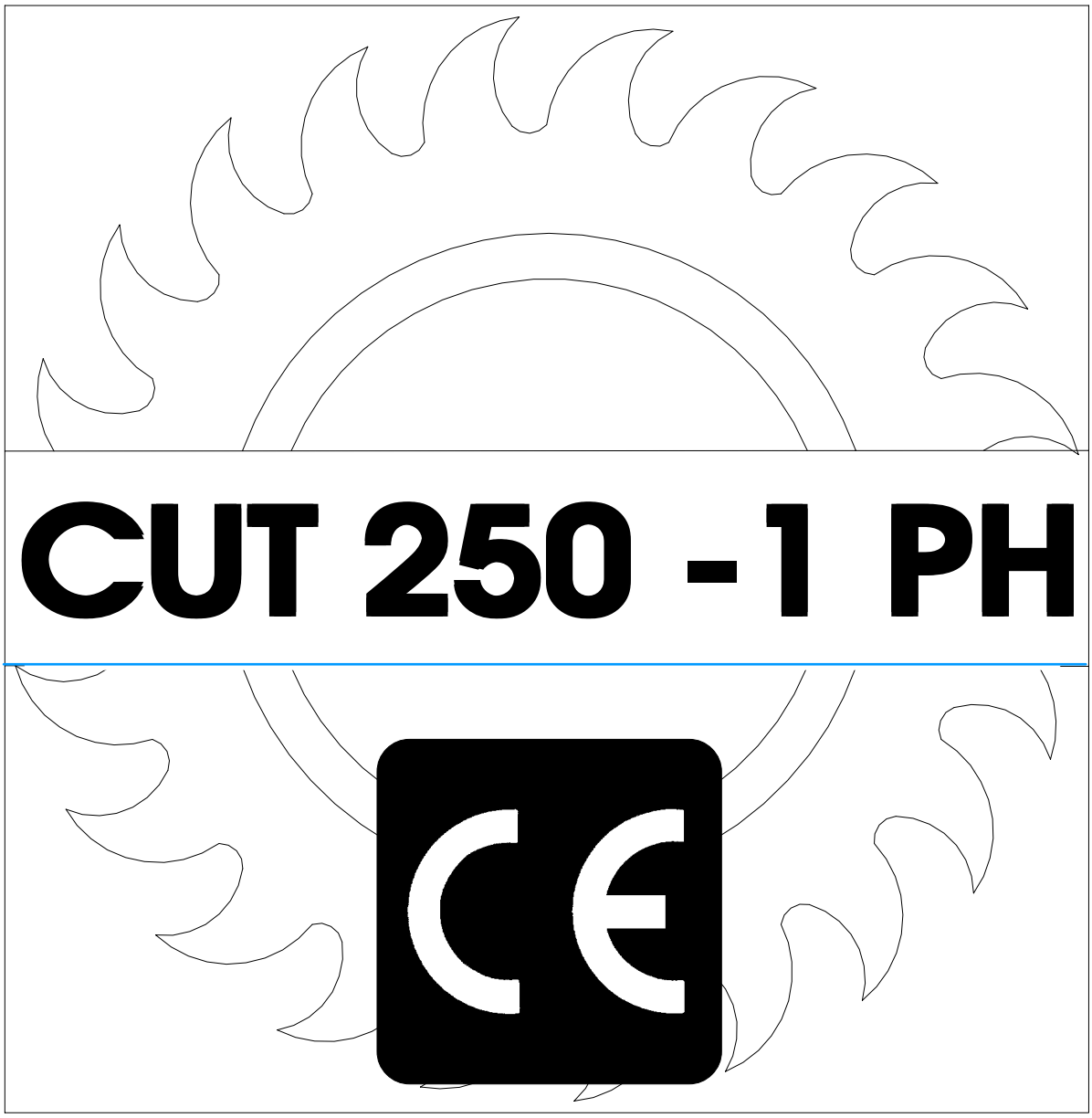
USE AND MAINTENANCE MANUAL



CUT 250 - 1 PH

THOMAS S.p.A. - Via Pasubio, 32 - 36033 Isola Vicentina (VI) - Telephone 0444 / 97.61.05 - Fax 0444 / 97.69.34
Registro Imprese n. 4272//VI 116 REA n. 93906/Vicenza

Contents

Ordering spare parts

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

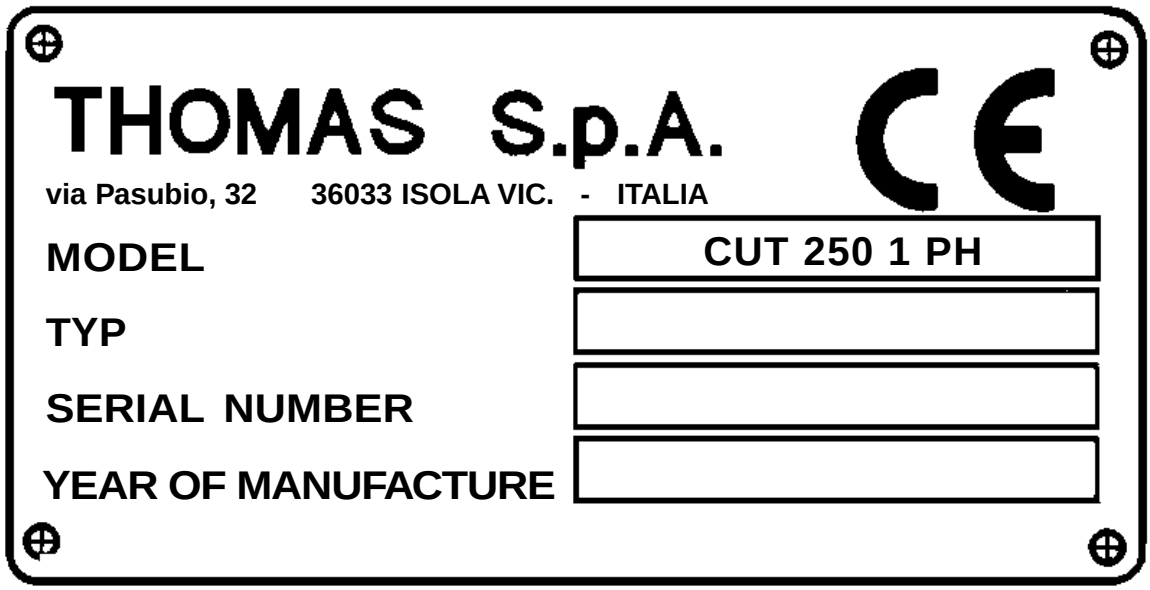
Without these references WE WILL NOT SUPPLY the spares. See point 10.1 - list spare parts -.

