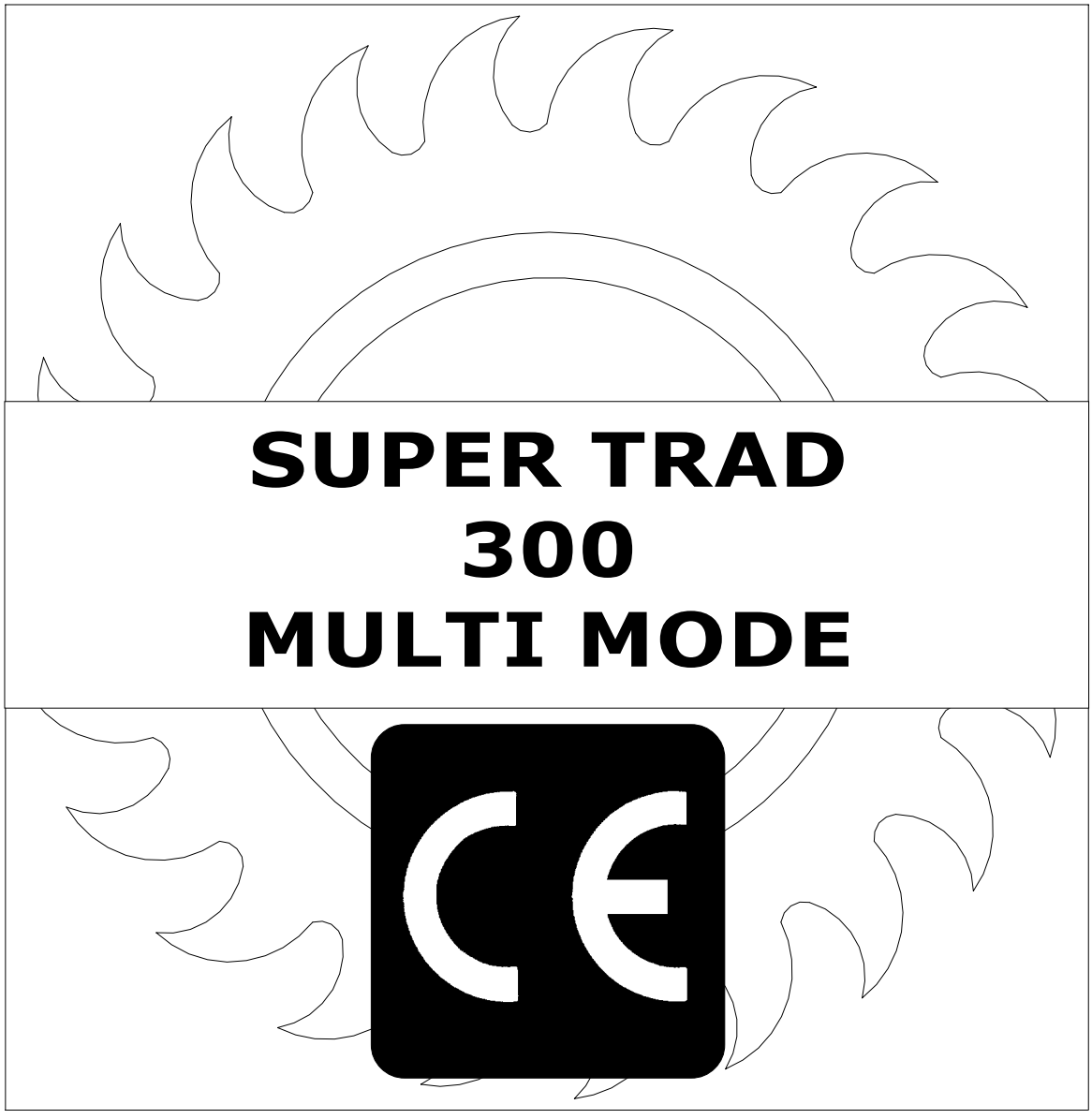
THOMAS

USE AND MAINTENANCE MANUAL



05/2004

THOMAS S.p.A. - Via Pasubio, 32 - 36033 Isola Vicentina (VI) - Telephone 0444 / 97.61.05 - Fax 0444 / 97.69.34

Contents

Ordering spare part

- When ordering spare parts you must state:
  MACHINE MODEL
  SERIAL NUMBER
  PART REFERENCE NUMBER

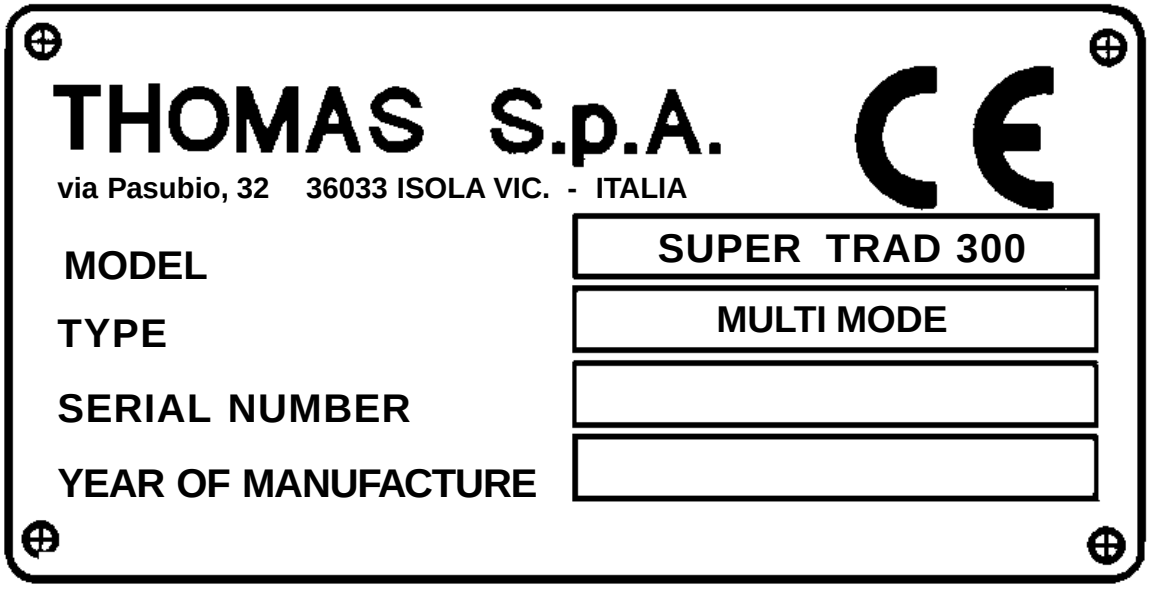
Without these references WE WILL NOT SUPPLY the spares. See point 10.1 - list of spare parts -

Guarantee

- The Company guarantees that the machine to which this manual refers has been designed and built to comply with safety regulations and that it has been tested for functionality in the factory.
- The machine is guaranteed for 12 months: the guarantee does not cover the electric motors, electric components, pneumatic components or any damage due to dropping or to bad machine management, the failure to observe maintenance standards or bad handling by the operator.
- The buyer has only the right to replacement of the faulty parts, while transport and packing costs are at his expense.
- The serial number on the machine is a primary reference for the guarantee, for after-sales assistance and for identifying the machine for any necessity.

Machine certification and identification marking

MACHINE LABEL



(Space reserved for the NAME and STAMP of the DEALER and/or IMPORTER)

1 REFERENCE TO ACCIDENT - PREVENTION REGULATIONS

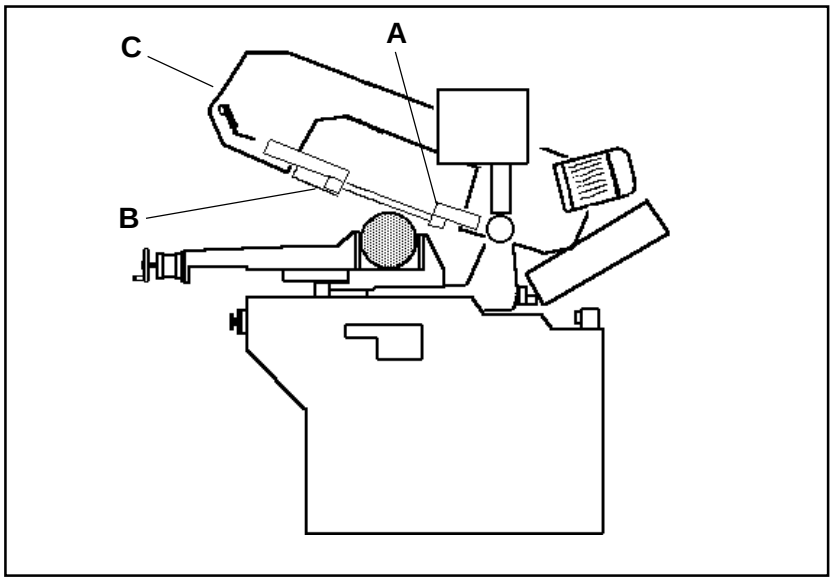
This machine has been built to comply with the national and community accident-prevention regulations in force. Improper use and/or tampering with the safety devices will relieve the manufacturer of all responsibility.

1.1 - Advice for the operator

- Check that the voltage indicated on the plate, normally fixed to the machine motor, is the same as the line voltage.
- Check the efficiency of your electric supply and earthing system; connect the power cable of the machine to the socket and the earth lead (yellow-green in colour) to the earthing system.
- When the saw frame is in suspend mode (up) the toothed blade must not move.
- Only the blade section used for cutting must be kept unprotected. Remove guarding by operating on the adjustable head.
- It is forbidden to work on the machine without its shields (these are all white, blue or grey in colour).
- Always disconnect the machine from the power socket before blade change or carrying out any maintenance job, even in the case of abnormal machine operation.
- It is forbidden to disconnect the "man present" device, known more correctly in the EEC as the " safety switch with hold-down action"
- Always wear suitable eye protection.
- Never put your hands or arms into the cutting area while the machine is operating.
- Do not shift the machine while it is cutting.
- Do not wear loose clothing with sleeves that are too long, gloves that are too big, bracelets, chains or any other object that could get caught in the machine during operation; tie back long hair.
- Keep the area free of equipment, tools or any other object.
- Perform only one operation at a time and never have several objects in your hands at the same time. Keep your hands as clean as possible.
- All internal and/or internal operations, maintenance or repairs, must be performed in a well-lit area or where there is sufficient light from extra sources so as to avoid the risk of even slight accidents.

1.2 - Location of shields against accidental contact with the tool

- Blue, grey right and left hand metal shields, fastened with screws onto the guide blade stationary head (Rif. A).
- Blue or grey metal shield fastened with screws onto the blade guide adjustable head, ensures covering of blade section not used in cutting operation (Rif. B).
- Grey metal guard, fastened with knobs onto the saw frame, to protect from flywheels (Rif. C).



1.3 - Electrical equipment according to Euro-pean Standard"CENELEC EN 60 204-1" which assimilates, with some integrating modifications, the publication "IEC 204-1"

- The electrical equipment ensures protection against electric shock as a result of direct or indirect contact. The active parts of this equipment are housed in a box to which access is limited by screws that can only be removed with a special tool; the parts are fed with alternating current at low voltage (24 V). The equipment is protected against splashes of water and dust.
- Protection of the system against short circuits is ensured by means of rapid fuses and earthing; in the event of motor overload, protection is provided by a thermal probe.
- In the event of a power cut, the specific start-up button must be reset.
- The machine has been tested in conformity with EN 60204.

