

# **MANUAL**

**MACHINE MODEL: S-1724**

**MACHINE NAME: MITER CUTTING BAND SAWING  
MACHINE**

## SECURITY CAUTION ITEMS

1. Don't exceed the use and the range which have been provided by this machine.
2. Read the instruction carefully before using this machine.
3. In order to avoid the destroys and damages caused by the mistakes of the operators, users must give specialized training to the operators of this machine and let them have various kinds of safety operating abilities.
4. Users must correctly fix and use this machine according to its instruction and provide the suitable operation area around the machine. In order to have safety operations and daily protections of the machine, the operation area should be neat and without obstacles which will affect the work of the operators.
5. Operators must follow the orders of the instruction and the training they have been given before using this machine. In order to maintain the safety operation conditions, operators should give periodical safeguard and maintenance to the machine.
6. Operators must work under the condition that the machine has safety protection installations and often check their conditions. It's forbidden that anyone willfully demolishes these kinds of installations on the machine. The protection paling should be ranged around the machine when it's necessary.
7. Operators must close all of the protection covers before using, at the same time, try to make the band saw adjustable protection cover close to the workpiece. Don't open any protection cover when the machine is working.
8. Operators must be sure about the machine has stopped when they want to dismantle the band saw, then the operators can open the protection cover, at the same time, check whether the supporter is steady and safety. Operators should wear protection gloves when they fix and dismantle the saw blade, in order to avoid to be hurt by the saw blade.
9. When the machine is working , don't touch the working band saw blade, don't entry the machining area, don't get the workpiece which has been cut or blocked.
10. Don't wear gloves and loose clothes when you are operating and maintaining the machine.
11. The workpiece must be tightly fixed before and during sawing. The installation for tightly controlling the workpiece can be open must after the saw blade stops working.
12. Operators should be sure that they support and fix the long and heavy workpiece steadily when they are using this machine, this can avoid the

- workpiece which has been cut off falls down and also avoid the overturning of the machine after sawing. When you want to saw longer material, you must use material feeding shelf and material getting shelf.
13. The elec.power must be cut before adjusting, maintaining and cleaning, especially before checking the electricity.
  14. The machine must be stopped before changing the speed.
  15. The machine must be stopped when adjusting the distance between the direction arms. Tweaking the controlling handwheel tightly after adjusting.
  16. The elec.power of the machine is three-phase alternating, AC380V, 50Hz. The range of voltage fluctuating is less than 10%. Setting up separate elec.power, ground connection and leak protection installation according to the rated capacity, it's forbidden that the machine shares lines with the equipments which may cause the voltage fluctuating and mis-operation.
  17. The ground connection of the machine must be good and steady.
  18. Please press the urgent stopping button if unexpected events happen during the working time of the machine.
  19. Operators should be careful of the cooling liquid when clean it because it's bad for skin. Don't drain it off directly, please pay attention to the environmental protection. In order to prevent the cooling liquid splashing during machining, users can install protection guard.
  20. When sawing the material which scraps is combustible (magnesium, titanium, etc.) the working area should have no fire and users should prepare fighting fire method.
  21. It's forbidden that sawing the material which is inflammable and quick-boiling in powder shape (carbon stick, etc.).

