WE-350DS

HORIZONTAL METAL CUTTING BAND SAW

✴Study Carefully Before Operating

CE

Specifications

Capacity:	●	■	▬
90°	260mm (10.2”)	260mm (10.2”)	250x350mm (9.8”x13.7”)
45°	230mm (9”)	165mm (6.4”)	110x240mm (4.3”x9.4”)
60°	150mm (5.9”)	90mm (3.5”)	90x150mm (3.5”x5.9”)
45°(L)	200mm (7.8”)	170mm (6.6”)	60x260mm (2.3”x10.2”)

Blade Size

27 x 0.9 x 3160mm

Blade Speed

50Hz 4P 72m/min 8P 36m/min

Motor

2HP (1.5kW)

Floor Space (L xWxH)

2100mm x 1200mm x 1960mm

Container Loads

18 sets per 20 feet

NW: 360kgs **GW:** 410kgs

07/2022

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 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 60204-1"

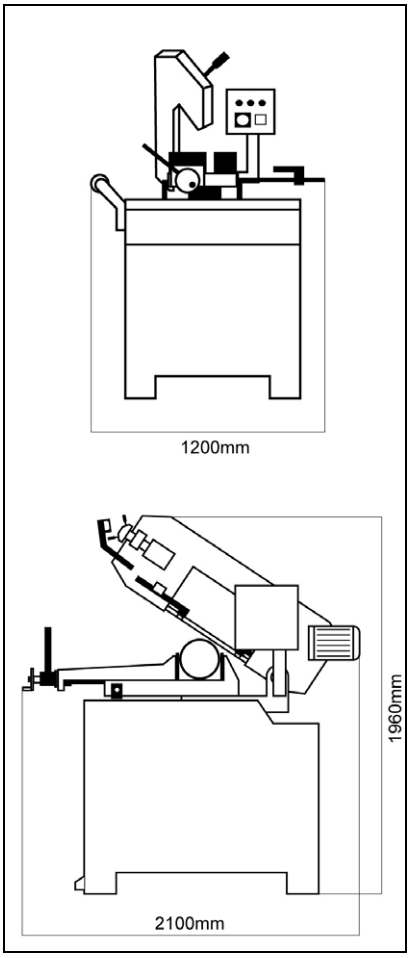
- The electrical equipment ensures protection against electric shock as a result of direct or indirect contact. The active parts of this equipment are housed in a box to which access is limited by screws that can only be removed with a special tool; the parts are fed with alternating current as low voltage (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 60204-1"*

- In the event of incorrect operation or of danger conditions, the machine may be stopped immediately by pressing the red mushroom button.
- The casual or voluntary removal of the blade cover of the flywheels causes the stepping-in of a interlock switch that automatically stops all machine functions.
- In case blade breakage, the tension release microswitch disconnects all machine functions.

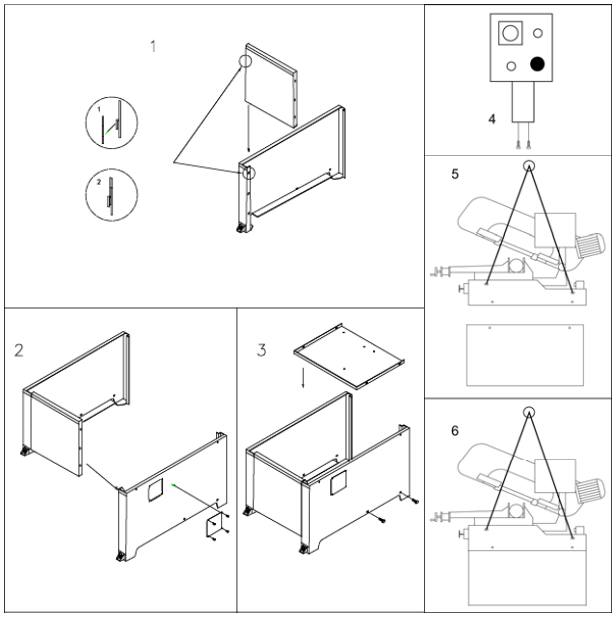
2 *MACHINE DIMENSIONS TRANSPORT INSTALLATION DISMANTLING*

2.1 Machine dimensions



2.2 Assembling the Saw and the Base

- Join panels A, B, and C by inserting tenon into mortise as shown in circle diagram 1 and 2.
- Fasten bottom panel D into the joined panels A, B, and C using set screws that are provided.
- Attach panel F to panel C with provided set screws.
- Attach control box with two provided set screws.
- Mount the saw unit on the base as shown in drawing 5.
- Fasten the saw unit to the base with provided set screws.

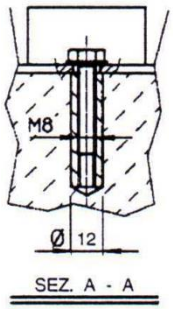


If the machine needs to be moved in its own packing, use a forklift truck or sling it with straps as illustrated in drawing 6 above.

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 ºC to +50 ºC.
- 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 Deactivation of machine

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

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

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:

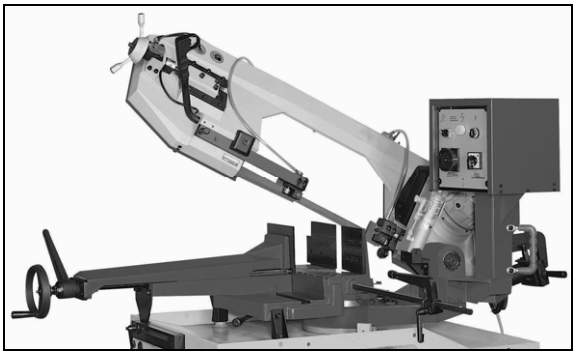
1) Cast iron or ferrous materials, composed of metal alone, are secondary raw materials, so they may be taken to an iron foundry for re-smelting after having removed the contents (classified in point 3).
2) Electrical components, including the cable and electronic material (magnetic cards, etc.), fall 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.

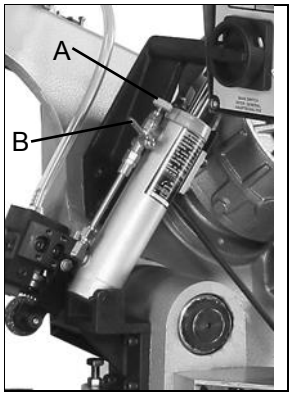
3 *THE MACHINE'S FUNCTIONAL PARTS*

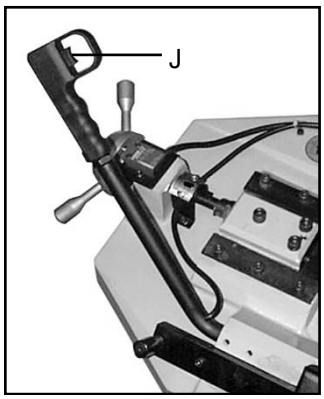
3.1 The saw arm

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



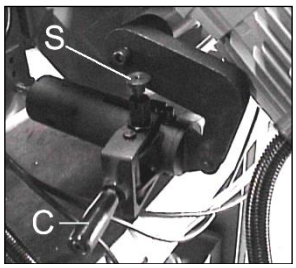
3.2 Controls



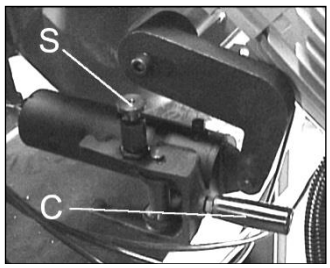


A. Hydraulic Flow control valve
B. Hydraulic regulation (ON/OFF) valve
J. Trigger Switch

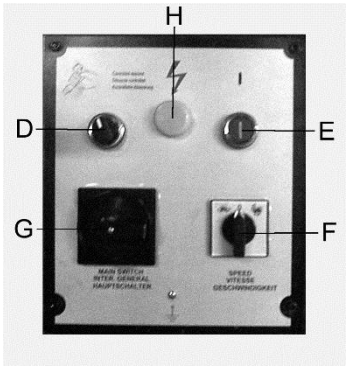
C1



C2



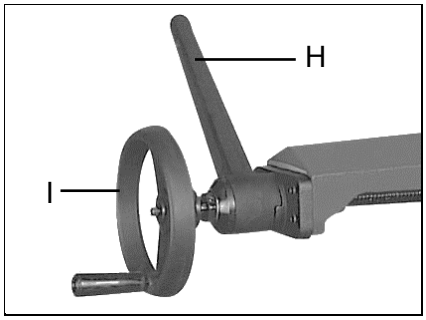
C. Fork handle
S. Spring knob
C1. Manual position
C2. Auto position



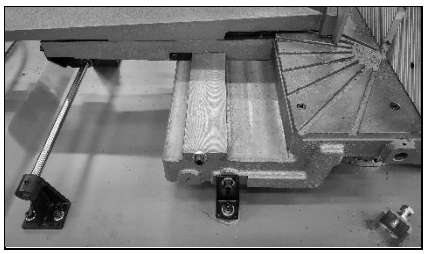
D. Manual/Auto selector
E. Start/Reset push button
F. Speed selector
G. Main connect switch
H. Indicator light

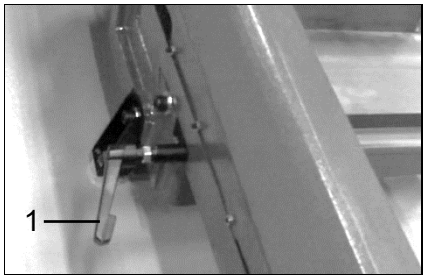
3.3 Vise adjustment

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 (I) clockwise to close the free vise jaw on to the work piece, and tighten.
- Rotate the hand wheel (I) 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.



When cutting angles, it may require the adjustment of the vise jaw's position so that the saw blade's path is not impeded. Follow the procedures below.
- Release the track support by turning handle (1) counter-clockwise.
- The vise may now be moved to right or left position by pushing it with one hand on the vise and the other hand on the handle (1).
- Once in position, turn handle (1) clockwise to lock it into position.





WARNING: When 90° cutting, the vise jaw must be in left side position to avoid the interference between saw bow and vise jaw.

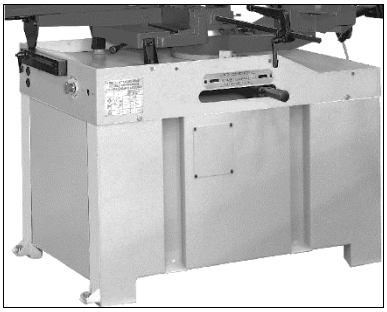
3.4 Cutting angle adjustment

Cutting at angles
- Angle can be cut up to 60°.
- Unlock lever (L) by pushing it to the left side.

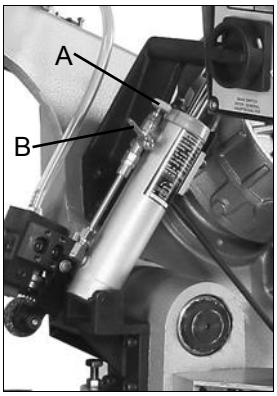
- Rotate the saw arm to the desired angle by following the index on the scale.
- Lock lever (L) by pushing to the right side.

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 for the support of the material. The base houses the cooling liquid TANK and PUMP.



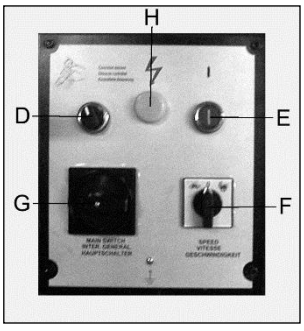
3.6 Saw frame return stroke-limiting device



The hydraulic cylinder is ideal for the cutting of thin or STAINLESS STEEL section bars, that determines a constant lowering and consequently a good efficiency of the blade throughout the work phase. By adjusting the flow control valve (A), this device can be accommodated to the different situations and applications. Defectiveness in the control of the lowering may be caused by the drop in braking power of the device due to the long-term blowby of the braking fluid.

3.7 The operation cycle

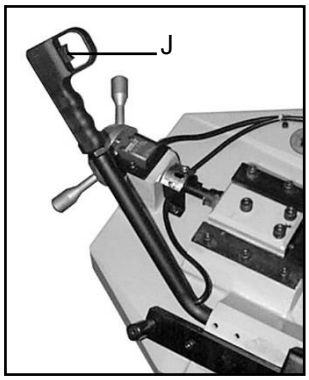
Before operating, all the main organs of the machine must be set in optimum conditions.

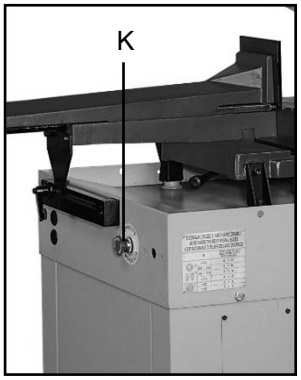


Operation Procedure:

A. Trigger switch operation

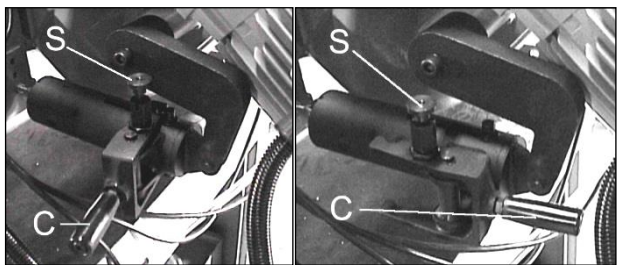
- Close the hydraulic flow control valve (A) by turning the valve clockwise all the way to the end.
- Raise the saw arm.
- Lift the spring knob (S) to release the pin from its slot. This will free the fork handle (C). Move the handle to the manual position (C1). Lift the spring knob (S) and secure its pin into its slot.
- Use manual/auto selector (D) to select handle icon.
- Select cutting speed by turning speed selector (F). Turtle is low speed, rabbit is high speed, and 'O' is neutral.
- Turn main connect switch (G) to the ON position. Check that the indicator light (H) is on.
- Load work piece and clamp it properly.
- Fully open the hydraulic flow regulation valve (B) by turning the valve counter-clockwise all the way to the end.





- Press trigger switch (J) to start operation.
- If cutting pipe with thin walls, reduce the saw arm descent rate by adjusting the flow control valve (A)
- Press the emergency push button (K) down to shut off all functions. To release the emergency push button rotate the mushroom shaped button (K) clockwise. The button will pop up and then the cutting cycle can be restarted.
- In general, start cuts by slightly turning hydraulic flow control valve (A) counter-clockwise from 2 to 3 to control the saw arm descent rate. If the arm descends too quickly, turn the hydraulic flow regulation valve (B) clockwise all the way back to stop its descent. A saw arm dropping too quickly can cause the blade to stall on the work piece and the machine will shut off. Push down on emergency push button (K) to immediately stop all machine functions.

C1 **C2**



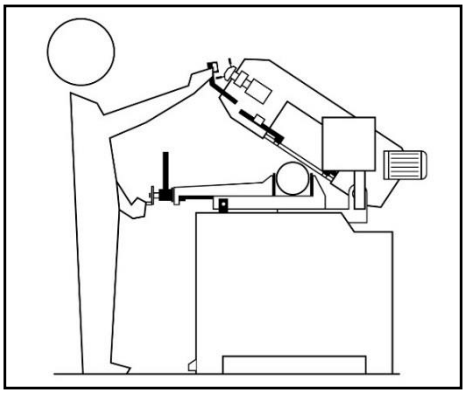
B. Auto cutting operation

- Close the hydraulic flow control valve (A) by turning the valve clockwise all the way to the end.
- Raise the saw arm.
- Lift the spring knob (S) to release the pin from its slot. This will free the fork handle (C). Move the handle to the auto position (C2). Lift the spring knob (S) and secure its pin into its slot.
- Use manual/auto selector (D) to select auto.
- Select cutting speed by turning speed selector (F). Turtle is low speed, rabbit is high speed, and 'O' is neutral.
- Turn main connect switch (G) to the ON position. Check that the indicator light (H) is on.
- Load work piece and clamp it properly.
- Press start/reset button (E) to start machine. Check that the blade is running in the correct direction.
- Slightly pull the saw arm down to get rid of air bubbles from the hydraulic cylinder.
- Adjust hydraulic flow control valve (A) by slightly turning the valve counter-clockwise to let saw arm descend and start cutting.
- Press the emergency push button (K) down to shut off all functions. To release the emergency shut off rotate emergency push button (K) clock-wise. The button will pop up and then the cutting cycle can be restarted.
- In general, start cuts by slightly turning hydraulic flow control valve (A) counter-clockwise from 2 to 3 to control the saw arm descent rate. If the arm descends too quickly, turn hydraulic flow regulation valve (B) clockwise all the way back to stop its descent. A saw arm dropping too quickly can cause the blade to stall on the work piece and the machine will shut off. Push down on emergency push button (K) to immediately stop all machine functions.

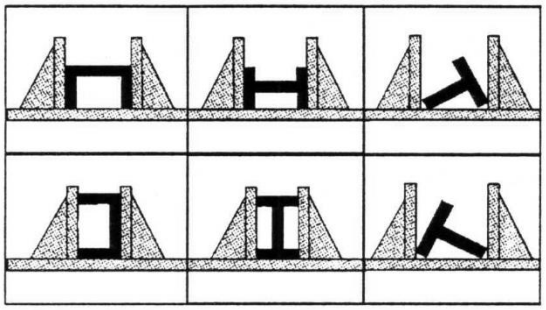
4 *ADVICE ON USING YOUR BANDSAW*

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.

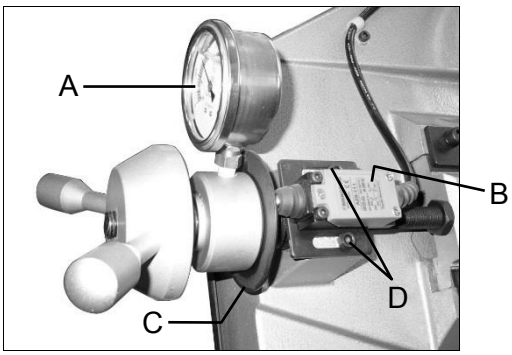


- Do not use blades of a different size from those stated in the machine specifications.
- If the blade gets stuck in the cut, release the running button immediately, switch off the machine, open the vice slowly, remove the part and check that the blade or its teeth are not broken. If they are broken,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

5 ADJUSTING YOUR MACHINE

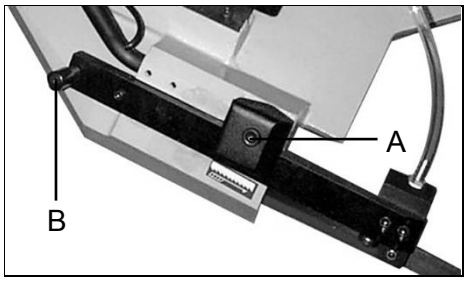
5.1 Blade tension assembly

The ideal tension of the blade is achieved rotating the handwheel until the needle reaches the proper blade tension on the tension gauge (A).



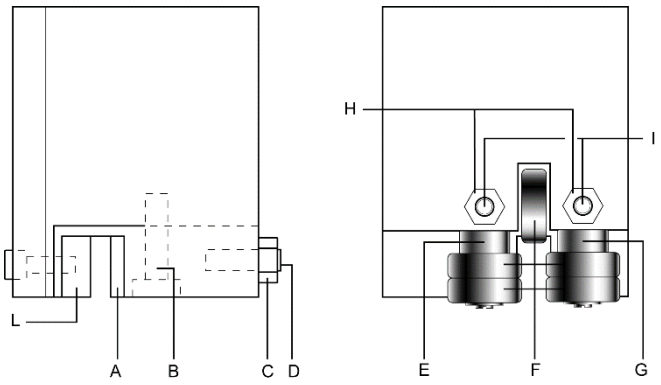
The machine will not operate if the microswitch does not actuate by contacting the touch plate (C).
If the tension is set properly, but the microswitch (B) does not contact or trigger properly, make this adjustment.
- Loosen the setscrews (D).
- Push the microswitch (B) towards the touch plate (C). Make sure that the plunger is pressed properly.
- Tighten down the setscrews (D) to secure the microswitch (B) in place.

5.2 Adjusting the blade guide



- Disconnect the machine from the power source.
- Use a Hex. Wrench to loosen Hex. Socket screw (A) on the square lock plate.
- Hold the handle (B) and slide blade guide block as close as possible to the material without interfering with the cut
- Tighten the Hex. Socket screw (A).
- 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.

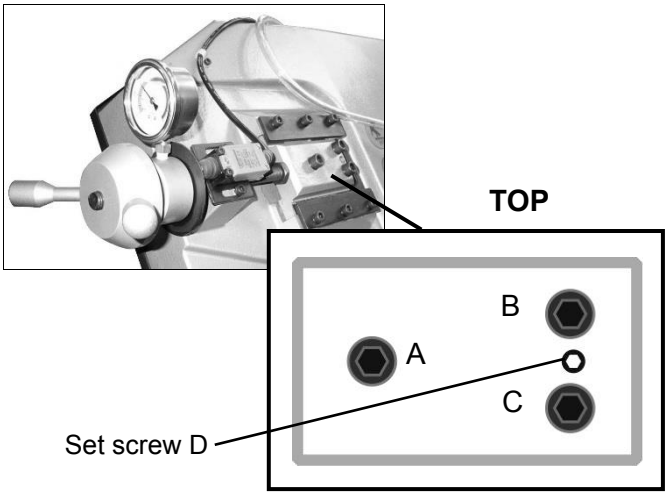


In case the blade needs to be replaced, make sure to always install 0.9mm thick blades for which the blade guide pads have been adjusted. In the case of toothed blades with different thicknesses adjustment should be carried out as follows:
- Loosen nut (C), screw (B) and loosen dowel (D) widening the 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 handwheel, remove the mobile blade-guard cover, open the flywheel guards and remove the old blade from the flywheels and the blade guide blocks.
- Assemble the new blade by placing it first between the pads and then on the race of the flywheels, paying particular attention to the cutting direction of the teeth.
- Tension the blade and make sure it perfectly fits inside the seat of the flywheels.
- Assemble the mobile blade-guide end, the flywheel guard, and fasten it with the relative knobs. Check that the safety microswitch is activated otherwise when electric connection will be restored the machine will not start.

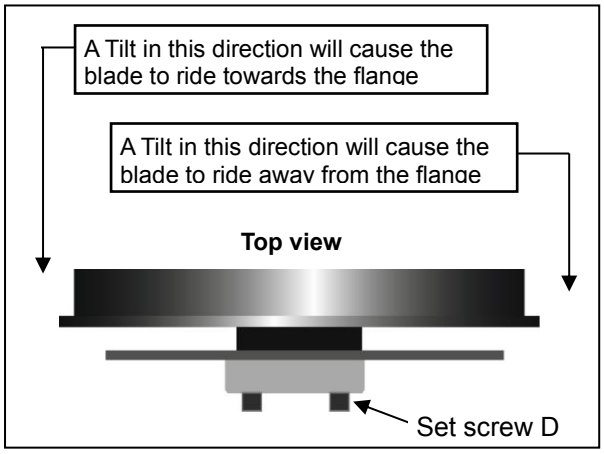
5.4 Adjusting the blade to the flywheels



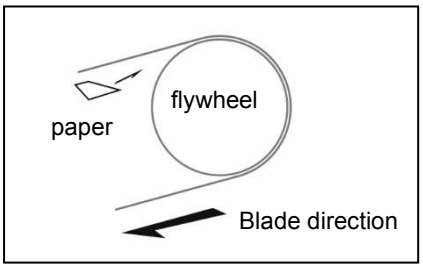
1. Loosen the hex nut screws A, B, and C.
2. Use an Allen wrench on setscrew D to adjust the tilt of the flywheel.

-Turning the setscrew, D clockwise will tilt flywheel so that the blade will ride closer to the flange.
-Turning the setscrew, D counter-clockwise will tilt the flywheels so the blade will ride away from the flange. If the blade rides away too far then it will come off.

After the adjustment is finished, fasten the hex nut screws in this order: A, B, and C.



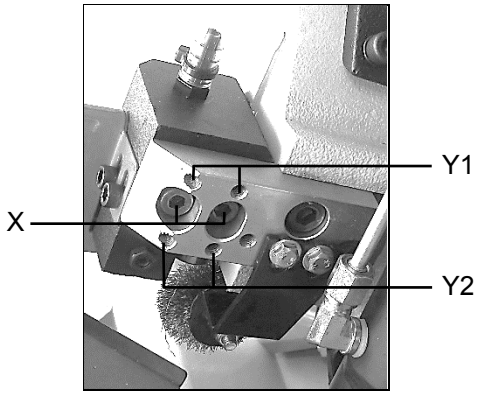
Checking the adjustment of the blade



Use a strip of scrap paper and slide it between the blade and the flywheel while it is running.
-if the paper is cut then the blade is riding too close to the flange. Re-adjust.
-if you notice that the blade is riding away from the flange. Then re-adjust.

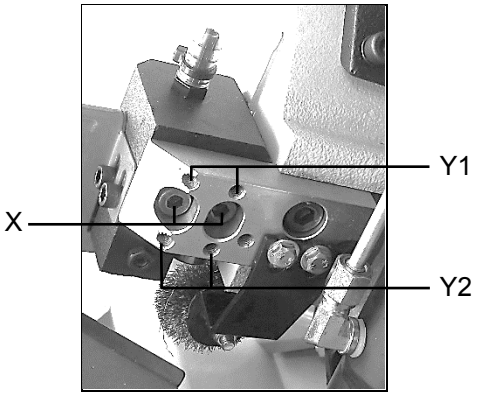
WARNING: Always assemble blades having dimensions specified in this manual and for which the blade guide heads have been set; otherwise, see chapter on "Description of the operating cycle" in the section Starting-up.

5.5 Bearing adjustment



The back of blade should rest on the upper bearing. If the gap is too large, it needs to be adjusted.
- Turn off the machine power.
- Loosen the Hex. Socket Cap Screw (X) a little bit, then adjust the set screws (Y1 & Y2). Make the back of the blade touch the upper bearing a little bit, and tighten the Hex. Socket Cap Screw (X).
- Turn on the machine power to check blade running.

5.6 Cutting precision adjustment



- The machine has been adjusted and power-tested with several test cuts before leaving the factory to insure proper cutting. If there is any poor cuts occurred，correct it as follows:
- Turn off the machine power.
- Loosen the Hex. Socket Cap Screw (X) a little bit.
- According to the required direction to loosen or tighten the set screws (Y1&Y2) for adjustment.
- Cutting inward skew：adjust set screw (Y2).
- Cutting outward skew：adjust set screw (Y1).
- Tighten the Hex. Socket Cap Screw (X).

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.

6.3 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.

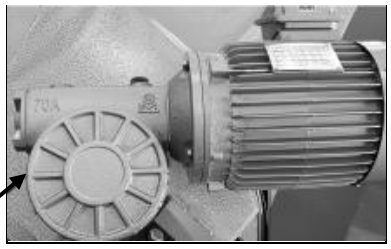
6.4 Six-Monthly Maintenance
- Continuity test of the equipotential protection circuit.

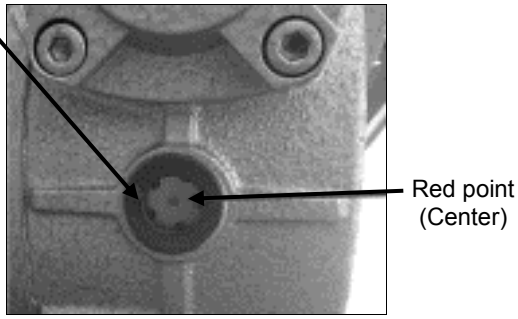
6.5 Oils for Lubricating Coolant
Considering the vast range of products on the market, the user can choose the one most suited to their own requirements, using as reference the type SHELL LUTEM OIL ECO. THE MINIMUM PERCENTAGE OF OIL DILUTED IN WATER IS 8 - 10 %.

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 Maintenance of other machine parts
The worm drive gearbox mounted on the machine is maintenance-free guaranteed by its manufacture.

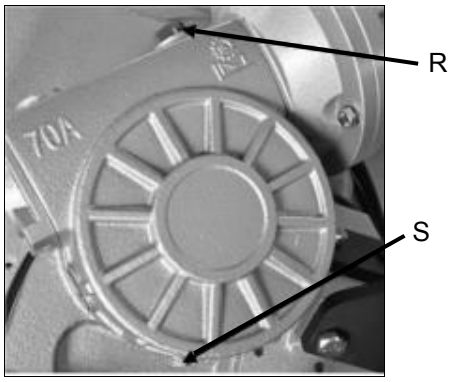
6.8 Gearbox
Monitor oil volume in gear box before operating.
Always keep sufficient oil in gear box.
1. Raise saw bow until blade motor and gear box lie horizontally.
2. Look through oil level gauge on the side of gear box.
3. Always keep oil level over the Red Point (center) of oil level gauge.
4. In case of insufficient oil, supplement oil into gear box.





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

Change or refill gear box oil



1. Disconnect machine from power source. Raise saw bow to vertical position.
2. Release the drain hole (S) to draw off gear oil by loosening the oil fill bolt (R).
3. Replace the drain plug bolt (S) after oil completely flows off.
4. Place the saw bow back to horizontal position. Fill Gear box with approximately 0.7 liter of gear oil through the hole of the oil fill bolt (R).
5. Recommendation, use SHELL or other general commercial #90 gear oil.

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			
90°	260mm (10.2”)	260mm (10.2”)	250x350mm (9.8”x13.7”)
45°	230mm (9”)	165mm (6.4”)	110x240mm (4.3”x9.4”)
60°	150mm (5.9”)	90mm (3.5”)	90x150mm (3.5”x5.9”)
45°(L)	200mm (7.8”)	170mm (6.6”)	60x260mm (2.3”x10.2”)

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

ELECTRIC MOTOR-BLADE ROTATION	kW	0.75 / 1.5
REDUCTION UNIT IN OIL BATH	I	40:1
FLYWHEEL DIAMETER	mm	380
BLADE DIMENSIONS	mm	27x0.9x3160
BLADE SPEED CUTTING	m/min	72 / 36
OPENING VICE	mm	355
SAW FRAME TILTING	°	40
WORKING TABLE HEIGHT	mm	900
MACHINE WEIGHT	kg	360

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 as to choose the right tool to use.

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:

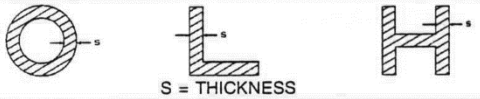
- Parts with a thin and/or variable section such as profiles, pipes and plate, need close toothing, so that the number of teeth used simultaneously in cutting is from 3 to 6;
- Parts with large transverse sections and solid sections need widely spaced toothing to allow for the greater volume of the shavings 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

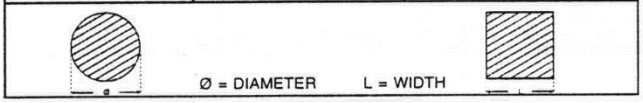
As already stated, this depends on the following factors:

- **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	6	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.

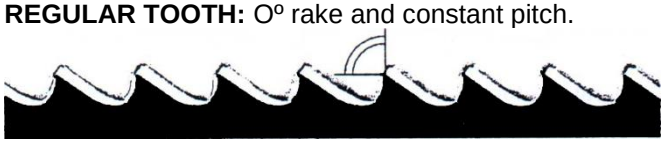
Thick and/or blue chips indicate overload of the blade.

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

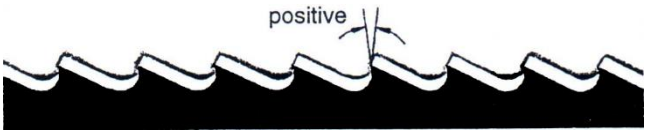
8.7 Blade type
They differ essentially in their constructive characteristics, such as:
- **Shape** and cutting **angle** of tooth
- **Pitch**
- **Set**

Shape and angle of tooth
REGULAR TOOTH: Oº rake and constant pitch.



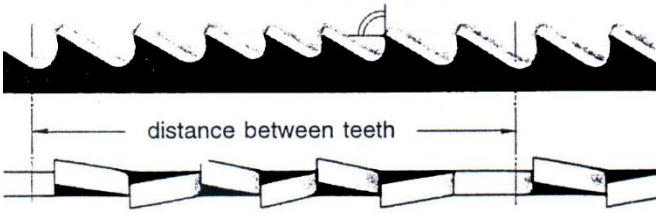
Most common form for transversal or inclined cutting of solid small and average cross-sections or pipes, in laminated mild steel and gray iron or general metal.

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



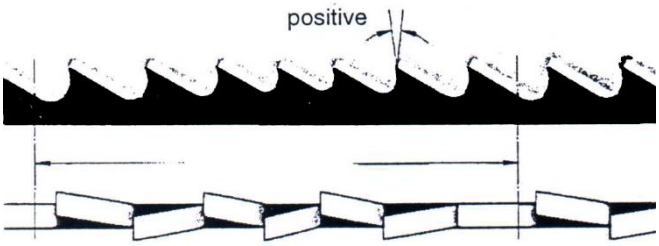
Particular use for crosswise or inclined cuts in solid sections or large pipes, but above all harder materials (highly alloyed and stainless steels, special bronze and forge pig iron).

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.

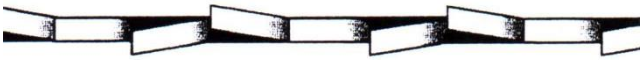
COMBO TOOTH: 9º - 10º positive rake.



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).

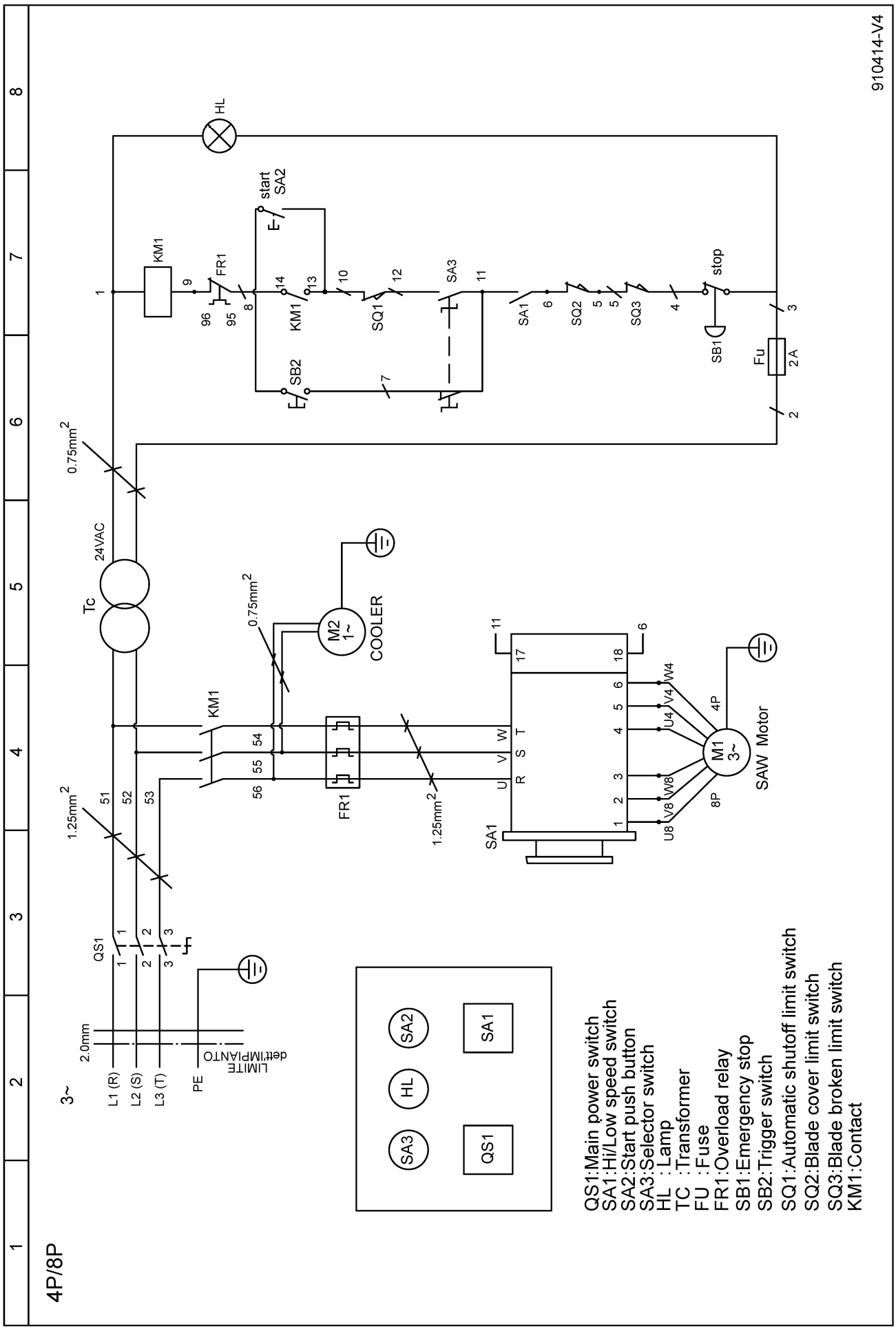
ALTERNATE SET *(INDIVIDUAL* TEETH): Cutting teeth right and left.

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.

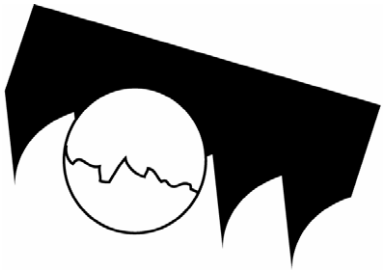
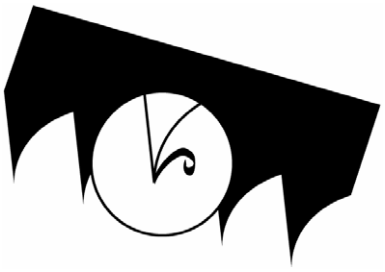
10 *WIRING DIAGRAMS*

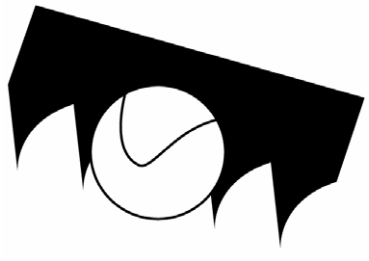
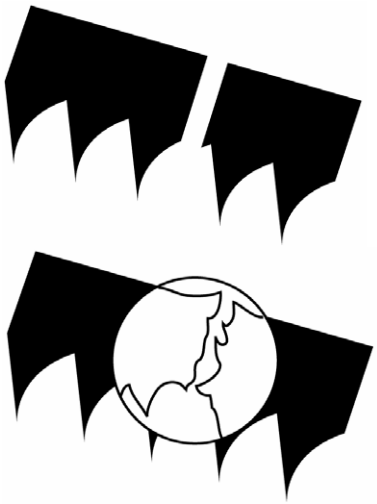


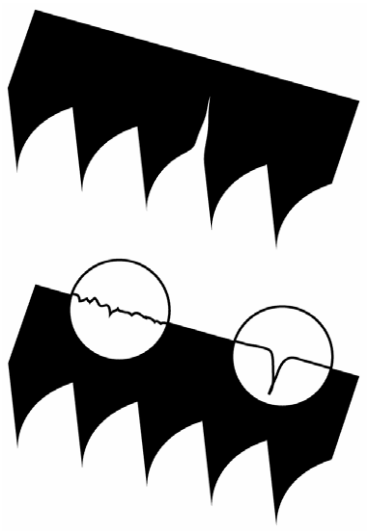
11 *TROUBLESHOOTING*

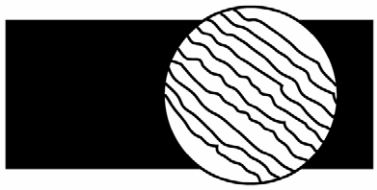
This chapter lists the probable faults and malfunctions that could occur while the machine is being used and suggests possible remedies for solving them.
The first paragraph provides diagnosis for TOOLS and CUTS the second for ELECTRICAL COMPONENTS.

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.

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. Ch eck 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 BAND ROTATION MOTOR DOES NOT WORK	"SA1" two-speed switch	It must be exactly turned towards Rabbit or Turtle sign.
	"FR1" band motor over-load relay	Push down FR1 red button. After a motor cooling time of 5 minutes, if there is no current continuity on these two wires, the motor must be replaced.
	"SB1" emergency switch	Reset emergency switch (see operation procedure).
	"SA2" start push button	Check the functioning and/or possible damages. If so, replace it.
MACHINE DOES NOT WORK	Fuses "FU"	Check electrical efficiency. If not, replace the fuse.
	"SQ1" Automatic shutoff limit switch	Refer to the operation procedure and adjust the switch if machine doesn't shut off after the material completely cuts. Replace it if it damaged.
	"SQ2" blade cover limit switch	Check closing of the fly wheel cover. Check the efficiency of the device; replace it if damaged.
	"SQ3" blade broken limit switch	Check the efficiency of the device; replace it if damaged.
	Speed switch "SA1" in position "0"	It must be exactly turned to Rabbit or Turtle sign.
	Emergency button "SB1" on	Reset the emergency switch by following the steps of Operation Procedure. Check electrical efficiency, if not, replace it.
	"SB2" trigger switch	Check the efficiency of the device; replace it if damaged.
	Motor "M1"	Check current continuity on the two wires in the prone, if not, replace the motor.
MOTOR STOPPED WITH PILOT LIGHT "HL2" LIT	"SB2" trigger switch	Check the efficiency of the device; replace it if damaged.
	Motor "M 1"	Check that it is not burnt and that it turns freely. Replace it if damaged.

PART LIST

Part No.	Description	Size No.	Q'ty	Part No.	Description	Size No.	Q'ty
1	Base (Bottom Plate)		1	45	Hex. Cap Bolt	M12x25	2
1-1	Hex. Cap Bolt	M8x16	4	46	Spring Washer	M12	2
1-2	Washer	M8x23x2	4	46-1	Washer	M12x28x3	2
2	Base (Left Part)		1	47A	Roller		1
3	Base (Right Part)		1	49A	Roller Shaft		1
4	Base (Front Part)		1	50	Hex. Socket Cap Screw	M8x20	2
4-1	Hex. Cap Bolt	M8x16	4	50-1	Spring Washer	M8	2
4-2	Washer	M8x23x2	4	60A	Handle		1
4-3	Plate		1	60-1	Hex. Socket Cap Screw	M8x20	2
4-4	Hex. Socket Cap Screw	M5x8	4	60-2	Nut	M8	2
5	Hex. Cap Bolt	M12x40	2	61	Handle	M12x25	1
6	Nut	M12	2	62	Nut	M12	1
7	Base (Rear Part)		1	63	Locking Lever		1
7-1	Hex. Socket Cap Screw	M6x8	4	63-1	Set Screw	M10x16	1
8	Hex. Cap Bolt	M10x20	4	64	Hex. Socket Cap Screw	M10x35	1
8-1	Washer	M10x25x2	4	64-1	Spring Washer	M10	1
9	Plate		1	65	Shaft Nut		1
10	Hex. Socket Cap Screw	M5x8	4	65-1	Oil Seal	4mmx720mm	1
11	Coolant Tank		1	65-3A	Disk		1
12	Hex. Cap Bolt	M8x16	2	65-4	Spring Washer	M8	4
13	Coolant Gauge	3"	1	65-5	Hex. Socket Cap Screw	M8x35	4
13-1	Nut	M10	2	66A	Shaft		1
13-2	Washer	M10x10x3	2	67	DU Plate		6
14	Hex. Cap Bolt	M10x15	2	67-1	Flat Head Socket Screw	M4x8	6
15	Tank Cover		1	68A	Swivel Arm		1
16	Filter		1	68-1	Hex. Cap Bolt	M10x35	1
17	Pump		1	68-2	Oil Inlet	1/16	2
18	Hex. Socket Cap Screw	M6x25	2	69	Scale	+45°~ -60°	1
18-1	Washer	M6x13x1	2	69-1	Scale	45°	1
22	Hose Clamp	13mm	1	70	Rivet	2.3x4	4
23	Hose	5/16"x254cm	1	71	Pin		1
23-1	Hose	1"x43cm	1	72	Spring Pin	2.5x16	1
24B	Coolant and Chip Tray		1	73	Spring	0.8x9x30mm	1
24-1	Plate		4	74	Bushing		1
24-2	Hex. Cap Bolt	M10x20	4	75	Bracket		1
24-3	Nut	M10	4	76	Spring Washer	M8	2
24-4A	Coolant Plate		1	77	Hex. Socket Cap Screw	M8x25	2
25	Mounting Bracket		2	78	Knob		1
25-1	Hex. Socket Cap Screw	M8x16	2	79	Jam Nut	M40	1
26	Spring Washer	M10	4	80	Star Washer	M40	1
27	Hex. Socket Cap Screw	M10x20	4	81	Anti-Dust Cover	#40	2
28	Washer	M10x25x2	4	82	Bearing	32008	2
29	Hex. Cap Bolt	M10x20	6	83A	Shaft		1
29-1	Spring Washer	M10	6	84	Hex. Cap Bolt	M10x45	1
30	Hex. Cap Bolt	M12x40	2	85	Nut	M10	2
31	Nut	M12	2	86A	Pointer		2
36	Emergency Switch		1	87	Hex. Socket Cap Screw	M5x8	2
37-1	Hole Cover	HP-25	2	88A	Cover		1
37-2	Hole Cover	HP-19	1	88-1	Spring Pin	6x20	2
38-1	Hole Cover	HP-22	1	88-2	Set Screw	M8x10	1
39	Shaft Seat		2	89	Hex. Socket Cap Screw	M8x35	5
40	Hex. Socket Cap Screw	M8x25	4	89-1	Spring Washer	M8	5
41	Spring Washer	M8	4	92B	Table		1
42	Set Screw	M6x12	10	92-1	Set Screw	M6x12	1
43	Shaft	SCF16x460	1	92-2	Changeable Plate		1
44A	Roller Stand		1	92-3	Hex. Socket Cap Screw	M8x16	4

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PART LIST

Part No.	Description	Size No.	Q'ty	Part No.	Description	Size No.	Q'ty
93	Hex. Socket Cap Screw	M10x20	2	144-2	Fuse Block	2A	1
93-1	Washer	M10x25x2	4	144-3	Magnetic Switch	C-12D	1
94	Bar-Stop-Rod		1	144-4	Overload Relay		1
95A	Bar Bracket		1	144-5	Terminal Strip		1
95-1	Nut	M8	2	144-6	Insulation Plate		1
95-2	Hex. Socket Cap Screw	M8x25	1	144-7	Electric Parts Plate		1
95-3	Knob	M8x30	1	144-8	Grounding Plate		1
95-4	Stop Bar		1	146	Round Head Screw	M5x10	4
97	Scale		1	147-1	Indicator Light		1
98	Rivet	2.3x4	3	147-2	Main Connect Switch		1
99	Chip Gutter		1	147-5	Speed Selector		1
100	Hex. Socket Cap Screw	M6x8	2	147-6	Start Push Button		1
102	Vise Jaw - Right		1	147-7	Manual / Auto Selector		1
103	Hex. Socket Cap Screw	M6x15	2	147-8	Control Panel		1
104	Vise Jaw - Left		1	148	Electrical Box Cover		1
105	Hex. Socket Cap Screw	M6x15	2	149	Supporting Bracket		1
106	Vise Jaw - Front		1	149-1	Shaft		1
107	Flat Head Machine Screw	M6x16	2	150	Set Screw	M8x10	1
108A	Movable Vise		1	150-1	Hex. Socket Cap Screw	M8x20	4
109	Dovetail Plate		1	150-2	Spring Washer	M8	4
110	Nut	M5	3	151	Reduction Unit		1
111	Set Screw	M5x25	3	151-1	Vent Screw	1/4"	1
113	Key	5x5x15	1	152	Key	8x7x30	1
115	Spring Washer	M8	4	153	Hex. Cap Bolt	M8x25	4
116	Hex. Socket Cap Screw	M8x20	4	153-1	Spring Washer	M8	4
117	Hand Wheel	6-1/2	1	154	Motor		1
117-1	Spring Washer	M6	1	154-1	Junction Box		1
117-2	Hex. Socket Cap Screw	M6x25	1	155	Key	8x7x40	1
117-3	Bushing		1	186	Hex. Socket Cap Screw	M10x35	4
118	Set Screw	M8x10	1	186-1	Spring Washer	M10	4
120B	Vise Seat (Wedge type)		1	193B	Saw Arm		1
121	Position Seat		1	193-1	Set Screw	M8x10	2
121-1	Hex. Socket Cap Screw	M10x20	2	194	Hex. Socket Cap Screw	M10x35	4
122	Block		1	194-1	Spring Washer	M10	4
123	Eccentric Shaft		1	195	Limit Switch		1
123-1	Ring	S-18	2	195-1	Switch Pin		1
124	Handle	TRT80 M10x25	1	196	Hex. Socket Cap Screw	M4x30	2
125	Nut	M10	1	197	Hex. Socket Cap Screw	M10x35	4
126	Spring Washer	M10	1	197-1	Spring Washer	M10	4
127	Linear Bearing Bracket		1	198A	T Connecter		1
128	Hex. Socket Cap Screw	M8x25	2	199	Hex. Socket Cap Screw	M5x16	2
128-1	Spring Washer	M8	2	200	Coolant Switch	1/4Px5/16	2
129	Bearing	LM-16UU	1	201	Hose Clamp	13mm	1
130	Ring	S-28	2	203	Pipe Fitting	1/4Px5/16	1
131	Electric Box Holder		1	204	Hose	5/16"x120cm	1
132	Spring Washer	M8	4	205	Hose	5/16"x50cm	1
133	Hex. Socket Cap Screw	M8x20	4	206	Drive Flywheel		1
135	Hex. Socket Cap Screw	M10x25	2	207	Washer		1
136	Spring Washer	M10	2	207-1	Spring Washer	M10	1
138	Hex. Socket Cap Screw	M6x25	2	208	Hex. Cap Bolt	M10x25	1
138-1	Spring Washer	M6	2	209A	Idle Flywheel Shaft		1
139	Nut	M6	2	210	Bearing	32007	2
142	Hex. Socket Cap Screw	M5x8	10	211	Idle Flywheel		1
143	Nut	M5	4	212	Star Washer	M35	1
144	Electric Box Platform		1	212-1	Anti-dust Cover	35mm	2
144-1	Transformer		1	213	Jam Nut	M35	1

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PART LIST

Part No.	Description	Size No.	Q'ty	Part No.	Description	Size No.	Q'ty
214	Oil Inlet	1/16	1	275	Ball Bearing Bracket		1
215A	Saw Blade		1	276	Set Screw	M6x12	4
216B	Blade Cover		1	277	Hex. Socket Cap Screw	M10x20	2
216A-1	Coolant Tray		1	279	Hex. Socket Cap Screw	M8x20	2
216A-2	Round Head Screw	M6x8	2	280A	Brush	Ø50	1
217	Plum Screw	M6x12	4	281	Brush Clamp		1
219	Round Head Screw	M4x8	2	284	Hex. Cap Screw	M6x12	2
220	Nut	M4	2	285	Washer	M6x13x1	2
222	Handle		2	286A	Lead Screw		1
223	Handle Wheel		1	286-1	Spring	5x31x35mm	1
223-1	Thrust Bearing	51103	1	286-2	Hex. Socket Cap Screw	M8x16	1
223-2	Blade Tension Gauge		1	286-3	Washer	M8x23x2	1
223-3	Plate		1	287	Setting Seat		1
224	Special Spring Washer		10	288	Lock Handle		1
225	Tension Shaft	M16x270	1	289	Bearing Bushing		1
229	Plate		1	289-1	Bearing	51104	1
230	Hex. Socket Cap Screw	M6x12	2	289-2	Nut	M20x30x9P1.5	1
230-1	Washer	M6x13x1	2	289-3	Set Screw	M5x5	1
231	Limit Switch		1	291	Trigger Switch		1
232	Hex. Socket Cap Bolt	M4x25	2	292	Pipe		1
239	Nut	M16	1	292-1	Nut	M16	1
240A	Slide Bracket		1	293	Nut	M12	1
240A-1	Spring Washer	M10	3	294	Spring Hook		1
240A-2	Hex. Socket Cap Screw	M10x45	3	295	Spring	7.5x50x190mm	1
240A-3	Set Screw	M10x25	1	296	Spring Seat		1
244	Cover Plate		1	297	Spring Bushing		1
245	Hex. Socket Cap Screw	M6x8	2	298	C-Ring	S-12	4
246	Gib		2	298-1	Washer	M10	2
247	Spring Washer	M8	6	299	Shaft		1
248	Hex. Socket Cap Screw	M8x20	6	300	Pin		1
249	Blade Guide Movable Rod		1	301	Spring Pin	2.5x16	1
249-1	Hex. Socket Cap Screw	M6x8	1	302	Spring	0.8x9x30mm	1
250	Set Screw	M6x12	4	303	Handle	M10x70	1
251	Hex. Socket Cap Screw	M8x20	2	304	Nut	M10	1
252	Setting Bracket		1	305	Adjusting Bracket		1
253	Hex. Socket Cap Screw	M12x50	1	306	Shaft		1
254	Handle	M6x60	1	307	Knob		1
256	Guide Bracket		1	307-1	Bushing		1
259	Bolt		2	308	Shaft		1
260	Hex. Socket Cap Screw	M6x8	1	309	Arm		1
261	Blade Guard		1	310	C-Ring	S-12	2
262	Set Screw	M6x12	2	311	Hex. Socket Cap Screw	M10x25	1
263	Nut	M6	2	312	Spring Washer	M10	1
264	Centric Shaft		2	313	Post		1
265	Ball Bearing	608ZZ	8	314	Set Screw	M10x16	3
265-1	Ball Bearing	608ZZ	2	315	Hydraulic Cylinder Post		1
266	E-Ring	E-7	4	316	Spring Washer	M8	4
267	Blade Guide		2	317	Hex. Socket Cap Screw	M8x25	4
268	Hex. Socket Cap Screw	M6x25	2	318	Round Head Screw	M5x10	2
269	Eccentric Shaft		2	319	Limit Switch		1
270	Hex. Socket Cap Screw	M6x8	2	320	Hex. Socket Cap Screw	M6x8	2
271	Blade Guard		1	320-1	Washer	M6x13x1	2
272	Guide Bracket		1	321A	Adjusting Bracket		1
272-1	Hex. Socket Cap Screw	M6x8	2	322A	Hydraulic Cylinder		1
273	Pipe Fitting	1/4Px5/16	2	323	Hex. Socket Cap Screw	M10x40	1
274	Blade Guide		2	324	Nut	M10	1

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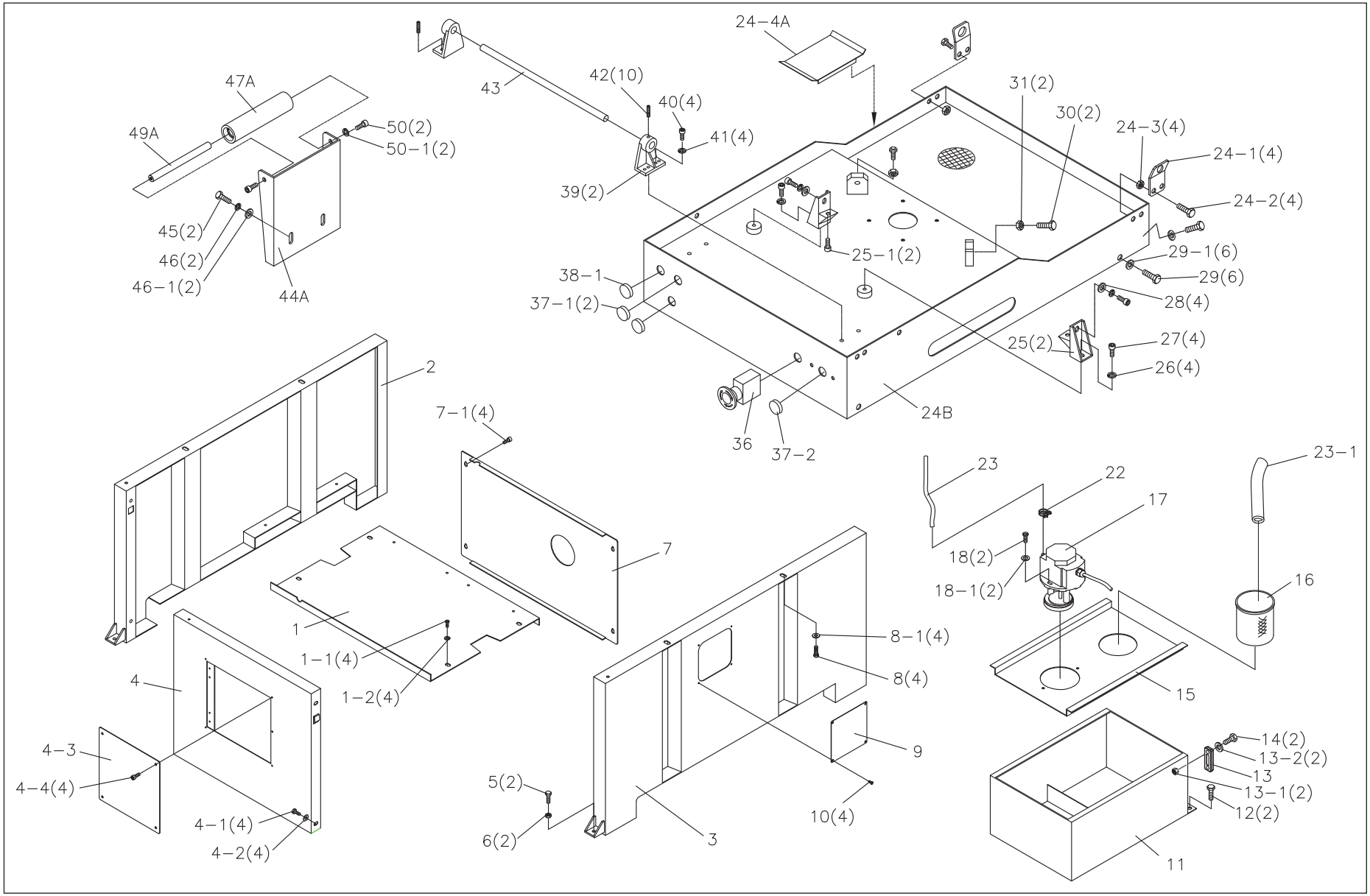

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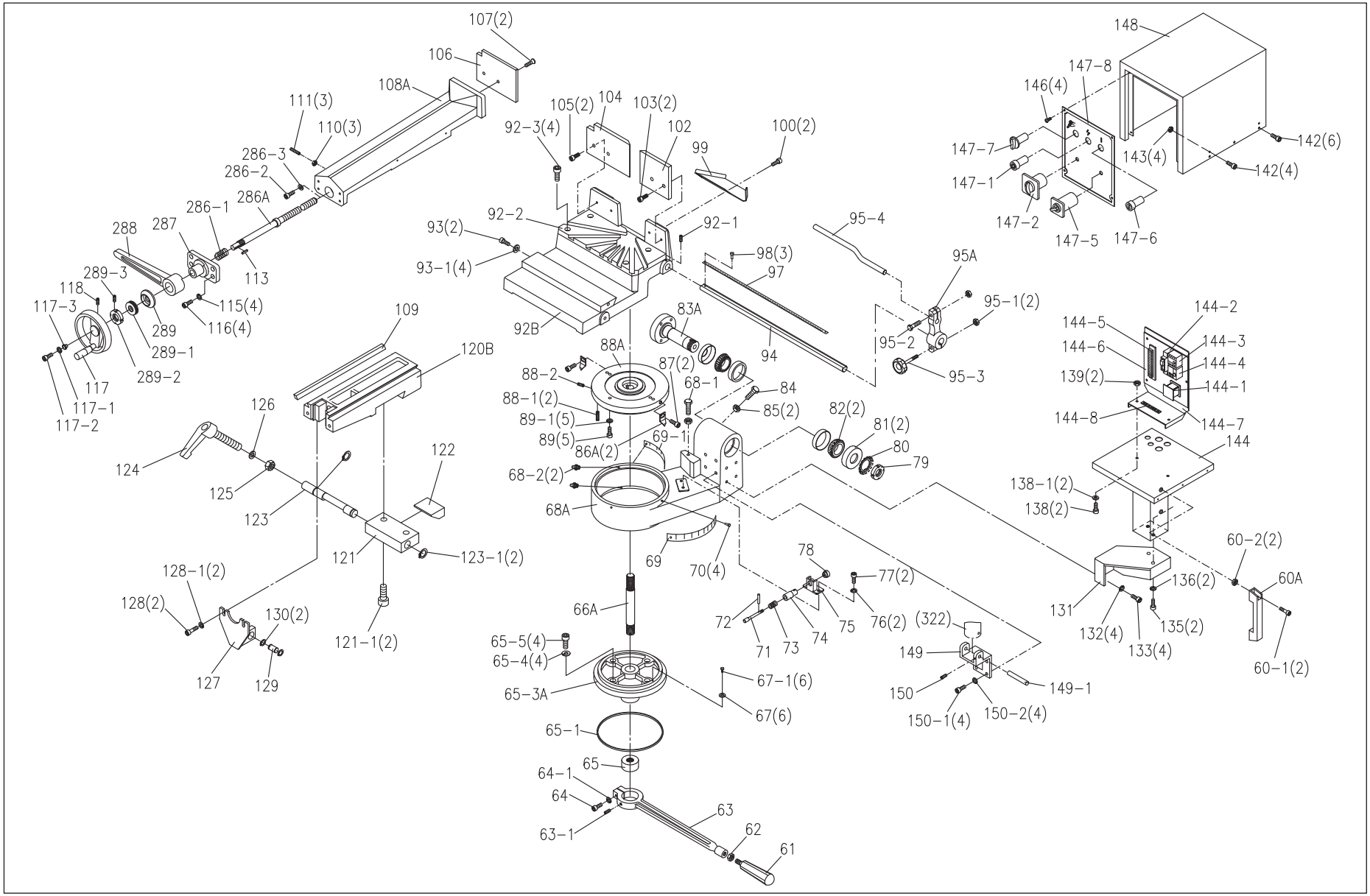

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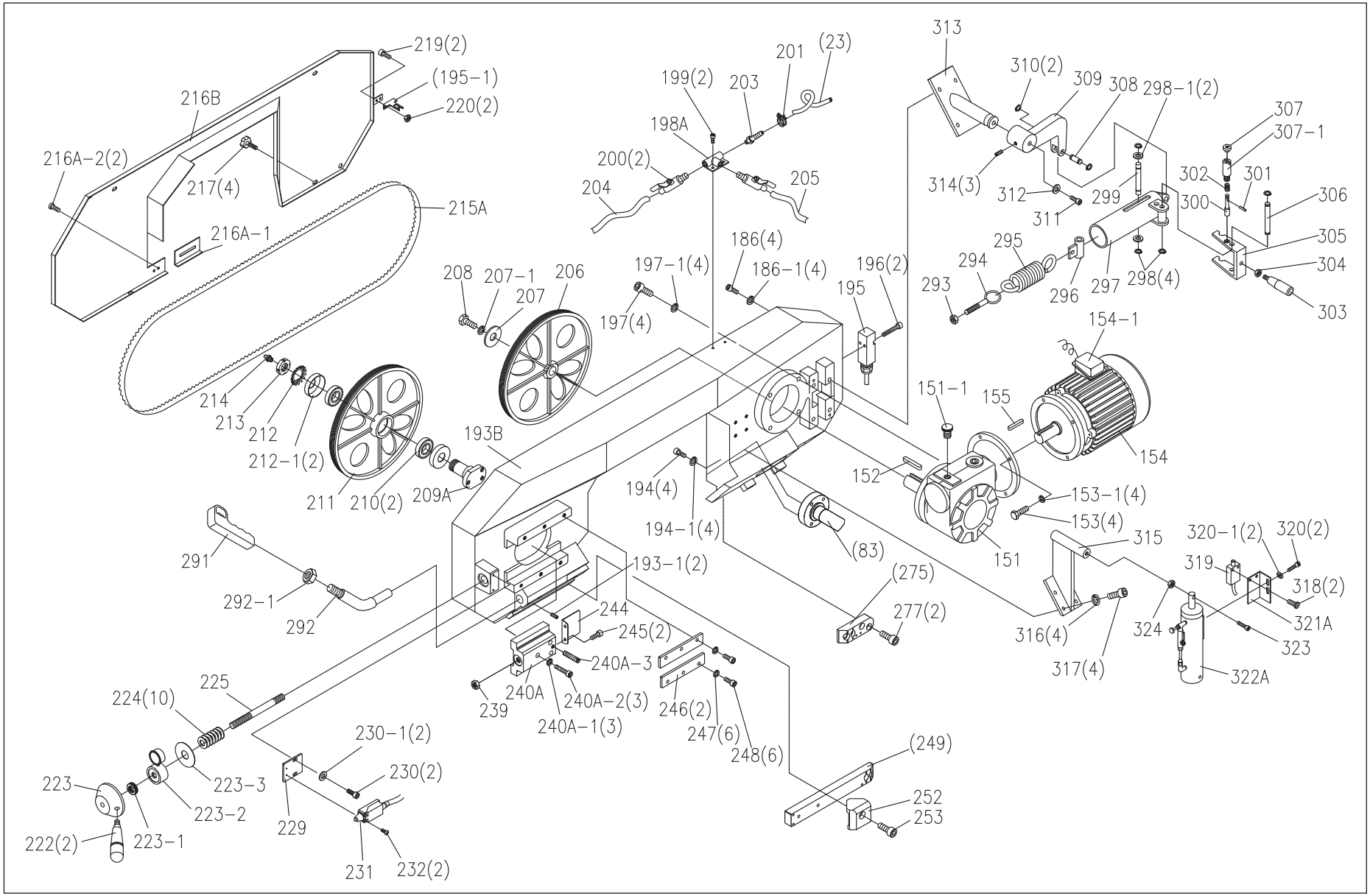

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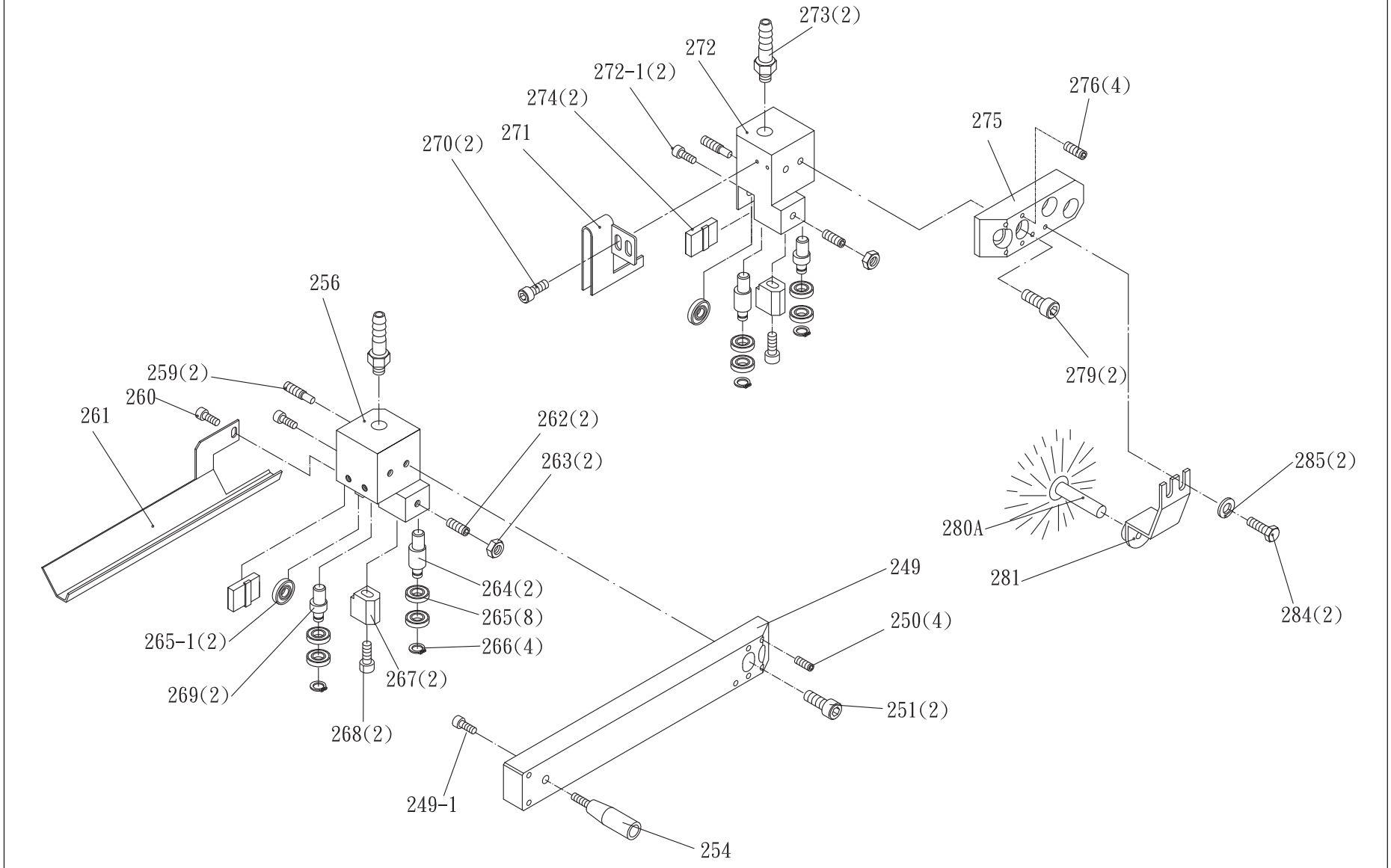
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