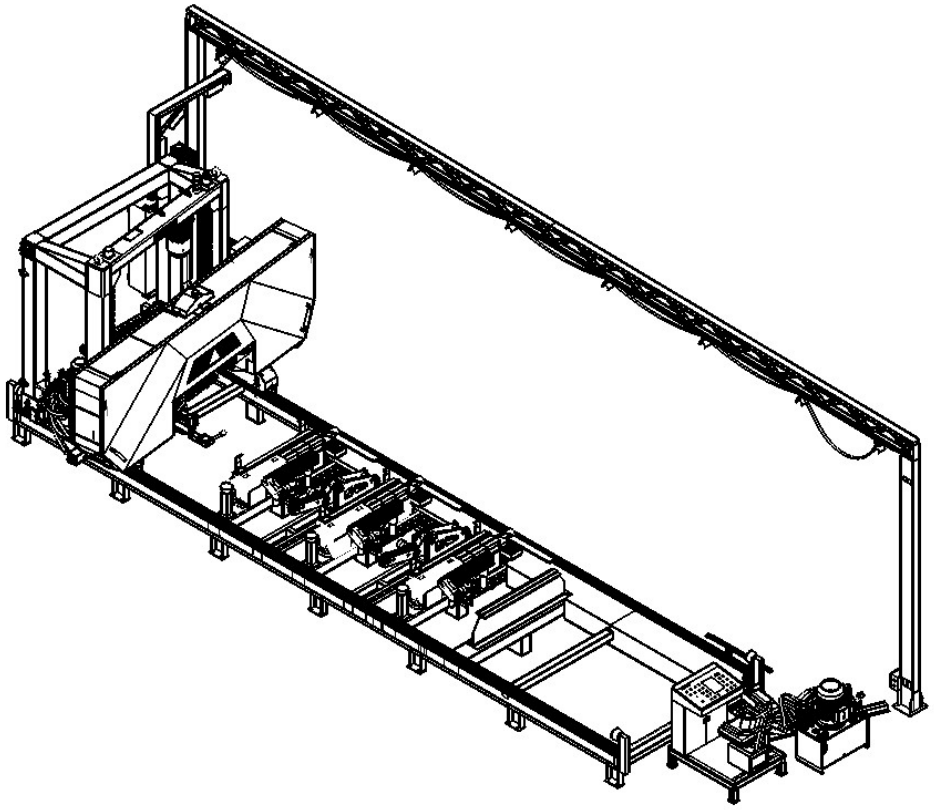
ÜSTÜNKARLI
LOG SAWING LINES

INSTRUCTION MANUAL



UHYB-120 HORIZONTAL BANDSAW

TYPE : UHYB-120
SERIAL NUMBER : 0162463201

TURKEY 2016

INSTRUCTION MANUAL

PREFACE

Congratulations. You have chosen a machine which will cover your requirements and which will increase your production capacity.

Please read this user manual carefully. This manual contains important information about equipment, its transportation, and maintenance. Please do not misplace this user manual. You will need it time and again to troubleshoot the problems that may occur, to get maintenance and lubrication information, and for parts lists.

You are invited to consult us on any subject, be it of a technical nature or commercial. We at **ÜSTÜNKARLI LTD** consider it our duty to provide you the best service at all times.

Since 1954 onwards, **ÜSTÜNKARLI INDUSTRIAL WOODWORKING EQUIPMENT LTD** has a proven superiority and track record of manufacturing and supplying to its customers the most economical equipment using the latest technologies, for use in large and medium scale timber factories and enterprises, and for pallet, crate, and case production. Led by the support and trust of its customers, **ÜSTÜNKARLI LTD** has a target of producing the best, by following closely the current economic conditions, technology, and quality.

With its experience well over 50 years, a production facility with 5000 m^2 of covered area and a large and expert staff, ÜSTÜNKARLI LTD continues production using the highest technology, and realizes belt conveyor and carrier band projects of all scales, up to complete timber factories. Our producs are certificated by TSEK, GOST, and CE.

Machinery manufactured by **ÜSTÜNKARLI LTD** feature a strong structure, with a steel and cast iron construction, meticulously manufactured with the experience of a leader company. Today, a large number of timber machinery and complete factories built by **ÜSTÜNKARLI LTD**, at locations both domestic and abroad, are operating with a fully satisfying efficiency. Germany, Austria, Scotland, Denmark, Czech Republic, Belgium, Switzerland, Russia, Estonia, Lithuania, Georgia, Macedonia, Romania, Bulgaria, Greece, Kenya, and Ghana are among the countries that have chosen our products.

Other equipment you can choose from our production program contains:

Timber Industry Processing Machinery:

- Hydraulic Digital System Remote Controlled or with Mechanical ruler Log Carriage Unit
- Log Saw blades wheel diameters 1000mm, 1200mm, 1400mm
- Hydraulic System Splitting Units,(Resaw) wheel diameters 1000mm,1200mm

- Full wheel mill sawing unit, wheel diameters 800mm
- Hydraulic system parallel board edger
- Hydraulic system single mill roller multi slicing unit
- Double mill multi slicing machine
- Cutting heights:120mm, 160mm, 240mm
- Hydraulic system prism machine
- Single, double or triple head cutting units
- Single mill palletized short cutting multi slicing machine
- Single mill palletized multi slicing machine

Carrier bands, complete timber factories design and installation.

Please make sure that you supply the following information when ordering spare parts or have questions about your machine.

Machine Typ:	Serial Number:	Production year
UHYB-120	0162463201	2016

For after-sales service and spare parts requirements and complaints, please use the contact information below:

Gölcükler Mah. 798/4 Sok. No:1 Menderes, 35470 İZMİR / TÜRKİYE
Tel: +90232 782 13 90, 788 22 68, 782 22 69, 782 22 70-Fax. +90 232 782 13 91
www.ustunkarli.com www.ustunkarli.com.tr E mail:info@ustunkarli.com

Due to continuous development and improvement efforts, we reserve the right to make any changes on the machines and in technical drawings and specifications.

ÜSTÜNKARLI
LOG SAWING LINES

CONTENTS

1.0 GENERAL INFORMATION

1.1 TERMS OF WARRANTY

- Machine and equipments is guaranteed for objective application and usage, which is showed in the instruction manual. Do not exceed capacity of the machine (material, technical limits), otherwise machine and equipments ARE NOT COVERED BY WARRANTY.

- Any other type of material (metal, ceramic tiles, marble, etc.) usage in sawing operation IS NOT COVERED BY WARRANTY.

- Machine is not covered by warranty which is not mounted or installed by except ÜSTÜNKARLI.

- Removing or repositioning the original part of machine and all modification IS NOT COVERED BY WARRANTY. Do not using original parts for spare part IS NOT COVERED BY WARRANTY.

- Usage, repair and maintenance operation interfered by unauthorized person IS NOT COVERED BY WARRANTY.

  Unauthorized Person
  Trained person who signed the submission form, must do repair maintenance and lubricate operation, other person are unauthorized person. Person who interfere the machine without training is called unauthorized person.

- Damage caused by unauthorized, untrained, careless usage IS NOT COVERED BY WARRANTY even if it is warranty terms.

- Maintenance, lubricate and assembly operation (appropriate environment, tools, material, period and quantity) must be done thusly in instruction manual by authorized person, otherwise machine IS NOT COVERED BY WARRANTY.

- Failures and problems caused by incorrect use, abuse, and unauthorized repair and maintenance designated in instruction manual ARE NOT COVERED BY WARRANTY.

- Damage caused by transportation, handling, loading and storage after delivery to the customer IS NOT COVERED BY WARRANTY.

- Damage caused by external effects (crash, drop, hit) IS NOT COVERED BY WARRANTY.

- Damage caused by inappropriate electrical supply, higher and lower voltage level IS NOT COVERED BY WARRANTY.

- Damage caused by fire, lightning, flood and other natural disasters IS NOT COVERED BY WARRANTY.

ÜSTÜNKARLI products are warranted for the duration of 1 year in these terms.

1.2 TECNICAL DATA

UHYB TECNICAL DATA

Table 1.1

TYPE	**UHYB-120**
Serial number	0162463201
Production date	2016
Machine weight	~9650Kg
Machine dimensions (L, W, H)	12350x4500x4060mm
TECHNICAL OPERATION DATA	
Band saw – roller top distance	Max.1200 mm
	Min.45 mm
Distance between railsl	2220mm
Distance between rail and band saw	Min.300mm
	Max.1455mm
Bandsaw for/back move drive	Gear Motor
Bandsaw up/down move drive	Gear motor
Log rotator drive	Hydraulic
Log rotator up/down move drive	Hydraulic
Hooks for/back move drive	Hydraulic
Slab bar for/back move drive	Hydraulic
Roller up/down move drive	Hydraulic
Roller drive	Hydraulic
Bandsaw move speed	0 – 42m/min
Bandsaw up/down move speed	80mm/s
Bandsaw hydraulic tank capacity	60lt
Log handling unit hydraulic tank capacity	120lt.
ELEKTRİK ÖZELLİKLERİ	
Total power	37kW + 2,2kW + 4kW + 3kW + 11kW +2,2kW =59,4kW
Ana gerilimmains voltage	3 Faz 380-400 V 50 Hz
Control voltage	24 V AC DC Œ

1.3 FOOTPRINT

MACHINE INSTALLATION

Machine installation, adjustment and starting up require profession and because of that installation and starting up should be carried out by specialized personnel assigned by the manufacturer.

FOUNDATION BUILD UP

Customer must prepare a base on which to stand the machine.

For this purpose, the customer is given, prior to delivery, a foundation plan special to shape and working principles of the machine. In order to locate the machine foundation on the work floor, a layout plan is prepared approved by the customer by taking care on the customer needs; machine foundations shall be prepared according to this layout plan.

CONNECTION TO SUCTION UNIT

If the customer planned to remove the dust and chips output of the production by a suction unit, a dust pit is build up beneath the machine from where the suction will be done.

CONNECTION TO ELECTRICITY SUPPLY

Machine is wired for the voltage and frequency required by the customer. Machine must be fed by the 3 phase system and connected to earth wire. Customer shall cable up to defined locations on the layout and installed earth wire system prior to installation and startup. Cable specifications shall be chosen according to machine power and shall be connected to electricity power junction box.

2.0 TRANSPORTATION, INSTALLATION AND MACHINE CONNECTIONS

2.1 TRANSPORTATION

TRANSPORTAION OF UHYB AND EQUIPMENTS

In transportation, log handling unit and should be lifted via the transportation hooks installed to able a balanced lift. In order to parallel lift of the log handling unit, the movable parts should be positioned in the middle. In transportation proper steel guy for crane or forklift should be used capable to lift approximate weight of the log handling unit is min ~4500kg and bandsaw group is min ~4500.kg

The forklift, crane and steel guys to be used must be capable of carrying the weight.

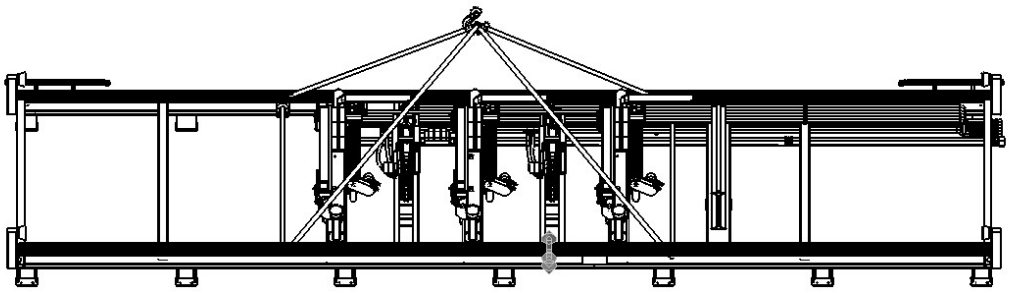


Fig 2.1

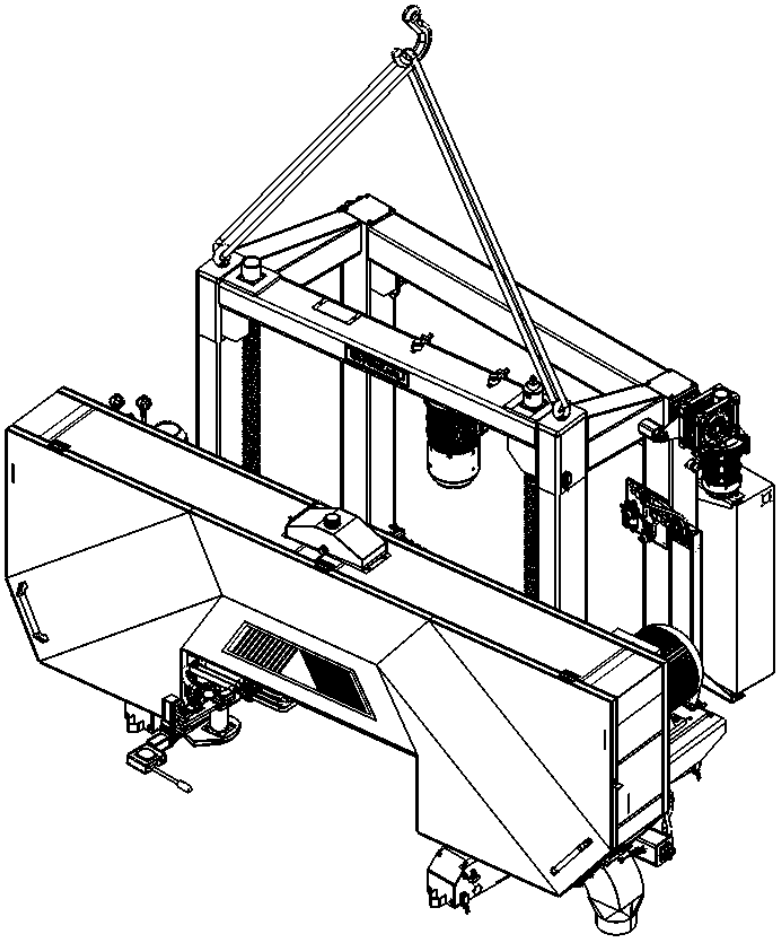


Fig 2.2

Transportation of the control panel

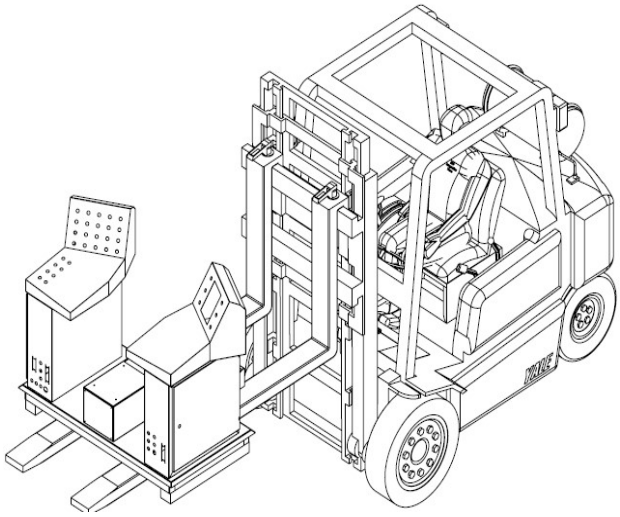


Fig 2.3

Control panel is transported by forklift capable to lift 500kg.

Transportation of hydraulic unit

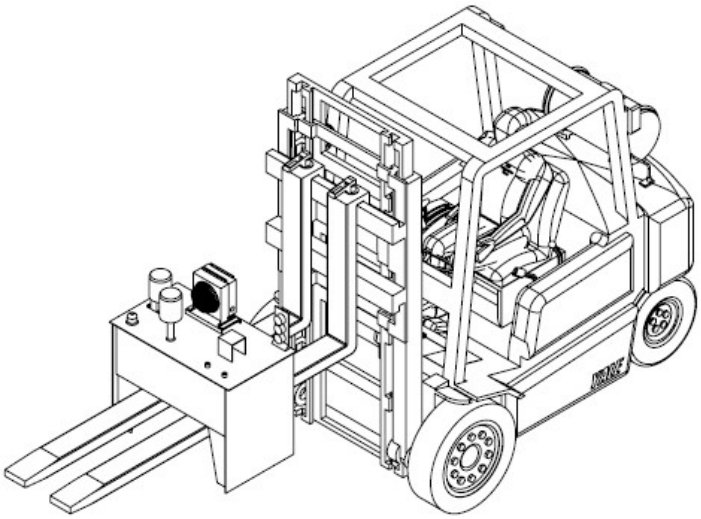


Fig 2.4

Hydraulic unit is transported by forklift capable to lift 500kg.

Transportation of the auxiliary parts

Weight of auxiliary parts are given in packing list and should be transported by proper crane or a forklift, using a steel rope.

2.2 MEASURES TO BE TAKEN IN STORAGE PERIOD

Machine should be stored before assembly in a dry medium. Profiles should be placed beneath the machine to cut the contact with the ground. Dust prevention may be done by covering with a texture or nylon material.

In case of a longer storage period, mechanical working surfaces should be protected by applying oil and should be checked periodically.

2.3. STORAGE AND OPERATING CONDITIONS

This machine is designed for operation in an environment at which the temperature range is between -10°C to +40°C, with a maximum humidity of 50% (RH).
Areas which may be subject to corrosion should be coated with protective material. This machine is designed to be operated in a closed area. If operated in places open to atmospheric effects, rain and humidity may cause corrosion on external surfaces.

Electronic tools must be protected from humidity. It must not expose to sunlight and heat generating resource.
If the machine will be stored for a long period without operation, ÜSTÜNKARLI factory should be called promptly (+90 232 782 22 68-69-70 or 0 232 782 13 90, servis@ustunkarli.com)

If the machine will be stored for a long period without operation, it should be lifted on chocks or skids, to prevent water entry. The storage environment for the machine must protect from effect of humidity.

USTUNKARLI can not be held responsible for damage due to operation in inconvenient storage and operating conditions.

2.4 INSPECTION FOR HAZARDS AFTER TRANSPORTATION

Log Carriage is shipped with the main chassis, cylinder assembly, operator seat, rope spools, guard plates, rails, and hydrostatic assembly disassembled.
ÜSTÜNKARLI cannot be held responsible for damages taken place after shipment from factory, such as during transport, unloading, or storage of the machine. The following points should be checked carefully:

- The presence of any visible damage
- The dismounted parts are undamaged and complete
- Rotator chains are complete and undamaged
- No damage exists in the control panel
- No damage exists in the electrical panel
- No damage exists in the carriage (Hydraulic unit, hose, pipe, valves and chains in the rotator group vs.)
- Drum and spools are installed properly

- Hydraulic unit is complete and undamaged
- Rails are complete and undamaged

In case of any missing or damaged parts, **ÜSTÜNKARLI** factory should be called **(+90 232 782 22 68-69-70 or +90 232 782 13 90** servis@ustunkarli.com**)** and Customer Services Representative should be notified. Otherwise, **ÜSTÜNKARLI** cannot accept any responsibility for subsequent damages.

2.5 CUSTOMER CONTRIBUTION TO INSTALLATION

1- Preperation of the foundation according to the given plan by USTUNKARLI.
2- Installation of power cable up to machine electric distribution panel.
3- Installation of compressed air system up to installation zone.
4- Appropriate lightening of the machine environment
5- Preparation of chip and dust suction system according to given data. Static electric in dust collection system shall be charged to earth potential.

In case of self installation, ÜSTÜNKARLI Service Department shall be called from telephones 0 232 782 22 68-69-70 or 0 232 782 13 90 or email address servis@ustunkarli.com.

2.6 DİSCHARGE OF CHIPS AND DUST

Dust will be sucked from suction opening on the machine and/or dust pit beneath the machine. In the dust pit, guiding of the dust through the suction hole will increase the suction efficiency. Dust suction pipe and hole elbows shall have large radii for dust pile prevention.

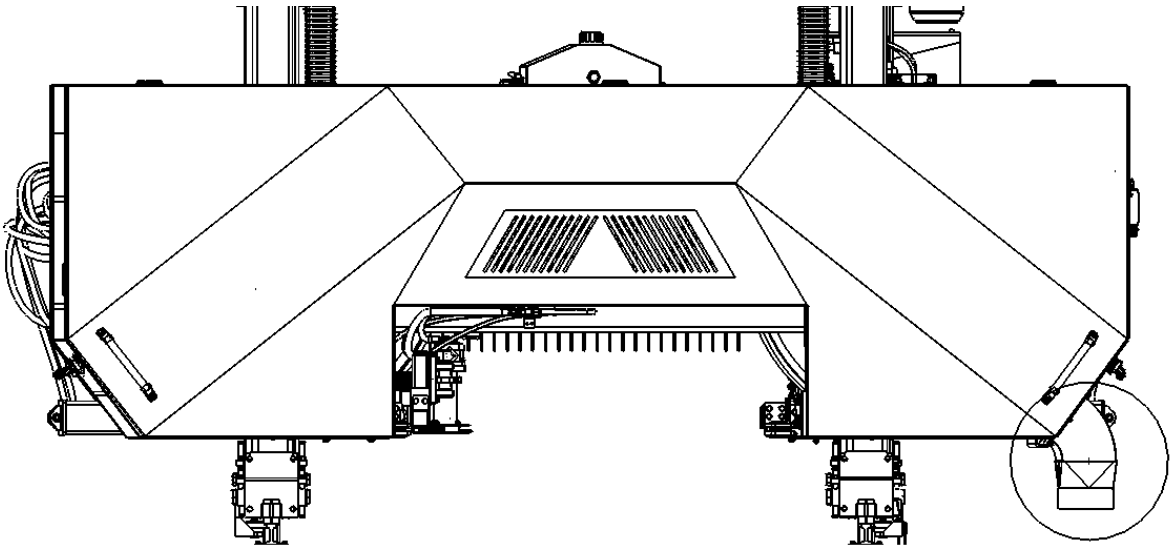


Fig 2.5

2.7 ELECTRICAL HARDWARE

Machine energy feed should be done by qualified personal in cooperation with USTUNKARLI and according to electrical project given.

2.8 DISPOSAL OF WASTE AFTER INSTALLATION

After installation of the machine, waste material around machine and working zone should be disposed in a environmental conservative procedure.

3.0 GENERAL DESCRIPTION OF THE MACHINE

3.1 GENERAL VIEW OF MACHINE

General view of UHYB

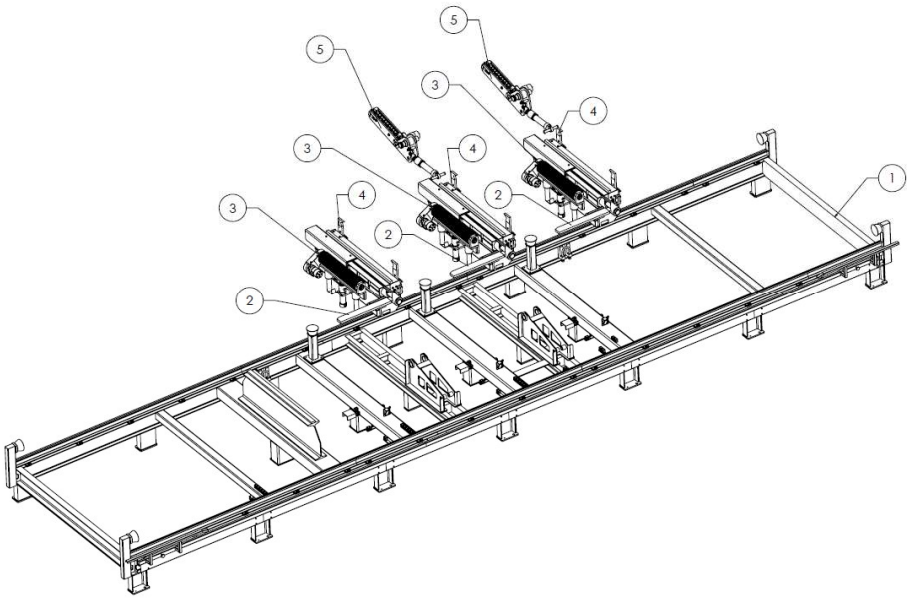


Fig 3.1

1. Chassis
2. Log support group
3. Log move group (İFor/back, up/down)
4. Log clamping hook group
5. Log rotator group

General view of **UYHB**

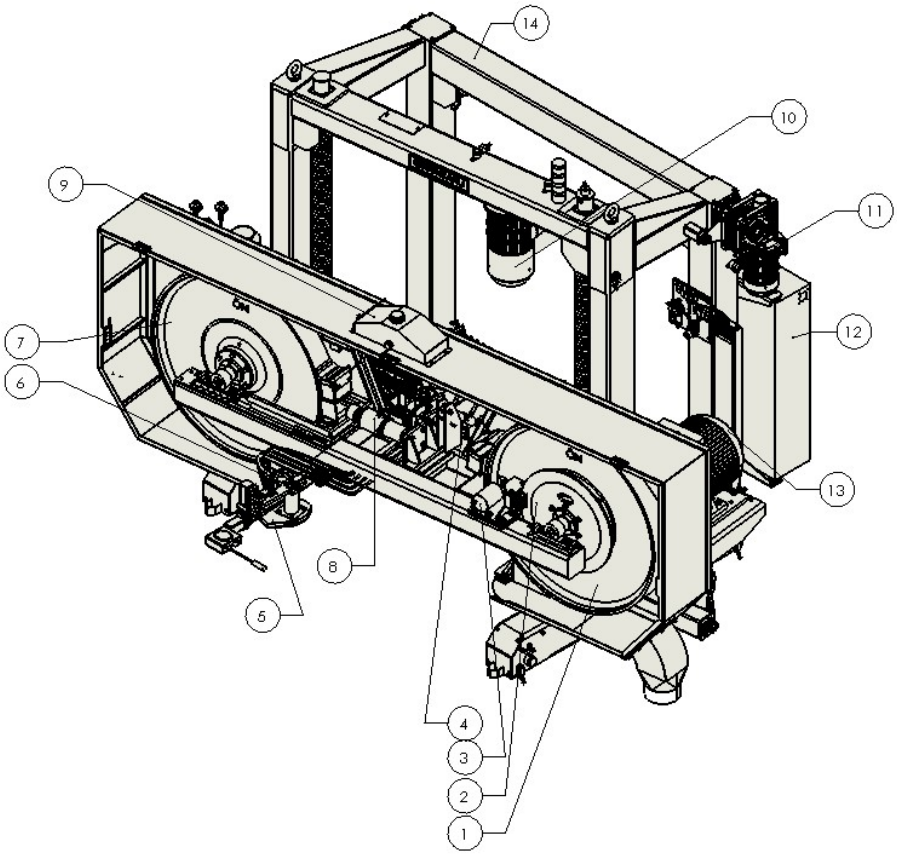


Fig 3.2

1. Driven Wheel group
2. Brake diski
3. Brake group
4. Timber separator cylinder
5. Scoring unit (optional)
6. Scoring unit cylinder
7. Free Wheel group
8. Wheel tensioning cylinderi
9. Fuel container
10. Bandsaw up/down move motor
11. Bandsaw for/back move motor
12. Electric box
13. Bandsaw main motor
14. Bandsaw chasis

3.2. INTENDED USE OF THE MACHINERY

The production, material selection and assembly of the UHYB Horizontal BAndsaw Machine which is steel construction, is realized with a great care and under the control of qualified personal. It is produced considerably tough and rigid applying the latest standards and precise dimensions.

