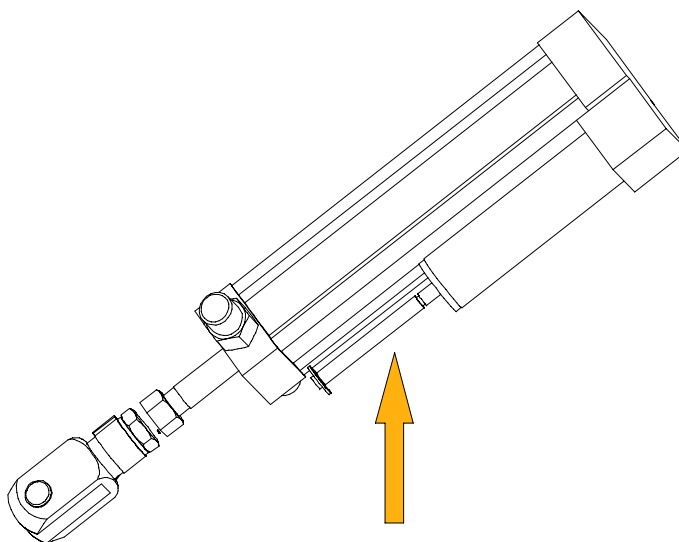
The diagram below shows an exploded view of the air treatment unit: the working pressure is regulated by rotating the knob indicated by the arrow, and is displayed on the pressure gauge.



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

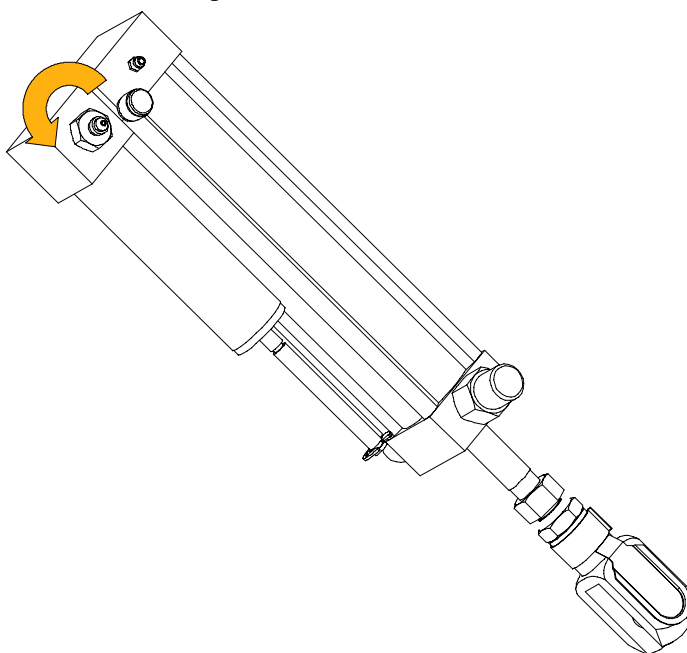
Topping up the head cylinder

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.

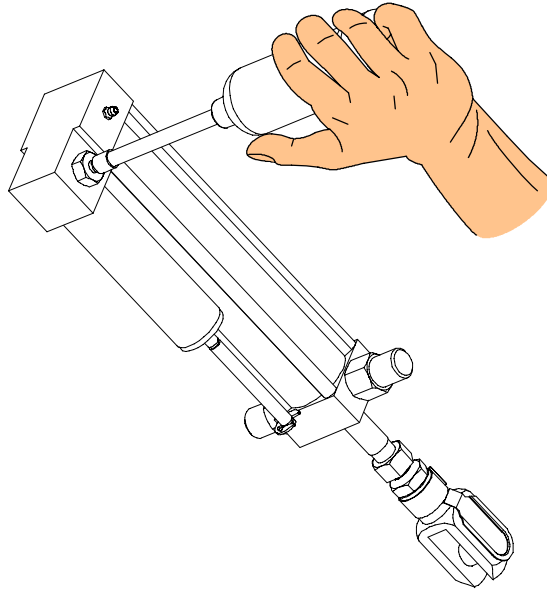


To top up the oil in the tank, the instructions are as follows:

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



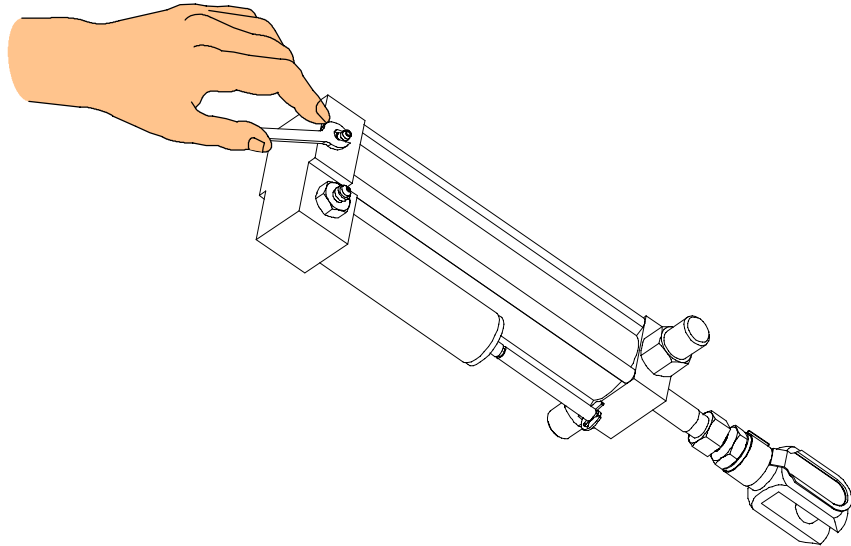
- ▶ using a manual pump, loaded with MOBIL DTE 11 oil (or equivalent – see table in Chapter 8), top up until the upper rod groove exits, as illustrated above.



Bleeding the head cylinder

Accumulations of air inside the hydraulic circuit cause the head to stutter in down phase. When this happens, bleed the circuit as follows:

- ▶ position the head at FCTI;
- ▶ using a 10 mm open wrench, slacken the bleed valve until oil exits;



- ▶ close the valve and perform a number of empty work cycles; if necessary, top up the compensation tank.

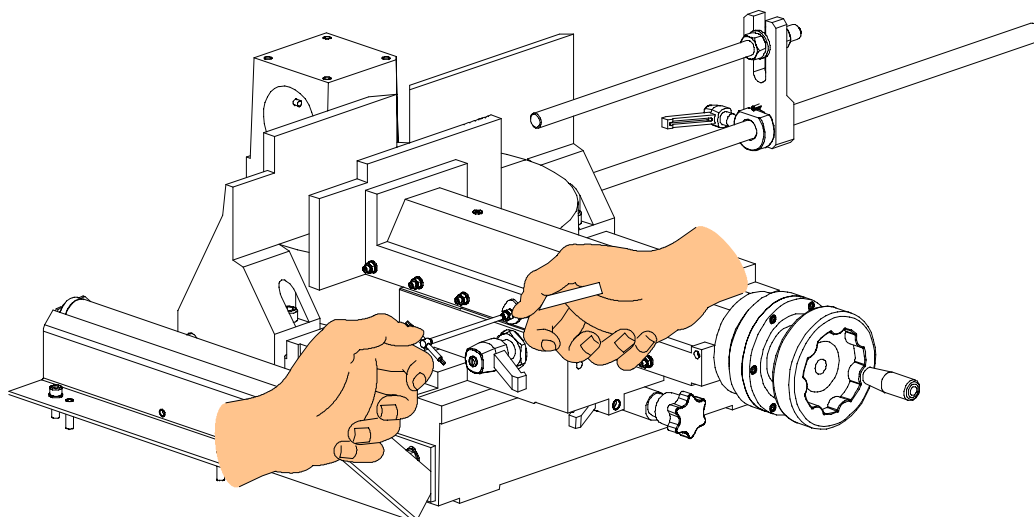
N.B. The oil which spills out during the above operation can be collected using a pipe inserted on the valve, and re-used.

Vice

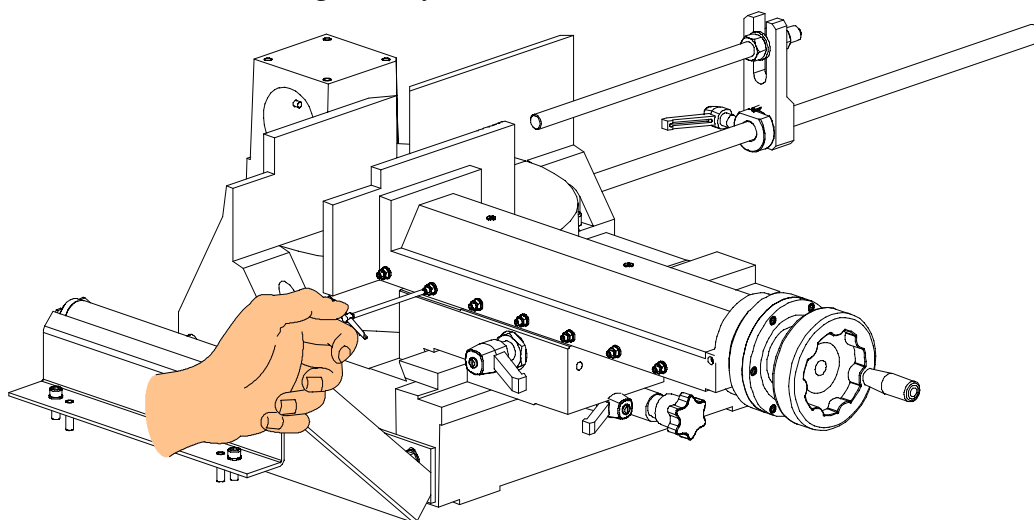
Vice play adjustment

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;

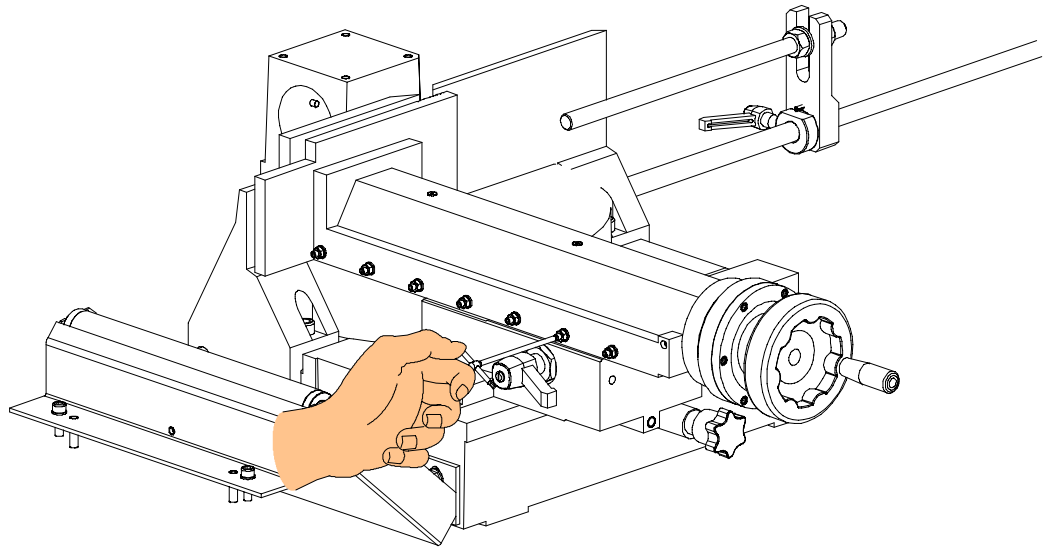


- ▶ adjust the slight pressure exerted by the grub screws on the gib, starting with the first two in contact with the lead screw;
- ▶ after adjusting the two grub screws, tighten the locknut, holding the grub screws with the hexagonal key;



- ▶ 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;

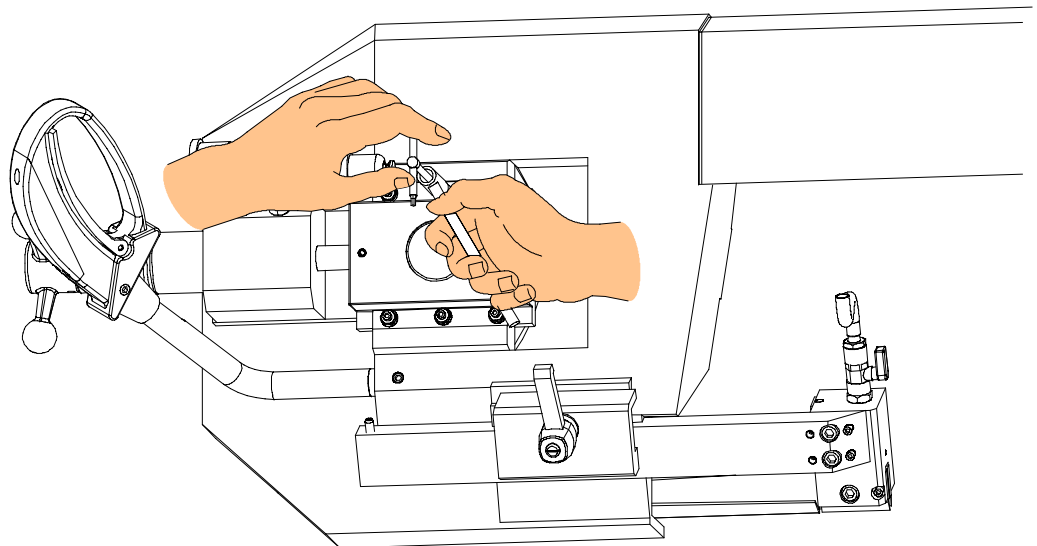
- at the end of the operation, use the handwheel to move the slideway back and forth, identifying the zones where the grub screws exert greater pressure on the gib.