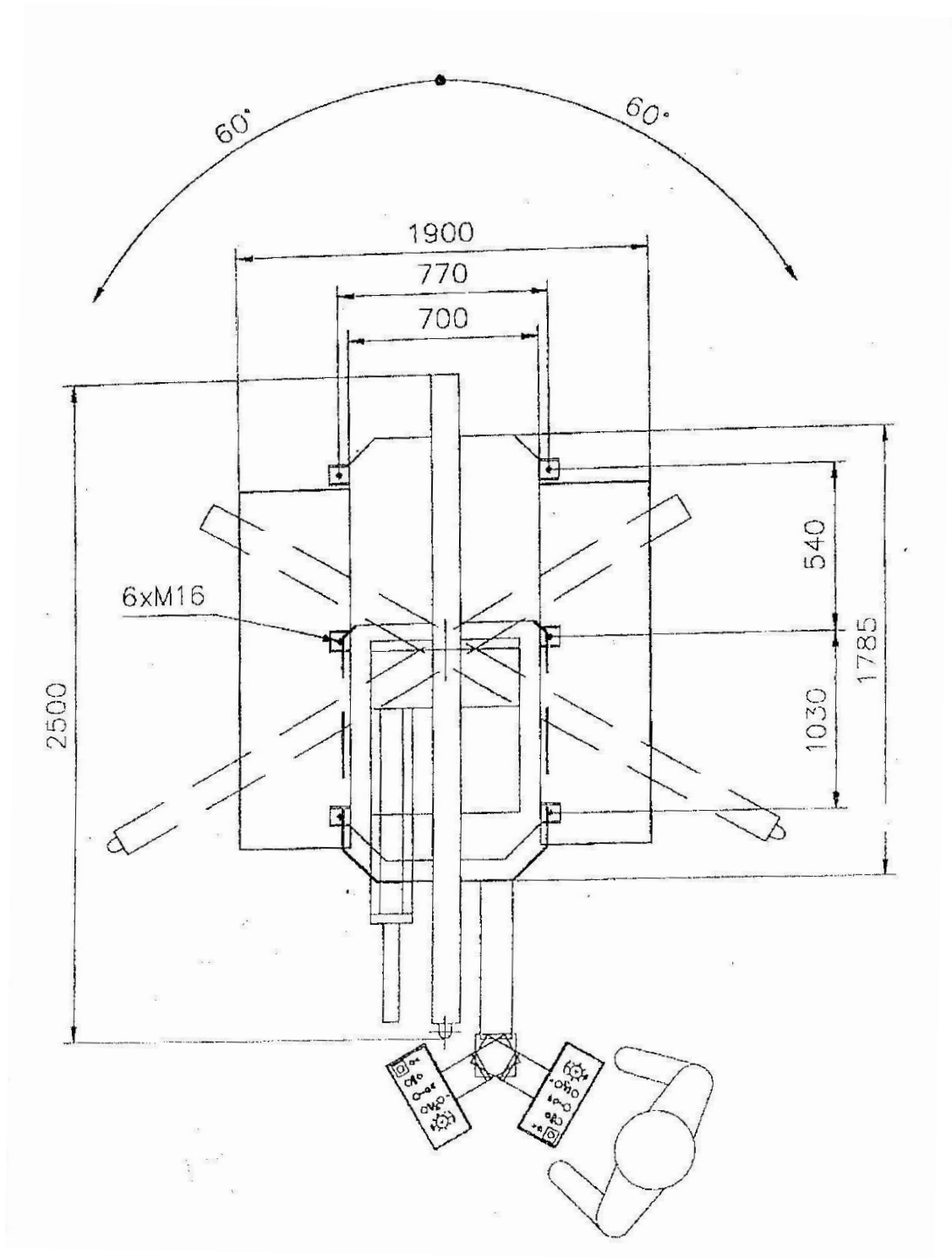
## CONTENT

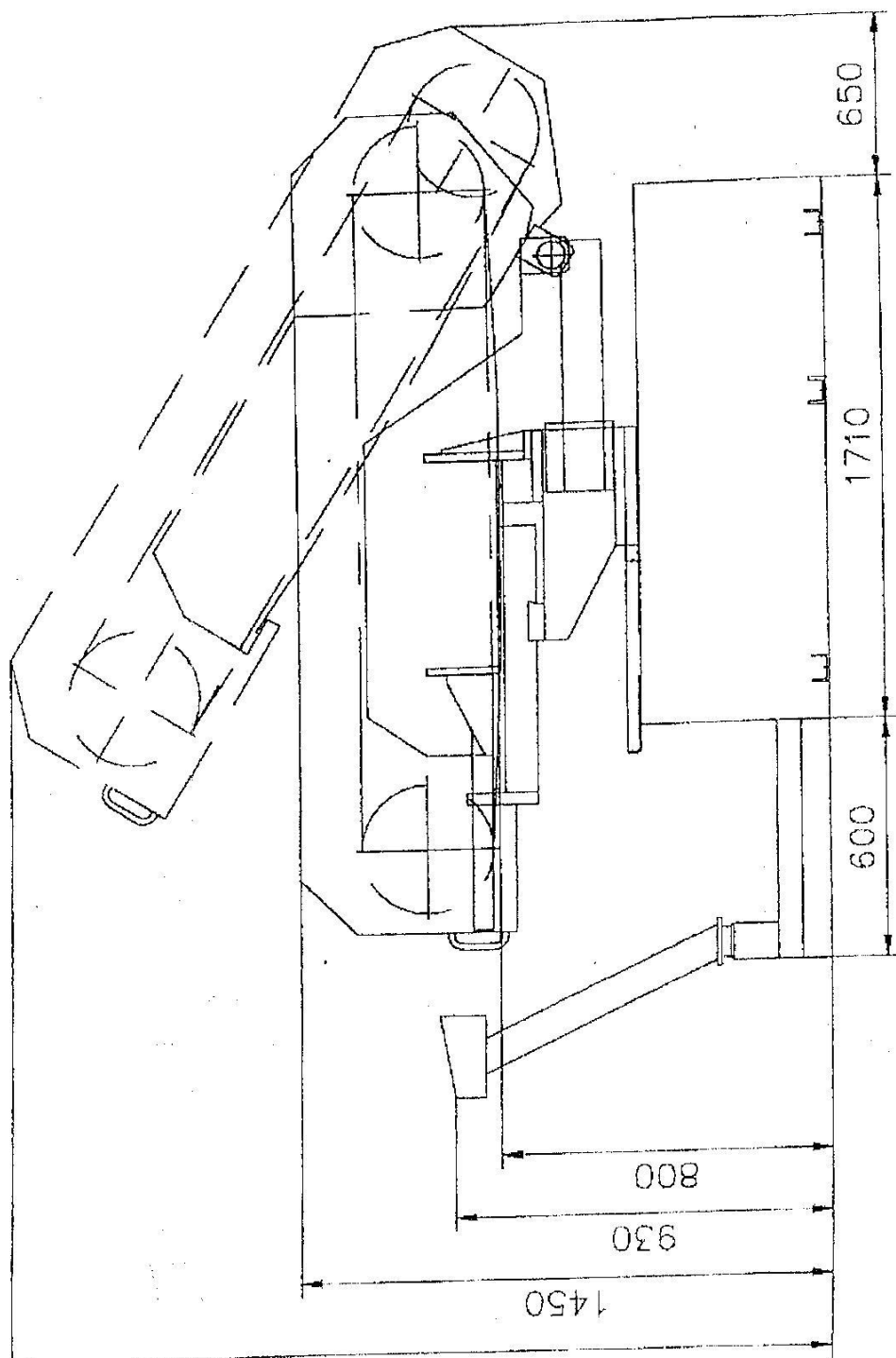
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## INTRODUCTION

Bandsaw machine for metal S-440R  $+60^{\circ} \div -60^{\circ}$  is semi-automatic machine for separating of all metal materials. It is especially used for material cutting in workshops where it is necessary to cut elements in the angles  $+30^{\circ} \div -30^{\circ}$  in semi-automatic and manual regime.

It is distinguished oneself that vice is displaced on linear feeding before or behind of blade (at its perpendicular position) and this enables double-sided arm turning and to cut either right or left.

The machine is used for cutting of iron metals, alloy steel, cast iron, copper, carbon, aluminium alloy, artificial substance, teflon, and PVC.

It is not allowed to cut wood, meat, bones, glass, all materials based on wood.

If you want to cut materials, which are not written in our tables, be informed by producer or seller of machine.

It is necessary to use proper parameters of machine while cutting. In order to achieve optimum machine capacity and to keep tolerance of rectangularity, it is necessary to correctly install machine and roller conveyors and to select blade, machine feeding, cut pressure and cooling liquid.

In this manual for operation, there are written all data necessary for successful operation and service.