1.4 - Emergencies according to European Standard "CENELEC EN 60 204-1"

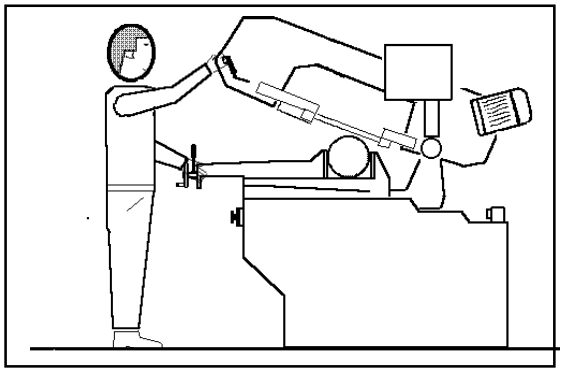
- In the event of incorrect operation or of danger conditions, the machine may be stopped immediately by pressing the red mushroom button.
- The casual or voluntary removal of the protection shield of the flywheels causes the stepping-in of a microswitch that automatically stops all machine functions.
- In case blade breaks, the tightening micro switch stops all machine functions.

NOTE: Resetting of machine operation after each emergency stop is achieved by reactivating the specific restart button.

2 RECOMMENDATIONS AND ADVICE FOR USE

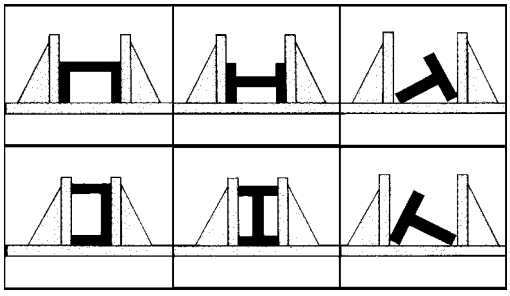
2.1 - Recommendations and advice for using the machine

- The machine has been designed to cut metal building materials, with different shapes and profiles, used in workshops, turner's shops and general mechanical structural work.
- For the use of the machine, one operator having basic technical knowledge should stand in the position shown here below:



- Before starting each cutting operation, ensure that the part is firmly gripped in the vice and that the end is suitably supported.

These figures show examples of suitable clamping of different section bars, bearing in mind the cutting capacities of the machine in order to achieve a good efficiency and blade durability.



- Do not use blades of a different size from those stated in the machine specifications.
- If the blade gets stuck in the cut, release the running button immediately, switch off the machine, open the vice slowly, remove the part and check that the blade or its teeth are not broken. If they are broken, change the tool.
- Check saw frame return spring to ensure proper balancing.
- Before carrying out any repairs on the machine, consult the dealer or apply to THOMAS.

3 TECHNICAL CHARACTERISTICS

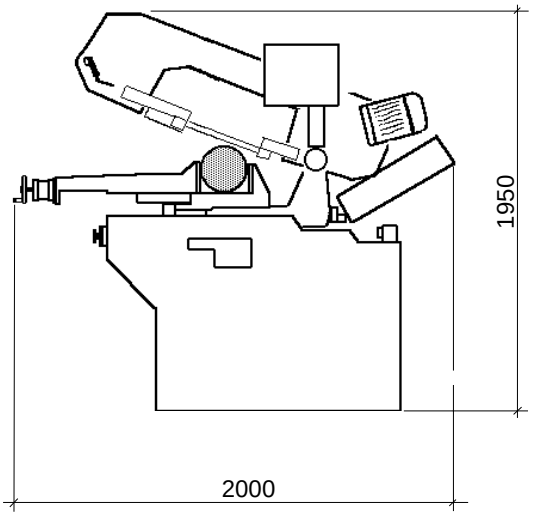
3.1 - Table of cutting capacity and technical details

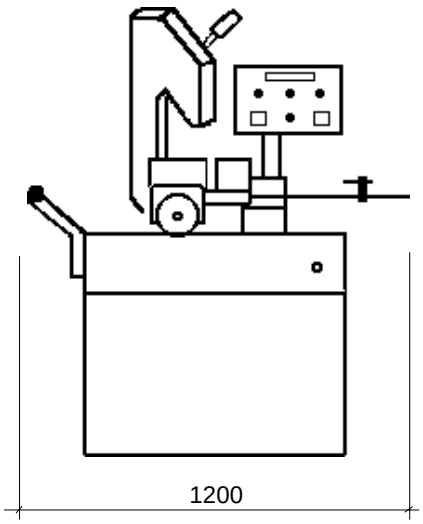
	○	□	▭
0°	255	250	300 x 200
45°	160	140	170 x 120
45° DX	190	180	190 x 170
60°	110	110	110 x 150

TECNICAL DATA		
BLADE MOTOR	Kw	1 - 1,4
COOLANT LIQUID MOTOR	Kw	0,07
BLADE DIMENSIONS	mm	2750 x 27 x 0,9
FLYWHEEL Ø	mm	300
CUTTING SPEED	m/1'	33 - 66
VICE OPENING	mm	305
SAWFRAME INCLINATION	°	30
WORKING TABLE HEIGHT	mm	940
MACHINE WEIGHT	Kg	440

4 MACHINE DIMENSIONS TRANSPORT INSTALLATION DISMANTLING

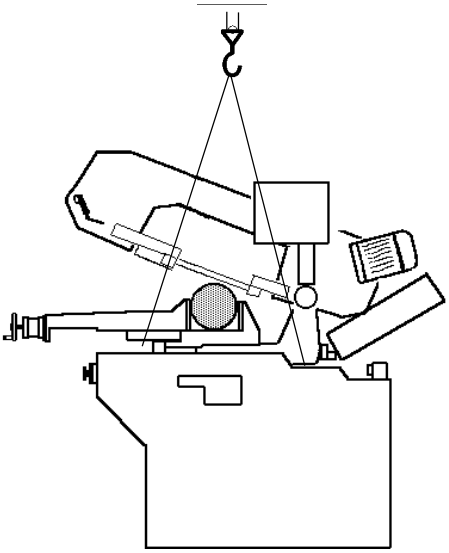
4.1 - Machine dimensions





4.2 - Transport and handling of the machine

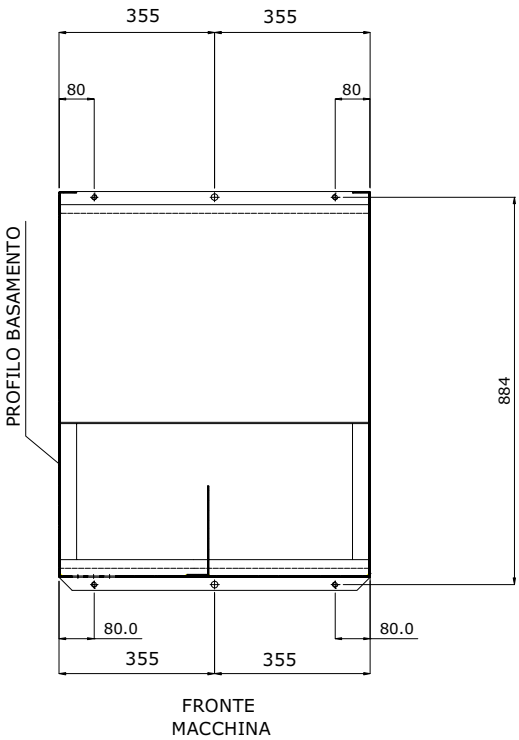
If the machine has to be shifted in its own packing, use a fork-lift truck or sling it with straps as illustrated.



4.3 - Minimum requirements for the premises housing the machine

- Mains voltage and frequency complying with the machine motor characteristics.
- Environment temperature from -10 °C to +50 °C.
- Relative humidity not over 90%.

4.4 - Anchoring the machine

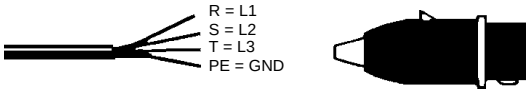


- Position the machine on a firm cement floor, maintaining, at the rear, a minimum distance of 1000 mm from the wall; anchor it to the ground as shown in the diagram, using screws and expansion plugs or tie rods sunk in cement, ensuring that it is sitting level.

4.5 - Instructions for electrical connection

- The machine is not provided with an electric plug, so the customer must fit a suitable one for his own working conditions:

1 - WIRING DIAGRAM FOR 4-WIRE SYSTEM FOR THREE-PHASE MACHINE - SOCKET FOR A 16A PLUG



4.6 - Instructions for assembly of the loose parts and accessories

Fit the components supplied:

- Mount bar-stop rod
- Mount and align the roll supporting arm as per the counter-vice table.
- Mount the metal protection against coolant splashing on the left side of the machine base.

4.7 - Disactivating the machine

- If the sawing machine is to be out of use for a long period, it is advisable to proceed as follows:

1) detach the plug from the electric supply panel
2) loosen blade
3) release the arch return spring
4) empty the coolant tank
5) carefully clean and grease the machine
6) if necessary, cover the machine.

4.8 - Dismantling
(because of deterioration and/or obsolescence)

General rules
If the machine is to be permanently demolished and/or scrapped, divide the material to be disposed of according to type and composition, as follows:
1) Cast iron or ferrous materials, composed of metal alone, are **secondary raw materials**, so they may be taken to an iron foundry for re-smelting after having removed the contents (classified in point 3);
2) electrical components, including the cable and electronic material (magnetic cards, etc.), fall within the category of material classified as being **assimilable to urban waste** according to the laws of the European community, so they may be set aside for collection by the public waste disposal service;
3) old mineral and synthetic and/or mixed oils, emulsified oils and greases are **special refuse**, so they must be collected, transported and subsequently disposed of by the old oil disposal service.

NOTE: since standards and legislation concerning refuse in general is in a state of continuous evolution and therefore subject to changes and variations, the user must keep informed of the regulations in force at the time of disposing of the machine tool, as these may differ from those described above, which are to be considered as a general guide line.

5 *MACHINE FUNCTIONAL PARTS*

5.1 - Operating head or saw frame

- Machine part consisting of the members that transfer the motion (gearmotor, flywheels), and tension/guide (blade-guides, blade tension slide) and lowering control (optional) of tool.

5.2 - Vice

- System fro clamping the material during the cutting operation, operated with approach handwheel and locking lever or by a pneumatic device (optional).

5.3 - Bed

- Support structure for the OPERATING HEAD OR SAW FRAME (rotating arm for gradual cutting, with respective blocking system), the ELECTRIC BOX, the VICE, the BAR STOP, the material support ROLLER and the housing for the cutting coolant TANK and pump.

6 DESCRIPTION OF THE OPERATING CYCLE

Before operating, all the main organs of the machine must be set in optimum conditions (see the chapter on "**Regulating the machine**").

6.1 - Starting up and cutting cycle

CUTTING CYCLE

- Manual vice locking;
- Manual sawframe downfeed;
- Manual sawframe lift;
- Manuale vice opening.

- Make sure the machine is not in emergency stop; if so, release the red mushroom push-button.
- Turn the blade tension Handwheel (2) clockwise untill the microswitch button (3) is pressed down.
- Select the cutting speed on switch (5):

  position 1 = 33 m/min
  position 2 = 66 m/min

  ATTENTION: Make sure that the vice has been positioned to the far right or left of the countervice to avoid accidental impact with the sawblade. Also make sure that the relevant lever has been locked *(also see Chapter **7** paragraph **7.3**)*.
- Place the piece to be cut inside the vice by moving jaw to about 3 - 4 mm and lock with lever (8 pag. 11).
- Strike the start/reset push-button (6).
- Turn the selector (4) to the desired function mode:

Cutting cycle selection

MANUAL MODE WITH DOWNFEED DAMPER

- As you turn the selector (4) to the left (see figure A), you can pull down the sawframe manually at the feed rate set on the regulator (9).
- If you want to approach the sawframe to the workpiece quickly (blade not started), press the button located on top of the trigger switch (6 - figure D); as you release the button, the sawframe stops.
- Press the trigger switch (7 - figure D) to start the blade and pull down the sawframe manually to cut the workpiece. The motor will stop automatically as soon as you release the trigger switch..
  Note: the sawframe return spring (8 - figure E) must be tensioned as much as to counterbalance the weight of the sawframe.