Cutting head

Blade tensioner slide play adjustment

To reduce the play which develops over a period of time between the blade tensioner slide and the slide gibs, the grub screws separating the gibs from the slide must be adjusted as follows:

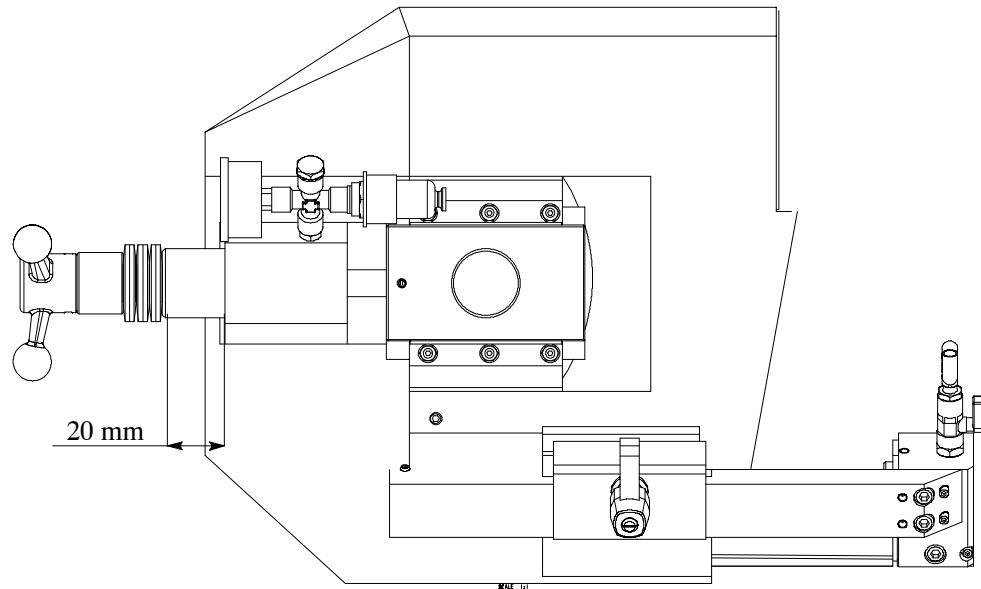


- remove the blade from the flywheels;
- move the slide backwards and forwards to locate any friction or play;
- slacken the nuts, holding the grub screws with a hexagonal pipe wrench;
- if there is play, tighten the grub screws; if there is friction rubbing, loosen the grub screws.

Blade tensioning unit

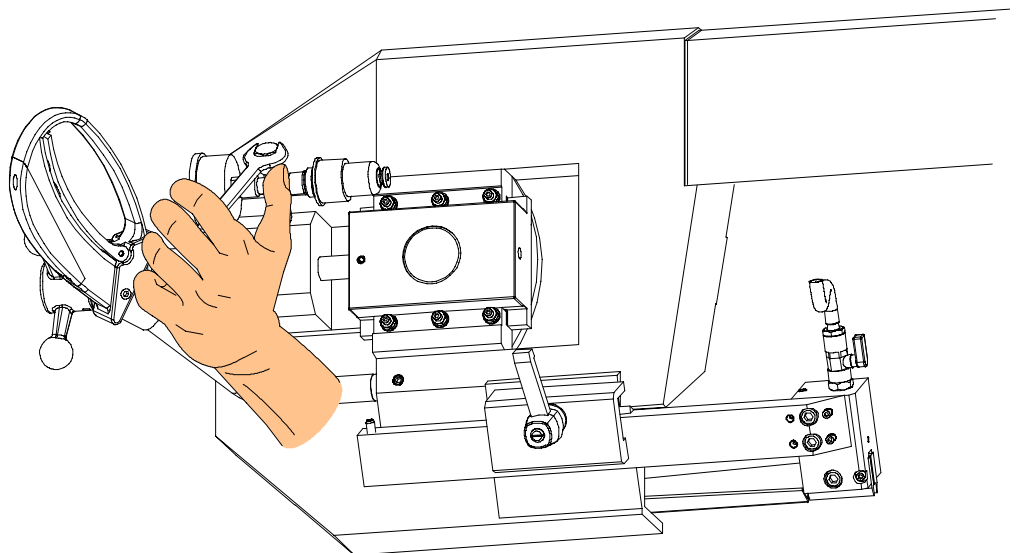
The blade tensioning unit on these models is hydraulic. This means that the oil level in the tensioning cylinder must be replenished whenever needed to ensure correct operation of the unit. To replenish the blade tensioning cylinder, follow the steps illustrated in the figures below.

When the piston protrudes from the blade tensioning cylinder by just 20 mm as illustrated below, the cylinder must be topped up.

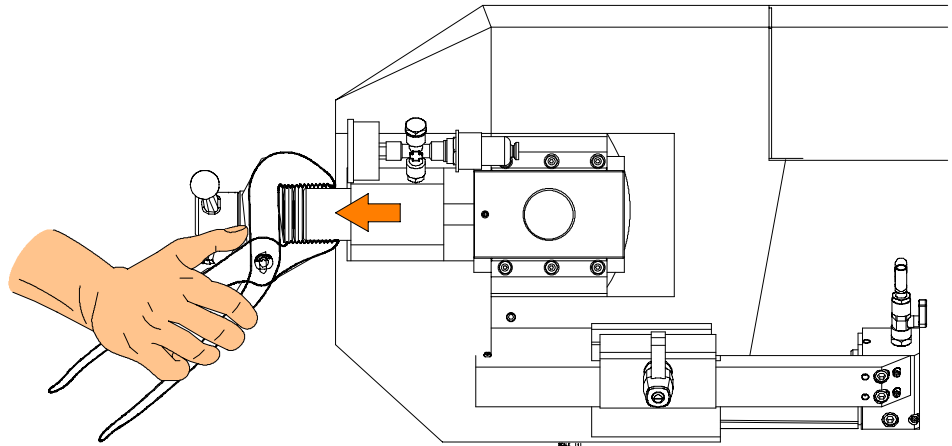


Topping up sequence:

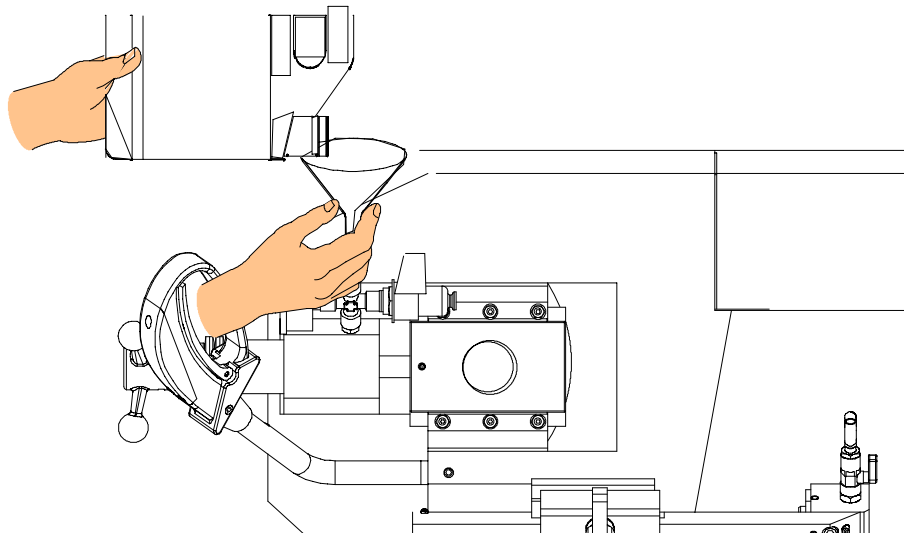
- ▶ lower the head;
- ▶ slacken the blade tensioning handwheel;
- ▶ remove the filler cap using a hex wrench;



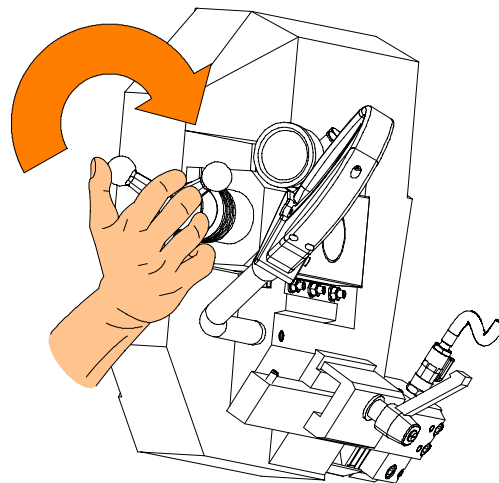
- pull out the piston, if necessary, using a pair of pliers, until it protrudes 44 mm from the cylinder;



- top up with AGIP ATF DEXRON oil or one with similar characteristics using a funnel.



- screw on the filler cap;
- using the handwheel, tension the blade to 70 Bar = 900 Kg.



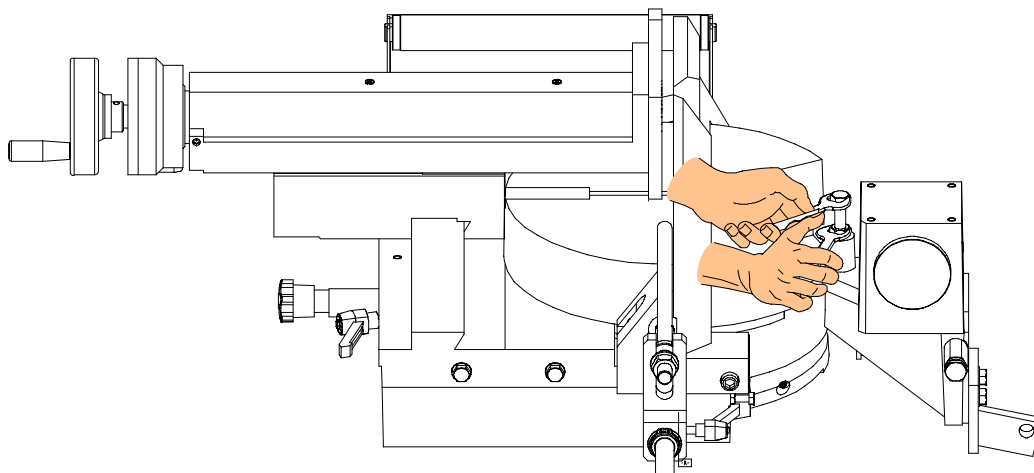
Attention

The machine enters emergency status if the blade tension is too slack. A pressure contact (pressure switch) disables blade start-up if the blade is not correctly tensioned, since it might otherwise slip off the wheels, cut poorly or wear prematurely. This should always be born in mind when using the machine.

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:

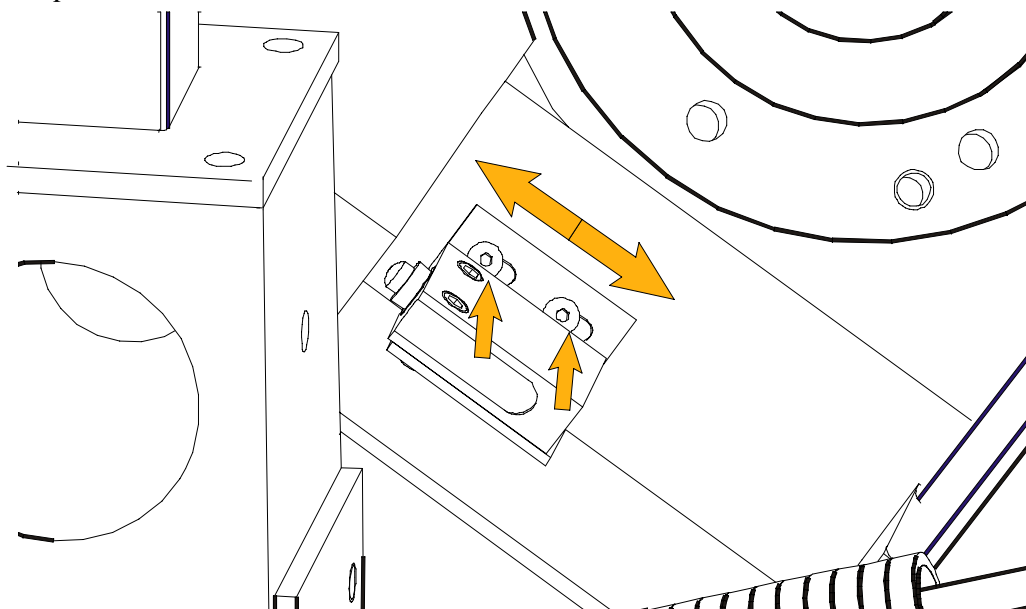
- to change this setting, two hexagonal spanners must be used, one to keep the nut in position, and the other to tighten and loosen the stop screw.



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.



Blade guide parts

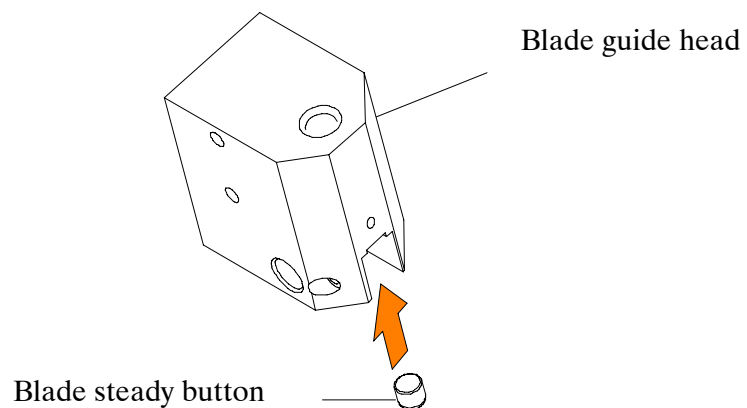
Band saw blades offer enormous advantages to cutting applications, without requiring any special skills by the operator. A description follows of the blade guide adjustments required to ensure correct operation of the saw.

Blade guide heads

The first blade adjustment involves adjustment of the heads. The blade guide heads comprise the blade guide plates which ensure correct longitudinal alignment, the blade steady buttons which control vertical blade flexure, and the coolant supply cocks.

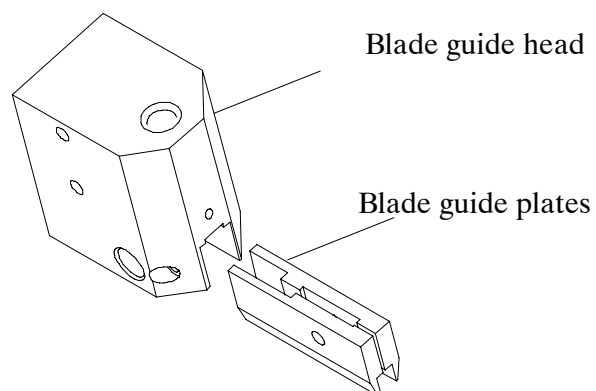
Blade steady buttons

The blade steady buttons prevent upward blade flexure caused by the vertical action of the cutting force. These buttons are fitted on both the front and rear heads, and need no adjustment.



