

**A) Safety measures and
accident prevention**



Safety measures and accident prevention

- 1) General
- 2) Transport
- 3) Setup
- 4) Operation
- 5) Change of band saw blade
- 6) Service and repair
- 7) Additional equipment and original parts

**A) Safety measures and
accident prevention**



1) General

Read instruction book and observe safety advices before putting machine in operation.

Observe instruction details and keep them legible.

Only qualified and authorized workers should set up and operate the machine as well as carry out the necessary service and repair works.

It is understood that this personnel is familiar with the safety regulations.

The responsibility for a safe condition of the machine as well as the use of the appropriate safety devices rests with the owner of the machine.

Besides of the general rules the following safety instructions are important:

This instruction manual should always be at hand with the operator. Operation and maintenance must follow according to the instructions given in this book.

Neglecting the instructions given in this book and/or unauthorized changes of the machine design or its components void the warranty.

The manufacturer of the machine is not responsible for any damage or injuries that will occur due to neglecting of the safety regulations when operating or servicing the machine.

2) Transport

The machine has to be transported by a fork lift (not by crane).

Besides of the general rules for transporting machines please observe chapter *B) "Transport and Packing"*.

3) Setup

The machine must be placed on even and solid ground.
Care has to be taken that spilled coolant or hydraulic oil cannot filter through the floor.

Outsticking machine parts - like handles and rods etc. have to be shielded by local measures to avoid accidents.

The electrical installation of the machine must only be carried out by a qualified and authorized electrician. This is also valid for the electrical power supply which has to be carried out according to the local safety instructions.

Care has to be taken that the personnel stands clear off falling material pieces during the sawing operation.

**A) Safety measures and
accident prevention**



4) Operation of the band saw

During operation of the machine please always observe that

- personnel must stand clear off the operation radius of the saw frame.
- the operator never reaches into the area of the running saw blade or the running chip brush.
- falling off material pieces will be appropriately guided away from the machine to avoid damage of machine or personnel.
- all safety devices (like covers, guard for band saw etc.) are mounted and in good working condition.
- only appropriate material is being cutted.

5) Change of band saw blade

The change the band saw blade always wear security clothes.

Switch off main switch and safe it against involontarily switch on.

Please observe correct direction of teeth.

6) Maintenance and repair

Maintenance and repair of the machine must be carried out by qualified personnel.

During all service and repair works the main switch must be switched off and secured against involontarily switch on.

For repair works on the electrical part of the machine it has to be cut from the main power and safed against accidental power-switch-on.

If service work on the hydraulic part of the machine is required, the pressure of the hydraulic system has to be released before.

Always use original spare parts and running material which has been suggested by the manufacturer (like saw blades, coolants, hydraulic oils etc.)

For service work always use appropriate tools only.

**A) Safety measures and
accident prevention**



Never use inflammable liquids or liquids which develop hazardous fumes for cleaning of the machine.

Welding (or other jobs which develop extensive heat) must not be carried out near oil systems or electrical wirings. Should welding be required on oil tanks or cylinders, please always drain them from oil and clean them with appropriate measures (for example high-pressure-cleaner).

Electrical motors or other electrical components must be safed against incoming water when cleaning the machine.

Before clearing up the machine after service work has been carried out all safety devices (like emergency off-switch, end switch etc.) have to be checked for proper function.

7) Additional equipment and spare parts

BAUER - Original spare parts have been specifically designed for each type of the BAUER - band saw machines.

Non-original parts are not tested by us and, thus, are not released for use on our machines.

Installation and/or use of non-original products can negatively influence the safety of our machines. Damage that results from use of non-original parts exclude the warranty from the manufacturer.

The user of the machine is responsible for a proper and safe installation of original parts and additional equipment delivered loose with the machine.

B) Transport and packing

Each machine is appropriately packed according to the mode of transportation.

Despite of a proper packing the machine could be damaged during transport. Therefore, please check machine and additional equipment for damage immediately after delivery.

In case of a damage during transport please always inform us immediately if the freight insurance was borne by us.

In all other cases a warranty claim has to be filled against the forwarding company.

The machine is designed to be transported by fork lifts or similar equipment (see sketch). There are no hooks available to lift the machine by a crane.

The packing material has to be recycled or dumped according to the local instructions.

Non sprayed parts of the machine are covered by a thin film of corrosion-resistant oil which should not be removed.

When transporting the unpacked machine, please observe the following points (besides the local safety instructions for transport):

Please only transport the machine by fork lift or platform truck.

The gravity point of the machine (see chapter C "Technical data") must be within the forks.

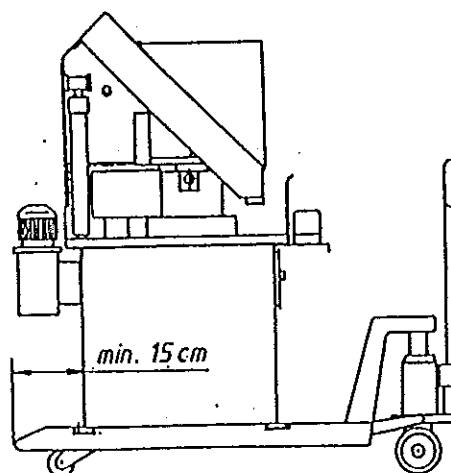
Since the body of the machine is hollow, the forks must reach throughout the whole body.

The saw frame has to be secured against self-actuated lifting (for example fixing the saw frame to the hand wheel of the vise).

All covers of the machine and the coolant tank have to be fixed with a self-adhesive tape.

Outsticking parts have to be removed and transported with the loose equipment.

Before the transport the machine has to be cleaned from chips and loose metal parts.

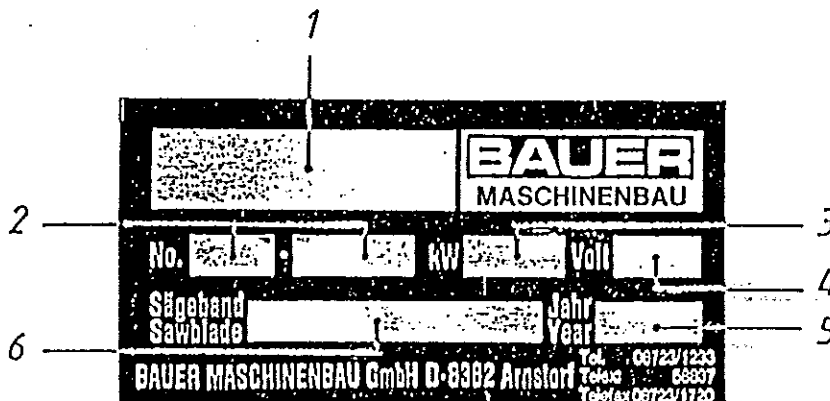


C) Type plate and technical data



The machine's type plate is placed on the front cover of the saw frame.

For enquiries or spare parts orders please always refer to the data given in your type plate.



- 1 Type designation.....
- 2 Serial number.....
- 3 Electrical performance.....
- 4 Voltage.....
- 5 Year of manufacture.....
- 6 Measurement of band saw blade.....

**D) Setup and first
operation**



Set-up of the machine

The band saw can be placed on an even and solid ground.

We suggest to use machine brackets which we offer as additional equipment.

The floor must be prepared to not allow spilled coolant or hydraulic oil to enter into ground.

The required space for the machine can be taken from the measurement drawing (page -D3-).

Please observe the minimum distance to walls or neighbouring machines.

The user of the machine is responsible for a safe material feeding to and a safe material removing from the machine.

The operating temperature of the machine has to be between 0 and 35°C.

The machine has to be placed horizontally.

<p>!! Caution: The roller conveyor and/or the material support have to be adjusted horizontally towards the material bed of the machine. Otherwise the cuts will be parallel, but not right angled.</p>
--

We, therefore, suggest to use our roller conveyors which are fixed mounted and not - like other material supports - used on different machines with different heights.

The electrical installation must only be made by an authorized electrician.

The electrical connection of the band saw has to be carried out in the switch box with the connectors L1, L2, L3, PE of the motor overload switch (see measurement drawing and wiring diagram).

The power supply must be provided with fuses on site.

D) Setup and first
operation



First operation

Each one of the Bauer band saws has to undergo several test cuts before it is delivered to the customer.

The guidance of the saw band and the cheeks of the vise are adjusted to have no more deviation than 0,2 mm per 100 mm cutting height.

The handles for the hand wheels for vise are rpm-adjustment are to be rightly positioned (they have been mounted "inwards" to avoid accidents during transportation.