Horizontal movable bandsaw is remote controlled. Log is loaded to carriage one by one. There are log rotators on its head blocks which help to right position and align of logs. There are log rotators on its head blocks which help to right position and align of logs. Reciprocating motion of the bandsaw on the rails is driven by an electric motor.Control of motion is done via joystick on control panel. Adjustment of cut width is done by vertical motion of bandsaw. Logs are cut in planned patterns by operator's optimization by rotating the log.

Bandssaw is movable and the logs has to be positioned and fixed by the handling units. Band saw is mounted around the wheels and tensioned via hydraulic or mechanical means according to type used. Band saw tooth characteristics, sharpness and tension is very effective to saw performance. Sawmill always saws with the adjusted installation and quality of saw only differs with the means mentioned above. Band saws are selected according to characteristics of wood.

You can find the required maintenance and lubrication operations this manual.

Operators control panel should be installed away from sawmill and log loading unit. It is seriously dangerous to close to sawmill while the wheels are running. Customer should build fences around sawmill, log carriage and log loading unit to prevent closing of persons while the blades are running as guided in this manual.

3.3. EMISSION OF NOISE AND HAZARDOUS SUBSTANCES

While operating band saw intensity of sound is higher than effective value (Leq=85 dB). Operators and personal who are at the sawing area must wear ear protector.

There is no chemical emission out off the machine. In case of loss of the labels on the machine, please contact with ÜSTÜNKARLI for new ones.

3.4. ESSENTIAL HEALTH AND SAFETY MEASURES

For personal safety, warning labels are located on the machine. Operators must confirm these warnings during installing, operating, maintenance and lubrication operations.

For safety operations these terms must be completed.

- Saw dust suction must be activated before operation.
- Do not operate without the protective covers on.
- Working area must be enough lightened.
- After operation main motor must be stopped.
- Operation, adjustment, lubrication and maintenance of the machine must be done by authorized persons.
- Maintenance and lubrication must be done periodically.
- Automatic lubrication unit terms in instruction manual must be applied.
- Do not operate with faulty encoder, safety switches, and emergency stop buttons.
- Check the sawdust suction and hydraulic connection pipes.
- V-belt assembly and tension of the belts must be checked.
- Band saw adjustment and maintenance terms in instruction manual must be applied.

OPERATOR TRAINING

Operators undergo training:

- Operating condition
- Safety operation rules and risks
- Appropriate band saw and tensioning
- Maintenance and lubrication

WARNING LABELS

In case of operator do not use or conform warning labels occupational accident is appeared.

 **Use of protective gloves** is required during sawing operation. While using sharp and drill tools protective gloves must be used.	 **Use of a mask** is required in order to avoid the dust caused by the cutting operation.
 Since the noise level is high, **use of ear protectors** is required while sawing.	 **Use of an eye protector** is required to avoid saw dust and flying wood particles while sawing.

Fig 3.3

	**ATTENTION!** **OPERATOR MUST CONFORM TERM** **INDICATED IN INSTRUCTION MANUAL**
ATTENTION! **KEEP YOUR HANDS AWAY FROM** **THE GEARS DURING OPERATION!** **DO NOT OPEN THE PROTECTIVE SHIELD!**	
	**ATTENTION!** **KEEP YOUR HANDS AWAY FROM** **ROTATING PARTS DURING OPERATION!**
ATTENTION! **PROTECT YOUR BODY FROM FLY OUT PARTS** **FOR IMPACT RISK!**	
	**ATTENTION!** **KEEP YOUR HANDS AWAY FROM THE** **SAW DURING OPERATION!**
ATTENTION! **KEEP YOUR HANDS AWAY FROM THE** **MACHINE IN SPITE OF CUTTING DAMAGE** **DURING OPERATION!**	
	**ATTENTION!** **HIGH VOLTAGE**

Fig 3.4

3.5 ESSENTIAL SAFETY PRECAUTION SUPPORTED BY THE CUSTOMER

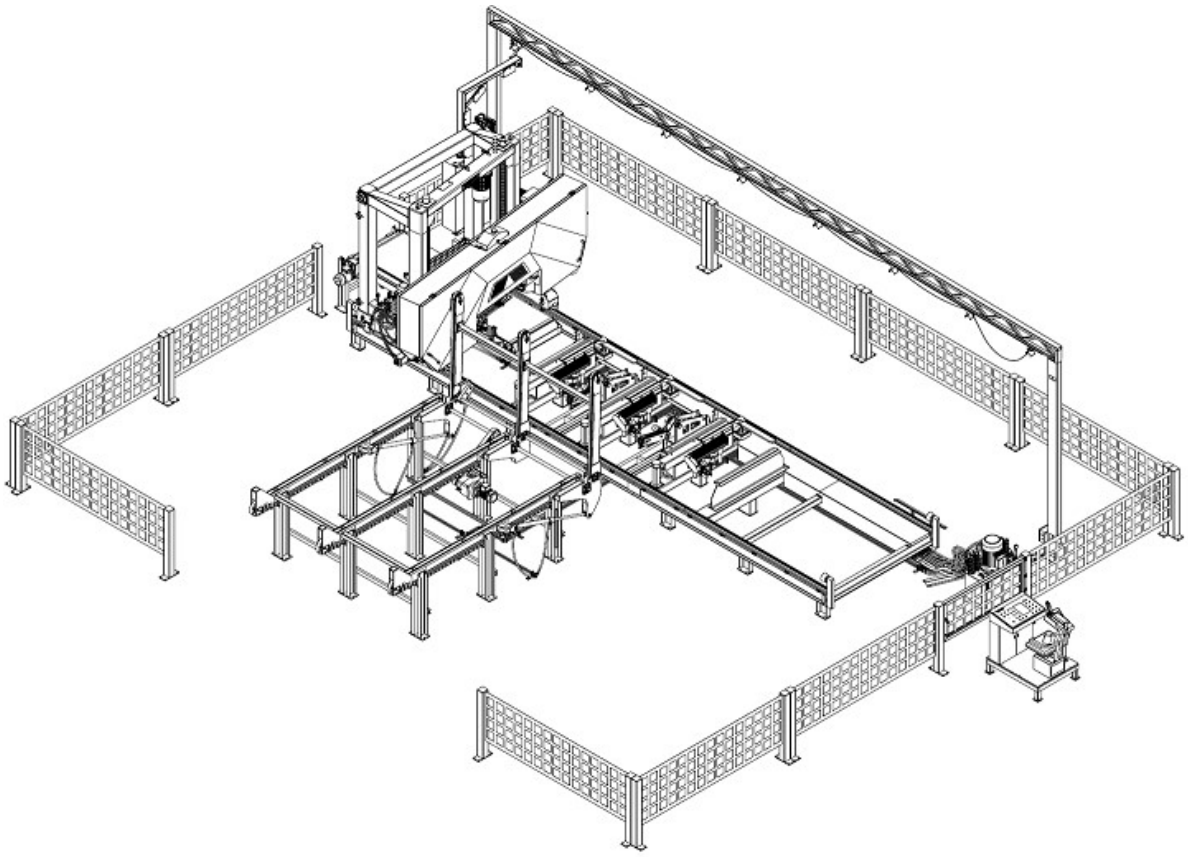


Fig 3.5

Fix and movable guards

A perimeter fence has to be built by the customer to prevent access to moving parts of the horizontal bandsaw as well as loading and unloading zones.

Access to the path of the moving head rig shall be deterred by a deterring/ impeding device at a height of between 1,0 m and 1.2 m sited at least 1.4 m from the danger zone, or by a fixed guard.

For all machines where movement of the head rig and/or any other feed mechanism, for example a conveyor, access to dangerous moving parts shall be prevented until all dangerous parts have come to rest, e.g. by means of a perimeter fence of minimum height 1,8 m. All access gates within this perimeter fence shall be interlocked with guard locking. The safety related control system for interlocking shall be conditional unlocking. In case of openings on the perimeter fence, if reaching distance to dangerous zone is more than 200mm, the square mesh opening shall be maximum 40mm x 40mm, if more than 850mm, the mesh opening shall be between 40mm and 120mm. All access gates within

this perimeter fence shall be interlocked with guard locking (access to dangerous moving parts shall be prevented until all dangerous parts have come to rest).

The safety related control system for interlocking shall be conditional unlocking according to Table 1 of EN 1088:1995+A2:2008. All other openings in the perimeter fence, e.g. infeed and outfeed, shall conform to Table 4 of EN ISO 13857:2008.

Interlocking switch for door in fence will be supplied by Üstünkarlı and will be activated during installation. If the customer does not prepare the required guards and fence before installation period, Üstünkarlı cannot activate the switches and is not responsible for possible harms related with safety.

In the figure, a sample demonstration for perimeter fence building. Unless it is not stated in contract, Üstünkarlı is only responsible to supply the machinery and related equipments for production line. For safety issues and activation of locking mechanism, customer must contact with Üstünkarlı.

NOTE: Safety standards may vary for different countries. Customer is responsible to apply required safety issues.

Operator seat must be in the same line with the Band Saw.

It is forbidden to enter the safety operation area. Fences must be built around these zones with height of minimum 1.2m.

3.6. MACHINE SETUP

3.6.1 Horizontal bandsaw installation

Horizontal bandsaw work needs precise adjustment so, the installation of the machinery should be carried out only by profession personal assigned by Üstünkarlı.

3.6.2 Preparation of machine foundations

Customer is responsible to prepare machinery foundations prior to installation detailed in plans.

For this purpose, foundation plans beneath the machinery and moving line are delivered to customer prior to installation. Any alteration to the base required by customer, according to particular needs, can be done provided that the end result coincides with the requirements of our plans.

The concrete to be used in foundations shall be reinforced; the stopping blocks at the end of the carriage tracking line shall be strong enough to prevent carriage going beyond the line.

3.6.3 Connection to suction unit

Dust and chip discharge is in customer issue. If customer choose to stock the chips in a pit, customer has to build a pit beneath the machine according to supplied plan and regularly discharge the stock. If a suction system is chhosen, the suction line and has to provide the below data.

ASPIRATION Hız (30 m/dk)	
Ø(mm)	Hava Akımı (m/saat)
200	5280
Emiş Kaybı	3720
Ortalama Talaş Atığı	0,8-1,3 m^3/saat
	6,4-10,4 m^3/gün

Fig 3.7

3.6.4 Connection to power supply

Machine is wired for the voltage and frequency with the customer requirements.

Customer shall install cables that satisfy the machine power requirements given in technical data up to determined zone by the producer in the work floor. Machine must be fed by three phase electricity, earth wire must be installed to suitable locations and earth wire shall be connected to terminals colored in green and yellow in the electric terminal box.

3.6.5 Connection of pressured air

There is a brake system connected to bottom Wheel on the saw mill for emergency stopping cases. Brake system works with 6 bars pressured air. Customer shall install pressured air line up to the machine connection point and must provide disconnected supply of pressured air in work life.

4.0 OPERATION AND ADJUSTMENT INFORMATION

4.1 BAND SAW REPLACEMENT

During the installation of the band saw the main switch should be set to position '0'.

Gloves and eye protector must be used when installing the band saw. Due to the length of the band, this procedure should be applied by two authorized personnel.

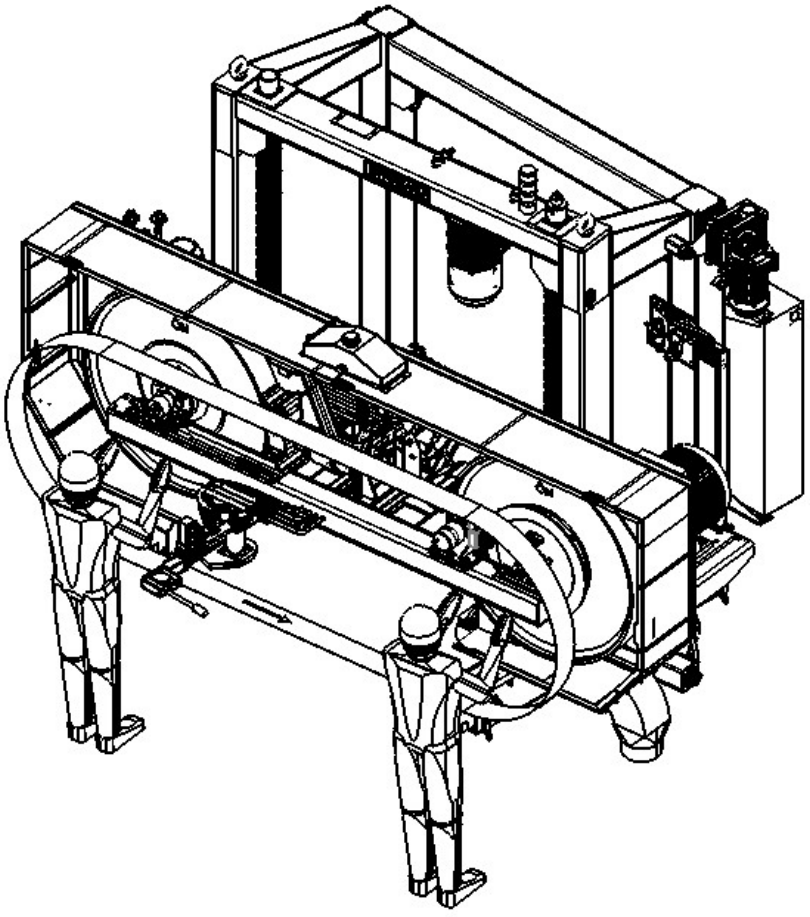


Fig 4.1

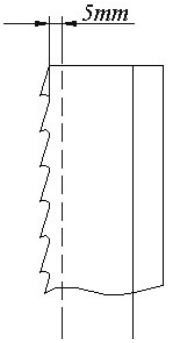


Fig 4. 2

Blade adjustment: The distance between blade and the wheel should be between 3-5mm after adjustment by wheel inclination.

The value shall be read on the manometer calculation is given in the 4.1.4 Band Saw Tensioning Tables. The strength value to be used in reading these tables shall be requested from blade suppliers.

4.1.1 UHYB Bandsaw Blade Replacement

Manual work of blade tensioning cylinder: Bandsaw blade elong by time in process and loosen on wheels. When blade loosen, tension pressure drops, in this case, operatör has to adjust the tension pressure via button inside the machine cover to the proper pressure by reading the value on the manometer. After a period of work, blade tips are eroded. In this case, the blade has to be replaced with a sharpened one. Machine power has to be off for blade replacement.

Blade replacement procedure:

- Main cover is opened and blade tension is removed via tensioning button on the machine.
- Eroded blade is taken away and the sharp one is placed. New blade is tensioned up to the value determined on the tensioning tables.
- Main cover is closed and locked.
- Bandsaw motor is run for 5 seconds and stopped.
- Main motor is powered off, cover is opened and the extension of blade tooth gullet base from wheel edge is measured. 3-5mm extension is proper for sawing. Tension pressure is checked.
- Cover is closed and process can be started.

In case of different extension value other than 3-5 mm, operator shall apply for machine adjustment maintanence**.**

4.1.2. Band Saw Tensioning Tables

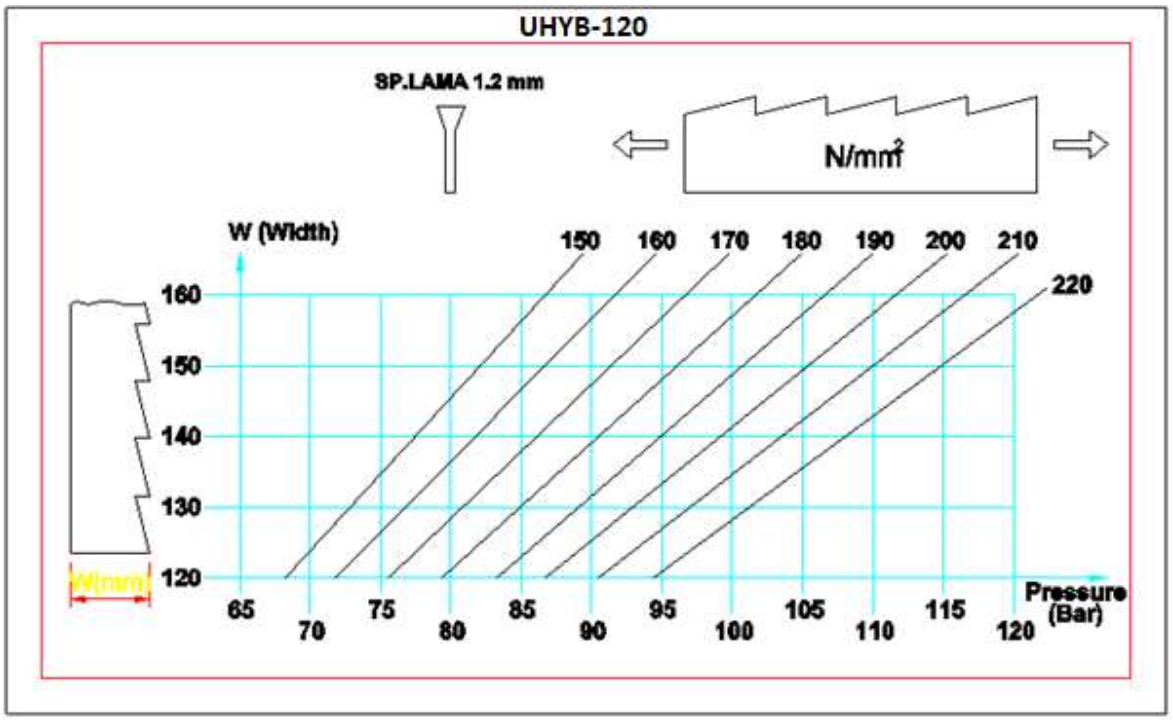


Fig 4. 3

Band saw pressure adjustment

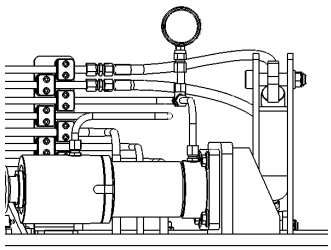
In order to follow above indicated diagram and determine a strain force (N/mm^2)

Measure blade width.

Contact blade manufactures to find out blades yield strain used. (The normal strain is 150-175 N/mm^2, while high strain blades' strain is about 175-220N/mm^2)

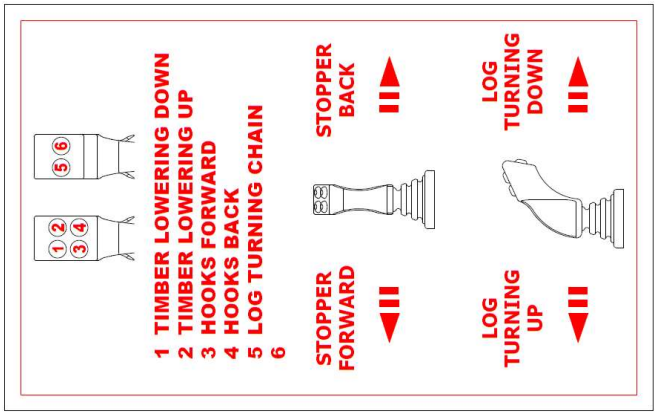
Tension pressure in the table is the intersection point of blade width and yield strain of blade.

Pressure values are read on the manometer on the machine.Blade tensioning is done by hydraulic power Blade manufacturers' recommendation must be followed; values can be different for band saw brand.