Guarantee

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

Machine certification and identification marking

MACHINE LABEL



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

1 REFERENCE TO ACCIDENT-PREVENTION REGULATIONS

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

1.1 - Advice for the operator

- Check that the voltage indicated on the plate, normally fixed to the machine motor, is the same as the line voltage.
- Check the efficiency of your electric supply and earthing system; connect the power cable of the machine to the socket and the earth lead (yellow-green in colour) to the earthing system.
- When the 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.
- It is forbidden to disconnect the “man present” device, known more correctly in the EEC as the “safety switch with hold-down action”.
- Always wear suitable eye protection.
- Never put your hands or arms into the cutting area while the machine is operating.
- Do not shift the machine while it is cutting.
- Do not wear loose clothing with sleeves that are too long, gloves that are too big, bracelets, chains or any other object that could get caught in the machine during operation; tie back long hair.
- Keep the area free of equipment, tools or any other object.
- Perform only one operation at a time and never have several objects in your hands at the same time. Keep your hands as clean as possible.
- All internal and/or internal operations, maintenance or repairs, must be performed in a well-lit area or where there is sufficient light from extra sources so as to avoid the risk of even slight accidents.

1.2 - Location of shields against accidental contact with the tool

- Grey metal shield screwed onto the disk head.
- Self-regulating mobile blue plastic shield, fitted coaxially with the fixed shield.

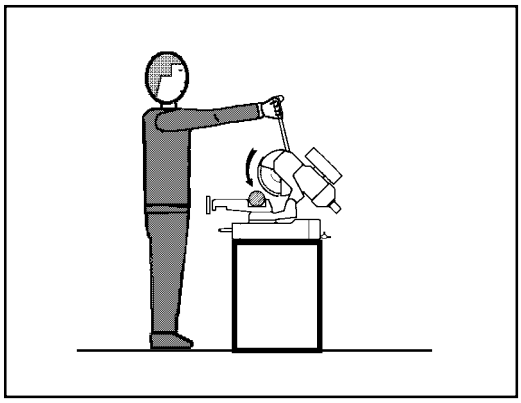
1.3 - Electrical equipment according to European Standard"CENELEC EN 60 204-1" which assimilates, with some integrating modifications, the publication "IEC 204-1"

- 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 equipment is protected against splashes of water and dust.
- Protection of the motor overload, 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.

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

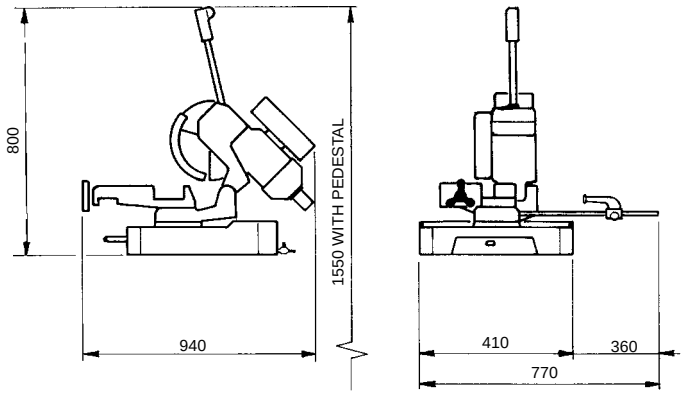
3.1 - Table of cutting capacity and technical details

CUTTING CAPACITY	●	○	□	▭
90°	30	70	65	100 x 45
45° DX	25	60	55	65 x 50

- Single-phase el. motor for 1-speed disk rotation	**kW**	**0.9**
- Reduction gear in an oil bath	**Ratio =**	**1:32**
- Maximum disk diameter	**mm**	**250**
- Disk rotation speed	**rpm**	**40**
- Vice opening	**mm**	**105**
- Machine weight	**kg**	**80**