Remove all transportation safety locks for saw frame, covers etc. and mount all loose equipment to the machine according to its usage.

When the machine is switched on for the first time, check the running direction of the saw band. The correct direction is shown by an arrow on the backside of the cover.

Before the first cut please pay attention to the following points:

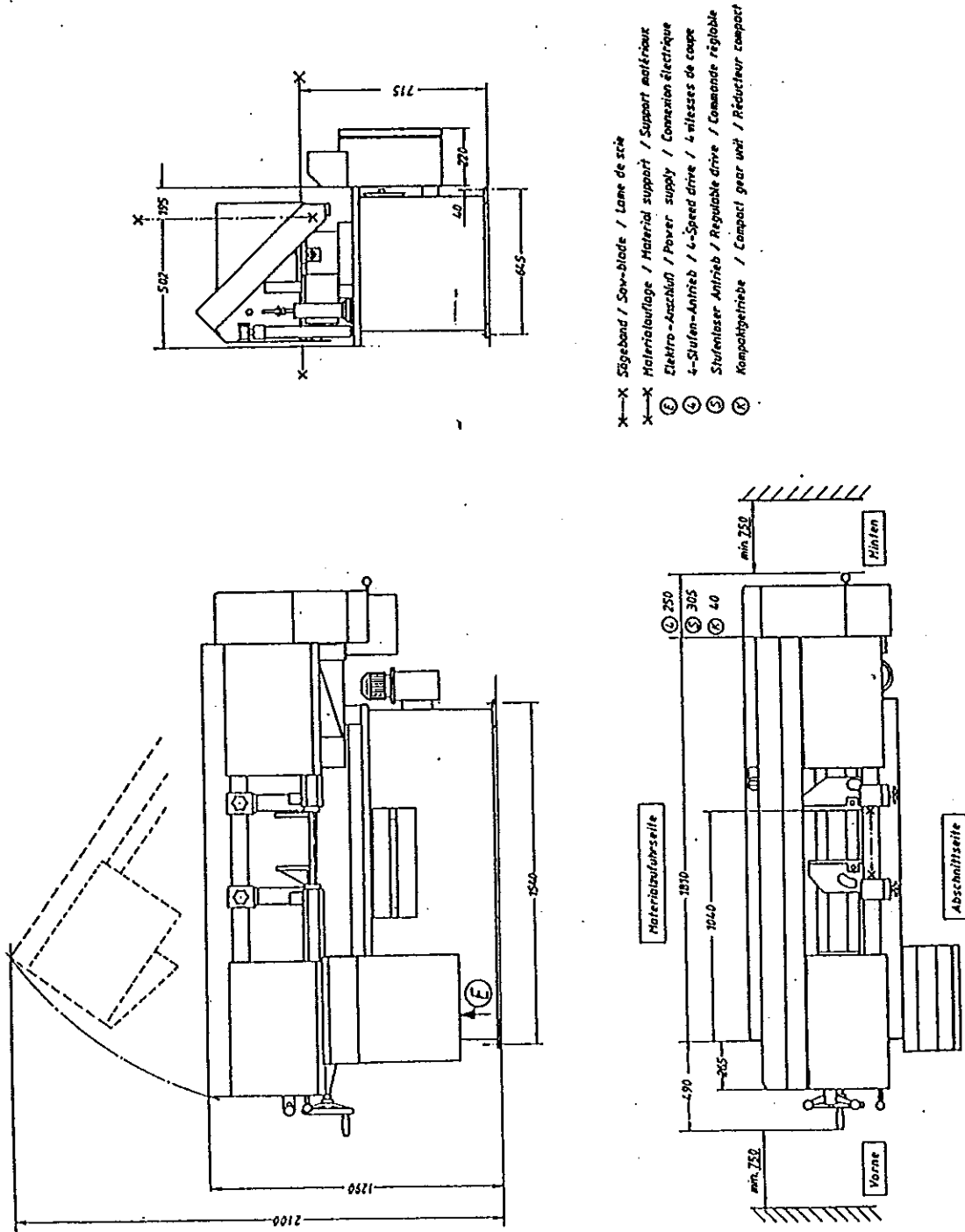
- Fill cooling fluid into the tank (correct mixture between coolant concentrate : water see table on the backside of the cover).
- Make sure that pitch of teeth and chosen cutting speed suit the material of the workpiece.
- Is the workpiece correctly placed and tightened? (The workpiece has to be placed on both cross bars of the vise)
- Adjust the distance of the guiding shoes according to the material
- Check coolant flow
- Check for a safe transport of the cutted-off material.
- When the saw is switched on, the saw blade must not touch the material!

<p>Caution!!: Before switching on the saw, remove transport security locks of the saw frame.</p>

D) Setup and first operation



Measurement Drawing



**E) Technical Description
and Operation**



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E) Technical Description and Operation



1) Mode of use

BAUER - band saws are specifically designed for cutting bar material made of metal, castings or plastics as mentioned in our material tables.

The materials must be of such a form (for ex. bar material) that they can be safely tightened in the vise of the machine.

In order to reach the optimum performance of the machine and keep the required tolerances, it is important to choose the correct saw blade, force feed speed, cutting pressure, cutting speed and coolant.

You will find the correct data in tables of your instruction book as well as on the stickers of the machine.

Should you need to saw different materials than specified on our tables, please ask for the required data from your distributors or from Bauer Maschinenbau.

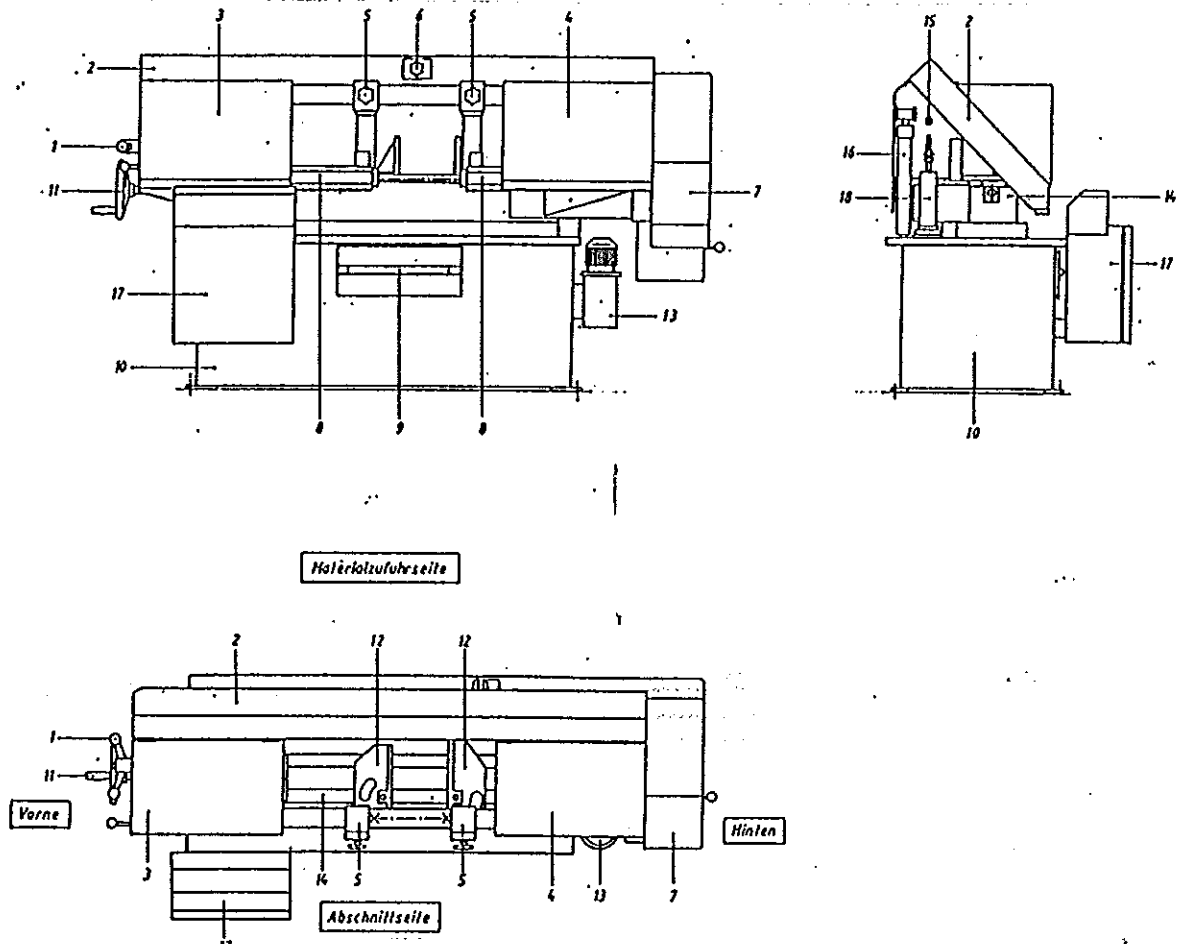
The maximum permissible material cross-sections can be seen on Chapter C "Type Plate, Technical Data".

