



THOMAS

USE AND MAINTENANCE MANUAL





Contents

Contents	2
Ordering spare parts	2
Guarantee	2
Machine certification and identification marking	3
CHAPTER 1	
Reference to accident-prevention regulations	4
1.1 - Advice for the operator	4
1.2 - Location of shields against accidental contact with the tool	4
1.3 - Electrical equipment according to European Standard "CENELEC EN 60 204-1" (1992)	4
1.4 - Emergencies according to European Standard "CENELEC EN 60 204-1" (1992)	4
CHAPTER 2	
Recommendations and advice for use	4
2.1 - Recommendations and advice for using the machine	4
CHAPTER 3	
Technical characteristics	5
3.1 - Table of cutting capacity and technical details	5
CHAPTER 4	
Machine dimensions - Transport - Installation	
Dismantling	5
4.1 - Machine dimensions	5
4.2 - Transport and handling of the machine	5
4.3 - Minimum requirements for the premises housing the machine	5
4.4 - Anchoring the machine	5
4.5 - Instructions for electrical connection	6
4.6 - Instructions for assembly of the loose parts and accessories	6
4.7 - Disactivating the machine	6
4.8 - Dismantling	6
CHAPTER 5	
Machine functional parts	6
5.1 - Operating head	6
5.2 - Vice	6
5.3 - Bed	7
CHAPTER 6	
Description of the operating cycle	7
6.1 - Starting up and cutting cycle	7
CHAPTER 7	

Regulating the machine	7
7.1 - Disk head	7
7.2 - Vice	7
7.3 - Head return stroke limiting device	8
7.4 - Restoring oil level in head compensation cylinder tank	8
7.5 - Adjustment of pneumatic system pressure	8
7.6 - Regulating arm blockage	9
7.7 - Changing the disk	9
7.8 - Clutch adjustment	9
7.9 - Changing the lubricating coolant pump	8

CHAPTER 8	
Routine and special maintenance	9
8.1 - Daily maintenance	9
8.2 - Weekly maintenance	9
8.3 - Monthly maintenance	9
8.4 - Six-monthly maintenance	9
8.5 - Oils for lubricating coolant	10
8.6 - Oil disposal	10
8.7 - Special maintenance	10

CHAPTER 9	
Material classification and choice of tool	10
9.1 - Definition of materials	10
9.2 - Choosing the disk	11
9.3 - Teeth pitch	11
9.4 - Cutting and advance speed	11
9.5 - Running in the disk	11
9.6 - Disk structure	11
9.7 - Type of disks	11
Tooth shape	11
Tooth cutting angle	11
9.7.1 - Table of recommended cutting parameters	12
9.7.2 - Table of cutting speed according to disk diameter	12

CHAPTER 10	
Machine components	13
10.1- List of spare parts	13

CHAPTER 11	
Wiring diagrams	18

CHAPTER 12	
Troubleshooting	20
12.1- Blade and cutting diagnosis	20

CHAPTER 13	
Noise tests	22

Plates and labels	22
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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 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

THOMAS S.p.A.	CE
via Pasubio, 32 36033 ISOLA VIC. - ITALIA	
MODEL	350 SUPER TECHNICS
TYP	SA
SERIAL NUMBER	
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 tool head is in rest position (raised), the toothed disk must be stationary.
- 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 changing the disk 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 shield screwed onto the disk head.
- Self-regulating mobile blue plastic shield, fitted coaxially with the fixed shield.

1.3 - Electrical equipment according to European 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 point 20 of EN 60204.

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

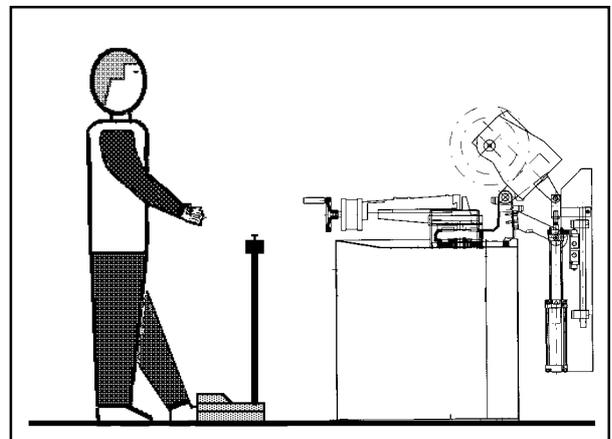
- In the event of incorrect operation or of danger conditions, the machine may be stopped immediately by pressing the red mushroom button.

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.
- Only one operator is needed to use the machine.



- To obtain good running-in of the machine it is advisable to start using it at intervals of about half an hour. This operation should be repeated two or three times, after which the machine may be used continuously.
- Before starting each cutting operation, ensure that the part is firmly gripped in the vice and that the end is suitably supported.
- Do not use disks of a different size from those stated in the machine specifications.
- If the disk 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 disk or its teeth are not broken. If they are broken, change the tool.
- Before carrying out any repairs on the machine, consult the dealer or apply to THOMAS.

3 TECHNICAL CHARACTERISTICS

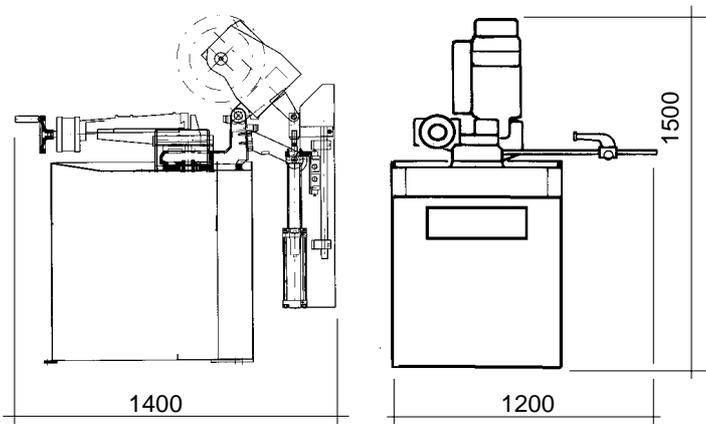
3.1 - Table of cutting capacity and technical details

CUTTING CAPACITY				
90°	60	120	105x105	160x90
45° DX - SX	60	100	85x85	85x70

3-speed three-phase electric motor	KW	1.35-1.7-2.4
2-speed three-phase electric motor	KW	1,35 - 1,7
Oil-bath reduction unit	i	32 : 1
Max. blade diameter	mm	350
Blade rotation speed	rpm	22 - 44- 88
Vice opening	mm	170
Machine Weight	KG	220
Coolant liquid	L	5
Working table height with base	mm	940