4.2 DESCRIPTION OF CONTROL SYSTEMS

Horizontal mobile band saw control panels



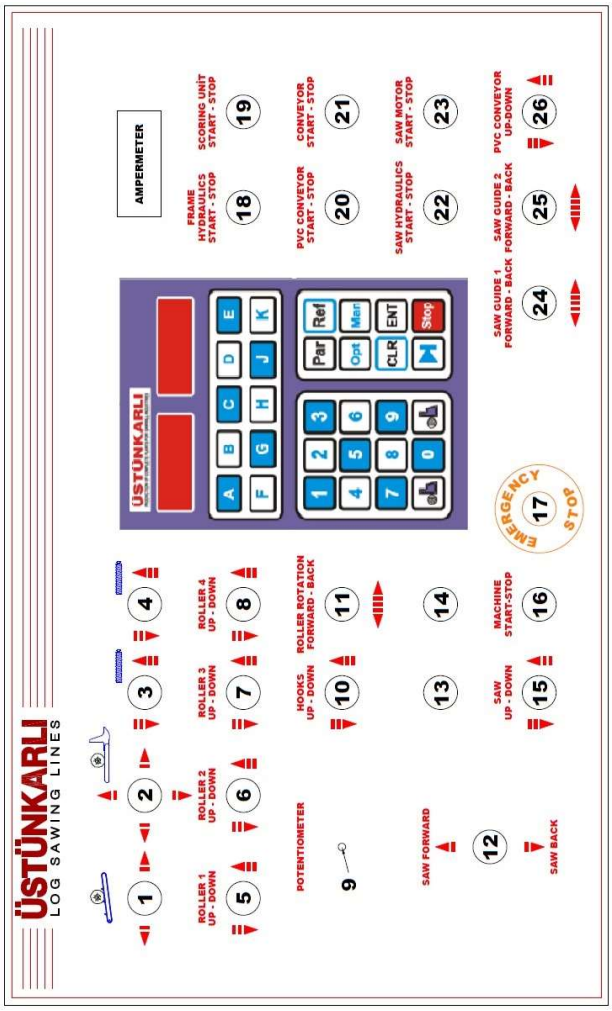


Figure 4.2.1

Movement Control Panel

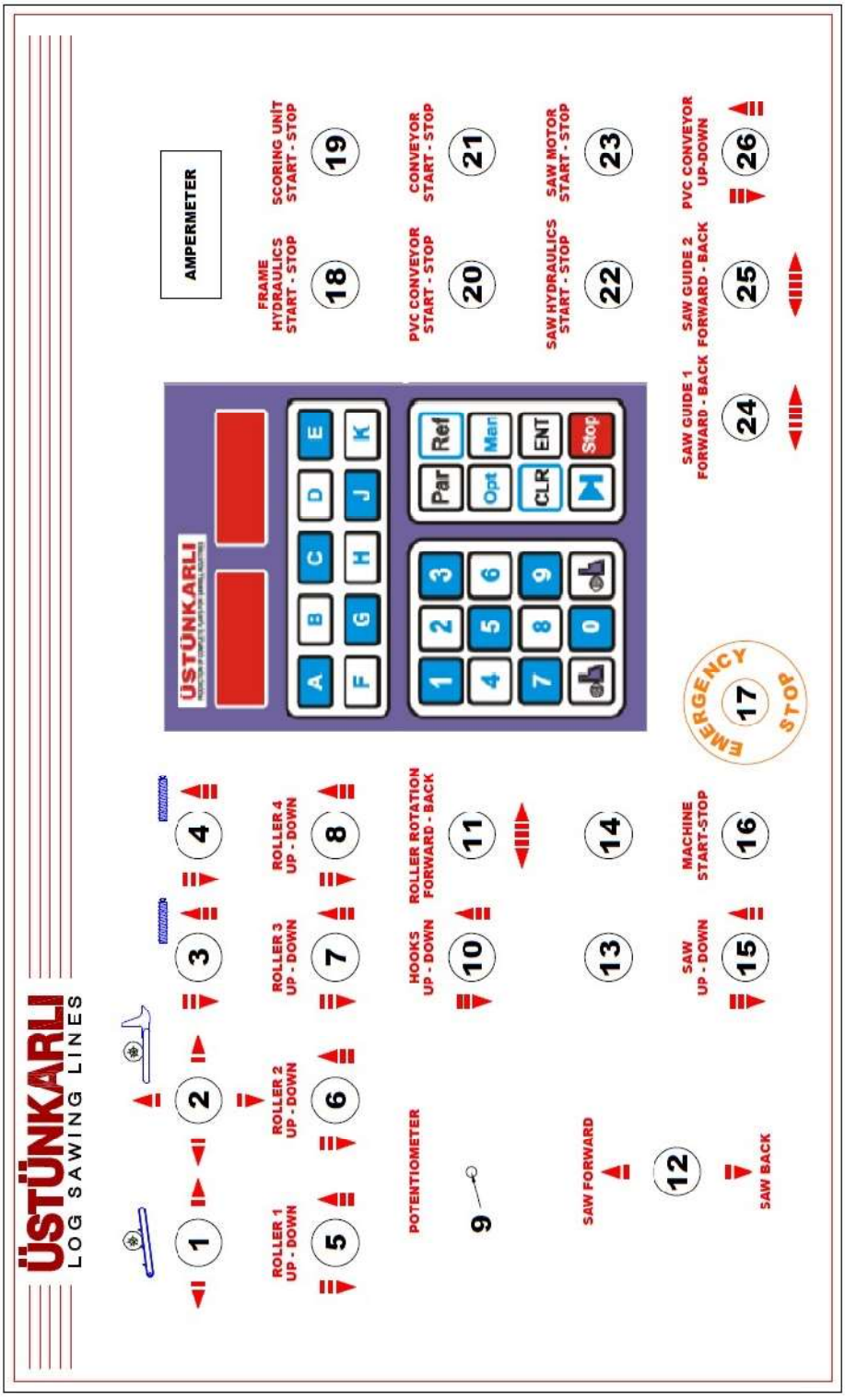


Figure 4.2.2

Functions of the buttons

1- Horizontal log transport conveyor right/left move joystick
2- Log loading conveyor right/left and up/down move joystick
3- 1. Conveyor separator up/down joystick (optional)
4- 2. Conveyor separator up/down joystick (optional)
5- 1. Alignment roller up/down joystick
6- 2. Alignment roller up/down joystick
7- 3. Alignment roller up/down joystick
8- 4. Alignment roller up/down joystick (optional)
9- Saw forward/backward move speed potentiometer
10- Hooks inside/outside move joystick
11- Rollers forward/backward rotation move joystick
12- Saw forward/backward move joystick
13- Cutting without dropping timber
14- Null
15- Saw up/down move joystick
16- Machine start/stop switch
17- Emergency stop button
18- Log positioning group hydraulic unit motor start/stop switch
19- Scoring saw hydraulic motor start/stop switch
20- Band conveyor motor start/stop switch
21- Succeeding conveyor motor start/stop switch (optional)
22- Saw hydraulic unit motor start/stop switch
23- Saw motor start/stop switch
24- 1st Saw guide forward/backward move joystick
25- 2nd Saw guide forward/backward move joystick
26- Band conveyor up/down joystick

Movement Joystick

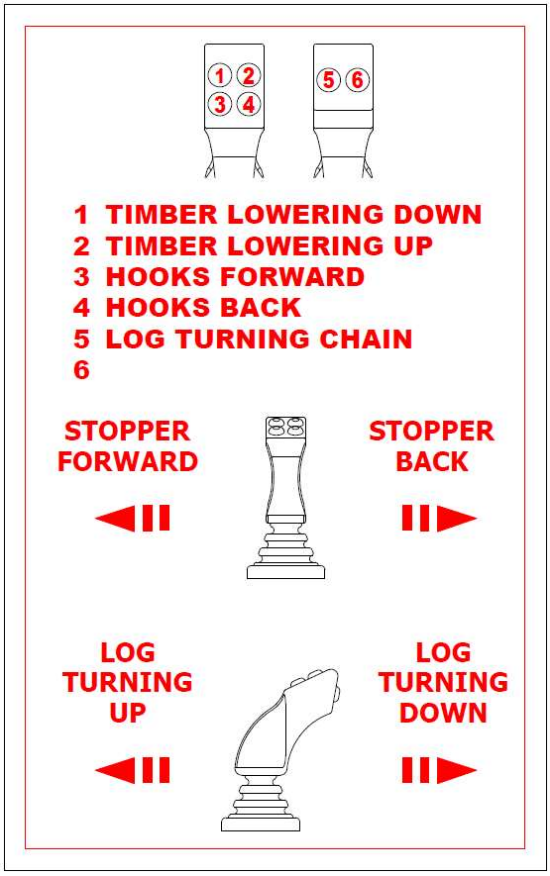


Figure 4.2.3

4.3 FIRST OPERATION OF THE MACHINE

The machine has been coated with protective chemical on its flat surfaces after mounting and prior the exiting the factory in order to protect from rust. These can be removed using a cleaning material.

Below controls must be done before operation:

- Check the electric connections and direction of the saw blade. Check the hydraulic unit oil level. Control the hydraulic connection pipes leaking; check the safety operation pressure on the hydraulic schema.
- Check the proper fixing of sawmill motor on its place.
- Clean the carriage rails.
- Check the status and tension of V-belts.
- Check the fueling unit level.
- Check the tension of the band saw (teeth must be correct sharpened)
- Check the sawdust suction outlet and saw dust suction system pressure.
- Close the safety covers and activate the safety switches.
- Operation area must be tidy and suitable for safe work..

Following These Controls the main switch is set on;

- Start the hydraulic unit motors.
- Adjust the blade tension.
- Close the bandsaw cover; safety switch will be on.
- Check the movement of bandsaw on rail in slow motion.
- Check the vertical move of the bandsaw in slow motion.
- Check the work of rotators, support arms and hooks,
- Load the first log on the carriage, position the log by rotators.
- Clamp the log by hooks.
- Measure the dimension of the log and set the distance between log and saw band guide.

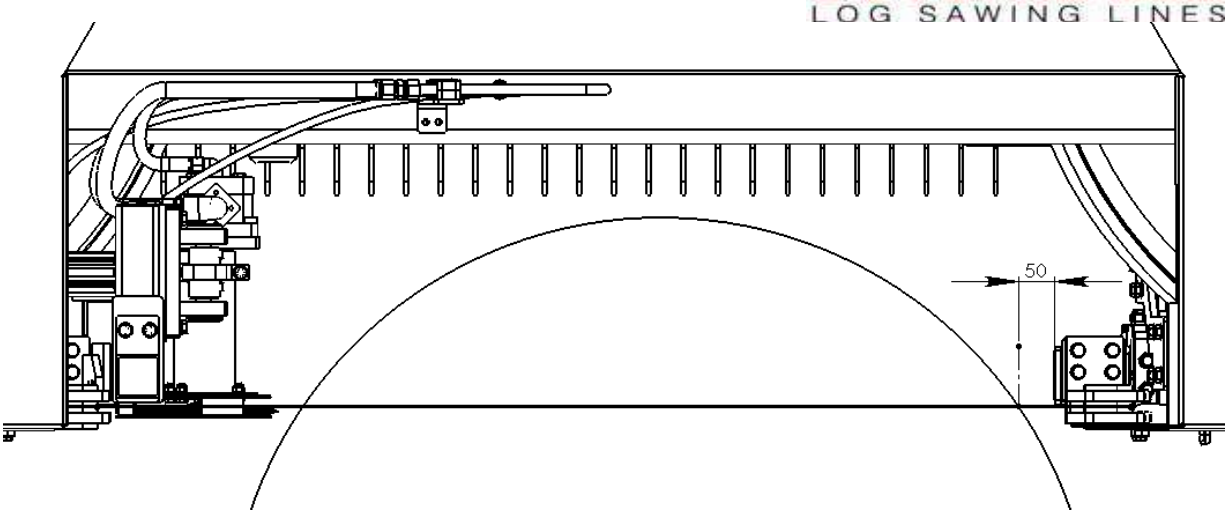


Fig 4.7

Distance between log and Saw Band Guide must be ~50mm, otherwise log hit the Band Saw. If operators do not adjust distance between log and Band Saw guide, MACHINE IS NOT COVERED BY WARRANTY.

4.4 STOPPING MODES AND DEVICES

4.4.1 SAFETY AND OPERATIONAL SWITCHES

Removing or repositioning the safety switches or encoder is strictly forbidden.

- There are installed four switches on the bandsaw for safety for/back move. Two of them are to limit for move and other two are to limit back move. First rear limit switch is on if the bandsaw close to rear end and it slows the motion. Second limit switch stops the motion. In the for move the same limitation ocur. These switches protects the impact of bandsaw tol ine ends by stopping the move in steps.

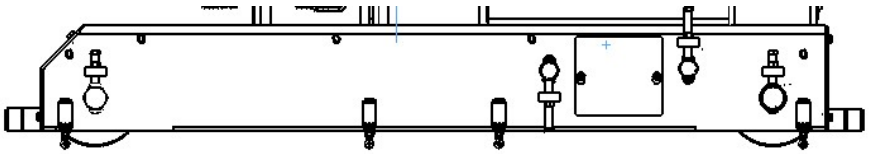


Fig 4.8

- There are installed two limit switches on coloums to limit up/down motion of bandsaw.

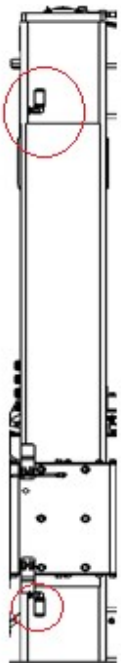


Fig 4.9

- There installed damper block at ends to prevent bandsaw exit the rails because of mulfunction of switches and operatör fault.

- There is installed a magnetic switch on machine cover and prevents machine to run when the cover is opened. It keeps locked until the motorsa re completely stop and permits to open the cover afterwise. It blocks opening of the cover while machine is running.

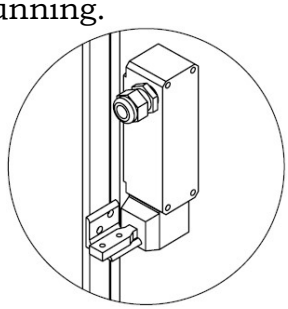


Fig 4.10

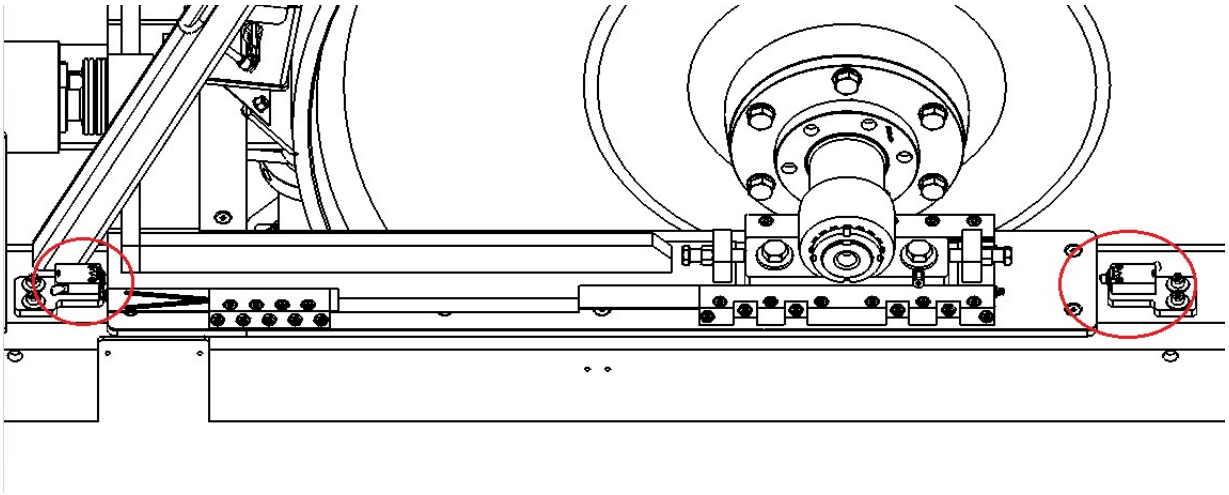


Fig 4.11

Wheel housing limit switch limits move of the housing for and back in tensioning.

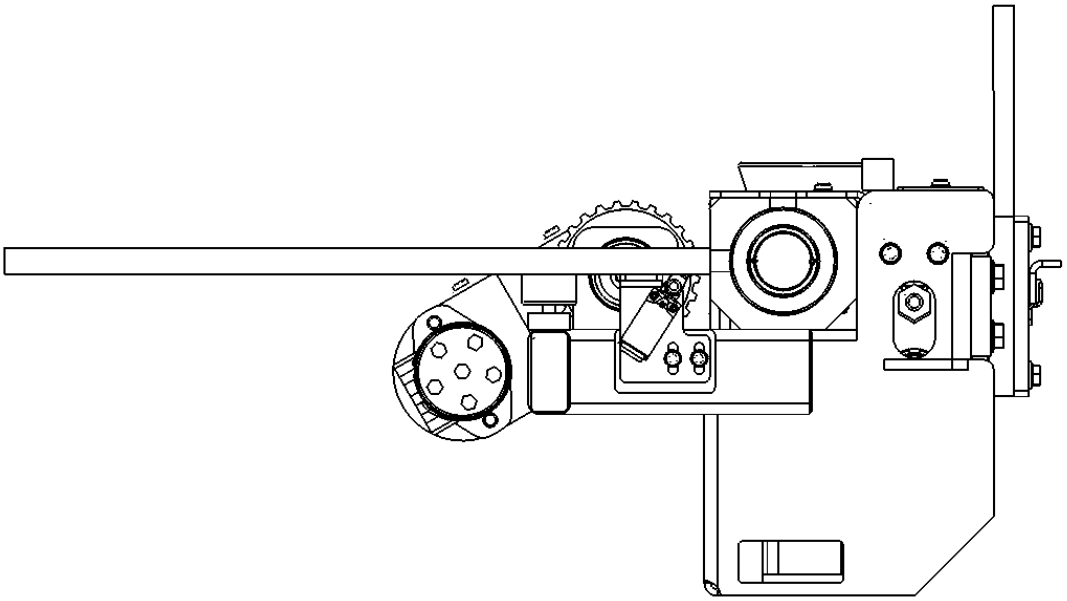


Fig 4.12

There are installed limit switches to control the position of the log support arms. There is switch on each arm. Bandsaw is prevented to move unless the support arm switch is activated. Also, it is not possible to load log, when the support arms are in rest position.

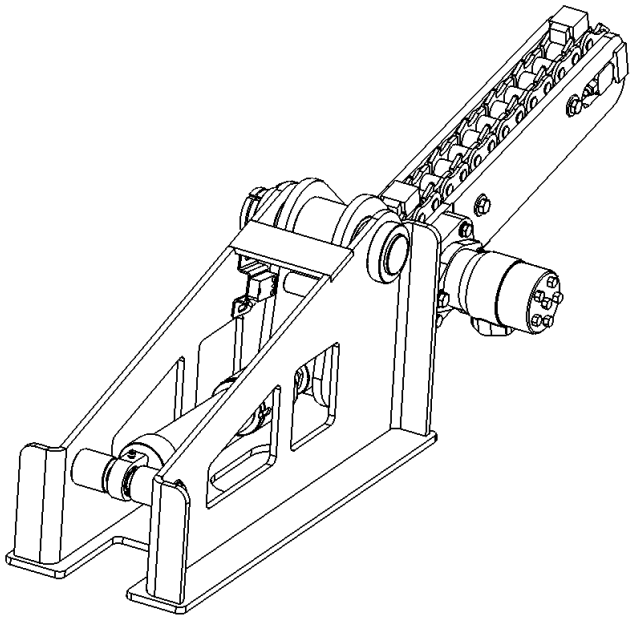


Fig 4.13

Rotator arms limit switches are used to confirm the arms are in rest or not. If the the arms are not in rest, it is not possible to load the log and the bandsaw is unable to move for or back. There are one switch for each rotator arms.

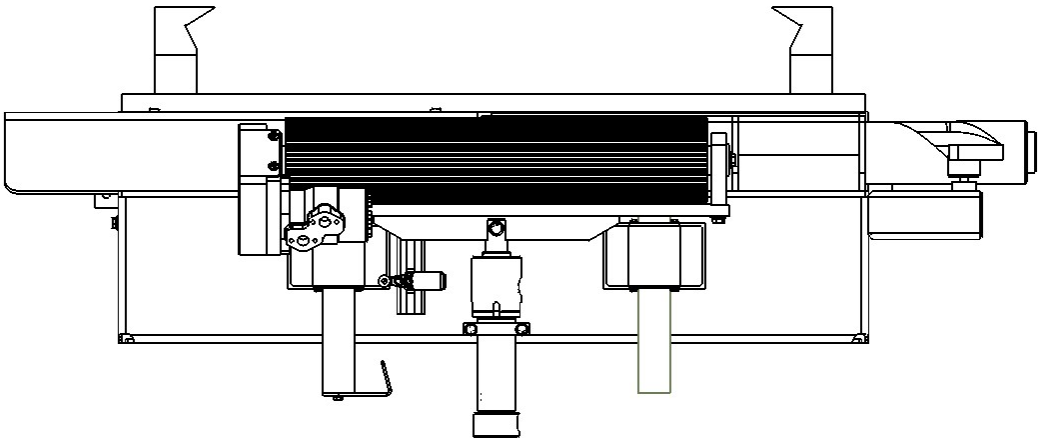


Fig 4.14

Thre installed limit switches beneath rollers to confirm the rest position of log for/back moving rollers. If the rollers are not in rest position, the saw dimension referance on the monitör is no longer valid. There is installed aone limit switch beneath each roller.

4.4.2 EMERGENCY STOP BUTTONS

There are 2 emergency stop buttons to cut off electricity in an emergency situation. These buttons (1-2) is located on the control panel and tensioning panel..

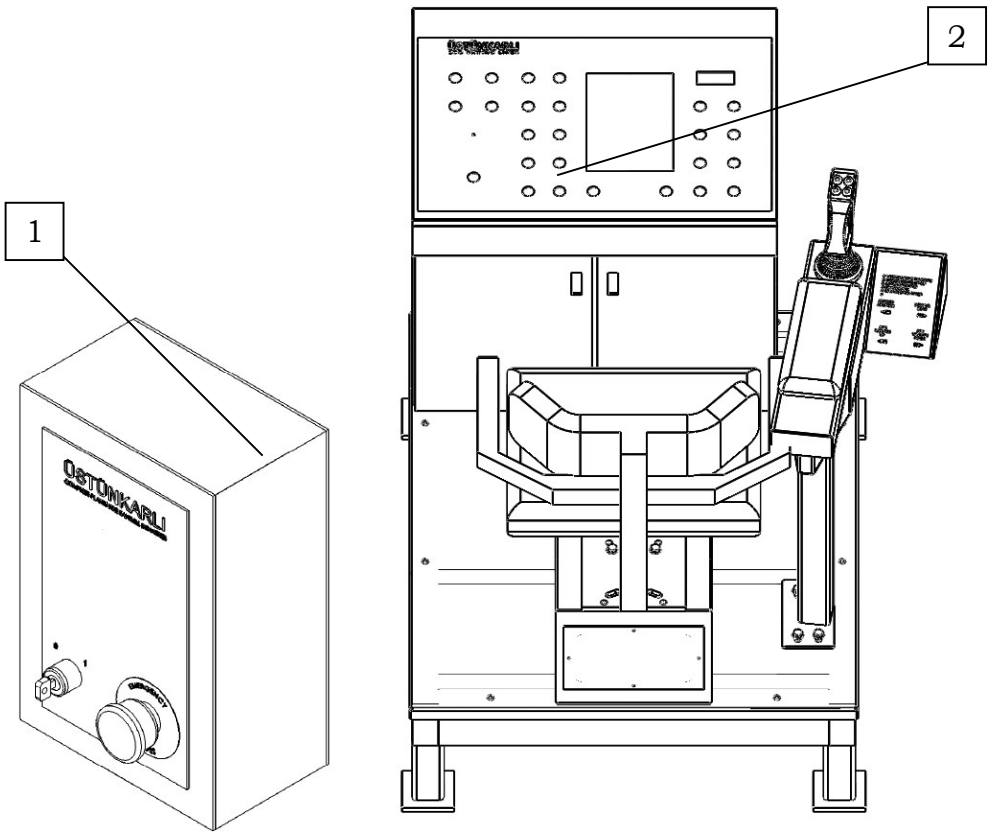
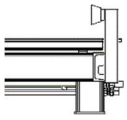


Fig 4.15

When the emergency stop button is pressed, the motors get off. The button must be returned to its previous position for restart is possible.

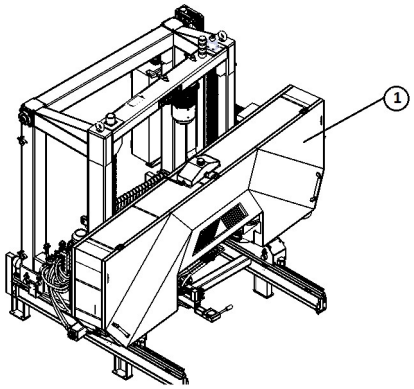
It is strictly forbidden to bypass emergency stop button or working or operating with faulty button.

4.5 PROTECTIVE DESIGN MEASURES



Rubber blocks on log handling unit ends reduces the impact force of bandsaw if control is lost and prevent bandsaw run off the rails. It is forbidden to operate without these blocks..

Fig 4.16



Blade is guarded against break by body guard (1). This guard prevents blade to rush out and give any harm to staff. There is a switch installed on the body guard which does not allow motor run if not closed.
.

Fig 4.17

4.6 WRONG AND ORDERLY APPLICATIONS

- Any other type of material (metal, ceramic tiles, marble, etc.) is absolutely disallowed. **ÜSTÜNKARLI** cannot accept any responsibility for accidents due to the incorrect operation of the machine.
- Log dimension and parallelism must be controlled. Log must be selected according to carriage and sawmill capacity.
- Unexpected materials (nail, metal parts and sharpened materials) must be taken out; otherwise **ÜSTÜNKARLI** cannot accept any responsibility for accidents due to the incorrect operation of the machine.

Do not feed more than one log on machine.

4.7 FAILURE DESCRIPTION, RECOVERY AND RESTART REQUIREMENTS

Table 4. 1 Possible saw blade problems

ERROR	REASON	SOLUTION
Unparallel saw line	High sawing speed Incorrect internal tension Blunted saw teeth Excessive forward speed Frozen wood	Check the internal tension Re-sharpen the saw Reduce forward speed Modify tooth form, reduce cutting and forwarding speed
Backlash on the saw	Incorrect welding at joint	Check weld point
Increase in sawdust gap	Vibration of saw Bad wheel balance Faulty ball bearing Rooked saw External effects	Check rotation of the wheel Replace ball bearing Replace saw Check of the machine generally
Blade moves back during cut	Insufficient sawdust angle Teeth damaged during cutting due to foreign material	Increase sawdust angle Use sharp blade
Saw slides back on the wheel	Cracked saw Backside of the saw curved Sawdust on wheel	Check and correct. Correct the saw backside. Clean wheel
Cracks on saw backside	Backside too short or excessive tensioning	Reduce the internal tension in the backside Release the tension after work has finished
Blade excessive heat	Guide adjustment incorrect Blade guide Insufficient crossing or hammering Soft wood and small tooth pitch	Readjust guide Check the blade, clean, never apply oil Repeat crossing or hammering Use the blade only to cut hard woods
Cracks in the middle of the blade	Imperfections in the blade form tensioning	Reduce the internal blade tension slightly
Cracks in tooth gullet bottom	Sharpened with a coarse stone Small gullet radius Burned gullet bottom during sharpening (sharpened using very hard stone) Excessive force has been applied to the blade Blade left in tension too much	Sharpen with a fine grade stone Select a radius suitable to the tooth form Sharpen with a soft stone Reduce the feed speed Release the tension after work
Cracks in the weld point	Very hard weld point Inappropriate welding method	Apply heat treatment until a cherry-red color is obtained
Timber surface very coarse	Uneven tooth crossing Blunt teeth Blade vibrating Cracked teeth	Check tooth crossing Use sharp blade Check tensioning Replace blade

5.0 MAINTENANCE AND LUBRICATION

5.1 LUBRICATION INSTRUCTION

Prior to launching the lubrication, the main switch must be set to position '0' for safety purposes. Lubrication must be done by authorized personnel.

