PAR 280 PLC - PAR 350 PLC FULL AUTOMATIC PLC CONTROLLED BAND SAW MACHINE

OPERATION AND MAINTENANCE INSTRUCTIONS

PAR 280 FULL AUTOMATIC PLS CONTROLLED BAND SAW MACHINE



PAR 350 FULL AUTOMATIC PLS CONTROLLED BAND SAW MACHINE

IMPORTANT WARNING !

DO NOT OPERATE FULL AUTOMATIC AND PLC CONTROLLED PAR 280 & PAR 350 BAND SAW MACHINES BEFORE READING THE OPERATION AND MAINTENANCE INSTRUCTION MANUAL !

PLEASE READ THE BELOW SAFETY PRECAUTIONS BEFORE OPERATING THE FULL AUTOMATIC AND PLC CONTROLLED PAR 280 & PAR 350 BAND SAW MACHINE

- The all sections except the cutting system of Band Saw Machine were taken into protection cover. <u>Never put your hand or fingers inside the</u> <u>protection covers.</u>
- The cut material can fall on your foot. <u>Never put your hand or foot</u> <u>under the cut material.</u>
- Do the all maintenance, repairing and revision when the band saw machine stopped and the switch was turned off.
- Do lubricating and cleaning process when the band saw machine stopped and the switch was turned off.
- Keep the all covers and protections closed. If you took them out for any process, please fix them again after your process finished.
- Please lighten enough the band saw machine operation area for your safety.

PAR 280 - PAR 350 PLC FULL AUTOMATIC PLC CONTROLLED BAND SAW MACHINE

OPERATION AND MAINTENANCE INSTRUCTION MANUAL

SERIAL NUMBE	R :	•••••	
MODEL	: PAR 28	80 PLC	PAR 350 PLC
PRODUCTION (M	IONTH / YEAR)	:	/ 20

The label of serial number and production date was fixed on lower chassis left side.

Please read this instruction manual before starting which is giving important informations about the placing, using and maintenance of the machine.

The Instruction Manual must be kept protected for it is important for conscious use of machine and for your safety.

Please do not forget that the manufacturer company will have no liability in case the instructions in this manual were not taken into consideration during the operation.

Please ask your machine producer during the purchasing to fill the CERTIFICATE of WARRANTY for starting the warranty term. The certificate of warranty was arranged in two copies. Please provide one of two copies delivered to IMAS Integrated Systems Co. This is important for a better and active service for you.

The machines of which the certificate of warranty did not presented to producer will be out of warranty terms in case of any breakdown or problem with the machine.

KEEP YOUR CERTIFICATE OF WARRANTY!

IMAS INTEGRATED SYSTEMS CO. ALWAYS FOLLOWS UP A DEVELOPMENT POLICY. FOR THAT REASON IMAS CO. KEPPS THE RIGHTS OF ANY CHANGING AND RENEWING ON THE PRODUCTS GIVEN IN INSTRUCTION MANUAL BEFORE GIVING ANY INFORMATION.

www.capitalmachinery.com.au

GENERALWARNINGS!

A- MANUALS

The operation and maintenance manuals should be delivered to the responsible and in charge persons.

B- DELIVERY

Please check the machines when they arrived your land. If you determine any damage occured during the transportation, apply and fulfill the related agreement conditions. Please contact to IMAS Co. for changing the damaged parts and for ordering the new parts

C- STORING

Keep the machines which will not be used for a while in their packing for protecting from the bad air consitions and outer effects.

D- INSTALLATION AND STARTING

The installation of the machine must be done by the experienced staff as suitable to installation instructions. The starting and adjustments must be done by the experienced technical persons,too. The instructions must be observed during all procedures.

E- PRECAUTIONS AGAINST ACCIDENSTS

Please comply to all instructions on the manuals for preventing the accidents. The machines were produced as suitable to current international safety standards. The client should inform us about the local safety conditions before starting to manufacturing. If these local conditions needs extra expenses, those expenses will be on client's account.

F- MAINTENANCE and CLEANING

The maintenance and cleaning should be done by the qualified person as suitable to instructions given in manuals. The said instructions must be complied for longer machine and system lifetime.

G- COPYRIGHT

The copy or simulation of our machines or some parts is not allowed without written permision of us.

H- WARRANTY

The warranty is applied according to the conditions on the agreement. The breakdowns caused using of foreing spare parts supplied out of our company will be out of our warranty terms. Our company will have no any responsibility for the reason of the instructions are not complied or the wrong operation of non-capable staff.

CONTENTS

FIRST PARTS

1. SAFETY WARNINGS

1.1 GENERAL WARNINGS	7
1.2 GENERAL WARNINGS ABOUT USE OF BAND SAW MACHINE	8
1.3 TRANSPORTATION OF BAND SAW MACHINE	8
1.4 OPERATION AND MAINTENANCE OF BAND SAW MACHINE D	8
1.5 PREVENTIVE WEAR	9
1.6 PROTECTING DEVICES	10
1.7 CUTTING LIQUID	10
1.8 BLADE	10
1.9 TO BE CUT MATERIAL	10
1.10 THINGS TO BE TAKEN INTO CONSIDERATION	11
1.11 DANGEROUS SECTIONS OF MACHINE	
1.11.1 FEEDING UNIT AND SAWDUST CONVEYOR	12
1.11.2 CUTTING UNIT	12
1.11.3 ELECTRICITY DANGER	13
1.12 SAFETY SWITCHS	14

SECOND PART

2. GENERAL SPECIFICATIONS, TRANSPORTATION and I	INSTALLATION
2.1 GENERAL SPECIFICATIONS OF MACHINE	15
2.2 TECHNICAL SPECIFICATIONS OF MACHINE	16
2.3 TRANSPORTATION OF MACHINE AND INSTALLATION	
2.3.1 TRANSPORTATION OF MACHINE	17
2.3.2 THE WORKING AREA OF MACHINE	18
2.3.3 LAYOUT AND INSTALLATION	18-19
THIRD PART	
$\frac{1111}{2} \pi 1 =$	
5. THE MAIN PARTS OF MACHINE AND STARTING	20.22
3.1 MAIN PARTS OF MACHINE	20-23
3.2 THE CONTROL PANEL	24
3.2.1 OPENING SCREEN	24
3.2.2 MAIN CONTROL SCREEN	24-25
3.2.3 SECOND CONTROL SCREEN	25
3.2.4 SETUP SCREEN	26
3.2.5 PROGRAMME SCREEN	26-27
3.3 THE THINGS TO BE DONE BEFORE STARTING	
3.3.1 PRE- CONTROL	28
3.3.2 BAND SAW CHOOSE	29-32
3.4 STRATING THE MACHINE	33
3.4.1 MANUAL CUTTING	34
3.4.2 AUTOMATIC CUTTING	34
3.5 THE INFORMATIONS ABOUT THE OPERATION	35
3.6 THE HEALTHY CUTTING CONDITIONS	36
3.7 KEEPING IN SAFETY	36

FORTH PART

4. ADJUSTIVIENTS AND MAINTENANCE	
4.1 CHANGING THE BAND SAW 36-	-37
4.2 THE ADJUSTMENT OF BAND SAW ADJUSTING FEET	38
4.3 BAND SAW PULLEYS' ADJUSTMENT	38
4.4 HYDRAULIC SYSTEM ADJUSTMENT 38-	-39
4.5 BAND SAW HEAD LOWERING SPEED ADJUSTMENT	39
4.6 MAINTENANCE	
4.6.1 DAILY MAINTENANCE	40
4.6.2 WEEKLY MAINTENANCE	40
4.6.3 MONTHLY MAINTENANCE	40
4.6.4 SIX MONTHS MAINTENANCE	41
FIFTH PART	
5. BAND SAW DAMAGES AND REASONS, THE PROBABLE PROBLEMS AND	
SOLUTIONS	
5.1 BAND SAW DAMAGES AND REASONS 42-	-43
5.2 THE PROBABLE PROBLEMS AND SOLUTIONS	
5.2.1 THE PROBABLE PROBLEMS ON HYDRAULIC SYSTEM AND SOLUTIONS	44
5.2.2 THE PROBABLE PROBLEMS ON ELECTRICITY SYSTEM AND	4.5
SOLUTIONS	45
SIXTH PART	
6. BAND SAW BLADE, CUTTING SPEEDS and CUTTING LIQUID RATES	
6.1 BAND SAW BLADE INFORMATIONS 46	-47
6.2 THE CUTTING SPEEDS FOR CUTTING MATERIALS AND CUTTING LIQUID RATES 48	-49
SEVENTH PART	
7. THE HYDRAULIC AND ELECTRICITY SYSTEM	
7.1 THE HYDRAULIC SYSTEM SCHEMA	50
7.2 THE ELECTRICITY SYSTEM SCHEMA 51	-55
EIGHTH PART	
8. THE CUTTING CRITERIAS	
8.1 CUTTING CRUTERIAS 56	-63
ΝΙΝΕΤΗ ΡΑΡΤ	
$\mathbf{Y}, \qquad \mathbf{\Pi} \mathbf{U} \mathbf{W} = \mathbf{U} \mathbf{K} \mathbf{E} \mathbf{A} \mathbf{U} \mathbf{U} \mathbf{U}$	61
9.1 PRODUCER COMPANY INFORMATIONS	04

FIRST PART

1. SAFETY WARNINGS

1.1 GENERAL WARNINGS

The Band Saw machines can cause to serious injury in case of they are not used as suitable to instructions. For this reason the users needs to have common sense and be carefull during the operation of machine. First the person using the Band Saw machine should have a healthy psychology, spiritual health and he needs wearing suitable clothes and especially he must know well about the Band Saw machine.

For your safety and for preventing the damage of Band Saw:



• Please read the instruction manual before operating the Band Saw machine and advise your staff for reading the instructions carefully, as well. Please keep the User Manual in a place just beside the machine where it is easily found.

• Please be sure that working area was cleaned and designed well for not to prevent your healthy working.

• Please be away from the behaviours and operations that can effect your safety in a bad way.

- Do not step on the driver rollers and on the other accessories.
- Please keep always the labels clean and in good condition.

• Please examine and apply all safety precautions well informed on operation and maintenance instructions.