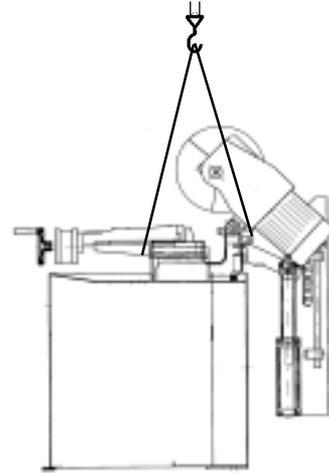
4 MACHINE DIMENSIONS TRANSPORT INSTALLATION DISMANTLING

4.1 - Machine dimensions



4.2 - Transport and handling of the machine

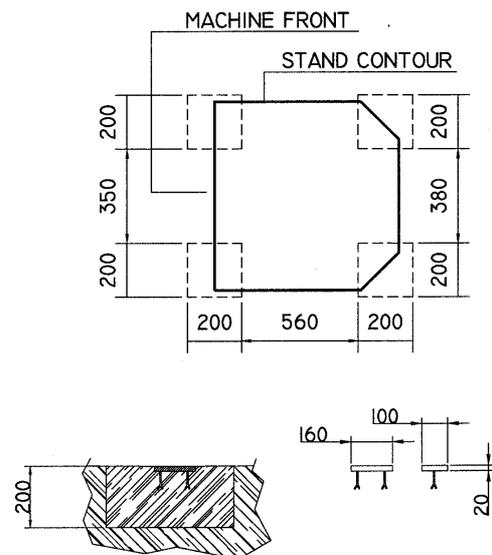
If the machine has to be shifted in its own packing, use a fork-lift truck or sling it with straps as illustrated.



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

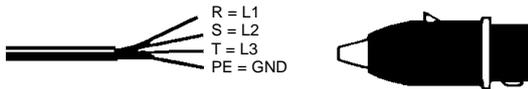


- Position the machine on a firm cement floor, maintaining, at the rear, a minimum distance of 1000 mm from the wall; anchor it to the ground as shown in the diagram, using screws and expansion plugs or tie rods sunk in cement, ensuring that it is sitting level.

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 5-WIRE SYSTEM WITH NEUTRAL FOR THREE-PHASE MACHINE - SOCKET FOR A 16A PLUG



4.6 - Instructions for assembly of the loose parts and accessories

Fit the components supplied:

- part. 1 Fit the bar holding rod
- part. 2 Fit and align the roller carrying arm on the counter-vice bench.

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
- 3) empty the coolant tank
- 4) carefully clean and grease the machine
- 5) 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

- Machine part composed of the parts that transmit movement (motor, reduction unit).



5.2 - Vice

- System for gripping material during the cutting operation, by means of the approach handwheel and pneumatic locking. It is provided with an anti-burr device for blocking the part that is to be cut.



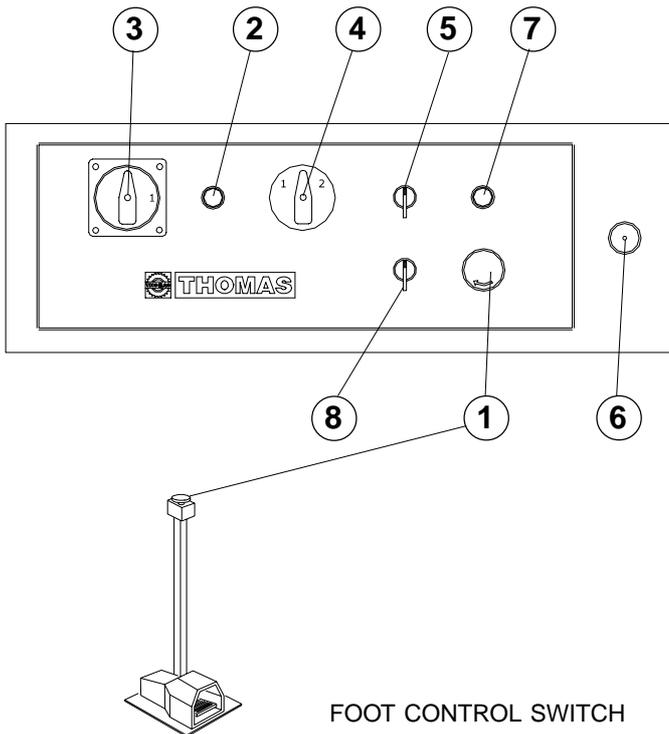
5.3 - Bed

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

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

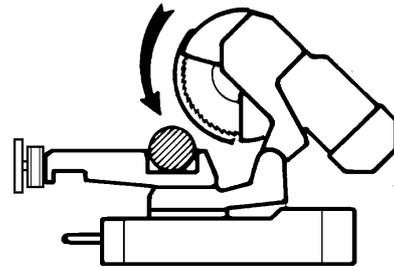


CUTTING CYCLE:

- Vice locking;
 - Head downfeed;
 - Head lifting;
 - Vice opening.
- Ensure that the machine is not in emergency stop condition; if it is, release the red mushroom button (1).
 - Turn the main switch (3) in position ON.
 - Press the start/reset button (2): its green light will go on.
 - Select the cutting speed on the switch (4):
- position 1 = 22 rpm
position 2 = 44 rpm
- Make sure that selector (8) is set mid position (neutral).
 - Place material to be cut in the vice. Close jaws against piece, keeping a distance of approx. 3 - 4 mm.
 - Adjust the cutting stroke by means of the selector (5) approaching the blade upto 10 mm from the workpiece. Position the relevant mechanical endstroke.
 - Set the blade downfeed speed on the regulator (6) according to the specifications of the workpiece.
 - Turn the selector (8) either to the left (foot control switch) or to right (control panel).

- Press **Cycle Start** and verify the following functions: vice clamping, blade rotation anticlockwise, coolant liquid flow and cutting cycle execution (motorhead stops against the upper endstroke).
- In case of wrong operation press Emergency Push-button (1).

CUTTING DIRECTION



The cropper is now ready to start work, bearing in mind that the CUTTING SPEED and the TYPE of DISC - 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 choice of disks").

- **When starting to cut with a new disk, 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 choice of disks" in the section on *Running in the disk*).
- 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 - Disk head

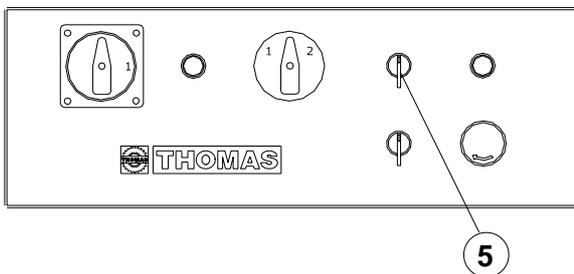
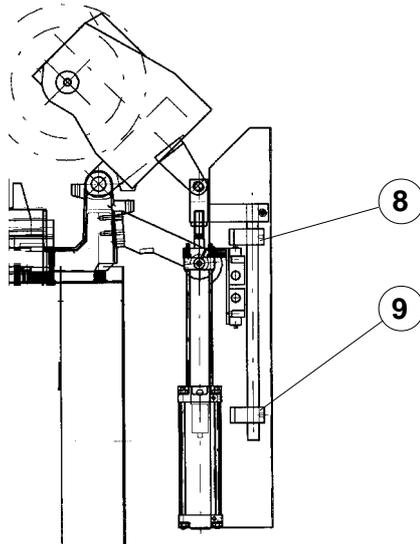
- If excessive axial play is found on the hinge, it will be sufficient to tighten the ring nuts, paying attention not to make the joint too tight.