For material cross-sections below 8 mm special vise jaws and fine-toothed saw blades are necessary.

The admissible room temperature for the operation of the machine is 0°C to plus 35°C.

**E) Technical Description
and Operation**

2) Complete machine



- | | |
|------------------------------------|--|
| 1 Tensioning bolt | 10 Machine bed |
| 2 Saw frame | 11 Hand wheel for vise |
| 3 Cover driven pulley | 12 Jaws of vise |
| 4 Cover drive pulley | 13 Coolant pump |
| 5 Guiding arms | 14 Vise |
| 6 Handle for force feed adjustment | 15 Adjustment screw for cutting pressure |
| 7 Cover for motor | 16 Hydraulic support cylinder |
| 8 Guard for saw band | 17 Switchboard with control panel |
| 9 Coolant tank | 18 Lifting gear |

E) Technical Description and Operation

3) Saw band tensioner

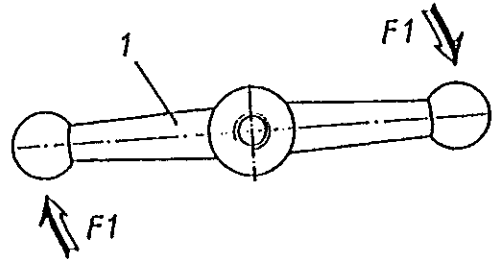
By clockwise turning the handle for saw band tensioner (1) the adjustable driven pulley is pulled forward and thus tightens the saw band.

The required saw band tension depends on the cross-section of the saw band (for ex. 25 x 0,9 mm) and its quality (special or bi-metal).

The correct tension of saw band is achieved by turning the tensioning toggle according to the below mentioned values.

Saw band quality "special"
F1 = approx. 190N
(torque approx. 35 Nm)

Saw band quality "bi-metal"
F1 = approx. 300 N
(torque approx. 56 Nm)



The correct saw band tension is a decisive factor for an exact cut and for the lifetime of the saw band.

A "constant saw band tensioner" is available which keeps the tension of the saw band constant even under when the band gets longer due to heat elongation. It also monitors the correct saw band tension (description of this device see Chapter I Special equipment).

4) Saw band guide (SBG)

The saw band guides are mounted to the guiding bars (5) and also hold the taps for the coolant.

The saw band guide consists of reverse rollers and hard metal shoes. They are exactly adjusted to the thickness and tilting angle of the saw band and must not be readjusted (change of saw band guides and new adjustment see Chapter J) - "Repair and Service Works".

Especially when feeding material to the saw attention must be paid that the saw band guides are not damaged or displaced.

For an exact cut it is important that the saw band guides are placed as near as possible to the material through adjustment of the guiding arms.

!! Caution: Carefully observe the moving area of the saw frame!

E) Technical Description and Operation



5) Drive and cutting speed

The saw band is driven via a three-phase electric motor which is mounted to the saw frame.

The cutting speed can be adjusted by changing the V-belt of the stepped pulley on the motor.

To change the V-belt open motor cover (7) and lift motor with the ball handle. Then change V-belt to correct bed (as recommended in the cutting pressure table).

!! Caution: Switch off motor before changing V-belt!

The correct choice of the cutting speed is a decisive factor for the cutting performance, the life time of saw band and a right-angled cut.

A variable speed control or a compact gear with variable speed control is available as special equipment. The cutting speed is then adjusted via hand wheel on the electric motor and is shown on a scale on the rear of saw frame respectively on a scale on the gear.

!!Caution: In case of variable speed control or compact gear adjust speed only when motor is running.

6) Cutting pressure

The cutting pressure is regulated by the weight of the saw frame and a pressure spring.

Originally the cutting pressure is adjusted to a mean value, which should only be increased if high alloyed steel is cut.

The cutting pressure can be adjusted on the red adjustment screw (15) at the hydraulic support cylinder (16).

Clockwise turning lowers the cutting pressure, anti-clockwise increases the pressure.

!!Caution: A high cutting pressure requires a rough-toothed saw band. Otherwise the cutting slot is overfilled with saw dust causing the teeth to break.

A hydraulic cutting pressure adjustment is available as special equipment (description see Chapter 1 "Special equipment").

**E) Technical Description
and Operation**



7) Force feed of saw frame

The force feed of the saw frame is determined by the hydraulic support cylinder. The support cylinder (16) is mounted to the saw frame (2) and to the machine bed (10).

The force feed is adjusted by the black handle (6). The scale (0 - 6) is only a relative measurement (not a speed of the force feed).

If adjusted to "0" the saw frame must not lower.

The adjustment "6" is equal to the highest force feed and must only be used when full material is sawed and a rough toothed saw band is used. When profiles are cut respectively a fine toothed saw band is used, the force feed should be adjusted between "1" and "4".

As a thumb rule the following adjustments should be used: The finer the tooth pitch and/or the thinner the walls of the profiles, the lower the force feed has to be adjusted.

8) Cooling

The coolant is pumped by the coolant pump (13) via its hoses and dosing taps directly to the saw band at both guiding shoes.

The coolant pump is a rigidly designed vane-type pump which can handle even saw chips.

The pump is mounted to the coolant tank (9) with the advantage of a positive suction head and, thus, does not have problems with air bubbles in the suction line.

If the coolant tank is filled for the first time, it may be necessary to bleed the system by opening the pressure line.

The mixture coolant concentrate : water is 1 : 20 for normal operations.

When sawing bigger quantities of non-ferrous metals or PVC, please refer to the mixture ratio as shown in the table on the machine.

!! Caution: You may saw grey cast iron best without any cooling.

9) Choice of the correct saw band

The choice of the right saw band for each different material is important to reach the optimum cutting performance.

There is a variety of saw band qualities and teeth pitches which might make the choice of the correct saw band seem difficult.

Therefore, we shall give you some hints before explaining the details:

If you are not sure what kind of saw band to use, please call us. We will gladly assist you to find the right choice.

If you have to saw many different materials and profiles, we suggest to use a saw band with a teeth pitch of 4 teeth per inch (tooth form N) and 8/12 teeth per inch (combi tooth).

The saw band with 4 teeth per inch is used for full material from 20 to 200 mm and profiles starting from 5 mm thickness.
For full material from 10 to 60 mm and profiles from 2 to 10 mm use the saw band with the combi-tooth.

Generally we suggest to use bi-metal saw bands since the quality of this kind of saw bands allows you to cut all materials (even if the material has hard inclusions).

Furthermore less saw band changes are necessary since the life time of the bi-metal saw bands is higher than those of lower quality.

In some cases, however, it might be more economical to use saw bands of the quality "special". This is the case if saw bands fail more often because of broken teeth due to wrong handling.

Should you want to make use of the full performance of the machine, for example when sawing bigger quantities of the same material and form, please choose then the optimum teeth pitch and tooth form and the best quality of the saw band.

Tooth forms

Standard tooth (S) tooth cutting angle 0°
To be used for sawing most of grey cast iron and steels.

Hook tooth (K) tooth cutting angle 10°
For materials which can be cutted easily, for example non-ferrum metals and lower quality steel.

Combi-tooth (C) (only available as bi-metal band):
Variable teeth pitch with different sets and teeth heights.
Suitable for all materials and changing cross-sections, for ex. profiles.

Quality of saw bands:

Special Suitable for all materials up to alloyed tool steel. Not suitable for stainless and anti-acid steels and high alloyed tool steel. Mean life time approx. 20.000 -30.000 cm² when sawing steel quality C45.

Bi-Metal M42 Suitable for all materials given in the table below.
Especially recommended for all production processes. Mean life time approx. 50.000 - 70.000 cm² when sawing steel quality C45.