• Do not let someone else for operating the machine out of experienced machine operators.

• Please lighten the Band Saw working environment well for safer working.

• Please apply all instructions given in this Instruction Manual for having the maximum efficiency of your Band Saw machine.

1.2 GENERAL WARNINGS ABOUT USE OF BAND SAW MACHINE

• This machine was designed only for cutting the general metal materials. Do not cut wooden, radioactive metals, flammable materials etc. Our company will not accept any responsibilities for the harms caused cutting such materials.

• Our company has no responsibility against any damages and risks caused as the result of changing and addition on the machine or removing any part of the machine.

• The Band Saw machine should be used only by experienced and adequate staff.

• The machine should be operated as suitable to the instructions given in this manual.

• The machine should be used in a closed area and in a dry environment. It must not be used in the environments have the risks of explosion.

• The machine should be used as suitable to it's capacity and should not be over-charged.

• The electricity connection and maintenance of electricity system should be maintained by an electrician.

1.3 TRANSPORTATION OF MACHINE



• The transportation and carrying of machine should be done by the suitable vehicles.

• Please be sure about the enough capacity of transporting and carrying vehicles during the transportation.

1.4 OPERATION AND MAINTENANCE OF MACHINE



• Please keep enough space between you and the machine for protecting any stroke.

• In emergency or during any problem please stop the machine urgently by pushing the emergency stop button.

• Please keep the machine always clean. Please clean the oil spots, metal shavings and cutting liquids just after each cutting process.



• Please do not leave any keys, tools etc. on the machine.

• Please cut the electricity connection and lock the main switch on electricity panel before any maintenance and reapiring. Otheriwise someone can probably operate the machine during your maintenance or reparing.

• Do not start the machine if the guards and covers are taken out.

• Please fix the all taken out guards and covers just after the maintenance or repairing process.

• The maintenance and repairing should be done by the experienced mechanics or electricians.

• Before any process on the hydraulic system, please decompress the hydraulic pressure and keep the Band Saw head in the lowest level for preventing any falling risks.

• Please use the original spare parts for maintenance and repairing. Otherwise our company will not accept any responsibility.

The well-ordered maintenance is the first condition of perfect operation of your Band Saw machine.

1.5 PREVENTIVE WEAR



• It is very important for the machine user wearing the safety clothes. All safety wear should be buttoned up. The safety wear not buttoned up could be hitched to movable parts of machine.

• Please do not start the machine with your long and untidy hair. Do not wear neclace, loose wristband etc. Those things could be dangerous during the working.



• Please wear the safety shoes with steel protector and non-slip sole. Because the cut and falling metal parts can be sometimes very heavy and they can cause serious injury. Please portect yourself from those falling parts.

• Please use the safety gloves only when carrying the material, placing the material on the machine, cleaning the machine, changing the band saw and changing the shaving cleaning brush, because:

- 1- The band saw is very sharp and can cut your hand.
- 2- Some material corners and edges are very keen and can cut your hand.
- 3- The hot shavings and the cut parts can burn your hands.
- 4- The longtime contact of your hand with cutting liquid can cause to health problems.
- Do not use gloves for commanding the control panel.

• Do not start the machine before using safety glasses. Because the cutting process can cause thrown up the small shavings suddenly and this can harm your eyes.

• Please use a suitable safety headset during working. In most cutting process 80dB(A) noise comes out. If you stay longtime in this noise, your ears can suffer for this.



1.6 PROTECTING DEVICES

• Please provide a safe using of the machine. Be sure about all safety equipment (covers,guards, limit switches etc.) are installed and functional. Otherwise do not start the machine.



• Please never open the guard covers during the operation of the machine. Especially do not by-pass those covers and guards and they must not be non-functional.

• Never keep the safety swithes out-of-service.

• If a safety device is out of service, immediately push the emergency stop switch. Do not start the machine again before repairing it.

• Please stop the machine before taken the safety devices out, cut the electricity connection and lock the main switch.

• Please check all safety and guard devices monthly whether they are functional.

1.7 CUTTING LIQUIDS

• The cutting liquids include chemical additives and they can be harmfull to your health.

• The cutting liquids can dirty your working area. They can deform the base. The cutting liquid on the floor increase the slipping and falling risks. For that reason please use the shoes with non-slip sole and clean the liquid on the flor everyday.

• Do not let cutting liquid contact your body anycase. Please use gloves for carrying the cut materials wet with cutting liquids and for cleaning the machine.

٠

1.8 BAND SAW

• The teeth of band saw is very keen and sharp. Please use gloves for carrying and changing the band saw.

• Please take the plastic guard of band saw teeth just after fixed on the machine. So you lower the probable accident risks.

1.9 MATERIAL

• The materials may have the keen and sharp edges and corners which cause the accidents. Please use gloves for carrying and placing the material on the machine.

• The cut parts are hot and wet with cutting liquid. Fort his reason surely use the safety gloves.

- Keep the safety during carrying and placing the material on the machine.
- Please use suitable lifting devices for carrying heavy materials.

• Please stack the cut and to be cut materials in well order for preventing the slipping and falling and please use suitable supporters for that.

1.10 THINGS TO BE TAKEN INTO CONSIDERATION DURING THE OPERATION OF MACHINE

• Never close to operating Band Saw machine. The band saws work in high speed and can cause to serious injury.

- Do not close to the movable parts during the operation and cutting process.
- Please do not step and walk on the machine and any accessories.

• Pay attention during the clamps closed and pay attention whether being an alive or human organs between them.

• Do not touch the band saw before completely stop, do not open any guard and do not close to clamps, as well.

• Please do all kind of adjustments, maintenance when the machine is stopped and cut the electricity connection before this process.

Please comply the above given safety rules. Otherwise:

1- Some accidents and injury may happen(cuts, smashes, broken etc.)

2- Our company has no any responsibility against the negative results such as accidents and injury etc. as a result of breaking the safety rules.

1.11.1 FEEDING UNIT AND BANDSAW CONVEYOR



1.11.3 ELECTRICITY DANGER







1.12 SAFETY SWITCHES



SECOND SECTION

2. GENERAL SPECIFICATIONS, TRANSPORTATION and INSTALLATION

2.1 GENERAL SPECIFICATIONS

- PLC controlled cutting specification
- Touch control panel
- 10 different cutting programme specification
- Sequential cutting specification between the programmes
- Non-gradual bandsaw speed adjustment on touch screen
- Written warning on touch screen in such cases bandsaw break, motor thermic blow-out etc.
- Double language option on touch screen
- Saw dust conveyor
- Easy cleaning mobile cutting liquid tank and saw dust bin
- Material driving mechanism with gearing system
- Manual and automatic operating specification
- Counting the cut and to be cut material, automatic stop after cutting and hydraulic head lifting
- Hydro-mechanic bandsaw stretch
- Hydraulic material tightening
- Adjustable material tighten pressure
- Material table with 5 rollers
- Adjustable maual top pressing roller installed on material table
- Saw dust cleaning specification with pressure water on bandsaw foot
- Cutting liquid system on bandsaw foot
- Steel middle body, casting bandsaw pulleys
- Bandsaw break switch, fase protection relay
- Sensitive lowering speed
- Thermic protected electricity motors
- Safety switch on panel and bandsaw cover
- Bi-metal bandsaw
- Bandsaw directing double ball bearing
- Single ball bearing supporting on band saw.
- Adjustable band saw feet and carbide bandsaw guides
- Hardened material driving rollers
- Fix and mobile clamping rollers bottom bearing
- Cooling liquid and hydraulic oil level indicators

		PAR 280 PLC	PAR 350 PLC	
MAIN MOTOR	kW	2,2	2,2	
MATERIAL DRIVING MOTOR	kW	0,37	0,37	
CUTTING LIQUID MOTOR	kW	0,12	0,12	
HYDRAULIC MOTOR	kW	0,37	0,37	
CONVEYOR MOTOR	kW	0,18	0,18	
OPERATION PRESSURE	Bar	50	50	
BANDSAW TIGHTEN PRESSURE	Bar	100-150	100-150	
MATERIAL TIGHTEN PRESSURE	Bar	20 - 30	20 - 30	
CUTTING SPEED	m/dk	15130	15100	
CUTTING CAPACITY	mm	280	350	
		280x265	350x350	
BANDSAW SIZE	mm	27x0,9x3670	34x1,1x4145	
VOLTAGE	V (AC)	400	400	
FASE NUMBER		3	3	
FREQUENCY	Hz	50	50	
MAX. POWER	kW	3,24	3,24	
MAX. CURRENT	Α			
MATERIAL FEEDING HEIGHT	mm	700	700	
MACHINE SIZES	mm	1950x2150	2230X2500	
MIN. HEIGHT	mm	1200	1300	
MAX. HEIGHT	mm	1800	2000	
WEIGHT	kg	870	950	

2.3 TRANSPORTATION AND INSTALLATION

2.3.1 TRANSPORTATION



• Please be sure about the enough capacity of the devices and vehicles for safety transportation of the machine.

• Please lift the machine from the four pieces lifting hooks on the machine and by the means of enough length and strong lifting rope. **Drawing 1**

• Please lower and fix the machine head in the lowest position before the transportation. **Picture 2**





Drawing 1

Picture 2

- Cut the machine electricity connection.
- Take the material table out.
- Pay attention whether being any material between the clamps.
- Empty the cutting liquid. Clean the shavings.

• Take the necessary precautions for protecting the touch screen from the damages during the transportation.



2.3.2 WORKING AREA AND SIZES



	А	В	С	D
PAR 280 PLC	1950	4300	2150	9400
PAR 350 PLC	2250	4500	2250	9500

Note: All sizes were given in mm.

• Please prepare a space in the above given dimensions for the machine. The working area floor should be plain and strong enough.

2.3.3 LAYOUT AND INSTALLATION

• Please place the machine on the plain and strong floor by fixing the chassis adjustment bolts. The chassis adjustment bolts was put inside the electricity panel.

• Please un-pack the machine and clean the guard oil on the machine.

• Take the safety part out which is fixing the machine head to middle body. Drawing 2

• Put and fix the material table in a suitable place at the behind of the machine.