Blade guide plates

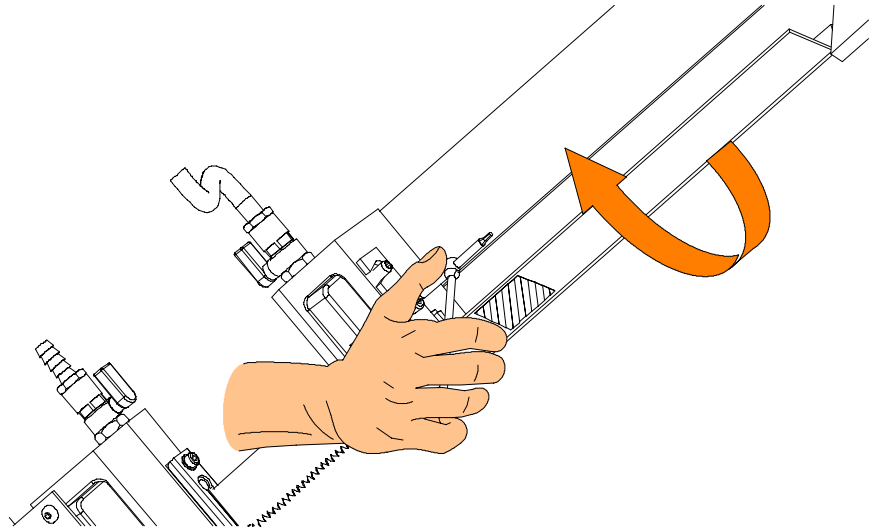
The plate contact points feature widia inserts which guide the blade longitudinally. A small amount of play must exist between the plates and blade to ensure that the blade runs smoothly and perpendicular to the work table.



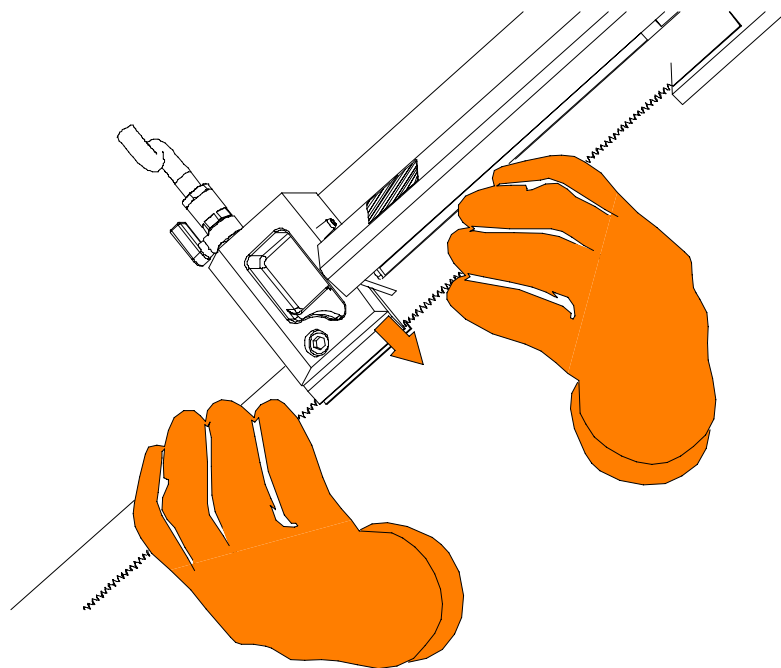
Thanks to the widia inserts, the working life of the guide plates is practically the same as that of the machine itself. However, if due to wear or the assembly of a new blade with a different thickness, the amount of play between the plates and blade changes, the plates must be adjusted as follows:

- disconnect the machine from the power supply;

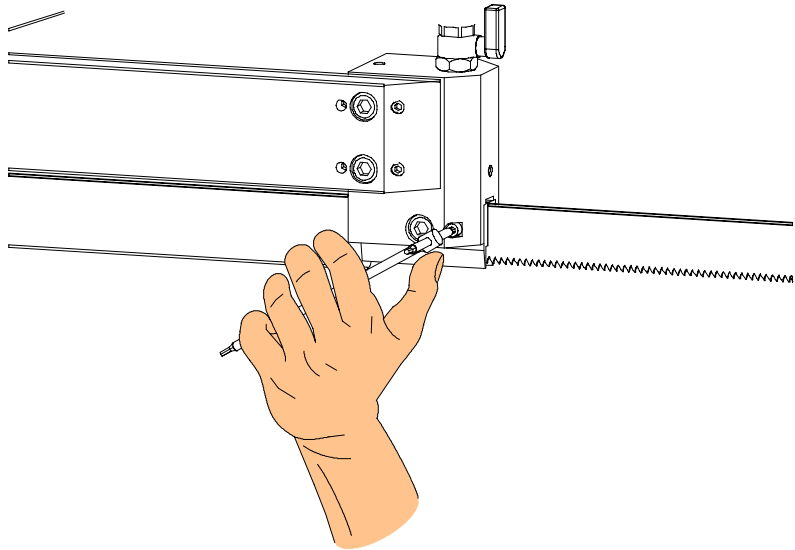
- ▶ slacken the blade tension using the handwheel;
- ▶ open the front blade guard by undoing the fixing screw and rotating it as illustrated in the figure below;



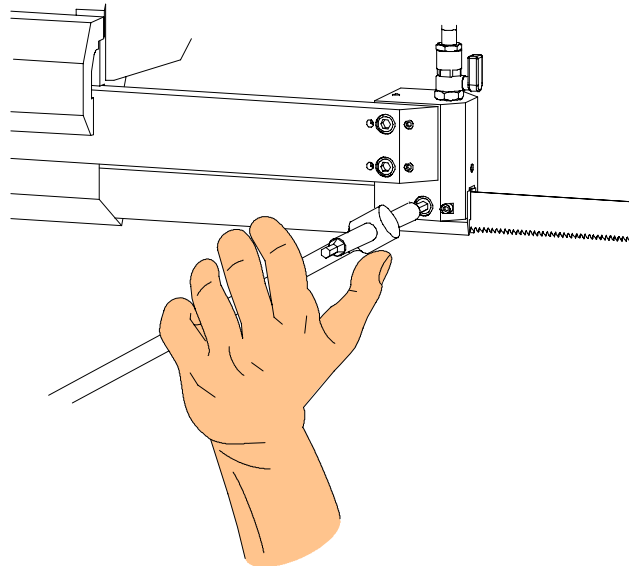
- ▶ wear protective gloves when making this adjustment;
- ▶ make sure there is a small amount of play between the blade and guide plate inserts;



- ▶ if the amount of play is not sufficient for the blade to run smoothly, adjust the locking torque of the two grub screws with an Allen key;



- ▶ replace any worn plates by removing the plate fixing screw;



- ▶ repeat the above sequence of steps on the rear blade guide head;
- ▶ refit the front blade guard;
- ▶ tension the blade and power up the machine again.

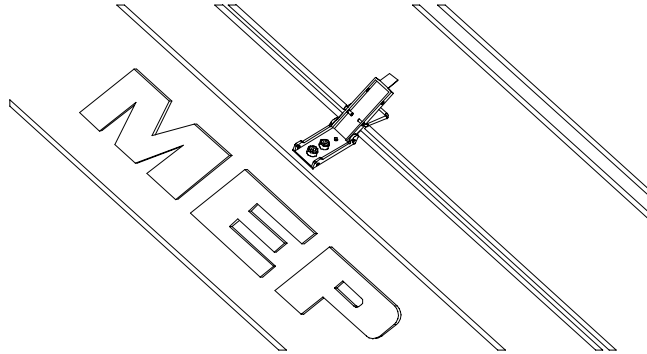
Blade

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.

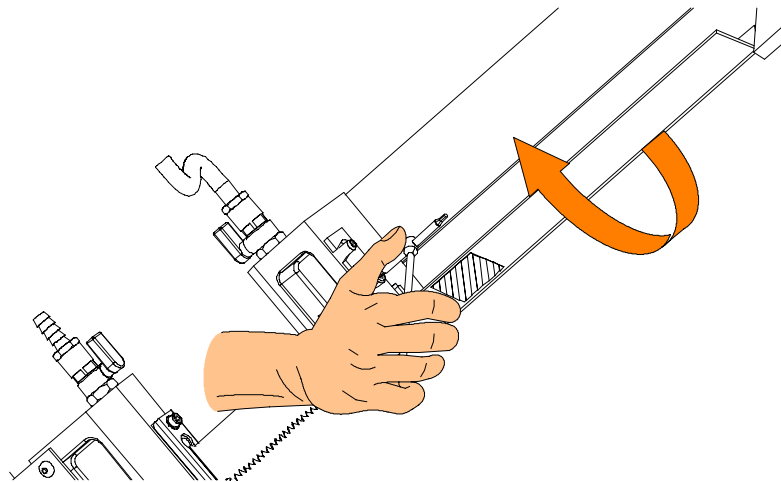
Tool change

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:

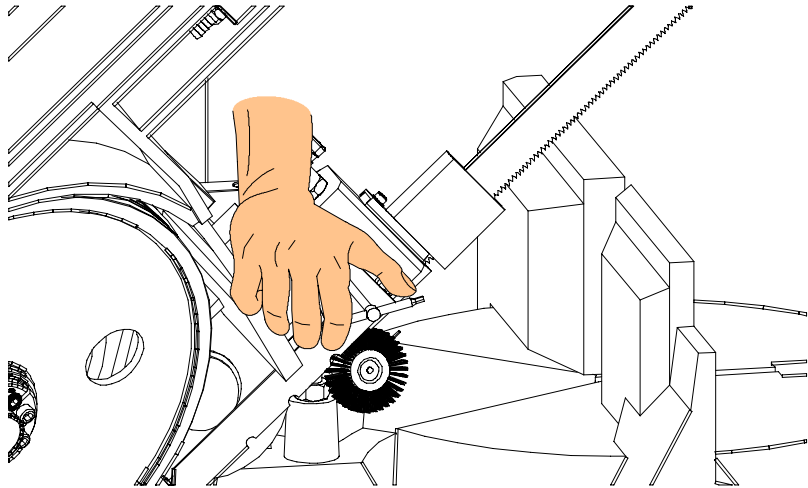
- ▶ disconnect the machine from the power supply;
- ▶ slacken the blade tension using the handwheel;
- ▶ open the cutting head cover by unscrewing the two knobs and hooking it onto the galvanised lever on the back of the head;



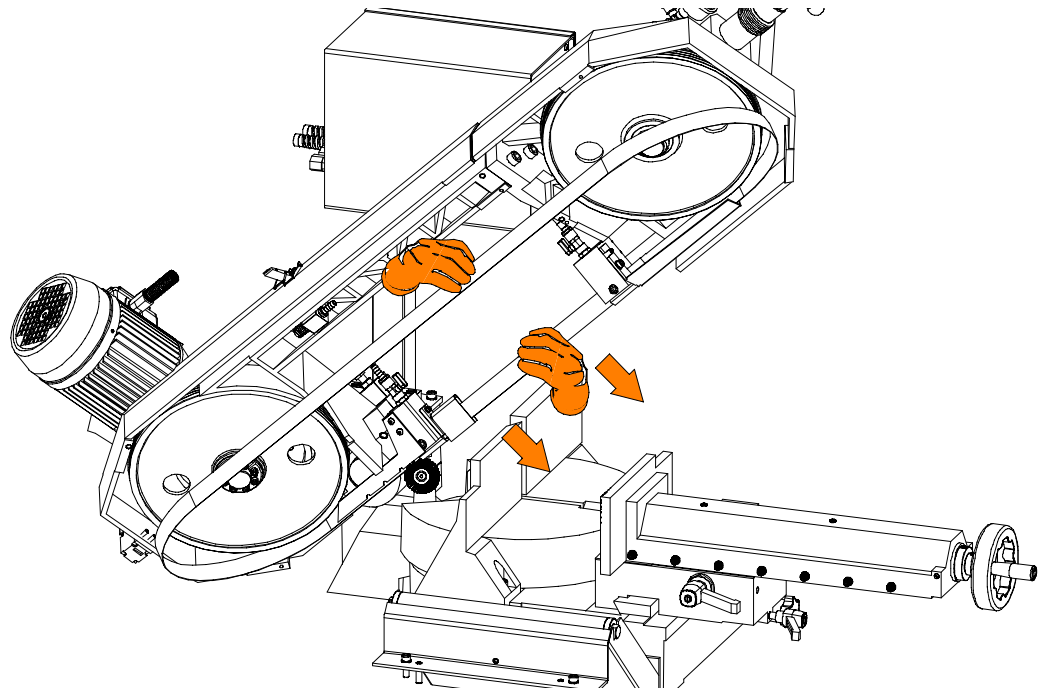
- ▶ open the front blade guard by undoing the fixing screw and rotating it as illustrated in the figure below;



- ▶ remove the rear blade guard by undoing the two fixing screws using an Allen key;



- ▶ wear protective gloves when changing the blade;
- ▶ remove the worn blade by sliding it off the flywheels and front and rear heads;
- ▶ fit the new blade into the front blade guide head;
- ▶ make sure the back of the blade is facing the flywheel stop and that the teeth along the lower part of the blade are inclined towards the head pivot.
- ▶ Make sure there is a small amount of play between the blade and guide plate inserts;

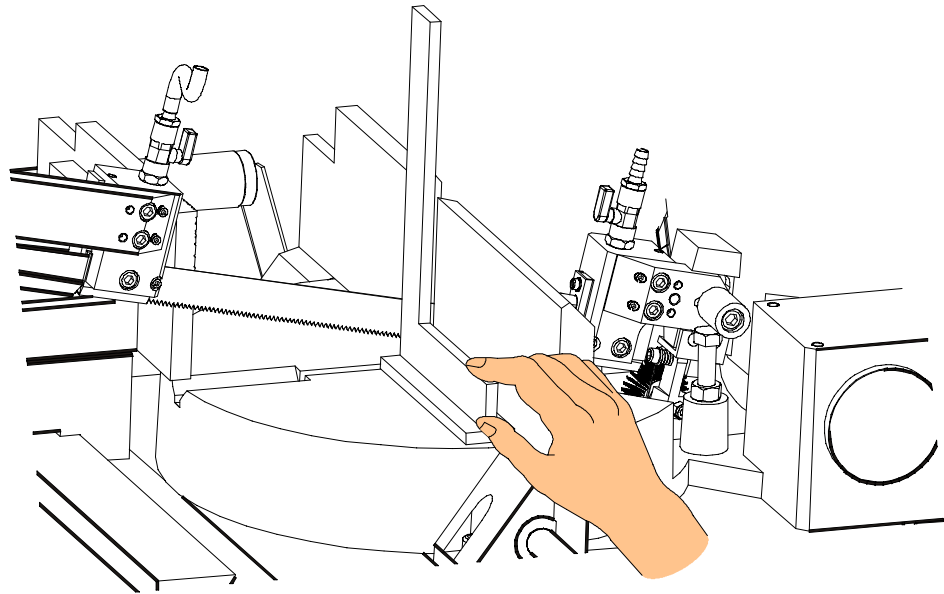


- ▶ repeat the above sequence of steps on the rear blade guide head;
- ▶ fit the blade on the flywheels and remount the front and rear blade guards;
- ▶ close the cutting head cover, correctly tension the blade and power up the machine.

