



THOMAS

USE AND MAINTENANCE MANUAL

SAR 460 SA G **DIGIT**



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Ordering spare parts

- 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, described in this manual, has been designed to meet safety requirements. As for machine functionality, inspection has been successful.
- 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.

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Machine certification and identification marking

MACHINE LABEL

THOMAS S.p.A. via Pasubio, 32 36033 ISOLA VIC. - ITALIA	CE
TYPE	SAR 460 SA-G
SERIAL NUMBER	DIGIT
YEAR OF MANUFACTURE	

(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.

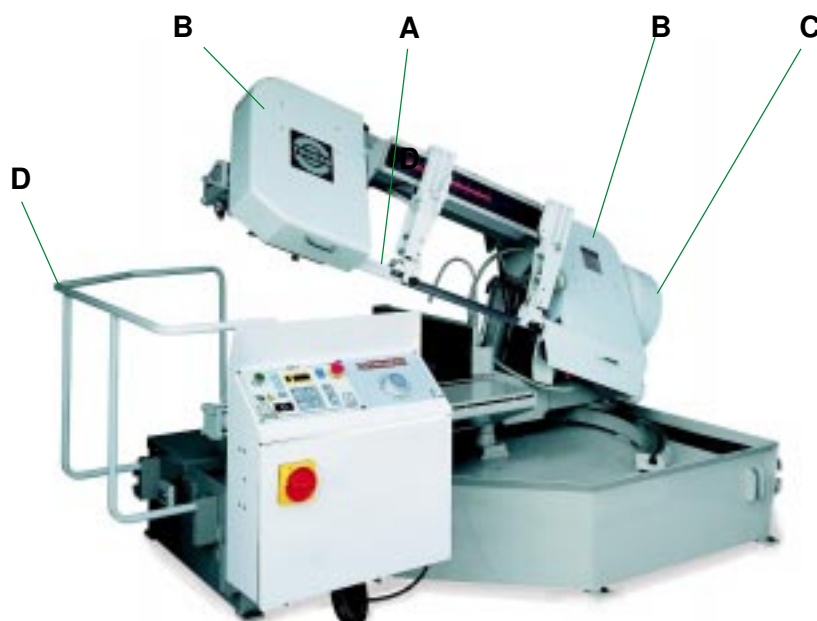


1.1 - Advice for the operator

- 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.
- 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

- Grey metal guards, fastened with screws onto the mobile blade-guide ensures covering of blade section not used in cutting operation (A).
- Grey metal guards, fastened onto the sawframe, to protect from flywheels (B).
- Grey metal guard to protect from driving belts (C).
- Grey metal fence around the machine, to protect the operator from cutting area (D).



1.3 - Electrical equipment according to Euro-pean Standard "CENELEC EN 60 204-1" which as-similates, 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. 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 through the inverter.
- The machine has been tested in conformity with point 20 of 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 pressure switch stops all machine functions.

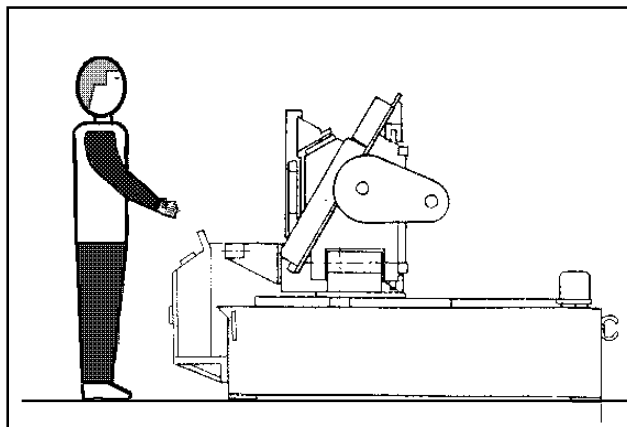
1.5 - OTHER RISKS

- As the machine is running, any intervention from the operator within the "**dangerous zone**" or cutting area must be considered a risk for his own safety.

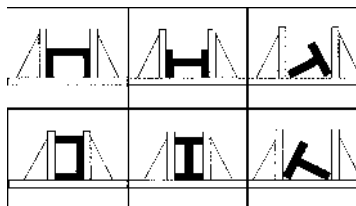
2 RECOMMENDATIONS AND ADVICE FOR USE

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.
- Only one operator is needed to use the machine, that must stand as shown in the picture.



- 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 does not cut through the material, immediately strike the emergency push-button and switch off the machine. Open the vice with the handwheel, remove part to be cut and check that the blade teeth are not broken, if they are, replace 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 standard model

			
0°	460	450	760 x 380
30°	450	440	600 x 400
45°	400	380	400 x 360
60°	210	210	210 x 280

TECHNICAL DETAILS

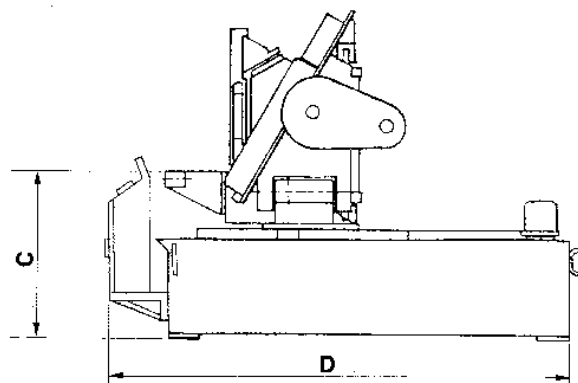
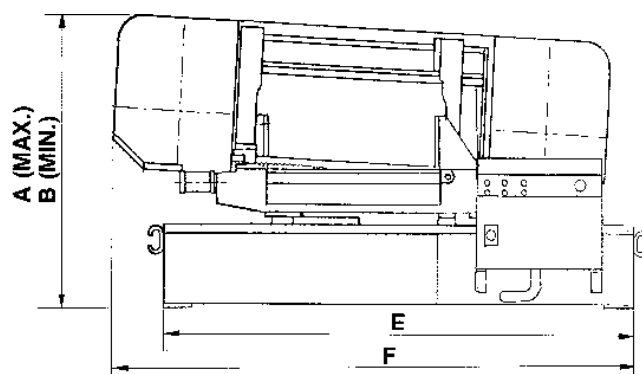
Blade dimension	mm	5500 x 38 x 1,3
Flywheel diameter	mm	560
Working table height	mm	630
Vice opening	mm	770
Cutting speed	m/1'	20 ÷ 100
Gear-box	Rapp.	INVERTER
Hydraulic service pressure	Bar	35
Blade tension pressure	Bar	22
Weight	Kg	2600

MOTORS

		A	KW
1	Blade motor		5,5
2	Hydraulic pump motor		1,5
3	Coolant liquid electropump		0,15
4			

4 MACHINE DIMENSIONS TRANSPORT INSTALLATION DISMANTLING

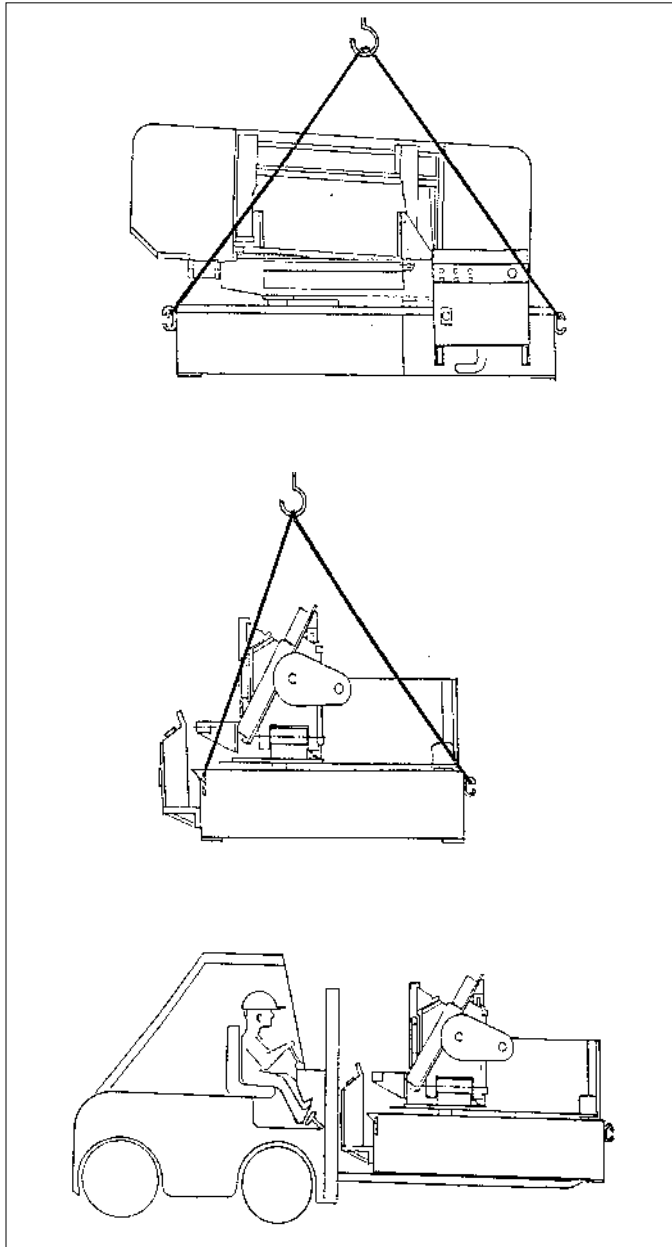
4.1 - Machine dimensions



A	=	2400
B	=	1550
C	=	630
D	=	2500
E	=	2360
F	=	2830

4.2 - Transport and handling of the machine

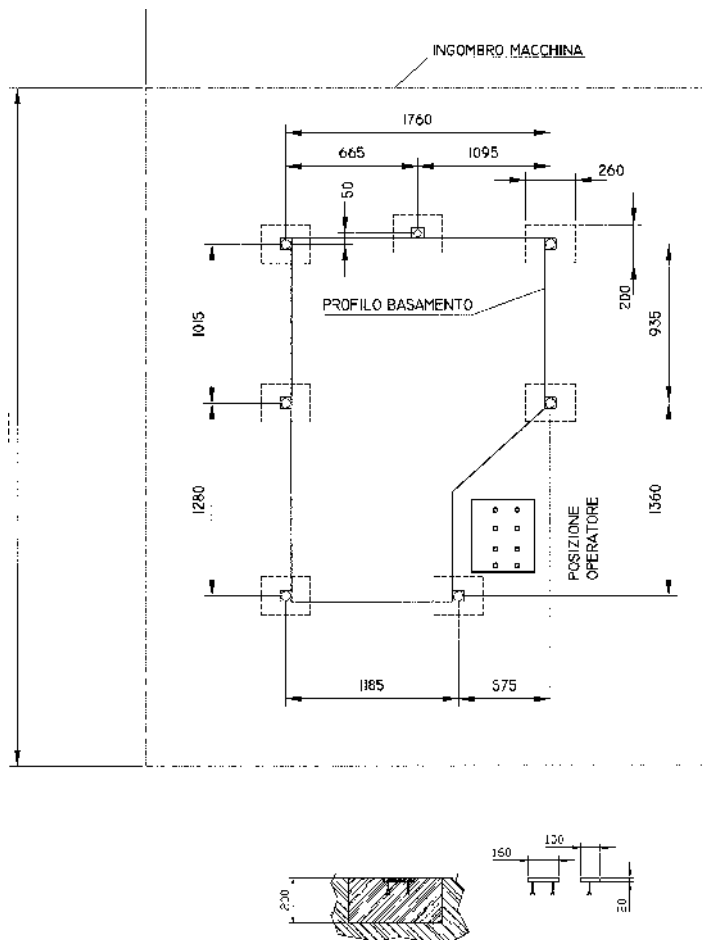
If the machine has to be shifted in its own packing, use a fork-lift truck or sling it with straps as illustrated.



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

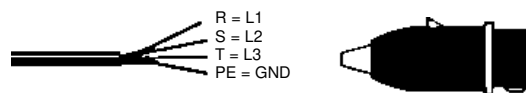


- Position the machine on a firm cement floor, maintaining, at the rear, a minimum distance of 1500 mm from the wall; anchor it to the ground as shown in the diagram, using screws and expansion plugs or tie rods sunk in cement, ensuring that it is sitting level.

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 5-WIRE SYSTEM FOR THREE-PHASE MACHINE - SOCKET FOR A 32A PLUG



4.6 - 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) remove the sawframe return spring
 - 4) empty the coolant liquid tank.

4.7 - Dismantling

(because of deterioration and/or obsolescence)

General rules

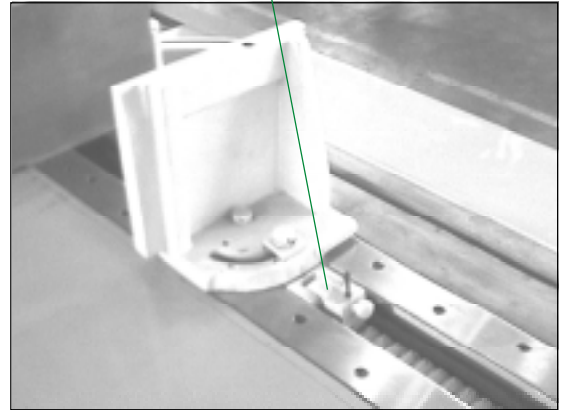
If the machine is to be permanently demolished and/or scrapped, divide the material to be disposed of according to type and composition, as follows:

- 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.

5.2 - Vice

- Material clamping system during the cutting operation by means of a special stop **pawl** and hydraulic locking.



5.3 - Bed

- Structure supporting the SAWFRAME OPERATING HEAD (revolving arm for degree cutting along with clamping system), the VICE; the bedplate houses the cooling liquid TANK, the CONTROL BOARD, ELECTRICAL and HYDRAULIC SYSTEMS and the DEVICE CONTROLLING the AUTOMATIC HYDRAULIC LOWERING AND RISE of the SAWFRAME.



5 MACHINE FUNCTIONAL PARTS

5.1 - Operating head or saw frame

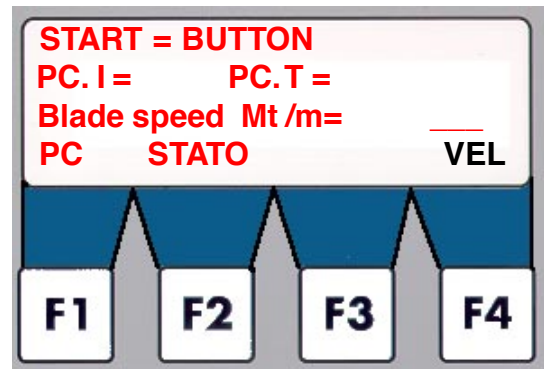
- Part of the machine consisting of drive members (gearmotor or variable speed motor, flywheels), tightening and guide (blade tightening slide, blade guide head) of tool.



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").