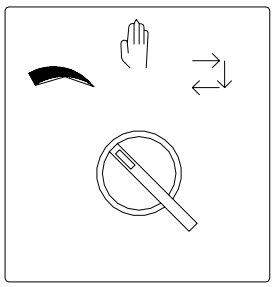
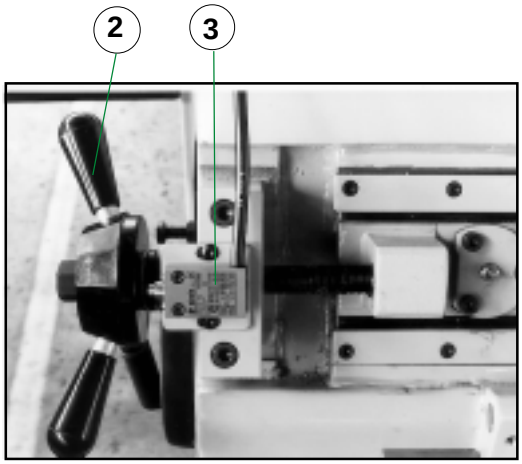
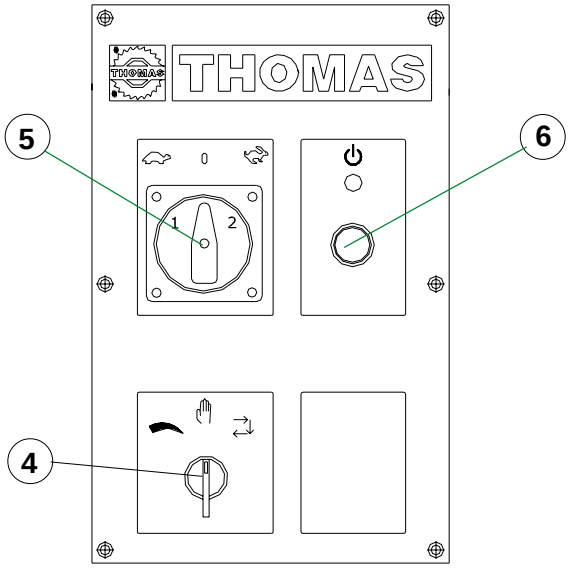
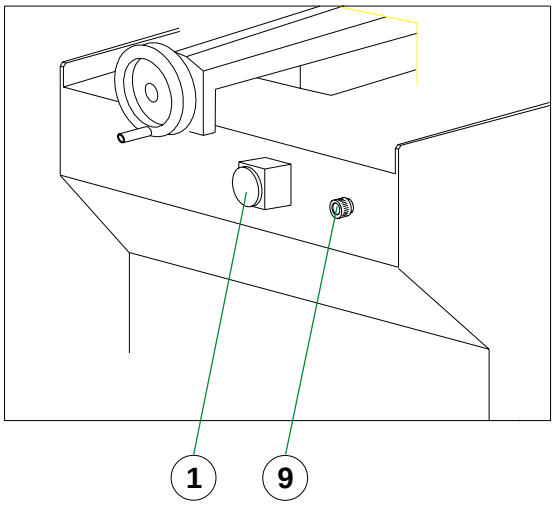


FIGURA A







MANUAL MODE

- Turn the selector (4) to the center (see figure B) to pull down the sawframe with no damping.
- Start the blade by pressing the trigger switch (7 - figure D) and pull down the sawframe to cut your workpiece. The motor will stop at the end of the cut as soon as you release the trigger switch..
  Note: the sawframe return spring (8 - figure E) must be tensioned as much as to counterbalance the weight of the sawframe.

FIGURE B

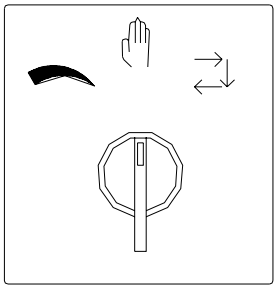
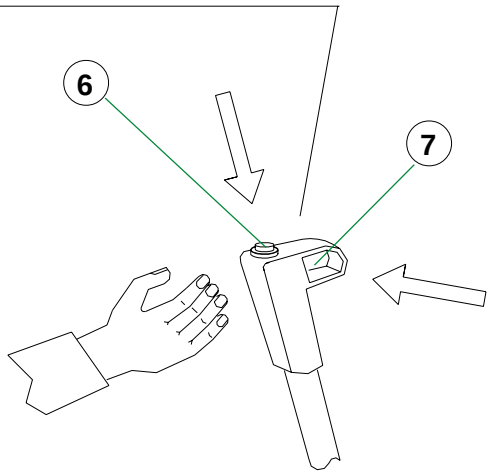


FIGURE D

Trigger switch



SELF DOWNFEED MODE

- As you turn the selector (4) to the right (see figure C), you allow the automatic sawframe downfeed.
- Release the tension of the spring (8 - figure E) by means of the relevant lever.
- You can approach the sawframe to the workpiece quickly by pressing the button (6 - figure D); we advise to approach the blade up to 10mm from the workpiece.
- Press the trigger switch (7 - figure D) to start the blade. The sawframe will feed down automatically to cut the workpiece. The motor will stop automatically at the end of the cut by a special endstroke microswitch.
- Adjust the sawframe downfeed rate on the regulator (9) according to the specifications of your workpiece.

FIGURE E

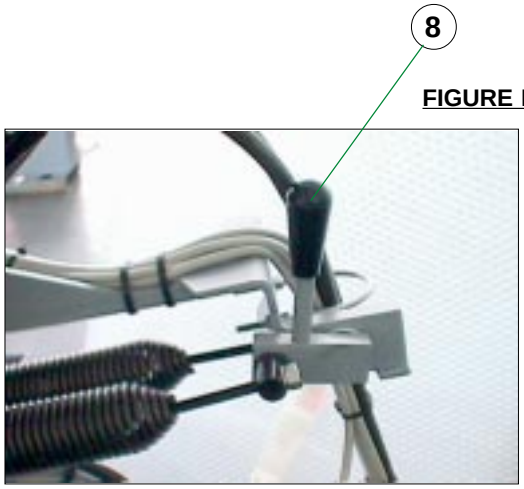
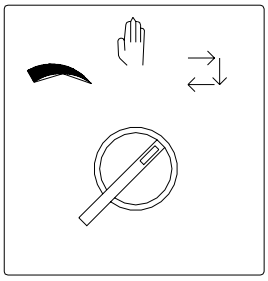
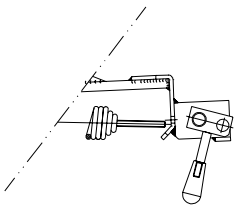
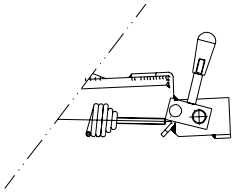


FIGURE C



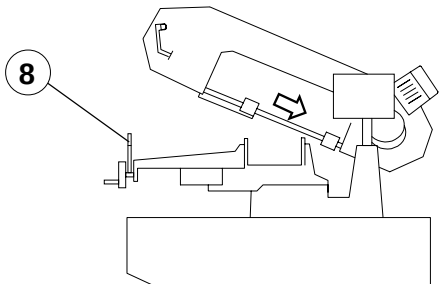


Tension spring position



Release spring position

- Once you selected the function mode (see paragraph 6.1), place the piece to be cut inside the vice by moving jaw to about 3 - 4 mm and lock with lever (8).
- Reach for handgrip (7) of the SAW FRAME control lever, strike the push-button and check that the blade is turning in the direction indicated (if not, invert the two phase leads);
- Make sure that the cooling liquid flows regularly.



Ne pas approcher les mains ou les bras à la zone de coupe quand la machine fonctionne.

Note: In case the saw is not used for a period of time, release the blade tension to avoid useless stress.

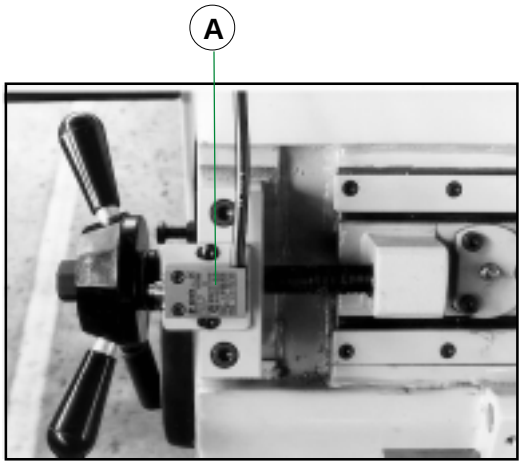
The band saw is now ready to start work, bearing in mind that the CUTTING SPEED and the TYPE of BLADE - combined with a suitable descent of the head - are of decisive importance for cutting quality and for machine performance (for further details on this topic, see below in the chapter on "**Material classification and blade selection**").

- **When starting to cut with a new blade, in order to safeguard its life and efficiency, the first two or three cuts must be made while exerting a slight pressure on the part, so that the time taken to cut is about double the normal time** (see below in the chapter on "**Material classification and blade selection**" in the section on *Blade running-in*).
- Press the red emergency button (1) when there are conditions of danger or malfunctions in general, so as to stop machine operation immediately.

7 REGULATING THE MACHINE

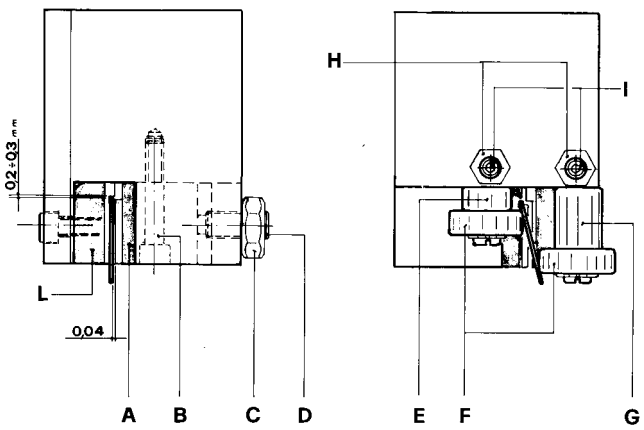
7.1 - Blade tension assembly

The ideal tension of the blade is achieved rotating the handwheel until it stops against the microswitch button (A).
WARNING: the projection of the microswitch is factory set during inspection, after having tightened the blade on the lengthening values indicated by its manufacturer as per specific dimensions set with the help of a special gauge. If, when replacing the blade, the thickness and the width differ, it will be necessary to correct the projection of the microswitch. For this purpose we suggest to strictly select blades having the same features as the ones mounted originally.



7.2 - Blade guide blocks

The blade is guided by means of adjustable pads set in place during inspection as per the thickness of the blade with minimum play as shown in the figure.