5.1.1 Bandsaw Lubrication Points

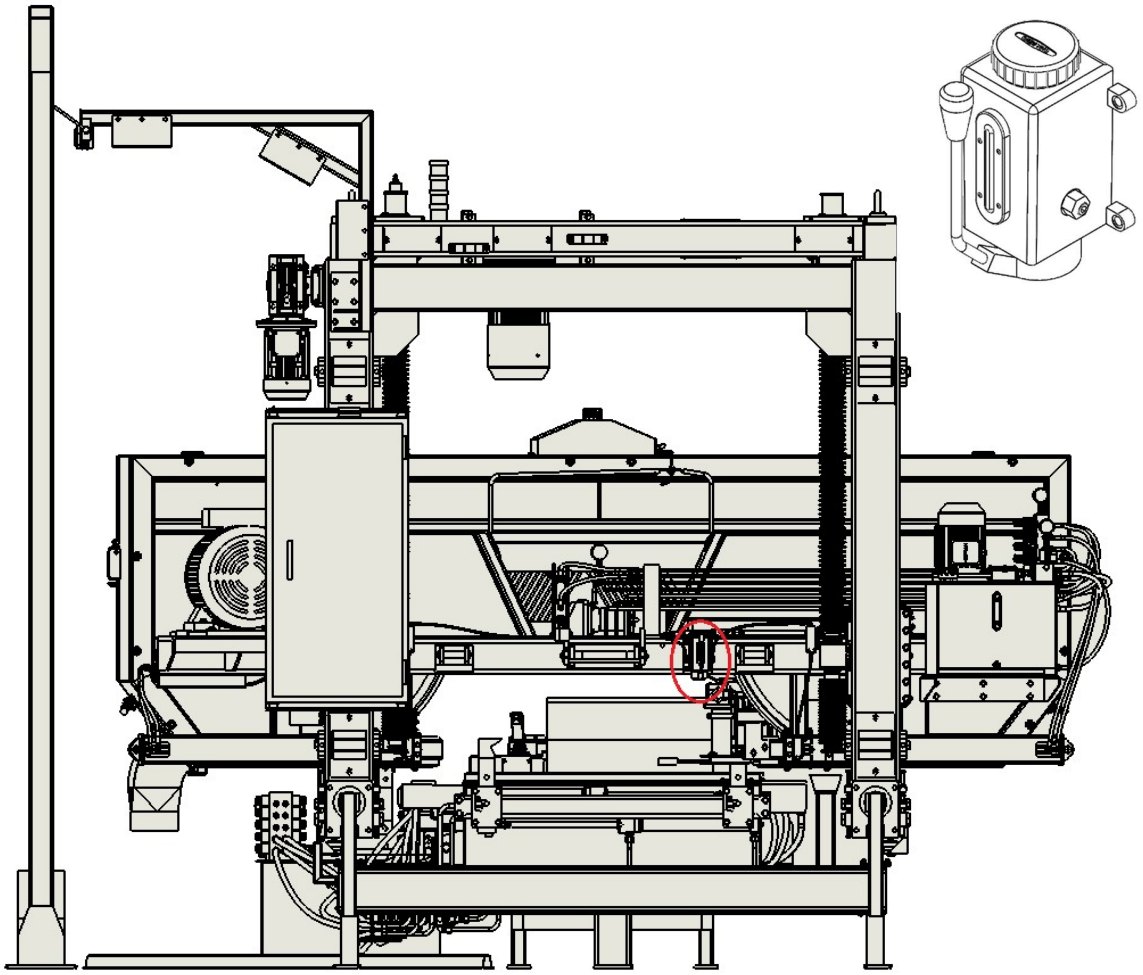
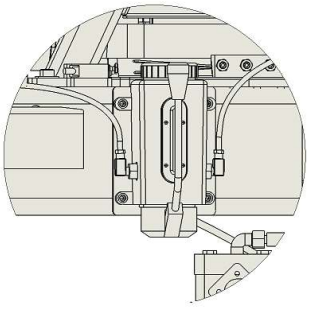


Fig 5.1



Bandsaw manual oil pump is on the machine shown in the figure. Lubrication is done by pulling down the unit arm 2 times in 2 hours working time. Before lubrication, check the pipes are full

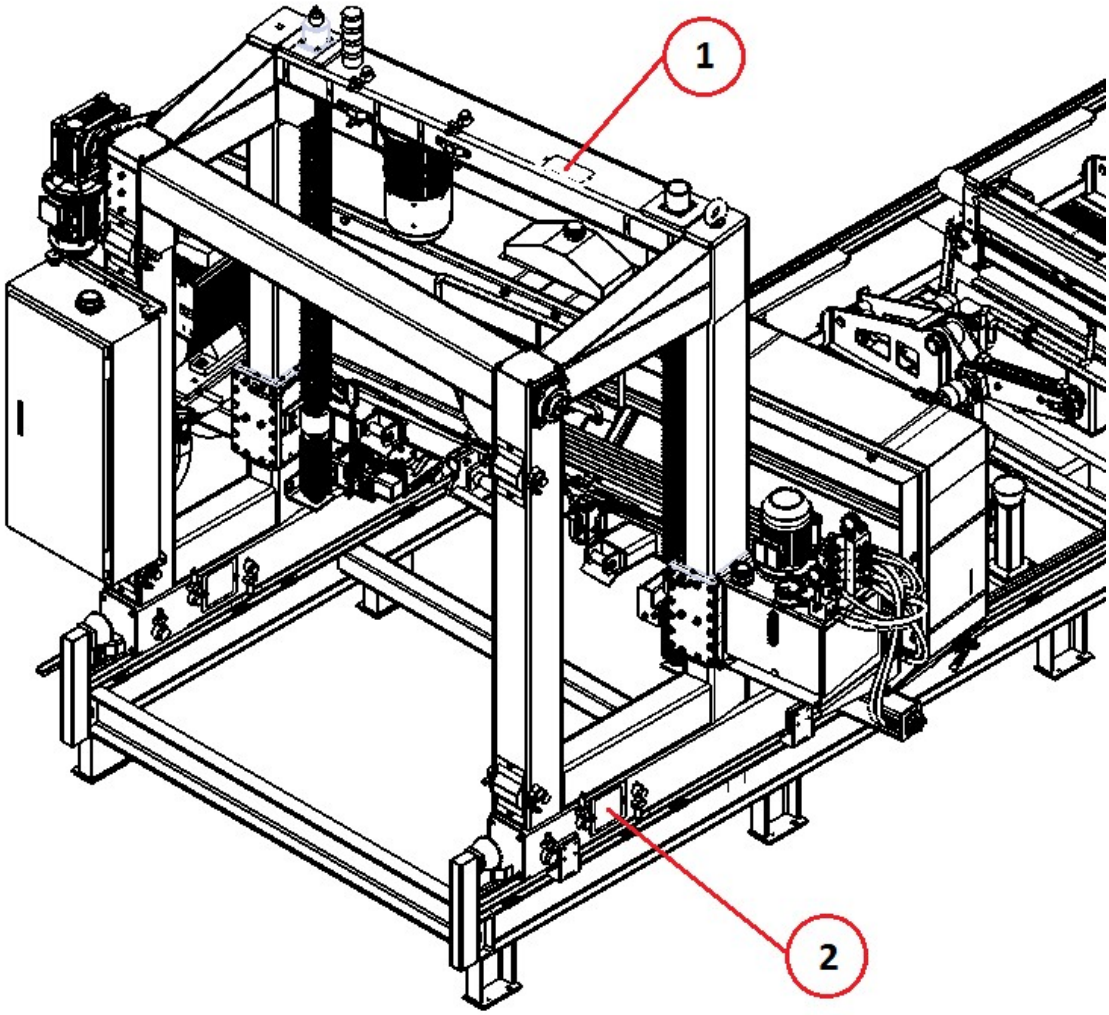


Fig 5. 2

Bandsaw drive chains shall be lubricated weekly by removing the related covers. Chain tension control is also done.

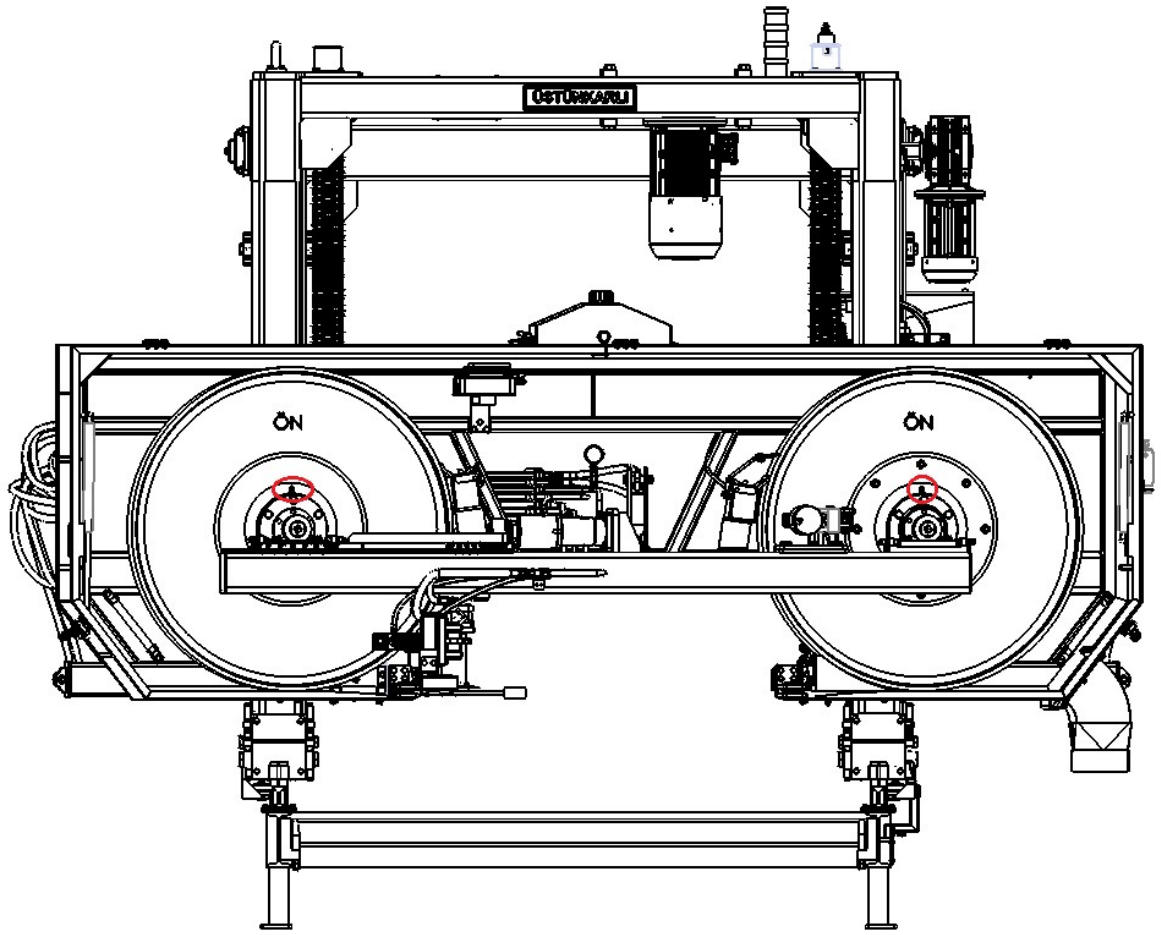


Fig 5. 3

Blade wheels should be lubricated in 2400 hours working time from the nipples shown in the figüre.

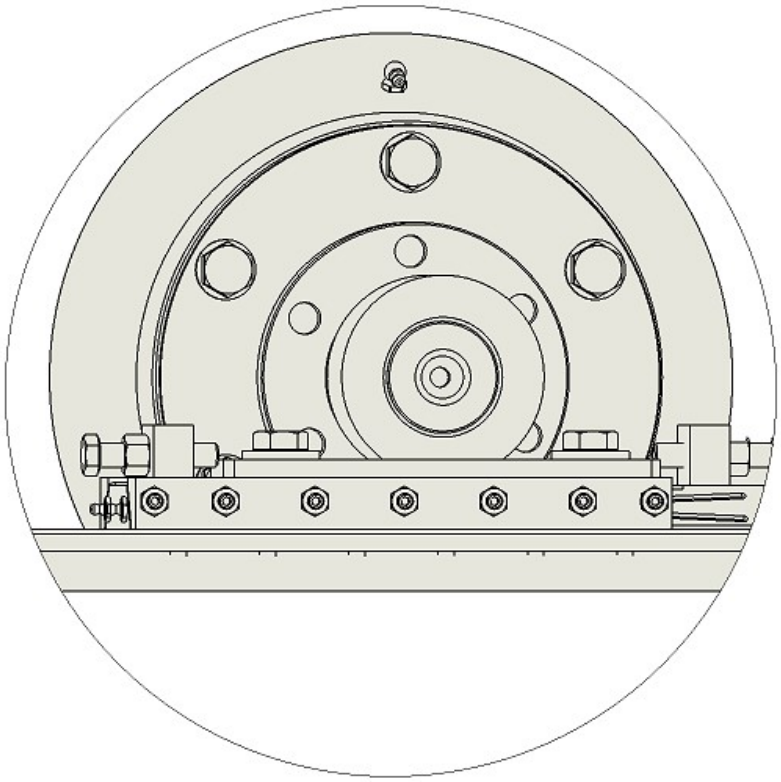


Fig 5. 3

5.1.2 LUBRICATION TABLE

Table 5. 1

symbol	Lubrication Points	SHELL	MOBIL	PETROL OFİSİ	CASTROL	BP	SAAT (TIME)	ÖLÇÜ (QTY)
▫	Lubrication unit	TONNAT 46	VACTRA OIL No.2	D 46	MAGNA BD 46	ENERGOL 46	8	Seviye kontrolü yapılmalıdır
▲	Bandsaw and log handling unit oil tank	WARM TELLUS 46 COLD TELLUS 37	WARM DTE 25	WARM HD 46 COLD HD 37	WARM HYSPIN AWS 46 COLD HYSPIN AWS 37	WARM HLP-HM 46 COLD HLP-HM 37		
▼	Conditioner	EXTREME COLD TELLUS32	EXTREME COLD DTE 24	EXTREME COLD HD 32	EXTREME COLD HYSPIN AWS 32	EXTREME COLD HLP-HM 46		
•	Wheel housings	ALVANIA RL 2-3	MOBILUX 3	SUPER GRES 3	SPHEEROL AP-3	ENERGREASE LS-3	2400	UHYB= 60g

5.2 MAINTENANCE INSTRUCTIONS

Before proceeding with maintenance on the machine, the main switch must be brought to '0' position. All maintenance operation must be done by authorized personnel.

In order to provide productive and efficient operation of the machine, relevant maintenance, repair and cleaning shall be provided periodically by authorized person.

DAILY MAINTENANCE-BEFORE OPERATION

- Piece debris, dust to remain on the machine can be cleaned with a brush or broom. Gaps between parts in the internal section can be cleaned using compressed air.
- It is recommended not to use volatile and combustible material as cleaning material.
- Status of all machine parts, bolts, nuts and other parts shall be checked in terms of rigidity, and it shall further be checked whether there is any mechanical wear. If there is any loose nut or bolt, it shall be tightened immediately. In order not to lead to significant damages in subsequent usages, worn parts shall be frequently checked and those which require immediate replacement shall be replaced with new ones.
- Fueling unit level must be checked twice at daily operation.

5.2.1 MAINTENANCE TABLE

Table 5. 2

Maintenance / Period	8hours	40 hours	Monthly Maintenance	6-Monthly Maintenance	Annual Maintenance
Daily maintenance and control before operation	O				
Log handling unit and Bandsaw hydraulic yank level control	O				
Log handling unit and Bandsaw hydraulic unit oil check					O
Advance accumulator check				O	
Bandsaw move wheel bearing check					O
UHYB oil pump level check	O				
Cooling fuel unit level check	O				
Rotator chain check	O				
Bandsaw for/back and up/down drivew chains tension check		O			
V-belt tensioning		O			
Brake pad check			O		
Conditioner water level check		O			
Tensioning plate spring check			O		
Main motor					O
All parts are checke on the electric box and control panel. Parts malfunctioned are replaced by qualified personmel.					O

5.2.3 GEARBOX MAINTENANCE

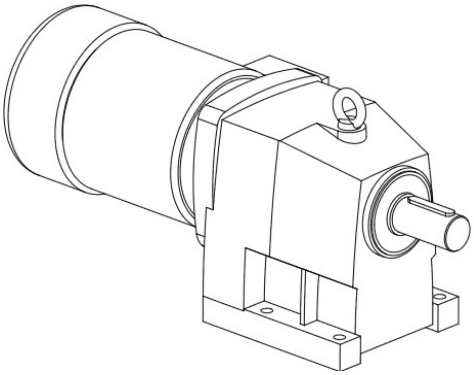


Fig 5.5

Periodically check the oil level.
Oil type is showed on the gearbox label.
Change lubricant every 10.000 working hours or after two years at the latest.
Lubricant changing intervals will be twice as long if synthetic products are used
Extreme working conditions (high air humidity, aggressive media and large temperature variations) call for reduced lubricant changing intervals. Combine the lubricant change with thorough cleaning of gear unit.

GEARBOX LUBRICATION TABLE

Table 5. 3

Type Of Lubrication	Ambient Temp.	SHELL	MOBİL	BP	CASTROL
Mineral oil	0...40°C	Shell Omala 680	Mobilgear - 636 -XMP 680	--	Alpha SP 220
	-5... 40°C	Shell Omala 220	Mobilgear - 630 -XMP 220	Energol GR-XP 220	Alpha SP 220
					Alpha MW 220
					Alpha MAX 220
	-15...-25°C	Shell Omala 100	Mobilgear - 627 -XMP 110	Energol GR-XP 100	Alpha SP 100
					Alpha MW 100
					Alpha MAX 100
	-45...-15°C	Shell Tellus T15	Mobil DTE 11 M	Bartran HV 15	Hyspin AWS 15
					Hyspin SP 15
					Hyspin ZZ 15
Synthetic oil	-5...60°C	Shell Tivela S 680	Glygoyle 680	Energol SG-XP 680	--
	-25...80°C	Shell Tivela S 220	Glygoyle HE 220	Enersyn SG-XP 220	Alphasyn PG 220

5.2.4 SAW GUIDE MAINTENANCE

General rules:

Saw guide and bandsaw blade must be parallel to each other.
Saw guide abrasion must be checked regularly
Saw guide surface can be flattened by CNC to calibrate.

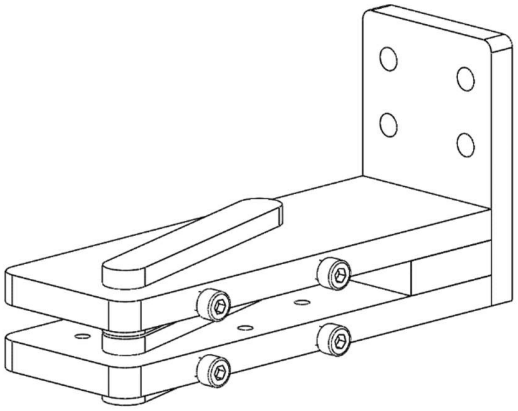
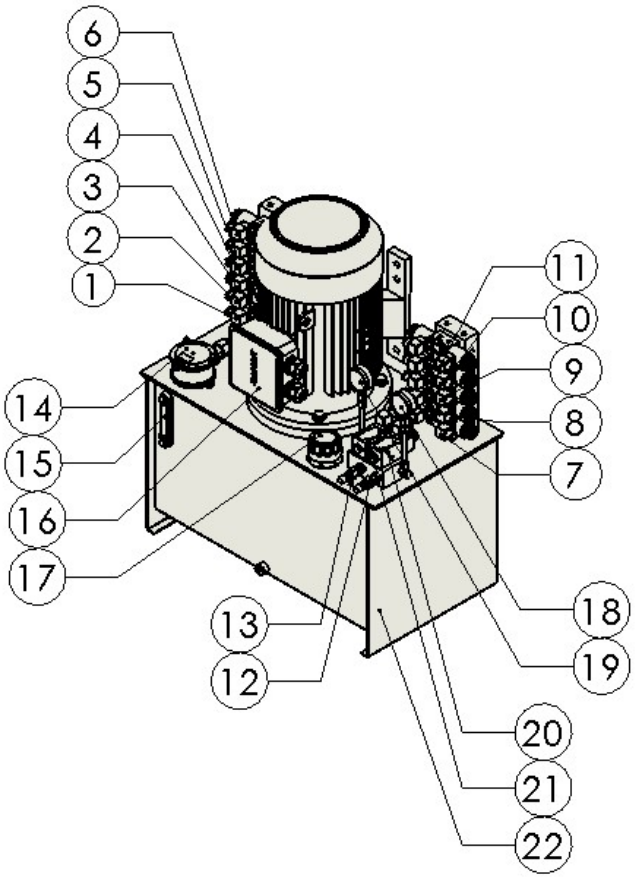


Fig 5.6

5.2.5 BANDSAW AND LOG HANDLING UNIT HYDRAULIC UNITS

LOG HANDLING UNIT HYDRAULIC UNIT



1- hooks for/back valve
2- rollers up/down valve
3- rollers up/down valve
4- rollers up/down valve
5- rotators up/down valve
6- support arms for/back valve
7- rotators drive valve
8- rollers drive valve
9- log loading arms up/down valve
10-log loading arms drive valve
11-pvc band up/down valve
12-pressure relief valve
13-pressure relief valve
14-return filter
15-oil level and heat indicator
16-electric motor
17-oil filling cap
18-manometer
19-manometer
20-directional control valve
21-directional control valve
22-120 lt. hydraulic tank

Fig 5.7

- Hydraulic system pressure is read on manometer and the value should be 100 bars.
- Vacuum measure on the filter exit shows the dirt level of filter. Initial value is 0,8 bars and should be replaced with new one when value drops to 0,1 bars.

BANDSAW HYDRAULIC UNIT

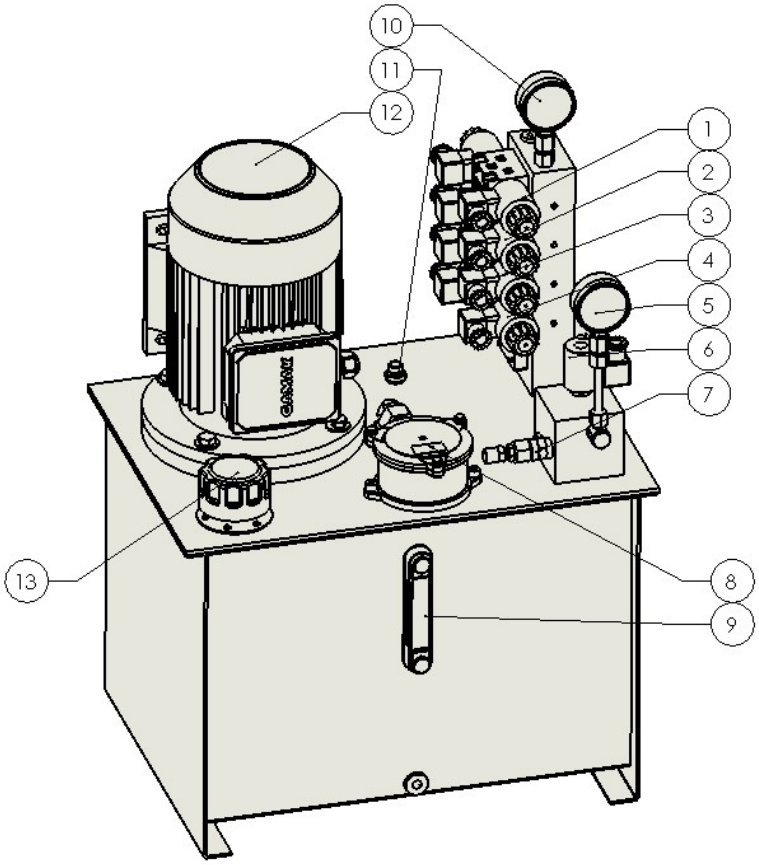


Fig 5.8

1- Gerdirme silindir valfi
2- Sol şako silindir valfi
3- Tahta düşürme silindir valfi
4- Sağ şako silindir valfi
5- Manometre
6- Çizici hidromotor popet valfi
7- Basınç emniyet valfi
8- Dönüş filtresi
9- Seviye ve sıcaklık göstergesi
10- Manometre
11- Hidromotor sızıntı hattı
12- Elektrik motoru
13- Depo kapağı

- Hydraulic system pressure is read on manometer and the value should be 120 bars.
- Vacuum measure on the filter exit shows the dirt level of filter. Initial value is 0,8 bars and should be replaced with new one when value drops to 0,1 bars.

Hydraulic unit tank level must be checked in daily operation, if necessary hydraulic oil must be added.
Temperature must be observed on cover of the hydraulic unit.
(Temperature should not exceed 80^0 C)
In first installation filter and hydraulic oil must be changed within 6 month.
After first change, oil and filter should be changed yearly.
Saw dust and resin over the hydraulic unit must be cleaned in daily maintenance.