7.2 - Vice

- The device does not require any particular adjustment; in the event of excessive play in the sliding guide, tighten the dowels for adjusting the gib inside the slide.

7.3 - Head return stroke limiting device

It consists in a mechanical adjustment system, mounted parallel to the head rise cylinder, to reduce the passive phases of the operating cycle, in other words to eliminate the idle stroke that takes place when the size of the part to be cut is much smaller than the maximum cutting capacity. Practically, you adjust the starting position of the disk in proximity of the part, independently of its dimensions.



To carry out this operation you must:

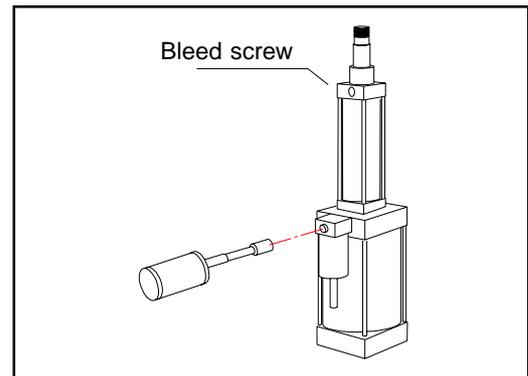
- slightly open regulator.
- Rotate the selector (5) either to the right or left to lower or lift the motorhead.
- position and secure the mechanical stop (8) against upper plate of the cylinder, so as to press the upper limit microswitch.
- the lower limit switch (9) is set during inspection and limits the lower stroke of the motorhead. Do not change this setting.

ATTENTION:

- It is not necessary to adjust the upper end-stroke everytime; one can bring the disk near to the workpiece by means of selector (5) and then start the automatic cutting cycle which will take place from the actual position of the disk. Do notice that, once the cut is completed, the motorhead will go to the upper end-stroke (against the relevant microswitch).
- operate on regulator to modify motorhead return speed.

7.4 - Restoring oil level in motorhead compensation cylinder tank

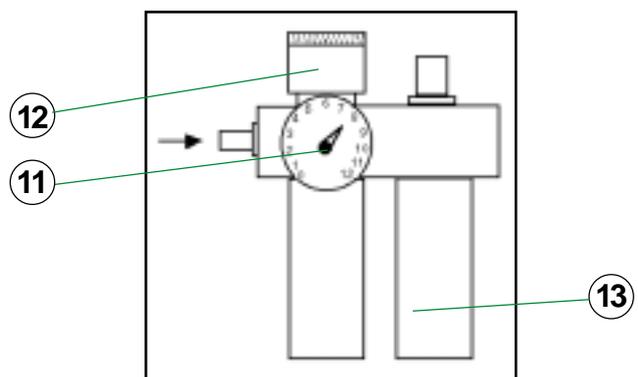
- Braking fluid in the cylinder controlling the head, may consume through the time.
- It is therefore important to restore the oil quantity inside the compensation tank by removing the plug and then using a syringe type injector (see following picture) to fill the tank.
- **First, take the head to the upper position in the mechanical stop. Switch on the machine and push the Line button.**



- Add oil until the rod, corresponding to the second mark on the stem, has come out completely.
- Air must be bled from the tank by loosening the bleed screw located on the side of the cylinder (see arrow) until some oil pours out; when this has been done, secure the screw, remove the injector and put back the plug.
- Use SHELL hydraulic oil 32 or similar.

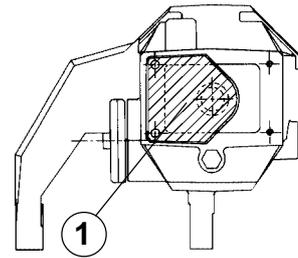
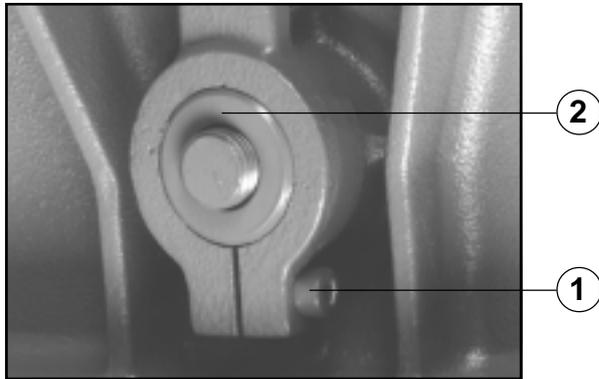
7.5 - Adjustment of pneumatic system pressure

- The pressure in the pneumatic system necessary for the proper operation of the sawing machine must be equal to 6 - 7 Bar.
- Check on pressure switch (11) the exact correspondence and if necessary operate on regulator (12) to set the ideal pressure.
- Make sure that a drop of oil runs through the lubricator bulb (13) every 4/5 work cycle.



7.6 - Regulating arm blockage

- If there is insufficient blockage of the head arm in the desired position, slacken the screw (1) on the lever, hold the bush (2) in position, turn the lever to the left and tighten the screw.



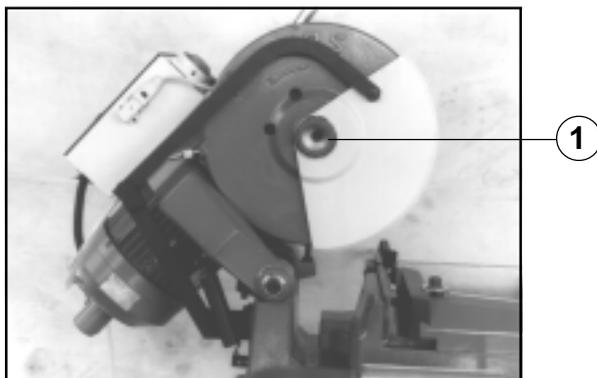
ANY REPLACEMENTS OF OTHER PARTS - SUCH AS THE COMPONENTS OF THE REDUCTION GEAR, MOTOR AND VARIOUS ELECTRIC PARTS - MUST BE CARRIED OUT BY SKILLED OR COMPETENT PERSONNEL.

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

7.7 - Changing the disk

To change the disk:

- Release the mobile yellow, white or orange guard and turn it back.
- Block a piece of wood in the vice and lean the disk on it.
- Insert the special spanner provided and remove the screw (1), slackening it in a clockwise direction because it has a left-handed thread, then slip off the flange that holds the disk.
- Fit the new disk, checking the cutting direction of the teeth, then replace the flange, the screw and the mobile white, yellow or orange guard.