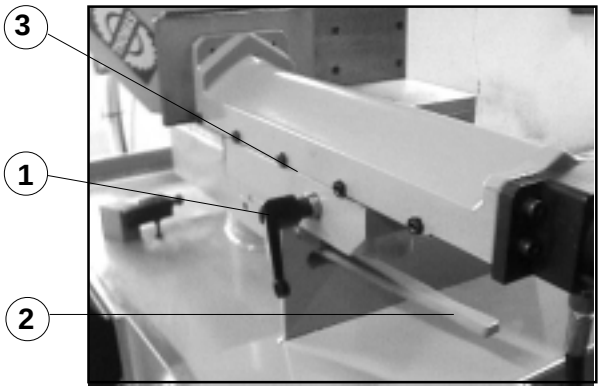


In case the blade needs to be replaced, make sure to always install 0.9 mm thick blades for which the blade guide pads have been adjusted. In the case of toothed blades with different thicknesses adjustment should be carried out as follows:

- Loosen nut (C), screw (B) and loosen dowel (D) widening the passage between the pads.
- Loosen the nuts (H) and the dowels (I) and rotate the pins (E - G) to widen the passage between the bearings (F).
- Mount the new blade, place the pad (A) on the blade and, loosening the dowel, allow a play of 0.04 mm for the sliding of the toothed blade; lock the relative nut and screw (B):
- Rotate the pins (E - G) until the bearings rest against the blade as indicated in the figure and then secure the dowels (I) and nut (H).
- Make sure that between the blade and the upper teeth of the pad (L) this is at least 0.2 - 0.3 mm of play; if necessary, loosen the screws that fasten the blocks and adjust accordingly.

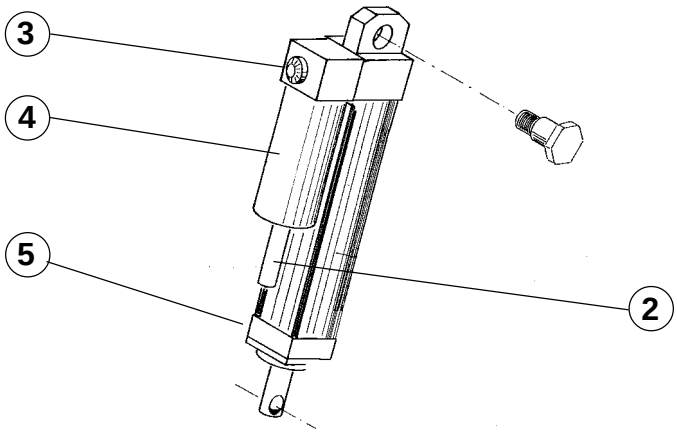
7.3 - Vice

- The vice can be positioned either to the right or to the left of the blade. Tight Lever (**2**) after positioning the vice to the far right/left. The vice can slide very quickly by meand of the handle (**1**); in case the the vice moves too loose along the guide, tight the screws (**3**).
- Approach the vice jaw allowing **3-4** mm clearance between jaw and material.



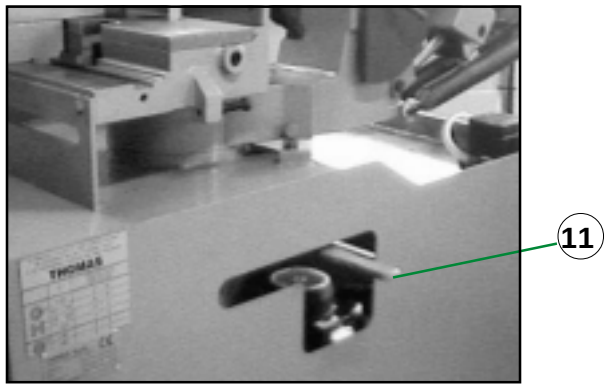
7.4 - Saw frame lowering control device

It is an accessory, ideal for the cutting of thin or STAINLESS STEEL section bars, that determines a constant lowering and consequently a good efficiency of the blade throughout the work phase. By adjusting the ring nut on the base (9), this device can be accommodated to the different situations and applications. Defectiveness in the control of the lowering may be caused by the drop in braking power of the device due to the long-term blow-by of the braking fluid.
Push rod (2) back into its seat and loosen plug (3). Use recommended oil to top up oil tank (4) with the help of a syringe-type pump. Bleed air, after having tightened plug (3) and loosen screw (5) lightly until a little oil drip out; when this has been completed, secure the screw.
Use SHELL HYDRAULIC OIL 32 or similar.



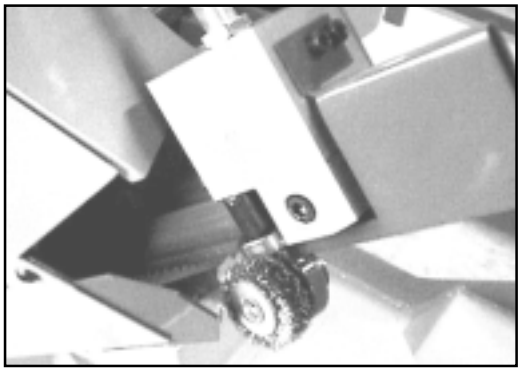
7.5 - Cutting angle adjustment

- Unlock lever (11) and rotate the saw frame arm until you reach mechanical stop and check if the index corresponds to 45°; if not operate on the set screws to make measures meet.



7.6 - Blade cleaning brush

It is an ideal accessory for the cleaning of the blade during the cutting cycle. Periodically check the condition of the brush and if necessary proceed to further adjustment to ensure cleaning of the blade.



BEFORE PERFORMING THE FOLLOWING OPERATIONS, THE ELECTRIC POWER SUPPLY AND THE POWER CABLE MUST BE COMPLETELY DISCONNECTED.

7.7 - Changing the blade

To change the blade:
- Lift the saw frame.
- Loosen the blade with the handwheel, remove the mobile blade-guard cover, open the flywheel guards and remove the old blade from the flywheels and the blade guide blocks.
- Assemble the new blade by placing it first between the pads and then on the race of the flywheels, paying particular attention to the cutting direction of the teeth.
- Tension the blade and make sure it perfectly fits inside the seat of the flywheels.
- Assemble the mobile blade-guide enf the flywheel guard and fasten it with the relative knobs. Check that the safety microswitch is activated otherwise when electric connection will be restored the machine will not start.

WARNING: always assemble blades having dimensions specified in this manual and for which the blade guide heads have be set: otherwise, see chapter on “Description of the operating cycle” in the section Starting-up.

7.8 - Replacing saw frame return spring

- When performing this operation it is necessary to keep saw frame up using the lifting device.
- Replace the spring by loosening the upper coupling rod and releasing it from the lower tie-rod.

RELY ON SKILLED AND QUALIFIED PERSONNEL TO REPLACE OTHER MACHINE MEMBERS SUCH AS REDUCTION UNIT OR VARIATOR, PUMP MOTOR AND ELECTRICAL COMPONENTS.

8 *ROUTINE AND SPECIAL MAINTENANCE*

THE MAINTENANCE JOBS ARE LISTED BELOW, DIVIDED INTO DAILY, WEEKLY, MONTHLY AND SIX-MONTHLY INTERVALS. IF THE FOLLOWING OPERATIONS ARE NEGLECTED, THE RESULT WILL BE PREMATURE WEAR OF THE MACHINE AND POOR PERFORMANCE.

8.1 - Daily maintenance

- General cleaning of the machine to remove accumulated shavings.
- Clean the lubricating coolant drain hole to avoid excess fluid.
- Top up the level of lubricating coolant.
- Check blade for wear.
- Rise of saw frame to top position and partial slackening of the blade to avoid useless yield stress.
- Check functionality of the shields and emergency stops.

8.2 - Weekly maintenance

- More accurate general cleaning of the machine to remove shavings, especially from the lubricant fluid tank.
- Removal of pump from its housing, cleaning of the suction filter and suction zone.
- Clean the filter of the pump suction head and the suction area.
- Cleaning with compressed air the blade guide heads (guide bearings and drain hole of the lubricating cooling).
- Cleaning flywheel housings and blade sliding surfaces on flywheels.

8.3 - Monthly maintenance

- Check the tightening of the motor flywheel screws.
- Check that the blade guide bearings on the heads are perfect running condition.
- Check the tightening of the screws of the gearmotor, pump and accident protection guarding.

8.4 - Six-monthly maintenance

- Continuity test of the equipotential protection circuit.

8.5 - Maintenance of the operating machine members

The worm drive gear box mounted on the machine is maintenance-free guaranteed by its manufacture.

8.6 - Oils for lubricating coolant

Considering the vast range of products on the market, the user can choose the one most suited to his own requirements, using as reference the type SHELL LUTEM OIL ECO.
THE MINIMUM PERCENTAGE OF OIL DILUTED IN WATER IS 8 - 10 %.

8.7 - Oil disposal

The disposal of these products is controlled by strict regulations. Please see the Chapter on “**Machine dimensions - Transport - Installation**” in the section on *Dismantling*.

8.8 - Special maintenance

Special maintenance operations must be carried out by skilled personnel. However, we advise contacting THOMAS or their dealer and/or importer. Also the reset of protective and safety equipment and devices, of the reducer, the motor, the motor pump and electric components is to be considered extraordinary maintenance.

9 MATERIAL CLASSIFICATION AND CHOICE OF TOOL

Since the aim is to obtain excellent cutting quality, the various parameters such as **hardness of the material, shape and thickness, transverse cutting section** of the part to be cut, **selection of the type of cutting blade, cutting speed** and **control of saw frame lowering**.These specifications must therefore be harmoniously combined in a single operating condition according to practical considerations and common sense, so as to achieve an optimum condition that does not require countless operations to prepare the machine when there are many variations in the job to be performed.The various problems that crop up from time to time will be solved more easily if the operator has a good knoledge of these specifications.
WE THEREFORE RECOMMEND YOU TO ALWAYS USE GENUINE SPARE BLADES THAT GUARANTEE SUPERIOR QUALITY AND PERFORMANCE.

9.1 - Definition of materials

The table at the foot of the page lists the characteristics of the materials to be cut, so as to choose the right tool to use.

9.2 - Selecting blade

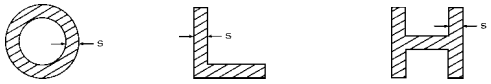
First of all the pitch of the teeth must be chosen, in the other words, the number of teeth per inch (25,4 mm) suitable for thematerial to be cut, according to these criteria:
- parts with a thin and/or variable section such as profiles, pipes and plate, need close toothing, so that the number of teeth used simultaneously in cutting is from 3 to 6;
- parts with large transverse sections and solid sections need widely spaced toothing to allow for the greater volume of the shavings and better tooth penetration;
- parts made of soft material or plastic (light alloys, mild bronze, teflon, wood, etc.) also require widely spaced toothing;
- pieces cut in bundles require combo tooth design.