**Before work starting, it is necessary to attentively study instruction manual.**

## MACHINE INSTALLATION PUTTING TI INTO OPERATION

- 1) Machine is installed on horizontal and fixed support plate which will have loading capacity for machine, special accessories and maximum weight of cut material.
- 2) Required space for machine installation.-look at dimensioned sketch.
- 3) Pay attention to minimal distance — min.1 m from walls respectively from other machines.
- 4) Operating temperature of the room, in which machine will work, can be in the range of  $0^{\circ} \text{ C} \div 40^{\circ} \text{ C}$ .
- 5) Pedestal and conveyer must be in horizontal position in order to keep rectangularity of cut. At setting up, the water level must be placed on the putting area of vice.
- 6) We recommend to use conveyers of our production which can be fixed installed.
- 7) Electric connection of machine shall be made by qualified worker who is authorised for this activity. To ensure dry surroundings in the place of connection.
- 8) Before putting machine into operation, it is necessary to add all parts of accessory.
- 9) Plates used for conducting coolant liquid away, which are removed during. Transportation, must be assembled to machine pedestal by screws M 20 into holes for suspension screws used for machine lifting by crane.
- 10) Before first switch on machine, take control :
  - a.) correctness of blade movement ( there is illustrated arrow on the cover of driving wheel )
  - b.) blade tension : control panel-control NP note 9 (it lights at correct tension )
  - c.) amount and supply of a coolant liquid
  - d.) correct placing and fixing of material which will be cut
  - e.) distance between blade and cut material ( blade does not have to be in the

## 2.) Basic technical parameters

Cutting capacity:  $17\frac{1}{4}$  inch

power of main motor	3.0 kw, 1410 turns/min
motor power of hydraulic unit	0.75 kw
power of coolant pump	0.07 kw
amount of coolant liquid	$10 \div 12$ L
amount of hydraulic oil	5 L
blade dimension	$0.043 \times 1\frac{1}{4} \times 204\frac{3}{4}$ inch
cut width	1.4 mm
blade speed	20-90 m/min
weight	1100 kg
height, width, length, ( working position )	2500 mm, 1900 mm, 1450 mm
height, width, length, ( working position )	2500 mm, 750 mm, 1450 mm
voltage	460 V; 60Hz
connecting el. cable	$4 \times 2.5$ B
perpendicularity	

Ø100 mm	0.2 mm
Ø200 mm	0.5 mm
Ø300 mm	0.8 mm
Ø400 mm	1.2 mm

### **Blade**

#### **Blade tension**

Turning by tightening wheel in direction of hour-hands, blade moves ahead and blade tension is bigger.

REQUIRED BLADE TENSION : is set up by producer.

#### **Blade guide**

Blocks of blade guide are fastened by two holders. There are placed cocks with regulation of coolant liquid on blade guide. Blade guide is ensured by hearing and carbide pads



The guide is set up by producer and does not have to be changed!  
Distance of guide holder is adjustable according to dimensions of cut material.  
While blade installation, it is important not to have damaged or not-installed guide.

### **Drive and cutting speed**

Blade is driven by electromotor through belonging gearing for the purpose of reaching necessary cutting speed.

### **REGULATION OF CUTTING SPEED :**

Two-rotary motor changes into required revolutions by assistance of pole-changing switch.  
In case of torn blade, its drive stops in automatic regime.

### **Cutting pressure**

Cutting pressure is produced by weight of machine arm and throttle valve. In production, cutting pressure is setting up on average value and can be increase only working of high-alloy steel.

Cutting pressure is regulated by throttle valve.

### **CAUTION:**

**It is necessary to use blade with large teeth for usage of high pressure, otherwise, it is going to be broken teeth!**

### **Blade pressure ( feed )**

Blade pressure ( feed ) into cut is committed by cutting pressure and hydraulic cylinder. Hydraulic cylinder is placed on machine arm and fixed on pedestal.

Throttle valve :

- at setting up "0" blade does not have to decrease.
- at setting up "7" we obtain the largest feed which is used while cutting solid materials by blade with large teeth.

### **Main rule :**

The softer teeth and thinner profile, the smaller must be pressure ( feed ).

### **COOLING**

The coolant liquid is given by pump piping towards blade guide through cock and ten on blade. Pump of coolant liquid is dipping type with circulating wheel. It is placed on tank of coolant liquid.