• The material table rollers and the machine central body should be in the same level and well balanced. This adjustment could be done by the means of the bolts in front and behind of machine and by the means of the bolts on the table. (Drawing 3)



Drawing 3

• Please supply the machine electricity connection as suitable as the attached given electricity schema. The grounding connection must be done. The network should be V (AC) 50Hz.

• Plug the machine cable on. Switch on the main switch beside the electricity panel. The signal lamb on the panel will light on and the touchscreen will be ready. On the contrary please try again by changing the connection the two of L1, L2 and L3 cables ends. <u>Before doing the changing process, please unplug the electricity cable and cut the electricity connection all.</u>



THIRD PART

3. MAIN PARTS OF MACHINE AND STARTING

3.1 MAIN PARTS



- 1- Bottom Chassis
- 2- Electricity Panel
- 3- Middle Body
- 4- Bandsaw Supoorting Feet
- 5- Top Head
- 6- Joint Spring
- 7- Cutting Liquid Pump
- 8- Saw Dust Box
- 9- Cutting Liquid Tank



- 10- Saw Dust Conveyor Motor
- 11-Main Switch
- 12- Material Tighten Hydraulic Cylinder
- 13-Touch Control Panel
- 14-Bandsaw Stretching Mechanism
- 15-Bandsaw Cover Switch
- 16-Material Grill
- 17-Saw Dust Conveyor
- 18- Chassis Adjustment Bolts



- 19-Material Table
- 20- Cutting Cylinder
- 21-Bandsaw Drive Reducer
- 22-Material Feeding Reducer
- 23-Bandsaw Break Switch
- 24-Fix Clamp
- 25-Mobile Clamp
- 26-Top Pres



- 27-Signal Lamp, lights on when the machine has power
- 28-Emergency Stop Button
- 29- Head Lowering Speed Adjustment Valve



30- Fix Clamp Between Switch and Mechanism 31- Encoder



32- Top Limit Switch33- Bottom Limit Switch

3.2 CONTROL PANEL

➢ INITIAL SCREEN



This is the screen you will see after power comes to the machines. You will choose the language in this screen.

➢ CONTROL SCREEN



AUTO/MANUAL	: To run the machine in automatic or manual mode
CLOSE VICE	: Closes the vice and clamps the material.
OPEN VICE	: Opens the vice and releases the material.
MATERIAL BACK	: Feeds the material back.
MATERIAL FORWA	ARD: Feeds the material forward.
BOW UP	: Lifts the bow up. Stops after touching the upper limit.
BOW DOWN	: Lifts the bow down. The bow goes up after touching the lower limit.
CONVEYOR BACK	: Moves the chip conveyor back.
CONVEYOR FORW	ARD: Moves the chip conveyor forward.
COOLING LIQUID	: To choose to run the cooling liquid or not
SET VALUE	: Length to be cut (mm)

ACT. LENGTH REMAINING CUT STOP	 : Length that is cut at that moment (mm) : Remaining amount of pieces to be cut : Number of pieces that have been cut : To stop the machine
START PRG NR	: To start cutting: To choose the program number among the list that has been entered in the program
screen PAGE 2	: To pass to screen 2.



PAGE 1 : Goes to control screen 1

PROG. : Opens program screen

PROGRAMMED CUTTING: To cut the programs that have been entered in program screen one after another

UP ARROW : Increases blade speed

DOWN ARROW : Decreases blade speed

TIME SETUP : To adjust the time of the panel

PASS : To activate the SETUP button, password should be entered. Press the PASS button and then enter the password and press OK. Then press RETURN button to return the previous screen.

SETUP : To open the parameters screen to control the bandsaw

NOTE: It is not recommended to change these parameters so the password is not supplied to the operator. If needed, please contact the manufacturer.

➢ SETUP SCREEN



ENCODER ROLL CIRCUMFERENCE: Circumference of the roll of the encoder on the vice (133,50 mm)**ENC PULSE** : Number of pulses on the encoder (written on the encoder label) (500)**BLADE SPEED CO** : Blade Speed Measuring Coefficient (176) **BLADE SPEED DIVIDER** : Blade Speed Measuring Divider (100) : Blade Thickness (1,3 mm) **BLADE THICKNESS** : Speed of the cut material to reach the dimension (9) DISTANCE COE : Upper speed frequency of the driver motor (30,00 Hz) MAX FREQUENCY MIN FREQUENCY : Lower speed frequency of the driver motor (6,00 Hz) : Time for the vice to close after start button is pressed (1,5 seconds) VICE CHECK TIME : Upper cycle of the blade motor (130) MAX (m/min) MIN (m/min) : Lower cycle of the blade motor (15) : Acceptable error tolerance for the material to be cut (0, 1mm)ERROR TOLERANCE MENU : Opens control screen 2

PROGRAM SCREEN

· NR·LENGTH(mm)· · · QTY·	#IN ONE BUNDLE
∴ 1-; ; ; <u>0000.0</u> ; ; ; ; <u>0000</u>	
2- 0000.0 0000	
3- 0000.0	
: 4-: : : 0000.0 : : : : 0000	
; 5-; ; ; 0000.0 ; ; ; ; 0000	
6- 0000.0 0000	
; 7- ; ; 0000.0 ; ; ; ; 0000	
: i8- : : 0000.0 : : : 0000	
: ₉₋ : : : 0000.0 : : : 0000	
· 10- · · 0000.0 · · · · 0000	

NR : Program number; the number to be chosen during cutting

LENGTH (mm) : Length of the material to be cut

QTY : Quantity to be cut

IN ONE BUNDLE : Number of pieces between the vices. Number of pieces cut increases by the multiple of the value entered here.

- RESET : Clears all values on the program screen
- MENU : Opens control screen

3.3 THINGS TO DO BEFORE STARTING THE MACHINE

3.3.1 PRE-CONTROLS

• Place the machine as it was advised in before sections.

• Be sure about the electricity connection was done as suitable to given Electricity Schema. The network should be 400V AC and the grounding must be done well.

• Fill the cutting liquid reservoir with 30lt. cooling liquid. See the given Mixing Table for a necessary mixing rates.

• Be sure about the safety part was taken out which is fixing the machine head to middle body (Picture 1)





Picture 1

• Check the hydraulic oil tank for oil level. The tank capacity is 9 lt. If the oil decresed, fill it up. The oil should be No 46 hydraulic system oil. (Picture 2)



Picture 2

• Check the band saw stretching system pressure. The pressure seeon on manometer should be between 100-150 bar. (Picture 3)





Picture 3

3.3.2 CHOOSING BAND SAW

The following steps should be followed for choosing band saw:

- 1. It should be suitable to be cut material.
- 2. 1" (25,4 mm) teeth number should be determined as suitable to be cut diameter.

CHOOSING TEETH

The correct teeth choosing is important. This up to two criterias.

- **\Box** The teeth number in one inch (25,4 mm)
- □ Grade angle

TEETH NUMBER IN ONE INCH (25,4 mm)

The Three Teeth Rule

Please choose the biggest tooth including min. three teeth inside the material for an easy and efficient cutting. This is shown as the teeth number in one inch(25,4 mm). (1 inch = 25,4 mm) If the material thickness is changable, please choose the the changable tooth which has wider using area. Please use the following that for choosing teeth.

> Solid Material

Use the following table for choosing the teeth according to the material thickness



Choose the teeth from the beside table according to the material diameter.

b) Multiple Cutting



ACCORDING TO THE DIAMETER AND THICKNESS OF CUTTING MATERIAL(25,4 mm) TEETH QUANTITY IN 1"						
FIX TOOTH	E (mm)	CHANGABLE TOOTH				
18	2	10 / 14				
14	5 8	8 / 12				
10	12	6 / 10				
10	22	6 / 10				
0	30	5 / 8				
8 6	40					
4	100 140	4 / 6				
3	200 240	3 / 4				
2	300 450 600	2/3				
1,2	000	1 / 2				
0,75		0,75 / 1,2				

Choose the teeth by taking E sizes into consideration for multiple cutting materials.

NOTE: The changeable teeth band saw sometimes prevents the vibration caused by the resonance of the single tooth.

c) Angle Cutting

In case of angle cutting on the machine, the band saw cutting surface can be changed according to the angle degree. As a result of this the teeth number on the band saw also changes. For that reason the teeth choosing process should be done again as suitbale to cutting angle degree.



a) Single Cutting



<u>NOTE:</u> <u>PAR280 PLC and PAR 350 PLC Band Saw machines have no angle cutting</u> system. The information was given only for extra information.

> Variable Cross-Section Materials

Single Cutting



L (mm) E (mm)	20	40	60	80	100	120	150	200	300	500
2	14	14	10/14	10/14	10/14	10/14	10/14	8/12	6/10	6/10
3	10/14	10/14	10/14	10/14	8/12	8/12	8/12	6/10	6/10	5/8
4	8/12	8/12	8/12	8/12	8/12	6/10	6/10	6/10	5/8	5/8
5	8/12	8/12	8/12	6/10	6/10	6/10	6/10	5/8	5/8	4/6
6	6/10	6/10	6/10	6/10	6/10	6/10	5/8	5/8	4/6	4/6
8	6/10	6/10	6/10	6/10	5/8	5/8	5/8	4/6	4/6	3/4
10		5/8	5/8	5/8	5/8	5/8	4/6	4/6	4/6	3/4
12		5/8	5/8	5/8	4/6	4/6	4/6	4/6	3/4	3/4
15		4/6	4/6	4/6	4/6	4/6	3/4	3/4	3/4	2/3
20			4/6	4/6	3/4	3/4	3/4	3/4	2/3	2/3
30				3/4	3/4	3/4	2/3	2/3	2/3	2/3
50						2/3	2/3	2/3	2/3	1,2/2

Please choose the teeth from the above given table according to the material diameter (L) and the thickness (E).

FOR INSTANCE: The material diameter is (L) = 60 mm and the thickness is E = 6 mm.

The teeth should be ; 6/10 teeth band saw according to above given sample.

Multiple Cutting



e: The thickness of the material

L: The quantity of multiple cutting materials in "L" dimension

E: The thickness taken for teeth choosing

$E = \frac{e \ x \ "L" \ quantity \ in \ this \ dimension}{2}$

FOR INSTANCE: The material diameter is 30 mm.