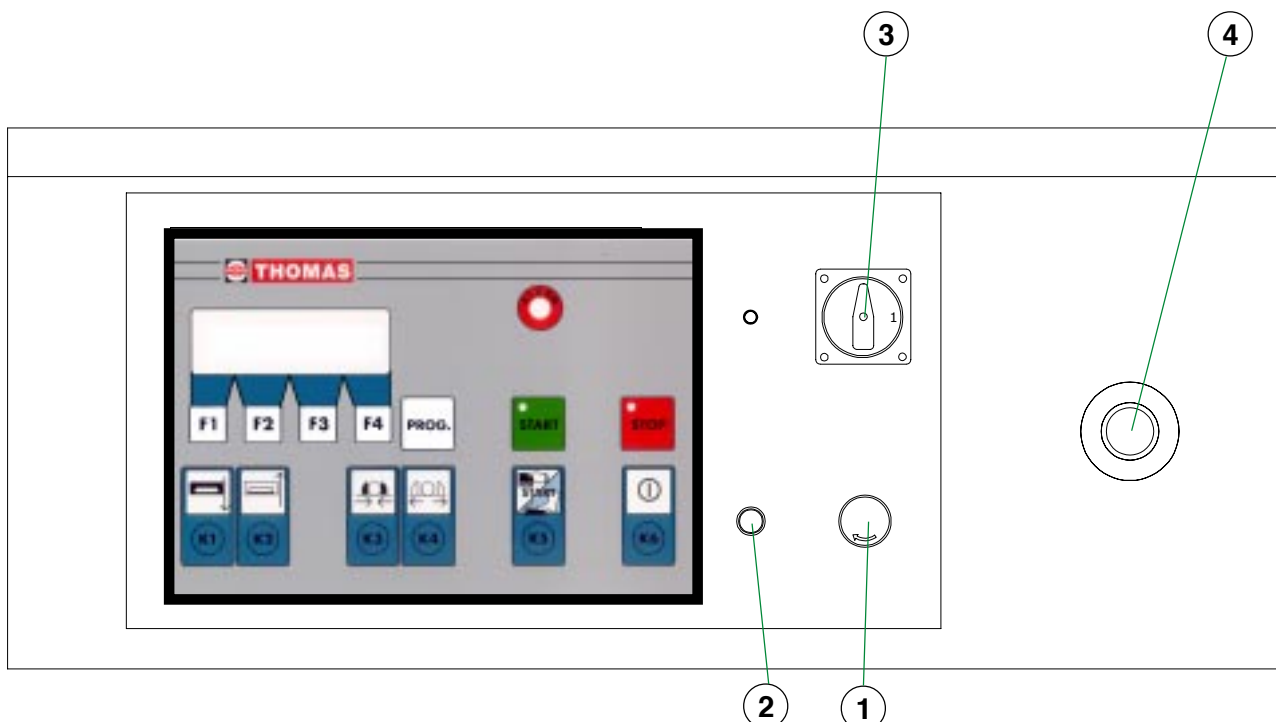
- Display shows the following information soon after you switch on the machine:



- **START** = start of the cutting cycle.
- **PZ. I** = programmed cutting cycles. The machines stops automatically once the programmed number has been completed; reset the piece-counter to start the machine again.
- **PZ. T** = programmed cutting cycles completed.
- **VEL . LAMA** or **BLADE SPEED** = current blade speed expressed in meters per minute.
- **F1**: corresponding to the sign 'PZ' goes to the programming of the piece-counter.
- **F2**: corresponding to the sign 'STATO' goes to the visualization checking up the machine functions.
- **F4**: corresponding to the sign 'VEL' goes to the adjustment of the blade speed.

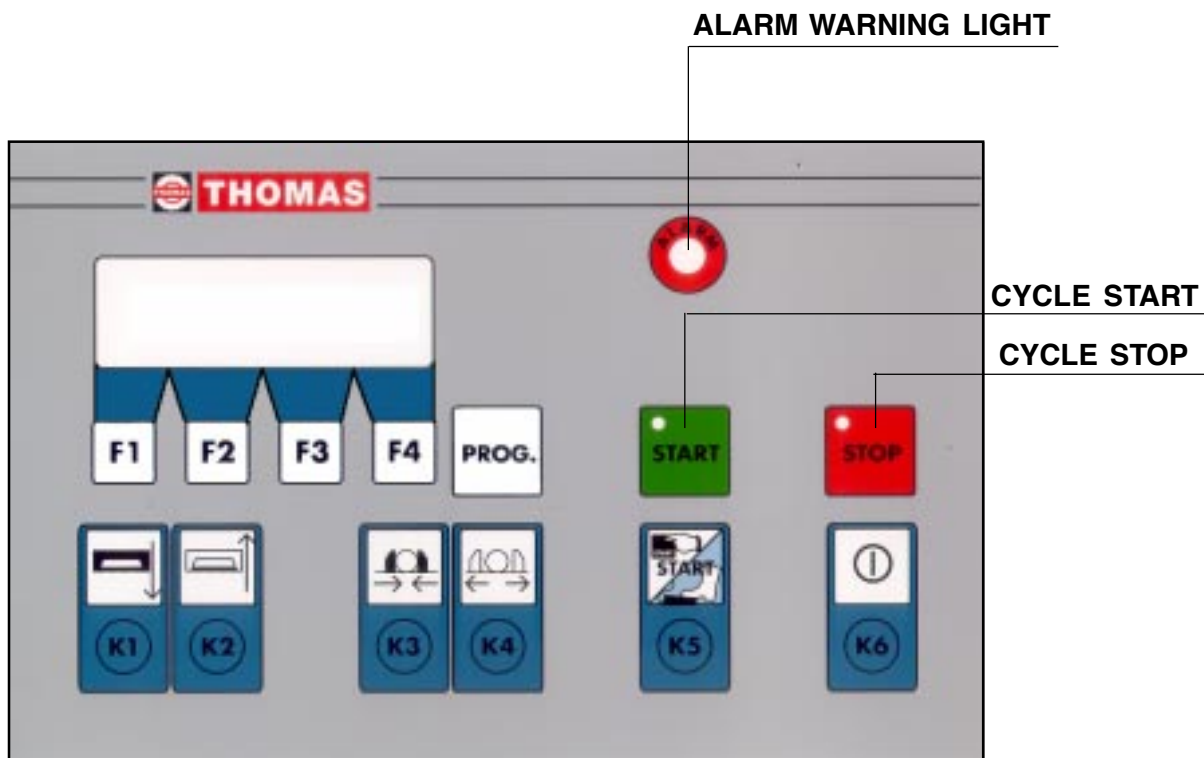
6.1 - Starting up and cutting cycle

- Ensure that the machine is not in emergency stop condition; if it is, release the red mushroom button (1).
- Make sure that the flywheel metal Cover is closed as well as the relevant Microswitch.
- Rotate the main switch (3) towards the right to *position 1*.
- Press start button (2).
- Close the regulator (4) completely (turn it clockwise).
- Press the key activating the hydraulic pump (see legenda at page 10) as well as the keys moving the sawframe and the vice to verify if these work properly; if they doesn't attempt to swap one of the electric power supply wires (only during installation).
- **ATTENTION**: having started the hydraulic unit motor, make sure that the blade is under tension (eventually the blade tension lever is released), so that the relevant microswitch won't break the electrical circuit. Please refer to **para. 7.1 Blade tension assembly** for more details.
- Press the key lifting the sawframe.
- Check the index showing the cutting angle; refer to **para. 7.4 Cutting angle adjustment** if you want to perform mitre cutting.





LEGENDA CONTROLLER

**K1**

SAWFRAME DOWNFEED

K2

SAWFRAME LIFT

K3

VICE LOCK

K4

VICE OPEN

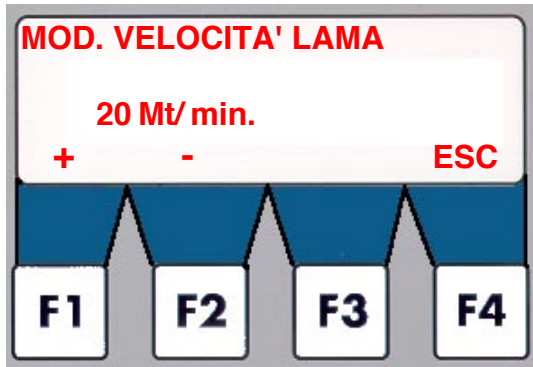
K5CYCLE START SELECTION:
FOOT CONTROL SWITCH, OR
KEY ON THE CONTROLLER**K6**

HYDRAULIC PUMP ON

PROGACCESS TO THE CONTROLLER
CONFIGURATION (ACCESS PROTECTED BY
PASSWORD).**F1**ACTIVATES THE FUNCTION SHOWN RIGHT
ABOVE ON THE DISPLAY**F2**ACTIVATES THE FUNCTION SHOWN RIGHT
ABOVE ON THE DISPLAY**F3**ACTIVATES THE FUNCTION SHOWN RIGHT
ABOVE ON THE DISPLAY**F4**ACTIVATES THE FUNCTION SHOWN RIGHT
ABOVE ON THE DISPLAY

6.2 - Adjustment of the blade speed INVERTER

- The INVERTER or frequency converter controls the blade speed rotation. The range goes from **20 to 100 meters per minute**.
- Press the key corresponding to the sign 'VEL' (F4) as shown at page n. 9.
- The display shows:



- Press the keys 'F1' or 'F2' to set the correct blade speed.
- Press the key 'F4' to exit.

Note: the blade speed can be adjusted even during the cutting phase.

automatically.

- To start the machine again, reset the number of the executed cuts by pressing the key 'F3' (RES).

ATTENTION: if you do not need the piece-counter, just set '0' (zero) on the field 'PZ. I'.

6.4 - Cutting cycle

- Press the key to lift the sawframe over the material to be cut.
- Open the vice and load the material.
- Rest the vice jaw on the material and make sure that the pawl is hooked down to the rack.
- Press the key to lock the vice.
- Set the correct cutting speed (see table at chapter 9).
- Set the sawframe downfeed speed on the regulator (4); initially, we recommend to set lower speed to avoid any dangerous effect.
- Press the key START: make sure that the blade turns the right direction, the coolant liquid flows and the cutting cycle proceeds properly.
- Press the red emergency push button in case of incorrect operation, or to stop the machine immediately.
- Press CYCLE STOP to stop the cutting cycle.

6.3 - Piece-counter

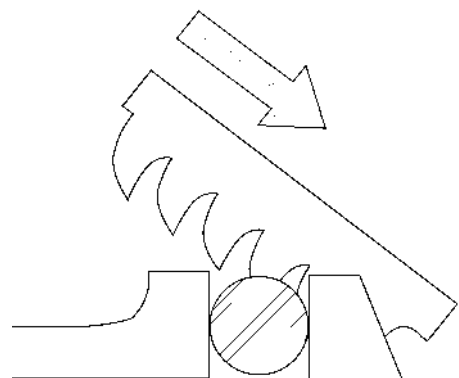
- The piece-counter not only counts each cutting cycle, but it stops the machine automatically as soon as the programmed cutting cycle number has been completed.
- Press the key corresponding to the sign 'PZ' (F1)
The display shows the following information.
- Press the keys 'F1' or 'F2' to set the desired number.

PZI. = number of cutting cycles to be executed.
PZT.= number of cutting cycles already executed.
RES.: to reset the visualized number of cuts.
ESC.: to go back to the initial page.

- As soon as the programmed number of cutting cycles has been completed, a message appears and the machine stops



CUTTING DIRECTION



The machine is now ready to start work, bearing in mind that the CUTTING SPEED and the TYPE of BLADE - combined with a suitable lowering of saw frame - 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.

6.6 - Alarms

- The display shows any problem or dangerous situation. Once the problem has been solved, press the Start key (2) and the key corresponding to the function 'RES'.

'5 FINE PEZZI' or 'PIECES END':

It stops the machine automatically as soon as the programmed cutting cycle number has been completed. Reset the counter.

'12 ROTTURA LAMA' or 'BROKEN BLADE'

Replace the blade or check tension.

'13 CARTER APERTO' or 'OPEN DOOR'

Close the sawframe door.

'14 FUNGO EMERGENZA' or 'EMERGENCY PUSH-BUTTON'

Release the emergency push-button.

'15 TERMICO2 CENTRAL' or 'THERMAY PROTECTION'

Reset the thermal relay protecting the hydraulic unit.

'16 ALLARME INVERTER'

Reset the thermal relay protecting the Inverter.

7 REGULATING THE MACHINE

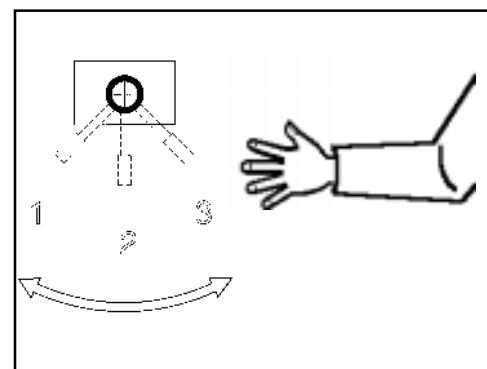
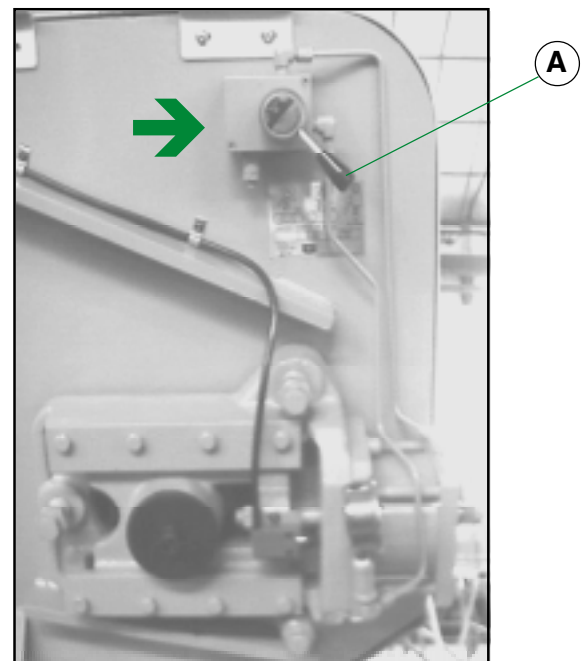
7.1 - Blade tension

Lever (A) can be set to three different positions :

POSITION 1 : LOOSE
POSITION 2 : NEUTRAL
POSITION 3 : TENSION

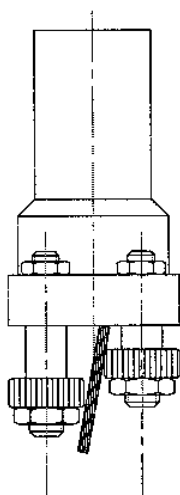
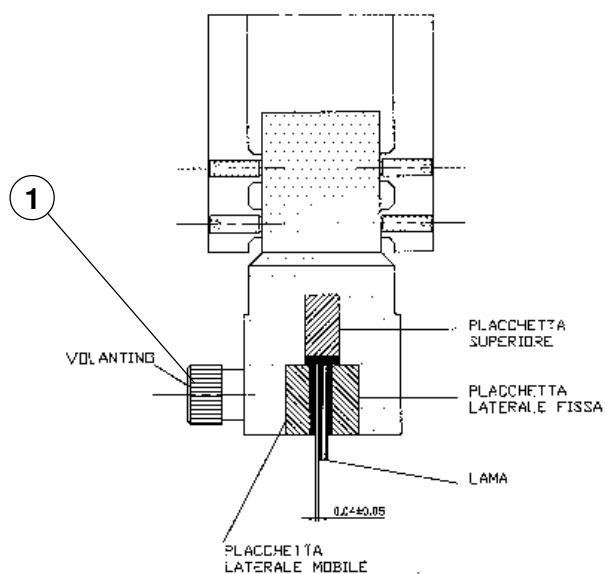
Ensure that Lever (A) is at position 3 whenever the hydraulic pump has been started. Also make sure the blade correctly rests on the flywheels and runs through the blade-guides. Manometer should indicate 22 BAR pressure as blade tension.

A safety microswitch located on the blade tension slide, stops the machine in case of blade breakage or insufficient tensioning.

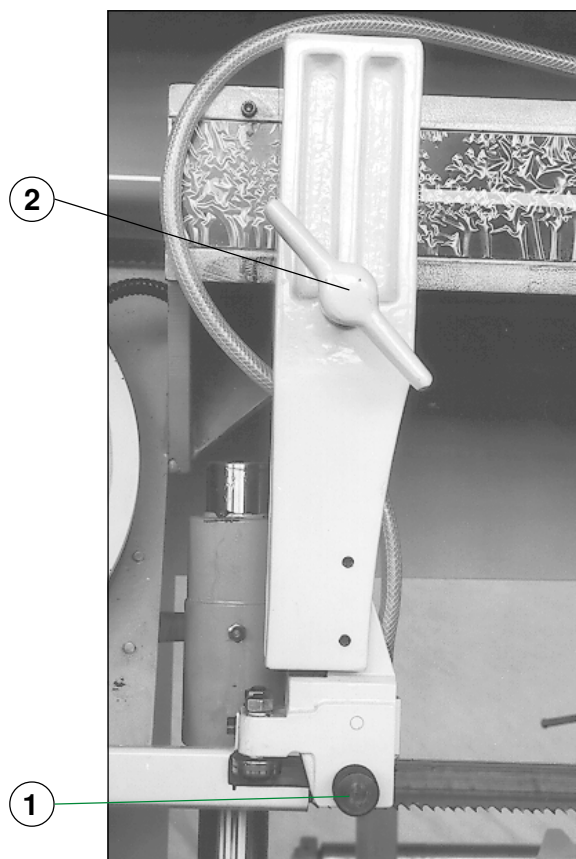


7.2 - Blade-guide blocks

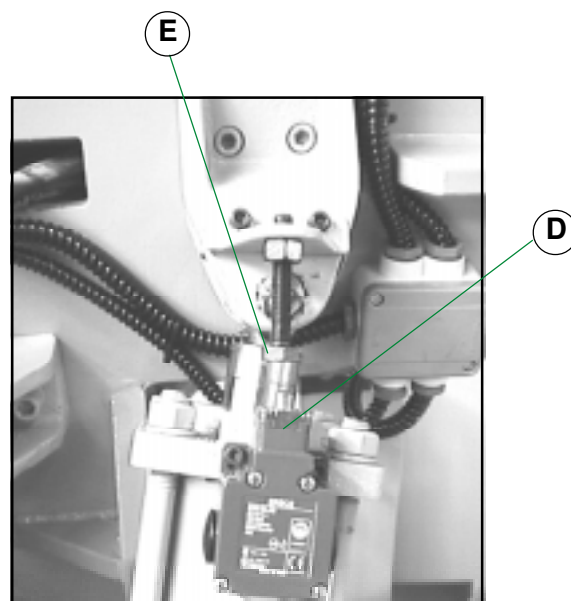
Blade-guide adjustment was made at the factory during the machine testing. The blade is kept perpendicular to the workpiece by means of CARBIDE blade-guide pads. Ensure that knob (1) is completely screwed up against the block. Periodically check wear status of the pads; also keep the block and the pads clean.



- The bearings guide the blade to the pads providing the necessary inclination and reducing the torsion stress of the blade; they do not need any adjustment or particular care.

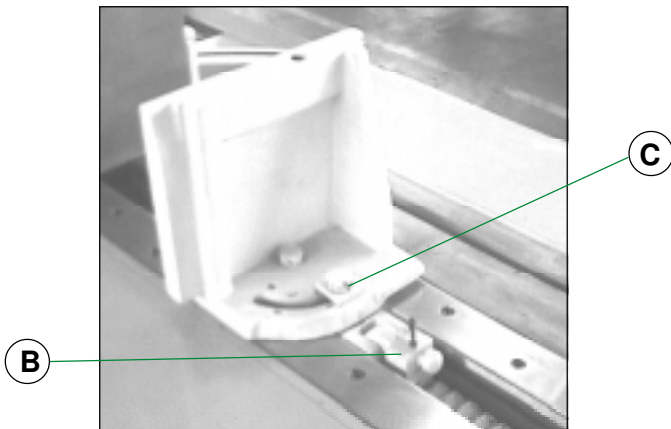


- Adjust the blade-guide arm as follows:
Release both knob (1) and handwheel (2).
Position the arm according to the workpiece dimensions; ensure that it doesn't hit the bench vice.
Fix both handwheels (1) and (2).
- **ATTENTION:** Make sure that the limit switch (D) stops the blade-guide arm just before the working table. **The blade-guide arm should not fall against the working table !!** The reference screw (E) can be adjusted for this purpose.



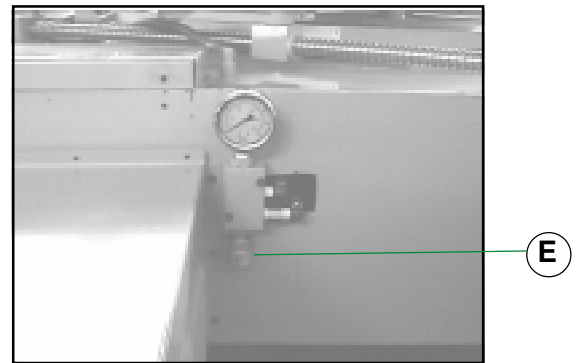
7.3 - Vice

- Press the function key to open the vice.
- Lift the stop pawl (**B**), and rest the vice jaw against the workpiece.
- **Ensure that the pawl (B) perfectly catches with the rack tooth.**
- Press the function key to close the vice.
- Keep the rack clean to ensure that the pawl perfectly catch with the rack.
- Keep the vice guide always clean.
- In case of mitre cutting, unscrew the nut (**C**) swinging the vice to the required angle. Fix the nut (**C**).



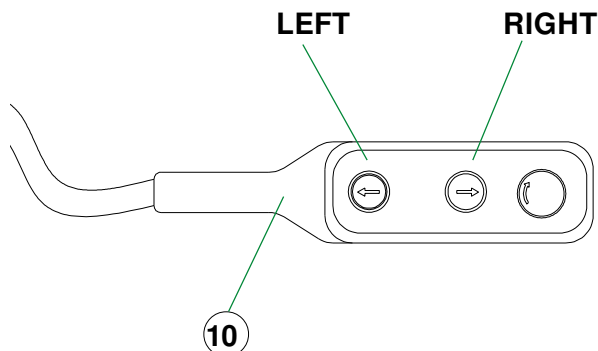
7.5 - Vice pressure regulation (OPTION)

- Vice pressure can be adjusted through a special hydraulic valve.
- Turn the knob (**E**) either increasing or decreasing vice pressure.



7.4 - Cutting angle adjustment

- The sawframe can be swivelled from 0° to 60° to the lefthand. This way you can have the workpiece cut at a required angle.
- Fully rise the sawframe to the top position.
- Unscrew the nut (**C**) swinging the vice to the required angle. Unscrew the nuts of the circular guide as well.
- Press the push buttons located on the machine base (**10**) swivelling the sawframe to the required angle.



7.6 - Blade cleaning brush

The brush removes the chips off the blade during the cutting cycle. Periodically check its wearing degree, eventually adjust or replace the metal brush.



- Screw the nut (**C**) of the vice. Screw the nuts of the circular guide as well.
- Keep the circular guide always clean.

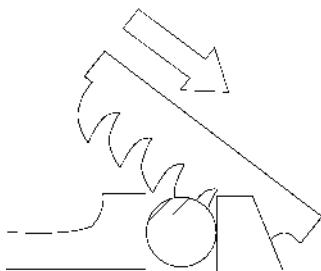
CAREFULLY CARRY OUT THE FOLLOWING INSTRUCTIONS ABOUT BLADE REPLACEMENT.

7.7 - Blade replacement

- Lift the sawframe to the top position.
- Turn the lever to *LOOSE*, and soon after to *NEUTRAL* (see drawing below).
- Release the knob controlling the blade-guide pads.
- Open both flywheel covers and remove the blade first off the guiding blocks, then off the flywheels.
- Mount a new blade, first through the blade-guide pads, then on the flywheels (**pay attention to the teeth cutting direction**).
- Put the blade under tension by means of the special lever. Gradually tension the blade making sure that it perfectly suits to the flywheels and through the blade-guide pads. Definitely turn the lever to *TENSION* after having made sure that the blade is correctly positioned.
- **Note: recommended blade tension pressure= 22 BAR.**
- Ensure that the blade cleaning brush is correctly adjusted.
- Close both flywheel covers.

ATTENTION: ensure that you are using the blade having the same size as indicated at page 5.

CUTTING DIRECTION



RELY ON SKILLED AND QUALIFIED PERSONNEL TO REPLACE OTHER MACHINE MEMBERS SUCH AS REDUCTION UNIT, 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.
- Rack cleaning - stop pawl of the vices.
- Top up the level of lubricating coolant.
- Check blade for wear.
- 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.
- More accurate cleaning of the rack - stop pawl of the vice.
- Removal of pump from its housing, cleaning of the suction filter and suction zone.
- Cleaning with compressed air the blade guide pads and bearing (drain hole of the lubricating cooling).
- Cleaning flywheel housings and blade sliding surfaces on flywheels.
- **Check transmission belt on blademotor-gearbox.**
- Check blade cleaning brush.

8.3 - Monthly maintenance

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

8.4 - Six-monthly maintenance (every 2000 hours)

REDUCTION UNIT

- Complete oil change (use GEARCO 85 W 140 of 'National', or KLUBER SYNTHESO EP 460 or equivalent).

HYDRAULIC UNIT

- Complete oil change (use SHELL TELLUS T32 or equivalent).
- Check continuity of the equipotential protection circuit.

8.5 - 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 %.

8.6 - 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*.

8.7 - 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 knowledge of these specifications.

WE THEREFORE RECOMMEND YOU TO ALWAYS USE GENUINE "THOMAS" 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 the material 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/mm ²
Construction steels	Fe360	St37	E24	----	----	116	67	360÷480
	Fe430	St44	E28	43	----	148	80	430÷560
	Fe510	St52	E36	50	----	180	88	510÷660
Carbon steels	C20	CK20	XC20	060 A 20	1020	198	93	540÷690
	C40	CK40	XC42H1	060 A 40	1040	198	93	700÷840
	C50	CK50	----	----	1050	202	94	760÷900
	C60	CK60	XC55	060 A 62	1060	202	94	830÷980
Spring steels	50CrV4	50CrV4	50CV4	735 A 50	6150	207	95	1140÷1330
	60SiCr8	60SiCr7	----	----	9262	224	98	1220÷1400
Alloyed steels for hardening and tempering and for nitriding	35CrMo4	34CrMo4	35CD4	708 A 37	4135	220	98	780÷930
	39NiCrMo4	36CrNiMo4	39NCD4	----	9840	228	99	880÷1080
	41CrAlMo7	41CrAlMo7	40CADG12	905 M 39	----	232	100	930÷1130
Alloyed casehardening steels	18NiCrMo7	----	20NCD7	En 325	4320	232	100	760÷1030
	20NiCrMo2	21NiCrMo2	20NCD2	805 H 20	4315	224	98	690÷980
Alloyed for bearings	100Cr6	100Cr6	100C6	534 A 99	52100	207	95	690÷980
Tool steel	52NiCrMoKU	56NiCrMoV7C100K	----	----	----	244	102	800÷1030
	C100KU	C100W1	----	BS 1	S-1	212	96	710÷980
	X210Cr13KU	X210Cr12	Z200C12	BD2-BD3	D6-D3	252	103	820÷1060
	58SiMo8KU	----	Y60SC7	----	S5	244	102	800÷1030
Stainless steels	X12Cr13	4001	----	----	410	202	94	670÷885
	X5CrNi1810	4301	Z5CN18.09	304 C 12	304	202	94	590÷685
	X8CrNi1910	----	----	----	----	202	94	540÷685
	X8CrNiMo1713	4401	Z6CDN17.12	316 S 16	316	202	94	490÷685
Copper alloys Special brass Bronze	Aluminium copper alloy G-CuAl11Fe4Ni4 UNI 5275					220	98	620÷685
	Special manganese/silicon brass G-CuZn36Si1Pb1 UNI5038					140	77	375÷440
	Manganese bronze SAE43 - SAE430					120	69	320÷410
	Phosphor bronze G-CuSn12 UNI 7013/2a					100	56,5	265÷314
Cast iron	Gray pig iron G25					212	96	245
	Spheroidal graphite cast iron GS600					232	100	600
	Malleable cast iron W40-05					222	98	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



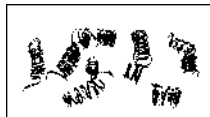
9.4 - Cutting and advance speed

The cutting speed (m/min) and the advance speed (cm²/min = area travelled by the blade during removal of chip) 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 blade 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 cm²/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**

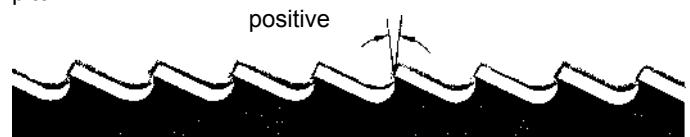
Shape and angle of tooth

REGULAR TOOTH: 0° rake and constant pitch.



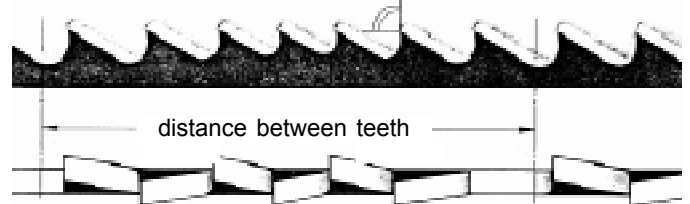
Most common form for transversal or inclined cutting of solid small and average cross-sections or pipes, in laminated mild steel and grey iron or general metal.

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



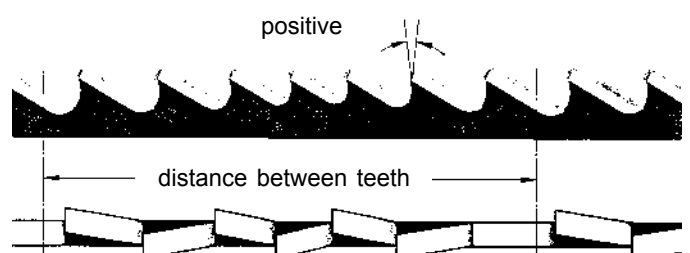
Particular use for crosswise or inclined cuts in solid sections or large pipes, but above all harder materials (highly alloyed and stainless steels, special bronze and forge pig).

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.

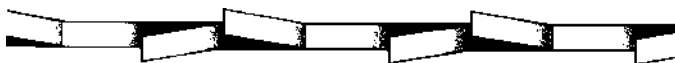
COMBO TOOTH: 9° - 10° positive rake.



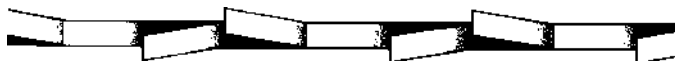
This type of blade is the most suitable for the cutting of section bars and large and thick pipes as well as for the cutting of solid bars at maximum machine capacity. Available pitches: 3-4/4-6.

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	REMOVAL cm ² /min
CONSTRUCTION	60/80	EMULSIFIABLE OIL	40/60
CEMENTATION	40/50	EMULSIFIABLE OIL	20/40
CARBON STEEL	40/60	EMULSIFIABLE OIL	40/60
HARDENING AND TEMPERING	40/50	EMULSIFIABLE OIL	30/50
BEARINGS	40/60	EMULSIFIABLE OIL	15/30
SPRINGS	40/60	EMULSIFIABLE OIL	10/30
FOR TOOLS	30/40	EMULSIFIABLE OIL	6/20
FOR VALVES	35/50	EMULSIFIABLE OIL	20/30
STAINLESS STEEL	30/40	EMULSIFIABLE OIL	6/20
SPHEROIDAL GRAPHITE	20/40	EMULSIFIABLE OIL	6/30
CAST IRON	40/60	EMULSIFIABLE OIL	30/60
ALUMINIUM	80/600	KEROSENE	60/450
BRONZE	70/120	EMULSIFIABLE OIL	40/70
HARD BRONZE	30/60	EMULSIFIABLE OIL	6/20
BRASS	70/350	EMULSIFIABLE OIL	25/80
COPPER	50/720	EMULSIFIABLE OIL	-----

10 MACHINE COMPONENTS

10.1 - List of spare parts

TABLE 1

N.	DESCRIPTION
01	Base
02	Coolant tank level
03	Electropump
04	Electric component box
05	Righthand angle guide
06	Screw
07	Electropump plate
08	Screw
09	Coolant filter
10	Screw
11	Central support
12	Screw
13	Lefthand angle guide
14	Screw
15	Nut
16	Screw
17	Stop block
18	Cover
19	Box supporting square (R)
20	Box support square (L)
21	Bearing housing
22	Bearing 6205 2Z
23	Screw
24	Motherscrew
25	Nut
26	Screw
27	Motor for swivelling system
28	Bearing 6004
29	Plate
30	Pin
31	Pin
32	Screw

TABLE 2

N.	DESCRIPTION
01	Counterservice support
02	Washer
03	Screw
04	Material support (loading side)
05	Screw
06	Vice support
07	Vice
08	Rack
09	Stop pawl
10	Vice gib
11	Pin
12	Pin
13	Screw
14	Vice guide
15	Front plate of vice cylinder
16	Screw
17	Spring
18	Piston
19	Guarnizione USH 60 A
20	Cilindro morsa

21	Ring 'OR'
22	Cylinder rear flange
23	Screw
24	Material support (unloading side)
25	Pin
26	Counterservice
27	Screw
28	Block
29	Screw
30	Washer

TABLE 3

N.	DESCRIPTION
01	Gear-box housing
02	Wrench
03	Worm screw shaft
04	Bearing 6206
05	Cover (L)
06	Screw
07	Stop ring
08	Protection support
10	Nut
11	Bearing 51204
12	Specer
13	Hinged pin
14	Bushing
15	Screw
16	Threaded pin
17	Washer
18	Washer
19	Screw
20	Driving belt protection
21	Bushing
22	Bearing 6207
23	Spacers
24	Ring Seeger Ø 35
25	Bearing 51307
26	Springs
27	Joint SM 35 50 7
28	Belt 3V 475
29	Driven pulley
30	Threaded rod
31	Plate guide
32	Motor support plate
33	Nut
34	Wrench
35	Motor for blade rotation
36	Motor pulley
37	Flange
38	Screw
39	Motor pulley for blade cleaning brush
40	Driving belt for blade cleaning brush

TABLE 4

N.	DESCRIPTION
01	Gear-box housing
02	Washer
03	Screw
04	Worm wheel
05	Worm wheel bushing
06	Joint
07	Worm wheel shaft
08	Bearing 32012
09	Bearing spacer
10	Motor flywheel cover
11	Stop ring
12	Nut
13	Sawframe
14	Screw
15	Motor flywheel
16	Screw
17	Flange of motor flywheel
18	Flange

TABLE 5

N.	DESCRIPTION
01	Sawframe
02	Driven flywheel cover
03	Driven flywheel
04	Driven flywheel shaft
05	Bearing 32209 A
06	Spacer
07	Screw
08	Stop ring
09	Nut M 45
10	Driven flywheel flange
13	Greasing point
14	Slide support for blade tension
15	Slide for blade tension
16	Slide gibs
17	Nut
18	Washer
19	Front part of blade tension cylinder
20	Ring 'OR'
21	Ring 'OR'
22	Blade tension cylinder
23	Piston of blade tension cylinder
24	Ring 'OR'
25	Joint DH28
26	Rear part of blade tension cylinder
27	Screw for blade tension adjustment
28	Screw
29	Reference plates
30	Screw
31	Adjusting screw
32	Washer
33	Screw
34	Screw
35	Washer
36	Screw
37	Washer
38	Screw

TABLE 6

N.	DESCRIPTION
01	Slide
02	Scale
03	Pin

04	Screw
05	Screw
06	Blade-guide arm
07	Gib
08	Plate
09	Washer
10	Screw
11	Fixed blade-guide block
12	Joint
13	Washer
14	Nut
15	Spacer
16	Bearing 6201
17	Screw
18	Washer
19	Screw
20	Screw
21	Spacer
22	Pin
23	Spring
24	Knob
25	Pin
26	Lateral blade-guide pad (R)
27	Top blade-guide pad
28	Lateral blade-guide pad (L)
29	Mobile blade-guide block
30	Pin
31	Mobile blade-guide arm
32	Threaded pin
33	Handwheel
34	Screw

TABLE 7

NR.	DESCRIZIONE
1ª SERIE	
01	Brush
02	Shaft
03	Guard
04	Shaft
05	Support
06	Swivel joint
07	Bush
2ª SERIE	
01	Guard
02	Pulley
03	Pulley shaft
04	Bearing
05	Spacer
06	support
07	Screw
08	Pin
09	Belt
10	Screw
11	Ring
12	Brush
13	Nut
14	Handwhell
15	support
16	Screw
17	Guard
18	Screw
19	Bracket
20	Bush
21	Brush shaft
22	Swivel joint
23	Shaft

TAVOLA 1

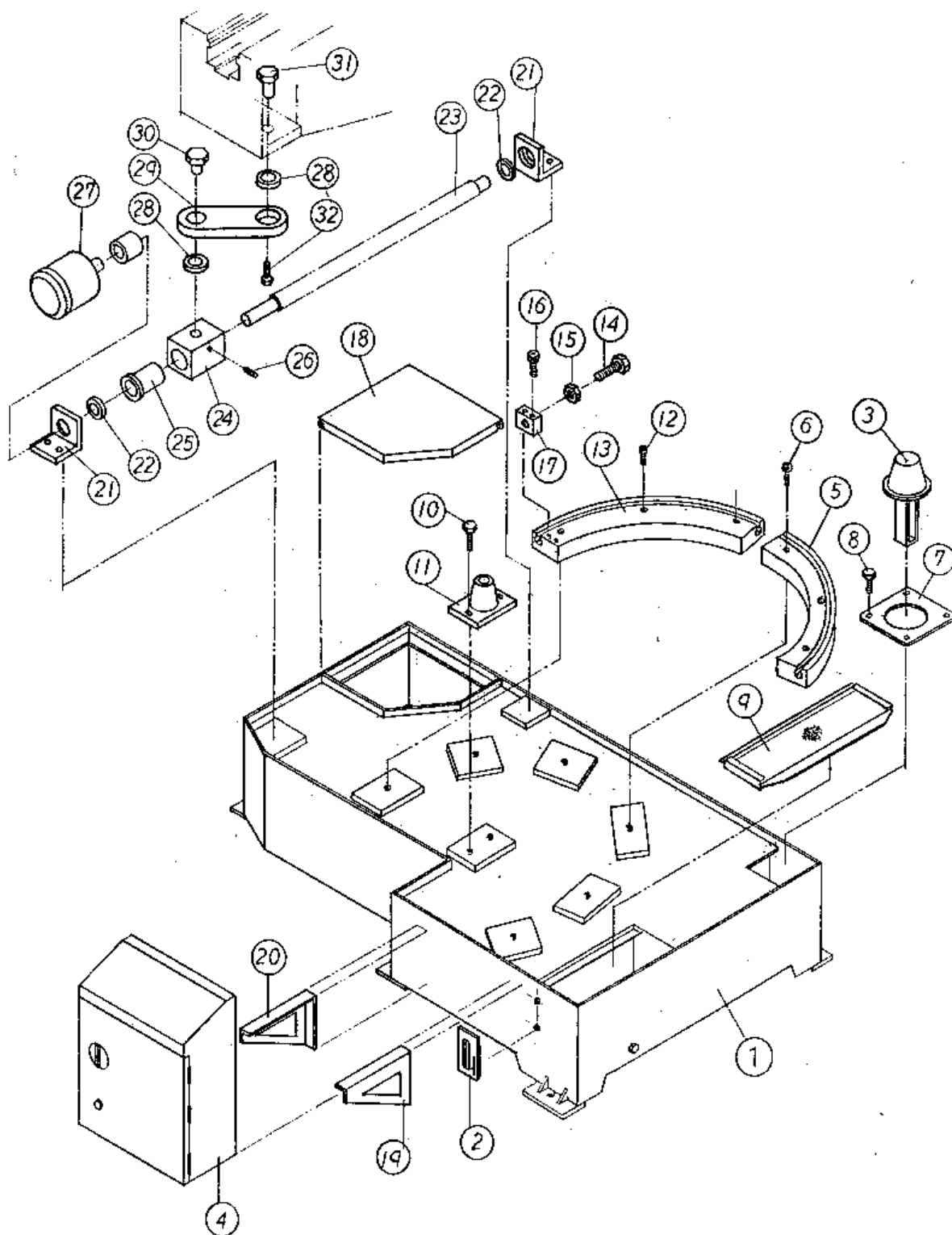


TAVOLA 2

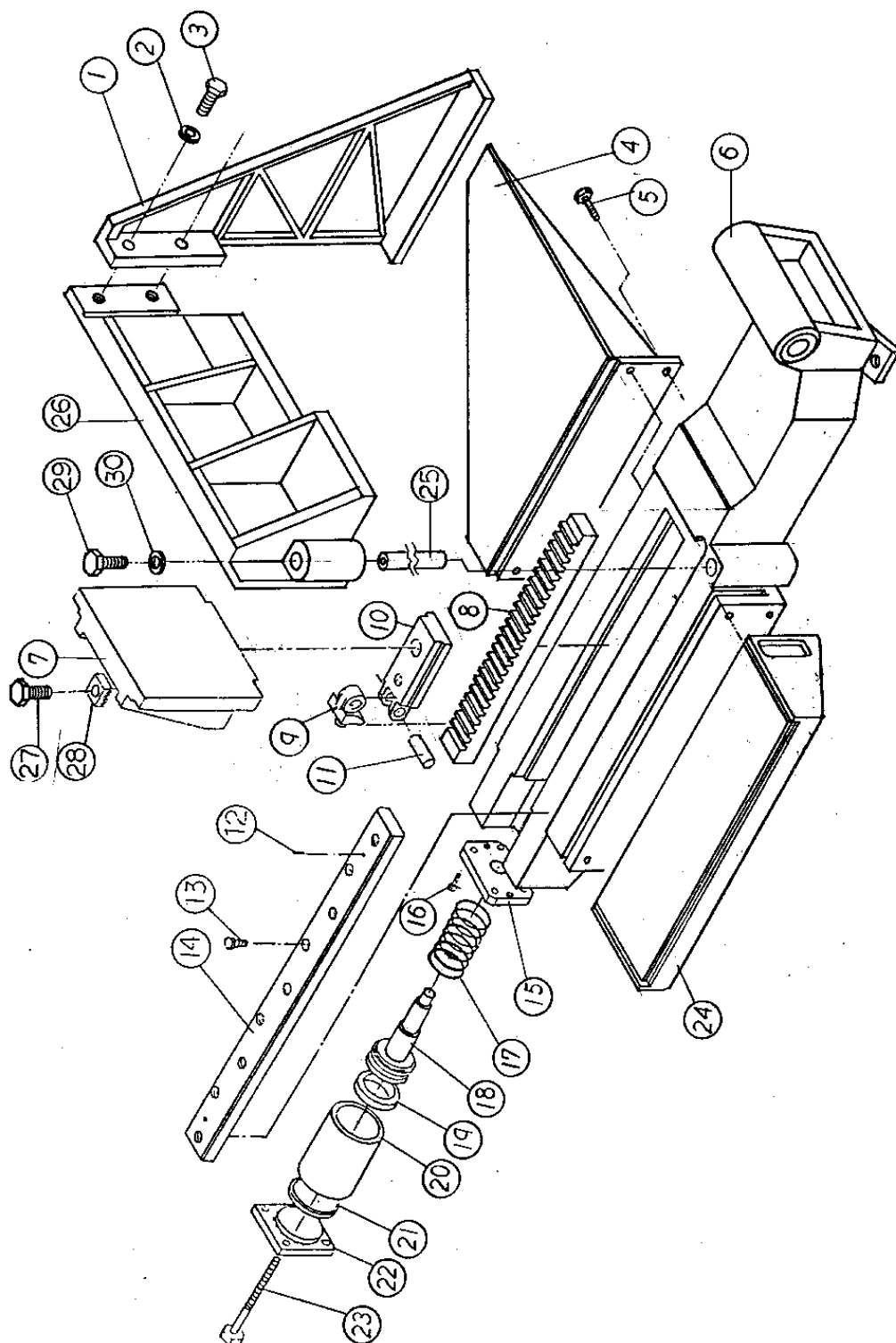


TAVOLA 3

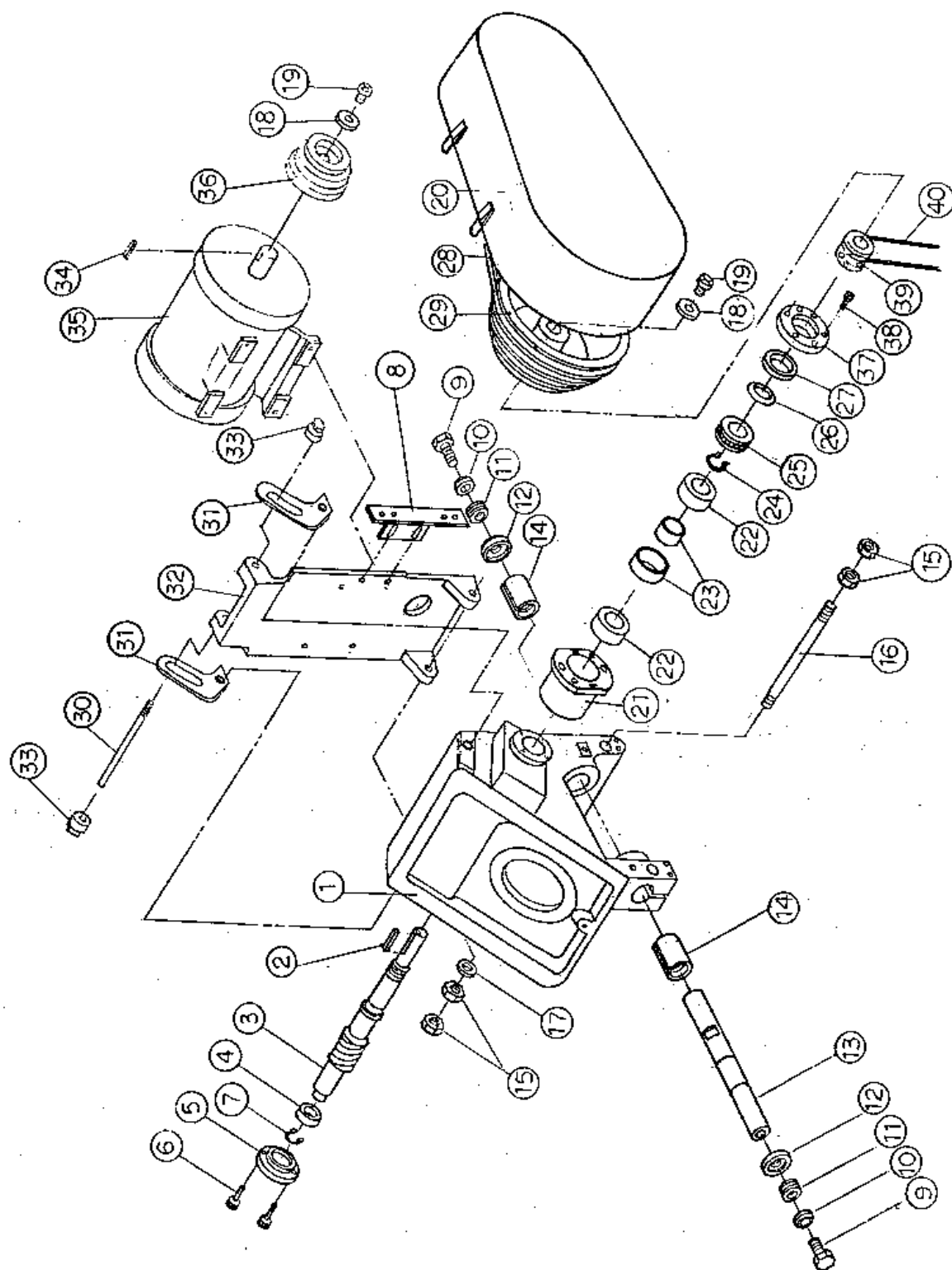


TAVOLA 4

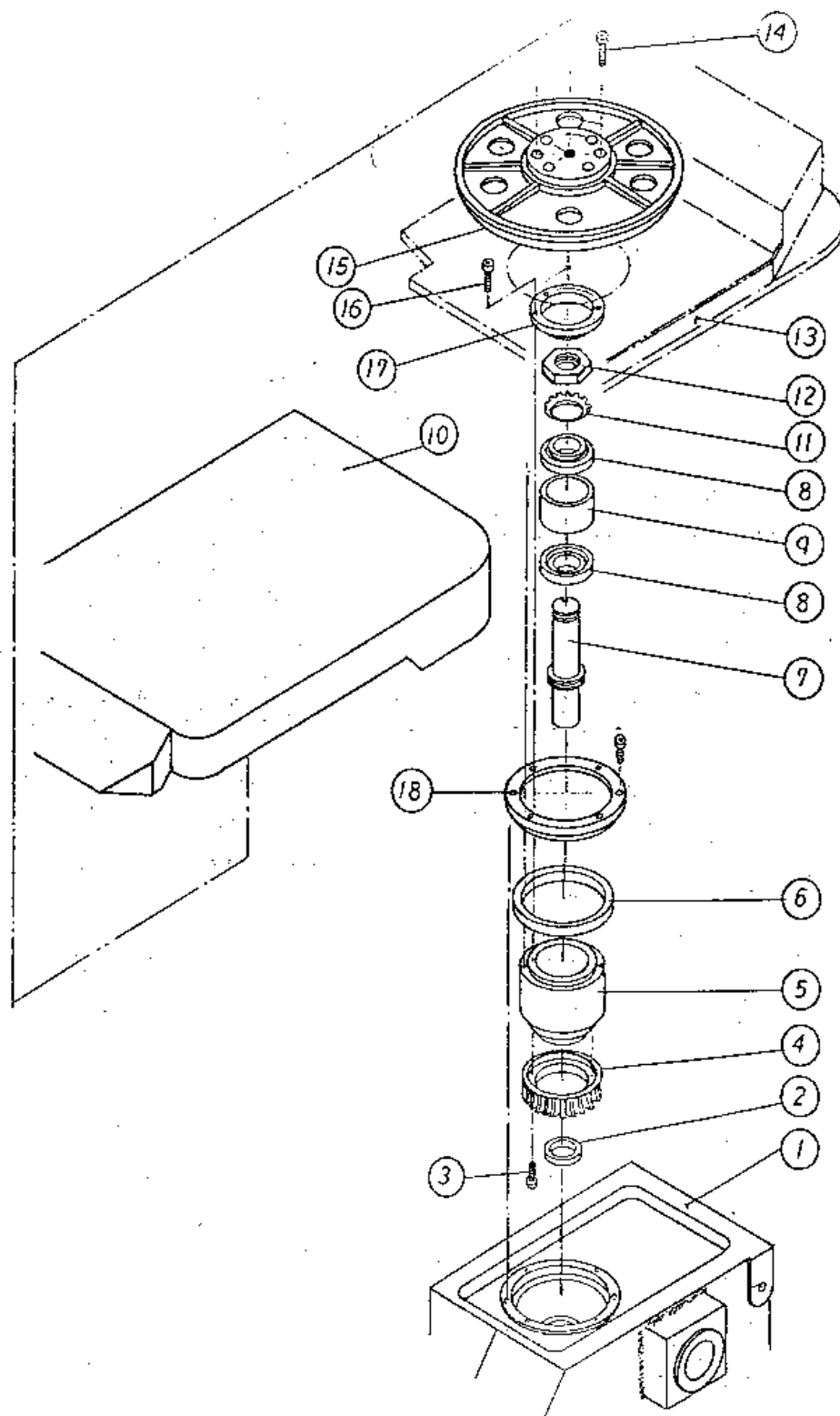


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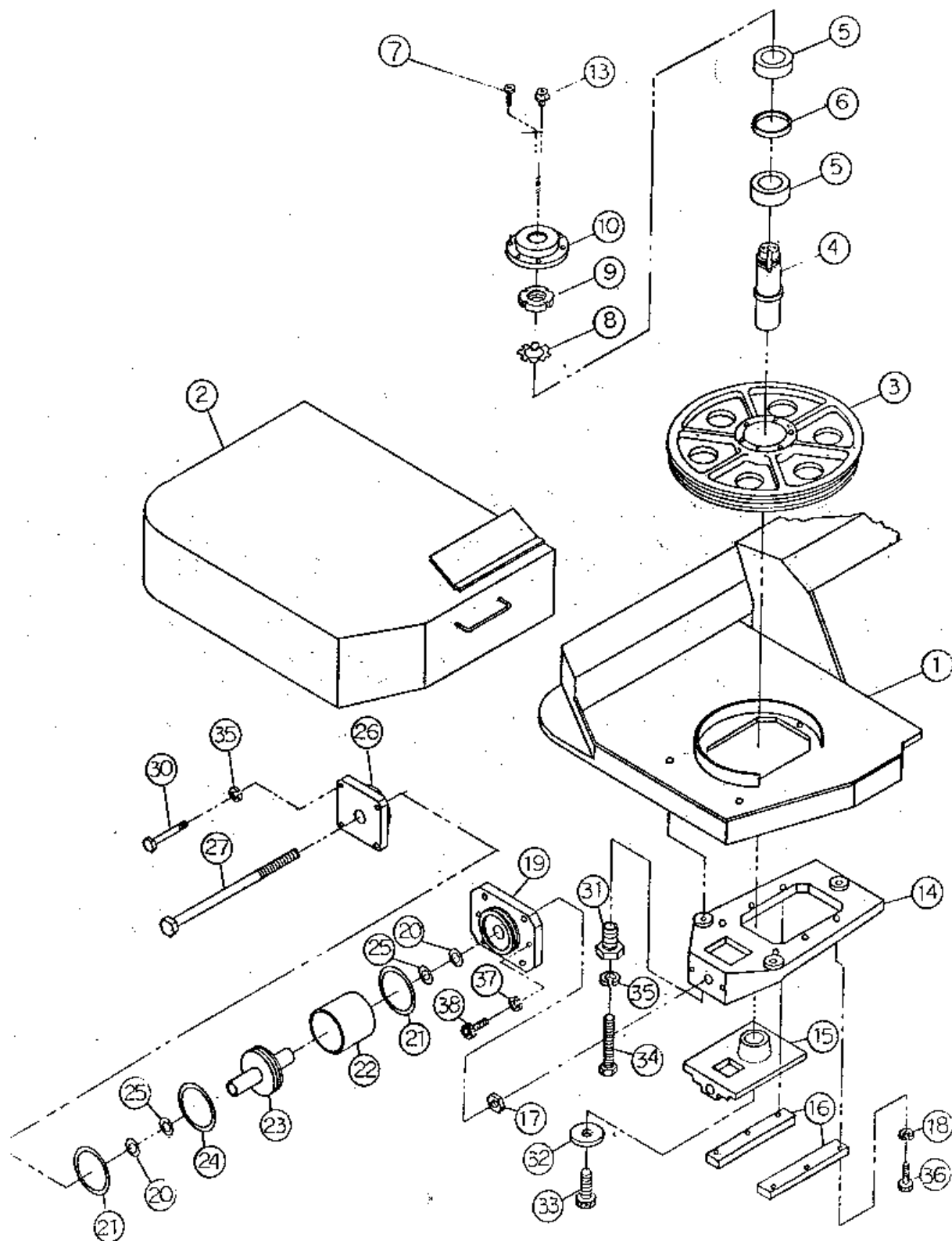


TAVOLA 6

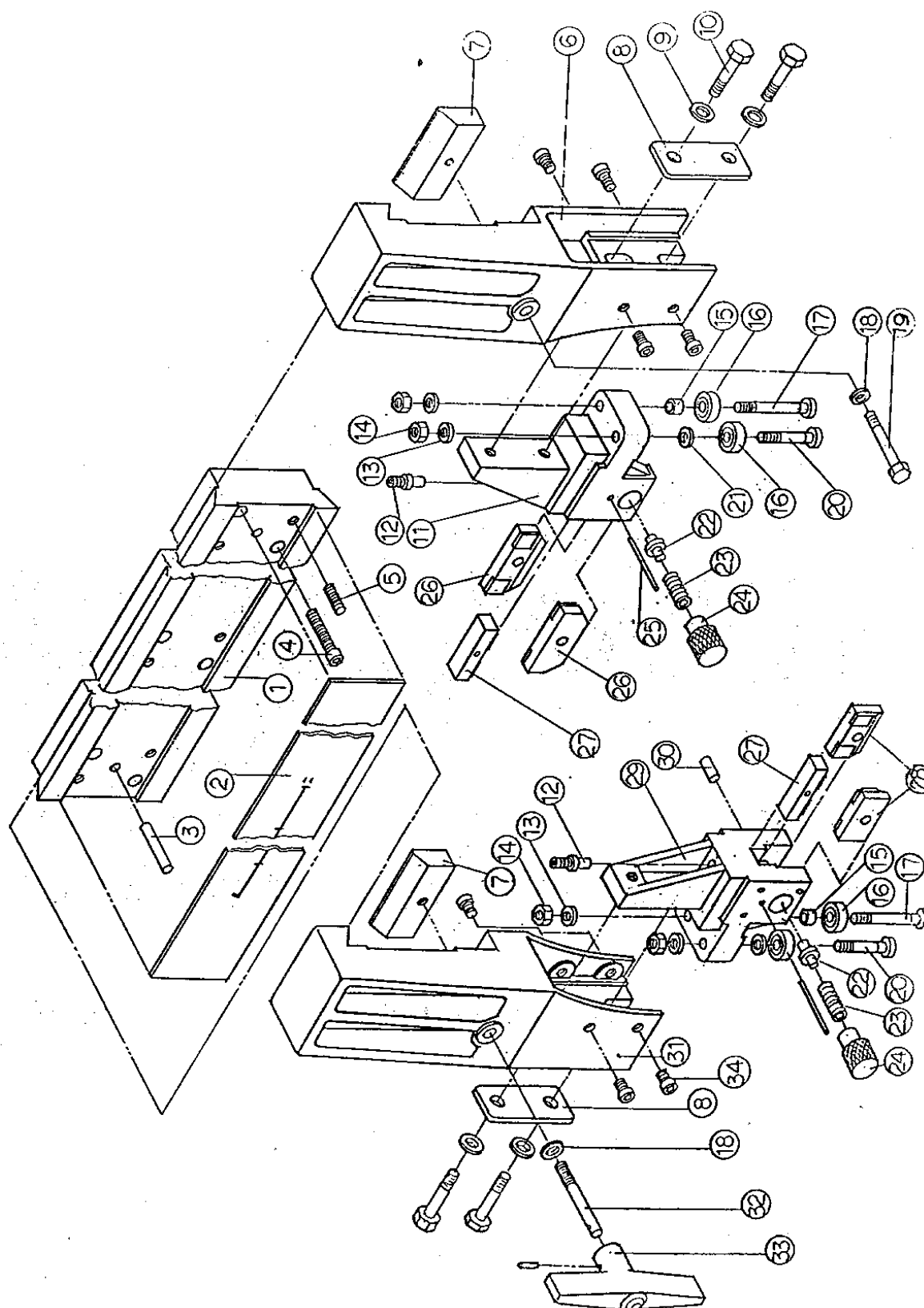
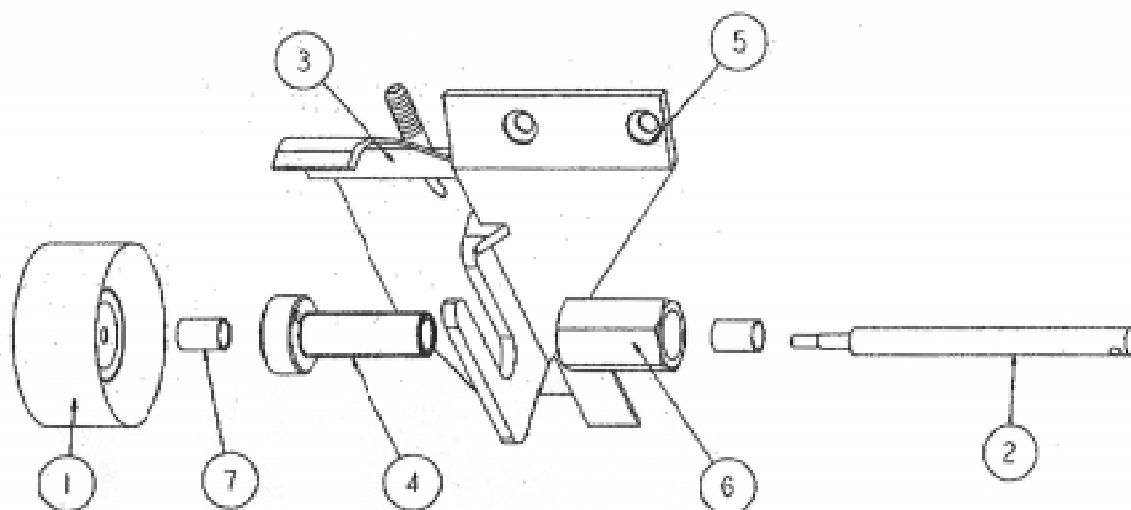
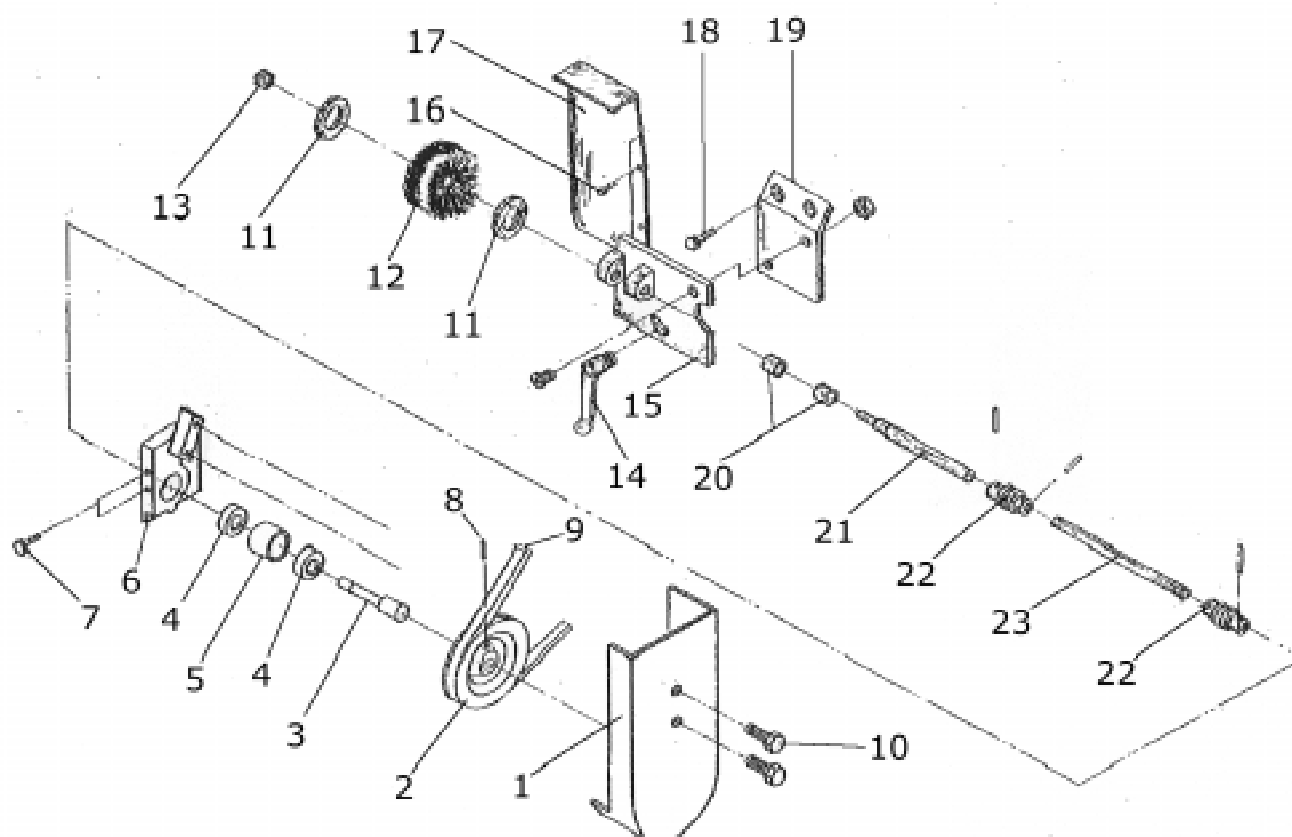


TAVOLA 7

1ª SET

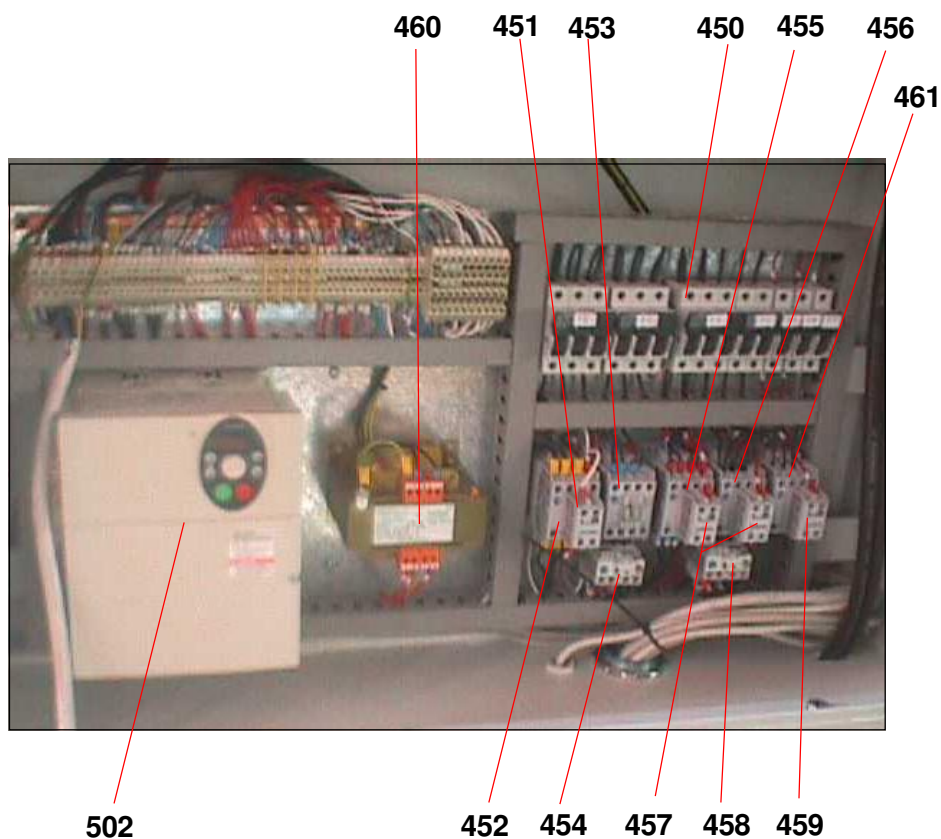


2ª SET



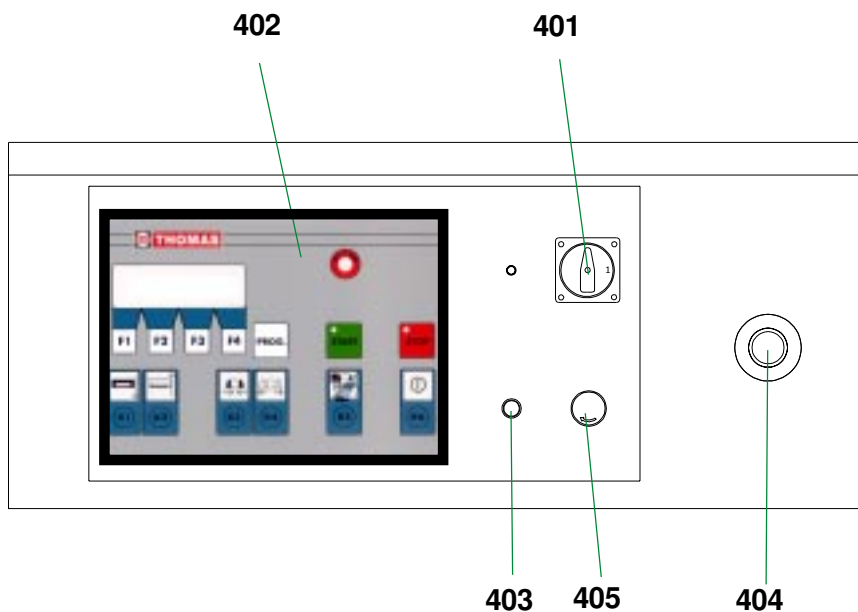
LEGENDA ELECTRIC COMPONENTS

- 450 Fuse cartridge
- 451 Aux. contact
- 452 Remote switch
- 453 Remote switch
- 454 Thermal relay
- 455 Remote switch
- 456 Remote switch
- 457 Aux. contact
- 458 Remote switch
- 459 Aux. contact
- 460 Transformer
- 461 Thermal relay



LEGENDA CONTROL PANEL

- 401 Main switch
- 402 Electronic control SAW 1
- 403 Start push button
- 404 Sawframe downfeed regulator
- 405 Emergency push button