7.8 - Clutch adjustment

Inside the head there is a clutch device which has already been adjusted during assembly. If, after long use, further adjustment is necessary, proceed as follows:

- remove the cover
- fit the template provided
- turn the motor shaft so that the ring nut (1) is in a convenient position to allow it to be tightened or slackened enough to calibrate the clutch system.

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.
- Top up the level of lubricating coolant.
- Check the disk for wear.
- Lift the head into a high position to avoid yield stress on the return spring.
- 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.
- Clean the filter of the pump suction head and the suction area.
- Clean and grease the screw and the sliding guide of the vice.
- Clean the disk housing.
- Sharpen the disk teeth.

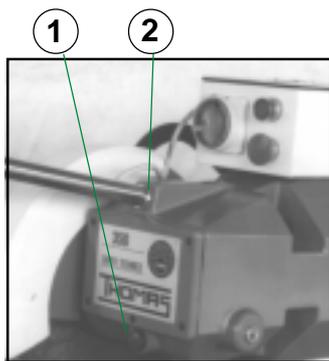
8.3 - Monthly maintenance

- Check tightness of the screws on the motor, the pump, the jaws and shields.
- Check that the shields are unbroken.
- Grease the head hinge pin.

8.4 - Six-monthly maintenance

- Change the oil in the reduction unit using oil type GEARCO 85W-140 by NATIONAL CHEMSEERACH or MOBIL GLYCOLE 30 or KLUBER SINTHESO 460 EP or an equivalent oil, proceeding as follows:

- Remove the connecting plug from the electric box and unscrew the head moving lever.
- Drain off the old oil from the cap (1).
- Pour in new oil up to the mark (1), through the lever fixing hole, keeping the head in upper position (2).
- Reassemble all the parts.



- 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. The term special maintenance also covers the resetting of protection and safety equipment and devices.

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, **choice of the type of cutting disk, cutting speed and control of head descent**, must be suitably combined. 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 ADVISE YOU ALWAYS TO CHOOSE ORIGINAL SPARE DISKS 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.

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
Steel for bearings	100Cr6	100Cr6	100C6	534 A 99	52100	207	95	690÷980
Tool steel	52NiCrMoKU C100KU X210Cr13KU 58SiMo8KU	56NiCrMoV7 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 steel	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

9.2 - Choosing the disk

First of all the pitch of the teeth must be chosen, 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.

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.**

	S (MM)	PITCH	SHAPE	SPEED
	up to 2	4 - 6	B shaped	3
	2 ÷ 5	8	C solid	3 - 2
	5 ÷ 10	8	C solid	2
	over 10	8	C solid	2
	up to 20	8	C solid	2
	20 ÷ 50	10	C solid	1
	50 ÷ 65	13 ÷	C solid	1

9.4 - Cutting and advance speed

The cutting speed (m/min) and the advance speed (cm²/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 (= disk descent) tends to cause the disk to deviate from the ideal cutting path, producing non rectilinear cuts on both the vertical and the horizontal plane.

9.5 - Running in the disk

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 - Disk structure

The most commonly used disks are made of extra high speed steel (HHS) of **normal quality** (HHS/DMo5) or **superior quality** (HHS/Mo5 + Co5) with a treated tooth, which differentiates them from the former on account of the high value of structural resistance, greater resistance to seizing, absence of stress in the mass and a better holding of lubricating coolant during work.

9.7 - Type of disks

The disks differ essentially in their constructive characteristics, such as:

- **Tooth shape**
- **Tooth cutting angle**

Tooth shape

The profile of the toothing depends on the size, shape and thickness of the section to be cut, either straight or at an angle. It may also vary according to the pitch, but not so distinctly as to make this an element for classification.

- Fine toothing is to be chosen for cutting small sections with a profiled shape and tubular sections with thin walls (2-5 mm depending on the material).
- Large toothing is suitable for cutting medium and large solid sections or fairly thick profiled or tubular sections (over 5 mm).

"A" toothing:
normal fine toothing



"AW" toothing:
fine toothing with alternate side rake



"B" toothing:
normal large toothing with or without shaving breaking incision



"BW" toothing:
large toothing with alternate side rake



"C (HZ)" toothing:
large toothing with roughing tooth with rake on both sides, alternating with a finishing tooth without rake. The roughing tooth is 0.15-0.30 mm higher



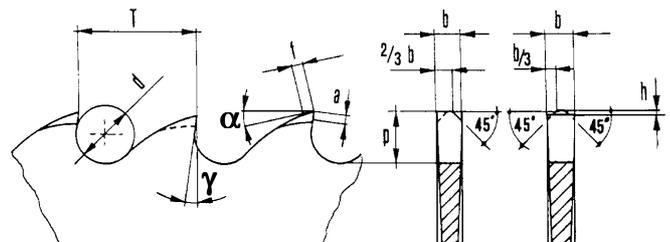
Added toothing:
disks made in this way are used for cutting non-ferrous metals, such as light alloys, and plastics, and above all in wood-working. The teeth are hard metal (HM) plates brazed onto the body of the disk; there are various types and shapes and, considering the vastness of the field, the topic is not developed further here.

Tooth cutting angle

Each tooth has two cutting angles:

- α : front rake angle
- γ : rear rake angle

SHARPENING CIRCULAR SAWS



T	3	4	5	6	7	8	9	10	12	14	16
p	1,3	1,6	2,1	2,5	2,9	3,4	3,8	4,2	5,1	5,9	7,2
d	1,5	2	2,5	3	3,5	4	4,5	5	6	7	8
h = 0,2 mm						h = 0,3 mm					