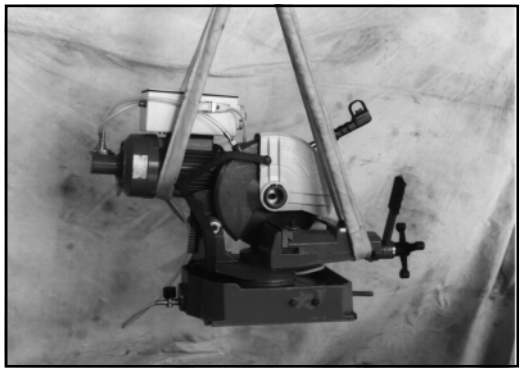
4 MACHINE DIMENSIONS TRANSPORT INSTALLATION DISMANTLING

4.1 - Machine dimensions



4.2 - Transport and handling of the machine

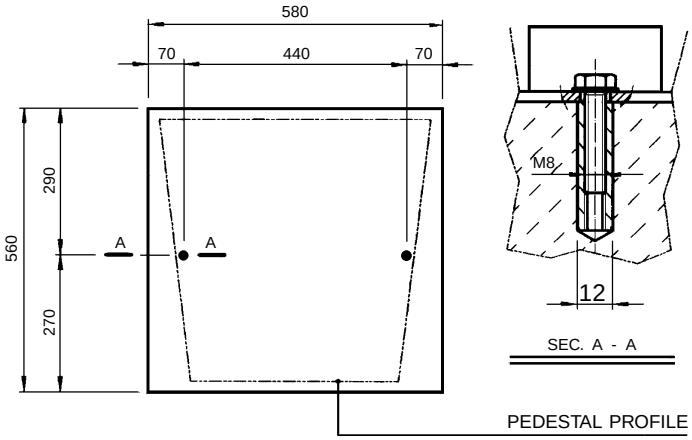
If the machine has to be shifted in its own packing, use a fork-lift truck or sling it with straps as illustrated.



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

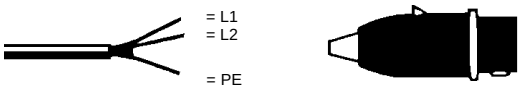


- Position the machine on a firm cement floor, maintaining, at the rear, a minimum distance of 800 mm from the wall; anchor it to the ground as shown in the diagram, using screws and expansion plugs or tie rods sunk in cement, ensuring that it is sitting level.

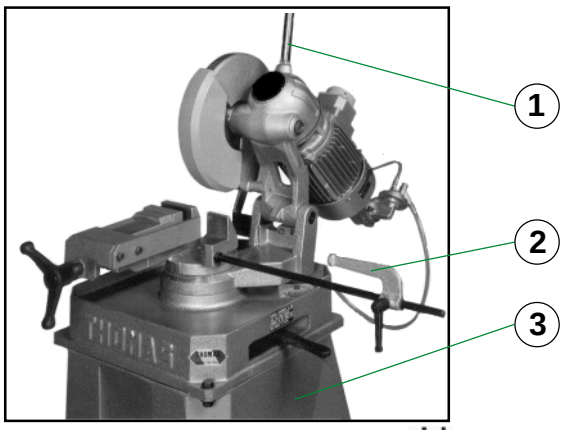
4.5 - Instructions for electrical connection

- The machine is not provided with an electric plug, so the customer must fit a suitable one for his own working conditions.
- Before connecting the machine to the mains, make sure that your electrical installation is in good conditions and that a suitable thermo-magnetic protection is provided.

- **WIRING DIAGRAM FOR THE SINGLE-PHASE SYSTEM SOCKET FOR A 16A PLUG**



4.6 - Instructions for assembly of the loose parts and accessories



Fit the components supplied as indicated in the photo:
- part. 1 Screw the lever onto the head and fix it
- part. 2 Fit the bar holding rod
- part. 3 Fix the pedestal firmly onto the base

4.7 - Disactivating the machine

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

1) detach the plug from the electric supply panel
2) release the head return spring
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), the lubricating coolant pump and the electrical components.

5.2 - Vice

- System for gripping material during the cutting operation, operated with handwheel.
  It is provided with an anti-burr device for blocking the part that is to be cut.

5.3 - Bed

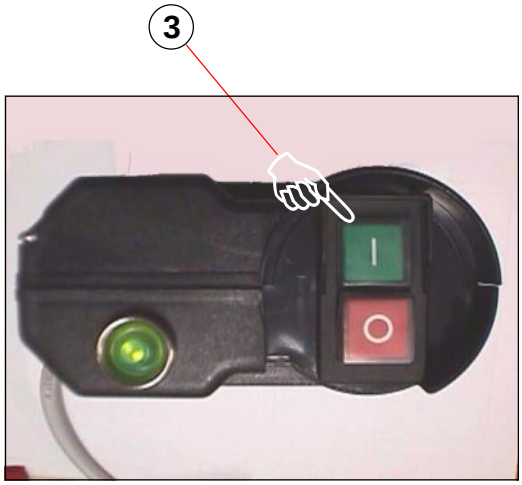
- Support structure for the OPERATING HEAD (rotating arm for gradual cutting, with respective blocking system), the VICE, the BAR STOP, and the housing for the cutting coolant TANK.

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

- Press switch (**3**). The warning light lights up.
- Place material to be cut in the vice (4) and clamp the part into place by handwheel (5).
- Grip the handle (6) of the HEAD control arm and press the button, checking that the disk is turning in the direction indicated.



- ATTENTION: In case of electrical drop-out or overload cut-out, press switch (3) to start the machine again.