B) Technical Description and Operation



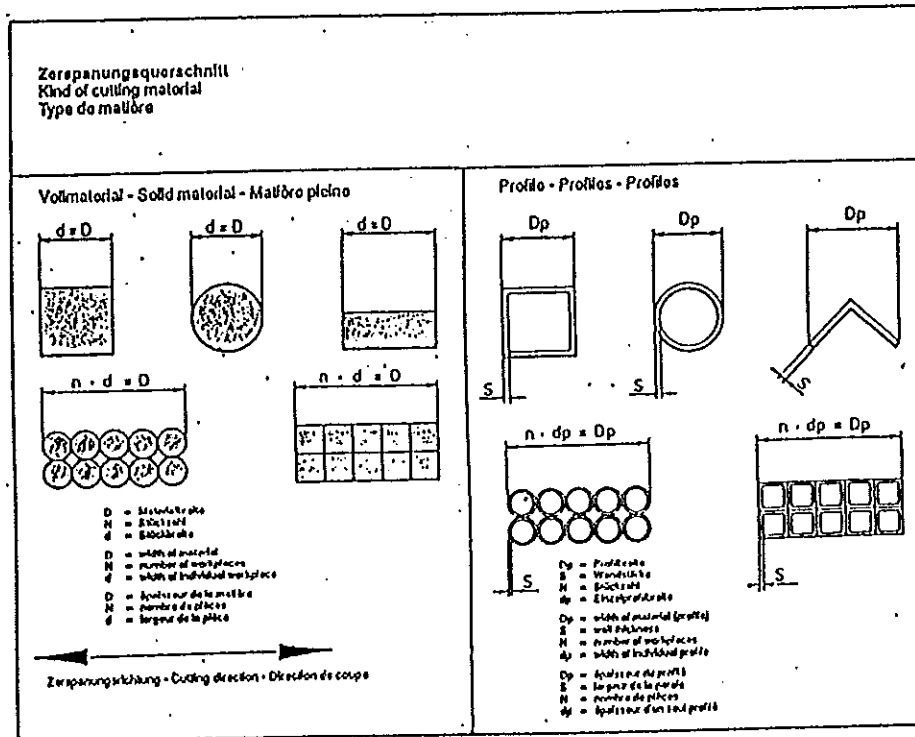
Table for tooth pitch and tooth form for solid material

The tooth pitch is specified in teeth per inch (=25,4 mm).

Werkstoff Group of material Catégorie de matériaux	Kurzname DIN	W.-Nr. Material-No. No. Matière DIN, 17007	Richtwerte zur Wahl der Zähne per Zoll Recommendations for choice of teeth per inch Choix du nombre de dents au pouce									
			Vollmaterial			Solid material - Matière pleine						
			bis zu 30	50	80	D (mm)						
			120	200	400	800	> 800					
Baustähle Structural steel Acier de construction	S137	1.0110										
	S150 S160-1	1.0531 1.0540	10 S	8 S	6 S	4 S	3 H	2 H	1,25 H	0,75 H		
Einsatzstähle Case-hardening steel Acier de cémentation	C 10	1.0301										
	14 NiCr 14 21 NiCrMo 2 18 MnCr 6	1.5752 1.6523 1.7131	10 S	8 S	6 S	4 S	3 H	2 H	1,25 H	0,75 H		
	9 S 20 45 S 20	1.0711 1.0727	6 S	6 S	4 S	3 H	2 H	2 H	1,25 H	0,75 H		
Vergütungsstähle Heat treatable steel Acier traité	C 45	1.0503										
	40 Mn 4 36 NiCr 6 34 CrNiMo 8 42 CrMo 4	1.5038 1.5710 1.6582 1.7225	10 S	8 S	6 S	4 S	3 H	2 H	1,25 H	0,75 H		
	100 Cr 6 100 CrMo 6	1.3505 1.3523	10 S	8 S	6 S	4 S	3 H	2 H	1,25 H	0,75 H		
	65 Si 7 60 CrV 4	1.0906 1.8159	10 S	8 S	6 S	4 S	3 H	2 H	1,25 H	0,75 H		
Kugellagerstähle Roller bearing steel Acier à roulement	100 Cr 6 100 CrMo 6	1.3505 1.3523	10 S	8 S	6 S	4 S	3 H	2 H	1,25 H	0,75 H		
	65 Si 7 60 CrV 4	1.0906 1.8159	10 S	8 S	6 S	4 S	3 H	2 H	1,25 H	0,75 H		
Federstähle Spring steel Acier ressort	C 125 W 1 C 75 W 3	1.1560 1.1750	10 S	8 S	6 S	4 S	3 H	2 H	1,25 H	0,75 H		
	125 Cr 1 X 210 Cr 12 X 40 Cr 13 X 165 CrV 12 100 CrMo 5 X 32 CrMoV 3 3 45 WCrV 7 58 NiCrMoV 7	1.2002 1.2080 1.2083 1.2201 1.2303 1.2365 1.2542 1.2714	10 S	8 S	6 S	4 S	3 H	2 H	1,25 H	0,75 H		
Schnellarbeitsstähle High speed steel Acier rapide	S 6-5-2-5 S 18-1-2-10 S 6-5-2	1.3243 1.3265 1.3343	10 S	8 S	6 S	4 S	3 H	2 H	1,25 H	0,75 H		
	X 45 CrSi9 3 X 45 CrNiV 18 9	1.4716 1.4873	10 S	8 S	6 S	3 H	2 H	2 H	1,25 H	0,75 H		
	X 20 CrMoV 12 1 X 5 NiCrTi 26 15	1.4922 1.4980	10 S	8 S	6 S	3 H	2 H	2 H	1,25 H	0,75 H		
Hochwärmefeste Stähle High temperature steel Acier réfractaire	X 10 CrSi 6 X 10 CrAl 18 X 15 CrNiSi 25 20	1.4712 1.4742 1.4841	10 S	8 S	6 S	3 H	2 H	2 H	1,25 H	0,75 H		
	X 5 CrNi 18 9 X 10 CrNiMoTi 18 10	1.4301 1.4571	10 S	8 S	6 S	3 H	2 H	2 H	1,25 H	0,75 H		
	GS-30 GS-60	1.0418 1.0553	10 S	8 S	6 S	4 S	2 H	2 H	1,25 H	0,75 H		
Stahlguß Steel casting Acier coulé	GG-15 GG-30 GGG-30 GTW-40 GTS-65	0.6015 0.6030 0.7050 0.8040 0.8165	10 S	8 S	6 S	4 S	3 H	2 H	1,25 H	0,75 H		
	Kupfer Copper Cuivre	KE-Cu G-Cu	2.0050 2.0109.01	10 S	6 S	4 S	3 H	2 H	1,25 H	0,75 H	0,75 H	
		Messing Brass Laiton	CuZn 10 CuZn 31 Si	2.0230 2.0490	8 S	6 S	4 S	3 H	2 H	1,25 H	0,75 H	0,75 H
	Alu-Bronze Aluminium Bronze Bronze d'Aluminium		CuAl8 CuAl 10 Fe	2.0920 2.0936	10 S	6 S	4 S	3 H	2 H	1,25 H	0,75 H	0,75 H
		Bronze Bronze Bronze	CuSn 6 CuSn 8 Zn	2.1020 2.1080	10 S	6 S	4 S	3 H	2 H	1,25 H	0,75 H	0,75 H
Rotguß Red brass Fonte rouge	G-CuSn 10 Zn G-CuSn 5 ZnPb		2.1086.01 2.1098.01	10 S	6 S	4 S	3 H	2 H	1,25 H	0,75 H	0,75 H	
	Hochwärmefeste Nickel-Legierungen High temperature nickel alloy Alliage à haute teneur de Nickel	NiCr 20 TiAl NiCr 22 FeMo	2.4631 2.4972	10 S	6 S	6 S	3 H	2 H	2 H	1,25 H	0,75 H	
Aluminium u. -Legierungen Aluminium and alloys Aluminium et alliages		Al 99.5 AlMgSPb G-AlSi 5 Mg	3.0255 3.0615 3.2311.01	10 S	6 S	4 S	3 H	2 H	1,25 H	0,75 H	0,75 H	
	Titan u. -Legierungen Titanium and alloys Titane et alliages	Ti 99.5 TiAl 8 V 4	3.0765 3.7165	10 S	6 S	6 S	4 S	3 H	2 H	1,25 H	0,75 H	
Thermoplastische Kunststoffstoffe Thermoplastic plastics Matière synthétique thermoplastique		PVC Teflon, Hostalon		6 S	4 S	3 H	3 H	2 H	1,25 H	0,75 H	0,75 H	
	Kunststoffe mit Harzgewebe Plastics with fiber layers Matière synthétique avec fibre	Reslax Novotex		10 S	6 S	6 S	4 S	3 H	2 H	1,25 H	0,75 H	

Table for tubes and profiles

s (mm)	Profile · Profiles · Profiles. Dp (mm)					
	< 40	80	100	150	200	300
3	8/12	8/12	8/12	8/12	6/10	6/10
8	8/12	6/10	6/10	5/8	4/6	4/6
12	6/10	5/8	5/8	4/6	4/6	4/6
15	5/8	4/6	4/6	4/6	3/4	3/4
20		4/6	4/6	3/4	3/4	3/4
30		3/4	3/4	3/4	2/3	2/3
50				3/4	2/3	2/3



10) Change of band saw blade

The change of the band saw blade is one of the most dangerous maintenance works on your band saw as during this work the sharp teeth of your saw blade are unprotected.