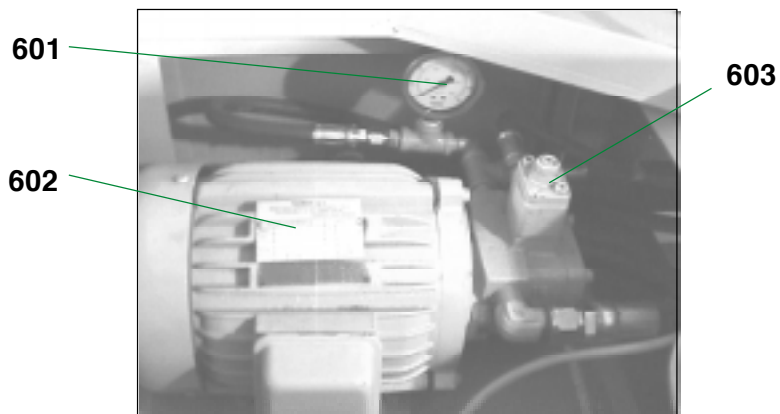


LEGENDA INVERTER

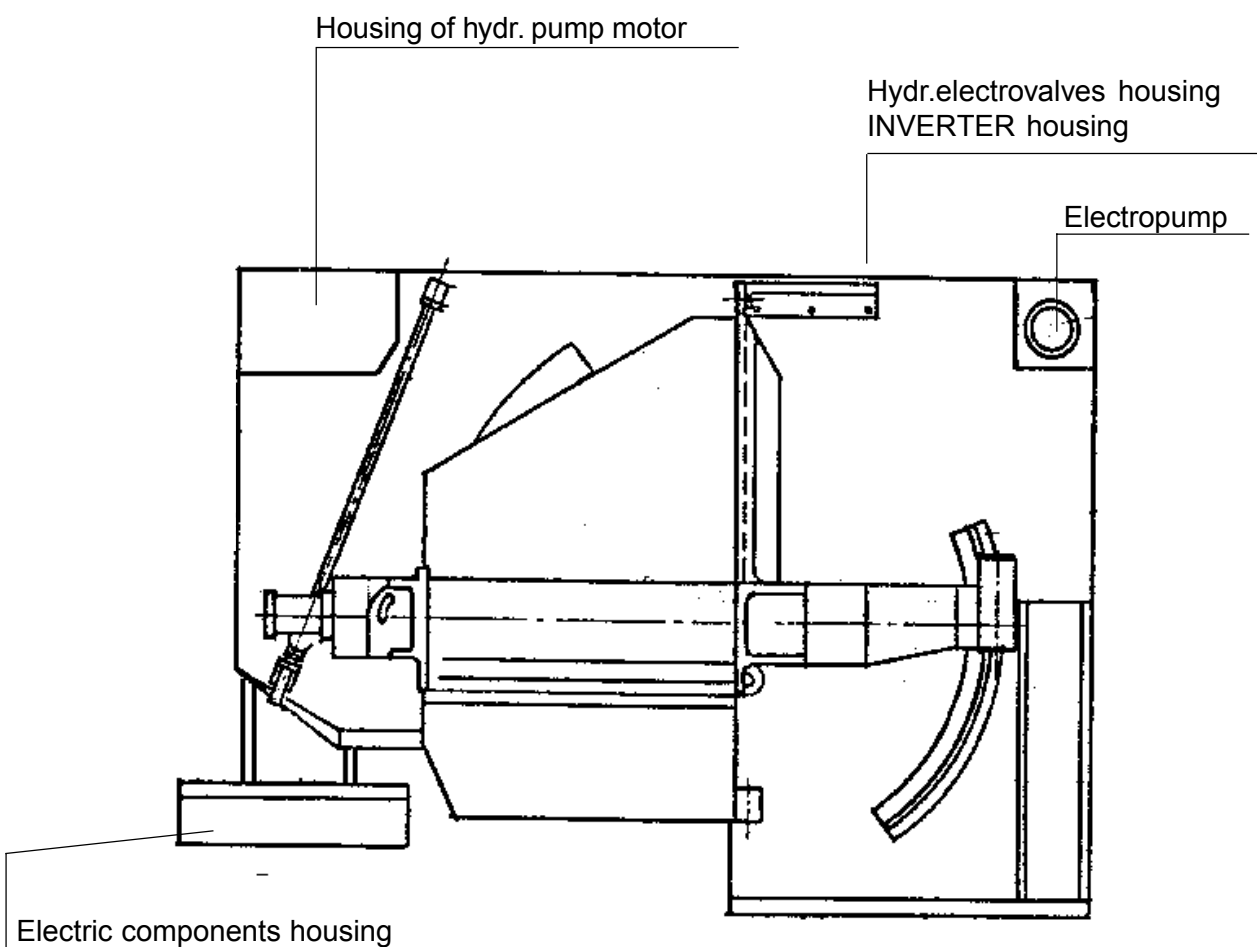
- 501 Inverter

LEGENDA HYDRAULIC COMPONENTS

- 601 Hydraulic pump motor
- 602 Pressure gauge
- 603 Hydraulic pump

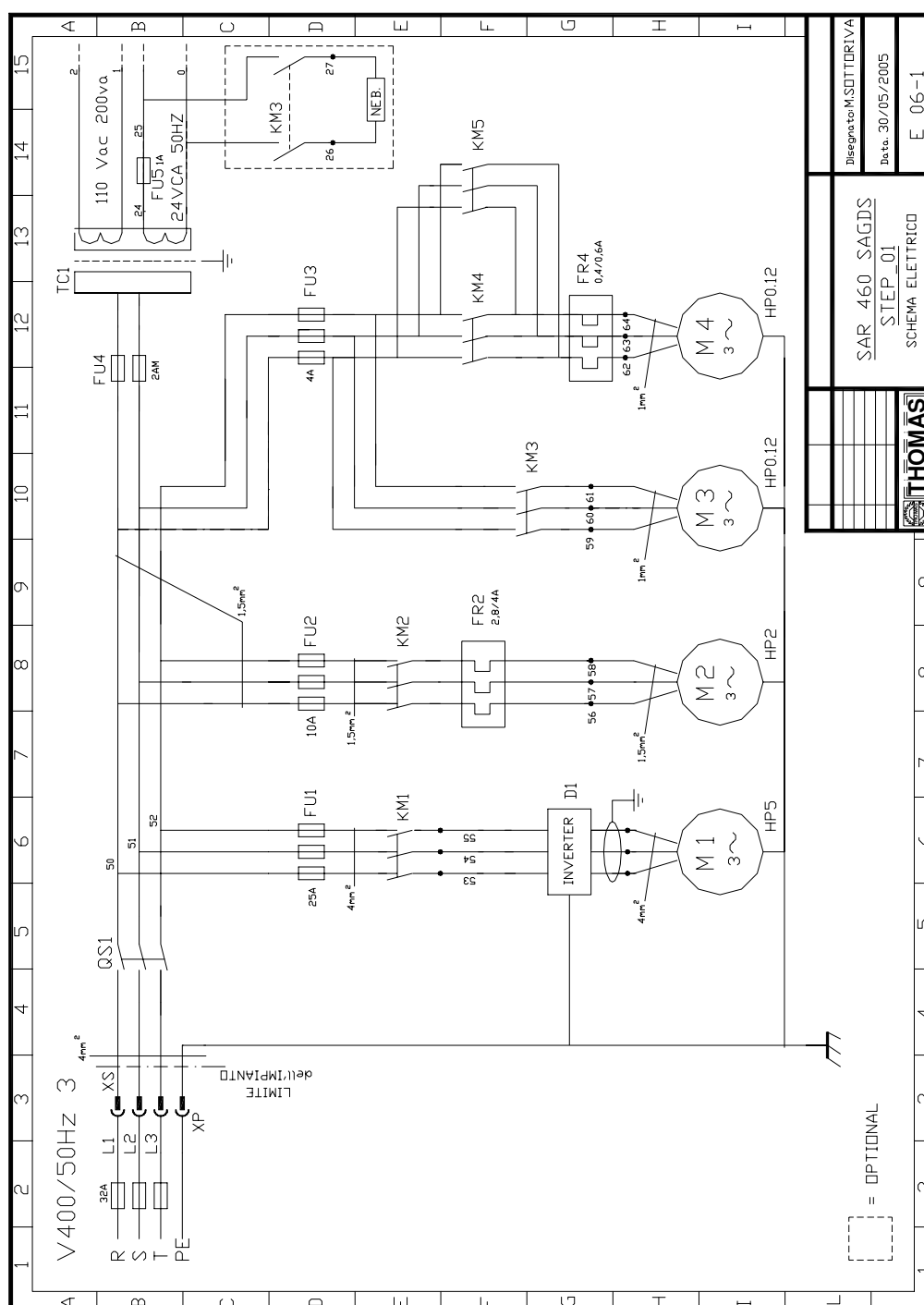


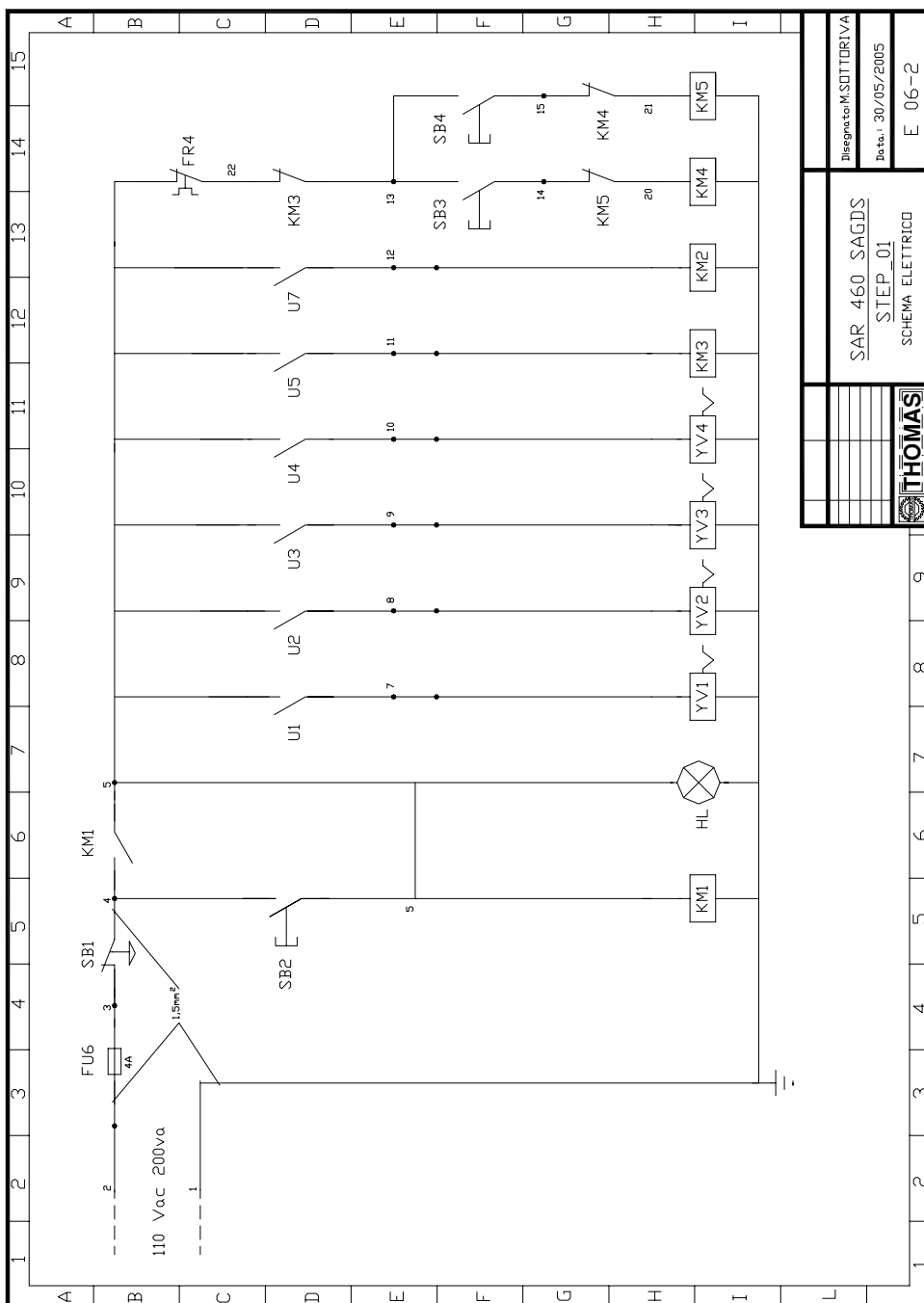
COMPONENTS LAYOUT



11 SCHEMI ELETTRICI

11.1 - Schema elettrico trifase

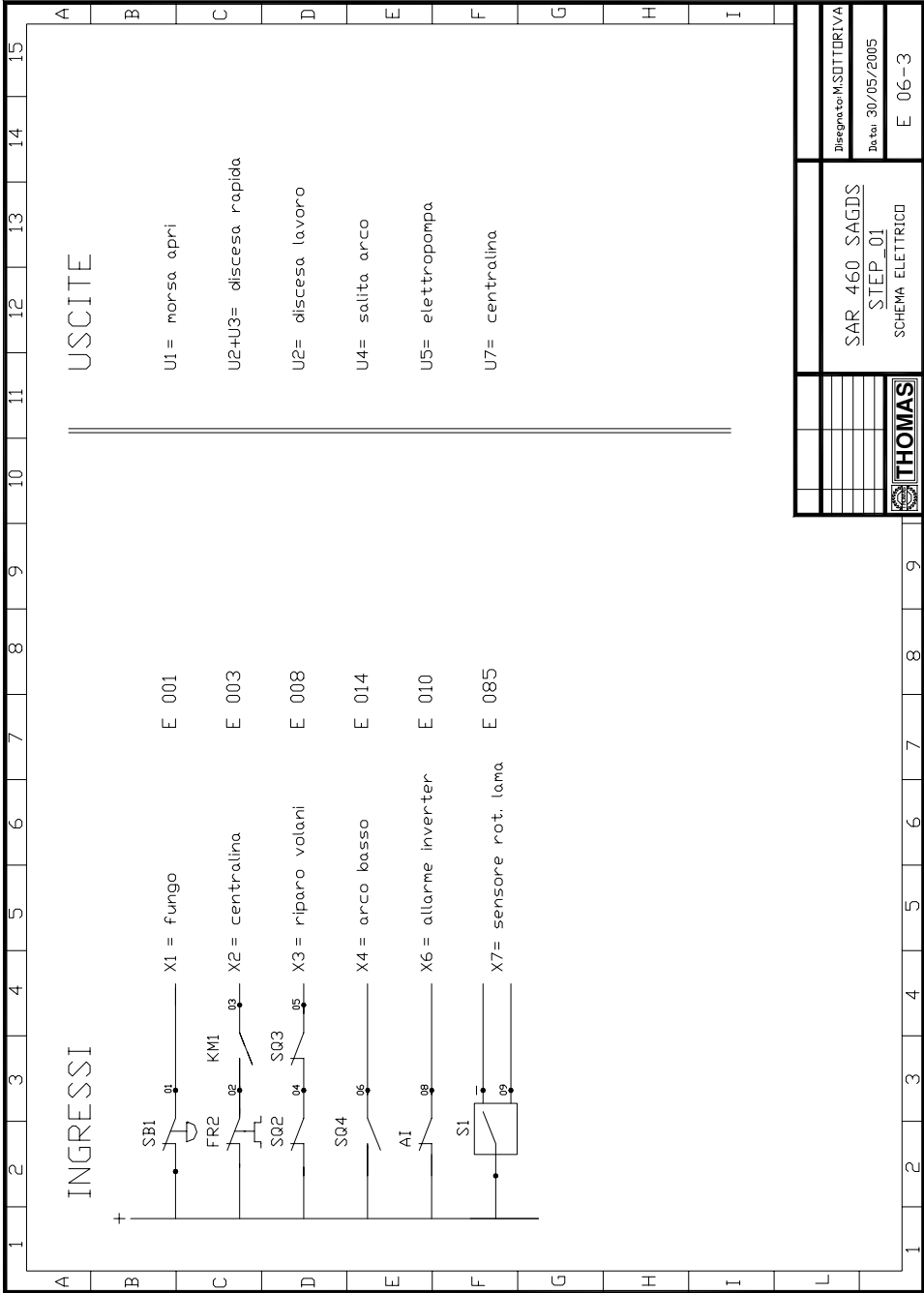


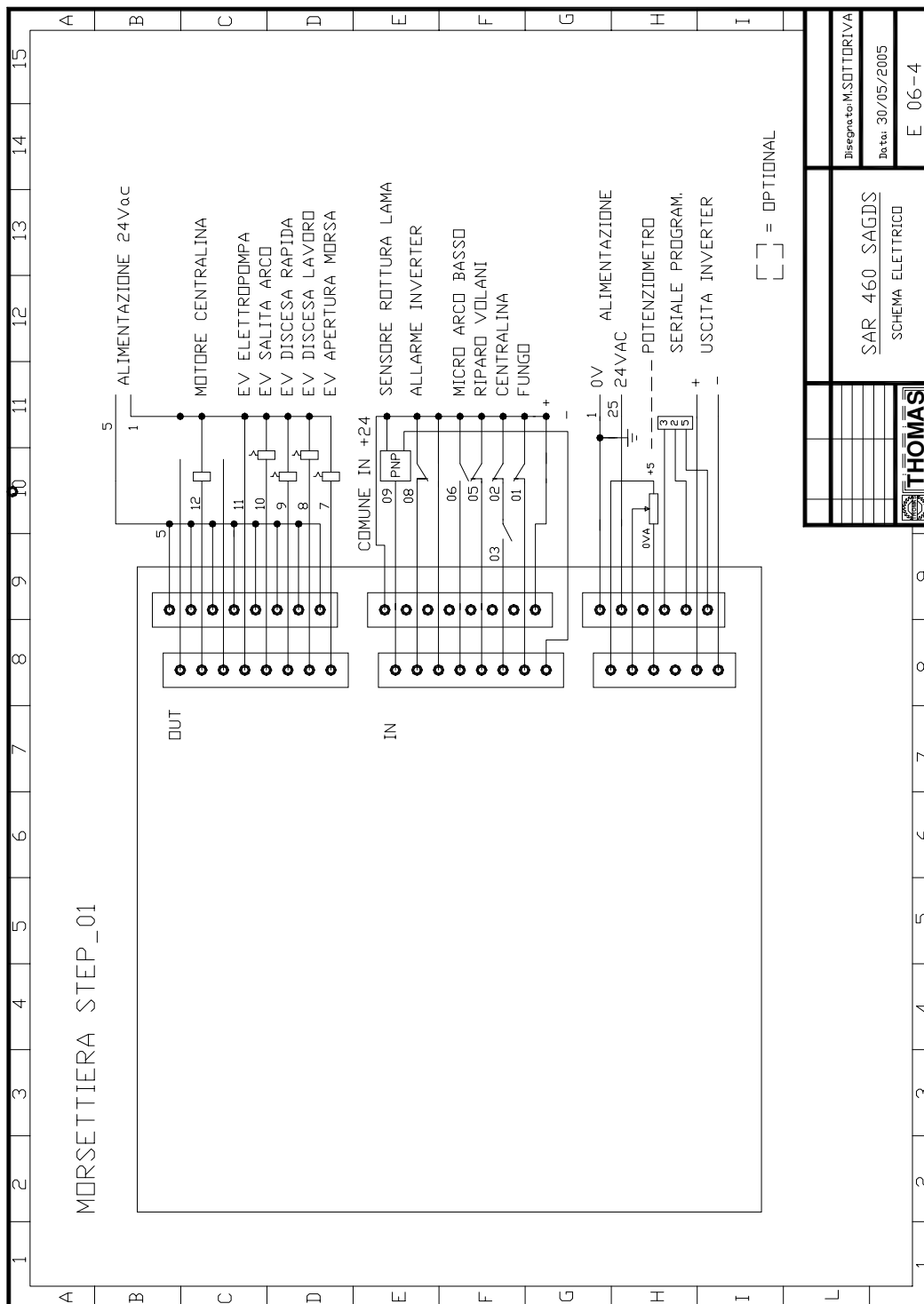


Disegnato: M. SOTTORIVA
Data: 30/05/2005
E 06-2

SAR 460 SAGDS
STEP_01
SCHEMA ELETTRICO

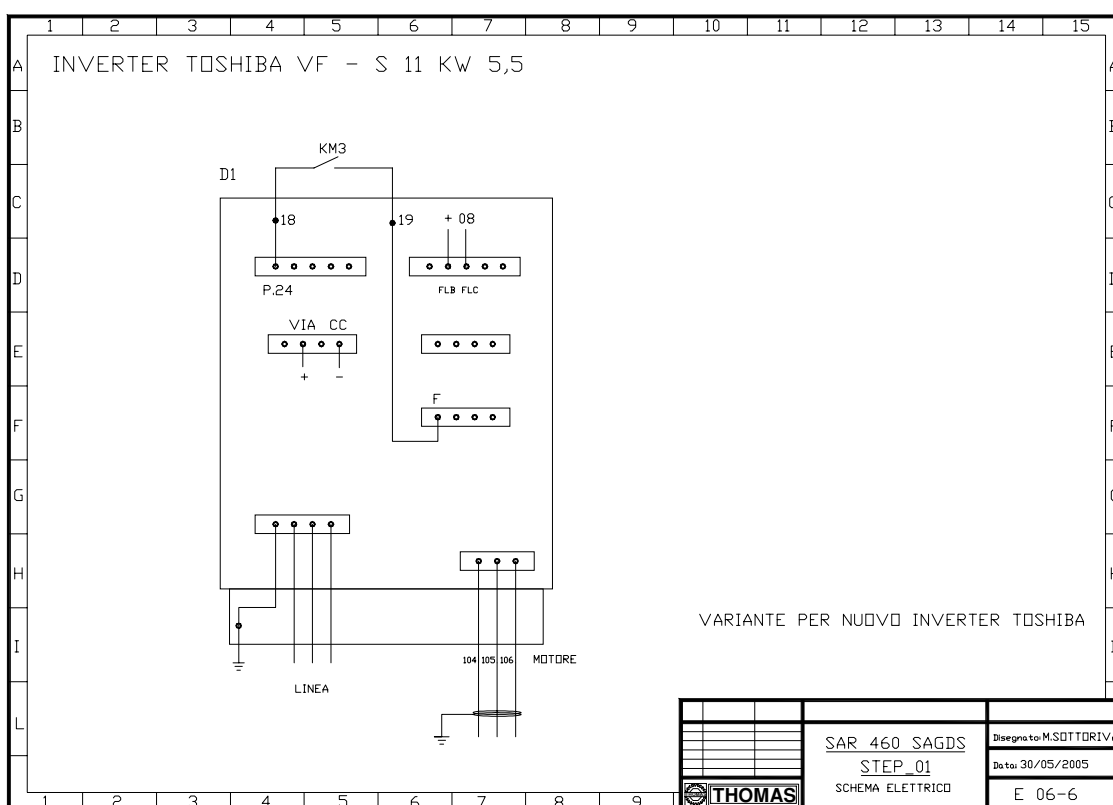




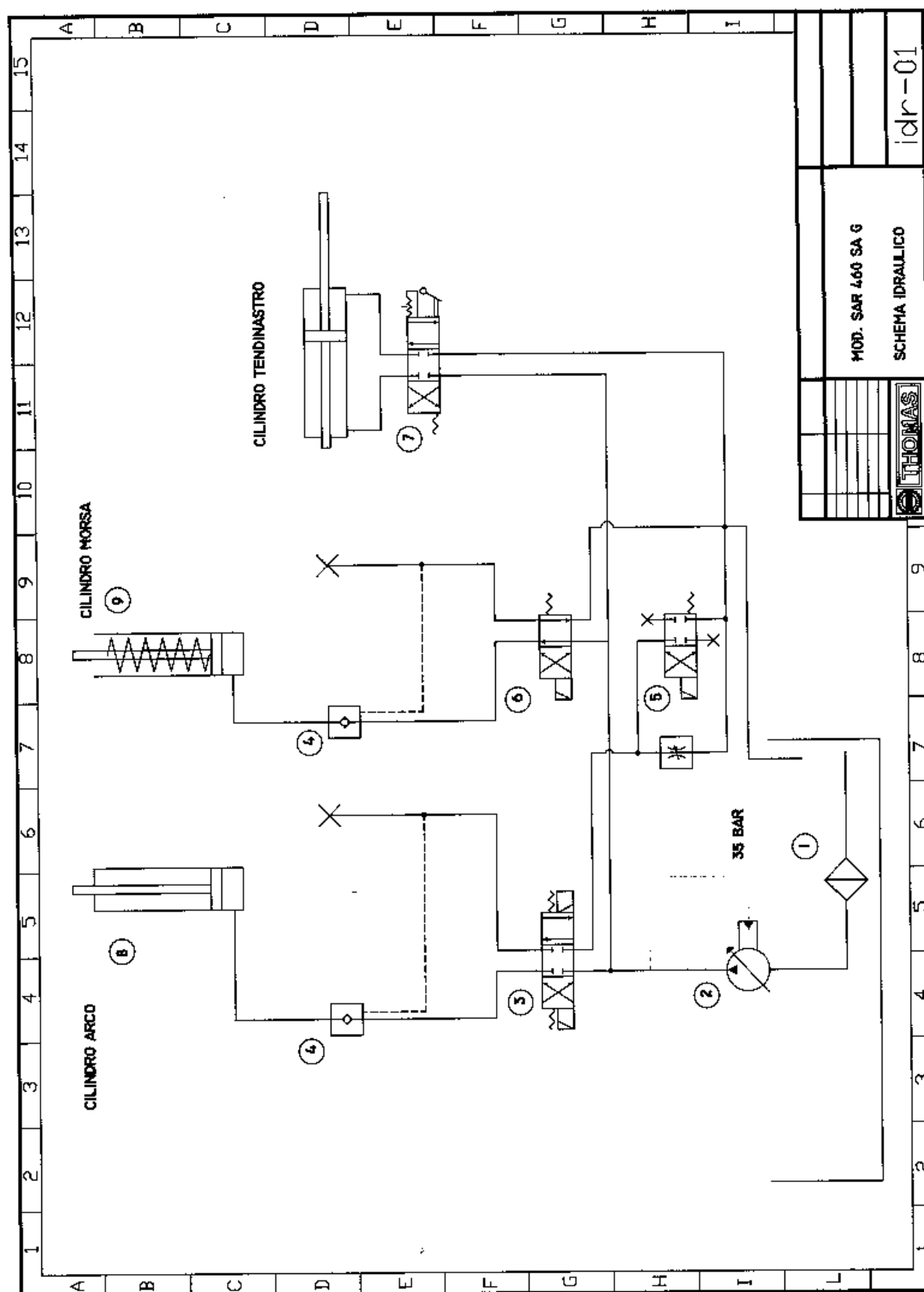


Disegnato: MS.D.T.TORIVA	
Data: 30/05/2005	
E 06-4	
SAR 460 SAGDS	
SCHEMA ELETTRICO	
THOMAS	

SIGLA	DESCRIZIONE
QS1	Interruttore generale
FU1	Cartuccia fusibile
FU2	Cartuccia fusibile
FU3	Cartuccia fusibile
FU4	Cartuccia fusibile
FU5	Cartuccia fusibile
FU6	Cartuccia fusibile
FU7	Cartuccia fusibile
KM1	Teleruttore alim. inverter
KM2	Teleruttore centr. idraulica
KM3	Teleruttore elettropompa
KM4	Teleruttore rot. arco
KM5	Teleruttore rot. arco
FI1	Filtro inverter
D1	Inverter
D2	Potenziometro angolare
D3	Strumento Step_01
FR2	Rele' termico
FR4	Rele' termico
TC1	Trasformatore
SB1	Pulsante emergenza
SB2	Pulsante inizio ciclo
SB3	Pulsante rotaz. arco
SB4	Pulsante rotaz. arco
U1, 2, 3, 4, 5,	Uscite
YV1	Elettrovalv. apri morsa
YV2	Elettrovalv. discesa lavoro
YV2+YV3	Elettrovalv. discesa rapida
YV4	Elettrovalv. salita arco
SQ1	Micro rottura lama
SQ2-SQ3	Micro riparo volani
SQ4	Micro arco basso
A1	Allarme inverter
S1	Sensore rottura lama



11.2 - Schema elettrico idraulico





LEGENDA ELECIRIC CIRCUIT

QS1	Main switch
M1	Motor for blade rotation
M2	Motor for hydraulic unit
M3	Motor for coolant liquid
M4	Motore for sawframe swivelling
FU1	Fuse cartridge
FU2	Fuse cartridge
FU3	Fuse cartridge
FU4	Fuse cartridge
FU5	Fuse cartridge
FU6	Fuse cartridge
KM1	Remote switch for INVERTER
KM2	Remote switch for hydraulic unit
KM3	Remote switch for coolant electropump
KM4-KM5 ..	Remote switch for sawframe swivelling
.....	
FI1	Filter for Inverter
D1	INVERTER
D2	Potentiometer
FR2	Thermal relay
TC1	Transformer
SB1	Emergency push button
SB2	Cycle start push button
SB3	Push button for sawframe swivelling
SB4	Push button for sawframe swivelling
AI	Alarm Inverter
YV1	Electrovalve vice opening
YV2	Electrovalve sawframe downfeed
YV2+YV3 ..	Electrovalve quick sawframe downfeed
YV4	Electrovalve sawframe lifting
SQ1	Microswitch for blade breakage
SQ2-SQ3...	Microswitch for flywheel cover
SQ4	Microswitch for sawframe down
U1,2,3,4	
,5,7	Outputs
S1	Blade breakage sensor

LEGENDA HYDRAULIC CIRCUIT

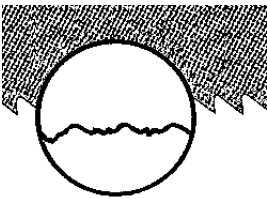

01	Filter
02	Hydraulic pump
03	Electrovalve for sawframe cylinder
04	Stop Valve
05	Electrovalve for quick sawframe downfeed
06	Electrovalve fro vice cylinder
07	Electrovalve for blade tension cylinder
08	Sawframe cylinder
09	Vice cylinder

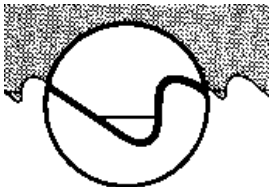
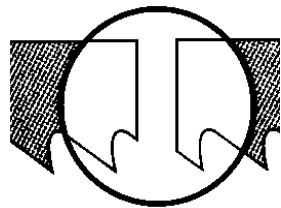

12 TROUBLESHOOTING

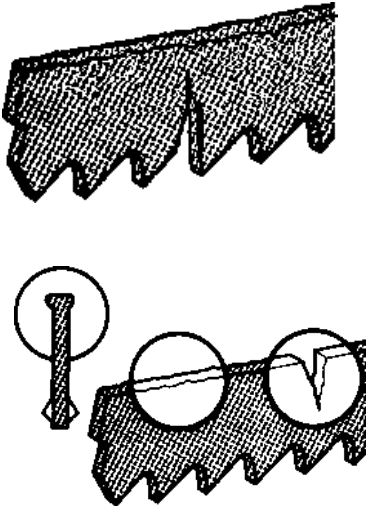
This chapter lists the probable faults and malfunctions that could occur while the machine is being used and suggests possible remedies for solving them.

The first paragraph provides diagnosis for TOOLS and CUTS, the second for ELECTRICAL COMPONENTS.

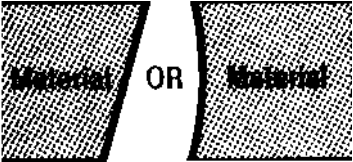
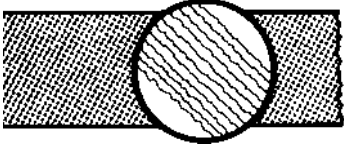
12.1 - Blade and cut diagnosis

FAULT	PROBABLE CAUSE	REMEDY
<p>TOOTH BREAKAGE</p>  	<p>Too fast advance</p> <p>Wrong cutting speed</p> <p>Wrong tooth pitch</p> <p>Chips sticking onto teeth and in the gullets or material that gums</p> <p>Defects on the material or material too hard</p> <p>Ineffective gripping of the part in the vice</p> <p>The blade gets stuck in the material</p> <p>Starting cut on sharp or irregular section bars</p> <p>Poor quality blade</p> <p>Previously broken tooth left in the cut</p> <p>Cutting resumed on a groove made previously</p> <p>Vibrations</p> <p>Wrong tooth pitch or shape</p> <p>Insufficient lubricating refrigerant or wrong emulsion</p> <p>Teeth positioned in the direction opposite the cutting direction</p>	<p>Decrease advance, exerting less cutting pressure.</p> <p>Change blade speed and/or type of blade. See Chapter "Material classification and blade selection" in the <i>Blade selection table according to cutting and feed speed</i>.</p> <p>Choose a suitable blade. See Chapter "Material classification and blade selection".</p> <p>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.</p> <p>Material surfaces can be oxidised or covered with impurities making them, at the beginning of the cut, harder than 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.</p> <p>Check the gripping of the part.</p> <p>Reduce feed and exert less cutting pressure.</p> <p>Pay more attention when you start cutting.</p> <p>Use a superior quality blade.</p> <p>Accurately remove all the parts left in.</p> <p>Make the cut elsewhere, turning the part.</p> <p>Check gripping of the part.</p> <p>Replace blade with a more suitable one. See Chapter "Material classification and blade selection" in the <i>Blade Types</i> section.</p> <p>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.</p> <p>Check the emulsion percentage.</p> <p>Turn teeth in correct direction.</p>

FAULT	PROBABLE CAUSE	REMEDY
<p>PREMATURE BLADE WEAR</p> 	<p>Faulty running-in of blade</p> <p>Teeth positioned in the direction opposite the cutting direction</p> <p>Poor quality blade</p> <p>Too fast advance</p> <p>Wrong cutting speed</p> <p>Defects on the material or material too hard</p> <p>Insufficient lubricating refrigerant or wrong emulsion</p>	<p>See Chapter "Material classification and blade selection" in the <i>Blade running-in</i> section.</p> <p>Turn teeth in correct direction.</p> <p>Use a superior quality blade.</p> <p>Decrease advance, exerting less cutting pressure. Adjust the braking device if mounted on the machine.</p> <p>Change speed of blade.</p> <p>See Chapter "Material classification and blade selection" in the <i>Blade selection table according to cutting and feed speed</i>.</p> <p>Material surfaces can be oxidised or covered with impurities making them, at the beginning of the cut, harder than 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.</p> <p>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.</p> <p>Check the emulsion percentage.</p>
<p>BLADE BREAKAGE</p>  	<p>Faulty welding of blade</p> <p>Too fast advance</p> <p>Wrong cutting speed</p> <p>Wrong tooth pitch</p> <p>Ineffective gripping of the part in the vice</p> <p>Blade touching material at beginning of cut</p>	<p>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 guiding block pads.</p> <p>Decrease advance, exerting less cutting pressure. Adjust the braking device if mounted on the machine.</p> <p>Change blade speed and/or type of blade. See Chapter "Material classification and blade selection" in the <i>Blade selection table according to cutting and feed speed</i>.</p> <p>Choose a suitable blade. See Chapter "Material classification and blade selection".</p> <p>Check the gripping of the part.</p> <p>At the beginning of the cutting process, never lower the saw frame before starting the blade motor.</p>

FAULT	PROBABLE CAUSE	REMEDY
	<p>Blade guide pads not regulated or dirty because of lack of maintenance</p> <p>Blade too slack</p> <p>Blade guide block too far from material to be cut</p> <p>Improper position of blade on flywheels</p> <p>Insufficient lubricating refrigerant or wrong emulsion</p>	<p>Check distance between pads (see Chapter "Machine adjustments" in the <i>Blade Guide blocks</i> section): extremely accurate guiding may cause cracks and breakage of the tooth. Clean carefully.</p> <p>Check that on the blade tightening pressure gauge reads 22 BAR, the ideal tightening value.</p> <p>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.</p> <p>The back of blade rubs against the support due to deformed or poorly welded bands (tapered), causing cracks and swelling of the back contour.</p> <p>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.</p>
<p>STREAKED OR ETCHED BANDS</p>	<p>Damaged or chipped blade guide pads</p> <p>Tight or slackened blade guide pads</p>	<p>Replace them.</p> <p>Adjust them (see Chapter "Machine adjustments" in <i>Blade guide blocks</i> section).</p>
<p>CUTS OFF THE STRAIGHT</p>	<p>Blade not parallel as to the counter-vice</p> <p>Blade not perpendicular due to the excessive play between the guide bearings and maladjustment of the heads</p> <p>Too fast advance</p> <p>Blade guide block too far from material to be cut</p> <p>Blade too slack</p> <p>Worn out blade</p> <p>Wrong tooth pitch</p>	<p>Check fastenings of the blade guide heads as to the counter-vice so that they are not too loose and adjust heads vertically; bring into line the position of the degrees and if necessary adjust the stop screws of the degree cuts.</p> <p>Check and vertically re-adjust the blade guide blocks; reset proper side guide play (see Chapter "Machine adjustments" in <i>Blade guide blocks</i> section).</p> <p>Decrease advance, exerting less cutting pressure. Adjust the braking device if mounted on the machine.</p> <p>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.</p> <p>Check that the tightening pressure gauge reads 22 BAR, the ideal tightening value. Replace it.</p> <p>Blade used probably has too large teeth; use one with more teeth (see Chapter "Material classification and blade selection" in the <i>Selecting blade</i> section).</p>



FAULT	PROBABLE CAUSE	REMEDY
	<p>Broken teeth</p> <p>Insufficient lubricating refrigerant or wrong emulsion</p>	<p>Irregular work of the blade due to the lack of teeth can cause deflection in the cut; check blade and if necessary replace it.</p> <p>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.</p> <p>Check the emulsion percentage.</p>
<p>FAULTY CUT</p> 	<p>Worn out flywheels</p> <p>Flywheel housing full of chips</p> <p>Blade too slack</p>	<p>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.</p> <p>Clean with compressed air.</p> <p>Check that on the blade tightening pressure gauge reads 22 BAR, the ideal tightening value.</p>
<p>STREAKED CUTTING SURFACE</p> 	<p>Too fast advance</p> <p>Poor quality blade</p> <p>Worn out blade or with chipped and/or broken teeth</p> <p>Wrong tooth pitch</p> <p>Blade guide head too far from material to be cut</p> <p>Blade too slack</p> <p>Insufficient lubricating refrigerant or wrong emulsion</p>	<p>Decrease advance, exerting less cutting pressure. Adjust the braking device if mounted on the machine.</p> <p>Use a superior quality blade.</p> <p>Replace it.</p> <p>Blade used probably has too large teeth; use one with more teeth (see Chapter “Material classification and blade selection” in the <i>Selecting blade</i> and <i>Blade Types</i> sections).</p> <p>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.</p> <p>Check that on the blade tightening pressure gauge reads 22 BAR, the ideal tightening value.</p> <p>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.</p> <p>Check the emulsion percentage.</p>
<p>NOISE ON GUIDE BLOCKS</p>	<p>Chipped bearings</p> <p>Worn out or damaged pads</p>	<p>Dirt and/or chips between blade and guide bearings. Replace them.</p> <p>Replace them.</p>

12.2 - Electrical components diagnosis

FAULT	PROBABLE CAUSE	REMEDY
MACHINE DOES NOT WORK	Power supply	Check: <ul style="list-style-type: none"> - phases - cables - socket - plug Voltage must arrive upstream from the fuses (terminal board). It must be turned to ON position. Check electrical efficiency. Check power line connections and relative terminals. Check electrical efficiency and check for shorts that trigger these protections on the power side of the circuit.
	Main disconnect switch	Check closing of the flywheel guard. Check the efficiency of the device; replace it if damaged.
	Fuses	Make sure to have tightened the blade with the relevant handwheel and to have actuated the microswitch.
	" SQ 1 " safety microswitch	Ensure that it is off and that its contacts are unbroken.
	Blade tightening microswitch	Check mechanical efficiency; replace if damaged.
	Emergency button " SB 1 " on	Check that thermal relay protecting main motor is correctly connected.
	Cycle reset or line button " SB 2 "	
	Thermal relay of main motor	
	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 on the control side of the circuit.
MOTOR STOPPED WITH PILOT LIGHT "HL" LIT	Microswitch " SQ 2 "	After having raised the saw frame, check that the microswitch is not engaged and if necessary check operating efficiency.
	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 98/37

INTEGRATING PHONOMETER "DELTA OHM" mod. HD9019K1 serial n. 110996B295. MICROPHONE mod. HD 9019S1. SOUND GAUGER mod. HD 9101 at 94dB/110dB 1.000 Hz in CLASS 1 according to IEC regulation n. 942 1988 and ANSI S1.40 1984 3 measurements with the machine operating unloaded.

- The microphone was been located close to the operator's head, at medium height.
- The weighted equivalent continuous acoustic pressure level was 74,3 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



NOTE: _____