7 REGULATING THE MACHINE

7.1 - Disk head

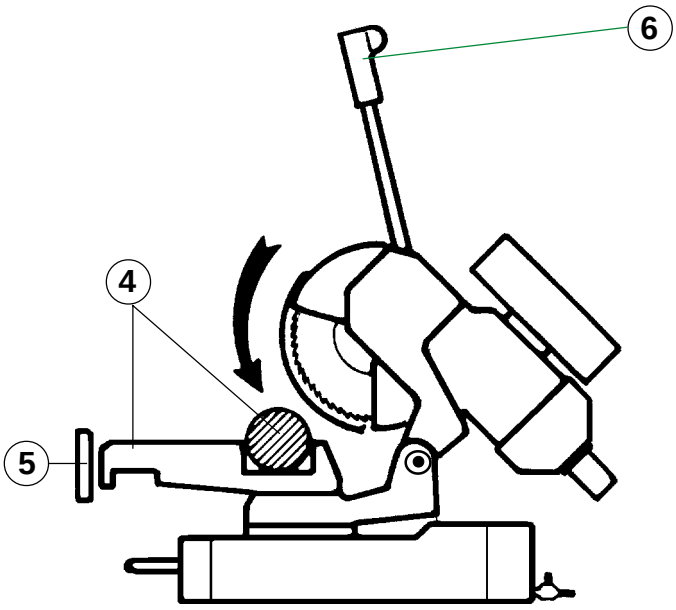
- The devices do not require any particular adjustments.

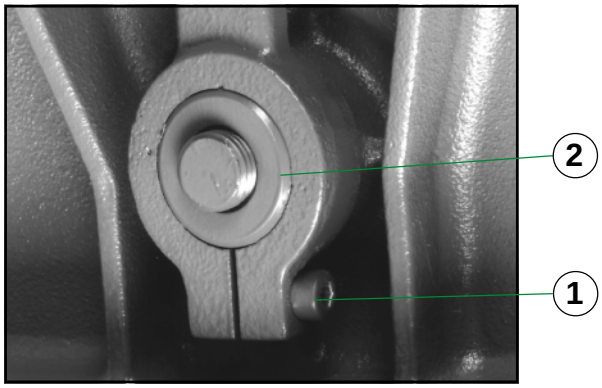
7.2 - Vice

- The devices do not require any particular adjustments.

7.3 - 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.





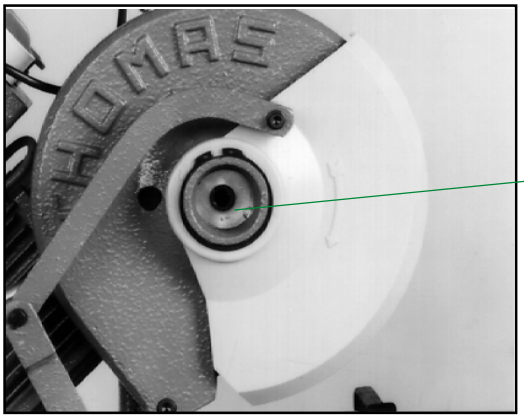
The cropper is now ready to start work, bearing in mind that the CUTTING SPEED and the TYPE of DISC - combined with a suitable descent of the head - are of decisive importance for cutting quality and for machine performance (for further details on this topic, see below in the chapter on "**Material classification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

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

7.4 - 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.



7.5 - Changing the lubricating coolant pump

- Takes yhe pipes of the lubricating-refrigerating system off.
- Remove the fastening screws and replace the little pump, being careful to keep the driving stem centred on the drive shaft bearing.

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

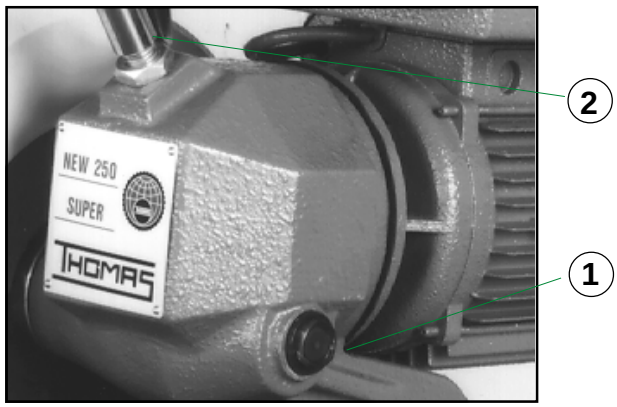
- Check tightness of the screws on the motor, the pump, the jaws and shields.
- Check that the shields are unbroken.
- Grease the head hinge pin.

8.4 - Six-monthly maintenance

- Change the oil in the reduction unit using oil type GEARCO 85W-140 by NATIONAL CHEMSERACH 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 at the side (1).
- Pour in new oil up to the mark (1), through the lever fixing hole, keeping the head in a horizontal 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 **con-trol of head descent**, must be suitably combined.These spe-cifications must therefore be harmoniously combined in a single operating condition according to practical consi-dera-tions and common sense, so as to achieve an optimum condi-tion 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 ti-me will be solved more easily if the operator has a good know-ledge 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.

9.2 - Choosing the disk

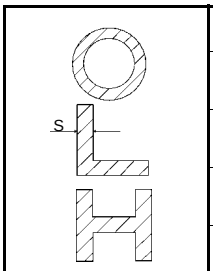
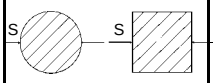
First of all the pitch of the teeth must be chosen, suitable for the material to be cut, according to these criteria:

- 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.

