



BAND SAW BLADES

ALO 106	COILING SYSTEM - THE CUBE, ELEVATOR, PLANE DRIVE, MILLING TAKE UP"
ALO 111	BAND SAW BLADE WASHER SYSTEM
ALO 123	AUTOMATIC CAPPING MACHINE FOR WELDED BAND SAW LOOPS
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ALO 127	BAND LOOP WELD TESTER
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ALO 199	BACK HARDENING, TEMPERING, STRAIGHTENING, FOR CARBON BAND SAW BLADES
ALO 9817	FLYING PNEUMATIC SHEAR FOR CUTTING BAND SAMPLES
ALO 9818	BAND LOOP ACCUMULATOR
ALO 9820	SHEAR AND WELD STATION
ALO 91526	CENTRAL CONTROL FOR HEAT TREATMENT PROCESSES
ALO 200666	SINGLE BAND FEED SYSTEM
ALO 200844	DOUBLE BAND FEED SYSTEM
BS 35/45	AUTOMATIC GRINDING MACHINE FOR BAND SAW BLADES

ALO 106 The Cube



THE CUBE:

The ALO Cube is a universal coil handling system designed to make all coil handling safe, easy and efficient. The system can be retrofitted to almost any machine system for coils.

The space and time saver

Instead of only one coil, this solution allows you to store and move up to ten coils simultaneously, process time and cost will improve, by the reduced storage requirements as well as more efficient handling of coils between separate operations.

A safe environment for you and the blades

Band saw blades can inflict cuts and scratches on the operator if not controlled properly, ALO 106 will handle the blades in safe way by enclosing the coils and also protecting the teeth from damage. This ensures that the saw bands high quality from the production is maintained.

The Cube can be used as:

Band storage and transport system.
Undriven pay off system for uncrated coils and/or crated coils.
Single coil/tray driven pay off or take up system.
Multi band pay off or take up system

The cube system brings you:
Safe- smart- cheap- rational coil handling and storing.
Complete system with many smart options
for all existing tooting- setting- hardening and CTL system.



ALO's setters, hardening, CTL-machines, tooth milling or grinding machines can be equipped with the cube system for operation as pay off and/or take up.

Many other coil or band saw machines can be equipped with this system.

The Cube consists of a rigid frame that is equipped with 10 shelves. Each shelf locks in a safe position or opens as a sliding extension for easy band access.

Bands may be handled clockwise or counter clockwise. Each shelf can be equipped to handle uncrated coils of bands or crated band coils. The Cube can be rotated for left or right hand band pay off or take up coiler. Cubes can be nested on top of each other to save space.



Our upgraded Cube has now, as an option, a coil with 1000mm which suits most of our customers' requests.

ALO can offer various solutions with the right features and functionalities that you need, to improve your production. For example, add ALO 825 loop table to your coil system to maintain an automatically controlled loop of band being feed into your ALO machine.

We strive to offer a unique solution for your individual production and our experience in this area. Let us offer the best system for you!

OPTIONS:

103-6C:	Standard center with band end lock, Ø 320mm
200619:	Safety clutch
300020:	Auto band end lock

ALO 106 SPECIFICATION:

Size L x W x H:	1010 x 1125 x 950 mm	39.8 x 44.3 x 37.4"
Max band width:	41 mm	1.61"
Max coil diameter:	860 mm	33.9"
Max weight/shelf:	150 kg	330 lb
Max pay load/cube:	1500 kg	4.400 lb
Weight inc 10 empty shelves:	407 kg	897 lb



ALO 106-E Hydraulic cube elevator



The ALO 106 Cube can be docked to an hydraulic elevator that automatically lock the cube in a secure way. The elevator can lift the cube to get any shelf in the correct height for operation.

Each shelf is easily indexed with a built in semi-automatic height function for fast and reliable coil changes.

ALO can offer various solutions with the right features and functionalities that you need, to improve your production. For example, add ALO 825 loop table to your coil system to maintain an automatically controlled loop of band being feed into your ALO machine.

The cube elevator have a safety protective guards for a secure work environment as an option.

ALO 106-ESD Single plane takeup drive or Single plane payoff drive

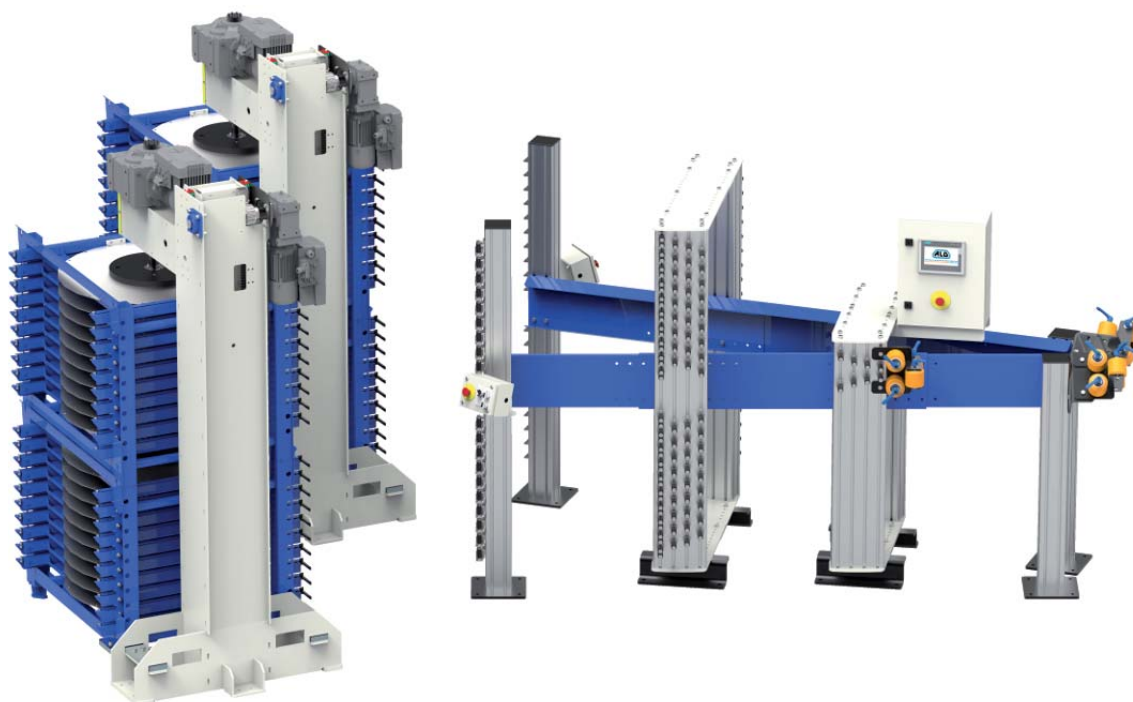
106-ESD is an extended version of 106-E and equipped with the single plane drive. To be used as take up system into the cube from a single band operation such as setting for example. The elevator can lift the cube to get any shelf in the correct height for operation.



SWEDISH QUALITY
WITH RESPECT FOR THE
ENVIRONMENT AND
SAFETY REGULATIONS



ALO 106-MTU Milling take up system



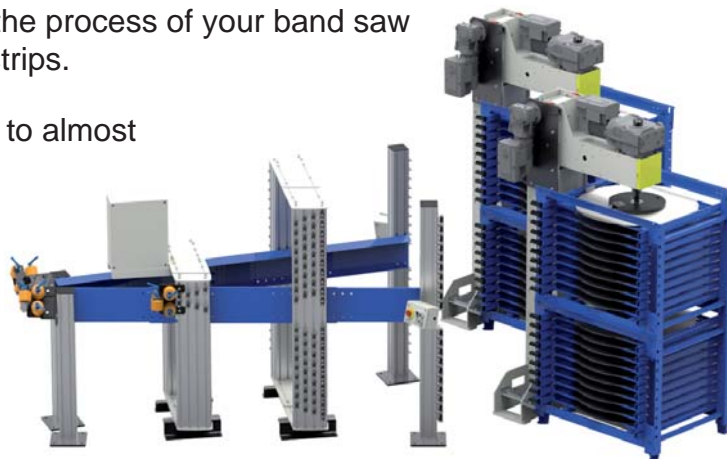
ALO 106-MTU is a universal coil handling system designed to make all coil handling safe, easy and efficient.

It can handle up to 40 bands at the same time. Perfect to place after a tooth milling or grinding machine. 106-MTU will sort, separate and coil the bands into the cube system.

ALO 106-MTU offers an optimized space- and cost-efficient system. 106-MTU is using one feed unit for up to 40 bands, where other systems often need one feed unit per band. The cubes can be nested on top of each other to save space.

An operator friendly HMI gives you total control over of the operation and all the important settings and parameters during the process of your band saw blades or other band blades or strips.

ALO 106-MTU can be retrofitted to almost any machine system for coils.



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ALO 111

Band saw blade washer system



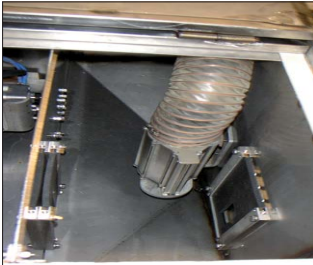
Multi band washing system

This washing system is designed to stand in-line with ideally a Normac band saw blade grinder, to wash off mineral oil, burrs or other dirt sticking to the band saw blades.

Only hot water heated in washing tank to approx. 60 °C is used for cleaning the saw blade coils. The system can handle 24 bands at the same time and a band width up to 100 mm.

HIGHLIGHTS:

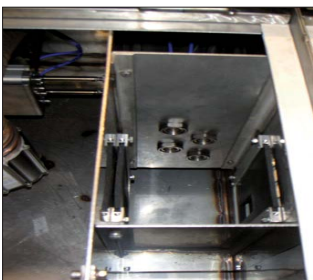
- In line with process with no added labor costs
- Low cost since washer use just high pressure, heated and circulated tap water
- Cleaned bands meet food industry demands
- Washed and de-burred bands generate better set and hardening results
- Less oil and dirt on shop floor downstream washer
- Dry and rust protected bands after washing



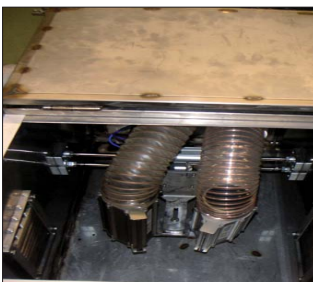
Oil blow off with air knives



High pressure spray cleaning



Rust inhibitor spray chamber



High pressure air knives

MACHINE DESCRIPTION

All critical components such as base stand, washing chamber and tanks are built in stainless steel while other components are made of zinc plated steel or aluminium. The top of the washer can manually be opened for service etc. The system are designed to clean mineral oil, swarf and dirt from bands.

OIL BLOW OFF CHAMBER

The saw blade coils is mainly "cleaned" from oil via air knives, which are connected to a high pressure fan. This oil can be returned to grinder/milling if filtered or recovered by an outlet pipe to container, not included.

WASH CHAMBER

The washer is using high pressure water that splits and cleans the band stacks. The high pressure spray cleaning over the saw blades is made with four turbo rotor spray nozzles. The water are heated to approx. 60°C and thereby clean water without any chemicals can be used. The "dirty" water passes through a magnetic filter cassette that seperates the remaining steel from the water. The cassette can easily be removed for cleaning. The water in the tank is cleaned from oil by a band oil skimmer, the system is separately programmed to allow water cleaning cycle on standstill.

RUST INHIBITOR CHAMBER

The rust inhibitor media is pumped from an external tank to spray nozzles that apply the required amount for each cycle. The excess fluid is returned to the tank.

DRYING CHAMBER

After rust inhibitor is applied the bands are finally dried by a third air blow off unit before the take up coiling.

FILTERING

Water is constantly filtered and cleaned through several filter stages like, magnetic filter, oil skimmer, water tank with several settling compartments and changeable large capacity filter bag. No need of unfriendly chemicals in cleaning process make system easy and safe to handle as well as cost effective.

HMI

The washer is equipped with a Siemens control system and a user friendly 7" HMI colour touch screen. ALO 111 is equipped with an EWON modem for instant remote support in case of malfunction or for updates.

TECHNICAL SPECIFICATION:

Max band width:	100 mm
Max band capacity:	24 bands with a band stack of max 13 mm
Water temperature:	Heated to 60°C
Space requirement (LxWxH):	2 x 2 x 2.4 m



ALO 123

Automatic capping machine for welded band saw loops



ALO 123

Is a compact and easy operated machine for fitting U-shaped plastic tooth protection on welded band saw loops. After the loop is placed in the open fixture by the operator or by a robot, the machine automatically adds the plastic teeth protection and completes the loop.

For safety reasons the cycle is started with double buttons on a separate control cabinet.

Light curtain safety system can be used as an option to the dual button operation.

No adjustments needed for different band length, thickness or tooth pitch.

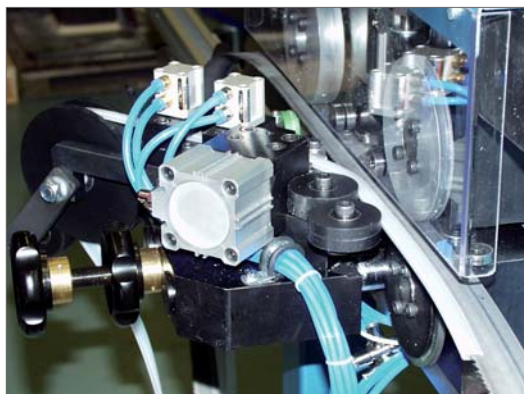
Parameters can be saved under product names and easily recalled from the control systems memory.

CAPACITY:

Band widths: 20 - 54 mm

Band thickness: 0.6 - 2 mm

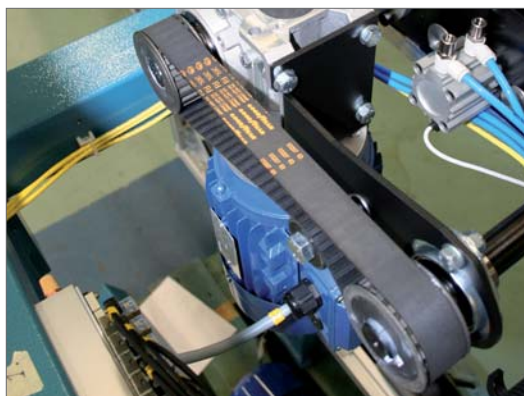




Band loop and plastic strip feeding units.



Shear and strip feeding unit.



Twin wheel driven band feed unit.

MACHINE DESCRIPTION

The tooth protection material is opened and pneumatically fed over the first teeth by the strip feeding unit. The frequency controlled feed wheels feed the loop and after a complete revolution the protection material is cut automatically by the shear unit. The feed speed and several other parameters can be easily be adjusted on the operator terminal, and saved for future use.

After loading a new loop in the open fixture by use of a floor pedal the machine is ready for the next cycle. The tooth protection material is fed from a coil that is driven by a frequency controlled motor.

The ALO 123 manages several different plastic types and sizes. A new coil of plastic strip are easily loaded when the strip coil are consumend.

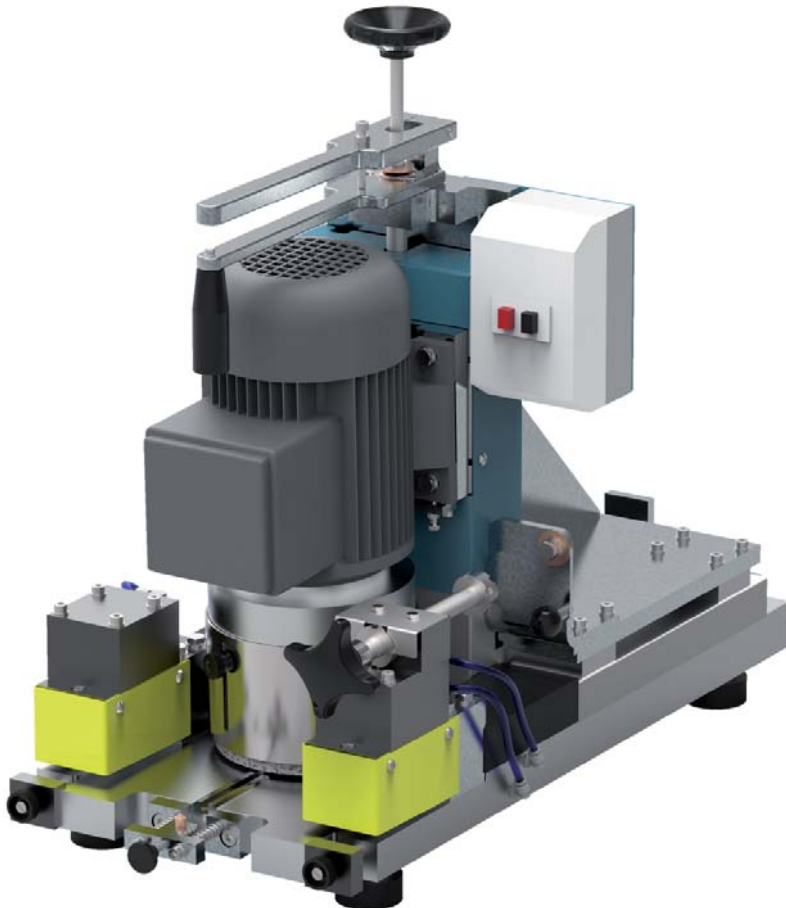
TECHNICAL SPECIFICATION:

Band width:	20 - 54 mm
Band thickness:	0.6 - 2.0 mm
Min. band loop length:	2 m
Capacity:	10 sec for a 8 m / 26ft loop
Air pressure:	6.3 bar 91 psi
Voltage:	230 VAC \pm 10%, 1 or 2 phase, 50 - 60 Hz
Space requirement (l x w x h)	2300 x 1100 x 1800mm



ALO 126

Table top grinding fixture for welded band saw loops



ALO 126

Designed for quick and easy grinding of band saw welds. Pneumatic clamping pads activated by a foot pedal holds the blade. The blade is placed in the fixture with the tootinging towards an adjustable mechanical stop.