Filter must be changed when the curser is approached to red level.

Company setting pressures to be read on manometers are as follows:

Table 5.4

Model	Çalışma basıncı
UHYB 120 ŞASE	100 bar
UHYB 120 BIÇKI	120 bar

ONLY QUALIFIED PERSONS SHOULD ATTEMPT MAINTANENCE WORK.

BEFORE CARRYING OUT ANYTHING OTHER THAN ROUTINE MAINTENANCE, CONSULT MANUFACTURER.

IN FIRST 6 MONTHS CONTROL MUST BE DONE BY QUALIFIED PERSON.

5.2.6 CONDITIONER MAINTENANCE

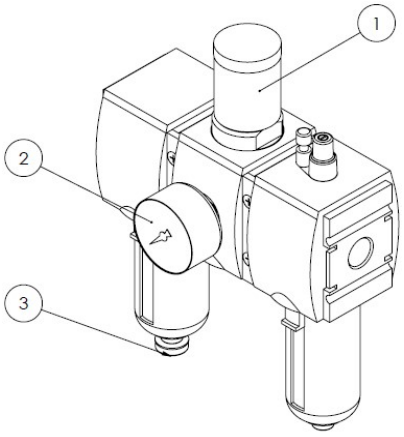


Fig 5.9

Oil which used in conditioner is shown in the lubrication table.
By turning adjusting lever (1) pressure and humidity settings can be done.
Pressure level can be observed from indicator (2).
Extra water can be evacuated by using needle valve (3).

Oil and water level must be control. If the water exceeded max level, it must be evacuated by needle valve.

5.2.7 BRAKE PAD REPLACEMENT

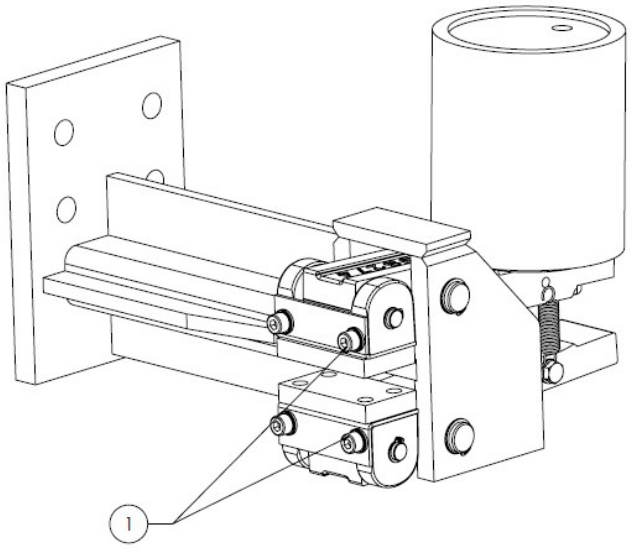


Fig 5.10

Brake pad safety thickness is min 6mm.

The pads must be replaced when worn out to this thickness. If the pads are not replaced, they will damage the brake disk.

Brake pad replacement:
Pins on the arbor (1) are loosened and brake group is taken away.
Brake pad is replaced and connections of the brake group must be done.

Brake air pressure must be 4bars.

Before brake pad replacement operation please contact the ÜSTÜNKARLI otherwise machine **IS NOT COVERED ON WARRANTY.**

Brake mechanism and brake pad must be control periodically which showed in the maintenance instruction.

5.2.8 V-BELT REPLACEMENT AND TENSIONING

Tensioning of the V-belts must be controlled in daily operation.

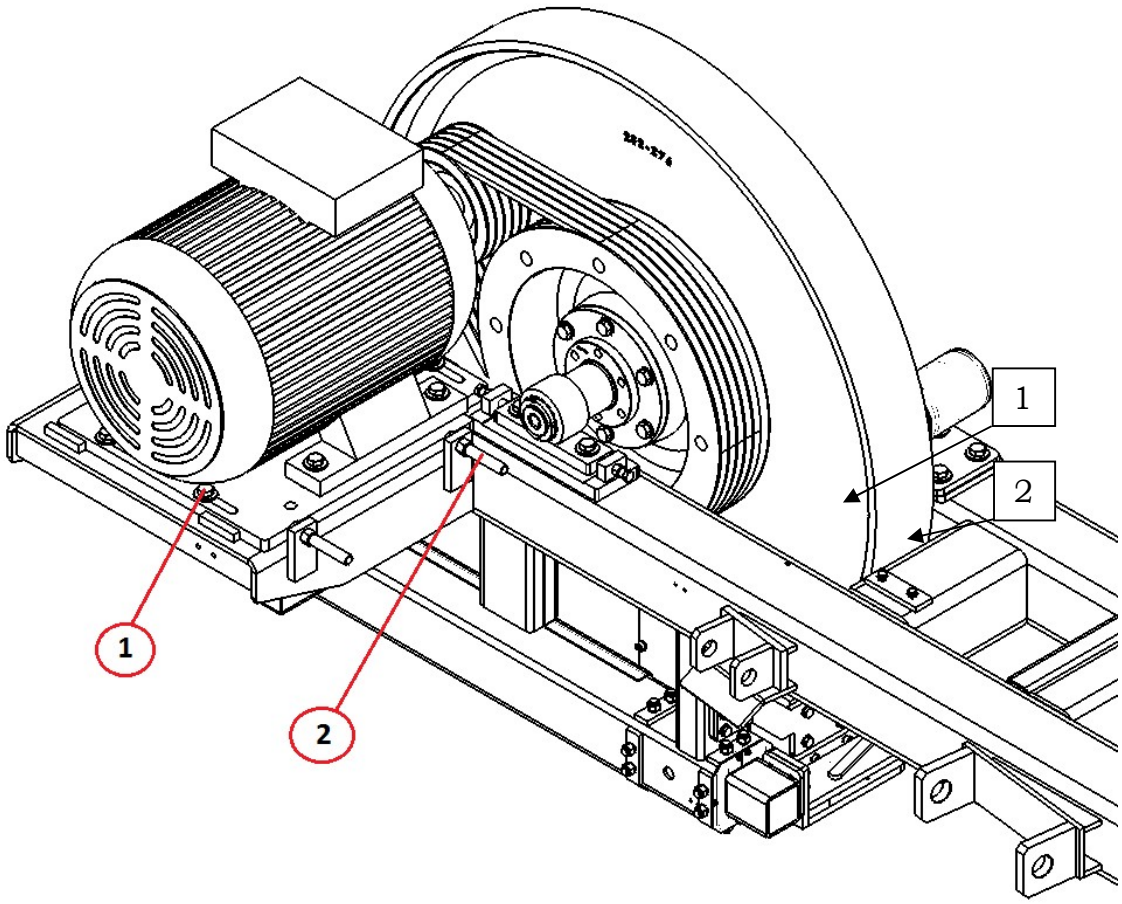


Fig 5.11

V- BELT REPLACEMENT

Replacement method of V-belts in case of wear off:

- Loosen connection bolts (1).
- Replace the old belts with new ones.
- Tension the belts via adjustment screws on motor base frame
- Adjust the parallelizm and fix the motor via bolts

TENSIONING THE V-BELTS

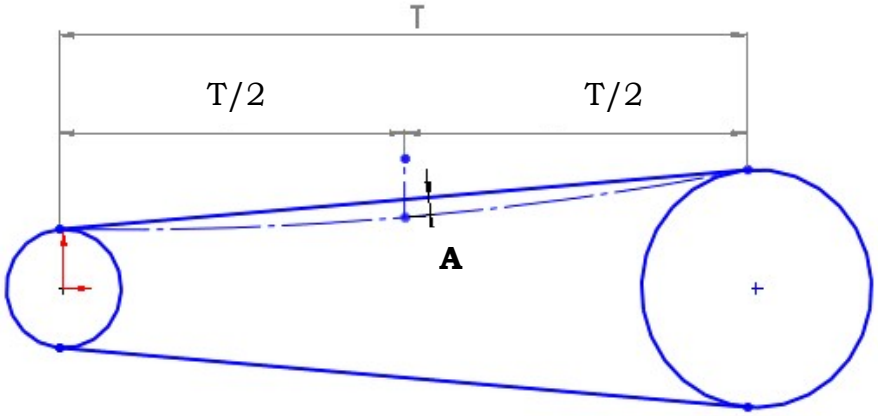


Fig 5.12

Note: Tension tester must be provided by the customer.

TENSION MEASUREMENT PROCEDURE

Apply force with the help of Tension Tester perpendicular to the span (T). Read the deflection force value.
Compare the deflection force value (N) with the values given in the table below. The deflection force value (N) should lie between the minimum and maximum values given in the table.

DEFLECTION-FORCE TABLE

Table 5.5

MACHINE TYPE	Deflection (mm)	F_{min}-F_{max} (N)
UHYB	22mm	40-70N

5.2.9 BLADE COOLING SYSTEM

Bandsaw is equipped with a cooling fuel unit that drip diesel oil as cooling fluid in order to reduce blade worn out rate because of high heat rise during cutting process. There installed a fuel tank on the bandsaw; when the valve is opened, fuel is dripped on the wheels from the tap installed on the rear of the blade. Cooling fluid in the reservoir should be checked during work shift to keep it full.

Fuel tank shown as #1, should be filled prior to work and its level should be checked at least two times daily.

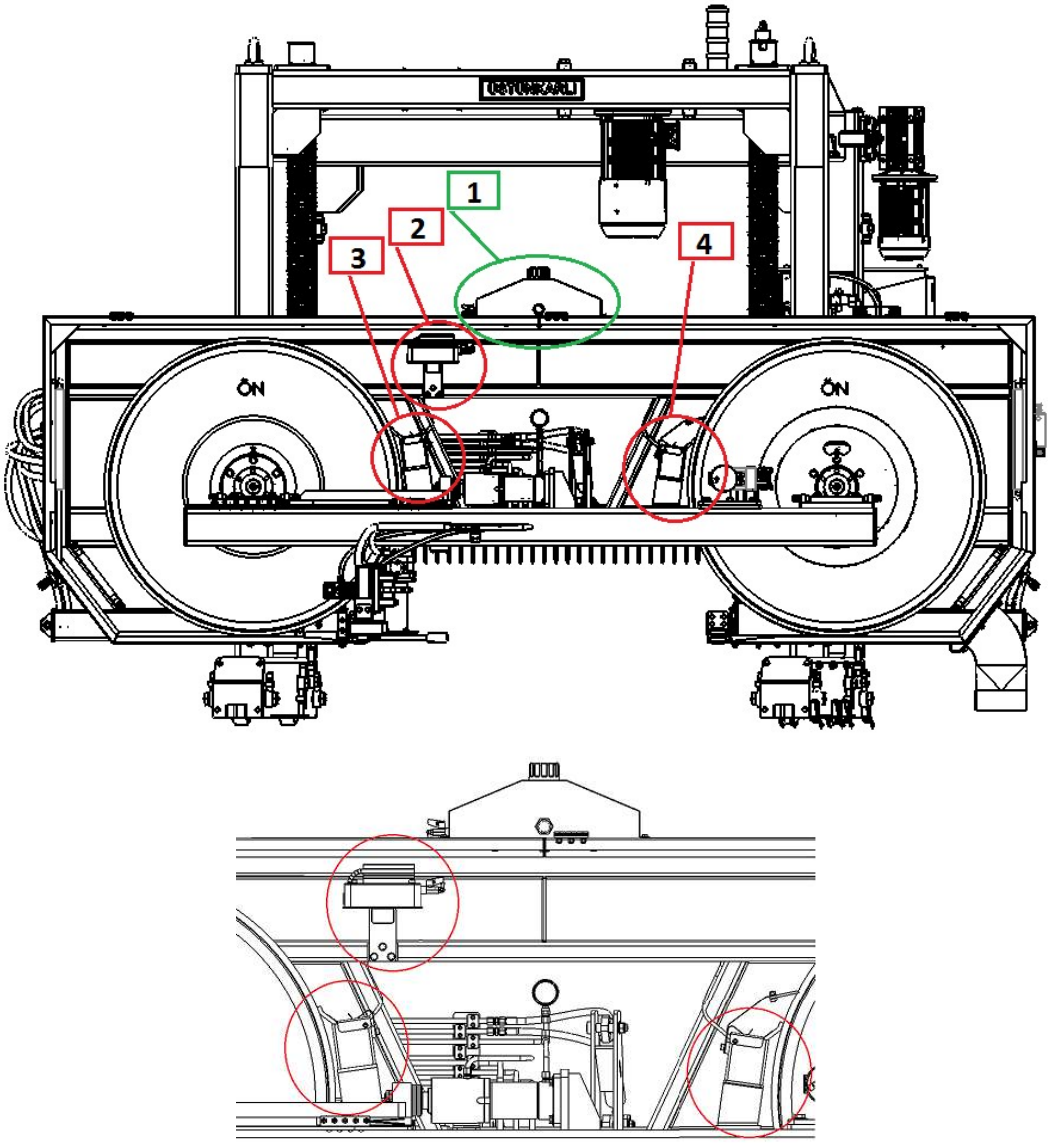


Fig 5.13

6.0 DECOMMISSIONING AND DISASSEMBLY

6.1 DECOMMISSIONING

Once the machine has reached the end of its technical and service life, it must be put out of service. Appropriate measures should be taken to ensure that it will not be possible to use it again for the purposes it was originally designed and made for; it should, nevertheless, be possible to re-use the raw materials it is made from.

6.2 DECOMMISSIONING PROCEDURES

Decommissioning and disposal should be done by authorized persons. If the decommissioning directions have been followed properly, there is no residual risk after decommissioning.

Machine: Disconnect the power. The information and procedures are defined at Electric Scheme.
Power Unit: Disconnect the power cable from control panel terminal box.
Disassembly and separate the following parts:
Electrical and electronic parts
Nonmetallic parts and components

Disposal of used oil should be charged to professional companies. Electronic parts such as batteries and condensers should be discarded according to national norms.

7.0 INFORMATION FOR EMERGENCY CASES

7.1 FIRE EQUIPMENT

In case of fire in the production line, fire extinguisher should be obtained ready to use.

Maintenance of fire extinguishers should be done by the producer company.

7.2 WARNINGS FOR EMISSIONS OFF THE MACHINERY

There is no hazardous emission from the log carriage.

EKLER (APPENDIX)

Information about band blades

Spare part list

Hydraulic scheme

Pneumatic scheme

Electric scheme

INFORMATION ABOUT BAND BLADES

SELECTION OF BAND SAW

Stellite material-stellite band saws:
Stellite is a special alloy. It is used in cutting tools which are subject to wear. The alloy is comprised of cobalt, carbon, chrome, and wolfram.
This material is of about the same hardness compared to band saw steel (45-50 HRC), but exhibits a very high resistance against wear and heat, and is also rust-resistant. It is processed using a grinding stone. Stellite is applied onto the saw using gas welding. Stellite alloy #12 is the preferred variety. Stellite comes in different grades of hardness. As mentioned above, alloy #12 should be used for sizes 1, 6, and 12 saws. The most suitable thickness is about 2-2,5mm. This way, one drop of molten stellite is enough to cover one tooth.
Band saws with stellite are recommended for use when cutting highly abrasive woods. These wood types include Macore, sypho, teak, etc., which contain a large amount of silica in their structure.
In recent years, stellite saws are used also for cutting soft woods. A normal stone should be used to sharpen the teeth of the saw. The recommended stone is Norton 38A46J8 V.B.E. fine (60) grain or equivalent. Very light burning at the base of the teeth during sharpening is considered normal. Considering the cost of stellite, the sharpening machine should be of high quality machine, selected with due care.
After the application of satellite, tooth tips will be as hard as glass. These teeth should be heated using a gas flame until brown (~ 550^0 C), and then left to cool slowly. Temperature at the tips should be measured with temperature markers.
Stellite tipped band saws should be replaced every 4 - 8 hours of operation. Timely replacement will reduce the need for straightening, and the danger of tooth base cracking and similar tasks.

TOOTH FORM AND PITCH:
For wide band saws, a tooth form of LS should be preferred and the tooth height should be approximately 30% of the pitch. Teeth with an LS form are suitable for cutting all types of wood. Pitches of 30 and more are preferred for cutting hard wood. When cutting small diameter timber, saws with an SB tooth form provide more desirable results.

CROSSING:
Crossing should be done only when the tooth size is too small for the hammering machine. Normally, crossing cannot be done for teeth with a pitch of less than 18-20 mm. Crossing is applied as much towards the tooth tips as possible, with direction alternated at each tooth. Sometimes it can be advised to leave one tooth straight after every two or three. Saws crossed in this manner produce better results when cutting timber with a high silica content. Band saw steel should be of CrV.

HAMMERED TEETH
The hammerability of a saw is in close relationship with its chemical structure and hardness. Saws made steel with a higher purity (less Phosphor and Sulphur content) alloyed with Nickel are more suitable to be hammered. Due to the cold forming of the tooth tips, the hardness of the

material will be around 2-5 HRC. This provides a higher hardness to the teeth in comparison to the body, and increases the saw life. High frequency hardening can be applied to the sharpened tooth tips, in order to provide a longer saw life. The hardness in this case is equal to 60 HRC. Therefore, the best efficiency can be obtained from the saw. Before starting the hammering, molycote should be applied generously to the tooth tips. After hammering, the tips should be sharpened in the form desired.

Recommended hammering width:

Hard wood : 0.3-0.4mm (single side)
Pine wood : 0.4-0.5mm (single side)
Poplar wood : 0.5-0.6mm (single side)

Data for crossed or hammered saws with a large width:

Saw width				**Pitch – soft wood**				**Pitch – hard wood**			
Width		Thickness		Cross		Hammered		Cross		Hammered	
mm	inch	mm		mm	inch	mm	inch	mm	inch	mm	inch
76	3	1,07		32	11/4	41	15/8	21	13/6	30	11/8
105	41/3	1,07		35	13/8	45	13/4	22	7/8	35	13/8
120	45/8	1,07		35	13/8	45	13/4	22	7/8	35	13/8
130	51/8	1,07		35	13/8	45	13/4	25	1	35	13/8
156	61/8	1,25		38	11/2	45	13/4	25	1	38	11/2
181	71/8	1,47		38	11/2	45	13/4	29	11/8	38	11/2
206	81/8	1,65		44	13/4	51	2	31	11/4	45	13/4
232	91/8	1,83		48	17/8	51	2	38	11/2	45	13/4
260	101/4	1,83				63	21/2			51	2
286	111/4	2,11				63	21/2			51	2
311	121/4	2,11				63	21/2			51	2
337	131/4	2,41				70	23/4			51	2
362	141/4	2,41				76	3			57	21/4
387	151/4	2,77				83	31/4			57	21/4
413	161/4	2,77				83	31/4			57	21/4

Pitch dimensions for hammered teeth:

Example:
Band saw dimensions : 181 x 1.47 mm
Tooth form : S, hammered
d: pitch
h: tooth height
d=3h
Soft wood : pitch ~45 mm
Hard wood : pitch ~40 mm

Pitch can be larger for very high forward speeds. In principle, a pitch of 35-40 mm is sufficient when cutting hard or soft wood. This recommendation is true for hammered teeth.

TOOTH HEIGHT AND SAWDUST GULLET

A larger tooth height implies a larger tooth base and sawdust gullet. Too much a height is undesirable because it creates vibration which results in an improper cut.

The strength of the teeth depends on the tooth height and pitch. For hammered teeth, a ratio of 1:3 is appropriate for the tooth height (h) to the

pitch. For crossed teeth, this ratio should be limited to 1:4. For pitches above 50 mm, the ratios for hammered and crossed teeth should be 1:4 and 1:5 correspondingly, and should never be more than 8-10 times the blade thickness.
Sawdust gullet depends on the tooth form, pitch and tooth height. Sawdust gullet should be as large as possible when compared to the tooth base radius and tooth form. This facilitates the distribution of the forces applied to the tooth base and reduces the risk of tooth base cracks. At any rate, the sawdust gullet should be large enough to dispose of the sawdust easily.
Fresh wood produce more sawdust in comparison to an aged wood. For an aged wood, this ratio is 3:1, while in a soft or freshly felled wood this ratio can be as high as 6:1. For this reason, use of saws with a much larger sawdust gullet is recommended for cutting soft or freshly felled woods.
A small sawdust gullet causes sawdust to enter between the blade and the part being cut. This causes a higher power requirement, in addition to the heating of the saw, reducing the hardness and internal tension of the saw. The cutting quality will be less than desired.

PITCH:
Pitch (d) should be selected according to the type of the wood, cutting speed, forward speed, and cut depth. Due to the increased force applied to the teeth, larger pitch saws will get dull more often. They also produce a powder-like sawdust. When the pitch is small, the cut surface is smoother, but more power is required, and forward speed will be reduced because of the decreased sawdust angle. In cases where the sawdust angle and tooth back angle are sufficient, a protruding-back form can be adopted to avoid increasing the pitch.
The only difference required for hammered teeth is the necessity of using a greater pitch when compared to crossed teeth. Crossing of the teeth in the thinner saws are usually achieved by bending, but these saws should have relatively smaller teeth with a smaller pitch.

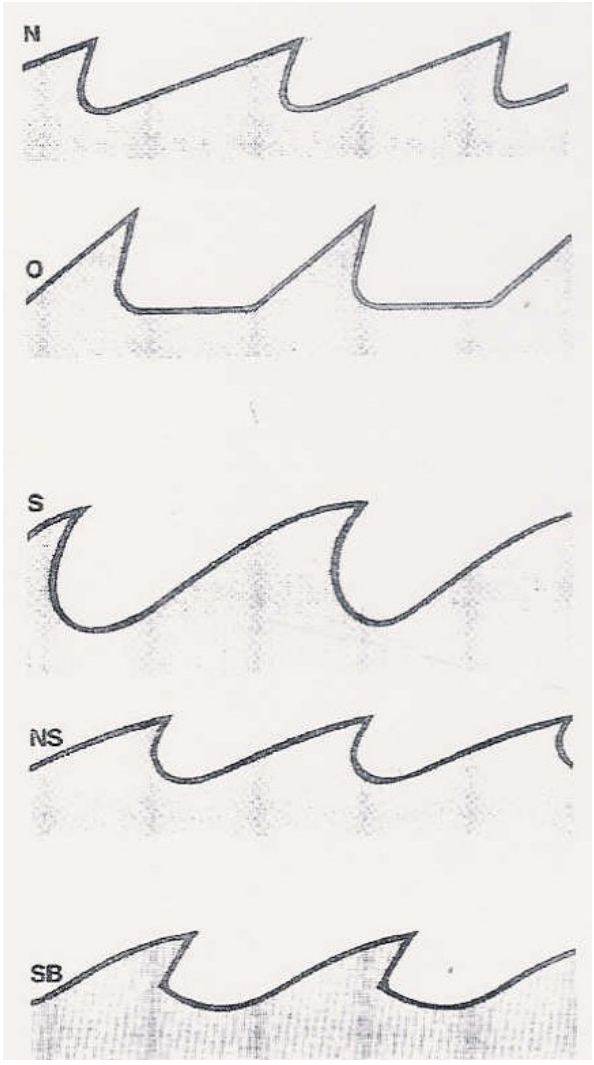
TOOTH FORMS

Form N: Usually used with narrow saws up to 50 mm width. Normally they are crossed, but tooth base cracks are very often due to the small tooth base radius.

Form O: Usually used with wider saws. Tooth base is flat and wide. Best for saws with a width of up to 130 mm.

Form S: Usually used with saws with a width of up to 250mm. Particularly suitable for hammered wide saws. The lifted-back form provides a longer life.

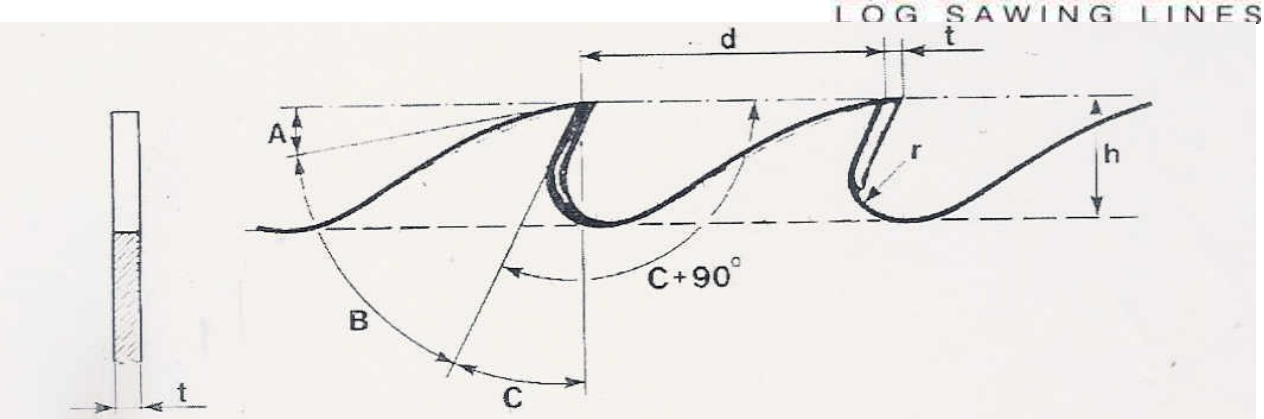
Form NS: Is a combination of N and S forms. Hammerable tooth tips provide a large sawdust gullet. This helps reduce the tooth base cracks. NS form is best suitable for saws with a width of 150mm to 200mm, for cutting soft and some hard wood types.