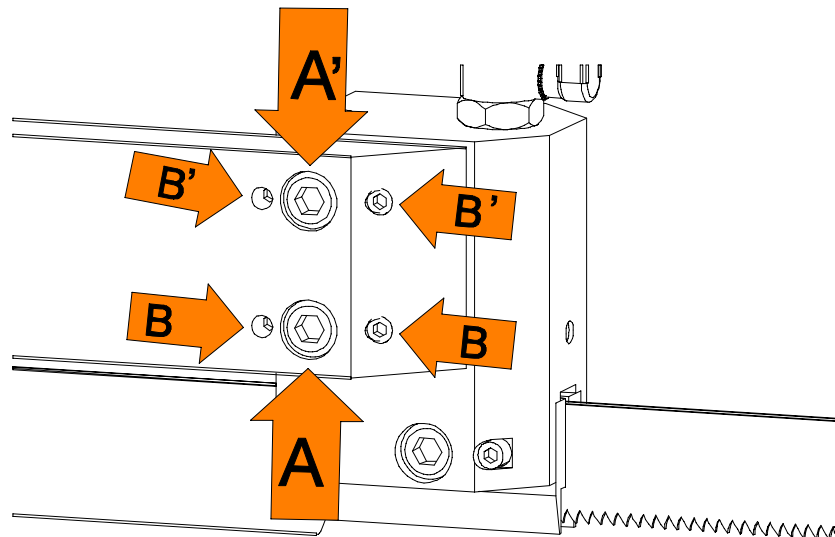
Blade perpendicularity

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.

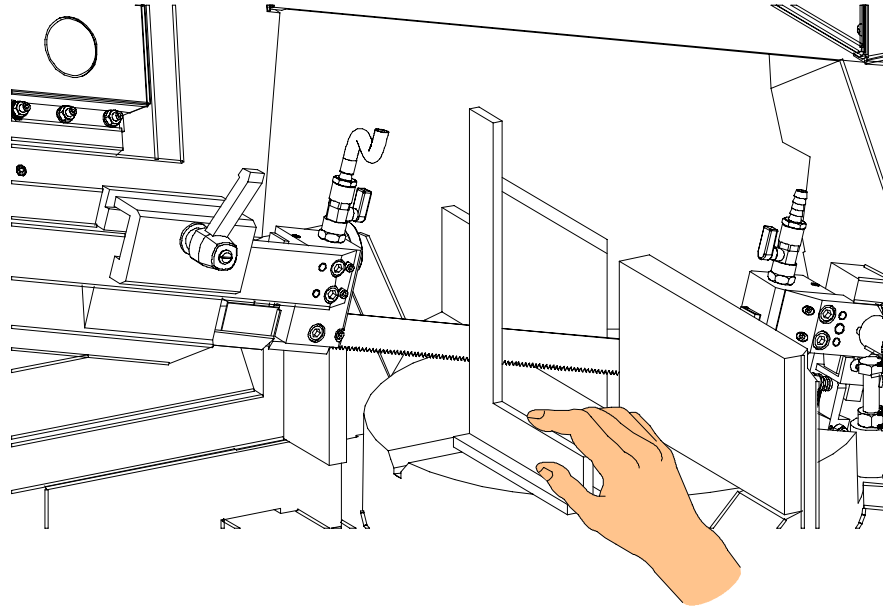
- Position the square on the cleaned work surface and rest it against the blade, close to the right vice jaw at a point where the blade teeth do not prevent contact.



- 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.



- Position the square on the work surface close to the front head.



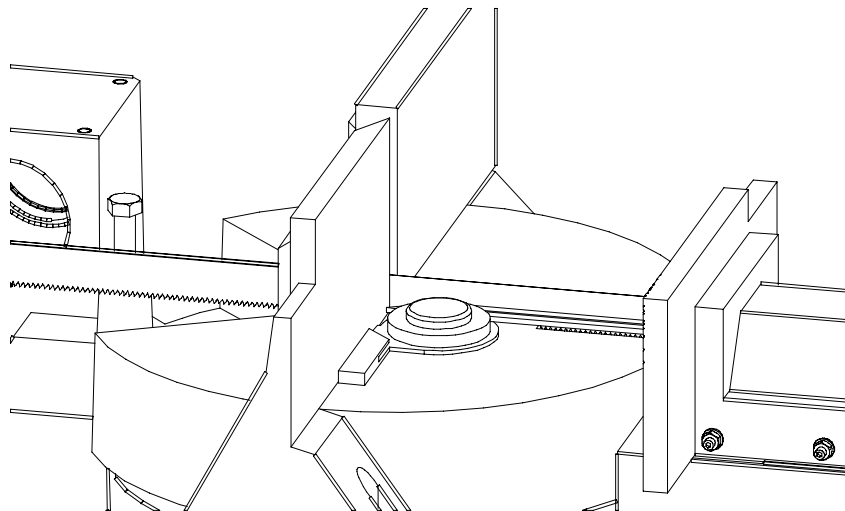
- Repeat the squaring operations as for the rear head.

Orthogonality of the blade

The procedure for correcting and adjusting the blade to 0° and 45° right and 45° and 60° left in order to make cuts at right angles to the fixed vice jaw is described below.

To make orthogonal adjustments at 0° , use a workshop goniometer or a simple 90° square. Operation sequence:

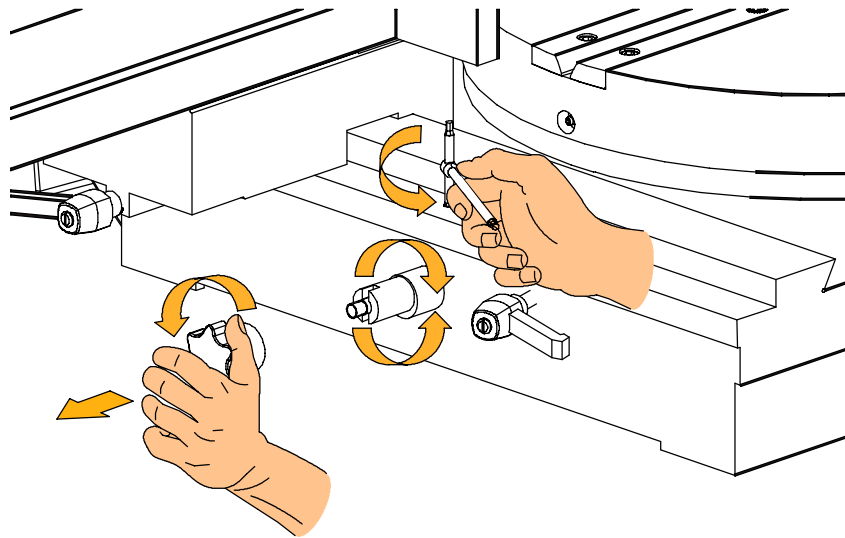
- lower the head;
- position the goniometer or square, resting it on the fixed vice jaw adjacent to the blade;



- slacken the turntable lock lever;
- remove the knob illustrated in the figure below controlling the eccentric lock pin;

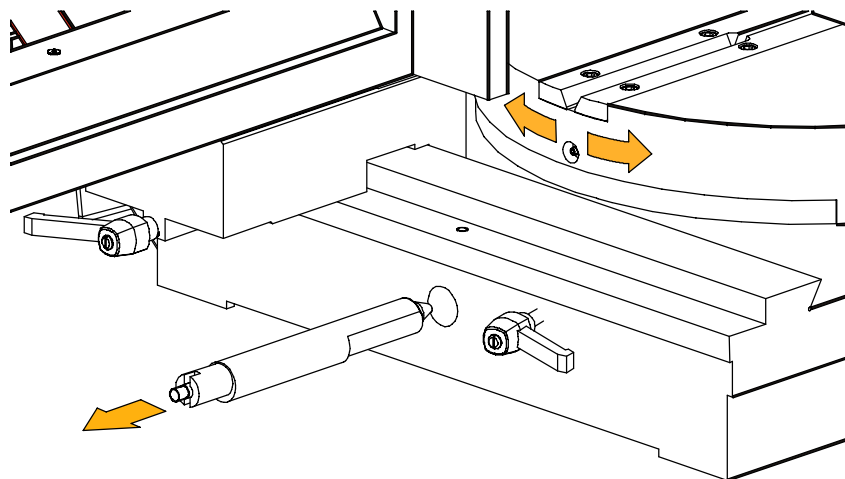
If the degree of error read on the goniometer is equal to or less than 1 degree, proceed as follows:

- ▶ 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.

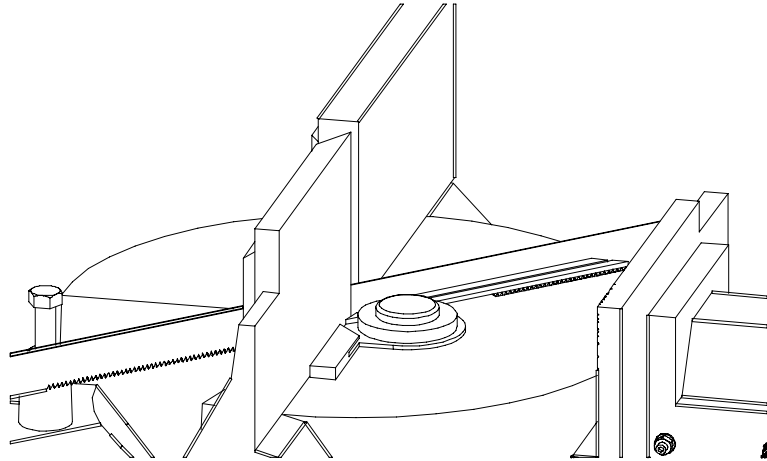
Warning

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.

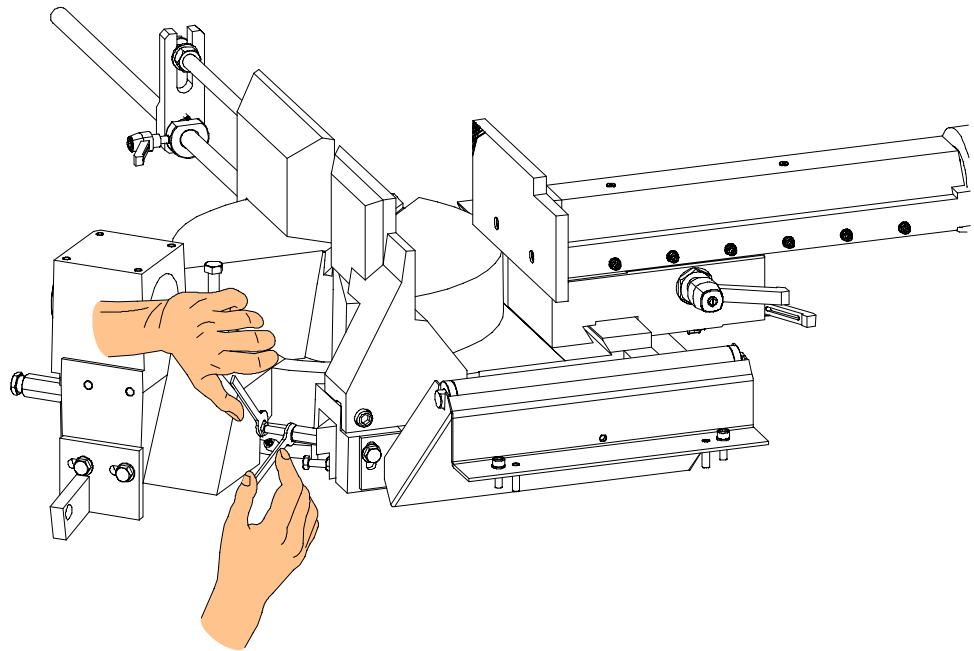
Operation sequence for blade adjustment to 45 degrees:

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

- ▶ position the goniometer on the work table and measure the angle between the vice jaw and blade;

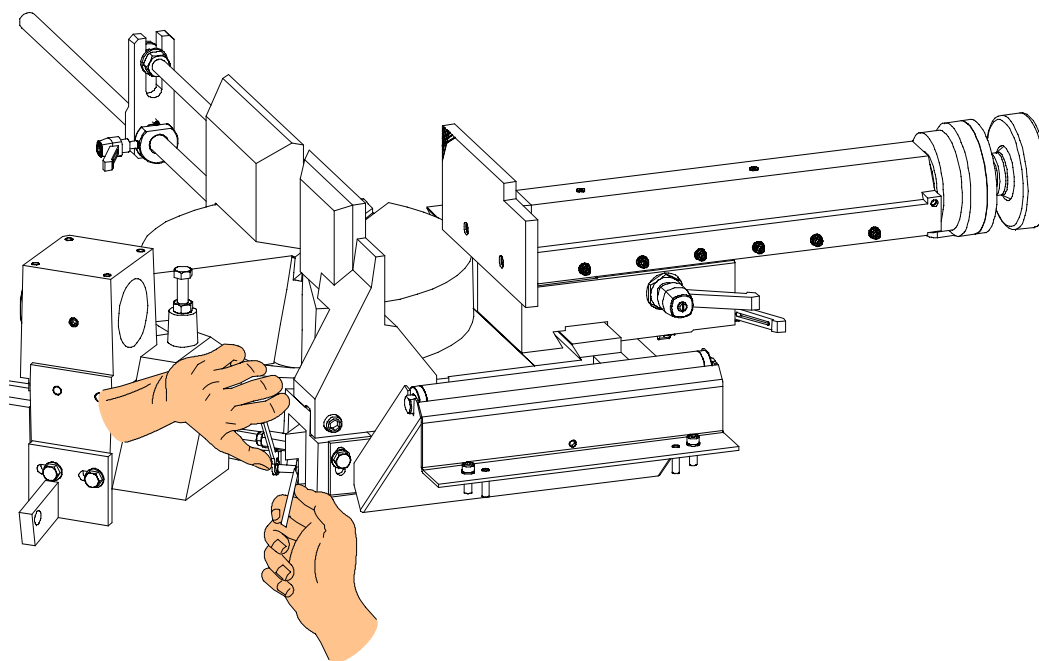


- ▶ once you have identified the degree of error, adjust the pins by gripping the pin with an Allen key and slackening the lock nut with a normal wrench;
- ▶ this done, adjust the depth of the pin inside the turntable until the error is corrected;



- ▶ relock the nut, while gripping the grub screw.