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

9.3 - 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)	PICTH	SHAPE	SPEED
	up to 2	4 - 6	B shaped	2
	2 ÷ 5	8	C solid	2
	5 ÷ 10	8	C solid	1
	over 10	8	C solid	1
	up to 20	8	C solid	1
	20 ÷ 50	10	C solid	1

9.4 - Cutting and advance speed

The cutting speed (m/min) and the advance speed (cm^2/min = area travelled by the disk teeth when removing shavings) are limited by the development of heat close to the tips of the teeth.
- The cutting speed is subordinate to the resistance of the material (R = N/mm^2), to its hardness (HRC) and to the dimensions of the widest section.
- Too high an advance speed (= 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 cm^2/min on material of average dimensions with respect to the cutting capacity and solid section of normal steel with R = 410-510 N/mm^2), **generously spraying the cutting area with lubricating coolant.**

9.6 - 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

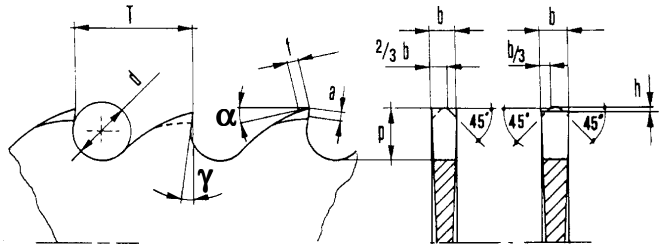
"**BW**" toothing:
large toothing with alternate side rake

"**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



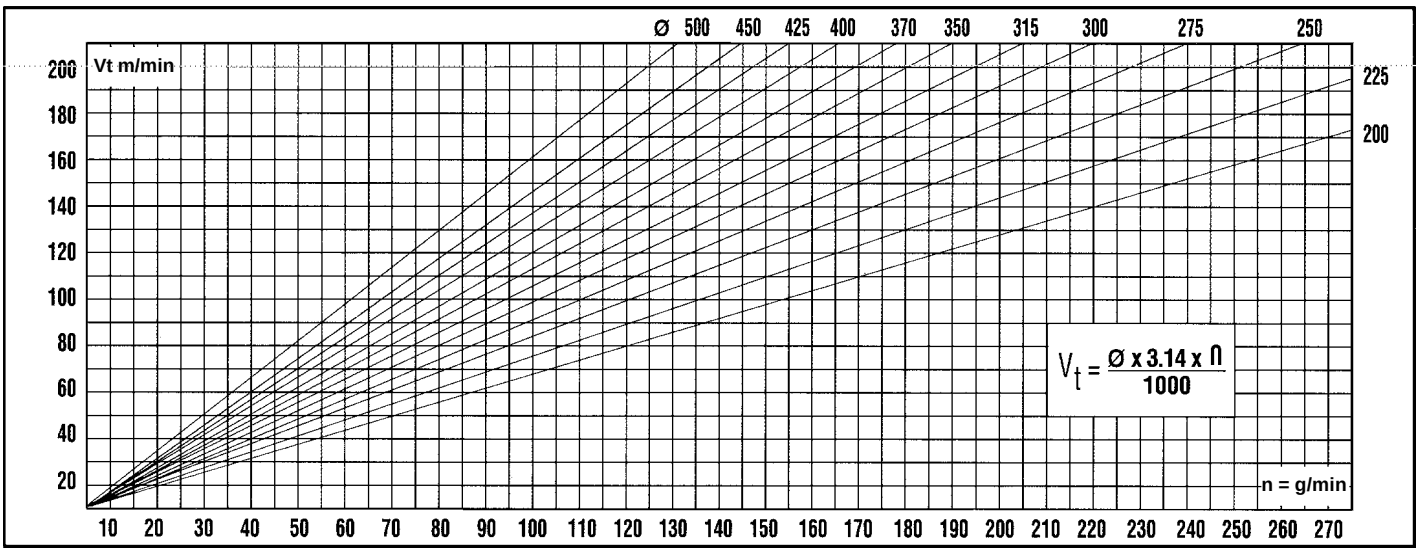
T	3	4	5	6	7	8	9	10	12	14	16
p	1,3	1,6	2,1	2,5	2,9	3,4	3,8	4,2	5,1	5,9	7,2
d	1,5	2	2,5	3	3,5	4	4,5	5	6	7	8
h = 0,2 mm						h = 0,3 mm					

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

9.7.1 - RECOMMENDED CUTTING PARAMETERS

			Mild steel R = 350-500 N/mm²	Semi-hard steel R = 500-700 N/mm²	Hard steel R = 750-950 N/mm²	Extra-hard steel R = 950-1000 N/mm²	Heat-treated steel R = 950-1300 N/mm²	Austentic stainless steel R = 500-800 N/mm²	Martensitic stainless steel R = 500-800 N/mm²	Grey cast iron	Aluminium and alloys R = 200-400 N/mm²	Aluminium and alloys R = 300-300 N/mm²	Copper R = 200-350 N/mm²	Phosphor bronze R = 400-600 N/mm²	Hard bronze R = 600-900 N/mm²	Brass R = 200-400 N/mm²	Alloyed brass R = 400-700 N/mm²	Titanium and alloys R = 300-800 N/mm²	Tubes and beams 0,05. D R = 300-600 N/mm²	Tubes and beams 0,025. D R = 300-600 N/mm²
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°	10°	8°	10°	8°	8°	16°	16°	8°	8°	8°
SECTION TO BE CUT (IN MM)	10 - 20	*T mm	5	4	4	3	2	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	120	600	500	50	19	35
		Av mm/1'	160	130	110	60	35	50	50	100	1800	400	600	800	160	1100	700	160	130	130
	20 - 40	*T mm	7	6	6	4	3	6	6	6	8	7	8	7	8	6	7	4	4	3
		Vt m/1'	45	30	20	15	9	19	19	23	1000	180	350	400	110	600	400	45	18	33
		Av mm/1'	150	120	110	60	33	45	45	100	1700	400	600	700	150	1100	600	150	120	120
	40 - 60	*T mm	10	9	8	6	4	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	100	550	350	45	18	30
		Av mm/1'	140	110	100	50	30	45	45	90	1600	350	550	700	140	1000	600	140	110	110
	60 - 90	*T mm	12	12	11	9	6	11	11	11	16	12	14	12	10	12	12	10	6	5
		Vt m/1'	40	25	17	14	8	17	17	20	800	160	250	300	90	550	350	45	17	30
		Av mm/1'	130	110	50	50	28	40	40	80	1400	300	550	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	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 LUBRIFICANTS			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
Av mm/min	Advance in millimetres per minute
Vt m/min	Cutting speed in metres per minute
Az	Tooth advance
Ng/min	Number of revs per minute
Z	Number of teeth on the disk
p	Tooth depth
d	Diameter of the tooth fillet cone distance
h	Tooth protrusion
γ	Front rake
α	Rear rake
N/mm	Ultimate tensile stress
a-f	Flat parts of the cutting edge
Ø	Tube diameter or profile width