Form SB: Can be used to cut all wood types. Particularly efficient when cutting frozen wood. Large tooth base radius helps prevent tooth base cracks, and helps to break the sawdust inside the radius, for easy ejection from the sides.

Tooth base radius:
A large force is applied to the tooth base during cutting. A large tooth base radius prevents excessive force.

Roundness, smoothness and gloss of the tooth base radius are of a great importance. They all help to prevent tooth base cracks and provide a longer life.



t	: saw thickness	A	: tooth back angle
d	: pitch	B	: tooth body angle
h	: tooth height	C	: sawdust angle
r	: tooth base radius	C+90⁰	: breast angle

$A+B+C:90^0$

Tooth back angle:

Tooth back angle starts right from the tip of the tooth. For the saw to work easily, a back angle (A) less than 8^0 is required. This minimum angle should be calculated after the determination of the body angle (B) and the sawdust angle (C). When cutting very soft woods, this angle can be increased up to 15^0. If this angle is very small, friction of the tooth tip back can cause unexpected damage at the saw. Tooth back angle is determined by the tooth profile. Tooth back angle is a very important item that should be considered during sharpening. Tooth back should be ground in full; otherwise heating can occur in a very short time, causing loss of hardness and wear.

Tooth breast angle:
Breast angle (B) determines the strength of a tooth. The larger this angle, the better. Principally, this angle should not be less than40^0. When cutting hard woods, this angle can be increased up to 50^0.

Sawdust angle:
Sawdust angle (C) is one of the most important factors during cutting. It has a great effect on the production capacity. This angle is determined by the wood to be cut, saw speed, forward speed, tooth form, and thickness of the blade. A small sawdust angle provides a smooth cut surface. A very small sawdust angle makes it difficult to eject the sawdust, which gets stuck between the saw and the wood being cut. The saw is pushed backwards on the wheel. If the sawdust angle is too large in relation to the forward speed, then the teeth will bite into the wood and the saw will tend to escape from the wheels. A very low forward speed will disable the cutting, causing heating and wear very fast. Sawdust angle should be between 20^0 and 35^0.
Sawdust angle for cross teeth:
If the saw thickness is low, the sawdust angle can be chosen nearer to the lower limit. With thicker saws, the sawdust angle should be increased towards the upper limit.

Sawdust angle:Hard woods: 15-25^0 (Oak, Teak, Mahogany, Hornbeam)
Soft woods: 25-30^0 (Spruce, White Pine, Cedar)
General woods: 25-35^0 (Poplar)

Sawdust angle for hammered and hardened teeth:
Hammered teeth need a larger sawdust angle in comparison to cross teeth. In general, soft woods are cut with a very high speed. Please see the table below.

Forward speed (m/min)	Sawdust angle	Type of wood
<8	15^0	very hard woods
8-30	20^0	medium hard woods
30-50	25^0	medium-low hard woods
>50	35^0	soft woods

Thickness of the saw:
In general, the thickness of the band saw should not exceed 1/1000th of the wheel diameter. This ensures the limiting of the bend resistance of the saw to a value of 200 N/mm^2. Although the thicker saws will exhibit a greater bend resistance, they will also exhibit cracks in the tooth bases in a short time.

Environment of the workshop:
Sharpening workshop should always be kept clean and maintained.
Maintenance for the machinery in the sharpening workshop should be performed regularly.
The workshop environment should be free from humidity.
All the grinding stones should be selected correctly, and all damaged stones should be replaced immediately.
A newly replaced stone should be rotated freely for approximately 5 minutes before actual use.
Eye protectors must be worn and sharpening must be performed only by experienced personnel.

A new band saw should be allowed to free run for approximately 30 minutes after installation on the wheels. After 1-2 hours of usage without being forced too much, it should be removed and checked for tension and parallelism. Any faults should be corrected, and re-sharpened. Every ripsaw should have a minimum of 5 replacement band saws. The saws should be used only on the machine they are assigned to. They should be numbered, and used in the same order they are sharpened. The saw coming out of load (cutting) should be let to rest for a while. The back of the saw should never protrude beyond the rim of the wheel. Otherwise, it may leave marks on the wheel, necessitating expensive re-tooling of the wheel surface.

Stellite malzemesi-stellite şerit testereler:

Stellite özel alaşımlı dökme bir çubuktur. Talaş kaldıran ve aşınmaya yatkın kesici takımlarda kullanılmakta olup bileşimi kobalt, karbon, krom ve wolfram içermektedir.
Bu malzeme şerit testere çeliğinden (45-50 HRC) çok fazla sert olmayan, fakat aşınmaya ve ısınmaya karşı çok dayanıklı olup, paslanmaya karşıda korumalıdır ve işlenmesi de bileme taşı ile yapılır. Stellitin testereye tatbiki gaz kaynağı ile yapılır. Kullanılacak olan stellite alloy no.12 olmalıdır.
Stellite malzemelerinde farklı sertlik dereceleri mevcuttur. Örneğin; 1,6 ve 12 şerit testereler için yukarıda da belirtildiği gibi no.12 kullanılmalıdır. En uygun ölçüsü ise, 2-2,5mm olan çubuk olup, bir şerit testere dişini stellitlemeye bir damla kaynak eritmesi ile yeterlikli olacağı gibi, bir diş için gerekli kaplama miktarı verilmiş olur.
Stellitli şerit testereler kesim esnasında çabuk aşınan ağaç cinslerinde kullanılır. Bu ağaç tiplerini şöyle sıralayabiliriz. Makore, sipo, tik ağacı vb. bu cins ağaçlarda büyük miktarda silis bulunmakta olup, stelliteli şerit testere ile kesim yapılması tavsiye olunur.
Yapılan araştırmalara göre son yıllarda stelliteli testere ile yumuşak ağaçların, örneğin; köknar, mavi çam ve beyaz çam gibi ağaçların da kesimi yapılmaktadır. Şerit testere uçlarının bileme işlemi normal taş ile yapılacaktır. Tavsiye olunan taş norton 38A46J8 V.B.E. ince daneli 60 kum olan bir taş ile bilenmesidir. Bu arada bileme işlemi esnasında diş diplerinde hafif yanmalar meydana gelmesi normaldir. Bu sebeple stellite malzemesinin pahalı bir malzeme olduğu göz önüne alındığında, bileme makinasının ne kadar önemli olduğu ve iyi bir makina olması gerektiği ortaya çıkmaktadır.
Diş uçlarının stellitleme işlemi ile birlikte diş uçları cam sertliğinde olacaktır. Bu sebeple sertleşen bu diş uçlarının gaz alevi ile kahverengi kırmızılığında (~550 ^{0}C) olana kadar ısıtılması ve daha sonra yavaşça soğutulmaya bırakılması gerekir. Diş uçlarındaki sıcaklık hararet tebeşiri ile kolaylıkla kontrol edilebilir.
Stellite uçlu şerit testereyi, dört saat ile sekiz saat arasında değiştirmekte yarar vardır. Fazla geciktirmeden yapılacak değiştirme işlemi ile, doğrultma işleminden, diş dibi çatlama tehlikesinden ve benzeri işlerden tasarruf edilmiş olur.

Şerit testere neden çatlar?

Genel olarak şerit testerelerdeki çatlamalar, malzeme yorgunluğundan kaynaklanmaktadır. Ayrıca, şerit testere bilemesinde yanlış kullanılan sert veya körelmiş bileme taşı ve bileme taşı ilerleme hızının yüksek oluşundan, diş dibi yanmalarına oldukça sık olarak rastlanmaktadır.
Şerit testere gergisinin yüksek olması şerit testerenin ömrünün kısa olmasına neden olur. Şerit testerelerin ortasında iç gerilim kuvveti mevcuttur. Şerit testerenin volanlar üzerinde bükülmelerinden dolayı, gerçek gergi kuvvetinden daha fazla güç gereksimi, çatlamalara neden olur.
Diş dibi çatlamalarını önlemek için, bileme atölyesinde gerekli makina ve teçhizatın bulunması, bilemeyi yapacak personelin gerekli teknik bilgiye hasıl olması, bileme taşı seçiminin doğru yapılması, bileme hızlarının doğru ayarlanması gerekmektedir.

Şerit testerenin sadece diş uçları değil, komple bilenmesi gerekmektedir. Aksi halde talaş boşluğu radyusunde çatlamalar meydana geleceğinden testerenin ömrü kısalmış olacak ve kopmalar meydana gelecektir.
Şerit testerede oluşan bileme çapaklarının yuvarlak bir eğe ile mutlaka alınması gerekmektedir. Diş dibi radyusunun parlatılması diş dibi yanmalarına sebep olabileceğinden çok dikkat edilmesi gerekmektedir.

Possible reasons of cracks and breakup of blades:

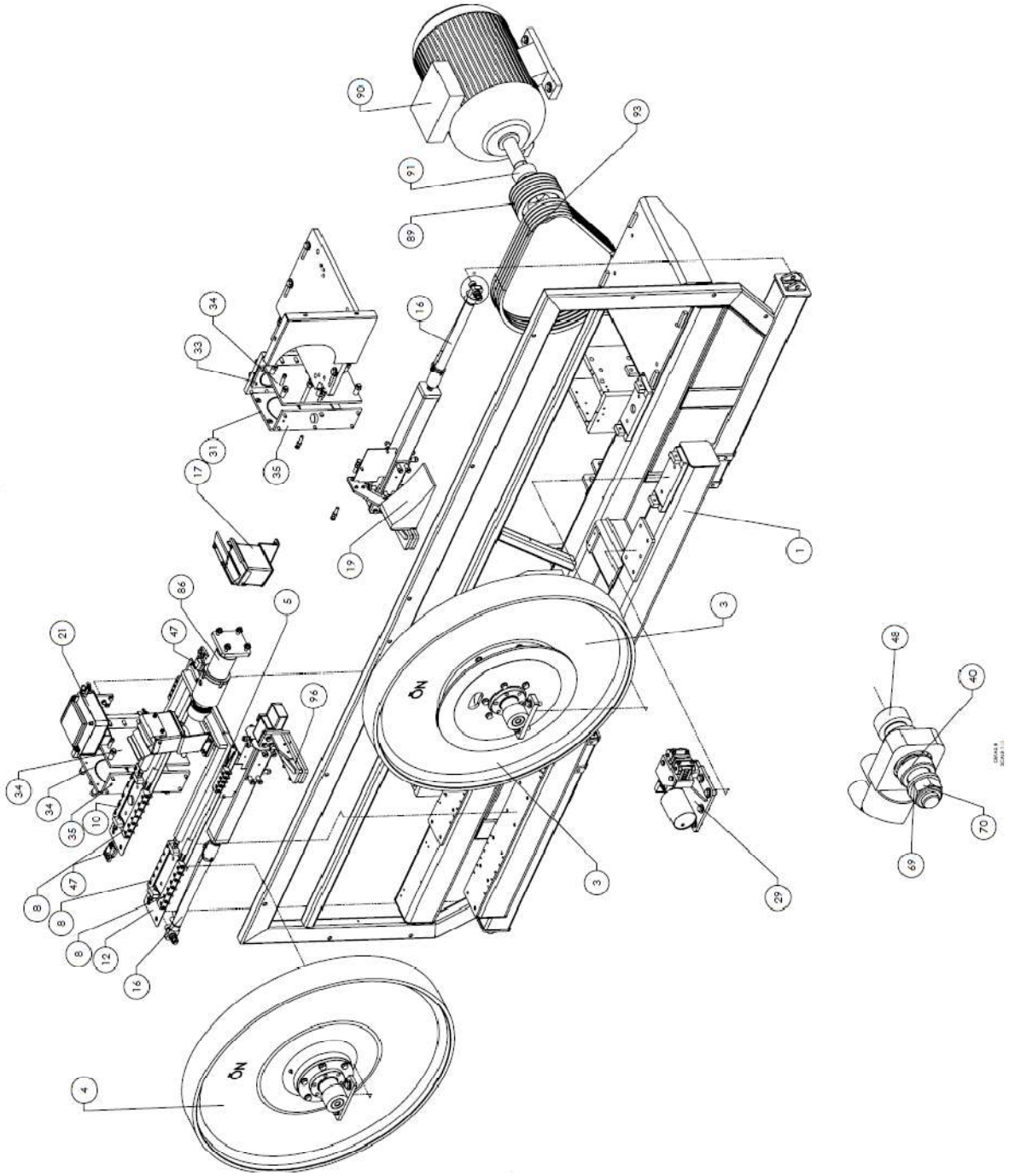
a) Faults on blades:

1. Improper blade selection
2. Improper welding
3. Improper sharpening
4. Improper tensioning
5. Improper material selection
6. Improper tooth progile
7. Small clearence
8. High tooth profile
9. Small tooth gap radius
10. Coarse weld grinding
11. Excessive heat in grinding
12. Crooked tooth back
13. Improper blade band thickness, thickness shall not pass beyond 1/1000 wheel diameter ratio

b) Faults on machine:

1. Rocking of frame
2. Rocking of wheels (bearing clearence etc.)
3. Chip stick on wheel profiles
4. Worn out wheel profiles
5. Misalignment of top and bottom wheels
6. Malfunction of tensioning mechanism
7. Unparallel move of bandsaw with blade
8. Improper adjustment of blade guard
9. Excessive tension of blade
10. Loose tensioning of blade
11. Worn out blade guides
12. Excessive feed speed of bandsaw
13. Excessive hang out of blade from wheel edge more than 5cm

BANDSAW UNIT SPAREPART SCHEME



BANDSAW UNIT SPAREPART LIST

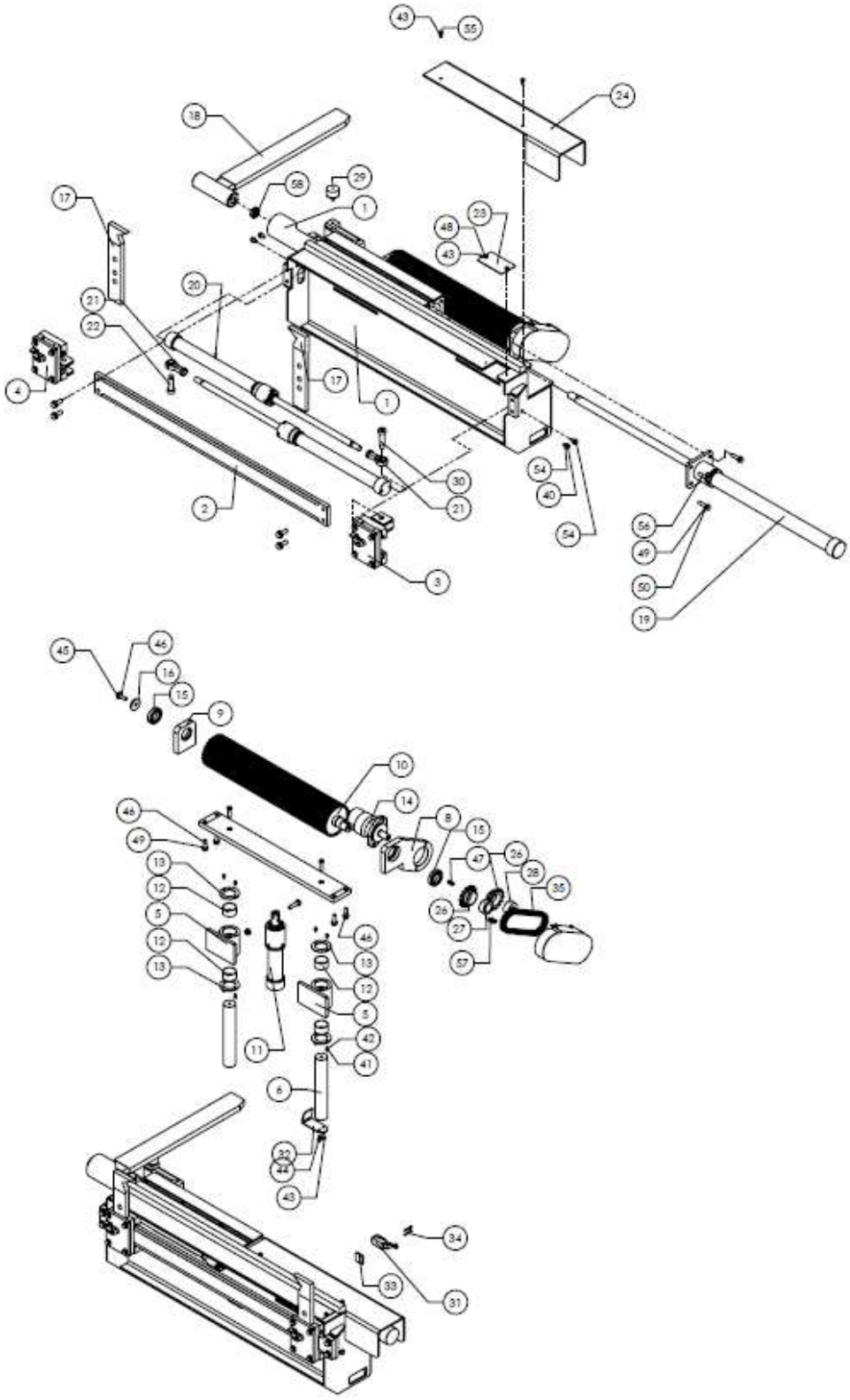
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	DN-221744	Gövde_Kaporta Konsolu Kaynaklı	1
2	DN-221004	Volan Yataklaması	2
3	DN-221031-02	Sabit Volan Komple	1
4	DN-221032	Gerdirme Volanı Komple	1
5	DN-220984	Gerdirme Kırlangıcı	2
6	DN-220985	Çatal	1
7	DN-220787	Volan Yataklaması	2
8	DN-220986	Gerdirme Kırlangıcı	3
9	DN-221021	Çatal Hareket Kızağı	2
10	DN-221766	Gerdirme Kırlangıcı	2
11	DN-221028	Çatal Hareket Levhası	1
12	DN-221763	Çatal Hareket Levhası	1
13	DN-221029	Çatal Hareket Levhası	1
14	DN-221184	Şako Hareket Konsolu	1
15	DN-221105	Şako Hareket Konsolu	1
16	H96710170866	Ø30x400 Arka Bağlantılı Hidrolik Silindir (HS-30-400-01-01-O1)	2
17	DN-221207	Mazotlama	1
18	DN-221199	Mazotlama	1
19	DN-221392	Sıyırıcı Fiber	1
20	DN-221391	Fiber Bağlantı Plakası	1
21	DN-221250	Mazotlama	1
22	DN-221389	Şako Konsol Hareket Delrinleri	8
23	DN-221394	Şako Konsol Hareket Somunları	32
24	DN-221538	Hareket Mafsal Parçası	2
25	DN-221600	Kaporta Muhafaza Sacı	1

26	DN-221580	Kaporta Muhafaza Sacı	1
27	DN-221583	Kaporta Muhafaza Sacı	1
28	DN-221648	Çatal Hareket Kızağı	3
29	DN-221776	Pnömatik Fren Komple	1
30	DN-221724	Swicht Sacı	2
31	DN-221093	Konsol Hareket Levhası	1
32	DN-220903	Konsol Kapak Plakası	1
33	DN-220921	Konsol Hareket Levhası	2
34	DN-220905	Konsol Hareket Levhası	3
35	DN-221094	Şako Konsol Hareket Delrinleri	2
36	DN-221098	Konsol Kapak Plakası	1
37	DN-220906	Şako Konsol Hareket Somunları	28
38	DN-221757	Yağlama Adaptörü	5
39	DN-222015	Çatal Hareket Kızağı	1
40	DN-221770	Burç	4
41	H92103000018	Çelik Düz Rondela DIN 125 - A 10.5	19
42	DN-221791	Kapak	2
43	DN-220997	Motor Gerdirme Plakası	1
44	H92007000008	KM Somun DIN 981 - M55x2	2
45	H92007000004	KM Somun DIN 981 - M35x1.5	2
46	H92102000008	MB Emniyet Sacı DIN 5406 - M55x2	2
47	H92506001153	Switch - XCMD 2110 L5	2
48	H96100000021	Yay Ayar Civatası - YAC Ø20xM16x65	2

49	H92011000008	Alti Kose Kontra Somun DIN 936 - M16x1,5 - 6	2
50	H91512000103	Küresel Yatak Burcu GE 20 ES 2RS	2
51	H91902000247	Altı Köşe Tam Paso Civ.ISO 4017 - M10 x 50-N-8.8	28
52	H92106000011	Çelik Konik Rondela DIN 6796 - 12	32
53	H91901000133	Altı Köşe Yarım Paso Civ. ISO 4014 - M12 x 50 x 30-N-8.8	24
54	H91904000298	Imbus Cıvata DIN 912 M8 x 35 --- 35N-8.8	32
55	H92002000022	Kontra Somun ISO 4035 - M8 -8	37
56	H91910000115	Setskur Kesik Koni Uclu DIN 914 - M8 x 35-45H	32
57	H91910000111	Setskur Kesik Koni Uclu DIN 914 - M8 x 25-45H	4
58	H92106000013	Çelik Konik Rondela DIN 6796 - 16	21
59	H91902000319	Altı Köşe Tam Paso Civ.ISO 4017 - M16 x 35-N-8.8	4
60	H92001000013	Alti Kose Somun ISO 4034 - M12 -8	8
61	H91902000292	Altı Köşe Tam Paso Civ.ISO 4017 - M12 x 60-N-8.8	12
62	H93900162419	DIN 71412 UNF 3/8"-24 Düz Grasörlük	6
63	H91906000118	Havsa Basli Imbus Civata DIN 7991 - M8 x 20 -8.8	33
64	H91902000334	Altı Köşe Tam Paso Civ.ISO 4017 - M16 x 60-N-8.8	4
65	H91902000322	Altı Köşe Tam Paso Civ.ISO 4017 - M16 x 40-N-8.8	5
66	H92111000008	Duz Rondela (Geniş)DIN 9021 - 8.4	4
67	H91904000292	Imbus Cıvata DIN 912 M8 x 25 --- 25N-8.8	4
68	H91904000154	Imbus Cıvata DIN 912 M4 x 16 --- 16N-8.8	4
69	H92103000024	Çelik Düz Rondela DIN 125 - A 17	2
70	H92005001601	DIN 985 Fiberli Somun - M16	2
71	H92005001201	DIN 985 Fiberli Somun - M12	4
72	H92205000024	Emniyet Segmanı DIN 472 - 35 x 1.5	2

73	H91901000082	Altı Köşe Yarım Paso Civ. ISO 4014 - M8 x 40 x 22-N-8.8	32
74	H92002220003	DIN 127 - A10- Tip B	8
75	H91902000235	Altı Köşe Tam Paso Civ.ISO 4017 - M10 x 30-N-8.8	8
76	H92108000021	Kanatlı Rondela A Biçimli DIN 6798 - A 10.5	7
77	H91902000229	Altı Köşe Tam Paso Civ.ISO 4017 - M10 x 20-N-8.8	7
78	H91914000001	DIN 571 - Alti Kose Trifon Vida - 10x50	4
79	H92103000016	Çelik Düz Rondela DIN 125 - A 8.4	8
80	H91904000286	Imbus Cıvata DIN 912 M8 x 16 --- 16N-8.8	4
81	H91902000328	Altı Köşe Tam Paso Civ.ISO 4017 - M16 x 50-N-8.8	4
82	H92001000016	Alti Kose Somun ISO 4034 - M16 -8	2
83	H91902000355	Altı Köşe Tam Paso Civ.ISO 4017 - M16 x 120-N-8.8	2
84	H92108000019	Kanatlı Rondela A Biçimli DIN 6798 - A 8.4	4
85	H91902000190	Altı Köşe Tam Paso Civ.ISO 4017 - M8 x 16-N-8.8	4
86	H96710170883	Ø80x120 Arka Flanş Bağlantılı Hidrolik Silindir (HS-80-120-01-01-O1)	1
87	H91906000148	Havsa Basli Imbus Civata DIN 7991 - M10 x 25 - 8.8	18
88	H91904000148	Imbus Cıvata DIN 912 M4 x 10 --- 10N-8.8	12
89	H91702162297	Konik Sıkma Burçlu Kasnak SPB 212-5	1
90	H94901020023	GM 225 S 4 - 37 kW 1500 D/dk Ayaklı	1
91	H91506000010	Konik Sıkma Burç 3020-Ø60	1
92	H91902000331	Altı Köşe Tam Paso Civ.ISO 4017 - M16 x 55-N-8.8	4
93	DN-222220	V Kayisi-TS 198/2/SPB///Lw:2130 mm/1.Serbest Marka/	5
94	H96902170440	Çanak Yay - DIN 2093 A - 80x41x5	4
95	DN-221950	Şako Komple	1
96	DN-221952	Şako Komple	1
97	DN-222121	Kapak	4