During each putting into operation ( e.g. While tank emptying with a coolant liquid ), it is necessary to make its aeration.

Concentration mixture of a coolant liquid and water is in the relation 1:20 ( at normal operation ).

**CAUTION:** Cast iron is worked without cooling!

## SELECTION OF PROPER BLADE

Selection of proper blade for special material is important for cutting power. It can be difficult because there existed a large number of blades of different quality and various teeth.

We recommend to use blade BIMETALL. It has high quality, and you can cut all materials without change of blade. Its quality is much more higher than using set of blades.

In certain cases, it is advantageous to use blade marked SPESICIAL, especially in case when there is frequent damage of teeth that is caused by attendance mistakes.

If you want to use all possibilities of machine, e.g. When you work larger amount of the same material and cross section, you should choose optimum teeth, tooth shape, and the best quality of blade.

## SHAPE OF TEETH

Standard (N) - angle of tooth inclination  $0^\circ$  . It is determined for cutting cast iron and steel materials.

Rack (K) - angle of tooth  $10^\circ$  . It is determined for brittle materials, e.g. non-iron metals and less hard steel.

Combined teeth (C) - variable teeth with different angles and shapes of teeth that is determined for all materials even in the case of often change of profile.

## Blade quality

Mark SPESICIAL - blade is determined for all materials included alloy steel. It is not used in cases of rustles and acid - proof steel. Average life- 20 000 to 30 000 cm<sup>2</sup> mark C 45.

Mark BIMETALL M 42 - blade is determined for all materials indicated in the chart. We recommend to use ( 50 000 to 70 000 cm<sup>2</sup>, C 45 ) while cutting average amount of material.

## TABLE FOR TEETH SELECTION

Thickness of material	<2	2-10	10-25	25-5	50-80	80-12	<120
Worked material	number of teeth for 1 inch ( cca mm )						
Automat steel	22 N	18 N	10 N	8-7 N	6 N/KL	4 N/KL	3 KL
Structural steel to St 42	22 N	18 N	14-10 N	8-7 N	6 N/KL	4 N/KL 3KL	3 KL
Structural steel to St 70, noble steel	30-22 N	22-18 N	14-10 N	8-7 N	6 N/KL	4 N/KL	3 KL
Unalloyed tool steel	30-22 N	18 N	14 N	8 N	8-7 N	6-4 N/KL	4 N/KL

Alloy tool steel	30-22 N	18 N	14 N	8 N	8-7 N	6-4 N/KL	4 N/KL
Cast iron	—	14 N	14-10 N	10-8 N	8-7 N	6-4 N	4 N
Grey cast iron	—	14 N	14-10 N	10-8 N	8-7 N	6-4 N	4 N
Aluminium, aluminium alloy	18 N	10 N	8-6 N/KL	6-4 N/KL	3 L/KL	3 L/KL	3 L/KL
Bronze	18 N	14 N	10 N	8 N	6 KL	4-3 KL	3 KL/L
Brass	18 N	14 N	10 N	8 N	6 N/KL	4 KL 3 KL/L	3 KL/L
Cooper	18 N	14 N	10 N	8 N	6 N/KL	4 KL 3 KL/L	3 KL/L
Plastic substance	—	8 N	8-6 N	6-4 N	3 L	3 L	3 KL/L

### **BLADE CHANGE**

Before putting new blade into operation, it is necessary to make run in. During running in, arm downstroke by blade pressure. Running in must be made by cutting material until diameter 300 mm<sup>2</sup> during aprx. 15 min.

Change of blade is dangerous work because its sharp teeth does not have any protection.

Worker must take care for work that has to be performed by qualified staff.

### **CAUTION!**

Change of blade requires worker should have prescribed work facilities.

Main machine switch must be switched off and insured against switch on!

### **PROCESS OF BLADE CHANGE**

- 1) Switch off main switch.
- 2) Removal of cut material from machine.
- 3) Arm upstroke and fixing (in half of stroke height ), feed is 10".
- 4) Covers opening (note no.3 and note no.4 -dimensioned sketch) and their locking.
- 5) Maximum blade releasing from guide by pressing tightening wheel (1).
- 6) Blade pressing out from guide and taking out from machine. Hold it by both hands.
- 7) Take blade into hands, make „rolling movement " and fasten blade by wire.
- 8) Start turning of new blade.
- 9) Check correct direction of blade. Cutting edges of teeth should be in direction of blade movement.
- 10) If it is not like this turn blade „on back".
- 11) Blade putting into machine. ( Pass blade through tightening and driving pulleys as the first and then through guide ).

### **CAUTION!**

**Bottom part of blade (without teeth ) should lay on driving pulleys.**

### **CAUTION!**

**Danger of accident! Hold blade by both hands as further as possible from yourself and slowly turn it. Do not leave blade from hands in any case!**

## **MATERIAL FIXING**

Vice is used for placing and fixing of cut material. Material is placed between front and back jaw. By pressing push button, hydraulic cylinder is activated and material is fixed. By pressing push button, material in vice is released. It is setting up distance of vice opening by switch, mainly during repeated cutting cycle.

Vice is manually moved on linear guide to left or right dependent on arm deflection at angle cuts. In this chosen position, vice is fixed by lever.

### **CAUTION!**

**Take care for the fact that material must be strongly fixed after each change of jaw position. Bar material which is automatically worked must be safely fixed during movement of conveyor. Thin profiles should be safely fixed not to be deformed.**

Take care for keeping safety regulations while fixing and working materials.

**We offer followings as special accessories:**

CLAMP OF SETS : as help for cutting of sets.

ROLLER CONVEYORS : with drive a without drive (before and behind bandsaw machine) for easy manipulation with material.

## **INSTRUCTIONS TOWARDS CORRECT CUTTING**

### **Tooth deformation**

Each tooth of blade can tolerate certain pressure in dependence of blade quality. If you overcome this measure, tooth will break.

It can be a moment of fulfilling space among teeth by greater amount of filings.

Fulfilling space among teeth ( filings ) is possible if material with big cross section is worked by blade with too soft teeth ( e.g. diameter 100 mm, teeth 10, and feed 6 ). In some cases, material with big cross section can be cut by soft blade, but feed should be less ( e.g. 0,5 or 1 ).

Damage of teeth happens with large amount of filings if thin profiles are worked by blade which has too soft teeth, or if there is set up large feed.

Frequent damage of blades causes not keeping of operating instructions.

### **BLADE LIFE**

Damage of teeth is caused :

- not suitable cutting speed
- not suitable selection of blade quality for worked material
- not using of cooling or using of insufficient cooling.

## **MATERIAL WITH VARIOUS CROSS SECTION**

While cutting some types of materials, e.g. profile bars and tubes, cross section is

changed. In this case, we recommend you to use blade with combined teeth. The number of teeth for blade length is possible to determine according to the table no. 5. Feed must be smaller than „3" and during often change of profile, feed must be more smaller to avoid tooth damage.

## TEETH FOR CUTTING TUBES AND PROFILES

**O H L U**

$\begin{matrix} \text{D (mm)} \\ \text{S (mm)} \end{matrix}$	<40	80	100	150	200	300	500
	Number of teeth fro 1 finger (cca 25 mm)						
3	8/12	8/12	8/12	8/12	6/10	6/10	6/10
8	8/12	6/10	6/10	6/10	6/10	4/6	4/6
12	6/10	4/6	4/6	4/6	4/6	3/4	3/4
15	—	4/6	4/6	3/4	3/4	3/4	2/3
20	—	4/6	4/6	3/4	3/4	3/4	2/3
30	—	3/4	3/4	3/4	2/3	2/3	2/3
50	—	—	—	2/3	2/3	2/3	1/2

## 6.) ELECTION EQUIPMENT

1) Voltage system:

- 3 phase — 50 Hz, 380 V electric drives
- 2 — 24 V control

2) Electro-motors are protected from progressive overload from short-circuit by circuit-breakers with heat protection, appliances are protected from short-circuit.

3) Appliances are connected from system 3 phase — 50 Hz, 400 V has a protection by zero and connection.

4) Protection must be ensured according to STN 34 1010.

5) Environment, in which equipment is determined, is according to STN 33 0300.

6) Installed power :

- overall installed power  $P = 3 \text{ kVA}$
- max. power current  $I_n = 8 \text{ A}$

## B.) MACHINE SERVICE AND CLEANING

It is necessary to follow those commands during machine service and cleaning :

- 1) Main switch must be switched off and protected from chance switch on.
- 2) All work must be performed by qualified staff or controlled by them.
- 3) Before switching on machine, check if all persons making service are out of dangerous zone.

## COOLANT LIQUID

Check daily level of coolant liquid that does not have to decrease below 1/3. If this

happens, fulfil tank immediately!

## **HYDRAULIC**

During service and repairs, it is necessary not to have hydraulic mechanism under pressure. Check level of hydraulic oil every day the first week of operation. Later, once a week. Fulfil oil until maximum level during each checking.

Change of oil :

- first time after working of 50 to 100 hours
- then, after every 200 hours of operation, at least 1 × yearly.

**It is necessary to keep cleanness during service and repairs!**

## **MACHINE ARM**

On wearing surfaces or surfaces with non-attendance coating, there must be oiled surface. Oiling is perform during machine cleaning.

Regular cleaning of machine and early removal of filings is condition of good machine efficiency.

Filings is necessary to remove from a zone of driving mechanism, guide ( under covers 3 and 4 ) and rom tank with coolant liquid.

## **CAUTION :**

**Do not use inflammable or evaporated substances as cleaners!**

**Protect electric parts meaning motor, switch, electric box etc. from humidity!**

**Do not perform welding works or other repairs during high temperatures in the nearest of oil systems and electric supply! Oil remainders from tank is necessary to clean by cleaners before this type of work. It is necessary to switch off machines from electric network during idle time!**

## **EQUIPMENT AND PRIMARY COMPONENTS**

Components and equipment are constructed for bandsaw machine - models BR. Usage of foreign components on those machines can negatively influence their operation. In those case, producer is not responsible for possible failures.