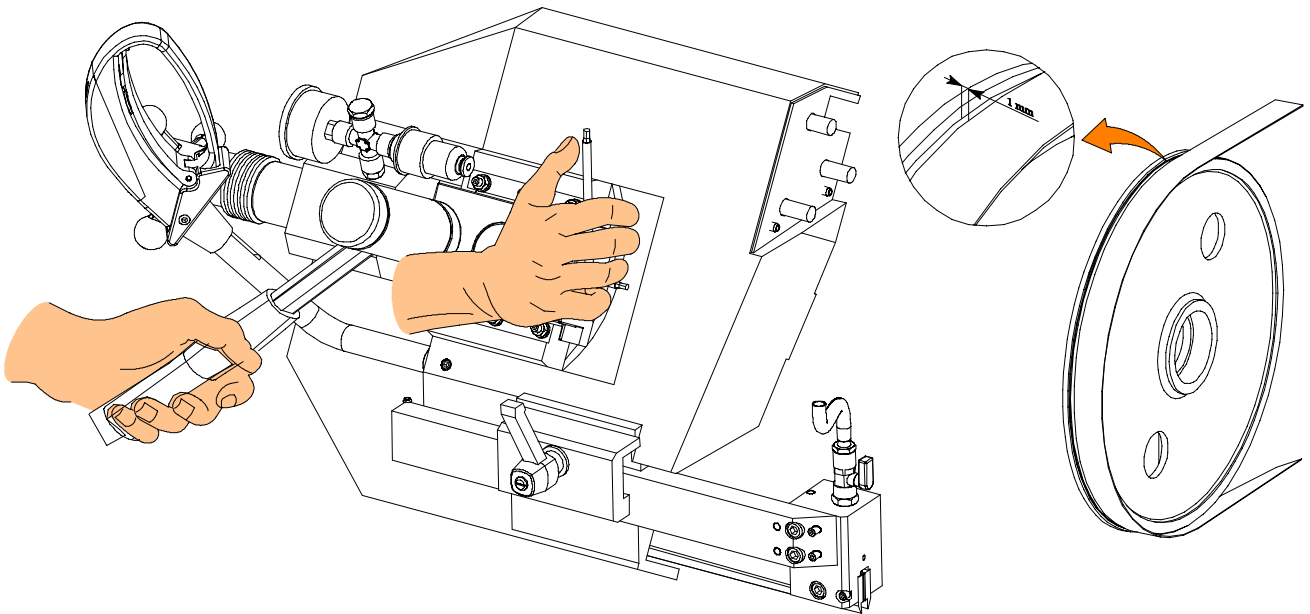
To adjust the blade to **60 degrees left**, proceed as described above for a 45 degree angle, this time however, adjusting the stop indicated in the drawing below.



Front flywheel

The front flywheel must be adjusted so that it is aligned with the rear wheel. The purpose of this adjustment is to make sure the back of the blade remains about 1 mm from the edge of the flywheel during rotation. This prevents premature wear to the blade which, due to excessive friction with the edge, may crack.

- ▶ Slacken the blade tension and open the cutting head cover;
- ▶ slacken the grub screw and, using a mallet, tap the shaft in or out;
- ▶ finally, close the cover and set the blade in motion;
- ▶ check the distance between the blade and edge of the wheels;

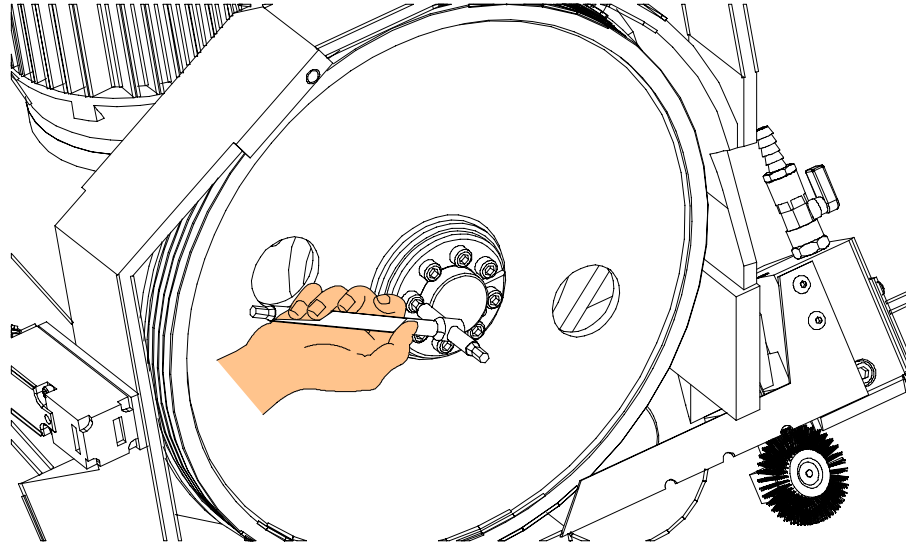


- ▶ if necessary, repeat the above operation until a gap of 1 mm is obtained between the back of the blade and edge of the wheels.

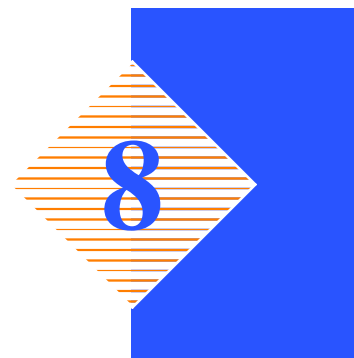
Motor flywheel

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.



Maintenance and choice of consumables



DM10–2 is built to be sturdy and long-lasting. It has no need of any special maintenance, though, like all other tools, it needs adjusting from time to time, especially if not regularly looked over or used without due care.

This chapter, therefore, is intended as a guide for those who want to look after the machine and get the most out of it for as long as possible.

The role of the operator

The person operating and maintaining the machine must follow these instructions for his own safety, as well as for the safety of other personnel, and in the interests of machine productivity:

- check that his own work and that of the other operators of the machine always complies with the relevant safety standards. Therefore, check that the safety devices are in position and work perfectly and that personal safety requirements are complied with.
- Ensure that the working cycle is efficient and guarantees maximum productivity, checking:
 - ✓ the functions of the main components of the machine;
 - ✓ the sharpness of the blade and coolant flow;
 - ✓ the optimum working parameters for the type of material.
- Check that the quality of the cut is that required and that the final product does not have any machining defects.

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.

Monthly

This section lists the operations to be carried out for the monthly maintenance of the machine:

- ▶ check the perpendicularity of the blade to the work surface; if it is necessary to adjust the blade setting, follow the instructions set out in Chapter 7;
- ▶ check on blade orthogonality with respect to the workpiece rest shoulder; if adjustment is necessary, proceed as instructed in Chapter 7;
- ▶ check that the 0° notch on the work table is in line with the graduation on the turntable; if not, readjust by regulating the 0° stop; then re-check that the blade is perpendicular and orthogonal;
- ▶ check the precision of the 45° and 60° left stops and the 45° right stop; if out-of-set, adjust following the steps indicated in Chapter 7;
- ▶ check the state of the widia inserts and the blade steady button; replace if worn or chipped; check their positions and adjust if necessary (see Chapter 7);
- ▶ thoroughly clean the bottom of the water tank and the electropump filter;
- ▶ check oil level in the CCS optional hydraulic cylinder (Chapter 7).

Maintenance of working parts

In maintenance work on the **DM10–2**, special attention should be paid to operating units such as the blade tensioning cylinder, already dealt with in Chapter 7, topping up levels, the air treatment unit, the pneumatic vice on the MA version, and the optional CUT CONTROL SYSTEM. The transmission box equipping the machine needs no maintenance.

Consumable materials

Only specified oils must be used for the hydraulic and pneumatic and for lubricant/coolant devices. Below is a list of compatible oils for each of these circuits.

Oil for blade tensioner cylinder

The type of oil supplied with the machine is AGIP OSO 15, class F, ISO and UNI FD 22; The following are compatible or equivalent oils:

API Cis 22 – ARAL Dural SR 22 – CASTROL Hyspin AWS 22 – ESSO Spinesso 22 – IP Hydrus oil 22 – TOTAL Azolla ZS 22 – VALVOLINE ETC 22 – MOBIL Velocite oil D – Mobil DTE 22 – MOBIL ATF 220 – OLIO FIAT HTF 22 – Q8 Haydn 22 – SHELL Tellus oil 22 BP AUTRAN GM–MP;

Blade tensioner unit:

- | | |
|-----------------|---------|
| – tank capacity | Lt. 0.6 |
| – oil volume | Lt. 0.5 |

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 %

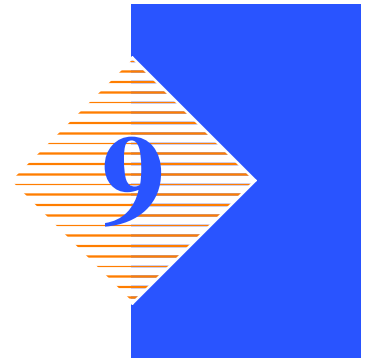
Oils for spray mist system (optional)

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

Cutting speed and choice of tools



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

When using the **DM10–2**, it is important to select the correct type of blade for the material to be cut. This chapter explains the limitations and specific applications of the different types of blades.

Cutting speed

Standard machine

The basic version with 2/4 pole motor, is provided with the following cutting speeds:

- 1st speed = 36m/min. (4 pole)
- 2nd speed = 72 m/min. (2 pole)

These speeds are selected using the polarity change switch situated on the control panel.

Machine with 4/8 pole motor (optional)

The machine can be provided with the optional 4/8 pole spindle motor, which supplies the following cutting speeds:

- 1st speed = 18 m/min. (8 pole)
- 2nd speed = 36 m/min. (4 pole)

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 technical 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 \pm 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 Motor protections Motor protections	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
	Thermal protection against overheating and overcurrents
	Protection integrated in the electronic speed control with I^2t calculation
	Protection integrated in the electronic speed control with I^2t calculation
Motor protections	Protection integrated in the electronic speed control with I^2t calculation

Choice of blade

When using band saws to cut metals, an important factor is the choice of pitch, i.e. the number of teeth per inch (25.4 mm.), which must be suitable for the workpiece material. The following recommendations may be taken as general guidelines:

- thin-walled materials, such as sheet steel, tubes and profiles require a fine pitch frequency. 3 to 6 teeth should be engaged in the breadth of the material at any one time;
- large section cutting requires a coarse pitch to cope with the higher volume of swarf and optimal tooth penetration;
- soft materials (aluminium alloys, soft bronze etc.) also require a coarse tooth pitch.

Saw tooth pitch

The choice of teeth per inch, therefore, depends on various factors:

- the size of the section;
- the hardness of the material;
- workpiece wall breadth.

Very large dimensions require coarse teeth, while small dimensions require finer teeth. Whatever the case, ensure that there are always at least six teeth engaged in the cut, with reference to the thinnest vertical walls positioned transversally to the blade.

Concerning the type of Shark machine, a first broad distinction can be made according to the hardness of materials:

	Mild steels < 61 HRB < 55 Kg/mm ²	Hard steels <> 65 HRB > 65 kg/mm ²
	NR. TEETH/INCH	NR. TEETH/INCH
MINIMUM	3 / 4	5 / 8
OPTIMUM	4 / 6	6 / 10
MAXIMUM	8 / 12	10 / 14

Cutting speed and downstroke speed

The cutting speed (m/min) and the downstroke speed (cm²/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/mm²), 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 cm²/min on normal steels), equal to a removed surface area of about 300 – 600 cm².

Types of swarf:

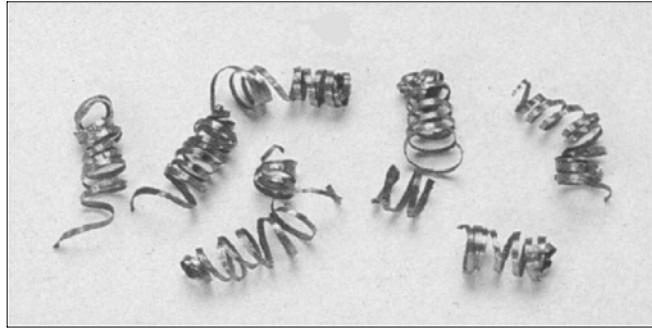
- Very fine or fragmented swarf indicates that the downstroke speed and/or cutting pressure is too low.



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

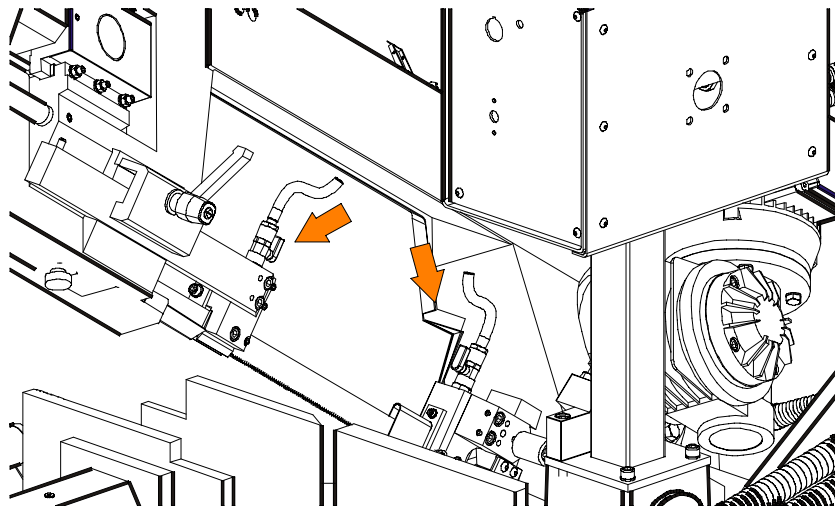


- Long coils of swarf indicate ideal cutting conditions.



