INSTRUCTION MANUAL

EB-260S
Swivel Head Metal Cutting Band Saw (415V)
260 x 100mm (W x H) Rectangle

B060

Contents

Contents

1 ACCIDENT PREVENTION AND SAFETY REGULATION

This machine has been designed to comply with national and community accident-prevention regulations. 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 machine motor is the same as the line voltage.
- Check the efficiency of your electric supply and grounding system; connect the power cable of the machine to the socket and the ground lead (yellow-green in color) to the grounding system.
- When the saw frame is in suspended mode (or raised) the blade must not move.
- Only the blade section used for cutting must be kept unprotected. To remove guards operate on the adjustable head.
- It is forbidden to use the machine without its shields
- 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 like: shirts 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. Never have several objects in your hands at the same time. Keep your hands as clean as possible.
- All 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 The electrical equipment according to European Standard" CENELEC EN 60 204-1" which assimilates, with some integrating modifications, the publication "IEC 204-1 (1992)"

- 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 as low voltage (24V). 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 grounding; in the event of a 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

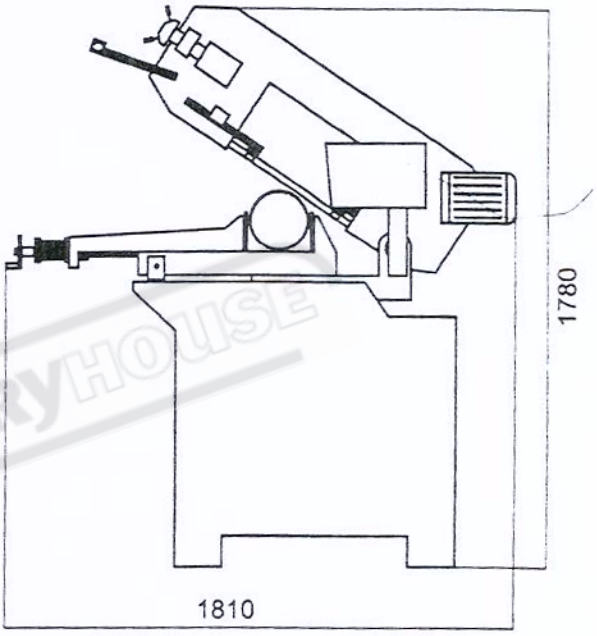
1.3 *Emergencies according to European Standard "CENELEC EN 60 204-1 (1992)"*

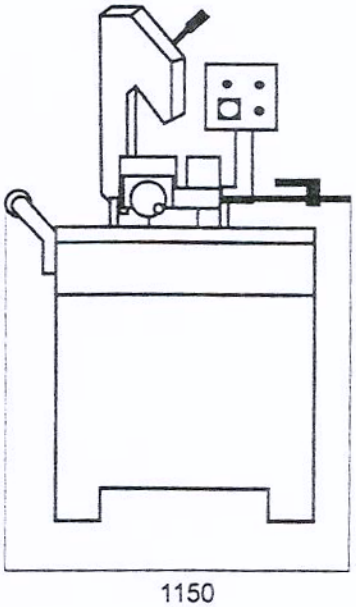
- In the event of incorrect operation or of danger conditions, the machine may be stopped immediately by pressing the red mushroom button.
- The casual or voluntary removal of the protection shield of the flywheels causes the stepping-in of a microswitch that automatically stops all machine functions.

NOTE: Resetting of machine operation after each emergency stop requires specific restart button.

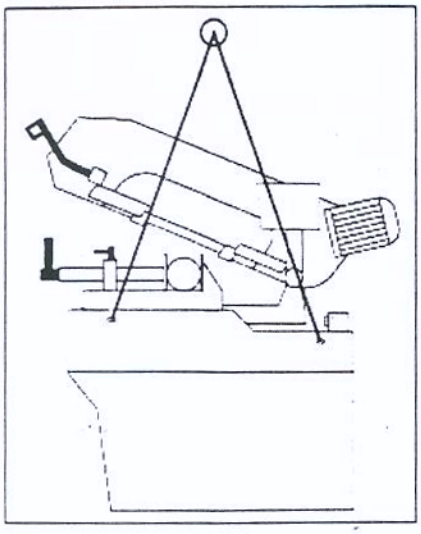
2 MACHINE DIMENSIONS TRANSPORT INSTALLATION DISMANTLING

2.1 Machine dimensions





2.2 Transportation of your machine

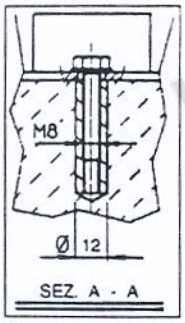


To move the machine, the machine needs to be moved in its own packing, use a forklift truck or sling it with traps as illustrated in the drawing above.

2.3 Minimum requirements for housing the machine

- Main voltage and frequency must comply with the machine's motor requirements.
- Environment temperature should fall within –10 °C to +50 °C.
- Relative humidity cannot be over 90%.

2.4 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.

2.5 Instructions for assembly of the loose parts and accessories

Fit the components supplied:
Detail 1 Mount bar-stop rod
Detail 2 Mount and align the roll-supporting arm as per the counter-vice table.

2.6 Disactivation of machine

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

I) Detach the plug from the electric supply panel
2) Loosen blade
3) Release the arch return spring
4) Empty the coolant tank
5) Carefully clean and grease the machine
6) If necessary, cover the machine.

2.7 Dismantling (due to deterioration and/or (obsolescence)

General rules

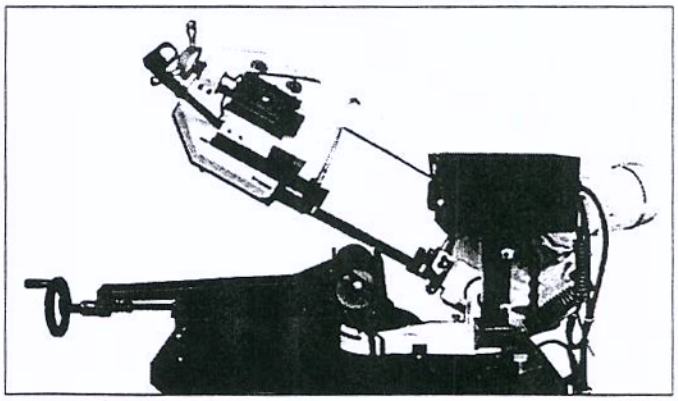
If the machine is to be permanently demolished and/or scrapped, divide the material to be disposed of according to type and composition, as follows:
1) Cast iron or ferrous materials, composed of metal alone, are secondary raw materials, so they may be taken to an iron foundry for re-smelting after having 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 assimilated to urban waste according to the laws of your local, state, or federal government, 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 considered hazardous or special refuse, so they must be collected, transported and disposed of at a special waste disposal service.

NOTE: The standards and legislation concerning refuse is in a constant state of evolution, therefore is subject to changes. The user must keep informed of the regulations at the time of disposal as these may differ from those described above.

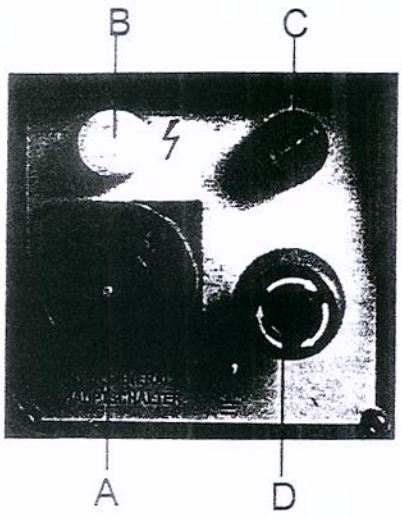
3 *THE MACHINE'S FUNCTIONAL PARTS*

3.1 The saw arm

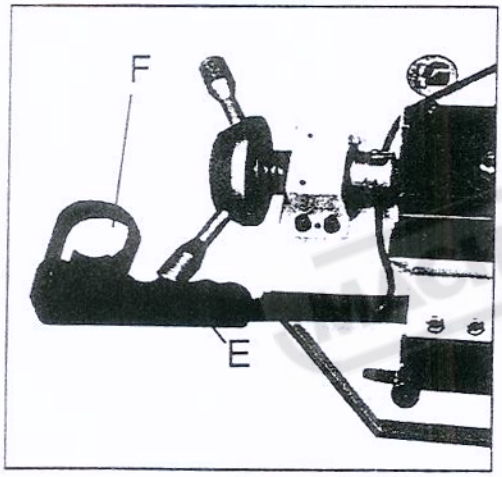
Machine part consisting of drive members (gear motor or variable speed motor, flywheels), tightening and guide (blade tightening slide, blade guide blocks) of tool.



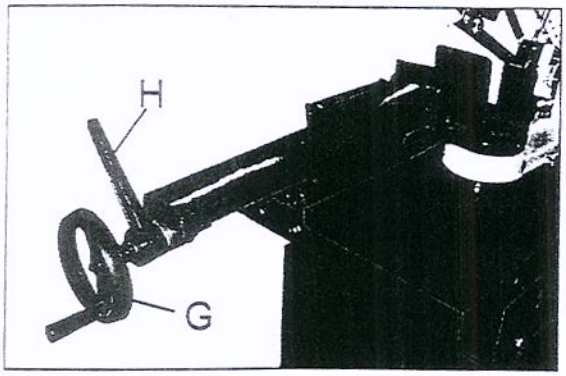
3.2 Controls



A. Main connect switch
B. Power ON indicator light
C. Operating indicator light
D. Emergency push button
E. Manual operation handle
F. Trigger start switch

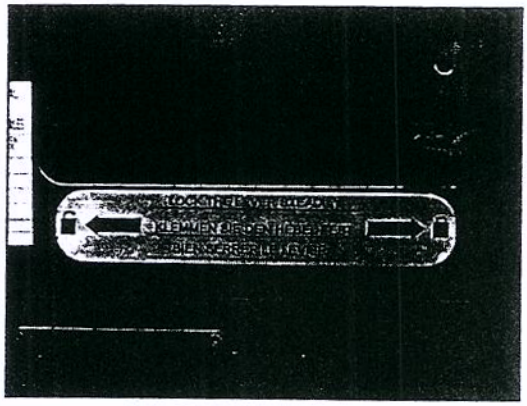


3.3 Vice adjustment



Clamping the Work Piece
- Place the work piece between the vise jaws and have it rest next to the fixed vise jaw.
- Rotate the hand wheel (G) clockwise to close the free vise jaw on to the work piece, and tighten.
- Rotate the hand wheel (G) counter-clockwise to release
- Lever (H) can be used to rapidly lock and release the work piece by allowing a shallow gap between the vise and work piece. Then rotate lever (H) counter-clockwise to lock and clockwise to release.

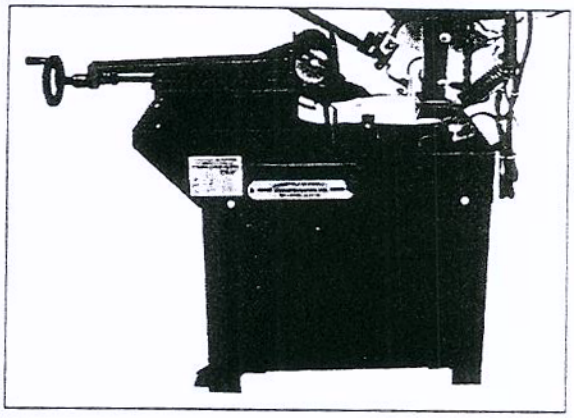
3.4 Cutting angle adjustment



Cutting at angles
- Angle can be cut up to 60°.
- Unlock lever (I) by pushing it to the left side.
- Rotate the saw arm to the desired angle by following the index on the scale.
- Lock lever (I) by pushing to the right side.

3.5 The base

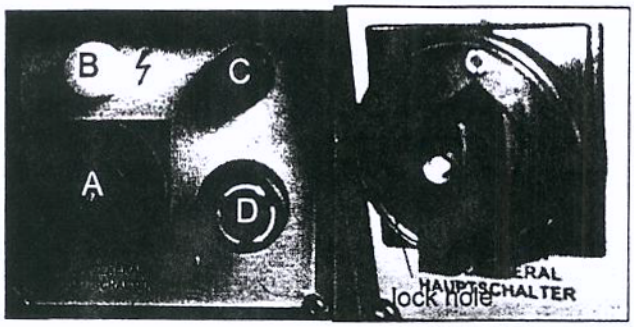
- A structure supporting the SAW ARM (revolving arm for gradual cutting and respective blocking system), the VICE, the BAR STOP, the ROLLER, and the coolant return plate for the support of the material. The base houses the cooling liquid TANK and PUMP.



3.6 The operation cycle

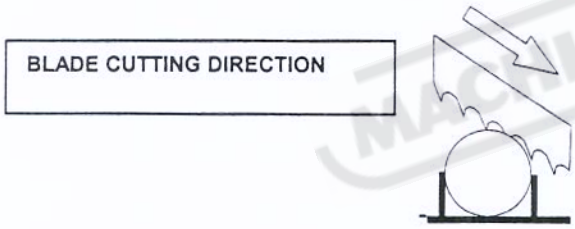
Before operating, all the main organs of the machine must be set in optimum conditions

The main connect switch is designed with a lock hole. A lock can be attached using the lock hole to prevent machine operation for safety and security reasons.



Operation Procedure:
- Raise the saw arm to the highest position.
- Load work piece and clamp it properly.
- Turn on **main connect switch (A)** to the ON position. Check to see that the **indicator light (B)** is lit.
- Press the **trigger start switch (F)** and **indicator light (C)** will light. The coolant system should activate at the same time.
- Pull the **manual operation handle (E)** down to start cutting.
  After the cut is complete press the **trigger start switch (F)** the machine will shut down. Raise the saw arm to the highest position for the next cut.

If an emergency situation should occur.
- Press the **emergency push button (D)** down to shut off all functions. To release the emergency push button rotate the mushroom shaped button clock-wise. The button will pop up, then the cutting cycle can be restarted.

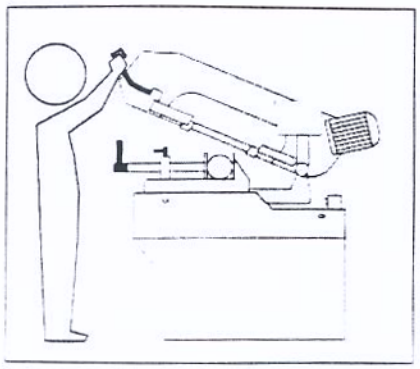


4 ADVICE ON USING YOUR BANDSAW

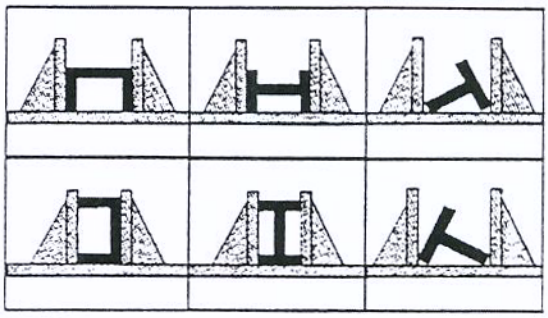
4.1 Recommendations and advice for using the machine

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 clamped in the vice and that the end is suitably supported.
- These figures below show examples of suitable clamping of different section bars, bearing in mind the cutting capacities of the machine in order to achieve a good efficiency and blade durability.

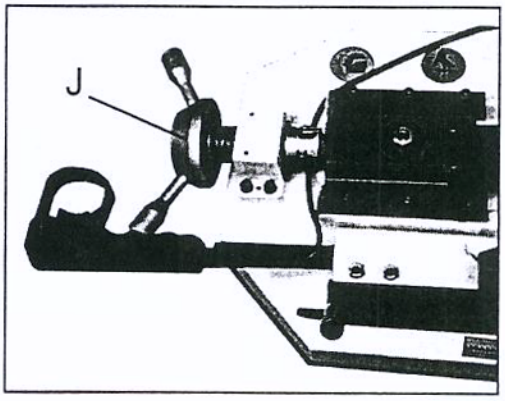


- Do not use blades of a different size from those stated in the machine specifications.
- If the blade gets stuck in the cut, release the running but ton immediately, switch off the machine, open the vice slowly, remove the part and check that the blade or its teeth are not broken. If they are broken, change the tool.
- Before carrying out any repairs on the machine, consult the dealer.

5 ADJUSTING YOUR MACHINE

5.1 Blade tension assembly

Blade tension is important to the proper operation of the saw. Proper blade tension is 700 to 900 kgs. Per square inch as measured on a blade tension gauge.



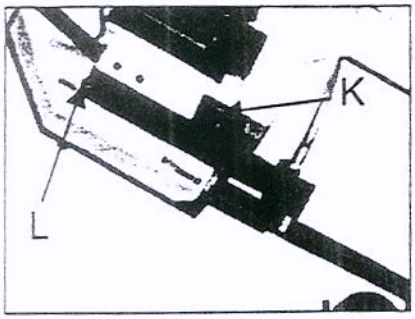
To set the blade tension without the use of a tension gauge:

- Disconnect the machine from the power source.
- Install blade between wheel and insert blade between bearings on blade guides.
- Tension blade slightly to remove any sag in blade between blade wheels.
- Turn blade tension knob (J) one and three quarter to two revolutions clockwise. To test press the flat side of the blade with your thumb, if moves with 2mm-3mm range then it is set correctly.
- After blade has been completely installed, close covers, connect the power source, and run saw for

two to three minutes so blade can seat properly.
- Disconnect machine from the power source. Open cover and loosen blade just until it begins to sag.
- Tighten blade until it becomes straight between blade wheel and all sag has been eliminated.
- Tighten blade by tuning blade tension wheel two full revolutions. Blade is now property tensioned and ready for use.

Close covers and connect machine to the power source.

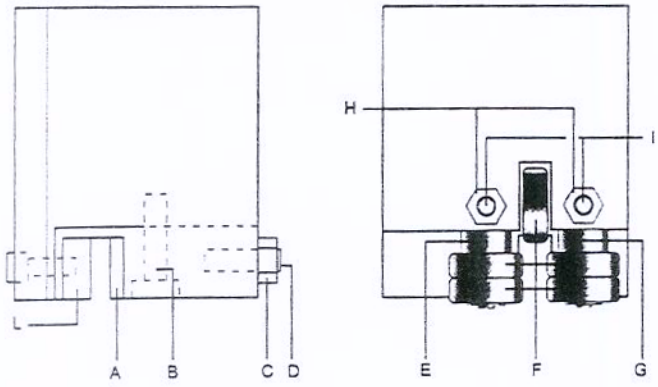
5.2 Adjusting the blade guide



- Disconnect the machine from the power source.
- Loosen hex screw (K) on the square lock plate.
- Hold the handle (L) and slide blade guide block as close as possible to the material without interfering with the cut
- Tighten hex screw (K).
- Reconnect the machine to power source.

Blade guide blocks

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



In case the blade needs to be replaced, make sure to always install 0.9mm thick blades for which the blade guide pads have been adjusted. In the case of toothed blades with different thicknesses adjustment should be carried out as follows:
- Loosen nut (C), screw (B) and loosen dowel (D) widening the passage between the pads.
- Loosen the nuts (H) and the dowels (I) and rotate the pins (E - G) to widen the passage between the bearings (F).
- To mount the new blade: place the pad (A) on the blade, loosening the dowel, allow a play of 0.04 mm for the sliding of the toothed blade, lock the relative nut and screw (B), Rotate the pins (E - G) until the bearings rest against the blade as indicated in the figure and then secure the dowels (I) and nut (H).
- Make sure that between the blade and the upper teeth of the pad (L) this is at least 0.2 - 0.3 mm of play; if necessary, loosen the screws that fasten the blocks and adjust accordingly.

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

5.3 Changing the blade

To change the blade:
- Lift the saw arm.
- Loosen the blade with the blade tension hand wheel, remove the mobile blade-guard cover, open the flywheel guards and remove the old blade from the flywheels and the blade guide blocks.
- Assemble the new blade by placing it first between the pads and then on the race of the flywheels, paying particular attention to the cutting direction of the teeth.
- Tension the blade and make sure it perfectly fits inside the seat of the flywheels.
- Assemble the mobile blade-guide end, the flywheel guard, and fasten it with the relative knobs. Check the safety **microswitch (M)** is activated otherwise when electricity is applied the machine will not start.

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

6 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.

6.1 Daily maintenance

- General cleaning of the machine to remove

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

6.2 Weekly maintenance
- Thorough cleaning of the machine to remove shavings, especially from the lubricant fluid tank.
- Removal of pump from its housing, cleaning of the suction filter and suction zone.
- Clean the filter of the pump suction head and the suction area.
- Use compressed air to clean the blade guides (guide bearings and drain hole of the lubricating cooling).
- Cleaning flywheel housings and blade sliding surfaces on flywheels.

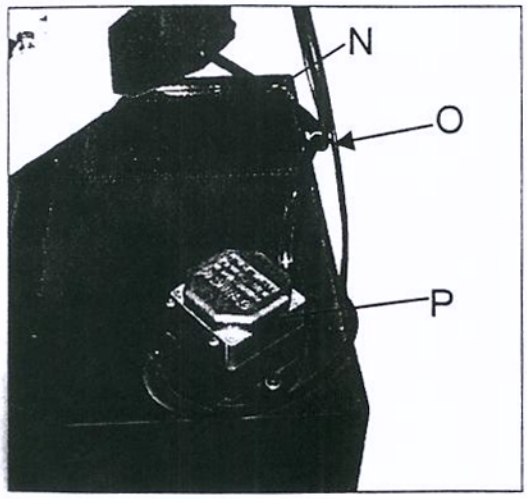
3 Monthly maintenance
- Check the tightening of the motor flywheel screws.
- Check that the blade guide bearings on the heads are perfect running condition.
- Check the tightening of the screws of the gear motor, pump, and accident protection guarding.

6.4 Six-monthly maintenance
- Continuity test of the equipotential protection circuit.

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

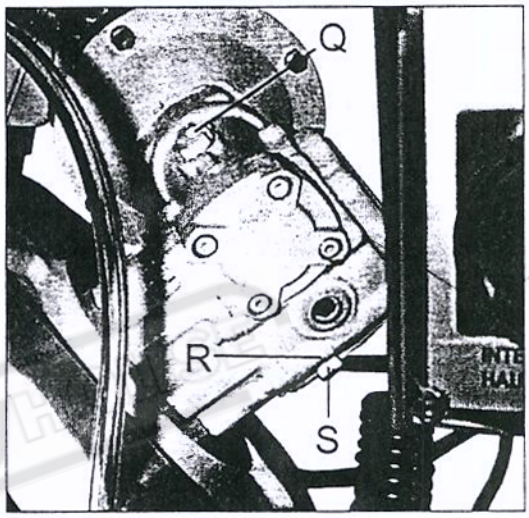
6.6 Oil disposal
The disposal of these products is controlled by strict regulations. Please see the Chapter on **"Machine Dimensions Transport - Installation"** in the section on *Dismantling.*

6.7 Coolant system



Cleaning the tank
- Use hex wrench to open the plug (O)(not shown) to allow the coolant to drain out.
- Remove the filter (N) by loosening the four set screws.
- Remove the pump (P) by loosening the four set screws.
- Use a vacuum cleaner to vacuum chips and debris from the tank.
- Replace the plug (O)
- Thoroughly clean the pump (P) and replace.
- Fill tank with coolant to a level about 25mm below the filter.
- Replace the filter.

6.8 The gear box



The gear box requires periodic changing of oil. The oil must be changed by the first 6 months of a new machine and every year thereafter.

To change the gear box oil
- Disconnect the machine from the power source.
- Raise the saw arm to vertical position
- Release the drain hold (R) to draw off gear oil by loosening the hex socket screw (S).
- Replace the screw (S) after oil completely flows off.
- Place the saw arm back to horizontal position.
- Fill Gear box with approximately .3 liter of gear oil through the hole of the vent screw (Q)

For reference, use SHELL type gear oil or Mobile gear oil #90.

6.9 Special maintenance
Special maintenance must be conducted by skilled personnel. We advise contacting your nearest dealer and/or importer. Also the reset of protective and safety equipment and devices (of the reducer), the motor, the motor pump, and other electrical components requires special maintenance.

7 TECHNICAL CHARACTERISTICS

7.1 Table of cutting capacity and technical details

CUTTING CAPACITY			
0°	225	220 x 220	245 X 160 260 X 100
45°	150	140 x 140	200 X 140
60°	90	90 x 90	

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	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

ELECTRIC MOTOR-BLADE ROTATION	kW	0.95 / 1.1
REDUCTION UNIT IN OIL BATH	I	40:1
FLYWHEEL DIAMETER	mm	295
BLADE DIMENSIONS	mm	2455x27x0.9
BLADE SPEED CUTTING	m/1'	36 / 72
OPENING VICE	mm	260
SAW FRAME TILTING	°	40
WORKING TABLE HEIGHT	mm	900
MACHINE WEIGHT	kg	216

8 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.

8.1 Definition of materials

The table above lists the characteristics of the materials to be cut. So that the correct tools to use, can be chosen.

8.2 Selecting blade

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

8.3 Teeth pitch

As already stated, this depends on the following factors:

- **Hardness of the material**
- **Dimensions of the section**
- **Wall thickness.**

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	5	5/8
FROM 4 TO 6	6	4/6
MORE THAN 6	4	4/6

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

8.4 Cutting and advance speed

The cutting speed (m/min) and the advance speed (cm2/min =area traveled 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/mm2), to its hardness (HRC) and to the dimensions of the widest section.
- Too high an advance speed (= lowering of the saw frame) tends to cause the disk to deviate from the ideal cutting path, producing non rectilinear cuts on bath 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.

8.5 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 Nimm2). **Generously spraying the cutting area with lubricating coolant.**

8.6 Blade structure

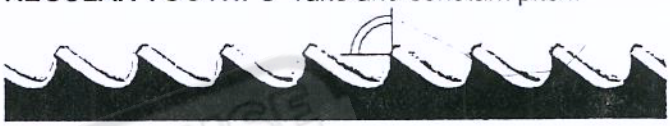
Bi-metal blades are the most commonly used. They consist of a silicon-steel blade backing by a laser welded high speed steel (HHS) cutting edge. The type of stocks are classified in M2, M42, M51 and differ from each other because of their major hardness due to the increasing percentage of Cobalt (Cc)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

8.7 Blade type

They differ essentially in their constructive characteristics, such as:
- **Shape** and cutting **angle** of tooth
- **Pitch**
- **Set**

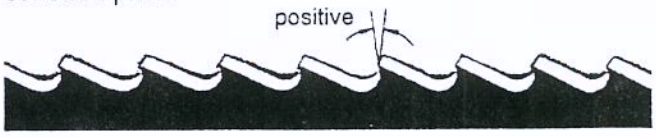
Shape and angle of tooth

REGULAR TOOTH: O° rake and constant pitch.



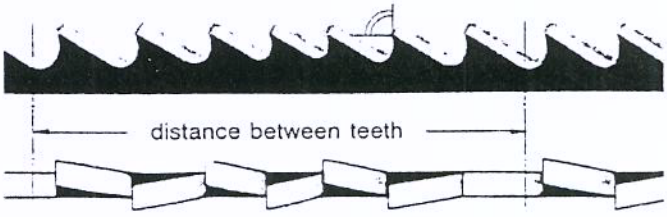
Most common form for transversal or inclined cutting of solid small and average cross-sections or pipes, in laminated mild steel and gray iron or general metal.

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



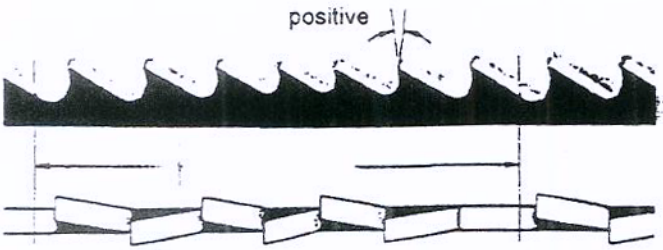
Particular use for crosswise or inclined cuts in solid sections or large pipes, but above all harder materials (highly alloyed and stainless steels, special bronze and forge pig iron).

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.



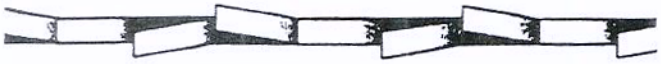
Another advantage offered in the use of this type of blade in the fact that with an only blade it is possible to cut a wide range of different materials in size and type.

COMBO TOOTH: 9° - 10° positive rake.

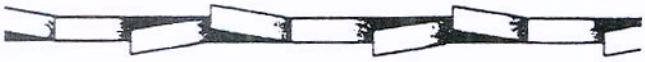


This type of blade is the most suitable for the cutting of section bars and large and thick pipes as well as for the cutting of solid bars at maximum machine capacity. Available pitches: 3-4/4-6.

SETS
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.

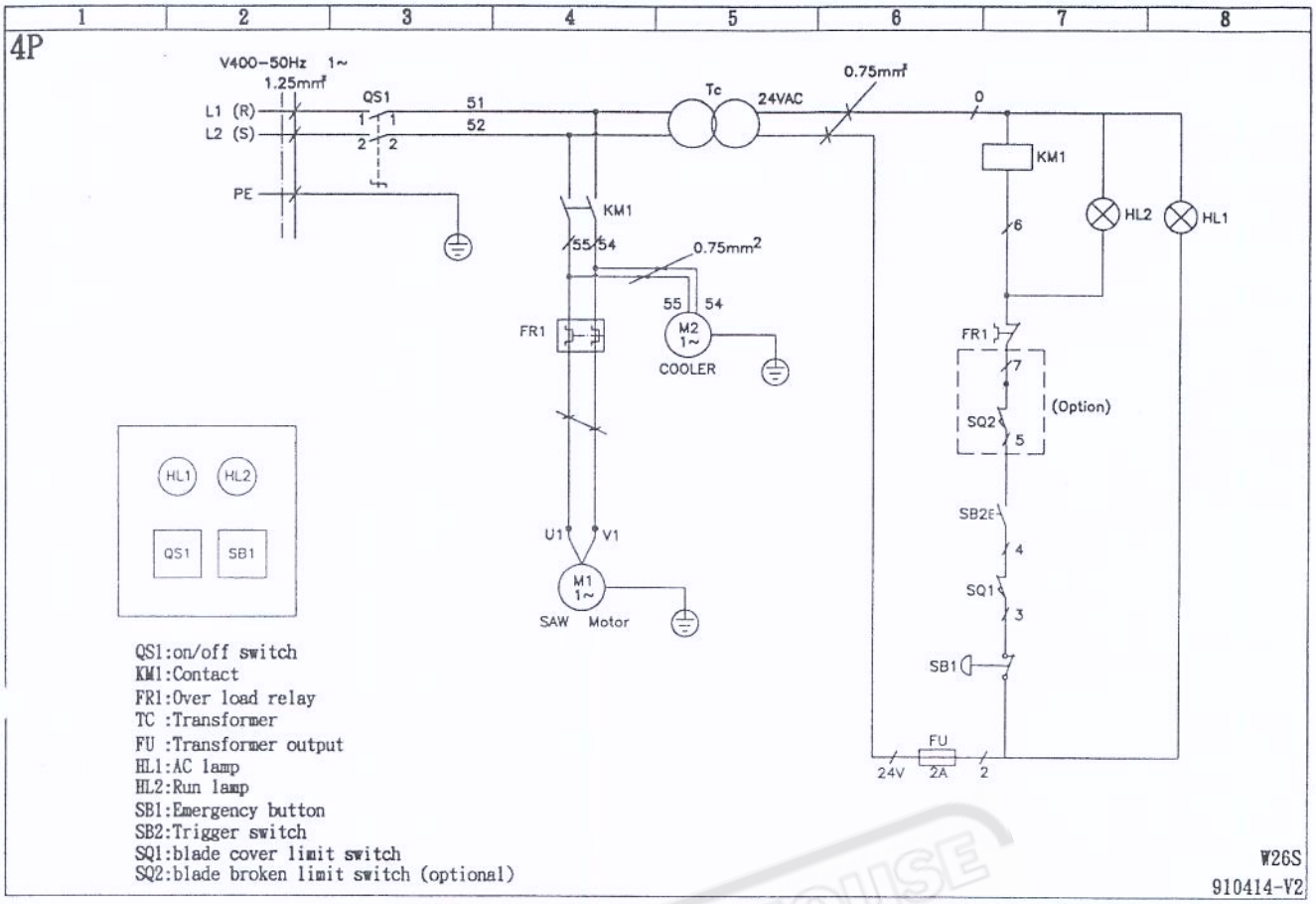
This set is associated with very fine teeth and it is used for extremely thin materials (less than 1mm).

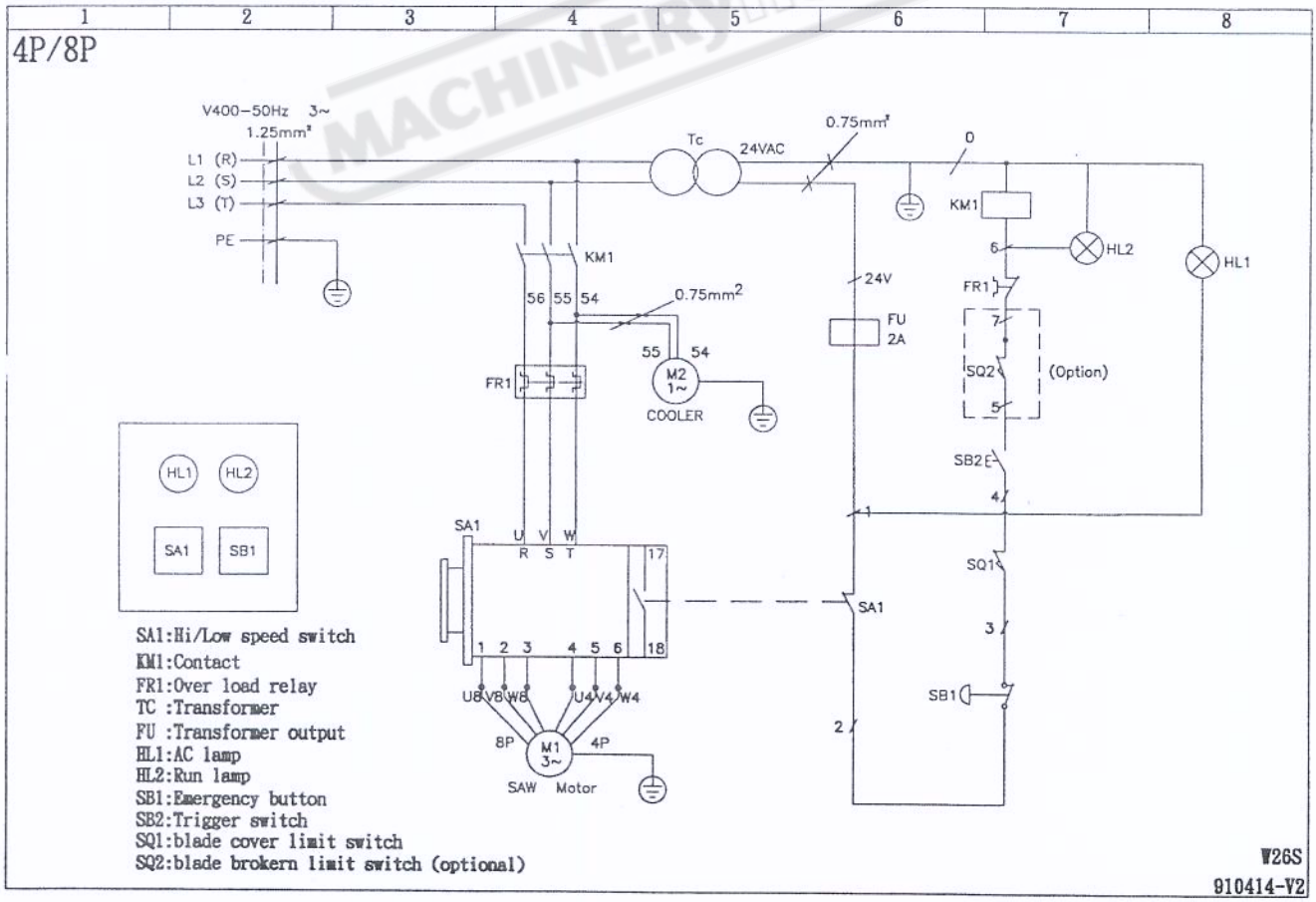
ALTERNATE SET *(INDIVIDUAL* TEETH): Cutting teeth right and left.

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

9 NOISE TESTS

The test was held under environmental noise levels of 65db. Noise measurements with the machine operating unload was 71db. Noise level during the cutting of mild carbon steel was 73db.
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.

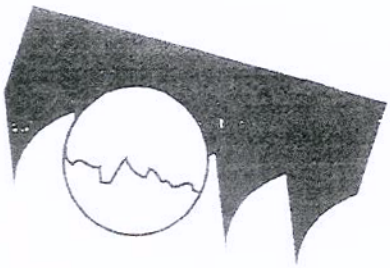
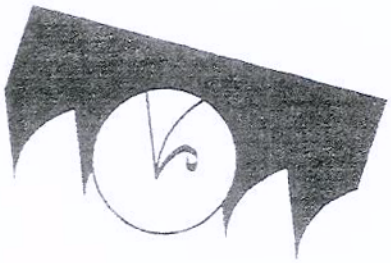




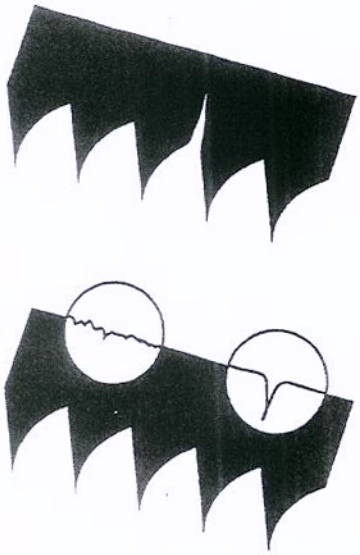
11 TROUBLESHOOTING

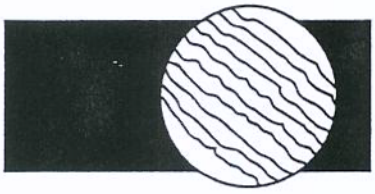
This chapter lists the probable faults and malfunctions that could occur while the machine is being used and suggests possible remedies for solving them.
The first paragraph provides diagnosis for TOOLS and CUTS the second for ELECTRICAL COMPONENTS.

11.1 - Blade and cut diagnosis

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

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

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

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

11.2 - Electrical components diagnosis

FAULT	PROBABLE CAUSE	REMEDY
THE SAW FRAME DOES NOT LOWER MANUALLY	Band speed switch	Check that selector is turned towards 0 (zero).
THE BAND ROTATION MOTOR DOES NOT WORK	"SQ3" low saw frame microswitch	Check that it is released and that it operates well.
	"SA" speed switch	It must be turned towards position 1 or 2.
	Band motor temperature relay	Check for current continuity on both wires of the probe after a motor cooling time of 10 - 15 minutes. If there is no current continuity on these two wires, the motor must be replaced or rewound.
	"SB3" cycle start push-button	Check the functioning and/or possible damages. If so, replace it.
STOP OF THE MACHINE AFTER SHUT DOWN	The timer does not stop the machine after about 1 minute	Check working condition of the timer; check the adjustment of the timer. Replace it, if necessary.
MACHINE DOES NOT WORK	Power supply	Check: -phases -cables -socket -plug Voltage must arrive upstream from the fuses (terminal board).
	Main disconnect switch	Check electrical efficiency. Check power line connections and relative terminals.
	Fuses "FU 1"	Check electrical efficiency and check for shorts that trigger such protections.
	"SQ 1" safety microswitch	Check closing of the fly wheel guard check the efficiency of the device; replace it if damaged.
	Blade tightening microswitch	Make sure to have tightened the blade with the relevant hand wheel and to have actuated the microswitch.
	Speed switch "SA" in position "0"	It must be turned to position 1 or 2.
	Emergency button "SB 1" on	Ensure that it is off and that its contacts are unbroken.

FAULT	PROBABLE CAUSE	REMEDY
MACHINE DOES NOT WORK (continued)	Cycle reset or line button "SB 2"	Check mechanical efficiency; replace if damaged.
	Microswitch "SQ 2" in the handle	Check current continuity on the two wires in the prone after letting the motor cool for about 10-15 minutes. If after this time there is no current continuity in the two wires, the motor must be changed or rewound.
	Remote-control switch "KM"	Check that the supply voltage is the same as the line voltage and that it gives a value of 24V at output.
	Motor "M 1"	Check the fuse efficiency and ensure there are no short circuits causing the protection to trip
MOTOR STOPPED WITH PILOT LIGHT "HL" LIT	Microswitch "SQ2" in the handle	Check operation and/or efficiency; replace if broken
	Remote control switch "KM"	Check that phases are present at both input and output; ensure that it is not blocked, that it closes when fed, that it does not cause short circuits; otherwise change it.
	Motor "M 1"	Check that it is not burnt and that it turns freely. It may be rewound or changed

PART LIST

Part No.	Description	Size No.	Q'ty	Part No.	Description	Size No.	Q'ty
1	Base (Right Part)		1	54	Vise		1
2	Nut	M12	2	55	Bar-Stop-Rod		1
3	Hex. Cap Bolt	M12x40	2	56	Bracket		1
4	Nut	M8	2	57	Butterfly Screw	5/16x3/4	1
5	Flat Washer	M8	2	58	Flat Washer	5/16x3t	1
6	Hex. Cap Bolt	M8x16	2	59	Spring Washer	5/16	1
7	Base Plate		2	60	Hex. Cap Bolt	5/16x1	1
8	Base (Left Part)		1	61	Cap Bushing		1
9	Hex. Socket Cap Screw	M8x10	2	62	Nut	5/16	1
10	Spring Washer	M8	2	63	Hex. Cap Bolt	5/16x2	1
11	Hex. Socket Cap Screw	M8x25	2	64	Set Screw	M8x10	1
12	Spring Washer	M8	2	64-1	Hex. Socket Cap Screw	M5x6	2
13	Flat Washer	M8	2	64-2	Scale		1
14	Supporting Plate		1	65	Pivot		1
15	Roller Stand Bracket		1	66	Anti-Dust Cover		2
16	Flat Washer	M10	2	67	Ball Bearing	#32006ZZ	2
17	Spring Washer	M10	2	68	Nut	M10	2
18	Hex. Cap Bolt	M10x20	2	69	Hex. Cap Bolt	M10x45	2
19	Roller		1	70	Spring Hook		1
20	Flat Washer	M8	2	72	Star Washer	Ø30	1
21	Spring Washer	M8	2	73	Nut	M30	1
22	Hex. Socket Cap Screw	M8x15	2	74	Start Button		1
23	Filter Net		1	75	Emergency Switch		1
24	Round Head Cross Screw	M5x10	4	76	0-1 Power Switch		1
25	Hex. Socket Cap Screw	M6	2	77	Power Indicator Light		1
26	Flat Washer	M6x15	2	78	Hex. Socket Cap Screw	M5x6	4
27	Hose Clamp		1	79	Flat Washer	M5	2
27-1	Hose	5/16x130cm	1	80	Hex. Socket Cap Screw	M5x6	2
28	Pump	WE90	1	81	Cover		1
29	Hex. Cap Bolt	M10x20	4	82	Hex. Socket Cap Screw	M5x6	4
30	Coolant and Chip Tray		1	33	Control Box Bottom Plat		1
31	Hex. Cap Bolt	M12x40	2	83-1	Transformer		1
32	Nut	M12	2	83-2	Contacts		1
33	Hex. Socket Cap Screw	M5x8	4	83-3	Fuse Seat		1
34	Base Front Plate		1	83-4	Overload Rely		1
35	Hex. Socket Cap Screw	M6x25	1	83-5	Magnetic Connector		1
36	Spring Washer	M6	1	84	Control Box Bottom Part		1
37	Bushing		1	85	Control Box Panel		1
38	Hand Wheel		1	86	Support		1
39	Set Screw	M8x10	1	87	Spring Washer	M5	4
40	Nut		1	88	Hex. Socket Cap Screw	M5x6	4
41	Bearing Bushing		1	88-1	Nut	M8	1
42	Thrust Ball Bearing	#51104	1	88-2	Hex. Socket Cap Screw	M8x20	1
43	Lock Handle		1	88-3	Carry Handle		1
44	Bushing		1	89	Hex. Socket Cap Screw	M8x15	2
45	Hex. Socket Cap Screw	M6x100	2	90	Spring Washer	M8	2
46	Table		1	91	Setting Bracket		1
47	Plate		1	92	Spring Washer	M8	4
48	Flat Head Machine Screw	M6x20	2	93	Hex. Socket Cap Screw	M8x15	4
49	Compressed Spring		1	94	Swivel Arm		1
50	Lead Screw		1	94-1	Scale		1
51	Hex. Socket Cap Screw	M8x20	4	94-2	Rivet	2mm	2
52	Spring Washer	M8	4	95	Disk		1
53	Treaded Nut		1	96	Set Screw	M8x10	1

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PART LIST

Part No.	Description	Size No.	Q'ty	Part No.	Description	Size No.	Q'ty
97	Oil Seal	4mm	1	153	Flat Washer	M4	2
98	Shaft		1	154	Nut	M4	2
99	Nut		1	155	Hex. Cap Bolt	M10x20	1
100	Hex. Socket Cap Screw	M8x20	4	156	Spring Washer	M10	1
101	Spring Washer	M8	4	157	Washer		1
102	Set Screw	M8x10	2	158	Drive Flywheel		1
103	Hex. Socket Cap Screw	M10x35	1	159	Hex. Socket Cap Screw	M10x40	4
104	Spring Washer	M10	1	160	Spring Washer	M10	4
105	Set Screw	M8x10	1	161	Hose	5/16(100cm)	1
106	Locking Lever		1	162	Pipe Fitting	1/4Px5/16	1
107	Nut	M12	1	163	Pipe Fitting Seat		1
108	Handle		1	164	Hex. Socket Cap Screw	M5x30	2
109	Hex. Socket Cap Screw	M10x30	4	165	Coolant Switch	1/4Px5/16	1
110	Spring Washer	M10	4	166	Hose Clamp		1
111	Gib		2	167	Pipe Fitting	1/4Px5/16	1
112	Spring Washer	M8	6	168	Hose	5/16(40cm)	1
113	Hex. Socket Cap Screw	M8x25	6	169	Saw Arm		1
114	Key	8x8x35	1	170	Limit Switch	AZD-S11-1A	1
115	Front Ball Bearing Bracket		1	171	Hex. Socket Cap Screw	M4x35	2
116	Set Screw	M6x12	4	172	Spring Shaft		1
117	Hex. Socket Cap Screw	M8x25	2	173	Spring		1
118	Hex. Socket Cap Screw	M12x50	1	174	Key	8x8x35	1
119	Setting Bracket		1	175	Motor (1HP)	4/8P(50/400/3)	1
120	Hex. Socket Cap Screw	M6x8	2	176	Spring Washer	M8	4
121	Handle	M6x65L	1	177	Hex. Cap Bolt	M8x30	4
122	Hex. Socket Cap Screw	M6x8	2	178	Gear Box	70# 1/20A	1
123	Cover Plate		1	179	Set Screw	M6x12	4
124	Hex. Cap Bolt	M10x20	1	180	Spring Washer	M8	2
125	Spring Washer	M10	1	181	Hex. Socket Cap Screw	M8x30	2
126	Washer		1	182	Front Blade Guard		1
127	Slide		1	183	Hex. Socket Cap Screw	M6x8	3
128	Nut		1	184	Nut	M10	2
129	Hex. Socket Cap Screw	M8x30	4	185	Bolt		2
130	Spring Washer	M8	4	186	Front Ball Bearing Seat		1
131	Handle		2	187	Pipe Fitting	1/4Px5/16	1
132	Handle Wheel		1	188	Rear Blade Guard		1
133	Thrust Spring Washer		10	189	Blade Guide (B)		2
134	Tension Shaft		1	190	Hex. Socket Cap Screw	M6x8	2
135	Adjusting Bracket		1	191	Rear Ball Bearing Seat		1
136	Pin	Ø6x20	2	192	Pipe Fitting	1/4Px5/16	1
137	Set Screw	M8x30	2	193	Set Screw	M6x20	2
138	Rod		1	193-1	Nut	M6	2
139	Nut		1	194	Hex. Cap Bolt	M6x12	1
140	Trigger Switch		1	195	Flat Washer	M6	1
141	Shaft		1	196	Brush Set Ring		1
142	Bell Bearing	#32006ZZ	2	197	Set Screw	M5x5	1
143	Idle Flywheel		1	198	Bracket		1
144	Anti-Dust Cover	Ø30	2	199	Brush	1 1/2"	1
145	Star Washer	Ø30	1	200	Eccentric Shaft		2
146	Jam Nut	M30	1	201	Ball Bearing	#608ZZ	10
147	Oil Inlet	1/16(1/4x28T)	1	202	Blade Guide (A)		2
148	Saw Arm	27x2455x5/8T	1	203	Hex. Socket Cap Screw	M6x25	2
149	Blade Cover		1	204	E Ring	Ø7	4
150	Knob Bolt	M6x10	4	205	Shaft		2
151	Round Head Screw	M4x8	2				
152	Mounting Bracket		1				

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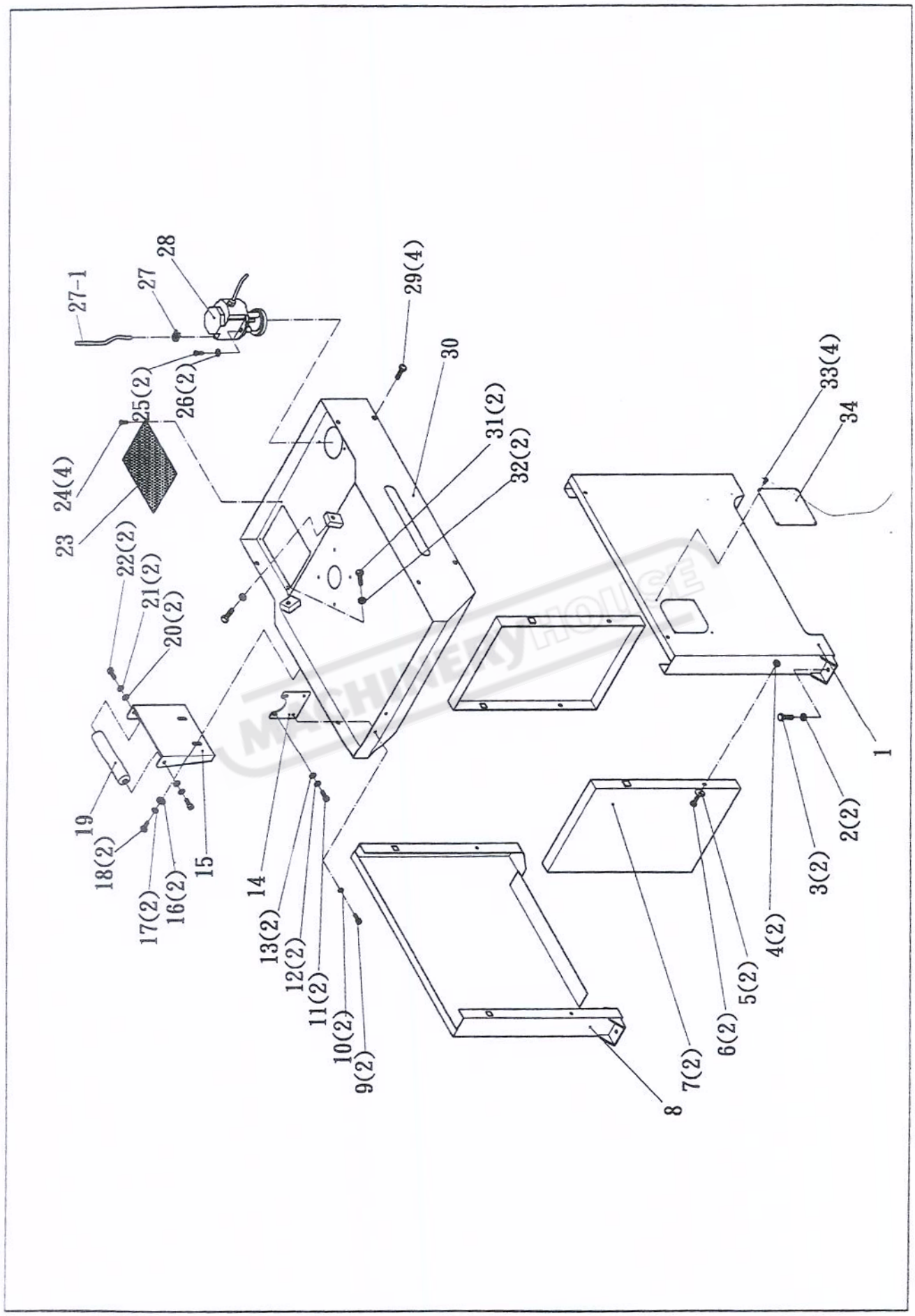
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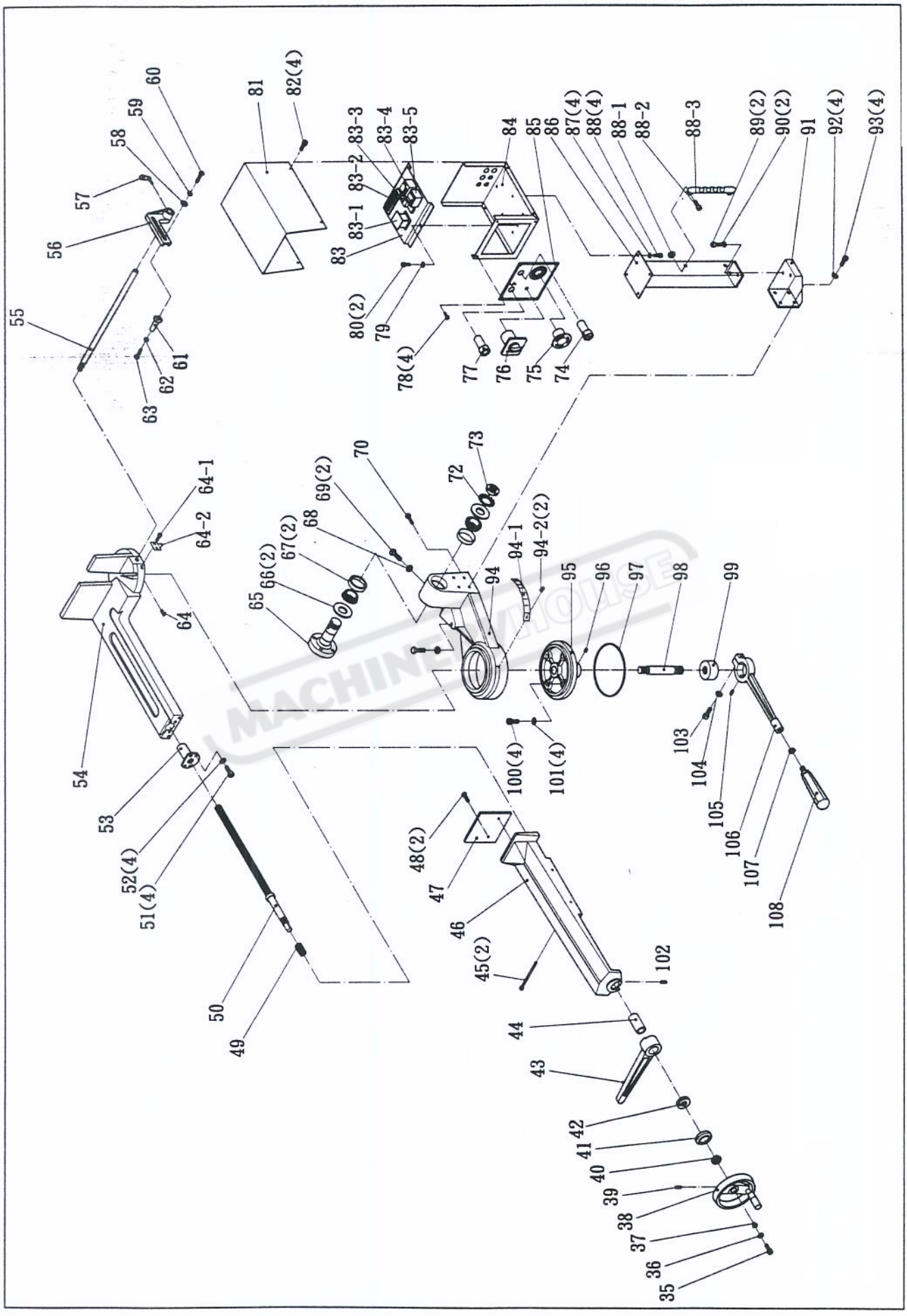
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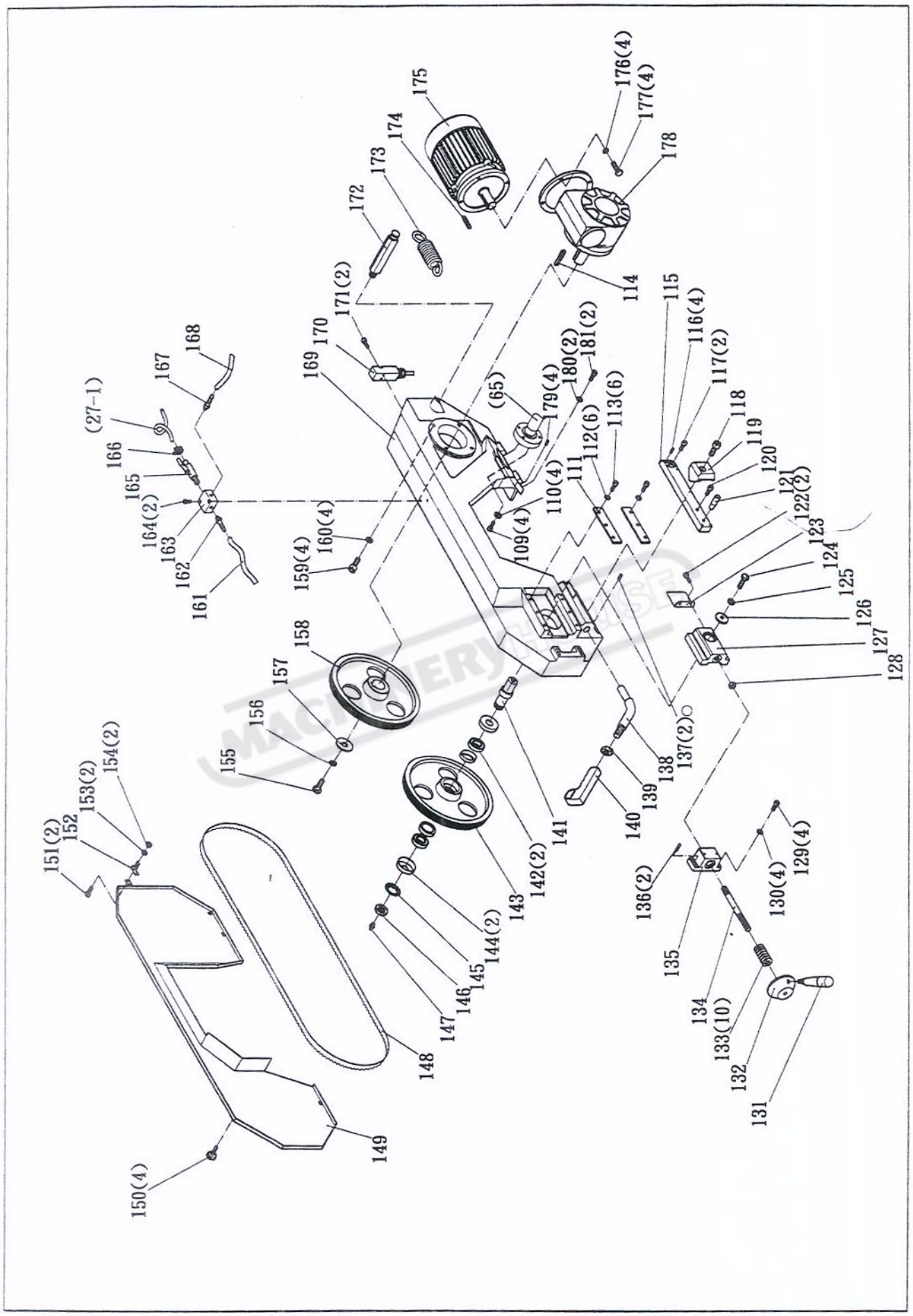
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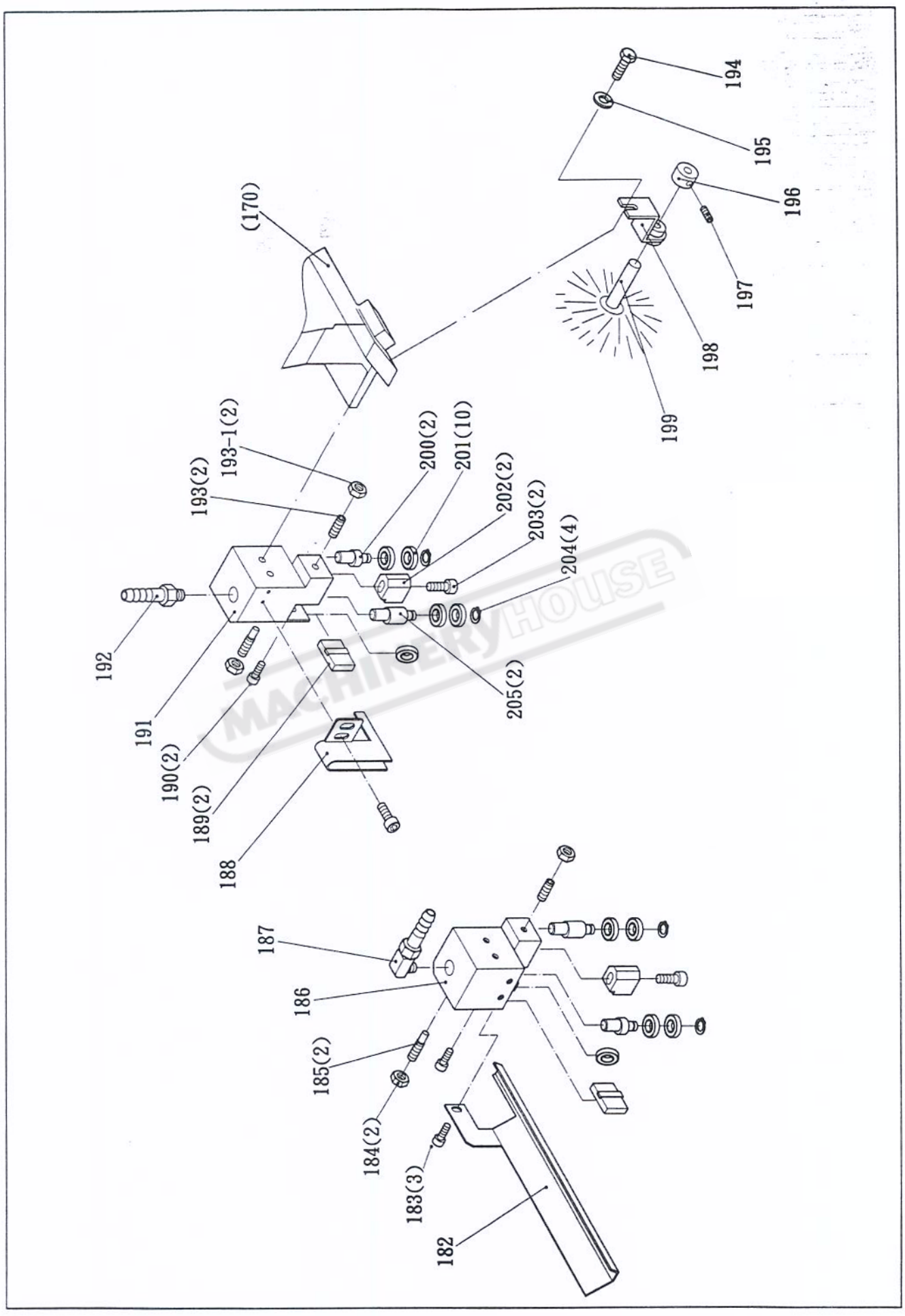
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