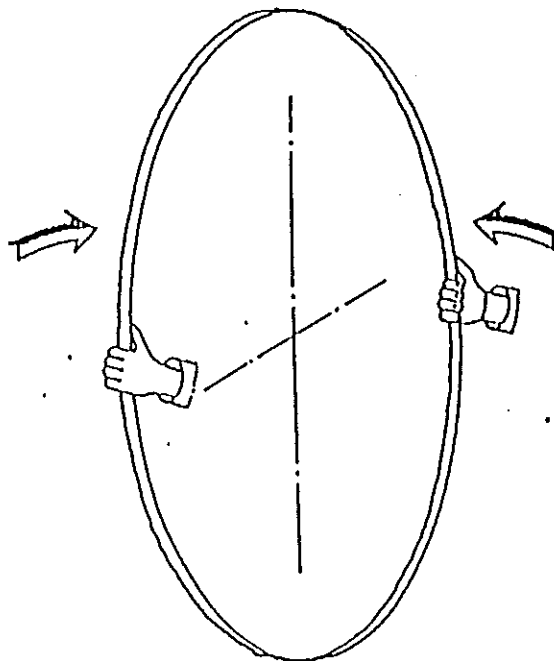
It is, therefore, absolutely necessary that this work is carried out only by authorized and skilled personnel.

!! Caution: When changing the saw blade always wear protection clothes!

Turn main switch of machine to off-position and secured main switch against unexpected switch-on!

For change of band saw blade proceed in the following sequence:

- Lift saw frame.
- Remove material from vise (14).
- Switch off main switch and secure against unexpected switch-on.
- Open covers for drive - (4) and driven pulley (3).
- Loosen blade tension as far as possible and press toggle handle (1) backwards.
- Remove band saw blade by pressing it downwards from the guide ways and remove it from the machine. Hold saw blade with both hands.
- Roll saw blade (as shown in sketch) to form a role and secure it with a piece of wire.
- Clean saw frame from saw dust.
Install new band saw blade.



!! Caution: Danger of injury!
Hold saw blade firmly with both hands, hold away from your body and turn it slowly onto wheels.
Never loose grip during turning on saw blade!

- Check now whether the direction of teeth is correct. The tips of the teeth have to point towards the drive direction of the saw blade.

- If this is not the case, correct the direction of teeth by "twist-loop" the saw band:

Hold the saw band firmly with both hands (between thumb and index finger at the upper third of band.

The thumbs must be placed on the outer side of the saw band whereby the band can now be twisted in itself by simultaneously turning your hands.

- Now the saw band can be again laid into the machine by reverse drawing over both pulleys.
Finally press saw band into the drive ways.

!! Caution: Neck of saw band (not the teeth) must be placed below the guide collar of the tension- and drive pulley.
Between the guide ways the teeth must point downwards!

- Tension saw band with toggle handle slightly (F1 approx. 50 N)
In case of a contact tensioner: switch on main switch and tension until control lamp switches off.
- Close covers of drive- and driven pulley and shortly switch on the machine.
The saw band will immediately adjust itself in the right position,
(e.g. neck of saw band adjusts to the collar of the guiding roles).
- Now tension saw band. (see Chapter 3 resp. 1 Special Equipment "constant tensioner")

Your machine is now ready to go.

!! Caution: Each new saw band should be "broken in".
To do so, the forward feed should be reduced to 2/3 of the first 300 cm² of cut section.

**E) Technical Description
and Operation**



11) Vise and chucking of saw material

The vise (14) is used as support as well as to chuck the material.

The material is being pressed by the movable front jaw (12) against the fixed rear jaw of the vise.

The front jaw is moved by the motor of the electrical vise tensioner witch is operated by push buttons on the switchboard table.

The electrical vise tensioner stops the motor as soon as the presetted tensioning force is reached.

The tensioning force is adjusted by a current limiting device inside the switchboard.

The adjustment should only be changed to a lower setting current when chucking very thinwalled profiles or tubes.

Caution!! Before opening the switchboard switch off the main switch.

For mitred cuts the jaws of the vise can be continuously adjusted up to 45°.

To achieve this, open the tightening bolts of both jaws and pull the complete vise to the front until the rear jaw is placed in front of the rear guiding shoe of the saw band.

In order to adjust the vise correctly you will find a scale which allows you to adjust the angle with an accuracy of +/- 1°. A more accurate adjustment of the angle (specially when cutting 90°) can be achieved by using a protractor. Remember to measure the angle to the base of the saw band and not to the vise.

Caution!!: Make sure that all bolts are retightened after adjusting the vise.

Chuck thin-walled profiles with "feeling", otherwise they will be distorted.

Observe the safety measures for handling the material.

Adjust required angle to the base of the saw band and not to the vise.

We also offer you the following special equipment:

Clamping devices for bundles: This device helps safely chucking complete bundles of material.

Tensioner for residue pieces: Helps you to chuck rest pieces of material safely (up to 60 mm).

Turntable: To tilt the machine for mitred cuts.

12) Cut-off material

For the various lengths of the cut-off material suitable devices to safely guide and hold these materials are necessary.
For short lengths a slide or a container or - for longer materials - a roller conveyor may be necessary.

Since length and weight of the cutted material are varying strongly, the scope of delivery of a standard machine does not include any devices to remove cut-material from the machine.

Devices which ensure a safe and accident-free removal of the cut material has to be, therefore, provided for by the user.

If we have exact specification of the cut material, our company can as well offer containers and roller conveyors for this purpose.

Upon special request we also offer material slides, spraying stations and devices for burr-removing.

13) Positioning of the material

The standard scope of delivery of the machine includes a material stop 800 mm without scale.

To position the material correctly, lower the saw frame to a position shortly above the material and adjust the length with a metre rule.

Then place material stop onto end of material.

As special equipment we offer

- material stop 2 m with scale
- roller conveyor with sliding stop and scale
- roller conveyor with NC-stop

With the above mentioned material stops the positioning of the material is much simpler because a metre rule and the lowering of the saw frame is no longer necessary.

!!Caution: Make sure that there are no obstacles between material stop and material (for ex. metal chips or burr).

Always measure the length after the first cut.

Check regularly the adjustment of the material stop.

15) Operation of saw

The former chapters described the single components of the band saw and their handling.

This chapter gives you an example of how to operate the saw.

Example: Cut a bar material of 150 mm diameter, material quality ST42, to a length of 200 mm.

Before operating the saw, make sure that the removal of the cut material is secured.

In this example the cut material is too heavy to let it simply fall off the machine.

It would be more suitable to guide the cut material over a slide into a container or take the material manually away from the machine.

Step	Designation	Description/Remarks
1	Choose saw band	See Chapter 9) and table "solid material" Suitable saw band: 3 ZPZ, hook tooth quality: bi-metal
2	Install saw band	See Chapter 10)
3	Material positioning and chucking	See Chapter 11) When using a new bar material, we suggest to make a first "head cut".
4	Choice and adjustment of cutting speed	See Chapter 5) and table on the cover of the drive disk. Adjust 50 m/min.
5	Adjust cooling	See Chapter 8)
6	Adjust force feed speed	See Chapter 7) Adjust to value 2-3
7	Cutting process	Press button (S4) "lower"

After the head cut is carried out, the saw switches off, the saw frame is down.

8	Lift saw frame	Press button (S3) "lift" until saw frame reaches the required height (approx. 10 - 20 mm above material)
9	Adjust material to length	See Chapter 13) Adjust material stop
10	Switch on saw and start cutting	Press button (S1) "saw on" and (S4) "lower"

To step 1 "Choice of saw band"

You can, of course, also cut with a saw band type whose tooth pitch is not optimal, especially when you carry out only a single cut.

You have then to reduce the force feed speed and/or the cutting speed in order to avoid breakage of teeth respectively premature wear of your saw band (see Chapter 14). The cutting time in this case is then somewhat longer.

16) Electrical equipment

The electrical components are wired according to wiring diagram (Chapter "I").

The safety switches are triggered in case the saw motor or gear motor is overloaded respectively in case of a short circuit.

The control switch S1e (saw band torn) is mounted to the saw band tensioner.