Lubricant/coolant fluid

The lubricant/coolant fluid must ensure so that neither the saw teeth nor the work piece material in the cutting zone overheat. Furthermore, there must be a sufficient quantity and pressure of lubricant/coolant to remove swarf from the cutting zone. The lubricant/coolant fluid must be of the highest quality in order to prevent tooth abrasion and welding of swarf to the teeth themselves (seizing).

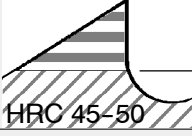
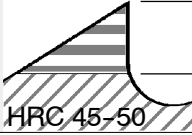


Blade structure

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.

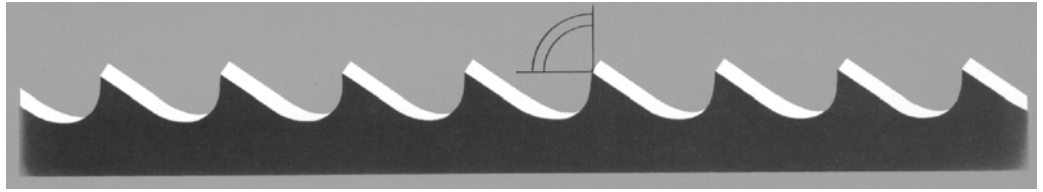
Blade types

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.

Conventional rake

Cutting angle 0° , constant pitch.

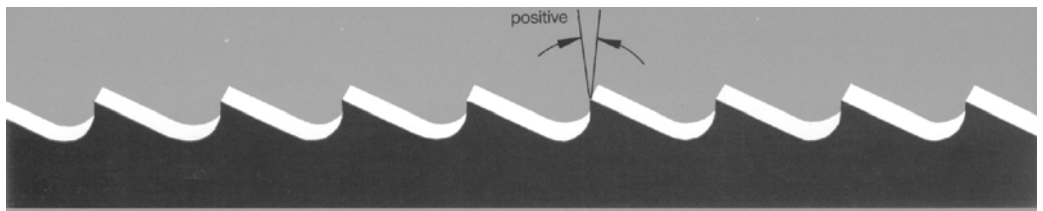


In general use, for small or medium section cast iron or steels and rolled materials, for straight or angled cuts.



Positive rake

Positive cutting angle $9-10^\circ$, constant pitch.

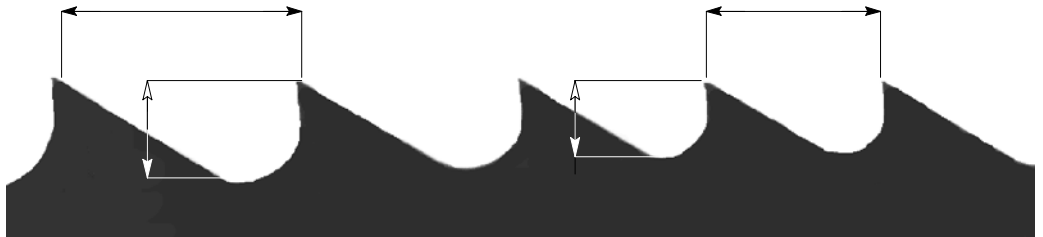


Can be used for cutting all types of materials, and is particularly suited to low-carbon and non-ferrous steels. Used for cutting very large sections and diameters.



Variable pitch

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

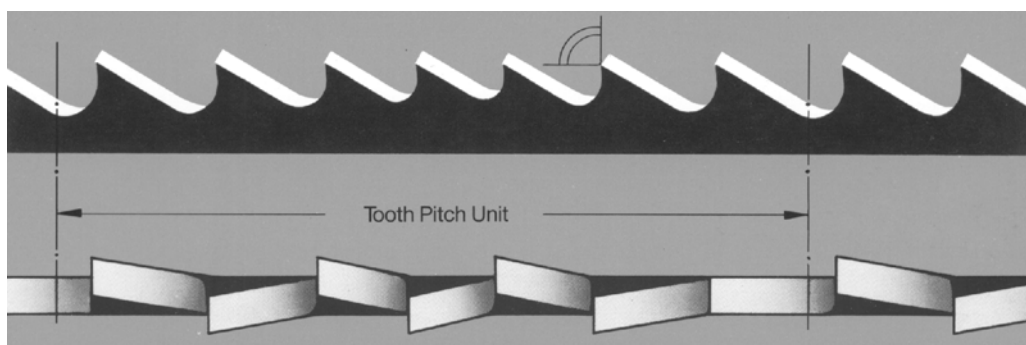


A further advantage in using these types of blades lies in the fact that a wide range of different material types and dimensions can be cut with the same blade.



Variable pitch blades with 0° cutting angle

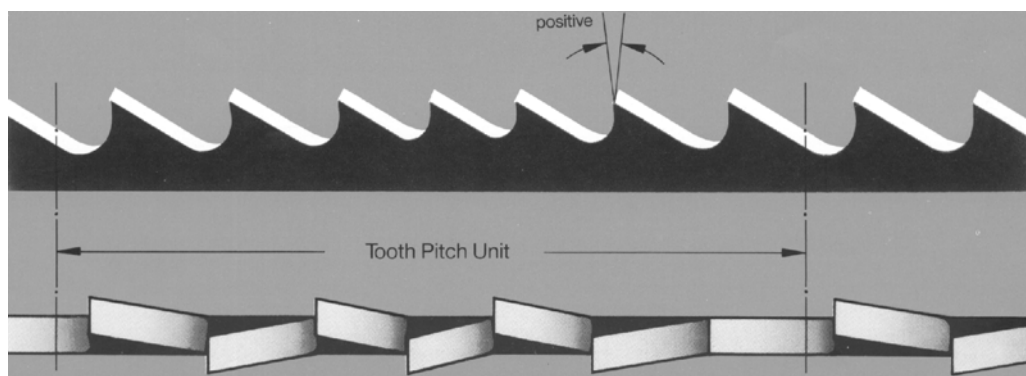
This type of tooth formation is ideal for cutting single pipes or medium size bundles, in accordance with the capacity of the machine.



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 played set

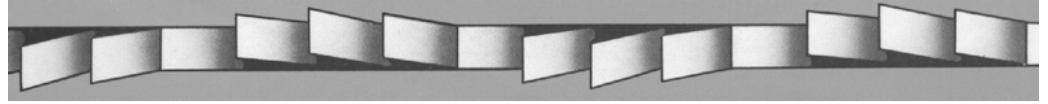
This term is used to describe an alternated angling of the teeth: one to the right, one to the left and one straight.



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

Undulated set

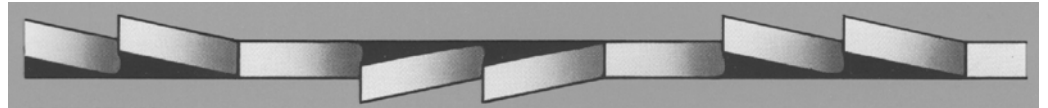
Used to describe groups of teeth undulating alternatively to the right and left.



This type of set is used with very fine teeth for cutting thin pipe walls and small-section profiles (from 1 to 3 mm).

Alternating grouped sets

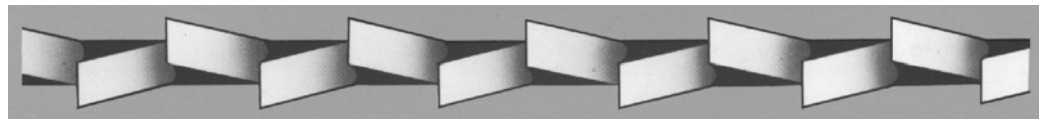
These are groups of teeth angled to the right, one straight tooth, then a further group angled to the left.



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

Alternating set

This set is one tooth to the right followed by one to the left.



This set is used for soft non-ferrous materials, plastics and wood.

Blade selection table relating to cutting speed and downstroke speed

		Dimensions of the cutting section S (mm)								
Cutting material	Cutting speed mt./min	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	8	6	4	3	Emulsible oil Cutting fluid	60 – 70	
		10	10 / 14	8	6	5 / 8	4			4 / 6
High-duty cast iron										
Rolled steel Spring steel	40 / 50	14	10 / 14	8	6	4	3	Emulsible oil	50 – 60	
		10	10 / 14	8	6	5 / 8	4			4 / 6
Alloy steel										
Tool steel Valve steel	30 / 40	14	10 / 14	8	6	4	3	Emulsible oil Cutting fluid	15 – 20	
		10	10 / 14	8	6	5 / 8	4			4 / 6
Stainless steel										
Nodular cast iron	30 / 40	14	10 / 14	8	6	4	3	Emulsible oil	15 – 20	
		10	10 / 14	8	6	5 / 8	4			4 / 6
Copper										
Soft bronze	90 / 150	14	10 / 14	6	5 / 8	3	3	Emulsible oil	75 – 90	
		10	10 / 14	6	5 / 8	4	4 / 6			3
Brass										
Hard bronze	90 / 300	14	10 / 14	6	5 / 8	3	3	Emulsible oil	80 – 90	
		10	10 / 14	6	5 / 8	4	4 / 6			3
Hard bronze	20 / 40	14	10 / 14	6	5 / 8	3	3	Emulsible oil	25 – 40	
Aluminium	80 / 800	14	10 / 14	4	4 / 6	3	3	Emulsible oil	70 – 80	
Plastics	90 / 400	14	10 / 14	4	4 / 6	3	3	Emulsible oil	80 – 90	
		Blade pitch							Number of teeth per inch	

Classification of steels

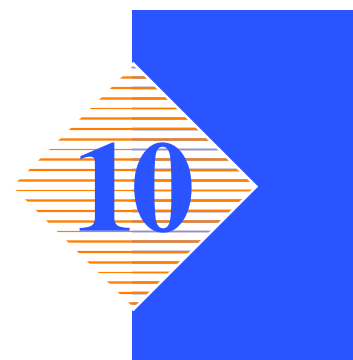
This page provides a table giving the user specific information on the cutting materials, in order that they can be classified on the basis of their hardness, and thus the correct tool can be selected for the task in hand.

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

Classification of steels

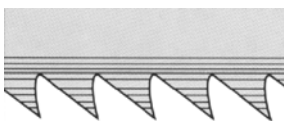
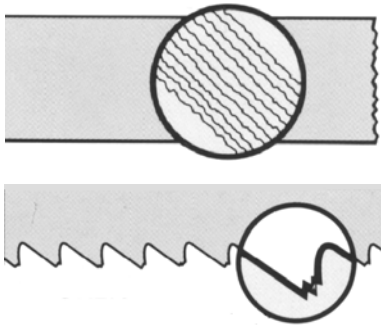
Material							
Carbon steels	1311 1572	1015 - 1035	C 22 - C 35 20 Mn 5 - 28 Mn 6 CK 22 - CK 50	050 A 20 080 M 46 - 50 120 M 19 150 M 28	C 15 - C 35 C 22 Mn C 28 Mn	XC 18 XC 38 H 1 20 M 5	
Carbon steels	1650 1880	1040 - 1064 1770 - 1880	CK 60 - CK 101 36 Mn 5 Cm 45 - Cm 55	060 A 40 - 060 A 96 070 M 55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


Troubleshooting

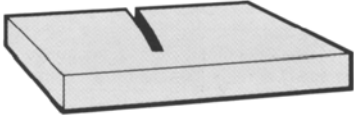
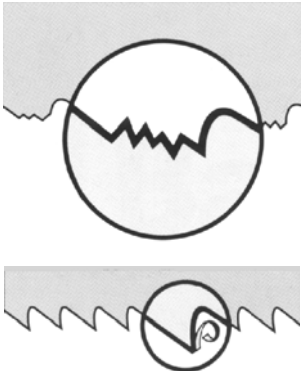


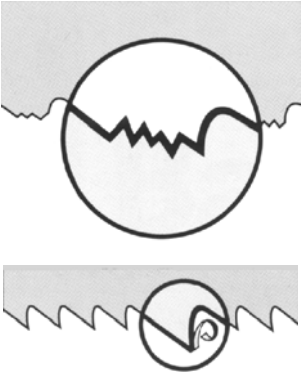
This chapter describes the inspection and troubleshooting procedures for the **DM10-2**. Regular inspections and efficient maintenance are essential to ensure your machine gives you a long, trouble-free service life. The chapter is divided into two sections: the first being dedicated specifically to **TROUBLESHOOTING BLADE AND CUTTING PROBLEMS**, while the second **TROUBLESHOOTING** section concerns troubleshooting general machine operating faults. Taken together they form a comprehensive troubleshooting guide which will enable you to follow a methodical procedure for solving any problem.