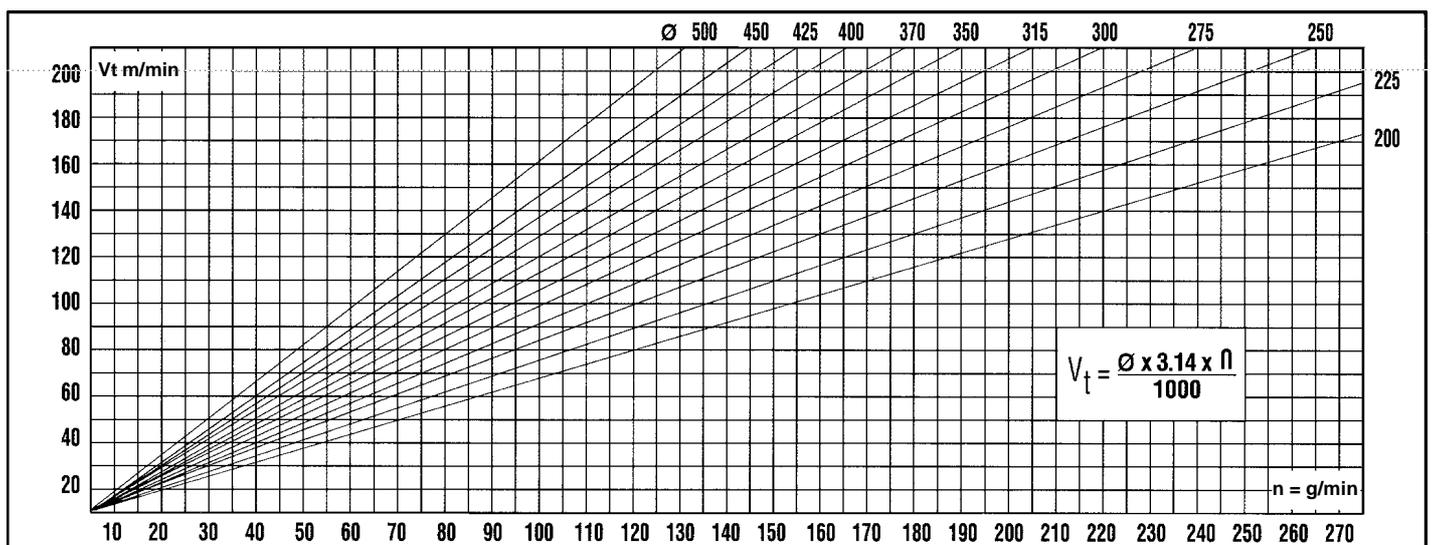
The rake varies especially according to the type of material to be cut.



9.7.1 - RECOMMENDED CUTTING PARAMETERS

CUTTING ANGLES			γ	20°	18°	15°	12°	10°	12°	15°	12°	22°	20°	20°	15°	12°	16°	12°	18°	18°	15°	
			α	8°	8°	8°	6°	6°	8°	6°	8°	6°	8°	10°	8°	10°	8°	8°	16°	16°	8°	8°
SECTION TO BE CUT (IN MM)	10 - 20	*T mm	5	4	4	3	2	4	4	4	4	6	5	6	5	4	5	5	4	3	2	
		Vt m/1'	50	30	20	15	9	20	20	25	1100	200	400	400	400	120	600	500	50	19	35	
		Av mm/1'	160	130	110	60	35	50	50	100	1800	400	600	800	800	1100	700	160	130	130		
	20 - 40	*T mm	7	6	6	4	3	6	6	6	6	8	7	8	7	8	6	7	7	4	4	3
		Vt m/1'	45	30	20	15	9	19	19	23	1000	180	350	400	400	110	600	400	45	18	33	
		Av mm/1'	150	120	110	60	33	45	45	100	1700	400	600	700	700	150	1100	600	150	120	120	
	40 - 60	*T mm	10	9	8	6	4	8	8	8	8	12	10	11	10	8	10	10	6	5	4	
		Vt m/1'	45	25	18	14	9	18	18	22	900	160	300	350	350	100	550	350	45	18	30	
		Av mm/1'	140	110	100	50	30	45	45	90	1600	350	550	700	700	140	1000	600	140	110	110	
	60 - 90	*T mm	12	12	11	9	6	11	11	11	16	12	14	12	12	10	12	12	10	6	5	
		Vt m/1'	40	25	17	14	8	17	17	20	800	160	250	300	300	90	550	350	45	17	30	
		Av mm/1'	130	110	50	50	28	40	40	80	1400	300	550	600	600	130	900	500	130	110	110	
	90 - 110	*T mm	14	14	14	12	8	14	14	14	18	14	17	14	12	16	16	16	12	6	5	
		Vt m/1'	40	20	15	13	8	15	15	19	700	140	200	250	70	500	300	40	16	28		
		Av mm/1'	110	100	80	45	25	40	40	880	1300	300	500	600	110	900	500	110	100	100		
	110 - 130	*T mm	16	16	16	14	10	16	16	16	20	16	18	16	14	18	18	14	8	6		
		Vt m/1'	35	20	14	13	7	14	14	17	600	130	150	200	60	500	300	35	16	26		
		Av mm/1'	100	90	70	45	25	35	35	70	1100	250	500	500	100	800	400	100	90	90		
	130 - 150	*T mm	18	16	16	14	12	16	16	16	20	16	20	18	16	18	18	16	10	6		
		Vt m/1'	30	15	12	12	7	12	12	16	500	130	120	150	50	450	200	30	15	24		
		Av mm/1'	90	80	60	40	22	35	35	60	900	250	400	400	90	800	400	90	80	80		
	RECOMMENDED LUBRICANTS			Emulsion - Cutting oil							Dry	Kerosene Dry		Emulsion			Cutting oil		Emulsion			

9.7.2 - DIAGRAM OF CUTTING SPEEDS ACCORDING TO DISK DIAMETER



- KEY**
- | | | | |
|-----------|------------------------------------|------|--|
| T | Tooth pitch in millimetres | d | Diameter of the tooth fillet cone distance |
| Av mm/min | Advance in millimetres per minute | h | Tooth protrusion |
| Vt m/min | Cutting speed in metres per minute | γ | Front rake |
| Az | Tooth advance | α | Rear rake |
| Ng/min | Number of revs per minute | N/mm | Ultimate tensile stress |
| Z | Number of teeth on the disk | a-f | Flat parts of the cutting edge |
| p | Tooth depth | Ø | Tube diameter or profile width |



10 MACHINE COMPONENTS

10.1 - List of spare parts

REFERENCE N°	DESCRIPTION	REFERENCE N°	DESCRIPTION
1	Machine bed	38	Burr-free plate
2	Revolving arm	39	
3	Revolving arm locking pin	40	Screw M8
4	Revolving arm locking bush	41	Crucible
5	Revolving arm locking lever	42	Screw M6
6	Screw M10	43	Bar stop rod
7	Countervice	44	Ruler
8	Mobile countervice	45	Screw M2
9	Countervice jaws	46	Bar stop
10	Burr-free jaws	47	Oiler Ø 8
11	Countervice rotation locking pin	48	Grain M8
12	Roller arm	49	Tank cover gasket
13	Roller	50	Ring seeger Ø 42l
14	Nut M12	51	Tank cover filter
15	Screw M12	52	Tank cover wire gauze
16		53	Tank cover
17		54	Washer
18	Vice jaws	55	1/4 gas tap
19	Vice jaw washer	56	Coolant tube
20	Screw M12	57	Extra shield
21	Washer	58	Spring connection
22	Screw M12	59	
23	Grain M8	60	Nut M12
24	Lever bush	61	Screw M12
25	Quick lock vice lever	62	Head
26	Thrust bearing AX 3047 + counter-bearing CP 3047	63	3/8 gas tap
27	Quick lock vice lever washer	64	GUK M25x1,5 ring nut
28	Vice handwheel	65	Spring thrusting washer
29	Pin Ø 6	66	Oil level and drain plug 1/2 gas
30	Washer	67	Hinge cylindrical pin
31	Screw M8	68	GUK M25x1,5 ring nut
32	Vice gib	69	Hinge eccentric pin
33	Grain M8	70	Eccentric bush
34	Nut M8	71	Bearing 6202
35	Vice thread	72	Nut M20
36	Quick lock vice spring	73	Head lever
37	Burr-free transverse plate	74	Head lever handgrip
		75	Bush
		76	Bearing 32008X

