HORIZONTAL METAL CUTTING BAND SAW

*Study Carefully Before Operating

BS-76G

Table of Contents

NOTE:This manual is only for your reference. Owing to the continuous improvement,changes may be made at any time with no obligation on the part of machine.And please note the local voltage for operating this electric machine.

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 of 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 "IEC204—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 altemating 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.

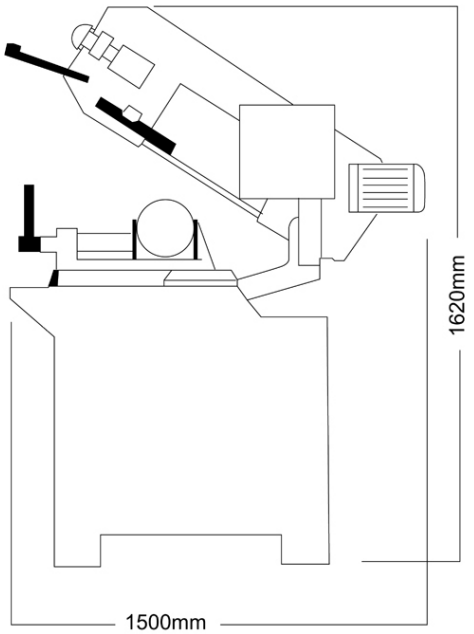
1.3 Emergencies according to European Standard "CENELEC EN 60 204—1(1992)"

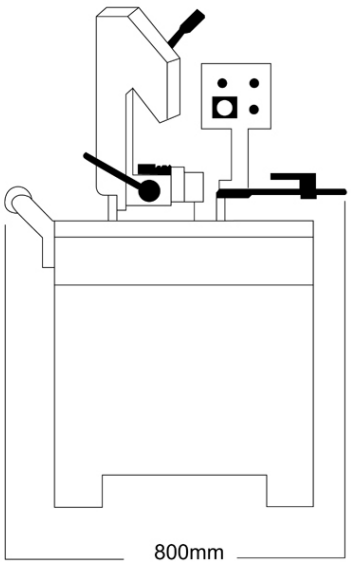
- In the event of incorrect operation or of danger conditions,the machine may be stopped immediately by pressing the red mushroom button.
- The casual or voluntary removal of the protection shield of the flywheels causes the stepping-in of a micro switch that automatically stops all machine functions.

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

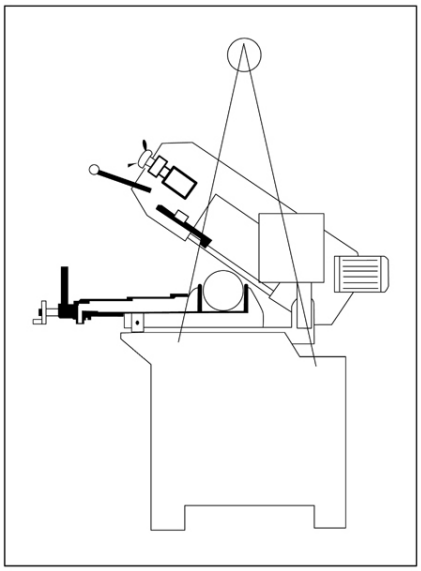
2 MACHINE DIMENSIONS TRANSPORT INSTALLATION DISMANTLING

2.1 Machine dimensions





2.2 Transportation of your machine

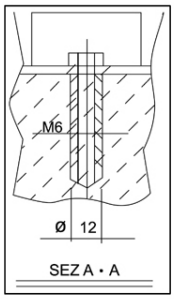


- To move the machine, the machine needs to be moved in its own packing,use a forklift truck or sling it with straps as illustrated in the drawing above.

2.3 Minimum requirements for housing the machine

- Main vollage and frequency must comply with the machine's motor requirements.
- Environment temperature should fall within-10ºc to+50ºc
- 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:

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:

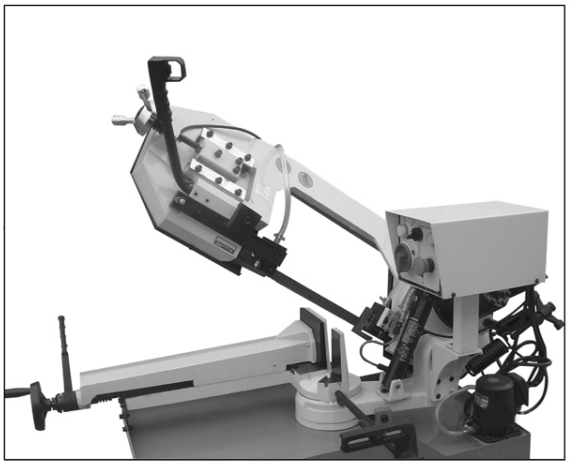
1) Cast iron or ferrous materials,composed of metal alone,are secondary raw materials,so they may be taken to an iron foundry for re-smelting after having removed the contents(classified in point 3).
2) Electrical components, including the cable and electronic material (magnetic cards,etc).fall within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

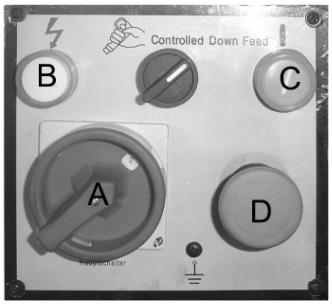
3 THE MACHINE'S FUNCTIONAL PARTS

3.1 The saw arm

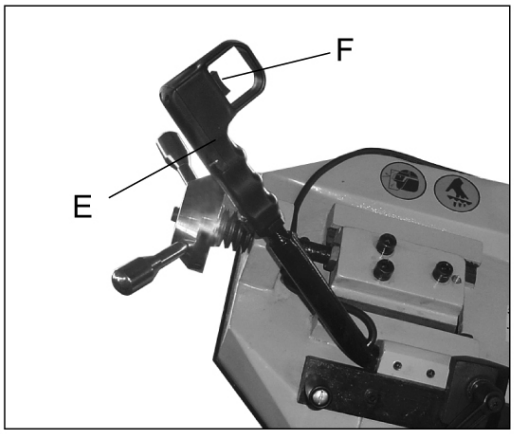
Machine part consisting of drive members(gear motor or variable speed motor, flywheels),tightening and guide (blade tightening slide,blade guide blocks)of tool.



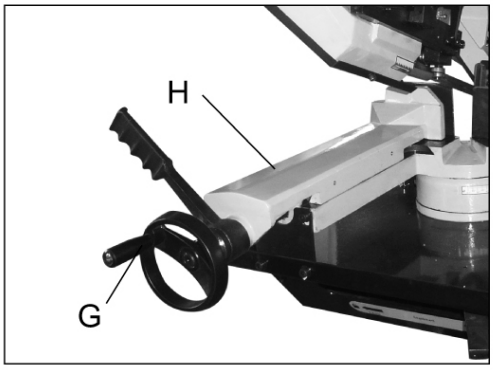
3.2 Controls



A:Main connect switch
B:Power ON indicator light
C:Emergency push button
D:Operation indicator light
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.