"L" quantity in this dimension = 4

$$L = 4x30 \qquad L = 120 \text{ mm}$$

$$E = \underline{e \ x \text{``L'' quantity in the dimension}} = \underline{3x4} \qquad = \underline{12} = 6 \text{ mm}$$

According to the values L = 120 mm and E = 6 mm, 6/10 teeth band saw should be choosen from the table.

c) Angle Cutting

In case of angle cutting on the machine, the band saw cutting surface can be changed according to the angle degree. As a result of this the teeth number on the band saw also changes. For that reason the teeth choosing process should be done again as suitable to cutting angle degree.



A: The view of band saw during 90 degree cutting B: the view of band saw during angle cutting E1: The cutting surface of band saw during 90 degree cutting E2: The cutting surface of band saw during angle cutting.

$\underline{\mathbf{E2}=\mathbf{E1}\,/\,\cos\,\alpha}$

The cutting surface of band saw should be calculated again in accordance with the above given values. As the result of calculation, choose the teeth again.



<u>NOTE:</u> PAR280 PLC and PAR 350 PLC Band Saw machines have no angle cutting system. The information was given only for extra information.

3.4 STARTING



• Please read the instruction manual before operating the Band Saw machine and advise your staff for reading the instructions carefully, as well. Please keep the User Manual in a place just beside the machine where it is easily found.

• The machine should be used only by the experienced and the suitable staff for this work.

• Please provide the correct placing of machine and do the all controls which should be fone before operation as advised in before sections of this manual.



• Please take the all safety precautions for preventing the harms in case of the cut material falling down.

• Please check if the correct and suitable band saw was fixed on the machine. If not, please choose the correct band saw as suitable to above given informations.

• Please supply power to machine by switching on the main switch. In this case the signal lamp will be light on. Later puch the Start button.

• Please adjust the top head as high as 10cm from the material to be cut by fixing the top limit switch and tighten the bolt. Adjust the between space of band saw guiding feet according to the material sizes that you wish to cut.

• Lift up the machine head by pushing the Head Lifting Button.

• Open the active clamp as much as your material is going to fit by pushing the Clamp Opening button.

• Clasp the material between the clamps by pushing the Clamp Closing button just after placing the material as touching on the front stoper. The pressure seen in the manometer on the material clasping hydraulic cylinder should be around 20 bar.

• Be sure for being the speed adjustment valve in closed level (0). Push the start button for starting the band saw. The band saw turning direction should be in the same direction seen in the below drawing.



3.4.1 MANUAL CUTTING

• Stop the machine by pushing stop button after doing all above procedures. The speed adjustment valve (0) should be closed and the manual cutting mode should be choosen. Push the Forward button as long as you would like to cut the material.

• If the length of material is longer than you need, you can take it back by pushing backward button.

• Start the machine by pushing the Start button. Open the second control panel by pushing Page 2. Here adjust the suitable speed as suitable to your material type. Use the Annex table for the advised values.

• Go back to main control panel by pushing Page 1. Here activate the cutting liquid button. After this the cutting liquid pump is going to start and pump cutting liquid on band saw.

• Provide the machine head lowering down and starting to cut the material by opening the speed adjustment valve a little. After cutting finishes the band saw is going to stop and the head is going to lift up till pushing the top limit button.

3.4.2 AUTOMATIC CUTTING

• Place the material on the machine as being the material length passed forward the level of band saw a little or drive the material a little manually forward from the level of band saw.

• Open the Programme panel by pushing the programme button on second control panel. Here there are 10 different cutting programmes. Please enter the length and cutting number for each programme. If you are going to do multiple cutting, enter the cutting number into the multiple numbers section.

• If you would like to pass automatically to second programme and would like to continue from the second programme after the first was finished; activate the sequential cutting button on the second control panel.

• Choose the automatic cutting mode on main control panel. Choose any programme you did before on the Programme No section. Activate the cutting liquid button.

• Provide the machine head lowering down and starting to cut the material by opening the speed adjustment valve a little. The first cutting of automatic cutting process is end levelling process and it is not deducted from the total cutting number. After cutting finishes the band saw is going to stop and the head is going to lift up till pushing the top limit button. Later the material is driven as long as it was programmed and the cutting starts again. This continues till the programmed total cutting number is cut.

3.5 SOME INFORMATION ABOUT THE OPER ATION OF MACHINE

• In the time the top limit switch is not pushed, the machine will be nonfunctional. For starting the top head should be lift up and the top limit switch should be pushed for functioning.

 \wedge

• For operating the machine the clamp between switches should be active. The bandsaw stops in case the switch is out of service for such cases the material finishes or the material surface is very bad or the movable clamp is not able to give enough pressure for tightening the material. In this case the "material finished" message is seen on the screen.

• In case of the band saw breaks or very loosen the machine stops. On the screen the "Band saw break" message is seen on the panel. In such cases check the band saw and stretch.

• The machine stops in the time any of motor thermics is out of service and the related message is seen on the panel.

• The machine stops if the band saw guard cover or electricity panel cover is opened and the related message is seen on the panel.

• In emergency stop the machine by pushing the stop button. During the emergency button is pushed the machine will be non-functional and the "Emergency Stop" message is seen on the panel.

• The cleannes of the encoder rollers fixed to the encoder on the movable clamp is very important fort he sensivity of the band saw machine. Clean the saw dusts collected here often.

• In multiple material cutting process, it is very important that the materials are clasped strongly between the clamps. In such cases it is advised to spot-welding the materials to each other from the back sides.



3.6 HEALTHY CUTTING CONDITIONS

We, Imas Integrated Systems Ltd. advise you the 7 golden rules for the operating the Band Saw Machines with a maximum capacity and maximum efficiency as follows:

- 1. Rule: The band saw should be choosen as suitable to material.
- 2. Rule: The band saw teeth 1" (25,4 mm) should be choosen as suitable to material diameter.
- 3. Rule: The band saw stretch should be suitable.
- 4. Rule: The band saw (cutting) speed should be suitable to material.
- 5. Rule: The material should be clasped strongly.
- **6.** Rule: Material-machine and material table should be in the same level (well balanced).
- 7. Rule: After providing all above given conditions the correct head lowering speed should be adjusted as suitbale to material. The head lowering speed could be adjusted by taken the shaving forms into consideration. (Please see the Fourth Part)

3.7 KEEPING THE MACHINE SAFE

After the operation is finished, if the machine is going to be kept without operation for a short or long time;

- Cut the electricity connection
- Loosen the band saw. (Strech again when you need to start the machine.)
- If any material between the clamps, take them out.
- Do the general and periodical cleaning of machine.
- Take precautions in winter times fort he cooling liquid for not to freeze.
- Tezgahın elektrik bağlantısını kesin.
- If the machine is going to be kept for a long time without operation; Grease and lubricate the machine with protector Grease and oil.
- Do not leave the covers of the machine.

FOURTH PART

4. ADJUSTMENTS AND MAINTENANCE

4.1 CHANGING BAND SAW / BLADE

Bandsaw Take Out:



- Please use the suitable safety gloves for taking the bandsaw out.
- Lift the machine head as much as you can change the bandsaw easily.
- Switch off the main switch of machine and cut the electricity connection.
- Open the bandsaw pulley covers. Take the bandsaw guards out.

- Loosen the bandsaw by turning the bandsaw strecting hand wheel in the direction
- of 1 as seen in the below drawing.
 - Be sure that the bandsaw was loosen as much as it can be taken out easily.
 - Take the bandsaw out from the bandsaw channel on the guiding feet.
 - Take the bandsaw from the machine in a safe way.

Placing the Bandsaw:

- Please use the suitable goloves for fixing the bandsaw.
- Cut the electricity connection by switching off the main switch.
- Please choose the bandsaw as suitable as the material type and diameter.
- Please pay attention that the bandsaw was fixed well in the cutting direction.
- Place the bandsaw on the free and driving pulleys.
- Place the bandsaw in the bandsaw channel on the bandsaw guiding feet.
- Please stretch the bandsaw by turning the stretching hand wheel in the direction of 2 as seen in the below drawing. The manometer pressure should be between 100–150 Bar.
- Close the bandsaw pulley cover and fix the guards.





The band saw should be fixed on the machine as seen in the above drawing. Provide the band saw placed well on the pulley nest.

4.2 BAND SAW GUIDING FEET

Please adjust the band saw guiding feet between as suitable as to be cut material size. Close the free guiding foot to the machine by loosening the knob on the band saw free guiding foot. Otherwise the cutting quality and band saw lifetime will be effected negatively.



ADJUSTMENT OF BAND SAW PULLEYS 4.3

The band saw free and driver pulleys should be in the same level. For this please adjut the balance of pulleys with the adjuetment bolts on the band saw streching mechanism.



4.4 HYDRAULIC PRESSURE ADJUSTMENT

The hydraulic system pressure is adjusted by the means of pressure adjustement valve on the hydraulic unit on the side of machine. Here the head lifting pressure and material clamping pressure is shared.

> Lift the machine head on the top level. ۲

Cuteral

• Loosen the No 1 valve, and tighten the No 2 valve.

◆ Place any material between the clamps and push the clamp close valve. Tighten slowly the No1 valve and observe the pressure from the manometer on the material tighten hydraulic cylinder. Tighten the No1 valve till the pressure reach to 30-35 bar. Later fix it by the contra-nut. Thus the machine hydraulic is adjusted. This is the head lifting up pressure at the same time.

• Open the clamp by pushing the Clamp Open button. Loosen a little the No1 valve and observe the pressure again after tightening the clamp. Do this process till seeing the 20bar pressure. Thus the material tightening pressure is adjusted.



4.5 HEAD LOWERING SPEED ADJUSTMENT

Please use the speed adjustment valve on the electricity panel for adjusting the head lowering speed.



Adjust the cutting speed and head lowering speed according to the saw dusts coming out from the cutting process.

Very thin and dust like shaving type. Decrease the cutting speed and increase the head lowering speed.
Thick and/or blue color shaving type. Shows over-force on bandsaw. Decrease the cutting and head lowering speed.



4.6 MAINTENANCE

4.6.1 DAILY MAINTENANCE

- The general cleaning should be done daily.
- Check the band saw stretch before each starting.
- Please check the square of minimum 3 pieces of cut parts daily.
- The shavings on the machine and inside the basket should be cleaned daily according to the working capacity.

4.6.2 WEEKLY MAINTENANCE

- Grease in a suitable amount from the greasing nipple on the band saw free pulley.
- Oil the skids of band saw stretching system with lubricator.
- Clean the fixed and mobile clamps from the saw dusts, and lubricate the body surface under the clamps working on.
- The band saw should always be checked for the crack or brake. If any crack or braket he band saw should be changed immediately.
- Lubricate the helical gear system on fixed clamp.
- Grease the joint connection greasing nipple in a suitable quantity.
- Change the cooling liquid in case of it goes bad. The cooling liquid mixed with boron oil can have a heavy smell because of a long term working and for environmental conditions. Please change this liquid for not to effect the environmental health.
- If always the same size material is cut on the machine, the top part of the cylinders can be oxidized for it is not lubricated as the head lifting cylinders are single effectual cylinders. For that reason the top part of cylinders could be oxidized. For preventing this and for providing the lubrication of this part, please operate machine free without cutting any material 10 or 15 times weekly or lubricate the cylinders by taken the stoper out by the lubricator.
- Please clean the foreign materials such as dirts, saw dust etc. on the linear skids.

4.6.3 MONTHLY MAINTENANCE

- The hyraulic oil level should be checked, if any decrease, it should be filled.
- The band saw guiding jaws and ball bearings should be checked. If any wear and corrosion, they should be changed with the new one.
- The joint connection spring and the head weight should be checked.
- The oil leakage on hydraulic system and reducers should be checked.
- The band saw should be adjusted well on the pulleys in order not to give damage on pulley band saw nest.

4.6.4 SIX MONTH MAINTENANCE

• The hydraulic oil should be checked in every 6 months. The oil should be changed if it was spoiled.

Oil Type	: No 46
Oil Amount	: 9 Liter
Next Oil Change	: 6 months later.

- The clamp system, driver (feeding) system and motors should be maintained in every 6 months.
- The main reducer oil should be emptied completely and filled up again with the new oil.

Oil Type	: MOBILGEAR No 636634
Oil Amount	: 1,5 Liter
Next Oil Change	: 6 months later.

FIFTH PART

5. BAND SAW DAMAGE AND REASONS THE PROBABLE PROBLEMS AND SOLUTIONS

5.1 BAND SAW DAMAGE AND REASONS

Band Saw Damage	Probable Reason	Solution		
Band Saw Break Plain break indicates band saw weary.	 Wrong band saw Band saw too much tightness High lowering speed of head Wrong cutting liquid Band saw rubs against pulley flange Band saw touches to material before cutting Band saw diamonds are very tight 	 Please check whether the band saw teeth choice is correct Lower the band saw tightness according to the operation and maintenance instructions. Decrease the head lowering speed. Use the advised cutting liquids Align the pulleys Keep space between the band saw and material tobe cut. Adjust the diamonds according to the operation and maintenance instructions. 		
Teeth Earlier Getting Dull	 Band saw turning wrong direction. Band saw incorrectly fixed by forcing. Hard material or too much rough surface. Very hard material Unsuitable cutting liquid or incorrect mixture. High cutting or head lowering speed. 	 Fix the band saw well. Check the correct band saw placing. Check the material hardness and rough material surface. Prepare a suitable cutting liquid mixture. Check the cutting specifications. 		
Wrong Cutting BAND LEADING IN CUT	 The band saw supporters between space is too much. Band saw worn out Low or high head lowering speed. Wrong teeth choice The cutting liquid is not applied to material well. Too much teeth on cutting surface. Band saw diamonds worn out or loosen. Overloaded band saw. Loose band saw stretch Saw set is damaged Band saw supporters between space is wider Band saw diamonds between space is wider 	 Adjust the between space of band saw supporters suitbale to material. Change the band saw. Check the cutting specifications. Use the suitbale teeth band saw. Provide well flowing of cutting liquid on cutting surface. Use the suitable teeth band saw. Renew the diamonds or tighten them Check the cutting conditions Check the band saw stretch Check the material hardness Adjust the band saw and diamonds. 		
CHIP WELDING	 Worn out or unfunctional saw dust brush Wrong or missing cutting liquid Wrong cooling liquid mixture High cutting or head lowering speed Wrong teeth choice 	 Change the brush or adjust it. Check the cutting liquid level and type. Check the cutting liquid level and type. Decrease the cutting or head lowering speed. Check the correct teeth choice. 		

Band saw damage	Probable Reasons	Solution
Teeth Breake	 Unsuitable band saw fixing. Band saw speed is too low. Head loweirng speed is too high Teeth are tightened during the cutting. Poor cutting liquid application Hard material or rough surface Wrong teeth choice The material is turning or no top clasping Band saw turning opposite 	 Check the advised band saw fixing. Check the cutting specifications. Decrease the head lowering speed. Adjust the cutting liquid amount. Check the material hardness and surface smooth Check the teeth choice. Tighten the clamps or apply top clasping well. Change the band saw direction
Wear on Back of Blades	 Too much press on the back of band saw. Low band saw stretch. Wrong band saw (carbon steel type) High head lowering speed or pressure. Big space between band saw supporters. Band saw friction to pulley frame. 	 Check the band saw supporter ball bearings. Adjust the band saw stretch. Use bimetal band saw. Decrease the head lowering speed. Adjust band saw supporter between space according to the material. Balance the pulleys level.
Rough Cutting	 Not sharpen or damaged band saw. Wrong head lowering or cutting speed. Band saw is not supported well. Loosen band saw stretch. Wrong teeth choice. Big space between band saw supporter. 	 Renew the band saw. Check the cutting specifications Adjust the band saw diamonds or tighten them. Do the adjustment according to the operation and maintenance instructions. Check the correct teeth choice. Adjust the band saw supporters between space according to the material size.
Wear Lines	 The band saw diamonds are too much tight. The band saw teeth robs to diamonds. Band saw teeth robs pulley surface. Unsuitable band saw width to machine. Sawdust pack. Deficient cooling liqud 	 Adjust the band saw diamonds. Adjust the band saw ball bearings. Adjust the band saw pulleys or renew them Use the Instruction Manual. Adjust the sawdust brush or renew. Adjust the amount of cooling liquid. n
Twisted Band Saw	 Band saw is hardy cutting Band saw diamonds are tight. The material is not clasped well. The head lowering pressure is too much. Big space between the band saw supporters. 	 İnme hızını ayarlayın veya ağır tip şerit kullanın Elmasları ayarlayın Mengeneleri ayarlayın İnme basıncını ayarlayın Şerit ayaklarını iş parçasına göre ayarlayın
Band Saw Burn	 Wrong Band Saw High head lowering pressure or high cutting speed. Missing cutting liquid. Band saw turning in wrong direction. 	 Check the correct teeth choice Check the cutting specifications. Adjust well the amount and mixture of cutting liquid. Adjust the band saw well.



- the clamps.
- Wrong teeth choice
- High head lowering speed. High cutting speed.

Adjust the clamps.

٠

- Check the teeth choice.
- Deacrease the head lowering speed. • •
 - Check the cutting specifications.

5.2 THE PROBABLE PROBLEMS AND SOLUTIONS

THE PROBABLY HYDRAULIC PROBLEMS AND SOLUTIONS 5.2.1

- If the top head of the machine is not lifting up;
- First check the joint connection spring. If the joint spring is broken, the top head does not go up. Change the joint spring.
- There is pressure adjustment valve in the system of hydraulic pump. In case this valve is fastened the top head lifting up speed increases. In case the valve is loosened, the top head lifting up speed is decreases. Do the pressure adjusting valve adjustment controlled.
- The hydraulic unit coupling gear could be damaged. Check the coupling system.
- The hydarulic unit oil could be finished. Check the oil level.
- If the top head is not getting down;
- If the poppet valve spindle (the spindle that the electricity bobin fixed on) has damage such as bending, crushing etc. the top head does not come down. Change the poppet valve.
- If the poppet valve has dirties inside such as dust etc. the top head does not come down. Clean the poppet valve carefully.
- Check if the poppet valve has functioning well or not. The bobin is taken out and the head lowering button is pushed by a test light or screw driver from bobin hole. After pushing the button if there is electro-magnetize, the bobin is functioning well.
- Check the director valve sockets. The socket could be taken out or could not reflecting electricity.
- The hydraulic lowering speed adjusting key can not function in the "0" position. Check the un-leakage elements by taken the key spindle out.
- If the top head is coming down bouncing;
- Check the tightness elements by taking the hydraulic lift. Before taken the hydraulic lift out, take the safety precautions with top head. If the tightness elements damaged, please change them.
- The hydarulic lift pipe inside can be damaged. Change the hydraulic lift pipe.
- If the hydraulic lift has an exhale;
- First the top head is taken into safety. Take the hydraulic lift connection to top chassis out. Loosen the hydraulic hose sleeve or manometre indicator. Apply a pressure with your hand from hydraulic lift spindle. With this pressure, some oil and air will come out. Repeat this several times and install the taken out parts again.

5.2.2 THE PROBABLE ELECTRICITY SYSTEM PROBLEMS AND SOLUTIONS

- The material is driven longer than wished length.
- Check the encoder ball. Possibly there could be tightening.
- The encoder ball could presson material much.
- The encoder could has breakdown.
- "Encoder Breakdown" warning is seen on the screen.
- Check the encoder ball. Possibly there could be tightening.
- Check the encoder coupling.
- The encoder could has breakdown.
- Thermic Fault is seen on the screen.
- Check the motor thermics.
- There is electricity. But the bandsaw is not starting.
- Check the main power cable of the machine. Are the neutre and fase cables are strong?
- Is the direction of fases correct? Change the fase position. Correct the fase direction.
- The buttons are not functioning though the buttons are pushed. The communication warning is alarming on the screen.

Check the communication cable between the screen and PLC. The cable could be broken or the sockets could be taken out.

SIXTH PART

6. INFORMATION ABOUT THE BANDSAW LEAF THE CUTTING SPEEDS AND CUTTING LIQUID RATES

6.1 INFORMATION ABOUT BLADES

Blades that are used at bandsaw machines are manufactured by welding two different metals with electron-welding method and teething. This method can be seen on the figure below:



45 HRC ARC STEEL

Teeths of Bi-Metal HSS (Material Number 1.3247) and Bi-Metal HSS M51 (Material Number 1.3207) blades are at 67-69 HRC hardness and backs of the blades are at 45-48 HRC hardness. Bi-Metal blades contain about 8% cobalt. They are grouped according to crossing forms and cutting angles of teeths. Straight teeth crossing (one teeth right one tooth left) is used at constant pitch blades. Straight Raker teeth crossing is only used at variable pitch blades. This crossing is used extensively. Raker teeth crossing (No crossing at 3^{rd} 5th or 7th teeth) is used at constant pitch blades. This crossing is preferred when cutting iron alloy metals. Wave teeth crossing is also used at constant pitch blades and is preferred for cutting pipes and profiles.

Blades are grouped according to cutting angles as follows: 0 (zero) degree cutting angle cuts the material at 90 degrees. This is for cutting big solid materials. Positive cutting angle is designed such that the cutting angle of teeth is 10-15 degrees. This kind of blade is efficient at cutting every type of large steel materials.

There are also different types of blades according to the material that will be cut. Naming the blades is made according to the number of teeth per inch. There are constant pitch blades like 4 teeth, 6 teeth, 10 teeth and variable pitch blades like 3/4 teeth, 4/6 teeth, 5/8 teeth, etc. Blade manufacturers advise that constant pitch should be used for cutting solid materials whereas they advise variable pitch for cutting pipes and profiles. Our advice is using variable pitch for all materials. Teething should be chosen such that cutting can be made with at least three teeth.

www.capitalmachinery.com.au



6.2 THE CUTTING SPEEDS FOR THE MATERIALS AND CUTTING LIQUID RATES

				Cutting	Cutting	Cutting	
Material Group	DIN	Material	USA	Speed	Speed	Speed	Cutting
1		Number		m/min.	m/min.	m/min.	Liquid
				φ < 100 mm	100-500 mm	φ >500 mm	
Construction Steel	St37/42	1.0037/1.0042	A570	90-100	70-90	50-70	10%
	St52/60	1.0050/1.0060	A572	90-100	50-70	40-50	10%
	C10/C15	1.0301/1.0401	M1010/M101	95-110	80-95	60-80	15%
Cementation Steels			6				
	16MnCr5	1.7131	5115	65-75	55-65	40-55	10%
	20CrMo5	1.7264	-	65-75	55-65	40-55	10%
	21NıCrMo2	1.6523	8620	55-65	45-55	35-45	10%
Nitric Steels	34CrAl6	1.8504	-	40-45	30-40	20-30	5%
Automat Steels	9S20	1.0711	1212	100-130	80-120	60-80	15%
Annealed Steels	C35/45	1.0501/1.0503	1035/1045	75-90	60-75	40-60	5%
	42CrMo4	1.7225	4140	60-70	50-60	40-50	5%
	34CrNPAR6	1.6582	4340	60-70	50-60	40-50	5%
Bearing/ Ball	100Cr6	1.3505	52100	65-75	55-65	30-50	3%
Bearing Steels	100CrMo7 3	1.3536	-	50-60	40-50	30-40	3%
Spring Steel	65St7	1.5028	9260 H	60-70	40-60	30-40	3%
	50CrV4	1.8159	6150	60-70	40-60	30-40	3%
Non-alloyed	C125W	1.663	W112	50-65	40-50	30-40	3%
Carbon Steels	C80W1	1.1525	W108	55-70	45-55	35-45	3%
	125Cr1	1.2002	-	50-65	40-50	30-40	3%
Cold Carbon Steel	X210Cr12	1.2080	D3	30-40	20-30	15-20	Dry
	X155CrVMo12 1	1.2379	D2	30-40	20-30	15-20	Dry
	90MnCrV8	1.2842	O2	35-45	30-35	20-30	3%
	40CrMnMo7	1.2311	-	25-35	20-25	15-20	5%
Hot Carbon Steel	X40CrMoV51	1.2344	H 13	22-30	18-22	12-18	5%
	56NiCrMoV7	1.2714	L6	30-40	25-30	20-25	5%
	40CrMnNiMo	1.2738	-	25-35	20-25	15-20	5%
	864						
	S 6-5-2	1.3343	M 2	45-50	35-45	25-35	3%
High Speed Steels	S 3-3-2	1.3333	-	50-55	40-50	30-40	3%
	S 2-10-1-8	1.3247	M 42	40-45	30-40	20-30	3%
	S 10-4-3-10	1.3207	-	40-45	30-40	20-30	3%
	S 18-0-1	1.3355	T 1	40-45	30-40	20-30	3%
	X5CrNi18 10	1.4301	304	40-50	30-40	20-30	10%
The steels resistant	X6CrNiMoTi	1.4571	316 Ti	40-50	30-40	20-30	10%
to oxide and acid	17 12 2						
	X20Cr13	1.4021	420	40-50	30-40	25-35	10%
	X45CrSi 9 3	1.4718	HNV 3	45-55	35-45	25-35	5%
Valve Steels	X45CrNiW 189	1.4873	-	40-50	30-40	20-30	5%
High Temperature	X12CrCoNi 21 20	1.4971	HEV 1	25-30	20-25	15-20	10%
Steel	X20CrMoWV	1.4935	HNV 8	35-40	30-35	25-30	10%
Tamana and a	12 1 X15CrNiSi 25	1.4841	314	20-25	15-20	10-15	15%
resistant steel	20 X12NiCrSi 36	1.4864	330	20-25	15-20	10-15	15%
	16				10.17		
Special Alloy	N1Cr19NbMo	2.4668	Inconel 718	15-20	10-15	8-12	20%
	NPAR30	2.4810	Hasrelloy B	20-25	15-20	10-15	12%
	N1Cr13Mo6Ti3	2.4662	Nimonic 901	15-20	10-15	8-12	20%
	N1Co20Cr20 MoTi	2.4650	Nimonic 263	17-22	12-17	10-14	15%
			L				

Cuteral PAR 280 PLC ve PAR 350 PLC

	X8CrNiAlTi20	1.4847	Incoloy 840	18-23	13-18	11-15	15%
	20						
Tempered Steels							
1000-1200 N/mm2	-	-	-	30-35	25-30	20-25	5%
1200-1400 N/mm2	-	-	-	25-30	20-25	15-20	5%
1400-1600 N/mm2	-	-	-	20-25	15-20	10-15	5%
Hard-drawn steels							
50 HRC							
55 HRC	-	-	-	-	-	-	5%
60 HRC	-	-	-	-	-	-	5%
	-	-	-	-	-	-	5%
Steel Casting	GS-38	-	-	60-70	50-60	40-50	3%
	GS-60	-	-	50-60	40-50	35-40	3%
Iron Casting	GG-30	-	-	50-60	40-50	30-40	Dry
	GGG-50	-	-	45-55	35-45	25-35	Dry
Alloy	NıCrMo	-	-	30-40	20-30	15-25	Dry
Titanium	Ti 1	3.7025	-	-	-	-	10%
Alloy zirconium	G-TIAI 6V4	3.7164	-	-	-	-	12%

Material Group	DIN	Material Number	USA	Cutting Speed m/min.	Cutting Liquid
Copper	KE-Cu	2.0050		60-100	10%
	CuZn 40	2.0360		80-120	3%
Brass	CuZn 40 Pb 2	2.0402		80-120	3%
	CuZn 15 Si 4	2.0492		80-120	3%
Bronze	CuSn 6	2.1020		80-120	3%
Tin	CuSn8	2.1030		80-120	3%
Red Casting	CuSn5 ZnPb	2.1095		60-100	3%
_	CuSn 10 Zn	2.1086		60-100	3%
	CuAl8	2.0920		40-60	15%
Aluminium/Bronze	CuAl 10 Fe	2.0940		30-40	15%
	Ampco 18			40-65	15%
	Ampco 25			30-50	15%
Tin/Lead/ Bronze	CuPb 20 Sn 5	2.1818		80-120	3%
Aluminium Non-	Al 99,8	3.0285		80-120	25%
Processed Metal Alloy	AlMg3	3.3535		80-120	25%
	AlMg 4,5 Mn	3.3547		80-120	25%
Casting Metal Alloy	G-AlSi 5Mg	3.2341		80-120	25%
	G-AlSi 12	3.2581		80-120	25%
Piston Metal Alloy	AlSi21 CuNiMg			80-120	25%
	PVC			80-120	Dry
Thermoplastics	Teflon			80-120	Dry
_	Hostalen			80-120	Dry
	Fibre-glass			50-80	Dry
	reinforced				-
Duroplastics	Polyurethane			80-120	Dry
	Polystyrol			80-120	Dry
	Polyester			80-120	Dry
	Fabric-reinforced			80-120	Dry
Aerated Cement ,				80-120	Dry
Grapnitic Carbon					

7 THE HYDRAULIC AND ELECTRICITY SYSTEM 7.1 THE HYDRAULIC SYSTEM SCHEMA



7.2 THE ELECTRICITY SYSTEM SCHEMA



Z4 VAC Z20V LG MASTER K120S P00 ENC Z4 VAC CIMID Z4 VAC P01 Z05 Z1 Z4 VAC CIMID Z1 Z05 Z1 Z4 VAC CIMID Z10 P03 Z1 Z2 Z11 Z24 Z05 Z05 DRIVER P1 P43 P44 P03 S1V DRIVER P1 P44 P44 P03 S1V DRIVER P2 P44 P44 P03 S1V ASAGI Valr P44 P03 S1V MENGENE P44 P44 P03 S1V MENGENE P44 P44 P03 S1V SURME A2 P48 P03 S1V SURME P24 P44 P24 P24
--







EIGHTH PART

8 CUTTING CRITERIAS

8.1 CUTTING CRITERIAS

The information about the cutting criterias and bandsaw lifetime according to the material type was studied and given in the below by IMAS Co.