HOOK-SUPPORT ARMS-ROLLER GROUP SPAREPART SCHEME



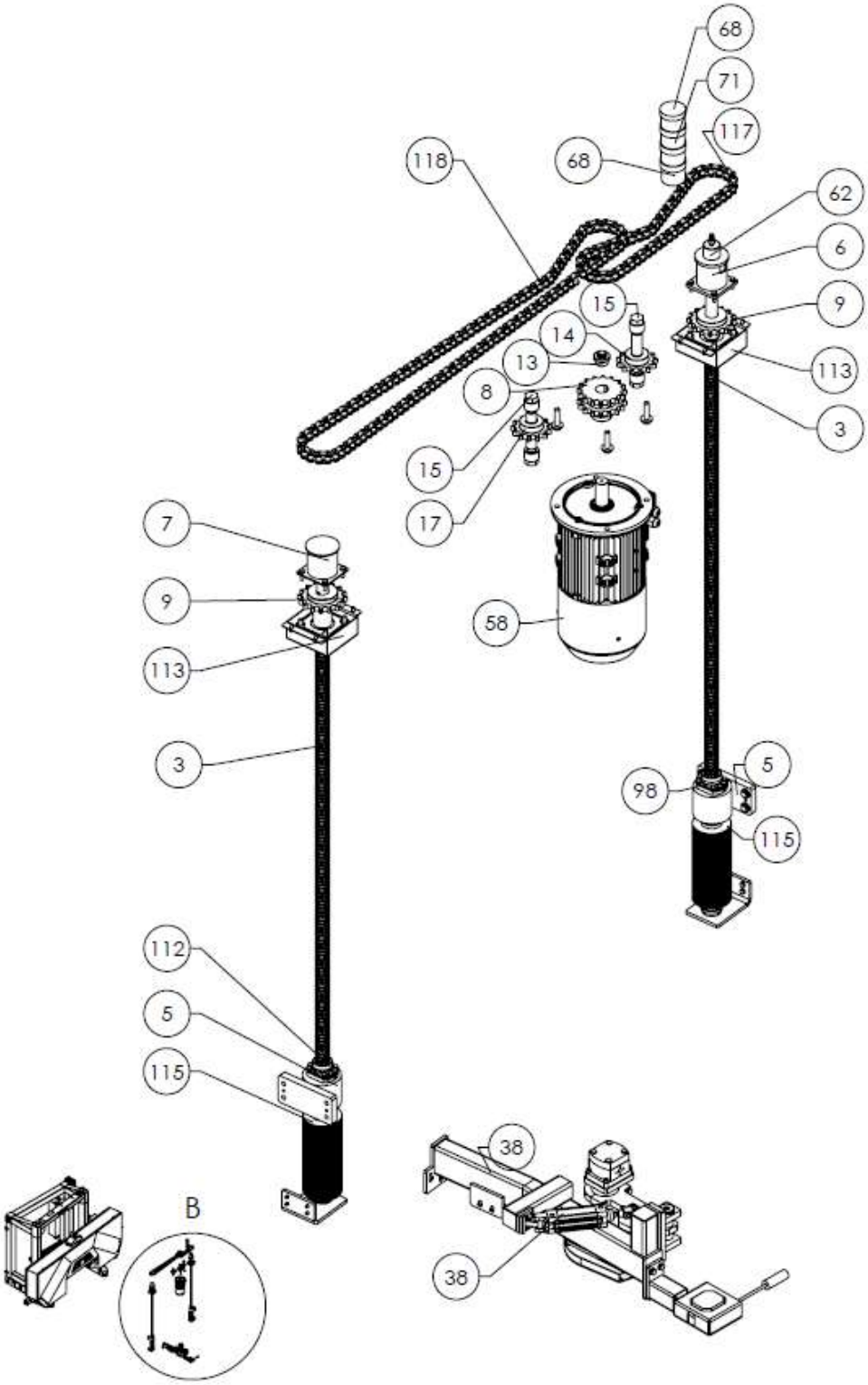
HOOK-SUPPORT ARMS-ROLLER GROUP SPAREPART LIST

	PART NUMBER	DESCRIPTION	QTY
1	DN-221906	Tomruk Dayama	1
2	DN-220822	Kanca Klavuz Laması	1
3	DN-220836-01	Kanca Yatağı	1
4	DN-220836-02	Kanca Yatağı	1
5	DN-220852	Yatak Bloğu	2
6	DN-221488	Rulo Klavuz Mili	2
7	DN-220837	Rulo Laması	1
8	DN-220844	Hidromotor Bağlantı Plakası	1
9	DN-221470	Rulo Bağlantı Yatağı	1
10	DN-220839	Tahrik Rulosu	1
11	H96710170885	Ø50x150 Arka Bağlantılı Hidrolik Silindir (HS-50-150-01-01-O1)	1
12	H91502000187	PAP 5030 P10	4
13	DN-221491	Pap Burç Kapağı	4
14	H96712170591	OMP 200 - Shaft Ø25 - 151-0315	1
15	H91501000844	Sabit Bilyalı Rulman DIN 625 - 6008-2RS	2
16	DN-209774	Ozel Pul-/Ø50/Ø13/6	1
17	DN-220834	Kanca	2
18	DN-221419	Dayama Konsolu	1
19	H96710170895	Ø50x660 Çift Yastıklamalı Flanş Bağlantılı Hidrolik Silindir (HS-50-660-02-04-O1)	1
20	H96710170884	Ø40x450 Arka Delik Bağlantılı Hidrolik Silindir (HS-40-450-01-01-O1)	2

21	H91508010014	Mafsal Kafa - PHS 20 R (M20x1,5)	2
22	DN-221493	Yay Ayar Civatası	1
23	DN-221494	Kapak	1
24	DN-221495	Silindir Kapama Sacı	1
25	DN-221497	Zincir Muhafazası	1
26	H91608170580	Sıkma Burçlu Zincir Dişli (3/4") Tek Sıra 14 Diş - 12B-TB-14	2
27	H91506000001	Konik Sıkma Burç 1610-Ø38	1
28	H91506000044	Konik Sıkma Burç 1610-Ø25	1
29	H92900025436	Ø50x30 - M10x28 Tek Tarafı Erkek Civatalı Vibrasyon Takozu (TİP-D)	1
30	H96100000019	Yay Ayar Civatası - YAC Ø20xM16x55	1
31	H92506001142	Switch - XCKP 2118 P16	1
32	DN-221741	Switch Basma Sacı	1
33	254-04-103802	SWITCH BAĞLANTI SACI	1
34	H91904000208	Imbus Cıvata DIN 912 M5 x 35 --- 22N-8.8	2
35	H926253951000000000	Zincir-DIN 8187/12B/01/32 Bakla	1
36	H92103000022	Çelik Düz Rondela DIN 125 - A 15	4
37	H92108000025	Kanatlı Rondela A Biçimli DIN 6798 - A 15	4
38	H91902000676	Altı Köşe Tam Paso Civ. ISO 4017 - M14 x 40-N-8.8	4
39	H92103000018	Çelik Düz Rondela DIN 125 - A 10.5	4
40	H92108000021	Kanatlı Rondela A Biçimli DIN 6798 - A 10.5	4
41	H92103000012	Çelik Düz Rondela DIN 125 - A 6.4	8
42		DIN 7984 - M6 x 14 --- 11N-8.8	8
43	H92103000016	Çelik Düz Rondela DIN 125 - A 8.4	8
44	H91902000193	Altı Köşe Tam Paso Civ.ISO 4017 - M8 x 20-N-8.8	2
45	H92106000011	Çelik Konik Rondela DIN 6796 - 12	1

46	H91902000280	Altı Köşe Tam Paso Civ.ISO 4017 - M12 x 40-N-8.8	5
47	H94101000227	Kama DIN 6885 - AB 10x8x30 - C 45	1
48	H91907000118	Ince Bas Imbus Cıvata DIN 7984 - M8 x 16 -8.8	4
49	H92103000020	Çelik Düz Rondela DIN 125 - A 13	10
50	H92108000023	Kanatlı Rondela A Biçimli DIN 6798 - A 13	8
51	H91907000199	Ince Bas Imbus Cıvata DIN 7984 - M12 x 40 -8.8	2
52	H92005001201	DIN 985 Fiberli Somun - M12	5
53	H91902000286	Altı Köşe Tam Paso Civ.ISO 4017 - M12 x 50-N-8.8	1
54	H91902000229	Altı Köşe Tam Paso Civ.ISO 4017 - M10 x 20-N-8.8	4
55	H91907000124	Ince Bas Imbus Cıvata DIN 7984 - M8 x 20 -8.8	2
56	H91901000133	Altı Köşe Yarım Paso Civ. ISO 4014 - M12 x 50 x 30-N-8.8	4
57	H95500073571	DIN 8187 - 12B-1 Segmanli Zincir Kilidi	1
58	DN-222801	Ozel Somun-M28x1,5 L:10	1

BANDSAW UNIT DRIVE SYSTEM SPAREPART SCHEME



BANDSAW UNIT DRIVE SYSTEM SPAREPART LIST

NO.	PART NUMBER	DESCRIPTION	QTY.
1	DN-221091	Ø1200 Bıçkı Gövde _Konsol_Hareket İletim Montajı	1
2	DN-220785-01	Ø1200 Bıçkı Gövde Montajı	1
3	DN-221069	Yukarı Aşağı Hareket Mili	2
4	DN-221071	Ozel Pul-/Ø66/Ø25/6	2
5	DN-220908	Bilyalı Yatak Bağlantı Takozu	2
6	DN-221076	Enkoder Bağlantısı	1
7	DN-221077	Enkoder Bağlantısı	1
8	DN-221079	Zincir Dişlisi-DIN 8187/16B/D/02/Ø38/Arası Açık	1
9	DN-221282	Zincir Dişlisi-DIN 8187/16B/B/01/Ø35	2
10	DN-221283	Mesafe Burcu	1
11	DN-221284	Mesafe Burcu	1
12	DN-221675	Mesafe Burcu	1
13	DN-221287	Mesafe Burcu	1
14	DN-221285	Gerdirme Komple	1
15	DN-221133	Tekerlek Ayar Civatası	4
16	DN-221134	Mesafe Burcu-/Ø42,4/Ø25/30	4
17	DN-221288	Gerdirme Komple	1
18	DN-221290	Kapak	5
19	DN-221291	Kapak	2
20	DN-221737	Kapak	4
21	DN-221841	Kapak	4

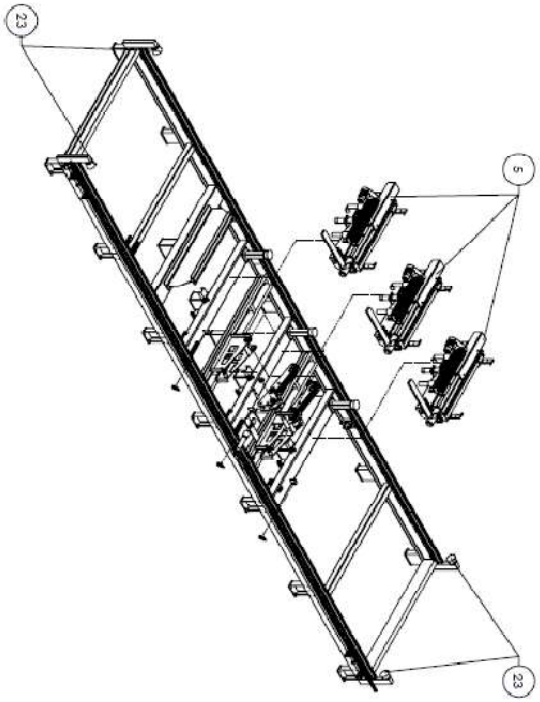
22	DN-221740	Tetikleyici Sacı	2
23	H92002000037	Kontra Somun ISO 4035 - M24 -8	2
24	DN-206356	Ozel Pul-/40/11/4/	4
25	H92101000420	Çelik Layner Halka DIN 988-40x50x1	2
26	DN-209774	Ozel Pul-/Ø50/Ø13/6	2
27	H91502000179	PAP 4020 P10	2
28	H91502000180	PAP 4030 P10	2
29	H96100000027	Yay Ayar Civatası - YAC Ø16xM12x60	1
30	H96100000022	Yay Ayar Civatası - YAC Ø20xM16x70	1
31	H91512000103	Küresel Yatak Burcu GE 20 ES 2RS	1
32	DN-221249	Mafsal Pimi	1
33	DN-221234	Süpürücü Bağlantı Konsolu	1
34	H96710170865	Ø30x120 Arka Bağlantılı Hidrolik Silindir (HS-30-120-01-01-O1)	1
35	H91508010011	Mafsal Kafa - PHS 16F R (M16x1,5)	1
36	DN-221221	Tahta Düşürme Sistemi	1
37	DN-221212	Düşürme Kolu	1
38	DN-221746	Çizici Grubu	1
39	H92410170577	Kapak Amortisörü - 10-27-360 -1400N - 825 - 4C-4C	2
40	DN-221050	Kaporta Ön Kapak	1
41	DN-221279	Kaporta Yan Sacı	1
42	DN-221277	Kaporta Yan Sacı	1
43	H96800030832	Emniyet Kapı Kilidi - 1S / 1AS - Pilz PSEN	1
44	101-11-118741	BASMA PARCASI	1
45	H92900038539	Tutamak 300mm - BİTAŞ (Ürün Kodu:1160 30 101)	2

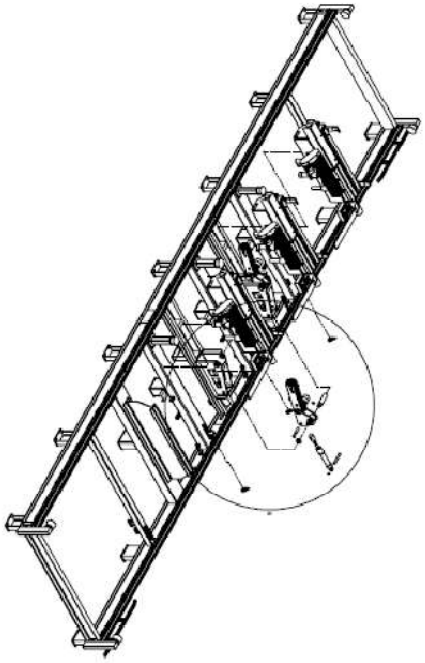
46	H95500170574	S-311-4-L - Paslanmaz - Kilitli Yatay Tabanli - U Kancali Baglanti Elemani	2
47	DN-221642	Baca	1
48	DN-221748	Şako Destek Sacı	1
49	DIN 6796-10		6
50	H91902000235	Altı Köşe Tam Paso Civ.ISO 4017 - M10 x 30-N-8.8	6
51	H92106000011	Çelik Konik Rondela DIN 6796 - 12	10
52	H92005001201	DIN 985 Fiberli Somun - M12	1
53	H92005002401	DIN 985 Fiberli Somun - M24	2
54	H92005000801	DIN 985 Fiberli Somun - M8	22
55	H92005001401	DIN 985 Fiberli Somun - M14	12
56	H92005001001	DIN 985 Fiberli Somun - M10	4
57	H92005001601	DIN 985 Fiberli Somun - M16	1
58	H94901070007	4 kW - 1000 Rpm - 132 M 6 - Flanşlı (Bicim A-B5) Gamak Elektrik Motoru - Frenli 24V 95Nm	1
59	H91501010549	Eksenel Bilyali Rulman-DIN 711-51307	2
60	H91503020007	Rulmanlı Yatak - UCF 207	2
61	H97000170579	Hassas Vidali Bilyalı Milin Flanşlı Çiftli Somunu - DFU 04005-4	2
62	H92534081125	Rotary Enkoder (ARS-S-50-100-PP-3-S16-A-8-C)	1
63	H91505038330	ATEK Aluminyum Kaplin HT-20-8-8-L=28	1
64	H93700000001	Etiket - 90x420	1
65	H92506001142	Switch - XCKP 2118 P16	4
66	H92506001142	Switch - XCKP 2118 P16	1
67	H92506001142	Switch - XCKP 2118 P16	1
68	H92519030814	İkaz Lambası Alt Ve Üst Kapak - XVB - C21	1
69	H92519030815	Yeşil İkaz Lambası - XVB - C4B3	1
70	H92519030816	Kırmızı İkaz Lambası - XVB - C4B4	1
71	H92519030817	Sarı İkaz Lambası - XVB - C4B5	1
72	H95700011280	DIN 580 Mapa - M30	2
73	H92800170559	90x60 Düz Menteşe - 900-1-1 (Krom Kaplı)	3
74	H91908000067	Bombe Bas Imbus Cıvata ISO 7380 - M8 x 16 -8.8	14
75	H92106000012	Çelik Konik Rondela DIN 6796 - 14	16

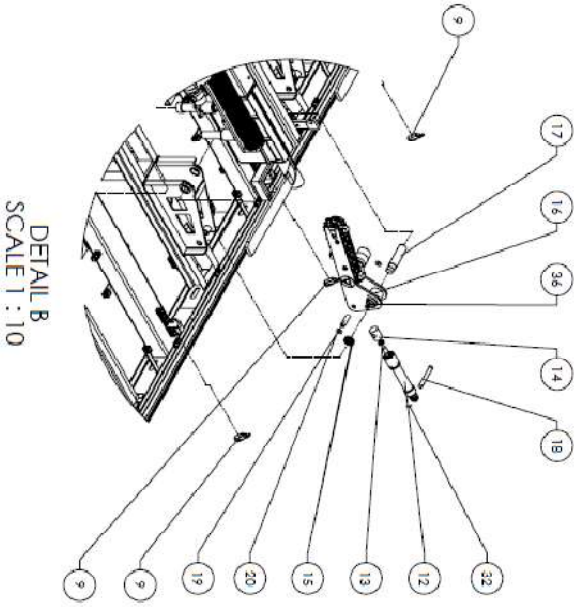
76	H91902000682	Altı Köşe Tam Paso Civ. ISO 4017 - M14 x 60-N-8.8	4
77	H92001000013	Alti Kose Somun ISO 4034 - M12 -8	4
78	H91902000304	Altı Köşe Tam Paso Civ.ISO 4017 - M12 x 90-N-8.8	4
79	H92103000016	Çelik Düz Rondela DIN 125 - A 8.4	122
80	H91902000199	Altı Köşe Tam Paso Civ.ISO 4017 - M8 x 30-N-8.8	8
81	H91902000280	Altı Köşe Tam Paso Civ.ISO 4017 - M12 x 40-N-8.8	9
82	H92103000020	Çelik Düz Rondela DIN 125 - A 13	8
83	H92108000023	Kanatlı Rondela A Biçimli DIN 6798 - A 13	8
84	H92108000019	Kanatlı Rondela A Biçimli DIN 6798 - A 8.4	32
85	H91901000082	Altı Köşe Yarım Paso Civ. ISO 4014 - M8 x 40 x 22-N-8.8	16
86	H91904000286	Imbus Cıvata DIN 912 M8 x 16 --- 16N-8.8	48
87	H91906000121	Havsa Basli Imbus Civata DIN 7991 - M8 x 25 -8.8	4
88	H92103000018	Çelik Düz Rondela DIN 125 - A 10.5	16
89	H91907000157	Ince Bas Imbus Cıvata DIN 7984 - M10 x 20 - 8.8	4
90	H91902000229	Altı Köşe Tam Paso Civ.ISO 4017 - M10 x 20-N-8.8	8
91	H92106000009	Çelik Konik Rondela DIN 6796 - 8	8
92	H91904000283	Imbus Cıvata DIN 912 M8 x 12 --- 12N-8.8	8
93	H92103000024	Çelik Düz Rondela DIN 125 - A 17	1
94	H96500170564	CEA Kablo Kanalı Bağlama Ayağı / SD2 - B100	2
95	H92108000021	Kanatlı Rondela A Biçimli DIN 6798 - A 10.5	4
96	H91906000115	Havsa Basli Imbus Civata DIN 7991 - M8 x 16 -8.8	4
97	H91902000193	Altı Köşe Tam Paso Civ.ISO 4017 - M8 x 20-N-8.8	16
98	H95500170498	Ayarlı Hortum Kelepçesi Ø57-Ø76 (200 B Tipi)	8
99	H92517030822	Kroşe (CPS) - NFH10	13
100	H91904000178	Imbus Cıvata DIN 912 M4 x 40 --- 20N-8.8	12
101	H91902000190	Altı Köşe Tam Paso Civ.ISO 4017 - M8 x 16-N-8.8	12
102	H92201000586	Sıkma Kovanı Kalın-Çelik ISO 8752 - 8 x 40 - St	4
103	H91902000283	Altı Köşe Tam Paso Civ.ISO 4017 - M12 x 45-N-8.8	8

104	H92900033692	M8 Civatalı Vibrasyon Takozu (TİP MAKARA - D:Ø50 H:30 - LASTEKSAN)	6
105	H92405091359	Ø6 Pnomatik Kruva	1
106	H931409951000001500	Kablo Kanali-CEA SD2 100 R150 01-Serbest Marka L:1500 mm	1
107	DN-221844	Kaporta Baskı Sacı	1
108	DN-221828	Elektrik Panosu 600x1200x300	1
109	DN-221936	Kablo Kanalı Bağlantısı	1
110	DN-221937	Kablo Kanalı	1
111	DN-221970	Körük Bağlantısı	1
112	DN-221972	Körük Bağlantısı	4
113	DN-221976	Körük Bağlantısı	2
114	DN-221978	Körük	2
115	DN-221978	Körük	2
116	DN-221979	Körük Bağlantısı	1
117	H926254951000000000	Zincir-DIN 8187/16B/01/29	1
118	H926254951000000000	Zincir-DIN 8187/16B/01//61/Serbest Marka/	1
119	DN-221991	Pnömatik Hortum Tutucu	1
120	DN-221992	Pnömatik Hortum Tutucu	1
121	DN-221995	Mazotlama Tankı	1
122	H94101000037	Kama DIN 6885 - AA 10x8x70 - C 45	2
123	DN-222654	Perno Ø30/119	2