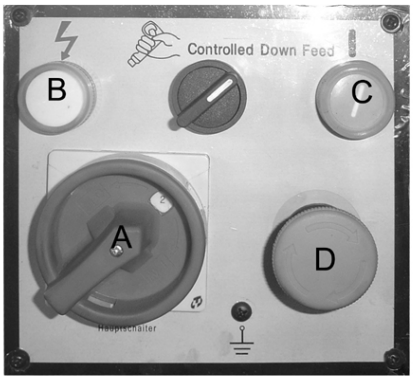
3.4 Cutting angle adjustment

Cutting at angles
- Angle can be cut up to 60º
- 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 graduae cutting and respective blocking system), the VICE, the BAR STOP, the WORK PIECE SUPPORTER,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.

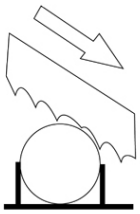
The main connect switch is designed with a lock hole.A lock can be attached using the lock hole to prevent machine operation for safety and security reasons.



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.

BLADE CUTTING DIRECTION

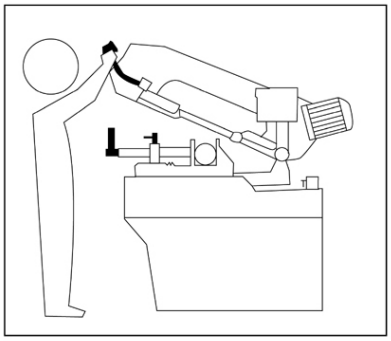


4 ADVICE ON USING YOUR BANDSAW

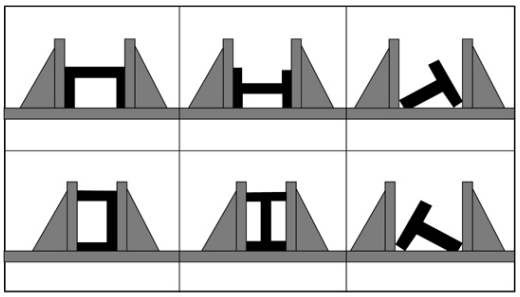
4.1 Recommendations and advice for using the machine

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.

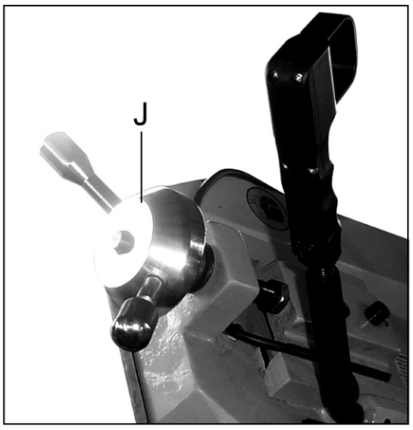


- Do not use blades of a different size from those stated in the machine specifications.
- If the blade gets stuck in the cut, release the running button immediately, switch off the machine,open the vice slowly. remove the part and check that the blade or its teeth are not broken. If they are broken,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

5 ADJUSTING YOUR MACHINE

5.1 Blade tension assembly

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

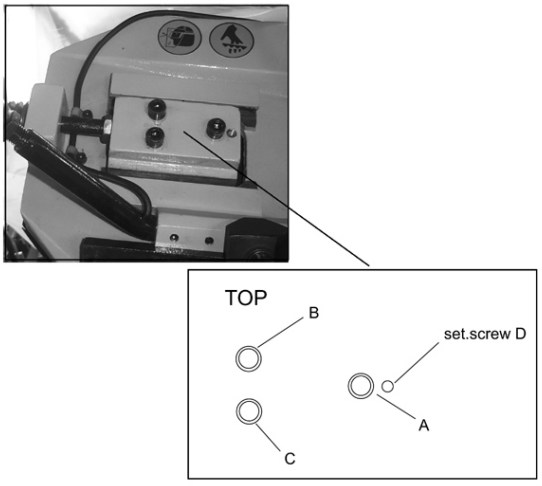


To set the blade tension without the use of a tension gauge:

- 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.

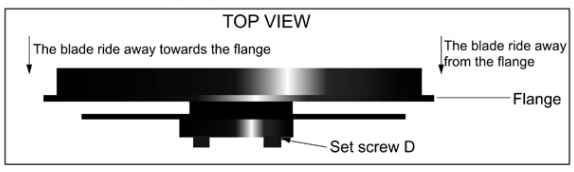
5.2 Adjusting the blade to the flywheels



1.Loosen the Hex nut screws A, B,and C.

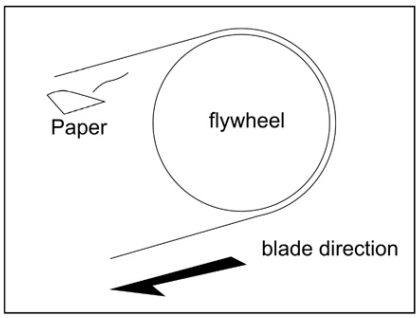
2. Use and Allen wrench on set screw D to adjust the tilt of the flywheel.
   - Turning the setscrew. D clockwise will tilt flywheel so that the blade will ride closer to the flange.
   - Turning the setscrew. D counter-clockwise will tilt the flywheel so that the blade will ride away from the flange. If the blade rides too far then it will come off.

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

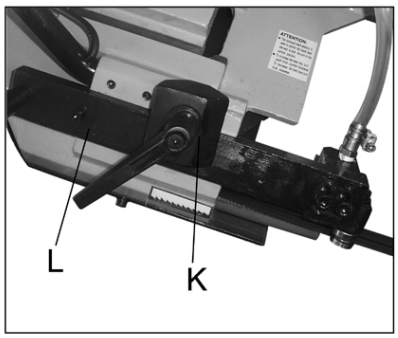


5.3 Checking the adjustment of the blade

1. 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, Readjust.
- If the paper folds or creases then the blade is seated properly.
- If you notice that the blade is riding away from the flange, then readjust.



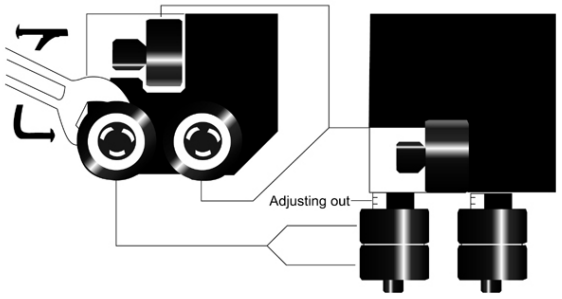
5.4 Adjusting the blade guide



- 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 roller bearings placed during inspection as per the thickness of the blade with a minimum amount of play.

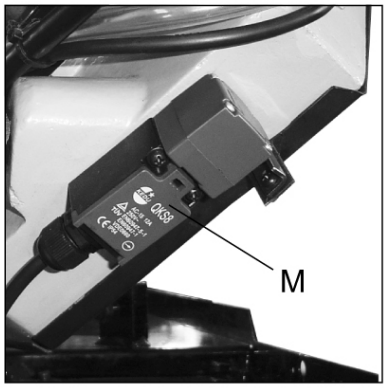


In case the blade needs to be replaced ,make sure to always install 0.9mm thick blades for which the blade guide bearing have been adjusted, in the case of toothed

blades with different thicknesses adjustment should be carried out as follows:
- From the bottom of the guide blocks, use a wrench on the adjusting nut of the eccentric bearing.
- Turning the adjusting nut clockwise will move the eccentric bearing away from the blade.
-Turning the adjusting nut counter-clockwise will move the eccentric bearing closer to the blade.

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

5.5 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.

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.

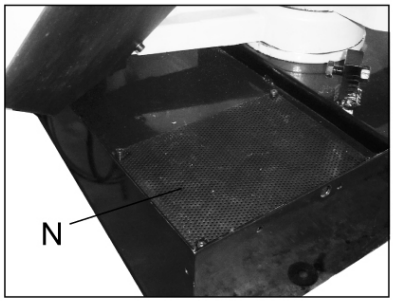
6.5 Oils for lubricating coolant

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

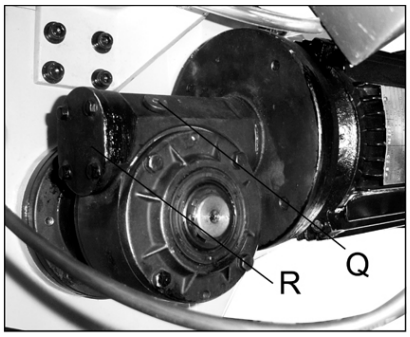
The disposal of these products is controlled by strict regulations,Please see the Chapter on “Machine dimensions Transport-Installation” in the section on Dismantling.

6.7 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.
- Replace the screw 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°□	170□	170x170□	210x170
45°□	120□	110x110□	
60°	70	60x60	

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 A50 ----	6150 9262	207 224	95 98	1140÷1330 1220÷1400
Alloyed steels for hardening and tempering and for nitriding	35CrMo4 39NiCrMo4 41CrAlMo7	34CrMo4 36CiNiMo4 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	En325 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/sillcon brass G-CuZn36S11Pb1 UNI5038 Manganese bronze SAE43 • SAE430 Phosphor bronze G-CuSn 12 UNI 7013/2a					220 140 120 100	98 77 69 58.5	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	0.56
FLYWHEEL DIAMETER	mm	260
BLADE DIMENSIONS	mm	20x0.9x2085
BLADE SPEED CUTTING	m/min	40/80
OPENING VICE	mm	215
SAW FRAME TILTING	°	40
WORKING TABLE HEIGHT	mm	890
MACHINE WEIGHT	kg	156

8 MATERIAL CLASSIFICATION AND CHOICE OF TOOL

Since the airn 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 does not require countless operations to repare 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 (25.4mm) 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.

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.

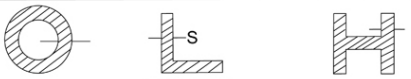
The best combination of these two parameters can be seen directly examining the chips.

Long spiral-shaped chips indicate ideal cutting.

Very fine or pulverized chips indicate lack of feed and/or cutting pressure.

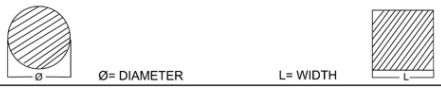
Thick and /or blue chips indicate overload of the blade.

BLADE TEETH SELECTION TABLE		
THICKNESS mm	Z CONTINUOUS TOOTH DESIQN	Z COMBO TOOTH DESIGN
TILL 1.5	14	10/14
FROM 1TO 2	8	8/12
FROM 2TO 3	6	8/10
FROM 3TO 5	6	5/8
FROM 4TO 6	6	4/6
MORE THAN 6	4	4/6



S=THICKNESS

SOLID Ø ORLmm	Z CONTINUOUS TOOTH DESIGN	Z COMBO TOOTH DESIGN
TILL 30	8	5/8
FROM 30 TO 80	6	4/6
FROM 40 TO 80	4	4/6
MORE THAN 90	3	3/4



Ø= DIAMETER L= WIDTH

8.5 Blade running–in

When cutting for the first time,it is good practice to run in the too 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:

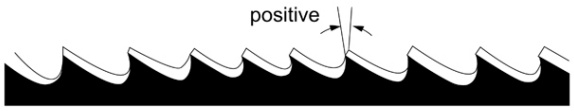
- Shape and cutting angle of tooth
- Pitch
- Set

Shape and angle of tooth

REGULAR TOOTH:0º rake and constant pitch.

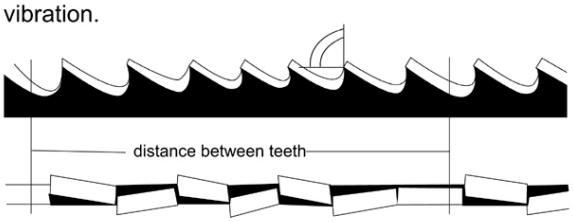
Most common form for transversal or inclined cutting of solid small and average cross-sections or pipes,in laminated mild steel and gray iron or general metal.

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



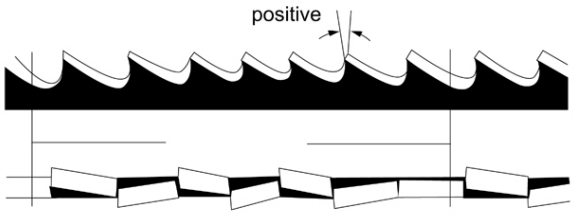
Particular use for crosswise or inclined cuts in solid sections or large pipes,but above all harder materials (highly alloyed and stainless steels, special bronze and forge pig iron).

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.

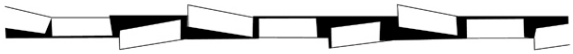
COMBO TOOTH:9º-10º positive rake.



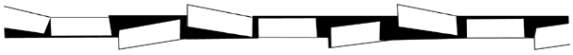
This type of blade is the most suitable for the cutting of section bars and large and,thick plpes as well as for the cutting of solid bars at maximum machine capacity.
Available pitches:3-4/4-6.

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 5mm. 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 3mm).

ALTERNATE SET(IN GROUPS):Groups of cutting teeth right and left,alternated by a straight tooth.

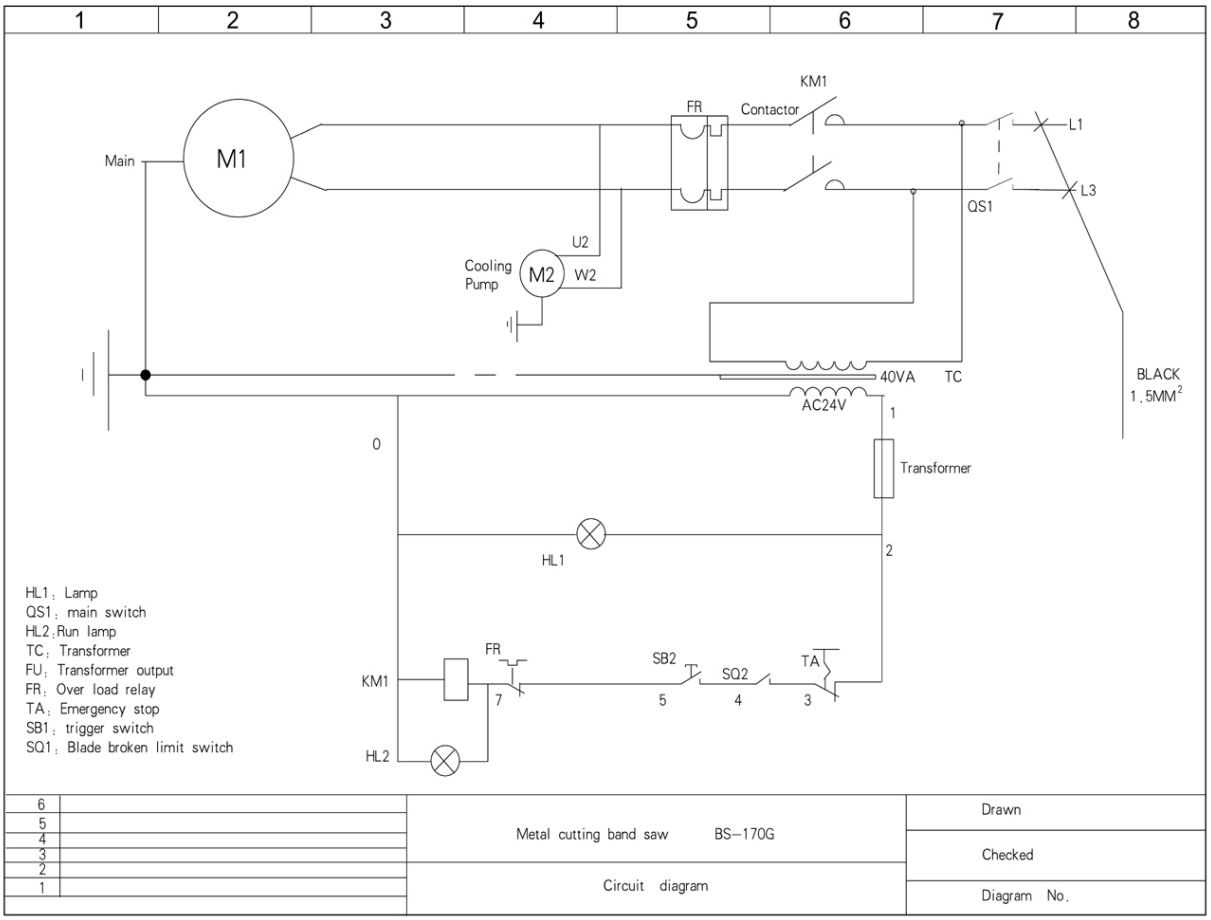
This set is associated with very fine teeth and it is used for extremely thin materials(less than 1mm)

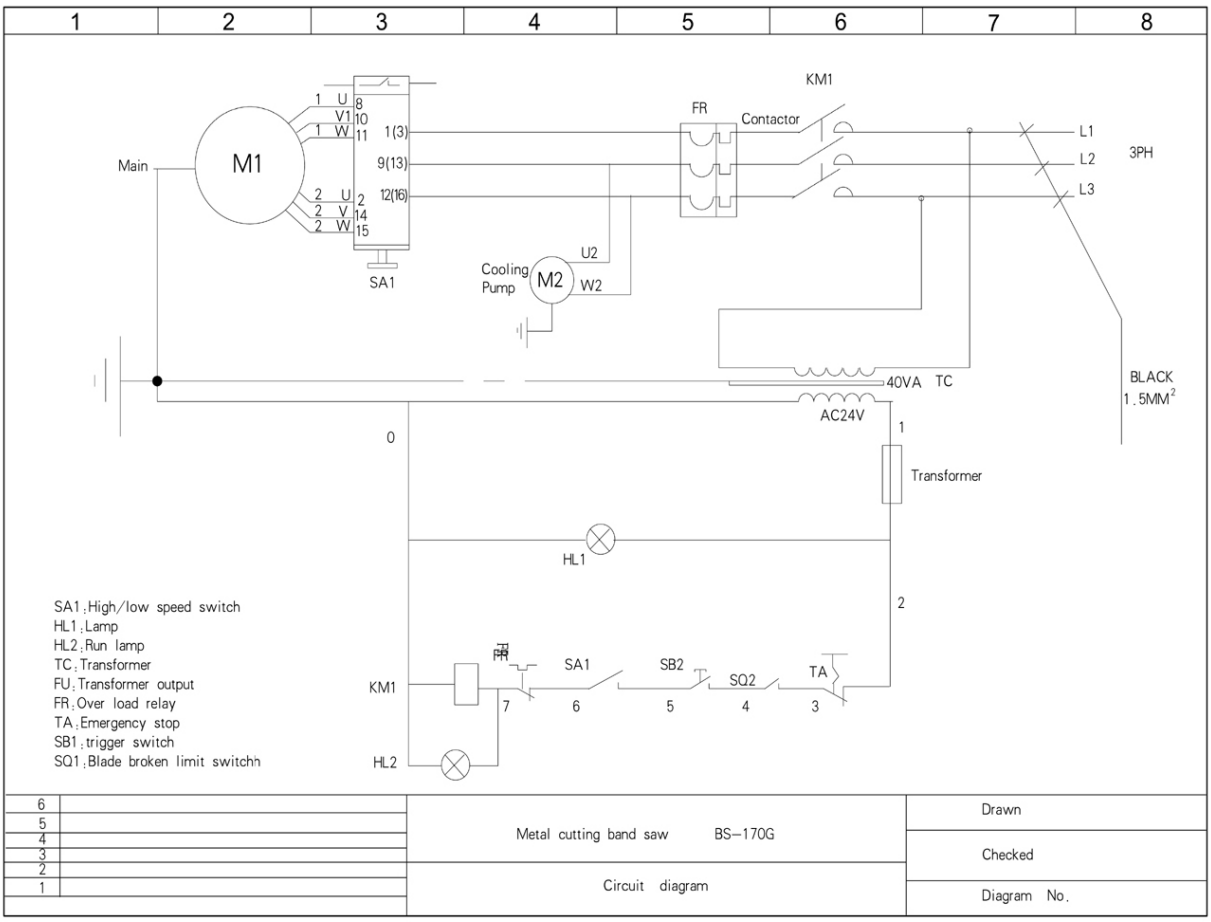
ALTERNATE SET (INDIVIDUAL TEETH):Cutting teeth right and left.

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.

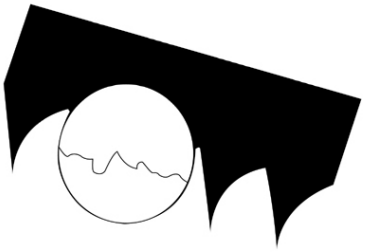
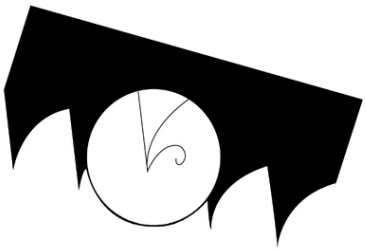

1 2 3 4 5 6 7 8
KM1
FR
Contactor
Main
M1
L1
L3
QS1
U2
Cooling Pump
M2
W2
40VA
TC
AC24V
BLACK 1.5MM²
0
1
Transformer
HL1
2
HL1: Lamp
QS1: main switch
HL2:Run lamp
TC: Transformer
FU: Transformer output
FR: Over load relay
TA: Emergency stop
SB1: trigger switch
SQ1: Blade broken limit switch
KM1
FR
SB2
SQ2
TA
7
5
4
3
HL2
6
5
4
3
2
1
Metal cutting band saw BS-170G
Circuit diagram
Drawn
Checked
Diagram No.

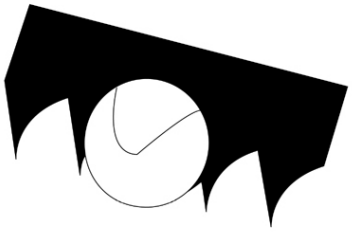

1 2 3 4 5 6 7 8
KM1
FR
Contactor
Main
M1
1 U
1 V
1 W
8
10
11
1(3)
9(13)
12(16)
2 U
2 V
2 W
2
14
15
SA1
L1
L2
L3
3PH
U2
Cooling Pump
M2
W2
40VA
TC
AC24V
BLACK 1.5MM²
0
1
Transformer
HL1
2
SA1:High/low speed switch
HL1:Lamp
HL2:Run lamp
TC:Transformer
FU:Transformer output
FR:Over load relay
TA:Emergency stop
SB1:trigger switch
SQ1:Blade broken limit switchh
KM1
FR
SA1
SB2
SQ2
TA
7
6
5
4
3
HL2
6
5
4
3
2
1
Metal cutting band saw BS-170G
Circuit diagram
Drawn
Checked
Diagram No.

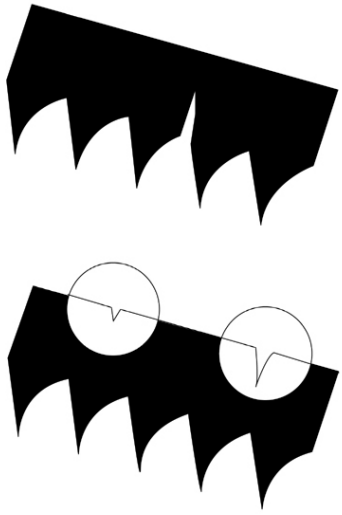
11 TROUBLESHOOTING

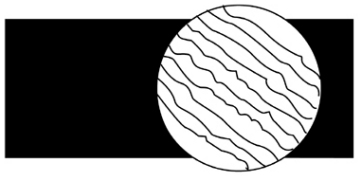
This chapter lists the probable faults and malfunctions that could occur while the machine is being used and suggests possible remedies for solving them.
The first paragraph provides diagnosis for TOOLS and CUTS the second for ELECTRICAL COMPONENTS.

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 seletion**".
	Chips sticking onto teeth and in the guilets 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,Adujst blade guide pads.
	Insufficient lubricating,refrigerant,or wrong emulsion	Check level of liquid in the tank.
	Teeth positioned in the direction	Increase the flow of lubricating refrigerant, checking that the hole and the liquid outler pipe are not blocked. Check the emuision percentage.

FAULT	PROBABLECAUSE	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 classlification 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 beanings.	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	"SA1"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 10-15minutes.If there is no current continuity on these two wires, the motor must be replaced or rewound.
	"SB2"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:-phasses -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"FR1"	Check electrical efficiency and check for shorts that trigger such protections.
	"SB1"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"SA1"in position"0"	It must be turned to position 1 or 2.
	Emergency button "SB1"on	Ensure that it is off and that its contacts are unbroken.
	Microswitch"SQ2"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.
	Motor"M1"	Check the fuse efficiency and ensure there are no short circuits causing the protection to trip.
MOTOR STOPPED WITH PILOT LIGHT"HL2 亟 IT	Microswitch"SQ2"in the handle	Check operation and/or efficiency: replace if broken.
	Motor"M1"	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	Hand Wheel	5"	1
1-1	Base (Left Part)		1	55	Set Screw	M8X10	1
2	Hex.Cap Bolt	M12x40	2	56	Nut		1
3	Nut	M12	2	57	Bearing Bushing		1
4	Base Cover Plate		2	58	Ball Bearing	#51104	1
5	Hex.Cap Bolt	M8x16	8	59	Lock Handle		1
6	Flat Washer	M8	8	60	Bushing		1
7	Nut	M8	8	61	Hex. Socket Cap Screw	M6X100X25	2
8	Flat Washer	M10X20	2	62	Table		1
9	Spring Washer	M10	2	63	Compressed Spring		1
10	Hex.Cap Bolt	M10X20	2	64	Lead Screw		1
11	Hex. Socket Cap Screw	M6X8	2	64-1	Key	5X5X20	1
12	Plate		1	66	Vise		1
13	Hex. Socket Cap Screw	M8X20	2	67	Set Screw	M8X10	1
14	Spring Washer	M8	2	68	Hex. Socket Cap Screw	M5X8	2
15	Hex. Socket Cap Screw	M8X20	2	69	Scale Point		1
15-1	Spring Washer	M8	2	70	Set Screw	M8X10	1
16	Flat Washer	M8	2	71	Pivot		1
17	Supporting Plate		1	72	Anti-Bust Cover	Ø30	2
18	Nut	M8	2	73	Ball Bearing	#32006ZZ	2
18-1	Flat Washer	M8	2	74	Nut	M10	2
19-1	Support Plate		1	75	Hex. Cap Bolt	M10X40	1
19-2	Hex. Socket Cap Screw	M10X20	2	75-1	Hex. Cap Bolt	M10X25	1
19-3	Spring Washer	M10	2	76	Spring Hook		1
19-4	Flat Washer	M10	2	77	Star Washer	ø30	1
28	Block Plate		1	78	Nut	M30	1
29	Hex. Socket Cap Screw	M6X8	2	79	Swivel Arm		1
30	Flat Washer	M6	2	80	Scale		1
30-1	Nut	M6	2	81	Rivet	2m/m	2
31	Hex. Cap Bolt	M12X40	2	82	Bar-Stop-Rod		1
32	Nut	M12	2	83	Rod		1
33	Filter Net		1	84	Butterfly Screw	5/16X3/4	1
34	Round Head Screw	M5X10	4	85	Cover		1
35	Hex. Socket Cap Screw	M6X15	2	86	Hex. Socket Cap Screw	N5X8	
36	Flat Washer	M6	2	88	Hex. Socket Cap Screw	M5X8	2
37	Hose	5/16"X125cm	1	88-1	Flat Washer	M5	2
38	Hose Clamp		1	89	Control Box Bottom Plat		1
39	Pump	WE90	1	90-1	Transformer		1
40	Plug	M3/8"	1	90-2	Magnetic Connector		1
41	Coolant and Chip Tray		1	90-3	Fuse Seat		1
42	Locking Lever		1	90-4	Overload Rely		1
43	Set Screw	M10X10	1	90-5	Contacts		1
44	Spring Washer	M10	1	91	Hex. Socket Cap Screw	M5X8	4
45	Hex. Socket Cap Screw	M10X35	1	92-1	0-1 Power Switch		1
46	Nut		1	92-2	Power Indicator Light		1
47	Shaft		1	92-3	Emergency Switch		1
48	Oil Seal	4m/m(51.7-52cm)	1	92-4	Start Button		1
49	Set Screw	M8X10	1	93	Control Box Panel		1
50	Disk		1	94	Control Box Bottom Pat		1
51	Spring Washer	M8	4	95	Supprt		1
52	Hex. Socket Cap Screw	M8X25	4	96	Setting Bracket		1
53	Set Screw	M8X10	1	97	Spring Washer	M8	2

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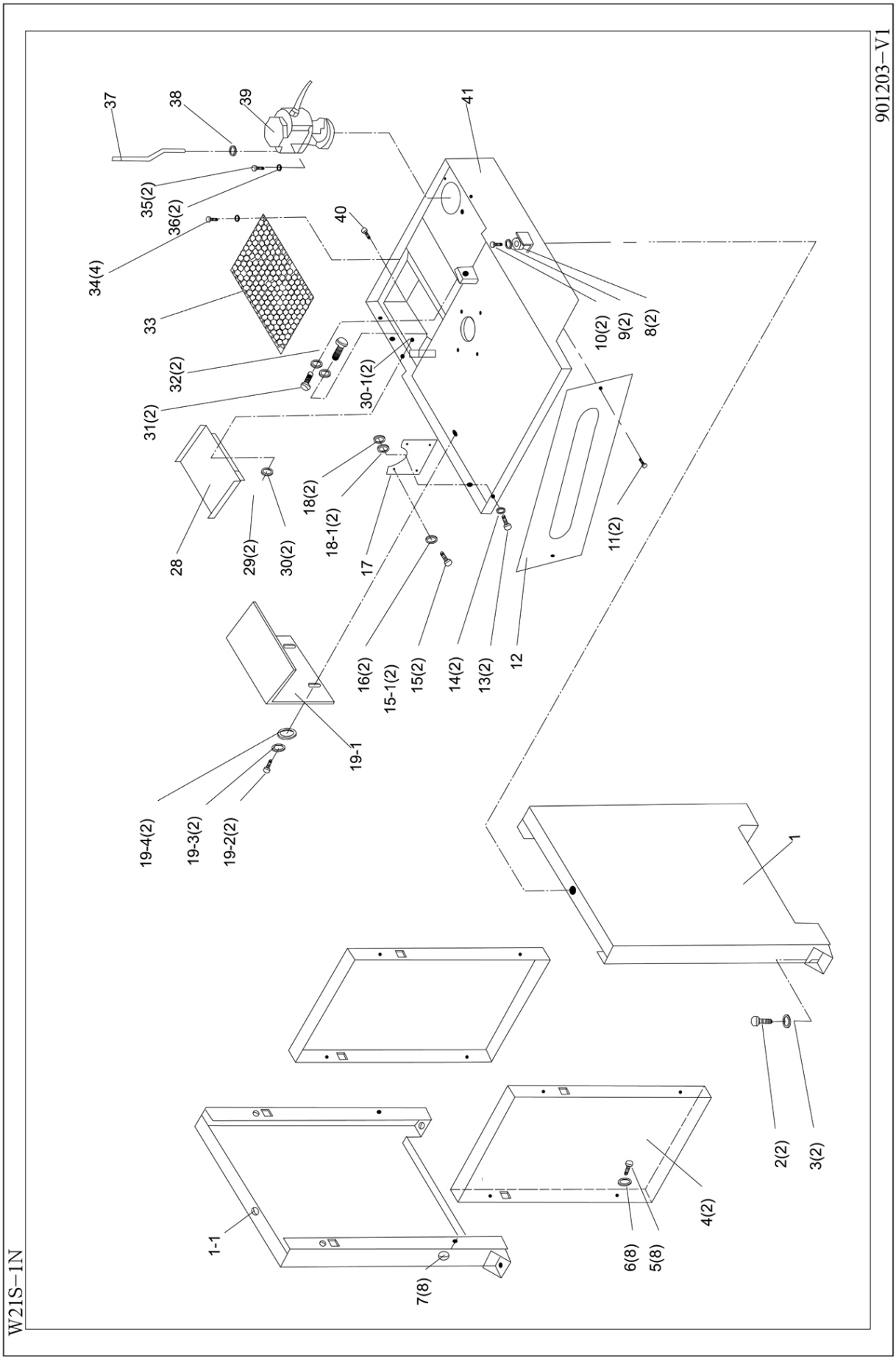
PART LIST

Part No.	Description	Size No.	Q'ty	Part No.	Description	Size No.	Q'ty
98	Hex. Socker Cap Screw	M8X20	2	145-1	Set Shaft		1
99	Spring Washer	M8	4	146	Hose	5/16"x75cm	1
100	Hex. Socket Cap Screw	M8X20	4	147	Pipe Fitting	1/4Px5/16	2
101	Hex. Socket Cap Screw	M5X8	4	148A	Pipe Fitting Seat		1
103	Front Ball Bearing Bracket		1	150	Coolant Switch	1/4Px5/16	1
104	Setting Bracket		1	150-1	Brace		1
105	Handle	M10X45	1	150-2	Hex. Socket Cap Scnew	M6x8	2
106	Hex. Socket Cap Screw	M6X8	1	151	Hose Clamp		1
107	Plastic Handle	M6	1	152	Hose	5/16" x35cm	1
108	Spring Washer	M8	3	153	Limit Switch	AZD-S11-1A	1
109	Hex. Socket Cap Screw	M8X30	3	153-1	Switch Pin		1
110	Set Screw	M8X30	2	154	Hex. Socket Cap Screw	M4x35	2
114	Rod		1	155	Spring Shaft		1
115	Nut	M16x2	1	156	Spring		1
116	Trigger Switch		1	157	Key	7x7x25	1
117	Cover Plate		1	158	Gear Box		1
118	Hex.Socket Cap Screw	M6x8	2	159	Key	5x5x25	1
119	Set Screw	M10x16	1	160	Motor	4P/8P(0.56kw)	1
120	Hex. Socket Cap Screw	M10x40	3	161	Spring Washer	M8	4
121	Spring Washer	M10	3	162	Hex. Cap Bolt	M8x20	4
122A	Slide		1	163	Set Screw	M6x12	4
123	Nut	M16X2	1	170	Set Screw	M6x12	4
124	Handle		2	171	Spring Washer	M8	2
125	Handle Wheel		1	172	Hex.Socket Cap Screw	M8x30	2
126	Thrust Spring Wahe$_r$		6	173	Centric Shaft		2
127	Tension Shaft		1	174	Ball Bearing	#608ZZ	8
128A	Shaft		1	175	E Ring	E7	4
129	Ball Bearing	#6006ZZ	2	176	Eccentnic Shaft		2
130	Idle Flywheel		1	177	Front Ball Bearing Seat		1
131	Washer		1	178	Front Blade Guard		1
132	Spring Waher	M10	1	179	Round Head Screw	M6x8	1
133	Hex. Cap Bolt	M10x25	1	180	Hex. Socket Cap Screw	M8x20	2
134	Blade	20X0.9X2085mm	1	181	Ball Bearing	#608ZZ	2
135	Knob Bolf	M6x10	4	182	Flat Washer	M8	2
136	Blade Cover		1	183	Pipe Fitting	1/4Px5/16	2
137	Round Head Screw	M4x8	2	184	Nut	M8	4
138	Spring Washer	M4	2	185	Spring Washer	M8	4
138-1	Nut	M4	2	186	Rear Ball Bearing Seat		1
139	Hex.Cap Bolt	M10x25	1	187	Spring Washer	M8	2
140	Spring Washer	M10	1	188	Hex. Socket Cap Screw	M8x30	2
141	Washer		1	189	Rear Blade Guard		1
142	Drive Flywheel		1	190	Round Head Screw	M6x8	2
143	Hex.Socker Cap Screw	M8x30	4				
144	Spring Waher	M8	4				
145	Saw Arm		1				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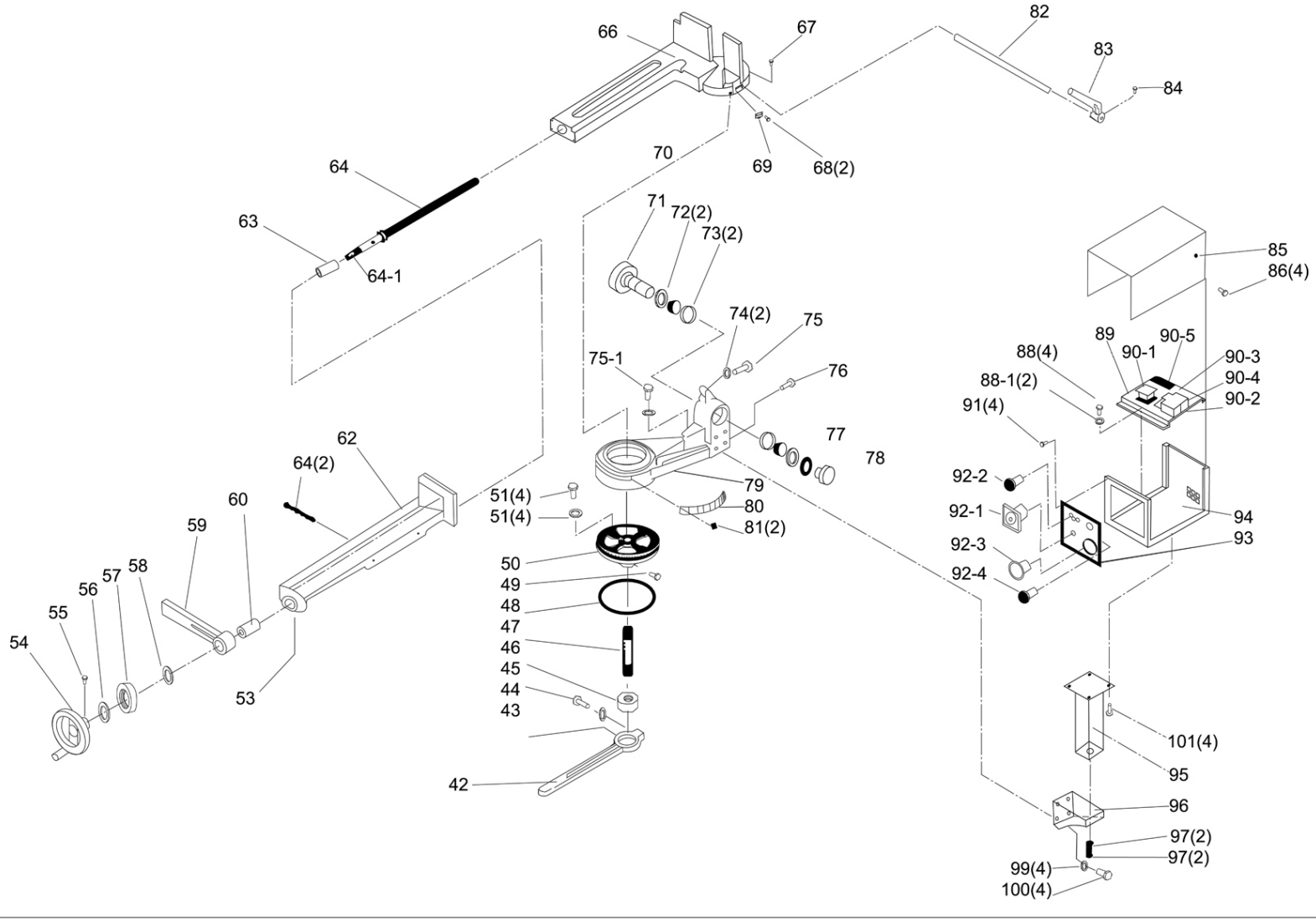
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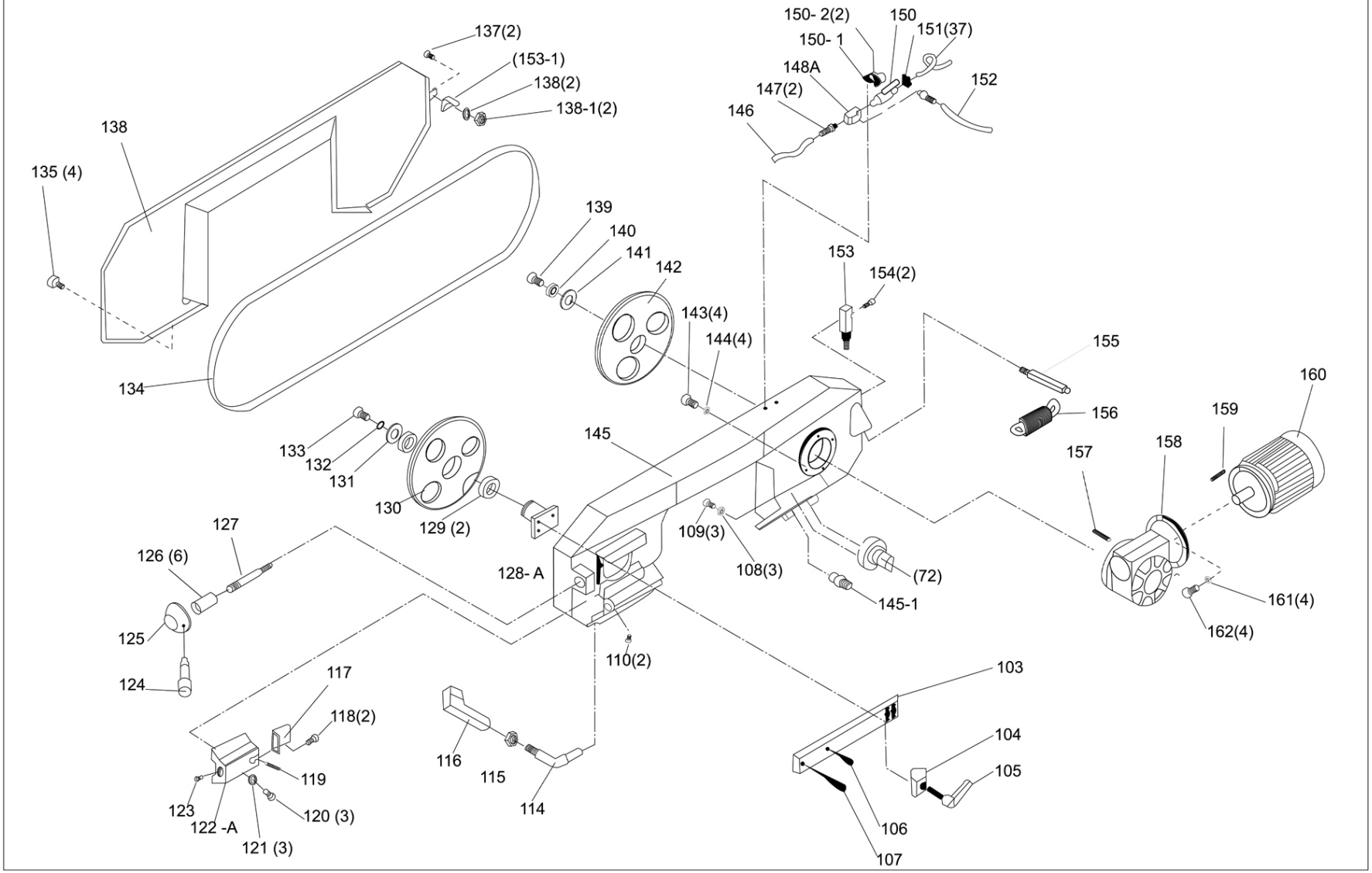
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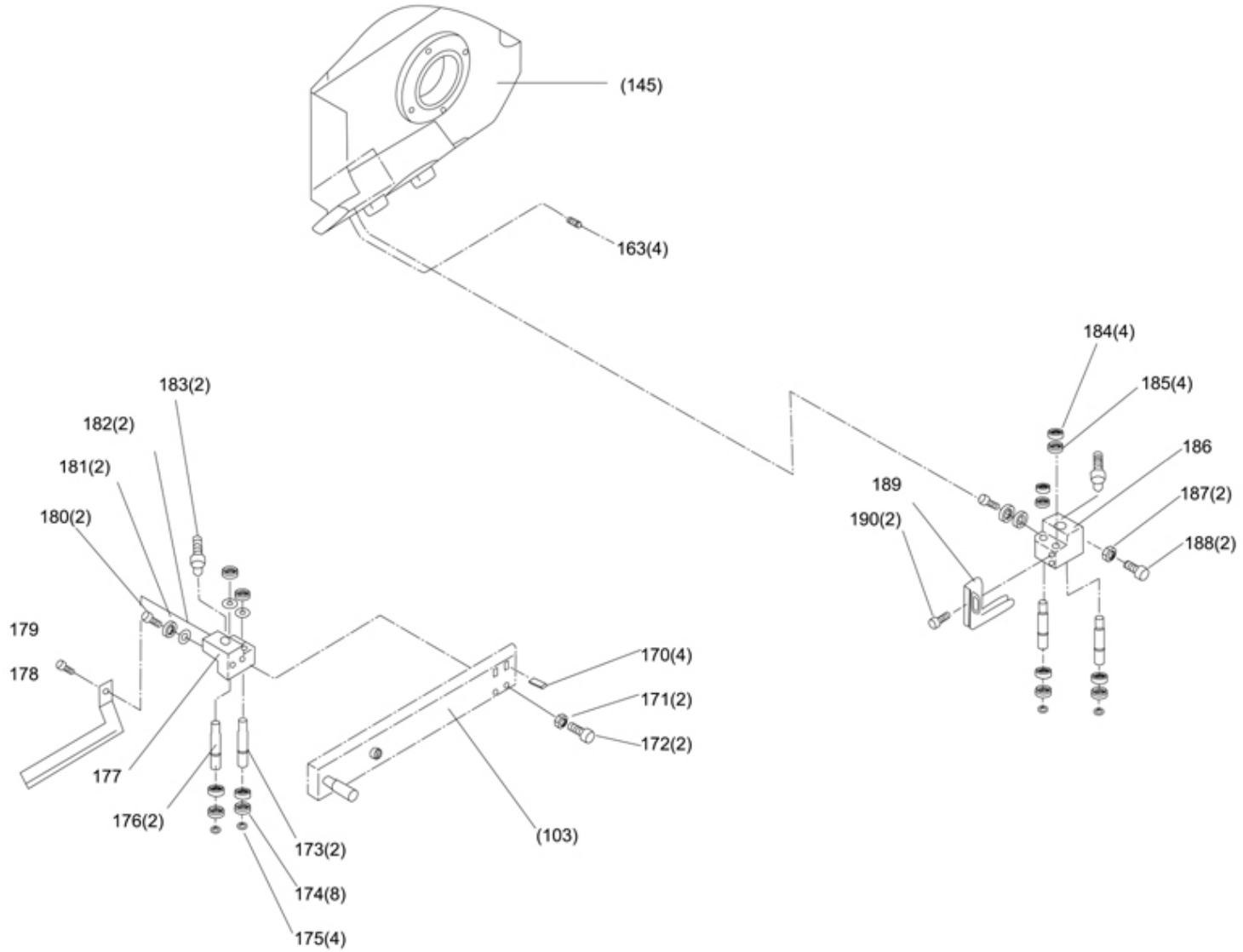

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