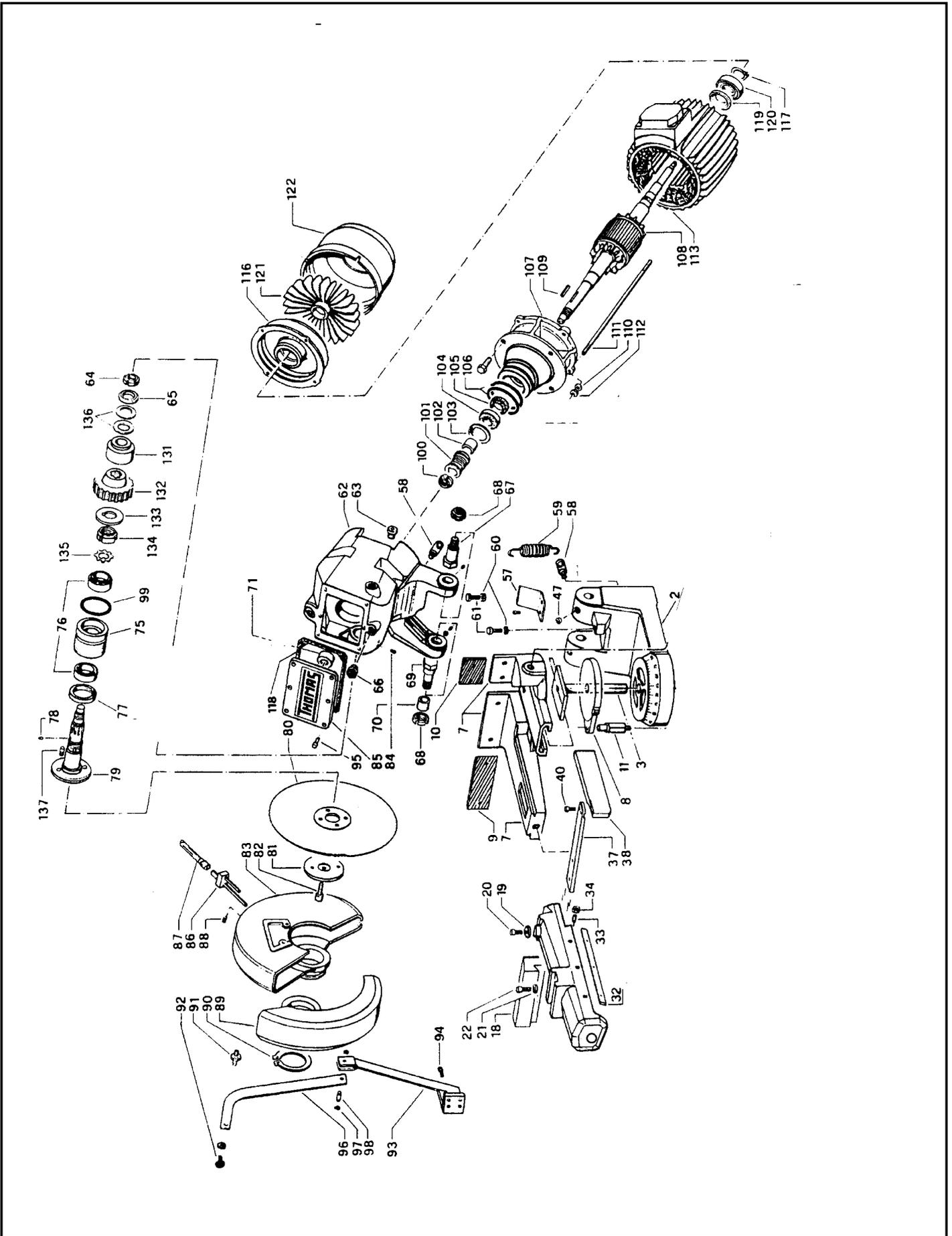


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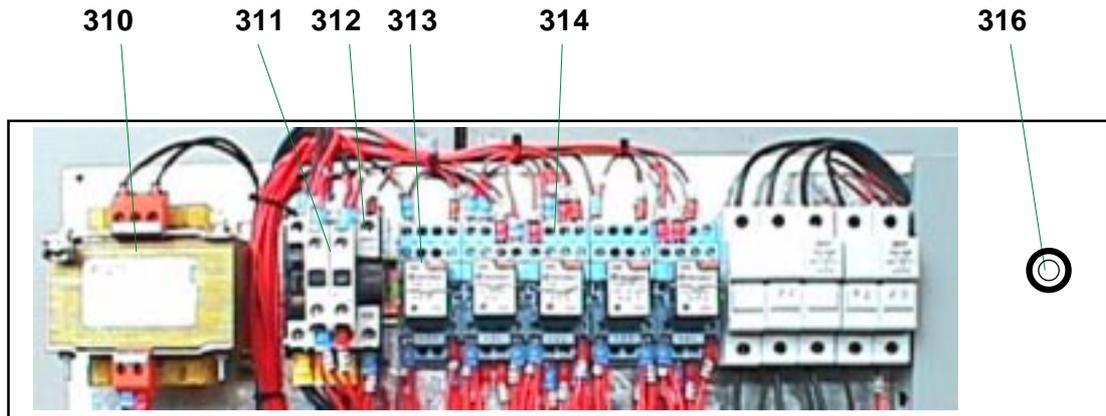
77	Ring DPSM 50728
78	Cylindric pin Ø 5x12
79	Disk shaft
80	Disk
81	Disk shaft flange
82	TCCE M12x35 I.h. Screw
83	Fixed blade guard
84	Grain M8
85	Front head cover
86	Cooling distributor
87	Coolant tube
88	Grain M6
89	Mobile blade guard
90	Ring seeger Ø 60E
91	Pin
92	
93	Tie rod support
94	Screw M6
95	Screw M6
96	Tie rod
97	Ring seeger Ø 10E
98	Tie rod support pin
99	Ring OR 4205
100	GUK M20x1 ring nut
101	Worm screw
102	Worm screw spacer
103	Ring seeger Ø 62l
104	Bearing 3305
105	Ring SM 32527
106	OR-Rings 4312
107	Front motor flange
108	Motor shaft (rotor)
109	Key 5x6x35
110	Washer
111	Stud bolt
112	Nut
113	Motor housing and stator
114	Switch box
115	Ring OR 3081
116	Motor rear cover
117	Ring seeger Ø 25E
118	Head cover gasket