The end switch S2e (saw off) controls the end of the sawing process and is located on the vise.

The end switch S3e (lift saw frame) stops the lowering of the saw frame and is mounted to the flange tube of the lifting gear.

The end switch S4e limits the upper position of the saw frame and is located on the machine bed right behind the vise.

Steering of the band saw

The main switch S7 supplies power for electric motors and steering system.

The buttons S1 (on) and S2 (off) switch the saw motor on or off.

The buttons S3 (lift) and S4 (lower) lift or lower the saw frame.

When lowering the saw frame by pushing the button S4 note that the gear travels to its lowest point and the saw frame follows according to the adjusted force feed speed (1 - 6).

After the saw motor has been switched on the sawing process is released by pressing button S4 (lower).

The gear travels to its lowest point (is being switched off automatically by end switch S3e) and releases the saw frame.

By pressing button S3 (lift) the travelling of the gear can be manually

interrupted.

After cutting process has ended, the saw motor is switched off by end switch S3e.

In case of a saw band failure the process will be interrupted by end switch S1e and failure lamp H1 will be switched on.

As special equipment we offer the following electrical components:

- Pole switch motor
- Emergency off-switch on instrument panel
- Emergency off-switch - external
- Electronic saw band monitoring
- Automatic lifting of saw frame after cutting process
- End switch for cover
- Chip remover
- Driven roller conveyor

The wiring diagram for these special equipments (if not included in your standard wiring diagram) you will find in the instrument panel as well as in your spare parts list.

17) Hints for an optimum sawing process

1) General

a) Broken tooth

Each tooth of the saw band can bear only a certain cutting pressure according to its quality. If this limits will be surpassed, the tooth will break.

The cutting pressure for the single tooth will be too high if the gap between two teeth will be overfilled with chips or if the chip will be too thick.

The "overfilling" of the chip space mostly appears if bigger cross sections are sawed with high-pitched saw bands (for example 100 mm diameter with a saw band 10 teeth per inch) and high force feed as well as cutting pressure.

Single cuts of bigger cross sections may be executed with fine saw bands, however, the force feed and cutting pressure have to be lowered accordingly.

Teeth breakages because of "too thick chips" may occur when you saw thin-walled profiles with a saw band of low pitch, too high of a force feed and too high cutting pressure. It may also occur if the saw band contacts the material before the machine is switched on.

b) Life time of the saw band

If the quality of the saw band is incorrectly chosen with regard to the material or if a too high cutting pressure is chosen or if the sawing process is done without cooling, the saw band will not reach its determined lifetime.

In case of a too high cutting speed or of missing cooling, the teeth will not be sufficiently cooled and lose their sharpness through overheating.

Overheating of the tooth tips could also occur if the saw band will just "slip" over the material (poor heat transfer because of only pin-point contact to the material).

2) Sawing of changing cross sections

a) Profiles

During the sawing process of profiles (for example tubes) the cross section of the cut changes constantly.

For these kinds of cuts we suggest to use a suitable "combination-pitch" of the saw band.

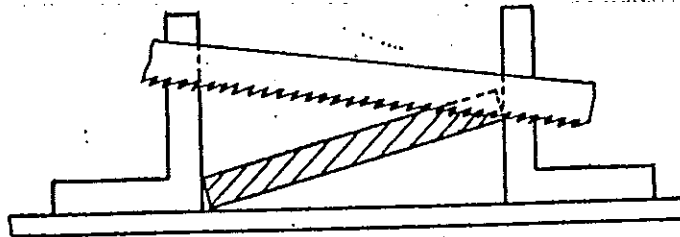
The suitable pitch can be taken from the table on page 10.

The force feed speed should not be adjusted bigger than "3". In case of big variations in wall thickness adjust force feed speed smaller than 3 in order to avoid tooth breakage.

b) Flat iron

The most tooth breakages occur when cutting flat iron with too high toothed pitch.

If the flat iron, however, is chucked according to the lower sketch, you may as well cut this material with a "too fine saw band" since the cross section is smaller due to the tilting of the material.



**F) Service and
Repair works**

Important for all service- and repair works!!

The main switch of the machine must be switched off and secured.

All works must only be carried out by qualified and authorized workers.

Before the machine is switched on again, all safety devices have to be mounted first and nobody must be within the danger-zone of the machine.

Coolant

The coolant level has to be checked daily.

Recommendation: Refill immediately if coolant tank is filled less than 1/3 of its capacity.

Vise

Spindle and bed of the vise should always be slightly oiled. It is recommended to do this service work always when the vise is cleaned.

Cleaning and saw chip disposal

A troublefree functioning of the machine requires a regular cleaning and saw chip disposal.

When the machine is cleaned, remove the saw chips also from both saw band pulleys (under the covers 3 and 4) as well as from the coolant tank.

For disposal of the saw chips please refer to your local regulations.

In any case separate saw chips and coolant from each other which can be easily managed with our saw chips container and coolant separator.

Always take care that the stickers of the machine are well legible. Should they become illegible, please renew them immediately.

Caution!!

Never use cleaning fluids which develop flammable or aggressive fumes!

Electrical components like motors, switches, switchboard etc. must be saved against moisture!

Failure	Possible cause	Remedy
Drive motor overloaded	Cooling air intake of the motor choked (blower housing damaged or dirty)	Check and clean
	Motor seized	Find cause of seizure. Repair or change.
	Band saw drive seized	Find cause of seizure. Repair.
Coolant pump overloaded	Air intake of the motor choked (blower housing damaged or dirty)	Check and clean.
	Motor- or pump shaft seized.	Find cause of seizure. Repair or change.
No coolant flow	Coolant tank empty	Fill coolant tank.
	Coolant taps closed	Open coolant taps
	Coolant taps choked	Clean coolant taps
	Coolant hoses bent or choked	Check and clean
	Air in coolant system (mainly after refilling)	Bleed system by shortly open the pressure hose.
Saw band stops during operation although drive motor is running.	Saw band tensioned too less	Tension
Saw band stops during operation although drive motor is running.	V-belt slides	Clean resp.change V-belt
	Defective drive role of gear	Find cause (dismantle drive role)

Failure	Possible cause	Remedy
Saw band comes off drive or tension role	Saw band tensioned too less at high force feed	Tension saw band correctly, check force feed.
	Incorrect position of drive resp. driven role	Adjust angle (see "repair- and service works")
Low life time of saw band (teeth are getting blunt)	Wrongly choosen quality of saw band for this material.	Choose saw band with higher quality (bi-metal)
	Wrongly choosen pitch of saw band results in broken teeth	Choose correct pitch of saw band
	Missing coolant	Adjust coolant flow, use correct coolant
	Too high cutting pressure	Reduce cutting pressure acc.to table
Broken teeth	Chip space of saw band overfilled	Use saw band with different pitch or reduce force feed or chuck material differently (see Chapter "E) Hints for optimum sawing")
Torn saw band	Saw band tension too high or too low	Tension correctly
	Defective saw band	Change saw band
Displaced cut (saw band displaces during cutting process)	Distance from guiding shoe to work piece too big	Place guiding shoes as near as possible to the work piece
	Saw band blunt	Change
	Tension of saw band too low	Tension correctly

6) Troubleshooting

Failure	Possible cause	Remedy
Displaced cut (saw band displaces during cutting process)	Force feed too high	Reduce force feed
	Cutting pressure too high	Reduce cutting pressure
	Defective saw band (Set not even)	Replace saw band
	Guiding shoes displaced	Adjust guiding shoes
Cut not right-angled, but parallel	Material is not correctly placed between the two vises	Place material correctly
	Cheeks of the vises are not exactly adjusted to 90°	Adjust to 90°
	Roller conveyor or material support not adjusted to the height of vise	Adjust correctly

I) Special Equipment



Elektronic Saw Band Monitoring

Failure	Reason	Remedy
LED does not shine	Wire broken	Replace wire EBU defective
Distance between sensor and cam incorrect	EBU has loosened itself	Adjust again
Frequency of switchpoint too high	Was wrongly adjusted or mistuned	Adjust again

Retrofitting of EBU

The bracket of the EBU has to be mounted to the bolt of the driving disc. Mount EBU in bracket and adjust the distance between sensor and cam. Lay wires protected against damage and connect them according to wiring diagram.

!!Caution: The EBU has to be switched in row with a protection switch, otherwise the electronic can be damaged.

Current under load: min. 20 mA
 max. 350 mA (2 A switch-on current)

Adjust frequency as described above.