Stabil and easy horizontal and vertical movement of the grinding unit thanks to linear ball guides.

The horizontal axle is equipped with mechanical stop and fine tuning device to optimize the grinding result.

Options

126-1 Assembly for sharpening of grinding wheel

TECHNICAL SPECIFICATION:

Max band width:	100 mm
Max band thickness:	3 mm
Weight:	80 kg
Air pressure:	6.3 bar 91 psi
Grinding wheel quality:	Norton "SG" (3SG46P8VH 71) 150 mm Ø
Voltage:	220 VAC, ± 10%, 1-phase, 50 - 60 Hz ± 1%
Space requirement (l x w x h):	302 x 684 x 590 mm

ALO 127

Band and weld fatigue tester

ALO 127

Designed for quick, easy and safe testing of band loop welds. ALO 127 are built on an aluminium frame that can be mounted on the wall, table or similar. The whole assembly is protected by a easy open cover.

A welded bandsaw blade of 1200mm length is to be used, where the ends are placed in two locking devices that will hold the ends. The weld is bent over a wheel that is pneumatically pressured and the bandsaw blade will cycle back and forth over the wheel by the means of an electrical motor drive.

Once the band or the weld is broken by fatigue, the automatic cycle is stopped and the number of feeds or cycles can be read out on a counter display.



TECHNICAL SPECIFICATION:

Max band width:	67 mm
Max band thickness:	1,6 mm
Weight:	90 kg
Air pressure:	6.3 bar 91 psi
Voltage:	230 VAC, ± 10%, 1-phase, 50 - 60 Hz ± 1%
Space requirement (l x w x h):	1135 x 775 x 1350 mm

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ALO Center AB
Industrivägen 10
SE-792 32 Mora Sweden
+46 250 94900
info@alocenter.se
www.alocenter.se



ALO 131

ALO 131 Band coiling station



HIGHLIGHTS:

- Keep track of the diameter size and when coil is near band end
- Electrically powered coiling
- Protective cover for the bands with an easy opening for load or unload
- Option: Oil clean unit
- Option: Collapsible centre with auto band lock

CAPACITY:

Band width: 20 - 100 mm
Band thickness: 0.3 - 1.6 mm
Max coil weight: 300 kg

OPTIONS / ACCESSORIES:



Collapsible centre
90915/6/7/8





Control panel and band holder arm



ALO 131 with closed protective cover

MACHINE DESCRIPTION

The band coiling station ALO 131 recoil your band in a safe and easy way. To prevent over speed on the pay-off coiler during coiling, the speed will automatically decrease and the coiling system gives a soft and controlled acceleration. The machine has three modes: jog speed, low speed and high speed.

The band holders for take-up coil, keep track of the diameter size and when coil is near band end. The holders also keeps the band in place and ensures an even and smooth coil.

The protective hood, over the coil units, is open and closeable from the operator panel for an easy load or unload.

OPTIONS

ALO 131 can be equipped with an oil cleaning unit, the unit cleans the band from oil between pay-off and take-up.

The pay-off coil can also be equipped with a band holder arm.

Select between different expandable centre with auto band lock and safety coiling centre.



Expanded center



Collapsed center

OPTIONS:

131-OCU	Oil cleaning unit
201202	Band holder arm pay-off

SELECT:

ALO 90915,-S/90916,-S/90917,-S/90918,-S

Expandable centre with auto band lock and safety center with auto band lock (-S).

Coil center	Expanded size
90915, -S	320 mm
90916, -S	450 mm
90917, -S	500 mm
90918, -S	400 mm

TECHNICAL SPECIFICATION:

Band width:	20 - 100 mm	
Coiler OD:	1000 mm	
Coiler ID:	Min 300 mm (expanded)	
Voltage:	400 VAC ±10%, 3-phase, 50-60 Hz ±1%, directly earthed system	
Motor:	2 x 0.55 kW	
Feed speed:	Max 120 m/minute	
Max. coil weight:	300 kg	
Air pressure:	6,3 bar	91 psi
Max power consumption:	3.3 kVA	
Weight:	380 kg	
Space requirement (LxWxH):	2600 x 1750 x 1300-2250 mm, H-max = protection open	



ALO 144

Coil wind station for band saw blades



THE SYSTEM COMPRISES:

Feed and measuring system
Cutting unit
Tooth matching system
Pay-off coiler with protective cover
Take-up coiler with protective cover

CAPACITY:

Blade width: 12 - 50 mm
Blade thickness: 0.3 - 1.6 mm
Blade length: 0 - 1000 m
Feed speed: 0 - 57 m/min

HIGHLIGHTS:

- Length measuring with coiling rates up to 57m/min
- Match finder compare actual band pitch against programmed band pitch to avoid wrong set up
- Improved and updated shear unit for trouble free cutting
- Take up coiler operates with torque control for best coiling result
- Safe version of coiling center that interlocks with coiler plate
- Coilers have safe protective guarding
- Option: Capping allows you to add capping during coiling
- Option: Bar code reader system for quick and easy setup of work orders
- Option: Ink jet printer can be connected to print your brand/logo during coiling

COILER:

Take up coiler operates with torque control: 880-CW 1000mm outside diameter (OD)
Pay off coiler, options: 880-CTL 1000mm OD
863-CTL 1250mm OD



The new improved shear unit



*Safety coil center 90915-S:
Releasing the hooks from the plate*

MACHINE DESCRIPTION

Our new machine is easy to use and fast, length measuring with a coiling rates up to 57m/min. Let the "Match finder" do the job when comparing the actual band pitch against programmed band pitch to avoid wrong set up and the improved and updated shear unit gives you a trouble free cutting.

Take up coiler operates with torque control for best coiling result and the new safe version of coiling center interlocks with the coiler plate. The coilers have a safe protective guarding for a secure work environment

To make the job even easier ALO 144 has some great options:

- Bar code reader system for quick and easy setup of work orders.
- Capping allows you to add capping during coiling.
- Ink jet printer can be connected to print your brand/logo during coiling.

OPTIONS:

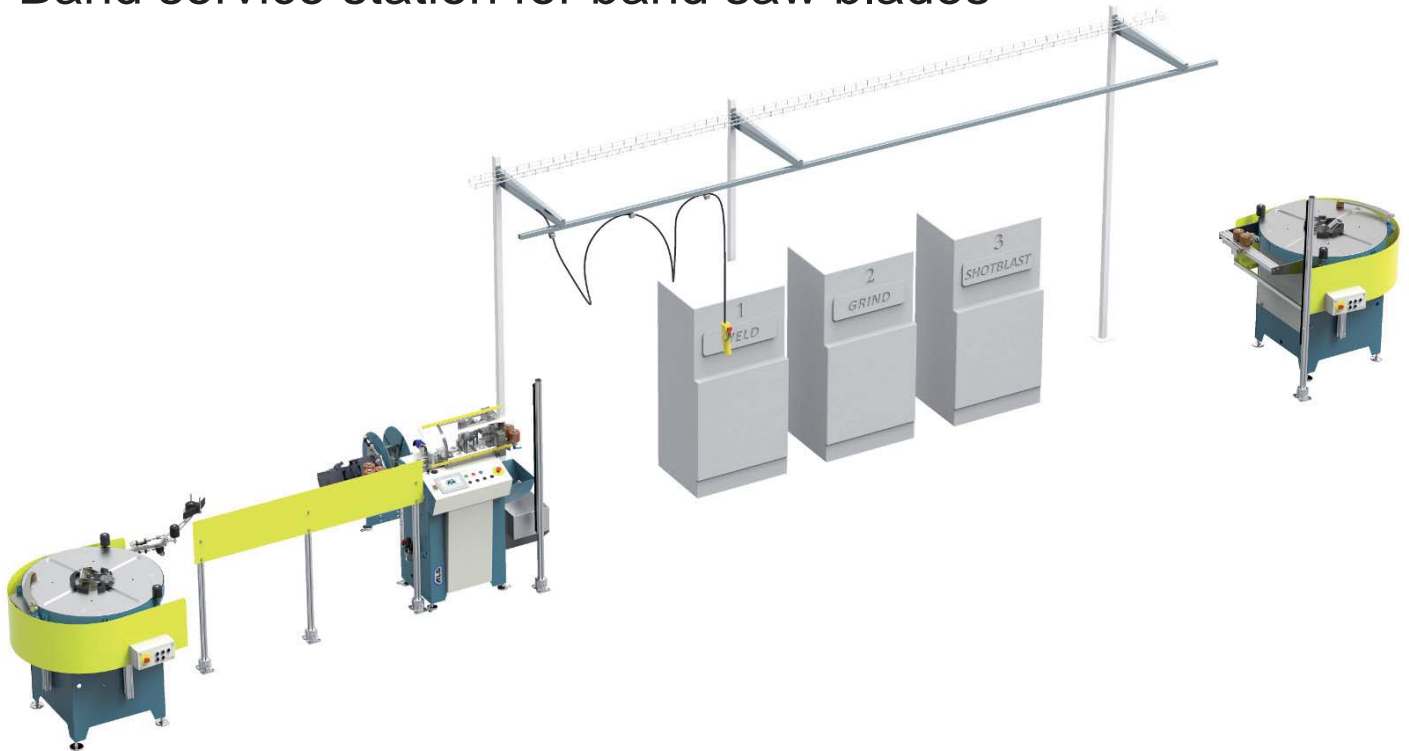
144-BAR:	Bar code reading system
144-CAP:	Tooth protection applier
144-INK-KIT:	Ink jet printer
9091x:	Collapsible coiling center

TECHNICAL SPECIFICATION:

Band width:	12 - 50 mm
Band thickness:	0.3 - 1.6 mm
Band length:	0 - 1000 m
Accuracy:	± 10 mm at L= 10 m
Feed speed:	0 - 57 m/min
Coiler OD take up:	1000 mm
Coiler OD pay off:	1000/1250 mm
Max coil weight:	250 kg
Type of coiler centres:	Collapsible coiling center with automatic band end lock device.
Air pressure:	6.3 bar 91 psi
Voltage:	400 VAC ±10% 3 phase, 50 60 Hz ±1% directly earthed system.
Space requirement (LxWxH):	6000x2000x1800mm
Weight:	612 kg Including coilers

ALO 144-PSS

Band service station for band saw blades



THE SYSTEM COMPRISES:

Feed and measuring system
Cutting unit
Tooth matching system
Pay-off coiler with protective cover
Take-up coiler with protective cover

CAPACITY:

Blade width: 12 - 50 mm
Blade thickness: 0.3 - 1.6 mm
Blade length: 0 - 1000 m
Feed speed: 0 - 57 m/min

HIGHLIGHTS:

- Length measuring with coiling rates up to 57m/min
- Match finder compare actual band pitch against programmed band pitch to avoid wrong set up
- Improved and updated shear unit for trouble free cutting
- Defect removal match finder automatically cut out pre marked defects with kept teeth pattern after weld
- Take up coiler operates with torque control for best coiling result
- Safe version of coiling center that interlocks with coiler plate
- Coilers have safe protective guarding
- Option: Capping allows you to add capping during coiling
- Option: Bar code reader system for quick and easy setup of work orders
- Option: Ink jet printer can be connected to print your brand/logo during coiling

COILER:

Take up coiler operates with torque control: 880-CW 1000mm outside diameter (OD)
Pay off coiler, options: 880-CTL 1000mm OD
863-CTL 1250mm OD





The new improved shear unit



Safety coil center 90915-S:
 Releasing the hooks from the plate

MACHINE DESCRIPTION

Our new machine is easy to use and fast, length measuring with a coiling rates up to 57m/min. Let the "Match finder" do the job when comparing the actual band pitch against programmed band pitch to avoid wrong set up and the improved and updated shear unit gives you a trouble free cutting.

The feature "Defect removal match finder" helps you to automatically cut out pre marked defects with kept teeth pattern after weld. With help of the additional pendant control system you can manually jog the band to different finishing stations with the safety feature SLS (Safe Limited Speed).

The machine also have counters helping you to keep track of scrap lengths, number of weld in ordered coil and how much more length needed to complete ordered length after band fault.

144-PSS also comes with a light barrier safety feature.

The take up coiler operates with torque control for best coiling result and the new safe version of coiling center interlocks with the coiler plate. The coilers have a safe protective guarding for a secure work environment

To make the job even easier ALO 144-PSS has some great options:

- Bar code reader system for quick and easy setup of work orders.
- Capping allows you to add capping during coiling.
- Ink jet printer can be connected to print your brand/logo during coiling.

OPTIONS:

144-BAR:	Bar code reading system	144-INK-KIT:	Ink jet printer
144-CAP:	Tooth protection applier	9091x:	Collapsible coiling center

TECHNICAL SPECIFICATION:

Band width:	12 - 50 mm		
Band thickness:	0.3 - 1.6 mm		
Band length:	0 - 1000 m		
Accuracy:	± 10 mm at L= 10 m		
Feed speed:	0 - 57 m/min		
Coiler OD take up:	1000 mm		
Coiler OD pay off:	1000/1250 mm		
Max coil weight:	250 kg		
Type of coiler centres:	Collapsible coiling center with automatic band end lock device.		
Air pressure:	6.3 bar	91 psi	
Voltage:	400 VAC ±10% 3 phase, 50 60 Hz ±1% directly earthed system.		
Space requirement (LxWxH)*:	6000-15000x2000x1800mm		
Weight:	612 kg	Including coilers	

*) The length depends on which equipment are used between ALO 144-PSS and the coilers



ALO 177

Cut to length machine with match finder system

The newest generation of ALO's cut to length machine is completely new and designed with the unique and innovative tooth matching system called "match finder". Never before has it been so easy to prepare band saw blades for welding thanks to our brand-new ALO 177 cut to length machine.

The new design makes it so easy to perform a setup, simply load an actual blade into the machine, activate the match finder feature, toggle matching preference on the screen and save. Now there is no need to manually adjust tooth detector in any axis. Simply specify the size from a tooth where the finished weld should be located and then

prepare the band saw blade for welding with compensation for weld burn off for perfect tooth and pattern match. The process is fully automatic and can repeat the same set up time after time with excellent results. Just choose length, band width and how many blades you need to cut and go!

MF+ (Match Finder Plus) is an option, which allows you to complete an intact loop of several shorter pieces that you weld together. This helps you to save material when, either of the coil reaching the end or if a band error is detected.

With this machine, ALO is changing the way band saw blades are cut to length, the new ALO 177 cuts your blades faster, more consistent and with higher accuracy than ever before.

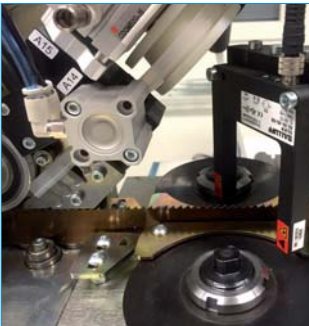


ALO 177 fully equipped with all options

HIGHLIGHTS

- *Tooth matching are now easier than ever with the new system "Match finder"*
- *Several different automatic cutting modes for band saw material or edge material*
- *A fully manual cut to length mode for quick process of single or small batch orders*
- *VIP patterns as well as regular patterns can automatically be cut to length*
- *New cut to length mode for set pattern match of band saw blades with regular pitch*
- *Band ends fully prepared for welding with perfect tooth match after welding process*
- *Blade pattern are compared to program pattern before auto start*
- *Completely new mechanical design of feed and drive unit*
- *New and improved shear unit design that warrant for trouble free cutting*





The match finder system

Band length is measured by a metering wheel and a pulse transducer to eliminate band slipping faults.

Tooth pitch, band width, length with tolerance and number of bands are chosen from a drop down bar in the HMI panel. The machine will compare the actual blade loaded into the machine to the saved group pattern. If they match, the machine will execute the cut to length job fully automatic.

With no match the machine will alarm the operator, this will minimize the risk for human errors by loading wrong band type or size. ALO 177 also has a detector for pre-marked band faults that will stop automatic mode.

The cut are made by a new powerful pneumatic shear unit with blades made of high speed steel. The slide is forcibly guided and will follow the cylinders wedge back on the return stroke. The shear cuts widths between 6-100mm.

The machine are available both with left to right, or right to left band feed direction and with different useful options.



The new improved shear unit

Match finder legend:



First priority cut, e.g. start a new blade at this gullet



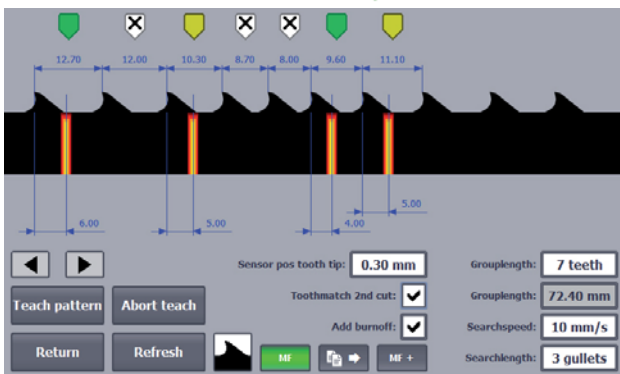
This gullet(s) not allowed to be used for tooth match



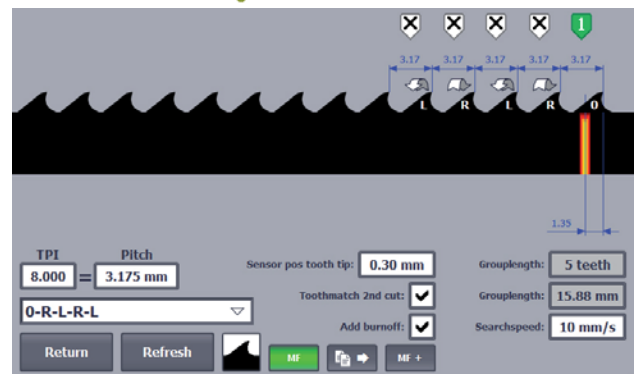
This gullets are ok to match with each other, also in combination with first priority cut



This gullets are ok to match with each other



Actual HMI screen shot from VIP group definition



Actual HMI screen shot from set match definition

TECHNICAL SPECIFICATION:

Band width:	6 -100 mm
Band thickness:	0.3 - 1.6 mm
Band length:	0.25 - 20 m
Air pressure:	6.3 bar
Voltage:	400 VAC ±10% 3-phase, 50-60 Hz ±1% directly earthed system
Space requirement (LxWxH)	0.7 x 0.8 x 1.4 m

REMARKS:

Band width between 6-10 mm requires a band guide, 200674-L or 200674-LV. Tooth match is possible from 10mm.

OPTIONS:

177-BAR:	Barcode scanner
177-CAP:	Tooth protection applier
177-CBD:	Color band detector
177-DBD:	Double band detector
177-INK-KIT:	Mounting kit for inkjet printer
177-MF+:	Match finder plus
177-OCU:	Oil cleaning unit for the band

177-TCL:	Tooth protection lift unit
200674:	Band guide
200674-V:	Band guide



SWEDISH QUALITY
 WITH RESPECT FOR THE
 ENVIRONMENT AND
 SAFETY REGULATIONS

ALO 184-B

Setting machine with programmable feed unit and SGS camera system for band saw blades



The new generation ALO setting machine that together with the SGS camera system will help you to monitor and get in full control of the setting process and quality.

New features include programmable linear servo feed pawl unit which enables varying feed lengths and set patterns.

Adjustments such as setting height and the feed units pick-up and drop-off positions can be saved in the HMI making the set-up or change-over of the machine easy and quick for the operator.

Another novelty is pneumatical blade guide clamping which simplifies loading and unloading and ensures that bands are guided correct.

A completely new design of the machine head and clamping unit with very few and durable parts ensures high availability and higher set precision even on more demanding sizes and materials.

CAPACITY:

Band width:	12 - 67mm	Setting tolerance:	±0.01mm
Bland thickness:	0.4 - 1.6mm	Symmetry tolerance:	±0.01mm
Tooth pitch:	0.5 - 32 tpi		

- Modular design, coilers and SGS camera system can be added as options
- A programmable feed pawl system give new possibilities, like variable feed lengths
- Straight and fixed band back position through the machine from coiler to coiler
- New enforced clamping system that also eliminates overclamping issues
- Automatic set symmetry adjustment

OPTIONS / ACCESSORIES:



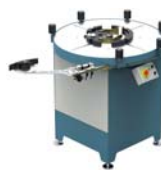
ALO 61201
Grinding fixture



ALO 61207
Grinding fixture



ALO 83-60
Set gauge

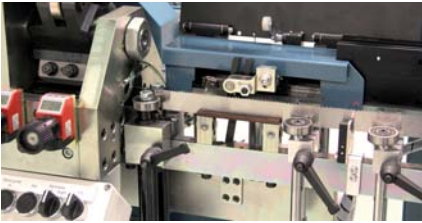


ALO 880
Coiler



ALO 106 CUBE
Coil handling system





New programmable linear servo carry out the feeding of the blade.



Operator friendly HMI gives full control of the setting operation.



Completely new design of the machine for the setting demands of today and tomorrow.



With the SGS camera system you get in control of the setting result and quality

The new band saw setting machine 184-B can handle all known forms and groups of teeth with a repeated feed pattern of max 125mm. In addition, the machine with its new linear servo feed unit, can be set-up to alternate different stroke lengths, opening possibilities for never before seen group lengths and patterns.

The band is guided by pneumatically operated band guides to assure that the band is held in position and also facilitates loading and unloading of the bands. Bands are always oriented from the back, and the setting head are adjusted up or down with an electrical motor for different band widths, making changeover between widths very easy for the operator.

The clamping jaws is adjusted by two micrometres, if clamping pressure is adjusted to high, there is a safety feature that will give, before mechanical failure occurs. Minor adjustments of the clamping can be done while the machine is running.

The setting head can also be tilted to optimize the set result over long groups. Overall set are adjusted with micrometres.

In the operator friendly HMI all the set related values can be saved making change-over and set-up easy for the user. The automatic adjustment of set balance based on the SGS camera readings are carried out by an actuator during setting operation.

The feed pawls and setting tools are of the same standard as on previous ALO setting machines, on certain sizes of setting tools minor adjustments are needed before use in ALO 184.

A high resolution CCD line camera measures the set teeth and stops the machine if the set is out of the set-up tolerances. Information about the set as well as what caused the stop, will be shown on the computer monitor. The operator will also get advice how to adjust the machine to correct any faults in the setting result.

TECHNICAL SPECIFICATION:

Band width:	(12) 20-67mm (12mm by change of clamping jaws)
Band thickness:	0.4-1.6mm
Overall setting accuracy:	± 0.01mm
Symmetry accuracy:	± 0.01mm
Tooth pitch:	Up to 32 tpi
Max stroke length:	125mm
Weight:	810kg
Air pressure:	6.3bar
Standard voltage:	400VAC ±10% 3-phase, 50-60 Hz ±1% directly earthed system, other voltages available upon request.
Max power consumption:	3 kVA
Space requirement (l x w x h):	2x1.5x2m



ALO 185

Automatic set gauge for band saw blades



THE SYSTEM COMPRISES:

Measuring fixture
Camera
PC and SGS software

CAPACITY:

Blade width: 12 - 100 mm
Blade thickness: 0,4 - 1.6 mm
Tooth pitch: 0.5 - 14 tpi
Measure width max: 5 mm

OPTIONS / ACCESSORIES:



ALO 81-60
Set gauge



ALO 185-011 / 185-012
Band symmetry control kit



MACHINE DESCRIPTION

The set gauge will measure each set tooth on a band saw blade and check against user defined tolerances.

The individual setting of each tooth as well as average, imbalance and overall set can be displayed on the PC monitor. Control of the set gauge and programming of all parameters and tolerances are done interactive by the menu driven software. The user can freely choose metric or inch as measuring units.

The software supports all Western languages. A special set gauge computer equipped with a CCD line camera scanning the teeth of the saw blade does the measuring. The analysis of the incoming data is done in real-time and the result is transmitted online to the PC. The gauge can be placed in line with any ALO band saw setting machine.

If the 185 stand together with an ALO band saw setting machine, a kit that automatically will control and adjust the set symmetry can be added, making it possible to keep a very tight tolerance without any unnecessary stops for manual adjustments.

OPTIONS:

- 185 - 001A PC monitor stand
- 185 - 003 Laser printer
- 185 - 011 Automatic symmetry adjustment kit for 181 machine
- 185 - 012 Automatic symmetry adjustment kit for 182 and 183 machines
- 185 - 181 Kit with all necessary parts, including a free standing coiler type 820 - 6, for connecting ALO 185 to an existing ALO 181 setting machine.
- 185 - 182 Kit with all necessary parts for connecting ALO 185 to an existing ALO 182 or ALO 183 setting machine.

TECHNICAL SPECIFICATION:

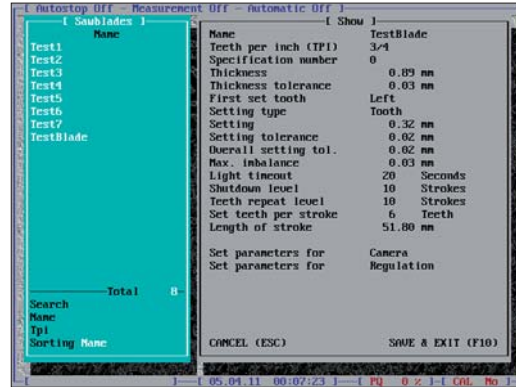
Blade width:	12 - 100 mm
Blade thickness:	0,4 - 1.6 mm
Tooth pitch:	0.5 - 14 tpi
Measure width max:	5 mm
Resolution:	0.002 mm
Resolution on screen(user selectable):	.01, 0.001 mm
Camera:	High speed, high resolution CCD line camera
PC:	Actual market standard with monitor, keyboard and SGS software



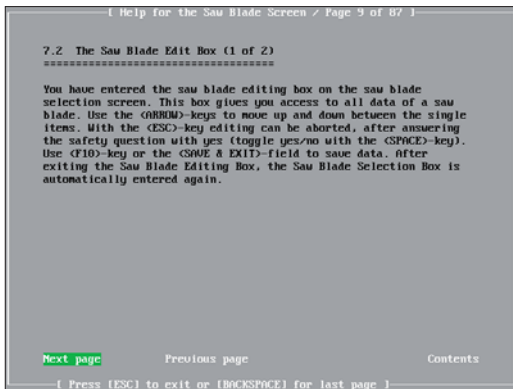
SCREENSHOTS FROM SGS SOFTWARE:



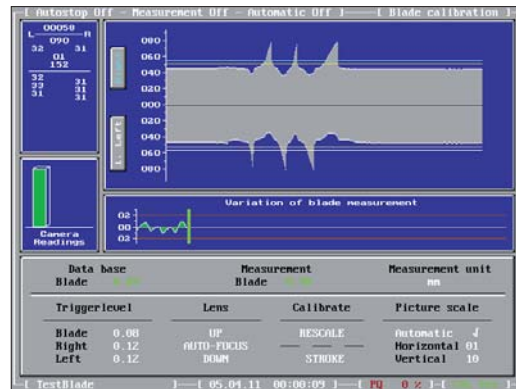
MAIN MENU:
 Choose mode of operation in a simple interactive menu system. The program handles all European languages and works with metric or Imperial readings.



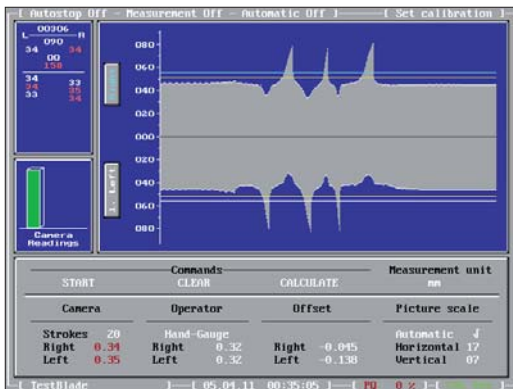
EDIT SAW BLADE:
 Pre-programming of all band and system parameters makes it easy for the operator to select the actual blade from the library at set up. The use of passwords prevents tampering with band or system parameters.



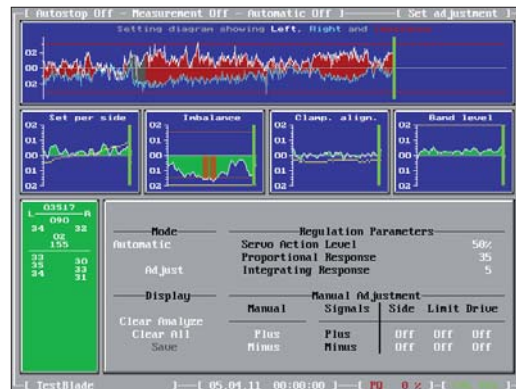
HELP MENU:
 Help is available at any place in the program by pressing the help function key. The help system also provides help with common setup mistakes.



OPTICAL CALIBRATION:
 Real time vision showing the blade with set teeth, actual set readings, the database as well as quality of the camera readings.

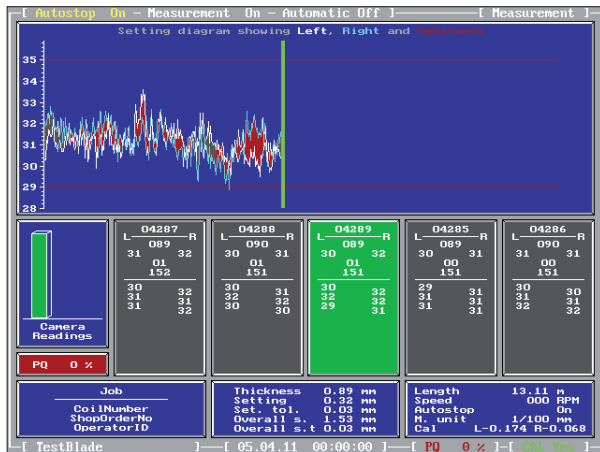


SET CALIBRATION:
 A very simple calibration system makes it possible to calibrate the system to any other measuring system as well as fulfilling standards like ISO-9000



AUTO SYMMETRY ADJUSTMENT:
 If the ALO 185 set gauge stands together with a ALO setting machine, a kit is available that will control and adjust the symmetry automatically.

During the actual measurement its possible to see the results of the set and several different statistical diagrams while the system keeps control of the set.

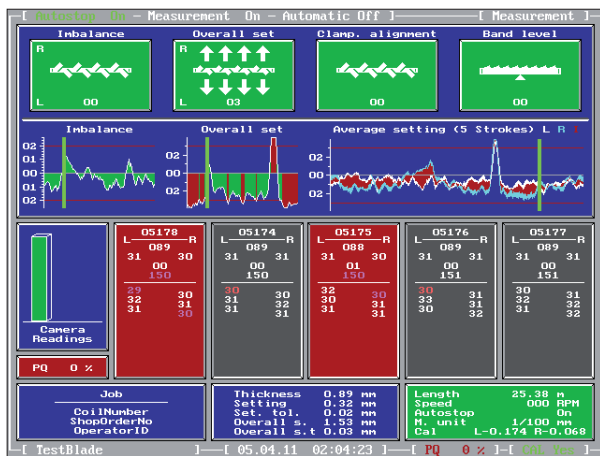


Top part of the screen is showing a setting diagram over the last 500 feedings.

Left side set = white
 Right side set = blue
 Imbalance = red

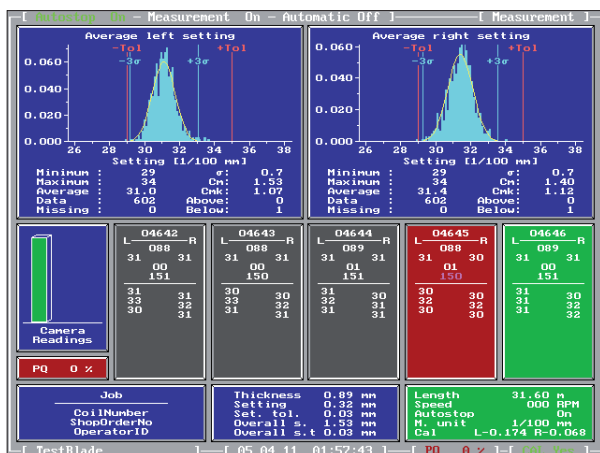
The red horizontal lines are the tolerance limits. The grey line in the middle represents the nominal set. Mid part of the screen is showing the last five groups of set/tooth, imbalance, average/side and the overall set. Each tooth is measured and the set value is displayed. The background colour is showing the status of the set; green yellow or red.

The change between these screens is done by a simple touch on a function key. The frame around all screens is always showing basic information like actual band name or number, auto stop on or off, video quality and calibration status.



The system can stop the setter if the set goes out of the tolerances and will give instructions how to adjust the setting machine to correct the set.

Low part of the screen is from left showing coil number, shop order and operators id. Mid part is showing the basic blade information. Right side is giving band length, speed, auto stop on or off, metering system and the actual offset.



Top part of the screen is showing a standard deviation diagram over left and right side set. Min, max, average set as well as standard deviations are shown. The set values with histogram can be printed out at any time or at the end of the measurement.

Automatic self-test of the set gauge computer and the camera at system start up. The system also displays the current speed and the produced length as well as speed and length counter.

ALO 185-C

Band quality control system for band saw blades



This system lends itself to be placed in-line with other band coiling systems to make a final quality control of your continuous feeding band saw blade. The camera system will measure set parameters like set per side, balance and overall set.

The blade data base in the SGS software allows the user to set up tolerances for each of the above parameters and will measure and record the actual result of the band.

The system can also be completed with additional sensors to detect for example pre-marked band faults.

Reports can be printed of the measured result, proving the actual set quality of the measured band including statistical data information.

Examples of operations where the system could be integrated are sandblasting, coiling/recoiling, ALO 144 band service station, ALO 177 CTL system or ALO 198-ILT75 bi-metal hardening system. ALO 185-C can also be put in-line with systems that are not provided by ALO, as long as it feeds and drives the band saw blade.

TECHNICAL SPECIFICATION:

Blade width:	12 - 100 mm
Blade thickness:	0,4 - 1.6 mm
Tooth pitch:	0.5 - 14 tpi
Measure width max:	5 mm
Resolution:	0.002 mm
Resolution on screen(user selectable):	0.01, 0.001 mm
Camera:	High speed, high resolution CCD line camera
PC:	Actual market standard with monitor, keyboard and SGS software

ALO 187-B

Heavy duty setting machine with programmable feed stroke and SGS camera system for band saw blades



The new generation ALO setting machine together with the SGS camera system will help you to monitor and get in full control of the setting process and quality. The SGS system automatically adjust over all set and symmetry by servo motors.

New features include programmable linear servo feed pawl unit which enables varying feed lengths and set patterns. A new setting head sets all teeth, both sides, simultaneously and can thereby handle both longer set groups and harder band material.

Adjustments such as setting height and the feed units pick-up and drop-off positions can be saved in the HMI making the set-up or change-over of the machine easy and quick for the operator.

Another novelty is pneumatically blade guide clamping which simplifies loading and unloading and ensures that bands are guided correct.

A completely new design of the machine head and clamping unit with very few and durable parts ensures high availability and higher set precision even on more demanding sizes and materials.

CAPACITY:

Band width:	20 - 100 mm	Setting tolerance:	±0.01mm
Bland thickness:	0.4 - 1.6 mm	Symmetry tolerance:	±0.01mm
Feed stroke:	max 200 mm.	(Variable length/stroke.)	
Tooth pitch:	0.5 - 14 tpi		
Group lengths:	140 mm set teeth + neutral tooth/stroke		
Material:	Soft or harden bands		

- A programmable feed pawl system give new possibilities, like variable feed lengths
- Straight and fixed band back position through the machine from coiler to coiler
- New enforced clamping system that also eliminates over-clamping issues
- Automatic over all and set symmetry adjustment

OPTIONS / ACCESSORIES:



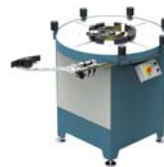
ALO 61201
Grinding fixture



ALO 61207
Grinding fixture



ALO 83-60
Set gauge



ALO 880
Coiler



ALO 106 CUBE
Coil handling system





New programmable linear servo carry out the feeding of the blade.



Operator friendly HMI gives full control of the setting operation.



Completely new design of the machine for the setting demands of today and tomorrow.



With the SGS camera system you get in control of the setting result and quality

ALO 187 band saw setting machine can handle all known forms and groups of teeth with a repeated feed pattern of max 200 mm. In addition, the machine with its new linear servo feed unit, can be set-up to alternate different stroke lengths, opening possibilities for never before seen group lengths and patterns.

The band is guided by pneumatically operated band guides to ensure that the band is held in position and also facilitates loading and unloading of the bands. Bands are always oriented from the back, and the setting head are adjusted up or down with an electrical motor for different band widths, making changeover between widths very easy for the operator.

The clamping jaws parallelism is adjusted by two micrometres in the front of the machine equipped with a display that can show both metric or inch values. The clamping jaws pressure are adjusted by a knob on the back of the unit, if clamping pressure is adjusted to high, there is a safety feature preventing mechanical failure.

The setting head can also be tilted to optimize the set result over long groups.

In the operator friendly HMI all the set related values can be saved making change-over and set-up easy for the user. A high resolution CCD/SGS camera measures the set teeth and servo motors will automatically adjust over all set and set balance.

The feed pawls and setting tools are of the same standard as on previous ALO setting machines, on certain sizes of setting tools minor adjustments are needed before use in ALO 187-B.

TECHNICAL SPECIFICATION:

Band width:	20 - 100 mm
Band thickness:	0.4 - 1.6 mm
Overall setting accuracy:	± 0.01 mm
Symmetry accuracy:	± 0.01 mm
Tooth pitch:	0.5 - 14 TPI Up to 32 TPI (without measuring)
Max set length/set cycle:	140 mm + unset tooth
Max stroke/feed length:	200 mm
Air pressure:	6.3 bar
Standard voltage:	400VAC ±10% 3-phase, 50-60 Hz ±1% directly earthed system, other voltages available upon request.
Max power consumption:	Approx 1.5 kW
Weight:	1030kg
Space requirement (l x w x h):	2 x 1.5 x 2 m



ALO 191-CP

Induction tooth hardening and hot straightening of bandsaw blades



THE SYSTEM COMPRISES:

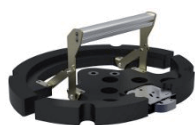
Feed unit
 Hardening generator and inductor
 Straightening generator and inductor
 Closed coolant system
 Closed quench system

CAPACITY:

Band width 12 - 38 mm (other widths on request)
 Band thickness 0.6 - 1.4 mm
 Tooth pitch 0.5 - 14 tpi
 Hardening generator frequency 3 MHz.
 Straightening generator frequency 1.5 MHz.
 Tempering generator frequency 1.5 Mhz. (option)

- High efficiency and low energy consumption generators with air-cooled oscillator tubes.
- Band feeder with a pulling 4-wheel drive system designed for accurate speed and guiding.
- Electromagnetic brake for optimal control of band tension.
- High reproducibility due to accurate digital/analogue settings of power, speed and work coils.
- Fast and easy start up and change over.

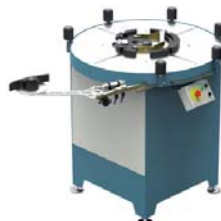
OPTIONS / ACCESSORIES:



ALO 90915/16/17/18
Collapsible coil center



ALO 831
Double coiler



ALO 880
Electric coiler



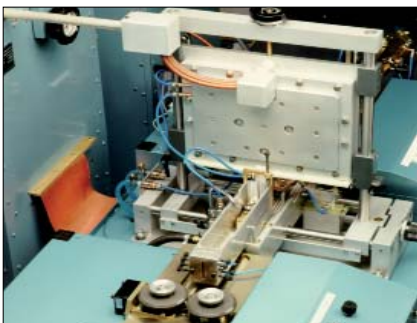
ALO 106 CUBE
Coil handling system



Tooth hardening generator



Inductors



Quench system

MACHINE DESCRIPTION

Band feeder

The band feeder consists of two units, one 4-wheel feed unit, the other as an adjustable brake to control the band tension by using an electro magnetic friction brake. Both units are equipped with two pairs of inclined rolls. The four rolls on the feed unit are driven by a servomotor, and the speed is controlled by a servo controller. The oscillating circuits with the inductors are located between the brake and the feed units such that the band is pulled through the inductors at a controlled tension

Generators

The hardening and straightening generators are enclosed in separate aluminium cabinets, equipped with separate oscillating circuits connected to the cabinets via coaxial cables. The generators are air cooled, thus limiting the cooling water requirements to inductors and oscillating circuit only. The hardening and straightening generator is equipped with a chopper for infinitely variable control of the output power.

Inductors

The inductors are made of copper tubing and can be custom made for different pitches and band gauges. They are adjustable in height for different blade widths and sideways for different blade gauges. The inductors are interchangeable and can easily be replaced.

Quench system

The system is designed for liquid quenching, such as oil or polymer quenchants. It consists of quenching device for the teeth, quenchant tank built into the feeder, circulation pump, thermostat, heat exchanger, magnetic filter and a heating device for preheating of the quenchant.

TECHNICAL SPECIFICATION:

Band width:	12 - 38 mm	(other widths on request)
Band thickness:	0.6 - 1.4 mm	
Tooth pitch:	0.5 - 14 tpi	
Capacity:	5 - 15 m/min	
Air pressure:	6.3 bar	91 psi
Standard voltage:	400VAC $\pm 10\%$ 3-phase, 50-60 Hz $\pm 1\%$ directly earthed system, other voltages available upon request.	

Power consumption (at max output power): 20 kVA

ALO 191 CP is also available with a inline tempering generator ALO 191 - CPT

Other customer requirements may be discussed between customer and ALO.



ALO 191-MS-2

Induction tooth hardening with mechanical straightening of carbon band saw blades



HIGHLIGHTS:

- High efficiency and low energy consumption generator with air-cooled oscillator tube.
- Automatic flash guard protect the system against damage from flash-overs.
- Band feeder with a pulling 4-wheel drive system designed for accurate speed and guiding.
- Electromagnetic brake for optimal control of band tension.
- High reproducibility due to accurate digital/analogue settings of power, speed and work coils.
- Fast and easy start up and change over.

THE SYSTEM COMPRISES:

Hardening generators
 Hardening inductors
 Band feed unit
 Closed coolant system
 Closed quench system
 Mechanical straightening device

CAPACITY:

Band width 12 - 38 mm
 Band thickness 0.6 - 1.3 mm
 Tooth pitch 0.5 - 6 tpi
 Capacity: 5-15 m/min
 Hardening generator frequency: 3 MHz.

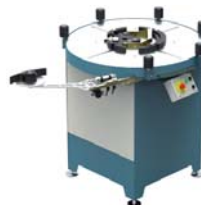
OPTIONS / ACCESSORIES:



ALO 90915/16/17/18
Collapsible coil center



ALO 831
Double coiler

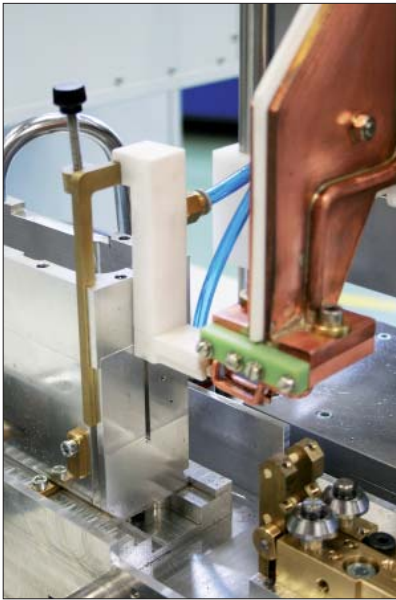


ALO 880
Electric coiler



ALO 106 CUBE
Coil handling system

MACHINE DESCRIPTION



Tooth hardening inductor



Pinch roller straightening unit

Band feeder

The band feeder consists of two units, one 4-wheel feed unit, the other as an adjustable brake to control the band tension by using an electro magnetic friction brake. Both units are equipped with two pairs of inclined rolls. The four rolls on the feed unit are driven by a servo motor, and the speed is controlled by a servo controller. The oscillating circuit with the inductor is located between the brake and the feed units such that the band is pulled through the inductor at a controlled tension.

Generator

The generators are enclosed in separate aluminium cabinets, equipped with separate oscillating circuits connected to the cabinets via coaxial cables. The generators are air cooled, thus limiting the cooling water requirements to inductors only. The generators are equipped with a chopper for infinitely variable control of the output power.

Inductors

The inductors are made of copper tubing and can be custom made for different pitches and band gauges. The inductors are interchangeable and can easily be replaced from one type to another.

Quench system

The system is designed for liquid quenching, such as oil or polymer medium.

Mechanical pinch roller straightening unit

The straightening device consists of a pair of rolls situated after the quench tank. The rolls are driven synchronized with the band feed unit and are adjusted in height for different band widths by an electrical actuator. The straightening force is manually adjusted on a fine threaded screw system.

TECHNICAL SPECIFICATION:

Band width:	12 - 38 mm	(other widths on request)
Band thickness:	0.6 - 1.3 mm	
Tooth pitch:	0.5 - 6 TPI	
Capacity:	5 - 15 m/min	
Air pressure:	6.3 bar	91 psi
Standard voltage:	400VAC \pm 10% 3-phase, 50-60 Hz \pm 1% directly earthed system, other voltages available upon request.	

Power consumption (at max output power): 10 kVA

Other customer requirements may be discussed between customer and ALO.

ALO 191-MS-3

Induction tooth hardening with mechanical straightening of carbon band saw blades



HIGHLIGHTS:

- High efficiency and low energy consumption generator with air-cooled oscillator tube.
- Automatic anode current control keep the anode current constant during the whole coil.
- Automatic flash guard protect the system against damage from flash-overs.
- Band feeder with a pulling 4-wheel drive system designed for accurate speed and guiding.
- Electromagnetic brake for optimal control of band tension.
- High reproducibility due to accurate digital/analogue settings of power, speed and work coils.
- Fast and easy start up and change over.

THE SYSTEM COMPRISES:

Band feed unit
 Hardening generator and inductor
 Closed coolant system
 Closed quench system
 Mechanical straightening device

CAPACITY:

Band width 6 - 38 mm
 Band thickness 0.4 - 1.3 mm
 Tooth pitch 3 - 32 tpi
 Capacity: 5-15 m/min
 Hardening generator frequency: 27 MHz.

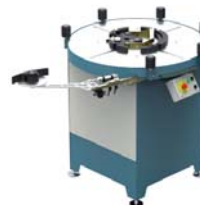
OPTIONS / ACCESSORIES:



ALO 90915/16/17/18
Collapsible coil center



ALO 831
Double coiler



ALO 880
Electric coiler



ALO 106 CUBE
Coil handling system



Tooth hardening generator



Inductor



Quench system



Pinch roller straightening unit

MACHINE DESCRIPTION

Band feeder

The band feeder consists of two units, one 4-wheel feed unit, the other as an adjustable brake to control the band tension by using an electro magnetic friction brake. Both units are equipped with two pairs of inclined rolls. The four rolls on the feed unit are driven by a servo motor, and the speed is controlled by a servo controller. The oscillating circuit with the inductor is located between the brake and the feed units such that the band is pulled through the inductor at a controlled tension.

Generator

The hardening generator is enclosed in separate aluminium cabinets, equipped with separate oscillating circuits connected to the cabinets via coaxial cables. The generator is air cooled, thus limiting the cooling water requirements to inductor and oscillating circuit only. The hardening generator is equipped with an automatic anode current regulator, thus ensuring a stable power during the hardening operation.

Inductors

The inductors are made of copper tubing and can be custom made for different pitches and band gauges. The inductors are interchangeable and can easily be replaced from one type to another.

Quench system

The system is designed for liquid quenching, such as oil or polymer quenchants.

Mechanical pinch roller straightening unit

The second straightening device consists of a pair of rolls situated after the quench tank. The mechanical straightening unit are best suited to work within the band widths of 12-20 mm, thickness of 0,45-0,6 mm with TPI between 3-6 TPI.

TECHNICAL SPECIFICATION:

Band width:	6 - 38 mm	(other widths on request)
Band thickness:	0.4 - 1.3 mm	
Tooth pitch:	3 - 32 tpi	
Capacity:	5 - 15 m/min	
Air pressure:	6.3 bar	91 psi
Standard voltage:	400VAC \pm 10% 3-phase, 50-60 Hz \pm 1% directly earthed system, other voltages available upon request.	

Power consumption (at max output power): 14 kVA

Other customer requirements may be discussed between customer and ALO.



ALO 191-MS-4

Induction tooth hardening with bend straightening and mechanical pinch roller straightening unit



HIGHLIGHTS:

- High efficiency and low energy consumption generator with air-cooled oscillator tube.
- Automatic anode current control keep the anode current constant during the whole coil.
- Automatic flash guard protect the system against damage from flash-overs.
- Band feeder with a pulling 4-wheel drive system designed for accurate speed and guiding.
- Electromagnetic brake for optimal control of band tension.
- High reproducibility due to accurate digital/analogue settings of power, speed and work coils.
- Fast and easy start up and change over.

THE SYSTEM COMPRISES:

Band feed unit
 Hardening generator and inductor
 Closed coolant system
 Closed quench system
 Bend straightening unit
 Pinch roller straightening unit

CAPACITY:

Band width 6 - 38 mm
 Band thickness 0.4 - 1.3 mm
 Tooth pitch 3 - 18 tpi
 Capacity: 5-15 m/min
 Hardening generator frequency: 27 MHz.
 Tempering generator frequency: 1.5 Mhz. (option)

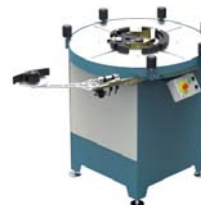
OPTIONS / ACCESSORIES:



ALO 90915/16/17/18
Collapsible coil center



ALO 831
Double coiler



ALO 880
Electric coiler



ALO 106 CUBE
Coil handling system



Tooth hardening generator



Inductor



Quench system



Pinch roller straightening unit

MACHINE DESCRIPTION

Band feeder

The band feeder consists of two units, one 4-wheel feed unit, the other as an adjustable brake to control the band tension by using an electro magnetic friction brake. Both units are equipped with two pairs of inclined rolls. The four rolls on the feed unit are driven by an asynchronous motor, and the speed is controlled by a frequency controller. The oscillating circuit with the inductor is located between the brake and the feed units such that the band is pulled through the inductor at a controlled tension.

Generator

The hardening generator is enclosed in separate aluminium cabinets, equipped with separate oscillating circuits connected to the cabinets via coaxial cables. The generator is air cooled, thus limiting the cooling water requirements to inductor and oscillating circuit only. The hardening generator is equipped with an automatic anode current regulator, thus ensuring a stable power during the hardening operation.

Inductors

The inductors are made of copper tubing and can be custom made for different pitches and band gauges. The inductors are interchangeable and can easily be replaced from one type to another.

Quench system

The system is designed for liquid quenching, such as oil or polymer quenchants.

Bend straightening unit

A section of the bench are hinged in such manner that the band can be bent over a high point to counteract camber effect during teeth hardening on the most narrow bands, typically 6-12mm width.

Mechanical pinch roller straightening unit

The second straightening device consists of a pair of rolls situated after the quench tank. The mechanical straightening unit are best suited to work within the band widths of 12-20 mm, thickness of 0,45-0,6 mm with TPI between 3-6 TPI.

TECHNICAL SPECIFICATION:

Band width:	6 - 38 mm	(other widths on request)
Band thickness:	0.4 - 1.3 mm	
Tooth pitch:	3 - 18 tpi	
Capacity:	5 - 15 m/min	
Air pressure:	6.3 bar	91 psi
Standard voltage:	400VAC \pm 10% 3-phase, 50-60 Hz \pm 1% directly earthed system, other voltages available upon request.	

Power consumption (at max output power): 10 kVA

Other customer requirements may be discussed between customer and ALO.



ALO 191-MST-2

Induction tooth hardening and tempering with mechanical straightening of carbon band saw blades



HIGHLIGHTS:

- High efficiency and low energy consumption generator with air-cooled oscillator tube.
- Automatic flash guard protect the system against damage from flash-overs.
- Band feeder with a pulling 4-wheel drive system designed for accurate speed and guiding.
- Electromagnetic brake for optimal control of band tension.
- High reproducibility due to accurate digital/analogue settings of power, speed and work coils.
- Fast and easy start up and change over.

THE SYSTEM COMPRISES:

Hardening and tempering generators
 Hardening and tempering inductors
 Band feed unit
 Closed coolant system
 Closed quench system
 Mechanical straightening device

CAPACITY:

Band width 12 - 38 mm
 Band thickness 0.6 - 1.3 mm
 Tooth pitch 0.5 - 6 tpi
 Capacity: 5-15 m/min
 Hardening generator frequency: 3 MHz.
 Tempering generator frequency: 1.5 MHz.

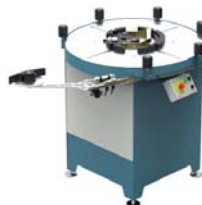
OPTIONS / ACCESSORIES:



ALO 90915/16/17/18
Collapsible coil center



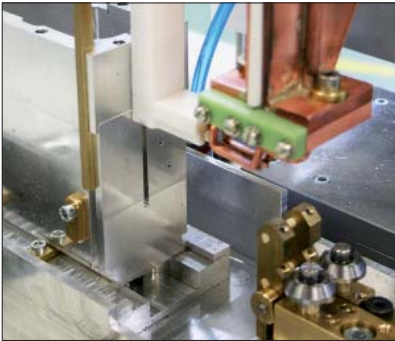
ALO 831
Double coiler



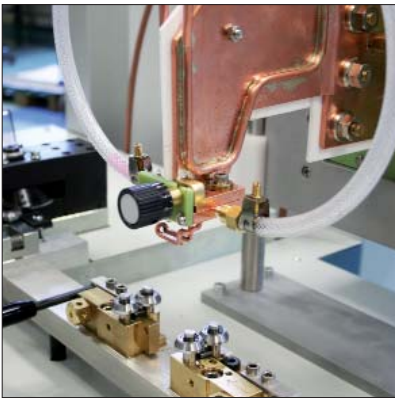
ALO 880
Electric coiler



ALO 106 CUBE
Coil handling system



Tooth hardening inductor



Tempering inductor



Pinch roller straightening unit

MACHINE DESCRIPTION

Band feeder

The band feeder consists of two units, one 4-wheel feed unit, the other as an adjustable brake to control the band tension by using an electro magnetic friction brake. Both units are equipped with two pairs of inclined rolls. The four rolls on the feed unit are driven by a servo motor, and the speed is controlled by a servo controller. The oscillating circuit with the inductor is located between the brake and the feed units such that the band is pulled through the inductor at a controlled tension.

Generator

The generators are enclosed in separate aluminium cabinets, equipped with separate oscillating circuits connected to the cabinets via coaxial cables. The generators are air cooled, thus limiting the cooling water requirements to inductors only. The generators are equipped with a chopper for infinitely variable control of the output power.

Inductors

The inductors are made of copper tubing and can be custom made for different pitches and band gauges. The inductors are interchangeable and can easily be replaced from one type to another.

Quench system

The system is designed for liquid quenching, such as oil or polymer medium.

Mechanical pinch roller straightening unit

The straightening device consists of a pair of rolls situated after the quench tank. The rolls are driven synchronized with the band feed unit and are adjusted in height for different band widths by an electrical actuator. The straightening force is manually adjusted on a fine threaded screw system.

TECHNICAL SPECIFICATION:

Band width:	12 - 38 mm	(other widths on request)
Band thickness:	0.6 - 1.3 mm	
Tooth pitch:	0.5 - 6 TPI	
Capacity:	5 - 15 m/min	
Air pressure:	6.3 bar	
Standard voltage:	400VAC \pm 10% 3-phase, 50-60 Hz \pm 1% directly earthed system, other voltages available upon request.	

Power consumption (at max output power): 10 kVA

Other customer requirements may be discussed between customer and ALO.



ALO 191-MST-3

Induction tooth hardening and tempering with mechanical straightening of carbon band saw blades



HIGHLIGHTS:

- High efficiency and low energy consumption generator with air-cooled oscillator tube.
- Automatic flash guard protect the system against damage from flash-overs.
- Band feeder with a pulling 4-wheel drive system designed for accurate speed and guiding.
- Electromagnetic brake for optimal control of band tension.
- High reproducibility due to accurate digital/analogue settings of power, speed and work coils.
- Fast and easy start up and change over.

THE SYSTEM COMPRISES:

Hardening and tempering generators
 Hardening and tempering inductors
 Band feed unit
 Closed coolant system
 Closed quench system
 Mechanical straightening device

CAPACITY:

Band width 6 - 38 mm
 Band thickness 0.4 - 1.3 mm
 Tooth pitch 3 - 32 tpi
 Capacity: 5-15 m/min
 Hardening generator frequency: 27 MHz.
 Tempering generator frequency: 1.5 MHz.

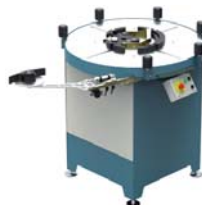
OPTIONS / ACCESSORIES:



ALO 90915/16/17/18
Collapsible coil center



ALO 831
Double coiler



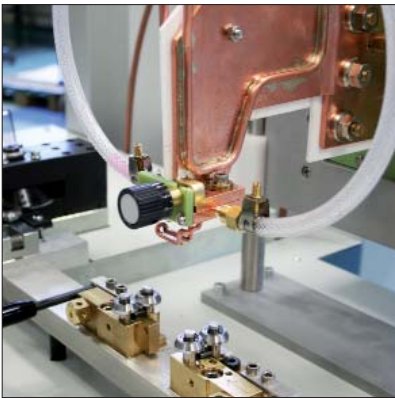
ALO 880
Electric coiler



ALO 106 CUBE
Coil handling system



Tooth hardening inductor



Tempering inductor



Pinch roller straightening unit

MACHINE DESCRIPTION

Band feeder

The band feeder consists of two units, one 4-wheel feed unit, the other as an adjustable brake to control the band tension by using an electro magnetic friction brake. Both units are equipped with two pairs of inclined rolls. The four rolls on the feed unit are driven by a servo motor, and the speed is controlled by a servo controller. The oscillating circuit with the inductor is located between the brake and the feed units such that the band is pulled through the inductor at a controlled tension.

Generator

The generators are enclosed in separate aluminium cabinets, equipped with separate oscillating circuits connected to the cabinets via coaxial cables. The generators are air cooled, thus limiting the cooling water requirements to inductors only. The generators are equipped with a chopper for infinitely variable control of the output power.

Inductors

The inductors are made of copper tubing and can be custom made for different pitches and band gauges. The inductors are interchangeable and can easily be replaced from one type to another.

Quench system

The system is designed for liquid quenching, such as oil or polymer medium.

Mechanical pinch roller straightening unit

The straightening device consists of a pair of rolls situated after the quench tank. The rolls are driven synchronized with the band feed unit and are adjusted in height for different band with a gear actuator. The pinch force is controlled by pneumatic cylinders. Adjustments are made via the HMI and settings are possible to save in blade recipe(s).

TECHNICAL SPECIFICATION:

Band width:	6 - 38 mm	(other widths on request)
Band thickness:	0.4 - 1.3 mm	
Tooth pitch:	3 - 32 TPI	
Capacity:	5 - 15 m/min	
Air pressure:	6.3 bar	
Standard voltage:	400VAC \pm 10% 3-phase, 50-60 Hz \pm 1% directly earthed system, other voltages available upon request.	

Power consumption (at max output power): 24 kVA

Other customer requirements may be discussed between customer and ALO.



ALO 191-MST-4

Induction tooth hardening and tempering with bend straightening and mechanical pinch roller straightening unit



HIGHLIGHTS:

- High efficiency and low energy consumption generator with air-cooled oscillator tube.
- Automatic anode current control keep the anode current constant during the whole coil.
- Automatic flash guard protect the system against damage from flash-overs.
- Band feeder with a pulling 4-wheel drive system designed for accurate speed and guiding.
- Electromagnetic brake for optimal control of band tension.
- High reproducibility due to accurate digital/analogue settings of power, speed and work coils.
- Fast and easy start up and change over.

THE SYSTEM COMPRISES:

Hardening and tempering generators
 Hardening and tempering inductors
 Band feed unit
 Closed coolant system
 Closed quench system
 Bend straightening unit
 Pinch roller straightening unit

CAPACITY:

Band width 6 - 38 mm
 Band thickness 0.4 - 1.3 mm
 Tooth pitch 3 - 18 tpi
 Capacity: 5-15 m/min
 Hardening generator frequency: 27 MHz.
 Tempering generator frequency: 1.5 MHz.

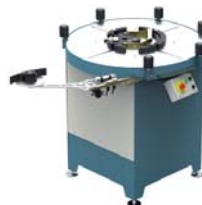
OPTIONS / ACCESSORIES:



ALO 90915/16/17/18
Collapsible coil center



ALO 831
Double coiler



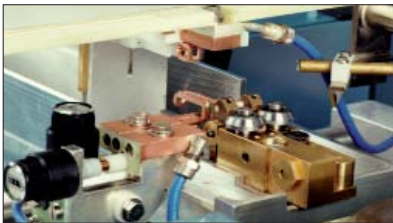
ALO 880
Electric coiler



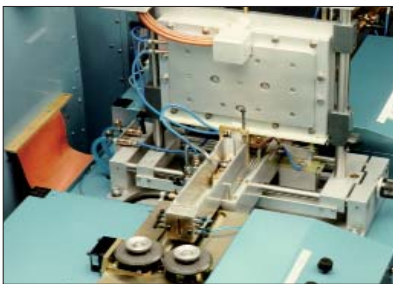
ALO 106 CUBE
Coil handling system



Tooth hardening generator



Inductor



Quench system



Pinch roller straightening unit

MACHINE DESCRIPTION

Band feeder

The band feeder consists of two units, one 4-wheel feed unit, the other as an adjustable brake to control the band tension by using an electro magnetic friction brake. Both units are equipped with two pairs of inclined rolls. The four rolls on the feed unit are driven by an asynchronous motor, and the speed is controlled by a frequency controller. The oscillating circuit with the inductor is located between the brake and the feed units such that the band is pulled through the inductor at a controlled tension.

Generator

The generators are enclosed in separate aluminium cabinets, equipped with separate oscillating circuits connected to the cabinets via coaxial cables. The generators are air cooled, thus limiting the cooling water requirements to inductor and oscillating circuit only. The hardening generator is equipped with an automatic anode current regulator, thus ensuring a stable power during the hardening operation. The tempering generator is equipped with a chopper for infinitely variable control of the output power.

Inductors

The inductors are made of copper tubing and can be custom made for different pitches and band gauges. The inductors are interchangeable and can easily be replaced from one type to another.

Quench system

The system is designed for liquid quenching, such as oil or polymer quenchants.

Bend straightening unit

A section of the bench are hinged in such manner that the band can be bent over a high point to counteract camber effect during teeth hardening on the most narrow bands, typically 6-12mm width.

Mechanical pinch roller straightening unit

The second straightening device consists of a pair of rolls situated after the quench tank. The mechanical straightening unit are best suited to work within the band widths of 12-20 mm, thickness of 0,45-0,6 mm with TPI between 3-6 TPI.

TECHNICAL SPECIFICATION:

Band width:	6 - 38 mm	(other widths on request)
Band thickness:	0.4 - 1.3 mm	
Tooth pitch:	3 - 18 tpi	
Capacity:	5 - 15 m/min	
Air pressure:	6.3 bar	
Standard voltage:	400VAC \pm 10% 3-phase, 50-60 Hz \pm 1% directly earthed system,	other voltages available upon request.

Power consumption (at max output power): 10 kVA

Other customer requirements may be discussed between customer and ALO.



ALO 197

Induction back hardening and tempering of carbon steel band saw blades



THE SYSTEM COMPRISES:

Hardening generator and inductor
Tempering generator and inductor
Closed cooling system for generators and inductors
Band feeder
Quench system

CAPACITY:

Band width: 6 - 38 mm
Band thickness: 0.5 - 1.43 mm
Production speed: 5 - 9 m/min

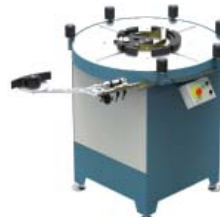
OPTIONS / ACCESSORIES:



ALO 822
Double coiler



ALO 831
Double coiler



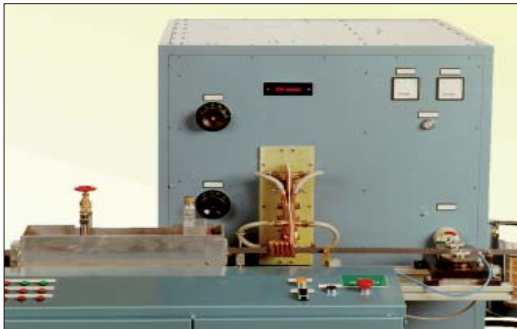
ALO 880
Electric coiler



ALO 106 CUBE
Coil handling system



Tempering and feeding



Hardening and quenching

MACHINE DESCRIPTION

The ALO-197 back hardener is designed for a combination of high production rate, easy to handle and a low power consumption which leads to high quality and low production costs. The Quench system with tank, pump, thermostat, heat exchanger, separator and a heating device for preheating the quenchant is designed for liquid quenching using oil, aqua-quench or similar quenchant. High reproducibility due to accurate digital/analogue settings of power and speed.

Generators

A 25 KW and a 15 kW generator will harden and temper in line. The closed cooling system, made for cooling of generators and work coils will assure clean and cooled water with constant pressure.

Band feeder with a pulling 4-wheel drive system and an adjustable brake unit for control of the band tension. Fast and easy to start up or change overs.

TECHNICAL SPECIFICATION:

Band width:	6 - 38 mm
Band thickness:	0.5 - 1.0 mm
Capacity:	5 - 9 m/min
Air pressure:	6.3 bar
Standard voltage:	400VAC \pm 10% 3-phase, 50-60 Hz \pm 1% directly earthed system, other voltages available upon request.
Power consumption (at max output power):	75 kVA

Other customer requirements may be discussed between customer and ALO.

ALO 198H QUICK QUENCH



ALO 198H Quick Quench

The quick quench system consists of a blower and a cooling unit build in stainless steel. The quick quenching of the hot band is done by high volume of cool protective gas soaking the band. The gas is circulated in a closed loop system to avoid colorization or scale on the band. The hot gas is effectively cooled in a gas/water heat exchanger tank.

Blower unit

The blower head is equipped with blocks of nozzles that can be adjusted to match different band widths to optimize the quenching effect. The unit are equipped with a filter and are easy to open for service. The blower unit should be connected to the furnace muffle and are allowed to move on guides to self-compensate length vice for temperature related movements. It also allows larger side movements for service purpose.

HIGHLIGHTS

- The system can be integrated to any existing hardening system where quick quenching of bands are needed
- The system monitors airflow, water temps, in and outgoing gas temps giving a good overview of the process
- Bands are quenched only with high velocity protective gas and no contact against the bands
- Air nozzle blocks can be adjusted for different band widths for most effective quenching
- Air pump can be regulated by means of a frequency controller to tune and keep electrical consumption low

TECHNICAL SPECIFICATION:

Band width:	12 - 80 mm	(other widths on request)
Band thickness:	0.9 - 1.6 mm	
Quench effect:	15-30 kW depending on system setting	
Voltage:	400 VAC, 3-phase, 50 - 60 Hz direct earthed system	
Power consumption average:	3,5 kVA	Power consumption max: 9 kVA

The system requires an external coolant water source as well as an external protective gas source

Other customer requirements may be discussed between customer and ALO.



ALO 198T QUICK QUENCH



ALO 198T Quick Quench

The quick quench system consists of a blower and a cooling unit build in stainless steel. The quick quenching of the hot band is done by high volume of cool protective gas (N₂) pumped by a high velocity pump. The gas is circulated in a closed loop system to avoid colorization or scale on the band. The hot gas is effectively cooled in a gas/water heat exchanger tank.

Blower unit

The blower head is equipped with blocks of gas nozzles that can be adjusted to match different band widths to optimize the quenching effect. The unit are equipped with a filter and are easy to open for service. The blower unit should be connected to the furnace muffle and are allowed to move on guides to self-compensate length vice for temperature related movements. It also allows larger side movements for service purpose.

HIGHLIGHTS

- The system can be integrated to any existing hardening system where quick quenching of bands are needed
- The system monitors airflow, water temps, in and outgoing gas temps giving a good overview of the process
- Bands are quenched only with high velocity protective gas and no contact against the bands
- Air pump can be regulated by means of a frequency controller to tune and keep electrical consumption low

TECHNICAL SPECIFICATION:

Band width:	12 - 80 mm	(other widths on request)
Band thickness:	0.9 - 1.6 mm	
Quench effect:	15-30 kW depending on system setting	
Voltage:	400 VAC, 3-phase, 50 - 60 Hz direct earthed system	
Power consumption average:	3,5 kVA	Power consumption max: 9 kVA

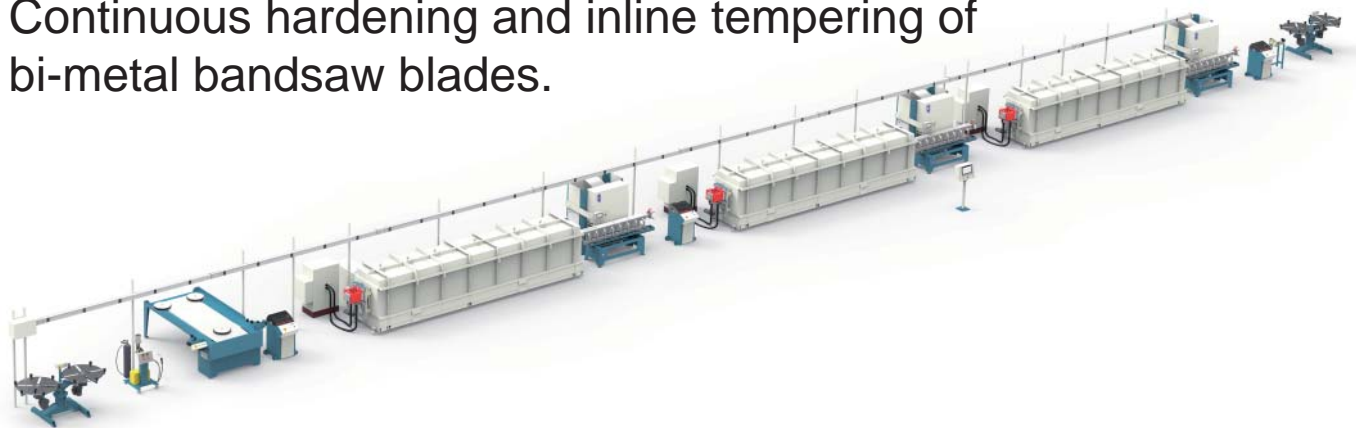
The system requires an external coolant water source as well as an external protective gas source

Other customer requirements may be discussed between customer and ALO.



ALO 198-ILTA Mk.IV.

Continuous hardening and inline tempering of bi-metal bandsaw blades.



ALO 198-ILTA Mk.IV. is one of the fastest and most cost effective system compared to other bi-metal hardening systems on the market.

- Can be operated with 2-3 times higher speeds compared to other systems.
- Reducing your energy consumption dramatically compared to pit furnace concept.
- Reducing your energy consumption to half compared to other induction heating system.
- Process time and cost will improve dramatically when minimizes the handling and operations such as recoiling- straightening and separate tempering operations.

Thanks to:

- Induction pre-heating with Litz coils before hardening and tempering furnaces.
- Properly insulated furnace system with high quality heating elements.
- Highly efficient Quick Quench system.
- Multi band feed system with exceptional well controlled band feeding and tensioning.
- A Central PLC that is handling all process parameters.

THE SYSTEM COMPRISES:

3 times band feed and tension units.
Generator and inductor for pre-heating before hardening.
High temperature hardening furnace.
Quick Quench after hardening.
Generator and inductor for pre-heating before tempering 1.
Tempering 1 furnace.
Quick Quench after tempering 1.
Generator and inductor for pre-heating before tempering 2.
Tempering 2 furnace.
Quick Quench after tempering 2.
Closed cooling system for generators and inductors.
Flying shear.
Central control and power distribution system.
(Optional band coiling systems available)

HIGHLIGHTS:

- One in line operation complete hardening and tempering operation.
- High output capacity, up to 4 meters/minute.
- Short lead time, 6-8 minutes from coil to coil.
- Low cost/meter band produced.
- Eliminating recoiling and separate tempering operation.
- Reduce or eliminate need of camber straightening.
- Low energy cost thanks to induction band pre heating.
- Low cost and high capacity Quick quench system.
- Full process control and coil histogram by central control table.

CAPACITY:

Band width: 25 - 80 mm
Band thickness: 0.9 - 1.6 mm
Speed example, 27 x 0.9 mm: 3.0 - 4.0 m/min



Take up coiler. Picture 1



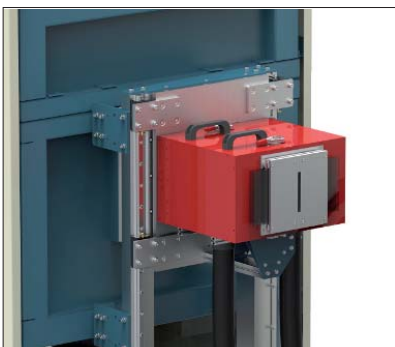
ALO Cube Elevator system. Picture 2



The band loop generate a loop of band, this will give time to weld coils together. Picture 3



Band feed unit and flying shear. Picture 4



Tempering 1 pre-heating inductor. Picture 5

MACHINE DESCRIPTION

Optional Band Coiling System (picture 1 and 2)

Pay off and take up double coilers

Double coilers built on a sturdy welded stand.

Pay off is unpowered with friction brakes.

Take up is driven by an AC motor with gear box.

Equipped with folding coil protector and expandable centers which can be removed to facilitate loading.

Cube pay off and take up system

The Cube will dock to a hydraulic elevator that automatically locks the Cube.

From the elevators control panel each cube-shelf can be indexed by the operator.

On the take up side, the cube elevator also is equipped with power unit for singel coil drive.

Band loop accumulator (picture 3)

The band accumulator will towards end of each coil be activated to generate a loop of band. This will give time to weld coils together and facilitate continuous hardening/tempering.

Band feed/tensioning unit (picture 4)

A total of three feeding and tensioning units are included in the line, equipped with three pairs of feed rolls as all driven by a DC-motor. each rolls are driven and each pair is mechanically compressed. The speed is infinitely variable between 0 - 5 m/min and the torque can be controlled to give optimum tensioning of the band in the hardening furnace. All band feeding units are monitored and controlled by the central PLC line control for optimal band feeding. The third (3) band feed unit is equipped with a flying pneumatic shear for cutting band samples.

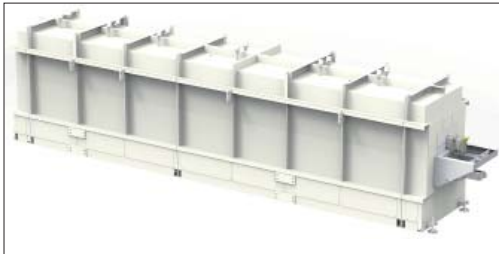
Induction preheating before hardening and tempering (picture 5)

Band is pre-heated by induction before entering the hardening and tempering furnace to allow band maximum time at temperature for proper transformation. Each furnace have a preheating unit capable of heating the bands up to approx 750°C.

After the preheating inductors, an infrared thermometer monitor and report band temperature to the PLC system. Nitrogen is introduced through the box lid. By using Litz-coils, the induction heating efficiency rate will be significantly better than other available technologies in the market and capable to deliver well over 90% of energy consumed to the band compared to 40-45% for conventional induction systems. Induction coils are designed as separate flat coils on both sides of the band and thereby easily open for service.

The output power is continuously controllable by frequency converter and a current breaker protects the generator in the event of a short circuit or overload.

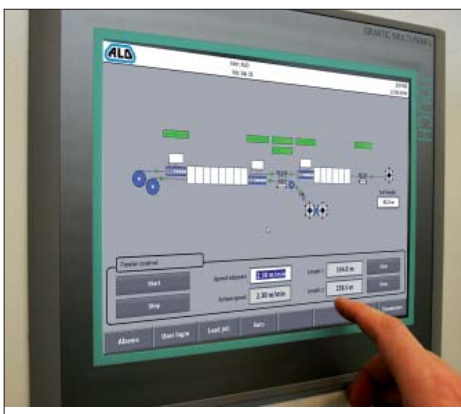




Hardening furnace. Picture 6



High velocity nitrogen gas quenching zone.
Picture 7



Siemens Comfort Touch Panel 15". Picture 8

High temperature hardening furnace (picture 6)

The high temperature muffle furnace is designed and built for hardening temperature of approximately 1160 – 1220 °C and divided into six separate heating zones, with totally 60 kW to be distributed individually to each zone. The furnace is made of a stable steel casing with a separate ceiling section. The ceiling can be swing opened for easy access to the heating chamber for service reasons. The heating elements are arranged freely radiating in the furnace walls and are designed for an intrinsic temperature up to max 1380 °C. The muffle and band guides are made of a high temperature resistant alloy, Inconel 602, and kept it in a straight condition by an automatic mechanical stretching device.

Quick Quench zone (picture 7)

The quick quenching of the hot band is done by high volume of cool protective gas soaking both sides of the band. The gas is circulated in a closed loop system to avoid colorization or scale on the band. The hot gas is effectively cooled in a gas/water heat exchanger tank. The blower head is equipped with an air filter and blocks of nozzles that can be adjusted to match different band widths to optimize the quenching effect. The blower unit head is placed on a special floor stand allowing muffle expansion and retraction as well as a larger side movement for easy access to muffle.

Tempering 1 and 2 furnace

The muffle furnaces are light weight construction, made of rectangular profiles and angle-iron bars. In order to obtain a low surface temperature the outer shutting is distanced from the furnace body.

The furnace body is made of two separate sections, one top and one bottom section to facilitate service. The furnace is insulated with a multi layer made of light-weight ceramic blocks and ceramic fibre boards. The wire helix heating elements of high quality heating conductor alloy, imbedded in ceramic fibre insulation in the furnace walls. The furnace is divided in four separate heating zones, with 12kW to be distributed individually to each zone.

Master control panel (picture 8)

The electrical power supply is modular by the use of Schneider Canalis that simplify installation and allowing future modifications and/or upgrading of the line. The setting- handling and control of all process parameters is executed in a Profi Bus D.P. system as mastered by a Siemens S7 1200 PLC unit. All data is entered and presented on a Siemens Comfort Touch Panel 15". Import or export of process data is available via an Ethernet communication module.

Software includes:

- System set up by band recipe handling
- Central monitoring and recording of related parameters.
- On line graphic presentation of process data
- External communication via Ethernet module
- Band batch and coil histogram recording

TECHNICAL SPECIFICATION:

Band width:	20 - 80mm
Band thickness:	0.9 - 1.6 mm
Air pressure:	6.3 bar
Mains voltage:	400 VAC \pm 10% 3-phase, 50-60 Hz \pm 1%, directly earthed system
Power consumption at max. output power:	170 kVA (complete system)
Preheating HF generator, hardening max. output power:	37 kW
Preheating HF generators, tempering max. output power:	24 kW

SPEED AND ENERGY CONSUMPTION EXAMPLE:

27 x 0.9mm	3.0 – 4.0 meter/min	57 – 68 kWh
34 x 1.1 mm	2.0 – 2.8 meter/min	55 – 63 kWh
42 x 1.1mm	1.5 – 2.3 meter/min	
54 x 1.3 mm	1.0 – 1.5 meter/min	
67 x 1.3 mm	1.0 – 1.3 meter/min	
67 x 1.6 mm	0.8 – 1.2 meter/min	
80 x 1.6 mm	0.6 – 1.0 meter/min	

TECHNICAL SPECIFICATION HARDENING FURNACE

Type of furnace:	Electrically heated pull-through muffle furnace	
Process:	Austenitizing of HSS	
Approx. operating temperature:	1160 -1220°C	2120 - 2228°F
Approx. connected power:	Approx. 60 kW	
Heating power:	Approx. 60 kW	
Approx. weight:	6400 kg	

TECHNICAL SPECIFICATION TEMPERING FURNACE

Type of furnace:	Electrically heated pull-through muffle furnace	
Process:	Tempering of HSS	
Approx. operating temperature:	600 - 750°C	1112 -1382°F
Approx. connected power:	Approx. 12 kW	
Heating power:	Approx. 12 kW	
Approx. weight:	3000 kg	

TECHNICAL SPECIFICATION DOUBLE PAYOFF COILER. (OPTION)

For more information please refer to our brochure ALO 831

TECHNICAL SPECIFICATION CUBE PAYOFF SYSTEM. (OPTION)

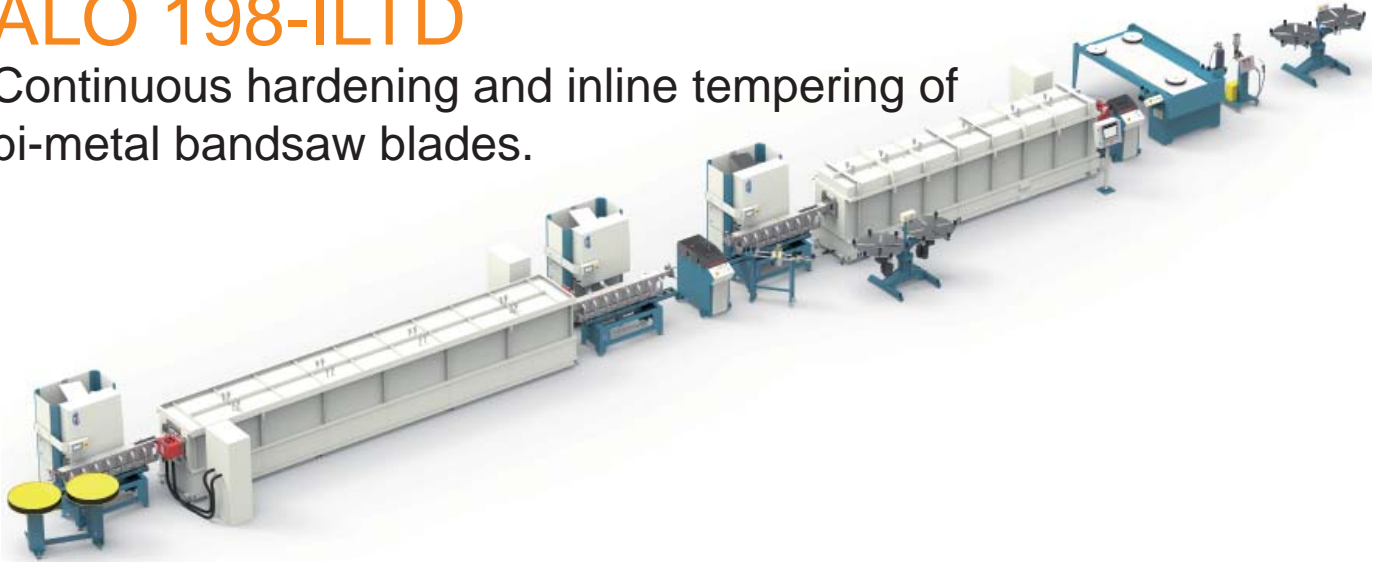
For more information please refer to our brochure ALO 106

Other customer requirements on request.



ALO 198-ILTD

Continuous hardening and inline tempering of bi-metal bandsaw blades.



ALO 198-ILTD Mk.IV. is one of the fastest and most cost effective system compared to other bi-metal hardening systems on the market.

- Can be operated with 2-3 times higher speeds compared to other systems.
- Reducing your energy consumption dramatically compared to pit furnace concept.
- Reducing your energy consumption with 30-50% compared to other alternative system.
- Process time and cost will improve dramatically when minimizes the handling and operations such as recoiling- straightening and separate tempering operations.

Thanks to:

- Induction pre-heating with Litz coils before hardening and tempering furnaces.
- Properly insulated furnace system with high quality heating elements.
- Highly efficient Quick Quench system.
- Multi band feed system with exceptional well controlled band feeding and tensioning.
- A Central PLC that is handling all process parameters.

THE SYSTEM COMPRISES:

2 times band feed units.
Induction generator and work coil for pre-heating before hardening.
High temperature hardening furnace.
Quick Quench after hardening.
Induction generator and work coil for pre-heating before tempering 1.
Tempering 1 furnace double muffle.
Quick Quench after tempering 1.
Induction generator and work coil for pre-heating before tempering 2.
Tempering 2 furnace double muffle.
Quick Quench after tempering 2
Circulation and cooling system for generators and work coils
Master control panel and power distribution system.
Flying shear & take-up speed control (option)
(Optional band coiling systems available)

HIGHLIGHTS:

- One in line operation complete hardening and tempering operation.
- High output capacity, up to 4 meters/minute.
- Short lead time, 6-8 minutes from coil to coil.
- Low cost/meter band produced.
- Eliminating recoiling and separate tempering operation.
- Reduce or eliminate need of camber straightening.
- Low energy cost thanks to induction band pre heating.
- Low cost and high capacity Quick quench system.
- Full process control and coil histogram by central control table.

CAPACITY:

Band width: 20 - 80 mm
Band thickness: 0.9 - 1.6 mm
Speed example, 27 x 0.9 mm: 3.0 - 4.0 m/min





Take up coiler. Picture 1



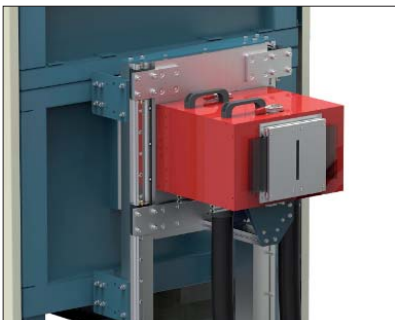
ALO Cube Elevator system. Picture 2



The band loop generate a loop of band, this will give time to weld coils together. Picture 3



Band feed unit. Option: Flying shear. Picture 4



Tempering 1 pre-heating inductor. Picture 5

MACHINE DESCRIPTION

Optional Band Coiling System (picture 1 and 2)

Pay off and take up double coilers

Double coilers built on a sturdy welded stand.

Pay off is unpowered with friction brakes.

Take up is driven by an AC motor with gear box.

Equipped with folding coil protector and expandable centers which can be removed to facilitate loading.

Cube pay off and take up system

The Cube will dock to a hydraulic elevator that automatically locks the Cube.

From the elevators control panel each cube-shelf can be indexed by the operator. On the take up side, the cube elevator also is equipped with power unit for singel coil drive.

Optional Band loop accumulator (picture 3)

The band accumulator will towards end of each coil be activated to generate a loop of band. This will give time to weld coils together and facilitate continuous hardening/tempering.

Band feed/tensioning unit (picture 4)

The system includes two band feed units, one single band feed and one double band feed. The speed is infinitely variable between 0 - 5m/min and the torque can be set to give the optimal controlled tensioning of the band in the hardening furnace. All band feeding units are monitored and controlled by the central PLC line control for optimal band feeding. A protective fold away cover over the drive systems are also included.

Option: The second band feed unit can be equipped with a flying pneumatic shear for cutting band samples.

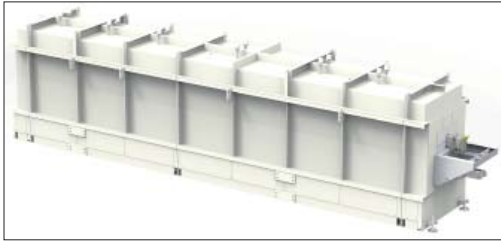
Induction preheating before hardening and tempering (picture 5)

Band is pre-heated by induction before entering the hardening furnace to allow band maximum time at temperature for proper transformation. The furnace have a preheating unit capable of heating the bands up to approx 750°C.

After the preheating coils, the band temperature is monitored and reported to the PLC system. By using Litz-coils, the induction heating efficiency rate will be significantly better than other available technologies in the market and capable to deliver 80-90% of energy consumed to the band compared to 30-50% for conventional induction systems. Induction coils are designed as separate flat coils on both sides of the band and thereby easily open for service.

The output power is continuously controllable by frequency converter and a current breaker protects the generator in the event of a short circuit or overload.





Hardening furnace. Picture 6

High temperature hardening furnace (picture 6)

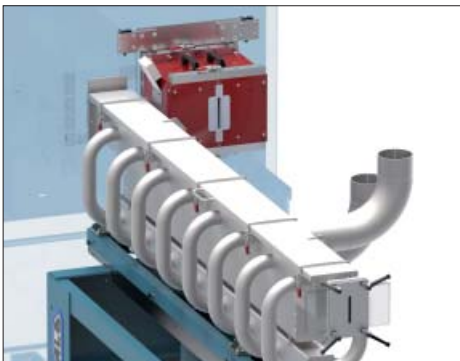
The high temperature muffle furnace is designed and build for hardening temperature of approximately 1160 – 1220 °C and divided into six separate heating zones, with totally 60 kW to be distributed individually to each zone. The furnace is made of a stable steel casing with a separate ceiling section. The ceiling can be swing opened for easy access to the heating chamber for service reasons. The heating elements are arranged freely radiating in the furnace walls and are designed for an intrinsic temperature up to max 1380 °C. The muffle and band guides are made of a high temperature resistant alloy, Inconel 602, and kept it in a straight condition by an automatic mechanical stretching device.



High velocity nitrogen gas quenching zone. Picture 7

Quick Quench zone (picture 7)

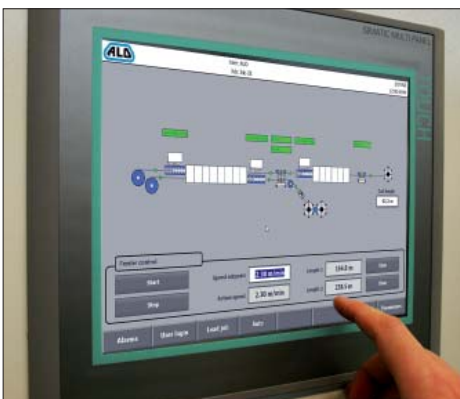
The quick quenching of the hot band is done by high volume of cool protective gas soaking both sides of the band. The gas is circulated in a closed loop system to avoid colorization or scale on the band. The hot gas is effectively cooled in a gas/water heat exchanger tank. The blower head is equipped with an air filter and blocks of nozzles that can be adjusted to match different band widths to optimize the quenching effect. The blower unit head is placed on a special floor stand allowing muffle expansion and retraction as well as a larger side movement for easy access to muffle.



Tempering 1 and 2 double muffle furnace. Picture 8

Tempering 1 and 2 double muffle furnace (picture 8)

The furnaces has a double muffle to allow the band go through the same furnaces twice in opposite directions. This make the whole line more compact, saving floor space and reduce the price of the system. The muffle furnaces are light weight construction, made of rectangular profiles and angle-iron bars. In order to obtain a low surface temperature the outer shutting is distanced from the furnace body. The furnace body is insulated with a multi-layer made of light-weight ceramic blocks and ceramic fibre boards.



Siemens Comfort Touch Panel 15". Picture 9

Master control panel (picture 9)

The electrical power supply is modular by the use of Schneider Canalis that simplify installation and allowing future modifications and/or upgrading of the line. The setting- handling and control of all process parameters is executed in a Profi Bus D.P. system as mastered by a Siemens S7 1200 PLC unit. All data is entered and presented on a Siemens Comfort Touch Panel 15". Import or export of process data is available via an Ethernet communication module.

Software includes:

- System set up by band recipe handling
- Central monitoring and recording of related parameters.
- On line graphic presentation of process data
- External communication via Ethernet module
- Band batch and coil histogram recording

TECHNICAL SPECIFICATION:

Band width:	20 - 80mm
Band thickness:	0.9 - 1.6 mm
Air pressure:	6.3 bar
Mains voltage:	400 VAC \pm 10% 3-phase, 50-60 Hz \pm 1%, directly earthed system
Power consumption at max. output power:	170 kVA (complete system)
Preheating HF generator, hardening max. output power:	37 kW
Preheating HF generators, tempering max. output power:	24 kW

SPEED AND ENERGY CONSUMPTION EXAMPLE:

27 x 0.9mm	3.0 – 4.0 meter/min	57 – 68 kWh
34 x 1.1 mm	2.0 – 2.8 meter/min	55 – 63 kWh
42 x 1.3mm	1.5 – 2.3 meter/min	
54 x 1.3 mm	1.0 – 1.5 meter/min	
67 x 1.3 mm	1.0 – 1.3 meter/min	
67 x 1.6 mm	0.8 – 1.2 meter/min	
80 x 1.6 mm	0.6 – 1.0 meter/min	

TECHNICAL SPECIFICATION HARDENING FURNACE

Type of furnace:	Electrically heated pull-through muffle furnace	
Process:	Austenitizing of HSS	
Approx. operating temperature:	1160 -1230°C	2120 - 2246°F
Approx. connected power:	Approx. 60 kW	
Heating power:	Approx. 60 kW	
Approx. weight:	4800 kg	

TECHNICAL SPECIFICATION TEMPERING FURNACE

Type of furnace:	Electrically heated pull-through muffle furnace	
Process:	Tempering of HSS	
Approx. operating temperature:	600 - 750°C	1112 -1382°F
Approx. connected power:	Approx. 12 kW	
Heating power:	Approx. 12 kW	
Approx. weight:	3000 kg	

TECHNICAL SPECIFICATION DOUBLE PAYOFF COILER. (OPTION)

For more information please refer to our brochure ALO 830

TECHNICAL SPECIFICATION CUBE PAYOFF SYSTEM. (OPTION)

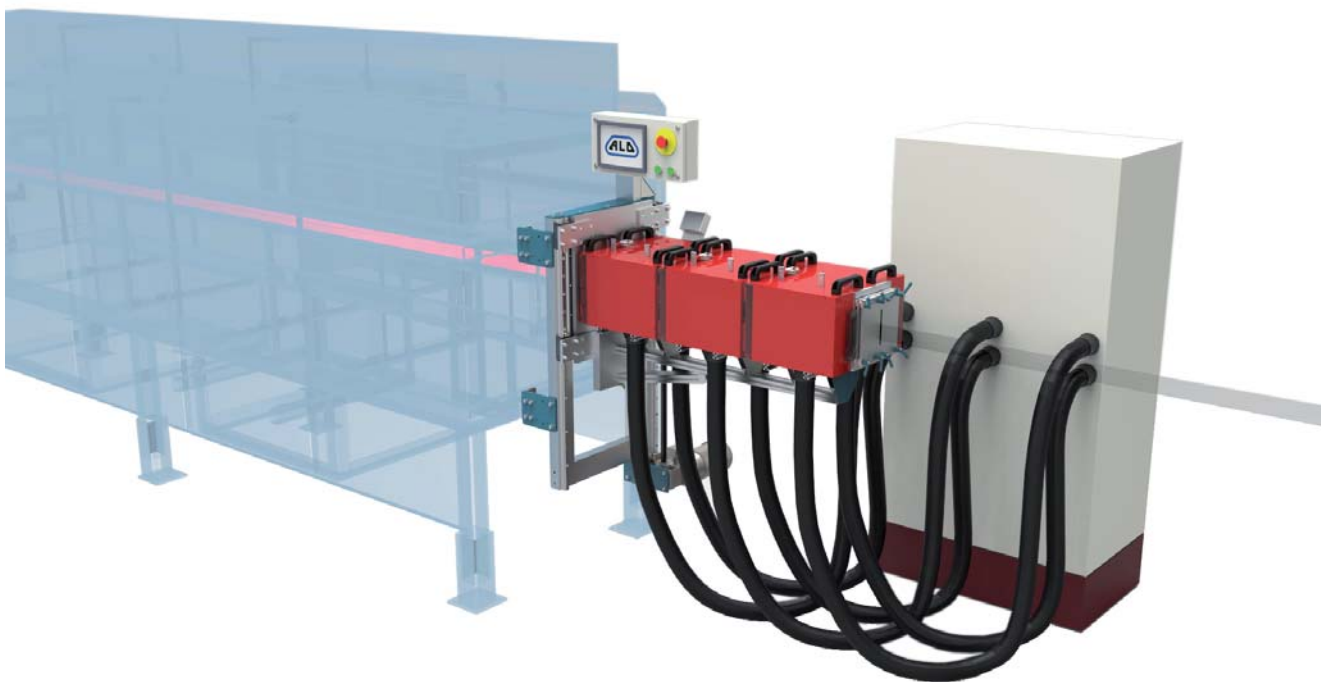
For more information please refer to our brochure ALO 104

Other customer requirements on request.



ALO 198-PREHEAT-B

Induction pre-heating of band saw blades



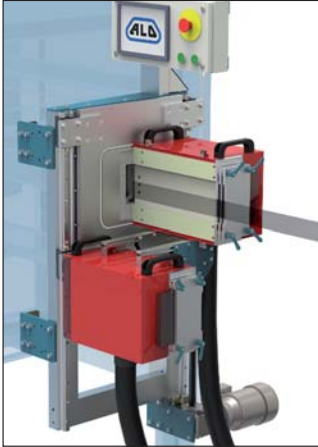
THE SYSTEM COMPRISES:

Work coil and generator
Work coil against furnace muffle assembly
HMI

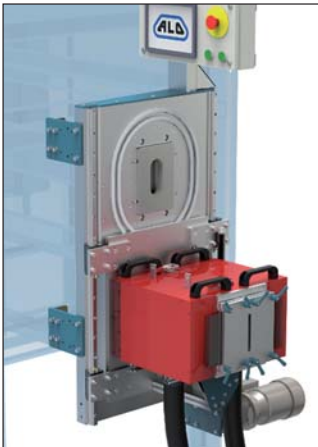
CAPACITY:

Band width: 20 - 85mm
Band thickness: 0.6 - 1.6mm
Heating capacity: up to 1000° C

- Can be integrated to any existing hardening or tempering furnace to boost the output rate
- High efficiency rate, some 85% or more by use of Litz coils imbedded in magnetic flow material SM²C®!
- The heater have in principle no magnetic stray fields eliminating medical risks
- Work coils are very robust and easy to service and operate
- Reduce energy consumption (compared with conventional induction heaters with efficiencies of 55%)



The work coil open up easy in separate halves for service



The work coils can be lowered out of the way to a service pos.

MACHINE DESCRIPTION

Heaters

By the new Induction technology it's possible to design inductors as separate flat coils on both sides of the band saw blade allowing easy access for service. In the gap for the band insulation material eliminates heat to reflect back from the band to the heaters. The SM2C®-material is the essential magnet flux leader which with correctly adopted permeability induces the right temperature in the band.

The heater is mounted against a motorized mounting plate that can be lowered to a service position giving access to the furnace muffle. The individual heaters can easily be dismantled giving access for service of for example the heaters insulation. The heater and the mounting plate should be assembled to an existing furnace/muffle and will keep the protective gas atmosphere since the unit are mounted against muffle and sealed on the band entrance side.

Internal cooling

Even if the system delivers over 85% of energy to the band it's still required with an inductor water cooling system. Cooling tubes for the excess heat are integrated into the inductors, and the internal water/liquid heat exchanger in cabinet generates cooling for inverters, inductors and supply lines.

HMI

The system is supplied with a Siemens PLC and operator terminal where parameterizing are made.

Environment and Economy

An important aspect in choosing a heater constructed by casting Litz coils into soft magnetic composite material, SM2C®, is the reduced energy consumption. This heaters high efficiency of 85% or more shall be compared with efficiencies of 55% for conventional induction heaters.

By using of this type of Induction heating equipment in two shift/day, means in comparison to existing induction alternatives an energy savings in the range of 90 MWh per year.

TECHNICAL SPECIFICATION:

Band width:	20 - 85mm
Band thickness:	0.6 - 1.6mm
Heating capacity:	Up to 1000° C
Heating capacity/speed example:	27x0,9mm @5m/min 1000° C
PLC system:	Siemens S7 1200
Voltage:	400 VAC 3-phase, 50-60 Hz direct earthed system
Max power consumption	47 kVA

The system requires an external cooling system



ALO 198-PREHEAT-C

Induction pre-heating of band saw blades



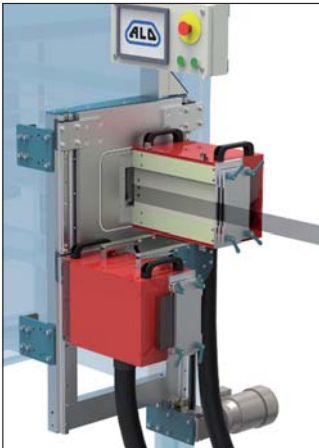
THE SYSTEM COMPRISES:

Work coil and generator
Work coil against furnace muffle assembly
HMI

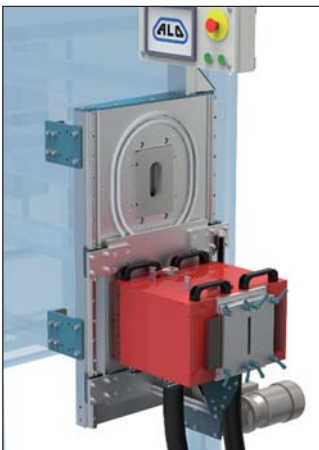
CAPACITY:

Band width: 20 - 85mm
Band thickness: 0.6 - 1.6mm
Heating capacity: up to 750° C

- Can be integrated to any existing hardening or tempering furnace to boost the output rate
- High efficiency rate, some 85% or more by use of Litz coils imbedded in magnetic flow material SM²C®!
- The heater have in principle no magnetic stray fields eliminating medical risks
- Work coils are very robust and easy to service and operate
- Reduce energy consumption (compared with conventional induction heaters with efficiencies of 55%)



The work coil open up easy in separate halves for service



The work coils can be lowered out of the way to a service pos.

MACHINE DESCRIPTION

Heaters

By the new Induction technology it's possible to design inductors as separate flat coils on both sides of the band saw blade allowing easy access for service. In the gap for the band insulation material eliminates heat to reflect back from the band to the heaters. The SM2C®-material is the essential magnet flux leader which with correctly adopted permeability induces the right temperature in the band.

The heater is mounted against a motorized mounting plate that can be lowered to a service position giving access to the furnace muffle. The individual heaters can easily be dismantled giving access for service of for example the heaters insulation. The heater and the mounting plate should be assembled to an existing furnace/muffle and will keep the protective gas atmosphere since the unit are mounted against muffle and sealed on the band entrance side.

Internal cooling

Even if the system delivers over 85% of energy to the band it's still required with an inductor water cooling system. Cooling tubes for the excess heat are integrated into the inductors, and the internal water/liquid heat exchanger in cabinet generates cooling for inverters, inductors and supply lines.

HMI

The system is supplied with a Siemens PLC and operator terminal where parameterizing are made.

Environment and Economy

An important aspect in choosing a heater constructed by casting Litz coils into soft magnetic composite material, SM2C®, is the reduced energy consumption. This heaters high efficiency of 85% or more shall be compared with efficiencies of 55% for conventional induction heaters.

By using of this type of Induction heating equipment in two shift/day, means in comparison to existing induction alternatives an energy savings in the range of 90 MWh per year.

TECHNICAL SPECIFICATION:

Band width:	20 - 85mm
Band thickness:	0.6 - 1.6mm
Heating capacity:	Up to 750° C
Heating capacity/speed example:	27x0,9mm @5m/min 600° C
PLC system:	Siemens S7 1200
Voltage:	400 VAC 3-phase, 50-60 Hz direct earthed system
Max power consumption	14 kVA

The system requires an external cooling system



ALO 199

Back hardening and tempering, tooth hardening and hot straightening of carbon steel band saw blades



THE SYSTEM COMPRISES:

Back hardening generator and inductor
Back tempering generator and inductor
Tooth hardening generator and inductor
Straightening generator and inductor
Closed cooling system
Band feeder
Quench system
Universal clarifier for the quenchant

CAPACITY:

Band width: 6 - 32 mm
Band thickness: 0.64 - 1.07 mm
Tooth pitch: 1 - 14 tpi
Speed capacity: 5 - 9 m/min

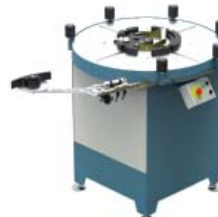
OPTIONS / ACCESSORIES:



ALO 822
Double coiler



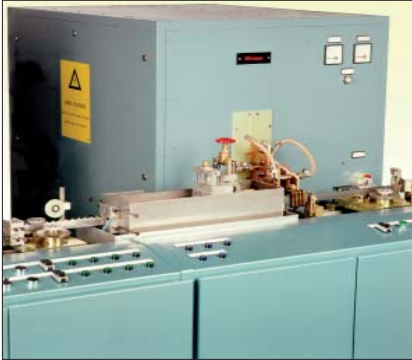
ALO 831
Double coiler



ALO 880
Electric coiler



ALO 106 CUBE
Coil handling system



Back hardening unit



Tempering unit

MACHINE DESCRIPTION

Band feeder

The band feeder consists of two units, one 6-wheel feed unit, the other as an 4 wheel adjustable tension control using a electro magnetic friction brake. The six rolls on the feed unit are driven by a servomotor, and the speed is controlled by a servo controller. The inductors are located between the brake and the feed units such that the band is pulled through the inductors at a controlled tension.

Generators

The generators are enclosed in separate aluminium cabinets. The tooth hardening and straightening generators are air cooled, while the back hardening and tempering are water cooled. The tooth hardening generator are equipped with a chopper for infinitely variable control of the output power.

Inductors

The inductors are made of copper tubing and can be custom made for different pitches and band gauges. They are adjustable in height for different blade widths and sideways for different blade gauges. The inductors are interchangeable and can easily be replaced. The inductors for back hardening are made of copper and designed for uniform heating of the whole of the bandsaw blades. They are easily exchangeable for service or replacement.

TECHNICAL SPECIFICATION:

Band width:	6 - 32 mm
Band thickness:	0.64 - 1.07 mm
Tooth pitch:	1 - 14 TPI
Capacity:	5 - 9 m/min
Air pressure:	6.3 bar
Standard voltage:	400VAC $\pm 10\%$ 3-phase, 50-60 Hz $\pm 1\%$ directly earthed system, other voltages available upon request.
Power consumption (at max output power):	95 kVA
Weight:	900 kg
Space requirement (l x w)	8 x 2 m

Other customer requirements may be discussed between customer and ALO.

ALO 9817

Pneumatic shear



Flying pneumatic shear for cutting band samples.

Pneumatic shear with cutting edges made from hardened powder steel ASP 23.

The cutters can be re-ground and the design admits adjustment of both slides and cutters.

With option 9.1 the shear is stationary placed at end of band loop accumulator.

With option 9.2 the shear moves with the band when cutting, e.g. "flying shear"

THE SYSTEM COMPRISES:

Shear unit

OPTIONS:

9.1 the shear is stationary placed

9.2 the shear moves with the band, "flying shear"

CAPACITY:

Band width: 20 - 80 mm

Band thickness: 0.9 - 1.6 mm

ALO 9818

Band loop accumulator



The band accumulator can be activated to generate a 12m loop of band at any time. When it's time to change coiler or cube the band end is locked and band is automatically fed into the loop accumulator allowing time to change coiler or cube. This will give time to weld coils together and facilitate continuous hardening/tempering. After welding, the band loop has been consumed allowing band to be feed directly from coiler or cube system again.

THE SYSTEM COMPRISES:

Band loop table

CAPACITY:

Band width: 20 - 80 mm
Band thickness: 0.9 - 1.6 mm

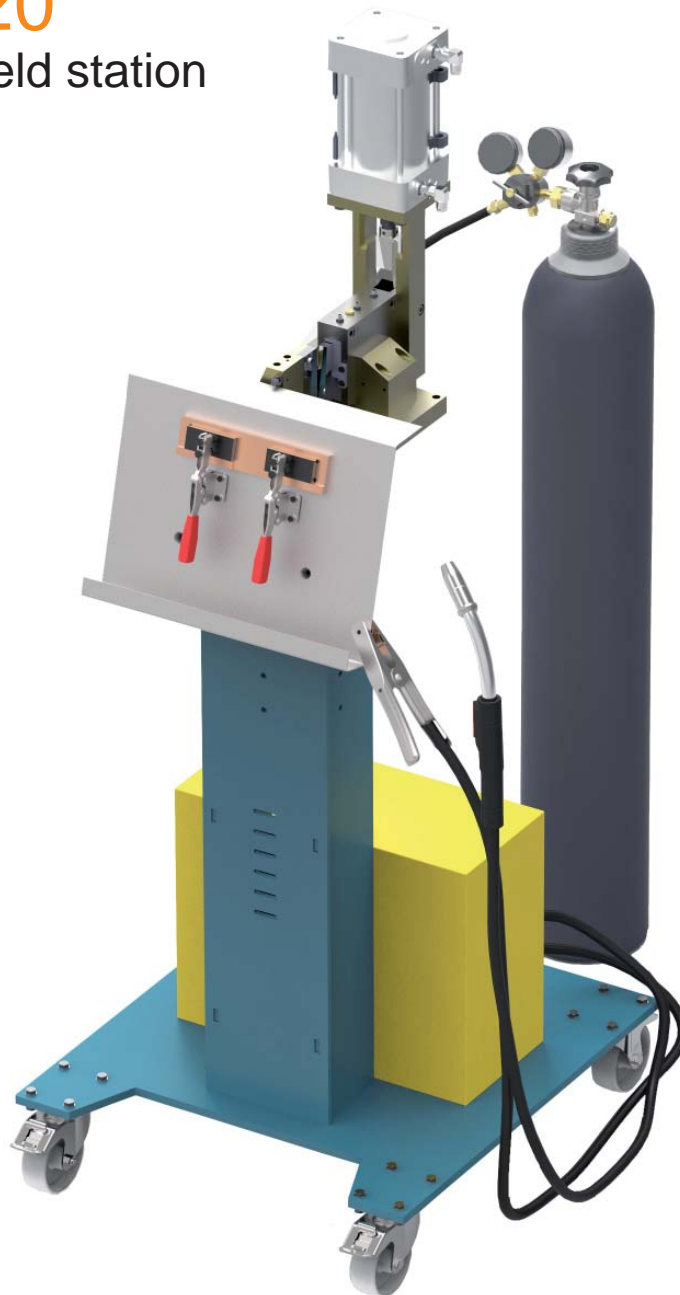


SWEDISH QUALITY
WITH RESPECT FOR THE
ENVIRONMENT AND
SAFETY REGULATIONS



ALO 9820

Shear and weld station



This system contains a band weld fixture and a pneumatic shear to trim the ends of the bands before welding them together in the fixture for continuous hardening/tempering.

THE SYSTEM COMPRISES:

Shear and weld unit

CAPACITY:

Band width: 20 - 80 mm
Band thickness: 0.9 - 1.6 mm



SWEDISH QUALITY
WITH RESPECT FOR THE
ENVIRONMENT AND
SAFETY REGULATIONS



ALO 91526

Central control for heat treatment processes

ALO 91526

ALO's Central Control (CC) gives you total control over all the critical, most important settings and parameters during heat treatment process of bi metal band saw blades or other band saws or strips.

This system is ready and prepared for the numerous steps and processes involved.

Foremost, it is a superb control over ALOs different band feed units. It can be set up to work with our single band feeders or our double band feeders or a combination of our single and double feeders. It is also fully prepared for our pre heating modules, our Quick quench modules and ETS/Ruhstrat new models of hardening and tempering furnaces.

By using the various set ups options correctly, you can produce a band saw blade straight or with camber within specifications used and accepted by the saw blade business. This will in turn eliminate costly, time and labor consuming straightening steps after heat treatment process fully.

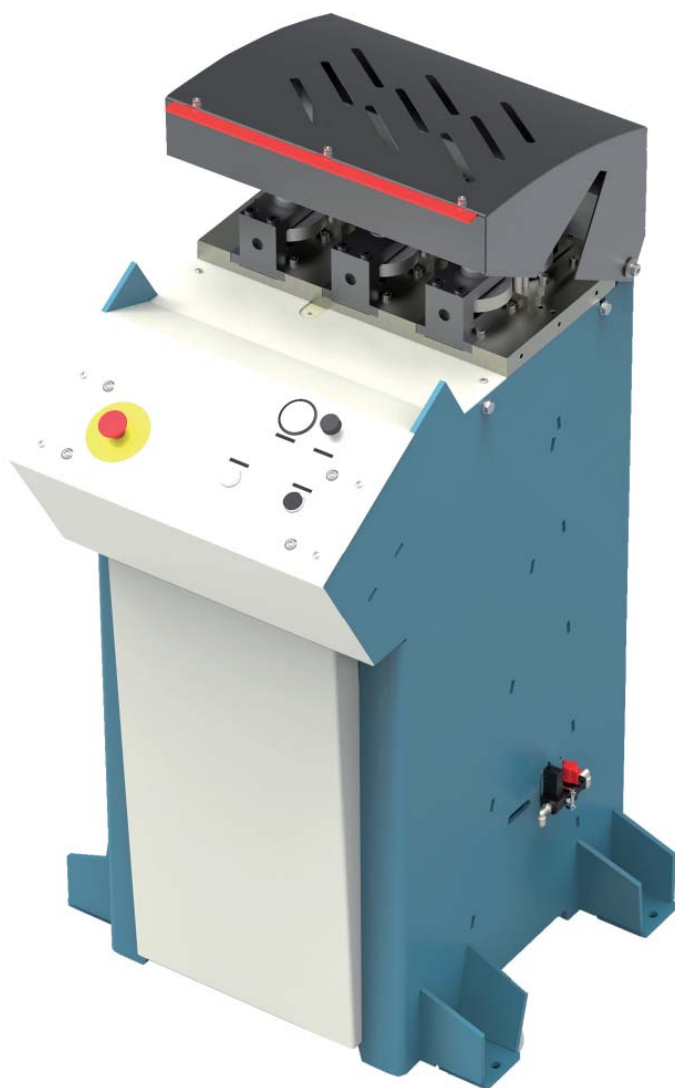
Thanks to user administration functions in CC, you can secure that only persons authorized can change settings, giving you control and repeatability of your heat treatment process according to your specifications and standards. There is also logging features available where you yourself can choose what data to include in the log.

You can easy export the recorded data to an USB stick and work with the data in an Excel sheet. All this together gives you a superior control of the whole heat treatment process at one location.



ALO 200666

Band feed system



This sturdy band feeder is designed to feed band in ALO 198ILT heat treatment line or in similar equipment. The feed units should be placed with one unit before hardening furnace, a second unit directly after hardening quench, and a third unit directly after last tempering furnace and quench.

Each drive unit have 6 wheel drive system with pneumatic band clamping complete with pressure gauge and regulator for adjustment of clamp pressure.

The clamping can be actuated by a push button that is located at an operator panel with a total of 5 push buttons and E-stop button.

A servo motor and gear are included but servo drive and parameterization of the drive are to be done by the customer and are not included in this offer.

The 200666-3 version of the feed units have additional push button for control of a standard ALO "flying shear" unit that can be mounted directly to the feed stand for cutting of blades.

OPTIONS:

ALO 9817 Pneumatic shear:
9.1 the shear is stationary placed
9.2 the shear moves with the band, "flying shear"

MODELS:

200666: Band feed unit
200666-3: Band feed unit with control button for ALO "flying shear"

CAPACITY:

Band width: 12 - 80 mm
Band thickness: 0.9 - 1.6 mm

ALO 200844

Band feed system



The ALO 200844 is a twin feeding station that uses two separate 6 wheel feeding units. The feed units has separate motors and they run separate from each other.

It is designed to feed band in a hardening line with a twin tube tempering furnace where one feeds towards first muffle and the other is pulling out of the second. Also suitable for a straight twin tube hardening line using three units in line.

The clamping is actuated by push button that is located at an operator panel that also includes a jog and E-stop button.

The 200844-3 version of the feed units have additional push button for control of a standard ALO "flying shear" unit that can be mounted directly to the feed stand for cutting of blades.

Fully integratable into ALO Central Control.

Standard C-C dimension between bands is 345 mm, custom modifications on request.

OPTIONS:

ALO 9817 Pneumatic shear:
9.1 the shear is stationary placed
9.2 the shear moves with the band, "flying shear"

MODELS:

200844: Band feed unit
200844-3: Band feed unit with control button for ALO "flying shear"

CAPACITY:

Band width: 12 - 80 mm
Band thickness: 0.9 - 1.6 mm
Feed Speed: 0.8 - 5 m/min

NORMAC BS 35 / BS 45

Automatic grinding machine for band saw blades



BS 35



BS 45

EXCLUSIVE FEATURES OF THE BS35 AND BS45AUTOMATIC
BAND SAW GRINDING MACHINES

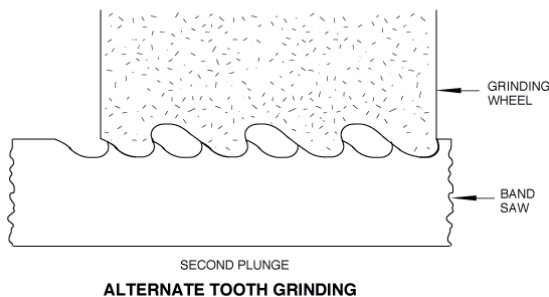
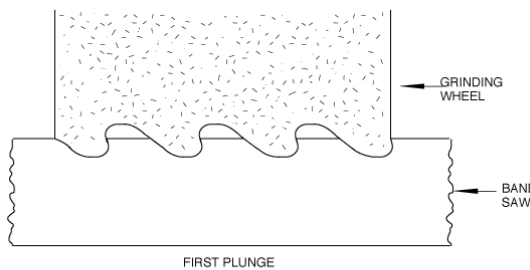
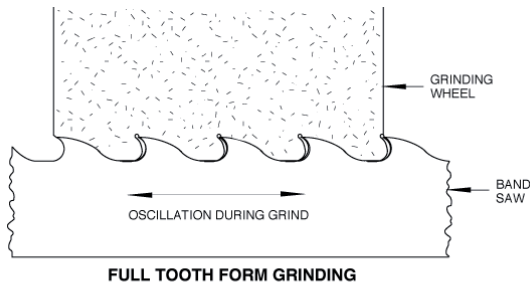
- FULLY AUTOMATIC OPERATION
- FULLY ENCLOSED GRINDING CHAMBER
- AUTOMATIC LUBRICATION
- HARDENED AND GROUND WHEEL AND DRESSER SLIDES
- PRECISION GRINDING SPINDLE
- HEAVY DUTY, COMPACT DESIGN



NORMAC, Inc. / Precision Grinding Machines

www.normac.com





NORMAC'S BAND SAW GRINDING MACHINES GREATLY IMPROVE THE QUALITY AND CONSISTENCY OF BAND SAW BLADE PRODUCTION

Both models can fully automatically grind straight or variable pitches from 1 to 32 TPI in one plunge with a band stock reciprocation, up to 10 degrees positive rake angle. Machines capable to grind band widths from 6 to 66 mm in a band stack up to 13 mm thickness.

The BS 35 model is equipped with an automatic diamond roll dressing system that is adjustable for depth of dress and for the number of grinding cycles between dressing operations. The machine also includes an automatic dress-in feature for automatically dressing tooth forms in new grinding wheels.

The BS45 is equipped with a 2 axis CNC dressing.

The Grind Vise Slides are mounted on extra precision Preloaded Linear Bearing Ways providing maximum rigidity and nearly frictionless motion on all Normac Band Saw Machines.

Precision Grinding Spindle Cartridge type, lubricated for life, driven by a 40 HP motor.

Fully Enclosed Grinding Chamber For a cleaner, quieter grinding environment.

Fully Automatic Lubrication Reduces parts wear and maintenance.

Automatic consumable burr plate system.

Production rate example:

- 3 tpi. band thickness 1.2 mm = 225 m / hr.
- 18 tpi. band thickness 0.9 mm = 225 m / hr.

TECHNICAL SPECIFICATION:

Band width:	6 - 66 mm	0,24 - 2,6"
Band stack thickness:	< 13 mm	< 0,51"
Pitch:	2 - 32 T.P.I.	
Vari. Pitch:	2 - 6 T.P.I. Up to 90 mm repeat patterns. 6 - 32 T.P.I. Up to 40 mm repeat patterns.	
Typical Cycle times:	3 T.P.I. - 18 sec. 10 T.P.I. - 24 sec.	
Materials:	Bi-metal or carbon steel, fully annealed or hardended.	
Accuracy:	Tooth height to within 0.002 mm in 100 mm band length.	
Weight:	4350 Kg	9,600 lbs
Electrical requirement:	230, 38, 415 & 60 or 575 V A.C. 50 or 60 Hz, 3 phase, 38 KW.	