REFERENCE N°	DESCRIPTION
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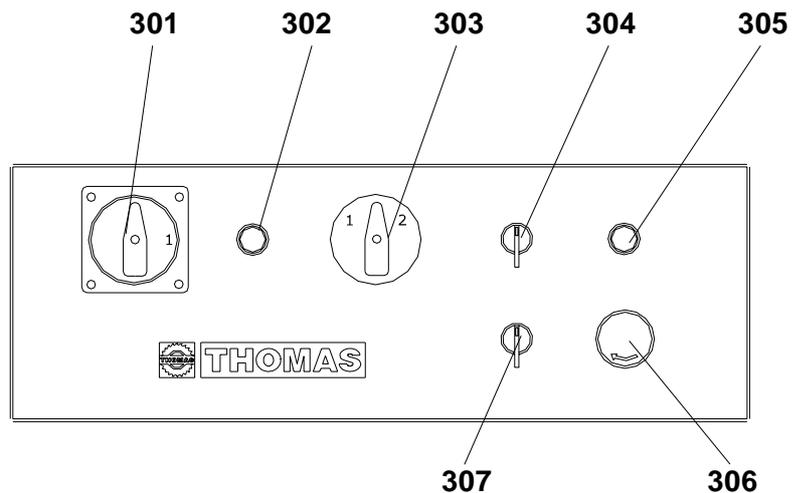
119	Nilos Ring 4205 AV
120	Bearing 4205
121	Motor fan
122	Fan cover
123	
124	
125	
126	
127	
128	
129	
130	
131	Clutch cone
132	Worm wheel
133	Clearance adjustment ring
134	KM8 M40x1,5 ring nut
135	Safety washer MB8
136	Cup springs 50x25 - 4x3
137	Disk shaft flange pin
201	Vice handwheel
202	Pneumatic vice cylinder
203	Corpo morsa pneumatica
204	Protection
205	Upper adjustable stop
206	Limit switch microswitch
207	Limit switch microswitch
208	Lower adjustable stop
209	Head cylinder
210	Electropump



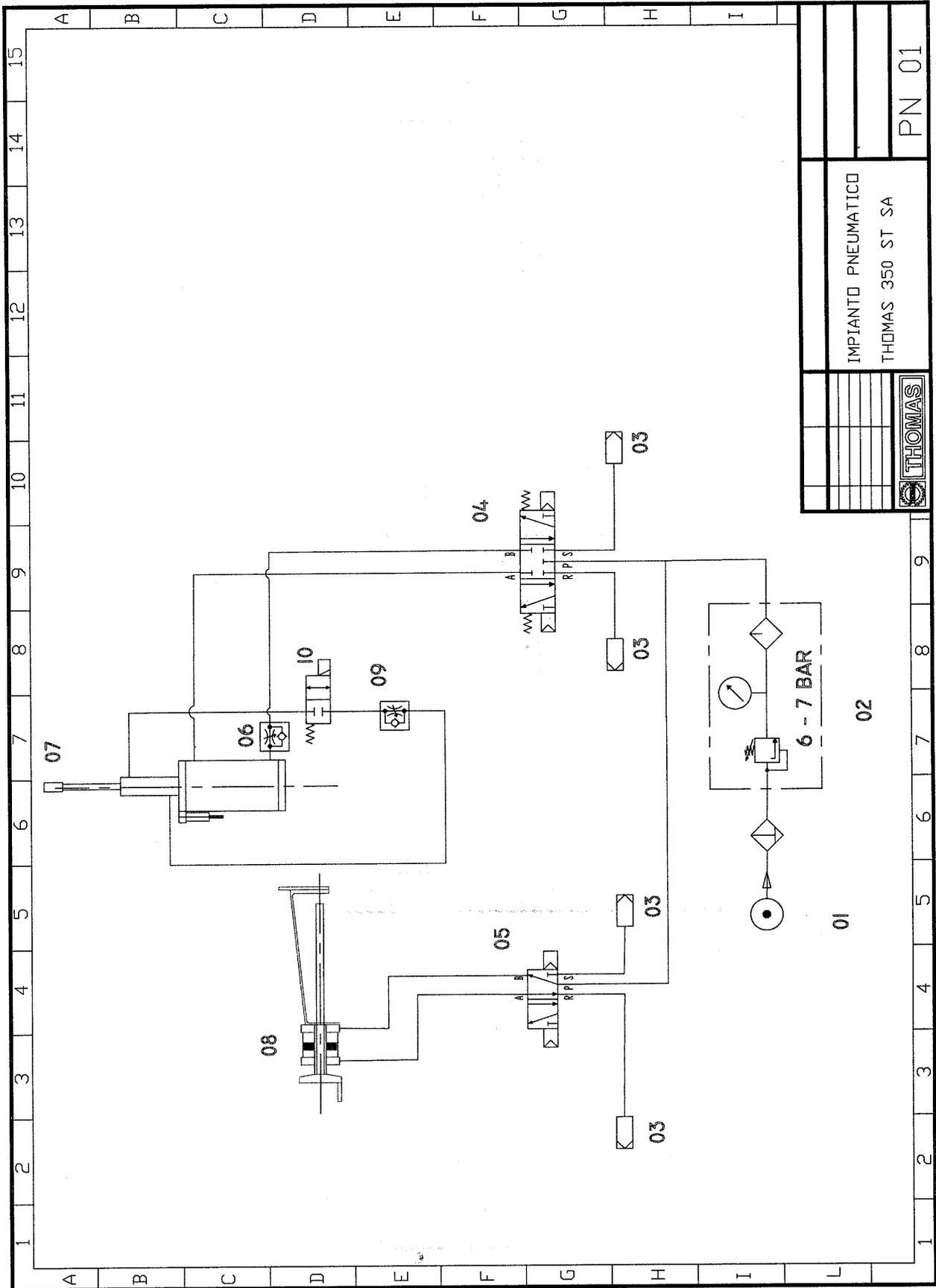
- 310 Transformer
- 311 Auxiliary contact
- 312 Remote control switch
- 313 Auxiliary relay
- 314 Fuses cartridges
- 315
- 316 Head descent speed adjustment



- 301 Main disconnect switch
- 302 Start push-button
- 303 Speed switch
- 304 Head selector
- 305 Cycle start push-button
- 306 Emergency push-button
- 307 Cycle selector



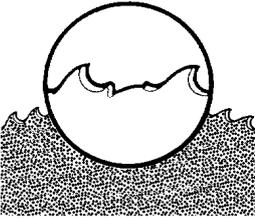
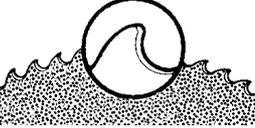
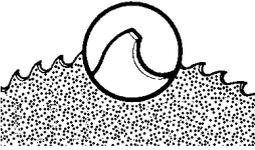
11.2 - Pneumatic diagram