GENERAL CONSTRUCTION STEEL 1.0037 St 37 St 42 1.0040 C 10 1.0301 C 15 1.0401 10S20 1.0721 Dia. Cutting Lowering Cutting **Cutting Term** Rate Rate Speed Cm2/min. mm mm/min. m/min. Minute 0,03 10 15 25 190 130 100 95 0.05 25 25 40 125 200 100 95 0,20 0,12 40 35 50 110 160 100 95 0,36 0,25 0,83 65 40 60 78 117 100 95 0,55 100 50 75 63 95 95 95 1,57 1,05 150 70 100 60 85 95 1,77 85 2,52 200 75 110 48 70 95 85 4,19 2,86 9,42 300 75 110 32 46 95 85 6,43 400 70 75 17,95 100 17 25 60 12,57 500 50 75 10 15 75 60 39,27 26,18 75 70,69 600 40 60 6 10 60 47,12 800 35 50 4,5 6 75 60 143,62 100,53 1000 20 30 2,5 4 55 45 314,16 196,35 1200 1,6 2,5 45 20 30 55 565,49 376,99 1500 15 25 1.6 55 45 1178,10 706,86 1

1. GROUP MATERIALS

2. GROUP MATERIALS

GENERAL CONSTRUCTION STEEL										
	St 50					1.0050				
		St 60			1.0060					
		C 35					1.0501			
		C 45					1.0503			
Dia.	Cut	ting	Low	ering	Cut	ting	Cuttir	ng Term		
	Ra	ate	Ra	ate	Speed		eed			
mm	Cm2	/min.	mm/	min.	m/min.		Minute			
10	12	18	150	230	75	70	0,07	0,04		
25	20	30	100	150	75	70	0,25	0,16		
40	25	38	80	120	75	70	0,50	0,33		
65	30	45	58	88	75	70	1,11	0,74		
100	40	50	51	70	70	65	1,96	1,57		
150	50	75	42	64	70	65	3,53	2,36		
200	55	80	31	51	70	65	5,71	3,93		
300	55	80	23	34	70	65	12,85	8,84		

www.capitalmachinery.com.au

400	50	75	12	18	50	48	25,13	16,76
500	40	55	8	11	50	48	49,09	35,70
600	30	45	5	7,5	50	48	94,25	62,83
800	25	38	3	5	50	48	201,06	132,28
1000	20	30	2	3	45	38	392,70	261,80
1200	15	25	1,2	2	45	38	753,98	452,39
1500	12	18	0,8	1,2	45	38	1472,62	981,75

CONDITIONING STEELS										
	16	6 Mn Ci	r 5		1.7131					
	42	Cr Mo	o 4				1.7225			
	5	0 CrV	4				1.8159			
Dia.	Cut	ting	Low	ering	Cut	ting	Cuttir	ng Term		
	Ra	ate	Ra	ate	Sp	eed				
mm	Cm2	/min.	mm/	min.	m/r	nin.	Mi	nute		
10	10	16	125	200	65	60	0,08	0,05		
25	15	26	75	130	65	60	0,33	0,19		
40	20	32	60	100	65	60	0,63	0,39		
65	25	38	49	74	65	60	1,33	0,87		
100	30	48	38	61	60	55	2,62	1,64		
150	40	60	34	51	60	55	4,42	2,95		
200	45	65	28	41	60	55	6,98	4,83		
300	45	65	19	27	60	55	15,71	10,87		
400	40	60	10	15	50	40	31,42	20,94		
500	30	48	6	9	50	40	65,45	40,91		
600	25	38	4	6	50	40	113,10	74,41		
800	20	32	2,5	4	50	40	251,33	157,08		
1000	15	26	2,5	2,5	37	33	523,60	302,08		
1200	12	20	1,1	1,6	37	33	942,48	565,49		
1500	10	16	0,6	1	37	33	1767,15	1104,47		

	BEARING STEEL												
	1	00 Cr (6		1.3505								
	(C 125 V	V				1.1663						
Dia.	Cutting		Lowering		Cut	ting	Cuttir	ıg Term					
	Ra	ate	Ra	ate	Sp	eed							
mm	Cm2	/min.	mm/	min.	m/r	nin.	Mi	nute					
10	10	15	125	200	60	58	0,08	0,05					
25	15	24	75	120	60	58	0,33	0,20					
40	20	30	60	95	60	58	0,63	0,42					
65	25	36	49	70	60	58	1,33	0,92					
100	30	45	38	57	55	50	2,62	1,75					
150	35	55	30	47	55	50	2,62	1,75					
200	40	60	25	38	55	50	7,85	5,24					
300	40	60	17	25	55	50	17,67	11,78					
400	35	55	9	13	45	35	35,90	22,85					
500	30	45	6	9	45	35	65,45	43,63					
600	25	36	4	6	45	35	113,10	78,54					
800	20	30	2,5	4	45	35	251,33	167,55					
1000	15	24	1,5	2,5	33	28	523,60	327,25					
1200	12	20	1	1,6	33	28	942,48	565,49					
1500	10	15	0,6	1	33	28	1767,15	1178,10					

HIGH SPEED STEEL												
		S 6-5-2	·		1.3343							
	S	2-10-1	-8				1.3247					
Dia.	Cut	ting	Low	ering	Cut	ting	Cuttin	ng Term				
	Ra	ate	Ra	ate	Sp	eed						
mm	Cm2	/min.	mm/	min.	m/r	nin.	Mi	nute				
10	7	11	90	140	48	32	0,11	0,07				
25	12	18	60	90	48	32	0,41	0,27				
40	15	22	48	70	48	32	0,84	0,57				
65	17	27	33	53	48	32	1,95	1,23				
100	20	33	25	42	40	27	3,93	2,38				
150	25	40	21	34	40	27	7,07	4,42				
200	30	45	19	29	40	27	10,47	6,98				
300	30	45	12	19	40	27	23,56	15,71				
400	25	40	8	12	36	24	50,27	31,42				
500	20	33	5	8	36	24	98,17	59,50				
600	17	27	4	5,7	36	24	166,32	104,72				
800	15	22	2,4	3,5	36	24	335,10	228,48				
1000	12	18	1,5	2,3	27	22	654,50	436,33				
1200	10	15	1	1,6	27	22	1130,97	753,98				
1500	7	11	0,6	0,9	27	22	2524,49	1606,50				

	COLD HARDWARE STEEL												
	X	210 Cr	12		1.2080								
	X 155	5 CrVm	o 121				1.2379						
Dia.	Cutting		Low	ering	Cut	ting	Cuttir	ıg Term					
	Ra	ate	Ra	nte	Sp	eed							
mm	Cm2	/min.	mm/	min.	m/r	nin.	Mi	nute					
10	5	7	64	89	35	32	0,15708	0,1122					
25	8	12	40	61	35	32	0,61359	0,40906					
40	10	15	32	48	35	32	1,25664	0,83776					
65	11	18	22	35	35	32	3,01664	1,8435					
100	13	22	16	28	30	25	6,04152	3,56999					
150	17	27	15	23	30	25	10,395	6,54498					
200	18	28	11	18	30	25	17,4533	11,22					
300	20	25	8	11	30	25	35,3429	28,2743					
400	17	27	5,5	9	24	20	73,9198	46,5421					
500	13	22	3,5	6	24	20	151,038	89,2498					
600	11	18	2,5	4	24	20	257,039 157,08						
800	10	15	2	2,5	24	20	502,655	335,103					
1000	8	12	1	1,5	18	15	981,748	654,498					
1200	7	10	,07	1,1	18	15	1615,68	1130,97					
1500	5	7	0,4	0,6	18	15	3534,29	2524,49					

			CON	DITIO	NING	STEEI				
	40 0	CrMnM	lo 7		1.2311					
	55 N	NiCrMo	oV 6		1.2713					
	X40	CrMo	V51				1.2344			
	3	4 CrAl	6				1.8504			
	40 CrM	InNiM	0 8-6-4				1.2738			
Dia.	Cut	ting	Low	ering	Cut	ting	Cuttir	ng Term		
	Ra	ate	Ra	ate	Sp	eed		-		
mm	Cm2	/min.	mm/	min.	m/r	nin.	Mi	nute		
10	6	10	76	125	45	42	0,1309	0,07854		
25	9	16	46	82	45	42	0,54542	0,3068		
40	12	20	38	64	45	42	1,0472	0,62832		
65	15	23	30	45	45	42	2,2122	1,44247		
100	18	30	23	38	40	36	4,36332	2,61799		
150	24	37	20	31	40	36	7,36311	4,77607		
200	28	37	18	24	40	36	11,22	8,49079		
300	28	37	12	16	40	36	25,2449	19,1043		
400	24	37	8	12	32	26	52,3599	33,9632		
500	18	30	5	8	32	26	109,083	65,4498		
600	15	23	3,5	5,5	32	26	188,496	122,932		
800	12	20	2	3	32	26	418,879	251,327		
1000	9	16	1	2	24	20	872,665	490,874		
1200	7	12	0,7	1,3	24	20	1615,68	942,478		
1500	6	10	0,5	0,8	24	20	2945,24	1767,15		

STAINLESS STEEL												
	X 5	CrNi 1	810		1.4301							
	X 6 Cr	NiMoT	ri 1810		1.4571							
Dia.	Cut	ting	Low	ering	Cut	ting	Cuttin	ıg Term				
	Ra	ate	Ra	nte	Sp	eed						
mm	Cm2	/min.	mm/	min.	m/r	nin.	Mi	nute				
10	6	8	75	100	40	37	0,1309	0,09817				
25	8	10	40	50	40	37	0,61359	0,49087				
40	10	12	32	38	40	37	1,25664	1,0472				
65	10	14	20	27	40	37	3,31831	2,37022				
100	12	15	15	19	35	32	6,54498	5,23599				
150	12	20	10	17	35	32	14,7262	8,83573				
200	15	25	9	16	35	32	20,944	12,5664				
300	15	25	6	10	35	32	47,1239	28,2743				
400	12	20	3	5	28	22	104,72	62,8319				
500	12	15	2	3	28	22	163,625	130,9				
600	10	14	1,5	2,5	28	22	282,743	201,96				
800	10	12	1,3	1,5	28	22	502,655	418,879				
1000	6	10	0,8	1	21	20	1309	785,398				
1200	6	8	0,5	0,7	21	20	1884,96	1413,72				
1500	4	7	0,35	0,6	21	20	4417,86	2524,49				