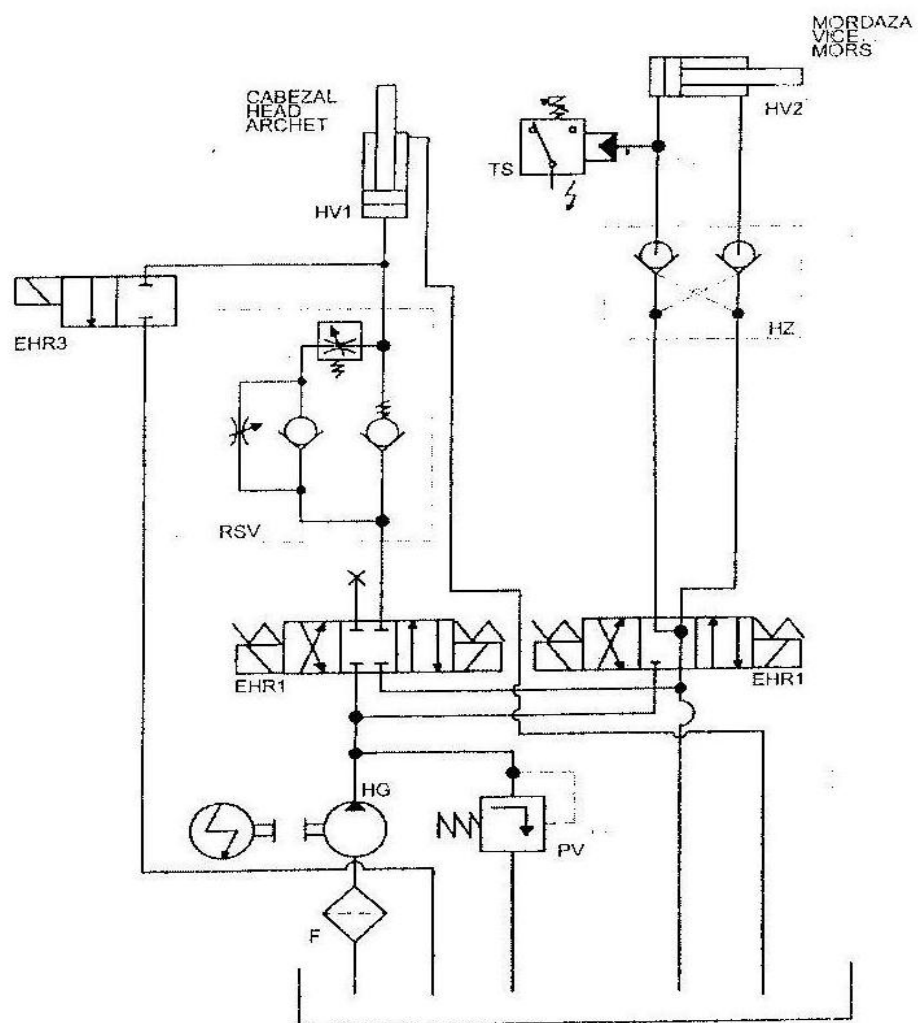
## **GEAR BOX**

Oiling of gearbox must be renewed after every 1 000 of operation.

### C.) OPERATING FAILURES AND REPAIRS

Failure	Possible cause	Repairs
Incorrect direction of blade feed	Incorrect phase connection	Phases must be correctly interconnected
Machine does not work	Bad safety pins Interruption of electric supply lead Open cover of safety switch Pushed emergency switch Switch off in the case of torn blade	Check Check Close cover Release emergency switch Change blade
Machine switches off itself during operation	Previous causes Protective motor switch is released	Previous Look releasing
Protective motor switch is released	Motor or pump for coolant liquid are overloaded Protective switch is incorrectly	Look at overloading Set up on value of motor electric supply
Overloaded motor or pump on coolant liquid	Suction of cold air Supply of coolant air is damaged or blocked Motor failure Blade drive is damaged	Check Clean Discover failure ( repair or change ) repair
Supply of coolant liquid does not work	Liquid tank is empty Cocks are closed Cocks are blocked Supply of coolant liquid is broken Air in the system ( after new filing up)	Fill up Open Clean Check, clean De-aeration by short-term taking out hose
Blade is not moving during working motor	Insufficient tension Tapered pulley is sliding Gear box failure	Tension Clean or change Discover cause ( remove driven wheel )
Blade is sliding from driving or driven wheel	Insufficient blade tension during big feed Setting angle of driving and driven wheel is incorrect	Correct tension of blade Check feed Set up again (look at unit about failures)
Short-term life of blade	Blade has insufficient quality for certain material Incorrect number proportion of teeth for machine length causes broken teeth Insufficient cooling High cutting speed	Select higher quality blade (BIMETALL) Select correct proportion  Check supply of cool. Liquid Set up speed table
Tooth breaking	Space between then is blocked	Use blade with other number proportion of teeth for blade length or to make smaller feed
Blade tearing	Blade tension is too weak or strong Non-qualitative blade	Correct change and tension change
Oblique cutting	Holder distance of blade guide towards material is too large Machine is blunt blade Insufficient blade tension Feed is too big Cutting pressure is big Non-qualitative blade Band blade guide	Set up holders of guide as the nearest  Change Tension Make smaller Make smaller Set up again
Cutting is not rectangular	Material does not lay on whole area	Put material correctly

## II — Hydraulic chart





## Elements for hydraulic

Element.	Description
HV1	Head cylinder
HV2	Vice cylinder
TS	Pressure switch
HZ	Hydraulic lock
RSV	Regulating throttle valve
EHR1	Head electro valve
EHR2	Vice electro valve
EHR3	Quick descent valve
HG	Hydro generator
F	Suction filter
PV	Safety valve

S-440R standard accessories					
N°	BANDSAW TYPE	BR		PRIVATEX NOVA	
	GENERAL VOLTAGE	460-60Hz			
	PROGRAMM				
N°	ULTIMA MODIFICACION	08-02-07			
IND	MODIFICACIÓN	FECHA	IND	MODIFICACIÓN	FECHA
DES.	GORKA	RESP. MIGUEL	FECHA	07-02-2007	ESC. 1/1
JULIHUANG GROUP					
CLIENTE / CUSTOMER					