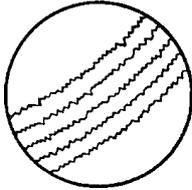
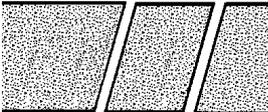


12 TROUBLESHOOTING

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>Low quality disk Ineffective gripping of the part in the vice. Previously broken tooth left in the cut Cutting resumed on a groove made previously. Insufficient lubricating refrigerant or wrong emulsion</p> <p>Sticky accumulation of material on the disk.</p>	<p>Decrease advance, exerting less cutting pressure Change disk speed and/or diameter. See Chapter “Material classification and choice of disks” and the <i>Table of cutting speeds according to disk diameter</i>. Choose a suitable disk. See Chapter “Material classification and choice of disks”. Use a better quality disk. Check the gripping of the part.</p> <p>Accurately remove all the parts left in. Make the cut elsewhere, turning the part.</p> <p>Check the level of the liquid in the tank. Increase the flow of lubricating refrigerant, checking that the hole and the liquid outlet pipe are not blocked. Check the blend of lubricating coolant and choose a better quality disk.</p>
<p>PREMATURE DISK WEAR</p> 	<p>Wrong running in of the disk</p> <p>Wrong cutting speed</p> <p>Unsuitable tooth profile</p> <p>Wrong tooth pitch</p> <p>Low quality disk Insufficient lubricating refrigerant</p>	<p>See Chapter “Material classification and choice of disks” in the paragraph on <i>Running in the disk</i>. Change disk speed and/or diameter. See Chapter “Material classification and choice of disks” and the <i>Table of cutting speeds according to disk diameter</i>. Choose a suitable disk. See Chapter “Material classification and choice of disks” in the paragraph on <i>Type of disks</i>. Choose a suitable disk. See Chapter “Material classification and choice of disks”. Use a better quality disk. Check the level of the liquid in the tank. Increase the flow of lubricating refrigerant, checking that the hole and the liquid outlet pipe are not blocked.</p>
<p>CHIPPED DISK</p> 	<p>Hardness, shape or flaws in the material (oxides, inclusions, lack of homogeneity, etc..) Wrong cutting speed</p> <p>Wrong tooth pitch</p> <p>Vibrations Disk incorrectly sharpened</p> <p>Low quality disk</p>	<p>Reduce the cutting pressure and/or the advance.</p> <p>Change disk speed and/or diameter. See Chapter “Material classification and choice of disks” and the <i>Table of cutting speeds according to disk diameter</i>. Choose a suitable disk. See Chapter “Material classification and choice of disks”. Check gripping of the part. Replace the disk with one that is more suitable and correctly sharpened. Use a better quality disk.</p>

FAULT	PROBABLE CAUSE	REMEDY
	Incorrect emulsion of the lubricating refrigerant	Check the percentage of water and oil in the emulsion.
DISK VIBRATION	<p>Wrong tooth pitch</p> <p>Unsuitable tooth profile</p> <p>Ineffective gripping of the part in the vice. Dimensions of the solid section too large with respect to the maximum admissible cutting dimensions Disk diameter incorrect and/or too large</p>	<p>Choose a suitable disk. See Chapter "Material classification and choice of disks".</p> <p>Choose a suitable disk. See Chapter "Material classification and choice of disks" in the paragraph <i>on Type of disks</i>.</p> <p>Check the gripping of the part.</p> <p>Abide by the instructions.</p> <p>Decrease the disk diameter, adapting it to the dimensions of the part to be cut; the cutting part of the disk must not be too large for the shape of the part to be cut.</p>
RIDGES ON THE CUTTING SURFACE	 <p>Disk diameter incorrect and/or too large</p> <p>Ineffective gripping of the part in the vice. Too fast advance</p> <p>Disk teeth are worn Insufficient lubricating refrigerant</p> <p>Toothing does not unload shavings well</p>	<p>Decrease the disk diameter, adapting it to the dimensions of the part to be cut; the cutting part of the disk must not be too large for the shape of the part to be cut. Check the gripping of the part.</p> <p>Decrease advance, exerting less cutting pressure. Sharpen the tool. Check the level of the liquid in the tank. Increase the flow of lubricating refrigerant, checking that the hole and the liquid outlet pipe are not blocked.</p> <p>Choose a blade with a larger tooth pitch that allows better unloading of shavings and that holds more lubricating refrigerant.</p>
CUTS OFF THE STRAIGHT	<p>Too fast advance</p> <p>Ineffective gripping of the part in the vice Disk head off the straight Disk sides differently sharpened. Disk thinner than the commercial standard. Dirt on the gripping device</p>	<p>Decrease advance, exerting less cutting pressure. Check the gripping of the part which may be moving sideways. Adjust the head. Choose tool quality carefully in every detail as regards type and construction characteristics. Carefully clean the laying and contact surfaces.</p>
BLADE STICKS IN THE CUT	 <p>Too fast advance</p> <p>Low cutting speed Wrong tooth pitch</p> <p>Sticky accumulation of material on the disk. Insufficient lubricating refrigerant</p> <p>Centering the piece with the disk</p>	<p>Decrease advance, exerting less cutting pressure. Increase speed. Choose a suitable disk. See Chapter "Material classification and choice of disks".</p> <p>Check the blend of lubricating coolant and choose a better quality disk. Check the level of the liquid in the tank. Increase the flow of lubricating refrigerant, checking that the hole and the liquid outlet pipe are not blocked. Always adjust the counter-vice in a position where it block the piece as perpendicular as possible to the cutting line.</p>

13 NOISE TESTS

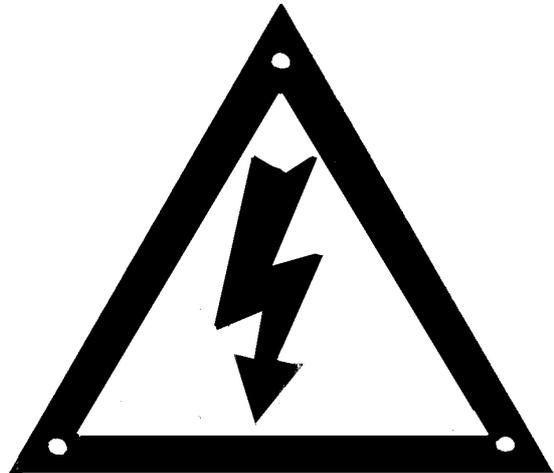
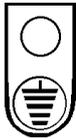
In accordance with point 1.7.4.f of the Machines Directive EEC 89/392

PRECISION PHONOMETER MOD. CEL-LUCAS 275-2B
INTEGRATING METER CLASS 1 IEC 651 - IEC 804 REGULATIONS
PRECISION GAUGE CEL-LUCAS 284/2 IEC 942 REGULATIONS
4 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 81,5 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





THOMAS

350 SUPER TECHNICS - SA