10 MACHINE COMPONENTS

10.1 - List of spare parts

REFERENCE N	DESCRIPTION
1	Machine bed
2	Revolving arm
3	Revolving arm locking pin
4	Revolving arm locking bush
5	Revolving arm locking lever
6	Screw M8
7	Pin Ø 6
8	Countervice
9	Grain M6
10	Bar stop rod
11	Bar stop
12	Vice
13	
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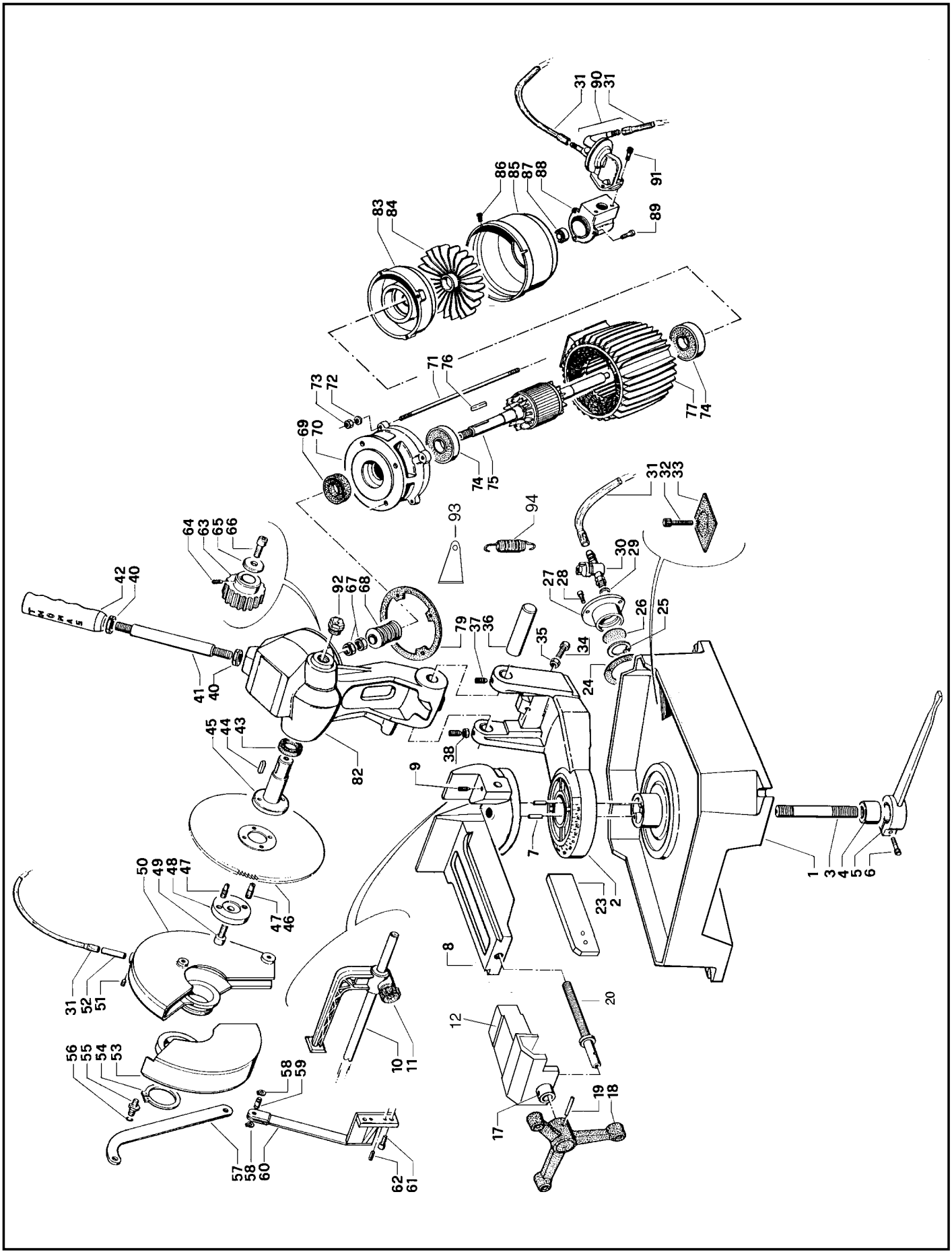
17	Oiler Ø 5
18	Vice handwheel
19	Pin Ø 6
20	Vice thread
21	
22	
23	Burr-free plate
24	Seal filter support flange
25	Ring seeger Ø 42 I
26	Tank cover filter
27	Filter support flange
28	Screw M5
29	Washer
30	Coolant tap
31	Coolant tube
32	Screw M6
33	Tank filter
34	Screw M8
35	Nut M8
36	Hinge pin
37	Grain M6
38	Nut M6
39	
40	Nut M16
41	Head lever
42	Head lever handgrip
43	Ring SM 30-40-7
44	Key 8x7x30
45	Blade shaft