	HI	GH TH	EMPE	RATUI	RE RESISTANT STEEL					
	X 15	CrNiSi	2520		1.4841					
	X 1	0 CrAl	18		1.4742					
	Х	10 CrS	i 6				1.4712			
Dia.	Dia. Cutting Lowering					ting	Cuttir	ıg Term		
	Ra	nte	Ra	nte	Sp	eed				
mm	Cm2	/min.	mm/	min.	m/r	nin.	Mi	nute		
10	3	5	40	60	30	27	0,26	0,16		
25	5	7	25	35	30	27	0,98	0,70		
40	6	8	19	25	30	27	2,09	1,57		
65	6	8	11	15	30	27	5,53	4,15		
100	6	9	7	11	25	22	13,09	8,73		
150	7	10	6	8	25	22	25,24	17,67		
200	8	12	5	7	25	22	39,27	26,18		
300	7	10	3	4	25	22	100,98	70,69		
400	6	9	1,5	2	20	16	209,44	139,63		
500	6	8	1	2	20	16	327,25	245,44		
600	5	7	1	1,5	20	16	565,49	403,92		
800	4	6	0,5	0,7	20	16	1256,64	837,76		
1000	3	5	0,3	0,5	15 13 2617,99		1570,80			
1200	2	3	0,2	0,4	15	13	5654,87	3769,91		
1500	2	3	0,2	0,4	15	13	8835,73	5890,49		

NICKEL ALLOYED STEELS												
	In	conel 7	18		2.4668							
	Ni	monic	90		2.4632							
	Has	stelloy	C 4				2.4610					
Dia.	Dia. Cutting Lowering					ting	Cuttin	ng Term				
	Ra	ate	Ra	ate	Sp	eed		_				
mm	Cm2	/min.	mm/	min.	m/r	nin.	Mi	nute				
10	2	3	25	38	18	15	0,39	0,26				
25	3	4	15	20	18	15	1,64	1,23				
40	3	5	10	16	18	15	4,19	2,51				
65	3	5	6	10	18	15	11,06	6,64				
100	4	5	5	6,5	15	14	19,63	15,71				
150	4	6	3	5	15	14	44,18	29,45				
200	5	8	3	5	15	14	62,83	39,27				
300	5	8	2	3,4	15	14	141,37	88,36				
400	4	6	1,3	1,9	12	10	314,16	209,44				
500	4	5	1	1,3	12	10	490,87	391,70				
600	3	4	0,6	0,8	12	10	942,18	706,86				
800	2	4	0,3	0,6	12	10	2513,27	1256,64				
1000	2	3	0,3	0,4	10	9	3926,99	2617,99				
1200	1,5	2	0,2	0,3	10	9	7539,82	5654,87				
1500	1,5	2	0,2	0,3	10	9	11780,9	8835,73				

				CAS	TING				
		GG 15			0,6015				
		GG 30					0,6030		
	(GGG 5	0				0,7050		
	(GTW 4	0				0,8040		
		GTS 65	5				0,8165		
Dia.	Cut	ting	Low	ering	Cut	ting	Cuttir	ng Term	
	Ra	ate	Ra	ate	Sp	eed		0	
mm	Cm2	/min.	mm/	min.	m/r	nin.	Mi	nute	
10	15	25	190	300	57	53	0,05	0,03	
25	20	30	100	150	57	53	0,25	0,16	
40	30	40	95	125	57	53	0,42	0,31	
65	40	50	75	95	57	53	0,83	0,66	
100	50	70	60	90	50	45	1,57	1,12	
150	60	80	50	65	50	45	2,95	2,21	
200	60	90	38	57	50	45	5,24	3,49	
300	50	80	20	34	50	45	14,14	8,84	
400	40	70	12	22	40	32	31,42	17,95	
500	35	60	9	15	40	32	56,10	32,72	
600	30	50	6	11	40	32	94,25	56,55	
800	25	40	4	6	40	32	201,06	125,66	
1000	20	30	2,5	4	30	25	392,70	261,80	
1200	15	25	1,5	2,5	30	25	753,98	452,39	
1500	15	20	1,3	1,7	30	25	1178,10	883,57	

TITANIUM ALLOY												
		Ti 1			3,7025							
		Ti 99,5			3,7024							
	T	iAl 6 V	4				3,7165					
Dia.	Cut	ting	Low	ering	Cut	ting	Cuttin	ig Term				
	Ra	ate	Ra	nte	Sp	eed						
mm	Cm2	/min.	mm/	min.	m/r	nin.	Mi	nute				
10	4	7	50	90	35	32	0,20	0,11				
25	6	10	30	50	35	32	0,82	0,49				
40	7	11	22	35	35	32	1,80	1,14				
65	8	12	15	23	35	32	4,15	2,77				
100	9	13	12	16	30	27	8,73	6,04				
150	10	15	8	12	30	27	17,67	11,78				
200	14	18	9	11	30	27	22,44	17,45				
300	10	15	4	6	30	27	70,69	47,12				
400	9	13	3	4	25	20	139,63	96,66				
500	8	12	2	3	25	20	245,44	163,62				
600	7	11	1,5	2,4	25	20	403,92	257,04				
800	6	10	1	1,6	25	20	837,76	502,65				
1000	4	7	0,5	0,9	18	15	1963,50	1122,00				
1200	3	5	0,4	0,7	18	15	3769,91	2261,95				
1500	3	5	0,4	0,7	18	15	5890,49	3534,29				

ALUMINIUM												
		Al 99,5			3,0255							
		AlMg 4										
	Al	Si 6 Cu	ı 4									
Dia.	Cut	ting	Low	ering	Cut	ting	Cuttir	ng Term				
	Ra	ate	Ra	nte	Sp	eed						
mm	Cm2	/min.	mm/	min.	m/r	nin.	Mi	nute				
10	36	84	450	850	110	130	0,02	0,01				
25	48	120	250	500	110	130	0,10	0,04				
40	72	170	230	480	110	130	0,17	0,07				
65	96	210	190	350	110	130	0,35	0,16				
100	130	260	160	295	110	130	0,60	0,30				
150	150	300	130	245	110	130	1,18	0,59				
200	150	300	95	165	110	130	2,09	1,05				
300	150	300	6	110	110	130	4,71	2,36				
400	140	300	45	88	110	130	8,98	4,19				
500	140	280	35	65	110	130	14,02	7,01				
600	130	270	27	45	110	130	21,75	10,47				
800	120	250	10	27	110	130	41,89	20,11				
1000	96	230	12	25	110	130	117,81	56,55				
1200	96	200	10	16	110	130	117,81	56,55				
1500	85	180	7	12	110	130	207,90	98,17				

	BRASS												
	(CuZn 3'	7		2,0321								
	Cuź	Zn 40 F	Ъ2		2,0402								
Dia.	Cut	ting	Low	ering	Cut	ting	Cuttir	ng Term					
	Ra	ate	Ra	ate	Spe	eed							
mm	Cm2	/min.	mm/	min.	m/r	nin.	Mi	nute					
10	43	52	300	650	115	125	0,02	0,02					
25	35	85	180	400	115	125	0,14	0,06					
40	48	96	150	280	115	125	0,26	0,13					
65	60	120	120	225	115	125	0,55	0,28					
100	72	156	90	175	115	125	1,09	0,50					
150	96	192	80	160	115	125	1,84	0,92					
200	120	240	75	150	115	125	2,62	1,31					
300	120	240	50	110	115	125	5,89	2,95					
400	120	250	38	75	115	125	10,47	5,03					
500	120	250	30	66	115	125	16,36	7,85					
600	120	215	25	45	115 125 23,56 13		13,15						
800	95	200	15	36	115	125	52,91	25,13					
1000	85	170	11	24	115	125	92,40	46,20					
1200	60	130	6	11	115	125	188,50	87,00					
1500	60	105	5	9	115	125	294,52	168,30					

				CO	PPER			
		KE-Cu			2,0050			
Dia.	Cut	ting	Low	ering	Cut	ting	Cuttir	ıg Term
	Ra	ate	Ra	ate	Spe	eed		
Mm	Cm2	/min.	mm/	min.	m/min.		Minute	
10	18	30	230	320	115	120	0,04	0,03
25	24	48	120	165	115	120	0,20	0,10
40	36	60	110	145	115	120	0,35	0,21
65	48	72	94	125	115	120	0,69	0,46
100	60	95	75	110	100	110	1,31	0,83
150	75	120	63	105	100	110	2,36	1,47
200	95	140	60	100	100	110	3,31	2,24
300	100	130	42	95	100	110	7,07	5,44
400	90	120	28	66	95	80	13,96	10,47
500	80	100	20	35	95	80	24,54	19,63
600	65	90	14	30	95	80	111,70	77,33
800	45	65	7	15	95	80	111,70	77,33
1000	30	50	4	6	75	60	261,80	157,08
1200	28	40	3	5	75	60	403,92	282,74
1500	22	35	2	3	75	60	803,25	504,90

NOTE : The DIN norms were taken reference for material naming. Material on left side is DIN Norms and the material on right side is material number.

THE REPORT OF STUDY ABOUT THE Bi Metal HSS M 42 BANDSAW LIFETIME

It was learnt that 1m bandsaw is cutting 1 m^2 according to the studies about the subject. The discussed companies are ; DOALL, ARNTZ, LENOX, ULTRA, EBERLE, HONSBERG, WIKUS and AMADA.

NINETH PART

9. HOW TO REACH US?

9.1 PRODUCER COMPANY INFORMATIONS

If you would like to have information about the PAR 280 PLC ve PAR 350 PLC Bandsaw Machine, please contact to IMAS Co. by the below given informations.

Producer Company Name	INTEGRATED MACHINERY SYSTEMS
	İmaş Integrated Systems Co.
Producer Company Addre	ess: 2. Organize Sanayi
	Lalehan Caddesi No: 61
	42300 KONYA / TÜRKİYE
Producer Company Tel.	: + 90.332.239 01 41 (3 Lines)
Producer Company Fax	: + 90.332.239 03 11
Technical Service	: + 90.532.589 52 34
Web	: <u>www.imas.com.tr</u>
E-mail	: info@imas.com.tr



 65	Cuteral