9.3 - Teeth pitch

As already stated, this depends on the following factors:
- **hardness of the material**
- **dimensions of the section**
- **thickness of the wall.**

BLADE TEETH SELECTION TABLE

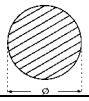
THICKNESS MM	Z CONTINUOUS TOOTH DESIGN	Z COMBO TOOTH DESIGN
TILL 1.5	14	10/14
FROM 1 TO 2	8	8/12
FROM 2 TO 3	6	6/10
FROM 3 TO 5	6	5/8
FROM 4 TO 6	6	4/6
MORE THAN 6	4	4/6



S = THICKNESS

TYPES OF STEEL						CHARACTERISTICS		
USE	I UNI	D DIN	F AF NOR	GB SB	USA AISI-SAE	Hardness BRINELL HB	Hardness ROCKWELL HRB	R=N/mm²
Construction steels	Fe360 Fe430 Fe510	St37 St44 St52	E24 E28 E36	---- 43 50	---- ---- ----	116 148 180	67 80 88	360÷480 430÷560 510÷660
Carbon steels	C20 C40 C50 C60	CK20 CK40 CK50 CK60	XC20 XC42H1 ---- XC55	060 A 20 060 A 40 ---- 060 A 62	1020 1040 1050 1060	198 198 202 202	93 93 94 94	540÷690 700÷840 760÷900 830÷980
Spring steels	50CrV4 60SiCr8	50CrV4 60SiCr7	50CV4 ----	735 A 50 ----	6150 9262	207 224	95 98	1140÷1330 1220÷1400
Alloyed steels for hardening and tempering and for nitriding	35CrMo4 39NiCrMo4 41CrAlMo7	34CrMo4 36CrNiMo4 41CrAlMo7	35CD4 39NCD4 40CADG12	708 A 37 ---- 905 M 39	4135 9840 ----	220 228 232	98 99 100	780÷930 880÷1080 930÷1130
Alloyed casehardening steels	18NiCrMo7 20NiCrMo2	---- 21NiCrMo2	20NCD7 20NCD2	En 325 805 H 20	4320 4315	232 224	100 98	760÷1030 690÷980
Alloyed for bearings	100Cr6	100Cr6	100C6	534 A 99	52100	207	95	690÷980
Tool steel	52NiCrMoKU C100KU X210Cr13KU 58SiMo8KU	56NiCrMoV7C100K C100W1 X210Cr12 ----	---- ---- Z200C12 Y60SC7	---- BS 1 BD2-BD3 ----	---- S-1 D6-D3 S5	244 212 252 244	102 96 103 102	800÷1030 710÷980 820÷1060 800÷1030
Stainless steels	X12Cr13 X5CrNi1810 X8CrNi1910 X8CrNiMo1713	4001 4301 ---- 4401	---- Z5CN18.09 ---- Z6CDN17.12	---- 304 C 12 ---- 316 S 16	410 304 ---- 316	202 202 202 202	94 94 94 94	670÷885 590÷685 540÷685 490÷685
Copper alloys Special brass Bronze	Aluminium copper alloy G-CuAl11Fe4Ni4 UNI 5275 Special manganese/silicon brass G-CuZn36Si1Pb1 UNI5038 Manganese bronze SAE43 - SAE430 Phosphor bronze G-CuSn12 UNI 7013/2a					220 140 120 100	98 77 69 56,5	620÷685 375÷440 320÷410 265÷314
Cast iron	Gray pig iron G25 Spheroidal graphite cast iron GS600 Malleable cast iron W40-05					212 232 222	96 100 98	245 600 420

SOLID Ø OR L MM	Z CONTINUOUS TOOTH DESIGN	Z COMBO TOOTH DESIGN
TILL 30	8	5/8
FROM 30 TO 60	6	4/6
FROM 40 TO 80	4	4/6
MORE THAN 90	3	3/4



Ø = DIAMETER L = WIDTH

9.4 - Cutting and advance speed

The cutting speed (m/min) and the advance speed (cm^2/min = area travelled by the disk teeth when removing shavings) are limited by the development of heat close to the tips of the teeth.
- The cutting speed is subordinate to the resistance of the material (R = N/mm^2), to its hardness (HRC) and to the dimensions of the widest section.
- Too high an advance speed (= lowering of the saw frame) tends to cause the disk to deviate from the ideal cutting path, producing non rectilinear cuts on both the vertical and the horizontal plane.

The best combination of these two parameters can be seen directly examining the chips.

Long spiral-shaped chips indicate ideal cutting.

Very fine or pulverized chips indicate lack of feed and/or cutting pressure.

Thick and/or blue chips indicate overload of the blade.

9.5 - Blade running-in

When cutting for the first time, it is good practice to run in the tool making a series of cuts at a low advance speed (= 30-35 cm^2/min on material of average dimensions with respect to the cutting capacity and solid section of normal steel with R = 410-510 N/mm^2), **generously spraying the cutting area with lubricating coolant.**

9.6 - Blade structure

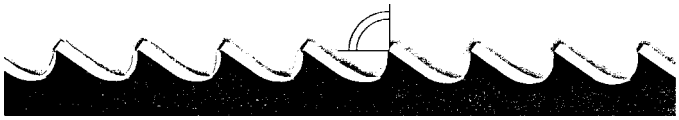
Bi-metal blades are the most commonly used. They consist in a silicon-steel blade backing with electron beam or laser welded high speed steel (HHS) cutting edge. The type of stocks are classified in M2, M42, M51 and differ from each other because of their major hardness due to the increasing percentage of Cobalt (Co) and molybdenum (Mo) contained in the metal alloy.

9.7 - Blade type

They differ essentially in their constructive characteristics, such as:
- **shape** and cutting **angle** of tooth
- **pitch**
- **set**

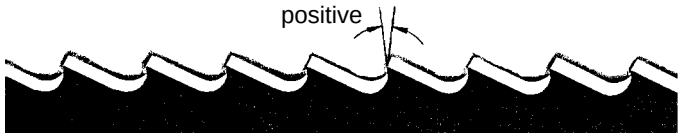
Shape and angle of tooth

REGULAR TOOTH: 0° rake and constant pitch.



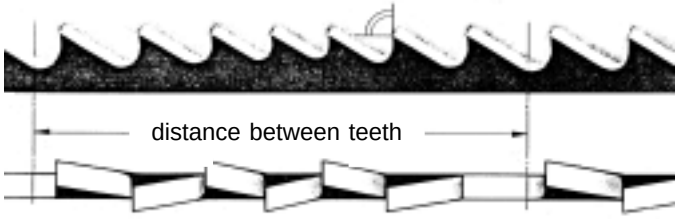
Most common form for transversal or inclined cutting of solid small and average cross-sections or pipes, in laminated mild steel and grey iron or general metal.

POSITIVE RAKE TOOTH: 9° - 10° positive rake and constant pitch.



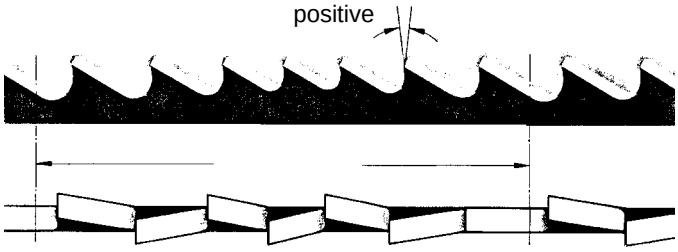
Particular use for crosswise or inclined cuts in solid sections or large pipes, but above all harder materials (highly alloyed and stainless steels, special bronze and forge pig).

COMBO TOOTH: pitch varies between teeth and consequently varying teeth size and varying gullet depths. Pitch varies between teeth which ensures a smoother, quieter cut and longer blade life owing to the lack of vibration.



Another advantage offered in the use of this type of blade in the fact that with an only blade it is possible to cut a wide range of different materials in size and type.

COMBO TOOTH: 9° - 10° positive rake.



This type of blade is the most suitable for the cutting of section bars and large and thick pipes as well as for the cutting of solid bars at maximum machine capacity. Available pitches: 3-4/4-6.

Set

Saw teeth bent out of the plane of the saw body, resulting in a wide cut in the workpiece.

REGULAR OR RAKER SET: Cutting teeth right and left, alternated by a straight tooth.

Of general use for materials with dimensions superior to 5 mm. Used for the cutting of steel, castings and hard nonferrous materials.

WAVY SET: Set in smooth waves.

This set is associated with very fine teeth and it is mainly used for the cutting of pipes and thin section bars (from 1 to 3 mm).

ALTERNATE SET (IN GROUPS): Groups of cutting teeth right and left, alternated by a straight tooth.

This set is associated with very fine teeth and it is used for extremely thin materials (less than 1 mm).

ALTERNATE SET (INDIVIDUAL TEETH): Cutting teeth right and left.

This set is used for the cutting of nonferrous soft materials, plastics and wood.

9.7.1 - RECOMMENDED CUTTING PARAMETERS

STEEL	CUTTING SPEED	LUBRICATION
CONSTRUCTION	60/80	EMULSIFIABLE OIL
CEMENTATION	40/50	EMULSIFIABLE OIL
CARBON STEEL	40/60	EMULSIFIABLE OIL
HARDENING AND TEMPERING	40/50	EMULSIFIABLE OIL
BEARINGS	40/60	EMULSIFIABLE OIL
SPRINGS	40/60	EMULSIFIABLE OIL
FOR TOOLS	30/40	EMULSIFIABLE OIL
FOR VALVES	35/50	EMULSIFIABLE OIL
STAINLESS STEEL	30/40	EMULSIFIABLE OIL
SPHEROIDAL GRAPHITE	20/40	EMULSIFIABLE OIL
CAST IRON	40/60	EMULSIFIABLE OIL
ALUMINIUM	80/600	KEROSENE
BRONZE	70/120	EMULSIFIABLE OIL
HARD BRONZE	30/60	EMULSIFIABLE OIL
BRASS	70/350	EMULSIFIABLE OIL
COPPER	50/720	EMULSIFIABLE OIL