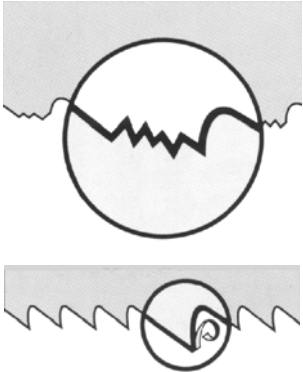
Troubleshooting blade and cutting problems


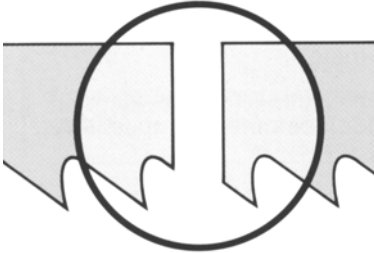
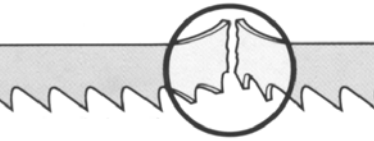

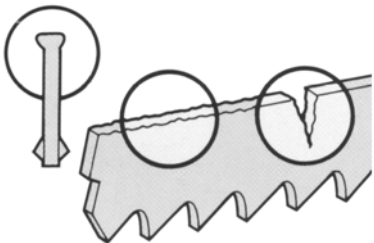
PROBLEM	PROBABLE CAUSE	SOLUTION
Blade scored or scratched 	▶ Widia inserts chipped or worn	☞ Replace
	▶ Widia inserts loose or tight	☞ Adjust
	▶ Widia inserts dirty	☞ Clean and re-adjust correctly
Cutting surfaces scored 	▶ Blade teeth worn	☞ Replace blade
	▶ Head downstroke speed too fast	☞ Reduce downstroke speed
	▶ Cutting speed too slow	☞ Increase cutting speed
	▶ Blade teeth too wide	☞ Change for wider teeth
	▶ Free blade guide head too far away	☞ Move blade guide head closer so as to leave only that part of the blade free which is needed to effect the cut
	▶ Blade tension low	☞ Reset tension to rated tension
	▶ Broken teeth on blade	☞ Check and replace blade

PROBLEM	PROBABLE CAUSE	SOLUTION
Rapid tooth wear 	<p>▶ Teeth pointing in the wrong direction</p>	<p>☞ Set teeth in correct direction</p>
	<p>▶ Blade worn in wrongly</p>	<p>☞ 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 cm² of work for hard cutting materials and about 1000 cm² for soft cutting materials) the cutting and downstroke speeds can be brought up to rated levels</p>
	<p>▶ Material too hard</p>	<p>☞ Check cutting speed, downstroke speed and blade pressure, as well as type of band saw being used</p>
	<p>▶ Material defective</p>	<p>☞ Surface defects: oxides, sand, surface hardening. Hardened inclusions in section. Reduce cutting and downstroke speeds or clean surface.</p>
	<p>▶ Cutting speed too high</p>	<p>☞ The teeth slide on the material without cutting: reduce cutting speed</p>
	<p>▶ Head downstroke speed too slow</p>	<p>☞ The band saw runs over the material without removing it: increase downstroke speed</p>
	<p>▶ Insufficient coolant</p>	<p>☞ Check coolant level and clean pipes and jets</p>
	<p>▶ Incorrect fluid concentration</p>	<p>☞ Check and use the correct concentration</p>
	<p>▶ New blade inserted into a partially-made cut</p>	<p>☞ 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</p>
	<p>▶ Flutter</p>	<p>☞ 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.</p>

PROBLEM	PROBABLE CAUSE	SOLUTION
Cuts not orthogonal or inclined 	<ul style="list-style-type: none"> Head downstroke speed too fast 	<ul style="list-style-type: none"> Reduce head downstroke speed
	<ul style="list-style-type: none"> Widia inserts worn 	<ul style="list-style-type: none"> Replace
	<ul style="list-style-type: none"> Inserts loose 	<ul style="list-style-type: none"> Adjust width
	<ul style="list-style-type: none"> Blade guide head positioned wrongly 	<ul style="list-style-type: none"> Move mobile head up to the workpiece using the guide plate to leave free only that part of the blade actually needed to make the cut
	<ul style="list-style-type: none"> Orthogonality of blade to workpiece rest shoulder 	<ul style="list-style-type: none"> Check and realign the blade guide heads, then reset the blade orthogonality with the shoulder using the adjustment pin at 0°; then set the stops at 45° right and left by means of the appropriate screws
	<ul style="list-style-type: none"> Perpendicularity of the blade to the work surface 	<ul style="list-style-type: none"> Check and realign the blade guide heads then adjust the blade using the appropriate screws so that it is perpendicular to the work surface
	<ul style="list-style-type: none"> Blade tension incorrect 	<ul style="list-style-type: none"> Bring pressure up to 60 Bar
	<ul style="list-style-type: none"> Blade worn 	<ul style="list-style-type: none"> Replace blade
	<ul style="list-style-type: none"> Tooth pitch unsuitable 	<ul style="list-style-type: none"> Probably a blade with too many teeth per inch is being used; change for a coarser blade
	<ul style="list-style-type: none"> Cutting speed too slow 	<ul style="list-style-type: none"> Increase the cutting speed
Broken teeth 	<ul style="list-style-type: none"> Cutting speed too high 	<ul style="list-style-type: none"> Reduce cutting speed
	<ul style="list-style-type: none"> Downstroke speed too high 	<ul style="list-style-type: none"> Reduce downstroke speed

PROBLEM	PROBABLE CAUSE	SOLUTION
Broken teeth 	<p>▶ Cutting pressure too high</p>	<p>☞ Check and set to correct pressure</p>
	<p>▶ Tooth pitch unsuitable</p>	<p>☞ Teeth too close together: change blade for one with a coarser tooth pitch</p>
	<p>▶ Swarf welded to teeth and gullets</p>	<p>☞ 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</p>
	<p>▶ Swarf welded to teeth and gullets</p>	<p>☞ 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.</p>
	<p>▶ Material defects</p>	<p>☞ 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.</p>
	<p>▶ Workpiece not clamped</p>	<p>☞ The blade may break if the workpiece moves during cutting: check the vice, jaws and clamping pressure</p>
	<p>▶ The blade stops in the cut</p>	<p>☞ 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.</p>
	<p>▶ New blade inserted in a partially made cut</p>	<p>☞ 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.</p>

PROBLEM	PROBABLE CAUSE	SOLUTION
Broken teeth 	<p>◆ Widia inserts positioned incorrectly</p>	<p>☞ Adjust the position of the inserts, especially the width, since blade thicknesses can exceed the manufacturer's declared tolerance ratings</p>
	<p>◆ Widia blade steady buttons</p>	<p>☞ Two widia blade steady buttons are located in the top of the blade guide heads which press on the back of the blade to transmit cutting pressure. If these buttons are too far from the blade, the blade may be prone to an up and down undulating action or abnormal vibrations, liable to cause the teeth to break: adjust the position of the heads by rotating them downwards so as to bring the blade steady buttons up against the back of the blade</p>
	<p>◆ Sections with large thickness variations</p>	<p>☞ The cutting speed and downstroke speed must be chosen to suit the most critical part of the cut</p>
	<p>◆ Teeth angled in the wrong direction</p>	<p>☞ Fit blade so that teeth point in the right direction</p>
	<p>◆ Blade run in wrongly</p>	<p>☞ When using a new blade, the cutting and downstroke speeds must be reduced to half the normal operating speed. After the blade has been worn in (about 300 cm² for hard materials and about 1000 cm² for soft materials) the cutting and downstroke speeds may be returned to their rated levels</p>
	<p>◆ Insufficient coolant</p>	<p>☞ Check coolant level and clean fluid lines and jets</p>
	<p>◆ Incorrect fluid concentration</p>	<p>☞ Check and use the correct concentration</p>
	<p>◆ Blade tension too high or too low</p>	<p>☞ Check and reset to rated tension</p>

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

PROBLEM	PROBABLE CAUSE	SOLUTION
	◆ Free blade guide head	✎ The head is too far away from the workpiece: move the head closer, leaving free only that part of the blade actually needed to make the cut
	◆ Teeth in contact with the material before starting the cut	✎ Always check the position of the blade before starting a new job, especially for the semi-automatic cycle
	◆ Widia inserts	✎ If worn, the inserts can score the blade, weakening it even to breaking point. If the inserts are too far apart, the blade will whip, striking both the inserts and the material. Replace or adjust
	◆ Insufficient coolant	✎ Check coolant fluid level; clean pipes and jets
	◆ Incorrect fluid concentration	✎ Check and use the correct concentration
	◆ The blade stops in the cut	✎ Cutting pressure too high: check pressure and reset to rated pressure. Head downstroke speed too fast: reduce. Head downstroke speed too slow: increase. The blade slips on the flywheels: incorrect or low blade tension; readjust or increase.

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
BMT not energised (Minimum Tension Coil)	▶ Electrical power supply	✎ Check: the phases; the cables; the plug; the socket.
	▶ BMT Reset switch	✎ Make sure that the minimum tension coil is energised when switch is turned from 0 to 1. If it is not, replace the switch.
	▶ Emergency stop pushbutton in	✎ Make sure the emergency stop button is released: turn it clockwise through 1/4 of a turn to release it.
Electropump is not working	▶ Electrical supply	✎ Check: phases, cables, plug, socket and fuse no. 5 in the electrical plant
	▶ No-return valve	✎ Clean, if blocked replace
	▶ Filter	✎ Clean
The pressure gauge does not give blade tension pressure	▶ Oil level	✎ Top up oil level in blade tensioner cylinder
	▶ Blocked connection	✎ Check for blockages
	▶ Broken	✎ If damaged, replace
Cutting vice will not close or will not open (MA version)	▶ VM: Cutting Vice Valve	✎ Make sure the valve is operating correctly, replace if necessary.
	▶ Vice cylinder	✎ Check that air is not leaking through the cylinder seals, by removing the hose (from the quick connector), where there is no pressurized air, and checking whether air escapes from the joint. If air is escaping, replace the seals or the entire cylinder.
	▶ Compressed air supply hose	✎ Check the hose is not kinked or blocked. Remove the obstruction.
	▶ Air treatment unit	✎ Check that the air treatment group is supplying the pressure shown on the gauge.

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

Accessory Installation

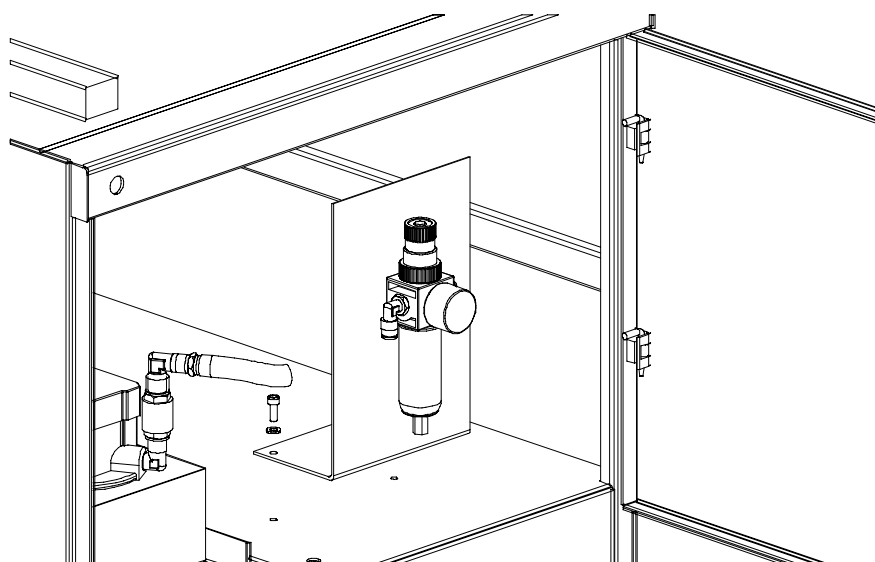


This chapter provides a list of the available accessories that can be fitted to this machine, along with assembly instructions.

Automatic vice kit

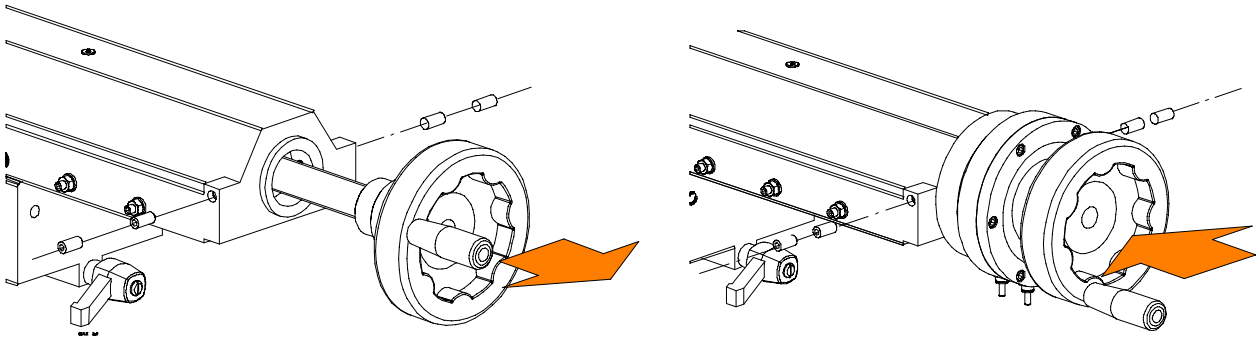
This pneumatic device can be activated by using the selector on the front of the machine base. The machine is set up for the passage of pneumatic pipes, for positioning the pneumatic selector, and for the maximum pressure valve on the air inlet, on the back of the base. To assemble the Automatic Vice, proceed as follows:

- drill two 5 mm holes as shown in the diagram, for fixing the support bracket for the air treatment unit;



- put the pneumatic valve in the base and fix it using the relevant ring nut;

- 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

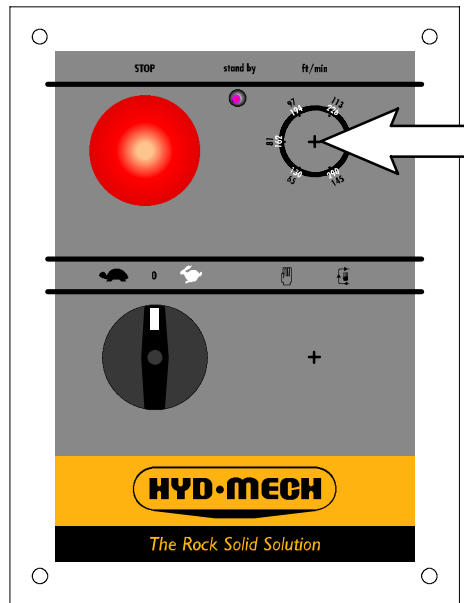
This accessory allows you to run a Semi-automatic / Dynamic work cycle as described in Chapter 5 of this manual.

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

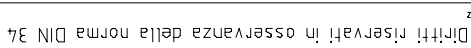
Electronic rpm variator (inverter)

This device provides a speed range of between 20 ÷ 90 m/min

- Open the door in the base and fix the inverter to the bottom, positioning it about 10 cm from the rear and right walls. Form two threaded holes for fixing the inverter casing.
- Drill a 22mm diameter hole in the back of the base near the existing three holes.
- Drill a 22 mm diameter hole in the back face of the control panel, being careful not to damage the electrical equipment inside.
- Drill an 11 mm diameter hole in the front of the control panel at the point fitted for the potentiometer, as shown in the diagram.



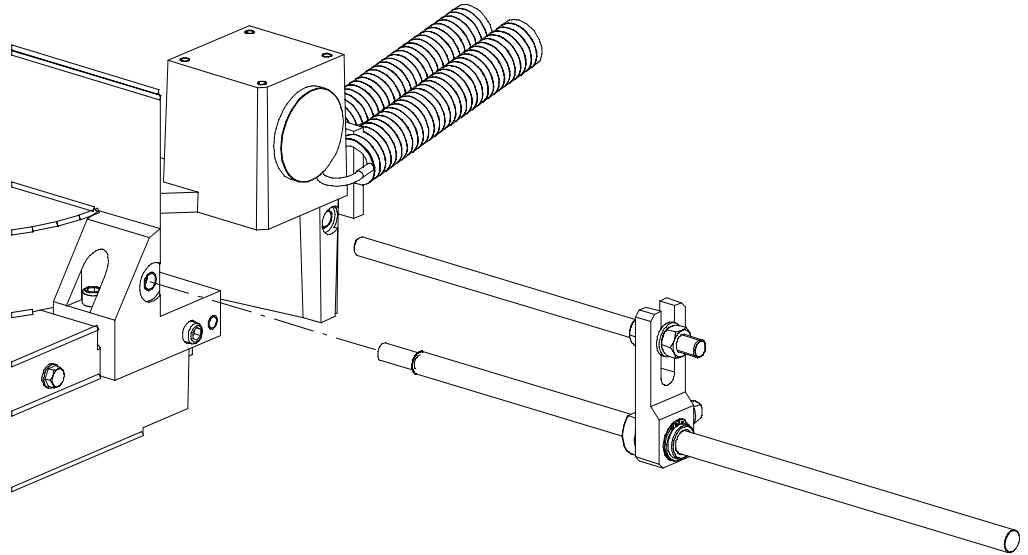
- Insert the cable clamps in the 22 mm holes.
- Pull the electric cables out of the base and feed them through the sheath and feed them into the control panel, then tighten the cable clamps.



Rod marked off in millimetres

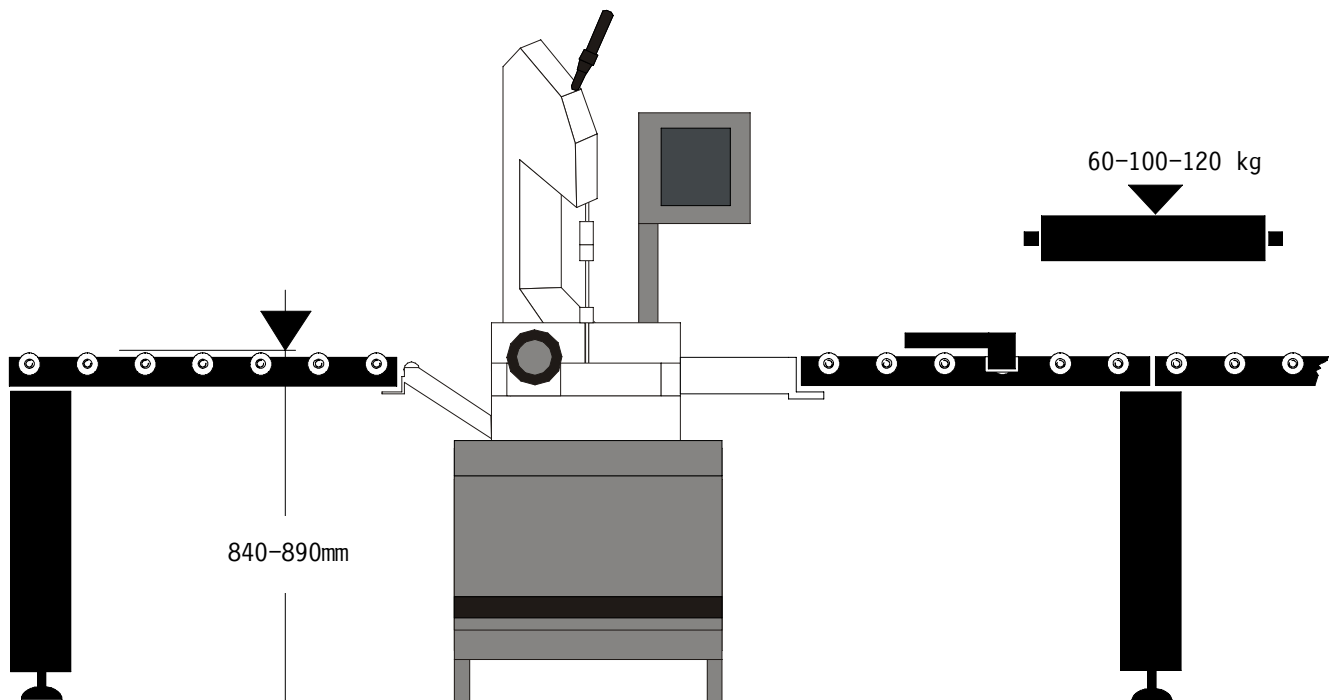
This device is used to measure the length of the pieces to be cut. To fit this accessory on the machine:

- screw the support for the rod marked off in millimetres to the existing seating on the discharge side of the fixed turntable as shown in the figure.



Roller table

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

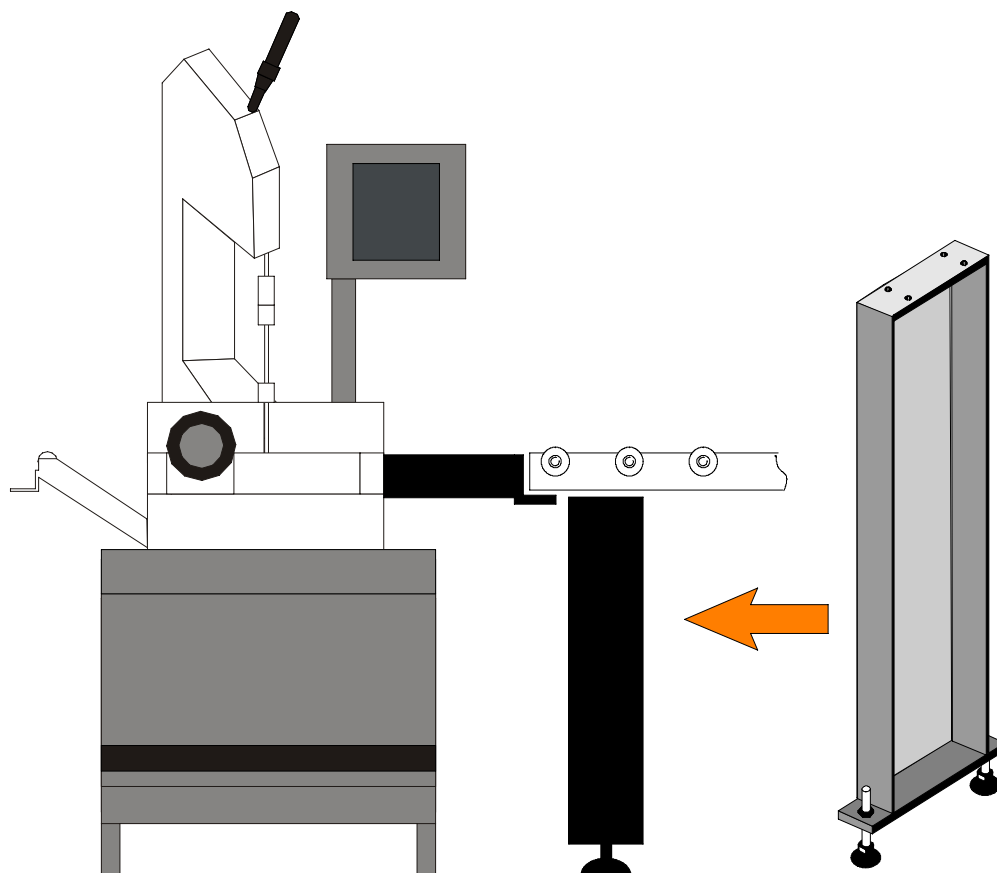


- K60/K100/K120 roller table for discharge side, 1500 ÷ 6000 mm;
- K60R/K100R roller table for discharge side, 1500 ÷ 6000 mm;
- To fit the roller loading platform on the loading side, the machine has a bar-support arm that one end of the roller-way can be positioned on and then screwed in place.
- To 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.

Support for the roller platform on the feeding/discharging side

This device is used to increase the load-bearing strength of the roller table, both during feeding and discharge. The steps which should be followed to assemble it are illustrated below.

- disconnect the table from the adapter (on the discharge side, for example);

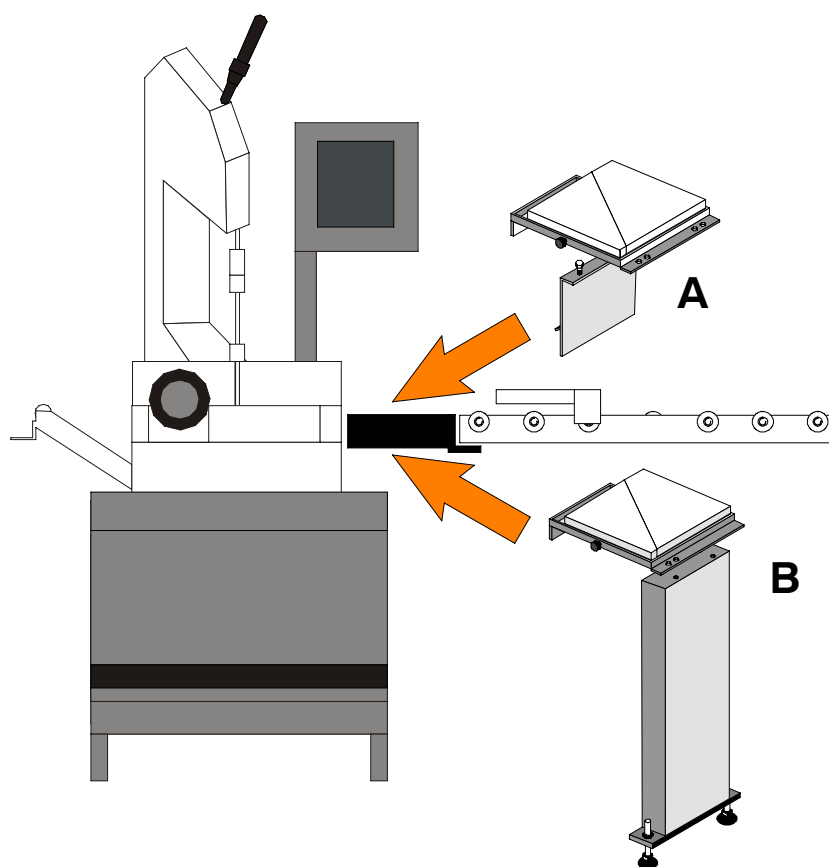


- Position the support to correspond with the holes on the base of the trailer and reconnect to the adapter.

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.

Warranty

Hyd–Mech Group warrants each new sawing machine to be free from failure resulting from defective material and workmanship under proper use and service for a period of one year following the date of shipment to the user.

Hyd–Mech’s sole obligation under this warranty is limited to the repair or replacement without charge, at Hyd–Mech’s factory, warehouse, or approved repair shop, of any part or parts which Hyd–Mech’s inspection shall disclose to be defective. Return freight must be prepaid by the user.

This warranty, in its entirety, does not cover maintenance items, including but not limited to lubricating grease and oils, filters, V–belts, saw blades, etc, nor any items herein which show sign of neglect, overloading, abuse, accident, inadequate maintenance or unauthorized altering.

Liability or obligation on the part of Hyd–Mech for damages, whether general, special or for negligence and expressly including any incidental and consequential damages is hereby disclaimed. Hyd–Mech’s obligation to repair or replace shall be the limit of its liability under this warranty and the sole and exclusive right and remedy of the user.

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This warranty may be not changed, altered, or modified in any way except in writing by Hyd–Mech Group.

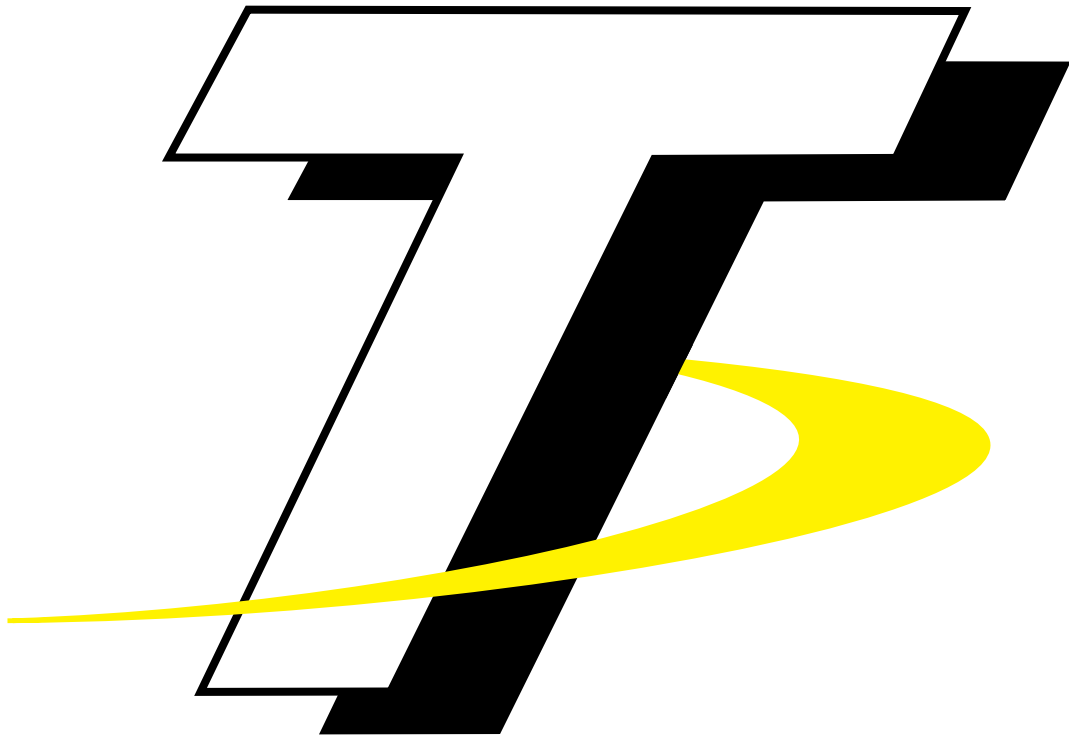
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