LOG HANDLING UNIT SPAREPART SCHEME



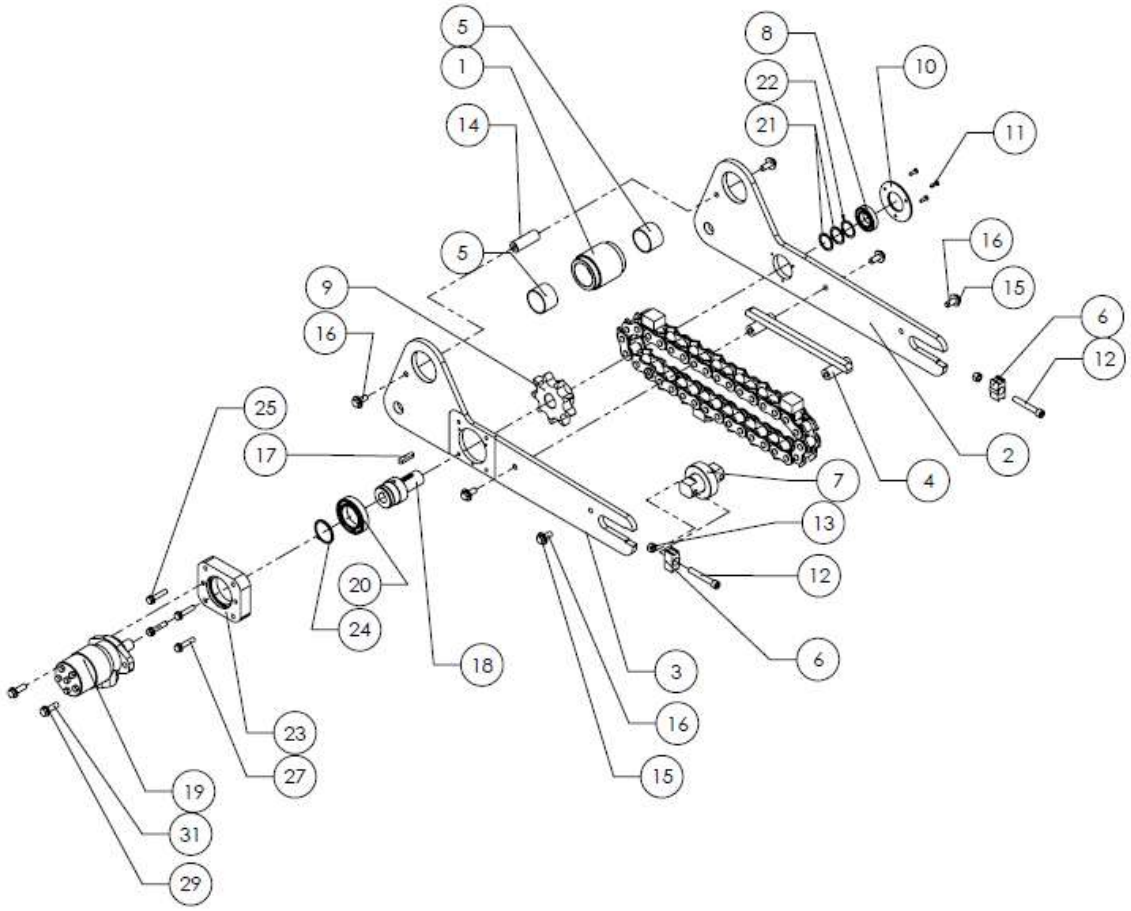




LOG HANDLING UNIT SPAREPART LIST

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	DN-221712	Tomruk Sabitleme-Cevirme Grubu Sasesi	1
2	DN-221872	U Profil	3
3	DN-221886	Duz Ray Montaji	3
4	DN-221876	Trapez Ray Montaji	3
5	DN-220821	Kanca - Dayama - Rulo Grubu	3
6	H92108000019	Kanatli Rondela A Biçimli DIN 6798 - A 8.4	6
7	H91902000190	Altı Köşe Tam Paso Civ.ISO 4017 - M8 x 16-N-8.8	6
8	H91904000166	Imbus Civata DIN 912 M4 x 30 — 20N-8.8	2
9	H92506001142	Switch - XCKP 2118 P16	3
10	DN-221905	Switch Bağlantı Sacı	3
11	H92103000016	Çelik Düz Rondela DIN 125 - A 8.4	6
12	H96710170886	Ø50x210 Çift Yastıklamalı Arka Bağlantılı Hidrolik Silindir (HS-50-210-01-04-S)	2
13	254-20210	HIDROLIK SILINDIR SOMUNU	2
14	397-02-115983	PISTON MAFSAL SOMUNU	2
15	H92007000007	KM Somun DIN 981 - M50x1.5	4
16	DN-220804	Çevirme Kolu	2
17	DN-220860	Çevirme Kolu Mafsal Mil	2
18	DN-221528	Silindir Pimi	2
19	DN-222026	Silindir Çevirme Kolu Bağlantı Mil	2
20	DN-206356	Özel Pul-/40/11/4/	4
21	DN-221705	Rampa	1
22	DN-221708	Rampa	1
23	H92900119924	Ø135xØ90xh=70 - M12x30 Tek Taraflı Erkek Civatalı Konik (Vakumlu) Vibrasyon Takozu	7
24	H92506001153	Switch - XCMD 2110 L5	2
25	DN-221913	Switch Bağlantı Parçası	2
26	DN-221884	Trapez Ray L:980	1
27	DN-221887	Düz Ray L:980	1
28	H92103000018	Çelik Düz Rondela DIN 125 - A 10.5	68
29	H92108000021	Kanatlı Rondela A Biçimli DIN 6798 - A 10.5	68
30	H91902000229	Altı Köşe Tam Paso Civ.ISO 4017 - M10 x 20-N-8.8	68
31	H91909000135	Setskur Duz Uclu DIN 913 - M10 x 16-45H	68
32	H92203000207	Kopilya Koni Uçlu DIN 94 - 5 x 32	2
33	DN-223076	KALDIRMA KANCASI	4
34	H92001000016	Altı Kose Somun ISO 4034 - M16 -8	16
35	H92900038626	Vidalı Kulp - Form T - BİTAŞ (Ürün Kodu:1118 44 504)	2
36	DN-222242	Mesafe Burcu-/Ø70/Ø55/19	4
37	DN-223098	Kablo Kanal Sacı	6
38	H91904000229	Imbus Civata DIN 912 M6 x 10 — 10N-8.8	24

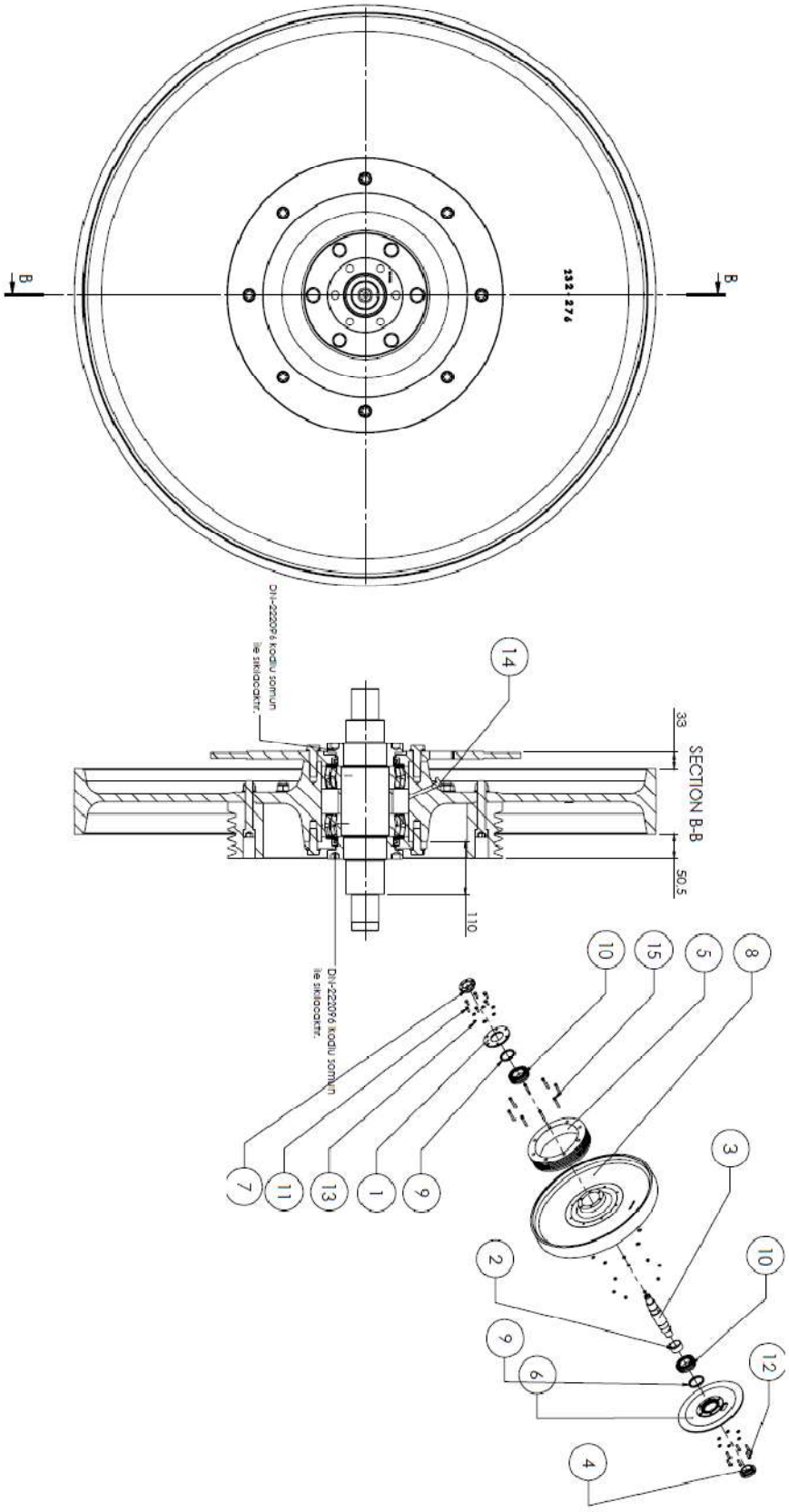
LOG ROTATOR ARM SPAREPART SCHEME



LOG ROTATOR ARM SPAREPART LIST

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	DN-213390	Çevirme Kolu Borusu	1
2	DN-221508	Çevirrme Kolu Plakası	1
3	DN-221507	Çevirrme Kolu Plakası	1
4	DN-221514	Zincir Klavuzu Kaynaklı	1
5	H91502000190	PAP 5540 P10	2
6	346-02-110111	GERDİRME PARÇASI	2
7	346-02-110105	DİSKLİ GERDİRME MİLİ	1
8	H91501000790	Sabit Bilyalı Rulman DIN 625 - 6007-2RS	1
9	DN-221505	Zincir Dişlisi-DIN 8187/24B/C/01/9/35	1
10	DN-213274	Çevirme Kolu Rulman Kapağı	1
11	H91906000091	Havsa Basli Imbus Civata DIN 7991 - M6 x 20 -8.8	3
12	H91904000469	Imbus Civata DIN 912 M12 x 80 --- 36N-8.8	2
13	H92001000013	Alti Kose Somun ISO 4034 - M12 -8	2
14	DN-213413	Çevirme Kolu Plaka Burcu	1
15	H92106000011	Çelik Konik Rondela DIN 6796 - 12	6
16	H91902000274	Altı Köşe Tam Paso Civ.ISO 4017 - M12 x 30-N-8.8	6
17	H94101000032	Kama DIN 6885 - AA 10x8x45 - C 45	1
18	DN-220806	Zincir Dişli Mili	1
19	H96712170590	OMP 250 - Shaft Ø25 - 151-0316	1
20	H91501001006	Sabit Bilyalı Rulman DIN 625 - 6011-2RS	1
21	H92101000372	Çelik Layner Halka DIN 988-35x45x1	2
22	H92101000371	Çelik Layner Halka DIN 988-35x45x0.5	1
23	DN-221512	Hidromotor Bağlantı Parçası	1
24	H92204000038	Emniyet Segmanı DIN 471 - 55 x 2	1
25	H92103000018	Çelik Düz Rondela DIN 125 - A 10.5	4
26	H92108000021	Kanatlı Rondela A Biçimli DIN 6798 - A 10.5	4
27	H91901000109	Altı Köşe Yarım Paso Civ. ISO 4014 - M10 x 50 x 26-N-8.8	4
28	DN-222926	Özel Zincir	1
29	H92103000020	Çelik Düz Rondela DIN 125 - A 13	2
30	H92108000023	Kanatlı Rondela A Biçimli DIN 6798 - A 13	2
31	H91902000280	Altı Köşe Tam Paso Civ.ISO 4017 - M12 x 40-N-8.8	2

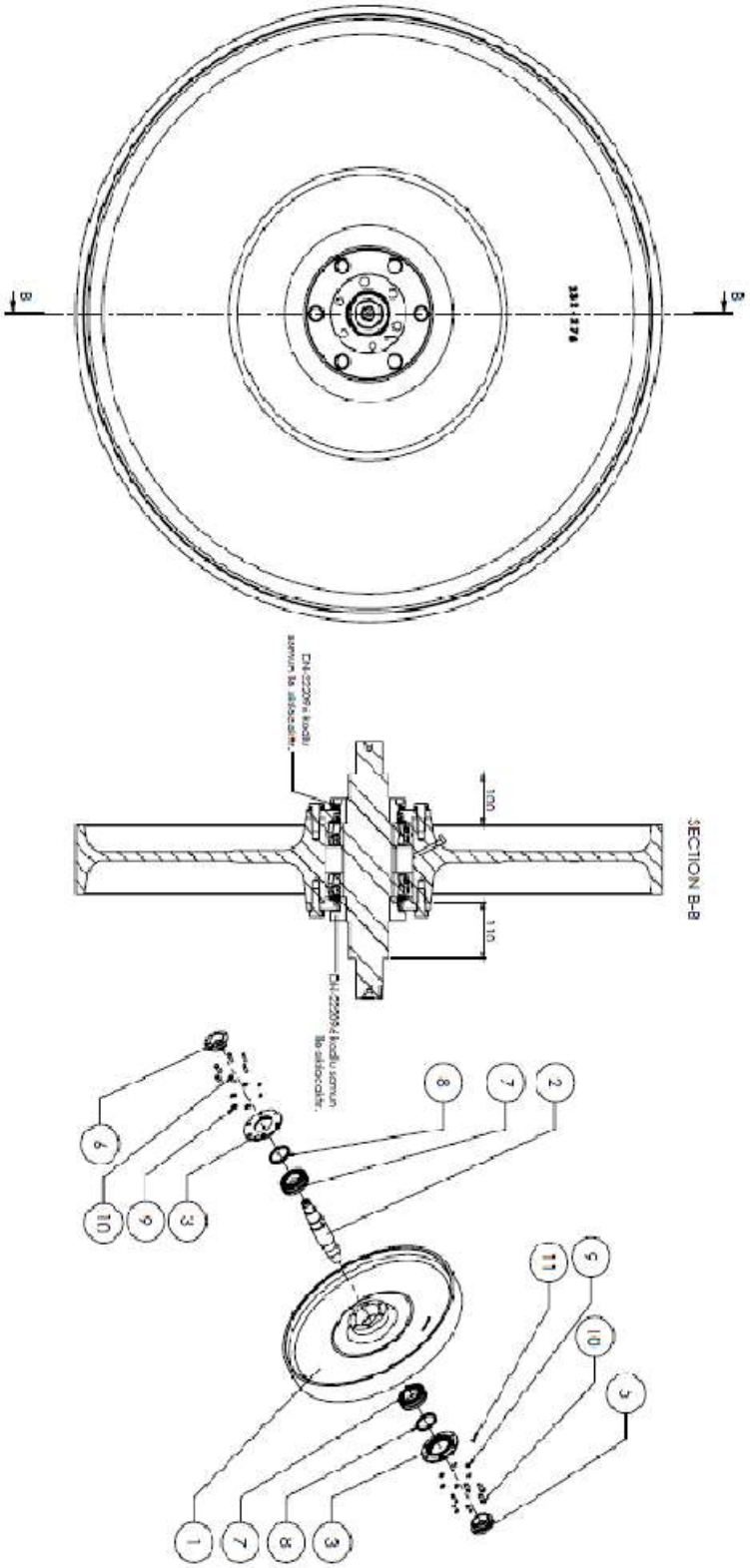
DRIVE WHEEL SPAREPART SCHEME



DRIVE WHEEL SPAREPART LIST

ÖĞE NO.	PARÇA NUMARASI	TANIM	DIN-221031-02 ADET
1	DIN-200507	Rulman Kapağı-///Ø180	1
2	DIN-200508	Mesafe Burcu-/112/100/53	1
3	DIN-220981	Volan Mili	1
4	DIN-220983	Sıkma Somunu	1
5	DIN-220988	SPB 560x5 Kasnak	1
6	DIN-221660	Fren Diski	1
7	DIN-221768	Sıkma Somunu	1
8	DIN-222184	1200mm Yatay Bıçka Volanı	1
9	H90008016609	Yağ keçesi - 115x140x12 - NBR (CR 115x140x12 HMS5-RG)	2
10	H91501010350	Silindirik makaralı rulman-DIN 5412-22220E.C3	2
11	H91902000325	Altı Köşe Tam Paso Civ.ISO 4017 - M16 x 45-N-8.8	6
12	H91902000331	Altı Köşe Tam Paso Civ.ISO 4017 - M16 x 55-N-8.8	6
13	H92103000024	Çelik Düz Rondela DIN 125 - A 17	20
14	H93900000704	Gresörlük 3/8" - 90	1
15	DIN 912 M16 x 100 — 44N-8.8		8

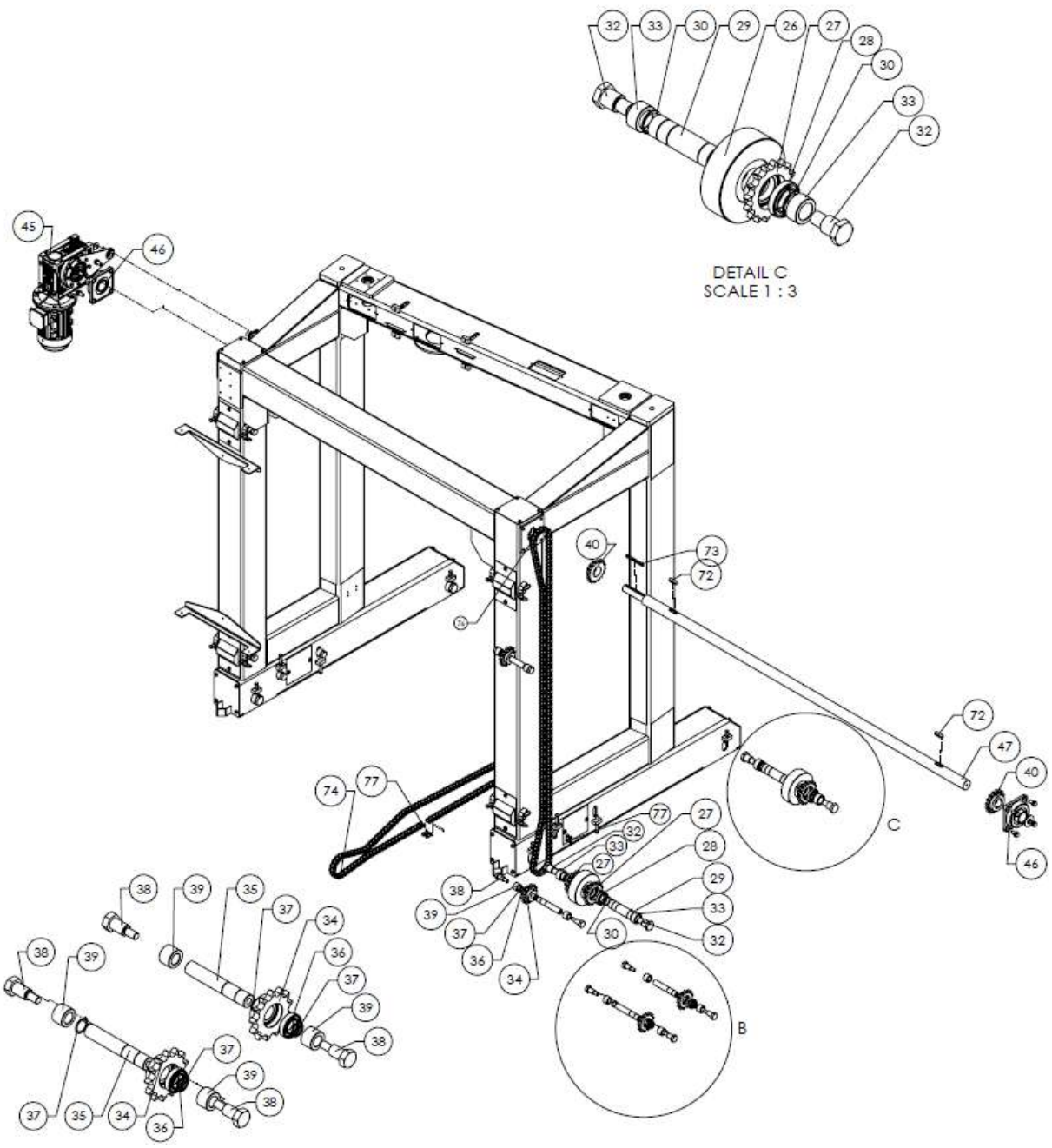
FREE WHEEL SPAREPART SCHEME



DRIVE WHEEL SPAREPART LIST

ÖĞE NO.	PARÇA NUMARASI	TANIM	MİKT.
1	DN-221532	1200mm Yatay Bıçkı Volanı	1
2	DN-220981	Volan Mili	1
3	DN-200507	Rulman Kapağı-///Ø180	2
4	DN-200508	Mesafe Burcu-/112/100/53	1
5	DN-220983	Sıkma Somunu	1
6	DN-221768	Sıkma Somunu	1
7	H91501010350	Silindirik makaralı rulman-DIN 5412-22220E.C3	2
8	H90008016609	Yağ keçesi - 115x140x12 - NBR (CR 115x140x12 HMS5-RG)	2
9	H92103000024	Çelik Düz Rondela DIN 125 - A 17	12
10	H91902000325	Altı Köşe Tam Paso Civ.ISO 4017 - M16 x 45-N-8.8	12
11	H93900000704	Gresörlük 3/8" - 90	1

BANDSAW UNIT BODY FRAME DRIVE TRANSMISSION SPAREPART SCHEME



BANDSAW UNIT BODY FRAME DRIVE TRANSMISSION SPAREPART LIST

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	DN-220892	Arka Kiriş	2
2	DN-220890	Taşıyıcı Kiriş	2
3	DN-220891	Kutu Profil	2
4	DN-221168	Tork Kolu Bağlantısı	1
5	DN-221679	Gerdirme Laması	8
6	DN-220894	Mapa Kaldırma Plakası	2
7	H92009000003	DIN 928 - Dört Köşe Kaynak Somunu M8	8
8	DN-221142	Araba Sacı	1
9	DN-221022	Gerdirme Laması	20
10	DN-221140	Bağlantı Laması	4
11	DN-221139	Ara Bağlantı Plakası	2
12	DN-221138	Zincir Kılavuzu	2
13	H92009000004	DIN 928 - Dört Köşe Kaynak Somunu M10	16
14	DN-221818	Kutu Profil	2
15	DN-221119	Araba Sacı	1
16	DN-221067	Orta Kiriş	1
17	DN-220885	Orta Profil	1
18	DN-221064	Motor Bağlantı Flanşı	1
19	DN-221674	Yatak Bağlantı Flanşı	2
20	DN-221070	Kiriş Üst Plakası	2
21	DN-221063	Feder	8
22	DN-221963	Konsol Bağlantı Plakası	1
23	DN-221966	Üst Kapama Sacı	1
24	DN-221845	Üst Kapama Sacı	1
25	DN-221980	Pano Bağlantı Sacı	2
26	DN-221124	Düz Tekerlek	1
27	DN-221120	Zincir Dişlisi-DIN 8187/168/B/01/16//	6
28	H91501000958	Sabit Bilyalı Rulman DIN 625 - 6010-2RS	8
29	DN-220881	Tekerlek Mili	4
30	H92204000036	Emniyet Segmanı DIN 471 - 50 x 2	8
31	DN-220897	Düz Tekerlek	1
32	DN-220973	Tekerlek Ayar Civatası	8
33	DN-221132	Mesafe Burcu-/Ø60,3/Ø40/30	8
34	DN-220967	Zincir Dişlisi-DIN 8187/16B/D/01/	8
35	DN-221136	Gerdirme Mili	4
36	H91501000718	Sabit Bilyalı Rulman DIN 625 - 6006-2RS	8
37	H92204000026	Emniyet Segmanı DIN 471 - 30 x 1.5	16
38	DN-221133	Tekerlek Ayar Civatası	16
39	DN-221134	Mesafe Burcu-/Ø42,4/Ø25/30	16
40	DN-221166	Zincir Dişlisi-DIN 8187/168/B/01/16//	2
41	DN-221144	Trapez Tekerlek	1
42	DN-220876	Trapez Tekerlek	1
43	DN-221695	Ön Kapak	2
44	DN-221692	Sıyırıcı Bağlantı Sacı	4

45	H94902011701	PMRV 105 – 112 M-4A - 2,2 kW - 70 D/dk - i:20 sf:2,2 - 255Nm - V6-1 [Ø42] - Tork Kolu Bağlantılı "L - 270° "	1
46	H91503020012	Rulmanlı Yatak - UCF 212	2
47	DN-220895	Tahrik Mili	1
48	DN-221057	Yatay Bağlantı Sacı	2
49	DN-221680	Mil Sabitleme Burcu Ø88,9/Ø60/16	1
50	DN-209148	Özel Pul-/Ø70/Ø13/6	1
51	DN-221677	Gerdirme Mili	4
52	DN-221684	Yan Kapak	8
53	DN-221681	Kapak	4
54	DN-221685	Servis Kapağı	4
55	DN-221687	Arka Kapak	2
56	DN-221696	Servis Kapağı	4
57	DN-221697	Üst Kapak	2
58	H92001000013	Altı Köse Somun ISO 4034 - M12 -8	24
59	H91902000298	Altı Köşe Tam Paso Civ.ISO 4017 - M12 x 70-N-8.8	16
60	H91902000310	Altı Köşe Tam Paso Civ.ISO 4017 - M12 x 110-N-8.8	8
61	H91902000229	Altı Köşe Tam Paso Civ.ISO 4017 - M10 x 20-N-8.8	17
62	H92103000018	Çelik Düz Rondela DIN 125 - A 10.5	16
63	H92103000016	Çelik Düz Rondela DIN 125 - A 8.4	24
64	H91904000286	Imbus Civata DIN 912 M8 x 16 --- 16N-8.8	24
65	H92103000024	Çelik Düz Rondela DIN 125 - A 17	8
66	H92108000027	Kanatlı Rondela A Biçimli DIN 6798 - A 17	8
67	H91902000319	Altı Köşe Tam Paso Civ.ISO 4017 - M16 x 35-N-8.8	8
68	H92106000011	Çelik Konik Rondela DIN 6796 - 12	1
69	H91902000274	Altı Köşe Tam Paso Civ.ISO 4017 - M12 x 30-N-8.8	1
70	DIN 6796-10		1
71	H91910000123	Setskur Kesik Koni Uclu DIN 914 - M10 x 20-45H	4
72	H94101000149	Kama DIN 6885 - AA 18x11x60 - C 45	2
73	H94101000064	Kama DIN 6885 - AA 12x8x140 - C 45	1
74	H926254951000000000	Zincir-DIN 8187/16B/01/138	2
75	DN-206356	Özel Pul-/40/11/4/	1
76	H926254951000000000	Zincir-DIN 8187/16B/01/194	2
77	H95500075106	DIN 8187 - 16B-1 Segmanlı Zincir Kilidi	4