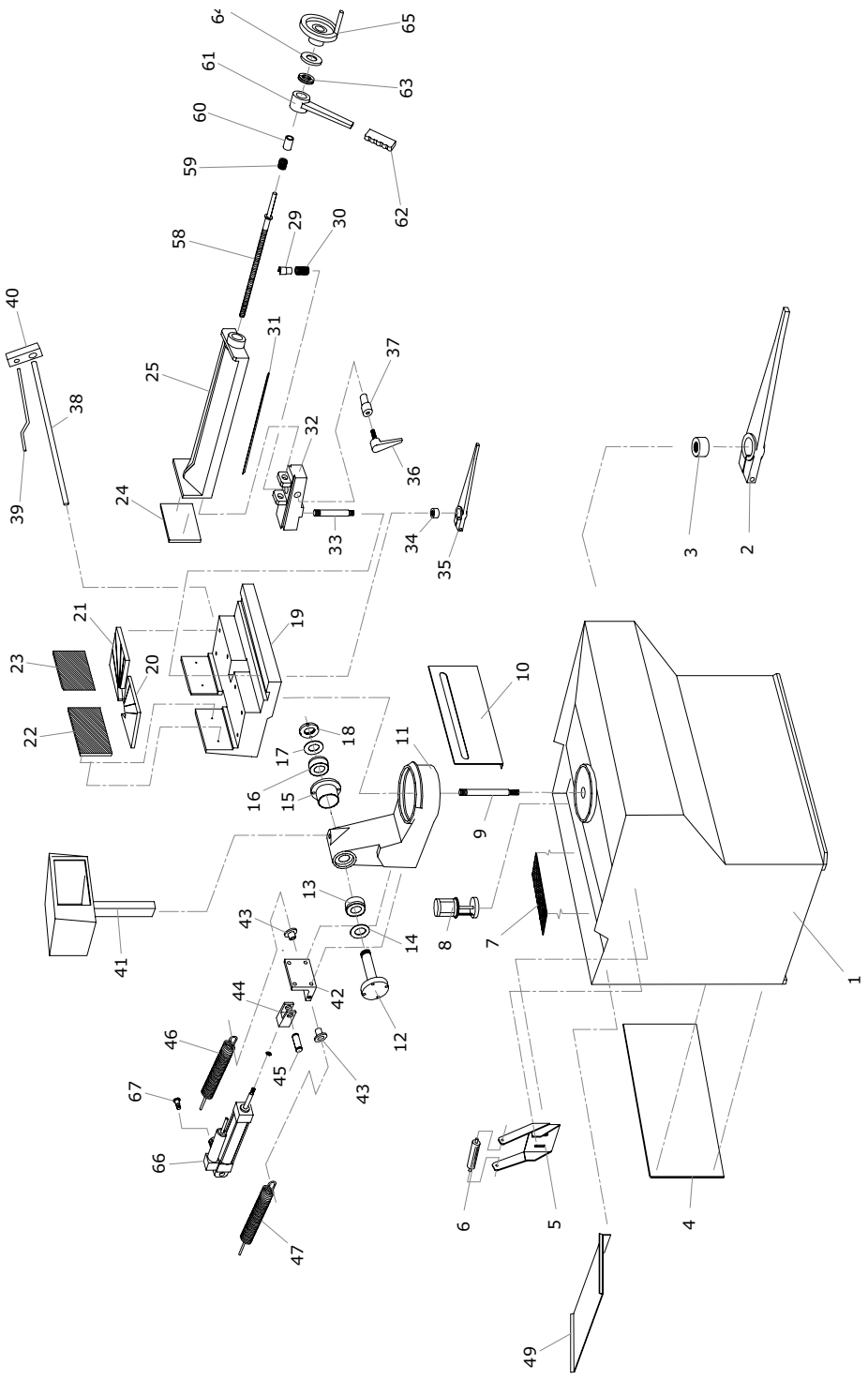
10 MACHINE COMPONENTS

10.1 - List of spare parts

REFERENCE N°	DESCRIPTION
1	Base
2	Arm locking lever
3	Bush
4	
5	Roller support
6	Roller
7	Crucible
8	Electropump
9	Arm pivot
10	Countervice plate
11	Arm
12	Hinge pivot
13	Bearing 32007 X
14	Ring Nilos 32007 XAV
15	Eccentric bush
16	Bearing 32007 XAV
17	Ring Nilos 32007 XAV
18	Ring nut Guk M 35
19	Countervice
20	Left countervice plate
21	Right countervice plate
22	Left countervice jaw
23	Right countervice jaw
24	Vice jaw
25	Vice
26	
27	
28	
29	Chiocciola
30	Spring
31	Vice gib
32	Vice support
33	Pin
34	Bush
35	Vice lever
36	Handle
37	Pin
38	Bar stop rod
39	Bar stop pointer
40	Bar stop body
41	Electric box
42	Cylinder plate
43	Ring
44	Cylinder fork
45	Pin
46	Right safreme return spring
47	Left sawframe return spring
48	
49	Splash protection
50	

REFERENCE N°	DESCRIPTION
58	Vice screw
59	Rapid locking spring
60	Vice lever bushing
61	Rapid locking vice lever
62	Handle
63	Bearing CP 30407 + AX 30407
64	Rapid locking lever washer
65	Vice handwheel
66	Brake cylinder
67	Cylinder articulation
68	Cylinder support
70	Rear part of the sawframe
71	Front part of the sawframe
72	Blade tension plate
73	Pivot
74	Blade tension Microswitch
75	Microswitch supporting plate
76	Blade tension guide
77	Blade tension pin
78	Springs
79	Blade tension handhwheel
80	Lever
81	Handle
82	Ring Nilos 32006 XAV
83	Spacer ring
84	Bearing 32006 X
85	Return flywheel
86	Ring nut Guk M 35
87	Screw TE M 12
88	Washer
89	Motor flywheel
90	Bearing 6208 2RS
91	Wrench
92	Wrench
93	Motor flywheel shaft
94	Reduction unit
95	Electric motor
99	Plate
100	Coolant distributor
101	Connection
102	Coolant tap
103	Connection
104	Microswitch
105	Knob
106	Cover
107	Handle
108	Plate
109	Connection

PART NUMBER	DESCRIPTION
110	Blade-guide rod
111	Short eccentric pin
112	Long eccentric pin
113	Bearing 608 2RS
114	Blade-guide protection
115	Fixed blade-guide pad
116	Mobile blade-guide pad
117	Mobile blade-guide block
118	Blade protection
119	Fixed blade-guide block
120	Blade-guide rod
121	Blade cleaning brush
122	Brush support
123	Bearing 626 2RS
124	Bush
126	Spring support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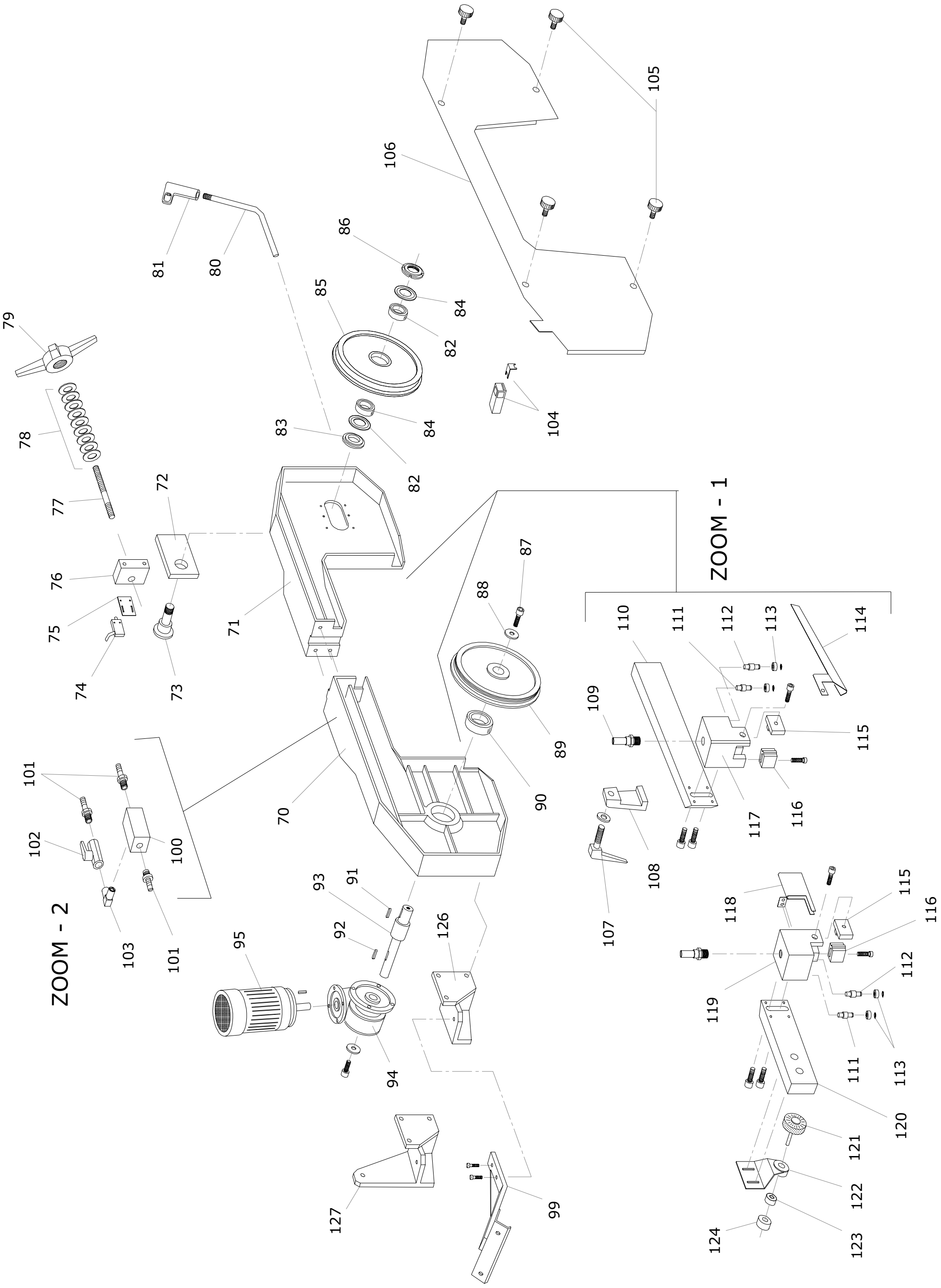
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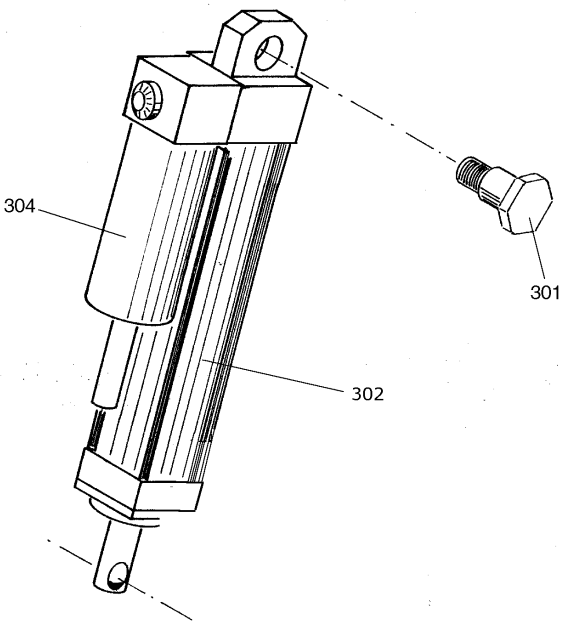
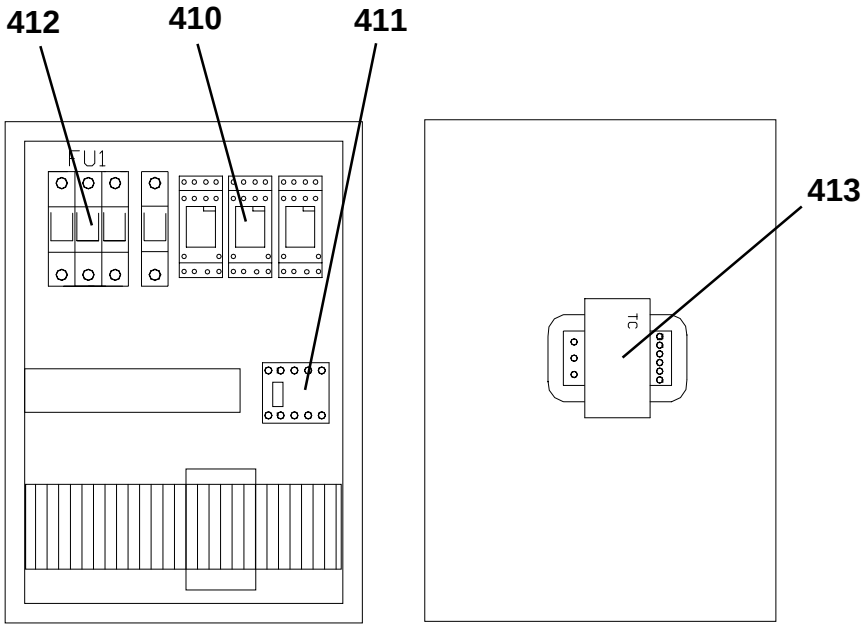
BRAKE UNIT

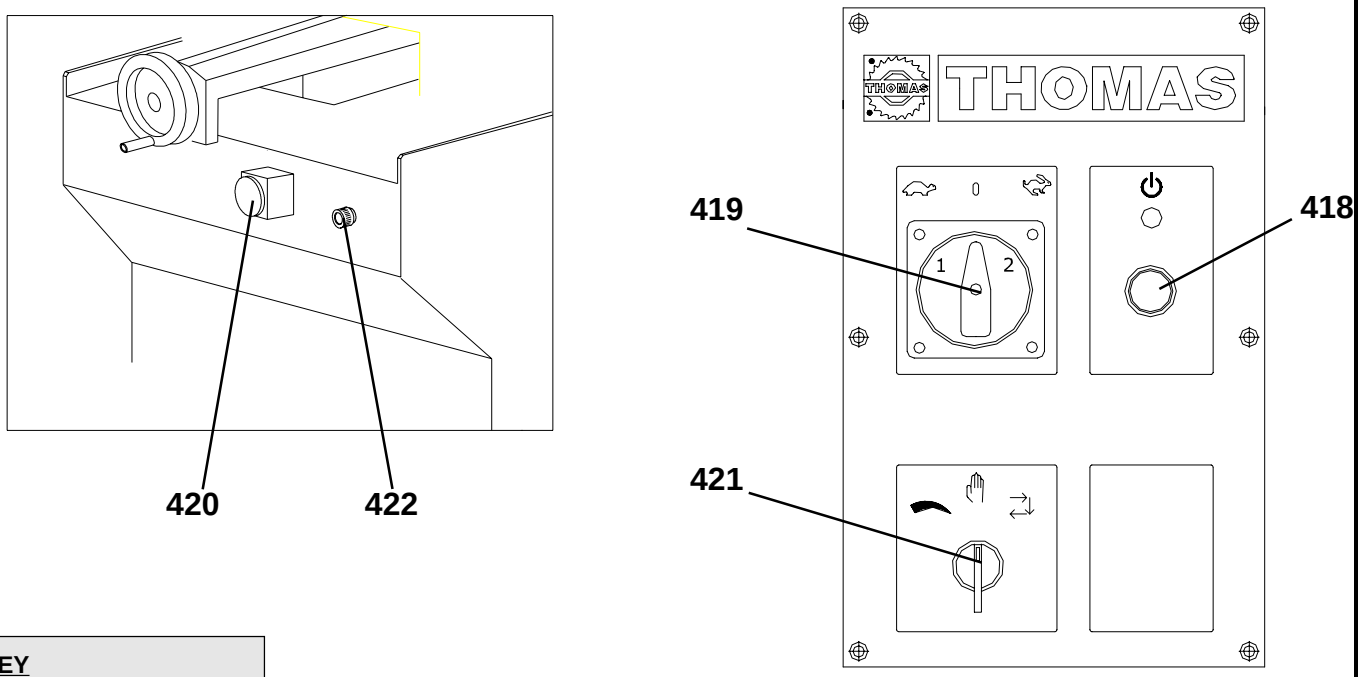


NR. RIFERIMENTO	DENOMINAZIONE
301	Cylinder articulation
302	Brake cylinder
303	
304	Tank
305	
310	Lever



KEY

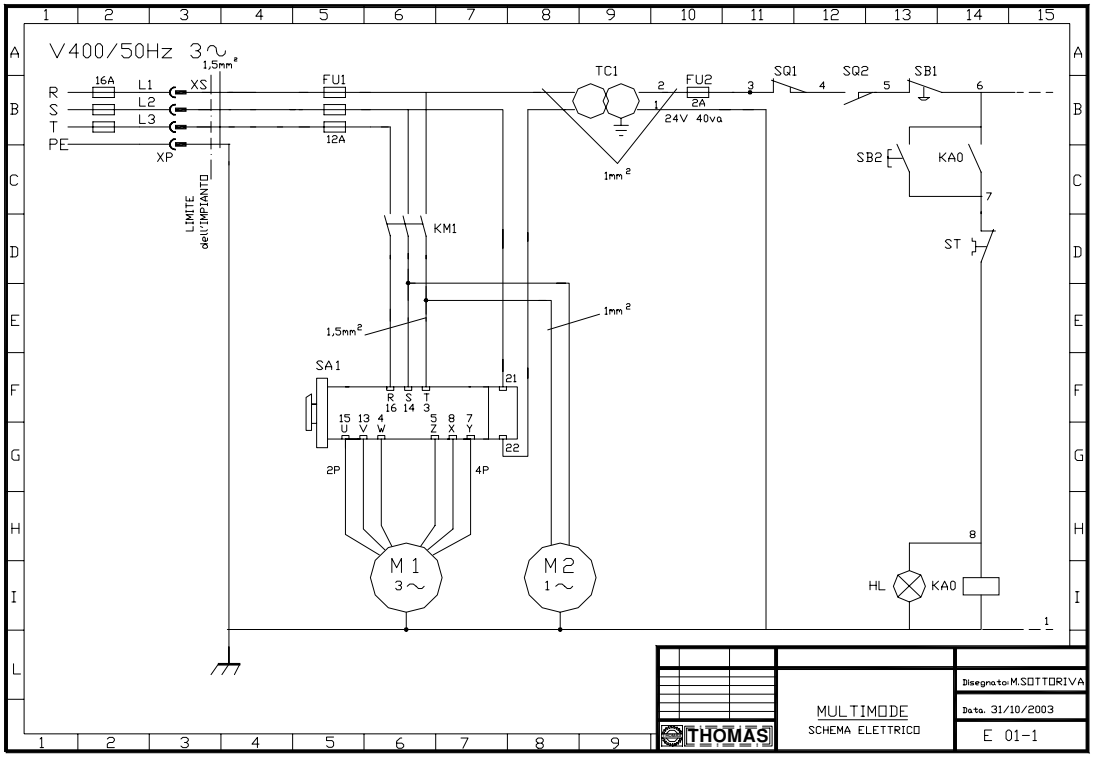
410 Auxiliary relay
411 Remote-control switch
412 Fuse cartridge
413 Transformer

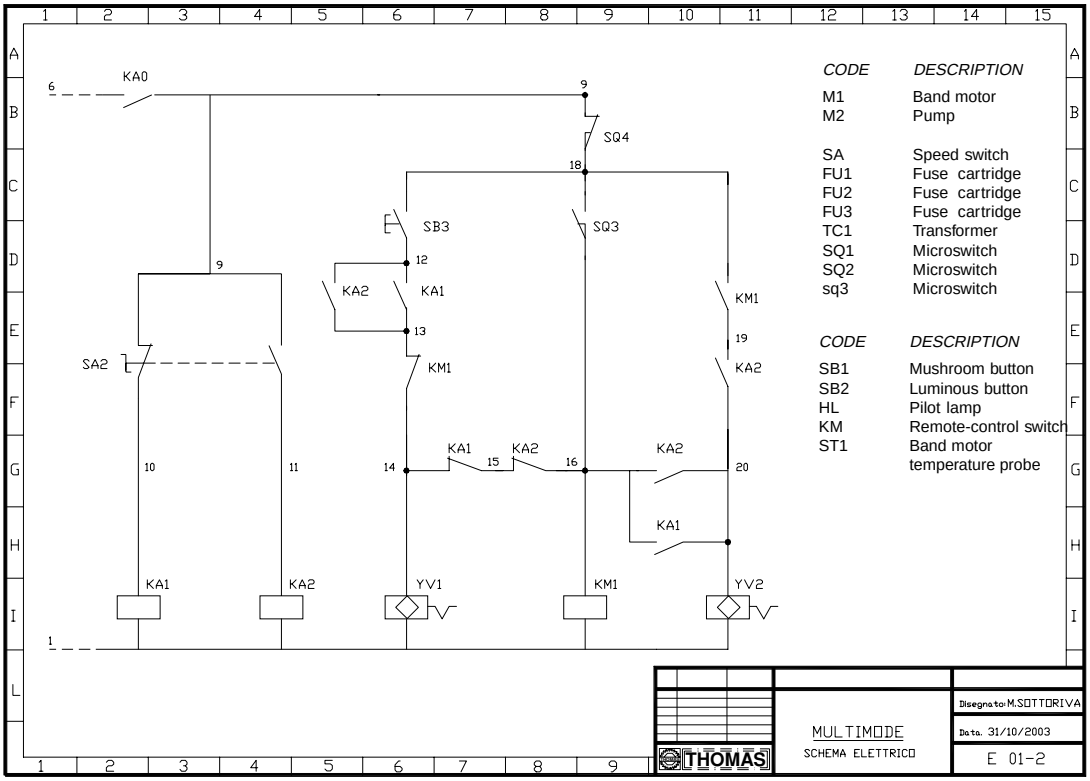


KEY

418 Reset push-button
419 Main switch
420 Emergency push-button
421 Cycle selector
422 Hydraulic regulator

11 WIRING DIAGRAMS

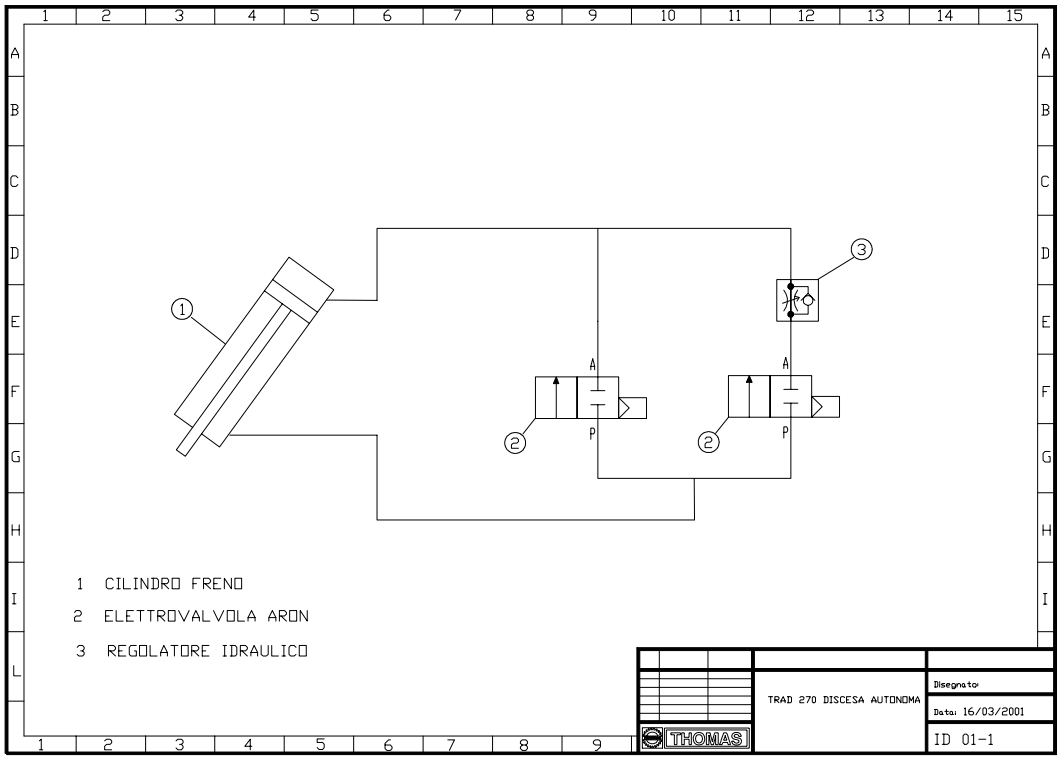




CODE	DESCRIPTION
M1	Band motor
M2	Pump
SA	Speed switch
FU1	Fuse cartridge
FU2	Fuse cartridge
FU3	Fuse cartridge
TC1	Transformer
SQ1	Microswitch
SQ2	Microswitch
sq3	Microswitch

CODE	DESCRIPTION
SB1	Mushroom button
SB2	Luminous button
HL	Pilot lamp
KM	Remote-control switch
ST1	Band motor temperature probe

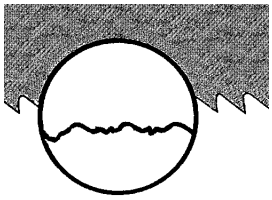
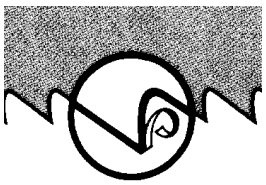
- Schema Idraulico

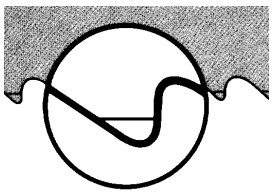
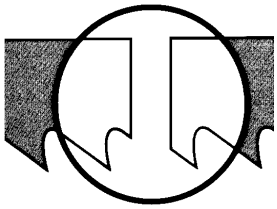
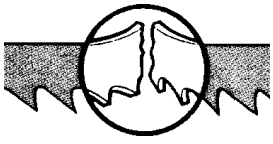


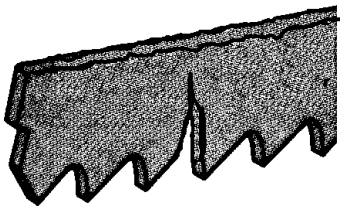
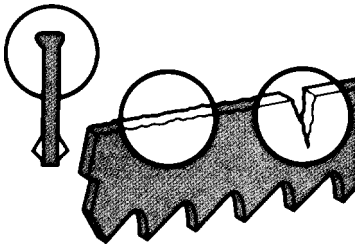
12 TROUBLESHOOTING

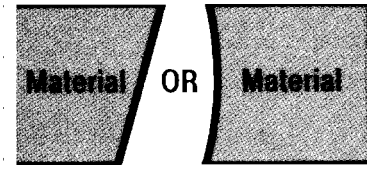
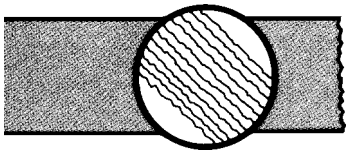
This chapter lists the probable faults and malfunctions that could occur while the machine is being used and suggests possible remedies for solving them.
The first paragraph provides diagnosis for TOOLS and CUTS, the second for ELECTRICAL COMPONENTS.

12.1 - Blade and cut diagnosis

FAULT	PROBABLE CAUSE	REMEDY
TOOTH BREAKAGE	Too fast advance	Decrease advance, exerting less cutting pressure. Adjust the braking device.
	Wrong cutting speed	Change speed and/or type of blade. See chapter on **"Material classification and blade selection"**, in the section *Blade selection table according to cutting and feed speed.*
	Wrong tooth pitch	Choose a suitable blade. See Chapter **"Material classification and blade selection".**
	Chips sticking onto teeth and in the gullets or material that gums	Check for clogging of cooling liquid drain holes on the blade-guide blocks and that flow is plentiful in order to facilitate the removal of chips from the blade.
	Defects on the material or material too hard	Material surfaces can be oxidised or covered with impurities making them, at the beginning of the cut, harder that the blade itself, or have hardened areas or inclusions inside the section due to productive agents used such as casting sand, welding wastes, etc. Avoid cutting these materials or in any case perform cutting with extreme care, cleaning and removing such impurities as quickly as possible.
	Ineffective gripping of the part in the vice	Check the gripping of the part.
	The blade gets stuck in the material	Reduce feed and exert less cutting pressure.
	Starting cut on sharp or irregular section bars	Pay more attention when you start cutting.
	Poor quality blade	Use a superior quality blade.
	Previously broken tooth left in the cut	Accurately remove all the parts left in.
	Cutting resumed on a groove made previously	Make the cut elsewhere, turning the part.
	Vibrations	Check gripping of the part.
	Wrong tooth pitch or shape	Replace blade with a more suitable one. See **"Material classification and blade selection"** in the *Blade Types* section. Adjust blade guide pads.
	Insufficient lubricating refrigerant or wrong emulsion	Check level of liquid in the tank. Increase the flow of lubricating refrigerant, checking that the hole and the liquid outlet pipe are not blocked. Check the emulsion percentage.
	Teeth positioned in the direction opposite the cutting direction	Turn teeth in correct direction.

FAULT	PROBABLE CAUSE	REMEDY
PREMATURE BLADE WEAR	Faulty running-in of blade	See **"Material classification and blade selection"** in the *Blade running-in* section.
	Teeth positioned in the direction opposite the cutting direction	Turn teeth in correct direction.
	Poor quality blade	Use a superior quality blade.
	Too fast advance	Decrease advance, exerting less cutting pressure. Adjust the braking device.
	Wrong cutting speed	Change speed and/or type of blade. See chapter on **"Material classification and blade selection"**, in the section *Blade selection table according to cutting and feed speed.*
	Defects on the material or material too hard	Material surfaces can be oxidised or covered with impurities making them, at the beginning of the cut, harder that the blade itself, or have hardened areas or inclusions inside the section due to productive agents used such as casting sand, welding wastes, etc. Avoid cutting these materials or in any case perform cutting with extreme care, cleaning and removing such impurities as quickly as possible.
	Insufficient lubricating refrigerant or wrong emulsion	Check level of liquid in the tank. Increase the flow of lubricating refrigerant, checking that the hole and the liquid outlet pipe are not blocked. Check the emulsion percentage.
BLADE BREAKAGE	Faulty welding of blade	The welding of the blade is of utmost importance. The meeting surfaces must perfectly match and once they are welded they must have no inclusions or bubbles; the welded part must be perfectly smooth and even. They must be evenly thick and have no bulges that can cause dents or instant breakage when sliding between the blade guide pads.
	Too fast advance	Decrease advance, exerting less cutting pressure. Adjust the braking device.
	Wrong cutting speed	Change speed and/or type of blade. See chapter on **"Material classification and blade selection"**, in the section *Blade selection table according to cutting and feed speed.*
	Wrong tooth pitch	Choose a suitable blade. See Chapter **"Material classification and blade selection"**.
	Ineffective gripping of the part in the vice	Check the gripping of the part.
	Blade touching material at beginning of cut	At the beginning of the cutting process, never lower the saw frame before starting the blade motor.

FAULT	PROBABLE CAUSE	REMEDY
	Blade guide pads not regulated or dirty because of lack of maintenance	Check distance between pads (see **"Machine adjustments"** in the *Blade Guide Blocks* section): extremely accurate guiding may cause cracks and breakage of the tooth. Clean carefully.
	Blade guide block too far from material to be cut	Approach head as near as possible to material to be cut so that only the blade section employed in the cut is free, this will prevent deflections that would excessively stress the blade.
	Improper position of blade on flywheels	The back of blade rubs against the support due to deformed or poorly welded bands (tapered), causing cracks and swelling of the back contour.
	Insufficient lubricating refrigerant or wrong emulsion	Check level of liquid in the tank. Increase the flow of lubricating refrigerant, checking that the hole and the liquid outlet pipe are not blocked. Check the emulsion percentage.
STREAKED OR ETCHED BANDS	Damaged or chipped blade guide pads	Replace them.
	Tight or slackened blade guide bearings	Adjust them (see Chapter **"Machine adjustments"** in *Blade guide* section).
CUTS OFF THE STRAIGHT	Blade not parallel as to the counter-vice	Check fastenings of the blade guide blocks as to the counter-vice so that they are not too loose and adjust blocks vertically; bring into line the position of the degrees and if necessary adjust the stop screws of the degree cuts.
	Blade not perpendicular due to the excessive play between the guide pads and maladjustment of the blocks	Check and vertically re-adjust the blade guide blocks; reset proper side guide play (see Chapter **"Machine adjustments"** in *Blade guide* section).
	Too fast advance	Decrease advance, exerting less cutting pressure. Adjust the braking device.
	Blade guide block too far from material to be cut	Approach it as near as possible to material to be cut so that only the blade section employed in the cut is free, this will prevent deflections that would excessively stress the blade.
	Worn out blade	Replace it.
	Wrong tooth pitch	Blade with major density of teeth is being used, try using one with less teeth (see Chapter **"Material classification and blade selection"** in the *Blade Types* section).

FAULT	PROBABLE CAUSE	REMEDY
	Broken teeth	Irregular work of the blade due to the lack of teeth can cause deflection in the cut; check blade and if necessary replace it.
	Insufficient lubricating refrigerant or wrong emulsion	Check level of liquid in the tank. Increase the flow of lubricating refrigerant, checking that the hole and the liquid outlet pipe are not blocked. Check the emulsion percentage.
FAULTY CUT 	Worn out flywheels	The support and guide flange of the band are so worn out that they cannot ensure the alignment of the blade, causing faulty cutting; blade rolling and drawing tracks can have become tapered. Replace them.
	Flywheel housing full of chips	Clean with compressed air.
STREAKED CUTTING SURFACE 	Too fast advance	Decrease advance, exerting less cutting pressure. Adjust the braking device.
	Poor quality blade	Use a superior quality blade.
	Worn out blade or with chipped and/or broken teeth	Replace it.
	Wrong tooth pitch	Blade used probably has too large teeth; use one with more teeth (see **"Material classification and blade selection"** in the *Blade Types* section).
	Blade guide block too far from material to be cut	Approach it as near as possible to material to be cut so that only the blade section employed in the cut is free, this will prevent deflections that would excessively stress the blade.
	Insufficient lubricating refrigerant or wrong emulsion	Check level of liquid in the tank. Increase the flow of lubricating refrigerant, checking that the hole and the liquid outlet pipe are not blocked. Check the emulsion percentage.
NOISE ON GUIDE BLOCKS	Chipped bearings	Dirt and/or chips between blade and guide bearings. Replace them.
	Worn out or damaged pads	Replace them.

12.2 - Electrical components diagnosis

FAULT	PROBABLE CAUSE	REMEDY
MACHINE DOES NOT WORK	Power supply	Check: - phases - cables - socket - plug Voltage must arrive upstream from the fuses (terminal board).
	Fuses “FU 1”	Check electrical efficiency and check for shorts that trigger such protections.
	"SQ 1" safety microswitch	Check closing of the flywheel guard. Check the efficiency of the device; replace it if damaged.
	Speed switch “SA” in position “0” Emergency button “SB 1” on	It must be turned to position 1 or 2. Ensure that it is off and that its contacts are unbroken.
	Cycle reset or line button “SB 2”	Check mechanical efficiency; replace if damaged.
	Thermal probe built into the stator winding has tripped due to motor over-heating	Check current continuity on the two wires in the prone after letting the motor cool for about 10-15 minutes. If after this time there is no current continuity in the two wires, the motor must be changed or re-wound.
	Transformer “TC 1”	Check that the supply voltage is the same as the line voltage and that it gives a value of 24 V at output.
	Fuse “FU 2 - FU 3”	Check fuse efficiency and ensure there are no short circuits causing the protection to trip.
MOTOR STOPPED WITH PILOT LIGHT “HL” LIT	Microswitch “SQ 2” in the handle	Check operation and/or efficiency; replace if broken .
	Remote-control switch “KM”	Check that phases are present at both input and output; ensure that it is not blocked, that it closes when fed, that it does not cause short circuits; otherwise change it.
	Motor “M 1”	Check that it is not burnt and that it turns freely. It may be rewound or changed.

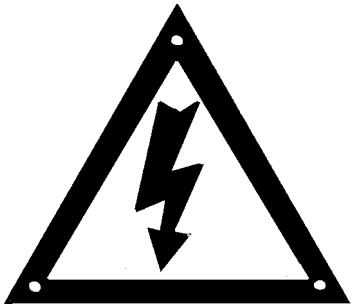
13 NOISE TESTS

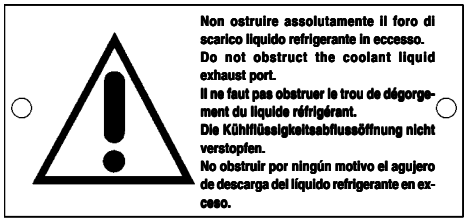
In accordance with point 1.7.4.f of the Machines Directive EEC 89/392

- The microphone was positioned close to the operator's head, at medium height.
- The saw during normal working condition, delivers the following acoustic pressure:
  . On idle running : 65,7 dB (A).
  . During cutting cycle sawing a UNI C40 steel bar diam. 50 : 64,4 dB (A).
- The maximum level of the WEIGHTED instantaneous acoustic pressure C was always less than 130 dB.

NOTE: with the machine operating, the noise level will vary according to the different materials being processed. The user must therefore assess the intensity and if necessary provide the operators with the necessary personal protection, as required by Law 277/1991.

PLATES AND LABELS





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