REFERENCE N	DESCRIPTION
46	Blade
47	Blade shaft flange stakes
48	Blade shaft flange
49	Screw M12
50	Fixed guard
51	Grain M16
52	Coolant tube
53	Mobile guard
54	Ring seeger Ø 60 E
55	Screw M6
57	Mobile guard rod
58	Ring seeger Ø 10 E
59	Tie rod support pin
60	Tie rod support
61	Screw M8
62	Pin Ø 4
63	Worm wheel
64	Grain M8
65	Worm wheel retaining washer
66	Screw M12
67	Ring nut M17
68	Worm screw
69	Ring DPSM 25-47-7
70	Front flange
71	Stud bolt
72	Washer
73	Nut M16
74	Bearing 6025 2rs
75	Motor shaft (rotor)
76	Key
77	Motor housing and stator
78	
79	Head gasket
80	
82	Motor head
83	Motor rear flange
84	Fan
85	Fan cover
86	Screw M4
87	Bearing 609
88	Pump connexion box
89	Screw M5
90	Coolant pump
91	Screw M6
92	Oil level-drain plug
93	Return spring connection
94	Head return spring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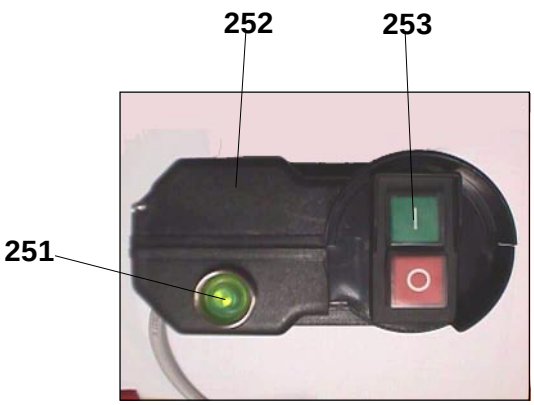
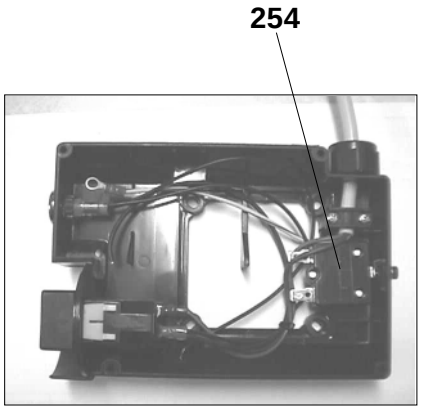
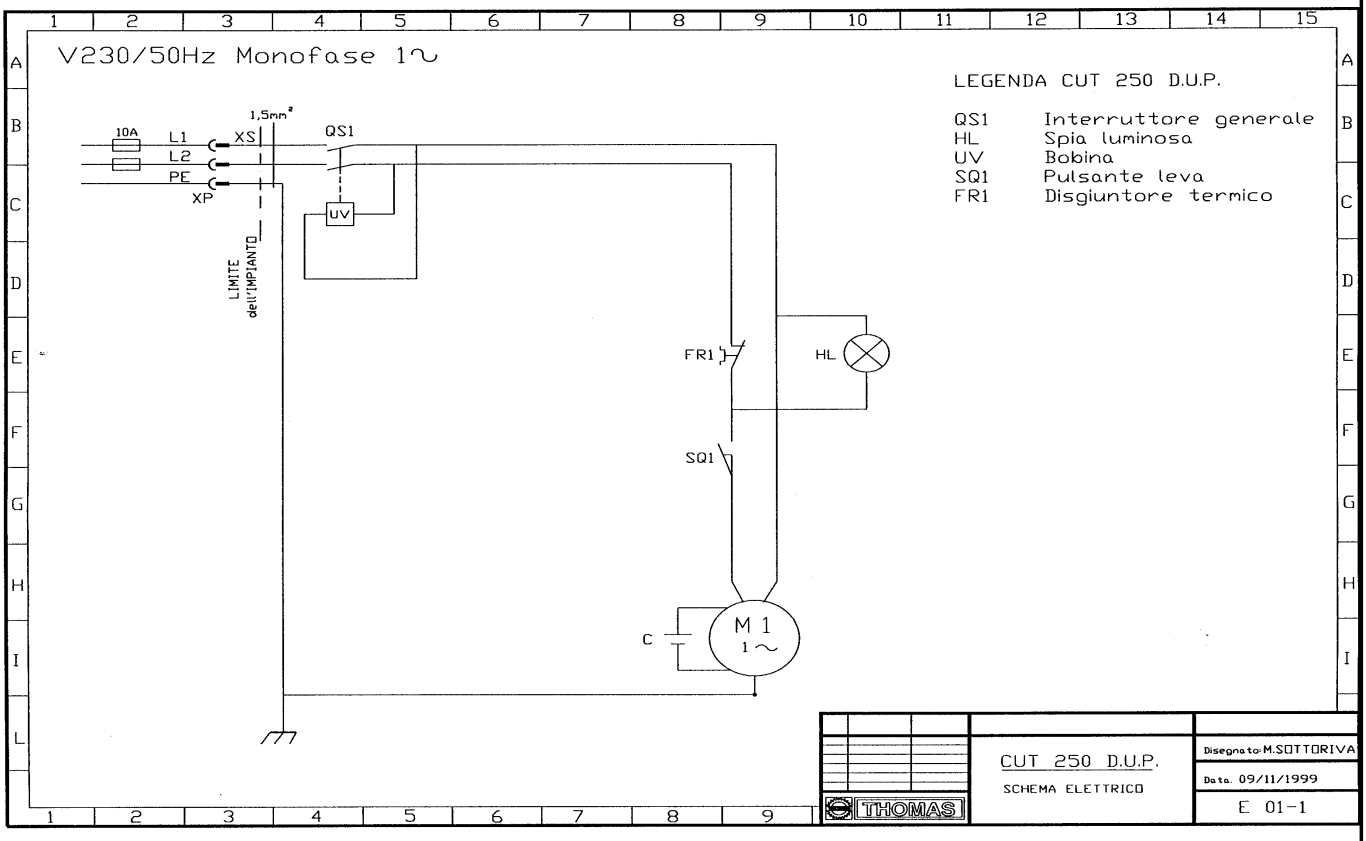