I) Special Equipment

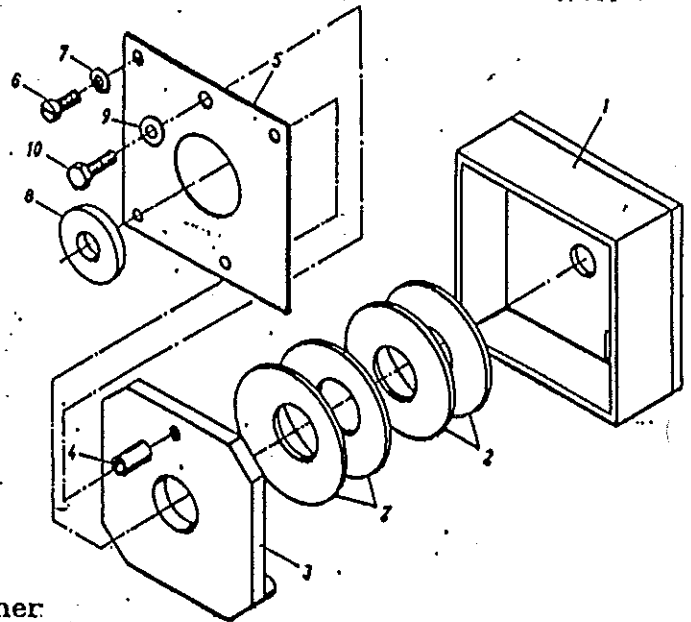
Constant Saw Band Tensioner



Constant saw band tensioner

The "constant saw band tensioner" is mounted between tensioning toggle and saw frame and keeps the tension of the saw band constantly under the required tension, even if the band would elongate under thermal stress. In case of saw band failure the tensioner would switch off saw band drive which would be signaled by the lamp "saw band torn".

The "saw band tensioner" has to be pretensioned by the toggle handle until disk 9 is even with cover 5.



Retrofit of the constant saw band tensioner

The retrofit work has to be carried out by a qualified worker only.

The retrofit set contains:

- constant saw band tensioner (completely assembled) with end switch for signal lamp for torn saw band
- signal lamp
- threaded bolt

Retrofit work:

- Remove drive disc
- Remove slide plate and exchange threaded bolt
- Reassemble slide plate and drive disc
- Drill two holes 7 mm diameter on front plate of saw frame (bore pattern see backside of constant tensioner)
- Fix constant tensioner with two M6 bolts
- Install signal lamp into control panel (bore hole diameter 10 mm)
- Wire end switch and signal lamp according to wiring diagram
- Adjust end switch to a position that signal lamp switches off if disc 9 is approx. 1 mm above cover 5.

Failure	Possible cause	Remedy
Saw frame does not stay in top position (lowers somewhat until support cylinder acts)	Lack of oil in support cylinder	Fill up hydraulic oil (see "Service and Repair (Works)")
Saw frame lowers slowly even at "0"-position of force feed switch	Valve does not close due to loose or misplaced positioning rods	Tight or adjust rods
	Rubber cap not tight	Change rubber cap
Saw frame cannot be lifted	Motor safety switch F2 has released	Find cause for safety switch release and clear problem (see paragraph below)
	Defective motor, clutch (motor runs, but ... no lifting)	Change clutch
Motor safety switch F2 on lift motor has released	End switch S3e defective, causing seizure of spindle nut	Change end switch and release spindle nut
	Misplaced end switch S3e resulting in a too late switch-off of motor This will cause spindle nut to seize	Adjust end switch correctly and release spindle nut

1) Special Equipment

Elektronic Saw Band Monitoring



Electronic saw band monitoring (EBU)

The electronic saw band monitoring system automatically switches off the saw band drive if the saw band slips or tears.

The EBU is mounted by a bracket to the bolt of the drive disc.

Description of function:

The EBU monitors through an inductive speed sensor the RPM of the drive disc.

If the RPM of the drive disc falls below an adjusted value, the output of the EBU opens and so stops the saw band drive (see wiring diagram in Chapter H - the EBU is configured as additional equipment O1).

The EBU has a delay-time of approx. 9 sec. That means. the monitoring of the rpm starts 9 sec. after the saw is switched on.

The LED of the EBU signals its function.

Adjustment

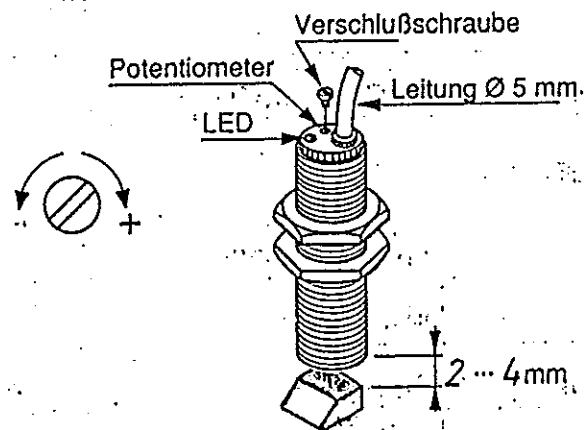
The distance between sensor and cam of the drive disc must be adjusted to 2 - 4 mm.

The frequency of the switch point is to be adjusted at the potentiometer. To increase the frequency turn the potentiometer-screw clockwise. To decrease the frequency turn anticlockwise.

Adjust the lower cutting speed on your machine and turn the potentiometer (20 turns) to the lowest frequency. Switch on the saw and turn the potentiometer slowly in clockwise direction until the drive will be switched off.

Now turn the potentiometer anticlockwise by 1 turn.

Don't forget to retighten the closing screw.



Amendment to Chapter G) Failures and trouble-shooting

If the points mentioned in Chapter G "Saw does not start" respectively "Saw switches off" do not lead to the desired remedy, the EBU has to be checked. First please check whether the saw band does not slip on the driving disc.

If this is not the case, bridge the contacts of the EBU.

If the saw now functions again, the EBU has been detected as the point of failure. Now remove the bridge and try to find the failure of the EBU through the following measures.

I) Special Equipment



Quick adjustment for mitred cuts

Quick adjustment for mitred cuts

Your band saw is equipped with a turnable vise to allow mitred cuts.

The turning point of the vise is placed in such a way that the material stop does not have to be corrected when cutting mitres.

During the sawing operation the rear jaw of the vise must be locked.

The front jaw of the vise is turnable mounted in bearings and adjusts itself automatically parallel to the rear jaw.

The turntable allows the complete machine to be turned to the required mitred angle.

The machine position is being fixed with the locking device.

The locking device shows a angle scale with a graduation of 1°.

The accuracy of adjustment with this scale is +/- 0,3°.

Adjusting the machine for mitred cuts:

- Release tensioning bolt of the rear jaw of vise
- Release locking device of turntable
- Adjust machine to required angle
- Lock rear jaw and locking device again

!!Caution:

Always check whether rear jaw of vise and locking device is tightened.

Never turn the machine under force, but release all locking bolts before

For an exact adjustment of the mitred angle use additional measurement tools (for ex.a protractor).

Base line of the adjusted angle is the saw band (not the vise bed).

Always control the adjusted angle of the first cut.

Important for all service and repair works!!

The main switch of the machine must be switched off and secured.

All works must only be carried out by qualified and authorized workers.

Before the machine is switched on again, all safety devices have to be mounted first and nobody must be within the danger zone of the machine.

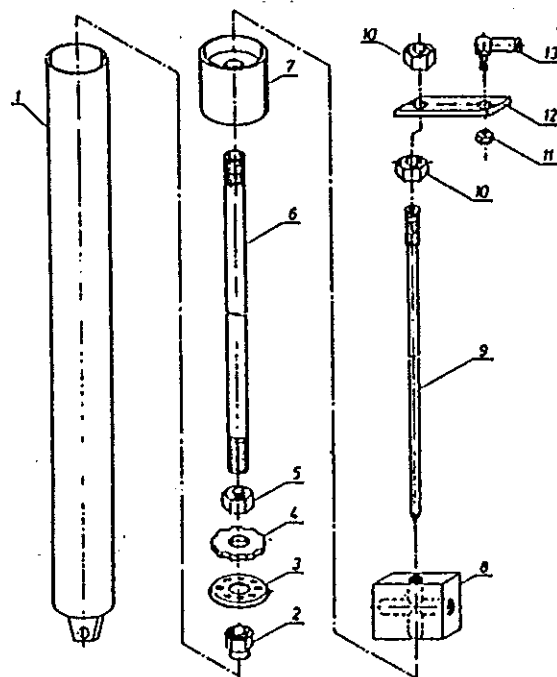
Hydraulic support cylinder

If saw frame does not stay in top position, but lowers until the hydraulic cylinder stops it, oil must be refilled.

Remove cylinder cover (7) (use hammer, if necessary) and refill oil (viscosity 32, DIN 51519) until approx. 50 mm below upper end of cylinder (1).

If the saw frame lowers itself slowly even if switch is set to "0", the governor rods of the cylinder have to be readjusted.

Loosen both hexagon nuts (10) and tightened nozzle rod (9) by turning clockwise. Set handwheel for force feed adjustment to "0" and retightened both hexagon nuts (10).



Should the saw frame still lower even at correctly adjusted rods, the reason must be dirt in the nozzle or sleeve (3) is worn out.

In both cases the cylinder has then to be removed, emptied from oil and dismantled.

The order no. for the sleeve (2) can be looked at in your spare parts book.

Adjustment of saw band run

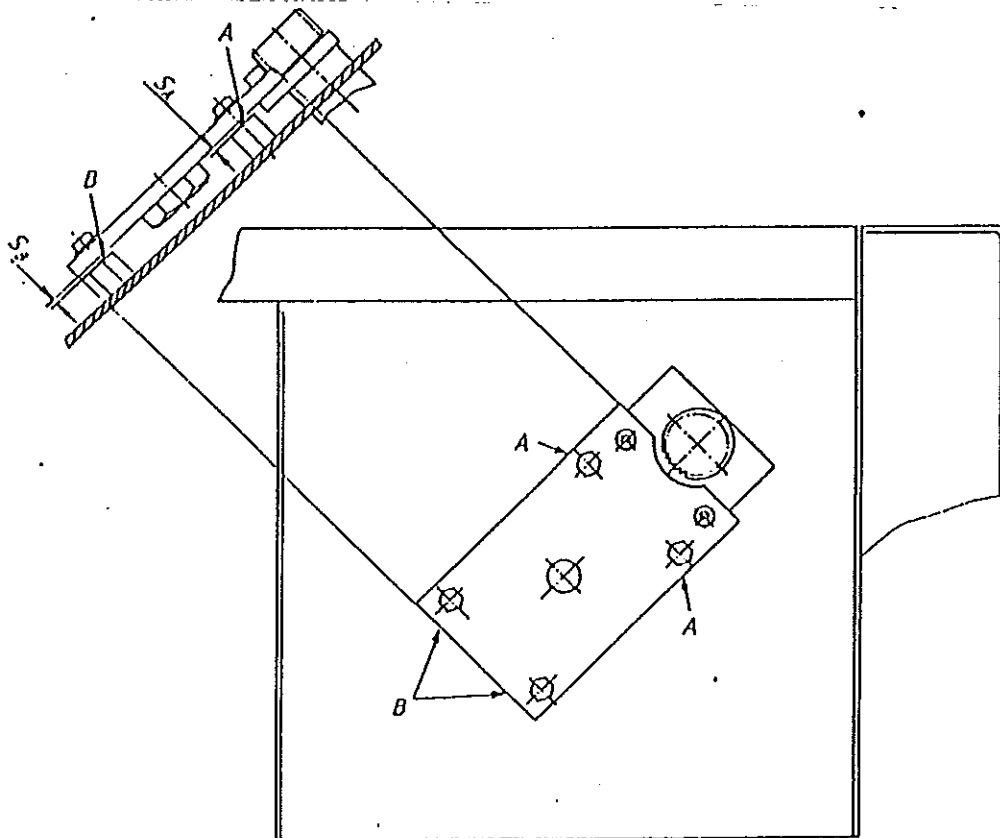
The saw band run has to be adjusted in such a way that the neck of saw band only slightly touches the collar of the drive respectively driven pulley. A correct band run would not deliver a loud scratching noise or, if a piece of paper is stuck between collar of drive pulley and neck of saw band, it must not be cut off. On the other hand, if saw band is tensioned properly, it must not run off the drive pulley.

a) Saw band runs off drive pulley:

Before adjusting the band run, make sure that the saw band did not run off the drive pulley because of incorrect band tension.

Adjustment of journal of drive pulley

- Remove saw band
- Take off drive pulley
- Remove 4 hexagon screws of flange plate and put shims underneath points "A" (thickness of shims is measurement SA = 0.3 - 0.5 mm)
- Retighten hexagon screws and reassemble drive pulley
- Lay on saw band, tension correctly and check band run.



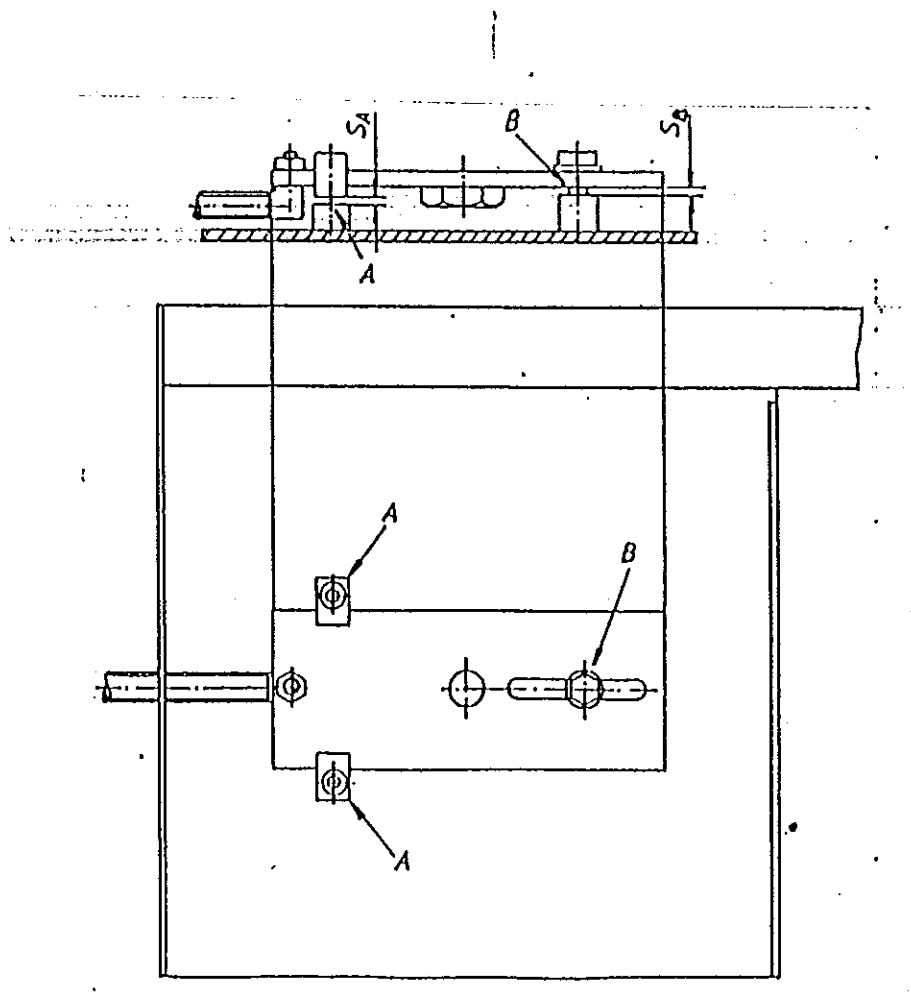
b) Saw band runs off driven pulley:

Before adjusting the band run, make sure that the saw band did not run off the driven pulley because of incorrect band tension.

Adjustment of journal of driven pulley

- Remove saw band
- Unscrew driven pulley
- Remove 2 Allen screws and 2 hexagon screws of sliding plate and place shims underneath points "A" (measurement SA = 0.3 - 0.5 mm)
- Retighten screws and reassemble driven pulley
- Lay on saw band, tension correctly and check band run.

**Caution!! Don't mount sliding plate under tension!
Enlarge guiding slot, if necessary.**



c) Saw band scratches collar of pulleys

A saw band that scratches the collar of the pulleys can be heard as a scratching noise and causes wear at the saw band neck as well as on the collar of the pulleys.

Before carrying out the following adjustment work please check whether the scratching is caused due to incorrect saw band tensioning.

First check whether the noise comes from the drive pulley or the driven pulley.

Adjustment of the journal of pulleys:

- Remove saw band
- Unscrew driven or drive pulley
- Dismantle flange plate or sliding plate and place shims underneath points "B" (measurement SB = 0.3 - 0.5 mm).
- Retighten flange plate or sliding plate and mount drive or driven pulley
- Lay on saw band, tension and check band run.

<p>Caution!! Don't mount sliding plate under tension. Enlarge guidance slot, if necessary.</p>