251 Warning light HL
252 Box
253 Main switch QS1
254 Circuit breaker FR1

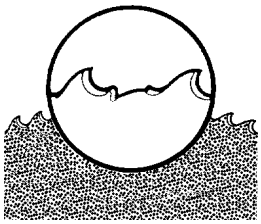
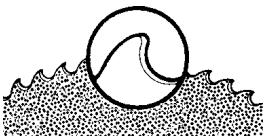
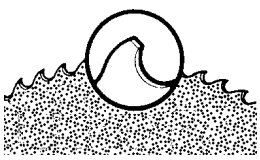
11 ELECTRIC DIAGRAMS

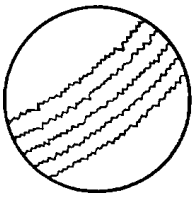
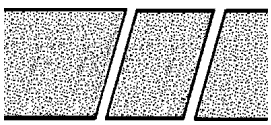


12 TROUBLESHOOTING

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

12.1 - Blade and cut diagnosis

FAULT	PROBABLE CAUSE	REMEDY
TOOTH BREAKAGE 	Too fast advance	Decrease advance, exerting less cutting pressure
	Wrong cutting speed	Change disk speed and/or diameter. See Chapter **" Material classification and choice of disks"** and the *Table of cutting speeds according to disk diameter.*
	Wrong tooth pitch	Choose a suitable disk. See Chapter **"Material classification and choice of disks".**
	Low quality disk	Use a better quality disk.
	Ineffective gripping of the part in the vice.	Check the gripping of the part.
	Previously broken tooth left in the cut	Accurately remove all the parts left in.
	Cutting resumed on a groove made previously.	Make the cut elsewhere, turning the part.
	Insufficient lubricating refrigerant or wrong emulsion	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.
	Sticky accumulation of material on the disk.	Check the blend of lubricating coolant and choose a better quality disk.
PREMATURE DISK WEAR 	Wrong running in of the disk	See Chapter **"Material classification and choice of disks"** in the paragraph on *Running in the disk.*
	Wrong cutting speed	Change disk speed and/or diameter. See Chapter **"Material classification and choice of disks"** and the *Table of cutting speeds according to disk diameter.*
	Unsuitable tooth profile	Choose a suitable disk. See Chapter **"Material classification and choice of disks"** in the paragraph on *Type of disks.*
	Wrong tooth pitch	Choose a suitable disk. See Chapter **"Material classification and choice of disks".**
	Low quality disk	Use a better quality disk.
	Insufficient lubricating refrigerant	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.
CHIPPED DISK 	Hardness, shape or flaws in the material (oxides, inclusions, lack of homogeneity, etc..)	Reduce the cutting pressure and/or the advance.
	Wrong cutting speed	Change disk speed and/or diameter. See Chapter **"Material classification and choice of disks"** and the **Table of cutting speeds according to disk diameter.**
	Wrong tooth pitch	Choose a suitable disk. See Chapter **"Material classification and choice of disks".**
	Vibrations	Check gripping of the part.
	Disk incorrectly sharpened	Replace the disk with one that is more suitable and correctly sharpened.
	Low quality disk	Use a better quality disk.

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

12.2 - Electrical components diagnosis

FAULT	PROBABLE CAUSE	REMEDY
THE GREEN PILOT LIGHT "HL" DOES NOT LIGHT UP	Lamp burnt out. Power supply	Change it. Check: - phases - cables - socket - plug
	Short circuits Main switch	Identify and eliminate. Check the switch. In case of electrical drop-out or overload cut-out, press switch to start the machine again.
	Circuit breaker	Reset the circuit breaker in case of overload cout-out.
MOTOR STOPPED WITH PILOT LIGHT "HL" LIT	Socket and plug connecting the electric box/ microswitch in the handle	Check that the plug is correctly inserted and look for any bad connections inside the box.
	Microswitch "SQ 1" in the handle	Check operation and/or efficiency; replace if broken.
	Motor "M 1"	Check that it is not burnt and that it turns freely. It may be rewound or changed.

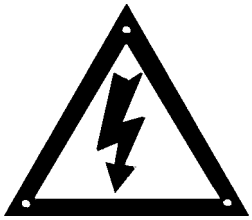
13 NOISE TESTS

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

INTEGRATING PHONOMETER " DELTA OHM " mod. HD9019K1 serial n. 110996B295.
MICROPHONE mod. HD 9019S1.
SOUND GAUGER mod. HD 9101at 94dB/110dB a 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 77,6 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 there-fore assess the intensity and if necessary provide the operators with the necessary personal protection, as required by Law 277/1991.

PLATES AND LABELS



NOTE: